Gallium-doped zinc oxide (Ga:ZnO) thin films were deposited onto quartz substrates by ultrasonic spray pyrolysis technique. Structural and optical properties were investigated by means of scanning electron microscopy (SEM), x ray diffraction (XRD) and photoluminescence (PL) methods. The effect of the variation of Ga doping 0.5% to 3% with steps of 0.5% on the optical properties was examined.

SEM study has confirmed the nanocrystal (NC) structure of ZnO:Ga films. X ray diffraction study has confirmed that the NCs have the wurtzite crystal lattice. PL study reveals the enhanced intensity of near band edge (NBE) emission in the spectral range of 2.9 - 3.2 eV that indicates an improvement in crystallinity at the Ga incorporation for the concentration at 2%. Defect related bands were not present in Ga doped films, suggesting a continuous reduction in defect concentrations. Simultaneously, the NBE peak positions shifted 3.06 to 3.2 eV when the Ga concentration varying undoped crystals to 2% in ZnO:Ga NCs. The variations versus Ga doping the X ray diffraction diagrams and PL spectra measured at 300 K have been analyzed and discussed.

**Keywords:** Ga-doped ZnO films, spray pyrolysis, luminescence

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