Supplementary Material

Facile fabrication of NiO/Ag_3PO_4 Z-scheme photocatalyst with enhanced visible-light-driven photocatalytic activity

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Synthesis of NiO nanopolyhedrons

Typically, 0.808 g of $NiCl_2 \cdot 6H_2O$ (3.4 mmol) was dissolved in 5 mL deionized water and 40 mL absolute ethanol via vigorous magnetic stirring. Then, 0.5 g of Polyvinyl Pyrrolidone (PVP) was dropwise added into the above solution under vigorous stirring. After that, sodium hydroxide (0.1 g) was dissolved in the above mixed solution. When a blur appeared, the suspensions were transferred into three 25 mL Teflon-lined autoclave and kept at 200 °C for 4 h. Following natural cooling to ambient temperature, the yellow products are rinsed with deionized water and ethanol for several times, and finally dried overnight at 60 °C in an oven. Then the precursor microspheres were calcined for 30 min at 450 °C to obtain NiO powder.

Synthesis of NiO/Ag_3PO_4 composites

Typically, $AgNO_3$ (0.510 g) was added into 20 mL deionized water and stirred for 10 min. Slowly dropwise add the ammonia aqueous solution into the above solution until a clear solution is formed. Then, a certain amount of as-prepared NiO

nanoparticles was dispersed into the above transparent solution by ultrasonic treatment. Subsequently, the aqueous solution of KH_2PO_4 (10 mL, 0.10 M) was added to the above dispersion, and then the resulting mixture was sonicated for another 30 min. Finally, the precipitates were collected, washed with distilled water and ethanol for several times, and then dried at 60 °C for 6 h. The final products were named as 3% NiO/Ag_3PO_4, 5% NiO/Ag_3PO_4 and 10% NiO/Ag_3PO_4 according to the mass fraction of NiO in the weight of Ag_3PO_4.

Table S1 Photocatalytic degradation of RhB by Ag_3PO_4-related photocatalysts in aqueous solutions.

Photoactive nanocomposite	**Initial dye conc. (mg/L)**	**Activity rate constant (min^{-1})**	**Reference**
NiO/Ag_3PO_4	10	0.1490	In this work
Ag_3PO_4	10	0.0324	1
Ag_3PO_4/TiO_2	10	0.1300	2
$Ag_3PO_4/g\text{-}C_3N_4$	10	0.0739	3
Ag_3PO_4/Bi_2MoO_6	5	0.0592	4
Ag_3PO_4/CeO_2	5	0.0331	5

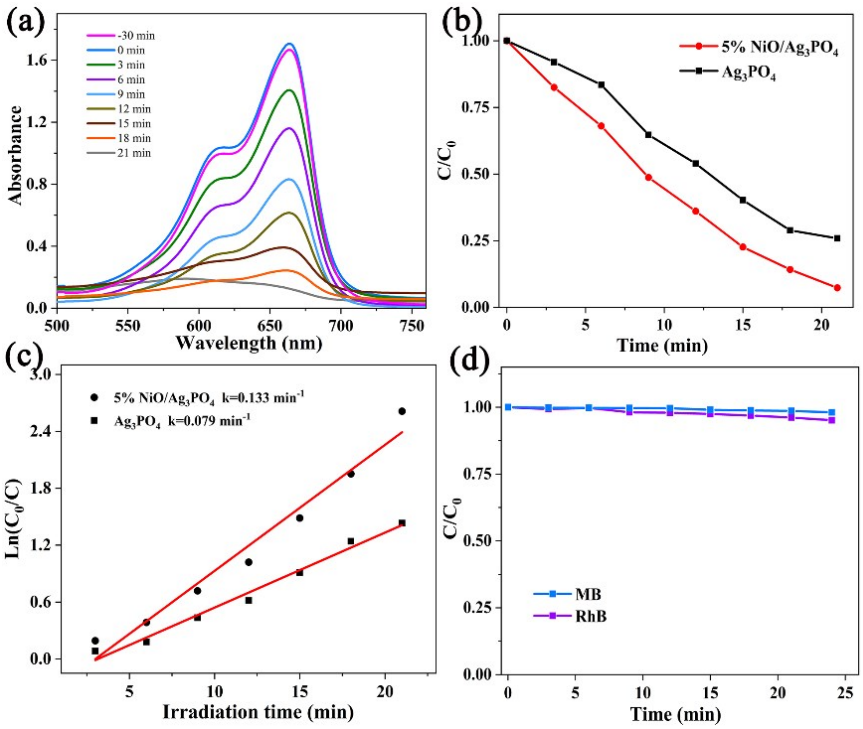

Fig. S1 (a) Photocatalytic activity of the as-prepared pure Ag_3PO_4 and 5% NiO/Ag_3PO_4 composites for the degradation of MB; (b) The kinetic fit for the degradation of MB with the pure Ag_3PO_4 and NiO/Ag_3PO_4 composites. (c) UV-Vis absorbance spectra of the MB aqueous solution under visible light at a different time interval with the assistance of the 5% NiO/Ag_3PO_4 composites. (d) Photocatalytic degradations of RhB and MB in the absence of catalyst under visible light irradiation.

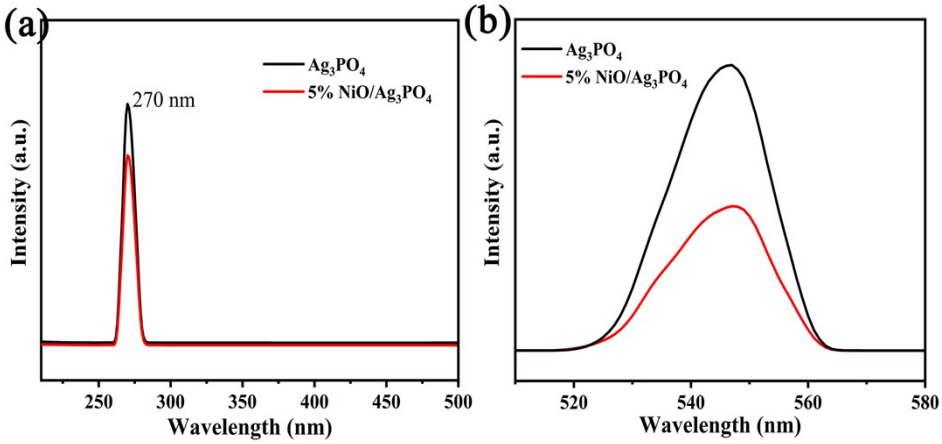

Fig. S2 (a) The excitation spectra of Ag_3PO_4 and 5% NiO/Ag_3PO_4 composite. (b) PL spectra of Ag_3PO_4 and 5% NiO/Ag_3PO_4 composite.

Reference

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