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Thermoelectric properties of nanoporous Ge JOO-HYOUNG LEE, JEFFREY GROSSMAN, University of California-Berkeley — Recently, silicon nanowires were shown to have a thermoelectric (TE) figure of merit (ZT) two orders of magnitude larger than that of bulk Si [1]. In addition, recent theoretical work predicted that Si with periodically arranged nanometer-sized pores (nanoporous Si) could result in a similar increase in ZT[2]. These results open an exciting new pathway towards efficient thermoelectrics based on standard semiconductor materials. In the present work, we extend our earlier calculations on silicon to explore the TE properties of nanoporous Ge. Specifically, we calculate the thermal and electrical conductivities, Seebeck coefficient and figure of merit of nanoporous Ge for a range of configurations using a combined *ab initio* electronic structure calculation and Boltzmann transport approach. The results show a substantial increase in ZT compared with that of bulk Ge, as in the Si nanostructures. A detailed comparison between the TE properties of nanoporous Ge and Si will be presented.

[1]A. I. Hochbaum *et al.*, Nature **451**, 163 (2009); A. I. Boukai *et al.*, *ibid.*, **451**, 168 (2009)
[2]J.-H. Lee *et al.*, Appl. Phys. Letts. **91**, 223110 (2007); J.-H. Lee *et al.*, Nano Lett. **8**, 3750 (2008)

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