

Detecting hydrogen using TiO₂-B₂O₃ at different operating temperature

ABSTRACT

Performance of TiO₂-B₂O₃ gas sensor that annealed using nitrogen at 650°C for 30 minutes was observed and analyzed. The sensing film of the gas sensor was prepared by mixing TiO₂-B₂O₃ with an organic binder. The sensing film was characterized by field emission scanning electron microscopy (FESEM) and X-ray diffraction (XRD). The gas sensor was exposed to hydrogen at a concentration of 100-1000 ppm with operating temperatures of 100°C and 200°C. However, no response was detected for 100 ppm at 100°C. But, as the operating temperature was increased to 200°C, the gas sensor indicated a good response for 100 ppm of hydrogen. The gas sensor exhibited p-type response based on decreased current when exposed to hydrogen. The sensitivity of gas sensor was calculated at 1.00, 2.18 and 3.58 for 100 ppm, 500 ppm and 1000 ppm respectively, at an operating temperature of 200°C.

Keyword: Gas sensor; TiO₂-B₂O₃; Hydrogen; Nitrogen; Organic binder