

Supplementary Material

Electrochemical Behavior of β -Cyclodextrin-Ni-MOF-74/Reduced Graphene Oxide Sensors for the Ultrasensitive Detection of Rutin

Li Zhang ^{1,2,3,4,†}, Mengting Zhang ^{5,†}, Pingping Yang ¹, Yin Zhang ⁶, Junjie Fei ^{4,5,*}
and Yixi Xie ^{2,3,5,*}

¹Hunan Engineering Laboratory for Preparation Technology of Polyvinyl Alcohol Fiber Material,
College of Chemistry and Materials Engineering, Huaihua University, Huaihua 418000, China

²Key Laboratory of Research and Utilization of Ethnomedicinal Plant Resources of Hunan Province,
Huaihua University, Huaihua 418008, China

³Hunan Provincial Higher Education Key Laboratory of Intensive Processing Research on Mountain
Ecological Food, Huaihua 418008, China

⁴Key Laboratory of Environmentally Friendly Chemistry and Applications of Ministry of Education,
College of Chemistry, Xiangtan University, Xiangtan 411105, China

⁵Key Laboratory for Green Organic Synthesis and Application of Hunan Province, Xiangtan
University, Xiangtan 411105, China

⁶Junior Education Department, Changsha Normal University, Changsha 410100, China

*Correspondence: fei_junjie@xtu.edu.cn (J.F.); xieyixige@xtu.edu.cn (Y.X.);

Tel.: +86-731-5829-2060 (J.F.)

†These authors contributed equally to this work.

List of Supplementary Tables and Figures:

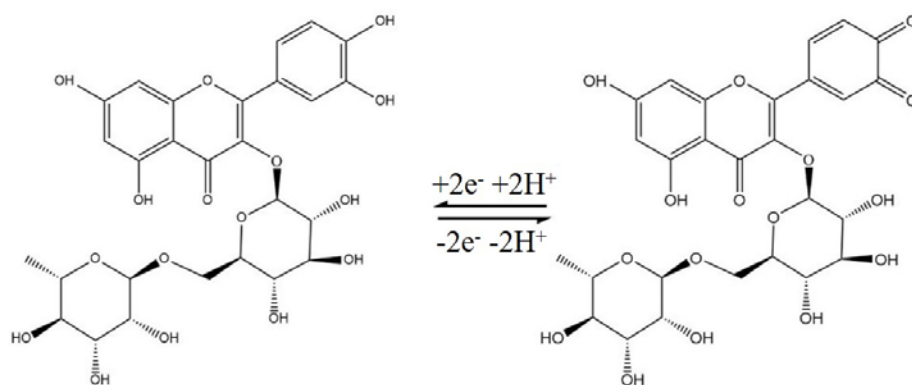
Scheme S1. The reasonable electrochemical reaction mechanism of RU at β -CD-Ni-MOF-74/rGO/GCE.

Figure S1. (A) CVs of β -CD-Ni-MOF-74/rGO/GCE at different pH (from a to k: 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0) in 0.1 M PBS containing 2 μ M RU. (B) The dependence of oxidation peak potential (E_{pa}), formal potential (E^θ), reduction peak potential (E_{pc}) on pH. (C) The linear relationship between redox current (i_{pa} and i_{pc}) and pH.

Figure 2. (A) CVs of β -CD-Ni-MOF-74/rGO/GCE at different scan rates (from a to t: 20, 40, 60, 80, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280, 300, 320, 340, 360, 380, 400 $\text{mV} \cdot \text{s}^{-1}$) in 0.1 M PBS (pH 3.5) containing 2 μ M RU. (B) The dependence of redox peak currents on the scan rates (ν). (C) The dependence of oxidation peak potential on $\ln \nu$.

Figure S3. (A) The DPV response of 1 μ M RU on modified electrodes of different electrodeposition cycles. (B) Influence of accumulation potential on the oxidation peak current of 2 μ M RU. (C) Influence of accumulation time on the oxidation peak current of 2 μ M RU. Accumulation potential: 0.2 V.

Table S1. Determination of RU in actual samples by β -CD-Ni-MOF-74/rGO/GCE sensor ($n=3$).



Scheme S1

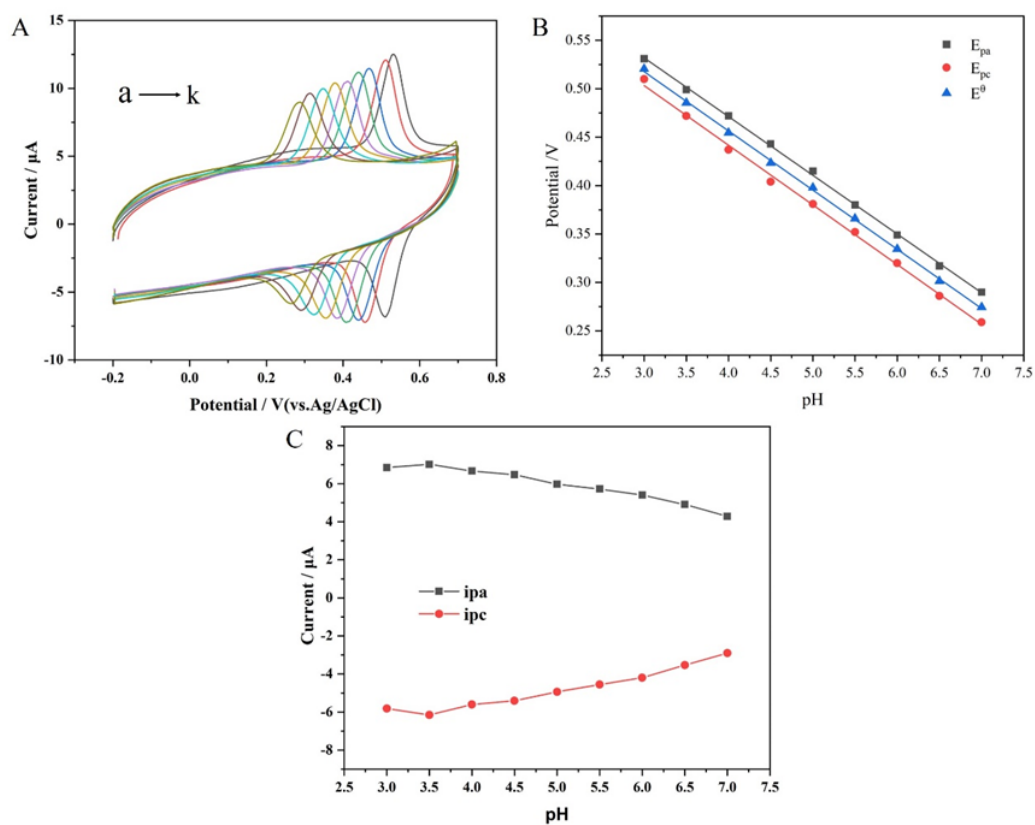


Figure S1

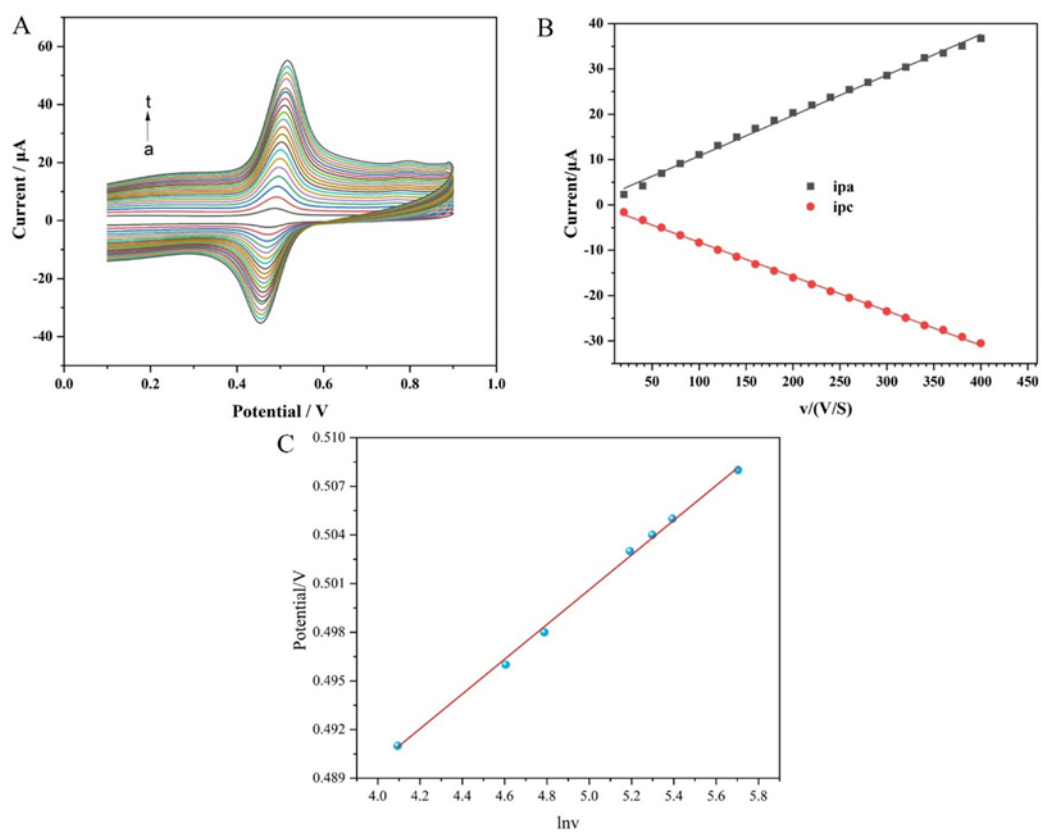


Figure S2

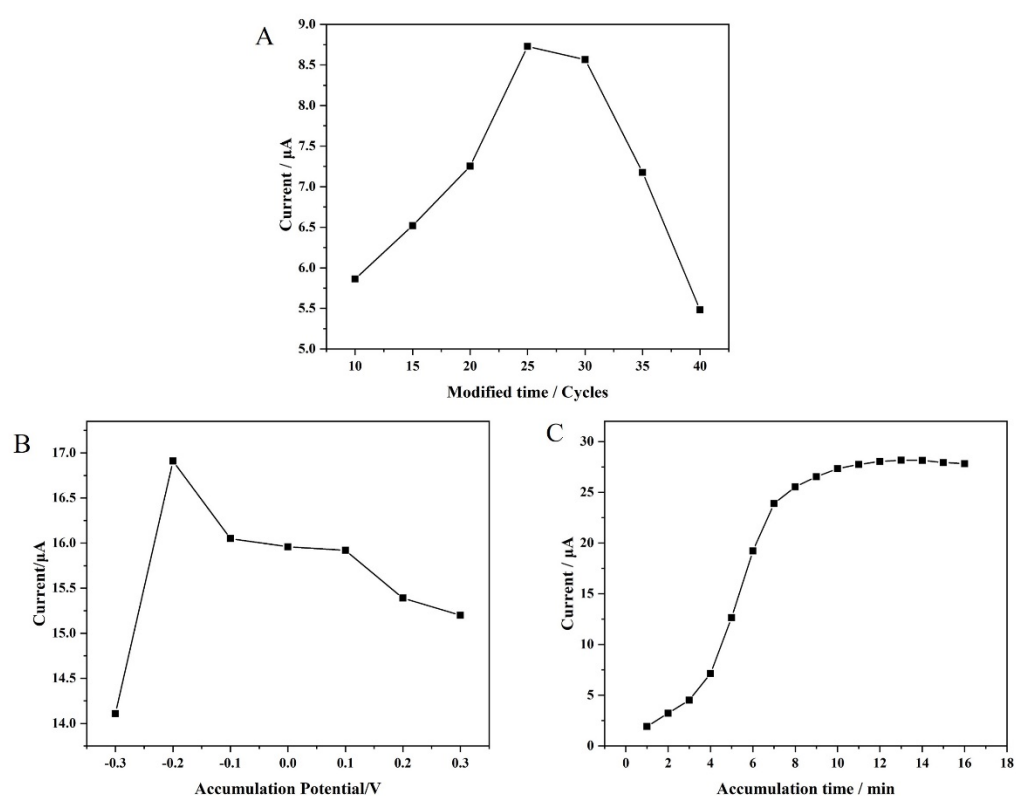


Figure S3

Table S1

	Added (μM)	Founded (μM)	Recovery (%)	RSD (%)
	0	0.055	—	—
rutin	0.05	0.1033	96.4	0.21
tablet	0.05	0.1556	101	0.11
	0.05	0.2075	104.5	0.16