

عنوان مقاله:

Effect of Formaldehyde on Pulsed Electro-Plated Nickel-Alumina Nanocomposite Coatings

محل انتشار:

مجله مواد دوستدار محیط, دوره 5, شماره 2 (سال: 1400)

تعداد صفحات اصل مقاله: 5

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خلاصه مقاله:

Metal-based nanocomposite coating prepared by plating method can exhibit unique mechanical, chemical, and physical features which have led to their extensive application in various high-tech industries. Nickel-based nanocomposite coatings can pose far lower pollution toward the environment and related staff as compared with chromium-based ones. In this research, a novel compound was developed to coat nickel-alumina nanocomposite by adding formaldehyde to the plating bath. The concentration of alumina nanoparticles (NPs) in the plating bath was ۱۰ g/L. The nickel-alumina nanocomposite coatings were prepared by a pulsed electrical current under ultrasound turbulence in the plating bath. Two Ni bathes in combination with Watt's compound were used with and without formaldehyde addition. Before plating, the zeta potential of alumina NPs was measured in the two different baths. After plating, the cross-section of the coatings and the alumina content participated in the coating, as well as the coating morphology, were analyzed by scanning electron microscopy (SEM) equipped with energy-dispersive X-ray spectroscopy (EDX). Based on the results, incorporation of formaldehyde into the Watt's solution increased the zeta potential of the nanoparticles from -۴.۱ to +۳۰.۵ mV; consequently, the nanoparticle content of the coatings enhanced .%.from ۴.۶ to ۸.۵ vol

کلمات کلیدی:

Composite Electrodeposition, Nickel Alumina Nanocomposite, Formaldehyde, Zeta Potential

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