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Effect of copper (II) acetate pretreatment on zinc phosphate coating morphology and corrosion resistance

Abstract

Zinc phosphate coating is widely used for corrosion protection of metallic materials, mainly mild steel. In the present study, the effect of pretreatment with copper acetate solution on zinc phosphate layer properties was investigated via scanning electron microscopy, energy-dispersive spectroscopy, and X-ray diffraction. The corrosion resistance of the coating was evaluated using polarization curves and electrochemical impedance spectroscopy in an aerated 3.5% NaCl solution. The pretreatment resulted in a compact and uniform phosphate coating with smaller crystal size and greater surface coverage. Electrochemical results showed better corrosion resistance for the pretreated phosphate layer compared with the untreated one.

Keywords — Zinc phosphate, copper acetate, corrosion resistance, mild steel.