Electronic Supplementary Information

Designed synthesis of Co-doped spongy-like In_2O_3 for high sensitive detection of acetone gas

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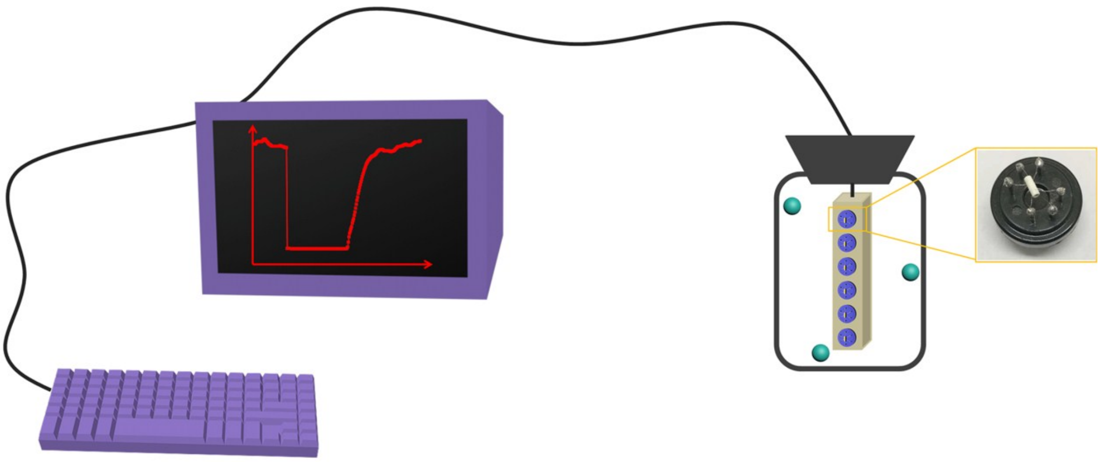

Fig. S1. The schematic illustration of acetone testing assembly.

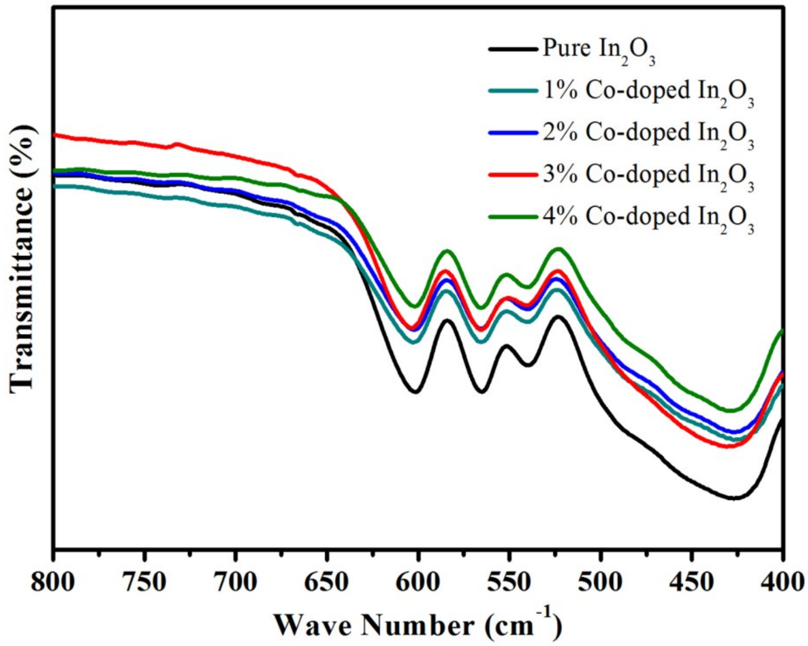

Fig. S2. FTIR spectra of pure In_2O_3 and Co-doped In_2O_3.

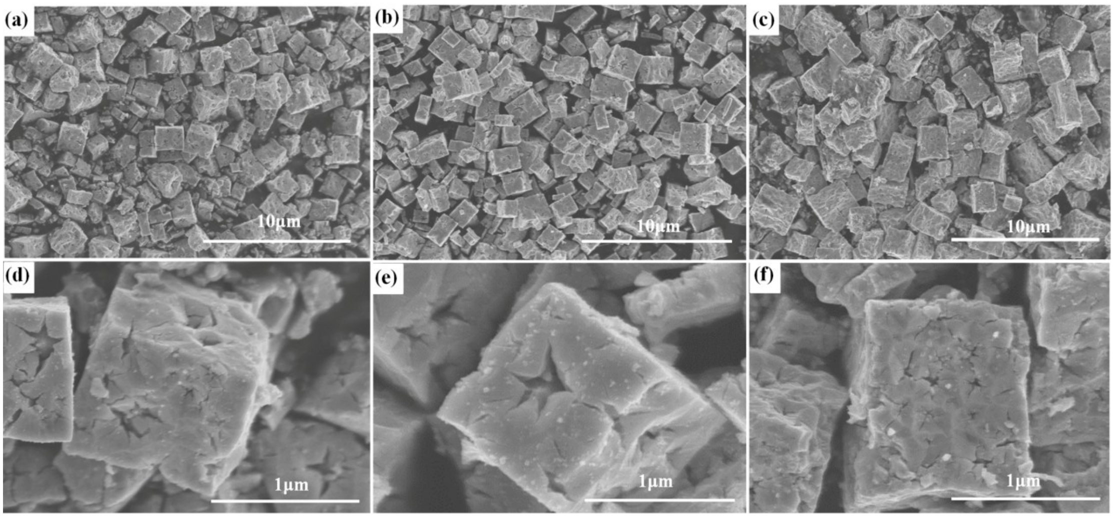

Fig. S3. SEM patterns of (a, d) 1 mol% Co-doped In_2O_3, (b, e) 2 mol% Co-doped In_2O_3 and (c, f) 4 mol% Co-doped In_2O_3.

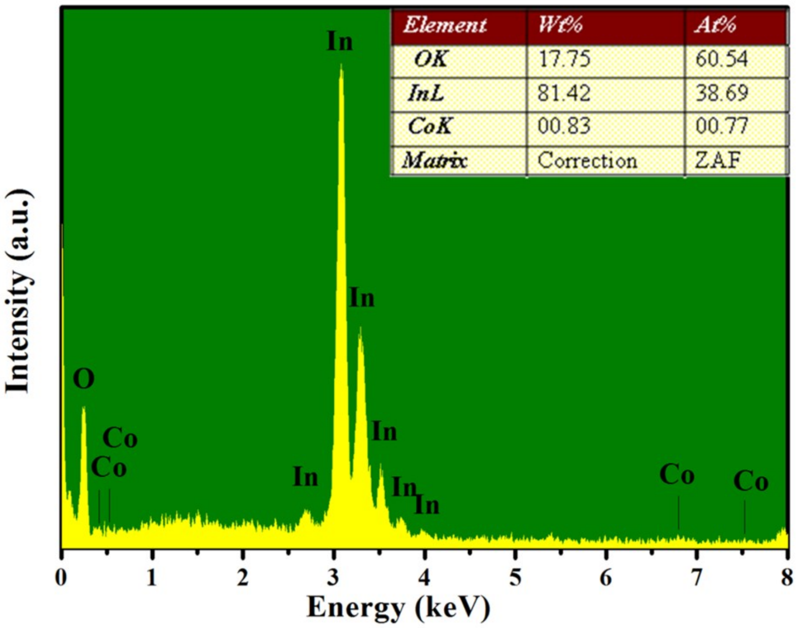

Fig. S4. The energy-dispersive X-ray spectroscopy (EDS) elemental spectrum of 3 mol% Co-doped In_2O_3.

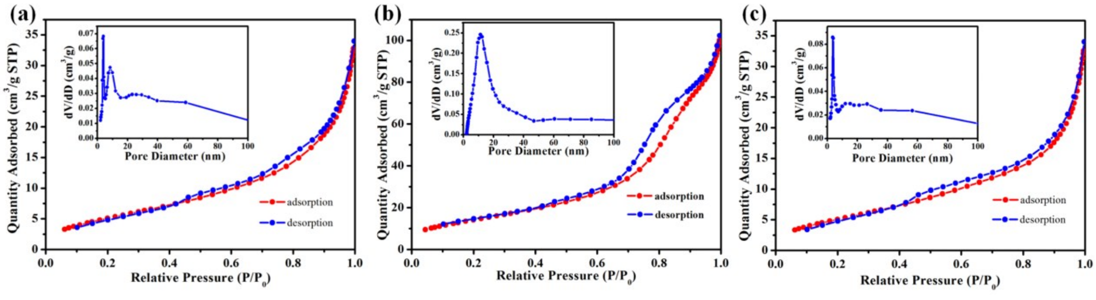

Fig. S5. Typical nitrogen adsorption−desorption isotherms and BJH pore-size distribution of (a) 1 mol% Co-doped In_2O_3, (b) 2 mol% Co-doped In_2O_3 and (c) 4 mol% Co-doped In_2O_3.

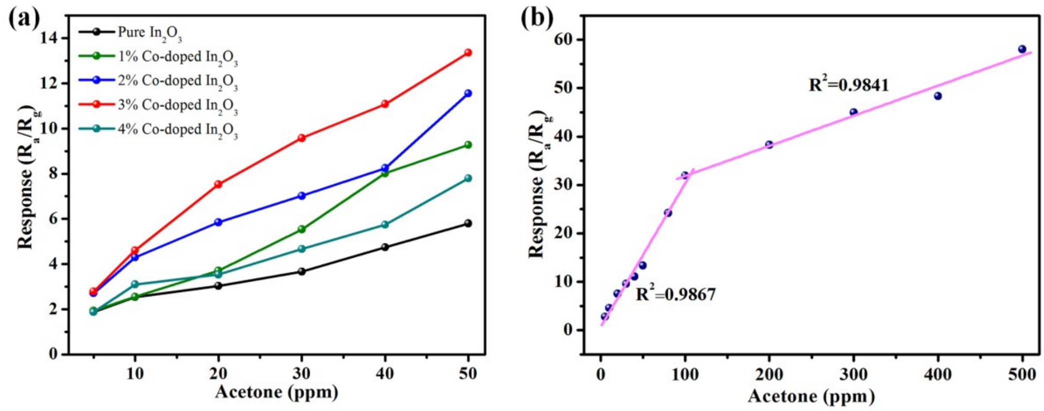

Fig. S6. (a) Relationship between the gas response and acetone concentration (5~50 ppm) at operation temperature of 240 °C; (b) The fitting curves between the responses of 3 mol% Co-doped In_2O_3 sensor and acetone concentration at 240 °C.

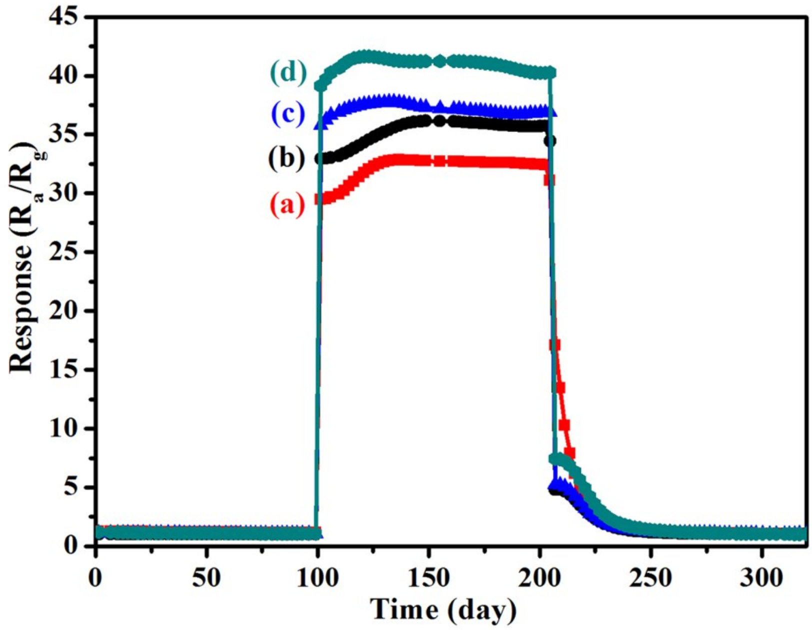

Fig. S7. Response of 3 mol% Co-doped In_2O_3 to mixture of (a) 100 ppm acetone and 100 ppm water, (b) 100 ppm acetone and 100 ppm ethanol, (c) 100 ppm acetone and 100 ppm acetaldehyde and (d) 100 ppm acetone and 100 ppm methanol at 240 °C.

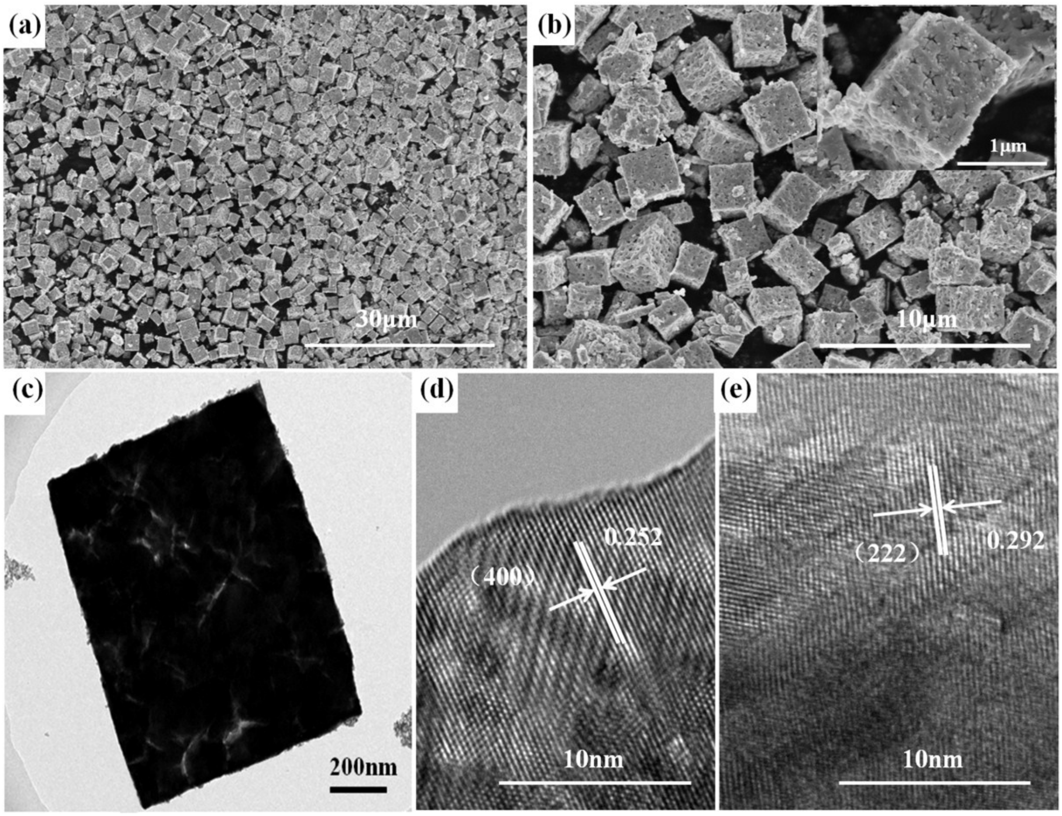

Fig. S8. (a-b) SEM images of 3 mol% Co-doped In_2O_3 after 20th cycles, (c-e) TEM images of 3 mol% Co-doped In_2O_3 after 20th cycles.

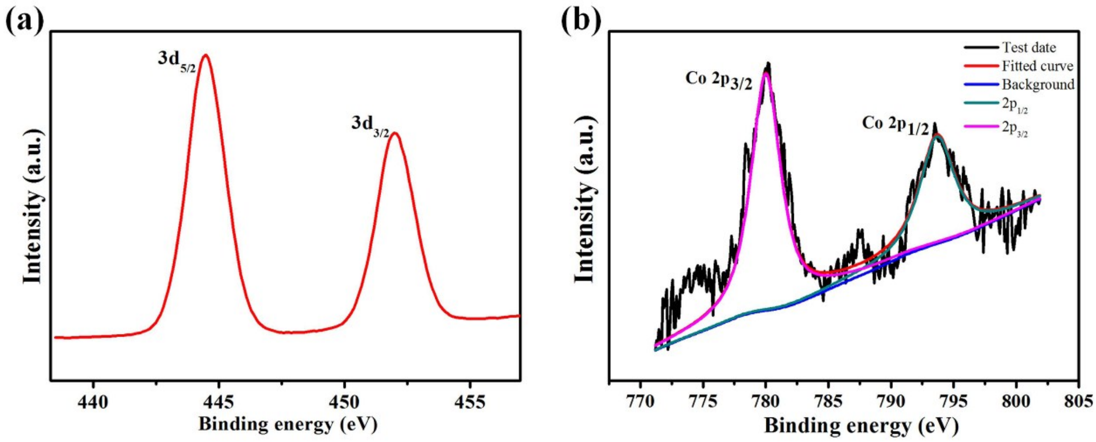

Fig. S9. The XPS spectrums of (a) In 3d in pure In_2O_3, (b) Co 2p in 3 mol% Co-doped In_2O_3.

Table S1. Gas sensing properties of different sensing materials to acetone, as reported in the literature and the present study.

sensing material	acetone/con.(ppm)	temperature (°C)	response	res./rec. time (s)	referencce
1-D α-Ag_2WO_4 nanorods	10	350	2.7	30/46	S1
In_2O_3 mesostructure	100	220	13.2	2/45	S2
NiO/ZnO hollow spheres	100	275	30	1/20	S3
raft-like Co_3O_4	200	180	9.2	58/17	S4
Eu-doped SnO_2 nanofibers	100	280	32.2	4/3	S5
Au-decorated ZnO microstructures	100	280	18.8	15/2	S6
Mo-W oxide nanofibers	100	375	26.5	-	S7
flower-like ZnO nanostructure	300	100	18.6	7/24	S8
Ce doping ZnO nanoparticles	100	300	20.3	10/9	S9
Co-doped spongy-like In_2O_3	100	240	32.808	1.143/37.5	This work

References:

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