Blade-Coated $CsPbX_3$ Films for Alphavoltaic and Optoelectronics Applications

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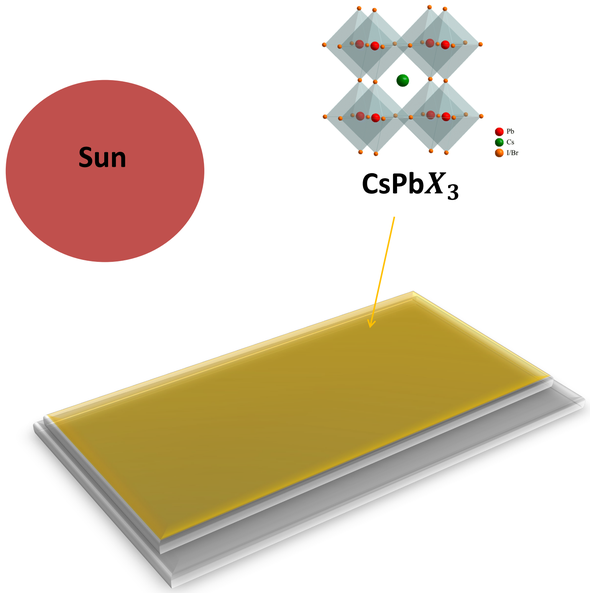
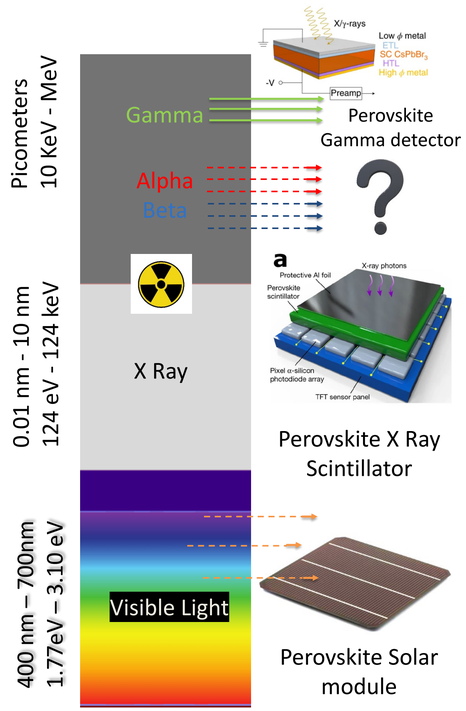
Introduction





- $CsPbX_3$ perovskites exhibit high photoluminescence quantum yields and tunable emission, enabling applications in photovoltaics and light-emitting devices.
- Their wide bandgaps also make them promising candidates for radio-voltaic applications, where efficient high-energy photon conversion is essential.

Mechano-synthesis → Blade Coating

Results

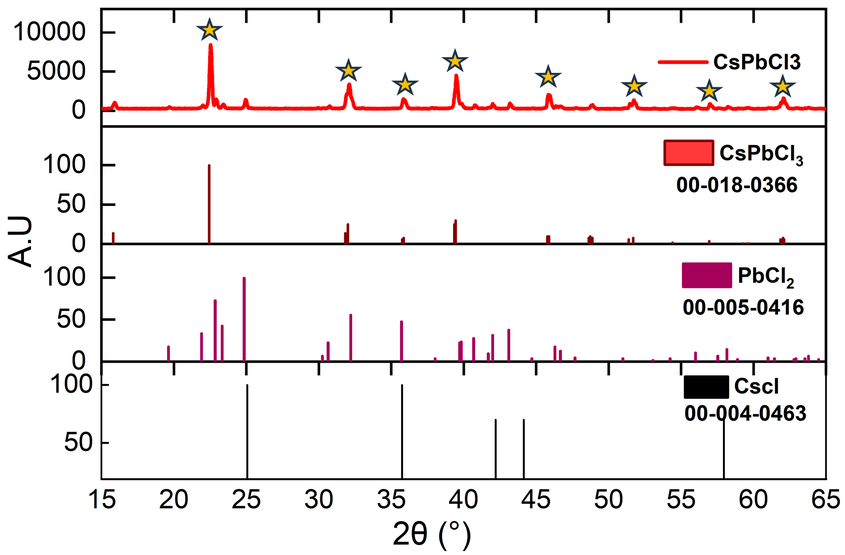


Figure 1 XRD of Cesium Lead Chloride

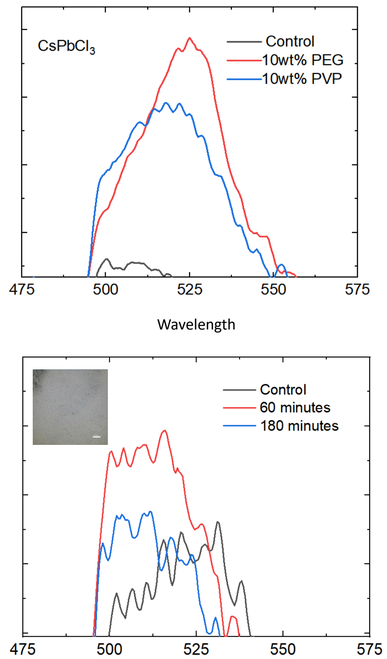


Figure 2 Photoluminescence response

Conclusion

- $CsPbCl_3$ films, fabricated via mechano-synthesis and ambient blade coating, exhibit phase-pure crystallinity, confirmed by XRD.
- The films demonstrate excellent photostability up to 300 °C under ambient conditions, as shown by photoluminescence (PL) measurements.
- Polymer additives effectively passivate the surface, enhancing PL intensity and overall optical quality.
- Thickness and Morphological optimization is still required for radiation testing.
- These properties make $CsPbCl_3$ a promising candidate for three-terminal tandem solar cells and radiation-sensing devices.

FURI

Wibowo, A. et al. Commun. Mater. 4, 21 (2023).Cartledge, C. et al. Energies 2024, 17, 1455.Nguyen, H. et al. MRS Commun. 14, 208–214 (2024).He, Y. et al. Nat. Photonics 15, 36–42 (2021).Bakshi, K. et al. Processes 2024, 12, 1901.Ferdowsi, P. et al. Chem. Mater. 33, 3971–3979 (2021). I thank my mentors Dr. Nicholas Rolston for his valuable mentorship, and the Rolston Lab team for their support. I also acknowledge the Eyring Materials Center (NNCI-EECS-1542160) and Intel for funding this work.

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