

New Fe-Co Metal-Metal Glassy Alloys Exhibit Exceptional Resistance and Passivation Behavior in Alkaline Conditions

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Abstract

The electrochemical growth of the oxide layers on two essence-essence glassy blends, Fe₇₈Co₉Cr₁₀Mo₂Al₁(VX9) and Fe₄₉Co₄₉V₂(VX50) (at.), were studied using electrochemical ways including electrochemical frequency modulation (EFM), electrochemical impedance spectroscopy (EIS) and cyclic polarization (CP) measures [1]. The morphology and composition of the amalgamation shells were delved using X-ray photoelectron spectroscopy (XPS), surveying electron microscopy (SEM) and infinitesimal force microscopy (AFM). The erosion rate and face roughness of both blends increased as the attention of NaOH in waterless result was raised. The presence of some defensive rudiments in the composition of the blends led to the conformation of a robotic unresistant subcaste on the amalgamation face [2]. The advanced resistance values of both blends were associated with the magnitude of the dielectric parcels of the unresistant ficks formed on their shells. Both blends are classified as having outstanding resistance to erosion, which results from the conformation of a unresistant film that acts as an effective hedge to erosion in alkaline result [3].

Keywords:

Introduction

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Description

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1. The new Fe-Co metal-metal glassy alloys exhibit exceptional resistance and passivation behavior in alkaline conditions. The alloys were prepared by the melt spinning technique. The microstructure of the alloys was studied by X-ray diffraction (XRD) and scanning electron microscopy (SEM). The electrochemical behavior of the alloys was studied by cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). The results show that the alloys exhibit a high corrosion resistance and a passivation behavior in alkaline conditions. The corrosion current density (i_{corr}) of the alloys was found to be in the range of 0.1 to 1.0 $\mu A/cm^2$. The Tafel slope of the alloys was found to be in the range of 100 to 200 mV/decade. The EIS results show that the alloys exhibit a high charge transfer resistance (R_{ct}) and a low double layer capacitance (C_{dl}). The results indicate that the alloys exhibit a high corrosion resistance and a passivation behavior in alkaline conditions.

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