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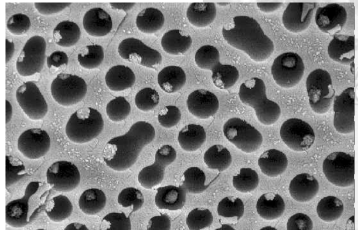
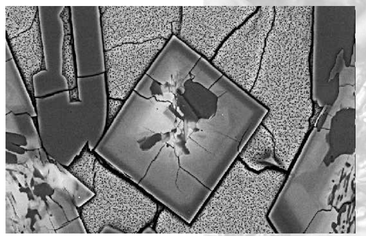
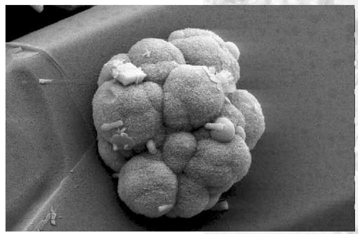
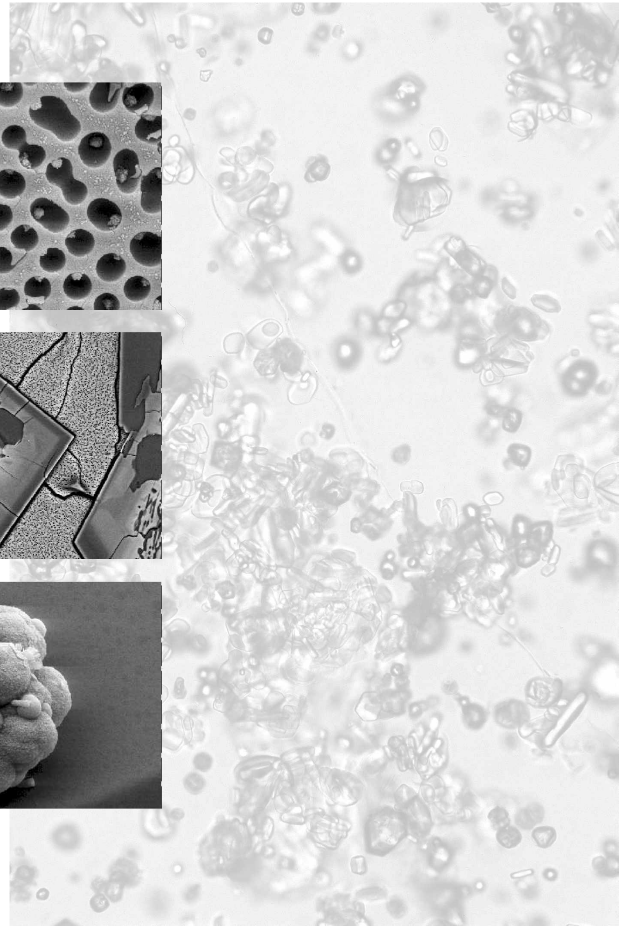
Fluids in Systems of Natural Rock Composition at Ultra-high Pressure Metamorphic Conditions: an Experimental Approach









Dissertation

zur Erlangung des Grades eines
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von der Fakultät für Geowissenschaften
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K. Annett Mönicke

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Contents

Abstract

The microstructures and the fluid distribution of crustal rocks as formed at pressures and temperatures typical of ultra-high pressure (UHP) metamorphism in nature was investigated through an extensive series of piston-cylinder experiments. Starting materials were natural rocks, which were crushed and ground to fine-grained powders, and different pre-defined amounts of water were added. Two experiments were performed using an uncrushed rock sample.

Run products were investigated by optical microscope and by scanning electron microscope (SEM). The chemical composition of crystalline phases and glasses was analyzed by electron microprobe (EMP). The amount of water dissolved in the glasses was estimated by the difference of the total EMP analysis to 100 wt.%. The fluid fraction was quantified from SEM images by using digital imaging software and image analysis software.

The runs are classified according to their pressure-temperature-time (P-T-t) paths, which differ in the timing of the initial pressure and temperature rise, maximum pressure and temperature, cooling rate, annealing time, and final temperature. The influence of P-T-t conditions, bulk water content, and rock composition on the phase assemblages and microfabrics was systematically explored. The experimentally formed fluids are characterized in terms of volume proportion, grain-scale distribution, and chemical composition. The present study is focused on the granitic system.

With a given set of conditions, a characteristic microfabric with a defined phase assemblage develops, which is preserved after quenching. When brought directly to run conditions, textural characteristics of the starting materials cannot be obliterated with the given low bulk water contents within experimental time spans. In these runs, new phases preferably grow in situ where pre-existing phases break down. Most of the runs performed are crystallization experiments, in which the samples are at first largely homogenized at high temperature. With cooling, crystalline phases grow freely within the fluid phase in these runs, thus attaining their characteristic habit. The crystals are predominantly bounded by crystallographically controlled interfaces of low Miller indices. With slow cooling, microstructural equilibrium is achieved at any given temperature.

The phase assemblages show a strong correlation with temperature and bulk water content. In the granitic system with a bulk water content of 2.8 wt.%, some quartz occurs at 2.5 GPa / 1000 °C, together with garnet, zircon, kyanite, rutile, and a fluid phase. K-feldspar crystallizes with annealing, and the fraction of quartz increases at the expense of the fluid. A rise in pressure to 3.5 GPa adds clinopyroxene to the phase assemblage and, as a function of time, quartz is transformed to coesite. At

3.5 GPa, phengite and apatite crystallize below 800 °C, and K-feldspar is transformed to K-feldspar hydrate at 700 °C. With continued annealing, the cores of clinopyroxene crystals become decomposed and replaced by phengite, coesite, and titanite. Further cooling to room temperature only changes the total amount of the crystalline phases.

With no water added to the sample powder, K-feldspar hydrate does not occur, as obviously the water activity is not high enough for the hydrate to crystallize. With high bulk water contents, feldspar, garnet, and zircon are absent, and a large volume proportion of fluid co-occurs with coesite, clinopyroxene, phengite, and apatite.

With quenching, the fluid topology as developed at run conditions does not appear to change. A large amount of fluid is contained in polygonal interstices of complex shape, which is constrained by the mineral species, the size, and the habit of the adjoining crystals. The fluid appears to form a three-dimensional network, which is uniform at the scale of the whole specimen but heterogeneous at grain-scale.

Fluids of different properties are formed as a function of pressure and temperature. At 3.5 GPa / 1000 to 800 °C, the fluid phase is quenched to form large amounts of a homogeneous silicic glass. Between 750 and 650 °C, the quenched glasses are vesiculated, owing to exsolution of an aqueous fluid during quenching. The material dissolved in this aqueous fluid is precipitated within the bubble cavities. Comparable, but much larger, precipitates co-occur with small beads of silicic glass within some of the interstices. At 3.5 GPa / 600 °C, the interstices in between the crystals are only partially filled with lumps of vesicular glass and accumulations of silicic beads, while large cavities contain characteristic precipitates rich in potassium and fluorine. At room temperature, the polygonal interstices are void except for material that has precipitated from a vapour-like fluid phase. The fluid fraction decreases from about 50 vol.% at 900 °C to 10-17 vol.% at 700 °C in the granitic composition. In other rock compositions investigated, the same overall features were observed.

The amount of water dissolved in the glasses increases with decreasing temperature. The fluid phase was found to become depleted or enriched in individual elements relative to the bulk composition of the starting material, correlated with the growth or breakdown of certain crystalline phases. In the granitic system, the fluid develops from alkaligranitic to alkalisyenitic and finally to foyaitic compositions.

The effects of various experimental parameters on variations of microfabrics and phase assemblage are discussed, which may render the run products difficult to interpret. Implications on the properties of fluids at run conditions and the fluid behaviour upon quenching are made, integrating the results of previous studies.

Glossary of abbreviations

Phases

Ab	albite
Ap	apatite
Arg	aragonite
Coe	coesite
Cpx	clinopyroxene
Bt	biotite
Dmd	diamond
f	fluid phase (general)
fL	fluid phase, quenched to glass
fL+b	fluid phase, quenched to vesiculated glass
fV	fluid phase, quenched to globules of glass and ‘salt’ precipitates
Grt	garnet
Jd	jadeite
KfH	K-feldspar hydrate
Kfs	K-feldspar
Ky	kyanite
Ms	muscovite
Mz	monazite
Phe	phengite
Py	pyrite
Qtz	quartz
Rt	rutile
See	scheelite
Ttn	titanite
Zrn	zircon

General

P	pressure
UHP	ultra-high pressure
T	temperature
t	time
sec	second(s)
min	minute(s)
h	hour(s)
d	day(s)
vol.%	volume per cent
wt.%	weight per cent
EMP	electron microprobe
SEM	scanning electron microscope
BSE	backscattered electron mode
SE	secondary electron mode

CHAPTER 1

Introduction

Ultra-high pressure (UHP) metamorphic rocks have equilibrated within the stability field of coesite (Schreyer, 1995; Carswell and Zhang, 1999) at pressures and temperatures that prevail in depths exceeding 100 km. Only since coesite was first described from metasediments of the Western Alps by Chopin (1984), the possibility that rocks exposed at the Earth's surface were formerly buried to deep crustal levels has been taken into consideration. Discovery of many other occurrences of coesite- and even diamond-bearing assemblages in the last two decades (Coleman and Wang, 1995; Ernst and Liou, 1999) has led to a reappraisal of the role of crustal material in geodynamic processes. Experimental studies on phase relations and stability fields of high pressure minerals (Harley and Carswell, 1990; Massonne, 1995, 1999; and references therein) have resulted in a refined calibration of eclogite-facies metamorphic processes (Carswell, 1990) at depths greater than the quartz-coesite transition (Bohlen and Boettcher, 1982).

UHP metamorphic rocks record the subduction and exhumation history of crustal slices in subduction and collision zones (Harley and Carswell, 1995). The Late Eocene age assigned to the UHP metamorphism in the Western Alps indicates a very rapid exhumation of the rocks within a few million years with rates on the order of centimetres per year (Gebauer *et al*., 1997; Rubatto and Hermann, 2001). While in some UHP metamorphic areas a retrograde overprint has destroyed the microstructural record of UHP metamorphism apart from mineral relics included in garnet or zircon (Shatsky *et al*., 1995; Wang *et al*., 1995; Stöckhert and Renner, 1998), UHP microstructures in the Dora Maira Massif in the Western Alps are well preserved (Chopin *et al*., 1991; Schertl *et al*., 1991; Henry *et al*., 1993; Michard *et al*., 1995). The Brossasco metagranite, a striking example of essentially undeformed UHP metamorphic rocks, underwent UHP metamorphism and the ascent to the surface without losing its igneous texture (Biino and Compagnoni, 1992). Even where transformed to augen gneiss or mylonite, quartz microstructures indicate deformation only in a late stage at greenschist-facies conditions (Stöckhert and Renner, 1998).

The lack of high strain fabrics led to the conclusion that deformation at UHP metamorphic conditions must be confined to weak shear zones (Stöckhert and Renner, 1998). These have not yet been identified in nature owing to a likely overprint by post-UHP reactivation and retrogression (Henry *et al*., 1993; Michard *et al*., 1995). The localization of deformation into shear zones is considered to be a consequence of strain softening. Flow laws for dislocation creep of coesite (Renner, 1996; Renner *et al*., 2001) and aragonite (Rybacki, 1995; Rybacki *et al.*, 2003), extrapolated to natural strain rates, indicate a strength of crustal material at UHP metamorphic conditions of a few MPa. The strength of eclogite may be somewhat higher, but, as concluded from the flow law for jadeite (Orzol, 2002), considerably lower than inferred by earlier studies (Jin *et al*., 2001).

It was proposed (e.g. Stöckhert and Renner, 1998) that the low strength of crustal rocks could be caused by fluids, be it aqueous solutions or hydrous melts (see Chapter 2). Interpreting the fabrics of crustal rocks wetted by interstitial fluids in terms of their rheology relies largely on experimental studies (Rutter, 1997; and references therein). The presence of a fluid allows for diffusive mass transfer by dissolution-precipitation creep or pressure solution (Durney, 1972; Rutter, 1983) involving dissolution at loaded grain contacts, transport through the pore fluid, and precipitation at sites of low normal stress. The wetting of grain boundaries by a fluid phase facilitates grain boundary sliding and enables granular flow, which is accommodated by solution and precipitation (Paterson, 1995, 2001a). In the presence of a fluid phase, even brittle deformation by grain-scale fracturing is possible at higher temperatures where plastic deformation and viscous flow by dislocation or diffusion creep would normally occur (Dell' Angelo and Tullis, 1988; Stöckhert and Renner, 1998).

However, the deformation mechanisms that are active at UHP metamorphic conditions are not well constrained. As the grain-scale distribution of fluid (see Chapter 3) governs the physical properties of rocks in terms of permeability, viscosity, and diffusivity (Laporte and Provost, 2000), the expected effects on deformation depend on the amount and distribution of the fluid, as well as on the grain size and the solid phase assemblage of the rock (Cooper and Kohlstedt, 1986; Dell'Angelo and Tullis, 1988). Therefore, characterization of the fluid topology is crucial for the understanding of strain localization in deep crustal levels. Whereas numerous studies on monomineralic or simple synthetic rock analogues have been performed at moderate temperatures and pressures (see Chapter 3), no experimental data on the fluid topology of crustal rocks at conditions of UHP metamorphism are available yet.

Also little is known about the properties of fluids in crustal rocks at UHP metamorphic conditions. Critical curves for some silicate - water systems have been experimentally determined (Shen and Keppler, 1997; Bureau and Keppler, 1999) and the second critical end points, in which a hydrous melt becomes indistinguishable from coexisting aqueous vapour in composition and properties have been derived from experiments on the systems silica - water and albite - water (Kennedy *et al*., 1962; Paillat *et al*., 1992). Comparable critical behaviour is supposed for the system granite - water (Schreyer, 1999) and other complex rock compositions in the presence of water at high pressure.

The experiments described herein were performed with natural bulk rock compositions at conditions of pressure and temperature characteristic of UHP metamorphism in nature (Chapter 4). The objective of the present study is to characterize the experimentally formed fluids in terms of volume proportion, grain-scale distribution, and chemical composition (Chapter 6). Microfabrics and phase assemblages that develop as a function of pressure, temperature, run time, water content, and bulk rock composition are investigated (Chapter 5). From the properties of the quenched fluids some tentative conclusions on the behaviour of crustal fluids at UHP metamorphic conditions in nature can be drawn (Chapter 8).

CHAPTER 2

Fluid-bearing systems

The term 'fluid' as conventionally used in Earth Sciences refers to aqueous solutions and water, both in the liquid and in the vapour state as well as to hydrous melts. Fluids in the Earth's crust enable mass transport and heat transfer, and promote magmatic processes and metamorphic reactions (Wickman and Rickard, 1981). Rheologically, their presence facilitates relative movements between rocks by reducing friction and may trigger earthquakes in subducting slabs by transient increase of pore pressure (Kirby *et al*., 1996). Fluid-rock interactions are the controlling factor in processes at convergent plate margins (Philippot and Rumble, 2000).

The study of hydrothermal reactions between minerals and fluids has commenced more than two centuries ago and has expanded ever since (see Eugster, 1986 for historical review). By applying the methods of chemistry and physics to rock formation and mineral deposition in nature, transport of non-volatile material by water vapour at high pressure and temperature was found to play an important role in these processes (Niggli, 1937; Morey, 1942). Water, recognized as the most important volatile in magmas, strongly affects the properties of melts, and therefore segregation, migration, and crystallization (Johannes and Holtz, 1996).

Numerous experimental studies have worked out the phase relations of binary and ternary silicate - water systems and of the synthetic system granite - water (Tuttle and Bowen, 1958; Johannes and Holtz, 1996; and references therein). By extending the experimental scope to more complex compositions and by using natural rocks as starting material, the knowledge of melting reactions and crystallization sequences, especially of granitic rocks, has been increased enormously (see Wyllie, 1983 for review).

This chapter deals with some of the fundamentals of physical geochemistry and gives definitions of the terms used in the present study. A brief review of previous experimental studies on water - silicate systems is given.

2.1 Terms and definitions

Solidus - liquidus. In two-dimensional sections through a three-dimensional pressure-temperature-composition diagram the solidus surface is a curve delimiting the stability field of crystalline phases from the field in which crystals coexist with a liquid phase, either in the presence or absence of vapour. The solidus thus defines the beginning of melting. The liquidus defines the boundary between the field of crystalline phases coexisting with a liquid and the stability field of liquid only, vapour being either present or not. The liquidus phase is the first phase that crystallizes from the liquid at a given set of conditions (Smith, 1963; Wyllie, 1983; Johannes and Holtz, 1996).

Liquid - gas - vapour - fluid. Liquid and gas are defined as disordered states of matter. Whereas liquids are characterized by a relatively high density with mutual interactions between the particles, in the gaseous state all substances form a single phase with a relatively low density. While a vapour of a pure substance means a gas below the critical temperature, a saturated vapour is defined as a gas in equilibrium with the pure solid or liquid (Smith, 1963). For binary or more complex systems, the term vapour becomes indeterminate or arbitrary (Morey, 1957).

In the present study, the term fluid is used to describe the non-crystalline phases. With regard to chemical composition and properties, which are predominantly inferred from the behaviour upon quenching, a differentiation will be made between a water-rich vapour-like fluid and a liquid-like fluid corresponding to a silicate melt.

Binary volatile - refractory systems. For one-component systems like pure water, the phase diagram in a pressure-temperature plane is relatively simple. The three monovariant sublimation, melting, and boiling curves meet in the invariant triple point. Along the boiling or vapour-pressure curve, liquid and vapour merge continuously into each other by decreasing the density of the liquid and increasing that of the vapour. At the invariant critical point, both states of matter are indistinguishable. For reasons of symmetry it is expected that the melting curve will not end in a critical point and, actually, even at highest pressure such a point was not yet determined (Möbius and Dürselen, 1985).

In binary systems composed of a volatile ‘V’, as water, and a second, more refractory component ‘R’, the melting points of the two components are widely separated. If there is no miscibility in the crystalline state, i.e. no binary compounds form, and if there is no liquid immiscibility, two contrasting cases have to be considered (Niggli, 1937; Ricci, 1951; Smith, 1963). The first case is characterized by a steady increase in solubility of the refractory component ‘R’ in the volatile ‘V’ with increasing temperature (Figure 1A). The system water - sodium chloride is one example of this type, where a continuum of compositions between pure water and molten sodium chloride exists (Morey, 1957; Sourirajan and Kennedy, 1962).

In the second case the solubility curve intersects the critical curve (Figure 1B). Along the monovariant solubility curve linking the eutectic with the triple point of the pure component ‘R’, crystalline ‘R’ coexists with liquid and vapour. At the eutectic, both crystalline phases ‘V’ and ‘R’ are in equilibrium with the eutectic liquid and vapour. The solubility of the refractory component ‘R’ in liquid ‘V’ decreases rapidly as the critical temperature of the volatile ‘V’ is approached, and the solubility of ‘R’ in vapour ‘V’ increases at the same time. Close to the critical point of pure ‘V’ liquid and gas become identical in composition and properties and a single fluid phase coexists with crystalline ‘R’ at the lower critical endpoint.

Adding of the volatile ‘V’ lowers the melting point of component ‘R’ and the pressure required to hold the volatile component in solution rises rapidly. The gas becomes increasingly dense and dissolves an increasing amount of component ‘R’ until liquid and gas become identical in the upper or second critical end point. The critical curve is thus cut into two segments, each rising from the critical point of the pure component and ending in a critical end point. Between the temperatures of the two critical end points, liquid cannot coexist in equilibrium with vapour at any pressure, and the solubility of component 'R' in the fluid is a function of temperature (Morey, 1957). The system water - silica is of this type (Morey, 1942; Kennedy *et al*., 1962).

Limited miscibility. The picture becomes more complex if there is only limited miscibility in the liquid state. Immiscibility

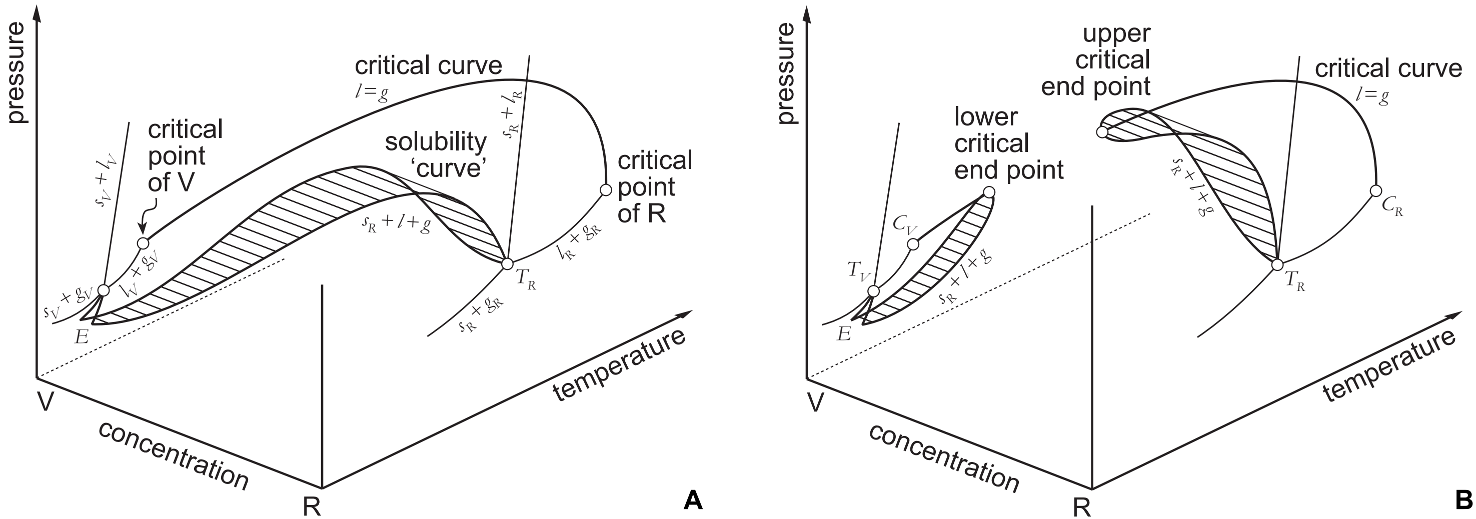


Figure 1: Theoretical, three dimensional phase diagrams for binary systems composed of a volatile component 'V' and a more refractory component 'R' with no miscibility in the crystalline and complete miscibility in the liquid state. In (A) the solubility of the refractory component 'R' in the volatile 'V' continuously increases with increasing temperature. Along the solubility 'curve', which links the eutectic 'E' with the triple points 'T' of the pure components, crystalline 'R' coexists with liquid and vapour. At the eutectic, both crystalline phases 'V' and 'R' are in equilibrium with the eutectic liquid and vapour. Along the critical curve, vapour and liquid are indistinguishable. In (B) the solubility 'curve' intersects the critical curve, which now ends in two critical end points. Between the temperatures of the lower and the upper critical end point, liquid cannot coexist in equilibrium with vapour at any pressure, and the solubility of component 'R' in the fluid is a function of temperature.

has been encountered in melts of silica and in many other oxides (Greig, 1927a, b; Tuttle and Friedman, 1948). In addition, in volatile - refractory systems the miscibility gap may be submerged by the critical and melting relations. Usually, a liquid miscibility gap becomes smaller with increasing temperature. At the upper critical solution or consolute temperature, the two branches of the liquid saturation curves become coincident and have zero slopes. This is the consolute point of the miscibility gap. The liquid - liquid consolute temperature and composition as a function of pressure gives a monovariant curve, somewhat like the critical curve, where liquid and gas phase become indistinguishable (Smith, 1963). If the solubility curve intersects the critical curve, the miscibility gap will gape above the critical curve and the phase relations will be similar to the case described above. Then, fluids would occur only with certain compositions (Niggli, 1937).

2.2 Silicate - water systems

The system silica - water has been investigated for long and its phase relations are thougth to be well understood. The compositions of the fluids that coexist along the lower and upper three phase region have been determined experimentally (Morey and Hesselgesser, 1951; Kennedy *et al*., 1962), and the upper critical end point was found at 970 MPa / 1080 °C. More recent studies, however, imply that this latter result can not be reproduced (Manning, 1994), and suggest a consolute point of the miscibility gap between aqueous vapour and hydrous silica melt at 1.5 GPa / 810 °C (Maresch *et al*., 2002). If this monovariant point, which lies on a critical curve that ends in the upper critical end point, is correctly determined, the phase relations as found by Kennedy *et al*., (1962) cannot be valid.

A far larger number of studies have been devoted to the system albite - water (Goranson, 1938; Burnham and Jahns, 1962; Kadik and Lebedev, 1968; Day and Fenn, 1982; Behrens, 1995). The upper critical end point for this binary system, which has been inferred from fluid behaviour upon quenching and experimentally derived solubility data, is determined to near 1.5 GPa / 670 °C (Paillat *et al*., 1992). By using a diamond anvil cell, complete miscibility between hydrous albite melt and water that contained dissolved albite was for the first time made visible in situ by Shen and Keppler (1997). Corresponding critical curves were determined by Bureau and Keppler (1999) for nepheline, jadeite, and two synthetic granite compositions. Instead of coexistence of a hydrous silicate melt and an aqueous vapor containing dissolved material, the results of Bureau and Keppler (1999) suggest the presence of a supercritical fluid at high pressures within many water-bearing silicate systems. Hence, the water-saturated solidus is no longer defined at these conditions, and the solid silicates become gradually dissolved in the fluid with rising temperature.

Schreyer (1999) tentatively extrapolated the critical curve for haplogranite of Bureau and Keppler (1999) towards the wet solidus of alkali granite as drawn by Huang and Wyllie (1975), inferred a likely position of a “kind of second critical end point” at 2.6 GPa / 670 °C, and stated that the system granite - water would behave supercritical. In the system trondhjemite - water, however, Adam *et al*. (1997) have convincingly demonstrated the coexistence of silicate melt and aqueous vapour at conditions of 2.0 GPa / 900 °C.

2.3 Water solubility in silicate melt

Numerous studies have been carried out in order to determine water solubility in silicate melts as a function of pressure, temperature, and chemical composition. However, there is no general agreement on their interpretation (Dingwell *et al.*, 1984), and experimental data and thermodynamic as well as structural models are as yet contradictory or inadequate (McMillan and Holloway, 1987; and references therein).

Generally, the methods used to determine water solubility can effect the obtained results significantly (McMillan and Holloway, 1987). All solubility data are derived from indirect observations, as they rely on the interpretation of quench products and the analysis of quenched glasses. The analytical techniques require that the water content in the quenched glass is the same as in the melt at run conditions and that no inclusions or vesicles from a coexisting vapour phase are trapped. The determined water contents may depend on whether crystals, gels, or glasses are used as starting material and on the grain size (Tuttle and Bowen, 1958; Behrens, 1995). Major effects also result from experimental procedure, especially if quenching is not isobaric. Methods used for determining water solubilities include phase equilibrium techniques, weigth loss, bulk analysis, manometric techniques, and ion beam spectrometry (Dingwell *et al.*, 1984; McMillan and Holloway, 1987).

Pressure is the most important parameter that controls the water solubility (Johannes and Holtz, 1996). Since the study of Goranson (1931) it is known that water solubility in a silicate melt increases with increasing pressure, but there are considerable discrepancies in the pressure dependence of water solubility (Behrens, 1995). Water solubility is greater in silica-rich melts than in silica-poor ones at comparable pressure (Wallace and Anderson, 2000).

Compared to the effect of pressure, the effect of temperature on the water solubility of silicate melts is only small. It has been found that water solubility at low pressure is retrograde, i.e. decreases with increasing temperature. At higher pressure, the solubility increases with increasing temperature and is thus prograde (Paillat *et al.*, 1992). The temperature dependence of water solubility is expressed by the behaviour of a silicate melt upon isobaric quenching. If the solubility is retrograde, a melt becomes undersaturated and bubbles cannot exsolve. In contrast, if the solubility is prograde, the solubility of water in the melt decreases with falling temperature at a given pressure and the melt becomes oversaturated. Upon isobaric quenching, bubbles are formed by exsolution of an aqueous vapour (Paillat *et al.*, 1992).

CHAPTER 3

Fluid distribution at grain-scale

The grain-scale distribution of fluid is a controlling factor of many physical properties of partially molten rocks, as electrical conductivity, permeability, and seismic velocity (Toramaru and Fujii, 1986). It affects the rheology of rocks through its significant influence on the mechanical strength. The connectivity of fluid governs the bulk transport potential and is crucial for melt segregation and migration processes.

Numerous experimental and theoretical studies have pointed out the role of fluid distribution and pore geometry for partially molten rocks in the crust and the upper mantle. This chapter briefly summarizes the theory of textural equilibrium in polycrystalline aggregates and gives an overview of the characteristics of grain-scale distribution of fluids as observed in static experiments in systems of geological relevance.

3.1 Textural equilibrium in polycrystalline aggregates

The fundamentals of polycrystalline microstructures and the concept of textural equilibrium was comprehensively reviewed by Smith (1964). A polycrystalline system is a three-dimensional space-filling packing of polyhedral grains that are in contact along crystal interfaces. Grain boundaries meet in groups of three along grain edges and in groups of four in grain corners or vertexes. Other configurations have been shown to be unstable or metastable (e.g. Bulau *et al*., 1979). At a given set of conditions, the system reduces its total interfacial energy, e.g. by interface rotation, re-arrangement of grains, interparticle welding, and grain growth (Faul, 2000; Laporte and Provost, 2000). In a partially molten system, the development of textural equilibrium involves a combination of solution-precipitation processes and diffusional transport through the fluid. The equilibrium grain-scale fluid geometry approaches a state of minimum interfacial energy per unit volume (Laporte and Watson, 1995).

Interfacial free energy. The evolution of any system depends on the Gibbs free energy. In a system composed of two phases at thermodynamic equilibrium separated by an interface, atoms far from the interface experience an uniform environment. Atoms close to the interface have certain bonds across the interface and therefore take slightly different equilibrium positions than the bulk phase (Laporte and Provost, 2000). Thus, the Gibbs free energy per unit volume close to the interface is influenced by positive perturbations that depend on the distance from the interface.

When both phases are disordered, interfacial free energy is isotropic and depends only on temperature, pressure, and composition. When one phase is crystalline, interfacial energy is anisotropic and depends additionally on the orientation of the interface relative to the crystal lattice. The energetic balance of a polyphase system includes the interfacial energies, so that the shape and size of the interfaces has an effect on the thermodynamic equilibrium.

Dihedral angle. In an isotropic, one-phase polycrystalline system in equilibrium, grains must join in groups of three at mutual angles of 120 °. When a fluid phase is introduced in such a system, the contact angle will be changed from 120 ° to some other value, which depends on the free energy of the interface between the fluid and the solid phase relative to the free energy of the interface between two crystals of the solid (Smith, 1964). This angle is termed the dihedral angle, defined in the plane normal to the line junction of the two adjoining crystals in equilibrium with the fluid phase (Figure 2). The dihedral angle is crucial for characterization of the fluid geometry in polycrystalline aggregates. A general problem, however, is to obtain the true dihedral angle inasmuch as any angle may be encountered in the two-dimensional section that cuts randomly across real intersection angles. A statistical method introduced by Harker and Parker (1945) compares the frequencies of apparent angles measured in a sample and an ideal frequency curve computed from likely angles that are theoretically predicted from an ideal, three-dimensional network of grain edges (Jurewicz and Jurewicz, 1986). Using this method, dihedral angles have been measured in polyphase, anisotropic crystalline aggregates, too.

Interconnection threshold. If the fluid is considered to fill tetrahedron-shaped pockets at grain corners, the length of the 'dry' grain edge between two of these pockets will decrease with increasing size of the pockets, i.e. with increasing volume fraction of fluid. For a critical fluid fraction, this length will be zero and pockets will become interconnected. There is a relationship between this interconnection threshold and the dihedral angle (see von Bargen and Waff, 1986). For any case of the dihedral angle being larger than, or equal to 60 °, the critical fluid fraction can be approximated from the volume of a spherical tetrahedron representing the fluid-filled pocket and the distance from the centre of such tetrahedron to one apex. The critical fluid fraction increases rapidly from 0.6 vol.% at a dihedral angle of 60 ° to 27.8 vol.% at an angle of 180 ° (Bulau *et al.*, 1979; von Bargen and Waff, 1986). The theoretically estimated critical volume fractions for fluids of geological relevance are in good agreement with the experimentally derived values (see

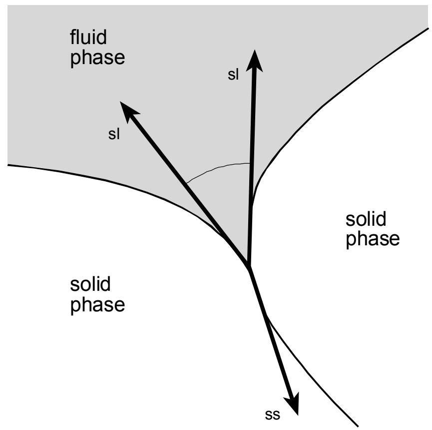


Figure 2: The dihedral angle is defined in the plane normal to the line junction of two adjoining crystals in equilibrium with a fluid phase. It depends on the ratio of the interfacial free energy of the solid - fluid interface ($_{sl}$) and the interfacial free energy of the grain boundary between the two crystals ($_{ss}$). After Holness (1997).

Laporte *et al*., 1997 for review). The interconnection threshold has been measured through interdiffusion experiments (Watson, 1991; Minarik and Watson, 1995).

3.2 Equilibrium fluid distribution in idealized polycrystalline aggregates

An idealized system is defined as monomineralic, having isotropic grain boundary and interfacial energies, and being under hydrostatic stress. Such simplified systems allow for quantification of certain aspects of fluid distribution.

In the idealized case, the equilibrium fluid distribution is homogeneous at the grain-scale, in that it is identical along each grain edge or each corner. At large fluid fractions, i.e. more than 10 vol.%, fluid distribution and interconnectivity is a function of grain size and fluid fraction. With decreasing fluid fractions, permeability becomes increasingly sensitive to grain-scale geometry of fluid distribution and, hence, to the crystalline phase assemblage.

For ideal isotropic systems, a constant ratio of grain boundary energy to solid - fluid interfacial free energy, which is expressed by the dihedral angle, and the fluid fraction are needed to constrain the fluid geometry (Faul, 2000). The equilibrium fluid distribution is characterized by a constant mean curvature of the crystal - fluid interfaces (Laporte and Watson, 1995). The dihedral angle is linked to the angle at the point junction of fluid with three adjoining crystals, i.e. the tip angle of a fluid-filled pocket. However, for dihedral angles lower than 60 °, the tip angle cannot be defined and a closed pocket does not exist. In the case of low dihedral angles, fluid therefore is distributed in channels along the grain edges (Figure 3A). For dihedral angles larger than 60 °, fluid occurs at the junction of four grains in pockets that have the equilibrium shape of a spherical tetrahedron. With increasing dihedral angle the equilibrium shape of the fluid-filled pockets evolves from a concave geometry with a high surface area-to-volume ratio to a convex geometry with a low surface area-to-volume ratio (Figures 3B to D). Consequently, two fundamentally different fluid geometries will develop in isotropic, polycrystalline aggregates at low fluid fractions (Laporte *et al*., 1997; Laporte and Provost, 2000). For low dihedral angles the fluid forms a continuous network of grain-edge channels and interconnectivity is theoretically established for an infinitely small fluid fraction (Figure 4A), whereas for large dihedral angles fluid is trapped in isolated pockets at grain corners (Figure 4B). Albeit of the simplicity of this qualitative approach, few quantitative solutions have been put forward because the complexity of fluid channels at equilibrium conditions can hardly be described by simple geometric models (von Bargen and Waff, 1986)

3.3 Equilibrium fluid distribution in rocks

Deviations from the idealized model arise because rocks are complex multicomponent systems with variable grain size, and are characterized by anisotropic interfacial free energies, which is evident from the occurrence of crystallographically controlled planar interfaces (Cooper and Kohlstedt, 1982; Waff and Faul, 1992). The fluid distribution is therefore heterogeneous at the scale of a few grains. The local equilibrium configuration varies from one grain edge or corner to the other as a function of the mineral species in contact and the orientation of the crystal lattice (Laporte and Watson, 1995). Dry and wetted grain edges may co-occur in the same system and the size and shape of melt channels may vary between individual grains (Toramaru and Fujii, 1986; Brenan, 1993). Even at low fluid fractions a significant proportion of fluid resides in interstices bounded by more than three grains or in films and thin layers (Cmíral *et al*., 1998). Consequently, a progressive development of permeability is likely rather than a sudden establishment of an interconnected network at a critical fluid volume (Laporte and Provost, 2000).

Mantle rock compositions. Aggregates of olivine with a few percent of basaltic melt have been used for experiments in order to approximate the partially molten upper mantle peridotite (Cmíral *et al*., 1998). Based on measurements of dihedral angles in this system, which were found to be lower than 60 °, fluids in the partially molten upper mantle were considered to be distributed along an interconnected network of grain-edge channels or three-grain junction tubules (Waff and Bulau, 1979; Fujii *et al*., 1986; Toramaru and Fujii, 1986; von Bargen and Waff, 1988; Riley and Kohlstedt, 1991).

However, the complex fluid geometry observed reveals significant deviations from the fluid distribution predicted by the

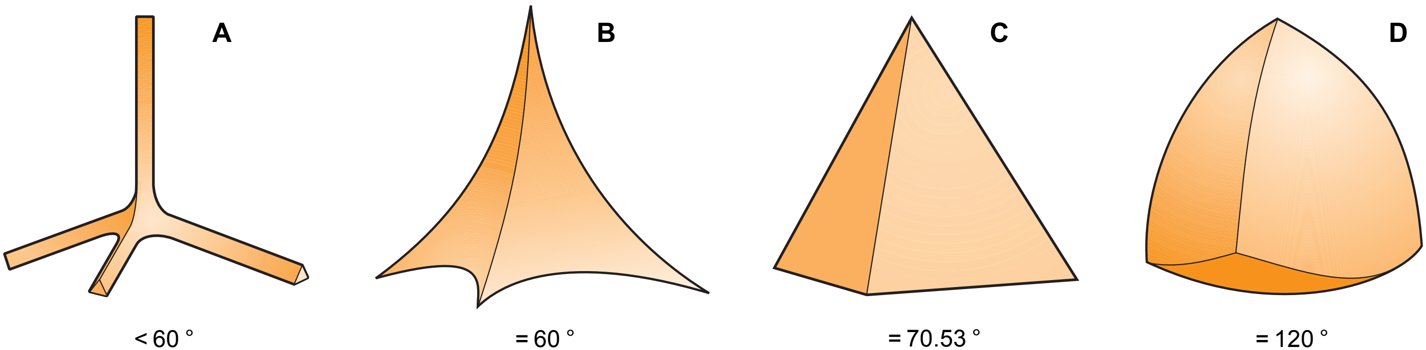


Figure 3: Fluid geometries as they will develop at the junction of four grains in idealized, isotropic systems. For dihedral angles lower than 60 °, fluid is distributed in channels along grain edges (A). For dihedral angles larger than 60 °, fluid occurs in tetrahedron-shaped pockets. With increasing dihedral angle the equilibrium shape of the fluid-filled pockets evolves from a concave geometry with a high surface area-to-volume ratio (B) to a convex geometry with a low surface area-to-volume ratio (D). In the special case the dihedral angle equals 70.53 °, the equilibrium shape is a regular tetrahedron (C). After Laporte and Provost (2000).

isotropic equilibrium model (Faul, 2000). Anisotropic interfacial energies will cause an anisotropic wetting behaviour (Cooper and Kohlstedt, 1982). Crystal faces on olivine are found to be planar instead of curved (Waff and Faul, 1992; Cmíral *et al*., 1998; Jung and Waff, 1998), and to be controlled by the crystallographic structure rather than by the surface area minimization. Even at very low fractions melt occurs in disc-shaped inclusions (Faul *et al*., 1994; Faul, 1997), and is distributed as films and thin layers upon crystal interfaces. Dihedral angles have been shown to be overestimated and to give only a rough indication of the wetting behaviour if interfacial energy distribution is anisotropic (Cmíral *et al*., 1998).

Continental crust rock compositions. Numerous studies have been performed in order to characterize the distribution of a partial melt in the quartz - feldspar system, which approximates granitic rocks, and in carbonatic systems (Hay and Evans, 1988; Holness and Graham, 1991; Laporte and Watson, 1991; Holness, 1995; Wark and Watson, 1998; Gleason *et al*., 1999; Lupulescu and Watson, 1999). Dihedral angles are strongly dependent on pressure, temperature, and fluid composition (Watson and Brenan, 1987; Lee *et al*., 1991; Holness, 1993). Although dihedral angles for silicic melts in contact to quartz and feldspar crystals were found to be lower than 60 ° (see Laporte *et al*., 1997; Laporte and Provost, 2000), a large melt fraction remains in separated large pools and a small volume is distributed along grain edge intersections (Jurewicz and Watson, 1984, 1985). The textural relationship of quartz with a hydrous granitic melt is characterized by the coexistence of planar and smoothly curved interfaces (Laporte, 1994). By contrast, a pronounced surface anisotropy is a general characteristic of most other phases in granitic compositions such as plagioclase, pyroxene, amphibole, garnet, and mica (Laporte and Watson, 1995), as revealed by planar, crystallographically controlled crystal interfaces. For these minerals the interface tends to adopt the orientation of crystallographic planes of low Miller indices in order to minimize interfacial energy per unit area (Laporte and Provost, 2000).

Low median dihedral angles for quartz in equilibrium with hydrous granitic melt imply that fluid interconnection will be

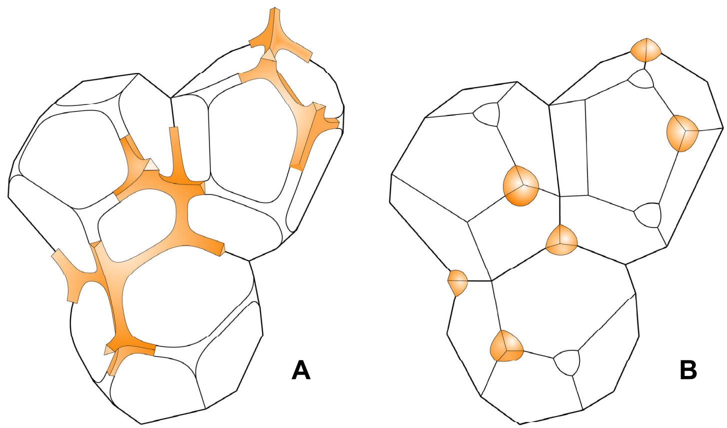


Figure 4: Intergranular fluid topology at low fluid fractions in idealized, isotropic polycrystalline aggregates. For low dihedral angles fluid forms a interconnected network of grain-edge channels (A), whereas for large dihedral angles fluid is trapped in isolated pockets at grain corners (B). Modified after Laporte and Provost (2000).

established at the onset of melting in crustal rocks of corresponding composition. Melt interconnectivity was shown to pertain at melt fractions down to 0.04 vol.% by Laporte *et al*. (1997). In crustal rocks that contain large modal fraction of phases such as mica, plagioclase, and amphibole, fluid interconnectivity will presumably not be establish at all at comparable low melt fractions owing to the effects of surface anisotropy (Laporte and Provost, 2000).

Effect of differential stresses. Many deformation experiments were carried out in order to investigate the effect of interstitial fluids on the creep behaviour of partially molten rocks (Cooper and Kohlstedt, 1984; Dell'Angelo and Tullis, 1988; Hirth and Kohlstedt, 1995a, 1995b; Rutter and Neumann, 1995; Daines and Kohlstedt, 1997; Zimmermann *et al*., 1999). Even at very low fluid fractions the creep rate is enhanced by more than an order of magnitude relative to fluid-free aggregates (Hirth and Kohlstedt, 1995b). The dominant deformation mechanisms at low fluid fractions are, depending on grain size, dislocation creep and melt-enhanced diffusion creep by dissolution and precipitation (Dell'Angelo and Tullis, 1988). Deformation of fine-grained partially molten rocks in the diffusion creep regime yields melt distributions that are not significantly different from those observed in rocks subjected only to hydrostatic conditions (Daines, 1997). With increasing differential stress, fluids will spread onto grain boundaries, thereby enhancing grain-boundary sliding accommodated by dissolution at sites of stress concentration (Jin *et al*., 1994).

Deformation experiments are performed at strain rates that are rapid as compared to natural tectonic processes (Stöckhert and Renner, 1998), and experimental results have to be extrapolated over several orders of magnitude in time (Paterson, 2001b). Thus, deformation mechanisms found to be active in laboratory experiments must not necessarily act in nature, and their application to natural rocks should be considered carefully.

CHAPTER 4

Materials and methods

4.1 Starting materials

All starting materials are pulverized natural rocks. Each experiment using a particular starting material is labelled by a corresponding letter and the run number: 'W' for the pyrope quartzite, 'G' for the granitic biotite-phengite gneiss, 'Q' for the biotite-phengite gneiss with 10 wt.% of pure quartz added, 'D' for the granodioritic garnet-mica gneiss, 'E' for the eclogite, 'B' for the phonolithic tephrite, and 'P' for the MOR basalt. In the following, the rocks used as starting material will be characterized by their metamorphic facies, phase assemblage, and microfabric. The chemical bulk rock compositions are listed in Table 1. Major and trace elements were analyzed by X-ray fluorescence (Philips Analytical PW 2404). The proportion of divalent iron was determined by potentiometric titration after Ungethüm, disregarding the iron sulfides. Water and carbon content was determined coulometrically, applying Karl-Fischer titration for water.

Pyrope quartzite. The fine-grained "pyrope quartzite", better referred to as a pyrope-kyanite-phengite fels (Figure 5), from the Coesite-bearing Unit of the Dora Maira Massif, Western Alps, Italy (Mineralogical Collection of Ruhr-Universität Bochum, sample number 20151) contains pyrope phenocrysts in a matrix of quartz (inverted from former coesite), phengite, kyanite, talc, jadeite, and minor zircon, rutile, and monazite (Chopin, 1984; Schertl *et al*., 1991; Chopin and Schertl, 1999; Compagnoni and Rolfo, 1999). The UHP metamorphism, dated as 35 Ma before present (Gebauer *et al*., 1997), attained peak conditions of 3.7 GPa / 800 °C (Schertl *et al*., 1991). While the assemblage kyanite - talc is characteristic of whiteschists, which are interpreted to have a sedimentary origin (Schreyer, 1977), the magnesium-rich composition of the pyrope quartzite lenses is considered to be caused by local metasomatic alteration of the granitoid protolith in the presence of fluids (Gebauer *et al*., 1997; Compagnoni and Rolfo, 1999).

Biotite-phengite gneiss. The biotite-phengite gneiss (Mineralogical Collection of Ruhr-Universität Bochum, sample number 17685) forms the country rock around lenses of the pyrope quartzite described above. The S-type granitic orthogneiss underwent the same late Alpine metamorphism as the pyrope quartzite with peak conditions of 3.6-4.2 GPa / 760-820 °C (Burchard, 1999). The fine-grained gneiss (Figure 6) is characterized by layers of quartz, albite, and K-feldspar alternating with layers of biotite, phengite, and few retrograde chlorite. The retrograde greenschist phase assemblage further comprises garnet, epidote, apatite, titanite, rutile, tourmaline, and zircon.

Table 1: Chemical bulk rock composition of starting materials.
Oxides and anions are given in weigth per cent, trace elements are given in parts per million.

	pyrope quartzite 'W'	biotite-phengite gneiss 'G'	garnet-mica gneiss 'D'	eclogite 'E'	phonolithic tephrite 'B'	MOR basalt 'P'
SiO_2	78.35	72.26	65.75	49.00	47.57	49.34
TiO_2	0.58	0.27	0.80	2.07	2.14	1.75
Al_2O_3	11.51	13.43	16.39	14.78	16.55	15.75
Fe_2O_3	0.00	0.63	1.39	7.22	5.45	2.40
FeO	0.55	1.36	4.32	5.47	2.87	7.66
MnO	0.00	0.04	0.07	0.19	0.20	0.18
MgO	5.37	0.28	2.16	5.66	4.31	7.13
CaO	0.25	0.87	1.33	8.96	9.23	11.35
Na_2O	0.00	3.15	2.66	3.79	4.80	2.85
K_2O	1.17	5.46	3.14	1.31	4.38	0.22
P_2O_5	0.11	0.13	0.04	0.22	0.57	0.16
total	97.89	97.88	98.05	98.67	98.07	98.79
CO_2	0.07	0.15	0.18	0.11	0.33	0.07
H_2O^+	0.85	0.69	1.25	0.70	0.62	0.39
H_2O^-	0.03	0.15	0.30	0.10	0.23	0.17
H_2O^{total}	0.88	0.84	1.55	0.80	0.85	0.56
total	98.84	98.87	99.78	99.58	99.25	99.42
S	0.001	0.000	0.000	0.012	0.157	0.061
F	0.020	0.090	0.066	0.046	0.089	0.017
Cl	0.000	0.000	0.005	0.006	0.157	0.021
O = S,F,Cl	0.009	0.038	0.029	0.027	0.151	0.042
total	98.83	98.83	99.75	99.58	99.10	99.378

Table 1 (continued)**:** Chemical bulk rock composition of starting materials.

	pyrope quartzite 'W'	biotite-phengite gneiss 'G'	garnet-mica gneiss 'D'	eclogite 'E'	phonolithic tephrite 'B'	MOR basalt 'P'
Rb	56	285	143	26	106	2
Cs	2	10	1	0	0	0
Sr	7	54	68	96	1574	133
Ba	11	227	399	152	1775	0
Co	0	58	14	50	23	47
Ni	0	1	35	66	26	109
Cu	0	4	8	81	31	62
Zn	1	54	83	102	80	83
Sn	5	7	4	2	1	2
Pb	3	34	2	4	12	4
Ga	11	21	20	20	20	19
Sb	0	0	1	5	4	6
Sc	8	3	13	45	17	40
Y	39	48	32	26	19	29
La	44	49	35	2	83	2
Ce	58	71	55	61	189	50
Pr	8	8	7	3	19	3
Nd	30	35	26	13	58	11
Sm	3	5	4	12	7	8
Gd	5	6	5	4	10	4
Cr	6	0	84	94	20	249
Zr	179	169	119	123	476	120
Hf	4	4	3	6	10	5
Th	17	52	10	1	6	0
U	2	7	1	0	5	0
V	19	11	88	310	230	287
Nb	20	17	16	13	135	2
W	2	26	1	1	1	1

Detailed information on petrographic features, mineral composition, metamorphic conditions, and the outcrop locality is given by Schertl *et al*. (1991), Tilton *et al*. (1991), and Burchard (1999).

Garnet-mica gneiss. The microdiamond-bearing garnet-mica gneiss (provided by B. Stöckhert, sample number St 6199) from the Gneiss-Eclogite Unit in the central part of the Erzgebirge (south-eastern Germany) has a granodioritic bulk composition. Millimetre-sized, irregularly shaped garnet phenocrysts are enclosed in a fine-grained matrix of quartz, plagioclase, K-feldspar, white mica, few biotite, zircon, and rutile (Figure 7). Diamond microcrystals recording metamorphism at conditions above 4 GPa and 900 to 1000 °C (Massonne, 1998) occur as inclusions in garnet and zircon (Massonne, 2001; Stöckhert *et al*., 2001).

Eclogite. The eclogite from the Sesia Zone, Western Alps, Italy (sample provided by D. Dorner and C. Trepmann) is composed of millimetre-sized, dark red phenocrysts of garnet in a deep green matrix of predominantly clinopyroxene and minor glaucophane, white mica, rutile, and quartz (Figure 8).

Phonolithic tephrite. The phonolithic tephrite, allegedly from Iceland (sample provided by F. Rummel), contains large, markedly zoned phenocrysts of titanaugite in a fine-grained

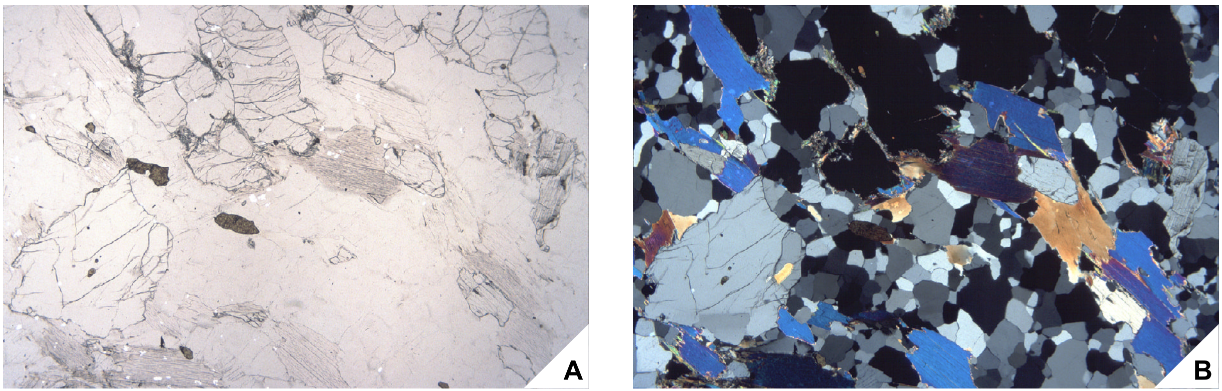


Figure 5: Optical micrographs of pyrope quartzite (pyrope-kyanite-phengite fels) from the Dora Maira Massif, Italy, in plane polarized light (A) and under crossed polars (B). Field of view is 7 mm wide. Pyrope (top), jadeite (bottom left), kyanite (right), and talc (blue interference colours) in a quartz matrix. Starting material ‘W’.

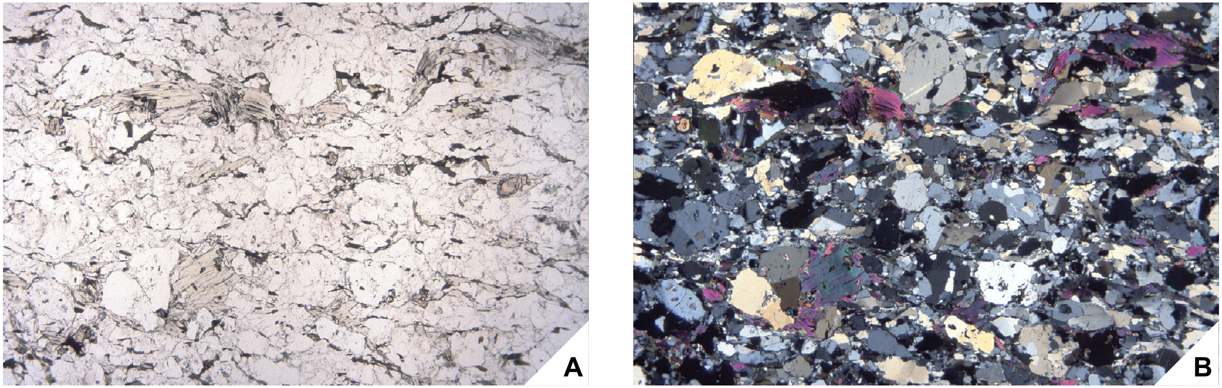


Figure 6: Optical micrographs of S-type granitic biotite-phengite gneiss from the Dora Maira Massif, Italy, in plane polarized light (A) and under crossed polars (B). Field of view is 7 mm wide. The fine-grained gneiss is composed of albite, K-feldspar and quartz, flakes of biotite and phengite, small garnet, and accessories. Starting material ‘G’.

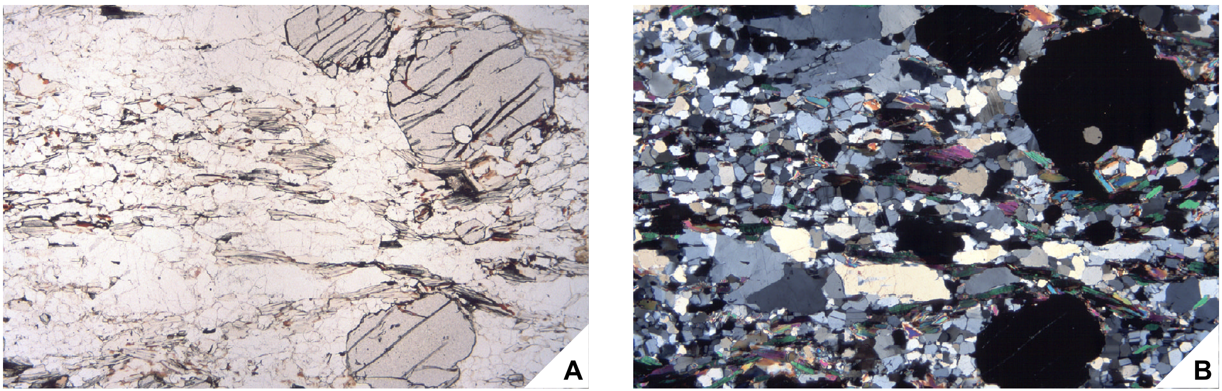


Figure 7: Optical micrographs of granodioritic garnet-mica gneiss from the Erzgebirge, Germany, in plane polarized light (A) and under crossed polars (B). Field of view is 7 mm wide. Diamond-bearing garnet phenocrysts in a fine-grained matrix of quartz, plagioclase, K-feldspar, white mica, some biotite, and rutile. Starting material ‘D’.

matrix of plagioclase, clinopyroxene, and opaque phases. Ubiquitous are millimetre-sized rounded or amoeboidal empty vesicles (Figure 9).

MOR basalt. A basalt from near the Mid-Atlantic Ridge rift valley was chosen as a sample of young oceanic crust. The sample ODP Leg 106-648B-1R-1 (Piece 2, 4-7 cm) is derived from Quarternary basalt pillows at the summit plateau of the small Serocki Volcano, situated near 23 °N, about 70 km south of the Kane Fracture Zone, known as the MARK area (Detrick *et al*., 1988). The phyric basalt (Figure 10) contains millimetre-sized euhedral crystals of plagioclase and olivine in a microcrystalline matrix. Radiating sheaths of clinopyroxene with interstitial plagioclase and olivine form a subvariolithic texture.

4.2 Sample preparation

As the biotite-phengite gneiss was investigated in a previous study (Burchard, 1999), a sample powder was already prepared and was used in this study too. This powder was produced by coarsely crushing the rock, hand-picking of tourmaline crystals, and then grinding in a tungsten carbide rotary cup mill. Homogenization of the sample powder was achieved by repeated splitting and remixing.

First experiments revealed a contamination of this sample powder with tungsten carbide from the mill (see the anomalous

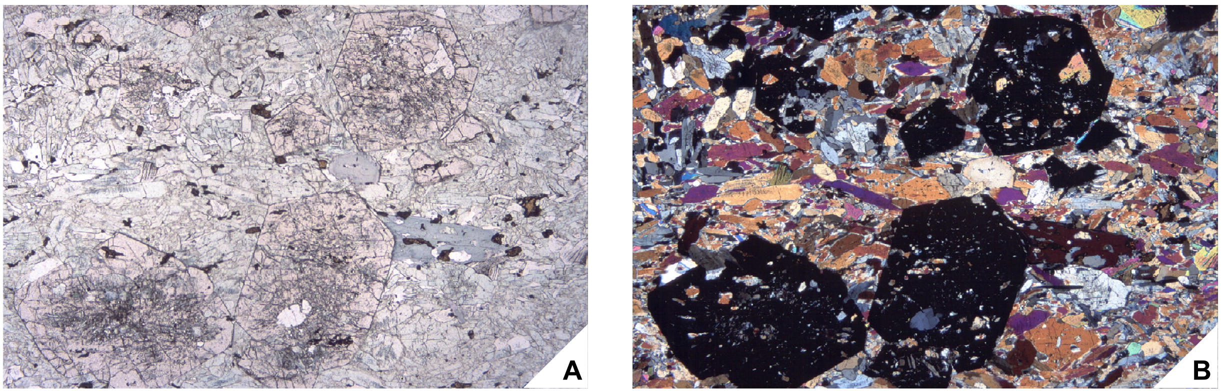
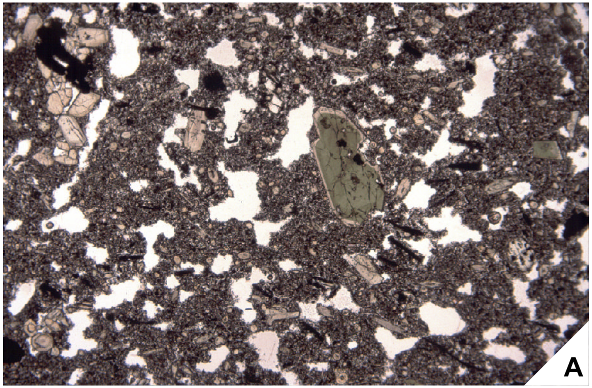


Figure 8: Optical micrographs of eclogite from the Sesia Zone, Italy, in plane polarized light (A) and under crossed polars (B). Field of view is 7 mm wide. Large phenocrysts of garnet in a matrix of deep green clinopyroxene, lavender-blue glaucophane, white mica, rutile, and quartz. Starting material ‘E’.



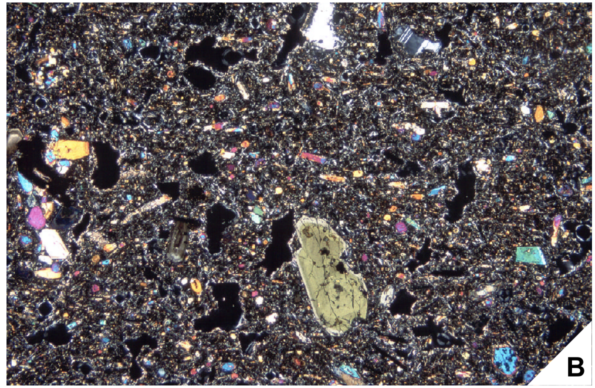


Figure 9: Optical micrographs of phonolitic tephrite in plane polarized light (A) and under crossed polars (B). Field of view is 7 mm wide. Greenish-brown titanaugite (centre) in a fine-grained matrix of plagioclase, clinopyroxene, and opaque phases. Ubiquitous are rounded or amoeboidal empty vesicles. Starting material 'B'.

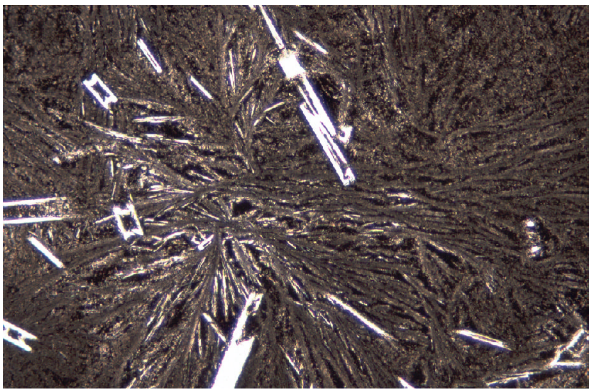


Figure 10: Optical micrograph of MOR basalt from Mid-Atlantic Ridge Valley, in plain polarized light. Field of view is 1.4 mm wide. Sheaths of plagioclase and radiating clinopyroxene. Starting material 'P'.

high tungsten content in Table 1). Therefore, all other rock samples were ground in an agate rotary cup mill after crushing.

The average particle size of all sample powders is near 5 µm, while larger angular grains retain a size of 20 µm, and a few even of 100 µm (Figure 11). First, a pre-defined amount of water was filled with a micro-syringe into a cylindrical medium-volume gold capsule with an outer diameter of 4 mm and a wall thickness of 0.5 mm. Then the required amount of sample powder, which is about 100 mg, was pressed in, the capsule was covered on its top face with a thin gold lid, and cold sealed.

For the 'Q' runs, 10 wt.% of pure natural quartz from Minas Gerais, Brazil, was added to the biotite-phengite gneiss. The quartz crystals were coarsely crushed, hand-ground and sieved; the grain size fraction between 50 and 160 µm was used. In

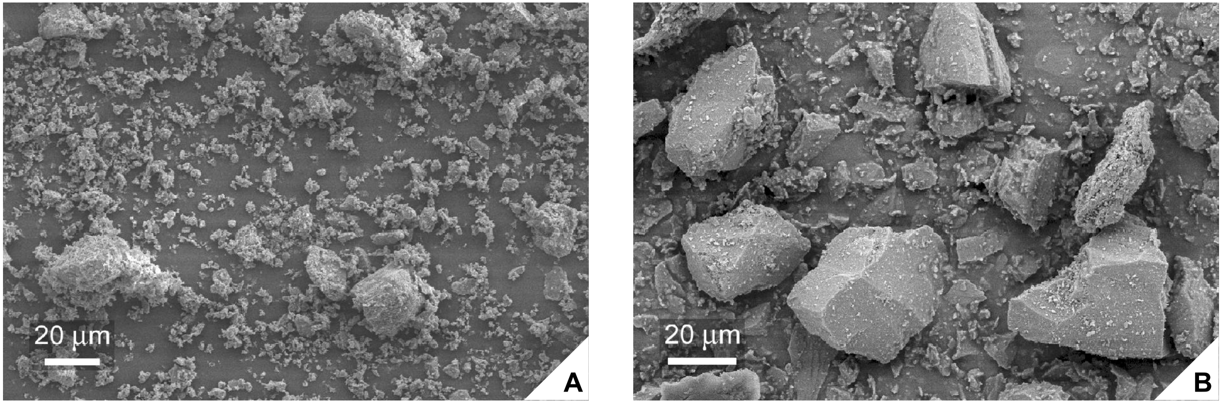


Figure 11: Examples of sample powders used as starting materials by the present study. SEM images show finely ground S-type granitic biotite-phengite gneiss (A) and granodioritic garnet-mica gneiss (B).

runs G41 and P1, a cylinder of entire rock drilled out of the hand-specimen of the respective starting material was used. For G41 the sample was 5 mm in diameter and 12 mm in length and was placed in a large-volume capsule.

The quantity of sample powder, the individual bulk water content, and the capsule parameters for all runs are listed in Table 4 in Appendix.

4.3 High pressure assembly

The experiments were carried out in a piston-cylinder apparatus based on the design described by Boyd and England (1960) with a 0.5-inch tungsten carbide pressure vessel. The gold capsules containing the sample were covered by a fired pyrophyllite sleeve and placed into a graphite resistance furnace. The sodium chloride pressure cell with all internal components is shown in Figure 12.

4.4 Temperature measurement

Temperature was measured by a sheathed chromel-alumel thermocouple. In the present study, temperatures are consistently given as measured by the thermocouple without any corrections or rounding. No corrections were made for the pressure dependence of thermocouple emf. Temperature is controlled with some accuracy even over extended run times, and minor deviations are rapidly corrected automatically.

However, owing to the geometry of the assembly with the

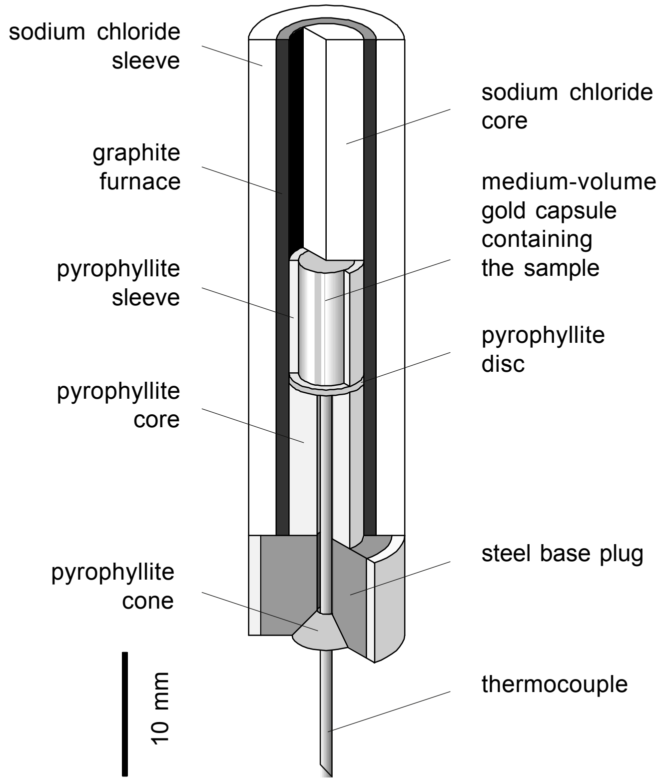


Figure 12: Pressure cell with all internal components as used in the piston-cylinder apparatus by the present study.

thermocouple positioned below the capsule, temperature is measured at the bottom end of the capsule. Calculations of the thermal gradient within salt pressure cells containing no gold capsule have shown a low radial gradient only but a considerable axial gradient, which increases towards higher temperatures (Leistner, 1979). The temperature distribution was found to be asymmetrical because of the different heat conductivities of pyrophyllite and sodium chloride.

Inserting the pyrophyllite core should locate the centre of the capsule within the temperature maximum, which is in the middle of a zone of lowest thermal gradient (Leistner, 1979; Massonne, 1981). The length of the pyrophyllite core used to place the capsule within the assembly was calculated with the premise of an overall shortening of 10 %. That does not apply for the shortening of the individual assembly components, as within the present study shortening of the pyrophyllite was found to be between 7 and 14 %, while measurements of the sample capsules revealed shortening of 8 to 30 %. The desired temperature is thus best realized where the thermocouple is located, that is at the lower end of the capsule, aided, moreover, by the heat isolation of the pyrophyllite core. In contrast, temperature at the upper end of the capsule will be affected by heat loss through the sodium chloride core and will be notably lower. In addition, deformation and fracturing of the graphite furnace during the run may alter its resistance and thus its heating capacity. In view of these uncertainties, the error of the thermocouple should be negligible.

4.5 Pressure calibration

In this study, no corrections to the pressure were applied. Friction measurements for piston-cylinder apparatus have shown that sodium chloride pressure cells exhibit low friction

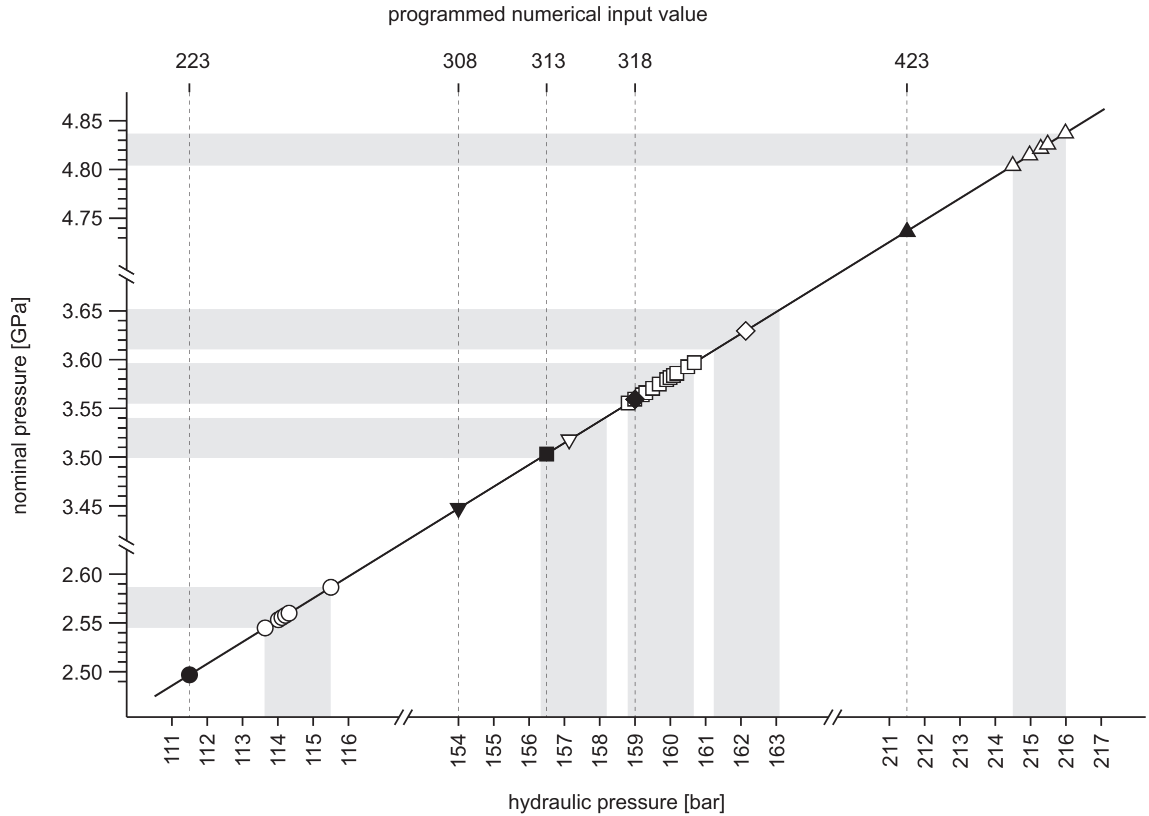


Figure 13: Pressure calibration in the piston-cylinder apparatus. The diagonal line gives the linear correlation between hydraulic pressure and nominal pressure. The closed circle and square indicate the numerical input value that is correlated with the desired nominal pressure of 2.5 GPa and 3.5 GPa, respectively. Open circles and squares indicate hydraulic pressures as actually given by the pressure gauge for individual runs (32 values) with these programmed numerical input values. Note that the corresponding nominal pressures are shifted to higher values. Other symbols give the relationship between numerical input value and hydraulic pressure in the runs with a pressure decreased and increased by 0.06 GPa and for the runs at 4.8 GPa. Grey bars give the variation of nominal pressure, which is ± 0.02 GPa.

(Mirwald *et al.*, 1975; Mirwald and Massonne, 1980a) with errors in the range of 30 to 50 MPa. The error of 0.25 % of the pressure gauge and the error of 0.4 % for lateral piston expansion (Massonne and Schreyer, 1986) are also negligible. More important, by contrast, is the reproducibility of the pressure for runs performed at nominally identical conditions.

The nominal pressure is calculated from the hydraulic pressure acting on the piston and the different piston areas. There is a linear correlation between the nominal pressure and the computer-controlled hydraulic pressure, given by the diagonal line in Figure 13. The programmed numerical input value should correspond to a particular hydraulic pressure.

A first series of experiments has shown the hydraulic pressure as given by the pressure gauge to be systematically higher than the pressure that was intended to be set by programming a certain numerical input value. The resulting difference between the desired pressure and the nominal pressure was about 0.06 GPa. Consequently, the numerical input value was corrected by five steps in order to end up at a nominal pressure lowered by 0.06 GPa. The specimens produced with these modified settings, however, showed a significant influence of the pressure difference on the microfabrics and the fluid properties. Therefore, subsequent runs were performed with returning to the former pressure settings again. To check whether the different microfabrics and fluid properties observed do in fact correlate with the modified pressure, run G85 was performed with a pressure raised by 0.06 GPa. The programmed numerical input value for each run is given in Table 2. The nominal pressure was found to be largely constant throughout the present study, as a variation of ± 20 MPa was observed, which is 0.6 % at 3.5 GPa.

4.6 Pressure-temperature-time paths

Pressurizing, heating, and cooling to the specific P-T conditions of each run is computer-controlled. The runs can be classified according to their pressure-temperature (P-T) paths (Figure 14). Samples corresponding to path I, II, III, and IV, in the following named 'runs at constant conditions' (Type 1), were pressurized and subsequently heated to the allotted conditions that were kept constant until the end of the run.

The three Type 1 runs at constant conditions of 4.8 GPa / 1000 °C (path I in Figure 14) were pressurized to 4.8 GPa within two hours at a rate of 120 MPa / 3 min and heated to 1000 °C at a rate of 100 °C / 3 min. The samples were annealed at conditions of 4.8 GPa / 1000 °C before quenching as shown in the pressure-time (P-t) and temperature-time (T-t) paths in Figure 15; details are listed in Table 2.

In the three Type 1 runs at constant conditions of 3.5 GPa / 1000 °C (path II in Figure 14) and the seven Type 1 runs at constant conditions of 2.5 GPa / 1000 °C (path III in Figure 14), the pressure was raised at a rate of 250 MPa / 3 min. Subsequently the samples were heated from room temperature to 1000 °C at a rate of 100 °C / 3 min and annealed for up to several hours or days before quenching. Details of the runs are given in the P-t and T-t paths in Figure 16 and Figure 17 and in Table 2.

The five Type 1 runs at constant conditions of 3.5 GPa / 700 °C (path IV in Figure 14) were pressurized to 3.5 GPa at a rate of 250 MPa / 3 min. The temperature was then increased to 700 °C at a rate of 100 °C / 3 min. See Figure 19 for annealing

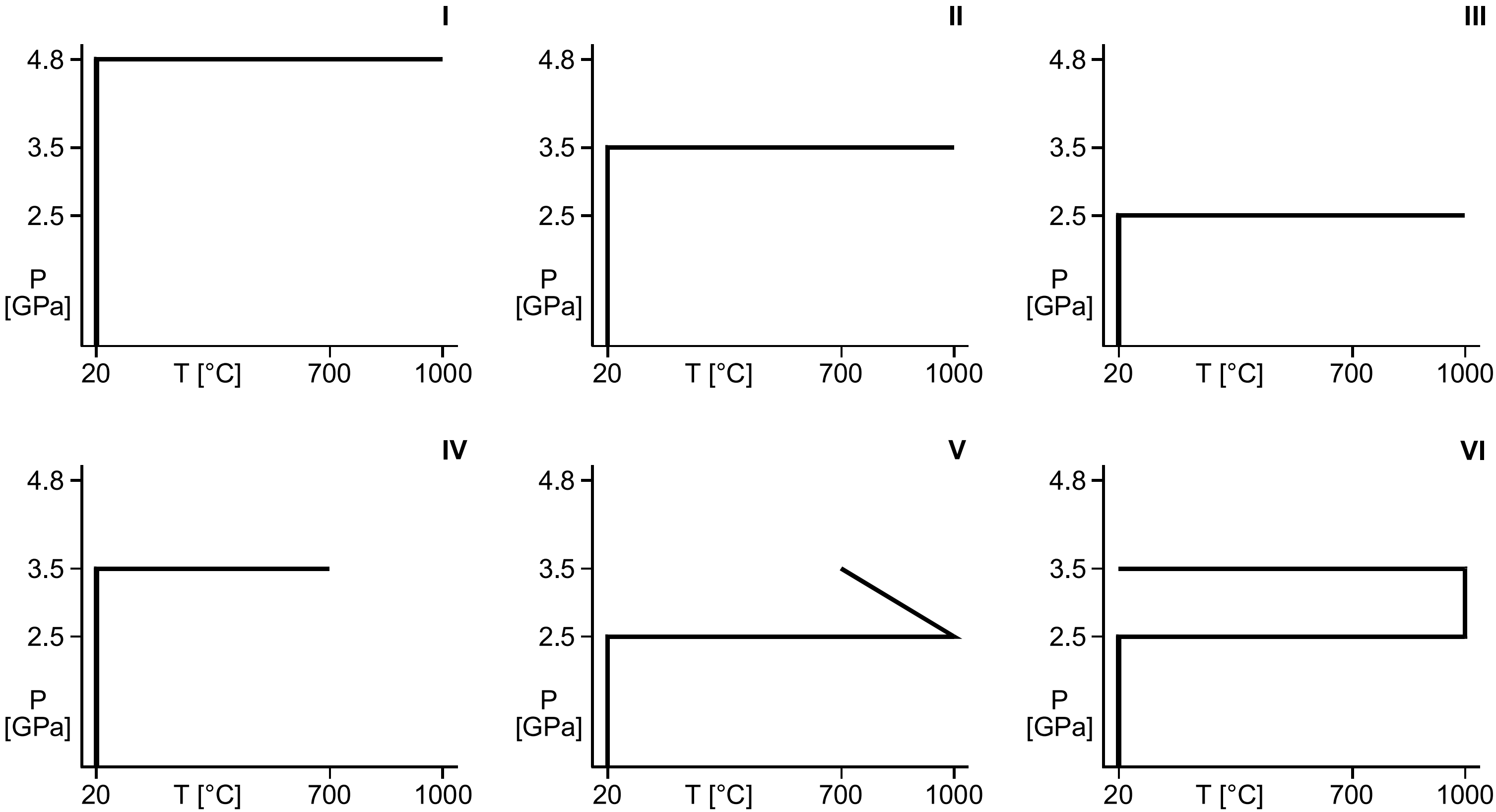


Figure 14: Pressure-temperature (P-T) paths. 'Runs at constant conditions' (Type 1 runs) are described by paths I to IV, the 'simultaneous cooling-pressurization run' (Type 2) corresponds to path V. The 'short-time melting runs' (Type 3), the 'runs without cooling' (Type 4), the Type 5 runs with different cooling rates, and the 're-heated runs' (Type 6) follow path VI. See text for details.

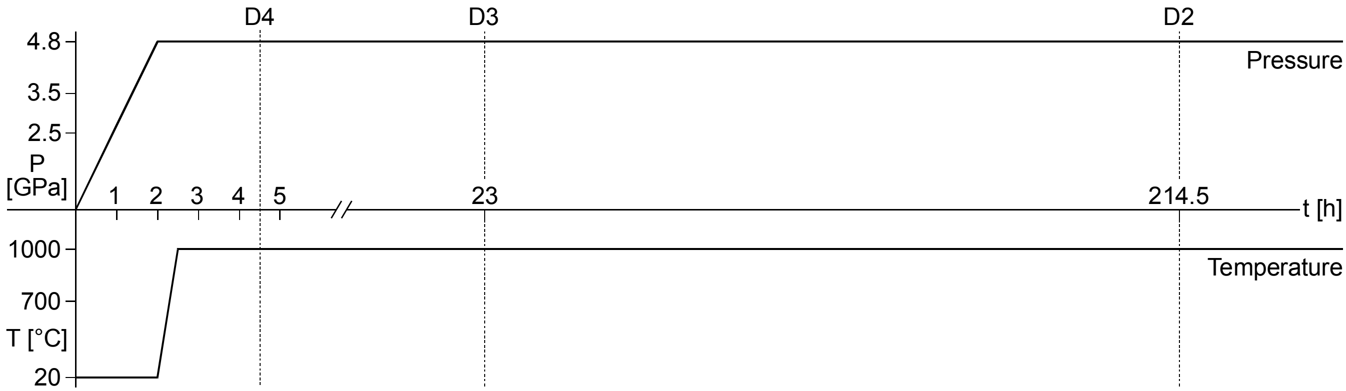


Figure 15: Pressure-time (P-t) and temperature-time (T-t) paths for the Type 1 runs at constant conditions of 4.8 GPa / 1000 °C (path I in Figure 14). Dashed lines mark the quench of the runs, specified by their run numbers above. Note that the scale changes along the time axis. For run details see Table 2 and Table 4 in Appendix.

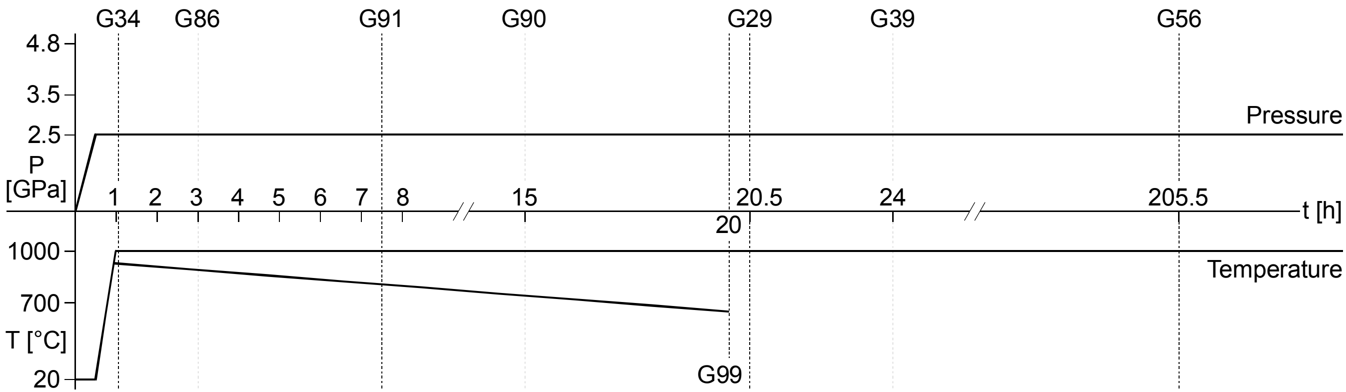


Figure 16: Pressure-time (P-t) and temperature-time (T-t) paths for the Type 1 runs at constant conditions of 2.5 GPa / 1000 °C (path III in Figure 14) and for the single heating-cooling run G99 (Type 7). Dashed lines mark the quench of the runs, specified by their run numbers above. Note that the scale changes along the time axis. For run details see Table 2 and Table 4 in Appendix.

time and Table 2 for additional details.

Path V (Figure 14) represents the single 'simultaneous cooling-pressurization run' G17 (Type 2). Here, the pressure was built up to 2.5 GPa, the temperature was raised to 1000 °C at a rate of 100 °C / 3 min, and these conditions were kept constant for further 24 hours. The subsequent increase of pressure to 3.5 GPa at a rate of 1 MPa /min was simultaneous with cooling from 1000 to 700 °C at a rate of 0.3 °C /min. At 3.5 GPa / 700 °C the sample was quenched.

The largest group of runs, that is runs of Type 3, Type 4, Type 5, and Type 6, follows path VI (Figure 14). These runs were pressurized to 2.5 GPa at a rate of 250 MPa / 3 min and heated from room temperature to 1000 °C at a rate of 100 °C / 3 min. Conditions of 2.5 GPa / 1000 °C were kept constant for 90 minutes only in the two 'short-time melting runs' (Type 3), and for 23 h in the other runs.

Afterwards, the pressure was raised to 3.5 GPa at a rate of 100 MPa / 3 min. At conditions of 3.5 GPa / 1000 °C the 'runs without cooling' (Type 4) were quenched either immediately or after annealing (see Figure 18).

In the Type 5 runs, conditions of 3.5 GPa / 1000 °C were kept constant for half an hour, followed by cooling to different final

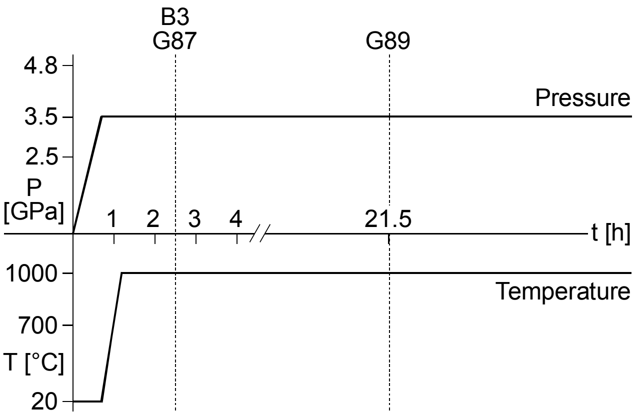


Figure 17: P-t and T-t paths for the Type 1 runs at constant conditions of 3.5 GPa / 1000 °C (path II in Figure 14). Dashed lines mark the quench of the runs, specified by their run numbers above. Note that the scale changes along the time axis. For run details see Table 2 and Table 4 in Appendix.

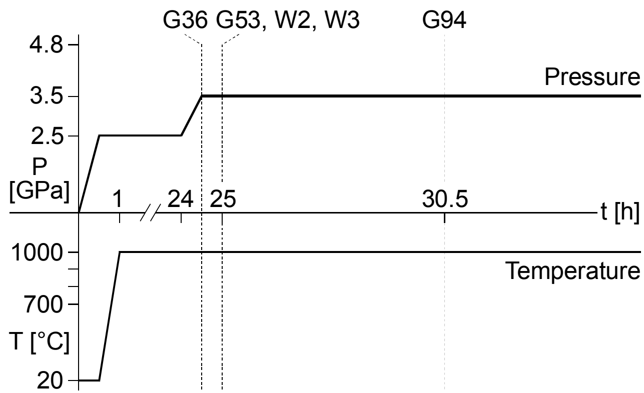


Figure 18: P-t and T-t paths for the Type 4 runs without cooling. Dashed lines mark the quench of the runs, specified by their run numbers above. Note that the scale changes along the time axis. For run details see Table 2 and Table 4 in Appendix.

temperatures at rates of 30 °C /min, 3 °C /min, 0.3 °C /min, and 0.03 °C /min, respectively. Some samples were annealed at 700 °C for up to several hours or days before quenching. The details of cooling rate, final temperature, annealing time, and run time are specified in the P-t and T-t paths in Figures 20, 21, 22, and 23, and are listed in Table 2.

In the two 're-heated runs' (Type 6) conditions of 3.5 GPa / 1000 °C were constant for half an hour, followed by cooling to 650 °C at a rate of 3.5 °C /min and to 400 °C at a rate of 1.2 °C /min, respectively. After 24 hours of annealing at 3.5 GPa / 650 °C and at 3.5 GPa / 400 °C, the samples were re-heated to 750 °C at a rate of 1 °C /min and to 700 °C at a rate of 0.6 °C / min, respectively, and finally quenched. See Figure 24 and Table 2 for details.

The single 'heating-cooling run' G99 (Type 7), best described by path III (Figure 14), was pressurized to 2.5 GPa at a rate of 250 MPa / 3 min and heated to 930 °C at a rate of 100 °C / 3 min. With achieving these conditions, cooling at a rate of 0.25 °C /min commenced. At 2.5 GPa / 650 °C the sample was quenched. See Figure 16 and Table 2 for details.

4.7 Quenching

At the end of the run, the samples were quenched by a sudden drop in temperature by turning off power to the furnace automatically or manually. The time needed to quench the

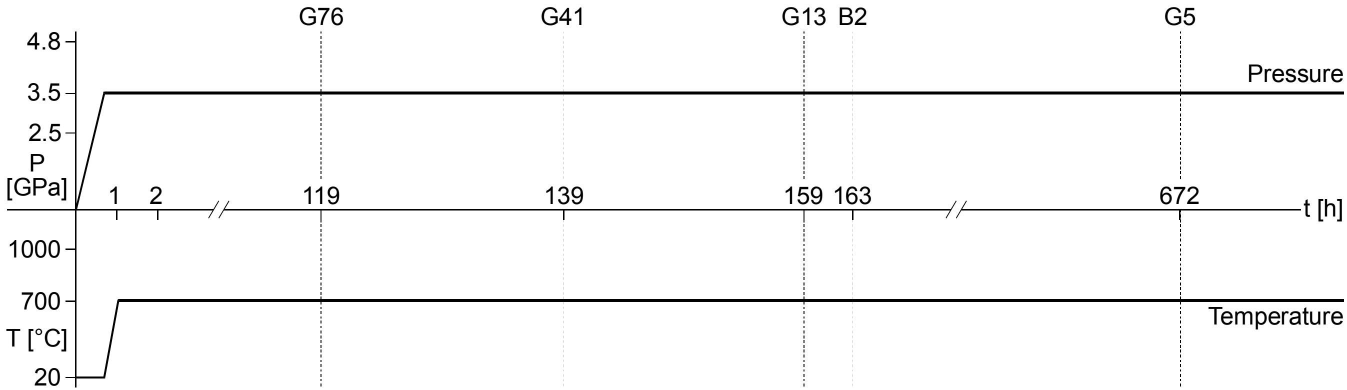


Figure 19: P-t and T-t paths for the Type 1 runs at constant conditions of 3.5 GPa / 700 °C (path IV in Figure 14). Dashed lines mark the quench of the runs, specified by their run numbers above. Note that the scale changes along the time axis. For run details see Table 2 and Table 4 in Appendix.

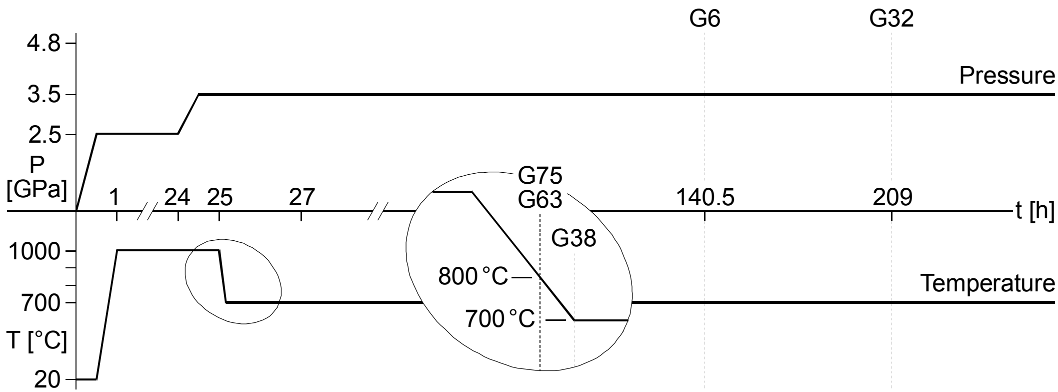


Figure 20: P-t and T-t paths for the Type 5 runs with a cooling rate of 30 °C /min. Dashed lines mark the quench of the runs, specified by their run numbers above. Note that the scale changes along the time axis. For run details see Table 2 and Table 4 in Appendix.

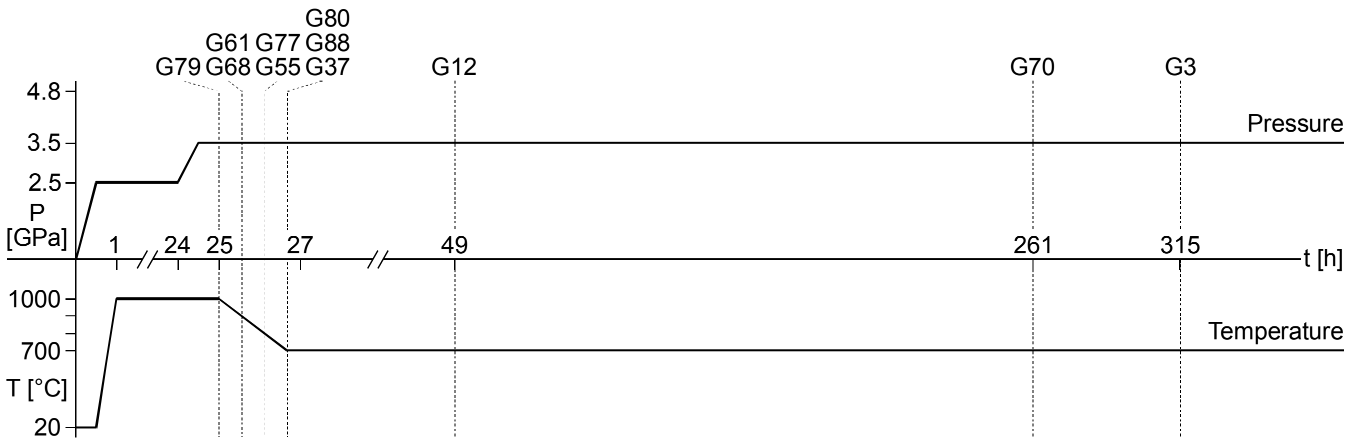


Figure 21: P-t and T-t paths for the Type 5 runs with a cooling rate of 3 °C /min. Dashed lines mark the quench of the runs, specified by their run numbers above. Note that the scale changes along the time axis. For run details see Table 2 and Table 4 in Appendix.

sample from run conditions to 200 °C is 10 to 15 seconds depending on run temperature (see Figure 25); 100 °C is reached after about two minutes. Upon quenching, the pressure was essentially kept constant. A computer-controlled concomitant increase of pressure upholds the desired conditions and compensates for the pressure loss which is about 0.3 GPa.

Some runs broke down early due to failure of the thermocouple. Generally, the quenching procedure is the same as in an intentional quench at the end of the run. Occasionally, the failure is however accompanied by a short-term temperature excursion to very high values. As a result, the capsule is molten either completely or partially with only remnants of or even no specimen left. Or, the capsule seems to be undamaged but there is no quenched fluid left leaving open cavities.

4.8 Specimen preparation

At the onset of this study, after completion of the run the entire capsule was longitudinally sawn with a water-cooled diamond wire saw. The disadvantage of this method was that the specimen had contact with tab water and was locally heated due to friction of the wire. Furthermore, the gold was smeared

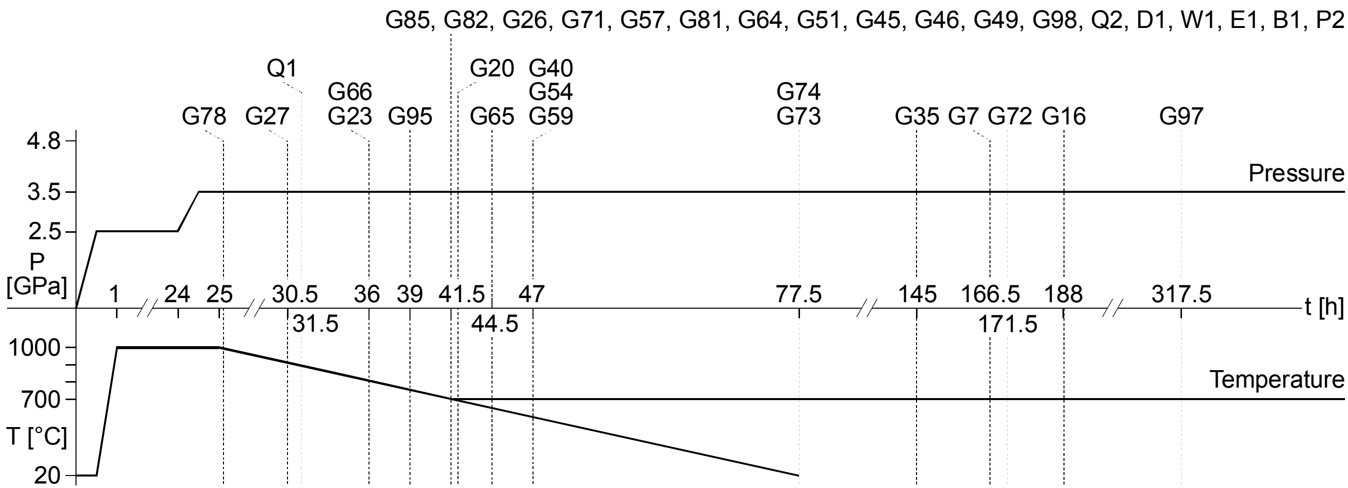


Figure 22: P-t and T-t paths for the Type 5 runs with a cooling rate of 0.3 °C /min. Dashed lines mark the quench of the runs, specified by their run numbers above. Note that the scale changes along the time axis. For run details see Table 2 and Table 4 in Appendix.

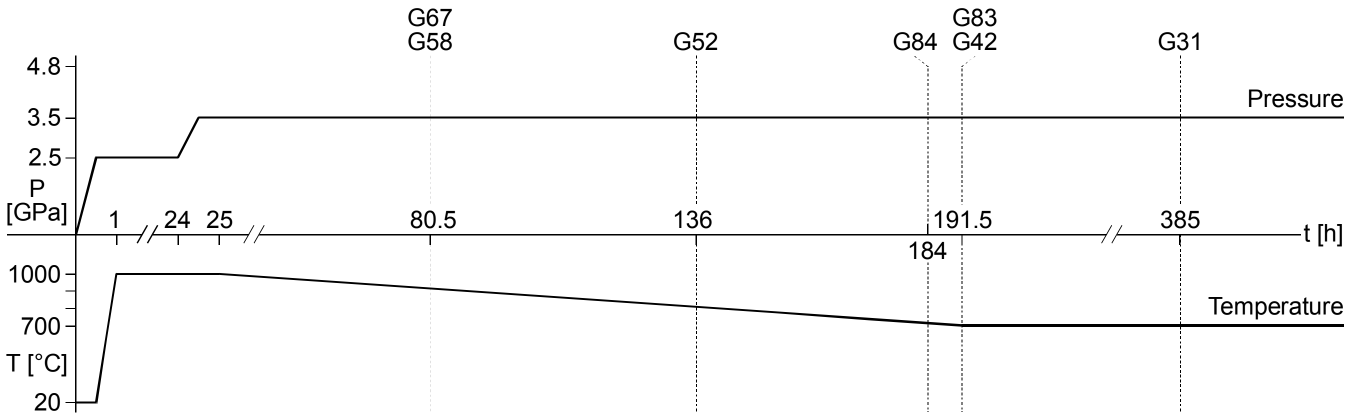


Figure 23: P-t and T-t paths for the Type 5 runs with a cooling rate of 0.03 °C /min. Dashed lines mark the quench of the runs, specified by their run numbers above. Note that the scale changes along the time axis. For run details see Table 2 and Table 4 in Appendix.

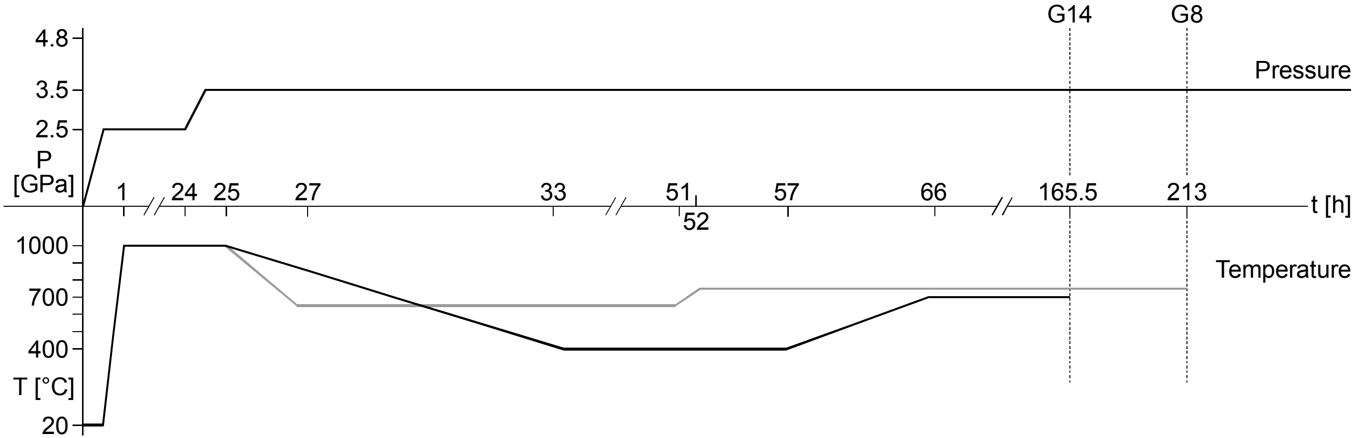


Figure 24: P-t and T-t paths for the re-heated runs (Type 6). Dashed lines mark the quench of the runs, specified by their run numbers above. Note that the scale changes along the time axis. For run details see Table 2 and Table 4 in Appendix.

Table 2: Run data. Runs are classified according to run type and P-T-t conditions (see Section 4.6). The letter in the run number indicates the starting material (see Section 4.1). For phases see Glossary of abbreviations.

run		bulk water [wt.%]	annealing time [h]	pressure input value	pressure [GPa]	temperature [°C]	run time [h]	observed phases
Type 1 runs at constant conditions of 4.8 GPa / 1000 °C (see Figure 15):								
D 4		1.6	2	423	4.8	1000	4.5	Qtz, Cpx, Grt, Ky, fL
D 3		1.6	20.5	423	4.8	1000	23	Coe, Cpx, Phe, Grt, Ky, fL
D 2		1.6	212	423	4.8	1000	214.5	Coe, Cpx, Phe, Grt, fL+b
Type 1 runs at constant conditions of 3.5 GPa / 1000 °C (see Figure 17):								
B 3		0.9	1.5	313	3.5	1000	2.5	Cpx, Phe, Grt, Ap, fL
G 87		0.8	1.5	313	3.5	1000	2.5	Coe, Cpx, Kfs, Grt, Zrn, Ky, Rt, fL
G 89		5.7	20.5	313	3.5	1000	21.5	Coe, Grt, Zrn, Ky, fL
Type 1 runs at constant conditions of 2.5 GPa / 1000 °C (see Figure 16):								
G 86		2.8	2	223	2.5	1000	3	Qtz, Grt, Zrn, Ky, Rt, fL
G 91		2.8	6,5	223	2,5	1000	7,5	Qtz, Grt, Zrn, Ky, fL
G 90		2.8	14	223	2.5	1000	15	Qtz, Grt, Zrn, Ky, fL
G 29		2.8	19.5	223	2.5	1000	20.5	Qtz, Kfs, Grt, Zrn, Ky, fL
G 56		2.8	204.5	223	2.5	1000	205.5	Qtz, Kfs, Grt, Zrn, Ky, fL
G 39	x	5.5	23	223	2.5	1000	24	fL
G 34		8.4	0	223	2.5	1000	1	Qtz, Grt, Zrn, Rt, fL

key to symbols:
- x capsule damaged
- ¥ specimen grain size-graded
- o oven power too high

Table 2 (continued)**:** Run data.

run		bulk water [wt.%]	annealing time [h]	pressure input value	pressure [GPa]	temperature [°C]	run time [h]	observed phases
Type 1 runs at constant conditions of 3.5 GPa / 700 °C (see Figure 19):								
B 2		0.9	161.5	313	3.5	700	163	Cpx, matrix
G 41		± 2	138	313	3.5	700	139	Coe, Cpx, Kfs, Phe, Grt, Zrn, Rt, fL
G 76		2.8	118	308	3.5	700	119	Coe, Cpx, Kfs, Phe, Grt, Ap, Zrn, Tit
G 13		2.8	159		3.5	700	159	Coe, Cpx, Kfs, Phe, Grt, Ap, Zrn, Tit
G 5		3.3	672		3.5	700	672	Coe, Cpx, Kfs, Phe, Grt, Ap, Zrn, Tit
Type 2, simultaneous cooling-pressurization run (see path V in Figure 14):								
G 17		2.8	175		3.5	700	216.5	Coe, Cpx, KfH, Phe, Grt, Ap, Zrn, Ttn, See, fL+b
Type 3, short-time melting runs (see path VI in Figure 14):								
P 1		0.6	0	313	3.5	700	20	Cpx, Grt, Ap, Ttn, fL
G 92		2.8	0	313	3.5	700	20	Coe, Cpx, KfH, Phe, Grt, Ap, Zrn, fL+b
Type 4 runs without cooling (see Figure 18):								
G 53		2.8	0.5	313	3.5	1000	25	Qtz, Cpx, Kfs, Grt, Zrn, Ky, Rt, fL
W 2	x	2.8	0.5	308	3.5	1000	25	Coe, Grt, fL
W 3		2.8	0.5	308	3.5	1000	25	Coe, Grt, fL
G 94	¥	2.8	6	313	3.5	1000	30.5	Coe, Cpx, Kfs, Grt, Zrn, Ky, Rt, fL
Type 5 runs with a cooling rate of 30 °C /min (see Figure 20):								
G 75	¥	2.8	0	307	3.5	800	25	Qtz, Cpx, Kfs, Grt, Ap, Zrn, Ky, fL
G 63		2.8	0	308	3.5	800	25	Qtz, Cpx, Kfs, Grt, Ap, Zrn, Ky, fL
G 38		2.8	0	313	3.5	700	25	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, fL+b
G 6		2.8	115	313	3.5	700	140.5	Coe, Cpx, Kfs, KfH, Phe, Grt, Zrn, Ttn, fL+b
G 32		2.8	184	313	3.5	700	209	Coe, Cpx, Kfs, KfH, Phe, Grt, Zrn, Ttn, fL+b

Table 2 (continued)**:** Run data.

run		bulk water [wt.%]	annealing time [h]	pressure input value	pressure [GPa]	temperature [°C]	run time [h]	observed phases
Type 5 runs with a cooling rate of 3 °C /min (see Figure 21):								
G 79		2.8	0	308	3.5	994	25	Qtz, Cpx, Kfs, Grt, Zrn, Ky, fL
G 61		2.8	0	308	3.5	900	25.5	Coe, Qtz, Cpx, Kfs, Grt, Zrn, Ky, fL
G 68		2.8	0	308	3.5	900	25.5	Coe, Cpx, Kfs, Grt, Zrn, fL
G 77		2.8	0	308	3.5	800	26	Coe, Qtz, Cpx, Kfs, Phe, Grt, Zrn, Ky, fL
G 55		2.8	0	313	3.5	800	26	Coe, Qtz, Cpx, Kfs, Phe, Grt, Zrn, Ky, fL
G 80		2.8	0	308	3.5	700	26.5	Coe, Cpx, Kfs, Phe, Grt, Ap, Zrn, fL+b
G 88	¥	2.8	0	313	3.5	700	26.5	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, fL+b
G 37	o	2.8	0	313	3.5	700	26.5	Coe, Cpx, Kfs, Phe, Grt, Ap, fL+b
G 12		2.8	22.5	313	3.5	700	49	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, Ttn, Arg, See, fL+b
G 70		2.8	234.5	308	3.5	700	261	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, Ttn, Arg, See, fL+b
G 3		3.2	288.5	313	3.5	700	315	Coe, Cpx, Kfs, KfH, Phe, Ap, Ttn, Arg, See, fL+b
Type 5 runs with a cooling rate of 0.3 °C /min (see Figure 22):								
G 78		0.8	0	308	3.5	995	25	Coe, Qtz, Cpx, Kfs, Grt, Zrn, Ky, Rt, fL
G 27		2.8	0	313	3.5	900	30.5	Coe, Cpx, Kfs, Grt, Zrn, Ky, fL
Q 1		2.7	0	313	3.5	886	31.5	Coe, Cpx, Kfs, Grt, Zrn, Ky, Rt, fL
G 66		2.8	0	308	3.5	800	36	Coe, Cpx, Kfs, Phe, Grt, Ap, Zrn, fL
G 23		2.8	0	313	3.5	800	36	Coe, Qtz, Cpx, Kfs, Phe, Grt, Zrn, Ky, fL
G 95	¥	2.8	0	313	3.5	750	39	Coe, Cpx, Kfs, Phe, Grt, Ap, Zrn, fL+b
G 57		0.8	0	313	3.5	700	41.5	Coe, Cpx, Kfs, Phe, Grt, Ap, Zrn, Rt, fL+b
G 81		0.8	0	308	3.5	700	41.5	Coe, Cpx, Kfs, Phe, Grt, Ap, Zrn, Rt, fL+b
G 85	¥	2.8	0	318	3.5	700	41.5	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, fL+b, fV
G 82		2.8	0	313	3.5	700	41.5	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, fL+b, fV
G 26	¥	2.8	0	313	3.5	700	41.5	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, fL+b, fV
G 71	¥	2.8	0	308	3.5	700	41.5	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, fL+b, fV

Table 2 (continued)**:** Run data.

run		bulk water [wt.%]	annealing time [h]	pressure input value	pressure [GPa]	temperature [°C]	run time [h]	observed phases
Type 5 runs with a cooling rate of 0.3 °C /min (continued):								
G 64		5.6	0	308	3.5	700	41.5	Coe, Cpx, KfH, Phe, Grt, Ap, Zrn, fL+b
G 51	o	9.1	0	313	3.5	700	41.5	Coe, Cpx, Phe, Ap, fL+b
G 45		10.8	0	313	3.5	700	41.5	Coe, Cpx, Phe, Ap, fL+b
G 46	x	13.1	0	313	3.5	700	41.5	Coe, Cpx, Phe, Ap, fL+b
G 49	x	13.2	0	313	3.5	700	41.5	Coe, Cpx, Phe, Ap, fL+b
G 98		15.4	0	313	3.5	700	41.5	Coe, Cpx, Phe, Ap, fL+b
D 1		3.6	0	307	3.5	700	41.5	Coe, Cpx, Kfs, Phe, Grt, Mz, Dmd, fL+b, fV
W 1		2.4	0	313	3.5	700	41.5	Coe, Phe, Grt, Ap, Rt, fV
E 1		2.7	0	313	3.5	700	41.5	Coe, Cpx, Phe, Grt, Ap, Ttn, Py, fL+b
B 1		2.8	0	308	3.5	700	41.5	Cpx, Phe, Grt, Ap, fL+b
P 2		2.5	0	313	3.5	700	41.5	Coe, Cpx, Phe, Grt, Ap, Ttn, fL+b, fV
Q 2		2.7	0	313	3.5	700	41.5	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, fL+b
G 35	x	5.5	103.5	313	3.5	700	145	Coe, Cpx, KfH, Phe, Ap, fL+b
G 7		2.8	125	313	3.5	700	166.5	Coe, Cpx, Kfs, KfH, Phe, Ap, fL+b
G 72		2.8	130	308	3.5	700	171.5	Coe, Cpx, Kfs, KfH, Phe, Ap, Zrn, fL+b
G 16		2.8	146.5	313	3.5	700	188	Coe, Cpx, Kfs, KfH, Phe, Ap, Zrn, Ttn, See, fL+b
G 97		2.8	276	313	3.5	700	317.5	Coe, Cpx, Kfs, KfH, Phe, Ap, Ttn, See, fL+b
G 65		2.8	0	308	3.5	650	44.5	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, fL+b
G 59		2.8	0	313	3.5	600	47	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, fL+b, fV
G 54		2.8	0	313	3.5	600	47	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, fL+b, fV
G 40		2.8	0	313	3.5	600	47	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, fL+b, fV
G 73		2.8	0	308	3.5	50	77.5	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, Ky, Rt, Ttn, fV
G 74		2.8	0	308	3.5	50	77.5	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, Ky, Rt, Ttn, fV
G 20		2.8	0	313	0.0	30	42	Coe, Cpx, Kfs, Phe, Grt, Ap, Zrn, fV

Table 2 (continued)**:** Run data.

run		bulk water [wt.%]	annealing time [h]	pressure input value	pressure [GPa]	temperature [°C]	run time [h]	observed phases
Type 5 runs with a cooling rate of 0.03 °C /min (see Figure 23):								
G 67		2.8	0	308	3.5	900	80.5	Coe, Cpx, Kfs, Ky, fL
G 58		2.8	0	313	3.5	900	80.5	Coe, Cpx, Kfs, Ky, fL
G 52		2.8	0	313	3.5	800	136	Coe, Cpx, Kfs, Phe, Grt, Ap, fL
G 84		2.8	0	313	3.5	715	184	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, fL+b, fV
G 83	¥	2.8	0	313	3.5	700	191.5	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, fL+b, fV
G 42	¥	2.8	0	313	3.5	700	191.5	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Zrn, fL+b, fV
G 31		2.8	193.5	313	3.5	700	385	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, See, fL+b
Type 6, re-heated runs (see Figure 24):								
G 8		2.8	160.5	313	3.5	750	213	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Ttn, Arg, See, fL+b
G 14		2.8	99.5	313	3.5	700	165.5	Coe, Cpx, Kfs, KfH, Phe, Grt, Ap, Ttn, See, fL+b
Type 7, heating-cooling run (see Figure 16):								
G 99		± 20	0	223	2.5	650	20	Qtz, Phe, Ap, fL

over the specimen's surface during the subsequent preparation of thin sections.

Thus, the gold was peeled off completely and the specimen was longitudinally split with a small chisel. From the few specimens that broke transversally, slices from the upper, middle, and lower part of the specimens were used. From the slices doubly polished sections with a thickness of 30 µm or more were prepared.

4.9 Analytical techniques

Phases were identified by optical microscope in transmission and reflection mode and by scanning electron microscope (SEM), supplemented by electron microprobe (EMP) measurements. Small chips of the specimens were mounted on a sample holder and gold sputtered for SEM (LEO 1530 Gemini) inspection of randomly broken surfaces in secondary electron

(SE) mode with an accelerating voltage of 10 kV. Sections were carbon coated for high resolution SEM imaging in back-scattered electron (BSE) mode with an accelerating voltage of 20 kV.

In order to quantify the volume proportion of the fluid formed, Adobe Photoshop 5.0 digital imaging software (Adobe Systems Inc.) was used to mark off the quenched fluid phase in the high resolution BSE images (3072 x 2069 pixels). From the binary images of the same resolution, which only distinguish between fluid phase and crystals, the quantity of fluid was calculated by Diana image analysis software (J. Duyster).

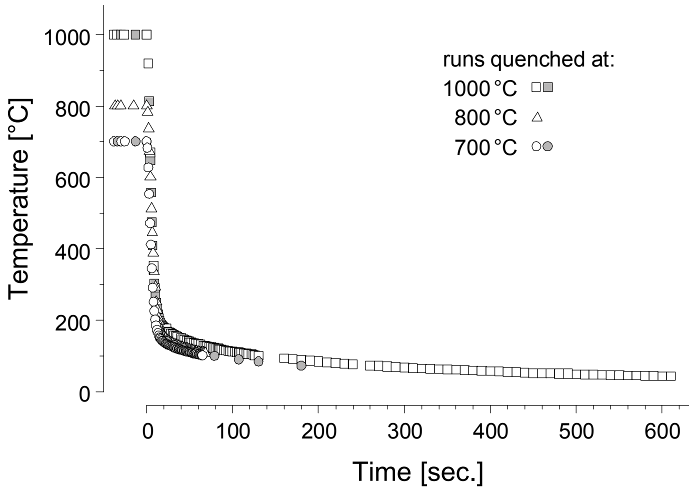


Figure 25: Quenching curve as determined for five individual runs. Zero on the time axis gives the time when power to the furnace was turned off. The time needed to quench the sample from run conditions to 200 °C is 10 to 15 seconds depending on run temperature; temperatures of 100 °C are reached after about two minutes.

In marking off the fluid, even tiny interstices were regarded in order to display their complexity and connectivity. However, they do not significantly contribute to the total volume proportion of the fluid phase, as disregarding these very small interstices modifies the result by far less than one volume per cent. A simple test has revealed that the volume proportion quantified by image analysis increases by only one percent when the selection is expanded by one pixel in a binary image of a specimen that contains 10 vol.% of fluid phase in numerous complex interstices.

Chemical composition of the run products was determined by EMP (Cameca SX 50) with four wavelength-dispersive spectrometers equipped with TAP, PCO, LiF, and PET analyzing crystals. Synthetic standards used are pyrope (MgKα, SiKα, AlKα), andradite (CaKα, FeKα), jadeite (NaKα), K-glass (KKα), spessartine (MnKα), rutile (TiKα), aluminium phosphate (PKα), topaz (FKα), and halite (ClKα).

Glasses were analyzed with an accelerating voltage of 15 keV, a beam current of 3 nA, and a beam diameter of 10 µm with 5 sec counting time per element, except 25 sec for fluorine (see Chapter 6). Oxygen was calculated by stoichiometry. The water content of the glasses is equated to the difference between 100 wt.% and the total EMP analysis, i.e. the cumulative weight percent of the oxides after correcting for fluorine and chlorine.

CHAPTER 5

Microfabrics

In this study, a series of 114 experiments covering different crustal rock compositions was performed. In the majority of the runs the S-type granitic composition was used, as the granitic system is already well studied (Huang and Wyllie, 1973, 1981; Stern and Wyllie, 1973, 1981) and the particular starting material, the biotite-phengite gneiss, was previously investigated by Burchard (1999). Thus, mineral composition and phase relations are already well known at pressures of 1.5 to 4.5 GPa and temperatures between 675 and 1000 °C at different water contents.

Most petrological studies, however, pay little attention to the experimentally produced microfabrics. The small samples used are sufficiently large for X-ray methods and electron microprobe measurements, but are too small to allow free crystal growth and an intrinsic fluid distribution and thus too small for microfabrics relevant to the aim of the present study to develop. Therefore, larger capsule volumes were used and emphasis was put on investigating the dependence of the microfabrics, and the fluid topology in particular, on parameters such as pressure, temperature, run time, and bulk water content.

5.1 Runs using the biotite-phengite gneiss

Type 1 runs at constant conditions of 3.5 GPa / 700 °C. The run G41 with a bulk water content of about 2 wt.%, held at constant conditions of 3.5 GPa / 700 °C for six days, was performed using an uncrushed rock cylinder drilled out of the hand-specimen of the biotite-phengite gneiss. The foliation of the gneiss, horizontally oriented in Figure 26A, is mirrored by elongated crystals of K-feldspar and by ribbons of garnet crystals grown at the expense of biotite. Some relics from the gneiss are preserved after the run, as are garnet of up to half a millimetre in size (Figure 26B). Coesite forms euhedral crystals, whereas K-feldspar is bounded by either rational or rounded interfaces. The fluid is quenched to form a homogeneous silicic glass free of bubbles or any cavities. Masses of small clinopyroxene crystals up to 20 µm in size are certainly not additional quench products, as they are only locally common while large areas of the glass are free of them (Figure 26C, D).

The three remaining Type 1 runs at constant conditions of 3.5 GPa / 700 °C, that is G76, G13, and G5 with bulk water contents of 2.8 or 3.3 wt.%, have run times between five and 28 days (see Figure 19). The microfabrics (Figure 27) are characterized by small grain sizes and an inhomogeneous distribution of the crystalline phases on a small scale. Clusters of crystals of the high pressure phases are grown at the expense of larger grains in the sample powder: coesite forms aggregates of subhedral crystals that largely retain the overall shape of the

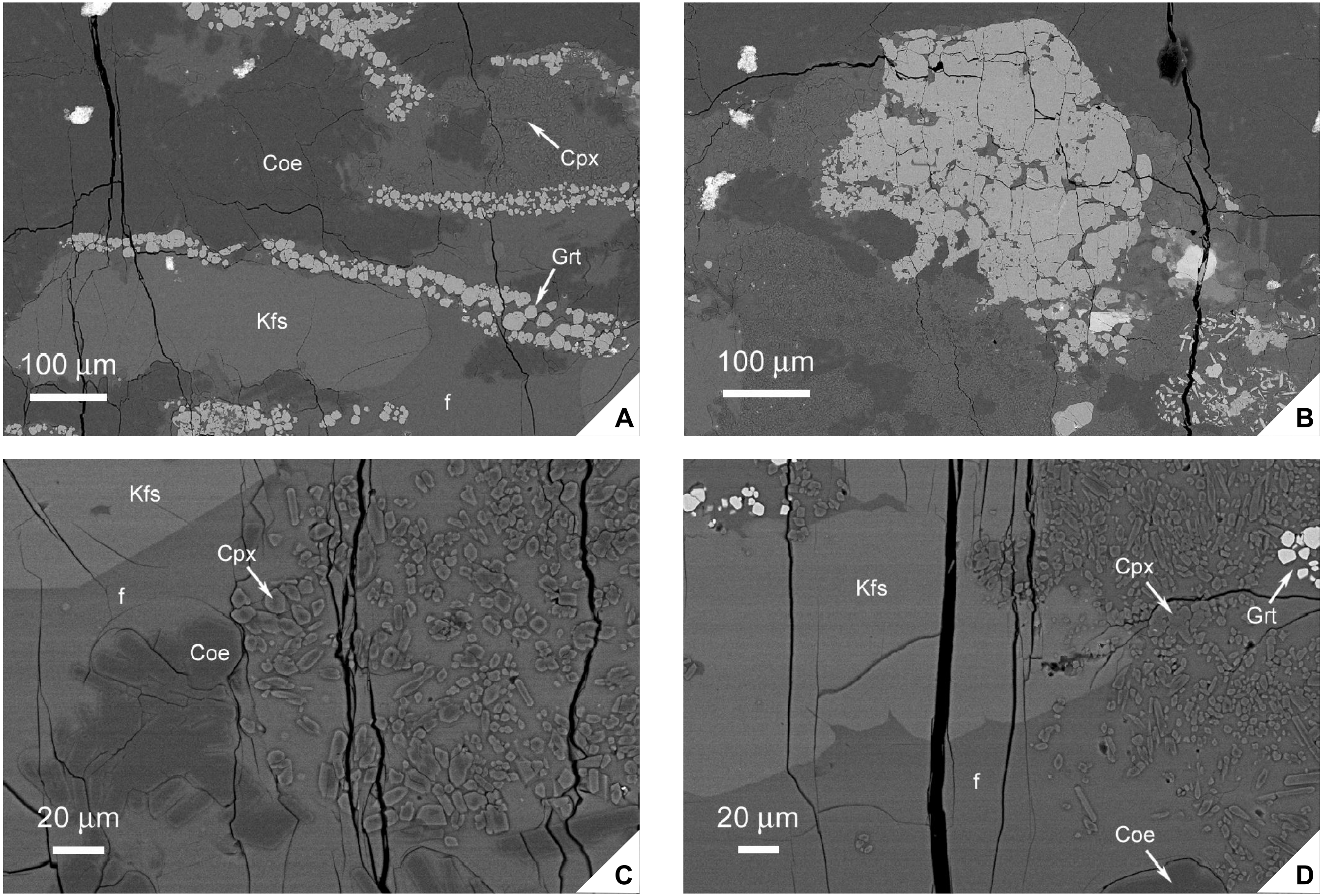


Figure 26: BSE images of Type 1 run G41 at constant conditions of 3.5 GPa / 700 °C, bulk water content 2 wt.%, run time 6 d. The foliation of the gneiss (horizontally oriented) is mirrored by K-feldspar and garnet (A). Relic garnet from the gneiss is preserved after the run (B). Clinopyroxene in the glass free of bubbles is grown at run conditions (C, D).

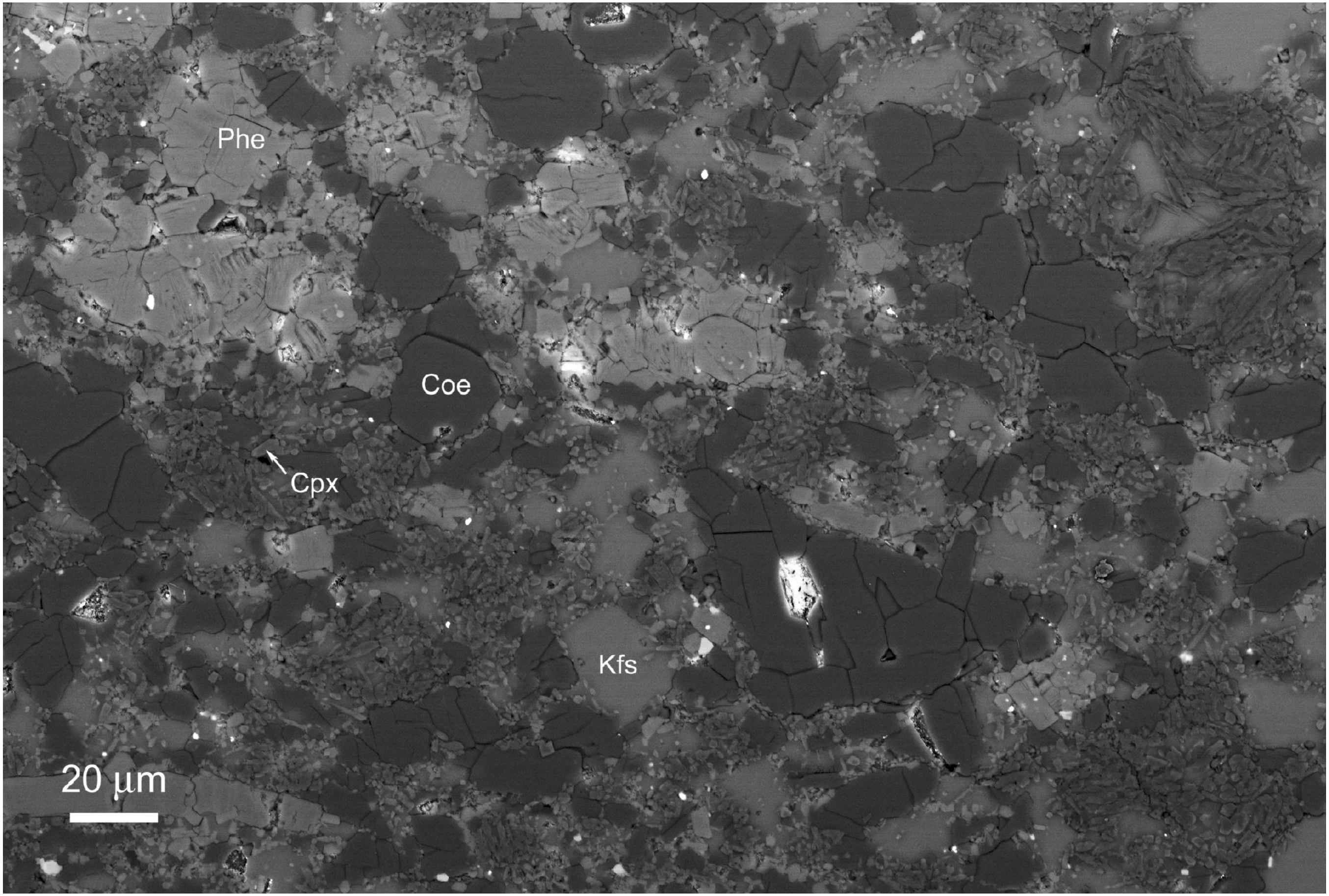


Figure 27: BSE image of Type 1 run G5 at constant conditions of 3.5 GPa / 700 °C, bulk water content 3.3 wt.%, run time 28 d. No glass is discernible between tiny clinopyroxene crystals, which are certainly not quench products.

former angular quartz fragments. The same holds true for accumulated phengite crystals replacing larger mica flakes. Myriads of tiny clinopyroxene crystals are grown throughout the sample. There is no fluid to be quenched, as no glass or other quench products occur.

Type 1 runs at constant conditions of 3.5 GPa / 1000 °C. Run G87 without added water and a run time of 2.5 h (see Figure 17) shows a microfabric very similar to that of the runs at constant conditions of 3.5 GPa / 700 °C. Between large coesite clusters and anhedral K-feldspar crystals numerous small clinopyroxene crystals occur along with some garnet, kyanite, rutile, and zircon (Figure 28). As observed in the runs described above (see Figure 27), the nucleation rate of clinopyroxene is obviously high, but, owing to the low bulk water content and despite the relatively high temperature, no grain growth seems to occur. Small fractions of glass may be present between the small crystals, but are not discernible.

The microfabric of Type 1 run G89 at constant conditions of 3.5 GPa / 1000 °C with a bulk water content of 5.7 wt.% and a run time of one day (see Figure 17) is completely different. The specimen consists of large amounts of coherent bubble-free silicic glass which enclose some euhedral crystals of coesite, garnet, zircon, and a few needles of kyanite (Figure 29).

Type 1 runs at constant conditions of 2.5 GPa / 1000 °C. The following seven runs were held at constant conditions of 2.5 GPa / 1000 °C (see Figure 16). After two hours in run G86 with a bulk water content of 2.8 wt.%, the fluid quenched to form a homogeneous bubble-free glass fills 88 vol.% (Figure 30). The vitrophyric fabric is characterized by anhedral quartz, irregular garnet, some zircon, and accumulations of acicular rutile and kyanite, respectively. Elongated clusters of more than 50 euhedral crystals of garnet formed at the expense of biotite thereby retaining the shape of the latter. The runs G91 and G90 with the same bulk water content of 2.8 wt.% show no change in microfabrics as compared to run G86. Further annealing of up to 15 hours does not significantly change the shape and the size of the crystals or the volume occupied by the fluid phase, which is determined to 84 vol.% in run G90 (Figure 31). In run G29 with a bulk water content of 2.8 wt.%, quenched after almost one day, euhedral crystals of K-feldspar are present, while the volume proportion of the fluid decreases to 70 vol.% (Figure 32). In run G56, also with a bulk water content of 2.8 wt.% and a run time of 8.5 d, the amount of fluid is dropped to 39 vol.%, while the proportion of K-feldspar and quartz is further increased (Figure 33).

Run G39 with a bulk water content of 5.5 wt.%, quenched after 23 h of annealing at 2.5 GPa / 1000 °C is entirely brownish, bubble-free glass. In run G34 with a bulk water content of 8.4 wt.% quenched when reaching 1000 °C, only a few crystals of quartz, garnet, zircon, and rutile remain within the homogeneous bubble-free glass. Hence, the bulk of the sample powder is already molten during the half hour of heating to 1000 °C.

Type 4 runs without cooling. The both runs with a bulk water content of 2.8 wt.% underwent conditions of 2.5 GPa / 1000 °C for 23 hours in an early stage of the run as it is represented by the microfabric of run G29 (Figure 32). Subsequent to pressurization to 3.5 GPa, the runs G53 and G94 without cooling were

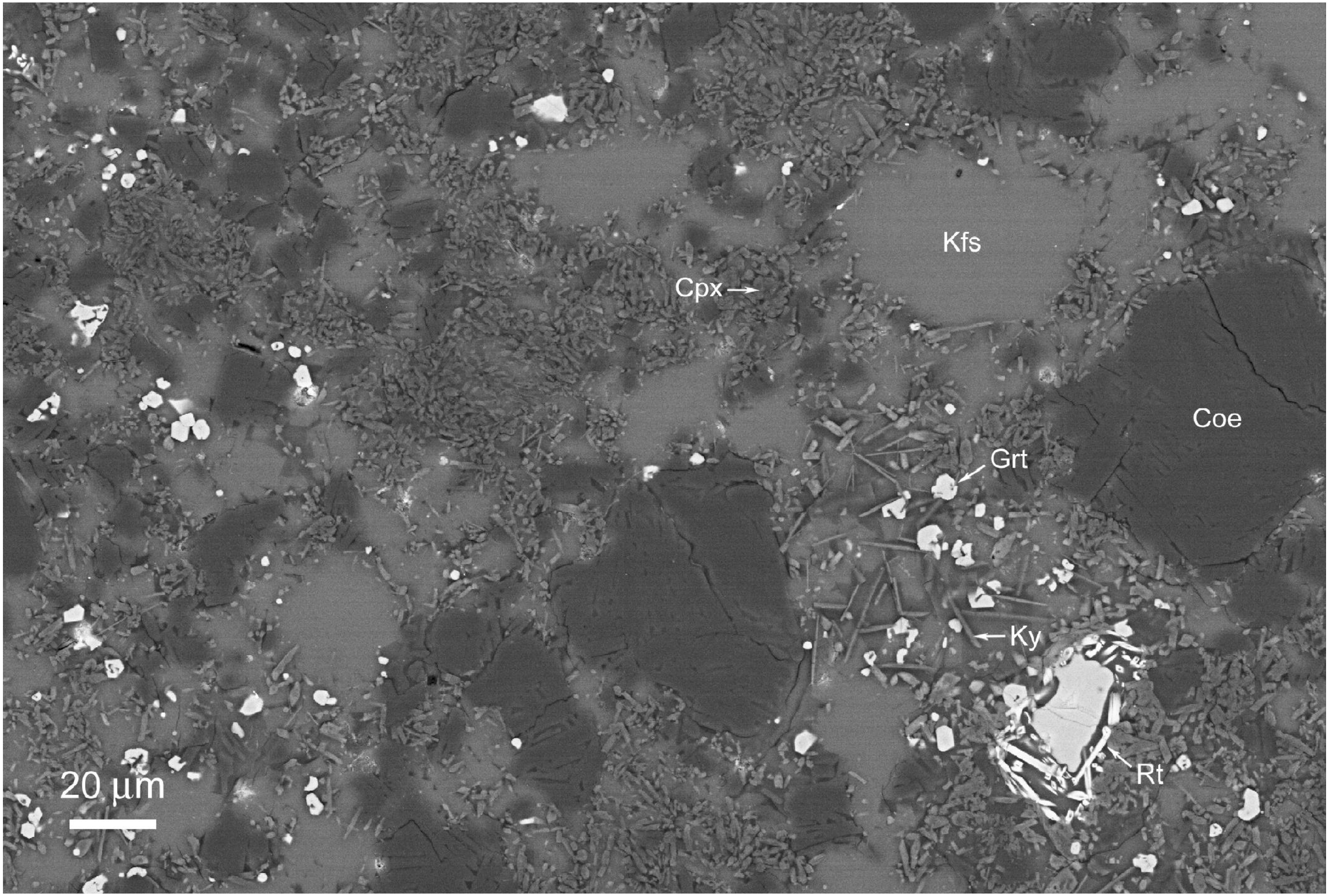


Figure 28: BSE image of Type 1 run G87 at constant conditions of 3.5 GPa / 1000 °C, bulk water content 0.8 wt.%, run time 2.5 h. Between large coesite clusters and anhedral K-feldspar crystals numerous small clinopyroxene crystals occur along with some garnet, rutile, kyanite, and zircon. Quenched glass is not discernible.

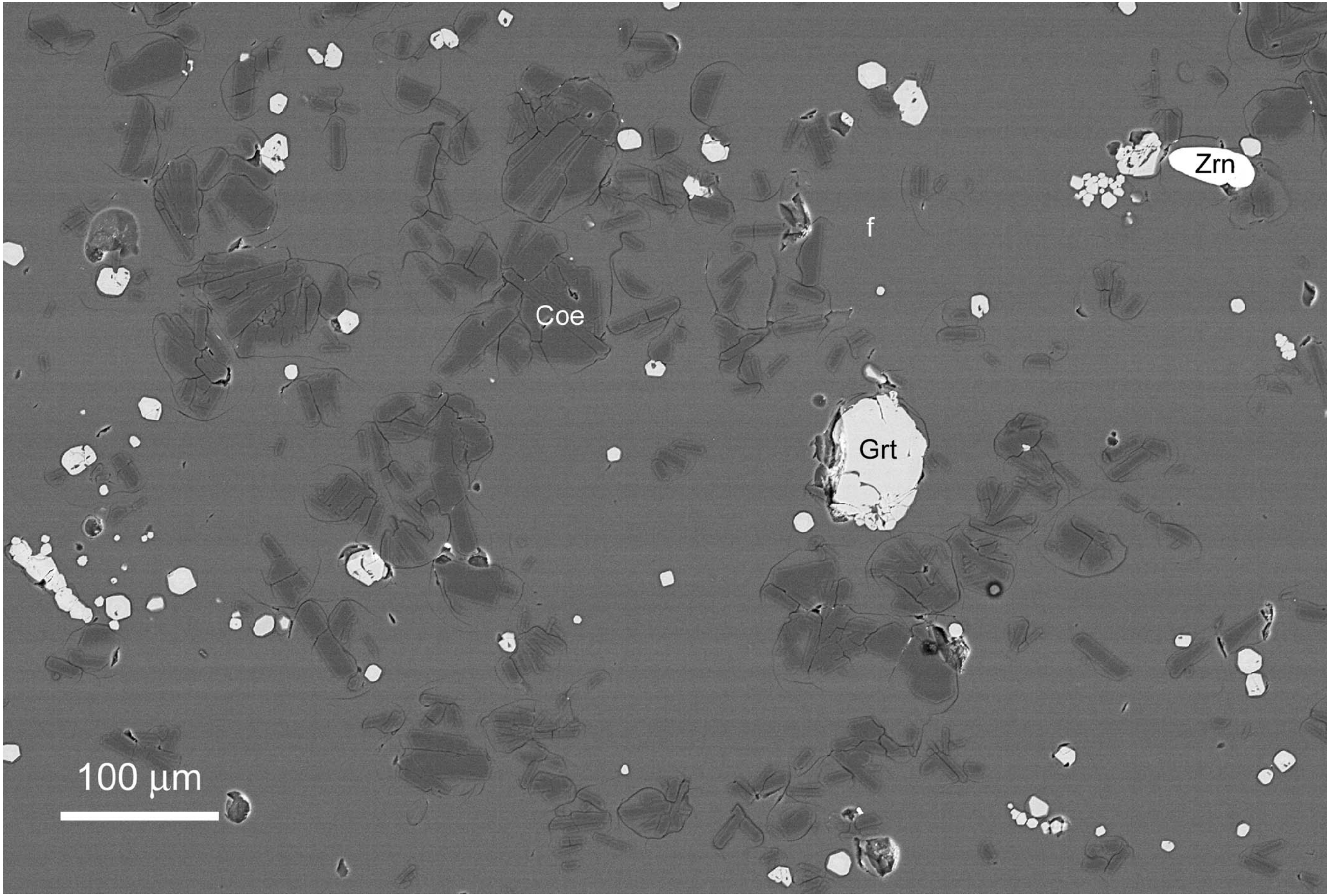


Figure 29: BSE image of Type 1 run G89 at constant conditions of 3.5 GPa / 1000 °C, bulk water content 5.7 wt.%, run time 21.5 h. Coherent glass free of bubbles contains some euhedral crystals of coesite, garnet, and zircon.

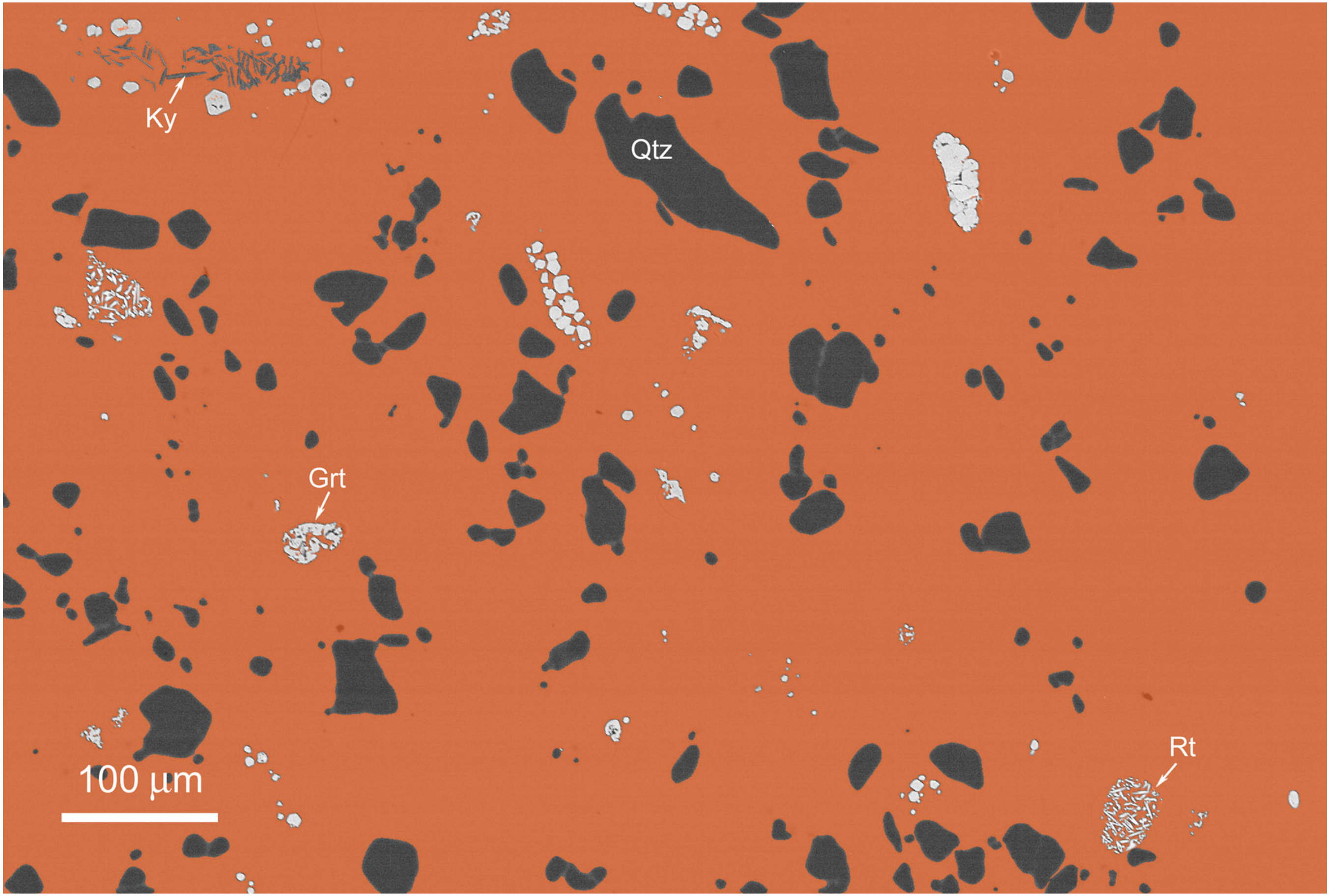


Figure 30: BSE image of Type 1 run G86 at constant conditions of 2.5 GPa / 1000 °C, bulk water content 2.8 wt.%, run time 3 h. The fluid quenched to form a homogeneous, bubble-free glass (orange) fills 88 vol.%, and contains anhedral quartz, irregular garnet, some zircon, and accumulations of acicular rutile and kyanite, respectively.

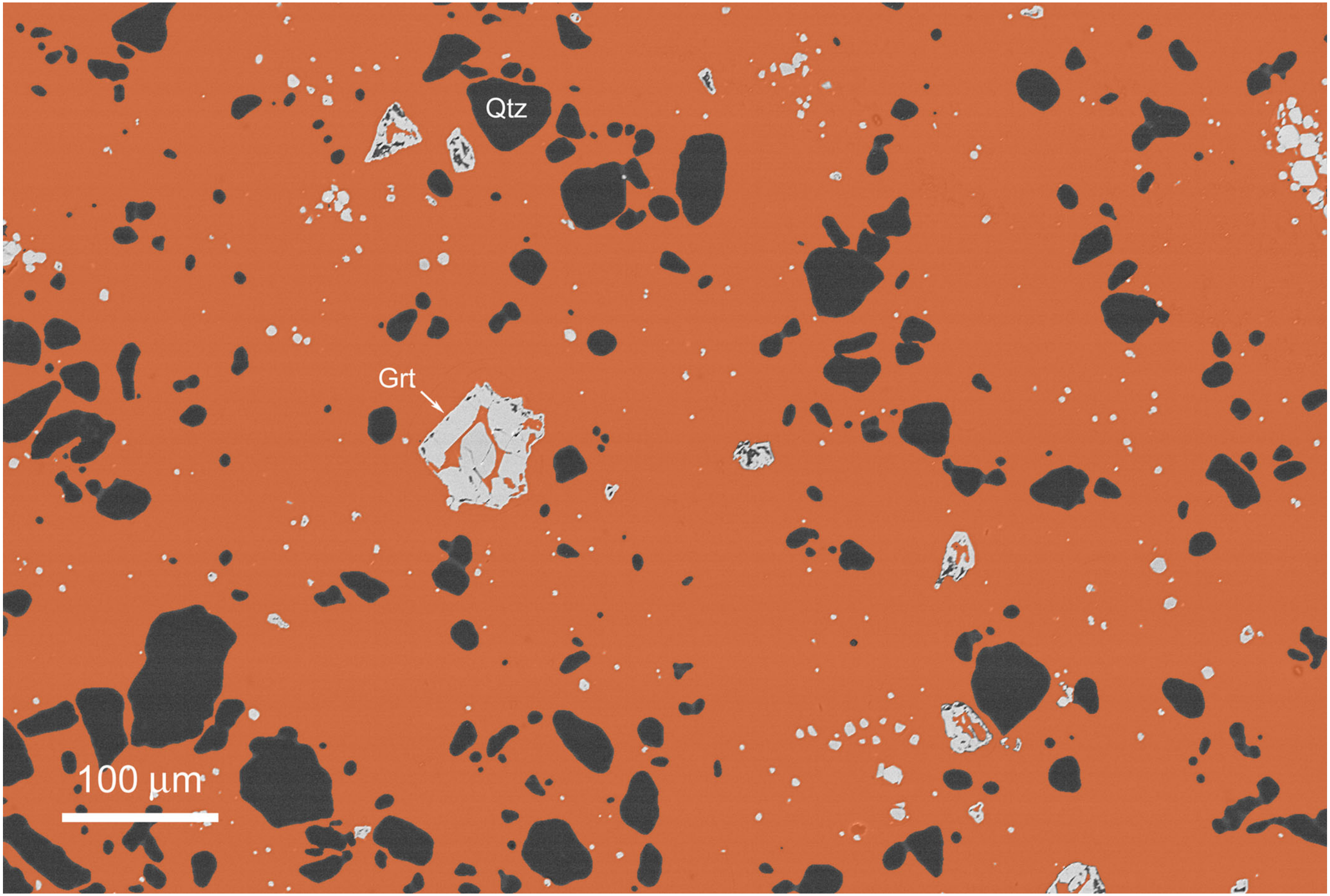


Figure 31: BSE image of Type 1 run G90 at constant conditions of 2.5 GPa / 1000 °C, bulk water content 2.8 wt.%, run time 15 h. The fluid phase (orange) occupies 84 vol.%.

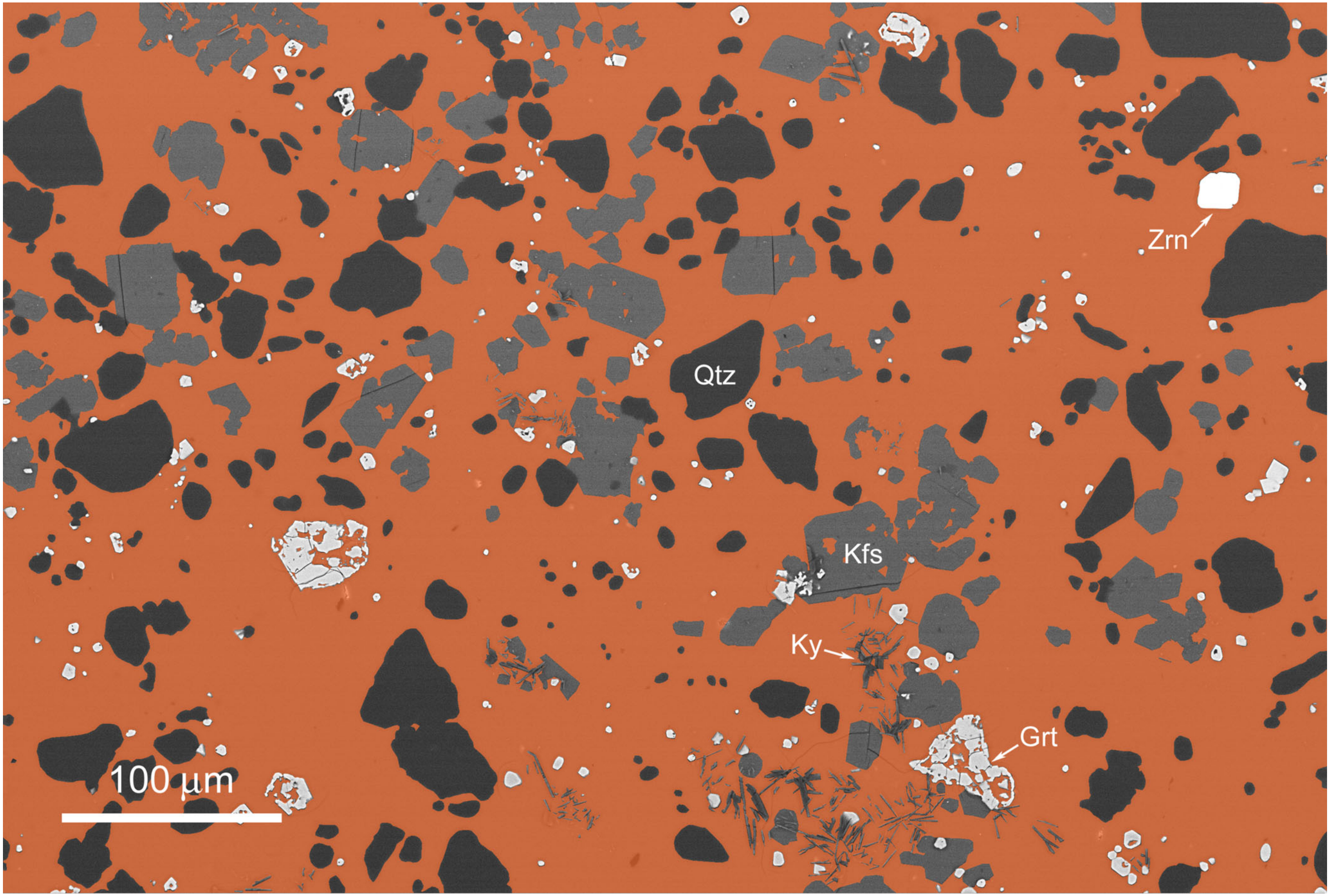


Figure 32: BSE image of Type 1 run G29 at constant conditions of 2.5 GPa / 1000 °C, bulk water content 2.8 wt.%, run time 20.5 h. K-feldspar is present and the volume proportion of the fluid (orange) is decreased to 70 vol.%.

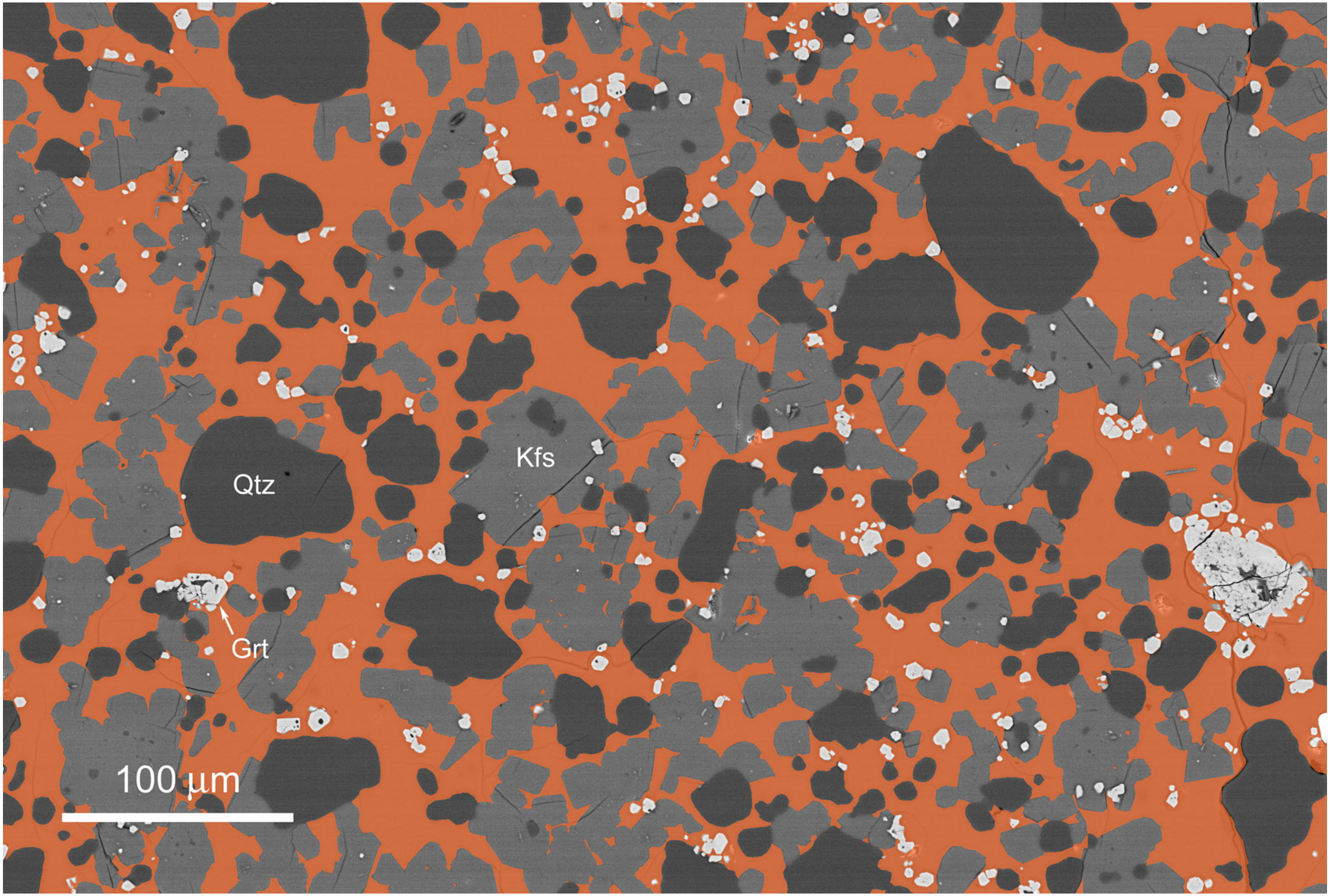


Figure 33: BSE image of Type 1 run G56 at constant conditions of 2.5 GPa / 1000 °C, bulk water content 2.8 wt.%, run time 205.5 h. The amount of fluid (orange) is eventually dropped to 39 vol.%, while the volume proportion and the size of K-feldspar and quartz crystals is further increased.

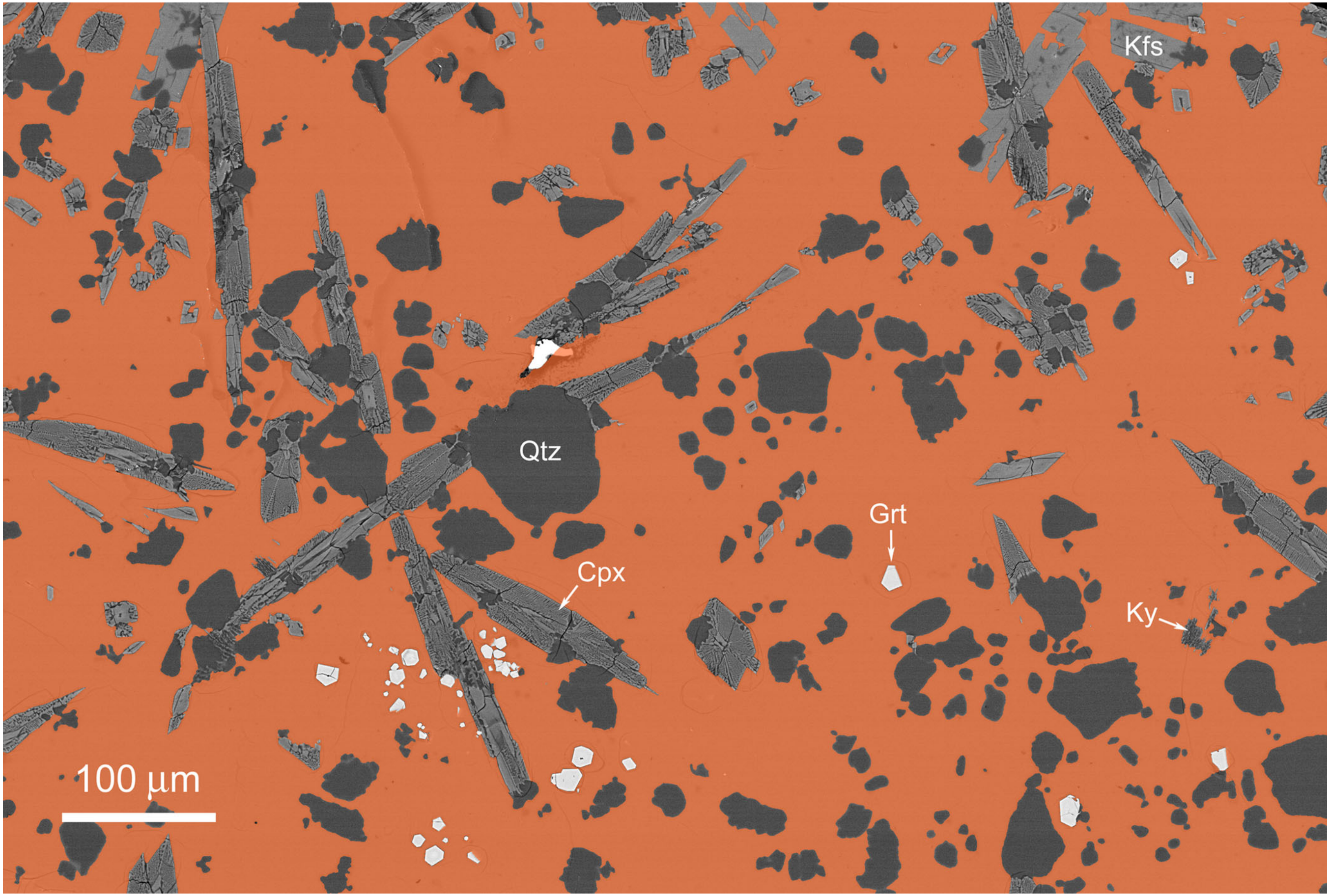


Figure 34: BSE image of Type 4 run G53 without cooling, bulk water content 2.8 wt.%, run time 25 h, quenched at conditions of 3.5 GPa / 1000 °C after 0.5 h of annealing. The homogeneous silicic glass free of bubbles (orange) occupies 72 vol.%. Irregular rounded quartz crystals occur together with garnet, K-feldspar, clinopyroxene, and kyanite.

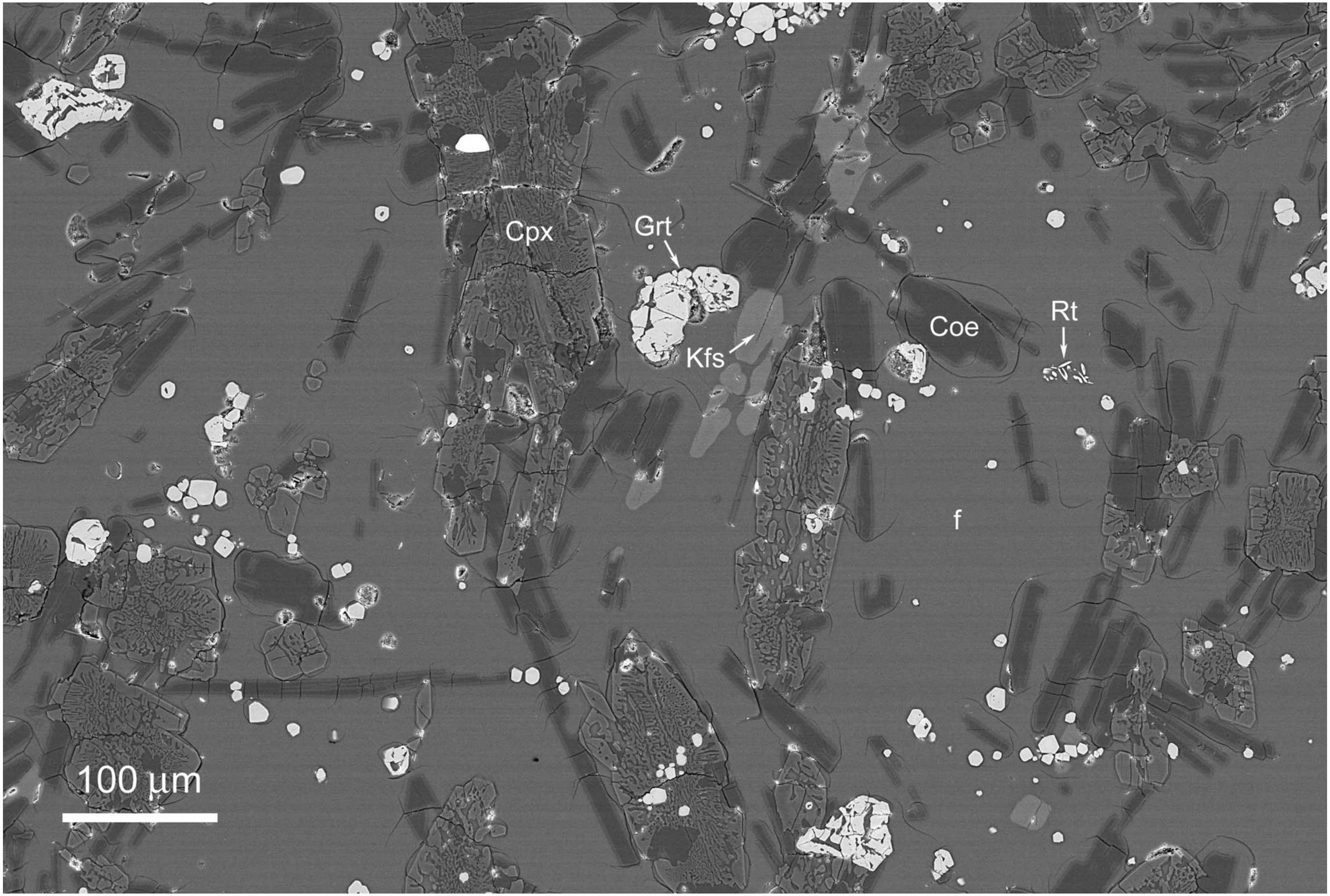


Figure 35: BSE image of Type 4 run G94 without cooling, bulk water content 2.8 wt.%, run time 30.5 h, quenched at conditions of 3.5 GPa / 1000 °C after 6 h of annealing. Quartz is completely transformed to coesite.

quenched after annealing at 1000 °C for half an hour and six hours, respectively (see Figure 18). In run G53 (Figure 34), the homogeneous silicic glass free of bubbles occupies 72 vol. %. Although the run conditions are certainly within the stability field of coesite (Mirwald and Massonne, 1980b; Bohlen and Boettcher, 1982), only irregular, rounded quartz crystals are present. Clusters of garnet and accumulations of acicular rutile and kyanite, respectively, also occur. Phenocrysts of K-feldspar and clinopyroxene are new to the assemblage. The latter are characteristically intergrown with thin lamellae of quartz. In run G94 (Figure 35) the quartz is completely transformed to coesite. The clinopyroxene crystals have increased in size. Former quartz inclusions within the clinopyroxene are transformed to coesite as well, but many of the thin lamellae are now replaced by fluid. The remainder of the assemblage is unchanged.

Type 5 runs with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%. All Type 5 runs first underwent melting for 23 hours at conditions of 2.5 GPa / 1000 °C, corresponding to the Type 1 run G29 (Figure 32). Then, subsequent to pressurization and half an hour of annealing at 3.5 GPa / 1000 °C as represented by the Type 4 run without cooling G53 (Figure 34), cooling starts at the respective rate (see Figures 20 to 23).

Cooling within five and a half hours to 900 °C at a rate of 0.3 °C /min results in microfabrics as observed in run G27 (Figure 36). Apart from a change in the volume proportion of the phases, the assemblage at 3.5 GPa / 900 °C is the same as the one at conditions of 3.5 GPa / 1000 °C in the Type 4 run G94 without cooling with the same run time. Platy coesite crystals and large phenocrysts of K-feldspar and clinopyroxene form a loose framework, the quenched fluid in between fills 49 vol.%. In contrast to the above described run G94, the lamellar symplectites of silica and clinopyroxene are distinct and the coesite inclusions still retain the shape of former quartz grains.

In run G66 (Figure 37), as cooling at a rate of 0.3 °C /min has proceeded to 3.5 GPa / 800 °C (see Figure 22), the phase assemblage comprises euhedral coesite crystals, large phenocrysts of clinopyroxene and K-feldspar, euhedral crystals of phengite, garnet, needles of kyanite, apatite, some zircon, and a fluid quenched to form a coherent silicic glass. The homogeneous bubble-free glass, which is transparent and colourless, fills 23 vol.%. No other quench phases were observed. In run G23 (Figure 38), performed at the same conditions, K-feldspar phenocrysts, which are normally a few hundred micrometres large, attain a size of up to one and a half millimetre. More strikingly, the transition from quartz to coesite is not yet completed in this particular run and only a few platy coesite crystals occur while rounded quartz crystals predominate. The quenched fluid comprises 27 vol.%.

Virtually the identical microfabric and phase assemblage as in run G66 (Figure 37) at 800 °C is observed in run G95 (Figure 39) with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 750 °C. At this temperature, bubbles in the quenched glass are observed for the first time. The bubbles are unevenly distributed on a small scale, as seen in close-ups of some fluid-filled interstices (Figure 40). While large parts of the glass are free of bubbles (Figure 40A, B), bubble cavities are densely arranged in other areas (Figure 40C). The bubble size is conspicuously different in contact to particular crystalline phases:

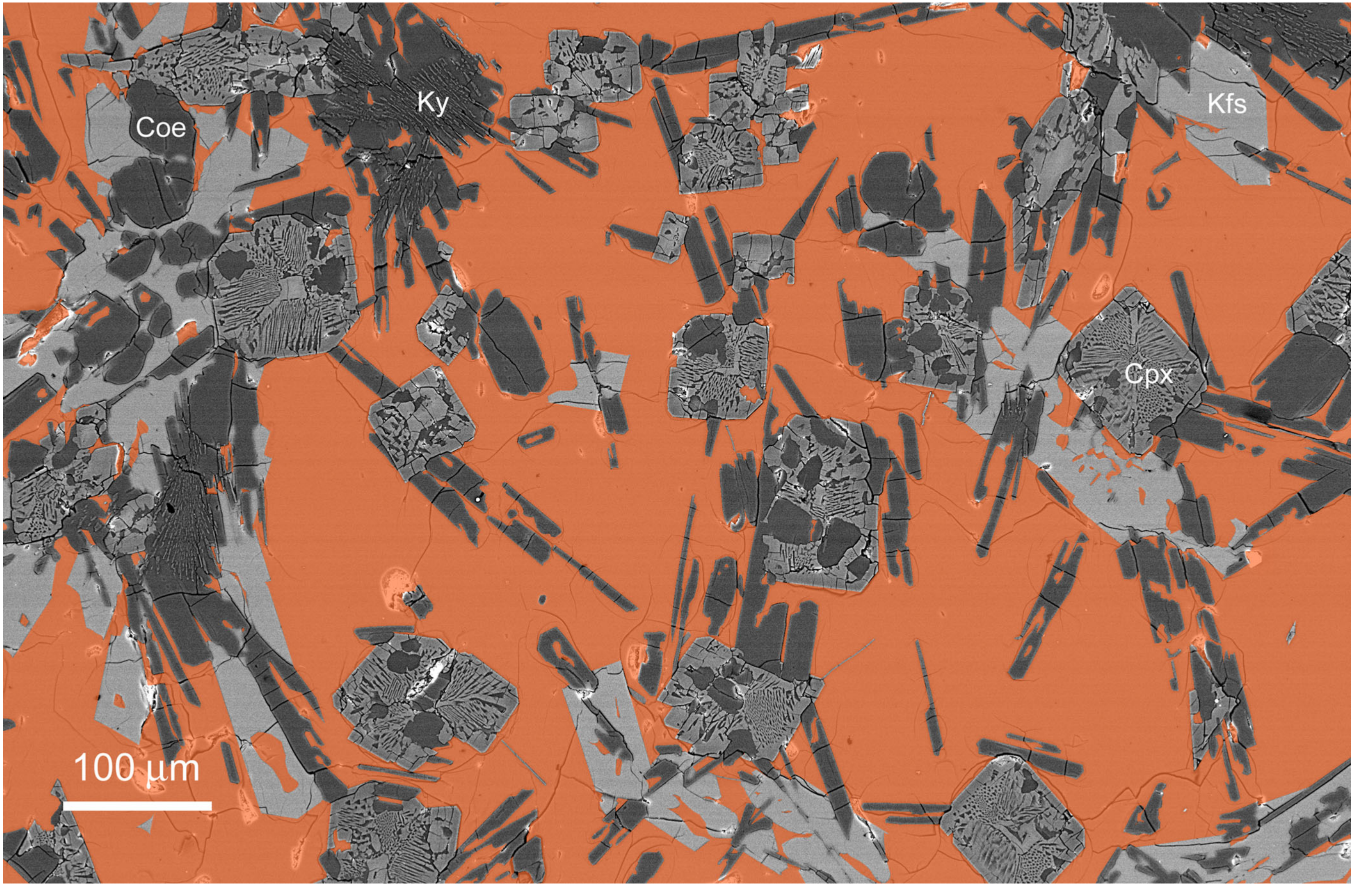


Figure 36: BSE image of Type 5 run G27 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 30.5 h, quenched at conditions of 3.5 GPa / 900 °C, no annealing. Platy coesite crystals and phenocrysts of K-feldspar and clinopyroxene form a loose framework, the quenched fluid (orange) in between fills 49 vol.%. In contrast to Type 4 run G94 without cooling (Figure 35) with the same run time but held at 1000 °C, the lamellar symplectites of clinopyroxene and silica are distinct.

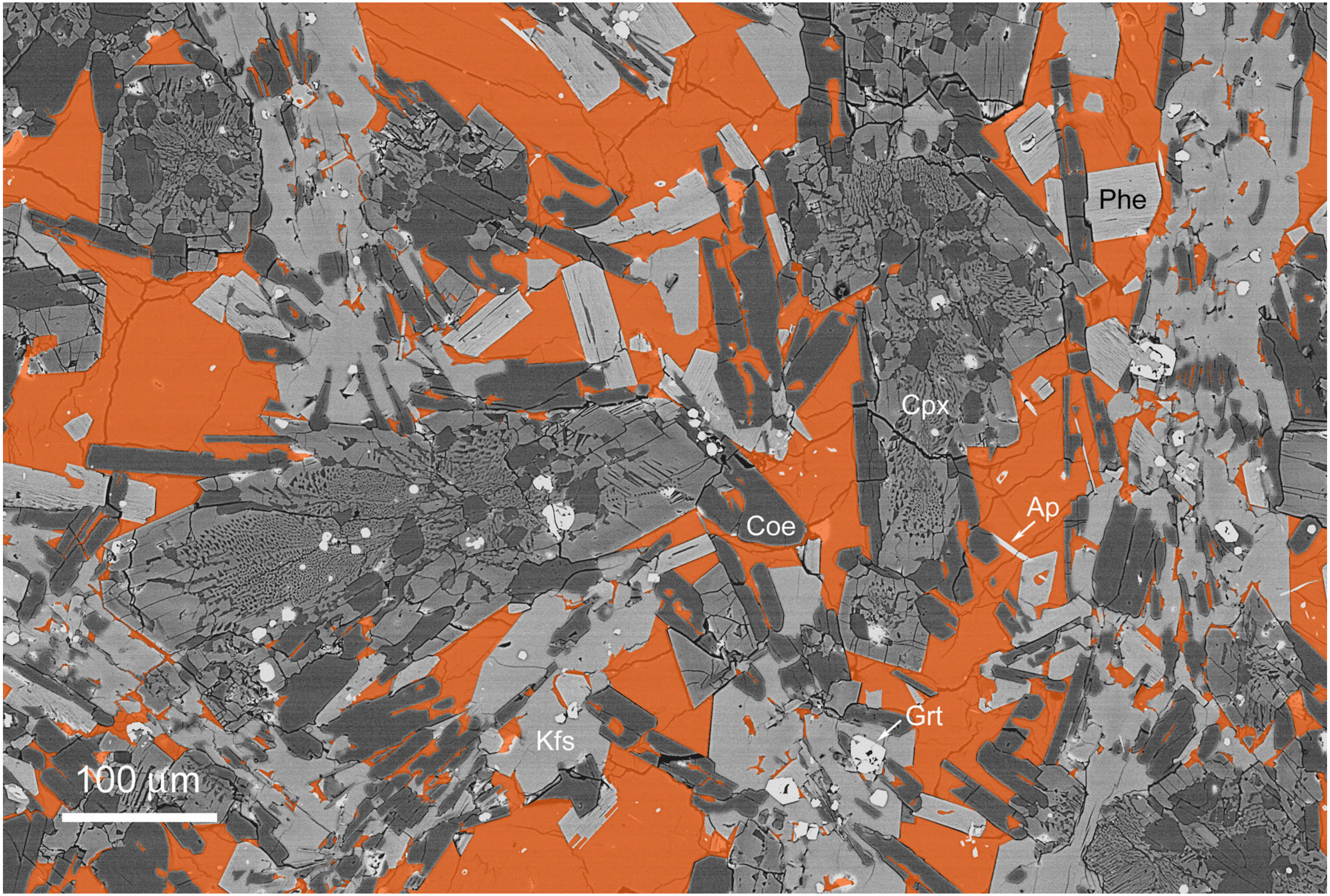


Figure 37: BSE image of Type 5 run G66 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 36 h, quenched at 3.5 GPa / 800 °C, no annealing. The transparent, bubble-free glass (orange) fills 23 vol.%.

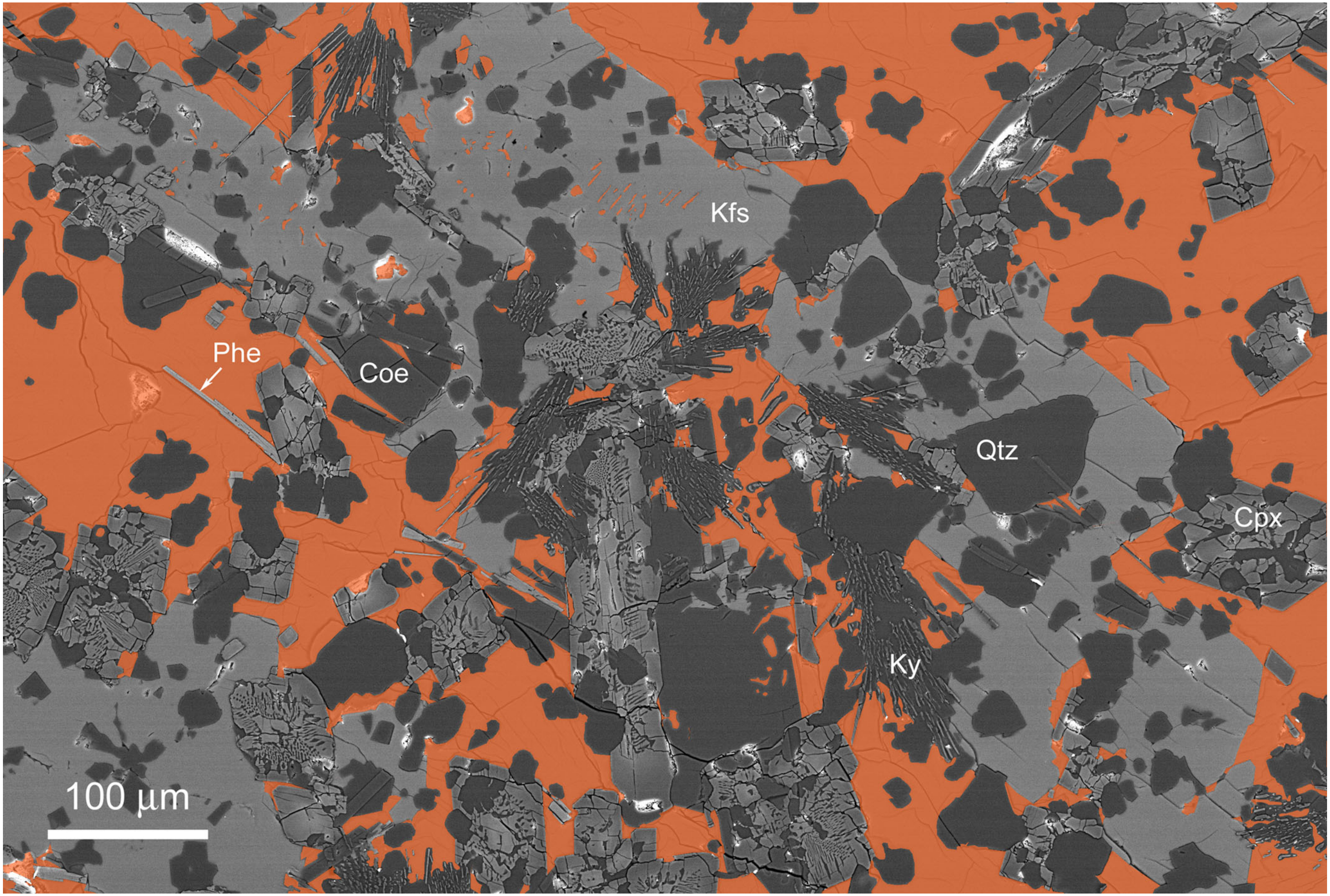


Figure 38: BSE image of Type 5 run G23 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 36 h, quenched at conditions of 3.5 GPa / 800 °C, no annealing. Note the large K-feldspar phenocrysts. Only a few platy coesite crystals occur while rounded quartz crystals predominate. The fluid (orange) comprises 27 vol.%.

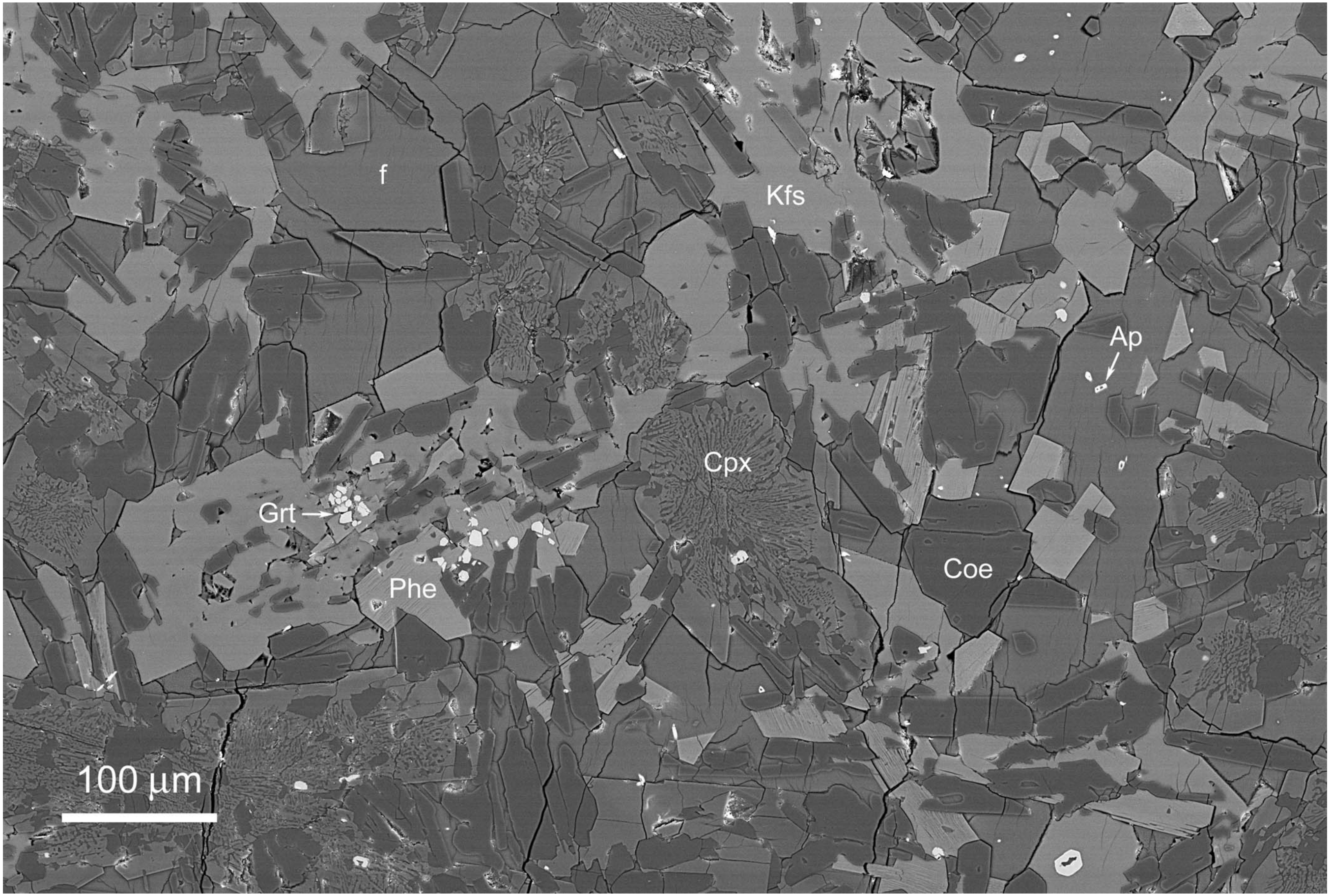
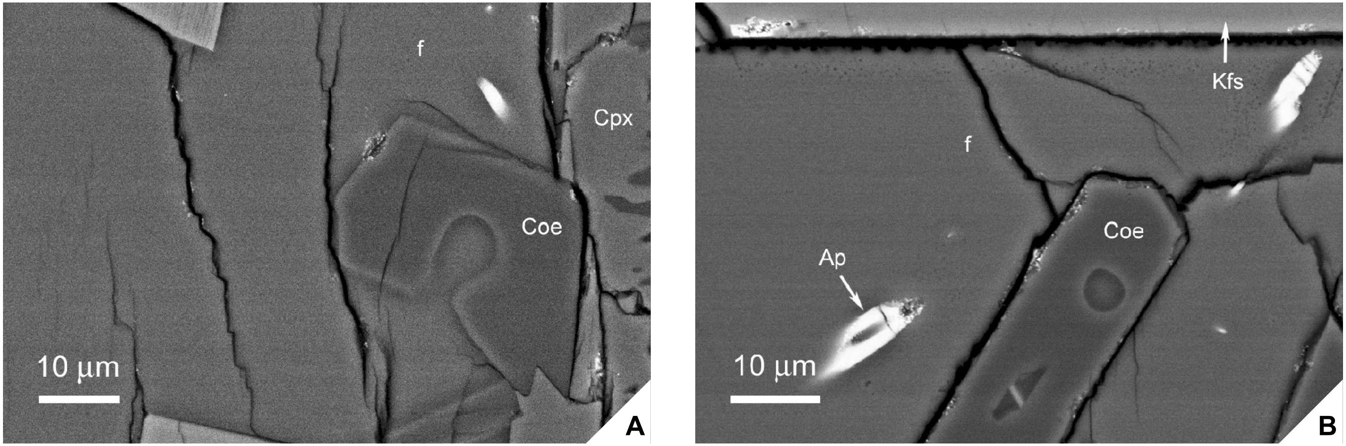


Figure 39: BSE image of Type 5 run G95 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 39 h, quenched at conditions of 3.5 GPa / 750 °C, no annealing. Euhedral crystals of coesite, large phenocrysts of clinopyroxene and K-feldspar, phengite, garnet, apatite, and a fluid quenched to form a silicic glass occur.



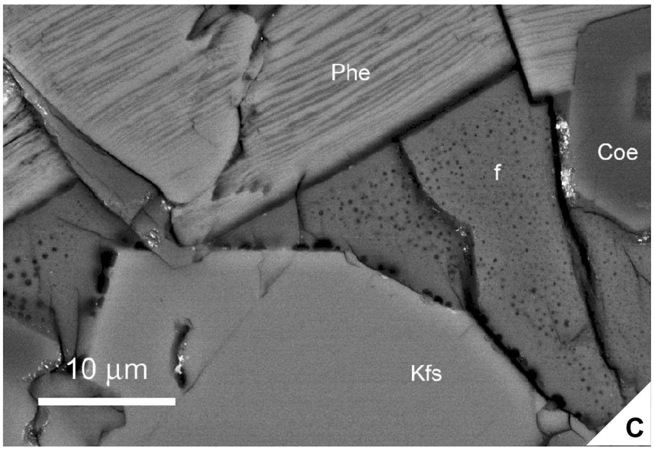


Figure 40: BSE images of Type 5 run G95 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 39 h, quenched at conditions of 3.5 GPa / 750 °C, no annealing. Close-ups of some fluid-filled interstices showing uneven distribution of bubbles in the quenched glass. While large parts of the glass are free of bubbles (A, B), bubble cavities are densely arranged in other areas (C). The bubble size is conspicuously different in contact to particular crystalline phases: whereas the glass adjacent to coesite is generally free of bubbles (A, B), large cavities up to two micrometres in diameter and accompanied by a seam free of bubbles are widespread in contact to K-feldspar (B, C).

whereas the glass adjacent to coesite is generally free of bubbles (Figure 40A, B), large cavities up to two micrometres in diameter and accompanied by a seam free of bubbles are widespread in contact to K-feldspar (Figure 40B, C).

The majority of the Type 5 runs with a cooling rate of 0.3 °C /min was quenched after 16 h and 40 min of cooling from 1000 to 700 °C at conditions of 3.5 GPa / 700 °C. At this temperature, the influence of variations in pressure, annealing time, and bulk water content on the microfabrics was verified by systematically changing these parameters. Four of the eight runs with a bulk water content of 2.8 wt.%, i.e. runs G85, G82 (Figure 41), G26 (Figure 42), and G71, were quenched without annealing at 700 °C. The others, namely G7 (Figures 43 and 44), G72 (Figure 45), and G16 (Figure 46), were quenched after 125 h, 130 h, and 146.5 h of annealing, respectively; G97 (Figure 47) was quenched even after 276 h of annealing. Run G85 was thereby performed at a pressure increased by 0.06 GPa, the runs G71 and G72 at a pressure decreased by 0.06 GPa. For details see Section 4.5 and Table 2.

The microfabrics and the phase assemblage of the four runs G85, G82 (Figure 41), G26 (Figure 42), and G71 as seen in the optical microscope and in the SEM are identical and prove a good reproducibility. The large clinopyroxene crystals measuring 100 μm across are rimmed by pure jadeite composition free of symplectitic silica lamellae. Euhedral coesite crystals, garnet, and zircon occur unchanged as observed at higher temperatures. The amount of apatite and phengite is increased, many of the large euhedral flakes of the latter include isolated crystals or clusters of garnet. The large phenocrysts of K-feldspar are partially broken down by formation of K-feldspar hydrate. Relics of K-feldspar frequently occur as inclusions in large euhedral K-feldspar hydrate crystals. Locally, both phases are intergrown, forming a patchy matrix of K-feldspar and K-feldspar hydrate enclosing coesite that was originally included in K-feldspar.

The microfabrics of the annealed runs show some recurrent features. After prolonged annealing as represented by run G97 (Figure 47), the cores of clinopyroxene crystals, formerly characterized by distinct symplectitic intergrowths with silica, become decomposed and are replaced by phengite, fluid, and little titanite. In run G16 this process has not yet that much proceeded. Decomposition of the calcium-rich core of clinopyroxene crystals results in an enrichment of calcium in the fluid (see Chapter 6).

Whereas annealing has no significant influence on the distribution of the fluid phase, the volume proportion of the fluid decreases with ongoing growth of the crystalline phases. In all runs quenched at conditions of 3.5 GPa / 700 °C, the fluid phase resides in polygonal interstices between the crystals, bounded by interfaces that are mostly rational. The fluid occupies 12 vol.% in specimen G82 (Figure 41), 14 vol.% in G26 (Figure 42), and 10 vol.% in the annealed run G16 (Figure 46). In comparison to the other runs quenched at 700 °C, in run G72 (Figure 45) the volume proportion of feldspar, that is predominantly K-feldspar hydrate, is increased at the expense of the fluid phase, which fills only 6 vol.%. The anomalous high fluid content of 15 vol.% and 19 vol.% in run G7 corresponds to the near-absence of K-feldspar hydrate; only a few small crystals occur besides the large K-feldspar phenocrysts (Figures 43 and 44). The deviation in the volume proportion of the fluid phase

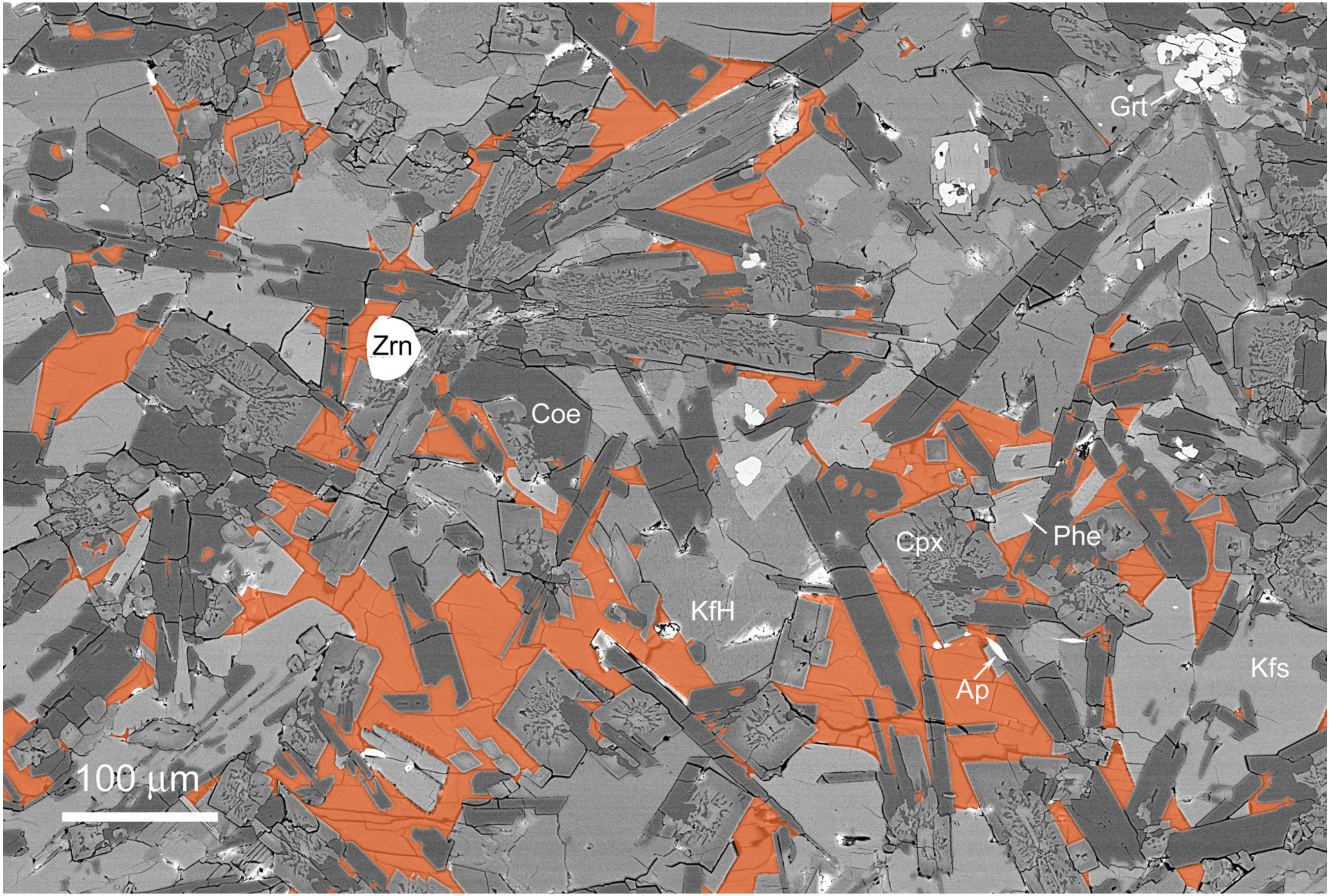


Figure 41: BSE image of Type 5 run G82 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 39 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. 12 vol.% of fluid (orange) fills polygonal interstices. K-feldspar (light grey) and K-feldspar hydrate (darker grey) are easily distinguished in this image.

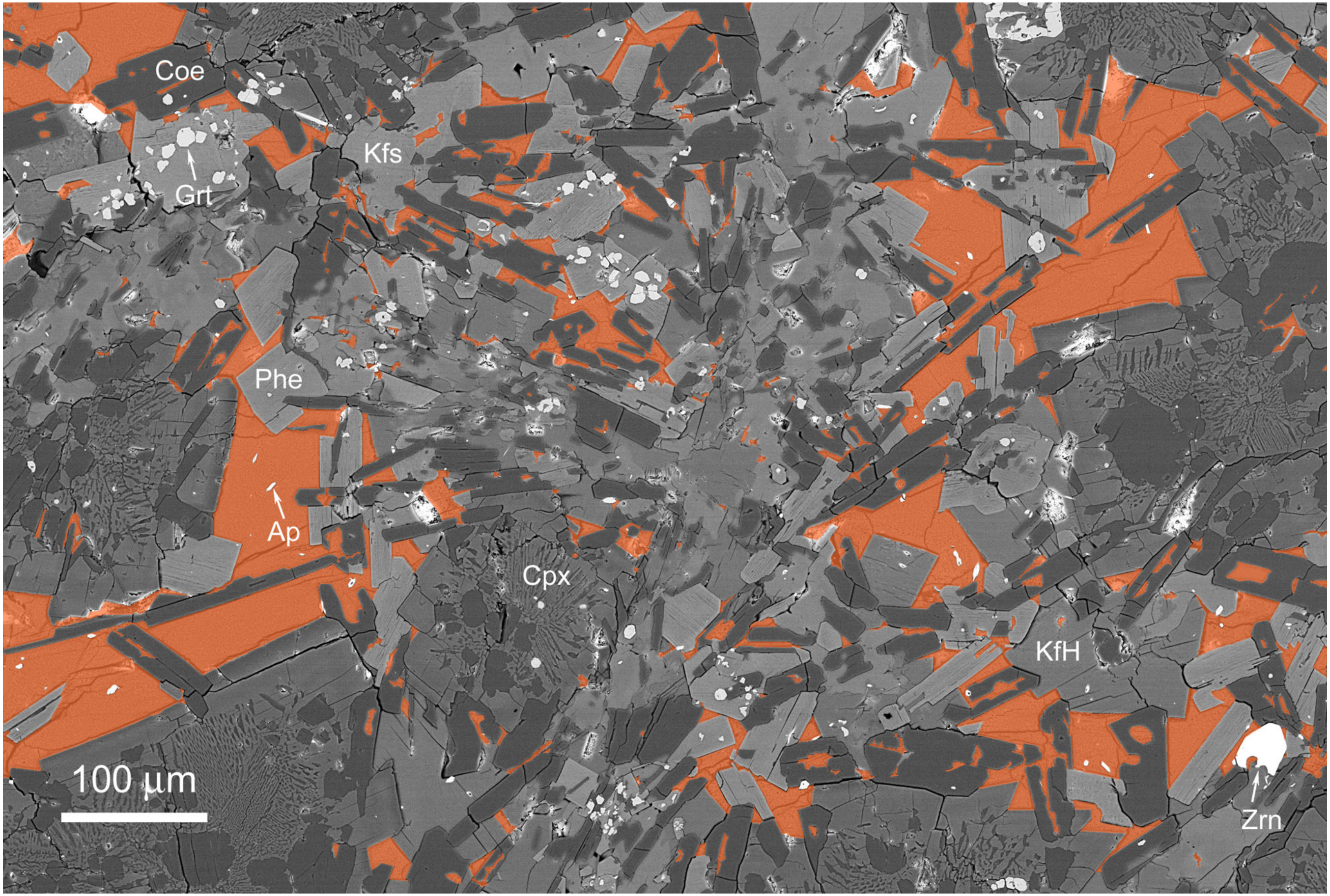


Figure 42: BSE image of Type 5 run G26 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. The fluid (orange) occupies 14 vol.%.

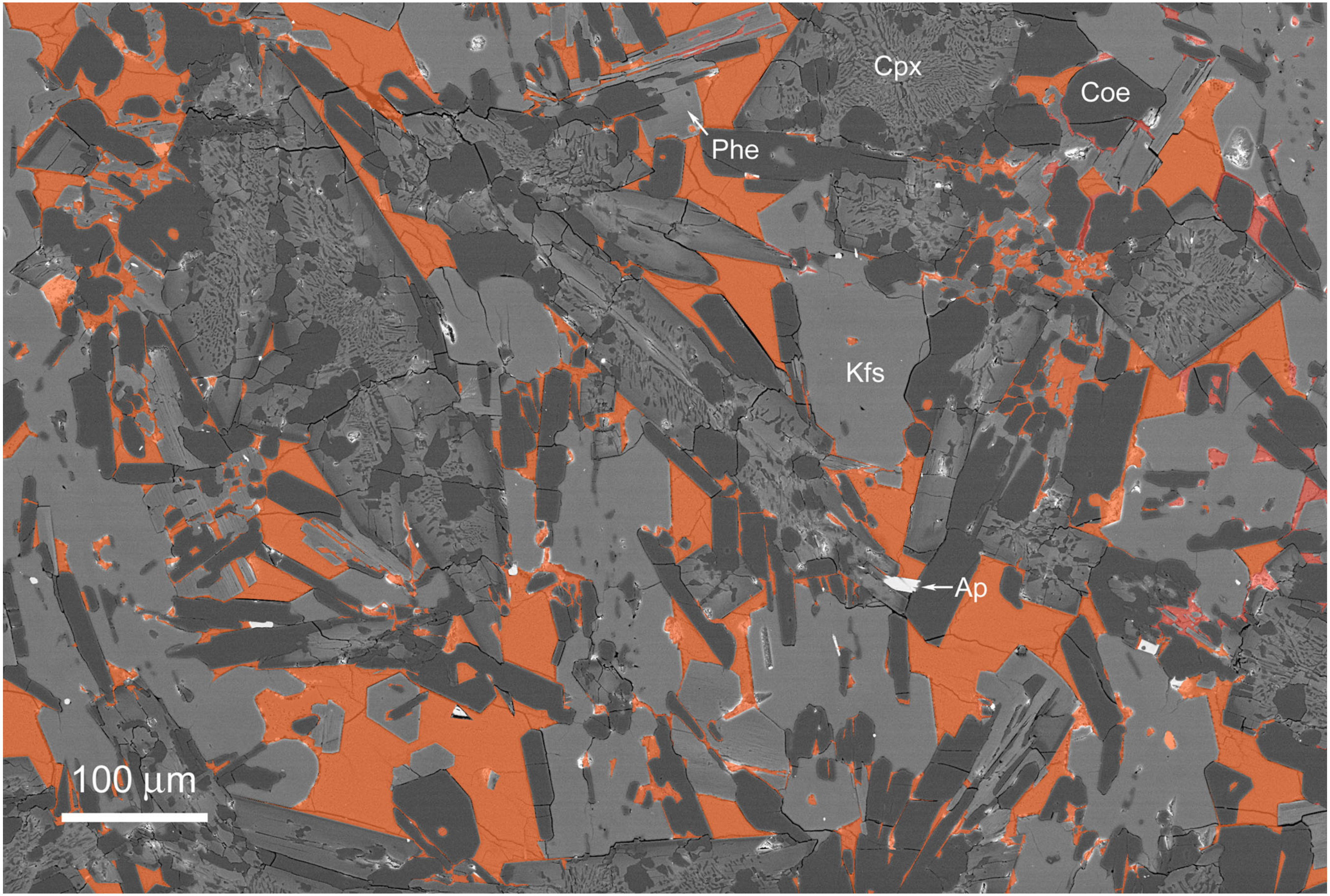


Figure 43: BSE image of Type 5 run G7 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 7 d, quenched at conditions of 3.5 GPa / 700 °C, 5 d annealing. The vesiculated glass (orange) fills 15 vol.%.

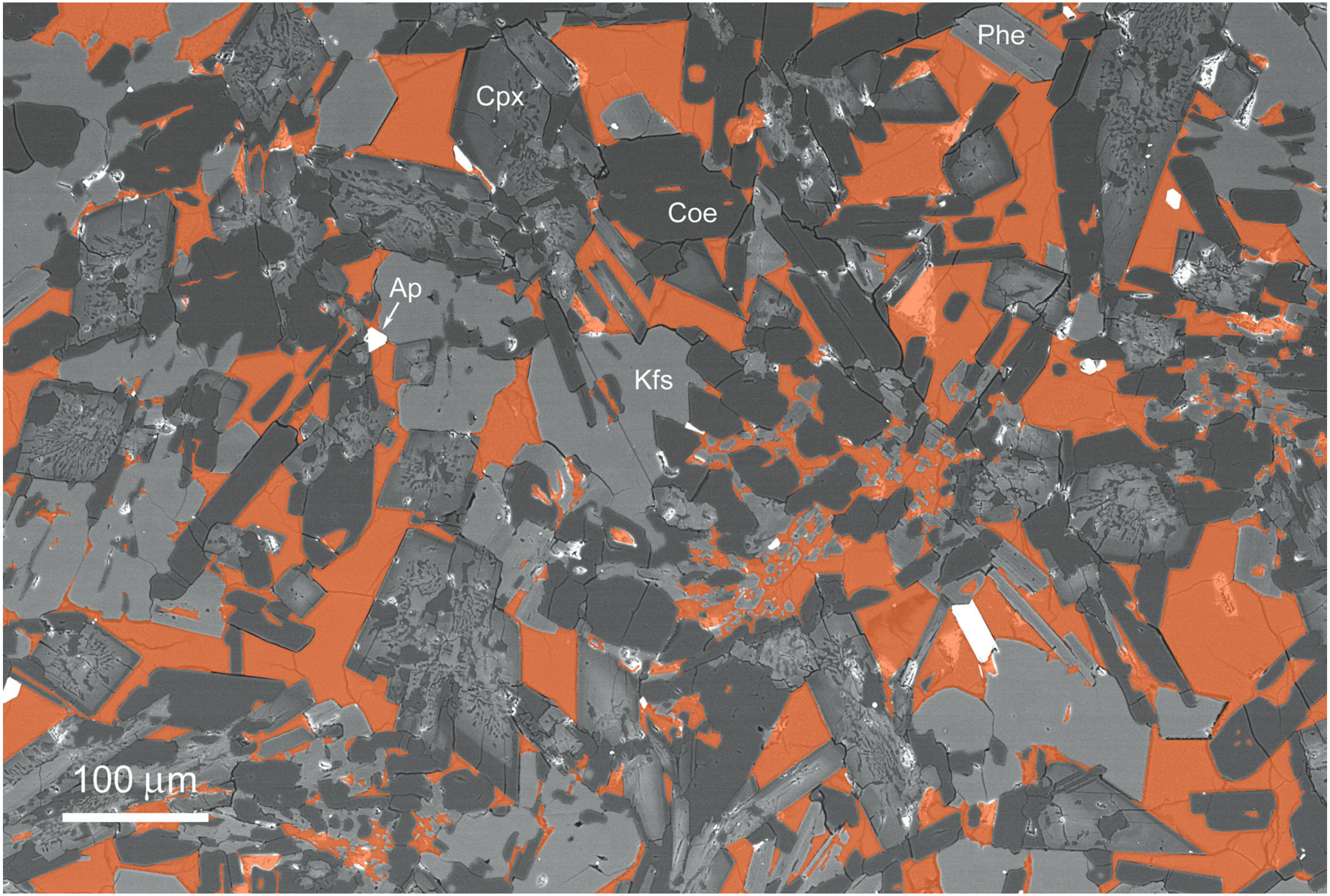


Figure 44: BSE image of Type 5 run G7 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 7 d, quenched at conditions of 3.5 GPa / 700 °C, 5 d annealing. The fluid (orange) comprises 19 vol.%. This image of the same specimen as above shows a slight difference in the amount of quenched fluid.

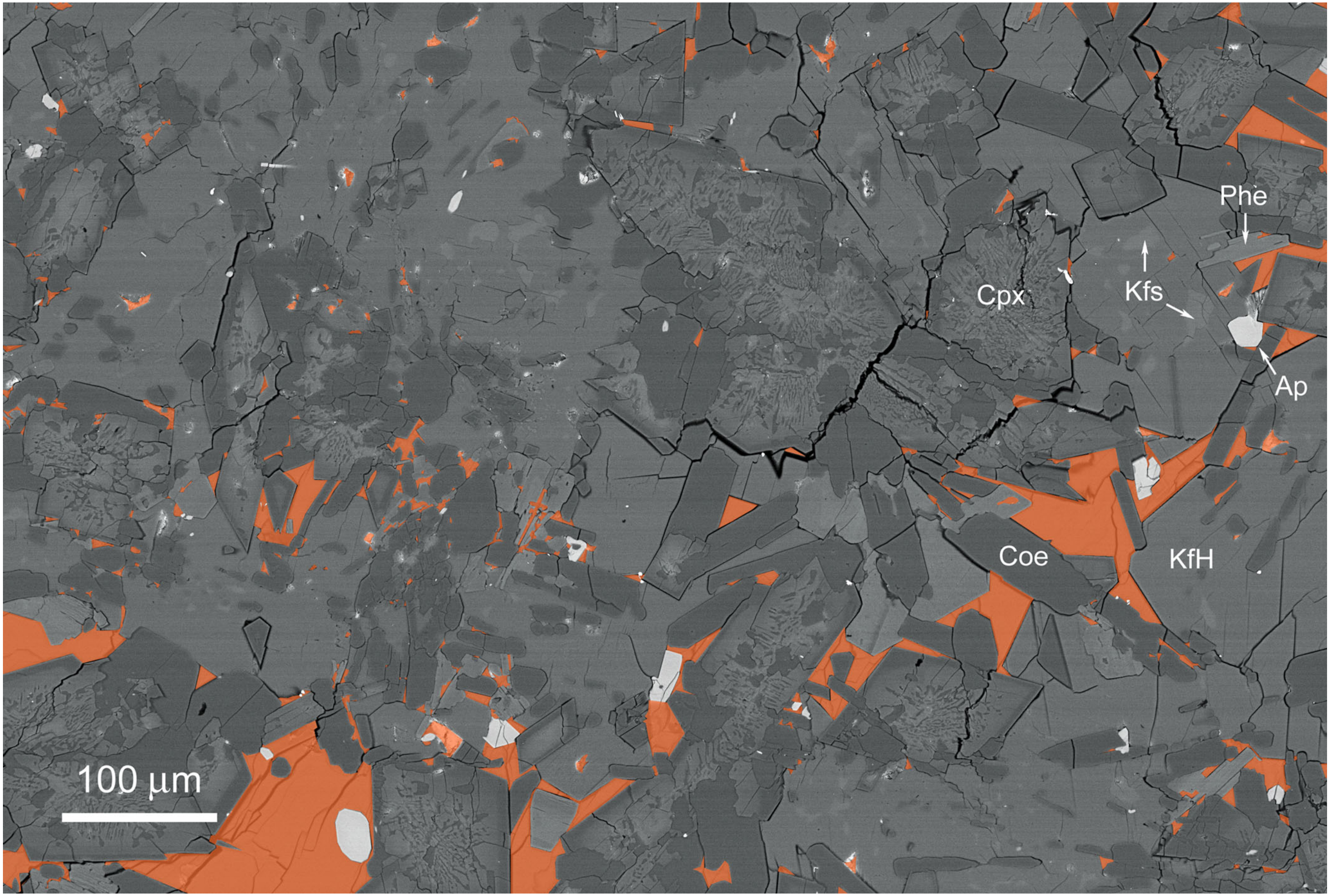


Figure 45: BSE image of Type 5 run G72 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 7 d, quenched at conditions of 3.5 GPa / 700 °C, 5.5 d annealing. The volume proportion of K-feldspar hydrate (and K-feldspar) is increased at the expense of the fluid phase (orange), which fills only 6 vol.%.

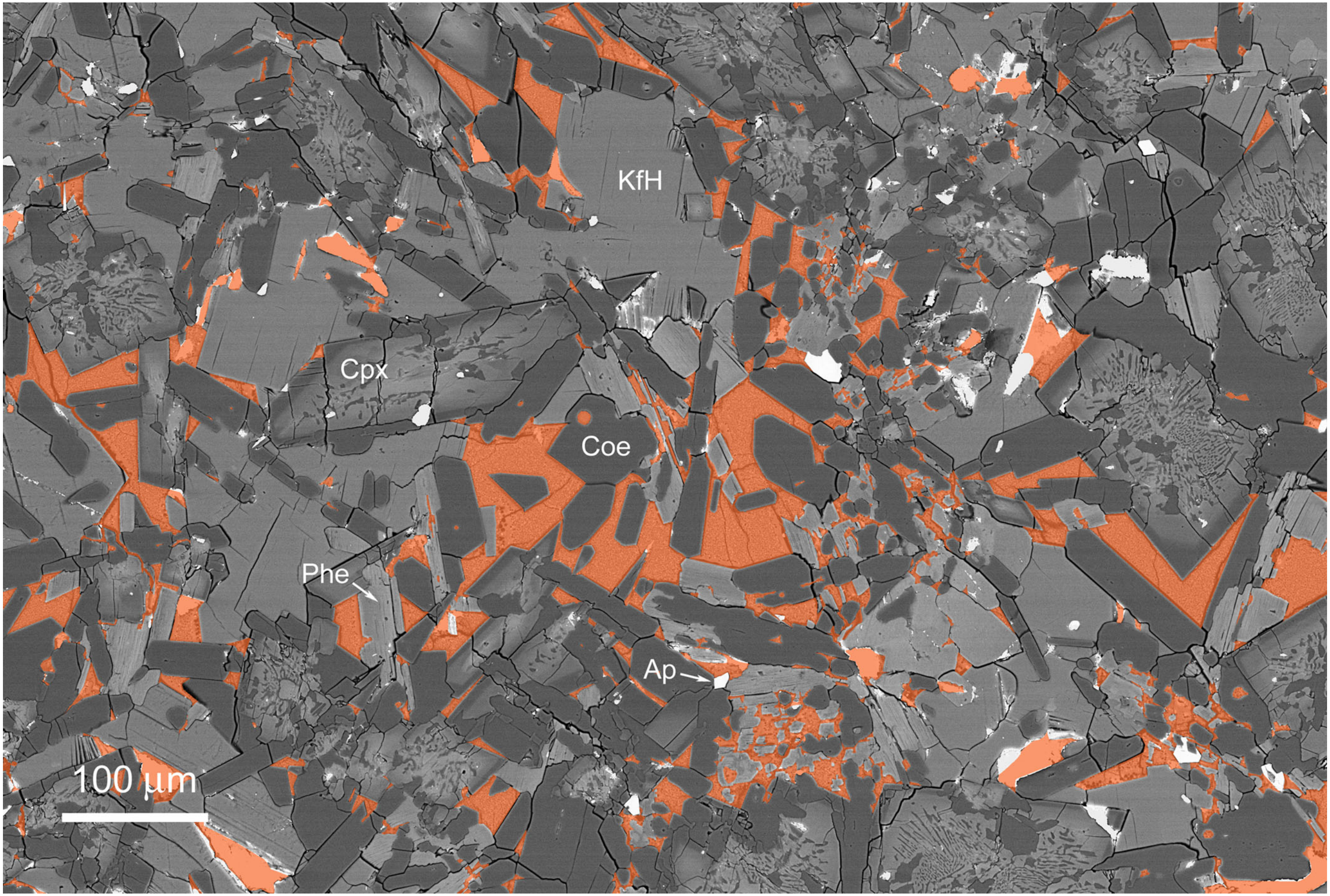


Figure 46: BSE image of Type 5 run G16 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 8 d, quenched at conditions of 3.5 GPa / 700 °C, 6 d annealing. The fluid (orange) comprises 10 vol.%.

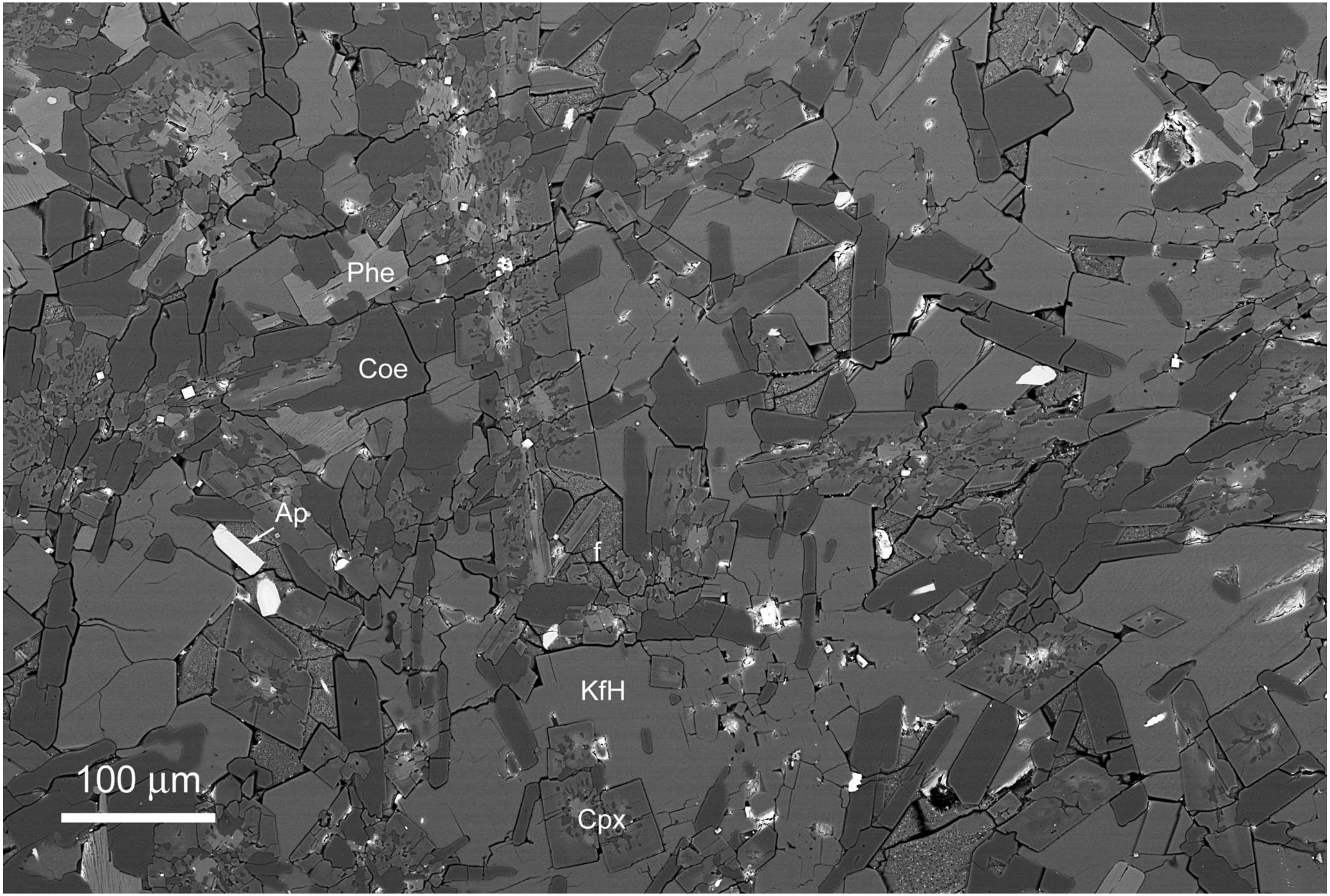


Figure 47: BSE image of Type 5 run G97 with a cooling rate of 0.3 °C /min, bulk water content 2.8 wt.%, run time 13 d, quenched at 3.5 GPa / 700 °C, 11.5 d annealing. Clinopyroxene cores, characterized by symplectites in less extensively annealed runs, are decomposed and replaced by mainly phengite and fluid. The dark grey rim is rich in jadeite.

determined from the two images of G7 is due to the fact that the high resolution SEM images, although randomly picked, may not be fully representative especially for larger grain sizes.

In all runs quenched at 700 °C the fluid is unevenly distributed at the grain scale, inasmuch as many crystal interfaces are dry, but is uniform at the scale of the whole specimen. The complex shape of the fluid-filled interstices is constrained by the adjacent, predominantly euhedral crystals (Figure 48). The interstices are not isolated, but are interconnected in three dimensions through smaller interstices, wedges, and layers of fluid along crystal faces (Figure 49A). Along some faces isolated fluid lenses occur as well (Figure 49B, C).

In contrast to the transparent, colourless, and bubble-free coherent glasses quenched at higher temperatures, the silicic glass formed upon quenching at 700 °C appears dark brown or nearly black in the optical microscope. The glass is crowded with bubbles, which are more or less evenly distributed within the fluid-filled pore space. However, the bubble size is different in contact to particular crystalline phases. Large bubbles chiefly occur close to K-feldspar hydrate as seen in BSE images of polished sections and even better in SE images of broken surfaces (Figure 50A). Fluid - crystal interfaces free of bubbles are not rare. In some cases, only a single, large bubble is formed at the interface (Figure 50B).

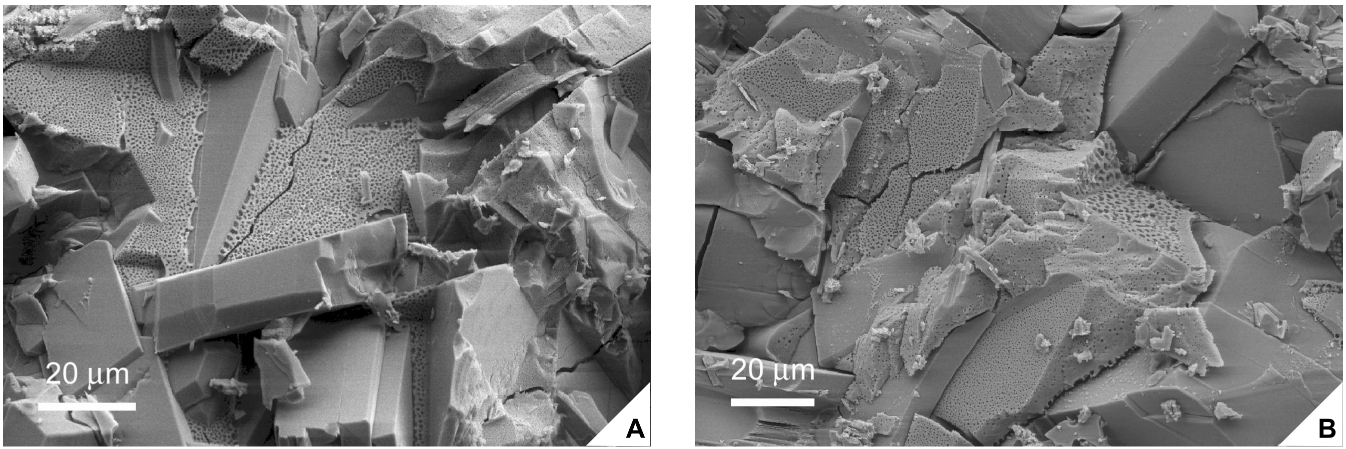


Figure 48: SE images of Type 5 runs G82 (A) and G26 (B) with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, quenched at conditions of 3.5 GPa / 700 °C, no annealing. The grain scale distribution of the fluid is constrained by predominantly euhedral crystals adjacent to the complex fluid-filled interstices.

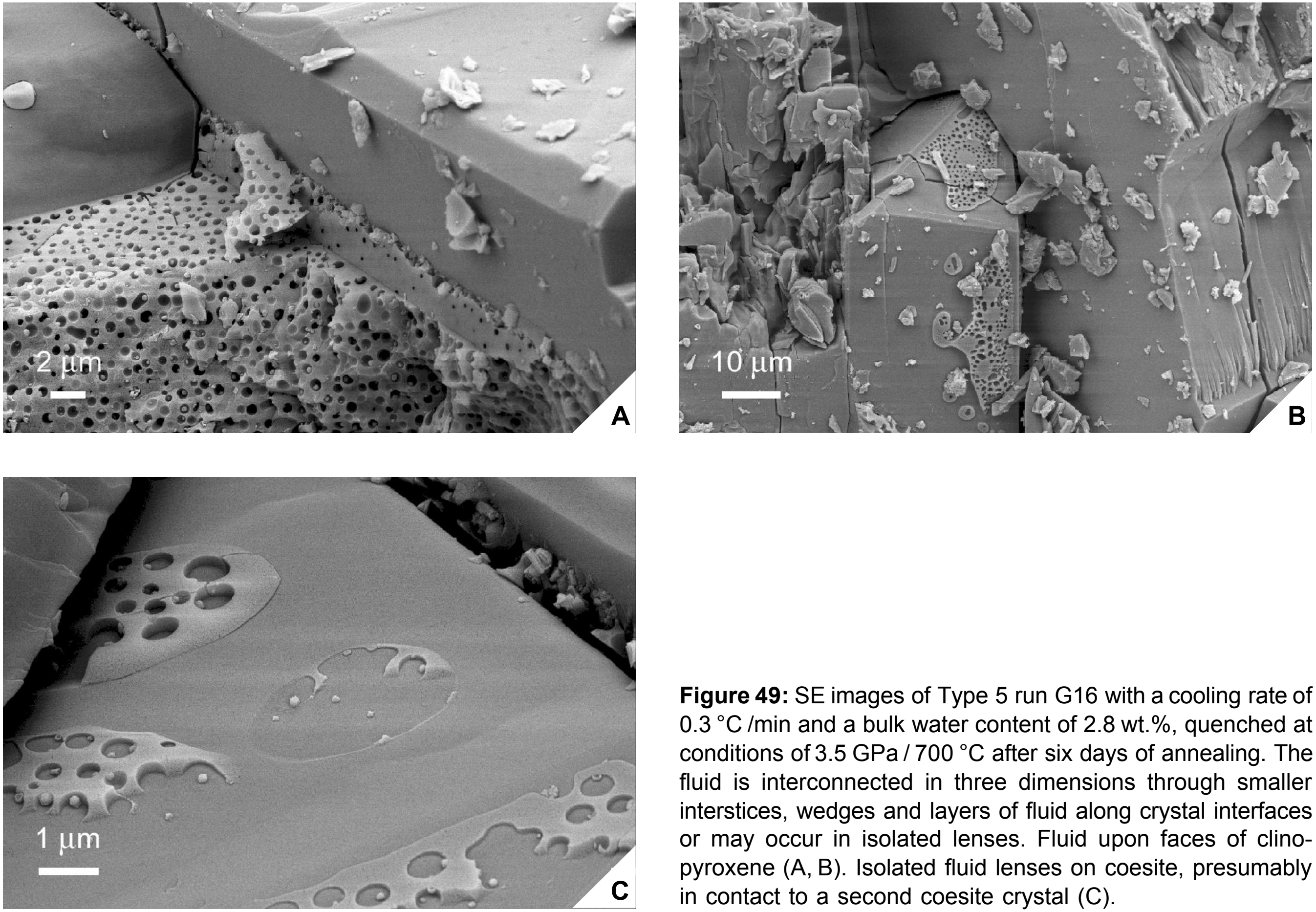


Figure 49: SE images of Type 5 run G16 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, quenched at conditions of 3.5 GPa / 700 °C after six days of annealing. The fluid is interconnected in three dimensions through smaller interstices, wedges and layers of fluid along crystal interfaces or may occur in isolated lenses. Fluid upon faces of clino-pyroxene (A, B). Isolated fluid lenses on coesite, presumably in contact to a second coesite crystal (C).

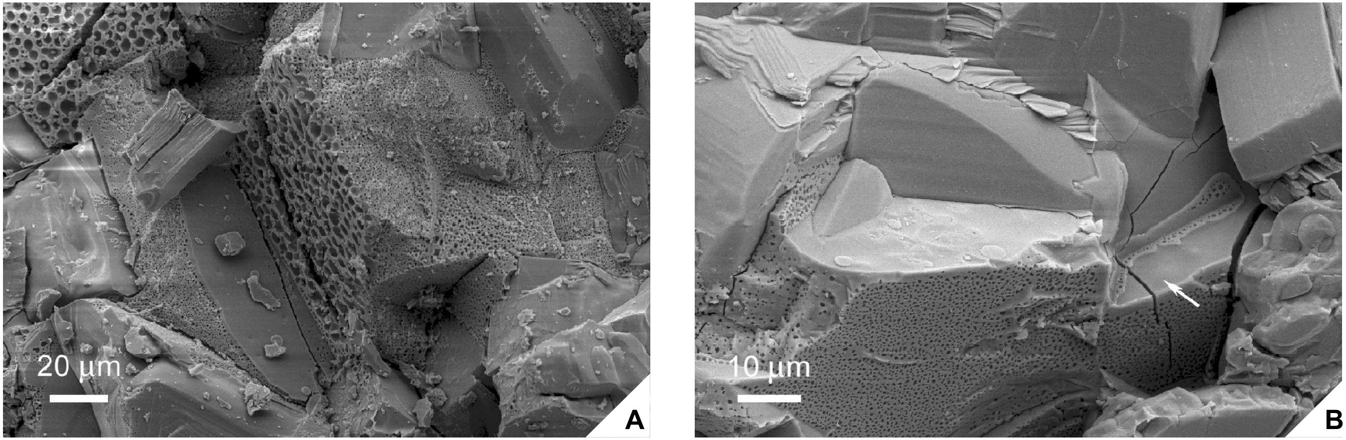


Figure 50: SE images of Type 5 runs with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, quenched at conditions of 3.5 GPa / 700 °C. G16 (A) six days of annealing, G26 (B) no annealing. Bubble size is different depending on the particular crystalline phase in contact. Note the fluid - crystal interface free of bubbles (A, centre) while only one large bubble (arrow) may form upon other interfaces (B).

Within the bubbles, material forming characteristic spherules is precipitated. These spherules occur in more or less identical size within each bubble (Figure 51). Whereas all features described above are not influenced by variations in pressure and annealing time, pressure remarkably affects the bubbles within the quenched glass. Already with the small increase by 0.06 GPa, the total bubble volume increases from 15 % in run G26 to about 30 % in run G85 (compare Figures 51A and B).

Figure 51 (following page)**:** SE images of Type 5 runs with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, quenched at conditions of 3.5 GPa / 700 °C. G26 (A) and G85 (B) no annealing, G72 (C) 5.5 d and G16 (D) six days of annealing. Small pressure variations and extended annealing is reflected by bubble size and type of spherules within: (A) experienced 'normal' pressure; (B) shows twice the total bubble volume and a three times higher spherule-to-bubble ratio as an effect of the pressure increase of 0.06 GPa; (C) was subjected to pressure decreased by 0.06 GPa and has a total bubble volume that is two thirds of (A) while the proportion of the spherules within the bubbles is only slightly decreased. An uncommonly smooth surface of the precipitated spherules is linked to enrichment in calcium in the fluid through extended annealing (D).

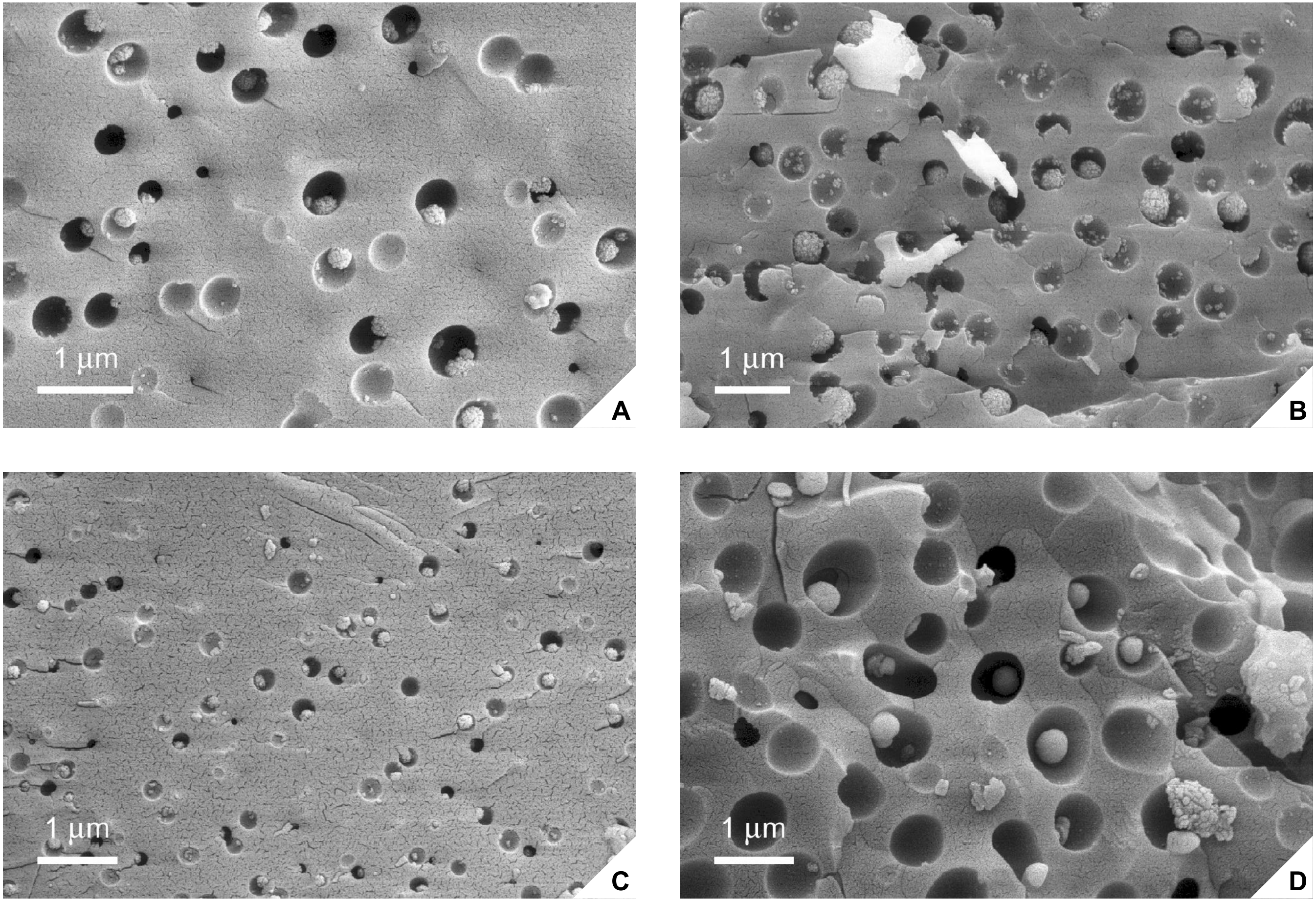


Figure 51 (see previous page for explanation)

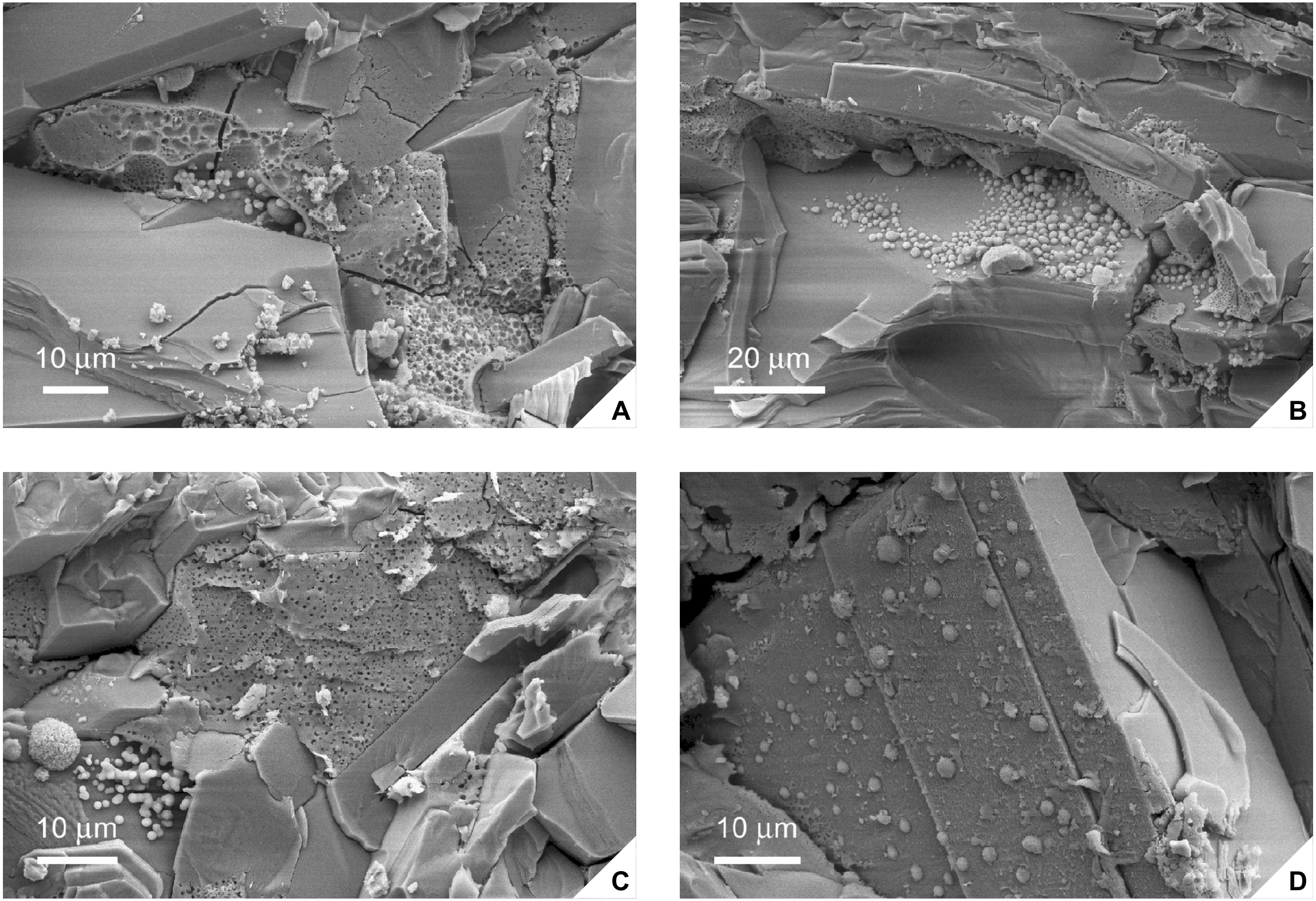


Figure 52 (see following page for explanation)

While the size of the bubbles remains largely the same, the proportion of the spherical precipitates within the bubbles increases from 17 vol.% to 45 vol.% with the pressure rise of 0.06 GP, pointing to a higher concentration of dissolved material. The slight decrease in pressure by 0.06 GPa leads to smaller bubbles, and the total bubble volume in the glass comprises only 10 % (compare Figures 51A and C). The smaller spherules occupy 15 vol.% of a bubble. In the annealed runs G97 and G16 (Figure 51D), the total bubble volume exceeds 40 % while the proportion of the spherules is about 12 vol.%. These spherules show an uncommonly smooth surface correlated to an enrichment in calcium in the fluid (see Chapter 6).

In some of the Type 5 runs, but most obvious in run G85, additional quench products are observed. Besides the bubble-bearing glass and the spherules with rough surface, small globules, presumably rich in silica, are present. These globules may be amalgamated or may occur in accumulations of single globules on crystal faces (Figure 52A to C). Precipitates are associated with the globules, which, apart from their larger size, appear to be identical to the spherules within the bubble cavities of the glass (Figure 52B to D).

Run G65 (Figure 53) was quenched at conditions of 3.5 GPa / 650 °C after 19.5 h of cooling from 1000 °C (see Figure 22). The phase assemblage comprises coesite, clinopyroxene, K-feldspar hydrate and K-feldspar, phengite, garnet, apatite, and some zircon. The microfabric and the fluid distribution is very similar to that observed in the Type 5 runs quenched at 700 °C with the same bulk water content. The fluid phase is quenched to form a silicic bubble-bearing glass filling 13 vol.%. As the run was performed at a pressure decreased by 0.06 GPa, the bubbles (Figure 54) have to be compared with those in run G71 and G72 (Figure 51C). They are larger and more abundant and the total bubble volume is increased to 30 %. The bubbles are filled with the same characteristic spherules as described above, which comprise a proportion of 22 vol.% (Figure 54).

In runs G59 (Figure 55), G54 (Figure 56), and G40, all quenched at conditions of 3.5 GPa / 600 °C (see Figure 22), the polygonal interstices between the crystals are not completely filled with quenched fluid. The fluid does not form a coherent silicic glass as observed at higher temperatures, but lumps of glass, accumulations of siliceous globules (Figure 57A, B) or coatings upon crystal interfaces (Figure 57C). In the large cavities 'cauliflowers' rich in potassium and fluorine occur (Figure 58). The crystalline phases are the same as observed at 650 °C in the run G65 (see Figure 53).

Runs G74 and G73 were cooled to ambient temperature at a rate of 0.3 °C /min while pressure was kept constant at 3.5 GPa. Run G20 was cooled to 700 °C at the same rate at

Figure 52 (previous page)**:** SE images of Type 5 runs G85 (A to C) and G71 (D) with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, quenched at conditions of 3.5 GPa / 700 °C, no annealing . Besides the bubble-bearing glass, small silica globules occur (A to C). Note small bubbles at the periphery of larger ones in (A). Silica globules may be amalgamated or may occur in accumulations of single globules (B, C). Precipitates of larger size, as compared to the spherules within the bubble cavities of the glass reside in void interstices (B, C) and upon crystal faces (D).

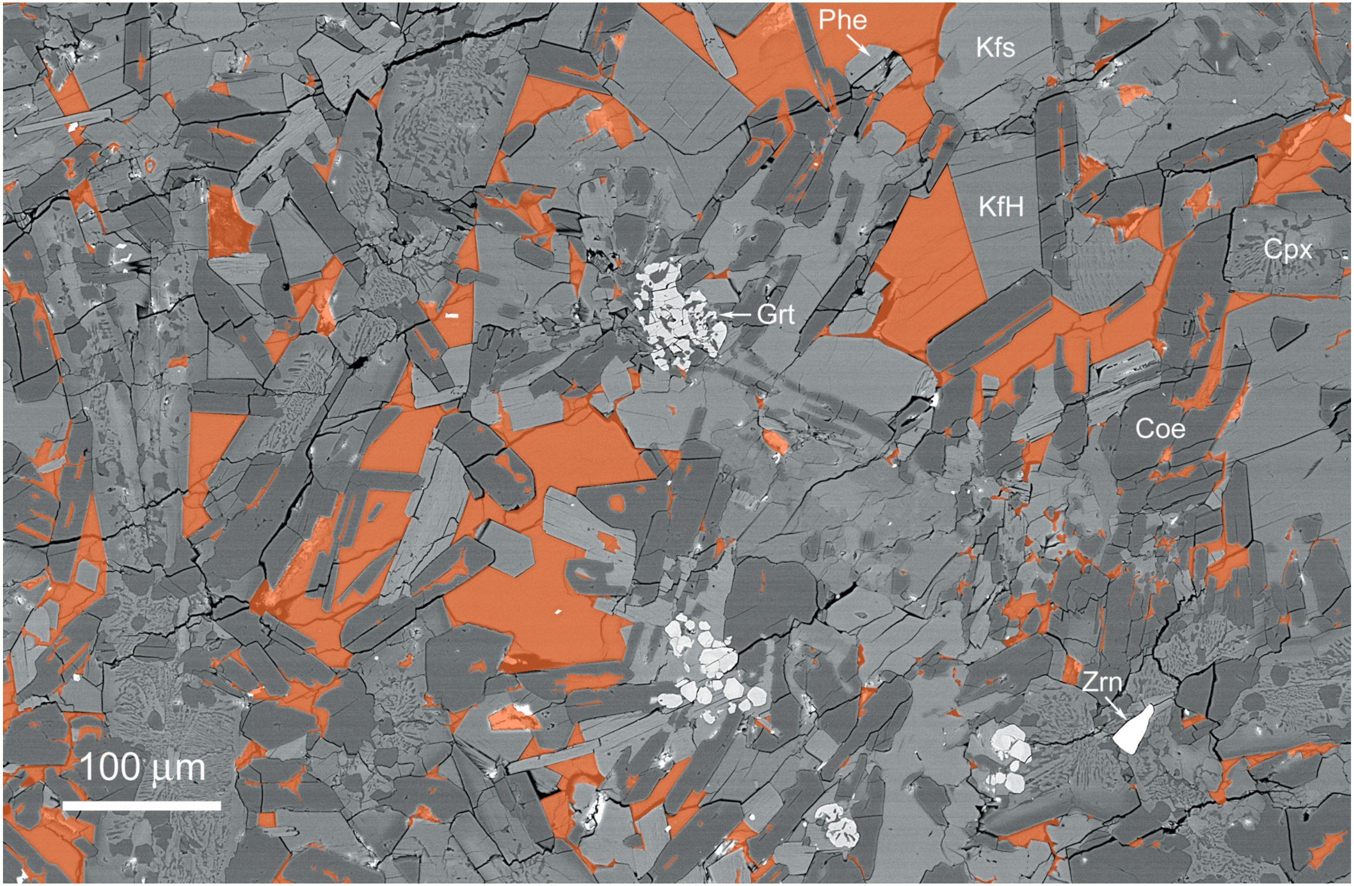


Figure 53: BSE image of Type 5 run G65 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 44.5 h, quenched at conditions of 3.5 GPa / 650 °C, no annealing. The vesiculated glass (orange) fills 13 vol.%. The microfabric and the phase assemblage, which comprises coesite, clinopyroxene, K-feldspar and K-feldspar hydrate, phengite, garnet, apatite, and some zircon, are the same as developed at 700 °C.

constant pressure of 3.5 GPa, and subsequently pressure and temperature were lowered simultaneously to ambient conditions within 35 minutes (see Figure 22).

All these runs contain coesite, clinopyroxene, phengite, garnet, apatite, and zircon. The framework of crystals is almost completely closed and the remaining polygonal interstices in between are void. It cannot be decided with certainty from the SEM images, whether the interstices are still interconnected or not. In runs G74 and G73 (Figure 59), both K-feldspar hydrate and K-feldspar occur, euhedral crystals of the former completely enclosing the latter. In these two runs, quench products are not easily discernible. G20 is one of the few runs where only K-feldspar occurs. Here, the crystal faces bounding the void interstices are spotted with spherules quenched from an aqueous fluid phase.

Type 5 runs with a cooling rate of 0.3 °C /min and different bulk water contents. This series of runs with different bulk water contents comprises the runs G57 and G81 without added water and seven runs with higher water contents between 5.5 and 15.4 wt.%. All these runs were cooled to 700 °C within 16 h and 40 min and quenched immediately when conditions of 3.5 GPa / 700 °C were reached; only run G35 was quenched after 103.5 h of annealing. For details see Figure 22 and Table 2.

The microfabrics in runs G57 (Figure 60) and G81 that have a bulk water content of 0.8 wt.% are characterized by small grain sizes and are rather comparable in their overall features to Type 1 run G87 (Figure 28), which was performed at constant conditions of 3.5 GPa / 1000 °C with the same bulk water content. In a diffuse matrix of K-feldspar, clusters of coesite and small crystals of clinopyroxene are enclosed along with some garnet, phengite, apatite, rutile, and zircon. The fluid, quenched to form a silicic glass, is distributed in minute interstices in the dense framework of small crystals. Bubbles do occur within the glass, but are substantially smaller in diameter compared to those in runs with a bulk water content of 2.8 wt.%. The characteristic spherules within the bubbles can be observed as well.

In run G64 (Figure 61) and G35, both with a bulk water content of 5.6 and 5.5 wt.%, respectively, exclusively euhedral

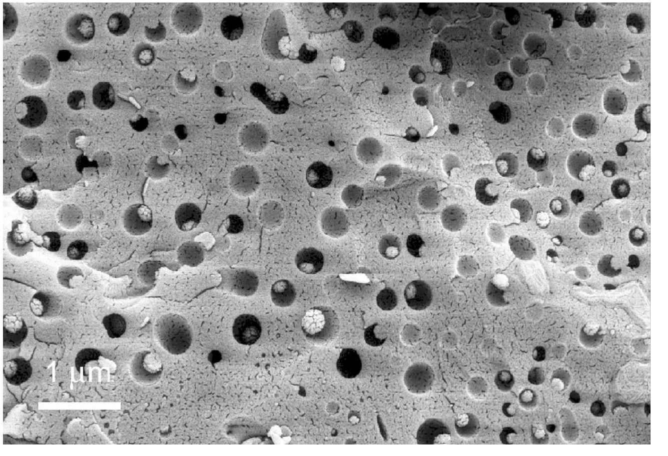


Figure 54: SE image of Type 5 run G65 with a cooling rate of 0.3 °C / min and a bulk water content of 2.8 wt.%, quenched at conditions of 3.5 GPa / 650 °C, no annealing. Compared to equivalent Type 5 runs quenched at 700 °C (Figure 51C), both the total bubble volume and the volume proportion of the precipitates within the bubbles is increased.

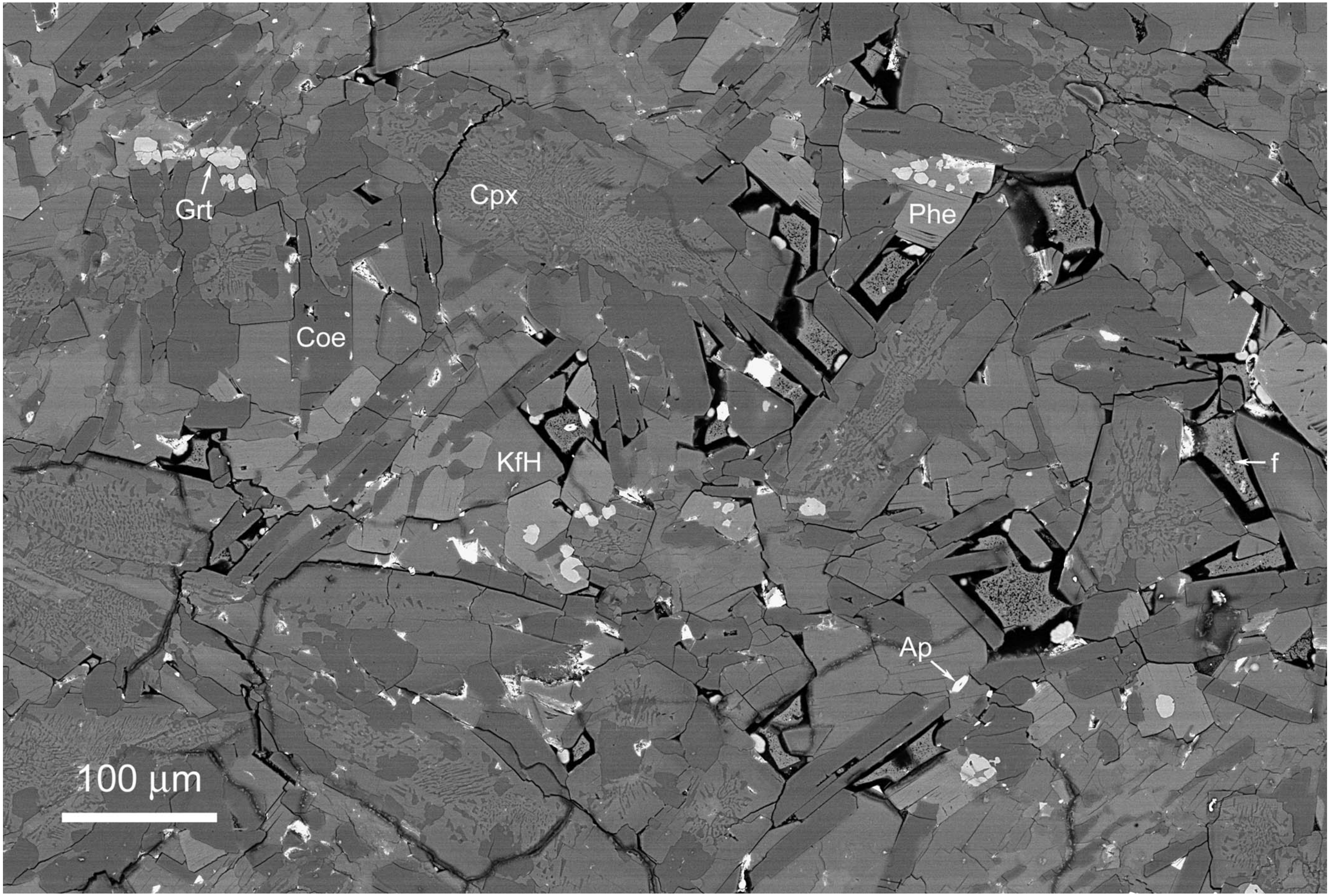


Figure 55: BSE image of Type 5 run G59 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 47 h, quenched at conditions of 3.5 GPa / 600 °C, no annealing. Quenched fluid comprises lumps of glass, glass globules, and 'cauliflower'-like precipitates, and only partially fills the interstices, which are otherwise void (black).

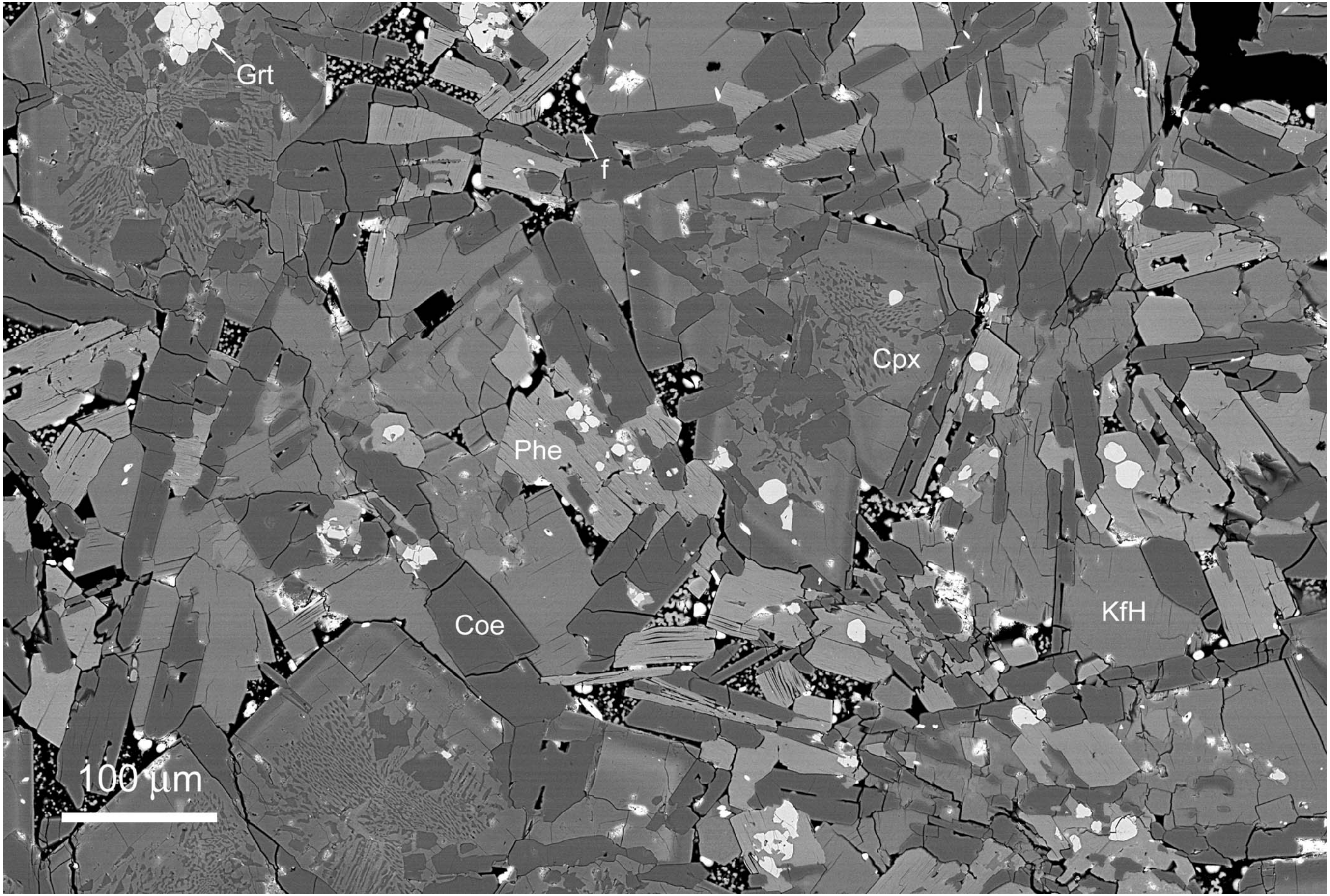


Figure 56: BSE image of Type 5 run G54 with a cooling rate of 0.3 °C /min, bulk water content 2.8 wt.%, run time 47 h, quenched at conditions of 3.5 GPa / 600 °C, no annealing. The quenched fluid does not form a coherent glass.

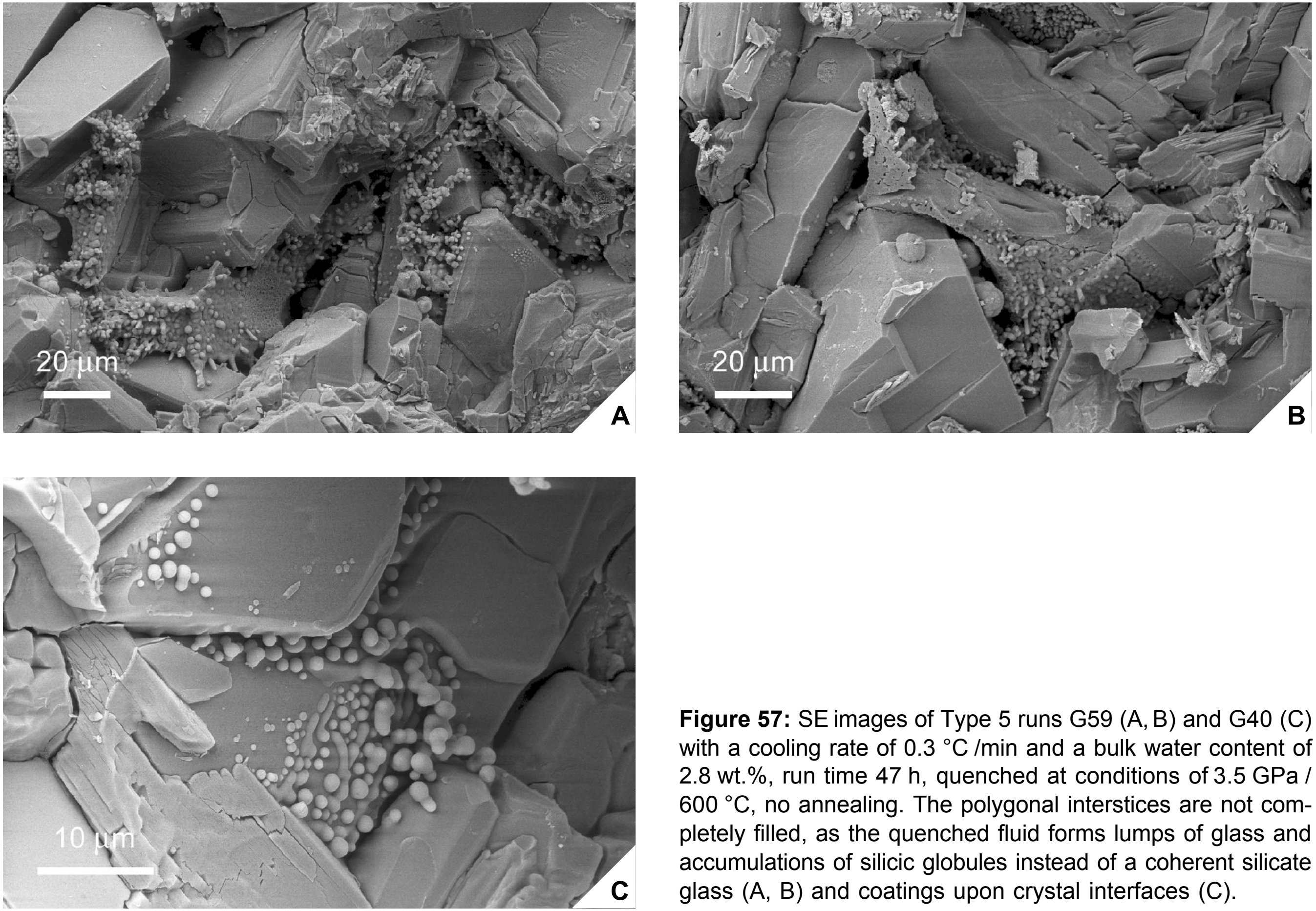
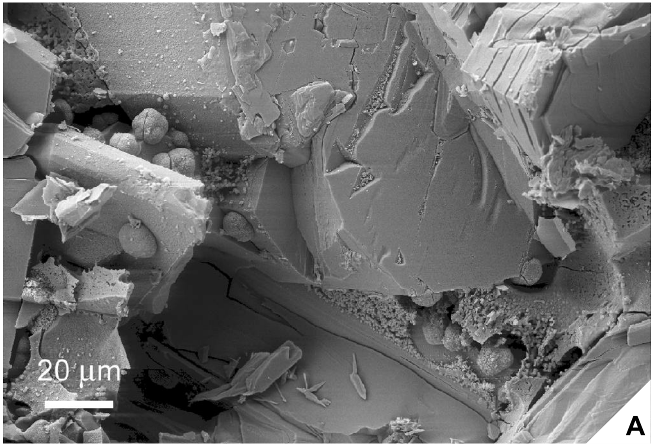
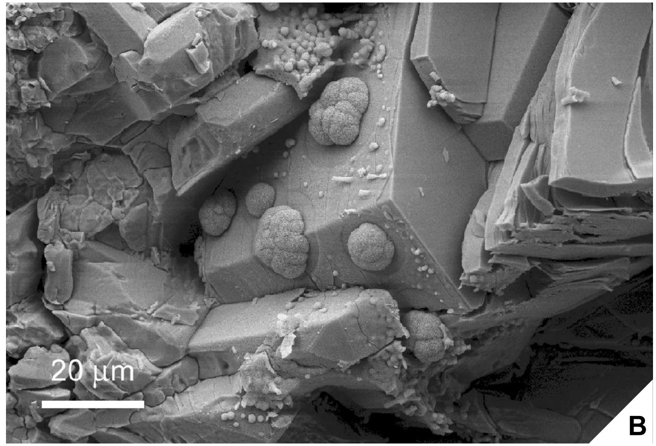


Figure 57: SE images of Type 5 runs G59 (A, B) and G40 (C) with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 47 h, quenched at conditions of 3.5 GPa / 600 °C, no annealing. The polygonal interstices are not completely filled, as the quenched fluid forms lumps of glass and accumulations of silicic globules instead of a coherent silicate glass (A, B) and coatings upon crystal interfaces (C).





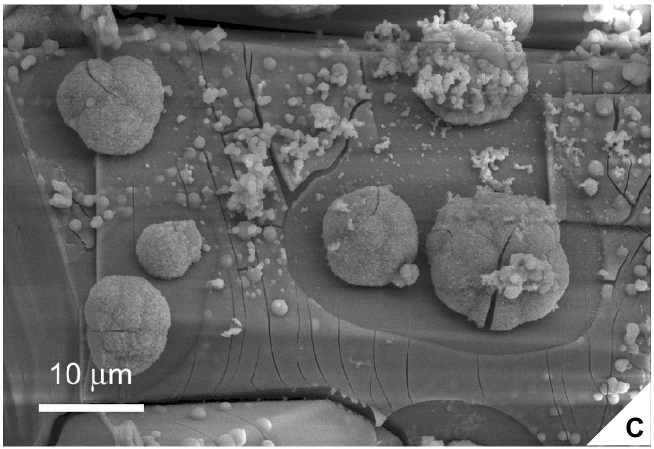


Figure 58: SE images of Type 5 runs G54 (A, C) and G59 (B) with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%, run time 47 h, quenched at conditions of 3.5 GPa / 600 °C, no annealing. ‘Cauliflowers’ that were precipitated from an aqueous fluid phase rich in potassium and fluorine reside in the large cavities between the crystals (A). These precipitates were formed identically in all runs at conditions of 3.5 GPa / 600 °C (compare B to C). Note that ‘cauliflowers’ and globules are not in contact.

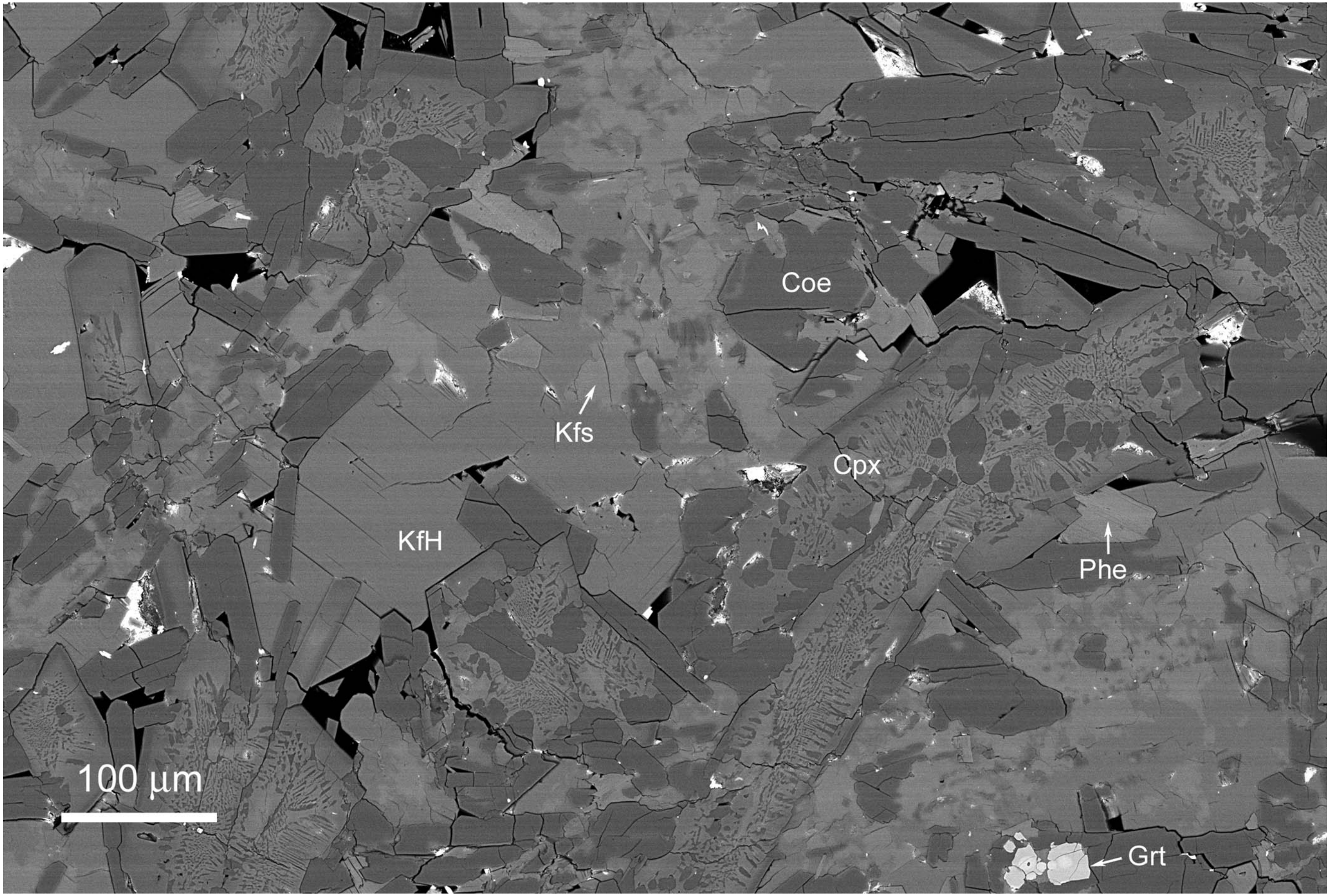


Figure 59: BSE image of Type 5 run G73 with a cooling rate of 0.3 °C /min, bulk water content 2.8 wt.%, run time 77.5 h, final conditions of 3.5 GPa / 50 °C, no annealing. A few void interstices (black) remain between the crystals.

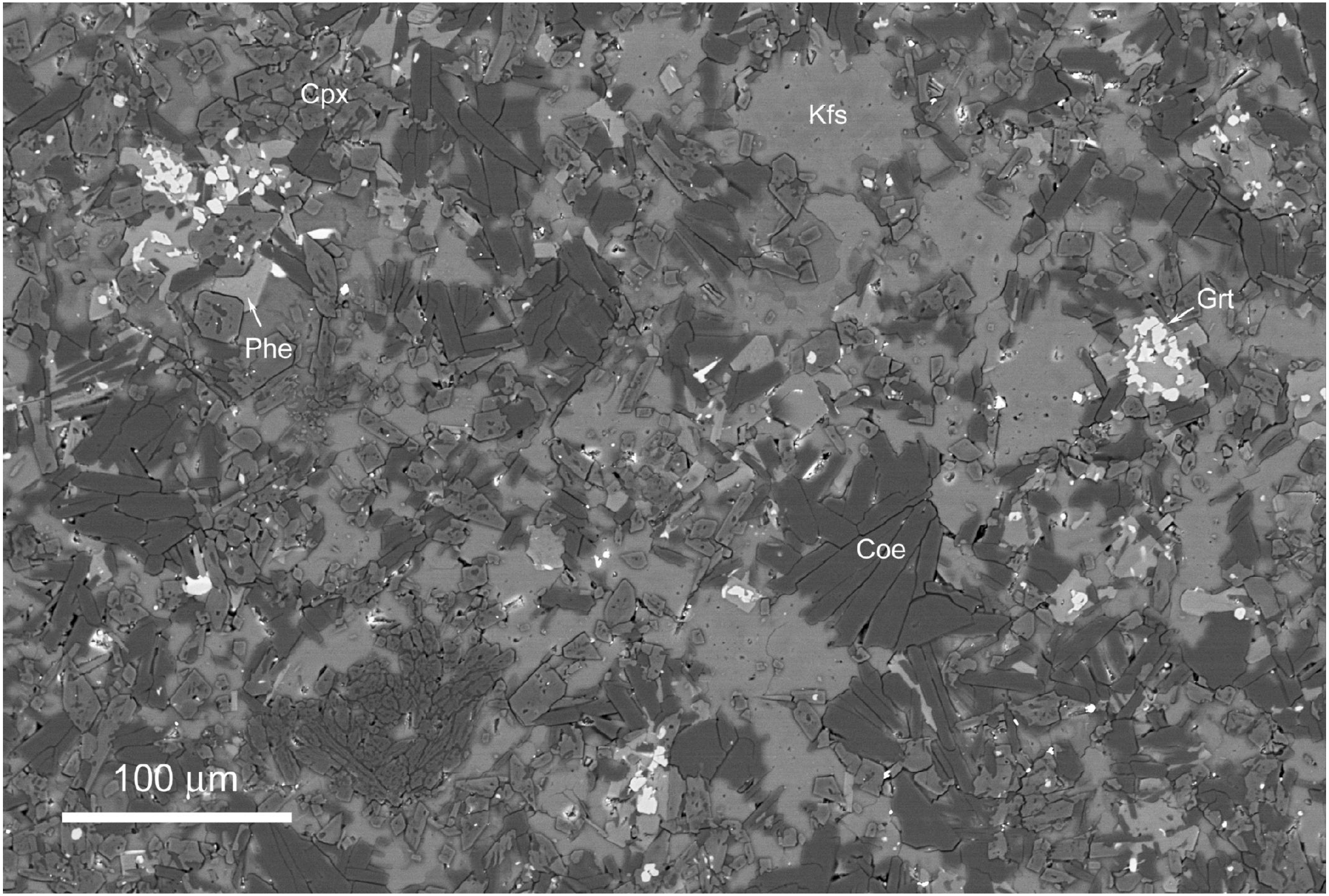


Figure 60: BSE image of Type 5 run G57 with a cooling rate of 0.3 °C /min and a bulk water content of 0.8 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. Small grain sizes predominate and the fluid fills minute interstices within the dense crystalline framework.

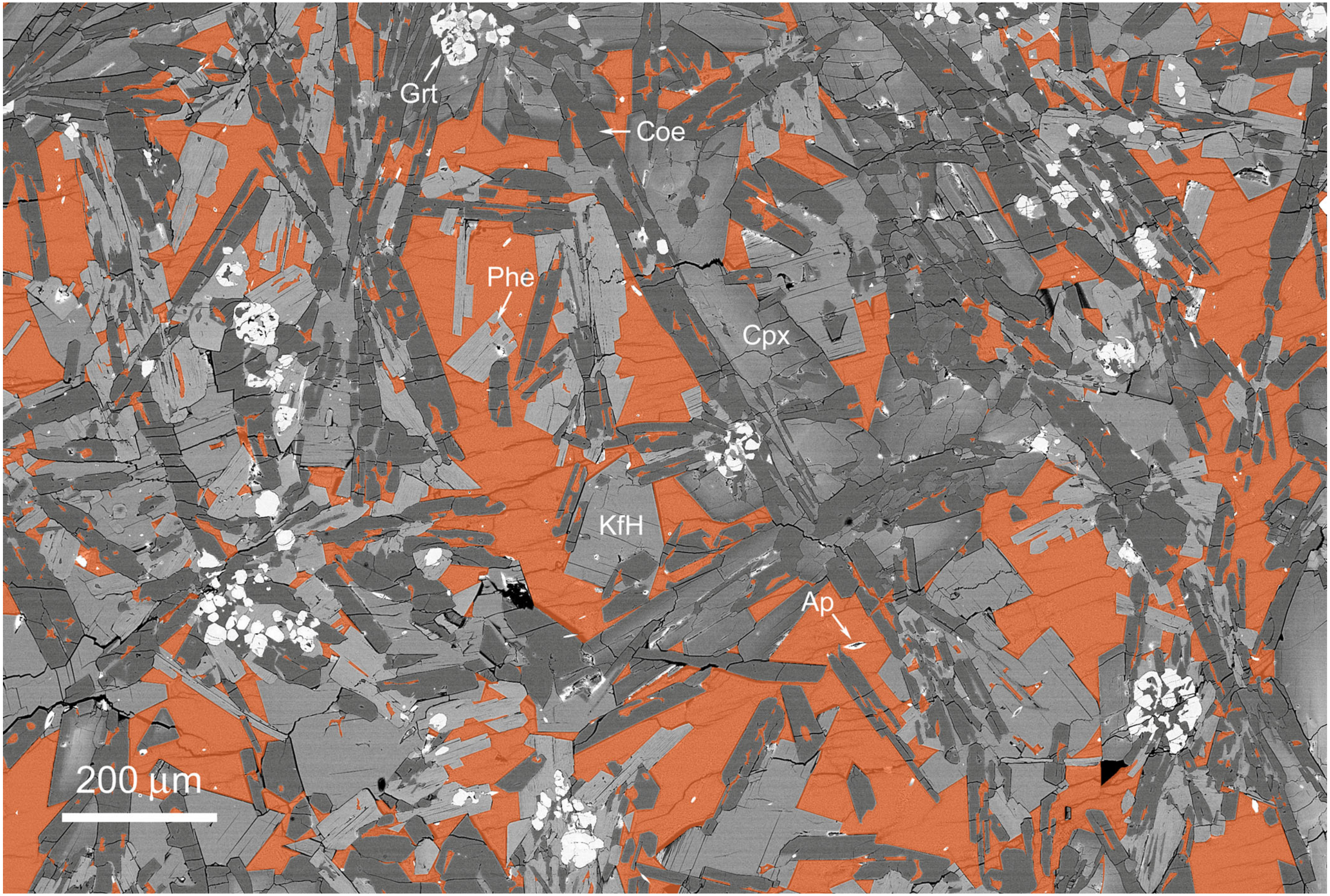


Figure 61: BSE image of Type 5 run G64 with a cooling rate of 0.3 °C /min and a bulk water content of 5.6 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. The fluid phase (orange) comprises 22 vol.%. Note that the cores of the clinopyroxene crystals show compositional zoning instead of symplectites.

crystals of coesite, K-feldspar hydrate, clinopyroxene, and phengite occur, together with clusters of garnet, some apatite and zircon. The cores of the clinopyroxene crystals are characterized by a distinct compositional zoning instead of symplectitic intergrowths with coesite. A wider framework of crystals results in large interstices filled by the fluid, which amounts to 22 vol.% in run G64. In comparison to the runs with a bulk water content of 2.8 wt.% performed at the same pressure decreased by 0.06 GPa (Figure 51C), the bubbles in the vesiculated glass are more than two times larger (Figure 62A). The total bubble volume in run G64 is 30 %, while the proportion of the precipitates within is about 17 vol.%. The precipitated material forms no spherules, but irregular lumps (Figure 62B). Along some crystal - fluid interfaces the bubbles are assorted in flexous rows forming spectacular graphic patterns and vortexes (Figure 63A, B). Also, interfaces that are free of bubbles or that are distinguished by different bubble sizes occur (Figure 63C, D). G35 is the only specimen showing different generations of bubbles (Figure 64A), as rows of large bubbles are encircled by smaller ones (Figure 64B). In some of the cavities two different kinds of precipitates occur. Besides the normal, but unusually small lumps with rough surface, material is precipitated as smoother spheres (Figure 64B). Both phenomena, i.e. two different generations of bubbles and different precipitates, correlate with an

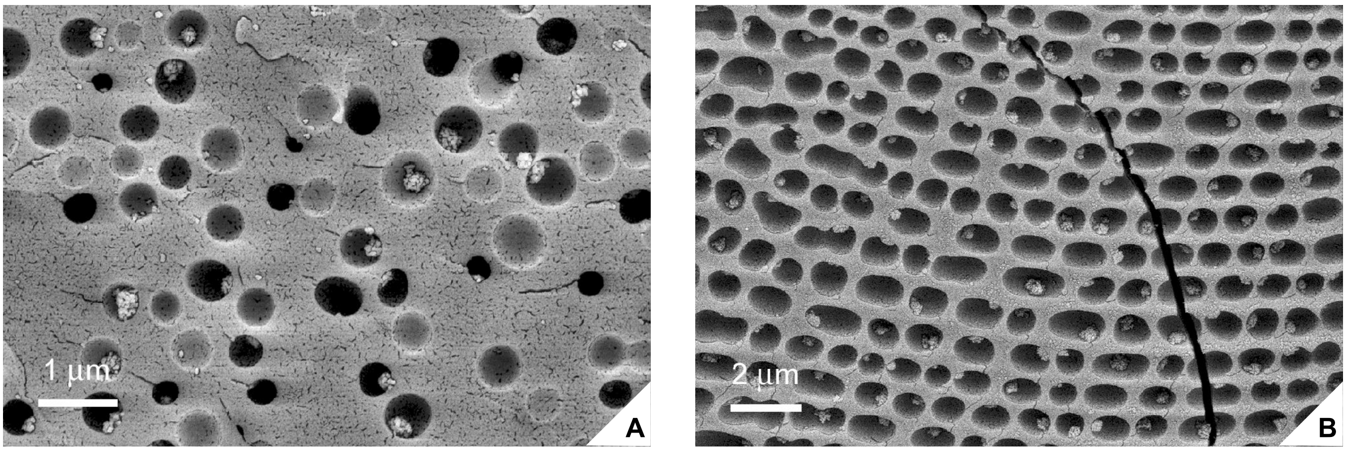


Figure 62: SE images of Type 5 run G64 with a cooling rate of 0.3 °C /min and a bulk water content of 5.6 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. Compared to Type 5 runs with lower bulk water contents performed at the same pressure (see Figure 51C), bubbles are larger and more frequent (A). Note irregular lumps instead of spherules occuring inside the bubbles (B).

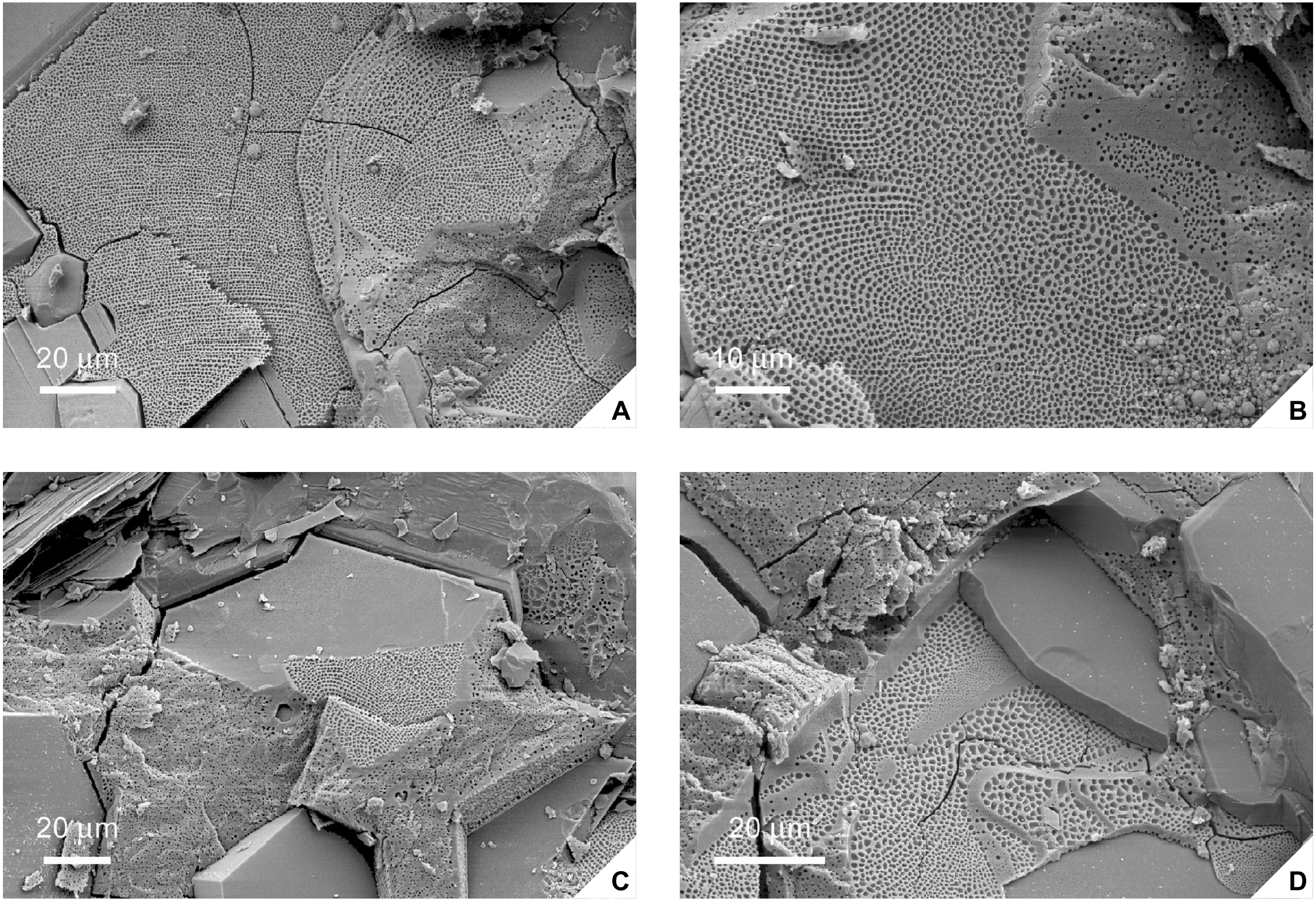


Figure 63 (see following page for explanation)

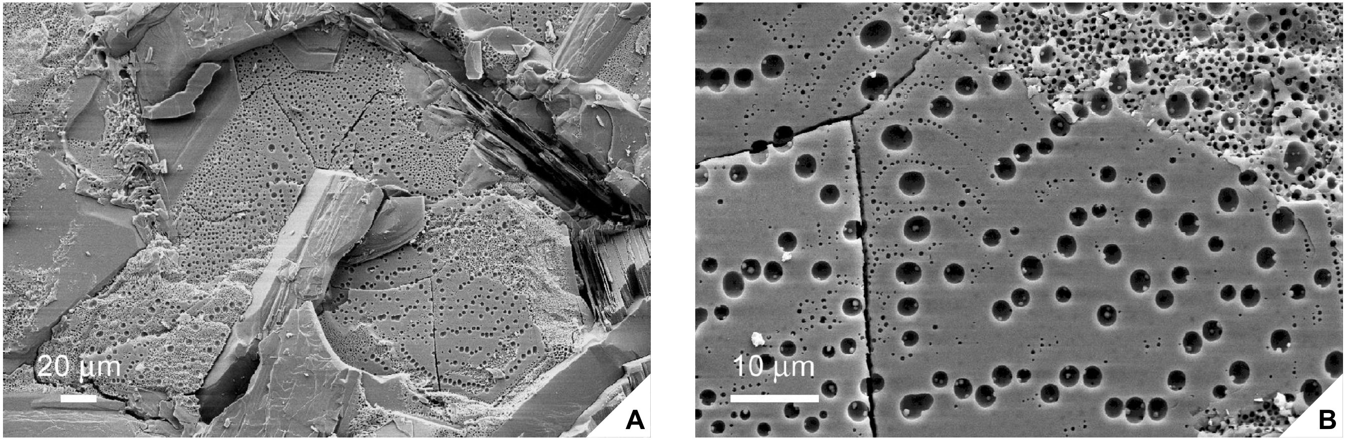


Figure 64: SE images of Type 5 run G35 with a cooling rate of 0.3 °C /min and a bulk water content of 5.5 wt.%, run time 145 h, quenched at conditions of 3.5 GPa / 700 °C, 103.5 h of annealing. This is the only specimen that shows different generations of bubbles (A), as rows of large bubbles are accompanied by smaller ones (B). Note that most of the larger bubble cavities contain more than one spherule.

unusual high concentration of chlorine in the fluid (see Chapter 6), which is due to the leakage of the capsule and contamination by salt from the pressure cell.

In the runs with an even higher water content, already the naked eye observes deep green prisms of clinopyroxene, brownish rods of coesite and flakes of white mica embedded in a white vesiculated glass matrix. The latter appears dark brown and almost opaque in thin section. In run G51 (Figure 65) with a bulk water content of 9.1 wt.%, a slightly higher temperature than 700 °C must be deduced from a rise in oven power. There seems to be no influence on the phase assemblage and the volume proportion of the fluid phase, which fills 43 vol.%. However, the size of the bubbles within the quenched glass is smaller, as it would be expected for increased temperatures.

Figure 63 (previous page)**:** SE images of Type 5 run G64 with a cooling rate of 0.3 °C /min and a bulk water content of 5.6 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. Bubbles are arranged in flexous rows (A) or vortexes (B) upon some crystal - fluid interfaces. Interfaces free of bubbles or distinguished by different bubble size may occur as well (C, D).

Figure 65: BSE image of Type 5 run G51 with a cooling rate of 0.3 °C /min and a bulk water content of 9.1 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. The fluid phase (orange) comprises 43 vol.%.

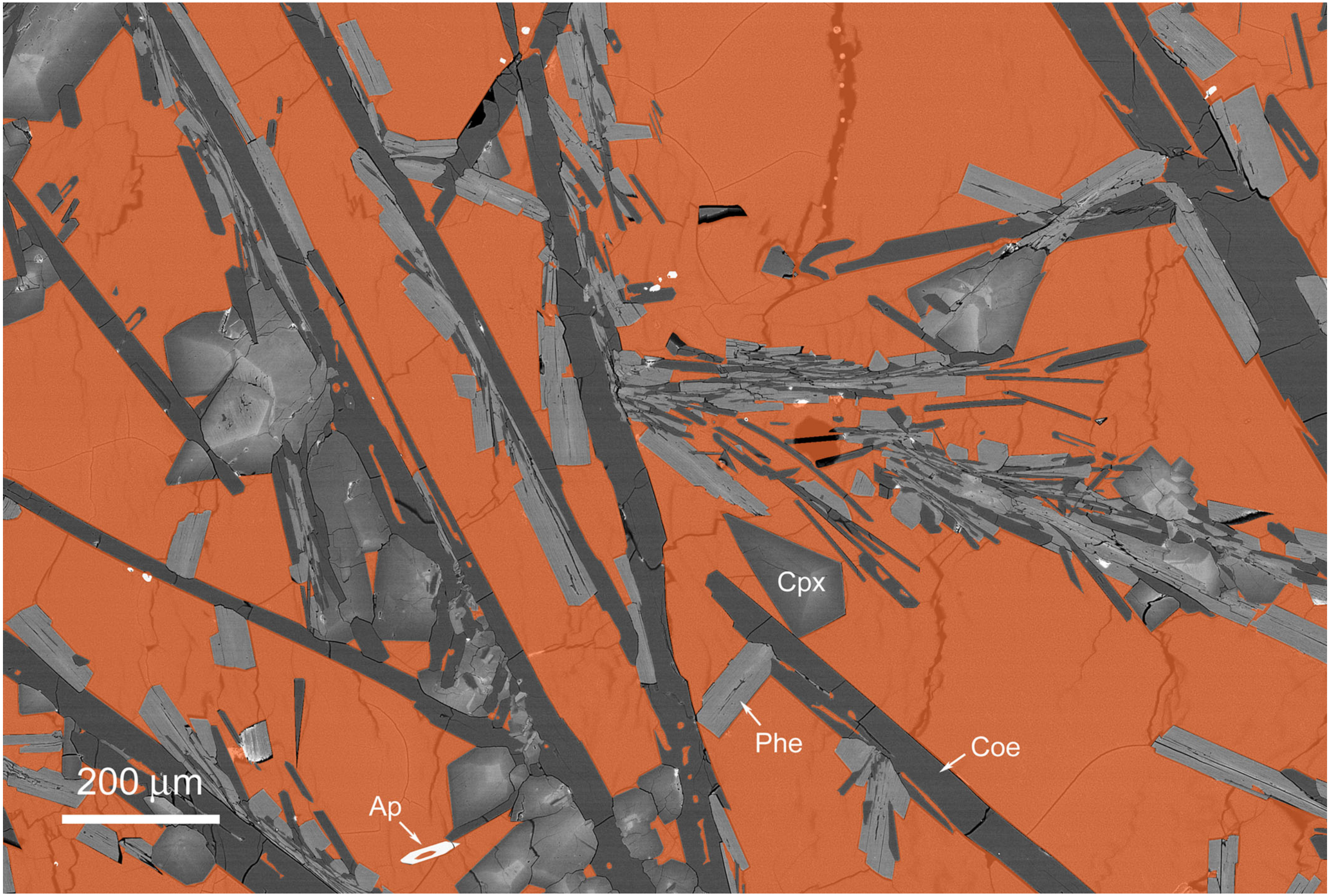


Figure 66: BSE image of Type 5 run G45 with a cooling rate of 0.3 °C /min and a bulk water content of 10.8 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. Coesite is characterized by a high aspect ratio, which points to rapid growth from an undercooled fluid phase. The quenched fluid (orange) comprises 57 vol.%.

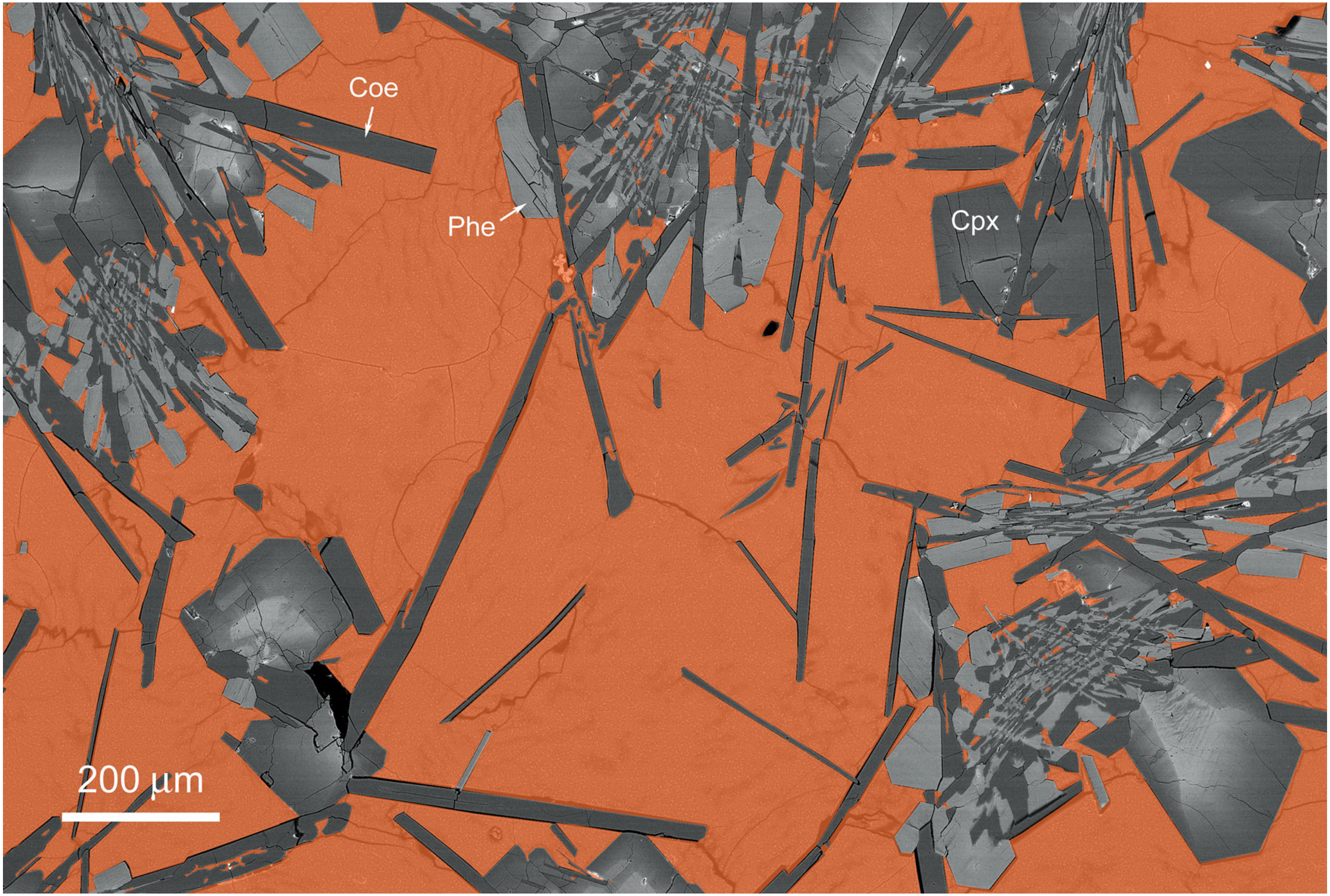


Figure 67: BSE image of Type 5 run G46 with a cooling rate of 0.3 °C /min and a bulk water content of 13.1 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. The fluid phase (orange) fills 56 vol.%. Acicular crystals of coesite are newly grown from the fluid on cooling instead of having been transformed from quartz relics of the sample powder. Note symplectitic intergrowths of phengite and coesite.

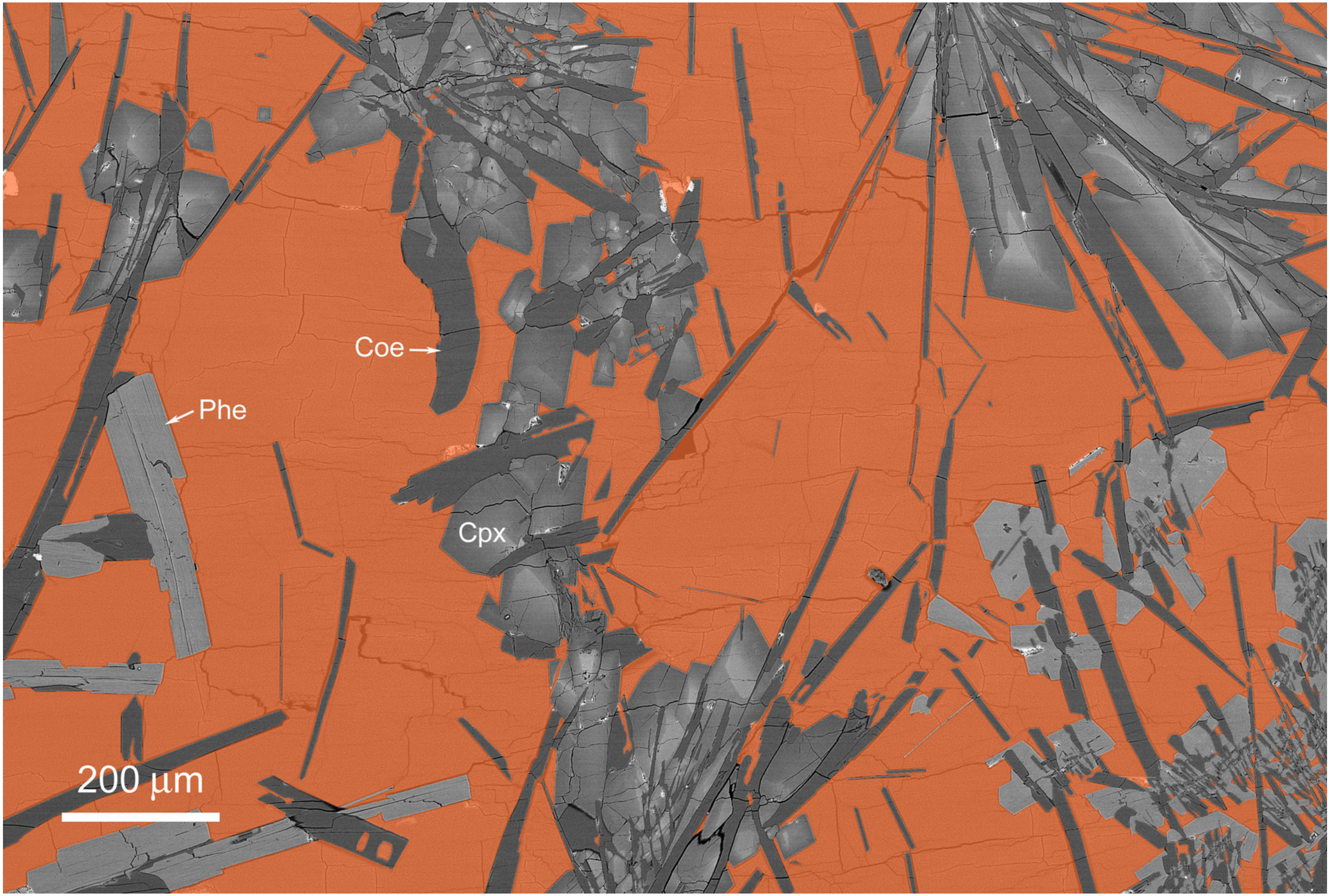


Figure 68: BSE image of Type 5 run G49 with a cooling rate of 0.3 °C /min and a bulk water content of 13.2 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. The fluid phase (orange) fills 57 vol.%.

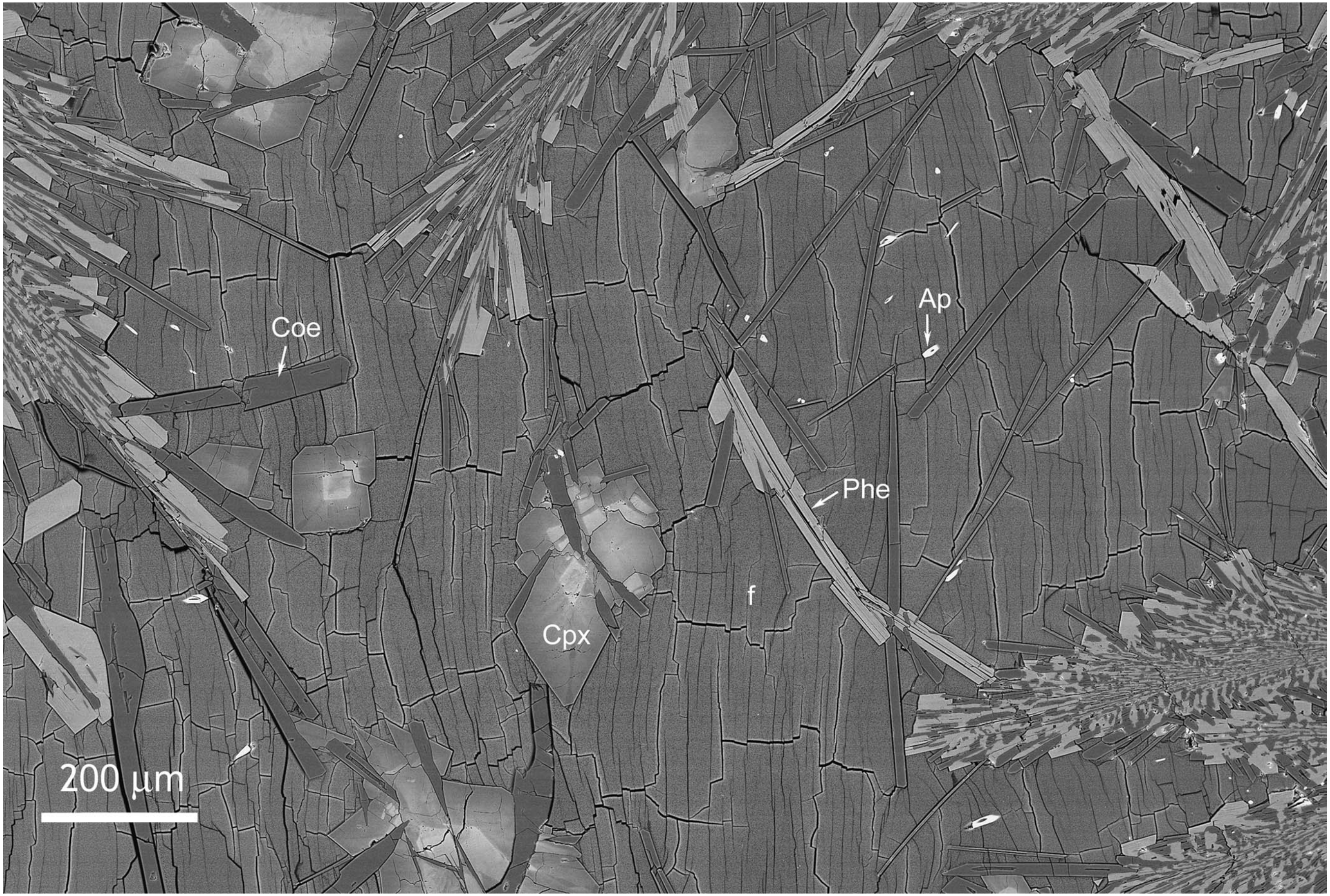
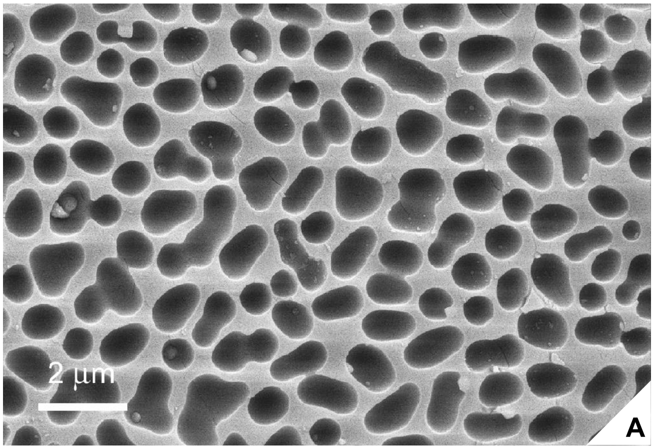


Figure 69: BSE image of Type 5 run G98 with a cooling rate of 0.3 °C /min and a bulk water content of 15.4 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. Note the most pronounced, ear-of-corn-like intergrowths of coesite and phengite.

The microfabrics of the runs G45 (Figure 66), G46 (Figure 67), and G49 (Figure 68) with a bulk water content of 10.8, 13.1, and 13.2 wt.%, respectively, are not discernible from each other in the SEM image. The absence of garnet and zircon indicates a water content high enough for the starting material to melt completely at 1000 °C. Coesite is characterized by a high aspect ratio, pointing to rapid growth from an undercooled fluid phase. The acicular crystals suggest that even the liquidus phase coesite is newly grown from the fluid on cooling instead of being transformed from quartz relics of the sample powder as it is the case with lower bulk water contents. Obviously, nucleation of crystalline phases is inhibited. Phengite occurs only intergrown with coesite, and the clinopyroxene crystals have mainly nucleated where coesite rods intersect. Feldspar is not observed. In run G98 (Figure 69) with a bulk water content of 15.4 wt.%, the most pronounced intergrowths of coesite and phengite resemble an ear of corn.

The fluid phase fills the extensive space within the loose crystal framework. The amount of fluid is almost constant with 57, 56 and 57 vol.% for run G45, G46, and G49, respectively. With high bulk water contents, no material is precipitated within the bubbles (Figure 70).



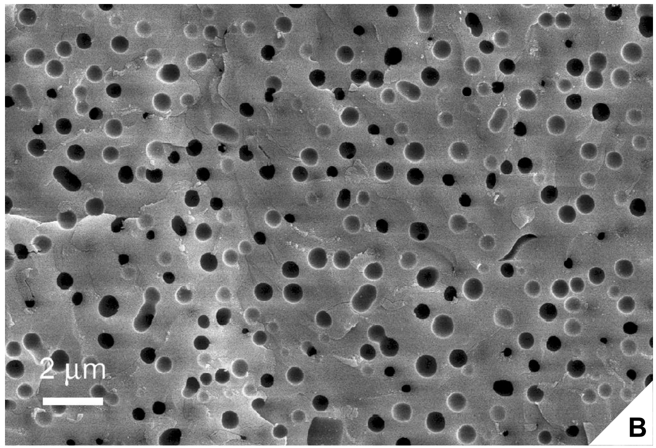


Figure 70: SE images of run G46 with a cooling rate of 0.3 °C /min and a bulk water content of 13.1 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. The aspect of bubbles varies markedly depending on whether a fluid - crystal interface (A) or a surface randomly broken through the glass (B) is looked at. The total bubble volume amounts to 20 %. Note that most bubbles do not contain precipitates.

Type 5 runs with a cooling rate of 3 °C /min. All runs with a cooling rate of 3 °C /min were performed with a bulk water content of 2.8 wt.%, except for a bulk water content of 3.2 wt.% in run G3 with the most extended annealing time (see Figure 21 and Table 2). The overall features described above in the runs with a cooling rate one order of magnitude smaller also hold true for the runs with a cooling rate of 3 °C /min.

Run G79 was quenched after a brief period of cooling at 3.5 GPa / 994 °C. Its microfabric corresponds entirely to that of Type 4 run without cooling G53, which was quenched at 1000 °C, and thus represents just the beginning of the cooling path.

In run G61 (Figure 71), quenched at conditions of 3.5 GPa / 900 °C, large phenocrysts of K-feldspar occur. As the run underwent a pressure of 3.5 GPa for little more than one hour, the transformation of quartz to coesite has just commenced. Bundles of acicular kyanite are always associated with quartz. Furthermore, clinopyroxene, garnet, zircon, and a fluid phase quenched to form a homogeneous silicic glass occur. In run G68, quenched at the very same conditions, peculiarly the quartz - coesite transition is already completed. Also, K-feldspar forms rather subhedral and anhedral crystals. Generally, the crystallization is further proceeded compared to other runs quenched at 900 °C and consequently a smaller volume proportion of fluid is left.

In runs G55 and G77 (Figure 72), quenched at conditions of 3.5 GPa / 800 °C after one hour and seven minutes of cooling, quartz and coesite still co-occur, together with elongated crystals of clinopyroxene and K-feldspar, bundles of kyanite, phengite, garnet, zircon, and a fluid quenched to form a homogeneous silicic glass free of bubbles or any cavities.

When quenched at conditions of 3.5 GPa / 700 °C, all specimens yield coesite, feldspar, clinopyroxene with characteristic symplectites, phengite, garnet, apatite, and zircon in a brownish vesiculated silicic glass. Owing to the small grain sizes, an unequivocal optical distinction between K-feldspar and K-feldspar hydrate is not always possible. In runs G80 (Figure 73) and G70, performed at a pressure decreased by 0.06 GPa, bubbles are substantially smaller than in run G88 (Figure 74). Nevertheless, the characteristic spherules within the bubbles are observed.

In run G70 and in run G3 (Figure 76), the cores of the clinopyroxene crystals have become unstable and are replaced by phengite, fluid phase, coesite, and few titanite after about ten and twelve days of annealing, respectively. Even in run G12 (Figure 75), quenched after only about one day of annealing, most of the clinopyroxene crystals have decomposed, despite of the relatively short annealing time. In all these runs, the fluid is enriched in calcium (see Chapter 6), correlated with perfectly rounded, large spherules with a smooth surface within the bubble cavities of the quenched glass (see Figure 51D). Additionally, the phase assemblage contains aragonite, and many small crystals of scheelite, the presence of the latter being due to contamination of the sample powder by tungsten from the mill (see Section 4.2).

Type 5 runs with a cooling rate of 30 °C /min. The microfabrics of the runs with a cooling rate of 30 °C/min are generally distinguished by very small grain sizes. The interstices filled by the fluid phase are only small and the fluid distribution is

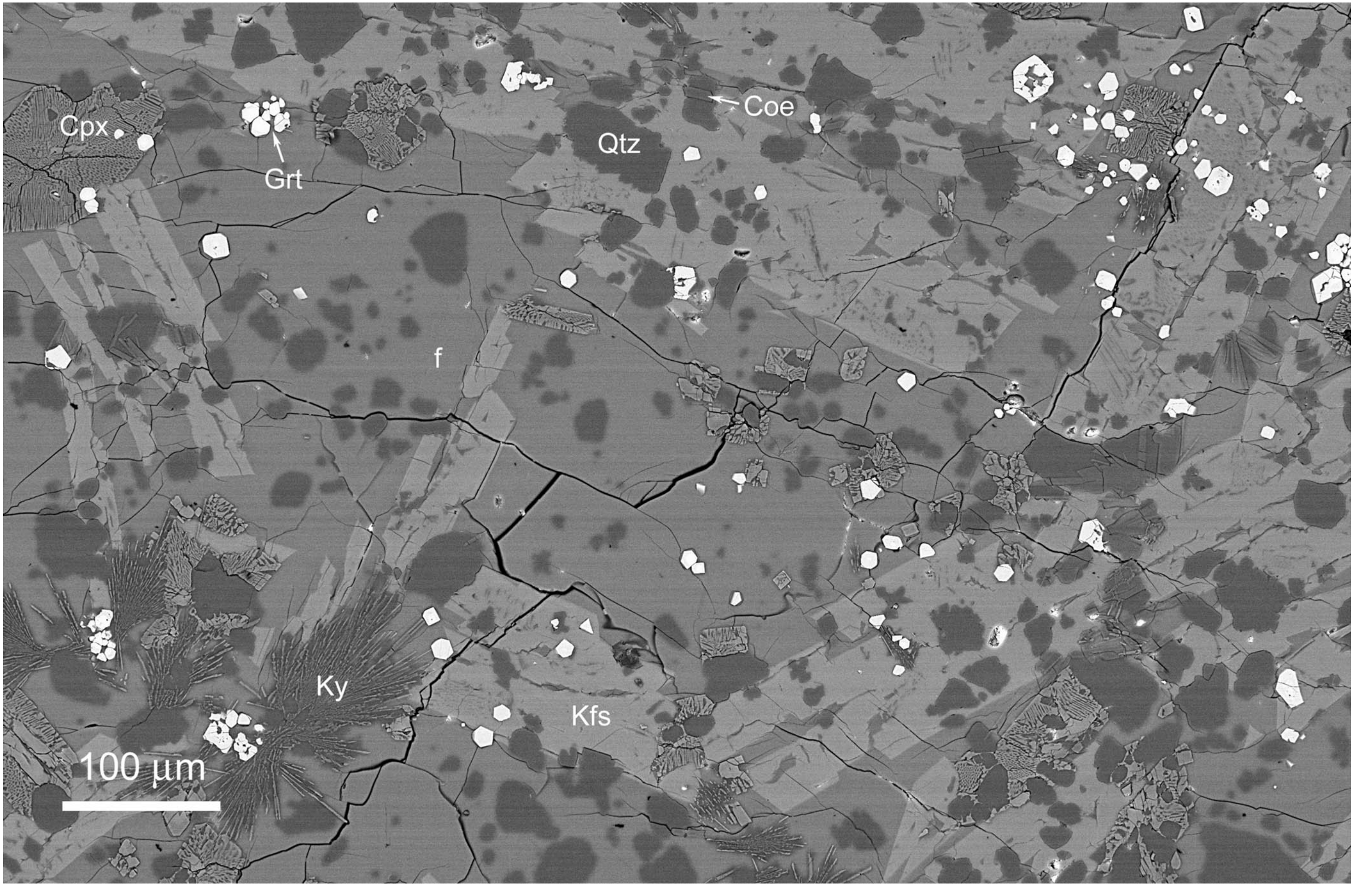


Figure 71: BSE image of Type 5 run G61 with a cooling rate of 3 °C /min and a bulk water content of 2.8 wt.%, run time 25.5 h, quenched at conditions of 3.5 GPa / 900 °C, no annealing. Quartz is about to transform to coesite. Large phenocrysts of K-feldspar, prisms of clinopyroxene with the characteristic symplectitic lamellae, and garnet crystals occur. Acicular kyanite is always associated with quartz. The fluid is quenched to form a coherent glass free of bubbles.

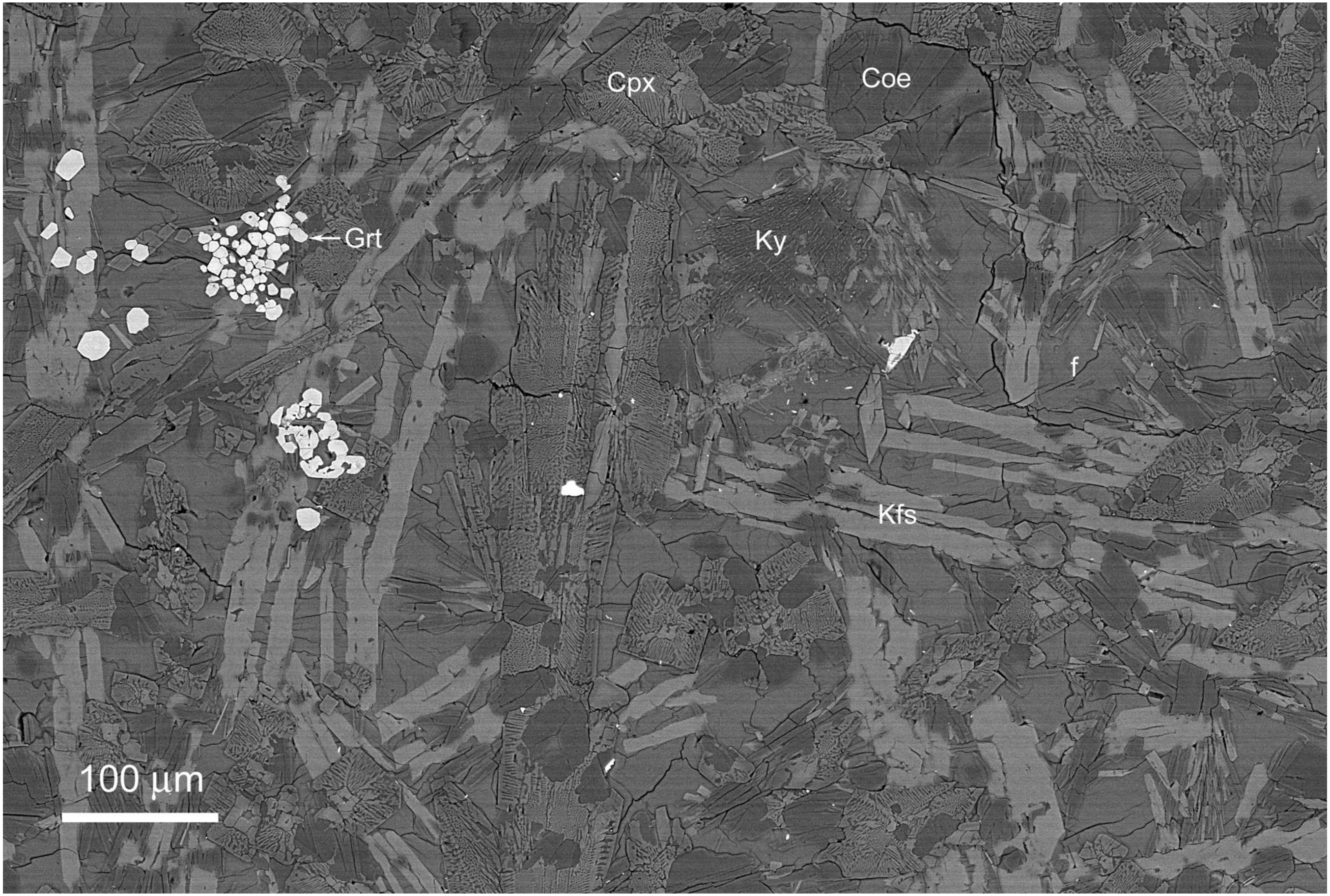


Figure 72: BSE image of Type 5 run G77 with a cooling rate of 3 °C /min and a bulk water content of 2.8 wt.%, run time 26 h, quenched at conditions of 3.5 GPa / 800 °C, no annealing. The transformation of quartz to coesite is almost completed and the clinopyroxene crystals are increased in size. The fluid is quenched to form a coherent bubble-free glass.

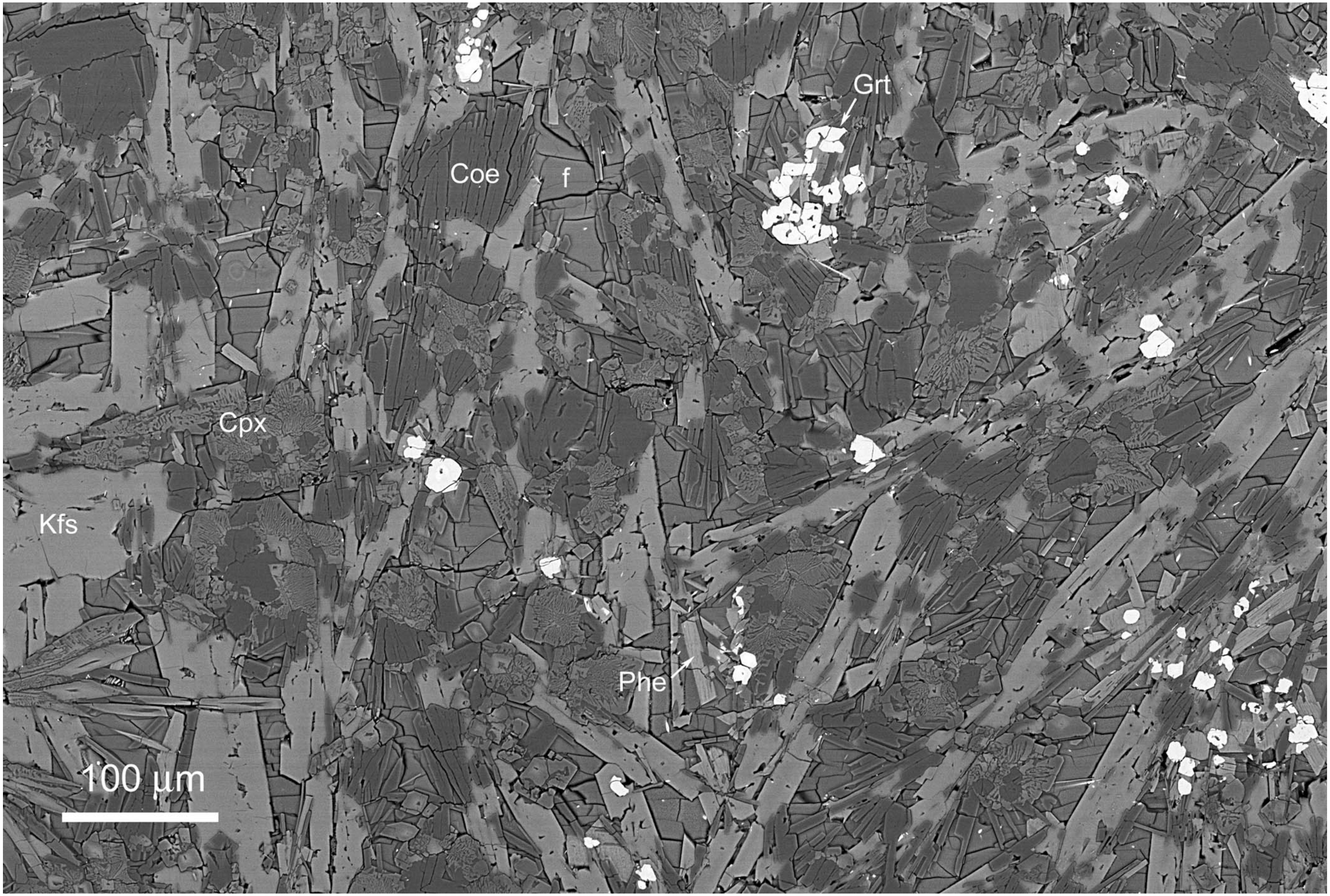


Figure 73: BSE image of Type 5 run G80 with a cooling rate of 3 °C /min and a bulk water content of 2.8 wt.%, run time 26.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. Owing to a pressure decrease of 0.06 GPa bubbles in the quenched glass are much smaller than in run G88 (Figure 74) and are thus hardly discernible.

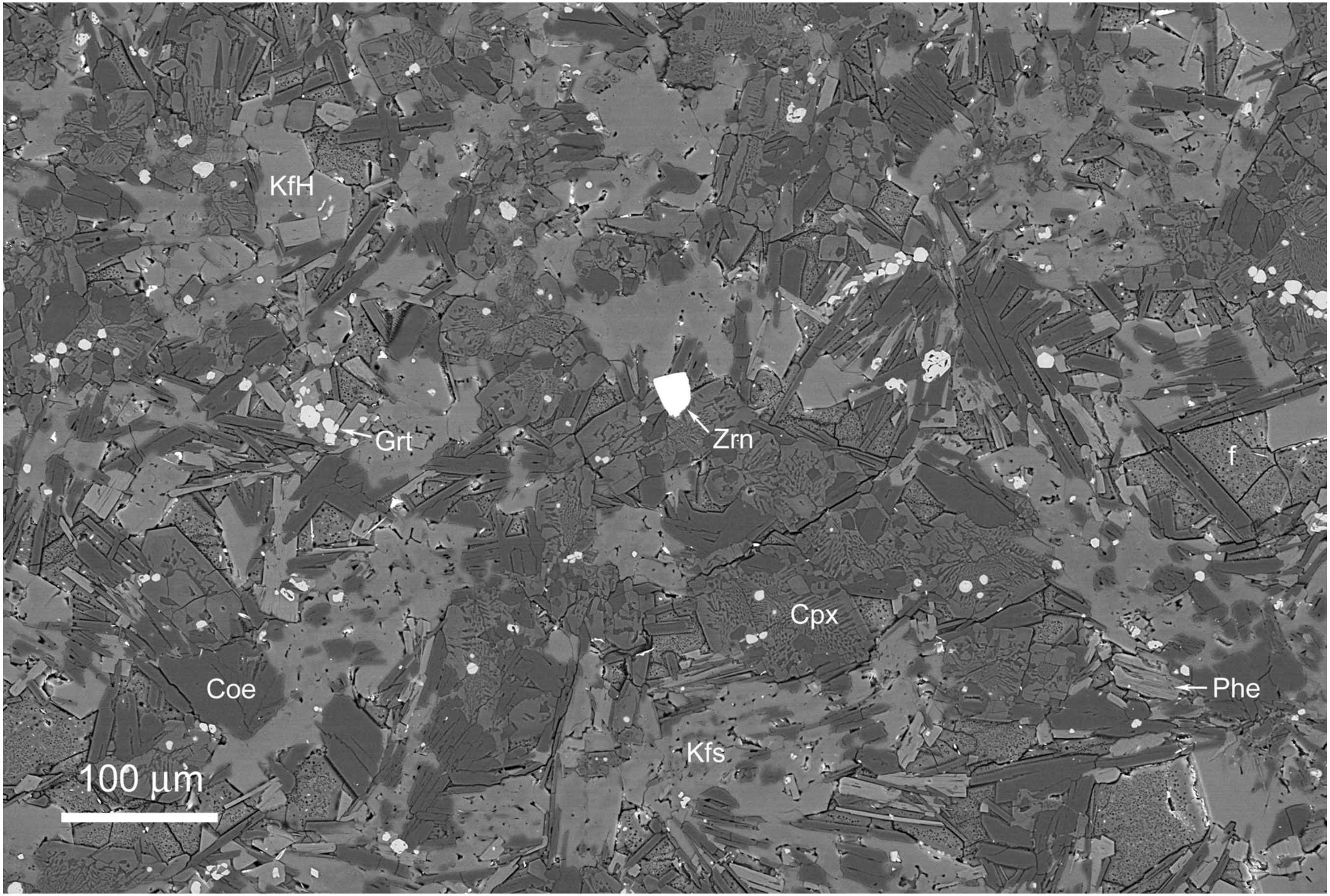


Figure 74: BSE image of Type 5 run G88 with a cooling rate of 3 °C /min, bulk water content 2.8 wt.%, run time 26.5 h, quenched at 3.5 GPa / 700 °C, no annealing. The glass-filled interstices appear spotted owing to large bubbles.

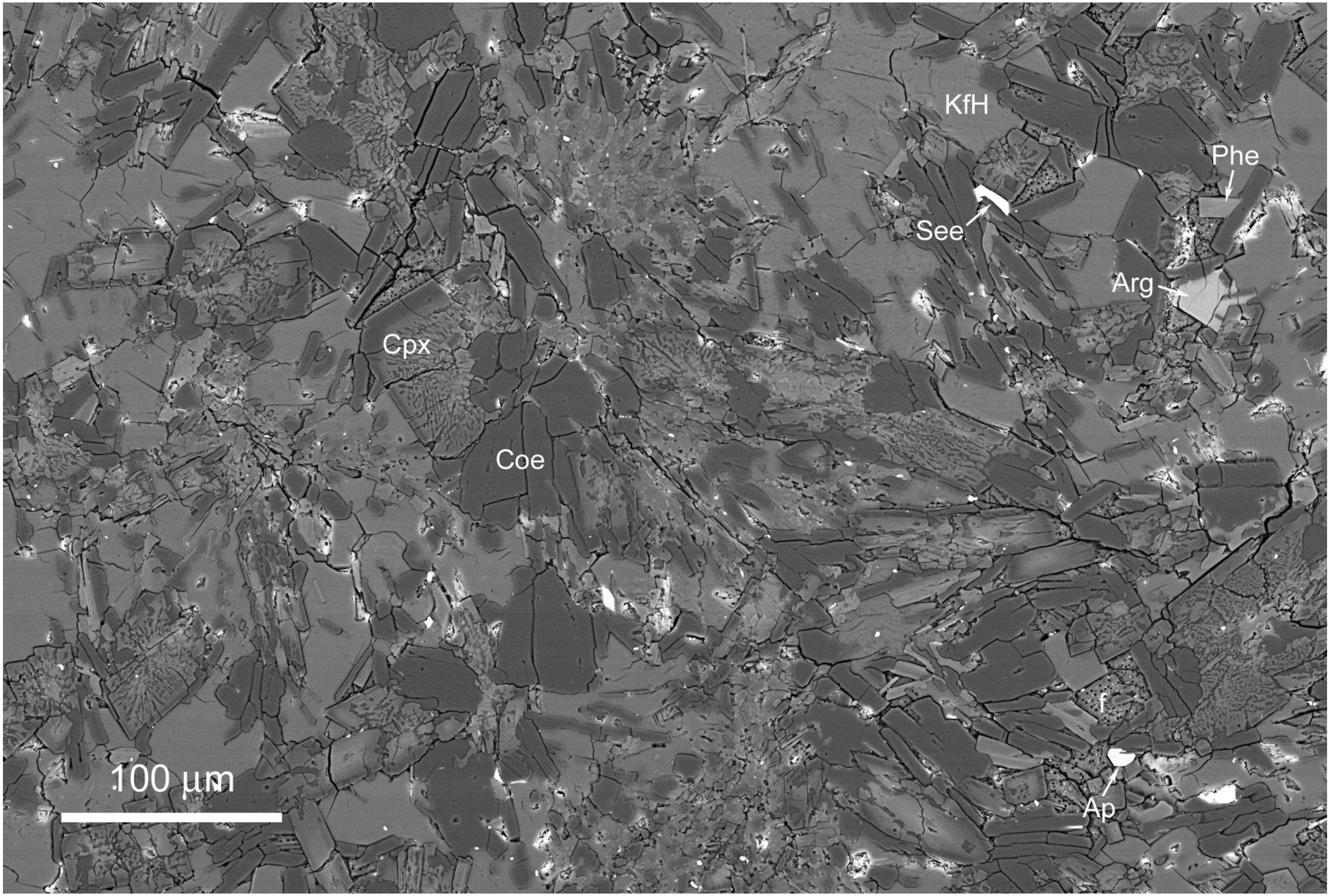


Figure 75: BSE image of Type 5 run G12 with a cooling rate of 3 °C /min, bulk water content 2.8 wt.%, run time 49 h, quenched at conditions of 3.5 GPa / 700 °C, 22.5 h of annealing. Clinopyroxene is largely decomposed internally.

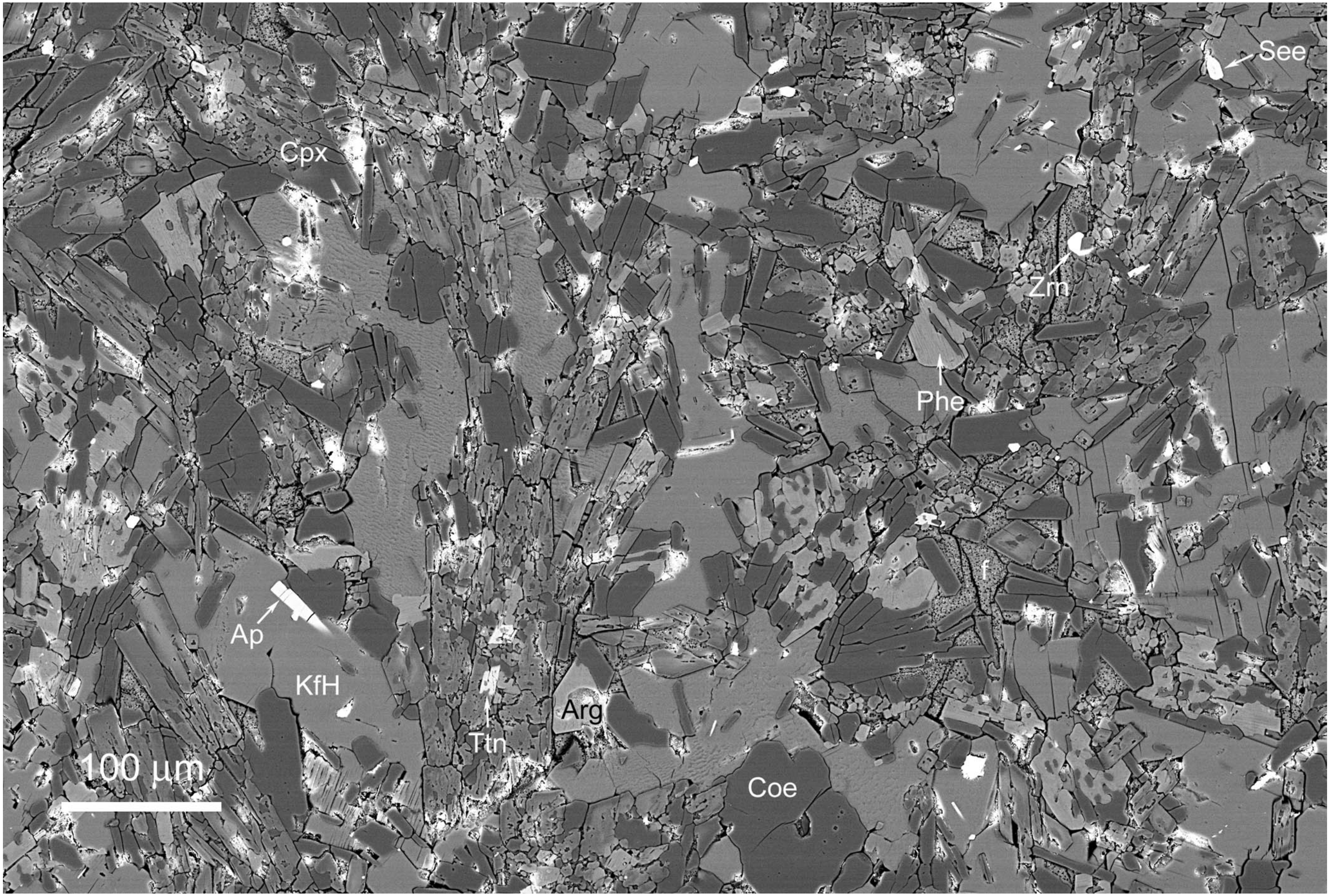


Figure 76: BSE image of Type 5 run G3 with a cooling rate of 3 °C /min, bulk water content 3.2 wt.%, run time 315 h, quenched at conditions of 3.5 GPa / 700 °C, 288.5 h of annealing. Clinopyroxene is completely replaced by phengite, coesite, and titanite, except for a jadeite-rich rim (dark grey). Note the euhedral crystals of aragonite and scheelite.

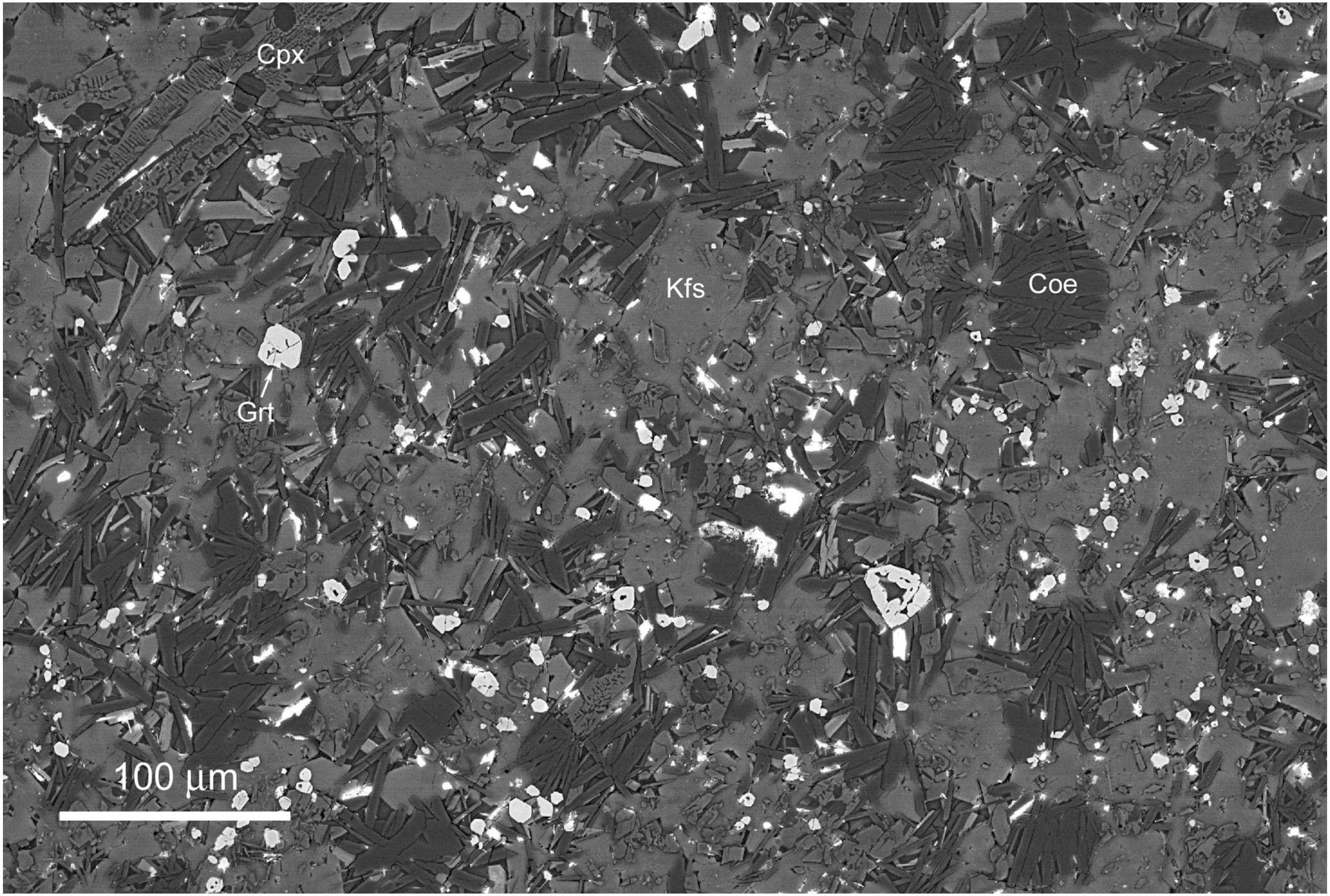


Figure 77: BSE image of Type 5 run G38 with a cooling rate of 30 °C /min and a bulk water content of 2.8 wt.%, run time 25 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. Predominantly small crystals are embedded in a matrix of K-feldspar. The fluid phase occupies only tiny polygonal interstices, preferentially where platy coesite crystals intersect.

thus difficult to characterize in SEM images.

In runs G75 and G63, both performed with a bulk water content of 2.8 wt.% and quenched at conditions of 3.5 GPa / 800 °C after rapid cooling (see Figure 20), rounded quartz crystals, some zircon, and large garnet crystals are relics of the sample powder. These phases co-occur with new-grown euhedral garnet and clinopyroxene, bundles of acicular kyanite, and rods or masses of K-feldspar. The homogeneous glass free of bubbles fills narrow interstices in a dense crystalline framework.

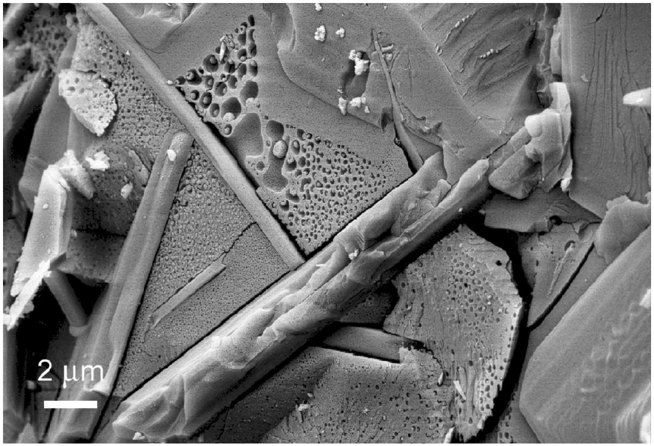


Figure 78: SE image of Type 5 run G38 with a cooling rate of 30 °C /min and a bulk water content of 2.8 wt.%, run time 25 h, quenched at conditions of 3.5 GPa /700 °C, no annealing. Close-up of a cluster of platy coesite crystals. The fluid phase is confined to the small polygonal interstices constrained by intersecting coesites. Note the different size and shape of the bubbles and the broad seam that is free of bubbles.

In run G38 with a bulk water content of 2.8 wt.%, quenched after ten minutes of rapid cooling at 3.5 GPa / 700 °C (see Figure 20), quartz is completely transformed to coesite. Coesite forms clusters of euhedral, platy crystals, which are embedded in a matrix of K-feldspar, together with crystals of clinopyroxene, phengite, garnet, apatite, and zircon (Figure 77). The fluid phase occupies small polygonal interstices, predominantly where platy coesite crystals intersect. The fluid is quenched to form a silicic glass with bubbles that are partially filled with precipitated material (Figure 78).

In runs G6 and G32, which have a bulk water content of 2.8 wt.%, quenched after five and almost eight days of annealing at 3.5 GPa / 700 °C, respectively (see Figure 20), the proportion of clinopyroxene and phengite is increased, the latter eventually becoming decomposed and replaced by new phengite and titanite. Within the dense groundmass of mainly K-feldspar, only tiny fluid-filled interstices remain.

Type 5 runs with a cooling rate of 0.03 °C /min. For the Type 5 runs described above a strong correlation between cooling rate and grain size is evident: the faster the cooling is, the smaller the crystals are. This trend is not strictly continued in the runs with the slowest cooling rate of 0.03 °C /min, as the average grain size comes rather close to that of the runs with a one order of magnitude smaller cooling rate of 0.3 °C /min.

All the runs of the series with a cooling rate of 0.03 °C /min (Figure 23) were performed with a bulk water content of 2.8 wt.%. In runs G58 and G67 (Figure 79), quenched at conditions

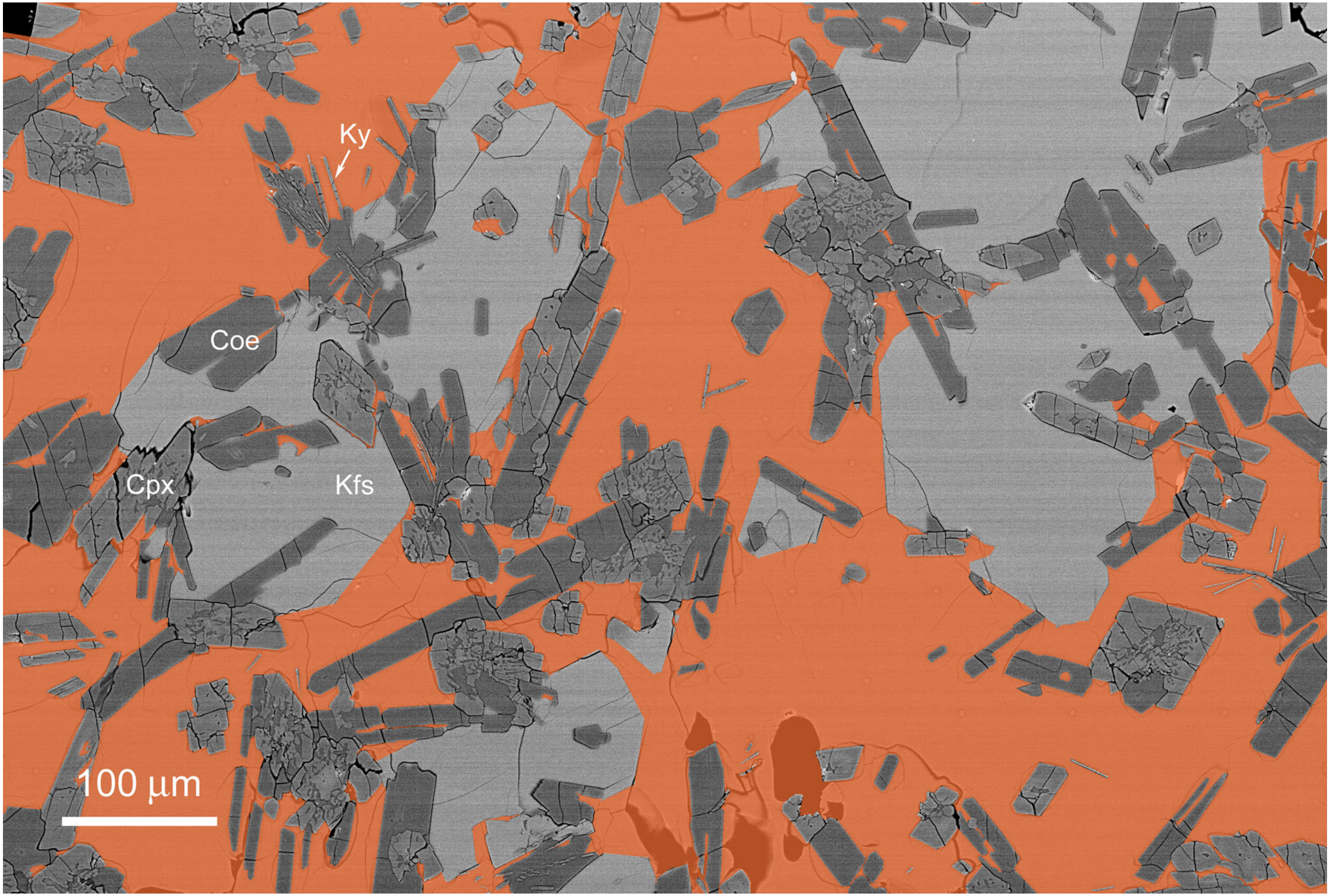


Figure 79: BSE image of Type 5 run G67 with a cooling rate of 0.03 °C /min and a bulk water content of 2.8 wt.%, run time 80.5 h, quenched at conditions of 3.5 GPa / 900 °C, no annealing. More or less isolated crystals are enclosed in a homogeneous glass (orange), which comprises 41 vol.%.

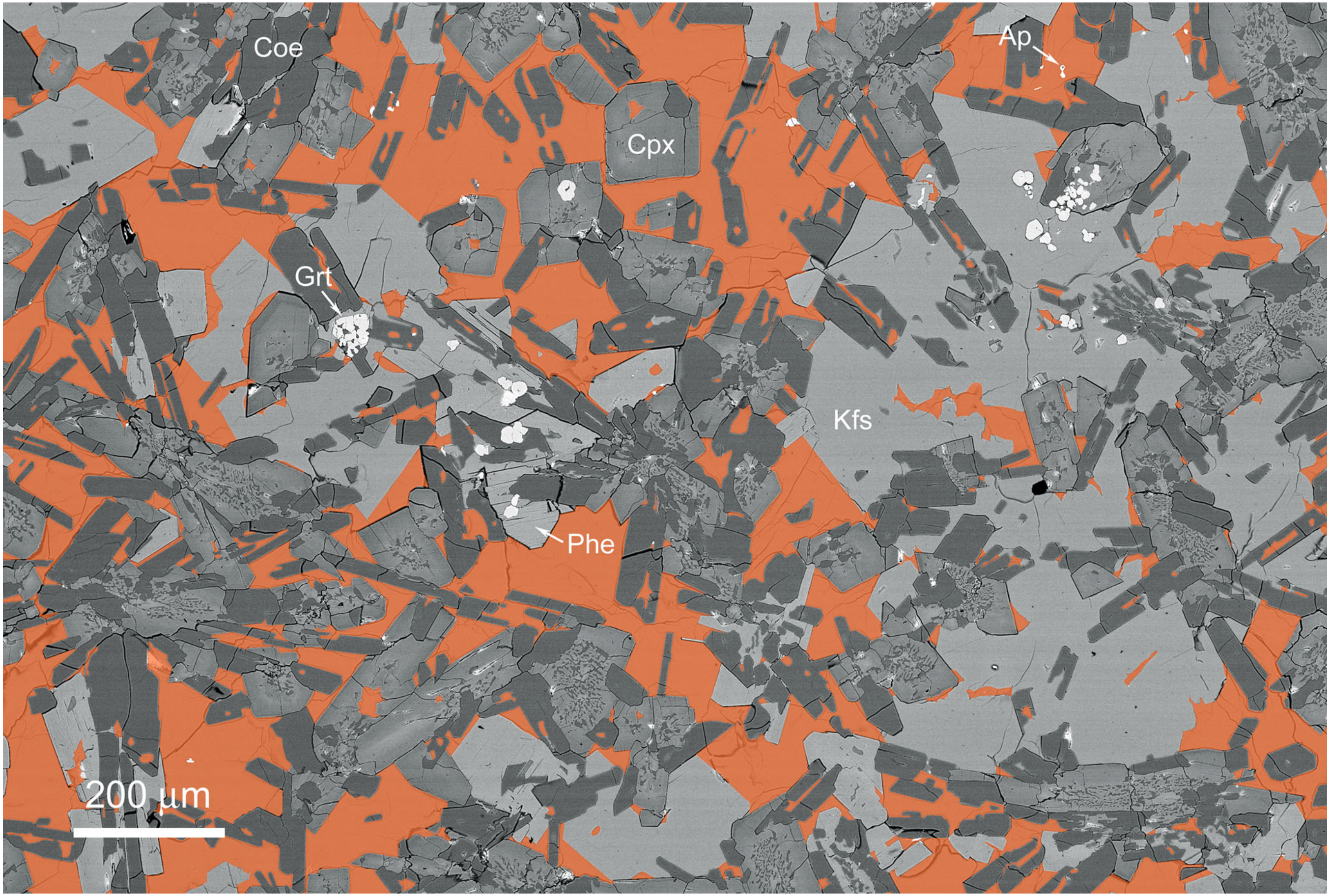


Figure 80: BSE image of Type 5 run G52 with a cooling rate of 0.03 °C /min and a bulk water content of 2.8 wt.%, run time 136 h, quenched at conditions of 3.5 GPa / 800 °C, no annealing. The silicic glass (orange) fills 22 vol.%.

of 3.5 GPa / 900 °C, more or less isolated crystals of coesite, clino-pyroxene, K-feldspar, garnet, and bundles of acicular kyanite in association with coesite are embedded in a transparent and colourless, bubble-free coherent glass (Figure 81). In run G67, the fluid occupies 41 vol.%.

With ongoing cooling to 800 °C as represented by run G52 (Figure 80), the crystalline phase assemblage is complemented by phengite and apatite. The proportion of the crystalline phases is increased and the coherent silicic glass in between now fills 22 vol.%.

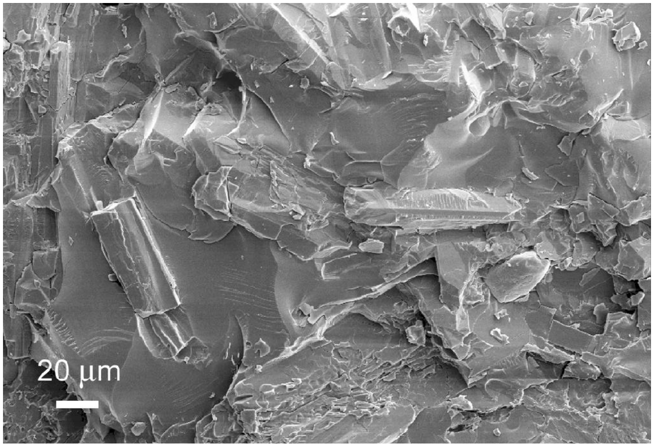


Figure 81: SE image of Type 5 run G67 with a cooling rate of 0.03 °C /min and a bulk water content of 2.8 wt.%, run time 80.5 h, quenched at conditions of 3.5 GPa / 900 °C, no annealing. Clinopyroxene prisms occur isolated within a coherent, homogeneous silicic glass free of bubbles.

In run G84, quenched at conditions of 3.5 GPa / 715 °C, in runs G42 and G83, quenched with reaching of 700 °C, as well as in run G31 with eight days of annealing at 3.5 GPa / 700 °C before quenching (see Figure 23), the microfabrics are nearly identical. The phase assemblage comprises coesite, K-feldspar hydrate enclosing K-feldspar, clinopyroxene, phengite, apatite, zircon, and garnet. Because of slow cooling clinopyroxene had enough time to approach its equilibrium composition and, hence, the symplectitic core is only narrow. The fluid phase is quenched to form a silicic glass rich in bubbles, filling 17 vol.% in run G83 (Figure 82). Within the bubbles, the typical spherules are found.

Re-heated runs (Type 6). The two re-heated runs G8 and G14, cooled to 650 °C and 400 °C and re-heated to 750 °C and 700 °C, respectively (see Figure 24), correspond very well to run G3 (Figure 76) with a cooling rate of 3 °C /min. The crystalline phases, i.e. coesite, clinopyroxene, K-feldspar hydrate, phengite, garnet, apatite, and zircon occur together with a brownish vesiculated silicic glass (Figure 83). The cores of the clinopyroxene crystals are decomposed as usually observed in runs with extended annealing time and are replaced by phengite, fluid phase, coesite, and some titanite. Aragonite, as well as small crystals of scheelite are found in both specimens. As already determined in other runs with decomposed clinopyroxene, the fluid phase is enriched in calcium (see Chapter 6) and perfectly rounded large spherules with a smooth surface occur within the bubble cavities of the glass.

Short-time melting run (Type 3). All Type 5 runs underwent

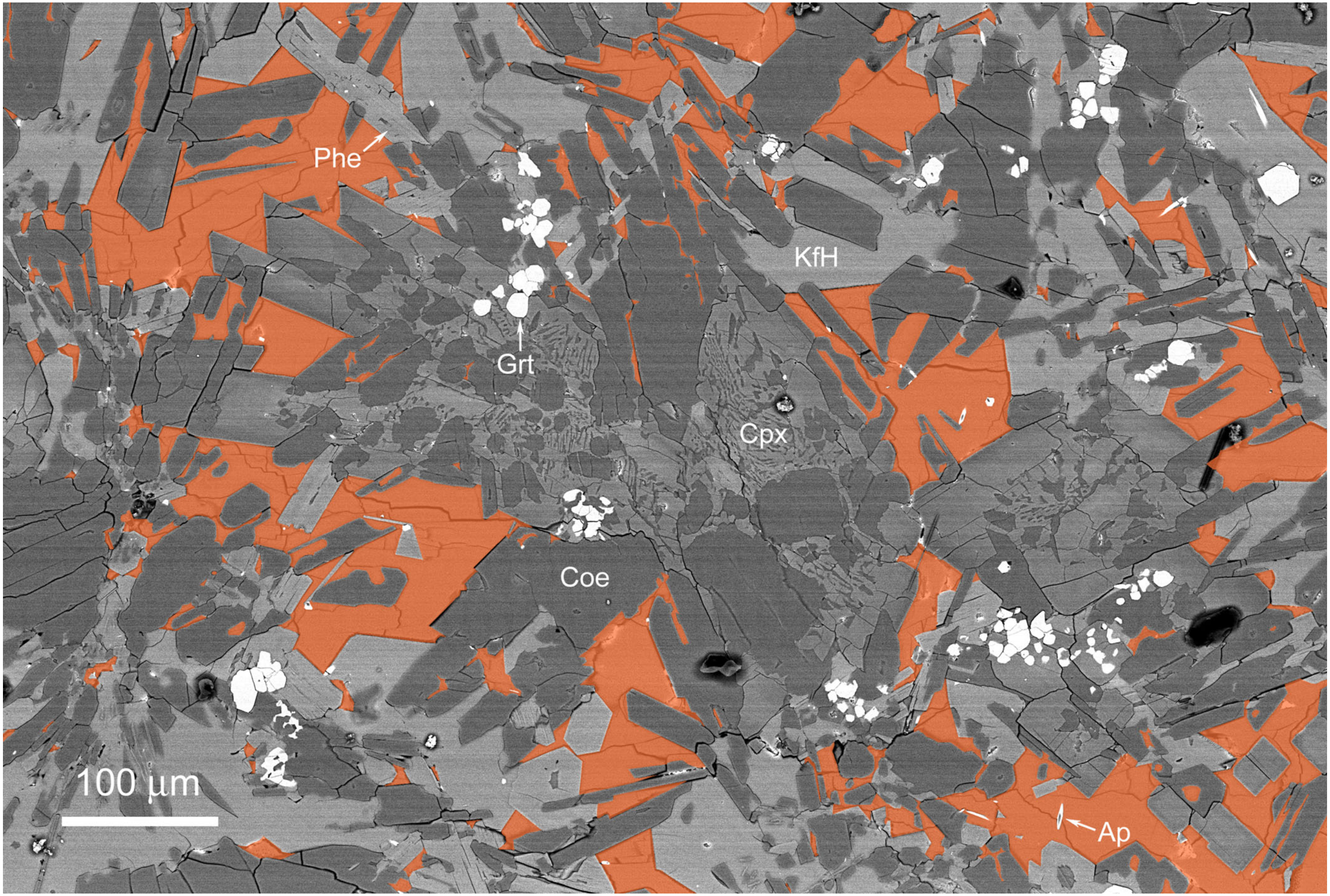


Figure 82: BSE image of Type 5 run G83 with a cooling rate of 0.03 °C /min and a bulk water content of 2.8 wt.%, run time 8 d, quenched at conditions of 3.5 GPa / 700 °C, no annealing. The clinopyroxene crystals show a broad rim free of symplectites and a distinct compositional zoning. The fluid phase is quenched to form a vesiculated silicic glass (orange), filling 17 vol.%.

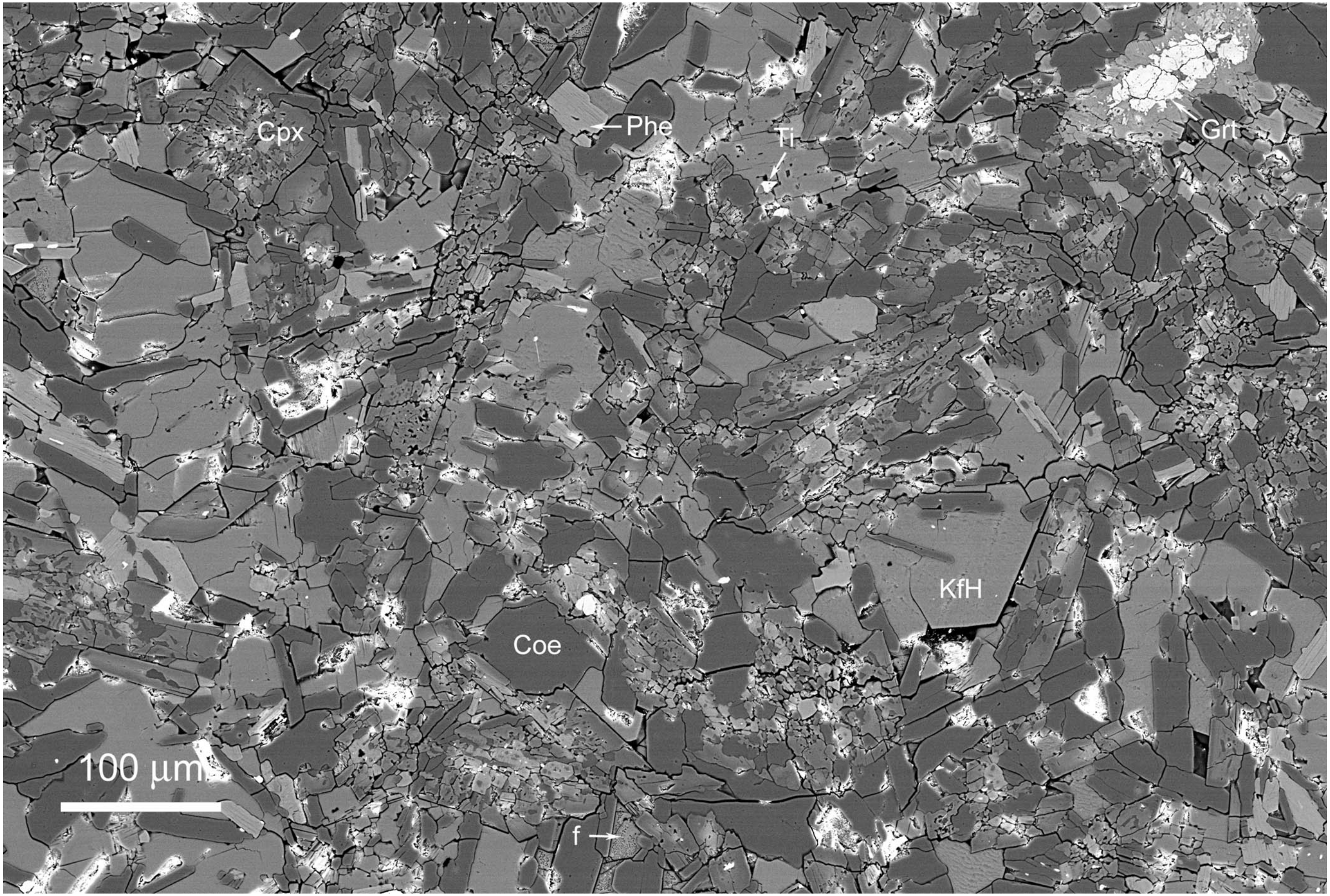


Figure 83: BSE image of the re-heated run G14 (Type 6) with a bulk water content of 2.8 wt.%, run time 7 d, quenched at conditions of 3.5 GPa / 700 °C, 4 d of annealing. Crystals of coesite, clinopyroxene, K-feldspar hydrate, phengite, garnet, apatite, and zircon occur together with a vesiculated silicic glass. Note the decomposition of the cores of clinopyroxene crystals into phengite, fluid phase, coesite, and some titanite.

melting for 23 hours at conditions of 2.5 GPa / 1000 °C before pressurization to 3.5 GPa. In the short-time melting run G92 with a bulk water content of 2.8 wt.%, by contrast, conditions of 2.5 GPa / 1000 °C were kept constant for 90 minutes only. Then the pressure was raised to 3.5 GPa, and after half an hour the charge was cooled at a rate of 0.3 °C /min. Finally, run G92 was quenched at conditions of 3.5 GPa / 700 °C without annealing.

Relics of the starting material are by no means more frequent in run G92 (Figure 84) than in the corresponding Type 5 runs with a cooling rate of 0.3 °C /min and the same bulk water content, G82 and G26, quenched at identical conditions of 3.5 GPa / 700 °C without annealing (see Figures 41 and 42). However, the grain size is generally slightly smaller and crystals larger than 100 µm are rare. The phase assemblage is that described above, comprising coesite, clinopyroxene, K-feldspar hydrate, phengite, garnet, apatite, zircon and the fluid phase. The fluid is distributed in relatively small polygonal interstices in the dense crystalline framework.

Simultaneous cooling-pressurization run (Type 2). In run G17 (path V in Figure 14), performed with a bulk water content of 2.8 wt.%, the increase of pressure from 2.5 to 3.5 GPa was simultaneous with cooling from 1000 to 700 °C at a rate of 0.3 °C /min. Specimen G17 is even finer grained than specimen G92 of the short-time melting run (see Figure 84), quenched at the same conditions. The phase assemblage of specimen G17 (Figure 85) comprises coesite, clinopyroxene, K-feldspar hydrate, phengite, garnet, and apatite and is thus typical of a run quenched at 3.5 GPa / 700 °C. Remarkably, clinopyroxene forms clusters of small grains instead of large phenocrysts. The quenched fluid is a vesiculated silicic glass filling tiny interstices. It is distinguished in the optical microscope by its black colour as well as in the SEM, pointing to a chemical composition different from glasses of Type 5 runs (see Chapter 6). The glass is enriched in iron and calcium, correlated to the jadeite-dominated clinopyroxene, and, as described for other runs with a high calcium concentration in the fluid phase, scheelite crystals occur too.

Heating-cooling run (Type 7). The single heating-cooling run G99 was heated to 930 °C at 2.5 GPa, then immediately cooled to 650 °C and quenched (see Figure 16). Owing to the problems generally arising from sealing capsules with high amounts of water, the bulk water content can only roughly be given as 20 wt.%.

The specimen contains large amounts of coherent dark brown glass free of bubbles (Figure 86). Many open cracks occur along which the glass is broken with decompression after the run or during preparation. The specimen contains euhedral crystals of quartz and of apatite. Most conspicuous are the large ear-like intergrowths of quartz and phengite, measuring several hundred micrometres. These correspond to those in Type 5 run G98 with a comparable high bulk water content of 15.4 wt.% (Figure 69), quenched at conditions of 3.5 GPa / 700 °C.

5.2 Runs using other rock compositions

Modified biotite-phengite gneiss. The Type 5 runs Q1 and Q2 with a cooling rate of 0.3 °C /min (see Figure 22) were performed using the biotite-phengite gneiss with 10 wt.% of

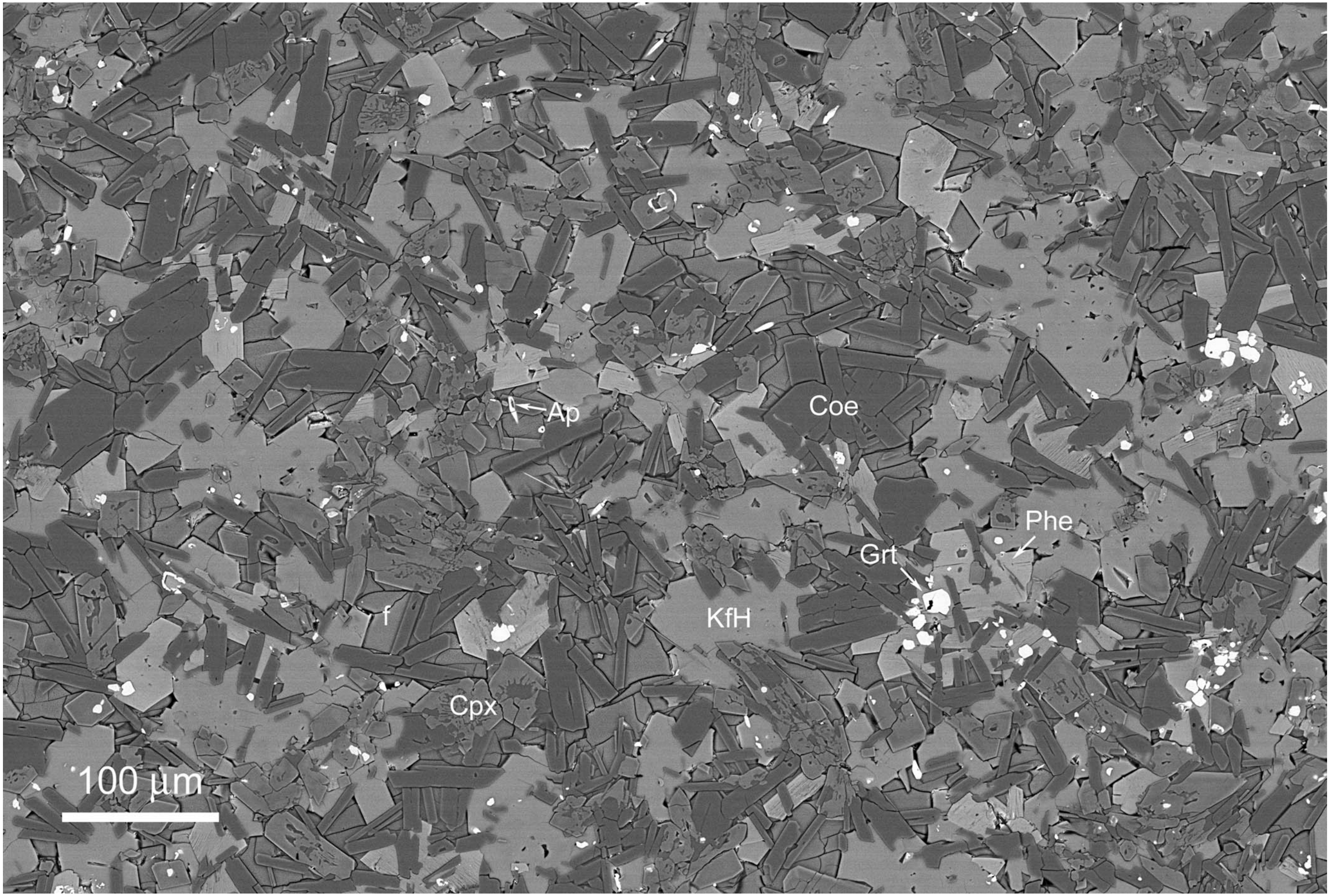


Figure 84: BSE image of short-time melting run G92 (Type 3) with a bulk water content of 2.8 wt.%, run time 20 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. Compared to Type 5 runs G82 and G26 with the same conditions (Figures 41 and 42), grain size is slightly smaller. A vesiculated glass occurs between crystals of coesite, clinopyroxene, K-feldspar hydrate, phengite, garnet, and apatite.

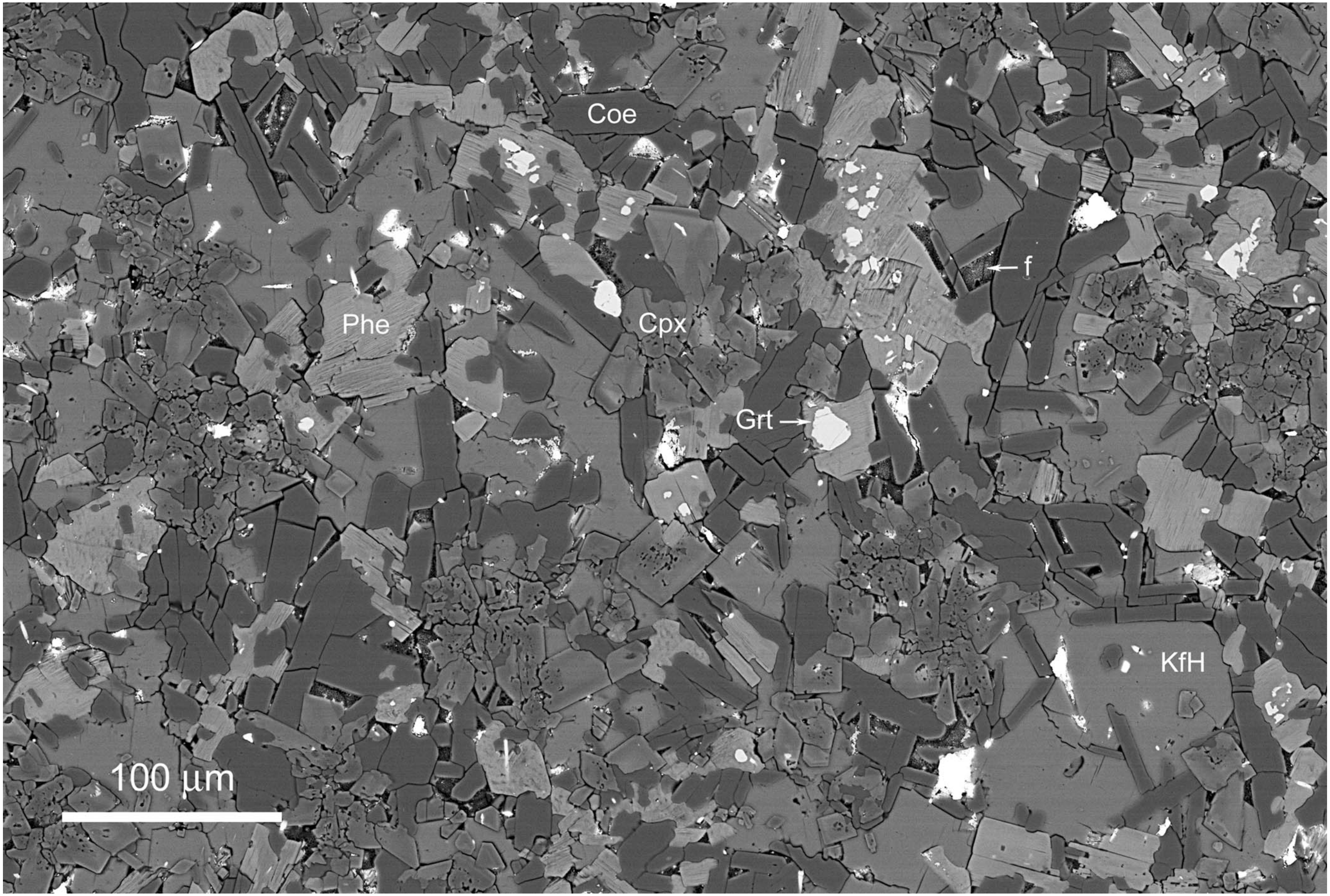


Figure 85: BSE image of simultaneous cooling-pressurization run G17 (Type 2) with a bulk water content of 2.8 wt.%, run time 9 d, quenched at conditions of 3.5 GPa / 700 °C, 7 d of annealing. Clinopyroxene forms clusters of small grains instead of large phenocrysts. The quenched fluid appears black, pointing to a different chemical composition as compared to glasses in Type 5 runs, quenched at the same conditions.

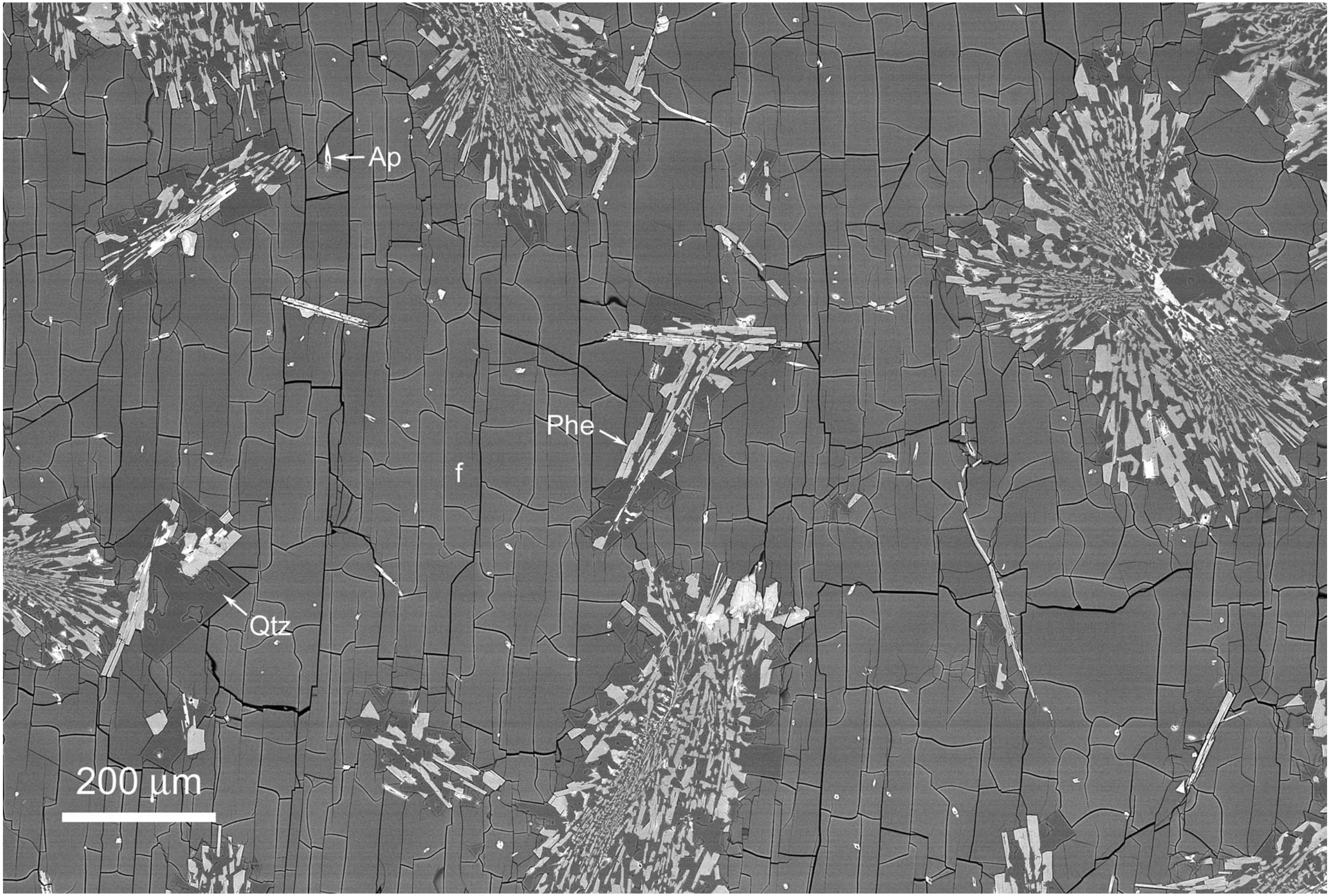


Figure 86: BSE image of the heating-cooling run G99 (Type 7) with a bulk water content of about 20 wt.%, run time 20 h, quenched at conditions of 2.5 GPa / 650 °C, no annealing. Ear-like intergrowths of quartz and phengite occur within large amounts of bubble-free glass. The many open cracks have formed with decompression after the run or during preparation.

quartz added. The bulk water content in both runs is 2.7 wt.%. Whereas in run Q2 the quartz powder was fully mixed with the gneiss, in run Q1 the gneiss was topped with a layer of pure quartz.

In run Q2, quenched at conditions of 3.5 GPa / 700 °C, the microfabric and the phase assemblage is identical to the runs using the original biotite-phengite gneiss apart from a higher proportion of coesite. In run Q1, quenched at conditions of 3.5 GPa / 886 °C, quartz is found transformed to coesite in place at the capsule's top (Figure 87A). The remainder of the specimen shows the same features as previously described for the biotite-phengite gneiss at comparable conditions (Type 5 run G27 with a bulk water content of 2.8 wt.%, see Figure 36): euhedral crystals of coesite, large phenocrysts of K-feldspar and clinopyroxene, clusters and isolated crystals of garnet, and acicular kyanite crystals occur in a coherent glass free of bubbles (Figure 87B).

Garnet-mica gneiss. The three Type 1 runs D4, D3, and D2 at constant conditions of 4.8 GPa /1000 °C (Figure 15) were performed to obtain a picture of the fluid topology that will establish with no additional water at conditions that have been

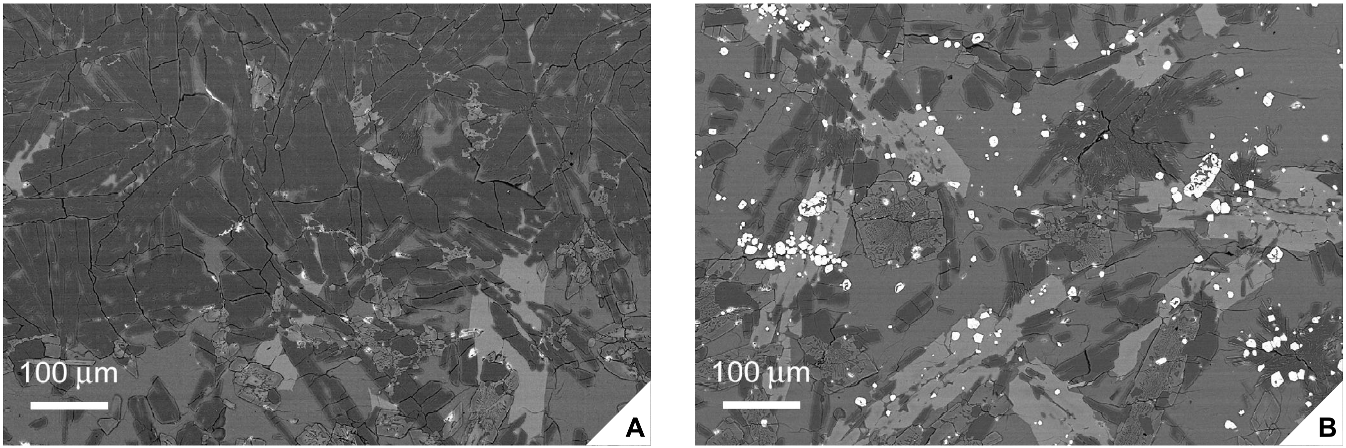


Figure 87: BSE images of Type 5 run Q1 with a bulk water content of 2.7 wt.%, run time 31.5 h, quenched at conditions of 3.5 GPa / 886 °C, no annealing. In this run with a modified biotite-phengite gneiss, the capsule was topped with a layer of pure quartz which is in situ transformed to coesite (A). Within the rest of the capsule (B), the microfabric and the phase assemblage does not differ from Type 5 runs with a cooling rate of 0.3 °C/min using the biotite-phengite gneiss without added quartz, quenched at comparable conditions.

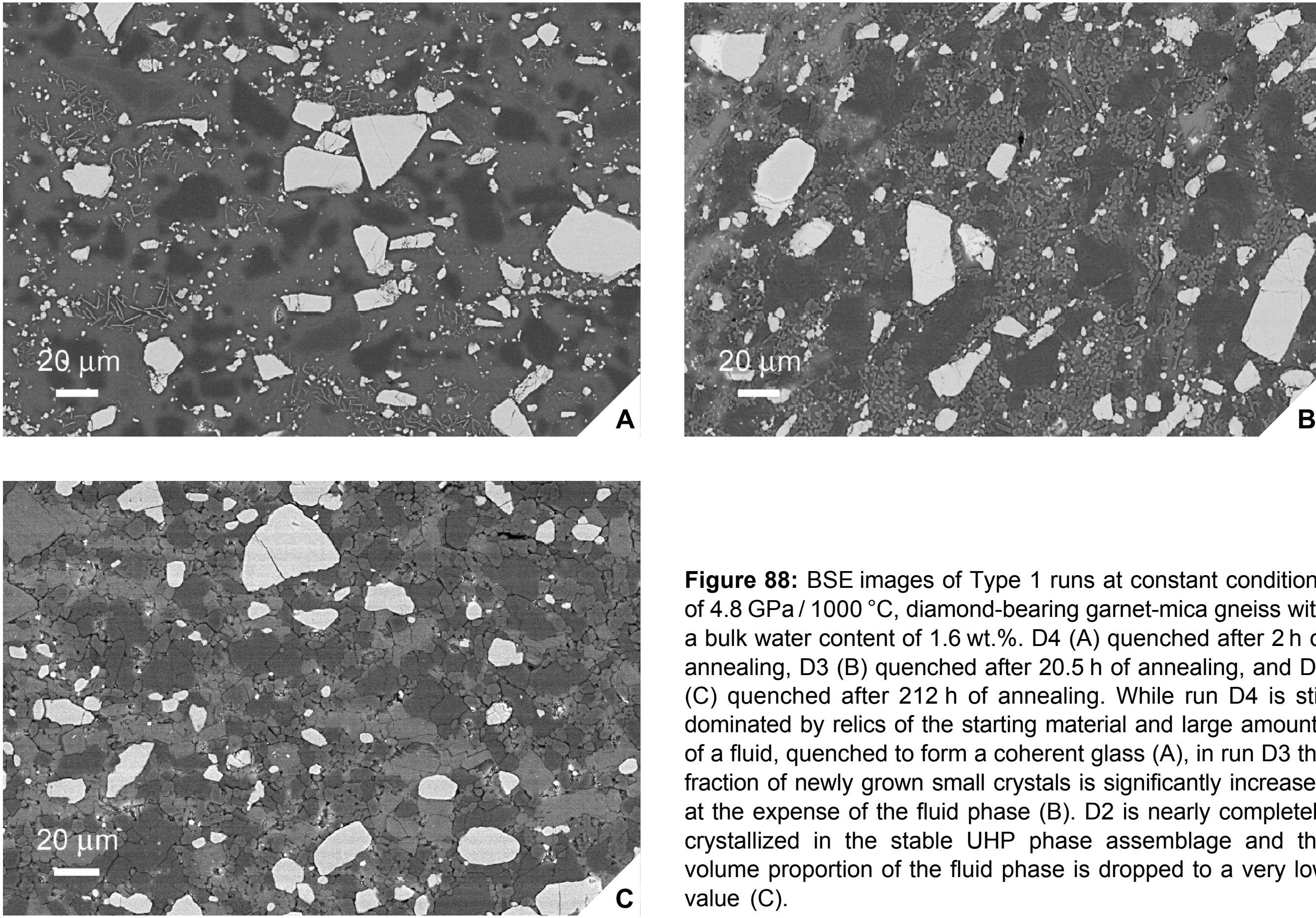


Figure 88: BSE images of Type 1 runs at constant conditions of 4.8 GPa / 1000 °C, diamond-bearing garnet-mica gneiss with a bulk water content of 1.6 wt.%. D4 (A) quenched after 2 h of annealing, D3 (B) quenched after 20.5 h of annealing, and D2 (C) quenched after 212 h of annealing. While run D4 is still dominated by relics of the starting material and large amounts of a fluid, quenched to form a coherent glass (A), in run D3 the fraction of newly grown small crystals is significantly increased at the expense of the fluid phase (B). D2 is nearly completely crystallized in the stable UHP phase assemblage and the volume proportion of the fluid phase is dropped to a very low value (C).

estimated for the natural UHP metamorphic peak conditions of the diamond-bearing gneiss.

Run D4 (Figure 88A), quenched after two hours of annealing, is still dominated by rounded quartz crystals, garnet, and clinopyroxene, which all are relics of the starting material, co-occurring with needles of kyanite. The glass phase in between incorporates lots of tiny crystals. After almost one day of annealing as represented by run D3 (Figure 88B), the transformation from quartz to coesite is completed. The amount of fluid is decreased significantly by nucleation and growth of numerous small crystals around the larger ones. In run D2, quenched after nine days of annealing at conditions of 4.8 GPa / 1000 °C, the crystalline framework is finally almost closed and consists predominantly of coesite, phengite, and garnet (Figure 88C). The fluid forms an interconnected network stretching along grain edges and grain faces and fills the pore space at the junctions where three or more crystals meet (Figure 89A). The fluid is quenched to form a coherent glass containing dispersed tiny bubbles with precipitates forming minute spherules within (Figure 89B).

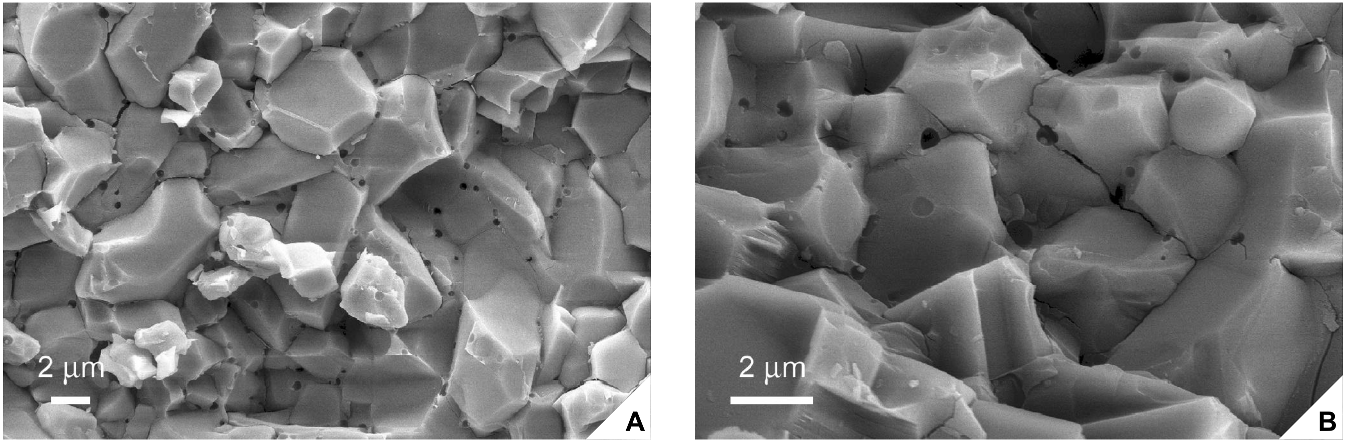


Figure 89: SE images of Type 1 run D2 at constant conditions of 4.8 GPa / 1000 °C with the garnet-mica gneiss and a bulk water content of 1.6 wt.%, quenched after 212 h of annealing. The fluid is quenched to form a glass (slightly darker grey than the crystalline phases), which is distinguished by dispersed tiny vesicles. It forms an interconnected network stretching along grain edges and grain faces, and fills the pore space at the junctions where three or more crystals meet (A). The bubble cavities within the glass contain precipitates forming minute spherules (B).

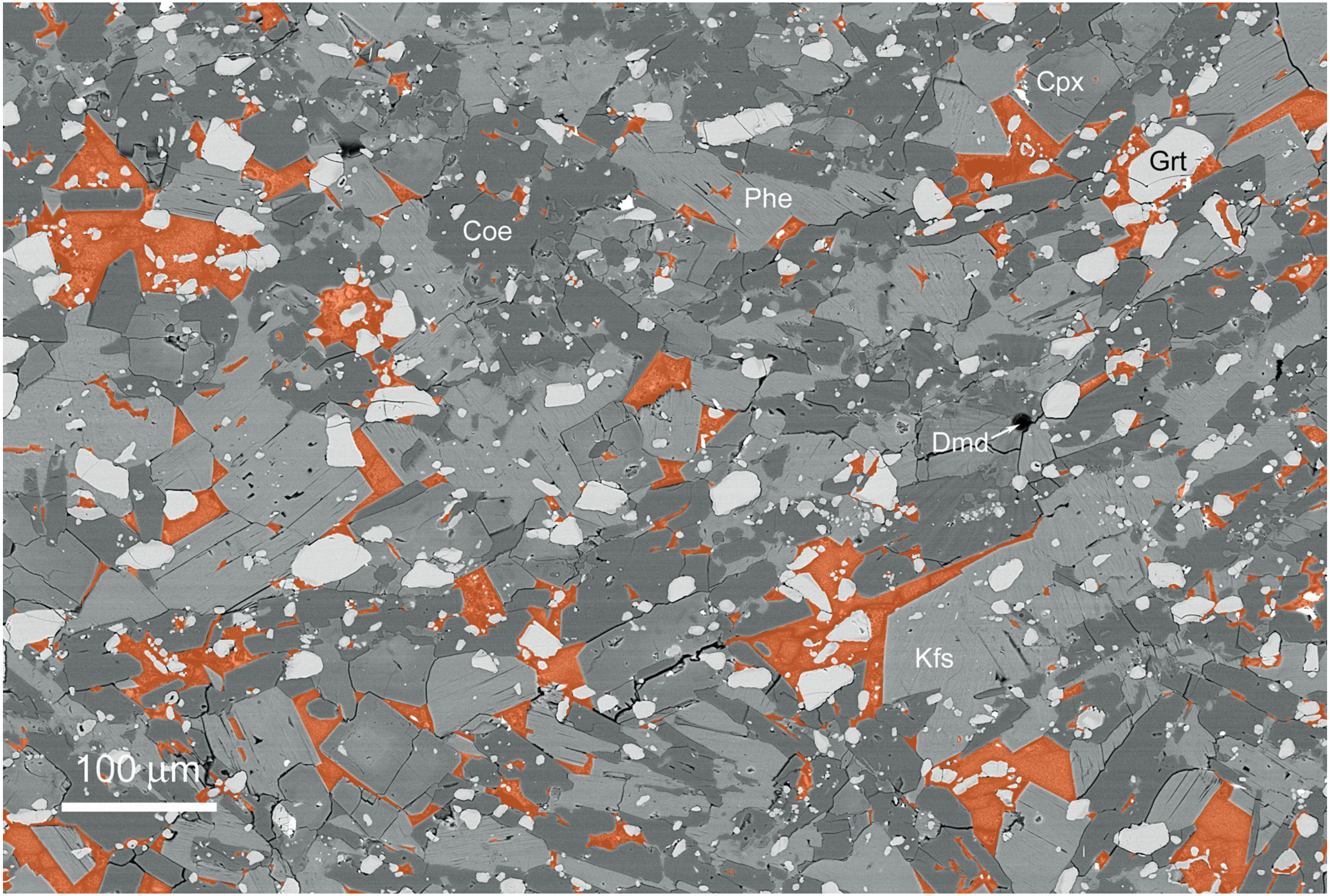


Figure 90: BSE image of Type 5 run D1 with a cooling rate of 0.3 °C /min, garnet-mica gneiss with a bulk water content of 3.6 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. The most common crystalline phases are coesite, K-feldspar, clinppyroxene, phengite, and garnet. Diamond, originally included in garnet, is easily identified by high relief. The vesiculated glass (orange) fills 9 vol.%.

The Type 5 run D1 with a cooling rate of 0.3 °C /min using the garnet-mica gneiss with 2 wt.% of water added was quenched at conditions of 3.5 GPa / 700 °C after 16 hours and 40 minutes of cooling from 1000 to 700 °C (Figure 22). It was performed to compare the fluid in the granodiorite with that developed in the granitic rock composition in terms of topology, volume proportion, and vesiculation. The specimen shows the same characteristics as observed in Type 5 runs with the biotite-phengite gneiss at comparable conditions and, apart from a change in the volume proportion of the individual crystalline phases, the microfabrics are similar (Figure 90). The phase assemblage comprises coesite, K-feldspar, clinopyroxene, almandine-rich garnet, phengite, and few monazite. Diamond crystals, originally included in garnet, survive the experimental procedure and are easily identified by their high relief (Figure 90 and 91).

Also, the features of the quenched fluid are equivalent to those in the runs using the biotite-phengite gneiss at the same conditions and with the same amount of water added. A coherent silicic glass is crowded with bubbles (Figure 92A), which are, however, less homogeneous in size and distribution (Figure 92B). Within the bubbles, small spherules are precipitated. Also, the size and the distribution of these spherules is more inhomogeneous than in the specimens of granitic composition and they are generally smaller, pointing to lower amounts of dissolved material. Small globules, presumably rich in silica (Figure 92C), are more frequently observed than in the granitic specimens.

Pyrope quartzite. The Type 4 runs without cooling W2 and W3, both having a bulk water content of 2.8 wt.%, underwent conditions of 2.5 GPa / 1000 °C for 23 hours followed by pressurization to 3.5 GPa. Without cooling, both runs were quenched at conditions of 3.5 GPa /1000 °C after half an hour of annealing (see Figure 18). The microfabrics (Figure 93) are dominated by euhedral crystals of coesite, which form a dense mesh, and by crystals of pyrope-rich garnet. The quenched fluid is a bubble-free glass occupying the angular interstices that are bounded by three or four crystals in the two-dimensional section.

The Type 5 run W1 with a cooling rate of 0.3 °C /min and a

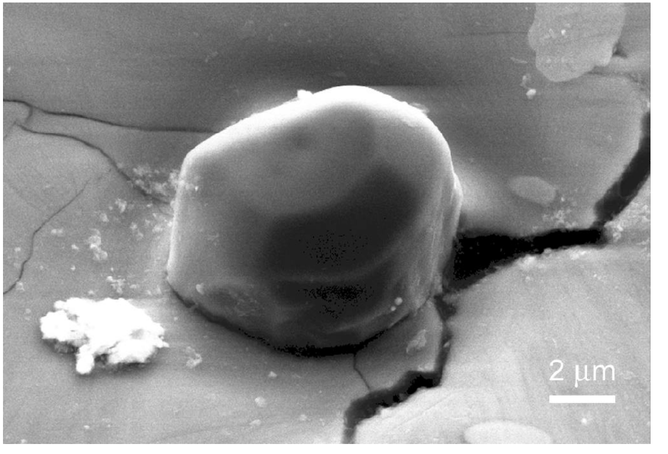


Figure 91: SE image of Type 5 run D1 with a cooling rate of 0.3 °C / min, diamond-bearing garnet-mica gneiss with a bulk water content of 3.6 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. Diamond from the starting material survives the experimental procedure: image shows a diamond crystal upon the surface of a polished section.

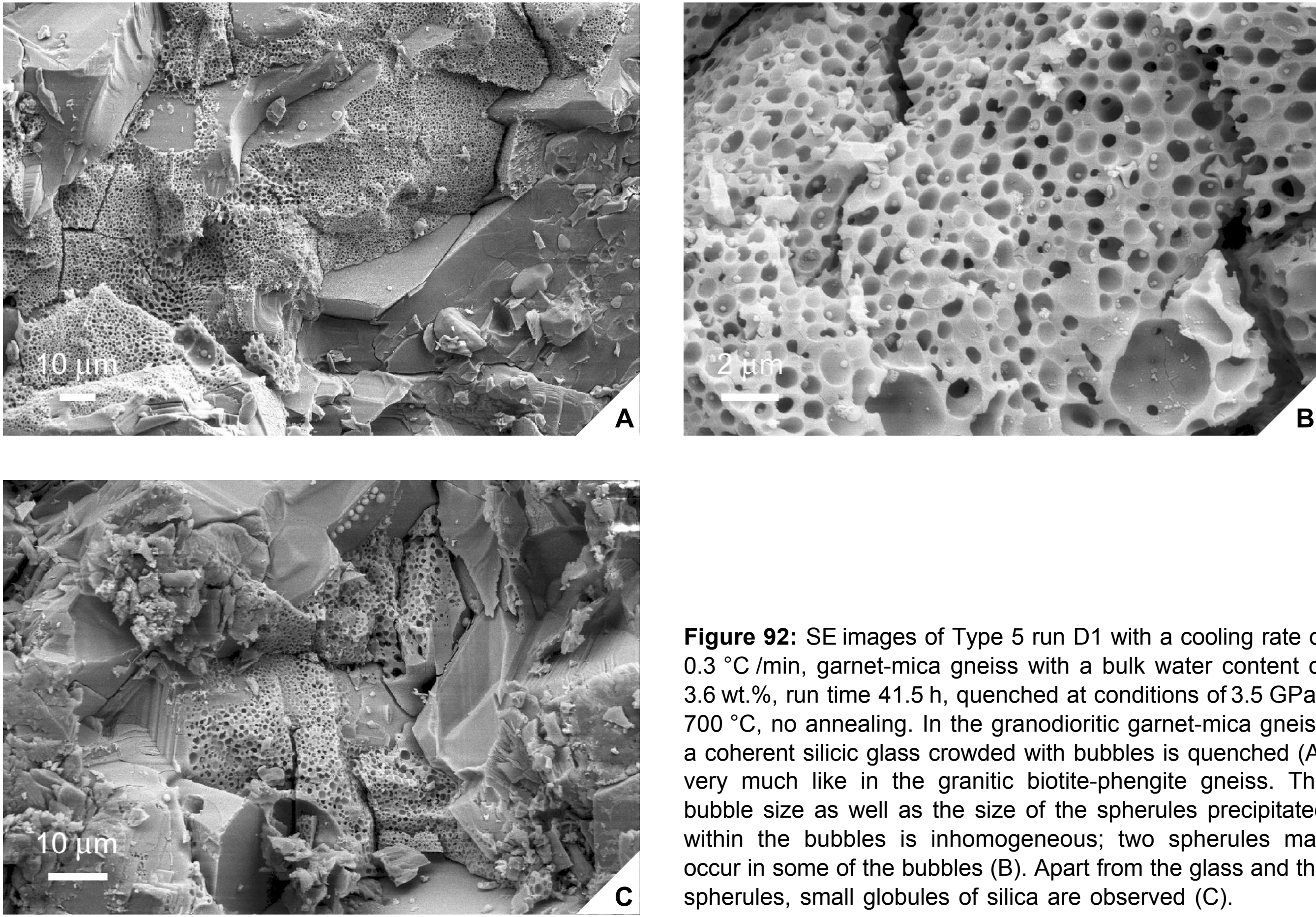


Figure 92: SE images of Type 5 run D1 with a cooling rate of 0.3 °C /min, garnet-mica gneiss with a bulk water content of 3.6 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. In the granodioritic garnet-mica gneiss a coherent silicic glass crowded with bubbles is quenched (A) very much like in the granitic biotite-phengite gneiss. The bubble size as well as the size of the spherules precipitated within the bubbles is inhomogeneous; two spherules may occur in some of the bubbles (B). Apart from the glass and the spherules, small globules of silica are observed (C).

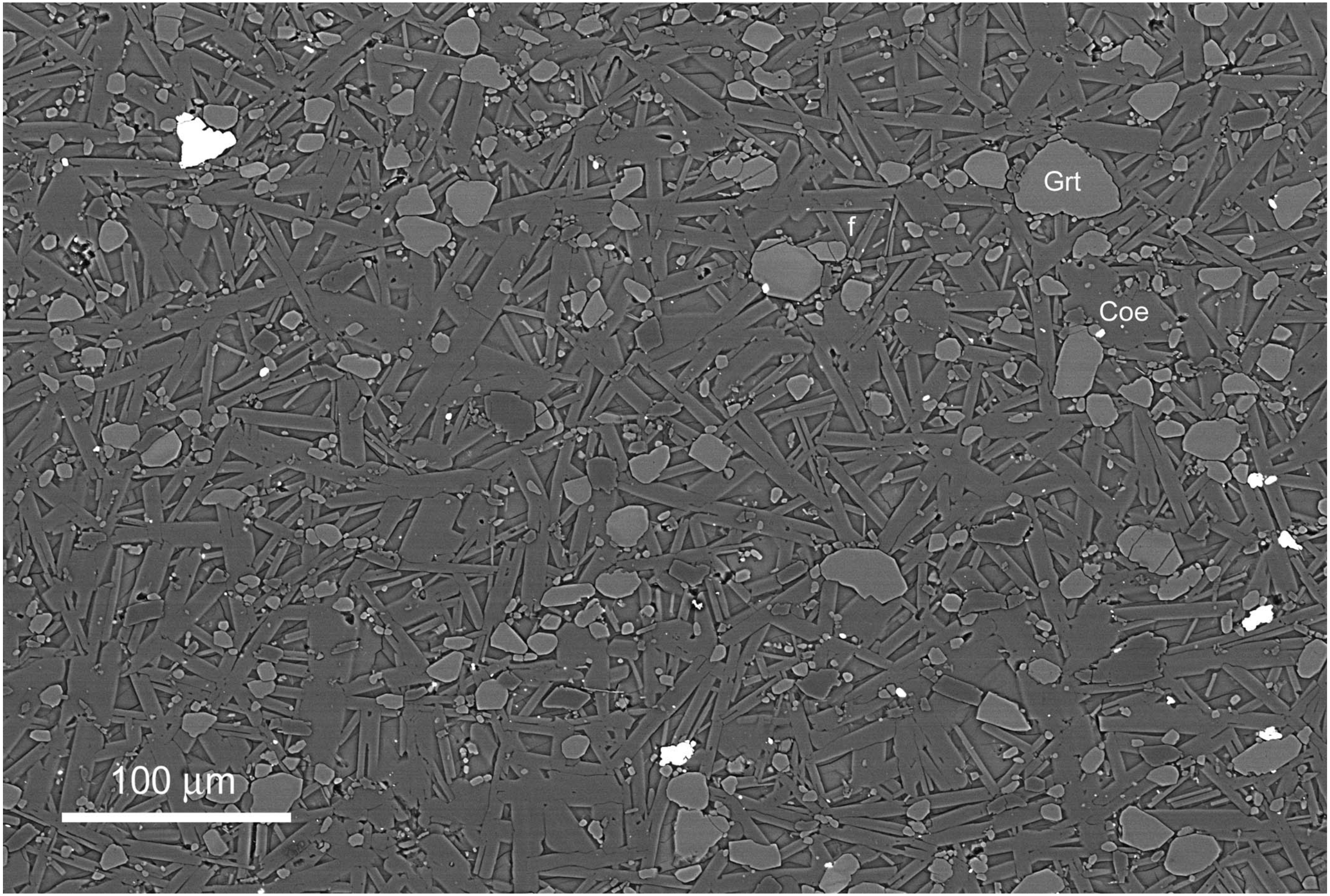


Figure 93: BSE image of Type 4 run without cooling W2, bulk water content 2.8 wt.%, run time 25 h, quenched at 3.5 GPa / 1000 °C, 30 min of annealing. In the pyrope quarzite, crystals of coesite and pyrope form a dense mesh.

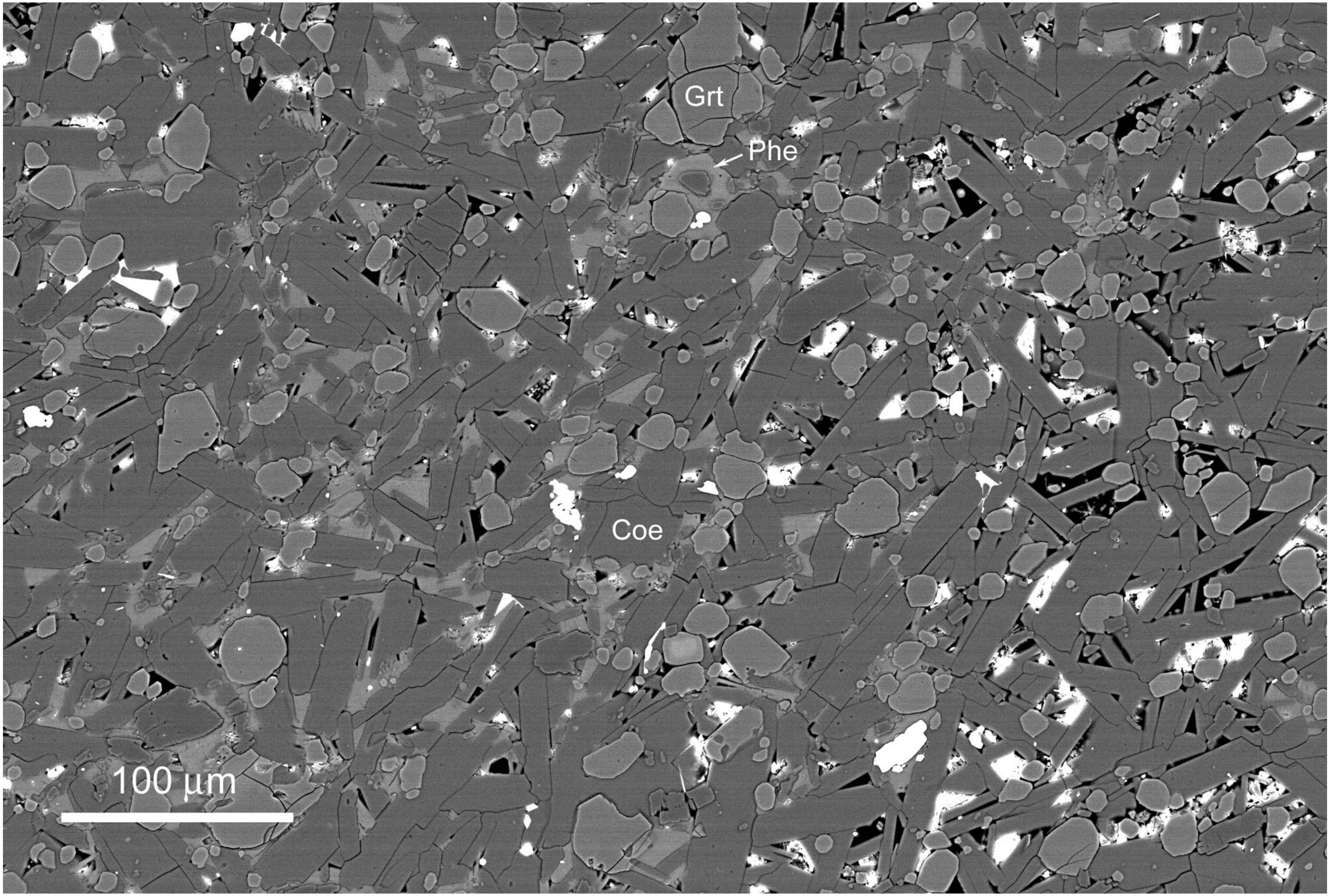


Figure 94: BSE image of Type 5 run W1 with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.% with the pyrope quartzite, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. Interstices in between the crystals of coesite and garnet are partially filled with phengite, apatite, and rutile while many of them are void.

bulk water content of 2.8 wt.% was quenched at conditions of 3.5 GPa / 700 °C (see Figure 22). It was performed to compare the fluid in the pyrope quartzite with that developed in the granitic and the granodioritic rock compositions. Coesite and garnet still dominate the phase assemblage, but the interstices are now partially filled with phengite, apatite, and rutile while many of them are void (Figure 94). Only some isolated glass globules were quenched within the interstices instead of a coherent silicic glass (Figure 95).

Starting materials representing oceanic crust. This series of experiments comprises six runs, one with the eclogite E, three using the phonolithic tephrite B, and two runs with the MOR basalt P. The Type 5 runs E1, B1, and P2, all with 2 wt.% of water added, were cooled to 700 °C within 16 hours and 40 minutes at a rate of 0.3 °C /min and then quenched immediately when reaching conditions of 3.5 GPa / 700 °C (Figure 22). These runs allow for direct comparison in regard to microfabrics and fluid composition with the runs using continental crust compositions described above, which were performed at the same conditions.

The other runs with the phonolithic tephrite B2 and B3 are Type 1 runs at constant conditions with no added water (see Figure 19 and 17). Run P1, the second run using the MOR

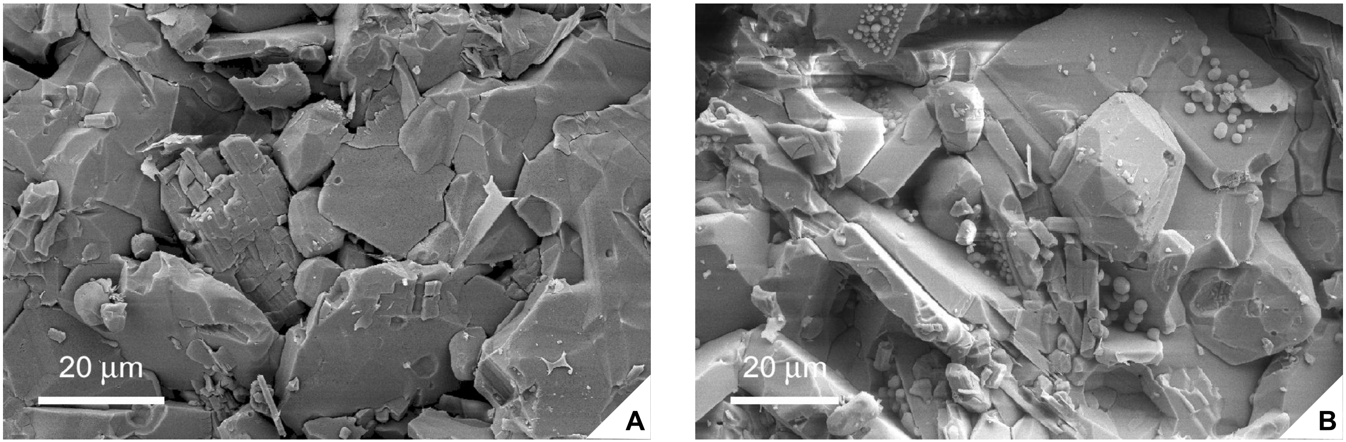


Figure 95: SE images of Type 5 run W1 with a cooling rate of 0.3 °C /min, pyrope quartzite with a bulk water content of 2.8 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. Most interstices in between the crystals of coesite and garnet are void (A). Isolated silica-rich globules occur upon crystal interfaces, which confine the otherwise void interstices (B).

basalt, is a short-time melting run (Type 3) with no water added; different to the other runs, an uncrushed drill-core in a medium-volume capsule was here used instead of the sample powder.

The major crystalline phases in the eclogite run E1 (Type 5) are euhedral crystals of clinopyroxene and subhedral, distinctively zoned crystals of garnet rich in almandine component, associated with coesite, phengite, apatite, titanite, and few pyrite (Figure 96). The overall shape of the crystals is rather isometric than characterized by a high aspect ratio as observed in the runs with the granitic and granodioritic bulk rock composition. The polygonal interstices between the crystals are filled with a fluid phase quenched to form a coherent silicic glass. Much like in most other Type 5 runs quenched at these conditions bubble cavities are observed within the glass.

Type 5 run B1 performed with the phonolithic tephrite shows a comparable microfabric (Figure 97). The phase assemblage comprises euhedral crystals of clinopyroxene, garnet, euhedral crystals of phengite, which is commonly grown around a core of biotite, apatite, and large amounts of a fluid phase. The majority of the crystals shows a distinct compositional zoning. The fluid is quenched to form a coherent glass that is crowded with bubbles (Figure 98A), which are frequently elongated rather than spherical. Bubbles appear to be arranged in vortexes (Figure 98B), suggesting that the fluid has been whirled upon quenching. Within the bubble cavities, material was precipitated without forming distinct spherules but being dispersed along the bubble wall instead (Figure 98C).

The two other runs with the phonolithic tephrite were performed with no water added at constant conditions (Type 1). The microfabric in run B2, performed at constant conditions of 3.5 GPa / 700 °C, is exclusively characterized by relics of the starting material, even after almost one week of annealing (Figure 99A). Reliable identification of the phases is impossible without chemical analysis. There is no evidence of a fluid phase having been released at run conditions.

Run B3 was annealed for one and a half hour at conditions of 3.5 GPa / 1000 °C. Compared to run B2, the formation of a phase assemblage corresponding to the run conditions is further proceeded owing to the higher temperature. Large clinopyroxene phenocrysts are characterized by a compositional zoning (Figure 99B). Between these, numerous smaller crystals of clinopyroxene, garnet, phengite, and some apatite nucleated. The pore space is filled by a fluid phase that is quenched to form a silicic glass.

The microfabric of the Type 5 run P2 with a cooling rate of 0.3 °C /min with the MOR basalt, quenched at conditions of 3.5 GPa / 700 °C (see Figure 22) differs somewhat from the other runs performed at the same conditions. The phase assemblage comprises clinopyroxene, garnet, coesite, apatite, and titanite. Most of the interstices in between the predominantly euhedral and isometric crystals are void and remnants of a glass phase with large bubble cavities are rare (Figure 100). While the capsule was slit open during preparation, a sulphur hydride-containing vapour escaped with a clearly audible hiss.

The microfabric of the short-time melting run P1 (Type 3) with no water added is very similar to that of Type 5 run P2, apart from the fluid being quenched to a coherent glass. Strikingly, the black specimen was covered by a brown coating, which is a glass containing large euhedral crystals and no relics from the starting material. In Figure 101, the left half of the

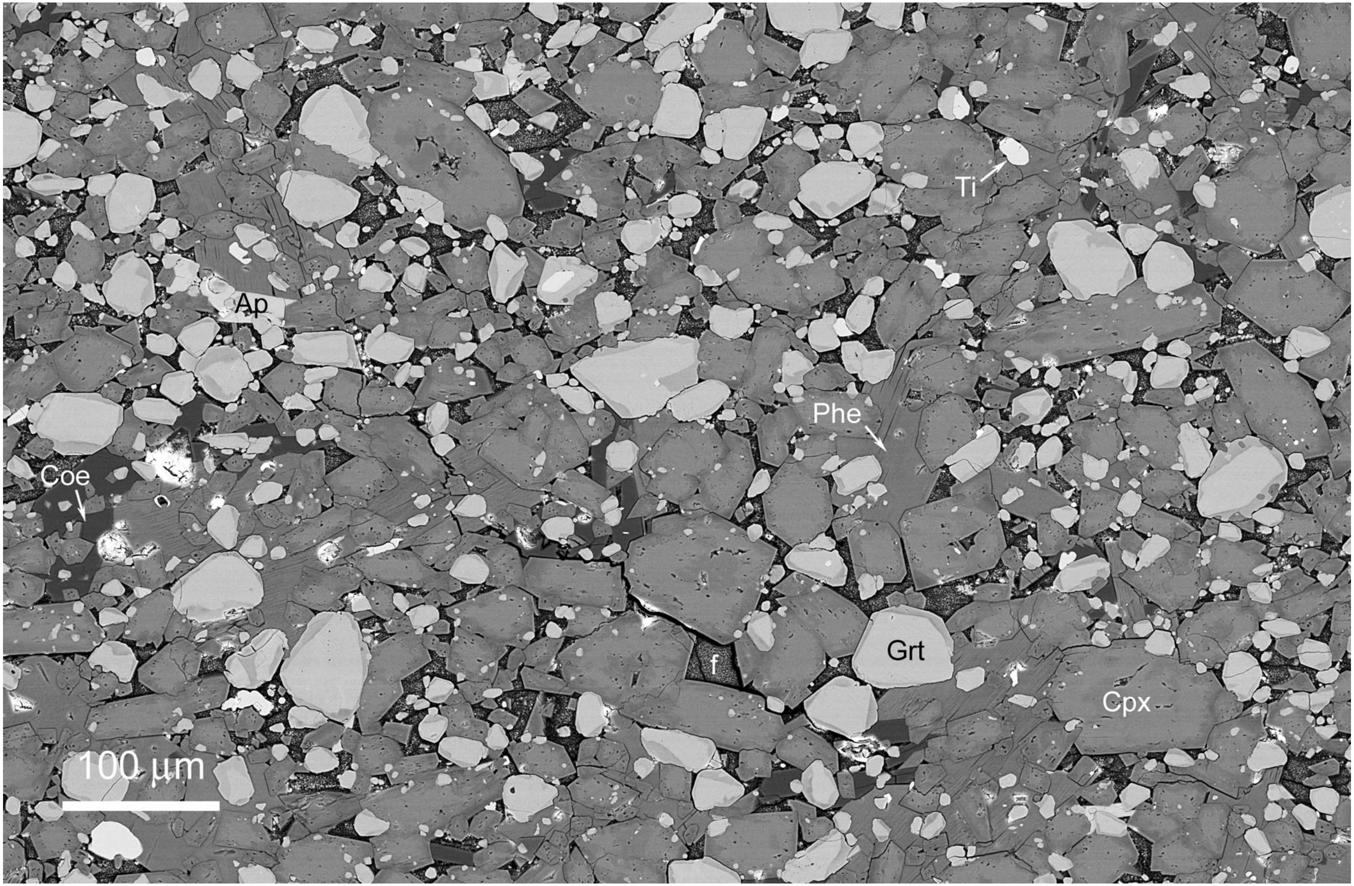


Figure 96: BSE image of Type 5 run E1 with a cooling rate of 0.3 °C /min and a bulk water content of 2.7 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. In the eclogite, clinopyroxene and garnet predominate. The crystalline phase assemblage further contains coesite, phengite, apatite, titanite, and few pyrite. The polygonal interstices in between the rather isometric crystals are filled with a fluid phase that is quenched to form a coherent vesiculated silicic glass.

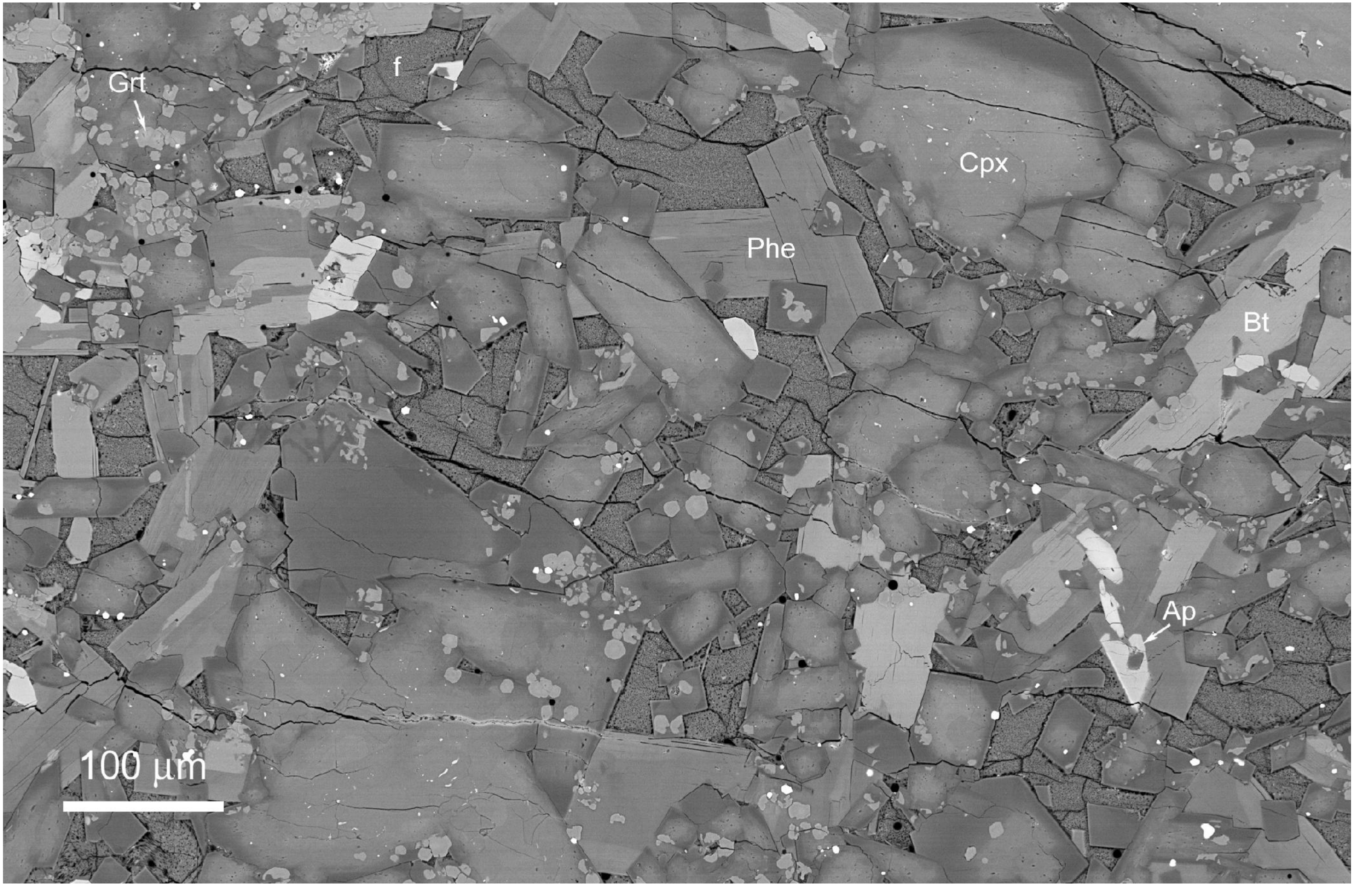


Figure 97: BSE image of Type 5 run B1 with a cooling rate of 0.3 °C /min, phonolithic tephrite with a bulk water content of 2.8 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. The crystalline phases are commonly euhedral and most of them are characterized by a distinct compositional zoning. Phengite is often grown around a core of biotite. The fluid is quenched to form a coherent vesiculated silicic glass.

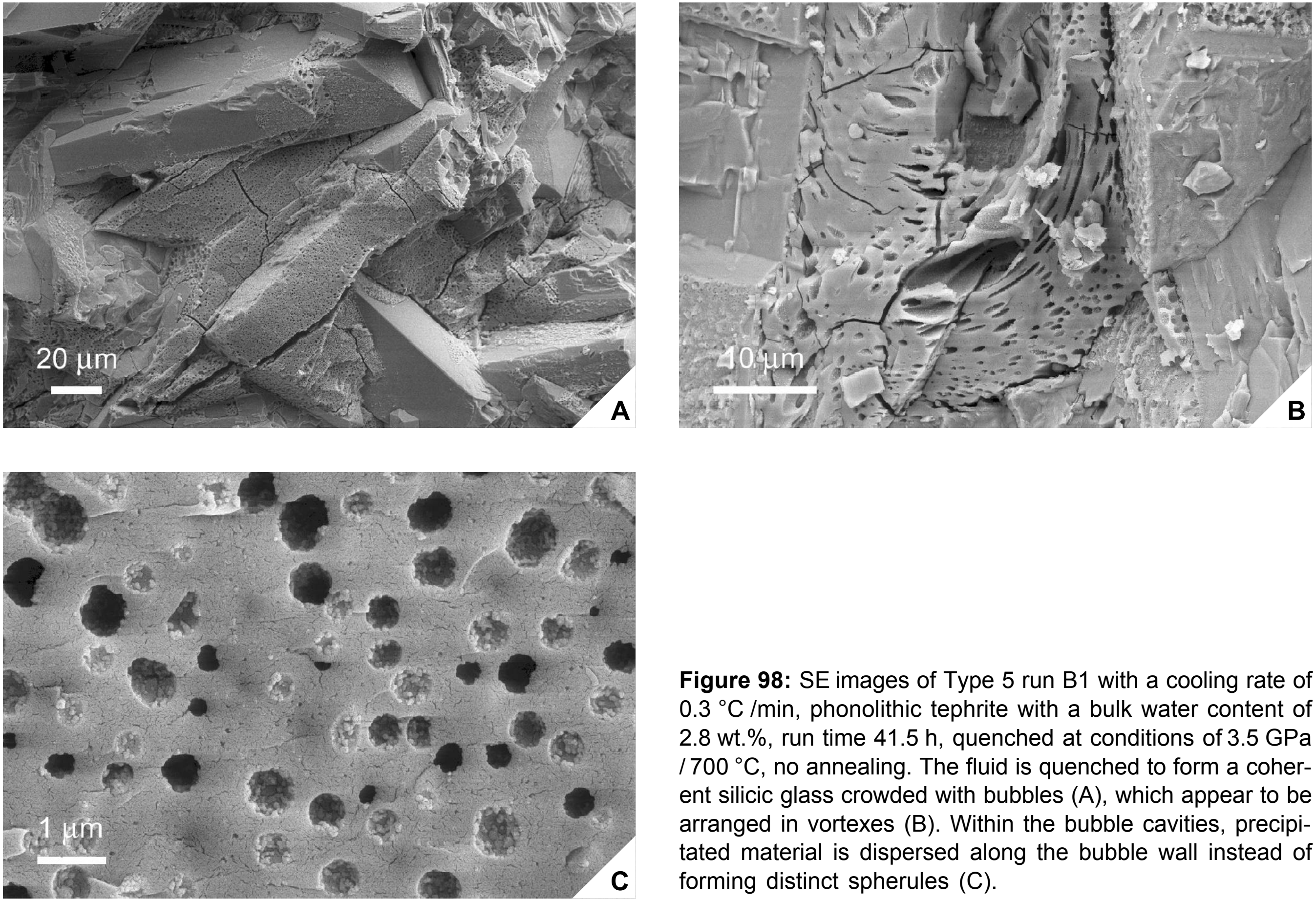


Figure 98: SE images of Type 5 run B1 with a cooling rate of 0.3 °C /min, phonolithic tephrite with a bulk water content of 2.8 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. The fluid is quenched to form a coherent silicic glass crowded with bubbles (A), which appear to be arranged in vortexes (B). Within the bubble cavities, precipitated material is dispersed along the bubble wall instead of forming distinct spherules (C).

image shows the coating with only new-grown phases, whereas the rigth half shows the 'normal' microfabric of P1 prevailing throughout the rest of the specimen. The crystalline phase assemblage is dominated by garnet and clinopyroxene, apatite and titanite are also frequent.

5.3 Grain size grading

Some of the specimens show a grain size grading caused by a thermal gradient within the assembly (see Section 4.4). This grading can easily be observed by macroscopic inspection of the specimens, but is much more evident in the optical microscope (Figure 102) and in the high resolution SEM images (Figure 103). In all specimens that show this feature the same characteristics occur. While near the bottom and in the middle part 'normal' grain sizes comparable to those in homogeneous specimens are observed, remarkably smaller grains dominate in the upper part of graded specimens. The change from fine-grained to 'normal' microfabrics is relatively sharp with no distinct transition zone in between.

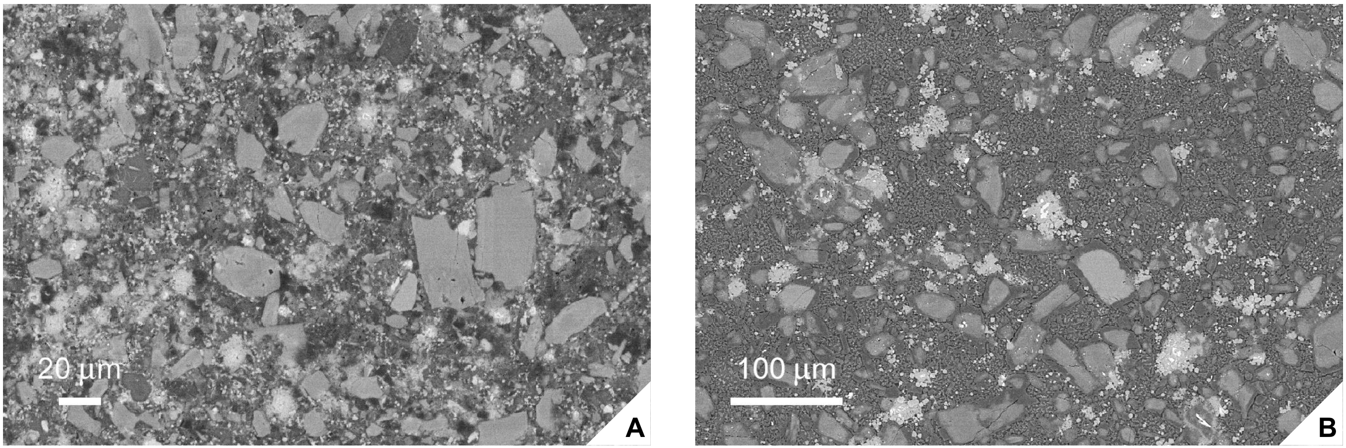


Figure 99: BSE images of Type 1 run B2 at constant conditions of 3.5 GPa / 700 °C, almost seven days of annealing (A) and of Type 1 run B3 at constant conditions of 3.5 GPa / 1000 °C, 1.5 h of annealing (B). Both runs with the phonolithic tephrite have a bulk water content of 0.9 wt.%. The microfabric in (A) is characterized by relics of the starting material and there is no evidence of a fluid formed at run conditions. Large clinopyroxene phenocrysts in (B) display compositional zoning. Numerous smaller crystals of clinopyroxene, garnet, phengite, and apatite are nucleated in between. The pore space is filled by a fluid that is quenched to form a silicic glass.

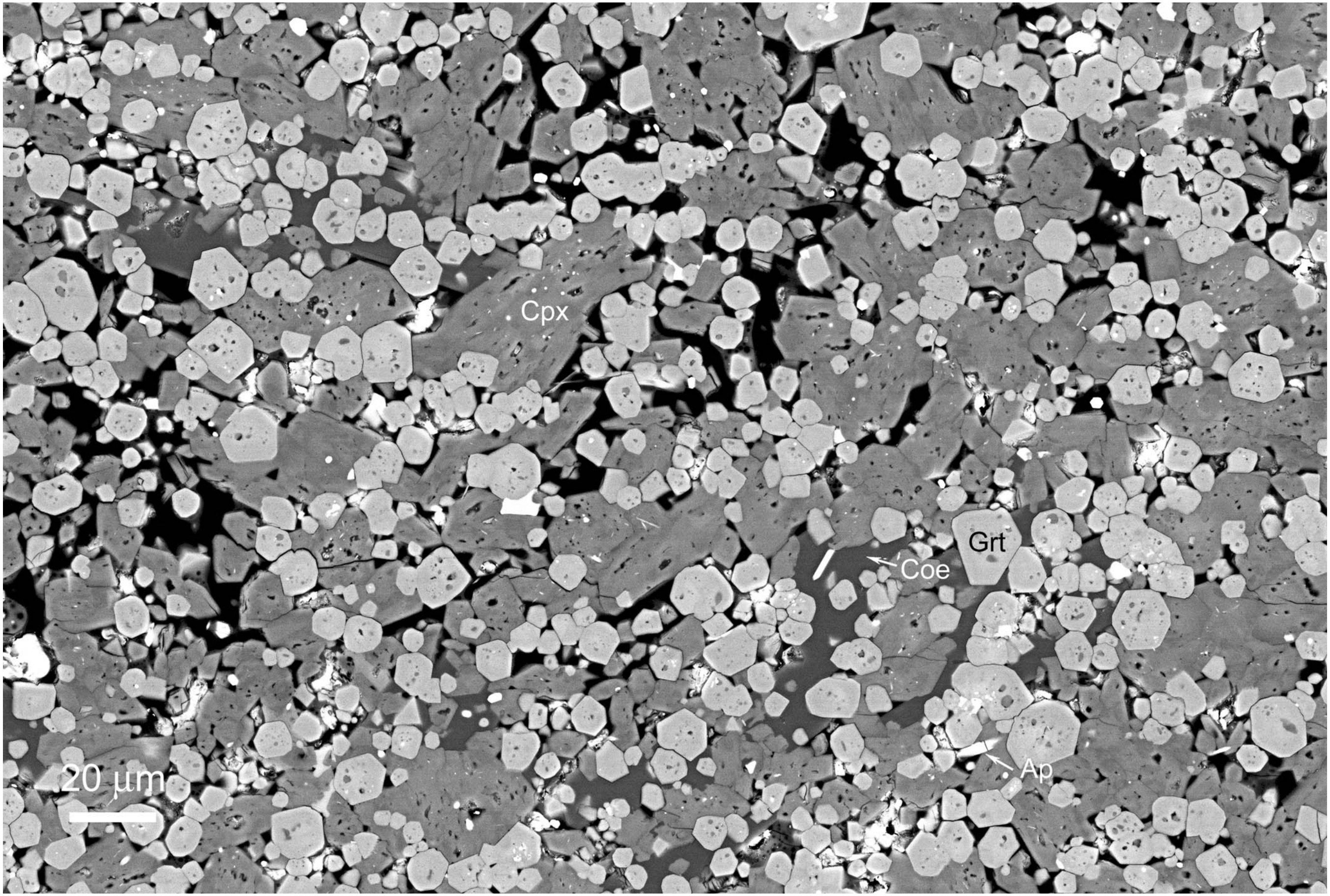


Figure 100: BSE image of Type 5 run P2 with a cooling rate of 0.3 °C /min, MOR basalt with a bulk water content of 2.5 wt.%, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. Most interstices are void.

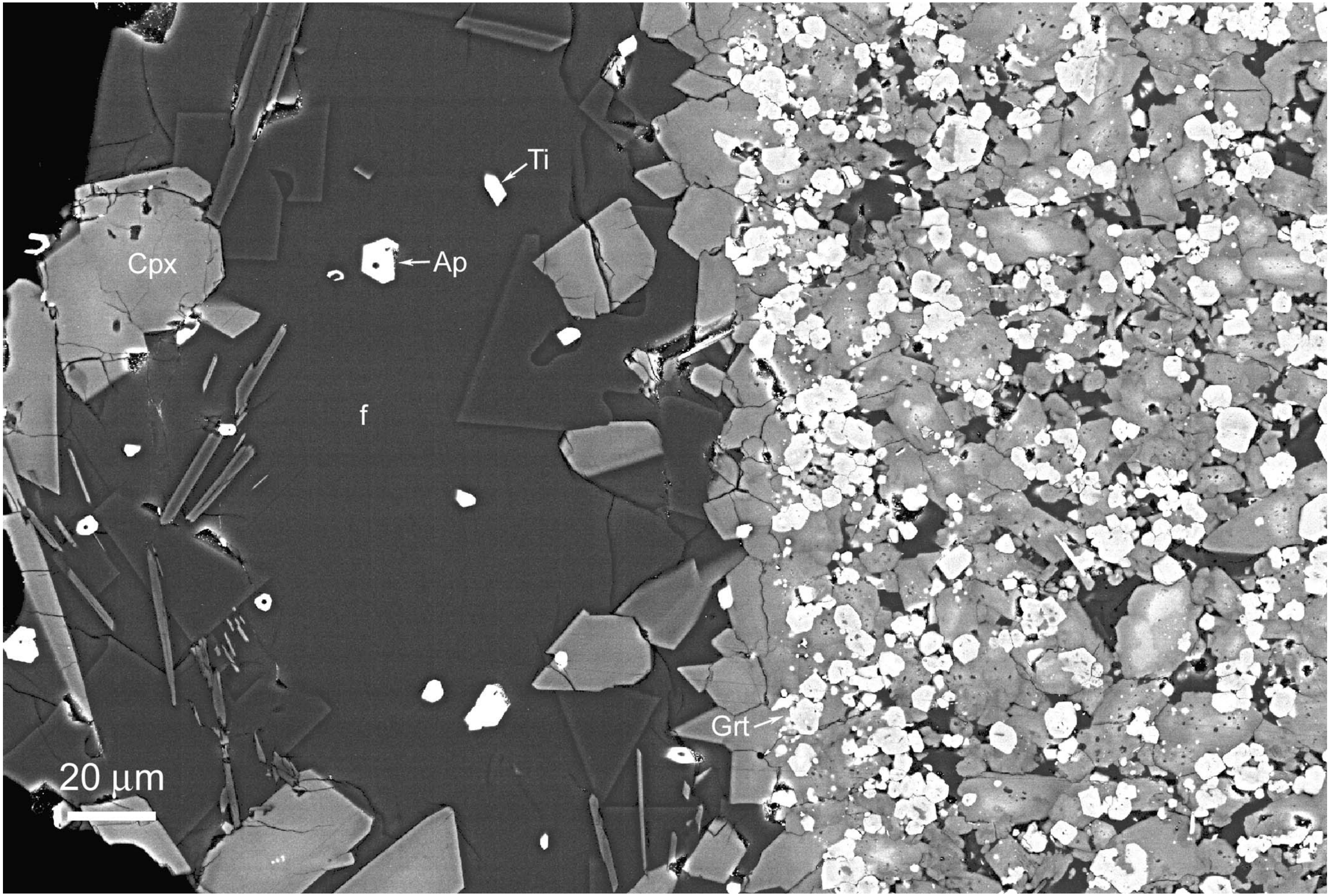


Figure 101: BSE image of short-time melting run P1 (Type 2), MOR basalt with a bulk water content of 0.6 wt.%, run time 20 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. The specimen is superficially coated by a coherent bubble-free glass containing large crystals of new-grown phases (left).

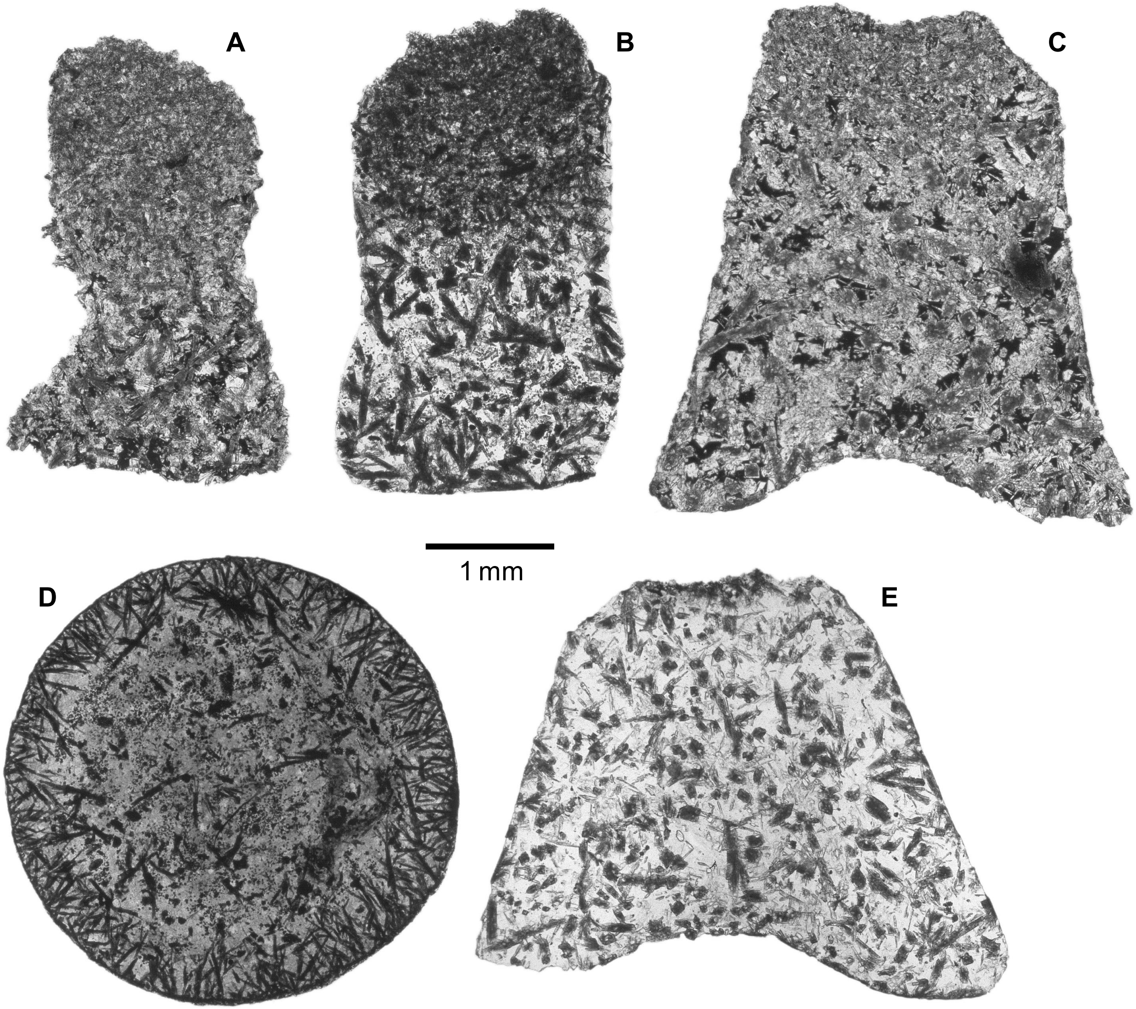


Figure 102: Optical micrographs of longitudinally (A to C, E) and transversally (D) sectioned specimens of S-type granitic composition with a bulk water content of 2.8 wt%. G85 (A) and G26 (C): Type 5 runs with a cooling rate of 0.3 °C / min, run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing; G94 (B) and G53 (D): Type 4 runs without cooling, quenched at conditions of 3.5 GPa / 1000 °C after 6 h (G94) and half an hour (G53) of annealing, respectively; G27 (E): Type 5 run with a cooling rate of 0.3 °C /min, run time 30.5 h, quenched at conditions of 3.5 GPa / 900 °C, no annealing. (A) to (C) show grain-size grading caused by a thermal gradient along the long axis of the capsule. (D) reveals preferential growth of clinopyroxene perpendicular to the capsule's wall which provides sites of nucleation. In (E) the distribution of crystals is homogeneous.

Coesite, garnet, and zircon are not affected by these phenomena in any of the specimens. These phases represent relics from the starting material, whereby coesite is transformed in situ at the expense of quartz. Hence, grain size grading only affects those phases that have crystallized from the fluid during the run. Especially in run G94 (Figure 103A) the high proportion of K-feldspar in the upper part of the capsule does not fit with the run temperature of 1000 °C, as comparable amounts of K-feldspar will normally crystallize at lower temperatures. And in fact, K-feldspar is rare near the bottom of the capsule, proving that the correct run temperature of 1000 °C has prevailed there.

There is no difference in the phase assemblage as well as in the chemical composition of each crystalline phase and of the fluid phase between the lower and the upper part of the specimen. Hence, there is only a gradient in the microstructural characteristics but no gradient in chemical composition. These observations support the interpretation of lower temperatures prevailing at the upper end of the capsules and show unequivocally that grain size grading is not an effect of gravitative differentiation.

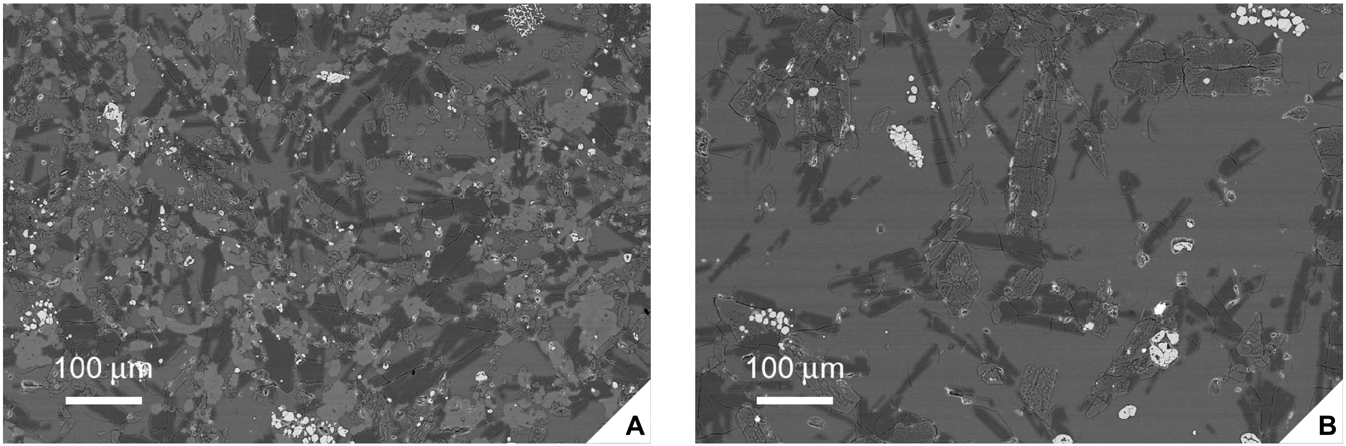


Figure 103 (this and following page)**:** BSE images of Type 4 run G94 without cooling, bulk water content 2.8 wt.%, run time 30.5 h, quenched at conditions of 3.5 GPa / 1000 °C after 6 h of annealing (A, B) and Type 5 runs with a cooling rate of 0.3 °C /min and a bulk water content of 2.8 wt.%: G95 (C, D) run time 39 h, quenched at conditions of 3.5 GPa / 750 °C, no annealing; G26 (E, F) run time 41.5 h, quenched at conditions of 3.5 GPa / 700 °C, no annealing. Examples of grain-size graded specimens. Each pair of images shows small grain sizes as developed at the top (A, C, E) and 'normal' microfabrics as prevailing within the rest of the capsule (B, D, F).

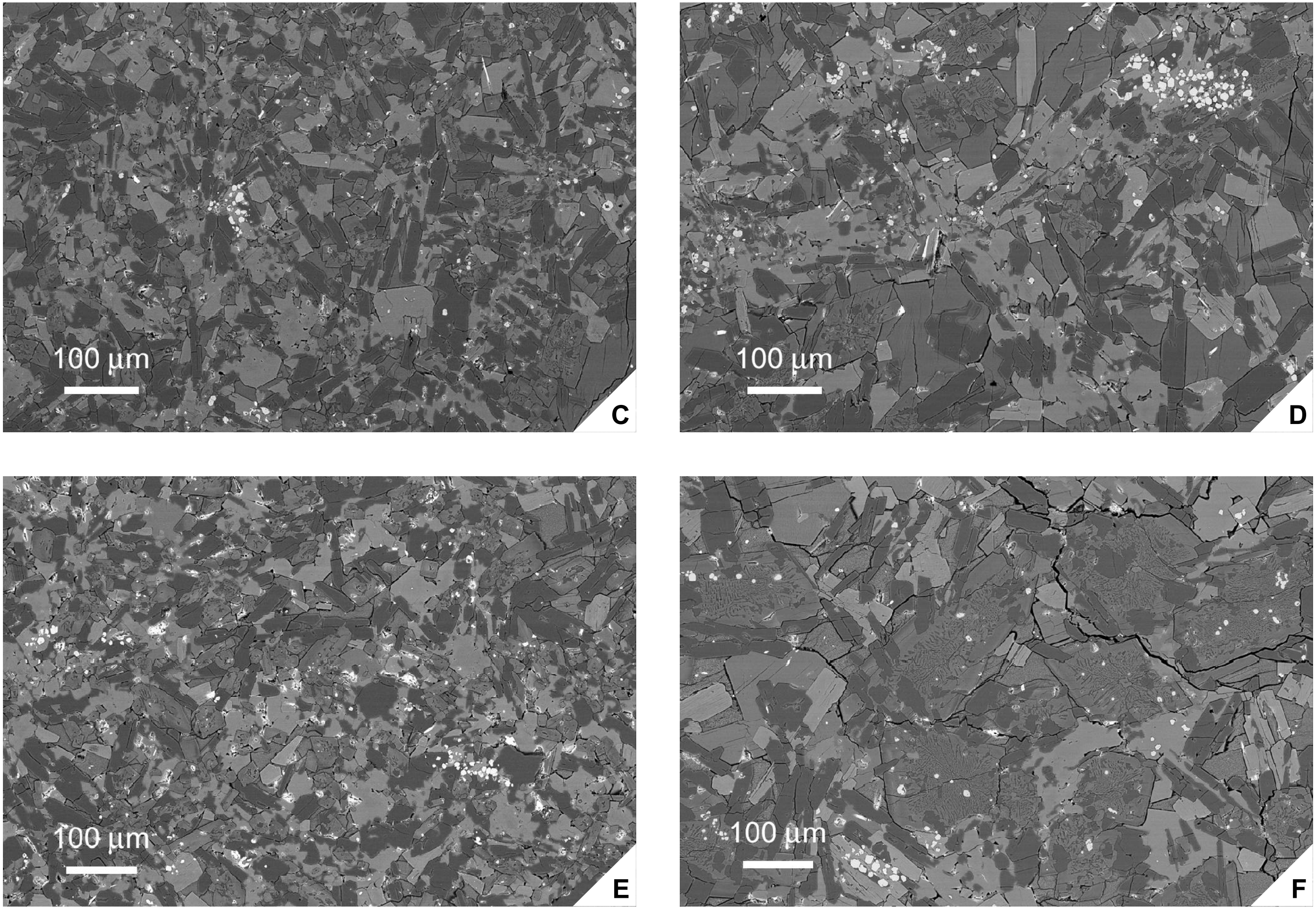


Figure 103 (continued)**:** Examples of grain-size graded specimens. Each pair of images shows small grain sizes as developed at the top (C, E) and 'normal' microfabrics as prevailing within the rest of the capsule (D, F).

5.4 Summary

The extensive series of runs using the S-type granitic starting material has shown that at a given set of conditions a characteristic microfabric with a defined phase assemblage will develop. The experimentally produced UHP phase assemblage is preserved metastably upon quenching. The fluid phase can be quenched to form a silicic glass without significant modification of the UHP topology. Cracks frequently occur in the specimens, but are never filled with quenched fluid and must therefore have formed due to depressurization subsequent to quenching. In some specimens, no glass phase can be quenched depending on run conditions and chemical composition. Open cavities in these specimens correspond to the pore space filled by the fluid phase at UHP conditions. The configuration of the adjacent crystals, however, is largely unchanged.

Different microfabrics develop at conditions of 3.5 GPa / 700 °C when the starting materials, although having the same chemical bulk composition, are of different nature. In a piece of rock retaining its original fabric, new phases preferably grow in situ where pre-existing phases break down. New phases also crystallize where permeability for the fluid is given, namely along the cleavage surfaces which are thus mirrored by the UHP phase assemblage. The fluid is quenched to form a coherent silicic glass without any cavities.

In a sample of crystal fragments of different size (i.e. a rock powder) brought directly to run conditions, crystals predominantly grow in clusters and are mostly anhedral or subhedral. Obviously, the amount of fluid formed is too low to allow for homogenization and free crystal growth. No glass is quenched in these specimens. In either case, the experimental time spans are too short to obliterate the textural characteristics of the starting materials with the given relatively low bulk water contents.

In a sample of crystal fragments that is largely molten at the onset of the experimental run, the microfabric is determined by the P-T conditions alone, as crystalline phases are allowed to grow freely within the fluid phase. The crystals will therefore attain their characteristic habit and will be predominantly bounded by rational faces. Upon quenching, a silicic bubble-bearing glass forms.

The applied experimental P-T path affects the microfabrics chiefly as far as the shape and the size of the crystals is considered. Generally, the faster the cooling the smaller is the grain size. With slow cooling rates, microstructural equilibrium is achieved at any given temperature, as even slower cooling does not result in larger grain sizes.

Temperature has the strongest influence on the phase assemblage. At 2.5 GPa / 1000 °C, only some anhedral crystals of quartz occur, together with garnet, zircon, kyanite, and rutile. With prolonged annealing, euhedral K-feldspar crystallizes and the partial mode of quartz increases at the expense of the fluid phase. With a rise in pressure to 3.5 GPa, clinopyroxene is added to the phase assemblage and, as a function of run time, quartz is transformed into coesite. With cooling to 900 °C, the assemblage does not change. Above 800 °C, phengite and apatite will crystallize. As 700 °C is reached, K-feldspar is transformed into large euhedral, pseudohexagonal crystals of K-feldspar hydrate frequently still including relics of the former.

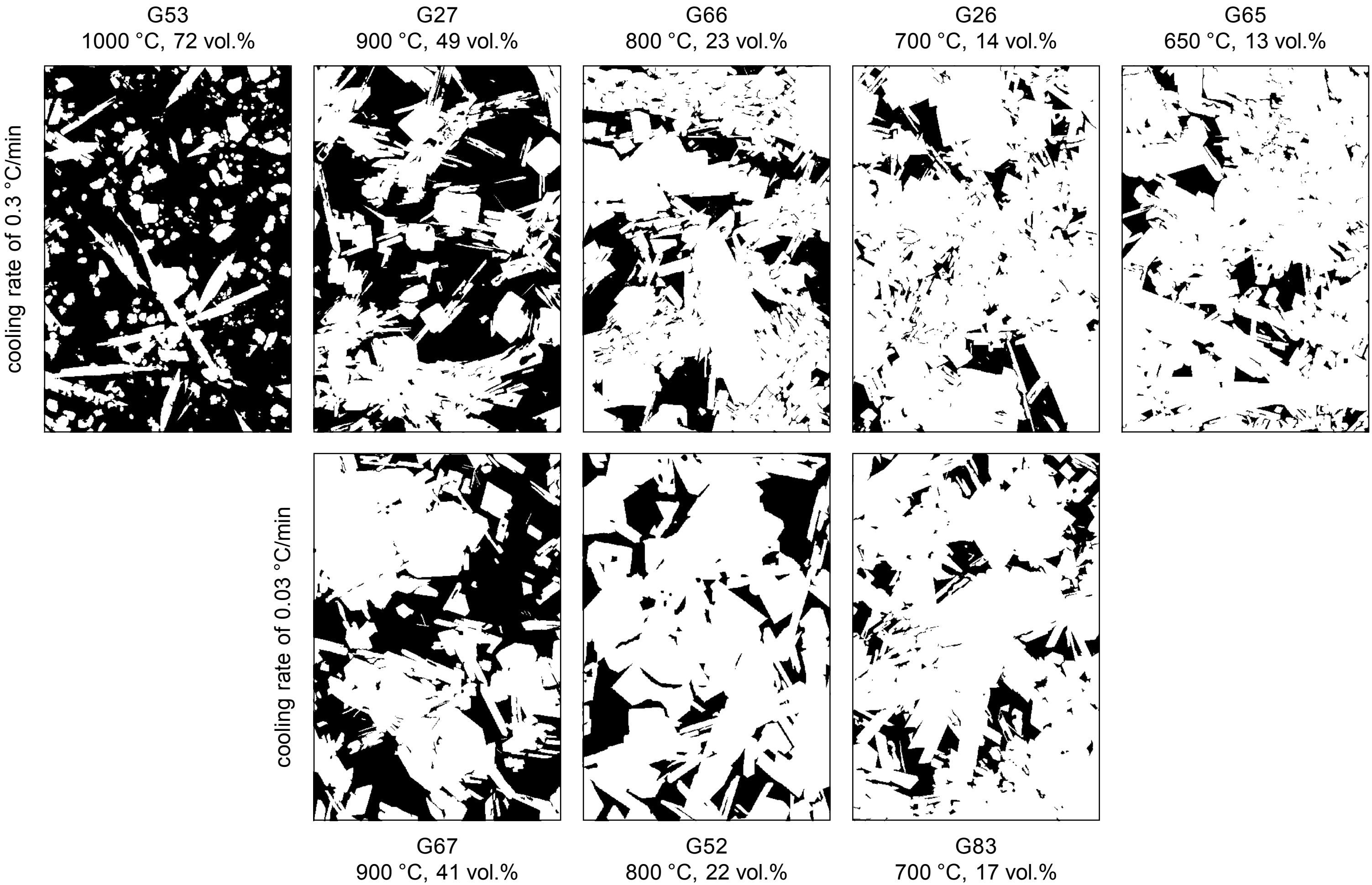


Figure 104 (see following page for explanation)

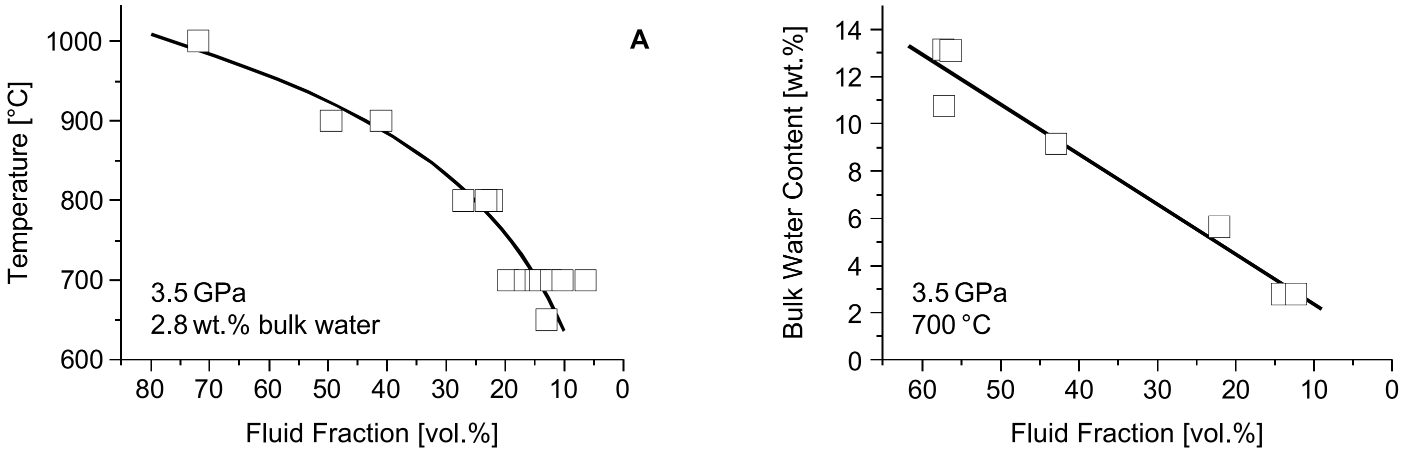


Figure 105: Diagrams showing the development of fluid fraction for runs with the S-type granitic biotite-phengite gneiss as a function of final temperature (A) and bulk water content (B).

With continued annealing at this temperature the core of the clinopyroxene crystals is decomposed and becomes replaced by phengite, coesite, fluid, and some titanite. Further cooling to room temperature only changes the total amount of the crystalline phases.

The bulk water content has an additional effect on the phase assemblage. With no water added, only K-feldspar occurs. K-feldspar hydrate is not observed, as obviously the water activity is not high enough for this hydrous phase to form. With high bulk water contents, feldspar is entirely absent, garnet and zircon are missing, too. A high volume proportion of fluid co-occurs with coesite, clinopyroxene, phengite, and apatite.

Figure 104 (previous page)**:** Binary images displaying the development of microfabrics, fluid topology, and fluid proportion with decreasing final temperature (left to right). The fluid is black, all crystalline phases are white. The two rows show specimens of S-type granitic biotite-phengite gneiss with a bulk water content of 2.8 wt.%, cooled at two different rates, each quenched at a pressure of 3.5 GPa and the indicated temperature, no annealing. Top row: Type 5 runs with a cooling rate of 0.3 °C /min; bottom row: Type 5 runs with a cooling rate of 0.03 °C /min. Field of view is 0.6 mm wide for each image.

Fluid is formed and will be quenched as a function of the P-T conditions, whereby characteristic features are observed. At 3.5 GPa / 1000 to 800 °C, the fluid phase is quenched to form a homogeneous silicic glass that encloses the more or less isolated euhedral crystals. At 750 °C tiny bubbles within the quenched glass are observed. At 700 and 650 °C, the fluid forms an interconnected network of polygonal interstices. The coherent glass in between the crystals is crowded with micrometre-sized bubbles which, in turn, contain material precipitated from a vapour-like fluid. Moreover, small silicic glass beads are observed within some of the interstices. Precipitates occur with the beads, which are larger but otherwise identical to the spherules within the bubble cavities of the glass. At 3.5 GPa / 600 °C, the interstices between the euhedral crystals are only partially filled with lumps of glass and accumulations of silicic beads, while the large cavities contain characteristic 'cauliflower'-like precipitates. At room temperature, the polygonal interstices are void except for material precipitated from an aqueous fluid phase.

In the granitic system, the fluid-filled volume at 3.5 GPa

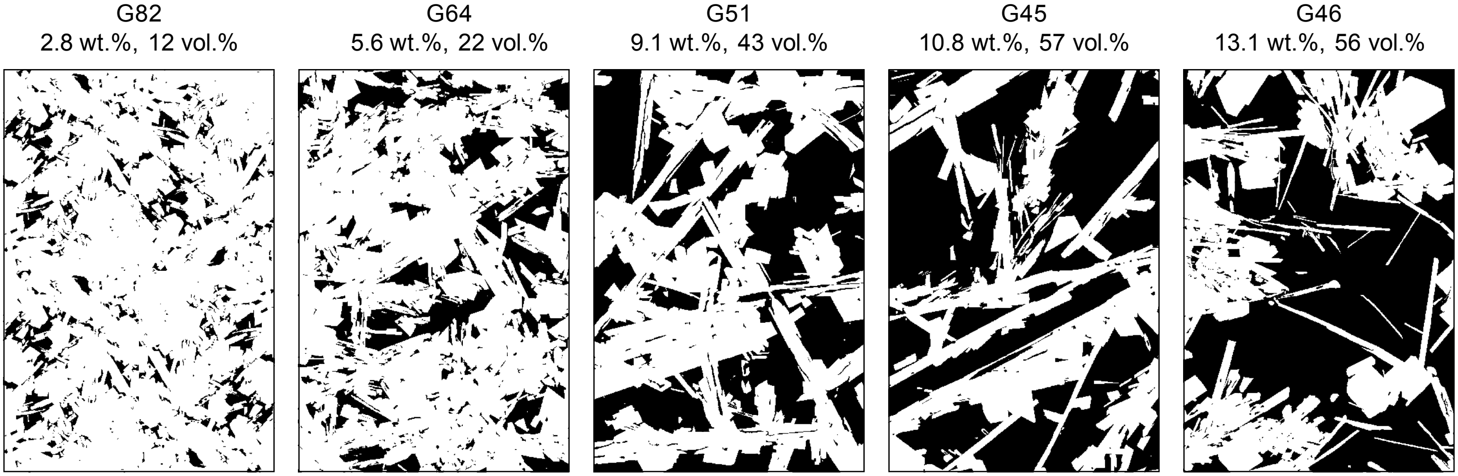


Figure 106: Binary images of Type 5 runs with a cooling rate of 0.3 °C /min, biotite-phengite gneiss with different bulk water contents, quenched at conditions of 3.5 GPa / 700 °C, no annealing. The images display the development of microfabrics, fluid topology, and fluid proportion with increasing bulk water content (left to right). The fluid is black, all crystalline phases are white. Field of view is 1.2 mm wide for each image. For G82, a compound of four times the same image is shown to maintain the same surface area and scale throughout.

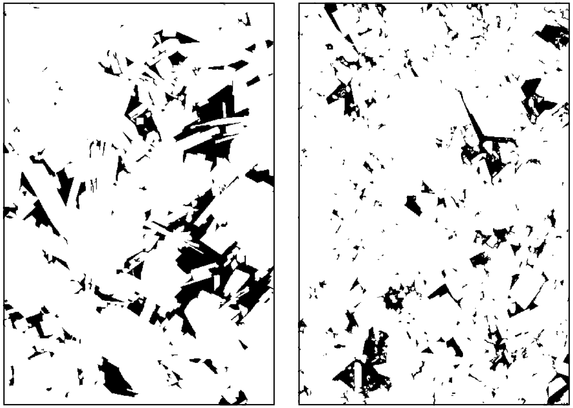


Figure 107: Binary images of Type 5 runs with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C, no annealing, displaying microfabrics, fluid proportion, and fluid topology in specimens G82 of S-type granitic biotite-phengite gneiss and D1 of granodioritic garnet-mica gneiss. The fluid is black, all crystalline phases are white. Note that the overall features are not significantly different despite of different rock composition. Field of view is 0.6 mm wide for both images.

decreases from about 50 vol.% at 900 °C to 10 to 17 vol.% at 700 °C (Figures 104 and 105A). With increasing bulk water content from 2.8 to 13.2 wt.%, the volume proportion of the fluid phase increases from about 13 to 57 vol.% at 3.5 GPa / 700 °C (Figures 105B and 106).

Adding of ten weigth per cent of quartz to the S-type granitic composition has no influence on the microfabrics. A layer of quartz crystals at the top of the specimens is found in place after the run, although transformed to coesite.

Notwithstanding the different chemical composition of the sample powders, in nearly all other bulk rock compositions the same overall features as summarized above are observed (Figure 107). Whereas at high temperatures of 1000 °C the fluid is quenched to form a coherent silicic glass free of bubble cavities, the quenched fluid is vesiculated at lower temperatures of 700 °C. Regarding the quenched fluid, the MOR basalt differs somewhat while the pyrope quartzite differs significantly. In the former, the interstices between the crystals are not completely filled with glass and large open cavities are left; in the latter, only a few silicic beads are found within the otherwise void interstices.

CHAPTER 6

Fluid composition

6.1 Analytical method

The chemical composition of the quenched glasses was determined by electron microprobe (see Section 4.9). A beam current of 10 nA and a beam defocused to 10 µm in diametre applied in a first series of measurements was chosen to analyze crystalline phases and glass with the same settings and during the same measuring routine. This particular beam current, however, proved to be inappropriate, because it produced randomly scattered data points for the glasses, particularly for those quenched at low temperatures. A lower beam current of 4 nA was applied in a second series. In order to minimize alkali loss, the beam was defocused to 10 µm in diametre in each analysis. Nevertheless, for some specimens the measured concentration of sodium and potassium still showed considerable scatter.

As the method of equating the water content of glasses to the difference between 100 wt.% and the total analysis has merit only if the EMP analysis is of good quality (Nash, 1992), much emphasis was put on reliable EMP data in the present study. Therefore, glasses were analyzed with a beam defocused to 10 µm in diametre and a beam current of only 3 nA. With these settings, the counts of sodium and potassium were steady over the time interval of the analysis indicating that alkali loss was insignificant. Irradiation damage of the glasses at the analysis point was, however, rather severe.

Figure 108 compiles data obtained from the three series of measurements for seven specimens of the S-type granitic biotite-phengite gneiss. For each specimen, the total of sodium oxide and potassium oxide content in the glass is plotted versus the silica content, corresponding to the total alkali versus silica diagram (Le Maitre, 1989). This type of diagram is most illustrative, as the concentration of alkali metals shows the strongest correlation with the microprobe settings and the silicon content is subjected to the largest error. Figure 108 shows an obvious shift towards higher alkali oxide to silica ratios with lower beam currents.

The concentration of the elements silicon, aluminium, potassium, sodium, iron, calcium, magnesium, manganese, titanium, phosphorus, fluorine, and chlorine in the quenched glasses is determined with a single analysis. For analyzing the quenched fluid, large fluid-filled interstices have to be chosen because of the broad beam. This procedure bears no difficulties for the glasses free of bubbles formed at high temperatures. In the vesiculated glasses quenched at temperatures below 750 °C, however, the determined chemical composition will give an average of that of the glass and of the precipitated spherules within the bubble cavities owing to the large diameter of the

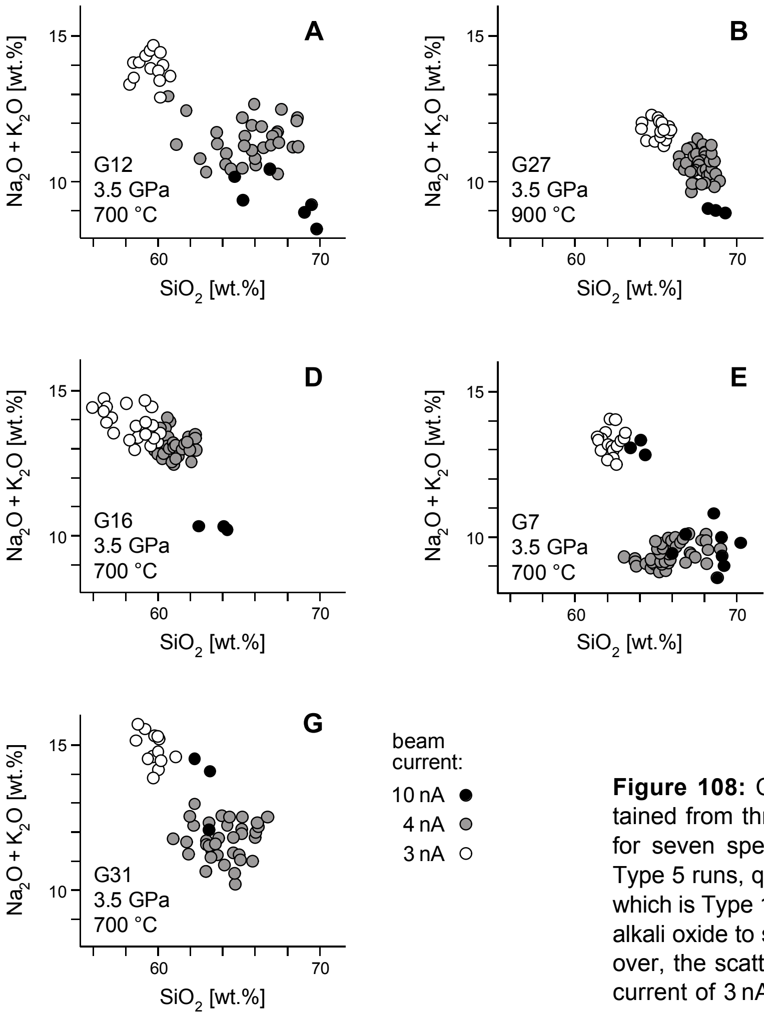


Figure 108: Concentration of alkali oxides versus silica obtained from three series of comparative EMP measurements for seven specimens of the biotite-phengite gneiss. All are Type 5 runs, quenched at the given conditions, except for (C), which is Type 1. There is an overall shift of data towards higher alkali oxide to silica ratios with decreased beam current. Moreover, the scatter of the data is reduced by using a low beam current of 3 nA.

beam. In run G59 (see Figure 55) quenched at 600 °C, lumps of glass or accumulations of glassy beads were analyzed. For this particular run, the quality of the analysis is difficult to assess.

6.2 Chemical composition of the fluid phase in the granitic system

To compare the composition of the glasses as a function of run conditions, in Figure 109 the mean concentration of each element (given in weight per cent) and the standard deviation is plotted for all analyzed runs with the biotite-phengite gneiss as starting material. The solid horizontal line indicates the concentration of the considered element in the starting material as given by the bulk rock analysis done by X-ray fluorescence (see Table 1). The runs are sorted according to their final temperature denoted above and are specified with their run number below. Alternating grey-and-white shading was applied in order to delimit different groups of runs (see Table 2); these are from left to right: Type 1 runs quenched at conditions of 2.5 GPa / 1000 °C sorted by increasing annealing time; Type 1 and Type 4 runs quenched at conditions of 3.5 GPa / 1000 °C; Type 5 runs quenched at conditions of 3.5 GPa / 900 °C and 800 °C, the single Type 5 run quenched at conditions of 3.5 GPa / 750 °C, and different runs quenched at conditions of 3.5 GPa / 700 °C (i.e. one run each of Type 1, Type 3, Type 6, and the Type 5 run with a cooling rate of 30 °C /min); Type 5 runs with a cooling rate of 3 °C /min, 0.3 °C /min, and 0.03 °C /min quenched at conditions of 3.5 GPa / 700 °C, each group sorted by increasing annealing time; Type 5 runs with higher bulk water contents quenched at conditions of 3.5 GPa / 700 °C; and, finally, Type 5 runs with a cooling rate of 0.3 °C /min quenched at conditions of 3.5 GPa / 650 °C and 600 °C, and the Type 7 run quenched at conditions of 2.5 GPa / 650 °C. The corresponding EMP data are listed in Tables 5 to 61 in Appendix, sorted by the same criteria as outlined above.

Silicon. The silicon content of the quenched glasses decreases with decreasing temperature, corresponding to proceeding crystallization. In runs with a high bulk water content, the amount of crystalline phases is significantly lower compared to that in runs with a lower bulk water content and, hence, high bulk water contents correlate to a higher silicon content of the fluid. Generally, the glasses are depleted in silicon relative to the bulk composition of the starting material.

Aluminium. Whereas at high temperatures aluminium is enriched in the fluid relative to the composition of the starting material, its concentration at lower temperatures decreases with the crystallization of phengite and of the jadeite-rich rim of clinopyroxene. This process is continued with annealing at 700 °C. Aluminium and silicon show the same compositional trend as the aluminium to silicon ratio is within a narrow range between 0.17 and 0.27 for all runs.

Sodium. The same trend as for aluminium is observed for sodium. At high temperatures, the sodium concentration within the fluid is higher than in the starting material. With decreasing temperature, the fluid becomes depleted in sodium relative to the starting material, as the bulk of sodium is stored in clinopyroxene. A decrease in sodium concentration observed in the Type 5 runs with a cooling rate of 3 °C /min and 0.03 °C /min is not recognized in the runs with an intermediate cooling rate of 0.3 °C /min, which show even slightly increasing sodium contents. The variation in sodium with different cooling rates is therefore considered to be accidental. An increased sodium concentration measured in runs with high bulk water contents is explained by the lower volume proportion of clinopyroxene in these runs.

Potassium. Fractionation into the fluid at all run conditions is expressed by the generally high concentration of potassium in the fluid compared to the starting material. In the runs with low bulk water contents, the concentration of potassium in the fluid strongly increases with decreasing temperature as well as with annealing at 700 °C. This development is observed despite of K-feldspar or K-feldspar hydrate, which act as sinks for potassium, being present in all these runs and the proportion of these phases even increasing with lower temperatures. In the runs with high bulk water content, feldspar is not contained in the phase assemblage and, apart from a small amount stored in phengite, potassium is almost fully dissolved in the fluid. But, owing to the dilution effect of an increased volume proportion of fluid with higher bulk water contents, the concentration of potassium is lower.

Iron. In the Type 1 runs at 2.5 GPa / 1000 °C that show the highest degree of melting, the iron content of the glass comes close to the concentration in the starting material. With ongoing annealing, crystallization of garnet lowers the concentration of iron in the fluid phase significantly.

Crystallization of clinopyroxene at higher pressure has the same effect. Progressive growth of clinopyroxene crystals with decreasing temperature results in a low iron concentration in the fluid. Because the clinopyroxene that is in equilibrium with the fluid phase at 700 °C is pure jadeite, much less iron is stored in the rims of the crystals as compared to their cores. As the cores decompose with ongoing annealing and become partly replaced by phengite and few titanite, iron will be released into the fluid phase and its concentration in the latter is consequently observed to increase again. In the simultaneous cooling-pressurization run G17 (Type 2), only small clinopyroxene crystals occur, which lack a core rich in iron. Thus, the concentration of iron in the fluid phase in this single run is significantly higher than in all other runs.

Calcium. The concentration of calcium in the fluid at conditions of 2.5 GPa / 1000 °C reaches its concentration in the starting material. With pressurization to 3.5 GPa and hence with the formation of clinopyroxene, the concentration of calcium in the fluid decreases significantly. Whereas the first clinopyroxene to crystallize contains about 50 wt.% of jadeite component and is rich in calcium and iron, clinopyroxene grown at lower temperatures, which forms the crystals' rims, is pure jadeite containing no calcium. The fluid phase that is in equilibrium with jadeite is distinguished by a low calcium concentration. Additionally, the crystallization of apatite lowers the calcium content of the fluid phase.

There are a few runs for which a remarkably higher calcium content was determined. In the Type 5 runs with extended annealing time and in the Type 6 run, these high calcium contents are caused by the decomposition of the calcium-rich cores of the clinopyroxene crystals. All these runs contain crystalline calcium phases as scheelite, which incorporates tungsten derived from the contamination of the sample powder by the tungsten carbide mill (see Section 4.2), and, some of them, even aragonite. The high concentration of calcium in the fluid phase correlates to spherical precipitates in the bubble cavities of the glass that have an unusually smooth surface (see Figure 51D). In Type 2 run G17, only small clinopyroxene crystals occur, which contain almost 90 wt.% of jadeite component, and, consequently, the calcium content in the fluid is increased.

Magnesium, manganese, and titanium. Released by the breakdown of biotite from the starting material, magnesium is dissolved in the fluid at 1000 °C. As for calcium, the magnesium

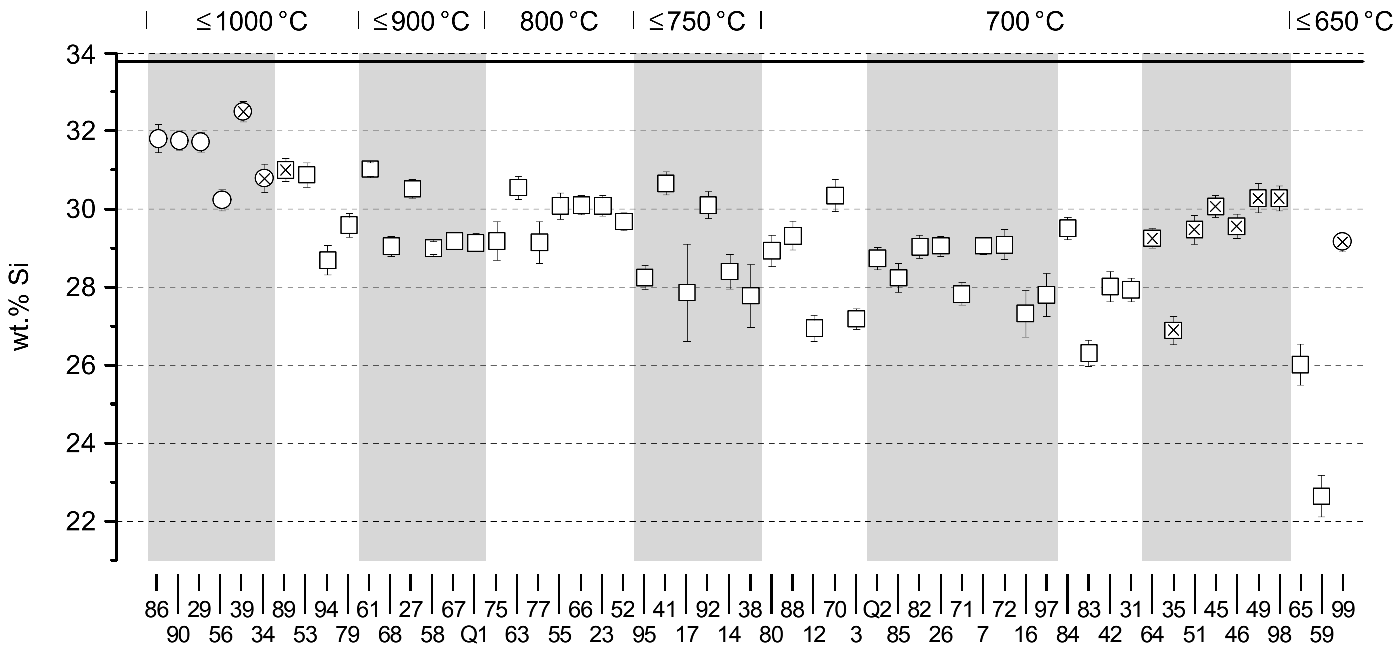


Figure 109 (this and following pages)**:** Mean element concentrations and their standard deviation (error bars) for glasses quenched in runs with the S-type granitic biotite-phengite gneiss. The solid horizontal line gives the element concentration in the starting material. Grey-and-white shading delimits different groups of runs. Circles indicate a pressure of 2.5 GPa, squares indicate a pressure of 3.5 GPa; open symbols represent runs with a bulk water content of 2.8 wt.%, runs with a higher bulk water content are marked with a cross. Detailed EMP data are given in Tables 5 to 61 in Appendix. For explanation see text.

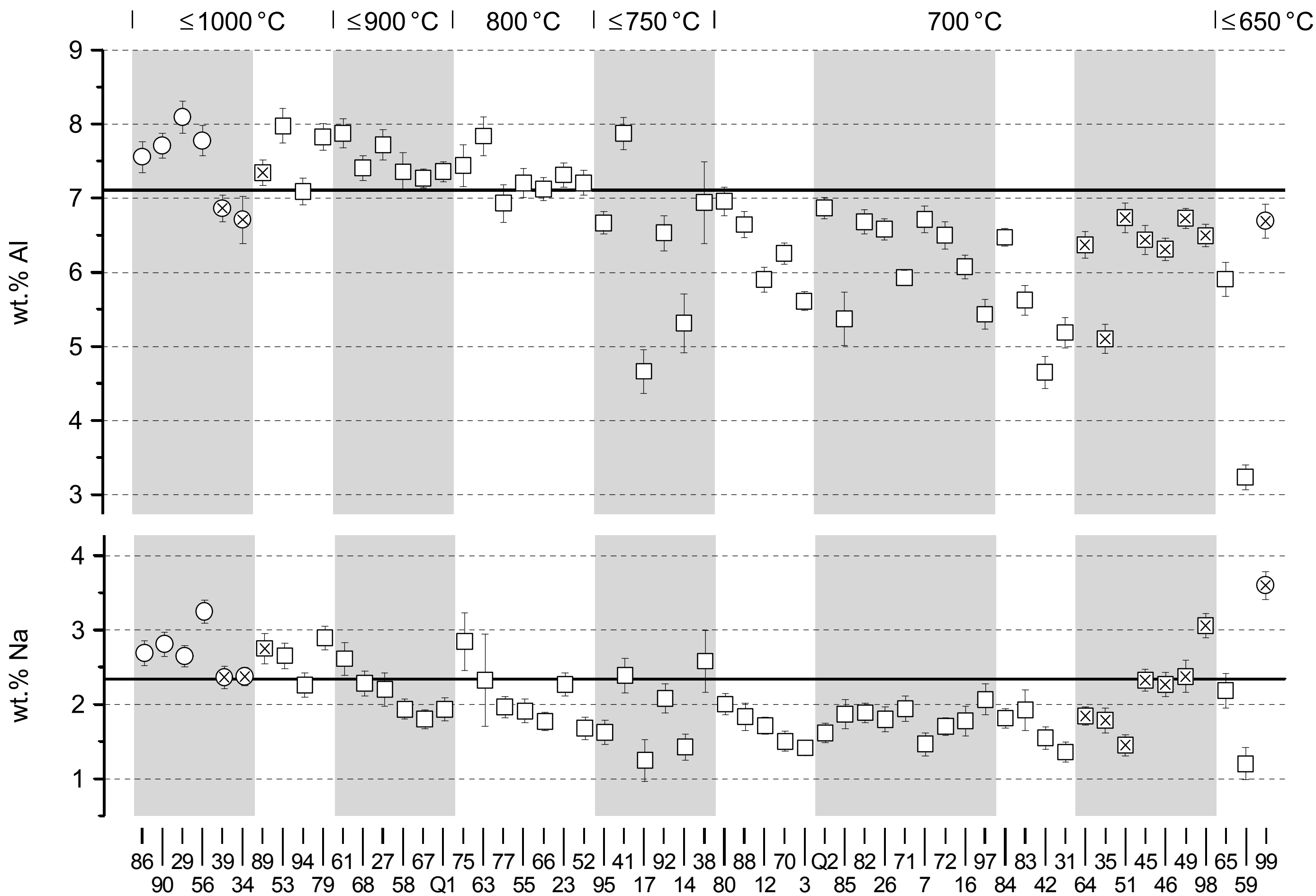


Figure 109 (continued)**:** Mean element concentrations and their standard deviation for glasses quenched in runs with the S-type granitic biotite-phengite gneiss.

content in the fluid phase at this temperature is that of the starting material. When cooled to 900 °C, the concentration drops to near zero, owing to magnesium now being stored in garnet.

The manganese concentration in the fluid is not influenced by pressure, temperature, or bulk water content and is generally low in all runs. Also, the concentration of titanium reveals no

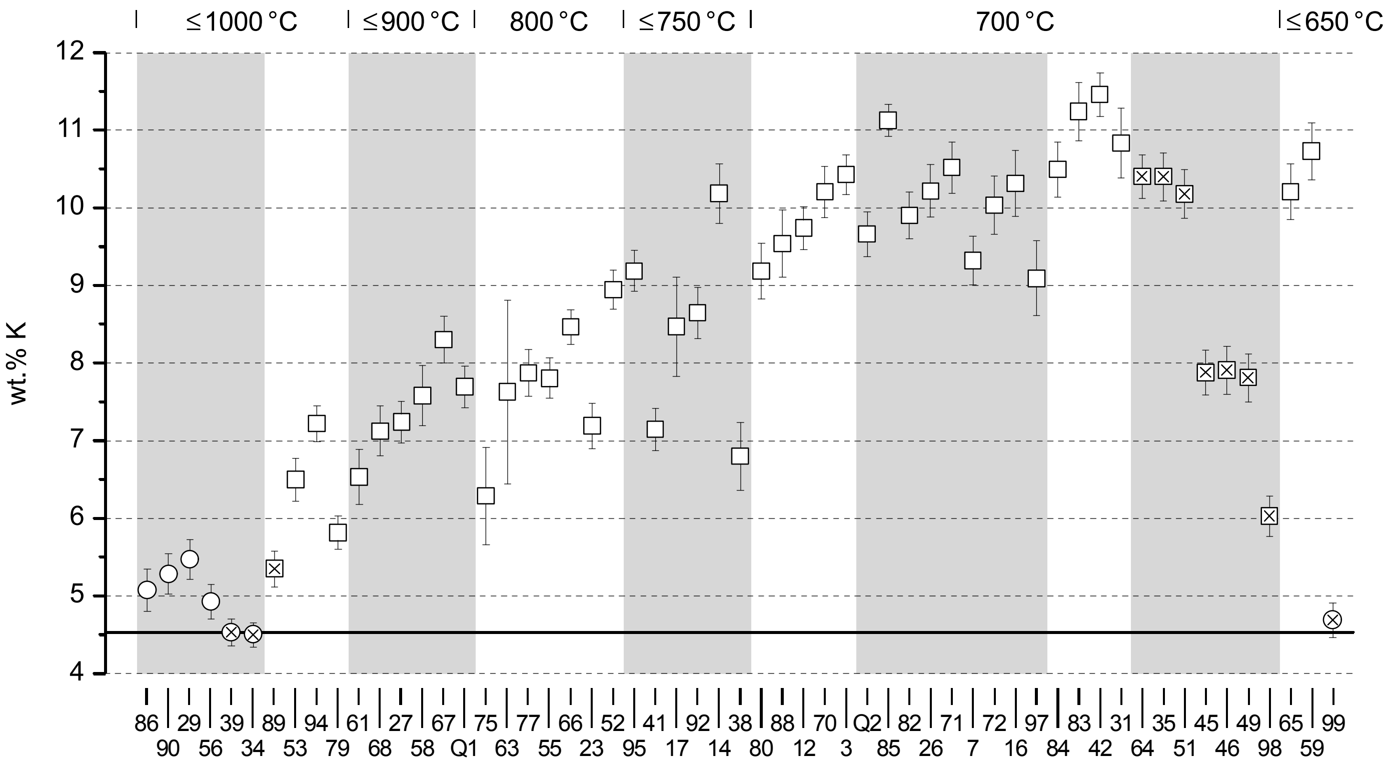


Figure 109 (continued)**:** Mean element concentrations and their standard deviation for glasses quenched in runs with the S-type granitic biotite-phengite gneiss.

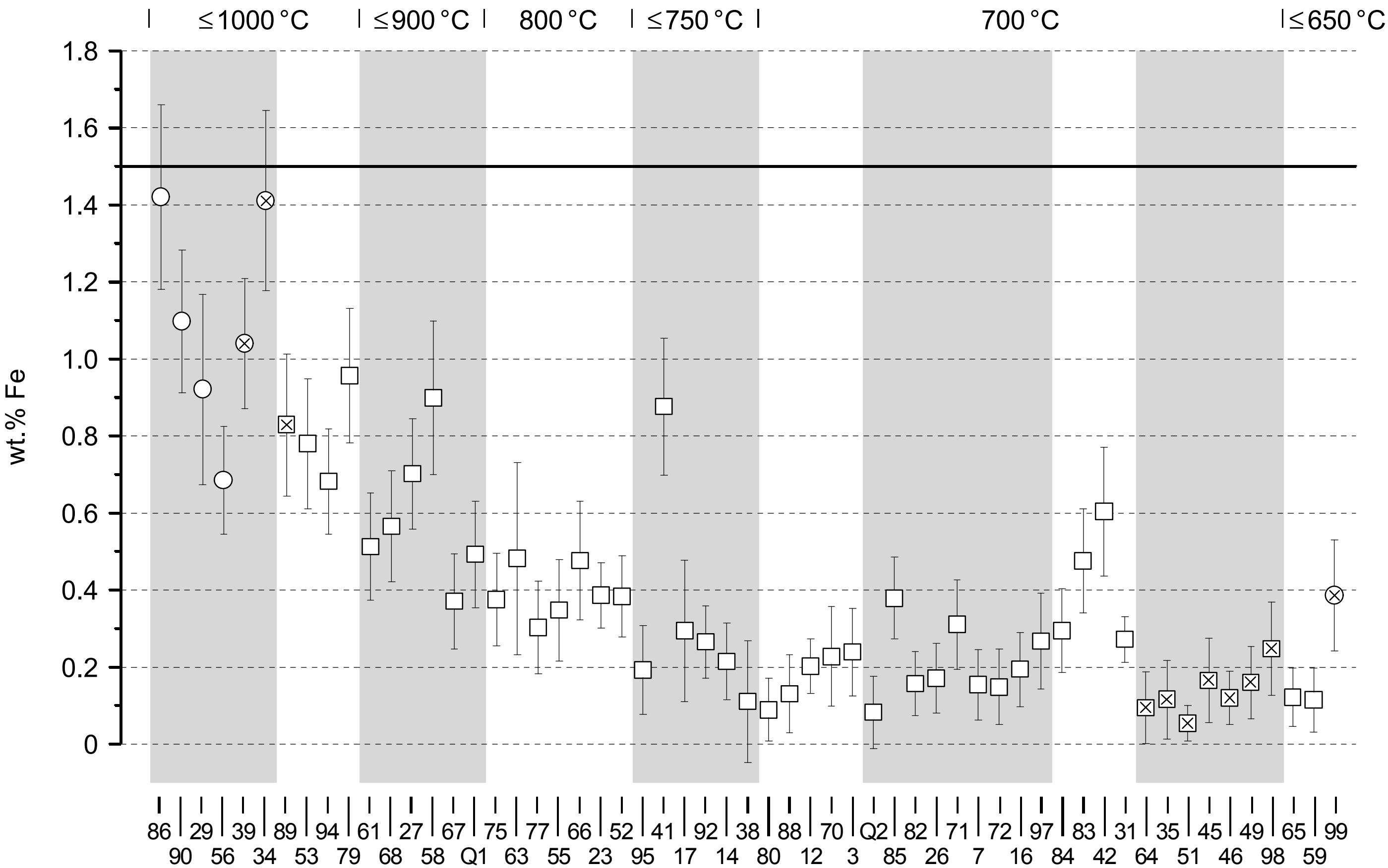


Figure 109 (continued)**:** Mean element concentrations and their standard deviation for glasses quenched in runs with the S-type granitic biotite-phengite gneiss.

dependence on run conditions and is near to that of the starting material.

Phosphorus. The phosphorus concentration in the fluid rises continuously with decreasing temperature; it is nearly by ten times higher than in the starting material in run G65 at 650 °C. With annealing at 700 °C, however, the concentration

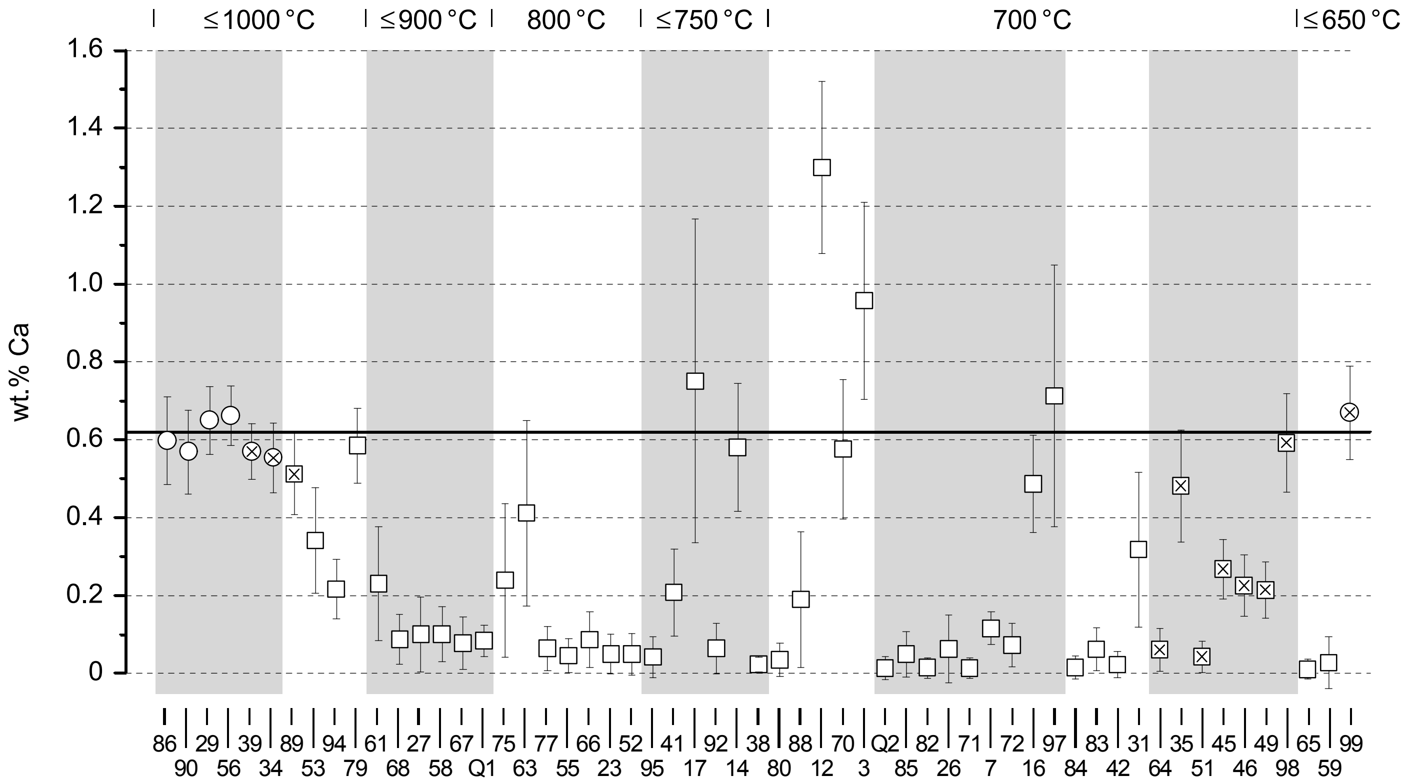


Figure 109 (continued)**:** Mean element concentrations and their standard deviation for glasses quenched in runs with the S-type granitic biotite-phengite gneiss.

of phosphorus is almost zero, correlated to the ongoing growth of apatite from the fluid phase.

Fluorine and chlorine. Fluorine will be enriched in the fluid with decreasing temperature. A large error of the measured concentrations is obvious for Type 5 runs quenched at 700 °C. In all these runs, the quenched glasses bear bubble cavities that contain spherical precipitates. Because analysis of the large 'cauliflower'-like precipitates within the runs quenched at 600 °C (see Figure 58B, C) has shown these to have a high fluorine content, the much smaller spherules are expected to be enriched in fluorine relative to the glass, too. Owing to the large diametre of the beam, an average of glass and precipi-

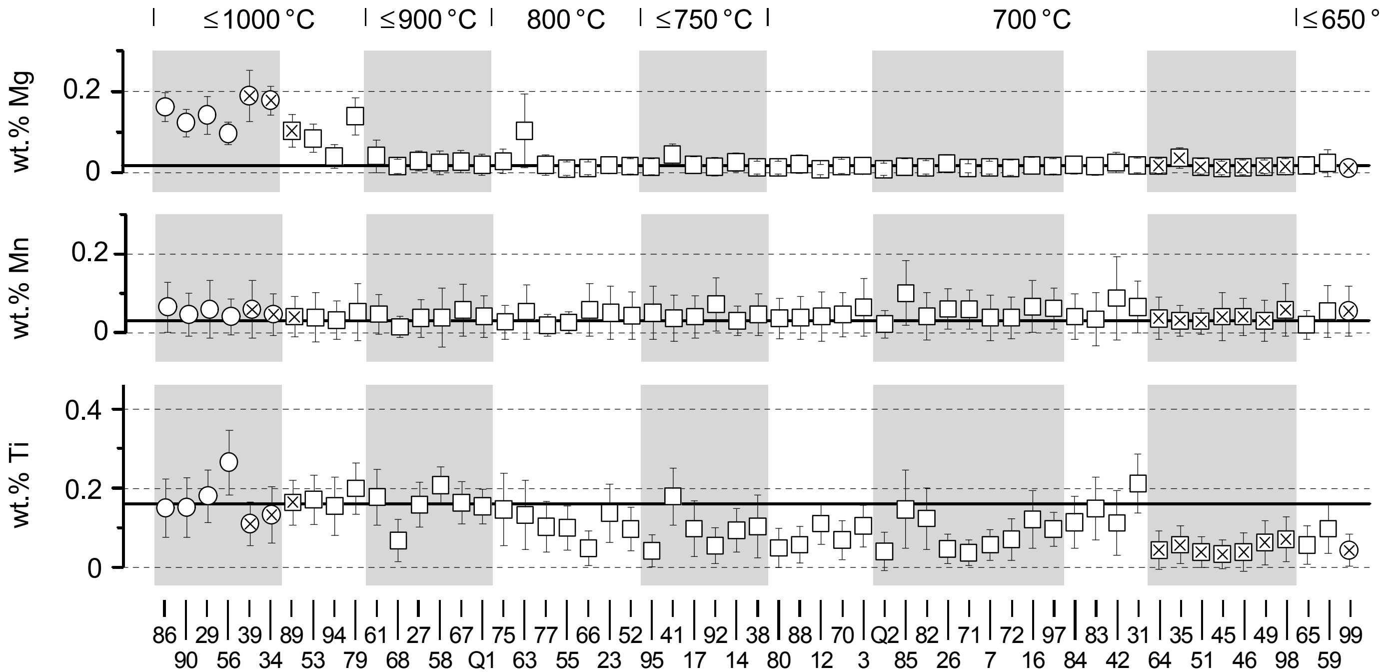


Figure 109 (continued)**:** Mean element concentrations and their standard deviation for glasses quenched in runs with the S-type granitic biotite-phengite gneiss.

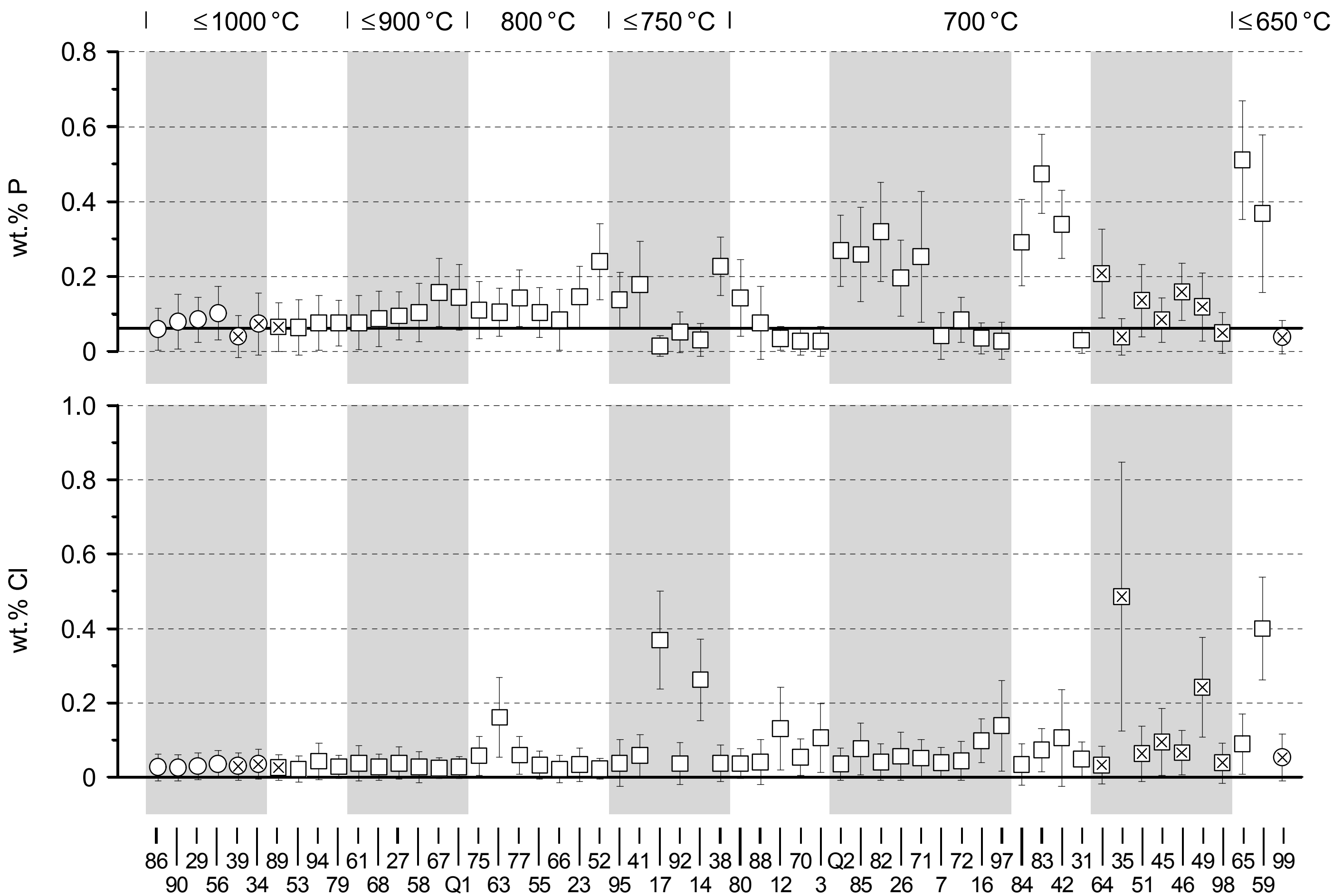


Figure 109 (continued)**:** Mean element concentrations and their standard deviation for glasses quenched in runs with the S-type granitic biotite-phengite gneiss.

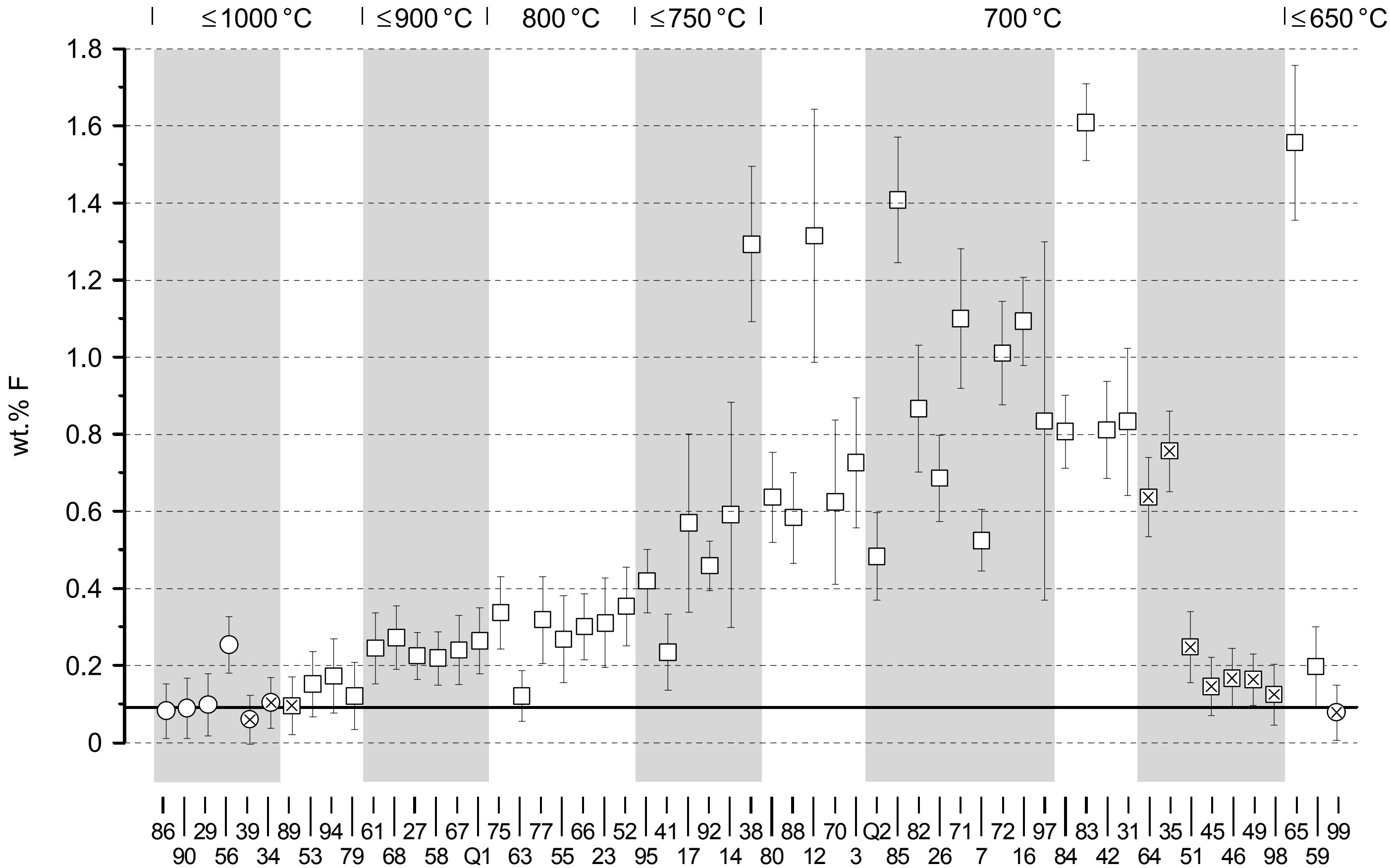


Figure 109 (continued)**:** Mean element concentrations and their standard deviation for glasses quenched in runs with the S-type granitic biotite-phengite gneiss.

tates within the bubbles will always be measured during EMP analysis. A certain scatter of the values for fluorine will result from changing amounts of precipitates, particularly when the size and frequency of bubbles and the volume proportion of the spherules within is inhomogeneous. In the runs with high bulk water content, the concentration of fluorine decreases as

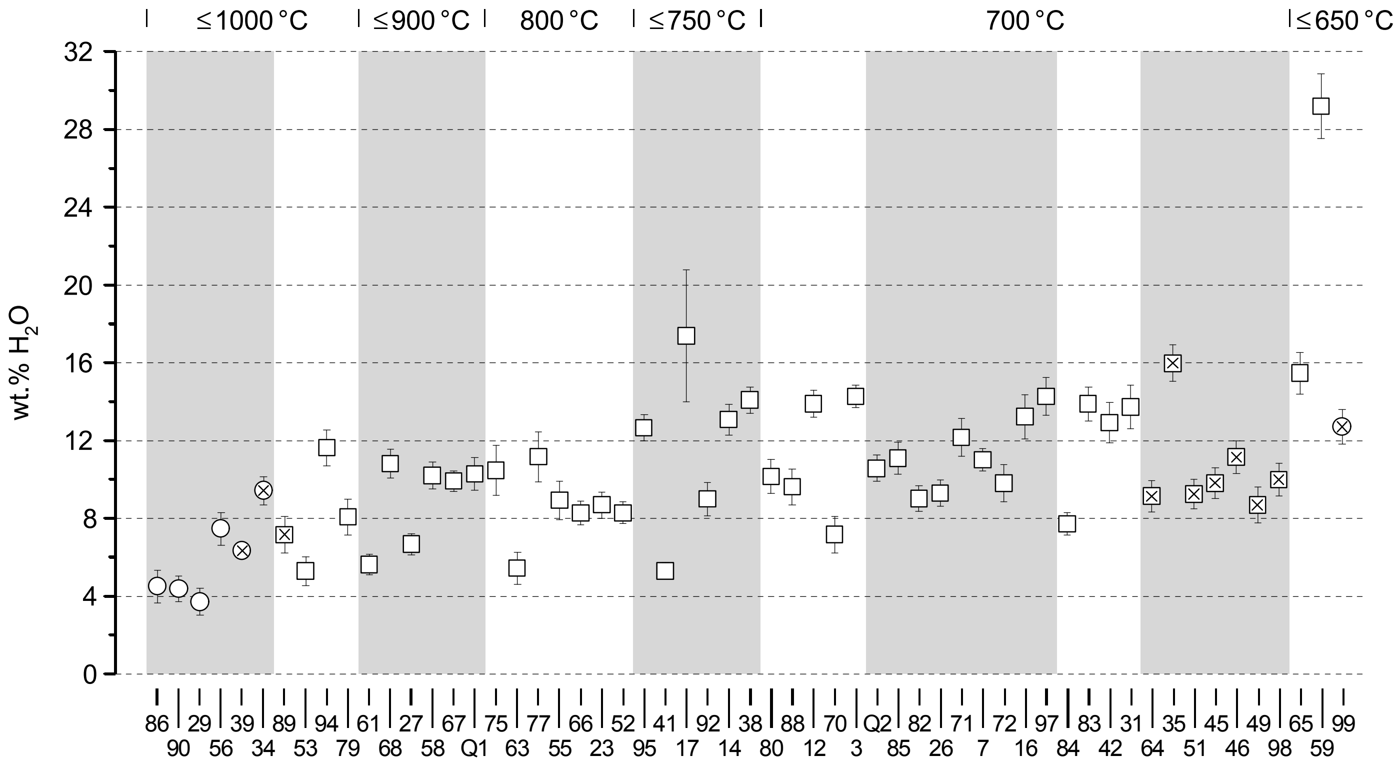


Figure 110: Calculated water content for the glasses quenched in runs with the biotite-phengite gneiss. Grey-and-white shading delimits different groups of runs. Circles indicate a pressure of 2.5 GPa, squares indicate a pressure of 3.5 GPa; open symbols represent runs with a bulk water content of 2.8 wt.%, runs with a higher bulk water content are marked with a cross. For explanation see text.

an effect of dilution by the higher volume proportion of fluid formed.

The chlorine concentration in the fluid is near zero in most of the runs. In the runs of Type 2 (G17) and Type 6 (G14), slightly higher concentrations may correlate to the different P-T paths. In both Type 5 runs with a higher bulk water content G35 and G49, the unusual high concentration of chlorine is due to contamination by salt from the pressure cell, which entered the leaking capsule.

Water. Figure 110 shows the calculated water content of the glasses. There is an overall trend of increasing water content with decreasing temperature, beginning with about 4 wt.% at 1000 °C and amounting to almost 16 wt.% at 650 °C. However, the scatter of water contents calculated for different runs quenched at the same final temperature has almost the same range without showing any correlation to P-T-t path, pressure, or annealing time. Moreover, the water content of the glasses is about the same in every specimen, notwithstanding the different bulk water contents used in the runs. This can be explained by the volume proportion of quenched fluid increasing with increasing bulk water content (see Figure 105B). Additionally, the total bubble volume within the glasses is much higher with increasing bulk water content, pointing to a higher amount of water being released upon quenching.

If the fluid-filled interstices are too small for reliable measurements or are only partially filled with glass lumps and beads, the error is large and the calculated water content is not well constrained. This is the case for the single cooling-pressurization run G17 (Type 2) as well as for the Type 5 run G59 quenched at 3.5 GPa / 600 °C.

6.3 Development of fluid composition in the granitic system

In the runs with the biotite-phengite gneiss, the chemical composition of the fluid develops along some general trends. At 1000 °C the fluid phase has a granitic / alkaligranitic to syenitic / alkalisyenitic composition (Figure 111). With ongoing annealing the fluid will become depleted in silica and slightly enriched in potassium and sodium. Whereas an increase in pressure shifts the data points towards higher alkali concentrations, a higher bulk water content has the opposite effect.

By continuous enrichment in alkali and concomitant depletion in silica, the fluid finally attains a foyaitic composition with decreasing temperature at a given pressure of 3.5 GPa. The fluid composition does not depend on the T-t path, as the data for the Type 5 runs with cooling rates of 3 °C /min, 0.3 °C /min, and 0.03 °C /min plot essentially in the same range and show the same compositional trend with decreasing final temperature (Figure 112).

The effect of large uncertainties due to very small fluid-filled interstices is again revealed by the fluid composition data of the Type 5 runs with a cooling rate of 30 °C /min and of the simultaneous cooling-pressurization run (Type 2). In these runs, composition data show a very broad scatter (Figure 113), indicating that the analyses of the glass are influenced by adjacent crystalline phases. The short-time melting run G92 (Type 3) as well as the re-heated run G14 (Type 6) are characterized by alkali to silica ratios that are comparable to those found in the Type 5 runs quenched at the same final temperature of 700 °C. Hence, the chemical composition of the glass is not significantly influenced by a reduced time span of melting at 1000 °C or cooling and re-heating.

The fluid in the Type 1 run G41 at constant conditions of 3.5 GPa / 700 °C, which was performed with a whole rock drill-core as starting material, is unusually high in silica and atypically poor in total alkali. This chemical composition is comparable to that of the fluid formed in Type 1 and Type 4 runs quenched at 1000 °C. The distinctively different fluid composition may explain why G41, different to all other runs quenched at 700 °C, yields a glass that is free of bubbles.

With increasing bulk water content at 3.5 GPa /700 °C in the Type 5 runs (Figure 114), the volume proportion of fluid steadily increases and, as the total alkali to silica ratio decreases, the composition of the fluid approaches that of the granitic/ alkali-

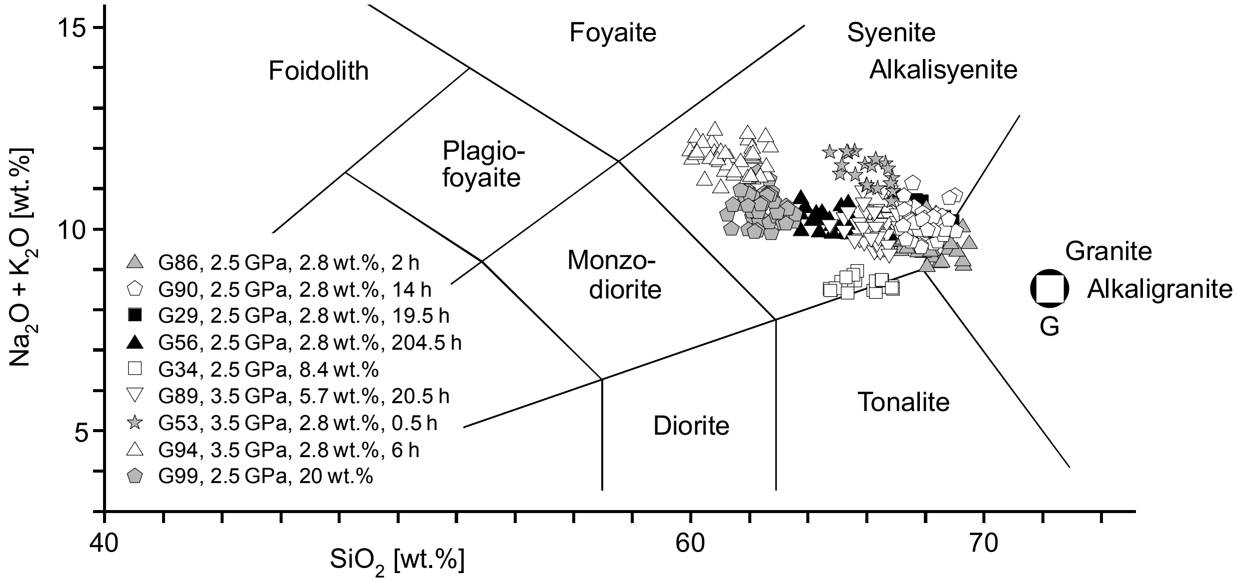


Figure 111: Total alkali versus silica diagram showing the chemical composition of the glasses as a function of pressure and annealing time in Type 1 and Type 4 runs with the biotite-phengite gneiss quenched at 1000 °C. Data pertaining to run G99 (Type 7), quenched at 2.5 GPa / 650 °C, are plotted for comparison. Pressure, bulk water content, and annealing time is indicated for each run. For run details see Table 2; EMP data are given in Tables 5 to 13 and Table 61 in Appendix. The large symbol labelled 'G' gives the composition of the starting material.

granitic bulk rock composition of the starting material. The data for the Type 7 run with a bulk water content of about 20 wt.%, quenched at conditions of 2.5 GPa / 650 °C, are plotted for comparison. They show, as already demonstrated in the Type 1 runs (Figure 112), that the lower pressure decreases the alkali content of the fluid phase.

6.4 Fluid composition in other rock types

In order to characterize the chemical composition of the fluids in the other rock types studied, glasses will be considered that formed in the Type 5 runs with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C, all with 2 wt.% of

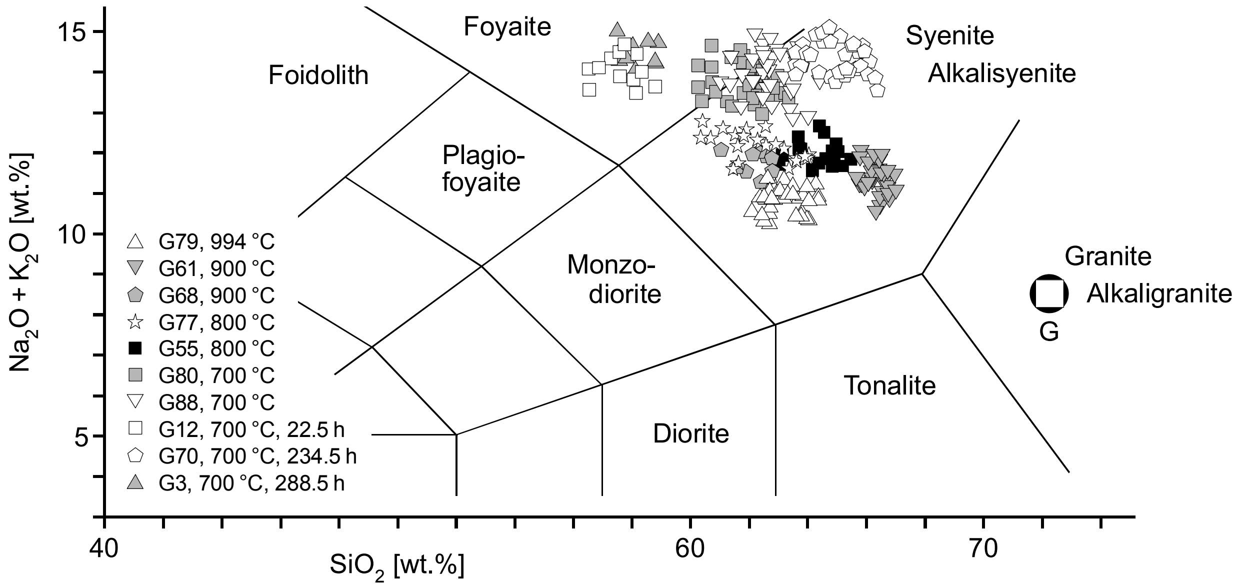


Figure 112 (this and following pages)**:** Total alkali versus silica diagrams showing the chemical composition of the glasses in Type 5 runs with the biotite-phengite gneiss with different cooling rates. Cooling rate is 3 °C /min, all runs are quenched without annealing or after the given annealing time at a pressure of 3.5 GPa and the indicated temperature. Bulk water content is 2.8 wt.% except for 3.2 wt.% in run G3. For run details see Table 2; EMP data are given in Tables 14 to 60 in Appendix. The large symbol labelled 'G' gives the composition of the starting material. For explanation see text.

water added. Because no coherent glass was quenched in the pyrope quartzite and in the MOR basalt at corresponding conditions and the silicic beads or lumps of glass formed are too small for EMP analysis, data of the Type 4 runs W2 and W3 without cooling, quenched at conditions of 3.5 GPa / 1000 °C and of the short-time melting run P1 (Type 3) with no water added quenched at conditions of 3.5 GPa / 700 °C are considered for these two starting materials. The EMP data for all runs are listed in Table 62 to 68 in Appendix.

For most of the rock types studied the fluid is depleted in

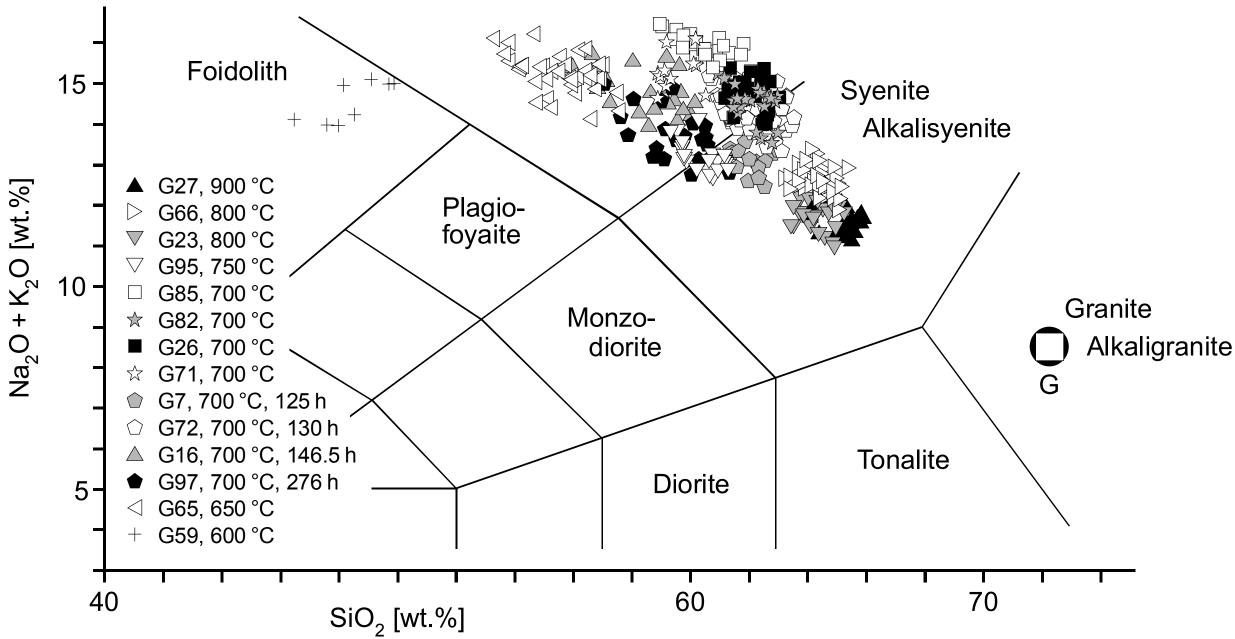


Figure 112 (continued)**:** Total alkali versus silica diagrams showing the chemical composition of the glasses in Type 5 runs with the biotite-phengite gneiss with different cooling rates. Cooling rate is 0.3 °C /min, all runs are quenched without annealing or after the given annealing time at a pressure of 3.5 GPa and the indicated temperature. Bulk water content is 2.8 wt.%. For run details see Table 2; EMP data are given in Tables 14 to 60 in Appendix. The large symbol labelled ‘G’ gives the composition of the starting material. For explanation see text.

silica and enriched in alkali oxides relative to their specific starting material (Figure 115). This holds especially for the phonolithic tephrite, which has an alkali content in the quenched glass that is three times the initial concentration in the starting material. Fluids formed in the eclogite and in the MOR basalt, by contrast, are significantly enriched in silica and in alkali oxides relative to the starting material.

Similar to the glasses quenched in the granitic system, the glass in run D1 performed with the granodioritic garnet-mica gneiss is enriched in alkali, phosphorus, and in halogenides relative to the starting material (Figure 116). In contrast to the granite, sodium is fractionated into the fluid. The glass is de-

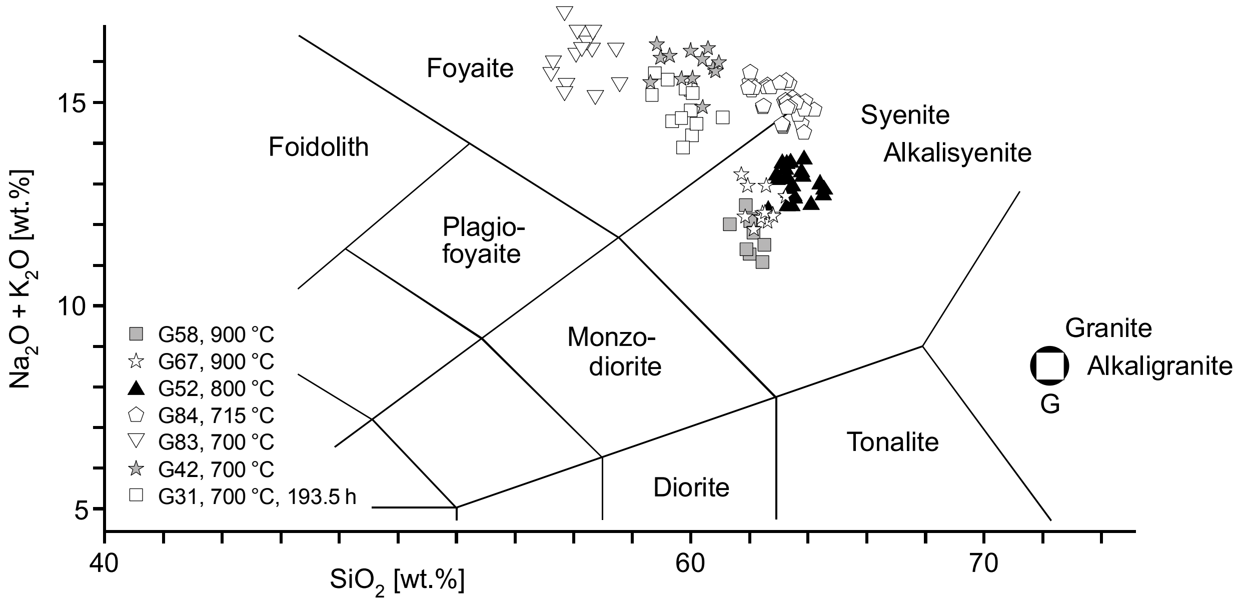


Figure 112 (continued)**:** Total alkali versus silica diagrams showing the chemical composition of the glasses in Type 5 runs with the biotite-phengite gneiss with different cooling rates. Cooling rate is 0.03 °C /min, all runs are quenched without annealing or after the given annealing time at a pressure of 3.5 GPa and the indicated temperature. Bulk water content is 2.8 wt.%. For run details see Table 2; EMP data are given in Tables 14 to 60 in Appendix. The large symbol labelled ‘G’ gives the composition of the starting material. For explanation see text.

pleted in the other elements, especially in aluminium, iron, and magnesium. With more than 18 wt.%, the calculated water content is higher than in the glasses of runs with the biotite-phengite gneiss.

Compared to the starting material, the glass in the run with the phonolithic tephrite is slightly enriched in phosphorus and much enriched in potassium. The high concentration of the latter is due to the absence of K-feldspar, which acts as a sink for potassium in the granitic as well as in the granodioritic composition. Relative to the starting material the fluid is depleted in all other elements, chiefly in iron, magnesium, calcium, and sodium, caused by the crystallization of garnet and by the growth of the rims of clinopyroxene crystals that are rich in jadeite component. The water content in the glass is equated

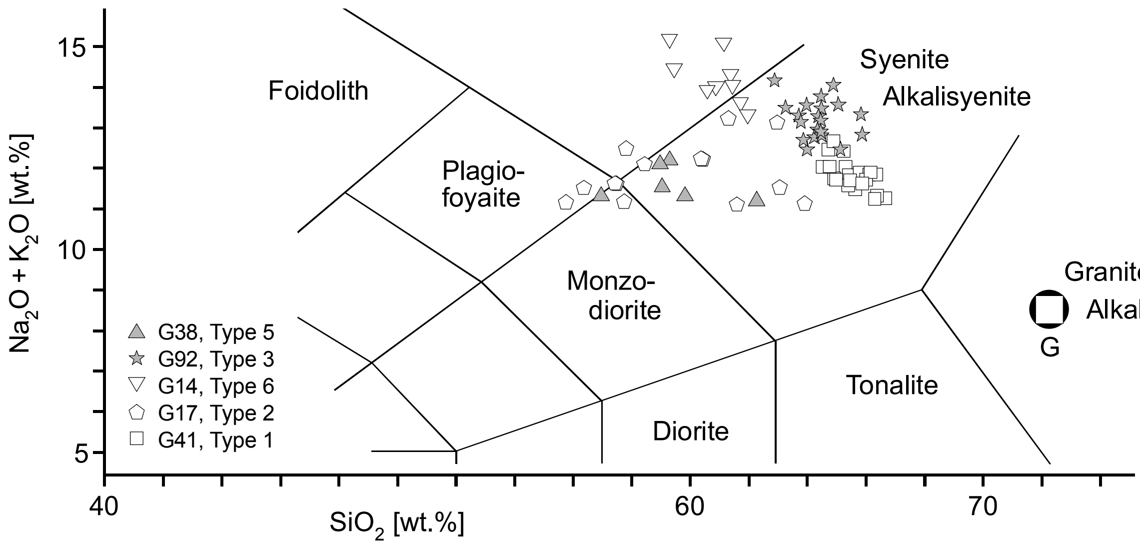


Figure 113: Total alkali versus silica diagram showing the chemical composition of the glasses in runs with the biotite-phengite gneiss of different P-T-t conditions: Type 5 run G38 with a cooling rate of 30 °C /min, short-time melting run G92, re-heated run G14, cooling-pressurization run G17, and run G41 at constant conditions, all quenched at conditions of 3.5 GPa / 700 °C. Bulk water content is 2.8 wt.% except for 2 wt.% in run G41. For run details see Table 2; EMP data are given in Tables 29 to 33 in Appendix. The large symbol labelled 'G' gives the composition of the starting material.

to almost 19 wt.%.

The glasses quenched in the runs with the eclogite and the MOR basalt are enriched in sodium, potassium, and silica relative to the starting material. As described for the phonolithic tephrite, the growth of garnet and clinopyroxene lowers the concentration of iron, magnesium, calcium, aluminium, and titanium. The water content of the glass is about 19 wt.% in the eclogite, which is comparable to that measured in the phonolithic tephrite, while the water content in the MOR basalt is determined to 14 wt.%.

Relative to the starting material, the glass quenched in the pyrope quartzite at 1000 °C is enriched in potassium, calcium, and phosphorus with a concomitant depletion in silica, magnesium, and iron. The water content amounts to more than

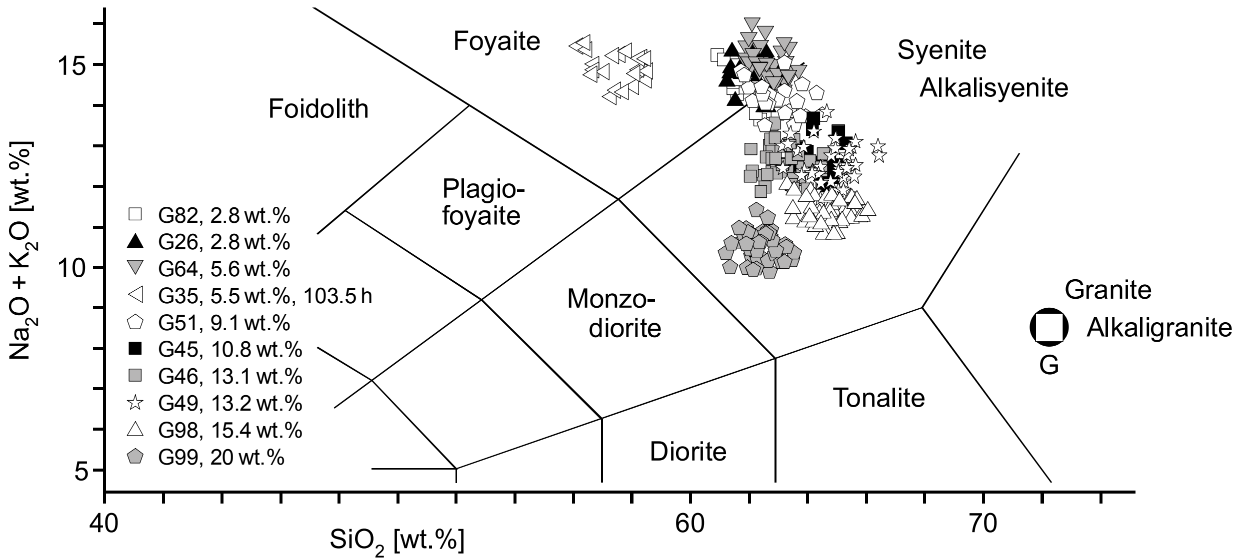


Figure 114: Total alkali versus silica diagram showing the chemical composition of the glasses as a function of bulk water content in runs with the biotite-phengite gneiss: Type 5 runs with a cooling rate of 0.3 °C /min, quenched without annealing or after the indicated annealing time at conditions of 3.5 GPa / 700 °C and the single heating-cooling run G99 (Type 7), quenched at conditions of 2.5 GPa / 650 °C. The bulk water contents are specified with the individual run numbers. For run details see Table 2; EMP data are given in Tables 41 to 61 in Appendix. The large symbol labelled 'G' gives the composition of the starting material.

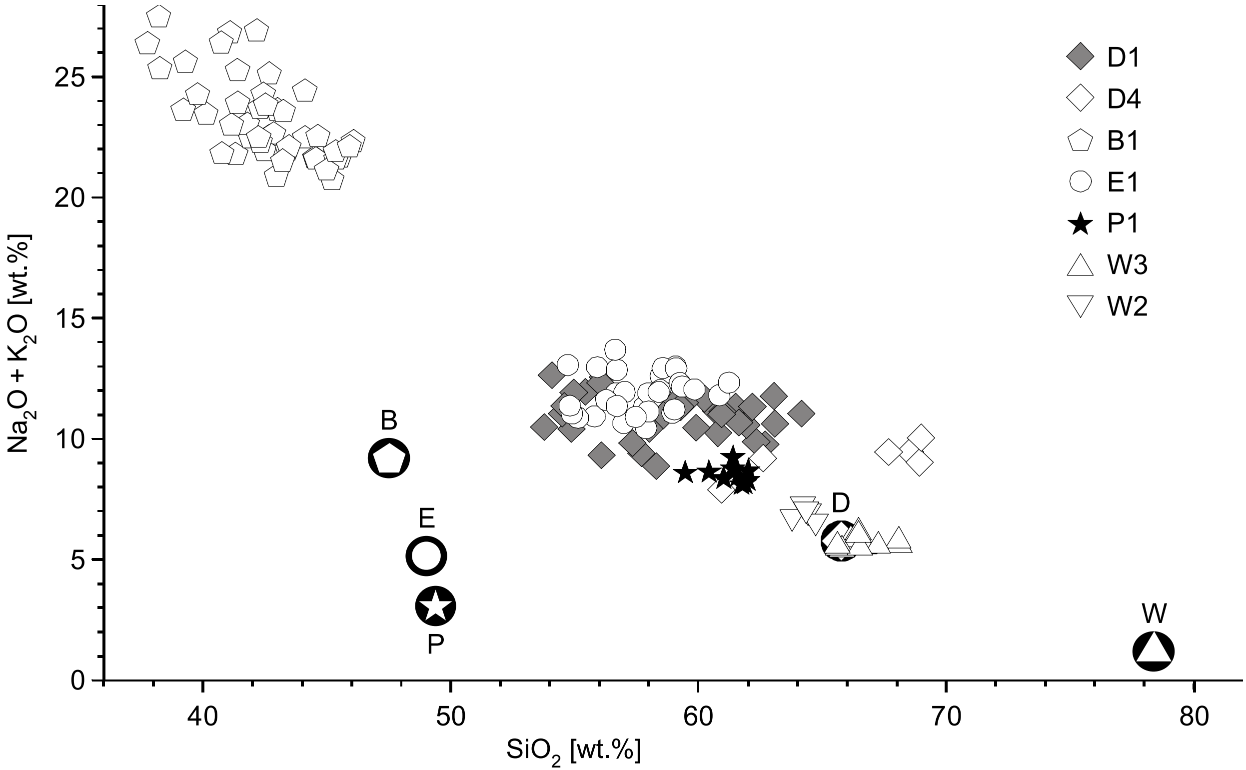


Figure 115: Total alkali versus silica diagram showing the chemical composition of glasses in runs with different rock types used in the present study: Type 5 runs with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C, with the garnet-mica gneiss ('D'), the phonolithic tephrite ('B'), and the eclogite ('E'), all with 2 wt.% of water added; Type 4 runs without cooling, quenched at conditions of 3.5 GPa / 1000 °C with the pyrope quartzite ('W') with a bulk water content of 2.8 wt.%; short-time melting run (Type 3), quenched at 3.5 GPa / 700 °C with the MOR basalt ('P') without added water. Large symbols indicate the composition of the starting materials. For run details see Table 2; EMP data are given in Tables 62 to 68 in Appendix.

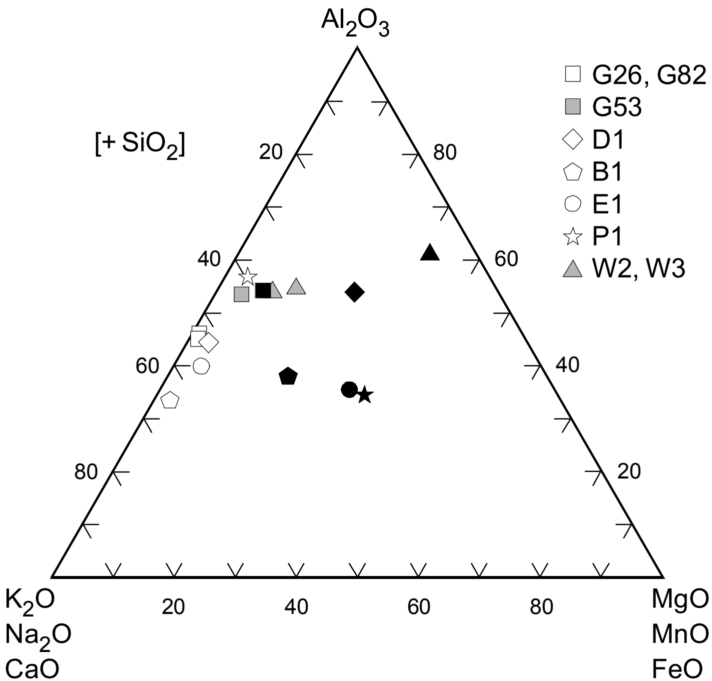
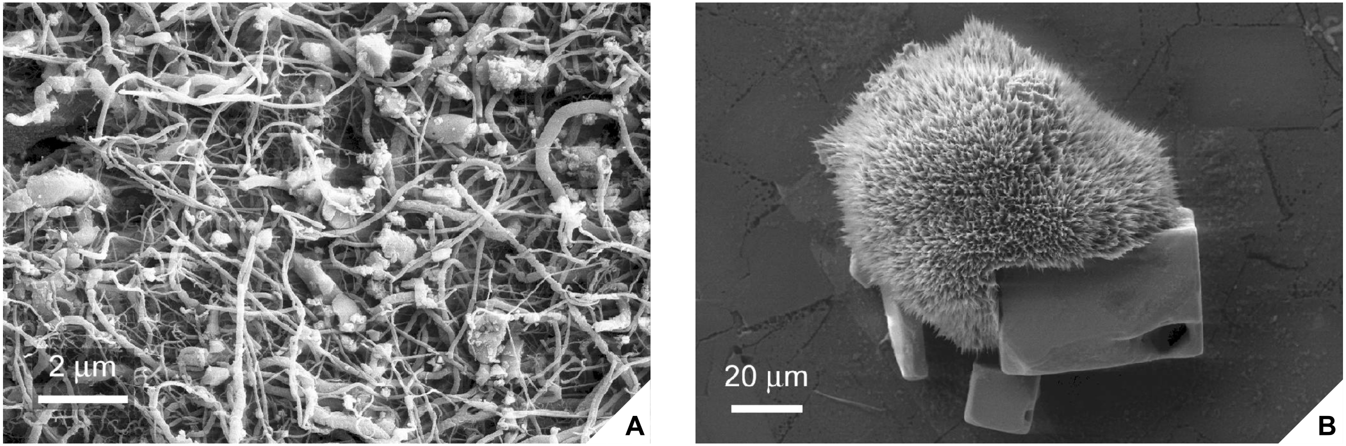


Figure 116: Triangle diagram showing the chemical composition of the glasses formed in the different rock types investigated in the present study (biotite-phengite gneiss 'G', garnet-mica gneiss 'D', phonolithic tephrite 'B', eclogite 'E', MOR basalt 'P', and pyrope quartzite 'W'). Runs were quenched at conditions of 3.5 GPa / 1000 °C (grey symbols) and 3.5 GPa / 700 °C (white symbols). The composition of the corresponding starting materials is indicated by black symbols.

13 wt.% and is thus rather high. With decreasing temperature, the water content of the fluid will further increase, inasmuch as at 700 °C only a few beads of silica were quenched from a vapour-like fluid phase that has a water content estimated to about 90 vol.%.

6.5 Preservation potential of the glasses

The homogeneous glasses poor in water that were quenched at high temperatures are rather resistant against moisture and atmospheric influences. In repeated analyses over a time span of two years, no change in chemical composition was detected. The water-rich, bubble-bearing glasses quenched from the runs with the biotite-phengite gneiss at lower temperatures, however, are considerably more sensitive to alteration. SEM inspection revealed that the glasses appear to remain unchanged for up to half a year. After one year, the glasses are completely decomposed and are overgrown by alteration products, particularly by carbonates (Figure 117A), and hence the specimens are useless for further investigations. Thereby, the high alkali content of the glasses promotes the decay. It has been found that carbon-coating of the polished sections will offer some protection. More severely, the glass quenched in the phonolithic tephrite, which has an extremely high potassium content, shows alteration already after a few days. The carbon-coated section, even though stored in an evacuated desiccator, liberates potassium, which results in the growth of euhedral sylvine and tufts of a potassium-phosphorus compound (Figure 117B). After a short time span, the vesiculated glass is completely substituted by alteration products (Figure 117C).



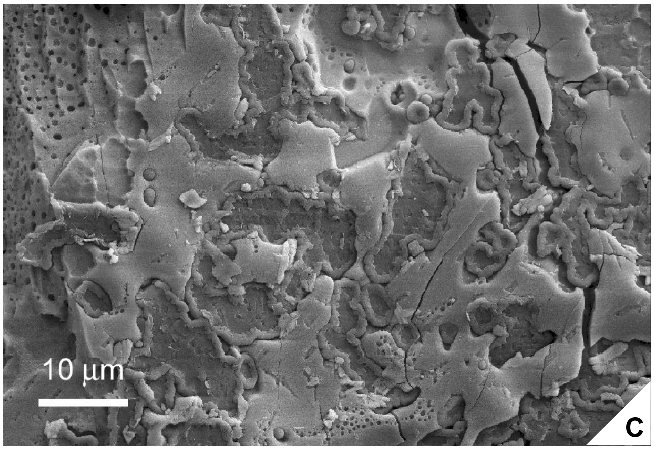


Figure 117: Examples of alteration products grown upon the glasses quenched from runs with the biotite-phengite gneiss (A) and the phonolithic tephrite (B, C). Threads of carbonate (A), 'hedgehog' composed of euhedral sylvine and tufts of potassium-phosphorus compound on a polished section (B), and near-complete alteration of vesiculated glass (C).

CHAPTER 7

Discussion

The interpretation of experimental results obtained when using conventional high pressure techniques is generally complicated by the fact that observations are not made in situ but in quenched samples at ambient conditions. As far as crystalline phases are concerned, this approach bears little difficulty, as the majority of the solid high pressure and high temperature phases will be preserved metastably without structural or compositional modification. This does not hold true for fluid phases, as liquids and gases cannot be quenched with preservation of their specific properties attained at high pressures and temperatures.

The solubility of solids in aqueous solutions and vapour generally varies considerably as a function of pressure and temperature and material formerly dissolved will therefore normally be precipitated during the rapid change in conditions upon quenching. If cooling is fast enough to prevent nucleation and crystallization, then a silicate liquid can be transformed into a silicic glass. From a melt of given composition, however, various more or less distinctively different glasses can be quenched depending on pressure, temperature, and time-related parameters. Moreover, a change of conditions will change the solubility of water in the silicate melt, resulting in degassing as expressed by the formation of bubbles, which is frequently observed.

7.1 Melting versus crystallization experiments

Attaining equilibrium is a general prerequisite for a meaningful interpretation of experiments performed to determine phase relations or to characterize grain-scale distribution of partial melts. The question of equilibrium in the granitic system has been thoroughly discussed by Johannes (1980). Reversibility is a strong argument for proving stable or metastable equilibrium. Therefore, not only an assemblage that corresponds to the given conditions has to develop, but also the same proportion of the particular phases with defined composition must be obtained in both crystallization and melting experiments (Piwinskii and Martin, 1970). Reversibility is likewise crucial for the fluids involved, as changes in the mineral assemblage have a pronounced effect on the chemical composition and thus properties of the fluid (see Chapter 6).

In the present study, the majority of the runs, i.e. the runs of Type 3 to 7, was performed as crystallization experiments, whereas only the Type 1 runs are melting experiments. Melting experiments, however, were performed with the same granitic starting material in a previous study (Burchard, 1999). Sample volumes used in these experiments were smaller and assemblies were different to those used in the present study. Bulk water contents applied by Burchard (1999) were 1.9, 3.8, 5.6, and 9.9 wt.% and run times were at least 7 days. With respect to the phase assemblage and the chemical composition of the individual crystalline phases, the results of both studies match closely. Certain minerals, i.e. garnet, rutile and zircon, are inhomogeneously distributed but nevertheless in equilibrium with all other phases of the assemblage. High pressure phases grow preferentially where low pressure phases supply the required elements, as, for example, garnet grows where biotite breaks down. Obviously, the compositional inhomogenities inherited from the starting material are not compensated for by diffusive transport through the fluid.

Burchard (1999) subdivided the runs into three groups according to the 'quench products' of the fluid phase, which were, however, not differentiated into glass, crystals, and other precipitates; in most, the microfabrics correspond to those of the Type 1 runs at constant conditions of 3.5 GPa / 700 °C (see Figure 27) in the present study. Only in melting experiments with high bulk water contents and at high temperatures Burchard (1999) found large volumes of coherent silicic glass, quenched from a homogeneous liquid-like fluid phase. Consequently, the microfabrics observed by crystallization and melting experiments differ at a given set of conditions.

A dependence of the microfabrics and particularly the fluid phase on the sort of the starting material used is evident in this study, too. In the Type 1 run at constant conditions of 3.5 GPa / 700 °C, in which a rock cylinder drilled out of the hand-specimen of the biotite-phengite gneiss was used, large amounts of coherent glass free of bubbles were quenched. By contrast, in the Type 1 runs performed at the same conditions with a fine-grained powder of the same rock and even slightly higher bulk water contents, no liquid-like fluid is formed within up to 28 days. Interpretation of both types of melting experiments in regard to the properties of the fluid present at run conditions will lead to contrasting results. In the first case, a single homogeneous fluid seems to be present with liquid-like properties and nothing points to the presence of an additional, vapour-like fluid phase. In the second, no indication of a silicic liquid exists, and instead the crystalline phases would coexist with an aqueous solution or vapour. Consequently, the first type of runs described above would be taken as 'hypersolidus', the latter as 'subsolidus'. Merril *et al.* (1970) have stated, that it would be easier to locate the solidus precisely when crystalline starting materials were used instead of glasses. However, as it is evident from the two types of experiments described above, it might be impossible at all to make any explicit statements about phase relations.

One may argue that natural crystalline starting materials, be it fine-grained powders or intact pieces of rock, are generally disadvantageous to ultra-high pressure experiments, as they have no UHP metamorphic phase assemblage and their initial state is far away from being stable at high pressure and temperature. Especially with low bulk water contents, many relics of low-pressure phases are preserved. However, the use of glasses as starting materials bears other difficulties, as, for instance, the loss of alkali during preparation at the high temperature necessary for dissolving all crystalline components. Furthermore, the glass may crystallize during pressurization and heating at the beginning of each run again producing an assemblage that will not be stable at run conditions. The approach used in the present study was therefore to perform crystallization experiments. The charge was largely homogenized first through melting at conditions of 2.5 GPa / 1000 °C to form a silicate liquid with only minor relics, from which a UHP phase assemblage was then crystallized. Provided that cooling is slow, microstructural equilibrium was found be achieved at any temperature in the crystallization experiments. Crystals are precipitated from the fluid near-instantaneously. The distribution of the crystalline phases is homogeneous at the scale of the whole specimen, although inhomogeneous at the grain-scale. However, these small-scale inhomogenities, which have necessarily to be considered when using natural rock compositions, can be demonstrated to have no particular influence on the fluid topology (see Chapter 5).

7.2 Water loss versus metastable melting

The series of Type 1 runs at constant conditions of 2.5 GPa / 1000 °C (see Figure 30 to 33) reveals an increase in the abundance of the crystals and a decrease in the volume proportion of the fluid phase quenched to form a silicic glass with prolonged annealing time (Figure 118). Caused by the crystallization of K-feldspar and an increase of the proportion of quartz, the volume of the fluid drops from more than 80 vol.% to less than the half of this value (Figure 119). A the same time, K-feldspar becomes enriched in sodium as expressed by the decreasing K-feldspar to albite ratio (Figure 120).

This might be considered as a response of the system to a

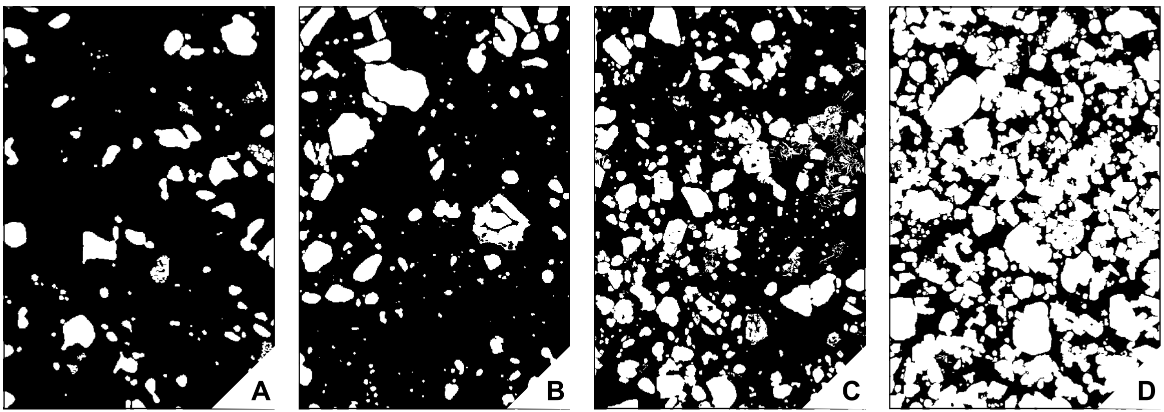


Figure 118: Binary images of Type 1 runs at constant conditions of 2.5 GPa / 1000 °C with the biotite-phengite gneiss. For details see Table 3. The images display the development of microfabrics, fluid topology, and fluid proportion with increasing annealing time (top to bottom). The fluid is black, all crystalline phases are white. Field of view is 0.6 mm wide for each image.

loss of water. Water loss of samples enclosed in noble-metal capsules during piston-cylinder experiments was investigated by several studies (e.g. Patiño Douce and Beard, 1994; Truckenbrodt and Johannes, 1999; Freda *et al*. 2001). Using a model amphibole gneiss, Patiño Douce and Beard (1994) indirectly documented changes in water concentration in gold capsules at conditions between 975 and 1000 °C at 1.0 GPa by an increase in plagioclase mode and a decrease of melt fraction. A model biotite gneiss, however, showed the opposite trend. Nominal changes in water concentrations observed in long-duration experiments on both starting materials were not resolvable within analytical error (Patiño Douce and Beard, 1994). Water concentrations were not measured directly, but calculated from excess oxygen in the quenched glasses determined by microprobe analysis.

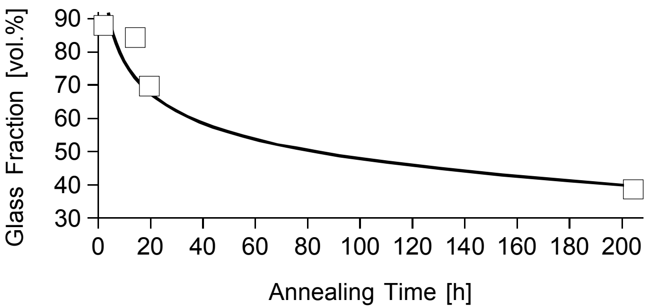


Figure 119: Volume fraction of the quenched fluid phase plottet versus annealing time in Type 1 runs at constant conditions of 2.5 GPa / 1000 °C with the biotite-phengite gneiss, bulk water content 2.8 wt.%. For details see Table 3.

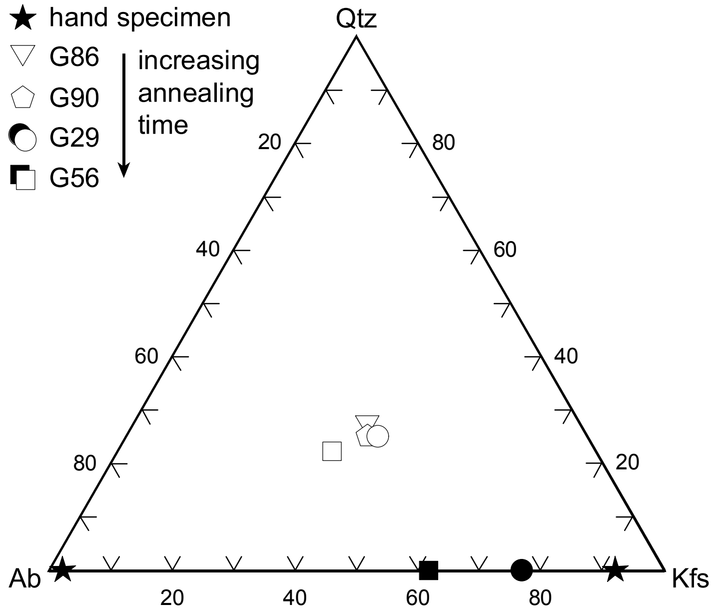


Figure 120: Quartz - albite - K-feldspar triangle diagram showing the composition of the fluid (open symbols) and of the feldspars (closed symbols) in Type 1 runs at constant conditions of 2.5 GPa / 1000 °C with the biotite-phengite gneiss, bulk water content of 2.8 wt.%. Asterisks give the composition of albite and microcline in the biotite-phengite gneiss after Schertl *et al.* (1991).

Truckenbrodt and Johannes (1999) tested gold, silver palladium, and platinum capsules embedded in boron nitride for permeability to C-H-O fluids within run times of six days at 1.0 GPa. No significant loss of oxygen, which was determined

Table 3: Type 1 runs with the biotite-phengite gneiss at constant conditions of 2.5 GPa / 1000 °C with a bulk water content of 2.8 wt.%. Letters A to D refer to images in Figure 118.

run	G86 (A)	G90 (B)	G29 (C)	G56 (D)
annealing time [h]	2	14	19.5	204.5
water content of glass [vol.%] [1]	4.5 (± 0.8)	4.4 (± 0.7)	3.7 (± 0.7)	7.5 (± 0.8)
glass fraction [vol.%] [2]	88	84	70	39
calculated water content of glass [vol.%] [3]	3.2	3.3	4.0	7.2
calculated glass fraction [vol.%] [4]	62 (+14 / -10)	64 (+11 / -8)	75 (+17 / -12)	38 (± 4)

1 Water content is equated to the difference between 100 wt.% and the total EMP analysis of oxides corrected for fluorine and chlorine.
2 Glass fraction was determined from BSE images by digital imaging and image analysis software.
3 Calculated from the determined glass fraction and the known bulk water content of the specimen with the assumption that all water is held in the glass.
4 Calculated from the measured water content of glass and the known bulk water content of the specimen with the assumption that all water is held in the glass; range of calculated glass fraction takes into account the standard deviation of EMP data.

by gas chromatography, and consequently no water loss could be observed with these capsule materials at temperatures up to 1000 °C.

Freda *et al.* (2001) measured water loss from water-undersaturated granitic melts in silver palladium capsules and sodium chloride - crushable alumina - pyrex assemblies at 1.0 GPa and 1050 and 1200 °C over a time span of 6 to 43 h. Their results confirm the general notion that pyrophyllite surrounding the capsule either prevents or at least reduces water loss significantly. In experiments with bulk water contents of 2 wt.%, the water loss even at high temperatures of 1200 °C was found to be fully eliminated.

Considering the results of these studies, water loss is not likely to occur in the described experimental series. First, temperatures of 1000 °C are not sufficiently high for hydrogen and oxygen diffusion through the gold capsules, the more so as the bulk water content of the samples is relatively low. Second, the capsules are surrounded by a pyrophyllite sleeve which should prevent the water loss additionally.

In Table 3 the glass fraction, representing the volume proportion of the fluid phase, and the water content of the glasses are compiled. The consistency of these data can be proven, given the bulk water content of the specimen and assuming that all water is held in the glass. This assumption is permitted, as no aqueous vapour has escaped upon quenching and no other hydrous phases are present. The calculated data of glass fraction and water content (Table 3) are in good agreement for the runs with extended annealing, whereas the calculation is not fully consistent for the two short-duration runs. Here, either the EMP data give a water content in the glass that is too high or the determined glass fraction is too large. The latter can be ruled out, as the discrepancy between the determined and the calculated glass fraction of more than 20 wt.% is large compared to the error inherent to the image analysis method (see Section 4.9).

Corresponding results have been obtained from runs at constant conditions of 4.8 GPa / 1000 °C using the 'dry' garnet-mica gneiss within the same time span. There, the decrease in fluid fraction is linked to a change in phase assemblage. The decrease in volume proportion of the fluid phase is obvious (see Figure 88), although almost impossible to quantify.

In conclusion, water loss was not encountered in the present study. Metastable melting may be a possible explanation of the phenomenon of melting with subsequent crystallization and concomitant decrease of the volume proportion and increase of the water content of the fluid. Johannes (1980, 1983) has shown that metastable melting is the major problem in melting experiments involving plagioclase of intermediate composition. In reviewing the studies of Wyllie and co-workers on natural granitic starting materials (Piwinskii and Wyllie, 1968; Boettcher and Wyllie, 1968, 1969; Piwinskii and Martin, 1970; Robertson and Wyllie, 1971; Piwinskii, 1973; Stern and Wyllie, 1973; Huang and Wyllie, 1973, 1975; Maaløe and Wyllie, 1975; Wyllie, 1977), Johannes (1980) has pointed out that these studies found it difficult or impossible to attain equilibrium at near-solidus conditions or in the vapour absent region. Probably, the phase assemblage and the microfabrics with high proportions of crystalline phases as observed in the annealed runs come closer to the equilibrium state of the system than the large amounts of fluid formed in the short-duration runs.

7.3 Grading

Some of the specimens show grain size grading (see Section 5.3). This gradient in the microstructural characteristics is not accompanied by a gradient in the phase assemblage and the chemical composition of the individual phases, as all phases occur more or less evenly distributed within the capsule, disregarding the local enrichment of certain minerals due to the localized breakdown of host minerals in the sample powder. Generally, grading only affects those phases that crystallize from the fluid during the run, whereas relics from the starting material remain unaffected.

The observed grain size grading is caused by nucleation and growth, controlled by a temperature gradient in the capsule. From temperature gradient measurements (Leistner, 1979) and from the geometry of the assembly with the thermocouple positioned below the capsule, a decrease in temperature from bottom to top of the capsule is expected (see Section 4.4). The microfabrics in the graded specimens support this assumption in that the more pronounced undercooling in the upper part of the capsule facilitates nucleation. The larger the undercooling, that is the difference between the equilibrium temperature and the given temperature, the smaller is the size of a critical nucleus (Putnis and McConnell, 1980). Thus, the nucleation probability is higher in the upper part of the capsule, and, consequently, grain sizes are smaller.

7.4 Fluids at run conditions and behaviour upon quenching

Experimental data on the behaviour of natural rock systems in the presence of water at UHP metamorphic conditions are as yet contradictory (see Chapter 2). Their interpretation with respect to whether either the solidus can still be defined or only a single supercritical fluid exists, are inconsistent among different authors. Thus, the question arises whether a silicic liquid forms by melting of silicate minerals in the presence of water vapour, or whether the solvus between silicic melt and aqueous vapour is closed. Consequently, the major point that has to be explored is how many and what kinds of fluids are present at run conditions. This is not unequivocal when a homogeneous fluid separates into two or more products upon quenching.

Earlier studies had likewise to rely exclusively on the interpretation of quench products to draw conclusions on the system's behaviour at run conditions. The pioneering works had, additionally, to struggle with the recognition of phases by optical microscopy alone. In his study on immiscibility in silicate melts, Greig (1927a) investigated many binary systems of silica and alkali metal oxides as well as alkaline earth metal oxides. In cases of miscibility, he observed a single melt quenched to form a homogeneous glass phase, while two immiscible liquids were quenched to form two different glasses. The less siliceous glass was thereby found to form spherules within the second, more siliceous glass. Seki and Kennedy (1965) observed muscovite, glass, and water as run products in melting experiments in the system $KAlSi_3O_8$ - water at up to 3.4 GPa / 900 °C. Seki and Kennedy (1965) stated that their results would suggest the presence of two fluid phases at run conditions, but they were unable to decide on this with certainty.

From the observations made in the experiments on natural I-type and S-type granitic rocks with different amounts of water and pressures of up to 3.5 GPa, Boettcher and Wyllie (1968), Huang and Wyllie (1981), and Stern and Wyllie (1981) did not infer critical behaviour, as a water-saturated region is outlined up to high pressures where vapour, i. e. a dense aqueous fluid phase containing dissolved solids, coexists with a silicate liquid that contains dissolved water (see Figure 121). While the liquids were quenched to glasses, the vapour phase was quenched to a variety of precipitated materials: all runs assigned to the vapour-present region by Boettcher and Wyllie (1968), Huang and Wyllie (1981), and Stern and Wyllie (1981) contained deposits such as "quench mica and brown aggregates". According to Boettcher and Wyllie (1968), this mica was never enclosed in the glass, suggesting that it was not in equilibrium with the liquid at run conditions. The other quench deposits varied with pressure: at 1 GPa small spheres of gel were observed, and the "brown aggregates" became darker and more compacted with rising pressure. The glasses in runs in the water-saturated region had cavities as had some glasses in the vapour-absent region, interpreted as indicating exsolution of vapour from liquids during quenching (Stern and Wyllie, 1981). Stern and Wyllie (1981) mentioned that many runs in the vapour-absent region contained glasses with no cavities. However, the occurrence of bubbles is not indicated in the individual runs reported.

In their experiments on the melting behaviour of K-feldspar, Goldsmith and Peterson (1990) were not able to distinguish between material quenched from the vapour at pressures above

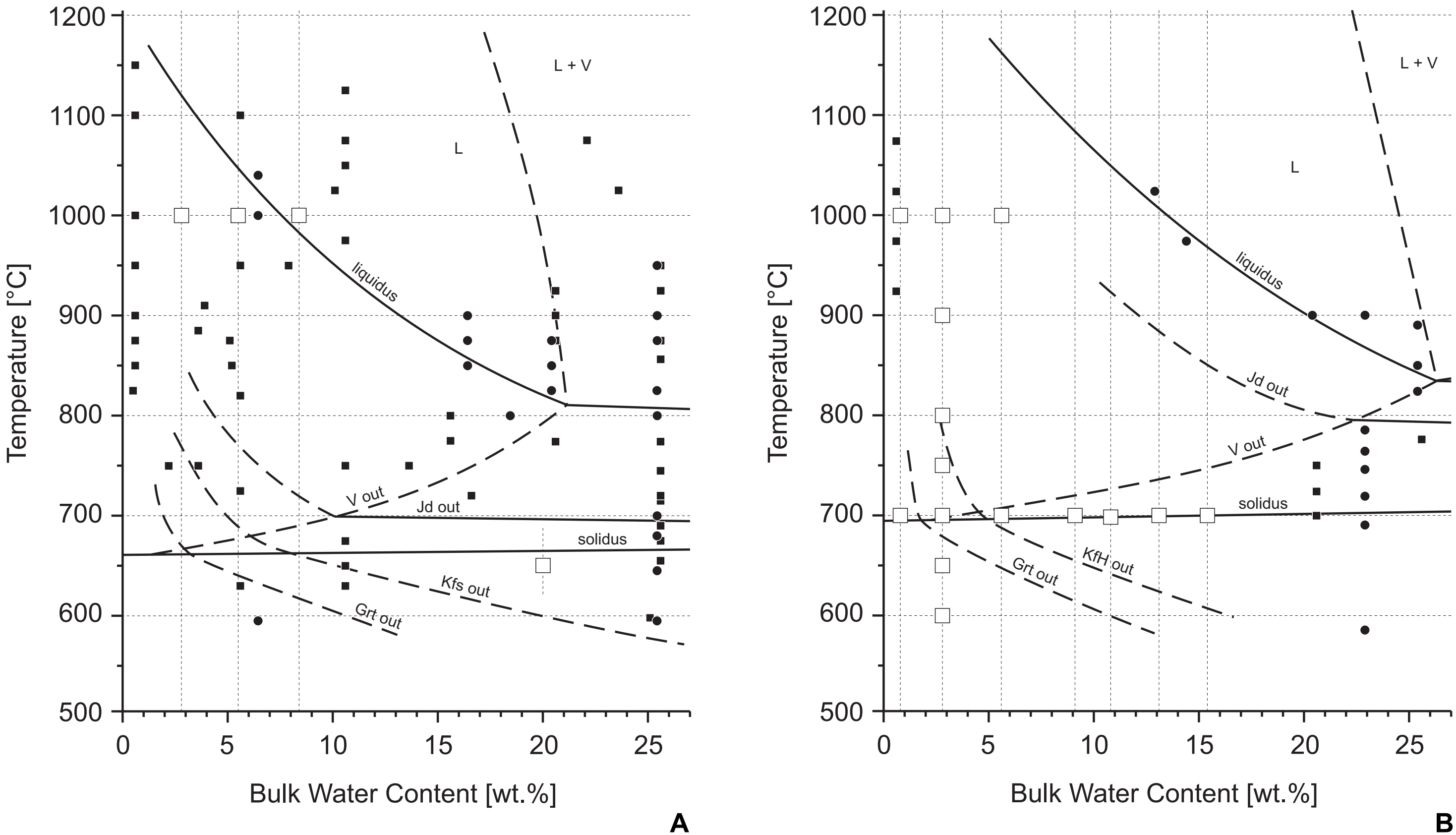


Figure 121: Phase relations for I-type Dinkey Lakes biotite granite from the Sierra Nevada batholith (Stern and Wyllie, 1981). Isobaric sections for pressures of 2.5 GPa (A) and 3.5 GPa (B). Closed squares give data points of experiments with S-type muscovite granite from Harney Peak, South Dakota with up to 25 wt.% of water added reported by Huang and Wyllie (1981). Closed circles give data points of experiments with Dinkey Lakes biotite granite with up to 25 wt.% of water added reported by Stern and Wyllie (1981). Open squares give data points of experiments with S-type granitic biotite-phengite gneiss performed in the present study.

1.5 GPa and melts quenched from above the liquidus. As a consequence, they could not define the solidus curve at higher pressures. Goldsmith and Peterson (1990) termed the quench product "granular isotropic brownish incoherent substance" and supposed this material to be identical to the "brown aggregates" of Boettcher and Wyllie (1968).

In the following, the results of the crystallization experiments carried out in the present study will be considered separately for pressures of 2.5 and of 3.5 GPa. In Figure 121, temperature versus bulk water content for the runs with the S-type granitic biotite-phengite gneiss is plotted in isobaric sections for both pressures. For comparison, the equivalent data points of runs with I-type and S-type granitic starting materials performed by Boettcher and Wyllie (1968), Huang and Wyllie (1981), and Stern and Wyllie (1981) and the derived phase relations are given, too.

Fluid behaviour at 2.5 GPa. Independent of the bulk water content, a coherent silicic glass is present in all runs performed at 2.5 GPa, which has solidified from a homogeneous liquid-like fluid. There is no evidence of a second fluid with vapour-like properties being present at run conditions, as the glass contains no bubble cavities and no other quench phases are observed. Consequently, the bulk water content is not high enough to achieve water-saturation of the fluid phase at run conditions. The total of bulk water must dissolve in the silicic 'melt', and, when no hydrous minerals crystallize, it must be stored in the glass.

At temperatures of 1000 °C and with a bulk water content of 2.8 wt.%, the water content of the glass, which is of alkali-granitic / alkalisyenitic composition, increases from 3.7 to 7.5 wt.% owing to a decrease in the volume fraction of the fluid with ongoing annealing (see Section 7.2). With a bulk water content of 5.5 wt.%, the specimen entirely consists of glass of alkaligranitic composition, the water content of which was determined to 6.3 ± 0.7 wt.%. This obvious discrepancy between bulk water and water content of the glass in a sample that was fully molten at run conditions illustrates the limited accuracy of the water content calculation method, being, however, well within the given limits of error. With an even higher bulk water content of 8.4 wt.%, the glass contains at least 9.4 ± 0.7 wt.% of water. But, as this run was already quenched when 1000 °C was reached (see Figure 16) and a few remnants of the sample powder are still present, this value does not represent the equilibrium water concentration of the fluid. In the Type 7 run with a bulk water content of about 20 wt.%, quenched after slow cooling to 650 °C, a water content of 12.7 ± 0.9 wt.% is measured in the syenitic / alkalisyenitic glass, while an additional fraction must be bound by phengite.

From the phase diagram drawn by Bureau and Keppler (1999; fig. 4) it is evident that even at much lower pressures the solubility of water in a haplogranitic melt will exceed 25 wt.%. A correspondingly high water content is given by Huang and Wyllie (1981) and Stern and Wyllie (1981) for the water-saturated region of muscovite granite and biotite granite at high temperatures (see Figure 121A). The fluid should thus be undersaturated in water in all the runs mentioned above, and, consequently, it cannot be proven from the presence of a single melt-like fluid phase, whether critical behaviour, as suggested by Schreyer (1999), is reached or not.

With respect to the phase relations, remarkably different results were obtained for the S-type granitic biotite-phengite gneiss at low temperatures in comparison to the S-type muscovite granite studied by Huang and Wyllie (1981) and for the I-type granitic biotite gneiss investigated by Stern and Wyllie (1981) (Figure 121A): specimen G99, quenched at 650 °C, should show a subsolidus phase assemblage with quartz, jadeite, mica, and a vapour phase instead of large amounts of silicic glass (see Figure 86). Not only the solidus, when critical behaviour is disregarded, is thus at lower temperatures, but also the liquidus at conditions of 2.5 GPa / 1000 °C should be shifted to lower bulk water contents (see Figure 121A). The discrepancy can be explained with the different experimental procedures applied: the runs by Stern and Wyllie (1981) and Huang and Wyllie (1981) were performed as melting experiments with run times of about one day, whereas run G99 in the present study is a crystallization experiment.

Fluid behaviour at 3.5 GPa. For the runs performed at a pressure of 3.5 GPa, the matter becomes more complex, because the fluid behaviour strongly depends on temperature. At high temperatures, i.e. between 1000 and 800 °C, a coherent glass of syenitic / alkalisyenitic composition is quenched from a homogenous liquid-like fluid. In the same way as in the runs carried out at 2.5 GPa, there is no evidence for a second fluid being present at run conditions, inasmuch as there are no bubbles or cavities within the glass. The water content in the glasses is 5.3 ± 0.7 to 11.6 ± 0.9 wt.% at 1000 °C, 5.6 ± 0.5 to 10.2 ± 0.7 wt.% at 900 °C, and 8.3 ± 0.6 to 11.2 ± 1.3 wt.% at 800 °C, respectively, depending on bulk water content, run type, and annealing time.

When quenched at temperatures between 750 and 650 °C, all specimens are characterized by the occurrence of coherent glasses of syenitic / alkalisyenitic or even foyaitic composition, which are crowded with tiny bubbles formed by the exsolution of an aqueous fluid phase. The run quenched at 750 °C, has large parts of the glass still free of bubble cavities, thus representing the beginning of vesiculation, which is more pronounced at lower temperatures. Bubble size and total bubble volume increases continuously with decreasing final temperature of the individual runs. The bubble distribution is rather uniform, although distinctly larger bubbles always occur along certain crystal - glass interfaces, in particular along K-feldspar hydrate and K-feldspar faces. In addition to the temperature dependence, an unequivocal effect of small pressure variations, i.e. of 60 MPa, was observed, in that decreased pressure at 700 °C significantly decreases the total bubble volume from 30 to 10 %, parallel to a smaller size of the individual bubbles.

These bubbles are interpreted to be formed by the exsolution of an aqueous fluid upon quenching, which contains dissolved material. The bubbles grow by diffusion of water through the liquid - bubble interface and by volume expansion. Enhanced by the near-instantaneous temperature drop upon quenching, material formerly dissolved in the aqueous fluid is precipitated to form the spherules within the bubble cavities. These precipitates point to a high amount of dissolved matter in the aqueous fluid. Thus, two steps of phase separation occur upon quenching: first, bubbles form and, second, the silicate liquid solidifies to glass while simultaneously solids are precipitated from the aqueous fluid within the bubbles. A corresponding decrease in solubility of silicate or salt, or, generally spoken, of solid components in an aqueous vapour phase with decreasing pressure and temperature was already observed by Kennedy *et al.* (1962).

Bubbles as observed in the present study attain a size of a few hundred nanometres (see Figure 51), depending on temperature, pressure, and on the composition of the fluid phase. Adam *et al.* (1997) found bubbles of 2 to 8 micrometres in size to be evenly distributed within glasses, and argued for their formation upon quenching, because bubbles would have tend to coalesce at run conditions. Bubbles formed with quenching were reported in some runs using albite and orthoclase melts at low pressure by Behrens (1995), and much larger ones in the albite glasses quenched in experiments of Paillat *et al.* (1992).

The nucleation of bubbles formed by gases that are dissolved in liquids requires a higher degree of supersaturation than in one-component systems and depends on the concentration of dissolved volatiles, the temperature, and the Gibbs free energy of formation of a bubble nucleus in a quantity of solution (Bottinga and Javoy, 1990). Whereas bubble growth has been found to be proportional to the square root of time, in situ observations in a diamond-anvil cell rather fit to a logarithmic time function (Martel and Bureau, 2001). Bubbles normally nucleate within a single event (Gardner *et al.*, 1999; Martel and Bureau, 2001). The two generations of bubbles observed in run G35 may be explained with a process known as 'sequential demixing' (Vogel, 1992) with decreasing distance of diffusion, but in this single case the leakage of the capsule during the run, which resulted in a modified fluid composition, is a likely correlation. In all other vesiculated glasses obtained, the uniform texture of the glass points to homogeneous nucleation. Heterogeneous bubble nucleation (Hurvitz and Navon, 1994; Mourtada-Bonnefoi and Laporte, 2002) is facilitated upon some crystal interfaces, resulting in much larger bubble cavities attached to certain crystals as compared to those distributed throughout the rest of the interstices.

The water content of the glasses was determined to 12.7 ± 0.7 wt.% at 750 °C, to between 9.0 ± 0.8 and 14.3 ± 1.0 wt.% at 700 °C, and to 15.5 ± 1.1 wt.% at 650 °C. Because an unknown, but large amount of water is lost owing to the exsolution of the aqueous fluid upon quenching, the water contents calculated for the glasses do not correspond to the water concentration in the liquid-like fluid at run conditions. Moreover, when melts contain more than 8 to 10 wt.% of water, water will be lost by diffusion out of the quenched glasses (see McMillan and Holloway, 1987). Therefore, additional water loss has to be taken into account, which occurs during the preparation of the specimens prior to EMP measurement.

Besides the vesicular glass that has solidified from a liquid-like fluid phase, further quench products are observed in the runs with a water content of 2.8 wt.%. First, glass globules that have a size of about one micrometre, second, precipitates measuring about ten micrometres across, which are similar to the spherules within the bubble cavities of the glass apart from their larger size. This observation may be alternatively explained by two different scenarios.

The first would involve the separation of the globules from the liquid-like fluid upon quenching and the subsequent growth of the larger 'salt' precipitates from the aqueous fluid. A gradual transition from coherent glass to glass globules should then be observable, but this is not the case.

The second scenario takes into account the co-existence of a liquid-like fluid and a vapour-like fluid at run conditions. Minute globules that "resembled fish roe", similar to those observed in the present study, were found by Kennedy *et al.* (1962) besides crystals and glass in the silica - water system, and were interpreted to have formed from the vapour-phase upon quenching. Such globules were also described by Brenan *et al.* (1995) and Adam *et al.* (1997) in the trondhjemite - water system, again indicating the presence of two immiscible fluids at run conditions of 2.0 GPa / 900 °C: a vesicular glass, which is quenched from a hydrous melt was found to be overlain by globules of chemical composition different from the glass, which were interpreted to have formed upon quenching from the second, aqueous fluid.

Applying the latter interpretation to the runs carried out by the present study would mean that the miscibility gap between a silicate melt and an aqueous vapour is not yet closed at a pressure of 3.5 GPa. The water solubility in silicate liquids at high pressures is a major point in this reasoning. For a vapour-like fluid to coexist with a hydrous melt, the latter must be saturated in water. Stern and Wyllie (1981) have estimated the solubility of water in the melt of a biotite granite to 27 ± 2.5 wt.% at 3.5 GPa / 800 °C by intersecting the experimentally determined water-saturation boundary and the liquidus. In the present study, an approximation of the water content based on the volume proportion of the glass determined by the image analysis method and the bulk water content of the specimen yields water contents of the liquid-like fluid that are within the range of the solubility as given by Stern and Wyllie (1981), although a certain amount of water bound by hydrous minerals is not considered. In the ligth of solubility data available (e.g. Burnham and Jahns, 1962; Dingwell *et al.*, 1984; Dingwell, 1986; McMillan and Holloway, 1987; Paillat *et al.*, 1992; McMillan, 1994; Wallace and Anderson, 2000), in the experiments with low bulk water content the coexistence of a hydrous melt and a vapour-like fluid appears to be possible at run conditions.

The variety of quench products occurring in the experiments performed at 600 °C do not provide either unequivocal evidence of the presence of only one or two different fluids at run conditions. In these runs, lumps of vesiculated glass occur within some of the interstices, which leave large cavities in contact to the adjoining crystal faces. The bubble cavities within the glass are irregular in shape, their size varies between less than a hundred and a few hundred nanometres, and some of them contain a spherule such as observed in the runs at higher temperatures. These lumps of glass are interpreted to have been quenched from a liquid-like fluid, whereby the bubbles were formed by exsolution of aqueous fluid upon quenching. A second quench product are small globules with a diametre of 1 to 2 micrometres, which are sometimes amalgamated into larger accumulations. Finally, large, 'cauliflower'-like precipitates with a diametre of about 10 μm occur. The latter are always attached to a crystal surface and keep a well defined distance to the glass lumps as well as to the globules. All these different quench products may have originated from a single supercritical fluid phase upon quenching or, alternatively, from a liquid-like fluid and a vapour-like fluid coexisting at run conditions. The former would then have given rise to lumps of vesiculated glass, the latter would have formed globules and 'cauliflowers'.

Thus, the results obtained from the runs performed with the biotite-phengite gneiss do not provide convincing evidence for critical behaviour at a pressure of 3.5 GPa. In the granodioritic garnet-mica gneiss, vesicular glass with spherules contained within the bubble cavities is formed by exsolution of an aqueous vapour during quenching and small globules of glass occur as well. The larger 'salt' precipitates are missing, which is in accordance with the much lower content of dissolved matter, in particular of potassium, in the fluid. The water content in the glass quenched from the granodioritic composition is determined to 18.3 ± 2.9 wt.%. Globules are also found in the run at conditions of 3.5 GPa / 700 °C using the pyrope quartzite. The absence of coherent quenched glass in this run demonstrates the presence of a single, vapour-like fluid phase.

7.5 Fluid distribution and implications on the deformation mechanisms of crustal rocks at UHP metamorphic conditions

Notwithstanding the different fluid properties, composition and volume proportions observed as a function of different end temperatures, the fluid distribution and configuration of interfaces appears to be not significantly modified upon quenching. There is no indication of compaction or relative movement between the solid grains, despite quenching at essentially constant confining pressure. The microstructure of the quenched samples suggests that the silicic glass, be it homogeneous when quenched at high temperatures or vesiculated when quenched at moderate temperatures, and even the open cavities left when quenched at low temperatures represents the pore space at run conditions.

On an experimental time scale of hours to days, the system adopts an equilibrium configuration with a relative minimum in interfacial free energy. The microstructure was not significantly modified after up to several days of annealing at 700 °C. The observed microfabrics are characterized by the predominance of rational solid - solid and solid - fluid interfaces of low Miller indices and thus by a strong anisotropy of the interfacial free energy (see Laporte and Provost, 2000). The complex shape of the fluid-filled interstices results in a very low volume to interfacial area ratio and indicates a high ratio of the free energy of solid - solid interfaces γ_{ss} to the free energy of solid - liquid interfaces γ_{sl}. Such a fluid topology cannot be described in terms of a dihedral angle (Cmíral *et al*., 1998). However, as suggested by the patterns observed in polished sections and randomly broken surfaces, the fluid is interconnected in three dimensions, filling a network of polygonal interstices. The fluid distribution is heterogeneous at the grain-scale, with both dry and wetted grain edges, but is uniform at the scale of the whole specimen.

At UHP metamorphic conditions, fluids should form an important constituent of subducted crustal material due to progressive dehydration (Philippot and Rumble, 2000; Scambelluri and Philippot, 2001). The presence of fluids comparable in distribution and properties to those produced by the experimental runs described herein are expected to have a significant influence on the deformation mechanisms and flow strength of deeply subducted crustal rocks. The following effects can be envisaged. First, stress concentration at the edges of the highly complex, polygonal interstices should facilitate subcritical growth of intergranular cracks, with redistribution of the highly mobile fluid compensating for dilation. Second, grain sliding is facilitated along fluid-wetted interfaces, whereby clusters of grains with 'dry' interfaces behave like grains of larger size (Paterson, 1995). Third, grain-shape accommodation with sliding is thought to occur by dissolution in, and precipitation from, the fluid phase. Fourth, conventional Coble creep should be strongly enhanced owing to the reduced transport distance along solid - solid interfaces. Experimental studies on diffusion creep in the system olivine - basaltic melt have shown the presence of less than 10 vol.% of melt resulting in a significant increase of strain rate, for instance by a factor of 25 for 7 vol.% of melt (Hirth and Kohlstedt, 1995a).

The transport properties, the density, and the viscosity of UHP metamorphic fluids are yet insufficiently constrained and await further investigation. These fluid properties strongly depend on temperature and bulk rock composition, as becomes evident from the present experimental study. For the systems and conditions here considered, deformation experiments do not seem feasible, as these are subjected to severe limitations with regard to stress resolution. Also, appropriate extrapolation to natural strain rates would require a full understanding of the deformation process. Actually, deformation mechanisms in crustal rocks at UHP metamorphic conditions and slow, i.e. natural, strain rates in the presence of fluids will be complex. As a first approximation, deformation may be described as a fluid-assisted granular flow, which requires grain shape accommodation by dissolution and precipitation. The rate-controlling step would then be either diffusion along the solid grain contacts, diffusion through the fluid, dissolution at loaded interfaces, or precipitation from the fluid, with the latter being most likely (De Meer *et al*., 2000).

The phase assemblages and microfabrics in the quenched samples reveal that at pressures and temperatures equivalent to UHP metamorphic conditions in nature, crystallization from the fluid takes place within experimental time spans of hours to days, that is instantaneously at a geological time scale. Thus, if precipitation of crystals from the fluid is the rate-controlling step in fluid-assisted granular flow, either high strain rates can be accommodated, or the strength of the material is negligible for low natural strain rates.

A strong influence of bulk rock composition on fluid properties is evident from the experiments, thus matching the prediction of deformation being confined to low viscosity shear zones within specific lithologies (Stöckhert, 2002). This localization is strongly suggested by the weak or absent deformation in many exhumed UHP metamorphic crustal slices (Stöckhert and Renner, 1998; Stöckhert, 2002). The high rates of crystallization from these fluids at 'geological' time scales preclude the preservation of an unequivocal microstructural record in slowly exhumed natural rocks, apart from isolated inclusions in minerals (Stöckhert *et al*., 2001).

CHAPTER 8

Summary and conclusions

The series of piston-cylinder experiments carried out in the present study provided insight into the fluid distribution and the microstructures of different crustal rocks at pressure and temperature conditions typical of UHP metamorphism in nature.

At a given set of conditions, a characteristic microfabric with a defined phase assemblage develops and is preserved metastably upon quenching. The experiments revealed different microfabrics when whole rock samples or rock powders, albeit of the same chemical bulk composition, are used as starting materials. 'Metastable melting' of the sample powders has been observed at high temperatures. Generally, faster cooling results in smaller grain size. With slow cooling rates, microstructural equilibrium is achieved at any given temperature. The phase assemblage and microfabrics reveal that crystals are precipitated from the fluid phase quasi-instantaneously at experimental time scales.

The fluid phase can be quenched to form a silicic glass. The microstructure of the quenched samples suggests that the silicic glass phase represents the fluid topology that developed at run conditions. In some specimens, no glass phase can be quenched depending on run conditions and chemical composition. Open cavities in these samples correspond to the pore space filled by a fluid phase at run conditions. The configuration of the adjacent crystals appears to be unchanged upon quenching.

A large amount of fluid is contained in polygonal interstices, the shape of which is constrained by the mineral species, the size, and the habit of the adjoining crystals. The interstices appear to be interconnected in three dimensions to form a fluid-filled network, which is coherent at the scale of the whole specimen. However, the fluid distribution is heterogeneous at the grain-scale, inasmuch as dry and wetted grain edges co-occur. Crystals are predominantly bounded by crystallographically controlled interfaces of low Miller indices, which reveal a strong anisotropy of the interfacial free energy. Accordingly, the fluid topology cannot be described by applying the dihedral angle concept.

The fluid properties strongly depend on rock type, bulk water content, pressure, temperature, and annealing time. In the granitic composition, which has been most intensely investigated by the present study, the large amount of fluid formed at 3.5 GPa / 1000 to 800 °C is quenched to a homogeneous silicic glass. When quenched at conditions of 3.5 GPa / 750 to 650 °C, the silicic glass is crowded with tiny bubbles that were formed by exsolution of an aqueous fluid upon quenching. The bubbles, in turn, contain material that is precipitated from this aqueous fluid. Fluids quenched at 3.5 GPa / 600 °C form lumps of vesiculated glass and accumulated silicate globules, which only partially fill the interstices between the crystals; large open cavities contain precipitates rich in potassium. All these different quench products, however, give no unequivocal evidence for either the presence of a single supercritical fluid at run conditions or the coexistence of hydrous melt and aqueous vapour up to pressures of 3.5 GPa.

Notwithstanding their different chemical composition, specimens of granodiorite, phonolithic tephrite and eclogite show the same overall fluid properties as do specimens of granite. In specimens of MOR basalt and pyrope quartzite, the pore space is largely void after quenching.

The amount of water dissolved in the glasses, which is estimated by the difference of the total EMP analysis to 100 wt.%, increases with decreasing final temperature. In the granitic system, the fluid develops from alkaligranitic to alkalisyenitic and eventually to foyaitic composition with decreasing temperature. Fluids quenched from granodiorite, phonolithic tephrite, and pyrope quartzite likewise develop towards higher concentrations in alkali elements with concomitant depletion in silica relative to the starting material; eclogite and MOR basalt, in contrast, show enrichment of silica in the fluid phase.

The results on fluid topology suggest that interstitial fluids have a pronounced effect on the flow strength of deeply subducted crust, as these allow for deformation by grain boundary sliding and dissolution-precipitation creep, or granular flow, accommodated by material transfer via an intergranular fluid, possibly localized in specific rock types.

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Appendix

Table 4: Documentation of conditions and parameters for all runs, sorted by run number.

run		bulk water [wt.%]	melting time [h]	melting P [GPa]	melting T [°C]	cooling rate [°C/min]	annealing time [h]	quenching P [GPa]	quenching T [°C]	run time [h]	sample material [mg]	sample water [mg]	m [(1)] [mg]	length initial [mm]	length final [mm]	diameter [(2)] upper [mm]	diameter [(2)] lower [mm]
G 1	‡																
G 2	~	± 3	23	2,5	1000	30	0	3.5	700	25			-1.94	9,0	6,6	-	-
G 3		3.2	23	2.5	1000	3	288.5	3.5	700	315	98.29	2.34	-	8.7	7.2	-	-
G 4	‡																
G 5		3.3	-	-	-	-	672	3.5	700	672	93.28	2.41	-0.58	8.8	8.2	4	4
G 6		2.8	23	2.5	1000	30	115	3.5	700	140.5	99.19	1.97	-4.26	9.1	7	4.25	4.85
G 7		2.8	23	2.5	1000	0.3	125	3.5	700	166.5	97.02	1.93	-2.01	9	7.25	4.2	4.85
G 8		2.8	23	2.5	1000	3.5	160.5	3.5	750	213	94.74	1.90	-2.42	8.55	6.4	3.95	5.05
G 9	‡																
G 10	‡																
G 11	‡																
G 12		2.8	23	2.5	1000	3	22.5	3.5	700	49	92.28	1.84	-1.27	8.55	7.05	4.15	4.55
G 13		2.8	-	-	-	-	159	3.5	700	159	100.82	2.02	-0.30	8.9	8	4.05	4.15
G 14		2.8	23	2.5	1000	1.2	99.5	3.5	700	165.5	99.79	1.99	-1.46	8.68	6.8	3.8	3.9

key to symbols:

‡ no specimen left
\+ capsule leaking, no fluid phase left
~ no record of experimental P,T-path
¤ thermocouple malfunction
¥ specimen grain size-graded

(1) m refers to the difference in capsule weigth before and after the run
(2) capsule diameter, measured after the run

Table 4 (continued)**:** Documentation of conditions and parameters.

run		bulk water [wt.%]	time [h]	melting P [GPa]	T [°C]	cooling rate [°C/min]	annealing time [h]	quenching P [GPa]	T [°C]	run time [h]	sample material [mg]	water [mg]	m (1) [mg]	length initial [mm]	final [mm]	diameter (2) upper [mm]	lower [mm]
G 15	+	2.8	23	2.5	1000	0.3	124	3.5	700	165.5	110.67	2.23	-62.30	9.5	6.5	-	-
G 16		2.8	23	2.5	1000	0.3	146.5	3.5	700	188	102.60	2.06	-	9.05	-	-	-
G 17		2.8	23	2.5	1000	0.3	175	3.5	700	216.5	96.90	1.93	-0.22	8.9	-	-	-
G 18	‡																
G 19	+	2.8	23	2.5	1000	0.03	285	3.5	700	476.5	94.96	1.93	-1.15	8.6	6.05	4.3	5.05
G 20		2.8	23	2.5	1000	0.3	0	0	30	42	69.50	1.39	-0.71	8.15	6.4	4.2	4.7
G 21	‡																
G 22	‡																
G 23		2.8	23	2.5	1000	0.3	0	3.5	800	36	90.59	1.81	2.70	8.6	7.2	4.2	5
G 24	+	2.8	23	2.5	1000	0.3	0	3.5	700	41.5	98.40	1.96	-	9.1	-	-	-
G 25	‡																
G 26	¥	2.8	23	2.5	1000	0.3	0	3.5	700	41.5	104.33	2.08	-2.01	9.05	7.7	4.1	5.1
G 27		2.8	23	2.5	1000	0.3	0	3.5	900	30.5	87.29	1.74	-0.59	8.47	6.85	4.2	5.05
G 28	+	2.8	23	2.5	1000	30	195.5	3.5	700	221	93.46	1.87	-7.93	9.07	7.45	4.1	4.6
G 29		2.8	-	-	-	-	19.5	2.5	1000	20.5	98.89	1.98	-0.54	9	7.8	4.2	4.7
G 30	+	2.8	23	2.5	1000	3	164	3.5	700	190.5	96.74	1.94	-13.85	8.87	7.45	4.2	5.1
G 31		2.8	23	2.5	1000	0.03	193.5	3.5	700	385	99.77	2.01	-1.02	8.7	7.45	4.15	5.25
G 32		2.8	23	2.5	1000	30	184	3.5	700	209	87.22	1.75	-4.85	8.55	6.3	4.18	4.85
G 33	+	4.8	23	2.5	1000	0.3	34.5	3.5	700	76	ca. 112	4.66	-	9.15	-	-	-
G 34		8.4	-	-	-	-	0	2.5	1000	1	98.52	8.07	-1.37	-	7.43	4.0 - 4.3	
G 35		5.5	23	2.5	1000	0.3	103.5	3.5	700	145	90.30	4.44	-6.17	8.8	6.8	4.52	4.85
G 36	¤	2.8	23	2.5	1000	-	0	3.5	1000	24.5	105.37	2.12	-3.15	8.9	7.35	4.25	4.85
G 37		2.8	23	2.5	1000	3	0	3.5	700	26.5	103.36	2.08	-1.16	8.95	7.4	4.2	4.7
G 38		2.8	23	2.5	1000	30	0	3.5	700	25	101.63	2.03	0.22	8.9	7.3	4.05	5.05
G 39		5.5	-	-	-	-	23	2.5	1000	24	83.30	4.08	-3.05	8.77	7.5	4.15	4.5

Table 4 (continued)**:** Documentation of conditions and parameters.

		bulk		melting		cooling	annealing	quenching		run	sample			length		diameter (2)	
		water	time	P	T	rate	time	P	T	time	material	water	m (1)	initial	final	upper	lower
run		[wt.%]	[h]	[GPa]	[°C]	[°C/min]	[h]	[GPa]	[°C]	[h]	[mg]	[mg]	[mg]	[mm]	[mm]	[mm]	[mm]
G 40		2.8	23	2.5	1000	0.3	0	3.5	600	47	98.60	1.97	-6.43	8.77	7	4.1	4.85
G 41		± 2	-	-	-	-	138	3.5	700	139	446.55	± 5.25	-0.10	12.5	11.35	6.45	6.95
G 42	¥	2.8	23	2.5	1000	0.03	0	3.5	700	191.5	92.96	1.86	2.28	8.8	7.07	4.3	4.5
G 43	‡																
G 44	‡																
G 45		10.8	23	2.5	1000	0.3	0	3.5	700	41.5	91.64	10.18	2.63	9.07	7.32	4	5.15
G 46		13.1	23	2.5	1000	0.3	0	3.5	700	41.5	89.91	12.68	-22.46	8.6	6.85	4.4	4.95
G 47	‡																
G 48	‡																
G 49		13.2	23	2.5	1000	0.3	0	3.5	700	41.5	94.52	13.42	-6.24	9.05	6.8	3.8	4.4
G 50	‡																
G 51		9.1	23	2.5	1000	0.3	0	3.5	700	41.5	89.89	8.21	-0.80	8.55	6.95	4.35	4.85
G 52		2.8	23	2.5	1000	0.03	0	3.5	800	136	91.98	1.84	1.01	8.1	6.85	4.25	4.65
G 53		2.8	23	2.5	1000	-	0.5	3.5	1000	25	100.68	2.03	1.79	8.9	6.92	4.25	4.9
G 54		2.8	23	2.5	1000	0.3	0	3.5	600	47	109.59	2.22	-7.26	8.75	7.35	4.05	4.5
G 55		2.8	23	2.5	1000	3	0	3.5	800	26	95.70	1.91	-1.09	9.05	-	4.18	-
G 56		2.8	-	-	-	-	204.5	2.5	1000	205.5	100.14	2.02	-3.18	8.6	7.7	4.2	4.8
G 57		0.8	23	2.5	1000	0.3	0	3.5	700	41.5	100.72	0.00	-0.20	9.05	7.95	4.1	4.65
G 58		2.8	23	2.5	1000	0.03	0	3.5	900	80.5	96.39	1.93	-18.85	8.7	-	-	-
G 59		2.8	23	2.5	1000	0.3	0	3.5	600	47	89.03	1.78	1.28	8.7	6.4	4.35	5.3
G 60	~	2.8	23	2.5	1000	3	283	3.5	700	309.5	89.68	1.80	-0.02	8.65	7	4.15	4.55
G 61		2.8	23	2.5	1000	3	0	3.5	900	25.5	85.51	1.71	-9.33	8.4	6.65	4.27	5.25
G 62	¤	2.8	23	2.5	1000	0.3	0	3.5	700	41.5	86.00	1.72	-1.30	8.8	6.95	4.2	4.75
G 63		2.8	23	2.5	1000	30	0	3.5	800	25	93.81	1.88	0.47	9.1	7.5	4.1	5.05
G 64		5.6	23	2.5	1000	0.3	0	3.5	700	41.5	88.52	4.50	-1.12	8.65	7.32	4.25	4.75

Table 4 (continued)**:** Documentation of conditions and parameters.

		bulk		melting		cooling	annealing	quenching		run	sample			length		diameter (2)	
		water	time	P	T	rate	time	P	T	time	material	water	m (1)	initial	final	upper	lower
run		[wt.%]	[h]	[GPa]	[°C]	[°C/min]	[h]	[GPa]	[°C]	[h]	[mg]	[mg]	[mg]	[mm]	[mm]	[mm]	[mm]
G 65		2.8	23	2.5	1000	0.3	0	3.5	650	44.5	90.51	1.81	-0.67	9.1	7.7	4.35	4.75
G 66		2.8	23	2.5	1000	0.3	0	3.5	800	36	91.24	1.82	-0.29	8.8	7.1	4.15	4.7
G 67		2.8	23	2.5	1000	0.03	0	3.5	900	80.5	91.24	1.82	-2.65	8.75	7.4	4.2	4.65
G 68		2.8	23	2.5	1000	3	0	3.5	900	25.5	90.09	1.79	-0.07	8.7	7.45	4.2	4.35
G 69	~	2.8	23	2.5	1000	0.3	314	3.5	700	355.5	103.67	2.08	0.08	8.82	7.05	4.05	4.9
G 70		2.8	23	2.5	1000	3	234.5	3.5	700	261	90.40	1.81	-1.26	8.92	7.3	4.1	4.8
G 71	¥	2.8	23	2.5	1000	0.3	0	3.5	700	41.5	92.35	1.84	-1.40	8.85	6.95	4.15	5.05
G 72		2.8	23	2.5	1000	0.3	130	3.5	700	171.5	93.31	1.86	-1.48	8.65	6.75	4.1	4.9
G 73		2.8	23	2.5	1000	0.3	0	3.5	50	77.5	89.73	1.79	+ 6.0	8.8	7.1	4.2	4.9
G 74		2.8	23	2.5	1000	0.3	0	3.5	50	77.5	90.55	1.81	-0.68	8.85	-	-	-
G 75	¥	2.8	23	2.5	1000	30	0	3.5	800	25	109.21	2.19	-0.11	9.3	7.4	4.15	4.75
G 76		2.8	-	-	-	-	118	3.5	700	119	96.72	1.93	-0.09	9.1	7.65	4.1	4.15
G 77		2.8	23	2.5	1000	3	0	3.5	800	26	91.15	1.83	-0.90	8.75	6.9	4.3	4.5
G 78		0.8	23	2.5	1000	0.3	0	3.5	995	25	97.45	0.00	0.00	9.1	7.25	4.15	4.75
G 79		2.8	23	2.5	1000	3	0	3.5	994	25	92.01	1.84	-0.07	8.9	7.1	3.95	5.0
G 80		2.8	23	2.5	1000	3	0	3.5	700	26.5	91.55	1.83	-0.02	9.5	6.75	4.2	4.85
G 81		0.8	23	2.5	1000	0.3	0	3.5	700	41.5	100.22	0.00	-0.89	8.75	7.0	4.15	4.55
G 82		2.8	23	2.5	1000	0.3	0	3.5	700	41.5	95.57	1.91	-0.19	9.15	7.75	4.25	4.5
G 83	¥	2.8	23	2.5	1000	0.03	0	3.5	700	191.5	97.67	1.93	-1.45	9.2	6.55	4.7	4.95
G 84		2.8	23	2.5	1000	0.03	0	3.5	715	184	87.76	1.75	-0.08	8.65	6.5	4.2	4.7
G 85	¥	2.8	23	2.5	1000	0.3	0	3.5	700	41.5	91.02	1.82	-0.31	8.75	7.35	4.05	4.75
G 86		2.8	-	-	-	-	2	2.5	1000	3	106.50	2.13	-0.29	9.2	7.65	4.2	4.7
G 87		0.8	-	-	-	-	1.5	3.5	1000	2.5	101.51	0.00	-0.59	8.85	7.45	4.1	4.5
G 88	¥	2.8	23	2.5	1000	3	0	3.5	700	26.5	101.04	2.02	1.84	9.0	8.1	4.0	4.75
G 89		5.7	-	-	-	-	20.5	3.5	1000	21.5	87.39	4.46	0.05	8.65	7.5	4.15	5.0

Table 4 (continued)**:** Documentation of conditions and parameters.

		bulk		melting		cooling	annealing	quenching		run	sample			length		diameter (2)	
		water	time	P	T	rate	time	P	T	time	material	water	m (1)	initial	final	upper	lower
run		[wt.%]	[h]	[GPa]	[°C]	[°C/min]	[h]	[GPa]	[°C]	[h]	[mg]	[mg]	[mg]	[mm]	[mm]	[mm]	[mm]
G 90		2.8	-	-	-	-	14	2.5	1000	15	99.46	1.99	-0.09	8.85	7.2	4.2	4.75
G 91		2.8	-	-	-	-	6.5	2.5	1000	7.5	94.56	1.89	-57.28	8.9	7.75	4.15	4.45
G 92		2.8	1,5	2.5	1000	0.3	0	3.5	700	20	93.05	1.86	1.11	8.8	6.4	4.4	4.95
G 93	¤	5.7		-	-	-	2	3.5	1000	3	83.69	4.27	-0.14	8.65	7.05	4.15	4.45
G 94	¥	2.8	23	2.5	1000	-	6	3.5	1000	30.5	92.46	1.85	-0.15	8.85	7.75	4.15	4.8
G 95	¥	2.8	23	2.5	1000	0.3	0	3.5	750	39	93.93	1.88	-0.96	8.8	7.65	4.1	4.9
G 96	¤	2.8	-	-	-	-	110	2.5	1000	111	97.78	1.96	-0.05	9,0	8.25	4.05	4.75
G 97		2.8	23	2.5	1000	0.3	276	3.5	700	317.5	90.78	1.82	-2.35	8.8	7.8	4.1	4.8
G 98		15.4	23	2.5	1000	0.3	0	3.5	700	41.5	89.21	15.38	-0.60	8.62	7.85	4.35	4.65
G 99		± 20	-	-	-	0.3	0	2.5	650	20	90.15	34.20	-3.95	8.4	7.35	4.2	4.5
Q 1		2.7	23	2.5	1000	0.3	0	3.5	886	31.5	77.46	1.72	-0.04	8.6	6.75	4.15	4.7
Q 2		2.7	23	2.5	1000	0.3	0	3.5	700	41.5	81.60	1.81	-0.25	8.65	7.35	4.05	4.75
D 1		3.6	23	2.5	1000	0.3	0	3.5	700	41.5	108.13	2.31	-0.08	8.95	7.3	4.25	4.8
D 2		1.6	-	-	-	-	212	4.8	1000	214.5	113.08	0.00	-0.22	9.05	6.6	4.3	4.85
D 3		1.6	-	-	-	-	20.5	4.8	1000	23	103.75	0.00	-0.08	8.95	6.65	4.3	5.15
D 4		1.6	-	-	-	-	2	4.8	1000	4.5	100.48	0.00	-0.01	9.1	6.7	4.3	4.9
W 1		2.4	23	2.5	1000	0.3	0	3.5	700	41.5	100.30	1.51	1.10	8.35	6.5	4.25	5.0
W 2		2.8	23	2.5	1000	-	0.5	3.5	1000	25	85.20	1.70	-8.23	8.65	6.8	4.15	4.57
W 3		2.8	23	2.5	1000	-	0.5	3.5	1000	25	88.49	1.77	-0.40	8.8	6.37	4.5	5.0
B 1		2.8	23	2.5	1000	0.3	0	3.5	700	41.5	108.39	2.15	-0.12	9.05	7.67	4.15	4.35
B 2		0.9	-	-	-	-	161.5	3.5	700	163	103.30	0.00	-0.11	8.85	7.5	4.4	4.35
B 3		0.9	-	-	-	-	1.5	3.5	1000	2.5	102.09	0.00	-0.02	9.0	6.6	4.25	4.7
P 1		0.6	1,5	2.5	1000	0.3	0	3.5	700	20	102.45	0.00	0.03	9.2	6.8	4.2	4.6
P 2		2.5	23	2.5	1000	0.3	0	3.5	700	41.5	84.90	1.70	0.28	8.2	6.45	4.2	4.6
E 1		2.7	23	2.5	1000	0.3	0	3.5	700	41.5	96.74	1.94	-0.68	8.25	6.65	4.25	4.75

Table 5: EMP data of glass in Type 1 run G86 at constant conditions of 2.5 GPa / 1000 °C; bulk water content 2.8 wt.%; 45 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.03	0.12	0.00	0.00	0.09	0.12	0.15	0.06	0.06	0.09	0.00	0.03	0.09	0.09	0.00	0.06	0.21	0.03	0.09	0.00	0.00	0.09	0.09	0.03	0.09	0.00	0.18
Si	32.38	31.34	31.84	32.17	32.39	31.96	32.01	31.90	31.89	31.94	32.09	31.39	32.39	32.16	31.59	32.49	31.40	31.80	31.46	31.81	32.30	31.28	31.75	31.67	31.09	31.83	31.22
Ti	0.08	0.13	0.11	0.30	0.21	0.06	0.17	0.06	0.18	0.13	0.31	0.15	0.19	0.19	0.07	0.23	0.14	0.17	0.15	0.17	0.18	0.11	0.11	0.16	0.09	0.09	0.02
Al	7.53	7.83	7.97	7.65	7.55	7.46	7.91	7.69	7.75	7.60	7.77	7.59	7.52	7.31	7.28	7.28	7.75	7.57	7.42	7.27	7.47	7.19	7.44	7.69	7.55	7.70	7.52
Fe	1.48	1.37	1.34	1.22	1.39	1.55	1.48	1.39	0.98	1.55	1.63	1.27	1.03	1.27	1.58	1.51	1.42	1.20	1.42	1.35	1.46	1.87	1.39	1.75	1.73	1.51	1.35
Mn	0.05	0.00	0.00	0.18	0.00	0.03	0.00	0.05	0.00	0.22	0.00	0.00	0.00	0.07	0.05	0.05	0.03	0.03	0.05	0.07	0.05	0.00	0.13	0.05	0.07	0.15	0.15
Mg	0.13	0.23	0.16	0.11	0.19	0.18	0.09	0.15	0.10	0.20	0.12	0.20	0.20	0.21	0.21	0.18	0.18	0.16	0.13	0.13	0.13	0.13	0.17	0.12	0.10	0.18	0.17
Ca	0.45	0.65	0.71	0.65	0.53	0.63	0.62	0.46	0.68	0.50	0.51	0.61	0.64	0.62	0.71	0.71	0.52	0.77	0.66	0.64	0.68	0.77	0.57	0.59	0.64	0.55	0.38
Na	2.90	2.90	2.61	2.64	2.59	2.57	2.41	2.70	2.73	2.79	2.67	2.57	2.67	2.68	2.68	2.79	2.70	3.00	2.62	2.26	2.52	2.88	2.53	2.90	2.49	2.88	2.50
K	5.09	5.28	5.18	5.29	4.66	5.72	4.89	4.84	4.66	5.35	5.23	5.16	4.65	4.87	5.40	4.86	4.83	4.72	5.37	4.99	5.01	5.07	4.98	4.58	5.04	4.97	5.10
F	0.12	0.07	0.06	0.19	0.08	0.03	0.13	0.20	0.11	0.11	0.00	0.05	0.03	0.08	0.09	0.12	0.00	0.00	0.20	0.06	0.09	0.05	0.08	0.07	0.04	0.06	0.19
Cl	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.03	0.05	0.08	0.08	0.05	0.00	0.00	0.05	0.00	0.05	0.05	0.00	0.11	0.00	0.00	0.03	0.00
total	50.23	49.92	49.99	50.38	49.72	50.31	49.85	49.49	49.16	50.48	50.34	49.07	49.50	49.64	49.71	50.28	49.16	49.50	49.54	48.81	49.94	49.45	49.35	49.62	48.94	49.94	48.78
P_2O_5	0.07	0.27	0.00	0.00	0.21	0.27	0.34	0.14	0.14	0.21	0.00	0.07	0.21	0.21	0.00	0.14	0.48	0.07	0.21	0.00	0.00	0.21	0.21	0.07	0.21	0.00	0.41
SiO_2	69.27	67.05	68.12	68.83	69.30	68.37	68.48	68.24	68.23	68.33	68.64	67.15	69.28	68.80	67.58	69.50	67.17	68.02	67.29	68.06	69.09	66.91	67.93	67.75	66.51	68.09	66.78
TiO_2	0.13	0.21	0.19	0.49	0.34	0.10	0.29	0.10	0.31	0.21	0.51	0.25	0.32	0.32	0.12	0.38	0.23	0.29	0.25	0.29	0.31	0.19	0.19	0.27	0.15	0.15	0.04
Al_2O_3	14.22	14.80	15.06	14.44	14.26	14.10	14.94	14.52	14.63	14.35	14.68	14.34	14.22	13.81	13.75	13.76	14.65	14.30	14.01	13.73	14.11	13.59	14.06	14.53	14.27	14.54	14.21
FeO	1.91	1.76	1.72	1.57	1.79	2.00	1.91	1.79	1.27	2.00	2.09	1.64	1.33	1.63	2.04	1.94	1.82	1.54	1.82	1.73	1.88	2.41	1.79	2.25	2.22	1.94	1.73
MnO	0.06	0.00	0.00	0.23	0.00	0.03	0.00	0.06	0.00	0.29	0.00	0.00	0.00	0.10	0.06	0.06	0.03	0.03	0.06	0.10	0.06	0.00	0.16	0.06	0.10	0.19	0.19
MgO	0.22	0.38	0.27	0.18	0.31	0.30	0.14	0.25	0.17	0.32	0.20	0.33	0.33	0.34	0.34	0.30	0.30	0.27	0.21	0.22	0.22	0.22	0.28	0.20	0.16	0.31	0.29
CaO	0.63	0.91	1.00	0.91	0.75	0.88	0.86	0.65	0.95	0.70	0.71	0.85	0.90	0.86	1.00	1.00	0.73	1.08	0.92	0.90	0.95	1.08	0.80	0.83	0.90	0.76	0.53
Na_2O	3.90	3.91	3.52	3.55	3.49	3.47	3.25	3.64	3.68	3.77	3.60	3.47	3.60	3.62	3.61	3.76	3.64	4.04	3.53	3.05	3.40	3.88	3.41	3.90	3.36	3.89	3.38
K_2O	6.13	6.36	6.24	6.37	5.61	6.89	5.89	5.83	5.62	6.45	6.30	6.21	5.60	5.87	6.50	5.86	5.81	5.69	6.46	6.02	6.03	6.11	6.00	5.52	6.07	5.99	6.14
F	0.12	0.07	0.06	0.18	0.08	0.03	0.12	0.20	0.11	0.11	0.00	0.05	0.03	0.08	0.09	0.12	0.00	0.00	0.20	0.06	0.09	0.05	0.08	0.07	0.04	0.06	0.19
Cl	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.03	0.05	0.08	0.08	0.05	0.00	0.00	0.05	0.00	0.05	0.05	0.00	0.11	0.00	0.00	0.03	0.00
total	96.61	95.70	96.15	96.69	96.14	96.43	96.18	95.33	95.06	96.68	96.76	94.37	95.87	95.68	95.09	96.77	94.86	95.38	94.89	94.16	96.14	94.63	94.95	95.43	93.97	95.92	93.82
H_2O	3.39	4.30	3.85	3.31	3.86	3.57	3.82	4.67	4.94	3.32	3.24	5.63	4.13	4.32	4.91	3.23	5.14	4.62	5.11	5.84	3.86	5.37	5.05	4.57	6.03	4.08	6.18
recalculated to 100 % total:																											
P_2O_5	0.07	0.29	0.00	0.00	0.21	0.29	0.36	0.14	0.14	0.21	0.00	0.07	0.22	0.22	0.00	0.14	0.51	0.07	0.22	0.00	0.00	0.22	0.22	0.07	0.22	0.00	0.44
SiO_2	71.70	70.07	70.84	71.19	72.08	70.90	71.20	71.59	71.78	70.68	70.94	71.15	72.27	71.91	71.06	71.83	70.81	71.32	70.92	72.28	71.86	70.71	71.54	70.99	70.78	70.99	71.18
TiO_2	0.14	0.22	0.20	0.51	0.36	0.10	0.30	0.10	0.32	0.22	0.53	0.26	0.34	0.34	0.12	0.39	0.24	0.30	0.26	0.30	0.32	0.20	0.20	0.28	0.16	0.16	0.04
Al_2O_3	14.72	15.46	15.67	14.94	14.84	14.62	15.53	15.23	15.39	14.84	15.17	15.19	14.83	14.44	14.46	14.22	15.44	14.99	14.77	14.59	14.67	14.36	14.81	15.23	15.18	15.16	15.15
FeO	1.97	1.84	1.79	1.62	1.86	2.07	1.99	1.88	1.33	2.07	2.16	1.74	1.38	1.71	2.14	2.00	1.92	1.62	1.92	1.84	1.96	2.55	1.89	2.36	2.37	2.02	1.85
MnO	0.07	0.00	0.00	0.23	0.00	0.03	0.00	0.07	0.00	0.30	0.00	0.00	0.00	0.10	0.07	0.07	0.03	0.03	0.07	0.10	0.07	0.00	0.17	0.07	0.10	0.20	0.21
MgO	0.23	0.40	0.28	0.19	0.32	0.31	0.15	0.26	0.18	0.33	0.21	0.35	0.35	0.36	0.36	0.31	0.31	0.28	0.22	0.23	0.23	0.23	0.29	0.21	0.17	0.32	0.30
CaO	0.65	0.95	1.04	0.94	0.78	0.91	0.90	0.68	1.00	0.72	0.74	0.90	0.94	0.90	1.05	1.03	0.77	1.13	0.97	0.96	0.99	1.14	0.84	0.87	0.96	0.80	0.57
Na_2O	4.04	4.08	3.66	3.67	3.63	3.60	3.38	3.81	3.87	3.90	3.72	3.67	3.76	3.78	3.79	3.89	3.84	4.24	3.72	3.23	3.54	4.10	3.59	4.09	3.57	4.05	3.60
K_2O	6.35	6.65	6.49	6.59	5.83	7.14	6.13	6.11	5.91	6.67	6.51	6.58	5.84	6.14	6.84	6.06	6.13	5.97	6.81	6.39	6.27	6.46	6.32	5.78	6.46	6.24	6.55
F	0.12	0.07	0.06	0.19	0.08	0.03	0.13	0.21	0.12	0.11	0.00	0.05	0.03	0.08	0.10	0.13	0.00	0.00	0.21	0.06	0.10	0.05	0.08	0.08	0.04	0.06	0.20
Cl	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.03	0.06	0.08	0.08	0.06	0.00	0.00	0.06	0.00	0.06	0.06	0.00	0.11	0.00	0.00	0.03	0.00

Table 5 (continued)**:** EMP data of glass in Type 1 run G86.

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	min	max	mean	σ
P	0.00	0.00	0.06	0.18	0.03	0.09	0.03	0.12	0.00	0.03	0.00	0.00	0.09	0.00	0.09	0.09	0.06	0.00	0.00	0.21	0.06	0.06
Si	32.06	32.06	32.05	31.40	31.65	31.80	31.61	31.47	31.54	31.99	31.87	31.80	31.44	32.19	31.98	31.12	31.95	31.50	31.09	32.49	31.80	0.36
Ti	0.08	0.01	0.17	0.00	0.17	0.27	0.17	0.19	0.18	0.18	0.18	0.00	0.19	0.13	0.23	0.27	0.14	0.18	0.00	0.31	0.15	0.07
Al	7.21	7.30	7.78	7.49	7.52	7.08	7.33	7.68	7.64	7.62	7.57	7.72	7.53	7.67	7.31	7.97	7.56	7.75	7.08	7.97	7.55	0.21
Fe	1.15	0.98	1.27	1.75	1.53	1.84	1.13	1.20	1.49	1.22	1.27	1.70	1.15	1.91	1.01	1.61	1.46	1.75	0.98	1.91	1.42	0.24
Mn	0.23	0.13	0.13	0.10	0.00	0.03	0.05	0.13	0.03	0.00	0.07	0.00	0.07	0.00	0.13	0.18	0.07	0.13	0.00	0.23	0.07	0.06
Mg	0.15	0.19	0.19	0.22	0.21	0.18	0.15	0.19	0.14	0.19	0.12	0.13	0.14	0.17	0.19	0.16	0.13	0.16	0.09	0.23	0.16	0.04
Ca	0.21	0.55	0.67	0.87	0.64	0.63	0.52	0.49	0.56	0.68	0.58	0.56	0.55	0.72	0.49	0.65	0.45	0.63	0.21	0.87	0.60	0.11
Na	2.79	2.92	2.38	2.40	2.93	2.83	2.68	2.81	2.50	2.74	2.76	2.85	2.90	2.75	2.64	2.72	2.59	2.58	2.26	3.00	2.69	0.17
K	4.94	5.02	4.96	5.36	5.37	5.55	4.90	4.94	5.58	5.32	4.75	5.31	4.84	4.91	5.57	4.85	5.23	5.02	4.58	5.72	5.07	0.27
F	0.20	0.00	0.00	0.04	0.13	0.26	0.22	0.13	0.00	0.00	0.02	0.00	0.00	0.00	0.18	0.09	0.06	0.06	0.00	0.26	0.08	0.07
Cl	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.05	0.13	0.03	0.00	0.08	0.11	0.00	0.05	0.00	0.03	0.00	0.13	0.03	0.04
total	49.02	49.15	49.65	49.88	50.20	50.56	48.79	49.34	49.69	50.11	49.24	50.07	48.99	50.56	49.81	49.76	49.71	49.77	48.78	50.56	49.68	0.50
P_2O_5	0.00	0.00	0.14	0.41	0.07	0.21	0.07	0.27	0.00	0.07	0.00	0.00	0.21	0.00	0.21	0.21	0.14	0.00	0.00	0.48	0.14	0.13
SiO_2	68.59	68.58	68.57	67.17	67.72	68.04	67.62	67.33	67.46	68.43	68.19	68.04	67.25	68.87	68.42	66.57	68.36	67.39	66.51	69.50	68.03	0.76
TiO_2	0.13	0.02	0.29	0.00	0.29	0.46	0.29	0.32	0.31	0.31	0.31	0.00	0.32	0.21	0.38	0.46	0.23	0.30	0.00	0.51	0.25	0.12
Al_2O_3	13.61	13.79	14.70	14.15	14.22	13.38	13.84	14.50	14.44	14.40	14.30	14.59	14.22	14.50	13.82	15.06	14.29	14.64	13.38	15.06	14.27	0.39
FeO	1.48	1.27	1.63	2.25	1.97	2.37	1.45	1.54	1.91	1.57	1.64	2.19	1.48	2.46	1.30	2.06	1.88	2.25	1.27	2.46	1.83	0.31
MnO	0.29	0.16	0.16	0.13	0.00	0.03	0.06	0.16	0.03	0.00	0.10	0.00	0.10	0.00	0.16	0.23	0.10	0.16	0.00	0.29	0.08	0.08
MgO	0.25	0.31	0.31	0.37	0.35	0.31	0.25	0.31	0.23	0.32	0.20	0.21	0.24	0.28	0.31	0.26	0.22	0.26	0.14	0.38	0.27	0.06
CaO	0.30	0.77	0.93	1.21	0.90	0.88	0.73	0.68	0.78	0.95	0.82	0.78	0.77	1.01	0.68	0.91	0.63	0.88	0.30	1.21	0.84	0.16
Na_2O	3.76	3.94	3.20	3.24	3.95	3.82	3.62	3.79	3.36	3.69	3.73	3.84	3.91	3.71	3.56	3.67	3.49	3.48	3.05	4.04	3.62	0.23
K_2O	5.95	6.05	5.97	6.45	6.47	6.68	5.90	5.95	6.72	6.41	5.72	6.40	5.83	5.91	6.71	5.85	6.29	6.04	5.52	6.89	6.11	0.33
F	0.20	0.00	0.00	0.04	0.13	0.26	0.22	0.12	0.00	0.00	0.02	0.00	0.00	0.00	0.18	0.09	0.06	0.06	0.00	0.26	0.08	0.07
Cl	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.05	0.13	0.03	0.00	0.08	0.11	0.00	0.05	0.00	0.03	0.00	0.13	0.03	0.04
total	94.49	94.88	95.90	95.47	96.01	96.32	93.96	94.94	95.28	96.25	95.02	96.05	94.39	97.04	95.65	95.37	95.67	95.46	93.82	97.04	95.51	0.83
H_2O	5.51	5.12	4.10	4.53	3.99	3.68	6.04	5.06	4.72	3.75	4.98	3.95	5.61	2.96	4.35	4.63	4.33	4.54	2.96	6.18	4.49	0.83
recalculated to 100 % total:																						
P_2O_5	0.00	0.00	0.14	0.43	0.07	0.21	0.07	0.29	0.00	0.07	0.00	0.00	0.22	0.00	0.22	0.22	0.14	0.00	0.00	0.51	0.14	0.13
SiO_2	72.59	72.28	71.50	70.35	70.53	70.64	71.97	70.92	70.81	71.09	71.76	70.84	71.25	70.98	71.54	69.81	71.46	70.59	69.81	72.59	71.23	0.61
TiO_2	0.14	0.02	0.30	0.00	0.30	0.47	0.31	0.34	0.32	0.32	0.32	0.00	0.34	0.21	0.40	0.48	0.24	0.32	0.00	0.53	0.26	0.13
Al_2O_3	14.41	14.53	15.33	14.83	14.81	13.89	14.73	15.28	15.15	14.96	15.05	15.19	15.06	14.94	14.44	15.80	14.94	15.34	13.89	15.80	14.95	0.40
FeO	1.57	1.34	1.70	2.36	2.05	2.46	1.55	1.63	2.01	1.63	1.72	2.28	1.57	2.53	1.35	2.17	1.96	2.36	1.33	2.55	1.91	0.32
MnO	0.31	0.17	0.17	0.14	0.00	0.03	0.07	0.17	0.03	0.00	0.10	0.00	0.10	0.00	0.17	0.24	0.10	0.17	0.00	0.31	0.09	0.09
MgO	0.26	0.33	0.33	0.39	0.37	0.32	0.26	0.33	0.24	0.33	0.21	0.22	0.25	0.28	0.33	0.27	0.23	0.27	0.15	0.40	0.28	0.06
CaO	0.32	0.81	0.97	1.27	0.94	0.91	0.78	0.72	0.82	0.99	0.86	0.81	0.81	1.04	0.71	0.96	0.66	0.92	0.32	1.27	0.88	0.16
Na_2O	3.98	4.15	3.34	3.39	4.11	3.97	3.85	3.99	3.53	3.84	3.92	4.00	4.14	3.82	3.72	3.85	3.65	3.64	3.23	4.24	3.79	0.24
K_2O	6.29	6.38	6.23	6.76	6.74	6.94	6.28	6.27	7.05	6.66	6.02	6.66	6.18	6.10	7.01	6.13	6.58	6.33	5.78	7.14	6.40	0.34
F	0.21	0.00	0.00	0.04	0.14	0.27	0.24	0.13	0.00	0.00	0.02	0.00	0.00	0.00	0.19	0.09	0.07	0.06	0.00	0.27	0.09	0.07
Cl	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.06	0.14	0.03	0.00	0.08	0.11	0.00	0.06	0.00	0.03	0.00	0.14	0.03	0.04

Table 6: EMP data of glass in Type 1 run G90 at constant conditions of 2.5 GPa / 1000 °C; bulk water content 2.8 wt.%; 43 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.12	0.06	0.00	0.03	0.03	0.21	0.18	0.00	0.06	0.09	0.03	0.03	0.00	0.06	0.00	0.03	0.12	0.09	0.09	0.27	0.15	0.03	0.00	0.18	0.12	0.15	0.03
Si	31.81	31.76	31.59	31.91	31.95	31.77	31.45	31.73	31.78	32.25	32.16	31.97	31.86	32.26	31.69	32.04	31.70	32.06	31.84	31.43	32.00	31.83	31.48	31.54	31.57	31.39	31.54
Ti	0.17	0.26	0.16	0.00	0.20	0.19	0.01	0.21	0.13	0.16	0.16	0.05	0.17	0.34	0.03	0.22	0.26	0.16	0.17	0.09	0.24	0.22	0.24	0.19	0.15	0.15	0.24
Al	7.88	7.75	7.78	7.60	7.61	7.74	7.76	7.45	7.90	7.50	7.63	7.72	7.79	7.86	8.03	7.87	7.74	7.61	7.41	7.84	7.33	7.47	7.71	7.73	7.74	7.57	7.85
Fe	1.41	0.94	1.37	1.13	0.79	1.29	1.08	1.06	1.29	1.27	0.98	1.13	1.13	0.91	1.25	0.65	1.10	1.08	1.01	1.13	1.10	1.18	0.98	1.18	1.15	0.96	0.91
Mn	0.00	0.00	0.07	0.10	0.00	0.15	0.03	0.18	0.00	0.00	0.13	0.13	0.15	0.07	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.13	0.03	0.03	0.00	0.13
Mg	0.09	0.17	0.06	0.10	0.09	0.12	0.18	0.14	0.17	0.14	0.11	0.13	0.18	0.14	0.13	0.14	0.15	0.10	0.10	0.11	0.07	0.15	0.13	0.15	0.13	0.14	0.13
Ca	0.59	0.38	0.64	0.44	0.49	0.76	0.52	0.49	0.64	0.62	0.58	0.48	0.54	0.81	0.61	0.70	0.52	0.69	0.62	0.68	0.67	0.49	0.70	0.55	0.61	0.54	0.74
Na	2.66	2.97	2.73	2.77	3.03	3.14	3.08	2.79	2.70	2.85	2.80	2.79	2.50	2.79	2.70	2.64	2.52	2.85	2.78	2.97	2.71	2.73	3.09	2.81	2.69	2.73	2.63
K	5.15	4.82	5.71	4.91	5.22	4.81	5.36	5.52	5.36	5.81	5.81	4.93	5.60	5.13	4.94	5.62	5.11	5.00	5.26	5.66	5.34	5.21	5.05	5.37	5.34	5.26	5.10
F	0.18	0.27	0.01	0.07	0.00	0.12	0.16	0.08	0.14	0.08	0.04	0.00	0.05	0.05	0.13	0.01	0.08	0.15	0.00	0.07	0.08	0.00	0.07	0.00	0.10	0.05	0.27
Cl	0.00	0.03	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.05	0.08	0.05	0.00	0.00	0.05	0.00	0.05	0.08	0.00	0.00	0.00	0.00	0.00	0.11	0.03	0.00
total	50.06	49.41	50.13	49.05	49.41	50.36	49.80	49.63	50.16	50.77	50.47	49.41	50.02	50.42	49.51	49.97	49.33	49.84	49.35	50.26	49.70	49.30	49.58	49.72	49.73	48.97	49.57
P_2O_5	0.27	0.14	0.00	0.07	0.07	0.48	0.41	0.00	0.14	0.21	0.07	0.07	0.00	0.14	0.00	0.07	0.27	0.21	0.21	0.62	0.34	0.07	0.00	0.41	0.27	0.34	0.07
SiO_2	68.04	67.95	67.59	68.26	68.36	67.97	67.29	67.87	67.98	68.99	68.79	68.39	68.15	69.01	67.80	68.55	67.82	68.58	68.11	67.25	68.46	68.10	67.34	67.48	67.53	67.15	67.48
TiO_2	0.29	0.44	0.27	0.00	0.33	0.32	0.02	0.34	0.21	0.27	0.27	0.08	0.29	0.57	0.06	0.36	0.44	0.27	0.29	0.15	0.40	0.36	0.40	0.32	0.25	0.25	0.40
Al_2O_3	14.88	14.65	14.69	14.36	14.37	14.63	14.66	14.08	14.93	14.18	14.41	14.58	14.72	14.84	15.17	14.87	14.62	14.38	14.00	14.82	13.85	14.12	14.56	14.60	14.63	14.31	14.84
FeO	1.82	1.20	1.76	1.45	1.02	1.66	1.39	1.36	1.66	1.63	1.26	1.45	1.45	1.17	1.61	0.83	1.42	1.39	1.30	1.45	1.42	1.51	1.27	1.51	1.48	1.24	1.17
MnO	0.00	0.00	0.10	0.13	0.00	0.19	0.03	0.23	0.00	0.00	0.16	0.16	0.19	0.10	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.16	0.03	0.03	0.00	0.16
MgO	0.15	0.28	0.10	0.16	0.15	0.20	0.31	0.23	0.28	0.24	0.18	0.21	0.30	0.23	0.22	0.23	0.26	0.16	0.16	0.19	0.12	0.25	0.22	0.25	0.22	0.24	0.22
CaO	0.83	0.53	0.90	0.62	0.68	1.06	0.73	0.68	0.90	0.86	0.82	0.67	0.75	1.13	0.85	0.98	0.73	0.97	0.87	0.95	0.93	0.68	0.98	0.77	0.85	0.75	1.03
Na_2O	3.59	4.00	3.68	3.74	4.08	4.23	4.15	3.75	3.64	3.84	3.77	3.76	3.38	3.77	3.64	3.56	3.40	3.84	3.75	4.00	3.66	3.68	4.16	3.79	3.63	3.68	3.54
K_2O	6.20	5.80	6.88	5.91	6.29	5.80	6.45	6.65	6.46	6.99	7.00	5.94	6.75	6.18	5.95	6.77	6.15	6.02	6.34	6.82	6.43	6.27	6.09	6.47	6.44	6.34	6.15
F	0.18	0.27	0.01	0.07	0.00	0.12	0.15	0.08	0.14	0.08	0.04	0.00	0.05	0.05	0.13	0.01	0.08	0.15	0.00	0.07	0.08	0.00	0.07	0.00	0.09	0.05	0.26
Cl	0.00	0.03	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.05	0.08	0.05	0.00	0.00	0.05	0.00	0.05	0.08	0.00	0.00	0.00	0.00	0.00	0.11	0.03	0.00
total	96.18	95.17	95.97	94.73	95.35	96.66	95.53	95.25	96.28	97.25	96.79	95.36	96.05	97.16	95.37	96.26	95.19	95.95	95.07	96.28	95.66	95.04	95.22	95.63	95.47	94.35	95.22
H_2O	3.82	4.83	4.03	5.27	4.65	3.34	4.47	4.75	3.72	2.75	3.21	4.64	3.95	2.84	4.63	3.74	4.81	4.05	4.93	3.72	4.34	4.96	4.78	4.37	4.53	5.65	4.78
recalculated to 100 % total:																											
P_2O_5	0.29	0.14	0.00	0.07	0.07	0.50	0.43	0.00	0.14	0.21	0.07	0.07	0.00	0.14	0.00	0.07	0.29	0.21	0.22	0.64	0.36	0.07	0.00	0.43	0.29	0.36	0.07
SiO_2	70.75	71.40	70.43	72.05	71.69	70.32	70.44	71.26	70.61	70.94	71.07	71.71	70.96	71.03	71.09	71.21	71.25	71.48	71.63	69.84	71.56	71.65	70.72	70.56	70.74	71.18	70.87
TiO_2	0.30	0.46	0.28	0.00	0.34	0.33	0.02	0.36	0.22	0.27	0.28	0.08	0.30	0.59	0.06	0.38	0.46	0.28	0.30	0.16	0.42	0.38	0.42	0.34	0.26	0.26	0.42
Al_2O_3	15.47	15.39	15.31	15.16	15.07	15.14	15.34	14.79	15.51	14.58	14.88	15.29	15.33	15.28	15.90	15.45	15.36	14.99	14.73	15.39	14.48	14.86	15.29	15.27	15.32	15.16	15.58
FeO	1.89	1.27	1.83	1.53	1.07	1.72	1.45	1.43	1.73	1.68	1.30	1.52	1.51	1.20	1.68	0.86	1.49	1.45	1.37	1.50	1.48	1.59	1.33	1.58	1.55	1.31	1.23
MnO	0.00	0.00	0.10	0.14	0.00	0.20	0.03	0.24	0.00	0.00	0.17	0.17	0.20	0.10	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.17	0.03	0.03	0.00	0.17
MgO	0.16	0.29	0.11	0.17	0.16	0.21	0.32	0.24	0.29	0.24	0.19	0.22	0.32	0.23	0.23	0.23	0.27	0.17	0.17	0.20	0.13	0.26	0.23	0.26	0.23	0.25	0.23
CaO	0.86	0.56	0.94	0.65	0.72	1.10	0.77	0.72	0.93	0.89	0.84	0.70	0.78	1.16	0.89	1.02	0.77	1.01	0.91	0.99	0.97	0.72	1.03	0.80	0.89	0.80	1.08
Na_2O	3.73	4.21	3.83	3.94	4.28	4.37	4.34	3.94	3.78	3.94	3.90	3.94	3.51	3.88	3.82	3.69	3.57	4.00	3.94	4.16	3.83	3.87	4.37	3.97	3.80	3.90	3.72
K_2O	6.45	6.10	7.17	6.24	6.60	6.00	6.75	6.98	6.71	7.19	7.23	6.23	7.03	6.36	6.24	7.03	6.46	6.28	6.66	7.09	6.72	6.60	6.39	6.76	6.74	6.72	6.46
F	0.19	0.28	0.01	0.07	0.00	0.12	0.16	0.09	0.14	0.08	0.04	0.00	0.05	0.05	0.13	0.01	0.08	0.16	0.00	0.07	0.09	0.00	0.08	0.00	0.10	0.05	0.28
Cl	0.00	0.03	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.05	0.08	0.06	0.00	0.00	0.06	0.00	0.06	0.08	0.00	0.00	0.00	0.00	0.00	0.11	0.03	0.00

Table 6 (continued)**:** EMP data of glass in Type 1 run G90.

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	min	max	mean	σ
P	0.18	0.18	0.00	0.00	0.12	0.03	0.00	0.06	0.03	0.09	0.03	0.15	0.00	0.06	0.24	0.09	0.00	0.27	0.08	0.07
Si	31.76	31.90	32.08	32.15	31.55	31.57	31.44	31.46	31.67	31.53	31.56	31.60	31.73	31.42	31.90	31.81	31.39	32.26	31.75	0.24
Ti	0.21	0.02	0.11	0.07	0.13	0.10	0.14	0.10	0.21	0.12	0.09	0.07	0.23	0.08	0.07	0.15	0.00	0.34	0.15	0.08
Al	7.82	7.55	7.50	7.61	7.56	7.73	7.90	7.83	7.56	7.97	7.81	7.55	7.90	7.77	8.04	7.50	7.33	8.04	7.71	0.17
Fe	0.67	1.13	1.25	0.96	1.25	0.94	1.01	1.23	1.42	0.72	1.32	1.15	0.98	1.23	1.25	1.27	0.65	1.42	1.10	0.19
Mn	0.10	0.05	0.05	0.10	0.05	0.05	0.13	0.00	0.00	0.07	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.05	0.05
Mg	0.10	0.03	0.10	0.15	0.07	0.09	0.09	0.17	0.11	0.14	0.17	0.13	0.11	0.09	0.11	0.11	0.03	0.18	0.12	0.03
Ca	0.57	0.60	0.67	0.43	0.54	0.67	0.47	0.49	0.61	0.38	0.67	0.54	0.55	0.43	0.45	0.35	0.35	0.81	0.57	0.11
Na	2.72	2.93	2.54	2.78	2.68	3.01	3.05	2.69	2.60	2.99	3.09	2.91	2.94	2.85	2.79	2.69	2.50	3.14	2.81	0.16
K	5.47	5.27	5.44	5.38	5.31	5.88	5.28	5.09	5.37	5.15	5.03	5.17	5.22	5.17	5.15	5.27	4.81	5.88	5.28	0.26
F	0.01	0.00	0.00	0.25	0.21	0.06	0.02	0.09	0.10	0.13	0.00	0.07	0.11	0.27	0.11	0.16	0.00	0.27	0.09	0.08
Cl	0.00	0.00	0.05	0.05	0.03	0.03	0.00	0.11	0.13	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.00	0.13	0.02	0.04
total	49.62	49.66	49.80	49.93	49.49	50.15	49.52	49.30	49.80	49.30	49.84	49.35	49.79	49.37	50.15	49.40	48.97	50.77	49.73	0.40
P_2O_5	0.41	0.41	0.00	0.00	0.27	0.07	0.00	0.14	0.07	0.21	0.07	0.34	0.00	0.14	0.55	0.21	0.00	0.62	0.18	0.17
SiO_2	67.95	68.24	68.63	68.77	67.49	67.54	67.26	67.31	67.75	67.46	67.52	67.60	67.88	67.21	68.24	68.05	67.15	69.01	67.93	0.51
TiO_2	0.34	0.04	0.19	0.12	0.21	0.17	0.23	0.17	0.34	0.19	0.15	0.12	0.38	0.13	0.11	0.25	0.00	0.57	0.25	0.13
Al_2O_3	14.77	14.27	14.17	14.38	14.28	14.61	14.93	14.79	14.28	15.06	14.76	14.27	14.92	14.67	15.20	14.17	13.85	15.20	14.57	0.32
FeO	0.86	1.45	1.60	1.23	1.61	1.20	1.30	1.58	1.82	0.93	1.70	1.48	1.27	1.58	1.60	1.64	0.83	1.82	1.41	0.24
MnO	0.13	0.06	0.06	0.13	0.06	0.06	0.16	0.00	0.00	0.10	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.06	0.07
MgO	0.17	0.05	0.17	0.25	0.12	0.15	0.14	0.28	0.18	0.24	0.28	0.22	0.18	0.15	0.19	0.18	0.05	0.31	0.20	0.05
CaO	0.80	0.83	0.93	0.60	0.75	0.93	0.65	0.68	0.85	0.53	0.93	0.75	0.77	0.60	0.63	0.48	0.48	1.13	0.80	0.15
Na_2O	3.67	3.95	3.43	3.75	3.61	4.06	4.11	3.62	3.51	4.03	4.16	3.93	3.96	3.85	3.76	3.62	3.38	4.23	3.78	0.22
K_2O	6.59	6.35	6.56	6.48	6.39	7.08	6.37	6.13	6.46	6.20	6.05	6.23	6.28	6.23	6.21	6.35	5.80	7.08	6.36	0.31
F	0.01	0.00	0.00	0.25	0.21	0.06	0.02	0.09	0.10	0.13	0.00	0.07	0.11	0.27	0.11	0.16	0.00	0.27	0.09	0.08
Cl	0.00	0.00	0.05	0.05	0.03	0.03	0.00	0.11	0.13	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.00	0.13	0.02	0.04
total	95.71	95.65	95.79	95.89	94.96	95.94	95.16	94.83	95.43	95.02	95.71	94.99	95.72	94.72	96.58	95.05	94.35	97.25	95.62	0.65
H_2O	4.29	4.35	4.21	4.11	5.04	4.06	4.84	5.17	4.57	4.98	4.29	5.01	4.28	5.28	3.42	4.95	2.75	5.65	4.38	0.65
recalculated to 100 % total:																				
P_2O_5	0.43	0.43	0.00	0.00	0.29	0.07	0.00	0.14	0.07	0.22	0.07	0.36	0.00	0.15	0.57	0.22	0.00	0.64	0.19	0.17
SiO_2	71.00	71.34	71.65	71.71	71.08	70.40	70.68	70.98	71.00	71.00	70.55	71.17	70.91	70.96	70.65	71.60	69.84	72.05	71.05	0.46
TiO_2	0.36	0.04	0.20	0.12	0.22	0.18	0.24	0.18	0.36	0.20	0.16	0.12	0.40	0.14	0.12	0.26	0.00	0.59	0.26	0.13
Al_2O_3	15.43	14.92	14.79	14.99	15.04	15.23	15.69	15.60	14.96	15.85	15.43	15.03	15.59	15.49	15.74	14.91	14.48	15.90	15.23	0.33
FeO	0.90	1.52	1.67	1.29	1.69	1.25	1.36	1.66	1.91	0.98	1.77	1.56	1.32	1.66	1.66	1.72	0.86	1.91	1.48	0.25
MnO	0.13	0.07	0.07	0.13	0.07	0.07	0.17	0.00	0.00	0.10	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.06	0.07
MgO	0.18	0.05	0.18	0.26	0.13	0.16	0.15	0.29	0.19	0.25	0.29	0.23	0.19	0.16	0.20	0.19	0.05	0.32	0.21	0.06
CaO	0.84	0.87	0.97	0.63	0.79	0.97	0.68	0.72	0.89	0.56	0.97	0.79	0.80	0.63	0.65	0.51	0.51	1.16	0.83	0.15
Na_2O	3.84	4.13	3.58	3.91	3.81	4.23	4.32	3.82	3.68	4.24	4.35	4.14	4.13	4.06	3.90	3.81	3.51	4.37	3.96	0.23
K_2O	6.89	6.64	6.84	6.76	6.73	7.38	6.69	6.46	6.77	6.53	6.32	6.56	6.57	6.58	6.43	6.68	6.00	7.38	6.65	0.31
F	0.01	0.00	0.00	0.26	0.22	0.06	0.02	0.09	0.11	0.14	0.00	0.08	0.12	0.29	0.12	0.17	0.00	0.29	0.09	0.08
Cl	0.00	0.00	0.06	0.06	0.03	0.03	0.00	0.11	0.14	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.00	0.14	0.03	0.04

Table 7: EMP data of glass in Type 1 run G29 at constant conditions of 2.5 GPa / 1000 °C; bulk water content 2.8 wt.%; 23 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	min	max	mean	σ
P	0.14	0.06	0.12	0.09	0.20	0.09	0.14	0.03	0.14	0.12	0.00	0.09	0.09	0.15	0.06	0.09	0.00	0.00	0.12	0.00	0.03	0.18	0.03	0.00	0.20	0.09	0.06
Si	32.05	31.67	31.65	31.45	32.02	31.54	31.66	31.78	31.92	31.73	31.56	32.09	31.58	31.99	31.55	31.52	31.63	31.29	31.49	31.67	32.22	31.32	32.08	31.29	32.22	31.72	0.26
Ti	0.23	0.13	0.27	0.19	0.19	0.24	0.26	0.23	0.21	0.19	0.13	0.17	0.14	0.24	0.03	0.29	0.09	0.19	0.14	0.25	0.13	0.15	0.08	0.03	0.29	0.18	0.07
Al	8.07	8.27	8.25	8.65	7.88	8.19	8.20	8.03	7.90	7.97	7.93	8.03	8.38	7.89	8.04	8.28	7.62	8.09	7.97	8.05	8.19	7.93	8.36	7.62	8.65	8.09	0.22
Fe	0.91	0.95	0.86	0.56	0.37	0.79	0.84	1.48	1.25	0.77	0.86	0.93	0.67	0.79	1.22	0.98	1.15	0.86	1.33	0.81	0.88	1.05	0.90	0.37	1.48	0.92	0.25
Mn	0.00	0.00	0.05	0.15	0.00	0.03	0.00	0.00	0.00	0.00	0.15	0.00	0.15	0.05	0.00	0.20	0.00	0.00	0.20	0.07	0.17	0.05	0.10	0.00	0.20	0.06	0.07
Mg	0.08	0.18	0.09	0.15	0.18	0.15	0.12	0.11	0.21	0.22	0.12	0.18	0.16	0.09	0.18	0.06	0.13	0.07	0.14	0.10	0.15	0.23	0.16	0.06	0.23	0.14	0.05
Ca	0.59	0.70	0.68	0.64	0.59	0.54	0.71	0.61	0.74	0.67	0.92	0.71	0.60	0.64	0.60	0.52	0.53	0.71	0.71	0.62	0.56	0.66	0.70	0.52	0.92	0.65	0.09
Na	2.92	2.76	2.75	2.38	2.32	2.57	2.42	2.56	2.67	2.75	2.69	2.66	2.62	2.66	2.67	2.56	2.64	2.73	2.79	2.79	2.77	2.52	2.68	2.32	2.92	2.65	0.14
K	5.17	5.43	5.82	5.75	5.71	5.69	5.51	5.60	5.59	5.79	5.49	5.58	5.19	5.34	5.62	5.18	5.25	5.92	5.02	5.45	5.37	5.26	5.07	5.02	5.92	5.47	0.25
F	0.10	0.13	0.11	0.06	0.14	0.00	0.07	0.05	0.01	0.04	0.08	0.25	0.16	0.08	0.14	0.22	0.00	0.04	0.09	0.00	0.02	0.27	0.22	0.00	0.27	0.10	0.08
Cl	0.00	0.05	0.10	0.00	0.00	0.00	0.05	0.10	0.00	0.00	0.00	0.03	0.05	0.03	0.03	0.00	0.00	0.03	0.11	0.03	0.08	0.00	0.00	0.00	0.11	0.03	0.04
total	50.26	50.32	50.73	50.05	49.61	49.82	49.99	50.57	50.65	50.24	49.93	50.71	49.80	49.95	50.14	49.88	49.04	49.94	50.10	49.85	50.57	49.61	50.36	49.04	50.73	50.09	0.41
P_2O_5	0.33	0.13	0.26	0.20	0.46	0.20	0.33	0.07	0.33	0.26	0.00	0.20	0.21	0.34	0.14	0.20	0.00	0.00	0.27	0.00	0.07	0.41	0.07	0.00	0.46	0.20	0.14
SiO_2	68.57	67.75	67.70	67.28	68.51	67.47	67.74	67.98	68.29	67.88	67.51	68.66	67.57	68.44	67.49	67.42	67.67	66.95	67.37	67.75	68.94	67.00	68.62	66.95	68.94	67.85	0.56
TiO_2	0.38	0.22	0.45	0.31	0.31	0.40	0.43	0.38	0.34	0.31	0.21	0.28	0.23	0.40	0.06	0.49	0.15	0.32	0.23	0.42	0.21	0.25	0.13	0.06	0.49	0.30	0.11
Al_2O_3	15.24	15.62	15.58	16.34	14.89	15.47	15.50	15.17	14.93	15.05	14.99	15.16	15.84	14.91	15.20	15.64	14.40	15.28	15.06	15.22	15.48	14.98	15.79	14.40	16.34	15.29	0.41
FeO	1.16	1.22	1.10	0.72	0.48	1.02	1.08	1.91	1.61	0.99	1.10	1.19	0.86	1.01	1.56	1.26	1.48	1.10	1.72	1.04	1.13	1.35	1.16	0.48	1.91	1.19	0.32
MnO	0.00	0.00	0.06	0.19	0.00	0.03	0.00	0.00	0.00	0.00	0.19	0.00	0.19	0.06	0.00	0.26	0.00	0.00	0.26	0.10	0.22	0.06	0.13	0.00	0.26	0.08	0.09
MgO	0.13	0.29	0.16	0.25	0.30	0.26	0.20	0.18	0.35	0.36	0.20	0.30	0.27	0.15	0.30	0.09	0.22	0.12	0.24	0.17	0.24	0.38	0.26	0.09	0.38	0.24	0.08
CaO	0.83	0.98	0.95	0.89	0.83	0.75	0.99	0.86	1.04	0.93	1.29	0.99	0.85	0.89	0.85	0.73	0.75	0.99	0.99	0.86	0.78	0.93	0.98	0.73	1.29	0.91	0.12
Na_2O	3.94	3.71	3.71	3.21	3.13	3.46	3.27	3.45	3.60	3.71	3.63	3.58	3.53	3.59	3.60	3.44	3.56	3.68	3.76	3.77	3.74	3.39	3.61	3.13	3.94	3.57	0.19
K_2O	6.23	6.54	7.01	6.92	6.88	6.86	6.64	6.74	6.74	6.98	6.62	6.72	6.25	6.43	6.77	6.24	6.32	7.13	6.04	6.56	6.47	6.34	6.10	6.04	7.13	6.59	0.31
F	0.10	0.13	0.11	0.06	0.14	0.00	0.06	0.05	0.01	0.04	0.08	0.25	0.16	0.08	0.14	0.21	0.00	0.04	0.09	0.00	0.02	0.27	0.22	0.00	0.27	0.10	0.08
Cl	0.00	0.05	0.10	0.00	0.00	0.00	0.05	0.10	0.00	0.00	0.00	0.03	0.05	0.03	0.03	0.00	0.00	0.03	0.11	0.03	0.08	0.00	0.00	0.00	0.11	0.03	0.04
total	96.87	96.59	97.12	96.34	95.87	95.91	96.25	96.84	97.23	96.50	95.79	97.26	95.92	96.30	96.07	95.90	94.54	95.63	96.07	95.91	97.35	95.25	96.98	94.54	97.35	96.28	0.69
H_2O	3.13	3.41	2.88	3.66	4.13	4.09	3.75	3.16	2.77	3.50	4.21	2.74	4.08	3.70	3.93	4.10	5.46	4.37	3.93	4.09	2.65	4.75	3.02	2.65	5.46	3.72	0.69
recalculated to 100 % total:																											
P_2O_5	0.34	0.14	0.27	0.21	0.48	0.21	0.34	0.07	0.34	0.27	0.00	0.21	0.21	0.35	0.14	0.21	0.00	0.00	0.28	0.00	0.07	0.43	0.07	0.00	0.48	0.20	0.14
SiO_2	70.79	70.14	69.71	69.84	71.47	70.34	70.38	70.20	70.24	70.34	70.48	70.59	70.44	71.07	70.25	70.30	71.58	70.01	70.12	70.64	70.81	70.35	70.76	69.71	71.58	70.47	0.46
TiO_2	0.39	0.23	0.46	0.32	0.32	0.41	0.45	0.39	0.35	0.32	0.22	0.29	0.24	0.41	0.06	0.51	0.16	0.34	0.24	0.43	0.21	0.26	0.14	0.06	0.51	0.31	0.11
Al_2O_3	15.74	16.17	16.04	16.96	15.53	16.13	16.10	15.66	15.36	15.60	15.65	15.59	16.51	15.48	15.82	16.30	15.23	15.98	15.68	15.87	15.90	15.73	16.28	15.23	16.96	15.88	0.40
FeO	1.20	1.27	1.14	0.74	0.50	1.06	1.12	1.97	1.66	1.02	1.15	1.23	0.90	1.05	1.63	1.31	1.56	1.15	1.79	1.09	1.16	1.42	1.20	0.50	1.97	1.23	0.33
MnO	0.00	0.00	0.07	0.20	0.00	0.03	0.00	0.00	0.00	0.00	0.20	0.00	0.20	0.07	0.00	0.27	0.00	0.00	0.27	0.10	0.23	0.07	0.13	0.00	0.27	0.08	0.10
MgO	0.13	0.30	0.16	0.25	0.31	0.27	0.21	0.19	0.36	0.37	0.21	0.31	0.28	0.16	0.31	0.10	0.23	0.13	0.25	0.18	0.25	0.40	0.27	0.10	0.40	0.24	0.08
CaO	0.86	1.01	0.98	0.92	0.87	0.79	1.03	0.89	1.07	0.97	1.35	1.02	0.88	0.93	0.88	0.76	0.79	1.04	1.03	0.90	0.80	0.97	1.01	0.76	1.35	0.94	0.13
Na_2O	4.06	3.85	3.82	3.33	3.26	3.61	3.39	3.56	3.70	3.85	3.79	3.68	3.68	3.73	3.75	3.59	3.76	3.85	3.91	3.93	3.84	3.56	3.72	3.26	4.06	3.71	0.19
K_2O	6.43	6.77	7.22	7.19	7.17	7.15	6.90	6.96	6.93	7.23	6.91	6.91	6.52	6.67	7.05	6.51	6.68	7.46	6.29	6.84	6.64	6.66	6.29	6.29	7.46	6.84	0.32
F	0.10	0.13	0.11	0.06	0.14	0.00	0.07	0.05	0.01	0.05	0.08	0.26	0.17	0.08	0.14	0.22	0.00	0.04	0.09	0.00	0.02	0.28	0.22	0.00	0.28	0.10	0.08
Cl	0.00	0.05	0.10	0.00	0.00	0.00	0.05	0.10	0.00	0.00	0.00	0.03	0.06	0.03	0.03	0.00	0.00	0.03	0.11	0.03	0.08	0.00	0.00	0.00	0.11	0.03	0.04

Table 8: EMP data of glass in Type 1 run G56 at constant conditions of 2.5 GPa / 1000 °C; bulk water content 2.8 wt.%; 22 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	min	max	mean	σ
P	0.06	0.23	0.06	0.17	0.09	0.12	0.12	0.14	0.03	0.14	0.06	0.14	0.14	0.12	0.12	0.00	0.00	0.09	0.00	0.29	0.09	0.06	0.00	0.29	0.10	0.07
Si	30.29	30.53	30.42	30.12	29.96	30.54	30.51	30.43	30.27	30.52	29.78	30.07	30.23	30.24	29.79	29.85	30.07	30.03	30.50	30.47	30.53	29.78	29.78	30.54	30.22	0.27
Ti	0.26	0.27	0.25	0.36	0.31	0.04	0.18	0.29	0.36	0.35	0.16	0.19	0.36	0.25	0.29	0.30	0.26	0.31	0.16	0.29	0.23	0.33	0.04	0.36	0.26	0.08
Al	7.67	7.84	7.86	7.90	7.91	7.92	8.05	7.70	8.05	7.82	7.72	8.10	7.77	7.62	7.55	7.50	7.73	7.38	7.65	7.84	7.43	8.06	7.38	8.10	7.78	0.20
Fe	0.59	0.68	0.94	0.77	0.52	0.63	0.68	0.66	0.52	0.68	0.68	0.61	0.63	0.75	0.56	0.38	0.63	0.98	0.73	0.84	0.77	0.84	0.38	0.98	0.68	0.14
Mn	0.10	0.00	0.07	0.07	0.00	0.10	0.00	0.00	0.07	0.00	0.00	0.07	0.00	0.00	0.00	0.07	0.15	0.07	0.00	0.05	0.00	0.05	0.00	0.15	0.04	0.05
Mg	0.13	0.11	0.14	0.06	0.13	0.08	0.10	0.08	0.10	0.06	0.10	0.08	0.11	0.13	0.12	0.08	0.08	0.14	0.08	0.07	0.04	0.08	0.04	0.14	0.10	0.03
Ca	0.76	0.85	0.56	0.56	0.70	0.62	0.58	0.58	0.70	0.66	0.63	0.63	0.62	0.73	0.75	0.62	0.68	0.55	0.66	0.75	0.67	0.69	0.55	0.85	0.66	0.08
Na	2.91	3.36	3.34	3.29	3.19	3.33	3.15	3.33	3.35	3.18	3.28	3.14	3.34	3.00	3.13	3.29	3.33	3.57	3.47	3.04	3.29	3.12	2.91	3.57	3.25	0.15
K	4.99	4.47	5.07	4.99	4.94	5.13	5.28	4.71	4.65	4.87	4.98	4.76	4.78	5.17	4.80	5.10	4.82	4.65	4.89	4.83	4.97	5.46	4.47	5.46	4.92	0.23
F	0.27	0.43	0.26	0.18	0.22	0.21	0.19	0.31	0.30	0.17	0.16	0.20	0.23	0.27	0.28	0.26	0.37	0.30	0.11	0.33	0.22	0.29	0.11	0.43	0.25	0.07
Cl	0.03	0.00	0.07	0.00	0.03	0.00	0.07	0.10	0.00	0.03	0.07	0.00	0.10	0.00	0.00	0.05	0.07	0.00	0.03	0.00	0.07	0.05	0.00	0.10	0.04	0.04
total	48.05	48.78	49.05	48.48	47.99	48.71	48.90	48.34	48.41	48.48	47.61	48.00	48.31	48.27	47.40	47.51	48.19	48.08	48.28	48.81	48.32	48.83	47.40	49.05	48.31	0.44
P_2O_5	0.13	0.53	0.13	0.40	0.20	0.26	0.26	0.33	0.07	0.33	0.13	0.33	0.33	0.26	0.26	0.00	0.00	0.20	0.00	0.66	0.20	0.13	0.00	0.66	0.23	0.17
SiO_2	64.79	65.32	65.07	64.43	64.09	65.33	65.27	65.11	64.76	65.28	63.71	64.33	64.67	64.69	63.72	63.87	64.32	64.24	65.25	65.19	65.31	63.72	63.71	65.33	64.66	0.59
TiO_2	0.43	0.45	0.42	0.61	0.52	0.07	0.29	0.49	0.61	0.59	0.26	0.31	0.61	0.42	0.49	0.50	0.43	0.52	0.26	0.48	0.38	0.55	0.07	0.61	0.44	0.14
Al_2O_3	14.50	14.82	14.86	14.93	14.94	14.96	15.21	14.55	15.21	14.78	14.58	15.30	14.67	14.40	14.27	14.18	14.61	13.95	14.46	14.82	14.04	15.22	13.95	15.30	14.69	0.38
FeO	0.75	0.87	1.20	0.99	0.66	0.81	0.87	0.84	0.66	0.87	0.88	0.78	0.81	0.96	0.73	0.48	0.81	1.27	0.93	1.08	0.99	1.08	0.48	1.27	0.88	0.18
MnO	0.13	0.00	0.10	0.10	0.00	0.13	0.00	0.00	0.10	0.00	0.00	0.10	0.00	0.00	0.00	0.10	0.19	0.10	0.00	0.06	0.00	0.06	0.00	0.19	0.05	0.06
MgO	0.21	0.18	0.23	0.09	0.22	0.14	0.17	0.13	0.16	0.09	0.17	0.14	0.19	0.22	0.21	0.13	0.14	0.22	0.14	0.12	0.07	0.14	0.07	0.23	0.16	0.05
CaO	1.06	1.19	0.79	0.79	0.99	0.86	0.82	0.82	0.98	0.92	0.88	0.88	0.86	1.02	1.05	0.87	0.95	0.77	0.92	1.04	0.94	0.97	0.77	1.19	0.93	0.11
Na_2O	3.93	4.53	4.50	4.43	4.30	4.48	4.24	4.48	4.52	4.28	4.42	4.23	4.50	4.04	4.22	4.43	4.48	4.82	4.68	4.10	4.44	4.21	3.93	4.82	4.38	0.21
K_2O	6.01	5.38	6.11	6.01	5.95	6.19	6.35	5.68	5.60	5.87	6.00	5.74	5.76	6.23	5.78	6.14	5.80	5.60	5.89	5.82	5.99	6.58	5.38	6.58	5.93	0.27
F	0.27	0.43	0.26	0.18	0.22	0.21	0.19	0.31	0.30	0.17	0.16	0.20	0.23	0.27	0.28	0.26	0.37	0.30	0.11	0.33	0.22	0.29	0.11	0.43	0.25	0.07
Cl	0.03	0.00	0.08	0.00	0.03	0.00	0.08	0.10	0.00	0.03	0.08	0.00	0.10	0.00	0.00	0.05	0.08	0.00	0.03	0.00	0.08	0.05	0.00	0.10	0.04	0.04
total	92.12	93.53	93.62	92.88	92.01	93.35	93.66	92.68	92.84	93.15	91.17	92.26	92.61	92.40	90.89	90.89	92.02	91.86	92.63	93.58	92.55	92.88	90.89	93.66	92.53	0.83
H_2O	7.88	6.47	6.38	7.12	7.99	6.65	6.34	7.32	7.16	6.85	8.83	7.74	7.39	7.60	9.11	9.11	7.98	8.14	7.37	6.42	7.45	7.12	6.34	9.11	7.47	0.83
recalculated to 100 % total:																										
P_2O_5	0.14	0.57	0.14	0.43	0.21	0.28	0.28	0.36	0.07	0.35	0.15	0.36	0.36	0.29	0.29	0.00	0.00	0.21	0.00	0.71	0.21	0.14	0.00	0.71	0.25	0.18
SiO_2	70.33	69.84	69.51	69.37	69.65	69.98	69.69	70.25	69.75	70.09	69.88	69.73	69.83	70.01	70.11	70.27	69.90	69.93	70.45	69.67	70.57	68.60	68.60	70.57	69.88	0.41
TiO_2	0.47	0.48	0.44	0.65	0.57	0.08	0.31	0.52	0.65	0.63	0.29	0.34	0.66	0.45	0.54	0.55	0.47	0.57	0.28	0.52	0.41	0.60	0.08	0.66	0.48	0.15
Al_2O_3	15.74	15.84	15.87	16.07	16.23	16.02	16.24	15.70	16.39	15.87	15.99	16.59	15.84	15.59	15.70	15.60	15.87	15.19	15.61	15.83	15.17	16.39	15.17	16.59	15.88	0.36
FeO	0.82	0.93	1.28	1.07	0.72	0.87	0.93	0.91	0.71	0.94	0.96	0.85	0.88	1.04	0.80	0.53	0.89	1.38	1.01	1.16	1.07	1.17	0.53	1.38	0.95	0.19
MnO	0.14	0.00	0.10	0.10	0.00	0.14	0.00	0.00	0.10	0.00	0.00	0.10	0.00	0.00	0.00	0.11	0.21	0.10	0.00	0.07	0.00	0.07	0.00	0.21	0.06	0.06
MgO	0.23	0.19	0.25	0.10	0.24	0.15	0.18	0.14	0.17	0.10	0.18	0.15	0.20	0.24	0.23	0.14	0.15	0.24	0.15	0.13	0.08	0.15	0.08	0.25	0.17	0.05
CaO	1.15	1.28	0.84	0.85	1.07	0.92	0.87	0.88	1.06	0.99	0.97	0.95	0.93	1.10	1.15	0.95	1.04	0.84	1.00	1.12	1.01	1.04	0.84	1.28	1.00	0.12
Na_2O	4.26	4.85	4.81	4.77	4.67	4.80	4.53	4.84	4.87	4.60	4.84	4.58	4.86	4.37	4.65	4.87	4.87	5.24	5.05	4.38	4.79	4.53	4.26	5.24	4.73	0.23
K_2O	6.52	5.75	6.53	6.47	6.46	6.63	6.78	6.12	6.03	6.30	6.58	6.22	6.22	6.74	6.36	6.76	6.31	6.10	6.36	6.22	6.47	7.08	5.75	7.08	6.41	0.29
F	0.29	0.46	0.28	0.19	0.24	0.22	0.20	0.33	0.32	0.18	0.18	0.22	0.25	0.29	0.31	0.29	0.40	0.33	0.12	0.35	0.24	0.32	0.12	0.46	0.27	0.08
Cl	0.03	0.00	0.08	0.00	0.03	0.00	0.08	0.11	0.00	0.03	0.08	0.00	0.11	0.00	0.00	0.06	0.08	0.00	0.03	0.00	0.08	0.05	0.00	0.11	0.04	0.04

Table 9: EMP data of glass in Type 1 run G39 at constant conditions of 2.5 GPa / 1000 °C; bulk water content 5.5 wt.%; 22 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	min	max	mean	σ
P	0.00	0.00	0.09	0.00	0.00	0.03	0.00	0.03	0.14	0.00	0.00	0.20	0.00	0.03	0.03	0.03	0.09	0.06	0.06	0.17	0.00	0.00	0.00	0.20	0.04	0.06
Si	32.16	32.22	32.42	32.17	32.14	32.20	32.71	32.68	32.81	32.64	32.31	32.48	32.43	32.87	32.51	32.74	32.92	32.72	32.31	32.61	32.19	32.65	32.14	32.92	32.50	0.25
Ti	0.05	0.16	0.09	0.05	0.14	0.16	0.06	0.10	0.12	0.13	0.18	0.05	0.03	0.08	0.02	0.15	0.06	0.14	0.04	0.21	0.15	0.11	0.02	0.21	0.11	0.05
Al	6.87	6.63	6.53	6.52	6.63	6.66	6.78	6.77	6.75	6.73	6.64	6.76	6.62	6.72	6.98	6.94	6.88	6.65	6.87	6.60	6.73	6.54	6.52	6.98	6.72	0.13
Fe	0.95	1.18	0.97	1.25	0.86	1.13	0.72	1.11	0.97	0.99	1.15	1.11	1.20	0.79	0.85	0.90	1.08	1.31	0.95	0.83	1.09	1.02	0.72	1.31	1.02	0.16
Mn	0.22	0.05	0.02	0.03	0.00	0.00	0.02	0.00	0.02	0.00	0.02	0.15	0.10	0.00	0.15	0.24	0.07	0.00	0.05	0.07	0.00	0.02	0.00	0.24	0.06	0.07
Mg	0.26	0.22	0.19	0.17	0.07	0.14	0.16	0.23	0.25	0.21	0.18	0.16	0.30	0.14	0.18	0.22	0.23	0.15	0.07	0.19	0.16	0.26	0.07	0.30	0.19	0.06
Ca	0.51	0.57	0.55	0.57	0.52	0.56	0.46	0.53	0.47	0.65	0.66	0.58	0.49	0.63	0.63	0.44	0.61	0.66	0.64	0.67	0.56	0.50	0.44	0.67	0.57	0.07
Na	2.34	2.35	2.64	2.73	2.40	2.29	2.59	2.50	2.07	2.26	2.31	2.45	2.32	2.23	2.24	2.37	2.36	2.20	2.28	2.30	2.36	2.32	2.07	2.73	2.36	0.15
K	4.60	4.67	4.58	4.45	4.50	4.50	4.52	4.20	4.36	4.41	4.84	4.63	4.69	4.65	4.71	4.85	4.52	4.40	4.27	4.17	4.68	4.46	4.17	4.85	4.53	0.18
F	0.13	0.00	0.13	0.00	0.10	0.17	0.14	0.00	0.10	0.00	0.12	0.14	0.06	0.07	0.05	0.03	0.00	0.01	0.00	0.02	0.01	0.00	0.00	0.17	0.06	0.06
Cl	0.07	0.03	0.10	0.07	0.05	0.00	0.03	0.00	0.07	0.00	0.00	0.00	0.00	0.07	0.03	0.00	0.00	0.10	0.07	0.00	0.00	0.00	0.00	0.10	0.03	0.04
total	48.17	48.07	48.31	48.01	47.41	47.84	48.19	48.15	48.15	48.03	48.42	48.70	48.23	48.28	48.37	48.90	48.82	48.42	47.61	47.85	47.92	47.88	47.41	48.90	48.17	0.36
P_2O_5	0.00	0.00	0.20	0.00	0.00	0.07	0.00	0.07	0.33	0.00	0.00	0.46	0.00	0.07	0.07	0.07	0.20	0.13	0.13	0.39	0.00	0.00	0.00	0.46	0.10	0.14
SiO_2	68.80	68.93	69.36	68.82	68.76	68.89	69.97	69.92	70.19	69.84	69.11	69.49	69.38	70.31	69.55	70.05	70.44	70.01	69.13	69.77	68.86	69.85	68.76	70.44	69.52	0.54
TiO_2	0.09	0.27	0.15	0.09	0.24	0.27	0.10	0.17	0.21	0.22	0.31	0.09	0.05	0.14	0.03	0.26	0.10	0.24	0.07	0.34	0.26	0.19	0.03	0.34	0.18	0.09
Al_2O_3	12.98	12.52	12.33	12.32	12.52	12.58	12.81	12.79	12.76	12.71	12.54	12.78	12.50	12.70	13.19	13.11	13.01	12.57	12.98	12.48	12.71	12.36	12.32	13.19	12.69	0.25
FeO	1.22	1.52	1.25	1.61	1.10	1.46	0.92	1.43	1.25	1.28	1.48	1.42	1.54	1.01	1.10	1.16	1.39	1.69	1.22	1.07	1.40	1.31	0.92	1.69	1.31	0.20
MnO	0.28	0.06	0.03	0.03	0.00	0.00	0.03	0.00	0.03	0.00	0.03	0.19	0.13	0.00	0.19	0.32	0.09	0.00	0.06	0.09	0.00	0.03	0.00	0.32	0.07	0.09
MgO	0.43	0.36	0.32	0.28	0.12	0.23	0.27	0.37	0.41	0.35	0.29	0.26	0.49	0.24	0.30	0.36	0.38	0.25	0.11	0.32	0.26	0.43	0.11	0.49	0.31	0.09
CaO	0.72	0.79	0.76	0.79	0.72	0.78	0.64	0.75	0.66	0.91	0.93	0.81	0.69	0.88	0.88	0.61	0.85	0.92	0.90	0.94	0.78	0.70	0.61	0.94	0.79	0.10
Na_2O	3.16	3.16	3.56	3.68	3.23	3.08	3.49	3.37	2.79	3.05	3.12	3.30	3.13	3.01	3.01	3.19	3.18	2.97	3.07	3.10	3.18	3.12	2.79	3.68	3.18	0.20
K_2O	5.54	5.63	5.52	5.36	5.43	5.42	5.44	5.06	5.25	5.31	5.83	5.57	5.65	5.61	5.68	5.84	5.44	5.30	5.15	5.03	5.63	5.37	5.03	5.84	5.46	0.22
F	0.13	0.00	0.13	0.00	0.10	0.17	0.14	0.00	0.10	0.00	0.12	0.13	0.06	0.07	0.05	0.03	0.00	0.01	0.00	0.02	0.01	0.00	0.00	0.17	0.06	0.06
Cl	0.07	0.03	0.10	0.07	0.05	0.00	0.03	0.00	0.07	0.00	0.00	0.00	0.00	0.07	0.03	0.00	0.00	0.10	0.07	0.00	0.00	0.00	0.00	0.10	0.03	0.04
total	93.35	93.27	93.64	93.05	92.22	92.87	93.79	93.92	93.99	93.67	93.71	94.45	93.59	94.05	94.04	94.97	95.08	94.17	92.88	93.55	93.09	93.36	92.22	95.08	93.67	0.67
H_2O	6.65	6.73	6.36	6.95	7.78	7.13	6.21	6.08	6.01	6.33	6.29	5.55	6.41	5.95	5.96	5.03	4.92	5.83	7.12	6.45	6.91	6.64	4.92	7.78	6.33	0.67
recalculated to 100 % total:																										
P_2O_5	0.00	0.00	0.21	0.00	0.00	0.07	0.00	0.07	0.35	0.00	0.00	0.49	0.00	0.07	0.07	0.07	0.21	0.14	0.14	0.42	0.00	0.00	0.00	0.49	0.10	0.15
SiO_2	73.70	73.90	74.08	73.97	74.56	74.17	74.61	74.44	74.68	74.55	73.75	73.57	74.13	74.76	73.95	73.76	74.08	74.34	74.43	74.58	73.97	74.82	73.57	74.82	74.22	0.37
TiO_2	0.09	0.29	0.16	0.09	0.26	0.29	0.11	0.18	0.22	0.24	0.33	0.09	0.06	0.15	0.04	0.27	0.11	0.25	0.07	0.37	0.28	0.20	0.04	0.37	0.19	0.10
Al_2O_3	13.91	13.42	13.17	13.24	13.57	13.55	13.66	13.62	13.58	13.57	13.38	13.53	13.36	13.50	14.02	13.81	13.68	13.34	13.98	13.34	13.65	13.24	13.17	14.02	13.55	0.23
FeO	1.31	1.63	1.33	1.73	1.20	1.57	0.98	1.52	1.33	1.37	1.58	1.51	1.65	1.07	1.17	1.22	1.46	1.80	1.31	1.14	1.50	1.40	0.98	1.80	1.40	0.22
MnO	0.30	0.07	0.03	0.03	0.00	0.00	0.03	0.00	0.03	0.00	0.03	0.20	0.14	0.00	0.20	0.33	0.10	0.00	0.07	0.10	0.00	0.03	0.00	0.33	0.08	0.10
MgO	0.46	0.39	0.34	0.30	0.13	0.25	0.29	0.40	0.43	0.38	0.31	0.28	0.52	0.25	0.32	0.38	0.40	0.27	0.12	0.34	0.28	0.46	0.12	0.52	0.33	0.10
CaO	0.77	0.85	0.82	0.85	0.78	0.84	0.69	0.80	0.70	0.97	0.99	0.85	0.73	0.94	0.94	0.64	0.89	0.98	0.97	1.01	0.84	0.75	0.64	1.01	0.85	0.11
Na_2O	3.38	3.39	3.80	3.95	3.51	3.32	3.72	3.59	2.97	3.26	3.33	3.50	3.34	3.20	3.21	3.36	3.34	3.15	3.30	3.32	3.42	3.34	2.97	3.95	3.40	0.22
K_2O	5.94	6.03	5.89	5.76	5.88	5.83	5.81	5.39	5.58	5.67	6.22	5.90	6.03	5.96	6.04	6.15	5.72	5.63	5.54	5.37	6.05	5.75	5.37	6.22	5.83	0.23
F	0.14	0.00	0.13	0.00	0.11	0.19	0.15	0.00	0.11	0.00	0.13	0.14	0.06	0.07	0.05	0.03	0.00	0.02	0.00	0.02	0.02	0.00	0.00	0.19	0.06	0.06
Cl	0.08	0.03	0.11	0.08	0.05	0.00	0.03	0.00	0.08	0.00	0.00	0.00	0.00	0.08	0.03	0.00	0.00	0.11	0.08	0.00	0.00	0.00	0.00	0.11	0.03	0.04

Table 10: EMP data of glass in Type 1 run G34 at constant conditions of 2.5 GPa / 1000 °C; bulk water content 8.4 wt.%; 21 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	min	max	mean	σ
P	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.09	0.11	0.11	0.06	0.17	0.00	0.00	0.14	0.34	0.09	0.11	0.06	0.00	0.34	0.07	0.08
Si	31.10	30.67	30.96	31.18	30.70	31.00	31.27	31.00	30.55	30.29	30.64	31.28	31.10	30.26	31.09	31.25	30.44	30.35	30.52	30.54	30.28	30.26	31.28	30.78	0.36
Ti	0.06	0.13	0.26	0.04	0.25	0.06	0.09	0.20	0.10	0.17	0.12	0.13	0.06	0.25	0.16	0.00	0.21	0.13	0.12	0.06	0.16	0.00	0.26	0.13	0.07
Al	6.33	6.91	6.52	7.08	6.47	6.71	6.91	6.31	6.64	6.78	7.08	6.10	6.11	6.88	6.63	6.55	7.28	6.89	6.93	6.84	6.95	6.10	7.28	6.71	0.32
Fe	1.19	1.32	1.30	1.21	1.53	1.35	1.41	1.46	1.51	1.35	1.44	1.23	1.12	1.79	1.46	1.21	1.71	2.02	1.07	1.65	1.30	1.07	2.02	1.41	0.23
Mn	0.00	0.07	0.07	0.00	0.05	0.00	0.00	0.00	0.10	0.00	0.12	0.10	0.12	0.00	0.15	0.00	0.03	0.00	0.12	0.00	0.05	0.00	0.15	0.05	0.05
Mg	0.15	0.17	0.13	0.11	0.15	0.16	0.21	0.18	0.17	0.14	0.26	0.17	0.24	0.18	0.20	0.21	0.19	0.21	0.14	0.21	0.16	0.11	0.26	0.18	0.04
Ca	0.57	0.62	0.57	0.56	0.43	0.46	0.60	0.65	0.54	0.53	0.55	0.48	0.52	0.62	0.58	0.45	0.66	0.79	0.59	0.43	0.44	0.43	0.79	0.55	0.09
Na	2.34	2.67	2.53	2.15	2.42	2.15	2.39	2.46	2.39	2.40	2.41	2.44	2.44	2.40	2.43	2.20	2.29	2.39	2.27	2.34	2.37	2.15	2.67	2.37	0.12
K	4.56	4.26	4.20	4.71	4.73	4.60	4.45	4.48	4.52	4.34	4.66	4.34	4.51	4.38	4.53	4.63	4.66	4.40	4.77	4.37	4.38	4.20	4.77	4.50	0.16
F	0.09	0.12	0.14	0.12	0.06	0.08	0.00	0.11	0.02	0.10	0.18	0.23	0.17	0.16	0.02	0.08	0.04	0.11	0.00	0.17	0.18	0.00	0.23	0.10	0.07
Cl	0.00	0.03	0.00	0.05	0.00	0.00	0.10	0.07	0.03	0.05	0.10	0.07	0.00	0.00	0.12	0.00	0.00	0.00	0.07	0.03	0.03	0.00	0.12	0.04	0.04
total	46.53	46.98	46.69	47.21	46.78	46.57	47.44	46.99	46.62	46.23	47.67	46.69	46.44	47.08	47.37	46.58	47.63	47.64	46.70	46.75	46.34	46.23	47.67	46.90	0.44
P_2O_5	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.19	0.26	0.26	0.13	0.39	0.00	0.00	0.33	0.78	0.19	0.26	0.13	0.00	0.78	0.17	0.19
SiO_2	66.54	65.61	66.24	66.71	65.68	66.31	66.89	66.31	65.36	64.80	65.55	66.91	66.53	64.73	66.51	66.85	65.12	64.94	65.29	65.34	64.77	64.73	66.91	65.86	0.77
TiO_2	0.10	0.22	0.43	0.07	0.41	0.10	0.15	0.33	0.17	0.28	0.21	0.22	0.10	0.41	0.27	0.00	0.34	0.22	0.21	0.10	0.26	0.00	0.43	0.22	0.12
Al_2O_3	11.96	13.06	12.33	13.38	12.23	12.68	13.06	11.93	12.55	12.81	13.37	11.53	11.54	13.00	12.52	12.38	13.76	13.02	13.09	12.93	13.12	11.53	13.76	12.68	0.60
FeO	1.52	1.70	1.67	1.55	1.97	1.73	1.82	1.88	1.94	1.74	1.85	1.59	1.44	2.30	1.88	1.56	2.21	2.59	1.38	2.12	1.68	1.38	2.59	1.82	0.30
MnO	0.00	0.10	0.10	0.00	0.06	0.00	0.00	0.00	0.13	0.00	0.16	0.13	0.16	0.00	0.19	0.00	0.03	0.00	0.16	0.00	0.06	0.00	0.19	0.06	0.07
MgO	0.25	0.28	0.22	0.18	0.25	0.27	0.34	0.31	0.29	0.24	0.42	0.29	0.40	0.30	0.33	0.34	0.31	0.34	0.24	0.35	0.27	0.18	0.42	0.30	0.06
CaO	0.80	0.87	0.79	0.78	0.60	0.65	0.84	0.92	0.75	0.74	0.76	0.68	0.72	0.87	0.81	0.63	0.93	1.11	0.83	0.60	0.62	0.60	1.11	0.77	0.13
Na_2O	3.15	3.59	3.42	2.89	3.27	2.90	3.22	3.32	3.22	3.24	3.25	3.29	3.29	3.23	3.28	2.96	3.08	3.23	3.06	3.15	3.19	2.89	3.59	3.20	0.16
K_2O	5.50	5.14	5.06	5.68	5.69	5.54	5.36	5.39	5.44	5.23	5.62	5.23	5.43	5.28	5.46	5.58	5.61	5.30	5.74	5.26	5.28	5.06	5.74	5.42	0.19
F	0.09	0.12	0.14	0.12	0.06	0.08	0.00	0.11	0.02	0.10	0.18	0.22	0.17	0.16	0.02	0.08	0.04	0.11	0.00	0.17	0.18	0.00	0.23	0.10	0.07
Cl	0.00	0.03	0.00	0.05	0.00	0.00	0.10	0.07	0.03	0.05	0.10	0.07	0.00	0.00	0.12	0.00	0.00	0.00	0.07	0.03	0.03	0.00	0.12	0.04	0.04
total	90.19	90.65	90.33	91.35	90.19	90.22	91.77	90.64	90.01	89.36	91.63	90.30	89.83	90.60	91.36	90.35	91.73	91.59	90.25	90.23	89.50	89.36	91.77	90.58	0.72
H_2O	9.81	9.35	9.67	8.65	9.81	9.78	8.23	9.36	9.99	10.64	8.37	9.70	10.17	9.40	8.64	9.65	8.27	8.41	9.75	9.77	10.50	8.23	10.64	9.42	0.72
recalculated to 100 % total:																									
P_2O_5	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.15	0.22	0.29	0.29	0.15	0.43	0.00	0.00	0.35	0.85	0.22	0.29	0.15	0.00	0.85	0.18	0.21
SiO_2	73.77	72.37	73.33	73.03	72.82	73.49	72.89	73.16	72.61	72.52	71.54	74.10	74.06	71.45	72.80	73.99	70.99	70.90	72.35	72.41	72.37	70.90	74.10	72.71	0.94
TiO_2	0.11	0.25	0.47	0.07	0.46	0.11	0.17	0.36	0.19	0.31	0.22	0.25	0.12	0.45	0.30	0.00	0.37	0.24	0.23	0.11	0.29	0.00	0.47	0.24	0.13
Al_2O_3	13.26	14.41	13.65	14.65	13.56	14.05	14.23	13.16	13.95	14.33	14.60	12.76	12.85	14.34	13.71	13.70	15.00	14.22	14.51	14.32	14.66	12.76	15.00	14.00	0.62
FeO	1.69	1.88	1.85	1.70	2.19	1.92	1.98	2.08	2.16	1.94	2.02	1.76	1.60	2.54	2.06	1.72	2.40	2.83	1.53	2.35	1.87	1.53	2.83	2.00	0.32
MnO	0.00	0.11	0.11	0.00	0.07	0.00	0.00	0.00	0.14	0.00	0.17	0.14	0.18	0.00	0.21	0.00	0.04	0.00	0.18	0.00	0.07	0.00	0.21	0.07	0.08
MgO	0.28	0.31	0.24	0.20	0.28	0.30	0.37	0.34	0.32	0.27	0.46	0.32	0.44	0.33	0.36	0.38	0.34	0.37	0.26	0.39	0.30	0.20	0.46	0.33	0.06
CaO	0.88	0.96	0.88	0.85	0.67	0.72	0.91	1.01	0.83	0.82	0.83	0.75	0.80	0.96	0.89	0.70	1.01	1.21	0.92	0.67	0.69	0.67	1.21	0.86	0.13
Na_2O	3.49	3.96	3.78	3.17	3.62	3.21	3.51	3.66	3.58	3.62	3.55	3.64	3.66	3.56	3.59	3.28	3.36	3.52	3.39	3.49	3.57	3.17	3.96	3.53	0.18
K_2O	6.09	5.66	5.60	6.21	6.31	6.15	5.85	5.95	6.04	5.86	6.13	5.79	6.05	5.83	5.98	6.17	6.11	5.78	6.36	5.83	5.90	5.60	6.36	5.98	0.21
F	0.10	0.14	0.16	0.13	0.06	0.09	0.00	0.12	0.02	0.11	0.20	0.25	0.19	0.18	0.02	0.09	0.04	0.12	0.00	0.19	0.20	0.00	0.25	0.11	0.07
Cl	0.00	0.03	0.00	0.05	0.00	0.00	0.11	0.08	0.03	0.05	0.11	0.08	0.00	0.00	0.13	0.00	0.00	0.00	0.08	0.03	0.03	0.00	0.13	0.04	0.04

Table 11: EMP data of glass in Type 1 run G89 at constant conditions of 3.5 GPa / 1000 °C; bulk water content 5.7 wt.%; 45 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.09	0.09	0.06	0.00	0.03	0.00	0.15	0.15	0.12	0.03	0.06	0.06	0.00	0.00	0.00	0.06	0.18	0.00	0.03	0.12	0.18	0.00	0.00	0.06	0.06	0.00	0.06
Si	31.32	31.18	31.10	31.10	30.98	31.00	31.05	31.21	30.74	30.49	30.27	31.07	30.81	31.10	31.36	30.56	31.34	31.01	30.74	31.23	30.80	31.51	30.91	30.98	31.17	30.50	30.66
Ti	0.23	0.14	0.07	0.22	0.21	0.15	0.17	0.17	0.12	0.18	0.14	0.07	0.17	0.21	0.20	0.14	0.30	0.18	0.17	0.21	0.18	0.20	0.23	0.20	0.24	0.12	0.04
Al	7.46	7.46	6.99	7.17	7.87	7.35	7.34	7.38	7.59	7.42	7.28	7.15	7.24	7.41	7.57	7.43	7.35	7.47	7.27	7.24	7.29	7.29	7.22	7.51	7.16	7.26	7.49
Fe	0.96	0.67	1.13	0.65	0.87	1.06	0.68	0.75	0.77	1.09	0.70	0.80	0.80	1.01	0.70	0.87	0.75	0.56	0.68	0.91	0.77	0.77	0.82	0.94	0.94	0.68	0.68
Mn	0.00	0.00	0.00	0.00	0.05	0.13	0.00	0.05	0.08	0.20	0.00	0.00	0.03	0.07	0.00	0.05	0.00	0.00	0.05	0.00	0.10	0.00	0.07	0.05	0.00	0.10	0.13
Mg	0.09	0.10	0.12	0.06	0.13	0.03	0.17	0.07	0.10	0.05	0.16	0.10	0.06	0.14	0.12	0.14	0.16	0.12	0.09	0.11	0.05	0.06	0.19	0.08	0.11	0.06	0.13
Ca	0.69	0.58	0.54	0.66	0.49	0.54	0.61	0.48	0.49	0.44	0.42	0.55	0.42	0.49	0.55	0.42	0.37	0.48	0.46	0.62	0.53	0.54	0.37	0.67	0.42	0.43	0.31
Na	2.95	2.80	2.93	2.90	2.58	2.74	2.62	2.71	2.39	2.93	2.78	2.49	2.60	2.93	3.11	2.57	2.88	2.93	2.67	2.88	2.95	2.73	2.66	2.67	2.57	2.45	2.50
K	5.56	5.53	4.97	5.31	4.97	5.21	5.47	5.51	5.44	5.26	5.27	5.07	5.13	4.90	5.35	5.78	5.07	5.45	5.46	5.87	5.80	5.15	5.69	5.40	5.32	5.53	5.28
F	0.05	0.09	0.24	0.20	0.00	0.04	0.14	0.13	0.13	0.03	0.15	0.10	0.03	0.13	0.00	0.19	0.11	0.01	0.14	0.08	0.02	0.04	0.03	0.03	0.02	0.17	0.22
Cl	0.05	0.08	0.03	0.00	0.03	0.03	0.03	0.08	0.00	0.03	0.00	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.03	0.00
total	49.45	48.74	48.18	48.27	48.19	48.27	48.42	48.68	47.97	48.15	47.24	47.53	47.35	48.39	48.96	48.20	48.50	48.20	47.74	49.37	48.65	48.29	48.19	48.59	48.01	47.33	47.49
P_2O_5	0.21	0.21	0.14	0.00	0.07	0.00	0.34	0.34	0.27	0.07	0.14	0.14	0.00	0.00	0.00	0.14	0.41	0.00	0.07	0.27	0.41	0.00	0.00	0.14	0.14	0.00	0.14
SiO_2	67.01	66.71	66.54	66.53	66.27	66.33	66.42	66.77	65.76	65.23	64.76	66.47	65.91	66.53	67.09	65.38	67.05	66.34	65.76	66.81	65.88	67.40	66.12	66.27	66.68	65.24	65.60
TiO_2	0.38	0.23	0.12	0.36	0.35	0.25	0.29	0.29	0.19	0.31	0.23	0.12	0.29	0.34	0.33	0.23	0.50	0.31	0.29	0.34	0.31	0.33	0.38	0.33	0.40	0.19	0.06
Al_2O_3	14.09	14.09	13.21	13.55	14.86	13.89	13.86	13.94	14.34	14.02	13.76	13.50	13.67	14.00	14.31	14.04	13.88	14.11	13.73	13.68	13.78	13.78	13.64	14.19	13.52	13.72	14.16
FeO	1.24	0.87	1.46	0.84	1.12	1.36	0.87	0.96	0.99	1.40	0.90	1.03	1.03	1.30	0.90	1.12	0.96	0.71	0.87	1.17	0.99	0.99	1.05	1.21	1.21	0.87	0.87
MnO	0.00	0.00	0.00	0.00	0.06	0.16	0.00	0.06	0.10	0.26	0.00	0.00	0.03	0.10	0.00	0.06	0.00	0.00	0.06	0.00	0.13	0.00	0.10	0.06	0.00	0.13	0.16
MgO	0.15	0.17	0.20	0.10	0.21	0.05	0.28	0.11	0.17	0.08	0.27	0.16	0.10	0.23	0.20	0.23	0.27	0.19	0.15	0.18	0.08	0.10	0.32	0.13	0.18	0.10	0.21
CaO	0.97	0.82	0.75	0.92	0.69	0.75	0.85	0.67	0.69	0.62	0.59	0.77	0.59	0.68	0.77	0.59	0.52	0.67	0.64	0.87	0.74	0.75	0.52	0.93	0.58	0.60	0.44
Na_2O	3.97	3.78	3.95	3.91	3.48	3.69	3.54	3.65	3.22	3.95	3.75	3.36	3.50	3.95	4.20	3.46	3.88	3.94	3.60	3.89	3.97	3.68	3.58	3.60	3.46	3.31	3.37
K_2O	6.70	6.67	5.98	6.39	5.98	6.27	6.59	6.63	6.55	6.33	6.35	6.10	6.18	5.90	6.45	6.96	6.10	6.57	6.57	7.08	6.98	6.20	6.85	6.51	6.41	6.67	6.36
F	0.05	0.09	0.24	0.20	0.00	0.04	0.14	0.13	0.13	0.03	0.15	0.10	0.03	0.13	0.00	0.19	0.11	0.01	0.14	0.08	0.02	0.04	0.03	0.03	0.02	0.17	0.21
Cl	0.05	0.08	0.03	0.00	0.03	0.03	0.03	0.08	0.00	0.03	0.00	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.03	0.00
total	94.79	93.65	92.51	92.72	93.11	92.80	93.14	93.57	92.36	92.30	90.83	91.76	91.37	93.11	94.24	92.32	93.64	92.85	91.82	94.41	93.27	93.26	92.58	93.39	92.61	90.96	91.49
H_2O	5.21	6.35	7.49	7.28	6.89	7.20	6.86	6.43	7.64	7.70	9.17	8.24	8.63	6.89	5.76	7.68	6.36	7.15	8.18	5.59	6.73	6.74	7.42	6.61	7.39	9.04	8.51
recalculated to 100 % total:																											
P_2O_5	0.22	0.22	0.15	0.00	0.07	0.00	0.37	0.37	0.30	0.07	0.15	0.15	0.00	0.00	0.00	0.15	0.44	0.00	0.07	0.29	0.44	0.00	0.00	0.15	0.15	0.00	0.15
SiO_2	70.70	71.23	71.93	71.76	71.18	71.47	71.31	71.36	71.20	70.67	71.29	72.43	72.14	71.45	71.20	70.82	71.60	71.45	71.62	70.76	70.63	72.27	71.42	70.95	72.01	71.73	71.70
TiO_2	0.40	0.25	0.12	0.39	0.37	0.27	0.31	0.31	0.21	0.33	0.25	0.13	0.32	0.37	0.35	0.25	0.53	0.33	0.31	0.36	0.33	0.35	0.41	0.35	0.43	0.21	0.06
Al_2O_3	14.87	15.05	14.28	14.61	15.96	14.97	14.88	14.90	15.52	15.19	15.15	14.71	14.96	15.03	15.18	15.21	14.83	15.20	14.95	14.49	14.77	14.78	14.73	15.20	14.60	15.08	15.47
FeO	1.30	0.93	1.58	0.90	1.20	1.47	0.93	1.03	1.08	1.51	0.99	1.12	1.12	1.40	0.95	1.21	1.03	0.77	0.95	1.24	1.06	1.06	1.14	1.29	1.31	0.96	0.95
MnO	0.00	0.00	0.00	0.00	0.07	0.18	0.00	0.07	0.11	0.28	0.00	0.00	0.04	0.10	0.00	0.07	0.00	0.00	0.07	0.00	0.14	0.00	0.10	0.07	0.00	0.14	0.18
MgO	0.16	0.18	0.22	0.10	0.22	0.05	0.30	0.12	0.18	0.08	0.30	0.18	0.11	0.25	0.21	0.25	0.29	0.21	0.17	0.19	0.08	0.11	0.34	0.14	0.20	0.11	0.23
CaO	1.02	0.87	0.81	0.99	0.74	0.81	0.92	0.71	0.74	0.67	0.65	0.84	0.64	0.73	0.82	0.64	0.55	0.72	0.69	0.92	0.79	0.81	0.56	1.00	0.63	0.66	0.48
Na_2O	4.19	4.03	4.27	4.22	3.74	3.98	3.80	3.90	3.49	4.28	4.13	3.66	3.83	4.24	4.45	3.75	4.15	4.25	3.92	4.12	4.26	3.95	3.87	3.86	3.74	3.64	3.69
K_2O	7.06	7.12	6.47	6.89	6.43	6.76	7.08	7.09	7.09	6.86	6.99	6.65	6.76	6.34	6.84	7.54	6.52	7.07	7.16	7.49	7.49	6.65	7.40	6.97	6.93	7.33	6.95
F	0.05	0.10	0.26	0.22	0.00	0.05	0.15	0.13	0.14	0.04	0.17	0.11	0.03	0.14	0.00	0.21	0.12	0.01	0.15	0.08	0.02	0.04	0.03	0.03	0.02	0.19	0.24
Cl	0.06	0.09	0.03	0.00	0.03	0.03	0.03	0.09	0.00	0.03	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.03	0.00

Table 11 (continued)**:** EMP data of glass in Type 1 run G89.

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	min	max	mean	σ
P	0.00	0.09	0.27	0.00	0.00	0.15	0.00	0.12	0.12	0.15	0.00	0.06	0.09	0.03	0.12	0.12	0.00	0.03	0.00	0.27	0.07	0.07
Si	31.17	30.26	31.06	30.79	31.01	31.35	31.10	31.19	30.84	31.30	31.00	31.04	31.36	30.92	30.98	31.21	30.80	31.34	30.26	31.51	31.00	0.29
Ti	0.20	0.13	0.01	0.20	0.21	0.16	0.21	0.14	0.23	0.13	0.10	0.18	0.18	0.15	0.13	0.15	0.17	0.07	0.01	0.30	0.16	0.06
Al	7.18	7.25	6.96	7.21	7.16	7.03	7.36	7.42	7.39	7.41	7.26	7.54	7.31	7.49	7.62	7.33	7.39	7.58	6.96	7.87	7.34	0.17
Fe	0.89	0.77	0.77	0.92	1.01	0.89	0.65	1.01	0.96	0.98	0.80	0.89	1.35	0.58	0.43	0.75	0.46	1.18	0.43	1.35	0.83	0.18
Mn	0.00	0.05	0.03	0.07	0.18	0.00	0.07	0.00	0.05	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.13	0.00	0.20	0.04	0.05
Mg	0.20	0.10	0.09	0.13	0.12	0.09	0.02	0.11	0.06	0.12	0.10	0.10	0.15	0.13	0.09	0.09	0.06	0.12	0.02	0.20	0.10	0.04
Ca	0.37	0.72	0.41	0.75	0.48	0.47	0.47	0.57	0.49	0.49	0.53	0.55	0.62	0.70	0.59	0.55	0.38	0.37	0.31	0.75	0.51	0.10
Na	2.77	2.56	2.64	2.86	2.62	2.74	3.21	2.51	2.93	3.05	2.81	2.76	2.68	2.70	2.70	2.27	2.91	3.10	2.27	3.21	2.75	0.20
K	5.34	5.54	5.47	5.14	5.08	5.40	5.50	5.17	5.42	5.45	5.21	5.05	5.37	5.10	5.64	5.26	5.60	5.16	4.90	5.87	5.35	0.23
F	0.09	0.00	0.16	0.21	0.14	0.12	0.00	0.08	0.00	0.29	0.06	0.07	0.19	0.04	0.17	0.00	0.09	0.10	0.00	0.29	0.10	0.07
Cl	0.00	0.03	0.00	0.05	0.00	0.00	0.05	0.05	0.08	0.03	0.05	0.13	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.13	0.03	0.03
total	48.21	47.49	47.86	48.34	48.00	48.39	48.64	48.37	48.56	49.39	47.91	48.38	49.30	47.92	48.51	47.75	47.86	49.16	47.24	49.45	48.27	0.55
P_2O_5	0.00	0.20	0.62	0.00	0.00	0.34	0.00	0.27	0.27	0.34	0.00	0.14	0.21	0.07	0.27	0.27	0.00	0.07	0.00	0.62	0.15	0.15
SiO_2	66.69	64.74	66.45	65.87	66.35	67.07	66.54	66.73	65.97	66.96	66.31	66.40	67.09	66.15	66.27	66.78	65.89	67.05	64.74	67.40	66.32	0.61
TiO_2	0.33	0.21	0.02	0.33	0.35	0.27	0.35	0.23	0.38	0.21	0.17	0.31	0.31	0.25	0.21	0.25	0.29	0.12	0.02	0.50	0.27	0.09
Al_2O_3	13.56	13.69	13.15	13.62	13.52	13.28	13.91	14.02	13.96	14.01	13.71	14.25	13.81	14.14	14.40	13.86	13.96	14.31	13.15	14.86	13.88	0.33
FeO	1.15	1.00	0.99	1.18	1.30	1.15	0.84	1.30	1.24	1.27	1.02	1.15	1.73	0.74	0.56	0.96	0.59	1.51	0.56	1.73	1.07	0.24
MnO	0.00	0.06	0.03	0.10	0.23	0.00	0.10	0.00	0.06	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.16	0.00	0.26	0.05	0.07
MgO	0.33	0.16	0.14	0.22	0.20	0.15	0.03	0.18	0.10	0.19	0.17	0.17	0.25	0.21	0.14	0.14	0.10	0.20	0.03	0.33	0.17	0.07
CaO	0.52	1.01	0.57	1.05	0.67	0.65	0.65	0.80	0.68	0.68	0.74	0.77	0.87	0.99	0.82	0.77	0.54	0.52	0.44	1.05	0.72	0.15
Na_2O	3.74	3.44	3.56	3.85	3.53	3.69	4.33	3.38	3.94	4.11	3.78	3.72	3.61	3.64	3.64	3.05	3.92	4.17	3.05	4.33	3.71	0.27
K_2O	6.43	6.68	6.59	6.19	6.12	6.50	6.62	6.23	6.52	6.56	6.28	6.09	6.47	6.14	6.79	6.34	6.74	6.22	5.90	7.08	6.44	0.28
F	0.09	0.00	0.16	0.21	0.14	0.12	0.00	0.08	0.00	0.28	0.06	0.07	0.19	0.04	0.17	0.00	0.09	0.10	0.00	0.29	0.10	0.07
Cl	0.00	0.03	0.00	0.05	0.00	0.00	0.05	0.05	0.08	0.03	0.05	0.13	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.13	0.03	0.03
total	92.79	91.22	92.22	92.58	92.35	93.17	93.40	93.23	93.20	94.52	92.26	93.13	94.44	92.45	93.27	92.44	92.08	94.39	90.84	94.79	92.84	0.94
H_2O	7.21	8.78	7.78	7.42	7.65	6.83	6.60	6.77	6.80	5.48	7.74	6.87	5.56	7.55	6.73	7.56	7.92	5.61	5.21	9.17	7.16	0.94
recalculated to 100 % total:																						
P_2O_5	0.00	0.22	0.67	0.00	0.00	0.37	0.00	0.29	0.29	0.36	0.00	0.15	0.22	0.07	0.29	0.30	0.00	0.07	0.00	0.67	0.16	0.16
SiO_2	71.87	70.97	72.06	71.15	71.85	71.98	71.24	71.58	70.79	70.84	71.87	71.30	71.03	71.56	71.05	72.23	71.56	71.04	70.63	72.43	71.43	0.47
TiO_2	0.35	0.23	0.02	0.35	0.37	0.29	0.37	0.25	0.41	0.22	0.19	0.33	0.32	0.27	0.23	0.27	0.31	0.12	0.02	0.53	0.29	0.10
Al_2O_3	14.62	15.01	14.26	14.72	14.64	14.25	14.90	15.04	14.98	14.82	14.86	15.30	14.62	15.30	15.44	14.99	15.16	15.16	14.25	15.96	14.95	0.34
FeO	1.24	1.09	1.08	1.27	1.41	1.23	0.90	1.40	1.33	1.34	1.11	1.23	1.83	0.81	0.60	1.04	0.64	1.60	0.60	1.83	1.15	0.25
MnO	0.00	0.07	0.04	0.10	0.25	0.00	0.10	0.00	0.07	0.00	0.00	0.00	0.00	0.07	0.07	0.00	0.00	0.17	0.00	0.28	0.06	0.07
MgO	0.35	0.18	0.15	0.24	0.22	0.16	0.03	0.19	0.10	0.20	0.19	0.18	0.26	0.23	0.15	0.15	0.11	0.21	0.03	0.35	0.18	0.07
CaO	0.56	1.10	0.62	1.14	0.72	0.70	0.70	0.86	0.73	0.72	0.80	0.82	0.92	1.07	0.88	0.83	0.58	0.55	0.48	1.14	0.77	0.16
Na_2O	4.03	3.78	3.86	4.16	3.83	3.96	4.63	3.63	4.23	4.35	4.10	3.99	3.82	3.94	3.91	3.30	4.26	4.42	3.30	4.63	3.99	0.27
K_2O	6.93	7.32	7.14	6.69	6.63	6.98	7.09	6.68	7.00	6.94	6.80	6.54	6.85	6.64	7.28	6.86	7.32	6.59	6.34	7.54	6.94	0.30
F	0.10	0.00	0.17	0.23	0.15	0.13	0.00	0.08	0.00	0.30	0.07	0.08	0.20	0.05	0.18	0.00	0.09	0.10	0.00	0.30	0.10	0.08
Cl	0.00	0.03	0.00	0.06	0.00	0.00	0.06	0.06	0.09	0.03	0.06	0.14	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.14	0.03	0.04

Table 12: EMP data of glass in Type 4 run G53 without cooling, quenched at conditions of 3.5 GPa / 1000 °C; bulk water content 2.8 wt.%; 20 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	min	max	mean	σ
P	0.00	0.06	0.00	0.28	0.03	0.00	0.00	0.09	0.11	0.17	0.09	0.03	0.14	0.03	0.00	0.06	0.11	0.00	0.00	0.09	0.00	0.28	0.06	0.07
Si	30.43	31.25	30.82	30.27	30.84	30.66	30.67	30.92	30.46	30.93	31.15	31.26	31.19	30.56	31.02	31.27	31.23	30.54	30.86	31.00	30.27	31.27	30.87	0.31
Ti	0.19	0.23	0.24	0.17	0.15	0.26	0.19	0.26	0.28	0.21	0.09	0.13	0.16	0.13	0.06	0.14	0.06	0.16	0.21	0.11	0.06	0.28	0.17	0.06
Al	8.24	7.38	7.85	7.74	8.07	7.91	7.96	8.17	7.67	7.99	7.79	8.15	7.80	8.36	8.20	7.88	8.03	8.14	8.26	7.94	7.38	8.36	7.98	0.24
Fe	0.65	0.79	0.60	0.72	0.56	1.06	0.62	0.58	0.90	0.71	1.01	0.65	0.67	0.85	0.72	0.65	0.97	0.90	0.92	1.08	0.56	1.08	0.78	0.17
Mn	0.07	0.00	0.00	0.10	0.00	0.07	0.00	0.02	0.02	0.00	0.20	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.17	0.00	0.00	0.20	0.04	0.06
Mg	0.15	0.10	0.07	0.07	0.09	0.10	0.08	0.08	0.06	0.08	0.03	0.07	0.07	0.14	0.05	0.03	0.09	0.08	0.17	0.09	0.03	0.17	0.08	0.03
Ca	0.59	0.27	0.25	0.28	0.24	0.35	0.39	0.14	0.29	0.26	0.30	0.19	0.28	0.36	0.49	0.26	0.67	0.40	0.54	0.30	0.14	0.67	0.34	0.14
Na	2.96	2.66	2.95	2.73	2.59	2.69	2.72	2.46	2.70	2.59	2.85	2.67	2.64	2.72	2.31	2.31	2.60	2.67	2.67	2.58	2.31	2.96	2.65	0.17
K	6.13	5.89	6.33	6.83	6.29	6.90	6.37	6.38	6.59	6.70	6.47	6.36	6.59	6.81	6.55	6.49	6.33	6.91	6.22	6.85	5.89	6.91	6.50	0.28
F	0.05	0.00	0.00	0.08	0.25	0.17	0.16	0.21	0.12	0.29	0.23	0.19	0.00	0.21	0.18	0.20	0.20	0.14	0.21	0.17	0.00	0.29	0.15	0.09
Cl	0.00	0.07	0.00	0.00	0.00	0.03	0.00	0.00	0.07	0.03	0.10	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10	0.02	0.04
total	49.44	48.69	49.10	49.25	49.12	50.19	49.15	49.31	49.28	49.95	50.31	49.70	49.59	50.18	49.70	49.29	50.29	49.93	50.21	50.30	48.69	50.31	49.65	0.50
P_2O_5	0.00	0.13	0.00	0.65	0.07	0.00	0.00	0.20	0.26	0.39	0.19	0.07	0.33	0.06	0.00	0.13	0.26	0.00	0.00	0.19	0.00	0.65	0.15	0.17
SiO_2	65.09	66.85	65.94	64.75	65.98	65.60	65.62	66.16	65.15	66.17	66.65	66.88	66.72	65.38	66.37	66.90	66.82	65.32	66.02	66.31	64.75	66.90	66.03	0.67
TiO_2	0.31	0.38	0.40	0.28	0.26	0.43	0.31	0.43	0.46	0.34	0.15	0.22	0.27	0.22	0.10	0.24	0.10	0.27	0.34	0.19	0.10	0.46	0.29	0.10
Al_2O_3	15.56	13.94	14.83	14.63	15.24	14.94	15.05	15.44	14.50	15.09	14.73	15.40	14.73	15.79	15.49	14.89	15.17	15.38	15.61	15.00	13.94	15.79	15.07	0.44
FeO	0.83	1.01	0.77	0.92	0.71	1.37	0.80	0.74	1.16	0.92	1.30	0.83	0.86	1.10	0.92	0.83	1.25	1.16	1.19	1.39	0.71	1.39	1.00	0.22
MnO	0.10	0.00	0.00	0.13	0.00	0.09	0.00	0.03	0.03	0.00	0.25	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.22	0.00	0.00	0.25	0.05	0.08
MgO	0.25	0.17	0.11	0.12	0.15	0.16	0.13	0.13	0.10	0.14	0.05	0.12	0.11	0.23	0.08	0.05	0.15	0.14	0.27	0.15	0.05	0.27	0.14	0.06
CaO	0.83	0.38	0.35	0.39	0.33	0.50	0.54	0.20	0.41	0.36	0.42	0.27	0.39	0.51	0.69	0.36	0.93	0.56	0.75	0.42	0.20	0.93	0.48	0.19
Na_2O	3.99	3.59	3.98	3.67	3.49	3.62	3.66	3.32	3.64	3.49	3.84	3.60	3.55	3.67	3.11	3.11	3.51	3.60	3.60	3.47	3.11	3.99	3.58	0.22
K_2O	7.38	7.09	7.62	8.22	7.58	8.31	7.67	7.69	7.94	8.07	7.80	7.66	7.94	8.21	7.89	7.82	7.62	8.32	7.49	8.26	7.09	8.32	7.83	0.33
F	0.05	0.00	0.00	0.08	0.25	0.17	0.16	0.21	0.12	0.29	0.23	0.19	0.00	0.21	0.18	0.20	0.20	0.14	0.21	0.17	0.00	0.29	0.15	0.09
Cl	0.00	0.07	0.00	0.00	0.00	0.03	0.00	0.00	0.07	0.03	0.10	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10	0.02	0.04
total	94.36	93.59	94.00	93.80	93.97	95.13	93.87	94.45	93.78	95.15	95.60	95.16	94.95	95.29	94.92	94.46	95.93	94.83	95.60	95.56	93.59	95.93	94.72	0.72
H_2O	5.64	6.41	6.00	6.20	6.03	4.87	6.13	5.55	6.22	4.85	4.40	4.84	5.05	4.71	5.08	5.54	4.07	5.17	4.40	4.44	4.07	6.41	5.28	0.72
recalculated to 100 % total:																								
P_2O_5	0.00	0.14	0.00	0.69	0.07	0.00	0.00	0.21	0.28	0.41	0.20	0.07	0.35	0.07	0.00	0.14	0.27	0.00	0.00	0.20	0.00	0.69	0.16	0.18
SiO_2	68.98	71.43	70.15	69.03	70.22	68.96	69.90	70.05	69.48	69.54	69.72	70.28	70.27	68.61	69.92	70.82	69.66	68.89	69.05	69.40	68.61	71.43	69.72	0.71
TiO_2	0.33	0.40	0.42	0.29	0.27	0.45	0.33	0.45	0.49	0.36	0.16	0.23	0.29	0.23	0.11	0.25	0.11	0.29	0.36	0.20	0.11	0.49	0.30	0.11
Al_2O_3	16.49	14.89	15.78	15.59	16.22	15.70	16.03	16.34	15.46	15.86	15.41	16.18	15.52	16.57	16.32	15.76	15.82	16.22	16.33	15.70	14.89	16.57	15.91	0.43
FeO	0.88	1.08	0.82	0.98	0.76	1.43	0.86	0.79	1.24	0.97	1.36	0.87	0.91	1.15	0.97	0.88	1.30	1.22	1.24	1.46	0.76	1.46	1.06	0.22
MnO	0.10	0.00	0.00	0.13	0.00	0.10	0.00	0.03	0.03	0.00	0.26	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.23	0.00	0.00	0.26	0.05	0.08
MgO	0.26	0.18	0.12	0.13	0.16	0.17	0.14	0.14	0.11	0.14	0.06	0.12	0.12	0.24	0.09	0.06	0.15	0.14	0.29	0.15	0.06	0.29	0.15	0.06
CaO	0.87	0.40	0.37	0.42	0.35	0.52	0.58	0.21	0.43	0.38	0.44	0.28	0.41	0.54	0.73	0.38	0.97	0.59	0.78	0.44	0.21	0.97	0.50	0.20
Na_2O	4.23	3.83	4.24	3.92	3.72	3.80	3.90	3.52	3.88	3.66	4.01	3.79	3.74	3.85	3.28	3.30	3.66	3.80	3.76	3.63	3.28	4.24	3.78	0.24
K_2O	7.82	7.58	8.11	8.77	8.07	8.74	8.17	8.14	8.46	8.48	8.16	8.04	8.36	8.61	8.31	8.28	7.94	8.77	7.83	8.64	7.58	8.77	8.26	0.34
F	0.05	0.00	0.00	0.08	0.27	0.18	0.17	0.22	0.13	0.30	0.24	0.20	0.00	0.22	0.19	0.21	0.21	0.14	0.22	0.18	0.00	0.30	0.16	0.09
Cl	0.00	0.08	0.00	0.00	0.00	0.03	0.00	0.00	0.08	0.03	0.10	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.10	0.02	0.04

Table 13: EMP data of glass in Type 4 run G94 without cooling, quenched at conditions of 3.5 GPa / 1000 °C; bulk water content 2.8 wt.%; 38 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.06	0.09	0.15	0.21	0.09	0.15	0.12	0.00	0.12	0.12	0.00	0.06	0.00	0.15	0.03	0.12	0.33	0.09	0.00	0.09	0.00	0.09	0.12	0.03	0.00	0.12	0.06
Si	28.38	29.06	28.96	28.59	28.73	29.03	29.03	29.26	29.04	29.26	28.99	29.32	28.95	29.15	29.00	28.65	28.26	28.13	28.50	28.23	28.42	28.95	29.04	28.84	28.53	28.03	28.45
Ti	0.16	0.05	0.17	0.19	0.12	0.00	0.22	0.11	0.24	0.10	0.24	0.00	0.20	0.24	0.12	0.21	0.06	0.22	0.22	0.13	0.20	0.08	0.22	0.16	0.16	0.18	0.08
Al	7.14	7.30	7.24	7.07	7.17	7.24	7.29	7.45	6.92	7.26	7.27	7.02	6.98	7.33	7.27	7.30	7.15	6.80	7.09	6.95	6.95	6.66	7.07	7.03	6.98	7.11	6.89
Fe	0.73	0.42	0.63	0.61	0.73	0.76	1.00	0.78	0.64	0.85	0.37	0.64	0.44	0.73	0.73	0.68	0.69	0.69	0.64	0.83	0.81	0.81	0.39	0.64	0.69	0.81	0.56
Mn	0.03	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.08	0.05	0.00	0.05	0.00	0.08	0.20	0.00	0.03	0.00	0.00	0.00	0.03	0.00	0.08	0.00	0.00	0.00
Mg	0.01	0.01	0.02	0.09	0.10	0.06	0.03	0.00	0.06	0.00	0.04	0.02	0.03	0.06	0.09	0.00	0.00	0.06	0.04	0.03	0.07	0.05	0.01	0.06	0.05	0.07	0.04
Ca	0.29	0.22	0.16	0.33	0.28	0.04	0.18	0.12	0.21	0.24	0.32	0.14	0.09	0.25	0.30	0.25	0.15	0.28	0.16	0.30	0.17	0.22	0.05	0.30	0.28	0.30	0.17
Na	2.29	2.22	2.10	2.03	2.34	2.39	2.14	2.06	2.22	2.32	2.37	2.40	2.14	2.11	2.07	2.25	1.96	2.54	2.29	2.48	2.45	2.44	2.44	1.98	2.00	2.40	2.30
K	7.51	7.25	7.77	7.21	6.79	7.28	7.38	7.08	6.84	6.98	7.17	7.29	6.93	7.00	7.05	7.25	7.11	7.34	7.11	7.30	7.13	7.52	7.11	7.46	6.91	7.21	7.17
F	0.19	0.14	0.11	0.14	0.00	0.13	0.04	0.10	0.19	0.29	0.27	0.09	0.06	0.07	0.09	0.13	0.10	0.10	0.08	0.28	0.22	0.26	0.11	0.18	0.12	0.15	0.39
Cl	0.05	0.08	0.05	0.00	0.00	0.00	0.03	0.08	0.11	0.11	0.13	0.00	0.00	0.03	0.05	0.00	0.00	0.05	0.03	0.03	0.08	0.00	0.00	0.11	0.03	0.00	0.00
total	46.84	46.84	47.39	46.47	46.35	47.07	47.47	47.02	46.61	47.61	47.21	46.97	45.87	47.13	46.89	47.06	45.80	46.31	46.16	46.65	46.48	47.11	46.54	46.86	45.73	46.38	46.11
P_2O_5	0.14	0.20	0.34	0.48	0.20	0.34	0.27	0.00	0.27	0.27	0.00	0.14	0.00	0.34	0.07	0.27	0.75	0.20	0.00	0.20	0.00	0.20	0.27	0.07	0.00	0.27	0.14
SiO_2	60.72	62.16	61.96	61.16	61.47	62.11	62.09	62.59	62.12	62.59	62.03	62.72	61.94	62.37	62.04	61.30	60.47	60.17	60.98	60.40	60.79	61.94	62.12	61.70	61.03	59.97	60.87
TiO_2	0.27	0.08	0.29	0.31	0.19	0.00	0.37	0.18	0.41	0.17	0.41	0.00	0.33	0.41	0.19	0.35	0.10	0.37	0.37	0.21	0.33	0.14	0.37	0.27	0.27	0.29	0.14
Al_2O_3	13.49	13.79	13.69	13.36	13.54	13.68	13.77	14.07	13.08	13.72	13.74	13.26	13.18	13.85	13.73	13.80	13.51	12.85	13.40	13.13	13.13	12.59	13.35	13.28	13.18	13.43	13.01
FeO	0.94	0.53	0.82	0.79	0.94	0.97	1.28	1.00	0.82	1.10	0.47	0.82	0.57	0.94	0.94	0.88	0.88	0.88	0.82	1.07	1.04	1.04	0.50	0.82	0.88	1.04	0.73
MnO	0.03	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.10	0.07	0.00	0.07	0.00	0.10	0.26	0.00	0.03	0.00	0.00	0.00	0.03	0.00	0.10	0.00	0.00	0.00
MgO	0.01	0.02	0.04	0.14	0.16	0.10	0.05	0.00	0.10	0.00	0.06	0.03	0.05	0.10	0.15	0.00	0.00	0.10	0.07	0.05	0.12	0.09	0.01	0.10	0.09	0.11	0.06
CaO	0.41	0.31	0.22	0.46	0.39	0.05	0.25	0.17	0.29	0.34	0.44	0.20	0.12	0.36	0.42	0.36	0.20	0.39	0.22	0.42	0.24	0.31	0.07	0.42	0.39	0.42	0.24
Na_2O	3.09	2.99	2.83	2.74	3.15	3.23	2.89	2.77	3.00	3.12	3.19	3.24	2.89	2.85	2.80	3.03	2.64	3.42	3.09	3.35	3.30	3.29	3.29	2.66	2.69	3.24	3.10
K_2O	9.05	8.74	9.36	8.69	8.18	8.76	8.89	8.53	8.24	8.41	8.63	8.78	8.35	8.43	8.50	8.74	8.57	8.84	8.56	8.79	8.58	9.06	8.56	8.99	8.32	8.69	8.64
F	0.18	0.14	0.11	0.14	0.00	0.13	0.04	0.10	0.19	0.29	0.27	0.09	0.06	0.07	0.09	0.13	0.10	0.09	0.08	0.28	0.22	0.26	0.10	0.18	0.12	0.15	0.39
Cl	0.05	0.08	0.05	0.00	0.00	0.00	0.03	0.08	0.11	0.11	0.13	0.00	0.00	0.03	0.05	0.00	0.00	0.05	0.03	0.03	0.08	0.00	0.00	0.11	0.03	0.00	0.00
total	88.30	88.97	89.66	88.20	88.24	89.32	89.94	89.43	88.55	90.08	89.30	89.23	87.53	89.70	89.04	89.06	87.17	87.35	87.58	87.80	87.72	88.83	88.60	88.59	86.94	87.55	87.14
H_2O	11.70	11.03	10.34	11.80	11.76	10.68	10.06	10.57	11.45	9.92	10.70	10.77	12.47	10.30	10.96	10.94	12.83	12.65	12.42	12.20	12.28	11.17	11.40	11.41	13.06	12.45	12.86
recalculated to 100 % total:																											
P_2O_5	0.15	0.23	0.38	0.54	0.23	0.38	0.30	0.00	0.31	0.30	0.00	0.15	0.00	0.38	0.08	0.31	0.86	0.23	0.00	0.23	0.00	0.23	0.31	0.08	0.00	0.31	0.16
SiO_2	68.76	69.87	69.11	69.33	69.66	69.54	69.04	69.99	70.16	69.48	69.46	70.29	70.77	69.53	69.68	68.83	69.36	68.88	69.63	68.79	69.31	69.73	70.11	69.65	70.19	68.50	69.85
TiO_2	0.31	0.09	0.32	0.35	0.22	0.00	0.41	0.20	0.46	0.19	0.46	0.00	0.38	0.45	0.22	0.39	0.11	0.42	0.42	0.24	0.38	0.15	0.42	0.31	0.31	0.33	0.16
Al_2O_3	15.28	15.50	15.26	15.15	15.35	15.32	15.31	15.74	14.77	15.23	15.39	14.86	15.06	15.44	15.42	15.50	15.50	14.71	15.30	14.95	14.97	14.17	15.07	14.99	15.16	15.34	14.93
FeO	1.07	0.60	0.91	0.89	1.07	1.09	1.43	1.12	0.92	1.22	0.53	0.92	0.65	1.05	1.06	0.99	1.01	1.01	0.94	1.22	1.18	1.17	0.57	0.92	1.02	1.19	0.83
MnO	0.04	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.04	0.11	0.07	0.00	0.08	0.00	0.11	0.30	0.00	0.04	0.00	0.00	0.00	0.04	0.00	0.11	0.00	0.00	0.00
MgO	0.01	0.02	0.04	0.16	0.19	0.11	0.05	0.00	0.11	0.00	0.06	0.03	0.05	0.11	0.17	0.00	0.00	0.11	0.08	0.05	0.13	0.10	0.01	0.11	0.10	0.12	0.07
CaO	0.46	0.34	0.25	0.52	0.44	0.06	0.28	0.19	0.33	0.38	0.49	0.23	0.14	0.40	0.48	0.40	0.23	0.45	0.25	0.48	0.27	0.34	0.08	0.48	0.45	0.48	0.27
Na_2O	3.50	3.36	3.16	3.11	3.57	3.61	3.21	3.10	3.38	3.47	3.57	3.63	3.30	3.18	3.14	3.40	3.03	3.92	3.53	3.81	3.76	3.70	3.71	3.01	3.09	3.70	3.56
K_2O	10.25	9.82	10.44	9.85	9.27	9.81	9.89	9.53	9.31	9.34	9.67	9.84	9.54	9.40	9.54	9.81	9.83	10.12	9.78	10.01	9.78	10.20	9.66	10.15	9.57	9.92	9.92
F	0.21	0.16	0.13	0.16	0.00	0.15	0.04	0.11	0.21	0.33	0.30	0.10	0.07	0.07	0.10	0.15	0.11	0.11	0.09	0.32	0.25	0.29	0.12	0.20	0.14	0.17	0.45
Cl	0.06	0.09	0.06	0.00	0.00	0.00	0.03	0.09	0.12	0.12	0.15	0.00	0.00	0.03	0.06	0.00	0.00	0.06	0.03	0.03	0.09	0.00	0.00	0.12	0.03	0.00	0.00

Table 13 (continued)**:** EMP data of glass in Type 4 run G94.

	28	29	30	31	32	33	34	35	36	37	38	min	max	mean	σ
P	0.00	0.06	0.03	0.12	0.21	0.06	0.00	0.00	0.03	0.00	0.03	0.00	0.33	0.08	0.07
Si	28.53	29.24	28.43	28.06	28.63	28.36	28.48	28.13	28.59	28.14	28.74	28.03	29.32	28.69	0.38
Ti	0.33	0.08	0.15	0.07	0.19	0.18	0.26	0.09	0.19	0.14	0.13	0.00	0.33	0.15	0.07
Al	7.11	6.98	6.70	7.12	6.90	7.29	6.99	6.95	7.08	7.13	7.35	6.66	7.45	7.09	0.18
Fe	0.61	0.51	0.59	0.81	0.68	0.73	0.59	0.76	0.88	0.66	0.81	0.37	1.00	0.68	0.14
Mn	0.15	0.05	0.03	0.00	0.05	0.13	0.13	0.03	0.00	0.00	0.00	0.00	0.20	0.03	0.05
Mg	0.00	0.00	0.05	0.10	0.05	0.06	0.00	0.05	0.04	0.04	0.06	0.00	0.10	0.04	0.03
Ca	0.17	0.24	0.27	0.19	0.29	0.28	0.09	0.22	0.23	0.27	0.21	0.04	0.33	0.22	0.08
Na	2.12	2.39	2.30	2.43	2.38	2.22	2.29	2.47	2.10	2.36	2.04	1.96	2.54	2.26	0.16
K	7.51	7.51	7.75	7.02	6.94	7.26	7.15	7.05	7.49	7.23	7.18	6.79	7.77	7.22	0.23
F	0.21	0.11	0.37	0.14	0.26	0.27	0.28	0.24	0.10	0.21	0.36	0.00	0.39	0.17	0.10
Cl	0.03	0.00	0.03	0.00	0.11	0.03	0.08	0.00	0.16	0.00	0.16	0.00	0.16	0.04	0.05
total	46.76	47.18	46.68	46.06	46.70	46.84	46.32	46.00	46.89	46.17	47.06	45.73	47.61	46.67	0.48
P_2O_5	0.00	0.14	0.07	0.27	0.48	0.14	0.00	0.00	0.07	0.00	0.07	0.00	0.75	0.18	0.17
SiO_2	61.03	62.55	60.83	60.04	61.26	60.66	60.92	60.18	61.17	60.21	61.49	59.97	62.72	61.37	0.81
TiO_2	0.54	0.14	0.25	0.12	0.31	0.29	0.43	0.16	0.31	0.23	0.21	0.00	0.54	0.26	0.12
Al_2O_3	13.43	13.18	12.65	13.45	13.03	13.77	13.21	13.13	13.38	13.47	13.88	12.59	14.07	13.40	0.34
FeO	0.79	0.66	0.76	1.04	0.88	0.94	0.76	0.98	1.13	0.85	1.04	0.47	1.28	0.88	0.18
MnO	0.20	0.07	0.03	0.00	0.07	0.16	0.17	0.03	0.00	0.00	0.00	0.00	0.26	0.04	0.06
MgO	0.00	0.00	0.09	0.17	0.09	0.10	0.00	0.09	0.07	0.06	0.10	0.00	0.17	0.07	0.05
CaO	0.24	0.34	0.37	0.27	0.41	0.39	0.12	0.31	0.32	0.37	0.29	0.05	0.46	0.30	0.11
Na_2O	2.85	3.23	3.10	3.27	3.21	2.99	3.08	3.33	2.83	3.18	2.75	2.64	3.42	3.04	0.22
K_2O	9.05	9.05	9.33	8.45	8.36	8.74	8.62	8.50	9.02	8.71	8.65	8.18	9.36	8.69	0.28
F	0.21	0.11	0.37	0.14	0.26	0.27	0.28	0.24	0.10	0.21	0.36	0.00	0.39	0.17	0.10
Cl	0.03	0.00	0.03	0.00	0.11	0.03	0.08	0.00	0.16	0.00	0.16	0.00	0.16	0.04	0.05
total	88.27	89.41	87.71	87.16	88.33	88.36	87.52	86.85	88.49	87.20	88.81	86.85	90.08	88.37	0.91
H_2O	11.73	10.59	12.29	12.84	11.67	11.64	12.48	13.15	11.51	12.80	11.19	9.92	13.15	11.63	0.91
recalculated to 100 % total:															
P_2O_5	0.00	0.15	0.08	0.31	0.54	0.15	0.00	0.00	0.08	0.00	0.08	0.00	0.86	0.20	0.19
SiO_2	69.14	69.96	69.35	68.88	69.35	68.66	69.61	69.30	69.13	69.05	69.24	68.50	70.77	69.45	0.50
TiO_2	0.62	0.15	0.29	0.13	0.35	0.33	0.49	0.18	0.35	0.27	0.24	0.00	0.62	0.29	0.14
Al_2O_3	15.22	14.74	14.42	15.44	14.75	15.58	15.09	15.12	15.12	15.44	15.63	14.17	15.74	15.16	0.33
FeO	0.89	0.74	0.86	1.19	1.00	1.07	0.86	1.13	1.28	0.98	1.17	0.53	1.43	0.99	0.20
MnO	0.22	0.07	0.04	0.00	0.07	0.19	0.19	0.04	0.00	0.00	0.00	0.00	0.30	0.05	0.07
MgO	0.00	0.00	0.10	0.19	0.10	0.11	0.00	0.10	0.08	0.07	0.11	0.00	0.19	0.08	0.06
CaO	0.27	0.38	0.43	0.31	0.46	0.44	0.14	0.35	0.36	0.43	0.32	0.06	0.52	0.34	0.12
Na_2O	3.23	3.61	3.53	3.75	3.64	3.38	3.52	3.84	3.20	3.64	3.10	3.01	3.92	3.45	0.26
K_2O	10.25	10.12	10.64	9.70	9.47	9.89	9.85	9.79	10.19	9.99	9.74	9.27	10.64	9.84	0.31
F	0.24	0.13	0.42	0.16	0.30	0.31	0.32	0.28	0.11	0.25	0.40	0.00	0.45	0.20	0.11
Cl	0.03	0.00	0.03	0.00	0.12	0.03	0.09	0.00	0.18	0.00	0.18	0.00	0.18	0.05	0.05

Table 14: EMP data of glass in Type 5 run G79; 31 analyses.

	1	2	3	4	5	6	7	8	9
P	0.06	0.12	0.17	0.12	0.00	0.14	0.12	0.00	0.03
Si	29.83	29.31	29.30	29.79	29.16	29.03	29.28	30.05	29.85
Ti	0.19	0.15	0.27	0.20	0.15	0.09	0.28	0.14	0.31
Al	7.71	7.93	7.64	7.59	8.10	8.05	7.93	7.88	8.05
Fe	1.03	0.73	0.89	0.82	1.08	1.38	1.19	0.70	0.98
Mn	0.00	0.00	0.00	0.07	0.00	0.12	0.15	0.03	0.07
Mg	0.12	0.08	0.19	0.20	0.22	0.14	0.06	0.10	0.12
Ca	0.54	0.53	0.60	0.65	0.69	0.57	0.47	0.50	0.55
Na	2.83	2.57	2.96	2.64	2.89	2.84	3.08	3.23	2.91
K	5.65	5.71	5.49	6.15	5.89	5.65	6.07	5.79	5.91
F	0.19	0.03	0.00	0.04	0.02	0.16	0.20	0.10	0.12
Cl	0.00	0.07	0.05	0.03	0.00	0.07	0.05	0.00	0.00
total	48.15	47.23	47.56	48.30	48.20	48.26	48.87	48.51	48.92
P_2O_5	0.13	0.26	0.39	0.26	0.00	0.33	0.26	0.00	0.07
SiO_2	63.82	62.71	62.69	63.73	62.37	62.10	62.64	64.29	63.86
TiO_2	0.31	0.24	0.45	0.33	0.24	0.16	0.47	0.23	0.52
Al_2O_3	14.57	14.98	14.44	14.34	15.31	15.21	14.98	14.89	15.22
FeO	1.33	0.94	1.15	1.05	1.39	1.78	1.53	0.90	1.26
MnO	0.00	0.00	0.00	0.10	0.00	0.16	0.19	0.03	0.10
MgO	0.20	0.14	0.31	0.33	0.37	0.23	0.10	0.16	0.20
CaO	0.76	0.75	0.84	0.91	0.97	0.80	0.65	0.70	0.77
Na_2O	3.81	3.47	3.99	3.56	3.90	3.83	4.15	4.36	3.93
K_2O	6.80	6.87	6.61	7.41	7.10	6.81	7.31	6.97	7.11
F	0.19	0.03	0.00	0.04	0.02	0.16	0.19	0.10	0.12
Cl	0.00	0.08	0.05	0.03	0.00	0.07	0.05	0.00	0.00
total	91.85	90.44	90.90	92.08	91.66	91.55	92.45	92.59	93.11
H_2O	8.15	9.56	9.10	7.92	8.34	8.45	7.55	7.41	6.89
recalculated to 100 % total:									
P_2O_5	0.14	0.29	0.43	0.29	0.00	0.36	0.29	0.00	0.07
SiO_2	69.49	69.34	68.96	69.22	68.05	67.82	67.75	69.44	68.58
TiO_2	0.34	0.27	0.50	0.36	0.27	0.17	0.51	0.24	0.56
Al_2O_3	15.86	16.56	15.89	15.58	16.70	16.61	16.21	16.09	16.35
FeO	1.44	1.04	1.26	1.15	1.51	1.94	1.66	0.98	1.36
MnO	0.00	0.00	0.00	0.10	0.00	0.17	0.21	0.03	0.10
MgO	0.22	0.15	0.34	0.36	0.41	0.26	0.11	0.17	0.22
CaO	0.83	0.82	0.92	0.99	1.06	0.88	0.71	0.75	0.83
Na_2O	4.15	3.84	4.39	3.87	4.25	4.18	4.49	4.70	4.22
K_2O	7.40	7.60	7.27	8.05	7.74	7.44	7.91	7.53	7.64
F	0.20	0.04	0.00	0.04	0.02	0.17	0.21	0.11	0.13
Cl	0.00	0.08	0.06	0.03	0.00	0.08	0.05	0.00	0.00

Table 14 (continued)**:** EMP data of glass in Type 5 run G79 with a cooling rate of 3 °C /min, quenched at conditions of 3.5 GPa / 994 °C; bulk water content 2.8 wt.%.

	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	min	max	mean	σ
P	0.03	0.09	0.14	0.00	0.12	0.06	0.00	0.09	0.06	0.06	0.03	0.12	0.20	0.09	0.17	0.17	0.00	0.00	0.06	0.03	0.00	0.12	0.00	0.20	0.08	0.06
Si	29.32	29.39	29.23	30.09	29.19	29.54	29.94	29.31	29.22	29.90	29.46	29.82	29.54	29.68	29.48	29.73	29.60	30.09	29.35	29.91	29.68	29.94	29.03	30.09	29.58	0.31
Ti	0.19	0.26	0.12	0.32	0.17	0.17	0.13	0.22	0.18	0.22	0.08	0.17	0.14	0.25	0.26	0.16	0.22	0.23	0.29	0.18	0.29	0.19	0.08	0.32	0.20	0.06
Al	7.81	7.52	7.84	7.54	7.95	7.36	7.83	7.85	7.86	7.76	7.98	7.71	7.86	7.90	7.83	8.19	7.84	7.79	7.67	7.90	7.92	7.87	7.36	8.19	7.83	0.18
Fe	0.82	0.59	0.96	0.77	1.01	1.03	1.08	0.89	0.75	0.75	0.98	1.01	1.05	0.98	1.12	1.31	1.10	0.87	0.98	1.03	0.82	0.94	0.59	1.38	0.96	0.17
Mn	0.00	0.07	0.00	0.00	0.03	0.00	0.22	0.00	0.03	0.05	0.05	0.00	0.15	0.07	0.03	0.07	0.00	0.00	0.00	0.00	0.30	0.12	0.00	0.30	0.05	0.07
Mg	0.09	0.18	0.09	0.15	0.14	0.12	0.11	0.10	0.11	0.13	0.11	0.13	0.27	0.14	0.21	0.14	0.15	0.16	0.14	0.08	0.16	0.17	0.06	0.27	0.14	0.05
Ca	0.47	0.49	0.70	0.62	0.60	0.52	0.51	0.54	0.55	0.58	0.43	0.60	0.75	0.63	0.71	0.75	0.63	0.49	0.59	0.81	0.43	0.65	0.43	0.81	0.59	0.10
Na	2.85	2.89	2.71	2.66	2.96	2.72	2.94	3.04	2.74	2.60	2.96	2.83	3.09	3.05	2.87	2.92	3.07	2.92	2.82	3.15	3.00	2.83	2.57	3.23	2.89	0.16
K	5.73	5.85	5.61	6.16	5.45	6.07	5.37	5.85	6.07	5.78	5.96	5.58	6.03	5.94	6.06	5.48	5.75	5.81	5.94	5.82	5.83	5.90	5.37	6.16	5.82	0.21
F	0.05	0.00	0.06	0.14	0.25	0.00	0.00	0.21	0.14	0.15	0.18	0.19	0.13	0.06	0.17	0.24	0.00	0.23	0.13	0.15	0.32	0.10	0.00	0.32	0.12	0.09
Cl	0.03	0.00	0.00	0.00	0.00	0.05	0.03	0.00	0.05	0.07	0.00	0.03	0.00	0.03	0.05	0.00	0.00	0.00	0.03	0.10	0.07	0.07	0.00	0.10	0.03	0.03
total	47.38	47.32	47.45	48.45	47.85	47.64	48.16	48.10	47.76	48.05	48.23	48.15	49.21	48.82	48.96	49.16	48.35	48.58	48.00	49.14	48.83	48.89	47.23	49.21	48.27	0.57
P_2O_5	0.07	0.20	0.33	0.00	0.26	0.13	0.00	0.20	0.13	0.13	0.07	0.26	0.46	0.20	0.39	0.39	0.00	0.00	0.13	0.07	0.00	0.26	0.00	0.46	0.17	0.14
SiO_2	62.73	62.88	62.53	64.37	62.44	63.20	64.05	62.71	62.52	63.97	63.02	63.79	63.20	63.50	63.07	63.61	63.32	64.37	62.79	63.99	63.50	64.06	62.10	64.37	63.28	0.66
TiO_2	0.31	0.44	0.19	0.54	0.28	0.28	0.21	0.37	0.30	0.37	0.14	0.28	0.24	0.42	0.43	0.26	0.36	0.38	0.49	0.29	0.49	0.31	0.14	0.54	0.33	0.11
Al_2O_3	14.76	14.20	14.81	14.24	15.03	13.91	14.80	14.82	14.86	14.66	15.08	14.57	14.85	14.93	14.79	15.48	14.81	14.71	14.48	14.92	14.96	14.86	13.91	15.48	14.79	0.34
FeO	1.06	0.76	1.24	0.99	1.30	1.33	1.39	1.15	0.97	0.96	1.27	1.30	1.35	1.26	1.44	1.68	1.42	1.11	1.27	1.32	1.05	1.20	0.76	1.78	1.23	0.22
MnO	0.00	0.10	0.00	0.00	0.03	0.00	0.29	0.00	0.03	0.06	0.06	0.00	0.19	0.10	0.03	0.10	0.00	0.00	0.00	0.00	0.38	0.16	0.00	0.38	0.07	0.09
MgO	0.15	0.30	0.15	0.25	0.23	0.20	0.18	0.17	0.18	0.22	0.19	0.21	0.45	0.23	0.34	0.24	0.24	0.26	0.23	0.13	0.27	0.28	0.10	0.45	0.23	0.08
CaO	0.65	0.68	0.97	0.86	0.84	0.73	0.71	0.76	0.78	0.80	0.61	0.83	1.05	0.88	1.00	1.04	0.88	0.68	0.82	1.14	0.61	0.91	0.61	1.14	0.82	0.13
Na_2O	3.84	3.90	3.65	3.59	3.99	3.67	3.97	4.10	3.70	3.50	4.00	3.81	4.16	4.12	3.87	3.94	4.14	3.94	3.81	4.24	4.05	3.81	3.47	4.36	3.90	0.22
K_2O	6.90	7.04	6.75	7.42	6.56	7.31	6.47	7.04	7.31	6.96	7.17	6.72	7.26	7.16	7.30	6.60	6.92	7.00	7.16	7.01	7.02	7.10	6.47	7.42	7.01	0.25
F	0.05	0.00	0.06	0.14	0.25	0.00	0.00	0.21	0.14	0.15	0.18	0.18	0.13	0.06	0.17	0.24	0.00	0.23	0.13	0.15	0.32	0.10	0.00	0.32	0.12	0.09
Cl	0.03	0.00	0.00	0.00	0.00	0.05	0.03	0.00	0.05	0.08	0.00	0.03	0.00	0.03	0.05	0.00	0.00	0.00	0.03	0.10	0.07	0.07	0.00	0.10	0.03	0.03
total	90.53	90.49	90.65	92.34	91.11	90.80	92.09	91.43	90.88	91.79	91.70	91.90	93.29	92.84	92.80	93.47	92.10	92.59	91.27	93.27	92.57	93.09	90.44	93.47	91.92	0.92
H_2O	9.47	9.51	9.35	7.66	8.89	9.20	7.91	8.57	9.12	8.21	8.30	8.10	6.71	7.16	7.20	6.53	7.90	7.41	8.73	6.73	7.43	6.91	6.53	9.56	8.08	0.92
recalculated to 100 % total:																										
P_2O_5	0.07	0.22	0.36	0.00	0.29	0.14	0.00	0.22	0.14	0.14	0.07	0.29	0.49	0.21	0.42	0.42	0.00	0.00	0.14	0.07	0.00	0.28	0.00	0.49	0.19	0.15
SiO_2	69.30	69.49	68.97	69.70	68.54	69.61	69.56	68.58	68.79	69.69	68.73	69.42	67.75	68.39	67.96	68.05	68.76	69.52	68.80	68.61	68.60	68.82	67.75	69.70	68.85	0.61
TiO_2	0.35	0.48	0.21	0.58	0.31	0.31	0.23	0.40	0.33	0.40	0.15	0.30	0.26	0.45	0.47	0.28	0.40	0.41	0.53	0.31	0.52	0.34	0.15	0.58	0.36	0.12
Al_2O_3	16.31	15.69	16.33	15.42	16.49	15.32	16.07	16.21	16.35	15.97	16.44	15.85	15.91	16.08	15.94	16.56	16.08	15.89	15.87	16.00	16.16	15.97	15.32	16.70	16.09	0.34
FeO	1.17	0.84	1.37	1.08	1.42	1.46	1.50	1.25	1.06	1.05	1.38	1.41	1.45	1.36	1.56	1.80	1.54	1.20	1.39	1.42	1.14	1.29	0.84	1.94	1.34	0.24
MnO	0.00	0.11	0.00	0.00	0.04	0.00	0.31	0.00	0.04	0.07	0.07	0.00	0.20	0.10	0.03	0.10	0.00	0.00	0.00	0.00	0.41	0.17	0.00	0.41	0.07	0.10
MgO	0.16	0.33	0.16	0.27	0.25	0.22	0.19	0.18	0.19	0.24	0.20	0.23	0.48	0.25	0.37	0.26	0.26	0.28	0.25	0.14	0.29	0.30	0.11	0.48	0.25	0.08
CaO	0.72	0.76	1.07	0.94	0.92	0.80	0.77	0.83	0.85	0.88	0.66	0.91	1.12	0.95	1.08	1.12	0.96	0.74	0.90	1.22	0.65	0.98	0.65	1.22	0.89	0.14
Na_2O	4.25	4.31	4.03	3.88	4.38	4.04	4.31	4.48	4.07	3.82	4.36	4.15	4.46	4.43	4.17	4.21	4.50	4.26	4.17	4.55	4.37	4.10	3.82	4.70	4.24	0.22
K_2O	7.62	7.78	7.45	8.04	7.20	8.05	7.03	7.70	8.04	7.58	7.82	7.31	7.79	7.71	7.86	7.06	7.52	7.56	7.84	7.52	7.58	7.63	7.03	8.05	7.62	0.27
F	0.05	0.00	0.07	0.15	0.28	0.00	0.00	0.23	0.16	0.17	0.19	0.20	0.14	0.06	0.19	0.26	0.00	0.25	0.15	0.16	0.34	0.11	0.00	0.34	0.13	0.09
Cl	0.03	0.00	0.00	0.00	0.00	0.06	0.03	0.00	0.06	0.08	0.00	0.03	0.00	0.03	0.05	0.00	0.00	0.00	0.03	0.11	0.08	0.08	0.00	0.11	0.03	0.03

Table 15: EMP data of glass in Type 5 run G61 with a cooling rate of 3 °C /min, quenched at conditions of 3.5 GPa / 900 °C; bulk water content 2.8 wt.%; 32 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.03	0.06	0.00	0.00	0.20	0.09	0.06	0.12	0.00	0.06	0.17	0.09	0.06	0.03	0.09	0.00	0.12	0.00	0.06	0.09	0.17	0.03	0.00	0.00	0.06	0.09	0.23
Si	31.19	31.01	31.05	31.13	31.00	30.76	31.07	30.95	30.95	31.11	30.75	30.75	30.77	30.89	31.07	30.93	31.19	31.22	30.82	30.88	31.12	30.88	31.30	31.00	31.09	31.19	30.69
Ti	0.17	0.21	0.14	0.14	0.11	0.14	0.30	0.14	0.21	0.23	0.09	0.10	0.26	0.19	0.23	0.20	0.05	0.20	0.22	0.08	0.31	0.16	0.13	0.21	0.21	0.11	0.36
Al	7.98	8.10	8.25	7.47	7.89	7.76	8.08	8.17	7.86	7.68	7.89	7.93	7.78	7.81	8.05	8.07	7.81	7.71	7.88	8.13	7.52	7.83	7.82	7.89	7.46	7.99	7.76
Fe	0.68	0.54	0.42	0.54	0.61	0.56	0.37	0.63	0.72	0.49	0.56	0.51	0.70	0.68	0.30	0.82	0.37	0.51	0.42	0.56	0.58	0.72	0.42	0.44	0.30	0.40	0.56
Mn	0.00	0.10	0.07	0.03	0.07	0.10	0.15	0.12	0.03	0.15	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.05	0.00	0.00	0.05	0.00	0.05	0.10	0.10	0.10	0.00
Mg	0.00	0.07	0.02	0.01	0.01	0.02	0.04	0.02	0.13	0.06	0.12	0.13	0.06	0.06	0.02	0.00	0.09	0.02	0.01	0.04	0.06	0.02	0.02	0.10	0.06	0.00	0.03
Ca	0.30	0.33	0.41	0.22	0.22	0.15	0.28	0.51	0.69	0.25	0.20	0.35	0.47	0.15	0.31	0.27	0.14	0.12	0.26	0.22	0.16	0.05	0.10	0.38	0.16	0.14	0.13
Na	2.79	2.92	3.14	2.59	2.77	2.64	2.83	2.73	3.02	2.90	2.55	2.56	2.66	2.57	2.52	2.64	2.21	2.28	2.64	2.30	2.59	2.54	2.52	2.25	2.26	2.82	2.57
K	6.13	6.59	6.12	6.47	6.52	7.07	5.72	6.34	6.07	5.94	6.48	7.03	6.35	6.49	6.25	6.65	6.82	6.47	6.32	6.79	6.65	6.94	6.71	6.25	7.04	6.45	6.59
F	0.21	0.19	0.22	0.27	0.29	0.31	0.13	0.11	0.17	0.22	0.29	0.10	0.29	0.27	0.34	0.26	0.25	0.30	0.09	0.39	0.18	0.33	0.17	0.32	0.27	0.22	0.46
Cl	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.07	0.00	0.00	0.05	0.12	0.03	0.07	0.05	0.05	0.00	0.12	0.00	0.00	0.00	0.12	0.05	0.10	0.05	0.15	0.00
total	49.48	50.10	49.87	48.90	49.69	49.59	49.04	49.91	49.85	49.07	49.15	49.67	49.43	49.20	49.31	49.88	49.05	49.00	48.70	49.46	49.40	49.63	49.29	49.04	49.06	49.65	49.37
P_2O_5	0.07	0.13	0.00	0.00	0.46	0.20	0.13	0.26	0.00	0.13	0.40	0.20	0.13	0.07	0.20	0.00	0.26	0.00	0.13	0.20	0.39	0.07	0.00	0.00	0.13	0.20	0.53
SiO_2	66.73	66.34	66.42	66.59	66.31	65.81	66.46	66.20	66.21	66.55	65.78	65.79	65.83	66.07	66.46	66.17	66.72	66.79	65.93	66.06	66.58	66.07	66.97	66.32	66.51	66.72	65.65
TiO_2	0.28	0.35	0.24	0.23	0.19	0.23	0.50	0.24	0.35	0.38	0.16	0.17	0.43	0.31	0.38	0.33	0.09	0.33	0.36	0.14	0.52	0.26	0.21	0.35	0.35	0.19	0.61
Al_2O_3	15.07	15.30	15.60	14.11	14.90	14.66	15.27	15.44	14.85	14.51	14.92	14.98	14.70	14.75	15.21	15.26	14.76	14.57	14.89	15.36	14.21	14.79	14.77	14.92	14.10	15.10	14.66
FeO	0.87	0.69	0.54	0.69	0.78	0.72	0.48	0.81	0.93	0.63	0.72	0.66	0.90	0.87	0.39	1.05	0.48	0.66	0.54	0.72	0.75	0.93	0.54	0.57	0.39	0.51	0.72
MnO	0.00	0.13	0.10	0.03	0.10	0.13	0.19	0.16	0.03	0.19	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.06	0.00	0.00	0.06	0.00	0.06	0.13	0.13	0.13	0.00
MgO	0.00	0.11	0.03	0.02	0.01	0.04	0.06	0.04	0.22	0.10	0.20	0.21	0.10	0.10	0.03	0.00	0.16	0.03	0.01	0.06	0.10	0.03	0.04	0.16	0.10	0.00	0.05
CaO	0.42	0.45	0.58	0.30	0.30	0.21	0.39	0.71	0.97	0.35	0.27	0.49	0.65	0.21	0.44	0.38	0.20	0.17	0.36	0.30	0.23	0.08	0.14	0.53	0.23	0.20	0.18
Na_2O	3.76	3.93	4.24	3.49	3.73	3.56	3.81	3.69	4.07	3.91	3.44	3.44	3.59	3.46	3.40	3.55	2.98	3.07	3.55	3.10	3.48	3.43	3.40	3.03	3.04	3.81	3.46
K_2O	7.39	7.94	7.37	7.80	7.85	8.51	6.89	7.63	7.32	7.15	7.81	8.47	7.65	7.82	7.53	8.01	8.21	7.80	7.61	8.17	8.01	8.36	8.08	7.52	8.48	7.76	7.93
F	0.21	0.19	0.22	0.27	0.29	0.31	0.13	0.11	0.17	0.22	0.29	0.10	0.29	0.27	0.34	0.26	0.25	0.30	0.09	0.39	0.18	0.33	0.17	0.32	0.27	0.22	0.46
Cl	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.07	0.00	0.00	0.05	0.12	0.03	0.07	0.05	0.05	0.00	0.12	0.00	0.00	0.00	0.12	0.05	0.10	0.05	0.15	0.00
total	94.71	95.49	95.24	93.46	94.81	94.24	94.28	95.30	95.04	94.03	93.89	94.56	94.17	93.88	94.37	94.93	94.00	93.75	93.45	94.34	94.45	94.30	94.34	93.79	93.65	94.85	94.06
H_2O	5.29	4.51	4.76	6.54	5.19	5.76	5.72	4.70	4.96	5.97	6.11	5.44	5.83	6.12	5.63	5.07	6.00	6.25	6.55	5.66	5.55	5.70	5.66	6.21	6.35	5.15	5.94
recalculated to 100 % total:																											
P_2O_5	0.07	0.14	0.00	0.00	0.49	0.21	0.14	0.28	0.00	0.14	0.42	0.21	0.14	0.07	0.21	0.00	0.28	0.00	0.14	0.21	0.42	0.07	0.00	0.00	0.14	0.21	0.56
SiO_2	70.46	69.48	69.73	71.25	69.94	69.84	70.49	69.47	69.66	70.78	70.06	69.57	69.90	70.38	70.43	69.70	70.98	71.25	70.55	70.02	70.50	70.06	70.98	70.71	71.02	70.34	69.80
TiO_2	0.29	0.36	0.25	0.24	0.20	0.24	0.53	0.25	0.36	0.40	0.17	0.18	0.46	0.33	0.40	0.35	0.09	0.35	0.39	0.15	0.55	0.28	0.22	0.37	0.37	0.20	0.64
Al_2O_3	15.92	16.03	16.37	15.10	15.72	15.55	16.20	16.20	15.63	15.43	15.89	15.84	15.61	15.72	16.12	16.07	15.70	15.54	15.93	16.28	15.04	15.69	15.66	15.90	15.05	15.92	15.58
FeO	0.92	0.72	0.57	0.74	0.82	0.76	0.51	0.85	0.98	0.67	0.77	0.70	0.96	0.93	0.41	1.10	0.51	0.71	0.58	0.76	0.79	0.99	0.57	0.61	0.42	0.54	0.77
MnO	0.00	0.13	0.10	0.03	0.10	0.14	0.20	0.17	0.03	0.20	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.07	0.00	0.00	0.07	0.00	0.07	0.14	0.14	0.13	0.00
MgO	0.00	0.11	0.03	0.02	0.01	0.04	0.07	0.04	0.23	0.11	0.22	0.22	0.11	0.11	0.03	0.00	0.17	0.03	0.01	0.07	0.11	0.03	0.04	0.18	0.11	0.00	0.06
CaO	0.45	0.48	0.60	0.32	0.32	0.23	0.42	0.75	1.02	0.37	0.29	0.51	0.69	0.23	0.47	0.40	0.21	0.18	0.39	0.32	0.24	0.08	0.15	0.57	0.24	0.21	0.19
Na_2O	3.97	4.12	4.45	3.73	3.94	3.77	4.04	3.87	4.29	4.16	3.66	3.64	3.81	3.68	3.60	3.74	3.17	3.28	3.80	3.28	3.69	3.64	3.61	3.23	3.25	4.01	3.68
K_2O	7.80	8.32	7.74	8.34	8.28	9.03	7.31	8.01	7.70	7.60	8.32	8.95	8.13	8.33	7.98	8.43	8.74	8.32	8.15	8.67	8.48	8.86	8.57	8.02	9.06	8.18	8.43
F	0.22	0.20	0.23	0.29	0.31	0.33	0.14	0.11	0.18	0.23	0.31	0.11	0.31	0.29	0.36	0.27	0.27	0.32	0.09	0.41	0.19	0.35	0.18	0.34	0.29	0.24	0.49
Cl	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.08	0.00	0.00	0.05	0.13	0.03	0.08	0.05	0.05	0.00	0.13	0.00	0.00	0.00	0.13	0.05	0.11	0.05	0.16	0.00

Table 15 (continued)**:** EMP data of glass in Type 5 run G61.

	28	29	30	31	32	min	max	mean	σ
P	0.00	0.17	0.00	0.20	0.20	0.00	0.23	0.08	0.07
Si	31.06	30.98	31.20	31.10	31.32	30.69	31.32	31.01	0.17
Ti	0.08	0.13	0.18	0.21	0.19	0.05	0.36	0.18	0.07
Al	8.00	7.80	8.05	7.56	8.00	7.46	8.25	7.87	0.20
Fe	0.49	0.44	0.42	0.47	0.19	0.19	0.82	0.51	0.14
Mn	0.00	0.03	0.00	0.03	0.12	0.00	0.15	0.05	0.05
Mg	0.08	0.00	0.00	0.00	0.02	0.00	0.13	0.04	0.04
Ca	0.12	0.07	0.04	0.11	0.10	0.04	0.69	0.23	0.15
Na	2.56	2.53	2.47	2.58	2.59	2.21	3.14	2.61	0.22
K	6.97	7.11	6.37	7.05	6.31	5.72	7.11	6.53	0.35
F	0.34	0.25	0.15	0.09	0.38	0.09	0.46	0.25	0.09
Cl	0.10	0.00	0.00	0.00	0.00	0.00	0.15	0.04	0.05
total	49.81	49.49	48.88	49.39	49.42	48.70	50.10	49.40	0.35
P_2O_5	0.00	0.39	0.00	0.46	0.46	0.00	0.53	0.18	0.17
SiO_2	66.45	66.27	66.74	66.52	67.00	65.65	67.00	66.34	0.36
TiO_2	0.14	0.21	0.30	0.35	0.31	0.09	0.61	0.30	0.12
Al_2O_3	15.12	14.75	15.21	14.29	15.12	14.10	15.60	14.88	0.38
FeO	0.63	0.57	0.54	0.60	0.24	0.24	1.05	0.66	0.18
MnO	0.00	0.03	0.00	0.03	0.16	0.00	0.19	0.06	0.06
MgO	0.14	0.00	0.00	0.00	0.04	0.00	0.22	0.07	0.07
CaO	0.17	0.09	0.06	0.15	0.14	0.06	0.97	0.32	0.20
Na_2O	3.46	3.41	3.33	3.48	3.49	2.98	4.24	3.52	0.30
K_2O	8.40	8.56	7.67	8.49	7.60	6.89	8.56	7.87	0.43
F	0.34	0.25	0.15	0.09	0.38	0.09	0.46	0.25	0.09
Cl	0.10	0.00	0.00	0.00	0.00	0.00	0.15	0.04	0.05
total	94.77	94.42	93.94	94.43	94.78	93.45	95.49	94.37	0.53
H_2O	5.23	5.58	6.06	5.57	5.22	4.51	6.55	5.63	0.53
recalculated to 100 % total:									
P_2O_5	0.00	0.42	0.00	0.49	0.49	0.00	0.56	0.19	0.18
SiO_2	70.12	70.18	71.04	70.45	70.69	69.47	71.25	70.31	0.53
TiO_2	0.15	0.22	0.31	0.37	0.33	0.09	0.64	0.31	0.12
Al_2O_3	15.95	15.62	16.19	15.13	15.95	15.04	16.37	15.77	0.35
FeO	0.67	0.60	0.58	0.64	0.25	0.25	1.10	0.70	0.19
MnO	0.00	0.03	0.00	0.03	0.17	0.00	0.20	0.06	0.07
MgO	0.15	0.00	0.00	0.00	0.04	0.00	0.23	0.07	0.07
CaO	0.18	0.10	0.06	0.16	0.14	0.06	1.02	0.34	0.21
Na_2O	3.65	3.61	3.55	3.68	3.68	3.17	4.45	3.73	0.30
K_2O	8.86	9.07	8.17	8.99	8.02	7.31	9.07	8.34	0.46
F	0.36	0.26	0.16	0.10	0.41	0.09	0.49	0.26	0.10
Cl	0.10	0.00	0.00	0.00	0.00	0.00	0.16	0.04	0.05

Table 16: EMP data of glass in Type 5 run G68, cooling rate 3 °C /min, 3.5 GPa / 900 °C; 2.8 wt.%.

	1	2	3	4	5	6	7	8	9	10	min	max	mean	σ
P	0.20	0.00	0.06	0.00	0.14	0.00	0.06	0.11	0.17	0.14	0.00	0.20	0.09	0.07
Si	29.22	29.31	29.32	29.12	29.01	29.13	28.51	28.91	28.77	29.18	28.51	29.32	29.05	0.26
Ti	0.12	0.02	0.14	0.01	0.09	0.02	0.02	0.06	0.14	0.04	0.01	0.14	0.07	0.05
Al	7.53	7.45	7.39	7.42	7.68	7.37	7.37	7.53	7.06	7.27	7.06	7.68	7.41	0.17
Fe	0.60	0.74	0.60	0.42	0.37	0.60	0.77	0.37	0.67	0.51	0.37	0.77	0.57	0.14
Mn	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.07	0.00	0.05	0.00	0.07	0.01	0.03
Mg	0.06	0.00	0.01	0.01	0.03	0.00	0.02	0.02	0.02	0.00	0.00	0.06	0.02	0.02
Ca	0.10	0.23	0.02	0.12	0.02	0.07	0.09	0.01	0.13	0.10	0.01	0.23	0.09	0.06
Na	2.27	2.43	2.07	2.50	2.19	2.25	2.47	1.99	2.26	2.39	1.99	2.50	2.28	0.17
K	7.34	7.11	7.26	7.17	7.47	6.83	7.24	7.33	7.13	6.35	6.35	7.47	7.12	0.32
F	0.20	0.14	0.28	0.19	0.29	0.29	0.29	0.41	0.37	0.26	0.14	0.41	0.27	0.08
Cl	0.00	0.10	0.00	0.05	0.00	0.02	0.07	0.00	0.00	0.03	0.00	0.10	0.03	0.04
total	47.64	47.54	47.15	47.02	47.29	46.60	46.90	46.82	46.73	46.32	46.32	47.64	47.00	0.41
P_2O_5	0.45	0.00	0.13	0.00	0.32	0.00	0.13	0.26	0.39	0.32	0.00	0.45	0.20	0.17
SiO_2	62.52	62.71	62.73	62.29	62.06	62.33	60.99	61.84	61.54	62.42	60.99	62.73	62.14	0.55
TiO_2	0.21	0.04	0.24	0.02	0.16	0.04	0.04	0.10	0.24	0.07	0.02	0.24	0.11	0.09
Al_2O_3	14.23	14.08	13.97	14.03	14.50	13.93	13.93	14.23	13.34	13.74	13.34	14.50	14.00	0.31
FeO	0.77	0.95	0.78	0.54	0.48	0.78	0.99	0.48	0.87	0.66	0.48	0.99	0.73	0.19
MnO	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.10	0.00	0.06	0.00	0.10	0.02	0.03
MgO	0.09	0.00	0.01	0.02	0.04	0.00	0.03	0.04	0.04	0.00	0.00	0.09	0.03	0.03
CaO	0.14	0.31	0.03	0.17	0.03	0.10	0.12	0.02	0.18	0.14	0.02	0.31	0.12	0.09
Na_2O	3.06	3.28	2.79	3.36	2.95	3.04	3.33	2.69	3.05	3.22	2.69	3.36	3.08	0.23
K_2O	8.84	8.57	8.75	8.64	9.00	8.23	8.73	8.83	8.59	7.65	7.65	9.00	8.58	0.39
F	0.20	0.14	0.28	0.18	0.29	0.29	0.29	0.41	0.37	0.26	0.14	0.41	0.27	0.08
Cl	0.00	0.10	0.00	0.05	0.00	0.02	0.07	0.00	0.00	0.03	0.00	0.10	0.03	0.04
total	90.42	90.10	89.57	89.23	89.71	88.62	88.49	88.80	88.44	88.45	88.44	90.42	89.18	0.73
H_2O	9.58	9.90	10.43	10.77	10.29	11.38	11.51	11.20	11.56	11.55	9.58	11.56	10.82	0.73
recalculated to 100 % total:														
P_2O_5	0.50	0.00	0.14	0.00	0.36	0.00	0.15	0.29	0.44	0.37	0.00	0.50	0.22	0.19
SiO_2	69.14	69.61	70.03	69.80	69.18	70.33	68.92	69.64	69.59	70.57	68.92	70.57	69.68	0.52
TiO_2	0.23	0.04	0.27	0.02	0.17	0.04	0.04	0.12	0.27	0.08	0.02	0.27	0.13	0.10
Al_2O_3	15.73	15.62	15.59	15.72	16.17	15.72	15.74	16.02	15.08	15.53	15.08	16.17	15.69	0.29
FeO	0.86	1.06	0.87	0.60	0.53	0.88	1.11	0.54	0.98	0.74	0.53	1.11	0.82	0.21
MnO	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.11	0.00	0.07	0.00	0.11	0.02	0.04
MgO	0.10	0.00	0.01	0.02	0.05	0.00	0.03	0.04	0.04	0.00	0.00	0.10	0.03	0.03
CaO	0.15	0.35	0.03	0.19	0.03	0.12	0.14	0.02	0.20	0.15	0.02	0.35	0.14	0.10
Na_2O	3.38	3.64	3.11	3.77	3.28	3.43	3.76	3.03	3.45	3.64	3.03	3.77	3.45	0.26
K_2O	9.78	9.51	9.77	9.68	10.03	9.28	9.86	9.94	9.71	8.65	8.65	10.03	9.62	0.40
F	0.22	0.16	0.31	0.21	0.33	0.33	0.32	0.46	0.42	0.30	0.16	0.46	0.31	0.09
Cl	0.00	0.11	0.00	0.05	0.00	0.03	0.08	0.00	0.00	0.03	0.00	0.11	0.03	0.04

Table 17: EMP data of glass in Type 5 run G27 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 900 °C; bulk water content 2.8 wt.%; 22 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	min	max	mean	σ
P	0.11	0.14	0.09	0.20	0.09	0.00	0.12	0.06	0.17	0.11	0.12	0.09	0.18	0.15	0.03	0.12	0.06	0.06	0.00	0.00	0.21	0.00	0.00	0.21	0.09	0.06
Si	30.48	30.47	30.63	30.56	30.68	30.37	30.51	30.57	30.55	30.54	30.63	30.11	29.97	30.00	30.82	30.72	30.28	30.77	30.68	30.78	30.57	30.64	29.97	30.82	30.51	0.24
Ti	0.16	0.19	0.13	0.10	0.10	0.14	0.17	0.05	0.21	0.20	0.08	0.17	0.21	0.29	0.23	0.11	0.11	0.13	0.16	0.16	0.15	0.25	0.05	0.29	0.16	0.06
Al	7.86	7.44	7.46	7.91	7.47	7.96	7.79	7.83	7.42	7.78	7.43	7.96	7.94	7.40	7.95	7.88	7.74	7.76	7.83	7.76	7.70	7.49	7.40	7.96	7.72	0.20
Fe	0.70	0.65	0.70	0.51	0.51	0.40	0.86	0.86	0.79	0.79	0.72	0.56	0.65	0.70	0.65	0.55	0.74	1.00	0.79	0.67	0.72	0.91	0.40	1.00	0.70	0.14
Mn	0.17	0.00	0.05	0.10	0.05	0.00	0.07	0.07	0.00	0.00	0.05	0.12	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.03	0.00	0.00	0.17	0.04	0.05
Mg	0.03	0.01	0.04	0.09	0.00	0.04	0.02	0.02	0.04	0.00	0.02	0.00	0.07	0.05	0.00	0.03	0.01	0.05	0.07	0.02	0.02	0.05	0.00	0.09	0.03	0.03
Ca	0.00	0.22	0.10	0.04	0.01	0.05	0.12	0.04	0.38	0.00	0.14	0.09	0.16	0.08	0.00	0.05	0.08	0.17	0.24	0.06	0.00	0.21	0.00	0.38	0.10	0.10
Na	2.18	2.38	2.17	2.10	1.95	2.09	2.07	2.06	2.12	1.67	2.37	1.79	2.52	2.41	2.26	2.34	2.48	2.49	2.31	2.31	2.00	2.32	1.67	2.52	2.20	0.22
K	7.57	7.44	7.33	7.13	7.50	7.09	7.24	7.23	7.62	7.83	7.01	7.45	6.97	7.26	7.23	7.15	7.40	6.89	6.89	7.28	7.14	6.70	6.70	7.83	7.24	0.27
F	0.26	0.19	0.28	0.18	0.32	0.27	0.14	0.20	0.17	0.26	0.27	0.19	0.18	0.23	0.30	0.14	0.29	0.12	0.16	0.24	0.29	0.30	0.12	0.32	0.23	0.06
Cl	0.10	0.00	0.05	0.03	0.07	0.00	0.03	0.00	0.05	0.00	0.00	0.10	0.03	0.05	0.08	0.00	0.00	0.00	0.16	0.00	0.05	0.05	0.00	0.16	0.04	0.04
total	49.63	49.12	49.01	48.96	48.75	48.41	49.13	48.98	49.50	49.18	48.84	48.63	48.86	48.61	49.54	49.14	49.24	49.43	49.29	49.27	48.86	48.93	48.41	49.63	49.06	0.32
P_2O_5	0.26	0.33	0.20	0.46	0.20	0.00	0.26	0.13	0.39	0.26	0.26	0.20	0.41	0.34	0.07	0.27	0.14	0.14	0.00	0.00	0.47	0.00	0.00	0.47	0.22	0.15
SiO_2	65.22	65.17	65.53	65.39	65.64	64.97	65.28	65.39	65.35	65.33	65.52	64.42	64.12	64.17	65.93	65.72	64.79	65.84	65.64	65.85	65.40	65.54	64.12	65.93	65.28	0.51
TiO_2	0.26	0.31	0.21	0.17	0.17	0.23	0.28	0.09	0.35	0.33	0.14	0.28	0.34	0.48	0.38	0.19	0.19	0.21	0.27	0.27	0.25	0.42	0.09	0.48	0.26	0.09
Al_2O_3	14.86	14.07	14.09	14.95	14.11	15.05	14.71	14.79	14.02	14.70	14.04	15.05	15.01	13.98	15.03	14.89	14.62	14.66	14.79	14.66	14.54	14.16	13.98	15.05	14.58	0.39
FeO	0.90	0.84	0.90	0.66	0.66	0.51	1.11	1.11	1.02	1.02	0.93	0.72	0.83	0.89	0.83	0.71	0.95	1.29	1.02	0.86	0.92	1.17	0.51	1.29	0.90	0.18
MnO	0.22	0.00	0.06	0.13	0.06	0.00	0.10	0.10	0.00	0.00	0.06	0.16	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.03	0.00	0.00	0.22	0.05	0.06
MgO	0.05	0.01	0.06	0.16	0.00	0.06	0.04	0.04	0.06	0.00	0.04	0.00	0.11	0.08	0.00	0.05	0.01	0.08	0.11	0.03	0.03	0.08	0.00	0.16	0.05	0.04
CaO	0.00	0.30	0.14	0.06	0.02	0.08	0.17	0.06	0.53	0.00	0.20	0.12	0.22	0.12	0.00	0.07	0.12	0.23	0.33	0.08	0.00	0.30	0.00	0.53	0.14	0.13
Na_2O	2.93	3.21	2.93	2.83	2.62	2.82	2.78	2.77	2.85	2.25	3.20	2.41	3.40	3.25	3.05	3.15	3.35	3.36	3.12	3.11	2.69	3.13	2.25	3.40	2.97	0.30
K_2O	9.12	8.96	8.82	8.59	9.03	8.54	8.72	8.71	9.17	9.43	8.44	8.97	8.40	8.75	8.71	8.61	8.91	8.29	8.30	8.77	8.60	8.08	8.08	9.43	8.72	0.32
F	0.26	0.19	0.28	0.18	0.32	0.27	0.14	0.20	0.16	0.26	0.26	0.19	0.18	0.23	0.30	0.14	0.29	0.12	0.16	0.24	0.29	0.30	0.12	0.32	0.23	0.06
Cl	0.10	0.00	0.05	0.03	0.07	0.00	0.03	0.00	0.05	0.00	0.00	0.10	0.03	0.05	0.08	0.00	0.00	0.00	0.16	0.00	0.05	0.05	0.00	0.16	0.04	0.04
total	94.05	93.31	93.14	93.51	92.76	92.41	93.54	93.29	93.89	93.47	92.99	92.52	92.96	92.23	94.22	93.81	93.30	94.16	93.79	93.77	93.15	93.09	92.23	94.22	93.33	0.56
H_2O	5.95	6.69	6.86	6.49	7.24	7.59	6.46	6.71	6.11	6.53	7.01	7.48	7.04	7.77	5.78	6.19	6.70	5.84	6.21	6.23	6.85	6.91	5.78	7.77	6.67	0.56
recalculated to 100 % total:																										
P_2O_5	0.28	0.35	0.21	0.49	0.21	0.00	0.28	0.14	0.42	0.28	0.28	0.21	0.44	0.37	0.07	0.29	0.14	0.14	0.00	0.00	0.51	0.00	0.00	0.51	0.23	0.16
SiO_2	69.34	69.85	70.36	69.92	70.76	70.31	69.78	70.09	69.61	69.89	70.46	69.63	68.97	69.58	69.97	70.06	69.44	69.92	69.99	70.22	70.21	70.41	68.97	70.76	69.94	0.41
TiO_2	0.28	0.33	0.22	0.19	0.19	0.24	0.30	0.09	0.37	0.35	0.15	0.30	0.37	0.52	0.40	0.20	0.20	0.22	0.28	0.28	0.27	0.45	0.09	0.52	0.28	0.10
Al_2O_3	15.80	15.07	15.13	15.99	15.21	16.28	15.73	15.85	14.93	15.73	15.10	16.26	16.15	15.16	15.95	15.88	15.67	15.57	15.77	15.63	15.61	15.21	14.93	16.28	15.62	0.40
FeO	0.96	0.90	0.97	0.71	0.71	0.55	1.19	1.19	1.09	1.09	1.00	0.78	0.90	0.97	0.88	0.75	1.02	1.37	1.08	0.92	0.99	1.26	0.55	1.37	0.97	0.19
MnO	0.24	0.00	0.07	0.14	0.07	0.00	0.10	0.10	0.00	0.00	0.07	0.17	0.00	0.00	0.00	0.07	0.07	0.00	0.00	0.00	0.03	0.00	0.00	0.24	0.05	0.07
MgO	0.05	0.01	0.07	0.17	0.00	0.07	0.04	0.04	0.07	0.00	0.04	0.00	0.12	0.08	0.00	0.05	0.01	0.08	0.12	0.03	0.03	0.08	0.00	0.17	0.05	0.04
CaO	0.00	0.33	0.15	0.06	0.02	0.08	0.18	0.06	0.56	0.00	0.21	0.13	0.23	0.13	0.00	0.07	0.12	0.25	0.36	0.09	0.00	0.32	0.00	0.56	0.15	0.14
Na_2O	3.12	3.44	3.14	3.03	2.83	3.05	2.98	2.97	3.04	2.41	3.44	2.61	3.66	3.53	3.24	3.36	3.59	3.56	3.32	3.32	2.89	3.37	2.41	3.66	3.18	0.32
K_2O	9.70	9.60	9.47	9.18	9.74	9.24	9.32	9.34	9.77	10.09	9.08	9.70	9.03	9.48	9.24	9.18	9.55	8.81	8.85	9.35	9.23	8.68	8.68	10.09	9.35	0.35
F	0.27	0.20	0.30	0.19	0.34	0.29	0.15	0.21	0.18	0.28	0.28	0.21	0.19	0.25	0.32	0.15	0.31	0.13	0.17	0.26	0.31	0.33	0.13	0.34	0.24	0.07
Cl	0.11	0.00	0.05	0.03	0.08	0.00	0.03	0.00	0.05	0.00	0.00	0.11	0.03	0.06	0.08	0.00	0.00	0.00	0.17	0.00	0.06	0.06	0.00	0.17	0.04	0.05

Table 18: EMP data of glass in run G58, 0.03 °C /min, 3.5 GPa / 900 °C; 2.8 wt.%.

	1	2	3	4	5	6	7	8	9	mean	σ
P	0.20	0.20	0.14	0.06	0.00	0.00	0.06	0.14	0.14	0.10	0.08
Si	28.98	28.67	29.19	29.00	28.99	28.93	29.04	29.22	28.94	28.99	0.16
Ti	0.19	0.14	0.26	0.26	0.25	0.17	0.18	0.24	0.19	0.21	0.05
Al	7.43	7.09	7.15	7.29	7.26	7.33	7.20	7.52	7.95	7.36	0.26
Fe	0.70	1.03	1.06	1.19	0.63	0.70	0.78	1.05	0.94	0.90	0.20
Mn	0.22	0.00	0.00	0.07	0.00	0.00	0.05	0.00	0.00	0.04	0.07
Mg	0.02	0.01	0.00	0.00	0.05	0.01	0.02	0.02	0.09	0.02	0.03
Ca	0.00	0.10	0.19	0.22	0.02	0.08	0.07	0.14	0.11	0.10	0.07
Na	2.11	1.86	1.77	1.93	2.15	1.91	1.88	2.02	1.78	1.94	0.13
K	6.99	7.87	7.21	7.91	7.61	8.22	7.69	7.28	7.45	7.58	0.39
F	0.20	0.19	0.08	0.29	0.21	0.26	0.20	0.22	0.33	0.22	0.07
Cl	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.10	0.10	0.03	0.04
total	47.07	47.16	47.07	48.21	47.18	47.61	47.15	47.96	48.01	47.49	0.46
P_2O_5	0.46	0.46	0.33	0.13	0.00	0.00	0.13	0.33	0.33	0.24	0.18
SiO_2	62.00	61.33	62.44	62.05	62.02	61.88	62.13	62.51	61.90	62.03	0.34
TiO_2	0.31	0.23	0.44	0.43	0.42	0.28	0.30	0.40	0.31	0.35	0.08
Al_2O_3	14.03	13.40	13.50	13.76	13.72	13.85	13.60	14.21	15.02	13.90	0.49
FeO	0.91	1.33	1.36	1.53	0.82	0.91	1.00	1.35	1.20	1.16	0.26
MnO	0.29	0.00	0.00	0.10	0.00	0.00	0.06	0.00	0.00	0.05	0.10
MgO	0.04	0.02	0.00	0.00	0.08	0.02	0.03	0.03	0.16	0.04	0.05
CaO	0.00	0.14	0.26	0.30	0.03	0.11	0.09	0.20	0.15	0.14	0.10
Na_2O	2.85	2.51	2.39	2.60	2.90	2.57	2.53	2.73	2.40	2.61	0.18
K_2O	8.42	9.48	8.68	9.52	9.17	9.90	9.26	8.77	8.97	9.13	0.47
F	0.20	0.18	0.08	0.28	0.20	0.26	0.20	0.22	0.33	0.22	0.07
Cl	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.10	0.10	0.03	0.04
total	89.44	88.99	89.47	90.60	89.28	89.67	89.25	90.73	90.71	89.79	0.69
H_2O	10.56	11.01	10.53	9.40	10.72	10.33	10.75	9.27	9.29	10.21	0.69
recalculated to 100 % total:											
P_2O_5	0.51	0.51	0.36	0.14	0.00	0.00	0.15	0.36	0.36	0.27	0.20
SiO_2	69.32	68.91	69.79	68.49	69.47	69.01	69.62	68.90	68.24	69.08	0.52
TiO_2	0.35	0.26	0.49	0.48	0.47	0.31	0.33	0.44	0.34	0.38	0.08
Al_2O_3	15.69	15.06	15.09	15.19	15.36	15.45	15.24	15.66	16.56	15.48	0.46
FeO	1.01	1.49	1.52	1.69	0.91	1.01	1.12	1.49	1.33	1.29	0.28
MnO	0.32	0.00	0.00	0.11	0.00	0.00	0.07	0.00	0.00	0.06	0.11
MgO	0.04	0.02	0.00	0.00	0.09	0.02	0.03	0.03	0.17	0.05	0.05
CaO	0.00	0.15	0.29	0.34	0.03	0.12	0.10	0.22	0.17	0.16	0.11
Na_2O	3.18	2.82	2.67	2.87	3.25	2.87	2.84	3.01	2.65	2.91	0.21
K_2O	9.41	10.66	9.71	10.51	10.27	11.05	10.37	9.67	9.89	10.17	0.53
F	0.22	0.21	0.09	0.31	0.23	0.29	0.23	0.25	0.36	0.24	0.08
Cl	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.11	0.11	0.03	0.05

Table 19: EMP data of glass in Type 5 run G67, 0.03 °C /min, 3.5 GPa / 900 °C; 2.8 wt.%.

	1	2	3	4	5	6	7	8	9	10	11	12	mean	σ
P	0.17	0.14	0.03	0.20	0.20	0.31	0.31	0.14	0.08	0.03	0.17	0.12	0.16	0.09
Si	29.56	28.96	29.35	29.25	28.85	29.27	28.91	29.19	29.05	29.36	29.17	29.23	29.18	0.21
Ti	0.16	0.18	0.22	0.17	0.13	0.05	0.22	0.11	0.20	0.10	0.21	0.22	0.16	0.05
Al	7.45	7.14	7.39	7.12	7.12	7.33	7.45	7.24	7.11	7.25	7.37	7.27	7.27	0.13
Fe	0.28	0.51	0.23	0.28	0.44	0.26	0.39	0.65	0.42	0.39	0.26	0.34	0.37	0.12
Mn	0.10	0.00	0.00	0.15	0.05	0.20	0.00	0.00	0.07	0.03	0.10	0.00	0.06	0.07
Mg	0.00	0.06	0.00	0.04	0.02	0.05	0.00	0.00	0.02	0.06	0.01	0.07	0.03	0.03
Ca	0.00	0.02	0.09	0.02	0.12	0.03	0.14	0.03	0.18	0.14	0.16	0.00	0.08	0.07
Na	1.66	1.93	1.96	1.89	1.95	1.73	1.65	1.83	1.74	1.72	1.63	1.92	1.80	0.13
K	8.68	8.58	7.97	8.64	8.80	8.08	8.27	8.14	7.91	8.21	8.26	8.05	8.30	0.30
F	0.28	0.36	0.11	0.12	0.35	0.29	0.23	0.14	0.15	0.30	0.28	0.28	0.24	0.09
Cl	0.00	0.00	0.02	0.07	0.00	0.02	0.07	0.05	0.00	0.02	0.00	0.03	0.02	0.03
total	48.32	47.89	47.36	47.95	48.02	47.62	47.65	47.52	46.94	47.61	47.61	47.53	47.67	0.35
P_2O_5	0.39	0.32	0.06	0.45	0.45	0.71	0.71	0.32	0.19	0.06	0.39	0.27	0.36	0.21
SiO_2	63.24	61.94	62.79	62.57	61.72	62.62	61.85	62.45	62.15	62.81	62.41	62.53	62.42	0.44
TiO_2	0.26	0.29	0.36	0.28	0.22	0.09	0.36	0.19	0.33	0.17	0.34	0.37	0.27	0.09
Al_2O_3	14.07	13.50	13.96	13.45	13.45	13.86	14.08	13.67	13.43	13.70	13.92	13.74	13.74	0.24
FeO	0.36	0.66	0.30	0.36	0.57	0.33	0.51	0.84	0.54	0.51	0.33	0.43	0.48	0.16
MnO	0.13	0.00	0.00	0.19	0.06	0.25	0.00	0.00	0.10	0.03	0.13	0.00	0.07	0.09
MgO	0.00	0.10	0.00	0.07	0.03	0.08	0.00	0.00	0.04	0.09	0.02	0.12	0.05	0.05
CaO	0.00	0.03	0.12	0.03	0.17	0.04	0.20	0.04	0.26	0.20	0.23	0.00	0.11	0.09
Na_2O	2.23	2.61	2.64	2.54	2.62	2.33	2.22	2.47	2.34	2.32	2.20	2.59	2.43	0.17
K_2O	10.45	10.34	9.60	10.41	10.60	9.73	9.97	9.81	9.53	9.89	9.95	9.70	10.00	0.36
F	0.28	0.36	0.11	0.12	0.35	0.29	0.23	0.13	0.15	0.30	0.28	0.28	0.24	0.09
Cl	0.00	0.00	0.02	0.07	0.00	0.02	0.07	0.05	0.00	0.02	0.00	0.03	0.02	0.03
total	91.30	90.00	89.92	90.48	90.10	90.23	90.08	89.90	88.99	89.97	90.07	89.94	90.08	0.52
H_2O	8.70	10.00	10.08	9.52	9.90	9.77	9.92	10.10	11.01	10.03	9.93	10.06	9.92	0.52
recalculated to 100 % total:														
P_2O_5	0.43	0.36	0.07	0.50	0.50	0.78	0.79	0.36	0.22	0.07	0.43	0.30	0.40	0.23
SiO_2	69.27	68.83	69.83	69.15	68.51	69.40	68.67	69.46	69.84	69.81	69.28	69.52	69.30	0.45
TiO_2	0.29	0.32	0.40	0.30	0.25	0.10	0.40	0.21	0.37	0.19	0.38	0.41	0.30	0.10
Al_2O_3	15.41	15.00	15.53	14.87	14.93	15.36	15.63	15.21	15.09	15.23	15.46	15.27	15.25	0.24
FeO	0.40	0.73	0.33	0.40	0.63	0.36	0.56	0.93	0.60	0.56	0.36	0.48	0.53	0.18
MnO	0.14	0.00	0.00	0.21	0.07	0.28	0.00	0.00	0.11	0.04	0.14	0.00	0.08	0.10
MgO	0.00	0.11	0.00	0.08	0.03	0.09	0.00	0.00	0.04	0.10	0.02	0.14	0.05	0.05
CaO	0.00	0.03	0.13	0.03	0.18	0.05	0.22	0.05	0.29	0.22	0.25	0.00	0.12	0.11
Na_2O	2.45	2.90	2.94	2.81	2.91	2.58	2.46	2.74	2.63	2.58	2.45	2.88	2.69	0.19
K_2O	11.45	11.49	10.67	11.51	11.77	10.79	11.06	10.91	10.71	10.99	11.05	10.79	11.10	0.37
F	0.30	0.40	0.12	0.13	0.38	0.32	0.26	0.15	0.17	0.34	0.31	0.31	0.27	0.10
Cl	0.00	0.00	0.03	0.08	0.00	0.03	0.08	0.05	0.00	0.03	0.00	0.03	0.03	0.03

Table 20: EMP data of glass in Type 5 run Q1 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 886 °C; bulk water content 2.7 wt.%; 22 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	min	max	mean	σ
P	0.15	0.21	0.06	0.15	0.24	0.09	0.30	0.12	0.12	0.12	0.15	0.06	0.15	0.15	0.00	0.12	0.06	0.39	0.15	0.18	0.03	0.21	0.00	0.39	0.14	0.09
Si	29.55	29.34	28.81	29.36	29.25	29.19	28.95	29.01	29.50	29.11	29.14	29.45	29.36	29.03	28.71	28.86	29.09	28.93	29.05	28.82	29.02	29.44	28.71	29.55	29.14	0.24
Ti	0.20	0.16	0.14	0.12	0.09	0.14	0.13	0.12	0.16	0.15	0.17	0.14	0.28	0.12	0.21	0.19	0.19	0.14	0.13	0.21	0.11	0.11	0.09	0.28	0.15	0.04
Al	7.35	7.31	7.37	7.29	7.35	7.43	7.57	7.50	7.42	7.29	7.46	7.20	7.35	7.48	7.29	7.31	7.33	7.55	7.61	7.07	7.13	7.23	7.07	7.61	7.36	0.14
Fe	0.54	0.36	0.63	0.73	0.58	0.42	0.63	0.39	0.46	0.68	0.61	0.44	0.51	0.27	0.54	0.46	0.46	0.73	0.44	0.29	0.34	0.32	0.27	0.73	0.49	0.14
Mn	0.03	0.00	0.00	0.03	0.05	0.00	0.00	0.18	0.03	0.00	0.00	0.13	0.05	0.00	0.10	0.00	0.00	0.08	0.00	0.05	0.08	0.13	0.00	0.18	0.04	0.05
Mg	0.00	0.07	0.01	0.00	0.00	0.01	0.00	0.00	0.04	0.00	0.01	0.00	0.01	0.00	0.05	0.00	0.00	0.05	0.03	0.07	0.07	0.03	0.00	0.07	0.02	0.03
Ca	0.12	0.07	0.04	0.12	0.12	0.16	0.06	0.10	0.07	0.11	0.12	0.07	0.06	0.16	0.02	0.12	0.02	0.07	0.07	0.05	0.04	0.09	0.02	0.16	0.08	0.04
Na	1.96	2.15	2.10	1.87	1.98	1.85	1.97	1.94	2.08	2.36	1.78	1.84	1.76	1.95	1.79	1.80	1.74	2.08	1.77	1.96	1.99	1.82	1.74	2.36	1.93	0.15
K	7.43	7.39	7.24	7.84	7.66	7.22	8.16	7.55	7.71	7.92	7.64	7.67	8.12	7.76	7.85	8.01	7.91	7.98	7.28	7.65	7.56	7.70	7.22	8.16	7.69	0.27
F	0.32	0.21	0.22	0.17	0.35	0.28	0.36	0.20	0.51	0.26	0.21	0.25	0.30	0.32	0.27	0.21	0.19	0.34	0.22	0.36	0.17	0.13	0.13	0.51	0.26	0.09
Cl	0.03	0.00	0.03	0.00	0.00	0.03	0.00	0.05	0.00	0.08	0.00	0.05	0.05	0.00	0.03	0.00	0.03	0.00	0.05	0.08	0.08	0.00	0.00	0.08	0.03	0.03
total	47.67	47.28	46.65	47.67	47.68	46.80	48.12	47.15	48.09	48.07	47.29	47.29	48.00	47.22	46.86	47.08	47.01	48.33	46.81	46.78	46.61	47.19	46.61	48.33	47.35	0.53
P_2O_5	0.34	0.48	0.14	0.34	0.55	0.20	0.68	0.27	0.27	0.27	0.34	0.14	0.34	0.34	0.00	0.27	0.14	0.88	0.34	0.41	0.07	0.48	0.00	0.88	0.33	0.20
SiO_2	63.22	62.78	61.63	62.82	62.59	62.44	61.93	62.06	63.12	62.27	62.35	62.99	62.81	62.11	61.42	61.75	62.22	61.90	62.16	61.66	62.09	62.98	61.42	63.22	62.33	0.52
TiO_2	0.33	0.27	0.23	0.19	0.16	0.23	0.21	0.19	0.27	0.25	0.29	0.23	0.46	0.19	0.35	0.31	0.31	0.23	0.21	0.35	0.18	0.18	0.16	0.46	0.26	0.07
Al_2O_3	13.89	13.81	13.93	13.78	13.89	14.04	14.30	14.17	14.03	13.77	14.09	13.60	13.89	14.13	13.78	13.82	13.84	14.27	14.38	13.35	13.47	13.65	13.35	14.38	13.90	0.26
FeO	0.69	0.47	0.82	0.94	0.75	0.53	0.81	0.50	0.59	0.87	0.78	0.56	0.66	0.34	0.69	0.60	0.60	0.94	0.56	0.38	0.44	0.41	0.34	0.94	0.63	0.18
MnO	0.03	0.00	0.00	0.03	0.07	0.00	0.00	0.23	0.03	0.00	0.00	0.16	0.07	0.00	0.13	0.00	0.00	0.10	0.00	0.07	0.10	0.16	0.00	0.23	0.05	0.07
MgO	0.00	0.12	0.02	0.00	0.00	0.01	0.00	0.00	0.06	0.00	0.01	0.00	0.01	0.00	0.08	0.00	0.00	0.08	0.05	0.12	0.12	0.05	0.00	0.12	0.03	0.04
CaO	0.17	0.10	0.05	0.17	0.17	0.22	0.08	0.14	0.10	0.15	0.17	0.10	0.08	0.22	0.03	0.17	0.03	0.10	0.10	0.07	0.05	0.12	0.03	0.22	0.12	0.06
Na_2O	2.64	2.89	2.84	2.53	2.67	2.50	2.66	2.62	2.80	3.19	2.40	2.48	2.37	2.62	2.42	2.42	2.35	2.81	2.39	2.64	2.68	2.46	2.35	3.19	2.61	0.21
K_2O	8.95	8.90	8.73	9.44	9.23	8.69	9.83	9.10	9.28	9.54	9.20	9.24	9.78	9.35	9.46	9.65	9.53	9.61	8.77	9.22	9.10	9.27	8.69	9.83	9.27	0.33
F	0.32	0.21	0.22	0.17	0.35	0.28	0.36	0.20	0.51	0.25	0.21	0.25	0.30	0.31	0.27	0.21	0.19	0.34	0.22	0.36	0.17	0.13	0.13	0.51	0.26	0.09
Cl	0.03	0.00	0.03	0.00	0.00	0.03	0.00	0.05	0.00	0.08	0.00	0.05	0.05	0.00	0.03	0.00	0.03	0.00	0.05	0.08	0.08	0.00	0.00	0.08	0.03	0.03
total	90.47	89.94	88.52	90.34	90.27	89.05	90.71	89.43	90.85	90.53	89.76	89.69	90.69	89.49	88.53	89.10	89.15	91.11	89.13	88.52	88.46	89.83	88.46	91.11	89.71	0.83
H_2O	9.53	10.06	11.48	9.66	9.73	10.95	9.29	10.57	9.15	9.47	10.24	10.31	9.31	10.51	11.47	10.90	10.85	8.89	10.87	11.48	11.54	10.17	8.89	11.54	10.29	0.83
recalculated to 100 % total:																										
P_2O_5	0.38	0.53	0.16	0.38	0.60	0.23	0.75	0.30	0.30	0.30	0.38	0.15	0.37	0.38	0.00	0.31	0.15	0.97	0.38	0.46	0.08	0.53	0.00	0.97	0.37	0.22
SiO_2	69.88	69.80	69.62	69.54	69.33	70.12	68.27	69.39	69.47	68.79	69.46	70.23	69.26	69.40	69.37	69.30	69.80	67.94	69.74	69.66	70.19	70.11	67.94	70.23	69.49	0.57
TiO_2	0.36	0.30	0.26	0.21	0.17	0.26	0.23	0.22	0.30	0.28	0.32	0.26	0.51	0.22	0.39	0.35	0.35	0.25	0.24	0.39	0.20	0.20	0.17	0.51	0.29	0.08
Al_2O_3	15.36	15.35	15.73	15.25	15.39	15.77	15.76	15.84	15.44	15.21	15.70	15.16	15.31	15.79	15.57	15.51	15.53	15.66	16.13	15.08	15.23	15.20	15.08	16.13	15.50	0.27
FeO	0.76	0.52	0.92	1.04	0.83	0.60	0.90	0.56	0.65	0.97	0.87	0.63	0.72	0.39	0.78	0.67	0.67	1.03	0.63	0.43	0.50	0.45	0.39	1.04	0.71	0.19
MnO	0.04	0.00	0.00	0.04	0.07	0.00	0.00	0.26	0.04	0.00	0.00	0.18	0.07	0.00	0.15	0.00	0.00	0.11	0.00	0.07	0.11	0.18	0.00	0.26	0.06	0.08
MgO	0.00	0.14	0.02	0.00	0.00	0.01	0.00	0.00	0.06	0.00	0.01	0.00	0.01	0.00	0.09	0.00	0.00	0.08	0.05	0.13	0.13	0.05	0.00	0.14	0.04	0.05
CaO	0.19	0.11	0.06	0.19	0.19	0.25	0.09	0.15	0.11	0.17	0.19	0.11	0.09	0.25	0.04	0.19	0.04	0.11	0.11	0.08	0.06	0.13	0.04	0.25	0.13	0.06
Na_2O	2.92	3.21	3.20	2.80	2.96	2.80	2.93	2.92	3.08	3.52	2.68	2.76	2.61	2.93	2.73	2.72	2.63	3.08	2.68	2.98	3.03	2.74	2.61	3.52	2.91	0.22
K_2O	9.89	9.90	9.86	10.45	10.22	9.76	10.84	10.18	10.22	10.54	10.25	10.30	10.79	10.44	10.68	10.83	10.69	10.55	9.84	10.41	10.29	10.32	9.76	10.84	10.33	0.33
F	0.35	0.23	0.25	0.18	0.38	0.31	0.39	0.22	0.56	0.28	0.24	0.28	0.34	0.35	0.30	0.23	0.21	0.37	0.24	0.40	0.20	0.14	0.14	0.56	0.29	0.09
Cl	0.03	0.00	0.03	0.00	0.00	0.03	0.00	0.06	0.00	0.09	0.00	0.06	0.06	0.00	0.03	0.00	0.03	0.00	0.06	0.09	0.09	0.00	0.00	0.09	0.03	0.03

Table 21: EMP data of glass in Type 5 run G75 with a cooling rate of 30 °C /min, quenched at conditions of 3.5 GPa / 800 °C; bulk water content 2.8 wt.%; 20 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	min	max	mean	σ
P	0.18	0.06	0.18	0.00	0.03	0.12	0.15	0.24	0.14	0.00	0.00	0.23	0.11	0.14	0.09	0.14	0.03	0.03	0.17	0.17	0.00	0.24	0.11	0.08
Si	28.48	28.99	28.49	29.17	28.36	28.60	28.77	28.91	29.95	29.60	28.95	29.18	29.16	29.77	29.45	29.83	29.75	29.51	29.66	29.00	28.36	29.95	29.18	0.49
Ti	0.33	0.08	0.19	0.21	0.14	0.05	0.14	0.21	0.01	0.21	0.13	0.01	0.02	0.07	0.16	0.14	0.07	0.30	0.24	0.22	0.01	0.33	0.15	0.09
Al	7.22	7.39	7.40	6.78	7.40	7.52	7.89	7.83	7.53	7.29	7.97	7.40	7.31	7.34	7.25	7.89	7.40	7.36	7.25	7.40	6.78	7.97	7.44	0.28
Fe	0.49	0.22	0.17	0.15	0.34	0.27	0.29	0.56	0.28	0.42	0.53	0.33	0.37	0.49	0.51	0.49	0.44	0.39	0.42	0.35	0.15	0.56	0.38	0.12
Mn	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.07	0.12	0.00	0.03	0.00	0.05	0.00	0.10	0.00	0.00	0.00	0.13	0.03	0.04
Mg	0.06	0.06	0.00	0.04	0.03	0.00	0.04	0.09	0.00	0.00	0.06	0.01	0.01	0.03	0.00	0.07	0.03	0.05	0.00	0.00	0.00	0.09	0.03	0.03
Ca	0.51	0.00	0.13	0.22	0.67	0.21	0.33	0.66	0.32	0.20	0.16	0.03	0.14	0.07	0.01	0.30	0.12	0.26	0.05	0.40	0.00	0.67	0.24	0.20
Na	3.21	2.45	2.75	3.04	3.85	3.00	2.47	3.44	2.67	2.51	2.47	2.56	2.50	2.35	2.67	3.07	3.07	3.19	2.73	2.93	2.35	3.85	2.85	0.39
K	5.40	6.63	6.15	5.68	5.05	6.97	7.98	5.87	5.83	6.53	6.52	6.54	6.48	6.71	6.56	5.85	6.16	6.04	6.13	6.65	5.05	7.98	6.29	0.63
F	0.39	0.48	0.26	0.30	0.40	0.31	0.20	0.23	0.26	0.29	0.35	0.35	0.53	0.20	0.35	0.33	0.50	0.31	0.29	0.42	0.20	0.53	0.34	0.09
Cl	0.03	0.21	0.00	0.03	0.00	0.08	0.03	0.11	0.05	0.00	0.05	0.12	0.07	0.05	0.07	0.00	0.10	0.07	0.03	0.05	0.00	0.21	0.06	0.05
total	46.40	46.58	45.72	45.61	46.28	47.13	48.29	48.15	47.06	47.07	47.27	46.88	46.70	47.23	47.13	48.16	47.67	47.61	46.95	47.60	45.61	48.29	47.07	0.74
P_2O_5	0.41	0.14	0.41	0.00	0.07	0.27	0.34	0.55	0.33	0.00	0.00	0.52	0.26	0.32	0.19	0.33	0.06	0.06	0.39	0.39	0.00	0.55	0.25	0.17
SiO_2	60.92	62.01	60.94	62.40	60.68	61.19	61.56	61.85	64.06	63.32	61.93	62.43	62.38	63.69	63.01	63.81	63.65	63.13	63.45	62.05	60.68	64.06	62.42	1.05
TiO_2	0.54	0.14	0.31	0.35	0.23	0.08	0.23	0.35	0.02	0.34	0.22	0.02	0.04	0.12	0.26	0.24	0.12	0.50	0.40	0.36	0.02	0.54	0.24	0.15
Al_2O_3	13.64	13.96	13.98	12.81	13.98	14.21	14.91	14.79	14.23	13.78	15.05	13.98	13.81	13.86	13.70	14.91	13.98	13.90	13.69	13.99	12.81	15.05	14.06	0.53
FeO	0.63	0.28	0.22	0.19	0.44	0.34	0.38	0.72	0.36	0.54	0.69	0.42	0.48	0.63	0.66	0.63	0.57	0.51	0.54	0.45	0.19	0.72	0.48	0.15
MnO	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.10	0.16	0.00	0.03	0.00	0.06	0.00	0.13	0.00	0.00	0.00	0.16	0.04	0.06
MgO	0.10	0.11	0.00	0.06	0.05	0.00	0.06	0.15	0.00	0.00	0.10	0.01	0.01	0.05	0.00	0.11	0.05	0.08	0.00	0.00	0.00	0.15	0.05	0.05
CaO	0.71	0.00	0.19	0.31	0.93	0.29	0.46	0.93	0.45	0.29	0.23	0.04	0.20	0.10	0.02	0.42	0.17	0.36	0.08	0.56	0.00	0.93	0.34	0.28
Na_2O	4.32	3.31	3.71	4.10	5.19	4.05	3.33	4.63	3.59	3.38	3.33	3.46	3.36	3.17	3.60	4.13	4.14	4.30	3.68	3.95	3.17	5.19	3.84	0.52
K_2O	6.50	7.99	7.41	6.85	6.09	8.39	9.62	7.07	7.02	7.86	7.85	7.88	7.81	8.08	7.90	7.05	7.41	7.28	7.38	8.01	6.09	9.62	7.57	0.75
F	0.39	0.48	0.25	0.30	0.40	0.31	0.20	0.23	0.26	0.28	0.35	0.34	0.53	0.19	0.35	0.33	0.50	0.31	0.28	0.42	0.20	0.53	0.34	0.09
Cl	0.03	0.21	0.00	0.03	0.00	0.08	0.03	0.11	0.05	0.00	0.05	0.12	0.07	0.05	0.07	0.00	0.10	0.07	0.03	0.05	0.00	0.21	0.06	0.05
total	88.19	88.38	87.32	87.25	87.89	89.07	91.02	91.26	90.28	89.72	89.74	89.21	88.70	90.20	89.60	91.88	90.52	90.48	89.78	90.04	87.25	91.88	89.53	1.28
H_2O	11.81	11.62	12.68	12.75	12.11	10.93	8.98	8.74	9.72	10.28	10.26	10.79	11.30	9.80	10.40	8.12	9.48	9.52	10.22	9.96	8.12	12.75	10.47	1.28
recalculated to 100 % total:																								
P_2O_5	0.47	0.16	0.47	0.00	0.08	0.31	0.38	0.60	0.36	0.00	0.00	0.58	0.29	0.36	0.22	0.35	0.07	0.07	0.43	0.43	0.00	0.60	0.28	0.19
SiO_2	69.08	70.17	69.79	71.52	69.04	68.70	67.63	67.77	70.96	70.58	69.01	69.98	70.32	70.61	70.32	69.45	70.32	69.77	70.67	68.91	67.63	71.52	69.73	1.02
TiO_2	0.62	0.15	0.36	0.40	0.27	0.09	0.25	0.38	0.02	0.38	0.25	0.02	0.04	0.13	0.29	0.26	0.13	0.55	0.44	0.40	0.02	0.62	0.27	0.17
Al_2O_3	15.47	15.80	16.01	14.68	15.90	15.95	16.38	16.21	15.76	15.36	16.77	15.67	15.57	15.37	15.29	16.23	15.45	15.37	15.25	15.54	14.68	16.77	15.70	0.47
FeO	0.71	0.32	0.25	0.22	0.50	0.39	0.41	0.79	0.40	0.60	0.77	0.47	0.54	0.69	0.73	0.68	0.63	0.56	0.60	0.50	0.22	0.79	0.54	0.17
MnO	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.11	0.18	0.00	0.04	0.00	0.07	0.00	0.14	0.00	0.00	0.00	0.19	0.04	0.06
MgO	0.11	0.12	0.00	0.07	0.06	0.00	0.06	0.17	0.00	0.00	0.11	0.01	0.01	0.05	0.00	0.12	0.05	0.09	0.00	0.00	0.00	0.17	0.05	0.05
CaO	0.80	0.00	0.21	0.35	1.06	0.32	0.50	1.02	0.50	0.32	0.25	0.05	0.22	0.12	0.02	0.46	0.18	0.40	0.08	0.62	0.00	1.06	0.37	0.31
Na_2O	4.90	3.74	4.25	4.70	5.91	4.55	3.66	5.08	3.98	3.77	3.71	3.87	3.79	3.51	4.02	4.50	4.57	4.75	4.10	4.39	3.51	5.91	4.29	0.60
K_2O	7.37	9.04	8.49	7.85	6.93	9.42	10.57	7.75	7.78	8.77	8.75	8.83	8.80	8.96	8.82	7.67	8.19	8.04	8.22	8.90	6.93	10.57	8.46	0.81
F	0.44	0.54	0.29	0.34	0.46	0.35	0.22	0.25	0.29	0.32	0.39	0.39	0.60	0.22	0.40	0.36	0.56	0.34	0.32	0.47	0.22	0.60	0.38	0.11
Cl	0.03	0.24	0.00	0.03	0.00	0.09	0.03	0.12	0.05	0.00	0.05	0.14	0.08	0.05	0.08	0.00	0.11	0.08	0.03	0.05	0.00	0.24	0.06	0.06

Table 22: EMP data of glass in Type 5 run G63, cooling rate 30 °C /min, quenched at 3.5 GPa / 800 °C; bulk water content 2.8 wt.%.

	1	2	3	4	5	6	7	8	9	10	11	min	max	mean	σ
P	0.03	0.14	0.11	0.17	0.11	0.17	0.03	0.11	0.00	0.09	0.20	0.00	0.20	0.10	0.06
Si	30.73	30.45	30.15	30.72	29.98	30.78	30.85	30.23	30.86	30.60	30.62	29.98	30.86	30.54	0.30
Ti	0.11	0.04	0.18	0.10	0.03	0.10	0.30	0.06	0.09	0.26	0.18	0.03	0.30	0.13	0.09
Al	7.47	7.88	7.61	7.80	7.83	7.71	7.54	8.08	8.24	8.23	7.84	7.47	8.24	7.84	0.26
Fe	0.35	0.46	0.53	0.16	0.46	0.16	0.23	0.60	0.89	0.83	0.64	0.16	0.89	0.48	0.25
Mn	0.00	0.00	0.00	0.15	0.05	0.05	0.12	0.00	0.19	0.00	0.02	0.00	0.19	0.05	0.07
Mg	0.00	0.04	0.00	0.03	0.10	0.03	0.11	0.27	0.20	0.19	0.18	0.00	0.27	0.10	0.09
Ca	0.20	0.59	0.45	0.16	0.19	0.11	0.25	0.50	0.63	0.75	0.71	0.11	0.75	0.41	0.24
Na	1.54	1.97	2.18	1.94	2.09	1.73	1.86	3.32	3.02	3.00	2.93	1.54	3.32	2.32	0.62
K	8.24	8.09	8.06	8.76	8.65	8.85	8.57	6.38	6.08	6.23	6.00	6.00	8.85	7.63	1.19
F	0.09	0.17	0.12	0.16	0.09	0.18	0.25	0.06	0.13	0.00	0.10	0.00	0.25	0.12	0.07
Cl	0.36	0.00	0.27	0.19	0.19	0.07	0.19	0.07	0.07	0.10	0.24	0.00	0.36	0.16	0.11
total	49.13	49.84	49.65	50.34	49.77	49.94	50.30	49.68	50.40	50.25	49.67	49.13	50.40	49.90	0.39
P_2O_5	0.06	0.32	0.26	0.38	0.26	0.39	0.06	0.26	0.00	0.19	0.45	0.00	0.45	0.24	0.15
SiO_2	65.74	65.14	64.49	65.73	64.14	65.85	66.00	64.67	66.02	65.46	65.50	64.14	66.02	65.34	0.64
TiO_2	0.19	0.07	0.31	0.17	0.05	0.17	0.49	0.10	0.15	0.43	0.31	0.05	0.49	0.22	0.14
Al_2O_3	14.12	14.89	14.38	14.73	14.79	14.57	14.25	15.27	15.56	15.55	14.80	14.12	15.56	14.81	0.49
FeO	0.44	0.59	0.68	0.21	0.59	0.21	0.29	0.77	1.15	1.06	0.83	0.21	1.15	0.62	0.32
MnO	0.00	0.00	0.00	0.19	0.06	0.06	0.16	0.00	0.25	0.00	0.03	0.00	0.25	0.07	0.09
MgO	0.00	0.07	0.00	0.05	0.16	0.05	0.18	0.44	0.33	0.31	0.29	0.00	0.44	0.17	0.15
CaO	0.29	0.82	0.63	0.22	0.27	0.15	0.34	0.70	0.88	1.04	1.00	0.15	1.04	0.58	0.33
Na_2O	2.07	2.66	2.93	2.62	2.81	2.33	2.51	4.48	4.07	4.04	3.95	2.07	4.48	3.13	0.83
K_2O	9.93	9.75	9.71	10.55	10.42	10.67	10.32	7.68	7.33	7.50	7.23	7.23	10.67	9.19	1.43
F	0.09	0.17	0.12	0.16	0.09	0.18	0.25	0.06	0.13	0.00	0.10	0.00	0.25	0.12	0.07
Cl	0.37	0.00	0.27	0.19	0.19	0.07	0.19	0.07	0.07	0.10	0.24	0.00	0.36	0.16	0.11
total	93.17	94.42	93.66	95.10	93.76	94.60	94.91	94.47	95.87	95.66	94.64	93.17	95.87	94.57	0.82
H_2O	6.83	5.58	6.34	4.90	6.24	5.40	5.09	5.53	4.13	4.34	5.36	4.13	6.83	5.43	0.82
recalculated to 100 % total:															
P_2O_5	0.07	0.34	0.27	0.40	0.27	0.41	0.07	0.27	0.00	0.20	0.48	0.00	0.48	0.25	0.16
SiO_2	70.55	69.00	68.86	69.12	68.42	69.61	69.54	68.46	68.87	68.43	69.21	68.42	70.55	69.10	0.63
TiO_2	0.20	0.07	0.33	0.18	0.06	0.18	0.52	0.11	0.16	0.44	0.32	0.06	0.52	0.23	0.15
Al_2O_3	15.15	15.77	15.35	15.49	15.77	15.40	15.01	16.17	16.23	16.26	15.64	15.01	16.26	15.66	0.43
FeO	0.48	0.63	0.73	0.22	0.63	0.22	0.31	0.81	1.20	1.11	0.87	0.22	1.20	0.65	0.33
MnO	0.00	0.00	0.00	0.20	0.07	0.07	0.17	0.00	0.26	0.00	0.03	0.00	0.26	0.07	0.09
MgO	0.00	0.08	0.00	0.06	0.17	0.06	0.19	0.47	0.34	0.32	0.31	0.00	0.47	0.18	0.16
CaO	0.31	0.87	0.67	0.24	0.29	0.16	0.36	0.74	0.92	1.09	1.06	0.16	1.09	0.61	0.35
Na_2O	2.22	2.82	3.13	2.75	3.00	2.46	2.65	4.74	4.24	4.22	4.17	2.22	4.74	3.31	0.87
K_2O	10.66	10.33	10.37	11.10	11.11	11.27	10.87	8.13	7.64	7.84	7.64	7.64	11.27	9.72	1.55
F	0.10	0.18	0.12	0.16	0.09	0.19	0.26	0.06	0.13	0.00	0.11	0.00	0.26	0.13	0.07
Cl	0.39	0.00	0.29	0.20	0.21	0.08	0.20	0.08	0.08	0.10	0.26	0.00	0.39	0.17	0.12

Table 23: EMP data of glass in Type 5 run G77 with a cooling rate of 3 °C /min, quenched at conditions of 3.5 GPa / 800 °C; bulk water content 2.8 wt.%; 23 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	min	max	mean	σ
P	0.15	0.12	0.09	0.09	0.09	0.15	0.27	0.24	0.15	0.00	0.21	0.06	0.08	0.25	0.20	0.09	0.17	0.17	0.25	0.17	0.20	0.11	0.00	0.00	0.27	0.14	0.08
Si	28.76	28.37	29.16	29.62	28.56	28.80	28.81	28.24	28.94	28.90	28.21	28.73	29.94	29.74	29.91	29.73	29.39	29.25	29.54	29.87	29.41	29.11	29.24	28.21	29.94	29.14	0.53
Ti	0.06	0.04	0.11	0.06	0.12	0.04	0.29	0.19	0.11	0.01	0.14	0.00	0.12	0.08	0.17	0.11	0.06	0.05	0.09	0.14	0.14	0.14	0.09	0.00	0.29	0.10	0.06
Al	6.67	7.25	6.75	6.68	6.64	6.78	6.89	7.11	6.76	6.35	6.91	6.86	6.85	7.06	7.33	7.33	7.10	7.17	6.96	7.07	7.16	6.58	7.13	6.35	7.33	6.93	0.26
Fe	0.37	0.07	0.24	0.20	0.34	0.37	0.32	0.15	0.15	0.29	0.25	0.49	0.42	0.42	0.35	0.19	0.12	0.28	0.40	0.39	0.44	0.26	0.49	0.07	0.49	0.30	0.12
Mn	0.00	0.00	0.00	0.08	0.05	0.05	0.08	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.03	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.08	0.02	0.03
Mg	0.01	0.01	0.00	0.00	0.00	0.03	0.04	0.08	0.00	0.00	0.00	0.06	0.01	0.03	0.01	0.03	0.03	0.08	0.00	0.00	0.00	0.01	0.02	0.00	0.08	0.02	0.03
Ca	0.06	0.22	0.00	0.00	0.12	0.06	0.09	0.04	0.04	0.12	0.06	0.13	0.09	0.01	0.11	0.12	0.00	0.05	0.00	0.02	0.04	0.12	0.00	0.00	0.22	0.07	0.06
Na	1.91	1.92	1.67	2.01	2.20	1.97	1.78	2.06	1.99	2.14	2.09	2.06	1.90	1.78	1.84	1.87	1.78	2.00	1.97	2.20	1.84	2.15	2.02	1.67	2.20	1.96	0.14
K	8.20	8.11	8.31	7.39	8.00	7.89	7.76	8.31	8.22	7.90	7.94	7.32	7.80	7.85	7.79	7.70	7.28	7.88	7.84	7.42	8.08	7.82	8.24	7.28	8.31	7.87	0.30
F	0.24	0.41	0.33	0.34	0.36	0.31	0.24	0.22	0.42	0.12	0.19	0.33	0.38	0.52	0.41	0.17	0.40	0.24	0.14	0.43	0.25	0.39	0.52	0.12	0.52	0.32	0.11
Cl	0.00	0.11	0.05	0.05	0.03	0.11	0.11	0.03	0.00	0.13	0.13	0.03	0.10	0.00	0.10	0.00	0.03	0.15	0.10	0.05	0.00	0.07	0.00	0.00	0.15	0.06	0.05
total	46.41	46.62	46.70	46.51	46.51	46.55	46.66	46.70	46.76	45.98	46.12	46.06	47.68	47.74	48.24	47.34	46.38	47.31	47.34	47.77	47.56	46.76	47.76	45.98	48.24	46.93	0.64
P_2O_5	0.34	0.27	0.20	0.20	0.20	0.34	0.61	0.54	0.34	0.00	0.47	0.14	0.19	0.58	0.45	0.19	0.39	0.39	0.58	0.39	0.45	0.26	0.00	0.00	0.61	0.33	0.17
SiO_2	61.52	60.68	62.37	63.36	61.10	61.61	61.63	60.41	61.90	61.82	60.35	61.45	64.04	63.63	63.98	63.61	62.88	62.57	63.19	63.90	62.91	62.28	62.56	60.35	64.04	62.34	1.14
TiO_2	0.10	0.06	0.18	0.10	0.20	0.06	0.49	0.31	0.18	0.02	0.23	0.00	0.21	0.14	0.28	0.19	0.10	0.09	0.16	0.24	0.24	0.23	0.16	0.00	0.49	0.17	0.11
Al_2O_3	12.60	13.70	12.75	12.63	12.55	12.81	13.02	13.44	12.77	12.00	13.06	12.96	12.94	13.34	13.84	13.86	13.42	13.54	13.14	13.36	13.52	12.43	13.47	12.00	13.86	13.09	0.48
FeO	0.47	0.09	0.31	0.25	0.44	0.47	0.41	0.19	0.19	0.38	0.32	0.63	0.54	0.54	0.45	0.24	0.15	0.36	0.51	0.51	0.57	0.33	0.63	0.09	0.63	0.39	0.15
MnO	0.00	0.00	0.00	0.10	0.07	0.07	0.10	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.03	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.10	0.02	0.04
MgO	0.02	0.02	0.00	0.00	0.00	0.05	0.07	0.13	0.00	0.00	0.00	0.10	0.02	0.04	0.01	0.05	0.05	0.14	0.00	0.00	0.00	0.01	0.04	0.00	0.14	0.03	0.04
CaO	0.09	0.31	0.00	0.00	0.17	0.09	0.12	0.05	0.05	0.17	0.09	0.19	0.12	0.02	0.15	0.17	0.00	0.08	0.00	0.03	0.06	0.17	0.00	0.00	0.31	0.09	0.08
Na_2O	2.57	2.59	2.24	2.71	2.97	2.66	2.40	2.77	2.68	2.89	2.81	2.77	2.56	2.40	2.48	2.52	2.40	2.70	2.66	2.97	2.47	2.90	2.72	2.24	2.97	2.65	0.20
K_2O	9.88	9.77	10.01	8.90	9.64	9.51	9.34	10.01	9.90	9.52	9.56	8.82	9.40	9.46	9.38	9.27	8.76	9.49	9.44	8.94	9.73	9.42	9.93	8.76	10.01	9.48	0.36
F	0.24	0.41	0.33	0.33	0.36	0.31	0.24	0.22	0.42	0.12	0.19	0.33	0.38	0.51	0.41	0.17	0.40	0.24	0.14	0.43	0.25	0.39	0.52	0.12	0.52	0.32	0.11
Cl	0.00	0.11	0.05	0.05	0.03	0.11	0.11	0.03	0.00	0.13	0.13	0.03	0.10	0.00	0.10	0.00	0.03	0.15	0.10	0.05	0.00	0.07	0.00	0.00	0.15	0.06	0.05
total	87.72	87.81	88.30	88.48	87.56	87.92	88.41	88.07	88.26	86.97	87.11	87.27	90.31	90.44	91.39	90.20	88.44	89.59	89.90	90.62	90.11	88.30	89.80	86.97	91.39	88.83	1.28
H_2O	12.28	12.19	11.70	11.52	12.44	12.08	11.59	11.93	11.74	13.03	12.89	12.73	9.69	9.56	8.61	9.80	11.56	10.41	10.10	9.38	9.89	11.70	10.20	8.61	13.03	11.17	1.28
recalculated to 100 % total:																											
P_2O_5	0.39	0.31	0.23	0.23	0.23	0.39	0.69	0.62	0.38	0.00	0.54	0.16	0.21	0.64	0.49	0.22	0.44	0.43	0.64	0.43	0.50	0.29	0.00	0.00	0.69	0.37	0.19
SiO_2	70.14	69.11	70.64	71.61	69.78	70.07	69.71	68.59	70.14	71.08	69.28	70.42	70.92	70.35	70.01	70.52	71.10	69.84	70.29	70.51	69.82	70.53	69.67	68.59	71.61	70.18	0.68
TiO_2	0.11	0.07	0.20	0.11	0.22	0.07	0.55	0.35	0.20	0.02	0.27	0.00	0.23	0.15	0.30	0.21	0.12	0.10	0.17	0.27	0.27	0.26	0.17	0.00	0.55	0.19	0.12
Al_2O_3	14.36	15.60	14.44	14.27	14.33	14.58	14.73	15.26	14.47	13.80	15.00	14.85	14.33	14.75	15.15	15.36	15.17	15.11	14.62	14.74	15.01	14.08	15.00	13.80	15.60	14.74	0.44
FeO	0.54	0.11	0.36	0.28	0.50	0.54	0.46	0.21	0.21	0.43	0.36	0.72	0.59	0.59	0.49	0.27	0.17	0.40	0.57	0.56	0.63	0.37	0.70	0.11	0.72	0.44	0.17
MnO	0.00	0.00	0.00	0.11	0.08	0.07	0.11	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.04	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.11	0.03	0.04
MgO	0.02	0.02	0.00	0.00	0.00	0.05	0.08	0.15	0.00	0.00	0.00	0.11	0.02	0.05	0.01	0.06	0.06	0.15	0.00	0.00	0.00	0.01	0.04	0.00	0.15	0.04	0.05
CaO	0.10	0.35	0.00	0.00	0.19	0.10	0.13	0.06	0.06	0.20	0.10	0.21	0.13	0.02	0.17	0.18	0.00	0.08	0.00	0.03	0.07	0.19	0.00	0.00	0.35	0.10	0.09
Na_2O	2.93	2.95	2.54	3.06	3.39	3.02	2.71	3.15	3.04	3.32	3.23	3.18	2.83	2.65	2.71	2.79	2.72	3.01	2.96	3.27	2.75	3.29	3.03	2.54	3.39	2.98	0.24
K_2O	11.26	11.12	11.34	10.06	11.01	10.81	10.57	11.36	11.22	10.95	10.97	10.11	10.41	10.46	10.27	10.28	9.91	10.59	10.50	9.87	10.80	10.66	11.06	9.87	11.36	10.68	0.46
F	0.27	0.47	0.37	0.38	0.41	0.35	0.27	0.25	0.47	0.14	0.21	0.38	0.42	0.57	0.45	0.19	0.45	0.26	0.16	0.48	0.28	0.45	0.58	0.14	0.58	0.36	0.13
Cl	0.00	0.12	0.06	0.06	0.03	0.12	0.12	0.03	0.00	0.15	0.15	0.03	0.11	0.00	0.11	0.00	0.03	0.16	0.11	0.05	0.00	0.08	0.00	0.00	0.16	0.07	0.06

Table 24: EMP data of glass in Type 5 run G55 with a cooling rate of 3 °C / min, quenched at conditions of 3.5 GPa / 800 °C; bulk water content 2.8 wt.%; 21 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	min	max	mean	σ
P	0.17	0.23	0.14	0.11	0.14	0.23	0.11	0.11	0.03	0.11	0.00	0.11	0.06	0.03	0.17	0.03	0.03	0.17	0.09	0.03	0.09	0.00	0.23	0.10	0.07
Si	30.11	30.31	30.38	30.32	30.19	29.83	30.35	30.00	30.11	29.52	30.22	30.42	30.32	29.79	29.52	29.47	29.80	29.78	30.48	30.62	30.00	29.47	30.62	30.07	0.33
Ti	0.07	0.08	0.06	0.08	0.16	0.19	0.10	0.07	0.25	0.02	0.12	0.12	0.06	0.03	0.04	0.09	0.06	0.16	0.12	0.05	0.14	0.02	0.25	0.10	0.06
Al	7.15	7.30	6.87	7.08	7.38	7.24	7.17	7.17	7.26	7.28	7.33	7.42	7.29	6.85	7.02	7.22	7.22	7.02	7.72	7.27	7.04	6.85	7.72	7.20	0.19
Fe	0.14	0.46	0.40	0.23	0.58	0.54	0.23	0.28	0.26	0.40	0.63	0.30	0.23	0.28	0.47	0.33	0.21	0.21	0.40	0.40	0.35	0.14	0.63	0.35	0.13
Mn	0.03	0.00	0.00	0.07	0.00	0.07	0.03	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.03	0.05	0.07	0.00	0.00	0.00	0.00	0.07	0.03	0.03
Mg	0.00	0.00	0.00	0.00	0.02	0.02	0.07	0.00	0.00	0.01	0.02	0.00	0.00	0.01	0.01	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.07	0.01	0.02
Ca	0.04	0.02	0.01	0.00	0.13	0.05	0.00	0.03	0.00	0.09	0.00	0.03	0.00	0.09	0.03	0.05	0.10	0.12	0.05	0.00	0.11	0.00	0.13	0.05	0.04
Na	2.15	1.94	1.81	2.18	1.91	2.22	1.75	2.00	1.76	2.00	1.75	2.03	1.92	2.04	1.76	1.90	1.70	1.87	1.96	1.67	1.82	1.67	2.22	1.91	0.16
K	8.12	7.84	8.12	7.40	8.26	7.57	7.89	7.38	7.80	7.68	7.90	7.73	7.54	7.78	7.97	7.61	8.05	8.21	7.51	7.97	7.60	7.38	8.26	7.81	0.26
F	0.19	0.32	0.24	0.42	0.28	0.29	0.19	0.18	0.37	0.17	0.06	0.26	0.32	0.20	0.40	0.31	0.20	0.45	0.04	0.36	0.41	0.04	0.45	0.27	0.11
Cl	0.00	0.10	0.07	0.05	0.05	0.03	0.00	0.00	0.00	0.03	0.03	0.05	0.00	0.00	0.00	0.12	0.00	0.07	0.03	0.07	0.00	0.00	0.12	0.03	0.04
total	48.17	48.61	48.10	47.95	49.10	48.25	47.89	47.22	47.83	47.30	48.05	48.52	47.79	47.15	47.44	47.17	47.42	48.15	48.43	48.43	47.55	47.15	49.10	47.93	0.53
P_2O_5	0.39	0.52	0.33	0.26	0.32	0.52	0.26	0.26	0.06	0.26	0.00	0.26	0.13	0.06	0.39	0.06	0.06	0.39	0.19	0.06	0.19	0.00	0.52	0.24	0.15
SiO_2	64.42	64.85	64.98	64.85	64.59	63.81	64.94	64.18	64.40	63.16	64.64	65.08	64.87	63.73	63.16	63.05	63.76	63.71	65.21	65.50	64.19	63.05	65.50	64.34	0.72
TiO_2	0.12	0.14	0.10	0.14	0.26	0.31	0.17	0.12	0.42	0.04	0.21	0.21	0.10	0.05	0.07	0.16	0.10	0.26	0.21	0.09	0.23	0.04	0.42	0.17	0.09
Al_2O_3	13.51	13.79	12.97	13.37	13.94	13.67	13.55	13.56	13.72	13.75	13.84	14.02	13.77	12.95	13.26	13.65	13.65	13.26	14.59	13.73	13.30	12.95	14.59	13.61	0.37
FeO	0.18	0.60	0.51	0.30	0.74	0.69	0.30	0.36	0.33	0.51	0.81	0.39	0.30	0.36	0.60	0.42	0.27	0.27	0.51	0.51	0.45	0.18	0.81	0.45	0.17
MnO	0.03	0.00	0.00	0.10	0.00	0.10	0.03	0.00	0.00	0.00	0.00	0.06	0.06	0.06	0.06	0.03	0.06	0.10	0.00	0.00	0.00	0.00	0.10	0.03	0.04
MgO	0.00	0.00	0.00	0.00	0.04	0.03	0.12	0.00	0.00	0.02	0.03	0.00	0.00	0.01	0.02	0.00	0.00	0.04	0.05	0.00	0.00	0.00	0.12	0.02	0.03
CaO	0.06	0.03	0.02	0.00	0.18	0.08	0.00	0.04	0.00	0.12	0.00	0.04	0.00	0.12	0.05	0.08	0.14	0.17	0.08	0.00	0.15	0.00	0.18	0.06	0.06
Na_2O	2.90	2.61	2.45	2.94	2.57	2.99	2.35	2.69	2.38	2.70	2.36	2.73	2.58	2.76	2.38	2.56	2.29	2.52	2.64	2.25	2.45	2.25	2.99	2.58	0.21
K_2O	9.78	9.45	9.79	8.91	9.95	9.11	9.51	8.89	9.39	9.25	9.51	9.31	9.09	9.37	9.60	9.17	9.70	9.89	9.05	9.60	9.16	8.89	9.95	9.40	0.31
F	0.19	0.32	0.24	0.42	0.28	0.28	0.18	0.18	0.37	0.17	0.06	0.25	0.32	0.20	0.40	0.31	0.20	0.45	0.04	0.36	0.41	0.04	0.45	0.27	0.11
Cl	0.00	0.10	0.07	0.05	0.05	0.03	0.00	0.00	0.00	0.03	0.03	0.05	0.00	0.00	0.00	0.12	0.00	0.07	0.03	0.07	0.00	0.00	0.12	0.03	0.04
total	91.50	92.25	91.33	91.16	92.80	91.49	91.34	90.20	90.91	89.92	91.46	92.30	91.10	89.59	89.81	89.45	90.15	90.91	92.57	92.01	90.36	89.45	92.80	91.08	0.99
H_2O	8.50	7.75	8.67	8.84	7.20	8.51	8.66	9.80	9.09	10.08	8.54	7.70	8.90	10.41	10.19	10.55	9.85	9.09	7.43	7.99	9.64	7.20	10.55	8.92	0.99
recalculated to 100 % total:																									
P_2O_5	0.43	0.56	0.36	0.29	0.35	0.57	0.28	0.29	0.07	0.29	0.00	0.28	0.14	0.07	0.43	0.07	0.07	0.43	0.21	0.07	0.22	0.00	0.57	0.26	0.17
SiO_2	70.40	70.30	71.15	71.15	69.60	69.74	71.09	71.15	70.84	70.24	70.68	70.51	71.21	71.14	70.33	70.49	70.73	70.08	70.44	71.19	71.04	69.60	71.21	70.64	0.49
TiO_2	0.13	0.15	0.11	0.15	0.28	0.34	0.19	0.14	0.46	0.04	0.23	0.22	0.11	0.06	0.08	0.17	0.11	0.28	0.22	0.09	0.25	0.04	0.46	0.18	0.10
Al_2O_3	14.77	14.95	14.20	14.66	15.02	14.94	14.84	15.03	15.09	15.29	15.14	15.19	15.12	14.45	14.77	15.26	15.14	14.58	15.76	14.93	14.72	14.20	15.76	14.95	0.33
FeO	0.20	0.65	0.56	0.33	0.80	0.75	0.33	0.40	0.36	0.57	0.88	0.42	0.33	0.40	0.67	0.47	0.30	0.30	0.55	0.55	0.50	0.20	0.88	0.49	0.18
MnO	0.04	0.00	0.00	0.10	0.00	0.10	0.04	0.00	0.00	0.00	0.00	0.07	0.07	0.07	0.07	0.04	0.07	0.11	0.00	0.00	0.00	0.00	0.11	0.04	0.04
MgO	0.00	0.00	0.00	0.00	0.04	0.03	0.13	0.00	0.00	0.02	0.03	0.00	0.00	0.01	0.02	0.00	0.00	0.04	0.06	0.00	0.00	0.00	0.13	0.02	0.03
CaO	0.07	0.03	0.02	0.00	0.20	0.08	0.00	0.05	0.00	0.14	0.00	0.05	0.00	0.14	0.05	0.08	0.15	0.18	0.08	0.00	0.17	0.00	0.20	0.07	0.07
Na_2O	3.17	2.83	2.68	3.23	2.77	3.27	2.58	2.98	2.61	3.00	2.58	2.96	2.84	3.08	2.64	2.86	2.54	2.77	2.86	2.45	2.72	2.45	3.27	2.83	0.23
K_2O	10.69	10.24	10.71	9.78	10.73	9.96	10.41	9.85	10.33	10.29	10.40	10.09	9.98	10.46	10.69	10.25	10.76	10.88	9.77	10.43	10.14	9.77	10.88	10.33	0.34
F	0.21	0.35	0.26	0.47	0.31	0.31	0.20	0.20	0.41	0.18	0.07	0.28	0.35	0.22	0.44	0.35	0.22	0.49	0.04	0.39	0.45	0.04	0.49	0.29	0.12
Cl	0.00	0.11	0.08	0.05	0.05	0.03	0.00	0.00	0.00	0.03	0.03	0.05	0.00	0.00	0.00	0.14	0.00	0.08	0.03	0.08	0.00	0.00	0.14	0.04	0.04

Table 25: EMP data of glass in Type 5 run G66 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 800 °C; bulk water content 2.8 wt.%; 41 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.14	0.20	0.17	0.09	0.26	0.06	0.14	0.03	0.06	0.00	0.00	0.20	0.03	0.03	0.06	0.00	0.00	0.00	0.03	0.00	0.03	0.06	0.11	0.06	0.00	0.03	0.06
Si	29.87	30.25	29.78	30.12	30.07	30.18	30.43	29.89	30.42	30.39	29.70	29.82	30.16	30.35	29.57	29.91	29.65	30.03	30.58	30.00	30.03	30.13	30.26	29.86	30.11	30.36	30.30
Ti	0.05	0.01	0.07	0.04	0.14	0.07	0.00	0.06	0.06	0.07	0.05	0.00	0.00	0.15	0.14	0.01	0.00	0.00	0.03	0.00	0.08	0.01	0.01	0.06	0.15	0.09	0.06
Al	7.16	7.18	7.06	7.12	7.33	7.38	7.08	7.13	6.92	6.93	7.25	7.08	7.15	7.19	7.33	7.57	7.13	6.98	7.06	7.16	7.30	7.09	7.21	7.08	7.33	6.93	7.17
Fe	0.54	0.52	0.49	0.75	0.40	0.35	0.38	0.56	0.66	0.58	0.40	0.38	0.56	0.33	0.40	0.49	0.42	0.54	0.30	0.58	0.75	0.52	0.66	0.47	0.23	0.75	0.54
Mn	0.00	0.15	0.07	0.00	0.00	0.00	0.12	0.15	0.00	0.22	0.00	0.00	0.05	0.00	0.03	0.00	0.00	0.12	0.05	0.00	0.15	0.00	0.07	0.00	0.20	0.00	0.10
Mg	0.00	0.00	0.00	0.03	0.00	0.02	0.01	0.00	0.00	0.01	0.00	0.00	0.03	0.03	0.04	0.00	0.06	0.00	0.03	0.00	0.00	0.00	0.03	0.02	0.00	0.01	0.02
Ca	0.08	0.01	0.08	0.05	0.00	0.14	0.00	0.03	0.07	0.03	0.26	0.18	0.14	0.01	0.06	0.07	0.14	0.04	0.16	0.06	0.23	0.13	0.05	0.06	0.12	0.09	0.12
Na	1.84	1.67	1.88	1.73	2.11	1.81	1.60	1.89	1.80	1.66	1.73	1.51	1.92	1.59	1.67	1.64	1.77	1.65	1.90	1.82	1.92	1.65	1.79	1.88	1.81	1.73	1.67
K	8.37	8.25	8.68	8.62	8.63	8.64	8.05	8.17	8.37	8.62	8.53	8.67	8.43	8.30	8.62	8.73	8.54	8.52	8.58	9.05	8.27	8.64	8.31	8.56	8.29	8.78	8.47
F	0.40	0.17	0.37	0.32	0.18	0.38	0.26	0.34	0.24	0.29	0.28	0.27	0.43	0.23	0.34	0.27	0.45	0.23	0.22	0.11	0.38	0.31	0.22	0.34	0.33	0.29	0.19
Cl	0.00	0.12	0.03	0.03	0.00	0.00	0.00	0.07	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.12	0.10	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.10	0.00
total	48.45	48.53	48.68	48.88	49.11	49.03	48.06	48.33	48.61	48.81	48.19	48.09	48.89	48.20	48.24	48.70	48.30	48.22	48.94	48.78	49.13	48.53	48.72	48.44	48.61	49.15	48.70
P_2O_5	0.33	0.46	0.39	0.20	0.59	0.13	0.33	0.07	0.13	0.00	0.00	0.46	0.07	0.07	0.13	0.00	0.00	0.00	0.07	0.00	0.07	0.13	0.26	0.13	0.00	0.06	0.13
SiO_2	63.90	64.72	63.72	64.44	64.34	64.56	65.10	63.93	65.08	65.01	63.54	63.78	64.51	64.93	63.26	63.98	63.44	64.25	65.43	64.18	64.24	64.46	64.74	63.88	64.41	64.95	64.82
TiO_2	0.09	0.02	0.12	0.07	0.23	0.12	0.00	0.11	0.11	0.12	0.09	0.00	0.00	0.24	0.23	0.02	0.00	0.00	0.05	0.00	0.14	0.02	0.02	0.11	0.24	0.16	0.11
Al_2O_3	13.53	13.56	13.35	13.45	13.85	13.94	13.37	13.46	13.07	13.09	13.70	13.37	13.51	13.58	13.84	14.29	13.48	13.19	13.33	13.53	13.79	13.40	13.62	13.38	13.85	13.09	13.55
FeO	0.69	0.66	0.63	0.96	0.51	0.45	0.48	0.72	0.84	0.75	0.51	0.48	0.72	0.42	0.51	0.63	0.54	0.69	0.39	0.75	0.96	0.66	0.84	0.60	0.30	0.96	0.69
MnO	0.00	0.19	0.10	0.00	0.00	0.00	0.16	0.19	0.00	0.29	0.00	0.00	0.06	0.00	0.03	0.00	0.00	0.16	0.06	0.00	0.19	0.00	0.10	0.00	0.26	0.00	0.13
MgO	0.00	0.00	0.00	0.05	0.00	0.03	0.01	0.00	0.00	0.01	0.00	0.00	0.05	0.05	0.06	0.00	0.10	0.00	0.05	0.00	0.00	0.00	0.05	0.04	0.00	0.01	0.04
CaO	0.11	0.02	0.11	0.08	0.00	0.20	0.00	0.05	0.09	0.05	0.37	0.24	0.20	0.02	0.08	0.09	0.20	0.06	0.23	0.08	0.32	0.18	0.08	0.08	0.17	0.12	0.17
Na_2O	2.48	2.25	2.53	2.33	2.84	2.44	2.16	2.55	2.42	2.24	2.33	2.04	2.58	2.14	2.25	2.20	2.39	2.23	2.56	2.45	2.59	2.22	2.41	2.53	2.43	2.33	2.25
K_2O	10.08	9.94	10.46	10.38	10.39	10.41	9.69	9.85	10.08	10.38	10.27	10.44	10.16	10.00	10.38	10.52	10.29	10.26	10.33	10.90	9.96	10.41	10.01	10.31	9.98	10.58	10.20
F	0.40	0.17	0.37	0.31	0.18	0.38	0.25	0.34	0.24	0.29	0.28	0.27	0.43	0.23	0.34	0.27	0.45	0.23	0.22	0.11	0.38	0.31	0.22	0.34	0.33	0.29	0.19
Cl	0.00	0.12	0.03	0.03	0.00	0.00	0.00	0.07	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.12	0.10	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.10	0.00
total	91.44	92.01	91.63	92.16	92.85	92.50	91.46	91.18	91.98	92.12	90.96	90.98	92.11	91.58	90.98	91.92	90.79	91.06	92.63	91.95	92.49	91.66	92.24	91.30	91.88	92.50	92.19
H_2O	8.56	7.99	8.37	7.84	7.15	7.50	8.54	8.82	8.02	7.88	9.04	9.02	7.89	8.42	9.02	8.08	9.21	8.94	7.37	8.05	7.51	8.34	7.76	8.70	8.12	7.50	7.81
recalculated to 100 % total:																											
P_2O_5	0.36	0.50	0.43	0.21	0.63	0.14	0.36	0.07	0.14	0.00	0.00	0.50	0.07	0.07	0.14	0.00	0.00	0.00	0.07	0.00	0.07	0.14	0.28	0.14	0.00	0.07	0.14
SiO_2	69.88	70.34	69.54	69.93	69.29	69.79	71.18	70.12	70.75	70.58	69.85	70.11	70.04	70.90	69.53	69.61	69.87	70.56	70.64	69.80	69.46	70.32	70.19	69.97	70.11	70.21	70.31
TiO_2	0.09	0.02	0.13	0.08	0.24	0.13	0.00	0.12	0.11	0.13	0.10	0.00	0.00	0.27	0.25	0.02	0.00	0.00	0.06	0.00	0.15	0.02	0.02	0.12	0.27	0.17	0.11
Al_2O_3	14.80	14.74	14.56	14.60	14.91	15.07	14.62	14.76	14.21	14.21	15.06	14.70	14.66	14.82	15.21	15.55	14.85	14.48	14.39	14.72	14.91	14.62	14.76	14.66	15.07	14.15	14.70
FeO	0.76	0.72	0.69	1.05	0.55	0.49	0.53	0.79	0.92	0.82	0.56	0.53	0.78	0.46	0.56	0.69	0.60	0.76	0.42	0.82	1.04	0.72	0.91	0.66	0.33	1.04	0.75
MnO	0.00	0.21	0.10	0.00	0.00	0.00	0.18	0.21	0.00	0.31	0.00	0.00	0.07	0.00	0.04	0.00	0.00	0.18	0.07	0.00	0.21	0.00	0.10	0.00	0.28	0.00	0.14
MgO	0.00	0.00	0.00	0.05	0.00	0.03	0.01	0.00	0.00	0.01	0.00	0.00	0.05	0.05	0.07	0.00	0.11	0.00	0.05	0.00	0.00	0.00	0.05	0.04	0.00	0.01	0.04
CaO	0.12	0.02	0.12	0.08	0.00	0.21	0.00	0.05	0.10	0.05	0.40	0.27	0.22	0.02	0.08	0.10	0.22	0.07	0.25	0.08	0.35	0.20	0.08	0.08	0.18	0.13	0.18
Na_2O	2.72	2.44	2.76	2.52	3.06	2.64	2.36	2.79	2.64	2.43	2.56	2.24	2.80	2.34	2.48	2.40	2.63	2.45	2.76	2.67	2.80	2.43	2.61	2.77	2.65	2.51	2.44
K_2O	11.02	10.80	11.41	11.27	11.19	11.26	10.60	10.80	10.96	11.27	11.29	11.48	11.03	10.92	11.41	11.44	11.33	11.27	11.15	11.85	10.77	11.35	10.85	11.30	10.86	11.44	11.06
F	0.44	0.19	0.40	0.34	0.19	0.41	0.28	0.37	0.26	0.32	0.31	0.30	0.47	0.25	0.37	0.29	0.50	0.26	0.24	0.12	0.41	0.34	0.24	0.37	0.36	0.32	0.21
Cl	0.00	0.13	0.03	0.03	0.00	0.00	0.00	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.14	0.11	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.11	0.00

Table 25 (continued)**:** EMP data of glass in Type 5 run G66.

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	min	max	mean	σ
P	0.14	0.03	0.00	0.09	0.20	0.14	0.20	0.26	0.06	0.26	0.00	0.00	0.11	0.14	0.00	0.26	0.08	0.08
Si	29.99	30.45	29.91	30.11	29.78	30.13	30.11	29.66	30.12	30.20	30.08	30.34	30.18	30.47	29.57	30.58	30.09	0.25
Ti	0.06	0.02	0.05	0.00	0.08	0.02	0.06	0.00	0.09	0.05	0.02	0.05	0.00	0.03	0.00	0.15	0.05	0.04
Al	7.02	7.25	7.12	7.04	6.94	6.89	7.32	7.18	6.98	7.27	7.01	6.90	7.03	6.90	6.89	7.57	7.12	0.15
Fe	0.30	0.45	0.33	0.75	0.49	0.07	0.56	0.26	0.68	0.42	0.47	0.54	0.38	0.30	0.07	0.75	0.48	0.15
Mn	0.10	0.00	0.07	0.00	0.03	0.05	0.12	0.00	0.10	0.12	0.17	0.00	0.00	0.12	0.00	0.22	0.06	0.07
Mg	0.00	0.03	0.00	0.01	0.00	0.04	0.01	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.01	0.02
Ca	0.07	0.00	0.00	0.13	0.11	0.06	0.01	0.00	0.12	0.21	0.00	0.10	0.12	0.26	0.00	0.26	0.09	0.07
Na	1.83	1.78	1.68	1.99	1.72	1.84	1.78	1.64	1.65	1.82	1.87	1.65	1.71	1.98	1.51	2.11	1.77	0.12
K	8.29	8.07	8.99	8.62	8.52	8.29	8.33	8.43	8.23	8.28	8.45	8.36	8.52	8.11	8.05	9.05	8.47	0.22
F	0.22	0.37	0.33	0.29	0.22	0.36	0.48	0.42	0.26	0.48	0.25	0.29	0.26	0.23	0.11	0.48	0.30	0.09
Cl	0.00	0.00	0.00	0.05	0.00	0.03	0.00	0.00	0.07	0.00	0.00	0.00	0.05	0.00	0.00	0.12	0.02	0.04
total	48.01	48.45	48.49	49.08	48.09	47.92	48.98	47.85	48.41	49.10	48.32	48.24	48.36	48.54	47.85	49.15	48.54	0.36
P_2O_5	0.33	0.07	0.00	0.20	0.46	0.33	0.46	0.59	0.13	0.59	0.00	0.00	0.26	0.33	0.00	0.59	0.19	0.19
SiO_2	64.16	65.15	63.99	64.42	63.72	64.47	64.42	63.44	64.43	64.61	64.36	64.91	64.57	65.18	63.26	65.43	64.38	0.53
TiO_2	0.11	0.04	0.09	0.00	0.14	0.04	0.10	0.00	0.16	0.09	0.04	0.09	0.00	0.05	0.00	0.24	0.08	0.07
Al_2O_3	13.25	13.71	13.46	13.30	13.11	13.01	13.83	13.56	13.19	13.73	13.25	13.04	13.27	13.03	13.01	14.29	13.46	0.29
FeO	0.39	0.57	0.42	0.96	0.63	0.09	0.72	0.33	0.87	0.54	0.60	0.69	0.48	0.39	0.09	0.96	0.61	0.20
MnO	0.13	0.00	0.10	0.00	0.03	0.06	0.16	0.00	0.13	0.16	0.22	0.00	0.00	0.16	0.00	0.29	0.08	0.09
MgO	0.00	0.05	0.00	0.02	0.00	0.07	0.02	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.02	0.03
CaO	0.09	0.00	0.00	0.18	0.15	0.08	0.02	0.00	0.17	0.29	0.00	0.14	0.17	0.37	0.00	0.37	0.12	0.10
Na_2O	2.47	2.40	2.27	2.69	2.32	2.48	2.39	2.21	2.23	2.45	2.52	2.23	2.31	2.66	2.04	2.84	2.38	0.17
K_2O	9.98	9.72	10.82	10.38	10.26	9.99	10.03	10.16	9.91	9.97	10.17	10.07	10.26	9.77	9.69	10.90	10.20	0.27
F	0.21	0.37	0.33	0.29	0.22	0.36	0.48	0.42	0.26	0.48	0.25	0.29	0.26	0.23	0.11	0.48	0.30	0.09
Cl	0.00	0.00	0.00	0.05	0.00	0.03	0.00	0.00	0.07	0.00	0.00	0.00	0.05	0.00	0.00	0.12	0.02	0.04
total	91.03	91.91	91.34	92.36	90.94	90.85	92.43	90.55	91.50	92.70	91.30	91.34	91.51	92.07	90.55	92.85	91.72	0.60
H_2O	8.97	8.09	8.66	7.64	9.06	9.15	7.57	9.45	8.50	7.30	8.70	8.66	8.49	7.93	7.15	9.45	8.28	0.60
recalculated to 100 % total:																		
P_2O_5	0.36	0.07	0.00	0.21	0.50	0.36	0.50	0.65	0.14	0.64	0.00	0.00	0.29	0.36	0.00	0.65	0.21	0.20
SiO_2	70.48	70.88	70.06	69.75	70.06	70.96	69.69	70.06	70.42	69.70	70.49	71.07	70.56	70.80	69.29	71.18	70.19	0.47
TiO_2	0.12	0.04	0.10	0.00	0.15	0.04	0.11	0.00	0.17	0.09	0.04	0.10	0.00	0.06	0.00	0.27	0.09	0.08
Al_2O_3	14.56	14.91	14.74	14.40	14.41	14.33	14.97	14.97	14.42	14.81	14.51	14.27	14.50	14.15	14.15	15.55	14.68	0.30
FeO	0.43	0.62	0.46	1.04	0.70	0.10	0.78	0.37	0.96	0.58	0.66	0.76	0.53	0.42	0.10	1.05	0.67	0.21
MnO	0.14	0.00	0.11	0.00	0.04	0.07	0.17	0.00	0.14	0.17	0.25	0.00	0.00	0.17	0.00	0.31	0.08	0.09
MgO	0.00	0.05	0.00	0.02	0.00	0.08	0.02	0.02	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.02	0.03
CaO	0.10	0.00	0.00	0.20	0.17	0.08	0.02	0.00	0.18	0.31	0.00	0.15	0.18	0.40	0.00	0.40	0.13	0.11
Na_2O	2.71	2.61	2.48	2.91	2.55	2.73	2.59	2.44	2.44	2.64	2.75	2.44	2.52	2.89	2.24	3.06	2.60	0.18
K_2O	10.96	10.58	11.85	11.24	11.28	11.00	10.85	11.22	10.83	10.75	11.14	11.03	11.21	10.61	10.58	11.85	11.12	0.30
F	0.24	0.40	0.37	0.32	0.24	0.40	0.52	0.47	0.28	0.52	0.28	0.32	0.29	0.25	0.12	0.52	0.33	0.09
Cl	0.00	0.00	0.00	0.05	0.00	0.03	0.00	0.00	0.08	0.00	0.00	0.00	0.05	0.00	0.00	0.14	0.02	0.04

Table 26: EMP data of glass in Type 5 run G23 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 800 °C; bulk water content 2.8 wt.%; 21 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	min	max	mean	σ
P	0.00	0.17	0.17	0.26	0.23	0.17	0.12	0.06	0.17	0.03	0.06	0.26	0.14	0.17	0.20	0.17	0.03	0.20	0.17	0.03	0.26	0.00	0.26	0.15	0.08
Si	29.96	30.19	29.70	29.79	29.80	29.69	30.32	30.42	30.35	30.16	30.26	29.66	30.51	30.37	30.09	29.94	30.35	30.04	29.86	30.01	30.07	29.66	30.51	30.07	0.26
Ti	0.24	0.04	0.05	0.18	0.03	0.22	0.12	0.17	0.08	0.14	0.18	0.19	0.09	0.13	0.03	0.16	0.21	0.21	0.23	0.20	0.00	0.00	0.24	0.14	0.07
Al	7.36	7.12	7.21	7.51	7.48	7.02	7.14	7.66	7.18	7.59	7.14	7.29	7.33	7.21	7.24	7.41	7.20	7.42	7.27	7.47	7.32	7.02	7.66	7.31	0.17
Fe	0.45	0.35	0.52	0.33	0.42	0.33	0.38	0.23	0.33	0.42	0.42	0.28	0.49	0.30	0.38	0.30	0.42	0.42	0.59	0.42	0.33	0.23	0.59	0.39	0.08
Mn	0.00	0.00	0.05	0.10	0.07	0.25	0.13	0.10	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.00	0.15	0.03	0.00	0.12	0.00	0.00	0.25	0.05	0.07
Mg	0.01	0.00	0.00	0.03	0.02	0.01	0.00	0.00	0.01	0.03	0.03	0.01	0.02	0.00	0.07	0.02	0.01	0.01	0.07	0.03	0.03	0.00	0.07	0.02	0.02
Ca	0.00	0.08	0.01	0.12	0.10	0.00	0.08	0.00	0.19	0.08	0.00	0.03	0.04	0.00	0.08	0.01	0.07	0.08	0.10	0.00	0.00	0.00	0.19	0.05	0.05
Na	2.28	2.06	2.52	2.24	2.24	2.26	2.04	2.09	1.97	2.12	2.31	2.26	2.30	2.57	2.32	2.42	2.27	2.22	2.41	2.38	2.27	1.97	2.57	2.26	0.15
K	7.01	7.04	6.75	7.34	7.63	7.44	6.94	7.63	6.94	7.53	7.25	7.05	7.26	6.65	6.82	7.42	7.39	7.28	7.09	7.06	7.53	6.65	7.63	7.19	0.29
F	0.53	0.32	0.40	0.20	0.21	0.42	0.18	0.21	0.13	0.38	0.48	0.21	0.20	0.33	0.43	0.36	0.20	0.32	0.20	0.37	0.46	0.13	0.53	0.31	0.12
Cl	0.00	0.03	0.00	0.05	0.00	0.07	0.00	0.17	0.00	0.07	0.00	0.00	0.05	0.00	0.03	0.00	0.03	0.07	0.10	0.05	0.00	0.00	0.17	0.03	0.05
total	47.84	47.38	47.38	48.14	48.25	47.88	47.42	48.74	47.34	48.57	48.12	47.26	48.44	47.76	47.68	48.21	48.32	48.29	48.08	48.16	48.27	47.26	48.74	47.98	0.43
P_2O_5	0.00	0.39	0.39	0.59	0.52	0.39	0.26	0.13	0.39	0.07	0.13	0.59	0.33	0.39	0.46	0.39	0.07	0.46	0.39	0.07	0.59	0.00	0.59	0.33	0.19
SiO_2	64.10	64.58	63.53	63.72	63.76	63.53	64.87	65.08	64.92	64.53	64.73	63.44	65.26	64.97	64.38	64.05	64.93	64.25	63.88	64.21	64.34	63.44	65.26	64.34	0.56
TiO_2	0.40	0.07	0.09	0.30	0.05	0.37	0.19	0.28	0.14	0.23	0.30	0.31	0.16	0.21	0.05	0.26	0.35	0.35	0.38	0.33	0.00	0.00	0.40	0.23	0.12
Al_2O_3	13.90	13.45	13.62	14.18	14.13	13.26	13.49	14.47	13.57	14.34	13.50	13.78	13.85	13.63	13.67	14.00	13.61	14.02	13.73	14.12	13.82	13.26	14.47	13.82	0.31
FeO	0.57	0.45	0.67	0.42	0.54	0.42	0.48	0.30	0.42	0.54	0.54	0.36	0.63	0.39	0.48	0.39	0.54	0.54	0.76	0.54	0.42	0.30	0.76	0.50	0.11
MnO	0.00	0.00	0.06	0.13	0.10	0.32	0.16	0.13	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.00	0.19	0.03	0.00	0.16	0.00	0.00	0.32	0.07	0.09
MgO	0.01	0.00	0.00	0.05	0.04	0.02	0.00	0.00	0.01	0.05	0.05	0.02	0.03	0.00	0.12	0.03	0.01	0.01	0.11	0.05	0.05	0.00	0.12	0.03	0.03
CaO	0.00	0.11	0.02	0.17	0.14	0.00	0.11	0.00	0.26	0.11	0.00	0.05	0.06	0.00	0.11	0.02	0.09	0.11	0.14	0.00	0.00	0.00	0.26	0.07	0.07
Na_2O	3.08	2.77	3.40	3.02	3.02	3.04	2.74	2.82	2.65	2.86	3.12	3.05	3.10	3.46	3.13	3.26	3.05	3.00	3.25	3.21	3.06	2.65	3.46	3.05	0.20
K_2O	8.45	8.47	8.13	8.84	9.20	8.96	8.36	9.19	8.36	9.07	8.73	8.49	8.74	8.01	8.21	8.94	8.91	8.77	8.54	8.50	9.07	8.01	9.20	8.66	0.35
F	0.53	0.32	0.39	0.20	0.21	0.42	0.18	0.21	0.13	0.38	0.47	0.21	0.20	0.33	0.43	0.36	0.20	0.32	0.20	0.37	0.46	0.13	0.53	0.31	0.12
Cl	0.00	0.03	0.00	0.05	0.00	0.07	0.00	0.17	0.00	0.07	0.00	0.00	0.05	0.00	0.03	0.00	0.03	0.07	0.10	0.05	0.00	0.00	0.17	0.03	0.05
total	90.82	90.51	90.14	91.58	91.62	90.61	90.77	92.66	90.80	92.09	91.36	90.24	92.32	91.29	90.89	91.55	91.89	91.77	91.37	91.45	91.62	90.14	92.66	91.30	0.67
H_2O	9.18	9.49	9.86	8.42	8.38	9.39	9.23	7.34	9.20	7.91	8.64	9.76	7.68	8.71	9.11	8.45	8.11	8.23	8.63	8.55	8.38	7.34	9.86	8.70	0.67
recalculated to 100 % total:																									
P_2O_5	0.00	0.44	0.44	0.64	0.57	0.43	0.29	0.14	0.43	0.07	0.14	0.66	0.35	0.43	0.51	0.43	0.07	0.50	0.43	0.07	0.65	0.00	0.66	0.37	0.21
SiO_2	70.58	71.36	70.48	69.58	69.59	70.11	71.47	70.24	71.50	70.07	70.85	70.30	70.69	71.17	70.84	69.96	70.67	70.01	69.92	70.21	70.22	69.58	71.50	70.47	0.57
TiO_2	0.44	0.08	0.10	0.32	0.06	0.40	0.21	0.30	0.15	0.25	0.32	0.35	0.17	0.23	0.06	0.28	0.38	0.38	0.42	0.36	0.00	0.00	0.44	0.25	0.14
Al_2O_3	15.30	14.86	15.11	15.49	15.42	14.64	14.86	15.62	14.94	15.57	14.77	15.27	15.00	14.93	15.05	15.29	14.81	15.27	15.03	15.44	15.09	14.64	15.62	15.13	0.28
FeO	0.63	0.50	0.74	0.46	0.59	0.47	0.53	0.32	0.47	0.59	0.59	0.40	0.69	0.43	0.53	0.43	0.59	0.59	0.83	0.59	0.46	0.32	0.83	0.54	0.12
MnO	0.00	0.00	0.07	0.14	0.11	0.35	0.18	0.14	0.00	0.04	0.00	0.04	0.00	0.04	0.00	0.00	0.21	0.04	0.00	0.18	0.00	0.00	0.35	0.07	0.10
MgO	0.01	0.00	0.00	0.06	0.04	0.02	0.00	0.00	0.01	0.05	0.05	0.02	0.03	0.00	0.13	0.03	0.01	0.01	0.12	0.06	0.05	0.00	0.13	0.03	0.04
CaO	0.00	0.12	0.02	0.18	0.15	0.00	0.12	0.00	0.29	0.12	0.00	0.05	0.07	0.00	0.12	0.02	0.10	0.12	0.15	0.00	0.00	0.00	0.29	0.08	0.08
Na_2O	3.39	3.06	3.77	3.30	3.30	3.36	3.02	3.04	2.92	3.11	3.41	3.38	3.36	3.79	3.44	3.57	3.32	3.26	3.55	3.51	3.34	2.92	3.79	3.34	0.23
K_2O	9.30	9.36	9.02	9.65	10.04	9.89	9.20	9.92	9.20	9.84	9.56	9.41	9.47	8.78	9.04	9.77	9.69	9.55	9.35	9.29	9.90	8.78	10.04	9.49	0.34
F	0.59	0.35	0.44	0.22	0.23	0.46	0.20	0.22	0.14	0.41	0.52	0.23	0.22	0.36	0.47	0.39	0.22	0.35	0.22	0.41	0.50	0.14	0.59	0.34	0.13
Cl	0.00	0.03	0.00	0.05	0.00	0.08	0.00	0.19	0.00	0.08	0.00	0.00	0.05	0.00	0.03	0.00	0.03	0.08	0.11	0.05	0.00	0.00	0.19	0.04	0.05

Table 27: EMP data of glass in Type 5 run G52 with a cooling rate of 0.03 °C /min, quenched at conditions of 3.5 GPa / 800 °C; bulk water content 2.8 wt.%; 22 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	min	max	mean	σ
P	0.25	0.23	0.25	0.17	0.17	0.28	0.39	0.11	0.11	0.20	0.14	0.20	0.09	0.34	0.25	0.11	0.28	0.34	0.23	0.36	0.48	0.28	0.09	0.48	0.24	0.10
Si	29.57	30.14	29.48	29.81	29.39	30.15	30.08	29.56	29.63	29.41	29.57	29.83	29.67	29.69	29.54	29.61	29.94	29.79	29.65	29.26	29.58	29.54	29.26	30.15	29.68	0.24
Ti	0.06	0.09	0.00	0.09	0.12	0.16	0.10	0.07	0.11	0.09	0.06	0.10	0.07	0.03	0.11	0.14	0.04	0.03	0.14	0.23	0.05	0.20	0.00	0.23	0.10	0.05
Al	7.33	6.99	7.16	7.30	7.26	7.29	6.79	7.34	7.30	7.20	7.23	6.95	7.33	7.40	7.50	7.29	7.11	7.01	7.33	7.14	7.04	7.21	6.79	7.50	7.20	0.17
Fe	0.30	0.37	0.40	0.28	0.37	0.39	0.44	0.49	0.05	0.47	0.39	0.60	0.42	0.37	0.39	0.42	0.42	0.28	0.51	0.39	0.35	0.35	0.05	0.60	0.38	0.11
Mn	0.05	0.05	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.03	0.10	0.05	0.00	0.03	0.03	0.00	0.10	0.05	0.00	0.22	0.12	0.00	0.00	0.22	0.04	0.06
Mg	0.01	0.01	0.03	0.06	0.01	0.02	0.00	0.03	0.00	0.00	0.01	0.00	0.00	0.04	0.00	0.01	0.00	0.01	0.05	0.02	0.01	0.05	0.00	0.06	0.02	0.02
Ca	0.13	0.00	0.12	0.15	0.02	0.00	0.09	0.09	0.11	0.07	0.00	0.00	0.03	0.09	0.13	0.01	0.00	0.00	0.07	0.00	0.01	0.00	0.00	0.15	0.05	0.05
Na	1.46	1.65	1.67	1.88	1.81	1.75	1.64	1.63	1.49	1.73	1.61	1.98	1.80	1.79	1.78	1.80	1.44	1.63	1.76	1.36	1.59	1.63	1.36	1.98	1.68	0.15
K	8.74	8.74	9.38	8.86	8.97	8.75	8.98	9.41	8.70	8.97	9.12	9.11	8.56	8.53	9.13	9.25	8.80	9.25	8.82	8.76	8.87	9.11	8.53	9.41	8.95	0.25
F	0.40	0.35	0.38	0.22	0.24	0.35	0.28	0.37	0.40	0.20	0.30	0.42	0.47	0.54	0.45	0.27	0.41	0.28	0.42	0.45	0.44	0.12	0.12	0.54	0.35	0.10
Cl	0.02	0.00	0.02	0.02	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.07	0.02	0.00	0.00	0.07	0.05	0.05	0.05	0.00	0.07	0.02	0.03
total	48.32	48.62	48.87	48.85	48.37	49.19	48.95	49.10	47.92	48.36	48.55	49.24	48.51	48.84	49.38	48.94	48.53	48.67	49.04	48.25	48.59	48.53	47.92	49.38	48.71	0.36
P_2O_5	0.58	0.52	0.58	0.39	0.39	0.65	0.90	0.26	0.26	0.45	0.32	0.45	0.19	0.77	0.58	0.26	0.65	0.77	0.52	0.84	1.10	0.64	0.19	1.10	0.55	0.23
SiO_2	63.25	64.48	63.07	63.77	62.88	64.51	64.35	63.24	63.40	62.91	63.27	63.81	63.48	63.51	63.19	63.35	64.05	63.74	63.42	62.60	63.29	63.19	62.60	64.51	63.49	0.51
TiO_2	0.10	0.16	0.00	0.16	0.21	0.26	0.17	0.12	0.19	0.16	0.10	0.17	0.12	0.05	0.19	0.24	0.07	0.05	0.24	0.38	0.09	0.33	0.00	0.38	0.16	0.09
Al_2O_3	13.84	13.21	13.52	13.79	13.71	13.77	12.83	13.86	13.80	13.60	13.66	13.12	13.85	13.98	14.18	13.77	13.44	13.25	13.86	13.49	13.31	13.62	12.83	14.18	13.61	0.32
FeO	0.39	0.48	0.51	0.36	0.48	0.51	0.57	0.63	0.06	0.60	0.51	0.77	0.54	0.48	0.51	0.54	0.54	0.36	0.65	0.51	0.45	0.45	0.06	0.77	0.49	0.14
MnO	0.06	0.06	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.03	0.13	0.06	0.00	0.03	0.03	0.00	0.13	0.06	0.00	0.29	0.16	0.00	0.00	0.29	0.06	0.08
MgO	0.01	0.01	0.04	0.10	0.01	0.04	0.00	0.04	0.00	0.00	0.02	0.00	0.00	0.07	0.00	0.01	0.00	0.02	0.08	0.04	0.01	0.08	0.00	0.10	0.03	0.03
CaO	0.18	0.00	0.17	0.21	0.03	0.00	0.12	0.12	0.15	0.09	0.00	0.00	0.04	0.12	0.18	0.02	0.00	0.00	0.09	0.00	0.02	0.00	0.00	0.21	0.07	0.07
Na_2O	1.97	2.23	2.25	2.54	2.45	2.36	2.22	2.20	2.01	2.33	2.17	2.67	2.43	2.41	2.39	2.42	1.94	2.19	2.37	1.84	2.14	2.20	1.84	2.67	2.26	0.20
K_2O	10.52	10.53	11.29	10.68	10.81	10.54	10.82	11.34	10.48	10.81	10.99	10.97	10.31	10.27	11.00	11.15	10.60	11.14	10.62	10.55	10.68	10.97	10.27	11.34	10.78	0.30
F	0.40	0.35	0.38	0.22	0.24	0.35	0.28	0.37	0.40	0.20	0.30	0.42	0.47	0.54	0.45	0.27	0.41	0.28	0.42	0.45	0.44	0.12	0.12	0.54	0.35	0.10
Cl	0.02	0.00	0.02	0.02	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.07	0.02	0.00	0.00	0.07	0.05	0.05	0.05	0.00	0.07	0.02	0.03
total	91.17	91.88	91.66	92.13	91.10	92.86	92.33	92.03	90.59	91.10	91.34	92.29	91.29	92.02	92.56	91.93	91.64	91.74	92.15	90.82	91.53	91.59	90.59	92.86	91.72	0.57
H_2O	8.83	8.12	8.34	7.87	8.90	7.14	7.67	7.97	9.41	8.90	8.66	7.71	8.71	7.98	7.44	8.07	8.36	8.26	7.85	9.18	8.47	8.41	7.14	9.41	8.28	0.57
recalculated to 100 % total:																										
P_2O_5	0.64	0.56	0.63	0.42	0.43	0.70	0.98	0.28	0.29	0.50	0.35	0.49	0.21	0.84	0.63	0.28	0.71	0.84	0.56	0.92	1.20	0.70	0.21	1.20	0.60	0.25
SiO_2	69.38	70.19	68.80	69.22	69.02	69.47	69.69	68.72	69.98	69.06	69.26	69.14	69.54	69.02	68.26	68.91	69.89	69.47	68.82	68.93	69.15	68.99	68.26	70.19	69.22	0.45
TiO_2	0.11	0.17	0.00	0.17	0.23	0.28	0.19	0.13	0.21	0.17	0.11	0.19	0.13	0.06	0.20	0.26	0.07	0.06	0.26	0.42	0.09	0.36	0.00	0.42	0.18	0.10
Al_2O_3	15.18	14.38	14.75	14.97	15.05	14.83	13.90	15.06	15.23	14.93	14.96	14.22	15.17	15.19	15.32	14.98	14.67	14.44	15.04	14.86	14.54	14.88	13.90	15.32	14.84	0.36
FeO	0.43	0.52	0.55	0.39	0.53	0.55	0.61	0.68	0.07	0.66	0.55	0.84	0.59	0.52	0.55	0.58	0.59	0.39	0.71	0.56	0.49	0.49	0.07	0.84	0.54	0.15
MnO	0.07	0.07	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.04	0.14	0.07	0.00	0.04	0.03	0.00	0.14	0.07	0.00	0.31	0.17	0.00	0.00	0.31	0.06	0.08
MgO	0.01	0.01	0.05	0.11	0.01	0.04	0.00	0.05	0.00	0.00	0.02	0.00	0.00	0.08	0.00	0.01	0.00	0.02	0.09	0.04	0.01	0.09	0.00	0.11	0.03	0.03
CaO	0.20	0.00	0.18	0.23	0.03	0.00	0.13	0.13	0.17	0.10	0.00	0.00	0.05	0.13	0.20	0.02	0.00	0.00	0.10	0.00	0.02	0.00	0.00	0.23	0.08	0.08
Na_2O	2.16	2.43	2.45	2.75	2.69	2.54	2.40	2.39	2.22	2.56	2.38	2.90	2.66	2.62	2.59	2.64	2.12	2.39	2.57	2.02	2.34	2.40	2.02	2.90	2.46	0.21
K_2O	11.54	11.46	12.32	11.59	11.87	11.35	11.72	12.32	11.57	11.86	12.03	11.89	11.29	11.16	11.88	12.12	11.56	12.14	11.53	11.62	11.67	11.98	11.16	12.32	11.75	0.32
F	0.44	0.39	0.41	0.24	0.27	0.38	0.31	0.40	0.44	0.22	0.33	0.45	0.52	0.59	0.49	0.29	0.44	0.31	0.45	0.49	0.48	0.13	0.13	0.59	0.38	0.11
Cl	0.03	0.00	0.03	0.03	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.08	0.03	0.00	0.00	0.08	0.05	0.05	0.05	0.00	0.08	0.03	0.03

Table 28: EMP data of glass in Type 5 run G95 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 750 °C; bulk water content 2.8 wt.%; 21 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	min	max	mean	σ
P	0.18	0.24	0.15	0.06	0.18	0.09	0.06	0.18	0.06	0.09	0.15	0.00	0.18	0.21	0.12	0.18	0.15	0.24	0.15	0.27	0.00	0.00	0.27	0.14	0.07
Si	27.91	28.62	28.41	28.00	28.59	28.35	27.92	28.58	28.47	28.49	28.40	28.15	27.95	27.84	28.35	28.18	28.66	27.93	27.95	27.73	28.59	27.73	28.66	28.24	0.30
Ti	0.00	0.08	0.06	0.09	0.00	0.14	0.05	0.01	0.00	0.02	0.00	0.06	0.00	0.09	0.02	0.00	0.04	0.06	0.08	0.00	0.07	0.00	0.14	0.04	0.04
Al	6.71	6.44	6.65	6.41	6.65	6.41	6.78	6.91	6.62	6.49	6.68	6.72	6.47	6.95	6.72	6.80	6.72	6.80	6.84	6.64	6.63	6.41	6.95	6.67	0.15
Fe	0.12	0.34	0.24	0.32	0.12	0.15	0.22	0.24	0.02	0.34	0.15	0.24	0.07	0.00	0.27	0.02	0.29	0.29	0.22	0.34	0.02	0.00	0.34	0.19	0.12
Mn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.03	0.05	0.08	0.13	0.26	0.05	0.05	0.03	0.05	0.00	0.15	0.08	0.00	0.26	0.05	0.07
Mg	0.00	0.02	0.02	0.01	0.00	0.00	0.02	0.00	0.00	0.00	0.03	0.01	0.05	0.06	0.03	0.00	0.06	0.01	0.00	0.01	0.00	0.00	0.06	0.01	0.02
Ca	0.00	0.01	0.04	0.00	0.05	0.00	0.00	0.19	0.11	0.00	0.07	0.00	0.00	0.09	0.01	0.07	0.00	0.09	0.10	0.00	0.07	0.00	0.19	0.04	0.05
Na	1.97	1.67	1.31	1.71	1.66	1.46	1.72	1.51	1.61	1.40	1.79	1.57	1.68	1.86	1.58	1.61	1.41	1.54	1.83	1.64	1.55	1.31	1.97	1.62	0.16
K	8.95	8.98	9.09	8.98	9.03	8.98	9.29	9.20	9.09	9.13	9.04	8.96	9.08	9.44	9.13	9.95	9.14	9.57	8.96	9.66	9.27	8.95	9.95	9.19	0.26
F	0.41	0.24	0.41	0.37	0.35	0.47	0.35	0.39	0.35	0.56	0.42	0.48	0.63	0.42	0.44	0.47	0.47	0.41	0.34	0.40	0.42	0.24	0.63	0.42	0.08
Cl	0.00	0.11	0.00	0.00	0.00	0.00	0.08	0.03	0.00	0.03	0.00	0.19	0.00	0.08	0.00	0.00	0.21	0.05	0.00	0.00	0.03	0.00	0.21	0.04	0.06
total	46.25	46.74	46.38	45.95	46.63	46.05	46.48	47.24	46.47	46.59	46.77	46.45	46.24	47.28	46.72	47.33	47.17	47.03	46.47	46.84	46.75	45.95	47.33	46.66	0.39
P_2O_5	0.41	0.54	0.34	0.14	0.41	0.20	0.14	0.41	0.14	0.20	0.34	0.00	0.41	0.47	0.27	0.41	0.34	0.54	0.34	0.61	0.00	0.00	0.61	0.32	0.17
SiO_2	59.70	61.22	60.78	59.89	61.16	60.66	59.74	61.15	60.91	60.96	60.75	60.23	59.79	59.56	60.65	60.30	61.30	59.74	59.80	59.33	61.17	59.33	61.30	60.42	0.65
TiO_2	0.00	0.14	0.10	0.16	0.00	0.23	0.08	0.02	0.00	0.04	0.00	0.10	0.00	0.16	0.04	0.00	0.06	0.10	0.14	0.00	0.12	0.00	0.23	0.07	0.07
Al_2O_3	12.68	12.17	12.57	12.12	12.57	12.11	12.80	13.06	12.51	12.27	12.62	12.69	12.23	13.13	12.69	12.85	12.70	12.85	12.93	12.55	12.54	12.11	13.13	12.60	0.29
FeO	0.16	0.44	0.31	0.41	0.16	0.19	0.28	0.31	0.03	0.44	0.19	0.31	0.09	0.00	0.35	0.03	0.38	0.38	0.28	0.44	0.03	0.00	0.44	0.25	0.15
MnO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.03	0.07	0.10	0.17	0.33	0.07	0.07	0.03	0.07	0.00	0.20	0.10	0.00	0.33	0.07	0.09
MgO	0.00	0.03	0.04	0.01	0.00	0.00	0.03	0.00	0.00	0.00	0.05	0.01	0.08	0.11	0.05	0.00	0.10	0.02	0.00	0.01	0.00	0.00	0.11	0.02	0.03
CaO	0.00	0.02	0.05	0.00	0.07	0.00	0.00	0.27	0.15	0.00	0.10	0.00	0.00	0.12	0.02	0.10	0.00	0.12	0.14	0.00	0.10	0.00	0.27	0.06	0.07
Na_2O	2.66	2.25	1.76	2.31	2.24	1.97	2.31	2.03	2.17	1.89	2.41	2.12	2.26	2.50	2.13	2.17	1.90	2.07	2.46	2.21	2.09	1.76	2.66	2.19	0.22
K_2O	10.78	10.81	10.95	10.82	10.88	10.81	11.19	11.08	10.95	11.00	10.89	10.79	10.94	11.37	11.00	11.98	11.01	11.53	10.79	11.64	11.17	10.78	11.98	11.07	0.32
F	0.41	0.24	0.41	0.37	0.34	0.47	0.35	0.39	0.35	0.56	0.42	0.48	0.63	0.42	0.44	0.47	0.47	0.41	0.34	0.40	0.42	0.24	0.63	0.42	0.08
Cl	0.00	0.11	0.00	0.00	0.00	0.00	0.08	0.03	0.00	0.03	0.00	0.19	0.00	0.08	0.00	0.00	0.21	0.05	0.00	0.00	0.03	0.00	0.21	0.04	0.06
total	86.62	87.83	87.14	86.06	87.69	86.45	86.84	88.57	87.23	87.18	87.66	86.77	86.33	88.05	87.51	88.17	88.25	87.68	87.07	87.21	87.59	86.06	88.57	87.33	0.67
H_2O	13.38	12.17	12.86	13.94	12.31	13.55	13.16	11.43	12.77	12.82	12.34	13.23	13.67	11.95	12.49	11.83	11.75	12.32	12.93	12.79	12.41	11.43	13.94	12.67	0.67
recalculated to 100 % total:																									
P_2O_5	0.47	0.62	0.39	0.16	0.46	0.23	0.16	0.46	0.15	0.23	0.39	0.00	0.47	0.54	0.31	0.46	0.38	0.61	0.39	0.70	0.00	0.00	0.70	0.36	0.19
SiO_2	68.92	69.70	69.75	69.59	69.75	70.17	68.79	69.04	69.83	69.92	69.30	69.41	69.26	67.64	69.30	68.39	69.46	68.13	68.68	68.03	69.84	67.64	70.17	69.19	0.69
TiO_2	0.00	0.15	0.11	0.18	0.00	0.27	0.09	0.02	0.00	0.04	0.00	0.11	0.00	0.18	0.04	0.00	0.07	0.11	0.16	0.00	0.13	0.00	0.27	0.08	0.08
Al_2O_3	14.63	13.86	14.43	14.08	14.34	14.01	14.75	14.74	14.35	14.07	14.39	14.63	14.16	14.91	14.50	14.57	14.39	14.66	14.84	14.39	14.31	13.86	14.91	14.43	0.28
FeO	0.18	0.50	0.36	0.48	0.18	0.22	0.33	0.35	0.04	0.50	0.21	0.36	0.11	0.00	0.40	0.04	0.43	0.43	0.33	0.50	0.04	0.00	0.50	0.28	0.17
MnO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.04	0.08	0.11	0.19	0.37	0.08	0.07	0.04	0.08	0.00	0.23	0.11	0.00	0.37	0.08	0.10
MgO	0.00	0.03	0.04	0.01	0.00	0.00	0.03	0.00	0.00	0.00	0.05	0.01	0.09	0.12	0.05	0.00	0.11	0.02	0.00	0.01	0.00	0.00	0.12	0.03	0.04
CaO	0.00	0.02	0.06	0.00	0.08	0.00	0.00	0.31	0.17	0.00	0.12	0.00	0.00	0.14	0.02	0.12	0.00	0.14	0.16	0.00	0.12	0.00	0.31	0.07	0.08
Na_2O	3.07	2.56	2.02	2.68	2.56	2.27	2.66	2.29	2.49	2.17	2.75	2.44	2.62	2.84	2.43	2.46	2.15	2.36	2.83	2.54	2.39	2.02	3.07	2.50	0.25
K_2O	12.45	12.31	12.56	12.57	12.41	12.51	12.89	12.51	12.55	12.62	12.43	12.44	12.67	12.91	12.57	13.59	12.48	13.15	12.39	13.34	12.75	12.31	13.59	12.67	0.33
F	0.48	0.28	0.47	0.43	0.39	0.55	0.41	0.44	0.40	0.64	0.48	0.55	0.73	0.47	0.50	0.53	0.54	0.47	0.39	0.46	0.48	0.28	0.73	0.48	0.10
Cl	0.00	0.12	0.00	0.00	0.00	0.00	0.09	0.03	0.00	0.03	0.00	0.21	0.00	0.09	0.00	0.00	0.24	0.06	0.00	0.00	0.03	0.00	0.24	0.04	0.07

Table 29: EMP data of glass in Type 1 run G41 at constant conditions of 3.5 GPa / 700 °C; bulk water content ± 2 wt.%; 21 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	min	max	mean	σ
P	0.06	0.00	0.12	0.15	0.03	0.30	0.21	0.18	0.18	0.33	0.15	0.24	0.41	0.06	0.09	0.06	0.35	0.12	0.24	0.18	0.33	0.00	0.41	0.18	0.11
Si	31.16	30.53	31.03	30.68	30.35	30.58	30.57	30.76	30.91	30.16	31.02	30.86	30.28	30.61	30.25	30.93	30.38	30.50	31.00	30.80	30.33	30.16	31.16	30.65	0.29
Ti	0.27	0.23	0.24	0.15	0.18	0.15	0.33	0.13	0.24	0.19	0.14	0.15	0.30	0.23	0.13	0.16	0.14	0.10	0.06	0.07	0.18	0.06	0.33	0.18	0.07
Al	7.53	8.01	7.70	7.96	8.48	7.72	8.15	7.61	7.81	7.95	7.84	7.97	7.80	7.75	7.66	7.75	8.02	7.74	7.78	8.00	8.13	7.53	8.48	7.87	0.22
Fe	0.95	0.91	0.53	0.74	0.43	0.65	0.98	0.96	0.93	1.07	0.91	0.98	1.03	0.93	0.98	1.03	0.81	1.00	1.00	0.62	0.98	0.43	1.07	0.88	0.18
Mn	0.00	0.07	0.10	0.07	0.05	0.00	0.05	0.07	0.00	0.05	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.25	0.03	0.00	0.00	0.00	0.25	0.04	0.06
Mg	0.03	0.07	0.03	0.07	0.00	0.02	0.02	0.04	0.03	0.03	0.06	0.04	0.07	0.07	0.08	0.03	0.07	0.00	0.07	0.00	0.07	0.00	0.08	0.04	0.03
Ca	0.37	0.26	0.31	0.33	0.42	0.39	0.29	0.21	0.06	0.20	0.12	0.18	0.13	0.31	0.10	0.12	0.11	0.10	0.13	0.16	0.10	0.06	0.42	0.21	0.11
Na	2.21	2.37	2.07	2.09	2.97	2.42	2.33	2.28	2.31	2.48	2.63	2.29	2.22	2.10	2.71	2.30	2.27	2.43	2.41	2.43	2.86	2.07	2.97	2.39	0.24
K	6.88	7.33	7.08	7.20	6.44	7.11	7.00	7.32	7.25	7.22	6.90	7.18	7.52	7.37	7.31	7.31	7.18	7.59	6.64	6.93	7.31	6.44	7.59	7.14	0.28
F	0.38	0.37	0.49	0.11	0.19	0.27	0.22	0.25	0.25	0.12	0.24	0.18	0.31	0.24	0.22	0.24	0.07	0.23	0.13	0.28	0.17	0.07	0.49	0.24	0.10
Cl	0.19	0.08	0.16	0.11	0.03	0.05	0.03	0.05	0.00	0.00	0.16	0.00	0.00	0.03	0.11	0.05	0.05	0.05	0.03	0.05	0.00	0.00	0.19	0.06	0.06
total	50.03	50.23	49.85	49.66	49.56	49.66	50.17	49.86	49.97	49.81	50.15	50.07	50.06	49.69	49.63	49.97	49.47	50.10	49.50	49.51	50.45	49.47	50.45	49.88	0.28
P_2O_5	0.14	0.00	0.27	0.34	0.07	0.68	0.47	0.41	0.41	0.74	0.34	0.54	0.95	0.14	0.20	0.14	0.81	0.27	0.54	0.41	0.74	0.00	0.95	0.41	0.26
SiO_2	66.67	65.32	66.38	65.64	64.94	65.43	65.41	65.80	66.13	64.53	66.37	66.02	64.79	65.48	64.73	66.17	65.00	65.25	66.31	65.88	64.89	64.53	66.67	65.58	0.63
TiO_2	0.46	0.38	0.40	0.25	0.30	0.25	0.55	0.21	0.40	0.32	0.23	0.25	0.49	0.38	0.21	0.27	0.23	0.17	0.10	0.11	0.30	0.10	0.55	0.30	0.12
Al_2O_3	14.23	15.13	14.56	15.03	16.02	14.59	15.40	14.37	14.75	15.02	14.81	15.06	14.73	14.65	14.47	14.64	15.16	14.62	14.70	15.12	15.37	14.23	16.02	14.88	0.41
FeO	1.23	1.17	0.68	0.95	0.55	0.83	1.26	1.23	1.20	1.38	1.17	1.26	1.32	1.20	1.26	1.32	1.04	1.29	1.29	0.80	1.26	0.55	1.38	1.13	0.23
MnO	0.00	0.10	0.13	0.10	0.06	0.00	0.06	0.10	0.00	0.06	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.32	0.03	0.00	0.00	0.00	0.32	0.05	0.08
MgO	0.06	0.11	0.06	0.12	0.00	0.04	0.03	0.07	0.06	0.06	0.09	0.07	0.12	0.11	0.13	0.05	0.12	0.00	0.12	0.00	0.11	0.00	0.13	0.07	0.04
CaO	0.51	0.37	0.43	0.47	0.58	0.55	0.40	0.30	0.08	0.28	0.17	0.25	0.18	0.43	0.13	0.17	0.15	0.13	0.18	0.22	0.13	0.08	0.58	0.29	0.16
Na_2O	2.97	3.19	2.79	2.82	4.00	3.26	3.14	3.08	3.12	3.35	3.55	3.08	2.99	2.83	3.65	3.10	3.07	3.27	3.25	3.28	3.85	2.79	4.00	3.22	0.32
K_2O	8.29	8.83	8.53	8.67	7.75	8.56	8.43	8.82	8.73	8.69	8.31	8.64	9.05	8.88	8.81	8.80	8.65	9.14	8.00	8.35	8.81	7.75	9.14	8.61	0.33
F	0.38	0.37	0.49	0.10	0.19	0.27	0.22	0.25	0.25	0.12	0.24	0.18	0.31	0.24	0.22	0.24	0.07	0.23	0.12	0.28	0.17	0.07	0.49	0.24	0.10
Cl	0.19	0.08	0.16	0.11	0.03	0.05	0.03	0.05	0.00	0.00	0.16	0.00	0.00	0.03	0.11	0.05	0.05	0.05	0.03	0.05	0.00	0.00	0.19	0.06	0.06
total	94.91	94.87	94.62	94.53	94.41	94.38	95.30	94.56	95.01	94.51	95.28	95.30	94.81	94.25	93.81	94.83	94.31	94.64	94.61	94.37	95.57	93.81	95.57	94.71	0.42
H_2O	5.09	5.13	5.38	5.47	5.59	5.62	4.70	5.44	4.99	5.49	4.72	4.70	5.19	5.75	6.19	5.17	5.69	5.36	5.39	5.63	4.43	4.43	6.19	5.29	0.42
recalculated to 100 % total:																									
P_2O_5	0.14	0.00	0.29	0.36	0.07	0.72	0.50	0.43	0.43	0.79	0.36	0.57	1.00	0.14	0.22	0.14	0.86	0.29	0.57	0.43	0.78	0.00	1.00	0.43	0.28
SiO_2	70.25	68.85	70.15	69.44	68.78	69.32	68.63	69.58	69.60	68.28	69.66	69.27	68.33	69.47	69.00	69.78	68.92	68.95	70.09	69.82	67.90	67.90	70.25	69.24	0.64
TiO_2	0.48	0.40	0.42	0.26	0.32	0.26	0.58	0.22	0.42	0.34	0.24	0.26	0.52	0.40	0.22	0.28	0.24	0.18	0.10	0.12	0.32	0.10	0.58	0.31	0.13
Al_2O_3	14.99	15.95	15.38	15.90	16.97	15.46	16.16	15.20	15.52	15.89	15.54	15.80	15.54	15.54	15.42	15.44	16.07	15.44	15.54	16.02	16.08	14.99	16.97	15.71	0.42
FeO	1.29	1.23	0.71	1.01	0.59	0.88	1.32	1.30	1.26	1.46	1.22	1.32	1.39	1.27	1.34	1.39	1.11	1.36	1.36	0.85	1.32	0.59	1.46	1.19	0.24
MnO	0.00	0.10	0.14	0.10	0.07	0.00	0.07	0.10	0.00	0.07	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.34	0.03	0.00	0.00	0.00	0.34	0.05	0.08
MgO	0.06	0.12	0.06	0.13	0.00	0.04	0.03	0.08	0.06	0.06	0.10	0.07	0.13	0.12	0.14	0.05	0.13	0.00	0.13	0.00	0.12	0.00	0.14	0.08	0.05
CaO	0.54	0.38	0.46	0.49	0.62	0.58	0.42	0.32	0.09	0.30	0.17	0.26	0.19	0.46	0.14	0.18	0.16	0.14	0.19	0.23	0.14	0.09	0.62	0.31	0.17
Na_2O	3.13	3.36	2.95	2.98	4.24	3.45	3.30	3.25	3.28	3.54	3.72	3.23	3.15	3.00	3.90	3.27	3.25	3.46	3.43	3.48	4.03	2.95	4.24	3.40	0.34
K_2O	8.73	9.31	9.02	9.17	8.21	9.07	8.84	9.32	9.19	9.20	8.72	9.07	9.55	9.42	9.39	9.28	9.17	9.66	8.45	8.85	9.21	8.21	9.66	9.09	0.35
F	0.40	0.39	0.52	0.11	0.20	0.28	0.23	0.26	0.26	0.12	0.25	0.19	0.33	0.26	0.23	0.25	0.08	0.24	0.13	0.30	0.18	0.08	0.52	0.25	0.10
Cl	0.19	0.08	0.17	0.11	0.03	0.06	0.03	0.06	0.00	0.00	0.17	0.00	0.00	0.03	0.11	0.06	0.06	0.06	0.03	0.06	0.00	0.00	0.19	0.06	0.06

Table 30: EMP data of glass in simultaneous cooling-pressurization run G17 (Type 2), quenched at 3.5 GPa / 700 °C; bulk water content 2.8 wt.%.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	min	max	mean	σ
P	0.09	0.00	0.00	0.00	0.00	0.00	0.03	0.06	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.09	0.01	0.03
Si	29.46	26.34	29.42	26.05	27.31	29.86	26.98	28.78	26.86	27.01	28.64	28.23	28.21	26.83	26.05	29.86	27.86	1.25
Ti	0.00	0.07	0.18	0.07	0.20	0.02	0.17	0.15	0.00	0.08	0.02	0.09	0.12	0.19	0.00	0.20	0.10	0.07
Al	5.00	4.41	5.15	4.51	5.09	4.38	4.43	4.61	4.27	4.71	4.85	4.75	4.82	4.29	4.27	5.15	4.66	0.29
Fe	0.20	0.25	0.22	0.40	0.25	0.22	0.50	0.32	0.25	0.54	0.07	0.12	0.71	0.07	0.07	0.71	0.29	0.18
Mn	0.05	0.00	0.08	0.00	0.00	0.00	0.00	0.10	0.08	0.15	0.00	0.00	0.00	0.10	0.00	0.15	0.04	0.05
Mg	0.05	0.02	0.00	0.00	0.00	0.03	0.05	0.01	0.03	0.00	0.05	0.04	0.00	0.00	0.00	0.05	0.02	0.02
Ca	1.60	0.97	0.30	0.87	0.74	0.54	0.70	1.03	0.34	0.62	0.59	0.33	1.52	0.36	0.30	1.60	0.75	0.42
Na	1.52	1.25	1.22	1.11	1.87	1.09	0.89	1.64	0.85	1.22	1.23	1.16	1.37	1.02	0.85	1.87	1.25	0.28
K	7.87	8.17	9.54	8.03	7.96	8.01	8.28	7.39	8.70	9.01	9.61	8.86	8.63	8.51	7.39	9.61	8.47	0.64
F	0.54	0.79	0.26	0.57	0.78	0.65	0.35	0.78	0.38	0.80	0.22	0.42	0.97	0.47	0.22	0.97	0.57	0.23
Cl	0.24	0.32	0.50	0.29	0.48	0.32	0.48	0.37	0.67	0.27	0.40	0.27	0.40	0.16	0.16	0.67	0.37	0.13
total	46.62	42.58	46.87	41.89	44.67	45.13	42.85	45.25	42.43	44.42	45.69	44.27	46.77	42.00	41.89	46.87	44.39	1.78
P_2O_5	0.20	0.00	0.00	0.00	0.00	0.00	0.07	0.14	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.20	0.03	0.06
SiO_2	63.03	56.34	62.94	55.73	58.41	63.88	57.72	61.57	57.46	57.78	61.28	60.40	60.35	57.41	55.73	63.88	59.59	2.67
TiO_2	0.00	0.12	0.29	0.12	0.33	0.04	0.28	0.25	0.00	0.14	0.04	0.16	0.20	0.32	0.00	0.33	0.16	0.12
Al_2O_3	9.45	8.32	9.74	8.52	9.62	8.28	8.36	8.71	8.07	8.91	9.17	8.97	9.11	8.10	8.07	9.74	8.81	0.56
FeO	0.25	0.32	0.28	0.51	0.32	0.28	0.64	0.41	0.32	0.70	0.10	0.16	0.91	0.10	0.10	0.91	0.38	0.24
MnO	0.07	0.00	0.10	0.00	0.00	0.00	0.00	0.13	0.10	0.20	0.00	0.00	0.00	0.13	0.00	0.20	0.05	0.07
MgO	0.08	0.03	0.00	0.00	0.00	0.05	0.08	0.02	0.05	0.00	0.09	0.06	0.00	0.00	0.00	0.09	0.03	0.03
CaO	2.24	1.36	0.43	1.22	1.04	0.75	0.98	1.45	0.48	0.87	0.82	0.46	2.12	0.50	0.43	2.24	1.05	0.58
Na_2O	2.05	1.68	1.65	1.50	2.51	1.47	1.20	2.21	1.14	1.64	1.66	1.56	1.85	1.38	1.14	2.51	1.68	0.38
K_2O	9.48	9.84	11.49	9.67	9.59	9.65	9.98	8.90	10.48	10.85	11.57	10.67	10.40	10.25	8.90	11.57	10.20	0.77
F	0.54	0.79	0.26	0.56	0.78	0.65	0.35	0.78	0.38	0.80	0.22	0.42	0.97	0.47	0.22	0.97	0.57	0.23
Cl	0.24	0.32	0.50	0.29	0.48	0.32	0.48	0.37	0.67	0.27	0.40	0.27	0.40	0.16	0.16	0.67	0.37	0.13
total	87.34	78.72	87.45	77.81	82.65	85.03	79.88	84.53	78.84	81.76	85.15	82.89	85.87	78.57	77.81	87.45	82.61	3.39
H_2O	12.66	21.28	12.55	22.19	17.35	14.97	20.12	15.47	21.16	18.24	14.85	17.11	14.13	21.43	12.55	22.19	17.39	3.39
recalculated to 100 % total:																		
P_2O_5	0.23	0.00	0.00	0.00	0.00	0.00	0.08	0.16	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.23	0.04	0.07
SiO_2	72.16	71.57	71.97	71.61	70.68	75.13	72.26	72.84	72.88	70.68	71.97	72.87	70.28	73.06	70.28	75.13	72.14	1.23
TiO_2	0.00	0.15	0.33	0.15	0.40	0.05	0.34	0.30	0.00	0.17	0.05	0.19	0.23	0.40	0.00	0.40	0.20	0.14
Al_2O_3	10.82	10.57	11.13	10.95	11.63	9.73	10.47	10.30	10.23	10.89	10.76	10.83	10.60	10.31	9.73	11.63	10.66	0.46
FeO	0.29	0.41	0.32	0.66	0.38	0.33	0.80	0.49	0.40	0.85	0.11	0.19	1.06	0.12	0.11	1.06	0.46	0.29
MnO	0.08	0.00	0.11	0.00	0.00	0.00	0.00	0.16	0.13	0.24	0.00	0.00	0.00	0.17	0.00	0.24	0.06	0.08
MgO	0.09	0.04	0.00	0.00	0.00	0.06	0.10	0.02	0.06	0.00	0.10	0.07	0.00	0.00	0.00	0.10	0.04	0.04
CaO	2.57	1.72	0.49	1.57	1.26	0.88	1.22	1.71	0.61	1.07	0.96	0.56	2.47	0.63	0.49	2.57	1.27	0.67
Na_2O	2.35	2.14	1.88	1.92	3.04	1.73	1.51	2.62	1.45	2.01	1.95	1.88	2.15	1.76	1.45	3.04	2.03	0.42
K_2O	10.85	12.50	13.13	12.42	11.60	11.35	12.49	10.53	13.30	13.27	13.59	12.87	12.11	13.04	10.53	13.59	12.36	0.96
F	0.62	1.00	0.30	0.73	0.94	0.76	0.44	0.93	0.49	0.98	0.26	0.51	1.13	0.59	0.26	1.13	0.69	0.28
Cl	0.27	0.41	0.58	0.38	0.58	0.38	0.60	0.44	0.85	0.33	0.47	0.32	0.46	0.20	0.20	0.85	0.45	0.16

Table 31: EMP data of glass in short-time melting run G92 (Type 3), quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.8 wt.%; 20 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	min	max	mean	σ
P	0.06	0.09	0.00	0.06	0.12	0.06	0.06	0.00	0.21	0.06	0.00	0.00	0.06	0.03	0.12	0.00	0.00	0.03	0.09	0.00	0.00	0.21	0.05	0.05
Si	30.09	29.91	29.91	29.58	30.15	30.14	30.80	30.10	30.15	29.40	29.78	29.86	30.34	29.82	30.04	30.46	30.78	30.42	30.14	30.14	29.40	30.80	30.10	0.35
Ti	0.05	0.12	0.00	0.09	0.02	0.00	0.01	0.09	0.12	0.02	0.06	0.00	0.09	0.00	0.02	0.06	0.07	0.14	0.02	0.10	0.00	0.14	0.05	0.05
Al	6.74	6.28	6.58	6.59	5.93	6.32	6.50	6.68	6.59	6.75	6.70	6.42	6.30	7.02	6.34	6.76	6.36	6.54	6.55	6.65	5.93	7.02	6.53	0.24
Fe	0.24	0.24	0.27	0.24	0.29	0.44	0.27	0.43	0.36	0.14	0.27	0.39	0.12	0.31	0.27	0.36	0.19	0.17	0.17	0.14	0.12	0.44	0.27	0.09
Mn	0.00	0.13	0.05	0.00	0.18	0.00	0.05	0.05	0.00	0.08	0.03	0.00	0.15	0.13	0.15	0.18	0.07	0.03	0.18	0.00	0.00	0.18	0.07	0.07
Mg	0.00	0.03	0.00	0.00	0.01	0.05	0.03	0.07	0.00	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.07	0.01	0.02
Ca	0.12	0.00	0.00	0.05	0.01	0.05	0.20	0.13	0.12	0.18	0.07	0.02	0.02	0.07	0.13	0.00	0.00	0.11	0.00	0.00	0.00	0.20	0.06	0.07
Na	1.82	1.85	2.20	2.00	2.07	1.81	1.89	2.23	2.28	2.32	2.00	2.11	2.26	2.16	2.47	1.79	2.11	2.08	1.91	2.28	1.79	2.47	2.08	0.19
K	8.72	8.29	8.81	8.97	8.32	8.68	8.55	8.54	8.65	9.18	8.80	8.20	9.15	8.51	7.85	8.37	8.71	8.94	8.82	8.90	7.85	9.18	8.65	0.33
F	0.54	0.51	0.48	0.44	0.34	0.48	0.47	0.42	0.40	0.47	0.49	0.39	0.38	0.52	0.44	0.55	0.37	0.59	0.48	0.44	0.34	0.59	0.46	0.06
Cl	0.03	0.00	0.00	0.00	0.05	0.19	0.00	0.08	0.03	0.00	0.00	0.00	0.11	0.00	0.16	0.00	0.08	0.00	0.03	0.00	0.00	0.19	0.04	0.06
total	48.39	47.44	48.29	48.02	47.49	48.22	48.83	48.83	48.90	48.61	48.19	47.39	48.99	48.58	47.98	48.51	48.75	49.03	48.42	48.65	47.39	49.03	48.38	0.50
P_2O_5	0.14	0.20	0.00	0.14	0.27	0.14	0.14	0.00	0.47	0.14	0.00	0.00	0.14	0.07	0.27	0.00	0.00	0.07	0.20	0.00	0.00	0.47	0.12	0.12
SiO_2	64.37	64.00	63.98	63.28	64.50	64.48	65.89	64.39	64.49	62.90	63.71	63.88	64.90	63.80	64.26	65.15	65.84	65.07	64.48	64.48	62.90	65.89	64.39	0.74
TiO_2	0.08	0.19	0.00	0.15	0.04	0.00	0.02	0.15	0.19	0.04	0.10	0.00	0.15	0.00	0.04	0.10	0.12	0.23	0.04	0.17	0.00	0.23	0.09	0.08
Al_2O_3	12.73	11.87	12.43	12.45	11.20	11.94	12.28	12.62	12.46	12.76	12.65	12.14	11.90	13.25	11.98	12.77	12.02	12.35	12.38	12.56	11.20	13.25	12.34	0.45
FeO	0.31	0.31	0.34	0.31	0.37	0.56	0.34	0.56	0.46	0.19	0.34	0.50	0.15	0.40	0.34	0.47	0.25	0.22	0.22	0.19	0.15	0.56	0.34	0.12
MnO	0.00	0.16	0.06	0.00	0.23	0.00	0.06	0.06	0.00	0.10	0.03	0.00	0.19	0.16	0.19	0.23	0.10	0.03	0.23	0.00	0.00	0.23	0.09	0.09
MgO	0.00	0.05	0.00	0.00	0.02	0.09	0.06	0.12	0.00	0.00	0.00	0.00	0.04	0.03	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.12	0.02	0.04
CaO	0.17	0.00	0.00	0.07	0.02	0.07	0.29	0.18	0.17	0.25	0.10	0.03	0.03	0.10	0.18	0.00	0.00	0.15	0.00	0.00	0.00	0.29	0.09	0.09
Na_2O	2.45	2.50	2.96	2.70	2.80	2.44	2.55	3.00	3.07	3.12	2.70	2.84	3.04	2.91	3.32	2.41	2.85	2.80	2.57	3.07	2.41	3.32	2.81	0.26
K_2O	10.51	9.98	10.61	10.81	10.02	10.46	10.30	10.29	10.42	11.06	10.61	9.88	11.02	10.25	9.46	10.08	10.49	10.77	10.62	10.72	9.46	11.06	10.42	0.40
F	0.54	0.50	0.48	0.44	0.34	0.48	0.46	0.42	0.40	0.46	0.49	0.39	0.38	0.52	0.44	0.55	0.37	0.59	0.48	0.44	0.34	0.59	0.46	0.06
Cl	0.03	0.00	0.00	0.00	0.05	0.19	0.00	0.08	0.03	0.00	0.00	0.00	0.11	0.00	0.16	0.00	0.08	0.00	0.03	0.00	0.00	0.19	0.04	0.06
total	91.07	89.56	90.67	90.15	89.70	90.59	92.19	91.70	92.00	90.83	90.52	89.50	91.86	91.28	90.42	91.52	91.93	92.04	91.10	91.44	89.50	92.19	91.00	0.85
H_2O	8.93	10.44	9.33	9.85	10.30	9.41	7.81	8.30	8.00	9.17	9.48	10.50	8.14	8.72	9.58	8.48	8.07	7.96	8.90	8.56	7.81	10.50	9.00	0.85
recalculated to 100 % total:																								
P_2O_5	0.15	0.23	0.00	0.15	0.30	0.15	0.15	0.00	0.52	0.15	0.00	0.00	0.15	0.08	0.30	0.00	0.00	0.07	0.22	0.00	0.00	0.52	0.13	0.14
SiO_2	70.68	71.46	70.57	70.19	71.91	71.18	71.47	70.22	70.10	69.25	70.38	71.38	70.64	69.90	71.06	71.19	71.61	70.70	70.77	70.51	69.25	71.91	70.76	0.66
TiO_2	0.08	0.21	0.00	0.17	0.04	0.00	0.02	0.17	0.21	0.04	0.11	0.00	0.17	0.00	0.04	0.11	0.13	0.25	0.04	0.19	0.00	0.25	0.10	0.08
Al_2O_3	13.97	13.26	13.71	13.81	12.49	13.18	13.32	13.77	13.55	14.05	13.98	13.56	12.95	14.52	13.24	13.95	13.08	13.42	13.58	13.73	12.49	14.52	13.56	0.46
FeO	0.34	0.35	0.38	0.35	0.42	0.62	0.37	0.61	0.50	0.21	0.38	0.56	0.17	0.44	0.38	0.51	0.27	0.24	0.24	0.20	0.17	0.62	0.38	0.13
MnO	0.00	0.18	0.07	0.00	0.25	0.00	0.07	0.07	0.00	0.11	0.04	0.00	0.21	0.18	0.22	0.25	0.11	0.04	0.25	0.00	0.00	0.25	0.10	0.10
MgO	0.00	0.05	0.00	0.00	0.02	0.10	0.06	0.14	0.00	0.00	0.00	0.00	0.04	0.03	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.14	0.03	0.04
CaO	0.18	0.00	0.00	0.07	0.02	0.07	0.31	0.20	0.18	0.28	0.11	0.04	0.04	0.11	0.20	0.00	0.00	0.16	0.00	0.00	0.00	0.31	0.10	0.10
Na_2O	2.69	2.79	3.27	2.99	3.12	2.70	2.76	3.28	3.34	3.44	2.98	3.17	3.31	3.19	3.68	2.63	3.10	3.04	2.82	3.36	2.63	3.68	3.08	0.29
K_2O	11.54	11.15	11.70	11.99	11.17	11.55	11.17	11.22	11.33	12.18	11.72	11.04	11.99	11.23	10.46	11.02	11.42	11.70	11.66	11.73	10.46	12.18	11.45	0.41
F	0.59	0.56	0.53	0.48	0.38	0.53	0.50	0.46	0.43	0.51	0.54	0.44	0.42	0.57	0.48	0.60	0.40	0.64	0.52	0.48	0.38	0.64	0.50	0.07
Cl	0.03	0.00	0.00	0.00	0.06	0.20	0.00	0.09	0.03	0.00	0.00	0.00	0.12	0.00	0.18	0.00	0.09	0.00	0.03	0.00	0.00	0.20	0.04	0.06

Table 32: EMP data of glass in re-heated run G14 (Type 6), 3.5 GPa / 700 °C; 2.8 wt.%.

	1	2	3	4	5	6	7	8	9	min	max	mean	σ
P	0.03	0.00	0.00	0.06	0.00	0.00	0.00	0.11	0.08	0.00	0.11	0.03	0.04
Si	28.63	28.40	28.79	28.91	28.26	28.67	28.52	27.73	27.66	27.66	28.91	28.40	0.44
Ti	0.16	0.11	0.10	0.14	0.12	0.08	0.14	0.01	0.00	0.00	0.16	0.09	0.05
Al	4.46	4.87	5.51	5.54	5.31	5.67	5.60	5.41	5.40	4.46	5.67	5.31	0.39
Fe	0.28	0.31	0.19	0.26	0.19	0.00	0.17	0.33	0.21	0.00	0.33	0.22	0.10
Mn	0.00	0.00	0.07	0.00	0.10	0.05	0.03	0.00	0.03	0.00	0.10	0.03	0.04
Mg	0.02	0.01	0.04	0.01	0.00	0.05	0.06	0.04	0.00	0.00	0.06	0.03	0.02
Ca	0.68	0.90	0.53	0.65	0.48	0.35	0.46	0.48	0.69	0.35	0.90	0.58	0.16
Na	1.73	1.30	1.30	1.23	1.30	1.33	1.59	1.45	1.62	1.23	1.73	1.43	0.18
K	9.93	10.15	9.83	9.65	10.09	10.14	10.73	10.37	10.77	9.65	10.77	10.19	0.38
F	0.86	1.16	0.39	0.70	0.28	0.36	0.32	0.54	0.71	0.28	1.16	0.59	0.29
Cl	0.52	0.27	0.15	0.20	0.22	0.32	0.22	0.17	0.29	0.15	0.52	0.26	0.11
total	47.29	47.49	46.91	47.35	46.36	47.04	47.84	46.64	47.47	46.36	47.84	47.15	0.46
P_2O_5	0.06	0.00	0.00	0.13	0.00	0.00	0.00	0.26	0.19	0.00	0.26	0.07	0.10
SiO_2	61.25	60.76	61.60	61.85	60.46	61.33	61.02	59.33	59.17	59.17	61.85	60.75	0.95
TiO_2	0.26	0.18	0.16	0.23	0.19	0.14	0.23	0.02	0.00	0.00	0.26	0.16	0.09
Al_2O_3	8.43	9.21	10.42	10.47	10.04	10.72	10.58	10.23	10.20	8.43	10.72	10.03	0.75
FeO	0.36	0.39	0.24	0.33	0.24	0.00	0.21	0.43	0.27	0.00	0.43	0.28	0.13
MnO	0.00	0.00	0.10	0.00	0.13	0.06	0.03	0.00	0.03	0.00	0.13	0.04	0.05
MgO	0.03	0.02	0.06	0.02	0.00	0.08	0.10	0.06	0.00	0.00	0.10	0.04	0.04
CaO	0.95	1.26	0.74	0.91	0.68	0.49	0.65	0.68	0.97	0.49	1.26	0.81	0.23
Na_2O	2.33	1.76	1.76	1.66	1.75	1.80	2.15	1.95	2.18	1.66	2.33	1.93	0.24
K_2O	11.96	12.23	11.84	11.63	12.15	12.22	12.93	12.49	12.98	11.63	12.98	12.27	0.46
F	0.86	1.16	0.39	0.70	0.28	0.36	0.32	0.54	0.71	0.28	1.16	0.59	0.29
Cl	0.52	0.27	0.15	0.20	0.22	0.32	0.22	0.17	0.29	0.15	0.52	0.26	0.11
total	86.53	86.69	87.26	87.78	85.98	87.30	88.25	85.88	86.64	85.88	88.25	86.92	0.79
H_2O	13.47	13.31	12.74	12.22	14.02	12.70	11.75	14.12	13.36	11.75	14.12	13.08	0.79
recalculated to 100 % total:													
P_2O_5	0.07	0.00	0.00	0.15	0.00	0.00	0.00	0.30	0.22	0.00	0.30	0.08	0.11
SiO_2	70.78	70.09	70.59	70.46	70.32	70.25	69.14	69.09	68.30	68.30	70.78	69.89	0.84
TiO_2	0.30	0.20	0.18	0.26	0.23	0.16	0.26	0.02	0.00	0.00	0.30	0.18	0.10
Al_2O_3	9.74	10.62	11.94	11.93	11.67	12.28	11.99	11.91	11.78	9.74	12.28	11.54	0.82
FeO	0.42	0.46	0.28	0.38	0.28	0.00	0.24	0.50	0.31	0.00	0.50	0.32	0.15
MnO	0.00	0.00	0.11	0.00	0.15	0.07	0.04	0.00	0.04	0.00	0.15	0.05	0.06
MgO	0.03	0.02	0.07	0.02	0.00	0.09	0.11	0.08	0.00	0.00	0.11	0.05	0.04
CaO	1.10	1.45	0.85	1.03	0.79	0.56	0.73	0.79	1.12	0.56	1.45	0.94	0.27
Na_2O	2.69	2.03	2.02	1.89	2.04	2.06	2.43	2.27	2.52	1.89	2.69	2.22	0.28
K_2O	13.82	14.11	13.57	13.25	14.13	14.00	14.65	14.54	14.98	13.25	14.98	14.12	0.54
F	0.99	1.34	0.45	0.80	0.33	0.41	0.37	0.62	0.82	0.33	1.34	0.68	0.34
Cl	0.60	0.31	0.17	0.22	0.26	0.37	0.25	0.20	0.34	0.17	0.60	0.30	0.13

Table 33: EMP data of glass in Type 5 run G38, 30 °C /min, 3.5 GPa / 700 °C; 2.8 wt.%.

	1	2	3	4	5	6	mean	σ
P	0.09	0.26	0.31	0.20	0.26	0.26	0.23	0.08
Si	27.61	27.97	26.64	27.72	29.11	27.57	27.77	0.80
Ti	0.12	0.03	0.25	0.05	0.09	0.07	0.10	0.08
Al	6.84	7.07	7.81	6.81	6.09	7.03	6.94	0.55
Fe	0.02	0.00	0.40	0.19	0.02	0.02	0.11	0.16
Mn	0.00	0.00	0.07	0.00	0.13	0.07	0.05	0.05
Mg	0.03	0.00	0.00	0.03	0.00	0.02	0.01	0.02
Ca	0.03	0.04	0.00	0.00	0.03	0.03	0.02	0.02
Na	2.77	2.47	1.78	2.82	2.82	2.83	2.58	0.41
K	6.52	6.68	7.45	7.03	6.18	6.93	6.80	0.44
F	1.53	1.22	0.98	1.31	1.50	1.23	1.29	0.20
Cl	0.00	0.03	0.00	0.10	0.10	0.00	0.04	0.05
total	45.55	45.76	45.70	46.25	46.33	46.06	45.94	0.32
P_2O_5	0.19	0.59	0.71	0.46	0.59	0.58	0.52	0.18
SiO_2	59.06	59.83	56.98	59.31	62.27	58.98	59.40	1.71
TiO_2	0.19	0.05	0.42	0.09	0.16	0.12	0.17	0.13
Al_2O_3	12.92	13.36	14.75	12.87	11.51	13.27	13.12	1.04
FeO	0.03	0.00	0.52	0.24	0.03	0.03	0.14	0.20
MnO	0.00	0.00	0.10	0.00	0.16	0.10	0.06	0.07
MgO	0.06	0.00	0.00	0.05	0.00	0.03	0.02	0.03
CaO	0.05	0.06	0.00	0.00	0.05	0.05	0.03	0.03
Na_2O	3.73	3.33	2.40	3.80	3.80	3.81	3.48	0.56
K_2O	7.86	8.04	8.97	8.46	7.45	8.35	8.19	0.53
F	1.53	1.21	0.98	1.31	1.50	1.23	1.29	0.20
Cl	0.00	0.03	0.00	0.10	0.10	0.00	0.04	0.05
total	84.97	85.99	85.42	86.10	86.96	86.03	85.91	0.67
H_2O	15.03	14.01	14.58	13.90	13.04	13.97	14.09	0.67
recalculated to 100 % total:								
P_2O_5	0.23	0.68	0.84	0.53	0.67	0.68	0.61	0.21
SiO_2	69.50	69.58	66.71	68.88	71.61	68.55	69.14	1.60
TiO_2	0.23	0.06	0.49	0.10	0.18	0.14	0.20	0.15
Al_2O_3	15.21	15.54	17.26	14.95	13.24	15.43	15.27	1.29
FeO	0.04	0.00	0.61	0.28	0.04	0.04	0.17	0.24
MnO	0.00	0.00	0.11	0.00	0.19	0.11	0.07	0.08
MgO	0.07	0.00	0.00	0.05	0.00	0.03	0.03	0.03
CaO	0.05	0.07	0.00	0.00	0.05	0.05	0.04	0.03
Na_2O	4.39	3.87	2.81	4.41	4.37	4.43	4.05	0.64
K_2O	9.25	9.35	10.51	9.83	8.56	9.71	9.53	0.65
F	1.80	1.41	1.15	1.52	1.72	1.43	1.51	0.23
Cl	0.00	0.03	0.00	0.11	0.11	0.00	0.04	0.06

Table 34: EMP data of glass in Type 5 run G80 with a cooling rate of 3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.8 wt.%; 32 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.09	0.14	0.11	0.42	0.11	0.20	0.09	0.06	0.23	0.26	0.14	0.37	0.03	0.00	0.11	0.28	0.06	0.09	0.14	0.09	0.31	0.17	0.03	0.11	0.14	0.00	0.09
Si	29.10	28.98	29.00	28.24	28.40	28.91	28.91	29.08	28.40	28.99	28.18	28.40	29.20	29.09	29.13	28.18	28.90	29.05	28.63	29.47	29.20	29.30	29.45	28.71	29.57	29.21	29.38
Ti	0.00	0.01	0.00	0.00	0.02	0.04	0.03	0.00	0.12	0.00	0.14	0.03	0.04	0.00	0.02	0.00	0.08	0.14	0.08	0.07	0.07	0.00	0.00	0.08	0.05	0.14	0.09
Al	7.33	7.07	6.67	6.92	6.94	6.90	6.69	6.68	6.72	6.83	6.78	6.72	6.99	6.75	7.15	7.11	7.07	6.99	7.03	7.31	7.03	6.77	6.82	6.92	6.96	7.11	7.32
Fe	0.14	0.00	0.19	0.14	0.09	0.00	0.00	0.07	0.00	0.00	0.14	0.09	0.21	0.14	0.00	0.14	0.02	0.05	0.02	0.02	0.14	0.07	0.21	0.12	0.02	0.00	0.02
Mn	0.10	0.00	0.05	0.10	0.00	0.05	0.00	0.07	0.13	0.03	0.15	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.03	0.05	0.17	0.12	0.00
Mg	0.00	0.00	0.02	0.00	0.02	0.05	0.02	0.03	0.04	0.02	0.00	0.01	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.02	0.00	0.01	0.02	0.00	0.05	0.00	0.00
Ca	0.00	0.00	0.01	0.01	0.00	0.06	0.08	0.00	0.04	0.02	0.01	0.00	0.00	0.07	0.08	0.01	0.06	0.00	0.07	0.13	0.14	0.04	0.00	0.00	0.00	0.00	0.04
Na	1.88	1.92	2.04	1.98	1.78	2.05	1.92	1.94	2.17	2.35	1.91	1.92	2.02	2.00	1.99	2.12	2.09	1.99	1.96	2.15	2.06	1.93	2.24	1.98	1.99	2.35	1.84
K	9.23	9.49	9.10	8.81	9.75	9.68	9.06	8.80	9.74	8.73	9.62	9.28	9.29	9.60	8.92	8.95	9.50	9.52	8.83	8.76	8.46	9.00	9.05	9.72	8.98	9.03	9.25
F	0.80	0.60	0.66	0.83	0.53	0.64	0.81	0.69	0.68	0.70	0.51	0.64	0.75	0.87	0.60	0.59	0.60	0.57	0.72	0.51	0.64	0.74	0.39	0.58	0.57	0.58	0.50
Cl	0.00	0.05	0.03	0.03	0.10	0.00	0.00	0.03	0.07	0.05	0.15	0.03	0.03	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.05	0.07	0.00	0.03	0.10
total	48.66	48.26	47.88	47.49	47.75	48.57	47.59	47.45	48.34	47.97	47.74	47.51	48.56	48.52	48.00	47.47	48.38	48.42	47.49	48.60	48.06	48.03	48.28	48.34	48.51	48.57	48.63
P_2O_5	0.19	0.33	0.26	0.97	0.26	0.45	0.19	0.13	0.52	0.59	0.32	0.84	0.06	0.00	0.26	0.65	0.13	0.19	0.33	0.19	0.72	0.39	0.06	0.26	0.33	0.00	0.19
SiO_2	62.25	62.01	62.05	60.42	60.75	61.84	61.84	62.21	60.75	62.03	60.29	60.76	62.46	62.23	62.32	60.28	61.82	62.14	61.26	63.04	62.46	62.67	63.00	61.42	63.25	62.50	62.85
TiO_2	0.00	0.02	0.00	0.00	0.04	0.07	0.05	0.00	0.19	0.00	0.23	0.05	0.07	0.00	0.04	0.00	0.14	0.23	0.14	0.12	0.12	0.00	0.00	0.14	0.09	0.23	0.16
Al_2O_3	13.85	13.35	12.60	13.07	13.12	13.04	12.63	12.63	12.70	12.90	12.82	12.70	13.21	12.76	13.50	13.44	13.36	13.21	13.29	13.81	13.28	12.79	12.89	13.07	13.14	13.43	13.83
FeO	0.18	0.00	0.24	0.18	0.12	0.00	0.00	0.09	0.00	0.00	0.18	0.12	0.27	0.18	0.00	0.18	0.03	0.06	0.03	0.03	0.18	0.09	0.27	0.15	0.03	0.00	0.03
MnO	0.13	0.00	0.06	0.13	0.00	0.06	0.00	0.10	0.16	0.03	0.19	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.03	0.06	0.22	0.16	0.00
MgO	0.00	0.00	0.04	0.00	0.04	0.08	0.04	0.05	0.06	0.03	0.00	0.01	0.00	0.00	0.00	0.06	0.00	0.05	0.00	0.03	0.00	0.01	0.04	0.00	0.08	0.00	0.00
CaO	0.00	0.00	0.02	0.02	0.00	0.08	0.11	0.00	0.06	0.03	0.02	0.00	0.00	0.09	0.11	0.02	0.08	0.00	0.09	0.18	0.20	0.06	0.00	0.00	0.00	0.00	0.06
Na_2O	2.53	2.59	2.74	2.66	2.40	2.76	2.58	2.61	2.93	3.17	2.58	2.59	2.72	2.70	2.69	2.86	2.82	2.69	2.64	2.89	2.78	2.61	3.02	2.67	2.68	3.17	2.48
K_2O	11.12	11.43	10.97	10.62	11.74	11.66	10.92	10.60	11.73	10.51	11.59	11.17	11.20	11.57	10.74	10.78	11.44	11.47	10.64	10.56	10.19	10.84	10.91	11.71	10.81	10.88	11.14
F	0.80	0.60	0.66	0.83	0.53	0.64	0.80	0.69	0.68	0.70	0.51	0.64	0.75	0.87	0.60	0.59	0.60	0.57	0.72	0.51	0.64	0.74	0.39	0.57	0.57	0.57	0.50
Cl	0.00	0.05	0.03	0.03	0.10	0.00	0.00	0.03	0.07	0.05	0.15	0.03	0.03	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.05	0.07	0.00	0.03	0.10
total	90.72	90.10	89.37	88.57	88.85	90.42	88.83	88.84	89.57	89.73	88.63	88.68	90.44	90.03	90.00	88.64	90.17	90.37	88.83	91.22	90.30	89.89	90.48	89.87	90.97	90.72	91.10
H_2O	9.28	9.90	10.63	11.43	11.15	9.58	11.17	11.16	10.43	10.27	11.37	11.32	9.56	9.97	10.00	11.36	9.83	9.63	11.17	8.78	9.70	10.11	9.52	10.13	9.03	9.28	8.90
recalculated to 100 % total:																											
P_2O_5	0.21	0.36	0.29	1.10	0.29	0.50	0.22	0.15	0.58	0.65	0.36	0.95	0.07	0.00	0.29	0.73	0.14	0.22	0.37	0.21	0.79	0.43	0.07	0.29	0.36	0.00	0.21
SiO_2	68.62	68.82	69.43	68.22	68.38	68.39	69.62	70.02	67.83	69.13	68.03	68.52	69.06	69.12	69.24	68.01	68.56	68.77	68.96	69.11	69.17	69.72	69.63	68.35	69.53	68.89	68.99
TiO_2	0.00	0.02	0.00	0.00	0.04	0.08	0.06	0.00	0.21	0.00	0.26	0.06	0.08	0.00	0.04	0.00	0.16	0.25	0.16	0.13	0.13	0.00	0.00	0.16	0.10	0.25	0.17
Al_2O_3	15.26	14.82	14.09	14.75	14.77	14.42	14.22	14.21	14.18	14.38	14.46	14.33	14.60	14.18	15.00	15.16	14.82	14.62	14.96	15.14	14.71	14.23	14.24	14.54	14.45	14.80	15.18
FeO	0.20	0.00	0.27	0.20	0.14	0.00	0.00	0.10	0.00	0.00	0.20	0.14	0.30	0.20	0.00	0.20	0.03	0.07	0.03	0.03	0.20	0.10	0.30	0.17	0.03	0.00	0.03
MnO	0.14	0.00	0.07	0.15	0.00	0.07	0.00	0.11	0.18	0.04	0.22	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.04	0.07	0.25	0.18	0.00
MgO	0.00	0.00	0.04	0.00	0.04	0.09	0.04	0.06	0.07	0.03	0.00	0.01	0.00	0.00	0.00	0.06	0.00	0.05	0.00	0.03	0.00	0.01	0.04	0.00	0.09	0.00	0.00
CaO	0.00	0.00	0.02	0.02	0.00	0.09	0.12	0.00	0.07	0.03	0.02	0.00	0.00	0.10	0.12	0.02	0.09	0.00	0.10	0.20	0.22	0.07	0.00	0.00	0.00	0.00	0.07
Na_2O	2.79	2.87	3.07	3.01	2.70	3.05	2.91	2.94	3.27	3.53	2.91	2.92	3.01	2.99	2.98	3.23	3.13	2.97	2.97	3.17	3.07	2.90	3.34	2.97	2.95	3.50	2.72
K_2O	12.26	12.69	12.27	11.99	13.22	12.89	12.29	11.93	13.10	11.72	13.08	12.60	12.38	12.85	11.93	12.16	12.69	12.69	11.97	11.57	11.29	12.06	12.05	13.03	11.89	12.00	12.23
F	0.88	0.67	0.74	0.94	0.60	0.71	0.91	0.77	0.76	0.78	0.58	0.72	0.83	0.97	0.67	0.67	0.67	0.63	0.81	0.56	0.71	0.82	0.43	0.64	0.63	0.63	0.55
Cl	0.00	0.05	0.03	0.03	0.11	0.00	0.00	0.03	0.08	0.05	0.17	0.03	0.03	0.00	0.00	0.06	0.00	0.00	0.00	0.05	0.00	0.00	0.05	0.08	0.00	0.03	0.11

Table 34 (continued)**:** EMP data of glass in Type 5 run G80.

	28	29	30	31	32	min	max	mean	σ
P	0.20	0.14	0.23	0.11	0.06	0.00	0.42	0.14	0.10
Si	28.46	29.05	28.85	28.72	29.63	28.18	29.63	28.93	0.40
Ti	0.00	0.00	0.15	0.08	0.07	0.00	0.15	0.05	0.05
Al	6.91	7.17	7.18	6.87	6.95	6.67	7.33	6.96	0.19
Fe	0.26	0.00	0.12	0.24	0.19	0.00	0.26	0.09	0.08
Mn	0.00	0.00	0.05	0.00	0.00	0.00	0.17	0.04	0.05
Mg	0.00	0.02	0.00	0.00	0.01	0.00	0.05	0.01	0.02
Ca	0.06	0.11	0.00	0.11	0.00	0.00	0.14	0.04	0.04
Na	1.77	1.97	2.06	1.87	1.85	1.77	2.35	2.00	0.14
K	9.25	8.89	9.78	8.84	9.04	8.46	9.78	9.19	0.36
F	0.59	0.87	0.54	0.55	0.51	0.39	0.87	0.64	0.12
Cl	0.00	0.12	0.07	0.07	0.03	0.00	0.15	0.04	0.04
total	47.50	48.35	49.02	47.46	48.34	47.45	49.02	48.12	0.46
P_2O_5	0.45	0.33	0.52	0.26	0.13	0.00	0.97	0.33	0.23
SiO_2	60.89	62.16	61.72	61.43	63.38	60.28	63.38	61.89	0.86
TiO_2	0.00	0.00	0.24	0.14	0.12	0.00	0.24	0.08	0.08
Al_2O_3	13.06	13.54	13.57	12.98	13.13	12.60	13.85	13.15	0.36
FeO	0.33	0.00	0.15	0.30	0.24	0.00	0.33	0.12	0.10
MnO	0.00	0.00	0.06	0.00	0.00	0.00	0.22	0.05	0.07
MgO	0.00	0.04	0.00	0.00	0.02	0.00	0.08	0.02	0.03
CaO	0.08	0.15	0.00	0.15	0.00	0.00	0.20	0.05	0.06
Na_2O	2.39	2.66	2.77	2.52	2.50	2.39	3.17	2.70	0.19
K_2O	11.15	10.71	11.78	10.65	10.89	10.19	11.78	11.07	0.43
F	0.59	0.87	0.54	0.55	0.51	0.39	0.87	0.64	0.12
Cl	0.00	0.12	0.07	0.07	0.03	0.00	0.15	0.04	0.04
total	88.68	90.18	91.19	88.82	90.73	88.57	91.22	89.84	0.87
H_2O	11.32	9.82	8.81	11.18	9.27	8.78	11.43	10.16	0.87
recalculated to 100 % total:									
P_2O_5	0.51	0.36	0.57	0.29	0.14	0.00	1.10	0.37	0.26
SiO_2	68.66	68.92	67.68	69.17	69.85	67.68	70.02	68.89	0.59
TiO_2	0.00	0.00	0.27	0.16	0.13	0.00	0.27	0.09	0.09
Al_2O_3	14.72	15.01	14.88	14.62	14.48	14.09	15.26	14.63	0.33
FeO	0.38	0.00	0.17	0.34	0.27	0.00	0.38	0.13	0.12
MnO	0.00	0.00	0.07	0.00	0.00	0.00	0.25	0.05	0.07
MgO	0.00	0.04	0.00	0.00	0.02	0.00	0.09	0.02	0.03
CaO	0.09	0.17	0.00	0.17	0.00	0.00	0.22	0.06	0.07
Na_2O	2.69	2.95	3.04	2.83	2.75	2.69	3.53	3.00	0.20
K_2O	12.57	11.88	12.92	11.99	12.00	11.29	13.22	12.32	0.49
F	0.67	0.97	0.59	0.62	0.56	0.43	0.97	0.71	0.13
Cl	0.00	0.14	0.08	0.08	0.03	0.00	0.17	0.04	0.05

Table 35: EMP data of glass in Type 5 run G88; 33 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
P	0.00	0.15	0.09	0.00	0.09	0.15	0.00	0.03	0.09	0.15	0.24	0.15	0.00	0.00
Si	29.06	29.63	28.87	29.93	29.30	29.20	29.07	29.04	29.32	29.41	29.19	29.34	29.20	29.36
Ti	0.06	0.06	0.06	0.09	0.01	0.00	0.05	0.00	0.00	0.07	0.13	0.00	0.14	0.00
Al	6.36	6.56	6.56	6.92	6.48	6.74	6.74	6.56	6.45	6.59	6.80	6.60	6.83	6.55
Fe	0.07	0.19	0.00	0.02	0.12	0.00	0.02	0.27	0.24	0.31	0.17	0.12	0.07	0.00
Mn	0.15	0.18	0.13	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.08	0.05	0.05	0.00
Mg	0.02	0.00	0.05	0.04	0.05	0.05	0.05	0.01	0.00	0.00	0.00	0.03	0.00	0.01
Ca	0.16	0.59	0.06	0.22	0.16	0.16	0.00	0.17	0.39	0.13	0.27	0.18	0.17	0.16
Na	1.53	1.91	1.83	1.68	1.96	1.61	2.09	1.82	2.05	2.35	1.80	1.94	1.65	1.77
K	9.75	8.74	9.54	8.84	9.48	10.40	10.08	9.86	10.02	9.47	10.04	8.76	9.76	9.96
F	0.51	0.64	0.41	0.66	0.56	0.67	0.70	0.71	0.70	0.54	0.47	0.50	0.55	0.53
Cl	0.03	0.00	0.00	0.11	0.00	0.00	0.05	0.00	0.00	0.00	0.13	0.00	0.03	0.00
total	47.69	48.64	47.59	48.52	48.23	49.00	48.86	48.46	49.25	49.02	49.30	47.67	48.44	48.34
P_2O_5	0.00	0.34	0.20	0.00	0.20	0.34	0.00	0.07	0.20	0.34	0.54	0.34	0.00	0.00
SiO_2	62.17	63.38	61.76	64.02	62.67	62.47	62.19	62.12	62.72	62.92	62.45	62.77	62.47	62.82
TiO_2	0.10	0.10	0.10	0.15	0.02	0.00	0.08	0.00	0.00	0.12	0.21	0.00	0.23	0.00
Al_2O_3	12.02	12.39	12.40	13.07	12.25	12.73	12.74	12.39	12.19	12.44	12.85	12.48	12.90	12.37
FeO	0.09	0.25	0.00	0.03	0.16	0.00	0.03	0.34	0.31	0.40	0.22	0.16	0.09	0.00
MnO	0.20	0.23	0.16	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.10	0.07	0.07	0.00
MgO	0.03	0.00	0.09	0.07	0.09	0.08	0.09	0.02	0.00	0.00	0.00	0.05	0.00	0.02
CaO	0.22	0.83	0.08	0.30	0.22	0.22	0.00	0.24	0.54	0.19	0.37	0.25	0.24	0.22
Na_2O	2.07	2.57	2.47	2.26	2.64	2.17	2.82	2.46	2.76	3.16	2.43	2.62	2.22	2.39
K_2O	11.74	10.53	11.49	10.65	11.42	12.53	12.14	11.88	12.07	11.41	12.10	10.55	11.76	12.00
F	0.51	0.64	0.41	0.66	0.56	0.67	0.70	0.71	0.69	0.54	0.47	0.50	0.54	0.53
Cl	0.03	0.00	0.00	0.11	0.00	0.00	0.05	0.00	0.00	0.00	0.13	0.00	0.03	0.00
total	88.95	90.98	88.99	91.05	90.02	90.96	90.53	89.92	91.20	91.30	91.63	89.57	90.32	90.11
H_2O	11.05	9.02	11.01	8.95	9.98	9.04	9.47	10.08	8.80	8.70	8.37	10.43	9.68	9.89
recalculated to 100 % total:														
P_2O_5	0.00	0.37	0.23	0.00	0.22	0.37	0.00	0.07	0.22	0.37	0.59	0.38	0.00	0.00
SiO_2	69.89	69.67	69.40	70.32	69.62	68.68	68.69	69.08	68.77	68.92	68.16	70.08	69.17	69.71
TiO_2	0.11	0.11	0.11	0.17	0.02	0.00	0.08	0.00	0.00	0.13	0.23	0.00	0.26	0.00
Al_2O_3	13.52	13.62	13.93	14.35	13.60	14.00	14.08	13.78	13.37	13.63	14.02	13.93	14.28	13.73
FeO	0.11	0.27	0.00	0.03	0.17	0.00	0.03	0.38	0.34	0.44	0.24	0.17	0.10	0.00
MnO	0.22	0.25	0.18	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.11	0.07	0.07	0.00
MgO	0.03	0.00	0.10	0.07	0.10	0.08	0.10	0.02	0.00	0.00	0.00	0.05	0.00	0.02
CaO	0.25	0.91	0.09	0.33	0.24	0.24	0.00	0.26	0.59	0.20	0.40	0.28	0.26	0.24
Na_2O	2.32	2.83	2.78	2.48	2.94	2.39	3.11	2.73	3.03	3.46	2.65	2.92	2.46	2.65
K_2O	13.20	11.57	12.91	11.70	12.68	13.78	13.41	13.21	13.23	12.50	13.20	11.78	13.02	13.31
F	0.57	0.71	0.46	0.72	0.62	0.74	0.77	0.79	0.76	0.60	0.51	0.56	0.60	0.59
Cl	0.03	0.00	0.00	0.12	0.00	0.00	0.06	0.00	0.00	0.00	0.14	0.00	0.03	0.00

Table 35 (continued)**:** EMP data of glass in Type 5 run G88 with a cooling rate of 3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.8 wt.%.

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	min	max	mean	σ
P	0.41	0.00	0.03	0.00	0.21	0.03	0.15	0.03	0.06	0.00	0.06	0.12	0.00	0.00	0.00	0.00	0.27	0.03	0.03	0.00	0.41	0.08	0.10
Si	28.85	29.26	29.53	29.47	28.53	29.76	29.64	29.26	30.10	29.21	28.69	29.68	29.74	29.32	29.67	29.71	29.20	28.68	29.04	28.53	30.10	29.31	0.36
Ti	0.12	0.00	0.08	0.08	0.05	0.00	0.02	0.00	0.08	0.07	0.04	0.09	0.09	0.12	0.02	0.13	0.08	0.13	0.01	0.00	0.14	0.06	0.05
Al	6.60	6.52	6.78	6.67	6.55	6.50	6.86	6.91	6.54	7.10	6.75	6.67	6.58	6.47	6.28	6.60	6.87	6.66	6.61	6.28	7.10	6.64	0.17
Fe	0.17	0.10	0.07	0.27	0.00	0.05	0.14	0.34	0.24	0.24	0.02	0.07	0.27	0.10	0.12	0.12	0.17	0.22	0.00	0.00	0.34	0.13	0.10
Mn	0.13	0.03	0.00	0.00	0.08	0.00	0.05	0.00	0.00	0.03	0.05	0.00	0.18	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.04	0.05
Mg	0.00	0.07	0.00	0.03	0.04	0.00	0.03	0.05	0.00	0.04	0.00	0.04	0.02	0.00	0.00	0.03	0.00	0.06	0.00	0.00	0.07	0.02	0.02
Ca	0.88	0.23	0.00	0.08	0.42	0.05	0.19	0.11	0.12	0.07	0.12	0.16	0.08	0.12	0.19	0.07	0.08	0.35	0.14	0.00	0.88	0.19	0.17
Na	1.76	1.94	1.90	1.88	1.69	1.66	1.81	1.96	1.74	1.75	2.05	1.87	1.87	1.94	1.42	2.05	1.87	1.60	1.77	1.42	2.35	1.83	0.18
K	8.95	9.13	9.40	9.90	9.54	10.29	9.20	9.58	9.50	10.01	9.65	9.19	9.74	9.19	9.10	9.66	9.02	9.59	9.47	8.74	10.40	9.54	0.43
F	0.65	0.58	0.80	0.56	0.38	0.49	0.63	0.40	0.59	0.59	0.66	0.65	0.81	0.72	0.32	0.50	0.71	0.53	0.57	0.32	0.81	0.58	0.12
Cl	0.03	0.27	0.05	0.05	0.16	0.00	0.00	0.08	0.05	0.05	0.13	0.08	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.04	0.06
total	48.54	48.12	48.65	49.00	47.62	48.82	48.73	48.72	49.03	49.16	48.22	48.63	49.43	48.01	47.12	48.86	48.26	47.84	47.65	47.12	49.43	48.47	0.58
P_2O_5	0.94	0.00	0.07	0.00	0.47	0.07	0.34	0.07	0.14	0.00	0.14	0.27	0.00	0.00	0.00	0.00	0.61	0.07	0.07	0.00	0.94	0.18	0.22
SiO_2	61.72	62.60	63.18	63.05	61.02	63.67	63.42	62.60	64.40	62.50	61.38	63.50	63.62	62.72	63.48	63.55	62.47	61.35	62.13	61.02	64.40	62.71	0.78
TiO_2	0.19	0.00	0.14	0.14	0.08	0.00	0.04	0.00	0.14	0.12	0.06	0.15	0.15	0.19	0.04	0.21	0.14	0.21	0.02	0.00	0.23	0.09	0.08
Al_2O_3	12.47	12.31	12.82	12.60	12.37	12.28	12.96	13.06	12.35	13.41	12.75	12.61	12.44	12.22	11.86	12.47	12.97	12.57	12.50	11.86	13.41	12.55	0.33
FeO	0.22	0.12	0.09	0.34	0.00	0.06	0.19	0.44	0.31	0.31	0.03	0.09	0.34	0.12	0.16	0.16	0.22	0.28	0.00	0.00	0.44	0.17	0.13
MnO	0.16	0.03	0.00	0.00	0.10	0.00	0.06	0.00	0.00	0.03	0.07	0.00	0.23	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.05	0.07
MgO	0.00	0.11	0.00	0.05	0.06	0.00	0.05	0.08	0.00	0.07	0.00	0.07	0.04	0.00	0.00	0.05	0.00	0.10	0.00	0.00	0.11	0.04	0.04
CaO	1.23	0.32	0.00	0.12	0.59	0.07	0.27	0.15	0.17	0.10	0.17	0.22	0.12	0.17	0.27	0.10	0.12	0.49	0.20	0.00	1.23	0.27	0.24
Na_2O	2.37	2.62	2.56	2.54	2.28	2.23	2.44	2.64	2.35	2.35	2.77	2.52	2.52	2.62	1.91	2.76	2.52	2.15	2.39	1.91	3.16	2.47	0.25
K_2O	10.78	11.00	11.32	11.93	11.49	12.39	11.08	11.54	11.45	12.06	11.62	11.08	11.73	11.08	10.96	11.63	10.86	11.55	11.41	10.53	12.53	11.49	0.52
F	0.65	0.58	0.80	0.56	0.37	0.49	0.63	0.40	0.59	0.59	0.66	0.65	0.81	0.72	0.32	0.50	0.71	0.53	0.57	0.32	0.81	0.58	0.12
Cl	0.03	0.27	0.05	0.05	0.16	0.00	0.00	0.08	0.05	0.05	0.13	0.08	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.04	0.06
total	90.49	89.67	90.68	91.12	88.80	91.05	91.21	90.87	91.68	91.33	89.47	90.94	91.70	89.58	88.86	91.22	90.31	89.09	89.03	88.80	91.70	90.38	0.92
H_2O	9.51	10.33	9.32	8.88	11.20	8.95	8.79	9.13	8.32	8.67	10.53	9.06	8.30	10.42	11.14	8.78	9.69	10.91	10.97	8.30	11.20	9.62	0.92
recalculated to 100 % total:																							
P_2O_5	1.04	0.00	0.07	0.00	0.53	0.07	0.37	0.07	0.15	0.00	0.15	0.30	0.00	0.00	0.00	0.00	0.67	0.07	0.07	0.00	1.04	0.19	0.25
SiO_2	68.21	69.82	69.67	69.19	68.72	69.93	69.53	68.89	70.25	68.43	68.61	69.83	69.38	70.02	71.44	69.67	69.18	68.86	69.78	68.16	71.44	69.38	0.69
TiO_2	0.21	0.00	0.15	0.15	0.09	0.00	0.04	0.00	0.15	0.13	0.07	0.17	0.17	0.22	0.04	0.23	0.15	0.24	0.02	0.00	0.26	0.10	0.08
Al_2O_3	13.78	13.73	14.14	13.82	13.93	13.49	14.20	14.37	13.47	14.68	14.25	13.87	13.56	13.64	13.35	13.67	14.37	14.11	14.03	13.35	14.68	13.89	0.33
FeO	0.24	0.14	0.10	0.38	0.00	0.07	0.20	0.48	0.34	0.34	0.03	0.10	0.37	0.14	0.18	0.17	0.24	0.31	0.00	0.00	0.48	0.19	0.14
MnO	0.18	0.04	0.00	0.00	0.11	0.00	0.07	0.00	0.00	0.04	0.07	0.00	0.25	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.05	0.08
MgO	0.00	0.13	0.00	0.05	0.07	0.00	0.05	0.08	0.00	0.07	0.00	0.07	0.04	0.00	0.00	0.05	0.00	0.12	0.00	0.00	0.13	0.04	0.04
CaO	1.36	0.36	0.00	0.13	0.67	0.07	0.30	0.17	0.18	0.11	0.19	0.24	0.13	0.19	0.30	0.11	0.13	0.55	0.23	0.00	1.36	0.30	0.27
Na_2O	2.62	2.92	2.83	2.78	2.56	2.45	2.68	2.90	2.56	2.58	3.09	2.77	2.75	2.93	2.15	3.03	2.79	2.42	2.68	2.15	3.46	2.73	0.27
K_2O	11.92	12.27	12.48	13.09	12.94	13.61	12.15	12.70	12.49	13.21	12.99	12.18	12.80	12.36	12.33	12.75	12.02	12.97	12.81	11.57	13.78	12.71	0.56
F	0.72	0.65	0.89	0.61	0.42	0.54	0.69	0.44	0.64	0.64	0.74	0.71	0.89	0.81	0.36	0.55	0.78	0.59	0.64	0.36	0.89	0.65	0.13
Cl	0.03	0.30	0.06	0.06	0.18	0.00	0.00	0.09	0.06	0.06	0.15	0.09	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.05	0.07

Table 36: EMP data of glass in Type 5 run G12 with a cooling rate of 3 °C /min, quenched at 3.5 GPa / 700 °C; bulk water content 2.8 wt.%.

	1	2	3	4	5	6	7	8	9	10	11	12	min	max	mean	σ
P	0.03	0.08	0.03	0.06	0.06	0.06	0.03	0.00	0.08	0.00	0.00	0.00	0.00	0.08	0.04	0.03
Si	26.78	27.19	27.18	26.41	27.48	26.91	26.59	26.99	27.14	26.43	27.27	26.92	26.41	27.48	26.94	0.34
Ti	0.10	0.08	0.07	0.17	0.14	0.17	0.11	0.05	0.15	0.00	0.16	0.13	0.00	0.17	0.11	0.05
Al	6.15	5.78	5.82	5.68	6.16	5.73	5.68	5.89	6.04	5.87	5.96	6.03	5.68	6.16	5.90	0.17
Fe	0.24	0.21	0.21	0.19	0.28	0.21	0.19	0.12	0.24	0.02	0.24	0.28	0.02	0.28	0.20	0.07
Mn	0.00	0.05	0.00	0.00	0.07	0.00	0.10	0.07	0.00	0.20	0.00	0.00	0.00	0.20	0.04	0.06
Mg	0.00	0.02	0.00	0.00	0.00	0.03	0.02	0.00	0.00	0.00	0.03	0.00	0.00	0.03	0.01	0.01
Ca	1.28	1.02	1.37	1.28	1.21	1.21	1.71	1.14	1.30	1.68	1.39	1.00	1.00	1.71	1.30	0.22
Na	1.74	1.88	1.67	1.70	1.64	1.77	1.84	1.83	1.60	1.79	1.51	1.57	1.51	1.88	1.71	0.12
K	9.95	9.89	9.31	9.78	9.48	10.06	9.65	10.14	9.67	9.25	9.93	9.77	9.25	10.14	9.74	0.28
F	1.32	1.18	1.26	1.55	0.77	1.21	1.31	1.06	1.40	2.14	1.43	1.14	0.77	2.14	1.32	0.33
Cl	0.22	0.00	0.12	0.39	0.12	0.17	0.05	0.05	0.07	0.22	0.15	0.00	0.00	0.39	0.13	0.11
total	47.81	47.38	47.05	47.21	47.41	47.52	47.27	47.35	47.69	47.61	48.06	46.84	46.84	48.06	47.43	0.33
P_2O_5	0.06	0.19	0.06	0.13	0.13	0.13	0.06	0.00	0.19	0.00	0.00	0.00	0.00	0.19	0.08	0.07
SiO_2	57.30	58.17	58.14	56.51	58.79	57.57	56.88	57.75	58.06	56.53	58.34	57.60	56.51	58.79	57.64	0.72
TiO_2	0.16	0.14	0.12	0.28	0.23	0.28	0.18	0.09	0.25	0.00	0.26	0.21	0.00	0.28	0.18	0.09
Al_2O_3	11.61	10.92	10.99	10.72	11.64	10.83	10.73	11.13	11.40	11.10	11.25	11.39	10.72	11.64	11.15	0.32
FeO	0.30	0.27	0.27	0.24	0.36	0.27	0.24	0.15	0.30	0.03	0.30	0.37	0.03	0.37	0.26	0.09
MnO	0.00	0.06	0.00	0.00	0.10	0.00	0.13	0.10	0.00	0.26	0.00	0.00	0.00	0.26	0.05	0.08
MgO	0.00	0.03	0.00	0.00	0.00	0.05	0.03	0.00	0.00	0.00	0.06	0.00	0.00	0.06	0.01	0.02
CaO	1.80	1.43	1.92	1.80	1.69	1.69	2.39	1.60	1.82	2.35	1.95	1.40	1.40	2.39	1.82	0.31
Na_2O	2.35	2.53	2.25	2.29	2.21	2.38	2.48	2.47	2.16	2.41	2.04	2.12	2.04	2.53	2.31	0.16
K_2O	11.98	11.91	11.22	11.78	11.42	12.11	11.62	12.21	11.65	11.15	11.96	11.77	11.15	12.21	11.73	0.34
F	1.32	1.18	1.26	1.55	0.77	1.21	1.31	1.06	1.40	2.14	1.43	1.14	0.77	2.14	1.32	0.33
Cl	0.22	0.00	0.12	0.39	0.12	0.17	0.05	0.05	0.07	0.22	0.15	0.00	0.00	0.39	0.13	0.11
total	86.50	86.34	85.81	84.96	87.11	86.15	85.54	86.15	86.70	85.24	87.10	85.51	84.96	87.11	86.09	0.70
H_2O	13.50	13.66	14.19	15.04	12.89	13.85	14.46	13.85	13.30	14.76	12.90	14.49	12.89	15.04	13.91	0.70
recalculated to 100 % total:																
P_2O_5	0.07	0.22	0.07	0.15	0.15	0.15	0.08	0.00	0.22	0.00	0.00	0.00	0.00	0.22	0.09	0.08
SiO_2	66.24	67.38	67.75	66.51	67.49	66.83	66.49	67.04	66.96	66.32	66.98	67.36	66.24	67.75	66.95	0.49
TiO_2	0.18	0.16	0.14	0.33	0.26	0.33	0.20	0.10	0.28	0.00	0.30	0.25	0.00	0.33	0.21	0.10
Al_2O_3	13.43	12.64	12.81	12.62	13.36	12.58	12.55	12.92	13.15	13.02	12.92	13.32	12.55	13.43	12.94	0.32
FeO	0.35	0.32	0.32	0.29	0.42	0.32	0.28	0.18	0.35	0.04	0.35	0.43	0.04	0.43	0.30	0.11
MnO	0.00	0.07	0.00	0.00	0.11	0.00	0.15	0.11	0.00	0.30	0.00	0.00	0.00	0.30	0.06	0.09
MgO	0.00	0.03	0.00	0.00	0.00	0.05	0.03	0.00	0.00	0.00	0.06	0.00	0.00	0.06	0.02	0.02
CaO	2.08	1.65	2.24	2.11	1.94	1.96	2.80	1.85	2.10	2.75	2.23	1.63	1.63	2.80	2.11	0.37
Na_2O	2.72	2.93	2.62	2.69	2.54	2.76	2.90	2.86	2.49	2.83	2.34	2.48	2.34	2.93	2.68	0.19
K_2O	13.85	13.80	13.08	13.87	13.11	14.06	13.59	14.17	13.44	13.08	13.73	13.76	13.08	14.17	13.63	0.38
F	1.53	1.37	1.47	1.83	0.88	1.40	1.53	1.24	1.61	2.51	1.65	1.33	0.88	2.51	1.53	0.39
Cl	0.25	0.00	0.14	0.46	0.14	0.20	0.06	0.06	0.09	0.26	0.17	0.00	0.00	0.46	0.15	0.13

Table 37: EMP data of glass in Type 5 run G70 with a cooling rate of 3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.8.%; 33 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.00	0.06	0.00	0.06	0.00	0.00	0.06	0.09	0.00	0.00	0.03	0.03	0.06	0.03	0.00	0.00	0.03	0.11	0.00	0.00	0.03	0.00	0.03	0.09	0.14	0.00	0.03
Si	30.26	30.78	30.66	30.35	29.81	30.50	30.89	30.71	29.71	30.14	30.50	30.41	29.79	30.61	31.02	29.82	30.75	30.86	30.56	29.71	30.08	30.63	30.04	29.71	29.88	29.94	30.42
Ti	0.00	0.00	0.05	0.07	0.13	0.05	0.05	0.00	0.06	0.08	0.08	0.00	0.01	0.00	0.05	0.00	0.02	0.10	0.01	0.10	0.07	0.10	0.13	0.06	0.14	0.19	0.07
Al	6.13	6.05	6.22	6.47	6.55	6.17	6.32	6.09	6.16	6.41	6.12	6.41	6.16	6.42	6.42	6.45	6.29	6.27	6.10	5.95	6.35	6.21	6.24	5.97	6.36	6.19	6.29
Fe	0.28	0.33	0.09	0.05	0.19	0.28	0.19	0.21	0.49	0.16	0.21	0.30	0.00	0.16	0.19	0.00	0.47	0.42	0.16	0.26	0.19	0.02	0.30	0.33	0.16	0.37	0.49
Mn	0.20	0.10	0.10	0.00	0.00	0.15	0.00	0.00	0.05	0.00	0.03	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.07	0.07	0.10	0.07	0.10	0.10	0.03	0.00	0.17
Mg	0.00	0.00	0.04	0.02	0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.01	0.04	0.05	0.04	0.05	0.06	0.00	0.02	0.02	0.03	0.02	0.00	0.00	0.03	0.00	0.02
Ca	0.83	0.58	0.64	0.31	0.68	0.70	0.49	0.37	0.56	0.87	0.49	0.81	0.26	0.69	0.59	0.37	0.22	0.39	0.42	0.58	0.85	0.33	0.69	0.82	0.73	0.56	0.52
Na	1.70	1.51	1.62	1.44	1.34	1.53	1.63	1.42	1.38	1.56	1.48	1.34	1.46	1.65	1.42	1.62	1.44	1.46	1.38	1.32	1.52	1.94	1.58	1.50	1.36	1.49	1.67
K	9.62	10.47	9.87	9.81	10.26	9.83	10.02	10.45	10.23	10.50	10.33	10.12	10.12	10.31	9.65	10.37	10.13	9.93	10.10	10.54	9.91	10.02	10.63	9.89	10.48	10.30	10.48
F	0.82	0.56	0.72	0.30	0.57	0.64	0.60	0.33	0.60	0.96	0.61	0.70	0.22	0.66	1.01	0.33	0.53	0.24	0.46	0.69	0.92	0.50	0.64	0.73	1.04	0.83	0.52
Cl	0.07	0.00	0.00	0.22	0.00	0.03	0.10	0.05	0.15	0.07	0.00	0.07	0.05	0.05	0.00	0.05	0.03	0.07	0.00	0.12	0.05	0.03	0.05	0.10	0.07	0.05	0.05
total	49.91	50.43	50.03	49.08	49.52	49.89	50.34	49.71	49.39	50.79	49.88	50.18	48.16	50.64	50.38	49.11	49.94	49.87	49.29	49.38	50.09	49.88	50.41	49.29	50.41	49.92	50.73
P_2O_5	0.00	0.13	0.00	0.13	0.00	0.00	0.13	0.19	0.00	0.00	0.06	0.06	0.13	0.06	0.00	0.00	0.06	0.26	0.00	0.00	0.06	0.00	0.06	0.19	0.32	0.00	0.06
SiO_2	64.74	65.84	65.60	64.92	63.78	65.24	66.09	65.71	63.57	64.48	65.26	65.05	63.74	65.49	66.35	63.81	65.78	66.03	65.38	63.57	64.35	65.54	64.25	63.56	63.92	64.06	65.07
TiO_2	0.00	0.00	0.09	0.12	0.21	0.09	0.09	0.00	0.11	0.14	0.14	0.00	0.02	0.00	0.09	0.00	0.04	0.17	0.02	0.17	0.12	0.17	0.21	0.11	0.23	0.31	0.12
Al_2O_3	11.59	11.44	11.75	12.22	12.37	11.66	11.95	11.50	11.64	12.12	11.56	12.11	11.64	12.13	12.12	12.18	11.88	11.84	11.53	11.24	12.00	11.72	11.79	11.28	12.02	11.69	11.88
FeO	0.36	0.42	0.12	0.06	0.24	0.36	0.24	0.27	0.63	0.21	0.27	0.39	0.00	0.21	0.24	0.00	0.60	0.54	0.21	0.33	0.24	0.03	0.39	0.42	0.21	0.48	0.63
MnO	0.26	0.13	0.13	0.00	0.00	0.19	0.00	0.00	0.06	0.00	0.03	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.10	0.10	0.13	0.10	0.13	0.13	0.03	0.00	0.22
MgO	0.00	0.00	0.07	0.03	0.00	0.02	0.00	0.01	0.00	0.03	0.00	0.01	0.06	0.08	0.07	0.08	0.09	0.00	0.04	0.04	0.05	0.04	0.00	0.00	0.05	0.00	0.03
CaO	1.16	0.81	0.90	0.43	0.95	0.98	0.69	0.52	0.78	1.22	0.69	1.13	0.37	0.96	0.82	0.52	0.31	0.55	0.58	0.81	1.19	0.46	0.96	1.15	1.02	0.78	0.73
Na_2O	2.29	2.03	2.19	1.94	1.80	2.07	2.19	1.91	1.86	2.10	1.99	1.80	1.97	2.22	1.91	2.19	1.95	1.97	1.86	1.78	2.05	2.61	2.12	2.02	1.83	2.01	2.25
K_2O	11.59	12.61	11.89	11.81	12.36	11.84	12.07	12.58	12.32	12.65	12.45	12.19	12.19	12.42	11.63	12.49	12.20	11.96	12.17	12.69	11.94	12.07	12.80	11.91	12.63	12.41	12.63
F	0.82	0.56	0.72	0.30	0.57	0.64	0.60	0.33	0.60	0.96	0.61	0.70	0.21	0.66	1.01	0.33	0.52	0.24	0.45	0.69	0.92	0.50	0.64	0.73	1.04	0.82	0.52
Cl	0.07	0.00	0.00	0.22	0.00	0.03	0.10	0.05	0.15	0.07	0.00	0.07	0.05	0.05	0.00	0.05	0.03	0.07	0.00	0.12	0.05	0.03	0.05	0.10	0.07	0.05	0.05
total	92.51	93.73	93.15	92.01	92.04	92.83	93.86	92.92	91.43	93.56	92.80	93.20	90.28	94.01	93.82	91.56	93.22	93.52	92.14	91.23	92.69	93.05	93.13	91.26	92.91	92.26	93.97
H_2O	7.49	6.27	6.85	7.99	7.96	7.17	6.14	7.08	8.57	6.44	7.20	6.80	9.72	5.99	6.18	8.44	6.78	6.48	7.86	8.77	7.31	6.95	6.87	8.74	7.09	7.74	6.03
recalculated to 100 % total:																											
P_2O_5	0.00	0.14	0.00	0.14	0.00	0.00	0.14	0.21	0.00	0.00	0.07	0.07	0.14	0.07	0.00	0.00	0.07	0.28	0.00	0.00	0.07	0.00	0.07	0.21	0.35	0.00	0.07
SiO_2	69.98	70.24	70.42	70.56	69.29	70.28	70.41	70.71	69.52	68.92	70.32	69.80	70.60	69.66	70.72	69.69	70.56	70.60	70.95	69.68	69.42	70.43	68.99	69.64	68.79	69.43	69.25
TiO_2	0.00	0.00	0.09	0.13	0.23	0.09	0.09	0.00	0.11	0.15	0.15	0.00	0.02	0.00	0.09	0.00	0.04	0.19	0.02	0.19	0.13	0.19	0.22	0.12	0.24	0.34	0.13
Al_2O_3	12.53	12.21	12.62	13.29	13.44	12.56	12.73	12.38	12.73	12.95	12.46	12.99	12.90	12.91	12.92	13.30	12.74	12.66	12.52	12.33	12.94	12.60	12.66	12.36	12.94	12.67	12.64
FeO	0.39	0.45	0.13	0.07	0.26	0.39	0.25	0.29	0.69	0.22	0.29	0.42	0.00	0.22	0.26	0.00	0.64	0.58	0.23	0.36	0.26	0.03	0.42	0.46	0.23	0.52	0.67
MnO	0.28	0.14	0.14	0.00	0.00	0.21	0.00	0.00	0.07	0.00	0.03	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.10	0.10	0.14	0.10	0.14	0.14	0.03	0.00	0.24
MgO	0.00	0.00	0.08	0.03	0.00	0.02	0.00	0.01	0.00	0.03	0.00	0.01	0.07	0.09	0.08	0.09	0.10	0.00	0.04	0.04	0.05	0.04	0.00	0.00	0.05	0.00	0.03
CaO	1.25	0.86	0.97	0.47	1.03	1.05	0.73	0.56	0.85	1.30	0.74	1.21	0.41	1.02	0.88	0.57	0.33	0.59	0.63	0.89	1.28	0.49	1.03	1.26	1.10	0.84	0.78
Na_2O	2.47	2.17	2.35	2.11	1.96	2.22	2.34	2.06	2.03	2.25	2.14	1.93	2.18	2.37	2.04	2.39	2.09	2.11	2.02	1.96	2.21	2.81	2.28	2.21	1.97	2.18	2.40
K_2O	12.53	13.45	12.76	12.84	13.43	12.76	12.86	13.54	13.48	13.52	13.41	13.08	13.50	13.22	12.39	13.64	13.09	12.79	13.20	13.91	12.88	12.98	13.74	13.05	13.59	13.45	13.44
F	0.89	0.60	0.77	0.33	0.62	0.69	0.64	0.35	0.66	1.03	0.65	0.75	0.24	0.71	1.07	0.36	0.56	0.26	0.49	0.76	0.99	0.54	0.68	0.80	1.12	0.89	0.55
Cl	0.08	0.00	0.00	0.24	0.00	0.03	0.10	0.05	0.16	0.08	0.00	0.08	0.05	0.05	0.00	0.05	0.03	0.08	0.00	0.13	0.05	0.03	0.05	0.11	0.08	0.05	0.05

Table 37 (continued)**:** EMP data of glass in Type 5 run G70.

	28	29	30	31	32	33	min	max	mean	σ
P	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.03	0.04
Si	30.81	30.98	30.14	30.27	30.25	30.52	29.71	31.02	30.35	0.40
Ti	0.09	0.10	0.15	0.12	0.05	0.10	0.00	0.19	0.07	0.05
Al	6.22	6.15	6.36	6.29	6.32	6.20	5.95	6.55	6.25	0.14
Fe	0.16	0.30	0.12	0.19	0.23	0.21	0.00	0.49	0.23	0.13
Mn	0.05	0.03	0.00	0.00	0.00	0.05	0.00	0.20	0.05	0.06
Mg	0.00	0.03	0.02	0.01	0.00	0.00	0.00	0.06	0.02	0.02
Ca	0.49	0.68	0.67	0.68	0.76	0.44	0.22	0.87	0.58	0.18
Na	1.38	1.58	1.30	1.65	1.54	1.47	1.30	1.94	1.50	0.13
K	10.51	9.73	10.97	10.40	10.81	10.05	9.62	10.97	10.21	0.33
F	0.69	0.88	0.63	0.79	0.47	0.42	0.22	1.04	0.62	0.21
Cl	0.03	0.03	0.02	0.03	0.12	0.03	0.00	0.22	0.05	0.05
total	50.47	50.49	50.37	50.40	50.56	49.48	48.16	50.79	49.95	0.58
P_2O_5	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.06	0.08
SiO_2	65.91	66.28	64.47	64.76	64.71	65.29	63.56	66.35	64.93	0.86
TiO_2	0.16	0.17	0.24	0.19	0.09	0.17	0.00	0.31	0.11	0.08
Al_2O_3	11.75	11.62	12.02	11.88	11.95	11.72	11.24	12.37	11.81	0.27
FeO	0.21	0.39	0.15	0.24	0.30	0.27	0.00	0.63	0.29	0.17
MnO	0.06	0.03	0.00	0.00	0.00	0.06	0.00	0.26	0.06	0.07
MgO	0.00	0.05	0.03	0.01	0.00	0.00	0.00	0.09	0.03	0.03
CaO	0.69	0.94	0.93	0.95	1.07	0.61	0.31	1.22	0.81	0.25
Na_2O	1.85	2.13	1.76	2.22	2.07	1.98	1.76	2.61	2.03	0.18
K_2O	12.65	11.72	13.22	12.53	13.03	12.11	11.59	13.22	12.30	0.40
F	0.68	0.88	0.63	0.79	0.47	0.42	0.22	1.04	0.62	0.21
Cl	0.03	0.03	0.02	0.03	0.12	0.03	0.00	0.22	0.05	0.05
total	93.83	93.87	93.20	93.25	93.58	92.48	90.28	94.01	92.83	0.93
H_2O	6.17	6.13	6.80	6.75	6.42	7.52	5.99	9.72	7.17	0.93
recalculated to 100 % total:										
P_2O_5	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.07	0.09
SiO_2	70.24	70.60	69.17	69.45	69.15	70.60	68.79	70.95	69.94	0.63
TiO_2	0.17	0.18	0.26	0.21	0.09	0.19	0.00	0.34	0.12	0.09
Al_2O_3	12.52	12.38	12.90	12.74	12.77	12.67	12.21	13.44	12.73	0.28
FeO	0.22	0.42	0.16	0.26	0.32	0.29	0.00	0.69	0.32	0.18
MnO	0.07	0.03	0.00	0.00	0.00	0.07	0.00	0.28	0.06	0.08
MgO	0.00	0.05	0.03	0.01	0.00	0.00	0.00	0.10	0.03	0.03
CaO	0.73	1.01	1.00	1.01	1.14	0.66	0.33	1.30	0.87	0.27
Na_2O	1.98	2.27	1.88	2.38	2.21	2.14	1.88	2.81	2.18	0.19
K_2O	13.49	12.49	14.18	13.44	13.92	13.09	12.39	14.18	13.25	0.43
F	0.73	0.94	0.67	0.85	0.51	0.45	0.24	1.12	0.67	0.23
Cl	0.03	0.03	0.03	0.03	0.13	0.03	0.00	0.24	0.06	0.05

Table 38: EMP data of glass in Type 5 run G3, cooling rate 3 °C /min, 3.5 GPa / 700 °C; 2.8 wt.%.

	1	2	3	4	5	6	7	8	9	10	min	max	mean	σ
P	0.00	0.11	0.03	0.03	0.00	0.03	0.00	0.00	0.00	0.08	0.00	0.11	0.03	0.04
Si	26.88	26.91	27.12	27.02	26.87	27.17	27.54	27.50	27.48	27.37	26.87	27.54	27.18	0.27
Ti	0.14	0.18	0.08	0.15	0.05	0.15	0.00	0.12	0.10	0.08	0.00	0.18	0.10	0.05
Al	5.83	5.50	5.66	5.55	5.57	5.54	5.53	5.43	5.75	5.75	5.43	5.83	5.61	0.13
Fe	0.35	0.07	0.35	0.17	0.19	0.17	0.31	0.31	0.10	0.38	0.07	0.38	0.24	0.11
Mn	0.18	0.00	0.18	0.00	0.10	0.10	0.00	0.10	0.00	0.00	0.00	0.18	0.07	0.07
Mg	0.04	0.00	0.02	0.01	0.02	0.02	0.00	0.00	0.00	0.06	0.00	0.06	0.02	0.02
Ca	1.05	0.95	0.89	1.13	1.37	0.76	1.12	0.95	0.93	0.42	0.42	1.37	0.96	0.25
Na	1.21	1.47	1.35	1.43	1.54	1.33	1.40	1.48	1.52	1.40	1.21	1.54	1.41	0.10
K	10.63	10.20	10.64	10.31	10.74	10.17	10.65	10.15	10.13	10.68	10.13	10.74	10.43	0.26
F	0.65	0.79	0.96	0.84	0.81	0.40	0.76	0.74	0.84	0.50	0.40	0.96	0.73	0.17
Cl	0.02	0.12	0.07	0.03	0.10	0.34	0.07	0.07	0.07	0.15	0.02	0.34	0.11	0.09
total	46.98	46.30	47.34	46.66	47.36	46.16	47.38	46.83	46.92	46.86	46.16	47.38	46.88	0.42
P_2O_5	0.00	0.26	0.06	0.06	0.00	0.06	0.00	0.00	0.00	0.19	0.00	0.26	0.06	0.09
SiO_2	57.49	57.56	58.02	57.80	57.49	58.12	58.91	58.82	58.78	58.56	57.49	58.91	58.16	0.57
TiO_2	0.23	0.30	0.14	0.25	0.09	0.25	0.00	0.19	0.16	0.14	0.00	0.30	0.17	0.09
Al_2O_3	11.01	10.40	10.69	10.49	10.53	10.47	10.45	10.25	10.87	10.85	10.25	11.01	10.60	0.24
FeO	0.46	0.09	0.46	0.21	0.24	0.21	0.39	0.39	0.12	0.49	0.09	0.49	0.31	0.15
MnO	0.23	0.00	0.23	0.00	0.13	0.13	0.00	0.13	0.00	0.00	0.00	0.23	0.08	0.10
MgO	0.07	0.00	0.03	0.02	0.04	0.03	0.00	0.00	0.00	0.09	0.00	0.09	0.03	0.03
CaO	1.48	1.32	1.24	1.58	1.92	1.06	1.57	1.32	1.31	0.58	0.58	1.92	1.34	0.35
Na_2O	1.63	1.99	1.82	1.93	2.07	1.79	1.89	2.00	2.05	1.89	1.63	2.07	1.91	0.13
K_2O	12.80	12.28	12.81	12.42	12.94	12.25	12.83	12.22	12.21	12.86	12.21	12.94	12.56	0.31
F	0.65	0.79	0.96	0.84	0.80	0.39	0.75	0.74	0.84	0.50	0.40	0.96	0.73	0.17
Cl	0.02	0.12	0.07	0.03	0.10	0.34	0.07	0.07	0.07	0.15	0.02	0.34	0.11	0.09
total	85.79	84.75	86.11	85.27	85.99	84.87	86.54	85.82	86.03	86.07	84.75	86.54	85.72	0.58
H_2O	14.21	15.25	13.89	14.73	14.01	15.13	13.46	14.18	13.97	13.93	13.46	15.25	14.28	0.58
recalculated to 100 % total:														
P_2O_5	0.00	0.30	0.07	0.08	0.00	0.08	0.00	0.00	0.00	0.22	0.00	0.30	0.08	0.11
SiO_2	67.02	67.92	67.37	67.79	66.86	68.48	68.07	68.54	68.32	68.04	66.86	68.54	67.84	0.59
TiO_2	0.27	0.35	0.16	0.29	0.10	0.29	0.00	0.23	0.18	0.16	0.00	0.35	0.20	0.10
Al_2O_3	12.83	12.27	12.42	12.30	12.25	12.34	12.08	11.95	12.63	12.61	11.95	12.83	12.37	0.27
FeO	0.53	0.11	0.53	0.25	0.28	0.25	0.46	0.46	0.14	0.57	0.11	0.57	0.36	0.17
MnO	0.26	0.00	0.26	0.00	0.15	0.15	0.00	0.15	0.00	0.00	0.00	0.26	0.10	0.11
MgO	0.09	0.00	0.03	0.02	0.04	0.03	0.00	0.00	0.00	0.11	0.00	0.11	0.03	0.04
CaO	1.72	1.56	1.44	1.86	2.23	1.25	1.81	1.54	1.52	0.68	0.68	2.23	1.56	0.41
Na_2O	1.90	2.34	2.12	2.26	2.41	2.11	2.18	2.33	2.38	2.19	1.90	2.41	2.22	0.16
K_2O	14.92	14.49	14.88	14.57	15.04	14.43	14.83	14.24	14.19	14.94	14.19	15.04	14.65	0.31
F	0.76	0.93	1.11	0.99	0.94	0.47	0.87	0.86	0.97	0.58	0.47	1.11	0.85	0.20
Cl	0.03	0.15	0.08	0.03	0.11	0.41	0.08	0.09	0.09	0.17	0.03	0.41	0.12	0.11

Table 39: EMP data of glass in Type 5 run Q2 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.7 wt.%.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	min	max	mean	σ
P	0.06	0.29	0.33	0.35	0.33	0.27	0.29	0.15	0.38	0.21	0.15	0.38	0.35	0.27	0.24	0.06	0.38	0.27	0.10
Si	29.02	28.53	29.15	29.15	28.93	28.57	28.52	28.72	28.58	28.72	29.00	28.19	28.88	28.57	28.44	28.19	29.15	28.73	0.28
Ti	0.11	0.00	0.14	0.00	0.05	0.00	0.01	0.00	0.06	0.11	0.04	0.09	0.00	0.01	0.00	0.00	0.14	0.04	0.05
Al	6.87	6.91	7.00	6.81	7.00	6.79	6.86	7.08	6.78	7.05	6.92	6.52	6.83	6.86	6.72	6.52	7.08	6.87	0.14
Fe	0.12	0.07	0.19	0.07	0.32	0.17	0.15	0.10	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.08	0.09
Mn	0.05	0.05	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.08	0.00	0.10	0.02	0.03
Mg	0.00	0.00	0.02	0.00	0.03	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.04	0.01	0.01
Ca	0.00	0.00	0.00	0.01	0.10	0.00	0.00	0.05	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.10	0.01	0.03
Na	1.43	1.74	1.51	1.65	1.66	1.57	1.43	1.72	1.52	1.42	1.63	1.68	1.63	1.87	1.76	1.42	1.87	1.61	0.13
K	9.90	9.78	9.27	9.09	9.42	10.12	9.39	9.52	9.80	9.48	9.93	9.71	9.87	9.90	9.74	9.09	10.12	9.66	0.29
F	0.53	0.56	0.59	0.49	0.45	0.39	0.37	0.45	0.29	0.50	0.39	0.55	0.78	0.42	0.50	0.29	0.78	0.48	0.11
Cl	0.08	0.00	0.00	0.05	0.08	0.00	0.00	0.00	0.13	0.00	0.00	0.05	0.05	0.00	0.08	0.00	0.13	0.04	0.04
total	48.16	47.93	48.20	47.70	48.34	47.88	47.07	47.78	47.64	47.48	48.12	47.28	48.39	47.94	47.55	47.07	48.39	47.83	0.38
P_2O_5	0.14	0.68	0.74	0.81	0.74	0.61	0.68	0.34	0.88	0.47	0.34	0.88	0.81	0.61	0.54	0.14	0.88	0.62	0.22
SiO_2	62.09	61.03	62.37	62.36	61.89	61.11	61.01	61.44	61.15	61.44	62.05	60.31	61.79	61.11	60.83	60.31	62.37	61.47	0.60
TiO_2	0.18	0.00	0.23	0.00	0.08	0.00	0.02	0.00	0.10	0.18	0.06	0.16	0.00	0.02	0.00	0.00	0.23	0.07	0.08
Al_2O_3	12.97	13.05	13.23	12.87	13.22	12.84	12.97	13.38	12.80	13.33	13.07	12.33	12.90	12.97	12.70	12.33	13.38	12.97	0.27
FeO	0.16	0.09	0.25	0.09	0.41	0.22	0.19	0.12	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.11	0.12
MnO	0.07	0.07	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.10	0.00	0.13	0.03	0.04
MgO	0.00	0.00	0.04	0.00	0.05	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.07	0.01	0.02
CaO	0.00	0.00	0.00	0.02	0.14	0.00	0.00	0.07	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.14	0.02	0.04
Na_2O	1.93	2.34	2.03	2.23	2.23	2.11	1.92	2.32	2.05	1.92	2.20	2.26	2.20	2.52	2.37	1.92	2.52	2.18	0.18
K_2O	11.93	11.78	11.16	10.95	11.34	12.19	11.31	11.47	11.81	11.42	11.97	11.69	11.89	11.93	11.74	10.95	12.19	11.64	0.35
F	0.53	0.56	0.59	0.49	0.45	0.39	0.37	0.45	0.29	0.50	0.39	0.55	0.77	0.42	0.50	0.29	0.78	0.48	0.11
Cl	0.08	0.00	0.00	0.05	0.08	0.00	0.00	0.00	0.13	0.00	0.00	0.05	0.05	0.00	0.08	0.00	0.13	0.04	0.04
total	89.82	89.36	90.40	89.66	90.41	89.31	88.38	89.40	89.18	89.04	89.99	88.12	90.08	89.46	88.63	88.12	90.41	89.42	0.68
H_2O	10.18	10.64	9.60	10.34	9.59	10.69	11.62	10.60	10.82	10.96	10.01	11.88	9.92	10.54	11.37	9.59	11.88	10.58	0.68
recalculated to 100 % total:																			
P_2O_5	0.15	0.76	0.82	0.91	0.82	0.68	0.76	0.38	0.98	0.53	0.38	0.99	0.90	0.68	0.61	0.15	0.99	0.69	0.24
SiO_2	69.13	68.30	68.99	69.55	68.45	68.43	69.03	68.72	68.57	69.00	68.95	68.45	68.60	68.31	68.64	68.30	69.55	68.74	0.36
TiO_2	0.20	0.00	0.26	0.00	0.08	0.00	0.02	0.00	0.11	0.20	0.06	0.18	0.00	0.02	0.00	0.00	0.26	0.08	0.09
Al_2O_3	14.44	14.60	14.64	14.35	14.62	14.38	14.67	14.97	14.36	14.97	14.53	13.99	14.32	14.49	14.33	13.99	14.97	14.51	0.25
FeO	0.17	0.11	0.28	0.10	0.45	0.24	0.21	0.14	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.12	0.13
MnO	0.07	0.07	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.11	0.00	0.15	0.03	0.05
MgO	0.00	0.00	0.04	0.00	0.05	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.07	0.02	0.03
CaO	0.00	0.00	0.00	0.02	0.15	0.00	0.00	0.08	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.15	0.02	0.05
Na_2O	2.15	2.62	2.25	2.49	2.47	2.37	2.17	2.60	2.30	2.15	2.44	2.57	2.44	2.81	2.68	2.15	2.81	2.43	0.20
K_2O	13.28	13.19	12.35	12.22	12.55	13.65	12.80	12.83	13.24	12.82	13.30	13.27	13.20	13.34	13.24	12.22	13.65	13.02	0.41
F	0.59	0.62	0.65	0.55	0.49	0.44	0.42	0.50	0.33	0.56	0.44	0.62	0.86	0.47	0.56	0.33	0.86	0.54	0.13
Cl	0.09	0.00	0.00	0.06	0.09	0.00	0.00	0.00	0.15	0.00	0.00	0.06	0.06	0.00	0.09	0.00	0.15	0.04	0.05

Table 40: EMP data of glass in Type 5 run G85 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.8 wt.%; 21 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	min	max	mean	σ
P	0.58	0.20	0.35	0.12	0.18	0.29	0.41	0.26	0.26	0.12	0.44	0.14	0.18	0.20	0.29	0.12	0.41	0.26	0.29	0.26	0.09	0.09	0.58	0.26	0.13
Si	28.05	28.42	27.60	28.41	28.66	28.51	28.14	28.15	28.90	27.83	28.31	27.78	28.58	28.25	28.28	28.86	28.29	27.94	27.56	27.93	28.53	27.56	28.90	28.24	0.38
Ti	0.49	0.14	0.21	0.19	0.15	0.07	0.05	0.13	0.14	0.17	0.14	0.21	0.02	0.04	0.10	0.08	0.21	0.21	0.12	0.17	0.05	0.02	0.49	0.15	0.10
Al	4.09	5.51	5.17	5.22	5.39	5.54	5.29	5.74	5.47	5.40	5.50	5.16	5.06	5.29	5.46	5.63	5.57	5.57	5.49	5.24	5.98	4.09	5.98	5.37	0.36
Fe	0.44	0.07	0.46	0.39	0.44	0.36	0.36	0.32	0.46	0.46	0.27	0.39	0.39	0.58	0.39	0.19	0.46	0.43	0.36	0.41	0.34	0.07	0.58	0.38	0.11
Mn	0.00	0.13	0.15	0.05	0.08	0.15	0.20	0.13	0.03	0.18	0.28	0.08	0.10	0.05	0.23	0.00	0.00	0.15	0.15	0.00	0.00	0.00	0.28	0.10	0.08
Mg	0.00	0.00	0.01	0.01	0.04	0.04	0.04	0.03	0.01	0.00	0.00	0.08	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.08	0.01	0.02
Ca	0.00	0.16	0.02	0.01	0.04	0.00	0.00	0.04	0.01	0.00	0.16	0.16	0.00	0.13	0.06	0.05	0.02	0.02	0.00	0.13	0.04	0.00	0.16	0.05	0.06
Na	2.27	1.49	1.93	1.65	1.78	1.98	2.15	1.97	1.88	2.01	1.91	2.13	1.69	1.90	1.63	1.86	1.78	1.71	1.99	1.95	1.61	1.49	2.27	1.87	0.20
K	10.92	11.26	11.46	10.93	11.09	11.15	10.90	10.78	11.16	11.30	10.98	10.97	11.34	11.03	11.34	10.95	11.05	11.52	11.45	11.00	11.13	10.78	11.52	11.13	0.21
F	1.68	1.33	1.43	1.09	1.59	1.71	1.33	1.33	1.33	1.37	1.26	1.44	1.20	1.63	1.46	1.32	1.51	1.58	1.35	1.25	1.37	1.09	1.71	1.41	0.16
Cl	0.00	0.00	0.03	0.11	0.11	0.00	0.00	0.11	0.08	0.00	0.13	0.13	0.00	0.26	0.03	0.11	0.11	0.11	0.18	0.08	0.05	0.00	0.26	0.08	0.07
total	48.50	48.70	48.82	48.17	49.53	49.81	48.87	48.97	49.73	48.84	49.35	48.67	48.55	49.37	49.29	49.18	49.40	49.50	48.94	48.45	49.18	48.17	49.81	49.04	0.45
P_2O_5	1.33	0.47	0.80	0.27	0.40	0.67	0.93	0.60	0.60	0.27	1.00	0.33	0.40	0.47	0.67	0.27	0.93	0.60	0.66	0.60	0.20	0.20	1.33	0.59	0.29
SiO_2	60.00	60.80	59.05	60.79	61.32	61.00	60.21	60.22	61.83	59.54	60.56	59.44	61.14	60.43	60.50	61.73	60.52	59.76	58.97	59.75	61.03	58.97	61.83	60.41	0.80
TiO_2	0.81	0.23	0.35	0.31	0.25	0.12	0.08	0.21	0.23	0.29	0.23	0.35	0.04	0.06	0.17	0.14	0.35	0.35	0.19	0.29	0.08	0.04	0.81	0.24	0.16
Al_2O_3	7.73	10.41	9.77	9.86	10.19	10.46	10.00	10.85	10.33	10.21	10.39	9.75	9.56	10.00	10.33	10.63	10.53	10.53	10.37	9.90	11.30	7.73	11.30	10.15	0.68
FeO	0.56	0.09	0.59	0.50	0.56	0.47	0.47	0.41	0.59	0.59	0.34	0.50	0.50	0.75	0.50	0.25	0.59	0.56	0.47	0.53	0.43	0.09	0.75	0.49	0.14
MnO	0.00	0.16	0.20	0.07	0.10	0.19	0.26	0.16	0.03	0.23	0.36	0.10	0.13	0.06	0.29	0.00	0.00	0.19	0.19	0.00	0.00	0.00	0.36	0.13	0.11
MgO	0.00	0.00	0.01	0.02	0.06	0.06	0.06	0.05	0.02	0.00	0.00	0.14	0.00	0.00	0.04	0.02	0.00	0.00	0.00	0.03	0.00	0.00	0.14	0.02	0.03
CaO	0.00	0.22	0.03	0.02	0.05	0.00	0.00	0.05	0.02	0.00	0.22	0.22	0.00	0.19	0.08	0.07	0.03	0.03	0.00	0.19	0.05	0.00	0.22	0.07	0.08
Na_2O	3.06	2.01	2.61	2.23	2.40	2.67	2.90	2.66	2.53	2.71	2.57	2.88	2.27	2.57	2.20	2.51	2.40	2.30	2.68	2.62	2.16	2.01	3.06	2.52	0.26
K_2O	13.15	13.56	13.80	13.17	13.36	13.44	13.13	12.98	13.45	13.61	13.22	13.21	13.66	13.29	13.66	13.19	13.31	13.88	13.79	13.25	13.41	12.98	13.88	13.41	0.25
F	1.68	1.32	1.43	1.09	1.59	1.71	1.33	1.33	1.33	1.37	1.26	1.44	1.20	1.63	1.46	1.32	1.51	1.58	1.35	1.25	1.37	1.09	1.71	1.41	0.16
Cl	0.00	0.00	0.03	0.11	0.11	0.00	0.00	0.11	0.08	0.00	0.13	0.13	0.00	0.26	0.03	0.11	0.11	0.11	0.18	0.08	0.05	0.00	0.26	0.08	0.07
total	87.61	88.71	88.05	87.93	89.69	90.06	88.81	89.04	90.46	88.23	89.72	87.84	88.40	88.96	89.30	89.66	89.61	89.20	88.25	87.95	89.50	87.61	90.46	88.90	0.81
H_2O	12.39	11.29	11.95	12.07	10.31	9.94	11.19	10.96	9.54	11.77	10.28	12.16	11.60	11.04	10.70	10.34	10.39	10.80	11.75	12.05	10.50	9.54	12.39	11.10	0.81
recalculated to 100 % total:																									
P_2O_5	1.52	0.53	0.91	0.30	0.45	0.74	1.05	0.67	0.66	0.30	1.11	0.38	0.45	0.53	0.75	0.30	1.04	0.67	0.75	0.68	0.22	0.22	1.52	0.67	0.32
SiO_2	68.48	68.53	67.06	69.13	68.37	67.73	67.80	67.63	68.35	67.48	67.50	67.66	69.17	67.94	67.75	68.86	67.53	67.00	66.82	67.94	68.19	66.82	69.17	67.95	0.66
TiO_2	0.93	0.26	0.39	0.35	0.28	0.13	0.09	0.24	0.26	0.33	0.26	0.40	0.04	0.07	0.19	0.15	0.39	0.39	0.22	0.33	0.09	0.04	0.93	0.27	0.19
Al_2O_3	8.82	11.74	11.09	11.21	11.36	11.62	11.27	12.19	11.42	11.57	11.58	11.10	10.81	11.24	11.56	11.86	11.75	11.80	11.75	11.26	12.62	8.82	12.62	11.41	0.72
FeO	0.64	0.11	0.67	0.57	0.62	0.52	0.53	0.46	0.65	0.67	0.38	0.57	0.56	0.84	0.56	0.28	0.66	0.63	0.53	0.60	0.49	0.11	0.84	0.55	0.15
MnO	0.00	0.18	0.22	0.07	0.11	0.22	0.29	0.18	0.04	0.26	0.40	0.11	0.15	0.07	0.33	0.00	0.00	0.22	0.22	0.00	0.00	0.00	0.40	0.15	0.12
MgO	0.00	0.00	0.01	0.02	0.06	0.06	0.07	0.05	0.02	0.00	0.00	0.15	0.00	0.00	0.04	0.02	0.00	0.00	0.00	0.03	0.00	0.00	0.15	0.03	0.04
CaO	0.00	0.25	0.04	0.02	0.06	0.00	0.00	0.06	0.02	0.00	0.24	0.25	0.00	0.21	0.09	0.07	0.04	0.04	0.00	0.21	0.06	0.00	0.25	0.08	0.09
Na_2O	3.49	2.26	2.96	2.53	2.68	2.97	3.26	2.99	2.80	3.07	2.86	3.27	2.57	2.88	2.46	2.80	2.68	2.58	3.04	2.98	2.42	2.26	3.49	2.84	0.31
K_2O	15.01	15.28	15.68	14.97	14.89	14.92	14.79	14.58	14.87	15.42	14.74	15.04	15.45	14.94	15.30	14.71	14.85	15.56	15.63	15.07	14.98	14.58	15.68	15.08	0.32
F	1.92	1.49	1.63	1.24	1.77	1.90	1.50	1.49	1.47	1.55	1.41	1.64	1.35	1.84	1.64	1.48	1.69	1.77	1.53	1.42	1.53	1.24	1.92	1.58	0.18
Cl	0.00	0.00	0.03	0.12	0.12	0.00	0.00	0.12	0.09	0.00	0.15	0.15	0.00	0.29	0.03	0.12	0.12	0.12	0.21	0.09	0.06	0.00	0.29	0.09	0.08

Table 41: EMP data of glass in Type 5 run G82 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.8 wt.%; 22 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	min	max	mean	σ
P	0.56	0.67	0.21	0.29	0.29	0.24	0.44	0.47	0.29	0.15	0.24	0.23	0.18	0.23	0.35	0.26	0.18	0.35	0.38	0.44	0.35	0.23	0.15	0.67	0.32	0.13
Si	29.00	28.80	29.32	29.43	29.21	29.22	29.15	28.84	29.26	29.39	29.34	28.75	28.48	29.16	29.43	28.91	28.73	28.72	29.12	28.79	29.09	28.58	28.48	29.43	29.03	0.29
Ti	0.18	0.25	0.09	0.09	0.16	0.16	0.09	0.24	0.09	0.13	0.00	0.05	0.23	0.24	0.05	0.09	0.10	0.17	0.05	0.16	0.00	0.07	0.00	0.25	0.12	0.08
Al	6.68	6.54	6.74	6.61	6.54	6.81	6.67	6.56	6.38	6.79	6.64	6.72	6.38	6.50	6.69	6.59	6.78	6.74	6.91	7.08	6.78	6.82	6.38	7.08	6.68	0.16
Fe	0.05	0.10	0.19	0.12	0.12	0.22	0.17	0.19	0.29	0.27	0.07	0.31	0.14	0.29	0.02	0.10	0.19	0.17	0.17	0.02	0.14	0.10	0.02	0.31	0.16	0.08
Mn	0.18	0.08	0.00	0.00	0.10	0.15	0.00	0.00	0.03	0.08	0.00	0.07	0.03	0.18	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.18	0.04	0.06
Mg	0.03	0.03	0.00	0.00	0.00	0.04	0.00	0.00	0.06	0.00	0.00	0.03	0.03	0.00	0.01	0.00	0.00	0.02	0.02	0.03	0.00	0.00	0.00	0.06	0.01	0.02
Ca	0.04	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.05	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.10	0.00	0.00	0.02	0.00	0.00	0.10	0.02	0.03
Na	2.02	1.97	1.89	1.81	1.80	1.96	2.01	1.94	1.91	2.09	1.62	1.94	2.03	1.59	1.86	1.79	1.92	2.02	1.80	1.88	1.78	1.88	1.59	2.09	1.89	0.13
K	9.85	9.64	10.04	9.41	10.26	9.79	10.00	9.81	10.03	9.74	9.43	10.27	10.38	9.55	10.11	10.13	9.83	9.84	9.78	10.04	9.47	10.46	9.41	10.46	9.90	0.30
F	1.21	1.17	0.83	0.54	0.82	0.82	1.24	0.85	0.86	0.89	0.75	0.88	1.00	0.88	0.84	0.81	0.82	0.85	0.83	0.67	0.85	0.68	0.54	1.24	0.87	0.16
Cl	0.00	0.11	0.00	0.00	0.00	0.03	0.00	0.08	0.03	0.16	0.08	0.11	0.08	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.08	0.11	0.00	0.16	0.04	0.05
total	49.77	49.40	49.31	48.32	49.31	49.43	49.77	48.99	49.29	49.73	48.17	49.35	48.96	48.63	49.37	48.73	48.54	48.98	49.08	49.11	48.57	48.92	48.17	49.77	49.08	0.45
P_2O_5	1.28	1.54	0.47	0.67	0.67	0.54	1.01	1.07	0.67	0.34	0.54	0.54	0.40	0.54	0.81	0.60	0.40	0.80	0.87	1.01	0.81	0.54	0.34	1.54	0.73	0.30
SiO_2	62.03	61.60	62.73	62.97	62.49	62.51	62.36	61.70	62.60	62.88	62.77	61.50	60.92	62.39	62.96	61.85	61.45	61.44	62.29	61.58	62.23	61.14	60.92	62.97	62.11	0.62
TiO_2	0.31	0.42	0.15	0.16	0.27	0.27	0.15	0.41	0.15	0.21	0.00	0.08	0.39	0.40	0.08	0.15	0.17	0.29	0.08	0.27	0.00	0.12	0.00	0.42	0.21	0.13
Al_2O_3	12.62	12.35	12.74	12.50	12.36	12.86	12.60	12.39	12.06	12.84	12.55	12.69	12.05	12.28	12.64	12.46	12.80	12.74	13.06	13.37	12.82	12.88	12.05	13.37	12.62	0.31
FeO	0.06	0.12	0.25	0.16	0.16	0.28	0.22	0.25	0.37	0.34	0.09	0.40	0.19	0.37	0.03	0.12	0.25	0.22	0.22	0.03	0.19	0.12	0.03	0.40	0.20	0.11
MnO	0.23	0.10	0.00	0.00	0.13	0.19	0.00	0.00	0.03	0.10	0.00	0.10	0.03	0.23	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.23	0.05	0.08
MgO	0.05	0.05	0.00	0.00	0.00	0.07	0.00	0.00	0.09	0.00	0.00	0.05	0.05	0.00	0.02	0.00	0.00	0.03	0.03	0.05	0.00	0.00	0.00	0.09	0.02	0.03
CaO	0.05	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.07	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.13	0.00	0.00	0.03	0.00	0.00	0.13	0.02	0.04
Na_2O	2.72	2.66	2.55	2.45	2.43	2.64	2.71	2.62	2.57	2.82	2.19	2.61	2.74	2.14	2.51	2.41	2.58	2.73	2.42	2.54	2.40	2.53	2.14	2.82	2.54	0.17
K_2O	11.86	11.61	12.09	11.34	12.36	11.79	12.05	11.82	12.09	11.73	11.35	12.37	12.50	11.51	12.18	12.20	11.84	11.85	11.78	12.09	11.40	12.60	11.34	12.60	11.93	0.36
F	1.21	1.17	0.83	0.54	0.81	0.82	1.24	0.85	0.86	0.89	0.75	0.88	0.99	0.88	0.84	0.81	0.82	0.85	0.83	0.67	0.85	0.68	0.54	1.24	0.87	0.16
Cl	0.00	0.11	0.00	0.00	0.00	0.03	0.00	0.08	0.03	0.16	0.08	0.11	0.08	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.08	0.11	0.00	0.16	0.04	0.05
total	91.90	91.29	91.47	90.55	91.34	91.65	91.81	90.81	91.25	91.96	89.99	90.92	89.92	90.37	91.71	90.31	89.98	90.73	91.26	91.32	90.43	90.40	89.92	91.96	90.97	0.66
H_2O	8.10	8.71	8.53	9.45	8.66	8.35	8.19	9.19	8.75	8.04	10.01	9.08	10.08	9.63	8.29	9.69	10.02	9.27	8.74	8.68	9.57	9.60	8.04	10.08	9.03	0.66
recalculated to 100 % total:																										
P_2O_5	1.39	1.69	0.52	0.74	0.74	0.59	1.10	1.18	0.74	0.37	0.60	0.59	0.45	0.59	0.88	0.67	0.45	0.89	0.96	1.10	0.89	0.59	0.37	1.69	0.80	0.33
SiO_2	67.50	67.48	68.59	69.54	68.42	68.21	67.92	67.95	68.60	68.38	69.75	67.64	67.74	69.03	68.65	68.49	68.30	67.72	68.25	67.43	68.82	67.63	67.43	69.75	68.27	0.64
TiO_2	0.33	0.46	0.17	0.17	0.30	0.29	0.17	0.45	0.17	0.23	0.00	0.08	0.43	0.45	0.08	0.17	0.19	0.32	0.08	0.29	0.00	0.13	0.00	0.46	0.23	0.14
Al_2O_3	13.73	13.53	13.93	13.80	13.53	14.03	13.72	13.64	13.22	13.96	13.95	13.96	13.41	13.59	13.78	13.79	14.23	14.04	14.31	14.64	14.17	14.25	13.22	14.64	13.87	0.33
FeO	0.07	0.14	0.27	0.17	0.17	0.30	0.24	0.27	0.41	0.37	0.10	0.44	0.21	0.41	0.03	0.14	0.28	0.24	0.24	0.03	0.21	0.14	0.03	0.44	0.22	0.12
MnO	0.25	0.11	0.00	0.00	0.14	0.21	0.00	0.00	0.04	0.11	0.00	0.11	0.04	0.25	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.25	0.06	0.09
MgO	0.05	0.05	0.00	0.00	0.00	0.07	0.00	0.00	0.10	0.00	0.00	0.05	0.05	0.00	0.02	0.00	0.00	0.03	0.03	0.05	0.00	0.00	0.00	0.10	0.02	0.03
CaO	0.05	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.07	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.15	0.00	0.00	0.04	0.00	0.00	0.15	0.02	0.04
Na_2O	2.96	2.91	2.79	2.70	2.66	2.88	2.96	2.88	2.82	3.06	2.43	2.87	3.05	2.37	2.73	2.67	2.87	3.01	2.65	2.78	2.65	2.80	2.37	3.06	2.80	0.18
K_2O	12.91	12.72	13.22	12.52	13.53	12.87	13.12	13.02	13.24	12.76	12.62	13.61	13.90	12.73	13.28	13.51	13.15	13.06	12.91	13.24	12.61	13.94	12.52	13.94	13.11	0.40
F	1.31	1.28	0.91	0.60	0.89	0.90	1.35	0.93	0.94	0.97	0.83	0.97	1.11	0.97	0.91	0.89	0.92	0.93	0.91	0.73	0.94	0.75	0.60	1.35	0.95	0.18
Cl	0.00	0.12	0.00	0.00	0.00	0.03	0.00	0.09	0.03	0.17	0.09	0.12	0.09	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.09	0.12	0.00	0.17	0.04	0.05

Table 42: EMP data of glass in Type 5 run G26 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.8 wt.%; 23 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	min	max	mean	σ
P	0.11	0.28	0.23	0.28	0.25	0.40	0.20	0.29	0.38	0.03	0.21	0.12	0.15	0.20	0.26	0.23	0.18	0.14	0.09	0.29	0.03	0.12	0.06	0.03	0.40	0.20	0.10
Si	29.21	28.65	28.61	29.02	28.83	29.18	29.48	28.84	29.19	29.28	29.29	29.08	29.26	29.23	29.21	28.67	29.23	28.69	28.74	28.97	29.32	28.92	29.26	28.61	29.48	29.05	0.26
Ti	0.01	0.06	0.08	0.09	0.11	0.04	0.07	0.00	0.08	0.07	0.01	0.02	0.10	0.00	0.08	0.05	0.00	0.00	0.02	0.09	0.03	0.00	0.05	0.00	0.11	0.05	0.04
Al	6.90	6.59	6.42	6.54	6.63	6.49	6.78	6.68	6.72	6.60	6.70	6.54	6.60	6.54	6.53	6.35	6.74	6.54	6.68	6.40	6.38	6.34	6.67	6.34	6.90	6.58	0.14
Fe	0.21	0.05	0.16	0.28	0.02	0.26	0.07	0.24	0.07	0.00	0.19	0.24	0.19	0.26	0.10	0.24	0.12	0.12	0.31	0.19	0.12	0.29	0.19	0.00	0.31	0.17	0.09
Mn	0.00	0.10	0.10	0.12	0.07	0.00	0.05	0.00	0.13	0.00	0.00	0.00	0.03	0.00	0.13	0.10	0.07	0.07	0.10	0.05	0.10	0.03	0.15	0.00	0.15	0.06	0.05
Mg	0.06	0.01	0.05	0.07	0.01	0.02	0.03	0.03	0.02	0.00	0.00	0.03	0.00	0.01	0.00	0.02	0.00	0.00	0.05	0.05	0.05	0.00	0.00	0.00	0.07	0.02	0.02
Ca	0.00	0.40	0.11	0.03	0.00	0.00	0.00	0.07	0.02	0.00	0.14	0.05	0.06	0.02	0.08	0.06	0.12	0.00	0.00	0.11	0.07	0.05	0.05	0.00	0.40	0.06	0.09
Na	2.00	1.91	1.95	1.80	1.89	1.75	1.91	1.75	1.80	1.57	2.04	1.56	1.71	1.91	1.85	1.59	1.68	1.78	1.55	1.85	2.15	1.81	1.49	1.49	2.15	1.80	0.17
K	10.22	10.17	9.96	10.68	10.36	10.49	10.02	10.35	9.60	10.05	9.59	10.45	9.88	10.62	10.57	10.63	9.80	10.78	10.02	10.27	10.09	10.43	9.96	9.59	10.78	10.22	0.34
F	0.49	0.69	0.73	0.84	0.49	0.71	0.83	0.57	0.60	0.63	0.64	0.63	0.87	0.75	0.73	0.66	0.50	0.67	0.74	0.80	0.77	0.83	0.61	0.49	0.87	0.69	0.11
Cl	0.00	0.27	0.00	0.10	0.00	0.00	0.00	0.11	0.11	0.05	0.08	0.03	0.00	0.00	0.05	0.16	0.08	0.08	0.05	0.03	0.05	0.08	0.00	0.00	0.27	0.06	0.06
total	49.22	49.19	48.41	49.85	48.67	49.32	49.44	48.92	48.72	48.29	48.91	48.73	48.84	49.56	49.58	48.76	48.53	48.87	48.35	49.10	49.17	48.89	48.48	48.29	49.85	48.95	0.42
P_2O_5	0.26	0.65	0.52	0.65	0.58	0.91	0.45	0.67	0.87	0.07	0.47	0.27	0.33	0.47	0.60	0.53	0.40	0.33	0.20	0.67	0.07	0.27	0.13	0.07	0.91	0.45	0.23
SiO_2	62.49	61.30	61.20	62.07	61.69	62.42	63.06	61.70	62.45	62.64	62.67	62.21	62.60	62.53	62.49	61.33	62.54	61.37	61.48	61.97	62.73	61.87	62.60	61.20	63.06	62.15	0.55
TiO_2	0.02	0.11	0.14	0.16	0.18	0.07	0.12	0.00	0.13	0.12	0.02	0.04	0.17	0.00	0.13	0.08	0.00	0.00	0.04	0.15	0.06	0.00	0.08	0.00	0.18	0.08	0.06
Al_2O_3	13.04	12.46	12.13	12.36	12.52	12.27	12.80	12.61	12.69	12.47	12.67	12.35	12.47	12.36	12.33	12.00	12.74	12.36	12.63	12.10	12.05	11.98	12.60	11.98	13.04	12.43	0.27
FeO	0.27	0.06	0.21	0.36	0.03	0.33	0.09	0.31	0.09	0.00	0.25	0.31	0.25	0.34	0.12	0.31	0.15	0.15	0.40	0.25	0.15	0.37	0.25	0.00	0.40	0.22	0.12
MnO	0.00	0.13	0.13	0.16	0.10	0.00	0.06	0.00	0.16	0.00	0.00	0.00	0.03	0.00	0.16	0.13	0.10	0.10	0.13	0.06	0.13	0.03	0.19	0.00	0.19	0.08	0.07
MgO	0.10	0.02	0.08	0.11	0.02	0.03	0.05	0.05	0.04	0.00	0.00	0.06	0.00	0.02	0.00	0.04	0.00	0.00	0.08	0.08	0.08	0.00	0.00	0.00	0.11	0.04	0.04
CaO	0.00	0.57	0.15	0.05	0.00	0.00	0.00	0.10	0.03	0.00	0.20	0.07	0.08	0.03	0.12	0.08	0.17	0.00	0.00	0.15	0.10	0.07	0.07	0.00	0.57	0.09	0.12
Na_2O	2.69	2.58	2.63	2.43	2.54	2.36	2.58	2.36	2.43	2.12	2.76	2.11	2.30	2.58	2.49	2.14	2.27	2.39	2.09	2.50	2.89	2.44	2.00	2.00	2.89	2.42	0.23
K_2O	12.31	12.25	12.00	12.86	12.48	12.64	12.07	12.47	11.56	12.11	11.56	12.58	11.90	12.79	12.73	12.81	11.81	12.99	12.07	12.37	12.16	12.57	12.00	11.56	12.99	12.31	0.41
F	0.49	0.69	0.73	0.84	0.49	0.71	0.83	0.56	0.60	0.63	0.64	0.62	0.87	0.75	0.73	0.66	0.50	0.67	0.74	0.80	0.77	0.82	0.61	0.49	0.87	0.69	0.11
Cl	0.00	0.27	0.00	0.10	0.00	0.00	0.00	0.11	0.11	0.05	0.08	0.03	0.00	0.00	0.05	0.16	0.08	0.08	0.05	0.03	0.05	0.08	0.00	0.00	0.27	0.06	0.06
total	91.47	90.72	89.63	91.76	90.42	91.42	91.78	90.68	90.89	89.92	91.02	90.37	90.65	91.56	91.64	89.95	90.52	90.14	89.59	90.78	90.91	90.14	90.27	89.59	91.78	90.70	0.67
H_2O	8.53	9.28	10.37	8.24	9.58	8.58	8.22	9.32	9.11	10.08	8.98	9.63	9.35	8.44	8.36	10.05	9.48	9.86	10.41	9.22	9.09	9.86	9.73	8.22	10.41	9.30	0.67
recalculated to 100 % total:																											
P_2O_5	0.28	0.71	0.58	0.70	0.64	0.99	0.49	0.74	0.96	0.07	0.52	0.30	0.37	0.51	0.66	0.59	0.44	0.37	0.23	0.73	0.07	0.30	0.15	0.07	0.99	0.50	0.26
SiO_2	68.32	67.57	68.28	67.65	68.22	68.28	68.71	68.05	68.71	69.66	68.85	68.84	69.06	68.30	68.19	68.18	69.09	68.09	68.63	68.26	69.00	68.63	69.34	67.57	69.66	68.52	0.51
TiO_2	0.02	0.12	0.16	0.17	0.19	0.08	0.13	0.00	0.15	0.13	0.02	0.04	0.19	0.00	0.15	0.09	0.00	0.00	0.04	0.17	0.06	0.00	0.09	0.00	0.19	0.09	0.07
Al_2O_3	14.25	13.73	13.54	13.47	13.85	13.42	13.95	13.91	13.96	13.87	13.92	13.66	13.76	13.50	13.46	13.34	14.08	13.71	14.09	13.33	13.26	13.29	13.95	13.26	14.25	13.71	0.29
FeO	0.30	0.07	0.24	0.39	0.03	0.36	0.10	0.34	0.10	0.00	0.27	0.34	0.27	0.37	0.13	0.34	0.17	0.17	0.45	0.27	0.17	0.41	0.27	0.00	0.45	0.24	0.13
MnO	0.00	0.14	0.14	0.17	0.11	0.00	0.07	0.00	0.18	0.00	0.00	0.00	0.04	0.00	0.18	0.14	0.11	0.11	0.15	0.07	0.14	0.04	0.22	0.00	0.22	0.09	0.07
MgO	0.11	0.02	0.09	0.12	0.02	0.03	0.06	0.05	0.04	0.00	0.00	0.06	0.00	0.02	0.00	0.04	0.00	0.00	0.09	0.08	0.09	0.00	0.00	0.00	0.12	0.04	0.04
CaO	0.00	0.62	0.17	0.05	0.00	0.00	0.00	0.11	0.04	0.00	0.22	0.07	0.09	0.04	0.13	0.09	0.19	0.00	0.00	0.17	0.11	0.07	0.07	0.00	0.62	0.10	0.13
Na_2O	2.95	2.84	2.94	2.65	2.81	2.58	2.81	2.60	2.67	2.36	3.03	2.33	2.54	2.82	2.72	2.38	2.50	2.65	2.33	2.75	3.18	2.71	2.22	2.22	3.18	2.67	0.24
K_2O	13.46	13.51	13.39	14.01	13.80	13.82	13.16	13.75	12.72	13.46	12.70	13.92	13.13	13.97	13.89	14.24	13.04	14.41	13.47	13.63	13.37	13.94	13.29	12.70	14.41	13.57	0.44
F	0.54	0.76	0.82	0.91	0.54	0.77	0.90	0.62	0.66	0.71	0.71	0.69	0.96	0.82	0.79	0.73	0.55	0.74	0.82	0.88	0.85	0.92	0.68	0.54	0.96	0.76	0.12
Cl	0.00	0.30	0.00	0.11	0.00	0.00	0.00	0.12	0.12	0.06	0.09	0.03	0.00	0.00	0.06	0.17	0.09	0.09	0.06	0.03	0.06	0.09	0.00	0.00	0.30	0.06	0.07

Table 43: EMP data of glass in Type 5 run G71 with a cooling rate of 0.3 °C /min, 3.5 GPa / 700 °C; bulk water content 2.8 wt.%.

	1	2	3	4	5	6	7	8	9	10	11	min	max	mean	σ
P	0.17	0.11	0.14	0.03	0.31	0.48	0.36	0.28	0.39	0.50	0.00	0.00	0.50	0.25	0.17
Si	27.53	27.66	28.14	28.30	27.57	27.53	27.64	28.14	28.10	27.67	27.74	27.53	28.30	27.82	0.29
Ti	0.04	0.07	0.01	0.09	0.03	0.00	0.00	0.05	0.00	0.04	0.06	0.00	0.09	0.04	0.03
Al	5.89	5.94	5.90	5.82	5.97	5.90	5.77	6.11	5.94	5.88	6.08	5.77	6.11	5.93	0.10
Fe	0.14	0.26	0.40	0.28	0.42	0.42	0.50	0.16	0.19	0.33	0.31	0.14	0.50	0.31	0.12
Mn	0.10	0.00	0.00	0.10	0.15	0.00	0.07	0.10	0.05	0.03	0.05	0.00	0.15	0.06	0.05
Mg	0.01	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.03	0.02	0.00	0.03	0.01	0.01
Ca	0.00	0.00	0.00	0.09	0.00	0.00	0.01	0.00	0.02	0.03	0.01	0.00	0.09	0.01	0.03
Na	1.78	1.74	2.04	2.03	1.99	1.80	1.89	1.93	2.27	2.14	1.76	1.74	2.27	1.94	0.17
K	10.66	10.46	11.08	9.94	10.37	10.13	10.60	10.67	10.31	10.90	10.58	9.94	11.08	10.52	0.33
F	0.77	1.07	1.38	1.08	1.08	1.24	1.14	1.27	0.95	1.24	0.88	0.77	1.38	1.10	0.18
Cl	0.07	0.00	0.00	0.10	0.12	0.00	0.00	0.10	0.07	0.10	0.00	0.00	0.12	0.05	0.05
total	47.17	47.31	49.09	47.85	48.01	47.52	48.00	48.83	48.32	48.90	47.48	47.17	49.09	48.04	0.67
P_2O_5	0.39	0.26	0.32	0.06	0.71	1.10	0.84	0.64	0.90	1.15	0.00	0.00	1.15	0.58	0.40
SiO_2	58.89	59.18	60.19	60.53	58.98	58.89	59.13	60.20	60.11	59.20	59.34	58.89	60.53	59.51	0.62
TiO_2	0.07	0.12	0.02	0.16	0.05	0.00	0.00	0.09	0.00	0.07	0.11	0.00	0.16	0.06	0.05
Al_2O_3	11.13	11.21	11.14	10.99	11.27	11.15	10.90	11.55	11.23	11.12	11.49	10.90	11.55	11.20	0.19
FeO	0.18	0.33	0.51	0.36	0.55	0.55	0.64	0.21	0.24	0.42	0.39	0.18	0.64	0.40	0.15
MnO	0.13	0.00	0.00	0.13	0.19	0.00	0.10	0.13	0.06	0.03	0.06	0.00	0.19	0.08	0.07
MgO	0.01	0.00	0.00	0.00	0.00	0.04	0.03	0.03	0.03	0.05	0.03	0.00	0.05	0.02	0.02
CaO	0.00	0.00	0.00	0.12	0.00	0.00	0.02	0.00	0.03	0.05	0.02	0.00	0.12	0.02	0.04
Na_2O	2.40	2.34	2.76	2.73	2.68	2.43	2.55	2.60	3.07	2.88	2.37	2.34	3.07	2.62	0.23
K_2O	12.84	12.60	13.35	11.97	12.50	12.20	12.76	12.85	12.42	13.14	12.75	11.97	13.35	12.67	0.39
F	0.77	1.07	1.38	1.08	1.08	1.24	1.14	1.27	0.95	1.24	0.88	0.77	1.38	1.10	0.18
Cl	0.07	0.00	0.00	0.10	0.12	0.00	0.00	0.10	0.07	0.10	0.00	0.00	0.12	0.05	0.05
total	86.55	86.67	89.09	87.77	87.64	87.06	87.61	89.11	88.70	88.90	87.06	86.55	89.11	87.83	0.97
H_2O	13.45	13.33	10.91	12.23	12.36	12.94	12.39	10.89	11.30	11.10	12.94	10.89	13.45	12.17	0.97
recalculated to 100 % total:															
P_2O_5	0.45	0.30	0.36	0.07	0.81	1.26	0.95	0.72	1.02	1.30	0.00	0.00	1.30	0.66	0.45
SiO_2	68.04	68.28	67.56	68.96	67.29	67.64	67.49	67.56	67.77	66.59	68.16	66.59	68.96	67.76	0.61
TiO_2	0.08	0.14	0.02	0.18	0.06	0.00	0.00	0.10	0.00	0.08	0.12	0.00	0.18	0.07	0.06
Al_2O_3	12.86	12.94	12.51	12.53	12.86	12.81	12.44	12.96	12.66	12.51	13.20	12.44	13.20	12.75	0.24
FeO	0.21	0.39	0.58	0.41	0.62	0.63	0.73	0.24	0.27	0.48	0.45	0.21	0.73	0.45	0.17
MnO	0.15	0.00	0.00	0.15	0.22	0.00	0.11	0.14	0.07	0.04	0.07	0.00	0.22	0.09	0.07
MgO	0.01	0.00	0.00	0.00	0.00	0.04	0.03	0.03	0.03	0.05	0.03	0.00	0.05	0.02	0.02
CaO	0.00	0.00	0.00	0.14	0.00	0.00	0.02	0.00	0.03	0.05	0.02	0.00	0.14	0.02	0.04
Na_2O	2.77	2.70	3.09	3.11	3.06	2.79	2.91	2.92	3.46	3.24	2.72	2.70	3.46	2.98	0.24
K_2O	14.84	14.54	14.98	13.64	14.26	14.01	14.57	14.42	14.00	14.77	14.64	13.64	14.98	14.42	0.41
F	0.89	1.24	1.55	1.23	1.23	1.42	1.31	1.43	1.07	1.39	1.01	0.89	1.55	1.25	0.20
Cl	0.09	0.00	0.00	0.11	0.14	0.00	0.00	0.11	0.08	0.11	0.00	0.00	0.14	0.06	0.06

Table 44: EMP data of glass in Type 5 run G7 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.8 wt.%.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	min	max	mean	σ
P	0.11	0.00	0.03	0.03	0.03	0.00	0.00	0.23	0.09	0.00	0.00	0.00	0.03	0.09	0.00	0.00	0.23	0.04	0.06
Si	29.12	29.38	28.94	29.47	29.25	29.06	28.99	29.26	28.70	29.15	29.16	28.72	28.82	28.81	29.01	28.70	29.47	29.05	0.23
Ti	0.04	0.04	0.00	0.13	0.08	0.02	0.09	0.00	0.03	0.09	0.04	0.12	0.05	0.07	0.03	0.00	0.13	0.06	0.04
Al	6.80	6.73	6.84	6.72	6.93	6.65	7.05	6.49	6.86	6.73	6.43	6.42	6.71	6.63	6.75	6.42	7.05	6.72	0.18
Fe	0.00	0.14	0.14	0.16	0.07	0.00	0.24	0.16	0.24	0.14	0.17	0.28	0.33	0.12	0.12	0.00	0.33	0.15	0.09
Mn	0.00	0.00	0.10	0.12	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.13	0.15	0.00	0.15	0.04	0.06
Mg	0.01	0.01	0.00	0.03	0.01	0.02	0.02	0.01	0.00	0.01	0.03	0.02	0.00	0.00	0.06	0.00	0.06	0.01	0.02
Ca	0.14	0.07	0.07	0.10	0.12	0.15	0.14	0.19	0.07	0.11	0.12	0.19	0.11	0.13	0.06	0.06	0.19	0.12	0.04
Na	1.35	1.39	1.46	1.71	1.31	1.55	1.22	1.32	1.63	1.37	1.55	1.46	1.31	1.74	1.59	1.22	1.74	1.46	0.16
K	9.39	9.51	9.67	9.22	8.92	9.95	9.14	9.43	9.35	9.25	8.83	9.45	9.65	8.84	9.17	8.83	9.95	9.32	0.32
F	0.58	0.59	0.59	0.54	0.59	0.38	0.52	0.57	0.43	0.50	0.48	0.69	0.46	0.45	0.49	0.38	0.69	0.53	0.08
Cl	0.10	0.00	0.00	0.00	0.10	0.05	0.03	0.00	0.00	0.07	0.10	0.03	0.07	0.00	0.05	0.00	0.10	0.04	0.04
total	47.65	47.85	47.83	48.23	47.41	47.82	47.44	47.66	47.38	47.50	46.90	47.37	47.54	46.99	47.47	46.90	48.23	47.54	0.33
P_2O_5	0.26	0.00	0.06	0.06	0.06	0.00	0.00	0.52	0.19	0.00	0.00	0.00	0.06	0.19	0.00	0.00	0.52	0.09	0.14
SiO_2	62.29	62.85	61.90	63.04	62.57	62.16	62.02	62.59	61.41	62.37	62.38	61.45	61.66	61.62	62.05	61.41	63.04	62.16	0.49
TiO_2	0.07	0.07	0.00	0.21	0.14	0.04	0.16	0.00	0.05	0.16	0.07	0.19	0.09	0.12	0.05	0.00	0.21	0.09	0.07
Al_2O_3	12.85	12.71	12.92	12.70	13.10	12.56	13.33	12.27	12.95	12.72	12.15	12.13	12.68	12.52	12.76	12.13	13.33	12.69	0.33
FeO	0.00	0.18	0.18	0.21	0.09	0.00	0.30	0.21	0.30	0.18	0.21	0.36	0.42	0.15	0.15	0.00	0.42	0.20	0.12
MnO	0.00	0.00	0.13	0.16	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.16	0.19	0.00	0.19	0.05	0.07
MgO	0.01	0.01	0.00	0.05	0.01	0.03	0.03	0.01	0.00	0.01	0.05	0.04	0.00	0.00	0.09	0.00	0.09	0.02	0.03
CaO	0.20	0.09	0.09	0.14	0.17	0.21	0.20	0.26	0.09	0.15	0.17	0.26	0.15	0.18	0.08	0.08	0.26	0.16	0.06
Na_2O	1.82	1.87	1.97	2.30	1.77	2.08	1.64	1.78	2.19	1.84	2.09	1.97	1.76	2.34	2.15	1.64	2.34	1.97	0.21
K_2O	11.31	11.46	11.64	11.11	10.75	11.99	11.01	11.36	11.26	11.14	10.63	11.38	11.62	10.65	11.04	10.63	11.99	11.22	0.38
F	0.58	0.59	0.59	0.54	0.59	0.38	0.52	0.57	0.43	0.50	0.48	0.69	0.46	0.45	0.49	0.38	0.69	0.53	0.08
Cl	0.10	0.00	0.00	0.00	0.10	0.05	0.03	0.00	0.00	0.07	0.10	0.03	0.07	0.00	0.05	0.00	0.10	0.04	0.04
total	89.23	89.59	89.25	90.29	89.07	89.32	89.00	89.34	88.70	89.02	88.11	88.20	88.78	88.21	88.90	88.11	90.29	89.00	0.57
H_2O	10.77	10.41	10.75	9.71	10.93	10.68	11.00	10.66	11.30	10.98	11.89	11.80	11.22	11.79	11.10	9.71	11.89	11.00	0.57
recalculated to 100 % total:																			
P_2O_5	0.29	0.00	0.07	0.07	0.07	0.00	0.00	0.58	0.22	0.00	0.00	0.00	0.07	0.22	0.00	0.00	0.58	0.11	0.16
SiO_2	69.81	70.15	69.36	69.82	70.24	69.59	69.68	70.06	69.23	70.07	70.80	69.67	69.46	69.86	69.80	69.23	70.80	69.84	0.39
TiO_2	0.08	0.08	0.00	0.23	0.16	0.04	0.18	0.00	0.06	0.18	0.08	0.22	0.10	0.14	0.06	0.00	0.23	0.11	0.07
Al_2O_3	14.41	14.19	14.47	14.07	14.71	14.06	14.97	13.73	14.60	14.29	13.79	13.75	14.28	14.19	14.36	13.73	14.97	14.26	0.35
FeO	0.00	0.20	0.20	0.23	0.10	0.00	0.34	0.24	0.34	0.20	0.24	0.41	0.48	0.17	0.17	0.00	0.48	0.22	0.13
MnO	0.00	0.00	0.14	0.18	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.18	0.22	0.00	0.22	0.06	0.08
MgO	0.01	0.01	0.00	0.05	0.01	0.03	0.03	0.01	0.00	0.01	0.05	0.04	0.00	0.00	0.10	0.00	0.10	0.02	0.03
CaO	0.22	0.10	0.10	0.15	0.19	0.24	0.22	0.29	0.10	0.17	0.19	0.30	0.17	0.21	0.09	0.09	0.30	0.18	0.07
Na_2O	2.04	2.09	2.21	2.55	1.98	2.33	1.84	2.00	2.47	2.07	2.38	2.23	1.98	2.66	2.42	1.84	2.66	2.22	0.24
K_2O	12.68	12.79	13.05	12.30	12.07	13.42	12.37	12.72	12.69	12.51	12.07	12.90	13.09	12.08	12.42	12.07	13.42	12.61	0.40
F	0.65	0.66	0.66	0.60	0.66	0.43	0.59	0.64	0.48	0.57	0.54	0.78	0.51	0.51	0.55	0.43	0.78	0.59	0.09
Cl	0.11	0.00	0.00	0.00	0.11	0.05	0.03	0.00	0.00	0.08	0.11	0.03	0.08	0.00	0.06	0.00	0.11	0.04	0.05

Table 45: EMP data of glass in Type 5 run G72 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.8 wt.%; 38 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.09	0.11	0.20	0.08	0.03	0.14	0.11	0.00	0.06	0.09	0.09	0.14	0.00	0.00	0.14	0.03	0.11	0.03	0.17	0.00	0.00	0.03	0.20	0.09	0.14	0.06	0.17
Si	29.11	29.24	28.98	28.49	29.43	29.59	28.72	29.28	28.93	28.71	29.11	28.82	28.98	29.60	29.26	28.86	29.06	29.68	28.56	28.72	28.80	29.02	29.52	29.52	28.84	28.62	28.97
Ti	0.10	0.05	0.01	0.13	0.12	0.00	0.00	0.00	0.04	0.03	0.11	0.00	0.01	0.00	0.04	0.09	0.07	0.04	0.08	0.16	0.11	0.00	0.10	0.08	0.15	0.13	0.01
Al	6.39	6.42	6.57	6.16	6.22	6.59	6.29	6.63	6.33	6.43	6.26	6.68	6.61	6.32	6.97	6.41	6.56	6.37	6.52	6.32	6.50	6.50	6.60	6.65	6.54	6.54	6.11
Fe	0.35	0.16	0.07	0.30	0.00	0.14	0.09	0.02	0.21	0.17	0.19	0.21	0.12	0.21	0.09	0.30	0.00	0.26	0.14	0.14	0.07	0.19	0.26	0.19	0.09	0.00	0.30
Mn	0.00	0.00	0.00	0.10	0.05	0.00	0.00	0.00	0.03	0.07	0.03	0.10	0.05	0.15	0.15	0.00	0.05	0.10	0.00	0.03	0.00	0.10	0.00	0.00	0.03	0.00	0.00
Mg	0.02	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.01	0.01	0.02	0.00	0.02	0.02	0.00	0.06	0.03	0.00	0.01	0.00
Ca	0.07	0.10	0.15	0.03	0.04	0.11	0.04	0.08	0.13	0.00	0.09	0.00	0.10	0.06	0.08	0.06	0.02	0.03	0.09	0.12	0.00	0.01	0.02	0.18	0.02	0.14	0.09
Na	1.93	1.41	1.70	1.73	1.60	1.72	1.53	1.61	1.63	1.62	1.70	1.62	1.71	1.87	1.83	1.72	1.66	1.81	1.72	1.76	1.66	1.88	1.34	1.69	1.90	1.79	1.69
K	10.11	10.67	9.88	10.33	9.50	9.61	10.00	9.38	10.17	9.94	9.77	9.76	10.35	10.15	9.93	9.82	9.62	9.61	10.18	9.82	10.73	9.46	9.61	10.07	10.38	9.88	9.89
F	1.23	0.69	1.01	1.02	1.24	0.76	1.00	0.96	1.08	0.93	1.06	1.03	0.88	1.05	0.64	0.94	0.95	1.10	1.05	1.12	1.14	1.12	1.08	0.95	1.09	1.07	0.84
Cl	0.05	0.00	0.00	0.00	0.03	0.10	0.00	0.00	0.05	0.05	0.07	0.00	0.10	0.00	0.03	0.12	0.03	0.07	0.00	0.03	0.15	0.03	0.00	0.00	0.00	0.00	0.05
total	49.45	48.86	48.58	48.38	48.25	48.77	47.79	47.98	48.65	48.05	48.45	48.36	48.91	49.43	49.16	48.35	48.13	49.11	48.51	48.23	49.18	48.32	48.78	49.45	49.18	48.23	48.12
P_2O_5	0.19	0.26	0.45	0.19	0.06	0.33	0.26	0.00	0.13	0.19	0.19	0.32	0.00	0.00	0.33	0.06	0.26	0.06	0.39	0.00	0.00	0.06	0.45	0.19	0.32	0.13	0.39
SiO_2	62.28	62.55	61.99	60.95	62.95	63.31	61.44	62.64	61.88	61.42	62.28	61.66	62.00	63.32	62.60	61.74	62.16	63.50	61.10	61.44	61.61	62.08	63.15	63.16	61.70	61.23	61.97
TiO_2	0.17	0.09	0.02	0.21	0.19	0.00	0.00	0.00	0.07	0.05	0.18	0.00	0.02	0.00	0.07	0.16	0.12	0.07	0.14	0.26	0.18	0.00	0.17	0.14	0.24	0.21	0.02
Al_2O_3	12.08	12.14	12.42	11.64	11.75	12.46	11.89	12.53	11.95	12.15	11.82	12.62	12.50	11.94	13.16	12.11	12.39	12.03	12.32	11.93	12.28	12.29	12.47	12.56	12.36	12.35	11.54
FeO	0.45	0.21	0.09	0.39	0.00	0.18	0.12	0.03	0.27	0.21	0.24	0.27	0.15	0.27	0.12	0.39	0.00	0.33	0.18	0.18	0.09	0.24	0.33	0.24	0.12	0.00	0.39
MnO	0.00	0.00	0.00	0.13	0.06	0.00	0.00	0.00	0.03	0.10	0.03	0.13	0.06	0.19	0.19	0.00	0.06	0.13	0.00	0.03	0.00	0.13	0.00	0.00	0.03	0.00	0.00
MgO	0.04	0.00	0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.02	0.05	0.00	0.01	0.01	0.03	0.00	0.04	0.04	0.00	0.09	0.05	0.00	0.01	0.00
CaO	0.09	0.14	0.21	0.05	0.06	0.15	0.06	0.11	0.18	0.00	0.12	0.00	0.14	0.08	0.11	0.08	0.03	0.05	0.12	0.17	0.00	0.02	0.03	0.24	0.03	0.20	0.12
Na_2O	2.60	1.90	2.29	2.33	2.15	2.31	2.06	2.18	2.20	2.19	2.28	2.18	2.31	2.52	2.47	2.32	2.23	2.44	2.31	2.38	2.23	2.53	1.81	2.28	2.57	2.41	2.27
K_2O	12.18	12.85	11.91	12.44	11.45	11.58	12.04	11.30	12.25	11.98	11.77	11.75	12.47	12.23	11.96	11.83	11.59	11.57	12.26	11.83	12.93	11.39	11.57	12.14	12.50	11.90	11.92
F	1.23	0.69	1.01	1.02	1.24	0.76	1.00	0.96	1.08	0.93	1.06	1.03	0.88	1.05	0.64	0.94	0.95	1.10	1.05	1.12	1.14	1.11	1.08	0.95	1.09	1.07	0.84
Cl	0.05	0.00	0.00	0.00	0.03	0.10	0.00	0.00	0.05	0.05	0.07	0.00	0.10	0.00	0.03	0.12	0.03	0.07	0.00	0.03	0.15	0.03	0.00	0.00	0.00	0.00	0.05
total	90.83	90.54	89.97	88.92	89.43	90.84	88.45	89.36	89.63	88.87	89.59	89.54	90.24	91.20	91.40	89.33	89.43	90.90	89.43	88.92	90.14	89.40	90.71	91.56	90.51	89.07	89.15
H_2O	9.17	9.46	10.03	11.08	10.57	9.16	11.55	10.64	10.37	11.13	10.41	10.46	9.76	8.80	8.60	10.67	10.57	9.10	10.57	11.08	9.86	10.60	9.29	8.44	9.49	10.93	10.85
recalculated to 100 % total:																											
P_2O_5	0.21	0.29	0.50	0.22	0.07	0.36	0.29	0.00	0.14	0.22	0.22	0.36	0.00	0.00	0.36	0.07	0.29	0.07	0.43	0.00	0.00	0.07	0.50	0.21	0.36	0.14	0.43
SiO_2	68.56	69.09	68.91	68.54	70.39	69.69	69.46	70.10	69.04	69.11	69.52	68.86	68.71	69.43	68.49	69.11	69.50	69.86	68.32	69.09	68.35	69.44	69.62	68.98	68.17	68.75	69.51
TiO_2	0.19	0.10	0.02	0.24	0.21	0.00	0.00	0.00	0.08	0.06	0.20	0.00	0.02	0.00	0.08	0.18	0.14	0.08	0.16	0.29	0.19	0.00	0.19	0.15	0.27	0.24	0.02
Al_2O_3	13.29	13.41	13.80	13.09	13.14	13.71	13.44	14.02	13.34	13.67	13.19	14.10	13.85	13.09	14.40	13.55	13.86	13.23	13.77	13.42	13.63	13.74	13.75	13.72	13.66	13.87	12.95
FeO	0.50	0.23	0.10	0.44	0.00	0.20	0.14	0.03	0.30	0.24	0.27	0.30	0.17	0.30	0.13	0.44	0.00	0.37	0.20	0.20	0.10	0.27	0.37	0.26	0.13	0.00	0.44
MnO	0.00	0.00	0.00	0.15	0.07	0.00	0.00	0.00	0.04	0.11	0.04	0.14	0.07	0.21	0.21	0.00	0.07	0.14	0.00	0.04	0.00	0.14	0.00	0.00	0.04	0.00	0.00
MgO	0.04	0.00	0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.02	0.05	0.00	0.01	0.01	0.03	0.00	0.04	0.04	0.00	0.10	0.06	0.00	0.01	0.00
CaO	0.10	0.15	0.24	0.05	0.07	0.17	0.07	0.12	0.20	0.00	0.14	0.00	0.15	0.08	0.12	0.09	0.03	0.05	0.14	0.19	0.00	0.02	0.03	0.27	0.03	0.22	0.14
Na_2O	2.86	2.09	2.55	2.61	2.41	2.54	2.32	2.43	2.45	2.46	2.55	2.44	2.55	2.77	2.70	2.59	2.50	2.68	2.59	2.67	2.48	2.83	2.00	2.49	2.84	2.71	2.55
K_2O	13.41	14.20	13.23	13.99	12.80	12.75	13.62	12.65	13.66	13.48	13.13	13.13	13.81	13.41	13.09	13.24	12.96	12.73	13.71	13.30	14.35	12.74	12.76	13.25	13.81	13.36	13.37
F	1.36	0.77	1.12	1.15	1.39	0.84	1.13	1.07	1.21	1.05	1.18	1.15	0.97	1.15	0.70	1.05	1.06	1.21	1.17	1.26	1.27	1.25	1.19	1.04	1.20	1.20	0.94
Cl	0.05	0.00	0.00	0.00	0.03	0.11	0.00	0.00	0.05	0.06	0.08	0.00	0.11	0.00	0.03	0.14	0.03	0.08	0.00	0.03	0.16	0.03	0.00	0.00	0.00	0.00	0.05

Table 45 (continued)**:** EMP data of glass in Type 5 run G72.

	28	29	30	31	32	33	34	35	36	37	38	min	max	mean	σ
P	0.09	0.14	0.06	0.00	0.14	0.00	0.11	0.06	0.14	0.06	0.14	0.00	0.20	0.08	0.06
Si	29.59	29.72	28.55	29.31	28.40	29.02	29.41	29.40	29.45	29.52	28.36	28.36	29.72	29.08	0.39
Ti	0.07	0.07	0.13	0.12	0.04	0.16	0.10	0.14	0.05	0.00	0.15	0.00	0.16	0.07	0.05
Al	6.53	6.57	6.83	6.57	6.38	6.47	6.71	6.67	6.52	6.80	6.44	6.11	6.97	6.50	0.18
Fe	0.19	0.14	0.19	0.00	0.05	0.00	0.23	0.12	0.00	0.19	0.23	0.00	0.35	0.15	0.10
Mn	0.00	0.00	0.10	0.00	0.00	0.05	0.00	0.07	0.00	0.20	0.00	0.00	0.20	0.04	0.05
Mg	0.00	0.05	0.01	0.00	0.01	0.00	0.00	0.04	0.08	0.00	0.03	0.00	0.08	0.01	0.02
Ca	0.15	0.00	0.06	0.10	0.06	0.10	0.01	0.15	0.00	0.10	0.22	0.00	0.22	0.07	0.06
Na	1.74	1.68	1.76	1.64	1.79	1.73	1.68	1.79	1.82	1.70	1.67	1.34	1.93	1.71	0.12
K	10.27	9.92	10.27	9.76	10.59	10.73	10.05	9.71	10.50	10.08	10.78	9.38	10.78	10.03	0.38
F	0.85	1.02	0.94	0.99	1.10	1.02	1.27	1.07	1.01	1.08	0.99	0.64	1.27	1.01	0.13
Cl	0.00	0.10	0.00	0.07	0.12	0.07	0.00	0.17	0.00	0.03	0.17	0.00	0.17	0.04	0.05
total	49.48	49.41	48.88	48.56	48.68	49.34	49.58	49.40	49.58	49.75	49.18	47.79	49.75	48.80	0.54
P_2O_5	0.19	0.33	0.13	0.00	0.32	0.00	0.26	0.13	0.32	0.13	0.32	0.00	0.45	0.19	0.14
SiO_2	63.31	63.57	61.08	62.70	60.76	62.07	62.93	62.90	63.01	63.16	60.68	60.68	63.57	62.22	0.83
TiO_2	0.12	0.12	0.21	0.19	0.07	0.26	0.17	0.23	0.09	0.00	0.24	0.00	0.26	0.12	0.09
Al_2O_3	12.33	12.42	12.90	12.42	12.05	12.22	12.67	12.60	12.32	12.84	12.16	11.54	13.16	12.28	0.34
FeO	0.24	0.18	0.24	0.00	0.06	0.00	0.30	0.15	0.00	0.24	0.30	0.00	0.45	0.19	0.13
MnO	0.00	0.00	0.13	0.00	0.00	0.06	0.00	0.10	0.00	0.26	0.00	0.00	0.26	0.05	0.07
MgO	0.00	0.08	0.01	0.00	0.01	0.00	0.00	0.07	0.13	0.00	0.05	0.00	0.13	0.02	0.03
CaO	0.21	0.00	0.08	0.14	0.08	0.14	0.02	0.21	0.00	0.14	0.31	0.00	0.31	0.10	0.08
Na_2O	2.34	2.27	2.37	2.22	2.41	2.33	2.26	2.41	2.45	2.28	2.26	1.81	2.60	2.30	0.16
K_2O	12.37	11.95	12.37	11.75	12.76	12.92	12.11	11.70	12.65	12.14	12.99	11.30	12.99	12.09	0.45
F	0.85	1.02	0.94	0.99	1.10	1.02	1.27	1.07	1.01	1.08	0.99	0.64	1.27	1.01	0.13
Cl	0.00	0.10	0.00	0.07	0.12	0.07	0.00	0.17	0.00	0.03	0.17	0.00	0.17	0.04	0.05
total	91.62	91.58	90.06	90.05	89.25	90.66	91.45	91.26	91.55	91.84	90.00	88.45	91.84	90.18	0.96
H_2O	8.38	8.42	9.94	9.95	10.75	9.34	8.55	8.74	8.45	8.16	10.00	8.16	11.55	9.82	0.96
recalculated to 100 % total:															
P_2O_5	0.21	0.36	0.14	0.00	0.36	0.00	0.28	0.14	0.35	0.14	0.36	0.00	0.50	0.22	0.15
SiO_2	69.10	69.42	67.83	69.63	68.07	68.47	68.81	68.93	68.82	68.77	67.42	67.42	70.39	69.00	0.62
TiO_2	0.13	0.13	0.23	0.21	0.08	0.29	0.19	0.25	0.09	0.00	0.27	0.00	0.29	0.13	0.10
Al_2O_3	13.46	13.56	14.32	13.79	13.50	13.48	13.86	13.80	13.45	13.98	13.51	12.95	14.40	13.62	0.33
FeO	0.26	0.20	0.27	0.00	0.07	0.00	0.33	0.16	0.00	0.26	0.33	0.00	0.50	0.21	0.14
MnO	0.00	0.00	0.14	0.00	0.00	0.07	0.00	0.10	0.00	0.28	0.00	0.00	0.28	0.05	0.07
MgO	0.00	0.09	0.01	0.00	0.01	0.00	0.00	0.08	0.14	0.00	0.05	0.00	0.14	0.02	0.03
CaO	0.23	0.00	0.09	0.15	0.09	0.15	0.02	0.23	0.00	0.15	0.34	0.00	0.34	0.11	0.09
Na_2O	2.55	2.47	2.63	2.46	2.70	2.57	2.47	2.65	2.68	2.49	2.51	2.00	2.86	2.55	0.17
K_2O	13.51	13.05	13.74	13.05	14.29	14.25	13.24	12.82	13.82	13.22	14.43	12.65	14.43	13.40	0.50
F	0.93	1.11	1.04	1.10	1.24	1.12	1.39	1.18	1.11	1.18	1.10	0.70	1.39	1.12	0.15
Cl	0.00	0.11	0.00	0.08	0.14	0.08	0.00	0.19	0.00	0.03	0.19	0.00	0.19	0.05	0.06

Table 46: EMP data of glass in Type 5 run G16 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.8 wt.%; 22 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	min	max	mean	σ
P	0.00	0.03	0.09	0.00	0.15	0.03	0.06	0.00	0.03	0.09	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.08	0.06	0.00	0.06	0.00	0.15	0.04	0.04
Si	27.88	26.57	26.49	26.77	26.16	27.24	26.72	27.13	27.48	26.58	27.90	27.42	27.67	27.70	28.06	26.49	27.79	28.12	27.85	27.70	27.94	27.39	26.16	28.12	27.32	0.61
Ti	0.13	0.15	0.12	0.06	0.18	0.16	0.08	0.20	0.13	0.14	0.09	0.04	0.08	0.00	0.21	0.27	0.04	0.06	0.01	0.13	0.25	0.13	0.00	0.27	0.12	0.07
Al	5.92	5.86	5.96	6.15	6.16	5.95	5.84	5.91	6.17	6.07	6.19	6.21	6.00	6.30	6.17	5.79	6.15	6.05	6.26	6.07	5.96	6.41	5.79	6.41	6.07	0.16
Fe	0.12	0.10	0.27	0.12	0.07	0.10	0.12	0.49	0.22	0.15	0.20	0.17	0.20	0.17	0.22	0.20	0.31	0.21	0.14	0.28	0.09	0.33	0.07	0.49	0.19	0.10
Mn	0.00	0.13	0.00	0.10	0.10	0.00	0.05	0.08	0.03	0.00	0.10	0.00	0.05	0.20	0.10	0.13	0.00	0.00	0.07	0.00	0.13	0.20	0.00	0.20	0.07	0.07
Mg	0.00	0.04	0.04	0.00	0.02	0.00	0.01	0.01	0.03	0.08	0.04	0.00	0.00	0.02	0.04	0.00	0.02	0.00	0.02	0.00	0.00	0.03	0.00	0.08	0.02	0.02
Ca	0.70	0.72	0.39	0.51	0.34	0.58	0.49	0.32	0.29	0.54	0.30	0.51	0.66	0.40	0.41	0.57	0.38	0.53	0.53	0.46	0.48	0.61	0.29	0.72	0.49	0.12
Na	1.96	1.58	1.78	1.53	1.57	1.73	1.61	2.08	1.92	1.62	1.58	1.75	1.92	2.00	1.66	2.05	1.88	2.14	1.76	1.94	1.59	1.41	1.41	2.14	1.78	0.20
K	10.61	10.58	10.68	10.34	11.02	9.90	10.69	10.58	9.78	10.98	10.50	10.29	10.84	10.13	9.93	10.74	9.99	9.66	9.71	9.85	10.12	9.99	9.66	11.02	10.31	0.43
F	1.20	1.12	1.00	1.12	1.27	1.11	1.26	1.00	1.00	1.12	1.25	1.33	1.08	0.94	1.03	1.03	1.01	0.95	0.92	1.08	1.16	1.08	0.92	1.33	1.09	0.11
Cl	0.08	0.24	0.03	0.08	0.11	0.11	0.19	0.13	0.11	0.08	0.13	0.19	0.11	0.08	0.11	0.03	0.12	0.15	0.00	0.07	0.00	0.05	0.00	0.24	0.10	0.06
total	48.60	47.12	46.83	46.78	47.15	46.92	47.12	47.93	47.17	47.44	48.34	47.90	48.60	47.94	47.94	47.30	47.75	47.87	47.35	47.64	47.73	47.69	46.78	48.60	47.59	0.53
P_2O_5	0.00	0.07	0.20	0.00	0.33	0.07	0.13	0.00	0.07	0.20	0.14	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.19	0.13	0.00	0.13	0.00	0.33	0.08	0.09
SiO_2	59.64	56.84	56.67	57.26	55.98	58.27	57.17	58.05	58.78	56.86	59.68	58.66	59.19	59.27	60.03	56.68	59.45	60.17	59.57	59.26	59.76	58.59	55.98	60.17	58.45	1.29
TiO_2	0.21	0.25	0.20	0.10	0.29	0.27	0.14	0.33	0.21	0.23	0.16	0.06	0.14	0.00	0.35	0.45	0.07	0.11	0.02	0.21	0.42	0.21	0.00	0.45	0.20	0.12
Al_2O_3	11.19	11.07	11.26	11.63	11.64	11.25	11.04	11.17	11.65	11.47	11.70	11.73	11.34	11.91	11.67	10.95	11.62	11.43	11.82	11.48	11.27	12.11	10.95	12.11	11.47	0.30
FeO	0.16	0.13	0.35	0.16	0.09	0.13	0.16	0.63	0.28	0.19	0.25	0.22	0.25	0.22	0.28	0.25	0.39	0.27	0.18	0.36	0.12	0.42	0.09	0.63	0.25	0.12
MnO	0.00	0.17	0.00	0.13	0.13	0.00	0.07	0.10	0.03	0.00	0.13	0.00	0.07	0.26	0.13	0.17	0.00	0.00	0.10	0.00	0.16	0.26	0.00	0.26	0.09	0.08
MgO	0.00	0.07	0.07	0.00	0.04	0.00	0.01	0.02	0.05	0.13	0.07	0.00	0.00	0.03	0.06	0.00	0.03	0.00	0.03	0.00	0.00	0.06	0.00	0.13	0.03	0.03
CaO	0.99	1.01	0.55	0.72	0.48	0.82	0.68	0.44	0.41	0.75	0.43	0.72	0.92	0.56	0.58	0.80	0.54	0.73	0.74	0.64	0.67	0.86	0.41	1.01	0.68	0.17
Na_2O	2.64	2.13	2.39	2.07	2.11	2.34	2.17	2.80	2.59	2.19	2.12	2.36	2.58	2.69	2.23	2.76	2.54	2.88	2.37	2.61	2.14	1.90	1.90	2.88	2.39	0.28
K_2O	12.78	12.74	12.86	12.45	13.28	11.93	12.87	12.74	11.78	13.22	12.65	12.40	13.05	12.20	11.96	12.94	12.04	11.64	11.70	11.86	12.20	12.04	11.64	13.28	12.42	0.51
F	1.19	1.12	0.99	1.12	1.27	1.11	1.26	1.00	1.00	1.12	1.25	1.33	1.08	0.94	1.03	1.03	1.01	0.95	0.92	1.08	1.16	1.08	0.92	1.33	1.09	0.11
Cl	0.08	0.24	0.03	0.08	0.11	0.11	0.19	0.13	0.11	0.08	0.13	0.19	0.11	0.08	0.11	0.03	0.12	0.15	0.00	0.07	0.00	0.05	0.00	0.24	0.10	0.06
total	88.36	85.31	85.14	85.22	85.19	85.79	85.32	86.96	86.51	85.95	88.14	87.06	88.26	87.74	87.97	85.61	87.48	87.89	87.26	87.25	87.42	87.24	85.14	88.36	86.78	1.13
H_2O	11.64	14.69	14.86	14.78	14.81	14.21	14.68	13.04	13.49	14.05	11.86	12.94	11.74	12.26	12.03	14.39	12.52	12.11	12.74	12.75	12.58	12.76	11.64	14.86	13.22	1.13
recalculated to 100 % total:																										
P_2O_5	0.00	0.08	0.24	0.00	0.39	0.08	0.16	0.00	0.08	0.23	0.15	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.22	0.15	0.00	0.15	0.00	0.39	0.09	0.11
SiO_2	67.49	66.63	66.56	67.19	65.71	67.92	67.01	66.75	67.95	66.15	67.71	67.38	67.07	67.55	68.24	66.20	67.96	68.46	68.27	67.93	68.36	67.16	65.71	68.46	67.35	0.78
TiO_2	0.24	0.30	0.23	0.12	0.34	0.32	0.16	0.38	0.25	0.27	0.18	0.07	0.16	0.00	0.40	0.52	0.08	0.12	0.02	0.24	0.48	0.24	0.00	0.52	0.23	0.14
Al_2O_3	12.66	12.98	13.23	13.64	13.66	13.11	12.94	12.85	13.46	13.35	13.27	13.48	12.85	13.57	13.26	12.79	13.28	13.01	13.55	13.15	12.89	13.89	12.66	13.89	13.22	0.33
FeO	0.18	0.15	0.41	0.19	0.11	0.15	0.18	0.72	0.33	0.22	0.28	0.25	0.28	0.25	0.32	0.29	0.45	0.31	0.21	0.42	0.14	0.49	0.11	0.72	0.29	0.14
MnO	0.00	0.19	0.00	0.15	0.15	0.00	0.08	0.11	0.04	0.00	0.15	0.00	0.07	0.30	0.15	0.19	0.00	0.00	0.11	0.00	0.18	0.30	0.00	0.30	0.10	0.10
MgO	0.00	0.08	0.08	0.00	0.04	0.00	0.01	0.02	0.06	0.15	0.08	0.00	0.00	0.03	0.07	0.00	0.03	0.00	0.03	0.00	0.00	0.06	0.00	0.15	0.03	0.04
CaO	1.12	1.18	0.64	0.84	0.56	0.95	0.80	0.51	0.47	0.87	0.48	0.82	1.04	0.64	0.66	0.94	0.61	0.84	0.84	0.74	0.77	0.98	0.47	1.18	0.79	0.20
Na_2O	2.99	2.50	2.81	2.42	2.48	2.72	2.55	3.22	2.99	2.54	2.41	2.71	2.93	3.07	2.54	3.23	2.90	3.28	2.72	3.00	2.45	2.18	2.18	3.28	2.76	0.31
K_2O	14.46	14.94	15.10	14.61	15.59	13.90	15.09	14.65	13.61	15.38	14.35	14.24	14.79	13.90	13.60	15.12	13.76	13.24	13.41	13.60	13.95	13.80	13.24	15.59	14.32	0.69
F	1.35	1.32	1.17	1.32	1.49	1.29	1.48	1.15	1.15	1.31	1.42	1.52	1.22	1.07	1.17	1.20	1.15	1.08	1.06	1.24	1.33	1.24	1.06	1.52	1.26	0.14
Cl	0.09	0.28	0.03	0.09	0.12	0.12	0.22	0.15	0.12	0.09	0.15	0.21	0.12	0.09	0.12	0.03	0.14	0.17	0.00	0.08	0.00	0.06	0.00	0.28	0.11	0.07

Table 47: EMP data of glass in Type 5 run G97 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.8 wt.%; 21 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	min	max	mean	σ
P	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.06	0.09	0.06	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.15	0.03	0.05
Si	28.56	27.82	27.50	28.23	28.66	28.06	28.08	26.93	27.04	27.13	26.66	28.27	27.58	28.17	27.64	27.75	28.31	27.95	28.28	27.62	27.44	26.66	28.66	27.79	0.54
Ti	0.13	0.07	0.16	0.07	0.10	0.07	0.12	0.06	0.02	0.14	0.13	0.05	0.00	0.12	0.16	0.07	0.14	0.11	0.11	0.08	0.12	0.00	0.16	0.10	0.04
Al	5.36	5.33	5.30	5.65	5.23	5.53	5.16	5.23	5.54	5.17	5.34	5.49	5.61	5.49	5.01	5.54	5.80	5.47	5.72	5.61	5.47	5.01	5.80	5.43	0.20
Fe	0.31	0.10	0.24	0.19	0.39	0.22	0.34	0.49	0.37	0.22	0.27	0.20	0.15	0.20	0.27	0.25	0.12	0.39	0.59	0.12	0.20	0.10	0.59	0.27	0.12
Mn	0.00	0.05	0.08	0.00	0.10	0.10	0.03	0.03	0.18	0.08	0.08	0.05	0.00	0.03	0.10	0.00	0.10	0.05	0.00	0.13	0.13	0.00	0.18	0.06	0.05
Mg	0.02	0.00	0.00	0.01	0.00	0.07	0.02	0.01	0.02	0.00	0.00	0.04	0.01	0.05	0.00	0.01	0.00	0.02	0.01	0.04	0.00	0.00	0.07	0.02	0.02
Ca	1.04	0.83	0.86	1.19	0.45	0.90	0.33	1.31	1.21	0.94	0.81	0.61	0.79	0.78	0.43	0.80	0.33	0.65	0.18	0.35	0.17	0.17	1.31	0.71	0.34
Na	2.36	2.22	2.32	2.17	1.96	2.02	1.99	2.17	1.92	2.23	2.53	2.11	1.89	1.80	1.91	2.30	1.88	1.71	1.99	1.90	1.97	1.71	2.53	2.06	0.21
K	8.28	8.81	8.53	8.88	8.43	8.33	9.40	9.34	9.25	9.64	9.62	9.22	9.98	8.88	9.38	9.78	9.10	9.46	9.12	8.78	8.74	8.28	9.98	9.09	0.48
F	1.17	1.50	0.87	0.97	0.28	1.46	0.11	1.44	0.95	0.86	1.48	0.55	0.65	1.03	0.47	1.12	0.29	1.27	0.15	0.64	0.24	0.11	1.50	0.83	0.47
Cl	0.00	0.29	0.37	0.18	0.13	0.11	0.05	0.00	0.03	0.13	0.19	0.00	0.21	0.08	0.35	0.13	0.08	0.00	0.03	0.19	0.37	0.00	0.37	0.14	0.12
total	47.23	47.01	46.22	47.55	45.73	46.95	45.63	47.01	46.59	46.64	47.16	46.57	46.88	46.63	45.88	47.76	46.15	47.06	46.32	45.46	44.85	44.85	47.76	46.54	0.73
P_2O_5	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.14	0.20	0.14	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.34	0.00	0.00	0.00	0.34	0.06	0.11
SiO_2	61.11	59.51	58.82	60.38	61.31	60.03	60.07	57.60	57.85	58.04	57.04	60.48	58.99	60.27	59.13	59.37	60.56	59.79	60.49	59.08	58.71	57.04	61.31	59.46	1.16
TiO_2	0.21	0.12	0.27	0.12	0.17	0.12	0.19	0.10	0.04	0.24	0.22	0.08	0.00	0.20	0.27	0.12	0.23	0.18	0.18	0.14	0.20	0.00	0.27	0.16	0.07
Al_2O_3	10.14	10.07	10.01	10.67	9.89	10.45	9.76	9.88	10.47	9.78	10.09	10.36	10.60	10.37	9.48	10.47	10.96	10.33	10.81	10.60	10.33	9.48	10.96	10.26	0.38
FeO	0.40	0.12	0.31	0.25	0.50	0.28	0.44	0.63	0.47	0.28	0.35	0.25	0.19	0.25	0.35	0.32	0.16	0.50	0.76	0.16	0.25	0.12	0.76	0.34	0.16
MnO	0.00	0.06	0.10	0.00	0.13	0.13	0.03	0.03	0.23	0.10	0.10	0.07	0.00	0.03	0.13	0.00	0.13	0.07	0.00	0.17	0.17	0.00	0.23	0.08	0.07
MgO	0.03	0.00	0.00	0.02	0.00	0.12	0.04	0.01	0.04	0.00	0.00	0.06	0.02	0.08	0.00	0.01	0.00	0.04	0.01	0.07	0.00	0.00	0.12	0.03	0.03
CaO	1.46	1.16	1.21	1.67	0.63	1.26	0.46	1.84	1.69	1.31	1.13	0.85	1.11	1.09	0.60	1.13	0.46	0.90	0.26	0.50	0.24	0.24	1.84	1.00	0.47
Na_2O	3.18	2.99	3.13	2.93	2.64	2.72	2.69	2.93	2.59	3.00	3.41	2.84	2.55	2.43	2.58	3.10	2.53	2.30	2.69	2.56	2.66	2.30	3.41	2.78	0.28
K_2O	9.98	10.61	10.28	10.70	10.16	10.04	11.33	11.25	11.14	11.62	11.58	11.11	12.02	10.69	11.30	11.78	10.96	11.40	10.98	10.58	10.53	9.98	12.02	10.95	0.58
F	1.17	1.50	0.87	0.97	0.28	1.46	0.11	1.44	0.95	0.86	1.48	0.55	0.65	1.03	0.47	1.12	0.29	1.27	0.15	0.64	0.24	0.11	1.50	0.83	0.47
Cl	0.00	0.29	0.37	0.18	0.13	0.11	0.05	0.00	0.03	0.13	0.19	0.00	0.21	0.08	0.35	0.13	0.08	0.00	0.03	0.19	0.37	0.00	0.37	0.14	0.12
total	87.17	85.74	84.91	87.43	85.68	86.26	85.10	85.11	85.23	85.18	85.05	86.42	86.03	86.08	84.71	87.05	86.22	86.23	86.62	84.36	83.51	83.51	87.43	85.72	0.98
H_2O	12.83	14.26	15.09	12.57	14.32	13.74	14.90	14.89	14.77	14.82	14.95	13.58	13.97	13.92	15.29	12.95	13.78	13.77	13.38	15.64	16.49	12.57	16.49	14.28	0.98
recalculated to 100 % total:																									
P_2O_5	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.16	0.24	0.16	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.39	0.00	0.00	0.00	0.40	0.08	0.13
SiO_2	70.10	69.41	69.27	69.06	71.55	69.58	70.58	67.68	67.88	68.15	67.07	69.98	68.58	70.02	69.80	68.21	70.24	69.33	69.84	70.04	70.30	67.07	71.55	69.37	1.10
TiO_2	0.24	0.13	0.32	0.13	0.20	0.13	0.23	0.12	0.05	0.28	0.25	0.09	0.00	0.23	0.32	0.13	0.27	0.20	0.20	0.16	0.23	0.00	0.32	0.19	0.09
Al_2O_3	11.63	11.75	11.79	12.20	11.54	12.11	11.46	11.61	12.29	11.48	11.86	11.99	12.32	12.05	11.19	12.03	12.71	11.98	12.48	12.57	12.37	11.19	12.71	11.97	0.40
FeO	0.46	0.15	0.37	0.29	0.58	0.33	0.52	0.74	0.56	0.33	0.41	0.29	0.22	0.29	0.41	0.36	0.18	0.58	0.87	0.19	0.30	0.15	0.87	0.40	0.19
MnO	0.00	0.08	0.12	0.00	0.15	0.15	0.04	0.04	0.27	0.12	0.12	0.08	0.00	0.04	0.16	0.00	0.15	0.08	0.00	0.20	0.20	0.00	0.27	0.09	0.08
MgO	0.03	0.00	0.00	0.02	0.00	0.13	0.04	0.01	0.05	0.00	0.00	0.07	0.02	0.09	0.00	0.01	0.00	0.04	0.01	0.08	0.00	0.00	0.13	0.03	0.04
CaO	1.67	1.35	1.42	1.91	0.73	1.46	0.54	2.16	1.98	1.54	1.32	0.99	1.29	1.27	0.71	1.29	0.53	1.05	0.30	0.59	0.29	0.29	2.16	1.16	0.55
Na_2O	3.64	3.49	3.69	3.35	3.08	3.15	3.16	3.44	3.04	3.52	4.01	3.28	2.97	2.83	3.05	3.57	2.93	2.67	3.10	3.03	3.18	2.67	4.01	3.25	0.32
K_2O	11.45	12.38	12.10	12.24	11.85	11.64	13.31	13.22	13.07	13.64	13.62	12.86	13.97	12.42	13.34	13.54	12.71	13.22	12.68	12.54	12.61	11.45	13.97	12.78	0.69
F	1.34	1.75	1.02	1.11	0.32	1.70	0.13	1.70	1.12	1.01	1.74	0.64	0.76	1.20	0.56	1.29	0.34	1.47	0.18	0.76	0.29	0.13	1.75	0.97	0.54
Cl	0.00	0.34	0.43	0.21	0.15	0.12	0.06	0.00	0.03	0.16	0.22	0.00	0.25	0.09	0.41	0.15	0.09	0.00	0.03	0.22	0.45	0.00	0.45	0.16	0.14

Table 48: EMP data of glass in Type 5 run G84 with a cooling rate of 0.03 °C /min, quenched at conditions of 3.5 GPa / 715 °C; bulk water content 2.8 wt.%; 32 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.29	0.38	0.32	0.06	0.44	0.29	0.15	0.35	0.26	0.29	0.21	0.32	0.15	0.09	0.27	0.21	0.12	0.29	0.24	0.32	0.32	0.21	0.32	0.44	0.18	0.32	0.56
Si	29.00	29.01	29.21	29.55	29.22	29.69	29.70	29.68	29.63	29.28	29.82	29.65	29.58	30.03	29.53	29.03	29.86	29.88	29.57	29.77	29.59	29.52	29.87	29.27	29.74	29.34	29.64
Ti	0.15	0.14	0.05	0.10	0.20	0.09	0.20	0.08	0.05	0.10	0.16	0.09	0.05	0.16	0.13	0.07	0.20	0.06	0.17	0.15	0.25	0.09	0.12	0.00	0.21	0.18	0.13
Al	6.28	6.25	6.42	6.56	6.38	6.23	6.43	6.47	6.37	6.59	6.40	6.44	6.71	6.56	6.65	6.47	6.46	6.45	6.49	6.33	6.66	6.58	6.50	6.34	6.56	6.43	6.45
Fe	0.39	0.41	0.29	0.19	0.31	0.34	0.14	0.48	0.29	0.31	0.17	0.48	0.29	0.29	0.17	0.10	0.27	0.29	0.36	0.29	0.36	0.34	0.48	0.24	0.34	0.53	0.22
Mn	0.03	0.18	0.03	0.00	0.00	0.05	0.03	0.15	0.07	0.15	0.05	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.07	0.00	0.15	0.03	0.00	0.15	0.00	0.03
Mg	0.05	0.05	0.00	0.01	0.00	0.07	0.00	0.02	0.01	0.00	0.00	0.04	0.06	0.00	0.00	0.03	0.01	0.03	0.00	0.02	0.00	0.00	0.01	0.00	0.05	0.02	0.07
Ca	0.10	0.00	0.01	0.00	0.00	0.00	0.01	0.11	0.01	0.00	0.04	0.00	0.00	0.00	0.01	0.00	0.00	0.08	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Na	1.80	1.98	1.91	1.68	1.93	1.79	1.53	1.74	1.78	1.73	1.89	1.85	1.87	1.79	1.82	1.75	1.90	1.86	1.69	1.87	1.53	1.93	2.08	1.86	1.59	1.76	1.72
K	10.90	10.91	10.27	10.64	10.27	10.47	10.69	10.65	10.89	10.92	9.95	10.33	10.85	10.35	9.96	10.79	9.76	10.44	10.66	10.16	10.79	9.88	10.03	10.73	10.72	10.84	10.49
F	0.94	0.68	0.92	0.84	0.73	0.69	0.97	0.73	0.80	0.91	0.94	0.79	0.77	0.88	0.80	0.76	0.69	0.99	0.71	0.72	0.67	0.75	0.66	0.74	0.82	0.87	0.89
Cl	0.00	0.00	0.05	0.13	0.00	0.00	0.00	0.00	0.08	0.05	0.08	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.11
total	49.90	49.97	49.47	49.77	49.48	49.71	49.85	50.47	50.24	50.34	49.71	49.99	50.33	50.15	49.36	49.36	49.26	50.38	49.91	49.71	50.17	49.47	50.08	49.62	50.59	50.29	50.29
P_2O_5	0.67	0.87	0.74	0.14	1.01	0.67	0.34	0.81	0.60	0.67	0.47	0.74	0.34	0.20	0.61	0.47	0.27	0.67	0.54	0.74	0.74	0.47	0.74	1.01	0.40	0.74	1.28
SiO_2	62.03	62.05	62.49	63.23	62.51	63.52	63.54	63.50	63.38	62.64	63.80	63.43	63.29	64.25	63.18	62.10	63.89	63.92	63.26	63.69	63.30	63.16	63.90	62.62	63.62	62.77	63.41
TiO_2	0.25	0.23	0.08	0.17	0.33	0.15	0.33	0.13	0.08	0.17	0.27	0.15	0.08	0.27	0.21	0.12	0.33	0.10	0.29	0.25	0.42	0.15	0.19	0.00	0.35	0.31	0.21
Al_2O_3	11.86	11.81	12.13	12.39	12.06	11.77	12.14	12.23	12.04	12.45	12.10	12.17	12.69	12.40	12.56	12.23	12.20	12.19	12.26	11.96	12.58	12.44	12.29	11.97	12.39	12.15	12.18
FeO	0.50	0.53	0.37	0.25	0.40	0.43	0.19	0.62	0.37	0.40	0.22	0.62	0.37	0.37	0.22	0.12	0.34	0.37	0.46	0.37	0.46	0.43	0.62	0.31	0.43	0.68	0.28
MnO	0.03	0.23	0.03	0.00	0.00	0.06	0.03	0.19	0.10	0.19	0.06	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.10	0.00	0.19	0.03	0.00	0.19	0.00	0.03
MgO	0.08	0.08	0.00	0.02	0.00	0.11	0.00	0.04	0.02	0.00	0.00	0.07	0.09	0.00	0.00	0.06	0.02	0.06	0.00	0.03	0.00	0.00	0.01	0.00	0.08	0.03	0.11
CaO	0.13	0.00	0.02	0.00	0.00	0.00	0.02	0.15	0.02	0.00	0.05	0.00	0.00	0.00	0.02	0.00	0.00	0.12	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
Na_2O	2.42	2.66	2.57	2.26	2.60	2.41	2.07	2.34	2.40	2.33	2.55	2.49	2.52	2.41	2.46	2.36	2.56	2.51	2.28	2.52	2.07	2.60	2.80	2.50	2.14	2.38	2.32
K_2O	13.13	13.14	12.37	12.82	12.38	12.61	12.88	12.83	13.12	13.15	11.98	12.44	13.07	12.47	12.00	12.99	11.75	12.57	12.84	12.24	12.99	11.90	12.08	12.93	12.92	13.05	12.64
F	0.94	0.68	0.92	0.84	0.73	0.69	0.97	0.73	0.80	0.91	0.94	0.79	0.77	0.88	0.80	0.76	0.69	0.99	0.71	0.72	0.67	0.75	0.66	0.74	0.82	0.87	0.89
Cl	0.00	0.00	0.05	0.13	0.00	0.00	0.00	0.00	0.08	0.05	0.08	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.11
total	91.65	91.99	91.37	91.86	91.70	92.16	92.10	93.27	92.65	92.57	92.11	92.56	92.89	92.87	91.73	91.07	91.76	93.09	92.36	92.31	92.95	91.81	93.04	91.77	93.18	92.60	93.06
H_2O	8.35	8.01	8.63	8.14	8.30	7.84	7.90	6.73	7.35	7.43	7.89	7.44	7.11	7.13	8.27	8.93	8.24	6.91	7.64	7.69	7.05	8.19	6.96	8.23	6.82	7.40	6.94
recalculated to 100 % total:																											
P_2O_5	0.73	0.95	0.81	0.15	1.10	0.73	0.37	0.86	0.65	0.73	0.51	0.80	0.36	0.22	0.66	0.52	0.29	0.72	0.58	0.80	0.79	0.51	0.80	1.10	0.43	0.80	1.37
SiO_2	67.68	67.46	68.40	68.83	68.17	68.93	68.99	68.09	68.41	67.66	69.27	68.52	68.13	69.18	68.88	68.19	69.63	68.67	68.50	68.99	68.10	68.79	68.68	68.24	68.27	67.78	68.14
TiO_2	0.27	0.25	0.08	0.19	0.36	0.17	0.36	0.14	0.08	0.19	0.29	0.17	0.08	0.29	0.23	0.13	0.36	0.10	0.31	0.27	0.45	0.17	0.21	0.00	0.37	0.33	0.23
Al_2O_3	12.94	12.84	13.27	13.49	13.15	12.77	13.19	13.11	13.00	13.44	13.13	13.15	13.66	13.35	13.69	13.43	13.29	13.10	13.27	12.96	13.53	13.55	13.21	13.05	13.30	13.12	13.09
FeO	0.54	0.57	0.41	0.27	0.44	0.47	0.20	0.66	0.40	0.43	0.24	0.67	0.40	0.40	0.24	0.14	0.37	0.40	0.50	0.40	0.50	0.47	0.67	0.34	0.47	0.74	0.30
MnO	0.04	0.25	0.04	0.00	0.00	0.07	0.04	0.21	0.10	0.21	0.07	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.10	0.00	0.21	0.03	0.00	0.21	0.00	0.03
MgO	0.08	0.08	0.00	0.02	0.00	0.12	0.00	0.04	0.02	0.00	0.00	0.07	0.10	0.00	0.00	0.06	0.02	0.06	0.00	0.03	0.00	0.00	0.01	0.00	0.08	0.03	0.12
CaO	0.15	0.00	0.02	0.00	0.00	0.00	0.02	0.16	0.02	0.00	0.05	0.00	0.00	0.00	0.02	0.00	0.00	0.13	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00
Na_2O	2.64	2.89	2.81	2.46	2.83	2.62	2.25	2.51	2.59	2.51	2.76	2.69	2.72	2.59	2.68	2.59	2.79	2.70	2.47	2.73	2.22	2.83	3.01	2.73	2.30	2.56	2.49
K_2O	14.33	14.29	13.54	13.96	13.50	13.69	13.99	13.75	14.16	14.21	13.01	13.44	14.07	13.42	13.08	14.27	12.81	13.51	13.90	13.26	13.98	12.96	12.98	14.09	13.86	14.10	13.58
F	1.02	0.74	1.01	0.91	0.79	0.75	1.05	0.79	0.86	0.99	1.02	0.85	0.83	0.95	0.87	0.84	0.75	1.06	0.77	0.78	0.73	0.81	0.71	0.81	0.88	0.94	0.96
Cl	0.00	0.00	0.06	0.14	0.00	0.00	0.00	0.00	0.09	0.06	0.09	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.11

Table 48 (continued)**:** EMP data of glass in Type 5 run G84.

	28	29	30	31	32	min	max	mean	σ
P	0.26	0.38	0.44	0.38	0.47	0.06	0.56	0.29	0.11
Si	29.48	29.60	29.07	28.98	29.52	28.98	30.03	29.51	0.29
Ti	0.04	0.00	0.15	0.07	0.00	0.00	0.25	0.11	0.07
Al	6.55	6.48	6.68	6.39	6.61	6.23	6.71	6.47	0.12
Fe	0.10	0.24	0.29	0.19	0.27	0.10	0.53	0.30	0.11
Mn	0.03	0.00	0.00	0.00	0.00	0.00	0.18	0.04	0.06
Mg	0.03	0.00	0.03	0.02	0.00	0.00	0.07	0.02	0.02
Ca	0.00	0.04	0.05	0.00	0.04	0.00	0.11	0.02	0.03
Na	2.02	1.81	1.70	1.96	1.90	1.53	2.08	1.81	0.13
K	10.64	10.37	10.90	10.62	9.94	9.76	10.92	10.49	0.35
F	0.91	0.82	0.79	0.76	0.89	0.66	0.99	0.81	0.10
Cl	0.03	0.00	0.05	0.16	0.05	0.00	0.24	0.03	0.06
total	50.07	49.73	50.15	49.52	49.67	49.26	50.59	49.91	0.36
P_2O_5	0.60	0.88	1.00	0.87	1.07	0.14	1.28	0.67	0.26
SiO_2	63.07	63.32	62.20	62.00	63.15	62.00	64.25	63.13	0.62
TiO_2	0.06	0.00	0.25	0.12	0.00	0.00	0.42	0.19	0.11
Al_2O_3	12.37	12.24	12.62	12.07	12.48	11.77	12.69	12.23	0.23
FeO	0.12	0.31	0.37	0.25	0.34	0.12	0.68	0.38	0.14
MnO	0.03	0.00	0.00	0.00	0.00	0.00	0.23	0.05	0.08
MgO	0.06	0.00	0.05	0.03	0.00	0.00	0.11	0.03	0.04
CaO	0.00	0.05	0.07	0.00	0.05	0.00	0.15	0.02	0.04
Na_2O	2.72	2.44	2.29	2.64	2.55	2.07	2.80	2.44	0.17
K_2O	12.81	12.49	13.14	12.79	11.97	11.75	13.15	12.64	0.42
F	0.90	0.82	0.79	0.76	0.89	0.66	0.99	0.81	0.10
Cl	0.03	0.00	0.05	0.16	0.05	0.00	0.24	0.03	0.06
total	92.40	92.19	92.48	91.32	92.18	91.07	93.27	92.28	0.59
H_2O	7.60	7.81	7.52	8.68	7.82	6.73	8.93	7.72	0.59
recalculated to 100 % total:									
P_2O_5	0.65	0.95	1.09	0.95	1.17	0.15	1.37	0.72	0.28
SiO_2	68.26	68.68	67.26	67.89	68.51	67.26	69.63	68.41	0.54
TiO_2	0.06	0.00	0.27	0.13	0.00	0.00	0.45	0.20	0.12
Al_2O_3	13.39	13.27	13.65	13.22	13.54	12.77	13.69	13.25	0.24
FeO	0.13	0.34	0.40	0.27	0.37	0.13	0.74	0.41	0.15
MnO	0.03	0.00	0.00	0.00	0.00	0.00	0.25	0.06	0.08
MgO	0.06	0.00	0.05	0.03	0.00	0.00	0.12	0.03	0.04
CaO	0.00	0.05	0.07	0.00	0.05	0.00	0.16	0.02	0.04
Na_2O	2.94	2.65	2.47	2.89	2.77	2.22	3.01	2.65	0.19
K_2O	13.87	13.54	14.20	14.01	12.98	12.81	14.33	13.70	0.45
F	0.98	0.89	0.85	0.84	0.97	0.71	1.06	0.87	0.10
Cl	0.03	0.00	0.06	0.17	0.06	0.00	0.25	0.04	0.06

Table 49: EMP data of glass in Type 5 run G83 with a cooling rate of 0.03 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.8 wt.%.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	min	max	mean	σ
P	0.41	0.58	0.44	0.29	0.52	0.38	0.41	0.72	0.55	0.52	0.46	0.46	0.41	0.49	0.29	0.72	0.47	0.10
Si	26.91	26.47	25.82	26.24	26.06	26.39	26.21	25.85	26.86	26.03	26.31	26.04	26.52	26.49	25.82	26.91	26.30	0.33
Ti	0.28	0.14	0.09	0.09	0.28	0.11	0.20	0.23	0.11	0.12	0.15	0.19	0.00	0.09	0.00	0.28	0.15	0.08
Al	5.48	5.61	5.85	5.72	5.66	5.75	6.05	5.45	5.50	5.60	5.79	5.32	5.38	5.55	5.32	6.05	5.62	0.20
Fe	0.29	0.36	0.54	0.66	0.42	0.66	0.24	0.46	0.39	0.51	0.46	0.44	0.51	0.70	0.24	0.70	0.48	0.14
Mn	0.10	0.00	0.00	0.03	0.00	0.00	0.23	0.03	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.23	0.03	0.07
Mg	0.05	0.02	0.00	0.01	0.07	0.04	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.01	0.00	0.07	0.02	0.02
Ca	0.00	0.07	0.09	0.00	0.00	0.07	0.00	0.16	0.00	0.12	0.10	0.11	0.05	0.11	0.00	0.16	0.06	0.05
Na	1.74	2.11	1.56	1.84	1.70	1.99	1.88	2.16	1.77	1.52	2.13	2.57	1.91	2.04	1.52	2.57	1.92	0.27
K	10.92	11.20	11.33	11.89	10.96	11.48	11.36	10.89	11.59	10.98	11.20	11.45	10.47	11.65	10.47	11.89	11.24	0.37
F	1.62	1.75	1.64	1.53	1.49	1.51	1.66	1.80	1.58	1.60	1.50	1.70	1.48	1.66	1.48	1.80	1.61	0.10
Cl	0.11	0.11	0.18	0.00	0.05	0.08	0.00	0.11	0.03	0.08	0.13	0.00	0.03	0.13	0.00	0.18	0.07	0.06
total	47.91	48.43	47.53	48.28	47.21	48.45	48.23	47.87	48.37	47.21	48.24	48.26	46.75	48.93	46.75	48.93	47.98	0.60
P_2O_5	0.93	1.33	1.00	0.66	1.20	0.86	0.93	1.66	1.26	1.20	1.06	1.06	0.93	1.13	0.66	1.66	1.09	0.24
SiO_2	57.57	56.63	55.23	56.14	55.75	56.45	56.07	55.31	57.45	55.70	56.28	55.70	56.73	56.66	55.23	57.57	56.26	0.71
TiO_2	0.47	0.23	0.16	0.16	0.47	0.18	0.33	0.39	0.18	0.20	0.25	0.31	0.00	0.16	0.00	0.47	0.25	0.13
Al_2O_3	10.36	10.60	11.06	10.81	10.70	10.87	11.43	10.30	10.39	10.59	10.95	10.05	10.16	10.49	10.05	11.43	10.63	0.38
FeO	0.38	0.47	0.69	0.85	0.53	0.85	0.31	0.60	0.50	0.66	0.60	0.56	0.66	0.91	0.31	0.91	0.61	0.17
MnO	0.13	0.00	0.00	0.03	0.00	0.00	0.30	0.03	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.30	0.04	0.09
MgO	0.08	0.04	0.00	0.01	0.12	0.06	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.02	0.00	0.12	0.03	0.04
CaO	0.00	0.10	0.12	0.00	0.00	0.10	0.00	0.22	0.00	0.17	0.14	0.15	0.07	0.15	0.00	0.22	0.09	0.08
Na_2O	2.34	2.85	2.11	2.47	2.29	2.69	2.53	2.91	2.38	2.05	2.86	3.46	2.57	2.75	2.05	3.46	2.59	0.37
K_2O	13.15	13.49	13.65	14.32	13.20	13.83	13.69	13.12	13.96	13.23	13.49	13.79	12.61	14.04	12.61	14.32	13.54	0.45
F	1.62	1.75	1.63	1.53	1.49	1.51	1.66	1.80	1.58	1.60	1.50	1.70	1.48	1.66	1.48	1.80	1.61	0.10
Cl	0.11	0.11	0.18	0.00	0.05	0.08	0.00	0.11	0.03	0.08	0.13	0.00	0.03	0.13	0.00	0.18	0.07	0.06
total	86.43	86.84	85.10	86.34	85.15	86.81	86.54	85.66	87.08	84.93	86.61	86.07	84.62	87.36	84.62	87.36	86.11	0.87
H_2O	13.57	13.16	14.90	13.66	14.85	13.19	13.46	14.34	12.92	15.07	13.39	13.93	15.38	12.64	12.64	15.38	13.89	0.87
recalculated to 100 % total:																		
P_2O_5	1.08	1.53	1.17	0.77	1.40	1.00	1.07	1.94	1.45	1.41	1.23	1.23	1.10	1.29	0.77	1.94	1.26	0.28
SiO_2	66.61	65.22	64.90	65.02	65.47	65.02	64.79	64.56	65.98	65.58	64.99	64.72	67.05	64.86	64.56	67.05	65.34	0.74
TiO_2	0.54	0.27	0.18	0.18	0.55	0.20	0.38	0.45	0.20	0.23	0.29	0.36	0.00	0.18	0.00	0.55	0.29	0.15
Al_2O_3	11.99	12.21	13.00	12.52	12.56	12.52	13.20	12.03	11.93	12.47	12.64	11.67	12.01	12.01	11.67	13.20	12.34	0.44
FeO	0.44	0.54	0.81	0.98	0.63	0.97	0.36	0.70	0.58	0.78	0.69	0.66	0.78	1.04	0.36	1.04	0.71	0.20
MnO	0.15	0.00	0.00	0.04	0.00	0.00	0.34	0.04	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.34	0.05	0.10
MgO	0.09	0.04	0.00	0.01	0.14	0.07	0.00	0.00	0.01	0.04	0.00	0.00	0.00	0.02	0.00	0.14	0.03	0.04
CaO	0.00	0.12	0.14	0.00	0.00	0.12	0.00	0.26	0.00	0.20	0.16	0.18	0.08	0.17	0.00	0.26	0.10	0.09
Na_2O	2.71	3.28	2.48	2.87	2.69	3.09	2.92	3.40	2.74	2.41	3.31	4.02	3.04	3.14	2.41	4.02	3.01	0.42
K_2O	15.22	15.53	16.04	16.59	15.50	15.93	15.81	15.31	16.03	15.57	15.58	16.02	14.90	16.07	14.90	16.59	15.72	0.43
F	1.88	2.01	1.92	1.77	1.75	1.74	1.92	2.10	1.81	1.89	1.74	1.97	1.75	1.90	1.74	2.10	1.87	0.11
Cl	0.12	0.12	0.22	0.00	0.06	0.09	0.00	0.12	0.03	0.09	0.15	0.00	0.03	0.15	0.00	0.22	0.09	0.07

Table 50: EMP data of glass in Type 5 run G42, cooling rate 0.03 °C /min, quenched at 3.5 GPa / 700 °C; bulk water content 2.8 wt.%.

	1	2	3	4	5	6	7	8	9	10	11	12	13	min	max	mean	σ
P	0.36	0.39	0.45	0.42	0.34	0.28	0.20	0.42	0.25	0.34	0.17	0.42	0.39	0.17	0.45	0.34	0.09
Si	28.06	27.39	28.39	28.43	28.03	27.55	28.22	28.48	28.31	28.21	27.49	27.88	27.69	27.39	28.48	28.01	0.38
Ti	0.02	0.02	0.11	0.17	0.18	0.15	0.06	0.00	0.14	0.09	0.25	0.04	0.23	0.00	0.25	0.11	0.08
Al	4.92	4.87	4.29	5.03	4.67	4.67	4.75	4.65	4.48	4.71	4.52	4.55	4.34	4.29	5.03	4.65	0.22
Fe	0.96	0.80	0.47	0.47	0.73	0.57	0.35	0.73	0.61	0.45	0.52	0.64	0.54	0.35	0.96	0.60	0.17
Mn	0.27	0.13	0.30	0.07	0.17	0.00	0.13	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.30	0.09	0.11
Mg	0.00	0.01	0.06	0.06	0.03	0.06	0.01	0.06	0.00	0.04	0.00	0.01	0.00	0.00	0.06	0.03	0.03
Ca	0.02	0.00	0.10	0.04	0.04	0.01	0.00	0.00	0.00	0.08	0.01	0.00	0.00	0.00	0.10	0.02	0.03
Na	1.30	1.66	1.52	1.55	1.77	1.53	1.28	1.51	1.45	1.51	1.79	1.57	1.66	1.28	1.79	1.55	0.15
K	11.50	11.02	11.46	11.36	11.54	11.66	10.92	11.59	11.95	11.65	11.64	11.18	11.56	10.92	11.95	11.46	0.28
F	1.09	0.76	0.69	0.86	0.78	0.87	0.90	0.63	0.95	0.75	0.84	0.67	0.76	0.63	1.09	0.81	0.13
Cl	0.00	0.00	0.49	0.07	0.10	0.10	0.05	0.07	0.05	0.10	0.07	0.03	0.25	0.00	0.49	0.11	0.13
total	48.51	47.03	48.31	48.53	48.36	47.43	46.88	48.13	48.18	47.93	47.38	46.98	47.42	46.88	48.53	47.78	0.61
P_2O_5	0.83	0.90	1.02	0.96	0.77	0.64	0.45	0.96	0.58	0.77	0.38	0.96	0.89	0.38	1.02	0.78	0.21
SiO_2	60.03	58.59	60.73	60.81	59.96	58.93	60.37	60.93	60.56	60.36	58.82	59.65	59.25	58.59	60.93	59.92	0.80
TiO_2	0.04	0.04	0.18	0.28	0.30	0.25	0.11	0.00	0.23	0.16	0.42	0.07	0.39	0.00	0.42	0.19	0.14
Al_2O_3	9.30	9.20	8.11	9.50	8.83	8.82	8.97	8.78	8.47	8.89	8.53	8.59	8.20	8.11	9.50	8.78	0.41
FeO	1.24	1.03	0.60	0.60	0.94	0.73	0.46	0.94	0.79	0.58	0.67	0.82	0.70	0.46	1.24	0.78	0.22
MnO	0.35	0.16	0.39	0.10	0.22	0.00	0.16	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.39	0.11	0.14
MgO	0.00	0.01	0.09	0.09	0.05	0.09	0.02	0.09	0.00	0.07	0.00	0.02	0.00	0.00	0.09	0.04	0.04
CaO	0.03	0.00	0.14	0.06	0.06	0.02	0.00	0.00	0.00	0.11	0.02	0.00	0.00	0.00	0.14	0.03	0.05
Na_2O	1.75	2.23	2.05	2.09	2.38	2.06	1.73	2.03	1.95	2.03	2.41	2.12	2.24	1.73	2.41	2.08	0.20
K_2O	13.85	13.27	13.80	13.69	13.90	14.04	13.16	13.96	14.39	14.03	14.03	13.46	13.92	13.16	14.39	13.81	0.34
F	1.09	0.76	0.69	0.86	0.78	0.87	0.90	0.63	0.95	0.75	0.84	0.67	0.76	0.63	1.09	0.81	0.13
Cl	0.00	0.00	0.49	0.07	0.10	0.10	0.05	0.07	0.05	0.10	0.07	0.03	0.25	0.00	0.49	0.11	0.13
total	88.05	85.87	87.89	88.75	87.92	86.16	85.98	88.11	87.55	87.51	85.91	86.10	86.21	85.87	88.75	87.08	1.05
H_2O	11.95	14.13	12.11	11.25	12.08	13.84	14.02	11.89	12.45	12.49	14.09	13.90	13.79	11.25	14.13	12.92	1.05
recalculated to 100 % total:																	
P_2O_5	0.94	1.04	1.16	1.08	0.87	0.74	0.52	1.09	0.66	0.88	0.45	1.12	1.04	0.45	1.16	0.89	0.23
SiO_2	68.18	68.23	69.10	68.53	68.19	68.40	70.21	69.15	69.17	68.97	68.46	69.28	68.72	68.18	70.21	68.81	0.58
TiO_2	0.04	0.04	0.20	0.32	0.34	0.28	0.12	0.00	0.26	0.18	0.49	0.08	0.45	0.00	0.49	0.22	0.16
Al_2O_3	10.56	10.72	9.22	10.71	10.04	10.23	10.44	9.97	9.68	10.16	9.93	9.98	9.51	9.22	10.72	10.09	0.45
FeO	1.41	1.20	0.69	0.68	1.07	0.85	0.53	1.06	0.90	0.66	0.78	0.95	0.81	0.53	1.41	0.89	0.25
MnO	0.40	0.19	0.44	0.11	0.26	0.00	0.19	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.44	0.13	0.16
MgO	0.00	0.01	0.11	0.10	0.05	0.11	0.02	0.11	0.00	0.09	0.00	0.02	0.00	0.00	0.11	0.05	0.05
CaO	0.03	0.00	0.16	0.07	0.07	0.02	0.00	0.00	0.00	0.12	0.02	0.00	0.00	0.00	0.16	0.04	0.05
Na_2O	1.99	2.60	2.33	2.35	2.71	2.39	2.01	2.31	2.23	2.32	2.80	2.46	2.60	1.99	2.80	2.39	0.24
K_2O	15.73	15.45	15.70	15.42	15.81	16.30	15.30	15.84	16.44	16.03	16.33	15.64	16.15	15.30	16.44	15.86	0.37
F	1.24	0.88	0.79	0.97	0.88	1.01	1.05	0.71	1.09	0.86	0.98	0.78	0.88	0.71	1.24	0.93	0.14
Cl	0.00	0.00	0.56	0.08	0.11	0.11	0.06	0.08	0.06	0.11	0.08	0.03	0.28	0.00	0.56	0.12	0.15

Table 51: EMP data of glass in Type 5 run G31 with a cooling rate of 0.03 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.8 wt.%.

	1	2	3	4	5	6	7	8	9	10	11	12	13	min	max	mean	σ
P	0.11	0.06	0.03	0.03	0.00	0.03	0.00	0.00	0.00	0.03	0.03	0.08	0.00	0.00	0.11	0.03	0.04
Si	28.06	28.04	27.42	27.96	27.75	28.05	28.14	27.68	27.90	27.93	27.48	28.08	28.56	27.42	28.56	27.93	0.30
Ti	0.02	0.22	0.21	0.32	0.23	0.28	0.28	0.24	0.19	0.16	0.19	0.24	0.16	0.02	0.32	0.21	0.07
Al	4.96	4.82	5.06	5.31	5.07	5.30	4.95	5.38	5.39	5.45	5.21	5.13	5.37	4.82	5.45	5.18	0.20
Fe	0.28	0.28	0.33	0.28	0.26	0.28	0.33	0.33	0.24	0.17	0.14	0.31	0.31	0.14	0.33	0.27	0.06
Mn	0.05	0.00	0.10	0.00	0.00	0.10	0.10	0.05	0.23	0.05	0.13	0.00	0.05	0.00	0.23	0.07	0.06
Mg	0.02	0.02	0.03	0.00	0.04	0.04	0.02	0.00	0.05	0.00	0.00	0.01	0.01	0.00	0.05	0.02	0.02
Ca	0.08	0.46	0.14	0.35	0.00	0.64	0.36	0.46	0.30	0.06	0.29	0.52	0.49	0.00	0.64	0.32	0.20
Na	1.51	1.19	1.59	1.50	1.45	1.27	1.38	1.38	1.26	1.18	1.45	1.24	1.24	1.18	1.59	1.36	0.14
K	10.08	11.37	10.82	11.05	10.44	10.87	10.47	11.37	10.73	10.21	11.44	11.25	10.75	10.08	11.44	10.83	0.45
F	0.63	0.78	0.58	1.02	0.78	0.98	0.88	1.15	0.86	0.58	0.80	0.67	1.11	0.58	1.15	0.83	0.19
Cl	0.07	0.00	0.00	0.12	0.00	0.05	0.10	0.10	0.10	0.00	0.00	0.02	0.07	0.00	0.12	0.05	0.05
total	45.89	47.25	46.32	47.95	46.03	47.89	47.01	48.13	47.24	45.80	47.14	47.54	48.13	45.80	48.13	47.10	0.85
P_2O_5	0.26	0.13	0.06	0.06	0.00	0.06	0.00	0.00	0.00	0.06	0.06	0.19	0.00	0.00	0.26	0.07	0.08
SiO_2	60.04	59.99	58.67	59.82	59.37	60.00	60.20	59.21	59.68	59.74	58.78	60.07	61.10	58.67	61.10	59.75	0.64
TiO_2	0.04	0.37	0.35	0.53	0.39	0.47	0.47	0.40	0.32	0.26	0.32	0.40	0.26	0.04	0.53	0.35	0.12
Al_2O_3	9.37	9.11	9.57	10.03	9.58	10.02	9.34	10.16	10.19	10.29	9.84	9.69	10.15	9.11	10.29	9.80	0.38
FeO	0.37	0.36	0.43	0.36	0.33	0.36	0.42	0.42	0.30	0.21	0.18	0.39	0.39	0.18	0.43	0.35	0.08
MnO	0.06	0.00	0.13	0.00	0.00	0.13	0.13	0.06	0.29	0.06	0.16	0.00	0.06	0.00	0.29	0.08	0.08
MgO	0.04	0.04	0.05	0.00	0.06	0.07	0.03	0.00	0.08	0.00	0.00	0.01	0.01	0.00	0.08	0.03	0.03
CaO	0.11	0.65	0.20	0.49	0.00	0.89	0.51	0.65	0.42	0.08	0.40	0.72	0.69	0.00	0.89	0.45	0.28
Na_2O	2.04	1.61	2.15	2.02	1.95	1.71	1.86	1.86	1.70	1.59	1.95	1.67	1.68	1.59	2.15	1.83	0.18
K_2O	12.14	13.69	13.03	13.31	12.58	13.09	12.61	13.70	12.93	12.30	13.77	13.56	12.95	12.14	13.77	13.05	0.54
F	0.63	0.78	0.58	1.02	0.78	0.98	0.88	1.14	0.86	0.58	0.80	0.67	1.11	0.58	1.15	0.83	0.19
Cl	0.07	0.00	0.00	0.12	0.00	0.05	0.10	0.10	0.10	0.00	0.00	0.02	0.07	0.00	0.12	0.05	0.05
total	84.88	86.41	84.97	87.32	84.72	87.42	86.17	87.21	86.48	84.94	85.94	87.11	88.00	84.72	88.00	86.27	1.12
H_2O	15.12	13.59	15.03	12.68	15.28	12.58	13.83	12.79	13.52	15.06	14.06	12.89	12.00	12.00	15.28	13.73	1.12
recalculated to 100 % total:																	
P_2O_5	0.30	0.15	0.08	0.07	0.00	0.07	0.00	0.00	0.00	0.08	0.07	0.22	0.00	0.00	0.30	0.08	0.09
SiO_2	70.74	69.43	69.05	68.51	70.08	68.64	69.86	67.90	69.01	70.34	68.40	68.96	69.43	67.90	70.74	69.26	0.83
TiO_2	0.04	0.43	0.41	0.60	0.46	0.54	0.55	0.46	0.36	0.31	0.37	0.46	0.30	0.04	0.60	0.41	0.14
Al_2O_3	11.04	10.55	11.26	11.49	11.30	11.46	10.84	11.65	11.78	12.11	11.45	11.12	11.53	10.55	12.11	11.35	0.41
FeO	0.43	0.42	0.50	0.42	0.39	0.41	0.49	0.49	0.35	0.25	0.21	0.45	0.45	0.21	0.50	0.41	0.09
MnO	0.08	0.00	0.15	0.00	0.00	0.15	0.15	0.07	0.34	0.08	0.19	0.00	0.07	0.00	0.34	0.10	0.10
MgO	0.04	0.04	0.05	0.00	0.08	0.09	0.03	0.00	0.10	0.00	0.00	0.01	0.01	0.00	0.10	0.03	0.03
CaO	0.13	0.75	0.24	0.56	0.00	1.02	0.59	0.74	0.48	0.09	0.47	0.83	0.79	0.00	1.02	0.51	0.32
Na_2O	2.40	1.86	2.53	2.31	2.31	1.96	2.16	2.13	1.96	1.88	2.27	1.91	1.91	1.86	2.53	2.12	0.23
K_2O	14.30	15.85	15.33	15.25	14.85	14.97	14.64	15.71	14.95	14.48	16.03	15.56	14.72	14.30	16.03	15.13	0.54
F	0.75	0.91	0.69	1.17	0.92	1.12	1.02	1.31	1.00	0.68	0.93	0.76	1.26	0.68	1.31	0.96	0.21
Cl	0.09	0.00	0.00	0.14	0.00	0.06	0.11	0.11	0.11	0.00	0.00	0.03	0.08	0.00	0.14	0.06	0.05

Table 52: EMP data of glass in Type 5 run G64 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 5.6 wt.%; 39 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.20	0.23	0.34	0.28	0.17	0.03	0.09	0.14	0.20	0.25	0.09	0.11	0.03	0.11	0.20	0.39	0.17	0.26	0.00	0.28	0.09	0.42	0.03	0.17	0.14	0.23	0.26
Si	28.95	29.15	29.17	29.14	28.98	28.96	29.00	28.93	29.03	29.16	28.93	29.16	28.93	29.08	29.28	28.97	28.98	29.57	29.04	29.09	29.15	29.49	29.56	29.24	29.37	29.66	29.62
Ti	0.00	0.02	0.00	0.01	0.00	0.00	0.02	0.05	0.07	0.00	0.13	0.02	0.03	0.05	0.01	0.02	0.14	0.02	0.02	0.06	0.08	0.07	0.13	0.02	0.00	0.05	0.01
Al	6.32	6.38	6.49	6.31	6.16	6.29	6.60	6.28	6.32	6.10	6.63	6.13	6.25	6.17	6.17	6.04	6.45	6.49	6.31	6.57	6.74	6.32	6.45	6.46	6.57	6.50	6.66
Fe	0.35	0.21	0.12	0.19	0.05	0.00	0.14	0.05	0.26	0.00	0.07	0.19	0.14	0.00	0.05	0.21	0.00	0.00	0.00	0.00	0.07	0.00	0.02	0.12	0.21	0.05	0.16
Mn	0.05	0.00	0.00	0.00	0.03	0.03	0.05	0.22	0.00	0.05	0.00	0.05	0.03	0.00	0.10	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.05	0.05	0.05	0.03	0.00
Mg	0.01	0.02	0.00	0.01	0.04	0.01	0.00	0.02	0.00	0.00	0.00	0.02	0.04	0.00	0.08	0.00	0.06	0.03	0.02	0.02	0.00	0.04	0.02	0.03	0.03	0.03	0.01
Ca	0.08	0.06	0.00	0.10	0.06	0.20	0.10	0.08	0.14	0.02	0.10	0.18	0.14	0.07	0.09	0.02	0.09	0.09	0.02	0.08	0.07	0.14	0.00	0.00	0.00	0.00	0.10
Na	1.89	2.02	1.52	1.98	1.82	1.67	1.85	1.96	1.96	2.05	1.85	1.94	1.78	1.64	1.90	1.75	1.79	2.01	1.94	1.76	1.91	1.85	1.61	2.11	1.92	1.80	1.81
K	10.25	10.07	10.19	10.63	10.49	10.47	10.34	10.65	11.12	10.57	10.47	10.35	10.61	10.11	10.22	10.57	11.01	10.28	10.53	10.55	9.90	10.68	10.32	10.79	10.32	10.31	10.19
F	0.63	0.47	0.66	0.82	0.49	0.49	0.64	0.67	0.60	0.73	0.54	0.76	0.52	0.66	0.69	0.75	0.54	0.82	0.66	0.63	0.57	0.54	0.68	0.71	0.61	0.74	0.81
Cl	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.15	0.12	0.00	0.15	0.07	0.10	0.00	0.00	0.00	0.00	0.07	0.05	0.00	0.00	0.05	0.00	0.07
total	48.72	48.66	48.49	49.46	48.27	48.14	48.82	49.05	49.80	48.94	48.94	49.02	48.49	48.03	48.86	48.82	49.22	49.58	48.56	49.04	48.65	49.60	48.87	49.70	49.26	49.40	49.69
P_2O_5	0.45	0.52	0.78	0.65	0.39	0.06	0.19	0.32	0.45	0.58	0.19	0.26	0.06	0.26	0.45	0.90	0.39	0.58	0.00	0.65	0.19	0.97	0.06	0.39	0.32	0.52	0.58
SiO_2	61.94	62.37	62.40	62.33	61.99	61.96	62.03	61.89	62.10	62.38	61.89	62.39	61.89	62.22	62.64	61.97	61.99	63.25	62.13	62.24	62.36	63.10	63.24	62.56	62.83	63.45	63.36
TiO_2	0.00	0.04	0.00	0.02	0.00	0.00	0.04	0.09	0.12	0.00	0.21	0.04	0.05	0.09	0.02	0.04	0.23	0.04	0.04	0.11	0.14	0.12	0.21	0.04	0.00	0.09	0.02
Al_2O_3	11.93	12.06	12.25	11.92	11.64	11.88	12.47	11.87	11.94	11.53	12.53	11.58	11.82	11.65	11.66	11.40	12.18	12.25	11.91	12.41	12.74	11.94	12.19	12.20	12.41	12.29	12.59
FeO	0.45	0.27	0.15	0.24	0.06	0.00	0.18	0.06	0.33	0.00	0.09	0.24	0.18	0.00	0.06	0.27	0.00	0.00	0.00	0.00	0.09	0.00	0.03	0.15	0.27	0.06	0.21
MnO	0.06	0.00	0.00	0.00	0.03	0.03	0.06	0.29	0.00	0.06	0.00	0.06	0.03	0.00	0.13	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.06	0.06	0.06	0.03	0.00
MgO	0.01	0.04	0.00	0.02	0.07	0.01	0.00	0.03	0.00	0.00	0.00	0.03	0.06	0.00	0.14	0.00	0.09	0.05	0.04	0.04	0.00	0.06	0.04	0.05	0.05	0.05	0.01
CaO	0.11	0.08	0.00	0.14	0.08	0.28	0.14	0.11	0.20	0.03	0.14	0.24	0.20	0.09	0.12	0.03	0.12	0.12	0.03	0.11	0.09	0.20	0.00	0.00	0.00	0.00	0.14
Na_2O	2.54	2.72	2.04	2.66	2.45	2.25	2.49	2.64	2.65	2.76	2.49	2.61	2.40	2.21	2.56	2.35	2.41	2.71	2.61	2.37	2.57	2.49	2.17	2.84	2.59	2.42	2.44
K_2O	12.34	12.12	12.27	12.81	12.63	12.62	12.45	12.83	13.39	12.73	12.61	12.47	12.78	12.17	12.31	12.73	13.27	12.39	12.68	12.71	11.93	12.86	12.43	13.00	12.43	12.42	12.27
F	0.63	0.47	0.66	0.82	0.49	0.49	0.64	0.67	0.60	0.73	0.54	0.75	0.52	0.66	0.69	0.75	0.54	0.82	0.66	0.63	0.56	0.54	0.68	0.71	0.61	0.74	0.81
Cl	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.15	0.12	0.00	0.15	0.07	0.10	0.00	0.00	0.00	0.00	0.07	0.05	0.00	0.00	0.05	0.00	0.07
total	90.21	90.51	90.29	91.26	89.62	89.37	90.43	90.51	91.60	90.51	90.57	90.45	89.78	89.18	90.55	90.21	90.99	91.89	89.85	90.98	90.51	92.09	90.82	91.70	91.36	91.76	92.14
H_2O	9.79	9.49	9.71	8.74	10.38	10.63	9.57	9.49	8.40	9.49	9.43	9.55	10.22	10.82	9.45	9.79	9.01	8.11	10.15	9.02	9.49	7.91	9.18	8.30	8.64	8.24	7.86
recalculated to 100 % total:																											
P_2O_5	0.50	0.57	0.86	0.71	0.43	0.07	0.22	0.36	0.49	0.64	0.22	0.29	0.07	0.29	0.50	1.00	0.43	0.64	0.00	0.71	0.22	1.05	0.07	0.42	0.35	0.56	0.63
SiO_2	68.66	68.91	69.11	68.30	69.17	69.32	68.60	68.37	67.79	68.92	68.33	68.98	68.94	69.76	69.18	68.70	68.13	68.83	69.15	68.41	68.90	68.52	69.63	68.22	68.77	69.15	68.76
TiO_2	0.00	0.04	0.00	0.02	0.00	0.00	0.04	0.10	0.13	0.00	0.23	0.04	0.06	0.10	0.02	0.04	0.25	0.04	0.04	0.12	0.15	0.13	0.23	0.04	0.00	0.09	0.02
Al_2O_3	13.23	13.33	13.57	13.06	12.98	13.30	13.79	13.11	13.03	12.74	13.83	12.80	13.16	13.06	12.88	12.64	13.39	13.33	13.26	13.64	14.08	12.97	13.42	13.31	13.59	13.39	13.67
FeO	0.50	0.30	0.17	0.26	0.07	0.00	0.20	0.07	0.36	0.00	0.10	0.27	0.20	0.00	0.07	0.30	0.00	0.00	0.00	0.00	0.10	0.00	0.03	0.16	0.30	0.07	0.23
MnO	0.07	0.00	0.00	0.00	0.04	0.04	0.07	0.32	0.00	0.07	0.00	0.07	0.04	0.00	0.14	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.07	0.07	0.07	0.04	0.00
MgO	0.01	0.04	0.00	0.02	0.08	0.01	0.00	0.03	0.00	0.00	0.00	0.03	0.07	0.00	0.15	0.00	0.10	0.05	0.04	0.04	0.00	0.07	0.04	0.05	0.05	0.06	0.01
CaO	0.12	0.09	0.00	0.15	0.09	0.31	0.15	0.12	0.22	0.03	0.15	0.27	0.22	0.10	0.14	0.03	0.14	0.13	0.03	0.12	0.10	0.22	0.00	0.00	0.00	0.00	0.15
Na_2O	2.82	3.01	2.26	2.92	2.74	2.52	2.75	2.92	2.89	3.05	2.75	2.89	2.67	2.47	2.83	2.61	2.65	2.95	2.90	2.60	2.84	2.70	2.39	3.10	2.83	2.64	2.64
K_2O	13.68	13.40	13.59	14.04	14.09	14.12	13.77	14.18	14.62	14.06	13.92	13.78	14.23	13.65	13.59	14.11	14.58	13.48	14.11	13.97	13.18	13.96	13.68	14.18	13.61	13.53	13.32
F	0.70	0.52	0.73	0.89	0.55	0.55	0.71	0.74	0.66	0.81	0.60	0.83	0.58	0.74	0.77	0.83	0.59	0.89	0.74	0.69	0.62	0.59	0.75	0.78	0.66	0.81	0.88
Cl	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.16	0.14	0.00	0.17	0.08	0.11	0.00	0.00	0.00	0.00	0.08	0.05	0.00	0.00	0.05	0.00	0.08

Table 52 (continued)**:** EMP data of glass in Type 5 run G64.

	28	29	30	31	32	33	34	35	36	37	38	39	min	max	mean	σ
P	0.51	0.28	0.23	0.20	0.06	0.28	0.11	0.28	0.31	0.28	0.34	0.37	0.00	0.51	0.21	0.12
Si	29.53	29.28	29.27	29.62	29.54	29.41	29.14	29.77	29.43	29.37	29.15	29.61	28.93	29.77	29.25	0.25
Ti	0.00	0.00	0.08	0.17	0.09	0.00	0.00	0.04	0.17	0.03	0.06	0.00	0.00	0.17	0.04	0.05
Al	6.45	6.29	6.08	6.28	6.66	6.47	6.14	6.41	6.22	6.30	6.58	6.39	6.04	6.74	6.37	0.18
Fe	0.00	0.14	0.05	0.14	0.14	0.12	0.02	0.05	0.00	0.12	0.28	0.00	0.00	0.35	0.09	0.09
Mn	0.10	0.03	0.17	0.00	0.00	0.00	0.07	0.00	0.17	0.00	0.05	0.00	0.00	0.22	0.04	0.05
Mg	0.00	0.01	0.00	0.01	0.00	0.01	0.03	0.02	0.02	0.00	0.02	0.00	0.00	0.08	0.02	0.02
Ca	0.00	0.00	0.00	0.00	0.06	0.00	0.03	0.13	0.11	0.00	0.02	0.06	0.00	0.20	0.06	0.06
Na	1.65	1.93	1.86	1.83	1.80	1.79	1.72	1.87	1.94	1.85	1.75	1.88	1.52	2.11	1.84	0.13
K	10.10	10.07	10.40	10.77	10.91	10.11	10.48	10.25	10.12	10.04	10.45	10.14	9.90	11.12	10.40	0.28
F	0.66	0.68	0.67	0.52	0.60	0.65	0.61	0.51	0.71	0.78	0.39	0.61	0.39	0.82	0.64	0.10
Cl	0.17	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.07	0.00	0.00	0.00	0.17	0.03	0.05
total	49.17	48.72	48.81	49.53	49.85	48.86	48.40	49.32	49.20	48.85	49.09	49.05	48.03	49.85	49.00	0.45
P_2O_5	1.17	0.65	0.52	0.45	0.13	0.65	0.26	0.65	0.71	0.65	0.78	0.84	0.00	1.17	0.48	0.27
SiO_2	63.18	62.65	62.61	63.37	63.20	62.91	62.34	63.69	62.96	62.84	62.37	63.34	61.89	63.69	62.57	0.53
TiO_2	0.00	0.00	0.14	0.28	0.16	0.00	0.00	0.07	0.28	0.05	0.11	0.00	0.00	0.28	0.07	0.08
Al_2O_3	12.18	11.89	11.48	11.87	12.58	12.22	11.60	12.10	11.75	11.91	12.44	12.07	11.40	12.74	12.03	0.34
FeO	0.00	0.18	0.06	0.18	0.18	0.15	0.03	0.06	0.00	0.15	0.36	0.00	0.00	0.45	0.12	0.12
MnO	0.13	0.03	0.22	0.00	0.00	0.00	0.10	0.00	0.22	0.00	0.06	0.00	0.00	0.29	0.05	0.07
MgO	0.00	0.02	0.00	0.01	0.00	0.01	0.05	0.03	0.04	0.00	0.04	0.00	0.00	0.14	0.03	0.03
CaO	0.00	0.00	0.00	0.00	0.08	0.00	0.05	0.18	0.15	0.00	0.03	0.08	0.00	0.28	0.09	0.08
Na_2O	2.22	2.61	2.51	2.47	2.42	2.41	2.32	2.52	2.62	2.49	2.36	2.54	2.04	2.84	2.49	0.17
K_2O	12.16	12.13	12.53	12.98	13.14	12.18	12.63	12.35	12.19	12.10	12.58	12.22	11.93	13.39	12.53	0.34
F	0.66	0.68	0.67	0.52	0.60	0.65	0.61	0.51	0.71	0.77	0.39	0.61	0.39	0.82	0.64	0.10
Cl	0.17	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.07	0.00	0.00	0.00	0.17	0.03	0.05
total	91.55	90.55	90.46	91.90	92.23	90.94	89.75	91.94	91.33	90.69	91.34	91.44	89.18	92.23	90.85	0.80
H_2O	8.45	9.45	9.54	8.10	7.77	9.06	10.25	8.06	8.67	9.31	8.66	8.56	7.77	10.82	9.15	0.80
recalculated to 100 % total:																
P_2O_5	1.27	0.72	0.57	0.49	0.14	0.71	0.29	0.71	0.78	0.72	0.85	0.92	0.00	1.27	0.53	0.30
SiO_2	69.01	69.19	69.21	68.95	68.53	69.18	69.46	69.27	68.94	69.29	68.28	69.27	67.79	69.76	68.87	0.43
TiO_2	0.00	0.00	0.15	0.30	0.17	0.00	0.00	0.08	0.31	0.06	0.12	0.00	0.00	0.31	0.08	0.09
Al_2O_3	13.30	13.14	12.69	12.92	13.64	13.44	12.93	13.16	12.87	13.13	13.62	13.20	12.64	14.08	13.25	0.33
FeO	0.00	0.20	0.07	0.20	0.20	0.17	0.03	0.07	0.00	0.17	0.40	0.00	0.00	0.50	0.13	0.13
MnO	0.14	0.04	0.25	0.00	0.00	0.00	0.11	0.00	0.25	0.00	0.07	0.00	0.00	0.32	0.05	0.08
MgO	0.00	0.02	0.00	0.01	0.00	0.01	0.06	0.03	0.04	0.00	0.04	0.00	0.00	0.15	0.03	0.03
CaO	0.00	0.00	0.00	0.00	0.08	0.00	0.05	0.20	0.17	0.00	0.03	0.08	0.00	0.31	0.09	0.08
Na_2O	2.42	2.88	2.77	2.69	2.62	2.65	2.59	2.74	2.87	2.75	2.58	2.77	2.26	3.10	2.74	0.18
K_2O	13.28	13.39	13.85	14.12	14.24	13.39	14.07	13.43	13.34	13.34	13.78	13.36	13.18	14.62	13.80	0.37
F	0.73	0.75	0.74	0.56	0.65	0.72	0.68	0.55	0.78	0.85	0.42	0.67	0.42	0.89	0.70	0.11
Cl	0.19	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.08	0.00	0.00	0.00	0.19	0.04	0.06

Table 53: EMP data of glass in Type 5 run G35 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 5.5 wt.%; 21 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	min	max	mean	σ
P	0.09	0.00	0.12	0.00	0.14	0.00	0.00	0.12	0.00	0.06	0.03	0.00	0.00	0.09	0.00	0.00	0.09	0.03	0.00	0.00	0.06	0.00	0.14	0.04	0.05
Si	27.27	26.93	26.50	27.34	26.25	27.23	26.78	26.86	26.50	26.68	26.39	26.36	27.14	26.83	27.36	27.17	27.02	27.23	26.98	27.33	26.48	26.25	27.36	26.89	0.36
Ti	0.13	0.09	0.05	0.14	0.00	0.02	0.13	0.07	0.00	0.09	0.01	0.12	0.04	0.09	0.00	0.00	0.00	0.05	0.04	0.08	0.05	0.00	0.14	0.06	0.05
Al	5.01	5.02	5.05	5.47	5.00	5.19	5.01	5.01	5.09	4.79	5.14	4.80	5.27	4.93	5.26	5.51	5.25	5.28	4.84	5.22	4.99	4.79	5.51	5.10	0.20
Fe	0.05	0.03	0.07	0.10	0.00	0.27	0.05	0.17	0.00	0.37	0.00	0.20	0.12	0.17	0.22	0.25	0.12	0.12	0.03	0.07	0.03	0.00	0.37	0.12	0.10
Mn	0.08	0.10	0.03	0.00	0.00	0.10	0.03	0.03	0.00	0.00	0.00	0.10	0.08	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.10	0.03	0.04
Mg	0.04	0.07	0.05	0.01	0.06	0.07	0.01	0.02	0.07	0.01	0.00	0.01	0.05	0.03	0.04	0.06	0.04	0.00	0.08	0.02	0.04	0.00	0.08	0.04	0.03
Ca	0.29	0.44	0.51	0.49	0.39	0.26	0.55	0.45	0.45	0.70	0.31	0.47	0.29	0.40	0.39	0.44	0.60	0.64	0.73	0.56	0.75	0.26	0.75	0.48	0.14
Na	1.98	1.96	1.82	1.70	1.59	1.85	1.96	1.70	1.82	1.86	2.07	1.74	1.64	2.08	1.52	1.71	1.88	1.71	1.49	1.81	1.63	1.49	2.08	1.79	0.17
K	10.39	10.47	10.43	10.23	11.06	10.29	9.61	10.03	10.31	10.23	10.45	10.97	10.18	10.32	10.62	10.36	10.63	10.67	10.23	10.55	10.43	9.61	11.06	10.40	0.31
F	0.67	0.86	0.86	0.74	0.91	0.78	0.65	0.79	0.95	0.77	0.78	0.58	0.69	0.70	0.62	0.72	0.91	0.79	0.79	0.73	0.58	0.58	0.95	0.76	0.10
Cl	0.24	0.21	1.00	0.27	1.48	0.11	0.27	0.03	0.00	0.71	0.27	0.87	0.74	0.34	0.32	0.58	0.53	0.61	0.45	0.34	0.84	0.00	1.48	0.49	0.36
total	46.24	46.17	46.49	46.49	46.89	46.16	45.04	45.28	45.20	46.28	45.44	46.20	46.23	46.03	46.36	46.80	47.07	47.12	45.65	46.73	45.91	45.04	47.12	46.18	0.60
P_2O_5	0.20	0.00	0.27	0.00	0.33	0.00	0.00	0.27	0.00	0.13	0.07	0.00	0.00	0.20	0.00	0.00	0.20	0.07	0.00	0.00	0.13	0.00	0.33	0.09	0.11
SiO_2	58.35	57.60	56.70	58.50	56.17	58.25	57.30	57.46	56.70	57.08	56.46	56.40	58.06	57.39	58.54	58.12	57.81	58.26	57.72	58.47	56.64	56.17	58.54	57.52	0.78
TiO_2	0.22	0.16	0.08	0.24	0.00	0.04	0.22	0.12	0.00	0.16	0.02	0.20	0.06	0.16	0.00	0.00	0.00	0.08	0.06	0.14	0.08	0.00	0.24	0.10	0.08
Al_2O_3	9.47	9.49	9.55	10.33	9.46	9.81	9.47	9.47	9.62	9.05	9.70	9.07	9.95	9.32	9.95	10.42	9.93	9.97	9.14	9.87	9.42	9.05	10.42	9.64	0.37
FeO	0.06	0.03	0.10	0.13	0.00	0.35	0.06	0.22	0.00	0.47	0.00	0.25	0.16	0.22	0.28	0.32	0.16	0.16	0.03	0.10	0.03	0.00	0.47	0.15	0.13
MnO	0.10	0.13	0.03	0.00	0.00	0.13	0.03	0.03	0.00	0.00	0.00	0.13	0.10	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.13	0.04	0.05
MgO	0.06	0.11	0.09	0.01	0.11	0.11	0.02	0.04	0.12	0.02	0.00	0.01	0.08	0.05	0.06	0.11	0.06	0.00	0.13	0.03	0.07	0.00	0.13	0.06	0.04
CaO	0.41	0.62	0.72	0.68	0.55	0.36	0.77	0.63	0.63	0.98	0.43	0.65	0.41	0.56	0.55	0.61	0.84	0.89	1.03	0.79	1.05	0.36	1.05	0.67	0.20
Na_2O	2.67	2.64	2.45	2.29	2.14	2.49	2.64	2.30	2.45	2.51	2.79	2.34	2.20	2.80	2.05	2.31	2.54	2.31	2.01	2.45	2.20	2.01	2.80	2.41	0.22
K_2O	12.52	12.61	12.56	12.33	13.32	12.39	11.58	12.08	12.42	12.32	12.59	13.21	12.26	12.43	12.79	12.48	12.81	12.85	12.32	12.70	12.56	11.58	13.32	12.53	0.37
F	0.67	0.86	0.86	0.74	0.91	0.78	0.65	0.79	0.95	0.77	0.78	0.58	0.69	0.70	0.62	0.72	0.91	0.79	0.79	0.73	0.58	0.58	0.95	0.76	0.10
Cl	0.24	0.21	1.00	0.27	1.48	0.11	0.27	0.03	0.00	0.71	0.27	0.87	0.74	0.34	0.32	0.58	0.53	0.61	0.45	0.34	0.85	0.00	1.48	0.49	0.36
total	84.63	84.05	83.82	85.14	83.74	84.46	82.67	83.10	82.50	83.72	82.72	83.26	84.26	83.87	84.82	85.22	85.27	85.50	83.24	85.23	83.23	82.50	85.50	84.02	0.95
H_2O	15.37	15.95	16.18	14.86	16.26	15.54	17.33	16.90	17.50	16.28	17.28	16.74	15.74	16.13	15.18	14.78	14.73	14.50	16.76	14.77	16.77	14.50	17.50	15.98	0.95
recalculated to 100 % total:																									
P_2O_5	0.24	0.00	0.32	0.00	0.40	0.00	0.00	0.32	0.00	0.16	0.08	0.00	0.00	0.24	0.00	0.00	0.23	0.08	0.00	0.00	0.16	0.00	0.40	0.11	0.13
SiO_2	68.95	68.53	67.65	68.71	67.08	68.97	69.32	69.15	68.73	68.18	68.26	67.73	68.91	68.43	69.01	68.19	67.80	68.14	69.34	68.60	68.05	67.08	69.34	68.46	0.60
TiO_2	0.25	0.19	0.09	0.28	0.00	0.05	0.26	0.14	0.00	0.19	0.02	0.23	0.07	0.19	0.00	0.00	0.00	0.09	0.07	0.16	0.09	0.00	0.28	0.11	0.10
Al_2O_3	11.19	11.29	11.39	12.13	11.29	11.61	11.45	11.39	11.67	10.81	11.73	10.89	11.81	11.11	11.73	12.22	11.64	11.66	10.98	11.58	11.32	10.81	12.22	11.47	0.37
FeO	0.07	0.04	0.11	0.15	0.00	0.41	0.08	0.27	0.00	0.57	0.00	0.30	0.19	0.26	0.34	0.37	0.18	0.18	0.04	0.11	0.04	0.00	0.57	0.18	0.16
MnO	0.12	0.16	0.04	0.00	0.00	0.16	0.04	0.04	0.00	0.00	0.00	0.16	0.12	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.16	0.05	0.06
MgO	0.07	0.13	0.10	0.01	0.13	0.13	0.02	0.05	0.14	0.02	0.00	0.01	0.09	0.06	0.07	0.12	0.07	0.00	0.15	0.04	0.08	0.00	0.15	0.07	0.05
CaO	0.48	0.73	0.86	0.80	0.66	0.42	0.93	0.76	0.77	1.16	0.52	0.78	0.49	0.67	0.64	0.72	0.98	1.04	1.23	0.92	1.26	0.42	1.26	0.80	0.24
Na_2O	3.15	3.15	2.93	2.69	2.56	2.95	3.19	2.76	2.97	3.00	3.37	2.81	2.62	3.34	2.42	2.71	2.98	2.70	2.42	2.87	2.64	2.42	3.37	2.87	0.27
K_2O	14.80	15.00	14.99	14.48	15.90	14.67	14.01	14.53	15.06	14.71	15.22	15.86	14.55	14.82	15.08	14.64	15.02	15.03	14.80	14.90	15.09	14.01	15.90	14.91	0.42
F	0.79	1.02	1.02	0.87	1.08	0.93	0.79	0.95	1.15	0.92	0.94	0.70	0.82	0.83	0.74	0.84	1.06	0.92	0.95	0.86	0.69	0.69	1.15	0.90	0.12
Cl	0.28	0.25	1.20	0.31	1.76	0.13	0.32	0.03	0.00	0.85	0.32	1.04	0.88	0.41	0.37	0.68	0.62	0.71	0.54	0.40	1.02	0.00	1.76	0.58	0.43

Table 54: EMP data of glass in Type 5 run G51 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 9.1 wt.%; 22 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	min	max	mean	σ
P	0.03	0.31	0.08	0.17	0.06	0.08	0.11	0.03	0.11	0.14	0.00	0.14	0.20	0.08	0.11	0.39	0.25	0.11	0.03	0.17	0.14	0.25	0.00	0.39	0.14	0.10
Si	29.56	29.64	29.26	29.19	29.56	29.90	29.25	29.76	30.07	29.21	29.72	30.16	29.30	29.45	29.57	28.99	29.05	29.31	29.84	29.81	28.92	28.87	28.87	30.16	29.47	0.37
Ti	0.04	0.00	0.09	0.02	0.05	0.00	0.04	0.05	0.00	0.00	0.09	0.06	0.00	0.14	0.03	0.04	0.00	0.00	0.02	0.05	0.07	0.02	0.00	0.14	0.04	0.04
Al	6.64	6.74	6.63	6.84	6.62	6.59	6.93	7.02	6.85	6.76	6.65	6.73	6.81	6.38	6.65	6.59	6.49	7.06	6.64	7.00	7.13	6.46	6.38	7.13	6.74	0.20
Fe	0.00	0.02	0.02	0.00	0.12	0.07	0.00	0.12	0.00	0.00	0.02	0.07	0.02	0.05	0.12	0.14	0.09	0.05	0.07	0.12	0.07	0.02	0.00	0.14	0.05	0.05
Mn	0.00	0.00	0.03	0.00	0.00	0.05	0.10	0.00	0.07	0.00	0.03	0.05	0.00	0.03	0.00	0.07	0.05	0.00	0.07	0.07	0.00	0.03	0.00	0.10	0.03	0.03
Mg	0.03	0.00	0.04	0.04	0.03	0.00	0.04	0.00	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.02	0.00	0.05	0.00	0.00	0.00	0.00	0.05	0.01	0.02
Ca	0.09	0.00	0.04	0.08	0.13	0.00	0.00	0.00	0.05	0.00	0.01	0.10	0.00	0.07	0.00	0.08	0.00	0.08	0.08	0.02	0.07	0.08	0.00	0.13	0.04	0.04
Na	1.56	1.49	1.40	1.70	1.47	1.47	1.42	1.38	1.44	1.25	1.49	1.46	1.44	1.63	1.03	1.54	1.38	1.54	1.35	1.31	1.61	1.55	1.03	1.70	1.45	0.14
K	10.79	9.88	10.13	10.14	10.32	9.80	9.67	10.19	10.30	10.49	9.61	9.84	10.08	9.96	10.36	10.30	10.21	10.15	10.59	9.98	10.48	10.63	9.61	10.79	10.18	0.31
F	0.42	0.18	0.35	0.26	0.20	0.14	0.26	0.24	0.23	0.23	0.30	0.21	0.38	0.15	0.17	0.27	0.11	0.15	0.17	0.42	0.36	0.26	0.11	0.42	0.25	0.09
Cl	0.12	0.00	0.00	0.24	0.20	0.00	0.00	0.07	0.00	0.00	0.00	0.12	0.00	0.00	0.10	0.02	0.17	0.10	0.02	0.10	0.00	0.12	0.00	0.24	0.06	0.08
total	49.27	48.25	48.08	48.69	48.76	48.10	47.81	48.86	49.14	48.08	47.91	48.98	48.28	47.94	48.14	48.45	47.83	48.55	48.92	49.05	48.86	48.29	47.81	49.27	48.46	0.46
P_2O_5	0.06	0.71	0.19	0.38	0.13	0.19	0.26	0.06	0.26	0.32	0.00	0.32	0.45	0.19	0.26	0.90	0.58	0.26	0.06	0.39	0.32	0.58	0.00	0.90	0.31	0.22
SiO_2	63.25	63.40	62.59	62.46	63.25	63.96	62.57	63.66	64.34	62.50	63.57	64.51	62.69	63.00	63.26	62.02	62.16	62.71	63.84	63.77	61.87	61.75	61.75	64.51	63.05	0.79
TiO_2	0.07	0.00	0.16	0.04	0.09	0.00	0.07	0.09	0.00	0.00	0.16	0.10	0.00	0.24	0.05	0.07	0.00	0.00	0.04	0.09	0.12	0.04	0.00	0.24	0.06	0.06
Al_2O_3	12.54	12.73	12.52	12.92	12.51	12.45	13.10	13.27	12.94	12.77	12.57	12.72	12.87	12.06	12.57	12.46	12.25	13.34	12.54	13.22	13.47	12.21	12.06	13.47	12.73	0.38
FeO	0.00	0.03	0.03	0.00	0.15	0.09	0.00	0.15	0.00	0.00	0.03	0.09	0.03	0.06	0.15	0.18	0.12	0.06	0.09	0.15	0.09	0.03	0.00	0.18	0.07	0.06
MnO	0.00	0.00	0.03	0.00	0.00	0.06	0.13	0.00	0.10	0.00	0.03	0.06	0.00	0.03	0.00	0.10	0.06	0.00	0.10	0.10	0.00	0.03	0.00	0.13	0.04	0.04
MgO	0.04	0.00	0.06	0.07	0.05	0.00	0.06	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.04	0.00	0.08	0.00	0.00	0.00	0.00	0.08	0.02	0.03
CaO	0.12	0.00	0.06	0.11	0.18	0.00	0.00	0.00	0.08	0.00	0.02	0.14	0.00	0.09	0.00	0.11	0.00	0.11	0.11	0.03	0.09	0.11	0.00	0.18	0.06	0.06
Na_2O	2.11	2.01	1.89	2.29	1.98	1.98	1.92	1.87	1.95	1.69	2.00	1.96	1.94	2.19	1.39	2.08	1.87	2.08	1.81	1.77	2.17	2.09	1.39	2.29	1.96	0.19
K_2O	12.99	11.90	12.21	12.21	12.43	11.80	11.64	12.28	12.41	12.63	11.57	11.86	12.15	12.00	12.48	12.41	12.29	12.23	12.76	12.03	12.63	12.80	11.57	12.99	12.26	0.38
F	0.42	0.18	0.35	0.26	0.20	0.13	0.26	0.24	0.23	0.23	0.30	0.21	0.38	0.15	0.17	0.27	0.11	0.15	0.17	0.42	0.36	0.26	0.11	0.42	0.25	0.09
Cl	0.12	0.00	0.00	0.24	0.20	0.00	0.00	0.07	0.00	0.00	0.00	0.12	0.00	0.00	0.10	0.02	0.17	0.10	0.02	0.10	0.00	0.12	0.00	0.24	0.06	0.08
total	91.52	90.88	89.95	90.82	91.04	90.62	89.89	91.57	92.19	90.04	90.12	92.05	90.41	89.96	90.33	90.49	89.56	90.94	91.54	91.86	90.98	89.89	89.56	92.19	90.76	0.77
H_2O	8.48	9.12	10.05	9.18	8.96	9.38	10.11	8.43	7.81	9.96	9.88	7.95	9.59	10.04	9.67	9.51	10.44	9.06	8.46	8.14	9.02	10.11	7.81	10.44	9.24	0.77
recalculated to 100 % total:																										
P_2O_5	0.07	0.78	0.21	0.42	0.14	0.21	0.29	0.07	0.28	0.36	0.00	0.35	0.50	0.21	0.28	0.99	0.64	0.28	0.07	0.42	0.35	0.64	0.00	0.99	0.34	0.25
SiO_2	69.10	69.76	69.59	68.77	69.47	70.58	69.61	69.52	69.78	69.41	70.54	70.09	69.34	70.03	70.03	68.54	69.40	68.95	69.74	69.43	68.01	68.70	68.01	70.58	69.47	0.63
TiO_2	0.07	0.00	0.17	0.04	0.10	0.00	0.08	0.09	0.00	0.00	0.17	0.11	0.00	0.27	0.06	0.08	0.00	0.00	0.04	0.09	0.13	0.04	0.00	0.27	0.07	0.07
Al_2O_3	13.70	14.01	13.92	14.23	13.75	13.74	14.57	14.49	14.03	14.18	13.95	13.82	14.23	13.41	13.91	13.77	13.68	14.67	13.70	14.39	14.81	13.59	13.41	14.81	14.02	0.38
FeO	0.00	0.03	0.03	0.00	0.16	0.10	0.00	0.16	0.00	0.00	0.03	0.10	0.03	0.07	0.17	0.20	0.13	0.07	0.10	0.16	0.10	0.03	0.00	0.20	0.08	0.07
MnO	0.00	0.00	0.04	0.00	0.00	0.07	0.14	0.00	0.10	0.00	0.04	0.07	0.00	0.04	0.00	0.11	0.07	0.00	0.10	0.10	0.00	0.04	0.00	0.14	0.04	0.05
MgO	0.05	0.00	0.07	0.08	0.06	0.00	0.07	0.00	0.00	0.00	0.00	0.07	0.07	0.00	0.00	0.00	0.04	0.00	0.09	0.00	0.00	0.00	0.00	0.09	0.03	0.03
CaO	0.13	0.00	0.07	0.12	0.20	0.00	0.00	0.00	0.08	0.00	0.02	0.15	0.00	0.10	0.00	0.12	0.00	0.12	0.12	0.03	0.10	0.12	0.00	0.20	0.07	0.06
Na_2O	2.30	2.21	2.10	2.53	2.18	2.19	2.13	2.04	2.11	1.87	2.22	2.13	2.15	2.44	1.54	2.30	2.08	2.29	1.98	1.93	2.39	2.33	1.54	2.53	2.16	0.21
K_2O	14.20	13.10	13.57	13.45	13.65	13.02	12.95	13.41	13.46	14.03	12.84	12.88	13.44	13.34	13.82	13.71	13.73	13.45	13.93	13.09	13.88	14.24	12.84	14.24	13.51	0.41
F	0.46	0.20	0.39	0.29	0.22	0.15	0.29	0.26	0.25	0.26	0.33	0.23	0.42	0.17	0.19	0.30	0.12	0.16	0.18	0.46	0.40	0.29	0.12	0.46	0.27	0.10
Cl	0.13	0.00	0.00	0.27	0.21	0.00	0.00	0.08	0.00	0.00	0.00	0.13	0.00	0.00	0.11	0.03	0.19	0.11	0.03	0.11	0.00	0.14	0.00	0.27	0.07	0.08

Table 55: EMP data of glass in Type 5 run G45 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 10.8 wt.%; 23 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	min	max	mean	σ
P	0.00	0.09	0.09	0.09	0.09	0.03	0.17	0.09	0.11	0.11	0.09	0.11	0.09	0.09	0.25	0.06	0.14	0.08	0.03	0.03	0.00	0.00	0.14	0.00	0.25	0.08	0.06
Si	30.00	30.38	30.23	30.23	29.75	29.77	30.16	30.26	29.78	30.43	30.31	29.91	29.67	30.53	30.03	29.80	29.89	29.99	30.41	29.57	29.86	30.16	30.31	29.57	30.53	30.06	0.27
Ti	0.04	0.02	0.03	0.04	0.08	0.06	0.00	0.00	0.11	0.11	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.00	0.03	0.07	0.00	0.06	0.03	0.00	0.11	0.03	0.04
Al	6.31	6.57	6.12	6.42	6.42	6.16	6.77	6.64	6.64	6.43	6.87	6.20	6.49	6.25	6.33	6.25	6.38	6.36	6.34	6.38	6.66	6.58	6.52	6.12	6.87	6.44	0.19
Fe	0.30	0.02	0.05	0.23	0.12	0.07	0.21	0.30	0.09	0.14	0.30	0.23	0.09	0.09	0.19	0.12	0.23	0.39	0.05	0.33	0.19	0.07	0.00	0.00	0.39	0.17	0.11
Mn	0.05	0.03	0.00	0.00	0.12	0.00	0.00	0.20	0.15	0.17	0.07	0.00	0.05	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.05	0.00	0.00	0.20	0.04	0.06
Mg	0.00	0.00	0.00	0.00	0.00	0.04	0.02	0.03	0.00	0.00	0.00	0.02	0.03	0.00	0.03	0.00	0.05	0.01	0.00	0.01	0.04	0.00	0.00	0.00	0.05	0.01	0.02
Ca	0.23	0.28	0.24	0.14	0.21	0.13	0.25	0.31	0.23	0.30	0.19	0.28	0.22	0.34	0.38	0.37	0.22	0.40	0.23	0.41	0.25	0.27	0.32	0.13	0.41	0.27	0.08
Na	2.63	2.06	2.48	2.33	2.26	2.48	2.27	2.25	2.22	2.44	2.05	2.33	2.32	2.25	2.51	2.33	2.40	2.39	2.54	2.23	2.36	2.27	2.12	2.05	2.63	2.33	0.15
K	8.41	7.87	7.58	7.37	7.79	7.98	7.49	8.01	8.02	7.67	7.95	8.06	7.56	8.33	7.65	7.91	7.75	8.45	8.24	7.88	7.70	7.80	7.78	7.37	8.45	7.88	0.29
F	0.28	0.10	0.24	0.16	0.18	0.10	0.21	0.17	0.14	0.17	0.22	0.14	0.11	0.08	0.06	0.07	0.14	0.29	0.01	0.11	0.00	0.15	0.22	0.00	0.29	0.15	0.08
Cl	0.00	0.12	0.12	0.10	0.00	0.12	0.07	0.00	0.22	0.02	0.00	0.15	0.15	0.10	0.03	0.17	0.27	0.27	0.05	0.22	0.00	0.00	0.00	0.00	0.27	0.09	0.09
total	48.25	47.53	47.16	47.11	47.01	46.95	47.62	48.26	47.72	48.01	48.06	47.45	46.77	48.05	47.46	47.10	47.49	48.67	47.94	47.23	47.05	47.41	47.44	46.77	48.67	47.55	0.49
P_2O_5	0.00	0.19	0.19	0.19	0.19	0.06	0.39	0.19	0.26	0.26	0.19	0.26	0.19	0.19	0.58	0.13	0.32	0.19	0.06	0.06	0.00	0.00	0.32	0.00	0.58	0.19	0.14
SiO_2	64.19	64.98	64.67	64.68	63.65	63.69	64.51	64.74	63.72	65.10	64.85	63.98	63.47	65.30	64.25	63.76	63.94	64.16	65.05	63.26	63.88	64.52	64.84	63.26	65.30	64.31	0.58
TiO_2	0.07	0.04	0.05	0.07	0.14	0.10	0.00	0.00	0.19	0.19	0.00	0.00	0.00	0.00	0.00	0.05	0.04	0.00	0.05	0.12	0.00	0.10	0.05	0.00	0.19	0.05	0.06
Al_2O_3	11.92	12.41	11.55	12.14	12.12	11.64	12.79	12.55	12.54	12.15	12.99	11.72	12.26	11.82	11.97	11.81	12.06	12.01	11.97	12.06	12.58	12.44	12.31	11.55	12.99	12.17	0.37
FeO	0.39	0.03	0.06	0.30	0.15	0.09	0.27	0.39	0.12	0.18	0.39	0.30	0.12	0.12	0.24	0.15	0.30	0.51	0.06	0.42	0.24	0.09	0.00	0.00	0.51	0.21	0.14
MnO	0.06	0.03	0.00	0.00	0.16	0.00	0.00	0.25	0.19	0.22	0.10	0.00	0.06	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.06	0.00	0.00	0.25	0.05	0.08
MgO	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.05	0.00	0.00	0.00	0.04	0.05	0.00	0.05	0.00	0.08	0.02	0.00	0.01	0.06	0.00	0.00	0.00	0.08	0.02	0.03
CaO	0.32	0.39	0.33	0.20	0.29	0.18	0.35	0.44	0.32	0.42	0.27	0.39	0.30	0.47	0.53	0.51	0.30	0.56	0.32	0.58	0.35	0.38	0.45	0.18	0.58	0.38	0.11
Na_2O	3.55	2.77	3.34	3.14	3.05	3.34	3.06	3.04	3.00	3.29	2.76	3.15	3.13	3.03	3.38	3.13	3.23	3.23	3.43	3.00	3.19	3.05	2.85	2.76	3.55	3.14	0.20
K_2O	10.13	9.48	9.13	8.88	9.38	9.62	9.03	9.64	9.66	9.24	9.57	9.71	9.11	10.04	9.22	9.52	9.34	10.18	9.92	9.49	9.27	9.40	9.37	8.88	10.18	9.49	0.34
F	0.28	0.10	0.24	0.15	0.18	0.10	0.21	0.17	0.14	0.17	0.22	0.14	0.11	0.08	0.06	0.07	0.14	0.29	0.01	0.11	0.00	0.15	0.22	0.00	0.29	0.15	0.08
Cl	0.00	0.12	0.12	0.10	0.00	0.12	0.07	0.00	0.22	0.02	0.00	0.15	0.15	0.10	0.03	0.17	0.27	0.27	0.05	0.22	0.00	0.00	0.00	0.00	0.27	0.09	0.09
total	90.78	90.49	89.57	89.76	89.24	88.95	90.60	91.39	90.24	91.17	91.25	89.75	88.88	91.09	90.27	89.25	89.90	91.27	90.94	89.23	89.57	90.12	90.33	88.88	91.39	90.18	0.79
H_2O	9.22	9.51	10.43	10.24	10.76	11.05	9.40	8.61	9.76	8.83	8.75	10.25	11.12	8.91	9.73	10.75	10.10	8.73	9.06	10.77	10.43	9.88	9.67	8.61	11.12	9.82	0.79
recalculated to 100 % total:																											
P_2O_5	0.00	0.22	0.22	0.22	0.22	0.07	0.43	0.21	0.29	0.28	0.21	0.29	0.22	0.21	0.64	0.14	0.36	0.21	0.07	0.07	0.00	0.00	0.36	0.00	0.64	0.22	0.15
SiO_2	70.71	71.82	72.21	72.06	71.33	71.60	71.20	70.84	70.61	71.41	71.07	71.29	71.41	71.69	71.18	71.44	71.12	70.30	71.53	70.89	71.32	71.59	71.78	70.30	72.21	71.32	0.46
TiO_2	0.08	0.04	0.06	0.08	0.16	0.12	0.00	0.00	0.21	0.21	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.00	0.06	0.14	0.00	0.11	0.06	0.00	0.21	0.06	0.07
Al_2O_3	13.13	13.72	12.90	13.52	13.58	13.09	14.11	13.73	13.90	13.32	14.23	13.06	13.80	12.97	13.26	13.23	13.42	13.16	13.16	13.52	14.04	13.80	13.63	12.90	14.23	13.49	0.38
FeO	0.43	0.03	0.07	0.33	0.17	0.10	0.30	0.42	0.13	0.20	0.43	0.33	0.13	0.13	0.27	0.17	0.33	0.56	0.07	0.47	0.27	0.10	0.00	0.00	0.56	0.24	0.16
MnO	0.07	0.04	0.00	0.00	0.18	0.00	0.00	0.28	0.21	0.24	0.10	0.00	0.07	0.00	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.07	0.00	0.00	0.28	0.06	0.09
MgO	0.00	0.00	0.00	0.00	0.00	0.07	0.04	0.06	0.00	0.00	0.00	0.04	0.05	0.00	0.06	0.00	0.09	0.02	0.00	0.01	0.07	0.00	0.00	0.00	0.09	0.02	0.03
CaO	0.35	0.43	0.37	0.22	0.32	0.20	0.38	0.48	0.35	0.46	0.30	0.44	0.34	0.51	0.59	0.58	0.34	0.61	0.35	0.64	0.39	0.42	0.50	0.20	0.64	0.42	0.12
Na_2O	3.91	3.06	3.72	3.50	3.42	3.76	3.38	3.32	3.32	3.61	3.03	3.51	3.52	3.33	3.74	3.51	3.59	3.54	3.77	3.36	3.56	3.39	3.16	3.03	3.91	3.48	0.22
K_2O	11.16	10.47	10.19	9.89	10.52	10.81	9.96	10.55	10.70	10.14	10.49	10.82	10.25	11.02	10.21	10.67	10.39	11.16	10.91	10.64	10.35	10.43	10.37	9.89	11	10.53	0.35
F	0.30	0.11	0.27	0.17	0.20	0.12	0.23	0.18	0.16	0.19	0.24	0.16	0.13	0.09	0.06	0.08	0.15	0.32	0.01	0.12	0.00	0.17	0.24	0.00	0.32	0.16	0.08
Cl	0.00	0.13	0.14	0.11	0.00	0.14	0.08	0.00	0.24	0.03	0.00	0.16	0.17	0.11	0.03	0.19	0.30	0.29	0.05	0.25	0.00	0.00	0.00	0.00	0.30	0.11	0.10

Table 56: EMP data of glass in Type 5 run G46 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 13.1 wt.%; 40 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.09	0.25	0.28	0.09	0.11	0.17	0.09	0.17	0.23	0.23	0.11	0.20	0.14	0.00	0.11	0.20	0.20	0.17	0.14	0.09	0.23	0.23	0.25	0.14	0.00	0.08	0.03
Si	29.36	29.75	29.32	29.25	29.61	29.36	29.50	30.18	29.65	29.43	29.80	29.44	29.22	29.54	29.35	29.18	29.28	29.69	29.41	29.39	29.27	29.93	29.71	29.53	30.15	29.03	29.41
Ti	0.00	0.06	0.18	0.14	0.00	0.00	0.00	0.09	0.00	0.02	0.18	0.02	0.02	0.09	0.00	0.03	0.01	0.03	0.04	0.02	0.00	0.02	0.00	0.04	0.04	0.04	0.02
Al	6.57	6.46	6.27	6.34	6.37	6.18	6.40	6.35	6.30	6.15	6.49	6.21	6.61	6.12	6.33	6.36	6.13	6.12	6.27	5.98	6.25	6.08	6.24	6.44	6.33	6.39	6.39
Fe	0.21	0.16	0.12	0.09	0.12	0.09	0.16	0.07	0.16	0.05	0.05	0.07	0.16	0.00	0.09	0.12	0.09	0.12	0.07	0.02	0.12	0.12	0.14	0.21	0.19	0.00	0.14
Mn	0.07	0.00	0.15	0.10	0.00	0.10	0.07	0.00	0.03	0.05	0.00	0.00	0.07	0.05	0.07	0.05	0.00	0.05	0.12	0.00	0.00	0.03	0.00	0.00	0.00	0.10	0.00
Mg	0.00	0.03	0.01	0.07	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.03	0.00	0.03	0.04	0.00	0.00	0.00	0.04	0.01	0.00	0.01	0.00	0.02	0.00	0.03	0.02
Ca	0.10	0.29	0.25	0.03	0.26	0.25	0.24	0.35	0.42	0.26	0.22	0.26	0.21	0.21	0.21	0.12	0.10	0.29	0.35	0.21	0.24	0.20	0.27	0.24	0.15	0.15	0.27
Na	2.19	2.01	2.34	2.31	2.51	2.28	2.12	2.40	2.52	2.28	2.28	2.46	2.16	2.55	2.61	1.86	2.21	2.01	2.13	2.25	2.36	2.24	2.50	2.30	2.19	2.31	2.46
K	7.83	7.86	8.19	7.38	7.49	8.23	8.43	7.95	8.04	7.78	7.60	7.49	7.78	7.60	8.02	7.79	7.75	7.88	8.58	8.03	7.93	7.42	8.13	7.85	7.86	8.15	8.51
F	0.16	0.07	0.03	0.15	0.19	0.02	0.00	0.21	0.24	0.20	0.12	0.22	0.22	0.16	0.14	0.10	0.14	0.28	0.21	0.28	0.08	0.17	0.21	0.10	0.26	0.34	0.20
Cl	0.00	0.00	0.00	0.17	0.12	0.15	0.05	0.03	0.07	0.00	0.07	0.15	0.10	0.05	0.12	0.12	0.12	0.00	0.00	0.05	0.12	0.15	0.00	0.05	0.05	0.10	0.00
total	46.57	46.96	47.12	46.11	46.78	46.84	47.06	47.80	47.66	46.50	46.93	46.55	46.69	46.40	47.10	45.92	46.04	46.64	47.36	46.33	46.60	46.58	47.46	46.91	47.21	46.72	47.45
P_2O_5	0.19	0.58	0.64	0.19	0.26	0.39	0.19	0.39	0.52	0.52	0.26	0.45	0.32	0.00	0.26	0.45	0.45	0.39	0.32	0.19	0.52	0.52	0.58	0.32	0.00	0.19	0.06
SiO_2	62.81	63.66	62.73	62.58	63.35	62.82	63.12	64.55	63.43	62.95	63.76	62.98	62.52	63.20	62.78	62.43	62.64	63.53	62.91	62.88	62.61	64.02	63.56	63.16	64.50	62.09	62.92
TiO_2	0.00	0.10	0.29	0.23	0.00	0.00	0.00	0.16	0.00	0.04	0.29	0.04	0.04	0.16	0.00	0.05	0.02	0.05	0.07	0.04	0.00	0.04	0.00	0.07	0.07	0.07	0.04
Al_2O_3	12.42	12.21	11.84	11.97	12.04	11.67	12.09	12.00	11.91	11.63	12.26	11.74	12.49	11.56	11.96	12.01	11.58	11.55	11.84	11.30	11.81	11.49	11.80	12.16	11.95	12.07	12.07
FeO	0.27	0.21	0.15	0.12	0.15	0.12	0.21	0.09	0.21	0.06	0.06	0.09	0.21	0.00	0.12	0.15	0.12	0.15	0.09	0.03	0.15	0.15	0.18	0.27	0.24	0.00	0.18
MnO	0.10	0.00	0.19	0.13	0.00	0.13	0.10	0.00	0.03	0.06	0.00	0.00	0.10	0.06	0.10	0.06	0.00	0.06	0.16	0.00	0.00	0.03	0.00	0.00	0.00	0.13	0.00
MgO	0.00	0.05	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.05	0.00	0.05	0.07	0.00	0.00	0.00	0.06	0.01	0.00	0.02	0.00	0.03	0.00	0.05	0.03
CaO	0.14	0.41	0.35	0.05	0.36	0.35	0.33	0.48	0.59	0.36	0.30	0.36	0.29	0.29	0.29	0.17	0.14	0.41	0.49	0.29	0.33	0.27	0.38	0.33	0.21	0.21	0.38
Na_2O	2.95	2.71	3.16	3.11	3.38	3.07	2.85	3.24	3.39	3.07	3.08	3.32	2.92	3.43	3.52	2.51	2.98	2.71	2.87	3.04	3.19	3.02	3.38	3.10	2.95	3.12	3.32
K_2O	9.43	9.47	9.86	8.89	9.02	9.92	10.15	9.58	9.69	9.37	9.15	9.03	9.37	9.15	9.66	9.38	9.33	9.50	10.34	9.68	9.56	8.93	9.79	9.46	9.47	9.82	10.25
F	0.16	0.07	0.02	0.15	0.19	0.02	0.00	0.21	0.24	0.20	0.12	0.22	0.21	0.16	0.13	0.10	0.14	0.28	0.21	0.28	0.08	0.17	0.21	0.10	0.26	0.34	0.19
Cl	0.00	0.00	0.00	0.17	0.12	0.15	0.05	0.03	0.07	0.00	0.07	0.15	0.10	0.05	0.12	0.12	0.12	0.00	0.00	0.05	0.12	0.15	0.00	0.05	0.05	0.10	0.00
total	88.39	89.44	89.25	87.60	88.76	88.59	89.09	90.63	89.96	88.28	89.30	88.30	88.44	88.04	88.94	87.36	87.44	88.51	89.28	87.64	88.31	88.71	89.78	89.00	89.58	88.02	89.36
H_2O	11.61	10.56	10.75	12.40	11.24	11.41	10.91	9.37	10.04	11.72	10.70	11.70	11.56	11.96	11.06	12.64	12.56	11.49	10.72	12.36	11.69	11.29	10.22	11.00	10.42	11.98	10.64
recalculated to 100 % total:																											
P_2O_5	0.22	0.65	0.72	0.22	0.29	0.44	0.22	0.43	0.57	0.59	0.29	0.51	0.37	0.00	0.29	0.52	0.52	0.44	0.36	0.22	0.58	0.58	0.65	0.36	0.00	0.22	0.07
SiO_2	71.06	71.17	70.29	71.44	71.37	70.90	70.85	71.23	70.51	71.31	71.40	71.32	70.69	71.78	70.59	71.46	71.64	71.77	70.46	71.74	70.90	72.17	70.79	70.97	72.00	70.55	70.41
TiO_2	0.00	0.12	0.33	0.26	0.00	0.00	0.00	0.17	0.00	0.04	0.33	0.04	0.04	0.18	0.00	0.06	0.02	0.06	0.08	0.04	0.00	0.04	0.00	0.08	0.08	0.08	0.04
Al_2O_3	14.05	13.65	13.27	13.66	13.56	13.18	13.57	13.24	13.24	13.17	13.73	13.29	14.12	13.13	13.45	13.74	13.24	13.05	13.27	12.89	13.38	12.95	13.14	13.66	13.34	13.71	13.51
FeO	0.31	0.23	0.17	0.14	0.17	0.14	0.24	0.10	0.23	0.07	0.07	0.10	0.24	0.00	0.13	0.17	0.14	0.17	0.10	0.03	0.17	0.17	0.20	0.30	0.27	0.00	0.20
MnO	0.11	0.00	0.21	0.15	0.00	0.14	0.11	0.00	0.04	0.07	0.00	0.00	0.11	0.07	0.11	0.07	0.00	0.07	0.18	0.00	0.00	0.04	0.00	0.00	0.00	0.15	0.00
MgO	0.00	0.06	0.01	0.13	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.06	0.00	0.06	0.08	0.00	0.00	0.00	0.07	0.01	0.00	0.02	0.00	0.03	0.00	0.05	0.03
CaO	0.16	0.46	0.39	0.05	0.41	0.39	0.37	0.53	0.66	0.41	0.34	0.41	0.33	0.33	0.32	0.19	0.16	0.46	0.54	0.33	0.38	0.31	0.42	0.37	0.24	0.24	0.42
Na_2O	3.33	3.03	3.54	3.55	3.81	3.47	3.20	3.57	3.77	3.48	3.45	3.76	3.30	3.90	3.96	2.87	3.41	3.06	3.22	3.47	3.61	3.41	3.76	3.48	3.29	3.54	3.71
K_2O	10.67	10.59	11.05	10.15	10.16	11.20	11.40	10.57	10.77	10.62	10.25	10.22	10.59	10.39	10.87	10.73	10.67	10.73	11.58	11.04	10.82	10.07	10.91	10.63	10.57	11.15	11.48
F	0.18	0.08	0.03	0.17	0.21	0.03	0.00	0.23	0.27	0.23	0.14	0.25	0.24	0.19	0.15	0.11	0.16	0.32	0.24	0.32	0.09	0.19	0.23	0.12	0.29	0.39	0.22
Cl	0.00	0.00	0.00	0.20	0.14	0.17	0.06	0.03	0.08	0.00	0.08	0.17	0.11	0.06	0.14	0.14	0.14	0.00	0.00	0.06	0.14	0.17	0.00	0.06	0.05	0.11	0.00

Table 56 (continued)**:** EMP data of glass in Type 5 run G46.

	28	29	30	31	32	33	34	35	36	37	38	39	40	min	max	mean	σ
P	0.14	0.25	0.23	0.09	0.20	0.25	0.11	0.20	0.28	0.28	0.09	0.14	0.11	0.00	0.28	0.16	0.08
Si	29.05	29.85	29.36	29.67	29.42	29.02	29.65	30.15	29.67	29.70	29.97	30.15	29.78	29.02	30.18	29.55	0.31
Ti	0.10	0.11	0.00	0.01	0.00	0.01	0.00	0.05	0.01	0.07	0.03	0.00	0.02	0.00	0.18	0.04	0.05
Al	6.33	6.30	6.63	6.07	6.04	6.25	6.43	6.29	6.27	6.44	6.23	6.49	6.51	5.98	6.63	6.31	0.15
Fe	0.23	0.09	0.28	0.00	0.19	0.14	0.05	0.07	0.05	0.19	0.12	0.21	0.26	0.00	0.28	0.12	0.07
Mn	0.07	0.00	0.00	0.07	0.12	0.03	0.00	0.00	0.00	0.15	0.00	0.07	0.00	0.00	0.15	0.04	0.05
Mg	0.02	0.04	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.04	0.01	0.02	0.00	0.00	0.07	0.01	0.02
Ca	0.21	0.25	0.26	0.37	0.21	0.16	0.33	0.30	0.17	0.15	0.17	0.23	0.14	0.03	0.42	0.23	0.08
Na	2.25	2.18	2.32	2.31	2.14	2.29	2.05	2.17	2.34	2.22	2.32	2.10	2.11	1.86	2.61	2.27	0.16
K	7.77	7.92	7.95	7.42	8.14	7.62	8.52	7.87	7.93	7.45	7.89	8.02	8.26	7.38	8.58	7.91	0.31
F	0.26	0.04	0.12	0.26	0.10	0.18	0.19	0.20	0.18	0.10	0.18	0.19	0.21	0.00	0.34	0.17	0.08
Cl	0.05	0.07	0.22	0.12	0.07	0.12	0.00	0.02	0.10	0.00	0.00	0.02	0.00	0.00	0.22	0.07	0.06
total	46.49	47.11	47.37	46.39	46.63	46.08	47.34	47.32	47.01	46.79	47.01	47.63	47.39	45.92	47.80	46.87	0.47
P_2O_5	0.32	0.58	0.52	0.19	0.45	0.58	0.26	0.45	0.65	0.65	0.19	0.32	0.26	0.00	0.65	0.36	0.18
SiO_2	62.14	63.85	62.82	63.48	62.94	62.08	63.44	64.49	63.48	63.53	64.11	64.49	63.71	62.08	64.55	63.23	0.66
TiO_2	0.17	0.19	0.00	0.02	0.00	0.02	0.00	0.09	0.02	0.12	0.05	0.00	0.04	0.00	0.29	0.06	0.08
Al_2O_3	11.96	11.90	12.53	11.47	11.42	11.82	12.14	11.89	11.85	12.17	11.77	12.26	12.29	11.30	12.53	11.92	0.29
FeO	0.30	0.12	0.36	0.00	0.24	0.18	0.06	0.09	0.06	0.24	0.15	0.27	0.33	0.00	0.36	0.15	0.09
MnO	0.10	0.00	0.00	0.10	0.16	0.03	0.00	0.00	0.00	0.19	0.00	0.10	0.00	0.00	0.19	0.05	0.06
MgO	0.04	0.06	0.00	0.00	0.00	0.01	0.04	0.00	0.00	0.07	0.02	0.03	0.00	0.00	0.11	0.02	0.03
CaO	0.29	0.35	0.36	0.51	0.29	0.23	0.45	0.42	0.24	0.21	0.24	0.32	0.20	0.05	0.59	0.32	0.11
Na_2O	3.04	2.94	3.13	3.12	2.89	3.09	2.76	2.93	3.16	2.99	3.13	2.83	2.85	2.51	3.52	3.06	0.22
K_2O	9.36	9.54	9.57	8.94	9.81	9.17	10.26	9.48	9.55	8.97	9.51	9.66	9.95	8.89	10.34	9.53	0.37
F	0.26	0.04	0.12	0.25	0.10	0.17	0.19	0.20	0.18	0.10	0.18	0.19	0.21	0.00	0.34	0.17	0.08
Cl	0.05	0.07	0.22	0.12	0.07	0.12	0.00	0.02	0.10	0.00	0.00	0.02	0.00	0.00	0.22	0.07	0.06
total	87.90	89.62	89.53	88.07	88.31	87.40	89.52	89.97	89.19	89.20	89.28	90.40	89.73	87.36	90.63	88.85	0.84
H_2O	12.10	10.38	10.47	11.93	11.69	12.60	10.48	10.03	10.81	10.80	10.72	9.60	10.27	9.37	12.64	11.15	0.84
recalculated to 100 % total:																	
P_2O_5	0.37	0.65	0.58	0.22	0.51	0.66	0.29	0.50	0.72	0.72	0.22	0.36	0.29	0.00	0.72	0.41	0.20
SiO_2	70.69	71.25	70.16	72.08	71.27	71.03	70.86	71.68	71.18	71.22	71.81	71.35	70.99	70.16	72.17	71.16	0.50
TiO_2	0.20	0.21	0.00	0.02	0.00	0.02	0.00	0.10	0.02	0.13	0.06	0.00	0.04	0.00	0.33	0.07	0.09
Al_2O_3	13.61	13.28	14.00	13.02	12.93	13.52	13.56	13.22	13.29	13.64	13.18	13.56	13.70	12.89	14.12	13.42	0.30
FeO	0.34	0.13	0.40	0.00	0.27	0.21	0.07	0.10	0.07	0.27	0.17	0.30	0.37	0.00	0.40	0.17	0.10
MnO	0.11	0.00	0.00	0.11	0.18	0.04	0.00	0.00	0.00	0.21	0.00	0.11	0.00	0.00	0.21	0.06	0.07
MgO	0.04	0.07	0.00	0.00	0.00	0.01	0.04	0.00	0.00	0.08	0.02	0.03	0.00	0.00	0.13	0.03	0.03
CaO	0.33	0.39	0.40	0.58	0.33	0.26	0.51	0.47	0.27	0.24	0.27	0.35	0.22	0.05	0.66	0.36	0.12
Na_2O	3.46	3.28	3.50	3.54	3.27	3.54	3.08	3.25	3.54	3.36	3.51	3.13	3.17	2.87	3.96	3.44	0.24
K_2O	10.64	10.65	10.69	10.15	11.11	10.49	11.46	10.54	10.71	10.06	10.65	10.69	11.08	10.06	11.58	10.72	0.39
F	0.29	0.04	0.13	0.29	0.11	0.20	0.22	0.22	0.20	0.11	0.20	0.21	0.24	0.00	0.39	0.19	0.09
Cl	0.06	0.08	0.25	0.14	0.08	0.14	0.00	0.03	0.11	0.00	0.00	0.03	0.00	0.00	0.25	0.07	0.07

Table 57: EMP data of glass in Type 5 run G49 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 13.2 wt.%; 43 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.20	0.17	0.06	0.28	0.17	0.11	0.00	0.31	0.17	0.03	0.14	0.20	0.06	0.28	0.14	0.17	0.00	0.00	0.14	0.11	0.25	0.00	0.14	0.09	0.09	0.11	0.23
Si	30.28	30.49	30.49	29.99	30.55	29.81	29.52	30.02	30.28	31.06	30.41	30.58	30.62	30.43	30.61	30.48	30.54	31.03	30.29	30.12	29.86	30.44	30.48	30.09	30.37	30.22	30.36
Ti	0.13	0.11	0.09	0.04	0.00	0.10	0.07	0.00	0.05	0.02	0.00	0.00	0.00	0.04	0.01	0.09	0.00	0.00	0.12	0.09	0.06	0.09	0.02	0.00	0.05	0.00	0.11
Al	6.73	7.07	6.84	6.89	6.57	6.83	6.46	6.75	6.66	6.64	6.88	6.84	6.62	6.88	6.80	6.79	6.79	6.51	6.78	6.52	6.67	6.82	6.58	6.51	6.89	6.95	6.84
Fe	0.12	0.19	0.02	0.09	0.02	0.12	0.28	0.02	0.12	0.16	0.23	0.12	0.23	0.23	0.05	0.26	0.00	0.21	0.26	0.14	0.19	0.07	0.40	0.12	0.05	0.32	0.09
Mn	0.00	0.05	0.00	0.22	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.05	0.05	0.00	0.10	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.03	0.00	0.05
Mg	0.00	0.01	0.06	0.02	0.05	0.01	0.04	0.03	0.02	0.02	0.02	0.02	0.03	0.05	0.01	0.00	0.03	0.02	0.02	0.00	0.01	0.00	0.02	0.00	0.02	0.00	0.00
Ca	0.13	0.21	0.07	0.30	0.15	0.23	0.27	0.12	0.17	0.23	0.17	0.24	0.05	0.22	0.18	0.23	0.24	0.25	0.18	0.16	0.18	0.36	0.22	0.38	0.29	0.13	0.39
Na	2.16	2.40	1.98	2.25	2.47	2.68	2.88	2.80	1.89	2.47	1.99	2.25	2.45	2.52	2.29	2.34	2.18	2.37	2.41	2.12	2.13	2.47	2.10	2.33	2.48	2.57	2.48
K	7.40	7.59	7.85	7.77	7.57	8.41	7.57	7.95	7.94	7.83	7.66	7.93	8.02	7.56	7.74	7.52	8.15	8.14	7.90	7.98	7.90	7.54	7.53	7.60	8.19	8.62	7.96
F	0.23	0.14	0.28	0.17	0.20	0.17	0.30	0.16	0.12	0.12	0.15	0.24	0.14	0.19	0.23	0.23	0.18	0.12	0.06	0.14	0.21	0.15	0.27	0.01	0.16	0.20	0.12
Cl	0.12	0.22	0.15	0.22	0.27	0.63	0.51	0.15	0.12	0.15	0.15	0.25	0.32	0.27	0.05	0.25	0.15	0.27	0.25	0.29	0.34	0.12	0.10	0.37	0.29	0.20	0.37
total	47.50	48.64	47.88	48.23	48.02	49.10	47.90	48.30	47.65	48.71	47.79	48.71	48.59	48.67	48.19	48.35	48.43	48.92	48.40	47.68	47.81	48.06	47.93	47.50	48.89	49.32	48.99
P_2O_5	0.45	0.39	0.13	0.65	0.39	0.26	0.00	0.71	0.39	0.06	0.32	0.45	0.13	0.65	0.33	0.39	0.00	0.00	0.32	0.26	0.58	0.00	0.33	0.19	0.19	0.26	0.52
SiO_2	64.78	65.22	65.23	64.16	65.35	63.77	63.14	64.21	64.79	66.44	65.06	65.42	65.51	65.09	65.47	65.22	65.34	66.39	64.80	64.43	63.88	65.11	65.22	64.38	64.97	64.65	64.94
TiO_2	0.22	0.19	0.16	0.07	0.00	0.17	0.12	0.00	0.09	0.04	0.00	0.00	0.00	0.07	0.02	0.16	0.00	0.00	0.21	0.16	0.10	0.16	0.04	0.00	0.09	0.00	0.19
Al_2O_3	12.71	13.36	12.93	13.02	12.41	12.91	12.21	12.76	12.59	12.55	13.00	12.92	12.51	13.00	12.85	12.82	12.83	12.30	12.81	12.32	12.60	12.89	12.43	12.30	13.01	13.13	12.92
FeO	0.15	0.24	0.03	0.12	0.03	0.15	0.36	0.03	0.15	0.21	0.30	0.15	0.30	0.30	0.06	0.33	0.00	0.27	0.33	0.18	0.24	0.09	0.51	0.15	0.06	0.42	0.12
MnO	0.00	0.06	0.00	0.29	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.06	0.06	0.00	0.13	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.03	0.00	0.06
MgO	0.00	0.02	0.09	0.03	0.08	0.02	0.06	0.04	0.04	0.03	0.04	0.04	0.04	0.08	0.01	0.00	0.04	0.04	0.03	0.00	0.02	0.00	0.04	0.00	0.03	0.00	0.00
CaO	0.18	0.29	0.09	0.42	0.21	0.32	0.38	0.17	0.24	0.32	0.24	0.33	0.08	0.30	0.26	0.32	0.33	0.35	0.26	0.23	0.26	0.50	0.30	0.53	0.41	0.18	0.54
Na_2O	2.92	3.24	2.67	3.03	3.33	3.61	3.88	3.78	2.55	3.33	2.68	3.03	3.31	3.40	3.08	3.16	2.94	3.19	3.24	2.85	2.87	3.33	2.83	3.14	3.34	3.46	3.34
K_2O	8.92	9.14	9.45	9.35	9.12	10.14	9.12	9.57	9.56	9.43	9.22	9.56	9.66	9.10	9.32	9.06	9.82	9.80	9.51	9.62	9.52	9.08	9.07	9.16	9.86	10.39	9.59
F	0.23	0.14	0.28	0.16	0.20	0.17	0.30	0.16	0.12	0.12	0.15	0.24	0.14	0.19	0.23	0.22	0.18	0.12	0.06	0.13	0.21	0.15	0.27	0.01	0.16	0.20	0.12
Cl	0.12	0.22	0.15	0.22	0.27	0.63	0.51	0.15	0.12	0.15	0.15	0.25	0.32	0.27	0.05	0.25	0.15	0.27	0.25	0.29	0.34	0.12	0.10	0.37	0.29	0.20	0.37
total	90.56	92.39	91.05	91.39	91.24	91.92	89.84	91.48	90.69	92.57	91.05	92.30	91.92	92.32	91.69	91.77	91.75	92.62	91.74	90.35	90.46	91.34	91.08	90.14	92.32	92.76	92.58
H_2O	9.44	7.61	8.95	8.61	8.76	8.08	10.16	8.52	9.31	7.43	8.95	7.70	8.08	7.68	8.31	8.23	8.25	7.38	8.26	9.65	9.54	8.66	8.92	9.86	7.68	7.24	7.42
recalculated to 100 % total:																											
P_2O_5	0.50	0.42	0.14	0.71	0.43	0.28	0.00	0.78	0.43	0.07	0.35	0.49	0.14	0.70	0.35	0.42	0.00	0.00	0.35	0.29	0.64	0.00	0.36	0.22	0.21	0.28	0.56
SiO_2	71.53	70.59	71.64	70.20	71.62	69.37	70.28	70.19	71.44	71.77	71.45	70.88	71.26	70.51	71.41	71.07	71.21	71.68	70.64	71.32	70.62	71.28	71.60	71.42	70.38	69.70	70.15
TiO_2	0.25	0.20	0.17	0.07	0.00	0.19	0.13	0.00	0.10	0.04	0.00	0.00	0.00	0.07	0.02	0.17	0.00	0.00	0.23	0.17	0.11	0.17	0.04	0.00	0.09	0.00	0.21
Al_2O_3	14.03	14.46	14.20	14.24	13.61	14.05	13.59	13.95	13.88	13.55	14.28	14.00	13.61	14.08	14.02	13.97	13.99	13.28	13.97	13.63	13.93	14.12	13.65	13.64	14.10	14.16	13.95
FeO	0.16	0.26	0.03	0.13	0.03	0.16	0.40	0.03	0.16	0.23	0.33	0.16	0.32	0.32	0.06	0.36	0.00	0.29	0.36	0.20	0.26	0.10	0.56	0.17	0.06	0.45	0.13
MnO	0.00	0.07	0.00	0.31	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.07	0.07	0.00	0.14	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.03	0.00	0.07
MgO	0.00	0.02	0.10	0.03	0.09	0.02	0.07	0.05	0.04	0.03	0.04	0.04	0.05	0.09	0.01	0.00	0.05	0.04	0.03	0.00	0.02	0.00	0.04	0.00	0.03	0.00	0.00
CaO	0.20	0.31	0.10	0.46	0.23	0.34	0.42	0.18	0.27	0.34	0.27	0.36	0.08	0.33	0.28	0.35	0.36	0.37	0.28	0.25	0.28	0.55	0.33	0.59	0.44	0.20	0.59
Na_2O	3.22	3.51	2.93	3.31	3.65	3.93	4.32	4.13	2.81	3.59	2.94	3.29	3.60	3.69	3.36	3.44	3.21	3.44	3.53	3.16	3.17	3.64	3.11	3.48	3.62	3.73	3.61
K_2O	9.85	9.89	10.38	10.23	9.99	11.03	10.15	10.46	10.55	10.19	10.13	10.36	10.51	9.86	10.16	9.87	10.71	10.58	10.37	10.64	10.52	9.94	9.96	10.16	10.68	11.20	10.36
F	0.26	0.15	0.31	0.18	0.22	0.18	0.34	0.17	0.13	0.13	0.16	0.26	0.15	0.20	0.25	0.25	0.19	0.13	0.07	0.15	0.23	0.16	0.29	0.02	0.17	0.21	0.13
Cl	0.14	0.24	0.16	0.24	0.30	0.69	0.57	0.16	0.13	0.16	0.16	0.27	0.35	0.29	0.05	0.27	0.16	0.29	0.27	0.33	0.38	0.13	0.11	0.41	0.32	0.21	0.40

Table 57 (continued)**:** EMP data of glass in Type 5 run G49.

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	min	max	mean	σ
P	0.00	0.11	0.00	0.17	0.11	0.09	0.17	0.00	0.00	0.17	0.00	0.11	0.09	0.17	0.28	0.00	0.00	0.31	0.12	0.09
Si	29.98	29.76	29.60	29.52	30.41	29.85	29.64	30.12	30.68	30.13	30.36	30.68	29.82	30.58	30.54	30.66	29.52	31.06	30.27	0.38
Ti	0.07	0.12	0.04	0.17	0.21	0.07	0.09	0.00	0.10	0.00	0.02	0.16	0.10	0.00	0.06	0.11	0.00	0.21	0.06	0.05
Al	6.61	6.56	6.68	6.69	6.72	6.62	6.84	6.69	6.77	6.86	6.81	6.59	6.58	6.70	6.70	6.72	6.46	7.07	6.73	0.13
Fe	0.00	0.19	0.16	0.19	0.12	0.07	0.28	0.19	0.16	0.23	0.09	0.14	0.21	0.28	0.30	0.21	0.00	0.40	0.16	0.09
Mn	0.00	0.00	0.00	0.15	0.10	0.05	0.03	0.00	0.00	0.00	0.00	0.05	0.07	0.00	0.00	0.00	0.00	0.22	0.03	0.05
Mg	0.00	0.00	0.02	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.02	0.03	0.01	0.04	0.00	0.00	0.00	0.06	0.01	0.02
Ca	0.22	0.28	0.20	0.30	0.24	0.24	0.26	0.15	0.18	0.12	0.18	0.24	0.25	0.19	0.25	0.22	0.05	0.39	0.22	0.07
Na	2.41	2.63	2.48	2.14	2.43	2.61	2.58	2.35	2.41	2.14	2.34	2.37	2.68	2.54	2.32	2.31	1.89	2.88	2.38	0.21
K	7.53	7.73	8.05	7.93	7.54	7.84	8.15	7.07	8.18	7.63	8.33	7.75	7.19	7.88	7.73	7.57	7.07	8.62	7.81	0.31
F	0.18	0.06	0.24	0.14	0.26	0.18	0.23	0.16	0.21	0.13	0.06	0.10	0.13	0.11	0.19	0.02	0.01	0.30	0.16	0.07
Cl	0.42	0.52	0.25	0.03	0.17	0.37	0.29	0.44	0.27	0.29	0.15	0.00	0.20	0.20	0.22	0.05	0.00	0.63	0.24	0.13
total	47.43	47.96	47.72	47.42	48.29	47.98	48.60	47.17	48.95	47.70	48.35	48.21	47.32	48.69	48.60	47.87	47.17	49.32	48.20	0.53
P_2O_5	0.00	0.26	0.00	0.39	0.26	0.19	0.39	0.00	0.00	0.39	0.00	0.26	0.19	0.39	0.65	0.00	0.00	0.71	0.27	0.21
SiO_2	64.14	63.66	63.32	63.15	65.05	63.86	63.41	64.43	65.63	64.45	64.95	65.64	63.79	65.42	65.34	65.59	63.14	66.44	64.76	0.81
TiO_2	0.12	0.21	0.07	0.28	0.35	0.12	0.16	0.00	0.17	0.00	0.04	0.26	0.17	0.00	0.10	0.19	0.00	0.35	0.10	0.09
Al_2O_3	12.50	12.39	12.63	12.64	12.69	12.50	12.92	12.64	12.78	12.95	12.86	12.46	12.42	12.66	12.65	12.70	12.21	13.36	12.71	0.25
FeO	0.00	0.24	0.21	0.24	0.15	0.09	0.36	0.24	0.21	0.30	0.12	0.18	0.27	0.36	0.39	0.27	0.00	0.51	0.21	0.12
MnO	0.00	0.00	0.00	0.19	0.13	0.06	0.03	0.00	0.00	0.00	0.00	0.06	0.10	0.00	0.00	0.00	0.00	0.29	0.04	0.07
MgO	0.00	0.00	0.03	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.03	0.05	0.02	0.07	0.00	0.00	0.00	0.09	0.02	0.03
CaO	0.30	0.39	0.27	0.42	0.33	0.33	0.36	0.21	0.26	0.17	0.26	0.33	0.35	0.27	0.35	0.30	0.08	0.54	0.30	0.10
Na_2O	3.25	3.55	3.34	2.88	3.27	3.52	3.48	3.17	3.25	2.88	3.15	3.19	3.61	3.42	3.13	3.12	2.55	3.88	3.20	0.29
K_2O	9.07	9.32	9.70	9.56	9.08	9.44	9.82	8.52	9.85	9.20	10.03	9.33	8.66	9.49	9.32	9.11	8.52	10.39	9.41	0.37
F	0.18	0.06	0.23	0.14	0.26	0.18	0.22	0.16	0.20	0.13	0.06	0.10	0.13	0.11	0.19	0.02	0.01	0.30	0.16	0.07
Cl	0.42	0.52	0.25	0.03	0.17	0.37	0.29	0.44	0.27	0.30	0.15	0.00	0.20	0.20	0.22	0.05	0.00	0.63	0.24	0.13
total	89.82	90.45	89.90	89.85	91.59	90.52	91.36	89.64	92.47	90.64	91.58	91.82	89.81	92.30	92.20	91.33	89.64	92.76	91.32	0.92
H_2O	10.18	9.55	10.10	10.15	8.41	9.48	8.64	10.36	7.53	9.36	8.42	8.18	10.19	7.70	7.80	8.67	7.24	10.36	8.68	0.92
recalculated to 100 % total:																				
P_2O_5	0.00	0.29	0.00	0.43	0.28	0.22	0.42	0.00	0.00	0.43	0.00	0.28	0.22	0.42	0.70	0.00	0.00	0.78	0.30	0.23
SiO_2	71.42	70.38	70.43	70.28	71.02	70.55	69.41	71.88	70.97	71.11	70.92	71.48	71.02	70.88	70.87	71.82	69.37	71.88	70.92	0.64
TiO_2	0.14	0.23	0.08	0.31	0.38	0.13	0.17	0.00	0.19	0.00	0.04	0.28	0.19	0.00	0.11	0.21	0.00	0.38	0.11	0.10
Al_2O_3	13.91	13.70	14.05	14.07	13.86	13.81	14.15	14.10	13.82	14.29	14.04	13.56	13.83	13.72	13.72	13.90	13.28	14.46	13.92	0.24
FeO	0.00	0.26	0.23	0.27	0.16	0.10	0.39	0.27	0.23	0.33	0.13	0.19	0.30	0.39	0.42	0.29	0.00	0.56	0.23	0.13
MnO	0.00	0.00	0.00	0.21	0.14	0.07	0.04	0.00	0.00	0.00	0.00	0.07	0.11	0.00	0.00	0.00	0.00	0.31	0.04	0.07
MgO	0.00	0.00	0.03	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.03	0.06	0.02	0.08	0.00	0.00	0.00	0.10	0.03	0.03
CaO	0.34	0.43	0.30	0.47	0.36	0.37	0.40	0.24	0.28	0.18	0.28	0.36	0.39	0.29	0.38	0.33	0.08	0.59	0.33	0.11
Na_2O	3.62	3.93	3.72	3.21	3.57	3.89	3.81	3.54	3.51	3.18	3.44	3.47	4.02	3.71	3.39	3.41	2.81	4.32	3.51	0.32
K_2O	10.10	10.30	10.79	10.64	9.91	10.43	10.75	9.50	10.65	10.15	10.95	10.17	9.65	10.28	10.10	9.98	9.50	11.20	10.30	0.37
F	0.20	0.06	0.26	0.16	0.28	0.20	0.25	0.18	0.22	0.14	0.06	0.11	0.15	0.12	0.20	0.02	0.02	0.34	0.18	0.07
Cl	0.46	0.57	0.27	0.03	0.19	0.41	0.32	0.49	0.29	0.33	0.16	0.00	0.22	0.21	0.24	0.05	0.00	0.69	0.27	0.15

Table 58: EMP data of glass in Type 5 run G98 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 15.4 wt.%; 45 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.06	0.00	0.09	0.06	0.03	0.03	0.18	0.03	0.00	0.00	0.00	0.06	0.09	0.00	0.00	0.06	0.00	0.00	0.09	0.00	0.06	0.00	0.09	0.00	0.06	0.00	0.03
Si	30.67	29.97	30.22	29.92	30.59	30.27	29.69	30.48	30.02	29.59	30.36	30.30	29.70	30.60	30.16	30.53	30.62	30.70	30.22	30.55	30.75	30.43	30.40	30.39	29.68	30.61	29.87
Ti	0.00	0.00	0.09	0.12	0.14	0.11	0.00	0.05	0.07	0.12	0.01	0.23	0.00	0.15	0.04	0.12	0.04	0.05	0.02	0.14	0.15	0.11	0.07	0.12	0.00	0.08	0.16
Al	6.51	6.60	6.25	6.65	6.54	6.44	6.38	6.43	6.53	6.45	6.42	6.44	6.61	6.75	6.61	6.80	6.41	6.52	6.34	6.33	6.58	6.66	6.55	6.56	6.46	6.40	6.73
Fe	0.10	0.20	0.29	0.24	0.46	0.32	0.07	0.39	0.37	0.27	0.00	0.17	0.20	0.29	0.00	0.24	0.05	0.34	0.15	0.44	0.24	0.27	0.12	0.10	0.29	0.20	0.15
Mn	0.00	0.00	0.05	0.13	0.20	0.03	0.05	0.23	0.00	0.03	0.03	0.13	0.20	0.03	0.00	0.00	0.00	0.00	0.00	0.15	0.03	0.00	0.13	0.10	0.00	0.05	0.03
Mg	0.01	0.01	0.00	0.01	0.00	0.04	0.00	0.07	0.00	0.06	0.00	0.04	0.02	0.01	0.00	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.07
Ca	0.53	0.33	0.38	0.71	0.81	0.70	0.53	0.51	0.52	0.45	0.38	0.64	0.70	0.51	0.77	0.48	0.67	0.41	0.44	0.52	0.50	0.57	0.58	0.83	0.57	0.71	0.60
Na	3.18	3.08	2.91	3.05	3.01	3.02	2.72	2.90	3.02	3.34	3.41	3.09	2.87	3.33	3.08	3.01	3.13	2.95	2.87	3.12	3.15	2.96	2.89	3.04	3.38	3.04	2.90
K	6.11	6.42	5.73	5.85	6.10	6.13	6.24	6.18	6.38	6.25	5.56	6.13	6.66	6.00	5.53	5.93	6.22	6.38	6.52	5.92	5.80	5.89	6.43	5.58	5.71	5.90	5.97
F	0.25	0.16	0.03	0.16	0.19	0.24	0.21	0.09	0.08	0.13	0.01	0.15	0.00	0.20	0.10	0.00	0.14	0.15	0.06	0.18	0.00	0.07	0.16	0.04	0.09	0.17	0.24
Cl	0.08	0.05	0.00	0.05	0.05	0.05	0.13	0.00	0.00	0.00	0.00	0.05	0.08	0.05	0.00	0.05	0.00	0.03	0.00	0.05	0.00	0.11	0.03	0.00	0.29	0.00	0.03
total	47.50	46.81	46.04	46.95	48.12	47.36	46.21	47.35	46.97	46.69	46.18	47.43	47.14	47.90	46.29	47.22	47.27	47.54	46.72	47.41	47.26	47.05	47.45	46.76	46.54	47.16	46.78
P_2O_5	0.14	0.00	0.21	0.14	0.07	0.07	0.41	0.07	0.00	0.00	0.00	0.14	0.20	0.00	0.00	0.14	0.00	0.00	0.21	0.00	0.14	0.00	0.21	0.00	0.14	0.00	0.07
SiO_2	65.62	64.11	64.65	64.02	65.44	64.75	63.52	65.21	64.22	63.30	64.94	64.82	63.54	65.46	64.53	65.31	65.50	65.68	64.64	65.36	65.78	65.10	65.03	65.01	63.50	65.48	63.91
TiO_2	0.00	0.00	0.16	0.19	0.23	0.18	0.00	0.08	0.12	0.19	0.02	0.39	0.00	0.25	0.06	0.19	0.06	0.08	0.04	0.23	0.25	0.18	0.12	0.19	0.00	0.14	0.27
Al_2O_3	12.31	12.46	11.81	12.56	12.35	12.16	12.05	12.15	12.33	12.19	12.12	12.18	12.48	12.75	12.49	12.85	12.10	12.31	11.97	11.96	12.44	12.58	12.37	12.39	12.22	12.10	12.72
FeO	0.12	0.25	0.38	0.31	0.59	0.41	0.09	0.50	0.47	0.35	0.00	0.22	0.25	0.38	0.00	0.31	0.06	0.44	0.19	0.56	0.31	0.34	0.16	0.13	0.38	0.25	0.19
MnO	0.00	0.00	0.07	0.16	0.26	0.03	0.07	0.30	0.00	0.03	0.03	0.16	0.26	0.03	0.00	0.00	0.00	0.00	0.00	0.20	0.03	0.00	0.16	0.13	0.00	0.07	0.03
MgO	0.01	0.02	0.00	0.02	0.00	0.06	0.00	0.12	0.00	0.10	0.00	0.07	0.04	0.01	0.00	0.00	0.00	0.03	0.04	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.12
CaO	0.74	0.46	0.52	1.00	1.13	0.98	0.75	0.71	0.73	0.63	0.52	0.90	0.98	0.71	1.08	0.68	0.93	0.58	0.61	0.73	0.69	0.79	0.81	1.17	0.80	1.00	0.85
Na_2O	4.29	4.15	3.93	4.11	4.06	4.08	3.67	3.91	4.07	4.51	4.60	4.16	3.87	4.48	4.15	4.06	4.22	3.97	3.86	4.20	4.25	3.99	3.90	4.10	4.56	4.10	3.91
K_2O	7.36	7.74	6.90	7.05	7.35	7.38	7.51	7.44	7.68	7.53	6.70	7.38	8.03	7.22	6.66	7.14	7.49	7.69	7.86	7.13	6.99	7.10	7.75	6.73	6.88	7.11	7.19
F	0.25	0.16	0.03	0.15	0.19	0.24	0.21	0.09	0.08	0.13	0.01	0.15	0.00	0.20	0.10	0.00	0.14	0.15	0.06	0.18	0.00	0.07	0.16	0.04	0.09	0.17	0.24
Cl	0.08	0.05	0.00	0.05	0.05	0.05	0.13	0.00	0.00	0.00	0.00	0.05	0.08	0.05	0.00	0.05	0.00	0.03	0.00	0.05	0.00	0.11	0.03	0.00	0.30	0.00	0.03
total	90.79	89.32	88.63	89.69	91.64	90.28	88.29	90.53	89.66	88.90	88.95	90.54	89.72	91.44	89.03	90.72	90.46	90.89	89.45	90.52	90.88	90.20	90.63	89.87	88.74	90.34	89.42
H_2O	9.21	10.68	11.37	10.31	8.36	9.72	11.71	9.47	10.34	11.10	11.05	9.46	10.28	8.56	10.97	9.28	9.54	9.11	10.55	9.48	9.12	9.80	9.37	10.13	11.26	9.66	10.58
recalculated to 100 % total:																											
P_2O_5	0.15	0.00	0.23	0.15	0.08	0.08	0.46	0.08	0.00	0.00	0.00	0.15	0.23	0.00	0.00	0.15	0.00	0.00	0.23	0.00	0.15	0.00	0.23	0.00	0.15	0.00	0.08
SiO_2	72.27	71.77	72.95	71.37	71.41	71.72	71.94	72.03	71.63	71.20	73.00	71.60	70.82	71.58	72.49	71.99	72.41	72.27	72.27	72.20	72.38	72.17	71.75	72.34	71.56	72.48	71.47
TiO_2	0.00	0.00	0.18	0.22	0.25	0.19	0.00	0.08	0.13	0.22	0.02	0.43	0.00	0.28	0.07	0.21	0.06	0.08	0.04	0.26	0.28	0.19	0.13	0.22	0.00	0.15	0.30
Al_2O_3	13.56	13.96	13.32	14.00	13.48	13.47	13.65	13.42	13.75	13.71	13.63	13.45	13.91	13.94	14.03	14.17	13.38	13.55	13.39	13.22	13.68	13.94	13.65	13.79	13.77	13.39	14.23
FeO	0.14	0.28	0.43	0.35	0.65	0.45	0.11	0.55	0.53	0.39	0.00	0.24	0.28	0.41	0.00	0.35	0.07	0.48	0.21	0.62	0.35	0.38	0.17	0.14	0.42	0.28	0.21
MnO	0.00	0.00	0.07	0.18	0.29	0.04	0.07	0.33	0.00	0.04	0.04	0.18	0.29	0.04	0.00	0.00	0.00	0.00	0.00	0.22	0.04	0.00	0.18	0.15	0.00	0.07	0.04
MgO	0.01	0.02	0.00	0.02	0.00	0.06	0.00	0.13	0.00	0.11	0.00	0.08	0.04	0.01	0.00	0.00	0.00	0.03	0.04	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.13
CaO	0.82	0.51	0.59	1.11	1.23	1.09	0.84	0.78	0.81	0.71	0.59	0.99	1.09	0.77	1.22	0.74	1.03	0.63	0.68	0.80	0.76	0.88	0.90	1.30	0.90	1.10	0.95
Na_2O	4.73	4.64	4.43	4.59	4.43	4.52	4.16	4.32	4.54	5.07	5.17	4.60	4.31	4.90	4.66	4.47	4.67	4.37	4.32	4.64	4.68	4.42	4.30	4.56	5.14	4.54	4.37
K_2O	8.10	8.66	7.78	7.86	8.02	8.18	8.51	8.22	8.57	8.47	7.53	8.15	8.95	7.90	7.48	7.87	8.28	8.46	8.78	7.88	7.69	7.87	8.55	7.48	7.75	7.87	8.04
F	0.27	0.18	0.03	0.17	0.21	0.26	0.23	0.09	0.09	0.15	0.01	0.17	0.00	0.21	0.11	0.00	0.16	0.16	0.06	0.20	0.00	0.07	0.18	0.05	0.10	0.18	0.27
Cl	0.09	0.06	0.00	0.06	0.06	0.06	0.15	0.00	0.00	0.00	0.00	0.06	0.09	0.06	0.00	0.06	0.00	0.03	0.00	0.06	0.00	0.12	0.03	0.00	0.33	0.00	0.03

Table 58 (continued)**:** EMP data of glass in Type 5 run G98.

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	min	max	mean	σ
P	0.03	0.00	0.09	0.21	0.00	0.00	0.18	0.12	0.06	0.09	0.09	0.12	0.00	0.09	0.03	0.00	0.00	0.09	0.00	0.21	0.05	0.05
Si	30.42	30.46	30.04	30.30	30.67	30.79	30.33	30.27	30.29	30.10	30.17	30.00	29.97	30.88	29.95	29.89	30.43	30.12	29.59	30.88	30.27	0.32
Ti	0.08	0.01	0.07	0.01	0.13	0.00	0.00	0.10	0.06	0.08	0.00	0.00	0.07	0.06	0.05	0.09	0.07	0.14	0.00	0.23	0.07	0.06
Al	6.81	6.77	6.50	6.64	6.19	6.37	6.22	6.50	6.51	6.38	6.37	6.55	6.46	6.53	6.54	6.32	6.19	6.59	6.19	6.81	6.50	0.15
Fe	0.32	0.34	0.17	0.34	0.32	0.34	0.32	0.41	0.37	0.41	0.17	0.29	0.10	0.19	0.39	0.07	0.39	0.24	0.00	0.46	0.25	0.12
Mn	0.00	0.00	0.00	0.03	0.05	0.18	0.08	0.00	0.18	0.10	0.00	0.05	0.13	0.10	0.03	0.05	0.00	0.08	0.00	0.23	0.06	0.07
Mg	0.04	0.03	0.00	0.05	0.01	0.04	0.00	0.00	0.02	0.04	0.00	0.03	0.00	0.01	0.04	0.00	0.00	0.00	0.00	0.07	0.02	0.02
Ca	0.70	0.48	0.79	0.68	0.82	0.63	0.67	0.76	0.48	0.63	0.48	0.63	0.59	0.68	0.64	0.53	0.66	0.48	0.33	0.83	0.59	0.13
Na	3.12	2.98	2.75	3.28	3.09	3.29	2.92	3.12	3.12	2.90	3.05	2.87	3.02	2.86	3.18	3.31	3.18	3.05	2.72	3.41	3.06	0.16
K	6.16	5.92	6.06	6.10	6.15	5.66	5.70	5.94	5.78	6.17	5.99	6.01	6.13	6.26	5.78	6.04	6.09	5.76	5.53	6.66	6.03	0.26
F	0.14	0.04	0.21	0.04	0.12	0.04	0.25	0.00	0.05	0.11	0.09	0.29	0.22	0.21	0.17	0.19	0.06	0.12	0.00	0.29	0.13	0.08
Cl	0.13	0.05	0.03	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.00	0.08	0.05	0.00	0.00	0.05	0.05	0.00	0.00	0.29	0.04	0.05
total	47.95	47.09	46.70	47.66	47.53	47.36	46.72	47.23	46.91	47.01	46.41	46.93	46.73	47.85	46.78	46.54	47.13	46.68	46.04	48.12	47.05	0.48
P_2O_5	0.07	0.00	0.21	0.48	0.00	0.00	0.41	0.27	0.14	0.21	0.21	0.27	0.00	0.21	0.07	0.00	0.00	0.21	0.00	0.48	0.11	0.13
SiO_2	65.08	65.16	64.26	64.83	65.62	65.87	64.89	64.76	64.80	64.39	64.54	64.18	64.12	66.06	64.07	63.95	65.10	64.45	63.30	66.06	64.77	0.69
TiO_2	0.14	0.02	0.12	0.02	0.21	0.00	0.00	0.17	0.10	0.14	0.00	0.00	0.12	0.10	0.08	0.16	0.12	0.23	0.00	0.39	0.12	0.09
Al_2O_3	12.86	12.79	12.28	12.54	11.69	12.03	11.76	12.28	12.30	12.06	12.03	12.39	12.20	12.33	12.36	11.94	11.69	12.45	11.69	12.86	12.28	0.29
FeO	0.41	0.44	0.22	0.44	0.41	0.44	0.41	0.53	0.47	0.53	0.22	0.38	0.13	0.25	0.50	0.09	0.50	0.31	0.00	0.59	0.32	0.16
MnO	0.00	0.00	0.00	0.03	0.07	0.23	0.10	0.00	0.23	0.13	0.00	0.07	0.16	0.13	0.03	0.07	0.00	0.10	0.00	0.30	0.08	0.09
MgO	0.07	0.05	0.00	0.08	0.02	0.07	0.00	0.00	0.04	0.06	0.00	0.05	0.00	0.01	0.07	0.00	0.00	0.00	0.00	0.12	0.03	0.03
CaO	0.98	0.68	1.10	0.95	1.15	0.88	0.93	1.06	0.68	0.88	0.68	0.88	0.83	0.95	0.90	0.74	0.93	0.68	0.46	1.17	0.83	0.18
Na_2O	4.20	4.02	3.71	4.42	4.16	4.44	3.94	4.21	4.20	3.91	4.11	3.87	4.07	3.85	4.28	4.46	4.29	4.11	3.67	4.60	4.12	0.22
K_2O	7.42	7.13	7.30	7.35	7.40	6.81	6.87	7.15	6.96	7.43	7.22	7.24	7.39	7.54	6.96	7.27	7.34	6.94	6.66	8.03	7.26	0.31
F	0.14	0.04	0.21	0.04	0.11	0.04	0.25	0.00	0.05	0.11	0.09	0.29	0.22	0.21	0.17	0.19	0.06	0.12	0.00	0.29	0.13	0.08
Cl	0.13	0.05	0.03	0.00	0.00	0.03	0.05	0.00	0.00	0.00	0.00	0.08	0.05	0.00	0.00	0.05	0.05	0.00	0.00	0.29	0.04	0.05
total	91.41	90.35	89.32	91.15	90.79	90.81	89.49	90.44	89.94	89.80	89.05	89.55	89.17	91.54	89.41	88.82	90.04	89.55	88.29	91.64	90.00	0.85
H_2O	8.59	9.65	10.68	8.85	9.21	9.19	10.51	9.56	10.06	10.20	10.95	10.45	10.83	8.46	10.59	11.18	9.96	10.45	8.36	11.71	10.00	0.85
recalculated to 100 % total:																						
P_2O_5	0.08	0.00	0.23	0.53	0.00	0.00	0.46	0.30	0.15	0.23	0.23	0.31	0.00	0.23	0.08	0.00	0.00	0.23	0.00	0.53	0.13	0.14
SiO_2	71.20	72.12	71.94	71.12	72.27	72.53	72.51	71.61	72.05	71.71	72.47	71.67	71.90	72.16	71.65	71.99	72.30	71.97	70.82	73.00	71.96	0.47
TiO_2	0.15	0.02	0.13	0.02	0.24	0.00	0.00	0.19	0.11	0.15	0.00	0.00	0.13	0.11	0.09	0.17	0.13	0.26	0.00	0.43	0.13	0.10
Al_2O_3	14.07	14.16	13.74	13.76	12.87	13.25	13.14	13.57	13.68	13.43	13.51	13.83	13.68	13.47	13.83	13.44	12.98	13.91	12.87	14.23	13.64	0.31
FeO	0.44	0.49	0.25	0.48	0.45	0.48	0.46	0.59	0.52	0.59	0.25	0.42	0.14	0.27	0.56	0.11	0.56	0.35	0.00	0.65	0.35	0.17
MnO	0.00	0.00	0.00	0.04	0.07	0.25	0.11	0.00	0.26	0.15	0.00	0.07	0.18	0.14	0.04	0.07	0.00	0.11	0.00	0.33	0.08	0.10
MgO	0.07	0.05	0.00	0.09	0.02	0.07	0.00	0.00	0.04	0.06	0.00	0.05	0.00	0.01	0.08	0.00	0.00	0.00	0.00	0.13	0.03	0.04
CaO	1.07	0.75	1.23	1.04	1.26	0.97	1.04	1.18	0.75	0.98	0.76	0.98	0.93	1.03	1.00	0.84	1.03	0.75	0.51	1.30	0.92	0.19
Na_2O	4.60	4.45	4.15	4.84	4.58	4.89	4.40	4.65	4.67	4.35	4.61	4.32	4.56	4.20	4.79	5.02	4.76	4.59	4.15	5.17	4.58	0.24
K_2O	8.12	7.89	8.17	8.06	8.16	7.50	7.68	7.90	7.74	8.27	8.10	8.08	8.29	8.24	7.78	8.19	8.15	7.76	7.48	8.95	8.07	0.34
F	0.16	0.05	0.24	0.04	0.13	0.05	0.28	0.00	0.06	0.13	0.10	0.32	0.24	0.23	0.19	0.21	0.06	0.14	0.00	0.32	0.14	0.09
Cl	0.15	0.06	0.03	0.00	0.00	0.03	0.06	0.00	0.00	0.00	0.00	0.09	0.06	0.00	0.00	0.06	0.06	0.00	0.00	0.33	0.04	0.06

Table 59: EMP data of glass in Type 5 run G65 with a cooling rate of 0.3 °C / min, quenched at conditions of 3.5 GPa / 650 °C; bulk water content 2.8 wt.%; 38 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.98	0.46	0.61	0.67	0.55	0.64	0.63	0.64	0.69	0.32	0.49	0.52	0.55	0.75	0.35	0.44	0.38	0.35	0.72	0.52	0.55	0.67	0.49	0.52	0.58	0.55	0.55
Si	25.17	25.34	26.40	25.99	25.36	25.73	24.94	25.17	25.10	26.29	25.87	25.40	25.79	25.58	25.68	26.64	26.18	26.27	25.78	26.07	25.86	26.40	26.15	26.23	26.18	26.41	26.90
Ti	0.00	0.13	0.07	0.04	0.21	0.16	0.12	0.09	0.06	0.01	0.07	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.09	0.05	0.02	0.02	0.05	0.00	0.08	0.07	0.00
Al	5.46	5.59	5.84	6.01	5.48	5.95	5.77	5.92	5.66	5.88	5.93	5.73	5.87	5.67	5.75	6.17	6.02	5.87	6.29	5.66	5.78	5.83	5.82	6.27	5.58	5.98	6.10
Fe	0.24	0.07	0.22	0.19	0.05	0.24	0.07	0.12	0.20	0.02	0.10	0.22	0.10	0.00	0.10	0.22	0.22	0.10	0.12	0.00	0.22	0.10	0.10	0.12	0.02	0.05	0.15
Mn	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.10	0.00	0.03	0.10	0.00	0.00	0.00	0.03	0.00
Mg	0.00	0.00	0.01	0.05	0.00	0.05	0.00	0.00	0.00	0.05	0.02	0.03	0.00	0.00	0.00	0.05	0.02	0.05	0.02	0.00	0.03	0.00	0.04	0.06	0.02	0.01	0.03
Ca	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.01	0.00	0.00	0.04	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Na	2.69	2.36	2.10	2.14	2.52	2.18	2.44	2.48	2.68	2.03	2.34	2.28	2.08	2.33	1.94	1.80	2.14	2.31	2.03	2.30	2.25	2.17	1.86	1.82	2.10	2.39	2.60
K	9.91	10.10	10.20	10.62	9.99	10.37	10.64	10.52	10.06	10.86	10.08	10.27	9.82	10.86	10.62	10.53	10.22	10.01	10.28	10.26	9.44	10.30	10.48	10.23	10.08	10.49	9.37
F	2.13	2.00	1.38	1.68	1.71	1.79	1.83	1.64	1.72	1.91	1.38	1.51	1.55	1.76	1.37	1.22	1.52	1.44	1.37	1.64	1.45	1.56	1.47	1.44	1.64	1.47	1.55
Cl	0.00	0.13	0.00	0.00	0.13	0.00	0.32	0.08	0.03	0.16	0.26	0.05	0.05	0.00	0.13	0.16	0.16	0.00	0.08	0.13	0.03	0.00	0.05	0.00	0.00	0.13	0.05
total	46.59	46.26	46.83	47.38	45.99	47.14	46.76	46.68	46.25	47.54	46.54	46.04	45.86	46.95	46.07	47.22	46.85	46.39	46.87	46.68	45.66	47.14	46.50	46.72	46.29	47.58	47.30
P_2O_5	2.25	1.06	1.40	1.52	1.26	1.46	1.45	1.46	1.59	0.73	1.13	1.19	1.26	1.72	0.80	1.00	0.86	0.80	1.66	1.19	1.26	1.53	1.13	1.20	1.33	1.26	1.27
SiO_2	53.85	54.21	56.48	55.61	54.25	55.04	53.35	53.85	53.70	56.24	55.34	54.33	55.18	54.73	54.94	56.99	56.01	56.20	55.14	55.78	55.32	56.48	55.95	56.13	56.01	56.50	57.55
TiO_2	0.00	0.21	0.12	0.06	0.35	0.27	0.19	0.16	0.10	0.02	0.12	0.00	0.08	0.00	0.08	0.00	0.00	0.00	0.16	0.08	0.04	0.04	0.08	0.00	0.14	0.12	0.00
Al_2O_3	10.31	10.56	11.03	11.35	10.35	11.25	10.91	11.18	10.69	11.12	11.21	10.83	11.09	10.72	10.86	11.67	11.38	11.09	11.88	10.70	10.93	11.01	11.00	11.85	10.55	11.30	11.53
FeO	0.31	0.09	0.28	0.25	0.06	0.31	0.09	0.16	0.25	0.03	0.12	0.28	0.13	0.00	0.13	0.28	0.28	0.13	0.16	0.00	0.28	0.12	0.12	0.16	0.03	0.06	0.19
MnO	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.13	0.00	0.03	0.13	0.00	0.00	0.00	0.03	0.00
MgO	0.00	0.00	0.02	0.08	0.00	0.09	0.00	0.00	0.00	0.09	0.04	0.05	0.00	0.00	0.00	0.08	0.03	0.08	0.03	0.00	0.05	0.00	0.07	0.11	0.04	0.01	0.05
CaO	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.02	0.00	0.00	0.05	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.02	0.00	0.00	0.00
Na_2O	3.63	3.18	2.83	2.88	3.39	2.94	3.30	3.34	3.61	2.74	3.16	3.07	2.80	3.15	2.62	2.43	2.88	3.11	2.74	3.10	3.03	2.92	2.50	2.45	2.83	3.22	3.50
K_2O	11.94	12.17	12.29	12.79	12.04	12.49	12.81	12.67	12.12	13.08	12.14	12.37	11.83	13.08	12.80	12.68	12.31	12.06	12.38	12.36	11.37	12.40	12.62	12.33	12.14	12.64	11.28
F	2.13	2.00	1.38	1.68	1.71	1.79	1.83	1.64	1.72	1.91	1.38	1.51	1.55	1.76	1.37	1.22	1.52	1.44	1.37	1.64	1.45	1.56	1.47	1.44	1.64	1.47	1.55
Cl	0.00	0.13	0.00	0.00	0.13	0.00	0.32	0.08	0.03	0.16	0.26	0.05	0.05	0.00	0.13	0.16	0.16	0.00	0.08	0.13	0.03	0.00	0.05	0.00	0.00	0.13	0.05
total	83.52	82.84	85.24	85.52	82.79	84.91	83.41	83.85	83.15	85.27	84.25	83.09	83.31	84.41	83.22	85.95	84.75	84.30	85.12	84.33	83.18	85.54	84.36	85.06	84.01	86.10	86.31
H_2O	16.48	17.16	14.76	14.48	17.21	15.09	16.59	16.15	16.85	14.73	15.75	16.91	16.69	15.59	16.78	14.05	15.25	15.70	14.88	15.67	16.82	14.46	15.64	14.94	15.99	13.90	13.69
recalculated to 100 % total:																											
P_2O_5	2.69	1.28	1.64	1.78	1.52	1.72	1.74	1.74	1.91	0.85	1.34	1.43	1.52	2.04	0.96	1.16	1.02	0.95	1.95	1.42	1.52	1.78	1.34	1.41	1.58	1.46	1.47
SiO_2	64.48	65.43	66.26	65.03	65.52	64.82	63.96	64.22	64.58	65.95	65.68	65.39	66.23	64.84	66.02	66.31	66.08	66.67	64.78	66.15	66.50	66.03	66.32	65.98	66.67	65.62	66.68
TiO_2	0.00	0.26	0.14	0.07	0.42	0.32	0.23	0.19	0.12	0.02	0.14	0.00	0.09	0.00	0.09	0.00	0.00	0.00	0.18	0.09	0.05	0.04	0.09	0.00	0.16	0.14	0.00
Al_2O_3	12.35	12.75	12.94	13.28	12.50	13.24	13.08	13.33	12.86	13.04	13.30	13.04	13.32	12.70	13.05	13.58	13.43	13.16	13.95	12.69	13.14	12.87	13.04	13.93	12.56	13.13	13.36
FeO	0.38	0.11	0.33	0.29	0.08	0.37	0.11	0.19	0.30	0.04	0.15	0.34	0.15	0.00	0.15	0.33	0.33	0.15	0.18	0.00	0.34	0.15	0.15	0.18	0.04	0.07	0.22
MnO	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.15	0.00	0.04	0.15	0.00	0.00	0.00	0.04	0.00
MgO	0.00	0.00	0.02	0.09	0.00	0.10	0.00	0.00	0.00	0.10	0.05	0.06	0.00	0.00	0.00	0.09	0.04	0.09	0.04	0.00	0.06	0.00	0.08	0.12	0.05	0.01	0.06
CaO	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.04	0.02	0.00	0.00	0.06	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.02	0.00	0.00	0.00
Na_2O	4.34	3.84	3.32	3.37	4.10	3.46	3.95	3.98	4.34	3.21	3.75	3.69	3.36	3.73	3.15	2.82	3.40	3.69	3.22	3.67	3.65	3.42	2.97	2.88	3.36	3.74	4.06
K_2O	14.29	14.69	14.42	14.96	14.54	14.71	15.36	15.11	14.58	15.34	14.41	14.89	14.20	15.50	15.38	14.75	14.53	14.31	14.54	14.65	13.67	14.50	14.96	14.49	14.45	14.68	13.08
F	2.55	2.42	1.62	1.96	2.06	2.11	2.20	1.95	2.06	2.24	1.64	1.81	1.86	2.08	1.64	1.42	1.79	1.70	1.60	1.95	1.75	1.82	1.74	1.69	1.96	1.71	1.80
Cl	0.00	0.16	0.00	0.00	0.16	0.00	0.38	0.09	0.03	0.18	0.31	0.06	0.06	0.00	0.16	0.18	0.19	0.00	0.09	0.16	0.03	0.00	0.06	0.00	0.00	0.15	0.06

Table 59 (continued)**:** EMP data of glass in Type 5 run G65.

	28	29	30	31	32	33	34	35	36	37	38	min	max	mean	σ
P	0.47	0.26	0.64	0.47	0.46	0.17	0.41	0.32	0.38	0.26	0.43	0.17	0.98	0.51	0.16
Si	26.67	26.55	25.63	26.48	26.61	26.62	25.98	26.48	26.94	26.18	25.61	24.94	26.94	26.02	0.52
Ti	0.07	0.06	0.01	0.07	0.07	0.09	0.07	0.08	0.09	0.00	0.07	0.00	0.21	0.06	0.05
Al	6.00	5.84	5.74	6.35	6.18	5.94	6.11	6.12	6.31	5.92	6.04	5.46	6.35	5.91	0.23
Fe	0.02	0.22	0.17	0.05	0.10	0.12	0.00	0.10	0.17	0.22	0.10	0.00	0.24	0.12	0.08
Mn	0.00	0.00	0.03	0.00	0.00	0.03	0.05	0.00	0.00	0.08	0.15	0.00	0.15	0.02	0.04
Mg	0.00	0.02	0.02	0.01	0.01	0.00	0.02	0.00	0.01	0.04	0.04	0.00	0.06	0.02	0.02
Ca	0.05	0.00	0.00	0.00	0.05	0.01	0.00	0.00	0.13	0.00	0.00	0.00	0.13	0.01	0.03
Na	2.36	2.10	1.96	1.95	2.06	2.19	1.83	2.00	2.07	2.12	1.97	1.80	2.69	2.18	0.23
K	10.19	9.98	9.88	9.55	10.26	10.40	10.65	10.39	9.57	10.16	10.29	9.37	10.86	10.21	0.36
F	1.72	1.38	1.50	1.41	1.47	1.35	1.36	1.64	1.32	1.40	1.44	1.22	2.13	1.56	0.20
Cl	0.03	0.21	0.13	0.19	0.16	0.16	0.16	0.13	0.05	0.05	0.00	0.00	0.32	0.09	0.08
total	47.59	46.63	45.70	46.51	47.42	47.09	46.63	47.26	47.04	46.43	46.14	45.66	47.59	46.70	0.53
P_2O_5	1.07	0.60	1.46	1.07	1.06	0.40	0.93	0.73	0.87	0.60	0.99	0.40	2.25	1.17	0.36
SiO_2	57.06	56.80	54.82	56.66	56.93	56.94	55.57	56.66	57.63	56.01	54.78	53.35	57.63	55.66	1.12
TiO_2	0.12	0.10	0.02	0.12	0.12	0.16	0.12	0.14	0.16	0.00	0.12	0.00	0.35	0.09	0.08
Al_2O_3	11.34	11.03	10.84	11.99	11.67	11.22	11.55	11.56	11.92	11.18	11.42	10.31	11.99	11.16	0.43
FeO	0.03	0.28	0.22	0.06	0.12	0.16	0.00	0.12	0.22	0.28	0.13	0.00	0.31	0.16	0.10
MnO	0.00	0.00	0.03	0.00	0.00	0.03	0.07	0.00	0.00	0.10	0.20	0.00	0.20	0.03	0.05
MgO	0.00	0.04	0.04	0.01	0.02	0.00	0.03	0.00	0.01	0.06	0.07	0.00	0.11	0.03	0.03
CaO	0.07	0.00	0.00	0.00	0.07	0.02	0.00	0.00	0.19	0.00	0.00	0.00	0.19	0.02	0.04
Na_2O	3.19	2.83	2.64	2.63	2.78	2.95	2.47	2.69	2.79	2.86	2.65	2.43	3.63	2.94	0.31
K_2O	12.27	12.03	11.90	11.50	12.36	12.53	12.83	12.51	11.53	12.24	12.40	11.28	13.08	12.30	0.43
F	1.72	1.38	1.50	1.41	1.47	1.35	1.35	1.64	1.32	1.40	1.44	1.22	2.13	1.56	0.20
Cl	0.03	0.21	0.13	0.19	0.16	0.16	0.16	0.13	0.05	0.05	0.00	0.00	0.32	0.09	0.08
total	86.17	84.67	82.94	84.99	86.09	85.31	84.46	85.47	86.11	84.18	83.58	82.79	86.31	84.52	1.07
H_2O	13.83	15.33	17.06	15.01	13.91	14.69	15.54	14.53	13.89	15.82	16.42	13.69	17.21	15.48	1.07
recalculated to 100 % total:															
P_2O_5	1.24	0.71	1.76	1.25	1.23	0.47	1.10	0.86	1.01	0.71	1.19	0.47	2.69	1.39	0.43
SiO_2	66.22	67.08	66.10	66.66	66.12	66.75	65.79	66.29	66.92	66.54	65.54	63.96	67.08	65.85	0.79
TiO_2	0.14	0.11	0.02	0.14	0.14	0.18	0.14	0.16	0.18	0.00	0.14	0.00	0.42	0.11	0.10
Al_2O_3	13.17	13.03	13.07	14.11	13.55	13.16	13.67	13.53	13.85	13.28	13.66	12.35	14.11	13.20	0.41
FeO	0.04	0.33	0.27	0.07	0.14	0.18	0.00	0.15	0.25	0.33	0.15	0.00	0.38	0.19	0.12
MnO	0.00	0.00	0.04	0.00	0.00	0.04	0.08	0.00	0.00	0.12	0.24	0.00	0.24	0.03	0.06
MgO	0.00	0.05	0.05	0.01	0.02	0.00	0.03	0.00	0.01	0.07	0.08	0.00	0.12	0.04	0.04
CaO	0.08	0.00	0.00	0.00	0.08	0.02	0.00	0.00	0.22	0.00	0.00	0.00	0.22	0.02	0.04
Na_2O	3.70	3.35	3.18	3.09	3.22	3.46	2.92	3.15	3.24	3.39	3.17	2.82	4.34	3.48	0.39
K_2O	14.25	14.21	14.34	13.53	14.35	14.69	15.19	14.64	13.38	14.54	14.83	13.08	15.50	14.55	0.53
F	2.00	1.63	1.81	1.66	1.71	1.59	1.60	1.92	1.54	1.67	1.72	1.42	2.55	1.84	0.25
Cl	0.03	0.25	0.16	0.22	0.18	0.19	0.19	0.15	0.06	0.06	0.00	0.00	0.38	0.11	0.10

Table 60: EMP data of glass in run G59, 0.3 °C /min, 3.5 GPa / 600 °C; 2.8 wt.%.

	1	2	3	4	5	6	7	8	mean	σ
P	0.22	0.30	0.41	0.85	0.36	0.17	0.33	0.30	0.37	0.21
Si	21.73	22.69	22.51	22.96	23.32	22.25	23.25	22.43	22.64	0.53
Ti	0.19	0.11	0.04	0.00	0.14	0.13	0.05	0.11	0.10	0.06
Al	3.33	3.31	3.27	3.09	2.89	3.22	3.36	3.40	3.23	0.17
Fe	0.02	0.02	0.14	0.14	0.05	0.17	0.27	0.10	0.11	0.08
Mn	0.00	0.03	0.05	0.00	0.03	0.08	0.20	0.05	0.05	0.07
Mg	0.00	0.04	0.01	0.02	0.01	0.01	0.01	0.10	0.02	0.03
Ca	0.00	0.00	0.00	0.19	0.00	0.03	0.00	0.00	0.03	0.07
Na	0.99	1.35	1.39	1.49	1.29	0.91	0.98	1.20	1.20	0.22
K	10.62	10.31	10.86	10.87	11.02	10.59	11.34	10.25	10.73	0.36
F	0.16	0.00	0.19	0.23	0.24	0.13	0.33	0.31	0.20	0.10
Cl	0.49	0.52	0.44	0.17	0.29	0.57	0.27	0.44	0.40	0.14
total	37.74	38.67	39.33	40.01	39.62	38.26	40.38	38.69	39.09	0.90
P_2O_5	0.50	0.69	0.94	1.95	0.82	0.38	0.76	0.69	0.84	0.48
SiO_2	46.48	48.54	48.16	49.11	49.88	47.61	49.73	47.98	48.44	1.13
TiO_2	0.32	0.18	0.07	0.00	0.23	0.22	0.09	0.18	0.16	0.10
Al_2O_3	6.30	6.25	6.17	5.84	5.46	6.08	6.34	6.43	6.11	0.32
FeO	0.03	0.03	0.19	0.19	0.06	0.22	0.34	0.12	0.15	0.11
MnO	0.00	0.03	0.07	0.00	0.03	0.10	0.26	0.07	0.07	0.09
MgO	0.00	0.07	0.02	0.03	0.01	0.02	0.01	0.16	0.04	0.05
CaO	0.00	0.00	0.00	0.27	0.00	0.05	0.00	0.00	0.04	0.09
Na_2O	1.33	1.81	1.88	2.01	1.74	1.22	1.32	1.62	1.62	0.29
K_2O	12.79	12.42	13.08	13.10	13.27	12.76	13.66	12.35	12.93	0.44
F	0.15	0.00	0.19	0.23	0.24	0.13	0.33	0.31	0.20	0.10
Cl	0.49	0.52	0.44	0.17	0.30	0.57	0.27	0.44	0.40	0.14
total	68.22	70.43	71.04	72.76	71.87	69.16	72.91	70.13	70.82	1.66
H_2O	31.78	29.57	28.96	27.24	28.13	30.84	27.09	29.87	29.18	1.66
recalculated to 100 % total:										
P_2O_5	0.74	0.99	1.33	2.68	1.14	0.55	1.04	0.99	1.18	0.65
SiO_2	68.13	68.92	67.80	67.50	69.40	68.84	68.20	68.42	68.40	0.63
TiO_2	0.47	0.26	0.10	0.00	0.33	0.31	0.12	0.26	0.23	0.15
Al_2O_3	9.23	8.87	8.69	8.03	7.60	8.79	8.70	9.17	8.63	0.56
FeO	0.05	0.04	0.26	0.26	0.09	0.32	0.47	0.18	0.21	0.15
MnO	0.00	0.05	0.09	0.00	0.05	0.14	0.36	0.09	0.10	0.12
MgO	0.00	0.10	0.03	0.04	0.01	0.03	0.01	0.23	0.06	0.08
CaO	0.00	0.00	0.00	0.37	0.00	0.07	0.00	0.00	0.05	0.13
Na_2O	1.95	2.58	2.65	2.76	2.42	1.76	1.81	2.31	2.28	0.39
K_2O	18.74	17.63	18.41	18.00	18.46	18.45	18.74	17.61	18.26	0.45
F	0.23	0.00	0.27	0.31	0.33	0.19	0.45	0.44	0.28	0.14
Cl	0.72	0.73	0.62	0.24	0.41	0.82	0.37	0.63	0.57	0.21

Table 61: EMP data of glass in heating-cooling run G99 (Type 7), quenched at conditions of 2.5 GPa / 650; bulk water content ± 20 wt.%; 43 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.03	0.06	0.12	0.03	0.06	0.00	0.03	0.09	0.00	0.06	0.00	0.00	0.00	0.03	0.12	0.03	0.00	0.03	0.03	0.00	0.00	0.00	0.06	0.00	0.00	0.06	0.03
Si	28.61	29.01	28.93	29.17	29.06	29.20	29.28	29.00	29.67	29.70	29.10	28.86	29.00	29.24	29.31	29.19	29.55	28.89	29.12	29.33	29.32	29.28	29.40	29.50	29.57	29.41	29.02
Ti	0.05	0.09	0.02	0.04	0.00	0.06	0.00	0.07	0.00	0.00	0.06	0.04	0.01	0.00	0.07	0.05	0.05	0.00	0.00	0.06	0.05	0.07	0.09	0.00	0.02	0.00	0.00
Al	6.68	6.62	6.71	6.97	6.80	6.79	6.73	6.72	7.27	6.81	6.73	6.95	6.44	6.21	6.48	6.85	6.85	6.62	6.73	6.86	7.06	6.88	6.83	6.57	6.61	6.65	6.76
Fe	0.27	0.29	0.54	0.47	0.17	0.39	0.25	0.37	0.27	0.51	0.47	0.29	0.61	0.42	0.17	0.52	0.22	0.20	0.56	0.12	0.56	0.29	0.47	0.42	0.32	0.51	0.32
Mn	0.13	0.03	0.00	0.00	0.10	0.00	0.13	0.00	0.00	0.13	0.00	0.03	0.10	0.00	0.08	0.05	0.00	0.13	0.15	0.13	0.00	0.00	0.15	0.08	0.00	0.10	0.03
Mg	0.04	0.00	0.00	0.00	0.00	0.04	0.01	0.00	0.03	0.04	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.03	0.00	0.02	0.00	0.00	0.00	0.00	0.08	0.02	0.00
Ca	0.67	0.70	0.76	0.75	0.64	0.57	0.74	0.58	0.77	0.68	0.64	0.62	0.59	0.84	0.76	0.48	0.65	0.59	0.94	0.74	0.75	0.93	0.75	0.73	0.68	0.82	0.79
Na	3.85	3.63	3.89	3.57	3.51	3.65	3.84	3.45	3.59	3.64	4.03	3.60	3.43	3.42	3.33	3.20	3.72	3.75	3.58	3.75	3.84	3.37	3.45	3.39	3.67	3.44	3.69
K	4.28	4.47	4.75	4.36	4.73	4.95	4.75	4.91	4.44	4.52	4.96	4.79	4.83	4.54	4.48	4.90	4.61	4.75	4.45	4.86	4.62	4.67	4.70	4.62	4.61	4.79	4.85
F	0.13	0.11	0.02	0.02	0.00	0.06	0.06	0.04	0.12	0.19	0.00	0.09	0.21	0.15	0.06	0.10	0.10	0.09	0.07	0.08	0.20	0.10	0.00	0.09	0.18	0.25	0.15
Cl	0.00	0.08	0.03	0.16	0.08	0.05	0.00	0.27	0.08	0.00	0.03	0.00	0.08	0.08	0.00	0.00	0.00	0.00	0.03	0.11	0.03	0.05	0.11	0.00	0.03	0.00	0.03
total	44.73	45.10	45.76	45.54	45.16	45.77	45.80	45.49	46.23	46.27	46.01	45.26	45.32	44.93	44.86	45.38	45.75	45.08	45.66	46.06	46.42	45.65	46.01	45.39	45.77	46.06	45.66
P_2O_5	0.07	0.14	0.27	0.07	0.14	0.00	0.07	0.21	0.00	0.14	0.00	0.00	0.00	0.07	0.27	0.07	0.00	0.07	0.07	0.00	0.00	0.00	0.14	0.00	0.00	0.14	0.07
SiO_2	61.21	62.07	61.90	62.41	62.18	62.48	62.64	62.04	63.47	63.54	62.25	61.73	62.04	62.56	62.70	62.45	63.22	61.81	62.30	62.74	62.73	62.64	62.89	63.11	63.27	62.92	62.08
TiO_2	0.08	0.16	0.04	0.06	0.00	0.10	0.00	0.12	0.00	0.00	0.10	0.06	0.02	0.00	0.12	0.08	0.08	0.00	0.00	0.10	0.08	0.12	0.16	0.00	0.04	0.00	0.00
Al_2O_3	12.62	12.51	12.68	13.17	12.85	12.82	12.71	12.69	13.73	12.86	12.72	13.13	12.17	11.74	12.24	12.94	12.94	12.50	12.72	12.96	13.33	13.00	12.91	12.42	12.48	12.56	12.77
FeO	0.35	0.38	0.69	0.60	0.22	0.50	0.32	0.47	0.35	0.66	0.60	0.38	0.79	0.54	0.22	0.66	0.28	0.25	0.73	0.16	0.72	0.38	0.60	0.54	0.41	0.66	0.41
MnO	0.17	0.03	0.00	0.00	0.13	0.00	0.17	0.00	0.00	0.17	0.00	0.03	0.13	0.00	0.10	0.07	0.00	0.17	0.20	0.17	0.00	0.00	0.20	0.10	0.00	0.13	0.03
MgO	0.07	0.00	0.00	0.00	0.00	0.07	0.01	0.00	0.05	0.06	0.00	0.00	0.02	0.01	0.00	0.02	0.01	0.05	0.00	0.04	0.00	0.00	0.00	0.00	0.13	0.04	0.00
CaO	0.93	0.98	1.07	1.05	0.90	0.80	1.03	0.81	1.08	0.95	0.90	0.86	0.83	1.17	1.07	0.68	0.91	0.83	1.32	1.03	1.05	1.30	1.05	1.02	0.95	1.15	1.10
Na_2O	5.19	4.90	5.24	4.81	4.73	4.93	5.18	4.65	4.84	4.91	5.43	4.86	4.62	4.61	4.49	4.31	5.01	5.06	4.83	5.06	5.17	4.54	4.65	4.56	4.95	4.64	4.98
K_2O	5.16	5.39	5.72	5.26	5.69	5.97	5.72	5.91	5.34	5.45	5.97	5.77	5.82	5.46	5.40	5.91	5.55	5.73	5.36	5.85	5.57	5.62	5.67	5.57	5.55	5.77	5.84
F	0.12	0.11	0.02	0.02	0.00	0.06	0.06	0.04	0.12	0.19	0.00	0.09	0.21	0.15	0.06	0.10	0.10	0.09	0.07	0.08	0.20	0.10	0.00	0.09	0.18	0.25	0.15
Cl	0.00	0.08	0.03	0.16	0.08	0.05	0.00	0.27	0.08	0.00	0.03	0.00	0.08	0.08	0.00	0.00	0.00	0.00	0.03	0.11	0.03	0.05	0.11	0.00	0.03	0.00	0.03
total	85.91	86.67	87.63	87.56	86.91	87.73	87.87	87.13	88.99	88.83	87.99	86.88	86.62	86.31	86.64	87.23	88.07	86.52	87.57	88.24	88.79	87.70	88.33	87.37	87.90	88.15	87.40
H_2O	14.09	13.33	12.37	12.44	13.09	12.27	12.13	12.87	11.01	11.17	12.01	13.12	13.38	13.69	13.36	12.77	11.93	13.48	12.43	11.76	11.21	12.30	11.67	12.63	12.10	11.85	12.60
recalculated to 100 % total:																											
P_2O_5	0.08	0.16	0.31	0.08	0.16	0.00	0.08	0.24	0.00	0.15	0.00	0.00	0.00	0.08	0.32	0.08	0.00	0.08	0.08	0.00	0.00	0.00	0.16	0.00	0.00	0.16	0.08
SiO_2	71.25	71.61	70.63	71.28	71.54	71.21	71.29	71.20	71.33	71.53	70.74	71.06	71.62	72.48	72.37	71.59	71.78	71.44	71.14	71.10	70.65	71.43	71.20	72.24	71.97	71.37	71.04
TiO_2	0.09	0.18	0.04	0.07	0.00	0.11	0.00	0.13	0.00	0.00	0.11	0.07	0.02	0.00	0.13	0.09	0.09	0.00	0.00	0.11	0.09	0.13	0.18	0.00	0.04	0.00	0.00
Al_2O_3	14.68	14.43	14.47	15.04	14.79	14.61	14.46	14.57	15.43	14.48	14.46	15.11	14.05	13.60	14.12	14.83	14.70	14.45	14.52	14.69	15.01	14.82	14.61	14.21	14.20	14.25	14.62
FeO	0.41	0.44	0.79	0.68	0.25	0.57	0.36	0.54	0.39	0.74	0.68	0.44	0.91	0.62	0.26	0.76	0.32	0.29	0.83	0.18	0.81	0.43	0.68	0.61	0.47	0.75	0.47
MnO	0.19	0.04	0.00	0.00	0.15	0.00	0.19	0.00	0.00	0.19	0.00	0.04	0.15	0.00	0.11	0.08	0.00	0.19	0.23	0.19	0.00	0.00	0.22	0.11	0.00	0.15	0.04
MgO	0.08	0.00	0.00	0.00	0.00	0.08	0.01	0.00	0.05	0.07	0.00	0.00	0.02	0.01	0.00	0.02	0.01	0.06	0.00	0.05	0.00	0.00	0.00	0.00	0.15	0.05	0.00
CaO	1.09	1.13	1.22	1.20	1.03	0.91	1.18	0.93	1.22	1.06	1.02	1.00	0.96	1.36	1.23	0.78	1.04	0.96	1.51	1.17	1.18	1.49	1.19	1.16	1.08	1.30	1.26
Na_2O	6.05	5.65	5.98	5.49	5.45	5.61	5.89	5.33	5.43	5.52	6.18	5.59	5.33	5.34	5.18	4.94	5.69	5.85	5.51	5.73	5.83	5.17	5.26	5.22	5.63	5.26	5.69
K_2O	6.00	6.21	6.52	6.00	6.55	6.80	6.51	6.78	6.00	6.13	6.79	6.64	6.71	6.33	6.23	6.77	6.30	6.62	6.12	6.63	6.27	6.41	6.42	6.37	6.31	6.55	6.68
F	0.15	0.12	0.02	0.03	0.00	0.07	0.07	0.05	0.14	0.21	0.00	0.10	0.25	0.17	0.06	0.11	0.11	0.10	0.08	0.09	0.22	0.12	0.00	0.10	0.21	0.29	0.17
Cl	0.00	0.09	0.03	0.19	0.09	0.06	0.00	0.31	0.09	0.00	0.03	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.03	0.12	0.03	0.06	0.12	0.00	0.03	0.00	0.03

Table 61 (continued)**:** EMP data of glass in Type 5 run G99.

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	min	max	mean	σ
P	0.03	0.00	0.09	0.00	0.12	0.00	0.00	0.03	0.00	0.03	0.00	0.12	0.09	0.18	0.06	0.00	0.00	0.18	0.04	0.04
Si	29.36	29.09	29.11	29.30	29.25	28.96	28.82	28.70	29.17	28.68	29.14	28.94	29.55	28.95	29.05	29.28	28.61	29.70	29.16	0.26
Ti	0.07	0.09	0.04	0.00	0.08	0.00	0.04	0.13	0.06	0.11	0.11	0.00	0.00	0.05	0.15	0.05	0.00	0.15	0.04	0.04
Al	6.69	6.52	6.61	7.17	6.47	6.51	6.53	6.48	6.66	6.55	6.52	6.81	7.00	6.61	6.13	6.27	6.13	7.27	6.69	0.23
Fe	0.17	0.39	0.27	0.59	0.64	0.42	0.57	0.52	0.15	0.42	0.47	0.29	0.56	0.42	0.49	0.22	0.12	0.64	0.39	0.14
Mn	0.05	0.08	0.03	0.00	0.03	0.10	0.00	0.00	0.00	0.26	0.00	0.05	0.03	0.00	0.18	0.03	0.00	0.26	0.05	0.06
Mg	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.01	0.00	0.01	0.00	0.04	0.00	0.02	0.02	0.00	0.08	0.01	0.02
Ca	0.64	0.82	0.52	0.65	0.52	0.63	0.69	0.53	0.63	0.42	0.42	0.80	0.57	0.52	0.63	0.63	0.42	0.94	0.67	0.12
Na	3.50	3.37	3.76	3.68	3.56	3.79	3.54	3.79	3.64	3.49	3.30	3.63	3.60	3.31	3.63	3.89	3.20	4.03	3.60	0.19
K	4.94	4.49	4.44	4.88	5.00	4.78	5.13	4.55	4.75	4.40	5.11	4.72	4.38	4.58	4.18	4.96	4.18	5.13	4.69	0.23
F	0.00	0.06	0.19	0.00	0.17	0.00	0.12	0.00	0.11	0.00	0.00	0.00	0.03	0.01	0.01	0.00	0.00	0.25	0.08	0.07
Cl	0.05	0.08	0.08	0.14	0.00	0.22	0.00	0.03	0.00	0.00	0.11	0.00	0.14	0.05	0.08	0.00	0.00	0.27	0.05	0.06
total	45.51	45.00	45.12	46.39	45.83	45.44	45.44	44.76	45.17	44.35	45.19	45.37	45.98	44.68	44.61	45.35	44.35	46.42	45.47	0.50
P_2O_5	0.07	0.00	0.21	0.00	0.27	0.00	0.00	0.07	0.00	0.07	0.00	0.27	0.21	0.41	0.14	0.00	0.00	0.41	0.09	0.10
SiO_2	62.80	62.24	62.27	62.67	62.57	61.95	61.65	61.39	62.40	61.35	62.35	61.91	63.22	61.92	62.14	62.64	61.21	63.54	62.39	0.55
TiO_2	0.12	0.16	0.06	0.00	0.14	0.00	0.06	0.22	0.10	0.18	0.18	0.00	0.00	0.08	0.25	0.08	0.00	0.25	0.07	0.07
Al_2O_3	12.65	12.32	12.49	13.54	12.23	12.30	12.34	12.25	12.59	12.38	12.33	12.87	13.23	12.50	11.58	11.85	11.58	13.73	12.64	0.44
FeO	0.22	0.51	0.35	0.76	0.82	0.54	0.73	0.66	0.19	0.54	0.60	0.38	0.72	0.54	0.63	0.28	0.16	0.82	0.50	0.19
MnO	0.07	0.10	0.03	0.00	0.03	0.13	0.00	0.00	0.00	0.33	0.00	0.07	0.03	0.00	0.23	0.03	0.00	0.33	0.07	0.08
MgO	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.01	0.00	0.01	0.00	0.06	0.00	0.04	0.04	0.00	0.13	0.02	0.03
CaO	0.90	1.15	0.73	0.91	0.73	0.88	0.97	0.75	0.88	0.59	0.59	1.12	0.79	0.73	0.88	0.88	0.59	1.32	0.94	0.17
Na_2O	4.71	4.55	5.07	4.96	4.80	5.11	4.78	5.11	4.90	4.70	4.45	4.89	4.86	4.47	4.90	5.25	4.31	5.43	4.85	0.25
K_2O	5.95	5.41	5.34	5.88	6.03	5.76	6.18	5.48	5.73	5.30	6.16	5.69	5.27	5.52	5.03	5.97	5.03	6.18	5.64	0.27
F	0.00	0.05	0.18	0.00	0.17	0.00	0.12	0.00	0.11	0.00	0.00	0.00	0.03	0.01	0.01	0.00	0.00	0.25	0.08	0.07
Cl	0.05	0.08	0.08	0.14	0.00	0.22	0.00	0.03	0.00	0.00	0.11	0.00	0.14	0.05	0.08	0.00	0.00	0.27	0.05	0.06
total	87.53	86.52	86.72	88.82	87.71	86.89	86.78	85.95	86.86	85.43	86.75	87.20	88.51	86.21	85.89	87.02	85.43	88.99	87.30	0.87
H_2O	12.47	13.48	13.28	11.18	12.29	13.11	13.22	14.05	13.14	14.57	13.25	12.80	11.49	13.79	14.11	12.98	11.01	14.57	12.70	0.87
recalculated to 100 % total:																				
P_2O_5	0.08	0.00	0.24	0.00	0.31	0.00	0.00	0.08	0.00	0.08	0.00	0.32	0.23	0.48	0.16	0.00	0.00	0.48	0.10	0.12
SiO_2	71.75	71.94	71.81	70.56	71.33	71.30	71.05	71.43	71.84	71.81	71.87	71.00	71.42	71.83	72.34	71.98	70.56	72.48	71.47	0.46
TiO_2	0.13	0.18	0.07	0.00	0.16	0.00	0.07	0.25	0.11	0.21	0.20	0.00	0.00	0.09	0.30	0.09	0.00	0.30	0.08	0.08
Al_2O_3	14.45	14.23	14.40	15.24	13.94	14.15	14.22	14.25	14.49	14.49	14.21	14.76	14.95	14.50	13.48	13.61	13.48	15.43	14.48	0.41
FeO	0.25	0.58	0.40	0.85	0.93	0.62	0.84	0.77	0.22	0.63	0.69	0.43	0.82	0.62	0.74	0.33	0.18	0.93	0.57	0.21
MnO	0.08	0.11	0.04	0.00	0.04	0.15	0.00	0.00	0.00	0.39	0.00	0.08	0.04	0.00	0.27	0.04	0.00	0.39	0.08	0.09
MgO	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.01	0.00	0.01	0.00	0.07	0.00	0.05	0.05	0.00	0.15	0.02	0.03
CaO	1.03	1.33	0.84	1.03	0.83	1.01	1.11	0.87	1.01	0.69	0.68	1.28	0.90	0.85	1.03	1.01	0.68	1.51	1.07	0.19
Na_2O	5.38	5.25	5.85	5.58	5.47	5.88	5.50	5.95	5.64	5.50	5.13	5.60	5.49	5.18	5.70	6.03	4.94	6.18	5.56	0.28
K_2O	6.80	6.26	6.16	6.62	6.87	6.62	7.13	6.38	6.59	6.20	7.10	6.52	5.95	6.40	5.86	6.86	5.86	7.13	6.47	0.31
F	0.00	0.06	0.21	0.00	0.19	0.00	0.14	0.00	0.13	0.00	0.00	0.00	0.04	0.01	0.01	0.00	0.00	0.29	0.09	0.08
Cl	0.06	0.09	0.09	0.15	0.00	0.25	0.00	0.03	0.00	0.00	0.12	0.00	0.15	0.06	0.09	0.00	0.00	0.31	0.06	0.07

Table 62: EMP data of glass in Type 5 run D1 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 1.6 wt.%; 30 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.33	0.48	0.45	0.47	0.33	0.45	0.33	0.18	0.18	0.24	0.30	0.09	0.27	0.30	0.42	0.18	0.06	0.25	0.36	0.36	0.25	0.58	0.34	0.28	0.25	0.11	0.23
Si	28.24	26.83	27.44	25.78	28.27	26.66	28.60	25.51	27.10	29.16	28.36	26.98	28.99	26.07	28.81	27.87	28.67	28.02	25.33	26.10	26.06	25.14	25.55	28.34	28.92	27.64	27.48
Ti	0.05	0.00	0.06	0.01	0.08	0.05	0.07	0.00	0.01	0.07	0.12	0.14	0.04	0.13	0.07	0.05	0.11	0.06	0.02	0.04	0.06	0.00	0.04	0.01	0.07	0.07	0.10
Al	5.16	4.79	5.26	4.90	5.16	5.18	5.13	4.70	4.86	5.62	5.39	5.00	5.67	5.11	5.56	5.72	5.36	5.09	4.64	4.70	4.71	4.74	4.73	5.30	5.62	4.94	5.43
Fe	0.25	0.32	0.17	0.42	0.84	0.52	0.39	0.72	0.37	0.27	0.69	0.67	0.12	0.50	0.61	0.35	0.66	0.42	0.33	0.21	0.21	0.71	0.28	0.19	0.37	0.52	0.26
Mn	0.00	0.03	0.13	0.00	0.00	0.03	0.26	0.00	0.00	0.00	0.08	0.03	0.10	0.00	0.00	0.08	0.05	0.00	0.03	0.00	0.05	0.13	0.00	0.07	0.10	0.10	0.10
Mg	0.00	0.06	0.04	0.01	0.04	0.00	0.14	0.12	0.08	0.17	0.13	0.03	0.04	0.12	0.07	0.07	0.07	0.02	0.09	0.00	0.03	0.12	0.01	0.00	0.00	0.06	0.06
Ca	0.59	0.51	0.35	0.51	0.40	0.43	0.46	0.39	0.45	0.34	0.63	0.28	0.66	0.55	0.59	0.40	0.57	0.55	0.59	0.31	0.49	0.39	0.41	0.41	0.56	0.42	0.57
Na	4.42	3.79	4.69	5.49	3.98	4.03	4.59	4.25	3.54	3.66	4.28	4.03	4.41	3.70	4.16	4.25	3.98	5.23	5.23	5.70	5.71	5.80	5.56	4.82	4.51	4.46	4.50
K	4.04	3.32	3.97	3.52	3.79	3.40	4.01	3.62	3.15	3.77	4.19	3.88	3.00	3.35	3.86	3.68	4.15	3.58	3.07	3.79	3.58	3.73	3.42	3.49	4.10	4.29	4.26
F	0.83	1.18	0.52	0.75	0.64	0.65	0.97	0.65	0.50	0.59	0.93	0.74	0.77	0.86	0.67	1.06	0.52	0.71	0.87	0.68	0.82	0.79	0.80	0.88	0.68	0.64	0.76
Cl	0.54	0.30	0.14	0.78	0.30	0.24	0.51	0.59	0.33	0.24	0.51	0.46	0.24	0.65	0.38	0.32	0.40	0.40	0.89	0.86	0.81	1.11	1.04	0.54	0.57	0.29	0.37
total	44.45	41.60	43.20	42.65	43.83	41.62	45.47	40.73	40.57	44.12	45.59	42.32	44.34	41.32	45.21	44.01	44.59	44.33	41.44	42.76	42.79	43.24	42.17	44.34	45.75	43.54	44.12
P_2O_5	0.75	1.09	1.02	1.08	0.75	1.02	0.75	0.41	0.41	0.55	0.68	0.20	0.62	0.68	0.96	0.41	0.14	0.58	0.83	0.83	0.58	1.34	0.77	0.65	0.58	0.26	0.52
SiO_2	60.42	57.39	58.70	55.14	60.48	57.03	61.19	54.57	57.98	62.39	60.67	57.72	62.03	55.78	61.63	59.61	61.33	59.94	54.19	55.83	55.75	53.79	54.66	60.63	61.88	59.14	58.78
TiO_2	0.08	0.00	0.10	0.02	0.14	0.08	0.12	0.00	0.02	0.12	0.19	0.24	0.06	0.22	0.12	0.08	0.18	0.10	0.04	0.07	0.11	0.00	0.07	0.02	0.12	0.12	0.17
Al_2O_3	9.76	9.06	9.94	9.27	9.75	9.79	9.70	8.88	9.18	10.62	10.18	9.44	10.72	9.65	10.51	10.82	10.12	9.62	8.77	8.88	8.91	8.95	8.94	10.02	10.61	9.32	10.26
FeO	0.32	0.42	0.22	0.54	1.08	0.67	0.50	0.93	0.48	0.35	0.88	0.86	0.16	0.64	0.79	0.44	0.85	0.54	0.43	0.27	0.27	0.91	0.37	0.24	0.48	0.67	0.33
MnO	0.00	0.03	0.17	0.00	0.00	0.03	0.33	0.00	0.00	0.00	0.10	0.03	0.13	0.00	0.00	0.10	0.07	0.00	0.03	0.00	0.06	0.16	0.00	0.10	0.13	0.13	0.13
MgO	0.00	0.10	0.07	0.02	0.06	0.00	0.24	0.19	0.13	0.28	0.22	0.05	0.07	0.19	0.12	0.11	0.11	0.04	0.16	0.00	0.05	0.20	0.01	0.00	0.00	0.09	0.10
CaO	0.83	0.72	0.49	0.72	0.56	0.60	0.64	0.55	0.63	0.47	0.88	0.39	0.93	0.77	0.83	0.56	0.79	0.77	0.82	0.44	0.68	0.54	0.58	0.57	0.78	0.59	0.80
Na_2O	5.96	5.10	6.32	7.39	5.37	5.43	6.18	5.73	4.78	4.93	5.77	5.43	5.94	4.99	5.61	5.72	5.37	7.04	7.05	7.69	7.70	7.82	7.49	6.50	6.08	6.01	6.06
K_2O	4.86	4.00	4.78	4.24	4.57	4.09	4.84	4.36	3.79	4.54	5.04	4.68	3.62	4.03	4.65	4.43	4.99	4.31	3.70	4.56	4.31	4.50	4.12	4.20	4.93	5.17	5.13
F	0.83	1.18	0.52	0.75	0.64	0.64	0.97	0.65	0.50	0.59	0.93	0.74	0.77	0.86	0.67	1.06	0.52	0.71	0.87	0.68	0.82	0.79	0.80	0.88	0.68	0.64	0.76
Cl	0.54	0.30	0.14	0.78	0.30	0.24	0.51	0.59	0.33	0.24	0.51	0.46	0.24	0.65	0.38	0.32	0.40	0.40	0.89	0.86	0.81	1.11	1.04	0.54	0.57	0.30	0.37
total	83.87	78.81	82.21	79.47	83.35	79.31	85.45	76.45	77.94	84.76	85.55	79.83	84.92	77.94	85.90	83.15	84.56	83.67	77.19	79.64	79.52	79.53	78.26	83.85	86.43	82.10	83.02
H_2O	16.13	21.19	17.79	20.53	16.65	20.69	14.55	23.55	22.06	15.24	14.45	20.17	15.08	22.06	14.10	16.85	15.44	16.33	22.81	20.36	20.48	20.47	21.74	16.15	13.57	17.90	16.98
recalculated to 100 % total:																											
P_2O_5	0.89	1.38	1.24	1.36	0.90	1.29	0.88	0.53	0.53	0.65	0.80	0.26	0.73	0.87	1.12	0.49	0.16	0.70	1.08	1.05	0.73	1.69	0.98	0.77	0.67	0.31	0.62
SiO_2	72.04	72.82	71.40	69.39	72.56	71.91	71.61	71.38	74.39	73.60	70.92	72.31	73.05	71.57	71.75	71.70	72.52	71.64	70.20	70.10	70.10	67.63	69.84	72.30	71.59	72.04	70.81
TiO_2	0.09	0.00	0.12	0.03	0.16	0.10	0.14	0.00	0.03	0.14	0.23	0.29	0.07	0.28	0.14	0.09	0.21	0.12	0.05	0.09	0.13	0.00	0.09	0.02	0.14	0.15	0.21
Al_2O_3	11.63	11.49	12.09	11.66	11.70	12.35	11.35	11.61	11.77	12.53	11.90	11.82	12.63	12.38	12.24	13.01	11.97	11.49	11.35	11.15	11.20	11.26	11.42	11.95	12.28	11.36	12.36
FeO	0.38	0.53	0.27	0.68	1.29	0.85	0.59	1.21	0.62	0.41	1.03	1.08	0.19	0.82	0.92	0.53	1.01	0.65	0.55	0.34	0.34	1.14	0.47	0.29	0.56	0.81	0.40
MnO	0.00	0.04	0.20	0.00	0.00	0.04	0.39	0.00	0.00	0.00	0.12	0.04	0.16	0.00	0.00	0.12	0.08	0.00	0.04	0.00	0.08	0.20	0.00	0.11	0.15	0.16	0.15
MgO	0.00	0.13	0.08	0.03	0.07	0.00	0.28	0.25	0.17	0.32	0.26	0.06	0.08	0.24	0.14	0.13	0.13	0.05	0.20	0.00	0.06	0.26	0.01	0.00	0.00	0.12	0.13
CaO	0.99	0.91	0.60	0.90	0.67	0.75	0.75	0.71	0.81	0.56	1.03	0.49	1.09	0.98	0.96	0.67	0.94	0.92	1.06	0.55	0.86	0.68	0.74	0.68	0.90	0.72	0.96
Na_2O	7.11	6.47	7.69	9.31	6.44	6.85	7.23	7.50	6.13	5.81	6.75	6.80	7.00	6.40	6.53	6.88	6.35	8.42	9.13	9.65	9.68	9.84	9.57	7.75	7.04	7.32	7.31
K_2O	5.80	5.07	5.81	5.34	5.48	5.16	5.66	5.71	4.86	5.35	5.90	5.86	4.26	5.17	5.41	5.33	5.90	5.16	4.79	5.73	5.42	5.65	5.27	5.01	5.71	6.29	6.18
F	0.99	1.50	0.63	0.95	0.77	0.81	1.14	0.86	0.65	0.70	1.09	0.93	0.91	1.11	0.78	1.27	0.61	0.85	1.12	0.86	1.03	1.00	1.02	1.05	0.79	0.78	0.92
Cl	0.64	0.38	0.16	0.98	0.36	0.31	0.60	0.78	0.42	0.29	0.60	0.57	0.29	0.83	0.44	0.39	0.48	0.47	1.15	1.08	1.02	1.39	1.32	0.65	0.65	0.36	0.44

Table 62 (continued)**:** EMP data of glass in Type 5 run D1.

	28	29	30	min	max	mean	σ
P	0.28	0.45	0.23	0.06	0.58	0.30	0.12
Si	27.56	25.37	27.24	25.14	29.16	27.27	1.26
Ti	0.00	0.03	0.01	0.00	0.14	0.05	0.04
Al	5.00	4.96	5.27	4.64	5.72	5.12	0.32
Fe	0.45	0.73	0.56	0.12	0.84	0.44	0.20
Mn	0.05	0.18	0.10	0.00	0.26	0.06	0.06
Mg	0.07	0.09	0.17	0.00	0.17	0.06	0.05
Ca	0.44	0.66	0.46	0.28	0.66	0.48	0.10
Na	4.75	4.87	4.49	3.54	5.80	4.56	0.64
K	3.83	3.73	3.83	3.00	4.29	3.71	0.34
F	0.73	1.08	0.65	0.50	1.18	0.76	0.16
Cl	0.54	0.57	0.27	0.14	1.11	0.51	0.25
total	43.71	42.70	43.29	40.57	45.75	43.33	1.42
P_2O_5	0.64	1.02	0.52	0.14	1.34	0.69	0.28
SiO_2	58.97	54.28	58.28	53.79	62.39	58.34	2.69
TiO_2	0.00	0.05	0.02	0.00	0.24	0.09	0.07
Al_2O_3	9.44	9.37	9.95	8.77	10.82	9.68	0.61
FeO	0.57	0.94	0.73	0.16	1.08	0.56	0.25
MnO	0.06	0.23	0.13	0.00	0.33	0.07	0.08
MgO	0.12	0.15	0.29	0.00	0.29	0.11	0.09
CaO	0.62	0.92	0.65	0.39	0.93	0.67	0.14
Na_2O	6.41	6.56	6.05	4.78	7.82	6.15	0.87
K_2O	4.61	4.49	4.61	3.62	5.17	4.47	0.41
F	0.73	1.08	0.65	0.50	1.18	0.76	0.16
Cl	0.54	0.57	0.27	0.14	1.11	0.51	0.25
total	82.30	79.08	81.80	76.45	86.43	81.66	2.93
H_2O	17.70	20.92	18.20	13.57	23.55	18.34	2.93
recalculated to 100 % total:							
P_2O_5	0.78	1.29	0.63	0.16	1.69	0.85	0.36
SiO_2	71.65	68.64	71.24	67.63	74.39	71.42	1.41
TiO_2	0.00	0.07	0.02	0.00	0.29	0.11	0.08
Al_2O_3	11.47	11.85	12.16	11.15	13.01	11.85	0.47
FeO	0.70	1.19	0.89	0.19	1.29	0.69	0.31
MnO	0.08	0.29	0.16	0.00	0.39	0.09	0.10
MgO	0.15	0.20	0.35	0.00	0.35	0.13	0.10
CaO	0.75	1.17	0.79	0.49	1.17	0.82	0.17
Na_2O	7.79	8.29	7.40	5.81	9.84	7.55	1.17
K_2O	5.61	5.68	5.64	4.26	6.29	5.47	0.43
F	0.89	1.36	0.80	0.61	1.50	0.94	0.21
Cl	0.66	0.72	0.33	0.16	1.39	0.63	0.32

Table 63: EMP data of glass in Type 1 run D4 at constant conditions of 4.8 GPa / 1000 °C; 1.6 wt.%.

	1	2	3	4	5	6	7	8	9	min	max	mean	σ
P	0.09	0.00	0.06	0.00	0.00	0.03	0.03	0.06	0.00	0.00	0.09	0.03	0.03
Si	29.39	28.39	29.18	29.41	31.95	29.90	32.13	32.16	31.54	28.39	32.16	30.45	1.48
Ti	0.03	0.72	0.61	0.00	0.48	0.00	0.40	0.49	0.26	0.00	0.72	0.33	0.27
Al	10.68	12.37	10.66	10.98	7.85	10.94	8.07	8.44	8.24	7.85	12.37	9.80	1.66
Fe	0.14	0.99	1.11	0.07	0.84	0.22	1.18	1.15	1.35	0.07	1.35	0.78	0.50
Mn	0.13	0.00	0.00	0.00	0.00	0.15	0.00	0.03	0.07	0.00	0.15	0.04	0.06
Mg	0.02	0.31	0.37	0.02	0.36	0.02	0.46	0.23	0.23	0.02	0.46	0.22	0.17
Ca	1.65	0.52	0.56	2.39	0.42	1.73	0.62	0.49	0.51	0.42	2.39	0.99	0.73
Na	5.97	2.66	3.06	7.25	3.33	7.16	2.94	3.16	3.20	2.66	7.25	4.30	1.91
K	2.94	3.43	4.05	0.55	3.96	0.99	4.04	4.65	4.11	0.55	4.65	3.19	1.46
F	0.00	0.17	0.16	0.04	0.10	0.00	0.17	0.17	0.19	0.00	0.19	0.11	0.08
Cl	0.05	0.16	0.00	0.00	0.08	0.05	0.05	0.00	0.00	0.00	0.16	0.04	0.05
total	51.09	49.72	49.82	50.70	49.38	51.20	50.09	51.02	49.71	49.38	51.20	50.30	0.70
P_2O_5	0.21	0.00	0.14	0.00	0.00	0.07	0.07	0.14	0.00	0.00	0.21	0.07	0.08
SiO_2	62.86	60.74	62.42	62.91	68.35	63.97	68.73	68.80	67.48	60.74	68.80	65.14	3.17
TiO_2	0.06	1.20	1.01	0.00	0.80	0.00	0.67	0.82	0.44	0.00	1.20	0.56	0.45
Al_2O_3	20.19	23.37	20.15	20.74	14.83	20.67	15.24	15.94	15.56	14.83	23.37	18.52	3.13
FeO	0.19	1.27	1.42	0.09	1.09	0.28	1.52	1.48	1.73	0.09	1.73	1.01	0.64
MnO	0.16	0.00	0.00	0.00	0.00	0.19	0.00	0.03	0.10	0.00	0.19	0.05	0.08
MgO	0.03	0.51	0.61	0.03	0.60	0.04	0.76	0.38	0.38	0.03	0.76	0.37	0.28
CaO	2.31	0.73	0.78	3.34	0.58	2.42	0.87	0.68	0.72	0.58	3.34	1.38	1.02
Na_2O	8.04	3.58	4.13	9.78	4.49	9.65	3.96	4.26	4.31	3.58	9.78	5.80	2.58
K_2O	3.55	4.13	4.88	0.66	4.78	1.19	4.87	5.61	4.95	0.66	5.61	3.85	1.76
F	0.00	0.17	0.16	0.03	0.10	0.00	0.17	0.17	0.19	0.00	0.19	0.11	0.08
Cl	0.05	0.16	0.00	0.00	0.08	0.05	0.05	0.00	0.00	0.00	0.16	0.04	0.05
total	97.63	95.76	95.63	97.57	95.64	98.53	96.83	98.23	95.79	95.63	98.53	96.85	1.18
H_2O	2.37	4.24	4.37	2.43	4.36	1.47	3.17	1.77	4.21	1.47	4.37	3.15	1.18
recalculated to 100 % total:													
P_2O_5	0.21	0.00	0.14	0.00	0.00	0.07	0.07	0.14	0.00	0.00	0.21	0.07	0.08
SiO_2	64.39	63.42	65.27	64.47	71.46	64.93	70.98	70.04	70.45	63.42	71.46	67.27	3.35
TiO_2	0.06	1.26	1.06	0.00	0.84	0.00	0.69	0.83	0.46	0.00	1.26	0.58	0.47
Al_2O_3	20.68	24.41	21.07	21.26	15.51	20.98	15.74	16.22	16.25	15.51	24.41	19.12	3.23
FeO	0.19	1.33	1.49	0.09	1.14	0.28	1.57	1.51	1.81	0.09	1.81	1.04	0.67
MnO	0.17	0.00	0.00	0.00	0.00	0.20	0.00	0.03	0.10	0.00	0.20	0.06	0.08
MgO	0.03	0.53	0.64	0.03	0.63	0.04	0.79	0.39	0.40	0.03	0.79	0.39	0.29
CaO	2.36	0.76	0.82	3.43	0.61	2.45	0.89	0.70	0.75	0.61	3.43	1.42	1.04
Na_2O	8.24	3.74	4.31	10.02	4.70	9.80	4.09	4.33	4.50	3.74	10.02	5.97	2.60
K_2O	3.63	4.32	5.10	0.68	4.99	1.21	5.03	5.71	5.17	0.68	5.71	3.98	1.82
F	0.00	0.18	0.17	0.04	0.10	0.00	0.18	0.17	0.20	0.00	0.20	0.12	0.08
Cl	0.06	0.17	0.00	0.00	0.08	0.05	0.06	0.00	0.00	0.00	0.17	0.05	0.06

Table 64: EMP data of glass in Type 4 run W3 without cooling, 3.5 GPa / 1000 °C; 2.8 wt.%.

	1	2	3	4	5	6	7	8	9	10	11	min	max	mean	σ
P	0.18	0.24	0.09	0.21	0.30	0.18	0.21	0.21	0.15	0.12	0.24	0.09	0.30	0.19	0.06
Si	30.85	31.76	31.75	30.69	30.99	31.10	31.36	30.61	30.59	31.03	30.99	30.59	31.76	31.07	0.41
Ti	0.55	0.35	0.36	0.43	0.37	0.50	0.59	0.35	0.42	0.41	0.43	0.35	0.59	0.43	0.08
Al	5.57	5.29	5.42	5.53	5.64	5.65	5.44	5.65	5.54	5.69	5.40	5.29	5.69	5.53	0.13
Fe	0.15	0.12	0.12	0.34	0.15	0.32	0.15	0.25	0.34	0.32	0.12	0.12	0.34	0.22	0.10
Mn	0.00	0.10	0.15	0.05	0.00	0.00	0.05	0.05	0.03	0.08	0.00	0.00	0.15	0.05	0.05
Mg	1.28	1.37	1.12	1.08	1.30	1.36	1.36	1.36	1.22	1.31	1.21	1.08	1.37	1.27	0.10
Ca	0.36	0.31	0.38	0.27	0.48	0.53	0.45	0.47	0.36	0.38	0.50	0.27	0.53	0.41	0.08
Na	0.07	0.17	0.13	0.08	0.08	0.09	0.17	0.23	0.00	0.00	0.11	0.00	0.23	0.10	0.07
K	4.80	4.49	4.70	4.44	5.04	4.53	4.46	4.33	4.67	4.59	4.89	4.33	5.04	4.63	0.21
F	0.25	0.24	0.00	0.25	0.03	0.23	0.11	0.15	0.19	0.21	0.23	0.00	0.25	0.17	0.09
Cl	0.08	0.16	0.00	0.05	0.00	0.00	0.16	0.03	0.00	0.00	0.11	0.00	0.16	0.05	0.07
total	44.14	44.62	44.22	43.42	44.38	44.49	44.52	43.69	43.51	44.12	44.24	43.42	44.62	44.12	0.41
P_2O_5	0.41	0.55	0.21	0.48	0.69	0.41	0.48	0.48	0.34	0.27	0.55	0.21	0.69	0.44	0.14
SiO_2	65.99	67.95	67.92	65.65	66.29	66.54	67.09	65.49	65.45	66.38	66.30	65.45	67.95	66.46	0.88
TiO_2	0.91	0.58	0.60	0.72	0.62	0.84	0.99	0.58	0.70	0.68	0.72	0.58	0.99	0.72	0.14
Al_2O_3	10.52	10.00	10.24	10.44	10.65	10.67	10.28	10.68	10.46	10.74	10.21	10.00	10.74	10.45	0.24
FeO	0.19	0.16	0.16	0.44	0.19	0.41	0.19	0.32	0.44	0.41	0.16	0.16	0.44	0.28	0.13
MnO	0.00	0.13	0.20	0.07	0.00	0.00	0.07	0.07	0.03	0.10	0.00	0.00	0.20	0.06	0.06
MgO	2.13	2.27	1.86	1.80	2.16	2.26	2.26	2.25	2.02	2.17	2.01	1.80	2.27	2.11	0.17
CaO	0.51	0.44	0.52	0.37	0.68	0.74	0.63	0.66	0.51	0.52	0.69	0.37	0.74	0.57	0.12
Na_2O	0.09	0.23	0.17	0.11	0.11	0.12	0.23	0.31	0.00	0.00	0.15	0.00	0.31	0.14	0.09
K_2O	5.78	5.41	5.66	5.34	6.07	5.45	5.38	5.22	5.62	5.54	5.89	5.22	6.07	5.58	0.26
F	0.25	0.24	0.00	0.25	0.03	0.23	0.11	0.15	0.19	0.20	0.23	0.00	0.25	0.17	0.09
Cl	0.08	0.16	0.00	0.05	0.00	0.00	0.16	0.03	0.00	0.00	0.11	0.00	0.16	0.05	0.07
total	86.75	87.99	87.54	85.61	87.48	87.59	87.78	86.16	85.69	86.93	86.91	85.61	87.99	86.95	0.83
H_2O	13.25	12.01	12.46	14.39	12.52	12.41	12.22	13.84	14.31	13.07	13.09	12.01	14.39	13.05	0.83
recalculated to 100 % total:															
P_2O_5	0.48	0.63	0.24	0.56	0.79	0.47	0.55	0.56	0.40	0.32	0.63	0.24	0.79	0.51	0.15
SiO_2	76.07	77.23	77.59	76.68	75.78	75.97	76.43	76.01	76.38	76.35	76.29	75.78	77.59	76.43	0.55
TiO_2	1.05	0.66	0.69	0.84	0.71	0.95	1.13	0.68	0.82	0.78	0.83	0.66	1.13	0.83	0.16
Al_2O_3	12.13	11.36	11.70	12.20	12.18	12.18	11.71	12.40	12.20	12.36	11.75	11.36	12.40	12.02	0.33
FeO	0.22	0.18	0.18	0.52	0.22	0.47	0.22	0.37	0.52	0.47	0.18	0.18	0.52	0.32	0.15
MnO	0.00	0.15	0.23	0.08	0.00	0.00	0.08	0.08	0.04	0.11	0.00	0.00	0.23	0.07	0.07
MgO	2.45	2.58	2.13	2.10	2.47	2.58	2.57	2.61	2.36	2.49	2.31	2.10	2.61	2.42	0.18
CaO	0.59	0.50	0.60	0.44	0.77	0.85	0.71	0.77	0.59	0.60	0.80	0.44	0.85	0.66	0.13
Na_2O	0.11	0.26	0.19	0.13	0.12	0.14	0.26	0.36	0.00	0.00	0.18	0.00	0.36	0.16	0.11
K_2O	6.67	6.15	6.47	6.24	6.94	6.23	6.13	6.05	6.56	6.37	6.78	6.05	6.94	6.42	0.29
F	0.29	0.27	0.00	0.30	0.03	0.26	0.13	0.17	0.22	0.24	0.27	0.00	0.30	0.20	0.10
Cl	0.09	0.18	0.00	0.06	0.00	0.00	0.18	0.03	0.00	0.00	0.12	0.00	0.18	0.06	0.07

Table 65: EMP data of glass in Type 4 run W2, same conditions as W3.

	1	2	3	4	5	mean	σ
P	0.34	0.29	0.26	0.14	0.20	0.25	0.08
Si	29.97	29.68	29.88	30.11	29.94	29.91	0.16
Ti	0.44	0.38	0.34	0.35	0.29	0.36	0.06
Al	5.68	5.75	5.62	5.77	5.97	5.76	0.13
Fe	0.10	0.19	0.19	0.29	0.07	0.17	0.09
Mn	0.00	0.03	0.00	0.00	0.03	0.01	0.01
Mg	1.00	1.00	1.20	0.90	0.75	0.97	0.17
Ca	0.65	0.54	0.59	0.52	0.46	0.55	0.07
Na	0.19	0.20	0.15	0.11	0.14	0.16	0.04
K	5.38	5.18	5.68	5.13	5.53	5.38	0.23
F	0.24	0.15	0.30	0.30	0.07	0.21	0.10
Cl	0.00	0.10	0.05	0.05	0.10	0.06	0.04
total	43.98	43.47	44.26	43.66	43.53	43.78	0.33
P_2O_5	0.79	0.66	0.59	0.33	0.46	0.57	0.18
SiO_2	64.12	63.49	63.92	64.42	64.04	64.00	0.34
TiO_2	0.74	0.63	0.56	0.58	0.48	0.60	0.10
Al_2O_3	10.73	10.86	10.62	10.91	11.27	10.88	0.25
FeO	0.12	0.24	0.24	0.37	0.09	0.21	0.11
MnO	0.00	0.03	0.00	0.00	0.03	0.01	0.02
MgO	1.65	1.66	1.99	1.49	1.24	1.61	0.28
CaO	0.90	0.75	0.83	0.72	0.65	0.77	0.10
Na_2O	0.25	0.27	0.21	0.15	0.19	0.21	0.05
K_2O	6.49	6.24	6.85	6.18	6.66	6.48	0.28
F	0.24	0.15	0.30	0.30	0.07	0.21	0.10
Cl	0.00	0.10	0.05	0.05	0.10	0.06	0.04
total	85.93	85.00	86.02	85.35	85.22	85.51	0.45
H_2O	14.07	15.00	13.98	14.65	14.78	14.49	0.45
recalculated to 100 % total:							
P_2O_5	0.92	0.77	0.69	0.38	0.54	0.66	0.21
SiO_2	74.62	74.69	74.31	75.48	75.15	74.85	0.46
TiO_2	0.86	0.75	0.65	0.68	0.56	0.70	0.11
Al_2O_3	12.49	12.78	12.34	12.78	13.23	12.72	0.34
FeO	0.14	0.29	0.28	0.43	0.11	0.25	0.13
MnO	0.00	0.04	0.00	0.00	0.04	0.02	0.02
MgO	1.92	1.96	2.31	1.74	1.45	1.88	0.32
CaO	1.05	0.88	0.96	0.84	0.76	0.90	0.11
Na_2O	0.29	0.31	0.24	0.17	0.23	0.25	0.06
K_2O	7.55	7.34	7.96	7.24	7.81	7.58	0.31
F	0.28	0.18	0.35	0.36	0.08	0.25	0.12
Cl	0.00	0.12	0.06	0.06	0.12	0.07	0.05

Table 66: EMP data of glass in Type 5 run B1 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.8 wt.%; 45 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.14	0.39	0.31	0.56	0.36	0.45	0.47	0.33	0.47	0.39	0.42	0.25	0.25	0.28	0.58	0.22	0.34	0.28	0.39	0.36	0.36	0.45	0.45	0.36	0.17	0.17	0.22
Si	20.73	19.24	18.29	20.03	19.52	20.01	19.78	19.28	18.99	19.87	19.47	19.70	19.17	20.55	17.81	18.69	19.88	19.13	19.64	19.71	20.14	21.04	18.26	18.53	19.96	19.76	19.28
Ti	0.49	0.46	0.36	0.55	0.58	0.48	0.46	0.47	0.46	0.58	0.36	0.43	0.64	0.41	0.35	0.20	0.55	0.42	0.51	0.46	0.54	0.67	0.41	0.49	0.48	0.50	0.34
Al	6.82	6.50	5.87	6.62	6.43	6.94	6.57	6.37	6.38	6.71	6.70	6.45	6.64	6.36	5.31	5.82	6.35	6.21	6.21	6.40	6.42	6.94	5.93	6.02	5.93	5.67	5.59
Fe	0.56	0.69	0.46	0.60	1.00	0.51	0.41	0.46	0.64	0.44	0.80	0.85	0.80	0.77	0.73	0.95	0.75	0.29	0.72	0.54	0.46	0.70	0.34	0.37	0.80	0.66	0.81
Mn	0.05	0.00	0.15	0.05	0.00	0.00	0.08	0.00	0.00	0.08	0.03	0.08	0.23	0.00	0.08	0.10	0.05	0.13	0.13	0.00	0.10	0.03	0.03	0.15	0.00	0.00	0.13
Mg	0.01	0.05	0.04	0.00	0.01	0.00	0.02	0.03	0.01	0.00	0.05	0.00	0.01	0.00	0.00	0.03	0.03	0.02	0.04	0.02	0.00	0.00	0.00	0.00	0.05	0.08	0.04
Ca	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.16	0.06	0.06	0.00	0.00	0.21	0.00	0.01	0.11	0.09	0.12	0.00	0.00	0.00	0.00	0.02	0.05	0.02
Na	2.17	2.47	4.09	2.47	1.82	1.89	1.43	3.89	1.61	2.28	1.83	3.31	3.05	3.60	4.28	3.00	4.61	5.22	7.02	2.61	1.54	2.01	3.43	3.04	2.57	3.64	3.26
K	15.38	15.15	16.51	16.68	16.45	15.05	16.46	16.45	16.15	16.00	16.90	15.80	15.52	16.07	16.09	15.94	15.53	16.25	14.30	15.41	17.67	15.54	15.60	16.57	15.74	15.92	16.03
F	0.76	0.80	1.09	0.74	1.17	0.99	1.10	1.07	1.16	1.18	0.74	1.09	1.03	1.35	1.08	0.85	0.88	0.88	0.89	1.14	0.85	0.86	1.05	1.60	0.98	0.97	0.79
Cl	1.34	1.08	0.56	1.86	0.84	1.00	1.43	1.84	1.15	1.28	1.38	1.25	1.15	1.28	0.79	1.46	0.95	1.66	0.85	0.69	2.62	1.10	1.08	0.36	1.46	0.74	0.72
total	48.44	46.82	47.72	50.16	48.19	47.32	48.20	50.24	47.02	48.97	48.73	49.27	48.48	50.66	47.31	47.26	49.92	50.59	50.79	47.46	50.69	49.34	46.57	47.49	48.16	48.16	47.22
P_2O_5	0.32	0.90	0.70	1.27	0.83	1.03	1.08	0.76	1.08	0.89	0.96	0.58	0.58	0.64	1.33	0.51	0.77	0.64	0.90	0.83	0.82	1.03	1.02	0.83	0.38	0.38	0.51
SiO_2	44.35	41.16	39.13	42.86	41.76	42.81	42.32	41.24	40.62	42.52	41.64	42.15	41.00	43.96	38.11	39.98	42.52	40.93	42.01	42.16	43.09	45.01	39.06	39.64	42.69	42.28	41.24
TiO_2	0.82	0.76	0.61	0.91	0.97	0.80	0.76	0.78	0.76	0.97	0.60	0.72	1.07	0.68	0.59	0.33	0.91	0.70	0.85	0.76	0.89	1.12	0.68	0.82	0.80	0.84	0.57
Al_2O_3	12.88	12.29	11.08	12.50	12.15	13.12	12.41	12.03	12.06	12.68	12.66	12.19	12.55	12.02	10.03	10.99	12.00	11.73	11.74	12.10	12.12	13.11	11.21	11.37	11.20	10.71	10.56
FeO	0.72	0.88	0.60	0.78	1.28	0.66	0.53	0.59	0.82	0.56	1.03	1.09	1.03	1.00	0.94	1.23	0.97	0.37	0.93	0.69	0.59	0.90	0.44	0.47	1.03	0.85	1.04
MnO	0.07	0.00	0.20	0.07	0.00	0.00	0.10	0.00	0.00	0.10	0.03	0.10	0.30	0.00	0.10	0.13	0.07	0.16	0.16	0.00	0.13	0.03	0.03	0.20	0.00	0.00	0.17
MgO	0.02	0.08	0.06	0.00	0.02	0.00	0.04	0.05	0.02	0.00	0.08	0.00	0.01	0.00	0.00	0.05	0.05	0.03	0.07	0.03	0.00	0.00	0.00	0.00	0.09	0.13	0.07
CaO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.22	0.09	0.09	0.00	0.00	0.29	0.00	0.02	0.15	0.12	0.17	0.00	0.00	0.00	0.00	0.03	0.07	0.03
Na_2O	2.92	3.33	5.51	3.33	2.46	2.55	1.92	5.24	2.18	3.07	2.47	4.46	4.11	4.85	5.76	4.04	6.21	7.04	9.47	3.51	2.07	2.71	4.62	4.10	3.47	4.91	4.40
K_2O	18.52	18.25	19.89	20.10	19.81	18.12	19.82	19.81	19.45	19.27	20.36	19.04	18.69	19.35	19.38	19.20	18.70	19.58	17.23	18.57	21.29	18.72	18.79	19.96	18.96	19.18	19.31
F	0.76	0.80	1.09	0.74	1.17	0.99	1.10	1.07	1.16	1.18	0.74	1.08	1.03	1.35	1.08	0.85	0.88	0.88	0.89	1.14	0.85	0.86	1.05	1.60	0.98	0.97	0.79
Cl	1.34	1.08	0.56	1.86	0.84	1.00	1.43	1.84	1.15	1.28	1.38	1.25	1.15	1.28	0.79	1.46	0.95	1.66	0.85	0.69	2.62	1.10	1.08	0.36	1.46	0.74	0.72
total	82.09	78.94	78.84	83.68	80.62	80.44	80.73	82.64	78.55	81.96	81.41	82.01	80.82	84.28	77.78	78.08	83.46	83.12	84.65	80.02	83.53	83.99	77.30	78.58	80.36	80.48	78.90
H_2O	17.91	21.06	21.16	16.32	19.38	19.56	19.27	17.36	21.45	18.04	18.59	17.99	19.18	15.72	22.22	21.92	16.54	16.88	15.35	19.98	16.47	16.01	22.70	21.42	19.64	19.52	21.10
recalculated to 100 % total:																											
P_2O_5	0.39	1.13	0.89	1.52	1.03	1.28	1.34	0.92	1.38	1.09	1.17	0.70	0.71	0.76	1.71	0.65	0.92	0.77	1.06	1.04	0.98	1.22	1.32	1.05	0.48	0.48	0.65
SiO_2	54.03	52.14	49.64	51.22	51.80	53.23	52.42	49.90	51.71	51.87	51.15	51.40	50.73	52.17	49.00	51.20	50.95	49.24	49.63	52.69	51.58	53.58	50.52	50.44	53.13	52.53	52.27
TiO_2	0.99	0.96	0.77	1.09	1.21	0.99	0.94	0.94	0.97	1.18	0.74	0.87	1.32	0.80	0.75	0.43	1.09	0.84	1.00	0.95	1.07	1.34	0.89	1.04	0.99	1.04	0.72
Al_2O_3	15.69	15.56	14.06	14.94	15.07	16.31	15.37	14.56	15.36	15.48	15.55	14.87	15.53	14.27	12.90	14.08	14.38	14.11	13.87	15.12	14.51	15.61	14.50	14.46	13.94	13.30	13.39
FeO	0.88	1.12	0.76	0.93	1.59	0.82	0.66	0.72	1.04	0.69	1.27	1.33	1.28	1.18	1.21	1.57	1.16	0.45	1.10	0.86	0.71	1.08	0.57	0.60	1.29	1.05	1.31
MnO	0.08	0.00	0.25	0.08	0.00	0.00	0.12	0.00	0.00	0.12	0.04	0.12	0.37	0.00	0.13	0.17	0.08	0.20	0.19	0.00	0.16	0.04	0.04	0.25	0.00	0.00	0.21
MgO	0.02	0.10	0.08	0.00	0.02	0.00	0.05	0.06	0.03	0.00	0.10	0.00	0.01	0.00	0.00	0.06	0.06	0.04	0.08	0.04	0.00	0.00	0.00	0.00	0.11	0.16	0.09
CaO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.27	0.10	0.10	0.00	0.00	0.37	0.00	0.02	0.19	0.14	0.21	0.00	0.00	0.00	0.00	0.04	0.09	0.04
Na_2O	3.56	4.22	6.99	3.98	3.05	3.17	2.38	6.34	2.77	3.74	3.03	5.44	5.08	5.76	7.41	5.17	7.44	8.47	11.18	4.39	2.48	3.23	5.98	5.22	4.31	6.10	5.57
K_2O	22.56	23.12	25.23	24.02	24.57	22.53	24.55	23.97	24.76	23.51	25.01	23.21	23.13	22.96	24.92	24.59	22.41	23.56	20.35	23.20	25.49	22.29	24.30	25.40	23.59	23.83	24.47
F	0.92	1.01	1.38	0.88	1.45	1.23	1.36	1.29	1.48	1.44	0.90	1.32	1.27	1.60	1.38	1.08	1.06	1.06	1.05	1.42	1.02	1.02	1.36	2.04	1.22	1.21	1.00
Cl	1.63	1.37	0.71	2.23	1.05	1.25	1.78	2.22	1.47	1.56	1.70	1.53	1.43	1.52	1.02	1.87	1.14	1.99	1.00	0.87	3.13	1.31	1.40	0.46	1.82	0.92	0.91

Table 66 (continued)**:** EMP data of glass in Type 5 run B1.

	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	min	max	mean	σ
P	0.34	0.50	0.22	0.22	0.21	0.32	0.27	0.29	0.32	0.24	0.32	0.16	0.29	0.32	0.21	0.24	0.48	0.35	0.14	0.58	0.33	0.11
Si	17.79	18.96	17.57	19.68	20.55	20.75	21.21	21.07	21.14	20.22	21.46	20.96	20.25	21.13	20.13	19.81	20.79	21.39	17.57	21.46	19.81	1.00
Ti	0.32	0.72	0.48	0.51	0.44	0.35	0.62	0.33	0.34	0.38	0.22	0.33	0.58	0.47	0.52	0.42	0.34	0.49	0.20	0.72	0.45	0.11
Al	5.72	6.02	5.95	6.48	6.65	6.02	6.54	6.56	6.34	6.44	6.16	6.43	7.06	7.11	6.70	6.33	6.79	6.61	5.31	7.11	6.36	0.40
Fe	0.61	0.46	0.81	0.37	0.42	0.70	0.72	0.77	0.88	0.91	1.13	0.56	0.63	0.44	0.84	0.60	0.56	0.37	0.29	1.13	0.64	0.20
Mn	0.00	0.00	0.00	0.05	0.00	0.10	0.07	0.07	0.22	0.10	0.12	0.05	0.07	0.00	0.20	0.15	0.00	0.03	0.00	0.23	0.06	0.06
Mg	0.00	0.04	0.00	0.00	0.06	0.05	0.04	0.02	0.04	0.01	0.06	0.06	0.04	0.00	0.00	0.02	0.00	0.07	0.00	0.08	0.02	0.02
Ca	0.00	0.00	0.00	0.00	0.15	0.07	0.08	0.11	0.00	0.10	0.02	0.12	0.04	0.00	0.08	0.00	0.00	0.16	0.00	0.21	0.04	0.06
Na	7.56	5.01	5.38	2.14	1.68	1.54	1.35	1.88	1.69	1.47	1.70	1.44	1.41	1.38	1.78	2.13	1.27	1.51	1.27	7.56	2.77	1.50
K	14.18	16.15	15.71	16.11	16.61	16.04	16.33	14.94	15.86	16.43	16.46	15.77	16.59	16.46	15.69	17.23	17.12	16.49	14.18	17.67	16.03	0.69
F	0.82	0.71	0.87	0.95	0.86	0.86	0.50	0.50	0.77	0.60	0.51	0.37	0.66	0.81	0.60	0.63	0.47	1.08	0.37	1.60	0.88	0.24
Cl	0.93	1.51	1.23	1.28	0.73	1.25	0.96	0.61	0.94	1.46	1.03	0.69	1.20	0.96	0.38	0.66	0.78	0.61	0.36	2.62	1.09	0.42
total	48.26	50.08	48.21	47.79	48.34	48.05	48.68	47.16	48.54	48.36	49.19	46.94	48.82	49.08	47.13	48.22	48.60	49.15	46.57	50.79	48.48	1.14
P_2O_5	0.77	1.15	0.51	0.51	0.49	0.73	0.61	0.67	0.73	0.55	0.73	0.37	0.67	0.73	0.49	0.55	1.09	0.79	0.32	1.33	0.75	0.25
SiO_2	38.06	40.57	37.60	42.09	43.96	44.40	45.37	45.07	45.23	43.26	45.91	44.85	43.32	45.19	43.07	42.38	44.48	45.76	37.60	45.91	42.37	2.13
TiO_2	0.53	1.20	0.80	0.86	0.73	0.59	1.04	0.55	0.57	0.64	0.36	0.56	0.97	0.78	0.87	0.69	0.57	0.81	0.33	1.20	0.76	0.18
Al_2O_3	10.81	11.38	11.23	12.24	12.56	11.37	12.36	12.39	11.98	12.17	11.63	12.15	13.34	13.44	12.67	11.97	12.83	12.50	10.03	13.44	12.01	0.76
FeO	0.79	0.59	1.04	0.47	0.54	0.90	0.92	0.99	1.13	1.16	1.46	0.72	0.81	0.57	1.08	0.78	0.72	0.48	0.37	1.46	0.83	0.25
MnO	0.00	0.00	0.00	0.07	0.00	0.13	0.10	0.10	0.29	0.13	0.16	0.06	0.10	0.00	0.26	0.19	0.00	0.03	0.00	0.30	0.08	0.08
MgO	0.00	0.06	0.00	0.00	0.09	0.08	0.06	0.04	0.06	0.02	0.09	0.10	0.07	0.00	0.00	0.04	0.00	0.12	0.00	0.13	0.04	0.04
CaO	0.00	0.00	0.00	0.00	0.21	0.09	0.11	0.15	0.00	0.14	0.03	0.17	0.06	0.00	0.11	0.00	0.00	0.23	0.00	0.29	0.06	0.08
Na_2O	10.19	6.75	7.25	2.88	2.26	2.08	1.82	2.53	2.28	1.97	2.29	1.94	1.90	1.86	2.40	2.87	1.71	2.03	1.71	10.19	3.73	2.03
K_2O	17.08	19.45	18.92	19.41	20.01	19.32	19.67	18.00	19.10	19.80	19.83	19.00	19.98	19.83	18.90	20.75	20.63	19.86	17.08	21.29	19.31	0.83
F	0.82	0.71	0.87	0.95	0.86	0.86	0.50	0.50	0.77	0.60	0.51	0.37	0.66	0.81	0.60	0.63	0.47	1.08	0.37	1.60	0.88	0.24
Cl	0.93	1.51	1.23	1.28	0.73	1.25	0.96	0.62	0.94	1.46	1.03	0.69	1.20	0.97	0.38	0.66	0.78	0.61	0.36	2.62	1.09	0.42
total	79.41	82.74	78.80	80.07	81.91	81.16	83.08	81.26	82.55	81.31	83.59	80.66	82.52	83.62	80.47	81.09	82.90	83.71	77.30	84.65	81.29	1.94
H_2O	20.59	17.26	21.20	19.93	18.09	18.84	16.92	18.74	17.45	18.69	16.41	19.34	17.48	16.38	19.53	18.91	17.10	16.29	15.35	22.70	18.71	1.94
recalculated to 100 % total:																						
P_2O_5	0.97	1.38	0.65	0.64	0.59	0.90	0.73	0.83	0.89	0.67	0.87	0.45	0.81	0.87	0.61	0.67	1.32	0.95	0.39	1.71	0.92	0.30
SiO_2	47.93	49.04	47.71	52.57	53.67	54.71	54.61	55.46	54.79	53.20	54.93	55.60	52.50	54.05	53.52	52.26	53.66	54.66	47.71	55.60	52.11	1.98
TiO_2	0.66	1.45	1.01	1.07	0.89	0.73	1.25	0.68	0.69	0.79	0.43	0.69	1.17	0.93	1.08	0.86	0.69	0.97	0.43	1.45	0.93	0.22
Al_2O_3	13.61	13.76	14.26	15.29	15.34	14.01	14.87	15.25	14.51	14.97	13.92	15.07	16.16	16.07	15.74	14.76	15.48	14.93	12.90	16.31	14.77	0.80
FeO	0.99	0.72	1.32	0.59	0.66	1.10	1.11	1.22	1.37	1.43	1.74	0.89	0.98	0.68	1.34	0.96	0.86	0.57	0.45	1.74	1.02	0.31
MnO	0.00	0.00	0.00	0.08	0.00	0.16	0.12	0.12	0.35	0.16	0.19	0.08	0.12	0.00	0.32	0.24	0.00	0.04	0.00	0.37	0.10	0.10
MgO	0.00	0.07	0.00	0.00	0.11	0.10	0.08	0.05	0.08	0.02	0.11	0.13	0.09	0.00	0.00	0.05	0.00	0.14	0.00	0.16	0.05	0.05
CaO	0.00	0.00	0.00	0.00	0.26	0.11	0.13	0.19	0.00	0.17	0.04	0.21	0.07	0.00	0.13	0.00	0.00	0.27	0.00	0.37	0.07	0.10
Na_2O	12.83	8.16	9.20	3.59	2.76	2.56	2.19	3.12	2.76	2.43	2.74	2.41	2.31	2.23	2.99	3.54	2.06	2.43	2.06	12.83	4.59	2.50
K_2O	21.51	23.51	24.01	24.24	24.43	23.81	23.68	22.15	23.14	24.35	23.72	23.55	24.21	23.72	23.49	25.60	24.88	23.73	20.35	25.60	23.76	1.06
F	1.03	0.86	1.10	1.19	1.05	1.06	0.60	0.61	0.93	0.74	0.61	0.46	0.80	0.97	0.74	0.78	0.57	1.29	0.46	2.04	1.09	0.31
Cl	1.17	1.82	1.56	1.60	0.89	1.54	1.16	0.76	1.14	1.79	1.24	0.85	1.45	1.15	0.47	0.81	0.94	0.73	0.46	3.13	1.34	0.51

Table 67: EMP data of glass in Type 5 run E1 with a cooling rate of 0.3 °C /min, quenched at conditions of 3.5 GPa / 700 °C; bulk water content 2.7 wt.%; 31 analyses.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
P	0.15	0.09	0.03	0.09	0.09	0.32	0.21	0.18	0.06	0.15	0.00	0.06	0.24	0.00	0.12	0.18	0.12	0.15	0.12	0.06	0.00	0.03	0.03	0.09	0.00	0.09	0.06
Si	27.62	26.49	27.33	25.58	26.14	26.51	27.37	26.48	27.62	25.77	27.03	27.10	27.33	26.65	26.31	26.63	25.66	25.62	27.56	26.08	27.70	27.74	27.06	27.98	27.30	28.44	27.59
Ti	0.26	0.08	0.24	1.36	0.06	0.20	0.17	0.16	0.19	0.20	0.12	0.21	0.09	0.14	0.08	0.13	0.15	0.18	0.22	0.08	0.27	0.12	0.19	0.25	0.11	0.11	0.20
Al	4.94	4.69	4.92	4.21	4.84	4.58	4.79	4.60	4.85	4.48	4.84	4.60	4.91	4.77	4.44	4.66	4.82	4.84	4.87	4.69	4.66	4.98	4.85	5.13	4.57	5.22	4.51
Fe	1.00	0.69	0.78	0.81	0.59	0.71	0.85	0.83	0.44	0.79	0.71	0.51	0.71	1.09	0.35	0.47	0.60	0.67	0.57	0.57	0.64	0.64	0.62	1.08	0.57	0.79	0.55
Mn	0.00	0.00	0.03	0.13	0.00	0.15	0.00	0.05	0.00	0.05	0.05	0.00	0.03	0.00	0.16	0.00	0.03	0.16	0.08	0.00	0.03	0.10	0.08	0.10	0.10	0.00	0.00
Mg	0.05	0.04	0.09	0.02	0.00	0.05	0.03	0.02	0.00	0.00	0.00	0.03	0.06	0.06	0.05	0.00	0.06	0.05	0.04	0.02	0.04	0.08	0.07	0.00	0.04	0.08	0.06
Ca	0.37	0.50	0.68	0.43	0.58	0.63	0.70	0.60	0.36	0.44	0.67	0.56	0.46	0.15	0.51	0.25	0.29	0.54	0.43	0.29	0.40	0.54	0.51	0.51	0.49	0.36	0.21
Na	3.38	2.92	3.38	3.94	3.31	3.45	3.67	3.49	3.26	2.66	2.79	2.66	3.08	2.72	3.27	3.02	2.84	2.75	2.57	2.64	3.48	3.34	2.61	3.06	2.99	2.80	2.87
K	7.01	6.59	6.67	6.43	7.05	6.81	6.62	7.45	7.07	6.05	6.28	6.89	6.53	6.85	5.97	5.46	5.99	6.35	6.31	6.11	6.31	6.36	5.74	6.58	6.56	6.66	6.09
F	0.32	0.27	0.01	0.30	0.14	0.18	0.12	0.09	0.14	0.11	0.15	0.19	0.16	0.16	0.14	0.14	0.30	0.15	0.07	0.23	0.25	0.11	0.25	0.05	0.15	0.22	0.22
Cl	0.48	0.24	0.45	0.50	0.37	0.40	0.29	0.42	0.56	0.72	0.35	0.90	0.88	0.48	0.43	0.46	0.54	0.62	0.22	0.72	0.13	0.70	0.35	0.13	0.29	0.40	0.70
total	45.55	42.59	44.60	43.80	43.16	43.98	44.83	44.38	44.55	41.41	42.97	43.71	44.48	43.08	41.83	41.39	41.40	42.06	43.05	41.51	43.91	44.73	42.34	44.95	43.17	45.17	43.05
P_2O_5	0.33	0.20	0.07	0.20	0.20	0.73	0.47	0.40	0.14	0.33	0.00	0.13	0.54	0.00	0.27	0.41	0.27	0.34	0.27	0.14	0.00	0.07	0.07	0.20	0.00	0.20	0.14
SiO_2	59.08	56.67	58.47	54.72	55.92	56.71	58.56	56.64	59.10	55.14	57.82	57.98	58.46	57.01	56.28	56.98	54.90	54.80	58.95	55.80	59.25	59.34	57.88	59.85	58.41	60.85	59.03
TiO_2	0.43	0.14	0.41	2.27	0.10	0.33	0.29	0.27	0.31	0.33	0.20	0.35	0.16	0.24	0.14	0.22	0.26	0.30	0.37	0.14	0.45	0.20	0.31	0.41	0.18	0.18	0.33
Al_2O_3	9.33	8.86	9.29	7.95	9.14	8.65	9.06	8.69	9.16	8.47	9.15	8.69	9.27	9.01	8.38	8.80	9.11	9.15	9.20	8.86	8.80	9.41	9.16	9.69	8.64	9.87	8.52
FeO	1.28	0.89	1.00	1.04	0.76	0.91	1.10	1.07	0.57	1.02	0.91	0.66	0.92	1.40	0.45	0.61	0.77	0.86	0.73	0.74	0.83	0.82	0.80	1.39	0.73	1.01	0.70
MnO	0.00	0.00	0.03	0.17	0.00	0.20	0.00	0.07	0.00	0.07	0.07	0.00	0.03	0.00	0.20	0.00	0.03	0.20	0.10	0.00	0.03	0.13	0.10	0.13	0.13	0.00	0.00
MgO	0.09	0.06	0.15	0.04	0.00	0.08	0.05	0.04	0.00	0.00	0.00	0.05	0.10	0.10	0.08	0.00	0.10	0.08	0.07	0.04	0.07	0.14	0.11	0.00	0.06	0.13	0.10
CaO	0.52	0.70	0.94	0.61	0.81	0.88	0.98	0.85	0.51	0.61	0.93	0.78	0.65	0.21	0.72	0.34	0.41	0.75	0.60	0.41	0.56	0.75	0.72	0.71	0.68	0.51	0.29
Na_2O	4.55	3.94	4.55	5.31	4.46	4.65	4.95	4.70	4.40	3.58	3.76	3.59	4.16	3.67	4.41	4.06	3.82	3.71	3.47	3.56	4.69	4.50	3.52	4.12	4.03	3.77	3.87
K_2O	8.44	7.94	8.04	7.74	8.50	8.20	7.97	8.98	8.51	7.28	7.56	8.30	7.87	8.26	7.19	6.58	7.22	7.65	7.60	7.36	7.60	7.66	6.92	7.92	7.90	8.02	7.34
F	0.32	0.27	0.01	0.30	0.14	0.18	0.12	0.09	0.14	0.11	0.15	0.18	0.16	0.16	0.14	0.14	0.30	0.15	0.07	0.23	0.25	0.11	0.25	0.05	0.15	0.22	0.22
Cl	0.48	0.24	0.45	0.50	0.37	0.40	0.29	0.42	0.56	0.72	0.35	0.90	0.88	0.48	0.43	0.46	0.54	0.62	0.22	0.73	0.13	0.70	0.35	0.13	0.30	0.40	0.70
total	84.61	79.73	83.31	80.61	80.25	81.76	83.73	82.08	83.20	77.45	80.74	81.34	82.93	80.36	78.54	78.43	77.48	78.40	81.57	77.74	82.54	83.62	79.99	84.56	81.08	84.98	80.98
H_2O	15.39	20.27	16.69	19.39	19.75	18.24	16.27	17.92	16.80	22.55	19.26	18.66	17.07	19.64	21.46	21.57	22.52	21.60	18.43	22.26	17.46	16.38	20.01	15.44	18.92	15.02	19.02
recalculated to 100 % total:																											
P_2O_5	0.40	0.25	0.08	0.25	0.25	0.90	0.56	0.49	0.16	0.43	0.00	0.16	0.65	0.00	0.34	0.52	0.35	0.43	0.33	0.17	0.00	0.08	0.09	0.24	0.00	0.24	0.17
SiO_2	69.83	71.08	70.19	67.89	69.68	69.36	69.95	69.00	71.03	71.19	71.60	71.28	70.50	70.95	71.66	72.65	70.85	69.90	72.27	71.78	71.79	70.96	72.36	70.77	72.04	71.61	72.89
TiO_2	0.50	0.17	0.49	2.82	0.12	0.40	0.35	0.33	0.37	0.43	0.24	0.43	0.19	0.29	0.18	0.28	0.33	0.38	0.46	0.18	0.55	0.23	0.39	0.48	0.22	0.21	0.41
Al_2O_3	11.03	11.11	11.15	9.86	11.39	10.58	10.82	10.59	11.01	10.94	11.33	10.69	11.18	11.22	10.67	11.22	11.76	11.66	11.28	11.40	10.66	11.25	11.45	11.46	10.66	11.61	10.52
FeO	1.52	1.11	1.21	1.29	0.94	1.12	1.31	1.30	0.68	1.31	1.13	0.81	1.11	1.74	0.57	0.78	0.99	1.10	0.90	0.95	1.00	0.98	1.00	1.65	0.90	1.19	0.87
MnO	0.00	0.00	0.04	0.21	0.00	0.24	0.00	0.08	0.00	0.09	0.08	0.00	0.04	0.00	0.26	0.00	0.04	0.26	0.12	0.00	0.04	0.16	0.13	0.16	0.16	0.00	0.00
MgO	0.10	0.07	0.18	0.05	0.00	0.10	0.06	0.05	0.00	0.00	0.00	0.06	0.12	0.12	0.10	0.00	0.13	0.10	0.09	0.05	0.08	0.17	0.14	0.00	0.07	0.15	0.12
CaO	0.62	0.87	1.13	0.75	1.01	1.07	1.17	1.03	0.61	0.79	1.15	0.96	0.78	0.26	0.92	0.44	0.53	0.96	0.73	0.53	0.68	0.90	0.90	0.84	0.84	0.60	0.36
Na_2O	5.38	4.94	5.47	6.59	5.56	5.68	5.91	5.73	5.29	4.62	4.66	4.41	5.01	4.56	5.61	5.18	4.93	4.73	4.25	4.58	5.69	5.38	4.40	4.87	4.97	4.44	4.78
K_2O	9.98	9.96	9.65	9.61	10.59	10.03	9.52	10.93	10.23	9.40	9.37	10.20	9.49	10.27	9.16	8.39	9.31	9.76	9.32	9.46	9.21	9.16	8.65	9.37	9.74	9.44	9.06
F	0.37	0.34	0.01	0.38	0.17	0.22	0.14	0.11	0.17	0.14	0.19	0.23	0.19	0.20	0.18	0.18	0.39	0.19	0.09	0.29	0.30	0.14	0.31	0.06	0.18	0.26	0.27
Cl	0.56	0.30	0.54	0.62	0.46	0.49	0.35	0.52	0.67	0.93	0.43	1.11	1.06	0.60	0.55	0.58	0.69	0.79	0.26	0.93	0.16	0.83	0.44	0.16	0.36	0.47	0.86

Table 67 (continued)**:** EMP data of glass in Type 5 run E1.

	28	29	30	31	min	max	mean	σ
P	0.03	0.09	0.15	0.06	0.00	0.32	0.10	0.07
Si	26.51	28.62	27.10	26.86	25.58	28.62	26.96	0.80
Ti	0.17	0.20	0.36	0.17	0.06	1.36	0.21	0.22
Al	4.88	4.78	4.74	4.77	4.21	5.22	4.75	0.20
Fe	0.35	0.29	0.89	0.77	0.29	1.09	0.68	0.20
Mn	0.23	0.00	0.03	0.05	0.00	0.23	0.05	0.06
Mg	0.00	0.04	0.00	0.04	0.00	0.09	0.04	0.03
Ca	0.39	0.44	0.39	0.33	0.15	0.70	0.45	0.14
Na	2.77	3.20	2.73	2.49	2.49	3.94	3.04	0.37
K	6.32	6.65	6.18	6.26	5.46	7.45	6.46	0.42
F	0.29	0.10	0.18	0.23	0.01	0.32	0.17	0.08
Cl	0.29	0.29	0.64	0.51	0.13	0.90	0.47	0.20
total	42.23	44.70	43.39	42.52	41.39	45.55	43.37	1.24
P_2O_5	0.07	0.20	0.34	0.14	0.00	0.73	0.22	0.17
SiO_2	56.71	61.23	57.98	57.46	54.72	61.23	57.68	1.71
TiO_2	0.28	0.33	0.61	0.28	0.10	2.27	0.35	0.37
Al_2O_3	9.22	9.03	8.95	9.01	7.95	9.87	8.98	0.38
FeO	0.45	0.38	1.15	0.99	0.38	1.40	0.87	0.25
MnO	0.30	0.00	0.03	0.07	0.00	0.30	0.07	0.08
MgO	0.00	0.07	0.00	0.06	0.00	0.15	0.06	0.04
CaO	0.55	0.61	0.55	0.46	0.21	0.98	0.63	0.19
Na_2O	3.74	4.31	3.69	3.35	3.35	5.31	4.09	0.49
K_2O	7.62	8.01	7.44	7.54	6.58	8.98	7.78	0.51
F	0.29	0.10	0.18	0.23	0.01	0.32	0.17	0.08
Cl	0.30	0.30	0.64	0.51	0.13	0.90	0.47	0.20
total	79.32	84.47	81.33	79.88	77.45	84.98	81.19	2.22
H_2O	20.68	15.53	18.67	20.12	15.02	22.55	18.81	2.22
recalculated to 100 % total:								
P_2O_5	0.09	0.24	0.42	0.17	0.00	0.90	0.27	0.21
SiO_2	71.49	72.49	71.29	71.94	67.89	72.89	71.04	1.15
TiO_2	0.35	0.39	0.75	0.34	0.12	2.82	0.43	0.46
Al_2O_3	11.63	10.69	11.00	11.28	9.86	11.76	11.07	0.42
FeO	0.56	0.45	1.41	1.24	0.45	1.74	1.07	0.30
MnO	0.38	0.00	0.04	0.08	0.00	0.38	0.08	0.10
MgO	0.00	0.08	0.00	0.07	0.00	0.18	0.07	0.05
CaO	0.69	0.73	0.67	0.58	0.26	1.17	0.78	0.23
Na_2O	4.71	5.10	4.53	4.20	4.20	6.59	5.04	0.56
K_2O	9.60	9.49	9.15	9.44	8.39	10.93	9.58	0.53
F	0.36	0.11	0.22	0.29	0.01	0.39	0.22	0.10
Cl	0.37	0.35	0.79	0.64	0.16	1.11	0.58	0.25

Table 68: EMP data of glass in short-time melting run P1 (Type 3), 3.5 GPa / 700 °C; 0.6 wt.%.

	1	2	3	4	5	6	7	8	9	10	min	max	mean	σ
P	0.03	0.15	0.15	0.12	0.15	0.00	0.15	0.06	0.00	0.18	0.00	0.18	0.10	0.07
Si	28.91	28.86	28.25	28.80	28.70	28.98	28.53	28.69	28.98	27.80	27.80	28.98	28.65	0.38
Ti	0.04	0.07	0.09	0.13	0.15	0.01	0.22	0.12	0.11	0.07	0.01	0.22	0.10	0.06
Al	7.37	7.26	7.22	7.39	7.50	7.42	7.31	7.33	7.37	6.92	6.92	7.50	7.31	0.16
Fe	0.81	0.32	0.64	0.64	0.81	0.54	0.61	0.69	0.64	0.42	0.32	0.81	0.61	0.15
Mn	0.00	0.10	0.00	0.05	0.03	0.05	0.08	0.00	0.00	0.00	0.00	0.10	0.03	0.04
Mg	0.00	0.00	0.03	0.06	0.02	0.01	0.00	0.06	0.00	0.15	0.00	0.15	0.03	0.05
Ca	0.93	0.74	0.57	0.76	0.78	0.69	0.83	0.73	0.59	1.03	0.57	1.03	0.77	0.14
Na	3.14	3.58	3.40	3.50	3.68	3.85	3.44	3.79	3.16	3.17	3.14	3.85	3.47	0.26
K	3.27	2.74	3.38	3.12	3.56	2.92	3.12	3.05	3.35	3.60	2.74	3.60	3.21	0.27
F	0.14	0.13	0.21	0.14	0.13	0.26	0.06	0.13	0.15	0.00	0.00	0.26	0.13	0.07
Cl	0.62	0.16	0.35	0.30	0.73	0.14	0.41	0.57	0.27	0.54	0.14	0.73	0.41	0.20
total	45.25	44.10	44.28	45.01	46.22	44.87	44.74	45.21	44.62	43.86	43.86	46.22	44.82	0.68
P_2O_5	0.07	0.34	0.34	0.27	0.34	0.00	0.34	0.14	0.00	0.41	0.00	0.41	0.23	0.16
SiO_2	61.86	61.74	60.43	61.62	61.39	62.00	61.02	61.38	61.99	59.46	59.46	62.00	61.29	0.80
TiO_2	0.06	0.12	0.16	0.21	0.25	0.02	0.37	0.19	0.18	0.12	0.02	0.37	0.17	0.10
Al_2O_3	13.92	13.71	13.64	13.97	14.16	14.02	13.82	13.85	13.93	13.07	13.07	14.16	13.81	0.30
FeO	1.04	0.41	0.82	0.82	1.04	0.69	0.79	0.88	0.82	0.54	0.41	1.04	0.79	0.20
MnO	0.00	0.13	0.00	0.07	0.03	0.07	0.10	0.00	0.00	0.00	0.00	0.13	0.04	0.05
MgO	0.00	0.00	0.05	0.10	0.03	0.01	0.00	0.10	0.00	0.25	0.00	0.25	0.05	0.08
CaO	1.30	1.03	0.79	1.06	1.09	0.96	1.16	1.03	0.83	1.44	0.79	1.44	1.07	0.20
Na_2O	4.23	4.83	4.58	4.72	4.96	5.18	4.63	5.11	4.26	4.27	4.23	5.18	4.68	0.35
K_2O	3.94	3.30	4.07	3.75	4.28	3.52	3.75	3.68	4.04	4.34	3.30	4.34	3.87	0.33
F	0.14	0.13	0.20	0.14	0.13	0.26	0.06	0.13	0.15	0.00	0.00	0.26	0.13	0.07
Cl	0.62	0.16	0.35	0.30	0.73	0.14	0.41	0.57	0.27	0.54	0.14	0.73	0.41	0.20
total	86.97	85.81	85.27	86.91	88.23	86.74	86.33	86.86	86.34	84.31	84.31	88.23	86.38	1.07
H_2O	13.03	14.19	14.73	13.09	11.77	13.26	13.67	13.14	13.66	15.69	11.77	15.69	13.62	1.07
recalculated to 100 % total:														
P_2O_5	0.08	0.40	0.40	0.32	0.39	0.00	0.40	0.16	0.00	0.49	0.00	0.49	0.26	0.19
SiO_2	71.12	71.95	70.86	70.90	69.58	71.48	70.68	70.66	71.80	70.53	69.58	71.95	70.96	0.69
TiO_2	0.07	0.14	0.18	0.25	0.29	0.02	0.43	0.22	0.20	0.14	0.02	0.43	0.19	0.11
Al_2O_3	16.01	15.98	16.00	16.07	16.05	16.17	16.00	15.94	16.14	15.50	15.50	16.17	15.99	0.18
FeO	1.20	0.48	0.96	0.94	1.18	0.80	0.91	1.02	0.95	0.64	0.48	1.20	0.91	0.22
MnO	0.00	0.15	0.00	0.08	0.04	0.08	0.12	0.00	0.00	0.00	0.00	0.15	0.05	0.06
MgO	0.00	0.00	0.06	0.11	0.03	0.01	0.00	0.11	0.00	0.29	0.00	0.29	0.06	0.09
CaO	1.49	1.20	0.93	1.22	1.24	1.11	1.35	1.18	0.96	1.71	0.93	1.71	1.24	0.23
Na_2O	4.87	5.63	5.37	5.44	5.63	5.98	5.36	5.88	4.94	5.06	4.87	5.98	5.42	0.38
K_2O	4.53	3.84	4.77	4.32	4.86	4.06	4.35	4.23	4.67	5.14	3.84	5.14	4.48	0.39
F	0.16	0.15	0.24	0.17	0.15	0.30	0.06	0.15	0.17	0.00	0.00	0.30	0.15	0.08
Cl	0.71	0.19	0.41	0.34	0.82	0.16	0.47	0.65	0.31	0.64	0.16	0.82	0.47	0.23