Faculty of Science and Technology
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Microstructural Analyses Using Electron Microscopy

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(1)

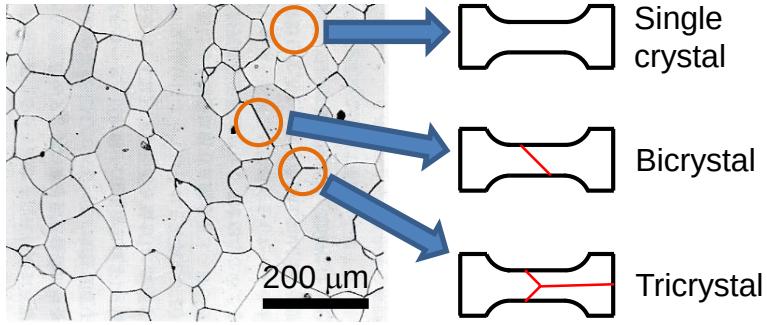


Fig. 1 Polycrystal (left), and single-, bi-, and tri-crystals.

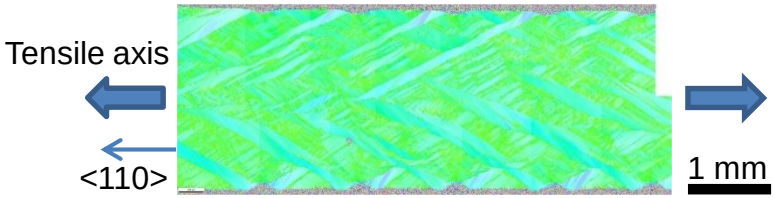
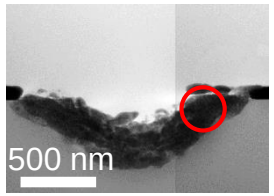


Fig. 2 SEM/EBSD orientation map of Cu single crystal deformed in tension (25%).

(2)



Diffraction spots from Ni_2Si phase are arranged on the dashed lines.

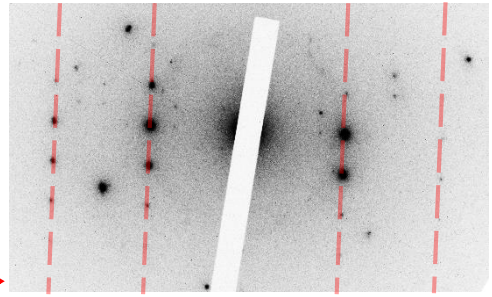


Fig. 3 Ni silicide formation at the Ni/SiC interface.
(Left) Cross-sectional TEM bright-field image, (Right) Selected area diffraction pattern from the circular area.

Content:

(1) We have been studying plastic deformation of orientation-controlled single-, bi- and tri-crystals of aluminum and copper. Polycrystalline materials are composed of numerous grains with a grain size of several ten to hundred μm. Hence, single-, bi- and tri-crystals are considered as enlarged portions in a polycrystalline material (Fig. 1). In our studies, we carry out orientation analyses of deformation microstructures using the SEM/EBSD method (Fig. 2).

*SEM: scanning electron microscopy

*EBSD: electron back-scattered diffraction

(2) We have been carrying out microstructural analyses using transmission electron microscopy (TEM). Presently, we focus our attention on the analyses of femtosecond (fs) laser-induced modifications in silicon carbide (SiC) and diamond crystals. Fs laser pulses were irradiated along lines on the SiC surface. A nickel (Ni) thin film was deposited on the SiC surface and subsequently annealed at 773 K. Cross-sectional TEM observation unveiled the formation of a Ni_2Si phase at the Ni/SiC interface (Fig. 3).

Keywords: electron microscopy, microstructural analysis

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