

Redox front formation and long-term behaviour of Fe-oxyhydroxides in the rock matrices under subsurface environment

Hidekazu Yoshida[1]

[1] NUM

Underground redox fronts, at which the oxidation states of pore fluids and/or rocks change rapidly over short spatial ranges of up to several meters, control the mobilization and fixation of many trace elements, including potential pollutants such as certain radionuclides. Safety assessments of potential future shallow (Low Level Waste; LLW) and deep (High Level Waste; HLW) geological repositories for radioactive wastes need to take long-term redox processes into account adequately, especially for realistic safety case development. Certain features of the studied redox front can be considered analogous to characteristics of the redox fronts that would develop around a geological repository for radioactive wastes. The observations suggest that the most prominent mineralogical expression of such a redox front may occur at some distance (up to several meters) within the sedimentary host rock and that, once formed, the Fe-oxyhydroxides within such a front would be preserved after even under low pO₂ conditions resume following repository closure.