Electronic Supplementary Material (ESI) for Nanoscale.

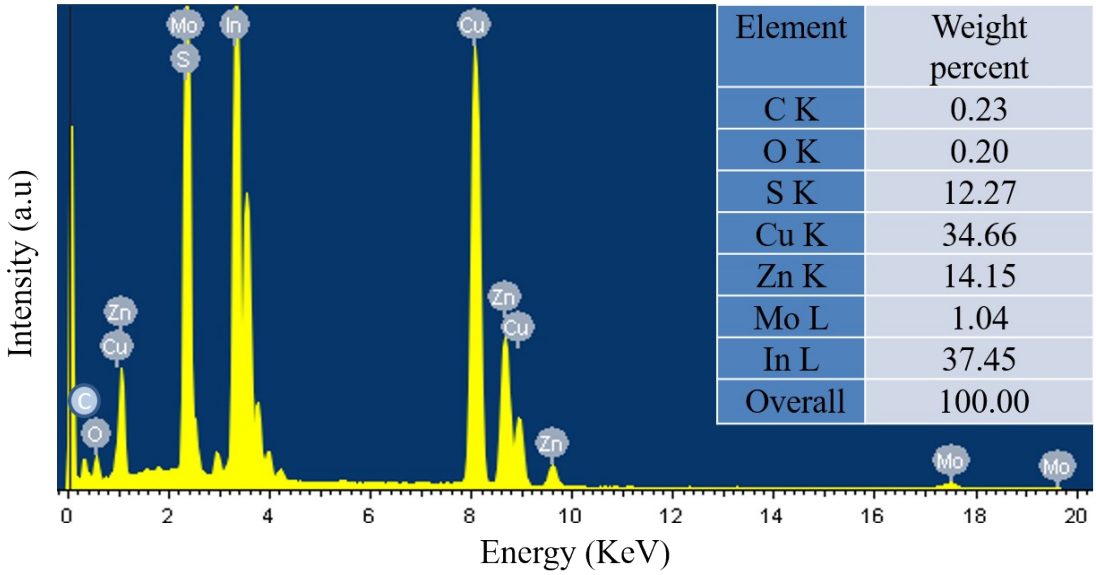
Supporting Information for

2D self-assembled $MoS_2/ZnIn_2S_4$ heterostructure for efficient photocatalytic hydrogen evolution

Weijia Li, Zhaoyong Lin and Guowei Yang*

State Key Laboratory of Optoelectronic Materials and Technologies, Nanotechnology Research Center, School of Materials Science & Engineering, School of Physics, Sun Yat-sen University, Guangzhou 510275, Guangdong, P. R. China.

*Corresponding author: stsygw@mail.sysu.edu.cn



Element	Weight percent
C K	0.23
O K	0.20
S K	12.27
Cu K	34.66
Zn K	14.15
Mo L	1.04
In L	37.45
Overall	100.00

Figure 1. EDS spectra of sample ZIS-1.5.

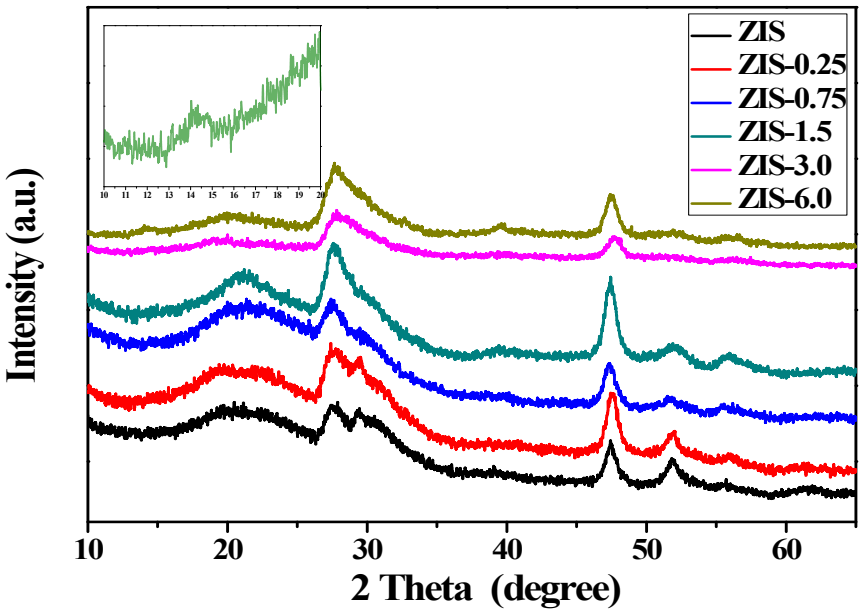


Figure 2. XRD patterns of $ZnIn_2S_4$ with different weight ratios of MoS_2. Inset: the enlarged XRD pattern in the range of 10 to 20 degree of sample ZIS-6.0.

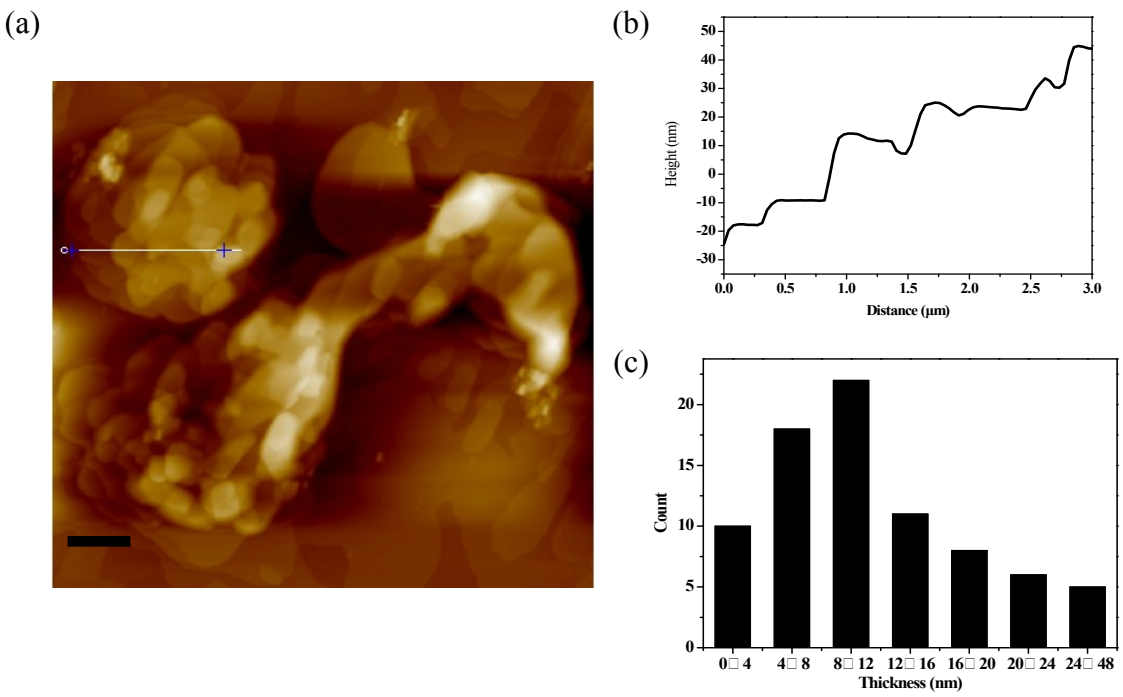


Figure 3. (a) AFM image of $ZnIn_2S_4$ on sapphire substrate. (b) Height profiles along the white lines in (a). (c) The thickness distribution graph of $ZnIn_2S_4$ nanosheets collected from 80 nanosheets.

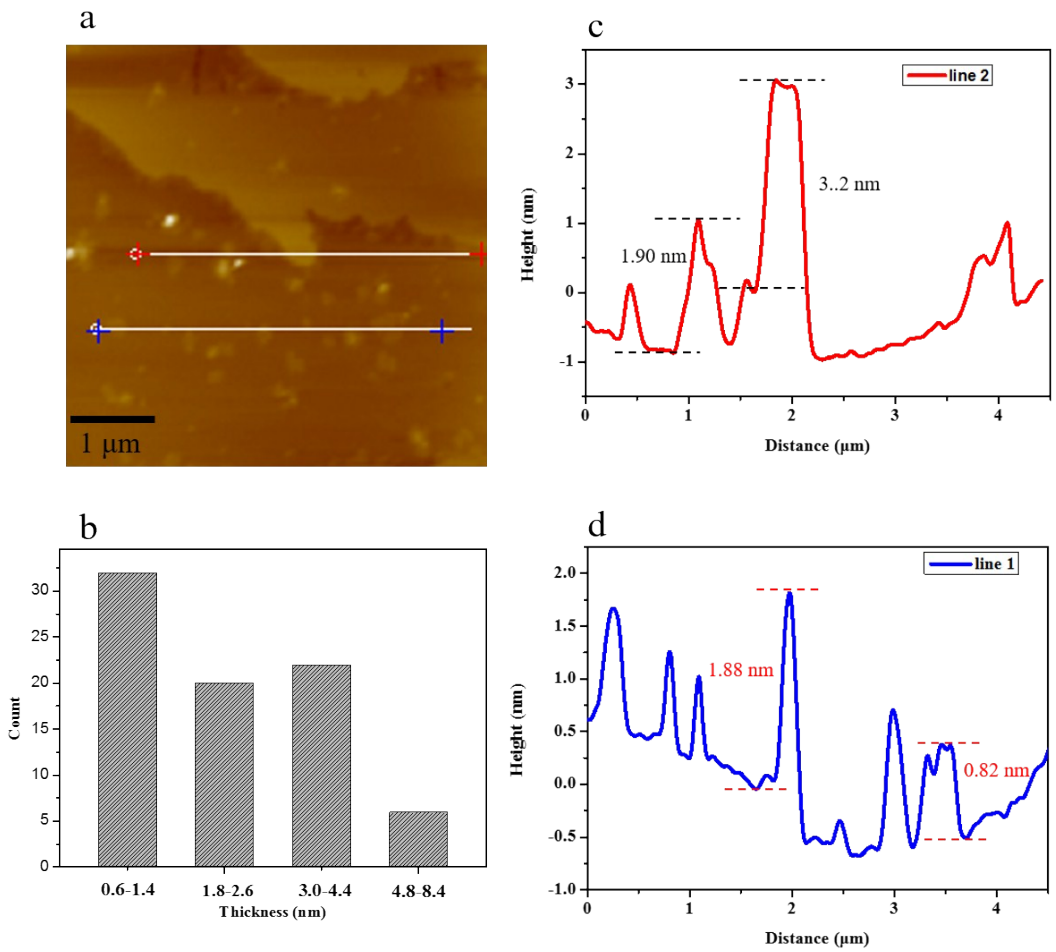


Figure 4. (a) AFM image of few-layer MoS_2. (b) The thickness distribution graph of MoS_2 collected from 80 nanosheets. (c, d) Height profiles along the red marked line and blue marked line.

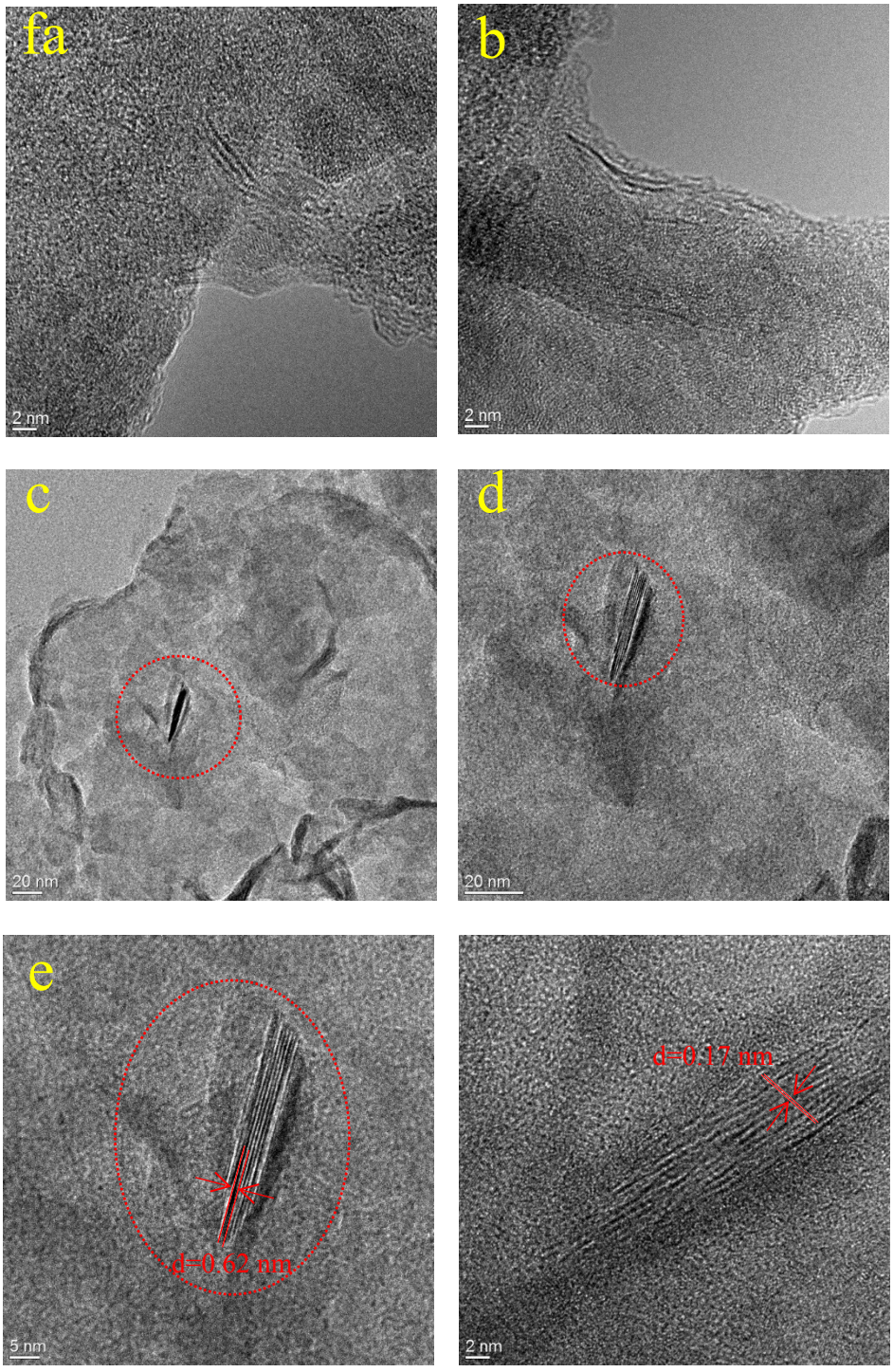


Figure 5. HRTEM image of $MoS_2/ZnIn_2S_4$ heterostructure.

Figure 6. The optical image of $ZnIn_2S_4$ (left) and 1.5% $MoS_2/ZnIn_2S_4$ (right).

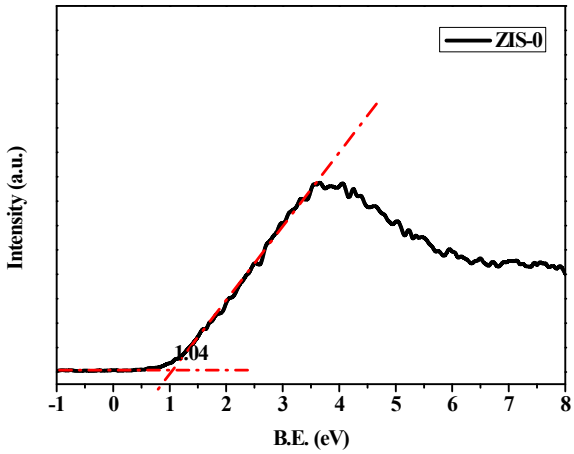


Figure 7. Valence band XPS spectra of $ZnIn_2S_4$.

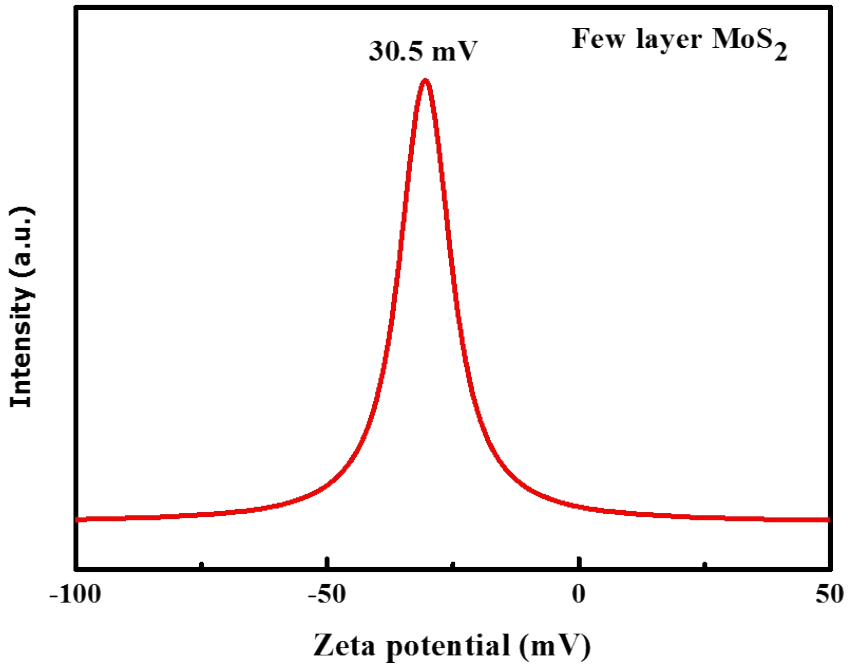


Figure 8. Zeta potential of $ZnIn_2S_4$ suspension dispersed in deionized water.

Entry	Photocatalyst	Light source	Sacrificial reagent	H_2 evolution rate ($\mu mol\ h^{-1}\ g^{-1}$)	Ref
1	RGO/La-$ZnIn_2S_4$	350W Xe lamp ($\lambda > 420$ nm)	Na_2S-Na_2SO_3	2255	1
2	$MoSe_2$/$ZnIn_2S_4$	300W Xe lamp ($\lambda > 400$ nm)	Lactic acid	6545	2
3	Graphene/$ZnIn_2S_4$	350W Xe lamp ($\lambda > 420$ nm)	Triethanolamine	2640.8	3
4	MoS_2-Graphene /$ZnIn_2S_4$	300W Xe lamp ($\lambda > 420$ nm)	Na_2S-Na_2SO_3	4169	4
5	MoS_2/Cu-$ZnIn_2S_4$	300W Xe lamp ($\lambda > 420$ nm)	Ascorbic	5463	5
6	MoS_2-RGO/ZnO	300W Xe lamp ($\lambda > 380$ nm)	Na_2S-Na_2SO_3	288.4	6
7	MoS_2/g-C_3N_4/GO	300W Xe lamp (AM1.5)	Na_2SO_3	1650	7
8	MoS_2/$ZnIn_2S_4$	300W Xe lamp ($\lambda > 400$ nm)	Triethanolamine	8898	This work

Table 1. The photocatalytic H_2 evolution performance comparison of the catalysts from the different references.

References

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