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**Observation of defects in single crystal diamond with high resolution x-ray topography** YUNCHENG ZHONG, ALBERT MACRANDER, FELIX KASNICKI, YONG CHU, JOE MAJ, Argonne — Single crystal diamond is an important optical component at synchrotron facilities, and is one of the best candidates for the optics for the next generation X-ray light source. The imperfections and surface conditions of the synthetic diamond crystals affect their applications. It has been shown that surface etching can improve the FWHM of type IB synthetic diamond crystals having (100) surface orientation to a certain extent. We studied the remaining defects in the crystals after surface etching of high-pressure-high-temperature type IB crystals using a high resolution X-ray topography method at APS beamline 2BM. The results are interpreted as various types of imperfections such as growth boundaries, dislocation lines, stacking faults and dislocation networks. These defects have been analyzed to explain their contributions to the FWHM. These results will be compared to very recent measurements on type IIA crystals. (The type IB crystals were procured from Drukker/Element Six, and type IIA crystal was on loan from Sumitomo. This work supported by the U.S. DOE, Basic Energy Sciences, under Contract No. W-31-109-ENG-38. )

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