Office of Technology Transfer

Auburn University

Low Cost Electroactive Polymer

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Reference: Electroactive Polymer

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Reference

Zhimin, Wang and Cheng. "Electromechanical properties of poly(vinylidene-fluoride-chlorotrifluoro-ethylene) copolymer." *Applied Physics Letters.* **88:** 062904, 2006.

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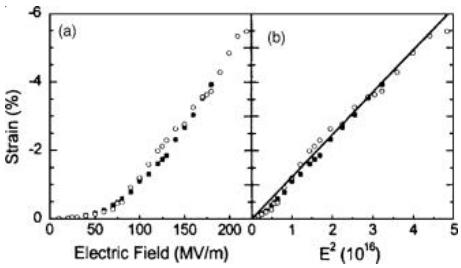
AUBURN UNIVERSITY

Overview

Auburn University seeks a licensee or development partner for a high-performance electroactive polymer (EAP) that can achieve a higher electrostrictive strain than similar EAPs. This copolymer has a wide range of potential applications in a number of technological fields where EAP use is growing, including actuators, transducers, artificial organs, and artificial muscles.

Advantages

- Produces electromechanical strain of greater than 5% at room temperature (see figure) in a lower electric field than competing materials
- Raw materials are inexpensive and readily available
- Unlike competing materials, does not require expensive irradiation processing
- Physical properties, such as piezoelectric constant and Young's modulus, comparable or superior to those found in much more expensive alternatives



Electrostrictive strain (a.) vs. electric field and (b.) vs. square of electric field for P(VDF-CTFE) copolymer

Description

Electroactive polymers (EAP) exhibit electrostrictive strain (physical shape displacement) when placed under an electric current. The number of fields in which this technology is being applied is expanding rapidly, with EAPs proving to be more efficient than traditional mechanical devices. The Auburn University invention is an EAP created from P(VDF-CTFE) copolymer. P(VDF-CTFE) is a well-known substance, currently used in a variety of other unrelated applications such as the production of films and fiber optic cables. Certain P(VDF-CTFE) copolymers can be utilized as EAPs when prepared with specific methods. Dr. Z.Y. Cheng and associates have discovered a particular P(VDF-CTFE) copolymer capable of exceptional electromechanical performance.

The Auburn University EAP solves some key issues currently plaguing other competing technologies such as irradiated P(VDF-TrFE) and P(VDF-TrFE-CTFE) terpolymers. Auburn's material outperforms both of these competitors by producing an electrostrictive strain of greater than 5%. Additionally, excessive processing and raw materials costs make application of irradiated P(VDF-TrFE) and P(VDF-TrFE-CTFE) terpolymers both impractical and uneconomical for many applications. Auburn University's technology can be produced at a low cost due to the high commercial proliferation of P(VDF-CTFE) and the simplicity of its preparation for use as an EAP.

Status

- Subject of US Patent 7,608,976
- This technology has been verified in laboratory experiments

Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Joint development opportunities include funded research or a joint venture