

Nanochemistry and biotechnology

ND\PAH Modified Screen Printed Carbone Electrodes for NADH detection.

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Nicotinamide adenine dinucleotide reduced (NADH) is an important coenzyme produced in vivo during dehydrogenase based enzymatic reactions and it has a number of essential roles in biological systems. The amperometric determination of NADH is based on current change registration at constant potential during it oxidation on the electrode surface. The experimental results showed that the surface modification of carbon screen-printed electrode (SPE) ("DropSens", C110) by nanodiamonds (NDs) (Ioffe Physical-Technical Institute (St. Petersburg, Russia) from an aqueous suspension at a concentration of 0.004-0.01% leads to decreasing of the current value at applied potential close to 0.5 V, and, as result, improves the sensitivity of NADH determination. The optimal ND concentration for SPE modification found near 0.01%. pH - optimum for NADH electrochemical oxidation is close to 6.0.

Sensitive sensor for NADH detection was optimized on the base of carbon SPE, modified by poly (allylamine hydrochloride) (PAH) – ND film. As was found the modification of carbon electrode surface by nanocomposite film resulted in shift of the optimal value of applied potential close to 0.45 V, and improved the sensitivity of NADH determination three times with significant reducing of the NADH limit detection (Table1).

Table 1. Comparison of sensors characteristics before and after modification.

Modification	Linear range, μM	Specific sensitivity, mA/M/sm^2	Limit detection, μM	E, mV
Carbon SPE	0-50	24.1	19,25	0.56
0,01% ND/SPE	0-50	57	18,315	0.5
0.01%PAH- 0.2% ND / SPE	0-10	83.706	0.412	0.45

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