Preparation of Keggin-type Polyoxomolybdate and its Application as Electrochemical Sensor for Detection of Levodopa

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In this study, a levodopa (LDA) electrochemical sensor based on Keggin-type polyoxometalate was constructed. First, the silicomolybdenum heteropoly acid SiMo_{12} imidazole was synthesized by hydrothermal method. Fourier transform infrared absorption spectrometry (FTIR), X-ray diffraction (XRD), scanning electron microscopy (SEM) and atomic force microscopy (AFM) were used to characterize the synthetic material. Then the SiMo_{12} imidazole was dropped onto the surface of a glassy carbon electrode (GCE) to construct an electrochemical sensor for detecting LDA. The sensing interface of the modified electrode was studied by cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). Under the optimal experimental conditions, the constructed electrochemical sensor had good detection performance for LDA with a linear range of $1 \times 10^{-7} \text{ mol/L} \sim 8 \times 10^{-6} \text{ mol/L}$ and a limit of detection (LOD) of $0.48 \times 10^{-7} \text{ mol/L}$. Satisfactory results were also obtained in the detection of LDA tablets.

Keywords: Keggin-type polyoxomolybdate; Levodopa; Electrochemical detection

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