Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

Supporting information available:

Synthesis of TiO_2-WO_3 nanocomposites as a highly sensitive benzene sensor and a high efficiency absorbent

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1. *Materials*

Unless otherwise stated, all reagents and chemicals were obtained commercially and used without further purification.

2. *Characterization*

X-ray diffraction (XRD) patterns of the products were recorded on a DX-1000 X-ray diffractometer equipped with graphite monochromatized Cu-Kα radiation (λ = 1.54056 Å). The microstructure of the TiO_2-WO_3 nanocomposites was investigated by Transmission electron microscopy (TEM, Hitachi H-600, Japan) and scanning electron microscopy (SEM, LEO1430VP, Germany). UV-vis absorption spectra were recorded with a Shimadzu UV-2450. The BET and BJH results were measured on a nitrogen adsorption apparatus (JW-BK, China) at 77 K.

3. Gas sensing

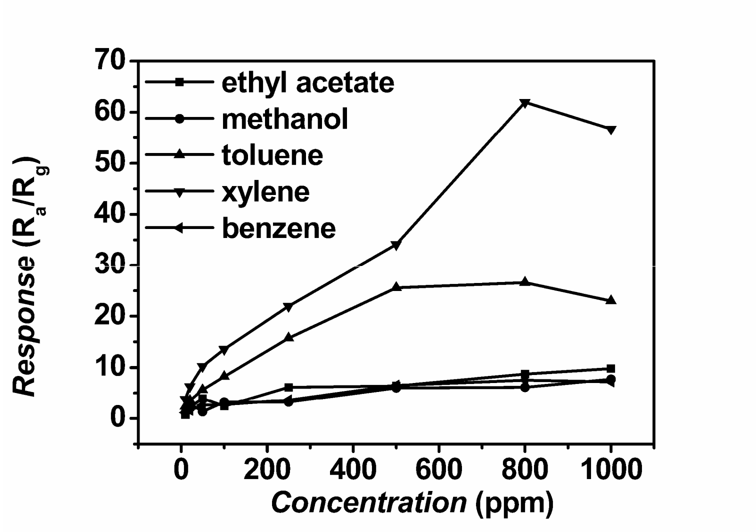

Fig. S1 The correlation between the concentration and the response (R_a/R_g) to three gases of the TiO_2-WO_3 composites (n_{Ti}:n_W=4:1) of methanol; ethyl acetate; benzene; toluene; xylene; at 340 °C; 400 °C; 400 °C; 440 °C; 420 °C, respectively.

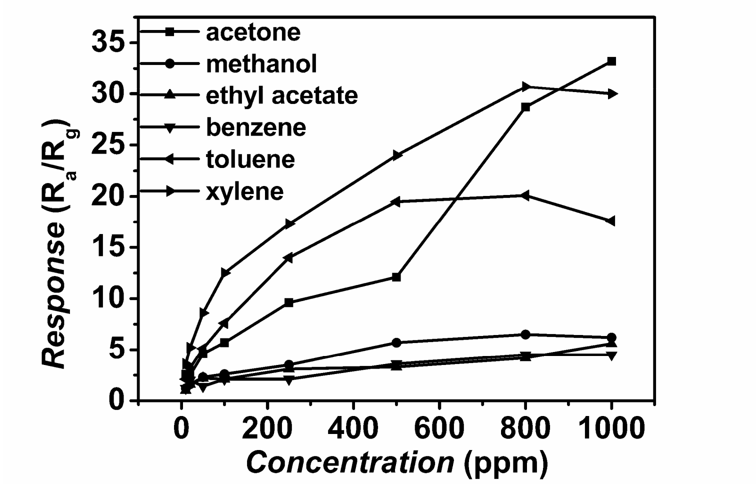

Fig. S2 The correlation between the concentration and the response (R_a/R_g) to three gases of the TiO_2-WO_3 composites (n_{Ti}:n_W=2:1) of acetone; methanol; ethyl acetate; benzene; toluene; xylene at 370 °C;340 °C; 400 °C; 400 °C; 440 °C; 420 °C, respectively.

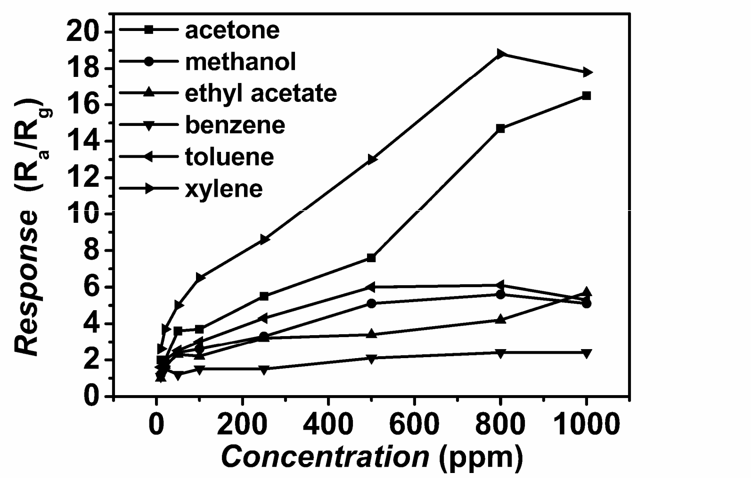

Fig. S3 The correlation between the concentration and the response (R_a/R_g) to three gases of the TiO_2-WO_3 composites (n_{Ti}:n_W=1:1) of acetone; methanol; ethyl acetate; benzene; toluene; xylene at 370 °C; 340 °C; 400 °C; 400 °C; 440 °C; 420 °C, respectively.

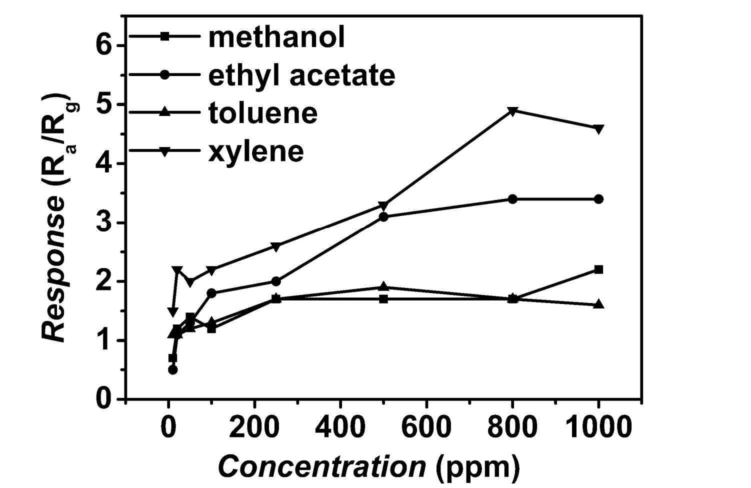

Fig. S4 The correlation between the concentration and the response (R_a/R_g) to three gases of the TiO_2-WO_3 composites (n_{Ti}:n_W=1:2) of methanol; ethyl acetate; toluene; xylene at 340 °C; 400 °C; 440 °C; 420 °C, respectively.

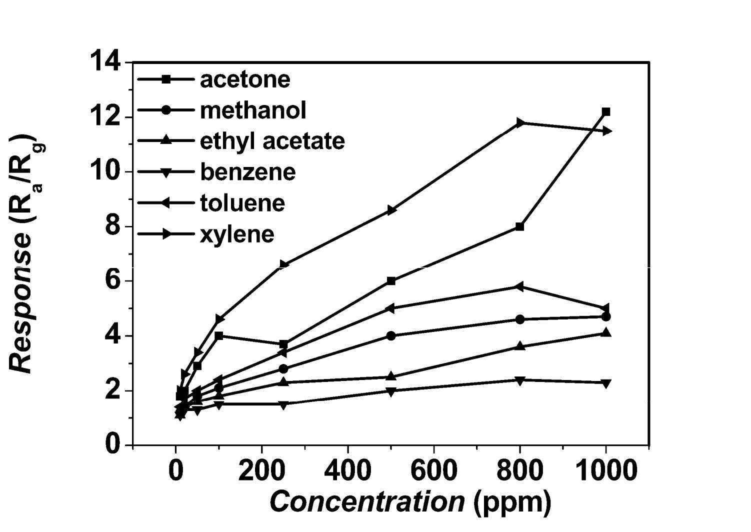

Fig. S5 The correlation between the concentration and the response (R_a/R_g) to three gases of the TiO_2-WO_3 composites (n_{Ti}:n_W=1:4) of ethanol; acetone; methanol; ethyl acetate; benzene; toluene; xylene at 340 °C; 370 °C; 420 °C; 400 °C; 400 °C; 440 °C; 420 °C, respectively.

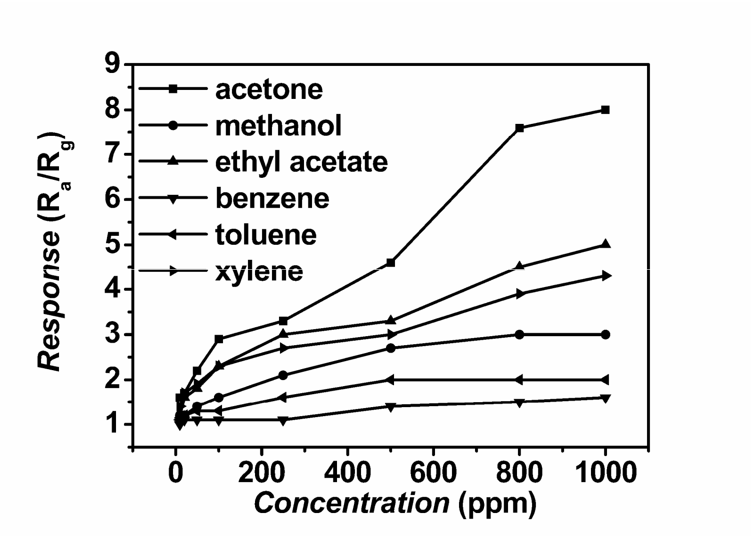

Fig. S6 The correlation between the concentration and the response (R_a/R_g) to three gases of the TiO_2-WO_3 composites (n_{Ti}:n_W=0:1) of ethanol; acetone; methanol; ethyl acetate; benzene; toluene; xylene at 340 °C; 370 °C; 420 °C; 400 °C; 400 °C; 440 °C; 420 °C respectively.

4. Adsorption

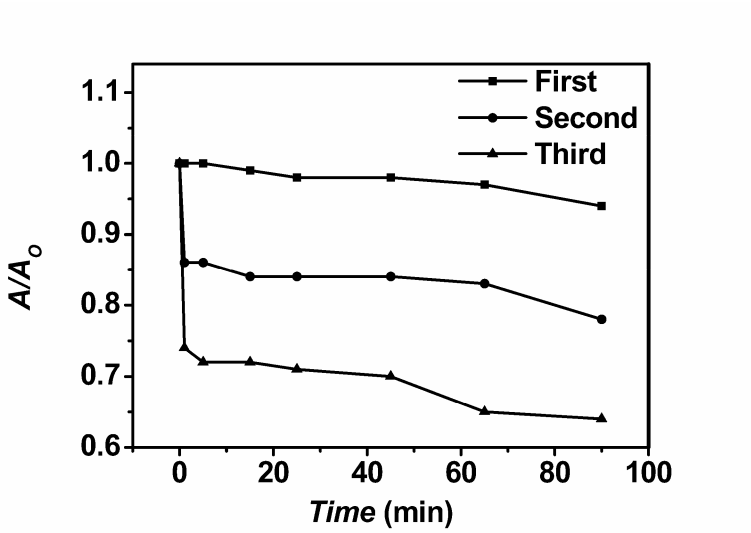

Fig. S7 Adsorption rate of the methylene blue (MB) on (a) fresh TiO_2-WO_3 composites (n_{Ti}:n_W=1:0); (b) secondary; (c) third, respectively.

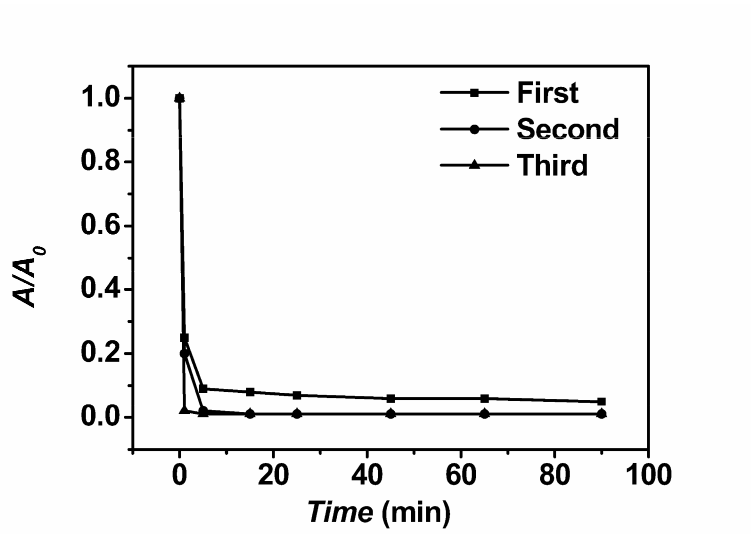

Fig. S8 Adsorption rate of the MB on (a) fresh TiO_2-WO_3 composites (n_{Ti}:n_W=4:1); (b) secondary; (c) third, respectively.

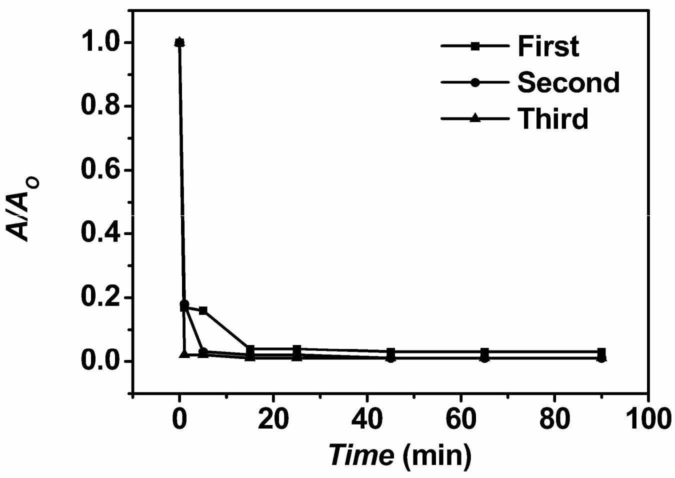

Fig. S9 Adsorption rate of the MB on (a) fresh TiO_2-WO_3 composites (n_{Ti}:n_W=2:1); (b) secondary; (c) third, respectively.

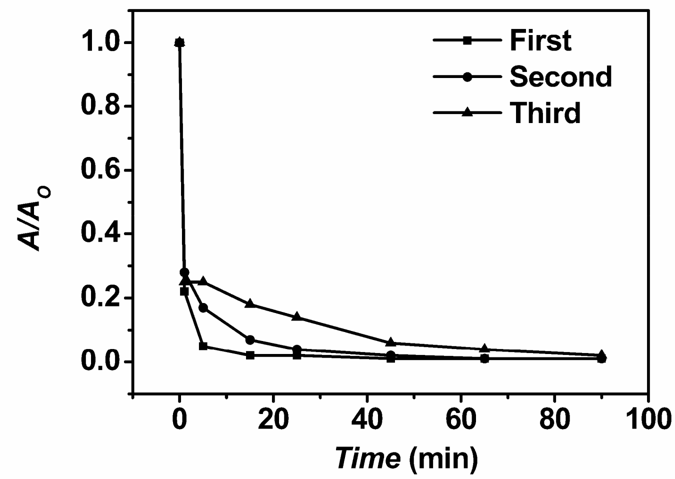

Fig. S10 Adsorption rate of the MB on (a) fresh TiO_2-WO_3 composites (n_{Ti}:n_W=1:1); (b) secondary; (c) third, respectively.

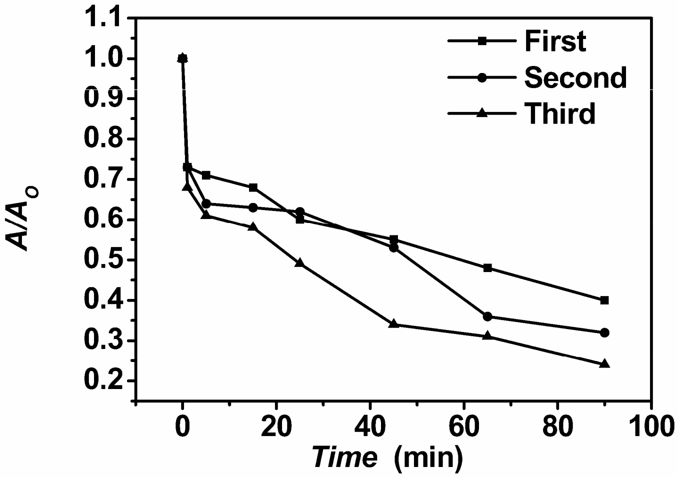

Fig. S11 Adsorption rate of the MB on (a) fresh TiO_2-WO_3 composites (n_{Ti}:n_W=1:2); (b) secondary; (c) third, respectively.

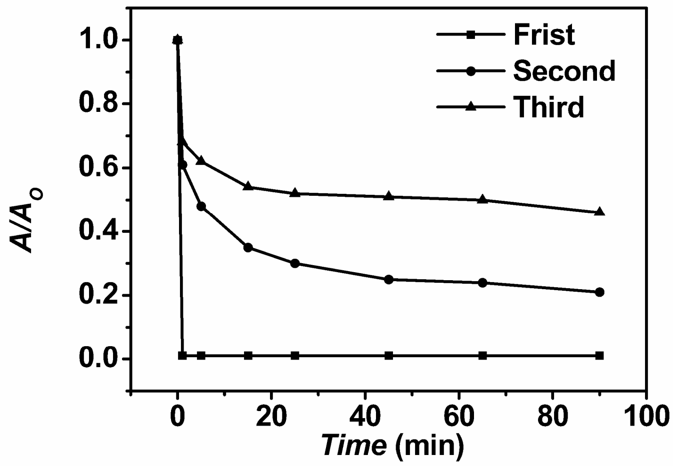

Fig. S12 Adsorption rate of the MB on (a) fresh TiO_2-WO_3 composites (n_{Ti}:n_W=1:4); (b) secondary; (c) third, respectively.

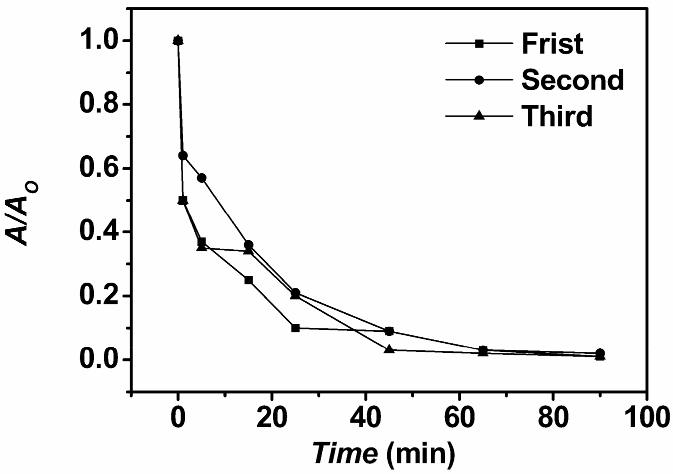

Fig. S13 Adsorption rate of the MB on (a) fresh TiO_2-WO_3 composites (n_{Ti}:n_W=0:1); (b) secondary; (c) third, respectively.