Electronic Supplementary Information for

2D Ruddlesden-Popper Perovskite Sensitized SnP$_2$S$_6$ Ultraviolet Photodetector Enabling High Responsivity and Fast Speed

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Fig. S1 (a) SEM image of (PEA)$_2$PbI$_4$ layer. (b) EDS mapping (C, N, Pb and I elements) of the white box area in (a).
Fig. S2 UPS of (a-b) SnP$_2$S$_6$ and (c-d) (PEA)$_2$Pbl$_4$, displaying the valence band spectra and secondary electron cut-off edge.
Fig. S3 (a-b) Optical images of SnP$_2$S$_6$ device and blank device. (c-d) Optical images of SnP$_2$S$_6$ device and blank device after spin-coating (PEA)$_2$Pbl$_4$. (e-f) AFM images of SnP$_2$S$_6$ device and (PEA)$_2$Pbl$_4$ film.
Fig. S4 (a-b) \(I_{ds}-V_{ds}\) curves of pure SnP\(_2\)S\(_6\) device and pure (PEA)\(_2\)PbI\(_4\) device in the dark and under 365 nm laser illumination with various power densities. (c-d) Responsivity and detectivity comparison of SnP\(_2\)S\(_6\), (PEA)\(_2\)PbI\(_4\) and SnP\(_2\)S\(_6\)/(PEA)\(_2\)PbI\(_4\) heterojunction at \(V_{ds} = 5\) V.
Fig. S5 Time resolved photoresponse of the heterojunction device after 2-weeks storage in the glove box.
Fig. S6 Response time of pure SnP$_2$S$_6$ device under 365 nm pulsed laser.
Fig. S7 Transfer characteristic curve of SnP$_2$S$_6$/(PEA)$_2$PbI$_4$ heterojunction device under dark condition.