nanomaterials

Supplementary Materials

Voltammetric Sensor for Doxorubicin Determination Based on Self-Assembled DNA-Polyphenothiazine Composite

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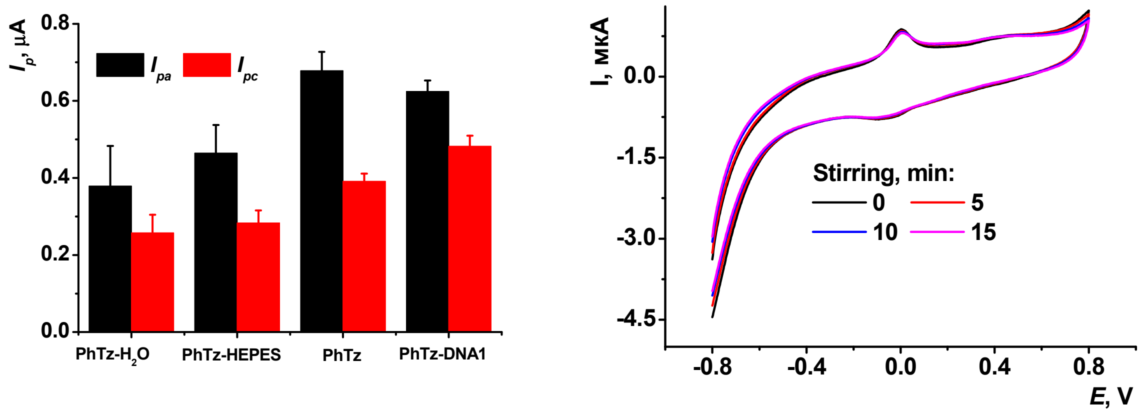
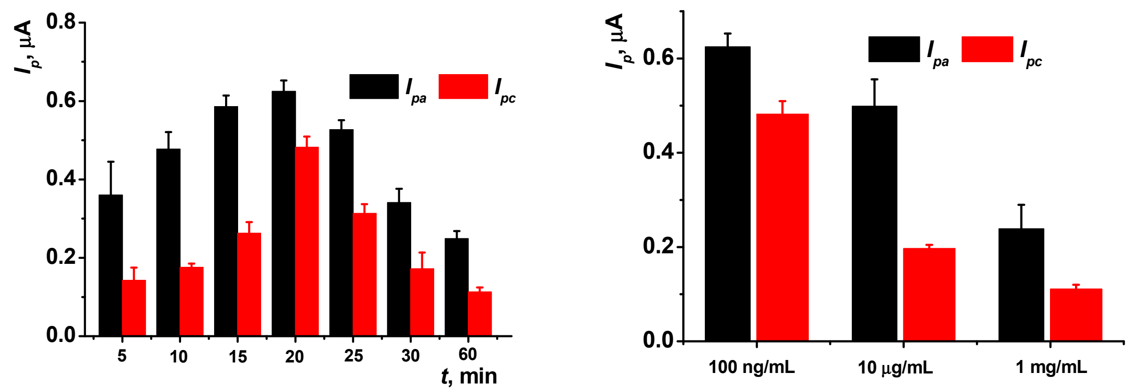


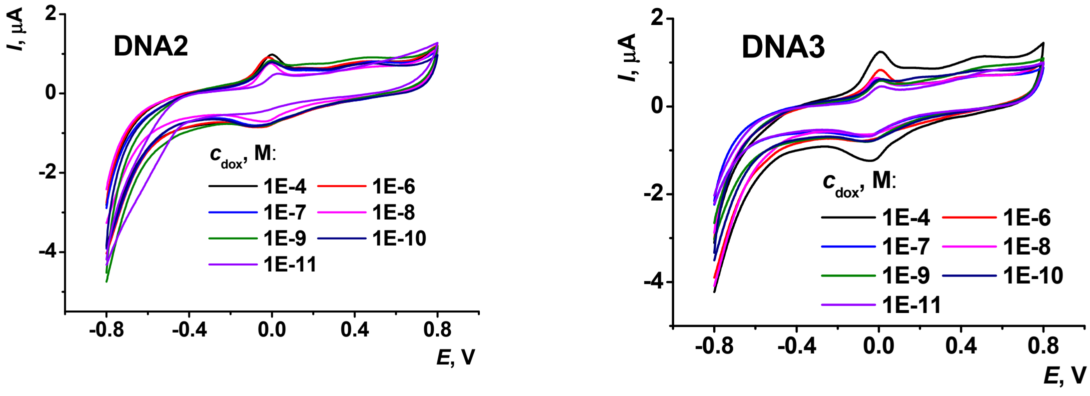
(**a**) (**b**)

Figure S1. (**a**) The dependence of the polyPhTz peak currents on the incubation of the GCE/polyPhTz sensors in water and HEPES. Average ± S.D. for five sensors, incubation 20 min; (**b**) Cyclic voltammograms recorded in 0.1 M HEPES + 0.1 M $NaNO_3$, pH 7.0, scan rate 100 mV/s, with intermediate stirring the solution.



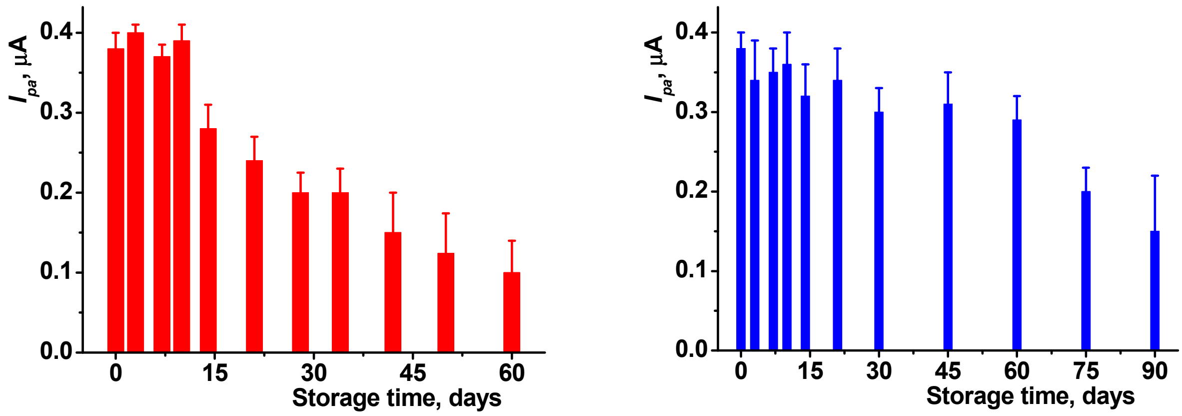
(**a**) (**b**)

Figure S2. (**a**) The dependence of the polyPhTz peak currents on the incubation time of the GCE/polyPhTz sensors in 0.1 M HEPES; (**b**) The polyPhTz peak currents after 15 min incubation of the GCE/polyPhTz sensor in DNA1 solution of various concentration. Average ± S.D. for five sensors.



(**a**) (**b**)

Figure S3. Cyclic voltammograms recorded after incubation of the GCE/polyPhTz/DNA sensor in doxorubicin solution. (**a**) DNA from fish sperm; (**b**) DNA from chicken erythrocytes.



(**a**) (**b**)

Figure S4. Anodic peak currents on cyclic voltammograms recorded after incubation of the GCE/polyPhTz/DNA (0.1 mg/mL DNA) sensor in 0.1 nM doxorubicin solution. (**a**) Storage in 0.1 M HEPES buffer at 4 °C; (**b**)Storage in dry conditions at 4 °C. Average ± S.D. for five individual sensors

Table 1. Analytical characteristics of the determination of doxorubicin with electrochemical sensors and DNA sensors.

Electrode / Modifier	Concentration range, μM	LOD, nM	Ref
Electrochemical sensors			
ZnO /graphite paste electrode	0.07–5000	9.0	[s1]
GCE/mesoporous carbon nanospheres / reduced graphene oxide	0.01–10	1.5	[s2]
Pyrographite	0.01–1.0	10	[s3]
Pt/ Silver solid amalgam	0.6–10	440	[s4]
Carbon paste electrode with implemented TiO_2 nanoparticles and multi-walled carbon nanotubes	5.0–35.0	1300	[s5]
Screen-printed carbon electrode /MgO/carbon nanodots/	0.1–1.0	90	[s6]
GCE/ Tryptophan / polyethylene glycol / $CoFe_2O_4$ nanoparticles	0.06–2.0	30	[s7]
Electrochemical DNA sensors			

GCE / poly(Azure B)	0.0001–0.1	0.07	[s8]
GCE/Polyaniline/DNA	$1 \cdot 10^{-6}$–1000	0.0006	[s9]
GCE / carbon nanotubes–polylysine	0.0025–0.25	1.0	[s10]
GCE / poly(Neutral red)	0.0001–0.1	50	[s11]
GCE / acridine yellow (monomer)	$1 \cdot 10^{-5}$–0.001	0.7	[s12]
GCE—poly(Methylene blue) -poly(Neutral red)	0.0005–1000	0.13	[s13]
Screen-printed carbon electrode/ Pt nanoparticles / Ag nanoparticles / DNA	0.2–2.0	-	[s14]
GCE / Single-walled carbon nanotubes	0.001–20	0.6	[s15]
Boron doped diamond electrode / DNA aptamer	Up to 2.3	49	[s16]
GCE/PolyPhTz/DNA	0.01–200	0.005	This work

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