

Supplementary Information

Microfluidic synthesis of monodispersed sharp emitting perovskite CsPbBr₃ quantum dots via multidimensional parameterization

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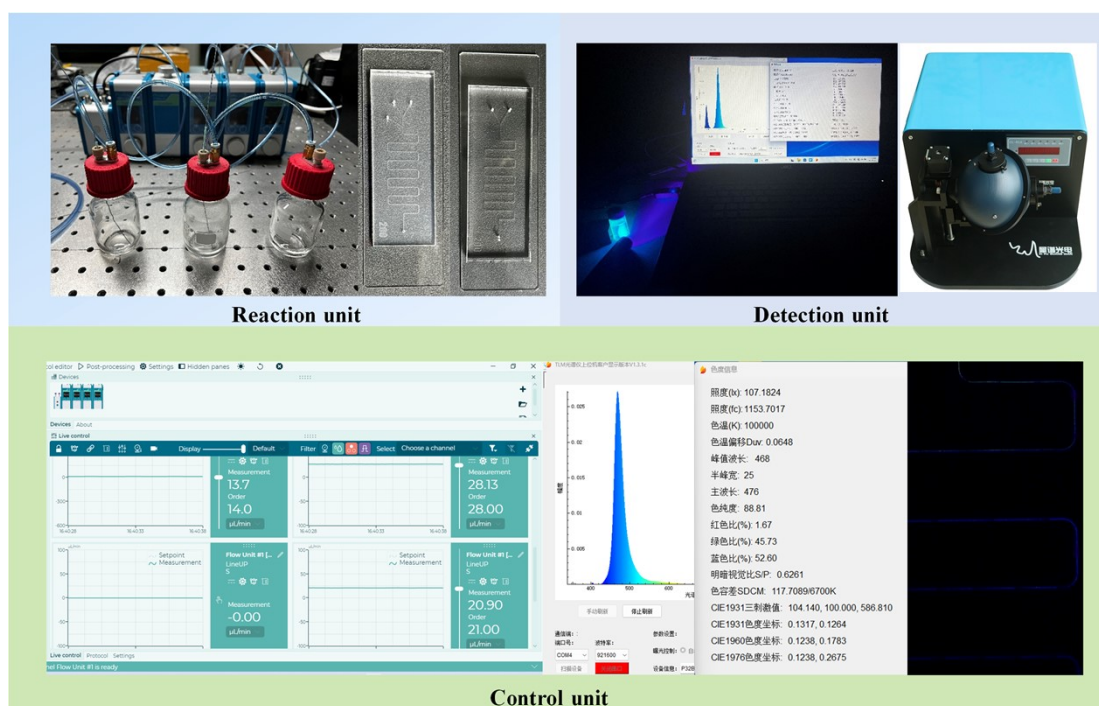


Figure S1. Microfluidic system including reaction unit, detection unit and control unit.

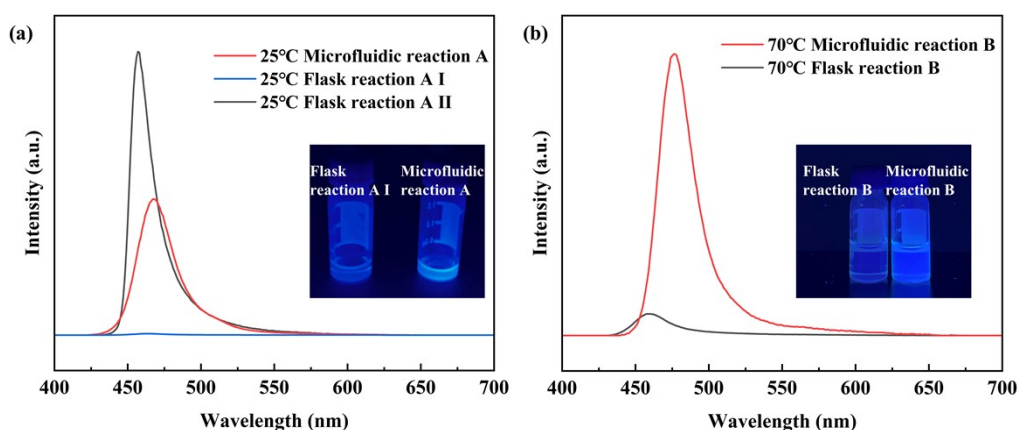


Figure S2 (a), (b) PL spectra and photograph under UV light of synthesized CsPbBr₃ QDs from batch and microfluidic reactor.

Table S1 PL emission wavelength, FWHM and PLQY of CsPbBr₃ QDs from batch and Microfluidic reactors under different conditions of reaction time and temperature.

	Microfluidic reaction A	Flask reaction A I	Flask reaction A II	Microfluidic reaction B	Flask reaction B
Temperature/(°C)	25	25	25	70	70
Reaction time	56.8s	10s	26h	2.7s	10s
Wavelength/(nm)	467	464	457	477	460
FHWM/(nm)	28	25	18	28	28
PLQY/(%)	21.67%	2.96%	20.47%	32.89%	4.59%

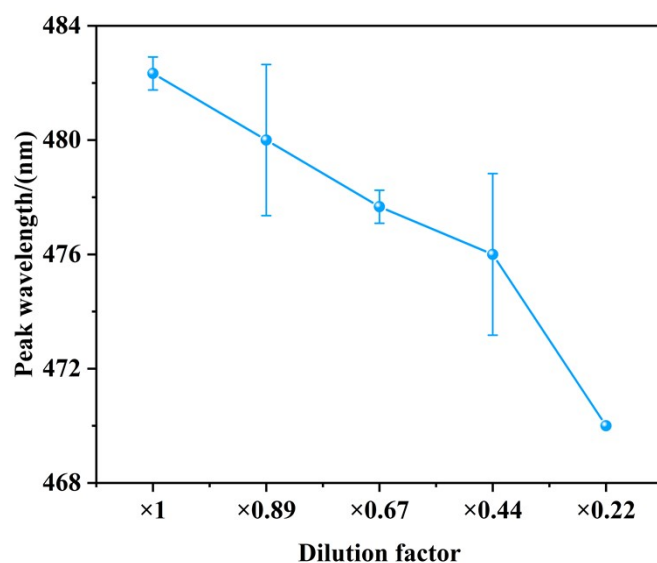


Figure S3 PL emission wavelength of different dilution factors.

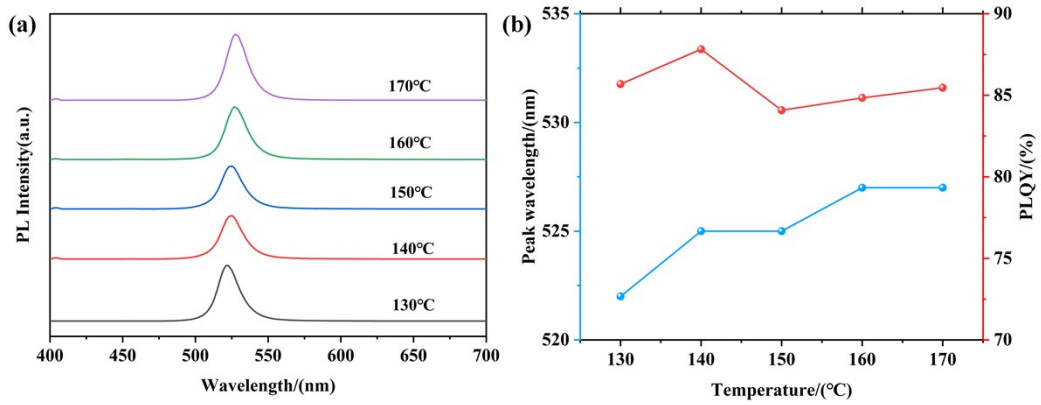


Figure S4 (a) PL spectra, (b) PL emission wavelength and PLQY of samples with different temperatures.

Table S2 PL emission wavelength, FWHM and PLQY of CsPbBr₃ QDs with different temperatures.

T/(°C)	130	140	150	160	170
PL/(nm)	522	525	525	527	527
PLQY/(%)	85.68	87.82	84.08	84.84	85.46
FWHM/(nm)	17	17	18	17	17

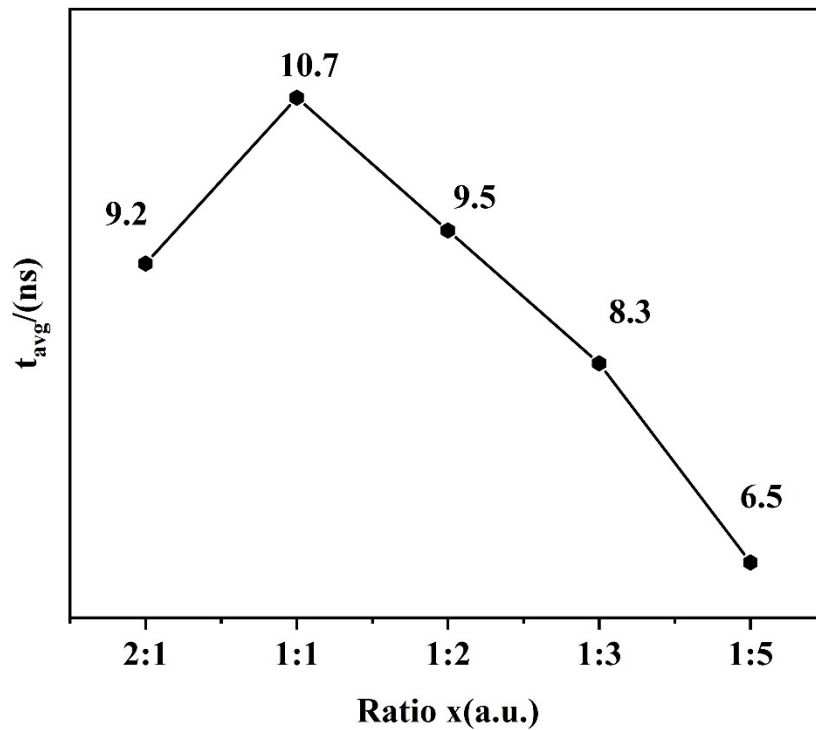


Figure S5 The average lifetimes of samples with different Cs/Pb (x) ratio.

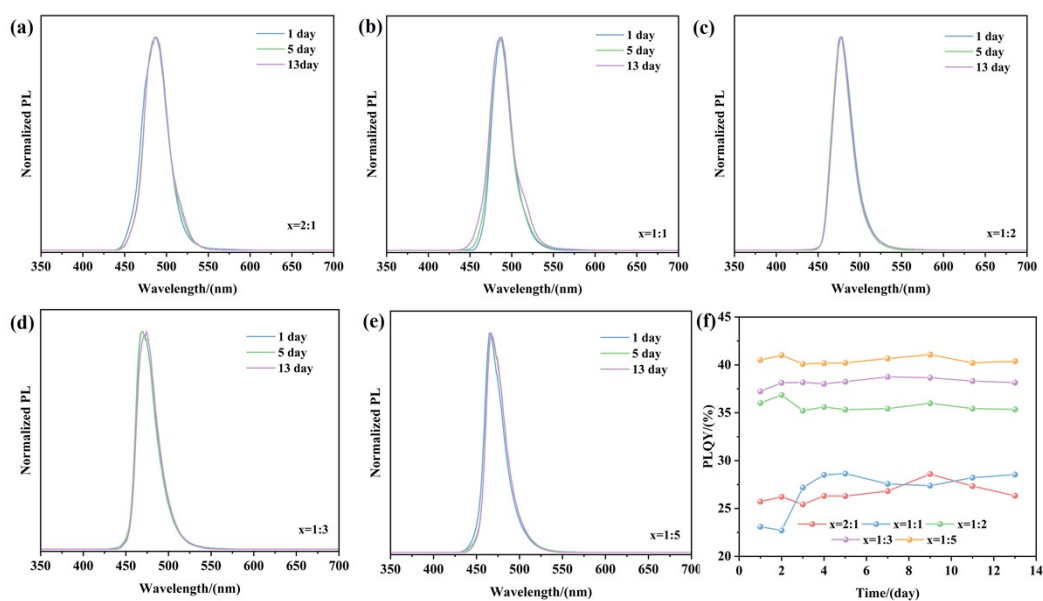


Figure S6 (a-e) PL spectrum and (f) PLQY values of samples with different ratios of Cs/Pb (x) in a constant temperature and humidity of 20 ± 5 °C and $25 \pm 5\%$.

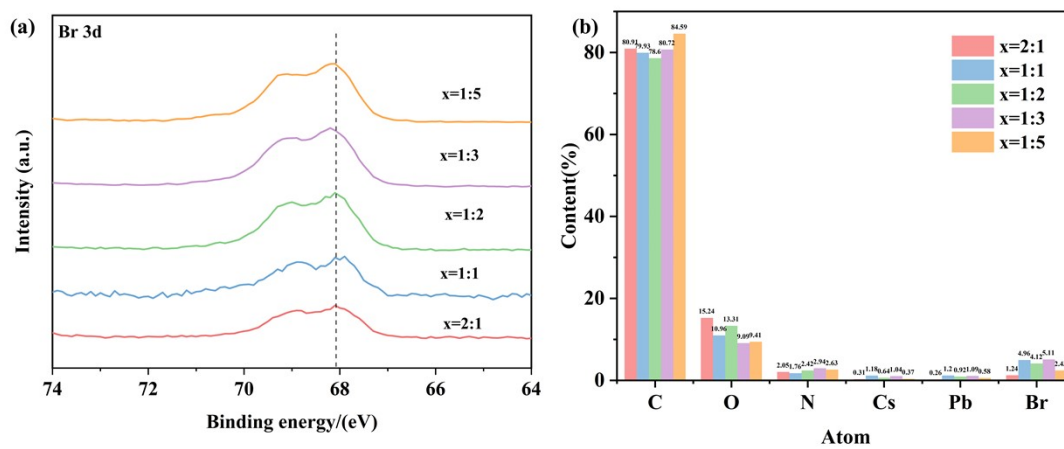


Figure S7 (a) XPS spectra of Br 3d. (b) Relative element content of samples with different ratios of Cs/Pb (x).

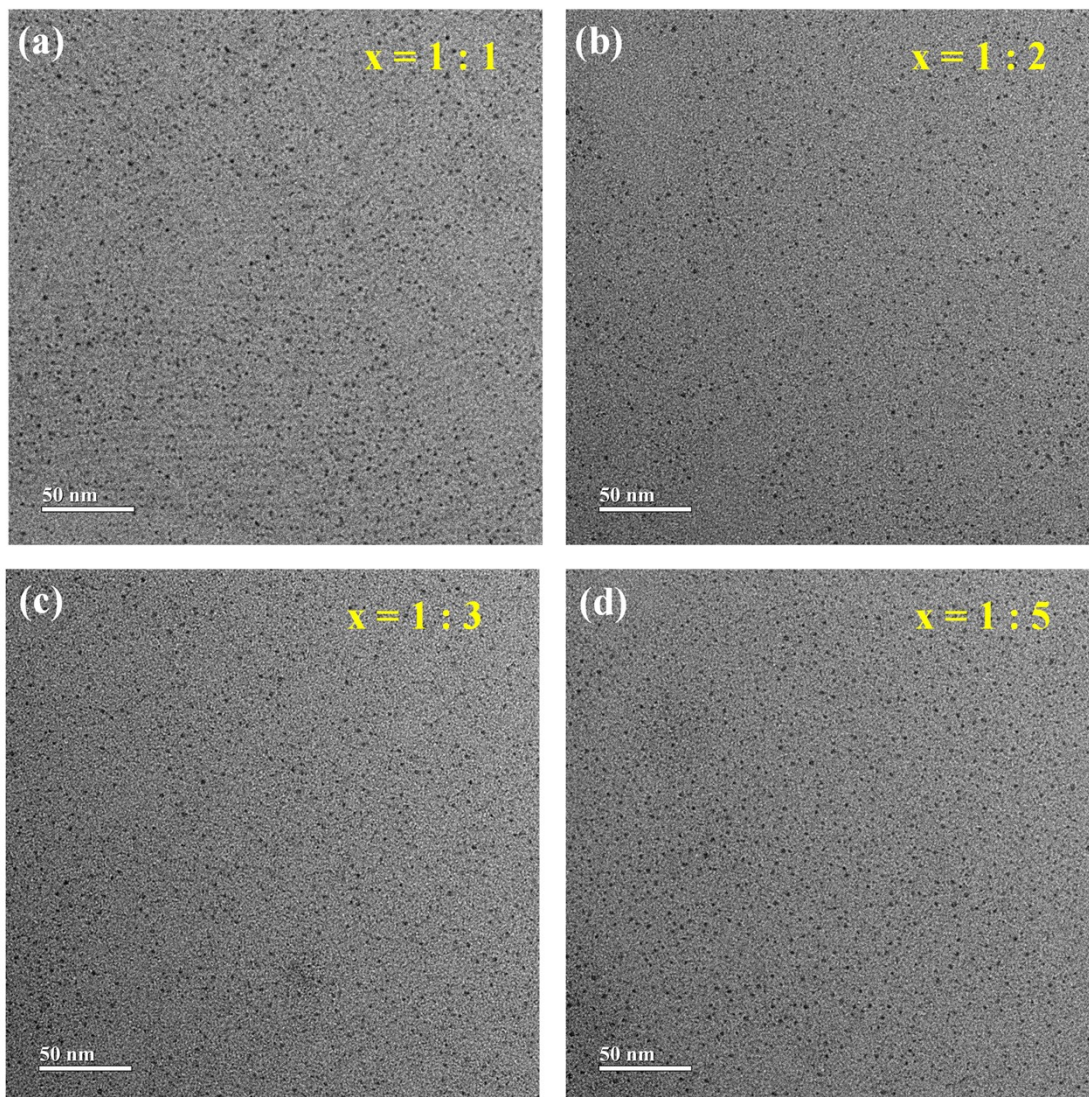


Figure S8. TEM images of different ratios Cs/Pb (x). (A) x = 1: 1, (B) x = 1: 2, (C) x = 1: 3, (D) x = 1: 5. Other parameters were OA/OAm = 2 and same reaction time.

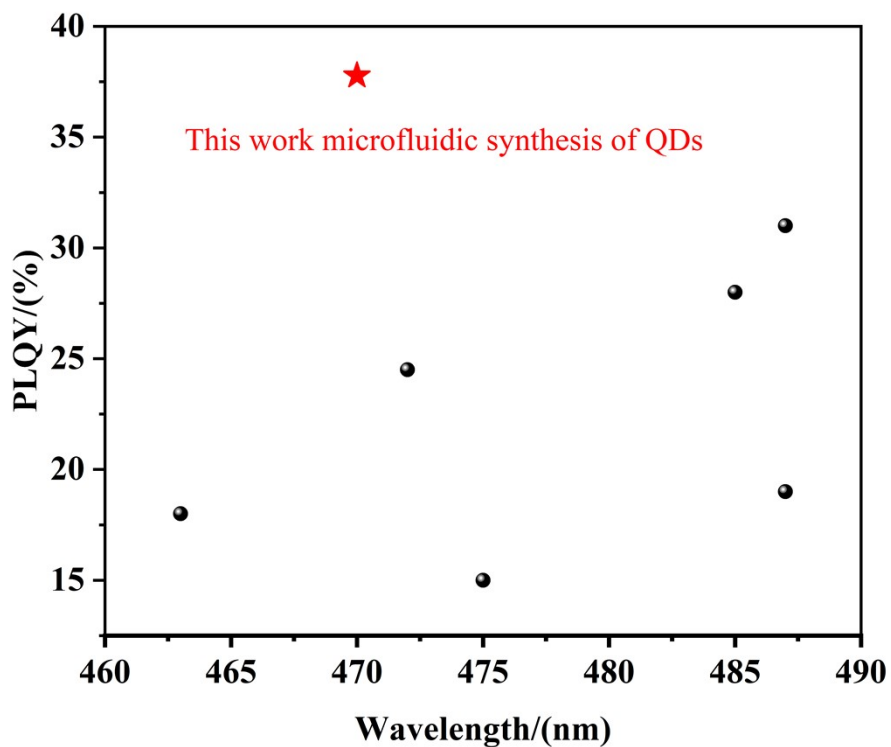


Figure S9 PLQY of the microfluidic chip synthesized QDs comparing with other literature studies without intentional passivation (see Table S3 for references).

Table S3 PLQY data and references shown

PL Peak position/(nm)	PLQY/(%)	Ref.
463	18	1
470	37.77	This work
472	24.5	2
475	15	3
485	28	3
487	19	4
487	31	5

Table S4 PL emission wavelength (nm), PLQY and FWHM of the CsPbBr₃ QD samples obtained with different temperatures.

T/(°C)	30	40	50	60	70	80	90	100	110	120	130
PL/(nm)	463	463	467	469	474	478	483	492	503	512	522
PLQY/(%)	14.56	7.44	22.21	21.7	32.30	39.42	47.82	50.43	63.34	72.36	85.68
FWHM/(nm)	28	27	29	27	30	31	34	31	27	23	17

Table S5 PL emission wavelength (nm) and PLQY of the samples with different ratios of Cs/Pb (x).

x	5:1	2:1	1:1	1:2	1:3	1:5
PL/(nm)	469.0	478.3	478.5	476.7	472.7	471.5
PLQY/(%)	2.76	27.97	29.60	36.39	37.36	41.87

References

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