Electro-Actuator Polymers Exhibiting Giant Strain Coefficients

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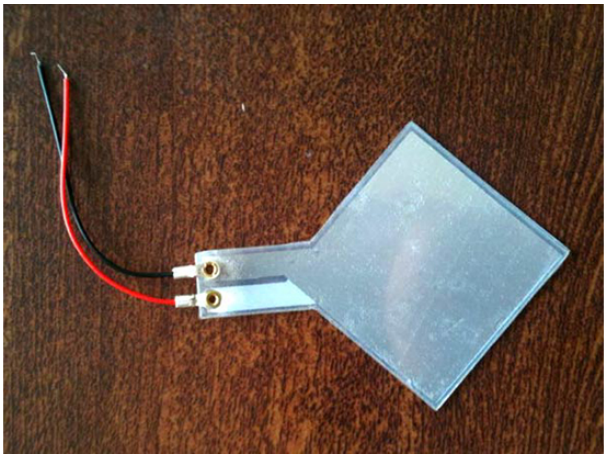

Technology Summary

Polyvinylidene difluoride (PVDF) and its copolymers are the most widely used piezoelectric polymers in the market for transducers, sensors, actuators, soft robots, artificial muscles, and wearable devices. However, many of these applications require large electromechanical actuation strain than either polymer can currently provide. While certain high strain PVDF-based materials exists, they suffer from electric breakdown that limits the electric field, as a higher field will result in device failure. Due to dielectric breakdown, larger films have a much lower breakdown field tolerance (<60MV/m). Commercially viable devices will require a large actuation response under low electric fields.

Application & Market Utility

The invention represents a new class of modified PVDF polymers that generate large actuation strain and large strain coefficient, while maintaining the elastic modulus > 0.15 GPa. The invention's polymeric material generates large actuation strength (ΔS/ΔE> 750 pm/V at electric fields below 60 MV/m). The researchers have demonstrated these effects under different applied electric fields (from 30 MV/m to 70 MV/m) and formulations.

Next Steps

Limited material samples may be available under a fee-bearing Materials Transfer Agreement that covers the costs of materials and labor.

TECHNOLOGY READINESS LEVEL 1-3

Seeking

Licensing | Research

Keywords

- Polyvinylidene difluoride (PVDF)
- Electro-active polymers
- Actuators
- transducers
- artificial muscles

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