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**New insight into gas sensing performance of nanorods assembled and nanosheets
assembled hierarchical WO₃•H₂O structures**

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Abstract: WO₃•H₂O 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 WO₃•H₂O structures exhibited higher response (54) than that of the WO₃•H₂O 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 WO₃•H₂O nanostructures are regarded as the most promising

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