

Abstract 2 – Paper ID: 029**Structural, Morphological and Optical characterization of Nanocrystalline PbSe thin films prepared at different molarity by CBD**

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Abstract

Nanocrystalline Lead selenide (PbSe) thin films are successfully synthesized by the simple chemical bath deposition (CBD) method at different molarities (0.2 M, 0.4 M, 0.6 M, and 0.8 M) by keeping the constant pH value 11.5 and deposition bath temperature 333K. The deposited PbSe thin films on the bare glass substrates are characterized by using X-ray diffraction (XRD), Scanning electron microscopy (SEM), energy-dispersive X-ray analysis (EDAX), and Raman spectroscopy. XRD analysis confirmed the deposited films are polycrystalline nature with cubic structure. The estimated crystallite sizes are found in between 15.5 nm to 24.5 nm. The crystallite size increases with increase in molarity whereas the microstrain and dislocation density decreased systematically, which indicates the improvement of crystal quality at higher molarity. The crystallite sizes which are calculated from the Monshi–Scherrer method [1] and different Williamson–Hall (W–H) models [2] such as UDM, USDM, and UDEDM are in good inter-correlation with TEM results. The SEM micrographs show without any voids and pin holes. EDAX analysis confirms the presence of Pb and Se in the prepared films. Raman studies further signifying better crystallization quality at higher molarities. The overall findings demonstrates that the structural characteristics of PbSe thin films are strongly dependence on the concentration of the precursor solution.

Keywords: Nanocrystalline, Thin film, CBD, X-ray diffraction, SEM, EDAX