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

Supporting Information

Mixed-ligands engineering for quasi-2D perovskite toward efficient sky-blue light-emitting diodes

Siyuan Zeng, Shasha Shi, Shirong Wang and Yin Xiao*

S. Zeng, S. Shi, Prof. S. Wang, A. Prof. Y. X.

School of Chemical Engineering and Technology, Tianjin Engineering Research Center of Functional Fine Chemicals, Tianjin University

Tianjin, 300072, China

Email: xiaoyin@tju.edu.cn

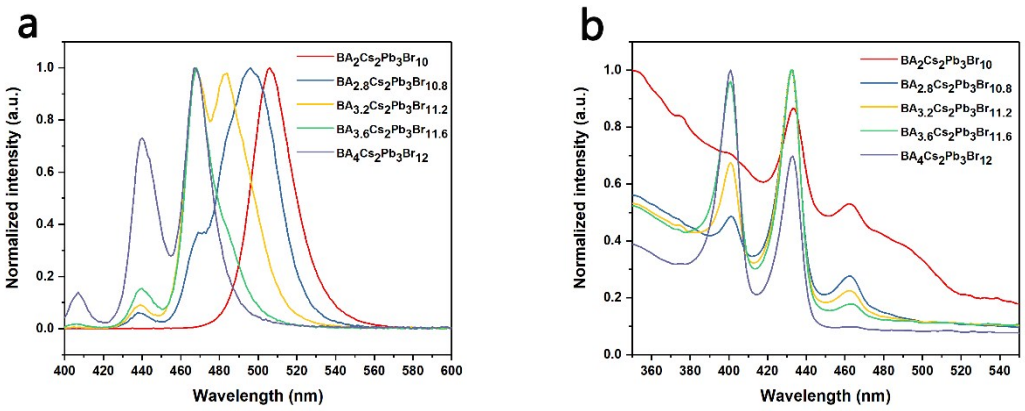

Figure S1. PL and UV absorption of BA-perovskites.

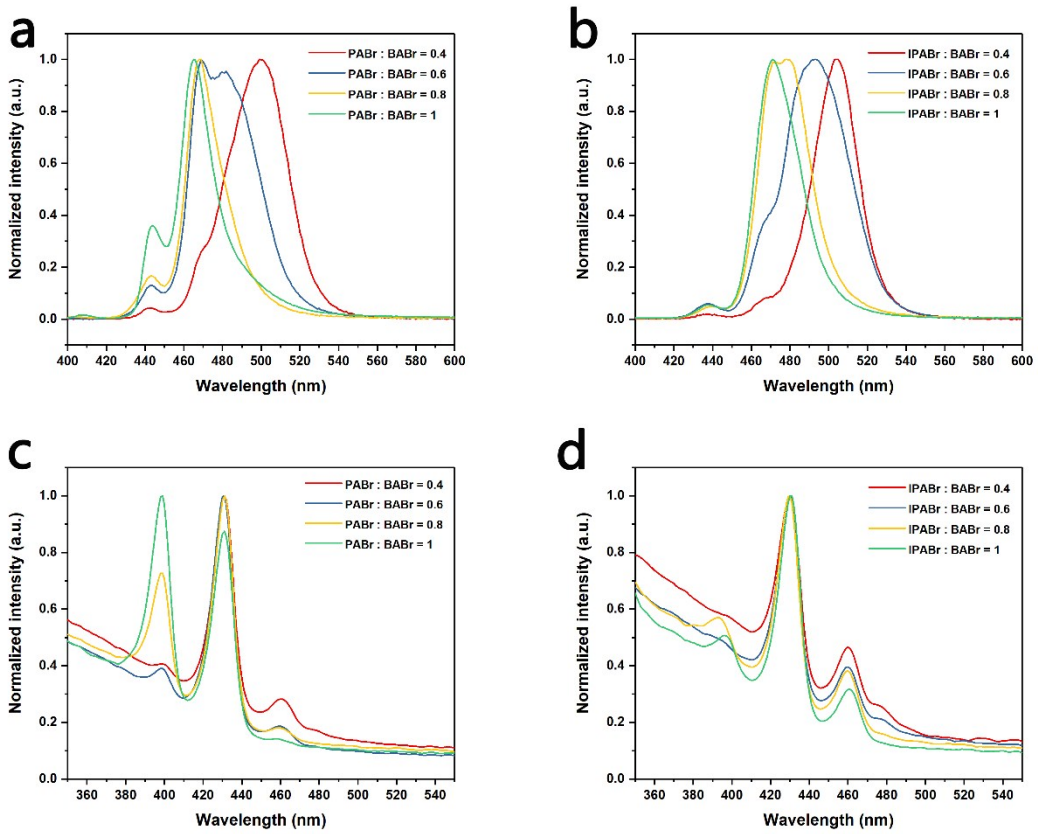

Figure S2. a,b) PL and c,d) UV absorption of mixed-ligands perovskite.

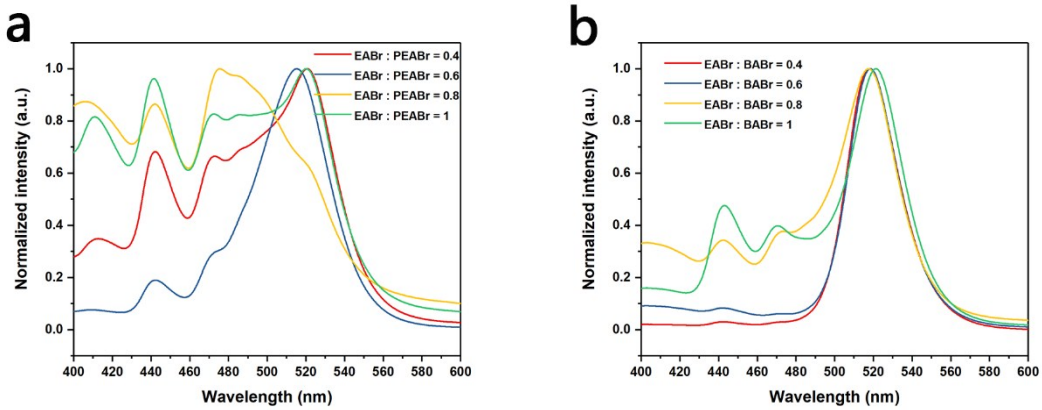

Figure S3. PL emssion of a) EA/PEA- and b) EA/BA-perovsiktes.

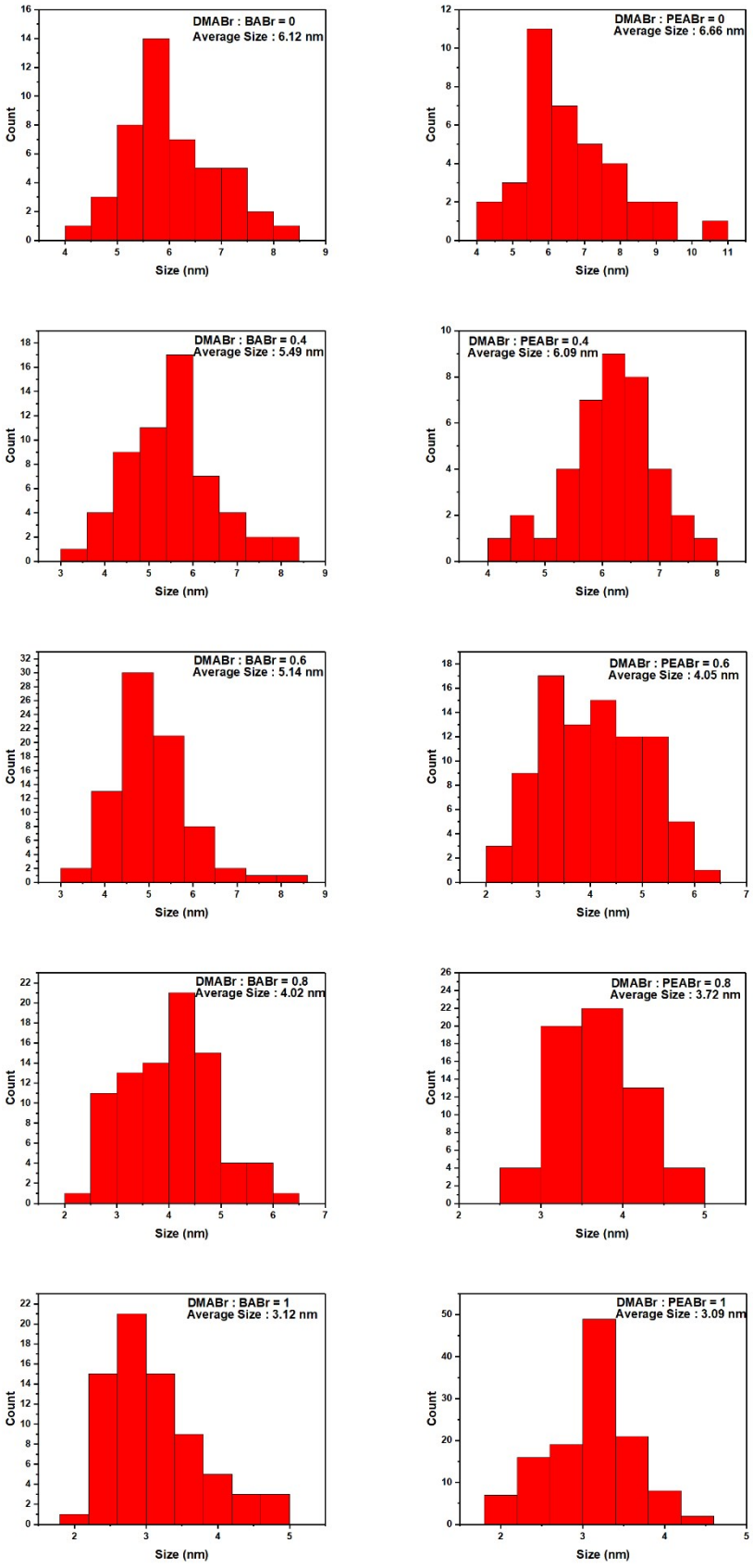

Figure S4. Size distribution of mixed-ligangs perovskite NCs.

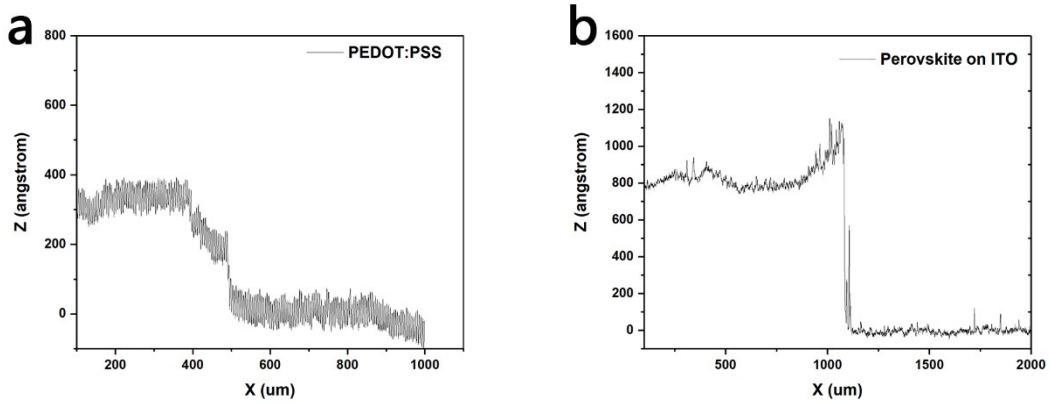

Figure S5. The thickness of different layers.

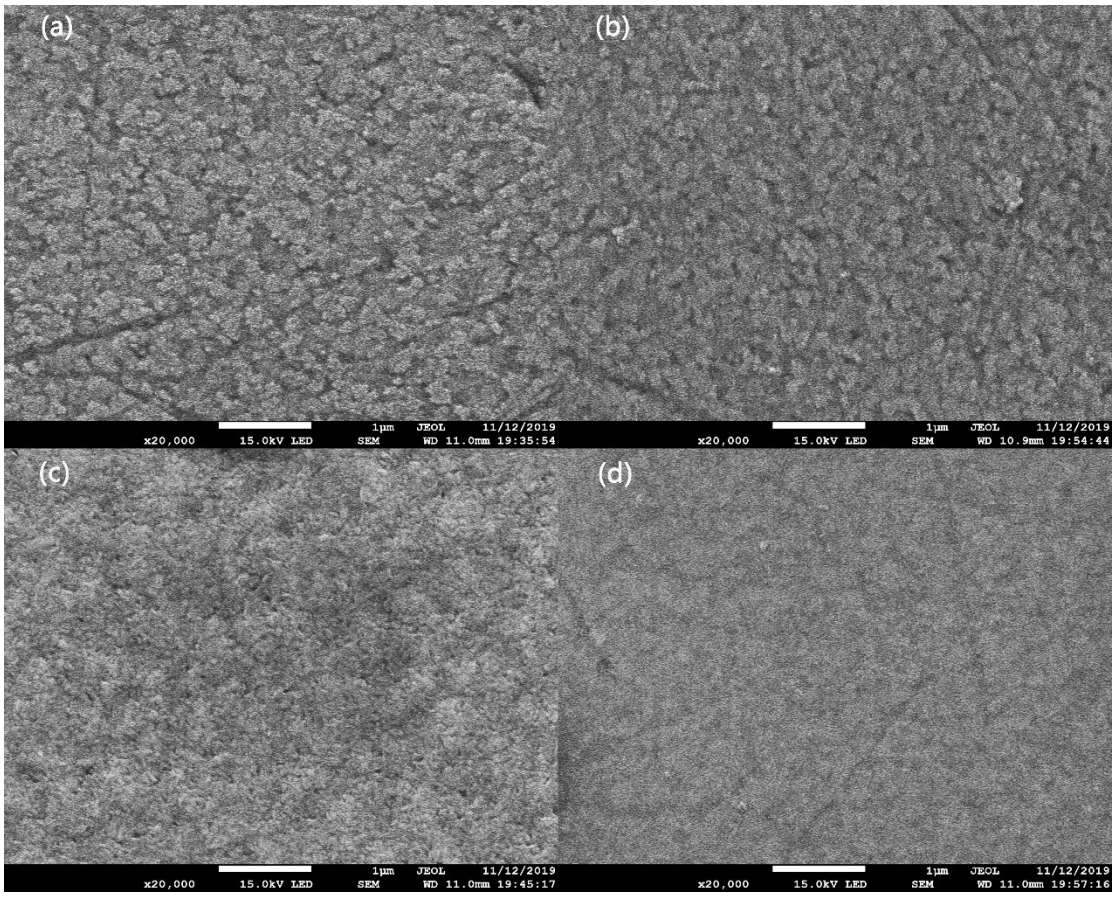

Figure S6. SEM of (a)NiOx, (b)PEDOT:PSS, (c)Perovskite on NiOx and (d) Perovskite on PEDOT:PSS.

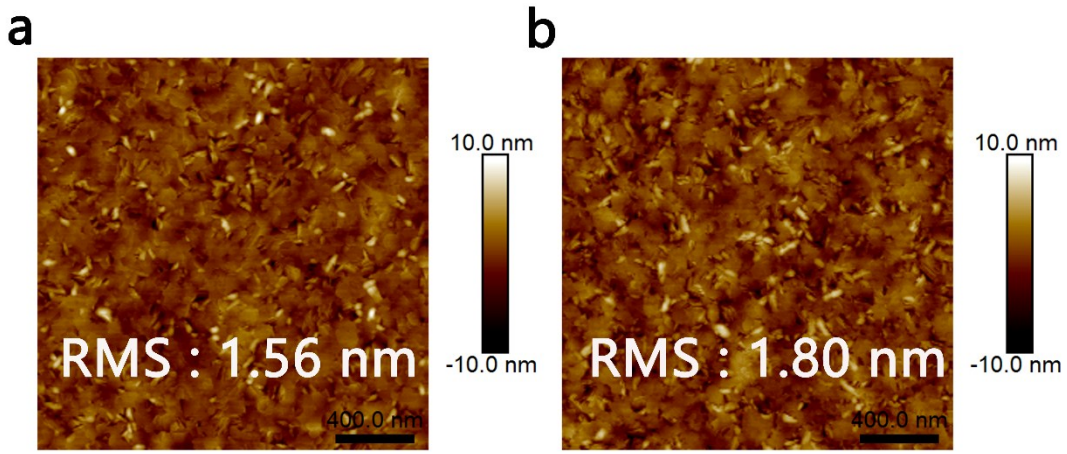

Figure S7. AFM of perovskite on NiOx and PEDOT:PSS.

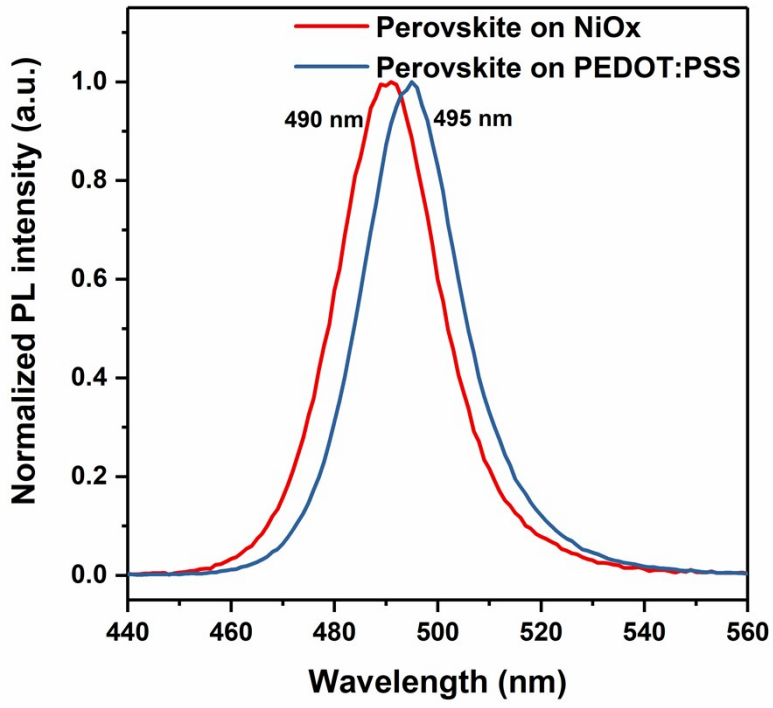

Figure S8. (a)UV of perovskite on NiOx and PEDOT:PSS and (b)PL of perovskite on NiOx and PEDOT:PSS.

Table S1. Synthesis conditions and performance for red perovskite devices

Device	DMAI mmol	PEAI mmol	PbI_2 mmol	CsI mmol	EL peak nm	V_t V	L_{max} cd m^{-2}	CE_{max} cd A^{-1}	EQE_{max} %
R657	0.12	0.2	0.3	0.2	657	3.7	737	1.29	2.56
R674	0.08	0.2	0.3	0.2	674	3.8	816	1.78	9.13
R688	0	0.2	0.3	0.2	688	3.6	554	0.33	4.53

All of the precursor amounts are given to make 1 mL of solution in DMF.

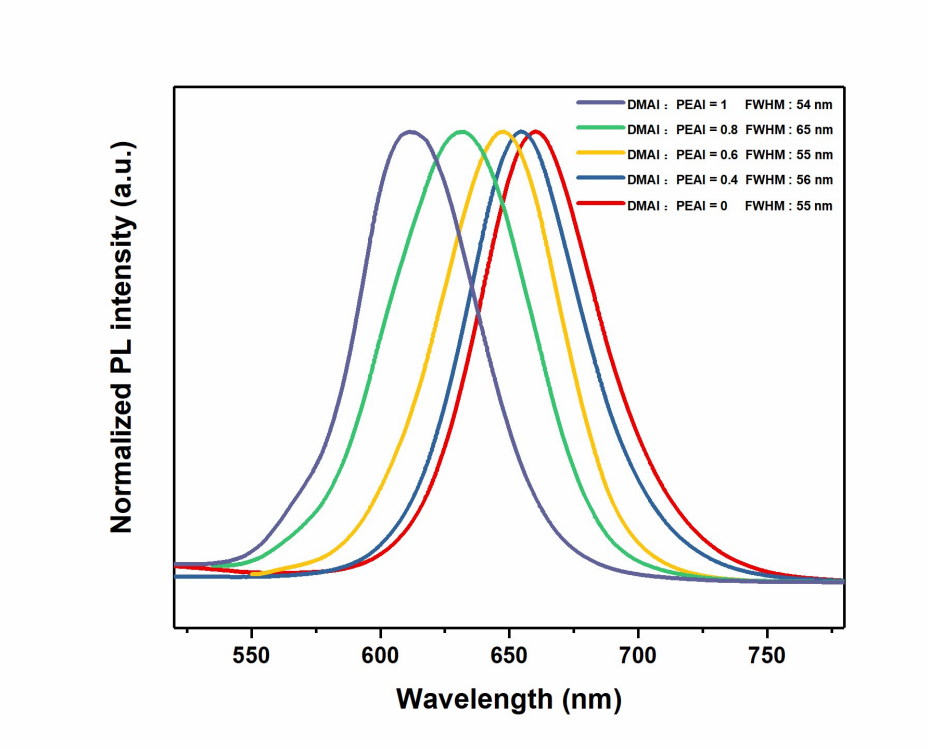

Figure S9. Normalized PL spectra of mixed-ligands I-based perovskite thin films.

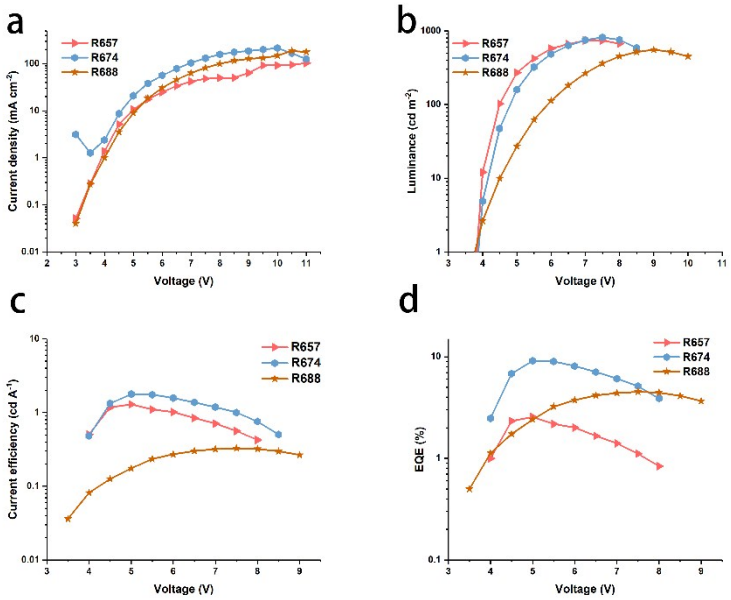

Figure S10. Current density, luminance, current efficiency and EQE of PeLEDs with mixed-ligands I-based perovskite.

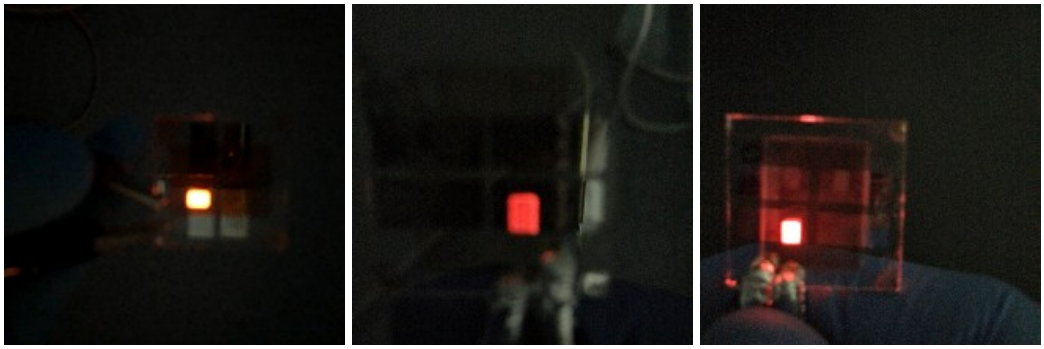

Figure S11. Photoes of R657, R674, R688.

As shown, employment of DMA as co-ligand to confine the diameter of perovskite NCs and modulat emmission is also demonstrated applicable for red region. A max EQE of 9.13 % was obtained at 674 nm.