Zinc antimonides for thermoelectric applications

Efficient energy harvesting in the mid-temperature range

Using thermoelectric materials (a material that interconverts heat to electricity), it is possible to harness waste heat from, e.g., exhausts and industrial processes, thus improving efficiency and reducing environmental impact. Zinc antimonide , Zn_4Sb_3, is a thermoelectric material that operates in the 100 – 500 °C temperature range and, unlike existing competing thermoelectric materials, consists of inexpensive, abundant and non-toxic elements. Additionally, it can be mass produced for use in thermoelectric generators for waste heat recovery. One main advantage of thermoelectric generators based on Zn_4Sb_3 is their superior durability relative to, e.g., batteries, where thermoelectric generators do not require regular maintenance and do not run out. Therefore, energy harvesting in the 100 – 500 °C range by Zn_4Sb_3, can provide a constant and reliable electrical supply to a range of electrical devices, including sensors or electrical switches.

Technology Description

Present invention relates to a synthesis method for novel compound Zn_4Sb_3. The operational temperature range is 100-500°C, an area where current alternatives are not suitable. This makes Zn_4Sb_3 suited for thermoelectric applications used in for example sensors or as part of energy harvesting devices.
Compared to traditional thermoelectric materials, Zn_4Sb_3 does not contain tellurium and a mass production is therefore expected to be possible at a significantly lower price than using other materials.

Intellectual Property Rights

US patent issued in August 2011.

Team

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Current State

The synthesis method will provide chemically pure homogeneous Zn_4Sb_3 with a very high figure of merit (zT) in the mid-temperature range (100-500°C).

Production methods for both p- and n-type Zn_4Sb_3 exist.

Business opportunity and Call to action

We are looking for a partner interested in taking up a license for the synthesis of present p- or n-type material.

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