Electrooxidation of 5-Hydroxymethylfurfural and Electroreduction of Nitrobenzene by Hollow CoFeP Cubes/rGO/Ni Foam

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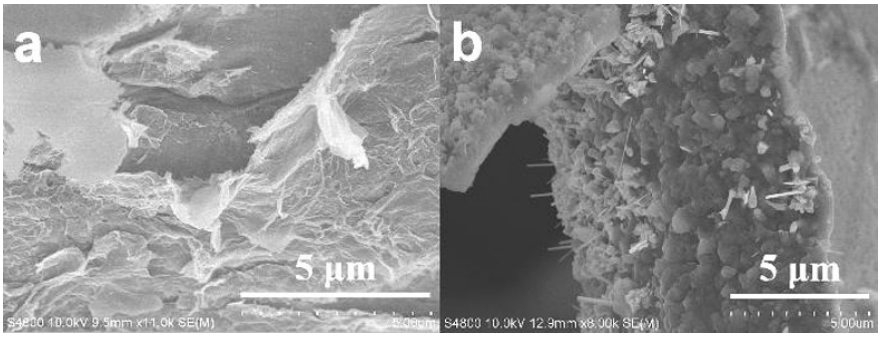

Figure S1. Cross-section SEM images (a, b) of the as-obtained rGO/NF and CoFeP/P-rGO/NF samples.

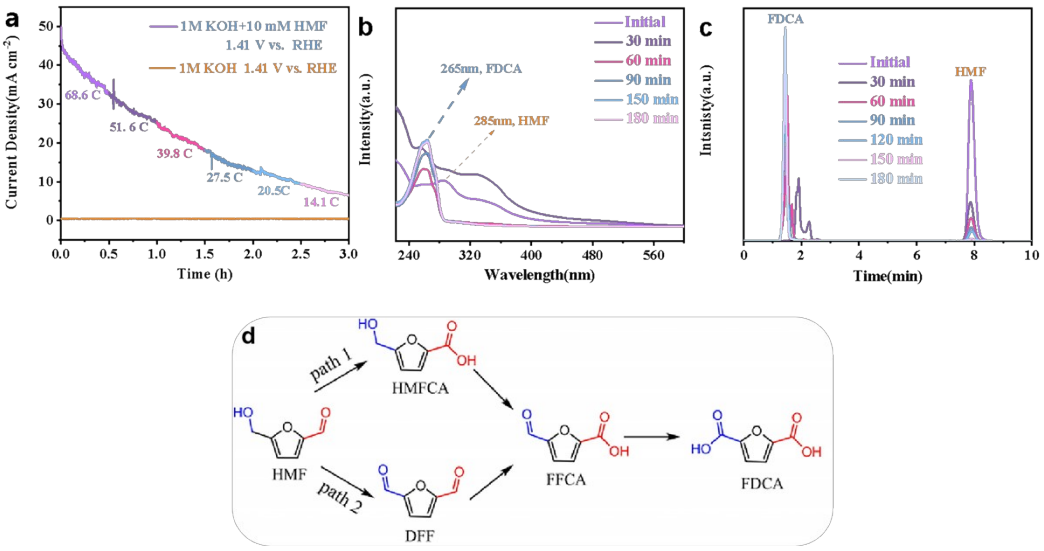

Figure S2. (a) i-t curves of HMFOR; (b ,c) UV-Vis and HPLC chromatograms corresponding i-t process; (d) Possible reaction pathway for electrochemical HMF oxidation to FDCA in alkaline solution.

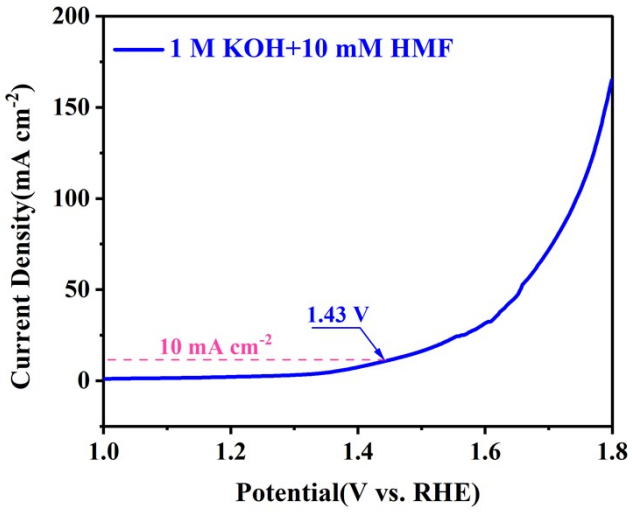

Figure S3. LSV curve of CoFeP/P-rGO/NF acted as a bifunctional catalytst for HMFOR and HER in a dual electrode system without iR compensation.

Table S1. Comparison of HMFOR performance coupled with HER between this work and recent literature in 1 M KOH + 10 mM HMF.

Catalysts	Voltage (10 mA cm^{-2})	FE(%)	Ref.
CoFeP/P-rGO/NF	1.43	100	This work
hp-Ni/NF	1.50	＞97	[1]
NiSe@NiO_X	1.50	＞99	[2]
N-Ni_3S_2- MoO_2/NF	~1.50	94.9	[3]
Ni_3N@C/NF	1.48	~98	[4]
Co-P/CF	＞1.4	90	[5]
CoNW/NF	1.50	95	[6]

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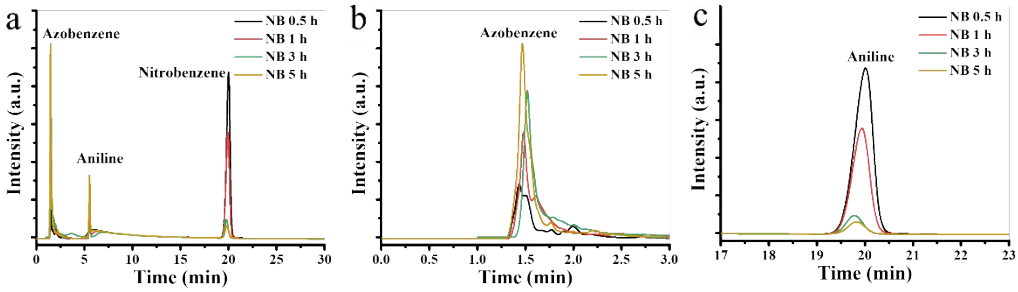

Figure S4. HPLC chromatograms (a,b,c) of NB electroreduction to produce aniline and azobenzene by the as-obtained CoFeP/P-rGO/NF samples.

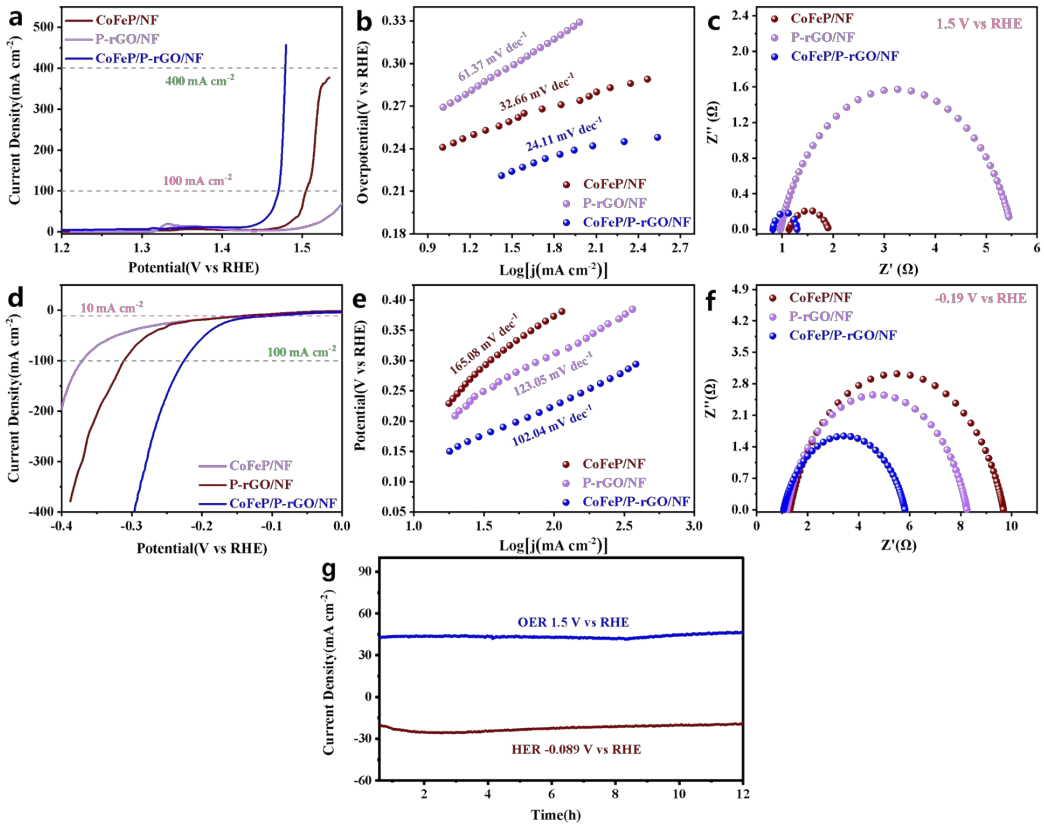

Figure S5. Control experiments of OER (a,b,c) and HER (d,e,f) of the as-obtained CoFeP/P-rGO/NF samples. (a,d) LSV curves; (b,e) Tafel plots; (c,f) EIS plots and (g) I-t curves of CoFeP/P-rGO/NF at 1.5 V vs. RHE and -0.19 V vs. RHE in 1 M KOH.

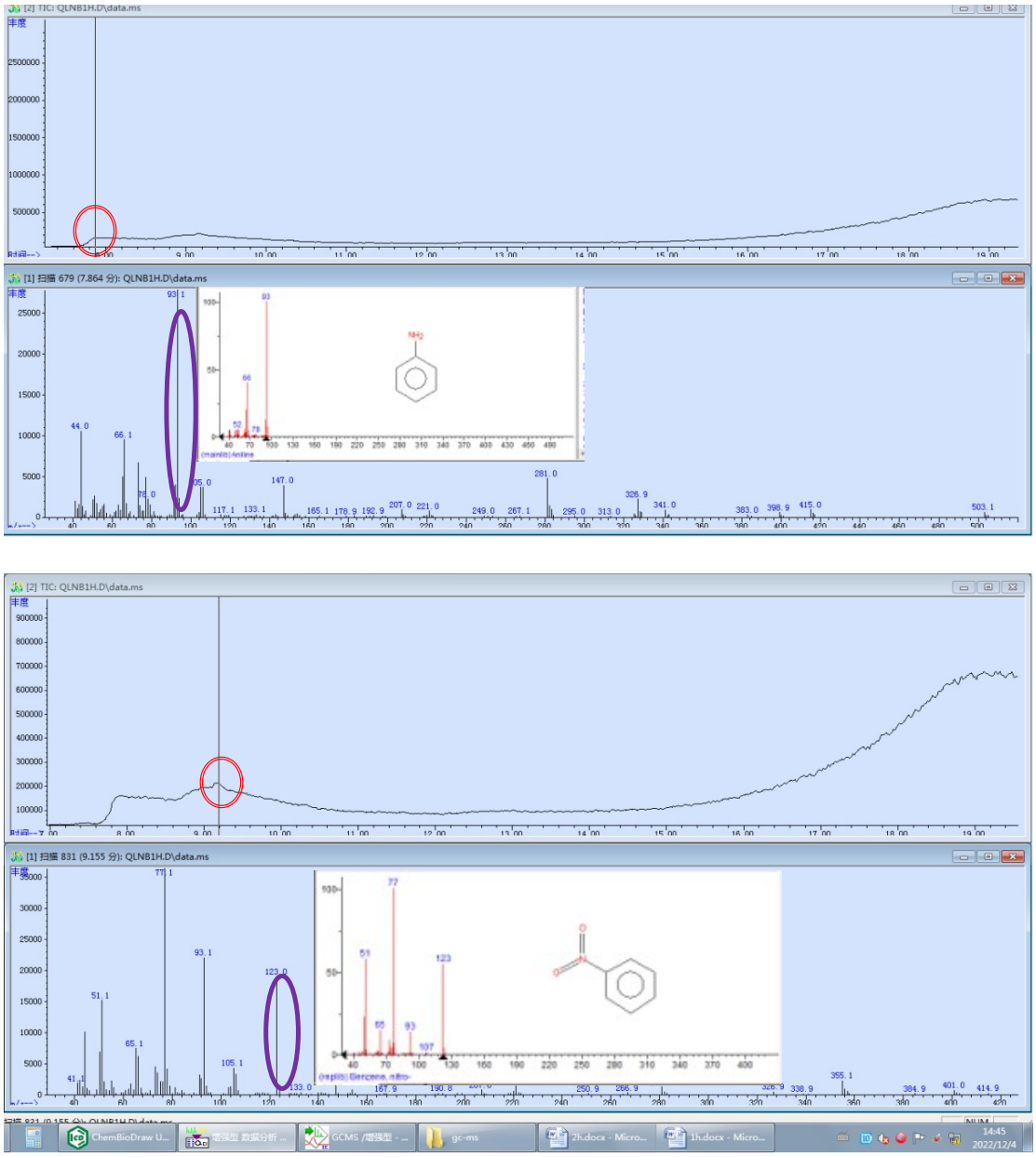

Figure S6. The GC-MS analysis of the products obtained through electrocatalytic reduction for 1 h at -0.2V revealed that the primary product was aniline (AB), along with unreacted NB.

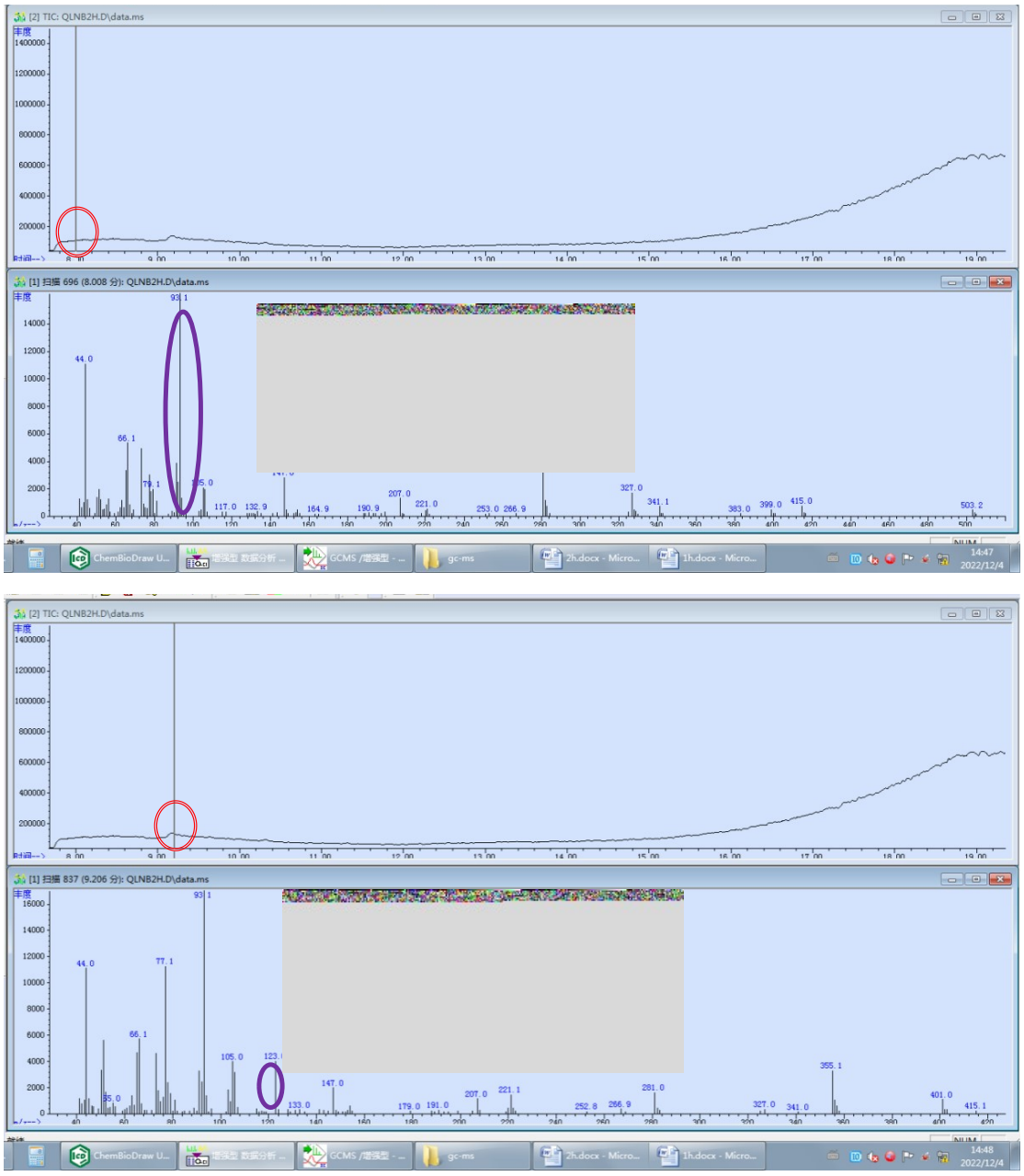

Figure S7. The GC-MS analysis of the product obtained through electrocatalytic reduction for 2 h at -0.2V revealed a gradual decrease in the peak intensity of NB.

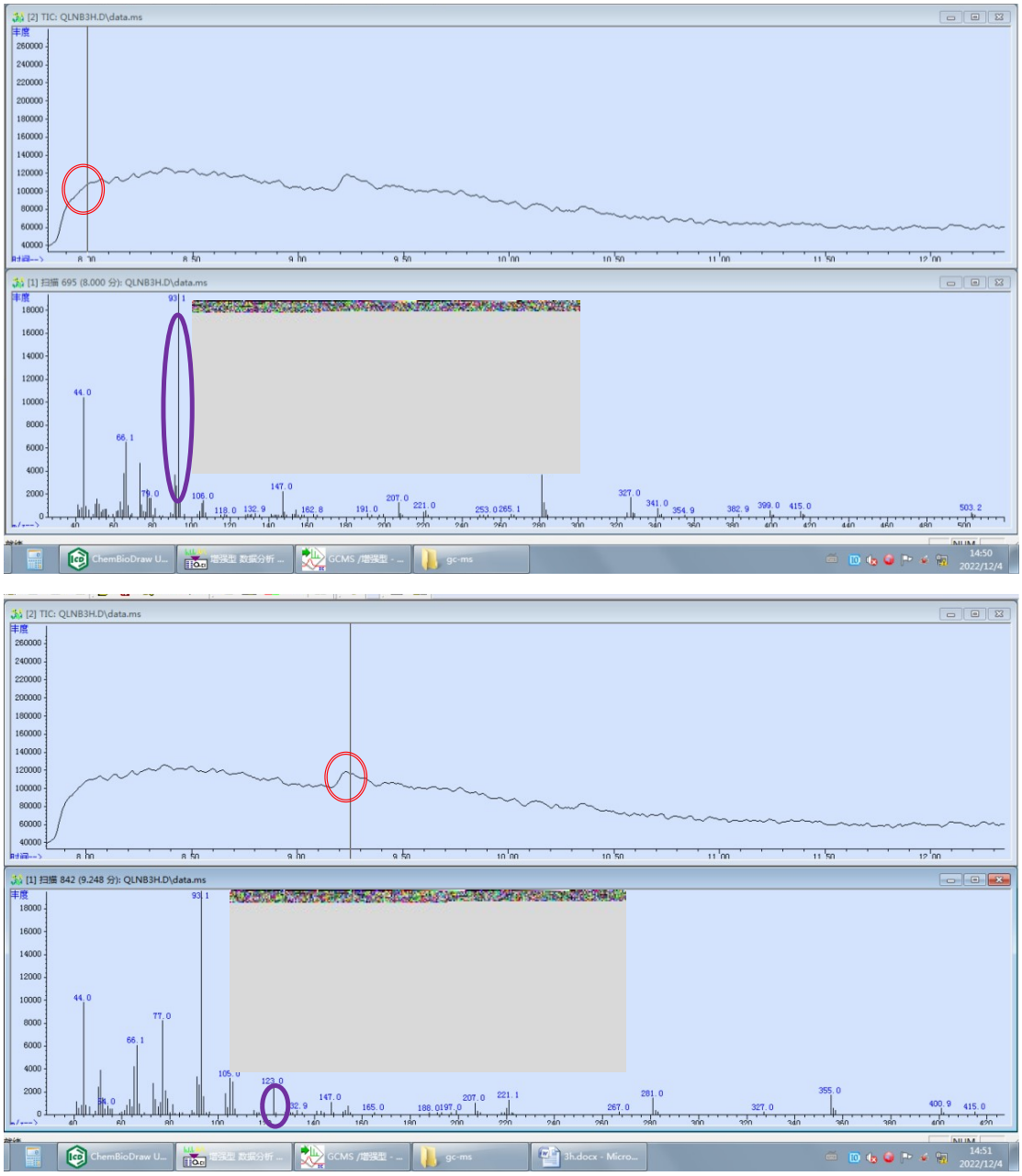

Figure S8. The GC-MS analysis of the product obtained through electrocatalytic reduction for 3 h at -0.2V.

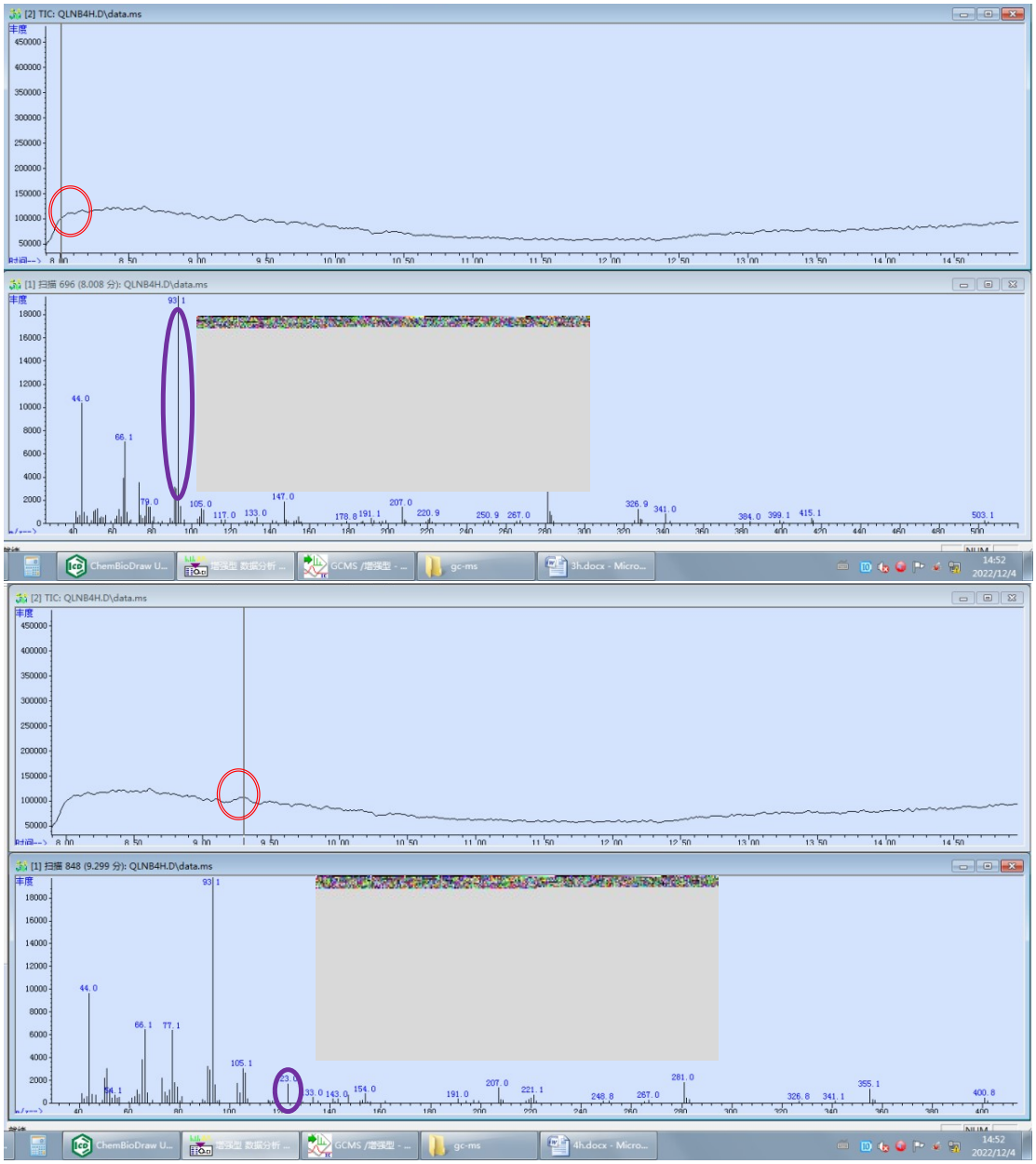

Figure S9. The GC-MS analysis of the product obtained through electrocatalytic reduction for 4 h at -0.2V.

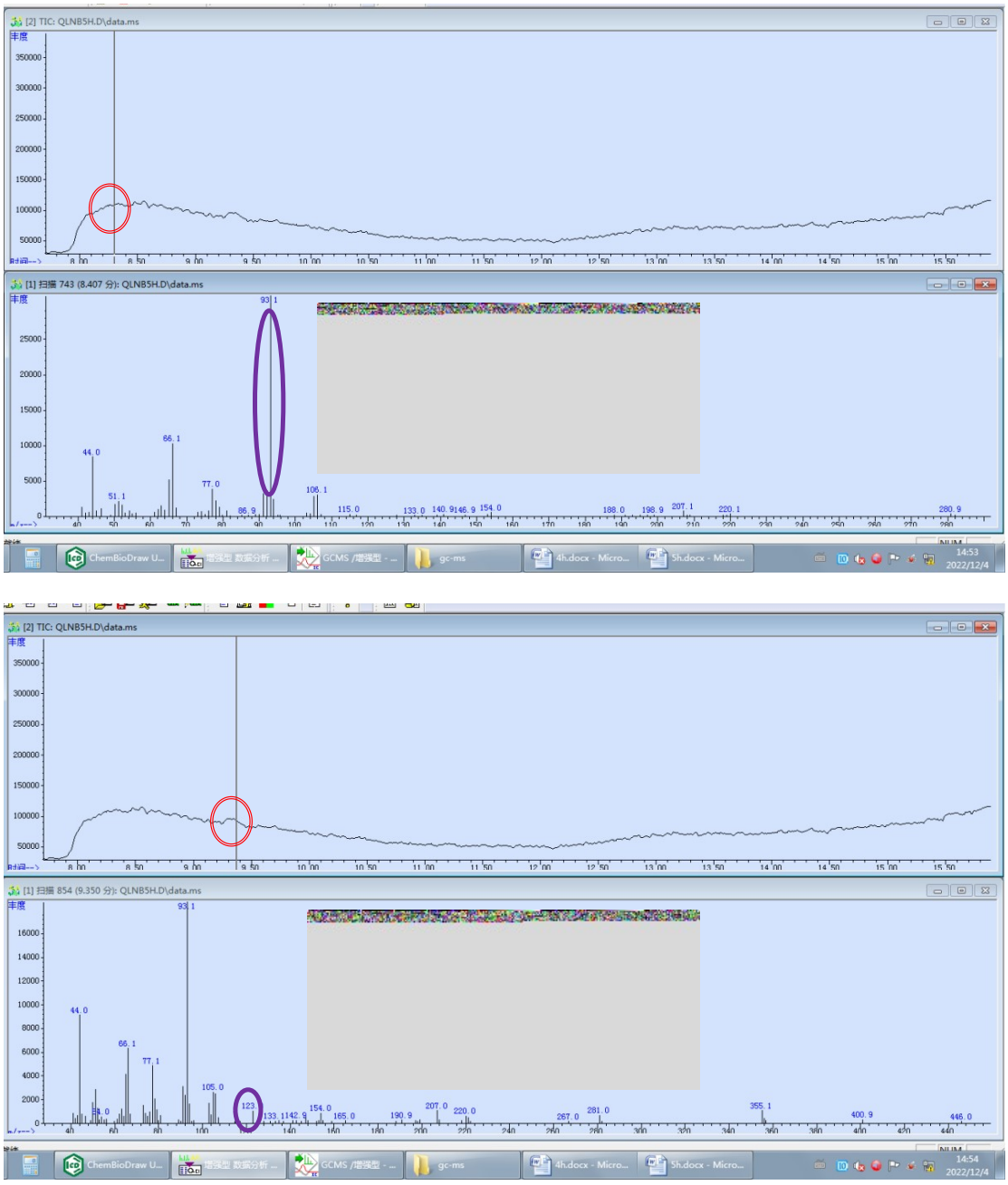

Figure S10. The GC-MS analysis of the product obtained through electrocatalytic reduction for 5 h at -0.2V with a low feature peak for NB.

Table S2. Comparison of overall water splitting performance of reported bifunctional catalysts in 1 M KOH.

Catalysts	Voltage (10 mA cm^{-2})	Ref.
CoFeP/P-rGO/NF	1.48	This work
Mo-CoP/CC	1.56	[6]
S:CoP@NF	1.62	[7]
CoP/C	1.56	[8]
CoP@NPMG	1.58	[9]
CoP@3D MXene	1.58	[10]
Co-P@PC-750	1.60	[11]
Er-doped CoP	1.58	[12]
Cr-FeNiP/NCN	1.5	[13]

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