Enhanced Corrosion Resistance of AZ91D Magnesium Alloy by Electric Field – Assisted Anodizing

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An external electric field was imposed on electrolytic cell in anodization of AZ91D magnesium alloy. The anodizing process became more stable with the assistance of the external electric field, and the obtained anodization film was smoother and compact. As a result, the corrosion resistance of the anodization film was enhanced. The external electric field can drive the anions in the electrolyte, especially the citrate ion with more negative charge and larger volume, to migrate to the surface of the AZ91D electrode to form the anodization film. The greatest carbon content could be obtained at an 8 V of external electric field, which corresponded to the best microstructure and corrosion resistance of the anodization film.

Keywords: Magnesium alloy; Anodizing; External electric field; Ionic motion; Corrosion resistance

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