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 CsPbI₃ nanosheets and the standard cubic phase CsPbI₃. The diffraction peaks ascribed to the orthorhombic phase CsPbI₃ were indicated by asterisks. The inset shows the sample after XRD data collection, in which the light yellowish color suggested the partial conversion of CsPbI₃ nanosheets despite the short period of exposure (~ 30 min). (b) XRD patterns of CsPbI₃ nanosheets after prolonged exposure and the standard orthorhombic phase CsPbI₃. The inset shows the sample after exposure to air for 2 h, showing the complete transition of CsPbI₃ 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$_2$I 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.