X-ray topography study of single crystal diamonds

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Abstract:

X-ray topography technique was used to characterize diamond crystals for synchrotron radiation applications. In order to obtain better surface sensitivity and to investigate near-surface damages/microstructures, a Bragg case limited-projection topography method was developed and employed to study some diamond single crystals. Experiments were performed using unfocused bending magnet synchrotron radiation (beamline 2-BM, Advanced Photon Source). Topographs were recorded by means of a CCD area detector. Images were taken applying both symmetric and asymmetric diffractions at x-ray energies in the range 9 to 14 keV. Images containing information on surface damage were obtained with a beam of 25 micrometers in the vertical direction. Examples of results will be presented and surface defects observed will be discussed. Finally, results obtained by the wide beam topography and limited-projection topography will be compared.