Cadmium Oxide Nanoflakes and Their Use for Gas Sensing

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Highly sensitive and selective detection of volatile organic compounds with fast response time is very important for safety, and gas sensors play a key role in daily life, contributing to toxic- and explosive-gas alarms, air-quality control, health care, household safety, and so on. Therefore, numerous efforts have been recently made to design and fabricate reliable and durable sensors with high sensitivity and selectivity, as well as fast response, towards various gases. This study focuses on chemiresistive gas sensors based on amorphous CdO nanoflakes, which are prepared via the chemical bath deposition approach and demonstrate promise in detecting certain volatile organic compounds, e.g. diethyl ether (DEE), with high selectivity, sensitivity and fast response time. The preparation, characterization and performance of such sensors are described and sensing mechanisms are discussed.

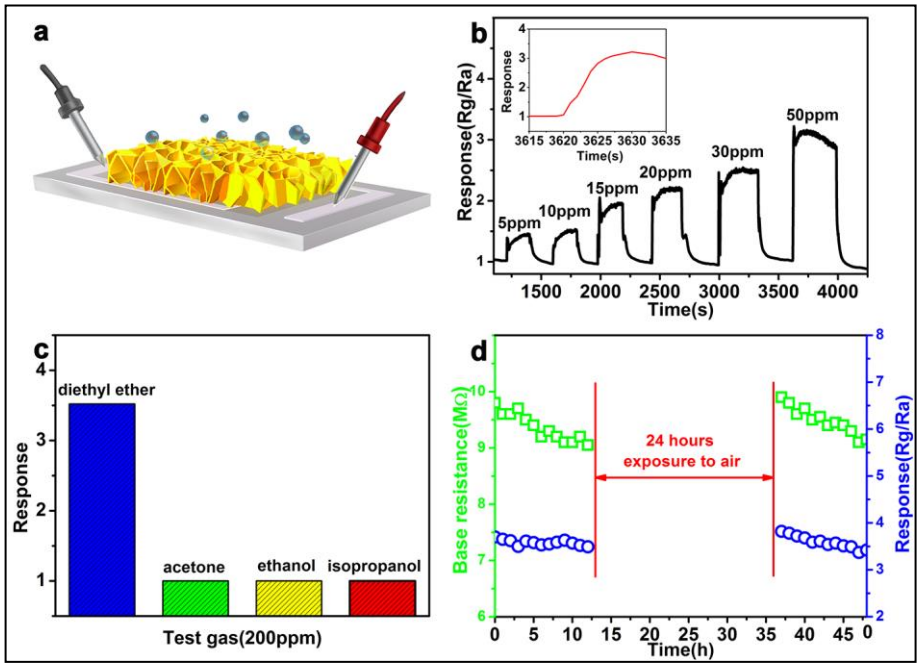

Figure 1. (a) Scheme of gas sensor based on CdO nanoflake arrays prepared via chemical bath deposition. (b) Dynamic response curve of the sensor to DEE at optimal temperature (175 °C). The inset is an enlarged part of panel (b), showing the average response time (4.5 s). (c) Response of the sensor to various organic compounds (concentration 200 ppm). (d) Stability of working sensor over time. After working at 175 °C and 200 ppm of DEE for 12 h, the base resistance and response of the sensor slightly decrease, however they recover back to their initial level after exposure to air for 24 h.