Electrochemical Performance and Electrocatalytic Behavior of Myoglobin Modified TiO₂@3D Graphene Composite Electrode

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In the study titanium dioxide (TiO₂) doped three-dimensional graphene (3DGR) nanocomposite (TiO₂@3D GR) was prepared via a one-step hydrothermal synthesis method. SEM results showed a three-dimensional network structure with TiO₂ particles uniformly loaded in the graphene pores. Using PBS with different pH values as supporting electrolyte, the influence of acid-base property on the electrochemical experiments based on the proposed biosensor (Nafion/Mb/TiO₂@3DGR/CILE) was investigated. The effect of sweep speed on electrochemical behavior was further explored. Nafion/Mb/TiO₂@3DGR/CILE showed good electrocatalytic activity for trichloroacetic acid, NaNO₂ and H₂O₂ with K_M^{app} as 107.12 mM, 31.53 mM and 34.23 mM, obtaining wider range of linearity and lower limit of detection. The biosensor is of important significance for future research and development of electrochemical biosensor.

Keywords: Carbon ionic liquid electrode; Direct electrochemistry; Titanium dioxide doped three-dimensional graphene; Myoglobin

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