POLYMER-MODIFIED THIN-FILM INTERDIGITATED ARRAY FOR (BIO)SENSING APPLICATIONS

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Thin-film interdigitated electrodes are one of the most used transducers in different technical and analytical applications with the particular importance in the field of (bio)sensing. They take advantages of the microelectrodes features enhancing the sensitivity and detection limits.
Since conducting polymers show some numerous features for sensing and biosensing, they have recently attracted a lot of attention in this field. Some features like, light weight, low cost, flexibility, biocompatibility and process ability made the conducting polymer a fertile farm for immobilization of bioreceptors. Among all organic conjugated polymers, polyaniline (PANI) is a very attractive conducting polymer in the field of biosensing for its easy preparation, good level of electrical conductivity and environmental stability.
In this work, we propose the use of innovative thin-film interdigitated array (IDA) electrodes modified with polyaniline polymer. The IDA electrodes are based on a four-electrodes system: two working, reference and auxiliary electrodes. The gold working electrodes consists of two individually addressable arrays with an interdigitated approach. Aniline monomer was first electro-polymerize on the surface of gold arrays by means of cyclic voltammetry. Various experimental parameters for the electropolymerization reaction were investigated. The electrochemical characteristics of the modified sensors were obtained studying the electron transfer rates of potassium ferricyanide redox couple under different experimental conditions in Cyclic Voltammetry (CV) experiments and the impedance spectrometry. Some applications of (bio)sensor realized are presented.