

Supporting Information

In-Situ Epitaxial Growth of MAPbBr₃/MAPbCl₃ Lateral Heterojunction Single Crystal Films for High Performance Photo-detectors

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Supplementary Fig. 1: The I-V characteristics of the MAPbBr₃ SCF photodetector.

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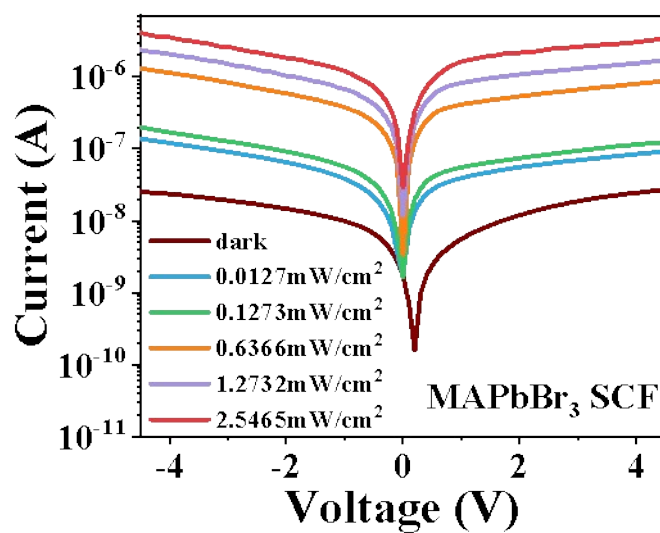
Supplementary Fig. 2: MAPbBr₃ SCF photodetector continuous switching photocurrent at various optical power densities with a switching time of 100 s; (b) On/off ratio and D^* versus light intensity at 0.01 V bias.

Supplementary Note 3: The temporal photoresponse characteristics of the MAPbBr₃/MAPbCl₃ heterojunction single-crystal-film photodetector.

Supplementary Fig. 3: Temporal photoresponse of the MAPbBr₃/MAPbCl₃ lateral heterojunction SCF photodetector.

Supplementary Note 1

The I-V characteristics of the MAPbBr₃ SCF photodetector, as shown in the figure, demonstrate that the photocurrent increases substantially with increasing optical power density.

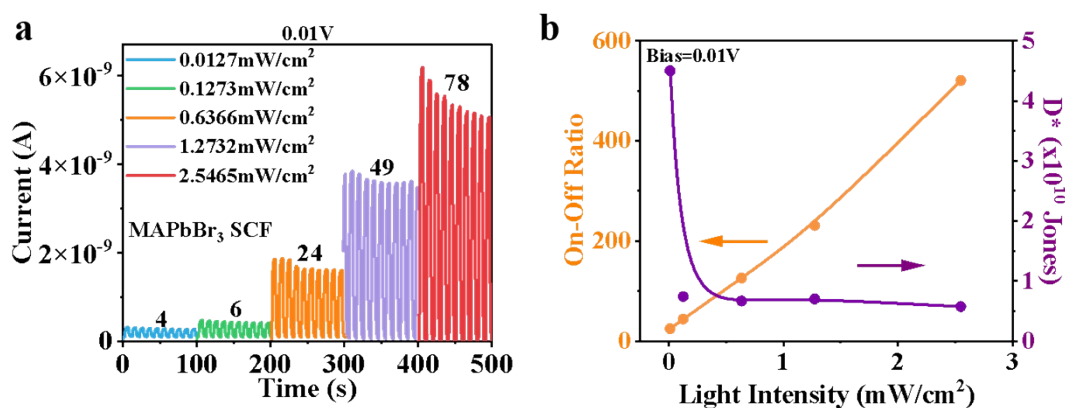


Supplementary Figure. 1 The I-V characteristics of the MAPbBr₃ single-crystalline film photo-detector.

Supplementary Note 2

Continuous switching photocurrent response of the MAPbBr₃ SCF photodetector under varying optical power densities in Figure. 2a. The experimental results indicate that the photodetector exhibits pronounced rise and fall in photocurrent upon illumination turn-on and turn-off, respectively, while the dark current remains stable. The photocurrent continuously increases with increasing optical power density, demonstrating the device's favorable responsivity to light intensity.

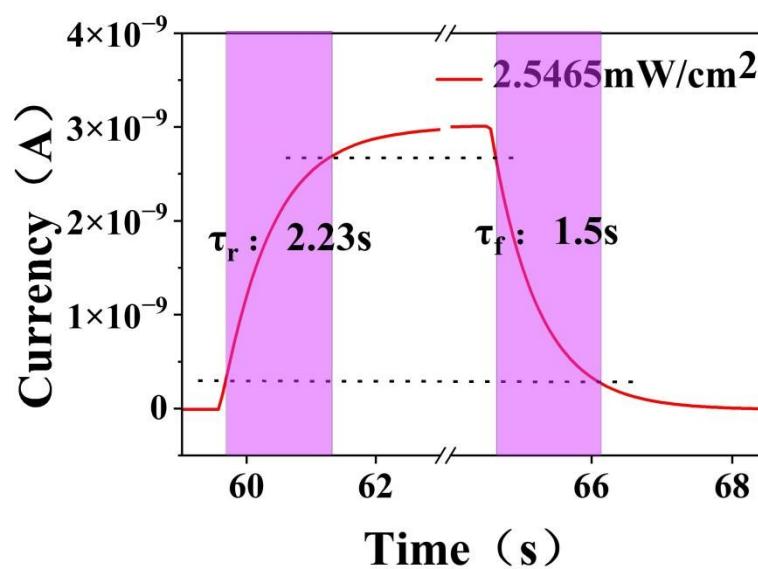
Figure. 2b shows the variation of the specific detectivity D^* with optical power density. D^* decreases rapidly with increasing optical power density. The MAPbBr₃ SCF photo-detector exhibited a detectivity of just 4.5×10^{10} Jones.



Supplementary Figure. 2 (a) MAPbBr₃ SCF photodetector continuous switching photocurrent at various optical power densities with a switching time of 100 s; (b) Evolution of on/off ratio, D^* as functions of optical power density at 0.01 V bias.

Supplementary Note 3

The temporal photoresponse characteristics of the MAPbBr₃/MAPbCl₃ heterojunction single-crystal-film photodetector, including the rise and decay processes, are shown in the figure below.



Supplementary Figure. 3 Temporal photoresponse of the MAPbBr₃/MAPbCl₃ lateral heterojunction SCF photodetector.

