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Growth of topological insulator Bi₂Se₃ thin films by the van-der-Waals epitaxy on vicinal Si(111) substrate Z.Y. WANG, Physics Department, The University of Hong Kong, Pokfulam Road, Hong Kong, China, H.D. LI, Physics Department, The University of Hong Kong, Pokfulam Road, Hong Kong, China; and Department of Physics, Beijing Jiaotong University, Beijing, X. KAN, X. GUO, Physics Department, The University of Hong Kong, Pokfulam Road, Hong Kong, China, H.T. HE, Z. WANG, J.N. WANG, T.L. WONG, N. WANG, Physics Department, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong, People's Republic of China, M.H. XIE, Physics Department, The University of Hong Kong, Pokfulam Road, Hong Kong, China — Thin films of Bi₂Se₃, a three-dimensional topological insulator, have been synthesized by molecular-beam epitaxy with varying thicknesses. Their surface, structural and transport properties have been characterized. For the purpose of lowering the structural defects in film, van-der-Waals epitaxy (vdWe) was adopted in a “two-step” growth process, where the initial low-temperature seed layer is followed by a crystalline layer grown at elevated temperatures. Employing vicinal Si(111) substrates, the crystallinity and surface morphology of the epilayer is further improved. Relatively high magnetoresistance along with its linear dependence on the magnetic field at high fields have been observed in the vicinal samples.

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