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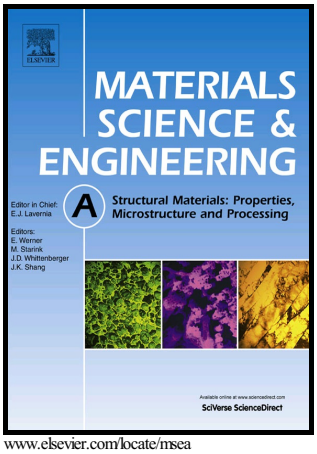

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PII: S0921-5093(18)30485-4
DOI: https://doi.org/10.1016/j.msea.2018.03.116
Reference: MSA36309

To appear in: *Materials Science & Engineering A*

Received date: 20 December 2017
Revised date: 10 March 2018
Accepted date: 28 March 2018

Cite this article as: Yanbin Ma, Jinshan Zhang, Chunxiang Xu, Yi Li, Yatong Zhang and Zhe Zhang, Effect of TiB_2-doping on the microstructure and mechanical properties of Mg-Zn-Y-Mn alloy, *Materials Science & Engineering A,* https://doi.org/10.1016/j.msea.2018.03.116

Effect of TiB_2-doping on the microstructure and mechanical properties of Mg-Zn-Y-Mn alloy

Yanbin Ma, Jinshan Zhang[1]*, Chunxiang Xu*, Yi Li, Yatong Zhang, Zhe Zhang

jinshansx@tom.com

Abstract:

The effect of TiB_2 doping on the microstructure and mechanical properties of the $Mg_{94.4}Zn_{2.5}Y_{2.5}Mn_{0.6}$ alloy was investigated in this study, which shown that the volume fraction of long-period stacking ordered (LPSO) structures was significantly increased and the LPSO/W interface shown anisotropy with TiB_2 doping to the $Mg_{94.4}Zn_{2.5}Y_{2.5}Mn_{0.6}$ alloy. When the doping amount of TiB_2 was 0.006wt%, the $Mg_{94.4}Zn_{2.5}Y_{2.5}Mn_{0.6}$ alloy appeared uniform equiaxed dendrites and the volume fraction of the LPSO phase was 3.65 times higher than of the TiB_2-free alloy. Meanwhile, $Mg_{94.4}Zn_{2.5}Y_{2.5}Mn_{0.6}$ alloy with 0.006 wt% TiB_2-doping shown optimal mechanical performance with ultimate tensile strength and elongation of 240 MPa and 13.5%, respectively.

Keywords: TiB_2; Mg alloys; LPSO; Doping; Mechanical performance

1. Introduction

For nearly ten years, the Mg-RE-Zn alloys have aroused widespread concern due to its distinctive grain structure, special strengthening phase and excellent mechanical properties [1, 2]. In the family of Mg-RE-Zn alloys, Mg-Zn-Y grades were one of the most representative alloys. Scholars have explored in detail that LPSO-phase, I-phase and W-phase can be found in Mg-Zn-Y alloy according to the

[1] Tel./fax: +86 351-601-8208