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Transport properties of chalcogenide and related topological insulator bulk crystals R.B. LILLIANFELD, HELIN CAO, TAI-LUNG WU, IREK MIOTKOWSKI, YONG P. CHEN, Purdue University — Three-dimensional (3D) topological insulators (TIs) have attracted strong theoretical and experimental interest in the condensed matter community. We have used the Bridgman method to synthesize various chalcogenide and related 3D TI crystals. We present an experimental survey of a group of binary, tertiary, and quaternary bulk crystals of various compositions of Bi, Sb, Ge, Se, Te, and S. Our survey includes systems without intentional doping, as well as systems doped with magnetic and non-magnetic impurities. We present magnetotransport data over a range of temperatures. We also measure thin films exfoliated from these bulk crystals to examine efficacy of carrier modulation through an applied gate voltage. We discuss the results of these measurements in the context of TI properties, with the ultimate goal of identifying systems that display electronic transport properties consistent with an insulating bulk and spin-helical Dirac fermion surface states.

[X] Prefer Oral Session
[ ] Prefer Poster Session

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