SYMPHONY

AIMS TO DEVELOP A COST-EFFICIENT AND ENVIROMENTALLY FRIENDLY REALIZATION OF ENERGY HARVESTING

DESIGN CONTEST

www.symphony-energy.eu

PROJECT CONCEPT

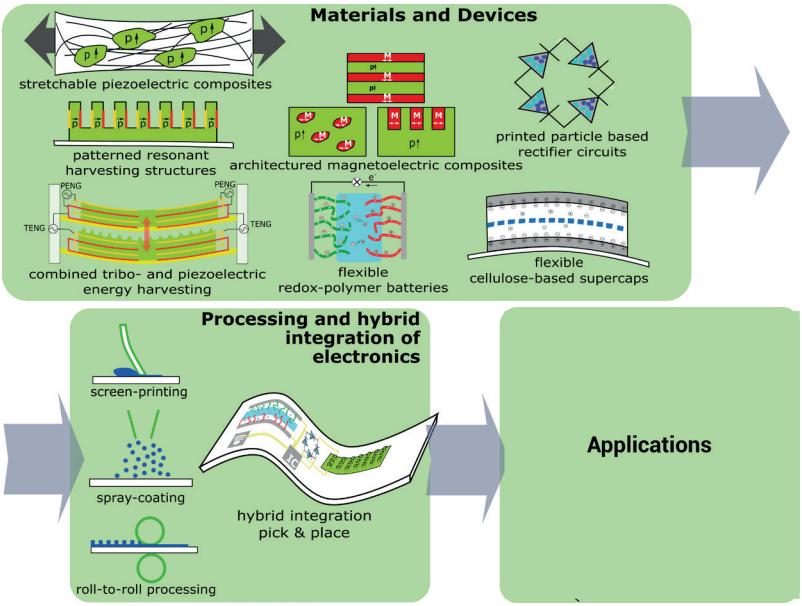

Figure 1: Project Concept

The spread of electronic systems in remote locations requires a change in power generation, making use of dislocated and disordered energy sources. A cost-efficient and environmentally friendly realization of energy harvesting (EH), however, is still a challenge, as the required input of functional material and electronic components in comparison to the energy output is high and often involves lead-based materials, manufacturing methods that consume high amounts of energy and costly assembly steps.

The SYMPHONY project is addressing all these challenges with the development of an innovative energy autonomous sensor system. The energy supply in this system is completely made of printed, recyclable, and non-toxic materials including the ferroelectric polymer P(VDFTrFE), printable Si-based rectifiers, redox polymer batteries and cellulose-based supercapacitors.

The SYMPHONY project develops cost effective and scalable methods to print these materials on flexible films and to combine them with energy efficient electronics and sensor technologies. With the scalable and low-cost processing in combination with optimized ICs for energy harvesting the SYMPHONY project strives the goal of a specific cost below 1€/mW harvesting power.

The SYMPHONY project delivers an energy supply platform for the powering of wireless sensors/sensor nodes for monitoring remote or difficult-to-access locations. The printed technology can be integrated cost effectively in stretchable and flexible devices, representing a huge potential for usage in a wide range of further IoT-supported applications.

OBJECTIVES OF THE CONTEST

The aim of the SYMPHONY design contest is to stimulate and collect ideas for applications where the implementation of the SYMPHONY Energy Supply Platform (ESP) will eb beneficial.

The ESP comprises (i) multimodal energy harvesting devices (nanogenerators) for converting diffuse energy from different sources to electrical energy, (ii) printed flexible energy storage devices, and (iii) energy-efficient electronics for power management.

The applicants will have to provide examples of applications where the exploitation of diffuse energy from different sources (i.e., vibration, pressure, deformation, magnetic field, etc.) is beneficial, while considering also the other features offered by the SYMPHONY ESP.

Additional information about the SYMPHONY ESP features are available at www.symphony-energy.eu.

TECHNICAL INFORMATION

In the SYMPHONY project so called ”nanogenerators” are developed, which allow harvesting a small amount of energy from our surrounding by converting it in usable electrical energy.

Typical sources of this omnipresent energy are vibrations, deformations or magnetic stray fields. The power generated by these nanogenerators is typically in the µW to low mW range, which suitable to power for example LEDs, sensors and wireless communication, such as Bluetooth or radio frequency data transmission.

The nanogenerators developed in SYMPHONY are printable on various substrates, which makes then low-cost, flexible or even stretchable and allows them to co-deform together with their surrounding in the given application.

Fig 1: A printed nanogenerator on a flexible substrate

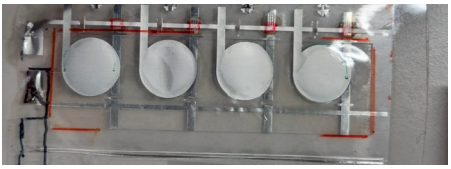

Fig 2: A spray-coated super-capacitor operating @ 3.2 V

However, in order to built-up a full energy supply platform not only a nanogenerator, but also an energy storage element and a rectifier is needed in order to efficiently generate energy from an alternating current source. These elements - a spray coated cellulose based supercapacitor with 10mF/cm^2 storage capacity, a redox-polymer based battery, and a flexible rectifier based on a Si-cellulose nanofiber laminate - were also made by printing and spray-coating processes in the SYMPHONY project, and therefore integrate well with flexible and stretchable environments.

All the components were designed to avoid the use of materials, which are toxic or environmentally dangerous, so that the distribution of sensors in remote locations or at the human body becomes feasible.

PROCEDURE & PRICE

The application forms will be evaluated by the SYMPHONY jury panel and the 3 finalists will be announced on 11th March 2024.

The project ideas of the 3 finalists will be published in the SYMPHONY website.

The 3 finalists will receive as prize the SYMPHONY T-Shirt and a bicycle tube kit including 2 Tubolito X-Tubo Tubes, 1 T-shirt and 1 water drinking bottle, kindly offered by the partner Tubolito.

HOW TO SUBMIT

The application form must be filled in and submitted in digital format to symphony@joanneum.at within 23rd February 2024. Total size of your email should not exceed 5MB. All entries must be in English, and attachments may be submitted in .pdf, .doc, docx, ppt, or .pptx formats.

DEADLINE: 23.02.2024
SUBMIT TO SYMPHONY@JOANNEUM.AT

Partner

Funding agency

The project SYMPHONY receives funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 862095.

Contact

Project Coordinator Dr. Jonas Groten

symphony@joanneum.at

IMPRESSUM Issued by: DI Jutta Isopp, CEO; Messfeld GmbH, Lakeside B07a, 9020 Klagenfurt; office@messfeld.com; Editor in Chief: Michèle Posch, Layout: Michèle Posch; Image copyrights are with the respective companies; The contents of these pages were prepared with utmost care. Nonetheless, we cannot assume liability for the timeless accuracy and completeness of the information.