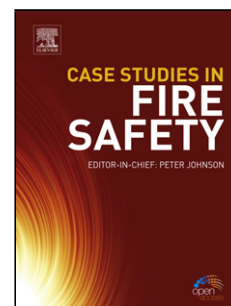


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Corrosion behaviour of AZ31 magnesium alloy containing various levels of strontium

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Highlights

- Effect of 0.4 and 0.8 wt.% Sr on corrosion behaviour of AZ31 is studied
- A discontinuous network of Al-Sr precipitates form at the interdendritic regions
- Both the Al-Sr and Al-Mn Precipitates are more cathodic compared to the Mg Matrix
- Corrosion starts at the Mg matrix at regions close to the precipitates
- Sr reduces the stability of the hydroxide/oxide protective film in the studied alloys

Abstract

The effect of Sr addition on corrosion behaviour of AZ31 was investigated. The corrosion properties were characterized by immersion, electrochemical, scanning Kelvin probe microscopy and microstructural experiments. With increasing Sr concentration, the Vf of Al-Sr precipitates increases. Furthermore, SKPFM results show that Al-Sr and Al-Mn precipitates are cathodic compared to the base Mg matrix. Consequently, more micro-galvanic cells are formed by more precipitates resulting in severe corrosion attack. Corrosion starts at regions close to the precipitates and proceeds through the inter-precipitate region. Nyquist plots indicate that the stability of hydroxide/oxide protective film decreased with increasing Sr concentration.

Keywords: AZ31-Mg Alloys, Strontium Addition, Corrosion, Micro-galvanic cells, Passivation

1- Introduction

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