Electronic Supplementary Information (ESI) for

Generalized colloidal synthesis of high-quality, two-dimensional cesium lead halide perovskite nanosheets and their applications in photodetectors

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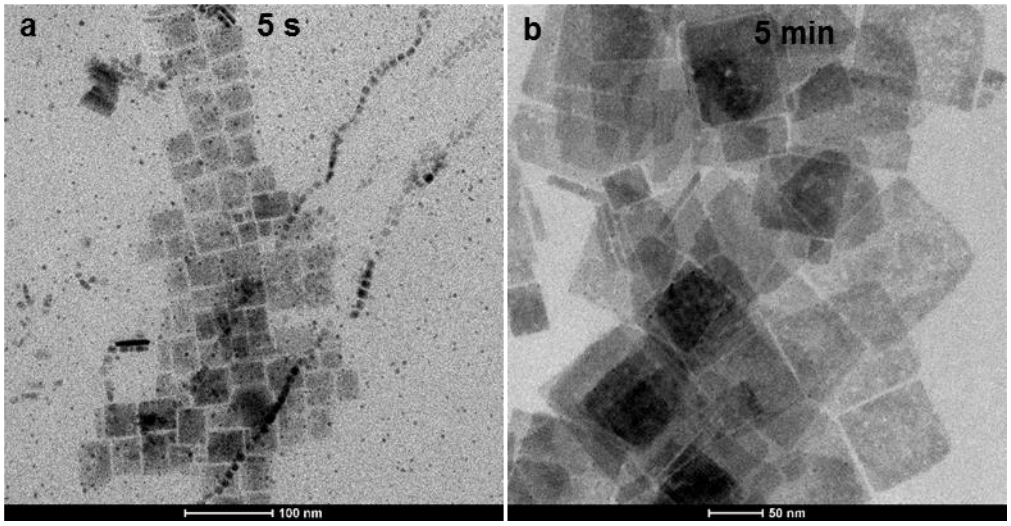

Figure S1. (a, b) TEM images of the $CsPbBr_3$ products formed after 5 s and 5 min of reaction, respectively.

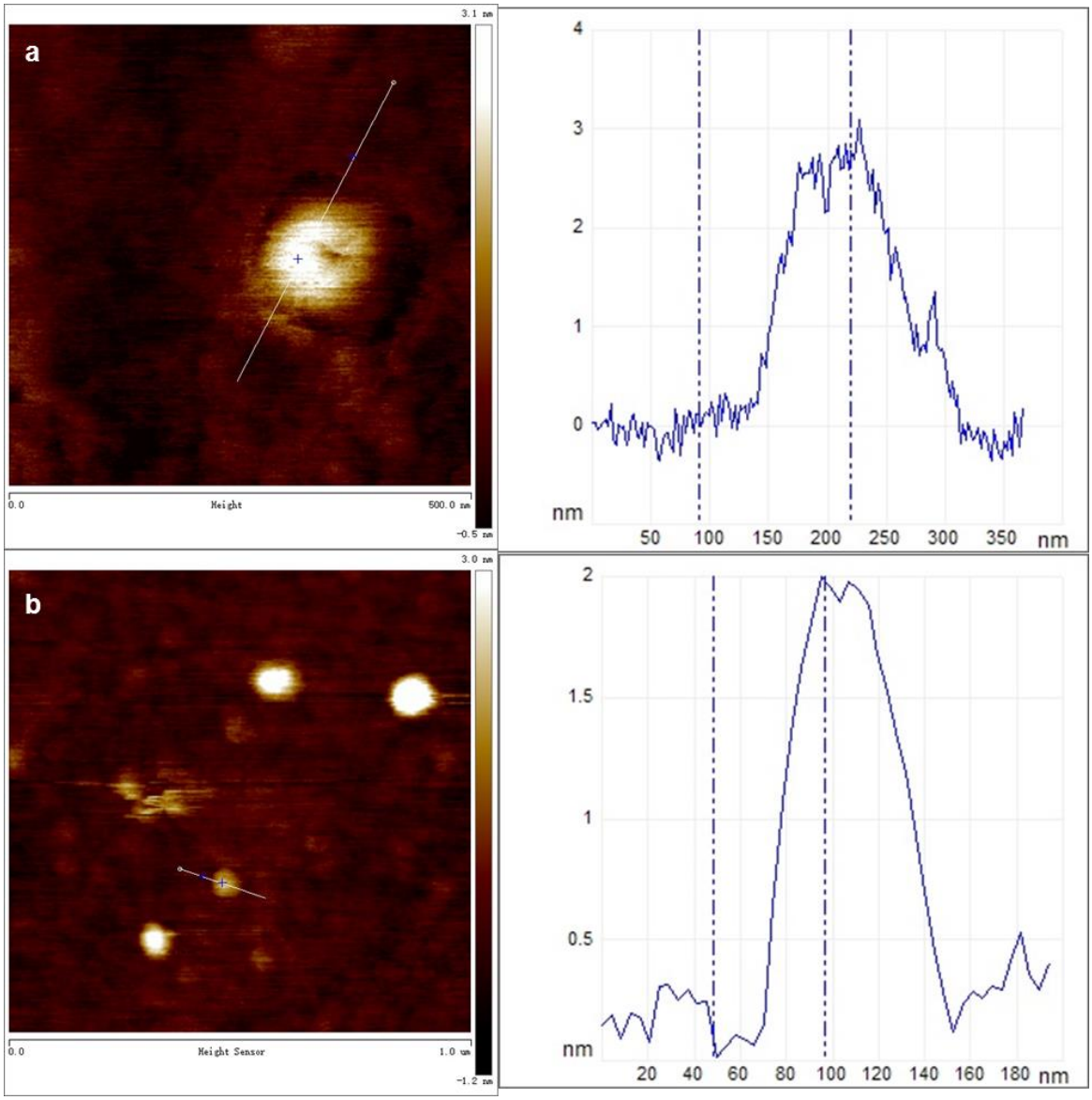

Figure S2. (a) AFM image of $CsPbBr_3$ nanosheets synthesized at 120 °C. The sheet thickness was determined to be ~ 3 nm. (b) AFM image of $CsPbBr_3$ nanosheets synthesized at 150 °C. The sheet thickness was determined to be ~ 2 nm.

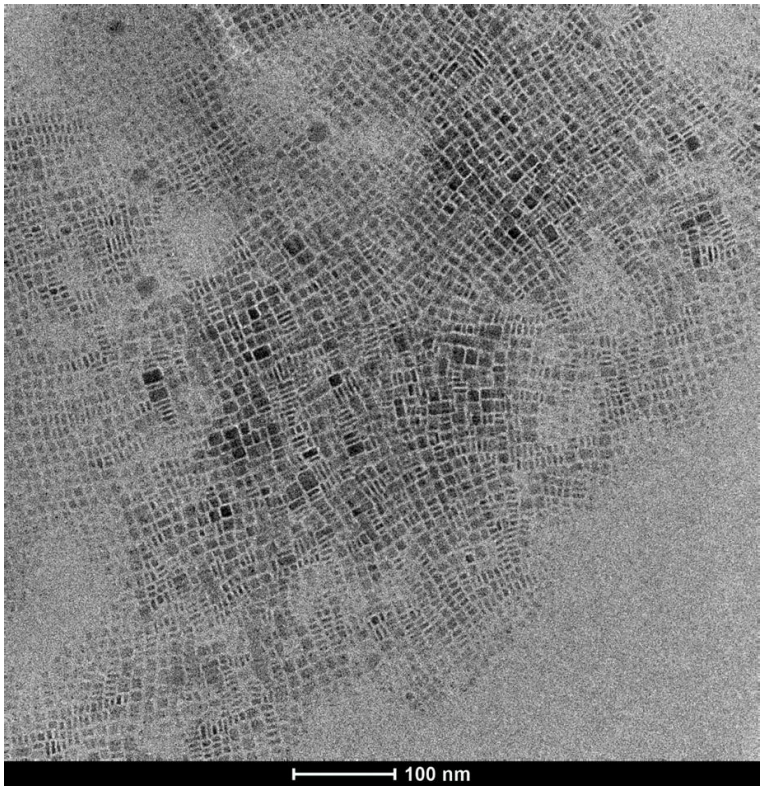

Figure S3. TEM image of $CsPbBr_3$ nanoplatelets synthesized at 170 °C.

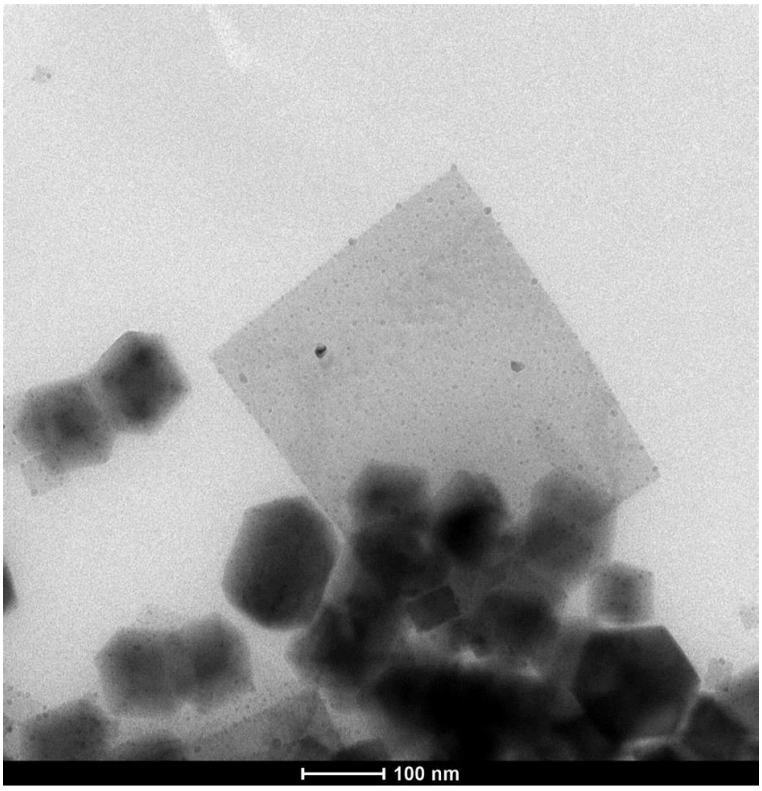

Figure S4. TEM image of $CsPbI_3$ nanosheets and nanocube by-products without reducing the OA/OAm amounts.

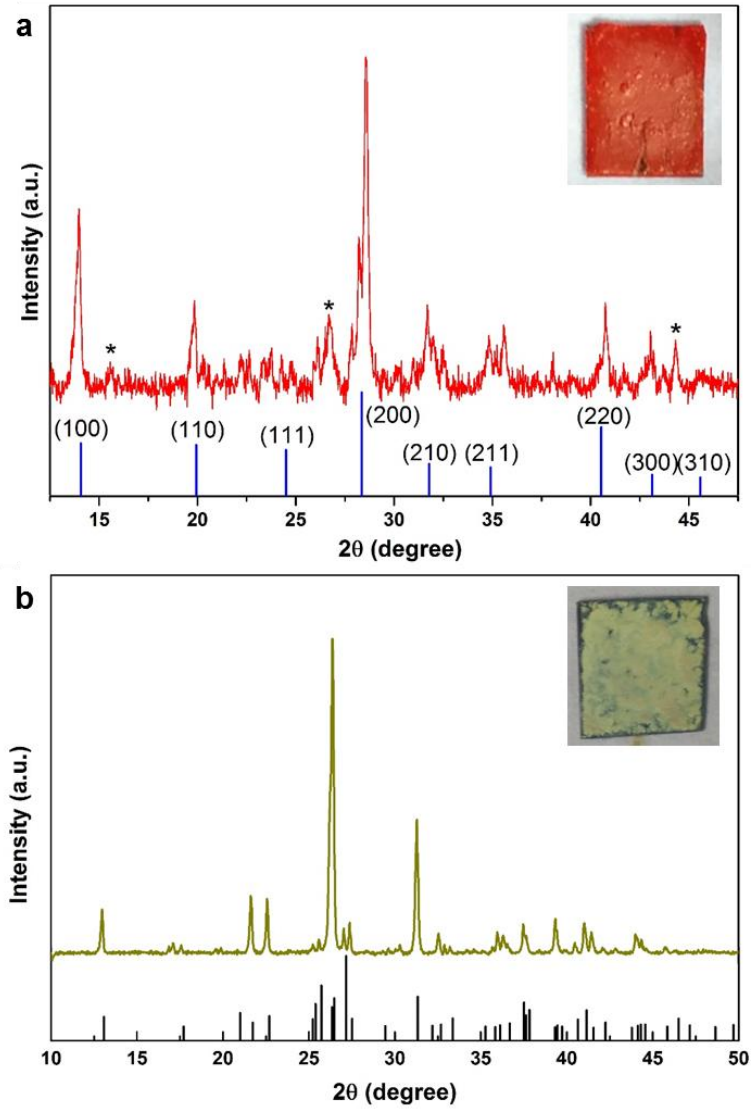

Figure S5. (a) XRD patterns of $CsPbI_3$ nanosheets and the standard cubic phase $CsPbI_3$. The diffraction peaks ascribed to the orthorhombic phase $CsPbI_3$ were indicated by asterisks. The inset shows the sample after XRD data collection, in which the light yellowish color suggested the partial conversion of $CsPbI_3$ nanosheets despite the short period of exposure (~ 30 min). (b) XRD patterns of $CsPbI_3$ nanosheets after prolonged exposure and the standard orthorhombic phase $CsPbI_3$. The inset shows the sample after exposure to air for 2 h, showing the complete transition of $CsPbI_3$ from cubic to orthorhombic phase (yellow phase).

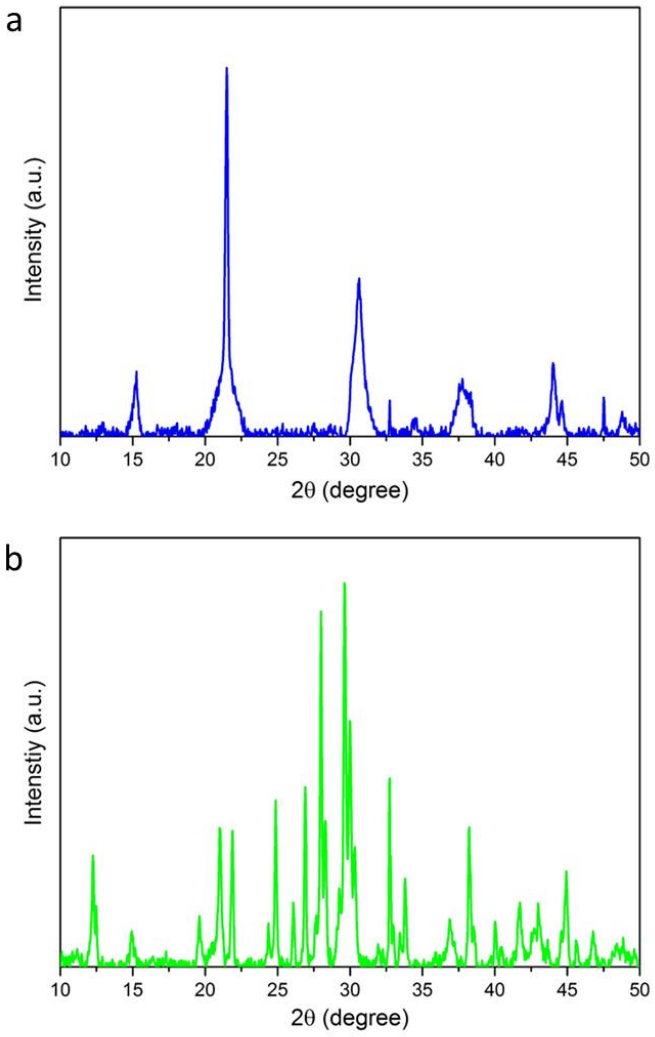

Figure S6. (a) XRD pattern of $CsPbClBr_2$ nanosheets, suggesting that the mixed halide perovskite nanosheets is primarily occupied by tetragonal phase. (b) XRD pattern of $CsPbBr_2I$ nanosheets suggesting the mixed halide perovskite nanosheets is primarily occupied by orthorhombic phase.

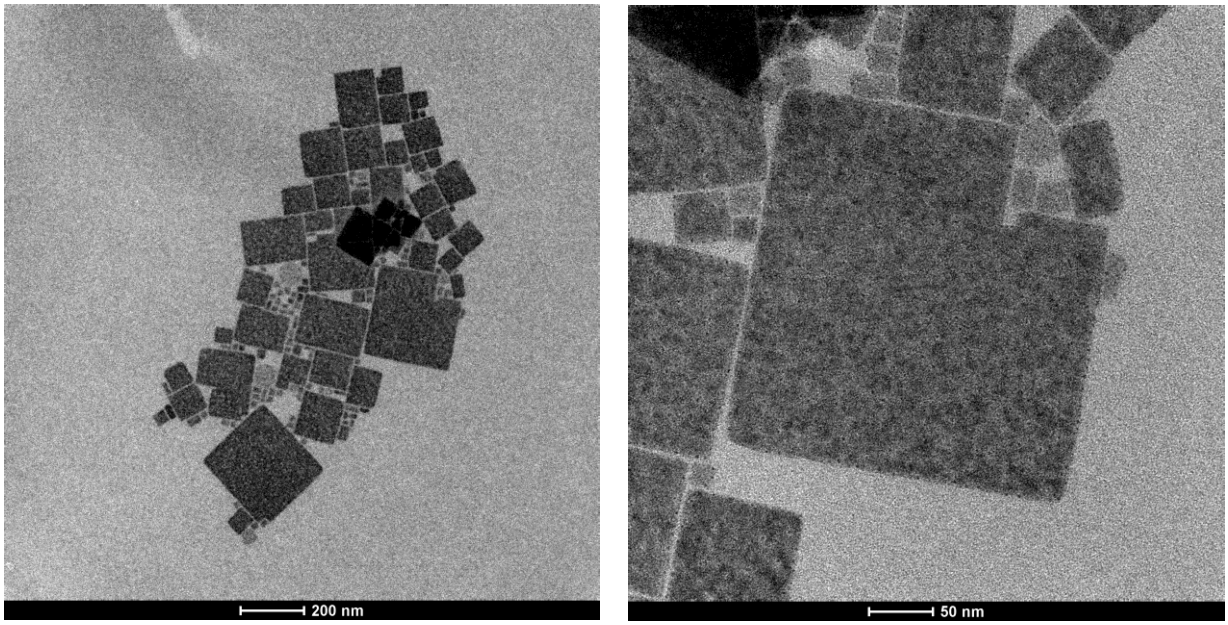

Figure S7. TEM images of $CsPbBr_3$ nanosheets, showing some nanosheets with missing corners.