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High-resolution X-ray topography characterization of diamond self-seeding monochromator for the SHINE

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In this paper, the results of high-resolution X-ray topography characterization of monocrystal diamond plate with (100) crystal surface orientation used as high-quality monochromator of high-heat-load self-seeding free electron lasers are reported. The plate was fabricated by laser-cutting of the (100) facet of monocrystal diamond grown using high-pressure high-temperature method. The intrinsic crystal quality of the diamond surface was studied using sequential X-ray diffraction topography in weak-dispersive and non-dispersive configuration and data analysis using rocking-curve topography. The variations of the rocking-curve width and peak position measured with 7.4 μm spatial resolution and $\sim 10^{-7}$ energy resolution over a 0.5 mm \times 0.5 mm selected region were found to be less than 0.15 arcsec, which was suitable for applications in wavefront-preserving high-heat-load crystal optics.

Footnotes

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Asia

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