Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information for

Facile synthesis of mesoporous hierarchical Co_3O_4–TiO_2 p–n heterojunctions with enhanced gas sensing performance

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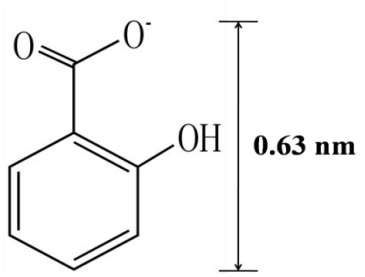

Fig. S1 Molecular structure of salicylic anion.

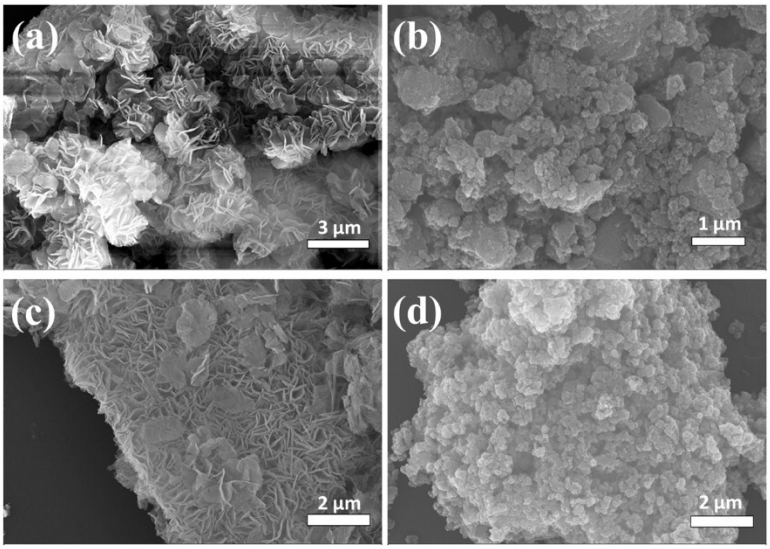

Fig. S2 SEM image (a) pure Co–LH, (b) Ti–LH, (c) pure Co_3O_4–350, and (d) pure TiO_2–350.

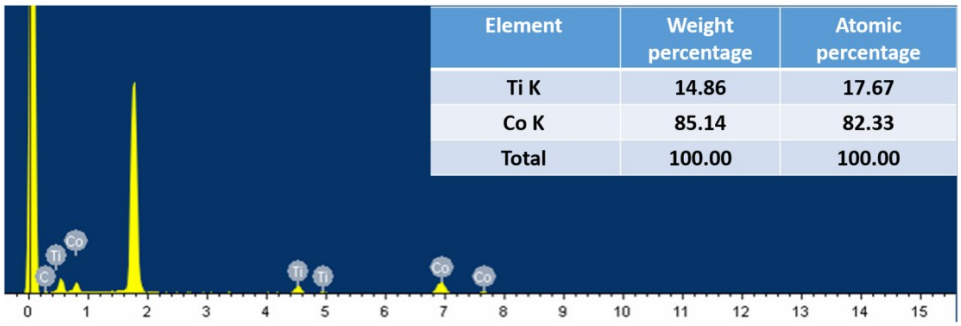

Fig. S3 The EDX spectra and atomic percentage of CoTiO–4–350.

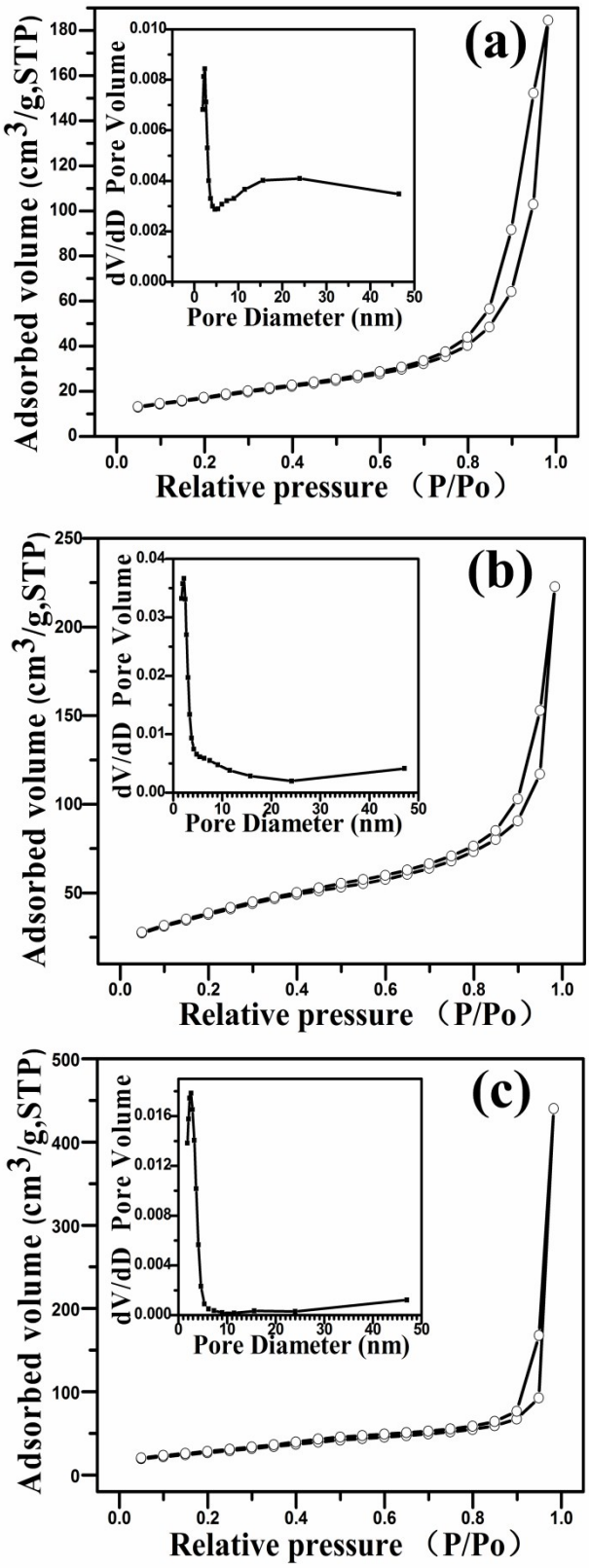

Fig. S4 Nitrogen adsorption–desorption isotherms and pore size distribution of (a) Co_3O_4–350, (b) CoTiO–4–300, and (c) CoTiO–4–400.

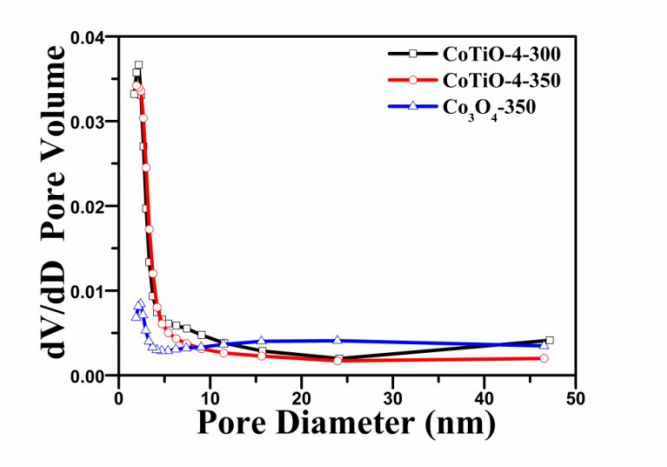

Fig. S5 The pore size distribution of Co_3O_4-350,CoTiO-4-300 and CoTiO-4-350.

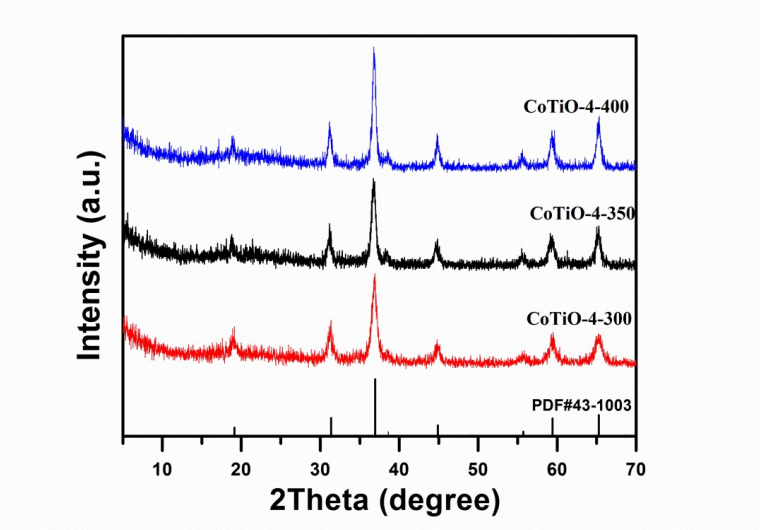

Fig. S6 XRD pattern of CoTiO–4–300, CoTiO–4–350 and CoTiO–4–400.

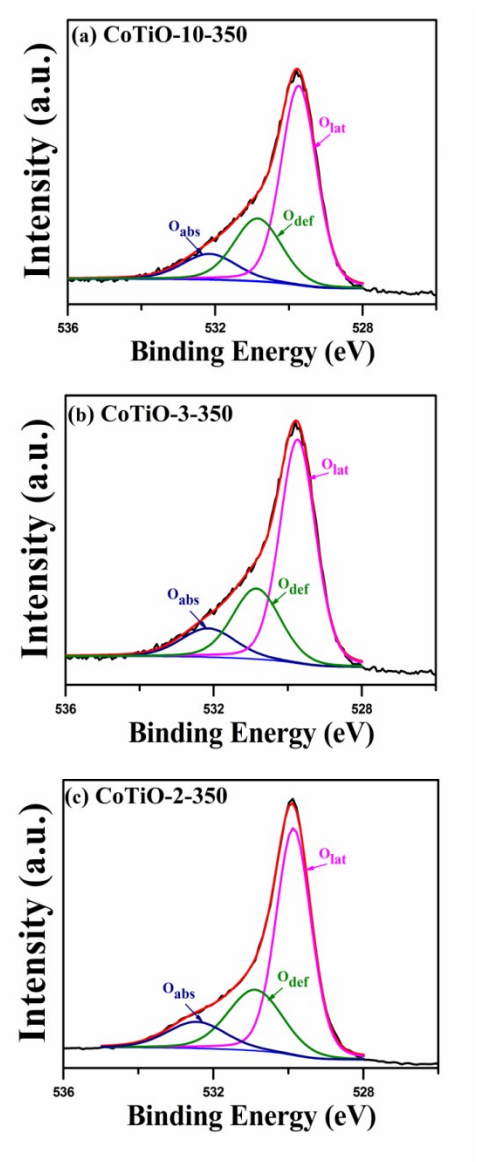

Fig. S7 The O 1s XPS spectra of CoTiO-10-350, CoTiO-3-350 and CoTiO-2-350.

Table S1 The relative percentage (%) of O 1s peaks for samples

	O_{abs}	O_{def}	O_{lat}
Co_3O_4-350	11.4	26.6	62.0
CoTiO-10-350	11.9	26.5	61.6
CoTiO-4-350	13.0	25.7	61.3
CoTiO-3-350	12.4	26.0	61.6
CoTiO-2-350	12.1	26.4	61.5

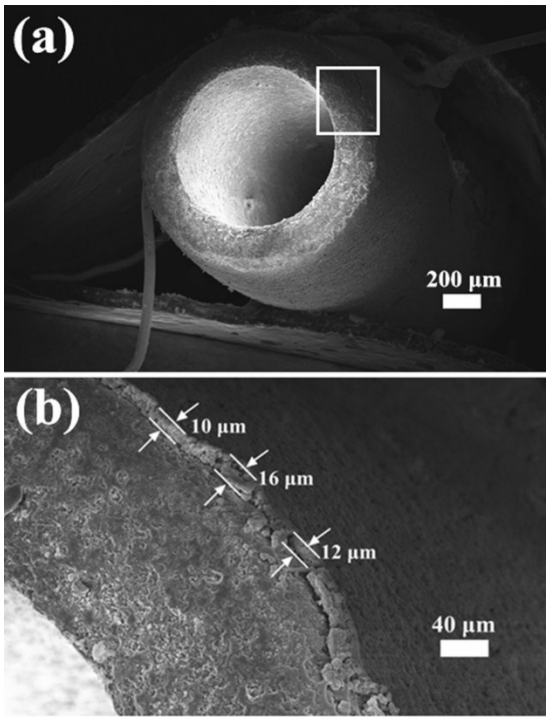

Fig. S8 Cross-section view images of the gas sensor.

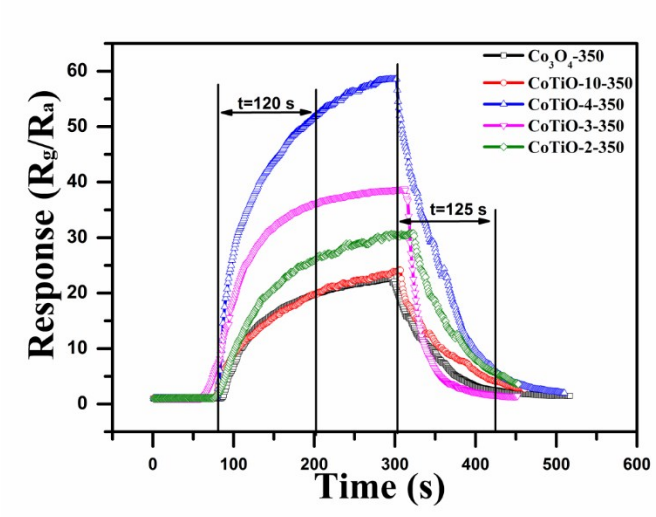

Fig. S9 Typical response and recovery curve of Co_3O_4-350, CoTiO-10-350, CoTiO-4-350, CoTiO-3-350 and CoTiO-2-350 to 50 ppm toluene at 115°C.

Table S2 Response values of sensors to 50 ppm xylene at different operating temperatures

Temperature	Co_3O_4-350	CoTiO-10-350	CoTiO-4-350	CoTiO-3-350	CoTiO-2-350	TiO_2-350
60	3	10	3	7	4	1
77	18	35	32	27	24.5	1
95	43	63	45	42	25.5	1
105	35	53	130	77	48	1
115	32	48	113	81	80	1
125	21.5	35	63	62	58	1
135	4	4	22	12	5	1

Table S3 The resistance of pure Co_3O_4–350 and CoTiO–4–350 in air and 50 ppm xylene at different temperatures (Resistance unit, kΩ)

Temperature	R_a（Co_3O_4-350）	R_g（Co_3O_4-350）	R_a（CoTiO-350）	R_g（CoTiO-350）
77	341.6	6148.7	374.6	16859.0
95	41.1	1766.9	28.5	3308.1
115	16.9	540.4	10.8	1142.9
135	9.7	209.3	5.8	255.2
155	1.9	7.7	2.0	4.7