

Supporting Information

A Donor-Acceptor Ligand Boosting the Performance of $\text{FA}_{0.8}\text{Cs}_{0.2}\text{PbBr}_3$ Nanocrystals Light-Emitting Diodes

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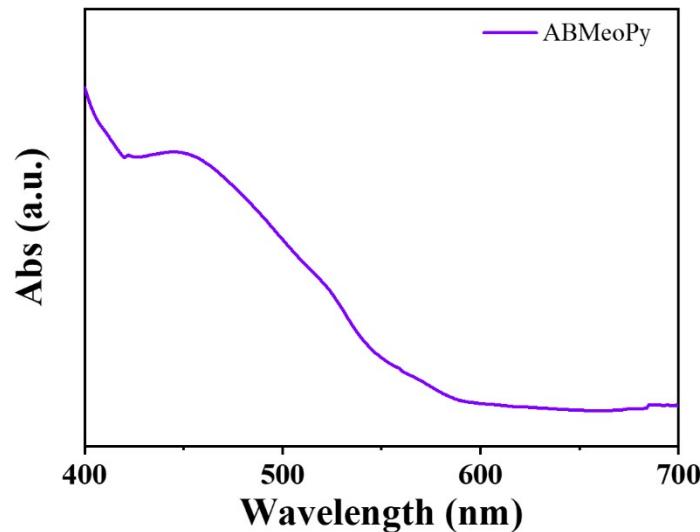


Fig. S1 Absorption spectra of ABMeoPy.

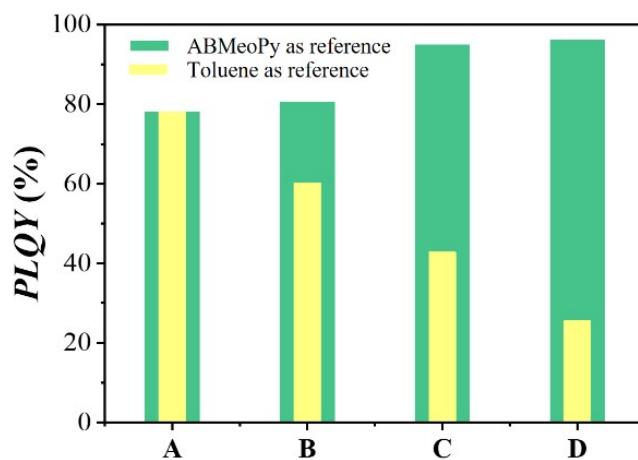


Fig. S2 Absolute PLQYs (excited at 375 nm) of NCs solutions using ABMeoPy toluene or toluene as the reference sample. (A: 0 mg/mL, B: 0.29 mg/mL, C: 0.59 mg/mL, and D: 1.11 mg/mL).

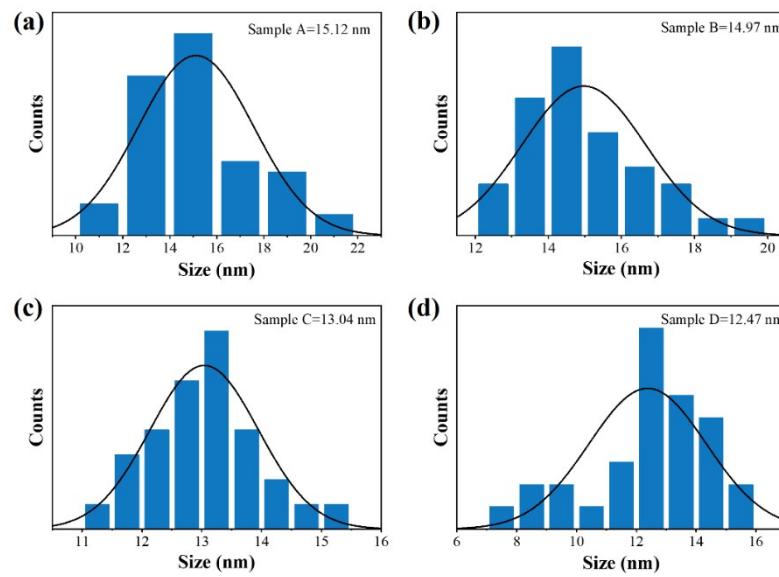


Fig. S3 Statistics of size distribution for samples A-E, (a) pristine perovskite NCs, (b-e) perovskite NCs treated with ABMeoPy concentrations of (b) 0.29 mg/mL, (c) 0.59 mg/mL, and (d) 1.11 mg/mL.

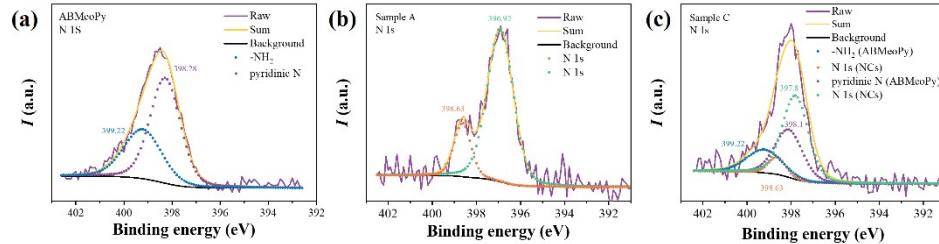


Fig. S4 High-resolution N 1s XPS spectra of (a) ABmeoPy, (b) pristine $\text{FA}_{0.8}\text{Cs}_{0.2}\text{PbBr}_3$ NCs (sample A), (c) $\text{FA}_{0.8}\text{Cs}_{0.2}\text{PbBr}_3$ NCs treated with ABMeoPy concentrations of 0.59 mg/mL (sample C).

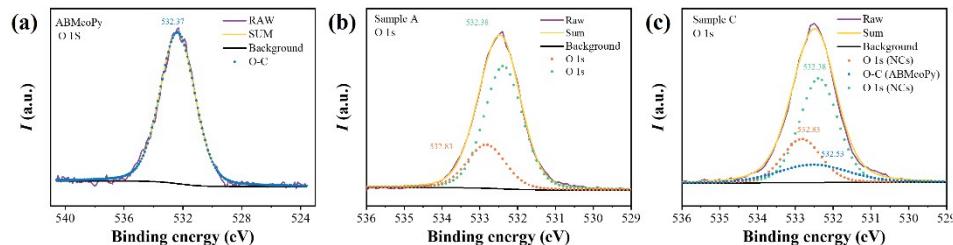


Fig. S5 High-resolution O 1s XPS spectra of (a) ABmeoPy, (b) pristine $\text{FA}_{0.8}\text{Cs}_{0.2}\text{PbBr}_3$ NCs (sample A), (c) $\text{FA}_{0.8}\text{Cs}_{0.2}\text{PbBr}_3$ NCs treated with ABMeoPy concentrations of 0.59 mg/mL (sample C).

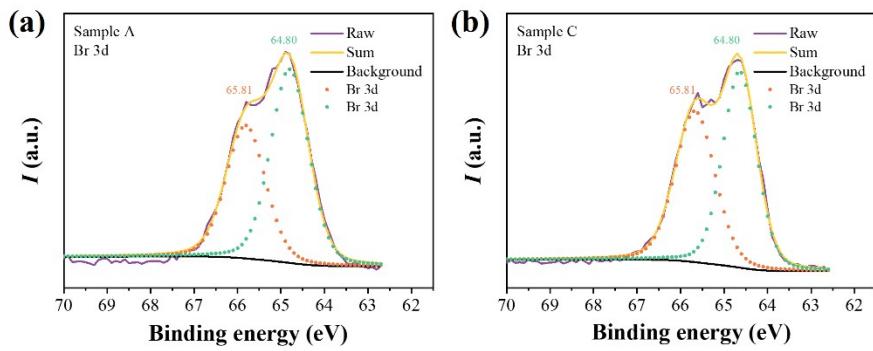


Fig. S6 High-resolution Br 3d XPS spectra of (a) pristine $\text{FA}_{0.8}\text{Cs}_{0.2}\text{PbBr}_3$ NCs (sample A), (b) $\text{FA}_{0.8}\text{Cs}_{0.2}\text{PbBr}_3$ NCs treated with ABMeoPy concentrations of 0.59 mg/mL (sample C).

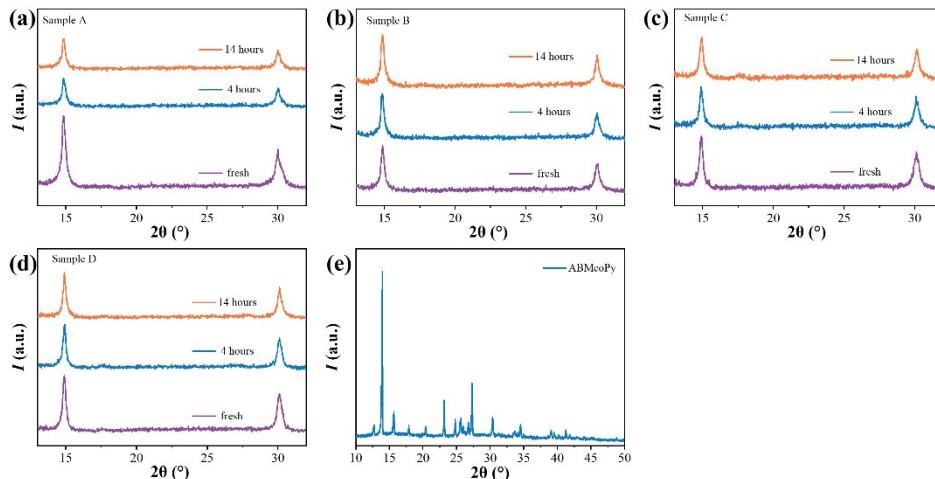


Fig. S7 XRD patterns of films preserved in N_2 atmosphere varies with time (a) pristine perovskite NCs, perovskite NCs mixed with ABMeoPy concentrations of (b) 0.29 mg/mL, (c) 0.59 mg/mL, (d) 1.11 mg/mL, and (e) XRD patterns of ABMeoPy powder.

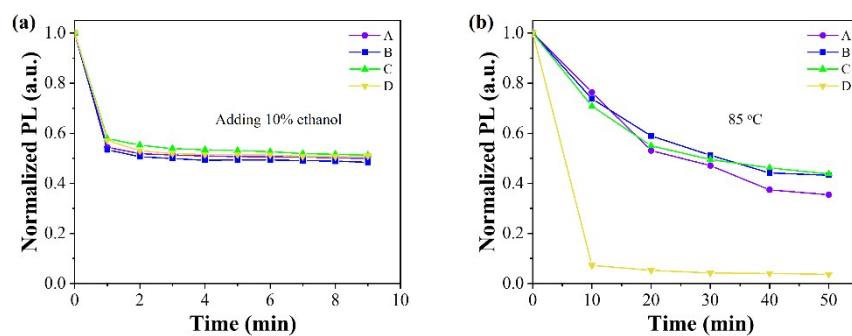


Fig. S8 Accelerated aging test of perovskite NCs solutions different ABMeoPy concentration (A: 0 mg/mL, B: 0.29 mg/mL, C: 0.59 mg/mL, and D: 1.11 mg/mL). (a) PL evolution after adding 10% ethanol; (b) PL evolution at 85 °C.

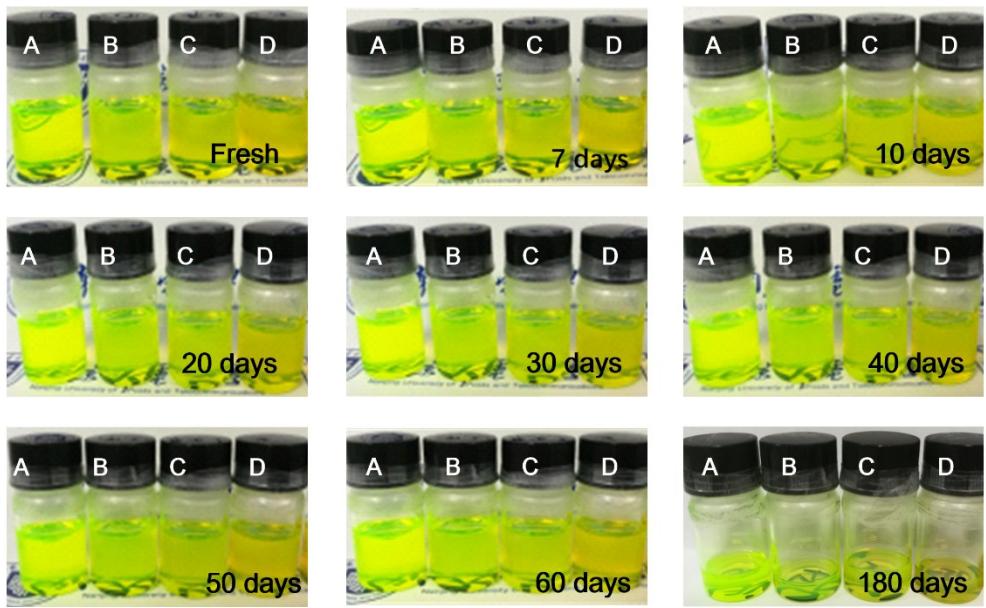


Fig. S9 Photos of NCs changing with storage time under ambient light.

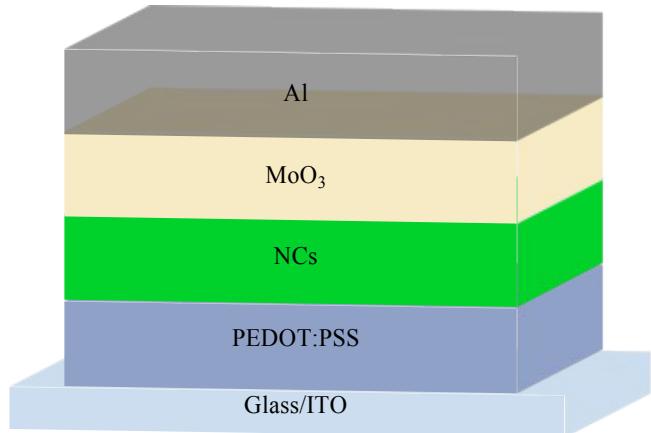


Fig. S10 Structure diagram of hole-only device.

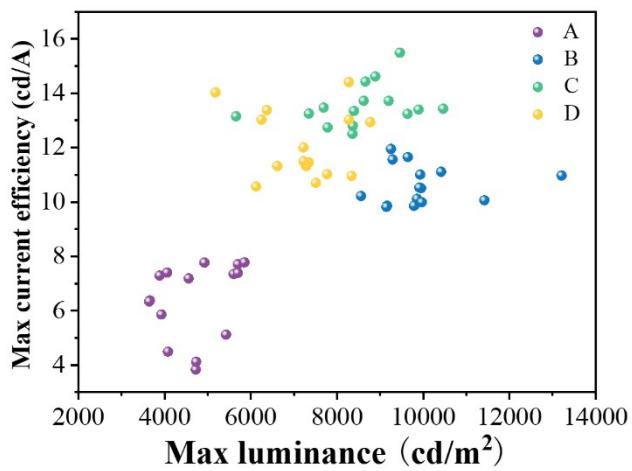


Fig. S11 Maximum (Max) luminance-current efficiency statistics of 15 devices based on NCs treated at different ABMeoPy concentrations.

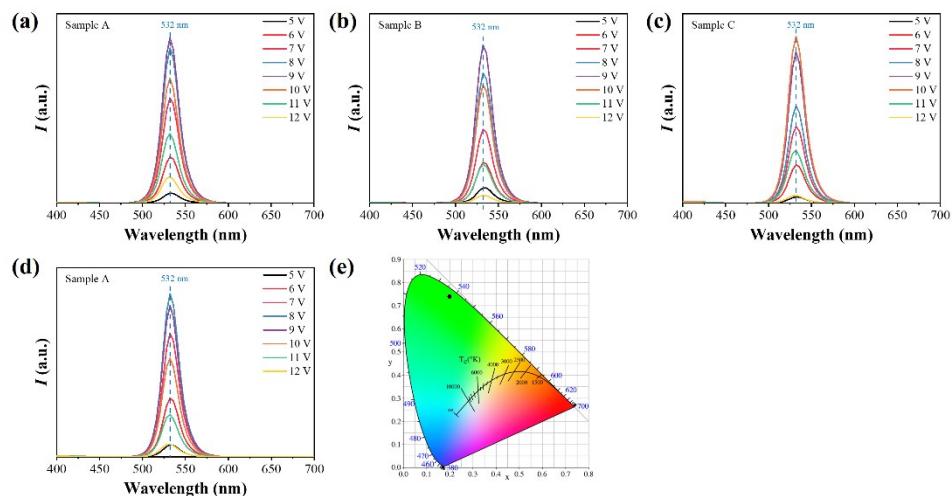


Fig. S12 (a-d) EL spectrum of devices constructed based on NCs treated with different ABMeoPy concentrations (samples A-D), (e) CIE color coordinate.

Table S1. Recombination lifetimes obtained from bi-exponential fitting of the TRPL decay curves.

Sample	τ_1 (ns)/A ₁ (%)	τ_2 (ns)/A ₂ (%)	χ^2	τ_{avr} (ns)
A	17.64/44.17	110.83/55.83	1.154	69.67
B	20.32/43.92	116.27/56.08	1.294	74.13
C	22.14/40.13	122.88/59.87	1.278	82.45
D	20.43/43.52	120.46/56.48	1.268	76.93

Table S2. Statistics of defect state density of perovskite NCs films for samples A-D.

Sample	A	B	C	D
V _{TFL} /V	0.127	0.11	0.094	0.095
n _e /cm ⁻³	7.41×10 ¹⁷	6.41×10 ¹⁷	5.48×10 ¹⁷	5.53×10 ¹⁷

Table S3. Summary of the device performance parameters of NCs

Sample	ABMeoPy concentration (mg mL ⁻¹)	L _{max} (cd m ⁻²)	CE _{max} (cd A ⁻¹)	EQE _{max} (%)
A	0	5598	7.35	1.70
B	0.29	9643	11.65	2.69
C	0.59	9459	15.49	3.59
D	1.11	8274	13.03	3.02