(One page abstract format: including figures and references. Please follow the model below.)

Iridium Oxide Nanoparticle Decorated Reduced Graphene Oxide for Reduction Sensing Hydrogen Peroxide

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Abstract (Arial 10)
Graphene based materials have been applied as sensing materials in these few years due to its special chemical and electric properties. Hydrogen peroxide is one of the most frequently-utilized markers in food and biomedical applications, and graphene had been used as non-enzymetic H_2O_2 sensor. In addition, various metallic or metal oxide nanoparticles were used to catalytic the oxidation of hydrogen peroxide. However, there were more potential interferences during the oxidation sensing of H_2O_2 which might reduce the selectivity of the sensor. In order to eliminate the interference effect, reduction of hydrogen peroxide is a promising solution and iridium has been used as electrocatalyst in the previous study [1]. In this study, reduced graphene oxide, which is easier to be modified than graphene, was chosen as based material. Iridium oxide nanoparticles were decorated onto reduced graphene oxide surface utilizing a simple one-pot strategy for reduction deposition. The surface morphology of the IrOx decorated reduced graphene oxide (IrO_X/RGO) was characterized by TEM. The IrO_X/RGO electrode catalyzed the reduction reaction of H_2O_2. IrO_X/RGO electrode showed larger electron transfer rate than the RGO electrode. Cyclic voltammograms reveal that the onset potential for the reduction of H_2O_2 on the IrO_x decorated reduced graphene oxide electrode occurs at -0.30 V vs. Ag/AgCl which is more anodic than the electrode without IrO_x nanoparticle decoration. In addition, the IrO_X/RGO electrode exhibited monotonic relation in a wide range from 10 μM to 20 mM. Since uniform distribution of IrOx catalyst, the electrode showed not only high sensitivity but also the reproducibility. In order to apply in biomedical environment, potential interference effect has been evaluated. The experimental results suggested that a high reliability H_2O_2 sensing platform has been successfully developed.

References

[1] Pei-Yin Liu, Sin-Cih Sun, Yi-Shiang Chen, Min-Chieh Chuang, Electrochimica Acta, 187 (2016) 256-263.

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