Supporting Information

Neutral inorganic salt additives universally regulate multicolor perovskite for efficient electroluminescence

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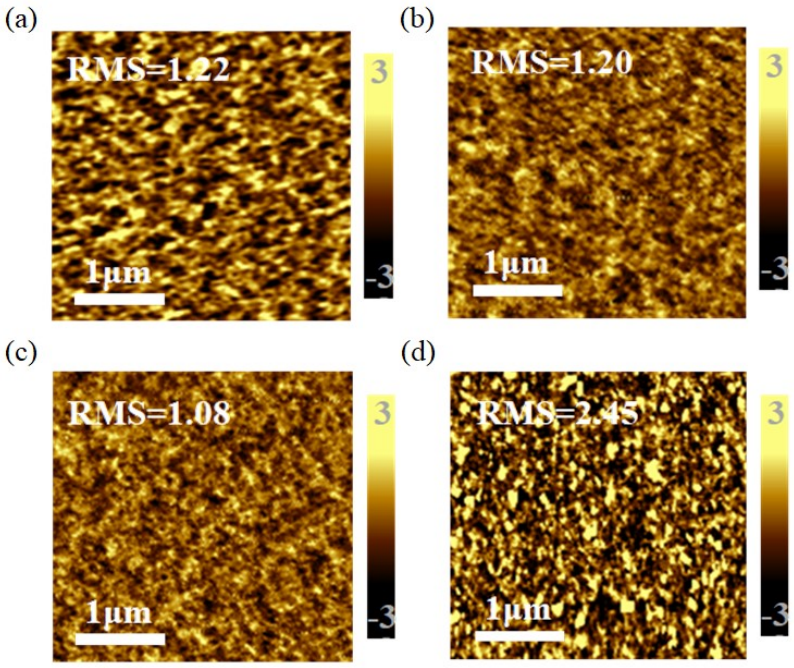

Figure S1. The films' atomic force microscopy (AFM) images by different $NaPF_6$ doping concentrations (2.5%, 5%, 10%)

From the SEM images of perovskite films at different $NaPF_6$ doping concentrations, the surface roughness of the pristine film are many gaps and voids. After the addition of $NaPF_6$, the perovskite film became denser (2.5% and 5% $NaPF_6$ doping). At the same time, under high concentrations of $NaPF_6$ doping (10%), it can be observed that the film begins to become uneven. The deterioration of the morphology at high doping concentration can due to the appearance of perovskite agglomerates.

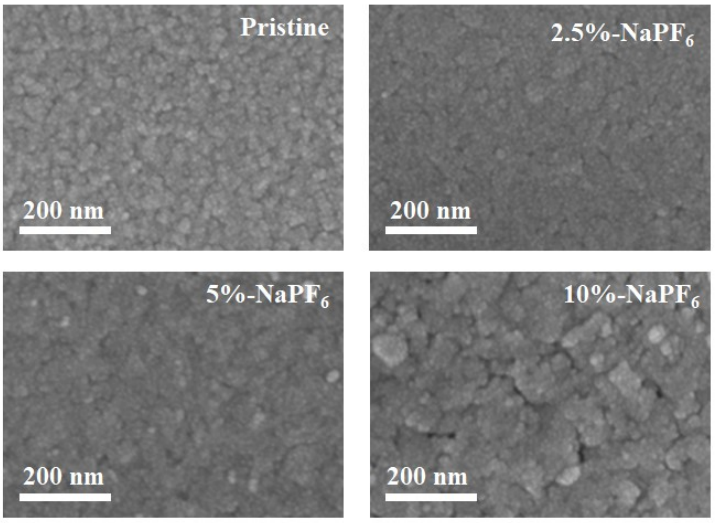

Figure S2. The SEM images of perovskite films at different $NaPF_6$ doping concentrations (pristine, 2.5%, 5%, 10%)

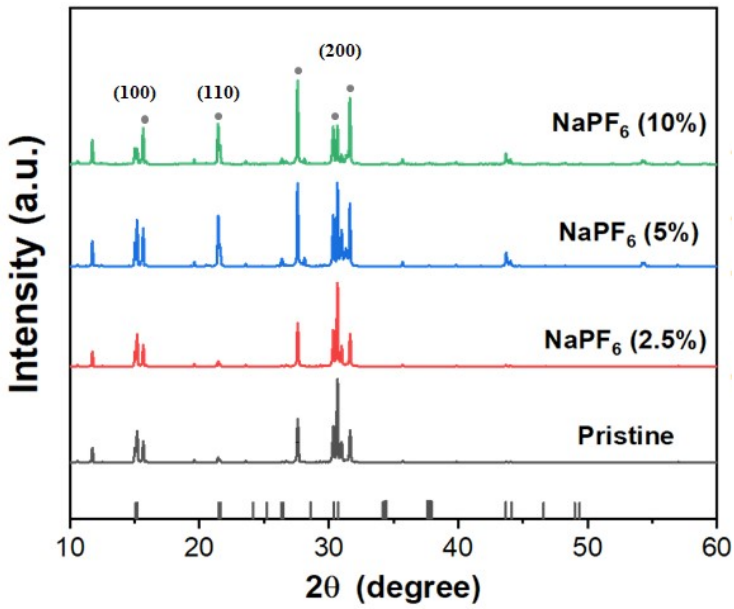

Figure S3. The X-ray diffraction (XRD) patterns with different $NaPF_6$ doping

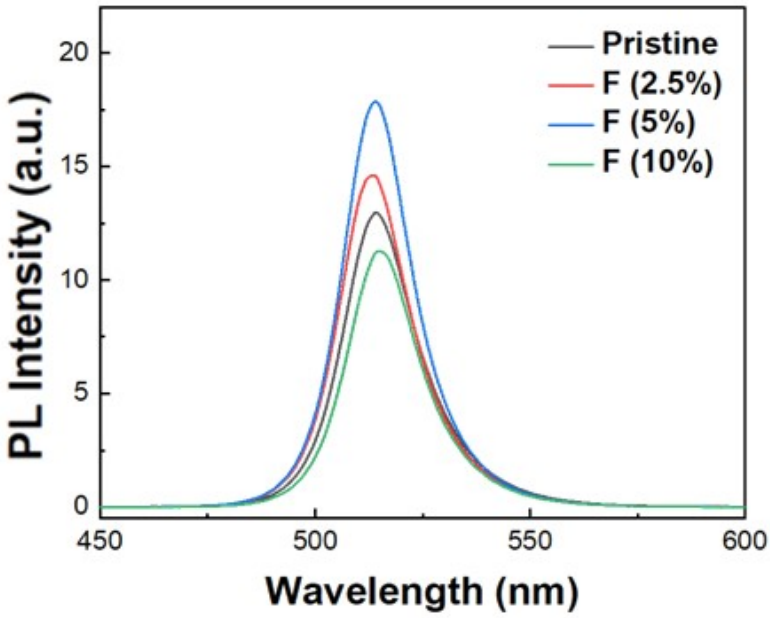

Figure S4. The unnormalized PL spectra under different $NaPF_6$ doping

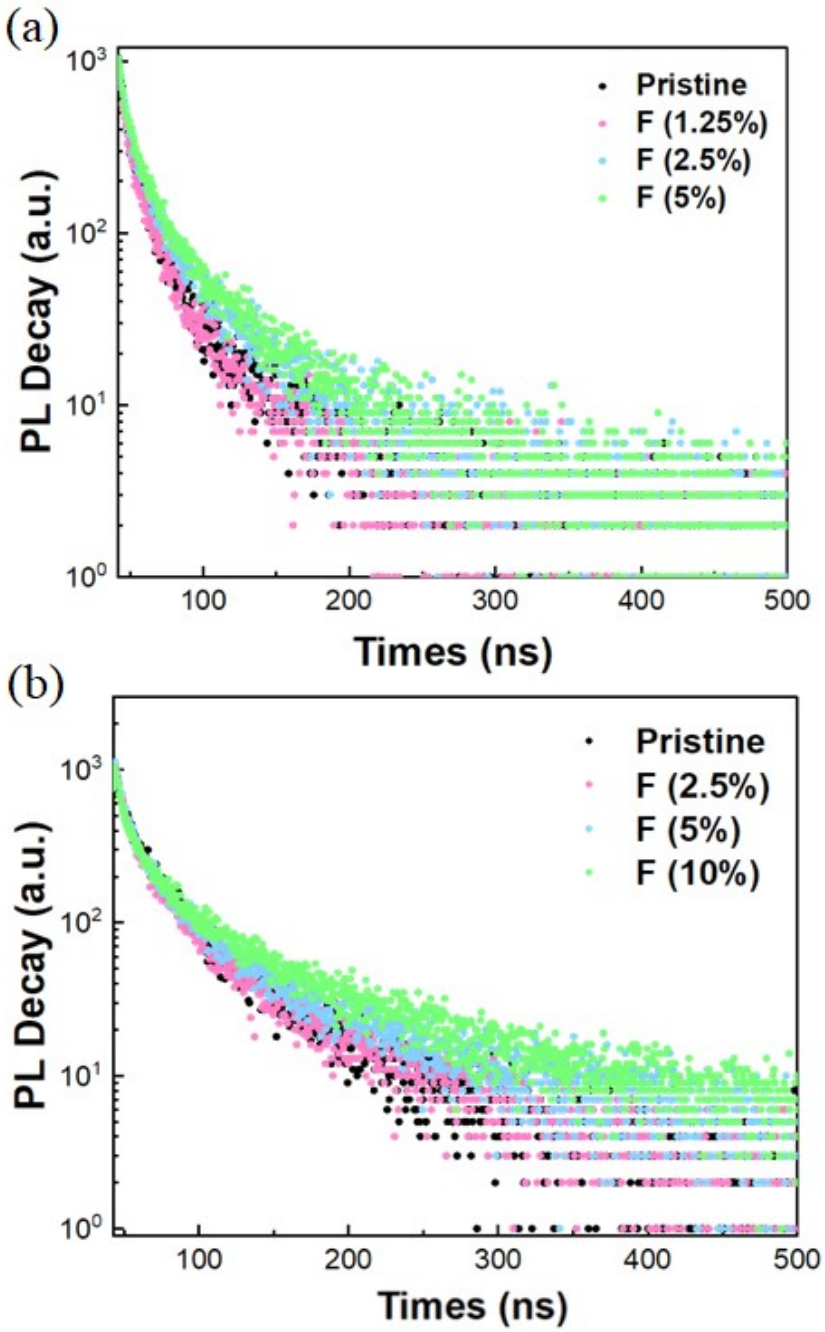

Figure S5. (a) The PL Decay of sky blue (490 nm) perovskite films, (b) The PL Decay of pure blue (474 nm) perovskite films

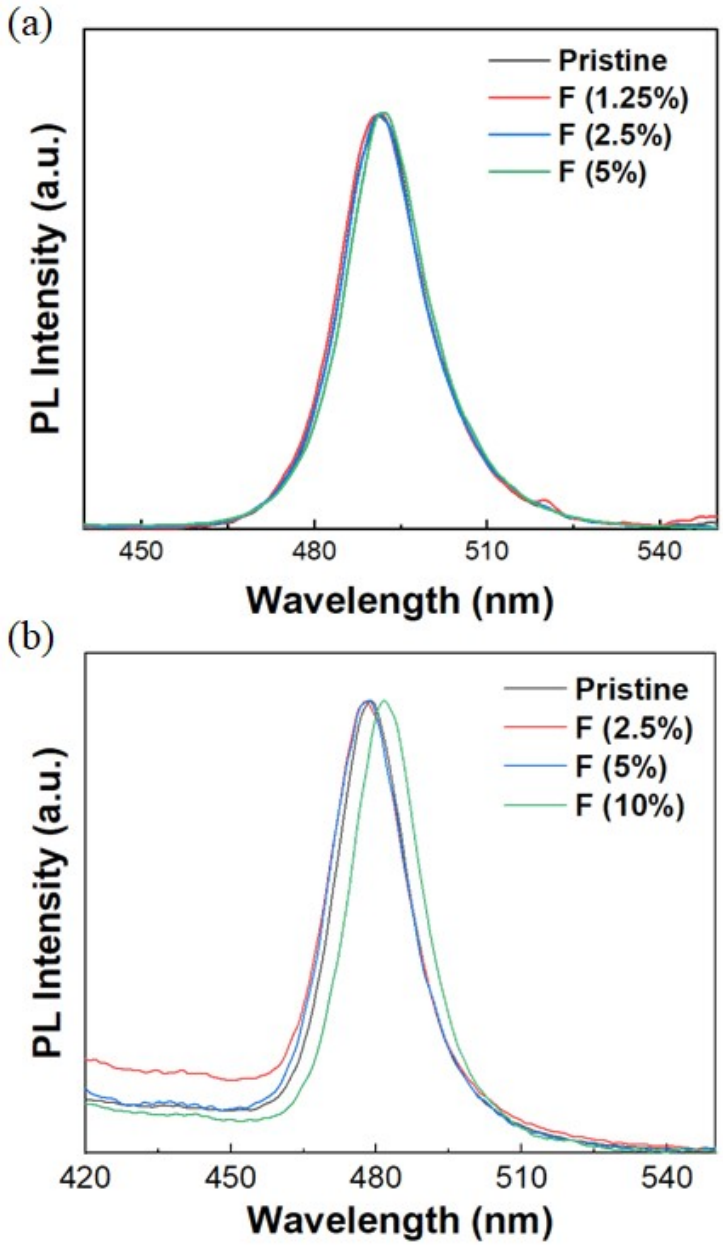

Figure S6. (a) The sky blue PL spectra with different $NaPF_6$ doping, (b) The pure blue PL spectra with different $NaPF_6$ doping

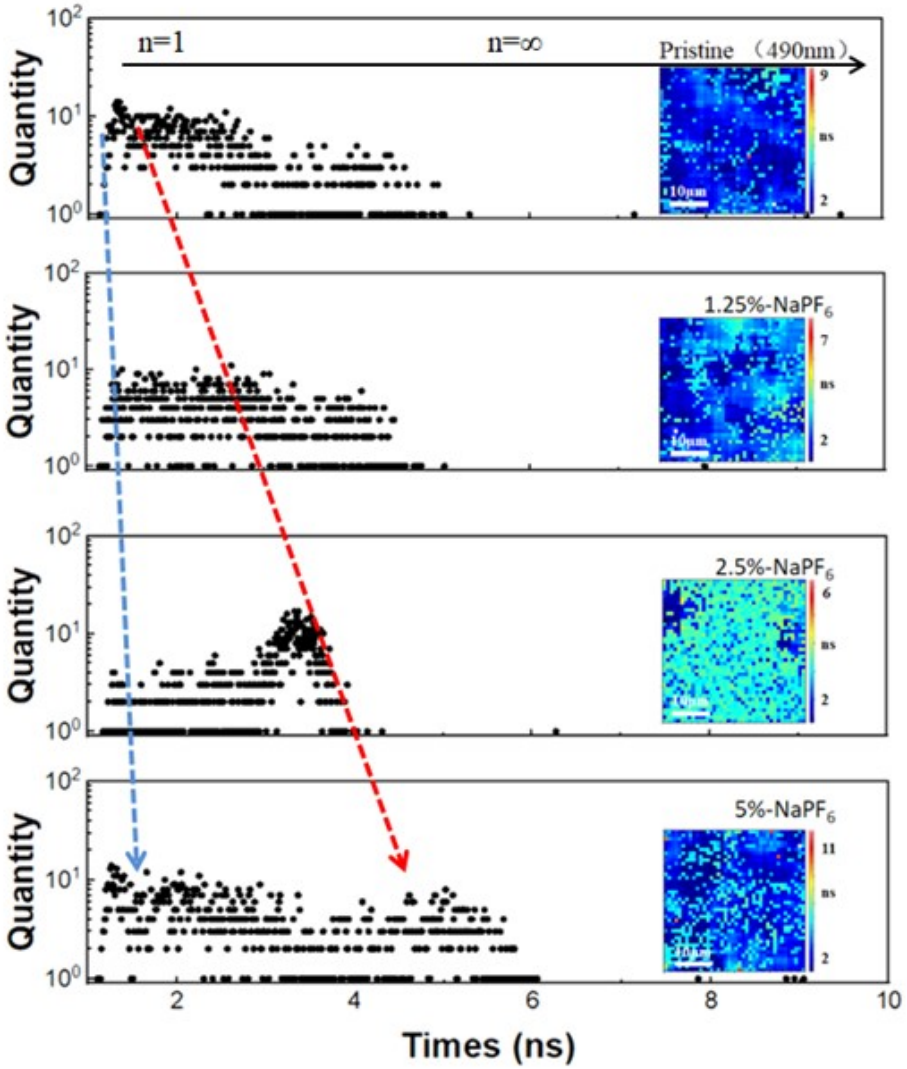

Figure S7. The sky blue films' PL mapping and their lifetime statistics

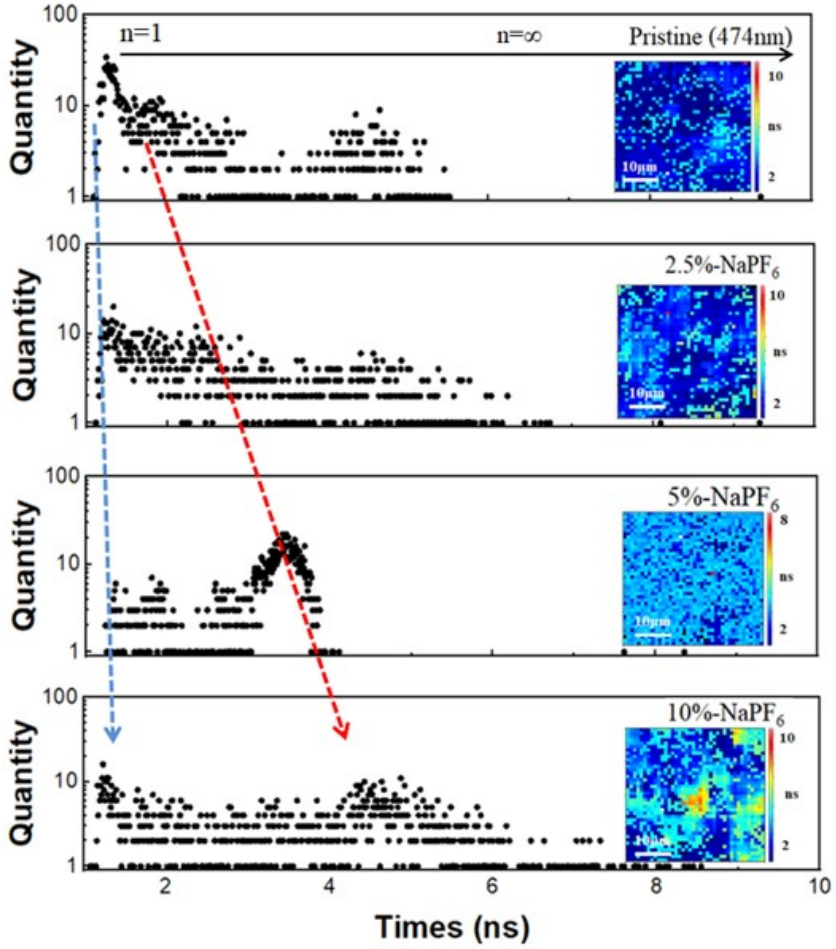

Figure S8. The pure blue films' PL mapping and their lifetime statistics

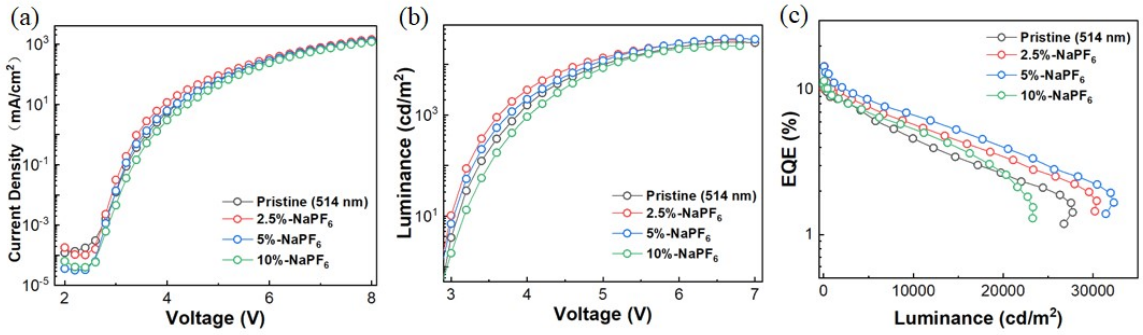

Figure S9. (a) Current density-voltage (J-V) curves, (b) Luminance- voltage (L-V) curves, (c) EQE-luminance (EQE-L) curves of green PeLEDs at different $NaPF_6$ doping

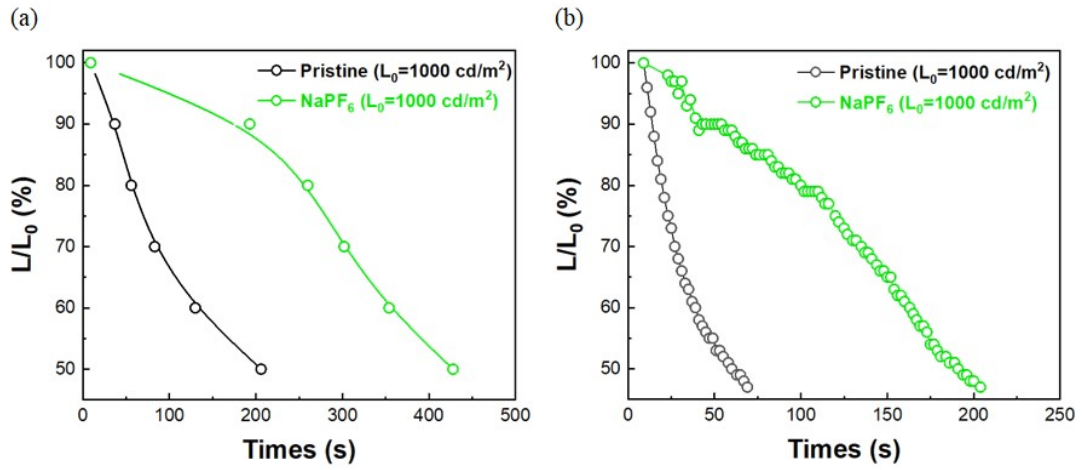

Figure S10. The device lifetime (T_{50}, initial luminance of 1000 cd/m^2) of pristine and $NaPF_6$-treated device (a) package, (b) unpackaged

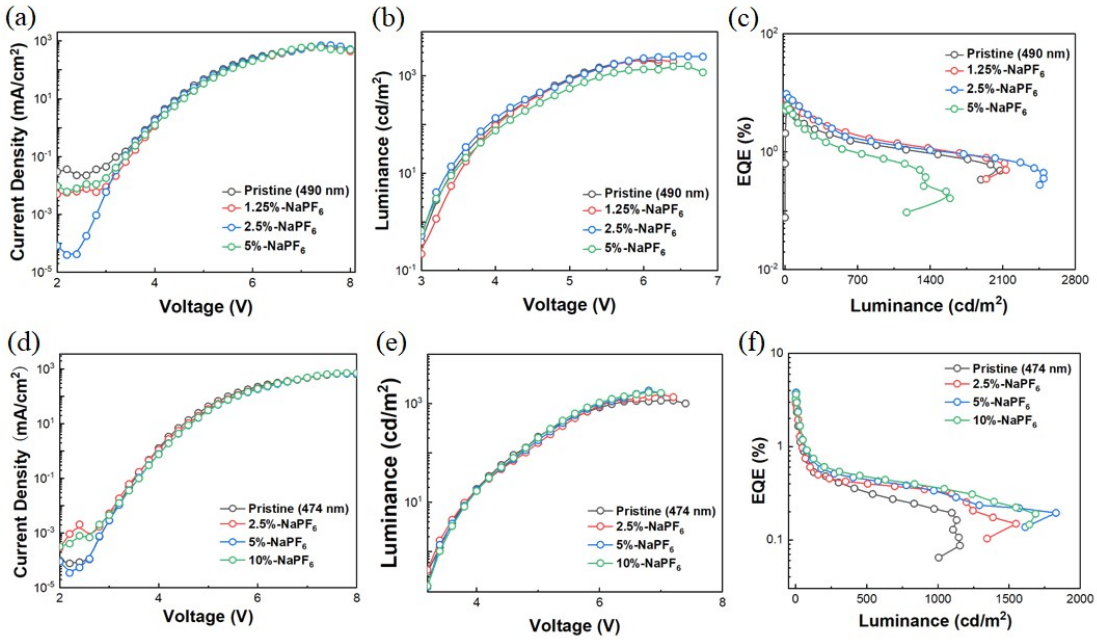

Figure S11. (a) Current density-voltage (J-V) curves, (b) Luminance- voltage (L-V) curves, (c) EQE-luminance (EQE-L) curves of sky blue PeLEDs at different $NaPF_6$ doping. (d) Current density-voltage (J-V) curves, (e) Luminance- voltage (L-V) curves, (f) EQE-luminance (EQE-L) curves of pure blue PeLEDs at different $NaPF_6$ doping.

Table S1 TRPL data of green perovskite films at different $NaPF_6$ doping concentrations

Sample	τ_1 (ns)	τ_2 (ns)	$\tau_{average}$ (ns)
Pristine	4.36	35.71	22.26
2.5 %-$NaPF_6$	9.74	73.27	50.09
5 %-$NaPF_6$	11.47	75.58	51.13
10 %-$NaPF_6$	18.58	140.36	114.49

Table S2 TRPL data of sky blue perovskite films at different $NaPF_6$ doping concentrations

Sample	τ_1 (ns)	τ_2 (ns)	$\tau_{average}$ (ns)
Pristine	6.64	39.62	22.05
1.25 %-$NaPF_6$	5.83	38.36	20.72
2.5 %-$NaPF_6$	7.57	44.26	28.44
5 %-$NaPF_6$	8.64	49.60	32.26

Table S3 TRPL data of pure blue perovskite films at different $NaPF_6$ doping concentrations

Sample	τ_1 (ns)	τ_2 (ns)	$\tau_{average}$ (ns)
Pristine	9.56	51.30	36.67
2.5 %-$NaPF_6$	9.66	58.67	39.10
5 %-$NaPF_6$	10.13	70.40	47.69
10 %-$NaPF_6$	10.91	91.65	64.09