## Nanoscaled-carbon hybrids for gas and organic vapor detection

Overview

Research activities in area of chemiresistors used in gas sensing is rising due to the demand for cost effective, fast response and sensitive sensors which are vital in detecting hazardous and harmful gases such as greenhouse gases, organic vapor and other gases produced by combustion of fossil fuels, power plants and automobiles etc. In such needs, nanoparticles serve as building blocks as they have very high aspect ratio combined with large surface area which is favourable for adsorption of gaseous analytes over them. Particularly, the advent of nanoscaled-carbon fuelled the invention of gas sensors that exploit unique geometry (tubular, spherical and sheet-like) and material properties. The electrical conductivity of nanocarbon (carbon nanotubes, carbon onion and graphene) is much higher in comparison with metal oxides and sulphides. The formation of heterojunctions (p-n) in nanocarbon-metal oxide/sulfide or conducting polymer hybrid lead to enhanced gas sensitivity of such hybridized gas sensor as the decrease in work function of the metal oxide/sulphide sensitive layer lead to improvement in performance of chemiresistor at low operating temperatures.
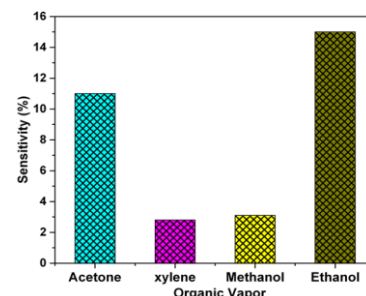
Key Features

- n-type metal oxide-anchored nanocarbon hybrids
- Surface modified carbon nanomaterials for gas selectivity
- Various kinds of metal oxides with tuneable bandgap
- Facile route to coat metal oxide on carbon nanomaterials
- Fast sensing characteristics
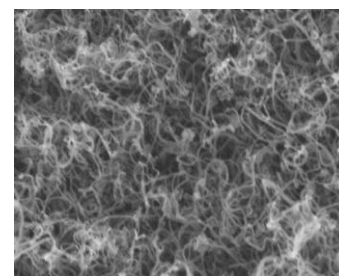
SEM micrograph of carbon nanotube-metal oxide hybrid

Potential Applications

- Gas sensing
- Organic vapor detection
- Automobile exhaust analysis
- Environment diagnosis
- Coal mine area monitoring
- Drainage lines monitoring

Intellectual Property Development Indices (IPDI)

- Preparation metal oxide anchored carbon nanomaterials
- Organic vapor sensing characteristics evaluated
- Development of sensor to detect organic vapor is underway

Sensitivity characteristics of carbon nanotube-metal oxide hybrid

Status	1	2	3	4	5	6	7	8	9	10