

CHM Behavior of Microfractures in Rock Salt

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Abstract

For underground constructions in rock salt like resource storages or waste disposals the hydraulic integrity is very important and often decisive. An essential point for the hydraulic integrity is the mechanical (M), hydraulic (H) and chemical (C) behavior of microfractures that usually occur in the border area of excavated openings and in some cases sealing-materials.

That is why the behavior of microfractures has been investigated at Clausthal University of Technology. A lot of measurements on rock salt samples from different locations have been conducted as basis. These measurements cover a large range of damage grades to analyze microfracture systems with different intensities. For investigations the inert fluids Hexane (liquid) and Nitrogen (gaseous) have been used and in addition as non inert fluid saturated NaCl solution.

On basis of these measurements with inert fluids an empiric correlation between permeability and pore pressure could be developed. It reflects the alteration on the fracture width and is presented in this publication. For small contact times measurements with non inert fluids show that the microfracture system behaves similarly as in case of inert fluids. Though later on there can be fast and significant changes. These changes have been investigated by chemical and x-ray computer tomography analysis and are shown below.

The CH behavior observed in experiments with rock salt samples is compared with numerical analysis of the saturation of SVV (self healing salt backfill) from earlier studies. The comparison of these two studies provides better understanding of fluid flow of reactive fluids in microfractures of rock salt.

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