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ABSTRACT BOOK

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[Abstract:0029]

Preparation of Electrochemically Mo-deposited Carbon Felt Electrodes for Alkaline Water Electrolysis: Optimization of pH, Current and Metal Amount

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In the present study, Mo was electrochemically deposited over carbon felt (C) electrode which is very suitable as electrode material and has large surface area in order to improve hydrogen evolution activity of the electrode in alkaline medium. Fort his aim, the effects of pH of deposition bath solution, deposition current and amount of Mo were studied and optimum conditions were determined. Hydrogen evolution activity of the electrodes was evaluated in 1 M KOH solution using various electrochemical techniques. Surface structures of the electrodes were investigated by scanning electron microscopy (SEM). It was found that 1 g Mo/g C deposited electrode at pH 6 and 50 mA current exhibits the highest electrochemical activity. SEM images showed that the electrode prepared at these optimum conditions has large surface area and fine structure. The high hydrogen evolution performance of this electrode was assigned to its large surface area as well as high intrinsic catalytic activity of Mo metal.

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Keywords: Carbon felt, electrochemical deposition, molybdenum, electrolysis, hydrogen production

[Abstract:0046]

Hydrogen Production by Alkaline Water Electrolysis at Activated Cu/NiCuZn Electrodes: Metal Ratio, Deposition Current Density and Thickness Optimizations

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In this study, NiCuZn composite coatings were electrochemically deposited on a copper electrode. The effects of metal ratios, thicknesses of the deposits and deposition current densities were investigated and optimum conditions were determined for hydrogen evolution reaction. The prepared electrodes were exposed to a concentrated alkaline solution (30 % NaOH) and more active Zn metal was chemically dissolved in order to produce a porous and electrocatalytic surface suitable for use in the hydrogen evolution reaction. The electrodes were characterized using cyclic voltammetry (CV), atomic absorption spectroscopy (AAS) and scanning electron microscopy (SEM). The electrodes were used as cathode in 1 M KOH solution and their hydrogen evolution activities were investigated using electrochemical techniques. It was reported that the alkaline leached NiCuZn coatings have great hydrogen evolution activity in the alkaline solution. Their activities depend on the chemical composition and thickness of the coatings as well as the deposition current density.

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Keywords: NiCuZn electrocatalysts, alkaline water electrolysis, hydrogen energy