Supporting Information

Perovskite Nanocrystals Passivated by Aromatics Phosphonic Acid for High-performance Light-Emitting Diodes

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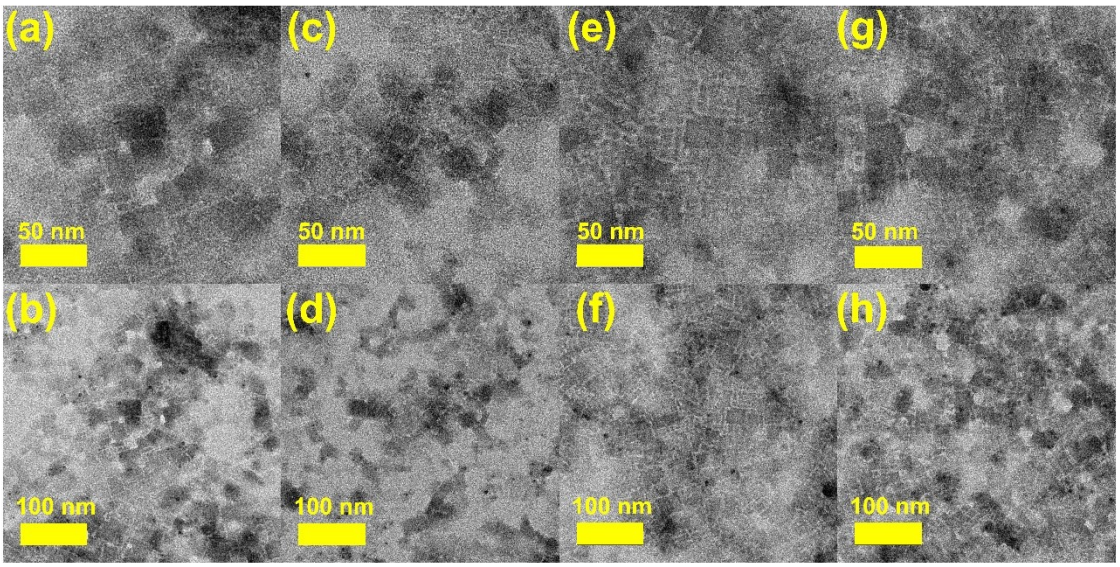

Fig. S1 High-resolution TEM images of pristine and BPA-passivated $FAPbBr_3$ NCs (50 nm, 100 nm): pristine (a-b), 0.5 mg (c-d), 1 mg (e-f), and 1.5 mg BPA-passivated $FAPbBr_3$ NCs (g-h).

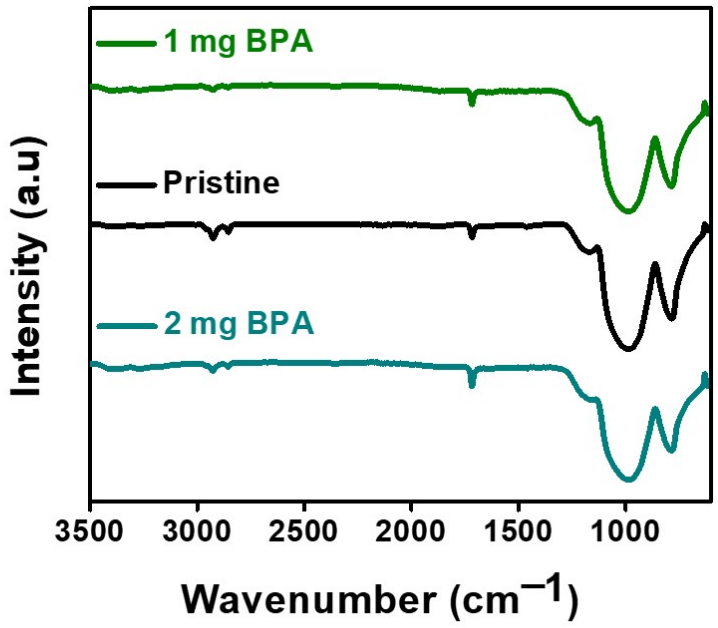

Fig. S2 FT-IR spectra of pristine and BPA-passivated $FAPbBr_3$ NC films.

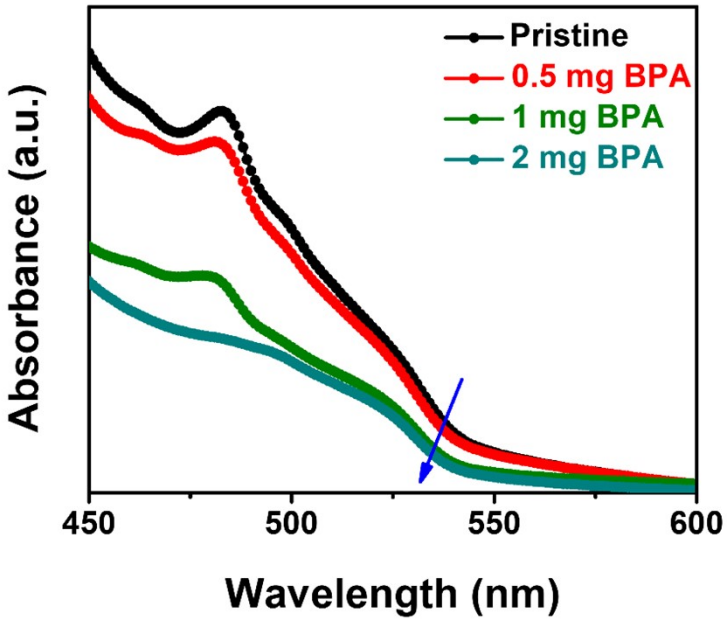

Fig. S3 Absorption spectra of Pristine and BPA-passivated $FAPbBr_3$ NCs.

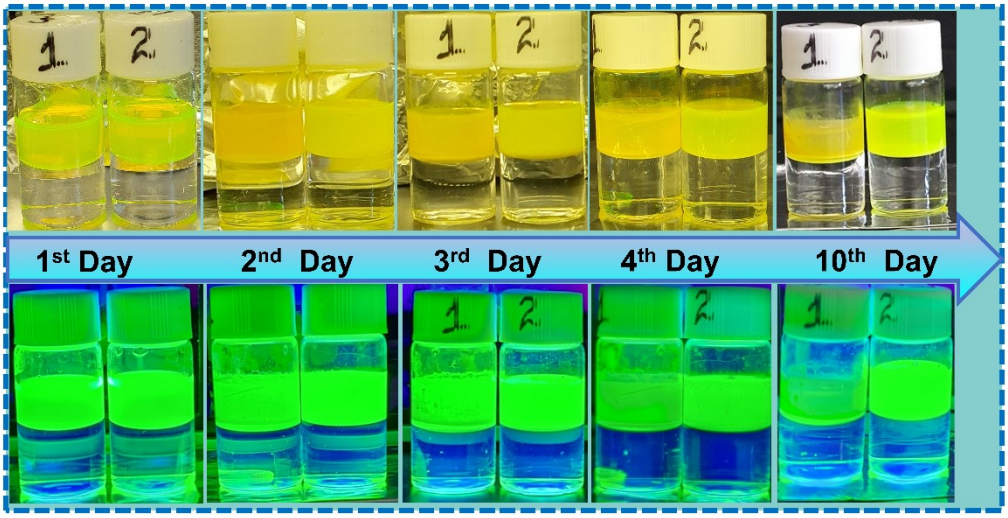

Fig. S4 Photographs of $FAPbBr_3$ NCs under room light and UV light at the different test times.

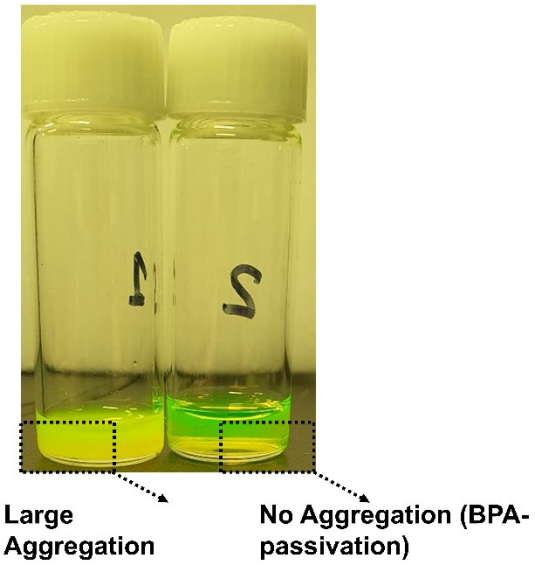

Fig. S5 Photographs of pristine and BPA-passivated FAPbBr3 NCs after storage in refrigeration for 14 days. After Storage for 14 days in refrigeration, large aggregates appear in pristine NCs, while there is no aggregation in BPA-passivation $FAPbBr_3$ NCs.

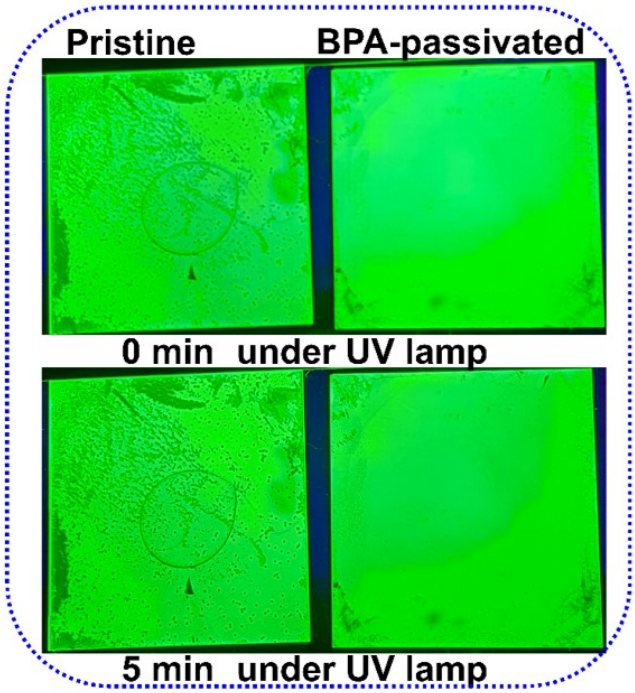

Fig. S6 Photographs of pristine and BPA (1 mg) passivated $FAPbBr_3$ NC films under the illumination of a UV lamp for 0 and 5 minutes.

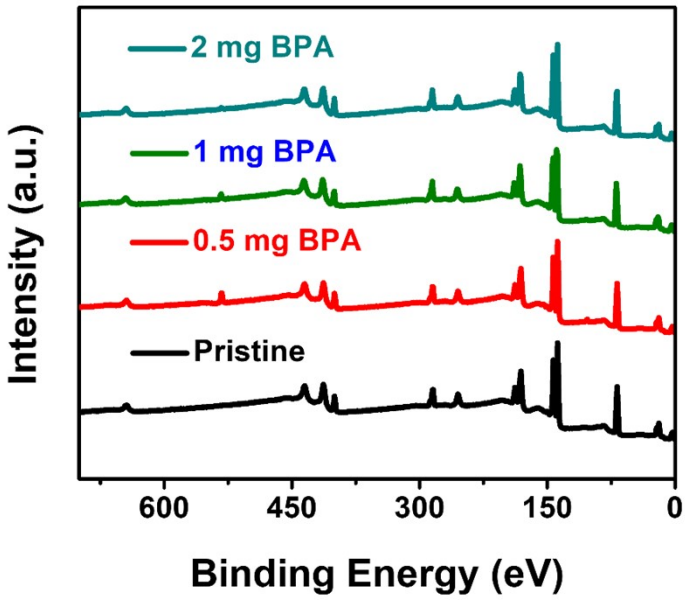

Fig. S7 XPS survey of pristine and BPA-passivated $FAPbBr_3$ NCs**.**

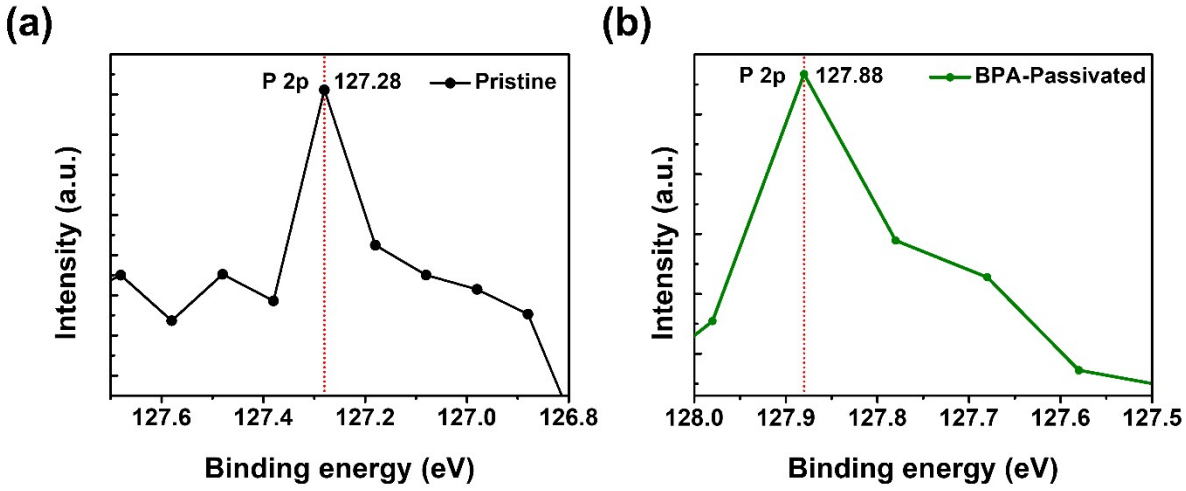

Fig. S8 (a-b) The P 2p peaks of pristine and BPA-passivated $FAPbBr_3$ NCs film.

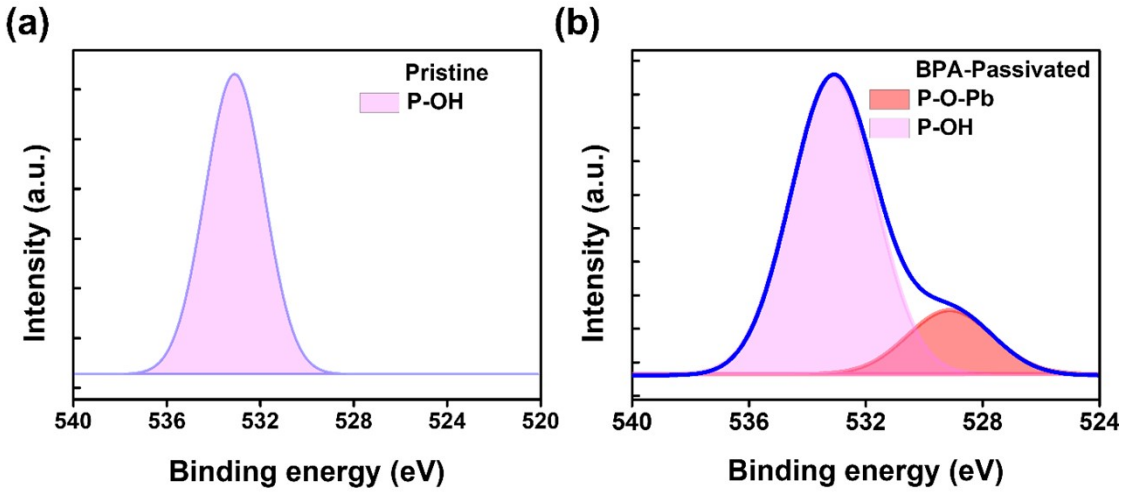

Fig. S9 (a-b). The formation of a novel Pb–O–P covalent bond in BPA-passivated $FAPbBr_3$ NCs.

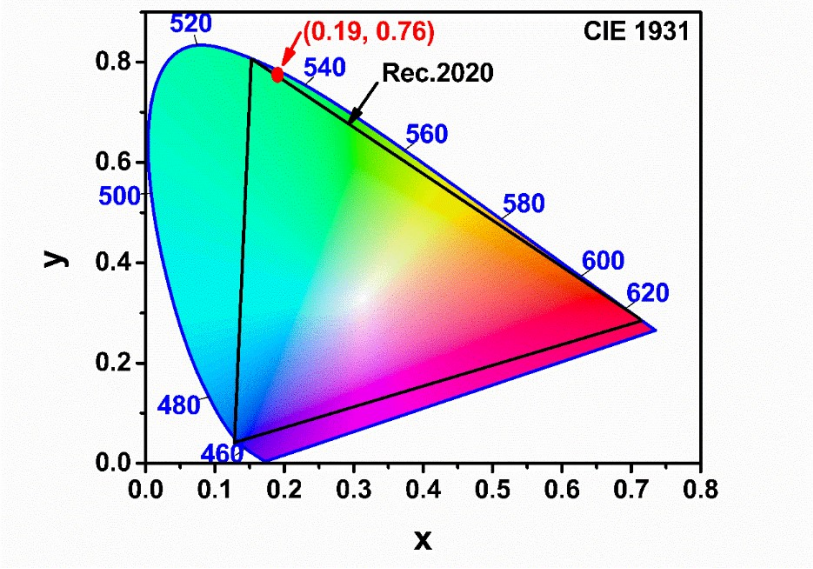

Fig. S10 Commission Internationale de l'Eclairage (CIE) coordinates (0.19, 0.76) of PeLEDs.

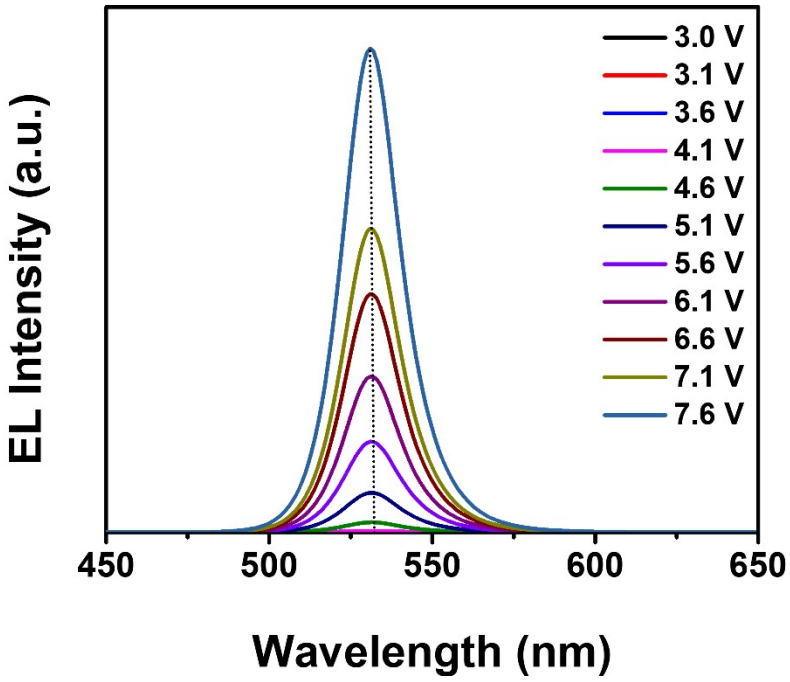

Fig. S11 EL spectra vs. different applied voltage of PeLEDs.

Table S1. PL decay Lifetimes of pristine and BPA-passivated NC films

$FAPbBr_3$ NCs	A_1	τ_1 (ns)	A2	τ_2 (ns)	$\tau_{avg.}$ (ns)
Pristine	0.4	5	0.3	5.12	5
BPA-passivated	0.9	7.8	0.8	3.8	7

Table S2. PLQY vs. storage lifetimes of pristine and BPA-passivated NCs.

PLQY	Pristine	0.5 mg BPA	1 mg BPA	2 mg BPA
0 Day	77%	86%	90%	83%
14 Day	55%	74%	80%	71%
Retain Factor ($R) = \frac{Final\ Value}{Initial\ Value} \times 100$	71.1%	86.0%	88.9%	85.5%

Table S3. A comparative table of reported LEDs mainly based on green perovskite NCs or QDs prepared at room temperature.

Perovskite LED	EL Peak (nm)	CE (cd/A)	EQE (%)	Lum. (cd/m^2)	Ref.
$FAPbBr_3$-CdSe/ZnS	526	31	7.1	86670	1
$FA_{0.9}GA_{0.1}PbBr_3$ NPs	535	91.11	20.48	6179	2
$FAPb_{0.7}Sn_{0.3}Br_3$	528	53.5	12.9	10520	3
$FA_{0.8}Cs_{0.2}PbBr_3$	532	15.49	3.59	9459	4
$Cu_2ZnSnS_4/FAPbBr_3$	529	-	7.59	27000	5
$CsPbBr_3$	513	46.18	12.17	9464	6
$CsPbBr_3$	516	-	15.1	5946	7
$CsPbBr_3$	512	21.1	6.43	96392	8
$FAPbBr_3$	536	76.8	17.1	10^4	9
BPA-passivated $FAPbBr_3$	531	55.83	12.90	29280	This work

References

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