

# Bright CsPbBr<sub>3</sub> perovskite nanocrystals with improved stability by in-situ Zn-doping

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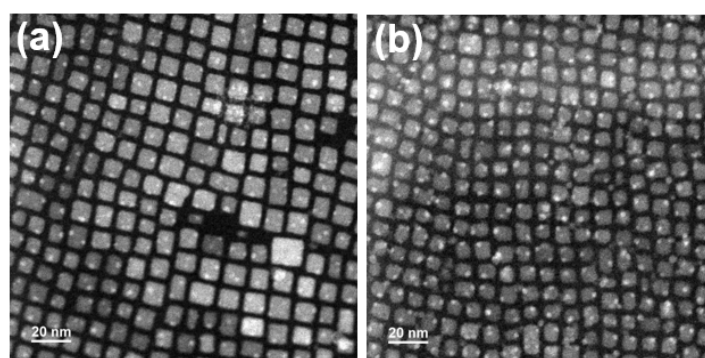


Figure S1. HAADF-STEM images of (a) CsPbBr<sub>3</sub> and (b) CsPbBr<sub>3</sub>:Zn NCs.

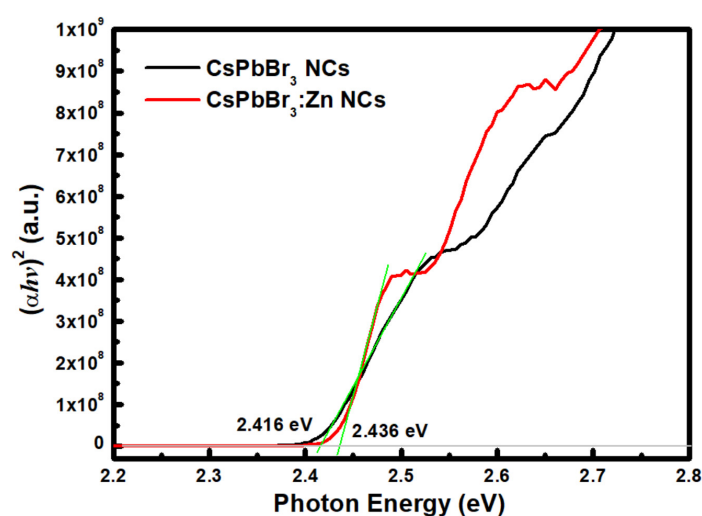


Figure S2. Tauc plot of CsPbBr<sub>3</sub> and CsPbBr<sub>3</sub>:Zn NCs from their absorption spectra.

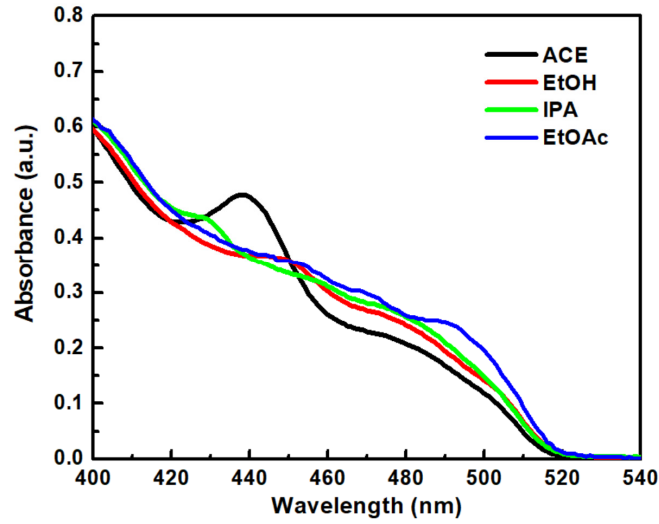


Figure S3. Absorption spectra of CsPbBr<sub>3</sub> NCs purified by different solvents.

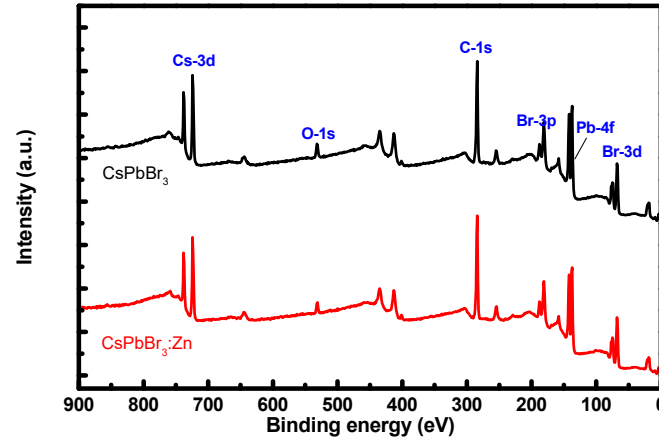


Figure S4. Full XPS survey scan spectra of CsPbBr<sub>3</sub> and CsPbBr<sub>3</sub>:Zn NCs from their absorption spectra.

The PL decay curves of NCs were fitted by a triple-exponential decay model expressed as the following:

$$I(t) = I_0(A_x e^{-t/\tau_x} + A_{x^*} e^{-t/\tau_{x^*}} + A_{xx} e^{-t/\tau_{xx}}) \quad (1)$$

Where  $\tau_x$ ,  $\tau_{x^*}$ ,  $\tau_{xx}$  and  $A_x$ ,  $A_{x^*}$ ,  $A_{xx}$  are the decay time constants of the exciton, trion, and biexciton and their relative generation probabilities, respectively. The average time constant can be calculated by:

$$\tau_{avg} = (A_x \tau_x^2 + A_{x^*} \tau_{x^*}^2 + A_{xx} \tau_{xx}^2) / (A_x \tau_x + A_{x^*} \tau_{x^*} + A_{xx} \tau_{xx}) \quad (2)$$

The fitted parameters are shown in Table S1.

Table S1. Parameters for the bi-exponential decay fitting of the TRPL spectra.

Sample	$A_x$	$\tau_x$ (ns)	$A_{x^*}$	$\tau_{x^*}$ (ns)	$A_{xx}$	$\tau_{xx}$ (ns)	$\tau_{avg}$ (ns)
CsPbBr <sub>3</sub>	0.04	7.33	0.37	1.79	0.59	0.68	2.66
CsPbBr <sub>3</sub> :Zn	0.06	10.37	0.21	1.67	0.82	0.54	5.14