

Characterization of photochemically grown Pd loaded WO₃ thin films and its evaluation as ammonia gas sensor

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Abstract

Pd-loaded tungsten oxide thin films have been successfully fabricated by direct UV irradiation of bis(beta-diketonate)dioxotungsten(VI) and Pd(II) precursor complexes spin-coated on Si(100) substrates. X-ray diffraction (XRD) and X-ray photoelectron spectroscopy (XPS) were used to analyze the crystal structure and the chemical composition of the films before and after annealing at 500 degrees C. The results of XRD and AFM analysis showed that the as-photodeposited films are amorphous whereas thermally treated films present a rougher morphology. Post-annealing of the films in air at 500 degrees C transforms the oxides to a monoclinic WO₃ phase. Annealed 10% Pd/WO₃ films exhibited an excellent response towards 50 ppm ammonia gas at an operating temperature of 300 degrees C. The Pd-loaded sensors presented higher sensitivity and quicker response-recovery rates than unloaded WO₃ films. (C) 2020 Elsevier B.V. All rights reserved.

Palabras clave

KeyWords Plus: [METAL-OXIDES](#); [SENSING](#)
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