

Supporting Information

Using Polar Alcohols for the Direct Synthesis of Cesium Lead Halide Perovskite Nanorods with Anisotropic Emission

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Table S1. Average lengths, widths, full width half maxima, and detailed statistical information of the respective size distributions for the short and long NRs derived from the TEM images shown in the main text as insets to figures 1a and 1b.

Short NRs			Long NRs		
Average length (nm)		FWHM (nm)	Average length (nm)		FWHM (nm)
10.8		3.5	23.2		7.0
Average width (nm)		FWHM (nm)	Average width (nm)		FWHM (nm)
5.3		1.8	5.4		1.6
Length (nm)	Counts	Percentage	Length (nm)	Counts	Percentage
7-9	35	7%	18-20	55	11%
9-11	240	48%	20-22	110	22%
11-13	165	33%	22-24	130	26%
13-15	55	11%	24-26	135	27%
15-17	5	1%	26-28	35	7%
			28-30	35	7%
Width (nm)	Counts	Percentage	Width (nm)	Counts	Percentage
3-4	13	10%	3-4	15	3%
4-5	157	31%	4-5	117	23%
5-6	230	46%	5-6	269	54%
6-7	80	16%	6-7	80	16%
7-8	20	4%	7-8	19	4%

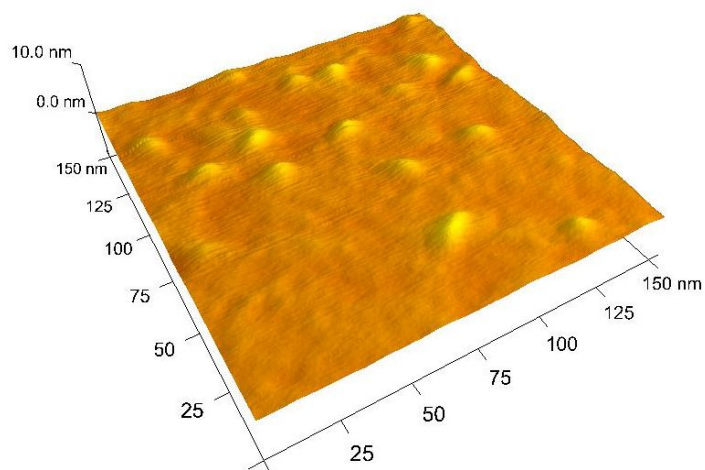


Figure S1 3D AFM images of short CsPbBr₃ NRs.

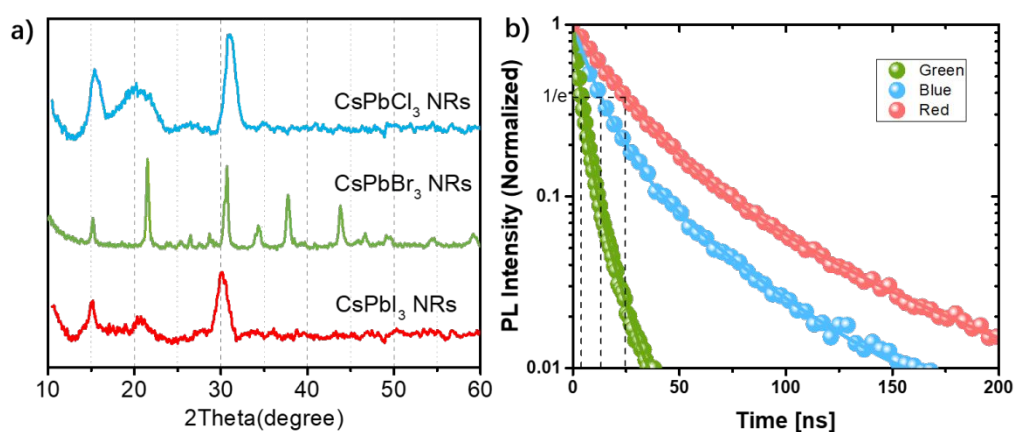


Figure S2. (a) XRD patterns of the parent CsPbBr₃ short NRs and CsPbCl₃ and CsPbI₃ NRs obtained through anion exchange reactions. (b) Time resolved PL decays of CsPbBr₃ short NRs, and anion-exchange products CsPbCl₃ and CsPbI₃ NRs, with the solid lines being a mono-exponential fit to the data.

Table S2. Comparison of PL QYs, average PL lifetimes (τ_{PL}), radiative recombination lifetimes (τ_r), and apparent non-radiative recombination lifetimes (τ_{nr}), exciton Bohr diameters (d_{Bohr}) of CsPbX₃ (X=Cl, Br, or I) NRs with varying halide obtained by ion

exchange.

	QY (%)	τ_{PL} (ns)	τ_r (ns)	τ_{nr} (ns)	d_{Bohr} (nm)	Size (nm)
CsPbI ₃ NRs	48	13.3	27.7	25.6	12	11.9 x 5.8
CsPbBr ₃ NRs	76	4.8	6.3	20	7	10.8 x 5.3
CsPbCl ₃ NRs	68	24.7	36.3	77.2	5	14.9 x 6.2

Table S3. Comparison of PL QYs, average PL lifetimes (τ_{PL}), radiative recombination lifetimes (τ_r), and apparent non-radiative recombination lifetimes (τ_{nr}) of CsPbBr₃ nanocubes and short NRs.

	PL QY	τ_{PL} (ns)	τ_r (ns)	τ_{nr} (ns)	$k_r(\text{ns}^{-1})$	$k_{\text{nr}}(\text{ns}^{-1})$
Nanocubes	78 %	13.8	17.7	62.7	0.056	0.016
Long NRs	60 %	6.9	11.5	17.3	0.087	0.058
Short NRs	76 %	4.8	6.3	20	0.158	0.05

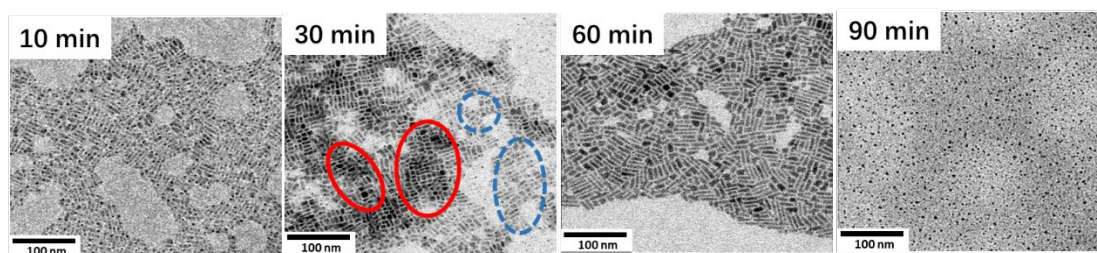


Figure S3. TEM images of CsPbBr₃ NRs prepared with different reaction times, as indicated on each frame. At 30 min reaction time, some areas of the initially formed NRs displayed much sharper edges, as marked with red circles, whilst some areas of other NRs still remained fuzzy, as marked with the blue dashed circles. At 60 min the high-quality sample is present. After 90 min the NRs degraded.

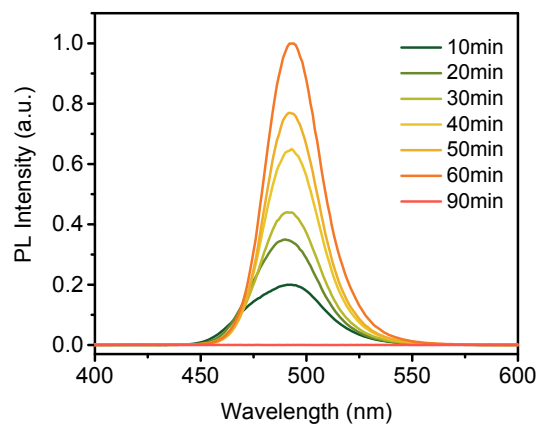


Figure S4. PL spectra of CsPbBr₃ NRs prepared with different reaction times, as indicated on the frame.