

NEXAFS study on $\text{Ge}_2\text{Sb}_2\text{Te}_5$ films

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Electronic structures of $\text{Ge}_2\text{Sb}_2\text{Te}_5$ films were investigated using near edge x-ray fine structure (NEXAFS) and x-ray photoelectron spectroscopy (XPS). Changes in NEXAFS spectra of the Te M_{45} edge were observed before and after the phase transition. From core level spectra of XPS, the Te core level hardly changed after phase transition.[1] However, NEXAFS Te M_{45} edge spectra showed that the unfilled p -orbital of Te was altered due to the phase transition of $\text{Ge}_2\text{Sb}_2\text{Te}_5$. Because of the weak covalent bonding of the $\text{Ge}_2\text{Sb}_2\text{Te}_5$, core level structures of Te atoms are intact during the phase transition. However, the partial density of states of Te are significantly changed. The changes in electronic state of Te atoms in $\text{Ge}_2\text{Sb}_2\text{Te}_5$ films are experimentally proved although there are some controversies to be discussed more thoroughly.

[1] Youngkuk Kim *et al.*, Appl. Phys. Lett. **90**, 171920 (2007)