

High performance mixed potential type acetone sensor based on CeO₂ and Sr₂FeMoO₆ sensing electrode

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Abstract:

In order to obtain high performance CeO₂-based mixed potential type acetone sensors, three series of sensing electrode materials include MMnO₃ (M: Sr, Ca, La and Sm), MFeO₃ (M: Bi, La and Sm) and Sr₂MMoO₆ (M: Mg, Fe and Ni) were prepared by sol-gel method. Results showed that the sensor attached with Sr₂FeMoO₆ sensing electrode presented the best sensing characteristic to acetone, which showed the maximum response value of -147mV to 100ppm acetone among all the other sensors in this study and the response time was about 13s. Moreover, the response value (ΔV) of the sensor changed proportionally with the logarithm of acetone concentration at the ranges of 0.5-5ppm and 5-200ppm, and the slopes of which were -10.8 and -100mV/decade, respectively. The device also exhibited excellent repeatability, relatively good selectivity, humidity stability and good long-term stability during 25days. Based on the above sensing performance, Sr₂FeMoO₆ could be used as a potential sensing electrode material to the rapid detection of acetone in atmosphere, microenvironment and diabetes.

Key words: acetone sensor, CeO₂, mixed potential, Sr₂FeMoO₆, high performance

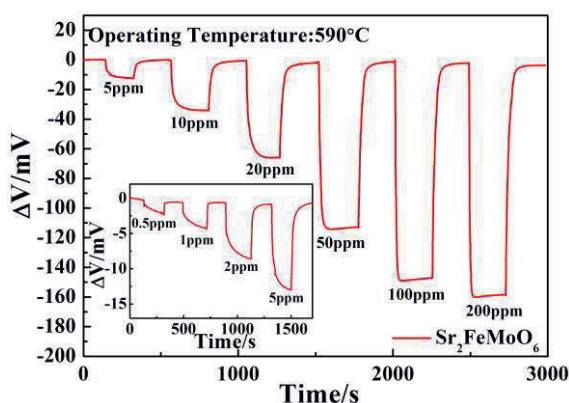


Fig. 1. Response transient curves for the sensor attached with Sr₂FeMoO₆-SE to 0.5-200ppm acetone at 590°C.

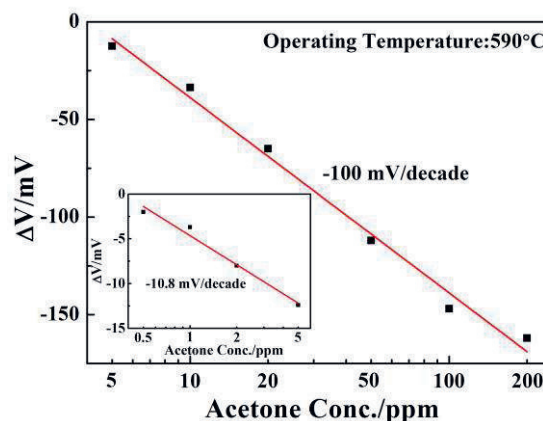


Fig. 2. Dependence of ΔV for the sensor attached with Sr₂FeMoO₆-SE on the logarithm of acetone concentration at 590°C.

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