

عنوان مقاله:

Corrosion Protection of Zn-Ni Alloy Coatings on Mild Steel by Green Conversion Coatings

محل انتشار:

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خلاصه مقاله:

Zn-Ni alloy coatings are electroplated on mild steel after an appropriate pretreatment from a tartrate free-cyanide alkaline bath solution, for the first time. A cerium-based chemical conversion process was developed as an alternative to chromate process. ZnNi coatings were obtained with a derivative of imidazol as a brightener agent. The formation of fine grain particles in the cerium conversion coatings leads to the improvement of a corrosion performance. Zn-Ni plated steel specimens were treated in Ce (NO₃)₃ solutions at room temperature with various immersion times. The corrosion behavior of bare and treated Zn-Ni alloy coatings on mild steel has been evaluated during an exposure to 0.5N NaCl using Tafel polarization and electrochemical impedance spectroscopy (EIS) measurements. The results of these measurements have shown that the newly developed cerium-based conversion coating process is a promising candidate for replacing the conventional chromate treatments, nowadays used for galvanized steel. The coatings were analyzed for phase structure by X-ray diffraction (XRD). This process may be useful in forming undercoats for paints and polymer coatings on mild steel.

کلمات کلیدی:

Zn-Ni Alloy, Green Conversion coating, Free-cyanide, Alkaline bath, Tartrate

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