

Supporting Information

Controllable growth of nonlayered 2D MnS nanosheets with thickness-tunable semiconductor to metal transition

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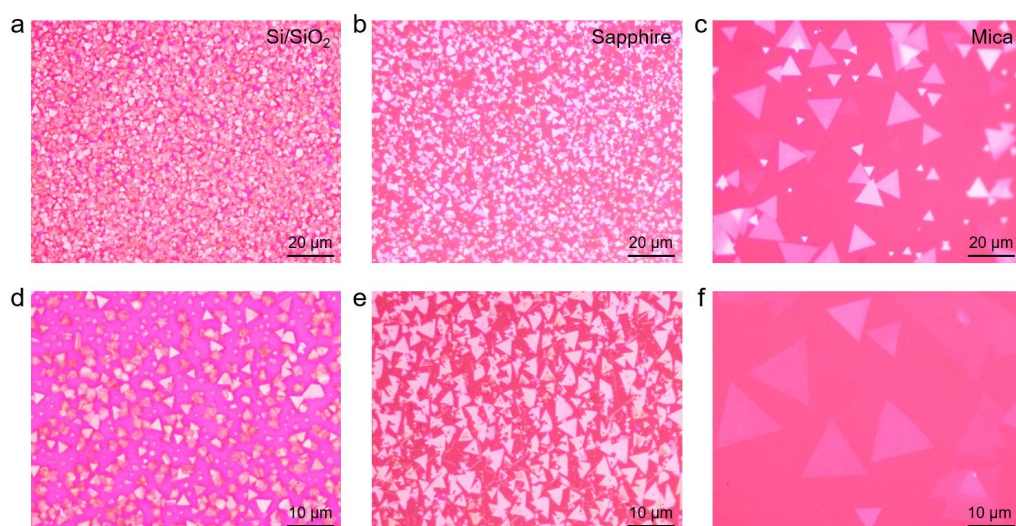


Figure S1. OM images of large-area MnS nanosheets grown on (a) SiO₂/Si (300 nm), (b) c-plane sapphire and (c) mica substrates, (d,e,f) the corresponding enlarged OM images.

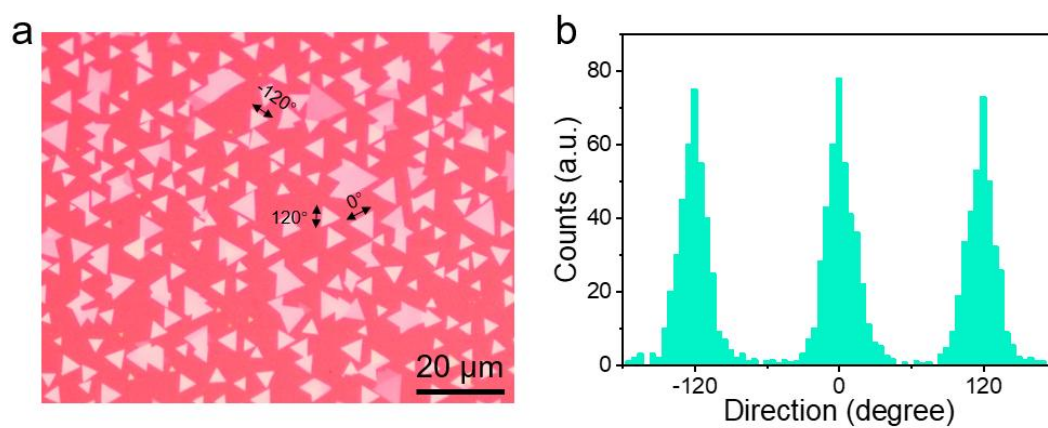


Figure S2. (a) OM image of MnS nanosheets grown on mica substrate, showing three primary orientations (0° , 120° and -120°), and (b) statistics of the number of different orientations of MnS nanosheets.

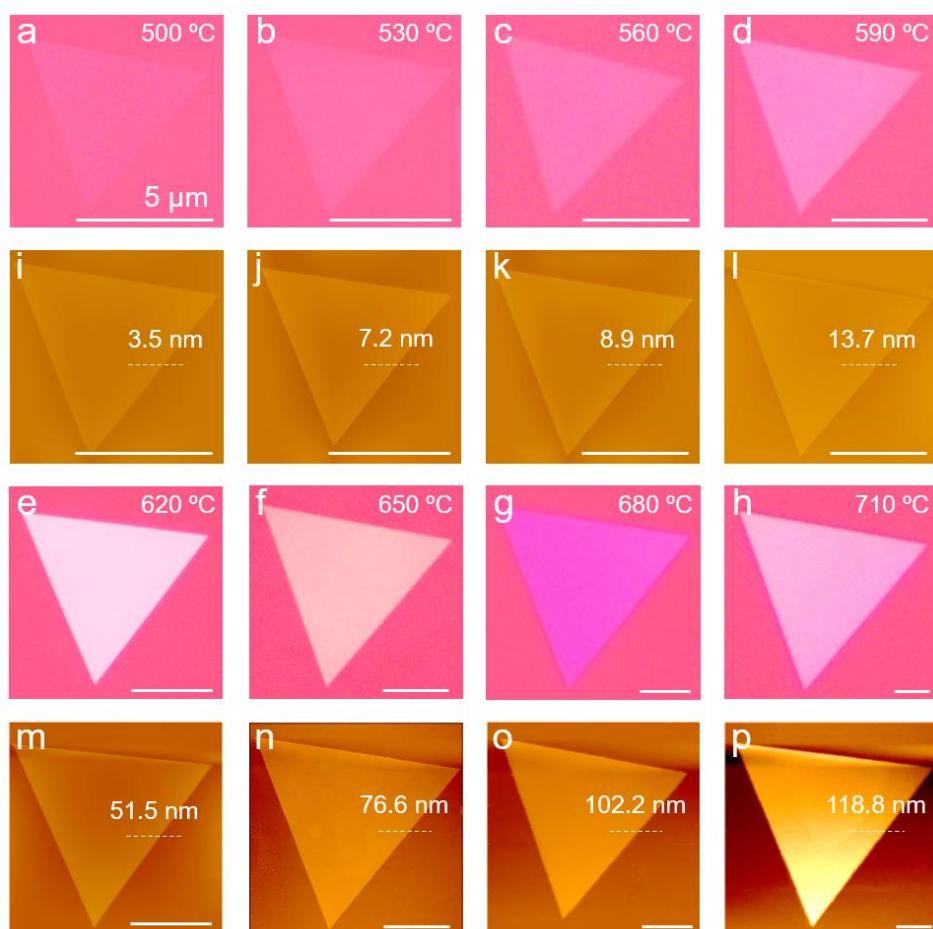


Figure S3. (a-d) OM images of MnS nanosheet grown at temperatures of 530, 560, 620 and 680, and (e-h) the corresponding AFM images.

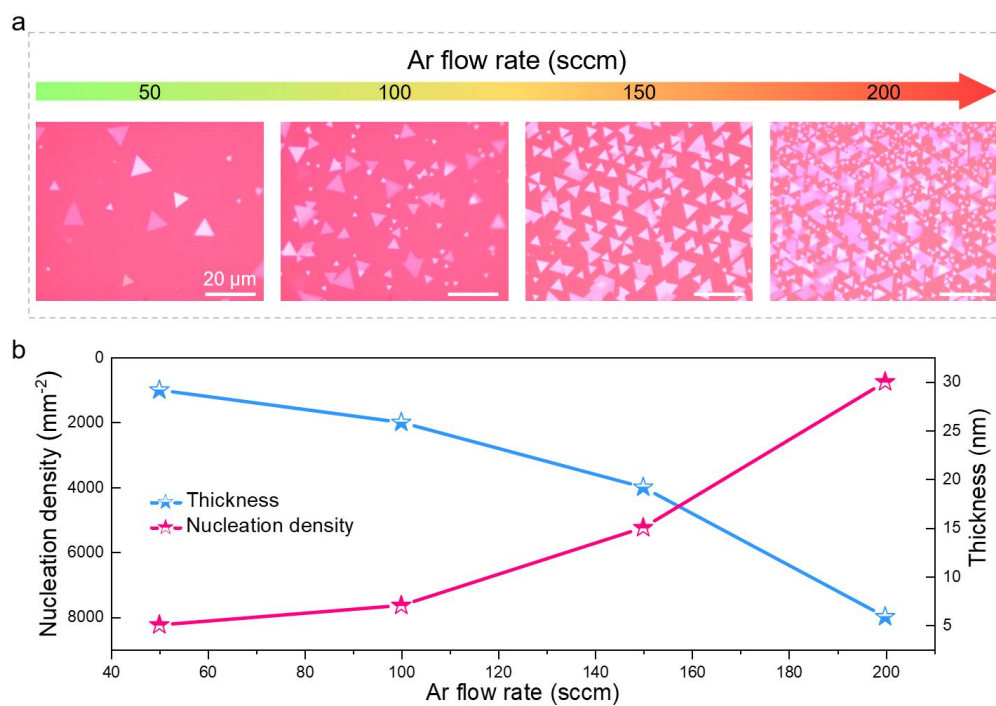


Figure S4. Airflow modulation for 2D MnS nanosheets growth. (a) OM images of MnS nanosheets grown at Ar flow rate of 50, 100, 150 and 200 sccm. (b) Statistics of nucleation density and thickness of MnS nanosheets under different Ar flow rate.

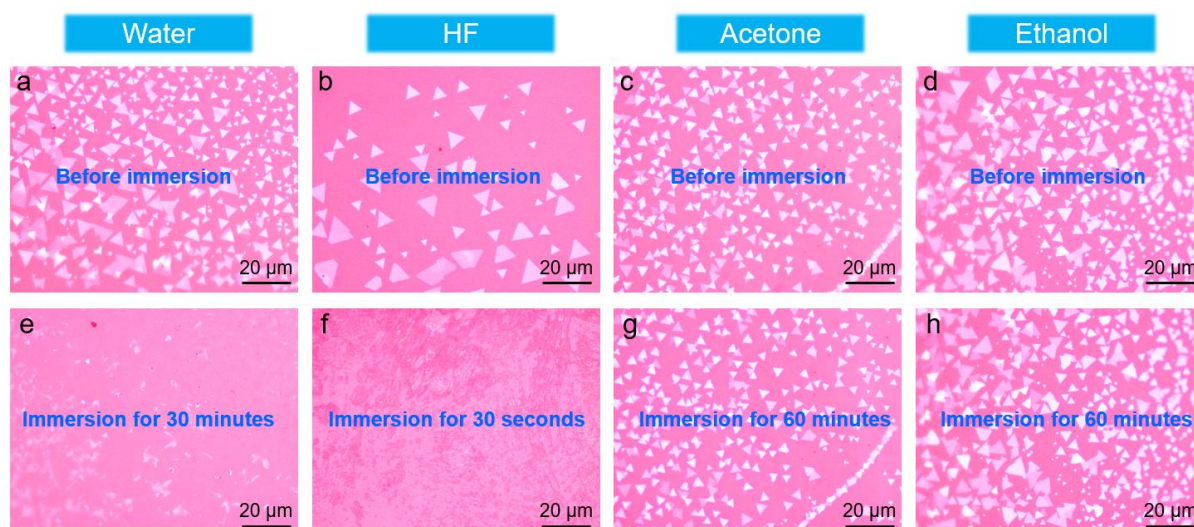


Figure S5. Stability of CVD-grown MnS nanosheet in different solvents. OM images of MnS₂ nanosheets before and after immersion in (a,e) water, (b,f) HF, (c,g) acetone, (d,h) ethanol.

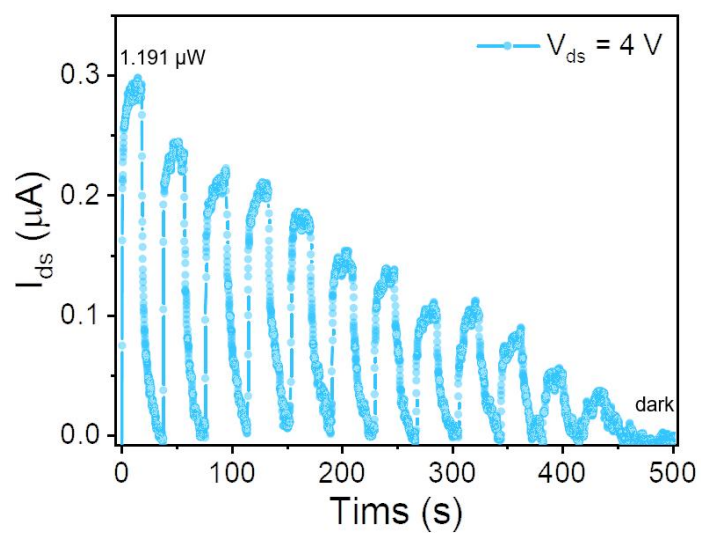


Figure S6. Time-dependent photoresponse of MnS photodetector under 532 nm light on/off switching illumination with power density changing from 1.191 $\mu\text{W}/\text{cm}^2$ to dark.