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Strain maps with ppm resolution for single crystal wafers obtained from x-ray rocking curve maps ALBERT MACRANDER, YUNCHENG ZHONG, JOSEF MAJ, YONG CHU, Argonne National Laboratory, SZCZESNY KRASNICKI, Carnegie Institute — A double crystal (+, -) x-ray technique has been used to obtain separate maps of strain and tilt across single crystal samples of high crystalline perfection. Rocking curves were obtained for each pixel of a CCD detector and from these data angular shifts of the rocking curve center were mapped. By using data for two azimuthal rotations, that is, by combining data from two diffraction conditions separated by 180° rotation around the diffraction vector, we obtained separately the tilt and the strain. Data for diamonds has been obtained to demonstrate the technique in the case of a symmetric reflection[1]. Extensions of the method to asymmetric reflections in order to also extract strains parallel to the surface[2] will be discussed. Also a correction for wavelength dispersion in the case of different d-spacings for first and second crystals will be discussed. This work was supported by DOE Basic Energy Sciences-Materials Science, under contract No. W-31-109-ENG-38 and by NSF under contract No. EAR-0421020. [1] A.T. Macrander et al., Applied Physics Letters, 87, 194113 (2003). [2] V. Swaminathan and A.T. Macrander, "Materials Aspects of GaAs and InP Based Structures", Prentice Hall, 1991, ISBN 0-13-346826-7.

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