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Effect of indium on structural, optical, electrical and photoconductivity of iso-coordinated $\text{In}_x\text{Sb}_{20-x}\text{Ag}_{10}\text{Se}_{70}$ ($0 \leq x \leq 20$) chalcogenide filmsRita Sharma¹, Shaveta Sharma¹, Praveen Kumar², R Thangaraj¹ and M Mian¹¹Guru Nanak Dev University, India²DAV University, India

Many physical properties of chalcogenide systems strongly depend upon the composition and type of impurity added. In this work, structural and optical properties of thermally evaporated $\text{In}_x\text{Sb}_{20-x}\text{Ag}_{10}\text{Se}_{70}$ ($0 \leq x \leq 20$) chalcogenide films were studied. Bulk polycrystalline granules were used for the deposition of thin films. XRD studies reveal the amorphous character of the as-prepared films. FESEM images reveal a change in irregular trend in the morphological structures with composition. The EDS spectra show the composition of the as-prepared films is stoichiometric with the bulk samples. Raman Spectroscopy shows the occurrence of Sb-Se and Sb-Sb bond vibrations for AgSbSe_2 structural units and In-Se bond vibrations in AgInSe_2 structural units. The optical transmittance and reflectance measurements were used to calculate the absorption coefficient and the indirect optical band gap is found to increase with indium content. The change in film morphology and change in the concentration of molecular units have been used to discuss optical properties with the increase in indium content. The electrical properties, by measurements of DC conductivity, intensity dependence of photoconductivity and IV characteristics, have been studied to give up the valuable information about the transport mechanism of the charge carriers and the type of charge carriers in $\text{In}_x\text{Sb}_{20-x}\text{Ag}_{10}\text{Se}_{70}$ ($0 \leq x \leq 20$) thin films.

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