

Powering Devices with Piezoelectric 'Sponge'

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WARF: P130228US01

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing nanoporous polymer film that generates electrical energy from vibrations.

OVERVIEW

Piezoelectric materials produce electric charge in response to mechanical stress. Such materials can be utilized as very small 'nanogenerators' that absorb vibrations from the environment (e.g., acoustic waves, car motion, etc.) and output sub-milliwatt energy. This is sufficient to power LEDs, speed sensors and other small devices.

Although exciting, nanogenerators require bendable components not easily integrated with portable electronics like cell phones. New nanogenerator designs must be simpler to fabricate and have good energy conversion efficiency.

THE INVENTION

UW-Madison researchers have developed a thin piezoelectric film that converts ambient vibrations into electrical energy and can be directly integrated onto the surface of a device.

The film is made by dispersing metal oxide or other nanoparticles into a solution of a piezoelectrically active polymer like PVDF (polyvinylidene fluoride). The solution is allowed to dry into a sponge-like layer. The nanoparticles then are etched away or otherwise removed. This leaves a finely porous matrix that can be sandwiched between electrodes to create a nanogenerator.

APPLICATIONS

- Nanogenerators for wireless sensors, battery chargers, laptops, tablets and other portable electronics



THE WARF ADVANTAGE

Since its founding in 1925 as the patenting and licensing organization for the University of Wisconsin-Madison, WARF has been working with business and industry to transform university research into products that benefit society. WARF intellectual property managers and licensing staff members are leaders in the field of university-based technology transfer. They are familiar with the intricacies of patenting, have worked with researchers in relevant disciplines, understand industries and markets, and have negotiated innovative licensing strategies to meet the individual needs of business clients.



KEY BENEFITS

- Design is simple and compact.
- Enables piezoelectric material to be thin and flexible
- Film can be directly attached to devices, eliminating the need for other components.
- Films can be tailored for desired characteristics based on the size and distribution of nanoparticles.

ADDITIONAL INFORMATION

Related Technologies

[WARF reference number P100129US01 describes thin metal oxide films for transparent, flexible electronics.](#)

Tech Fields

Materials & Chemicals - Polymers

Clean Technology - Energy & resource efficiencies

CONTACT INFORMATION

For current licensing status, please contact Emily Bauer at emily@warf.org or 608-960-9842.

