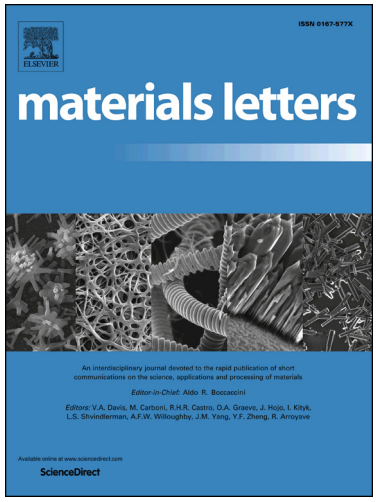

New insight into gas sensing performance of nanorods assembled and nanosheets assembled hierarchical WO_3•H_2O structures

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PII: S0167-577X(18)31569-6
DOI: https://doi.org/10.1016/j.matlet.2018.10.012
Reference: MLBLUE 25053

To appear in: *Materials Letters*

Received Date: 5 August 2018
Revised Date: 6 September 2018
Accepted Date: 2 October 2018

Please cite this article as: Y. Zhang, W. Zeng, Y. Li, New insight into gas sensing performance of nanorods assembled and nanosheets assembled hierarchical WO_3•H_2O structures, *Materials Letters* (2018), doi: https://doi.org/10.1016/j.matlet.2018.10.012

New insight into gas sensing performance of nanorods assembled and nanosheets assembled hierarchical $WO_3 \cdot H_2O$ structures

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Abstract: $WO_3 \cdot H_2O$ hierarchical structures assembled by nanorods or nanosheets were successfully synthesized via a facile hydrothermal method. Gas sensing behaviors were investigated for these two different nanostructures towards ethanol gas. The results indicated that the nanorods assembled flower-like structure exhibits faster response and recovery time as compared with the nanosheets assembled microspheres, which may be attributed to fast gas diffusion speed in the nanorods assembled nanostructures, while the nanosheets assembled hierarchical flower-like $WO_3 \cdot H_2O$ structures exhibited higher response (54) than that of the $WO_3 \cdot H_2O$ microspheres (25) because of the larger specific surface area and the abundant micro reaction rooms.

***Key words*:** Semiconductor; Functional; hollow; sensors; Formation mechanism

1. Introduction

In recent years, tungsten oxide, as a significant wide band gap n-type semiconductor, has captured a great deal of interest for their wide variety of potential applications such as in gas sensors [1, 2], energy [3], electrocatalyst [4], photocatalysts and electrochromic devices [5, 6]. In particular, various 3D hierarchical $WO_3 \cdot H_2O$ nanostructures are regarded as the most promising

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