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Supporting Information

Facil Topochemical Prepared Hierarchical Ni-Fe LDH Nanoflowers for Electrochemical Oxygen Elution Reaction

Zairan Liu[a], Yifei Yang[a], Yuanming Deng[a*], Jiaoning Tang[a]

[a]Shenzhen Key Laboratory of Polymer Science and Technology, Guangdong Research, Center for Interfacial Engineering of Functional Materials, College of Materials Science and Engineering, Shenzhen University, Shenzhen 518060, China

[*]Corresponding author: Yuanming Deng, e-mail address: ymdeng@szu.edu.cn;

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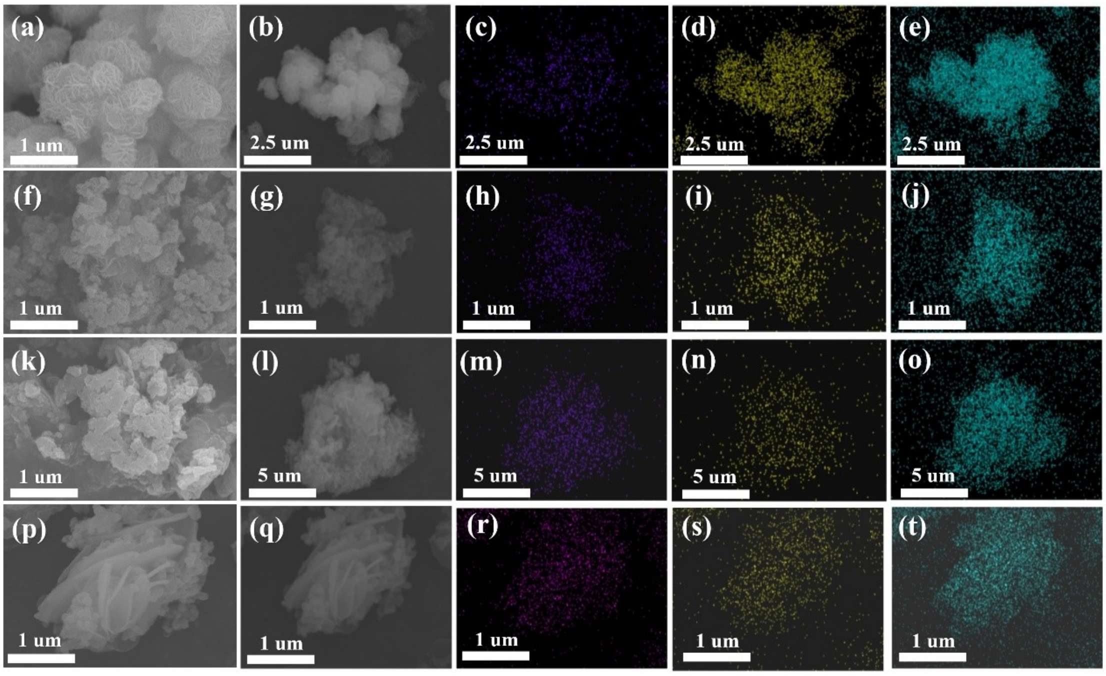

Figure S1 morphology and EDS mapping of precipitate obtained from coprecipitation of Ni^{2+} and Fe^{2+} by amine. (a-e) trolamine, (f-j) ammonium hydroxide, (k-o) triethylamine, and (p-t) morpholine

Table S1 Chemical composition of sample obtained from amines by EDS

Sample from amines	trolamine	ammonium hydroxide	triethylamine	morpholine
O(wt%)	40.21	47.37	40.68	42.10
Ni(wt%)	7.89	30.02	45.25	43.66
Fe(wt%)	51.91	22.62	14.06	14.24

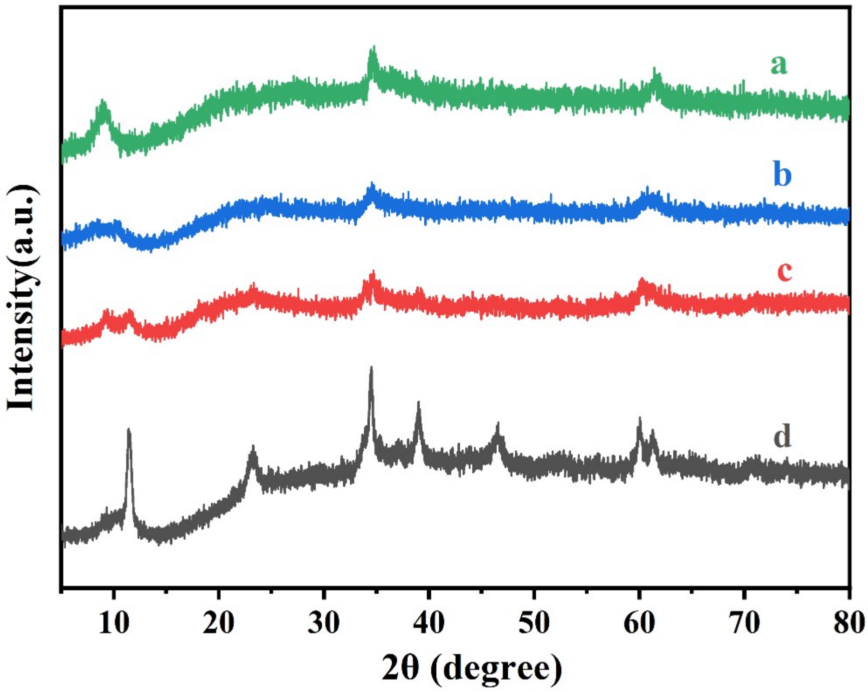

Figure S2 XRD of precipitate obtained from coprecipitation of Ni^{2+} and Fe^{2+} by amine. (a,e) trolamine, (b, f) ammonium hydroxide, (c, g) triethylamine, and (d,h) morpholine

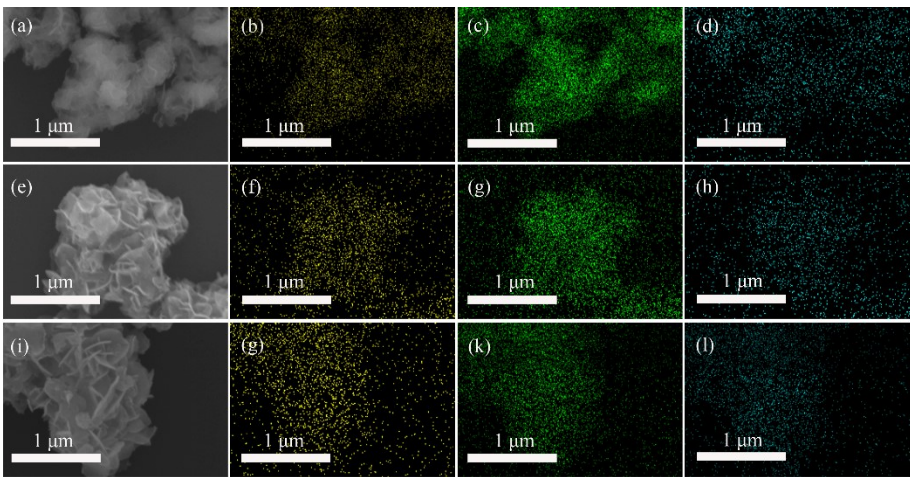

Figure S3 EDS Mapping (a-d)$Ni_{7.5}Fe_{2.5}$-LDH (e-h)Ni_7Fe_3-LDH (i-l)Ni_5Fe_5-LDH

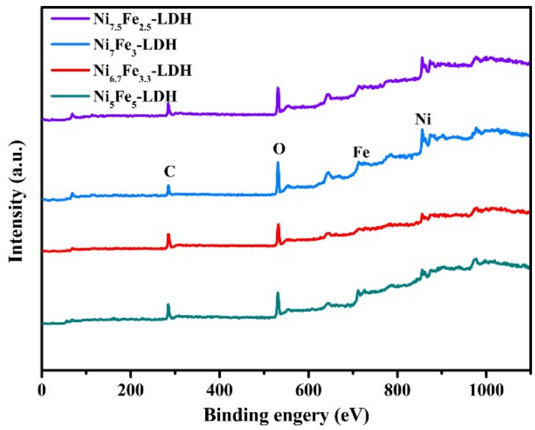

Figure S4 The full XPS spectra of $Ni_{7.5}Fe_{2.5}$-LDH, Ni_7Fe_3-LDH, $Ni_{6.7}Fe_{3.3}$-LDH, Ni_5Fe_5-LDH.

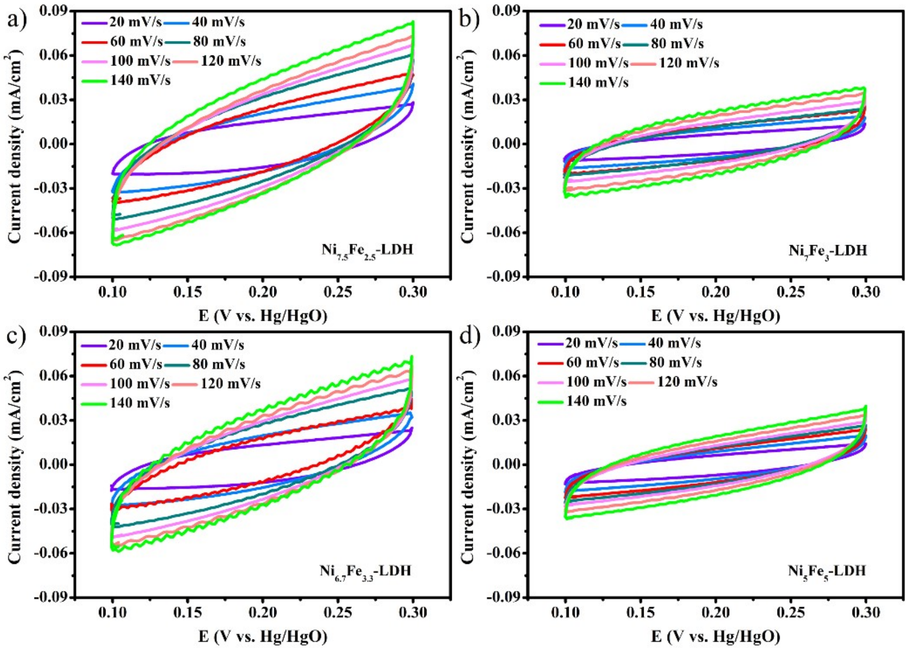

Figure S5 Cyclic voltammograms in 1 M KOH solution measured in the non-Faradaic potential range of 0.10 V to 0.30 V vs. Hg/HgO at scan rates of 20 mV s^{-1}, 40 mV s^{-1}, 60 mV s^{-1}, 80 mV s^{-1}, 100 mV s^{-1}, 120 mV s^{-1} 140 mV s^{-1}, respectively (a) $Ni_{7.5}Fe_{2.5}$-LDH (b) Ni_7Fe_3-LDH (c) $Ni_{6.7}Fe_{3.3}$-LDH (d) Ni_5Fe_5-LDH

For the estimation of ECSA, a specific capacitance (C_s) value C_s=0.040 mF cm^{-2} in 1 M NaOH solution is adopted from a previous report[1]. Cyclic voltammograms in 1 M KOH solution measured in the non-Faradaic potential range of 0.10 V to 0.30 V at scan rates of 20 mV s^{-1}, 40 mV s^{-1}, 60 mV s^{-1}, 80 mV s^{-1}, 100 mV s^{-1}, 120 mV s^{-1} 140 mV s^{-1}, respectively. The slope obtained by $\Delta j = (j_a - j_c)$ at different scanning speeds at 0.2 V which are twice of the electric double layer capacitor. ECSA can be estimated according to the following equation：$ECSA = C_{dl}/C_s$ (1)

The calculation results：9.725 cm^2 ($Ni_{7.5}Fe_{2.5}$-LDH), 5.575 cm^2 (Ni_7Fe_3-LDH), 8.225 cm^2($Ni_{6.7}Fe_{3.3}$-LDH), 5.075 cm^2(Ni_5Fe_5-LDH).

Reference

[1] C.C.L. McCrory, S. Jung, J.C. Peters, T.F. Jaramillo, Benchmarking Heterogeneous Electrocatalysts for the Oxygen Evolution Reaction, J. Am. Chem. Soc., 135 (2013) 16977-16987.