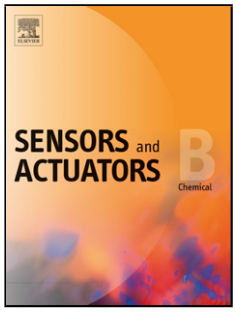

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Ultrasensitive and low detection limit of nitrogen dioxide gas sensor based on flower-like ZnO hierarchical nanostructure modified by reduced graphene oxide

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Highlights:

- The rGO/ZnO hybrids with flower-like ZnO and flexible rGO sheets were obtained.
- The response of rGO/ZnO to 50 ppb NO_2 was enhanced seven times than that of ZnO.
- The hierarchical rGO/ZnO hybrids can detect NO_2 as low as 5 ppb.
- The enhanced response was attributed to the local p-n heterojunctions in hybrids.

Abstract

Hierarchical rGO/ZnO hybrids with a flower-like morphology of ZnO and flexible rGO sheets were synthesized by a facile solution-processed method. The structures and morphologies of the hybrids were investigated by different kinds of techniques, including X-ray diffraction, field-emission electron scanning microscopy, transmission electron microscopy, and energy dispersive spectroscopy. The gas sensing properties of hierarchical rGO/ZnO hybrids toward nitrogen dioxide were studied via a static system. The response of rGO/ZnO hybrids to 50 ppb NO_2 was 12, which was seven times higher than that of pristine ZnO at 100°C. The limit of