

Accepted Manuscript

Mechanical properties and Hall-Petch relationship of the extruded Mg-Zn-Y alloys with different volume fractions of icosahedral phase

T.Y. Kwak, W.J. Kim



PII: S0925-8388(18)33000-7

DOI: [10.1016/j.jallcom.2018.08.121](https://doi.org/10.1016/j.jallcom.2018.08.121)

Reference: JALCOM 47209

To appear in: *Journal of Alloys and Compounds*

Received Date: 22 February 2018

Revised Date: 12 June 2018

Accepted Date: 14 August 2018

Please cite this article as: T.Y. Kwak, W.J. Kim, Mechanical properties and Hall-Petch relationship of the extruded Mg-Zn-Y alloys with different volume fractions of icosahedral phase, *Journal of Alloys and Compounds* (2018), doi: 10.1016/j.jallcom.2018.08.121.

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 proof before it is published in its final 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.

Mechanical properties and Hall-Petch relationship of the extruded Mg-Zn-Y alloys with different volume fractions of icosahedral phase

T. Y. Kwak and W. J. Kim*

^bDepartment of Materials Science and Engineering, Hongik University,
Mapo-gu, Sangsu-dong 72-1, Seoul 121-791, Korea

* Corresponding author, e-mail address: kimwj@wow.hongik.ac.kr

Abstract

The effect of the volume fraction (0.6-8.4%) of the icosahedral phase (*I*-phase) on the microstructure, texture and mechanical properties of extruded Mg-Zn-Y alloys was examined. During extrusion, the eutectic and divorced eutectic *I*-phase in the cast microstructures was broken into small particles, and the particles were dispersed along the extrusion direction, forming particle bands. The broken *I*-phase particles promoted grain refinement via a particle-stimulated nucleation mechanism and led to basal texture weakening through dynamic recrystallization. The work hardening rate increased with an increase in the volume fraction of *I*-phase. However, the strength decreased with an increase in the volume fraction of *I*-phase due to the texture softening effect. To incorporate the texture softening effect into the Hall-Petch relation, a modified Hall-Petch equation, which simultaneously considers the effects of grain size and texture, was developed using the Schmid factors for basal slip. The

Download English Version:

<https://daneshyari.com/en/article/8943347>

Download Persian Version:

<https://daneshyari.com/article/8943347>

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