# Electrochemistry of selected lanthanides in LiF-$BeF_2$ system

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*Abstract*

Electrochemical based separation of actinides and lanthanides from molten salt media seems to be suitable method for separation of fissile material and fission products within the proposed fuel cycle of Molten Salt Reactor (MSR). To manage the reprocessing part of MSR fuel cycle, it is necessary to have the knowledge electrochemical behaviour of supposed fissile material and fission products in molten salts media. This work focuses on electrochemical of selected lanthanides in LiF-$BeF_2$ system which is considered to be a primary choice for MSR system. Characterization of LiF-$BeF_2$-Ln systems was done by cyclic voltammetry and chronopotentiometry. Comparison with similar $BeF_2$-free systems was done in order to describe the influence of specific characteristics of $BeF_2$ ($BeF_2$ is highly viscous, network-forming component). Diffusion coefficients of lanthanide ions were calculated where possible. Electrolytic experiments were done to evaluate the possibility of the deposition on several electrode materials (W, Mo, Ni). Alloying processes were recognized and the deposits were analyzed by XRD and SEM analysis. Again, the influence of Be present in the melt was recognized.