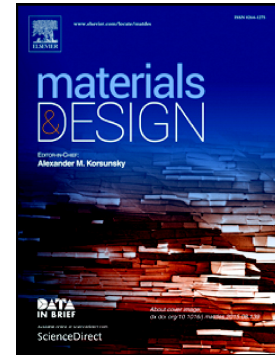


Accepted Manuscript

In situ electron backscatter diffraction study of twinning in commercially pure titanium during tension-compression deformation and annealing

Subhasis Sinha, N.P. Gurao



PII: S0264-1275(16)31358-2
DOI: doi: [10.1016/j.matdes.2016.10.060](https://doi.org/10.1016/j.matdes.2016.10.060)
Reference: JMADE 2417
To appear in: *Materials & Design*
Received date: 20 May 2016
Revised date: 20 October 2016
Accepted date: 25 October 2016

Please cite this article as: Subhasis Sinha, N.P. Gurao , In situ electron backscatter diffraction study of twinning in commercially pure titanium during tension-compression deformation and annealing. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Jmade(2016), doi: [10.1016/j.matdes.2016.10.060](https://doi.org/10.1016/j.matdes.2016.10.060)

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.

In-situ electron backscatter diffraction study of twinning in commercially pure titanium during tension-compression deformation and annealing

Subhasis Sinha, N.P. Gurao *

Department of Materials Science and Engineering, Indian Institute of Technology Kanpur, Kanpur 208016,
India

***Corresponding author: npgurao@iitk.ac.in**

Abstract

Tension-compression forward and reverse loading followed by annealing at 773K for 1 hour was carried out on commercially pure titanium using an in-situ heating stage with tensile testing facility in scanning electron microscope fitted with electron backscatter diffraction setup. Twins of four different variants were observed during tension in load control mode in a relatively large grain within the area of inspection. Morphology of the twins changed during subsequent deformation stages and un-indexed points within the twins decreased or increased which may be due to changes in dislocation density during unloading and compression loading stages. Reloading in tension caused barrelling of the twins. Some of the twins disappeared and new twins formed during annealing. Although all the variants show similar Schmid factor for extension twinning, there is variation in lateral thickening of different twin variants within the same grain which can be explained from variation in elastic modulus. It is also observed that twin intersections can play an important role in nucleation and growth of new twins.

Keywords: in-situ testing, electron backscatter diffraction, titanium, twinning

Download English Version:

<https://daneshyari.com/en/article/5024340>

Download Persian Version:

<https://daneshyari.com/article/5024340>

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