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Pyrochemical and electrochemical separations studies on plutonium (Part 2)

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Pyrochemical separations, involving molten salt and metal media, by liquid/liquid extraction or electrorefining are studies for nuclear defense and civil applications. The electrochemical properties of plutonium have been studied in molten salt-ternary eutectic mixture NaCl-KCl-BaCl₂, equimolar mixture NaCl-KCl and pure CaCl₂ - and in liquid gallium at 1073 K. These processes concern actinide separations, However, lanthanides, such as cerium, are often used as surrogates. The first steps of a pyrochemical process development consist in the solvent media. Activity coefficients of the solutes in the two phases, that described the solvent-solute interaction, are important thermochemical parameters to predict separations efficiency and to assess the solvents influence. As nuclear defense scientist, I discuss the advanced developments to separate plutonium by electrochemical method that has been supporting the developments of pyrochemical processes involving plutonium as main goal and actinides separations.

Keywords/ Electrochemical reactions, Molten salt, Metal media, Activity coefficient of plutonium.

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