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# Template-free synthesis of nanosheets-assembled SnO<sub>2</sub> hollow spheres for enhanced ethanol gas sensing

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**Abstract:** The specific structure of hollow sphere with hierarchical structure is beneficial to facilitate the gas diffusion and supply more active sites for improving gas sensing performance. In this paper, we report the fabrication of hierarchical SnO<sub>2</sub> hollow spheres assembled by ultrathin nanosheets (SnO<sub>2</sub> NSHSs) via a template-free hydrothermal method. The formation mechanism and microstructures of the SnO<sub>2</sub> NSHSs were discussed and characterized in detail. The SnO<sub>2</sub> NSHSs sensor shows a high response and ultrafast response time (5 s) towards ethanol. Furthermore, the SnO<sub>2</sub> NSHSs gas sensor also exhibits a low detection limit of ppb level. The enhanced sensing performance can be attributed to the unrestricted gas diffusion in the hierarchical hollow spheres and plenty of active sites on the ultrathin SnO<sub>2</sub> nanosheets.

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