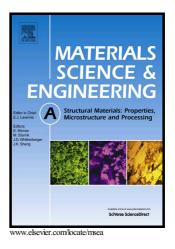
Author's Accepted Manuscript

Friction-stir welding of a ductile high entropy alloy: microstructural evolution and weld strength

Z.G. Zhu, Y.F. Sun, F.L. Ng, M.H. Goh, P.K. Liaw, H. Fujii, Q.B. Nguyen, Y. Xu, C.H. Shek, S.M.L. Nai, J. Wei



PII:S0921-5093(17)31519-8DOI:http://dx.doi.org/10.1016/j.msea.2017.11.058Reference:MSA35773

To appear in: Materials Science & Engineering A

Received date: 16 October 2017 Revised date: 14 November 2017 Accepted date: 15 November 2017

Cite this article as: Z.G. Zhu, Y.F. Sun, F.L. Ng, M.H. Goh, P.K. Liaw, H. Fujii Q.B. Nguyen, Y. Xu, C.H. Shek, S.M.L. Nai and J. Wei, Friction-stir welding of a ductile high entropy alloy: microstructural evolution and weld strength *Materials* Science & Engineering A http://dx.doi.org/10.1016/j.msea.2017.11.058

This is a PDF file of an unedited manuscript that has been accepted fo publication. As a service to our customers we are providing this early version o 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

ACCEPTED MANUSCRIPT

Friction-stir welding of a ductile high entropy alloy:

microstructural evolution and weld strength

Z. G. Zhu^{a,b}, Y. F. Sun^c, F. L. Ng^a, M. H. Goh^a, P. K. Liaw^d, H. Fujii^c, Q. B. Nguyen^a, Y. Xu^b, C. H. Shek^{b,*}, S. M. L. Nai^{a,*}, J. Wei^{a,*}

^aSingapore Institute of Manufacturing and Technology, Singapore

^bDepartment of Physics and Materials Science, City University of Hong Kong, Hong Kong, China

^cJoining and Welding Research Institute, Osaka University, Japan

^dDepartment of Materials Science and Engineering, The University of Tennessee, Knoxville, TN

37996, USA

Abstract

High entropy alloys (HEAs) are a novel subset of metallic systems with complex compositions usually yielding simple phase formation. To verify their potential engineering applications, a novel $Co_{16}Fe_{28}Ni_{28}Cr_{28}$ HEA with a low content of expensive Co was developed and its welding characteristics through friction-stir welding (FSW) were investigated. The HEA shows a stable face-centered-cubic (FCC) structure with an excellent ductility of about 70%. The microstructural evolution during FSW was dominated by discontinuous recrystallization through grain bulging and the B/\overline{B} {112}<110> shear texture formed in the stir zone (SZ). A white band (WB) containing W-rich and Cr-rich phases was detected in the SZ. The WB exhibited refined grains compared with the normal SZ, which may be associated with the particle-stimulated nucleation (PSN). The present understanding of the microstructural evolution during FSW of HEAs may help tailor the weld properties to pave the way for their engineering applications.

Download English Version:

https://daneshyari.com/en/article/7974335

Download Persian Version:

https://daneshyari.com/article/7974335

Daneshyari.com