

Abstract Submitted
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Nanostructured high thermoelectric figure-of-merit in n-type bulk SiGe alloys XIAOWEI WANG, Boston College, HOHYUN LEE, Massachusetts Institute of Technology, GAOHUA ZHU, YUCHENG LAN, DEZHI WANG, Boston College, MILDRED DRESSELHAUS, GANG CHEN, Massachusetts Institute of Technology, ZHIFENG REN, Boston College, BOSTON COLLEGE TEAM, MASSACHUSETTS INSTITUTE OF TECHNOLOGY COLLABORATION¹ — Silicon germanium alloys (SiGe) have been the exclusive choice for radioisotope thermoelectric generators (RTGs) because of its reliability and high operating temperatures. In this paper, by using mechanical alloying method, nano-sized phosphorous-doped (n-type) SiGe alloy powders were produced, followed by direct current induced hot press technique, bulk samples were obtained with $\sim 100\%$ density. The thermoelectric properties, including electrical conductivity, Seebeck coefficient, and thermal conductivity, were measured in the temperature range from 25 to 900 °C. A maximum ZT of around 1.3 at 900°C was obtained under certain doping concentration and hot press conditions, mainly due to thermal conductivity reduction from nanostructured SiGe grains of 20 nm.

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