

Electronic supplementary information

Cd₂SnO₄ Transparent Conductive Oxide: A Promising Alternative Candidate for Highly Efficient Hybrid Halide Perovskite Solar Cells

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TableS1. Detailed energy band parameters of the TiO₂ and Cd₂SnO₄ films.

Sample	Work Function Φ (eV)	$E_{Fermi}-E_{VBM}$ (eV)	Band Gap E_g (eV)	Electron affinity χ (eV)
Cd ₂ SnO ₄	4.2	3.03	3.05	4.18
TiO ₂	4.65	2.65	3.2	4.1

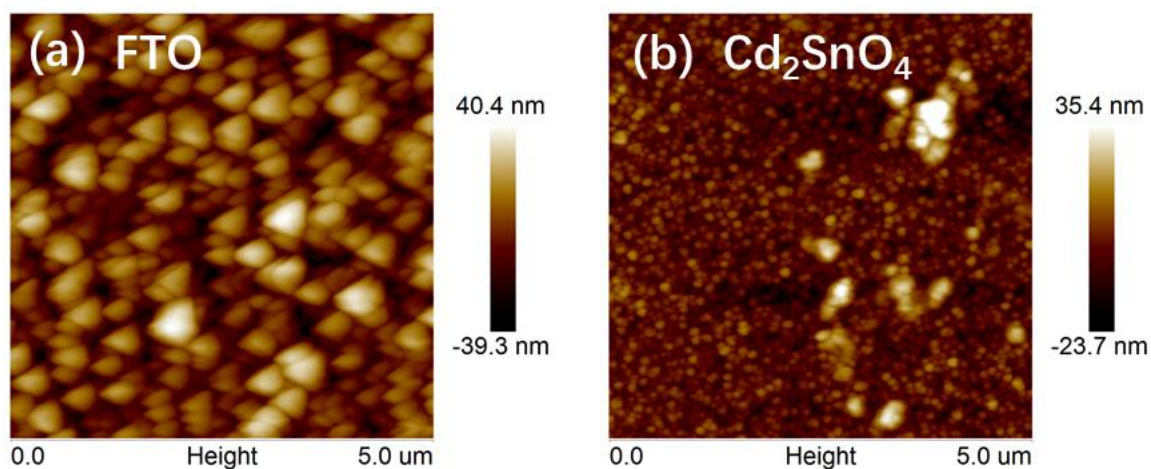


Fig. S1. AFM images of (a) FTO and (b) Cd₂SnO₄ substrates.

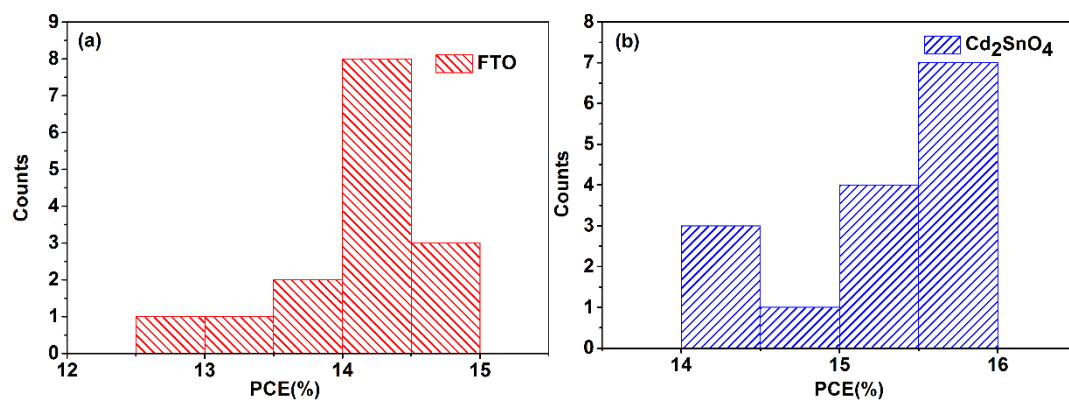


Fig. S2. Histograms of (a) FTO-based and (b) Cd₂SnO₄-based devices efficiency for 15 cells of each group.

TableS2 Values for PL decay time of perovskite films on FTO/TiO₂ and Cd₂SnO₄/TiO₂ substrates.

Substrate	τ_1 (ns)	Fraction	τ_2 (ns)	Fraction
FTO/TiO ₂	0.55	67.7%	14.44	32.3%
Cd ₂ SnO ₄ /TiO ₂	0.46	89.6%	9.26	10.4%

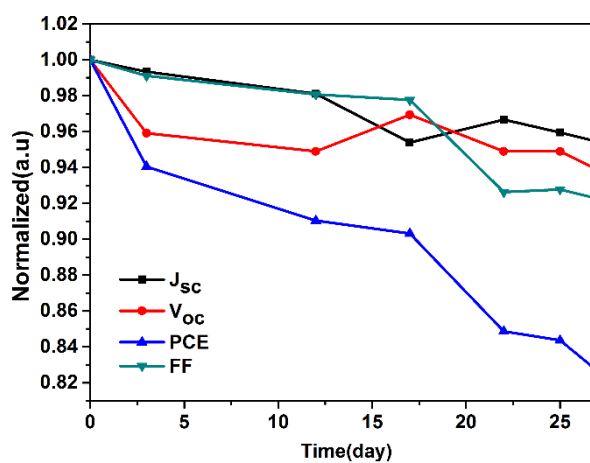


Fig. S3. Stability of FTO-based device stored in relative humidity of ~10% for 27 days.