Supporting Information for

Ligand-Mediated Synthesis of Compositionally-Related Cesium Lead Halide $CsPb_2X_5$ Nanowires with Improved Stability

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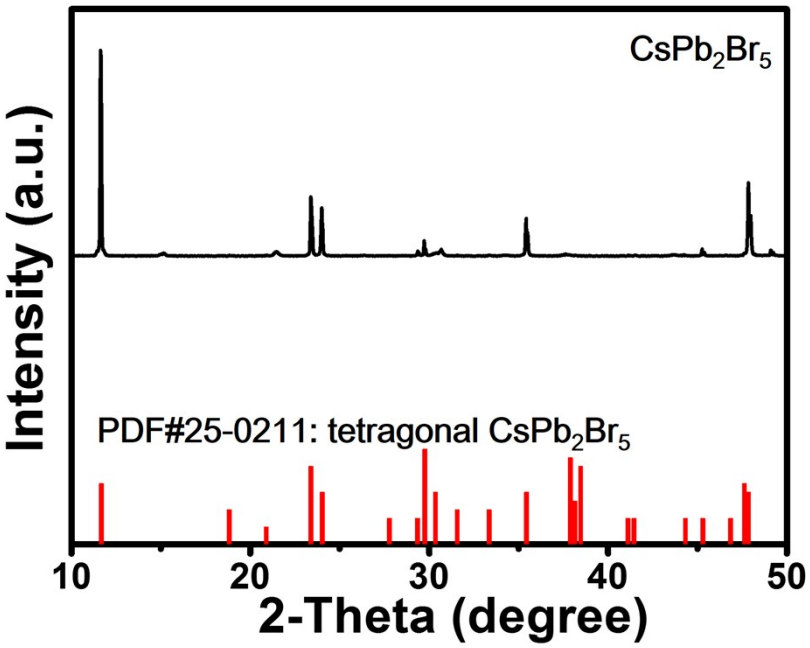

Figure S1. X-ray diffraction (XRD) patterns of the $CsPb_2Br_5$ nanowires (black line). Stick patterns: Standard PXRD of tetragonal $CsPb_2Br_5$ (PDF#25-0211, red line).

Table.S1 Fine XRD results of $CsPb_2X_5$ (X=Cl, Br or I) nanowires with different halide ratio. (Peak 1 and Peak 2 correspond to {002} and {413} planes of the tetragonal $CsPb_2X_5$)

Different proportion of halogen	Peak 1	Peak 2
I:Br=7:3	9.9±0.08	45.1±0.10
I:Br=2:8	11.3±0.06	46.6±0.05
I(Cl):Br=0:10	11.6±0.07	47.8±0.07
Cl:Br=3:7	11.8±0.08	48.2±0.04
Cl:Br=7:3	12.1±0.11	48.7±0.06

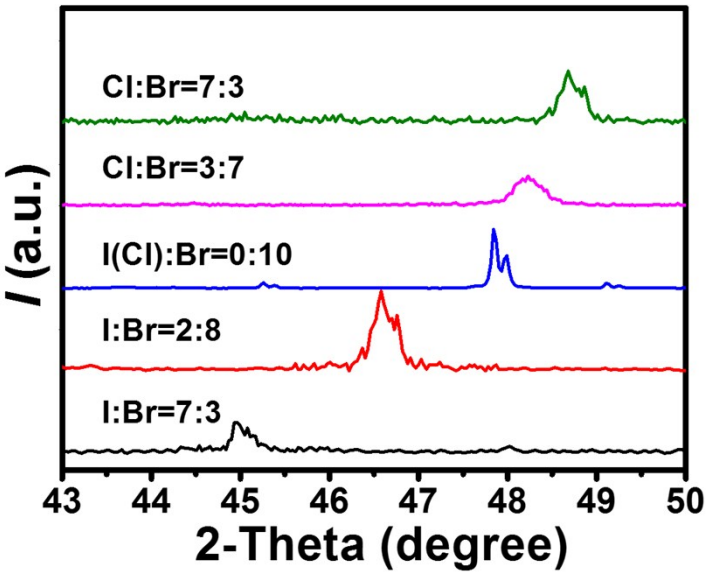

Figure S2. Fine XRD spectra in Figure **2A** of $CsPb_2X_5$ (X=Cl, Br or I) nanocrystals with different halide ratio.

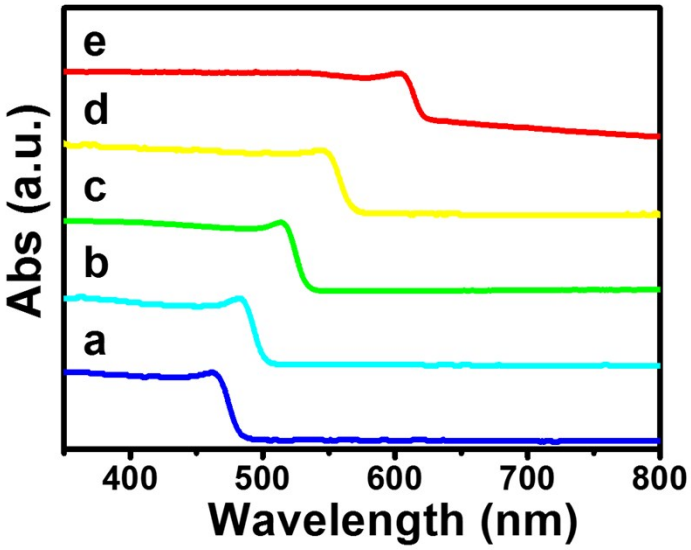

Figure S3. UV-Vis spectra of the $CsPb_2X_5$ (X=Cl, Br or I) nanowires with anion exchange.

Table S2. Correlations between bandgap and composition.

Sample	Bandgap (eV)	x	Halogen ratio
a	2.67	3.5	Cl/Br = 7/3
b	2.56	1.5	Cl/Br = 3/7
c	2.36	0	Cl or I/Br = 0/1
d	2.19	1.1	I/Br = 2.2/7.8
e	2.00	3.5	I/Br = 7/3

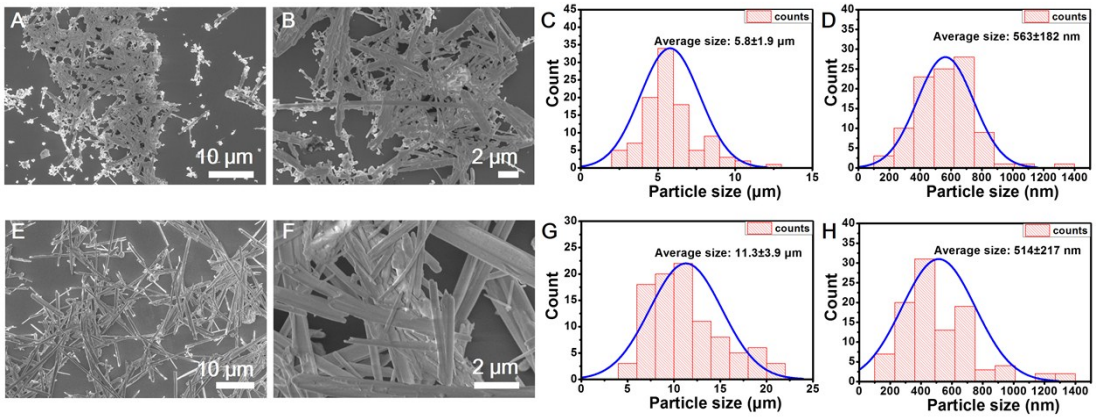

Figure S4. (**A**) and (**B**) Scanning electron microscopy (SEM) images of the blue (465 nm) nanowires with anion exchange; (**C**) and (**D**) Statistical distribution histogram of the blue (465 nm) nanowires with anion exchange (Length: 5.8 μm, width: 563 nm); (**E**) and (**F**) Scanning electron microscopy (SEM) images of the red (620 nm) nanowires with anion exchange; (**G**) and (**H**) Statistical distribution histogram of the red (620 nm) nanowires with anion exchange (Length: 11.3 μm, width: 514 nm).

Table S3. Relative PL intensity of the direct synthesis and anion exchange in humid air (60% RH, 25 °C).

Sample	Percentage
$CsPb_2(Cl_{0.7}/Br_{0.3})_5$-Direct synthesis-465 nm	114 %
$CsPb_2(I_{0.7}/Br_{0.3})_5$-Direct synthesis-621 nm	106 %
$CsPb_2Cl_XBr_{5-X}$-Anion exchange-465 nm	29 %
$CsPb_2I_XBr_{5-X}$ -Anion exchange-621 nm	40 %