Epitaxial Growth of Two-Dimensional Stanene JINFENG JIA$^1$, Shanghai Jiao Tong University — Ultrathin semiconductors present various novel electronic properties. The first experimental realized two-dimensional (2D) material is graphene. Searching 2D materials with heavy elements bring the attention to Si, Ge and Sn. 2D buckled Si-based silicene was realized by molecular beam epitaxy (MBE) growth. Ge-based germanene was realized by mechanical exfoliation. Sn-based stanene has its unique properties. Stanene and its derivatives can be 2D topological insulators (TI) with a very large band gap as proposed by first-principles calculations, or can support enhanced thermoelectric performance, topological superconductivity and the near-room-temperature quantum anomalous Hall (QAH) effect. For the first time, in this work, we report a successful fabrication of 2D stanene by MBE. The atomic and electronic structures were determined by scanning tunneling microscopy (STM) and angle-resolved photoemission spectroscopy (ARPES) in combination with first-principles calculations. This work will stimulate the experimental study and exploring the future application of stanene.

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