ZnWO₄ Nanorod Modified Electrode for Uric Acid Electrocatalytic Sensing and Application

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doi: 10.20964/2017.09.14

Received: 20 April 2017 / Accepted: 21 June 2017 / Published: 13 August 2017

In this paper ZnWO₄ nanorod was modified on carbon ionic liquid electrode (CILE) and used for voltammetric sensing of uric acid (UA). ZnWO₄ nanorod on CILE surface exhibited excellent electrocatalytic activity to UA redox reaction. On cyclic voltammogram the oxidation peak current of UA was enhanced and the oxidation peak potential was decreased, showing a typical electrocatalytic process. Electrochemical behaviors of UA were carefully studied on ZnWO₄/CILE with a quasi-reversible diffusional-controlled electrode process. Electrochemical parameters including, the number of electron transfer (n) and the diffusional coefficient (D) were calculated with the results as 2.26 and $3.26 \times 10^{-5} \text{ cm}^2/\text{s}$. At the optimal conditions the oxidation peak current of UA was proportional to its concentration from 0.2 to 800.0 $\mu\text{mol/L}$ by differential pulse voltammetry with the detection limit of 0.0637 $\mu\text{mol/L}$ (3σ). The urine from healthy human was chosen as the real sample for the detection of UA content with satisfactory results.

Keywords: Uric acid; ZnWO₄ nanorod; Electrocatalysis; Electrochemistry; Carbon ionic liquid electrode.

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