

Highly porous NiO nanoflower-based humidity sensor grown on seedless glass substrate via one-step simplistic immersion method

ABSTRACT

A highly porous nickel oxide (NiO) nanoflower was deposited directly onto glass substrates by the simplistic immersion method. The nanostructural property of the NiO was studied by X-ray diffraction pattern and obtained high crystal quality after annealing at 500 °C with an average crystallite size of 15.5 nm. The optical characterization was measured by ultraviolet-visible spectroscopy, with an average transmittance of 58 %. The value of 3.63 eV was estimated and confirmed as NiO bandgap energy. The current-voltage measurement result indicates that the NiO nanoflower has good electrical properties with resistance, resistivity, and conductivity value of 2.31 M Ω , 2.12 Ω .cm, and 4.71 $\times 10^{-1}$ S.cm $^{-1}$, respectively. The NiO is capable of performing satisfactorily as humidity sensor with a sensitivity of 138 with the response and recovery time were estimated at 389 s and 172 s, respectively. Besides, this sensor has stability at a humidity level of 40-90% relative humidity.