

Supplementary Information

Chestnut-like Fe₃O₄@C@ZnSnO₃ core-shell particles for the recyclable photocatalytic degradation of 2,5- dichlorophenol

Dewei Liang, Shouliang Wu, Panpan Wang, Yunyu Cai, Zhenfei Tian, Jun Liu, Changhao Liang*

Key Laboratory of Materials Physics and Anhui Key Laboratory of Nanomaterials and Nanotechnology, Institute of Solid State Physics, Hefei Institutes of Physical Science, Chinese Academy of Sciences, Hefei 230031, China

*Corresponding author. Tel.: +86 551 65591129; Fax: +86 551 65591434.

E-mail address: chliang@issp.ac.cn (C. H. Liang).

Synthesis of Fe₃O₄@C microspheres

FeCl₃·H₂O (1.5 g), PVP (1.0 g), and NaAc (2.0 g) were mixed in 30 mL ethylene glycol. After that, the mixture was heated to be completely dissolved at 50 °C with the help of magnetic stirring. Then the yellow mixture was transferred into a Teflon-lined stainless-steel autoclave with a capacity of 50 mL, and heated at 200 °C for 500 min. After the reaction, the autoclave was naturally cooled to room temperature, and the black solid products (Fe₃O₄) were collected and washed with ethanol and distilled water three times. The as-prepared Fe₃O₄ was suspended in 40 mL distilled water under ultrasonic irradiation. Then, soluble starch (5.0 g) was dissolved in the above suspension with sufficient stirring. The autoclave was placed in an oven and kept at 180 °C for 540 min. After cooling to room temperature, the precipitated black solid products were collected from the solution by an external magnet and washed with water several times. Finally, the black products were dried in an oven at 60 °C for 12 h.

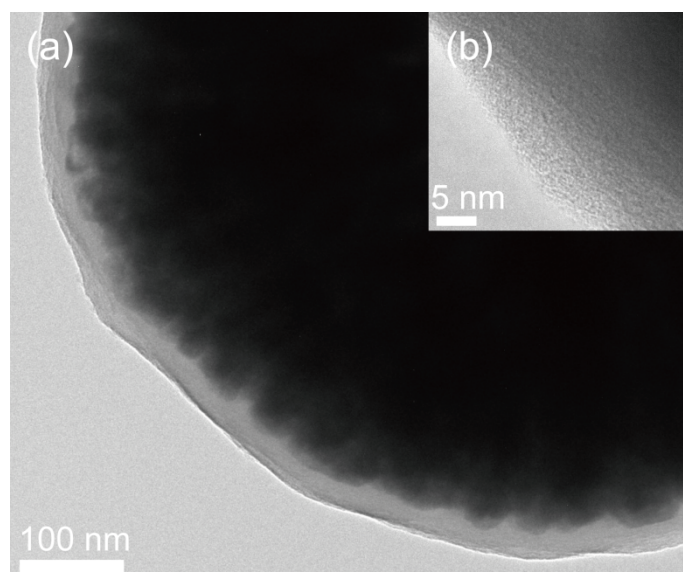


Fig. S1 TEM (a) and HRTEM (b) images of the $\text{Fe}_3\text{O}_4@\text{C}$ sphere.

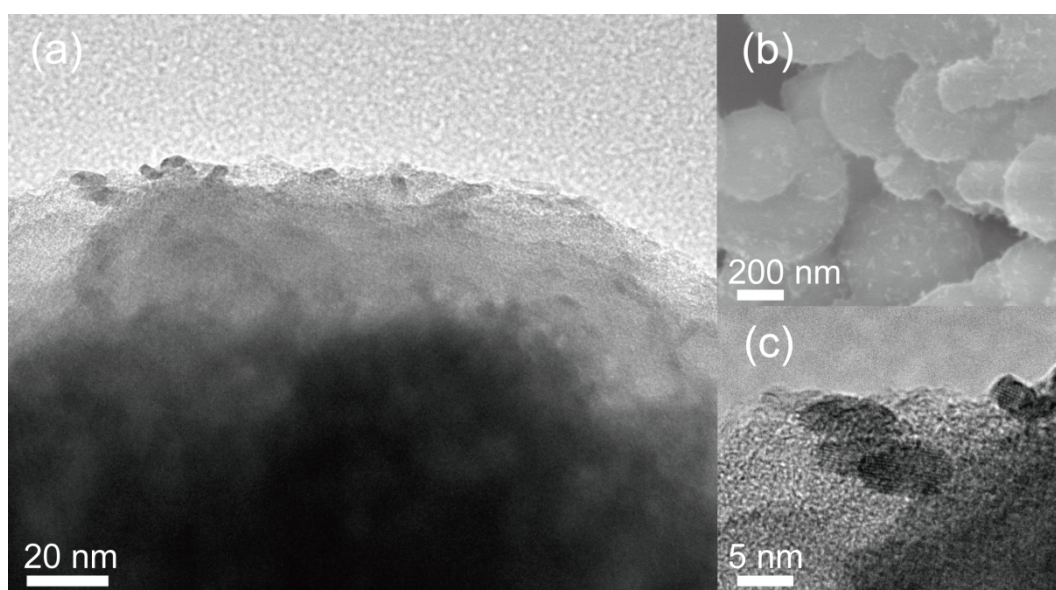
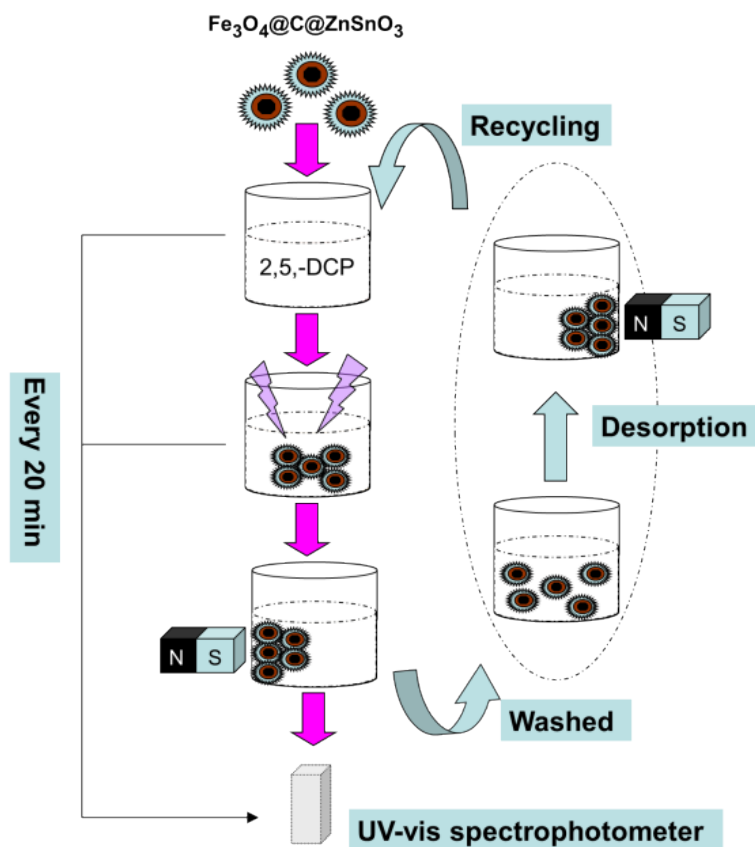


Fig. S2 (a) Typical TEM image of ZnSnO_3 particle nucleated on the carbon surfaces of the $\text{Fe}_3\text{O}_4@\text{C}$ particle obtained from 2 hour solvothermal treatment. (b) Corresponding SEM image of ZnSnO_3 particle nucleated on the carbon surfaces of the $\text{Fe}_3\text{O}_4@\text{C}$ particle. (c) HRTEM image of ZnSnO_3 nucleation sites.



Scheme S1. The route for recyclable photocatalytic degradation toward 2, 5-DCP using magnetic $\text{Fe}_3\text{O}_4@\text{C}@\text{ZnSnO}_3$ core-shell particles.