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Silicene growth on Ag(111) thin film covered Si(111) substrates.
TSU-YI FU, HUNG-CHANG HSU, YI-HUNG LU, TAI-LUNG SU, Department of Physics, National Taiwan Normal University — Silicene, the two dimensional monolayer films and the same group IV element with graphene, is expected for its abundant properties. However, the difficulty of structure growth and the demand for special substrates limit the possibility of further applications. Using scanning tunneling microscopy (STM) and scanning tunneling spectrum (STS), the formation of silicene on the 6~12ML Ag (111) thin films was studied. The Ag films were pre-grown on the Si (111) substrates. The classical silicene superstructures, such as 4×4 , $\sqrt{13} \times \sqrt{13}$, $2\sqrt{32} \times \sqrt{3}$, can be observed on this Ag (111) thin film covered Si(111) surfaces. The more continuous silicene sheet formed on 6~12 ML Ag (111)/Si(111) substrate than on the single crystal Ag (111) surface. Various silicene superstructures are usually discontinuous on the single crystal Ag (111) surfaces, but continuous on the thin film Ag (111) surfaces by Ag domain rotation on Si (111) surfaces. A flexible thin film Ag (111) surface seems a better substrate than solid crystal Ag (111) for silicene growth. The STS of each superstructure of silicene was measured and found the similar electron properties. It indicates the possible application for multi-superstructure silicene.

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