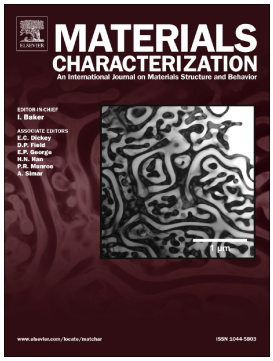
Accepted Manuscript




# $10\bar{1}1$ twin boundary showing very large deviation from the theoretical one in deformed magnesium alloy

Jing Zhang, Guoqiang Xi, Xin Wan

PII: S1044-5803(17)30384-4
DOI: doi: 10.1016/j.matchar.2017.08.021
Reference: MTL 8805

To appear in: *Materials Characterization*

Received date: 11 February 2017
Revised date: 30 July 2017
Accepted date: 24 August 2017

Please cite this article as: Jing Zhang, Guoqiang Xi, Xin Wan , $10\bar{1}1$ twin boundary showing very large deviation from the theoretical one in deformed magnesium alloy, *Materials Characterization* (2017), doi: 10.1016/j.matchar.2017.08.021

# $\{10\bar{1}1\}$ twin boundary showing very large deviation from the theoretical one in deformed magnesium alloy

Jing Zhang[a,] *, Guoqiang Xi[a], Xin Wan[a]

[a]College of Materials Science and Engineering, Chongqing University, Chongqing 400044, China

[b]National Engineering Research Center for Magnesium Alloys, Chongqing 400044, China

**Abstract**

Structure of $\{10\bar{1}1\}$ twin boundary in an AZ31 magnesium alloy has been characterized by means of transmission electron microscopy (TEM) and high-resolution TEM. It is found that actual twin boundary entirely departs from theoretical twinning plane in $\{10\bar{1}1\}$ twin system. Furthermore, it is shown that six kinds of facets, including $\{10\bar{1}1\}$ coherent twin boundaries, $\{0002\} \parallel \{10\bar{1}\bar{1}\}$ basal-pyramidal (BPy), $\{10\bar{1}1\} \parallel \{0002\}$ pyramidal-basal (PyB), $\{10\bar{1}0\} \parallel \{10\bar{1}3\}$ prismatic-third pyramidal (P3Py), basal-prismatic (BP/PB) boundaries and $\{10\bar{1}2\}$ coherent twin boundaries, can coexist in one $\{10\bar{1}1\}$ twin system. Based on these structure features, the underling mechanisms responsible for large deviation phenomenon are discussed, with focus on BPy, PyB, P3Py boundaries and strain accommodation.

Key words: Magnesium alloy; Twinning; Twin boundary; HRTEM

* Corresponding authors. Tel.: +86 23 65111167; Fax: +86 23 65102821.
E-mail addresses: jingzhang@cqu.edu.cn (J. Zhang).