

Supporting Information

Bandgap Alignment of Cu₁₂Sb₄S₁₃ Quantum Dots as Efficient Inorganic Hole Transport Materials in Planar Perovskite Solar Cells with Enhanced Stability

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Supplementary Figures

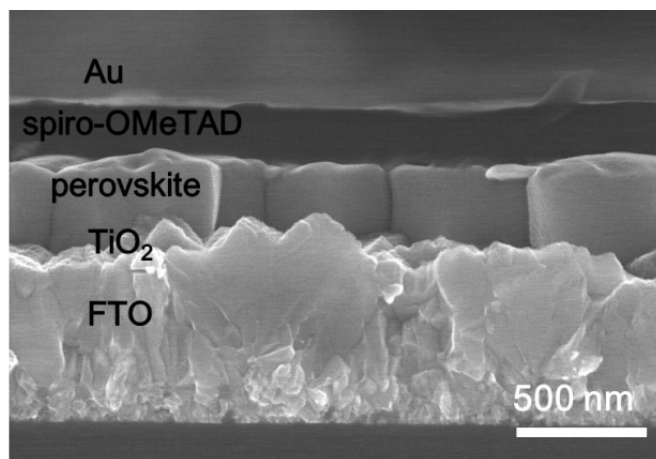


Figure S1. The cross-sectional FESEM image of the spiro-based PSC.

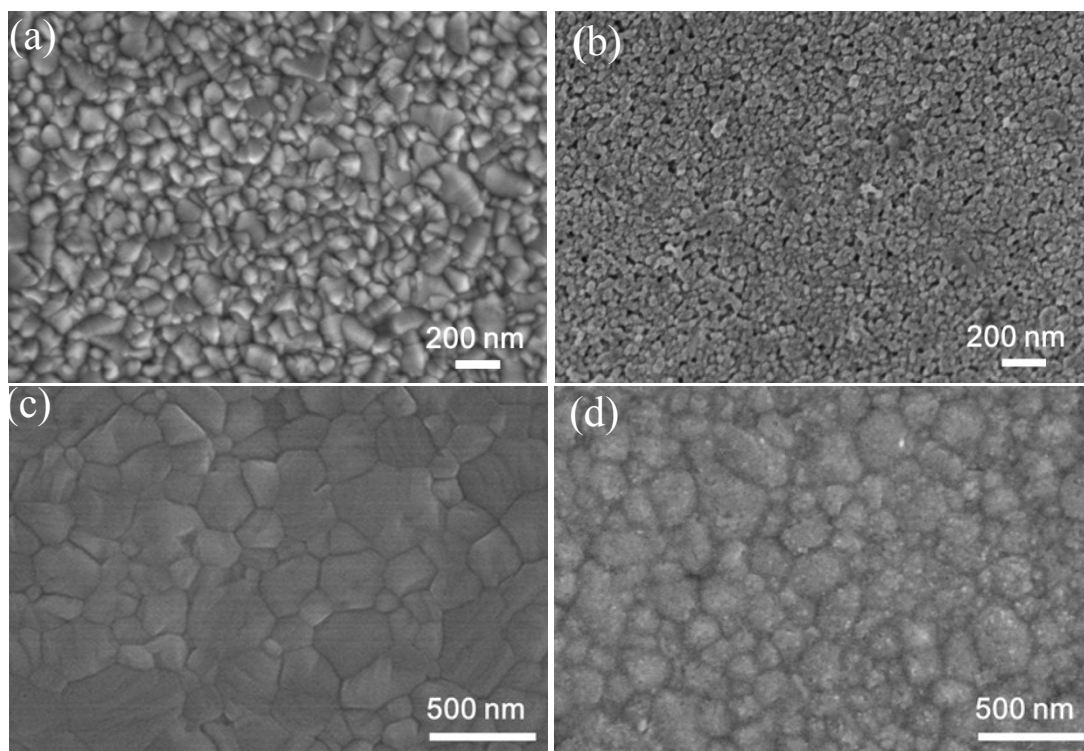


Figure S2. The top-view FESEM images of the different layers for Cu₁₂Sb₄S₁₃ QDs based PSCs: (a) FTO; (b) FTO/TiO₂; (c) FTO/TiO₂/perovskite (without Pb(SCN)₂ doped); (d) FTO/TiO₂/perovskite/Cu₁₂Sb₄S₁₃ QDs.

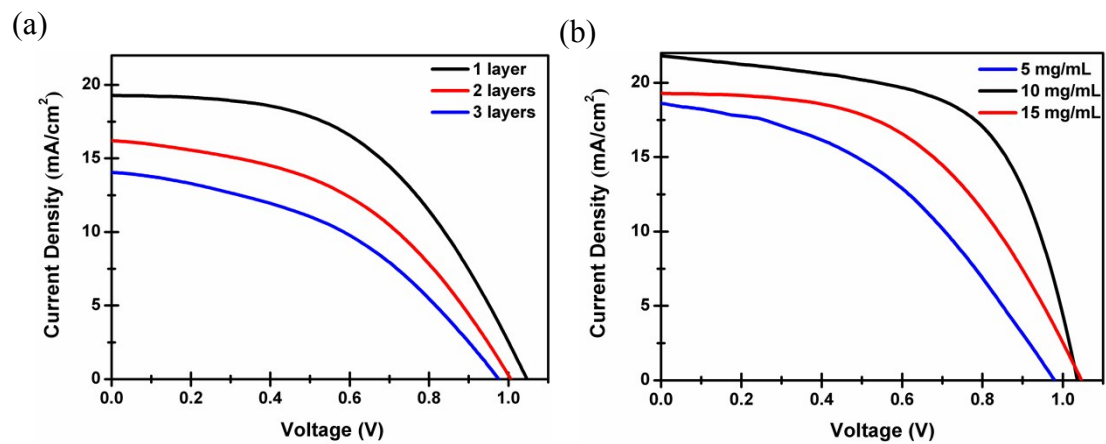


Figure S3. J-V curves of 5.7 nm sized $\text{Cu}_{12}\text{Sb}_4\text{S}_{13}$ QDs based PSCs fabricated by different conditions: (a) deposited QDs layers (15 mg/mL); (b) concentrations of QDs solution (single layer of QDs).

Table S1. Photovoltaic parameters of Cu₁₂Sb₄S₁₃ QDs based PSCs with 5.7 nm fabricated by different conditions

Conditions		V _{OC} (V)	J _{SC} (mA/cm ²)	FF	PCE (%)
Deposited QDs layers (15 mg/mL)	1 layer	1.05	19.23	51.5%	10.41
	2 layers	1.01	16.33	46.0%	7.59
	3 layers	0.98	14.01	43.5%	5.97
Concentrations of QDs solution (single layer)	5 mg/mL	0.98	18.92	42.1%	7.81
	10 mg/mL	1.05	21.85	61.6%	14.13
	15 mg/mL	1.05	19.23	51.5%	10.41