

## Enhancement of electrostrictive polymer efficiency for energy harvesting with cellular polypropylene electrets

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R�sum� en anglais	<p>The purpose of this paper is to propose new means for harvesting energy using electrostrictive polymers. The recent development of electrostrictive polymers has generated new opportunities for high-strain actuators. At the current time, the investigation of using electrostrictive polymer for energy harvesting, or mechanical-to-electrical energy conversion, is beginning to show its potential for this application. The objective of this work was to study the effect of cellular polypropylene electrets after high-voltage corona poling on an electrostrictive polyurethane composite filled with 1 vol.% carbon black at a low applied voltage in order to increase the efficiency of the electromechanical conversion with electrostrictive polymers. Theoretical analysis supported by experimental investigations showed that an energy harvesting with this structure rendered it possible to obtain harvested power up to 13.93 nW using a low electric field of 0.4 V/<math>\mu\text{m}</math> and a transverse strain of 3% at a mechanical frequency of 15 Hz. This represents an efficiency of 78.14% at low frequency. This percentage is very significant compared to other structures. Finally, it was found that the use of polypropylene electrets with electrostrictive polymers was the best way to decrease the power of polarization in order to obtain a good efficiency of the electromechanical conversion for energy harvesting.</p>
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