

Microenergy Supply without Battery and Cable

KIT's Startup otego GmbH Has Developed "oTEG," the First Commercial Printed Thermoelectric Generator Worldwide



The "oTEG" thermoelectric generator is versatile and can be used for the power supply of wireless industry sensors. (Figure: otego GmbH)

Power plants not larger than a sugar cube that can be used for both domestic and industry purposes: Thermoelectric generators (TEG) convert even small ambient temperature differences into electrical energy. otego GmbH, a spinoff of Karlsruhe Institute of Technology (KIT), has now commercialized the first electronic component of its kind: "oTEG" will be presented by the developers at the Hannover Messe from April 23 to 27, 2018.

The team of otego makes thermoelectric generators (TEG) fit for the mass market by using novel materials and large-scale production processes. Production of a prototype series is about to start this year. The "oTEG" innovative energy converter is suited for a large range of applications in the areas of Industry 4.0 and Smart Homes. Similar to solar cells that convert light into electrical energy, TEGs can extract electrical power from the ambient heat and, in this way, ensure continuous supply. "Various sensors, evaluation electronics, and wireless systems can be operated without a battery: From simple products, such as a wireless data tracker, to distributed sensor nodes of indus-



KIT Energy Center: Having future in mind

Monika Landgraf
Chief Press Officer,
Head of Corp. Communications

Kaiserstraße 12
76131 Karlsruhe, Germany
Phone: +49 721 608-47414
Fax: +49 721 608-43658
Email: presse@kit.edu

Press contact:

Margarete Lehné
Deputy Press Officer
Phone: +49 721 608-48121
Fax: +49 721 608-43658
Email: margarete.lehne@kit.edu

trial facilities to future electronic thermostats of radiators,” says Frederick Lessmann, one of the founders of the company. TEGs not only are an ideal energy source for comfort applications in the domestic environment, they can also be used for the power supply of a number of autonomous industry sensors in larger facilities. Polymer materials make the oTEG mechanical flexible and insensitive to impacts and vibrations. It can be operated for a longer term without any maintenance being required. Heavy metals are not needed at all, consumption of natural resources is reduced.

Conversion of energy from ambient heat is based on the Seebeck effect: The temperature gradient in the thermoelectric semiconductor material induces an electric voltage. When combined with another semiconductor material generating a complementary voltage, if possible, the potential of this “thermocouple” can be used as a source of voltage for small consumers. In oTEG, thousands of these thermocouples are connected in series. The generated voltage in the single-digit volt range is sufficient to operate microelectronic circuits. The difference of the oTEGs lies in the self-developed production process: “We print the electronic conducting paths onto extremely thin plastic foils – the time needed corresponds to about the time needed for printing a newspaper. Then, we use our special automated origami folding method to bring these printed foils into a compact form. In the past years, we intensively worked on implementing this method on the industrial scale for rapid production at low costs,” Lessmann says.

In the second half of this year, otego plans to produce a prototype series to realize concrete product applications with company partners. The startup does not only want to integrate generators in existing systems, but also enters new ground. Whereas battery storage systems or supply cables have been indispensable so far, the autonomous and maintenance-free oTEGs enable entirely new product approaches.

About otego GmbH

The patented thermoelectric generator technology by otego is the result of several years of research and development at the Light Technology Institute (LTI) of Karlsruhe Institute of Technology. otego GmbH was established in 2017 and currently works on the commercialization of the generators. Work of otego’s interdisciplinary team covers the complete value chain from the development of materials to generator production and its electronic connection. The concept of the young business has also convinced investors: otego completed the first capitalization round with seed funds in the seven-digit range.



*Thermoelectric generator made by otego – as small as a sugar cube.
(Figure: otego GmbH)*

At the Hannover Messe from April 23 to 27, otego will present its work at KIT's stand K51 in hall 27.

Click here for KIT's digital press kit for Hannover Messe:
www.kit.edu/hannovermesse2018

More about the KIT Energy Center: <http://www.energy.kit.edu>

Being "The Research University in the Helmholtz Association," KIT creates and imparts knowledge for the society and the environment. It is the objective to make significant contributions to the global challenges in the fields of energy, mobility and information. For this, about 9,300 employees cooperate in a broad range of disciplines in natural sciences, engineering sciences, economics, and the humanities and social sciences. KIT prepares its 26,000 students for responsible tasks in society, industry, and science by offering research-based study programs. Innovation efforts at KIT build a bridge between important scientific findings and their application for the benefit of society, economic prosperity, and the preservation of our natural basis of life.

Since 2010, the KIT has been certified as a family-friendly university.

This press release is available on the internet at http://www.sek.kit.edu/english/press_office.php.

The photos in the best quality available to us may be downloaded under www.kit.edu or requested by mail to presse@kit.edu or phone +49 721 608-47414. The photos may be used in the context given above exclusively.