Electronic Supplementary Material (ESI) for Analytical Methods.

Supplementary information

Non-enzymatic ethanol sensor based on a nanostructured catalytic disposable electrode

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Synthesis and characterization of the PtNPs

The synthesis of the PtNPs was performed using a previously described methodology [41].In detail, 1 L aqueous solution containing 2.5×10^{-4} M H_2PtCl_6 (hydrogen hexachloroplatinate hydrate, 99.99%, ACROS Organics) and 2.5×10^{-4} M trisodium citrate dihydrate (99% Sigma Aldrich) was prepared in a glass beaker at room temperature. Then, 5 mL of an ice-cold and freshly prepared 0.1 M $NaBH_4$ (ReagentPlus®99% Aldrich) solution was directly added to the solution under vigorous stirring. The stirring was slowed down after 60 s and the solution was keep unperturbed for the next 30 min. The morphology of the synthetized PtNPs was characterized by transmission electron microscopy (TEM). TEM experiments were performed with a JEOL, JEM 2010 microscope working at 200 kV. The sample for TEM analysis was obtained by placing a drop of the colloidal solution onto a Formvar-covered copper grid and evaporating it in air at room temperature. The purification of the PtNPs is carried out by adding about 25 NaOH pellets (pellets for analysis, EMSURE® ACS, Reag. Ph Eur., Merck) to the colloidal solution. The addition of NaOH produces the destabilization of the nanoparticles that subsequently precipitate. After complete precipitation, the sample is collected and 3–4 times washed with ultrapure water and stored in a 25 ml water solution to obtain a ~2 mg Pt mL^{-1} solution. This Pt concentration was confirmed by UV spectrophotometric measurements [42]. In brief, a known volume of the solution containing the Pt nanoparticles is incorporated in an *aqua regia* solution and heated to dryness. The resulting residue is finally dissolved in 20 ml of a 2% HCl solution and its absorbance measured at 262 nm. A platinum atomic absorption standard solution (TraceCERT®, 1000 mg/L Pt in hydrochloric acid (Fluka Analytical) was used to obtain the corresponding calibration curve between 0 and 25 ppm.

41. A. López-Cudero, J. Solla-Gullón, E. Herrero, A. Aldaz, J.M. Feliu, *J. Electroanal. Chem*., 2010, **644,** 117.

42. M. Georgieva, B. Andonovski, *Anal. Bioanal. Chem*., 2003, **375**, 836.

Figure S1

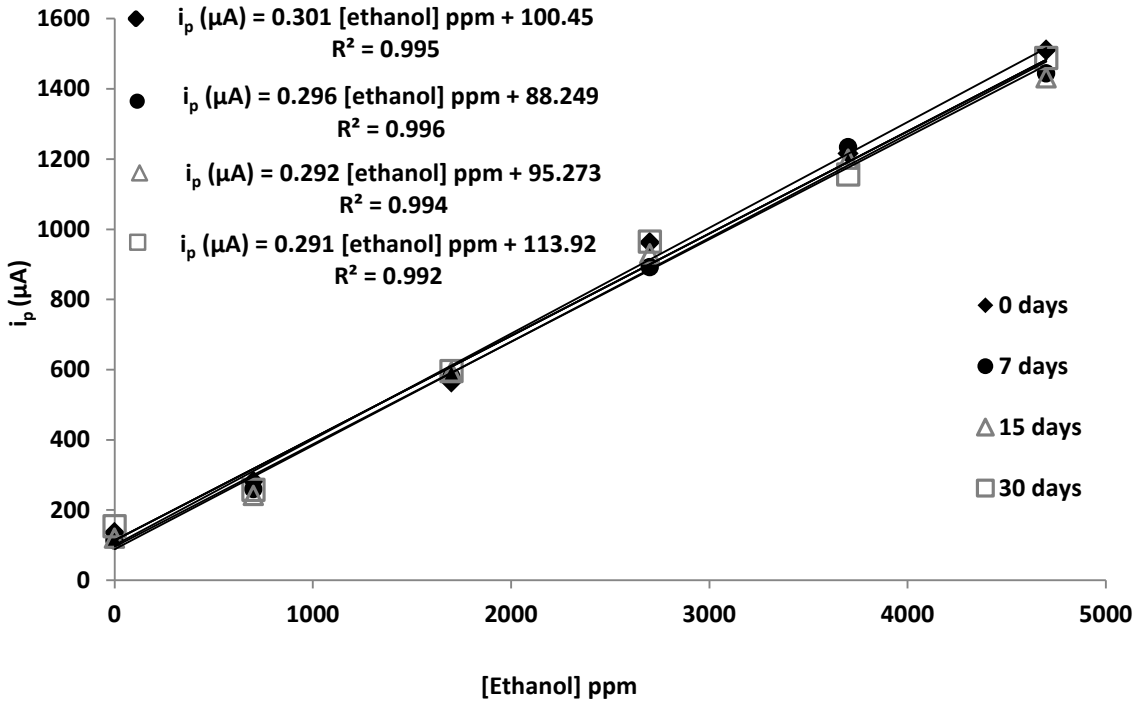

Fig. S1. Stability study of SPCE modified with PtNPs for a 30 day period. Data is given as average value (*n = 3*).

Table S1

Table S1. Determination of ethanol in real samples with the developed nanostructured sensor and using DROPSTAT device.

Samples	Labeled alc. % vol	Sensor response (deviation to labeled value) alc. % vol	Mean alc. % vol	± SD alc. % vol	RSD (%)
BEER					
Sample 1		5.24 (– 0.16)			
Sample 2		5.06 (– 0.34)			
Sample 3	**5.4**	5.89 (– 0.49	5.23	0.39	7.47
Sample 4		5.04 (– 0.36)			
Sample 5		4.90 (– 0.50)			
WINE					
Sample 1		10.16 (+ 0.16)			
Sample 2		10.30 (+ 0.30)			
Sample 3	**10.0**	10.15 (+ 0.15)	10.21	0.07	0.73
Sample 4		10.17 (+ 0.17)			
Sample 5		10.29 (+ 0.29)			

Data is given as average ± standard deviation (SD) (n = 5).