Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Electrical and thermal transport properties of the substituted defect manganese silicides $\mathbf{Mn_{1-x-y}Cr_xRu_ySi_{\delta\sim 1.74}}$[1] VIJAYABARATHI PONNAMBALAM, DONALD T. MORELLI, Department of Chemical Engineering and Materials Science, Michigan State University, East Lansing, MI- 48824 — Crystallizing in the $TiSi_2$ structure with considerable amount of random vacancies at the Si site, defect manganese silicides $MnSi_\delta(\delta \sim 1.72\text{-}1.74)$ are unusual in many respects. One of them is their structural stability which is determined by the electron concentration. In addition, $MnSi_\delta$ is known for unusually low thermal conductivity $\sim$ 3 - 3.5 W/m K at 300 K. We have substituted $MnSi_\delta$ with Cr and Ru simultaneously and studied the electrical and thermal transport properties of the resulting alloys. Both resistivity and Seebeck coefficient are less sensitive to substitutions and maintain robust values as high as that of $MnSi_{\sim 1.74}$. Hall measurements indicate that the carrier concentration remains high around $10^{21}/cm^3$ and more or less same for all compositions. Thermal conductivity is decreased further and interestingly increases with T reaching values $\sim$ 2.5 W/m K at 300 K. These results will be presented and discussed.

[1]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. DoE, Office of Science, Office of Basic Energy Sciences under Award Number DE-SC0001054.

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Date submitted: 15 Nov 2011 Electronic form version 1.4