

Case Study

Research and Development in Nanomaterials used for Thermoelectric Applications

CUSTOMER: U.S. Department of Energy (DoE)
CONTRACT #: DE-SC0000932
PROJECT NAME: STTR Project, "Nanotube-enhanced Bulk TE Nanocomposite for High-efficiency Waste Heat Recovery for Electricity Generation"
PROJECT DURATION: 2009-2010

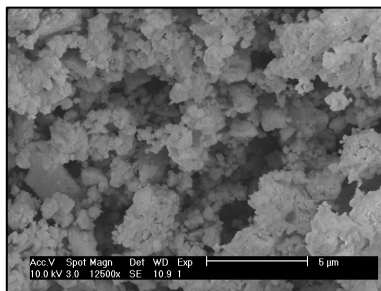
OVERVIEW

The US Department of Energy solicited a SBIR/STTR request for proposal (RFP) for the development of thermoelectric generators for use in waste heat recovery applications. In this project, Aegis Technology developed nanostructured materials, with high ZT values, for use in high performance thermoelectric generators. These nanostructured thermoelectric materials allow for high power, high power density, and high efficiency thermoelectric generators. Aegis Technology was awarded the project in 2009 and completed the project in 2010.

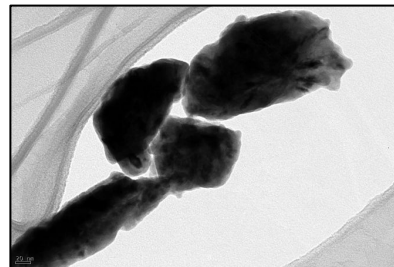
DELIVERABLES

Aegis Technology delivered several thermoelectric material samples. In the process, Aegis Technology conducted:

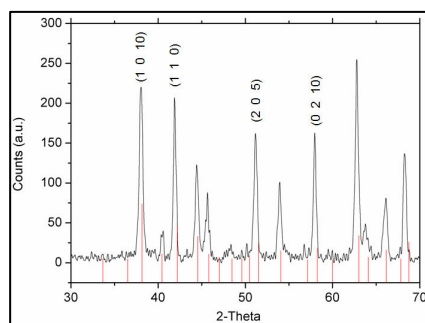
- Processing
- Scanning Electron Microscope (SEM) Characterization
- Transmission Electron Microscope (TEM) Characterization
- Energy-dispersive X-Ray Spectroscopy (EDS)
- X-ray diffraction characterization (XRD)
- Thermoelectric characterization (e.g. ZT vs. temperature)



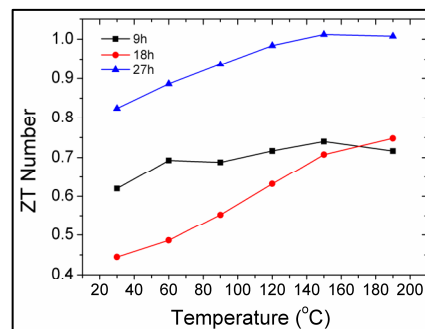
(a)



(b)



(c)



(d)

(a) SEM image of PbTe/PbSe nanomaterials, (b) TEM image of Bi₂Te₃/Sb₂Te₃ nanomaterials
 (c) XRD spectrum of consolidated Bi₂Te₃-Sb₂Te₃, (d) ZT number versus temperature

CONTACT

For more information, please contact:
Dr. Timothy Lin, Technical Director, Aegis Technology Inc.
 (714) 554-5511
timlin@aegistech.net
www.aegistech.net