Graphene/ZnO nanorods for H2 sensing

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Abstract

Much attention has, and is, being paid to the sensing of hydrogen, largely due to its potential for use as a clean source of energy. Hydrogen burns cleanly, requires no fuel processor in fuel cells, and is producible from renewable energy resources, e.g. electricity from solar cells. It is the most attractive future energy source. One-dimensional (1D) nanostructures in the form of nano wires, nanorods, nanotubes have recently been attracting considerable attention for sensors and catalysts due to their high surface-to-volume ratio. Zinc oxide (ZnO), one of the earliest discovered, has been the most extensively applied oxide gas sensing material due to its high mobility of conduction electrons. Particularly ZnO in the form of nanorods is of growing importance because of its high sensitivity. In another hand Graphene is a 2-dimensional allotrope of carbon that has a chicken wire type structure. This exciting zero gap semiconductor has shown some very interesting properties such as room temperature ballistic conductance, high carrier mobility exceeding 200,000 cm²V⁻¹S⁻¹, amipolar field effect properties and room temperature quantum hall effect as well as the potential for individual gas molecule detection.

In this work, we associated graphene and ZnO electronic properties to produce a smart sensor for large area detection.

Key board: Graphene, ZnO, H2, sensor