УДК 543

DEVELOPMENT OF INK FOR GRAPHITE ELECTRODES, STUDY OF THE INFLUENCE OF THE NUMBER OF CARBON-CONTAINING LAYERS IN THE ELECTRODE ON THE CURRENT CONDUCTIVITY

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Introduction At present, the manufacture of flexible and small-sized disposable electrochemical sensors for point-of-care diagnostics, which determine physical and chemical parameters in real time [1], is an important task. Electrodes based on graphite ink using cellulose acetate as a binding element for creating three-electrode electrochemical sensors by screen printing are characterized by low cost, high performance, and the possibility of automating analysis when interacting with other electronic devices. Therefore, the aim of the work is to develop carbon-containing ink to create an efficient electrode and further assembly of a selective, mobile biosensor.

Main part. In this paper, we consider the production of electrodes based on carbon-containing materials, since it becomes possible to change the charge of the layer. The advantage of graphite materials is that they have a high specific surface area and are also commercially available. Variation of the parameters of the graphite layer for further obtaining a biosensor that gives a fast-electrochemical response is the main task of the work.

The work consists of several stages. The first is the development of an ink formulation for electrodes. The second is the optimization of the number of graphite layers with maximum electrical conductivity. The third is the creation by the method of layer-by-layer modification and the identification of regularities in the influence of polyelectrolytes on the deposition of the obtained electrodes.

Conclusions. This work was aimed at the development of ink and methods of their application to create printed electrodes. Since the analytical signal is formed due to the processes occurring on the electrode surface, the choice of the electrode material and the method of processing its surface are very important. The possibility of using carbon-containing ink for voltammetric determination is shown. The sensor with 5 graphite layers showed the best results. The surface of an electrode with adsorbed polyelectrolyte layers was studied using the mediator system $Fe(CN)6^{3-/4-}$ by the method of cyclic voltammetry. Materials with high electrical conductivity, low resistance and reproducible surface have been obtained.

List of sources used:

1. Baldina A. A. et al. Immunochemical biosensor for single virus particle detection based on molecular crowding polyelectrolyte system //Journal of Applied Polymer Science. – 2022. – V. 139. – №. 24. – P. 52360.