Galvanomagnetic and Thermomagnetic Properties of Ag\textsubscript{(1−x)}Na\textsubscript{x}SbTe\textsubscript{2} Alloys

MICHELE NIELSEN, VLADIMIR JOVOVIC, CHRISTOPHER JAWORSKI, Department of Mechanical Engineering, Ohio State University, Columbus OH, JOSEPH HEREMANS, Department of Mechanical Engineering and Department of Physics, Ohio State University, Columbus, OH — Group I-V-VI\textsubscript{2} alloys have intrinsically low thermal conductivity on the order of 0.65 W/mK due to Umklapp phonon-phonon scattering. Combined with the high valence band density of states in AbSbTe\textsubscript{2}, this makes this material system ideal for thermoelectric applications up to 416 K, where AgSbTe\textsubscript{2} undergoes a crystallographic phase transition. The partial substitution of Na for Ag is expected to address this problem. We synthesize bulk Ag\textsubscript{(1−x)}Na\textsubscript{x}SbTe\textsubscript{2} alloys and measure the evolution of the phase transition as a function of Na concentration x. The thermoelectric and galvanomagnetic properties of the alloys are also studied: based on the measurement of resistivity, Seebeck, Nernst and Hall coefficients we calculate mobilities, Fermi energies and partial carrier concentrations of holes and electrons.

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