

EVALUATION OF THE THERMOCHEMICAL PROPERTIES OF THE HoCd_x INTERMETALLIC COMPOUNDS USING ELECTROCHEMICAL TECHNIQUES

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The electrode reaction of Ho(III)/Ho couple in the eutectic LiCl-KCl, at Cd liquid electrodes (i.e a Cd pool and a Cd coated W electrodes) was investigated in the temperature range of 673-823K. In both electrodes, the electrochemical reduction of Ho(III) was observed at less cathodic potential values than at the surface of an inert W electrode, due to the decrease of Ho activity in the metal phase.

The formation of intermetallic compounds was studied. Electromotive force, *emf*, measurements for five intermetallic compounds in two-phase coexisting states were carried out using a Cd coated tungsten electrode. The activities and relative partial molar Gibbs energies of Ho were obtained for HoCd_6 , $\text{HoCd}_{45/11}$, HoCd_3 , HoCd_2 and HoCd . The formation energy of each intermetallic compound, and the global formation constants were also calculated. The linear dependence of the Gibbs free energies with temperature yields to the enthalpies and entropies of formation of the five intermetallic compounds.

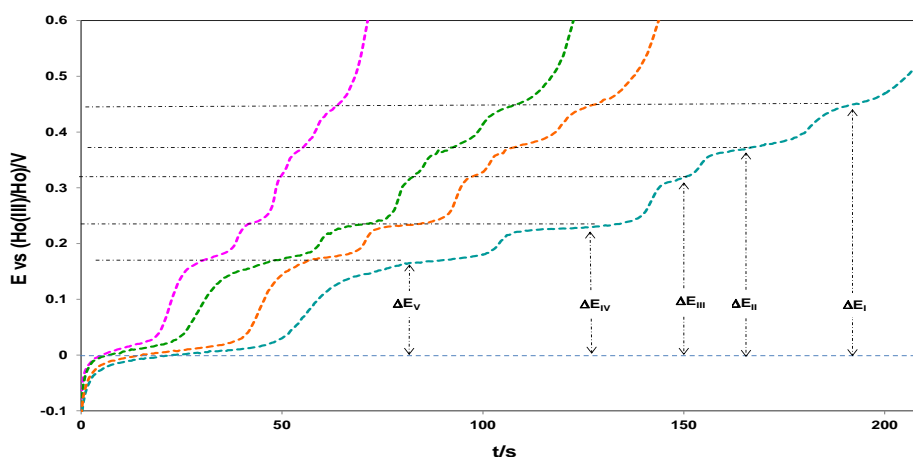


Figure 1.- OCP obtained with a CdFE. Experimental conditions: $E_d = -2.25$ V, $t_d = 20, 40, 60, 100$ s

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