Electronic Supplementary Material (ESI) for RSC Advances.

Biotemplated Synthesis of Hierarchically Nanostructured TiO_2 Using Cellulose and Their Applications in Photocatalysis

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Preparation of CHNT@Au

The sodium citrate solution (39 mM) was added to the $HAuCl_4$ solution (1 mM) stirred for 5 minutes to form the homogenous mixture, adjusting pH in the range of 8-9 with NaOH solution (1 wt%). Then, the calcined TiO_2 products (0.8 wt%) were dispersed into the above-mentioned mixture and refluxed at 97°C for 40 minutes to form CHNT@Au hybrid nanostructures.

Supporting Figures

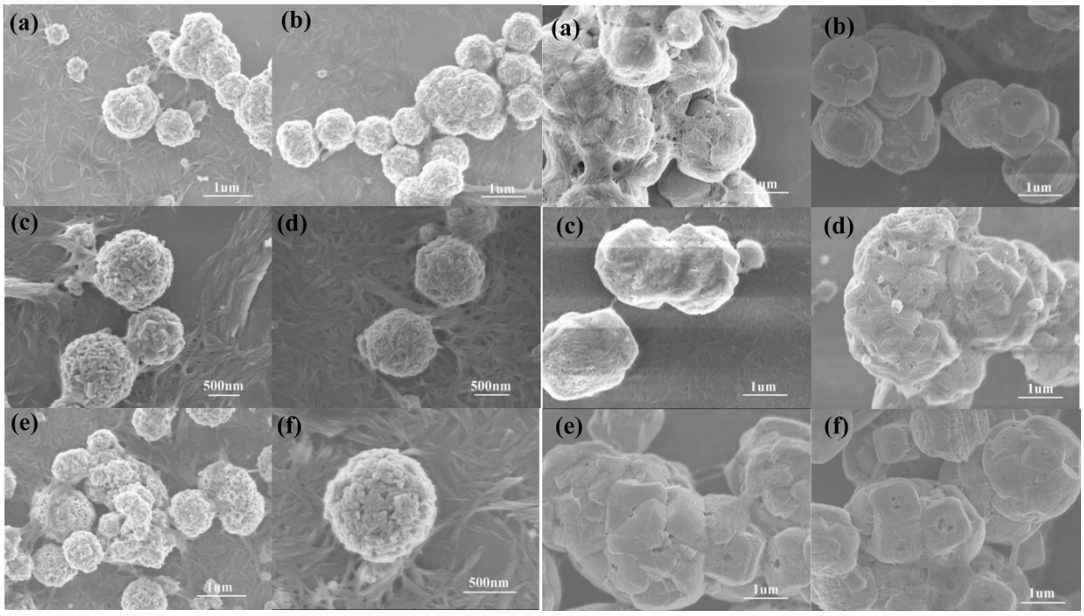

Fig. S1. FE-SEM images of HNTs from reaction system with no H_2SO_4 and the different amount of MCC: (a) 0.005 g; (b) 0.0075 g; (c) 0.01 g; (d) 0.015 g; (e) 0.02 g; (f) 0.025 g.

Fig. S2. FE-SEM images of HNTs from reaction system with 0.25 mL H_2SO_4 and the different amount of MCC: (a) 0.005 g; (b) 0.0075 g; (c) 0.01 g; (d) 0.015 g; (e) 0.02 g; (f) 0.025 g.

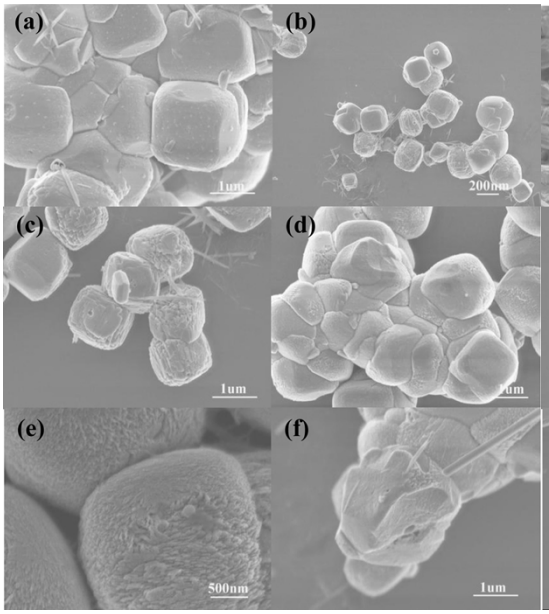

Fig. S3. FE-SEM images of HNTs from reaction system with 0.5 mL H_2SO_4 and the different amount of MCC: (a) 0.005 g; (b) 0.0075 g; (c) 0.01 g; (d) 0.015 g; (e) 0.02 g; (f) 0.025 g.

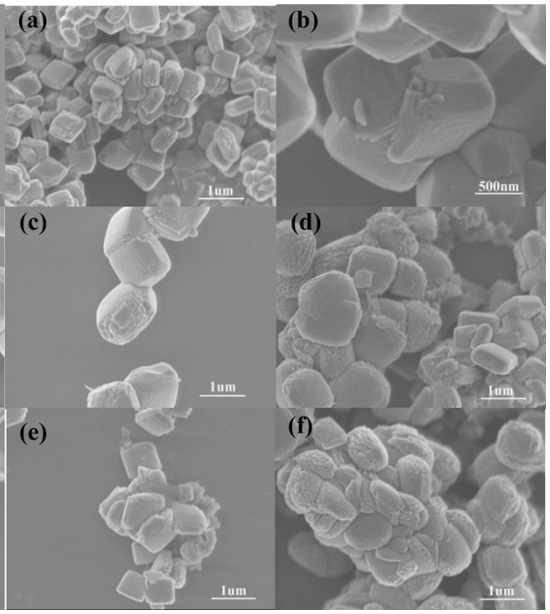

Fig. S4. FE-SEM images of HNTs from reaction system with 0.75 mL H_2SO_4 and the different amount of MCC: (a) 0.005 g; (b) 0.0075 g; (c) 0.01 g; (d) 0.015 g; (e) 0.02 g; (f) 0.025 g.

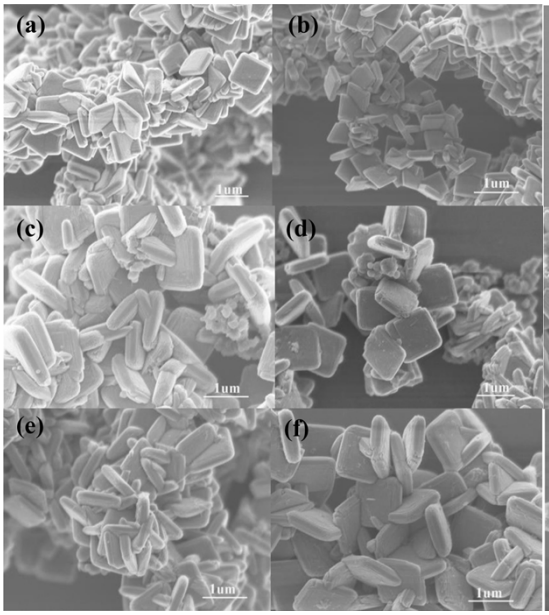

Fig. S5. FE-SEM images of HNTs from reaction system with 1.25 mL H_2SO_4 and the different amount of MCC: (a) 0.005 g; (b) 0.0075 g; (c) 0.01 g; (d) 0.015 g; (e) 0.02 g; (f) 0.025 g.

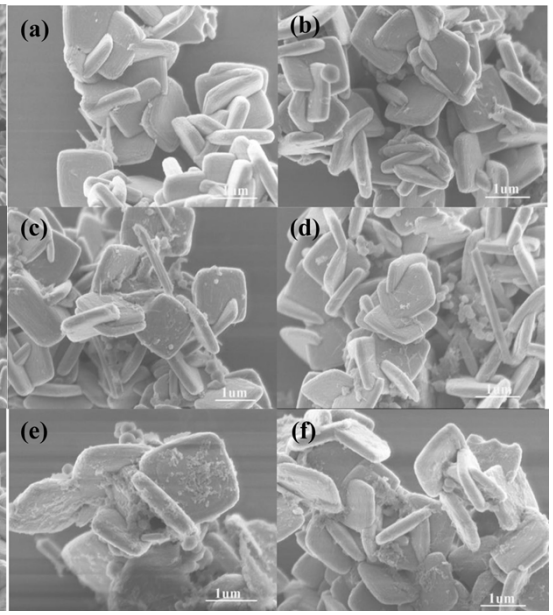

Fig. S6. FE-SEM images of HNTs from reaction system with 1.50 mL H_2SO_4 and the different amount of MCC: (a) 0.005 g; (b) 0.0075 g; (c) 0.01 g; (d) 0.015 g; (e) 0.02 g; (f) 0.025 g.

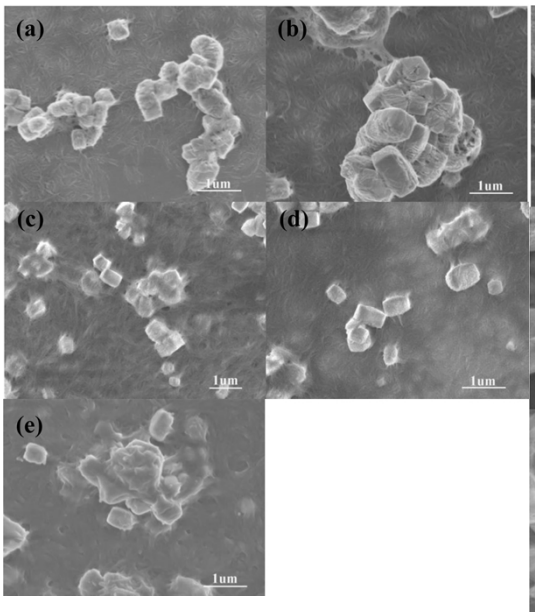

Fig. S7. FE-SEM images of HNTs from reaction system with 0.5 mL HCl and the different amount of MCC: (a) 0.005 g; (b) 0.0075 g; (c) 0.01 g; (d) 0.0125 g; (e) 0.015 g.

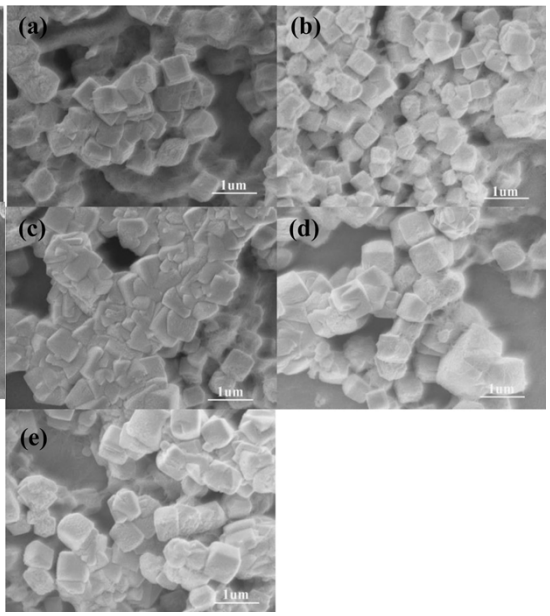

Fig. S8. FE-SEM images of HNTs from reaction system with 1.0 mL HCl and the different amount of MCC: (a) 0.005 g; (b) 0.0075 g; (c) 0.01 g; (d) 0.0125 g; (e) 0.015 g.

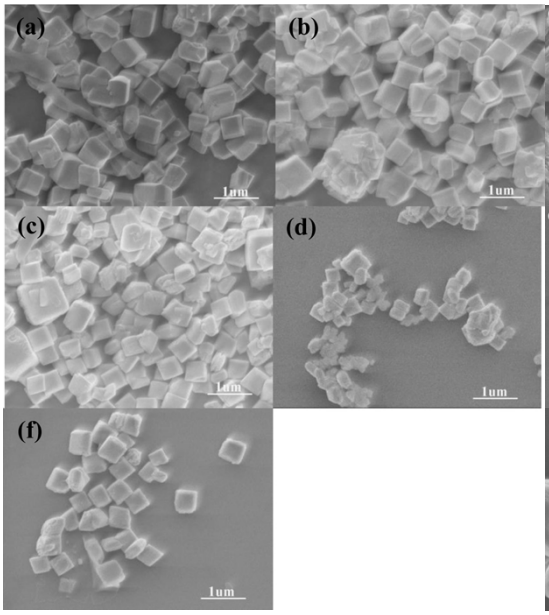

Fig. S9. FE-SEM images of HNTs from reaction system with 1.5 mL HCl and the different amount of MCC: (a) 0.005 g; (b) 0.0075 g; (c) 0.01 g; (d) 0.0125 g; (e) 0.015 g.

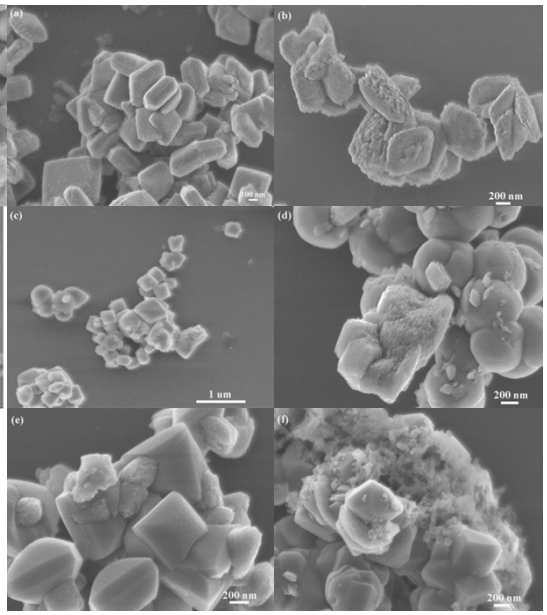

Fig. S10. FE-SEM images of HNTs by changing the temperature and the amount of HCl: (a) 140° HCl (1.5 mL); (b) 140° HCl (2.0 mL); (c) 160° HCl (1.5 mL); (d) 160° HCl (2.0 mL); (e) 180° HCl (1.5 mL); (f). 180° HCl (2.0 mL)

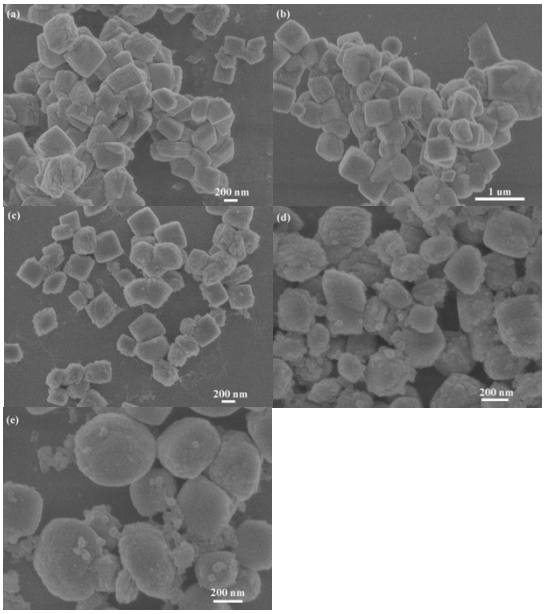

Fig. S11. FE-SEM images of HNTs by varying the amount of MCC: (a) 0.025 g; (b) 0.05 g; (c) 0.075 g; (d) 0. 125 g; (e) 0.15 g.

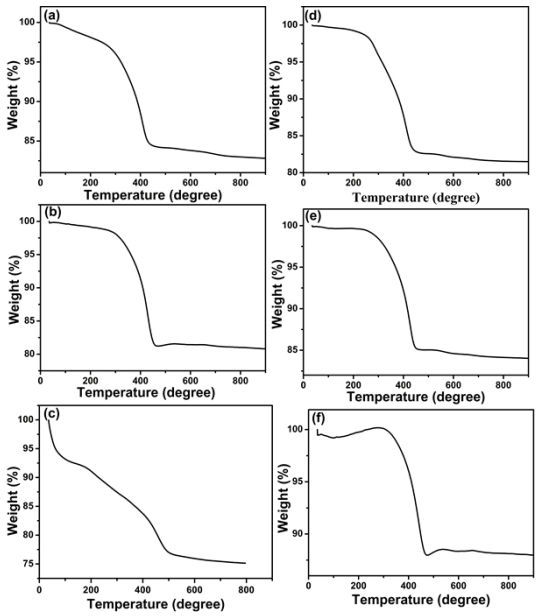

Fig. S12. Thermogravimetric analysis (TGA) of (a) HNT-S1; (b) HNT-S2; (c) HNT-S3; (d) HNT-C1; (e) HNT-C2; (f) HNT-C3;

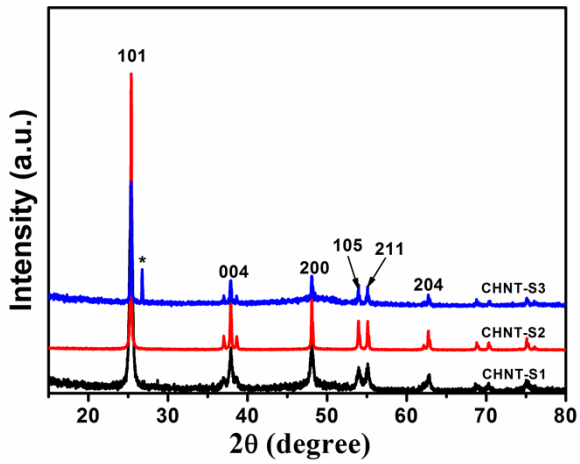

Fig. S13. XRD patterns of the as-prepared CHNT-Sn

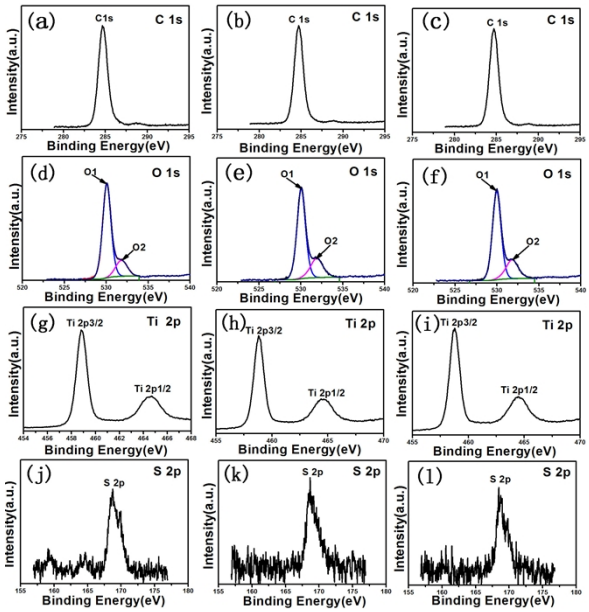

Fig. S14. XPS spectra of C 1s, O 1s, Ti 2p and S 2p for CHNT-Sn. (a-c) C 1s; (d-f) O 1s; (g-i) Ti 2p; (j-l) S 2p.

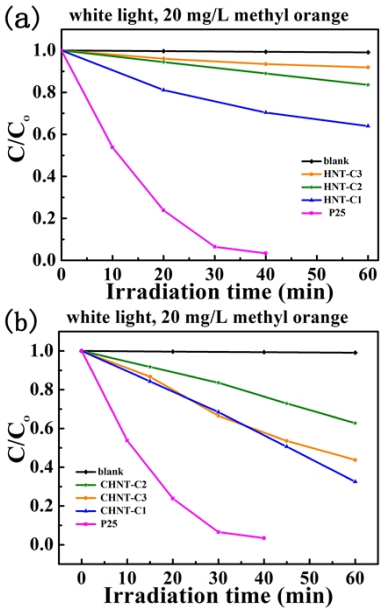

Fig. S15. Photocatalytic degradation of MO in the presence of (a) HNT-Cn; (b) CHNT-Cn.

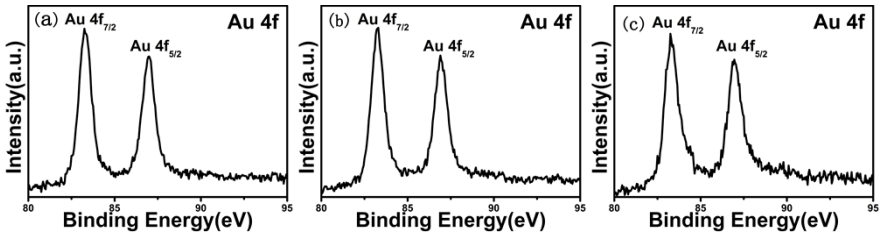

Fig. S16. XPS spectra of Au 4f for CHNT-Sn. (a) CHNT-S1@Au; (b) CHNT-S2@Au; (c) CHNT-S1@Au.