Electrolysis of Indium Oxide in LiCl-KCl Based Molten Salts with a Liquid Cathode

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In this work, the feasibility of extracting of metallic indium from In_2O_3 and ITO through the direct electrochemical reduction at 450°C in molten salt LiCl-KCl was studied. Cyclic voltammetry was carried out to study the behaviour of indium oxide by the liquid metal indium used as the working electrode. The reduction peak was observed in the cathodic scan for In_2O_3 . The direct de-oxidation of indium oxide and ITO were investigated by using liquid tin cathode. Constant voltage electrolysis was performed at 1.7 V for 2h. The reduction reaction occurred at the interface of the oxide pellets and the cathode. Sn-In alloy was detected after electrolysis. Liquid zinc cathode was also used as cathode taking into account the low melting points of indium and tin. Potentiostatic electrolysis was conducted for the ITO with a liquid zinc cathode. The result showed that indium could be produced at different liquid cathodes.

Keywords: Electrochemical behaviour, Indium oxide, Molten salts, Electrolysis

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