



## PREPARATION AND CHARACTERIZATION OF ZIRCONIA BASED THICK FILM RESISTOR AS A AMMONIA GAS SENSOR

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Submitted: July 5, 2012

Accepted: Aug. 23, 2012

Published: Sep. 1, 2012

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*Abstract - Thick film technique is popular because of low cost, simple for construction and better sensing surface area, hence for resistive gas sensor thick films of pure  $ZrO_2$  powder were prepared by Standard screen printing technique. The material was characterized by X-Ray diffraction pattern, surface morphology was observed by SEM, elemental composition were observed by EDAX and optical properties were studied with UV spectroscopy Techniques, electrical properties were studying with different applied voltages and at different working temperature. X-Ray Diffraction studies confirmed that the combinations of tetragonal and monoclinic structure. The energy band gap and the thicknesses of the films were evaluated, the crystalline grain size was determined using Scherrer's formula. The gas sensing performances of various gases were tested with working temperatures from 100° to 500°c. The sensitivity and selectivity to different gases was tested and the resistive thick films showed highest response to  $NH_3$*

*(100 ppm) at 300°C. It was observed that increase in gas concentration its sensing response goes on increasing but slowly increase being still constant for higher concentration. The sensitivity and selectivity may be further enhanced by doping other element and ZrO<sub>2</sub> can be stabilize by mixing other oxides. The quick response and fast recovery time was recorded.*

**Index terms:** ZrO<sub>2</sub> thick film; Screen printing technique; NH<sub>3</sub> sensors; high sensitivity; fast response and recovery time.