

Supplementary Information

Seeded growth of high-quality transition metal dichalcogenide single crystals via chemical vapor transport

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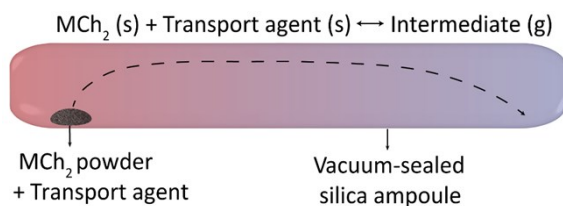
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Scheme S1 Schematic diagram of the C-CVT growth setup.

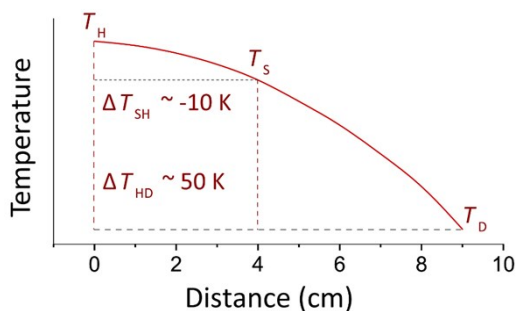


Fig. S1 The temperature gradient in the horizontal tube furnace. T_H : temperature of the hot end, T_D : temperature of the deposition end, T_S : temperature of source material.

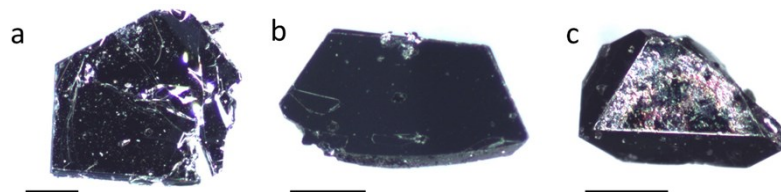


Fig. S2 Optical images of (a) MoSe₂, (b) MoTe₂, (c) PtSe₂ seed crystals, which are selected from samples grown via C-CVT and cut off into regular shape. The scale bars are 200 μm.

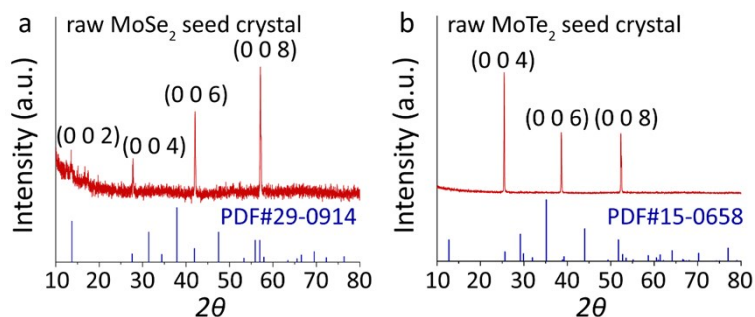


Fig. S3 PXRD patterns of (a) MoSe₂, (b) MoTe₂ raw seed crystals, which are selected from samples grown via C-CVT and cut into regular shapes, showing preferred orientation along the [0 0 1] direction.

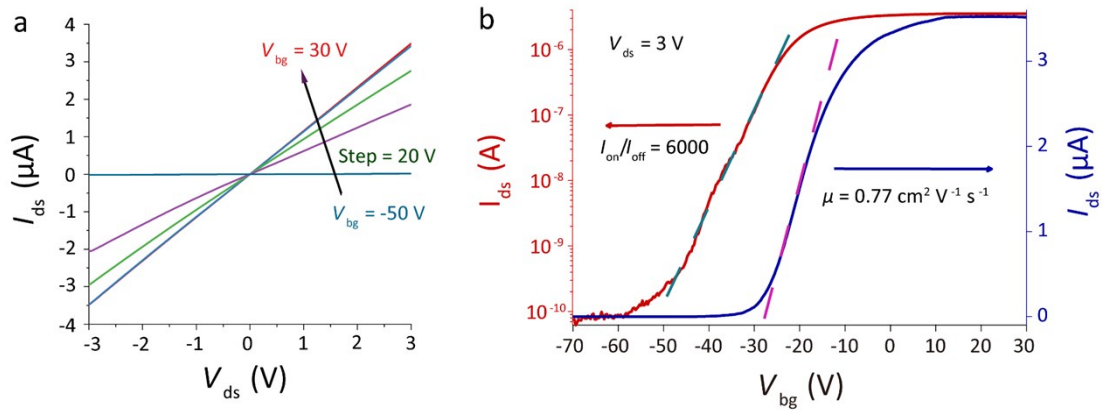


Fig. S4 Electronic properties of the back-gated multi-layered MoSe₂ phototransistor based on the mechanical exfoliation of MoSe₂ crystal grown via S-CVT. (a) Output characteristics and (b) transfer characteristics.

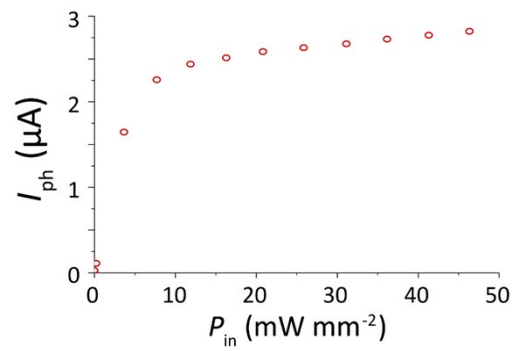


Fig. S5 Photocurrents of the back-gated multi-layered MoSe₂ phototransistor as a function of light power intensity (P_{in}) at $V_{ds} = 2.5\text{ V}$ and $V_{bg} = -50\text{ V}$ under 637-nm illumination.