

Effect Cd doping on the structural and optical properties of ZnO Thin Films

ZnO thin films with Cd/Zn nominal ratios of 0%, 1%, 3%, 5%, and 7% and thickness of 0.7 μm were prepared by chemical spray pyrolysis. X-ray diffraction patterns showed that the films have polycrystalline structures and peaks matching the hexagonal ZnO structure. Crystallite sizes ranged from about 35 nm to 87 nm. As the doping concentration increased, full width at half maximum values decreased and crystallite sizes increased. The UV-Vis spectra of the ZnO: Cd films showed high transparency in the visible region. The optical band gap of the ZnO: Cd films decreased from 3.255 eV to 3.17 eV with increasing Cd doping concentration. The transition type was direct, thereby allowing transition. The ZnO: Cd thin films were annealed at 400 C, and annealing treatment showed improvements in the properties of the derived films.