Invited speaker Topic 4

Professor Hidekazu Yoshida

Profile

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Date of Birth: 1962, Feb. 10
Nationality: Japanese

Titles

2000 ~ :Chairman of the committee of 'Research of Geological stability of Japan' in Geological Society of Japan.

Position Held

2010: Director of Nagoya University Museum (Professor of Graduate School of Environmental Studies)
2009: Nagoya University (Professor; University Museum/Graduate School of Environmental Studies)
2000: Nagoya University (Associate Professor; University museum/Graduate School of Science)
1990-1995: JAEA, Tono GeoScience Center (Senior Researcher; Head of Tono Uranium Natural Analogue Project)
1986: Japan Nuclear Fuel Development Cooperation (Present as JAEA/ Japan Atomic Energy Agency/ Researcher)

Research Interests

Since graduated Nagoya University, more than 25 years, main research relevant to HLW and utilization of underground environment as shown below has been conducted.

- Uranium series migration study using by uranium mine (natural analogue)
- Redox front development and related elemental migration study
- Fracture and filling generation with fluid interaction study
- Biogenic Fe concretion formation study
- Fault damage zone, fracture development and elemental migration study
- Carbonate and Fe concretion formation study

Education

1994: Doctor of Science (Nagoya University)
1986: Graduate School of Science, Nagoya University (Earth Science; MSc. (Structural Geology))
1984: Faculty of Science, Kumamoto University (Geology; Bc)

Abstract

Ferric oxyhydroxide in underground geological environments and high-level radioactive waste disposal: influence on siting and site characterization

Ferric oxyhydroxide in the underground geological environments is an important factor that may influence the long-term natural barrier function with respect to nuclide migration, in scenarios for the geological disposal of high-level radioactive wastes (HLW). Here, examples of Ferric oxyhydroxide seen in the underground environment of Japan were reviewed in order to: 1) evaluate suitable repository depths that will need to be characterized; and 2) assess how Ferric oxyhydroxide will need to be treated in nuclide migration scenarios at a future repository site. The Ferric oxyhydroxide examined provide the following insights into the features relevant to site characterization and the rock's barrier function: 1) Ferric oxyhydroxide has been formed along the connective fracture network that extends from the surface, but there is a certain depth limit of oxidation due to geochemical buffering by redox reactions; 2) Past Ferric oxyhydroxide will remain even after the environment returns to a reducing condition; 3) Ferric oxyhydroxide produced in the rock matrices, however, can contribute to retarding nuclide migration by sorbing radionuclides and clogging micro-pores. The evidence shows that Ferric oxyhydroxide formed in the geological environment may influence on the siting as well as the geosphere barrier function in and around repository caverns for the disposal of HLW constructed in the deep geological environment of Japan.

Keywords: Ferric oxyhydroxide, barrier function, radioactive waste, geological disposal