Electronic Supplementary Information

Plasmonic enhanced photoelectrochemical and photocatalytic performances of 1D coaxial Ag@Ag_2S hybrids

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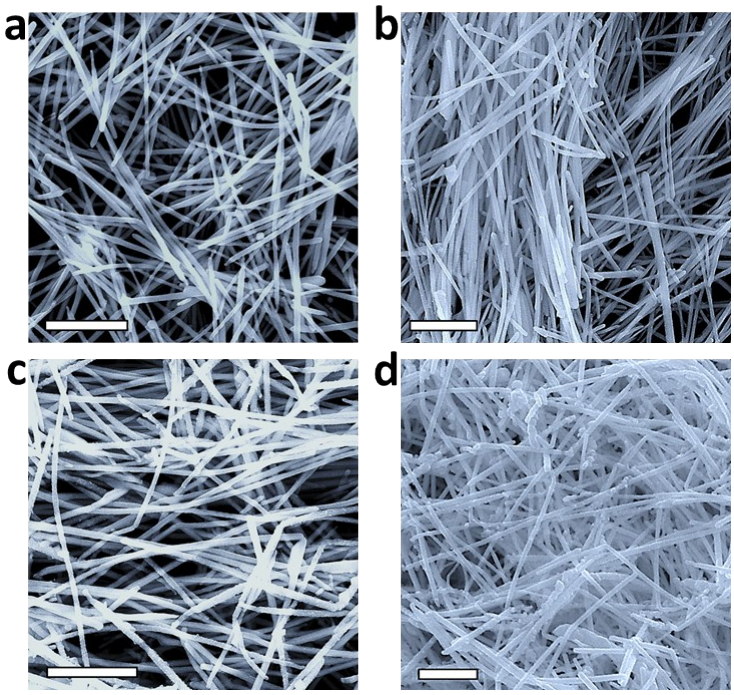

Fig. S1. SEM images of a-d) Ag@Ag_2S composites with different reaction times (1, 5, 20, and 60 min, respectively); the scale bar is 1 μm.

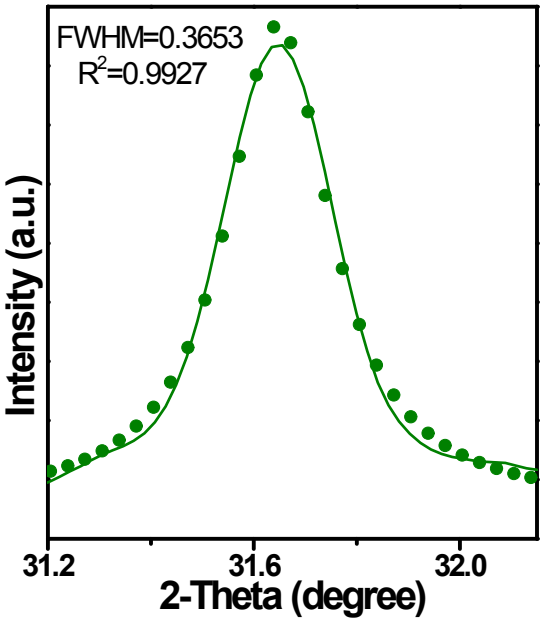

Fig. S2. Lorentzian function fitting of the (-112) characteristic peak of monoclinic Ag_2S in the sample of Ag@Ag_2S-60.

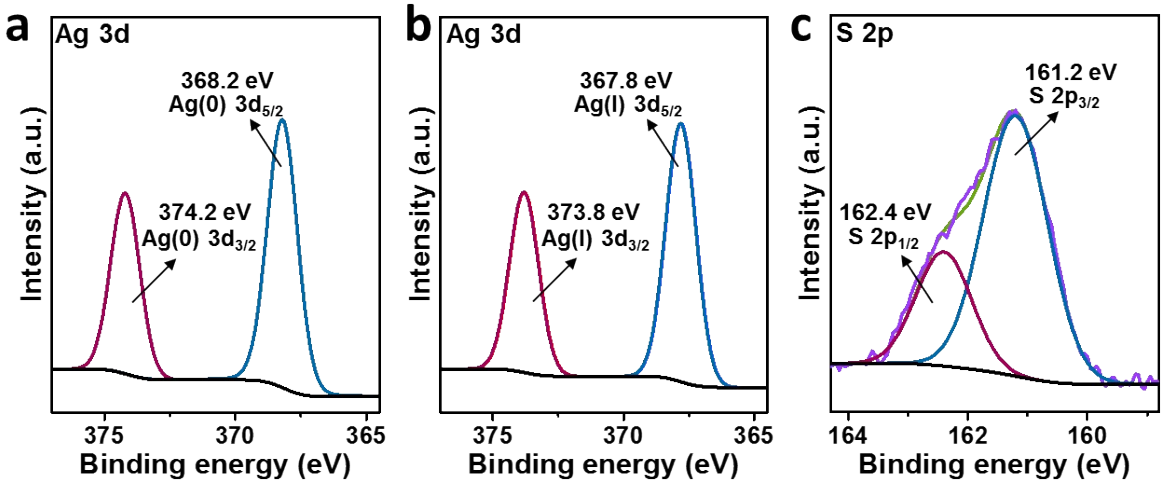

Fig. S3. XPS spectra of a) Ag 3d of Ag NWs, b) Ag 3d and c) S 2p of Ag@Ag_2S-40 core-shell structured composite.

Computational Methods.

Electrodynamic simulation was done by finite-difference time-domain (FDTD) method using FDTD solution 7.5.7 (Lumerical Solution. Inc). The diameter of the Ag nanowire was fixed at 80 nm and the thickness of Ag_2S shell (refractive index of 2.2) was fixed at 35 nm. The lengths of both the nanowires were set to be infinitely long. In the simulation, the calculation was done under the dielectric environment of 1.361, which equivalent to ethanol.

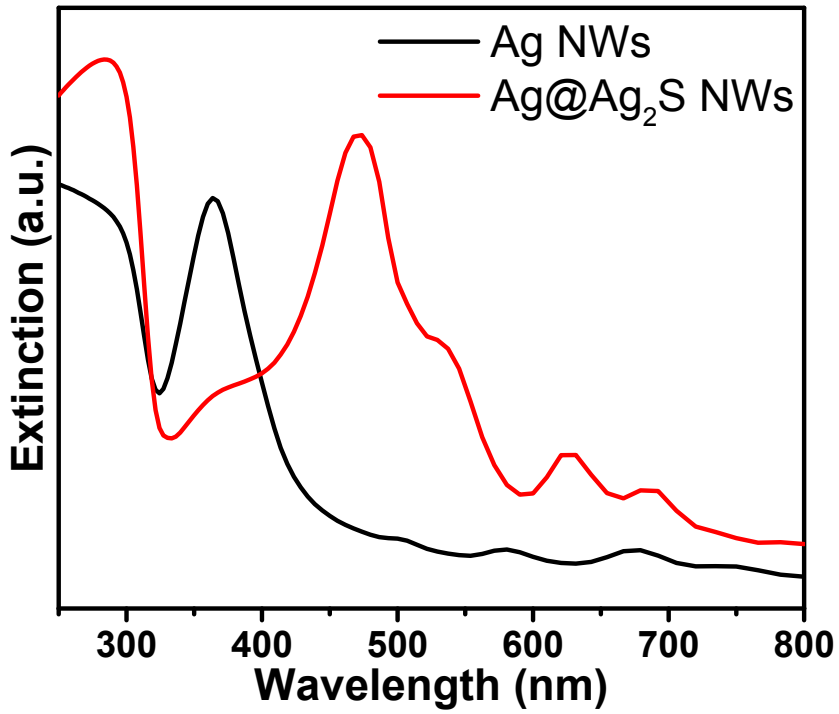

Fig. S4. The calculated extinction spectra of Ag NWs and $Ag@Ag_2S$ NWs.

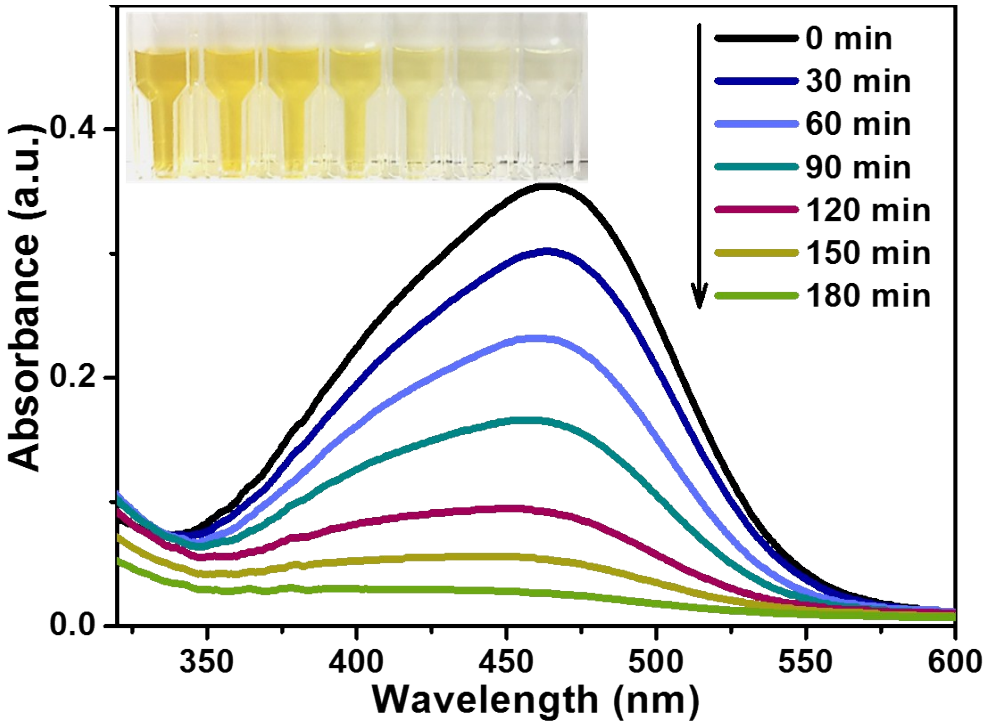

Fig. S5. UV-vis absorption spectra of MO during the photocatalytic degradation process over Ag@Ag_2S-40 under visible light irradiation ($\lambda > 400$ nm).

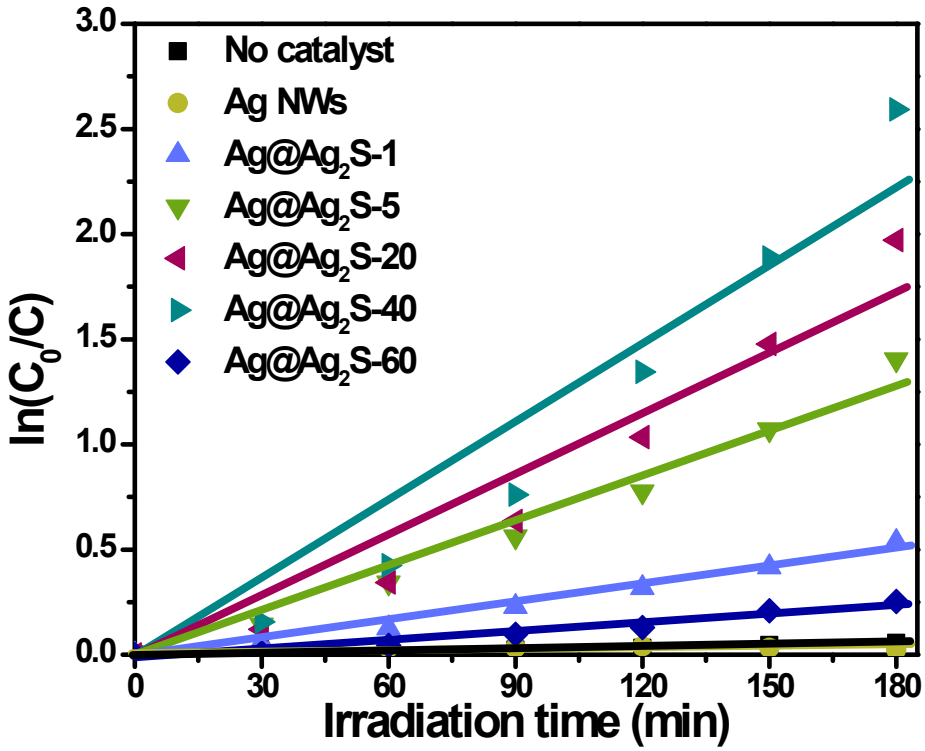

Fig. S6. Pseudo-first-order kinetic plots of Ag NWs and Ag@Ag_2S composites toward the degradation of MO under visible light irradiation ($\lambda > 400$ nm).

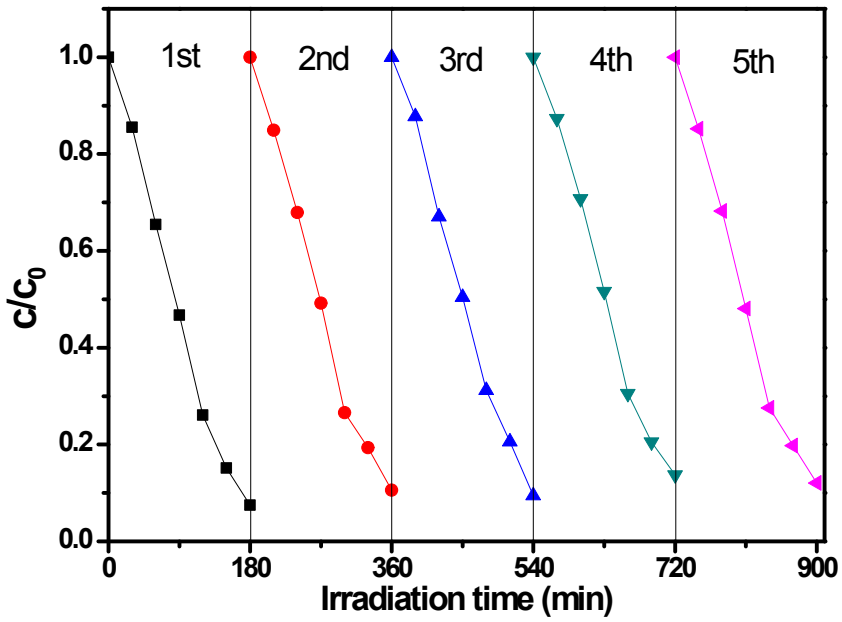

Fig. S7. Recycled experiment of photocatalytic degradation of MO over the sample of Ag@Ag_2S-40 under visible light irradiation ($\lambda > 400$ nm).