

OPTIMIZATION OF THE SYNTHESIS FOR PbSSe NANOSTRUCTURE FILM THIN USING THE CHEMICAL BATH DEPOSITION

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In the deposition chemical bath synthesis method, the preparation parameters have an important role that determines the final nature of the product formed. There are several factors that affect the structural properties. In this study two parameters have been chosen: the temperature and the time of deposition. The variation of the temperature was between 40-60°C and the range of the time used was between 60 to 240 minutes. The nanostructure film thin were characterized by X-ray Diffraction, UV-Visible Spectroscopy, Scanning Electronic Microscopy and electric properties by Photoresponse measurements. The PbSSe films have a cubic structure with preferred orientation in plane (200). The crystal size was estimated by X-ray diffraction. It has been observed that the temperature during the chemical bath deposition is decisive in the optimal morphology properties of the thin film. The crystal size increases as a function of the temperature within an range size of 15 to 30 nm. The band gap does not change significantly with values of 5.6 to 5.98 eV as temperature function. The I-V measurement under dark and bright conditions indicate very low resistance for nanofilms with the largest crystal size, 30 nm. The exceptional behavior in the photoresponse, makes this material an ideal material for the constructions of a solar cells devices.