

In situ growth of Ni/Fe hydroxide nanosheets by self-sacrificial template as an efficiently robust electrocatalyst for oxygen evolution reaction

Cuiping Chang^{†,1}, Ying Xiong^{†,1}, Rui Miao[†], Yanzhi Sun^{†,*}, Yongmei Chen[†], Junqing Pan[‡]

[†]National Fundamental Research Laboratory of New Hazardous Chemicals Assessment and Accident Analysis, Institute of Applied Electrochemistry, Beijing University of Chemical Technology, Beijing 100029, China

[‡]State Key Laboratory of Chemical Resource Engineering, Beijing University of Chemical Technology, Beijing 100029, China

¹These authors contributed to the work equally.

*E-mail: sunyz@buct.edu.cn (Y. Sun);

Tel./Fax: 8610-64435452

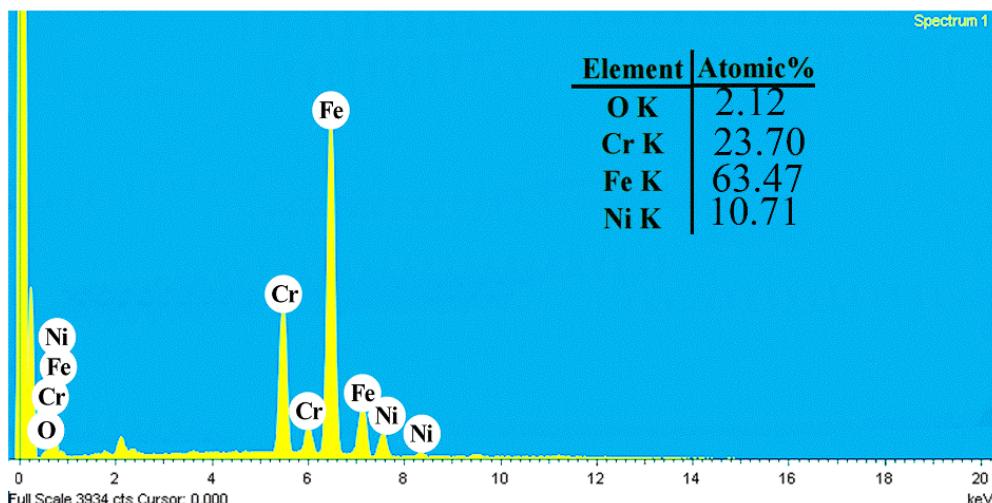


Fig. S1 The EDS image of SF

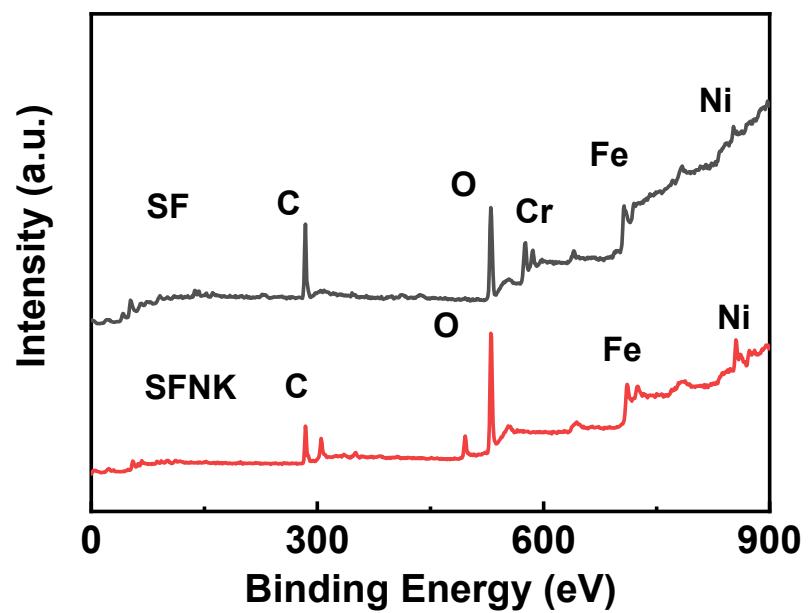


Fig. S2 XPS diagram of SF and SFNK

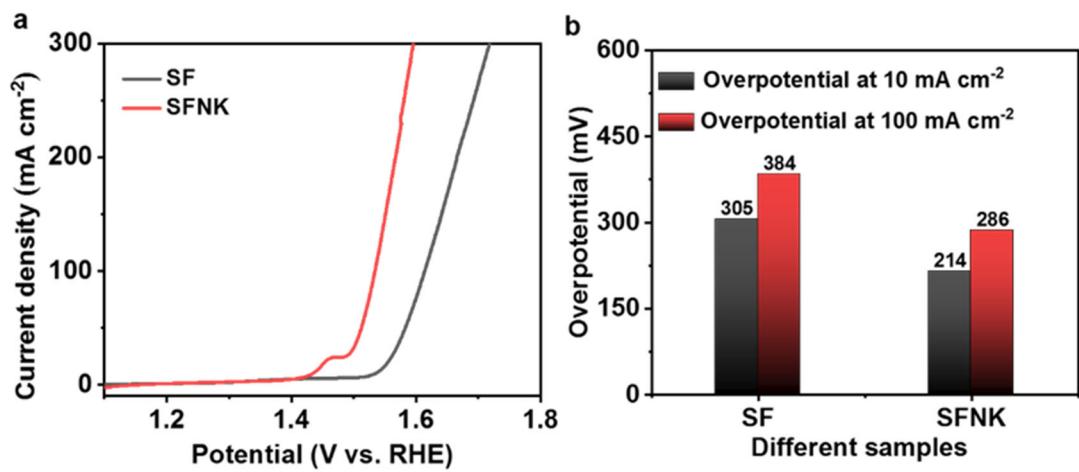


Fig. S3. (a) LSV curves of SF, and SFNK for O_2 evolution in 1 M KOH at a scan rate of 10 mV s^{-1} (with 85% iR-compensation). (b) Overpotential at the current density of 10 mA cm^{-2} and 100 mA cm^{-2} of SF and SFNK.

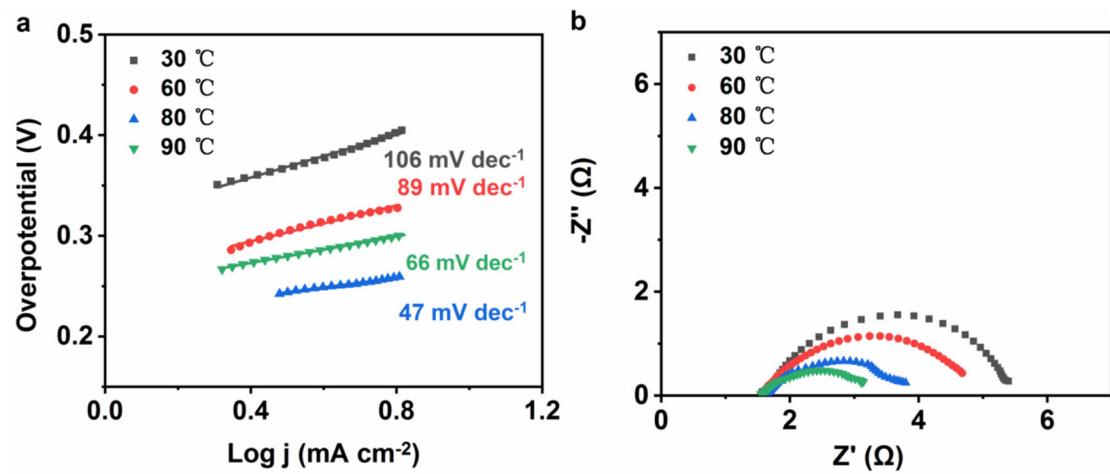


Fig. S4 Comparison of different reaction temperatures (a) Tafel diagrams; (b) EIS diagram

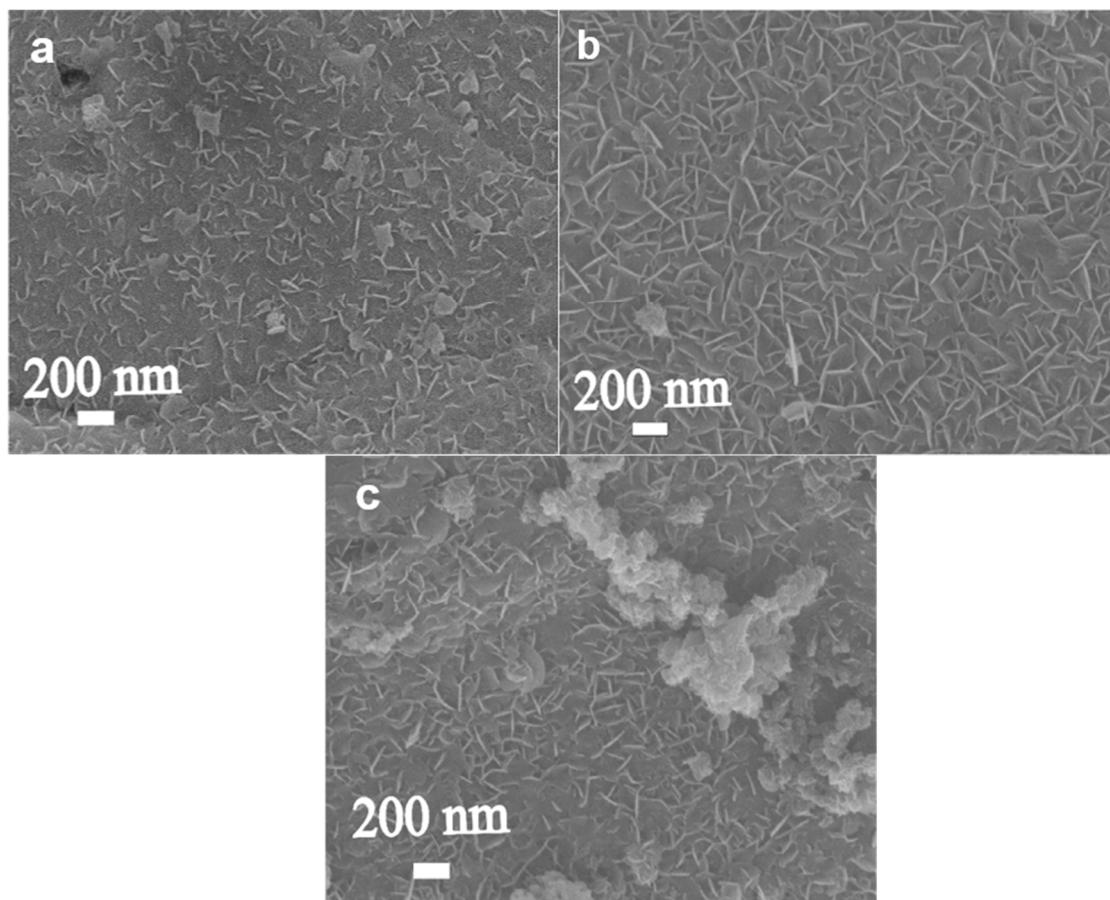


Fig. S5 SEM images of different reaction time (a) 10 min; (b) 30 min; (c) 60 min

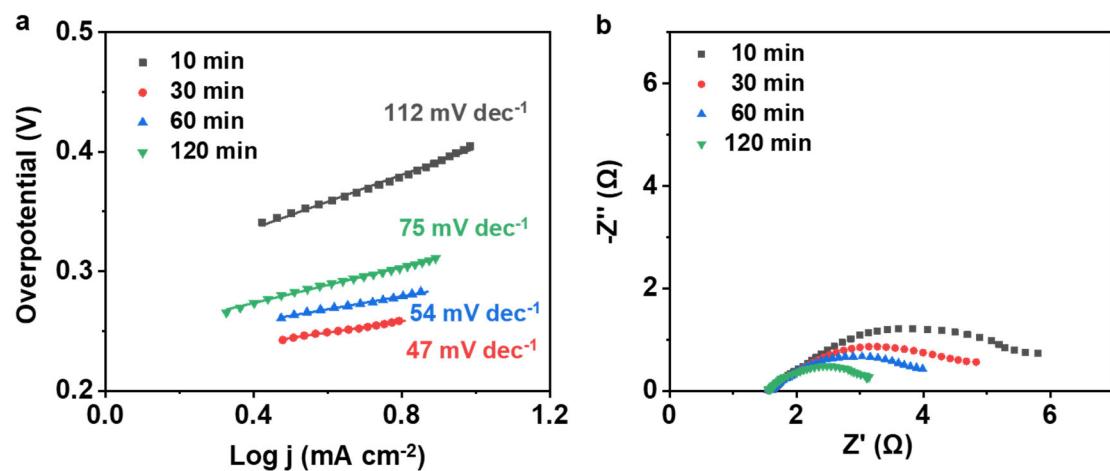


Fig. S6 (a) Tafel diagrams and (b) EIS diagram for different reaction times

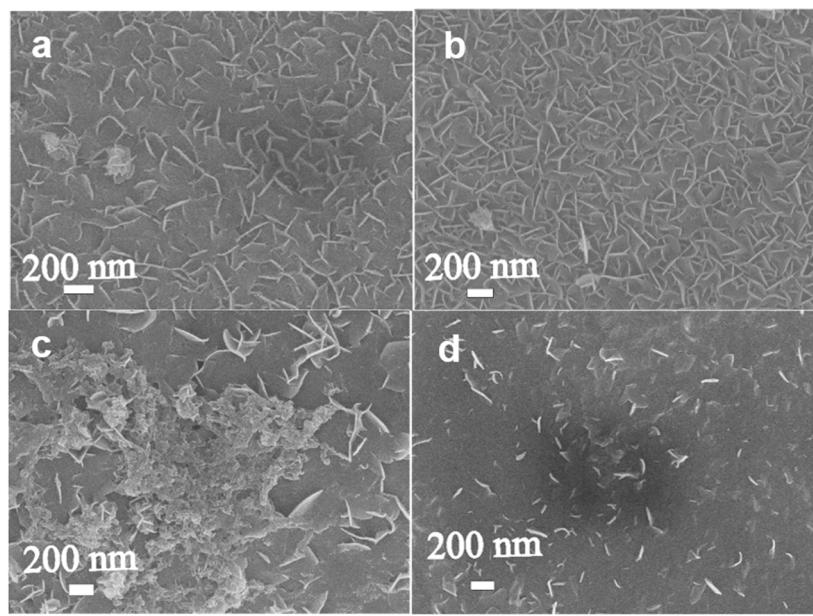


Fig. S7 Comparison of different NaOH concentrations (a) 1 M; (b) 3 M; (c) 5 M; (d) 7 M

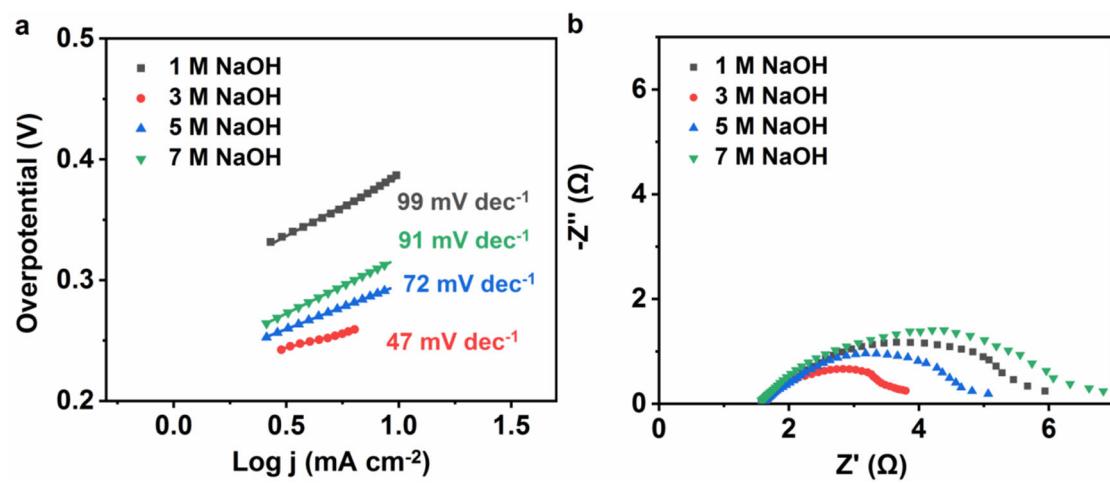


Fig. S8 (a) Tafel diagrams and (b) EIS diagrams for different NaOH concentration

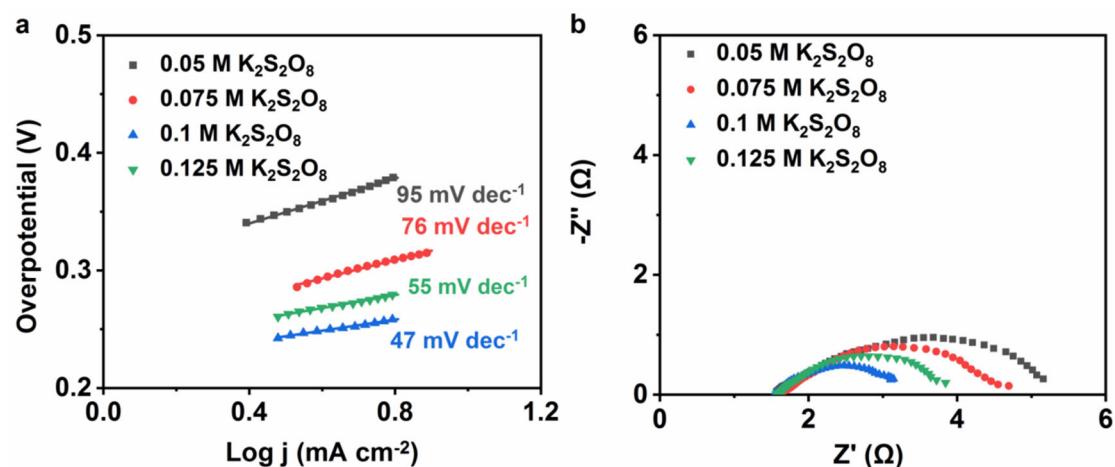


Fig. S9 (a) Tafel diagrams; (b) EIS diagram of different concentrations of $\text{K}_2\text{S}_2\text{O}_8$ reaction

Table S1 Specific information of the characterization instruments in this work.

Technique	Model	Company/Country	Condition
Field-Emission Scanning Electron Microscopy (FSEM)	Hitachi S-4700	Hitachi/ Japan	Operating voltage of 20 kV
High-Resolution Transmission Electron Microscopy (HR-TEM)	H-800 JEOL JEM-2100F	JEOL/ Japan	Operating voltage of 300.0 kV
X-ray Diffraction (XRD)	Rigaku D/max2500VB2 +/PCX diffractometer	Rigaku Corporation/ Japan	2θ range from 5 to 90° at sweep rate of 10 ° min ⁻¹ with a Cu-Kα radiation (40 kV, 200 mA)
X-ray Photoelectron Spectroscopy (XPS)	ESCALAB 250 spectrometer	ThermoFisher Scientific/ USA	Operating voltage of 200 eV for survey and 30 eV for high resolution at Al K radiation

Table S2 Comparison of catalytic performance of different catalysts

Catalysts	Electrolyte	j (mA cm ⁻²)	η (mV)	Tafel slope (mV dec ⁻¹)	References
SFNK	1 M KOH	10	215	/	This work
SFNK	0.5 M Na ₂ CO ₃ /NaHCO ₃	10	263	47	This work
NiFeO _x H _y	1 M KOH	10	250	30	[22]
GDY@NiFe	1 M KOH	10	260	95	[31]
Ni-11.8 at.%Fe	1 M KOH	10	260	53	[32]
Ni _x Fe _{1-x} OOH/ NiFe/ Ni _x Fe _{1-x} OOH	1 M KOH	10	220	57	[33]
NiFe/N-TiO ₂	1 M KOH	10	235	48.9	[34]
NiFe-NCs	1 M KOH	10	271	48	[35]