Electroanalysis with metal (nano) film electrodes

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Continuously increasing interest in sensitive, selective and robust chemical sensors pose the need for intensive research aimed at developing novel sensing schemes and approaches. Currently, there is a particular interest in simple, portable, and inexpensive sensing systems that enable decentralized, point-of-care testing, detection at micro-locations, in micro- or nano-volume samples, detection of low/trace concentrations, and measurements without or with a minimal sample (pre)treatment. Among different analytical techniques, electrochemistry meets most of these criteria. It offers unique possibilities for tailoring powerful sensing systems for the detection of numerous inorganic and organic analytes relevant in environmental monitoring, biology, clinical diagnostics, pharmaceutical industry, homeland security, preservation of cultural heritage, etc. Practically unlimited selection of electrode and modification (nano) materials, and unsurpassed possibilities for sensor miniaturization, make the electrochemical sensing even more attractive [1].

In this presentation, the electroanalytical characterization of selected metal film electrodes will be discussed. It is well-known that the electrode surface structure considerably affects the sensors' performance; thus, the development and optimization of preparation protocols yielding different nanostructured modification/sensing coatings still represent a significant challenge. Among others, a nanostructured bismuth film electrode for the detection of trace lead and progesterone will be presented [2-4]. In addition, a copper film electrode will be shown as an interesting sensor for stripping voltammetric detection of trace lead, mercury, and nickel, and for a rather unconventional detection of nitroaromatic compounds [5,6].

References

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