Short Communication

Effect of Duty Cycle on the Corrosion of Mg PEO Coatings

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Plasma electrolytic oxidation (PEO) is the method of applying corrosion resistant coatings on Mg alloys. Duty cycle is one of the effective parameters on PEO processes that can be employed to investigate the effect of duty cycle on the corrosion behavior. In this study, PEO coatings were fabricated in a silicate electrolyte with duty cycles in the range of 20 to 80%. Phase composition and microstructure of the PEO coatings were analyzed by X-ray diffraction (XRD) and scanning electron microscopy (SEM) followed by energy dispersive spectroscopy (EDS). The corrosion behavior of the PEO coatings was evaluated using potentiodynamic polarization in 3.5 wt.% NaCl solution. According to SEM and polarization results, a decrease in the duty cycle from 60% to 20% was found to result in about 72% reduction in the growth rate of PEO coatings and improvement of the coatings morphology; finally, 94% decrease in corrosion current density was observed.

Keywords: Mg, Plasma electrolytic oxidation, Oxide coating, Corrosion resistance, Duty cycle

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