

Fracture visualization by resin injection and rock texture observation

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Fractures developing in the rock can play as a main path for nuclide released from the deep geological repository. Fracture width is one of the important parameters for evaluating transport properties in the rock, therefore its measurement method of visualized fractures injected by fluorescence-doped resin has been developed at Grimsel test site in Switzerland. Fracture visualization technique by using resin injection has been advanced for applying to the domestic crystalline rock sites. In this study, we observed thin sections using a drill core sample which was drilled at -300m stage in the Mizunami Underground Research Laboratory of Japan Atomic Energy Agency (JAEA) after injecting yellow-colored epoxy resin into the fracture in a laboratory. The thin sections were made across the resin-filled fracture with some filling minerals. As a result, under a polarizing microscope, the width of the resin filled fracture is around 0.17mm on average, and the small scale of calcite (around 0.05mm) and the smaller scale of calcite (around 0.005mm) are recognized. In the former type, opaque minerals and fragmented plagioclase also are seen together. On the other hand, the latter type has no other minerals in calcite and it is relatively observed at uppermost part of the fracture surface. Furthermore, we measured the widths of the fractures injected by blue colored resin pressed under 15-17MPa before making thin sections and it was around 0.006mm on average. Blue resin filled fractures are seen along grain boundary of minerals or in cracks inside quartz. In future works, we will make thin sections of core samples -500m stage and apply the same methods of resin injection. This study is commissioned by the Agency for Natural Resources and Energy in the Ministry of Economy, Trade and Industry. Resin injection tests were conducted as a part of a collaborative research with JAEA.

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