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## Full Length Article

### Facile Route to Synthesize Porous Hierarchical $\text{Co}_3\text{O}_4/\text{CuO}$ Nanosheets with High Porosity and Excellent $\text{NO}_x$ Sensing Properties at Room Temperature

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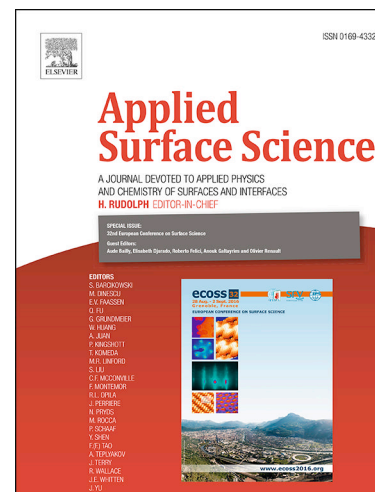
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# Facile Route to Synthesize Porous Hierarchical Co<sub>3</sub>O<sub>4</sub>/CuO Nanosheets with High Porosity and Excellent NO<sub>x</sub> Sensing Properties at Room Temperature

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## Abstract

To fabricate sensors that are capable of ultrasensitive detection of NO<sub>x</sub> as well as optimize their synthetic route, highly porous and hierarchically structured Co<sub>3</sub>O<sub>4</sub>/CuO nanosheets were synthesized by a facile hydrothermal-calcination route. The CC2-1 sample synthesized with the 2:1 molar ratio of Co(NO<sub>3</sub>)<sub>2</sub>·6H<sub>2</sub>O and CuCl<sub>2</sub>·2H<sub>2</sub>O has the most abundant porosity. Structural measurements found that the size of pore is 3.37 nm, the specific surface area is 24.04 m<sup>2</sup>g<sup>-1</sup>, and the average slice thickness is about 5 nm. This optimum sample presented excellent NO<sub>x</sub> sensing performance at room temperature (RT = 21 °C), which has not only the highest response (14.16 to 1000 ppm), the shortest response time (2 s to 1000 ppm), and the minimum detection limit (0.01 ppm), but also good reversibility and selectivity. The superior property arises from the appropriate CuO ratio and the addition of pore-forming agent NaHCO<sub>3</sub>, and all together resulted in the unique hierarchical heterojunction structure, endowed with abundant porosity and a large number of defects, which eventually engender the remarkable chemisorbed ability to oxygen species.

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