

**INVESTIGATION OF THE SYNERGISTIC EFFECT OF LAYER-BY-LAYER
FILMS OF CARBON NANOTUBES AND POLYPYRROLE ON A FLEXIBLE
DEVICE FOR ELECTROCHEMICAL ANALYSIS**

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This research aims to study flexible sensors based on a poly(butylene adipate-co-terephthalate) (PBAT) biodegradable polymer and graphite. Sensors were modified through the layer-by-layer (LbL) technique to improve their electrochemical behavior for paraquat (PQ) detection. Nanostructured films were obtained by alternating layers of anionic and cationic materials, carbon nanotubes (CNTs), and polypyrrole (PPY), respectively. The devices, with and without modification, were characterized by contact angle, scanning electron microscopy (SEM), and Fourier transform infrared spectroscopy (FTIR). Electrochemical characterization was labeled via cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). PQ molecules were detected using the differential pulse voltammetry (DPV) technique in a concentration

range of 0.1 to 2.1 μM . The sensor detection limit (LOD) was obtained using the analytical curve, with it being equal to 0.073 μM . The LbL film gPBAT(PPY/CNT)_n sensor showed good stability, reproducibility, and repeatability, with recovery values ranging from 99.4% to 109.3% for PQ when the analyzed samples were contaminated with tap water. The produced electrodes have the advantage of being flexible, disposable, reproducible, and of low manufacturing cost, which makes them attractive for portable environmental analysis.

References

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Palavras-chave: pbat; graphite; sensor; layer-by-layer film.

