Evaluation of the Corrosion of AZ31 Magnesium Alloy Used as Sacrificial Anode for Cathodic Protection of Hot-Water Tank Storage Containing Chloride

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Corrosion resistance of AZ31 magnesium alloy was evaluated in aqueous chloride-containing solutions. Combined weight loss and electrochemical data indicate that corrosion rate of magnesium alloy increased for greater NaCl concentrations and higher temperatures. Corrosion is characterized by the formation of precipitates, that present the distinctive XRD patterns corresponding to crystalline phases of Mg(OH)₂, accompanied by H₂ evolution, these processes leading to pH increases in the solution. Retrieved samples show a film of corrosion products distributed around cracks on the bare metal surface, and the subsequent development of large pits that prevent the material from attaining passive protection.

Keywords: Corrosion; Cathodic protection; Sacrificial anode; Magnesium alloy AZ31; Potentiodynamic polarization; Electrochemical impedance spectroscopy.

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