Microscopic pore structure in rock matrix by resin injected fracture measurements

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In the deep geological disposal, radioactive nuclide moves floating through fractures and diffuses in rock matrix which has microscopic fractures and pores. Because radioactive nuclide can be absorbed in such microscopic pore structures in rock matrix, understanding three-dimensional microscopic structures gives more spatial reality for modelling radioactive nuclide migration in the rock. The result of pore size measurements by mercury intrusion porosimetry shows that the porosity in rock matrix with alteration around fractures at -300m stage in the Mizunami Underground Research Laboratory of Japan Atomic Energy Agency (JAEA) decreases toward the inner matrix around 10 cm width and the average value is around 2.68%, which is larger than the porosity of fractures with no alteration (1.12%). In this study, three dimensional structural measurements in microscale under thin section is conducted. For visualization of such microscopic pore structures, fluorescent resin is injected into core sample and cut orthogonal and parallel to the fracture surfaces for making thin sections. I observe resin injected fine fractures and pores in rock matrix under fluorescent microscope with the filter (exciting wavelength: 330-380nm, absorption wavelength: over 420nm). As a result, the average width of resin injected fractures which is perpendicular to the fracture surface is around 7 μm and they penetrate grain boundaries or intragranular cracks of quartz and feldspar. As future works, pore structure measurements by making thin sections parallel to the fracture surface will be conducted and then summarize microscopic pore structures in three dimensions.
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