Supporting Information For:

Thermodynamics and Kinetics in van der Waals Epitaxial Growth of Te

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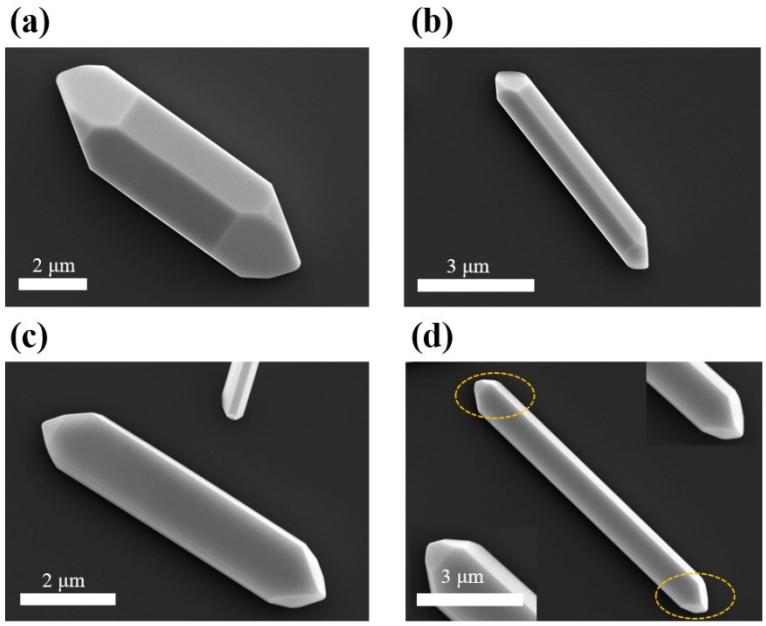

Figure S1. SEM images of CVD Te nanorods.

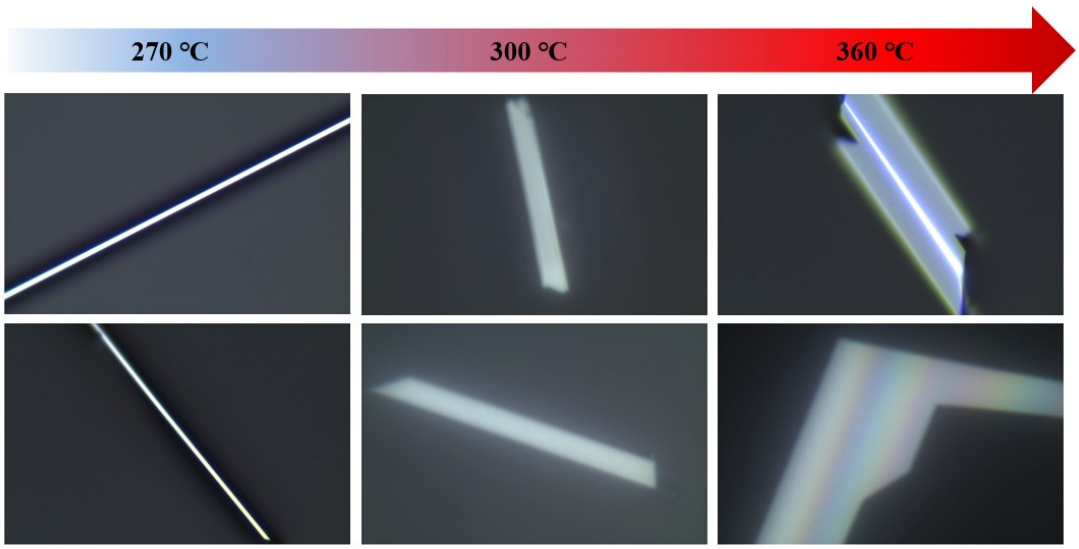

Figure S2. Optical images of CVD 1D and 2D Te crystals grown at different temperature on mica substrate.

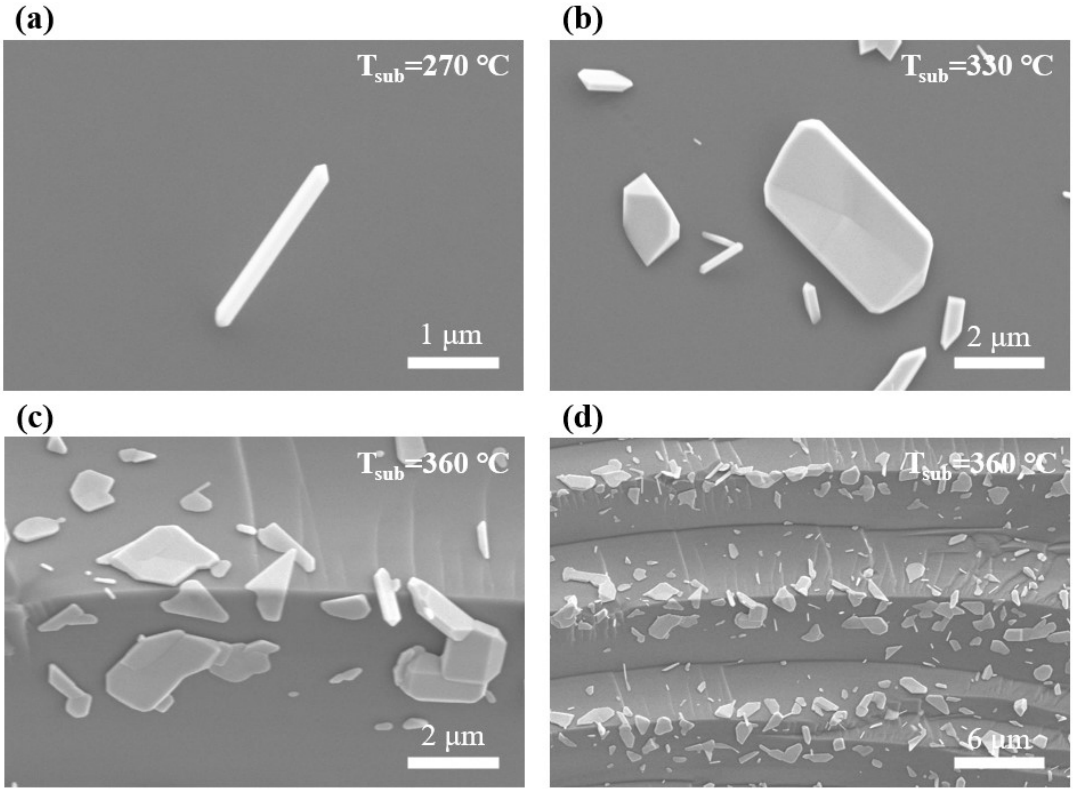

Figure S3. SEM images of CVD (**a**) 1D and (**b-d**) 2D Te crystals grown at different temperature on Si substrate.

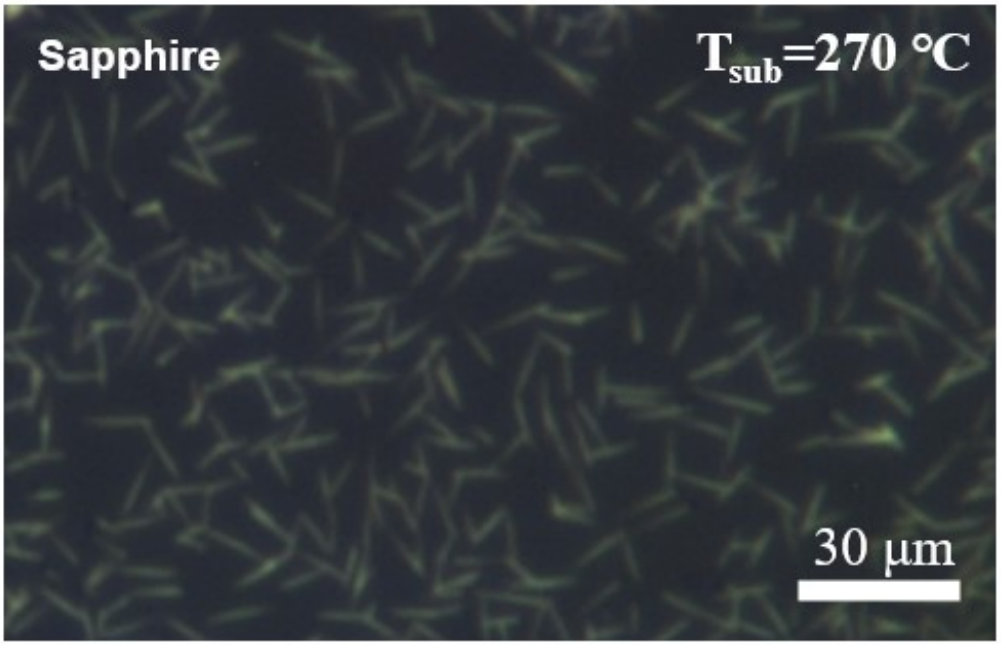

Figure S4. Optical image of CVD Te nanowires grown at 270 °C on sapphire substrate.

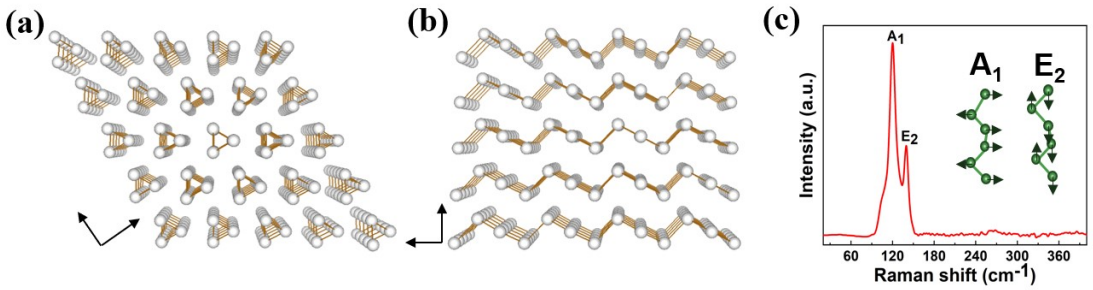

Figure S5. (**a-b**) Schematic illustration of Te crystal structure. (**c**) Raman spectrum of bulk Te synthesized via CVD on mica substrate. Inset is the A_1 and E_2 vibrational modes.

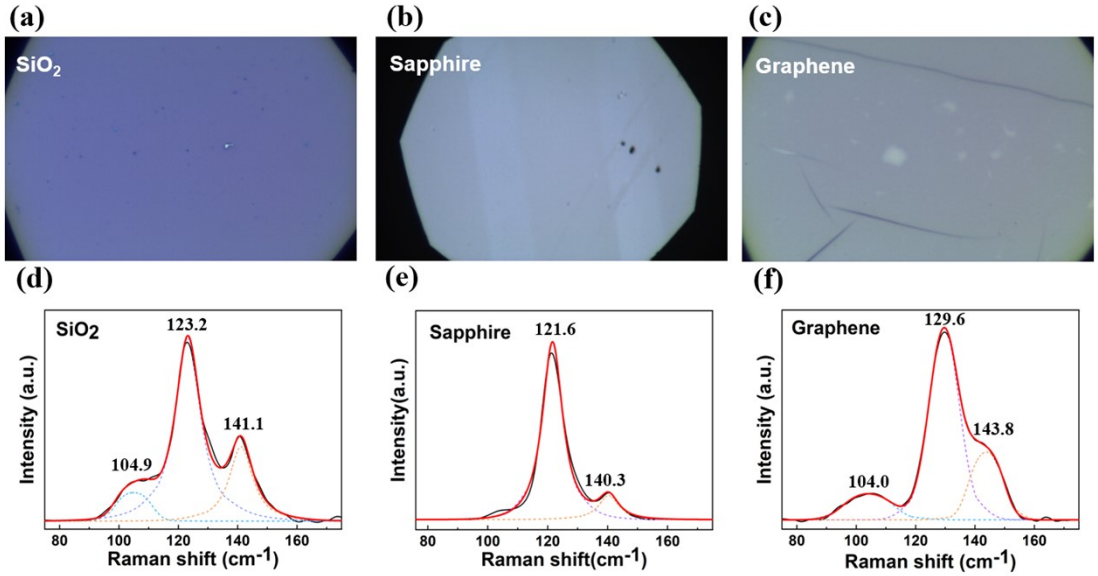

Figure S6. (**a-c**) Optical images of MBE Te films grown at 120 K on SiO_2, sapphire, graphene substrate. (**d-f**) The corresponding Raman spectra are shown below. The original Raman data is represented by the black solid line. The fitted data is represented by the red solid line. The E_1-LO peak is shown as the blue dashed line, the A_1 peak as the purple dashed line, and the E_2 peak as the yellow line.

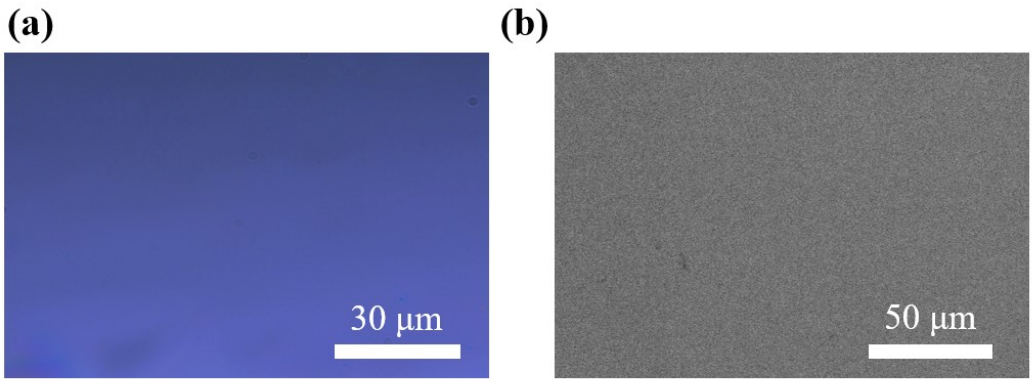

Figure S7. (**a**) Optical and (**b**) SEM images of the sample grown in MBE at T_{sub}=523 K on SiO_2 substrate.