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Abstract

In this work, we have studied the effect of aluminium dopant precursor type and doping concentration on the structural, morphological, optical and electrical properties of Al and In co-doped zinc oxide (AIZO) thin films deposited by ultrasonic spray pyrolysis. Zinc acetate dihydrate and indium acetate were used as zinc and indium precursors, respectively. Aluminium chloride and aluminium sulphate were used as aluminium precursors. The doping concentrations of Al (1 to 3at%) and In (1 to 3at%), were varied equally and the physical properties were analyzed. X-ray diffraction examinations confirmed that AIZO films were poly crystalline and grown as a hexagonal wurtzite structure. Scanning electron microscopy observations revealed that thin films were grown with different types of hexagonal nanostructures. From the optical and electrical measurements, the figure of merit was estimated. The values were $4.09 \times 10^{-3}/\Omega$ and $0.75 \times 10^{-3}/\Omega$ for the AIZO thin films deposited using aluminium chloride and aluminium sulphate respectively.