World Academy of Science, Engineering and Technology
International Journal of Mechanical and Materials Engineering
Vol:8, No:12, 2014

Ni-W alloy Coatings: A Promising Electrode Material

Authors : Mr. Liju Elias, A. Chitharanjan Hegde

Abstract : Ni-W alloy coatings have been developed galvanostatically on copper substrate from tri-sodium citrate bath, using glycerol as the additive. The deposition conditions for production of Ni-W coatings have been optimized for peak performance of their electrocatalytic activity, namely hydrogen evolution reaction (HER) and oxygen evolution reaction (OER). The corrosion behavior of the coatings were tested under working conditions of electrocatalysis (1M KOH). Electrocatalytic behaviours were tested by cyclic voltammetry and chrono-potentiometry techniques. Experimental results demonstrated that Ni-W coatings at low and high current densities (c. d.) showing superior performance for OER and HER respectively. The increased electrocatalytic activity for HER with increase of deposition c. d. was attributed to the phase structure, surface morphology and chemical composition of the coatings, confirmed by XRD, SEM and EDX analysis, respectively. The dependency of hardness and thickness of the coatings on HER and OER were examined, and results were discussed.

Keywords : electrocatalytic behavior, HER, Ni-W alloy, OER
Conference Title : ICMSME 2014 : International Conference on Materials Science and Mechanical Engineering
Conference Location : Bangkok, Thailand
Conference Dates : December 18-19, 2014