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Phase transition study of Ag doped $Ge_2Sb_2Te_5$ thin films

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Ge2Sb2Te5 (GST) is one of the best phase change material due to its unique properties viz. high thermal stability, fast crystallization speed, good endurance, scalability and reliability. It is a potential candidate for various technological applications because of its splendid set of properties [1-3].
Ag doped GST bulk alloys and thin films were prepared by melt quenching and thermal evaporation technique respectively. Deposited thin films were annealed at 160 °C and 260 °C temperature. It was found that as deposited GST thin film, annealed at 160 °C and 260 °C has amorphous, face centered cubic (FCC) and hexagonal closed packed (HCP) structures respectively. But at higher Ag content, there was direct HCP phase transition from amorphous to polycrystalline phase. Morphology of all samples was studied using scanning electron microscope (SEM). There was a drastic change in morphology upon phase transition. Optical properties were studied using transmission spectrum. Transmission spectrum of deposited and annealed thin films was taken using UV-VIS-NIR spectrophotometer. Direct HCP phase transition at higher Ag content was also observed from optical properties.
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