

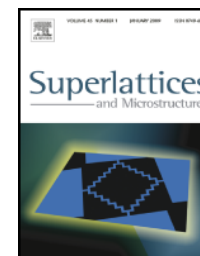


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Optical characterization of nanocrystalline $\text{Se}_{85}\text{Te}_{10}\text{Pb}_5$ and $\text{Se}_{80}\text{Te}_{10}\text{Pb}_{10}$ chalcogenides

Shamshad A. Khan*, F.A. Al-Agel, A.A. Al-Ghamdi

Department of Physics, Faculty of Science, King Abdul Aziz University, Jeddah-21589, Saudi Arabia

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ABSTRACT

Measurements of optical constants have been made on alloyed samples of Se and Te with Pb prepared under vacuum by diffusion methods. The polycrystalline $\text{Se}_{85}\text{Te}_{10}\text{Pb}_5$ and $\text{Se}_{80}\text{Te}_{10}\text{Pb}_{10}$ chalcogenides were used as a starting material for the milling process. The milled materials were characterized by TEM and optical measurements in a wavelength region of 400–1000 nm. The experimental result shows that the optical absorption follows the rules of direct transition. TEM measurements showed that after 60 h of milling, nanoparticles with a typical diameter of about 5 to 20 nm were developed. The optical band gap and optical constants of the milled materials in thin film form have been studied as a function of photon energy. It has been observed that the absorption coefficient, optical band gap and extinction coefficient increases while the refractive index decreases with an increase in milling time. The results have been analyzed on the basis of milling time.

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