



Supporting Information

for

A nonenzymatic reduced graphene oxide-based nanosensor for parathion

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Additional figures and tables

Table S1: Chemical sample table indicating corresponding CAS, supplier and other details.

Component	CAS Number	Supplier	Features
Parathion PESTANAL	56-38-2	Merck, India (45607)	Molecular Weight: 291.26 Analytical Standard
Graphite Powder	7782-42-5	Thermo Fisher Scientific - Fisher Chemicals (G090060)	Molecular Weight (g/mol) 12.011 99% Pure
Sulfuric Acid	7664-93-9	Thermo Fisher Scientific - Qualigens (Q37365)	N/50 Solution
Nitric Acid	7697-37-2	Thermo Fisher Scientific - Qualigens (Q29195)	1.42 (70%) Product Grade: SQ, ER
Hydrogen Peroxide	7722-84-1	Thermo Fisher Scientific - Qualigens (Q15465)	30% Product Grade: SQ, ER
Sodium Dihydrogen Phosphate Dihydrate	13472-35-0	Merck, India SKU: 1063420250	Molecular Weight: 156.01 analysis EMSURE®
Sodium Acetate Buffer	126-96-5	Merck, India SKU: S7899	pH 5.2 ± 0.1 (25 °C), for molecular biology, 3 M, 0.2 µm filtered

Table S2: Experimental sample table for composition analysis using binding energies of GO and RGO obtained by XPS.

Sample	C 1s				O 1s		
	C–OH	C–C	C–O–C	C=O	–C=O	C–OH	–OH
GO	284.69 eV (30.9 %)	284.84 eV (31.2 %)	286.65 eV (29.2 %)	288.21 eV (8.6 %)	531.38 eV (25.9 %)	532.51 eV (65.7 %)	533.21 eV (8.4 %)
ERGO	284.73 eV (35.1 %)	285.96 eV (15.9 %)	292.92 eV (32.3 %)		531.30 eV (34.9 %)	532.86 eV (55.9 %)	536.22 eV (9.2 %)

Table S3: Experimental sample table for modified glassy carbon electrode electrochemical characteristics.

Sample	R_s (Ω)	R_{ct} (Ω)	Cdl (F)	W [$\Omega \cdot \text{sqrt}(\text{Hz})$] ⁻¹
Bare GCE	0.0872	4.692	1.96E-04	0.06072
GO/GCE	0.7326	6.938	1.06E-02	0.06176
ERGO/GCE	0.6013	1.618	1.96E-02	0.08136

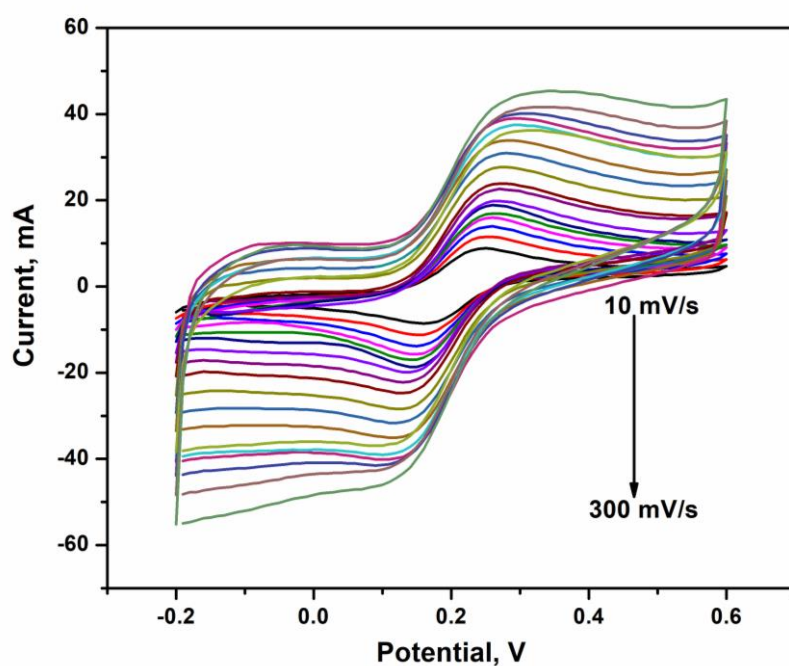


Figure S1: Cyclic voltammograms of ERGO/GCE at different scan rates (10–300 mV/s) in 1.0 mM $K_3Fe(CN)_6$ solution with 1 M KCl.

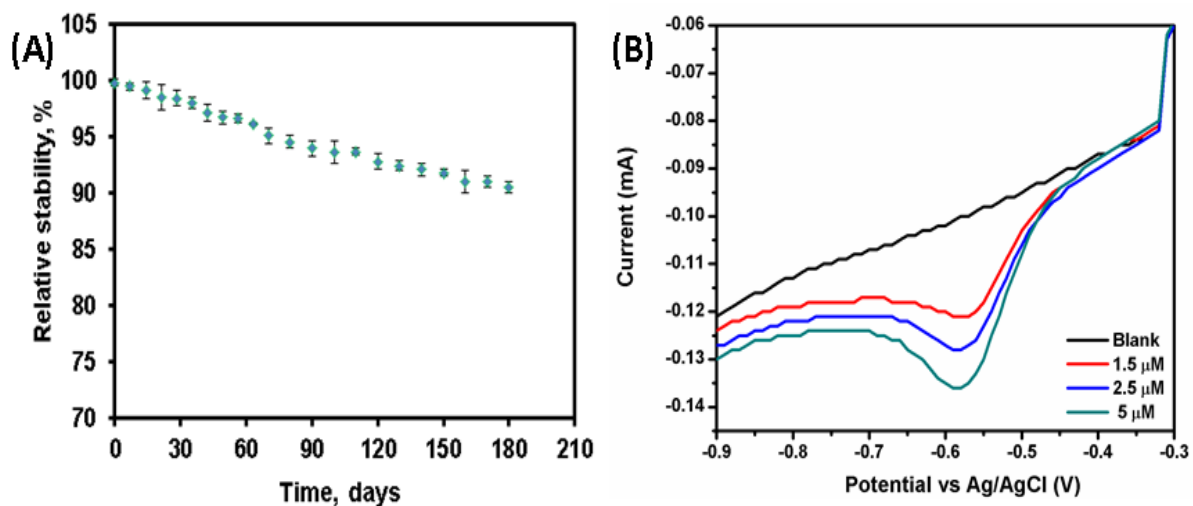


Figure S2: (A) Storage stability of the proposed sensing matrix (ERGO/GCE). (B) SWV of PT (1.5, 2.5, 5 μM) added in groundwater.

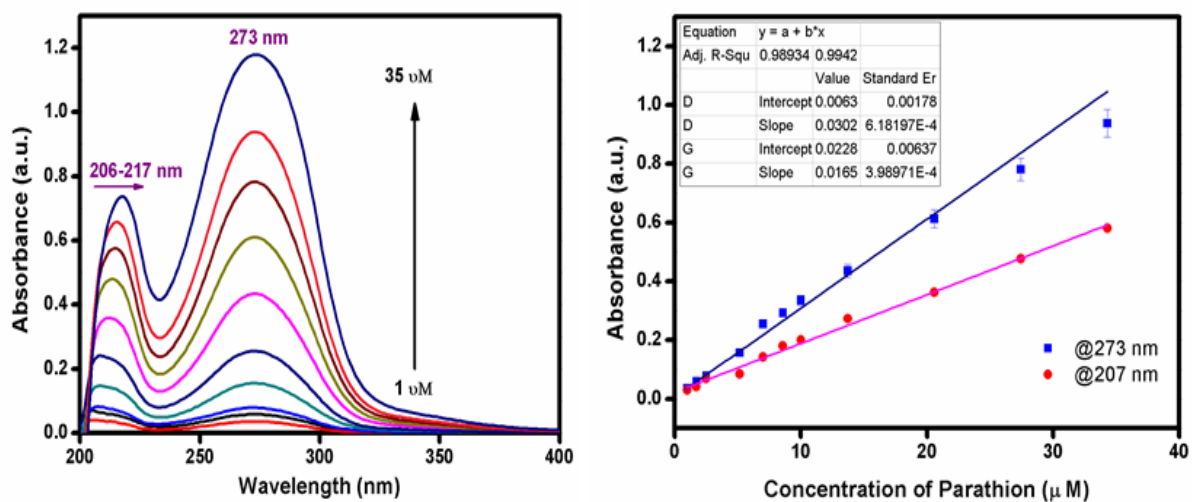


Figure S3: (A) Absorption spectra of parathion and (B) corresponding calibration plot.