

Structural and optical properties of nanocrystalline lead sulfide thin films prepared by microwave-assisted chemical bath deposition

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Abstract

Nanocrystalline PbS thin films have been successfully deposited on glass substrate from lead nitrate (Pb^{2+} ions) and thiourea (S^{2-} ions) precursors using MACB technique. The effects of molar concentration (0.02, 0.05, 0.075 and 0.1 M) on the structure and microstructure evolution were studied using X-ray diffraction (XRD), scanning electron microscopy, and atomic force microscopy. The optical properties were investigated using UV–vis spectrophotometer. Crystal size values obtained from XRD were compared with these calculated using atomic force microscopy (AFM). The values of optical band gaps were found to decrease as the ion source molar concentration increase.

Keywords

Thin films ;Chemical synthesis; Atomic force microscopy ;X-ray diffraction; Optical propertie