Electrospinning of mesoporous p-type In_2O_3/TiO_2 composite nanofibers for enchancing NO_x gas sensing properties at room temperature

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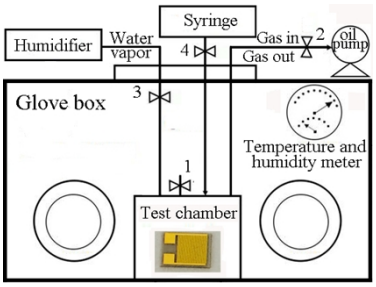

Fig. S1 The diagram of the gas delivery system for the gas sensing process.

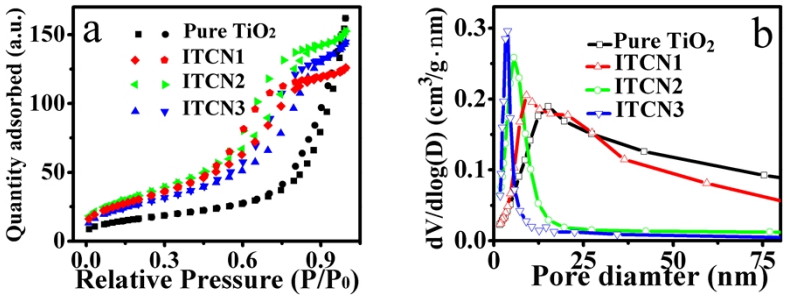

Fig. S2 (a) N_2 adsorption-desorption isotherms and (b) BET pore size distribution from the adsorption branch isotherm of pure TiO_2 nanofibers, ITCN1, ITCN2 and ITCN3.

Table S1 BET surface area of samples

Samples	Pure TiO_2 NFs	ITCN1	ITCN2	ITCN3
BET surface area (m^2/g)	59.52	99.69	120.8	111.4
Dominated mesopore size (nm)	5.54	9.05	15.2	3.84

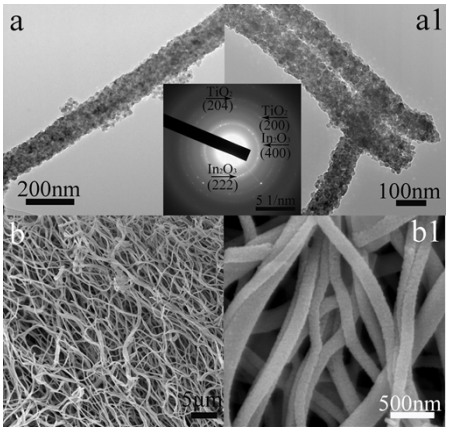

Fig. S3 (a) (a1) TEM image of ITCN3. The inset was SAED pattern of the Low magnification TEM image, (b) (b1) SEM images of ITCN3.

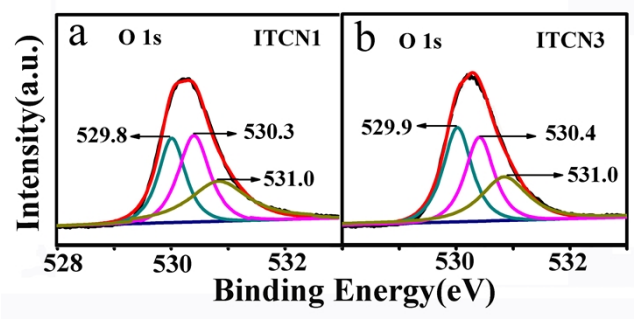

Fig. S4 XPS spectra of the O1s of (a) ITCN1; (b) ITCN3.

According to the Fig. S4 (a, b), the calculated chemisorption oxygen (O_b peak area) of ITCN1 and ITCN3 was about 32.4% and 34.1%, respectively.

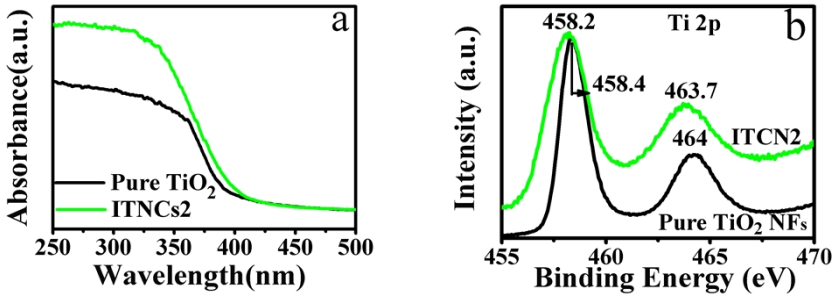

Fig. S5 (a) UV-vis absorption spectra of pure TiO_2 NFs and ITCN2, (b) Raman spectra of pure TiO_2 NFs and ITCN2

Fig. S5a showed the UV visible absorption spectra for the ITCN2 and the pure TiO_2 NFs. As it could be seen that the pure TiO_2 NFs showed a clear absorption edge at about 395 nm, this was only exhibited in the fundamental absorption in the UV region. The curves of ITCN2 exhibited a mixed absorption property of both TiO_2 and In_2O_3. The ITCN2 gave an absorbance at 405 nm.

As shown in Fig. S5b, the band gap values calculated for these absorbance values were corresponding to 3.15 and 3.07 eV, which might be considered as the effects of small size and existence of In^{3+}.

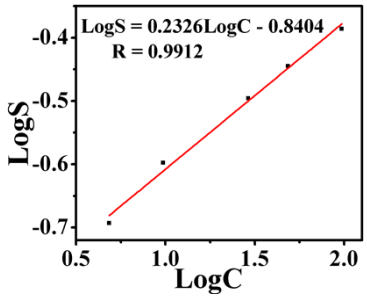

Fig. S6 The linear range of NO_x response of ITCN2.

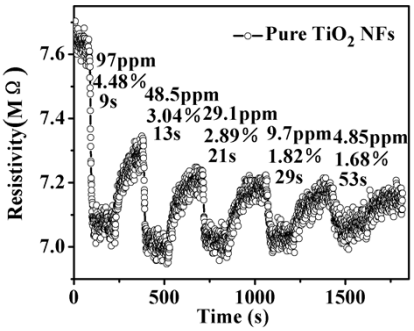

Fig. S7 Response to NO_x for the sample pure TiO_2 NFs at room temperature. (humidity 26 %)

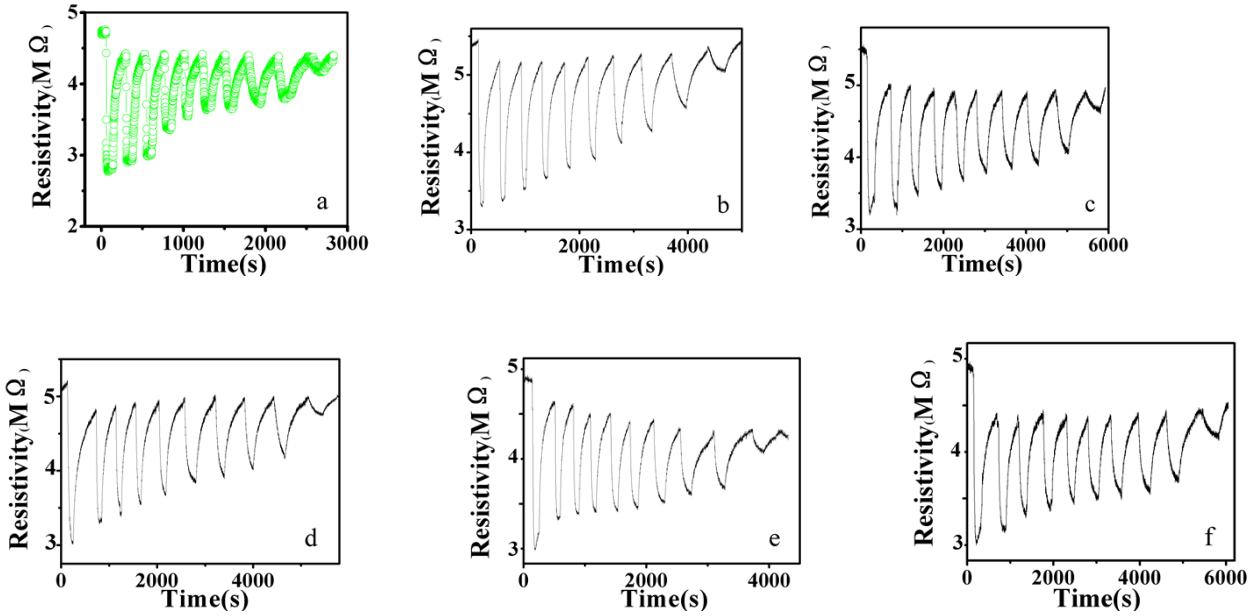

Fig. S8 Curves of the stability test of the gas response for the ITCN2 sensor to NO_x at RT in air. (a) fresh; (b) after 7 days; (c) after 14 days; (d) after 21 days; (e) after 28 days; (f) after 35 days.