

Supporting Information

Ultrasensitive ppb-level NO₂ gas sensors at room temperature based on SnS₂/rGO nanohybrids with P-N transition property and optoelectronic visible light enhancement performance

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Figure S1 a) PL spectroscopy of SnS₂/rGO-5 obtained under an excitation wavelength of 532nm at room temperature and UV-vis of b) SnS₂/rGO-1 and c) SnS₂/rGO-5

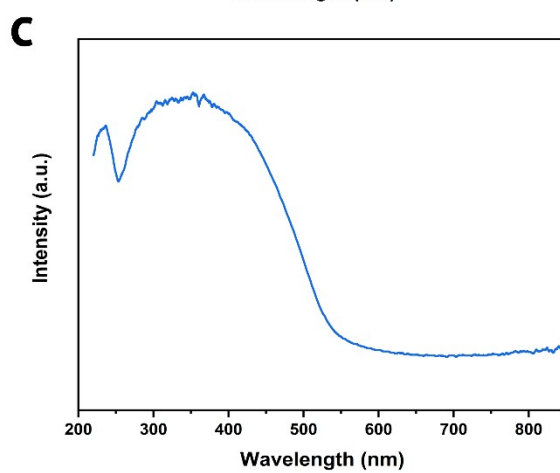
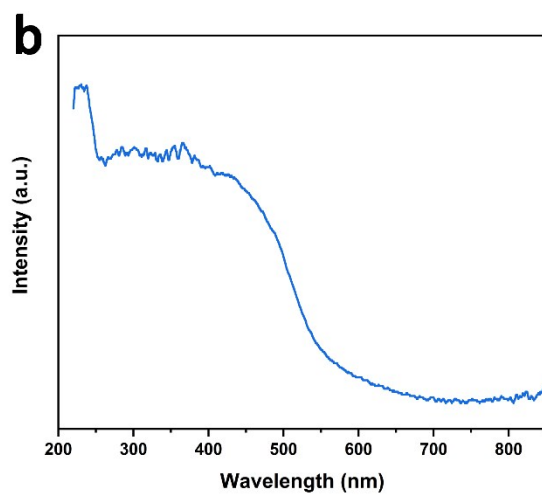
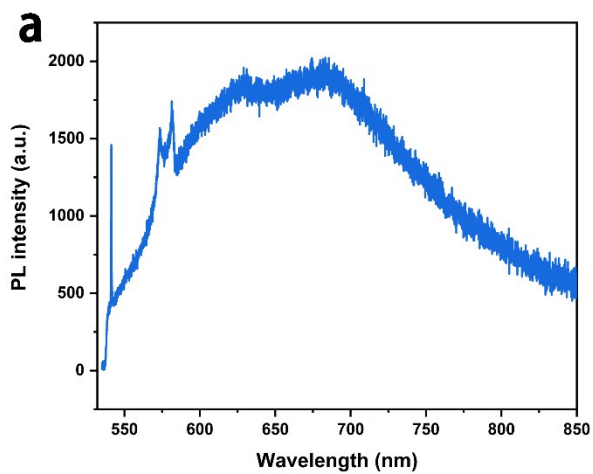


Figure S2 The SEM image of a) pristine graphene and b) pristine SnS₂

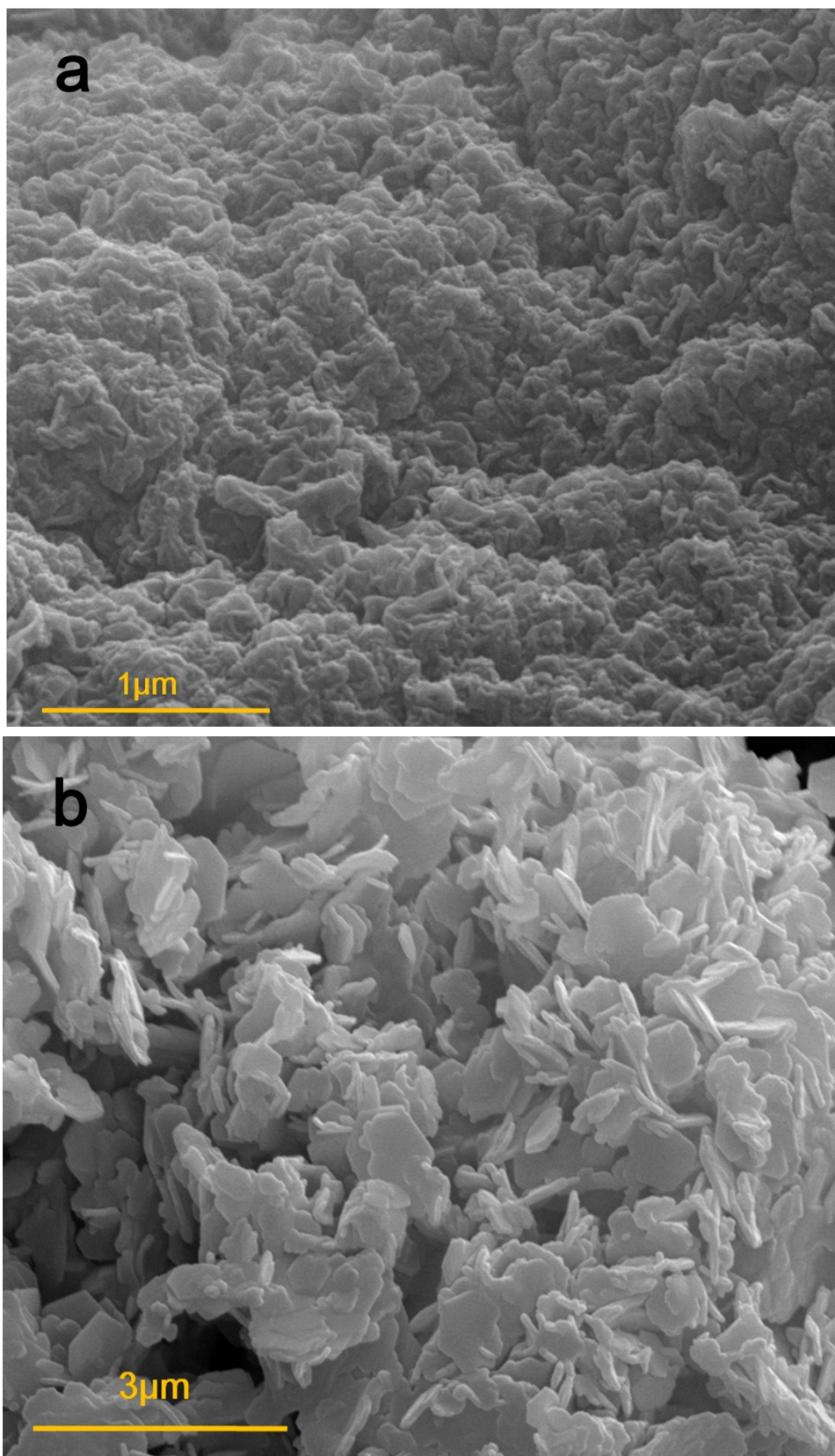


Figure S3 The EDS of a) SnS₂/rGO-1 and b) SnS₂/rGO-5

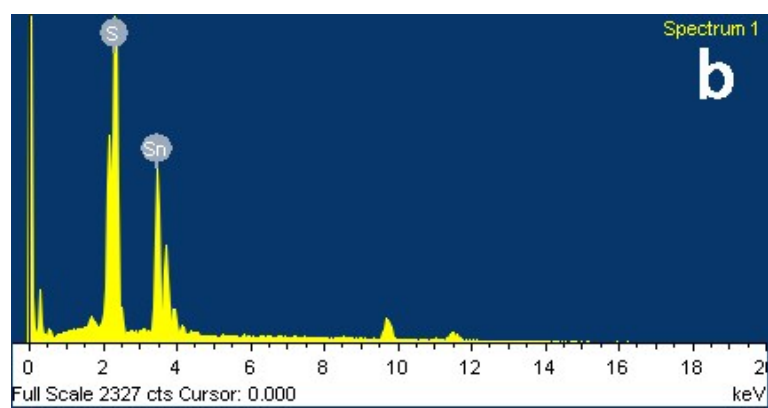
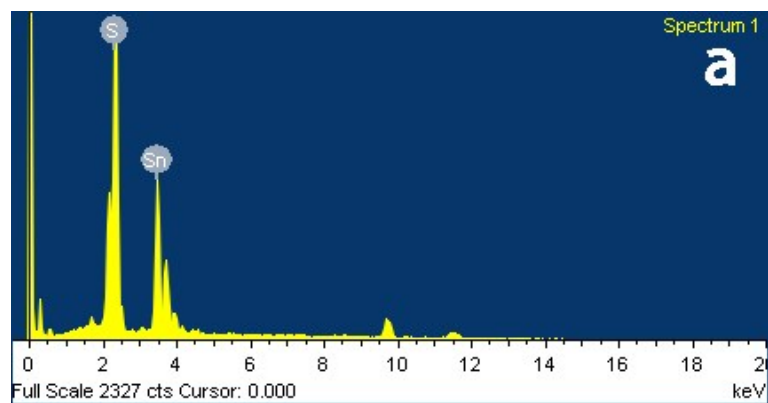


Figure S4 Dynamic sensing performance of SnS₂/rGO-2 and SnS₂/rGO-3 towards NO₂ with concentrations (125 ppb, 250 ppb, 500 ppb, 1 ppm) at room temperature.

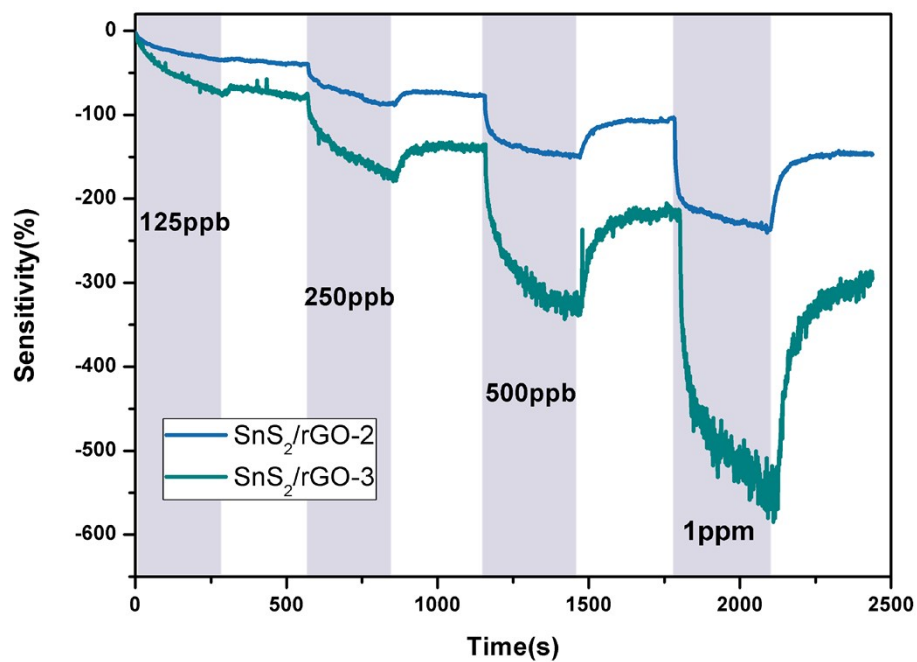


Figure S5 Dynamic sensing performance of SnS₂/rGO-10 and SnS₂/rGO-20 towards NO₂ with concentrations (125 ppb, 250 ppb, 500 ppb, 1 ppm) at room temperature.

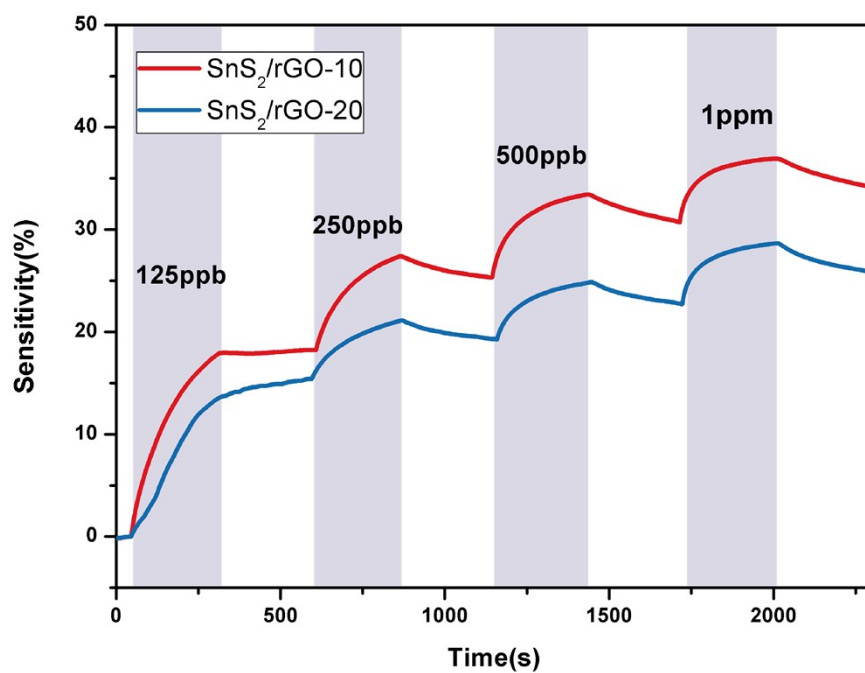


Figure S6. a) The response and recovery time vs NO₂ concentration of n-type sensors

b) The response time vs NO₂ concentration of p-type sensors

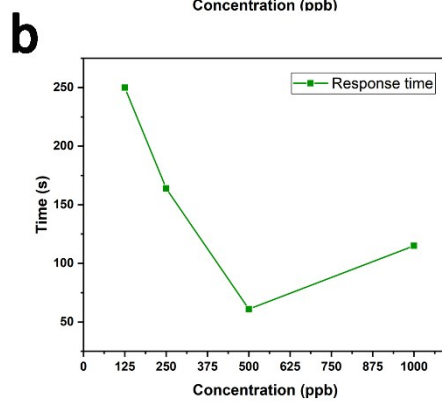
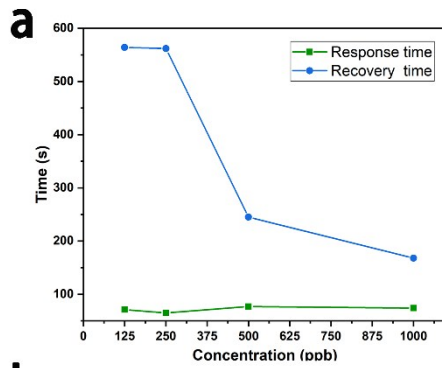


Figure S7. The fitting curves of the a) SnS₂/rGO-2, b) SnS₂/rGO-3, c) SnS₂/rGO-10 and d) SnS₂/rGO-5

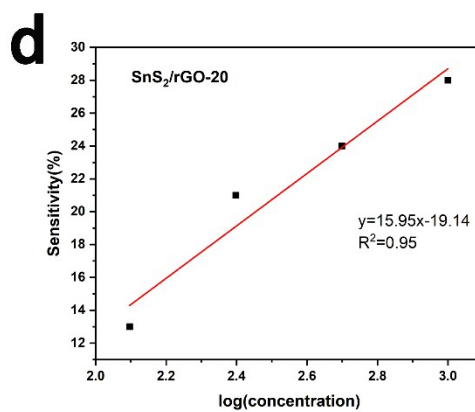
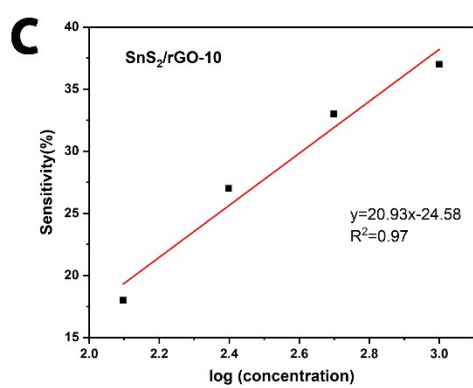
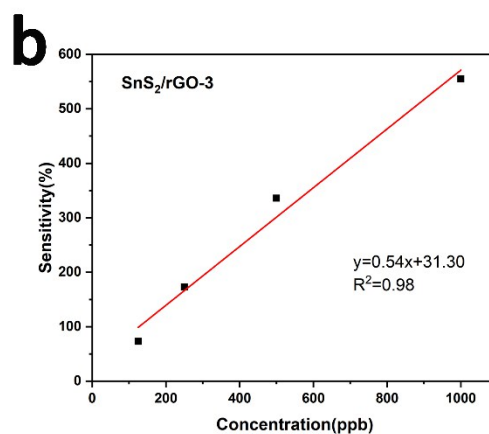
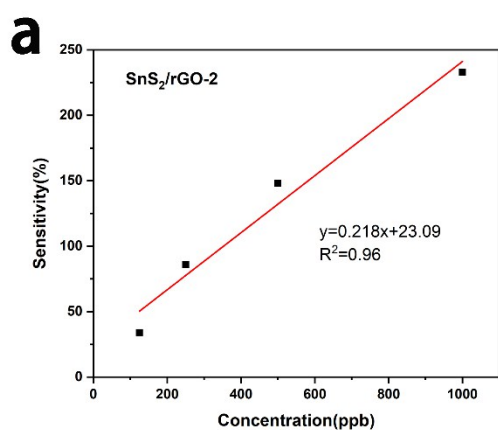
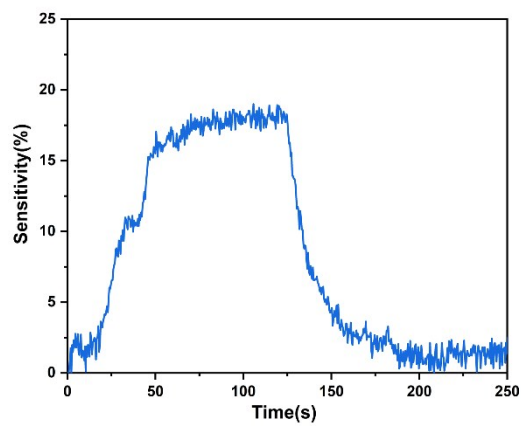


Figure S8 The sensing behavior of a) SnS₂/rGO-1 and b) SnS₂/rGO-5 to 70% relative humidity under room temperature.

a



b

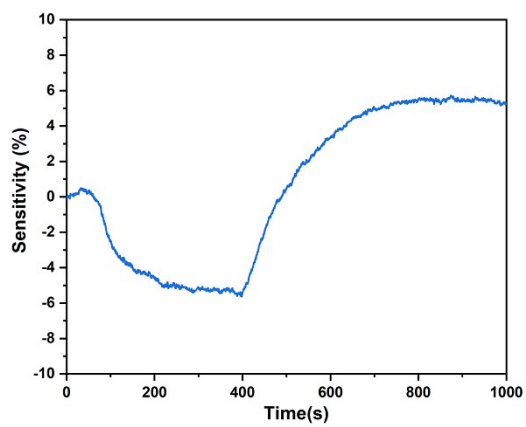


Figure S9 The effect of light illumination on gas sensing properties of p-type SnS₂/rGO sensors. a) The amplification factor of sensitivity under light illumination of different wavelengths and power density. b,) The relative response time under light illumination of different wavelengths and power density.

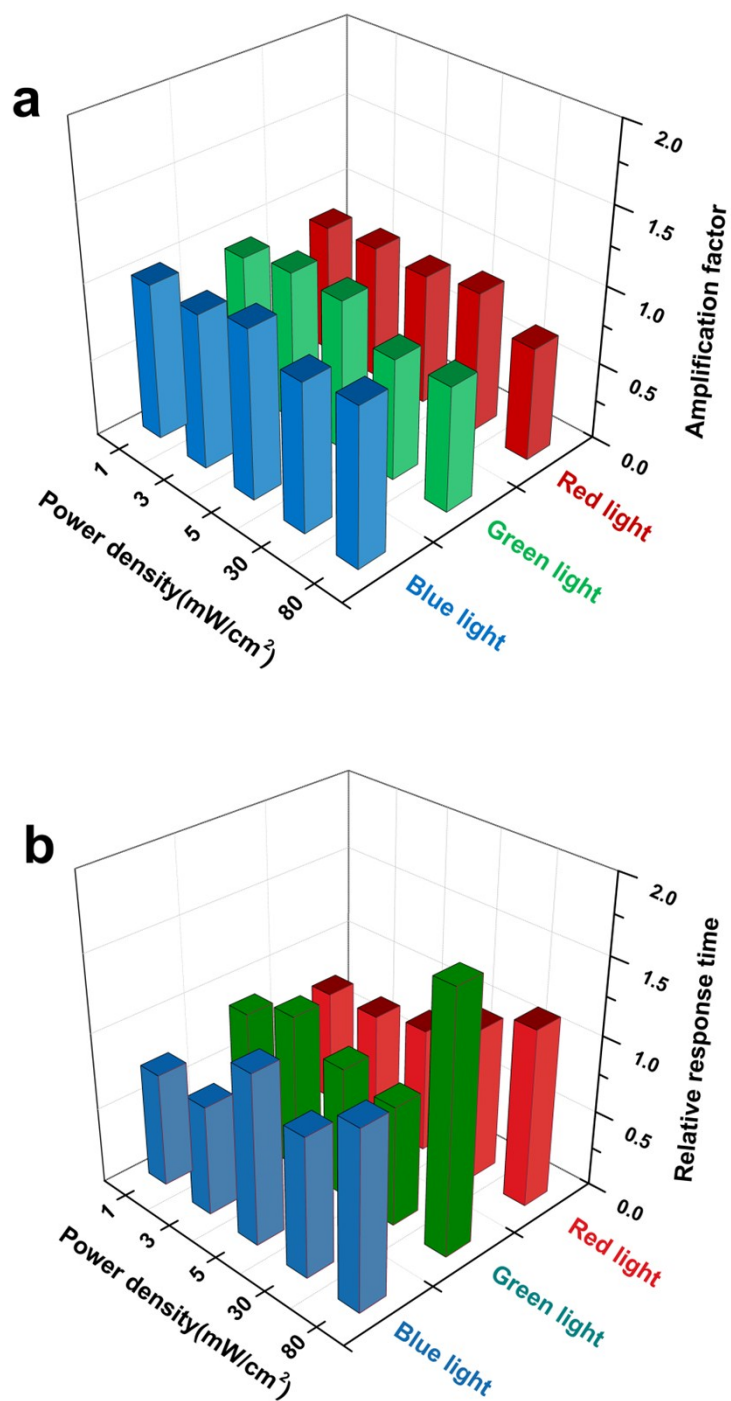


Figure S10 Comparison the sensing behavior of pure SnS₂ and SnS₂/rGO-1 under 2.5ppm concentration of NO₂ under 120°C.

