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Growth and electronic structure of topological insulator Bi_2Se_3 thin films on graphene/SiC(0001) substrate[1] CANLI SONG, YILIN WANG, XUCUN MA, KE HE, LILI WANG, Institute of Physics.CAS.China, JIAFENG JIA, XI CHEN, QIKUN XUE, Tsinghua University.China — We report on the growth of atomically smooth and stoichiometric Bi_2Se_3 thin films on bilayer graphene prepared on SiC(0001) substrate using molecular beam epitaxy. It is found that the position of the Dirac point changes with film thickness, and that the Dirac transport regime appears in Bi_2Se_3 film as thin as 10 quintuple layers. By mapping the step edge-induced interference patterns with scanning tunneling microscopy, a linear Dirac surface state band is obtained. By manipulating the charge states of subsurface Fe acceptors, we demonstrate the presence of a bulk bandgap in the Bi_2Se_3 films. The high quality films pave a way for fundamental research of topological insulators, and are important for potential spintronic and quantum-computing applications at room temperature.

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