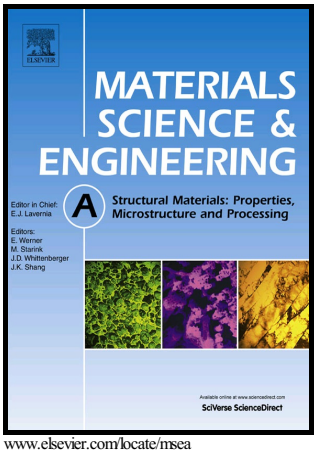
{101¯2}−{101¯2} double tensile twinning in a Mg-3Al-1Zn alloy sheet during cyclic deformation

Li Tan, Xiyan Zhang, Ting Xia, Qi Sun, Guangjie Huang, Renlong Xin, Qing Liu



www.elsevier.com/locate/msea

PII: S0921-5093(17)31469-7
DOI: https://doi.org/10.1016/j.msea.2017.11.021
Reference: MSA35736

To appear in: *Materials Science & Engineering A*

Received date: 20 June 2017
Revised date: 25 October 2017
Accepted date: 7 November 2017

Cite this article as: Li Tan, Xiyan Zhang, Ting Xia, Qi Sun, Guangjie Huang, Renlong Xin and Qing Liu, {101¯2}−{101¯2} double tensile twinning in a Mg-3Al-1Zn alloy sheet during cyclic deformation, *Materials Science & Engineering A,* https://doi.org/10.1016/j.msea.2017.11.021

$\{10\bar{1}2\}-\{10\bar{1}2\}$ double tensile twinning in a Mg-3Al-1Zn alloy sheet during cyclic deformation

Li Tan [a], Xiyan Zhang [a,*], Ting Xia [a], Qi Sun [a], Guangjie Huang [a], Renlong Xin [a], Qing Liu [a,b,*]

[a] College of Materials Science and Engineering, Chongqing University, Chongqing 400045, China

[b] National Engineering Research Centre for Magnesium Alloy, Chongqing University, Chongqing 400045, China

* Corresponding authors. E-mail addresses: kehen888@163.com (X. Zhang), qingliu@cqu.edu.cn (Q. Liu)

Abstract

The typical fracture morphology of the Mg-3Al-1Zn alloy after cyclic deformation was investigated using optical microscopy (OM), and an electron back-scatter diffraction (EBSD). A novel finding of this study is that large number of stripe-like laminas were found within the primary $\{10\bar{1}2\}$ tensile twins in the crack initiation and crack propagation regions. It is shown that these laminas primarily result from $\{10\bar{1}2\}-\{10\bar{1}2\}$ twinning during cyclic deformation. According to the results and combined with theoretical analysis, the formation of $\{10\bar{1}2\}-\{10\bar{1}2\}$ twins are largely contributing to the local strain accommodation caused by different twin variants.

Keywords: $\{10\bar{1}2\}-\{10\bar{1}2\}$ twin laminas; AZ31 Mg alloy; Twinning; Detwinning; Fracture