

Epitaxial Growth of Bi₂Se₃ on a Metal Substrate

전정흡, 장원준, 윤종건, 강세종

고려대학교 물리학과

Three dimensional(3D) topological insulators(TIs) of Bi binary alloys are characterized by a bulk energy gap with strong spin-orbit coupling and metallic surface states protected by time-reversal symmetry. It was reported that film forms of such materials were advantageous over bulk forms due to less defect density and better crystallinity. So far, the films have been prepared on several substrates including semiconductors and graphene. But, there were no studies on metal substrates. For electronic transport experiments and device applications, it is necessary to know epitaxial relation between TIs and metal electrodes. In this study, Atomically flat films of Bi₂Se₃ were grown on a Au(111) metal substrate by in-situ molecular beam epitaxy. Using home-built scanning tunneling microscope, we observed hexagonal atomic structures which corresponded to the outmost selenium atomic layer of Bi₂Se₃. Triangular-shaped defects known as Selenium vacancy were also found.

Keywords: scanning tunneling microscope, bismuth selenide, epitaxy, topological insulator