Impact of Zn content on structural, optical, and electrical properties of PVA capped Cd1-xZnxS thin films

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**Abstract.** In this study, PVA/Cd1-xZnxS nanocrystalline thin films have been grown within polyvinyl alcohol (PVA) polymer matrix on the glass substrates at different solute ratios of Cd:Zn using the ammonia free chemical bath deposition (CBD) method. XRD, HRTEM, and SAED pattern studies evidence the hexagonal phase structure of PVA/Cd1-xZnxS films. SEM images of all the film samples reveal the spherical grains were appearing almost more or less all over the entire surface of the polymer matrix. The presence of different functional groups along with main characteristics bonds between Cd-S and Zn-S was confirmed by FTIR analysis. Optical studies show the prominent blue shift in band gap energy (Eg) with the increased Zn content. The increment of Zn content in Cd:Zn solute ratios has led to enhancing the transmittance as well as the band gap energy. The electrical conductivity of the films at room temperature is of the order of 10-5 (Ωcm)-1.

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