

Multi-Walled Carbon Nanotubes Film Sensor for Carbon Mono-Oxide Gas

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Abstract: This paper reports the fabrication of a carbon nanotubes based carbon mono-oxide gas sensor. Initially, iron catalyzed carbon nanotubes were grown on silicon oxide grown silicon substrate using low pressure chemical vapor deposition. Morphology and microstructure of these CNTs were studied by field emission scanning electron microscopy (FESEM) and high resolution transmission electron microscopy (HRTEM). Morphological analysis shows the formation of multi-walled carbon nanotubes (MWCTs) with an average diameter of 30 nm. Typical response of MWCNTs gas sensor in the presence of CO gas has been studied. It was observed that this MWNTs gas sensor gives a quick response to CO gas and the recovery time of this sensor is also fast. The sensitivity of this sensor was found to decrease with an increase in the CO gas concentration. At a particular gas concentration, the responsiveness of this sensor increases with the increase in temperature. Electrical transport properties of this MWNTs film sensor have also been explained on the basis of temperature dependence of conductivity. On the basis these properties, it is suggested that this MWNTs-based gas sensor has potential to be used as a novel CO gas sensor.

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