Overview of NIST Thermoelectric Research

W. Wong-Ng, J. Martin, Y. Yan, Evan Thomas, M. L. Green, G. Liu and N. D. Lowhorn, Materials Measurement Science Division, National Institute of Standards and Technology, Gaithersburg, MD 20899

The increased interest in research and development on thermoelectric materials in recent years is partly due to the soaring global energy demand. To help fulfill NIST mission, a project entitled “Measurement, Standards and Data for Energy Conversion Materials” has been created in the Materials Measurement Science Division (formerly known as the Ceramics Division) in which thermoelectric research is a main component. The goal of this project is to address innovation in thermoelectric measurement technologies, measurement standards, and materials characterization. This project involves extensive international collaborations. Our current activities include development of standard reference materials (SRM\textsuperscript{TM}), measurement tools, methodology, and phase equilibrium and crystallographic data. We have recently completed the certification of a low-temperature Seebeck Coefficient standard (Bi\textsubscript{2}Te\textsubscript{3}). In the area of high-throughput combinatorial research for optimization of materials properties, we have developed a set of novel thermoelectric property screening tools. This paper summarizes our current efforts and future plan in the area of standard/metrology/data development of thermoelectric materials.