

Supplementary Information

A Chitosan/rGO/Fe₃O₄-Modified Electrode for Sensitive Cholesterol

Determination in Blood Serum

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Table S1. Elemental composition of the pure chitosan, CS/rGO-modified Cu-PCB electrode, CS/rGO/Fe₃O₄-modified C-PCB electrode with Fe₃O₄ 75 mg/L, CS/rGO/Fe₃O₄-modified Cu-PCB electrode with Fe₃O₄ 90 mg/L, CS/rGO/Fe₃O₄-modified Cu-PCB electrode with Fe₃O₄ 105 mg/L, and CS/rGO/Fe₃O₄-modified Cu-PCB electrode with Fe₃O₄ 120 mg/L

No	Samples	Elemental Composition (%)			Sum (%)
		C	O	Fe	
1	Pure Chitosan	52.8	47.2	-	100
2	CS/rGO-modified Cu-PCB electrode	76.4	23.6	-	100
3	CS/rGO/Fe ₃ O ₄ -modified Cu-PCB electrode with Fe ₃ O ₄ 75 mg/L	48.3	42.3	9.4	100
4	CS/rGO/Fe ₃ O ₄ -modified Cu-PCB electrode with Fe ₃ O ₄ 90 mg/L	45.1	42.3	12.6	100
5	CS/rGO/Fe ₃ O ₄ -modified Cu-PCB electrode with Fe ₃ O ₄ 105 mg/L	41.9	42.4	15.7	100
6	CS/rGO/Fe ₃ O ₄ -modified Cu-PCB electrode with Fe ₃ O ₄ 120 mg/L	39.1	42.6	18.3	100

Table S2. AFM characteristics of CS/rGO/Fe₃O₄-modified Cu-PCB electrode,

Fe ₃ O ₄ (mg/L)	Sa (nm)	RMS (Sq, nm)	Skew (Ssk)	Excess Kurtosis (Sku)
75	1.99	2.84	0.61	1.83
90	7.64	12.74	1.24	2.7
105	9.78	24.47	1.47	3.01
120	24.53	32.72	3.19	5.6

Table S3. Reproducibility performance of the developed electrode

Electrode	<i>I</i> _{pa} (A)	<i>I</i> _{pc} (A)	<i>E</i> _{pa} (V)	<i>E</i> _{pc} (V)	ΔE_p
1	0.000522	-0.000476	0.24	0.11	0.13
2	0.000516	-0.000469	0.24	0.11	0.13
3	0.000524	-0.000500	0.24	0.11	0.13
4	0.000520	-0.000474	0.24	0.11	0.13
5	0.000520	-0.000472	0.24	0.11	0.13

Table S4. Long-term stability performance of the developed electrode

Day	<i>I</i> _{pa} (A)	Retention (%)
0	0.000522	100
7	0.000505	96.7
14	0.000492	94.3
21	0.000478	91.6
28	0.000460	88.1

Table S5. Selectivity performance of the developed electrode

Sample	I_{pa} (A)	I_{pc} (A)	E_{pa} (V)	E_{pc} (V)	ΔE_p
Ch	0,000522	-0,000476	0,24	0,11	0,13
Ch + Glu	0,000515	-0,000468	0,24	0,11	0,13
Ch + Tri	0,000508	-0,000462	0,25	0,11	0,14
Ch + UA	0,000512	-0,000465	0,24	0,1	0,14
Ch + Urea	0,000550	-0,000459	0,25	0,1	0,15
Ch + All (mixture)	0,000496	-0,000450	0,25	0,1	0,15

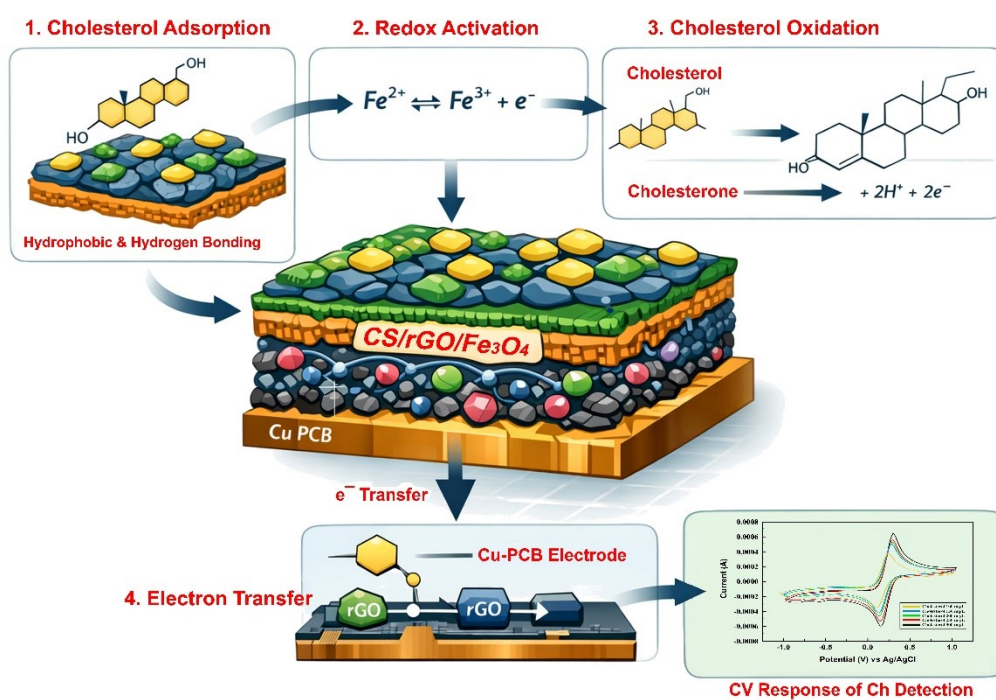


Fig. S1 The schematic representation of reaction mechanism of cholesterol detection using CS/rGO/Fe₃O₄-modified Cu-PCB electrode