Synchrotron Radiation X-ray Absorption Spectroscopy Investigation on InSb on GaAS and Bulk CdZnTe Materials

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We have recently employed the National Synchrotron Radiation Research Center (NSRRC) beamline 16A of Tender X-ray Absorption Spectroscopy for Te L-edge X-ray absorption measurements on a series of CdZnTe materials. Quit a lot of significant data and fruitful results have been obtained. High energy and high intensity synchrotron radiation technology is approved to be a powerful tool for materials fundamental research on these wide band gap semiconductors, and it can play an important rule to promote research in this filed.

Figures 1~4 show the tender X-ray absorption measurements on Cd and Te L-edge, respectively. These experiments were operated in X-ray fluorescence yield mode at beamline 16A of the National Synchrotron Radiation Research Center (NSRRC) in Hsinchu, Taiwan. Owing to the lack of the reference, this part of experimental data needs to do penetrating analysis in the future. Here, we just list the results of measurement.

The alloy $Cd_{1-x}Zn_xTe$ can ideally be regarded as a CdTe crystal with Zn atoms randomly substituted for a fraction x of the Cd atoms. The difference in the lattice constants of CdTe and ZnTe implies that this substitution is accompanied by some change in the average unit cell dimension. It is usually assumed that the resulting lattice constant is a linear interpolation between the two constituents, but EXAFS measurements have shown a bimodal distribution of bond lengths, suggesting distortion of the Te sub-lattice, so that the linear interpolation is true only in an approximate sense.