

## Accepted Manuscript

Optimized design for flexible polymer thermoelectric generators

P. Aranguren, A. Roch, L. Stepien, M. Abt, M. von Lukowicz, I. Dani, D. Astrain

PII: S1359-4311(16)30329-5

DOI: <http://dx.doi.org/10.1016/j.applthermaleng.2016.03.037>

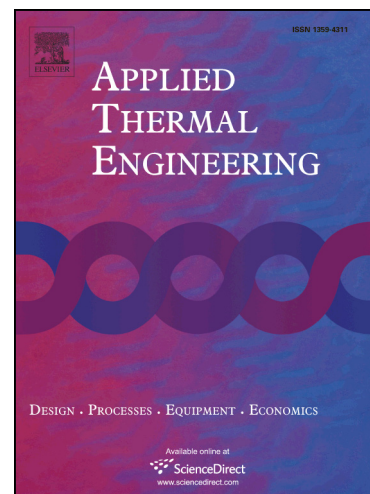
Reference: ATE 7905

To appear in: *Applied Thermal Engineering*

Received Date: 23 October 2015

Revised Date: 26 January 2016

Accepted Date: 5 March 2016



Please cite this article as: P. Aranguren, A. Roch, L. Stepien, M. Abt, M. von Lukowicz, I. Dani, D. Astrain, Optimized design for flexible polymer thermoelectric generators, *Applied Thermal Engineering* (2016), doi: <http://dx.doi.org/10.1016/j.applthermaleng.2016.03.037>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Optimized design for flexible polymer thermoelectric generators

P. Aranguren<sup>1,2</sup>, A. Roch<sup>3</sup>, L. Stepien<sup>3</sup>, M. Abt<sup>3</sup>, M. von Lukowicz<sup>4</sup>, I. Dani<sup>3</sup>, D. Astrain<sup>1,2</sup>

<sup>1</sup> *Mechanical, Energy and Materials Engineering Department Public University of Navarre,  
31006 Pamplona, Spain*

<sup>2</sup> *Smart Cities Institute, Pamplona, Spain*

<sup>3</sup> *Fraunhofer-Institute for Material and Beam Technology, Winterbergstr. 28, 01277 Dresden,  
Germany*

<sup>4</sup> *Institute of Aerospace Engineering, Technische Universität Dresden, 01062 Dresden,  
Germany*

\**e-mail: david.astrain@unavarra.es*

**Keywords:** thermoelectricity; intrinsically conducting polymers; computational model; geometrical optimization

### Abstract

Intrinsically conducting polymers are cheap, flexible, environmentally friendly and easy to manufacture. These characteristics and their low thermal conductivity make them suitable for thermoelectric generation. In this study a PEDOT:tos-Silver thermoelectric module (TEM) has been printed and tested. A computational model able to simulate the behavior of polymer thermoelectric generators (TEGs) has been developed and validated with the experimental data.

The validated computational model has been used to geometrically optimize the power generation of the polymer TEM. The  $\pi$ -sectional area of the p-type and n-type legs, their length and the number of thermocouples have been modified obtaining an improvement of 50 times the power generated by the printed module, the base design. The optimized geometry has been studied into a real application scenario of waste heat harvesting, a tile furnace with a

Download English Version:

<https://daneshyari.com/en/article/7047977>

Download Persian Version:

<https://daneshyari.com/article/7047977>

[Daneshyari.com](https://daneshyari.com)