

Author's Accepted Manuscript

Influence of Hot Rolling on Microstructure and Mechanical Behaviour of Al6061-ZrB₂ In-situ Metal Matrix Composites

R. Vasanth Kumar, R. Keshavamurthy, Chandra S. Perugu, Praveennath G. Koppad, M. Alipour



PII: S0921-5093(18)31312-1
DOI: <https://doi.org/10.1016/j.msea.2018.09.104>
Reference: MSA36985

To appear in: *Materials Science & Engineering A*

Received date: 25 June 2018
Revised date: 19 September 2018
Accepted date: 27 September 2018

Cite this article as: R. Vasanth Kumar, R. Keshavamurthy, Chandra S. Perugu, Praveennath G. Koppad and M. Alipour, Influence of Hot Rolling on Microstructure and Mechanical Behaviour of Al6061-ZrB₂ In-situ Metal Matrix Composites, *Materials Science & Engineering A*, <https://doi.org/10.1016/j.msea.2018.09.104>

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.

Influence of Hot Rolling on Microstructure and Mechanical Behaviour of Al6061-ZrB₂ In-situ Metal Matrix Composites

R. Vasanth Kumar¹, R. Keshavamurthy^{2*}, Chandra S. Perugu³, Praveennath G. Koppad⁴, M. Alipour⁵

¹Department of Mechanical Engineering, Bangalore Institute of Technology, Bengaluru 560004, India

²Department of Mechanical Engineering, Dayananda Sagar College of Engineering, Bengaluru 560078, India

³Department of Materials Engineering, Indian Institute of Science, Bengaluru 560012, India

⁴Department of Mechanical Engineering, Nagarjuna College of Engineering and Technology, Bengaluru 562164, India

⁵Department of Materials Engineering, University of Tabriz, Iran

*Corresponding author. keshavamurthy.r@gmail.com (R. Keshavamurthy)

Abstract

Synthesis of aluminium based metal matrix composites by in-situ reaction is considered as an alternative method for production of high quality metal matrix composites. In-situ technique eliminates the limitations associated with ex-situ processing technique and it is one of the most widely accepted one. In the present work, Al6061-ZrB₂ in-situ composites have been developed by stir casting technique using commercially available Al-10%Zr and Al-3%B master alloys. Cast matrix alloy and developed in-situ composites were hot rolled at a temperature of 400°C. Both as-cast and hot rolled matrix alloy and its in-situ composites were subjected to microstructure analysis, microhardness test, grain size studies and tensile test. Tensile behaviour of hot rolled alloy and its in-situ composites were evaluated in the rolling direction (RD), 45° from rolling direction (45D) and transverse direction (TD) and compared with cast ones. Optical and SEM micrographs of hot rolled in-situ composites show that the ZrB₂ particles are aligned in the rolling direction. Both as-cast and hot rolled in-situ composites have displayed extensive grain refinement and enhanced mechanical properties when compared with unreinforced alloy.

Download English Version:

<https://daneshyari.com/en/article/11020061>

Download Persian Version:

<https://daneshyari.com/article/11020061>

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