

High Temperature Thermoelectric Materials and Devices for Waste Heat Recovery

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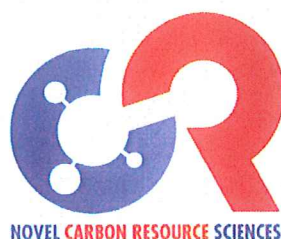
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The 10th International Symposium on Novel Carbon Resource Sciences

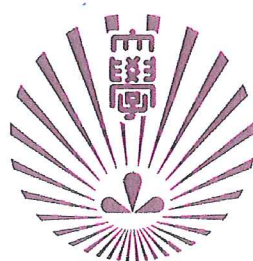
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Research and Education Center of Carbon Resources,
Research and Education Center for
Advanced Energy Materials, Devices and Systems,
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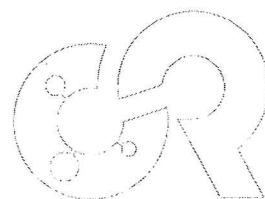
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IN-3 HIGH TEMPERATURE THERMOELECTRIC MATERIALS AND DEVICES FOR WASTE HEAT RECOVERY

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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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