

Characterization of ceramic coatings on aluminum alloy by AC plasma electrolytic oxidation

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In this study, the optimization condition of AC plasma electrolytic oxidation (PEO) has been investigated to obtain the coating on aluminum substrate of enhanced mechanical strength and corrosion resistance. Aluminum 3102 alloy was treated by AC PEO technique under different process parameters (supplied voltage, current density, and treatment time) in silicate solution system in which the voltage and time responses were recorded during its processes. The surface properties and corrosion resistances of the coatings were measured using scanning electron microscopy (SEM), X-ray diffractometer (XRD), and potentiodynamic polarization analysis. The current density and treatment time were found to be the major factors affecting the mechanical strength and corrosion resistance of the coating.