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Structural, optical and photoconductive properties of iso-coordinated $\text{In}_x\text{Sb}_{30-x}\text{Se}_{70}$ chalcogenide filmsShaveta Sharma¹, Rita Sharma, R Thangaraj¹, M Mian¹ and Praveen Kumar²¹Guru Nanak Dev University, India²DAV University, India

In this paper, we report the effect of in-addition on structural, optical and photoconductive properties of thermally evaporated $\text{In}_x\text{Sb}_{30-x}\text{Se}_{70}$ chalcogenide films. The absence of sharp diffraction peaks in XRD pattern reveals the amorphous state and nearly stoichiometric films with the bulk samples was confirmed by EDS spectroscopy. The Raman spectra reveals the formation of chalcogen based Sb and in structural units, while the intensity of two bands at 189 and 252 cm^{-1} due to Sb_2Se_3 structural units fades away with the appearance of new band 212 cm^{-1} with the increase in indium content. The indirect optical band gap and tailing parameter have been calculated from transmittance and reflectance data in spectral range of 200–1100 nm. The results are discussed based on average bond energies in the present system. The study of steady state and transient photocurrent measurement provide important information about carrier generation and recombination phenomena in various semiconducting systems for photo-sensor device applications. The initial rise of photocurrent sharply approaches a steady state value during illumination and fast decay to a constant persistent current after stopping the illumination has been observed. The decay of photocurrent has been fitted with stretched exponential function for different compositions along with at different light intensities. These results are important for the development of low cost photo absorbers for solar cell applications and visible region responsive photo sensor devices.

shaveta.sharma1987@yahoo.com