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Gas Sensing Characteristic of In_2O_3 Nanowires to H_2 and H_2S Gas

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Metal oxide nanowire-sensors are the most promising devices among the solid state chemical sensors, because they have many advantages such as a large surface to volume ratio, a Debye length comparable to the nanowires radius, and low power consumption. In_2O_3 nanowires as a wide band gap semiconductor (a direct band gap of 3.55–3.75 eV and an indirect energy gap of 2.62 eV) have been extensively studied for advanced applications in electronic, optoelectronic, photo-detectors, memory devices, and high sensitivity sensors.

In this study, we synthesized In_2O_3 nanowires using the carbothermal reduction method, an The phase and morphology of In_2O_3 nanowires are characterized by means of XRD and SEM,. The results indicate that In_2O_3 nanowires have a cubic structure with diameters under 200nm. And, we investigated about gas sensing properties of In_2O_3 nanowires. In case of In_2O_3 powders showed low sensitivity to H_2 gas(1), but relatively high sensitivity to H_2S. We could confirm that nanowires sensor has similar tendency with powder sensor (the maximum sensitivity of nanowires gas sensor is about 3 to H_2 gases at 400℃ and 11 to H_2S at 350℃).

References:

1. *Jiaqiang Xua, Xiaohua Wang, Jianian Shen , "Hydrothermal synthesis of In_2O_3 for detecting H_2S in air", Sensors and Actuators B 115 (2006) 642–646.*