Investigation on hydrogen sensing property of MWCNT/Pani nanocomposite films

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Abstract

Hydrogen sensing property of composite films of camphorsulfonic acid-protonated polyaniline (Pani) with different amounts of multiwall carbon nanotube (MWCNT) was investigated in this paper. The MWCNT/Pani composite films were deposited by a spin-coating method on both ITO and Au-interdigitated electrodes (Au-IDE) substrates. Sensor film characteristics were evaluated by monitoring the change in electrical resistance in the presence of hydrogen at room temperature. It was observed that all MWCNT/Pani composite films showed the better sensor indicators such as sensitivity, response and recovery times in comparison with pure Pani. It was found that sensor indicators were improved by increasing the MWCNT filler concentration in composite. Moreover, it was observed that Au-IDE substrate drastically increased sensor sensitivity in comparison with uniform ITO-coated glass at 4 wt% MWCNTs exposed to 0.4 vol% H₂ in the air.

Keywords: Polyaniline, Carbon nanotube, Nanocomposite, Hydrogen, Gas sensor.