Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Preparing Electrochemical Active Hierarchically Porous Carbons for Detecting Nitrite in Drinkable Water

Baojun Ding, Hong Wang, Shengyang Tao*, Yuchao Wang and Jieshan Qiu
Department of Chemistry, Dalian University of Technology, Dalian, Liaoning 116024, China.

* Corresponding author. Tel: +86-411-84986035. E-mail: taosy@dlut.edu.cn

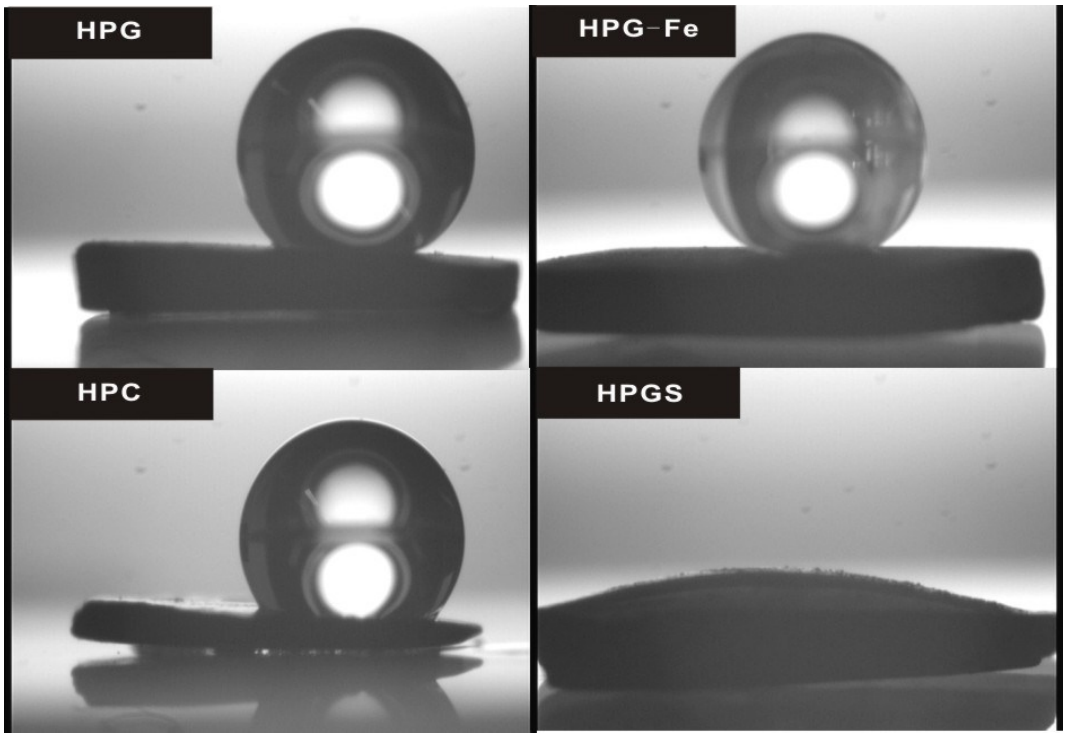

Fig. S1 The images of the water contact angles.

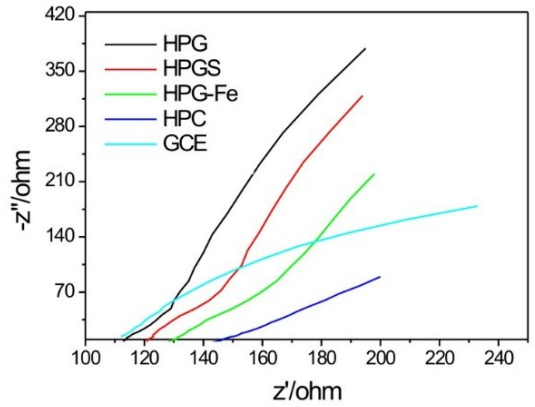

Fig. S2 The magnifying image of low Nyquist plot part.

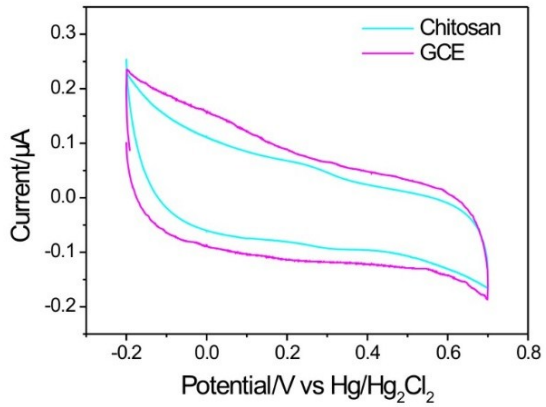

Fig. S3 CVs of chitosan electrode and bare GCE in 0.1 M KCl.

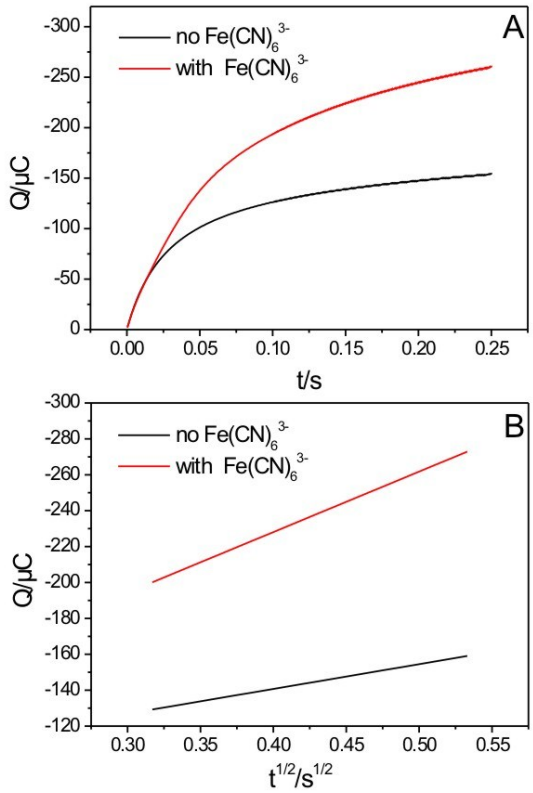

Fig. S4 (A) Chronocoulometric response curves in the absence and presence of 10nM $Fe(CN)_6^{3-}$ in 0.1 M KCl. **(B)** The corresponding Q-$t^{1/2}$ plots. The surface excess of $Fe(CN)_6^{3-}$ could be calculated based on the integrated Cottrell equation,[1]

$$Q = \frac{2nFAD_0^{1/2}c_0^*}{\pi^{1/2}}t^{1/2} + Q_{dl} + nFA\Gamma_0$$

where Q_{dl} is the capacitive charge, and Γ is the surface excess. Other symbols have their usual meaning. The surface excess of $Fe(CN)_6^{3-}$ was calculated as being 1.153×10^{-9} mol/cm^2.

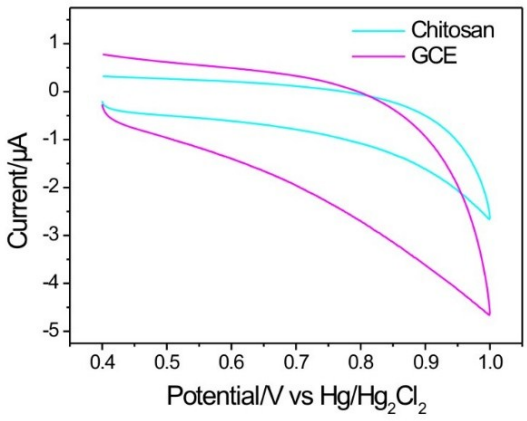

Fig. S5 CVs of chitosan electrode and bare GCE in 0.1 M PBS buffer solution (PH=7).

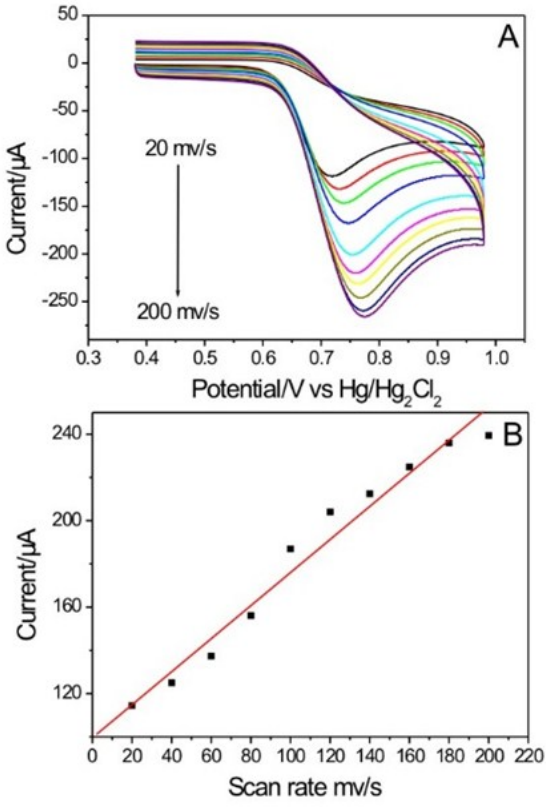

Fig. S6 (A) CVs of the integrated HPG electrode in 3.5mM nitrite at a scan rate ranging from 20 to 200 mV s^{-1}. **(B)** The plot of peak current versus scan rates. The current was proportional to scan rate and the corresponding linearity equation is I(μA)=0.7647υ (mv/s)+99.54, suggesting that the electrode reactions of nitrite were predominantly a surface-controlled processes on the HPG electrode.

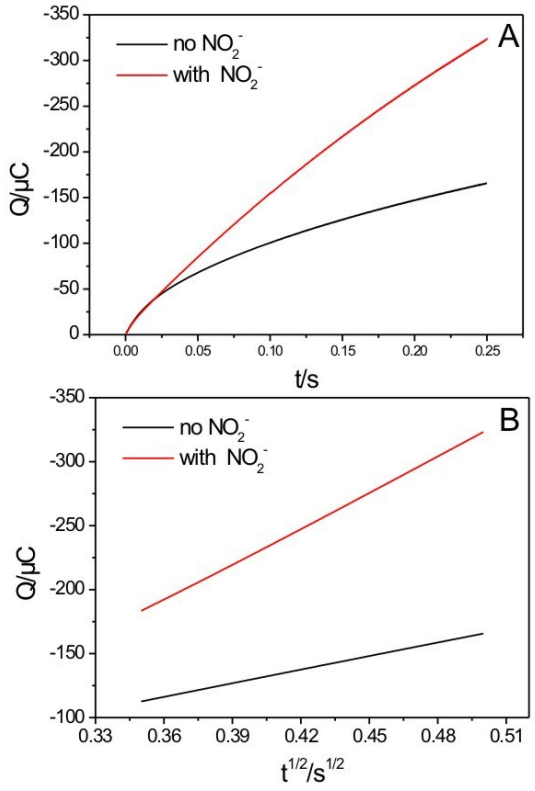

Fig. S7 (A) Chronocoulometric response curves in the absence and presence of 10mM NO_2^- in 0.1 M PBS buffer solution (PH=7). **(B)** The corresponding Q-$t^{1/2}$ plots. The surface excess of nitrite was calculated as being 9.844×10^{-9} mol/cm^2 with the same method as Fig. S4

Table S1 Comparison of several electrochemical sensors for nitrite determination.

modified electrode	PH	detection range (mM)	LOD (μM)	determination in real samples	ref
CuO/graphite electrode	4.0	0.01-1.25	0.6	–	2
CDP-GS-MWCNTs /GCE	6.0	0.005-6.75	1.65	River water	3
CTAB-GO/GCE	7.0	0.005-0.8	1.5	Urine	4
GO-COOLa/GCE	5.0	0.001-2.75	0.07	Urine and Serum	5
La-MWCNTs/GCE	6.0	0.0004-0.71	0.13	Urine and Serum	6
CR–GO/GCE	5.0	0.0089-0.167	1.0	river water, tap water and rain water	7
Pt-PANI-GE/GCE	7.2	0.0004-0.99	0.13	tap water	8
HPG electrode	7.0	0.2-0.8 2-10	8.1	tap water，lake water，mineral water，juice，pure milk	this work

Abbreviations:

LOD: limit of detection; CuO: copper oxide; CDP: cross linked cyclodextrin; GS: graphene sheets; MWCNT: multiwalled carbon nanotubes; CTAB-GO: Hexadecyl trimethyl ammonium bromide functionalized grapheme oxide; GO-COOLa: carboxylated graphene oxide/Lanthanum; CR-GO: chemically reduced graphene oxide; Pt-PANI-GE: Pt-Polyaniline-graphene nanocomposites.

Notes and references

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