Supporting Information

Evaluation of Transport Parameters in MoS_2/Graphene Junction Devices Fabricated by Chemical Vapor Deposition

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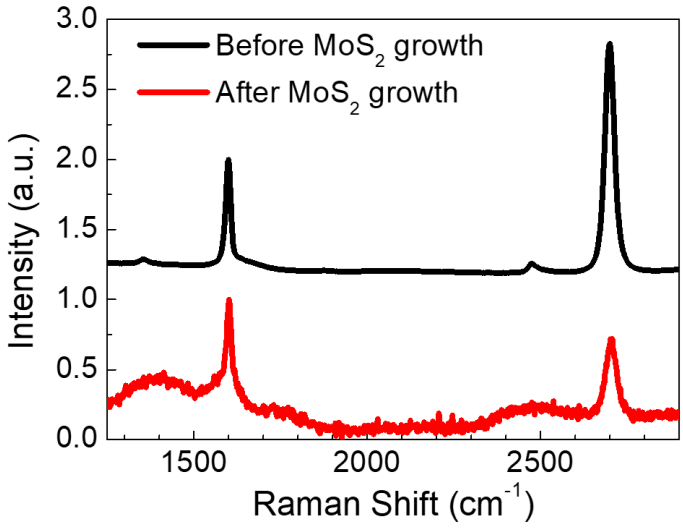

Figure S1. Evolution of graphene Raman spectra with MoS_2 growth. Raman spectra on graphene film before and after it is used as an anchor for MoS_2 growth. Relatively large 2D peak observed in the initial Raman spectrum confirms that it is a single-layer graphene. Conversely, after the MoS_2 growth, the relative strength of 2D peak decreases. In addition the D peak is not clearly resolved after the growth.

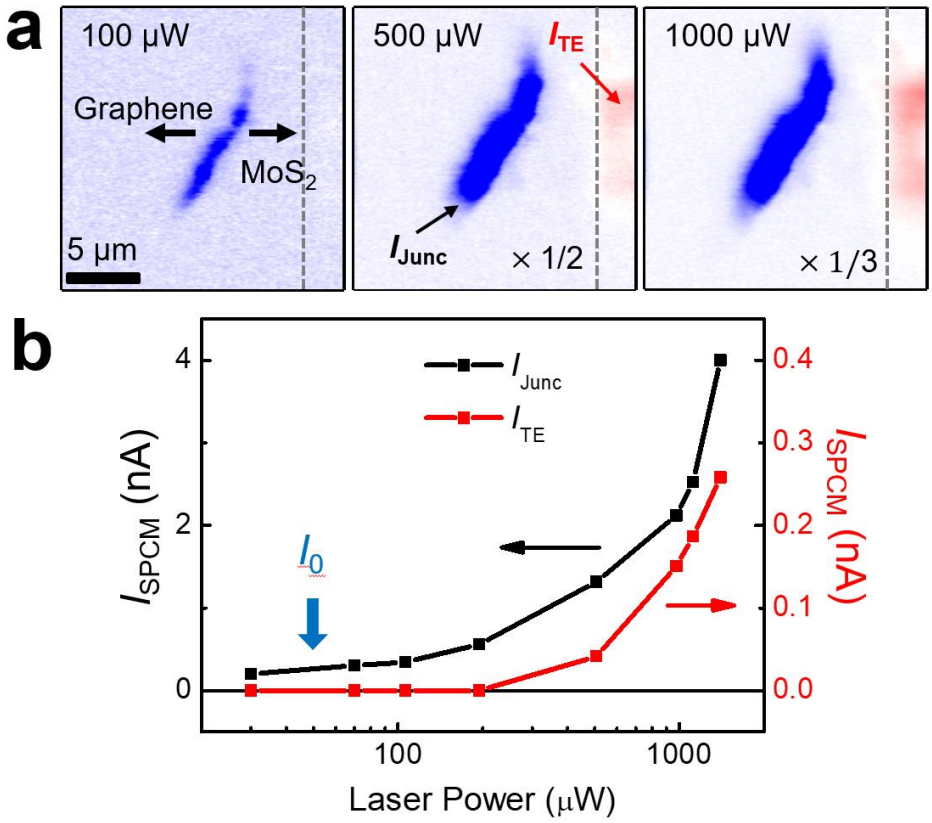

Figure S2. Laser power dependence and thermoelectric current. (a) A series of SPCM images for the three different laser power conditions (100, 500, and 1000 μW). The photocurrent at the junction region (I_{Junc}) dominate the SPCM signals at low power condition, whereas the thermoelectric current (I_{TE}) appears when we illuminate metal electrode with relatively high laser power. (b) Plot of I_{Junc} and I_{TE} as a function of laser power. I_0 (~ 50 μW) indicates the typical laser power condition used in the main manuscript. At the low power regime, I_{Junc} dominate the SPCM signal because I_{TE} increases nonlinearly with the laser power, whereas I_{Junc} increases linearly with the laser power.

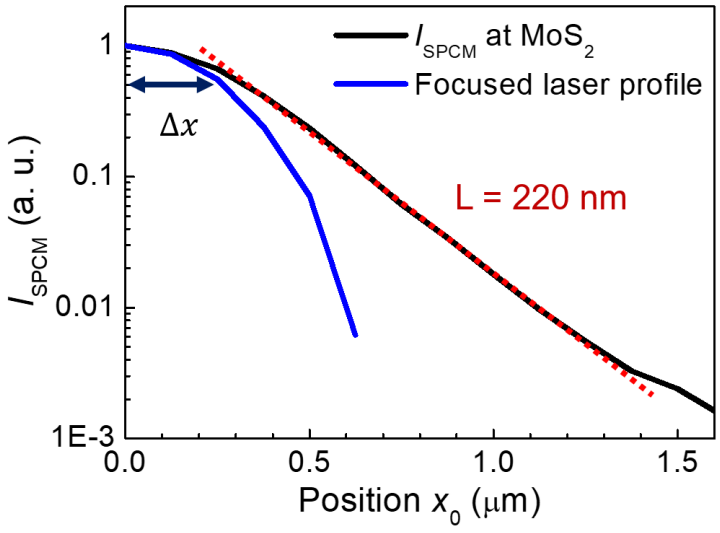

Figure S3. MoS_2 diffusion length vs focused laser beam profile I_{SPCM} is plotted as a function of the laser position (x_0) in the MoS_2 region (black line). The red dotted line is fit to the data. Shown together as blue solid line is the focused beam profile measured from the reflection image. We obtained the MoS_2 diffusion length by fitting the data away from the junction area, in which I_{SPCM} exhibit a simple exponential decay.