

Synthesis and Acetylene Sensing Properties of Zinc Oxide Nanostructure-Gold Nanoparticles Composites

In this work, acetylene sensing property of zinc oxide (ZnO) nanostructures-gold nanoparticles (Au NPs) composites were investigated and compared to ZnO nanostructures. Firstly, ZnO nanostructures were prepared by thermal oxidation of zinc films at oxidation temperature of 700°C for 5 hours. Au NPs were then assembled onto the surface of ZnO nanostructures via photoreduction of 1×10^{-4} M HAuCl₄ solution with deposition time 10, 20, and 30 minutes. The morphology of ZnO nanostructures were comprised of nanowires branched into their ZnO bases. Diameter of ZnO wires were measured approximately 200 nm. After photodeposition, Au NPs were assembled onto their ZnO nanowire and ZnO base with diameter less than 50 nm. In addition, an amount of Au that to be load onto ZnO increased with increasing of deposition time. Finally, ZnO nanostructures and ZnO nanostructures-Au NPs composites were applied as acetylene gas sensors. Therefore, gas sensing properties of sensors will be investigated at operating temperatures in the range of 150-450°C.

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Track Classification: Material Physics, Nanoscale Physics and Nanotechnology