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Structure and transport of topological insulators on epitaxial graphene[1] JAMES KALLY, Dept. of Physics, Penn State Univ., DANIELLE REIFSNYDER HICKEY, Dept. of Chemical Engineering and Materials Science, Univ. of Minnesota, YU-CHUAN LIN, Dept. of Materials Science and Engineering, Penn State Univ., ANTHONY RICHARDELLA, JOON SUE LEE, Dept. of Physics, Penn State Univ., JOSHUA ROBINSON, Dept.of Materials Science and Engineering, Penn. State Univ., K. ANDRE MKHOYAN, Dept. of Chemical Engineering and Materials Science, Univ. of Minnesota, NITIN SAMARTH, Dept. of Physics, Penn State Univ. — Recent advancements in spintronics have shown that a class of materials, topological insulators (TI), can be used as a spin-current generator or detector. Topological insulators have protected surface states with the electrons spin locked to its momentum. To access these surface states, $(Bi, Sb)_2Te_3$ can be grown by molecular beam epitaxy to have the Fermi energy near the Dirac point so that transport occurs only through the spin-dependent surface states. Graphene is another 2D material of great interest for spintronics because of its very long spin diffusion length. This is an ideal material to act as a spin channel in devices. The van der Waals nature of the growth exhibited by 2D materials such as $(Bi, Sb)_2Te_3$ and graphene allows heterostructures to be formed despite the large lattice mismatch. We explore the structure and transport of $(Bi, Sb)_2Te_3$ grown on epitaxial graphene on 6H-SiC substrates for spintronic applications.

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