Electronic Supplementary Material (ESI) for RSC Advances.

Electronic Supplementary Information

Multilayer Core-Shell MoS_2/CdS Nanorods with Very High Photocatalytic Activity for Hydrogen Production under Visible-Light Excitation and Investigation of the Photocatalytic Mechanism by Femtosecond Transient Absorption Spectroscopy

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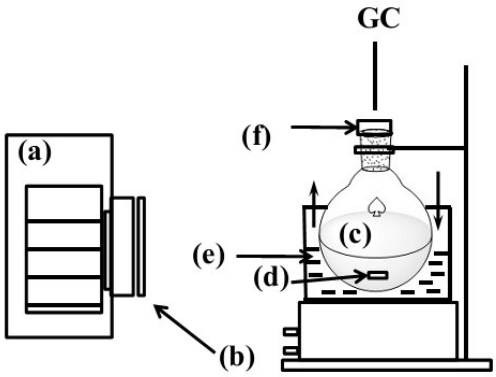

Figure S1. Reactor of the present photocatalytic reaction system: (a) light source of 300 W Xe lamp, (b) UV cut-off filter (λ > 420 nm), (c) reaction solution, (d) magnetic stirring bar, (e) water jacket, (f) septum.[1]

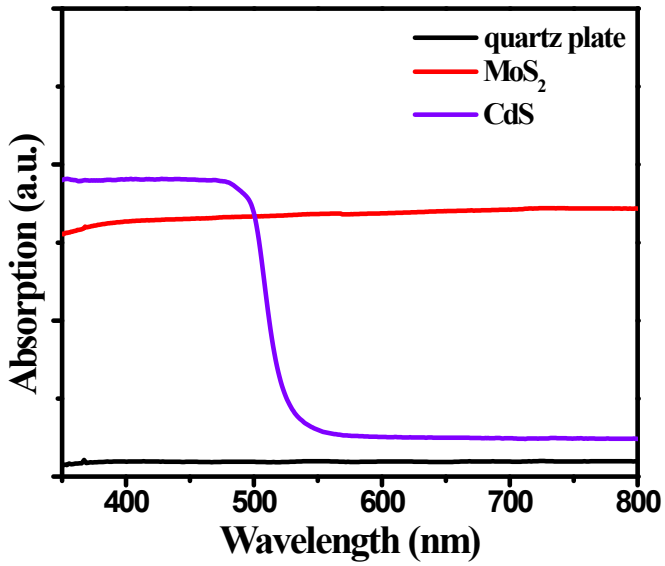

Figure S2. The UV-Vis spectra of the blank quartz plate, pure CdS and pure MoS_2.

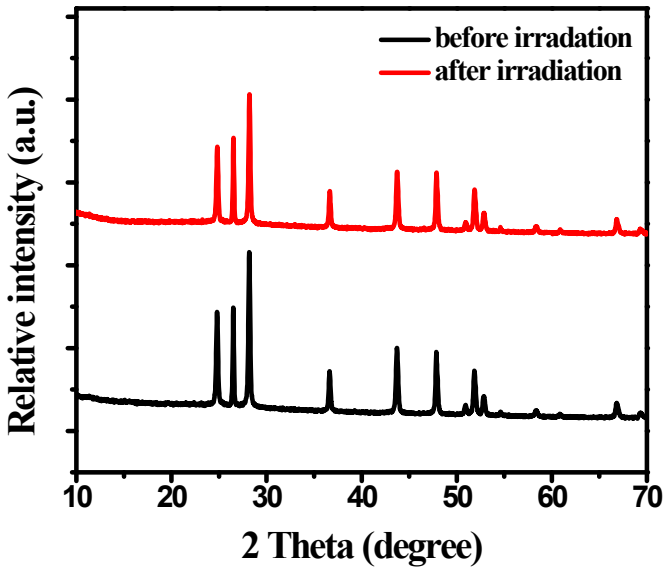

Figure S3. The XRD patterns of MoS_2/CdS sample containing 1.52 wt% MoS_2 before and after 12 h photocatalytic activity under visible light irradiation (λ > 420 nm).

Table S1. Parameters derived from fitting kinetics at 460 nm.

lifetimes (ps)	CdS	MoS_2/CdS
τ_{growth}	8.3	3.0
τ_{decay1}	67.8	36.4
τ_{decay2}	1203	344

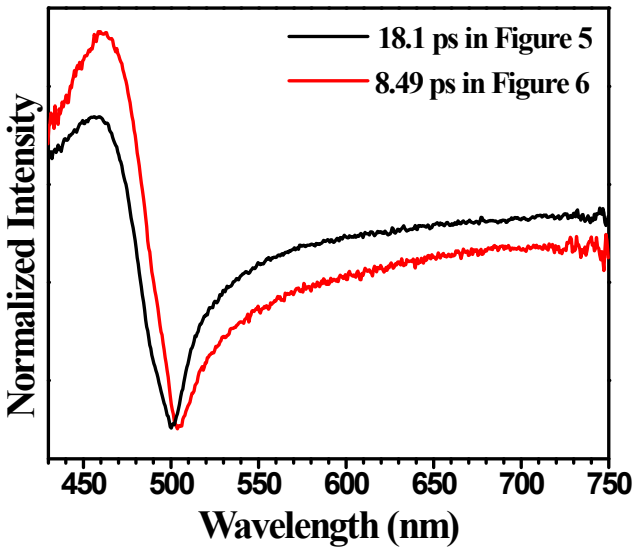

Figure S4. The normalized spectra of 18.1 ps in Figure 5 and 8.49 ps in Figure 6.

References

1 Z. P. Yan, H. T. Wu, A. L. Han,X. X. Yu, P. W. Du , *Int. J. Hydrogen Energy* **2014**, *39*, 13353-13360.