

SYNTHESIS AND HYDROGEN GAS SENSING PROPERTIES OF ZNO WIRELIKE THIN FILMS

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TÓM TẮT:

The authors investigated the hydrogen gas sensing properties of the ZnO wirelike films synthesized by two consecutive steps: thermal oxidation of sputtered Zn metallic films in dry air. Structural characterization revealed that the authors synthesized polycrystalline wurtzite ZnO films of a wirelike structure with a width of less than 100 nm and a length of several micrometers, possibly consisting of a chain of ZnO nanocrystallites with a mean granular size of 15 nm. It was found from the gas sensing measurements that the ZnO wirelike films exhibited a maximum sensitivity, defined as a ratio of the change in conductance upon exposure to H₂ gas in dry air over the conductance in dry air, DG/G_a , of 283% to 200 ppm H₂ gas at a temperature of 200 °C, indicating quite a possibility of much reduction in the operating temperature of the ZnO-based H₂ gas sensors. The ZnO wirelike film sensors showed a fast response to hydrogen gas in comparison with conventional ZnO films. These results suggest that the ZnO wirelike films can be used as the gas sensing materials for low-cost and high-performance gas sensors.