The Creation of an Annovative Nanofiber Capacitor of 75% of PVDF-TrFE Polymer Capable of Storing and Displacing Energy in a DC Series Circuit

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In electronic functions, the capacitors are components that store and displace electricity, supported by a stabilized flow of energy within electromagnetic fields. The majority of the electronic devices contain Thin Film capacitors to prevent electrical overcharge. This investigation intends to contribute an innovative technology in the nanofiber capacitor design with 75% of PVDF-TrFE polymer. The hypothesis was: If the nanofiber capacitor of 75%PVDF-TrFE polymer store and displace energy for a longer time than a Thin Film capacitor of 75%PVDF-TrFE polymer, then the nanofiber capacitor can store and retain energy for more time than the Thin Film capacitor when applied in a DC series circuit. To test the hypothesis, the Thin Film capacitor was developed with a drop of 75%PVDF-TrFE polymer and the nanofiber capacitor was created by electrospinning process. The Precision Impedance Analyzer machine provided data of the behaviour of the conductance and capacitance of both capacitors. Then, separately were connected to a DC series circuit and were tested with an oscilloscope which provided data of the behaviour of the electric current. The nanofiber capacitor retained electric current 1.33s longer than the Thin Film capacitor when 1 LED bulb was applied in the circuit. In another test, when a 12 LED flash light was applied in the circuit, the time of retention of the electric charge in the nanofiber was 0.22s longer than the Thin Film capacitor. The hypothesis was accepted because the high surface-area-to-volume ratio in the new nanofiber capacitor allowed more capacity to store and displace energy.

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