

Supporting information

Bandgap tuning of CsPbBr_3 perovskite with synergistically improved quality via Sn^{2+} doping for high-performance carbon-based inorganic perovskite solar cells

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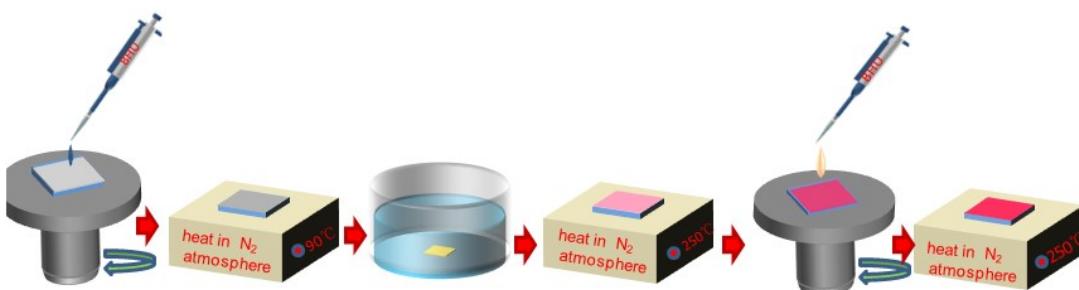


Fig. S1 Schematic illustration of the deposition process of $\text{CsPb}_{1-x}\text{Sn}_x\text{Br}_3$ perovskite films

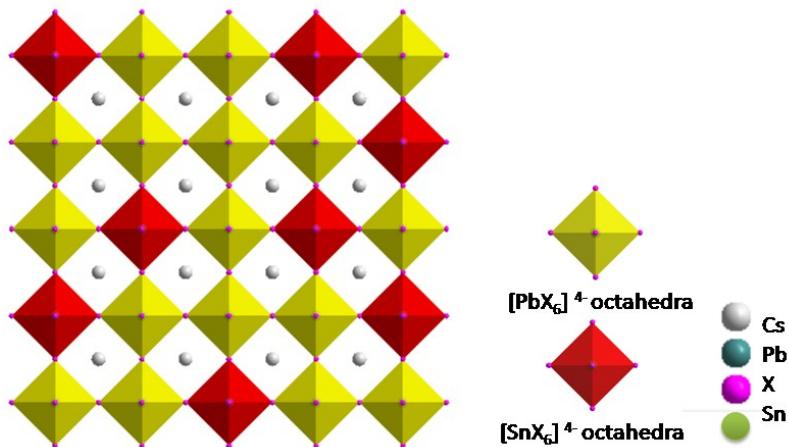


Fig. S2 Crystal structural model of $\text{CsPb}_{1-x}\text{Sn}_x\text{Br}_3$ perovskite

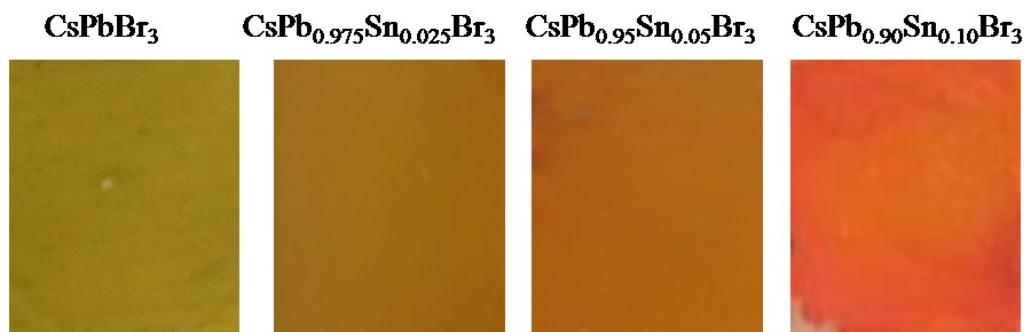


Fig. S3 Optical images of $\text{CsPb}_{1-x}\text{Sn}_x\text{Br}_3$ perovskite films

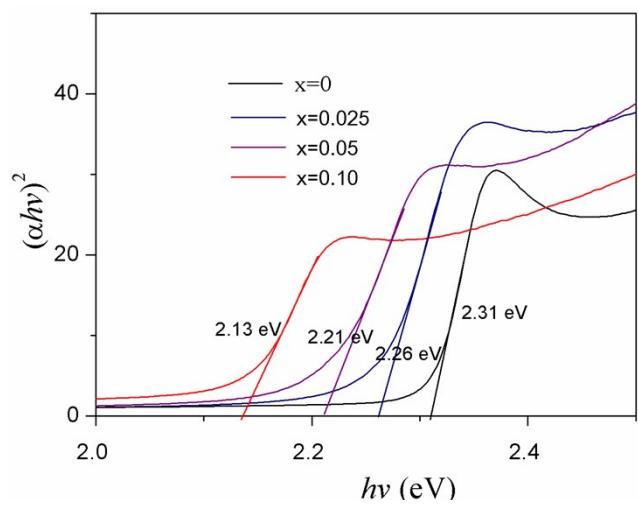


Fig. S4 Tauc plots of $\text{CsPb}_{1-x}\text{Sn}_x\text{Br}_3$ perovskite films

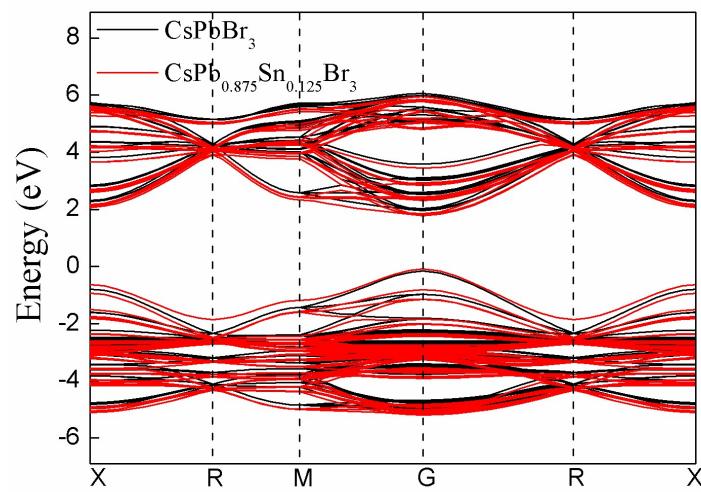


Fig. S5 The calculated band structure of CsPbBr_3 and $\text{CsPb}_{0.875}\text{Sn}_{0.125}\text{Br}_3$ perovskites

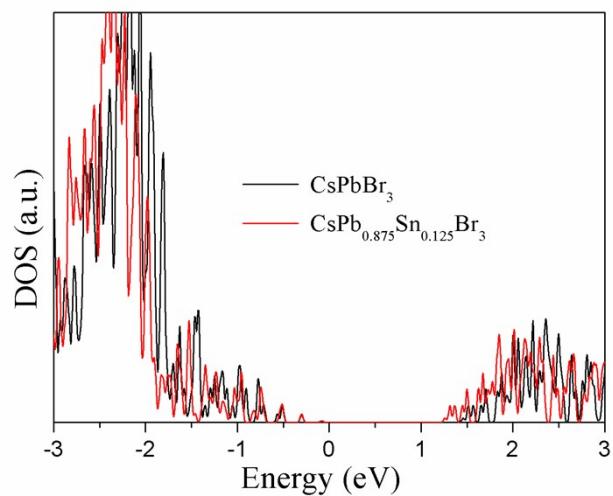


Fig. S6 The calculated total DOS of CsPbBr_3 and $\text{CsPb}_{0.875}\text{Sn}_{0.125}\text{Br}_3$ perovskites

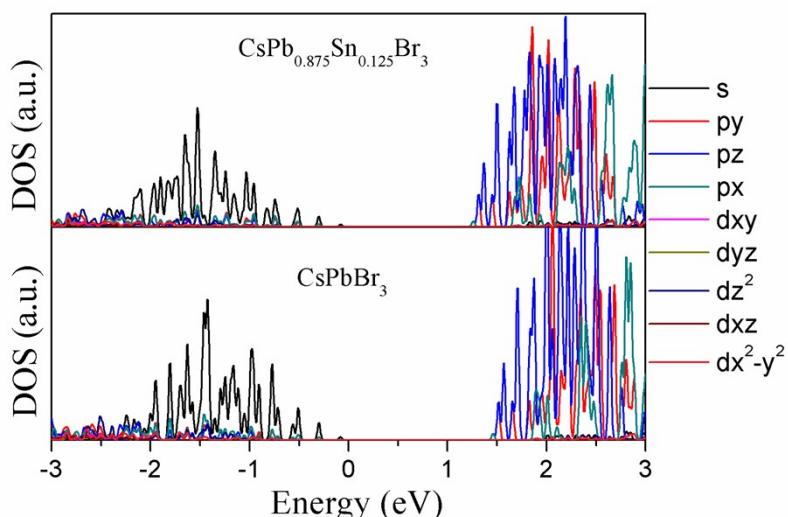


Fig. S7 The calculated DOS of Pb for CsPbBr_3 and $\text{CsPb}_{0.875}\text{Sn}_{0.125}\text{Br}_3$ perovskites

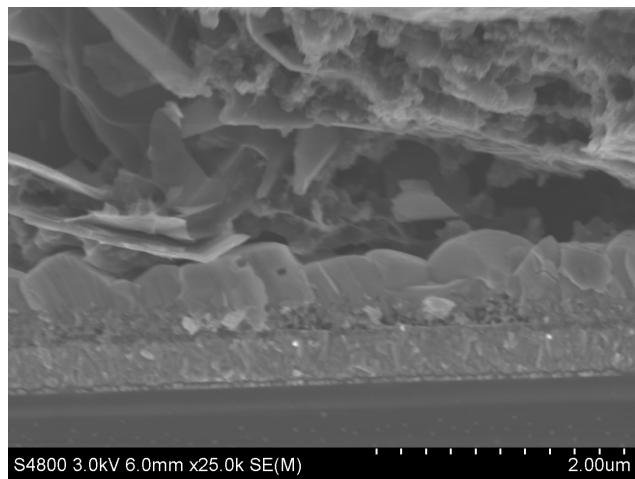


Fig. S8 The cross-sectional SEM image of carbon-based PSC with $\text{CsPb}_{0.95}\text{Sn}_{0.05}\text{Br}_3$ perovskite film

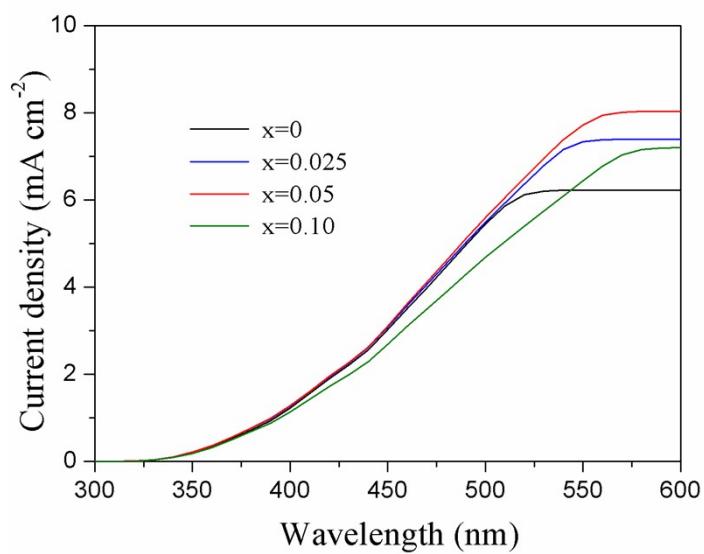


Fig. S9 Integrated current density of PSCs based on $\text{CsPb}_{1-x}\text{Sn}_x\text{Br}_3$ perovskite films

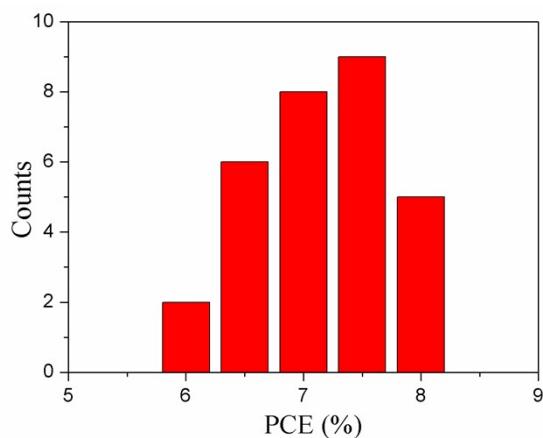


Fig. S10 Statistical efficiency distribution of 30 devices based on $\text{CsPb}_{0.95}\text{Sn}_{0.05}\text{Br}_3$ perovskite film.

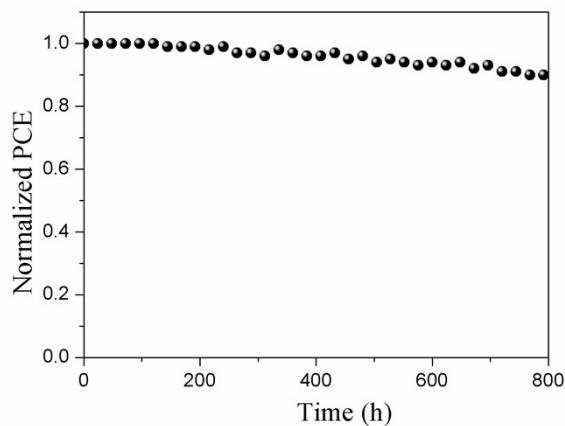


Fig. S11 Normalized PCE of CsPbBr_3 -based PSC without any encapsulation in ambient condition with a temperature of 30 °C and a relative humidity of 45%.