Electronic Supplementary Material (ESI) for Environmental Science: Nano.

Supporting Materials:

Synergistic enhanced NH_3-sensing of SnS via $Ti_3C_2T_x$-oriented vertical growth and oxygen-containing functional group regulation

Qin Yuxiang[*abc], Xie Jing*[a], Bai Yinan*[a]*

School of Microelectronics, Tianjin University, 92 Weijin Road, Nankai District, Tianjin 300072, China.

E-mail:

qinyuxiang@tju.edu.cn; Tel: +86 22 27402372

[a]School of Microelectronics, Tianjin University, Tianjin, 300072, China.

[b]Tianjin Key Laboratory of Imaging and Sensing Microelectronic Technology, Tianjin University, Tianjin, 300072, China

[c]Key Laboratory for Advanced Ceramics and Machining Technology, Ministry of Education, School of Materials Science and Engineering, Tianjin University, Tianjin, 300072, China

E-mail address: qinyuxiang@tju.edu.cn (Y. Qin)

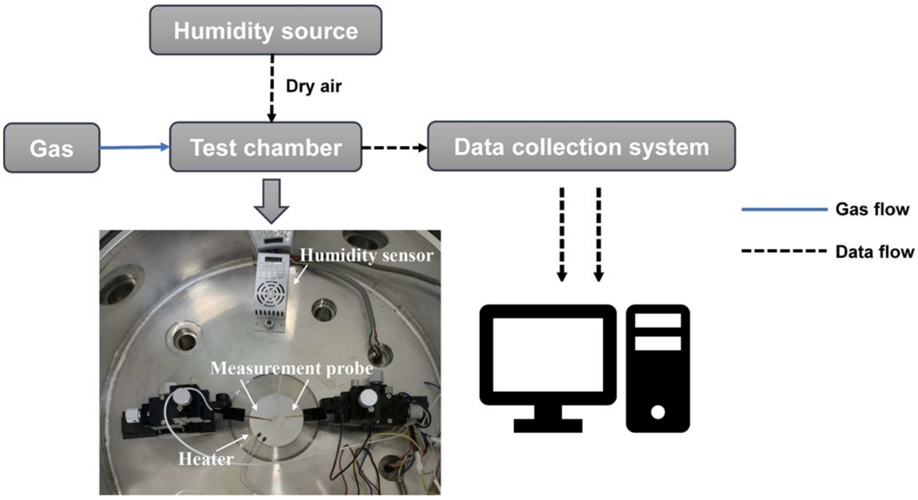

Fig. S1. Schematic diagram of the gas-sensing measurement system.

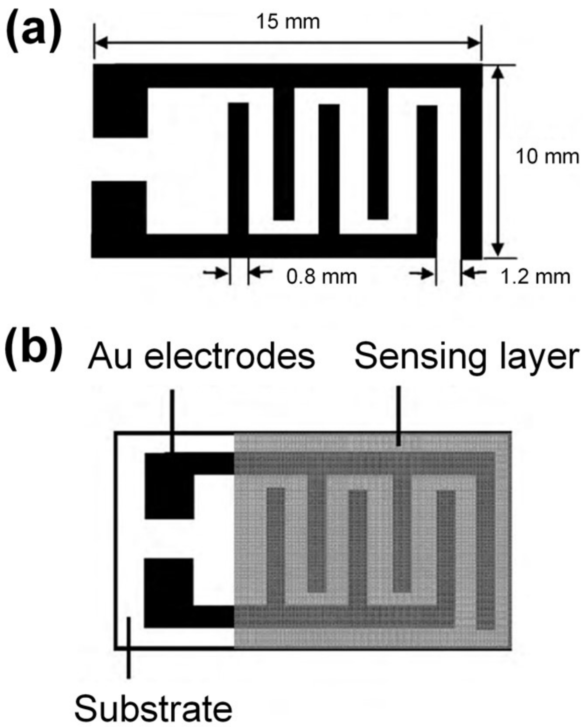

Fig. S2. Schematic diagrams of the interdigitated Au electrodes (a), the sensor (b).

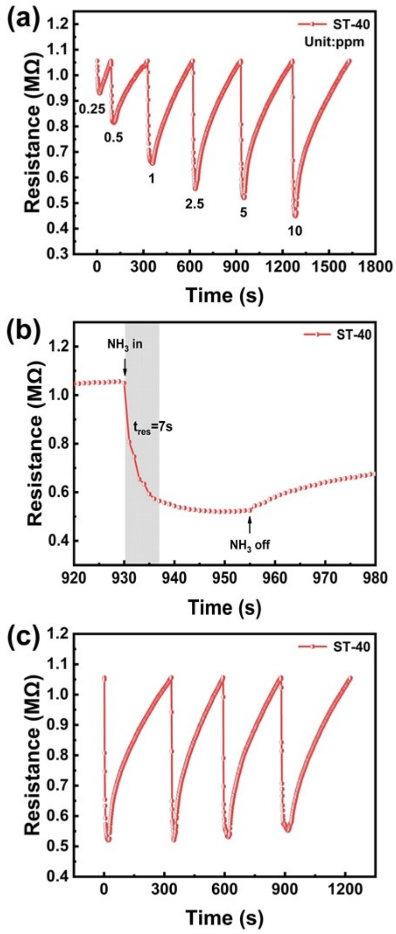

Fig. S3. (a) Dynamic response of $SnS/Ti_3C_2T_x$ (ST-40) to 0.25-10 ppm of NH_3 at 25 °C; (b) Response time of $SnS/Ti_3C_2T_x$ (ST-40) to 5 ppm of NH_3 at 25 °C. (c) Response cycle of $SnS/Ti_3C_2T_x$ (ST-40) to 5 ppm of NH_3 at 25 °C.

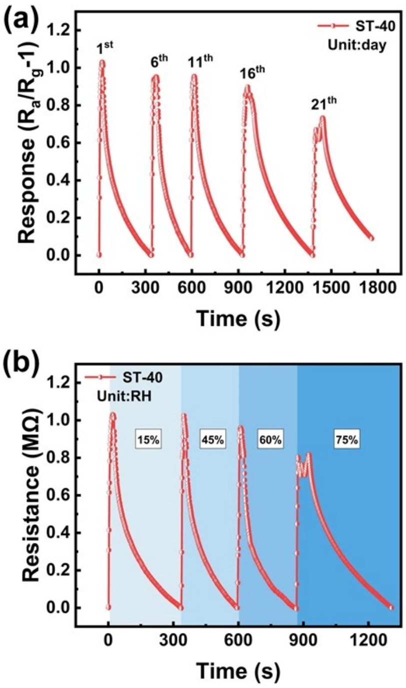

Fig. S4. (a,b) Dynamic response of SnS/$Ti_3C_2T_x$ (ST-40) to 5 ppm of NH_3 at 25 °C (a) for 3 weeks; (b) under different relative humidity.

Table S1 Parameters and statistics of the ST-40 and OST-40 response cubic fitting equation.

Model	ST-40	OST-40
Equation	y = A + B*x + C*x^2 + D*x^3	
Plot	△R/Ra (value/standard error)	
A	0.38617	2.19852
B	0.05487	0.14604
C	-0.00129	-0.00367
D	8.04436E-6	2.20193E-5
R-Square(COD)	1	1
Adj. R-Square	--	--

Table S2 Comparison of gas sensing performance of NH_3 sensors based on different materials at their optimal operating temperature in recent years.

Materials	Concentration (ppm)	Temperature (°C)	Response ($\lvert R_a/R_g \rvert$-1)	Ref.
NiO	1000	250	2.98	[1]
CNFL/SnO_2	100	400	0.71	[2]
SnO_2/RGO	500	RT	0.9	[3]
SnO_2/$Ti_3C_2T_x$	50	RT	0.4	[4]
TiO_2/$Ti_3C_2T_x$	10	RT	0.031	[5]
MoS_2/MoO_3	50	RT	0.55	[6]
SnS/$Ti_3C_2T_x$	5	25 °C	1.03	This work
O-SnS/$Ti_3C_2T_x$	5	25 °C	3.83	This work

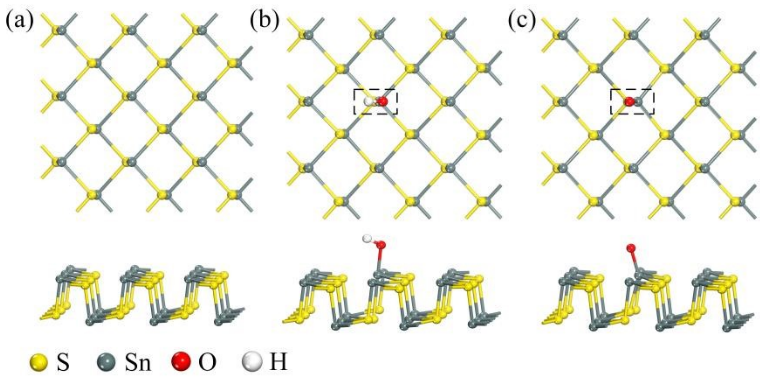

Fig. S5 Top and side views of (a) pure SnS, (b) OH-SnS and (c) O-SnS.

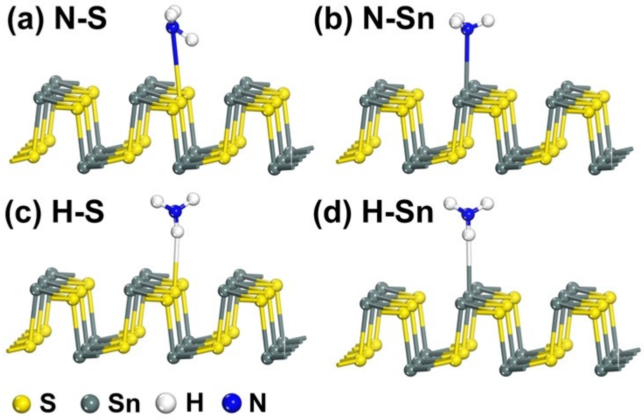

Fig. S6 Side views of possible adsorption configurations of NH_3 molecules on pure SnS: (a) N-S, (b) N-Sn, (c) H-S, (d) H-Sn.

References

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