Preparation and Corrosion Resistance of Ni-W-Y₂O₃-ZrO₂ Nanocomposite Coatings

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Composite coatings containing Y₂O₃ and ZrO₂ nanoparticles were prepared by the composite electrodeposition technique under ultrasonic stirring and electromagnetic stirring. The microstructure of the nanocomposite coatings was observed by scanning electron microscopy. In addition, the microhardness of the nanocomposite coatings was tested. Electrochemical polarization curves and AC impedance spectra of the nanocomposite coatings were tested in 3.5 wt% NaCl solution to study the corrosion resistance. The experimental results showed that the composite coatings prepared under ultrasonic stirring were compact, fine grain, and had no cracks. Compared to Ni-W alloy coating, the addition of nanoparticles Y₂O₃ and ZrO₂ significantly improved the microhardness and corrosion resistance of the composite coatings.

Keywords: Composite coating; Y₂O₃; ZrO₂; Nanoparticles; Corrosion resistance

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