

Supporting information

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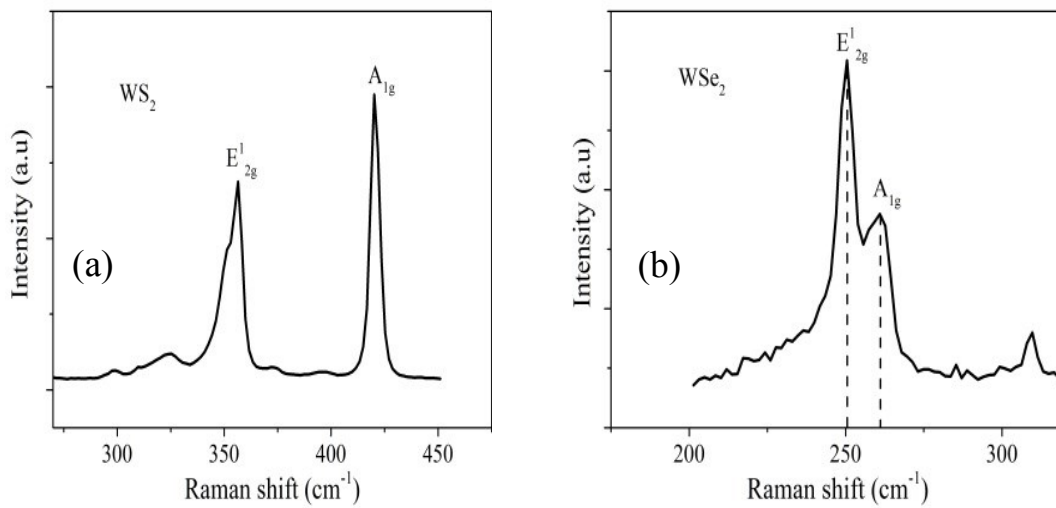


Figure S1. Raman spectroscopy, showing typical Raman spectral peaks of FL (a) WS₂ (b) WSe₂, at a laser excitation wavelength of 514 nm.

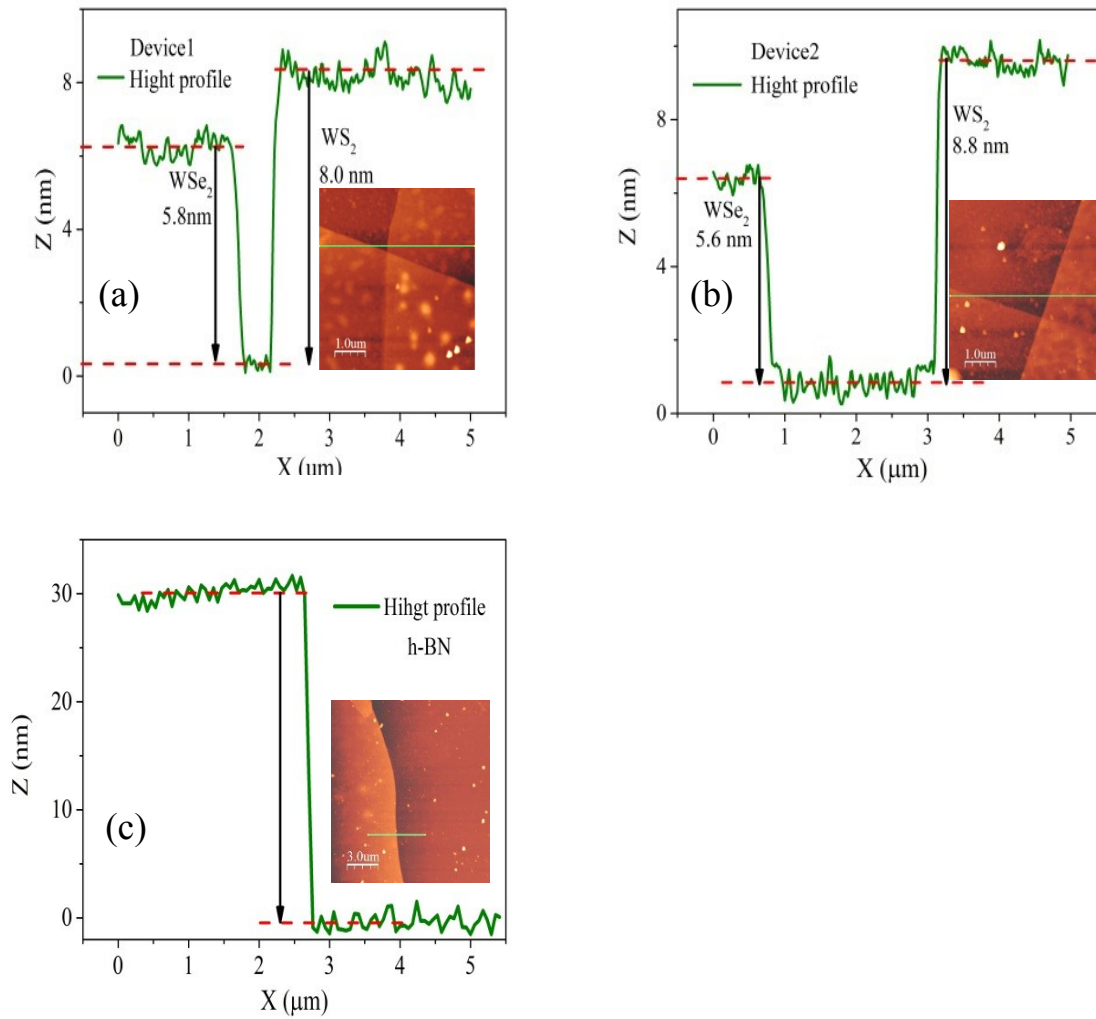


Figure S2. Atomic force microscopy, showing height profiles of TMDs along with their inset topographical images. (a) and (b) Height profile of WSe_2 and WS_2 for device1 and device2 respectively. (c) Height profile of h-BN used as a supporting base for device2.

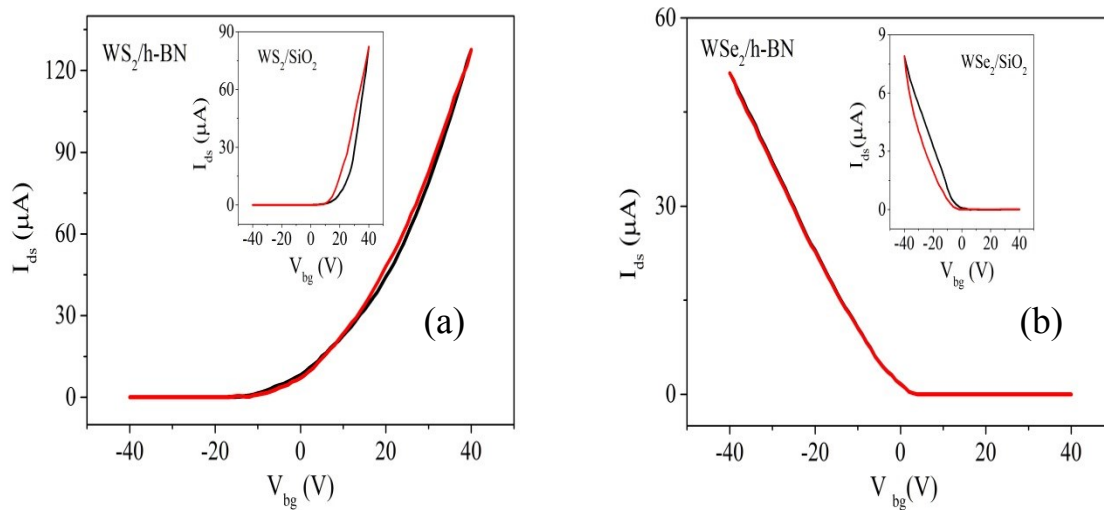


Figure S3. Hysteresis behavior (I_{ds} - V_{bg}) curve at $V_{ds}=1$ V on h-BN substrate for (a) WSe_2 (b) WS_2 , whereas each inset figure show that on SiO_2 substrate.

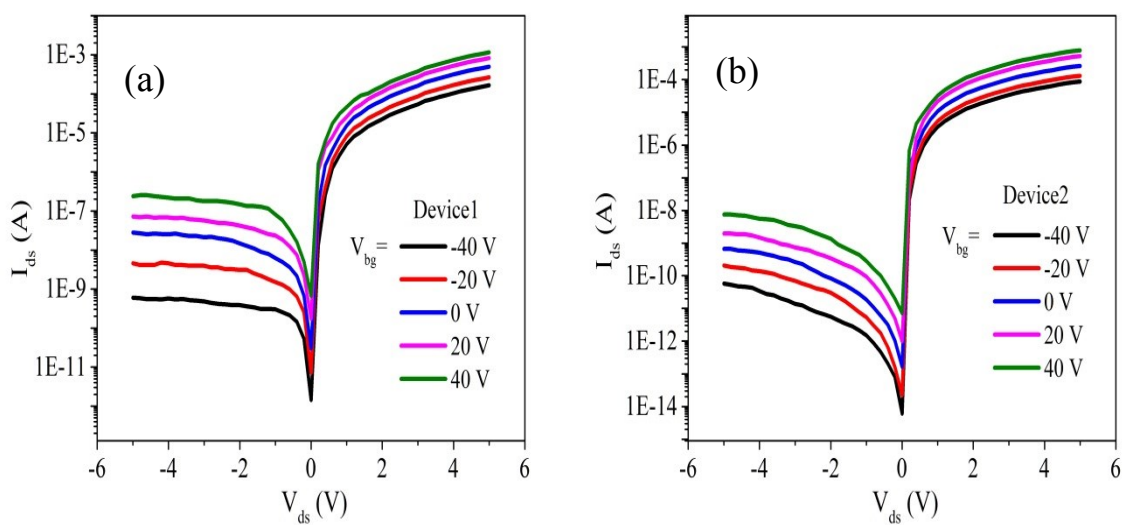


Figure S4. Back-gate dependent diode I_{ds} - V_{ds} curves plotted in the semi-log scale for (a) device1 and (b) device2.

