

RESUMO - CIÊNCIA DOS MATERIAIS

**COMPARATIVE STUDY OF GRAPHENE-DERIVED AND NANOCELLULOSE
COMPOSITES IN ELECTROSPUN POLYMERIC NANOFIBERS FOR ENERGY
HARVESTING**

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Mechanical energy is a widely available energy source in nature. Nanogenerators (NGs) based on materials with piezoelectric (PENGs) and triboelectric (TENGs) abilities have become technologies strongly explored in laboratories and produced in industry scale. These devices can convert mechanical energy into promising electrical outputs to be applied in wearable electronics, autonomous IoT-based sensors, and power sources for biomedical implants [1,2]. Electrospinning proves to be a promising and reliable material processing technique for producing polymeric nanofibers of natural or synthetic origin, offering unique characteristics for versatile applications in flexible electronics, particularly in NGs [3]. This study aims to characterize electrospun nanofibers of PVDF and Cellulose Acetate (CA), dissolved in DMF and DMAc, respectively, with the addition of carbon allotropes such as graphene (Graf) and its derivative reduced graphene oxide (rGO), at concentrations of 0% (pure), 2%, 4%, and 6% by mass relative to the PVDF polymer matrix. These samples were compared with concentrations of cellulose nanocrystals (CNC) in the CA matrix to analyze their piezoelectric, structural, and morphological behavior for potential application as active layers in piezoelectric and triboelectric nanogenerators. The samples were morphologically characterized by Scanning Electron Microscopy (SEM), structurally analyzed using Fourier Transform Infrared Spectroscopy (FTIR), and electrically evaluated in DC mode to assess the quality of the produced nanofibers and to verify the formation of the beta (β) crystalline phase in PVDF fibers.

References

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Palavras-chave: electrospinning; nanofibers; graphene; nanocellulose.