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Characterization of dislocation and defects for large high purity Ge crystals¹ HAO MEI, GUOJIAN WANG, YUTONG GUAN, GANG YANG, DONGMING MEI, University of South Dakota, CUBED COLLABORATION — Large diameter (~ 10 cm) high purity Germanium (HP-Ge) crystals have been growing via Czochralski method at University of South Dakota. We investigate the impacts of growth rate, time-temperature profile, and thermal gradient on the dislocation and defects distribution in HP-Ge crystals along $\langle 100 \rangle$ orientation. The dislocation density across the entire cross-section of a grown crystal is measured using microscope. Utilizing X-Ray Diffraction method, we obtain the rocking curves from the same crystal samples. We analyze the correlation between the full width at half maximum (FWHM) of the rocking curves and the dislocation densities from the optical observations (etch pits distribution). A model that describes the correlation of dislocation density, along the HP-Ge crystal, with the FWHM of the rock curves for XRD is established. We report these analytic results.

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