Preparation and Characterization of PAni/Gal blend

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Polyaniline (PAni) is a semiconductor polymer that presents a wide conductivity range and can be used as a biosensor for glucose measurement via glucose oxidase (GOx) catalysis [1]. However, PAni presents issues with enzyme leaching and high dielectric constant (10^4-10^5) [1,2]., which hinders its electrical response as a sensor. Blending polyaniline with galactomannan can solve both issues simultaneously. Gal can preserve the enzymatic activity and has insulating properties [3,4], making it suitable to enhance the immobilization of GOx on PAni and to improve the electrical response of the latter for biosensing. PAni was synthesized from the polymerization of aniline in HCl and ammonium persulfate and blended with a solution of Gal 2%, resulting in the polyaniline and galactomannan blend (PAni/Gal). Samples of Gal 2%, PAni and PAni/Gal were characterized by Fourier transform infrared spectroscopy (FTIR) at wavenumber range of 4000 cm^{-1} – 600 cm^{-1} and impedance spectroscopy (IS) in room temperature at frequency range of 100 Hz – 1 MHz with 1V signal amplitude and 20 samples per decade. The FTIR of the PAni blends detected the presence of the band associated to the deformation outside the binding plane (C-N) at 816 cm^{-1} and the oxidizing agent responsible for the semiconducting property of PAni in the bands between (1564-1140) cm^{-1} . The IS showed that PAni/Gal exhibited a smaller dielectric constant and a higher loss tangent than PAni between 100 Hz and 100 kHz, indicating that PAni/Gal has better electrical behavior as a sensor compared to PAni in that frequency range and thus has solid potential for use in biosensors.

Acknowledgement: *This work has been funded by the National Council for Scientific and Technological Development (CNPq), and by the Foundation for the Support of Research and Scientific and Technological Development of Maranhão (FAPEMA). This work was also partially supported by FEDER funds through the COMPETE 2020 Program and National Funds through FCT – Portuguese Foundation for Science and Technology – under the projects: LISBOA-01-0247-FEDER-039985/POCI-01-0247-FEDER- 039985, LA/P/0037/2020, UIDP/CTM50025/2019, UIDB/50025/ 2020, UID/NEU/04539/2013, UID/NEU/04539/2019, POCI-01-0145- FEDER-007440, UIDB/04539/2020, and UIDP/04539/2020. The authors acknowledge Bruno Melo (University of Aveiro, Portugal) for the support with EIS smart tool - a standalone MATLAB application software for analysis of impedance spectroscopy data - available at https://github.com/bmgmelo/EIS-smart-tool.*

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