

Accepted Manuscript

Effect of Sc addition, friction stir processing, and T6 treatment on the damping and mechanical properties of 7055 Al alloy

C.Y. Liu, B. Zhang, Z.Y. Ma, H.J. Jiang, W.B. Zhou



PII: S0925-8388(18)33349-8

DOI: [10.1016/j.jallcom.2018.09.109](https://doi.org/10.1016/j.jallcom.2018.09.109)

Reference: JALCOM 47528

To appear in: *Journal of Alloys and Compounds*

Received Date: 15 May 2018

Revised Date: 7 September 2018

Accepted Date: 11 September 2018

Please cite this article as: C.Y. Liu, B. Zhang, Z.Y. Ma, H.J. Jiang, W.B. Zhou, Effect of Sc addition, friction stir processing, and T6 treatment on the damping and mechanical properties of 7055 Al alloy, *Journal of Alloys and Compounds* (2018), doi: 10.1016/j.jallcom.2018.09.109.

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.

Effect of Sc addition, friction stir processing, and T6 treatment on the damping and mechanical properties of 7055 Al alloy

C.Y. Liu^{a,b}, B. Zhang^c, Z.Y. Ma^{a*}, H.J. Jiang^b, W.B. Zhou^d

^a Institute of Metal Research, Chinese Academy of Sciences, 72 Wenhua Road, Shenyang 110016, China

^b Key Laboratory of New Processing Technology for Nonferrous Metal & Materials, Ministry of Education, Guilin University of Technology, Guilin 541004, China

^c State Key Laboratory of Metastable Materials Science and Technology, Yanshan University, Qinhuangdao 066004, China

^d Guangxi Pingguo Baikuang high-tech aluminum Co. LTD, Pingguo 531400, China

Abstract

Sc addition, friction stir processing (FSP), and subsequent solid-solution treatment and aging to peak hardness (T6 treatment) were applied on a 7055 Al alloy. Fine equiaxed grains were obtained after FSP, and the size of the grains was further refined by minor Sc addition. Subsequent solid-solution treatment led to the dissolution of η phase, and aging led to the precipitation of η' phase in the FSP samples. The $\text{Al}_3(\text{Sc,Zr})$ particles effectively inhibited the grain coarsening in the Sc-containing FSP sample during the T6 process. Thus, a high density of η' phase and a fine equiaxed grain structure were obtained in the Sc-containing 7055 alloy after FSP and T6 treatment. The special structure endowed this alloy with higher yield strength than the T6 treated 7055 alloy. FSP enhanced the high-temperature internal friction value of the Sc-containing 7055 alloy, and subsequent T6 treatment did not significantly reduce the value. The Sc-containing 7055 alloy exhibited greater high-temperature internal friction value than the T6 samples and the 7055 alloy fabricated using the same processing route.

* Corresponding author. Tel./fax: +86-24-83978908; E-mail address: zyma@imr.ac.cn (Z.Y. Ma)

Download English Version:

<https://daneshyari.com/en/article/10156022>

Download Persian Version:

<https://daneshyari.com/article/10156022>

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