

عنوان مقاله:

Investigation of Microstructure, Hardness, and Corrosion Resistance of Ni-P-GO Electroless Nanocomposite Coating on AZ31D Alloy Surface

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تعداد صفحات اصل مقاله: 8

نویسندگان:

M. Hanachi - *Department of Metallurgy and Materials Engineering Karaj Branch, Islamic Azad University, Karaj, Alborz, Iran*

Z. S. Seyedraoufi - *Department of Metallurgy and Materials Engineering Karaj Branch, Islamic Azad University, Karaj, Alborz, Iran*

V. Abouei - *Department of Metallurgy and Materials Engineering Karaj Branch, Islamic Azad University, Karaj, Alborz, Iran*

خلاصه مقاله:

In the present study, the Ni-P-GO nanocomposite coating was applied to the surface of AZ31D alloy through electroless plating process. To achieve the nanocomposite coating, 5 g/L Graphene Oxide (GO) was added to the plating bath. By changing the pH of the bath, coatings were created in three ranges of low, medium, and high phosphorus on the surface of AZ31D. According to the results, by increasing the phosphorus content, the amount of graphene oxide absorbed in the coating increased. Microstructural examination by Scanning Electron Microscopy (SEM) showed that all coatings formed on the substrate had the cauliflower morphology. Phase analysis of the coating by X-Ray Diffraction (XRD) showed that at a low phosphorus level, the coating is semi-amorphous; however, with increasing phosphorus content, the coating becomes completely crystalline. The highest hardness value of the specimen was observed with the lowest amount of phosphorus. The microhardness measurements showed that the hardness decreased with increasing the amount of phosphorus so that the minimum hardness of the specimen containing 14.97 wt.% phosphorus was measured at 521 Hv50. Contrary to the morphology, phosphorus levels have a significant effect on the structure and hardness of Ni-P-GO nanocomposite coatings. As the amount of phosphorus increased, the corrosion resistance of the coating increased. This is attributed to the reduction of the current of corrosion and more positive potential values.

کلمات کلیدی:

Electroless, phosphorus content, Ni-P-GO Nanocomposite, Coating Cauliflower, corrosion

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