Constructing Graphite-like Carbon Nitride Modified Hierarchical Yolk-Shell TiO_2 Sphere for Water Pollution Treatment and Hydrogen Production

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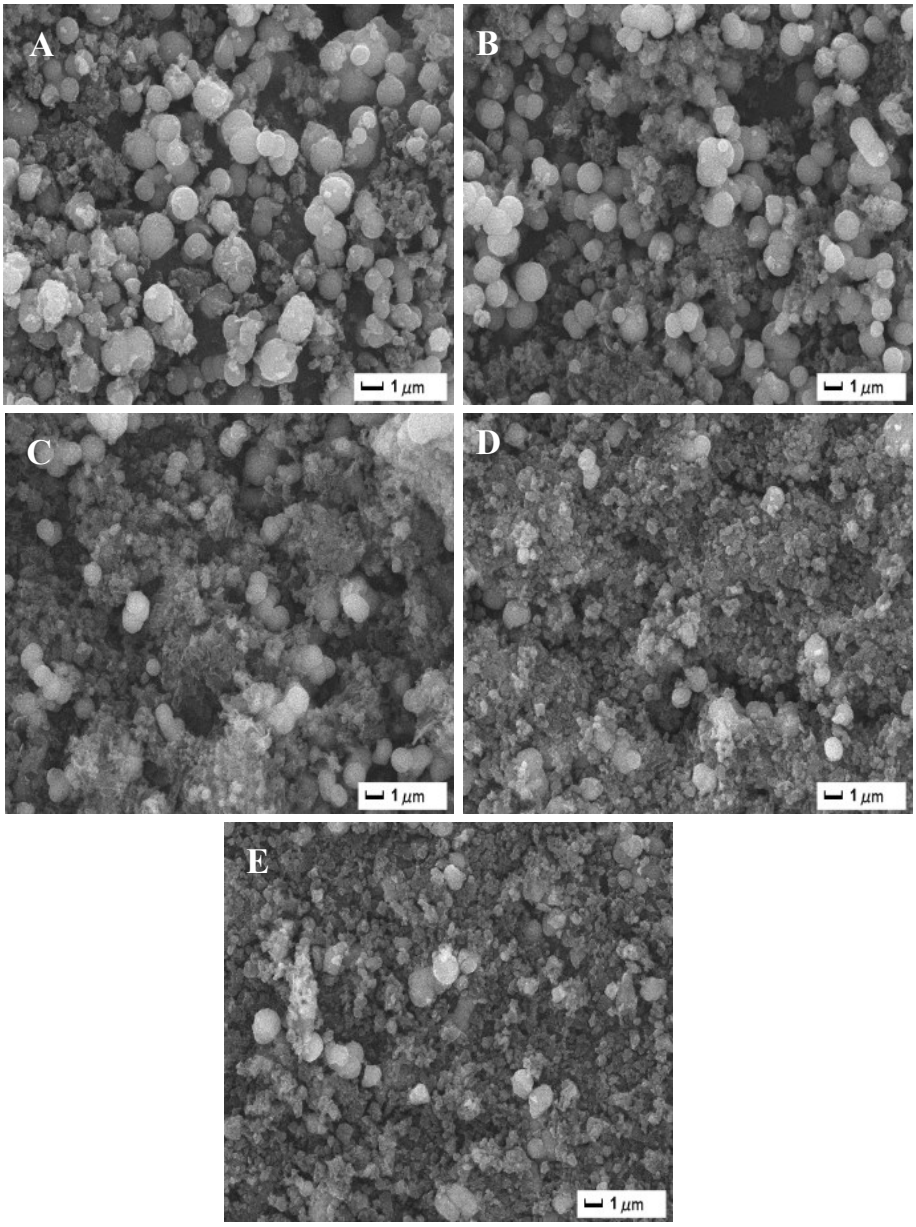

Fig. S1 SEM images of TiO_2/g-C_3N_4 with different g-C_3N_4 content (A: TCN-0.5, B: TCN-1.0, C: TCN-2.0, D: TCN-3.0, E: TCN-4.0).

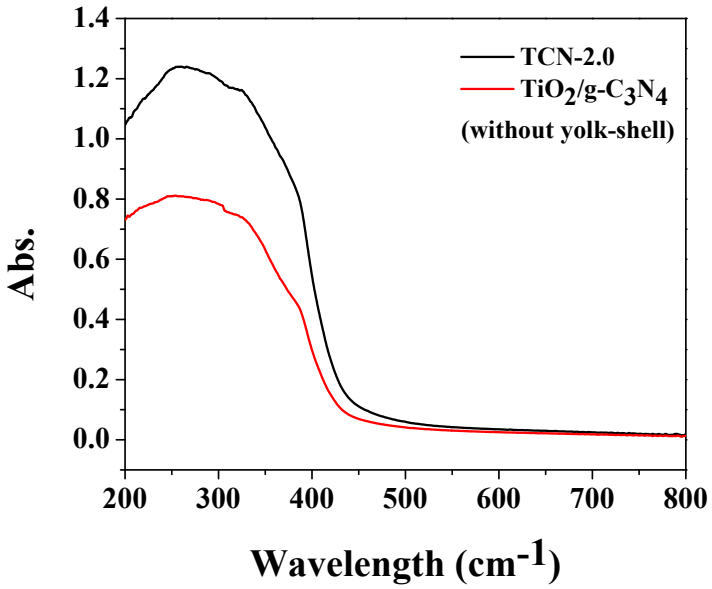

Fig. S2 Diffuse-reflectance spectroscopy of TiO_2/g-C_3N_4 (without yolk-shell) and TCN-2.0.

Table S1

Catalyst	Dosage of catalyst (g)	Pollutant	Rate ($min^{-1}g^{-1}$)	Ref.
TiO_2/g-C_3N_4	0.05	RhB	0.67	This work
Bi_2O_3/g-C_3N_4	0.3	RhB	0.034	1
WO_3/g-C_3N_4	0.06	MB	0.58	2
ZnO/g-C_3N_4	0.1	RhB	0.239	3
N-TiO_2/g-C_3N_4	0.2	RhB	0.45	4
N-doped TiO_2/g-C_3N_4	0.2	RhB	0.045	5
B-doped g-C_3N_4	0.2	RhB	0.325	6
g-C_3N_4/TiO_2 nanosheets	0.03	RhB	0.145	7
TiO_2/g-C_3N_4	0.04	RhB	0.3	8
mpg-C_3N_4/TiO_2	0.1	RhB	0.335	9

Table S2

Catalyst	H_2-production rate (μmol/h/g)	Ref.
TiO_2@g-C_3N_4	112	This work
Ag@g-C_3N_4 Core-shell	104	7
TiO_2-g-C_3N_4 composite	74.6	8
g-PAN/g-C_3N_4	31	9
MWNTs/g-C_3N_4	75.8	10
$Cu(OH)_2$/g-C_3N_4 composite	48.7	11

References

1. J. Zhang, Y. Hu, X. Jiang, S. Chen, S. Meng and X. Fu, J. Hazard. Mater., 2014, 280, 713-722.

2. S. Chen, Y. Hu, X. Jiang, S. Meng and X. Fu, Mater. Chem. Phy., 2015, 149-150, 512-521.

3. W. Liu, M. Wang, C. Xu, S. Chen and X. Fu, J. Mol. Catal. A-Chem., 2013, 368-369, 9-15.

4. X. Wang, W. Yang, F. Li, Y. Xue, R. Liu and Y. Hao, Ind. Eng. Chem. Res, 2013,

52, 17140-17150.

5. N. Yang, G. Li, W. Wang, X. Yang and W. F. Zhang, J. Phys. Chem. Solids, 2011, 72, 1319-1324.

6. S. C. Yan, Z. S. Li and Z. G. Zou, Langmuir, 2010, 26, 3894-3901.

7. Z. Tong, D. Yang, T. Xiao, Y. Tian and Z. Jiang, Chem. Eng. J., 2015,260, 117-125.

8. F. Chang, J. Zhang, Y. Xie, J. Chen, C. Li, J. Wang, J. Luo, B. Deng and X. Hu Appl. Surf. Sci., 2014, 311, 574-581.

9. S. Ma, J. Xue, Y. Zhou, Z. Zhang, Z. Cai, D. Zhu and S. Liang, RSC Adv., 2015, 5, 64976-64982.

10. T. Zhou, Y. Xu, H. Xu, H. Wang, Z. Da, S. Huang, H. Ji and H. Li, Ceram. Int., 2014, 40, 9293-9301.

11. H. Yan and H. Yang, J. Alloys Compd., 2011, 509, L26-29.

12. F. He, G. Chen, Y. Yu, S. Hao, Y. Zhou and Y. Zheng, ACS Appl. Mater. Interfaces, 2014, 6, 7171-7179.

13. L. Ge and C. Han, Appl. Catal. B, 2012, 117-118, 268-274.

14. X. Zhou, Z. Luo, P. Tao, B. Jin, Z. Wu and Y. Huang, Mater. Chem. Phys., 2014, 143, 1462-1468.