RESEARCH OF CATALASE MIMETIC SENSORS

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To determine low concentrations of hydrogen peroxide on the base of immobilized catalase simulators simple in use potentiometrical catalase biomimetic sensors stable to action of oxidizer and its intermediates were investigated. Catalase biomimetic electrodes were prepared by different used methods including: 1) agglutination of hemin on the surface of \textsuperscript{Al}/\textsuperscript{Al}_2\textsuperscript{O}_3 electrode and 2) adsorption of hemin and tetraphenylporphyrin (TPhPFe(III)) on the surface of the same electrode mentioned above. The outcomes of the research of catalase activity of electrodes under concentration of H\textsubscript{2}O\textsubscript{2} equal to 1.0\% of weight are shown in the Fig.1 and 2.

Fig.1. Change of the electrochemical potential (\(\Delta E\)) of system depending on the time: \(C_{H_2O_2}=1\) wt. \%, \(T = 22^\circ\) C. depending on the time: \(C_{H_2O_2}=1\) wt. \%, \(T = 22^\circ\) C.

Fig.2. Change of the electrochemical potential (\(\Delta E\)) of system depending on the time: \(C_{H_2O_2}=1\) wt. \%, \(T = 22^\circ\) C.

\textbullet \textsuperscript{1} – \textsuperscript{Al}/\textsuperscript{Al}_2\textsuperscript{O}_3 electrode without imitator
\textsuperscript{2} – hemin is applied by the way of agglutination in quantity of 33.6 mg.
\textsuperscript{3} – hemin is applied by the way of adsorption in quantity of 0.88 mg.

\textbullet \textsuperscript{1} – \textsuperscript{Al}/\textsuperscript{Al}_2\textsuperscript{O}_3 electrode without imitator
\textsuperscript{2} – TPhPFe (III) – applied by the way of adsorption in quantity of 0.084 mg.
\textsuperscript{3} – TPhPe (III) – applied by the way of adsorption in quantity of 0.44 mg.
\textsuperscript{4} – hemin is applied by the way of adsorption in quantity of 0.88 mg.

It follows from the curve lines of Fig.1 that depending on the time magnitude of electrochemical or diffusion potential is changing towards its increase. Activity of the electrode prepared by method (2) has been kept during the total time of experiment. Activity of the electrode prepared by method (1) has been lost after two experiments. Biomimetic electrodes with TPhPFe(III) have unlimited period of work independently of quantity applied working element, and their activity in a practical manner did not depend on quantity of conducted experiments (Fig.2).