Electrochemical Sensor for Simultaneous Determination of Theophylline and Caffeine Based on a Novel poly(folic acid)/graphene Composite Film Modified Electrode

Xiaoli Shu, Feng Bian, Qianqian Wang, Xiaofei Qin, Yan Wang*

College of Chemistry, Chemical Engineering and Materials Science, Collaborative Innovation Center of Functionalized Probes for Chemical Imaging in Universities of Shandong, Shandong Normal University, Jinan 250014, P. R. China

*E-mail: fagong@sdu.edu.cn

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In this work, a novel poly(folic acid)/ graphene composite film modified electrode was developed to construct an electrochemical sensor for simultaneous determination of theophylline (TP) and caffeine (CAF). The fabrication and characterization of nanocomposite film were investigated in details by electrochemistry and scanning electron microscopy. This new electrochemical sensor displayed superior electrocatalytic property to the oxidation of TP and CAF, which obviously improved the sensitive detection of the two compounds in the terms of high sensitivity and wide linear range. Under the optimized experimental conditions, the detection limits were obtained to be $0.03 \mu\text{mol L}^{-1}$ for TP and $0.08 \mu\text{mol L}^{-1}$ for CAF, respectively. The novel sensor was successfully used for the simultaneous detection of TP and CAF in food samples.

Keywords: Folic acid; Graphene; Chemically modified electrode; Theophylline; Caffeine

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