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Carrier concentration optimization and electrical and thermal transport properties of the defect manganese silicide $MnSi_\delta(\delta \sim 1.74)$*
V. PONNAMBALAM, GLORIA LEHR, D.T. MORELLI, Dept. of Chemical Engineering and Materials Science, Michigan State University — Defect manganese silicide $MnSi_\delta$ ($\delta \sim 1.74$) is known for unusually low thermal conductivity. In addition, it also exhibits promising thermoelectric properties. We have substituted $MnSi_\delta$ with various elements to optimize the carrier concentration. Electrical and thermal transport properties of the resulting alloys have been studied over a temperature (T) range of 80-300 K. Both resistivity and Seebeck coefficient vary with substitution. Hall measurements suggest that the carrier concentration indeed varies in these alloys. Interestingly, thermal conductivity either remains constant or weakly increases with T in the temperature range 80- 300 K, eventually reaching values $\sim$ 3 W/m K at 300 K. The results will be presented and discussed. *This work was supported as part of the Center for Revolutionary Materials for Solid State Energy Conversion, an Energy Frontier Research Center funded by the U.S. Department of Energy, Office of Science, Office of Basic Energy Sciences under Award Number DE-SC0001054.

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