



EFFECT OF ANNEALING ON GAS SENSING PERFORMANCE OF NANOSTRUCTURED ZnO THICK FILM RESISTORS

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Abstract- ZnO nano-particles have been synthesized by simple chemical route using a starting solution consisting of zinc acetate and citric acid as a surfactant agent. The structural properties of the prepared ZnO nano-particles annealed at different temperatures have been characterized by X-ray diffraction (XRD) and transmission electron microscopy (TEM) analyses. The XRD patterns show ZnO-wurtzite phase in the nano-powders, and size of crystals increases by increasing the annealing temperatures. The TEM images show nano-particles as clusters with size in the range of 10-20 nm. Electron diffraction pattern of nano-powders annealed at 900°C temperature shows a well distribution of spherical particles due to the effect of citric acid as surfactant in chemical process. Thick films prepared by screen printing technique from zinc oxide nano-powders annealed at different temperatures (500–900 °C), characterized by SEM analysis and tested for various gases. The film prepared from ZnO powder annealed at 700°C shows the higher sensitivity to H₂S gas for 10 ppm gas concentration.

Index terms: ZnO nano-particles, annealing, TEM, thick films, gas sensor.