Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.


**Supplementary Information**

# Bandgap and dimension regulation of $CsPbI_3$ perovskite through bromine-terminated ligand for efficient pure red electroluminescence†

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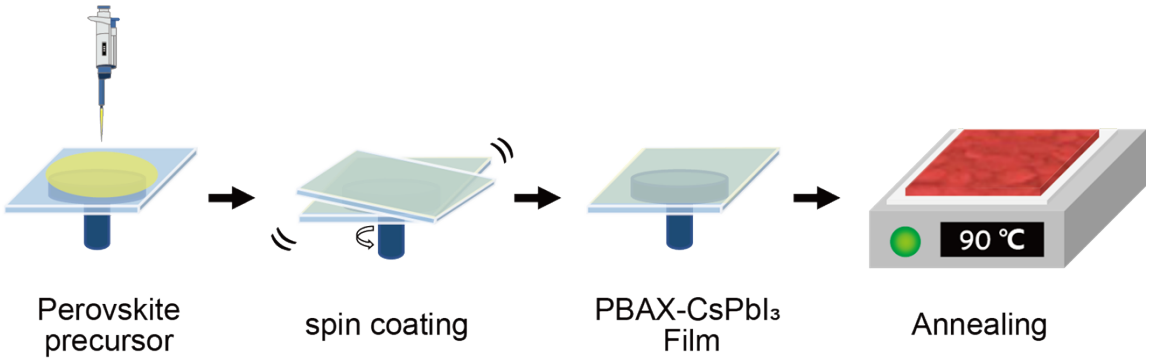


**Figure S1.** Schematic illustration of in situ fabrication process of q-2D PBAX-$CsPbI_3$ films.

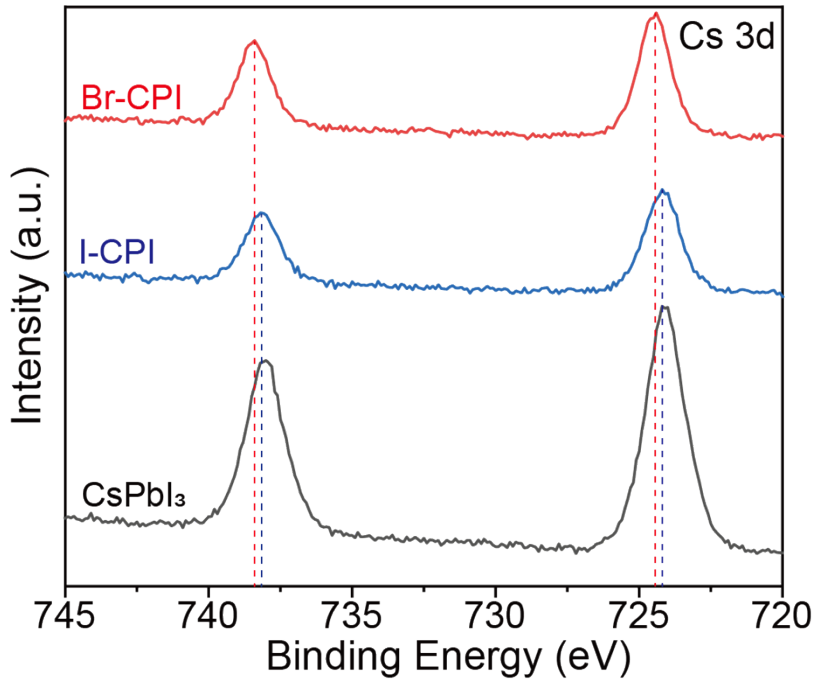


**Figure S2.** XPS spectra of Cs 3d of $CsPbI_3$, Br-CPI and I-CPI films.

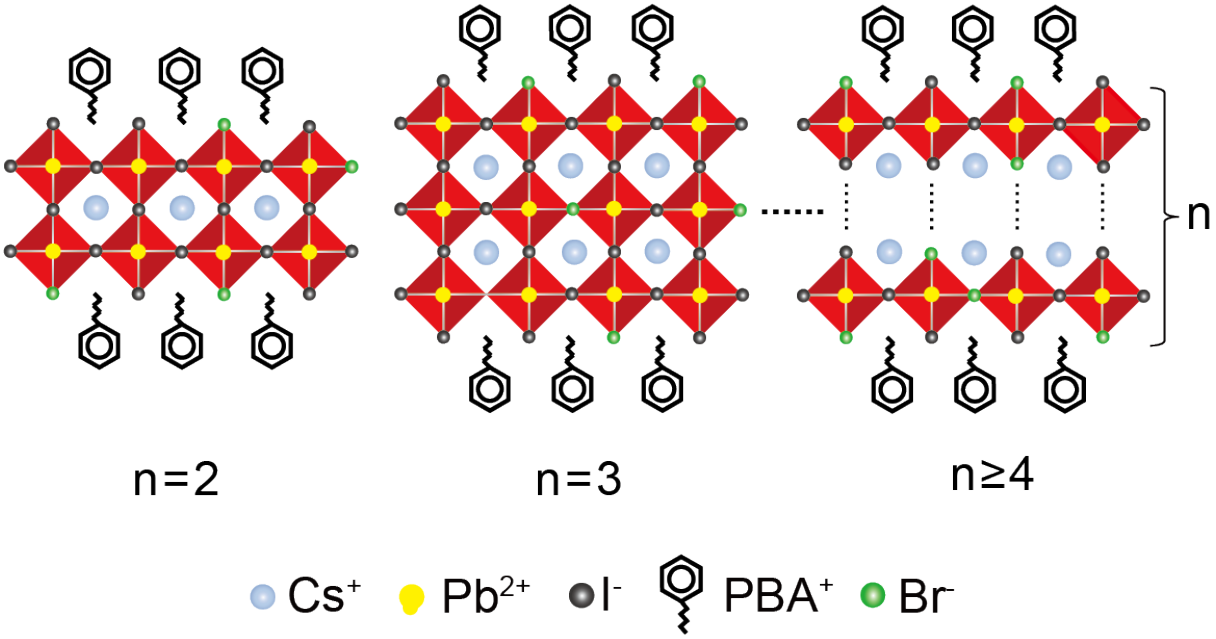


**Figure S3.** Schematic diagram showing the structures of the layered $CsPbI_3$ perovskites.

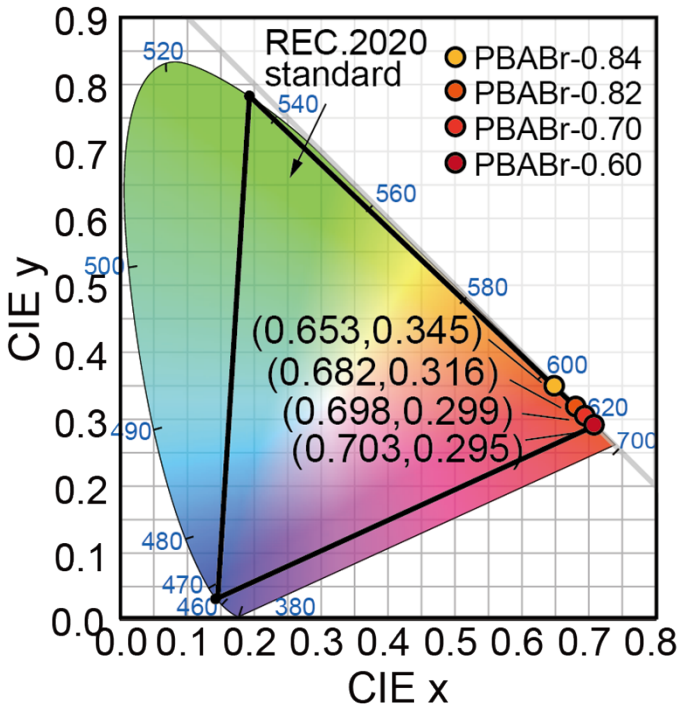


**Figure S4.** The corresponding CIE color coordinates of the devices based on Br-CPI films with different ligand ratios.

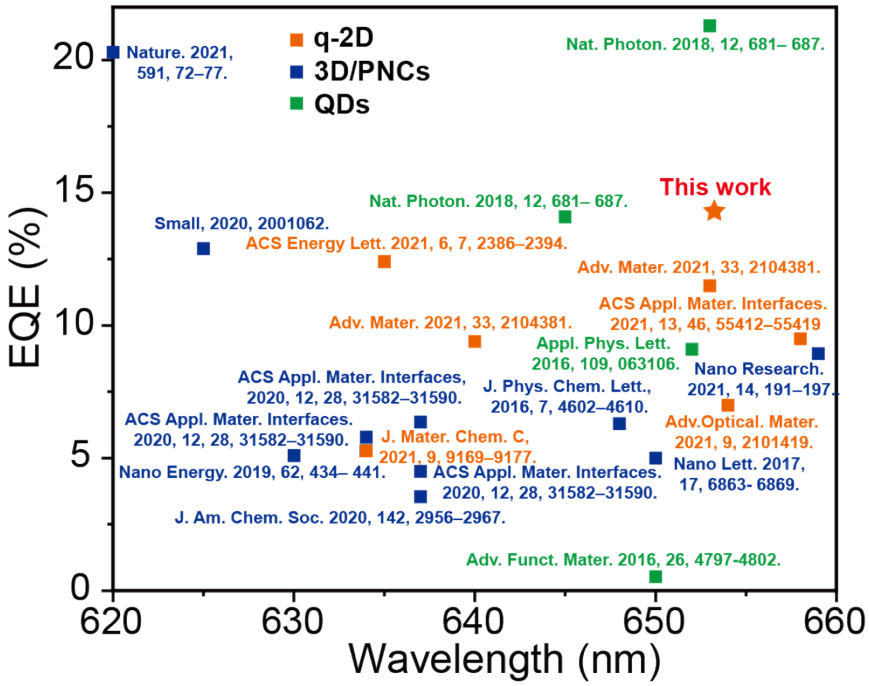


**Figure S5.** Summary of EQEs of pure red (620-660 nm) PeLEDs

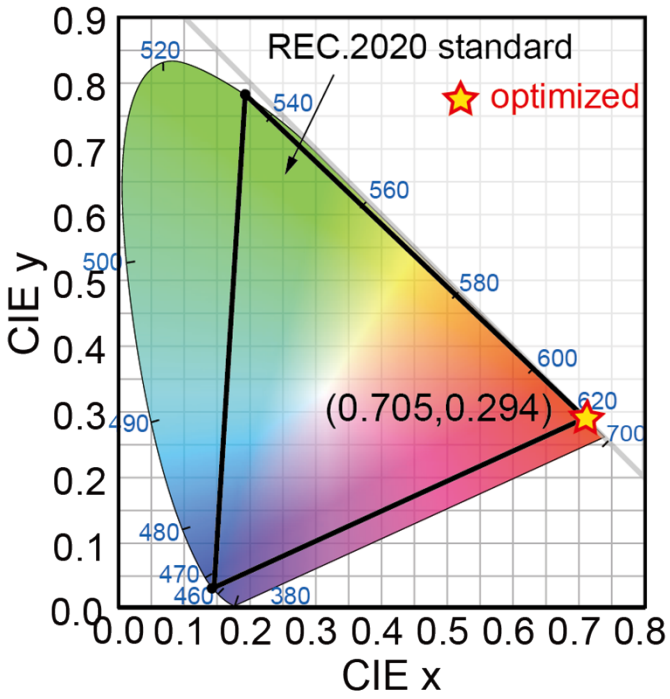


**Figure S6.** The corresponding CIE color coordinates of the optimized device.

**Table S1.** The performance parameters of PeLEDs based on Br-CPI films with different PBABr ratios.

| Ratio | Turn-on Voltage [V] | Maximum luminance [cd $m^{-2}$] | EL peak [nm] | FWHM [nm] | Peak EQE [%] | CIE (x, y) |
|---|---|---|---|---|---|---|
| 0.84 | 2.9 | 363 | 620 | 44 | 2.44 | (0.6534, 0.345) |
| 0.82 | 2.9 | 304 | 632 | 42 | 3.11 | (0.682, 0.316) |
| 0.80 | 2.9 | 466 | 640 | 40 | 4.33 | (0.694, 0.304) |
| 0.70 | 2.9 | 883 | 650 | 45 | 2.36 | (0.698, 0,299) |
| 0.60 | 3.0 | 600 | 661 | 45 | 1.09 | (0.703, 0.295) |