Effect of Arsenic Alloying on the Microstructure and Corrosion Properties of Mg-Al Alloy

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We report that arsenic alloying significantly accelerates the corrosion process of Mg-Al alloy. The microstructure of Mg-Al-As alloy consists of α -Mg grains, β -Mg₁₇Al₁₂ particles, and Mg₃As₂ particles. Gravimetric tests revealed that the average corrosion rates of Mg-Al-As and AZ80 magnesium alloys are 75.48 mm/y and 7.06 mm/y. The acceleration of the corrosion process in Mg-Al-As alloy is mainly attributed to the Mg₃As₂ phase, which quickly hydrolyzes to form a Mg(OH)₂ film.

Keywords: Magnesium corrosion, Electrochemistry, Arsenic

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