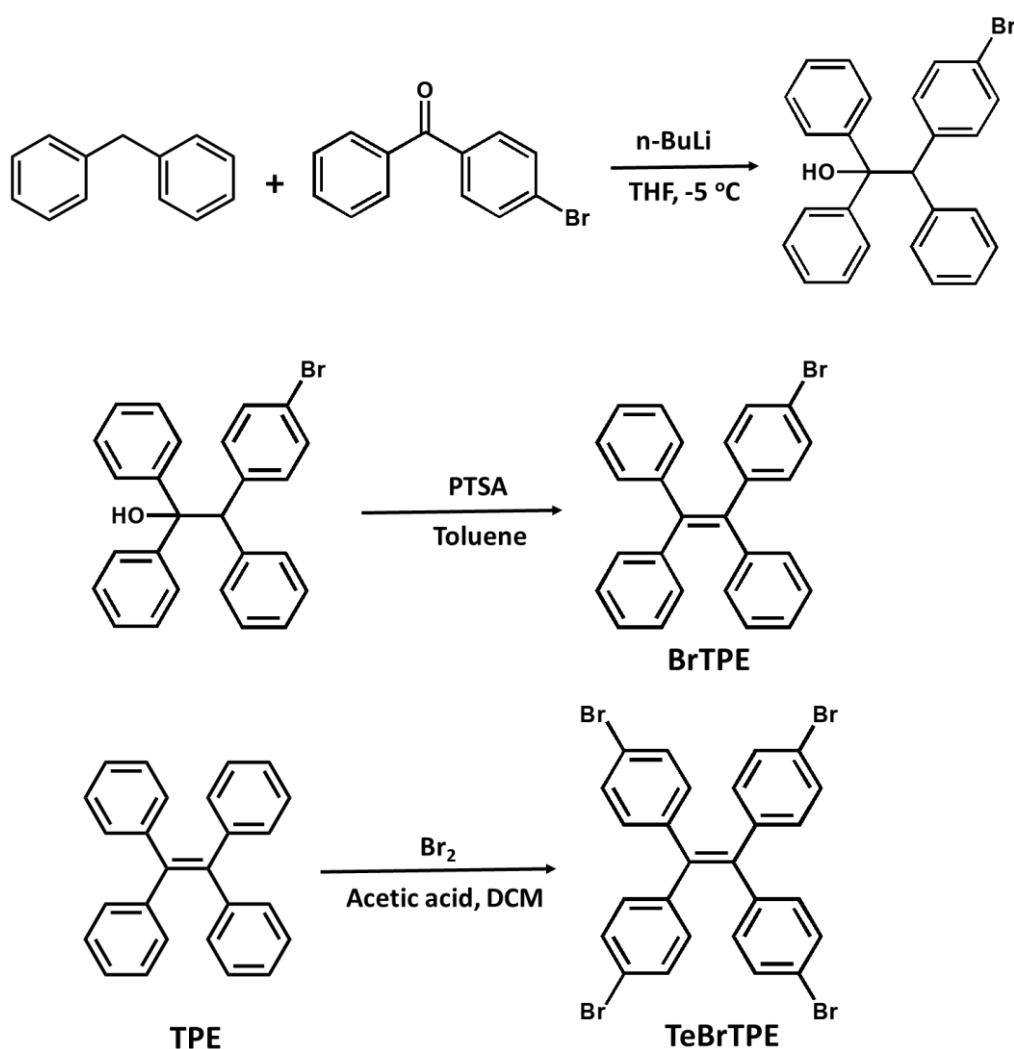


# Three-Color White Photoluminescence Emission Using Perovskite Nanoplatelet and Organic Emitter

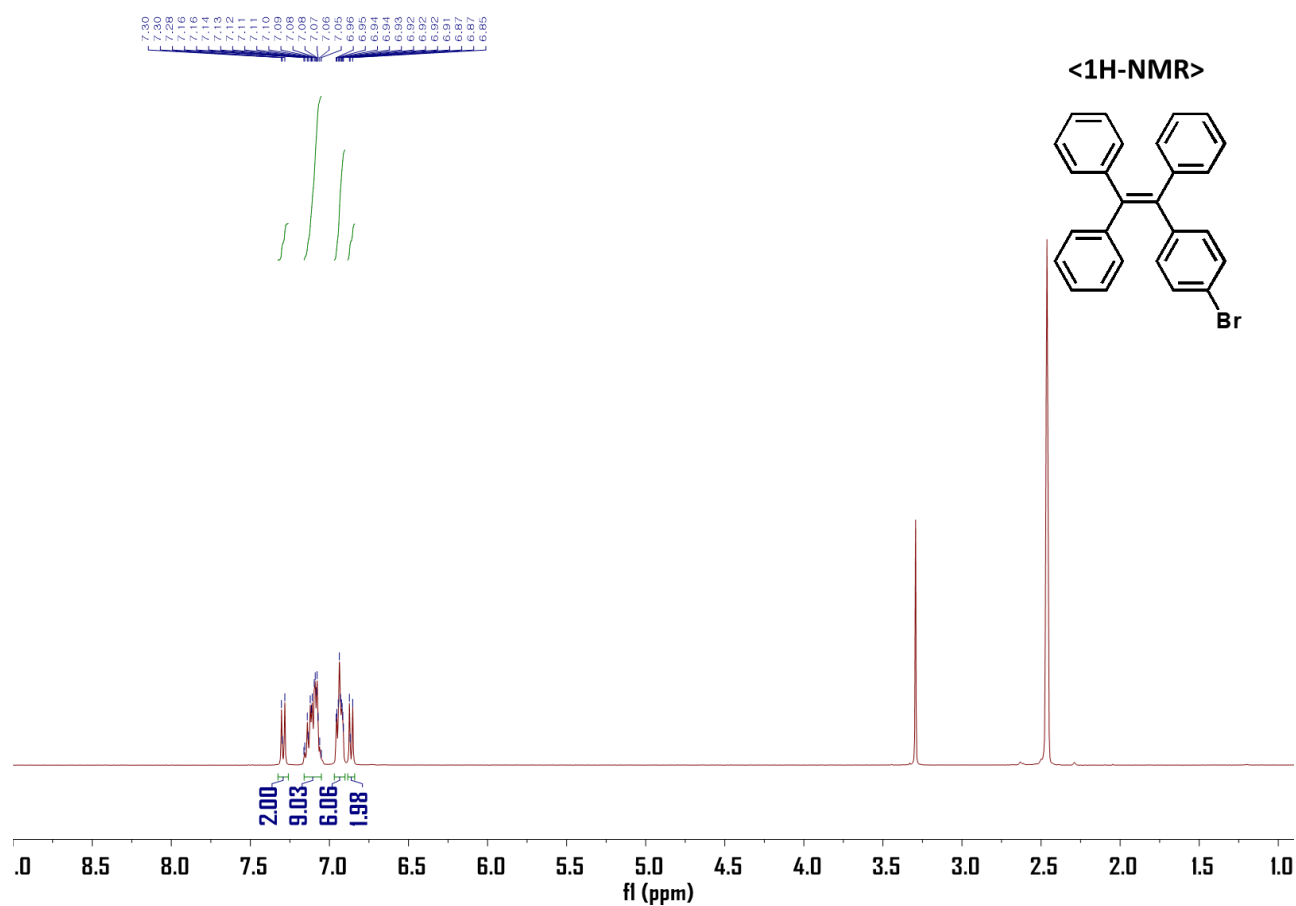
Hyukmin Kwon<sup>a,1</sup>, Sunwoo Park<sup>a,1</sup>, Seokwoo Kang<sup>a</sup>, Hayoon Lee<sup>a</sup>, and Jongwook Park<sup>a,\*</sup>

<sup>a</sup>Integrated Engineering, Department of Chemical Engineering, Kyung Hee University, Gyeonggi, 17104, Korea

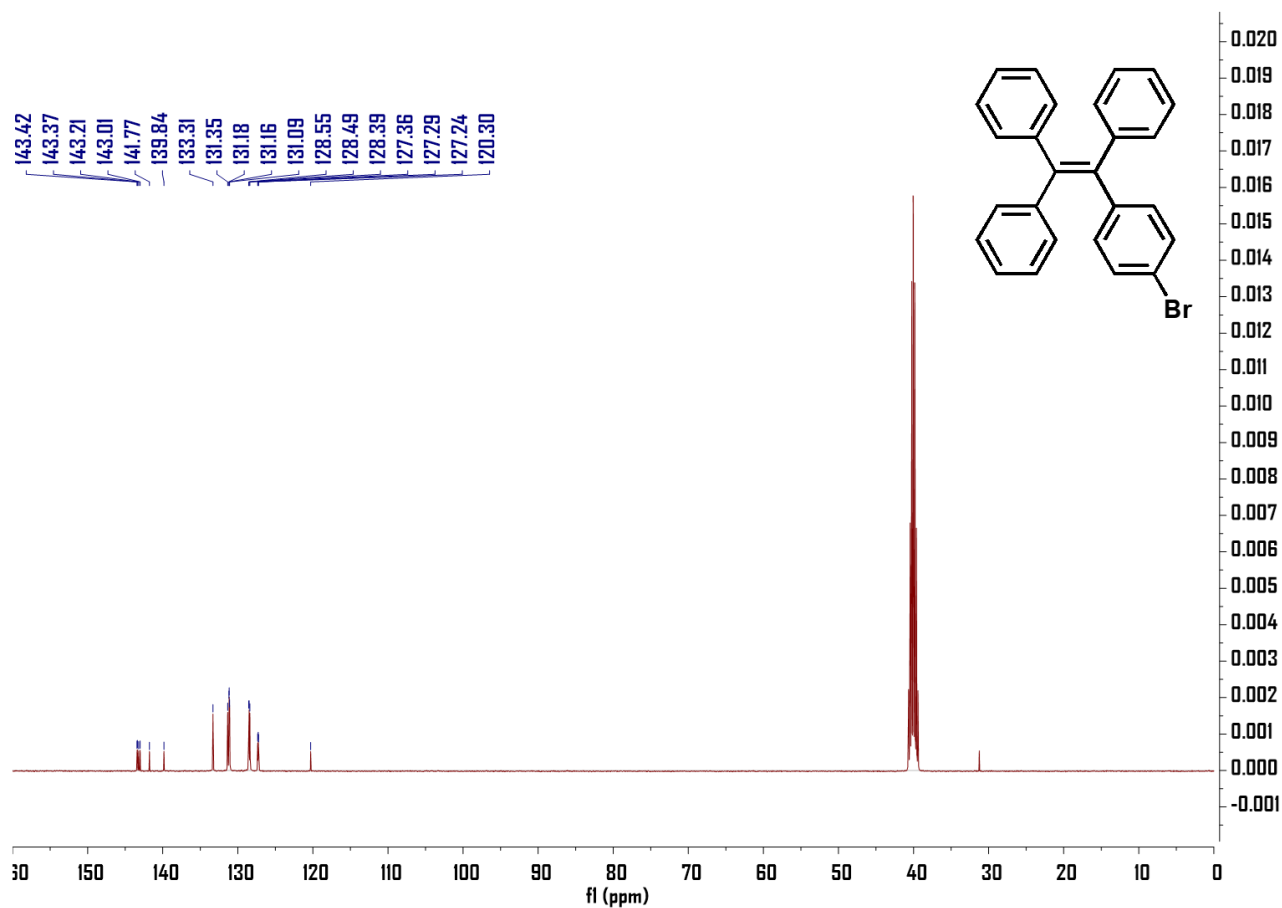
<sup>1</sup>Hyukmin Kwon and Sunwoo Park equally contributed to this work as first authors.



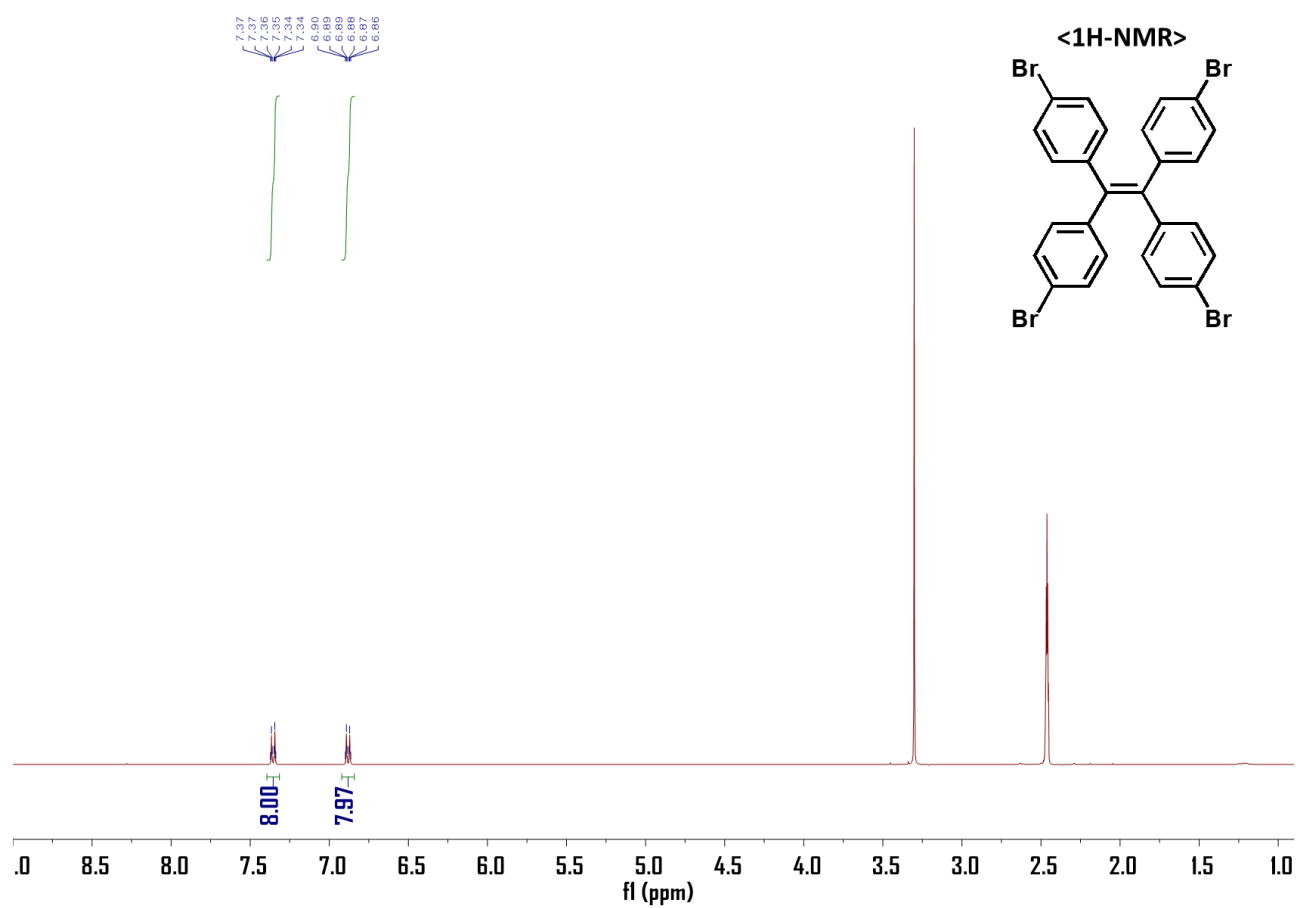
**Scheme. S1.** Synthetic route of TPE derivatives.



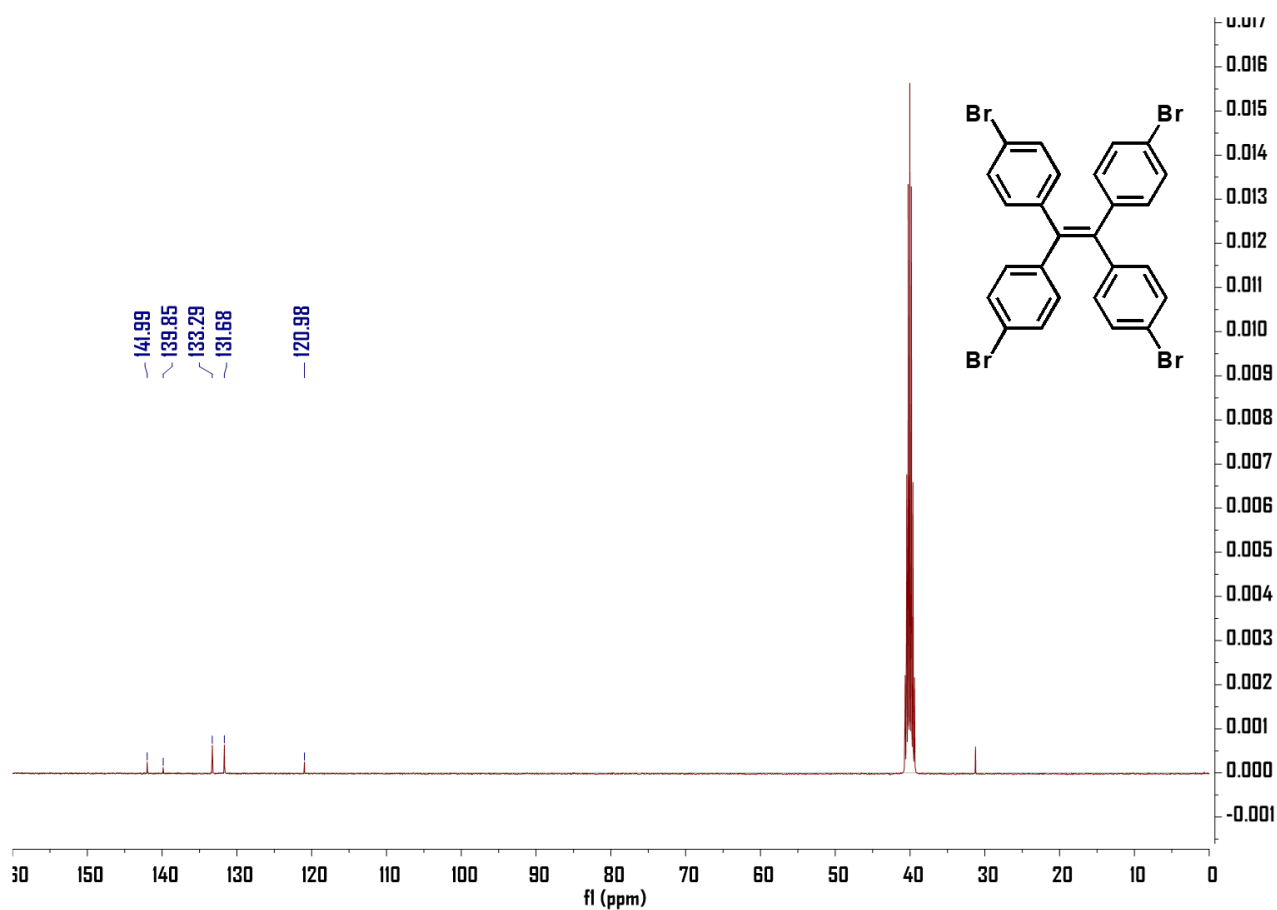
**Figure S1.**  $^1\text{H}$ NMR spectra of BrTPE.



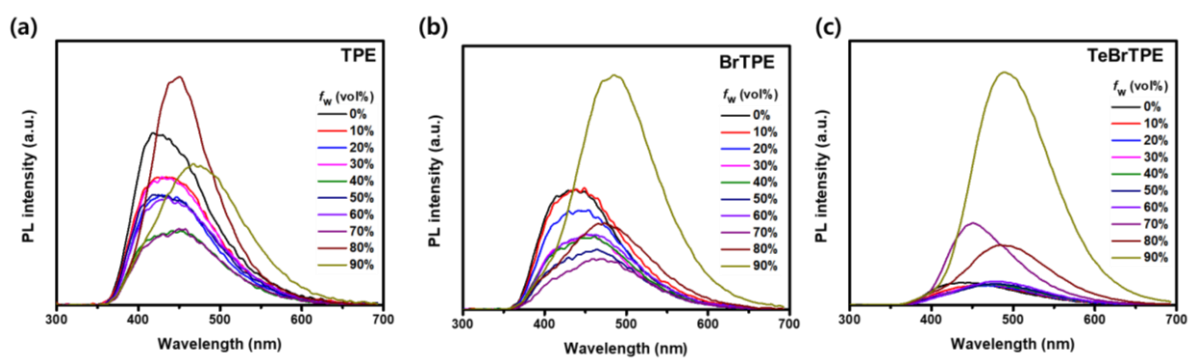
**Figure S2.** <sup>13</sup>CNMR spectra of BrTPE.



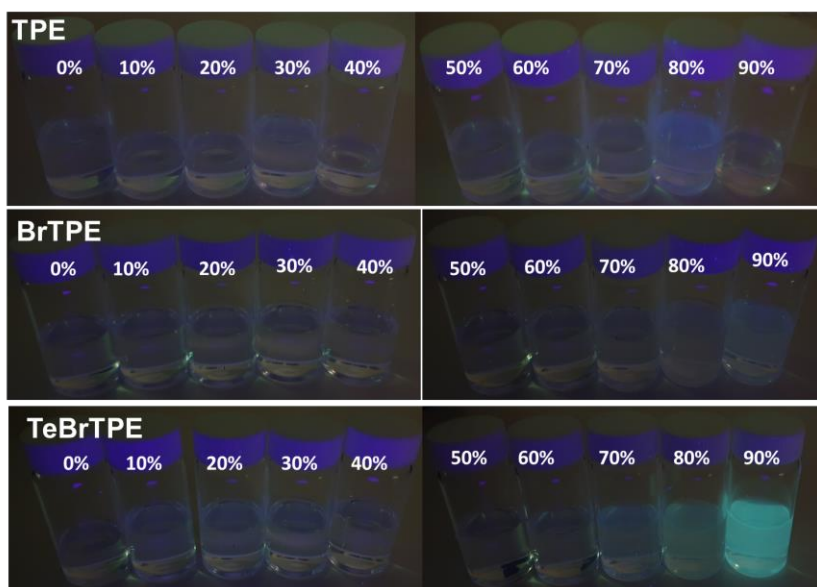
**Figure S3.** <sup>1</sup>HNMR spectra of TeBrTPE.



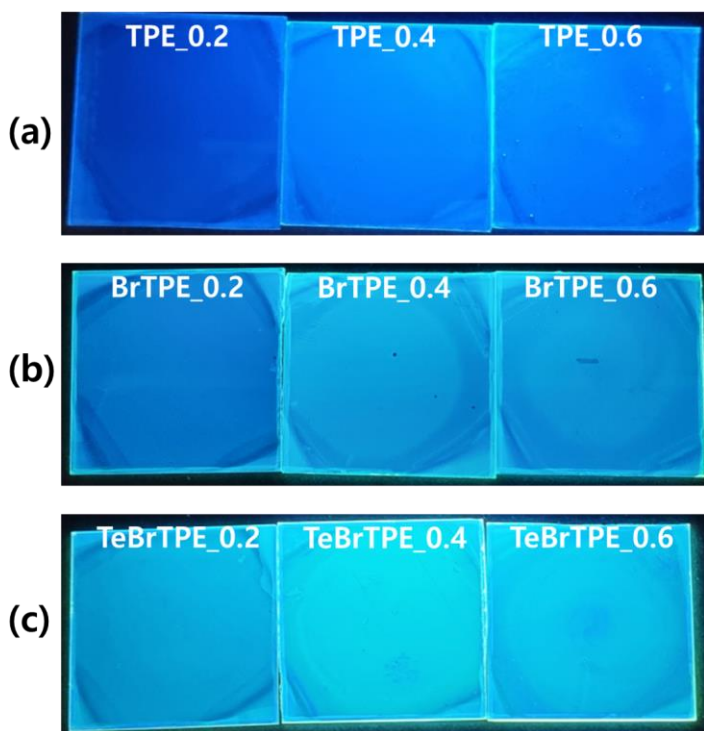
**Figure S4.** <sup>13</sup>CNMR spectra of TeBrTPE.



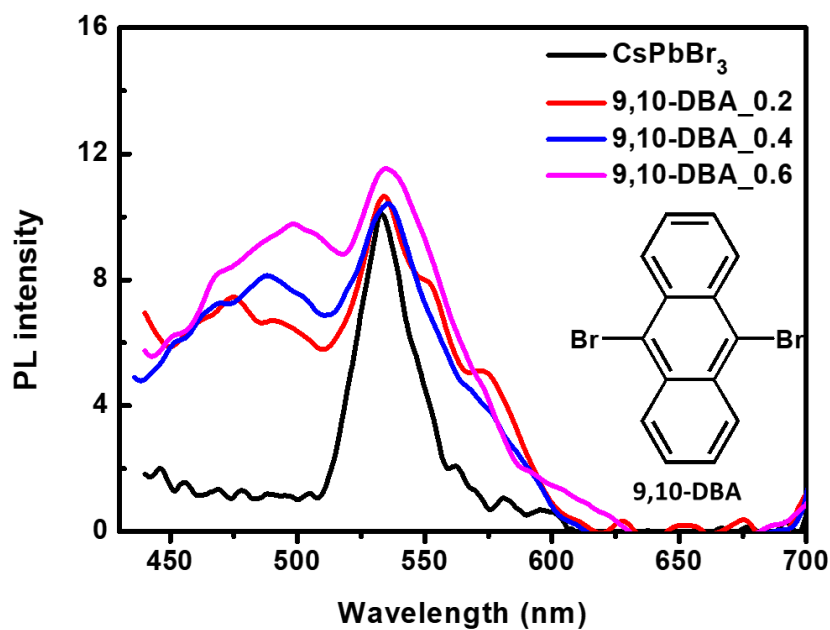
**Figure S5.** Fluorescence spectra of TPE derivatives measured in THF-water of different vol%. a) TPE, b) TPEBr, and (c) TeBrTPE (excitation: 300 nm)



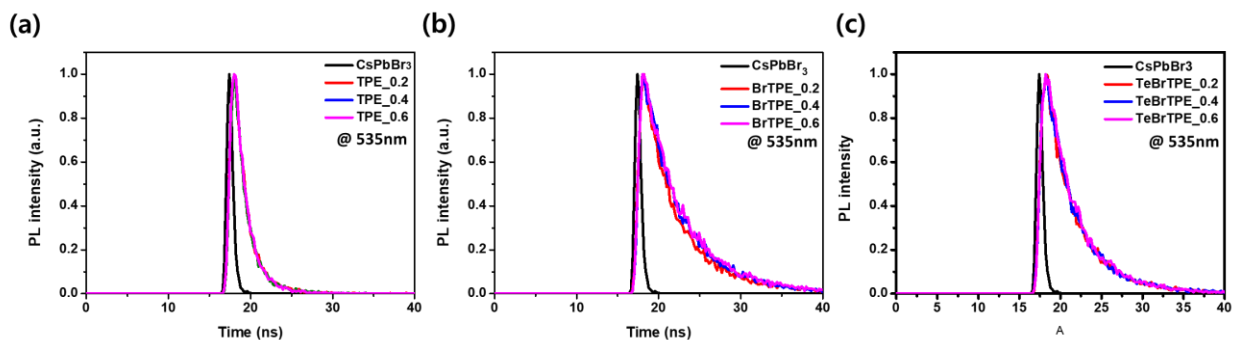
**Figure S6.** Fluorescence photographs of TPE derivatives measured in different vol% of THF-water (excitation: 365 nm).



**Figure S7.** Fluorescence photographs of CsPbBr<sub>3</sub> films containing TPE derivatives/CsPbBr<sub>3</sub> molar ratios of 0.2, 0.4, and 0.6 (excitation: 365 nm): (a) TPE, (b) BrTPE, and (c) TeBrTPE.



**Figure S8.** PL spectra of CsPbBr<sub>3</sub> films including various molar ratio of 9,10-DBA. (Excitation: 365 nm)



**Figure S9.** PL decay profiles of the CsPbBr<sub>3</sub> films including 0.2-0.6 molar ratio of TPE derivatives. (a) TPE, (b) BrTPE, and (c) TeBrTPE (excitation: 365 nm, emission 535 nm)

<The average lifetimes of the emission decay>

$$\langle \tau_{avg} \rangle = \frac{a_1 \tau_1^2 + a_2 \tau_2^2}{a_1 \tau_1 + a_2 \tau_2} \quad (S1)$$

$a_i$  is the amplitude of each exponential function, and  $\tau_i$  is the time constant.