

Room temperature multi gas detection using carbon nanotubes

ABSTRACT

Gas detection and monitoring are important aspect since it creates an immediate and long term health risk to personnel involved, whether it is in industrial, medical or commercial applications. Conventional metal oxide gas sensors lack flexibility with poor response times and are operated at elevated temperature (200-500°C), which implies that power is required. Nanomaterials offer tremendous opportunities for improved sensor devices due to their smaller size, low power consumption, higher performance, and cheaper than conventional sensors. Carbon nanotubes possess very unique characteristics due to their hollow center, nanometer size and large surface area, and are able to change their electrical resistance drastically when exposed to alkalis, halogens and other gases at room temperature. Hence, carbon nanotubes have the potential to be a better chemical sensor. This study is carried out to investigate the potential application of carbon nanotubes as a gas sensor by measuring the change of electrical resistance of the carbon nanotubes upon gas absorption. The gases used in this study were carbon dioxide (CO₂), acetylene (C₂H₂), ammonia (NH₃), natural gas (95% methane, CH₄) and hydrogen (H₂). Gas sensing properties of carbon nanotube was study; the presence of gas is detected by changing of its electrical resistivity.

Keyword: Carbon nanotubes; CVD; Gas sensor.