OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Materials Science & Engineering

October 7-9, 2013 Hampton Inn Tropicana, Las Vegas, USA

Performance enhanced nanostructured thermoelectric materials and their applications

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Abstract

Thermoelectric materials in energy conversion are more and more promising due to the recent breakthroughs in enhancing the dimensionless thermoelectric figure-of-merit (ZT) by nanostructuring approach. I will review the progresses on enhancing the thermoelectric figure-of-merit of a few materials: skutterudites, lead tellurides/selenindes, and half-Heuslers, and followed with a couple of examples of using these materials for applications in waste heat conversion. The main scheme is to enhance the ZT in these materials systems by studying the compositions and creating nanostructures to reduce the thermal conductivity and simultaneously increase the power factor.

Biography

Dr. Zhifeng Ren is currently the M. D. Anderson Chair Professor in the Department of Physics and TcSUH of the University of Houston. He obtainedPhD degree from the Institute of Physics Chinese Academy of Sciences in 1990, specializes in materials synthesis and applications, especially in nanostructured thermoelectricmaterials, devices, and systems for more efficient energy conversion using the enhanced thermoelectric materials. Heis a fellow of APS and AAAS. He has published more than 270 papers with a total citation of 15,000 and an H-index of 57. He is ranked at 49th of the materials scientists in the world.