

Voltammetric and flow-injection determination of carbohydrates using composite electrodes based on carbon nanotubes and Nickel(II) hexacyanoferrate

Shaidarova L., Chelnokova I., Makhmutova G., Gedmina A., Budnikov H.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The catalytic activities of oxo and hydroxo forms of nickel(II) on the surface of a nickel deposit and an inorganic film of nickel(II) hexacyanoferrate(III) (NiHCF) electrodeposited on a glassy-carbon electrode both unmodified and modified by multi-wall or single-wall (also functionalized) carbon nanotubes in the electrooxidation of glucose, sucrose, and maltose are compared. A more pronounced catalytic effect was obtained in the electrooxidation of these carbohydrates on an electrode modified with functionalized singlewall carbon nanotubes and a NiHCF film. Methods are proposed for the voltammetric and flow-injection determination of carbohydrates on this composite electrode. A linear dependence of the analytical signal on the analyte concentration was observed in the range from 5×10^{-7} to 5×10^{-2} M under stationary conditions and from 0.003 to 0.3 μmol under flow conditions. © 2014 Pleiades Publishing, Ltd.

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Keywords

carbon nanotubes, chemically modified electrodes, electrooxidation of carbohydrates, flow-injection analysis, nickel(II) hexacyanoferrate(III)