Electronic Supplementary Material (ESI) for Nanoscale Advances.


*Electronic Supplementary Information (ESI) for*

# Growth mechanistic insights into perovskite nanocrystals: dimensional growth

Prasenjit Mandal,[a,b,c] Angira Roy,[b] ,Subhashri Mannar,[b] and Ranjani Viswanatha [a,b,c*]

[a]New Chemistry Unit, [b]International Centre for Materials Science, [c]School of Advanced Materials, Jawaharlal Nehru Centre for Advanced Scientific Research, Jakkur, Bangalore, 560064, India. E-mail: rv@jncasr.ac.in [*] corresponding author.

**Table TS1.** Details of sample codes and their temperatures of synthesis

| Sample Code | $PbBr_2$ (mmol) | Oleic Acid (mL) | Oleyl amine (mL) | 1-octadecene (mL) | Cs-oleate (0.4 mL) injection or freezing temperatures |
|---|---|---|---|---|---|
| CLB-30 | 0.188 | 1.0 | 1.0 | 5.0 | 30 ℃ |
| CLB-60 | 0.188 | 1.0 | 1.0 | 5.0 | 60 ℃ |
| CLB-90 | 0.188 | 1.0 | 1.0 | 5.0 | 90 ℃ |
| CLB-100 | 0.188 | 1.0 | 1.0 | 5.0 | 100 ℃ |
| CLB-120 | 0.188 | 1.0 | 1.0 | 5.0 | 120 ℃ |
| CLB-150 | 0.188 | 1.0 | 1.0 | 5.0 | 150 ℃ |
| CLB-180 | 0.188 | 1.0 | 1.0 | 5.0 | 180 ℃ |

CLB = Cesium lead bromide ($CsPbBr_3$)

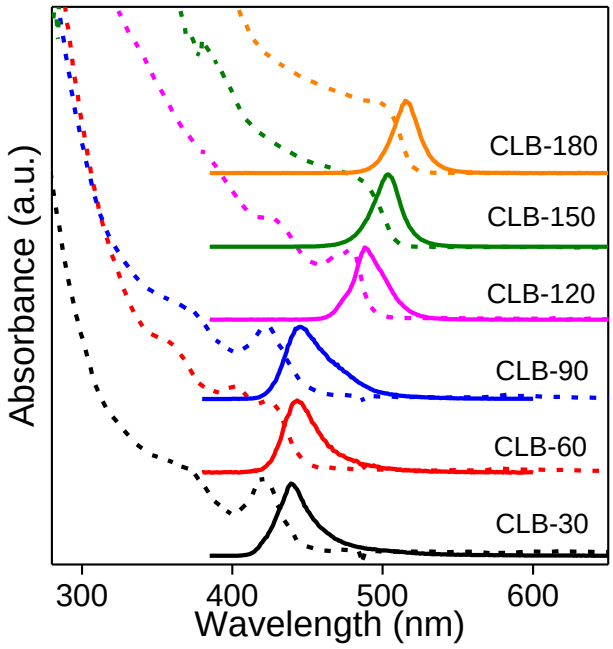


**Fig. S1.** Normalized optical absorption (dotted line) and photoluminescence emission spectra (solid line) of CLB nanocrystals (NCs) synthesized at various temperatures.

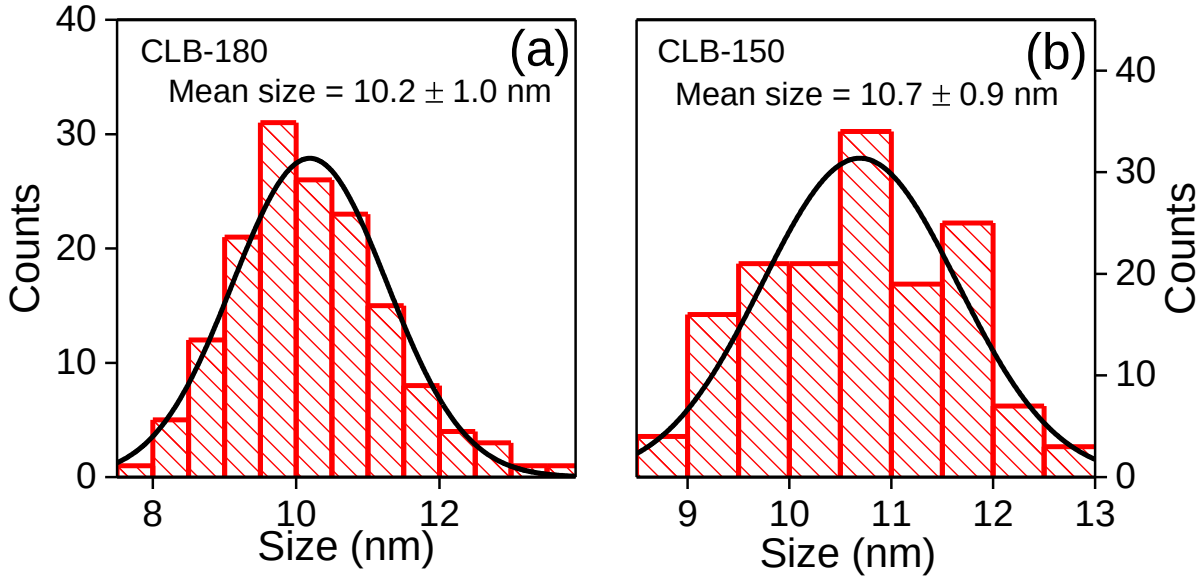


**Fig. S2.** Histogram for size analysis CLB NCs synthesized at two different reaction temperatures (a)180 ℃ (CLB-180) and (b) 150 ℃ (CLB-150).

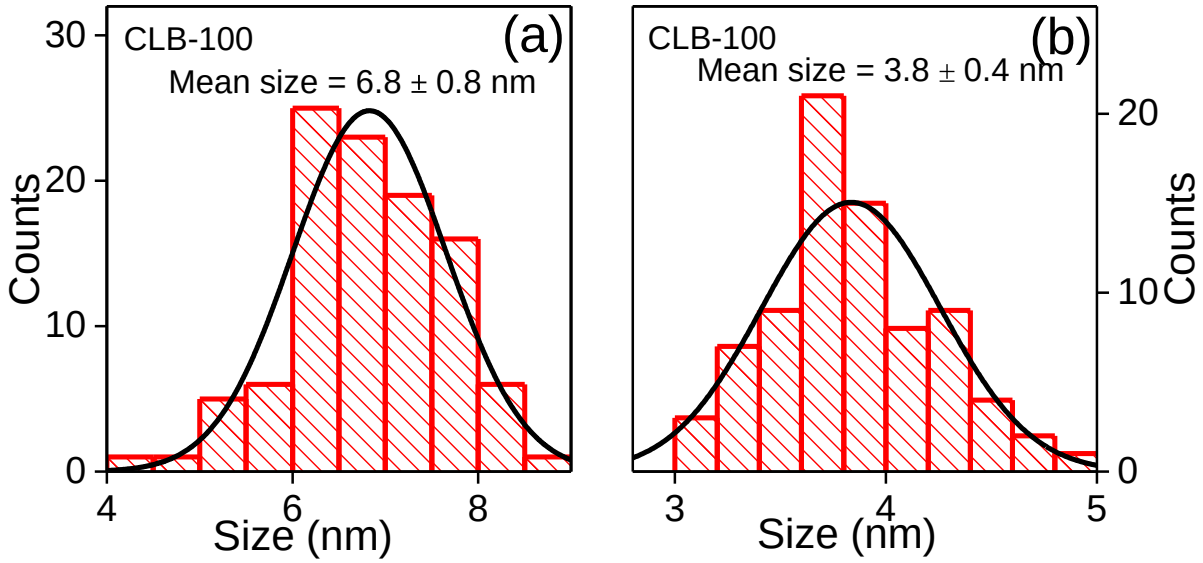


**Fig. S3.** Histogram for size analysis of CLB NCs synthesized at 100 ℃ (CLB-100) corresponding to the TEM image shown in Fig. 2(b) and 3(c).

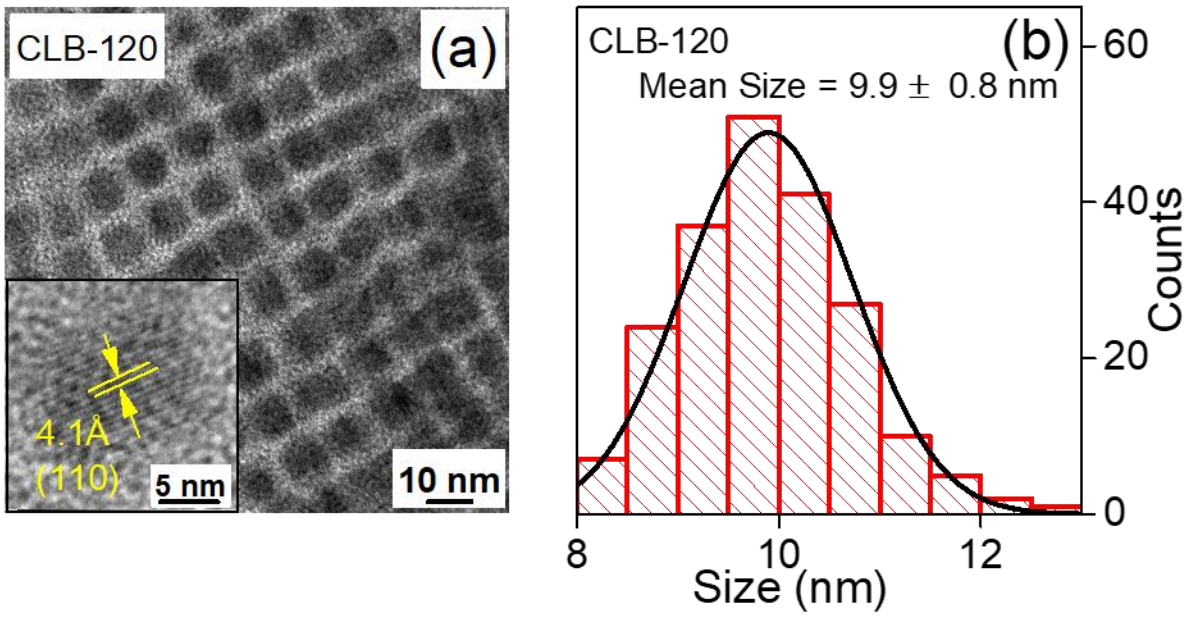


**Fig. S4.** TEM image and corresponding size distribution analysis of CLB NCs synthesized at 120 ℃ (a) TEM image showing square like CLB NCs synthesized at 120 ℃ (CLB-120), inset showing HRTEM of single nanoparticle and (b) corresponding histogram for size analysis.

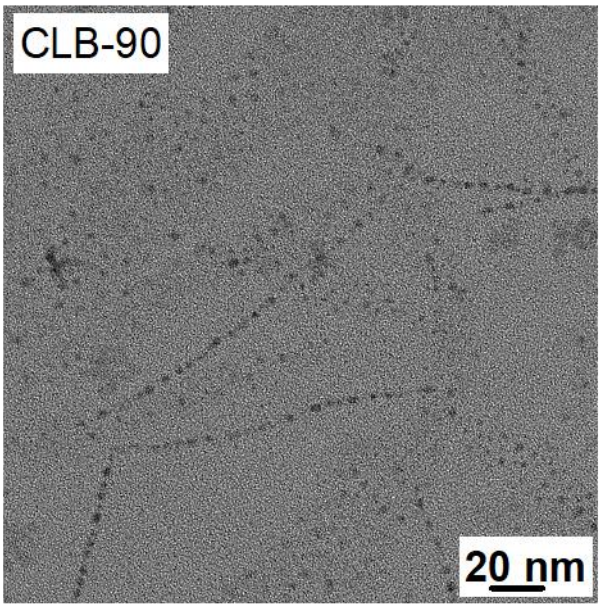


**Fig. S5.** TEM image showing array of dots of CLB NCs synthesized at 90 ℃ (CLB-90).

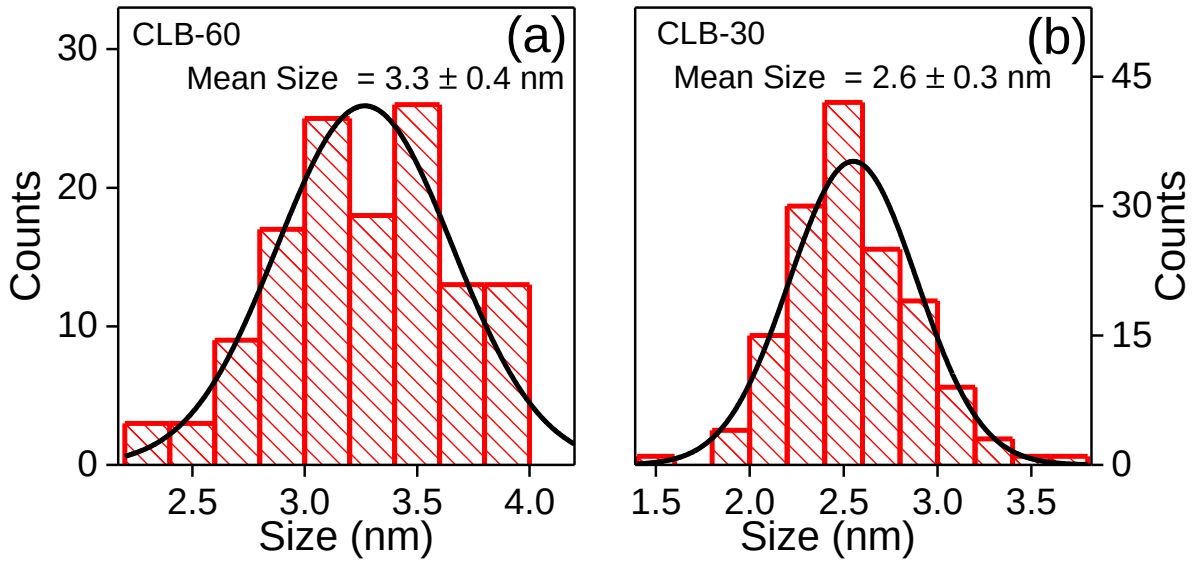


**Fig. S6.** Histogram for size analysis of CLB NCs synthesized at two different reaction temperatures (a) 60 ℃ (CLB-60) and (b) 30 ℃ (CLB -30).

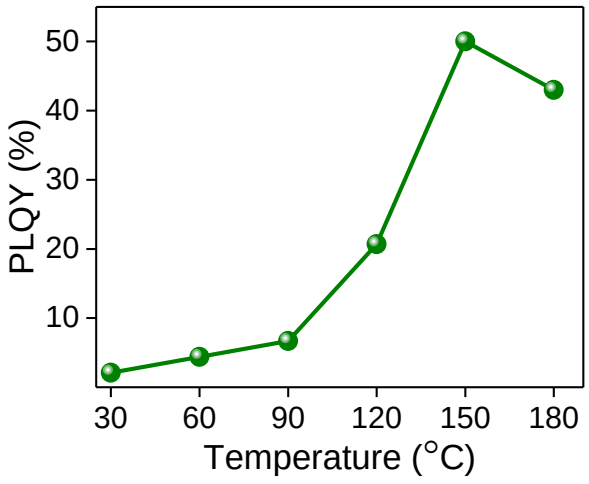


**Fig. S7.** Solution Photoluminescence quantum yield (PLQY) of CLB NCs synthesized at various temperatures.

**Table TS2.** Size of planes obtained from fitting of XRD peaks with least square error fitting

| | Temperatures (℃) | | | | | |
|---|---|---|---|---|---|---|
| Planes | 30 | 60 | 90 | 120 | 150 | 180 |
| | Size (nm) | | | | | |
| 101 | 2.9 | 2.8 | - | - | - | - |
| 202 | 3.1 | 3.4 | - | - | - | - |
| 321 | 3.6 | 2.4 | - | - | - | - |
| 100 | - | - | 2.7 | 3.3 | 11.8 | 10.4 |
| 220 | - | - | 1.3 | 1.8 | 10.7 | 10.4 |
| 310 | - | - | - | - | 6.4 | 6.9 |
| 111 | - | - | - | 5.5 | 4.2 | 9.1 |