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Composite coatings prepared by combined plasma electrolytic oxidation and chemical conversion routes on magnesium–lithium alloy

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Abstract

Various strategies for the elimination of inherent defects from plasma electrolytic oxidation (PEO) coatings are being developed for practical applications. In this regard, two types of composite coatings were introduced *via* PEO treatment followed by chemical conversion approach on a magnesium–lithium alloy (Mg–Li alloy). Detailed morphologies and compositions of the composite coatings were studied by scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDX), X-ray photoelectron spectroscopy (XPS), and thin-film X–ray diffraction (TF–XRD). Barrier properties of the composite coatings were evaluated by potentiodynamic polarization and electrochemical impedance spectroscopy (EIS). The results demonstrate that this two-step approach improves the anti-corrosion performance of the composite coatings for protection of the Mg–Li alloy. Specifically, the stannate composite coating exhibits enhanced corrosion resistance and impressive long-term stability relative to the composite coating prepared in cerium and lanthanum conversion solution. Our method allows the simple,

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