Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Measuring Strain field of Multi-Component Material Systems Using X-Ray Bragg- Surface Diffraction CHIA-HUNG CHU, YI-WEI TSAI, LI-JEN CHOU, National Tsing Hua University, MAU-TSU TANG, YURIY P. STETSKO, National Synchrotron Radiation Research Center, SHIH-LIN CHANG, National Tsing Hua University — We investigated the strain field of the β-$FeSi_2$ semiconductor on a Si(001) substrate, where FeSi in a grain form coexists with β-$FeSi_2$ during the growth of β-$FeSi_2$. The lattice-parameter variations of silicon, β-$FeSi_2$, FeSi and the grain boundary were detected using x-ray Bragg-Surface Diffraction (BSD). With the penetration depth calculated by the dynamical theory of x-ray diffraction, the strain field versus depth of Si-substrate near the interface is determined with the resolution of 0.002 Å. The largest strain detected is about 0.4% up to 8$\sim$12 Å below the interfaces.

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Date submitted: 16 Nov 2009 Electronic form version 1.4