

ANALYSIS & METHODOLOGY FOR IMPROVING CRYSTAL PERFORMANCE IN BEAMLINE OPTICS USING X-RAY TOPOGRAPHY

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The Topography X-ray Laboratory at the Advanced Photon Source (APS) operates as a collaborative effort with APS users to produce quality crystals to improve the performance of these crystals for beamline experiments. The laboratory has worked closely with an on-site optics shop to help ensure the production of crystals with high quality and stress-free surface finish for many years, and it has been instrumental in evaluating and refining methods used to produce quality crystals. The topography test has been shown to be an effective method to quantify stresses and help to identify methods which would mitigate the stresses and improve the Rocking curve. It has been used to determine the distribution of stresses and measure the Rocking curve, as well as to create CCD images of the crystal. This paper describes the process and offers methods for reducing the crystal stresses in order to substantially improve the crystal optics.

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