Electronic Supplementary Information

Enhanced acetone sensing performance of Au nanoparticles modified porous tube-like ZnO derived from rod-like ZIF-L

Huifen Fu, [a] Xun Wang, [a] Peng Wang, [a] Zhihua Wang [*b], Hang Ren, [a] Chong-Chen Wang [*a]

[a] *Beijing Key Laboratory of Functional Materials for Building Structure and Environment Remediation, Beijing University of Civil Engineering and Architecture, Beijing 100044, China*

[b] *State Key Laboratory of Chemical Resource, Beijing University of Chemical Technology, Beijing 100029, China*

Email: zhwang@mail.buct.edu.cn; chongchenwang@126.com

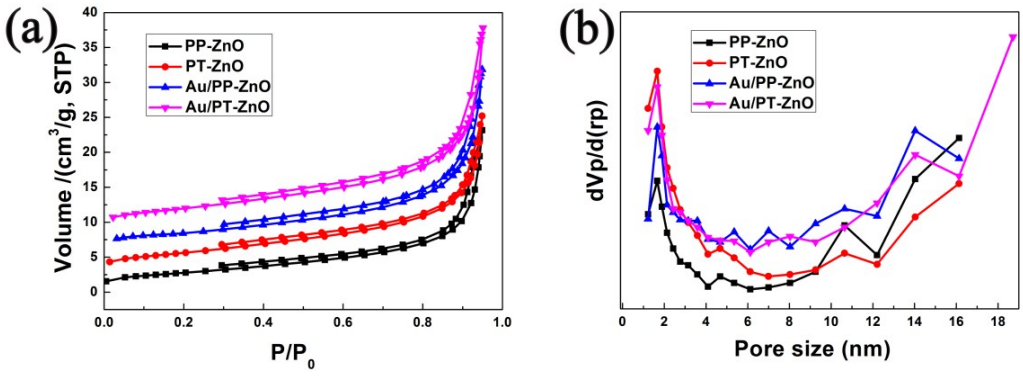

Fig. S1 (a) Nitrogen adsorption-desorption isotherms and (b) pore size distributions of PP-ZnO and PT-ZnO

Table S1 Specific surface areas of PP-ZnO and PT-ZnO

Samples	***Sa***
PP-ZnO	9.7
PT-ZnO	12.8
Au/PP-ZnO	11.8
Au/PT-ZnO	14.1

Table S2 Comparison of acetone sensing performances of Au-based sensing materials previously reported in literature

Sensing materials	Response (R_a/R_g)	Working temperature (°C)	Concentration (ppm)	Ref.
Porous tube-like Au/ZnO	6.2	190	5	This work
Porous tube-like Au/ZnO	115	190	50	This work
Porous tube-like Au/ZnO	280	190	100	This work
Porous tube-like Au/ZnO	490	190	200	This work
Au/WO_3 nanorod	131.26	300	200	[48]
Au@ZnO	32	400	100	[49]
Au-loaded NiO	15.3	240	100	[50]
Au nanoparticles functionalized flower-like ZnO	74.41	270	100	[51]
SnO_2/Au-doped In_2O_3 core-shell nanofibers	20.9	280	100	[52]
Au/In_2O_3 nanorods	44.3	215	50	[53]
Au@ZnO yolk-shell nanosphere	37	300	100	[54]
Porous Au/ZnO nanoparticles	17.1	275	1 ppm	[55]
Core-shell Au@ZnO nanoparticles	21	300	5 ppm	[56]

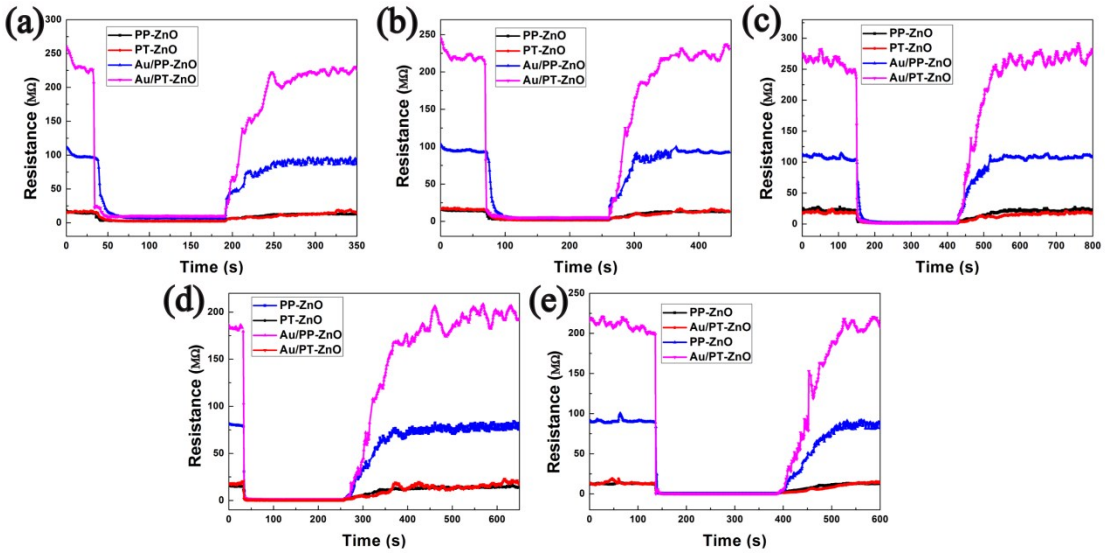

Fig. S2 Response-recovery curves to different acetone of these samples: (a) 12.5 ppm, (b) 25 ppm, (c) 50 ppm, (d) 100 ppm and (e) 200 ppm

Table S3 Response time and recovery time of PP-ZnO, PT-ZnO, Au/PP-ZnO and Au/PT-ZnO to acetone with different concentrations

Concentration	PP-ZnO		PT-ZnO		Au/PP-ZnO		Au/PT-ZnO	
	Response time	Recovery time	Response time	Recovery time	Response time	Recovery time	Response time	Recovery time
12.5 ppm	17	79	17	89	15	56	2	53
25 ppm	18	71	18	105	16	60	2	61
50 ppm	11	94	14	130	11	84	3	74
100 ppm	4	158	2	138	3	93	2	92
200 ppm	7	203	3	253	3	228	2	223

Table S4 Comparison of relative amount of oxygen species for PP-ZnO, PT-ZnO, Au/PP-ZnO and Au/PT-ZnO obtained from O1s XPS spectra

Samples	**OI**		**OII**	
	Peak (eV)	**Content (%)**	**Peak (eV)**	**content (%)**
Au/PT-ZnO	529.7	34.3	531.8	65.7
Au/PP-ZnO	529.8	66.2	531.3	33.8
PT-ZnO	529.8	69.5	531.5	30.5
PP-ZnO	529.8	71.0	531.5	29.0

References

48. S. Kim, S. Park, S. Park and C. Lee, *Sensor. Actuat. B*, 2015, **209**, 180.

49. Z. Feng, Y. Ma, V. Natarajan, Q. Zhao, X. Ma and J. Zhan, *Sensor. Actuat. B*, 2018, **255**, 884.

50. L. Wang, Z. Lou, T. Fei and T. Zhang, Sensor. Actuat. B, 2012, **161**, 178.

51. X. J. Wang, W. Wang and Y. L. Liu, *Sensor. Actuat. B*, 2012, **168**, 39.

52. F. Li, T. Zhang, X. Gao, R. Wang and B. Li, *Sensor. Actuat. B*, 2017, **252**, 822.

53. R. Xing, L. Xu, J. Song, C. Zhou, Q. Li, D. Liu and H. Song, *Sci. Rep.*, 2015, **5**, 10717.

54. X. Li, X. Zhou, H. Guo, C. Wang, J. Liu, P. Sun, F. Liu and G. Lu, *ACS Appl. Mater. Interfaces*, 2014, **6**, 18661.

55. J. Xia, K. Diao, Z. Zheng and X. Cui, *RSC Adv.*, 2017, **7**, 38444.

56. W. Li, X. Wu, N. Han, J. Chen, W. Tang and Y. Chen, *Powder Technol.*, 2016, **304**, 241.