Supporting Information

Highly Efficient and Stable Inverted Perovskite Solar Cells Using Down-Shifting Quantum Dots as a Light Management Layer and Moisture-Assisted Film Growth

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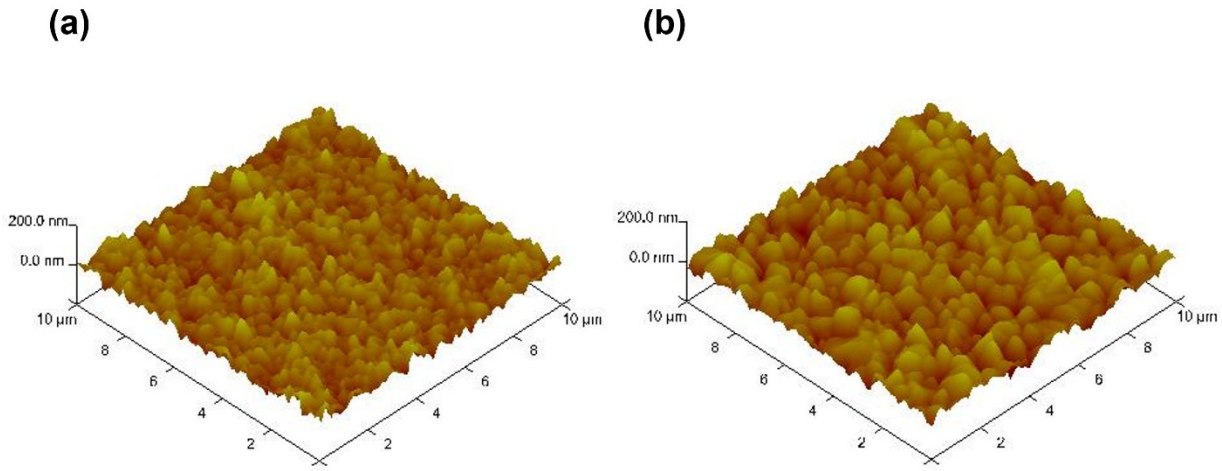

Figure S1. Three-dimensional AFM images of perovskite films annealed inside the glovebox (a) and (b) ambient air.

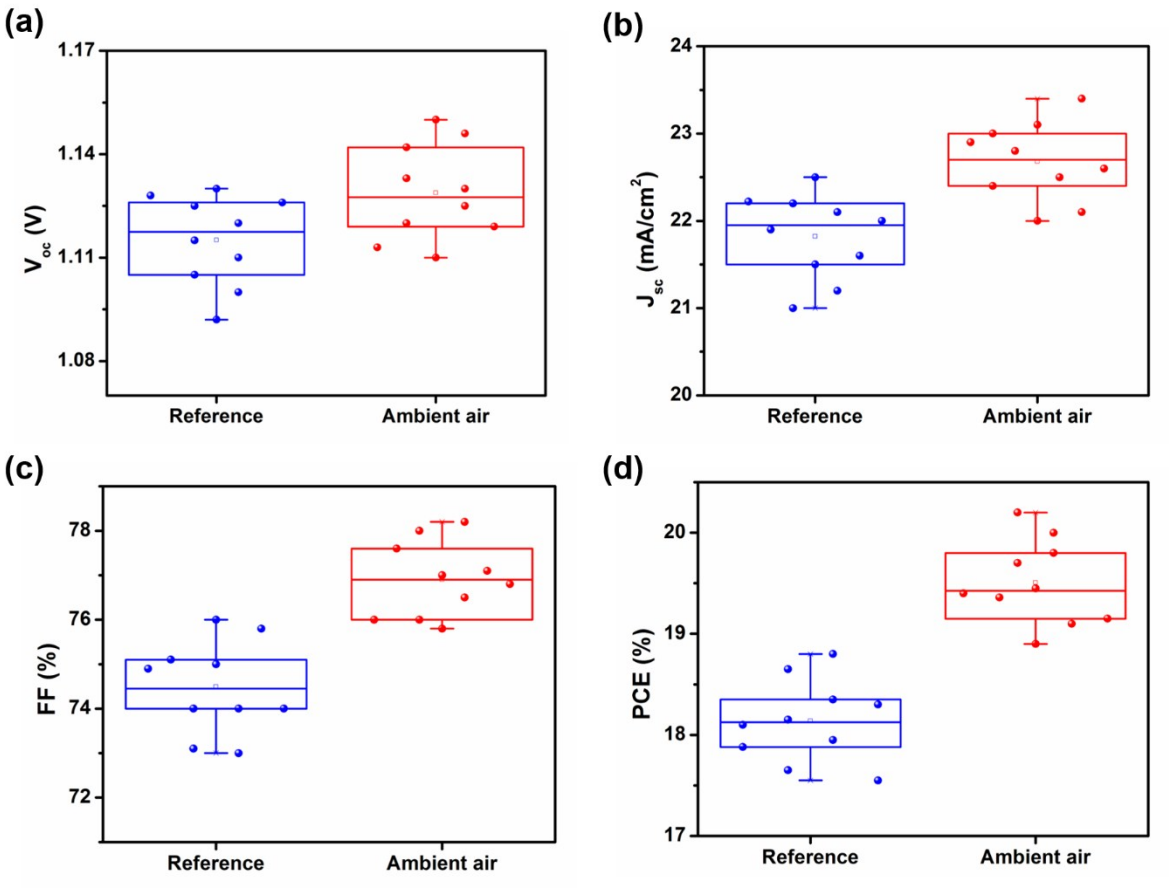

Figure S2. Statistic of the photovoltaic parameters for the PSC devices annealed in nitrogen glovebox (n = 10) and ambient air (n = 10).

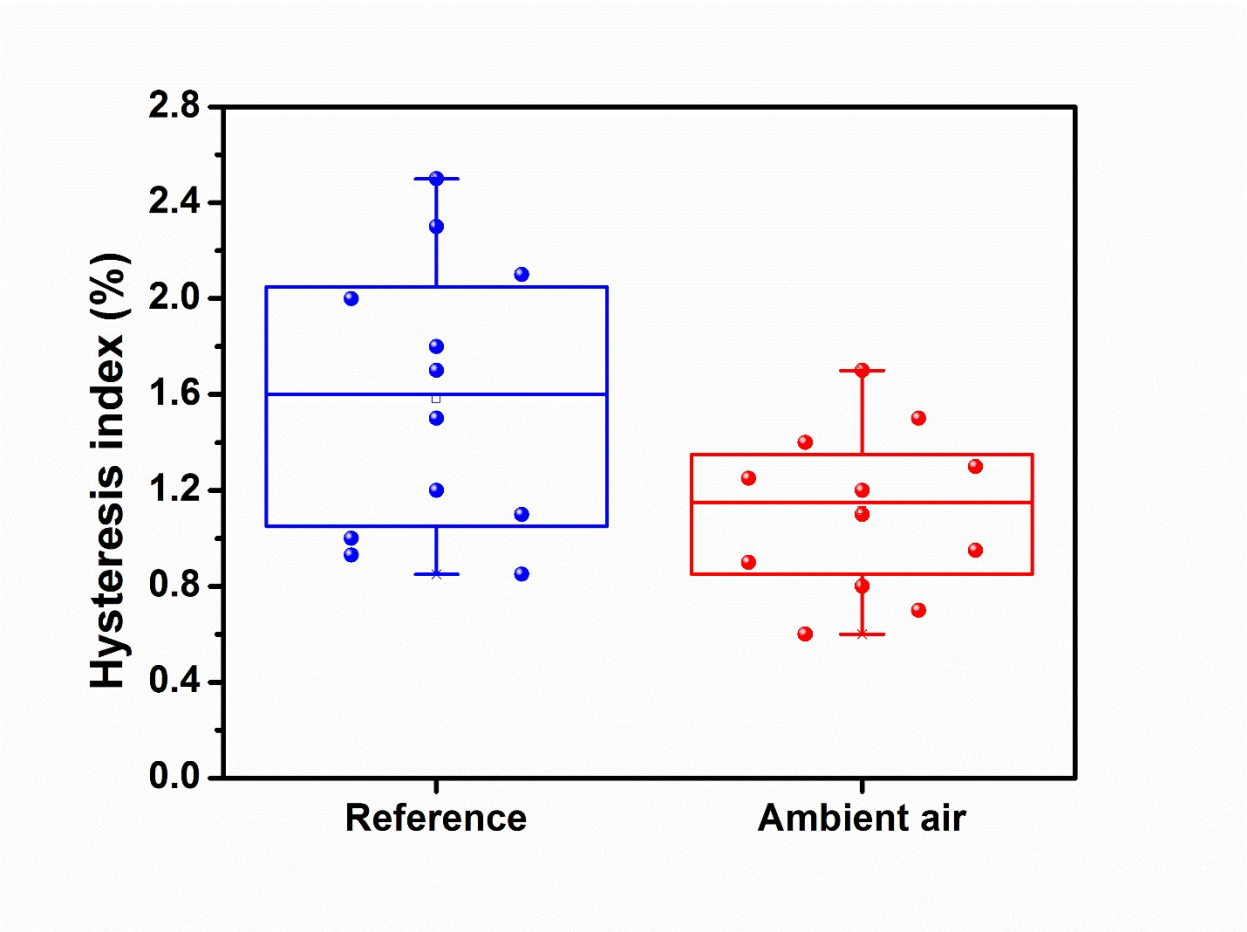

Figure S3. Statistic of hysteresis indices for the PSC devices annealed in nitrogen glovebox (n = 12) and ambient air (n = 12).

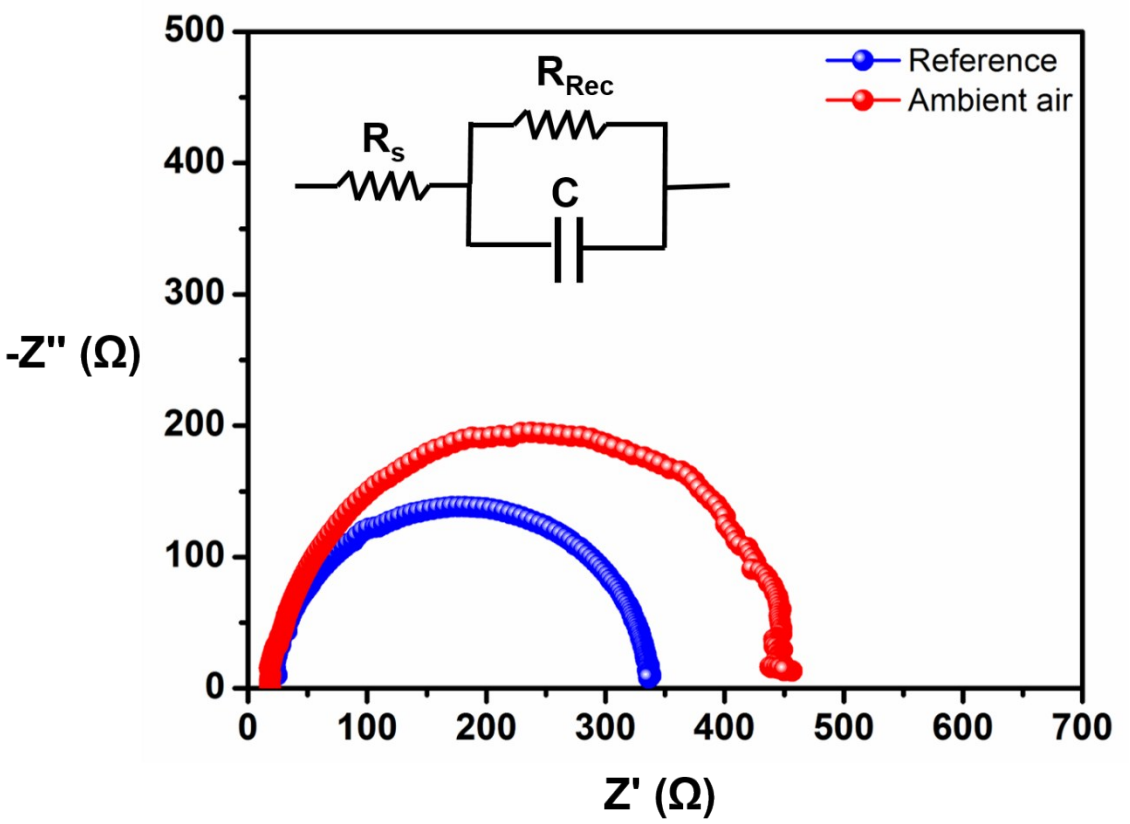

Figure S4. Nyquist plots of the reference device and modified PSC by annealing the perovskite film in ambient air under dark condition.

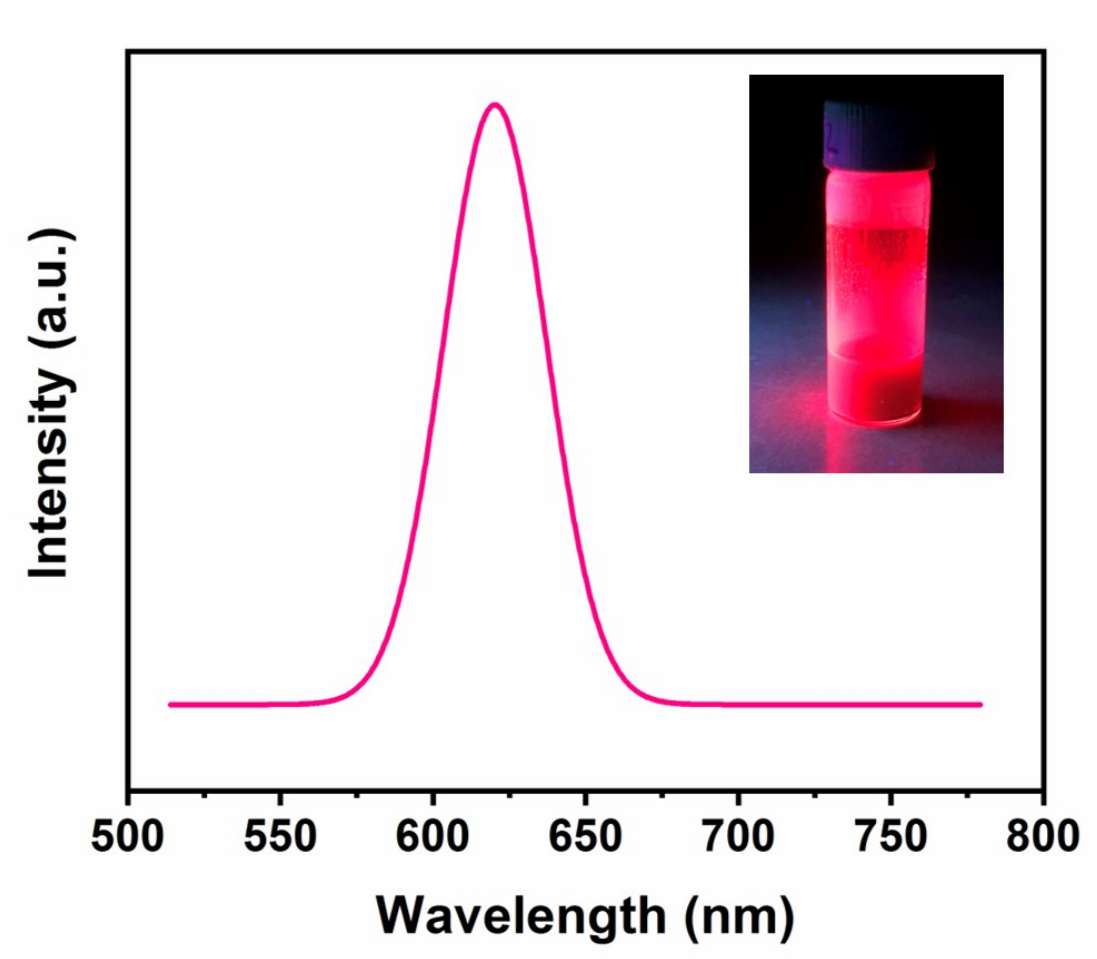

Figure S5. PL emission for a thin layer of CdSe/CdS QDs deposited on glass.

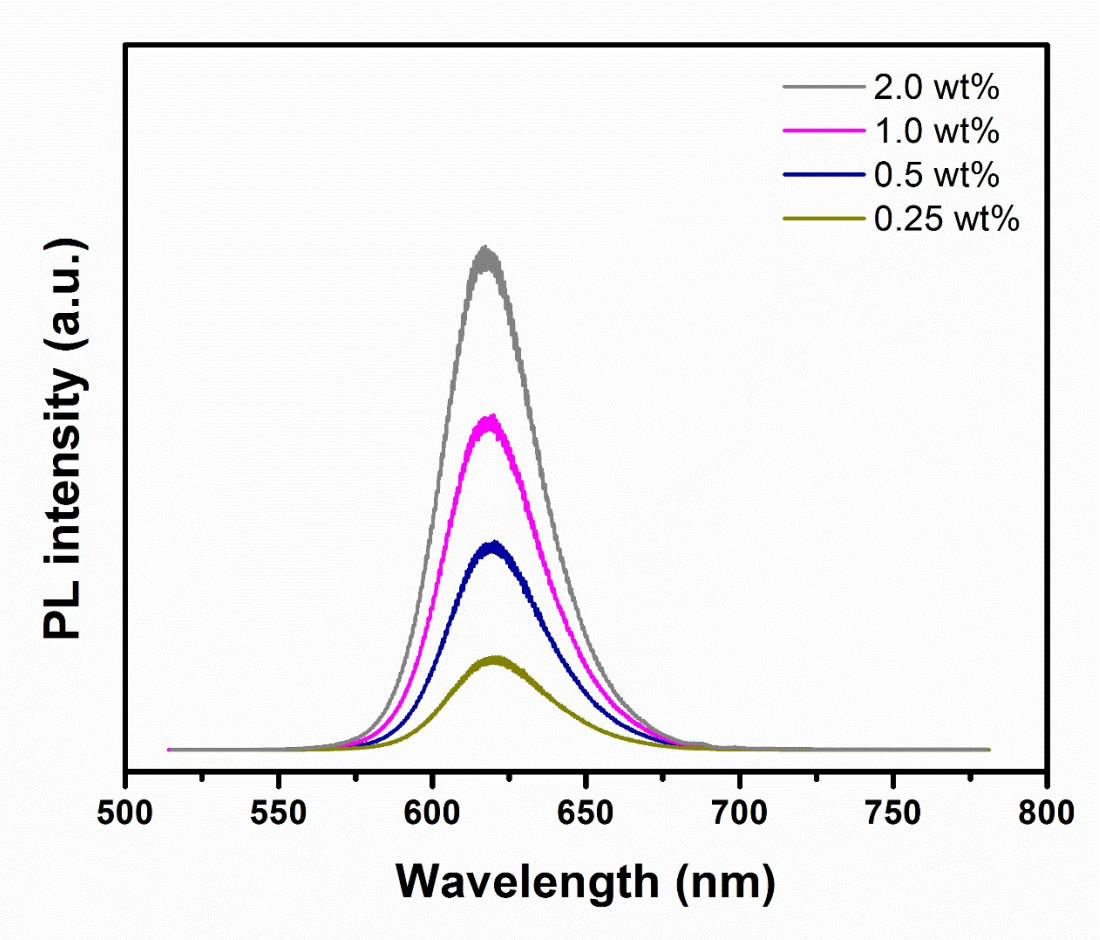

Figure S6. PL emission of the CdSe/CdS QDs layers with different thicknesses deposited on glass substrates.

Table S1. Fitting parameters of the TRPL measurement for the perovskite samples deposited on glass

Sample	A_1	τ_1 (ns)	A_2	τ_2 (ns)	A_3	τ_3 (ns)
Reference	0.164	3.39	0.3	24.1	0.56	78.75
Ambient air	0.049	7.36	0.384	68.74	0.52	179.7

Table S2. Figures of merit for the PSC devices including down-shifting layers with different concentrations (These data are the average value of 10 PSC devices)

Concentration (wt%)	V_{oc} (mV)	J_{sc} (mA/cm^2)	FF (%)	PCE (%)
0	**1130±17**	**22.7±0.4**	**77±1.1**	**19.4±0.7**
0.25	**1130±15**	**22.8±0.4**	**77±1.2**	**19.75±0.7**
0.5	**1130±17**	**22.9±0.5**	**77±1.3**	**19.86±0.7**
1.0	**1131±16**	**23±0.6**	**77.1±1.3**	**19.9±0.8**
2.0	**1131±18**	**22.3±0.3**	**76±1.2**	**19.1±0.6**