

Electrochemical Behavior of Ba²⁺ at Liquid Metal Cathodes in Molten Chlorides

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The electrochemical behavior of Ba²⁺ on several liquid metal electrodes (Al, Bi, Cd, Pb, Sn and Zn) in a NaCl-KCl equimolar solvent at 1000 K has been investigated by means of cyclic voltammetry and chronopotentiometry. The kinetic parameters and the diffusion coefficient for Ba²⁺ were determined by cyclic voltammetry with conventional, semi-integral, semi-differential methods and chronopotentiometry. It was revealed that on a liquid Pb electrode in the NaCl-KCl system at 1000 K the quasi-reversible cathodic reaction $\text{Ba}^{2+} + 2\text{e}^{-} + \text{Pb} \rightarrow \text{BaPb}$ takes place. In addition, the kinetic parameters and the diffusion coefficient agree well with the values determined by various electroanalyses. The possibility of alloy formation between Ba and Sn was also demonstrated in this paper.

Key words: Alloy Formation Reaction; Barium; Liquid Metal Cathodes; Molten Salts.