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The $\text{UO}_2\text{-MeO}_2$ (Me = Th, Pu, Zr) cathode crystalline deposits formation during the melts electrolysis.

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The cathode crystalline $\text{UO}_2\text{-ThO}_2$ (30-50 mol/ %), $\text{UO}_2\text{-PuO}_2$ (6, 42 and 72 mol. %), $\text{UO}_2\text{-ZrO}_2$ (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 $\text{UO}_2\text{-MeO}_2$ deposits was studied. The MeO_2 fraction in the cathode $\text{UO}_2\text{-MeO}_2$ deposits regularly decreased as the MeCl_4 concentration decreased and the current density and electrolysis duration increased. The electrolytic of $\text{UO}_2\text{-MeO}_2$ 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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