Electrocatalytic activity of sodium tetrafluorocuprate modified gold electrode for glucose determination

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Sodium tetrafluorocuprate (Na_2CuF_4) has been synthesized by the precipitation method. Then, Na_2CuF_4 was applied to glucose electrocatalysis for the first time, and modified bare Au electrode to obtain $\text{Na}_2\text{CuF}_4/\text{Au}$. $\text{Na}_2\text{CuF}_4/\text{Au}$ has strong anti-interference, extremely broad linear range of glucose detection, and great stability through stored for a long time at room temperature. A simple method was used to prepare Na_2CuF_4 with different morphologies, and the effects of different morphologies for the glucose sensing performance were studied. The optimal experimental parameters of glucose sensing were obtained through parameter optimization, which leads to enhanced glucose sensing performance. The selected Na_2CuF_4 was composed of large crystals and smaller crystals. The larger crystals sizes of selected Na_2CuF_4 are in the range from 5 μm to 6 μm , and the smaller are in the range from 230 nm to 300 nm, the two are mixed together. The $\text{Na}_2\text{CuF}_4/\text{Au}$ electrode showed high sensitivity and very wide linear range (the first 0.01-0.15 mM, the second 0.15-19.15 mM, the third 19.15-63.15 mM). The $\text{Na}_2\text{CuF}_4/\text{Au}$ shows good accuracy, reproducibility and stability, as well as excellent selectivity. The properties of Na_2CuF_4 indicate that it has a wide application prospect in the field of glucose electrocatalysis as a new glucose sensitive material.

Keywords: Sodium tetrafluorocuprate; Non-enzymatic sensor; Glucose detection; Wide linear range; Modified Au electrode

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