Modifikasi Glassy Carbon dengan Nanopartikel Emas sebagai Sensor Oksigen dan Studi Pendahuluan untuk Pengukuran BOD = Modification Of Glassy Carbon Using Gold Nanoparticles And The Preliminary Study For BOD Sensing

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Abstrak

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Sensitivitas elektroda emas dan elektroda glassy carbon sebagai sensor oksigen dapat ditingkatkan melalui modifikasi nanopartikel emas pada permukaan elektroda glassy carbon. Modifikasi ini dapat dilakukan dengan menggunakan teknik self assembly. Deteksi oksigen dengan elektroda termodifikasi ini dapat digunakan untuk pengukuran nilai BOD. Sensor pengukuran BOD dianalisakan sebagai sensor oksigen terlarut dalam air dengan memperhitungkan selisih dari kadar oksigen yang terlarut sebelum dikonsumsi oleh mikroorganisme, dan setelah dikonsumsi oleh mikroorganisme. Pengukuran sensor oksigen ini dilakukan dengan menggunakan cyclic voltammetry pada kisaran potensial -2000 mV hingga 2000 mV dan scanrate 100 mV/s. Puncak reduksi untuk pengukuran oksigen dengan menggunakan elektroda GC-NP Au berada pada potensial sekitar -0,538 V, sedangkan untuk elektroda GC dan Au masing-masing berada pada potensial -0,51 V dan -1,16 V. Hasil pengukuran menunjukkan bahwa kemampuan pemisahan sinyal dari background pada elektroda GC-NP Au (S/B=1,8994) lebih baik dibandingkan pada elektroda GC (S/B=1,53) dan elektroda Au (S/B=1,19). Elektroda GC-NP Au sensitivitas yang lebih baik dibanding GC dan Au. Presisi pengukuran respon arus sebanyak 10 kali terhadap larutan buffer posfat yang dialiri oksigen selama dua menit diperoleh sebesar 19,44% (RSD) untuk Au, 11,84% untuk GC, dan 10,50% untuk GC-NP Au. Hasil pengujian elektroda GC-NP Au untuk pengukuran BOD menunjukkan perbedaan arus yang sangat signifikan pada saat adanya khamir dan saat tidak adanya khamir.
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ABSTRACT
<i>Sensitivity of gold electrodes and glassy carbon electrodes as oxygen sensors can be improved through modification of gold nanoparticles on glassy carbon electrode surface. This modification can be done using self assembly techniques. Detection of oxygen with this modified electrode can be used for the measurement of BOD value. Sensors that is used for the measurement of BOD value is sensor for measurement of dissolved oxygen in water by calculating the difference in the levels of dissolved oxygen before being consumed by microorganisms, and when consumed by microorganisms. Measurement of the oxygen sensor is performed

using cyclic voltammetry at potential range of -2000 mV to 2000 mV and scanrate 100 mV/s. Reduction peak for oxygen measurement using GC-NP Au electrode at a potential of about -0.538 V, whereas for GC and Au electrodes each are at potential -0.51 V and -1.16 V. The measurement results show that the separation ability of the background signal on GC electrode Au-NP (S / B = 1.8994) better than the GC electrode (S / B = 1.53) and Au electrodes (S / B = 1.19). Sensitivity of GC-NP Au electrode is better than GC and Au. Precision measurement of the flow response to the phosphate buffer solution by flowing oxygen for two minutes was obtained for 19.44% (RSD) for Au, 11,84% for GC, and 10,50% for GC-NP Au. Test results-NP Au GC electrode for BOD measurement showed a highly significant difference in flow at the moment the absence of yeast and the present of yeast.</i>, Sensitivity of gold electrodes and glassy carbon electrodes as oxygen sensors can be improved through modification of gold nanoparticles on glassy carbon electrode surface. This modification can be done using self assembly techniques. Detection of oxygen with this modified electrode can be used for the measurement of BOD value. Sensors that is used for the measurement of BOD value is sensor for measurement of dissolved oxygen in water by calculating the difference in the levels of dissolved oxygen before being consumed by microorganisms, and when consumed by microorganisms. Measurement of the oxygen sensor is performed using cyclic voltammetry at potential range of -2000 mV to 2000 mV and scanrate 100 mV/s. Reduction peak for oxygen measurement using GC-NP Au electrode at a potential of about -0.538 V, whereas for GC and Au electrodes each are at potential -0.51 V and -1.16 V. The measurement results show that the separation ability of the background signal on GC electrode Au-NP (S / B = 1.8994) better than the GC electrode (S / B = 1.53) and Au electrodes (S / B = 1.19). Sensitivity of GC-NP Au electrode is better than GC and Au. Precision measurement of the flow response to the phosphate buffer solution by flowing oxygen for two minutes was obtained for 19.44% (RSD) for Au, 11,84% for GC, and 10,50% for GC-NP Au. Test results-NP Au GC electrode for BOD measurement showed a highly significant difference in flow at the moment the absence of yeast and the present of yeast.]