

Abstract Submitted
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Enhancement in power factor in p-type bulk SiGe alloys GIRI JOSHI, Boston College, AUSTIN MINNICH, MIT, XIAOWEI WANG, GAOHUA ZHU, YUCHENG LAN, DEZHI WANG, Boston College, BED POUDEL, GMZ Energy, Inc., MILDRED DRESSELHAUS, GANG CHEN, MIT, ZHIFENG REN, Boston College, DEPARTMENT OF PHYSICS, BOSTON COLLEGE COLLABORATION, DEPARTMENT OF MECHANICAL ENGINEERING, MIT COLLABORATION, GMZ ENERGY, INC. COLLABORATION, DEPARTMENT OF PHYSICS, MIT COLLABORATION — Silicon Germanium (SiGe) alloys have been used for high temperature power generation in thermoelectric generators that provided the onboard electrical power to several US space vehicles. Since their performance is related to dimensionless figure-of-merit (ZT), material scientists have focused their attention on possible improvements in ZT of SiGe alloys through an increase in power factor and decrease in thermal conductivity. We have improved peak ZT to 0.95 in p-type SiGe bulk alloys by reducing thermal conductivity with nanostructuring approach. Now, we have been perusing modulation doping technique to improve ZT by increasing power factor in SiGe bulk alloys. We have observed significant improvement in power factor but ZT is not improved due to increase in thermal conductivity. The enhancement of power factor is mainly due to increase in mobility of carriers without much affecting the Seebeck coefficient.

Giri Joshi
Boston College

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