

Abstract Submitted  
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**Electronic Transport of Encapsulated WSe<sub>2</sub> Fabricated by Pick-up of Pre-patterned hBN**<sup>1</sup> YAFANG YANG, HUGH CHURCHILL, Massachusetts Institute of Technology, KENJI WATANABE, TAKASHI TANIGUCHI, National Institute for Materials Science, Japan, PABLO JARILLO-HERRERO, Massachusetts Institute of Technology — We report high quality WSe<sub>2</sub> devices encapsulated between two hexagonal boron nitride (hBN) flakes using a pick-up method with etched hBN flakes. Previous work on graphene has shown that sample disorder can be greatly reduced via isolation from charge impurities in the substrate by means of encapsulation. However, the effect of encapsulation still remains unknown for dichalcogenides devices. Besides, the quality of contact to TMDs is also a critical factor limiting the transport performance of such devices. To measure the transport properties of dichalcogenide devices as a function of temperature, low resistance electrical contacts must be made to the material. To achieve this, we encapsulate few-layer WSe<sub>2</sub> in hexagonal boron nitride that has been patterned to allow ionic liquid doping of the contact region. This technique simultaneously protects the WSe<sub>2</sub> surface above and below, resulting in the highest mobility few-layer WSe<sub>2</sub> devices reported to date.

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