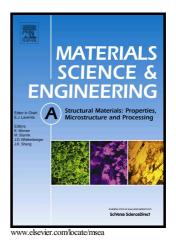
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Cyclic deformation mechanisms and microcracks behavior in high-strength bainitic steel

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Cyclic deformation mechanisms and microcracks behavior in high-strength

bainitic steel

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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:

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