

Electrochemical oxidation of sulfur-containing amino acids on an electrode modified with multi-walled carbon nanotubes

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Abstract

MWNT-modified electrodes are introduced for the voltammetric determination of sulfur-containing amino acids. The morphology of the electrode surface has been characterized by atomic force microscopy. The MWNT layer consists of deeply intertwined vermicular structures with the average diameter of 25 nm. Cysteine, glutathione and methionine are oxidized on the electrode while only cysteine gives signals on the glassy carbon (GC) electrode. The application of such electrodes leads to a decreased overpotential and increase of oxidation currents for cysteine in comparison with a bare GC electrode. The schemes of oxidation are proposed. A decrease of the lower limit of determination and an enlargement of the analytical range for antioxidants were obtained. A simple, fast and accurate procedure for the voltammetric determination of methionine in pharmaceuticals has been developed and can be recommended for quality control purposes. © 2009 Springer-Verlag.

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Keywords

Anodic voltammetry, Carbon nanotubes, Chemically modified electrodes, Pharmaceutical analysis, Sulfur-containing amino acids