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**Ferromagnetism in Transparent ZnO:xCu Sputter Deposited Thin Films** CHANDRAN SUDAKAR, R. NAIK, Wayne State University, Detroit, G. MOHAN RAO, ISU, IISc, Bangalore, India, V.M. NAIK, University of Michigan-Dearborn, K.V. RAO, Tmfy-MSE, KTH, Stockholm, Sweden — Currently, detailed understanding on the intrinsic or extrinsic nature of the diluted magnetic oxides when doped with cations (magnetic or nonmagnetic) is an intricate issue. We report a systematic study of ferromagnetism (FM) above room temperature in transparent ZnO:xCu ( $x$  in at.%) films deposited by reactive magnetron sputtering.  $\text{Cu}^{2+}$  ions are found to be in wurtzite structure for  $x < 3$ , whereas CuO phase is deciphered for  $x > 3$ , and located within the ZnO lattice with the associated stacking faults or at grain boundary regions. An anomalous large magnetic moment ( $M$ ) of  $\approx 1.76 \pm 0.2 \mu_B/\text{Cu}$  is observed for  $x \approx 0.6$ .  $M$  decreases drastically ( $\ll 0.4 \mu_B/\text{Cu}$ ) for  $x > 1$  due to increased Cu-O-Cu anti-FM interactions. Micro-Raman spectral studies reveal plausible Cu-O clusters of few Å in ZnO lattice giving rise to anomalous high  $M$  even at low concentrations ( $x < 1$ ) in ZnO lattice. Detailed discussion will be presented on related results.

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