APPLICATION NOTE

Preparation of a copper plate sample for scanning electron microscopy

Imaging results of a pure copper plate sample prepared by broad-beam ion milling for scanning electron microscopy (SEM).

Mechanical preparation

A sample of pure copper plate (10 x 10 x 1.5 mm) was cut and polished mechanically; diamond lapping films were used to produce a 1 µm final polish. The sample was observed under SEM at 5 kV, SED (ET) at 1000x magnification (top image).

Ion beam preparation

The sample was prepared using broad-beam ion milling with the Fischione Instruments Model 1060 SEM Mill.

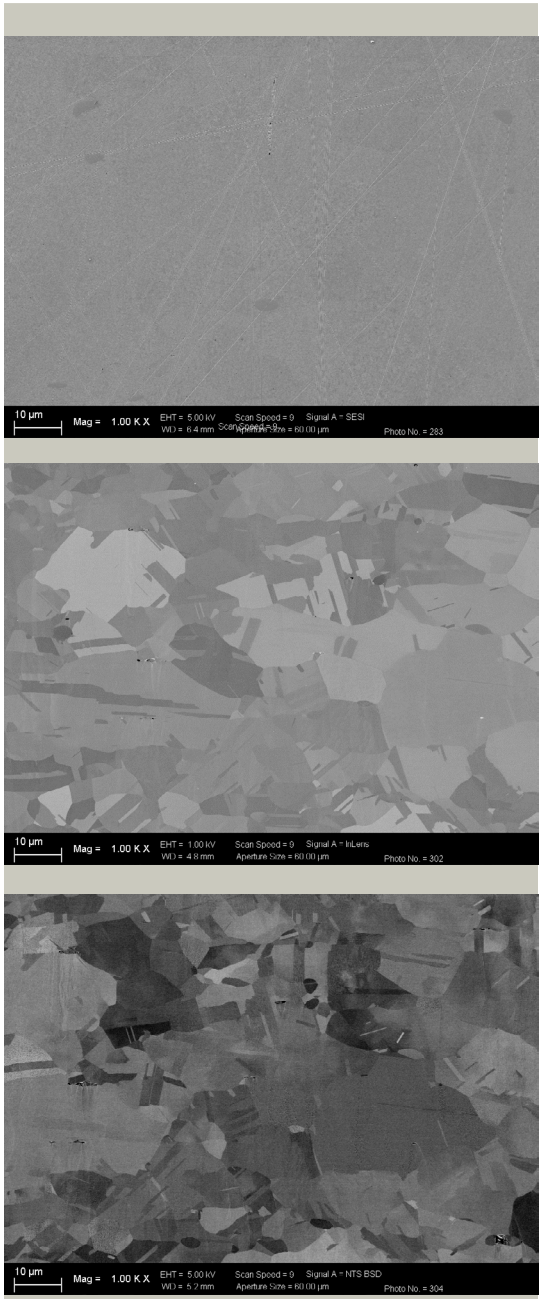
The ion milling parameters used were:

Parameter	Setting
Voltage	4 kV
Beam angle	5°
Stage rotation	Rocking
Milling time	40 minutes

Results and analysis

The sample was observed under SEM at 1 kV, SED (ET), 1000x magnification (middle image) and 5 kV, BSD, 1000x magnification (bottom image).

A significant amount of subsurface deformation may remain in the copper following mechanical polishing. Ion milling at a low incident angle with sample rotation removes this residual damage and produces a uniform planar surface ready for EBSD. The optimal choice of incident angle can produce electron channeling contrast at the same time, thus highlighting the grain and twin boundaries.



COPPER SAMPLE OBSERVED UNDER SEM

Top: 5 kV, SED (ET), 1000x. *Middle:* 1 kV, SED (ET), 1000x. *Bottom:* 5 kV, BSD, 1000x.

E.A. Fischione Instruments, Inc.
9003 Corporate Circle
Export, PA 15632 USA
Tel: +1 724.325.5444
Fax: +1 724.325.5443
info@fischione.com
www.fischione.com

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