

A novel electrochemical preparation of gold nanoparticles decorated on reduced graphene oxide-fullerene composite for highly sensitive electrochemical detection of nitrite†

Chellakannu Rajkumar, Balamurugan Thirumalraj, Shen-Ming Chen* and Selvakumar Palanisamy^a

¹Electroanalysis and Bioelectrochemistry Lab, Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, No. 1, Section 3, Chung-Hsiao East Road, Taipei 106, Taiwan, ROC.

*E-mail: smchen78@ms15.hinet.net; Fax: +886-2-27025238; Tel: +886-2-27017147

Supporting information

Table ST1 Comparison of electroanalytical performance of RGO-C60/AuNPs modified electrode with previously reported modified electrodes for detection of nitrite.

Modified electrode	Detection method	E _{app} (V)	pH	LOD (μM)	Response range (μM)	Ref.
CRGO/GCE	Amperometry	0.8	5.0	1.0	up to 167.0	12
AuNPs/Ch/GCE	DPV	–	4.0	0.1	up to 750.0	26
Gr-PANI-AuNPs/GCE	Amperometry	0.8	5.0	0.01	up to 205.8	27
AuNPs/ZnO/MWCNTs/GCE	Amperometry	0.75	7.0	0.4	up to 400.0	28
Gr/AuNPs/GCE	Amperometry	0.89	3.0	0.016	up to 5100	29
AuNPs/CPE	Amperometry	0.8	7.0	0.093	up to 30.0	34
GR/β-CD/SPCE	Amperometry	0.81	5.0	0.26	up to 2150.0	35
AGR/SPCE	Amperometry	0.8	4.5	0.038	up to 16400.0	36
Gr/PdNPs/GCE	Amperometry	0.8	4.1	0.01564	up to 108.0	37
RGO-MWCNTs/GCE	DPV	–	7.0	25.0	up to 6060.0	38
GR/PPy/CS/GCE	Amperometry	0.9	4.0	0.1	up to 722.0	39
RGO-C60/AuNPs/GCE	Amperometry	0.807	5.0	0.013 ± 0.003	up to 1175.32	This work

Abbreviations;

E_{app} – working potential, LOD – limit of detection, GRGO – chemically reduced graphene oxide, GCE – glassy carbon electrode, AuNPs –gold nanoparticles, Ch – choline, DPV – differential pulse voltammetry, Gr – graphene, PANI – polyaniline, MWCNTs – multiwalled carbon nanotubes, CPE – carbon paste electrode, GR – graphite, β-CD – β-cyclodextrin, SPCE – screen printed carbon electrode, AGR – activated graphite, PdNPs – palladium nanoparticles, RGO – reduced graphene oxide, PPy – polypyrrole, CS – chitosan

Table ST2 Determination of nitrite in water samples using RGO-C60/AuNPs modified electrode by amperometry. (The relative standard deviation (RSD) is related for n=3)

Sample	Spiked (μM)	Found (μM)	Recovery (%)	RSD
Tap water	1.0	0.984	98.4	4.6
	2.0	1.972	98.6	4.3
Drinking water	1.0	0.989	98.9	3.6
	2.0	1.986	99.3	3.5
River water	1.0	1.012	101.2	5.1
	2.0	2.027	101.4	4.9