COMPARATIVE MORPHOSTRUCTURAL AND ELECTROCHEMICAL CHARACTERIZATION OF HYBRID ELECTRODE Ti-TiO_2/rGO CORRELATED WITH THE SYNTHESIS METHOD

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Recently, graphene has been widely used with excellent results in electrochemical sensors because of its superior electrical conductivity, high surface: volume ratio, and a rapid electron transfer rate. Because graphene's electrocatalytic activity is restricted, it is often combined with metal oxides to obtain hybrid nanomaterials [1]. To fabricate the hybrid of TiO_2 nanoparticles, nanospheres, and nanofibers with graphene nanosheets have been reported through various methods, such as sol–gel, hydrothermal and solvothermal method [2]. For the liquids deposition, there are a variety techniques such as dip-coating [3], spray-coating [4], doctor Blade, spin-coating etc.

This research investigated the comparative study of two different methods, as spin-coating and dip-coating, for obtaining the advanced hybrid electrodes based on reduced graphene oxide deposited onto a titanium plate anode, named Ti-TiO_2/rGO. TiO_2 nanolayer was grown on titanium foil by thermal oxidation (Ti-TiO_2) at 500°C in 0.5 M hydrofluoric acid. Dip-coating technique is a facile and low-cost method for fabrication of hybrid electrode Ti-TiO_2/rGO (code Ti-TiO_2/rGO1). As comparison, spin-coating methodology was used, at speed of 1500 rot and time 10 sec, being deposited 6 layers of TiO2/GO pasta on both sides of Ti support (code Ti-TiO_2/rGO2). Specific investigations, such as X-ray diffraction, UV-VIS analysis, and SEM morphology, were used to analyses the morpho-structural and optical properties of the obtained electrodes. The electrochemical characterization will be performed by cyclic voltammetry, in 1M KOH supporting electrolyte, scan range -0.3 V/SCE and 1.4 V/SCE.

References

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Acknowledgements

This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS - UEFISCDI, project number PN-III-P1-1.1-TE-2021-0963, within PNCDI III, with contract number TE13/2022 (DD-CyT), partially project code PN 23 27 01 02 INOMAT, 23-27 29N/2023.