Structural study of Al-doped ZnO thin films produced by the sol-gel technique

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Abstract: In this work we studied the effect of aluminum doping concentration on the structural properties of zinc oxidethin films, we deposited samples of ZnO and aluminum doped ZnO with a doping rate of 1, 2, 3, 4 and 5%, on glass substrates by the spin coating technique. The structural characterization of the samples is done by the XRD and SEM techniques, the XRD spectra show that the layers are polycrystalline with a hexagonal wurtzite structure, and a preferred orientation in the plane (002), and for the doping 5% the structure is almost monocristalline (002). SEM images are used to confirm grain sizes and surface conditions. Optical characterization is done by UV-visible spectroscopy, gives a good visible transmittance up to 80% and exceeds 90% for 2% doping, and the gap varies with the doping variation with a small gap for the same doping (2%)

Keywords: Thin films, spin coater, ZnO / Al, XRD, SEM, UV-visible