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Organic Acid and DNA Sensing with Electrochemical Sensor Based on Carbon Black and Pillar[5]arene

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Abstract

© 2016 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim Electrochemical sensor has been proposed on the base of glassy carbon electrode (GCE) modified with carbon black (CB) and pillar[5]arene (P[5]A). The characteristics of the peak currents were found to be sensitive to the incubation of the sensor in organic acid and DNA solution. The detection of $n \times (10^{-8} - 10^{-5})$ M of organic acid and down to $(1-5) \times 10^{-18}$ g of DNA was attributed to the effect of the analytes on the aggregation and relative stability of oxidized and reduced forms of P[5]A. No signal interference with the alkali and alkali-earth metal ions was found. The electrochemical sensor was tested in the detection of specific DNA interactions, i.e. reactive oxygen species damage and intercalating pharmaceuticals detection.

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Keywords

carbon black, dicarboxylic acids, DNA sensing, pillar[5]arene, voltammetric sensor