

CH₄ and CO₂ detection by using carbon nanotube-based sensors

ABSTRACT

This research was carried out to investigate the effect of gas adsorption towards the electrical resistance of carbon nanotubes (CNTs) thin film. CNTs were synthesized by Floating Catalyst Chemical Vapor Deposition (FC-CVD) method on quartz substrate at 950°C under methane gas flow rate of 150 Standard Cubic Centimeters per Minute (SCCM). Then, the electrical resistance of CNTs was measured by exposing the sensors to CO₂ and CH₄ gases operating at room temperature. The sensors showed high responses to the gaseous molecules. In the same experimental conditions, the recovery of the sensors was different for CO₂ and CH₄. It was also observed that the CNTs device behaves as a p-type semiconductor when exposed to gaseous molecules. The fabrication process was relatively simple and did not require special techniques.

Keyword: Carbon nanotubes; Chemical vapor deposition; Electrical resistance; Gas exposure; Quartz substrate