
Effect of electron beam irradiation on NH₃ sensing characteristics of Cu-WO₃ films

Anusha¹, Poornesh P^{1*}

¹*Department of Physics, Manipal Institute of Technology, Manipal Academy of Higher Education, Manipal, Karnataka, 576104, INDIA*

^{1*}*Department of Physics, Manipal Institute of Technology, Manipal Academy of Higher Education, Manipal, Karnataka, 576104, INDIA*

Presenting author mail-id: anushabhat1230@gmail.com

Abstract

Copper doped tungsten oxide (Cu- WO₃) films were synthesized by spray pyrolysis technique and subjected to Electron Beam Irradiation (EBI). Several investigations involving the characterization of materials and testing for Ammonia (NH₃) sensing were carried out to examine the effects of EBI. From X-ray Diffraction (XRD), the monoclinic phase of the films was confirmed with the prominent orientation along the (200) plane. The photoluminescence (PL) emission at different wavelengths was assigned to defects like oxygen vacancies, interstitials, localized defects, etc. X-ray Photoelectron Spectroscopy (XPS) confirmed the presence of oxygen vacancy and adsorbed oxygen species in the irradiated Cu- WO₃ film. Ammonia (NH₃) sensing measurements of the films were carried out at an optimum working temperature of 200°C. The Cu-WO₃ film irradiated with 15 kGy presented the better sensor response among other samples with the response and recovery times as low as 51s and 54s, respectively at 5 ppm NH₃ concentration.

Keywords: Cu-WO₃; NH₃ sensing; EBI.
