

Supplementary Information

Sn²⁺ doping-induced large extra vibrational energy of excited state for efficient blue emission in Cs₂SnCl₆: Bi

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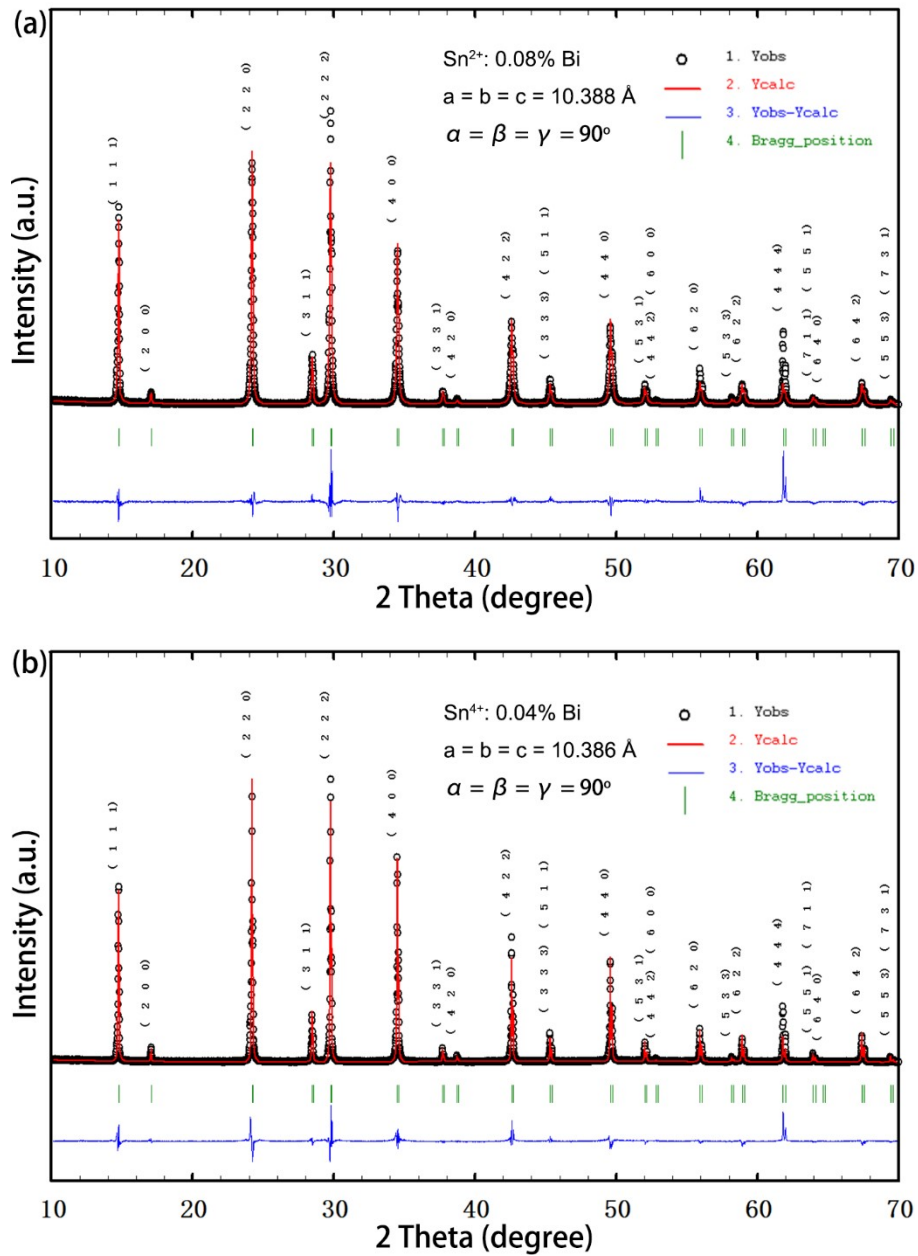


Figure S1. The XRD Rietveld refinement of Sn^{2+} : 0.08% Bi and Sn^{4+} : 0.04% Bi.

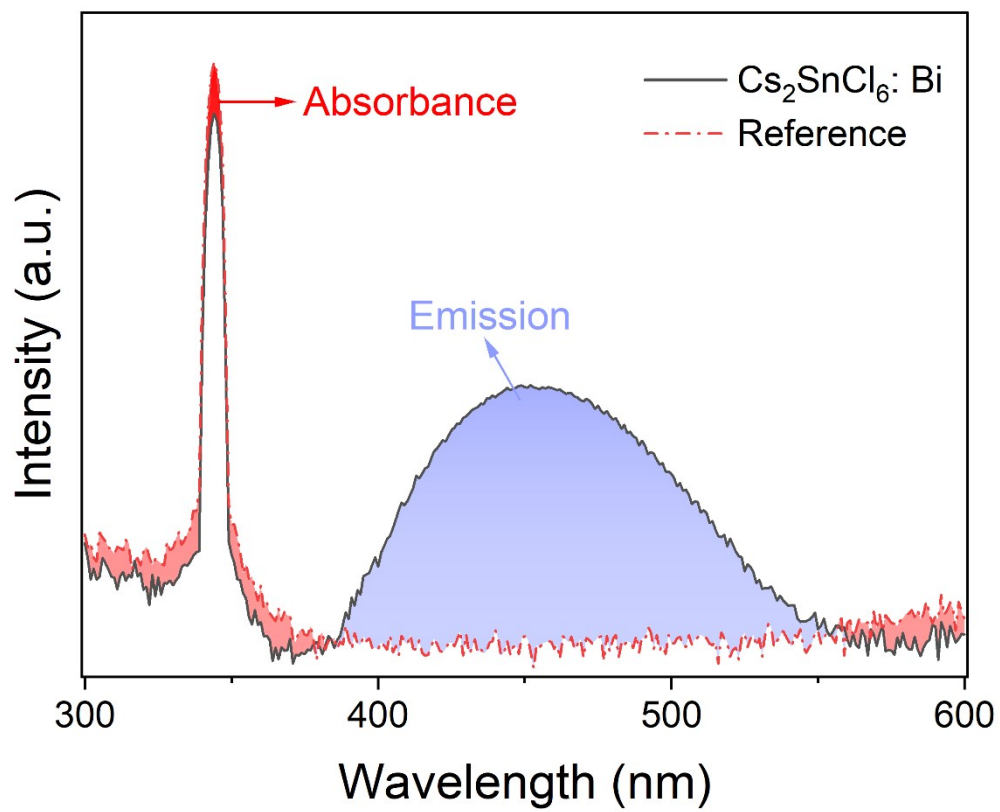


Figure S2. PL spectra for PLQY of $\text{Cs}_2\text{SnCl}_6:\text{Bi}$ at room temperature.

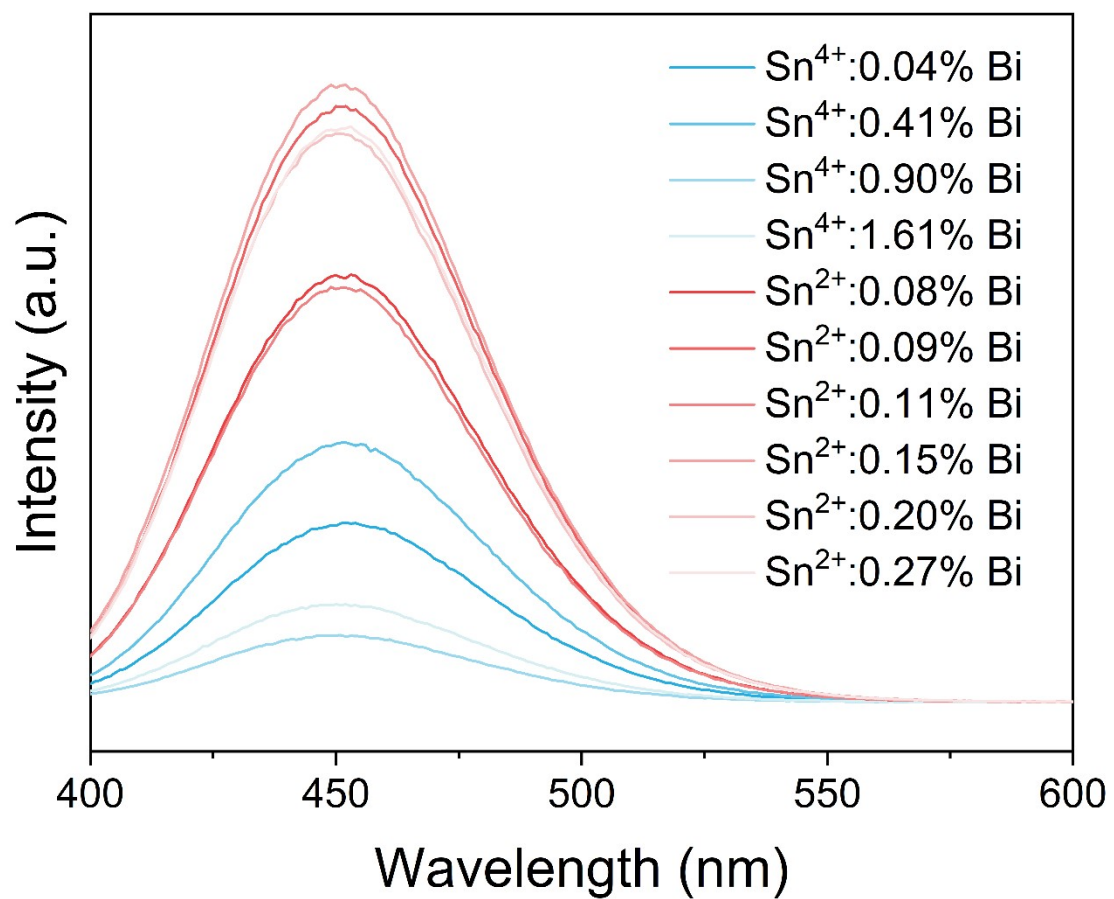


Figure S3. PL spectra of the $\text{Cs}_2\text{SnCl}_6:\text{Bi}$ samples synthesized by SnCl_2 or SnCl_4 precursor.

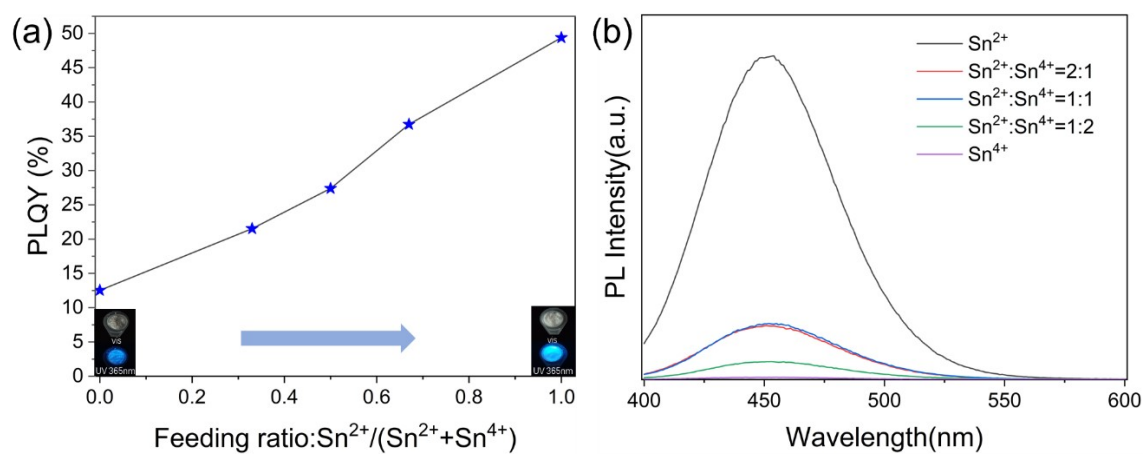


Figure S4. (a) PLQY and (b) PL spectra of the samples synthesized by different ratio of Sn²⁺ and Sn⁴⁺ in precursor solutions.

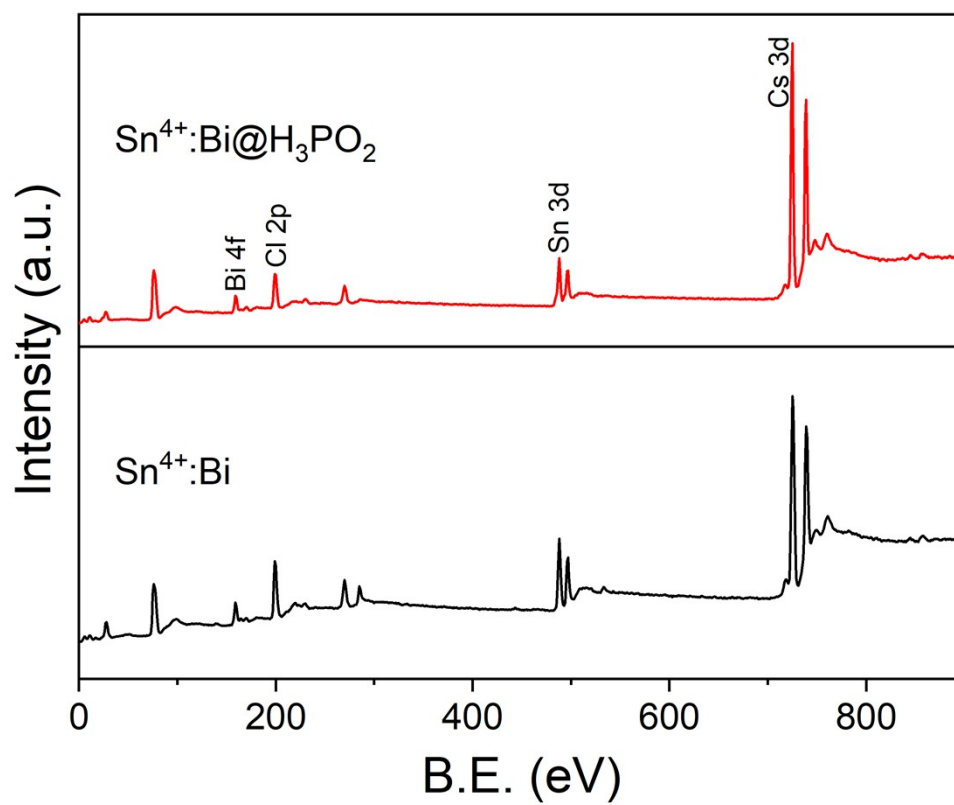


Figure S5. Full-scan XPS spectra of $\text{Sn}^{4+}:\text{Bi}@\text{H}_3\text{PO}_2$ and $\text{Sn}^{4+}:\text{Bi}$.

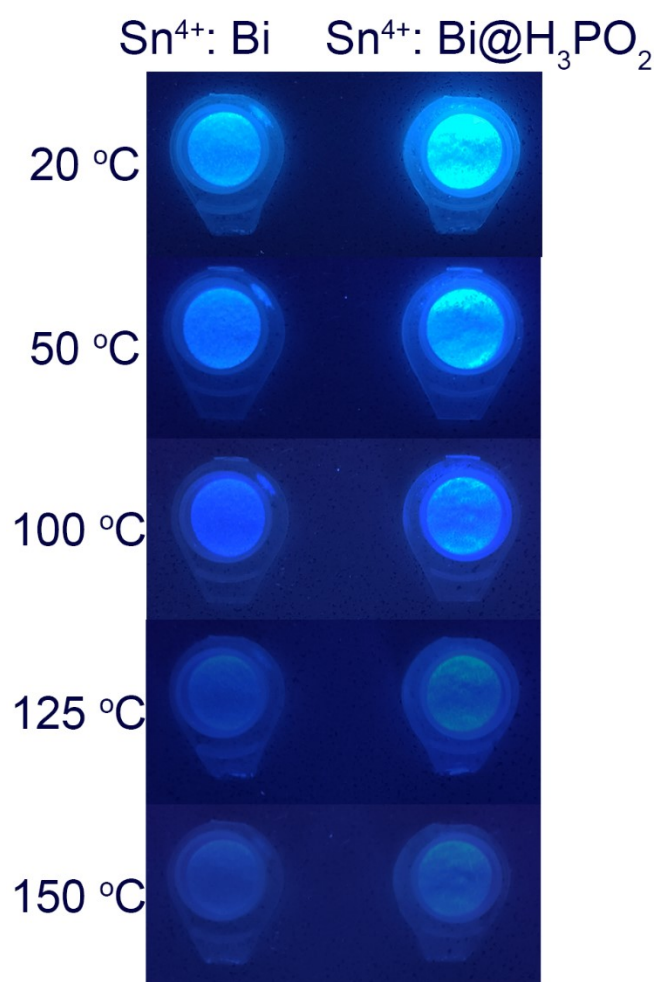


Figure S6. PL intensity of Sn⁴⁺: Bi and Sn⁴⁺: Bi@H₃PO₂ at different temperatures under UV light.

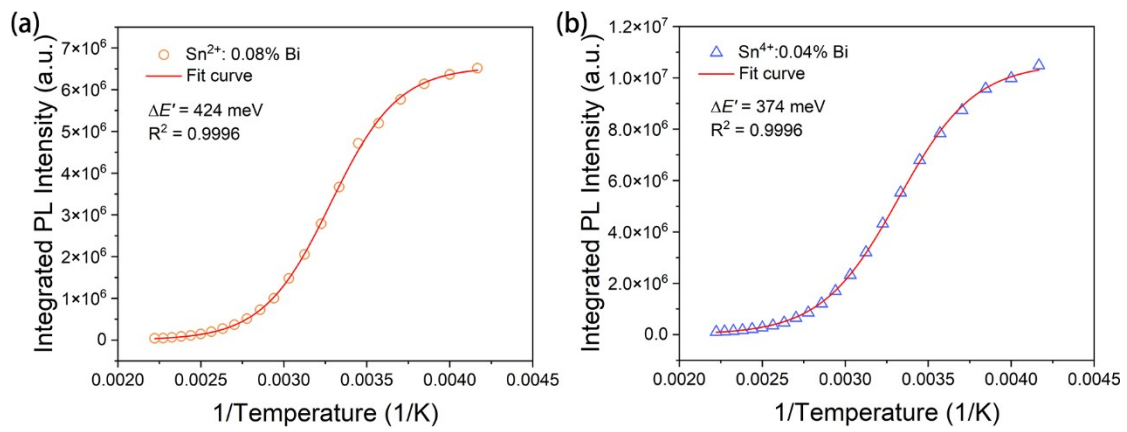


Figure S7. Integrated PL intensity as a function of temperature of (a) Sn²⁺: 0.08% Bi and (b) Sn⁴⁺: 0.04% Bi.