

Supplementary Information for

Van der Waals Integration of Phase-pure 2D Perovskite Sheets and GaAs Nanowires for Self-driven Photodetector

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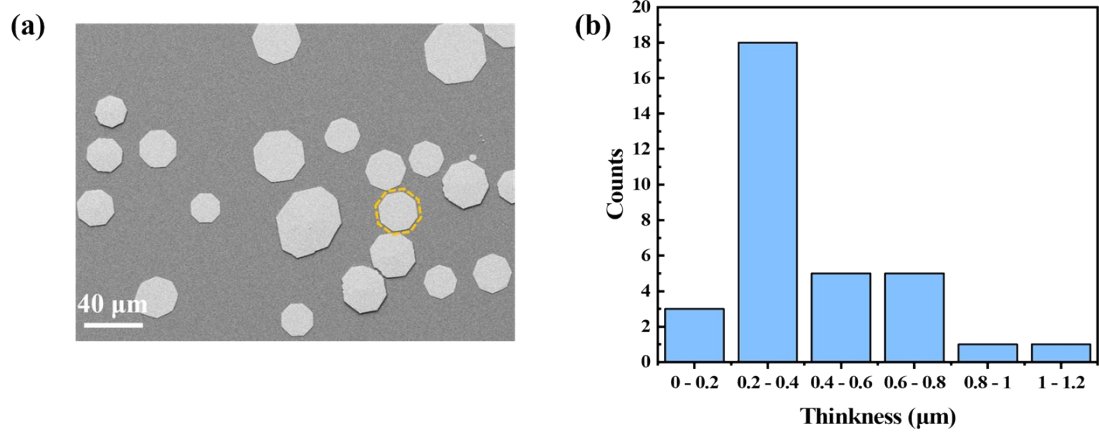


Figure S1 a) SEM image of the $\text{BA}_2\text{MA}_2\text{Pb}_3\text{I}_{10}$ nanosheets with varying thickness during a single transfer process. b) Height size distribution of perovskite nanosheets in the substrate, determined by AFM.

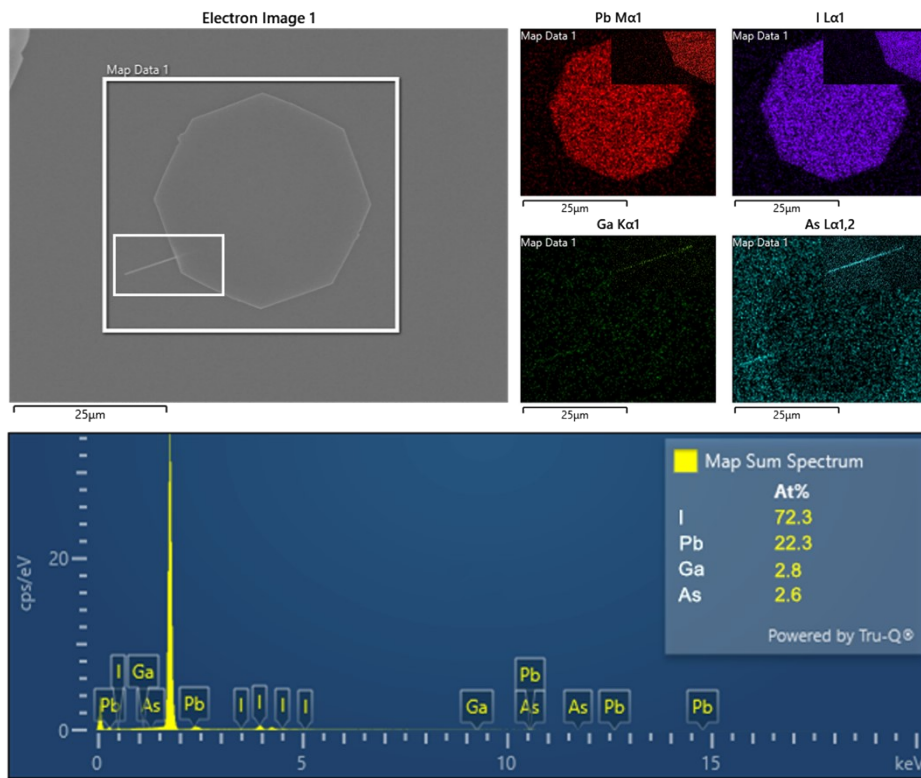


Figure S2 The EDS element mapping images of GaAs/BA₂MA₂Pb₃I₁₀ heterostructure.

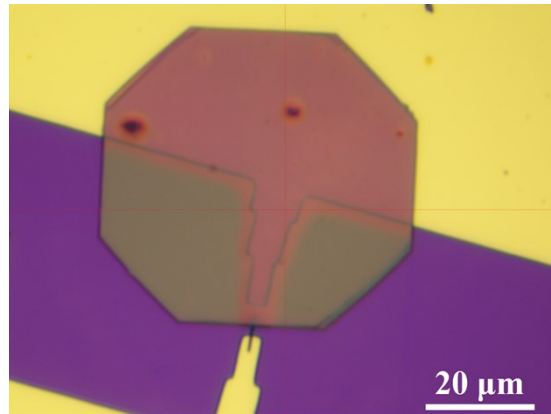


Figure S3 Optical micrograph image of the GaAs/BA₂MA₂Pb₃I₁₀ heterostructure photodetector.

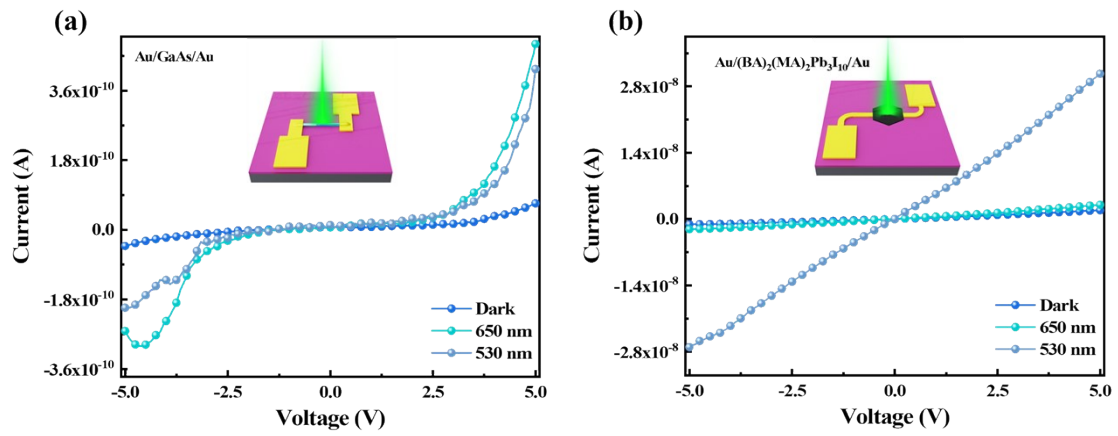


Figure S4 The I - V curves of devices under dark and 530 nm and 650 nm laser excitation based on GaAs (a), and $\text{BA}_2\text{MA}_2\text{Pb}_3\text{I}_{10}$ (b) devices, respectively.

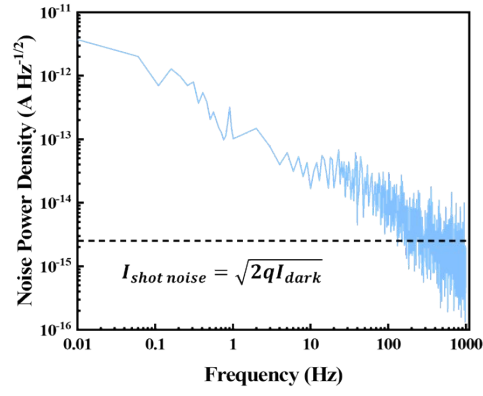


Figure S5 The noise power density spectra of the device ranging from 0.01 to 1000 Hz at -5 V bias.

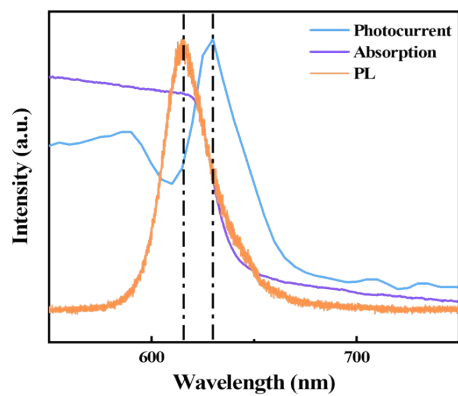


Figure S6 Comparison of the device normalized photocurrent with the $\text{BA}_2\text{MA}_2\text{Pb}_3\text{I}_{10}$ PL and absorption spectrum.