عنوان مقاله:

Fabrication and investigation of ZnO-MWCNT nanocomposite sensor for detection of ammonia gas at room temperature

محل انتشار:

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خلاصه مقاله:

In this study, ZnO-MWCNT nanocomposites prepared with in-situ method inclusive magnetron sputtering and spray pyrolysis. The structural properties of ZnO-MWCNT were studied by XRD spectroscopy, FESEM and EDX images. These studies showed that the nanotubes filled the porous space between the ZnO nanoparticles. Also they make the surface of the layer very rough, which increases the surface area of the gas sensing area. Sensor experiments were studied for different concentrations of CH4 and CO at 300 °C and for ammonia gas at room temperature. results indicated that the sensitivity of ZnO-MWCNT sensor to NH3 gas was higher and stable than CH4 and CO. Therefore it can be claimed that the MWCNTs have improved the sensing properties of the ZnO layers in order to detecting NH3 gas. We discused the various causes of ZnO-MWCNT sensor behavior against ammonia gas. The results suggest that ZnO molecules form a p-n junction with MWCNT, which improves the sensitivity properties of the ZnO sensor. On the other hand, NH3 gas is a corrosive gas that damages the sensitive layer of the metal oxide sensors. Therefore, multi-walled carbon nanotubes can increase the reversibility and lifetime of the ZnO nanosensor against NH3 due to its high stability.

کلمات کلیدی:

Nanosensor, Multi walled Carbon Nanotube, Zinc Oxide, Nanocomposite, Ammonia