

THE CATALYTIC ACTIVITY OF NICKEL BASED ALLOYS IN THE HYDROGEN EVOLUTION REACTION

O. V. Dolgikh, N. V. Sockaya, Yu. G. Kravcova, O. V. Slepova

Catalytic activity of electrodeposited Ni-P, Ni-S and Ni-P-S alloys in the hydrogen evolution reaction (HER) was investigated in dependence of their thickness, composition and structure. It was established that transition from solid Ni-electrode to the thin films of Ni-6P alloy is accompanied by acceleration of HER by of factor of 2.5; when the coating becomes thicker the reaction rate decreases. Insertion of small quantities of phosphorus (up to 5%) into the nickel lattice leads to enhancement of surface catalytic activity followed by its reduction even to constant value at 15% of P. Over potential of hydrogen evolution is noticeably decreases with insertion of sulfur into the coating. It was found that adsorbed hydrogen affects positively catalytic properties of the coating. Obtained experimental data confirm the existence of direct correlation between ability of the alloy to absorb atomic hydrogen and its electro-catalytic activity in HER.