

SYNTHESIS AND STRUCTURAL CHARACTERIZATION OF SOL-GEL DEPOSITED FLUORINE DOPED NANOCRYSTALLINE CdS THIN FILMS

ADEL H. OMRAN ALKHAYATT, GHOFRAN MOHAMMED HUSSEIN AL-HADDAD

Physics Department, Faculty of Science, Kufa University, Najaf, Iraq

ABSTRACT

In this study, pure and Fluorine (5,10 and 15 wt%) doped CdS thin films were prepared on glass substrate by sol-gel spin coating method dried at temperature 250 °C for 15 min. and annealed at temperature 450 °C for 2h. Structural properties, surface morphology of CdS and CdS: F thin films have been investigated with respect to the doping process. The X-ray diffraction (XRD) results point to that the structure of all prepared thin films are polycrystalline in nature and has a Hexagonal (Wurtzite) phase, CdS and CdO cubic phases was found related to annealing temperature and air ambient. The average grain size of CdS film was 53.4 nm and increases as fluorine dopant concentration increase with maximum value of 97.3 nm for CdS:F (15wt%) so the pure and doped films have nanocrystalline structure. The introducing of fluorine does not affect the structural properties of the films. The Scanning Electron Microscopy (SEM) image for CdS and CdS:F thin films shows that smooth, uniform morphology and plated regularly. The stoichiometry of CdS:F prepared films confirmed by the energy dispersion x-ray spectroscopy (EDX) spectra. Consequences of atomic force microscope (AFM) images for CdS and CdS:F thin films displayed smooth surface texture.

KEYWORDS: X-Ray Diffraction (XRD), X-Ray Spectroscopy (EDX), Atomic Force Microscope (AFM), CdS and CdS:F Thin Films