Visualization of diffusion phenomena in rock by means of X-ray CT

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ABSTRACT
X-ray CT method was applied to the visualization and the analysis of diffusion phenomena of solute in rock. X-ray CT makes it possible to evaluate the attenuation of X-ray at each point within a rock, by digitizing shadow pictures taking from various directions and subsequent image reconstruction. In addition, subtraction of CT images provides the distribution of concentration of solute. In this study, the one-dimensional diffusion tests by using high concentrated solution of potassium iodide (KI) were carried out, and the procedure to evaluate diffusion coefficient was discussed. It was found that measurements of distribution of concentration show a good agreement with the analytical solution and that the X-ray CT is the effective tool to the analysis of diffusion phenomena.