

Electronic Supplementary Information

**Keggin-type polyoxometalate/thiospinel octahedron heterostructures
for photoelectronic devices**

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Table of Contents

Figure S1. EDX spectra of CoW ₁₂ /CoIn ₂ S ₄	S3
Figure S2. EDX elemental mapping of CoW ₁₂ /CoIn ₂ S ₄ : (a) all elements, (b) O, (c) S, (d) In, (e) Co, and (f) W.....	S3
Figure S3. Nitrogen adsorption-desorption isotherms at 77 K for CoIn ₂ S ₄ and CoW ₁₂ /CoIn ₂ S ₄	S4
Figure S4. Full XPS spectra of (a) CoIn ₂ S ₄ ; High-resolution XPS spectra of (b) Co 2p, (c) In 3d, and (d) S 2p.....	S4
Figure S5. Long-term stability of DSSCs based on CoW ₁₂ -0.3/CoIn ₂ S ₄ heterostructures.....	S5
Table S1. The composition of elements for CoW ₁₂ /CoIn ₂ S ₄ heterostructures obtained from EDS spectra.....	S6
Table S2. EIS parameters using the different materials as CE.....	S6

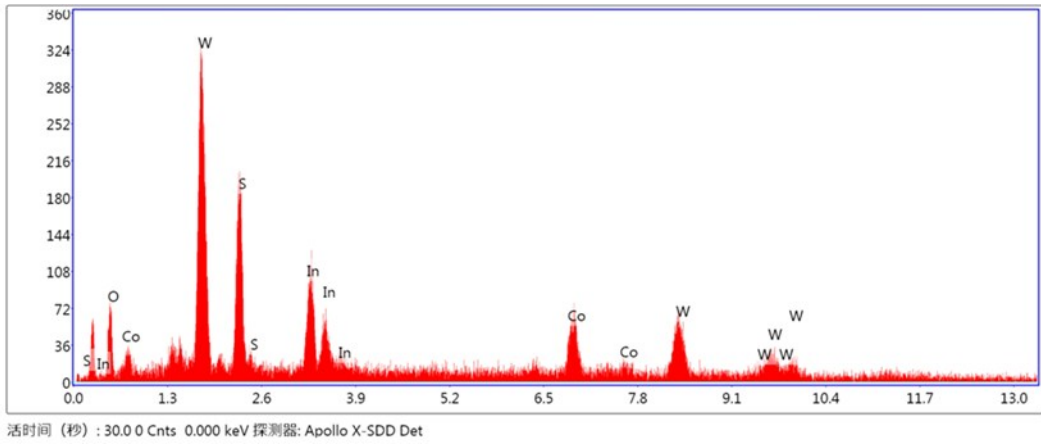


Figure S1. EDX spectra of $\text{CoW}_{12}/\text{Coln}_2\text{S}_4$.

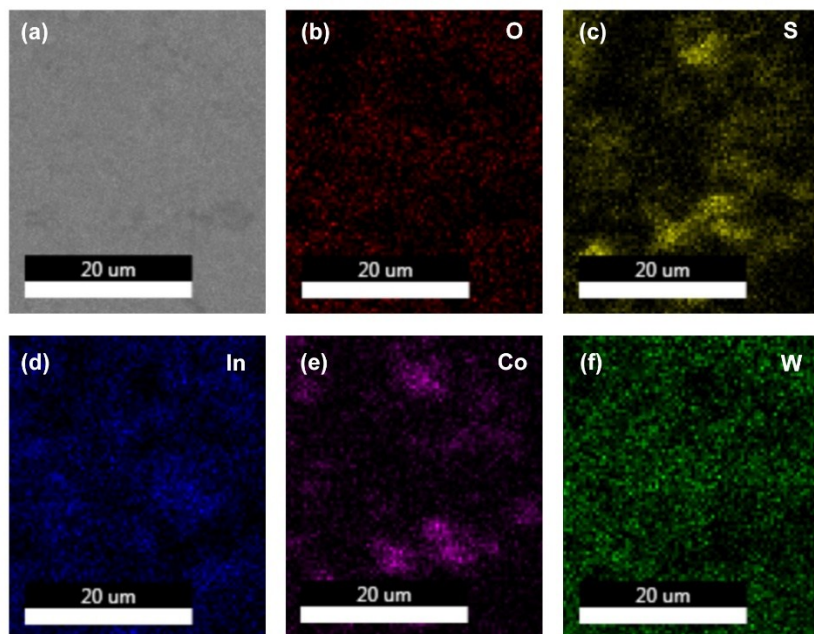


Figure S2. EDX elemental mapping of $\text{CoW}_{12}/\text{Coln}_2\text{S}_4$: (a) corresponding SEM images, (b) O, (c) S, (d) In, (e) Co, and (f) W.

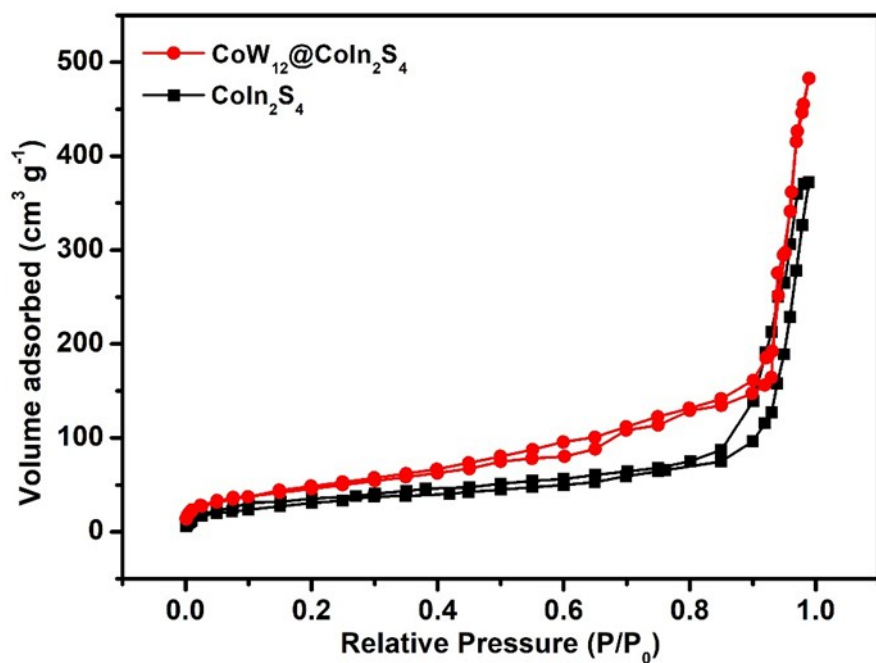


Figure S3. Nitrogen adsorption-desorption isotherms at 77 K for CoIn_2S_4 and $\text{CoW}_{12}/\text{CoIn}_2\text{S}_4$.

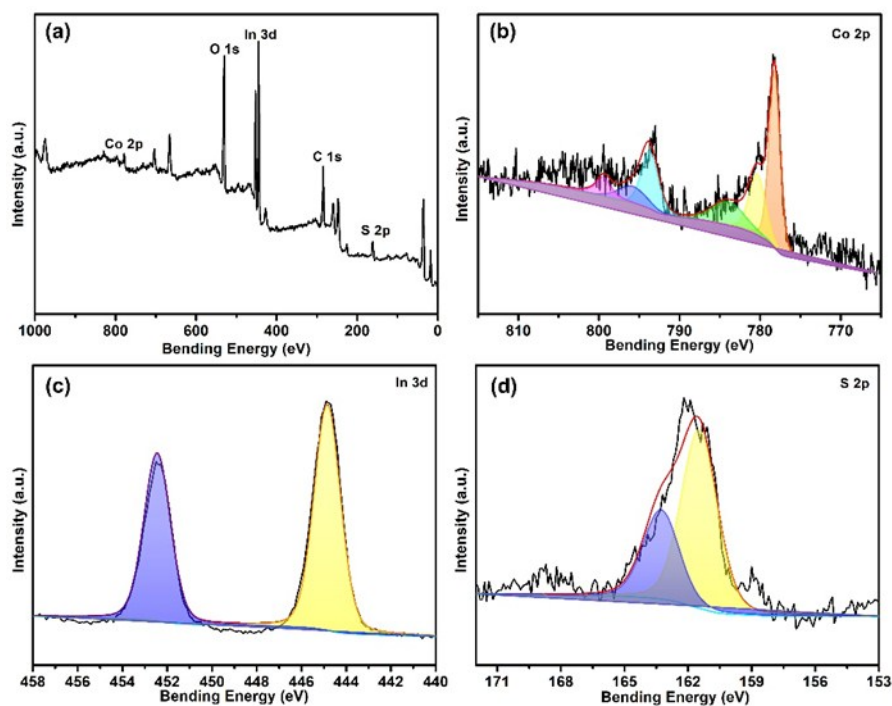


Figure S4. Full XPS spectra of (a) CoIn_2S_4 ; High-resolution XPS spectra of (b) Co 2p, (c) In 3d, and (d) S 2p.

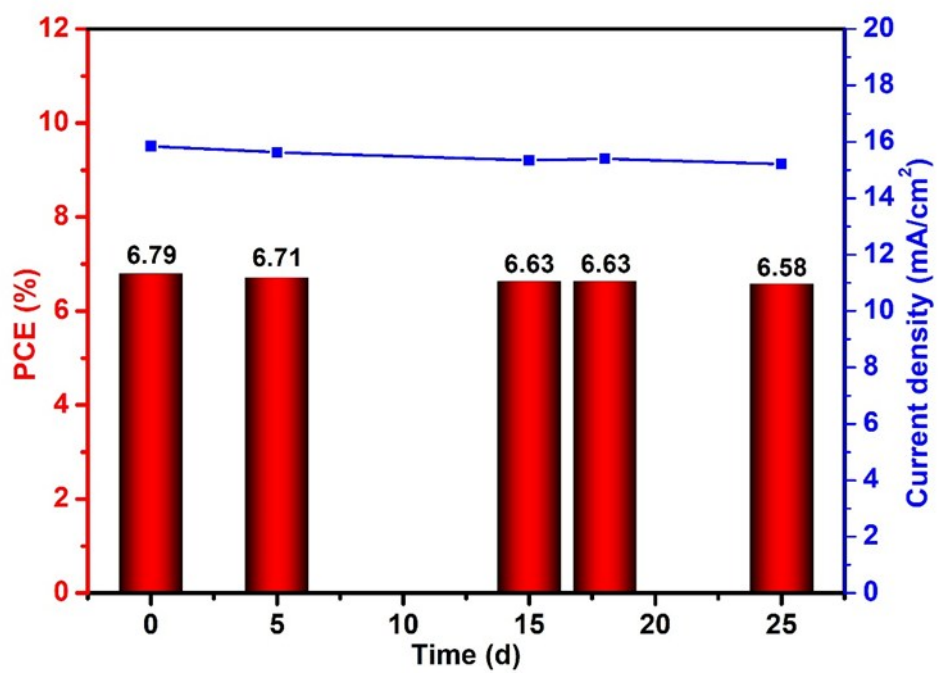


Figure S5. Long-term stability of DSSCs based on CoW_{12-0.3}/CoIn₂S₄ heterostructures.

Table S1. The composition of elements for CoW₁₂/CoIn₂S₄ heterostructures obtained from EDS spectra.

Element	Weight/ %	Atom/ %	NET strength
O	14.07	47.46	28.35
S	12.81	21.56	106.45
In	13.59	6.38	62.18
Co	11.45	10.49	54.73
W	48.08	14.11	64.31

Table S2. EIS parameters using the different materials as CE.

Sample	R _s (Ω/cm ²)	R _{ct} (Ω/cm ²)	Z _w (Ω/cm ²)
Pt	40.96	20.36	0.028
CoIn ₂ S ₄	40.58	17.35	0.013
CoW ₁₂ -0.1/CoIn ₂ S ₄	47.20	11.52	0.032
CoW ₁₂ -0.3/CoIn ₂ S ₄	36.81	5.93	0.057
CoW ₁₂ -0.6/CoIn ₂ S ₄	42.51	22.25	0.006