

Measurements of Local Rocking Curves, Tilt and Strain Distributions in Diamond Crystals*

S. Krasnicki, Y.Zhong, A.Macrander, J.Maj

Advanced Photon Source, Argonne National Laboratory, USA

Abstract:

X-ray diffraction images, with about 60 micrometer resolution, were collected for some type Ib and IIa synthetic diamond plates. Experiments were carried out using 8 keV x-rays and a double-crystal diffractometer equipped with a CCD detector. Crystals could be rotated about the azimuth axis parallel to a given reciprocal lattice vector. Sequences of many topographs were taken along the global rocking curves (GRCs) for some, at least two, azimuth positions of a specimen. Local rocking curves (LRCs) were extracted from the data and maps of the sample local FWHMs were produced. Based on the angular positions of the LRC centers, maps of local tilt (misorientation) and strain were created. Effects of crystal etching were also investigated.

*This work was supported by the U.S. Dept. of Energy, BES-Materials Sciences, under contract No. W-31-109-ENG-38.