Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

**Effects of Substitution and Grain Size on the High Temperature Thermoelectric Properties of MNiSn Phases.** SLADE CULP, University of Virginia, S. JOSEPH POON, University of Virginia, TERRY M. TRITT, Clemson University, NICOLETA HICKMAN, Clemson University, BRAD EDWARDS, Clemson University, UNIVERSITY OF VIRGINIA COLLABORATION, CLEMSON UNIVERSITY COLLABORATION — The merit of n-type Sb doped MNiSn (M=Ti, Zr, Hf) half-Heusler phase, as a promising material for use in high temperature power generation, is exhibited by large thermopower, and small, semimetallic, resistivity values. It has been observed that the level of Sb doping on the Sn site plays a fundamental role in the determining the temperature at which the material will achieve maximum thermoelectric efficiency. Meanwhile, the high thermal conductivity found in ternary MNiSn, can be reduced via mass fluctuations and strain field effects induced through substitution at the M and Ni sites. In addition, the effects of grain size modification, through supplemental synthesis techniques, on the lattice thermal conductivity will be discussed. The combination of substitutions and grain size modification in the ternary half-Heusler system results in a complex thermoelectric material with a figure of merit on the order of ZT=1.

Slade Culp
University of Virginia

Date submitted: 30 Nov 2005 Electronic form version 1.4