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Quantitative strain analysis of single crystals using x-ray topography[1] Y. ZHONG, Y.S. CHU, A. T. MACRANDER, Argonne National Laboratory, S.F. KRASNICKI, Carnegie Institution of Washington — The x-ray topography technique images diffraction intensity variations of a crystal. The use of a CCD camera enables the measurement of different spatial resolutions. Currently an x-ray topograph with spatial resolution of 1 micron has been achieved, but the quantitative data analysis has not been explored widely. Quantitative strain analysis on these images extends new capabilities in crystal study. We have developed methods to quantify strain information through topography data. We will present these methods and discuss related practical issues, such as advantages, sensitivities, and limitations. We first introduce the azimuthal rotation method, suitable for strain components along the surface normal direction. The analysis requires accurate image registration; therefore we use the cross correlation method. Next we introduce a method to obtain quantitative strain tensor using bright field lattice refinement. The application of these methods on materials study is shown.

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