Electrochemical characterization of Mos_2 thin film obtained at the liquid-liquid interface and their evaluation in biosensor application.

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Since the isolation of Graphene, developing 2D materials has been important in scientific studies. Examples are nanomaterials based on MoS_2, with its properties such as semiconductor character depending on the number of stacked layers, allowing diverse applications such as catalysis, batteries and photovoltaic devices. These characteristics highlight its high potential for use in the immobilization of various biomarkers and in the development of biosensors. [1] The morphological and structural characteristics of MoS_2-2D that determine its properties are strongly influenced by its synthesis method, which is an important means of controlling parameters. This work deals with the preparation of MoS_2 films using the liquid/liquid interface route (LLIR), a method that allows obtaining thin, homogeneous films with a high surface area simply and economically [2,3]. Due to the importance of detection techniques applied to the area of human health and well-being, films produced by this method were investigated for their potential use as electrodes for biosensors. MoS_2 samples of commercial origin and synthesized in the laboratory were used to prepare films by the interfacial route (LLIR), and deposited on electrodes by film transfer or drop-casting. After synthesis, the samples were characterized to evaluate their composition and structure using techniques such as Scanning Electron Microscopy, X-ray Diffraction, Raman Scattering Spectroscopy, and Ultraviolet Spectroscopy. The electrochemical characterization was carried out by cyclic voltammetry to evaluate the stability and response obtained with the modified electrodes in different electrolytes such as solutions containing Potassium, Lithium and Sodium. Through characterizations, the presence of MoS_2 in the form of flakes arranged in layers was observed, in addition to better electrochemical responses for electrodes modified by the LLIR method and film transfer. The results obtained with MoS_2 samples produced in the laboratory are compatible, in comparison with samples of commercial origin, demonstrating that electrodes modified by MoS_2 have potential for application in the production of efficient and low-cost biosensors.

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