Hydrogen sulfide sensor based on cupric oxide thin films

In this work, thin films of copper oxide (CuO) doped with different concentration of samarium oxide (Sm_2O_3) have been prepared using spray pyrolysis technique with optimum temperature of 325 °C. Structural, optical and gas sensor behaviors of CuO:Sm_2O_3 nano films for Hydrogen sulfide (H_2S) gas were studied. XRD analysis of high dopant concentration, more than 5%, revealed a mixed phase of monoclinic and cubic symmetry of CuO and SmO structure respectively, with two most preferred orientations along (11-1) and (111) planes. Optical properties reveal high transparency in the range of visible region. Energy gap varied from 2.2 eV to 2.28 eV by increasing dopant concentration. Sensing results determined that, the best doping ratio with Sm_2O_3 was 3% to achieve fast response sensor.