Facile Synthesis of Bimetallic Pt_xCu_{1-x} Nanostrands and Their Application in Non-Enzymatic Glucose Sensor

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Bimetallic Pt_xCu_{1-x} nanostrands were fabricated through a facile and effective wet chemical strategy and modified on glassy carbon electrode for sensitive non-enzymatic glucose sensors. Physical properties of the Pt_xCu_{1-x} nanostrands were characterized by transmission electron microscopy (TEM), scanning electron microscopy (SEM) combined with energy dispersive X-ray spectroscopy (EDS), and X-ray diffraction (XRD) techniques. Electrochemical performances of the Pt_xCu_{1-x} nanostrands were evaluated by cyclic voltammetry, electrochemical impedance spectroscopy and chronoamperometry and compared to Pt nanostrands when modified onto glassy carbon electrodes. Electrochemical measurements indicated that the oxidation current of glucose on the Pt₇₀Cu₃₀ nanostrands modified electrode is linear to its concentration from 0.1 to 19 mM with a detection limit of 25 μM (*S/N*=3) and a good sensitivity of 23 μA·mM⁻¹·cm⁻². Besides, the Pt₇₀Cu₃₀ nanostrands modified electrode can avoid the interference of ascorbic acid (AA), uric acid (UA), acetamidophenol (AP) and fructose. And it also demonstrated superior selectivity, outstanding stability, attractive reproducibility, and well feasibility for the analysis of real sample. Benefiting from its wonderful electrochemical performance, low spend as well as ease in fabrication, this novel Pt₇₀Cu₃₀ nanostrands material provides a potential candidate for preparing non-enzymatic glucose sensors with good properties.

Keywords: Electrocatalysis; Pt_xCu_{1-x} nanostrands; Glucose; Non-enzymatic sensor

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