

Sol-gel synthesis of ZnO nanorods for ultrasensitive detection of acetone

Abstract

ZnO nanorods were synthesized on low cost thermally oxidized silicon substrate using a simple and easily performable sol-gel spin coating technique followed by hydrothermal growth. C-axis orientation, good crystalline properties and less structural defects containing ZnO nanorods of diameter < 70 nm were obtained. These were confirmed through XRD, FESEM and photoluminescence analysis. The nanostructured ZnO was tested for detecting acetone, a hazardous and irritant gas frequently used in industries. The fabricated nanorods exhibited excellent acetone sensing properties in a home-made gas chamber at 325 °C. the detection limit was 0.05 ppm of acetone and the response time was 8 s. The easy preparation and high sensitivity of the nanorods ZnO suggested its feasibility to be used in acetone sensing devices.

Keywords

Acetone; Gas sensing; Nanorods; Optical; ZnO