# Supporting Information

## Controlled synthesis and magnetically separable photocatalytic property of magnetic iron oxides@$SnO_2$ yolk-shell nanocapsules

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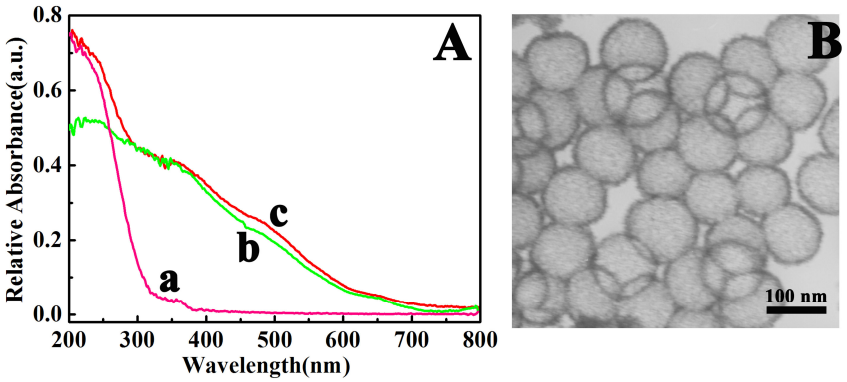


**Fig. S1** (A) UV-vis diffuse reflectance spectra of (a) hollow $SnO_2$ NPs, (b) SPIO NPs, (c) SPIO@$SnO_2$ yolk-shell NCs. (B) TEM image of hollow $SnO_2$ NCs using uniform $SiO_2$ NPs as the templates.

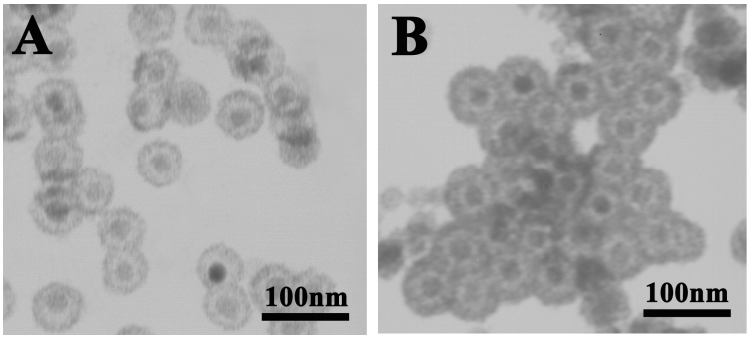


**Fig. S2** TEM images of the SPIO@$SnO_2$ yolk-shell NCs with different shell thicknesses (A, 7 ± 2 nm and B, 15 ± 2 nm).

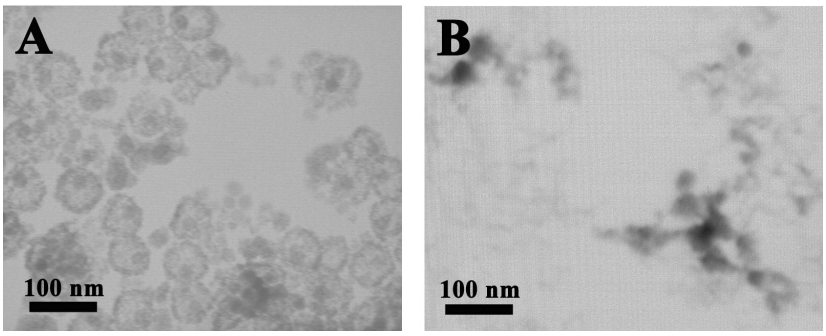


**Fig. S3** TEM images of SPIO@$SnO_2$ yolk-shell NCs with different reaction conditions (A) the addition of 0.064 mL 0.08 M $Na_2SnO_3 \cdot 3H_2O$ to the reaction system (B) the addition of 1.3 mL 0.2 M urea to the reaction system.

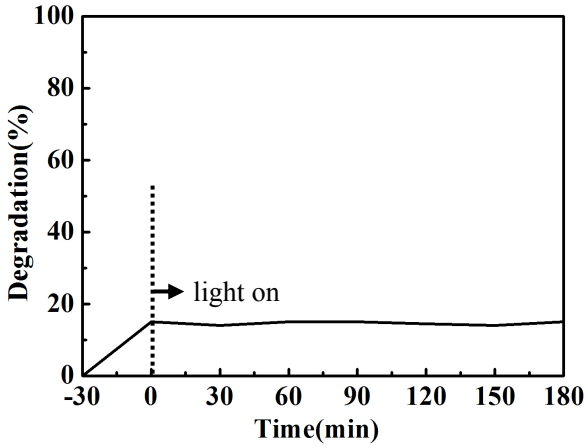


**Fig. S4** The photocatalytic degradation of RhB by using SPIO NPs as catalyst under irradiation with UV light.

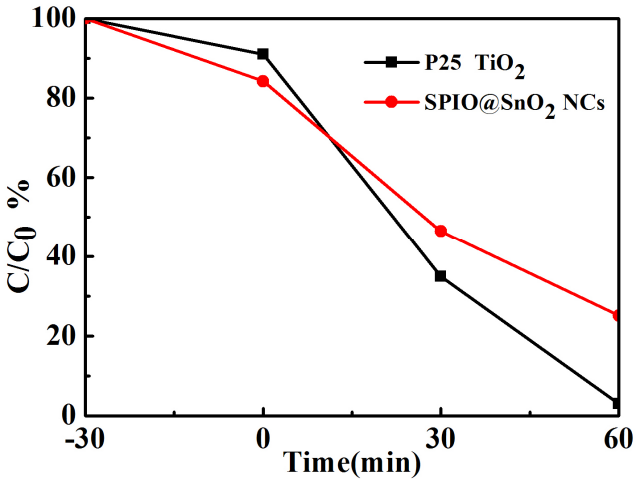


**Fig. S5** Photodegradation curves of RhB solution by using SPIO@$SnO_2$ yolk-shell NCs and P25 $TiO_2$ as catalysts under irradiation with UV light.

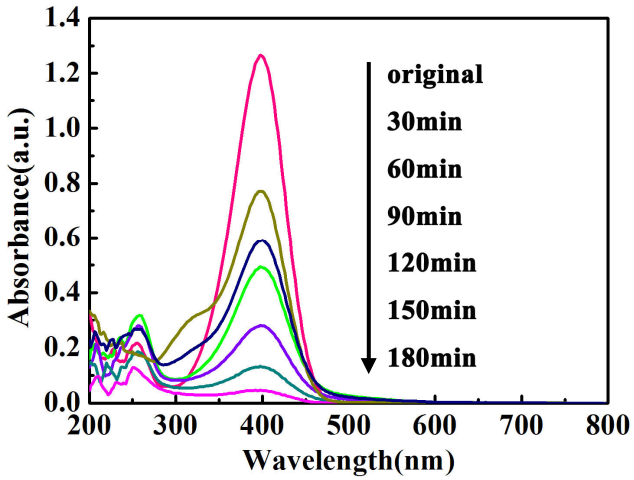


Fig. S6 UV-vis spectroscopic changes of the 4-nitrophenol aqueous solution in the presence of the SPIO@$SnO_2$ yolk-shell NCs under exposure to UV light.