

Preparation of Ultrafine ZnFe_2O_4 and Its Gas-Sensing Properties for Cl_2

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Ultrafine ZnFe_2O_4 , a Cl_2 gas-sensing material has been successfully fabricated by a novel polyoxyethylene lauryl ether + n-hexanol/n-heptance/water (zinc nitrate + ferrum nitrate) W/O microemulsion method. The composition and structure of the powder have been detected by X-ray diffraction analysis (XRD) and transmission electron microscopy (TEM). The results show that the as-made ZnFe_2O_4 has a spinel-type structure, and the size of each spherical particle is 30 nm with good dispersiveness. The effect of temperature on the sensitivity of sensors, gas sensor's selectivity, the effect of gas concentration, and response and recovery characteristics are investigated at the optimum working temperature of 270°C. The measurement of gas-sensing properties of the ZnFe_2O_4 sensors indicates that these sensors have high sensitivity, excellent selectivity and quick-response behavior to Cl_2 gas. The gas-sensing mechanism is also discussed.

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