

Structural and Optoelectronic Properties of Monovalent Cation Doping PbS Thin Films

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Abstract : Nanocrystalline Li-doped PbS thin films have been deposited by chemical bath deposition technique. The goal of this work is to study the modification of the optoelectronic and structural properties of Lithium incorporation. The increase of Li doping in PbS thin films leads to an increase of band gap in the range of 1.4-2.3, consequently, quantum size effect becomes pronounced in the Li-doped PbS films, which lead to a significant enhancement in the optical band gap. Doping shows influence in the film growth and results in a reduction of crystallite size from 30 to 14 nm. The refractive index was calculated and a relationship with dielectric constant was investigated. The dc conductivities of Li-doped and undoped samples were measured in the temperature range 290-340K, the conductivity increase with increase of Lithium content in the PbS films.

Keywords : doping, quantum confinement, optical band gap, PbS

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