

38-18 Formation of Ti-Si composite oxide films on Mg-Al-Zn alloy by electrophoretic deposition and anodization

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TiO₂ or SiO₂ nanoparticles dispersed in an acetone solvent containing iodine were deposited on Mg-Al-Zn alloy by electrophoretic deposition (EPD). Subsequently, the composite oxide films were formed on the substrate by anodization in KOH-Na₂SiO₃ aqueous solutions containing TiO₂ or SiO₂ nanoparticles. The films formed by EPD were improved binding with the substrate by anodization under high voltages with sparking, and then the anodic films consisted of Si-Mg or Ti-Si-Mg composite oxides. The film thicknesses of TiO₂ and SiO₂ on the alloy increased with anodization time. In polarization tests, the films anodized under high voltages with sparking in the alkaline solutions had high corrosion resistance. Thus, the composite oxide films formed in the present method were successful in providing corrosion resistance to Mg alloy.

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