

Ultra high sensitive electrochemical impedimetric myoglobin sensor with octadecylamine modified graphene oxide electrodes

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Numerous structuring strategies to enlarge surface area of electrode have been studied to improve sensitivity of electrochemical impedance spectroscopy-based biosensor. However, proposed approaches such as nano-micro patterning are not applicable to graphene-based electrodes due to ultrathin film thickness of electrodes (below than 10 nm). To overcome this limit, in this study, we researched a novel means to increase the electroactive surface area of graphene electrode. The surface area of electrode, where graphene nanosheets modified with octadecylamin (ODA) groups that can alter the inter-sheet spacing are assembled, increases through thermal reduction. To demonstrate presented method, the ODA modified graphene electrodes were assessed via EIS measurements and employed to detect myoglobin (Mb). As a result, the ODA modified graphene electrode exhibited detection limit of 2.37 pM concentration of Mb, which is outstanding sensing performance compared to normal graphene electrode.