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Ceramic coatings fabricated by micro-arc oxidation on ZK60 magnesium alloys under step current mode

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Micro-arc oxidation (MAO) surface treatment technology is able to *in-situ* form ceramic coatings on the surfaces of Aluminum, magnesium, titanium and their alloys by a plasma electrochemical method to enhance surface properties, such as strength, hardness, wear and corrosion resistance. In the present work, MAO coatings on ZK60 magnesium alloys were formed in a self-developed dual electrolyte composed of sodium silicate and phosphate under two-step decreasing current mode. Micro-structure morphology, element and phase structure of MAO coatings were investigated using scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), confocal laser scanning microscopy (CLSM), X-ray photoelectron spectroscopy (XPS) and X-ray diffraction (XRD). Furthermore, immersion test and friction wear test were employed to evaluate corrosion and abrasion resistance, as well as surface roughness and hardness of the coatings. The in-depth investigation was also focused on the inward and outward growth process, forming mechanism of micro-pores and distribution feature of dense layer and loose layer to achieve a comprehensive understanding on the growth mechanism of MAO coating.

Biography

Sheng Lu is a Professor of Jiangsu University of Science and Technology (China) and the Dean of School of Materials Science and Engineering. He completed his PhD from Southeast University (China) and Post-doctoral studies from McMaster University (Canada). His current work involves synthesis and characterization of novel ceramic coatings, friction stir welding and electronic packaging. He has published more than 100 papers in reputed journals.

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