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Effect of Rare Earth Additions on the Microstructure, Mechanical Properties and Corrosion of Magnesium Alloys

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Message from the Guest Editor

The low density of magnesium makes alloys based on this element potential candidates for many components in which “weight saving” constitutes a significant part of design. Nevertheless, the extended use of magnesium alloys has been limited by their low strength and poor corrosion resistance. Numerous benefits have been reported from the use of rare earth additions (yttrium included); strengthening induced by the formation of hard second phases, lessening the inherent basal texture of wrought magnesium alloys, refining grain size because they assist recrystallization of the magnesium matrix or lowering less noble the corrosion potential of many second phases. However, some issues need to be considered in the research of Mg-RE alloys. Firstly, the price of rare earth elements is increasing because of their higher consumption that cannot be totally sustained by exploited natural resources. Because of the low solubility of most of rare earth elements, small additions of these elements result in higher volume fractions of compounds which accelerating corrosion phenomena in magnesium alloys through the establishment of intense galvanic cells.

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Message from the Editor-in-Chief

Metallic materials play a vital role in the economic life of modern societies; contributions are sought on fresh developments that enhance our understanding of the fundamental aspects related to the relationships between processing, properties and microstructure – disciplines in the metallurgical field ranging from processing, mechanical behavior, phase transitions and microstructural evolution, nanostructures, as well as unique metallic properties – inspire general and scholarly interest among the scientific community.

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