# Supporting information

## Oxygen vacancy engineered tin dioxide/Tungsten disulfide heterostructure construction for effective NO sensing

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**Gas sensing system**

The resistance of as-prepared resistive gas sensors is tested by the gas sensing measurement system (CGS-1TP, Beijing Elite Tech Co., Ltd, China) under an atmospheric pressure in ambient air. After the gas sensor is placed at the center of the earth-brown heating stage (Fig. S1), the two metal probes were adjusted to contact with the two silver electrodes at the two ends of the gas sensor. After the gas sensor is heated to the target temperature, the current can be obtained with applying a constant voltage on the gas sensor and the resistance of the gas sensor can be determined according to Ohm's Law. When the resistance stays at almost a constant level, the calculated amount of target gases was injected into the test chamber, and the fans are turned on to realize a uniform concentration of the target gases in the chamber. After the resistance is well maintained, the test chamber will be opened and the sensor will be exposed to ambient until the the resistance becomes stable. The resistance curve druing the whole process is recorded.

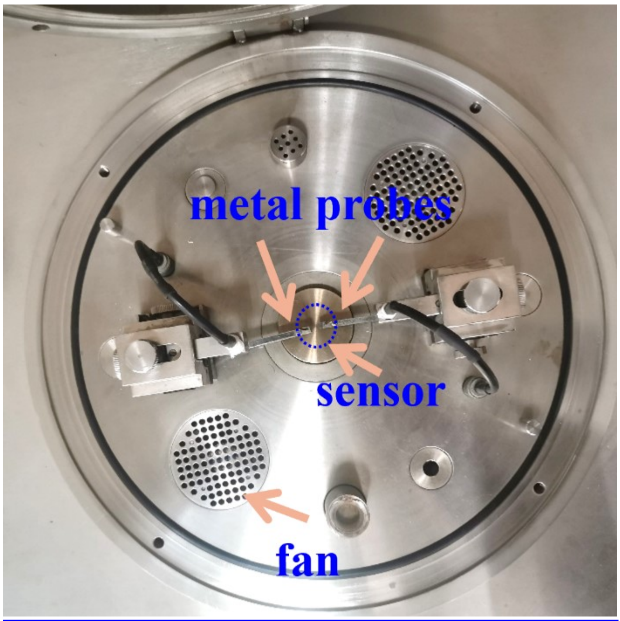


**Fig. S1.** Photograph of the gas sensing testing equipment CGS-1TP.

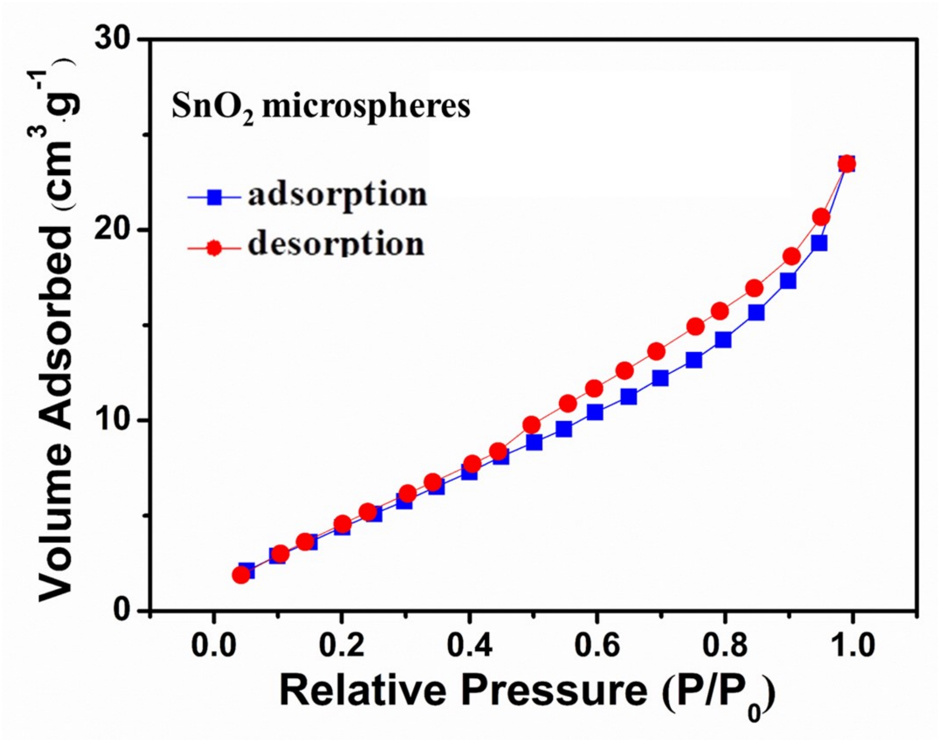


**Fig. S2.** $N_2$ adsorption-desorption isotherm of the pure $SnO_2$ microspheres.

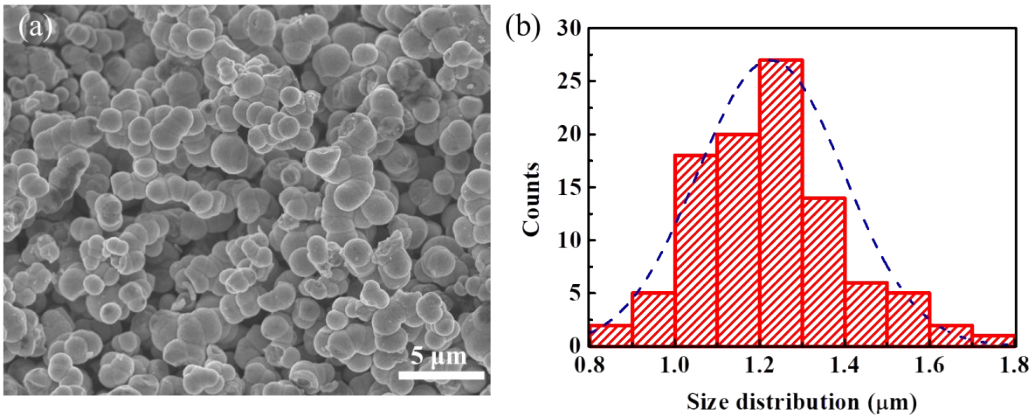


**Fig. S3.** (a) The SEM image and (b) the size distribution of the pure $SnO_2$ microspheres.

| Element | W | S | Sn |
|---|---|---|---|
| Atomic (%) | 12.0 | 24.9 | 2.5 |

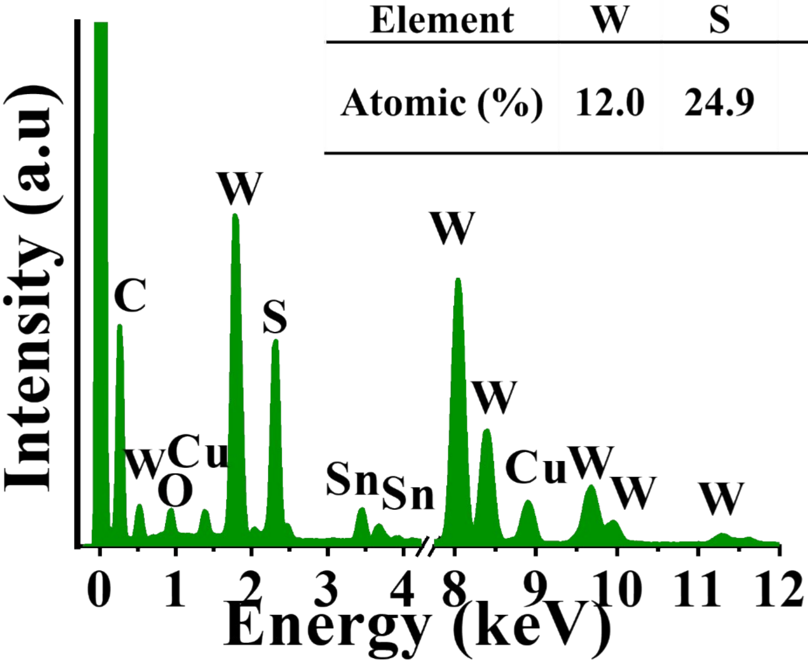


**Fig. S4.** EDS analysis of the $WS_2/SnO_2$ hybrid.

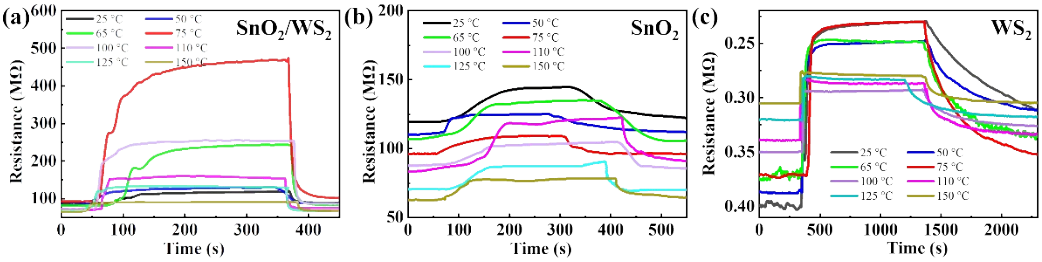


**Fig. S5.** Dynamic response and recovery curves of the gas sensors based on (a) the $SnO_2/WS_2$ hybrid, (b) pure $SnO_2$ microspheres and (c) hydrothermally-treated $WS_2$ nanosheets in different temperature.

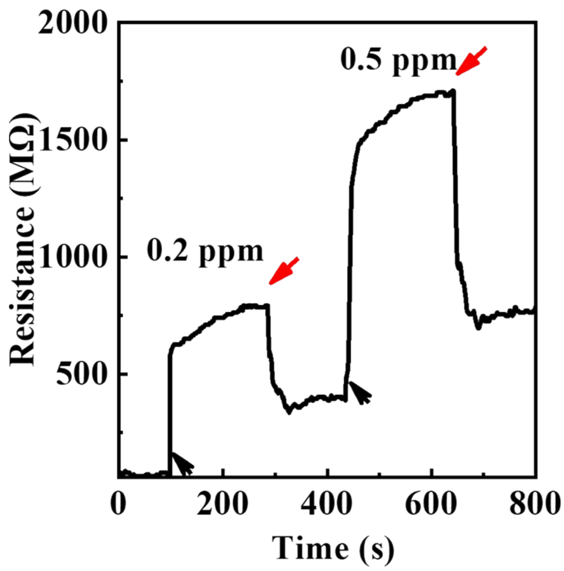


**Fig. S6.** Dynamic $S_r$ curves of the gas sensor based on the $WS_2/SnO_2$ hybrid to NO at 75 °C.

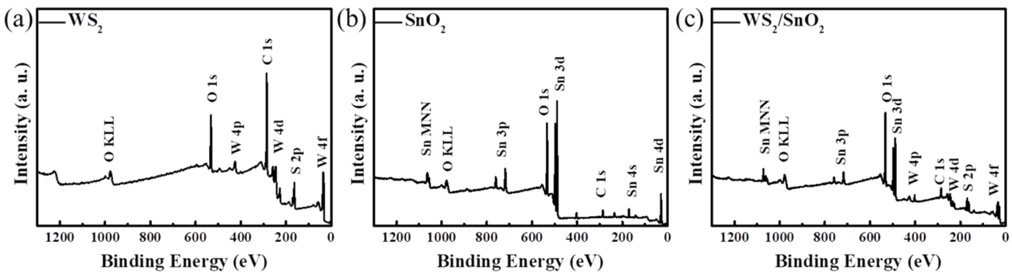


**Fig. S7.** XPS survey spectrum of the $WS_2$ nanosheets, pure $SnO_2$ microspheres and $WS_2/SnO_2$ hybrid, separately.