Supporting Information

Ultrasensitive Room-Temperature Acetone Gas Sensors Employing Green-Solvent-Processed Aligned InNdO Nanofiber Field-Effect Transistors

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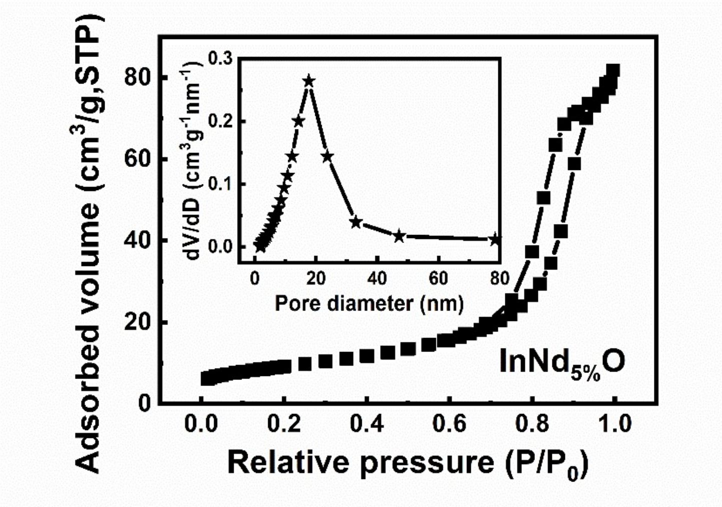

Fig. S1 N_2 adsorption-desorption isotherms and pore size distribution of $InNd_{5\%}O$ nanofibers.

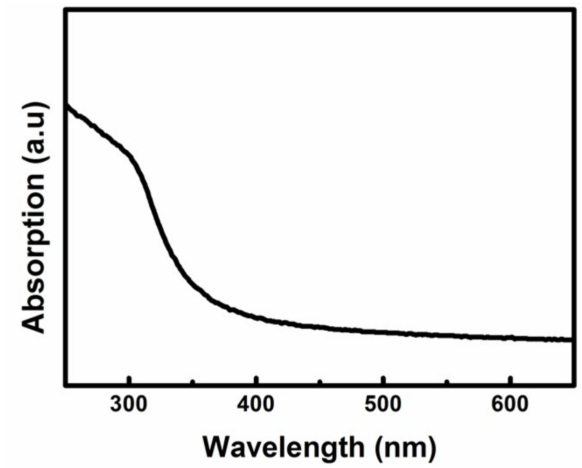

Fig. S2 Light absorption property of $InNd_{3\%}O$ nanofibers.

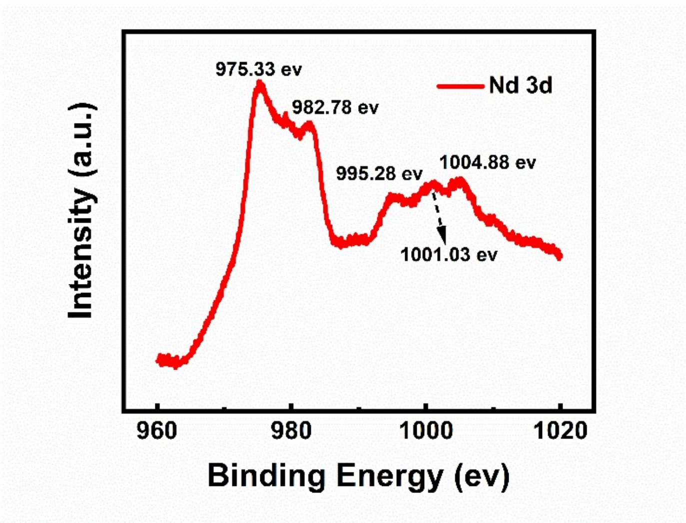

Fig. S3 Nd3d XPS spectrum with 3 mol.% Nd-In_2O_3

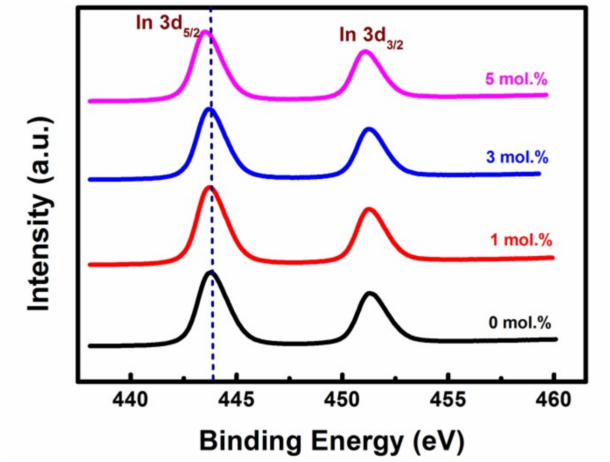

Fig. S4 In3d XPS spectrum with various Nd doping ratios

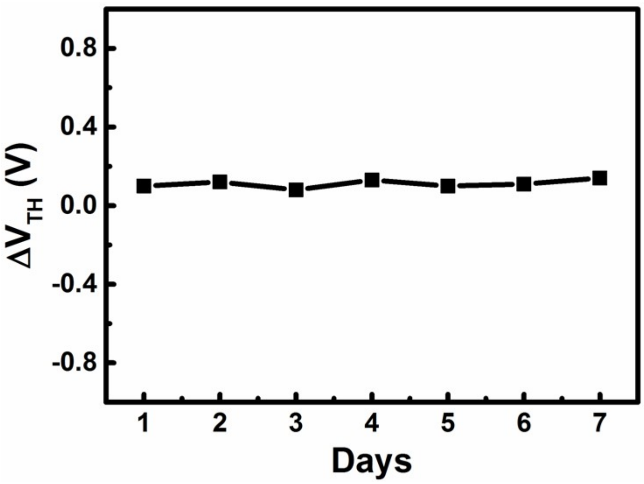

Fig. S5 Variation of V_{TH} of aligned InNdO nanofiber FET measured within 7 days.

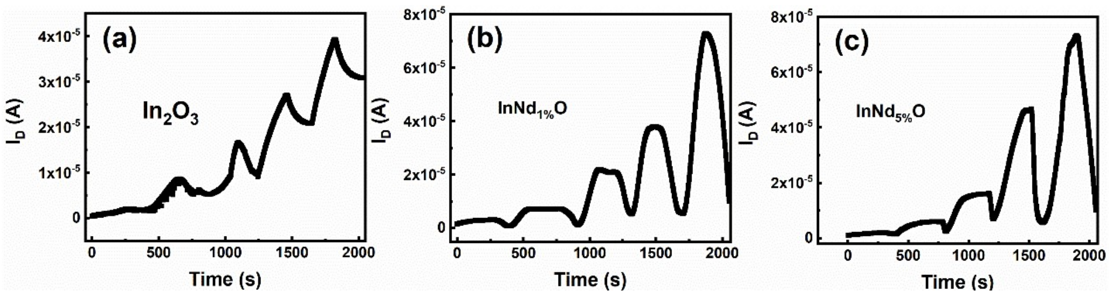

Fig. S6 Gas-sensing properties of 0, 1 and 5 mol.% Nd-doped In_2O_3 sensors.

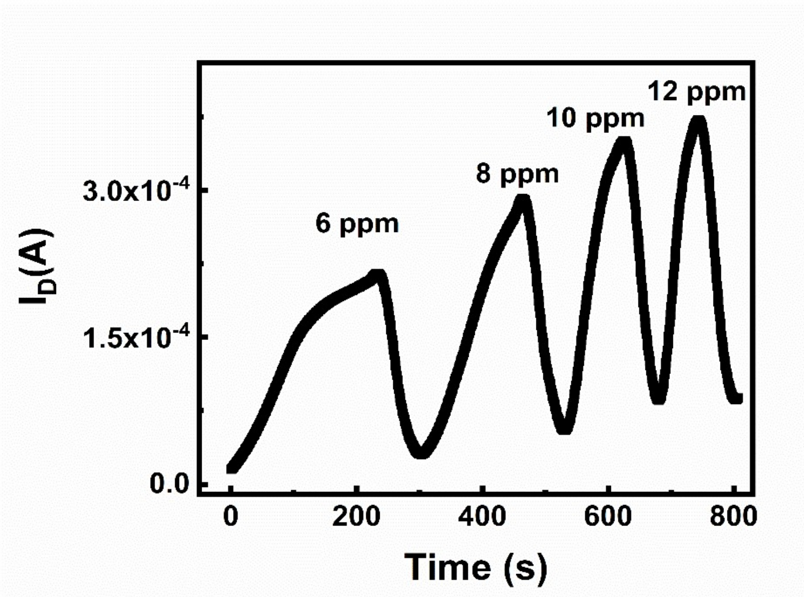

Fig. S7 Aligned InNdO nanofiber FET saturation concentration sensing test

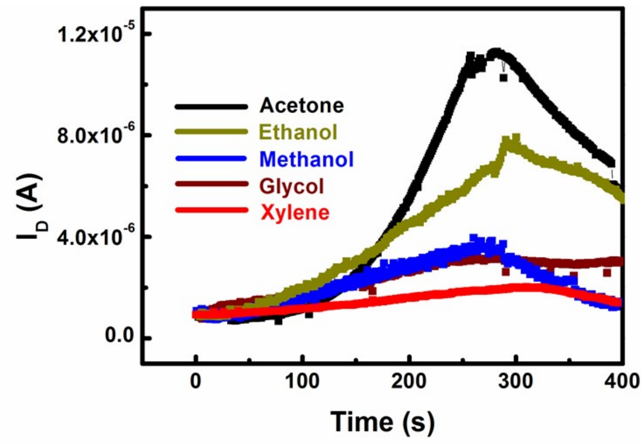

Fig. S8 Dynamic response behavior of the aligned InNdO nanofibers FET gas sensors to 0.5 ppm acetone, ethanol, methanol, glycol, and xylene gas (V_G = 2 V and V_D = 20 V).

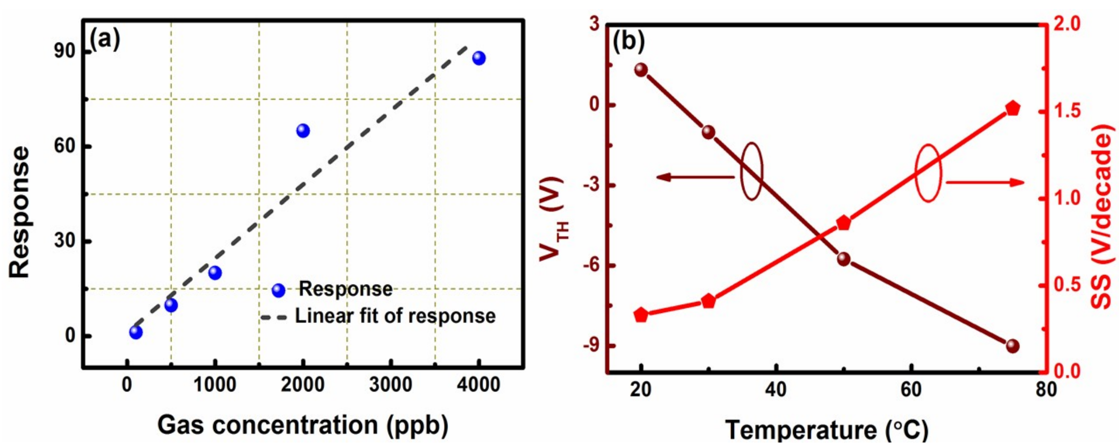

Fig. S9 (a) Limit of detection calculation. (b) Electrical parameters of V_{TH} and *SS* as a function of operation temperature for aligned InNdO nanofibers FET sensors.

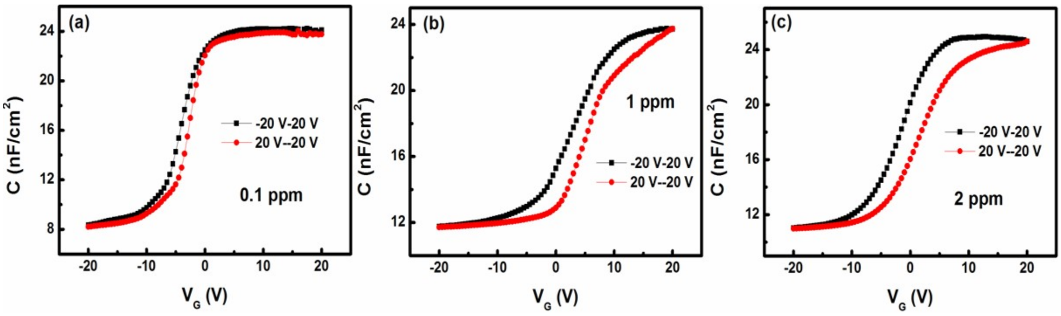

Fig. S10 *C-V* curves of (a) 0.1, (b) 1, (c) 2 ppm for the aligned InNdO nanofibers.

Table S1 Sensing performance of acetone gas sensors in the previously reported results.

Sensing materials	Synthesis	Sensor type	Concentration (ppm)	Response	Detection limit (ppm)	Temperature (°C)	Ref.
ZnO branched p-CuxO@n-	ALD	Chemiresistor	5	3.39	5	250	1
Ce–ZnO	Spray pyrolysis technique	Chemiresistor	5	3	5	24	2
Au-doped ZnO nanorod	hydrothermal	Chemiresistor	5	44.5	0.005	150	3
Pd-doped ZnO nanorod	Hydrothermal	Chemiresistor	5	31.8	0.005	150	4
Cr doped ZnO	Sputtering	Chemiresistor	15	2.8	15	300	5
GQD-modified 3DOM ZnO	Self-assembly	Chemiresistor	1	15.2	0.0087	320	6
Rh-doped SnO_2	Electrospinning	Chemiresistor	50	60.6	1	200	7
$InNd_{3\%}O$ nanofibers	Electrospinning	FET	4	88	0.069	20	This work

Reference:

1. H. S. Jeong, M. J. Park, S.-H. Kwon, H. J. Joo and H. I. Kwon, *Sens. Actuators B chem*, 2019, **288**, 625-33.
2. X.-T. Xue, L. Y. Zhu, K. P. Yuan, C. Zeng, X.-X. Li and H.-P. Ma, *Sens. Actuators B chem*, 2020, **324**, 128729.
3. A.J. Kulandaisamy, V. Elavalagan, P. Shankar, G.K. Mani, K.J. Babu, and J.B.B. Rayappan, *Ceram. Int.*, 2016, **42**, 18289-95.
4. J. Huang, J. Zhou, Z. Liu, X. Li, Y. Geng and X. Tian, *Sens. Actuators B chem*, 2020, **310**, 127129.
5. N.H. Al Hardan, M.J. Abdullah and A.A. Aziz, *Appl. Surf. Sci.*, 2013, **270**, 480-5.
6. W. Liu, X. Zhou, L. Xu, S. Zhu, S. Yang and X. Chen, *Nanoscale*, 2019, **11**, 11496-504.
7. X. Kou, N. Xie, F. Chen, T. Wang, L. Guo and C. Wang, *Sens. Actuators B chem*, 2018, **256**, 861-9.