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Antimony: a Dual Donor in Lead Telluride CHRISTOPHER JAWORSKI, Department of Mechanical Engineering, The Ohio State University, Columbus, OH, JANUSZ TOBOLA, Faculty of Physics and App. Comp. Science. AGH University of Science and Technology, Krakow, Poland, JOSEPH HEREMANS, Department of Mechanical Engineering and Department of Physics, The Ohio State University, Columbus, OH — Band structure calculations indicate the formation of an antimony impurity level just above the Fermi level for $Pb_{1-x}Sb_xTe$ and just below the Fermi level for $PbSb_xTe_{1-x}$. For experimental verification, we prepare bulk samples of $Pb_{1-x}Sb_xTe$ and $PbSb_xTe_{1-x}$ (x = 0.25, 0.5, 1%). Electrical resistivity, Seebeck, Hall and transverse Nernst-Ettingshausen coefficients of the crystals have been measured in the temperature range 2-580 Kelvin. Thermal conductivity data was measured in the range 80-800 Kelvin. We confirm the ability of antimony to take the place of a lead atom and dope PbTe n-type or take the place of a tellurium atom and dope PbTe p-type. Antimony, however, is not as efficient an acceptor in p-type material as it is a donor in n-type material. The Fermi levels are calculated using experimental data and will be reported here. Also, a phase transition is experimentally observed at 500 K in p-type $PbSb_xTe_{1-x}$.

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