

生物分子电催化的研究 IV: NADH在亚甲绿修饰石墨电极上的电催化氧化

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收稿日期 修回日期 网络版发布日期 接受日期

摘要 本文以强烈吸附在石墨电极上的亚甲绿作为电子传递媒介体构成修饰电极。在-0.25V~+0.10V电位区间内, 吸附态的亚甲绿表现出相当可逆的氧化还原行为, 电极反应有一个电子和一个质子参加。在pH=7.0的磷酸盐缓冲溶液中, 其式量电位 E° 为-0.14V, 表观电子传递速率常数 k_{app} 为 $4.4s^{-1}$ 。亚甲绿修饰电极对还原型烟酰胺腺嘌呤二核苷酸(NADH)的电化学氧化具有明显的催化作用, 可使NADH的氧化过电位降低500mV, 它作为NADH的电化学安培检测器具有很高的灵敏度和良好的重现性。文中还用X光电子能谱(ESCA)、衰减全反射红外光谱(ATR)等现代分析技术对修饰电极进行了表征。

关键词 [菸酰胺腺嘌呤二核苷酸](#) [修饰电极](#) [国家教委高等学校博士学科点专项科研基金](#) [电催化氧化](#) [亚甲绿](#)

分类号 [Q52](#) [O643](#)

Electrocatalysis of biomolecules at modified electrodes IV: Electrocatalytic oxidation of reduced nicotinamide adeninedinucleotide at the methylene green modified graphite electrode

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Abstract The chemically modified electrode(CME), which was constructed by adsorbing the mediator methylene green (MG) onto the spectrographic graphite electrode, shows significant electrocatalytic activity to the oxidation of reduced nicotinamide adeninedinucleotide (NADH), reducing oxidation overpotential by 500mV. In the potential range from -0.25V to +0.1V the adsorbed mediator MG behaves as one-electron reversible redox process involving one proton. In the medium of 0.1mol/dm³ phosphate buffer (pH=7.0) the surface formal potential E° and apparent electron-transfer rate of the adsorbed mediator MG were found to be -0.14V and $4.4s^{-1}$, respectively. The CME was tested as a electrochemical NADH detector, which shows high sensitivity and good stability. The CME was also characterized by ESCA and ATR.

Key words [NICOTINAMIDE ADENINE DINUCLEOTIDE](#) [MODIFIED ELECTRODE](#) [METHYLENE HALIDE](#)

DOI:

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