

Preparation of g-C₃N₄/Co₃O₄/Ag₂O ternary nanocomposites and its photocatalytic activity and mechanism

Qian Xu, Peng Zhao, Yu-Kun Shi, Jian-Sheng Li*, Wan-Sheng You, Lan-Cui Zhang and Xiao-Jing Sang*

School of Chemistry and Chemical Engineering, Liaoning Normal University, Dalian 116029, China

E-mail: lijiansheng@lnnu.edu.cn; sangxj923@lnnu.edu.cn

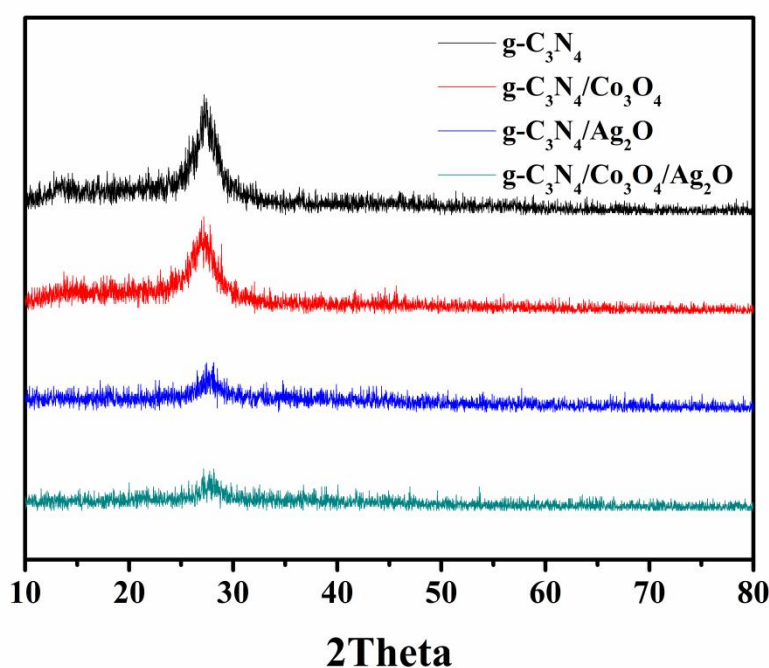


Fig. S1 XRD patterns of g-C₃N₄, g-C₃N₄/Co₃O₄, g-C₃N₄/Ag₂O, g-C₃N₄/Co₃O₄/Ag₂O samples.

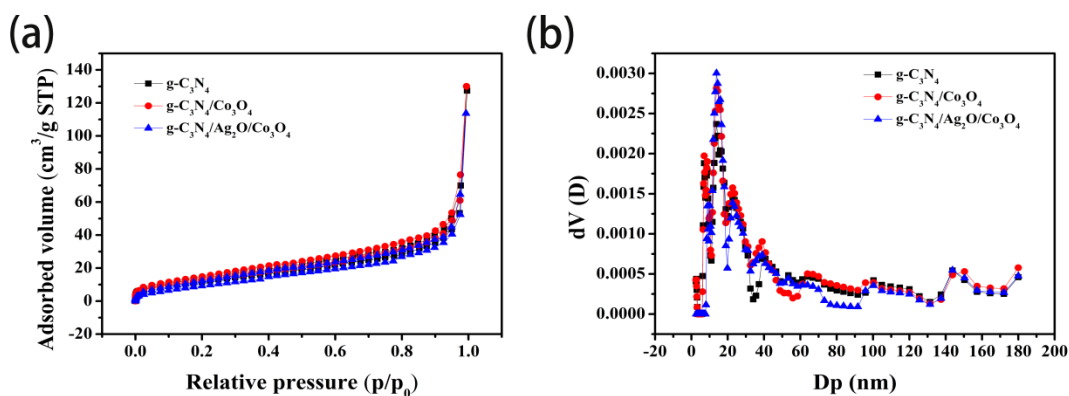


Fig. S2 BET analysis of g-C₃N₄, g-C₃N₄/Co₃O₄, g-C₃N₄/Co₃O₄/Ag₂O samples.

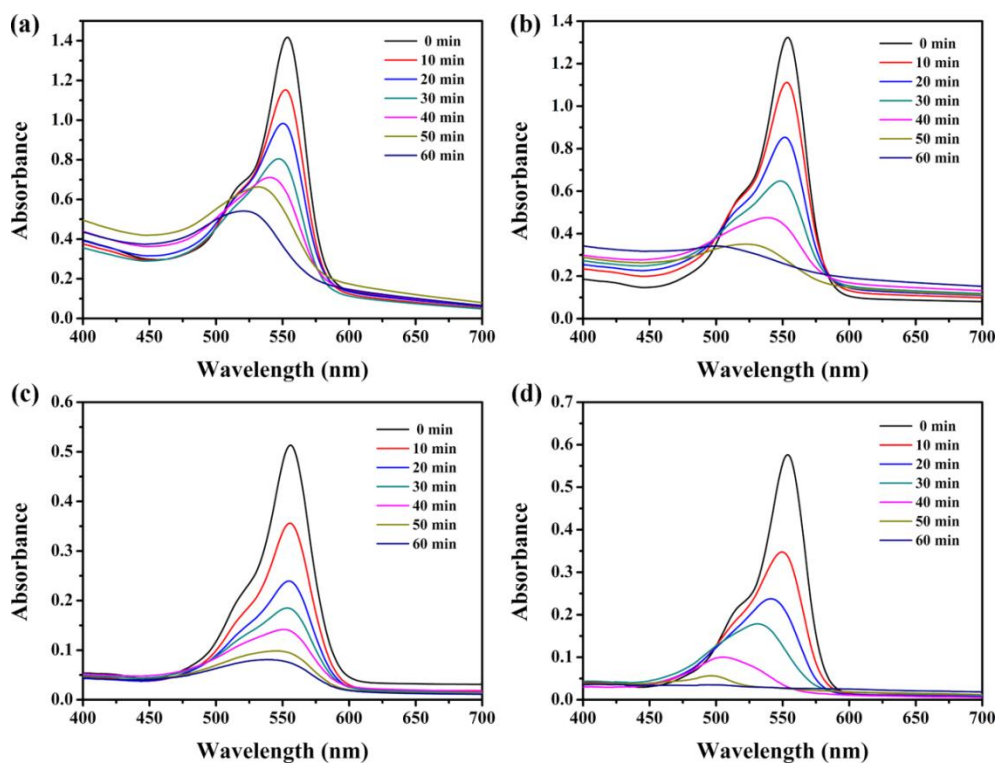


Fig. S3 UV-Vis absorption spectra of RhB during photodegradation over (a) $g\text{-C}_3\text{N}_4$, (b) $\text{C}_3\text{N}_4/\text{Co}_3\text{O}_4$, (c) $g\text{-C}_3\text{N}_4/\text{Ag}_2\text{O}$, (d) $g\text{-C}_3\text{N}_4/\text{Co}_3\text{O}_4/\text{Ag}_2\text{O}$ samples.

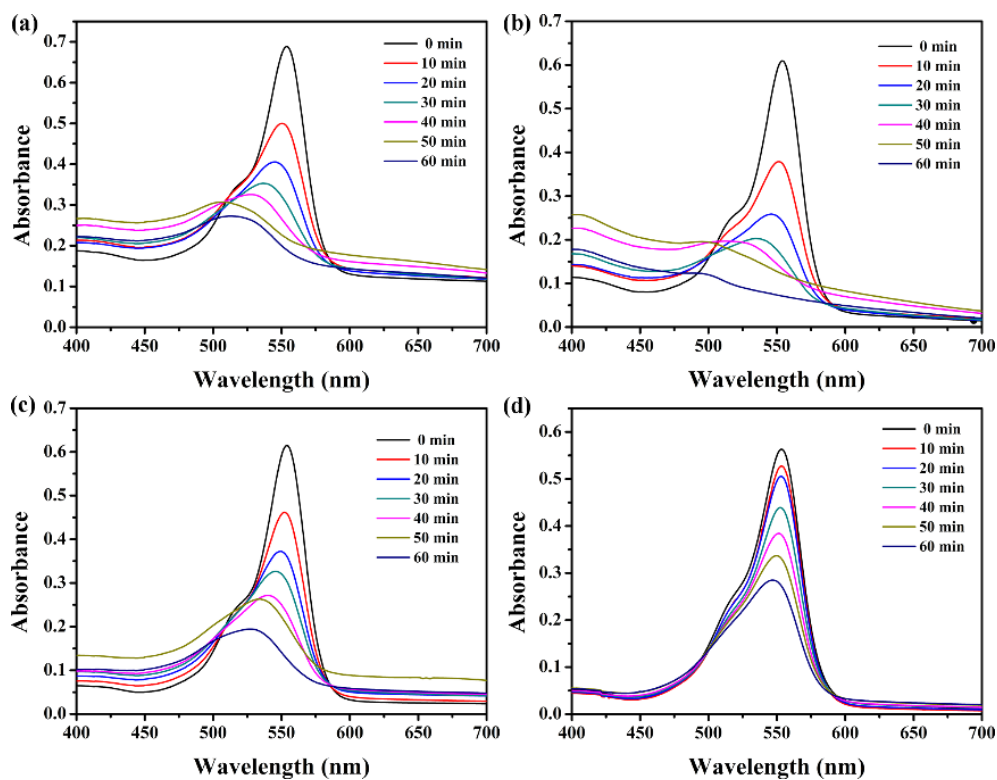


Fig. S4 UV-Vis absorption spectra of RhB during photodegradation over (a) $g\text{-C}_3\text{N}_4/\text{Co}_3\text{O}_4/\text{Ag}_2\text{O-0.05}$, (b) $g\text{-C}_3\text{N}_4/\text{Co}_3\text{O}_4/\text{Ag}_2\text{O-0.1}$, (c) $g\text{-C}_3\text{N}_4/\text{Co}_3\text{O}_4/\text{Ag}_2\text{O-0.5}$ and (d) $g\text{-C}_3\text{N}_4/\text{Co}_3\text{O}_4/\text{Ag}_2\text{O-1}$ samples.

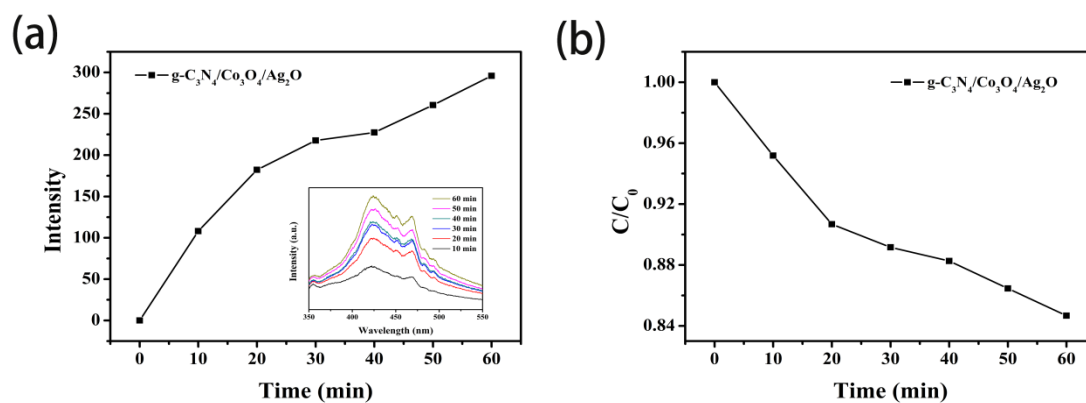


Fig. S5 (a) PL spectra of $g\text{-C}_3\text{N}_4/\text{Co}_3\text{O}_4/\text{Ag}_2\text{O}$ sample in 2 mM NaOH solution in the presence of 0.5 mM terephthalic acid under visible-light irradiation and (b) the concentration evolution of NBT during irradiating $g\text{-C}_3\text{N}_4/\text{Co}_3\text{O}_4/\text{Ag}_2\text{O}$ system.

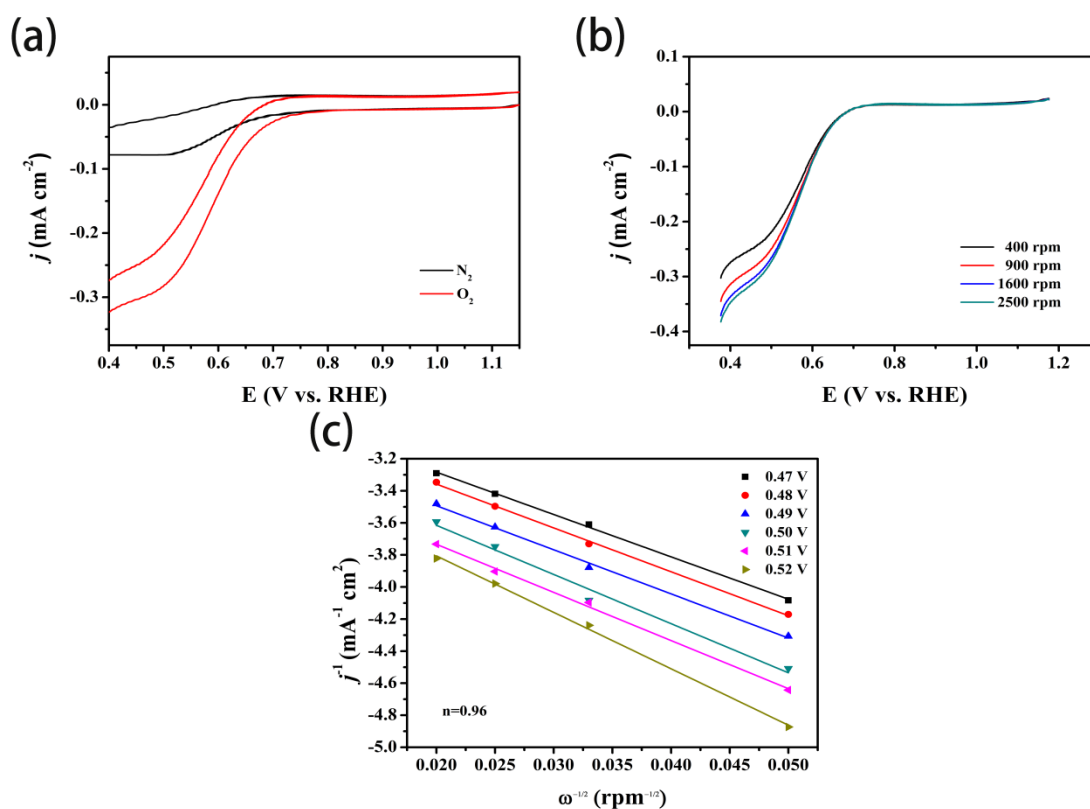


Fig. S6 (a) Cyclic voltammetry of $g\text{-C}_3\text{N}_4$, (b) LSV curves of $g\text{-C}_3\text{N}_4$ at different rotation rates in O_2 -saturated 0.1M KOH, (c) K-L plots of $g\text{-C}_3\text{N}_4$ at various potentials (0.47–0.52 V).

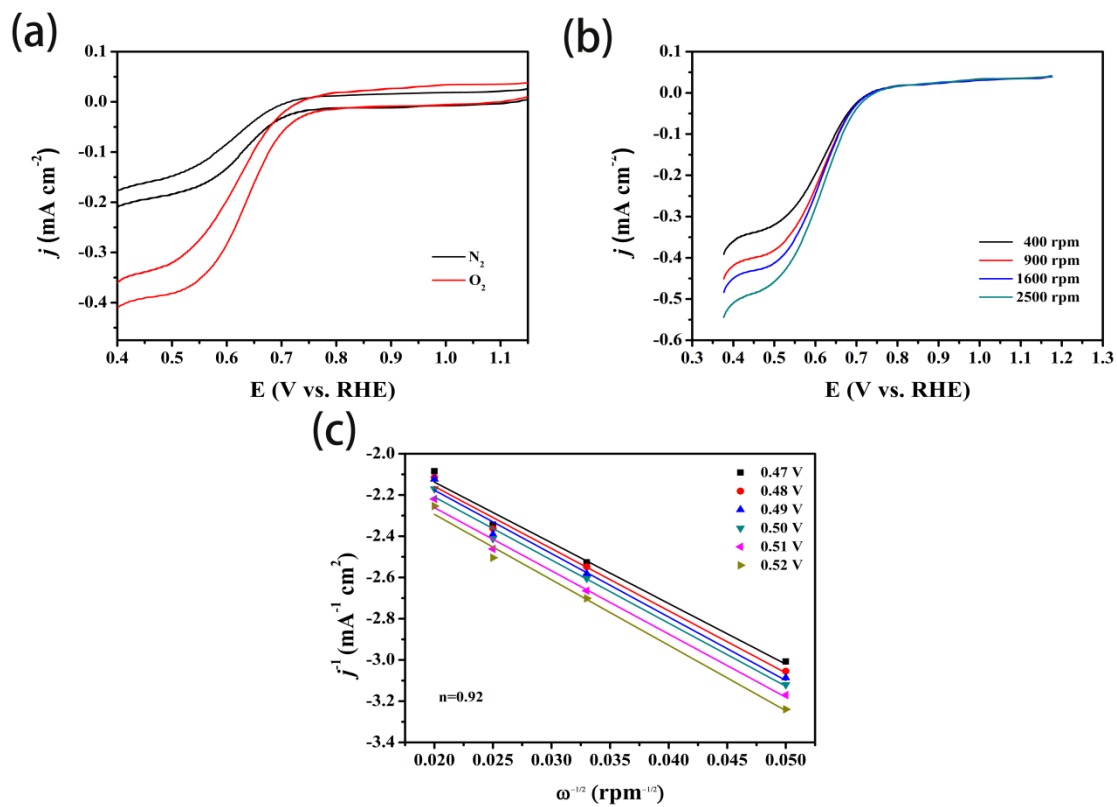


Fig. S7 (a) Cyclic voltammetry of g-C₃N₄/Co₃O₄, (b) LSV curves of g-C₃N₄/Co₃O₄ at different rotation rates in O₂-saturated 0.1M KOH, (c) K-L plots of g-C₃N₄/Co₃O₄ at various potentials (0.47–0.52 V).

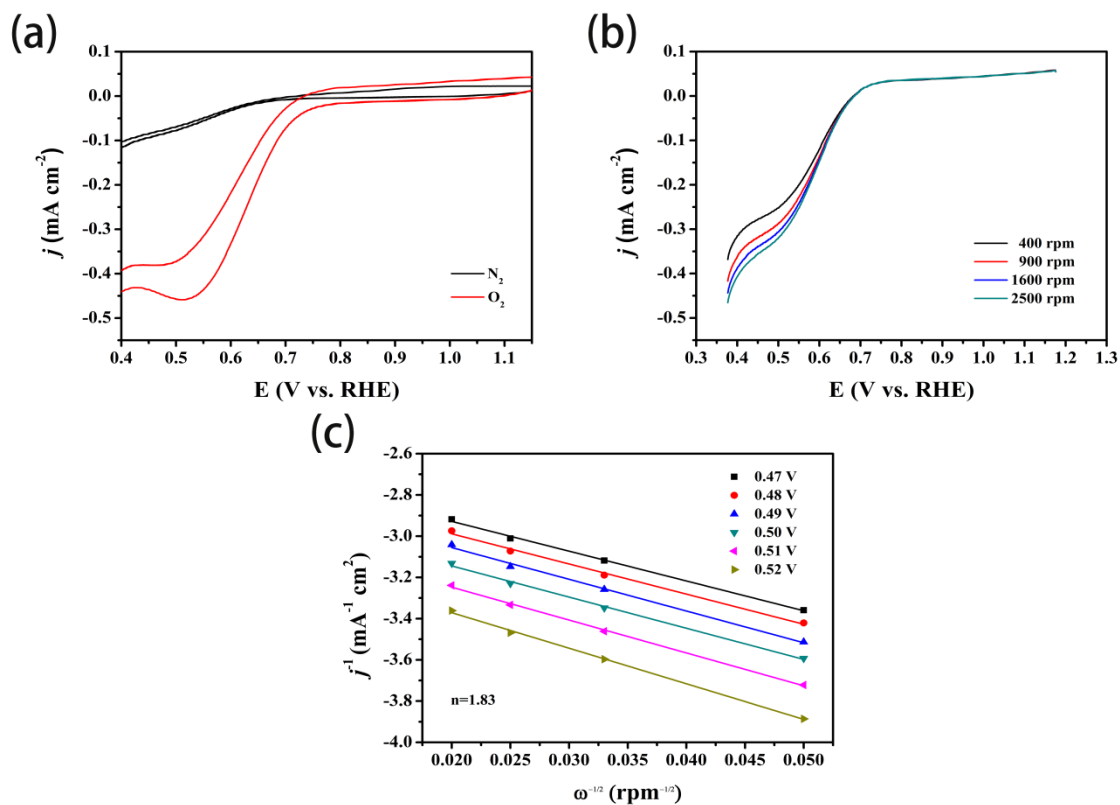


Fig. S8 (a) Cyclic voltammetry of g-C₃N₄/Ag₂O, (b) LSV curves of g-C₃N₄/Ag₂O at different rotation rates in O₂-saturated 0.1M KOH, (c) K–L plots of g-C₃N₄/Ag₂O at various potentials (0.47–0.52 V).

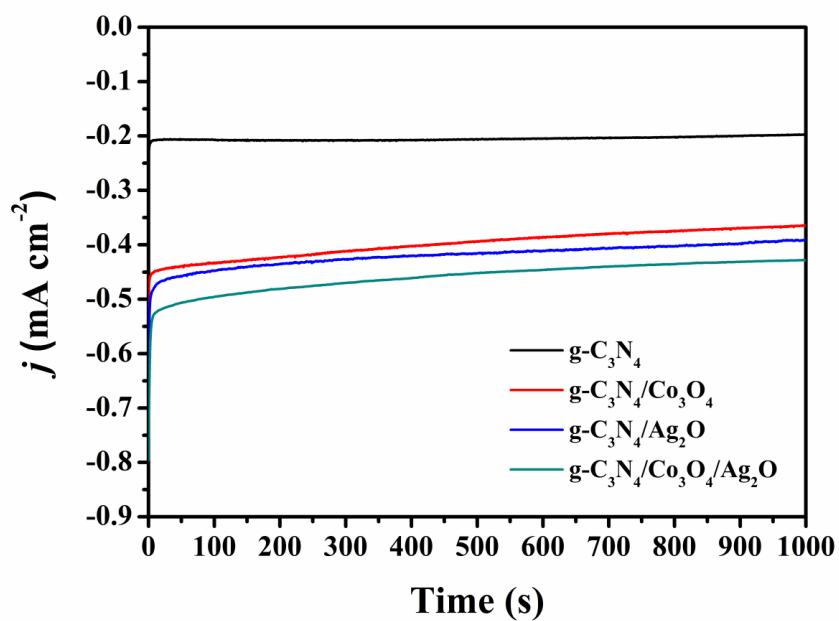


Fig. S9 Chronoamperometric responses at 0.6 V of g-C₃N₄ electrodes in O₂-saturated 0.1 M KOH.

Table S1 Optical properties of g-C₃N₄, Co₃O₄ and Ag₂O semiconductors vs. SHE ^[S1, S2]

Semiconductor	E _g (eV)	E _{CBM} (eV)	E _{VBM} (eV)
g-C ₃ N ₄ /Co ₃ O ₄	2.68	-0.50	2.18
Ag ₂ O	1.2	0.20	1.40

References

[S1] H. Y. Zhang, W. J. Tian, L. Zhou, H. Q. Sun, M. Tade and S. B. Wang, *Appl. Catal. B: Environ.*, 2018, **223**, 2-9.

[S2] M. Xu, L. Han and S. J. Dong, *ACS Appl. Mater. Interfaces*, 2013, **5**, 12533-12540.