Supplementary Material

Methane-Mediated Vapor Transport Growth of Monolayer WSe\textsubscript{2} Crystals

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Figure S1. SEM images of synthesized WSe\textsubscript{2}, which were used for analysis of the nucleation density and edge length of WSe\textsubscript{2} domains. Carrier gas ratio was CH\textsubscript{4} : Ar = 0 : 200 sccm.
Figure S2. SEM images of WSe2 domains synthesized with carrier gas ratio of CH4 : Ar = 50 : 150 sccm.
Figure S3. SEM images of WSe₂ domains synthesized with carrier gas ratio of CH₄ : Ar = 100 : 100 sccm
Figure S4. SEM images of WSe$_2$ domains synthesized with carrier gas ratio of CH$_4$ : Ar = 150 : 50 sccm
Figure S5. Distribution of grain sizes in WSe₂ according to carrier gas ratios.

<table>
<thead>
<tr>
<th>CH₄ : Ar (sccm)</th>
<th>150 : 50</th>
<th>100 : 100</th>
<th>50 : 150</th>
<th>0 : 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average size (mm)</td>
<td>52.67737</td>
<td>8.97221</td>
<td>6.13638</td>
<td>0.92437</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>25.72943</td>
<td>2.8419</td>
<td>1.97363</td>
<td>0.38015</td>
</tr>
</tbody>
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Figure S6. Raman spectrum of synthesized monolayer WSe₂.
Figure S7. The work function of Pt coated AFM tip and reference HOPG.

Figure S8. XPS wide-range spectra of synthesized WSe₂.