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# Characterization of $Se_{88}Te_{12}$ nanostructured chalcogenide prepared by ball milling

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ABSTRACT

The present work deals with the structural and optical studies of $Se_{88}Te_{12}$ chalcogenide nanoparticles prepared by ball milling. Polycrystalline $Se_{88}Te_{12}$ chalcogenide prepared by melt quenching was used as a starting material. The ball milling was performed in a Laboratory 8000 M-Mixer/Mill (SPEX) mill using hardened steel balls and a vial with a ball-to-powder weight ratio of 10:1. After various times of milling, a small amount of material was taken from the container to be characterized by Transmission Electron Microscopy and optical measurements in thin film form within the wavelength region 400–1000 nm. Optical absorption measurements indicate that the absorption mechanism is due to direct transition. It has been observed that the optical band gap increases with the increase of milling time. The results are interpreted in terms of the change in concentration of localized states due to the shift in Fermi level.