

Supporting Information

Photocurrent improvement on nanocrystalline $\text{Cu}_2\text{ZnSnS}_4$ photocathodes by introducing porous structure

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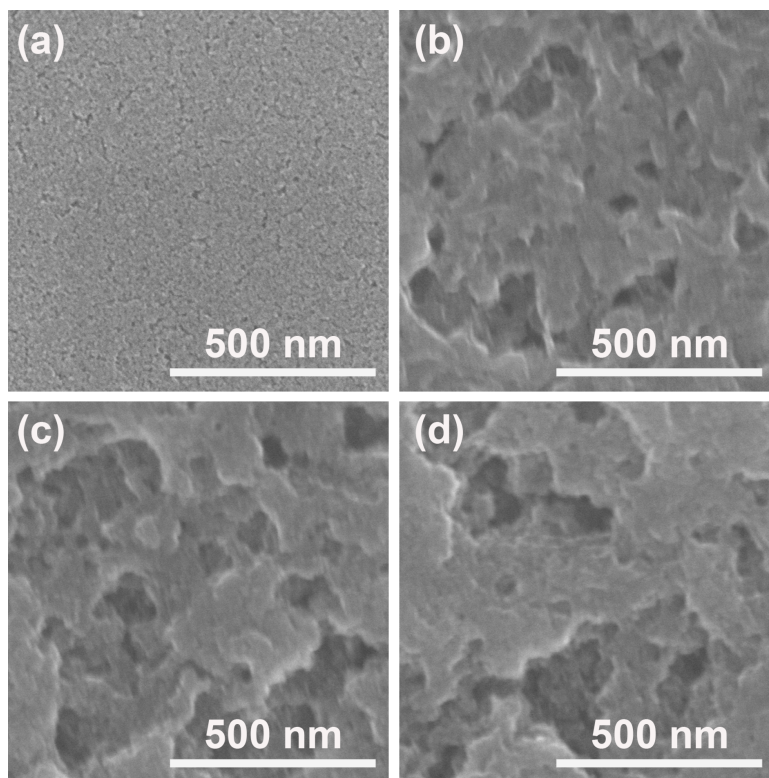


Fig. S1 SEM images of CZTS samples with S/Zn ratios of (a) 5, (b) 7.5, (c) 10 and (d) 12.5.

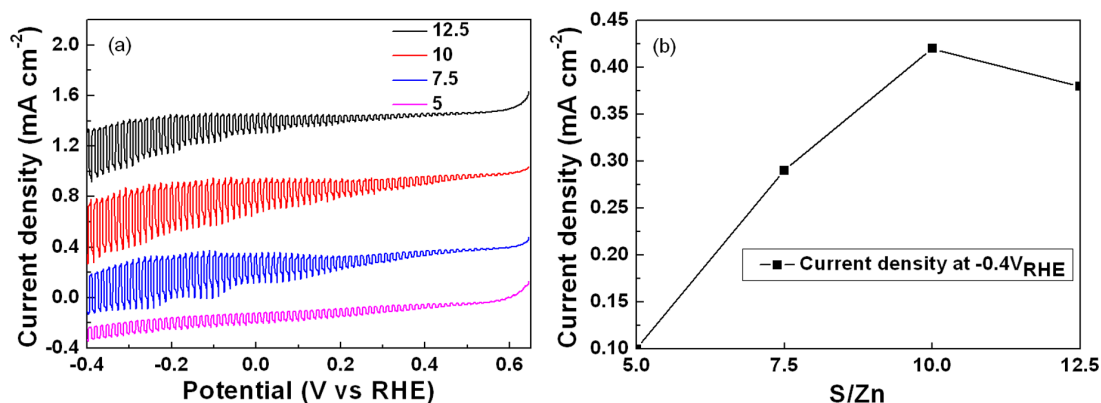


Fig. S2 (a) Current-potential curves of the samples with S/Zn ratios of 5, 7.5, 10 and 12.5 in 0.5 M Na₂SO₄ (pH = 6) aqueous solution under Xe lamp illumination. (b) Photocurrent densities of the samples with S/Zn ratios of 5, 7.5, 10 and 12.5 at -0.4 V_{RHE}.

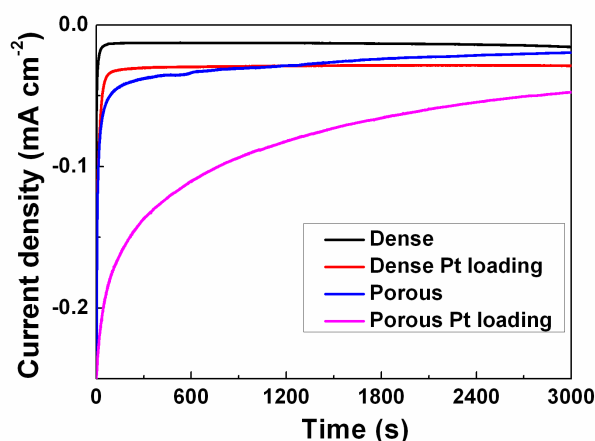


Fig. S3 Current-time curves of the dense and the porous samples (with and without Pt loading) at -0.2 V_{RHE} in 0.5M Na₂SO₄ (pH = 6) aqueous solution under Xe lamp illumination. Pt was loaded on the sample by scanning current-time curve at 0.22 V_{RHE} in 1 mM H₂PtCl₆ (pH = 3) for 12.5 mC cm⁻².

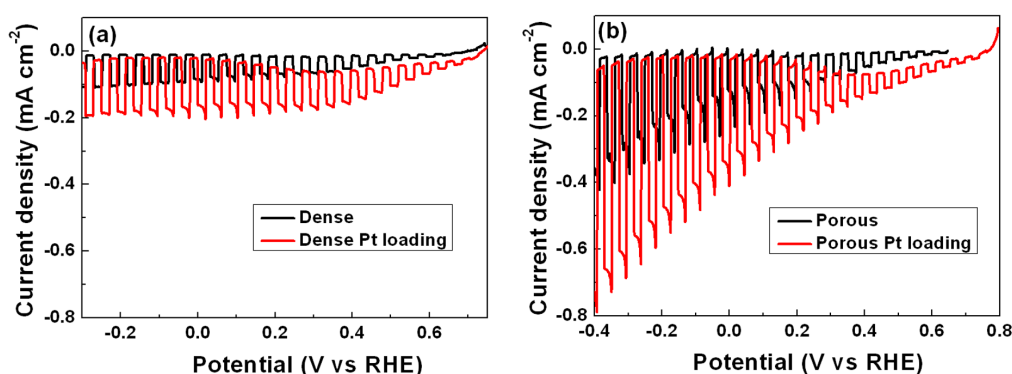


Fig. S4 (a) Current-potential curves of the dense sample before and after Pt loading measured in 0.5M Na₂SO₄ (pH = 6) aqueous solution under Xe lamp illumination. (b) Current-potential curves of the porous sample before and after Pt loading measured in 0.5M Na₂SO₄ (pH = 6) aqueous solution under Xe lamp illumination.

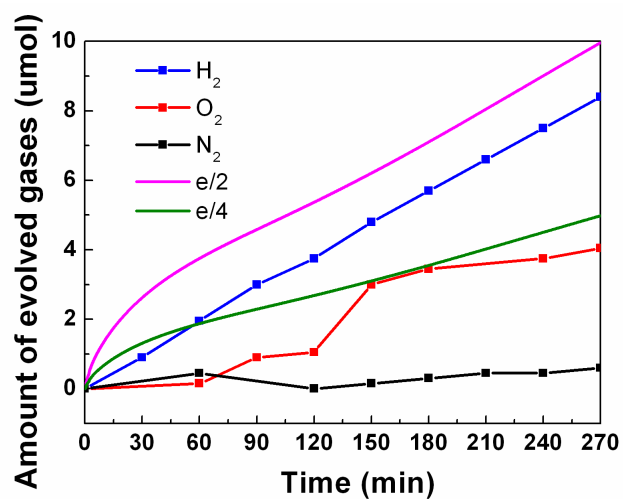


Fig. S5 Time courses of gas evolution from Pt loaded porous CZTS sample at $-0.2 V_{\text{RHE}}$ in $0.5 \text{ M Na}_2\text{SO}_4$ ($\text{pH} = 6$) aqueous solution under Xe lamp illumination.