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Maximizing thermoelectric figure-of-merit at high temperature in p-type Bi-Sb-Te system. BO YU, YI MA, JIAN YANG, BED POUDEL, YUCHENG LAN, DEZHI WANG, ZHIFENG REN, Dept. of Physics, Boston College, QING HAO, GANG CHEN, Dept. of Mechanical Engineering, Massachusetts Institute of Technology, DEPT. OF PHYSICS, BOSTON COLLEGE COLLABORATION, DEPT. OF MECHANICAL ENGINEERING, MASSACHUSETTS INSTITUTE OF TECHNOLOGY COLLABORATION — Bismuth telluride alloys and their derivatives are the most important thermoelectric materials used in refrigeration devices around room temperature. Using mechanical alloying and hot press, we have achieved 100% dense nano-structured p-type $Bi_xSb_{2-x}Te_3$ samples. We demonstrated here that the enhanced dimensionless figure-of-merit (ZT) are due to enhanced phonon-scattering, and the ZT peak could be easily shifted to higher temperature by varying the composition and processing conditions.

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