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Transport properties of new Pb-based Topological Insulators[1] KAZUMA ETO, SATOSHI SASAKI, KOUJI SEGAWA, YOICHI ANDO, Institute of Scientific and Industrial Research, Osaka University — A topological insulator (TI) has a gapped insulating bulk and a gapless metallic surface. So far, such materials as $Bi_{1-x}Sb_x$, Bi_2Se_3, and $TlBiSe_2$ are known to be TIs. Recently, several theoretical predictions have been made for new TI materials. In this work, we focus on the Pb-based ternary chalcogenides as new candidate TIs. We have grown a number of single crystals in the systems of Pb-Bi-Se, Pb-Bi-Te, Pb-Sb-Te and Pb-(Sb,Bi)-Te. After selecting single-phase samples, we measured the transport properties to check for their bulk-insulating nature. It was found that $Pb(Sb_xBi_{1-x})_2Te_4$ shows a change in the carrier type at around x= 0.55 as inferred both by the themopower and by the Hall effect, but the temperature dependences of the resistivity remained metallic in all the samples studied. We discuss the prospect of making a bulk-insulating material in the Pb-based TIs.

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