Supporting Information

SnO-Sn_3O_4 heterostructural gas sensor with high response and selectivity to parts-per-billion-level NO_2 at low operating temperature

Wenwen Zeng[a], Yingzhi Liu[a], Guoliang Chen[a], Haoran Zhan*[a], Jun Mei*[a], Nan Luo[a], Zhoukun He[b], Changyu Tang[a]

[a] Chengdu Green Energy and Green Manufacturing Technology R&D Center, Chengdu Development Center of Science and Technology, China Academy of Engineering Physics, Chengdu, 610200, China.

[b] Institute for Advanced Study, Chengdu University, Chengdu, 610106, China

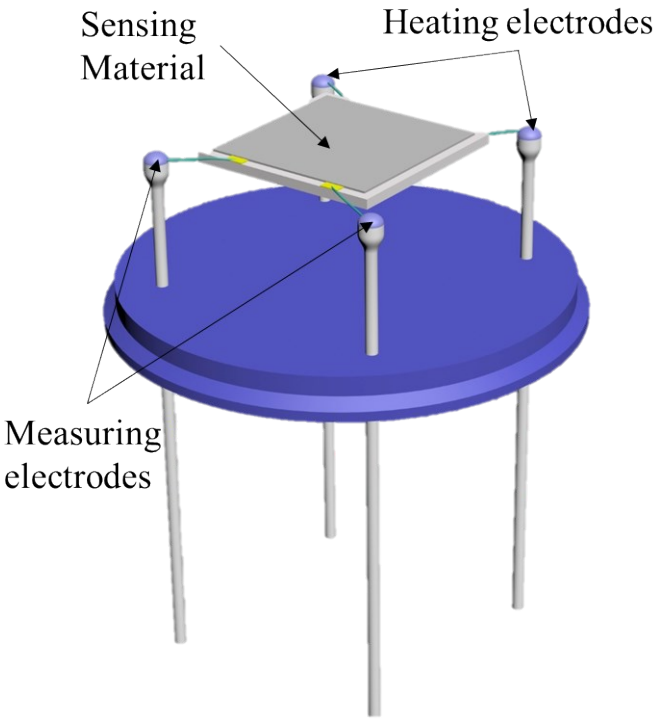

Figure S1. Schematic diagram of the gas sensors used in this study.

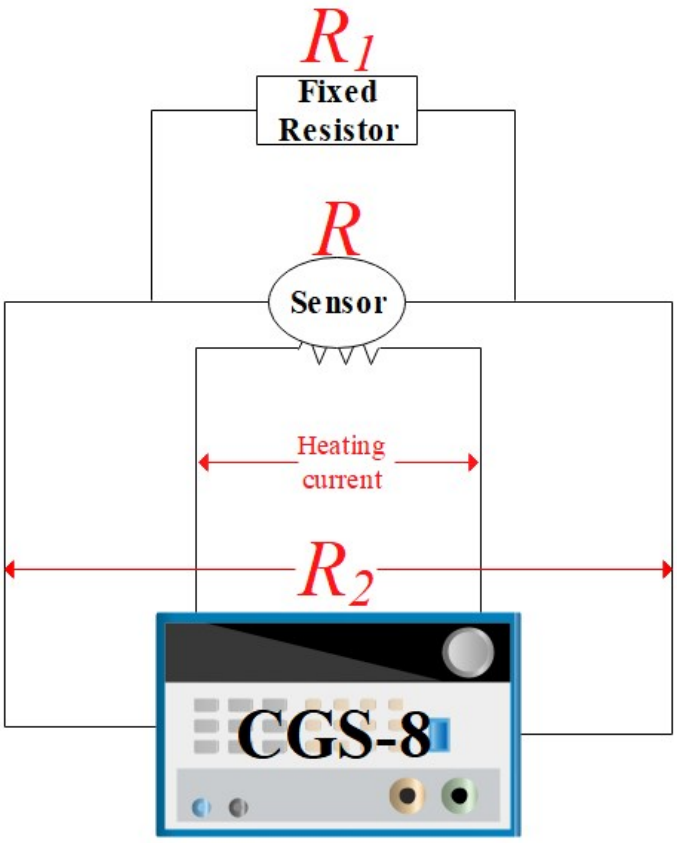

Figure S2. Schematic diagram of the measuring circuit used in the tests.

Because of the high resistance of the sensors made by SnO-Sn_3O_4 heterostructure, their resistances might exceed the measuring range of the test system (500 MΩ) when exposed to high concentrations of NO_2. Hence the circuit above was used to enlarge the mearing range. In Figure S2, R_1 was the resistance value of a fixed resistor (a resistor with 470MΩ nominal value was used here), which was parallel connected with the gas sensor. R was the resistance of the gas sensor, which was the value we ultimately need. R_2 was the resistance value measured by CGS-8 intelligent gas sensing analysis system. For these three factors,

$$\frac{1}{R_1}+\frac{1}{R}=\frac{1}{R_2}$$

So,

$$R = \frac{R_1 * R_2}{R_1 - R_2}$$

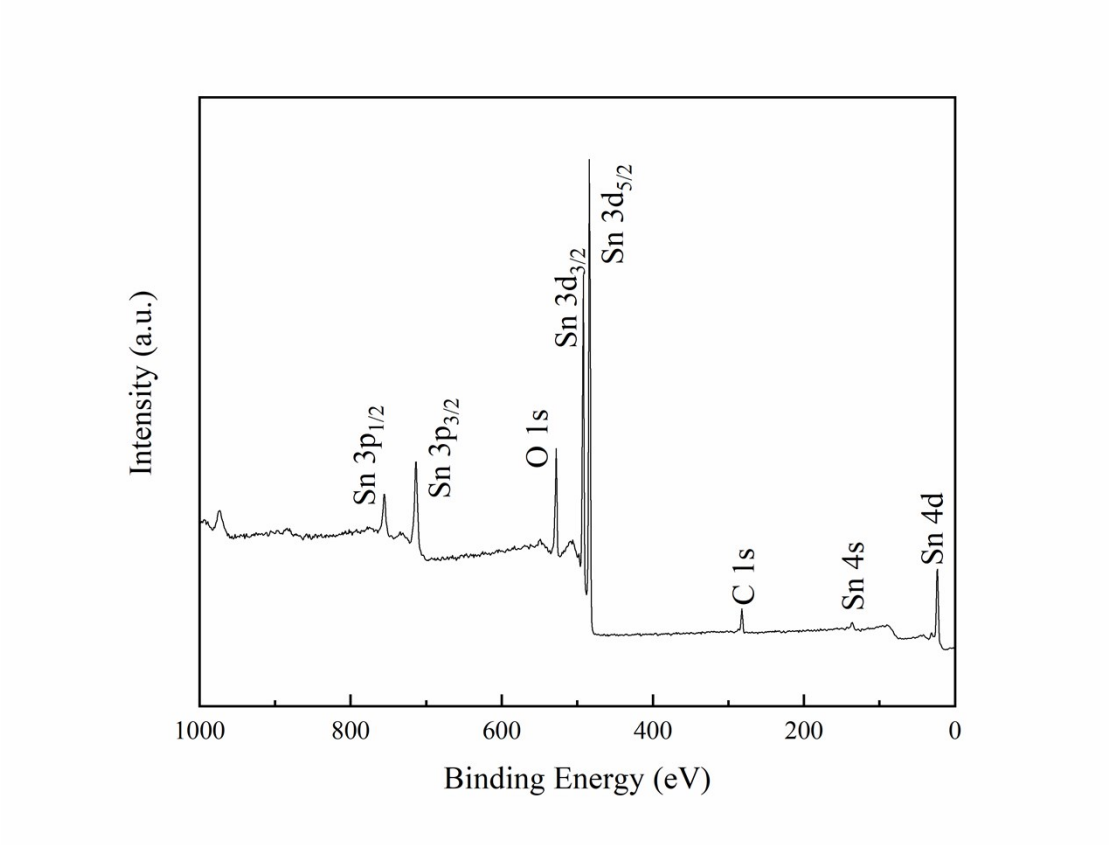

Figure S3. General scan X-ray photo electron spectra of as-prepared sample.

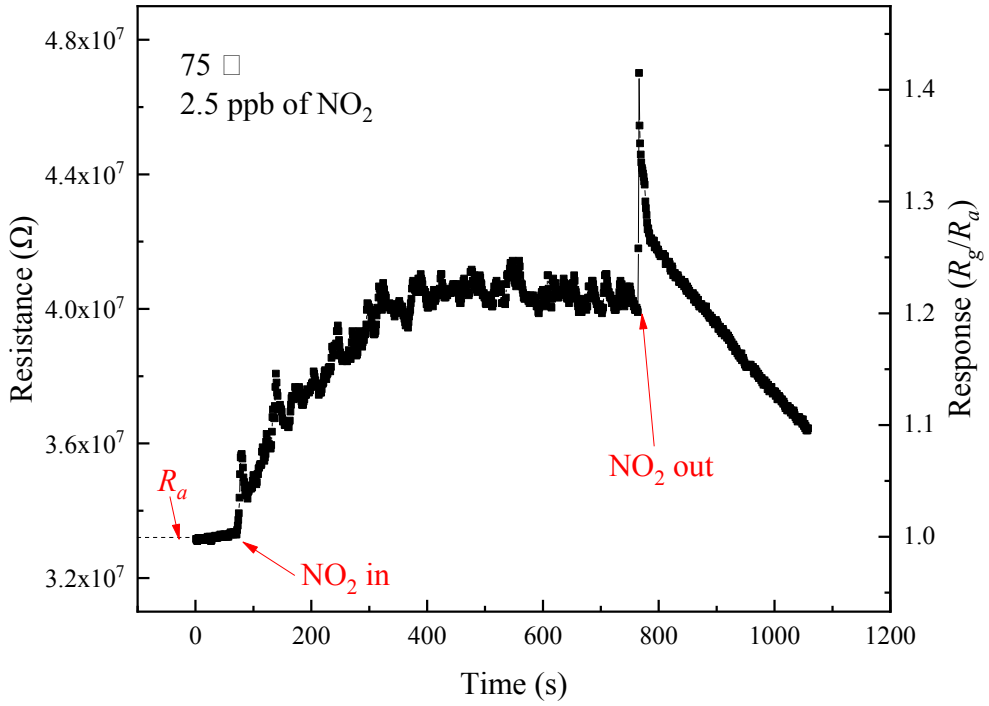

Figure S4. Resistance and response curve of SnO-Sn_3O_4 heterostructure when exposed to 2.5 ppb NO_2 at 75 ℃.

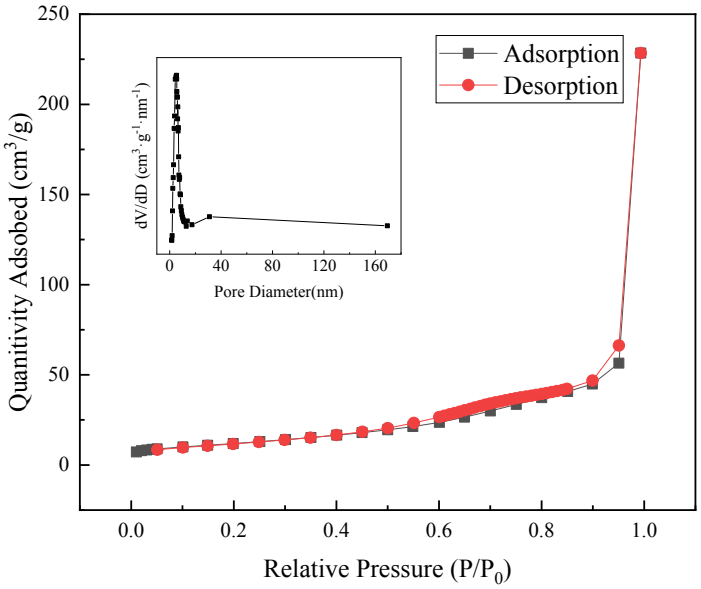

Figure S5. N_2 adsorption–desorption isotherm of the SnO–Sn_3O_4 heterostructure and corresponding pore size distribution.