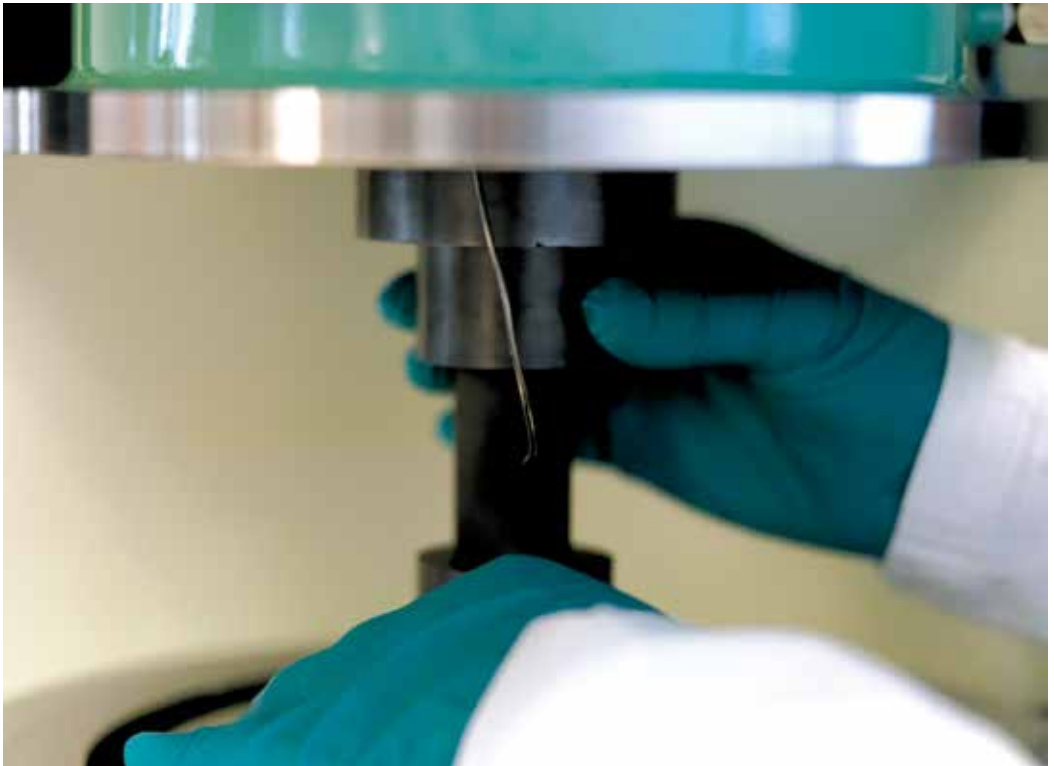


THERMOELECTRIC GENERATORS

– GREEN TECHNOLOGY FOR THE UTILIZATION OF WASTE HEAT



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Many industrial processes produce waste heat which can be difficult to utilize with traditional technologies. Thermoelectric generators can convert waste heat directly into electrical power and in this way improve the energy efficiency of the processes.

Thermoelectric power generation is based on the so-called Seebeck effect: When a temperature difference is established across a conducting material (metal or semiconductor), a voltage difference between the junctions at either end is generated. This phenomenon is used in thermocouples, which are used for temperature measurements, but it can also be used to convert heat into electricity. A thermoelectric generator can contain several hundred thermoelectric couples connected electrically. The properties of the thermoelectric materials

determine the operation temperature of the generator. One key challenge is to develop a segmented generator capable of operating with large temperature gradients across it; this increases the conversion efficiency.

Thermoelectric generators offer several advantages:

- no moving parts, which gives reliable and silent operation
- small units due to high power density
- capable of operating in a wide range of temperatures
- well-suited for remote applications without grid connection
- can be integrated with other power-generating technologies, e.g. fuel cells, and in this way increase the overall efficiency.

The research at the Department of Energy Conversion and Storage is directed towards both low, medium and high temperature thermoelectric devices. Our activities include materials synthesis and processing, segmentation and construction of thermoelectric generators, modelling of individual components as well as complete modules, and characterization of both thermoelectric materials and devices. We participate in several European and Danish projects which aim to develop high performance thermoelectric modules.

ABOUT THE DEPARTEMENT

We focus on functional materials and their applications for sustainable energy technologies

FURTHER INFORMATION

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