

Abstract Submitted
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Synthesis and characterizations of heterojunction of monolayer semiconductors. YI-HSIEN LEE, XIN-QUAN ZHANG, YU-WEN TSENG, KUAN-HUA HUANG, CHUN-AN CHEN, BO-HAN CHEN, National Tsing-Hua University — Monolayers of van der Waals materials, including graphene, and MoS₂, offered a burgeoning field in fundamental physics, and optoelectronics.[1-5] Recently, atomically thin heterostructures of monolayer TMDc with various geometrical and energy band alignments are expected to be the key materials for next generation flexible optoelectronics. The individual TMDc monolayers can be adjoined vertically or laterally to construct diverse heterostructures which are difficult to reach with the laborious pick up-and-transfer method of the exfoliated flakes. The ability to produce copious amounts of high quality layered heterostructures on diverse surfaces is highly desirable but it has remained a challenging issue. Here, we have achieved a direct synthesis of various heterostructures of monolayer TMDc.[6] The synthesis was performed using CVD with aromatic molecules as seeding promoters. We will discuss possible growth behaviors, and we examine the symmetry and the interface of these heterostructures using optical analysis and scanning TEM. Reference: [1] Xiaoze Liu et al, Nature Photonics, 9, p.30 (2015) [2] Yi-Hsien Lee, et al, Adv. Mater., 24, p.2320 (2012) [3] Yi-Hsien Lee, et al., Nano Lett., 13, 1852 (2013) [4] Xi-Ling et al, Nano Lett., 14, p.464 (2014) [5] Lili Yu et al, Nano Lett, 14, p.3055 (2014) [6] Xin-Quan Zhang et al, Nano Lett, 15, p.410 (2015)

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