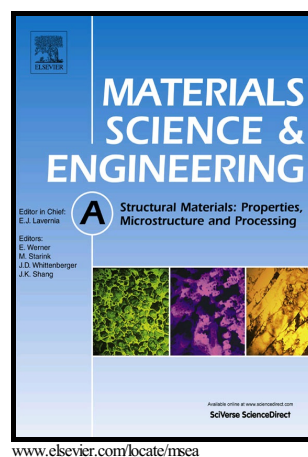


Cooperative deformation behavior between the shear band and boundary sliding of an Al-based nanostructure-dendrite composite

J.T. Kim, S.H. Hong, Y.S. Kim, H.J. Park, T. Maity, N. Chawake, X. Bian, B. Sarac, J.M. Park, P.K. Gokuldoss, J.Y. Park, J. Eckert, K.B. Kim



PII: S0921-5093(18)31092-X  
DOI: <https://doi.org/10.1016/j.msea.2018.08.034>  
Reference: MSA36805

To appear in: *Materials Science & Engineering A*

Received date: 17 April 2018  
Revised date: 9 August 2018  
Accepted date: 10 August 2018

Cite this article as: J.T. Kim, S.H. Hong, Y.S. Kim, H.J. Park, T. Maity, N. Chawake, X. Bian, B. Sarac, J.M. Park, P.K. Gokuldoss, J.Y. Park, J. Eckert and K.B. Kim, Cooperative deformation behavior between the shear band and boundary sliding of an Al-based nanostructure-dendrite composite, *Materials Science & Engineering A*, <https://doi.org/10.1016/j.msea.2018.08.034>

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.

# Cooperative deformation behavior between the shear band and boundary sliding of an Al-based nanostructure-dendrite composite

J. T. Kim<sup>1,3</sup>, S. H. Hong<sup>3</sup>, Y. S. Kim<sup>3</sup>, H. J. Park<sup>3</sup>, T. Maity<sup>2</sup>, N. Chawake<sup>1</sup>, X. Bian<sup>1</sup>, B. Sarac<sup>1</sup>, J. M. Park<sup>4</sup>, P. K. Gokuldoss<sup>1,5</sup>, J. Y. Park<sup>3</sup>, J. Eckert<sup>1,2</sup>, K. B. Kim<sup>3\*</sup>

<sup>1</sup>Erich Schmid Institute of Materials Science, Austrian Academy of Sciences, Jahnstraße 12, A-8700 Leoben, Austria

<sup>2</sup>Department Materials Physics, Montanuniversität Leoben, Jahnstraße 12, A-8700 Leoben, Austria

<sup>3</sup>Department of Advanced Materials Engineering, Sejong University, Gwangjin-gu, Gunja-dong, 143-747 Seoul, Republic of Korea

<sup>4</sup>Global Technology Center (GTC), Samsung Electronics Co., Ltd, 129 Samsung-ro, Yeongtong-gu, Suwonsi, Gyeonggi-do 443-742, Republic of Korea

<sup>5</sup>Department of Manufacturing and civil Engineering, Norwegian University of Science and Technology, Teknologivegen 22, 2815 Gjøvik, Norway

\*Corresponding author. Tel.: +82 2 3408-3690. kbkim@sejong.ac.kr

## Abstract

Investigation of the microstructural features and mechanical properties of the Al<sub>86</sub>Cu<sub>7</sub>Si<sub>7</sub> nanostructure-dendrite composite revealed that the high yield strength of 615 MPa and its reasonable plasticity of ~20% at room temperature mainly originate from the evolution of dislocations in the micron-scale dendrites together with the cooperative deformation action of shear band and interfacial sliding throughout the whole volume of the material. Especially, shear band-induced rotation of dendrites was found to be an important deformation mechanism. Here, we sequentially elucidate the deformation behavior using atomic force

Download English Version:

<https://daneshyari.com/en/article/7971524>

Download Persian Version:

<https://daneshyari.com/article/7971524>

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