Supporting Information

Two-step modification of high-performance inorganic perovskite quantum dots for blue light emission

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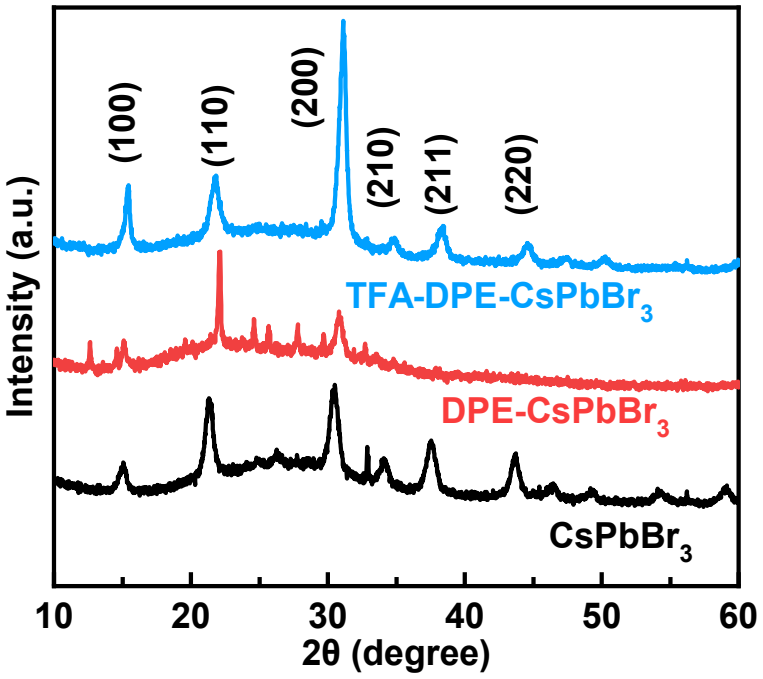

Figure S1. XRD diffraction patterns of $CsPbBr_3$ QDs, DPE-$CsPbBr_3$ QDs and TFA-DPE-$CsPbBr_3$ QDs.

In Fig.S1, The samples show diffraction peaks at about 15°, 22°, 32°, 35°, 38°, and 44°, corresponding to the (100), (110), (200), (210), (211), and (220) crystal planes, respectively, which suggests that all three samples have cubic phases and chalcocite structures. Among them, the (110) and (200) lattices of DPE-$CsPbBr_3$ QDs are shifted to high angles, indicating that the introduction of Cl^- replaces part of Br^- and triggered the lattice contraction. Moreover, the increase in the intensities of diffraction peaks at the (100), (110) and (200) crystal planes in TFA-DPE-$CsPbBr_3$ QDs suggests that passivation enhances the crystallinity of PQDs.

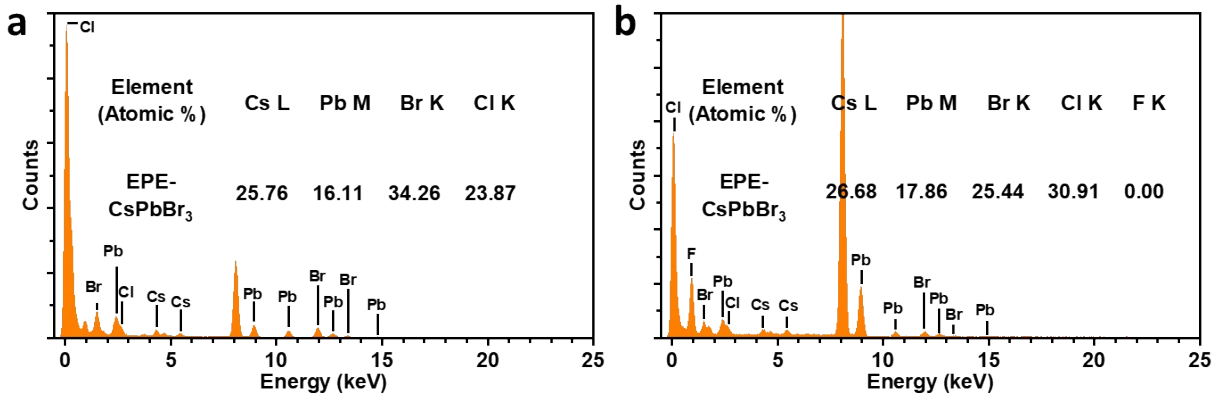

Figure S2. (a) EDS quantitative analysis results for DPE-$CsPbBr_3$ QDs and (b) EDS quantitative analysis results TFA-DPE-$CsPbBr_3$ QDs.

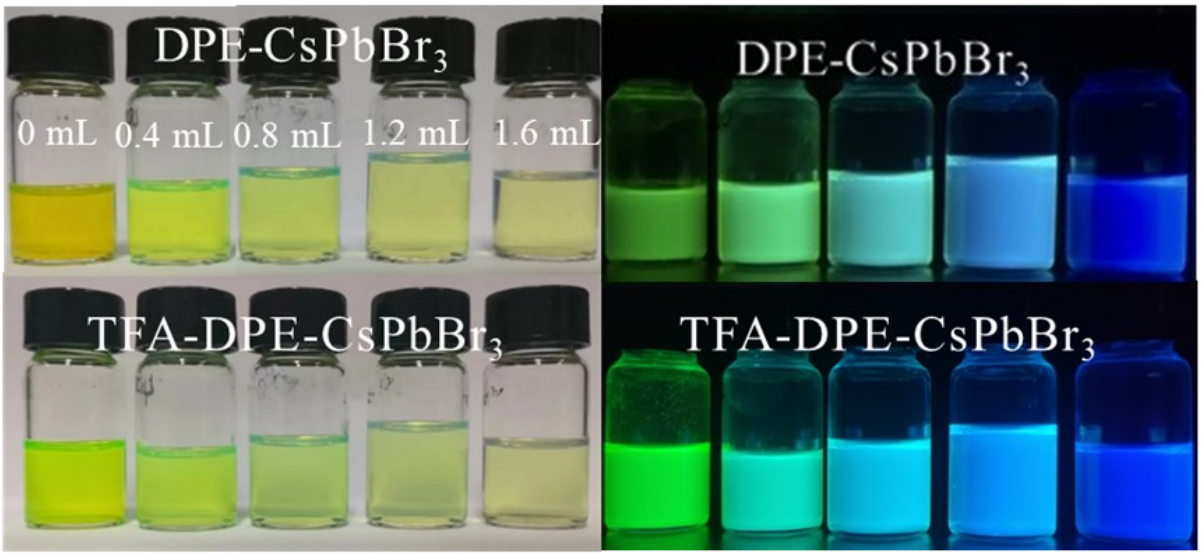

Figure S3. Optical camera photographs under fluorescent and UV light before and after passivation of PQDs. Photographic equipment: VIVO v20.

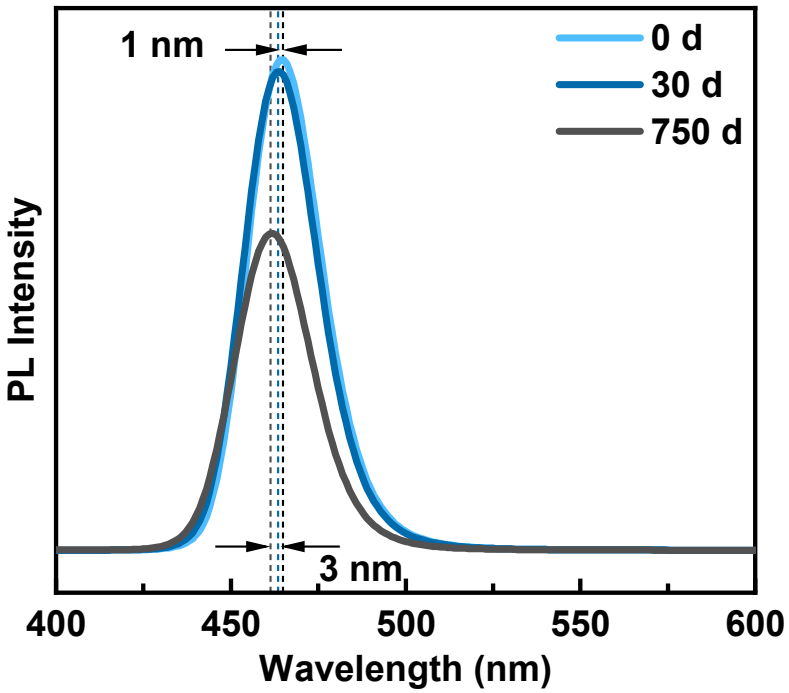

Figure S4. PL spectra of TFA-DPE-$CsPbBr_3$ QDs before and after 30 days and 750 days storage at room temperature. The PL intensity maintained 98% of the original value with almost no wavelength change after 30 days, and retained 65% of the initial intensity with a 3 nm wavelength shift after 750 days.

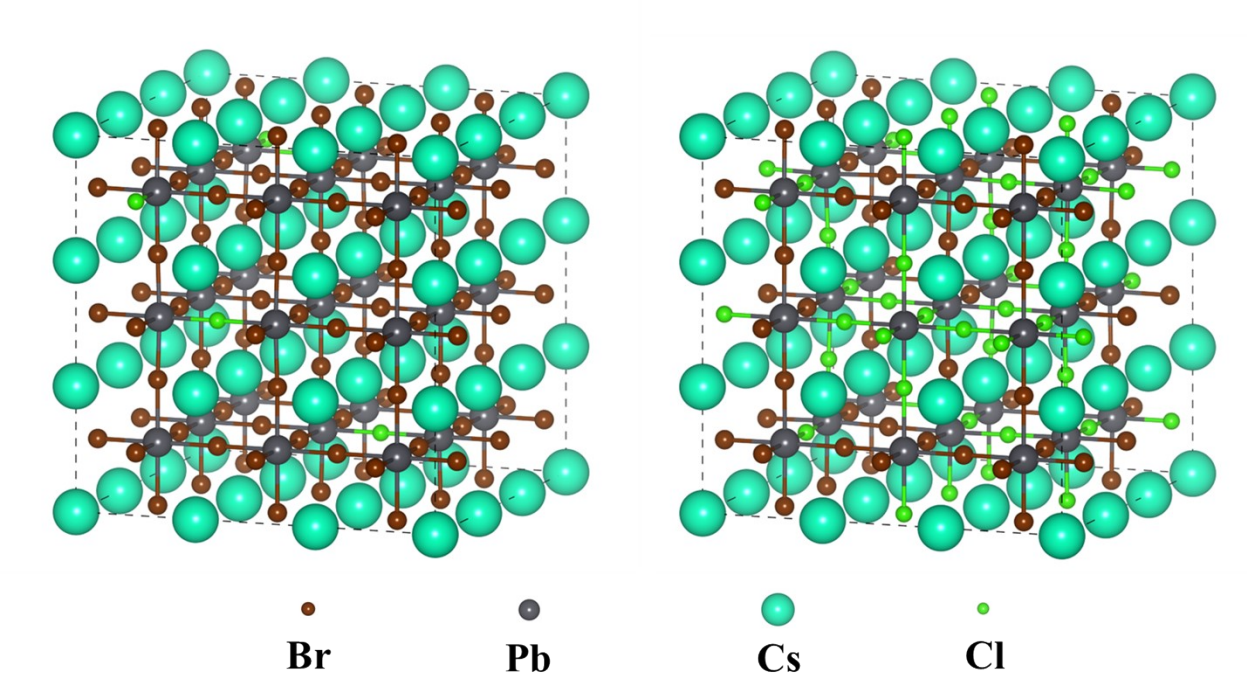

Figure S5. Two PQDs models for DFT calculations. In the model on the left, the ratio of Br to Cl is 15:1. In the model on the right, the ratio of Br to Cl is 6:4.

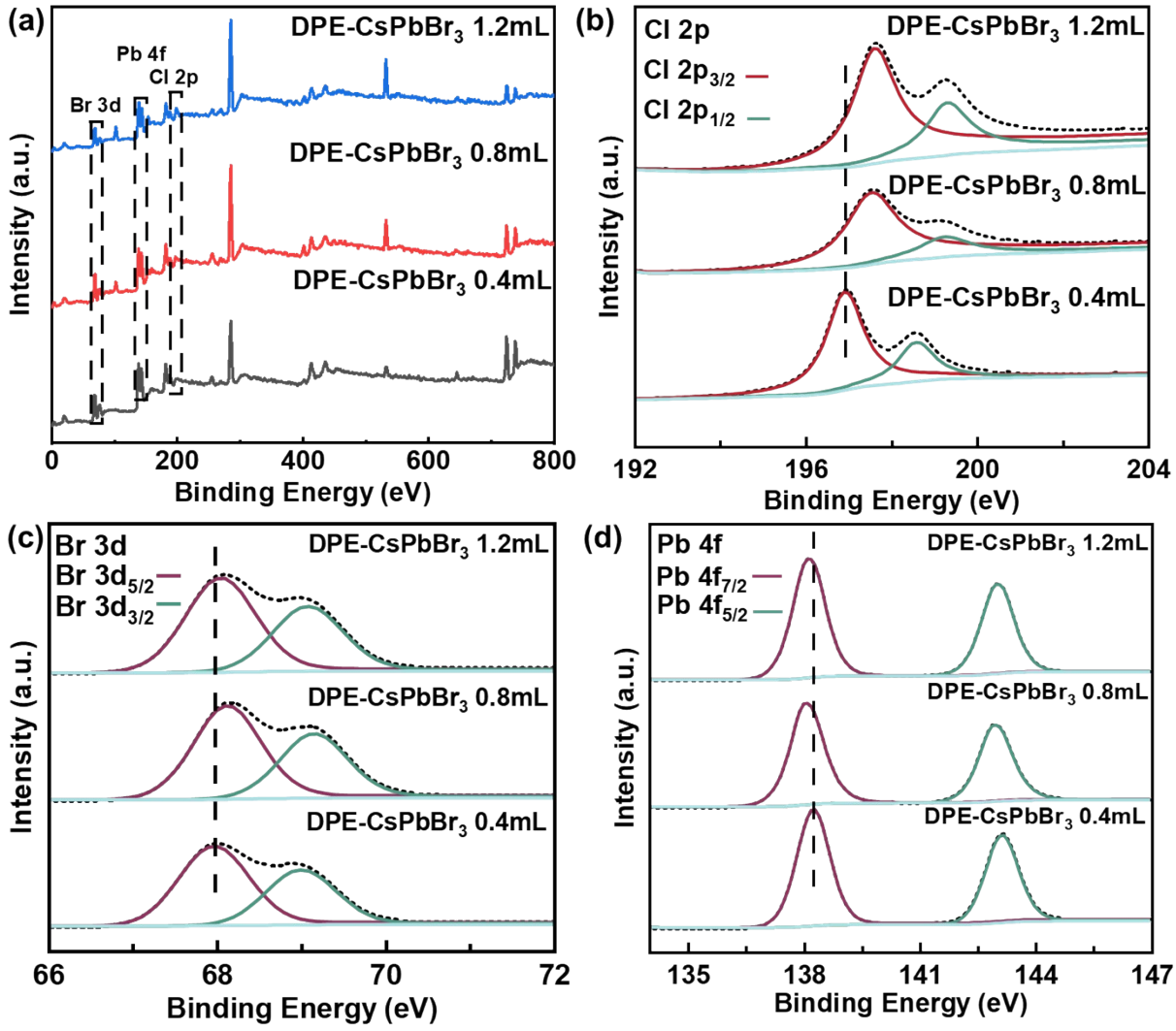

Figure S6. (a) XPS survey spectra of $CsPbBr_3$ QDs with different amounts of DPE added, and the corresponding (b) Cl 2p spectra, (c)Br 3d spectra, (d)Pb spectra.

Table S1. CIE Lab coordinates of DPE-$CsPbBr_3$ QDs subjected to UV photoluminescence before and after passivation with different DPE additions.

DPE additions (mL)	0	0.4	0.8	1.2	1.6
DPE-$CsPbBr_3$ QDs	(53.42, -44.88, 45.42)	(74.68, -50.71, 31.15)	(72.05, -31.48, -9.01)	(59.16, -0.26, -47.70)	(27.22, 67.31, -93.55)
TFA-DPE-$CsPbBr_3$ QDs	(76.91, -75.61, 67.52)	(79.33, -51.44, 2.11)	(74.30, -26.72, -31.74)	(64.88, -4.78, -52.44)	(36.41, 62.88, -97.62)