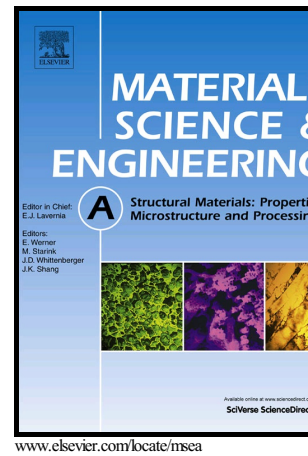


High temperature mechanical behavior of an extruded MG-11Gd-4.5Y-1Nd-1.5Zn-0.5Zr (wt%) alloy

Zijian Yu, Yuanding Huang, Hajo Dieringa, Chamini Lakshi Mendis, Renguo Guan, Norbert Hort, Jian Meng



PII: S0921-5093(15)30250-1
DOI: <http://dx.doi.org/10.1016/j.msea.2015.08.001>
Reference: MSA32635

To appear in: *Materials Science & Engineering A*

Received date: 18 June 2015
Revised date: 31 July 2015
Accepted date: 1 August 2015

Cite this article as: Zijian Yu, Yuanding Huang, Hajo Dieringa, Chamini Lakshi Mendis, Renguo Guan, Norbert Hort and Jian Meng, High temperature mechanical behavior of an extruded MG-11Gd-4.5Y-1Nd-1.5Zn-0.5Zr (wt%) alloy, *Materials Science & Engineering A* <http://dx.doi.org/10.1016/j.msea.2015.08.001>

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.

High temperature mechanical behavior of an extruded Mg-11Gd-4.5Y-1Nd-1.5Zn-0.5Zr (wt%) alloy

Zijian Yu^{a,b,c}, Yuanding Huang^b, Hajo Dieringa^b, Chamini Lakshi Mendis^b, Renguo Guan^d, Norbert Hort^b, Jian Meng^{a*}

- a. State Key Laboratory of Rare Earth Resources Utilization, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun 130022, P. R. China
- b. Institute of Materials Research, Helmholtz-Zentrum Geesthacht, Max-Planck-Str. 1, D-21502 Geesthacht, Germany
- c. University of Chinese Academy of Sciences, Beijing 100049, P. R. China
- d. School of Materials and Metallurgy, Northeastern University, 3-11 Wenhua Road, Shenyang 110004, China

Abstract

The microstructure-property relation of an extruded Mg-11Gd-4.5Y-1Nd-1.5Zn-0.5Zr (wt %) alloy was investigated by conducting hot compression and high temperature creep at temperatures up to 250 °C. The alloy exhibits an average compressive yield strength (σ_{CS}) of 363 ± 1 MPa and an average elongation to failure (ε_{f}) of 10.5 ± 0.2 % at room temperature, 301 ± 13 MPa and 12.8 ± 1.1 % at 200 °C. In creep the minimum creep strain rate ($\dot{\varepsilon}_{\text{min}}$) is $1.94 \times 10^{-9} \text{ s}^{-1}$ at 175 °C/160 MPa and $6.67 \times 10^{-9} \text{ s}^{-1}$ at 200 °C/100 MPa, The obtained stress exponent n is in the range of 3.7 - 4.7, suggesting that the creep is controlled by the dislocation climb mechanism. The improvement in compressive strength and creep resistance is attributed to the fine recrystallized grains, SFs in the grain interior, Mg_5RE and LPSO phases at grain boundaries. The alloy exhibits a bimodal texture with $\langle 0001 \rangle$ and $\langle 10\bar{1}0 \rangle$ components. Its strengthening effect is determined by the competition between

Download English Version:

<https://daneshyari.com/en/article/7976942>

Download Persian Version:

<https://daneshyari.com/article/7976942>

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