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Fabrication and performance analysis of a simple, cost-effective copper oxide / zinc oxide semiconductors composite for gas sensing RAFAEL VELAZQUEZ, MANUEL RIVERA, ERIC LI, PETER FENG, University of Pueto Rico — We report on our studies of composite zinc oxide semiconductor (COS) nanoparticles as sensing materials for the development of high-performance gas sensors. The average diameter of the nanoparticles is 40 nm. The basic electrical properties of sensing materials have been measured. The morphologic surface and crystalline structures of COS are characterized by using scanning electron microscopy (SEM) and Raman scattering spectroscopy, respectively. By using synthesized COS of CuO-ZnO materials, prototypic highly sensitive gas sensors have been designed, fabricated and tested. Important stability and repeatability features have been obtained. The sensitivities of the COS based sensors to methane and hydrogen gases as a function of time and the gas concentrations have been determined. Various sensing parameters including the sensitivity, response time, recovery time, and thermal effect on the gas sensor performance have also been investigated in order to reveal the sensing ability. Analyses of experimental data indicate that the obtained response and recovery are almost 10 times faster than conventional sensors constructed solely from one material.

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