11:20~12:00

STM Characterization of 2D Materials and Devices

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Abstract

Current semiconductor industry is facing a limit of scaling. Thus, it is urgent to find a new type of material to replace Si. Two-dimensional (2D) materials, especially those with a proper band gap provide a solution to this problem since the thickness of a monolayer of 2D materials can be reduced to only few atoms. Scanning tunneling microscopy (STM) is a powerful method to reveal both the geometry and electronic structure down to atomic scale. In this presentation, I will discuss several issues of 2D materials and devices studied by STM. First, the growth behavior of silicene, a monolayer honeycomb structure of Si, is clearly revealed. Second, the location of defect in monolayer transition metal dichalcogenides (TMDs) is clearly identified though the quasiparticle interference. Besides, to recover the imperfect TMD surfaces is realized through in situ sputtering and annealing. Finally, the defect induced mobility modulation in 2D devices is visualized by STM. It is clear that STM can provide vital information for helping the developments of 2D materials and devices.