ZrCoBi-BASED HALF-HEUSLER THERMOELECTRIC MATERIAL CONVERTING WASTE HEAT TO ENERGY

Summary

Thermoelectric materials are capable of converting waste heat into electricity. The dimensionless figure-of-merit (ZT), as the critical measure for the material's thermoelectric performance, plays a decisive role in the energy conversion efficiency. Half-Heusler compounds possess robust mechanical properties and excellent thermal stabilities, and have been recently recognized as one of the most promising candidates for high-temperature thermoelectric power generation; however, they have previously only shown relatively low ZTs compared to other material systems, until now...

University of Houston researchers have discovered ZrCoBi-based half-Heuslers with a record-high ZT of ~1.42 at 973 K and a high thermoelectric conversion efficiency of ~9% at the temperature difference of ~500 K.

Competitive Advantages

- Demonstrates that ZrCoBi-based half-Heuslers are promising candidates for high-temperature thermoelectric power generation.
- Exceptionally high thermoelectric performance.

Problem Addressed

- Identification of a novel compound that simultaneously possesses a high band degeneracy (i.e., high power factor) in combination with an intrinsically low sound velocity (i.e., low thermal conductivity).

Meet the Inventor

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Applications

- Thermoelectric energy generation
- Renewable energy
- Energy harvesting

Patents

- PCT Application Filed

Publications


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Global Thermoelectric Modules Market Size (in millions U.S. dollars)

Data by Statista 2019