Microstructures of fibrous halite veins *Poster*

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Introduction

Halite veins hosted in clastic sedimentary rocks are frequently observed next to evaporite layers. Their microstructure can be enhanced by gamma irradiation and etching, which can be used to infer the deformation mechanism of halite (e.g. Howard & Kerr 1960, Schleder & Urai 2005). In this study, we present results from gamma-decorated vein microstructures of fibrous halite veins hosted in claystone.

Data

Samples were taken in the Klodawa salt mine in Poland and the Hengelo mine in the Netherlands. Both locations expose halite veins with a white and orange colour. The halite host rock, which is the source of halite precipitated in the vein, is located centimeters to meters away from the veins. The vein microstructure is fibrous with variable fibre diameters, and slightly widens towards the vein-wall interface. This indicates antitaxial vein growth from the centre towards the wall and precipitation of new material on both sides of the vein. Fibre grain boundaries are straight and not serrated. Irradiated samples show that some fibres consist of subgrains, which formed during growth.

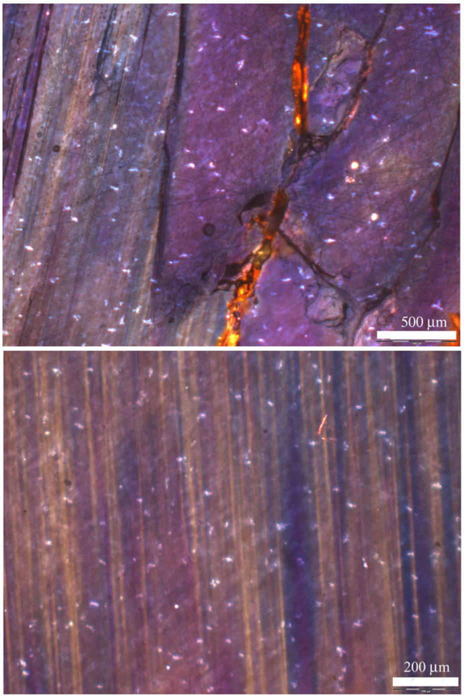

Figure 1: Gamma-irradiated fibrous halite veins show different fibre widths ranging between millimeters to microns. Micron-scale fibres are growth subgrains, while deformation subgrains are absent in the vein. Klodawa mine, Poland.

Overall, the vein is devoid of deformation subgrains. Repeated solid- or fluid inclusion bands have not been observed in the veins, which would point to the crack-seal mechanism causing vein opening (see also Hilgers & Urai 2005 for similar conclusion on antitaxial gypsum and calcite veins).

EBSD analysis suggests a random texture (Fig. 2), which is also apparent in colored maps showing the crystal directions of the grains. Thus, significant growth competition is absent and grains continue to grow regardless of their crystallographic orientation. Growth in an

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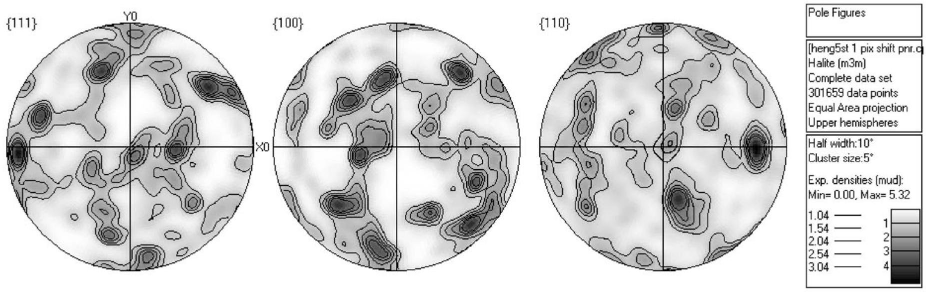

Figure 2: The fibrous halite vein from Hengelo shows a random texture (137 grains measured).

open vug would result in euhedral crystals and significant growth competition, while randomly oriented fibrous grains require contact with the wall rock during growth (Hilgers et al. 2001).

Conclusion

Fibrous antitaxial halite veins formed in extension fractures in claystone. Microstructural indicators for repeated crack-seal mechanism are absent, and thus veins may rather have formed during a continuous growth process. The bulk permeability of the fractured rock was low even if the vein aperture reaches several centimetres, because a random crystallographic texture of the vein microstructure requires close contact between the growing vein and the host rock.

References

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