APRESENTAÇÃO - PÔSTER (CLIQUE AQUI PARA SABER OS DETALHES PARA SUBMISSÃO) - SÍNTESE E CARACTERIZAÇÃO DE MATERIAIS

MODIFIED GRAPHITE ELECTRODES WITH RGO:TIO2 FOR ELECTROLYSIS APPLICATIONS

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In this work, we carried out studies of modifications of low-cost electrodes for application in electrolysis, based on studies of modified graphite electrodes, with composites of Reduced Graphene Oxide: Titanium Dioxide (rGO:TiO2). The rGO:TiO2 was obtained using the modified Hummers method. Characterizations of the optical properties, by UV-VIS spectrophotometry, and of morphology, by optical profilometry, of thin films of rGO:TiO2 deposited on glass substrates were carried out. The UV-VIS results indicated the presence of rGO:TiO2 compatible material, while the morphology results indicated

continuous and uniform films on the glass substrate. For the modified graphite electrodes, rGO:TiO2 was deposited by dip coating, from different precursor solutions, in solvents of Isopropyl Alcohol, Dimethylformamide (DMF), and N-methyl-2-pyrrolidone (NMP). These modified electrodes were characterized in terms of morphology, through optical profilometry, which showed a higher mean square roughness (Rrms) when compared to unmodified graphite electrodes, indicating a greater surface area of the modified electrodes that can help in electrolysis processes. To analyze the performance of modified electrodes in electrolysis processes, the different modified electrodes were compared, with unmodified graphite electrodes, in the electrolysis of H2O and H2SO4, through measurements of voltage-current density (JxV). In the electrolysis of H2O, superior performance of the modified electrodes was observed, when compared to the electrode without modification, being the electrode with the highest current density in the range associated with the electrolysis process, the electrode modified with the precursor solution of rGO:TiO2 in isopropyl alcohol, while in the electrolysis of H2SO4, a higher current density of the modified electrodes was also observed, with the electrode with the highest current density associated with the one with the precursor solution of rGO:TiO2 in NMP, this indicates in both cases that the modified graphite electrodes with rGO:TiO2 would have superior performance, to the electrode without modification, in the electrolysis processes due to the accelerated process indicated by the higher current density, which can be advantageous in applications such as the production of fuel for fuel cell applications.