

Variation of redox condition in groundwater during excavation

*Yusuke Watanabe¹, Kazuki Hayashida¹, Hiroaki Murakami¹, Teruki Iwatsuki¹

1. Japan Atomic Energy Agency

In the geological disposal of high-level radioactive waste, a disposal facility will be constructed in depths deeper than 300 m. The hydrochemical environment after the facility closure may change from the initial condition before the construction. In particular, the redox condition and pH of groundwater are important factors affecting the behavior of radionuclides. It is indispensable to understand the hydrochemical changing process and stable condition after the facility closure. In this study, the simulated experimental drift was constructed in the granite of 500 m depth at Mizunami Underground Research Laboratory, and the hydrochemical process after the drift closure was observed.

The groundwater chemistry around the drift was oxidized due to the infiltration of oxygen from the drift into the rock. After closing the drift, the redox potential of the groundwater decreased. In addition, it was suggested that the redox condition in groundwater was controlled by redox reaction of ferrous ion with iron hydroxide.

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