Supporting Information

ZnO Nanorods/Ag Nanoparticles Heterostructures with Tunable Ag Contents: a Facile Solution-Phase Synthesis and Applications in Photocatalysis

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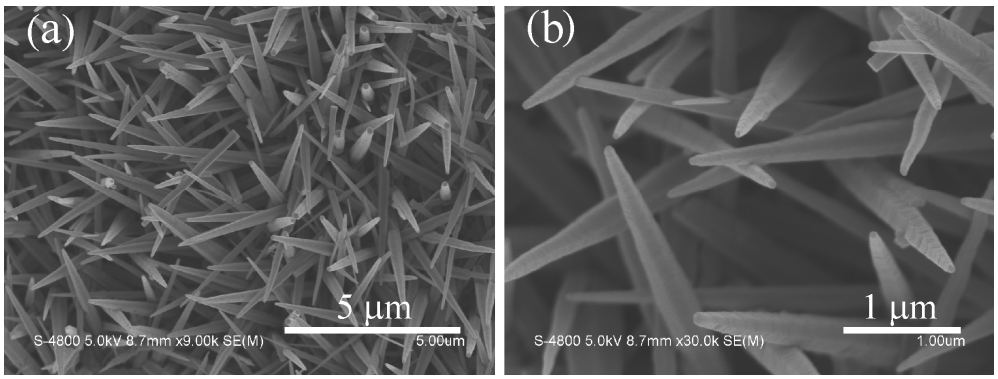

Fig. S1 Typical FESEM images of the needle-like ZnO-NRs grown on the zinc foil. (a, b) at low and high magnifications, respectively.

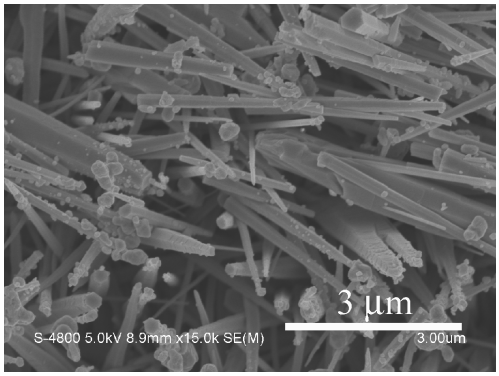

Fig. S2 FESEM image of the ZnO-NRs/Ag-NPs sample synthesized without the zinc substrate.

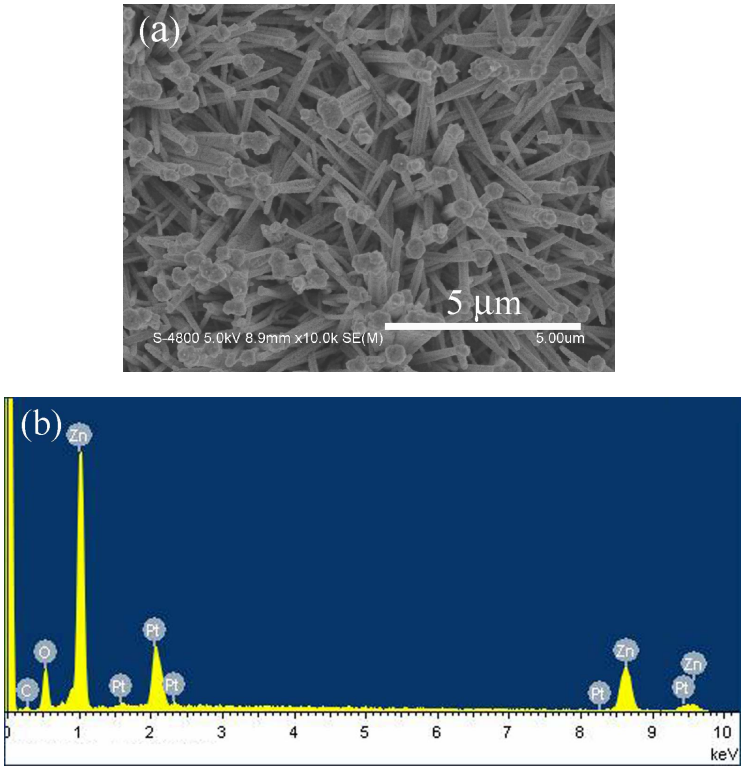

Fig. S3 FESEM image (a) and EDX spectrum (b) of the ZnO-NRs/Pt-NPs heterostructure on Zn substrate.

The ZnO-NRs/Pt-NPs heterostructure was prepared as following: 1 mL of H_2PtCl_6 solution (3.0×10^{-3} mol/L) was added into a mixed solvent of 1, 6-hexanediamine (10 mL) and distilled water (29 mL) to form a homogenous solution under constant stiring for 5 min, then the solution was loaded into a 50 mL teflon-lined stainless steel autoclave with the zinc foil covered by white precipitate inserted. The sealed vessel was maintained at 180 °C for 5 h. The zinc foil covered with gray-black precipitate was washed three times with distilled water and ethanol, respectively. The SEM image in Fig. S3(a) clearly show there were many tiny nanoparticles attached on ZnO-NRs. The point-scan energy dispersive X-ray spectrum (Fig. S3(b)) shows that atomic percent of Pt is 6.53%.

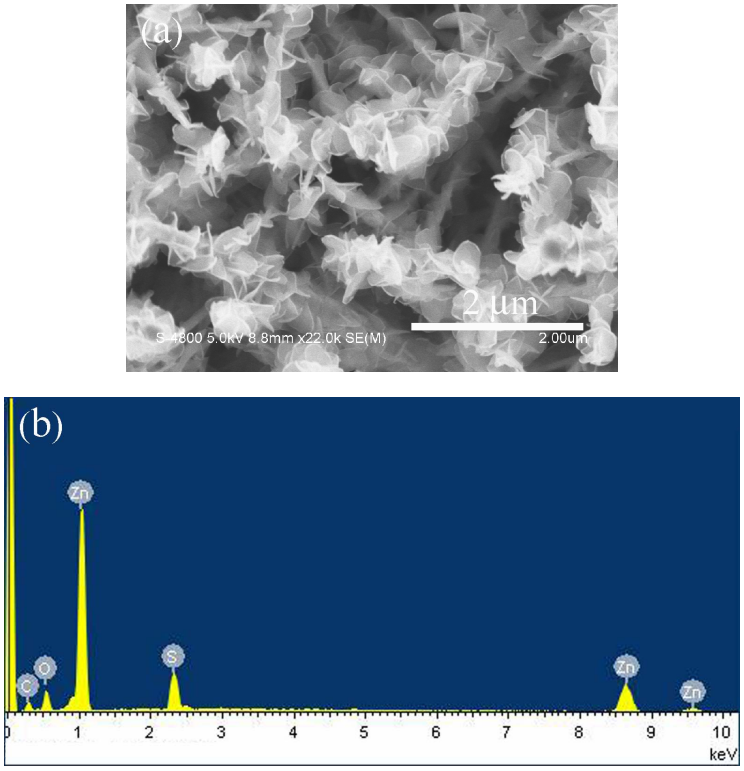

Fig. S4 FESEM image (a) and EDX spectrum (b) of the ZnO-NRs/ZnS nanoplates hierarchical heterostructure on Zn substrate.

The ZnO-NRs/ZnS nanoplates hierarchical heterostructure was prepared as following: $Na_2S \cdot 10H_2O$ (0.290 g) was added into a mixed solvent of 1, 6-hexanediamine (2 mL) and distilled water (58 mL) to form a homogenous solution under constant stiring in a 100 mL glass bottle, followed by insertion of the zinc foil covered by white precipitate. The bottle was loaded in an oven and maintained at 60 °C for 8 h. The zinc foil covered with white precipitate was washed three times with distilled water and ethanol, respectively. The SEM image in Fig. S4(a) clearly show the hierarchical heterostructure of the ZnO-NRs/ZnS nanoplates. The point-scan energy dispersive X-ray spectrum (Fig. S4(b)) shows that atomic percent of S is 8.44%.

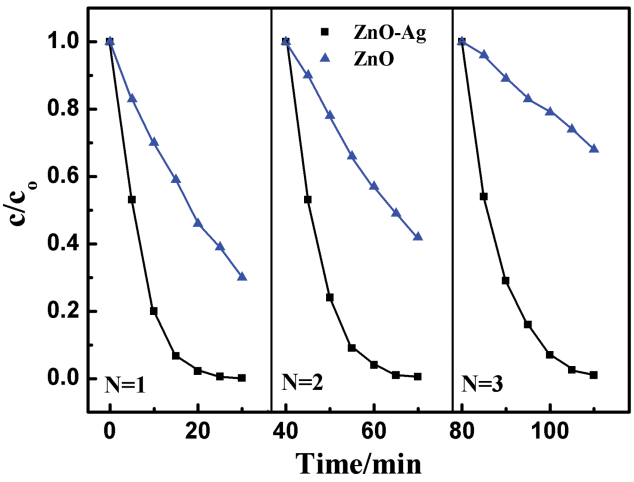

Fig. S5 The cycled photochemical experiments for comparison the photostability of the as-prepared ZnO-NRs/Ag-NPs heterostructure (with the sample of Ag/Zn atomic ratio of 0.89 as an example) with the pure ZnO-NRs.