Supporting Information

Growth of Large-Area Homogeneous Monolayer Transition Metal Disulfides via a Molten Liquid Intermediate Process

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**Figure S2.** AFM image of solid Na\textsubscript{2}WO\textsubscript{4} precursor after spin-coating. Scale bar: 5 μm.

**Figure S3.** Schematic illustration of the CVD setup.
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Figure S5. Photograph of the SiO$_2$/Si substrates using different growth method: (a) conventional CVD using solid WO$_3$ as precursor displays an obvious concentration gradient; (b) molten liquid intermediate CVD shows a uniform color contrast.

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**Figure S10.** Optical image of WS$_2$ from different location on a same substrate showing a large-area uniformity.

**Figure S11.** (a) Large-area uniform as-grown monolayer MoS$_2$ single crystals. (b) Large-area continuous monolayer MoS$_2$ film. (c, d) Raman and PL spectrum of typical MoS$_2$ samples in (a, b), respectively.

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Figure S13. Large-area MoS$_2$/WS$_2$ vertical bilayer heterostructures.

Figure S14. (a) Transfer curves of 20 different WS$_2$ FET.
Table S1. Statistics and comparison off/off ratio, mobility and performance of different WS$_2$ based FET devices

<table>
<thead>
<tr>
<th>on/off ratio</th>
<th>Mobility (cm$^2$V$^{-1}$s$^{-1}$)</th>
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References


(5) Zhang, Y.; Zhang, Y.; Ji, Q.; Ju, J.; Yuan, H.; Shi, J.; Gao, T.; Ma, D.; Liu, M.; Chen, Y.; Song, X.; Hwang,