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Optical and magnetic properties of $Zn_{1-x}Co_xO$ and $ZnCo_2O_4$ thin films. K. SAMANTA, P. BHATTACHARYA, R.S. KATIYAR, University of Puerto Rico, PR, W. IWAMOTO, R.R. URBANO, C.P. PAGLIUSO, C. RETTORI, Instituto de Fisica Unicamp, Campinos, Brazil, UPR TEAM, CAMPINO BRAZIL TEAM — The transition metal doped wide bandgap ZnO are considered possible candidates for room temperature ferromagnetic semiconductor for spintronic devices. Thin films of Co substituted ZnO and $ZnCo_2O_4$ were deposited using pulsed laser deposition on c-axis (0001) oriented Al_2O_3 substrates. The XRD results showed all the films were highly (002) oriented with a less intense peak of (311) for $ZnCo_2O_4$ thin film. Micro-Raman spectra of ceramic targets showed the modes related to wurtzite ZnO and spinel $ZnCo_2O_4$ structure. In thin films of $Zn_{1-x}Co_xO$ no such modes related to $ZnCo_2O_4$ were detected. The intensity of E_1(LO) and multiphonon peaks at 540 and 584 cm^{-1}, respectively, increased with increase in the Co substitution. The optical absorption of the films showed that the band gap decreased with the increase of Co concentrations at room temperature along with the sub-bandgap absorption due to $d-d$ transitions of Co^{2+}. Similar sub-bandgap $d-d$ transition was also observed in absorption spectra $ZnCo_2O_4$ thin film.

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