

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

**Lattice Dynamics Simulations of Phonon Thermal Conductivity
in SiGe Alloys** SHANG-FEN REN, WEI CHENG¹, Illinois State University —

Thermoelectric Properties of SiGe alloys and Si/SiGe alloy superlattices have attracted a great research attention in recent years because their potential applications in thermoelectric devices and other applications. By using a microscopic lattice dynamics model developed to investigate phonon properties in semiconductor nanostructures, we have calculated phonon thermal conductivities of Si/Ge superlattices in both the growth and in-plane directions [1]. In this research, we have calculated the phonon thermal conductivity of SiGe alloy with various alloy compositions at different temperatures. The calculated results are compared with available experimental measurement [2] with good agreement. We are expecting that these calculations can help with the searching for the most efficient thermoelectric materials for various applications. References: 1. Lattice Dynamics Investigations of Phonon Thermal Conductivity of Si/Ge Superlattices with Rough Interfaces, S.F. Ren, W. Cheng, G. Chen, J. Appl. Phys. (in print 2006). 2. The influence of the composition of SiGe mixed crystals on thermal diffusivity photoacoustic approach, A. Patrin, N. Abrosimov, M. Malinowski, L. Bychto, Solar Energy Materials & Solar Cells 72 (2002) 579.

¹On leave from Beijing Normal University

Shang-Fen Ren
Illinois State University

Date submitted: 09 Nov 2006

Electronic form version 1.4