High Temperature Thermoelectric Materials and Devices for Waste Heat Recovery

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Published in:
Program and Abstracts. The 10th International Symposium on Novel Carbon Resource Sciences

Publication date:
2013

Document Version
Publisher's PDF, also known as Version of record

The 10th International Symposium on Novel Carbon Resource Sciences

2 December 2013
Kyushu University, Fukuoka, Japan

Program and Abstracts

NOVEL CARBON RESOURCE SCIENCES

Hosted by
Center of "Novel Carbon Resource Sciences", Kyushu University

Co-Hosted by
Green Asia Education Center,
Research and Education Center of Carbon Resources,
Research and Education Center for
Advanced Energy Materials, Devices and Systems,
Kyushu University

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6-1 Kasuga Koen, Kasuga 816-8580, Japan

IN-3 HIGH TEMPERATURE THERMOELECTRIC MATERIALS AND DEVICES FOR WASTE HEAT RECOVERY

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By converting heat directly into electricity, thermoelectric (TE) generators provide a viable solution for waste heat recovery [1]. These devices are reliable, noiseless, maintenance- and emission-free, scalable, flexible to fit to any heat sources, and it is usually environmentally friendly. Despite many new TE materials discoveries in the past decade [2], the application of this technology to utilize waste heat is still limited. The major challenges are in materials and devices development (high performance, long-term stability) and processes (cost-effective, up-scalability). In this talk, an overview of thermoelectricity and its potential applications is introduced. Recent developments of high temperature TE oxide materials and their-based devices at the Department of Energy Conversion and Storage, Technical University of Denmark are the main focus of this presentation. The results of enhanced TE properties of the developed materials by nanostructuring approaches [3-6] and oxide-based TE devices at high temperatures [7,8] are highlighted.

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