

# Abstract

**Iman Gamal Morsi**

## **Synthesis of Nano Gas Sensor Arrays**

The paper presents novel structures of Nano gas sensor arrays by using ZnO doped with aluminum. ZnO Nanomaterial are successfully prepared using sol-gel technique. These include, similar and dissimilar structures. All used sensors are composed of zinc oxide doped with aluminum at different concentrations for dissimilar structures, with the same concentration for similar structures. The first array (double sensor array) based on doping with percentages of 5% and 1%, while the second array (quadrature sensor array) uses 5% doping only. The resulting Nano array characterization is carried out using the scanning electron microscopy (SEM). This characterization determines the structure of the Nano element (dot, rod wire). This is followed by the X-Ray Diffraction (XRD) characterization which indicates the purity and intensity of the Nano element within the structure. The electrical characteristic of the sensor is determined by measuring the two terminal sensor's resistance at different concentrations of the gas, for different temperature ranges. More than order of magnitude change in the resistance is found to occur in response more than 100% change in temperature for different doping concentration, which indicates that arraying results in a more than unity array factor. This is a good measure for pollution in industrial applications.