

# Controllable Synthesis of 2D Perovskite on Different Substrates and Its Application as Photodetector

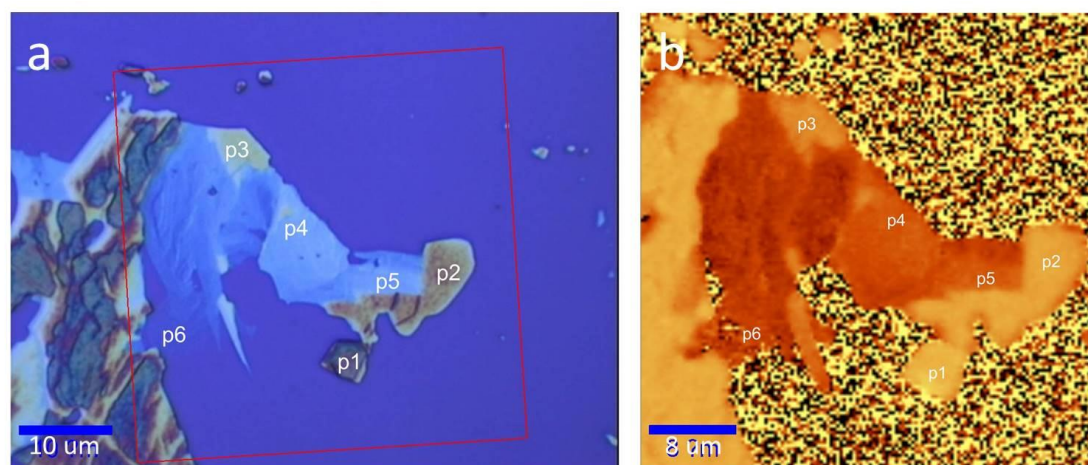
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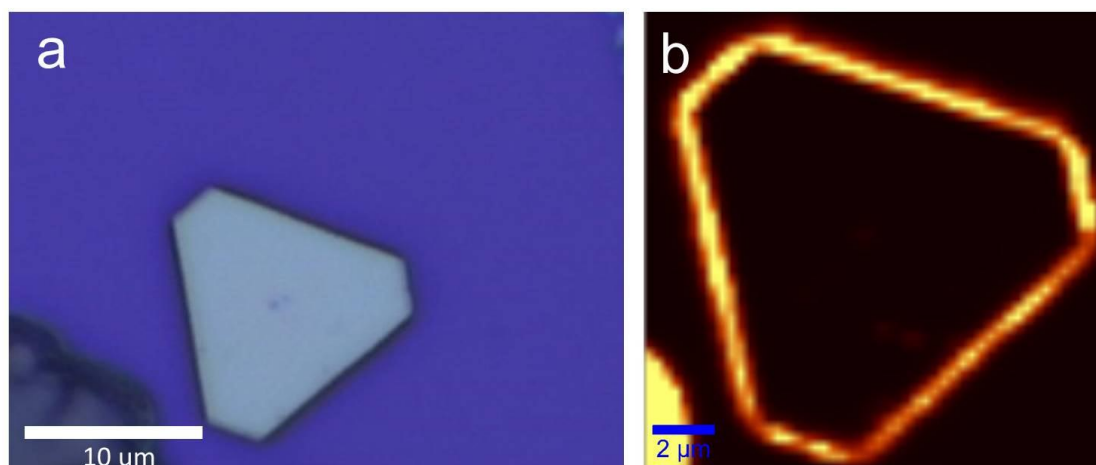
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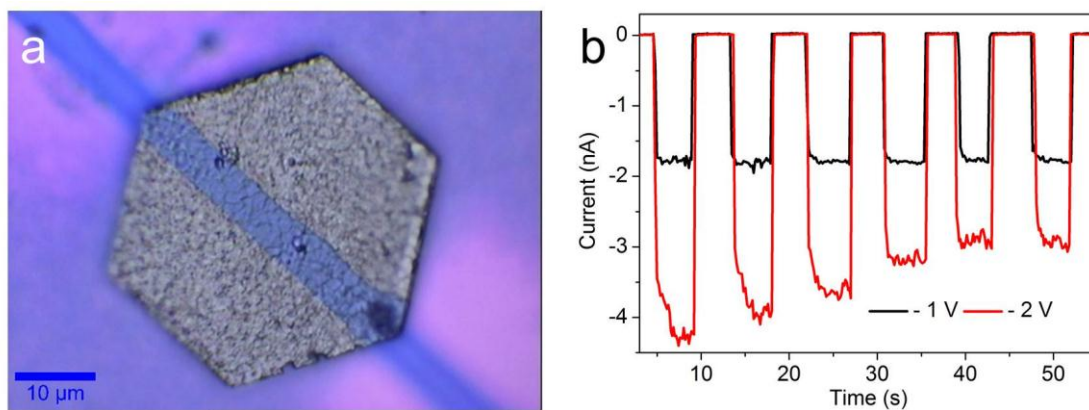
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**Figure S1.** (a) CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub> perovskite with different thicknesses marked by p1 to p6. The thickness of P1 to P6 is measured to be 63 nm, 41 nm, 25 nm, 18 nm, 11 nm, 2 nm, respectively. (b) The corresponding PL mapping images of the CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub> perovskite acquired in the red square in (a).



**Figure S2.** (a) Optical microscopy image of the converted CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub> perovskite without supplying sufficient CH<sub>3</sub>NH<sub>3</sub>I molecules during the conversion process on SiO<sub>2</sub>/Si substrate. (b) PL mapping image of the converted CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub> perovskite in (a).



**Figure S3.** (a) Optical microscopy image of a 2D  $\text{CH}_3\text{NH}_3\text{PbI}_3$  platelet phototransistor. (b) Time-dependent photocurrent of the 2D  $\text{CH}_3\text{NH}_3\text{PbI}_3$  platelet phototransistor during the laser switching on/off process under negative source-drain voltages  $V_{\text{sd}}$  of  $-1$  and  $-2\ \text{V}$ .