

Gas Sensing Properties and *In Situ* Diffuse Reflectance Infrared Fourier Transform Spectroscopy Study of Acetone Adsorption and Reactions on SnO₂ Films

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SnO₂ flat-type coplanar gas sensor arrays were fabricated by a screen-printing technique based on SnO₂ nanopowders prepared by a sol-gel method. The SnO₂ flat-type coplanar gas sensor arrays had good acetone gas-sensing characteristics such as a fast response, short recovery time, and an almost linear response to acetone concentration of 1–100 ppm. The response could reach 2.11 for acetone concentration as low as 1 ppm, and the response and recovery times for 1 ppm acetone were 8.9 and 10 s, respectively. The surface reactions were investigated by *in situ* diffuse reflectance infrared Fourier transform spectroscopy (DRIFTS) at different temperatures, and a possible sensing mechanism was proposed. Formate, acetate, carbonate ions, CH₃O_(ads), CO₂, H₂O, and adsorbed acetone were detected when the SnO₂ films were exposed to 100 ppm acetone at different temperatures.

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