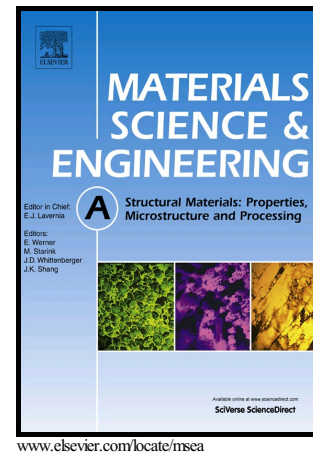


Author's Accepted Manuscript

Acceleration of globularization during interrupted compression of a two-phase titanium alloy

X.G. Fan, H.J. Zheng, Y. Zhang, Z.Q. Zhang, P.F. Gao, M. Zhan, J. Liu



PII: S0921-5093(18)30210-7
DOI: <https://doi.org/10.1016/j.msea.2018.02.026>
Reference: MSA36113

To appear in: *Materials Science & Engineering A*

Received date: 30 December 2017
Accepted date: 6 February 2018

Cite this article as: X.G. Fan, H.J. Zheng, Y. Zhang, Z.Q. Zhang, P.F. Gao, M. Zhan and J. Liu, Acceleration of globularization during interrupted compression of a two-phase titanium alloy, *Materials Science & Engineering A*, <https://doi.org/10.1016/j.msea.2018.02.026>

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 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.

Acceleration of globularization during interrupted compression of a two-phase titanium alloy

X.G. Fan^{a,b,*}, H.J. Zheng^{a,b}, Y. Zhang^{a,b}, Z.Q. Zhang^{a,b}, P.F. Gao^{a,b}, M. Zhan^{a,b}, J. Liu^{a,c}

^a State Key Laboratory of Solidification Processing, Northwestern Polytechnical University, Xi'an, 710072, P.R. China.

^b School of Materials Science and Engineering, Northwestern Polytechnical University, Xi'an, 710072, P.R. China.

^c Key Laboratory of Materials Processing Engineering, School of Material Science and Engineering, Xi'an Shiyou University, Xi'an 710065, P.R.

*Corresponding author. Tel./fax: +86-29-88460212-809; E-mail: fxg3200@nwpu.edu.cn

Abstract: To characterize the plastic deformation behavior and globularization in multistage primary hot working, isothermally interrupted compression was carried out for a TA15 titanium alloy with initial colony structure at temperature of 900°C and strain rate of 0.1 s⁻¹. Through-process microstructural developments were examined by Electron Backscattered Diffraction (EBSD) and Scanning Electron Microscope (SEM). The globularization efficiency was analyzed via the evolution of intra-alpha boundaries, alpha-beta interfaces and alpha grain size. The analyses show that the globularization efficiency is greatly enhanced by short time holding after a true strain of 0.73. The acceleration in globularization is associated with the formation of transverse intra-alpha boundaries across the alpha lamellae, the loss of alpha-beta interfacial coherency, the change in deformation mode and the improvement of deformation homogeneity. Thus, the globularization efficiency increases with interrupted strain, holding time and loading pass. The results can be used to optimize the primary hot working of titanium alloy.

Key words: titanium alloy; globularization; interrupted compression; coarsening; subgrain boundaries

1. Introduction

Owing to excellent service performance (high specific strength and good corrosion

Download English Version:

<https://daneshyari.com/en/article/7973045>

Download Persian Version:

<https://daneshyari.com/article/7973045>

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