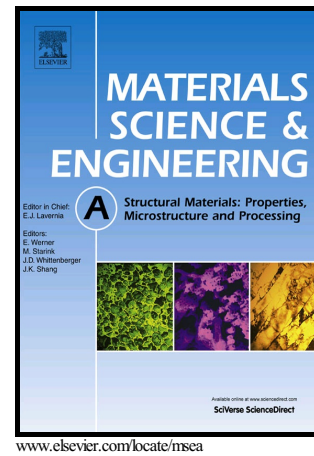


Author's Accepted Manuscript

Effect of Zr on recrystallization in a directionally solidified AA7050

Yiwei Sun, David R Johnson, Kevin P Trumble



PII: S0921-5093(17)30791-8
DOI: <http://dx.doi.org/10.1016/j.msea.2017.06.026>
Reference: MSA35164

To appear in: *Materials Science & Engineering A*

Received date: 30 November 2016
Revised date: 6 June 2017
Accepted date: 7 June 2017

Cite this article as: Yiwei Sun, David R Johnson and Kevin P Trumble, Effect of Zr on recrystallization in a directionally solidified AA7050, *Materials Science & Engineering A*, <http://dx.doi.org/10.1016/j.msea.2017.06.026>

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 a 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.

Effect of Zr on recrystallization in a directionally solidified AA7050

Yiwei Sun^{1,2*}, David R Johnson^{1,2}, Kevin P Trumble^{1,2}

¹School of Materials Engineering, Purdue University, 701 W. Stadium Ave, West Lafayette, IN, 47907-2045, USA

²Purdue Center for Metal Casting Research. Purdue University, 701 W. Stadium Ave, West Lafayette, IN, 47907-2045, USA

*Corresponding author. sun294@purdue.edu

Abstract

A high purity Al-Zn-Cu-Mg alloy based on AA7050 was cast with varying Zr concentrations by directional solidification (DS) and static casting (SC). Specimens were homogenized, hot rolled and solutionized to study the recrystallization behavior. In the DS ingot a gradient of Zr concentration existed along the growth direction, but across the transverse direction the distribution of Zr was uniform, while in SC ingots a dendritically cored Zr concentration gradient was found. The variations in solidification method and Zr concentration resulted in difference in size, number and spatial distribution of Al₃Zr-type dispersoids, and thus different degrees of recrystallization after solutionization. Recrystallization was delayed both in the SC specimen with 0.11 wt.% Zr and in the specimen from the top of the DS ingot with 0.03 wt.% Zr, whereas full recrystallization and grain growth were found in the SC specimen free of Zr and the DS bottom specimen with 0.11 wt.% Zr. The inconsistency between the recrystallization behavior of the DS bottom specimen and its relatively high Zr concentration is likely related to the precipitation and coarsening of the dispersoids during slow DS cooling.

Key words

Aluminum alloys, recrystallization, dispersoids, directional solidification

Download English Version:

<https://daneshyari.com/en/article/5455456>

Download Persian Version:

<https://daneshyari.com/article/5455456>

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