Supplementary Materials

Inter-conversion between Different Compounds of Ternary Cs-Pb-Br System

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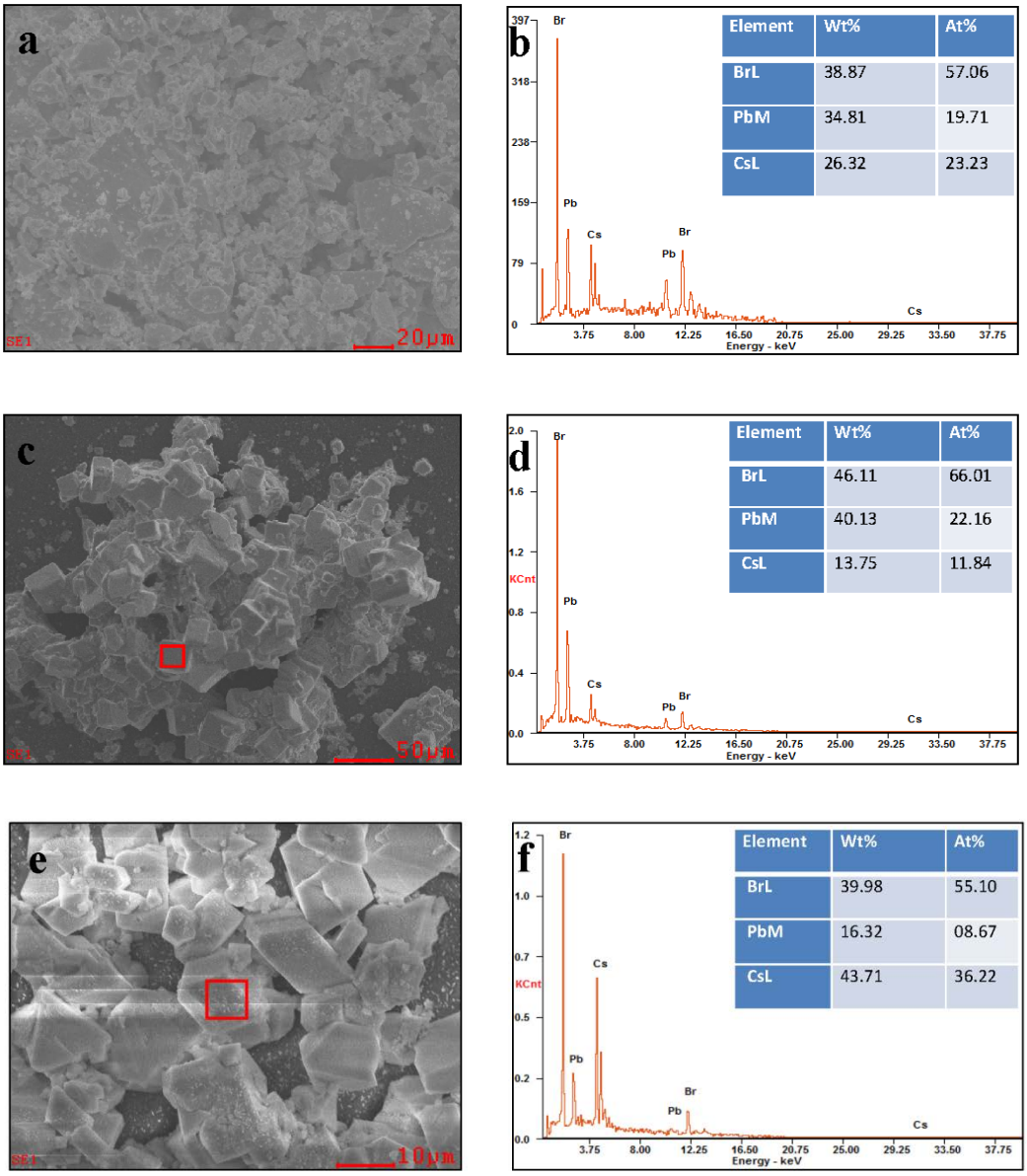

Figure S1. The SEM images of (**a**) $CsPbBr_3$, (**c**) Cs_4PbBr_6 and (**e**) $CsPb_2Br_5$. The Energy dispersive X-spectroscopy of (**b**) $CsPbBr_3$, (**d**) Cs_4PbBr_6 and (**f**) $CsPb_2Br_5$.

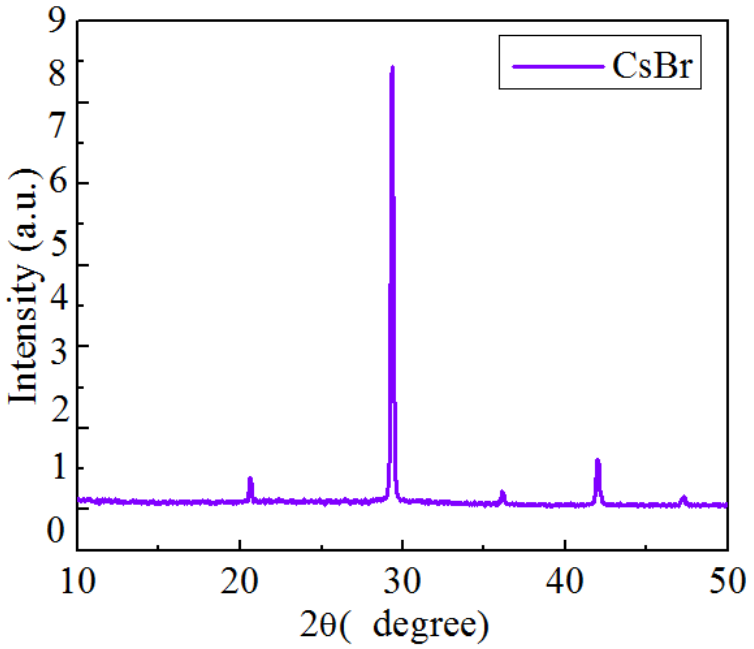

Figure S2. The XRD pattern of CsBr (PDF#73-0391) obtained from the solvent of water by evaporation.

Table S1. The total energy of each materials is calculated based on the optimized structure using DFT. The change of the total energy is obtained by the difference between the products and the reactants.

	$CsPbBr_3$	$PbBr_2$	$CsPb_2Br_5$	CsBr	Cs_4PbBr_6
Total energy (Et)	**-368.24550680 Ry**	**-1032.20505769 Ry**	**-2505.07266819 Ry**	**-110.17268316 Ry**	**-1397.59804554 Ry**

$CsPbBr_3 + 3CsBr = Cs_4PbBr_6$ (1)

$\Delta Et = Et_{Cs4PbBr6} - Et_{CsPbBr3} - Et_{CsBr} = -698.83 Ry = -9508.07$ eV

$CsPbBr_3 + PbBr_2 = CsPb_2Br_5$ (2)

$\Delta Et = Et_{CsPb2Br5} - Et_{CsPbBr3} - 3Et_{PbBr2} = -1104.62$ Ry $= -15029.13$eV