

## Electronic Supplementary Material

# Designing 2D-2D g-C<sub>3</sub>N<sub>4</sub>/Ag:ZnIn<sub>2</sub>S<sub>4</sub> nanocomposites for high-performance conversion of sunlight energy to hydrogen fuel and meaningful reduction of pollution

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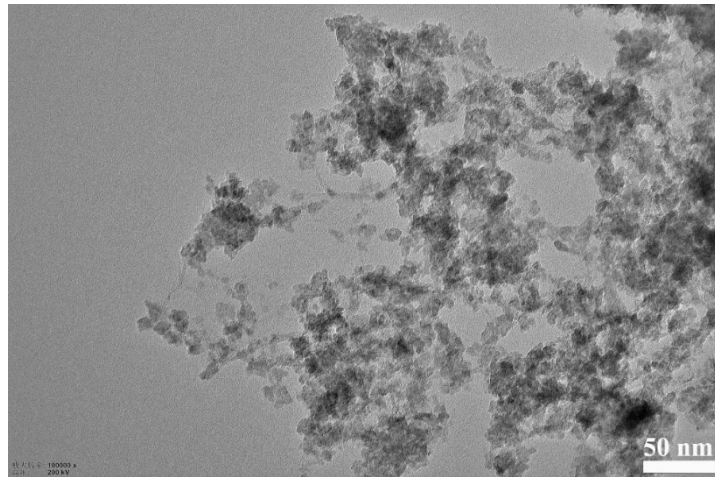
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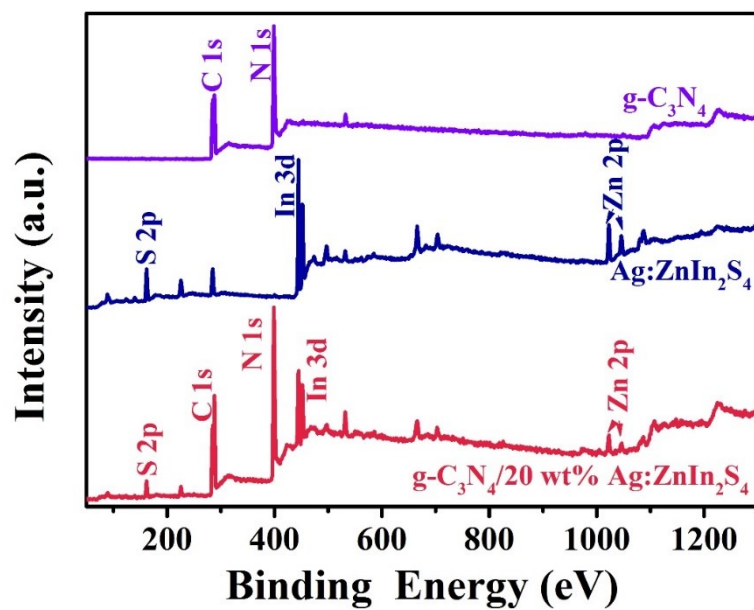
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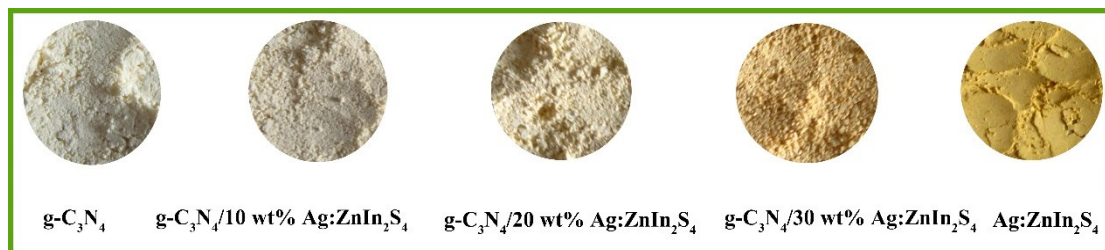
<sup>#</sup>These authors contributed equally to this work.



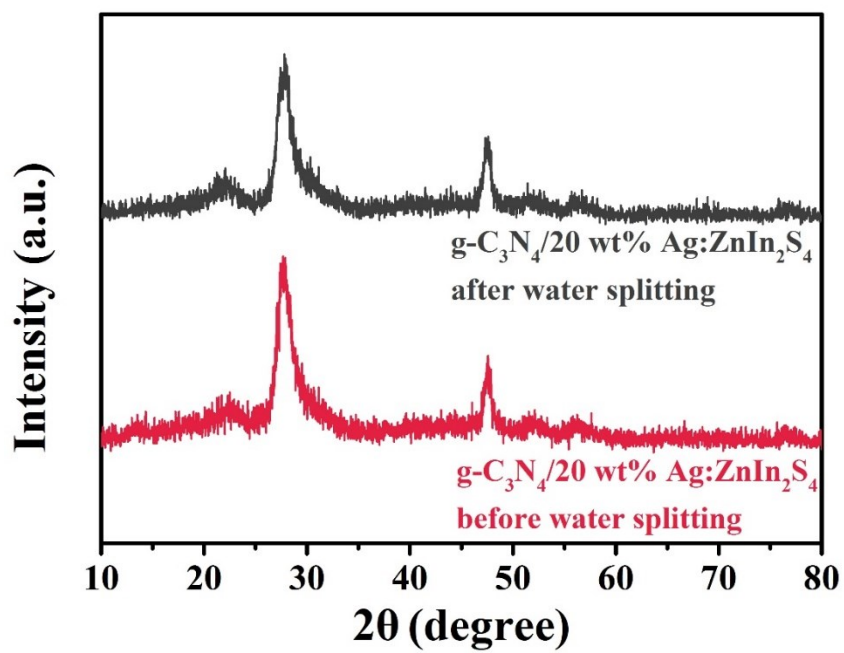
**Fig. S1.** TEM image of the Ag:ZnIn<sub>2</sub>S<sub>4</sub> sample.



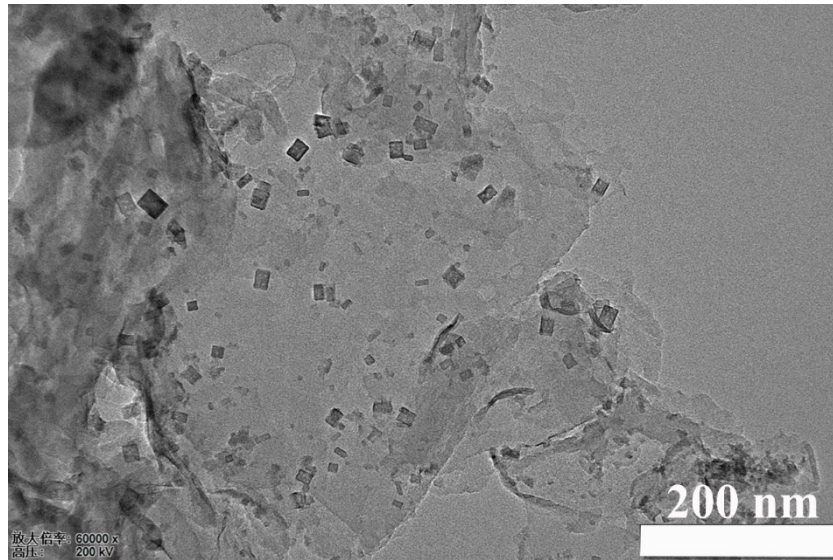
**Fig. S2.** XPS survey patterns of the g-C<sub>3</sub>N<sub>4</sub>, Ag:ZnIn<sub>2</sub>S<sub>4</sub>, and g-C<sub>3</sub>N<sub>4</sub>/20 wt% Ag:ZnIn<sub>2</sub>S<sub>4</sub> nanocomposites.



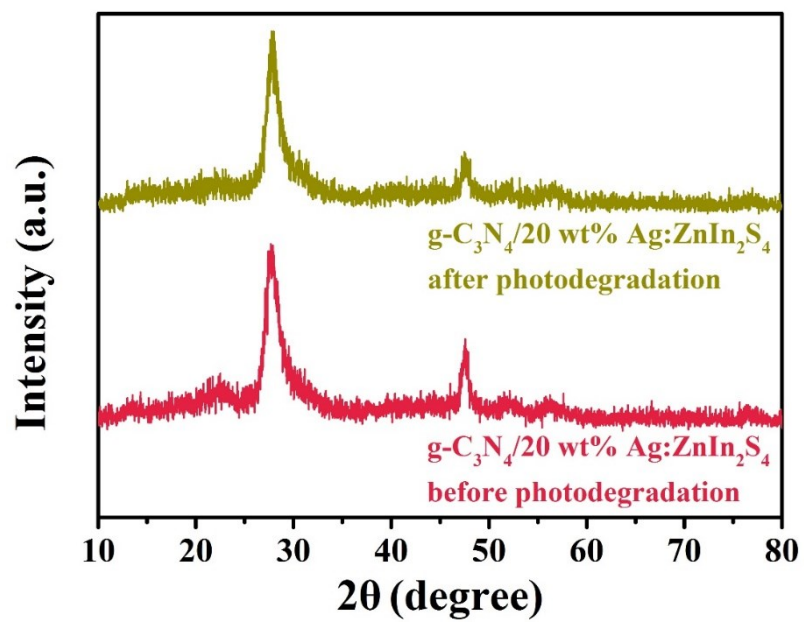
**Fig. S3.** Photographs of the  $g\text{-C}_3\text{N}_4$ ,  $\text{Ag:ZnIn}_2\text{S}_4$ , and  $g\text{-C}_3\text{N}_4/\text{Ag:ZnIn}_2\text{S}_4$  samples.



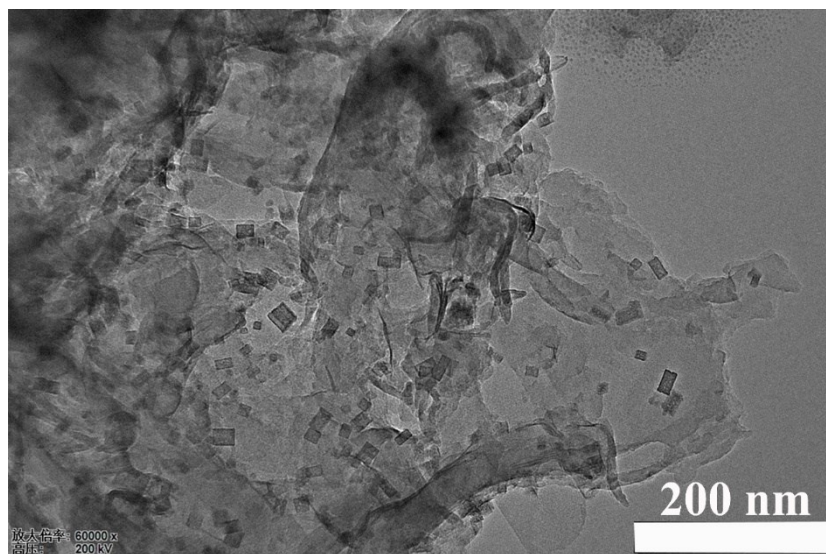
**Fig. S4.** XRD patterns of the g-C<sub>3</sub>N<sub>4</sub>/20 wt% Ag:ZnIn<sub>2</sub>S<sub>4</sub> sample before and after photocatalytic water splitting.



**Fig. S5.** TEM image of the g-C<sub>3</sub>N<sub>4</sub>/20 wt% Ag:ZnIn<sub>2</sub>S<sub>4</sub> sample after photocatalytic water splitting.



**Fig. S6.** XRD patterns of the g-C<sub>3</sub>N<sub>4</sub>/20 wt% Ag:ZnIn<sub>2</sub>S<sub>4</sub> sample before and after photodegradation of MO.



**Fig. S7.** TEM image of the g-C<sub>3</sub>N<sub>4</sub>/20 wt% Ag:ZnIn<sub>2</sub>S<sub>4</sub> sample after photodegradation of MO.