

Electronic Supplementary Information

Copper Zinc Tin Sulfide as the Catalytic Materials for Counter Electrodes in Dye-Sensitized Solar Cells

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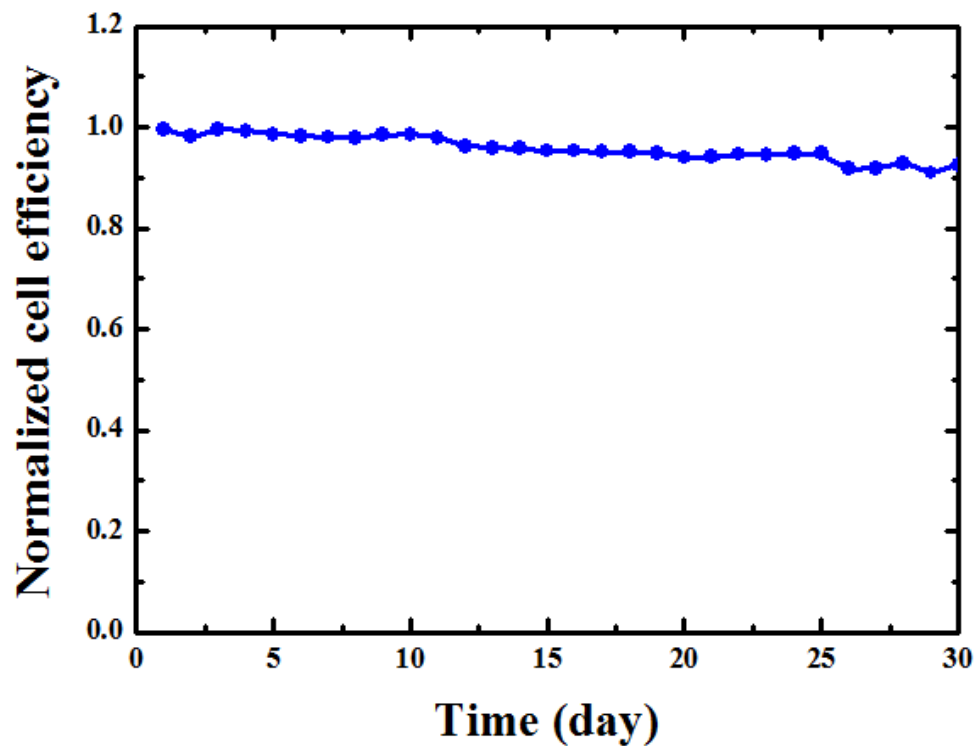


Fig. S1 At-rest long-term stability data of the DSSC with sample (C) CZTS as the counter electrode material in an ionic liquid electrolyte, containing 0.2 M I₂ and 0.5 M TBP in a mixture solvent of BMII/EMIBF₄ (volume ratio = 65/35), obtained at 100 mW cm⁻².

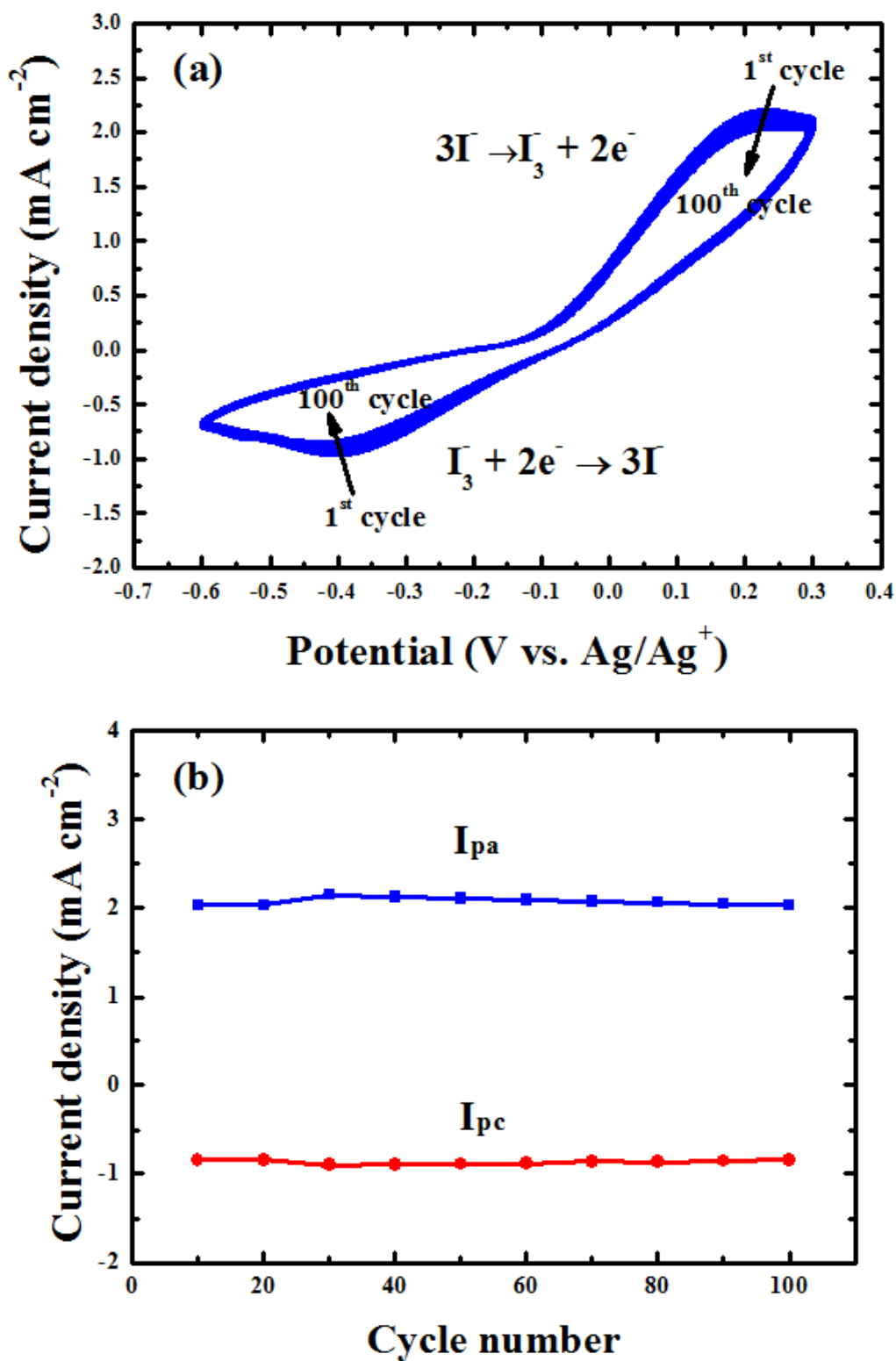


Fig. S2 (a) Cyclic voltammograms of the CZTS CE with sample (C), obtained for 100 cycles; (b) corresponding anodic and cathodic peak current densities (J_{pa} and J_{pc} , respectively) as a function of the cycle number. The CVs were obtained in the electrolyte containing 10.0 mM LiI, 1.0 mM I_2 , and 0.1 M LiClO_4 in ACN, at a scan rate of 100 mV/s.

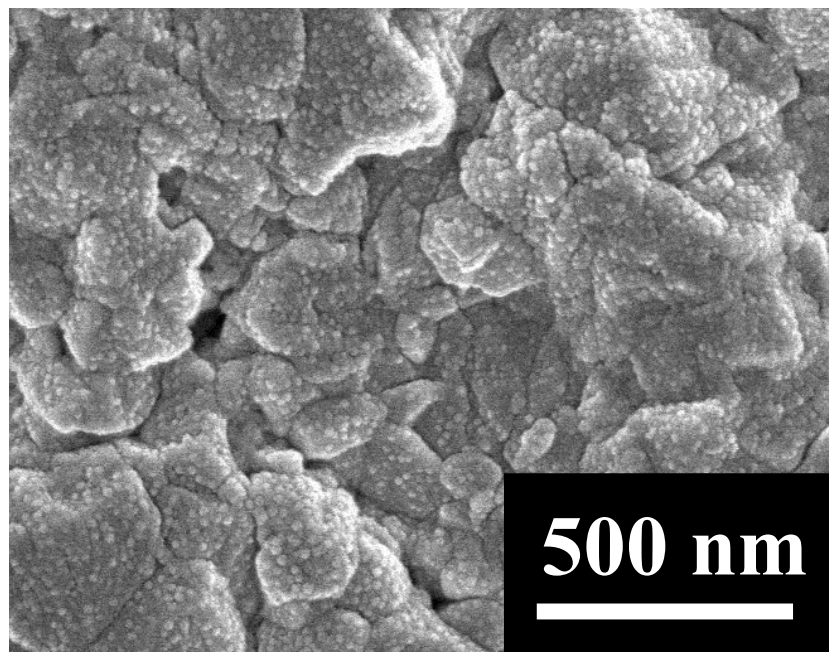


Fig. S3 Plane view FE-SEM image of sample (C).

Table S1 X-ray photoelectron spectroscopy analysis of the composite CZTS CEs.

CEs	Molar % of CZTS				[Cu]/[Zn]+[Sn]	[S]/Metal
	Cu	Zn	Sn	S		
(A)	30.21	6.41	14.25	49.62	1.46	0.98
(B)	27.32	10.05	13.72	50.12	1.15	0.98
(C)	25.41	11.77	13.33	50.03	1.01	0.99
(D)	23.26	12.99	14.03	49.72	0.86	0.99
(E)	22.03	15.23	13.20	49.64	0.77	0.98