Supporting Information

**Poly(Vinylidene Fluoride)-Passivated CsPbBr$_3$ Perovskite Quantum Dots with Near-Unity Photoluminescence Quantum Yield and Superior Stability**

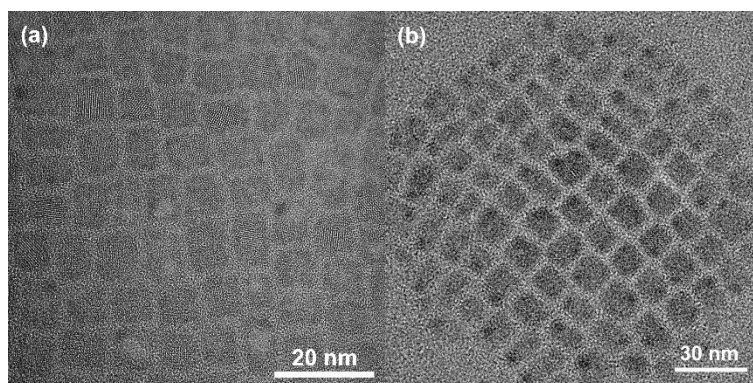Lin Yang,* Bowen Fu, Xu Li, Hao Chen, and Lili Li,

College of Physics Science and Technology, Hebei University, Baoding 071002, Hebei, P. R. China

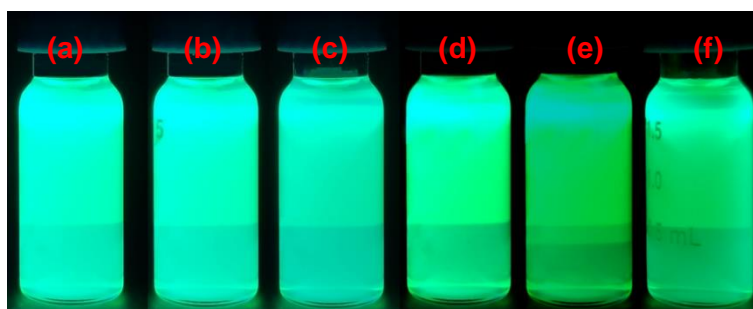** Corresponding authors. Tel.: +86 312 5077069; fax: +86 312 5077069.*

*E-mail addresses: yanglin@hbu.edu.cn (L.Yang).*
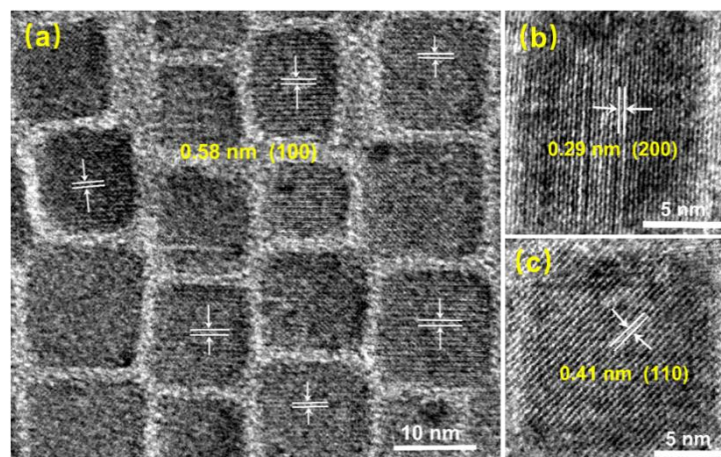
Figure S1. HRTEM of PVDF-CsPbBr$_3$ QDs reflecting the crystal planes of (100), (200), and (110), respectively.


Figure S2. TEM images of the (a) pristine CsPbBr$_3$ and (b) PVDF-CsPbBr$_3$ QDs after exposure in ambient condition for 60 days

Figure S3. Photographs of the pristine CsPbBr$_3$ QDs samples taken under a UV lamp after exposure in ambient condition for (a) 0, (b) 3, (c) 7, (d) 15, (e) 30, and (f) 60 days, respectively.
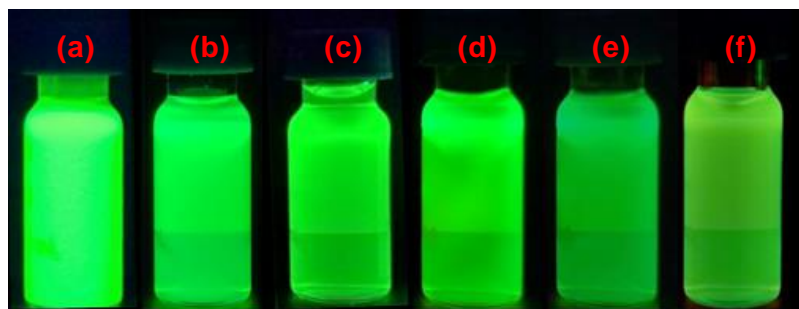
Figure S4. Photographs of the PVDF-CsPbBr$_3$ QDs samples taken under a UV lamp after exposure in ambient condition for (a) 0, (b) 3, (c) 7, (d) 15, (e) 30, and (f) 60 days, respectively.
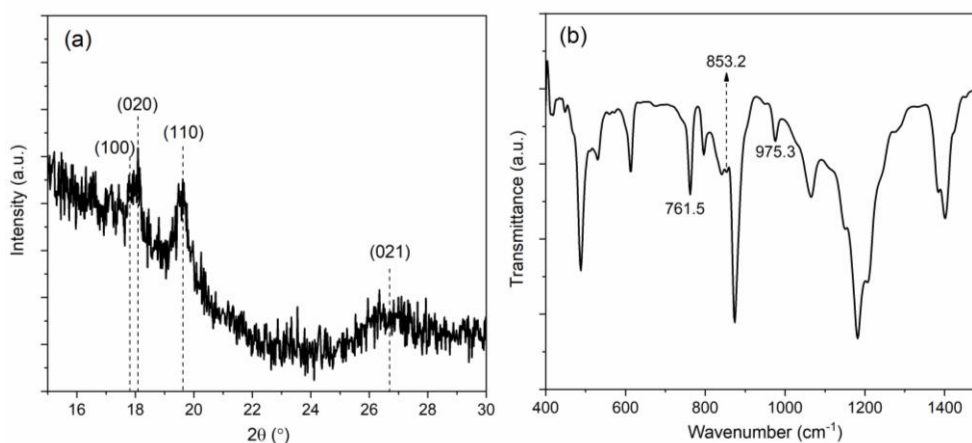
Figure S5. XRD pattern and FTIR spectrum of the raw PVDF used in our study.

The raw PVDF exhibit characteristic diffraction pattern for the α-phase, as shown in Figure S4. It presents three prominent diffraction peaks at 17.8 °, 18.1 ° and 19.6 °, which are relative to the (100), (020) and (110) planes of α-phase, respectively. Additionally, the XRD pattern also shows a diffraction peak of (021) plane at 26.7 °, allowing a clear identification of α-phase PVDF. In addition, the phase of PVDF is most easily detected by FTIR, as it presents a large number of characteristic bands, such as the absorption bands at 761.5 cm^{-1} (CF$_2$ bending), 853.2 cm^{-1} (C-C skeletal bending) and 975.3 cm^{-1} (CH out-of-plane deformation), which is unavailable for β and γ-phases.
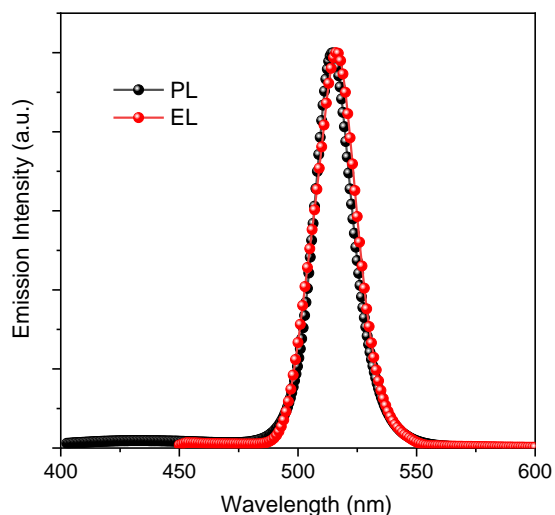
Figure S6. PL spectrum of PVDF-CsPbBr$_3$ film and EL spectrum of PVDF-CsPbBr$_3$ QLED.

Table S1. Fitting parameters of the time-resolved PL decay, PLQY, K_{et} and K_{net} values of pristine CsPbBr$_3$ and PVDF-CsPbBr$_3$ QDs.

	A$_1$ (%)	τ$_1$ (ns)	A$_2$ (%)	τ$_2$ (ns)	A$_3$ (%)	τ$_3$ (ns)	τ$_{ave}$ (ns)	PLQY (%)	K$_{et}$×10^7 (s^{-1})	K$_{net}$×10^7 (s^{-1})
Pristine CsPbBr$_3$	22.24	0.79	51.97	1.32	25.79	6.28	2.48	82	33.06	7.26
PVDF-CsPbBr$_3$	15.15	1.68	84.85	12.32	−	−	10.71	98	9.15	0.19

Table S2. Performance parameters of QLED devices: EL (electroluminescence), Von (turn-on voltage), L (Luminance), EQE (external quantum efficiency), CE (current efficiency), and PE (power efficiency).

QDs	EL λ$_{max.}$ (nm)	V$_{on}$ (V)	Max. L (cd m^{-2})	Max. EQE (%)	Max. CE (cd A^{-1})	Max. PE (lm W^{-1})
Pristine CsPbBr$_3$	517	3.88	5055	0.84	1.84	1.80
PVDF-CsPbBr$_3$	516	3.93	5711	1.71	4.25	3.90