Nanocrystalline CdS: In thin films prepared by the spray-pyrolysis technique

Nanocrystalline CdS:In thin films were produced by the spray pyrolysis technique (SP) on glass substrates. The films were characterized by investigating their X-ray diffractograms (XRD), scanning electron microscope images (SEM), energy dispersive analysis by using X-rays (EDAX), transmittance curves and photoluminescence (PL) spectra. The absorbance was deduced from the transmittance measurements and then it was used to estimate the optical bandgap energies. This was done by plotting the first derivative of the absorbance against wavelength of the radiation, where the positions of the minima in this curve refer to the values of the optical bandgap energy. The size of the nanocrystallites was estimated from XRD diffractograms then from the hyperbolic band model using the estimated bandgap energies. Fine-structured PL spectra confirmed the nanocrystalline nature of the films.