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Abstract ABSTRACT
In recent years, diabetes has become one of the top ten causes of death for people in our country. Therefore, a rapid and convenient glucose biosensor becomes an important research subject. Nowadays, sometimes the preservatives are used in the food industry for the purpose of food preservation. Therefore, a hydrogen peroxide sensor also becomes an important research subject. The glucose and oxygen can be catalyzed by the glucose oxidase and the glucose is oxidized to gluconic acid and the oxygen is reduced to hydrogen peroxide. The electrode releases the electrons at the reductive potential and converts the mediator to the reductive state. Then the mediator at the reductive state releases the electrons to reduce the hydrogen peroxide to water and consequently the mediator at the reductive state is converted to the oxidizing state. The responding current for detecting the hydrogen peroxide is used to measure the amount of hydrogen peroxide and consequently determine the concentration of the glucose. Therefore, the detecting technique for the hydrogen peroxide is an important research subject. Because the sensitivity of carbon paste electrodes modified with the ruthenium hexacyanoferrate(Ⅱ) was better than that of the carbon paste electrodes modified with the ruthenium purple, the ruthenium hexacyanoferrate(Ⅱ) was used to modify the carbon paste in this research. As the ruthenium hexacyanoferrate(Ⅱ) possesses the excellent catalytic characteristic and the graphite carbon powder possesses the high conductivity, a study was conducted to use the ruthenium hexacyanoferrate(Ⅱ) to modify the carbon paste electrode and the responding current for detecting the hydrogen peroxide could then be elevated. At 30℃, -200 mV operating potential, 600 rpm stirring rate and in 0.05 M PBS buffer solution(pH=7.4), when the carbon paste electrode was modified with the ruthenium hexacyanoferrate(Ⅱ)[ruthenium hexacyanoferrate(Ⅱ)：graphite carbon powder=3：7 (weight ratio)], the detection limit was 0.02 mM H2O2, the linear range was 0.02~2.7 mM H2O2, R2=0.9996, and the sensitivity was 661.8 U+B5A/cm2・mM H2O2. The sensitivity for the unmodified carbon paste electrodes was 31.3 U+B5A/cm2・mM H2O2. The results showed that the carbon paste electrode modified with the ruthenium hexacyanoferrate(Ⅱ) possessed the excellent sensitivity for detecting the hydrogen peroxide.
The most suitable mixing ratio of ruthenium hexacyanoferrate(Ⅱ) to graphite carbon powder obtained from the above mentioned results could be further applied to fabricate the glucose biosensor by using the glucose oxidase which was immobilized by the Nafion on the surface of electrode.The detection limit was 0.02 mM C6H12O6 , the linear range was 0.02~2.56 mM C6H12O6 (R2=0.999), and the sensitivity was 4.11 U+B5A/cm2・mM C6H12O6.
For the hydrogen peroxide screen printed planar sensor, the detection limit was 0.02 mM H2O2, the linear range was 0.02~0.96 mM H2O2 (R2=0.917), and the sensitivity was 28.77 U+B5A/cm2・

mM H2O2. For the glucose screen printed planar sensor, the detection limit was 0.02 mM C6H12O6 , the linear range was 0.02~2.24 mM C6H12O6 (R2=0.9983), and the sensitivity was 12.19 U+B5A/cm2 · mM C6H12O6.
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