Ferrocene/graphene modified glassy carbon electrode for Chloromycetin detection

Lin Hu, Xiaoqin Zhou*, Jinqing Li, Tongtong Bai, Juan Tang, Tao Zhou, Qujin Cui

Institute of Applied Chemistry, East China JiaoTong University, Nanchang, 330013, PR China

*E-mail: 1061508795@qq.com

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In this study, we used ferrocene/graphene to modify a glassy carbon electrode, which was fixed with an appropriate amount of Nafion solution. The -C-O-C- and -COOH functional groups were detected in the ferrocene/graphene composite using IR spectroscopy, which indicated that graphene was oxidized to graphene oxide, making it more hydrophilic, dispersible and compatible with polymers, thus increasing the chloromycetin detection rate. A scan rate of 0.05 V/s is ideal. The optimal conditions for chloromycetin detection were found using Cyclic voltammetry (CV): a scan rate of 0.05 V/s, pH 6.47, and 0.1 mol/L PBS buffer solution. Differential pulse voltammetry(DPV) shows that the concentrations of chloromycetin are 2×10^{-6} - 3.2×10^{-5} mol/L, and there is a good linear relationship between the peak current and the concentration: $I_{pa}(\mu A) = 2.44772 c(\mu mol/L) - 46.14375$, $r = 0.993$; the detection limit is 4.5×10^{-8} mol/L. This modified electrode has good stability, repeatability and operability and can be applied to detect actual samples.

Keywords: Ferrocene/graphene-modified electrode; Detection; Chloromycetin; Cyclic voltammetry; Differential pulse voltammetry.

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