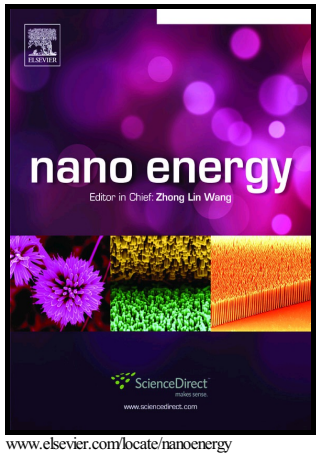

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Flexible thermoelectric foil for wearable energy harvesting

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Abstract

Flexible thermoelectric (TE) devices have been of rapidly growing interest for long-lasting and maintenance-free wearable power source that makes use of the temperature difference between human skin and ambient environment. Despite the high TE performance, conventional inorganic TE semiconductors, such as Bi_2Te_3, skutterudies, are restricted for this application due to their non-flexibility structure and non-scalable manufacturing techniques. In this paper, we report large-area free-standing TE foil with several centimeters in size through a scalable, cost-effective and solution-based approach for flexible thermoelectric devices. The foil is made by self-assembling two-dimensional hybrid superlattices of TiS_2 layers and hexylammine molecules. Through a Lewis base-acid reaction, electrons are transferred from the hexylamine molecules into the TiS_2 layers, making the material