Direct Electrochemistry and Electrocatalysis of Myoglobin with Copper Benzenetricarboxylate Metal-Organic Frameworks@ Nitrogen-Doped Graphene Composite Modified Electrode

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A novel nanohybrid material based on copper benzenetricarboxylate metal-organic framework (Cu-BTC) and nitrogen-doped graphene (NG) was used to immobilize myoglobin (Mb) with its biosensing ability checked. The surface images of the modifiers on the electrode were characterized by SEM. Spectroscopic results demonstrated that Mb kept its native structure in the composite film. Direct electrochemistry of Mb on Cu-BTC@NG modified electrode was checked by cyclic voltammetry with a pair of well-defined redox peaks observed. The peak-to-peak separation of 0.082 V and the formal peak potential of -0.187 V were calculated, corresponding to the realization of direct electrode transfer of Mb. Electrochemical investigations of Mb modified electrode were studied in detail. The modified electrode showed good sensitivity and wide linear range to the analysis of trichloroacetic acid and sodium nitrite. All the results demonstrated that is hybrid matrix exhibited a fast electron transfer pathway for the electron transfer of Mb.

Keywords: Copper benzenetricarboxylate metal-organic framework; nitrogen-doped graphene; myoglobin; direct electrochemistry

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