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Fabrication of mesoporous In₂O₃ nanospheres and their ultrasensitive NO₂ sensing properties

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Research Highlights

- A facile hydrothermal route was applied to fabricate the mesoporous In₂O₃ nanospheres with large specific area.
- The morphology evolution reveals three stages including nucleation, splitting and growing up.
- Appropriate annealing temperature of the In₂O₃ nanospheres is also very critical for NO₂ detection.
- Response of 330.1 to 100 ppb of NO₂ was reached.

Abstract Ultra-sensitive NO₂ sensor based on hierarchical In₂O₃ nanospheres which are successfully fabricated via facile thermal processes. Such morphology evolution is investigated by the time-dependent experiment. Remarkable features of the mesoporous structure and, large specific area (82.1 m²/g) and small sized nanoparticles result in the In₂O₃ nanospheres a high NO₂ sensing efficiency. For the In₂O₃ based NO₂ sensor, temperature of annealing process is an important factor to influence its sensing performance; the rather high sensitivity (360.1, 100 ppb) and low detection limit (1

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