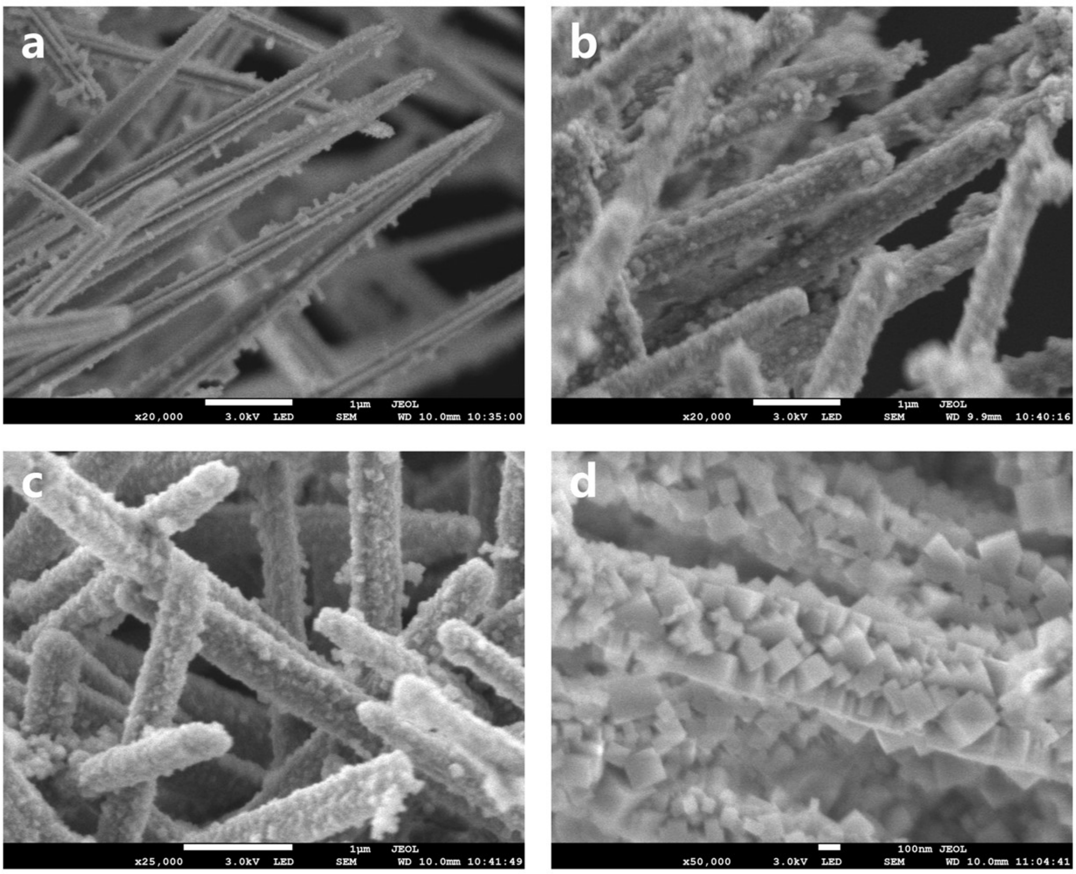
Supplementary Information (SI) for Catalysis Science & Technology.

Supporting Information for

Sulfur-Modified Copper Nanowires Substrate with Prussian Blue Analogues Reconstruction: A Dynamic Electrocatalyst for Biomass-Derived HMF Oxidation

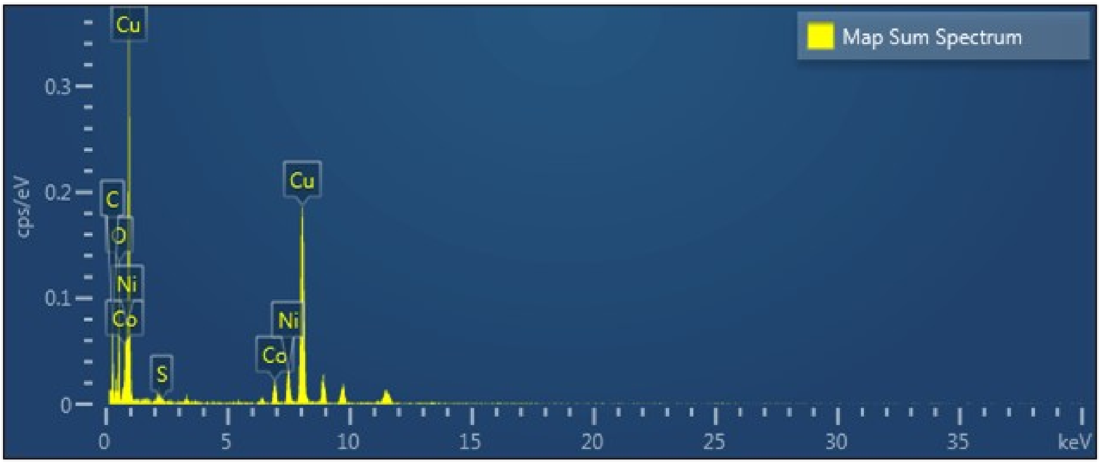
Yifang Fu,Yunliang Li,Bolun Liu,Wang Runwei,Shilun Qiu and Zongtao Zhang*

Supplementary Figures

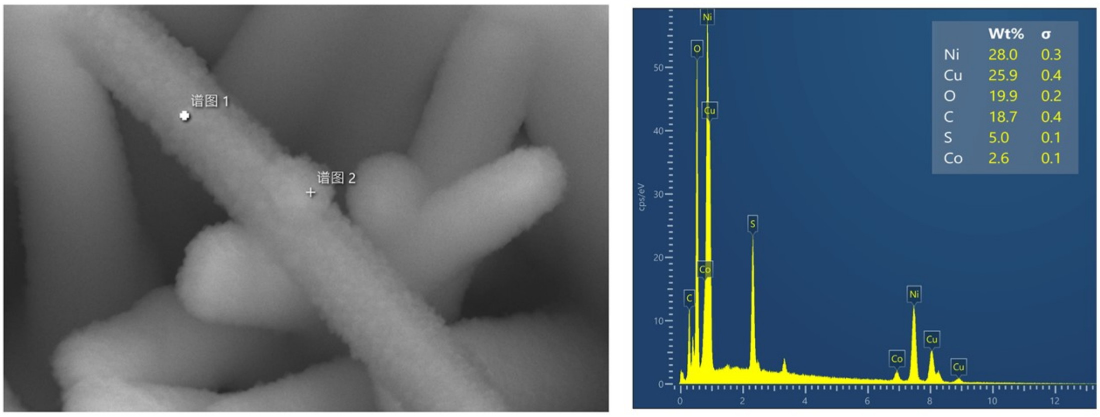


FigS1 a) PBAs loaded on nanowires synthesized in 1M NaOH b) PBAs generated

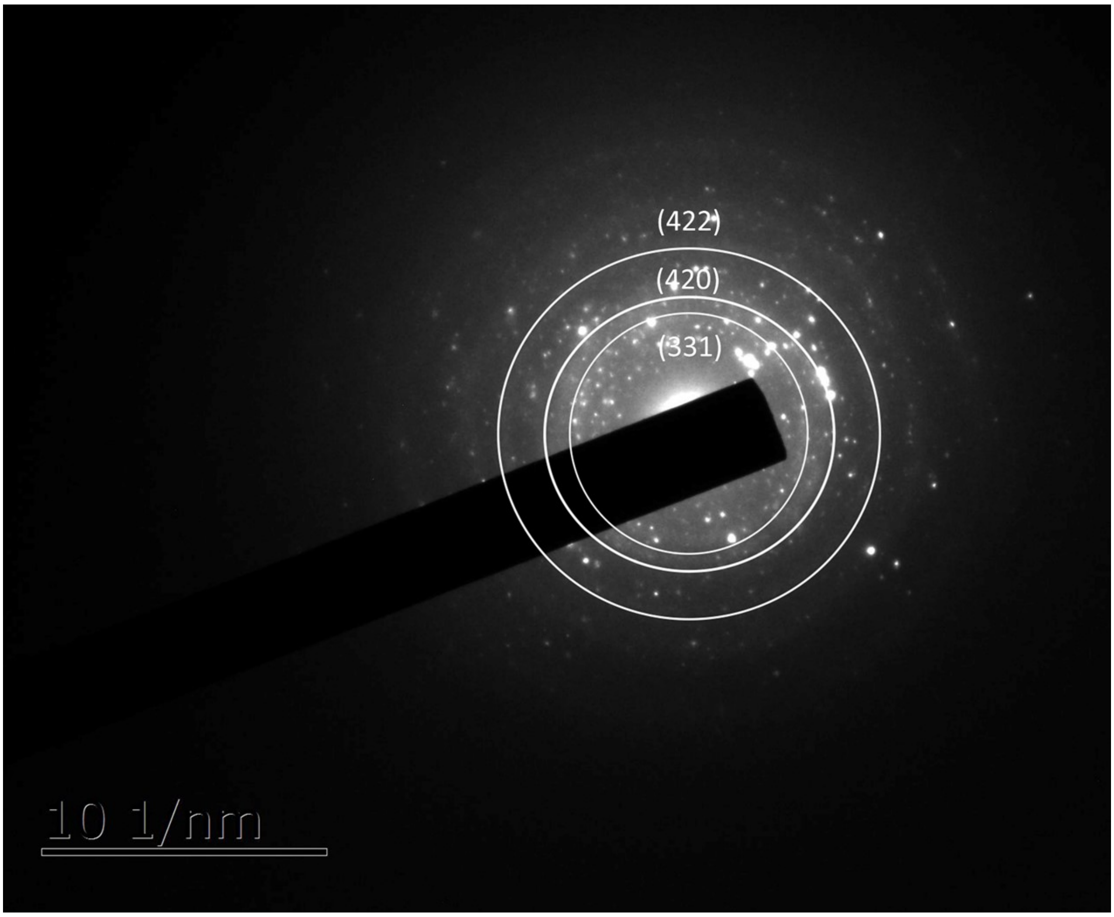
after a reaction time of more than 2 hours c) PBAs with prior deposition of cobalt hydroxide d) Nickel-iron PBAs



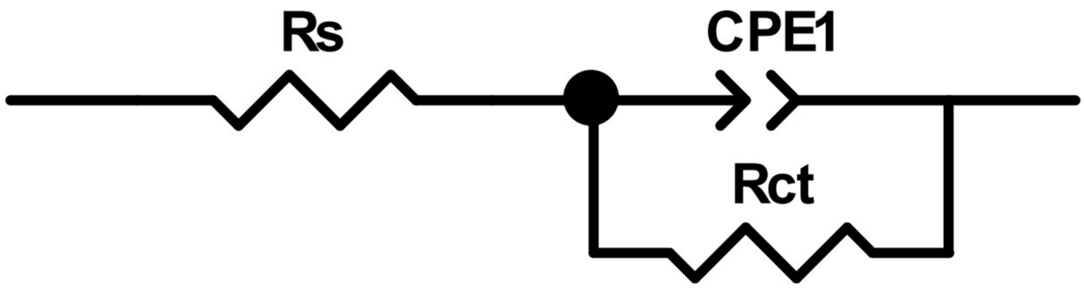
FigS2 TEM-EDX mapping test results and elemental ratios



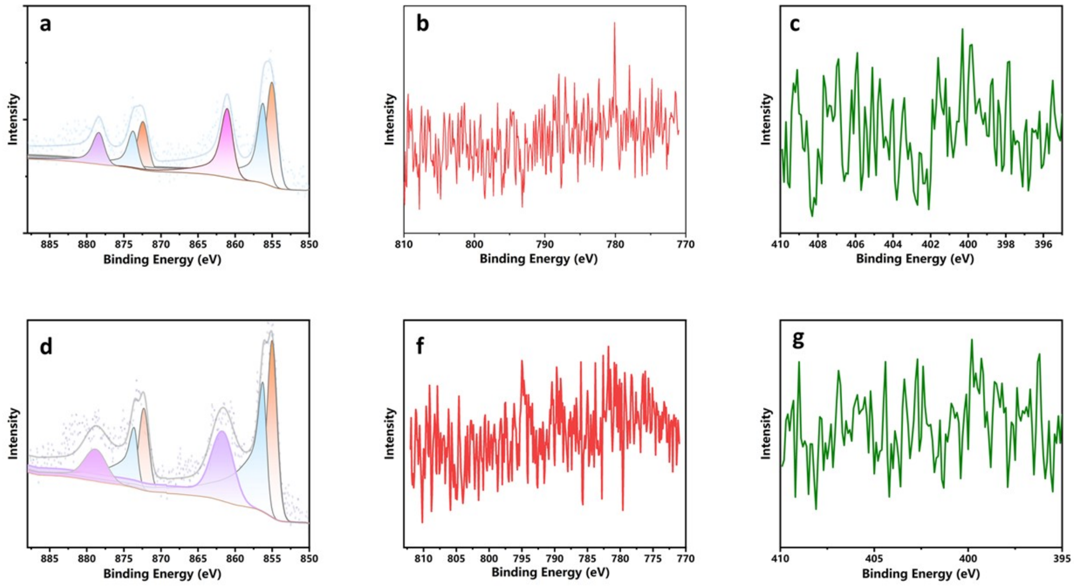
FigS3 SEM-EDS point scanning results and the elemental composition ratios after cycle



FigS4 SAED test results and markings

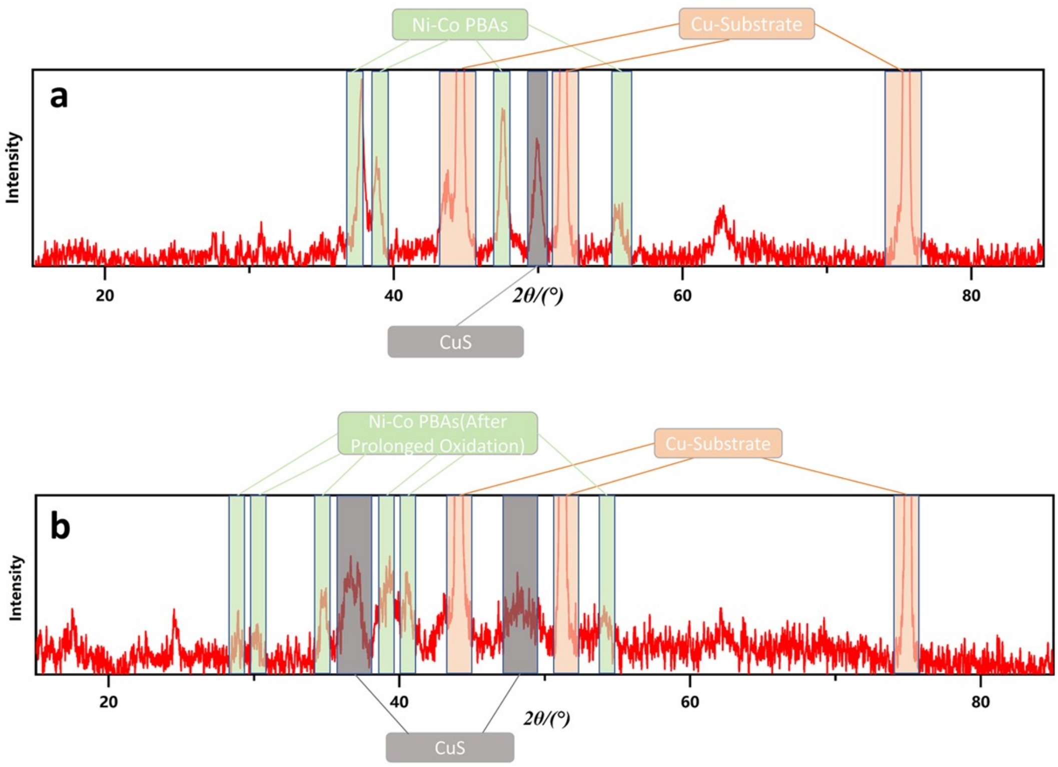


FigS5 EIS equivalent circuit

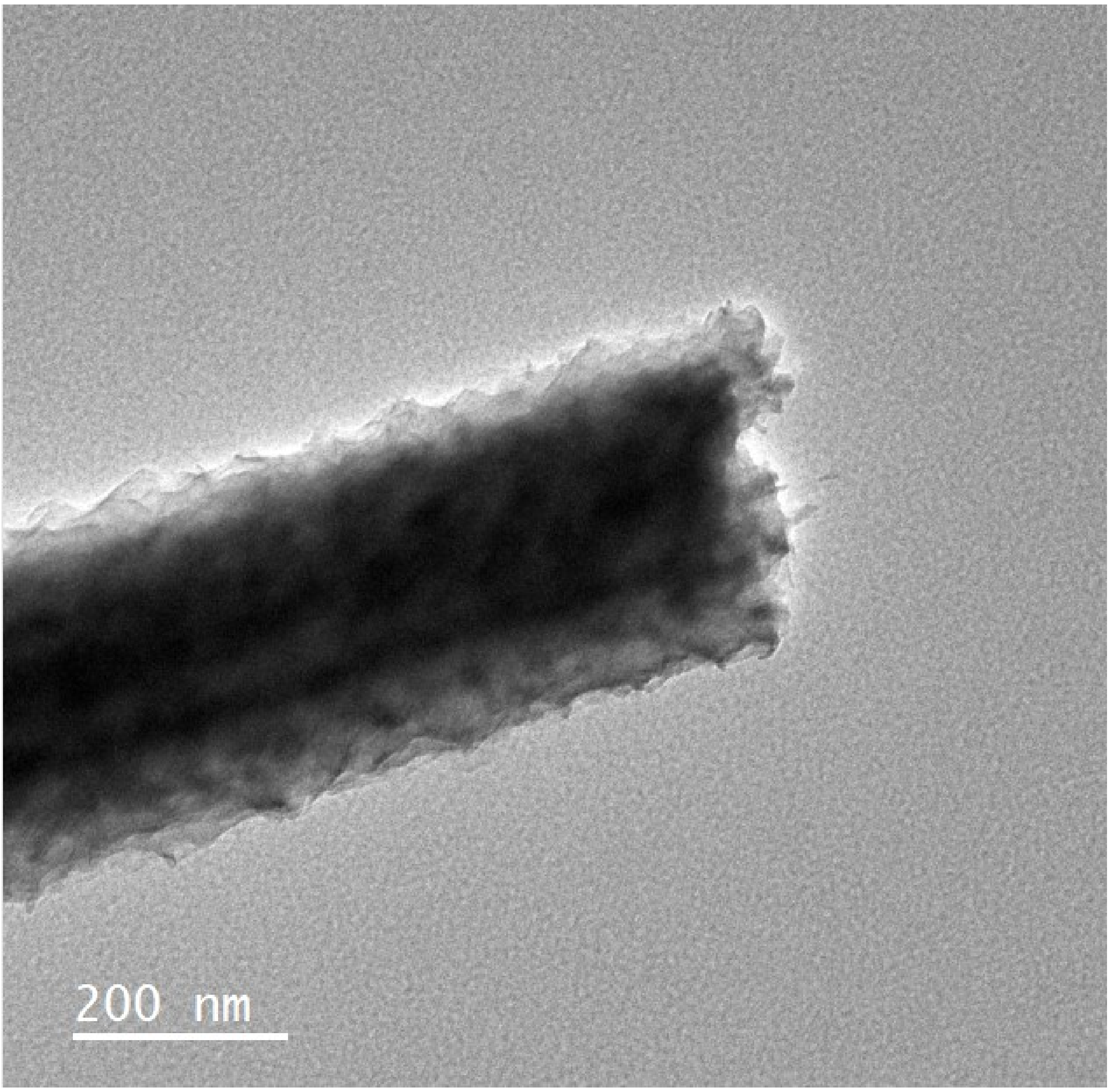


FigS6 XPS test results: 1000 rounds of CV test results a)Ni, b)Co, c)N,

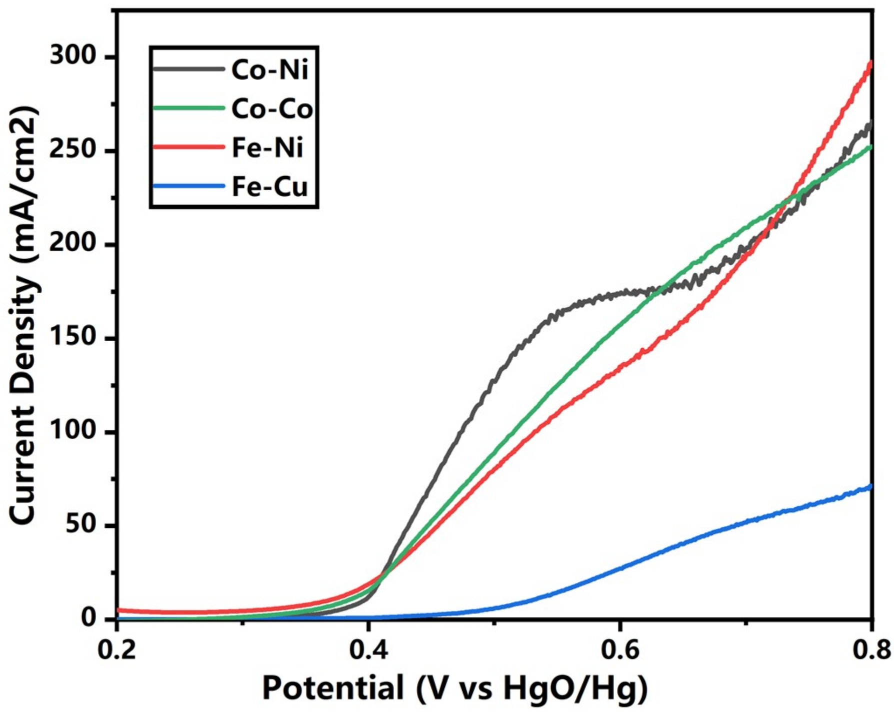
10h Oxidation test results d)Ni, e)Co, f)N,



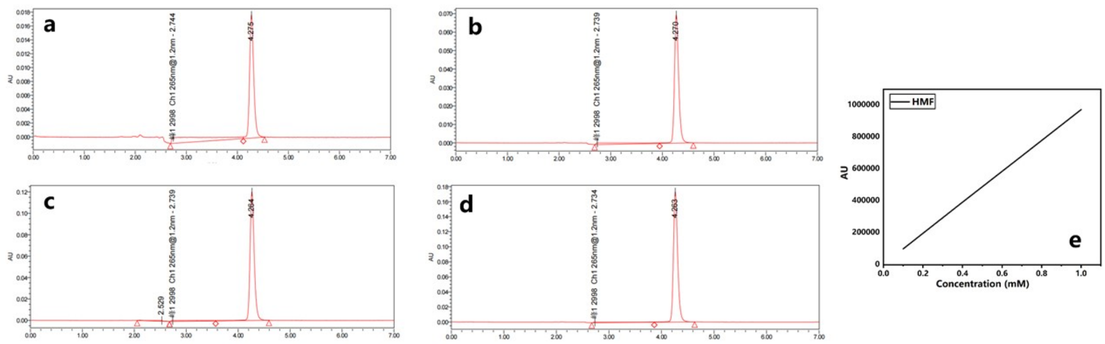
FigS7 XRD patterns: a) prepared sample b) after prolonged electrocatalytic oxidation



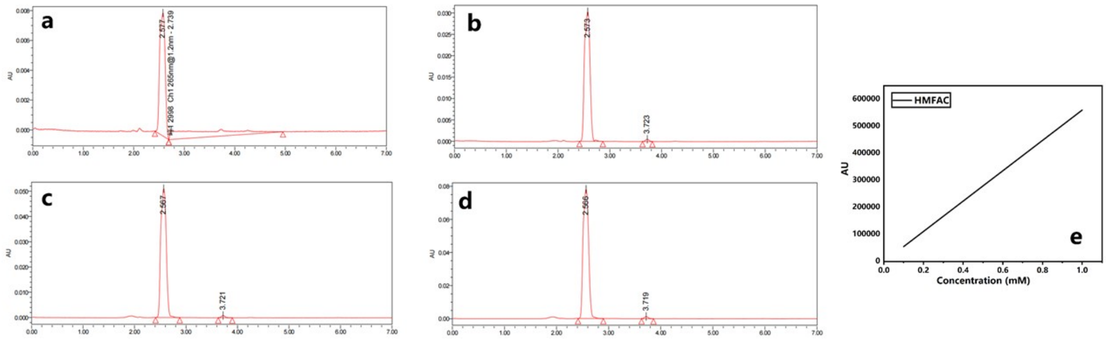
FigS8 HRTEM plots after a long time (After 1000 turns CV)



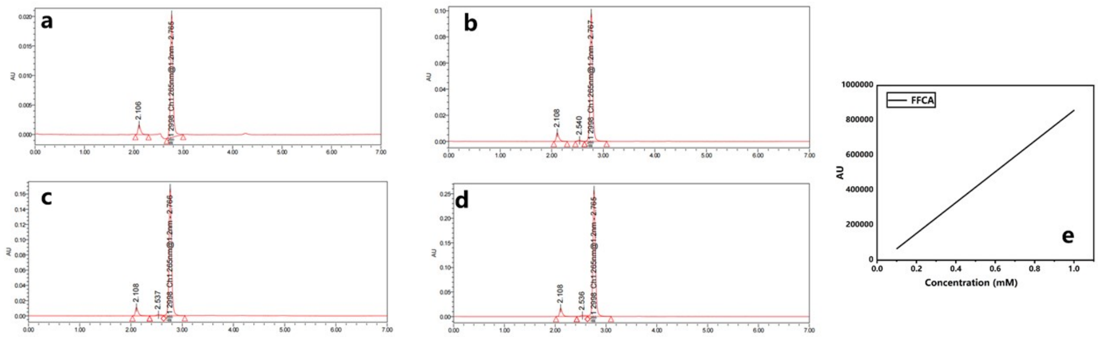
FigS9 Comparison of Linear Sweep Voltammetry (LSV) results under different elemental combinations



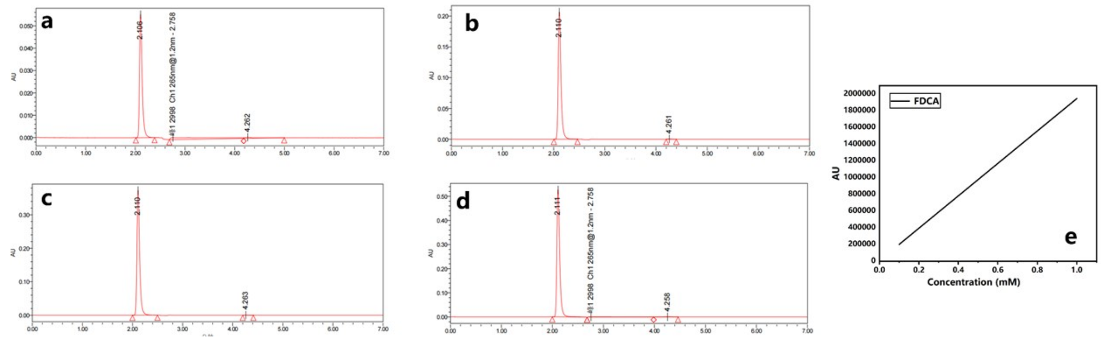
FigS10 HMF calibration curve



FigS11 HMFCA calibration curve



FigS12 FFCA calibration curve



FigS13 FDCA calibration curve

Fig S14 After long-term standing (>2 days) following the electrocatalytic reaction, whether further electrocatalytic reactions occur can be assessed by comparing the states of the pure Ni foam (left) and the target catalyst (right), both of which have completed the full electrolysis process

Supplementary Tables

Catalyst Materials	J (mA cm^{-2})/E (V vs. RHE)	Substrate concentration (mM)	Conversion (%)	FE (%)	Ref.
NiBx–Py	NA	10	99.61	92.5	1
NiCoP	10/1.26	10	99.20	95.8	2
NiFe LDH	10/1.32	10	99.93	99.4	3
NiSx/Ni_2P	10/1.33	10	99.11	95.1	4

NiBx	**10/1.33**	**10**	**84.50**	**99.5**	**5**
NiSe@NiOx	**50/1.35**	**10**	**NA**	**99**	**6**
$NiCo_2O_4$	**10/1.47**	**10**	**100**	**87.5**	**7**
MoO_2–FeP@C	**10/1.359**	**10**	**98.6**	**97.8**	**8**
Ru–NiO	**10/1.283**	**10**	**99.4**	**98.5**	**9**
Rh–SA/NiFe	**50/1.27**	**10**	**72.4**	**43.3**	**10**
CoNiP-NIE	**10/1.352**	**10**	**98**	**87.2**	**11**
Au/CeO_2	**NA**	**10**	**99**	**NA**	**13**
Fe_2O_3@HAP-Pd	**NA**	**10**	**99**	**NA**	**14**
$Ru/MnCo_2O_4$	**NA**	**10**	**99**	**NA**	**15**

Table S1: Other works for the oxidation of HMF,all current densities are at 1.40V vs.RHE. "NA" indicates that the electrocatalytic pathway was not employed.

Reference

1. X. Song, X. Liu, H. Wang, Y. Guo and Y. Wang, Ind. Eng. Chem. Res., 2020, 59, 17348–17356.
2. H. Wang, C. Li, J. An, Y. Zhuang and S. Tao, J. Mater. Chem. A, 2021, 9, 18421–18430.

3. W.-J. Liu, L. Dang, Z. Xu, H.-Q. Yu, S. Jin and
G. W. Huber, ACS Catal., 2018, 8, 5533–5541.
4. B. Zhang, H. Fu and T. Mu, Green Chem., 2022, 24, 877–884.
5. P. Zhang, X. Sheng, X. Chen, Z. Fang, J. Jiang, M. Wang,
F. Li, L. Fan, Y. Ren, B. Zhang, B. J. J. Timmer,
M. S. G. Ahlquist and L. Sun, Angew. Chem., Int. Ed., 2019,
58, 9155–9159.
6. L. Gao, Z. Liu, J. Ma, L. Zhong, Z. Song, J. Xu, S. Gan,
D. Han and L. Niu, Appl. Catal., B, 2020, 261, 118235.
7. M. J. Kang, H. Park, J. Jegal, S. Y. Hwang, Y. S. Kang and
H. G. Cha, Appl. Catal., B, 2019, 242, 85–91.
8. G. Yang, Y. Jiao, H. Yan, Y. Xie, A. Wu, X. Dong, D. Guo,
C. Tian and H. Fu, Adv. Mater., 2020, 32, 2000455.
9. R. Ge, Y. Wang, Z. Li, M. Xu, S.-M. Xu, H. Zhou, K. Ji,
F. Chen, J. Zhou and H. Duan, Angew. Chem., Int. Ed.,
2022, 61, e202200211.
10. L. Zeng, Y. Chen, M. Sun, Q. Huang, K. Sun, J. Ma, J. Li,
H. Tan, M. Li, Y. Pan, Y. Liu, M. Luo, B. Huang and
S. Guo, J. Am. Chem. Soc., 2023, 145, 17577–17587.
11. W. Jia, B. Liu, R. Gong, X. Bian, S. Du, S. Ma, Z. Song,
Z. Ren and Z. Chen, Small, 2023, 19, 2302025.
12. Y. Song, W. Xie, Y. Song, H. Li, S. Li, S. Jiang, J. Y. Lee and
M. Shao, Appl. Catal., B, 2022, 312, 121400.
13. Kim, M.; Su, Y.; Fukuoka, A.; Hensen, E.; Nakajima, K., Aerobic Oxidation of HMF-Cyclic Acetal Enables Selective FDCA Formation with CeO2-Supported Au Catalyst. Angewandte Chemie International Edition 2018.
14. Zhang, Z.; Zhen, J.; Liu, B.; Lv, K.; Deng, K., Selective aerobic oxidation of the biomass-derived precursor 5-hydroxymethylfurfural to 2,5-furandicarboxylic acid under mild conditions over a magnetic palladium nanocatalyst. GREEN CHEMISTRY 2015, 17 (2), 1308-1317.
15. Kar, S.; Zhou, Q. Q.; Ben-David, Y.; Milstein, D., Catalytic Furfural/5-Hydroxymethyl Furfural Oxidation to Furoic Acid/Furan-2,5-dicarboxylic Acid with H(2) Production Using Alkaline Water as the Formal Oxidant. J Am Chem Soc 2022, 144 (3), 1288-1295.