Short Communication

Corrosion Behavior Study of AZ31B magnesium Alloy by Sol-Gel Silica-based Hybrid Coating

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In this work, the silica-based hybrid coatings, which used 3-glycidoxypyltrimethoxysilane (GPTMS) and tetraethoxysilane (TEOS) as precursors, have been prepared by sol–gel method for protection of magnesium alloy (AZ31B) from corrosion. The morphology and surface chemistry of the optimized coatings were studied by scanning electron microscope (SEM) and Fourier transform infrared (FTIR), respectively. The corrosion behaviors of the coatings were evaluated by polarization curves measurements and electrochemical impedance spectroscopy (EIS) in the Harrison's solution (0.35wt% (NH₄)₂SO₄ + 0.05wt% NaCl), and the diagrams were fitted using equivalent electrical circuits (EEC). The results revealed that the compact and smooth hybrid silane films were formed on the substrates surface, which provided barrier protection and improved corrosion resistance ability in comparison to untreated magnesium alloy substrate.

Keywords: AZ31B magnesium alloy; Sol-gel; Corrosion protection; Electrochemical impedance spectroscopy (EIS)

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