Supporting Information

Solvent engineering for forming Stonehenge-like PbI_2 nanostructure towards efficient perovskite solar cells

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Fig. S1 ~ Fig. S7

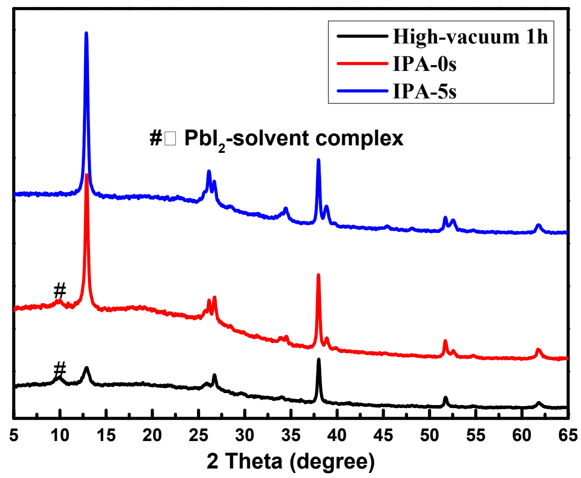

Fig. S1 XRD patterns of PbI_2 films prepared by high-vacuum treatment and IPA substitution.

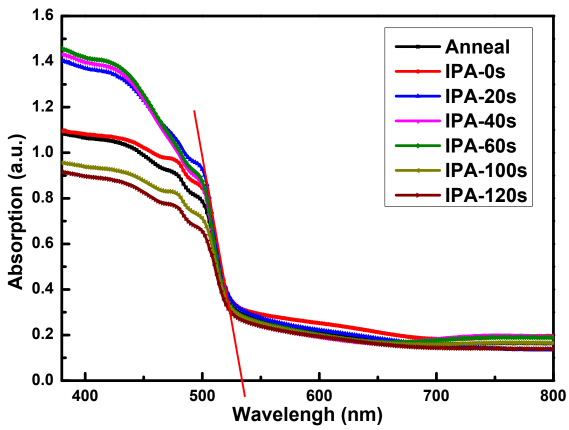

Fig. S2 UV–Vis absorption spectra of the PbI_2 films prepared by different approaches.

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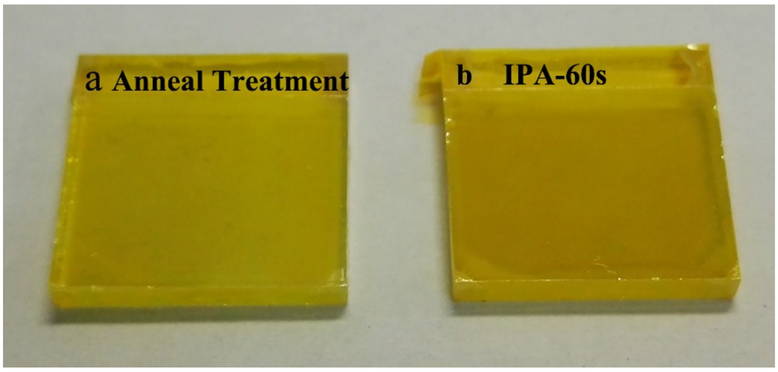

Fig. S3 PbI_2 film photographs. Prepared by **a**, anneal treatment; **b**, IPA substitution for 60 sec.

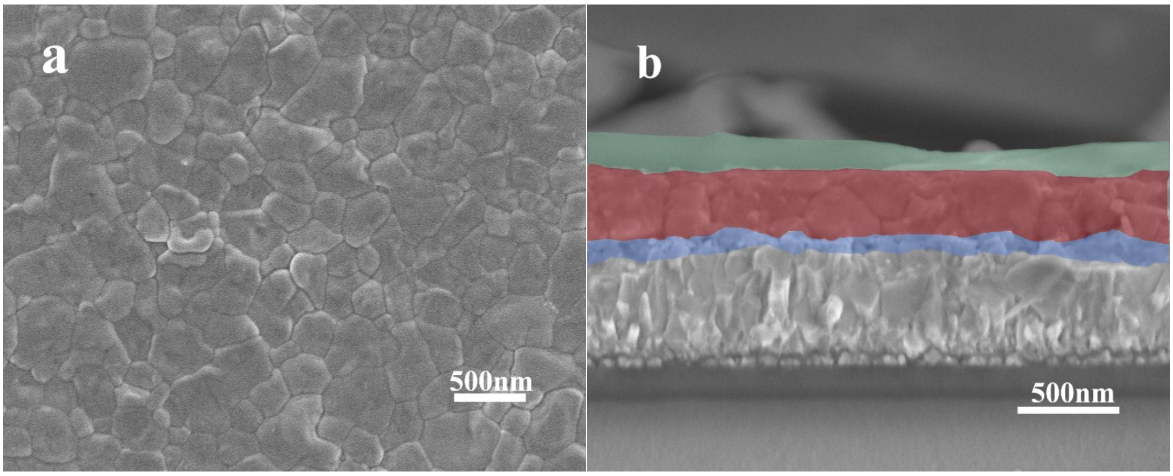

Fig. S4 a, Top-view SEM images of $CH_3NH_3PbI_3$ films; b, Cross-view SEM images of $CH_3NH_3PbI_3$ films (red region).

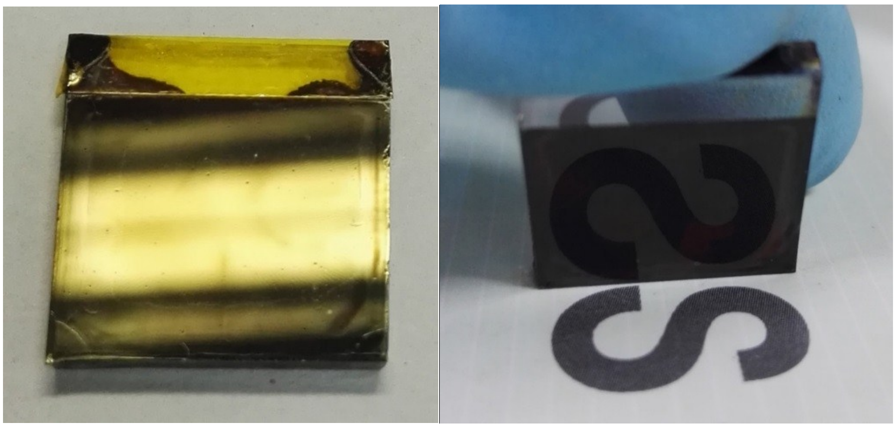

Fig. S5 Photographs of $CH_3NH_3PbI_3$ films prepared by IPA substitution.

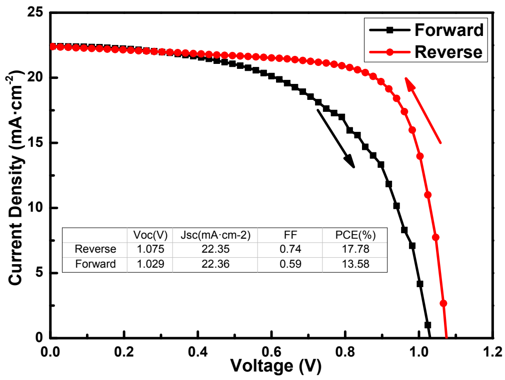

Fig. S6 J-V curves of the perovskite solar cell based on IPA substitution for 60 s measured by reverse (open circuit → short circuit) and forward (short circuit → open circuit) scans under one sun illumination.

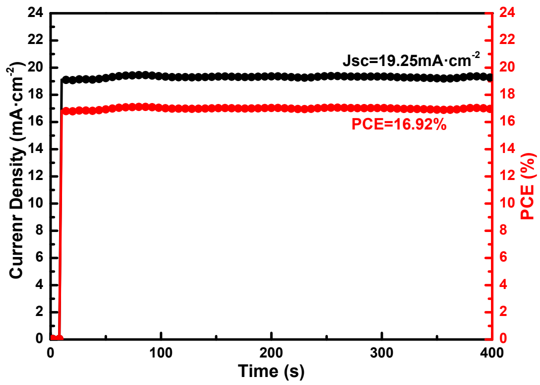

Fig. S7 The steady-state photocurrent and output PCE of the devices at the maximum power points.

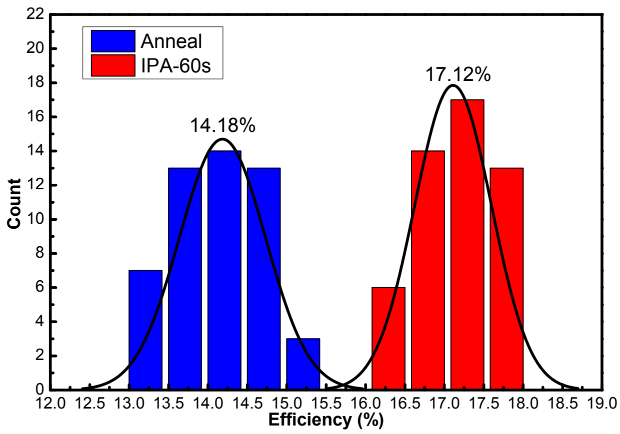

Fig. S8 Distribution of the efficiencies from for perovskite solar cell based on anneal-treatment and IPA-60s (Each team is calculated from a batch of 50 cells).

Table S1 Fitting parameters for the time-resolved PL measurements shown in Fig. 6b.

Sample	A_1	τ_1/ns	A_2	τ_2/ns	Averageτ/n
Anneal	0.68	31.26	0.32	6.20	23.24
IPA-5s	0.53	26.68	0.47	8.48	18.13
IPA-20s	0.56	14.77	0.44	4.66	10.32
IPA-60s	0.67	12.75	0.33	3.38	9.66
IPA-100s	0.47	23.36	0.53	5.31	13.79