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Improved NO₂ Sensing Performance of Electrospun WO₃ Nanofibers with Silver Doping

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Highlights

- Electrospun Ag-doped WO₃ nanofiber gas sensors were successfully fabricated.
- The 3 mol% Ag-doped sample exhibited the highest sensitivity toward NO₂.
- Upon doping of 3 mol% Ag, the sensitivity was improved by a factor of 9.
- Higher doping concentrations significantly lowered the NO₂ response.
- The effects of Ag dopant levels on NO₂ sensing performance are discussed.

Abstract

This work reports the enhancement of NO₂ gas sensing response which owing to the incorporation of Ag nanoparticles into WO₃ nanofiber matrices. Ag-doped WO₃ nanofibers were fabricated by electrospinning. The Ag dopant levels ranged from 1-10 mol%. The microstructures and chemical compositions were examined using a series of material characterization methods including TEM, SEM, XRD, and XPS. Porous mats of nanofibers comprising monoclinic WO₃ nanoparticles (28-39 nm) incorporated with small Ag particles were observed. The NO₂ gas sensing performance was investigated at various gas concentrations (0.5-5 ppm) and operating temperatures (200-275 °C). For 5 ppm NO₂ gas

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