PÔSTER - RESUMO - DISPOSITIVOS ELETRÔNICOS, ELETROQUÍMICOS, SUPERCAPACITORES E BATERIAS

ELECTROSPUN PVDF/GRAPHENE NANOCOMPOSITES TOWARD SUSTAINABLE SELF-POWERED ELECTRONIC SYSTEMS

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In view of the era of human–machine interfaces and integration with artificial intelligence, the growing demand for autonomous electronic systems for prolonged use has highlighted the technological bottleneck imposed by the use of conventional batteries, traditionally limited by their lifespan, the need for periodic maintenance, and the environmental and health impacts associated with their disposal [1].In this context, self-powered systems such as piezoelectric nanogenerators (PENGs) and triboelectric nanogenerators (TENGs) have emerged as promising technologies for converting mechanical

energy into electrical energy, reducing dependence on batteries and contributing to energy sustainability toward low-environmental-impact electronic devices capable of integration into intelligent applications, such as remote environmental and medical monitoring, wearable devices, and Internet of Things (IoT)-based systems [2].Thus, this work proposes the investigation of the synergistic effects of fibrous nanocomposites obtained through the electrospinning technique and composed of poly(vinylidene fluoride) (PVDF), containing distinct weight fractions (wt%) of carbon allotropes such as graphene nanoplatelets (GNP) and reduced graphene oxide (rGO), aiming at the development of electroactive layers for PENGs, TENGs, and hybrid piezoelectric–triboelectric nanogenerators (PT-HNGs). The electrospun nanofibrous mats were morphologically characterized by Scanning Electron Microscopy (SEM) and subsequently structurally analyzed by Fourier Transform Infrared Spectroscopy (FTIR) to determine the fraction of the electroactive ß-phase, responsible for the piezoelectric properties of the polymer matrix. Finally, the electrospun devices had their functional performance evaluated through distinct cyclic electromechanical stimuli, in which the figures of merit related to the electrical output of each device were analyzed as a function of the addition of fillers to the matrix, such as voltage, current, and electrical power.

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Palavras-chave: electrospinning; nanofibers; graphene; energy harvesting; pvdf.