

Sulfidation of nickel foam with enhanced electrocatalytic oxidation of 5-Hydroxymethylfurfural to 2,5-Furandicarboxylic Acid

Wei Wang,¹ Fanhao Kong¹, Zhe Zhang,^{1*} Lan Yang¹, Min Wang,^{1*}

Affiliations:

¹ Zhang Dayu School of Chemistry, Dalian University of Technology, Dalian 116024, Liaoning, China.

*Correspondence to: wangmin@dlut.edu.cn, zhzh@dlut.edu.cn

Supplementary Results

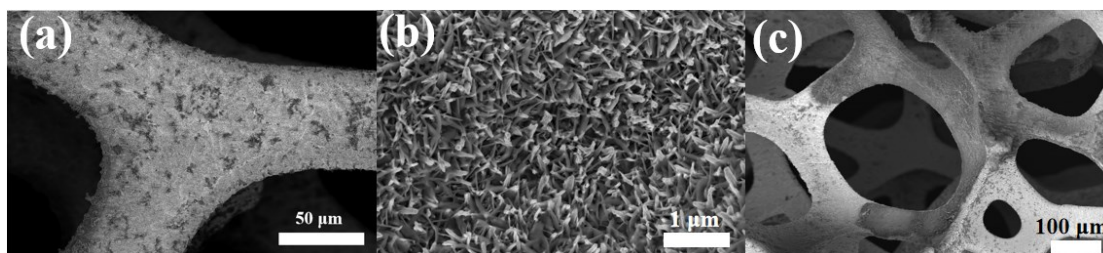


Figure S1. SEM images of Ni₃S₂/NF.

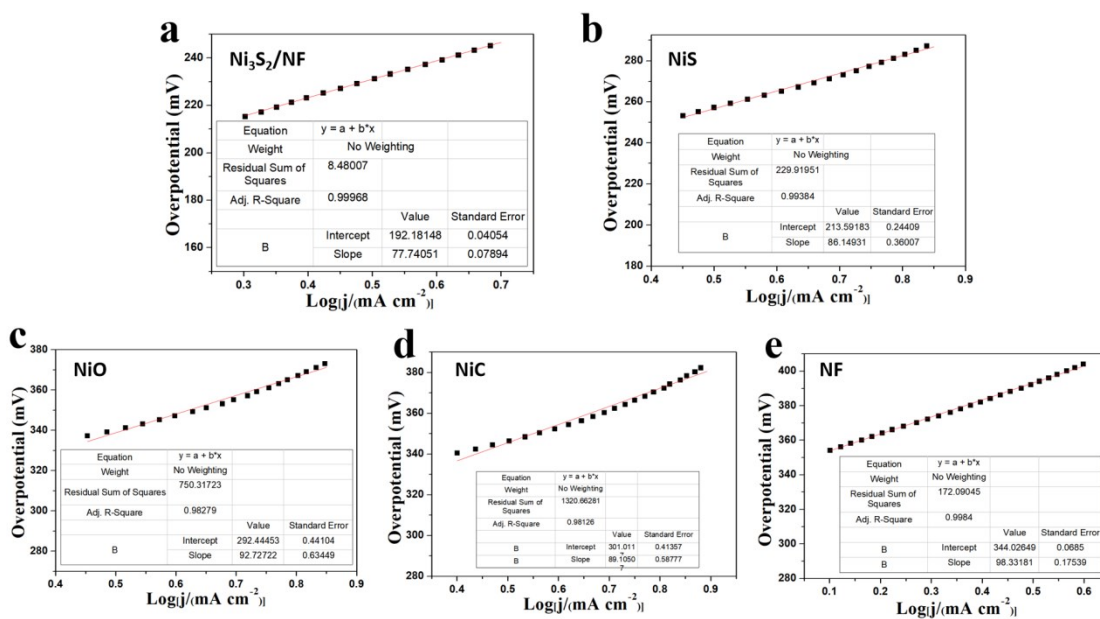


Figure S2. Tafel plot of Ni₃S₂/NF, NF, NiC, NiO and NiS in 10 mM HMF solution with different sweep speeds.

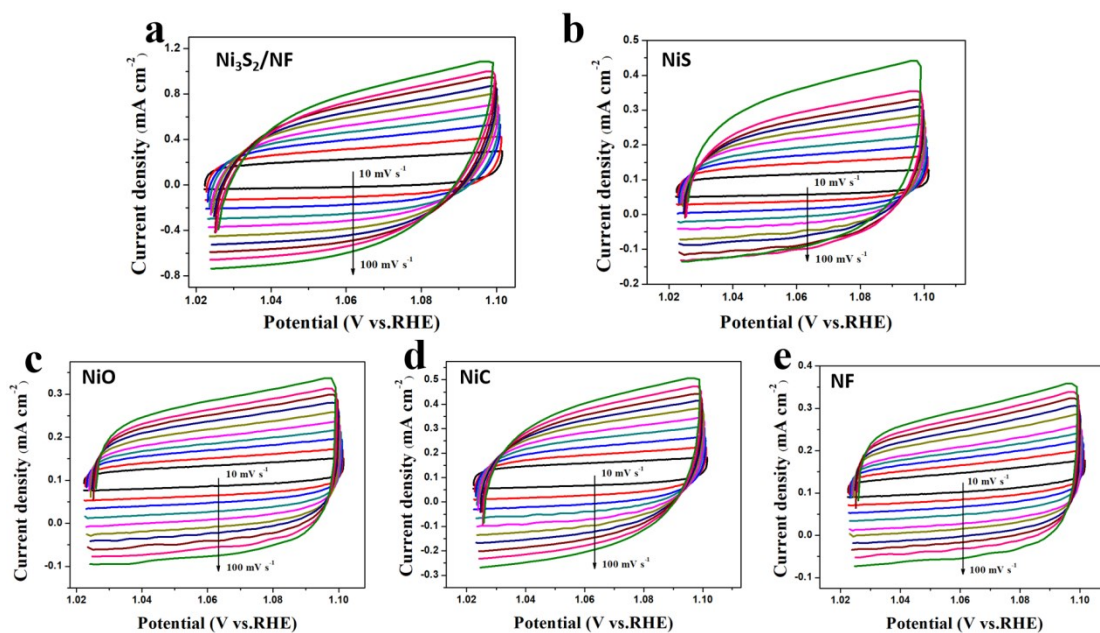


Figure S3. Cyclic voltammograms of $\text{Ni}_3\text{S}_2/\text{NF}$, NF , NiC , NiO and NiS in 10 mM HMF solution with different sweep speeds.

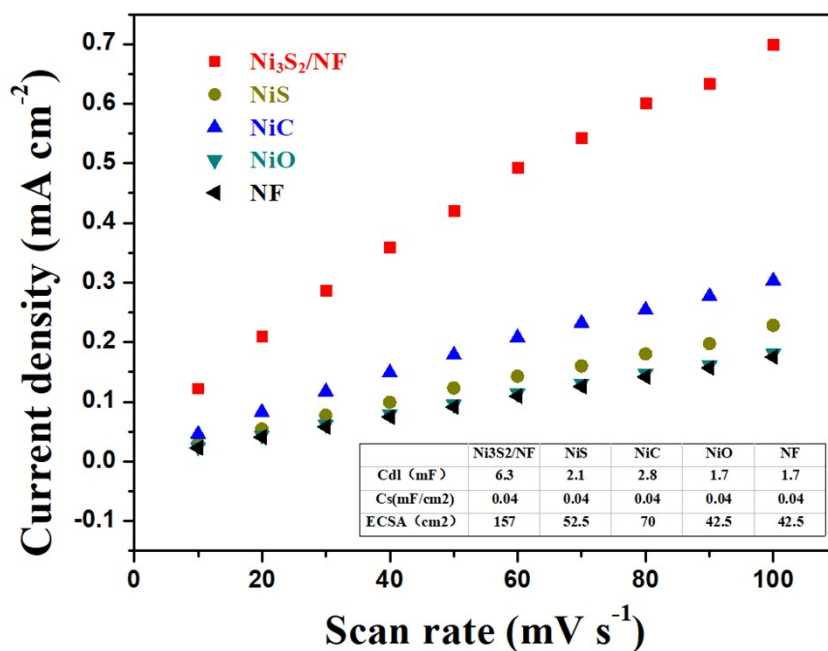


Figure S4. Schematic diagram of the charge current density difference and scan rate of $\text{Ni}_3\text{S}_2/\text{NF}$, NF , NiC , NiO and NiS .

Sample: HMF		Mobile phase: 5mM Ammonium Formate (70%) +Methanol (30%)	
Sample size (ul)	Concentration (mM)	Peak area	Peak time (min)
4	0.0267	303091	7.759
8	0.0533	584847	7.961
12	0.08	859438	7.962
16	0.1067	1123145	7.961
20	0.1333	1419352	7.963

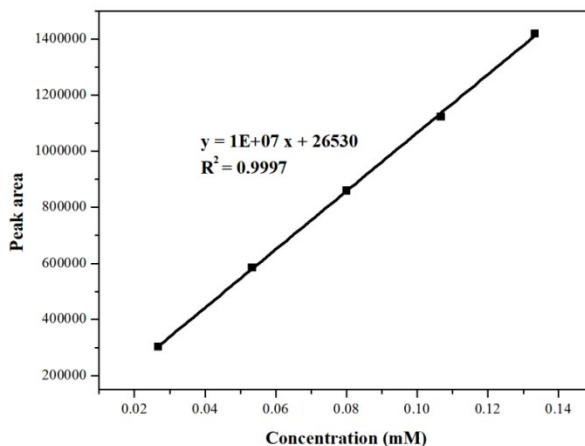


Figure S5. HPLC spectra of standard product of HMF.

Sample: FDCA		Mobile phase: 5mM Ammonium Formate (70%) +Methanol (30%)	
Sample size (ul)	Concentration (mM)	Peak area	Peak time (min)
4	0.0267	501212	3.069
8	0.0533	987783	3.067
12	0.08	1590407	3.063
16	0.1067	2141746	3.061
20	0.1333	2672621	3.599

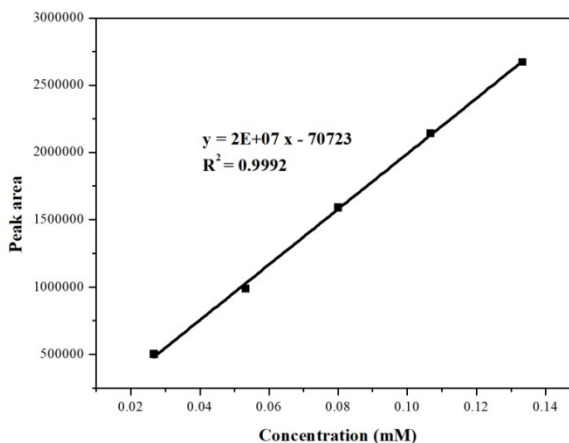


Figure S6. HPLC spectra of standard product of FDCA.

Sample: HMFCA		Mobile phase: 5mM Ammonium Formate (70%) +Methanol (30%)	
Sample size (ul)	Concentration (mM)	Peak area	Peak time (min)
4	0.0267	217371	5.417
8	0.0533	396997	5.406
12	0.08	564091	5.397
16	0.1067	756261	5.388
20	0.1333	919094	5.381

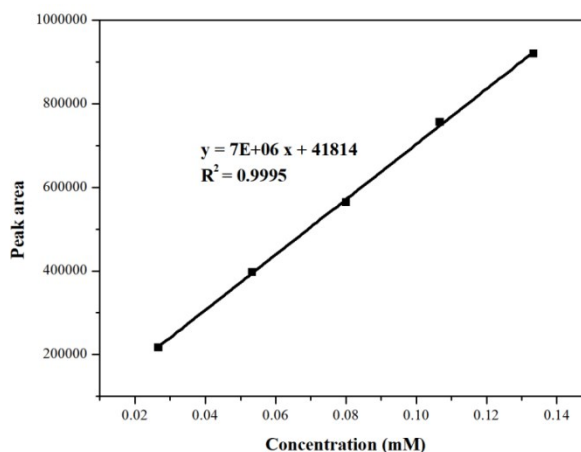


Figure S7. HPLC spectra of standard product of HMFCA.

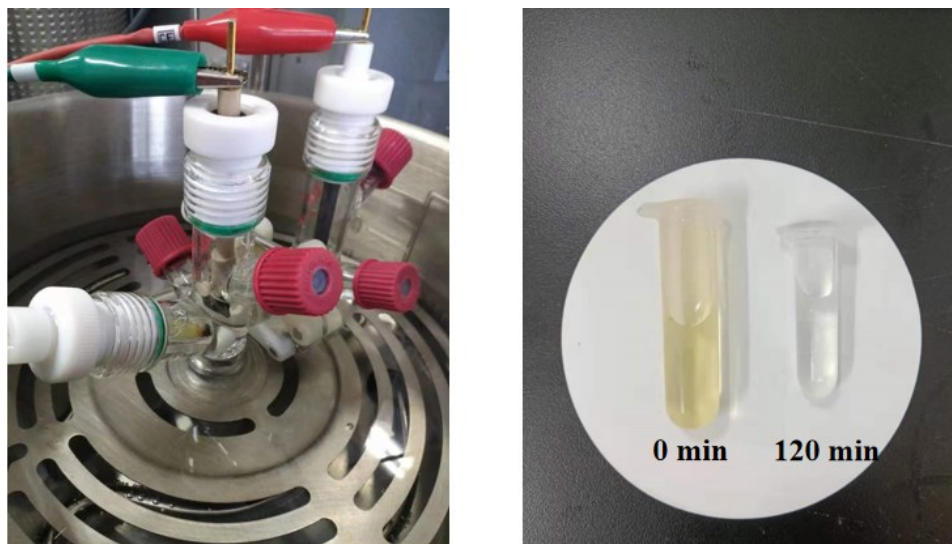


Figure S8. Solution color after 120 minutes of catalytic oxidation and color comparison (0 minutes and 120 minutes).

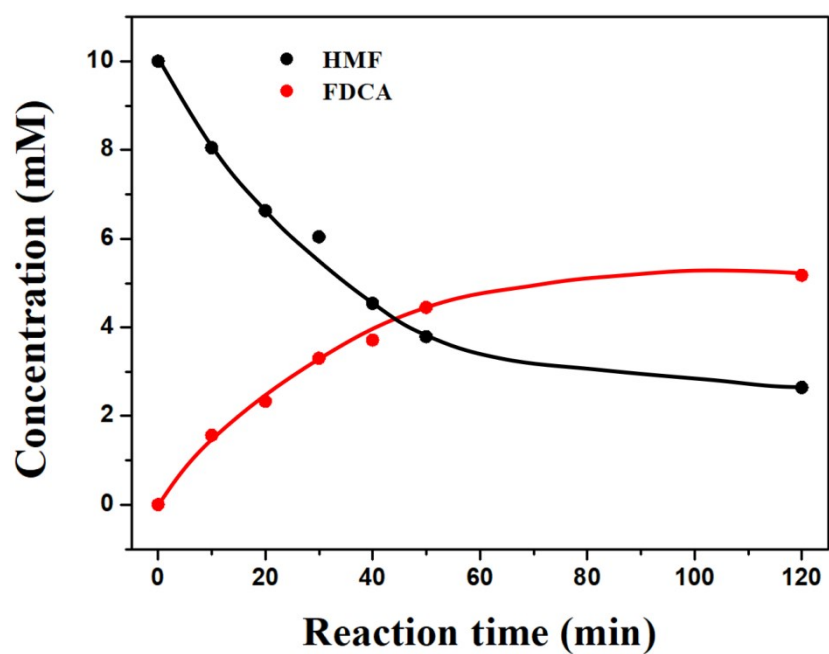


Figure S9. The reaction time and concentration changes of HMF and FDCA during the electrochemical oxidation of NF.