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The hydrothermal synthesis of 3D hierarchical porous MoS_2 microspheres assembled by nanosheets with excellent gas sensing properties

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Abstract: 3D hierarchical porous MoS_2 microspheres assembled by nanosheets were successfully fabricated via a facile yet efficient hydrothermal process using an assistance of CTAB as soft template which had significant effects on the final morphology of MoS_2 products. The possible formation mechanism of the harvested porous MoS_2 microspheres were preliminarily presented on the basis of the experimental results. Moreover, the gas sensing properties of the samples were investigated. The hierarchical porous MoS_2 microspheres are found to exhibit an excellent gas response capability, good response-recovery properties, reproducibility and selectivity, which provides further evidence that assistance CTAB is critical for governing the morphology and properties of the MoS_2.

***Key words*:** Porous structures; MoS_2; Hydrothermal; Gas sensors; Formation mechanism

1. Introduction

Hydrogen (H_2) is considered as one of the most promising and green energy source to solve future energy requirements due to its abundance, renewable, easy synthesis, and non-polluting nature [1-3]. Up to now, hydrogen have extensive applications in various important fields such as, fuel cells for civil transportation, power generators, automobiles and rockets for space vehicles [4,

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