

材料化学工程与纳米技术

## 碳纳米管/纳米TiO<sub>2</sub>-聚苯胺复合膜电极的制备及电化学性能

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摘要

在含有0.2 mol·L<sup>-1</sup>苯胺的0.5 mol·L<sup>-1</sup> H<sub>2</sub>SO<sub>4</sub>溶液中;采用循环伏安法(CV);以扫描速度50 mV·s<sup>-1</sup>;扫描电位为-0.1~0.9 V;在碳纳米管/纳米TiO<sub>2</sub>(CNT/nanoTiO<sub>2</sub>)膜电极上实现了苯胺的电化学聚合;通过CV法和电化学阻抗谱(EIS)并结合电子扫描显微镜和红外谱图对制备的碳纳米管/纳米TiO<sub>2</sub>-聚苯胺(CNT/nanoTiO<sub>2</sub>-PAn)复合膜电极的电化学性质和结构进行了表征;同时研究了复合膜电极对抗坏血酸(AH<sub>2</sub>)的电催化性能;发现该复合膜电极对抗坏血酸的氧化具有较高的电催化活性。

关键词

分类号

## Preparation and electrochemical properties of carbon nanotube/nanocrystalline TiO<sub>2</sub>-polyaniline complex film electrode

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### Abstract

Polymerization of aniline on carbon nanotube/nanocrystalline TiO<sub>2</sub> (CNT/nanoTiO<sub>2</sub>) film electrode performed in 0.5 mol·L<sup>-1</sup> sulfuric acid including 0.2 mol·L<sup>-1</sup> aniline with scanning voltage -0.1V—0.9V at scanning rate 50 mV·s<sup>-1</sup>.

The electrochemical properties and structure of carbon nanotube/nanocrystalline TiO<sub>2</sub>-polyaniline (CNT/nanoTiO<sub>2</sub>-PAn) complex film were characterized with cyclic voltammetry (CV); electrochemical impedance spectra (EIS); SEM and IR spectra. In addition; electrocatalytic performance of the complex film electrode was investigated for oxidation of ascorbic acid (AH<sub>2</sub>). It was found that the complex film electrode exhibited excellent catalytic activity toward the electrooxidation of ascorbic acid.

### Key words

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