

Woven Ribbon Thermoelectric Modules

An innovative, inexpensive, and flexible thermoelectric ribbon maximizes power output by conforming to curved surfaces and withstanding heating or cooling.

Conventional thermoelectric modules are rigid in nature and cannot fit onto any curvature of a hot or cold surface, which limits the amount of power produced by these thermoelectric modules. Additionally, the large numbers of small pieces which are later put together by soldering result in a lengthy and costly process. Researchers at Purdue University have developed an innovative technology that allows the thermoelectric modules to be more flexible, fitting onto any curvature surface and withstand heating and cooling. This also allows for the maximum power output to be reached by these thermoelectric modules. The ribbon itself can also be used as a standalone module conferring flexibility in these thermoelectric modules and allowing them to handle heating or cooling.

Advantages:

- Flexible
- Able to handle heating or cooling
- Inexpensive

Potential Applications:

- Thermoelectric modules
- Thermoelectric ribbons

Technology Validation: This technology has been validated through fabrication and testing of woven modules.

TRL: 6

Technology ID

2018-YAZA-68128

Category

Energy & Power Systems/Power Generation
Materials Science & Nanotechnology/Thermal Management Materials & Solutions
Semiconductors/Thermal Management & Cooling Technologies

Authors

Ulrich Lemmer
Andres Roesch
Ali Shakouri
Kazuaki Yazawa

Further information

Dipak Narula
dnarula@prf.org

View online



Intellectual Property:

Provisional-Patent, 2021-02-04, United States | Utility Patent, 2022-02-04, United States | CON-Patent, 2023-11-27, United States

Keywords: Flexible thermoelectric modules, curved surface power generation, inexpensive thermoelectric technology, high power output thermoelectric modules, standalone thermoelectric ribbon, woven thermoelectric modules, heating and cooling handling, ribbon thermoelectric, flexible thermal energy, inexpensive thermal energy conversion, Automation, Cooling, Electrical Engineering, Energy, flexible, Heat Transfer, Materials and Manufacturing, Modules, Power, Thermal, Thermoelectric