Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Synthesis and characterization of flower-like MoO_3/In_2O_3 microstructures for highly sensitive ethanol detection

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S1: XRD pattern of as-synthesized microstructures

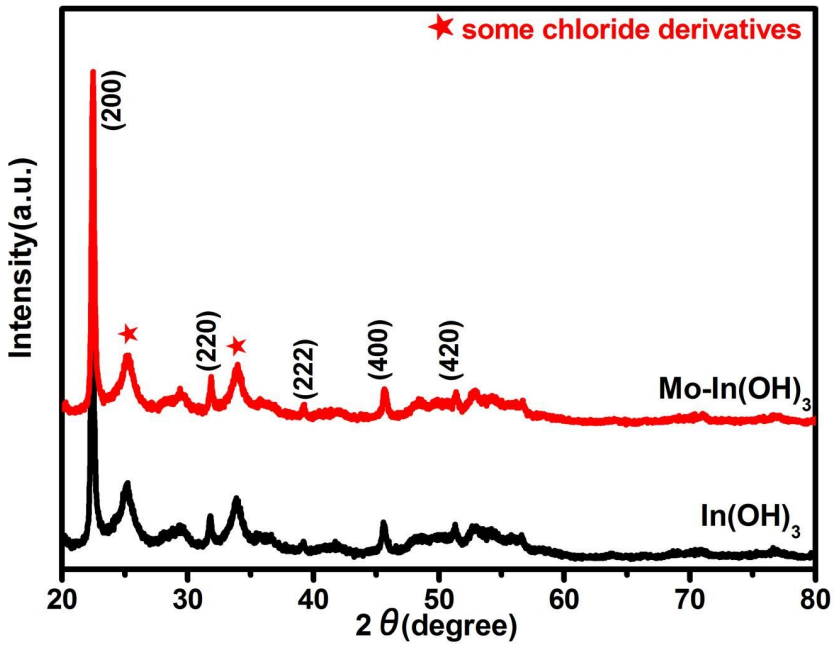

Fig. S1 X-ray diffraction patterns of as-obtained samples before calcination.

Fig. S1 shows the XRD pattern of as-synthesized pure and 3 mol% Mo-loaded In_2O_3 powder before calcining. Most of the diffraction peaks are coincident with the standard data file $In(OH)_3$ (JCPDS File no. 01-085), apart from two peaks marked with "★", which are indexed as some chloride derivatives [1-2].

S2: SEM images of as-prepared In_2O_3 samples

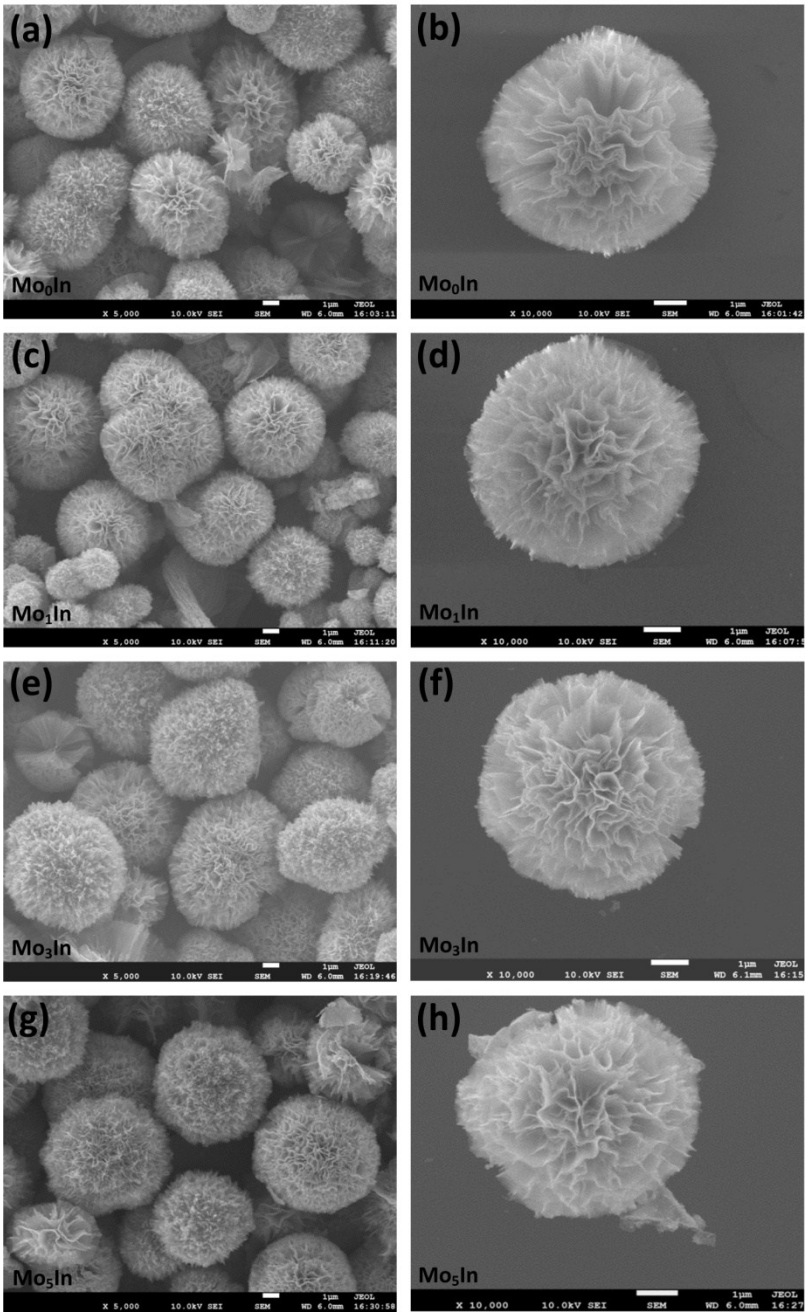

Fig. S2 SEM images of the as-prepared pure and Mo-loaded In_2O_3 microstructures, (a-b) Mo_0In, (c-d) Mo_1In, (e-f) Mo_3In, (g-h) Mo_5In.

Fig. S2 shows the low and high magnification SEM images of Mo_0In, Mo_1In, Mo_3In and Mo_5In, respectively. The hierarchical flower-like In_2O_3 microstructure is about 4 μm in diameter composed of ultrathin 25 nm thick nanosheets. From the high magnification SEM image, we can find that the introduction of Mo element has no apparent influence on morphology of microstructures.

S3: Resistance of as-prepared In_2O_3 gas sensors under different operating temperature

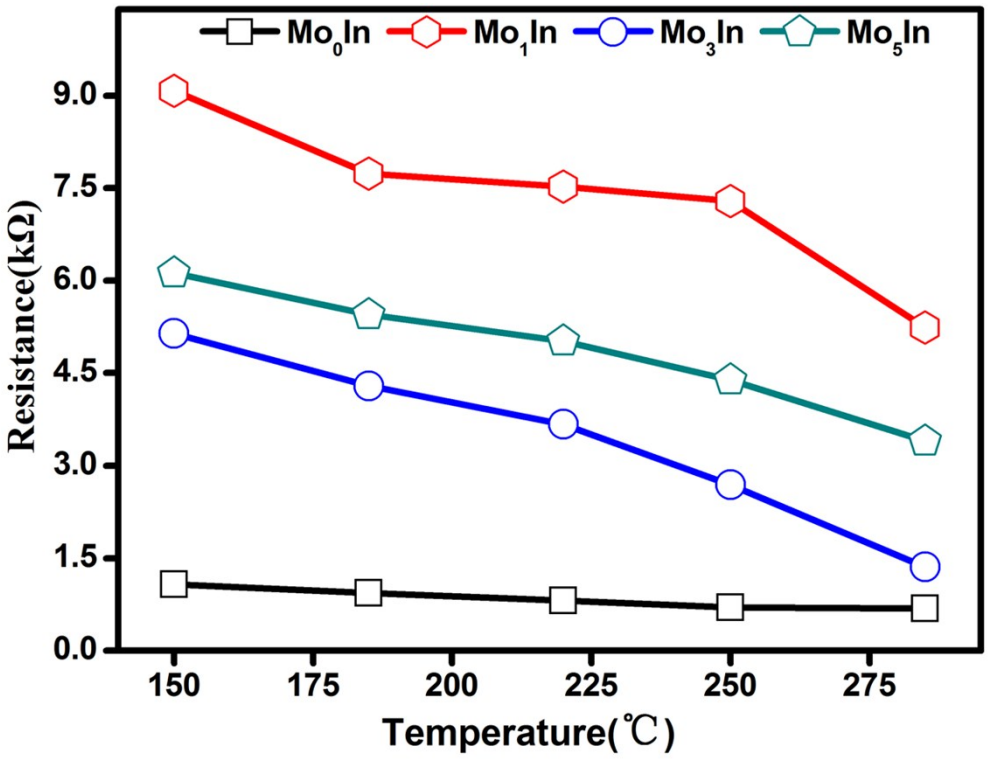

Fig. S3 Initial resistance of as-prepared In_2O_3 gas sensors under different operating temperature from 150 ℃ to 285 ℃.

S4: Response and recovery time of as-prepared In_2O_3 gas sensors under different operating temperature

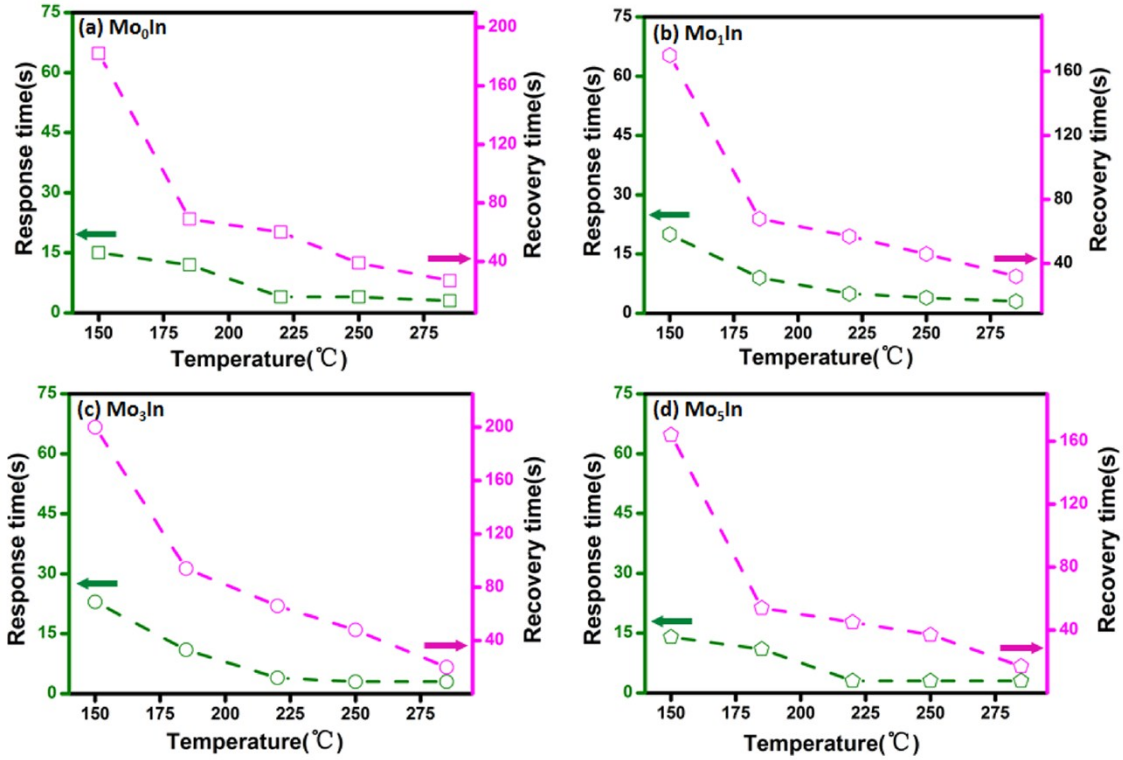

Fig. S4 The response/recovery time as a function of operating temperature to100 ppm ethanol, (a) Mo_0In, (b) Mo_1In, (c) Mo_3In, (d) Mo_5In.

S5: Dynamic resistance of as-prepared In_2O_3 gas sensors

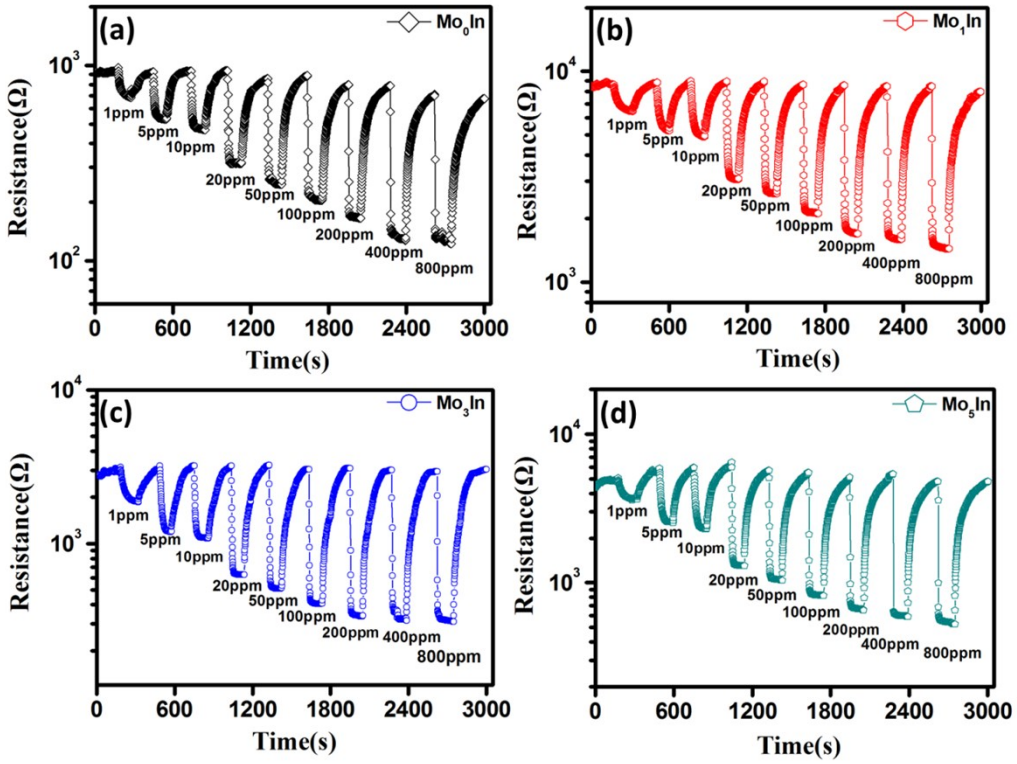

Fig. S5 Dynamic resistance of In_2O_3 gas sensors under different concentrations to ethanol at 185 ℃, (a) Mo_0In, (b) Mo_1In, (c) Mo_3In, (d) Mo_5In.

S6: Gas response of the as-prepared In_2O_3 gas sensors to low concentrations of ethanol (50 ppb-500 ppb) at 185 ℃

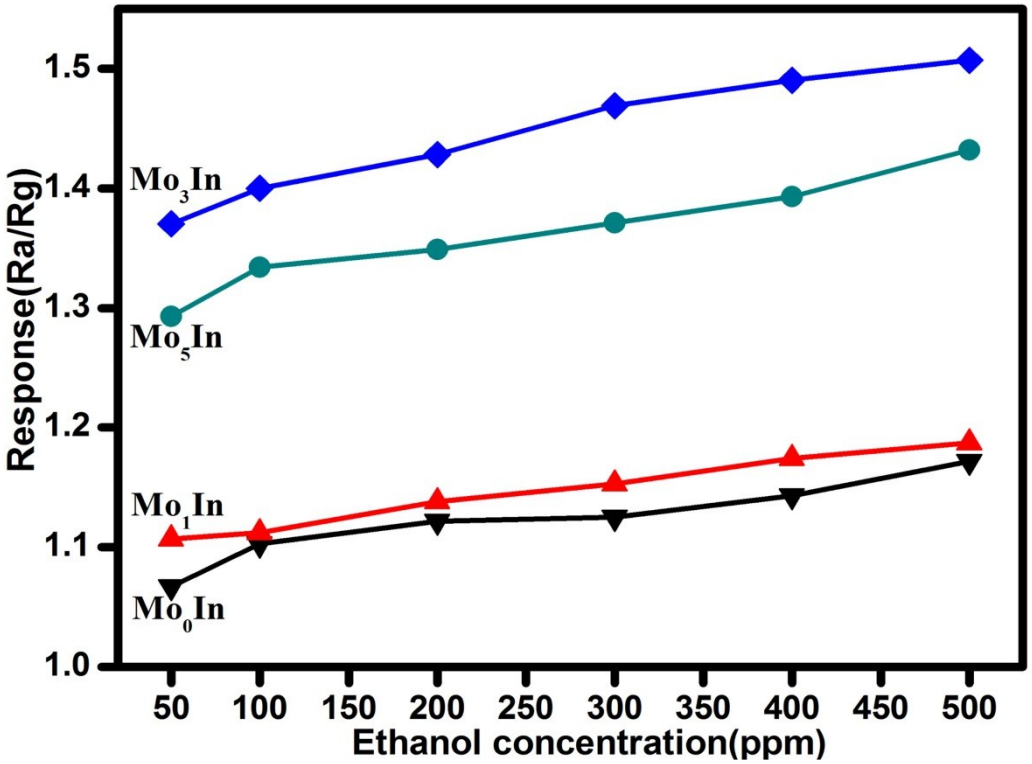

Fig. S6 Gas response of the as-prepared In_2O_3 gas sensors to low concentrations of ethanol (50 ppb-500 ppb) at 185 ℃.

References:

[1] H. Y. Lai and C. H. Chen, *J. Mater. Chem.*, 2012, **22**, 13204–13208.

[2] P. Wan, W. Yang, X. N. Wang, J. M. Hu and H. Zhang, *Sens. Actuators B: Chem.*, 2015, **214**, 36–42.