Electrochemical Behavior of Indium in LiCl-KCl Molten Salts

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The electrochemical reduction processes were studied on glassy carbon electrode in molten LiCl-KCl eutectic at 450 °C. There is a consecutive two-step electrochemical process taking place to form metallic indium from the cathodic discharge of indium ions. The process is regarded as: $\text{In}^{3+} + 2\text{e}^- = \text{In}^+$ and $\text{In}^+ + \text{e}^- = \text{In}$. The diffusion coefficient of In^{3+} ion was determined by chronoamperometry. Mass transport towards the electrode is a simple diffusion process. Metallic indium is deposited on the glassy carbon electrode, which occurs at a potential of around -0.85 V vs. the Ag^+/Ag reference electrode. InCl_2 forms InCl and InCl_3 disproportionately. After a certain time, the CV curves for InCl_2 and InCl were essentially the same as the one obtained from the reduction of InCl_3 .

Keywords: Electrochemical behaviour, Indium chloride, Molten salts, Kinetic parameters

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