Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Determination of interface compositions by X-ray three-beam resonance diffraction H.-H. WU, Y.-R. LEE, C.-M. HSUEH, H.-H. CHEN, S.-L. CHANG, National Tsing Hua University — X-ray three-beam diffraction(200/$\bar{3}\bar{1}1$)under resonant conditions is used to measure the concentrations of the constituent elements of the interface between a (100) CdTe thin film and a (100) InSb substrate. The three-beam diffraction profiles versus the azimuth angle of rotation around [200] reveal a wide variety of change in phase shift due to resonance for photon energies in the vicinity of the Cd L_{III} absorption edge. At different momentum transfers q_r along [200], sensitive to the interfacial structure, the phase shift in the resonant state also provides sufficient information about the distributions of Cd and Te concentrations. With theoretical analysis for the crystallographic phase of the structure-factor triplets and the resonance phase shifts involved in the three-beam diffraction, it allows us to determine the composition of Cd and Te as a function of depth normal to the interface. Via the propagation of the secondary($\bar{3}\bar{1}1$)reflected beam along the surface, possible interface structures parallel to the surface could also be deduced.

Shih-Lin Chang
National Tsing Hua University

Date submitted: 22 Nov 2005

Electronic form version 1.4