Study on Corrosion Properties and Microstructure of PEO Coatings Formed on AZ31 Mg Alloy

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Plasma electrolytic oxidation(PEO) coatings were fabricated on AZ31 Mg alloy in phosphate-silicate based electrolyte with additive K₂ZrF₆. The physical and chemical properties of the coatings were studied by SEM, AFM, XRD, XPS, potentiodynamic polarization and electrochemical impedance spectroscopy (EIS) test. The attained results showed that the thickness of the PEO coatings linearly increased with the increment treatment time. Besides, the micropores and corrosion resistance of the coatings varied with the PEO treatment time. The XRD presentation proved that the coatings were mainly composed of MgO, MgF₂, MgSiO₃ and ZrO₂. Moreover, the EIS results matched well with the potentiodynamic polarization test results.

Keywords: AZ31 Mg alloy; Corrosion; Potentiodynamic polarization; PEO Coatings; EIS

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