

Accepted Manuscript

Synthesis and characterization of an *in situ* consolidated nanocrystalline $\text{Cu}_{88}\text{Al}_{11.5}\text{Y}_{0.5}$ alloy

Koushik Sikdar, Somraj Chakravarty, Debdas Roy, Ronald O. Scattergood, Carl C. Koch

PII: S0925-8388(17)31675-4

DOI: [10.1016/j.jallcom.2017.05.092](https://doi.org/10.1016/j.jallcom.2017.05.092)

Reference: JALCOM 41822

To appear in: *Journal of Alloys and Compounds*

Received Date: 2 April 2017

Revised Date: 30 April 2017

Accepted Date: 8 May 2017

Please cite this article as: K. Sikdar, S. Chakravarty, D. Roy, R.O. Scattergood, C.C. Koch, Synthesis and characterization of an *in situ* consolidated nanocrystalline $\text{Cu}_{88}\text{Al}_{11.5}\text{Y}_{0.5}$ alloy, *Journal of Alloys and Compounds* (2017), doi: 10.1016/j.jallcom.2017.05.092.

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.



Synthesis and characterization of an in situ consolidated nanocrystalline $\text{Cu}_{88}\text{Al}_{11.5}\text{Y}_{0.5}$ alloy

Koushik Sikdar^a, Somraj Chakravarty^a, Debdas Roy^{a,b*}, Ronald O. Scattergood^b, Carl C. Koch^b

^aDepartment of Materials and Metallurgical Engineering, NIFFT, Ranchi 834003, India

^bDepartment of Materials Science and Engineering, NCSU, Raleigh, NC 27606, USA

Abstract

Artifact-free bulk nanocrystalline $\text{Cu}_{88}\text{Al}_{11.5}\text{Y}_{0.5}$ alloy has been synthesized by *in situ* consolidation of mechanically alloyed powder blend followed by annealing of the consolidated compact at 200°C (or 0.35 T_m) for 30 min. Grain size determination and phase identification have been carried by X-ray line broadening analysis and transmission electron microscopy (TEM). Hardness measurement has demonstrated that the Hall-Petch effect is the dominant strengthening mechanism for both as-consolidated and annealed specimens. Strength improvement after short annealing time was attributed to the relaxations of non-equilibrium grain boundaries.

Keywords: Nanocrystalline, Copper alloys, Mechanical alloying, In situ consolidation, strengthening mechanism

* Author for communication: Email: droy2k6@gmail.com (D. Roy); Tel.: +916512292018; Fax: +91-6512290860

Download English Version:

<https://daneshyari.com/en/article/5459007>

Download Persian Version:

<https://daneshyari.com/article/5459007>

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