Supporting Information

Interface engineering of noble-metal-free 2D-2D MoS_2/Cu-$ZnIn_2S_4$ photocatalyst for enhanced photocatalytic H_2 production

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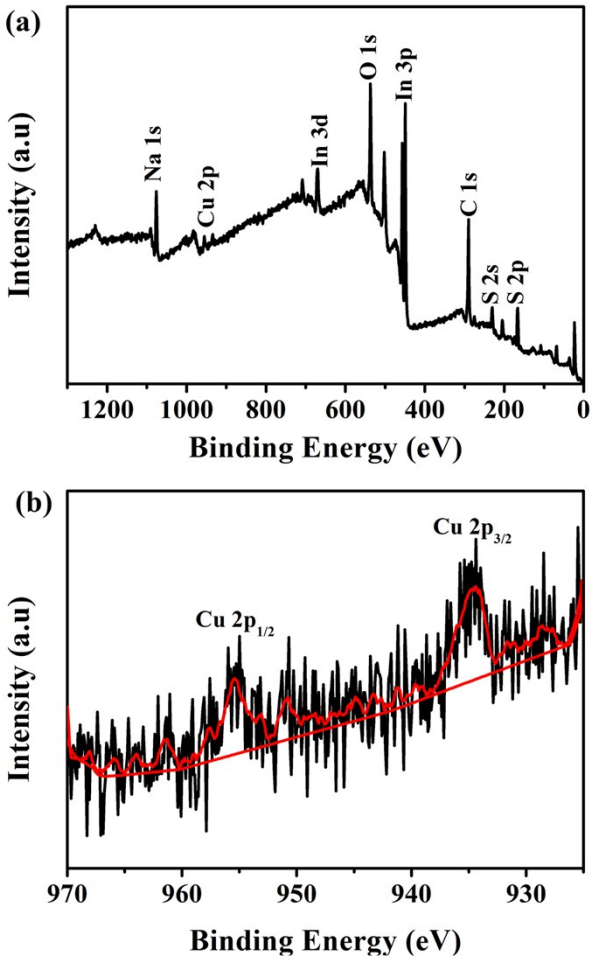

Figure S1. (a) Survey XPS spectra of Cu-$NaInS_2$. (b) High resolution XPS spectra of Cu 2p.

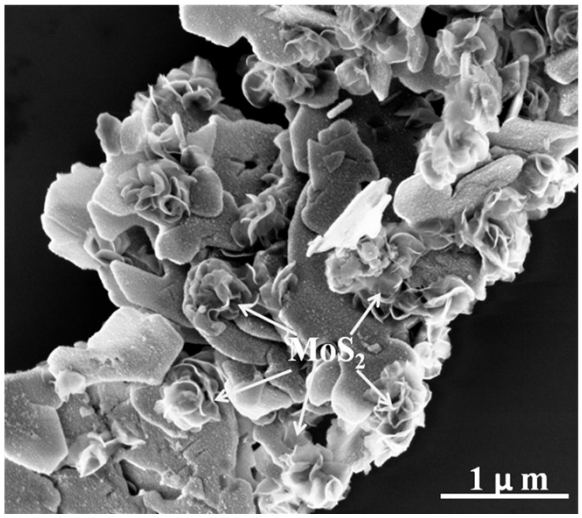

Figure S2. SEM image of 10 wt% MoS_2/Cu-$ZnIn_2S_4$ photocatalyst.

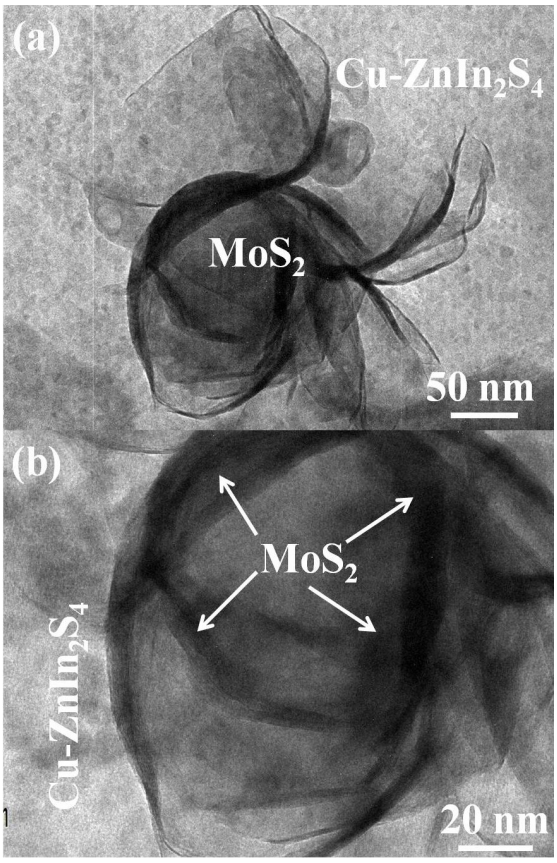

Figure S3. (a,b) TEM images of 10 wt% MoS_2/Cu-$ZnIn_2S_4$ photocatalyst.

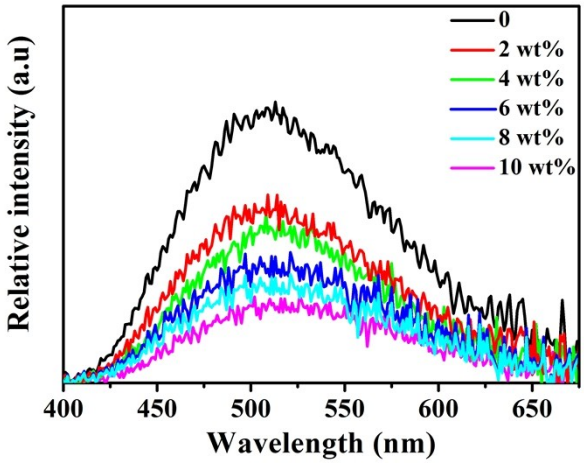

Figure S4. PL emission spectra of pure Cu-$ZnIn_2S_4$ and MoS_2/Cu-$ZnIn_2S_4$ photocatalysts in ethanol solutions (0.5 mg ml^{-1}) excited at 350 nm.

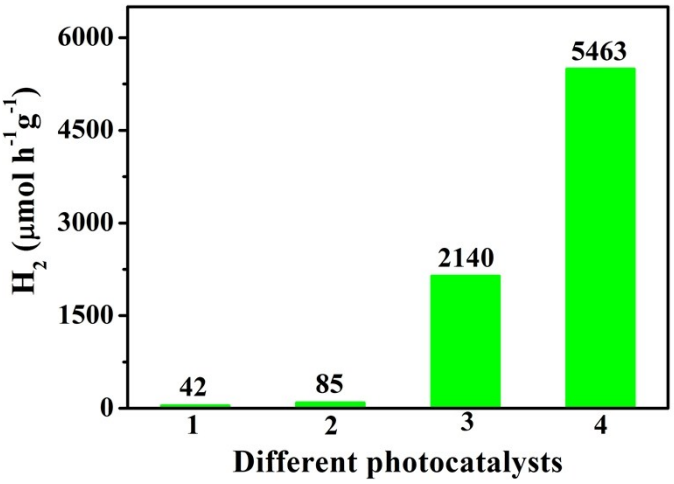

Figure S5. Photocatalytic H_2 evolution rate of $ZnIn_2S_4$ (1), Cu-$ZnIn_2S_4$ (2), 6 wt% MoS_2/$ZnIn_2S_4$ (3) and 6 wt% MoS_2/Cu-$ZnIn_2S_4$ (4) under visible light irradiation (λ> 420 nm) from a 300 W Xe lamp in 250 mL of 0.1 M ascorbic acid aqueous solution.

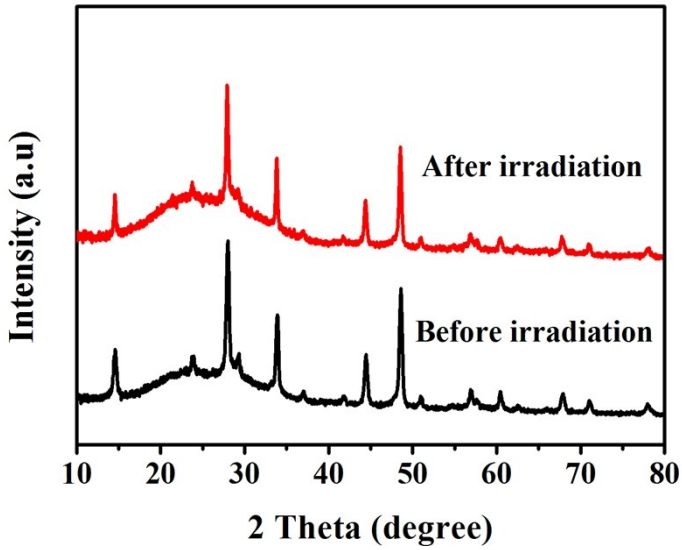

Figure S6. XRD patterns of 6 wt% MoS_2/Cu-$ZnIn_2S_4$ photocatalyst.

Table S1. Analytical results of Cu/In molar ratio in Cu-$NaInS_2$ and Cu/Cu-$ZnIn_2S_4$.

Sample	Sample concentration (mg/L)	Cu concentration (mg/L)	Cu/In molar ratio (mol%)
Cu-$NaInS_2$	420	0.785	0.59
Cu-$ZnIn_2S_4$	480	0.854	0.58

Table S2. Comparison of photocatalytic performance for H_2 production between the current work and other reported studies.

Entry	**Photocatalyst**	**Light source**	**Sacrificial reagent**	**H_2 evolution rate (μmol h^{-1} g^{-1})**	**Ref**
1	Graphene/$ZnIn_2S_4$	300 W Xe lamp (λ>420 nm)	Lactic acid	817	(1)
2	MoS_2/$ZnIn_2S_4$	300 W Xe lamp (λ>420 nm)	Na_2S/Na_2SO_3	3060	(2)
3	NiS/$ZnIn_2S_4$	300 W Xe lamp (λ>420 nm)	Na_2S/Na_2SO_3	2094	(3)
4	MoS_2-graphen/ $ZnIn_2S_4$	300 W Xe lamp (λ>420 nm)	Na_2S/Na_2SO_3	4169	(4)
5	Pt/$ZnIn_2S_4$	300 W Xe lamp (λ>420 nm)	Na_2S/Na_2SO_3	257	(5)
6	MoS_2/Cu-$ZnIn_2S_4$	300 W Xe lamp (λ>420 nm)	Ascorbic acid	5463	This work

References

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