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Thermodynamics and separation factor of lanthanides and actinides in system “liquid metal-molten salt”

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Pyrochemical separation processes in molten salt media have been proposed as a promising option in the future nuclear cycle. The major steps of these processes include the electrorefining or reductive extraction of the recovering actinides in molten chloride/liquid metal systems and for recovery of minor actinides from spent fuel or high level radioactive liquid wastes. The goal of these investigations is to find the extraction systems with high values of separation factor An/Ln using bimetallic liquid metals.

Thermodynamic properties of lanthanum, praseodymium, neodymium and uranium were studied in systems (Me)Ga-In/3LiCl-2KCl and (Me)Ga-Al/3LiCl-2KCl vs. of the composition of liquid alloys and the temperature. The influence of the nature of elements on activity coefficients and separation factor was determined. The calculated values of separation factor of U/La, U/Pr and U/Nd lies in the region $4.0 \cdot 10^4 - 5.0 \cdot 10^5$.

Country/Int. Organization

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