Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Potential thermoelectric performance from optimization of hole-doped Bi_2Se_3[1] DAVID PARKER, DAVID SINGH, Oak Ridge National Laboratory — We present an analysis of the potential thermoelectric performance of hole-doped Bi_2Se_3, which is commonly considered to show inferior room temperature performance when compared to Bi_2Te_3. We find that if the lattice thermal conductivity can be reduced by nanostructuring techniques (as have been applied to Bi_2Te_3) the material may show optimized ZT values of unity or more in the 300 - 500 K temperature range and thus be suitable for cooling and moderate temperature waste heat recovery and thermoelectric solar cell applications. Central to this conclusion are the larger band gap and the relatively heavier valence bands of Bi_2Se_3.

[1]This research was supported by the U.S. DoE, EERE, Vehicle Technologies, Propulsion Materials Program (DP) and the "Solid State Solar-Thermal Energy Conversion Center (S3 TEC)," an Energy Frontier Research Center funded by the US DOE(DJS)

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Date submitted: 09 Dec 2011 Electronic form version 1.4