

Supplementary Information

Synthesis and Characterization of All Inorganic (CsPbBr₃) Perovskite Single Crystal

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S1. Photoconductivity measurements using two probes:

To study the photoconductivity measurement, a photon is irradiated on a single crystal sample, where two probes instrument is used to read through the photosensitive properties. During Photoconductivity analysis, a single crystal sample with the contact of silver (Ag) paste leads to the number of photons illuminated from the sample, which turns into photocurrent. Time-dependent photoresponse was examined with the two monochromatic stable laser wavelengths 532nm and 376nm (UV and visible range) at room temperature.

The cascade Keithley 2634B source meter, along with an instrument from Microtech accomplices, is attached to illumination monochromatic laser sources of UV-376 nm with power ($P_d=2.8\text{mW}/\text{cm}^2$) and Visible range -532 nm ($P_d=32\text{ mW}/\text{cm}^2$), which complete the optoelectrical analysis of the single crystal. The Detectivity and responsivity are anticipated using the relation, the number of photocurrents generated by photons per unit irradiation area, and the illumination of the light sources power. ^{1,2}

$$R_{ph} = \frac{I_{ph}}{P_d A}$$

R_{ph} , A , P_d represents responsivity, illumination area, incident power, respectively.

Detectivity is a relation between the noise-equivalent power (NEP) and responsivity:^{3,4}

$$D = \frac{R_{ph} \sqrt{A}}{\sqrt{2qI_{dark}}} =$$

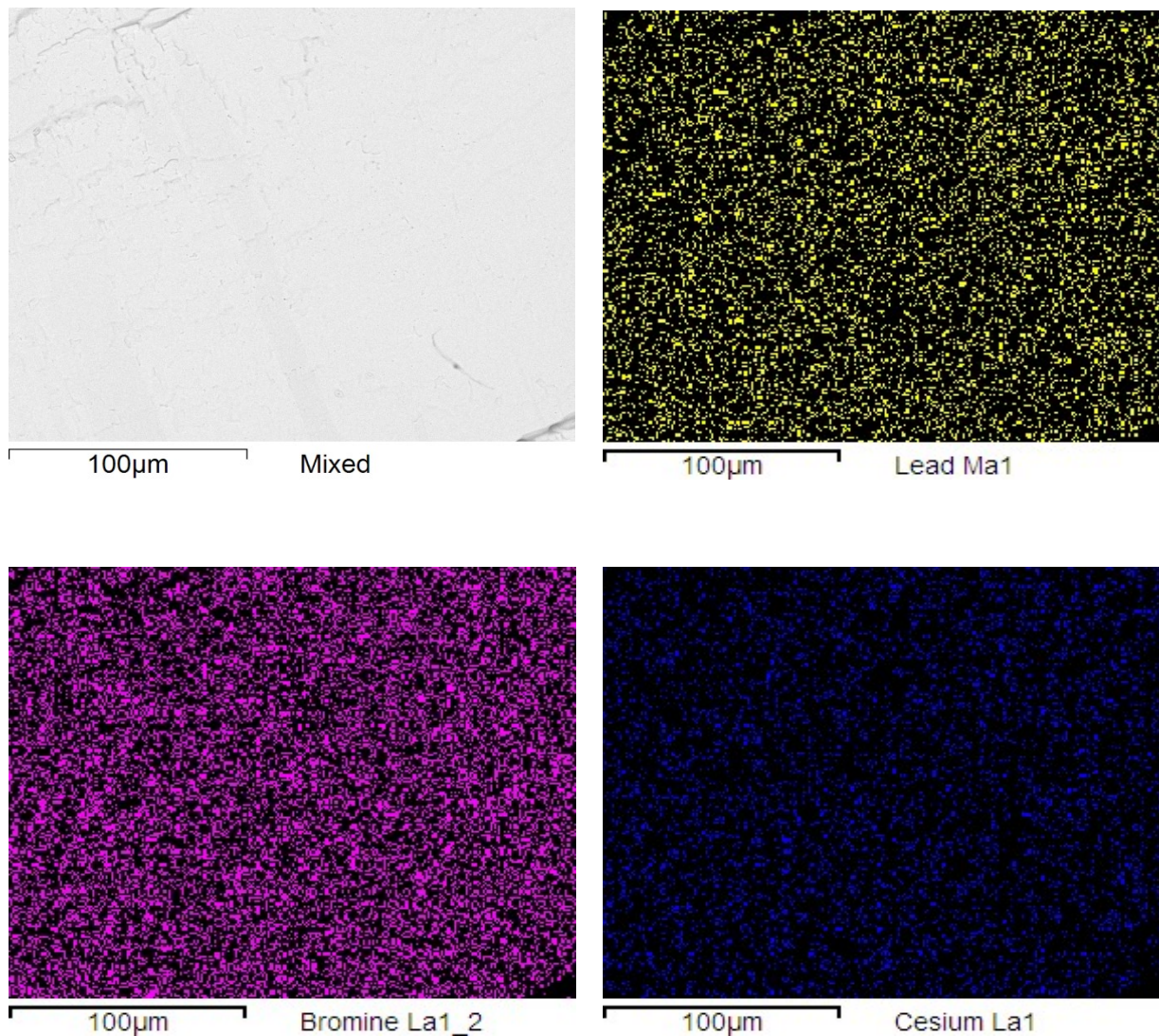
I_{dark} , R_{ph} , q and A represents a dark current, photoresponsivity, elementary charge, and illumination area respectively.

The measurements of rise and fall times were obtained by the help of fitting curves with equation I and II respectively,

$$I = I_0 \left(1 - e^{-\frac{t}{\tau_r}} \right) \tag{I}$$

$$I = I_0 \left(e^{-\frac{t}{\tau_d}} \right) \tag{II}$$

Where τ_r and τ_d listed the rise and the decay time constants respectively, The results were observed in millisecond time scale for UV and Visible light irradiation.



Summary results

Element	Weight %	Weight % σ	Atomic %
Bromine	41.507	0.528	59.596
Cesium	25.885	0.519	22.346
Lead	32.608	0.612	18.058

Figure S1: Represent elementary analysis by energy-dispersive X-ray spectroscopy in Supplementary Figure S1

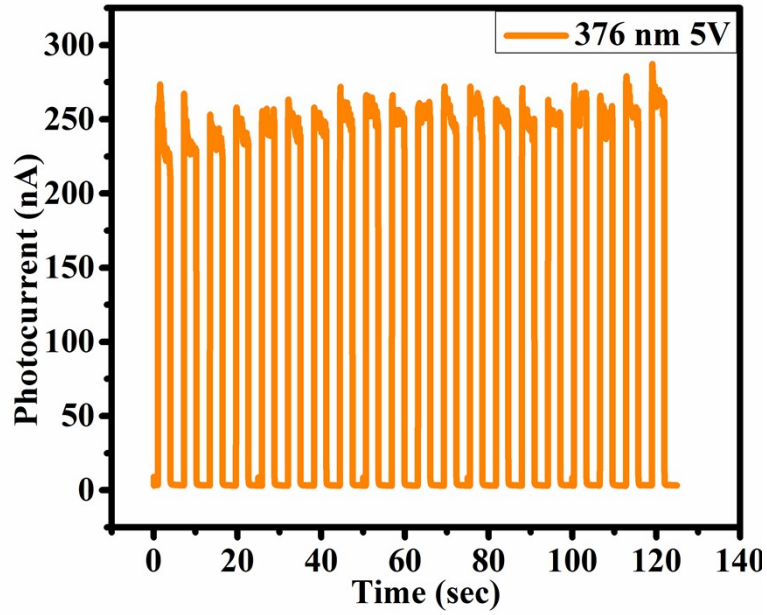


Figure S2: Represent long photocurrent response.

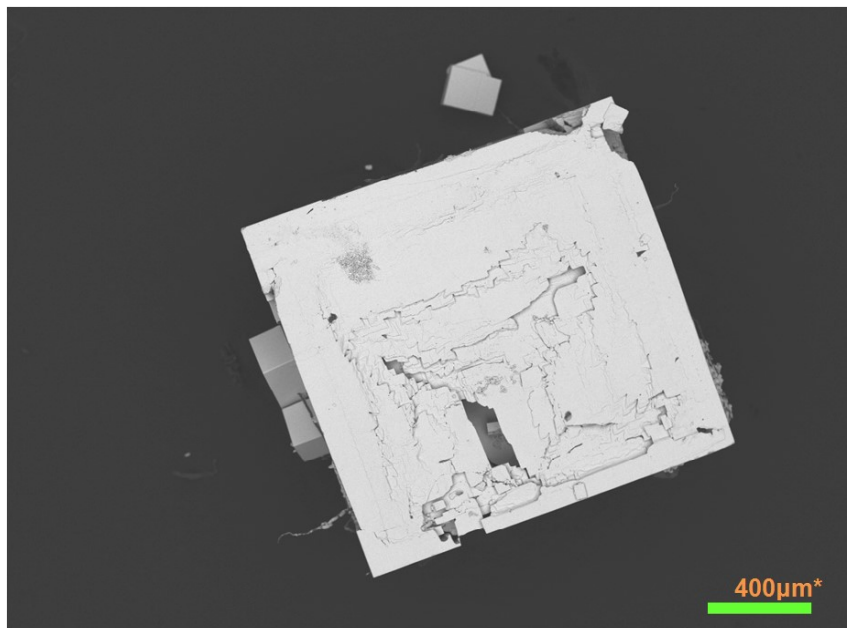


Figure S3: SEM image CsPbBr₃ perovskite single crystal.

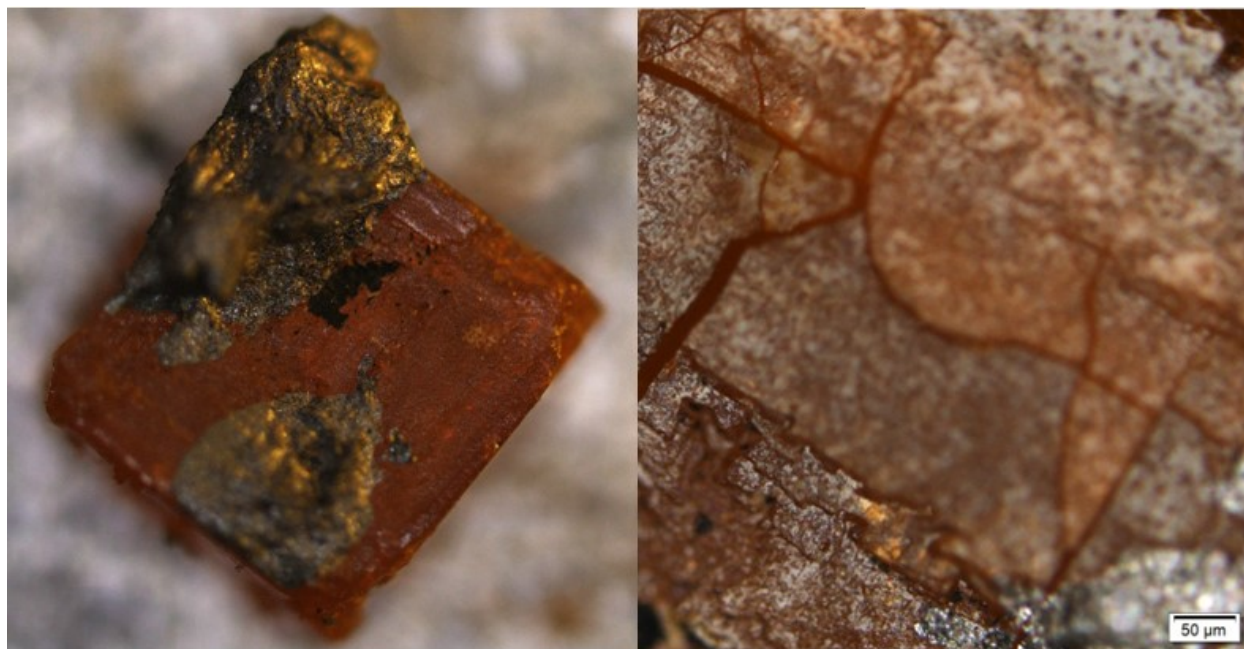


Figure S4: image CsPbBr_3 perovskite single crystal under optical microscopy.

References:

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