

The effect of CH₄ and CO₂ exposure on carbon nanotubes electrical resistance

ABSTRACT

This research was carried out to monitor and investigate the gas sensing effects on carbon nanotubes (CNTs) by a systematic study of the variations in the electrical resistance as sensor signal induced by adsorption of CO₂ and CH₄ gaseous molecules. The CNTs were synthesized by Floating Catalyst Chemical Vapor Deposition (FC-CVD) method on quartz substrate under benzene bubble at temperature of 700°C. Then, they were tested for gas sensing applications operating at room temperature. Upon exposure to gaseous molecules, the electrical resistance of CNTs dramatically increased for both CO₂ and CH₄ gases with short response time and high sensitivity. It was also observed that the CNTs device behaves as a p-type semiconductor when exposed to gaseous molecules. In addition, the recovery of the sensors and mechanism of gas sensing procedure are discussed.

Keyword: Carbon nanotubes; Chemical vapor deposition; Gas sensor; Quartz substrate