

## Accepted Manuscript

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PII: S0925-4005(17)30807-9  
DOI: <http://dx.doi.org/doi:10.1016/j.snb.2017.04.190>  
Reference: SNB 22278

To appear in: *Sensors and Actuators B*

Received date: 13-10-2016  
Revised date: 27-4-2017  
Accepted date: 28-4-2017

Please cite this article as: Jie Liu, Shan Li, Bo Zhang, Yan Xiao, Yuan Gao, Qiuyue Yang, Yinglin Wang, Geyu Lu, Ultrasensitive and low detection limit of nitrogen dioxide gas sensor based on flower-like ZnO hierarchical nanostructure modified by reduced graphene oxide, *Sensors and Actuators B: Chemical* <http://dx.doi.org/10.1016/j.snb.2017.04.190>

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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<sub>2</sub> was enhanced seven times than that of ZnO.
- The hierarchical rGO/ZnO hybrids can detect NO<sub>2</sub> 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<sub>2</sub> was 12, which was seven times higher than that of pristine ZnO at 100°C. The limit of

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