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Thermal annealing effect of on optical constants of vacuum evaporated $\text{Se}_{75}\text{S}_{25-x}\text{Cd}_x$ chalcogenide thin films

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ABSTRACT

Chalcogenide glasses are interesting materials due to their infrared transmitting properties and photo induced effects exhibited by them. Thin films with thickness of 3000 Å of the glasses $\text{Se}_{75}\text{S}_{25-x}\text{Cd}_x$ with $x=6, 8$ and 10 at% prepared by melt quench technique were evaporated by thermal evaporation onto glass substrates under a vacuum of 10^{-6} Torr. The optical constants (absorption coefficient, refractive index and extinction coefficient) of as-prepared and annealed films have been studied as a function of photon energy in the wave length region 400–1000 nm. Analysis of the optical absorption data shows that the rule of non-direct transitions predominates. It has been found that the absorption coefficient and optical band gap increase with increasing annealing temperatures. The refractive index (n) and the extinction coefficient (k) were observed to decrease with increasing annealing temperature.

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