

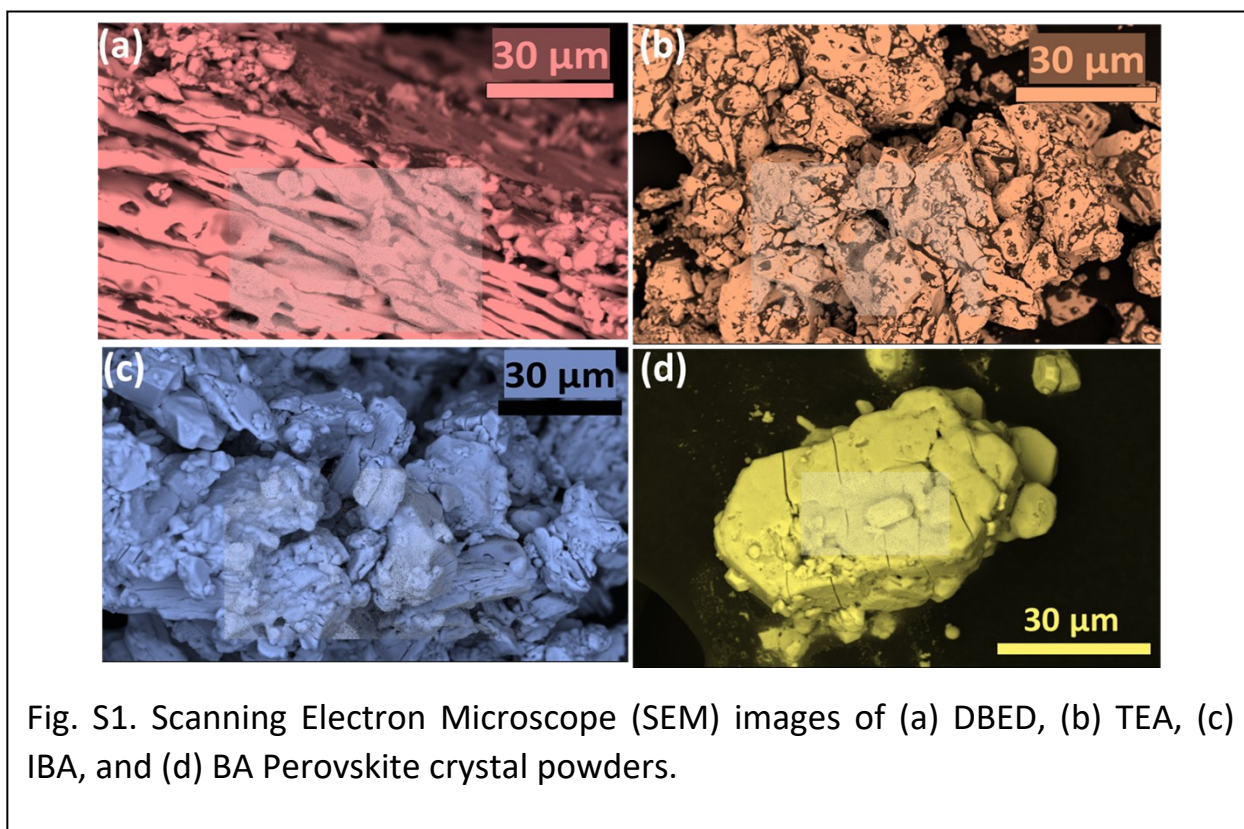
Synthesis of Different Organic Ammonium-Based Bismuth Iodide Perovskites for Photodetection Application

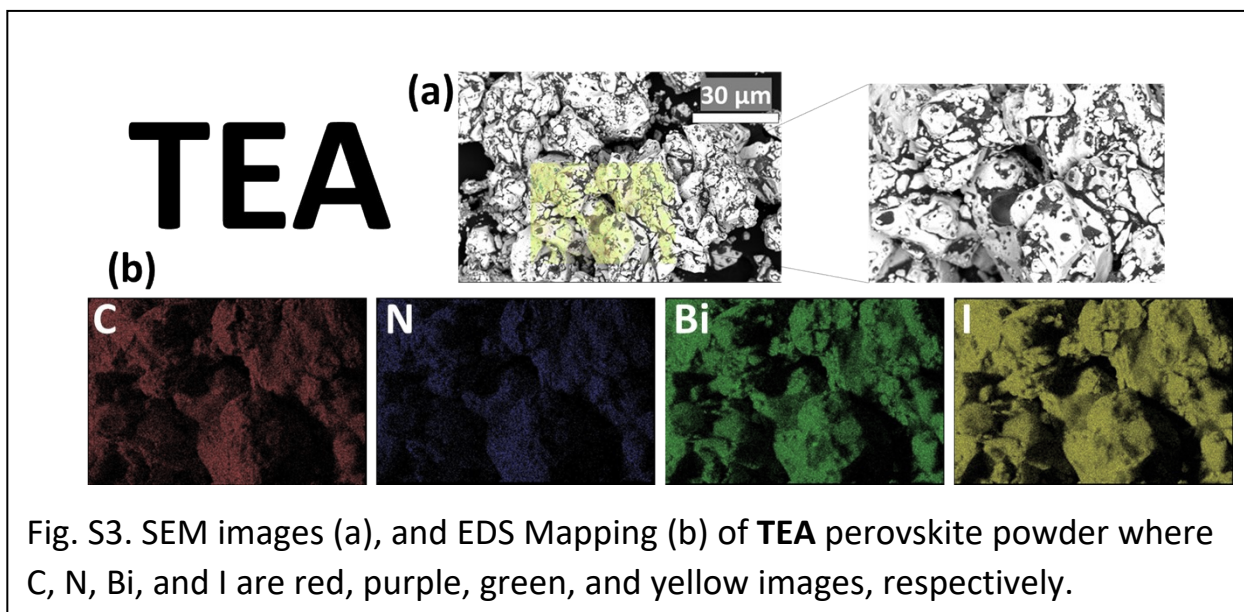
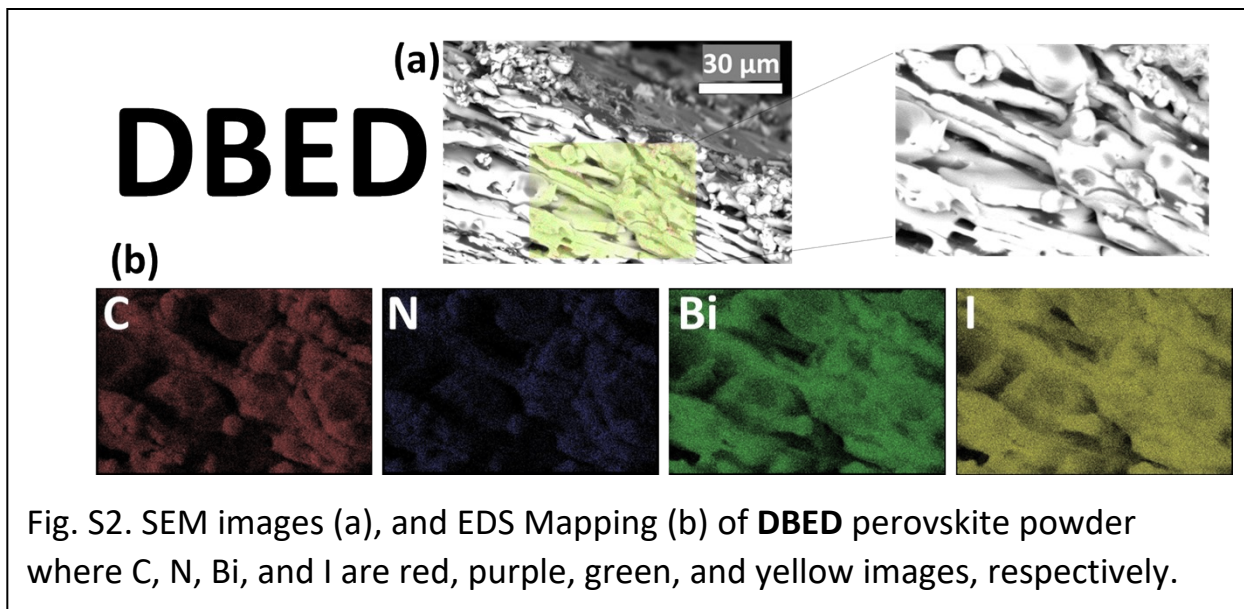
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Supporting Figures





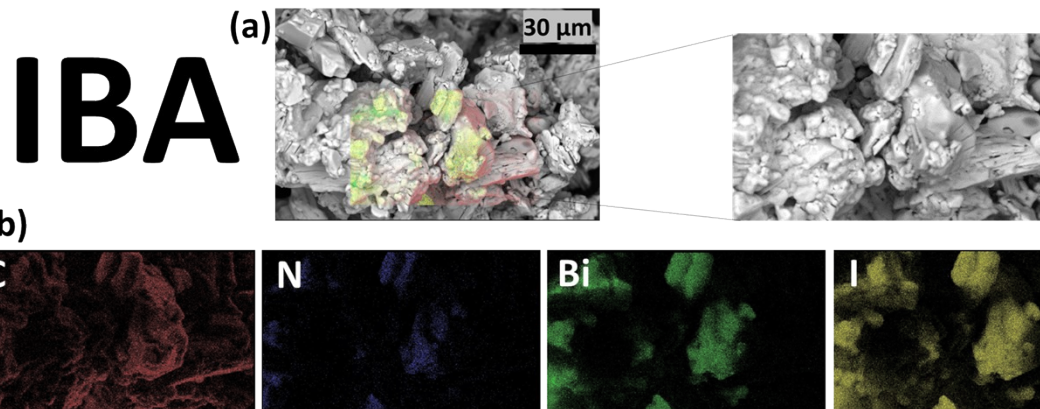


Fig. S4. SEM images (a), and EDS Mapping (b) of **IBA** perovskite powder where C, N, Bi, and I are red, purple, green, and yellow images, respectively.

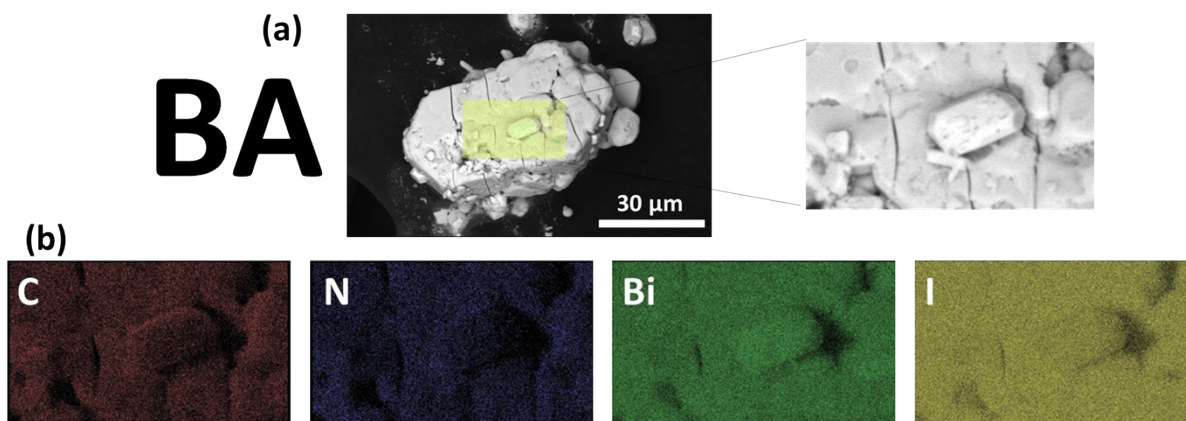
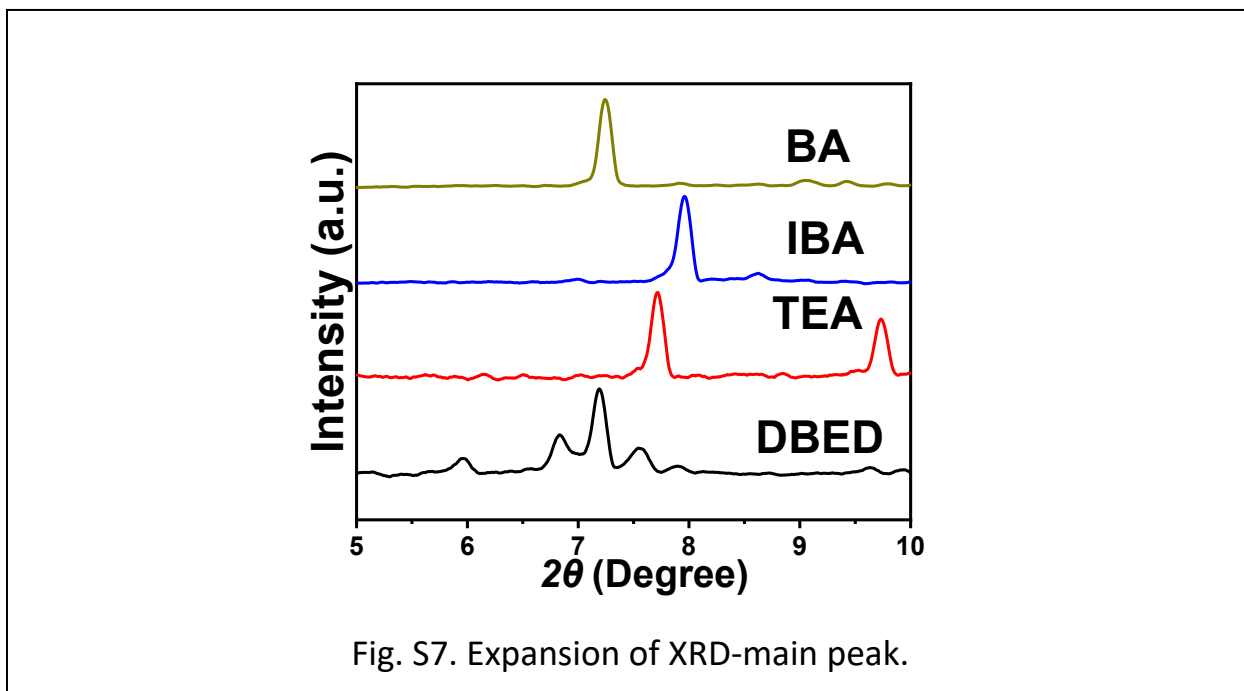
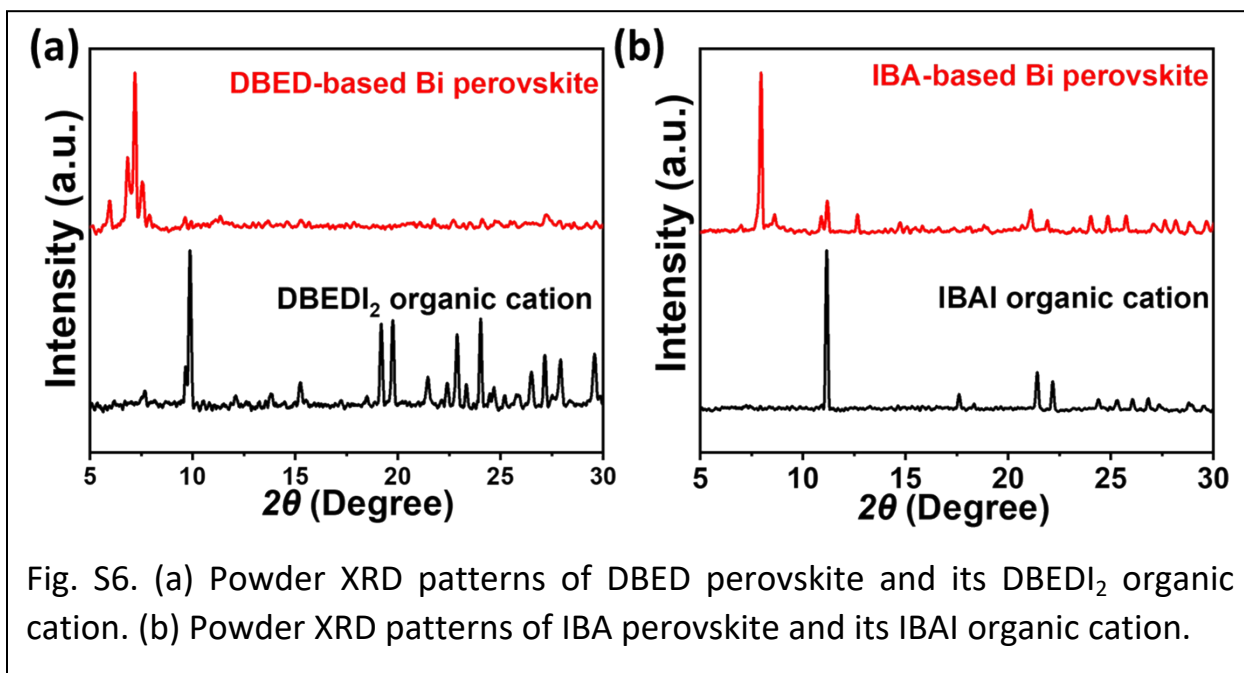


Fig. S5. SEM images (a), and EDS Mapping (b) of **BA** perovskite powder where C, N, Bi, and I are red, purple, green, and yellow images, respectively.



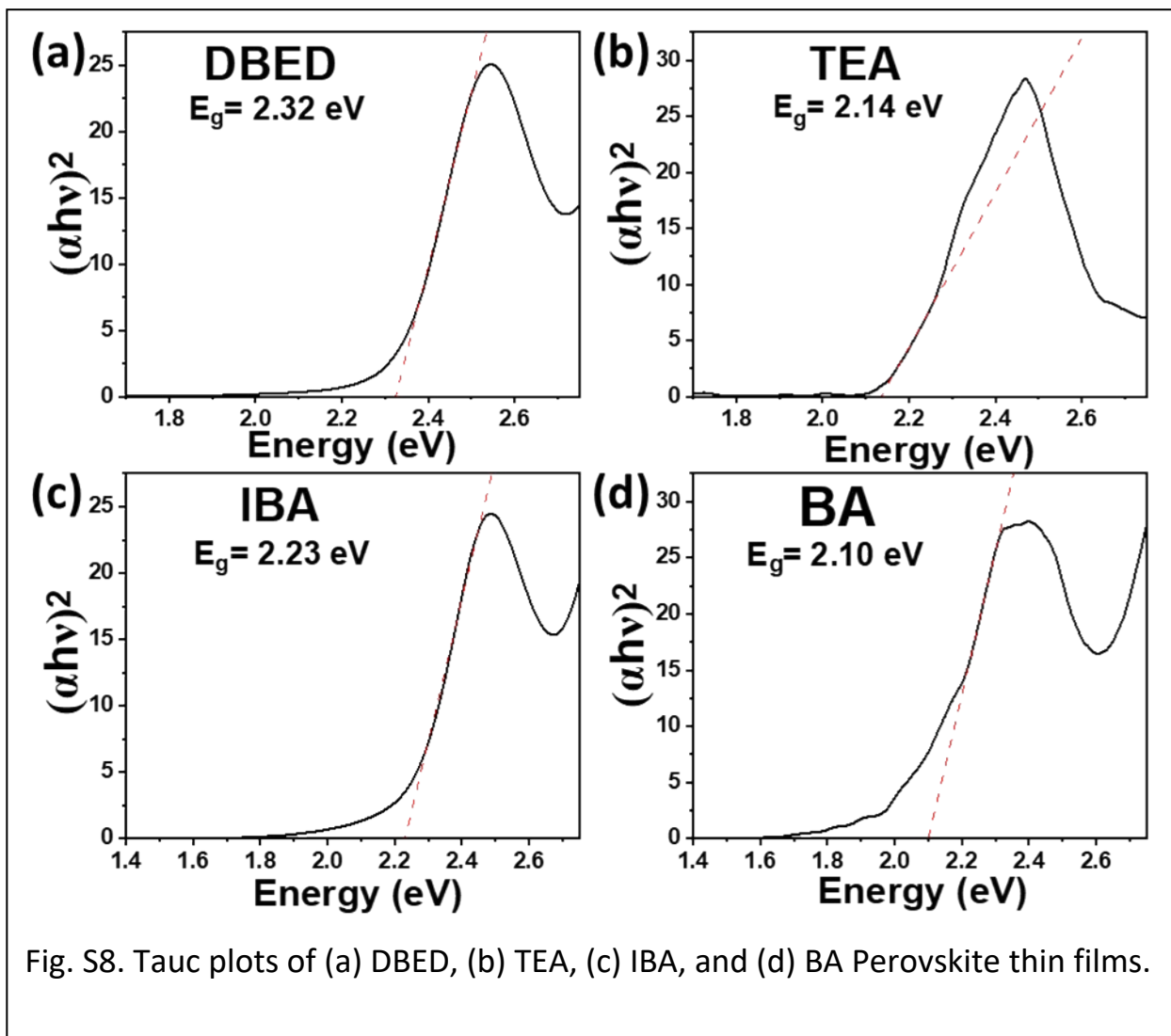


Fig. S8. Tauc plots of (a) DBED, (b) TEA, (c) IBA, and (d) BA Perovskite thin films.

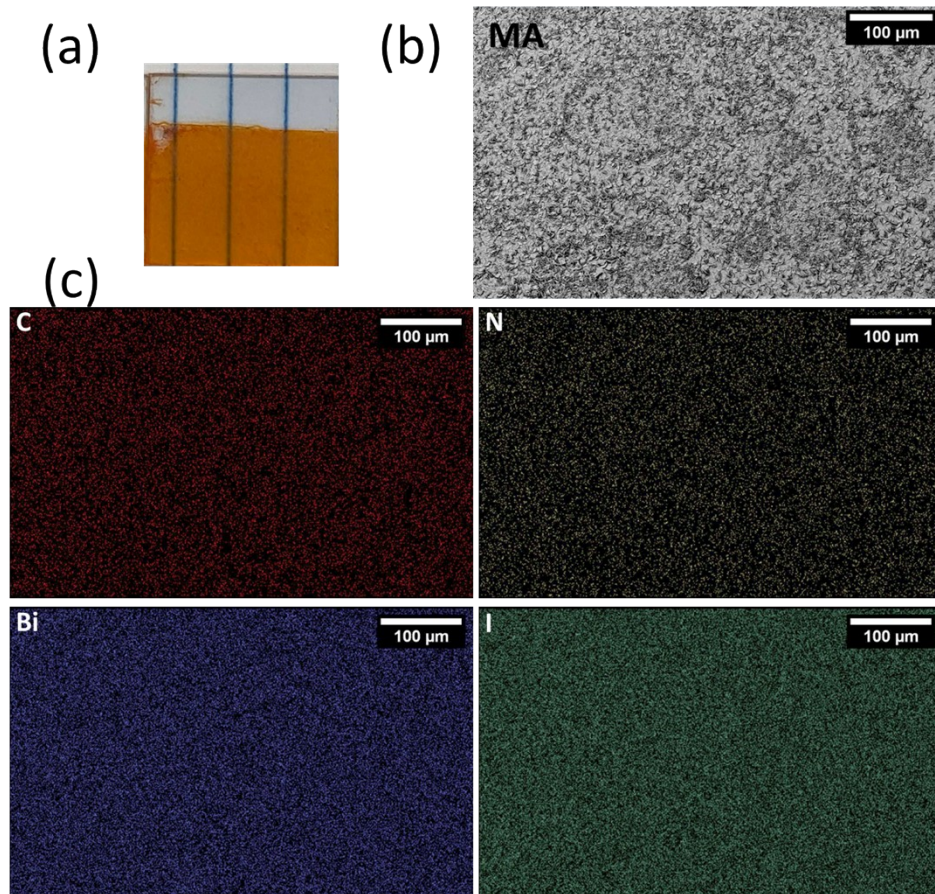


Fig. S9. Spin coated **MA** perovskite thin film (a), SEM image (b), and EDS Mapping (c) of **MA** perovskite powder where C, N, Bi, and I are red, yellow, blue, and green images, respectively.

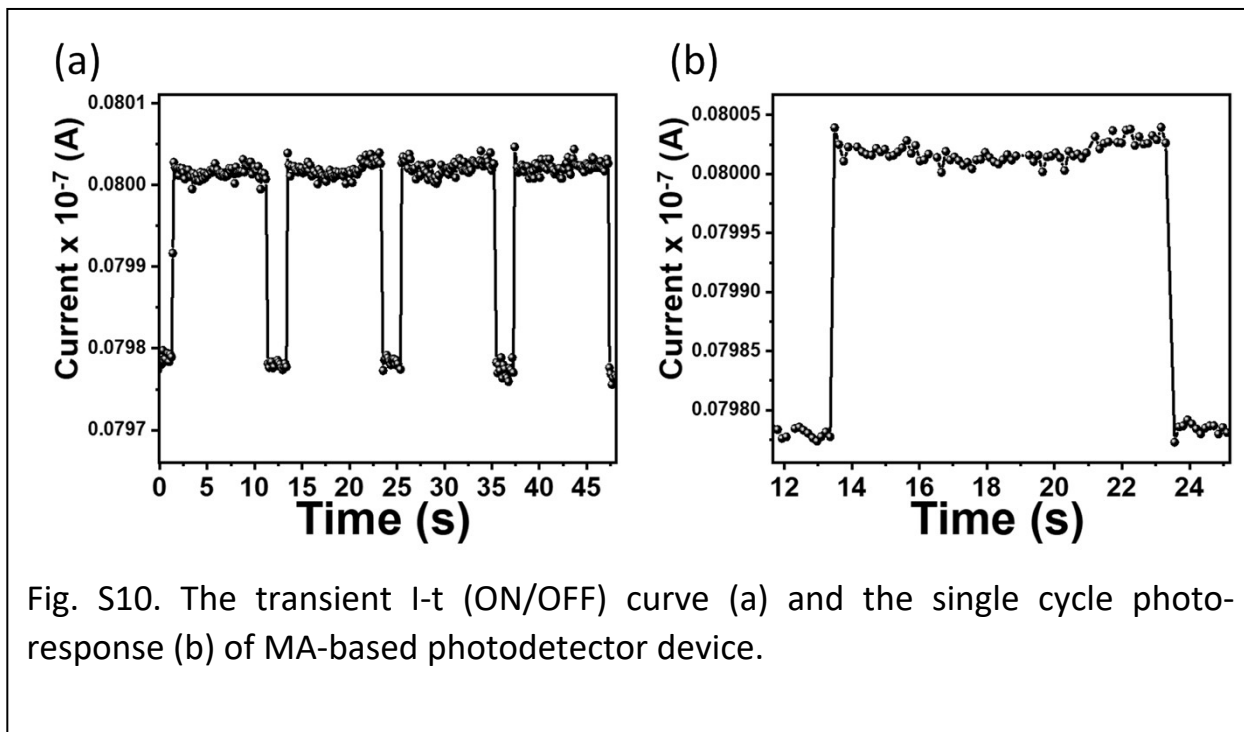


Fig. S10. The transient I-t (ON/OFF) curve (a) and the single cycle photoresponse (b) of MA-based photodetector device.

Table S1 Photodetector properties of MA Perovskite-based devices

Perovskite PDs	Response time τ_{rise} (s)	Decay time τ_{decay} (s)	Photoresponsivity R_{λ} (nA/W)	Photosensitivity ξ	Quantum Efficiency $IQE \times 10^{-6}$ (%)	Detectivity $D^* \times 10^4$ (Jones)
MA	0.1211	0.2669	0.0592	0.003154	0.01468	7.6339

Table S2 Comparison between Organic cation-based bismuth Perovskite-based photodetector devices

Perovskite PDs	Incident light power (mW/cm ²)	Wavelength (nm)	Illuminated Area (cm ²)	Operating Voltage (V)	Response time τ_{rise} (s)	Decay time τ_{decay} (s)	Photoresponsivity R_{λ} (A/W)	Detectivity D^* (Jones)	Ref.
MA	100	450-950	1.25	0	0.1211	0.2669	0.0592×10^{-9}	7.6339×10^4	This work
DBED	100	450-950	1.25	0	4.62	5.79	1.58×10^{-9}	0.0051×10^4	This work
TEA	100	450-950	1.25	0	9.92	5.36	5.71×10^{-9}	0.0015×10^4	This work
IBA	100	450-950	1.25	0	2.35	5.99	39.350×10^{-9}	11.6945×10^4	This work
BA	100	450-950	1.25	0	10.03	9.97	23.45×10^{-9}	7.2040×10^4	This work
MA ₃ Bi ₂ I ₉	0.01	400-700	0.25	0	0.02681	0.04198	1.76×10^{-3}	1.3×10^{12}	¹
MA ₃ Bi ₂ I ₉	0.01	400-700	0.25	0.8	0.03477	0.03946	0.16	4.6×10^{12}	¹
BI	100	White Light	0.25	-	2	1	0.5×10^{-3}	1.30×10^7	²
s-MBI	100	White Light	0.25	-	2	2	0.1×10^{-3}	0.61×10^7	²
Ns-MBI	100	White Light	0.25	-	3	2	0.2×10^{-3}	0.70×10^7	²
MBI	100	White Light	100	-	0.79	0.36	8×10^{-5}	5×10^8	³
MBI	1	382	0.25	0	-	-	0.30	0.9×10^{13}	⁴
MBIB	1	382	0.25	0	-	-	0.63	2×10^{13}	⁴
MBIC	1	382	0.25	0	0.46	0.41	0.92	2.9×10^{13}	⁴
(TMHD)BiBr ₅	0.8	365-700	-	10	9.6×10^{-3}	10.3×10^{-3}	0.1	-	⁵

References

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