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, Zn₄Sb₃, 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 Zn₄Sb₃ 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 Zn₄Sb₃, 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 Zn₄Sb₃. The operational temperature range is 100-500°C, an area where current alternatives are not suitable. This makes Zn₄Sb₃ suited for thermoelectric applications used in for example sensors or as part of energy harvesting devices. Compared to traditional thermoelectric materials, Zn₄Sb₃ 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.

**Current State**

The synthesis method will provide chemically pure homogeneous Zn₄Sb₃ with a very high figure of merit (zT) in the mid-temperature range (100-500°C).

Production methods for both p- and n-type Zn₄Sb₃ exist.

**Team**

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**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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