Effect of Zincating bath additives on structural and electrochemical properties of electroless Ni-P coating on AA6061

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Electrochemical behavior of electroless nickel phosphorus (EN-P) coated aluminum 6061 alloy combination in different zincating conditions have been evaluated. The effect of the zincate additives (anionic surfactant sodium dodecyl sulfate (SDS) and copper sulfate) on structure and morphology of zincating and electroless EN-P deposition have been studied. Corrosion performance of the prepared samples was studied by polarization and electrochemical impedance spectroscopy (EIS). Scanning electron microscope (SEM), Energy dispersive X-ray spectroscopy (EDS) and X-ray diffraction (XRD) analysis were used for studying surface morphology and chemical composition of coatings. According to the obtained results, the zincate solution containing copper sulfate and SDS surfactant indicated the fast deposition of Zn and dense nucleation with small Zn particles at the surface. This Zn films resulted in dense and small grains of EN-P deposition with smooth surfaces.

Keywords: Al 6061 alloy; Zincate treatment; surfactant; electroless nickel phosphorus; Electrochemical behavior

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