

New thermoelectric materials

Amorphous alloy will simplify the structure of thermoelectric conversion elements, reduce costs, and make them multifunctional.

Overview

The efficient use of thermal energy has become important to realize a sustainable energy recycling society. So, there is a demand for the development of thermoelectric materials.

This technology relates to novel thermoelectric materials using the anomalous Nernst effect. Conventional thermoelectric transducers employ complex three-dimensional structures to achieve high thermoelectric power. On the other hand, the anomalous Nernst effect makes it possible to design a variety of thermoelectric devices. Therefore, we investigated the anomalous Nernst effect of a versatile amorphous alloy thin film made mainly of Fe and Sn, which are inexpensive and have excellent environmental harmony, and found that it has the largest class of performance at room temperature.

Product Application

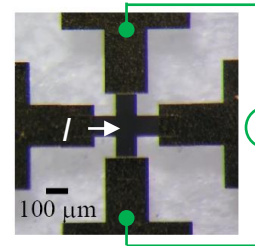
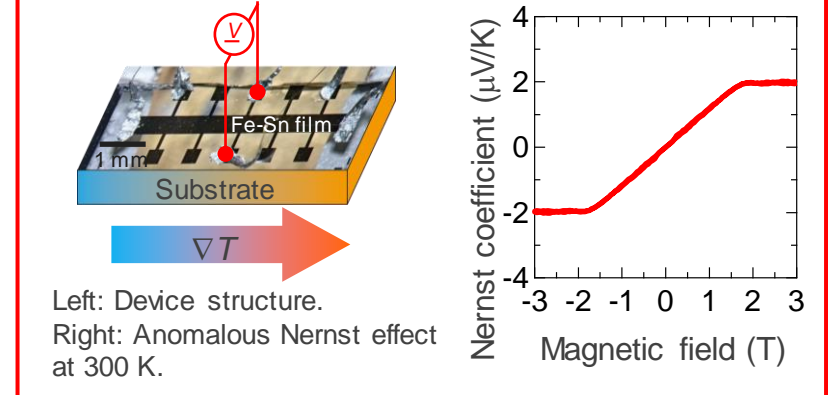
- Thermoelectric sensor
- Heat flow sensor
- IoT device
- Wearable device

IP Data

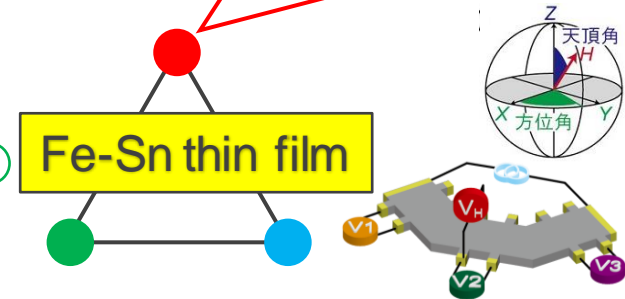
IP No. : PCT/JP2022/038027
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 Admin No. : T21-339

Features・Outstandings

Thermoelectric device using anomalous Nernst effect



Hall sensor by anomalous Hall effect



3D magnetic sensor by magnetoresistance

Related Works

- [1] Y. Satake *et al.*, *Sci. Rep.* **9**, 3282 (2019).
- [2] Hall sensor, JP2018-157542.
- [3] J. Shiogai *et al.*, *Commun. Mater.* **2**, 102 (2021).
- [4] Magnetic sensor, JP2022-524242.
- [5] K. Fujiwara *et al.*, *OYO BUTURI* **92**, p.20–23 (2023).

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