

Supporting Information

Construction of Reduced Graphene Oxide-Supported Ag-Cu₂O composites with Hierarchical Structures for Enhanced Photocatalytic Activities and Recyclability

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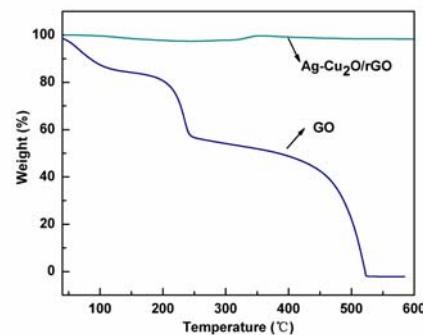


Fig. S1 TGA curves of the Ag-Cu₂O/rGO (G5-8.4) nanocomposites and GO in air.

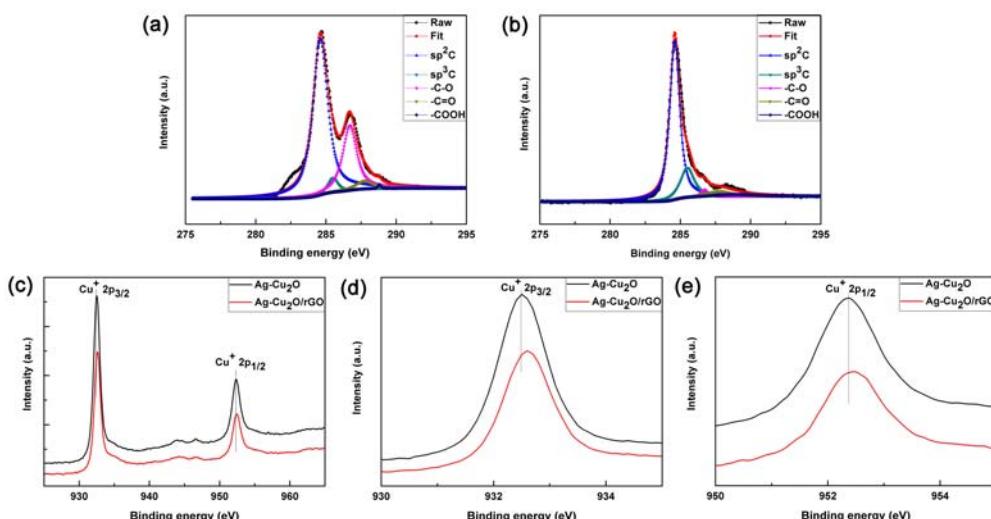


Fig. S2 XPS spectra of the C 1s peaks for GO (a) and Ag-Cu₂O/rGO NCs (b); the Cu 2p peaks for Ag-Cu₂O and Ag-Cu₂O/rGO NCs (c-e).

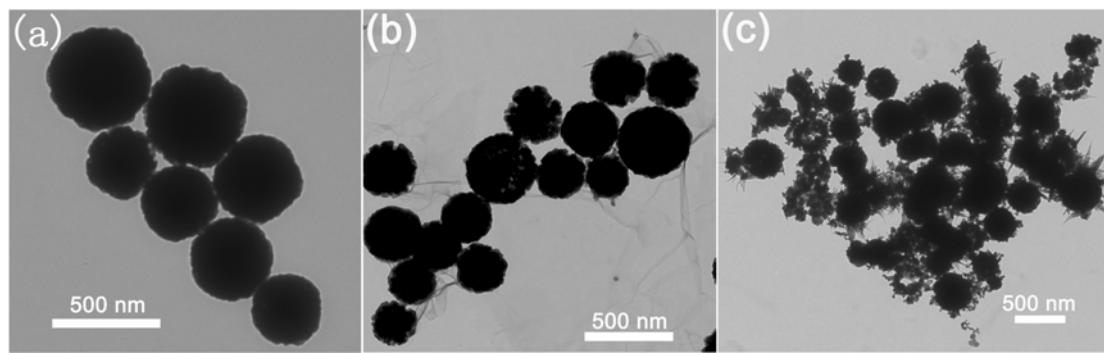


Fig. S3 TEM images of (a) pure Cu₂O microsphere, (b) Cu₂O/rGO nanocomposites and (c) Ag-Cu₂O nanocomposites.

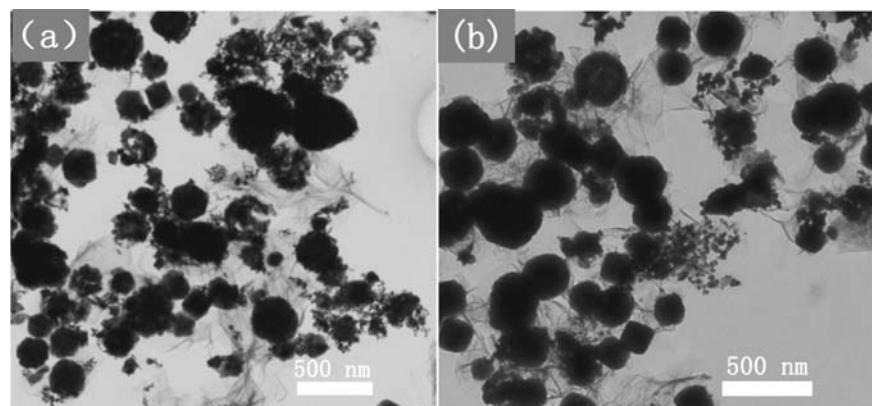
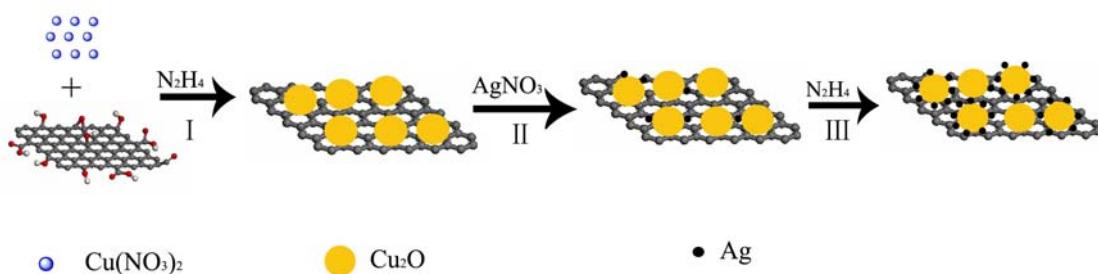


Fig. S4 TEM images of (a) the obtained sample: by first mixing spherical Cu₂O with GO and Ag, followed by reduction with hydrazine. (b) Ag-rGO-Cu₂O: add the total dosage of hydrazine hydrate once rather than two times.



Scheme 1. Schematic graph of the formation process of the spherical Ag-Cu₂O/rGO

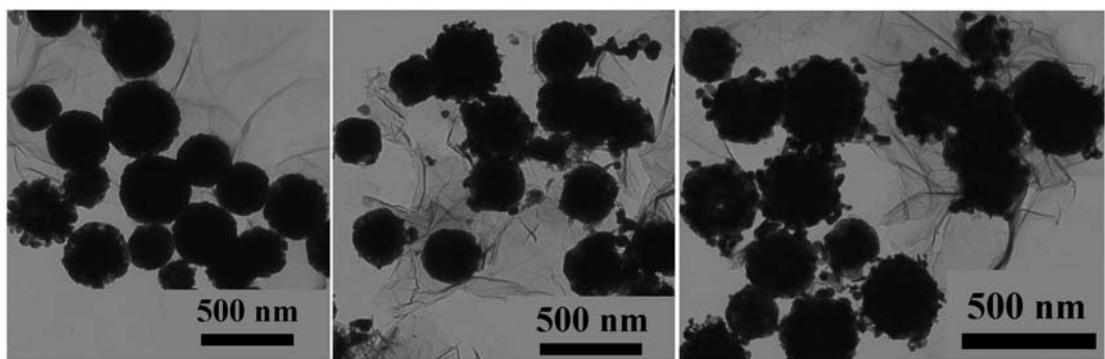


Fig. S5 TEM images of the Ag-Cu₂O/rGO composites prepared at different stages: (a) formation process of sphere-like Cu₂O/rGO (step I), (b) mixing of the AgNO₃ and Cu₂O/rGO (step II), (c) formation sphere-like Ag-Cu₂O on rGO (step III).

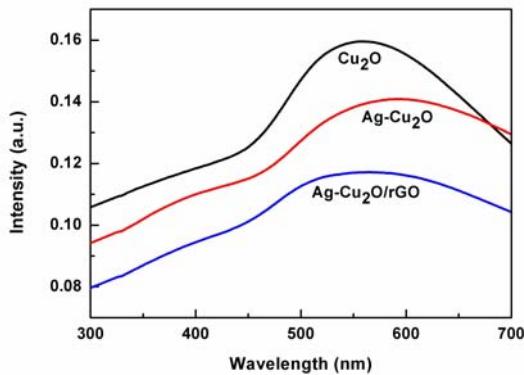


Fig. S6 The UV-vis absorption spectra of pure Cu₂O nanocrystals, Ag-Cu₂O composites, Ag-Cu₂O/rGO (G3-1.8) nanocomposites, respectively.

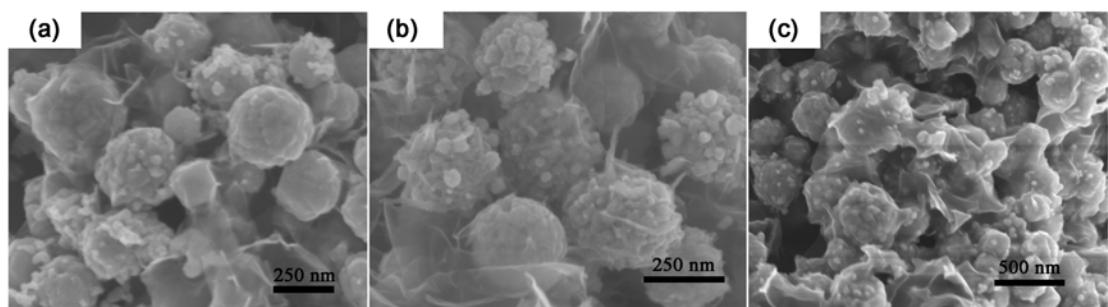


Fig. S7 SEM images of Ag-Cu₂O/rGO NCs with increasing amounts of Ag: (a) 6.4Ag-S1, (b) 12Ag-S2 and (c) 17Ag-S3.

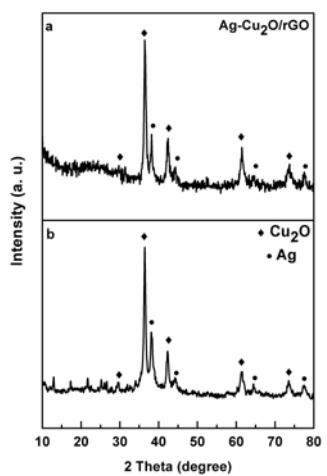


Fig. S8 XRD patterns for the Ag-Cu₂O/rGO (G3-1.8) NCs photocatalyst (a) before and (b) after the recycling experiment.

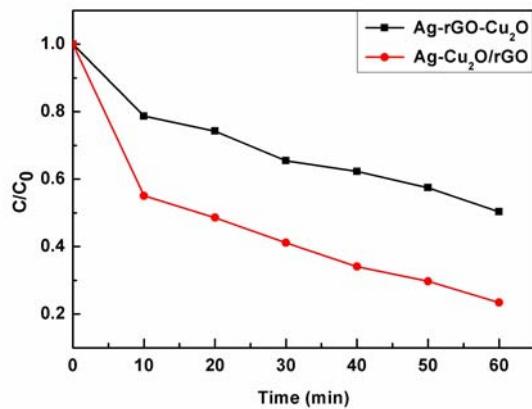


Fig. S9 Photocatalytic degradation of MO under visible light irradiation at 25 °C with different catalysts: Ag-rGO-Cu₂O NCs and Ag-Cu₂O/rGO (G5-8.4) NCs.

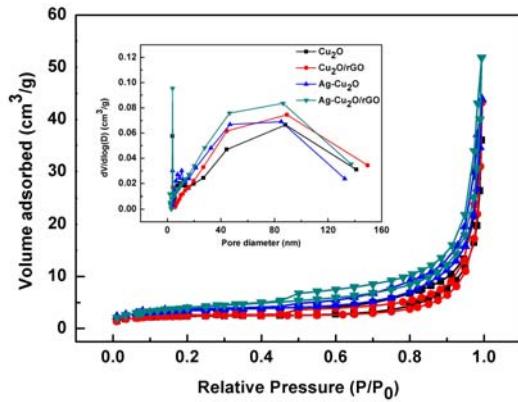


Fig. S10 N₂ adsorption-desorption isotherm and corresponding pore-size distribution curves (inset) of the obtained pure Cu₂O, Cu₂O/rGO NCs, Ag-Cu₂O NCs and Ag-Cu₂O/rGO (G3-1.8) NCs.

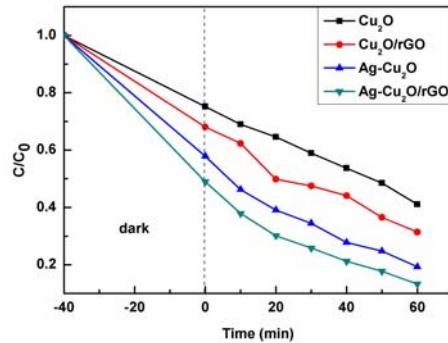


Fig. S11 The curves of adsorption and photodegradation of MO under visible light irradiation at 25°C with different catalysts: pure Cu₂O, Cu₂O/rGO NCs, Ag-Cu₂O NCs and Ag-Cu₂O/rGO (G3-1.8) NCs, respectively.

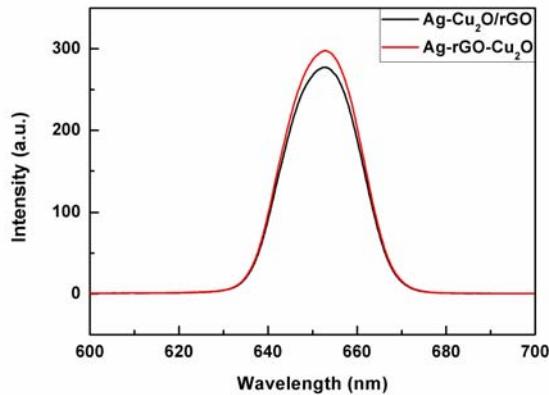


Fig. S12 PL spectra of Ag-rGO-Cu₂O NCs and Ag-Cu₂O/rGO (G5-8.4) NCs with the excitation wavelength of 325 nm.

Table S1 The BET surface area, pore volume and average pore size of (a) pure Cu₂O, (b) Cu₂O/rGO NCs, (c) Ag-Cu₂O NCs and (d) Ag-Cu₂O/rGO NCs

sample	Cu ₂ O	Cu ₂ O/rGO	Cu ₂ O-Ag	Cu ₂ O-Ag/rGO
S_{BET} (m ² g ⁻¹)	8.80	9.16	13.25	14.41
Pore volume (cm ³ g ⁻¹)	0.058	0.068	0.069	0.083
Average pore size (nm)	22.6	31.7	23.5	18.3

Table S2 The Degradation Effect of Different Photocatalysts Reported in the Following references

Type of catalysts	Light source	Pollutants (ρ/V) (mg• L ⁻¹ /mL)	Catal ysts (mg)	Results	Ref.
26(18)-facet Cu ₂ O polyhedra	Decomposing MO under visible light	15 /100	50	DP of 96% after 3 h	1
Cu ₂ O/PA/rGO	Decomposing MO under visible light	30/20	10	DP of 95% after 3 h	2
Cu ₂ O/Ag	Decomposing MO under visible light	30/100	30	DP of 75.34% after 110 min	3
Cu ₂ O-Au	Decomposing MO under visible light	32.73/20	4	DP of 91% after 2 h	4
Cu ₂ O/titanate	Decomposing MO under visible light	32.73/50	50	DP of about 95 % after 2.5h	5
Fe ₃ O ₄ @C@Cu ₂ O composites	Decomposing MO under visible light	32.73/50	50	DP of about 95% after 2.5 h	6
Ag-Cu ₂ O/rGO	Decomposing MO under visible light	32/50	10	DP of 95% after 1 h	Our work

References

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