

Thermal, physical, and optical properties of the solution and melt synthesized single crystal CsPbBr₃ halide perovskite

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Table S1. Positron Annihilation Lifetime Spectroscopy (PALS) data analysis.

Material Name	τ_1 (ns)	I_1 (%)	τ_2 (ns)	I_2 (%)	τ_3 (ns)	I_3 (%)	τ_{av} (ns)	τ_b (ns)	K_d (1/ns)	$\tau_2 - \tau_b$ (ns)	τ_2/τ_b
CsPbBr ₃ (floating zone)	0.1986	37.6	0.3698	57.823	2.1877	4.5658	0.6880	0.0029	134.7923	0.3669	127.85
CsPbBr ₃ (chemical synthesis)	0.17	32.6	0.348	61.836	2.0802	5.5047	0.7168	0.0027	186.0524	0.3453	128.69

Table S2. Fit parameters for the Fluorescence Lifetime Imaging Microscopy (FLIM) data for CsPbBr₃ synthesized with melt and solution-based methods.

Parameter	Floating zone		Chemical synthesis	
	Value	\pm	Value	\pm
Lifetime (τ) 1 [ns]	0.083	0.011	0.218	0.054
Lifetime (τ) 2 [ns]	0.329	0.029	0.601	0.219
Lifetime (τ) 3 [ns]	1.199	0.082	1.923	0.85
Lifetime (τ) 4 [ns]	6.274	0.612	7.855	1.313
Amplitude 1 [kCnts]	3181.521	188.583	3908.486	1017.625
Amplitude 2 [kCnts]	742.895	136.864	1920.121	820.878
Amplitude 3 [kCnts]	148.53	14.672	1049.036	219.662
Amplitude 4 [kCnts]	15.57	2.403	422.145	175.514
Sum Amplitudes [kCnts]	4088.516	150.119	7299.788	362.886

Sum Intensity [kCnts]	7930.434	224.892	68,067.408	1791.339
Mean τ , Intensity Weighted [ns]	1.092	0.044	3.791	0.526
Mean τ , Amplitude Weighted [ns]	0.192	0.008	1.006	0.064
χ^2	11.745		67.338	