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Chemical substrate transfer of topological insulator thin films for novel characterization and interfaces[1] GRANT SMITH, ANTHONY RICHARDELLA, NITIN SAMARTH, Pennsylvania State University — Molecular beam epitaxy (MBE) is a widely used technique for synthesizing wafer scale samples of bismuth chalcogenide topological insulator (TI) thin films. Importantly, the deposition technique allows the fabrication of heterostructures wherein a TI is interfaced with symmetry breaking phases of matter such as ferromagnets, antiferromagnets and superconductors. However, the MBE of TI films on such substrates yields films of widely varying structural quality.1 An alternative approach is to grow a TI film with optimized structural quality on an appropriate substrate and then lift it off for transfer onto an arbitrary substrate of interest [Bansal *et al.*, Nano Lett. **14**, 1343 (2014)]. This method vastly expands the range of possible TI heterostructures. We describe experiments wherein large area MBE-grown TI thin films are lifted off from sapphire substrates and then transferred onto other materials such as ferromagnetic insulators. These samples are characterized using electrical transport measurements, atomic force microscopy, and x-ray diffraction. We also describe plan view transmission electron microscopy (TEM) of the TI films by transfer to TEM grids, as well as attempts to fabricated TI thin films suspended over deep valleys in a substrate.

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