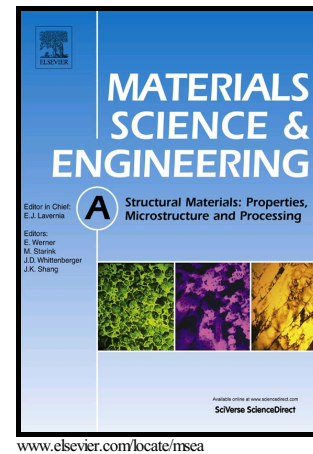


Author's Accepted Manuscript

On the microstructure and mechanical property of
as-extruded Mg-Gd-Y-Zn alloy with Sr addition

Shengming Liu, Hui Diao, Linjiang Chai, Bo Song



PII: S0921-5093(16)31224-2
DOI: <http://dx.doi.org/10.1016/j.msea.2016.10.016>
Reference: MSA34218

To appear in: *Materials Science & Engineering A*

Received date: 8 September 2016
Revised date: 1 October 2016
Accepted date: 4 October 2016

Cite this article as: Shengming Liu, Hui Diao, Linjiang Chai and Bo Song, On the microstructure and mechanical property of as-extruded Mg-Gd-Y-Zn alloy with Sr addition, *Materials Science & Engineering A* <http://dx.doi.org/10.1016/j.msea.2016.10.016>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

On the microstructure and mechanical property of as-extruded

Mg-Gd-Y-Zn alloy with Sr addition

Shengming Liu ^a, Hui Diao ^b, Linjiang Chai ^c, Bo Song ^{d,*}

^a College of Materials Science and Engineering, Xihua University, Chengdu 610039, China

^b Centre for Microscopy & Microanalysis, Faculty of Science, University of Queensland, Brisbane 4072, Australia

^c College of Materials Science and Engineering, Chongqing University of Technology, Chongqing 400054, China

^d Faculty of Materials and Energy, Southwest University, Chongqing 400715, China

*Corresponding author. Postal address: Tian Sheng Road 2#, Bei Bei District, Chongqing, China.

bosong@swu.edu.cn

Abstract

In this study, microstructure evolutions of Mg-6Gd-3Y-0.1Zn-xSr (x=0, 0.2, 0.6) alloys (named as sample 0Sr, 0.2Sr, 0.6Sr) during heat-treatment and extrusion were investigated. As-cast sample 0Sr contains typical long period stacking ordered (LPSO) phases and Mg₃RE. With Sr addition, amounts of LPSO phases decrease and are gradually replaced by the Mg₁₇Sr₂ phases. After homogenization and annealing treatment, profuse strip LPSO phases readily precipitate in grain interiors of sample 0Sr, while only Mg₁₇Sr₂ and Mg₃RE phases are detected in samples 0.2Sr and 0.6Sr. It suggests that the Sr addition would inhibit LPSO phases. After extrusion, the bimodal grain structures, the bulk and strip LPSO phases are detected in sample 0Sr, which can contribute to providing strengthening and extra strain hardening. In as-extruded sample 0.2Sr, finer recrystallized grain size, bulk Mg₁₇Sr₂ and LPSO phases (micron-scale) and Mg₅RE phase (nano-scale) are found due to the pre-annealing treatment. However, lower amounts of both nano-sized and macro-sized LPSO phases lead to the low ultimate strength (300 MPa). In sample 0.6Sr, the strip LPSO phases are readily formed even though the length and total amounts of LPSO phases decrease. More bulk Mg₁₇Sr₂ phases and LPSO phases are also precipitated, which lead to the more superior yield and ultimate strengths of 0.6Sr sample under higher temperature, as compared with the 0Sr sample.

Download English Version:

<https://daneshyari.com/en/article/5456601>

Download Persian Version:

<https://daneshyari.com/article/5456601>

[Daneshyari.com](https://daneshyari.com)