

Supporting Information

**Controlled Synthesis and Photocatalysis of Sea Urchin-Like
 $\text{Fe}_3\text{O}_4@\text{TiO}_2@\text{Ag}$ Nanocomposite**

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Table S1 The surface areas and average pore sizes of $\text{Fe}_3\text{O}_4@\text{TiO}_2@\text{Ag}$ NSs with different hydrothermal reaction time.

Time(h)	surface areas($\text{m}^2 \text{g}^{-1}$)	average pore sizes (nm)
1	289.420	4.077
2	125.349	9.057
3	73.187	11.935

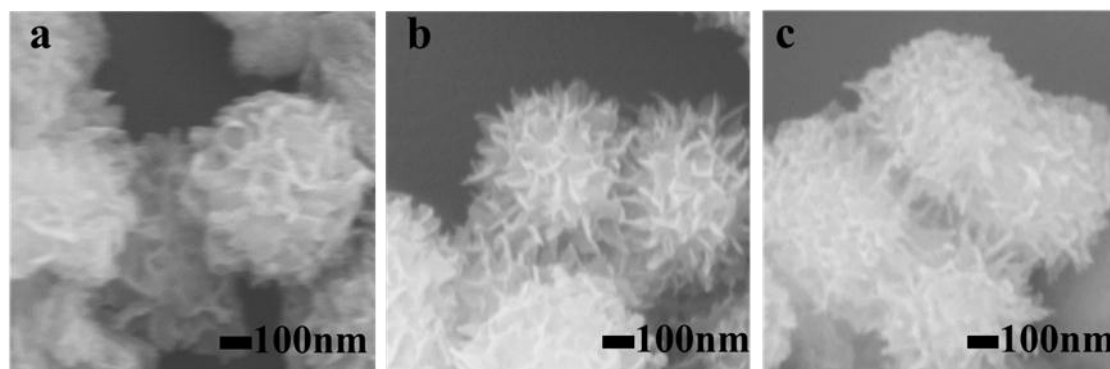


Figure S1. SEM images of $\text{Fe}_3\text{O}_4@\text{TiO}_2@\text{Ag}$ NSs. Hydrothermal reaction 120°C for 1h (a), 2h (b), 3h (c)

Table S2 The surface areas and average pore sizes of $\text{Fe}_3\text{O}_4@\text{TiO}_2@\text{Ag}$ NSs with different hydrothermal temperature.

Time(h)	surface areas($\text{m}^2 \text{g}^{-1}$)	average pore sizes (nm)
120	125.349	9.057
140	113.245	8.545
160	103.268	8.358

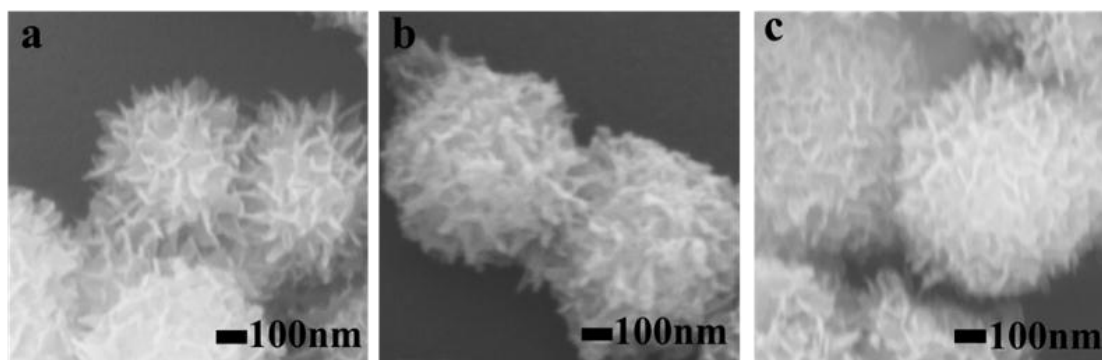


Figure S2 SEM images of $\text{Fe}_3\text{O}_4@\text{TiO}_2@\text{Ag}$ NSs. Temperature of hydrothermal reaction 2 hour for 120°C (a), 140°C (b), and 160°C (c).

Table S3 Preparation of Photocatalyst-Containing Antibacterial Films.

Antibacterial Films	Weight of Photocatalyst (mg)	Wt. (%)
$\text{Fe}_3\text{O}_4@\text{TiO}_2$ NSs films	0.15	5.86
$\text{Fe}_3\text{O}_4@\text{TiO}_2@\text{Ag}$ NSs films	0.16	6.22