**Transparent and conductive In doped zinc oxide (IZO) thin films deposited from different zinc precursors by the ultrasonic chemical spray technique**

M. de la L. Olvera, L.M. Balcazar-Villatoro

*Center for Research and Advanced Studies, Cinvestav, Electrical Engineering Department‑Solid State Electronics Section, Mexico City 07360, Mexico*

Indium doped zinc oxide (IZO) thin films were deposited onto soda-lime glass substrates by the ultrasonic chemical spray (USP) technique. The influence of different Zn precursors (zinc acetate, AcZn, zinc sulfate, SZn, and zinc chloride, CZn), used in the preparation of the starting solutions, on the structural, optimal, morphological and electrical characteristics was analyzed. Starting solutions were prepared with a molar concentration of 0.2M and an atomic concentration of In of 3 at%. The deposition conditions were kept constant, with a substrate temperature of 450 °C and a deposition time of 12 min. From the structural analysis, a preferential orientation along the (101) plane was observed for all IZO films. The optical transmission oscillated in the range of 61-81 %, confirming the transparency of all deposited films. The bandgap values, Eg, around 3.5 eV, showed slight variations with the different types of Zn precursor employed. The films were designed for being employed as Transparent Conductive Oxide (TCO) films, in this respect, the best figure of merit or quality factor for TCO applications were obtained in the IZO films doped with 3 at% of In in the starting solution, with a value of 2.49x10-3 (Ω/□)-1, calculated from an optical transmission of 81 % and a sheet resistance of 50 Ω/□. According to the results obtained, IZO thin films deposited by USP technique are potentially applicable in the field of optoelectronics, mainly as transparent electrode.

Keywords: Zinc oxide, thin films, ultrasonic chemical spray, TCO.

Presenting author: molvera@cinvestav.mx