Contribution ID: **64** Type: **Poster**

Interaction of Pu with Opalinus Clay studied by µ-XRF, µ-XRD, and µ-XANES

Friday, 16 September 2011 13:23 (2 minutes)

Plutonium will be a major contributor to the radiotoxicity of high-level nuclear waste after a storage time of more than 1,000 years due to the long half-lives of Pu-239, Pu-240, and Pu-242. Argillaceous rocks are under consideration as potential host rock formation for the construction of high-level nuclear waste repositories by several European countries, i.e., Belgium, France, Germany, and Switzerland. The interaction of Pu-242 with Opalinus Clay (OPA) from Mont Terri, Switzerland, was studied on a microscopic scale at the SLS MicroXAS beamline. The elemental distributions of Pu, Ca, Fe, and Mn on two OPA thin sections that were contacted with Pu(VI) solutions for 72 h and in an intact OPA bore core in which Pu was diffused over a period of one month were measured by µ-XRF. All samples contained Pu "hot spots"that were investigated by Pu LIII-edge µ-XANES and µ-XRD. As an important result, we found that the highly soluble Pu(VI) was retained by OPA in the reduced and less mobile tetravalent oxidation state of Pu.

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