Supporting Information

for

Synthesis of stable and phase-adjustable CsPbBr₃@Cs₄PbBr₆ nanocrystals via novel anion-cation reaction

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Experiment Section

Materials

PbBr\textsubscript{2}, CsBr, PbBr\textsubscript{2}, cesium acetate, lead acetate, DMF, DMSO, DDA-Cl, acetonitrile (from Macklin reagent) Cesium stearate (CsSt, 98\% pure, from J&K reagent), oleylamine (OAm, 80–90\% pure, from Aladdin-reagent), oleic acid (OA, from Aladdin-reagent), 1-octadecene (ODE, >80\% pure, from Aladdin-reagent), OAm-I (from Xi’an Baolaite) were used without further purification.

Synthesis of cubic CsPbBr\textsubscript{3} nanocrystals

PbBr\textsubscript{2} (0.6 mmol) and CsBr (0.6 mmol) were dissolved in 10 mL dimethyl sulfoxide (DMSO) solution. OA (0.5 mL) and OAm (0.5 mL) were added to stabilize the precursor solution. Then, 1 mL of the precursor solution was quickly added into 20 mL toluene under vigorous stirring. Strong green-mission crude production was observed immediately after the injection. After reaction for 1 min, 10 mL acetonitrile was added into the green crude solution for purification. The precipitate was dispersed in toluene for further use after centrifugation.

Synthesis of cubic CsPbBr\textsubscript{3} nanocrystals

15 mL of octadecene (ODE), 3 mL of OAm, 1.5 mL of OA, and PbBr\textsubscript{2} (0.2 g) were loaded into a 100 mL four-neck flask, degassed at 100 °C for 10 min, mixed at 100 °C for 30 min, and heated to 170 °C in 10 min under Ar flow. 0.55 mL of Cesium Stearate (CsSt) solution (0.15 M in ODE) was quickly injected. After 5 s, the reaction mixture was cooled by the ice-water bath. The resultant QDs were precipitated by 20 mL of acetone and separated via centrifugation. The separated QDs were redispersed in toluene for further use.
Fig. S1 Absorption spectra of CsPbBr$_3$@Cs$_4$PbBr$_6$ NCs prepared at different temperature.