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Growth of Er³⁺-doped PbS nanocrystals by chemical bath

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Abstract: The growth of Er³⁺-doped PbS thin films and the changes of structural, morphological, electrical and some optical properties were examined. The thicknesses of these films were found in the ~200-350 nm range. The morphological properties of the nanocrystals were analyzed using Atomic Force Microscopy (AFM). FTIR spectra showed strong sharp absorption located at ~1447 cm⁻¹ associated with the asymmetric stretching vibrations assigned to the bending out-plane vibrations of CO₃²⁻ ions. X-ray diffraction displayed a cubic phase in all films and grain size (GS) was ~6.5 nm for PbS, whereas for doped nanocrystals was ~5.1 nm. Absorption bands located at ~371nm (~3.3 eV), ~385 nm (~3.2 eV), 406 nm (~3.0 eV), ~608 nm (~2.0 eV), ~619 nm (~2.03 eV), ~640 nm (~1.9 eV), and another intense band located at ~682 nm (~1.8 eV) were observed. An optical absorption band located at ~371nm (~3.3 eV) was observed in doped films, corresponding

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