Supplementary Information

Layered $SnSe_2$ microflakes and $SnSe_2/SnO_2$ heterojunctions for low-temperature chemiresitive-type gas sensing

Xinyu Li [a], Wei Liu[a], Baoyu Huang*[a], Hang Liu[a], Xiaogan Li [a]*

[a] School of Microelectronics, Key Lab. of Liaoning for Integrated Circuits Technology, Dalian University of Technology, China,

*Corresponding authors. E-mail address: huangby@dlut.edu.cn (B. Huang), lixg@dlut.edu.cn (X. Li).

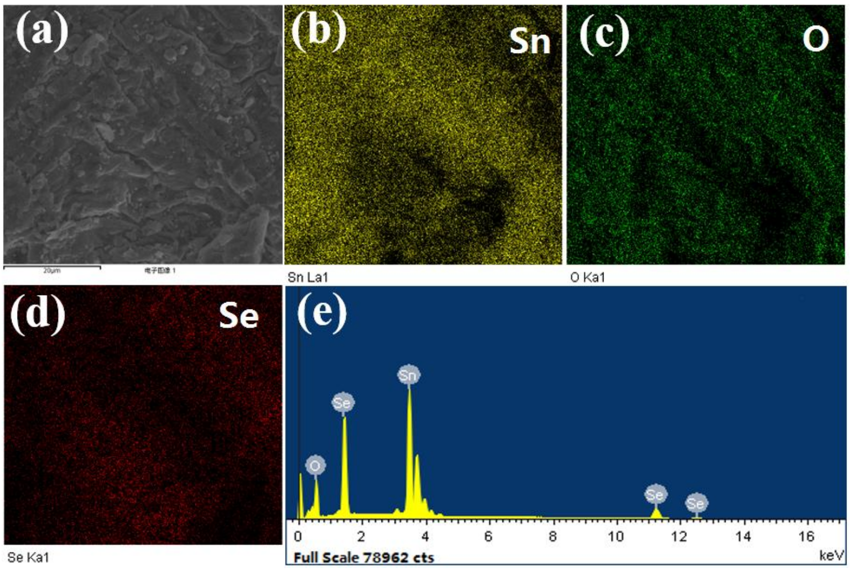

Fig.S1. (a) ~ (e) The EDS mapping analysis of $SnSe_2/SnO_2$.

Table S1. The results of the ratio of the integrated area under each peak in XPS.

XPS – O 1s	$SnSe_2$	$SnSe_2/SnO_2$-400	$SnSe_2/SnO_2$-500	SnO_2
Area (530.7eV)	-	38211.3	67447.0	83634.7
Area (531.8eV)	20831.3	16460.2	29141.4	22368.9

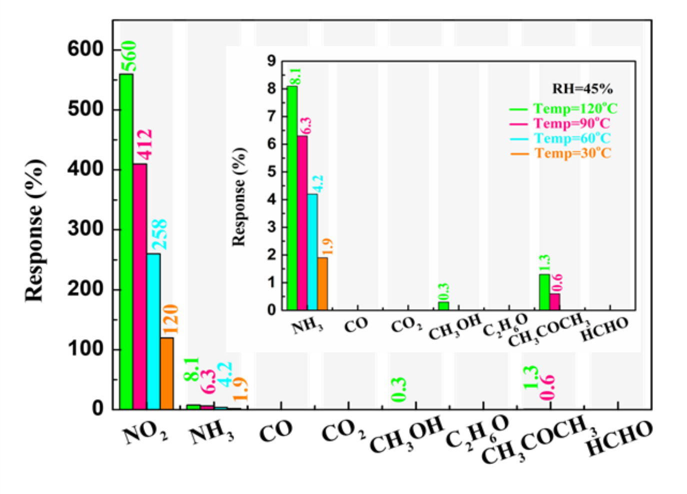

Fig. S2. Response of the $SnSe_2/SnO_2$-500°C-1h sensor to 8 ppm of NO_2, ammonia, methanol, ethanol, acetone, and formaldehyde at different operating temperatures.

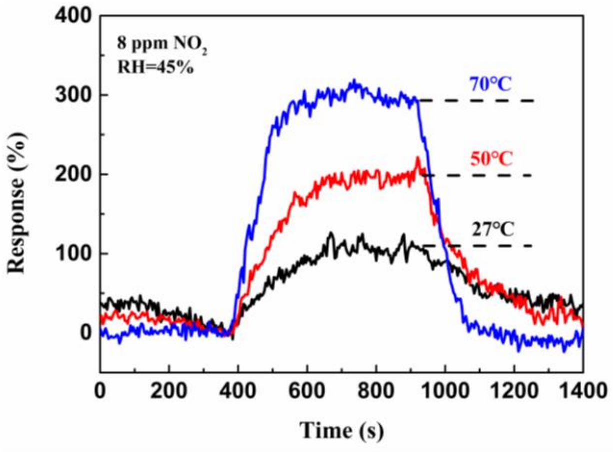

Fig. S3. Response of the $SnSe_2/SnO_2$-500°C-1h based sensor to 8 ppm NO_2 at different operating temperatures.

Table S2. The comparison between the response of $SnSe_2$ and $SnSe_2/SnO_2$ heterojunctions to NO_2 and to NH_3.

Materials	**R_{NO2}**	**R_{NH3}**	**R_{NO2}/ R_{NH3}**
$SnSe_2$	**38.2%**	**7.4%**	**5.16**
$SnSe_2/SnO_2$	**560%**	**8.1%**	**69.13**

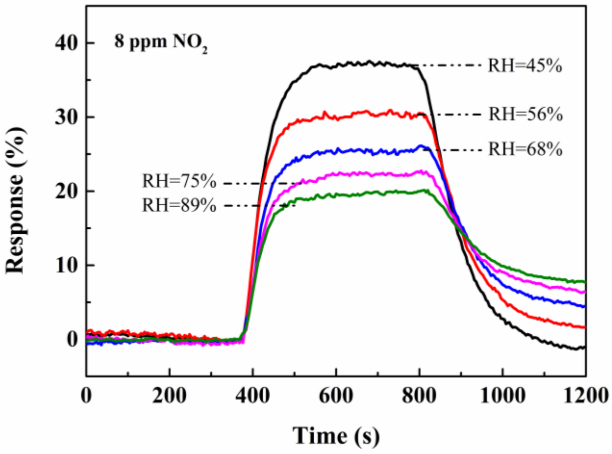

Fig. S4. The dynamic response curves of $SnSe_2$ sensor to NO_2 under different humidity conditions.

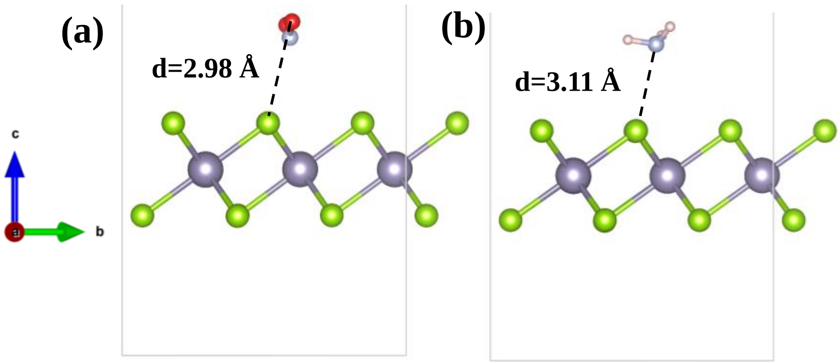

Fig. S5. The structure models of $SnSe_2$ with adsorbed NO_2 (a) and adsorbed NH_3 (b) molecules.