

Author's Accepted Manuscript

Kink deformation in a beta titanium alloy at high strain rate

Youping Zheng, Weidong Zeng, Yubo Wang, Saifei Zhang



PII: S0921-5093(17)30910-3
DOI: <http://dx.doi.org/10.1016/j.msea.2017.07.015>
Reference: MSA35263

To appear in: *Materials Science & Engineering A*

Received date: 28 April 2017
Revised date: 6 July 2017
Accepted date: 9 July 2017

Cite this article as: Youping Zheng, Weidong Zeng, Yubo Wang and Saifei Zhang, Kink deformation in a beta titanium alloy at high strain rate, *Material Science & Engineering A*, <http://dx.doi.org/10.1016/j.msea.2017.07.015>

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.

Kink deformation in a beta titanium alloy at high strain rate**Youping Zheng^{*}, Weidong Zeng, Yubo Wang, Saifei Zhang**

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

*Corresponding Author. Postal address: State Key Laboratory of Solidification Processing, Northwestern Polytechnical University, No. 127 Youyi Xilu, Xi'an 710072, P.R. China. zhenguping@qq.com

Abstract

Kink deformation is uncommonly observed in Ti-35V-15Cr-0.3Si-0.1C beta titanium alloy deformed at $5 \times 10^3 \text{s}^{-1}$. Band structures have formed on the deformed samples. Electron back scattered diffraction analyses prove those band structures are kink bands rather than commonly reported twins in beta alloys with high niobium. The kink bands are classified into three categories since the intragranular misorientation axis analyses reveal that three lattice rotation axes (Taylor axes) exist among the kink bands. The three Taylor axes are $[1\bar{1}0]$, $[5\bar{4}1]$, $[12\bar{1}]$ and the corresponding three slip mode of the dislocation kink model are $(112)[11\bar{1}]$, $(123)[11\bar{1}]$, $(101)[1\bar{1}\bar{1}]$ respectively. It is demonstrated that the selection of the slip mode in a kink bands is dominated by the loading axis. A slip system would have the priority to be selected as the slip mode of the kink deformation if the loading axis is close to the normal direction of the slip plane and the perpendicular direction of the slip direction.

Graphical abstract

Download English Version:

<https://daneshyari.com/en/article/5455833>

Download Persian Version:

<https://daneshyari.com/article/5455833>

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