

Supporting Information for

Controlled Synthesis of Brightly Fluorescent $\text{CH}_3\text{NH}_3\text{PbBr}_3$ Perovskite Nanocrystals Employing $\text{Pb}(\text{C}_{17}\text{H}_{33}\text{COO})_2$ as Sole Lead Source

*Xiaoming Fu^{1, 3, †}, Zhiwei Peng^{2, †}, Chi Zhang¹, Yong Xia¹, Jianbing Zhang¹, Wei Luo^{1, 5}, L. Jay Guo⁵,
Honglang Li^{4, *}, YuHuang Wang^{2, *}, and Daoli Zhang^{1, 2, *}*

¹ School of Optical and Electronic Information, Huazhong University of Science and Technology,
1037 Luoyu Road, Hongshan District, Wuhan City, Hubei Province, 430074, P. R. China

² Department of Chemistry and Biochemistry, University of Maryland, 8051 Regent Drive, College Park, MD 20742, United States

³ School of Physics, Communication and Electronics, Jiangxi Normal University, 99 Ziyang Avenues, Nanchang City, Jiangxi Province, 330022, P. R. China

⁴ Institute of Acoustics, Chinese Academy of Sciences, 21 North 4th Ring Road, Haidian District, Beijing 100190, P. R. China

⁵ Department of Electrical Engineering and Computer Science, University of Michigan, Ann Arbor, MI 48109, United States

† These authors contribute equally to this work.

* To whom correspondence should be addressed. E-mail: zhang_daoli@hust.edu.cn (Daoli Zhang); yhw@umd.edu (YuHuang Wang); and lhl@mail.ioa.ac.cn (Honglang Li)

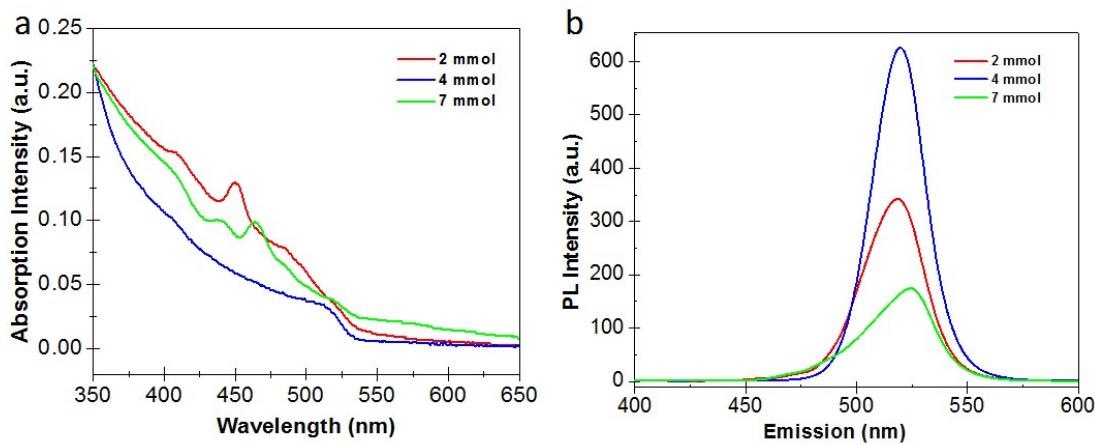


Figure S1. UV-Vis absorption (a) and PL emission spectra (b) of $\text{CH}_3\text{NH}_3\text{PbBr}_3$ perovskite NCs synthesized from different amount of Pb-oleate with an $\text{OA}^+:\text{MA}^+$ ratio of 4:6. The total amount of alkyl ammonium halides ($\text{OA}^+ + \text{MA}^+$) was set as 4 mmol.

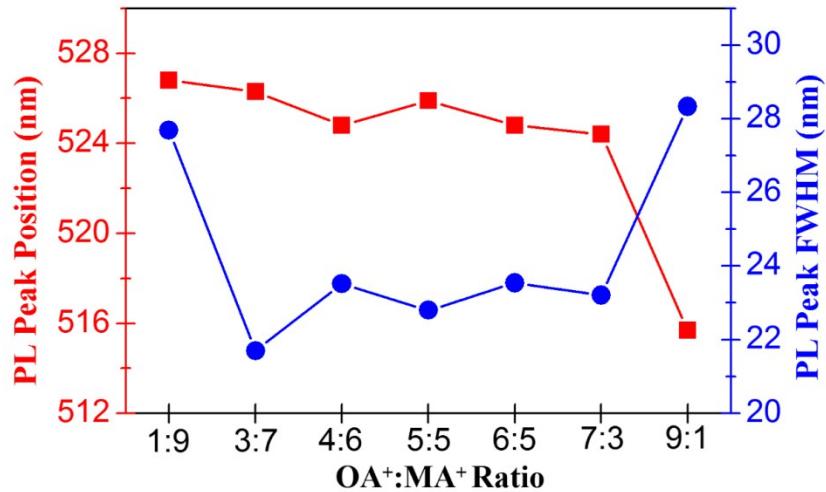


Figure S2. The position and full width at half maximum (FWHM) of the PL peak in $\text{CH}_3\text{NH}_3\text{PbBr}_3$ perovskite nanoparticle solutions synthesized from Pb-oleate as the sole lead source and varying $\text{OA}^+:\text{MA}^+$ ratios.

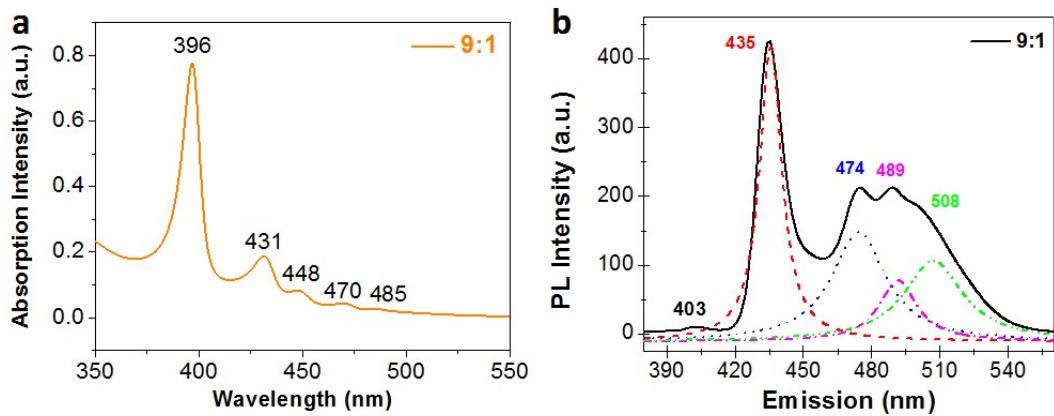


Figure S3. UV-Vis absorption (a) and PL emission spectra (b) of $\text{CH}_3\text{NH}_3\text{PbBr}_3$ perovskite NCs synthesized from PbBr_2 +Pb-oleate as lead source with an $\text{OA}^+:\text{MA}^+$ ratio of 9:1. The absorption peaks at 396, 431, 448, 470 and 485 nm correspond to the $\text{CH}_3\text{NH}_3\text{PbBr}_3$ nanoplatelets with different number of layers from 1 to 5. Similarly, the PL emission curve can be fitted into five sub-peaks corresponding to nanoplatelets with 1, 2, 4, and 5 layers (403, 435, 474 and 489 nm) and QDs at 508 nm. The absence of the PL emission peak from 3-layer nanoplatelets may be due to the interference from adjacent strong peaks.

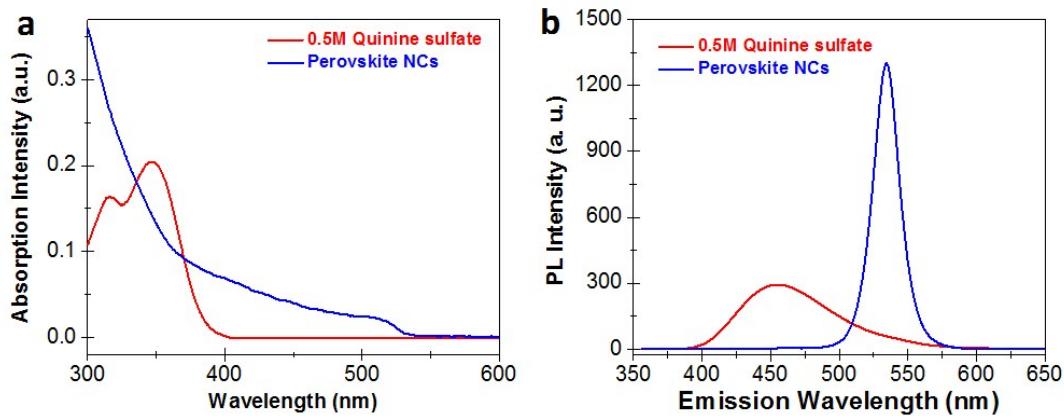


Figure S4. An example for the calculation of the PLQY of the $\text{CH}_3\text{NH}_3\text{PbBr}_3$ perovskite NCs. Here, the sample using Pb-oleate as the sole lead source with an $\text{OA}^+:\text{MA}^+$ ratio of 4:6 was measured against 0.5 mol/L quinine sulfate. (a) The UV-vis absorption curves. Two samples have the same absorbance at 336 nm. (b) The PL spectra at an excitation wavelength of 336 nm.

Table S1. XRD analysis of $\text{CH}_3\text{NH}_3\text{PbBr}_3$ perovskite NCs (synthesized from Pb-oleate as sole lead source with an $\text{OA}^+:\text{MA}^+$ ratio of 4:6) against the bulk $\text{CH}_3\text{NH}_3\text{PbBr}_3$ perovskite.

(h k l)	$\text{CH}_3\text{NH}_3\text{PbBr}_3$ NCs		Bulk $\text{CH}_3\text{NH}_3\text{PbBr}_3$	
	2 θ (°)	d (Å)	2 θ (°)	d (Å)
100	15.08	5.87	14.48	6.12
110	20.10	4.42	20.72	4.29
200	30.23	2.96	29.68	3.01
210	33.97	2.64	33.31	2.69
211	37.19	2.42	36.66	2.45
220	43.23	2.09	42.65	2.12
300	45.84	1.98	45.40	1.99