

**DEVELOPMENT AND CHARACTERIZATION OF ELECTROSPUN PCL/TiO₂
MATS INCORPORATED WITH NICKEL**

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The development of photocatalytic polymeric materials has attracted increasing interest due to their potential application in environmental remediation processes. In this study, electrospun mats were produced using poly(ϵ -caprolactone) (PCL) as the polymer matrix, titanium dioxide (TiO₂) as the semiconductor agent, and different concentrations of nickel (Ni) as a modifier of photocatalytic performance. The combination of these components aims to obtain fibrous structures with high surface area and functional properties suitable for photocatalytic applications.

The electrospinning solution was prepared by dispersing 1 g of TiO₂ in 10 mL of methanol, followed by the addition of 2 g of PCL, nickel concentrations ranging from 0.01 g to 0.11 g, and 16 mL of chloroform. The mixture remained under continuous stirring for 24 hours to ensure homogenization. The mats were fabricated by electrospinning using a fixed tip-to-collector distance of 18 cm and an applied voltage of 26.3 kV for all compositions, maintaining constant processing parameters.

Morphological characterization by Scanning Electron Microscopy (SEM) revealed the formation of continuous fibers with an average diameter of 1138.01 nm. Surface wettability was evaluated using the sessile drop method, resulting in an average contact angle of 119.10° after five measurements, indicating hydrophobic behavior.

Elemental analysis by Energy Dispersive Spectroscopy (EDS) was performed on the sample containing 0.07 g of Ni. The spectra confirmed the presence of carbon (C), oxygen (O), titanium (Ti), and nickel (Ni). Two Map Sum Spectra were obtained, both normalized to 100% composition. In the first spectrum, the weight percentages were C = 43.26 wt%, O = 32.39 wt%, Ti = 23.23 wt%, and Ni = 1.12 wt%. In the second spectrum, the values were C = 40.84 wt%, O = 25.88 wt%, Ti = 31.94 wt%, and Ni = 1.34 wt%. These results confirm the incorporation of TiO₂ and Ni into the PCL matrix.

Overall, the electrospun mats exhibited defined fibrous morphology, confirmed elemental composition, and hydrophobic surface characteristics, demonstrating their potential for application in photocatalytic systems.

Acknowledgments: The authors acknowledge the financial support from FAPESP (grant 2025/27044-5) and CNPq (grant 408449/2024-1). The authors also thank the Department of Physics and Chemistry (DFQ) and the Graduate Program in Materials Science (PPGCM) at São Paulo State University (UNESP), Ilha Solteira School of Engineering (FEIS), for institutional and technical support.

Palavras-chave: electrospinning; polycaprolactone; titanium dioxide; nickel; photocatalysis; scanning electron microscopy.