Supporting Information

Colloidal Synthesis of CsX Nanocrystals (X = Cl, Br, I)

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1 Size Distribution Analysis

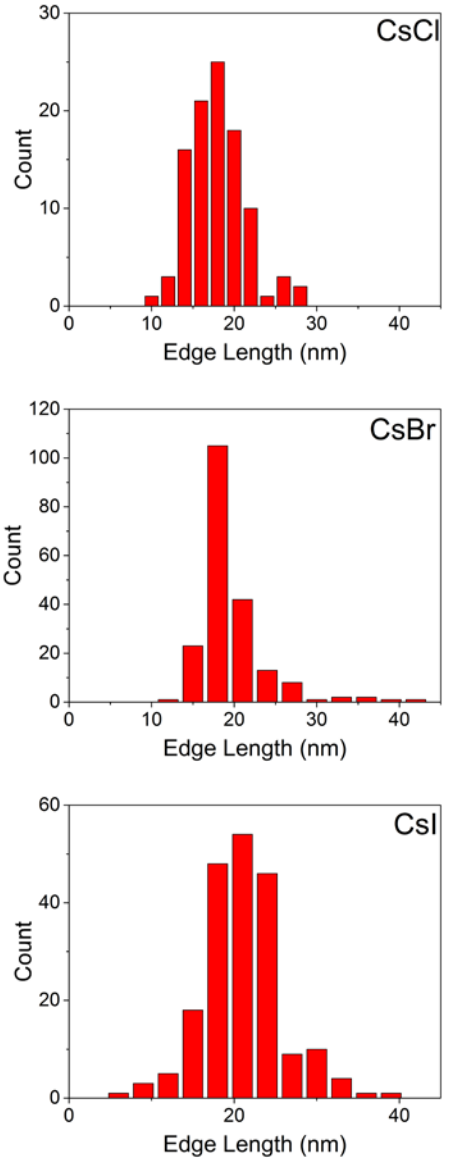


Figure S1. Size Distribution of obtained CsX nanocrystals.

2 XRD Analysis

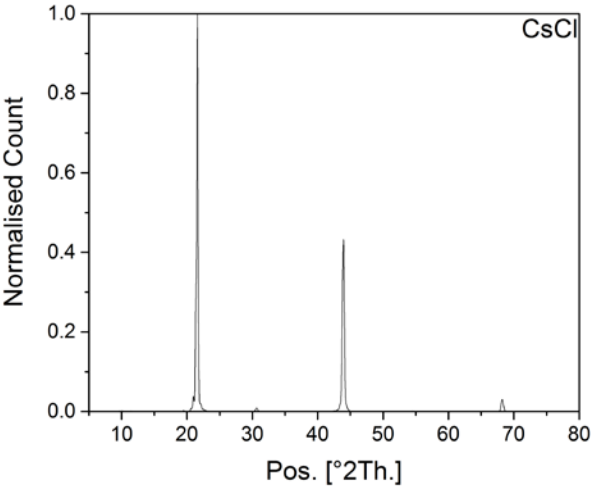


Figure S2. Full diffractogram of CsCl.

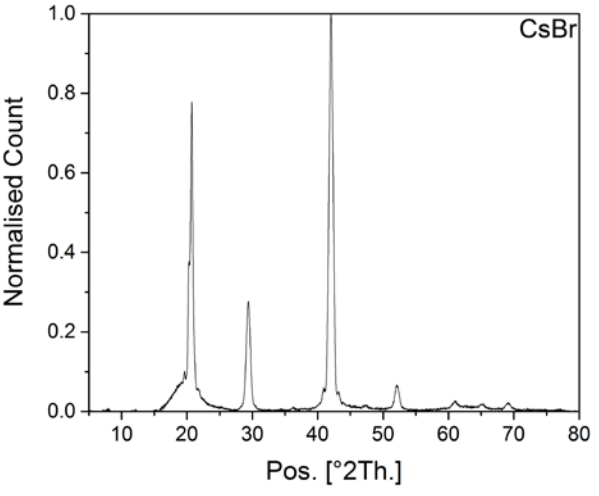


Figure S3. Full diffractogram of CsBr.

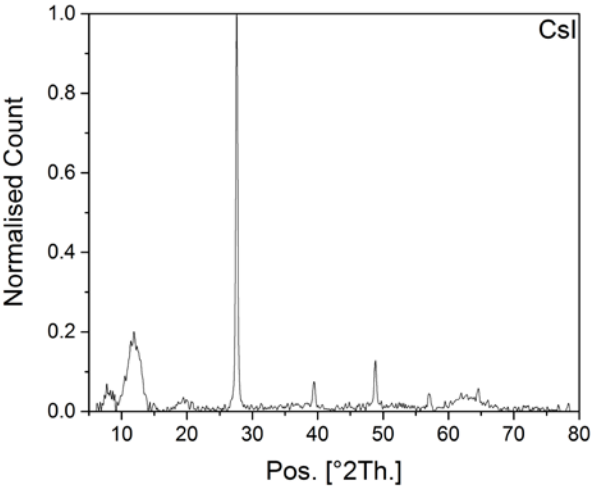


Figure S4. Full diffractogram of CsI.

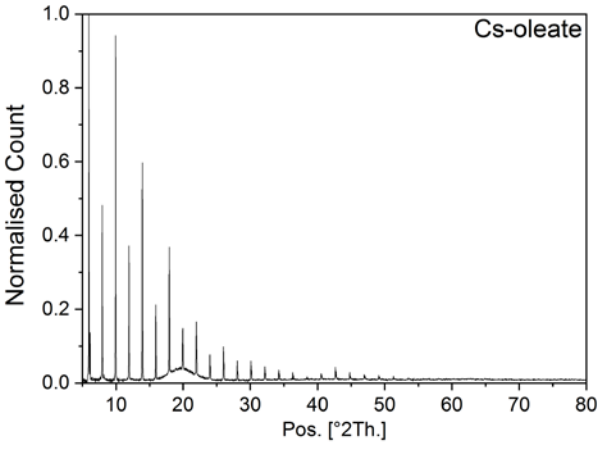


Figure S5. Diffractogram of cesium oleate.

3 EDX Analysis

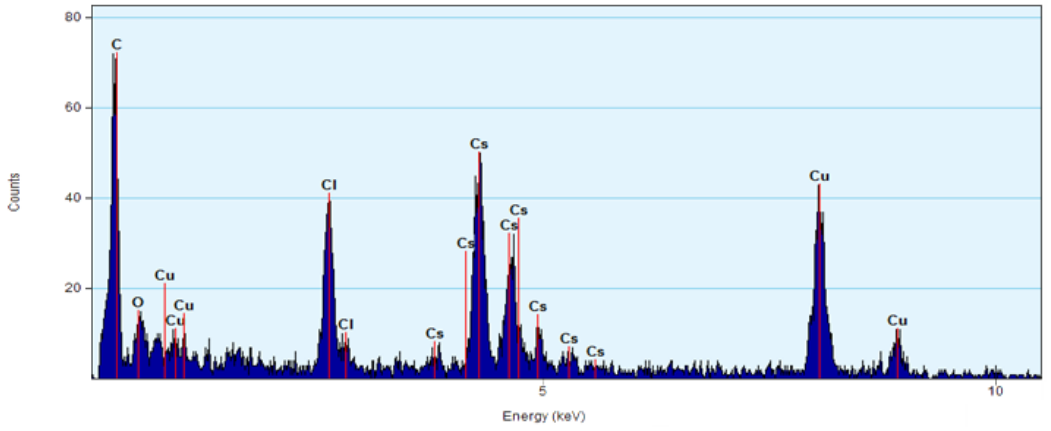


Figure S6. EDX spectrum acquired on CsCl nanocrystals. Both cesium and chlorine were identified. Peaks of copper and carbon arise from the supporting grid. The determined atomic percentages are (45±1) % Cl and (55±1) % Cs, which is stoichiometric in the range of accuracy of TEM-EDX. A slight excess would anyhow comply with an outer layer of Cs atoms.

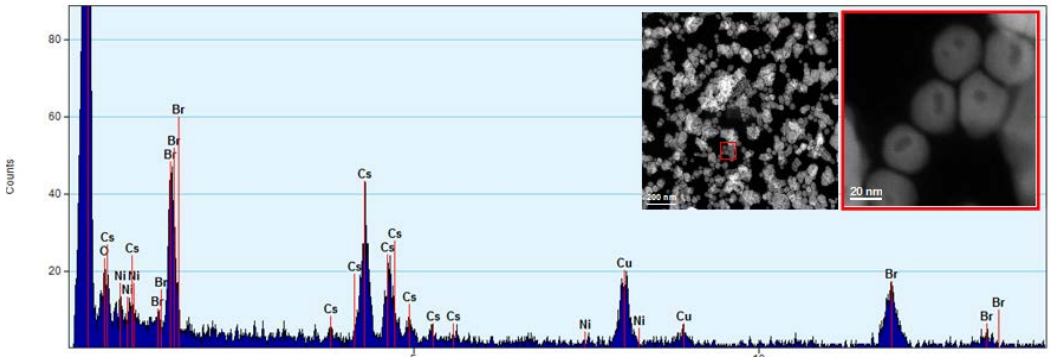


Figure S7. EDX spectrum of the shown area (inset) consisting of CsBr nanocrystals. The signals of cesium and bromide were detected. Peaks from nickel, copper and carbon were a result of the supporting grid. The oxygen peak could arise from the residual presence of organic compounds. The content of elements was (40±3) % Br and (60±3)% Cs in at.%, indicating an excess of Cs, which can be explained by Cs as terminating layer and, in line with XRD, a small residue of Cs-oleate.

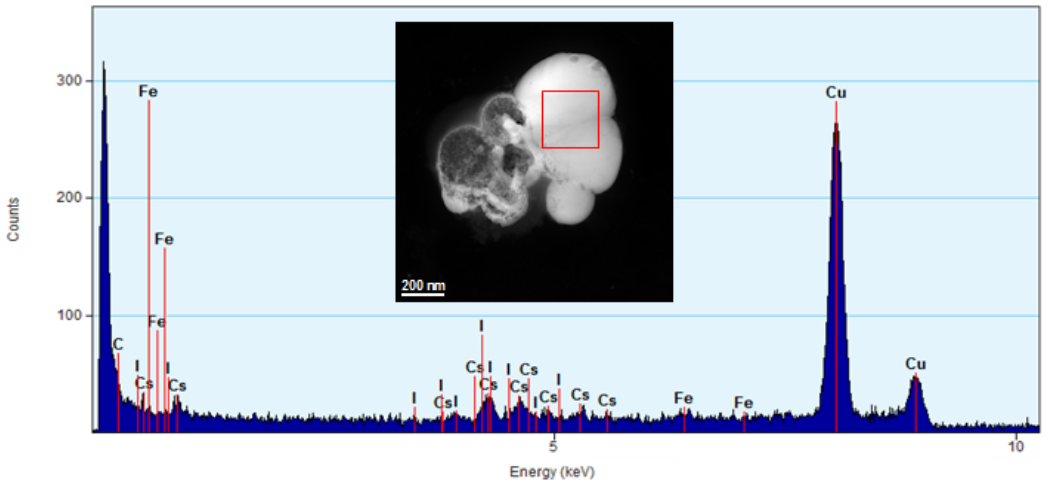


Figure S8. EDX spectrum of the shown area on the CsI nanocrystals (inset). The signals of cesium and iodine were detected. Peaks from iron, copper and carbon were a result of the supporting grid. We could not measure enough datapoints to quantify the atomic masses by TEM-EDX due to the rapid evaporation.

Table S1: SEM-EDX data of CsI which is more stable in this type of quantification experiment (not-rounded values for I and Cs are both close to 14.5%).

Element	Weight%	Weight% Sigma	Atomic%
C K	18	0.7	71
I L	41	0.6	15
Cs L	41	0.6	14

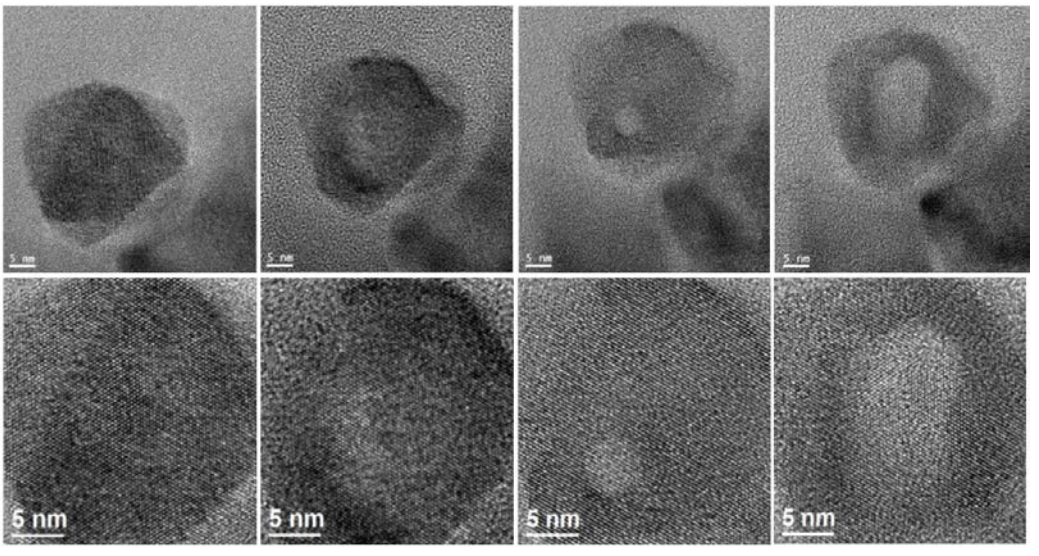


Figure S9. Evolution of a CsBr nanocrystal under HRTEM beam. A hollow space appeared inside the particle and grew over time (increasing time exposure from left to right). The total time exposure between the first and last acquisition was approximately 1.5 min.

4 Other Halide Sources

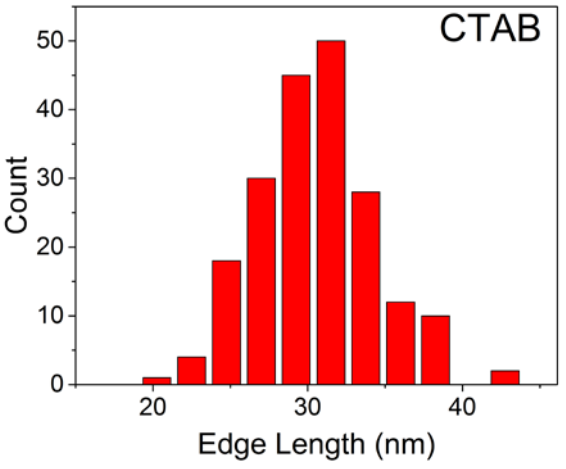


Figure S10. Size Distribution of obtained CsBr nanocrystals from a precursor of CTAB.

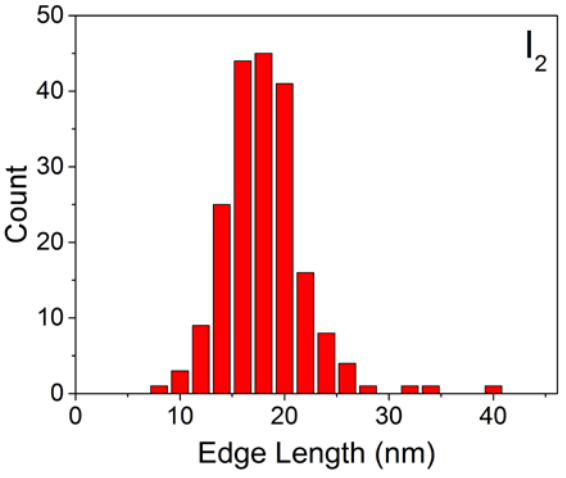
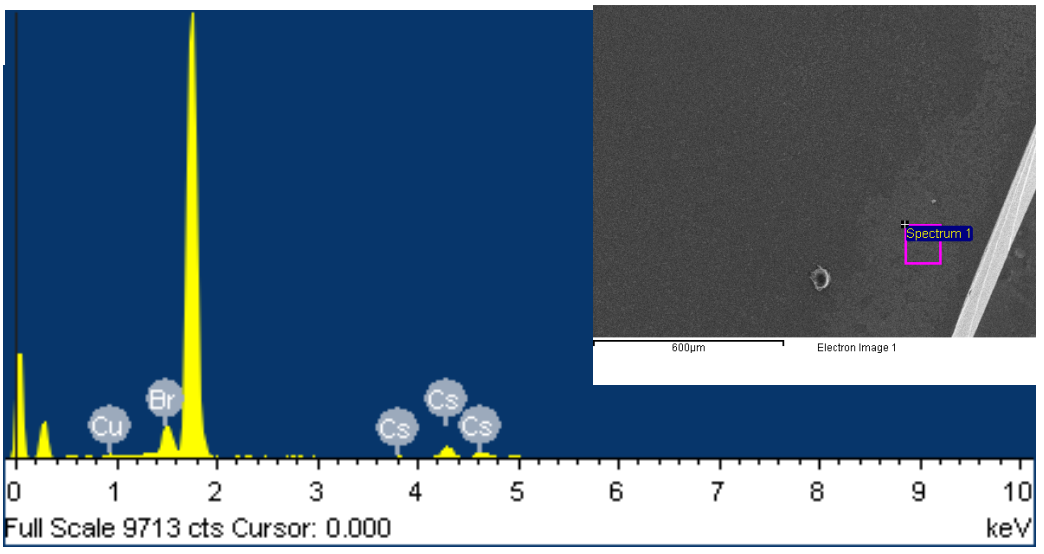


Figure S11. Size Distribution of obtained CsI nanocrystals from a precursor of I_2.

A



B

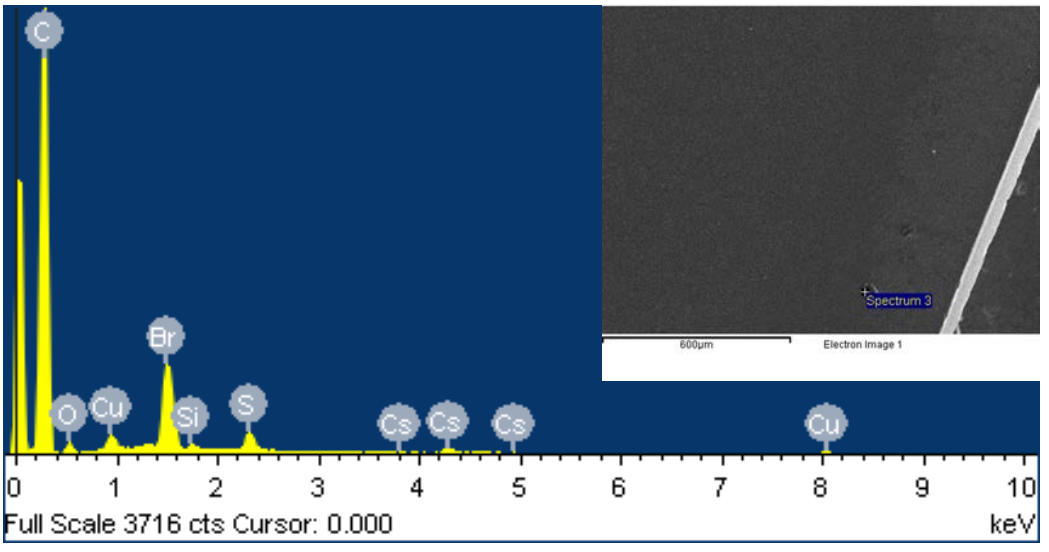


Figure S12. EDS spectra of obtained CsBr nanocrystals from a precursor of $CuBr_2$. Peaks of Si arise from the supporting Si wafer. Peaks of Cs, Br, and Cu can be seen, spots with varying Cu content are observed.

Table S2: Elemental Cs, Cu and Br content of spectra A and B of the sample obtained from $CuBr_2$ determined by EDS.

Element	**Weight%**	**Atomic%**
Spectrum A		
Cu K	2	4
Br L	61	71
Cs L	37	26
Spectrum B		
Cu K	9	11
Br L	81	83
Cs L	10	6