

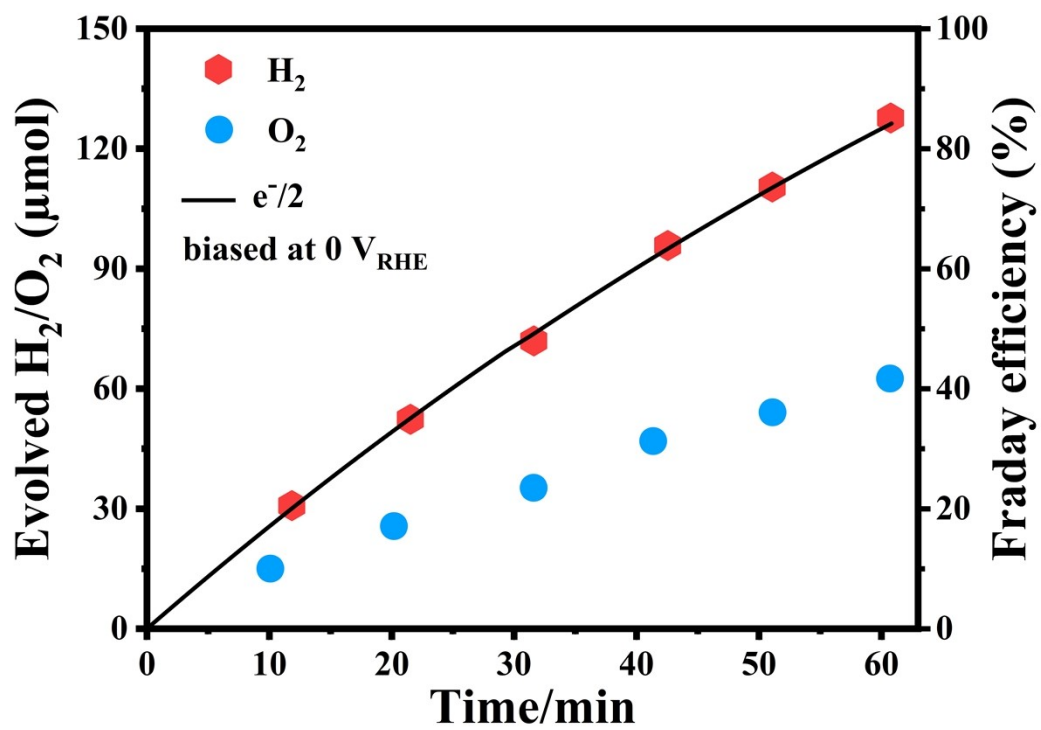
## **Band-Bending Engineering in $\text{Cu}_2\text{ZnSnS}_4$ Photocathodes Using a Composite (Zn,Ti)O Electron Transport Layer for Solar Water Splitting**

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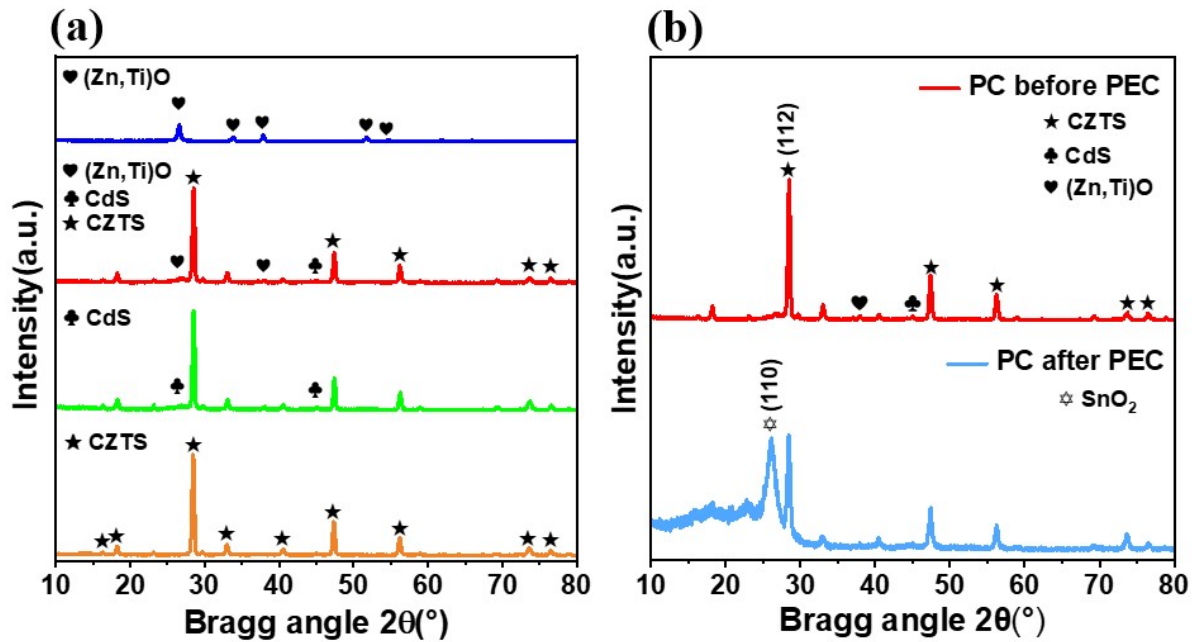
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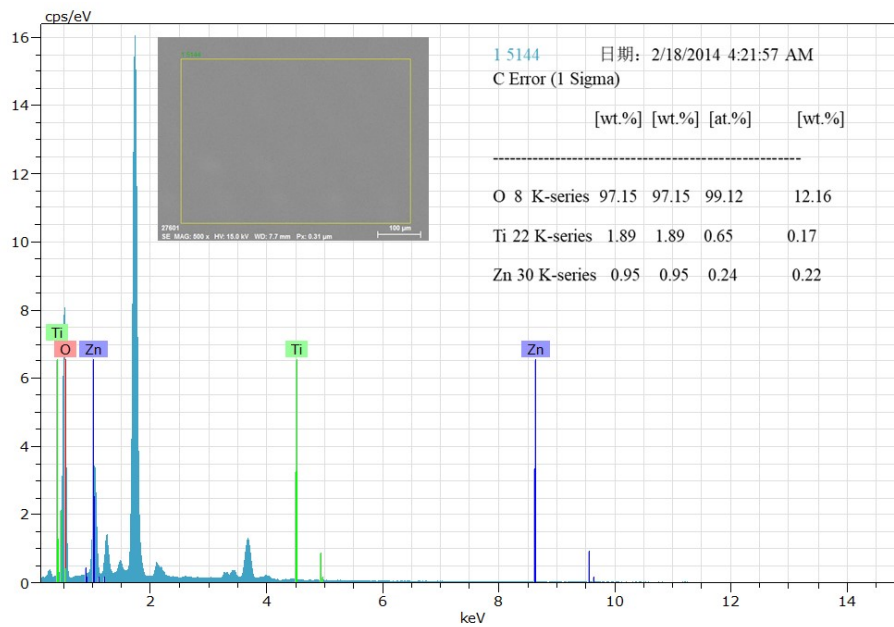
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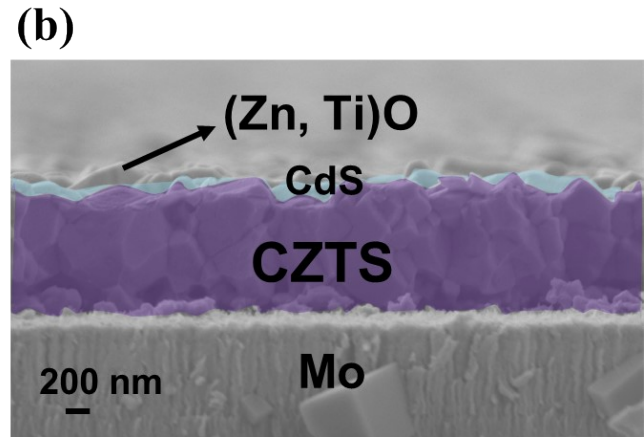
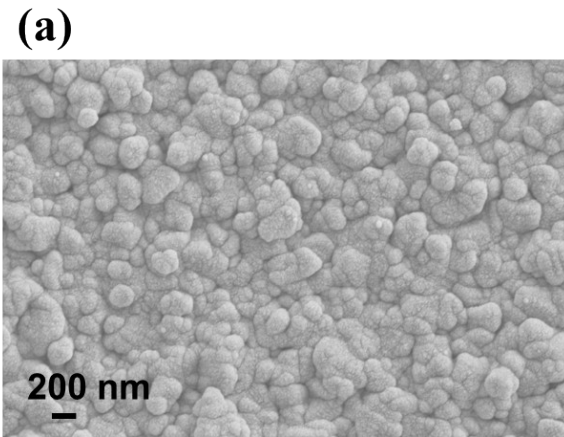
**Figure S1.** H<sub>2</sub> generation amount as a function of AM 1.5G solar light illumination time over PC-2 at 0 V<sub>RHE</sub> for 1 h in pH 1 buffer solution.



**Figure S2.** XRD patterns of PC-2 photocathode. (a) Before PEC operation; (b) After PEC operation.



**Figure S3.** EDS analysis of (Zn,Ti)O film prepared through ALD method



**Figure S4.** Post-PEC microstructural characterization of PC-2 photocathode. (a) Surface SEM image; (b) Cross-sectional SEM image.