

Corrosion Resistance Performance of Epoxy/Polyamidoamine Coating Due to Incorporation of Nano Aluminium Powder

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Abstract : In this current investigation, aliphatic amine-cured diglycidyl ether of bisphenol-A (DGEBA) based epoxy coating was mixed with certain weight % hardener polyaminoamide (1:2) and was coated on carbon steel panels with and without 1% nano crystalline Al powder. The corrosion behavior of the coated samples were investigated by exposing them in the salt spray chamber, for 500 hours. According to ASTM-B-117, the bath was kept at 35 °C and 5% NaCl containing mist was sprayed at 1.3 bars pressure. Composition of coatings was confirmed using Fourier-transform infrared spectroscopy (FTIR). Electrochemical characterization of the coated samples was also performed using potentiodynamic polarization technique and electrochemical impedance spectroscopy (EIS) technique. All the experiments were done in 3.5% NaCl solution. The nano Al coated sample shows good corrosion resistance property compared to bare Al sample. In fact after salt spray exposure no pitting or local damage was observed for nano coated sample and the coating gloss was negligibly affected. The surface morphology of coated and corroded samples was studied using scanning electron microscopy (SEM).

Keywords : epoxy, nano aluminium, potentiodynamic polarization, salt spray, electrochemical impedance spectroscopy

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