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Conjugated amidine ligands enhances performance of perovskite nanocrystal blue light-emitting diodes prepared in air with green solvents

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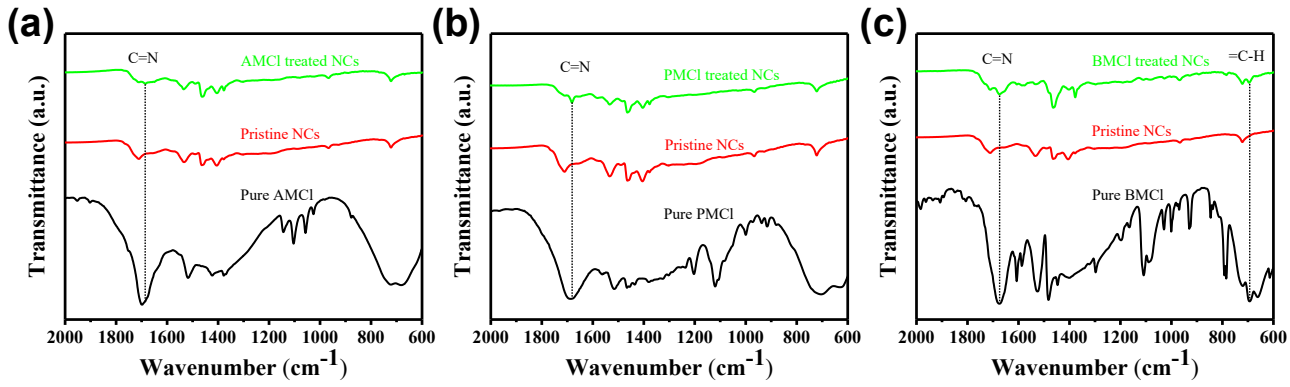

Fig. S1 FTIR spectra of pristine NCs, amidine treated NCs and pure amidine ligands.

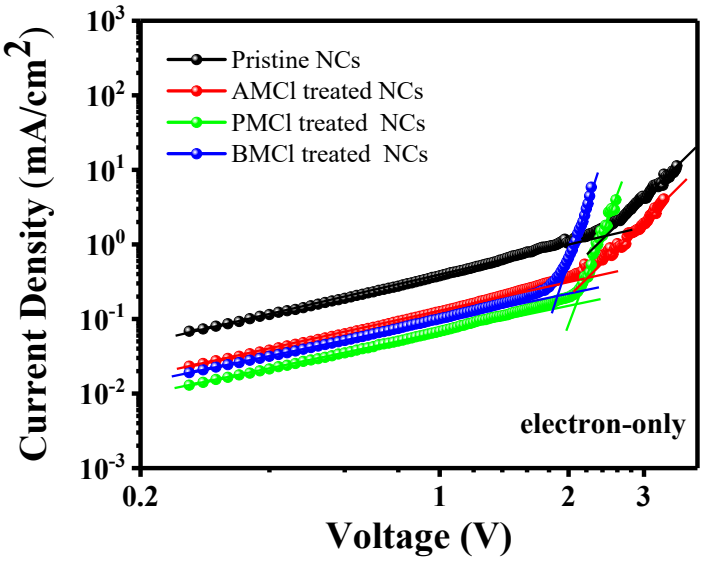

Fig. S2 Dark current-voltage curves from electron-only devices.

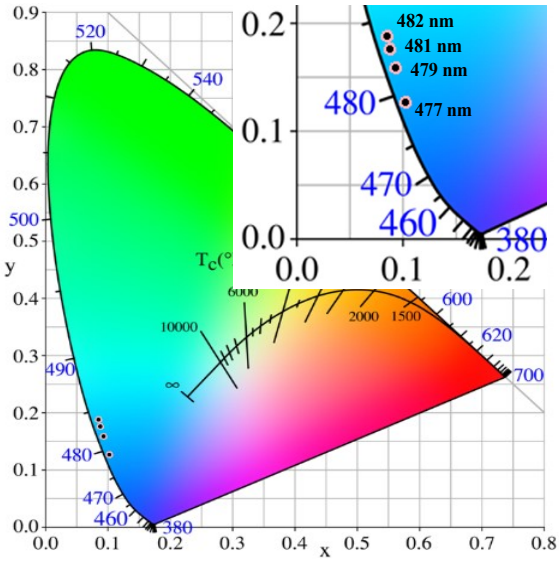

Fig. S3 CIE coordinates of PeLEDs based on pristine NCs (482 nm), AMCl treated NCs (481 nm), PMCl treated NCs (477 nm) and BMCl treated NCs (479 nm).

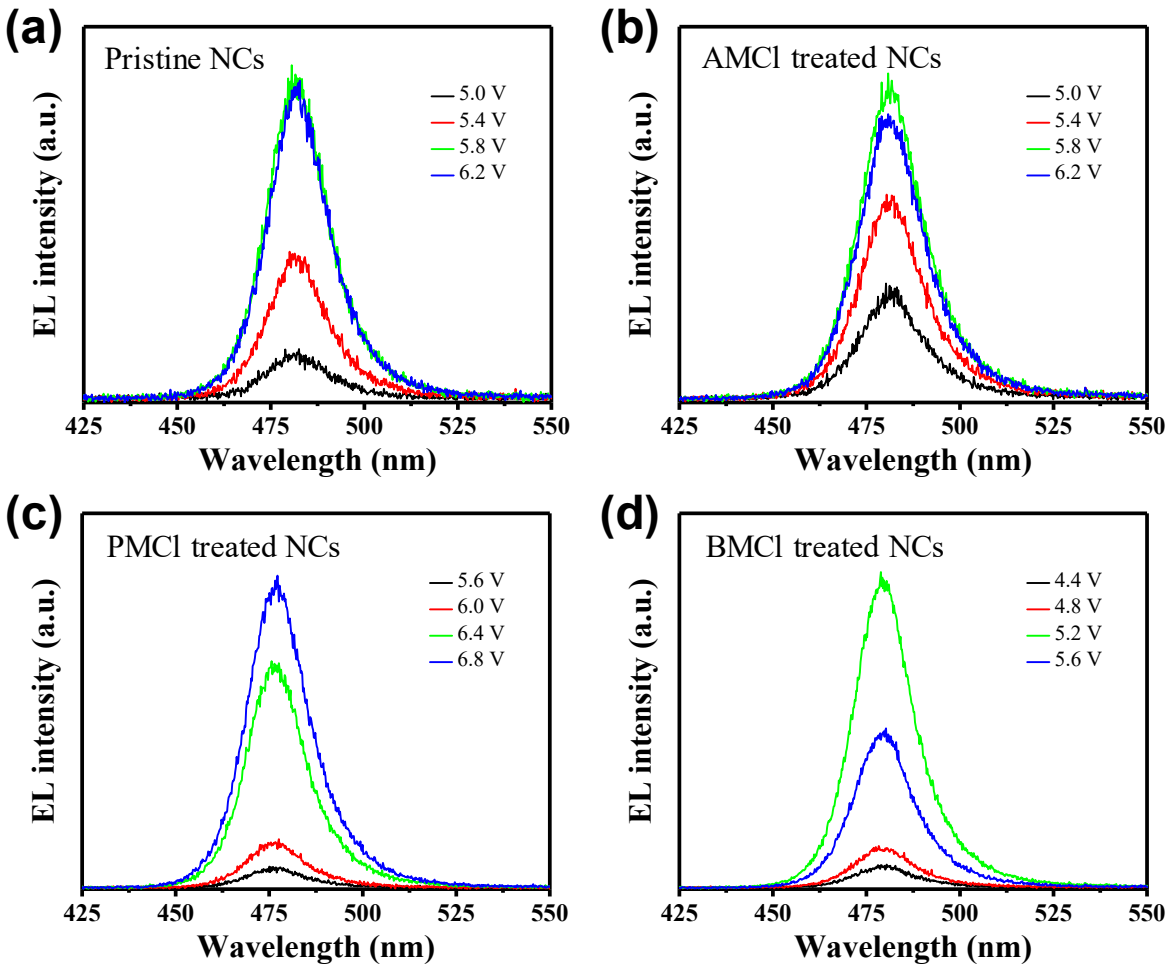

Fig. S4 EL spectra of PeLEDs based on (a) pristine NCs, (b) AMCl treated NCs, (c) PMCl treated NCs and (d) BMCl treated NCs under different bias.

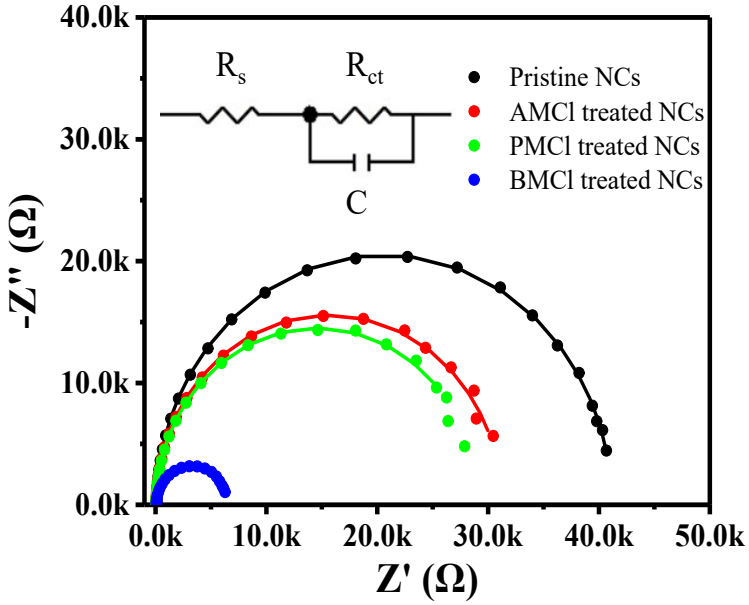

Fig. S5 Impedance spectra of PeLEDs based on pristine and amidine treated NCs.

Table S1 Detailed V_{TFL} and defect density obtained from electron-only devices.

Sample device	V_{TFL} (V)	defect density (cm^{-3})
Pristine NCs	2.45	1.30×10^{18}
AMCl treated NCs	2.21	1.17×10^{18}
PMCl treated NCs	2.08	1.10×10^{18}
BMCl treated NCs	1.88	9.94×10^{17}

TRPL curves were fitted using a tri-exponential decay function as

$$A(t) = A_1 e^{\left(-\frac{t}{\tau_1}\right)} + A_2 e^{\left(-\frac{t}{\tau_2}\right)} + A_3 e^{\left(-\frac{t}{\tau_3}\right)}$$

The average PL lifetimes was calculated according to the following formula

$$\tau_{ave} = \frac{A_1\tau_1^2 + A_2\tau_2^2 + A_3\tau_3^2}{A_1\tau_1 + A_2\tau_2 + A_3\tau_3}$$

Table S2 Detailed tri-exponential fitting parameters of TRPL curves.

Sample	A_1 (%)	τ_1 (ns)	A_2 (%)	τ_2 (ns)	A_3 (%)	τ_3 (ns)	τ_{ave} (ns)
Pristine NCs	6.1	75.8	33.0	15.8	61.1	3.22	37.0
AMCl treated NCs	6.0	90.0	36.5	21.5	57.7	5.13	41.1
PMCl treated NCs	4.9	129.1	32.3	31.0	62.9	7.32	55.4
BMCl treated NCs	6.6	140.5	34.9	33.4	58.6	7.43	68.1

Table S3 FWHM and CIE coordinates based on EL spectra of PeLEDs.

PeLEDs	EL peak (nm)	FWHM (nm)	CIE (x, y)
Pristine NCs	482	17	(0.086, 0.188)
AMCl treated NCs	481	17	(0.088, 0.175)
PMCl treated NCs	477	18	(0.102, 0.127)
BMCl treated NCs	479	17	(0.093, 0.159)

Table S4 Fitted R_s and R_{ct} values of PeLEDs. R_s is series resistance, and R_{ct} is charge transport resistance.

PeLEDs	R_s (Ω)	R_{ct} (kΩ)
Pristine NCs	92.8	41.0
AMCl treated NCs	55.9	31.1
PMCl treated NCs	63.0	29.0
BMCl treated NCs	79.5	6.4