

International Conference on Fast Reactors and Related Fuel Cycles: Next Generation Nuclear Systems for Sustainable Development (FR17)



Contribution ID: 379

Type: POSTER

The UO_2 – MeO_2 (Me = Th, Pu, Zr) cathode crystalline deposits formation during the melts electrolysis.

Tuesday, June 27, 2017 5:30 PM (1h 30m)

The cathode crystalline UO_2 – ThO_2 (30-50 mol/ %), UO_2 – PuO_2 (6, 42 and 72 mol. %), UO_2 – ZrO_2 (0.1 – 98 mol. %) deposits, were formed. The electrolyte - melt: $(\text{NaCl-KCl})\text{-UO}_2\text{Cl}_2\text{-MeCl}_4$, where $\text{MeCl}_4 = \text{ThCl}_4, \text{PuCl}_4, \text{ZrCl}_4$. The influence of the MeCl_4 concentration in the $(\text{NaCl-KCl})\text{-UO}_2\text{Cl}_2\text{-MeCl}_4$ melt, the initial electrolysis current density, the temperature, and the electrolysis duration on the average MeO_2 concentration in the UO_2 – MeO_2 deposits was studied. The MeO_2 fraction in the cathode UO_2 – MeO_2 deposits regularly decreased as the MeCl_4 concentration decreased and the current density and electrolysis duration increased. The electrolytic of UO_2 – MeO_2 cathode crystalline deposit are formed through simultaneous electrolytic reduction of UO_2^{2+} ions to UO_2 and the exchange between the UO_2 and Me^{4+} ions present in the molten $(\text{NaCl-KCl})\text{-UO}_2\text{Cl}_2\text{-MeCl}_4$ electrolyte.

Country/Int. Organization

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Session Classification: Poster Session 1

Track Classification: Track 5. Fast Reactor Materials (Fuels and Structures) and Technology