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Enhanced Activity of Polycrystalline Palladium Decorated by Ru Nanoislands for Hydrogen Evolution in Alkaline Medium

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Hydrogen evolution reaction (HER) was studied on polycrystalline Pd, Pd(poly), decorated by spontaneously deposited Ru nanoislands below full coverage. Surface features of as-prepared bimetallic Ru/Pd(poly) electrodes were explored by Field Emission Scanning Electron Microscopy with Energy Dispersive X-ray Spectrometer. Electrochemical properties and hydrogen evolution activities of obtained electrodes were investigated in an alkaline electrolyte by Cyclic and Linear Sweep Voltammetry, respectively. It was found that the activities of bimetallic Ru/Pd(poly) electrodes for HER significantly exceeded the activity of bare Pd(poly) and approached the activity of Pt, which is the most active material for this reaction. This enhancement was explained by the favorable influence of the electronic interaction between Pd substrate and Ru nanoislands on the adsorption of the reactive H species.

Keywords: palladium, ruthenium, FESEM, hydrogen evolution, alkaline solution

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