Electroanalysis of Dopamine Using Polydopamine Functionalized Reduced Graphene Oxide-Gold Nanocomposite

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Introduction

Graphene

- Two-dimensional monolayer of graphite
- Extraordinary mechanical strength, large specific surface area and high conductivity
- Excellent platform for loading nanoparticles
Introduction

Why Polydopamine and Gold?

- Reduce agent for reduction of grapheme oxide
- Increase dispersity of reduced grapheme oxide
- Improved the electronic conductivity
- Increase surface area for electrocatalytic activity
Method

PDA-RGO nanocomposite:

Dopamine self-polymerization in Tris-buffer for 24 h

PDA-RGO/Au nanocomposite:

Electrodeposition
Characterizations

- FTIR spectra confirmed the successful functionalization of PDA
- FTIR also confirmed the reduction of GO
- UV-vis spectra confirmed the reduction of GO
Morphology
Electrochemical Behavior Towards Oxidation of DA

- PDA-RGO/Au modified electrode showed the best electrocatalytic performance towards oxidation of DA
The oxidation peak currents showed a linear relationship with DA concentrations from 0.05-1 mM.

Linear regression equation:

\[ \text{as } I_{pa} (\mu A) = 9.8684 \, \text{c (mM)} + 2.2215 \]
Selectivity

- Excellent selectivity towards oxidation of DA
Summary

- PDA-RGO/Au nanocomposites were prepared via wet chemical method combined with electrodeposition.
- FTIR and UV-vis spectroscopy confirmed the reduction of GO and PDA surface functionalization.
- PDA-RGO/Au modified GCE exhibits an excellent electrocatalytic activity towards oxidation of DA.