
ZnO Gas Sensor Prepared by Plasma Based Ion Implantation

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Abstract

Zinc oxide is a semiconductor material which presents many interesting characteristics to electronic industry and in particular as gas sensor. This work shows the electrical resistance variance of ZnO films grown on glass substrate by Plasma Immersion Ion Implantation and Deposition (PIII&D), in the presence of the gases N₂, NO₂ and CH₄, respectively. In the process, metallic zinc is initially implanted and deposited into/onto the surface of the glass (10kV/20μs/250Hz). A post-oxidation is performed afterwards in a rich oxygen atmosphere for 1 hour, at 700 °C. After treatment, the samples were characterized by X-ray diffraction (XRD) in the mode of thin films, Scanning Electron Microscopy (SEM), Atomic Force Microscopy (AFM), Optical Profilometry and Optical Transmittance. Electrical resistance measurements were performed taken into account the variation of the substrate temperature. The sensitivity of the measurements was correlated with the surface morphology.

Keywords: Zinc Oxide, Semiconductor, Gas Sensor

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