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Growth of Si thin film on 6H-SiC(0001)¹ HSIN-JU WU, M. TIEN HOANG, YUNTAO LI, PHILLIP N. FIRST, School of Physics, Georgia Institute of Technology — Graphene is much studied for its unusual electronic properties. Other carbon group elements such as silicon (Si) and germanium (Ge) also are predicted to have stable 2D phases for which the electronic structure and properties could be still more interesting. Silicon carbide, already an excellent insulating substrate for epitaxial graphene, could potentially play a similar role for silicene. Commonalities in the substrate and processing may lead to the integration of carbon and silicon technologies. Here, we use surface analysis techniques (LEED, AES, STM) to investigate the formation of 2D Si on SiC(0001), under low pressures of silane or silicon. Similar methods allow control of surface graphene growth by compensating Si desorption from SiC. Among several Si-rich reconstructions, we find a single stable hexagonal phase, at a coverage close to twice the Si density predicted for silicene, and with a unit cell consistent with a commensurate layer of silicene or silicane. For a graphitized SiC starting surface, silane is shown to etch graphene, reforming SiC.

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