Electronic Supporting Information

Precursor-Compensation Strategy Boosts Photoresponse Performance of Air-stable, Self-powered Cs_2SnI_6 Photodetectors

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Typically, Cs_2SnI_6 films are prepared by using a stoichiometric SnI_4: CsI ratio (1:2) in the precursor solution. However, due to the easy volatilization of SnI_4, CsI precursor will be excessive in the film-forming process, especially for the films fabricated with stoichiometric precursor. **Fig. S1** shows the XRD patterns of the Cs_2SnI_6 films (without SnI_4 precursor compensation) prepared with SnI_4: CsI stoichiometric (1:2) and non-stoichiometric (1:1) ratios. Obviously, stronger CsI impurity peaks are observed for the Cs_2SnI_6 film obtained with the SnI_4: CsI ratio of 1:2 than that with ratio of 1:1, suggesting the non-stoichiometric precursor engineering will make it easier to obtain a pure-phase (CsI impurity free) Cs_2SnI_6 double perovskite through the developed PCT strategy.

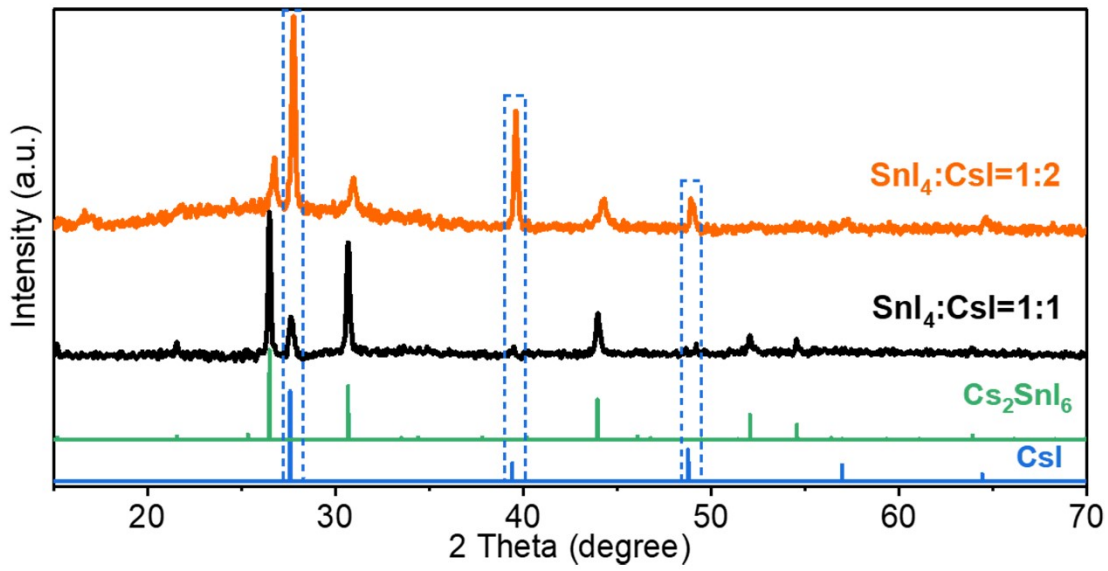

Fig. S1 XRD patterns of the Cs_2SnI_6 films prepared with different SnI_4: CsI stoichiometric ratios.

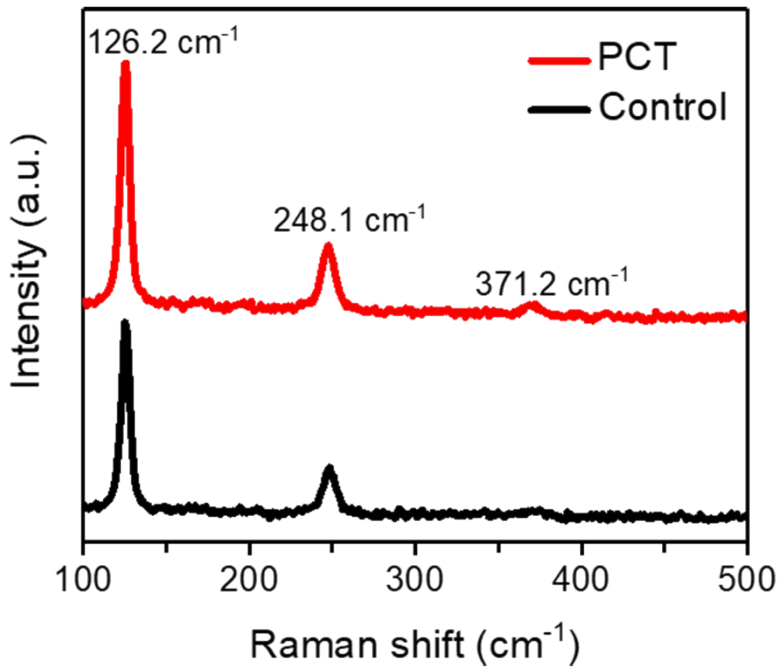

Fig. S2 Raman spectra of the PCT-Cs_2SnI_6 film and control sample.

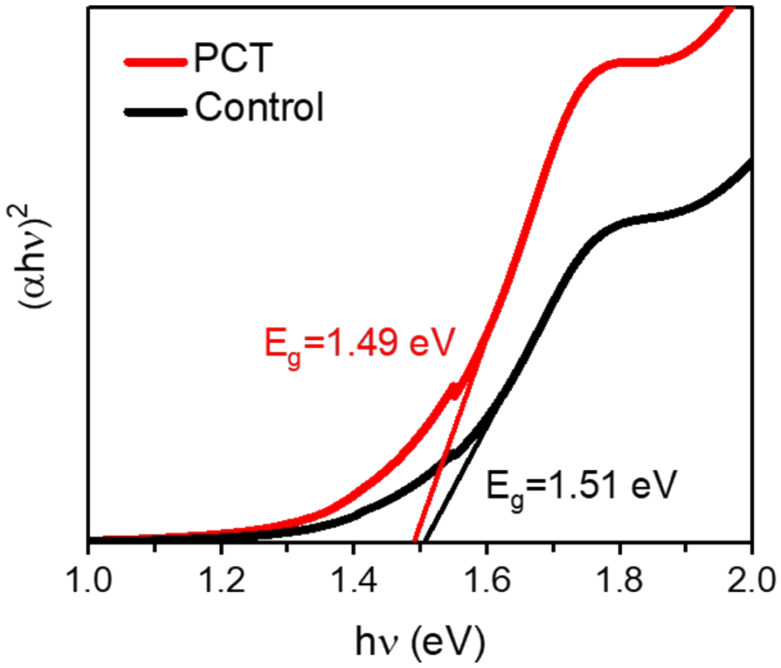

Fig. S3 Tauc plot of the PCT-Cs_2SnI_6 film and control sample.