Electron diffraction analysis of dislocation- induced substructure evolution of Al crystals in compression

Magsud Masimov

► To cite this version:

Magsud Masimov. Electron diffraction analysis of dislocation- induced substructure evolution of Al crystals in compression. Philosophical Magazine, 2007, 87 (10), pp.1565-1573. 10.1080/14786430601069792 . hal-00513802

HAL Id: hal-00513802

<https://hal.science/hal-00513802>

Submitted on 1 Sep 2010

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Electron diffraction analysis of dislocation- induced substructure evolution of Al crystals in compression

Journal:	<i>Philosophical Magazine & Philosophical Magazine Letters</i>
Manuscript ID:	TPHM-06-Mar-0072.R3
Journal Selection:	Philosophical Magazine
Date Submitted by the Author:	13-Oct-2006
Complete List of Authors:	Masimov, Magsud; TU Bergakademie Freiberg, Institute of Material Science
Keywords:	aluminium, dislocations, EBSD, TEM, X-ray diffraction
Keywords (user supplied):	lattice rotations, disorientations

Figure Captions

- 1. Fig. 1. Deformation – induced substructure in a [002] – oriented Al single crystal after compression to $\epsilon = 0.5$, is taken from [1]
- 2. Fig. 2. Evolution of the disorientation distribution $f(|\Theta|)$ in dependence on the strain
- 3. Fig. 3. Apparent disorientation distribution $f(|\Theta|_{irr})$ measured with a dislocation – free Si single crystal
- 4. Fig. 4 Disorientations $\langle |\Theta| \rangle$ and $\langle |\Theta| \rangle_{rel}$ of compressed Al crystals in dependence on the strain
- 5. Fig. 5 Mean chord lengths of the meso-scale substructure of compressed Al substructure as determined by TEM, EBSD, and XRD
- 6. Fig. 6. Determination of the number of correlated dislocation walls and the saturation disorientation $\langle |\Theta_{\infty}| \rangle$ (Example: $\epsilon = 1.92$)
- 7. Fig. 7. Distributions $f(n_{BC})$ of the band – contrast number n_{BC} of the compressed Al in comparison with that of a perfect Si single crystal
- 8. Fig. 8 . Integrated widths B_{BC} of the distributions $f(n_{BC})$ and mean total dislocation densities ρ_d of Al in dependence on the strain

Figures

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 4

Fig. 5

Fig. 6

Fig. 7

Fig. 8