

Investigation of VN/TiN Multilayer Coatings on AZ91D Mg Alloys

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Abstract : To develop AZ91D magnesium alloys with improved properties, we have applied TiN and VN/TiN multilayer coatings using DC magnetron sputter technique. Coating structure, surface morphology, chemical bonding and corrosion resistance of coatings were analyzed by x-ray diffraction (XRD), scanning electron microscope (SEM), x-ray photoelectron spectroscopy (XPS), and tafel extrapolation method, respectively. XPS analysis reveal that VN overlayer reacts with oxygen at the VN/TiN interface and forms more stable TiN layer. Morphological investigations and the corrosion results show that VN/TiN multilayer thin film coatings are quite effective to optimize the corrosion resistance of Mg alloys.

Keywords : AZ91D Mg alloys, high corrosion resistance, transition metal nitride coatings, magnetron sputter

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