Acta Materialia 109 (2016) 406–407

Contents lists available at ScienceDirect

Acta Materialia

journal homepage: www.elsevier.com/locate/actamat

Corrigendum

Corrigendum to “In situ TEM study of twin boundary migration in sub-micron Be fibers” [Acta Mater. 96 (2015) 57–65]

F. Mompiou [a,*], M. Legros [a], C. Ensslen [b], O. Kraft [b]

[a] CEMES-CNRS and Université de Toulouse, 29, rue J. Marvig, 31055 Toulouse, France
[b] Karlsruhe Institute of Technology, Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany

In the article [1], the authors regret the following errors. We have incorrectly attributed twinning to the motion of a dislocation of type $\vec{b}_{twin} = 2\vec{b}_{2/2}$ with a step height $h = 4d_{(10\bar{1}2)}$, while the correct twin boundary dislocation is simply $\vec{b}_{2/2}$ with a step of height $h = 2d_{(10\bar{1}2)}$ (see [2] p. 41 and [3]). This error does not change the theoretical value of the coupling factor since both the step height and Burgers vector are divided by two.

An additional error has to be pointed out in Equation (7): the time t_0 is not the time constant of Equation (6). It should be replaced by:

$$\dot{\varepsilon}_p \approx \frac{kT}{EV}\left(\frac{1}{t+t_0-t_i}\right) \tag{1}$$

where t_i is the starting time of the relaxation, i.e. $t_i \approx 240$ s in the experiment time scale. Then, Equation (10) should be written:

$$v = \frac{kT}{EV}\frac{l_0}{\beta \sin\alpha}\left(\frac{1}{t+t_0-t_i}\right) \tag{2}$$

For a true relaxation test, i.e. the twin speed going down to zero, the Equation (11) is of the form:

$$v = \frac{a_1}{t+t_0-t_i} \tag{3}$$

Reanalyzing the data using a custom Python script tracking the boundary trajectory [4], we found that $t_0 \approx 10$ s and $t_i \approx 240$ s, leading to a higher value of $a_1 = 250 \pm 60$ nm.

As a result, the following estimates have to be recalculated:

DOI of original article: http://dx.doi.org/10.1016/j.actamat.2015.06.016.

* Corresponding author.
E-mail addresses: mompiou@cemes.fr (F. Mompiou), legros@cemes.fr (M. Legros), charlotte.ensslen@kit.edu (C. Ensslen), oliver.kraft@kit.edu (O. Kraft).

http://dx.doi.org/10.1016/j.actamat.2016.02.055

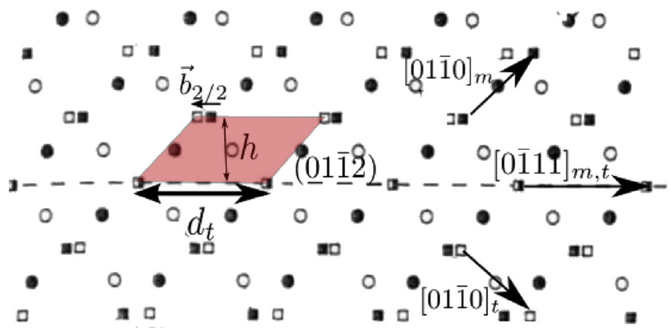

Fig. 1. Projection of the dichromatic pattern of the twin along the $[2\bar{1}\bar{1}0]$ direction. Black and white symbols corresponds to the twin and matrix respectively. Circle and square symbols indicate lattice positions in two adjacent planes along the $[2\bar{1}\bar{1}0]$ direction. The twinning dislocation has a Burgers vectors $\vec{b}_{twin} = \vec{b}_{2/2}$ associated with a step h. The shaded red area corresponds to the area swept by the twinning dislocation while moving along the twin plane during the twin boundary migration.

p. 60: The migration of the twin boundary of $d_\perp \approx 5.2 \pm 0.8$ nm corresponds to the motion of 20 twinning dislocations, leading to a nucleation of $\dot{n} = 5$ dislocations per second, which is still of the same order of magnitude than the source operation in Al fiber [6].
p. 61: the value of the activation volume is $V \approx 8.3 \pm 3.3 \times 10^{-29}$ m^3, which represents $V \approx 574 \pm 226b^3$.
p. 62: the evaluation of the activation energy is not significantly changed 0.56 eV < G < 0.72 eV, but a mistake has been made in the evaluation of the nucleation frequency: $1 \times 10^{11}\ s^{-1} < A \approx \nu^\star < 5 \times 10^{11}\ s^{-1}$ (cf. Appendix B)
p. 62: The experimental value ranging between 5×10^{-29} m^3 ($348b^3$)< V <1.2×10^{-28} m^3 ($800b^3$) is higher compared to the values obtained by atomistic simulation, but still comparable for instance with the work of [5], especially for the activation energy (see Fig. 2).

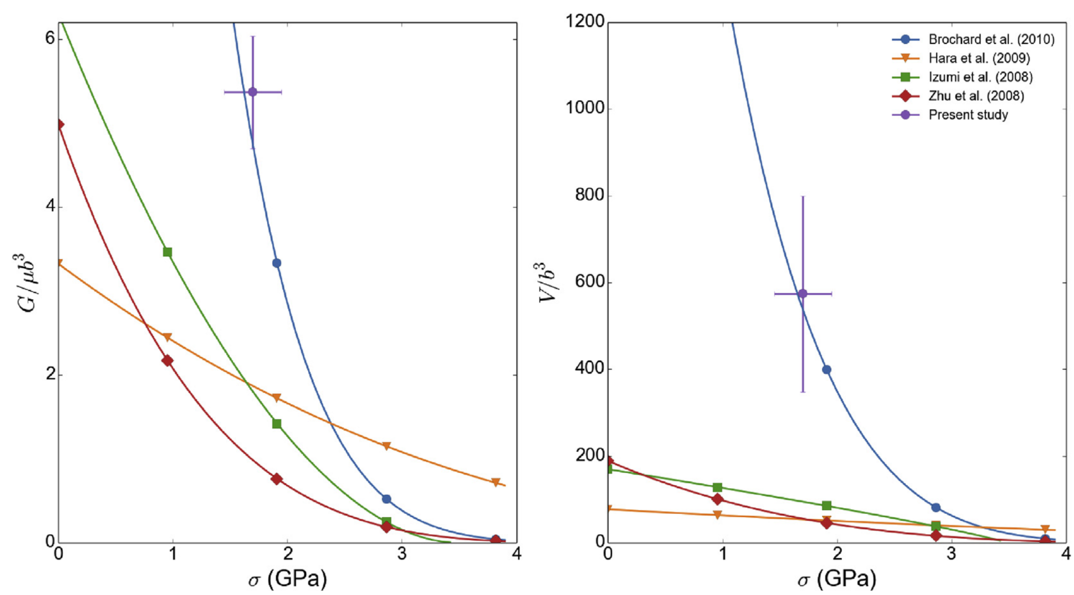

Fig. 2. Normalized activation energy (a) and activation volume (b) as a function of the stress. Full lines correspond to results of atomistic simulations of dislocation surface nucleation. The values of the present study are also indicated for comparison.

p. 62: The activation volume corresponding to the atomic shuffling is: $V_{shuffling} = h \times d_t \times \left\| \vec{b}_{twin} \right\| = 7.5 \times 10^{-30}$ m^3, which is still largely smaller than the volume corresponding to nucleation.

Acknowledgment

The authors acknowledge J. Bonneville and A. Serra for their comments.

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