

Migration experiments in naturally fractured crystalline core samples

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Safety assessment of deep geological repositories in crystalline rocks relies critically on the identification of fracture flow properties and the reliability of transport modelling approaches. We suggest experimental observations of such processes in the laboratory by using tomographic methods, as well as feedback with and improvement of existing transport modelling approaches.

Radionuclide tracer propagation in fractured crystalline cores from Bukov URL and Mrákotín quarry was studied in collaboration with HZDR. Spatiotemporal images of the tracer concentration during conservative transport were recorded with positron emission tomography (PET), and the underlying fracture structure was characterized by μ CT-imaging, which serves as a structural model for reactive transport modelling.

First results indicate the opportunities in reactive transport analysis by using PET- μ CT techniques, proving the existence of preferential migration pathways (Fig. 1).

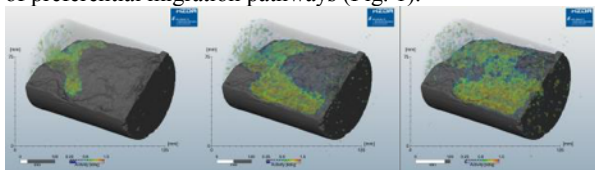


Fig. 1. GeoPET/ μ CT-imaging of the tracer propagation ($^{18}\text{F}^-$) along the fracture, 3 frames out of 60.

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