Contribution ID: 52 Type: Oral Presentation

Aqueous leaching of high burnup UO2 fuel under hydrogen conditions

Monday, 30 October 2017 15:30 (15 minutes)

Leaching results on fragments of high burnup (65 MWd/kgU) UO₂ fuel from a commercial pressurized water reactor are presented. The experiments were performed in simplified granitic groundwater under a hydrogen pressure of up to 5 MPa, representing conditions in a water intrusion scenario for a Swedish KBS-3 design spent nuclear fuel repository. The freshly crushed fragments were pre-washed under aerated conditions for 6 days to remove part of the instant release fraction of the radionuclide inventory and transferred to an autoclave for leaching under hydrogen conditions. Following an initial release of U attributed to dissolution of oxidized phases from the aerated handling, the U concentration decreased to levels of 2-5x10⁻⁹ M, in-line with the solubility of amorphous UO₂. The release of radionuclides such as Cs and Sr gradually declined indicating a transition towards inhibition of the fuel matrix dissolution.

Primary author: Dr PURANEN, Anders (Studsvik Nuclear)

Co-authors: Prof. SPAHIU, Kastriot (SKB); Dr EVINS, Lena (SKB); Dr ROTH, Olivia (Studsvik Nuclear)

Presenter: Dr PURANEN, Anders (Studsvik Nuclear)

Session Classification: Spent Fuel & Zircaloy Cladding

Track Classification: National and international collaborative waste management programs