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Galvanomagnetic and thermomagnetic properties of thallium doped PbSnTe and PbSeTe[1] VLADIMIR JOVOVIC, JOSEPH HEREMANS, The Ohio State University — Thallium acts as a resonant level in PbTe, so that PbTe:Tl shows a significant improvement of thermoelectric properties due to an increase in thermopower as compared to that of similarly Na-doped PbTe [2]. Further improvements in zT are expected from a reduction of the thermal conductivity by alloy scattering in Pb_{1-x-y} Tl_ySn_xTe and $Pb_{1-y}Tl_yTe_{1-x}Se_x$ alloys. However, the band structure of PbTe is sensitive to alloying with Sn and Se, and thus the location of the Tl level with respect to the valence band can change with x. In this study, we investigate the effects that band structure modifications have on the enhancement of thermopower. Thermoelectric properties of Pb_{1-x-y} Tl_ySn_xTe and $Pb_{1-y}Tl_yTe_{1-x}Se_x$ alloys with y=0.01-0.04 and x=0-0.3 are measured in directions longitudinal and transverse to magnetic fields in the range of -1.5 to 1.5T. We report zero field values of electrical resistivity, thermopower, Hall coefficient and adiabatic Nernst-Ettinghausen coefficient as measured in temperature range 80-420K. From these we calculate carrier density and mobility and the density of states effective masses and Fermi energies. [2] J.P. Heremans et al., Science 321, 554 (2008)

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