Short Communication

Effect of Extrusion Direction on Microstructure and Corrosion Behavior of Rare Earth doped AZ91 Alloy

Xiaoyu Fu¹, Ruiling Jia^{1,*}, Feng Guo¹, Wen Ma¹, Huixia Zhang², Jian Hou²

¹ Inner Mongolia Key Laboratory of Thin Film and Coatings, School of Materials Science and Engineering, Inner Mongolia University of Technology

² State Key Laboratory of marine corrosion and protection, 725 Research Institute of China Shipbuilding Industry Corporation, Qingdao 266101

*E-mail: jrl014014@163.com

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By studying the changes in the grain size of α -Mg matrix, the distribution and size of the intermetallic phases in the transverse and longitudinal sections of the extruded AZ91 alloy with 1.0% (La, Ce) mischmetal (MM) addition, in combination with the corrosion behavior on the transverse and longitudinal sections, the corrosion mechanism of them caused by the change of microstructure was revealed. The results showed that a grain refinement and size reducing in β -Mg₁₇Al₁₂ and Al₄(La, Ce) phases had been found in extruded alloy. The relative potential difference of the intermetallic phases was influenced by extrusion process, the one between the Al₄(La, Ce) phase and Mg matrix in the longitudinal section of the extruded alloy is the highest, but Al₄(La, Ce) phase was a weak cathode. The decrease in the size of β -Mg₁₇Al₁₂ reduced the area of the cathode of the micro-galvanic coupling, the change of the size of Al₄(La, Ce) phase has no remarkable effect on the micro-galvanic corrosion behavior. Corrosion morphologies were varied with difference in extrusion direction, the corrosion morphology in the transverse section is mainly pitting corrosion caused by the cathode phases of β -Mg₁₇Al₁₂ and individual Al₄(La, Ce). The corrosion morphology in the longitudinal section are characterized by corrosion streamline parallel to extrusion direction, the corrosion occurs at the grain boundaries of the recrystallized grain.

Keywords: Magnesium Alloy; Rare earth; Extrusion; Corrosion

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