# Supporting Information

# Ingeniously assemble metal organic framework on the surface of FeMn co-doped $Ni(OH)_2$ as a high-efficiency electrocatalyst for oxygen evolution reaction

Lei Ye [a], Yeqing Zhang [a], Meilin Zhang [a], Yaqiong Gong [a,b,*]

*a School of Chemical Engineering and Technology, North University of China, Taiyuan 030051, PR China.*

*b State Key Laboratory of Physical Chemistry of Solid Surfaces, Xiamen University, Xiamen 361005, PR China.*

** Email: gyq@nuc.edu.cn (Yaqiong Gong)*

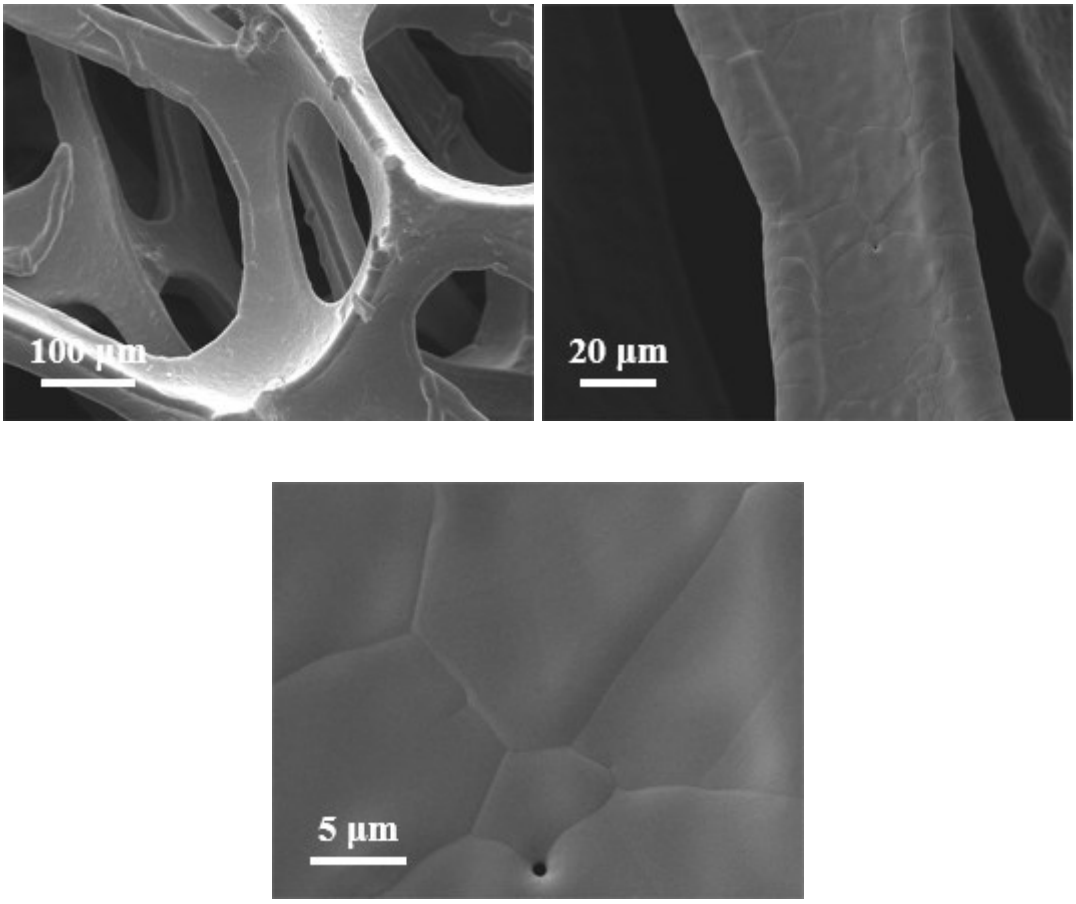


**Fig. S1.** SEM images of bare NF.

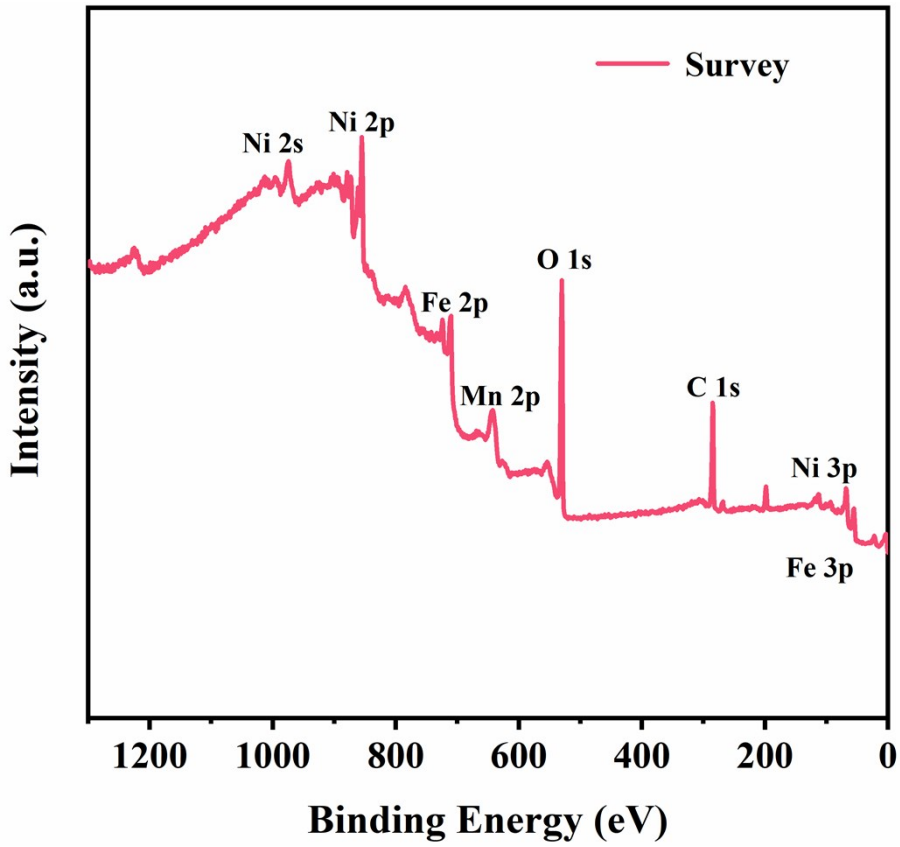


**Fig. S2.** The XPS survey spectra of FeMn-Ni$(OH)_2$@MOF/NF.

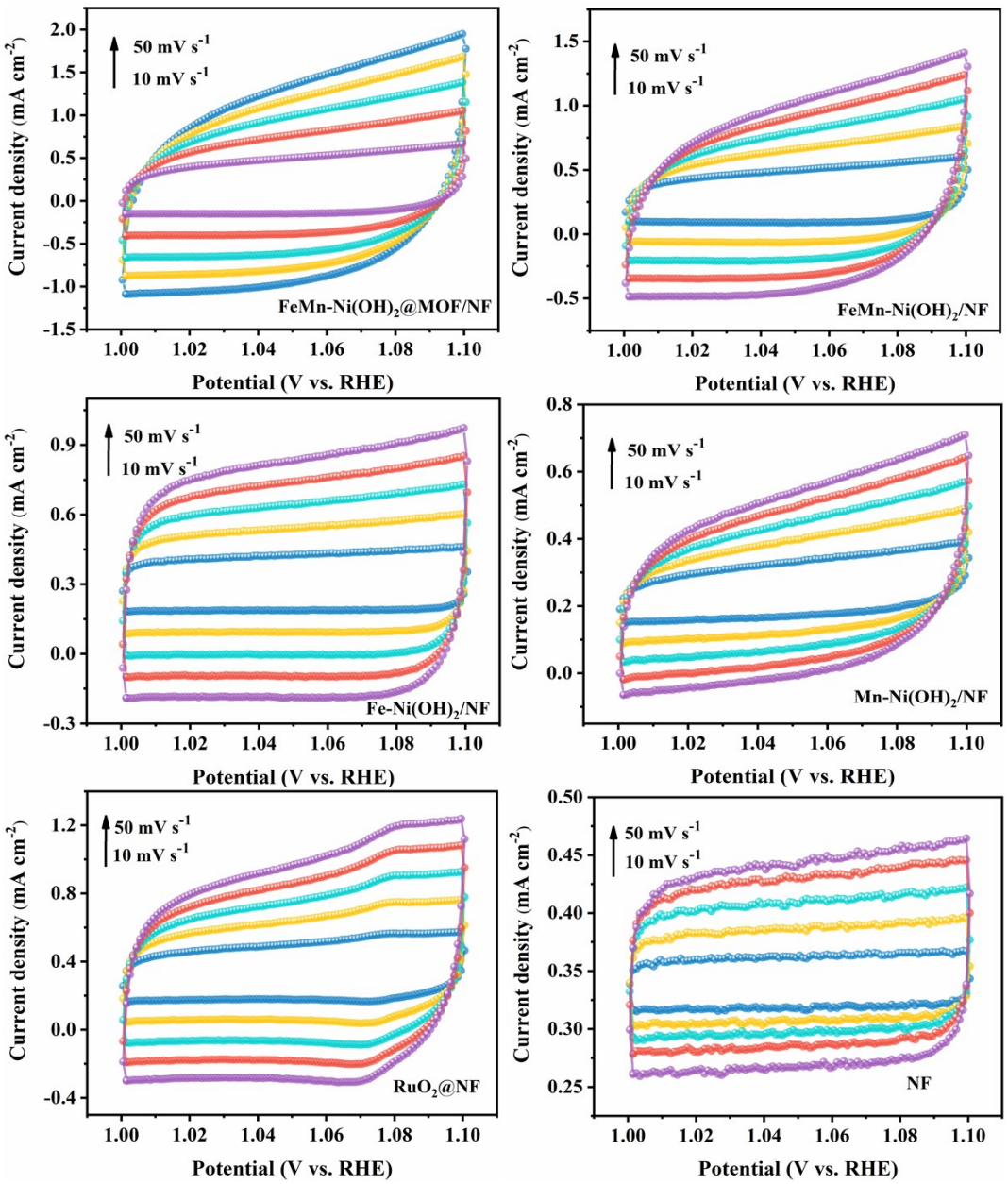


**Fig. S3.** Cyclic voltammetry curves of FeMn-Ni(OH)$_2$@MOF/NF, FeMn-Ni(OH)$_2$/NF, Fe-Ni(OH)$_2$/NF, Mn-Ni(OH)$_2$/NF , RuO$_2$@NF and bare NF.

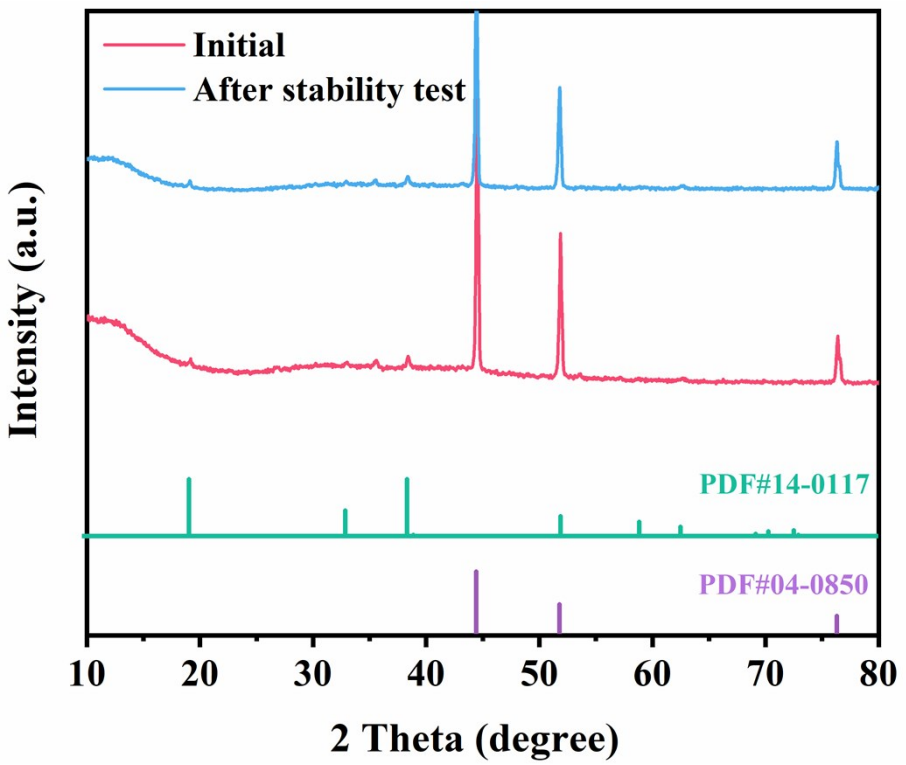


**Fig. S4.** XRD pattern of FeMn-Ni(OH)$_2$@MOF/NF before and after the stability test.

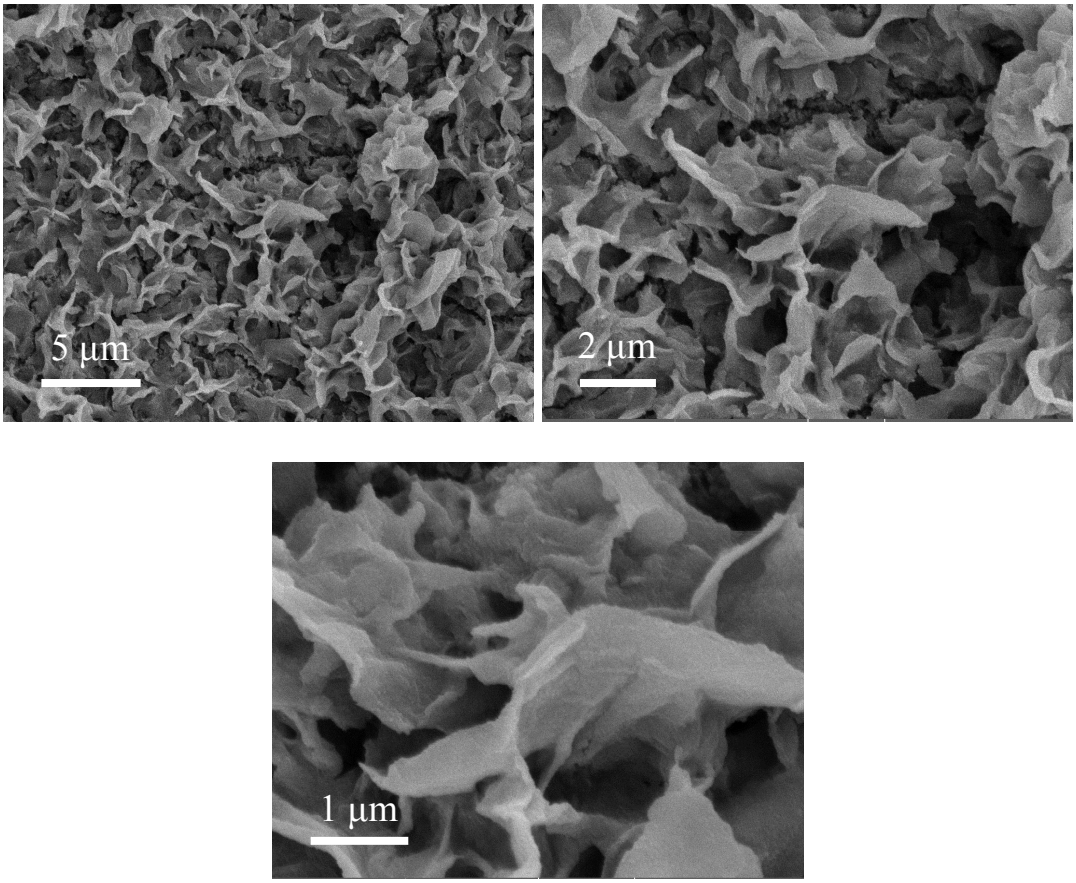


**Fig. S5.** The SEM images of FeMn-Ni(OH)$_2$@MOF/NF after the stability test.

**Table S1.** Comparison of OER activity between FeMn-$Ni(OH)_2$@MOF/NF and other recently reported non noble metal catalysts.

| Catalyst | Current density ($mA \cdot cm^{-2}$) | Overpotential (mV) | Tafel slope ($mV \cdot dec^{-1}$) | Reference |
|---|---|---|---|---|
| FeMn-$Ni(OH)_2$@MOF/NF | 10 | 199 | 26 | this work |
| NiFe-MOF-74/NF | 10 | 223 | 71.6 | 1 |
| $Fe_1Ni_2$-BDC | 10 | 260 | 35 | 2 |
| MIL-53(FeNi)/NF | 50 | 233 | 31.3 | 3 |
| NiFe-MOF/OM-NFH | 10 | 270 | 123 | 4 |
| Fe MOF/IF | 50 | 240 | 72 | 5 |
| NiFe-MOF | 50 | 270 | 49 | 6 |
| NiFe(dobpdc) | 10 | 207 | 36 | 7 |
| NiFe-NFF | 10 | 227 | 38.9 | 8 |
| NiFe-MS/MOF@NF | 50 | 230 | 32 | 9 |
| NiFe-NCs | 10 | 271 | 48 | 10 |

**Table S2** The Rct values of different samples.

| Catalyst | $R_{ct}$ (Ω) | $R_s$(Ω) |
|---|---|---|
| FeMn-$Ni(OH)_2$@MOF/NF | 0.558 | 1.566 |
| FeMn-$Ni(OH)_2$/NF | 0.749 | 1.906 |
| Fe-$Ni(OH)_2$/NF | 7.485 | 1.876 |
| Mn-$Ni(OH)_2$/NF | 109.4 | 1.825 |
| $RuO_2$@NF | 3.708 | 2.074 |
| NF | 157.2 | 1.983 |

Reference


1 J. Xing, K. Guo, Z. Zou, M. Cai, J. Du and C. Xu, *Chem. Commun.*, 2018, **54**, 7046-7049.

2 J. Li, W. Huang, M. Wang, S. Xi, J. Meng, K. Zhao, J. Jin, W. Xu, Z. Wang, X. Liu, Q. Chen, L. Xu, X. Liao, Y. Jiang, K. A. Owusu, B. Jiang, C. Chen, D. Fan, L. Zhou and L. Mai, *ACS Energy Lett.*, 2018, **4**, 285-292.

3 F. Sun, G. Wang, Y. Ding, C. Wang, B. Yuan and Y. Lin, *Adv. Energy Mater.*, 2018, **8**，1800574.

4 A. Kumar and S. Bhattacharyya, *ACS Appl. Mater. Interfaces*, 2017, **9**, 41906-41915.

5 F. Zheng, D. Xiang, P. Li, Z. Zhang, C. Du, Z. Zhuang, X. Li and W. Chen, *ACS Sustainable Chem. Eng.*, 2019, **7**, 9743-9749.

6 L. Qi, Y.-Q. Su, Z. Xu, G. Zhang, K. Liu, M. Liu, E. J. M. Hensen and R. Y.-Y. Lin, *J. Mater. Chem. A*, 2020, **8**, 22974-22982.

7 C. Cao, D. D. Ma, Q. Xu, X. T. Wu and Q. L. Zhu, *Adv. Funct. Mater.*, 2018, **29**, 1807418.

8 X. Zhang, Q. Liu, X. Shi, A. M. Asiri and X. Sun, *Inorg. Chem. Front.*, 2018, **5**, 1405-1408.

9 M. Zhao, W. Li, J. Li, W. Hu and C. M. Li, *Adv Sci (Weinh)*, 2020, **7**, 2001965.

10 X. Li, D. D. Ma, C. Cao, R. Zou, Q. Xu, X. T. Wu and Q. L. Zhu, *Small*, 2019, **15**, e1902218.