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Van der Waals growth of monolayer MoS_2 and its heterostructures DONGXIA SHI, Institute of Physics, Chinese Academy of Sciences, Beijing 100190 — Monolayer MoS_2 as one kind of TMDs two-dimensional (2D) crystals, is a direct bandgap semiconductor and has attracted much research interests beyond graphene. We report the van der Waals (vdW) growth of monolayer MoS_2 by chemical vapor deposition (CVD) in our developed 3-zones furnace with high quality. The integrated flexible TFTs based on our CVD MoS_2 have been fabricated with the device structure compatible with the traditional semiconductor fabrication process. The uniformity of the continuous MoS_2 film leads to the stable performance over a centimeter scale even under uniaxial strain 1% with mobilities of 14 $cm^2v^{-1}s^{-1}$ and on/off ratio higher than 10^5. The excellent performance of those devices suggests that they are promising candidates for flexible and integrable electronics devices in future. The epitaxial growth of MoS_2 on WS_2 via a two-step CVD growth approach was also reported to create bilayers of vdW heterostructures with clean interface and strong interlayer coupling. It was demonstrated that our epitaxial growth of MoS_2 /WS_2 heterostructures has strong interlayer coupling and reveals more efficient interlayer charge transfer and spatially separated exciton recombination than the transferred heterostructures. References: 1. **Adv. Electron. Mater.** 2016, 2: 1500379. 2. **Adv. Mater.** 2016, 28: 1950. 3. **J. Am. Chem. Soc.** 2015, 137 (50): 15632. 4. **ACS Nano** 2014, 8: 6024.

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