

Supplementary Information

Contrast and Raman spectroscopy study of single- and few-layered charge density wave material: 2H-TaSe₂

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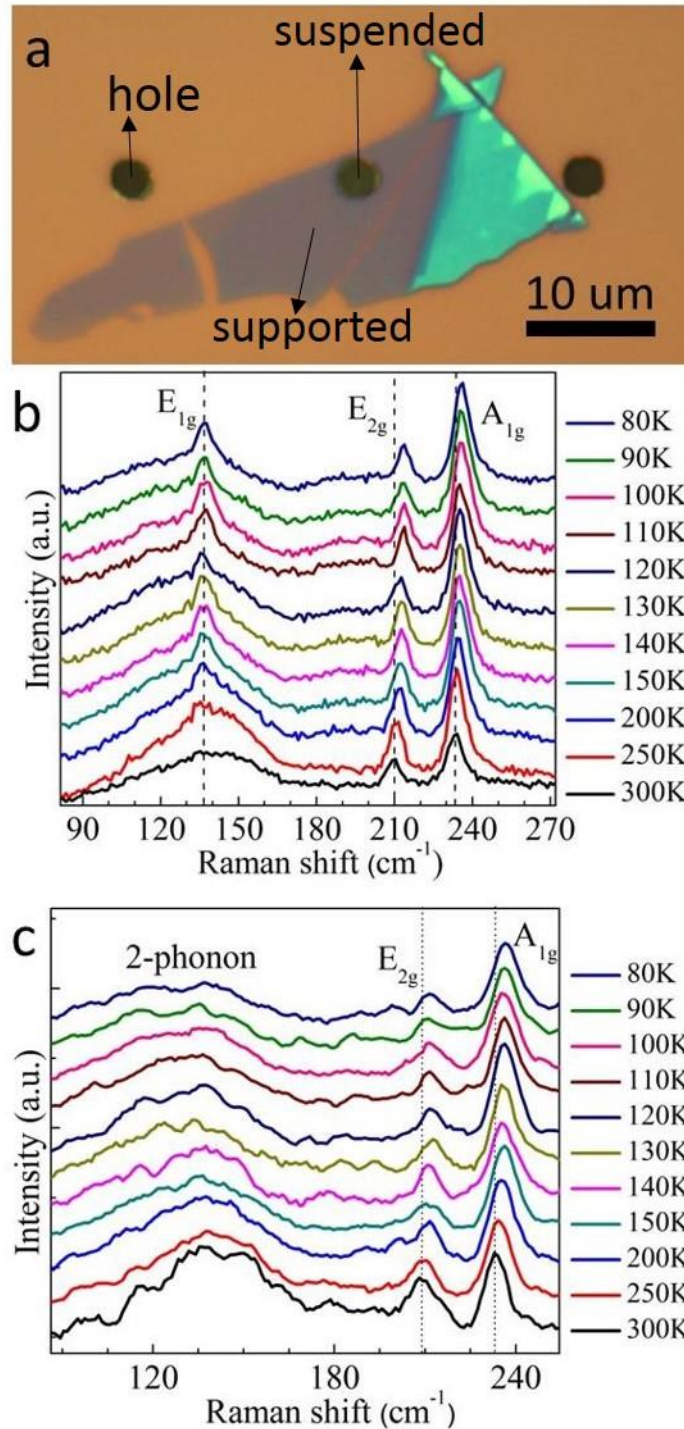
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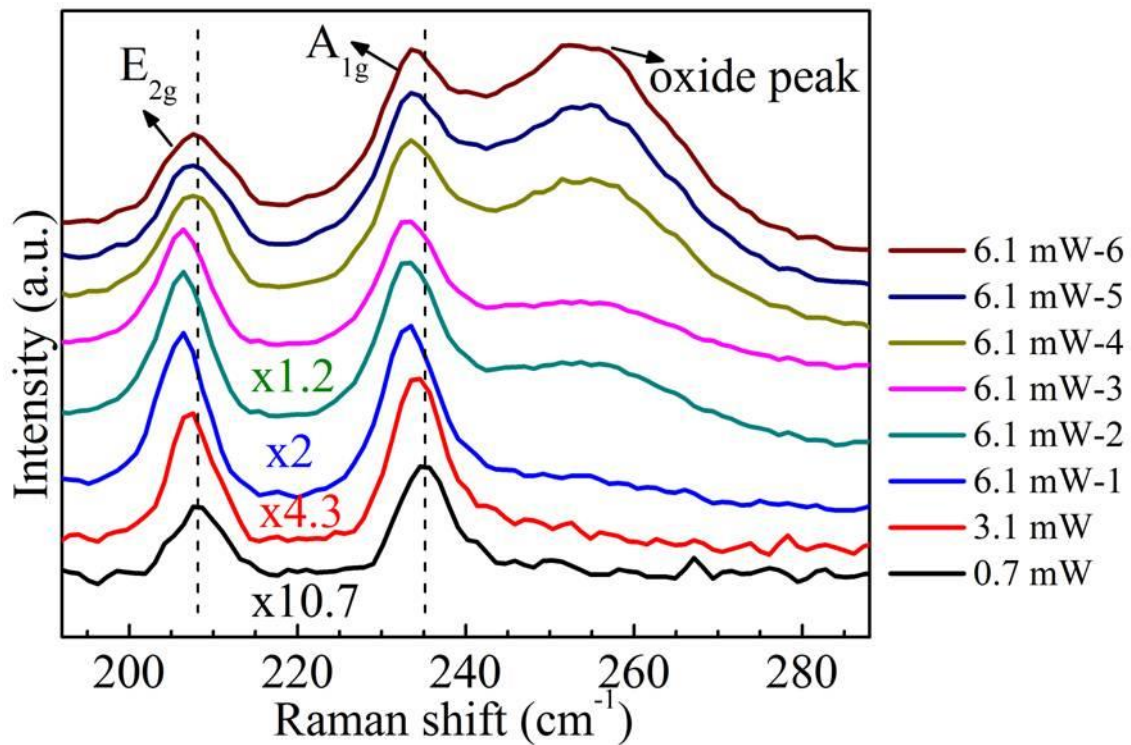
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There are 2 figures in this Supplementary Information section.

Supplementary Figures S1 depicts Raman spectra of supported and suspended part of the same 3-layer TaSe₂ sample.



Supplementary Figure S1 | This graph shows low temperature Raman measurement of suspended and supported 3-layer TaSe₂. (a) Optical image of suspended and supported trilayer TaSe₂ (b) Low temperature Raman measurement of 3-layer supported TaSe₂. (c) Low temperature Raman measurement of 3-layer suspended TaSe₂.



Supplementary Figure S2 | This graph shows burning stages of bulk TaSe₂. Until 3.1 mW laser power, the intensity of the E_{2g} peak is roughly ~80% of that of the A_{1g} peak. At 6.1 mW (blue line) laser power, it shows the pre-burn stage where the intensity of the E_{2g} peak becomes as strong as or even stronger than that of the A_{1g} peak. If we repeat the same measurement with same power, we observe emergence of broad oxide peak at around ~255 cm⁻¹. Appearance of oxide peak accompanies sample color change due to burning as well. Red-shift due to laser induced local heating can be also observed when power increased from 0.7 mW to 6.1 mW.

Referring to Supplementary Figure S2, we conclude that the E_{2g} intensity must be kept lower than that of the A_{1g} peak for healthy Raman spectra of TaSe₂ samples. If the E_{2g} peak intensity is as strong as or stronger than the A_{1g} peak intensity, this must be accepted as an indication of pre-burn stage and laser power must be decreased.