IMPEDANCE CHARACTERISTICS OF VOLTAMMETRIC ENANTIOSELECTIVE SENSORS BASED ON POLYELECTROLYTE COMPLEXES AND CYCLODEXTRINS

Shirokova E. E., Kabirova L. R., Dubrovsky D. I.
Bashkir State University, Ufa
pyatka-lena@mail.ru

The voltammetric method of analysis is one of the most sensitive in electrochemistry. One of the most important factors affecting both the sensitivity and the correctness of the analysis is the monitoring of the surface of the working electrode. The main methods for evaluating surface morphology are various kinds of microscopy, such as atomic force and scanning electron microscopy, however this equipment is expensive and requires special sample preparation. An alternative method for estimating the surface in electrochemistry is the spectroscopy of electrochemical impedance.

Electrochemical impedance spectroscopy is a highly sensitive analytical method capable of quite informative assessment of the surface state of a working electrode in the form of simple electrical equivalent circuits. In this paper, the characteristics of voltammetric sensors based on the glassy carbon electrodes (GCE) modified by composites of polyelectrolyte complexes of chitosan (CS) and chitosan succinamide (SCS) with cyclodextrins (CD) were demonstrated. These sensors, due to the structure of the applied composite, are able to selectively interact with the enantiomers of biologically active substances, such as atenolol, methionine, etc. The working conditions for recording the impedance spectra and applying a composite coating to the working electrode surface were established in the course of this study.
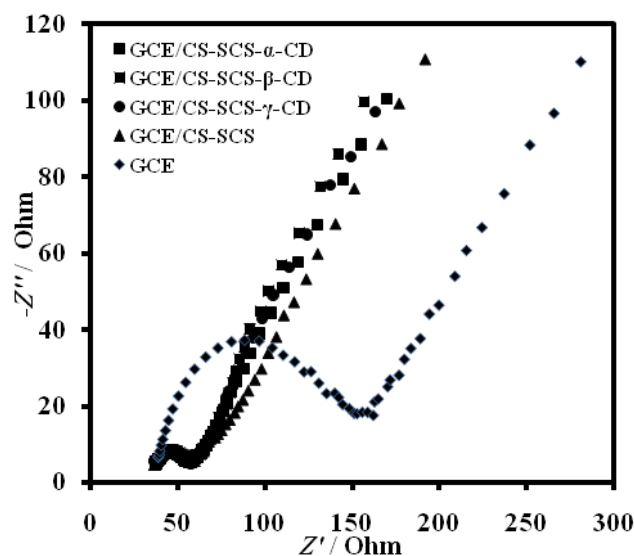

Fig. Impedance spectra for GCE/CS-SCS-CD

It can be seen from the figure that the resistance of electron transfer was much less for GCE, modified by CS-SCS-CD composite film compared to the bare GCE, perhaps this is related to the structure of the CS-SCS polyelectrolyte complex. It can also be noted that there is no difference in the resistance of electron transfer between the modified electrodes.