

# Author's Accepted Manuscript

Cyclic deformation mechanisms and microcracks behavior in high-strength bainitic steel

M.C. Marinelli, I. Alvarez-Armas, U. Krupp



PII: S0921-5093(16)31498-8  
DOI: <http://dx.doi.org/10.1016/j.msea.2016.12.018>  
Reference: MSA34449

To appear in: *Materials Science & Engineering A*

Received date: 22 August 2016  
Revised date: 2 December 2016  
Accepted date: 3 December 2016

Cite this article as: M.C. Marinelli, I. Alvarez-Armas and U. Krupp, Cyclic deformation mechanisms and microcracks behavior in high-strength bainitic steel *Materials Science & Engineering A* <http://dx.doi.org/10.1016/j.msea.2016.12.018>

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

Cyclic deformation mechanisms and microcracks behavior in high-strength  
bainitic steel

M.C. Marinelli<sup>a\*</sup>, I. Alvarez-Armas<sup>a</sup>, U. Krupp<sup>b</sup>

<sup>a</sup>Instituto de Física Rosario – Consejo Nacional de Investigaciones Científicas y Técnicas  
(CONICET), Universidad Nacional de Rosario, Argentina

<sup>b</sup>Faculty of Engineering and Computer Science, University of Applied Sciences Osnabrück,  
Germany

\*Corresponding author. Tel.: +54-341 485 3200. E-mail: marinelli@ifir-conicet.gov.ar

### Abstract

The purpose of this investigation is to analyze the mechanisms of cyclic deformation and the initiation and propagation of microcracks during low cycle fatigue in the bainitic steel 16CrMnV7-7. The slip systems and their associated Schmid Factor are analyzed in the bainitic ferrite laths and correlated with the short crack path using scanning electron microscopy observations (SEM) in combination with electron backscattered diffraction (EBSD) measurements. Moreover, the developed dislocation structure was analyzed and correlated with the formation and propagation of microcracks. The principal results show that microcracks initiate in lath boundaries and along slip systems with the highest Schmid Factor and low Taylor Factor. Besides, it was observed after experimental evidence that the parameters controlling crack propagation are associated with the crystallographic misorientation between bainite blocks and with the tilt/twist misorientation angle between slip planes of adjacent bainitic ferrite laths.

Download English Version:

<https://daneshyari.com/en/article/5456311>

Download Persian Version:

<https://daneshyari.com/article/5456311>

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