Electronic supplementary information (ESI)

Disposable screen-printed electrodes modified with uniform iron oxide nanocubes for the simple electrochemical determination of meclizine, an antihistamine drug

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S1: Fabrication of screen-printed electrodes (SPEs).

The screen-printed graphite electrodes were fabricated at *Manchester Metropolitan University* utilising appropriate stencil designs with a microDEK 1760RS screen-printing machine (DEK, Weymouth, UK). For each of the screen-printed sensors a carbon–graphite ink formulation (Product Code: product code: C2000802P2; Gwent Electronic Materials Ltd, UK) was first screen-printed onto a polyester flexible film (Autostat, 250 μm thickness). This layer was cured in a fan oven at 60 degrees Celsius for 30 min. Next a silver/silver chloride (40:60) reference electrode was applied by screen-printing Ag/AgCl paste (Product Code: C2040308P2; Gwent Electronic Materials Ltd, UK) onto the plastic substrate. This layer was once more cured in a fan oven at 60 degrees Celsius for 30 min. Last a dielectric paste ink (Product Code: D2070423P5; Gwent Electronic Materials Ltd, UK) was printed to cover the connections and define the 3 mm diameter graphite working electrode. After curing at 60 degrees Celsius for 30 min the screen-printed electrode is ready to use. Similar screen-printed platforms have been electrochemically characterized in a previous contribution [22-27].

S2: Apparatus

The morphology of Fe_2O_3 sample was investigated by field emission scanning electron microscopy (FE-SEM, JEOL model 6500). The scanning electron microscope was operated at 15 keV in order to record better SEM micrographs of the iron oxide samples. High resolution transmission electron microscopy (HR-TEM) of Fe_2O_3 sample was performed using a JEOL JEM model 2100F microscope. The Fe_2O_3 sample was dispersed in ethanol and dropped on a copper grid. Prior to inserting the sample into the HR-TEM column, the grid was vacuum dried for 20 minutes. The HR-TEM images were recorded using a CCD camera.

Wide-angle powder X-ray diffraction (XRD) was performed by X-ray diffractometer (Model FW 1700 series, Philips, Netherlands) using with monochromatic Cu Kα radiation (λ = 1.54 Å), employing a scanning rate of 0.06°/min and 2θ ranges from 6° to 80°. The diffraction data were analyzed using PDF software Released in 1996.

The voltammetric experiments were performed using Autolab 302N potentiostat/galvanostat workstation controlled by NOVA software version 1.11.2 for Windows 7. All measurements were conducted using a screen-printed electrode configuration. During the development of the protocol, the 3 mm graphite screen-printed electrode was used as working electrode with a carbon counter electrode and pseudo silver past as reference electrode. Connectors for the efficient connection of the screen-printed electrochemical sensors were purchased from *Kanichi* Research Services Ltd (UK).

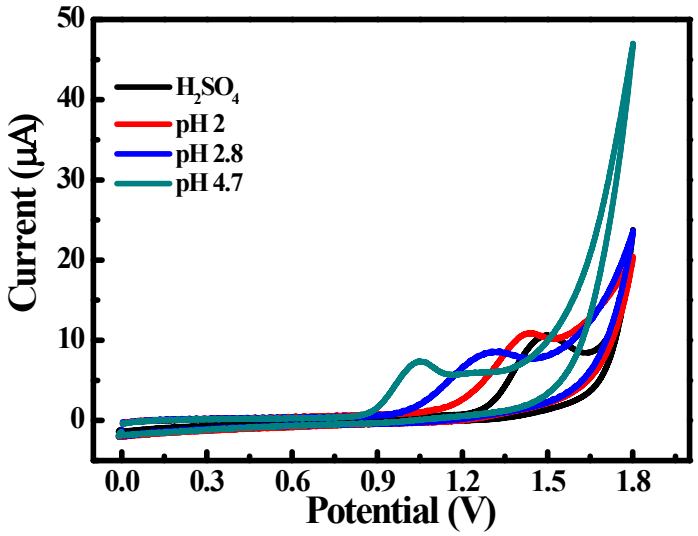

Figure S1. CV curves of 132 μM MEC on SDS/Fe_2O_3 NCs –SPEs in different pHs at scan rate 0.05 Vs^{-1}.

Table S1. Accuracy of the proposed voltammetric method

Amount taken [µM]	Amount added [µM]	Total Amount Found [µM]	% Recovery ± SD[a]
10	5	14.79	97.63± 2.61
10	10	19.61	98.08±1.50
10	15	24.13	96.51±3.09

Table S2. Inter- and Intra-day precision of the proposed method

Conc. [µM]	Intra-day [a]RSD %	Inter-day [b]RSD%
10	2.54	2.94
25	1.45	2.08
50	2.99	2.68

[a] average of 6 determinations
[b] average of 18 determinations over 3 days

Table S3. Robustness of the proposed method

Experimental parameter	**Recovery (%) ± SD[a]**
Optimal parameters	99.84 ± 1.14
Starting Potential	
-0.02	99.76 ± 1.68
0.02	97.66 ± 2.73
Modulation Amplitude	
0.02505	99.08 ± 1.07
0.02495	97.82 ± 2.85
Modulation Time	
0.0495	99.61 ± 1.82
0.0505	98.32 ± 2.86
Step Potential	
0.0495	97.51 ± 1.87
0.0505	99.61 ± 2.69
Interval Time	
0.495	100.93 ± 2.76
0.505	99.01 ± 2.81

a average of 3 determinations

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