

Carbon nanotube-based biosensors for DNA structure characterization

Abdullin T., Bondar' O., Rizvanov A., Nikitina I.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

The possibility of DNA detection using electrodes modified with carbon nanotubes (CNTs) was studied. CNTs facilitate the electrochemical oxidation of DNA guanine nucleotide, which allows direct detection of DNA on a modified electrode. Electrochemical properties of DNA depend on its secondary structure and molecular weight. Denaturation of native DNA improves the adsorption of biopolymer on CNTs and results in an increase in DNA oxidation current on the modified electrode. A similar effect is observed after ultrasonic shearing of DNA or its treatment with Fenton's reagent due to the fragmentation of biopolymer. Our results demonstrate the feasibility of biosensors based on CNT-modified electrodes for the direct detection and characterization of DNA and DNA damaging factors. © 2009 Pleiades Publishing, Ltd.

<http://dx.doi.org/10.1134/S0003683809020203>
