

## *Supplementary Materials*

# Fabrication of Large-Area Molybdenum Disulfide Device Arrays using Graphene/Ti Contacts

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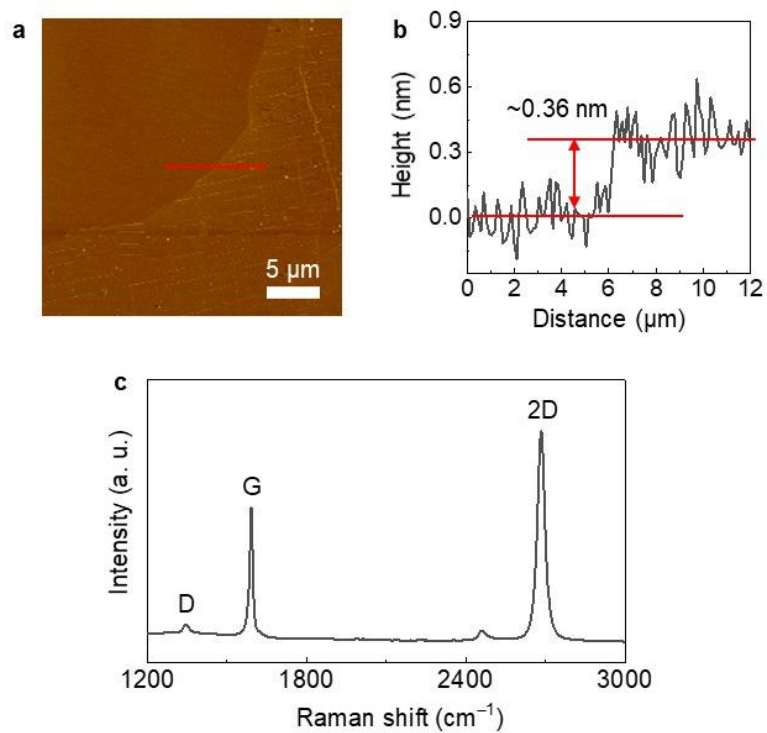
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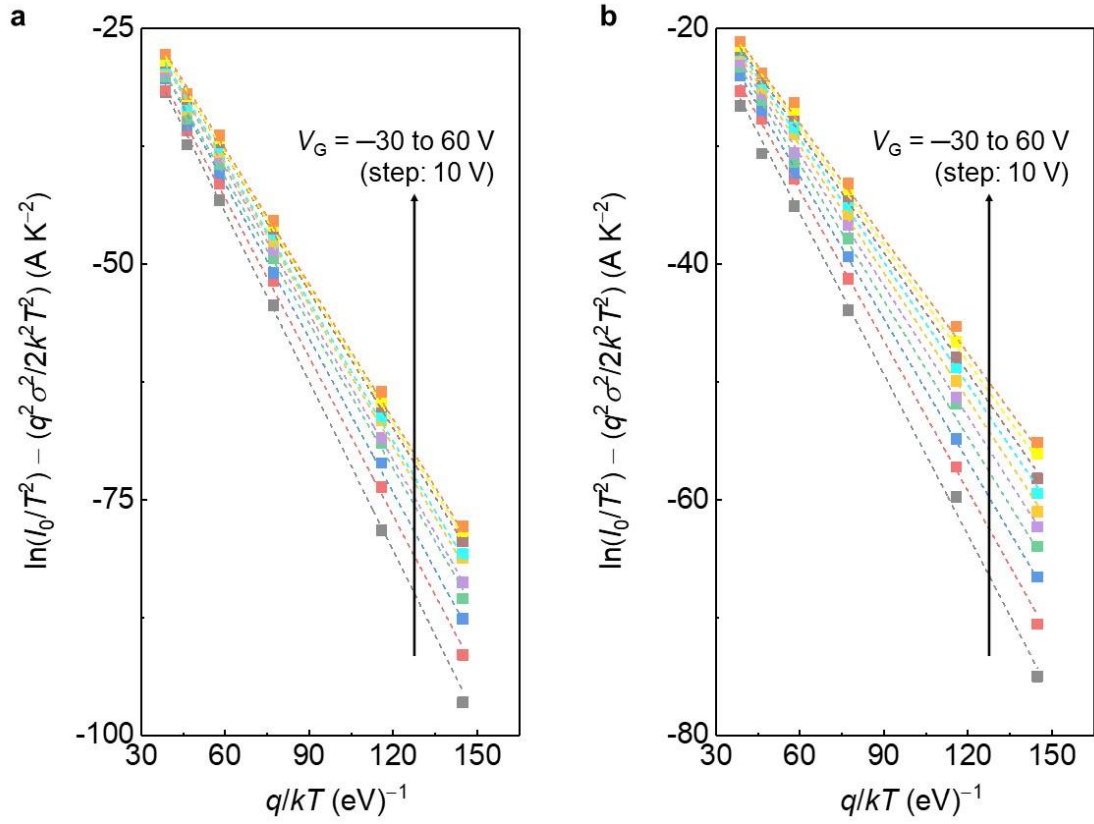
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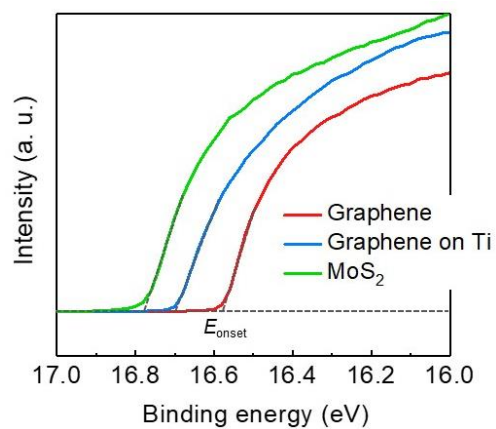
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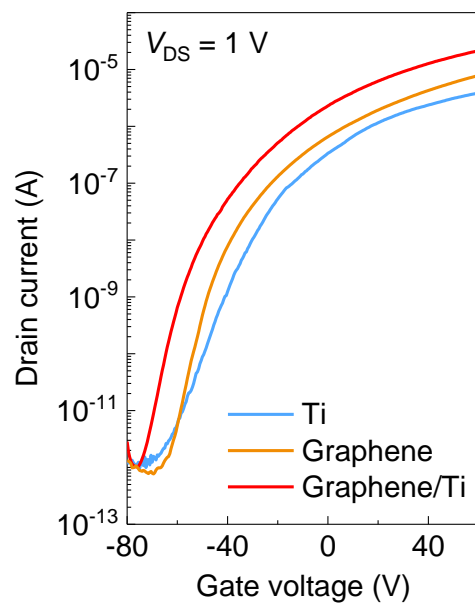
**Figure S1.** (a) AFM image, (b) line profile graph extracted from the red line in Fig. S1a, and (c) Raman spectrum of CVD-grown graphene film on a Si/SiO<sub>2</sub> substrate.



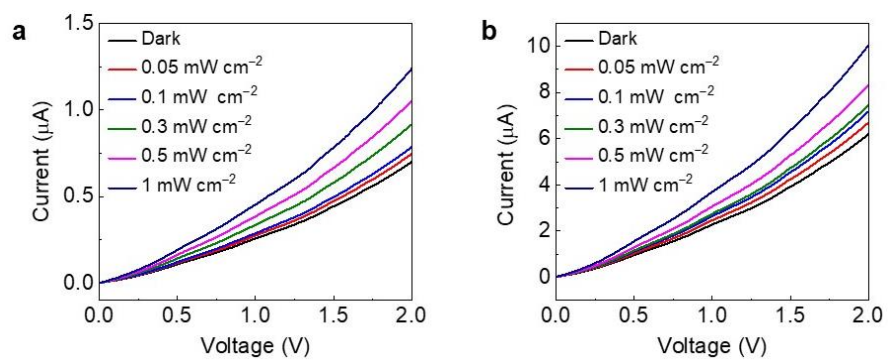
**Figure S2.**  $\ln(I_0/T^2) - (q^2 \sigma^2 / 2k^2 T^2)$  vs.  $q/kT$  plots of MoS<sub>2</sub> devices with (a) Ti and (b) graphene/Ti contacts, as a function of the gate voltage.



**Figure S3.** (a) UPS spectra of CVD-grown graphene (red), graphene on Ti substrate (blue), and CVD-grown MoS<sub>2</sub> films (green).



**Figure S4.** Transfer characterizations of MoS<sub>2</sub> devices with Ti, graphene, and graphene/Ti contacts. The data of Ti and graphene/Ti-contacted devices are taken from Fig. 2c.



**Figure S5.** Power dependent *I-V* curves of MoS<sub>2</sub> devices with (a) Ti and (b) graphene/Ti contacts in the dark and under 470 nm light illumination.