

Elastic Piezoelectric Nanocomposite Layers for Energy Harvesting Applications

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Abstract

Energy harvesting is an important area of research for State of Kuwait, to fully depend on the renewable energy resources by the end of the next decade. The project aims to develop an innovative technique to produce elastic piezoelectric nanofibers based on electrospinning process. It is targeted to explore the fabrication and characterization of an energy harvester based on electrospun Polyvinylidene Fluoride (PVDF) nanofibers. The electrospinning technique allows the applications of high DC-Voltage which will enhance the formation of enough polarization inside β -PVDF, to support parallel β -sheets. Moreover, some more additives are planned to be added to enhance both electric and mechanical properties of the electrospun nanofibers, such as polyurethane (PU). Polyurethane as elastomeric polymer is planned to be blended with PVDF with different blending ratios, to enhance the elastic properties of the developed piezoelectric nanofibers. The blend ratio will be optimized for the maximum piezoelectric properties with maximum elastic properties can be achieved. Then, the piezoelectric sensitivity of our synthesized nanofibers can be tested through an initiated piezoelectric analysis setup to detect few Newtons forces. The outcome of the project can be elastic, sensitive nanogenerator mats which can be helpful in cheap energy harvesting solutions.