Supplementary Information

Highly efficient 3D/0D $CdIn_2S_4/Cu_2O$ photoanode with p-n type heterojunction for boosted photoelectrochemical water splitting under visible light irradiation

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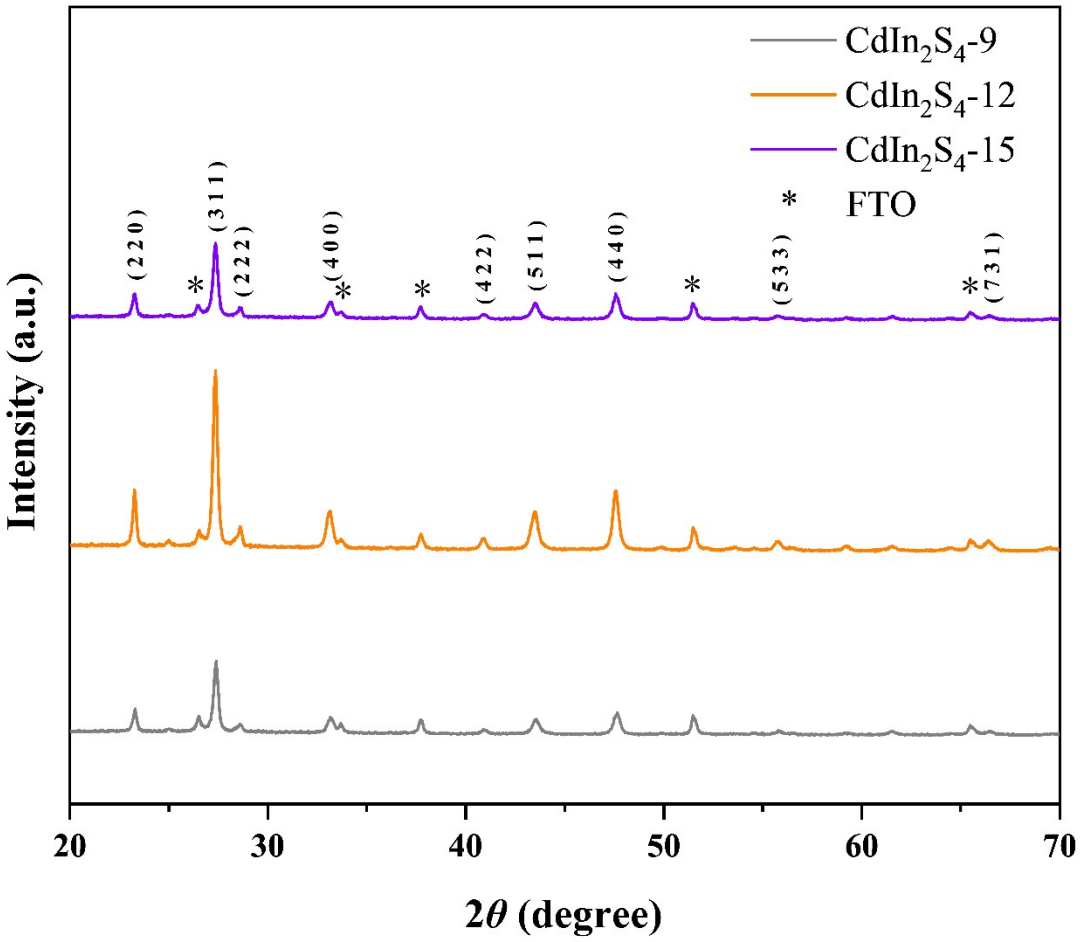

Fig. S1. The XRD patterns of $CdIn_2S_4$-9, $CdIn_2S_4$-12, $CdIn_2S_4$-15 nanofilms.

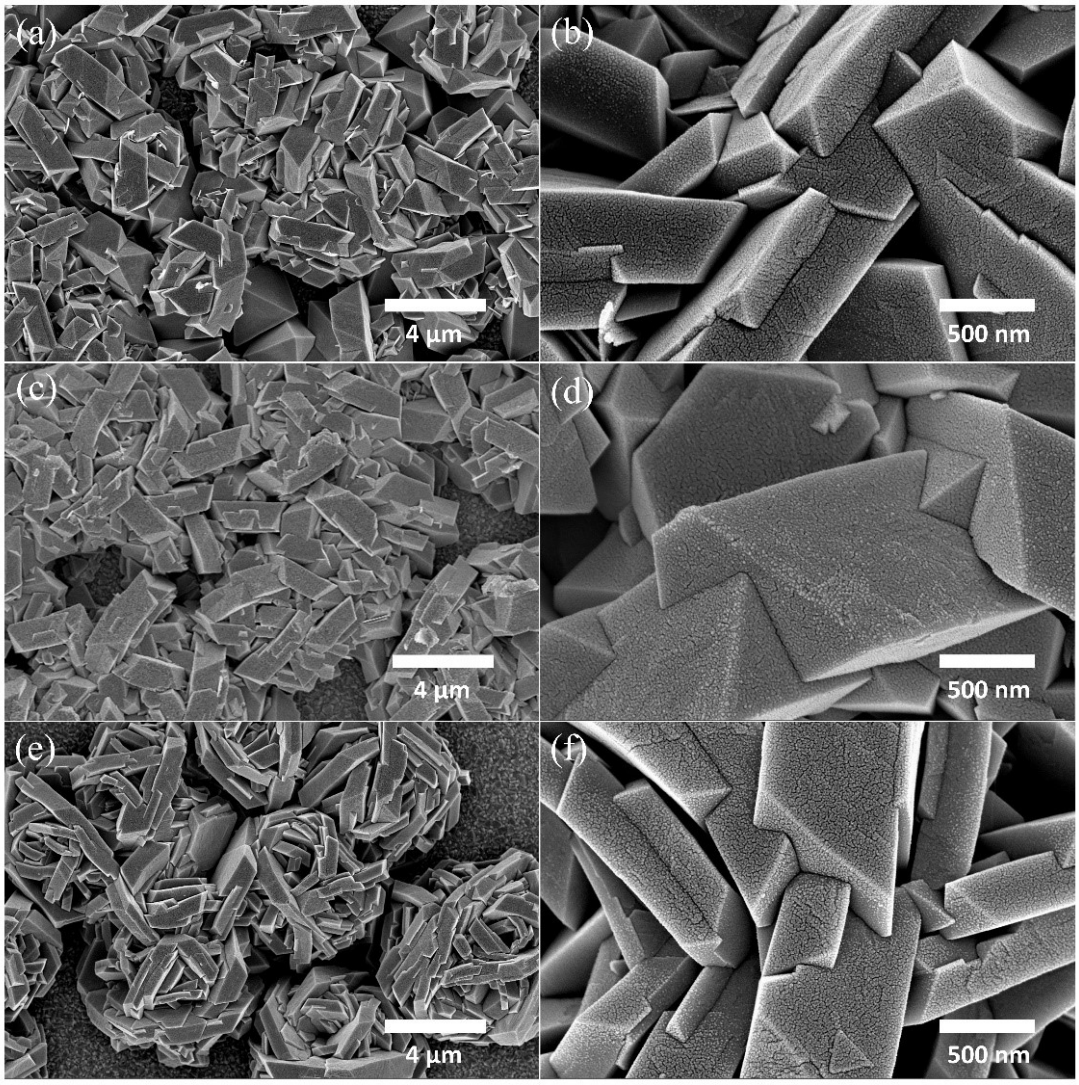

Fig. S2. (a,b) $CdIn_2S_4$-9, (c,d) $CdIn_2S_4$-12 and (e,f) $CdIn_2S_4$-15 Low magnification and high magnification SEM images of $CdIn_2S_4$ nanofilm.

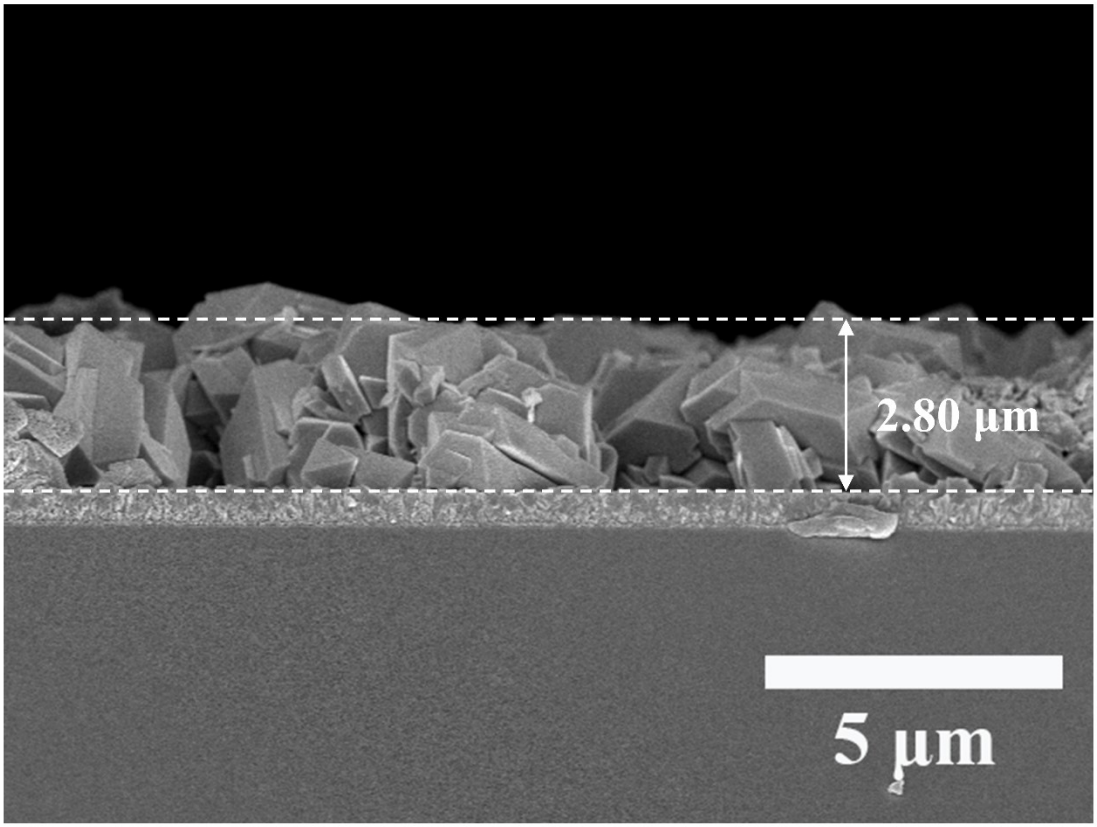

Fig. S3. The cross-section view of $CdIn_2S_4/Cu_2O$ heterojunction.

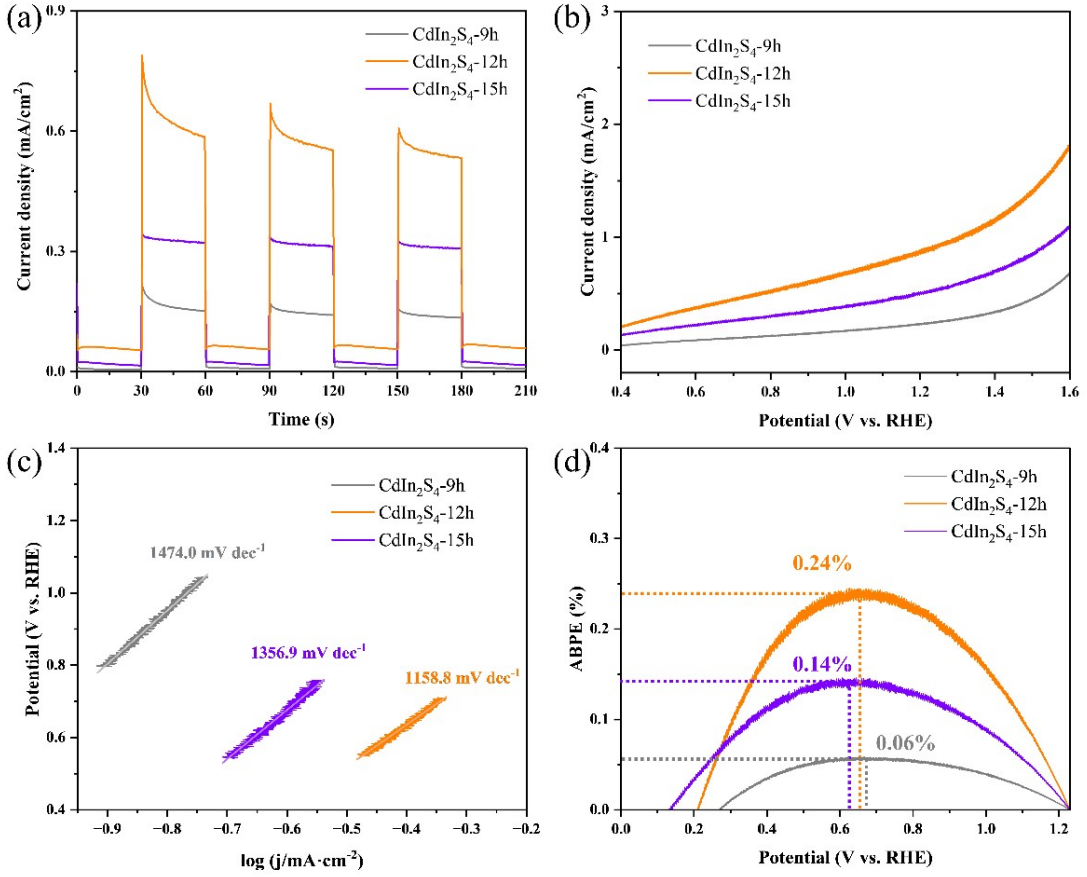

Fig. S4. (a) Transient photocurrent respond (TPR), (b) Linear sweep voltammetry (LSV), (c) Tafel plots and (d) ABPE curves of $CdIn_2S_4$.

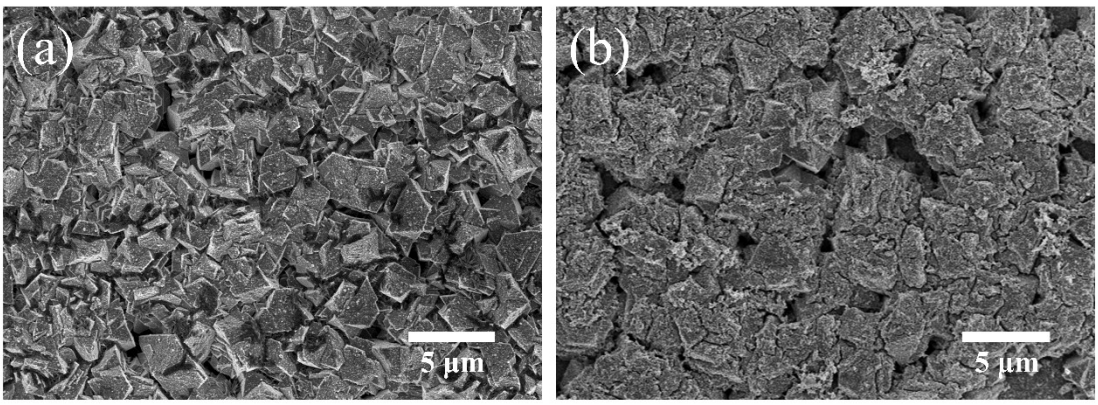

Fig. S5. SEM images of $CdIn_2S_4/Cu_2O$: (a) before and (b) after the stability test.

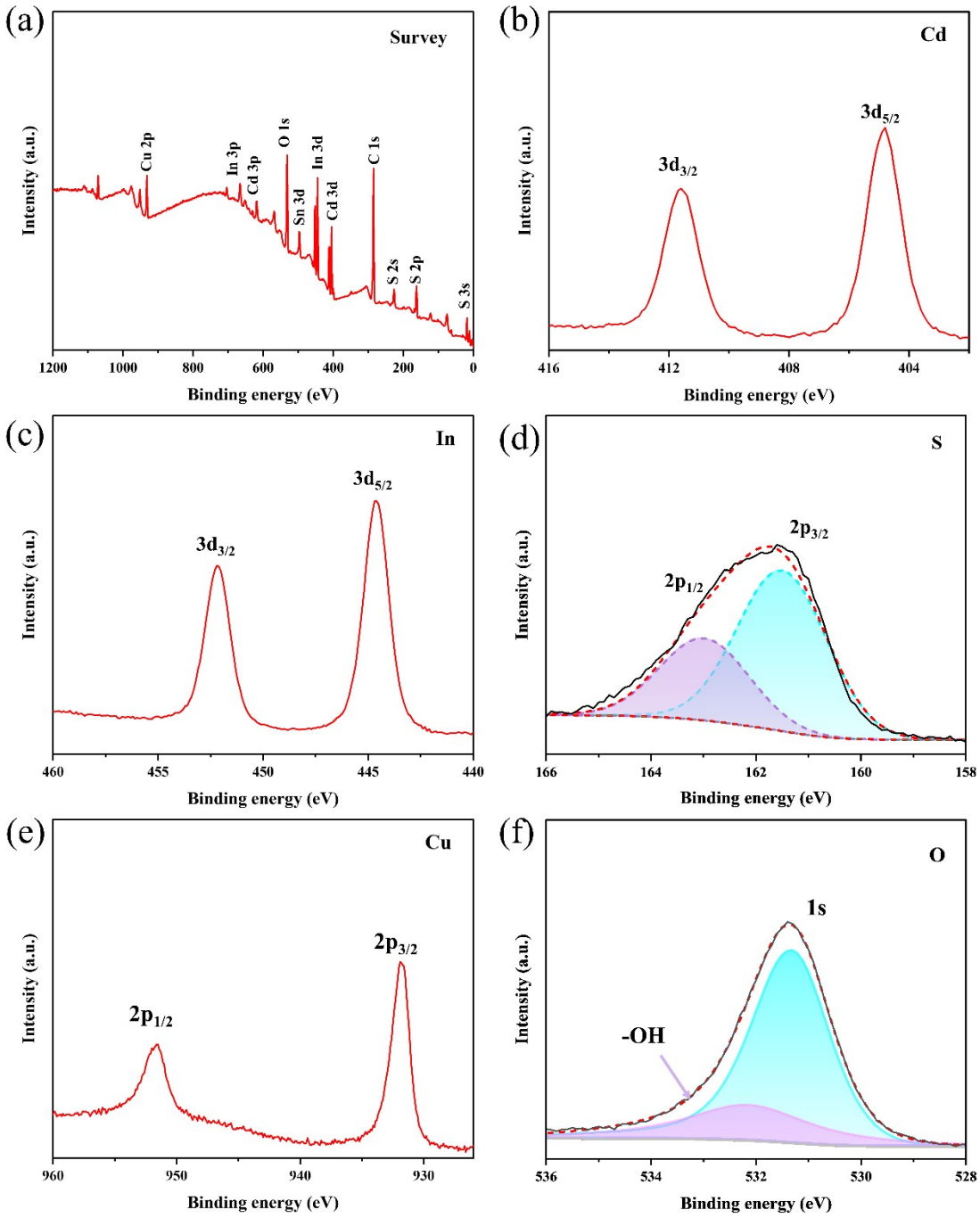

Fig. S6. (a) The XPS survey spectrum of $CdIn_2S_4/Cu_2O$ heterojunction, (b-f) high-resolution spectra of Cd、In、S、Cu and O elements after stability testing.

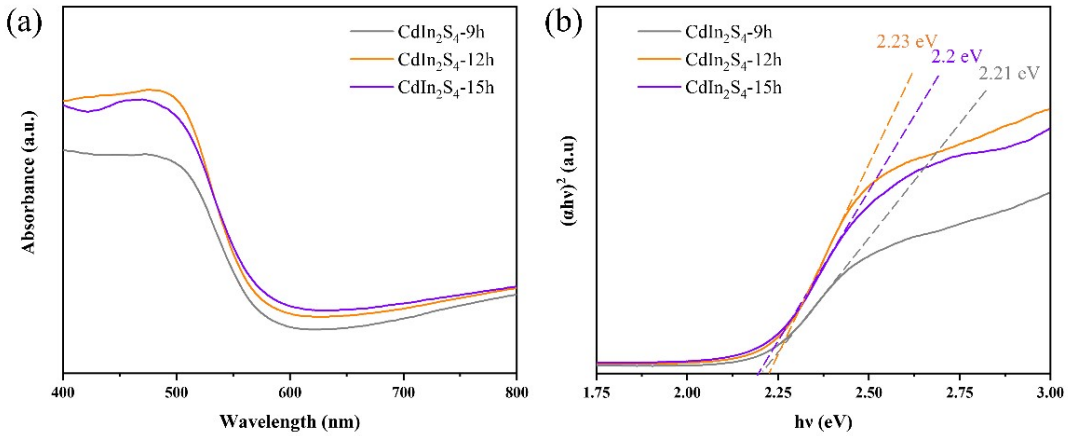

Fig. S7. (a) UV-vis diffuse reflectance spectroscopy and (b) corresponding Tauc plots for $CdIn_2S_4$.

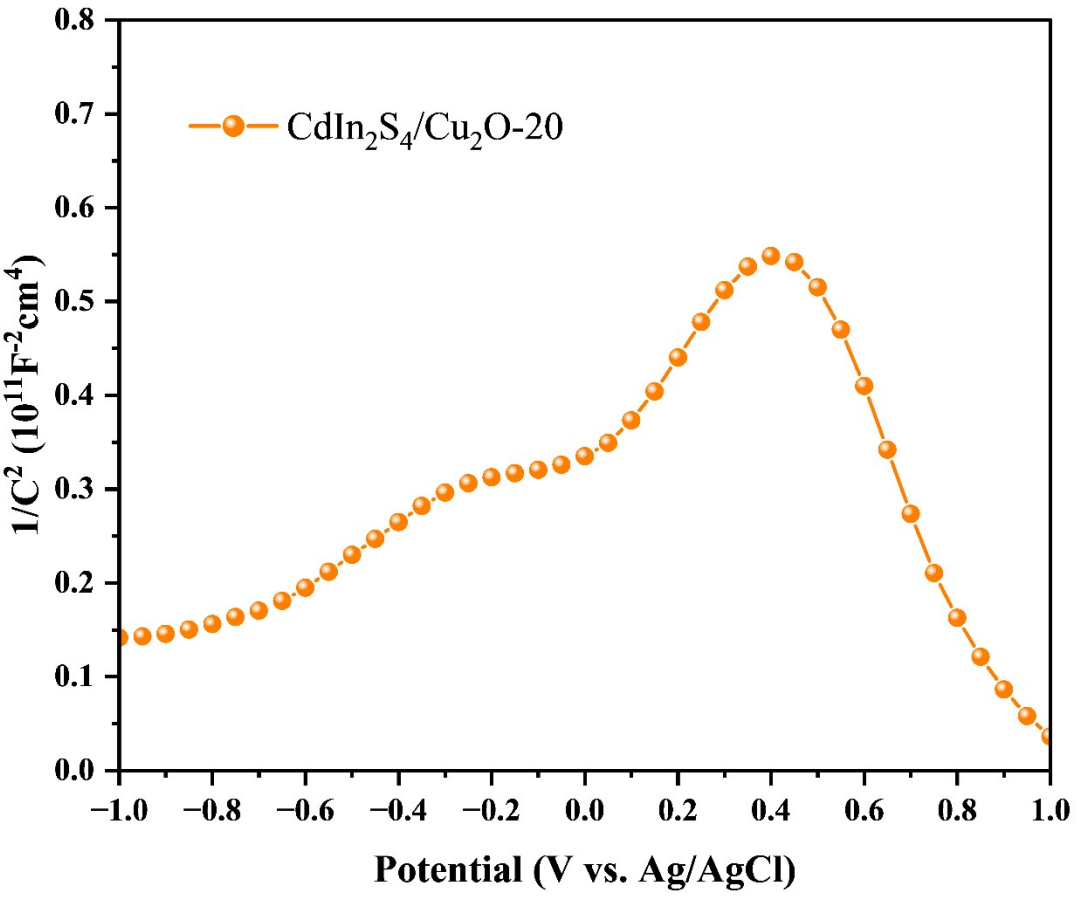

Fig. S8. The Mott-Schottky curve of the $CdIn_2S_4/Cu_2O$ photoanode.

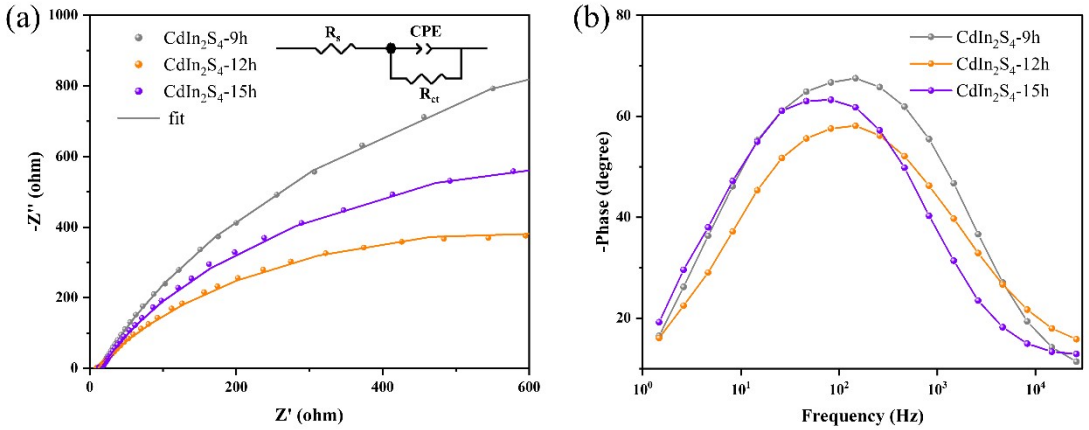

Fig. S9. EIS Nyquist plots with equivalent circuit fitting and (b) Bode plots of $CdIn_2S_4$.

Table 1 The comparison of PEC performance of $CdIn_2S_4/Cu_2O$ photoanodes with other $CdIn_2S_4$-based photoanodes.

Photoanodes	Photocurrent density (bias)	Light and intensity	Electrolyte	Ref.
$CdIn_2S_4/g\text{-}C_3N_4$	0.35 mA/cm^2 (1.23 V vs. RHE)	AM 1.5G 100 mW/cm^{2C}	0.1 M Na_2SO_4	1
$CdIn_2S_4/In_2S_3$-Sn	2.98 mA/cm^2 (1.23 V vs. RHE)	AM 1.5G 100 mW/cm^2	0.5 M Na_2SO_4	2
$CuS/CdIn_2S_4$	28 μA/cm^2 (0 V vs. Ag/AgCl)	A 300 W xenon lamp	0.5 M Na_2SO_4	3
$TiO_2/CdIn_2S_4/NiO$	0.6 mA/cm^2 (1.23 V vs. RHE)	AM 1.5G 100 mW/cm^2	0.5 M Na_2SO_4	4
NiOOH /F:$CdIn_2S_4$	5.48 mA/cm^2 (1.23 V vs. RHE)	AM 1.5G 100 mW/cm^2	0.5 M Na_2SO_3	5
FeOOH/ $CdIn_2S_4$-W	4.52 mA/cm^2 (1.23 V vs. RHE)	AM 1.5G 100 mW/cm^2	0.5 M Na_2SO_4	6
$CuCo_2S_4/CdIn_2S_4$	1.1 μA/cm^2 (1.23 V vs. RHE)	A 300W xenon lamp	0.2 M Na_2SO_4	7
$CdIn_2S_4/Cu_2O$	6 mA/cm^2 (0 V vs. Ag/AgCl)	A 300W xenon lamp (λ	0.35 M Na_2S + 0.25 M Na_2SO_3	This work

> 420 nm)

References

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