Electronic Supplementary Information

"The 250 mV Barrier": A Thermodynamic Ceiling That Every OER/ORR Researcher Must Know!

Pracheta Trivedi[#], Neha Clare Minj[#], Sneha Mittal[#], Balakumaran Kamaraj[#], Sandeep Yadav[#], and **Anantharaj Sengeni***

Laboratory for Electrocatalysis and Energy (LEE), Department of Chemistry, Indian Institute of Technology, Kanpur 208 016, Uttar Pradesh, India

[#]These authors have contributed equally.

* Correspondence should be addressed to: *ananthsatiitk.ac.in*

Table S1: Recently reported OER overpotentials measured for the current density of 10 mA cm^{-2} (unless otherwise specified) against different reference electrodes for various catalysts listed in Figure 1 (in main text) in 1.0 M KOH since 2019.

Catalyst	*η^{10} / mV*	*DOI*	*Bibliography*
NiS_x/C_3N_4	32	https://doi.org/10.1039/D1EE00509J	*Energy Environ Sci*, 2021, **14**, 5358–5365
CuCo/CP	80	https://doi.org/10.1016/j.molliq.2022.118635	*J Mol Liq*, 2022, **351**, 118635
MCC@Ag_45W	83	https://pubs.acs.org/doi/10.1021/acsaem.2c03455	ACS Appl Energy Mater, 2023, **6**, 2286–2295
NiSe/NF	136 at 100 mA cm^{-2}	http://dx.doi.org/10.1016/j.electacta.2016.12.070	*Electrochim Acta*, 2017, **224**, 412–418
$FF\text{-}Na_{500}Ni_{500}$	150 at 20 mA cm^{-2}	https://doi.org/10.1002/smll.202000663	*Small 2020, **16**, 2000663*
NiFe-LDH/RGO/NF	150	https://doi.org/10.1016/j.ijhydene.2018.11.167	*Int J Hydrogen Energy*, 2019, **44**, 2656–2663.
$Co(OH)_2$@HOS/CP	153 at 100 mA cm^{-2}	https://doi.org/10.1002/adfm.201909610	*Adv Funct Mater, 2020, **30**, 1909610*
$Co(OH)_2$@HOS/CP	155	https://doi.org/10.1002/adfm.201909610	*Adv Funct Mater*, 2020,**30**,1909610
MnFeO-NF-0.4	157	https://doi.org/10.1039/d0nr05864e	*Nanoscale*, 2020, **12**, 19992–20001
C-Qds-Mn	166.71	https://doi.org/10.1016/j.jics.2022.100775	*Journal of the Indian Chemical Society, 2022, **99**, 100775.*
$Pd/NiFeO_x$	180	https://doi.org/10.1002/adfm.202107181	*Adv Funct Mater, 2021,*

			***31**, 2107181*
np-NiAl-LDH/NF	180	https://doi.org/10.1039/d0se00050g	*Sustain Energy Fuels, 2020, **4**, 2850–2858.*
NiFe(OH)$_x$/(Ni, Fe)Se$_2$/CC	180	https://doi.org/10.1002/smll.202007334	*Small 2021, **17**, 2007334*
Ni$_x$Fe$_{3-x}$O$_4$-EDTA	180	https://doi.org/10.1016/j.jcis.2022.11.054	*J Colloid Interface Sci*, 2023, **632**, 44–53.
Fe-K$_2$WO$_4$	181	https://doi.org/10.1016/j.apcatb.2024.124423	*Applied Catalysis B: Environment and Energy*, 2024, **358**, 124423.
NiFeCoMnAl	190	https://doi.org/10.1016/j.apcatb.2021.120764	*Appl Catal B*, 2022, **301**, 120764
Ag2Se/rGO	192	https://doi.org/10.1016/j.jallcom.2024.174626	*J Alloys Compd*, 2024, **993**, 174626
CF-FeSO	192	https://doi.org/10.1038/s41467-022-28260-5	*Nat Commun*, 2022, **13**, 605.
np-NiFeCoMnOOH	194	https://doi.org/10.1016/j.apcatb.2023.123331	*Appl Catal B*, 2024, **341**, 123331.
V-NiFe-LDH/NF	195	https://doi.org/10.1039/d0dt01520b	*Dalton Transactions*, 2020, **49**, 11217–11225
VOOH-3Fe	195	https://doi.org/10.1002/smll.201904688	*Small 2019, **15**, 1904688*
NiFe-LDH/N10TC/NF	196	https://doi.org/10.1002/cssc.202100043	*ChemSusChem*, 2021, **14**, 1948–1954
β-NiFeOOH/NF	196	https://doi.org/10.1039/d2ta04688a	*J Mater Chem A Mater, 2022, **10**, 20847–*

			20855
FeCoPd	197	https://doi.org/10.1039/d2ta04436f	*J Mater Chem A Mater*, 2022, **10**, 23731–23743
HCl-c-NiFe	197 at 100 mA cm^{-2}	https://doi.org/10.1039/d0nr05458e	*Nanoscale, 2020,* ***12****, 21743–21749.*
Ni−Fe−S@GIP	197	https://doi.org/10.1002/cssc.202100891	*ChemSusChem*, 2021, **14**, 3131–3138.
$(Ni,Fe)O_xH_y/Ni/Cu$	199	https://doi.org/10.1039/C9CY02328C	*Catal Sci Technol*, 2020, **10**, 1803–1808.
FeS-RGS|NF	200	https://doi.org/10.1039/d1nr04138j	*Nanoscale*, 2021, **13**, 14837–14846
FeCoNiWCuOOH@Cu	200	https://doi.org/10.1002/advs.202406008	Adv. Sci. 2024, **11**, 2406008
Co_3O_4–C/FeMoP/NF	200 at 20 mA cm^{-2}	https://doi.org/10.1016/j.ijhydene.2021.07.103	*Int J Hydrogen Energy*, 2021, **46**, 32846–32857.
NiCoP/NF	203	https://doi.org/10.1016/j.ceramint.2022.09.035	*Ceram Int*, 2023, **49**, 659–668.
$CuCo_2B$	204 at 100 mA cm^{-2}	https://doi.org/10.1021/acssuschemeng.2c06708	*ACS Sustain Chem Eng*, 2023, **11**, 2541–2553
$NiFe_{A-S}$/NF	205	https://doi.org/10.1016/j.apcatb.2022.122165	*Appl Catal B*, 2023, **323**, 122165.
Fe-CoP/$Ni(OH)_2$	206	https://doi.org/10.1002/adfm.202101578	*Adv Funct Mater, 2021,* ***31****, 2101578*
Ni_3Te_2 -Au	210	https://doi.org/10.1039/c8ta01760c	*J Mater Chem A Mater*, 2018,

			6, 7608–7622
$NiFeCoS_x/FeNi_3$	210	https://doi.org/10.1039/d1ta07504g	*J Mater Chem A Mater, 2022, **10**, 5442–5451.*
SSF@NiFe-120	210	https://doi.org/10.1021/acssuschemeng.0c03017	*ACS Sustain Chem Eng, 2020, **8**, 9885–9895.*
CCF-1	210	https://doi.org/10.1016/j.cej.2020.126513	*Chemical Engineering Journal*, 2021, **404**, 126513.
FeNiSSe	213	https://doi.org/10.1016/j.jallcom.2020.156736	*J Alloys Compd*, 2021, **852**, 156736
NSC@NiFe	214	https://doi.org/10.1016/j.carbon.2020.06.022	*Carbon N Y*, 2020, **167**, 548–558.
FeNi (Oxy) Hydroxide	215	https://doi.org/10.1002/cctc.201900718	*ChemCatChem, 2019, **11**, 3004–3009.*
NiMo-Fe	217	https://doi.org/10.1016/j.apcatb.2022.121150	*Appl Catal B*, 2022, **307**, 121150
$Ni_{3.2}Co_{4.2}MnP_{6.5}$	218 at 50 mA cm^{-2}	https://doi.org/10.1039/d4ee00042k	*Energy Environ Sci*, 2024, **17**, 5200–5215
$Cu_{0.50}Fe_{0.50}$/NF	218	https://doi.org/10.1002/smll.201905884	*Small, 2020, **16**, 1905884*
$NiCo_2O_4$ (MNCO)	218	https://doi.org/10.1016/j.jallcom.2024.175375	*J Alloys Compd*, 2024, **1002**, 175375.
$Fe_{0.5}Ni_{0.5}$/40% C	219	https://doi.org/10.1002/smll.202203340	*Small*, *2020, **18,** 2203340*
NiFe-LDH/Raney-Ni	219	https://doi.org/10.1016/j.apcata.2024.119858	*Appl Catal A Gen*, 2024, **683**, 119858
$Fe-Co(OH)_2/Fe_2O_3$	219	https://doi.org/10.1002/adfm.2023052	*Adv Funct*

		43	*Mater, 2023, **33**, 2305243*
Fe -NiFe(OH)	220	https://doi.org/10.1039/d1ta10103j	*J Mater Chem A Mater, 2022, **10**, 8989–9000.*
Fe−Ni_3S_2/2OX	220	https://doi.org/10.1021/acssuschemeng.2c02456	*ACS Sustain Chem Eng*, 2022, **10**, 14396–14406.
FeCoNiO_x/C/NF	221	https://doi.org/10.1016/j.apcatb.2023.122717	*Appl Catal B*, 2023, **332**, 122717.
HS-Te-NiCo-LDH/NiO/NF	221	https://doi.org/10.1039/d1ma00688f	*Mater Adv*, 2022, **3**, 1286–1294
NiFe/NiFe−OH	222	https://doi.org/10.1016/j.apcatb.2020.119326	*Wang, Appl Catal B, 2020, **278**, 119326.*
CoPx/FeOOH	222	https://doi.org/10.1016/j.apcatb.2020.119326	Applied Catalysis B: Environmental 294 (2021) 120256
Ni-Fe-S	223	https://doi.org/10.1039/d1nj02382a	*New Journal of Chemistry*, 2021, **45**, 12996–13003
Graphene quantum dots (GQDs)	223 at 50 mA cm^{-2}	https://doi.org/10.1016/j.cej.2024.151436	*Chemical Engineering Journal*, 2024, **489**, 151436.
Co_6Mo_6C/MoC/Co	223	https://doi.org/10.1016/j.apcatb.2023.122474	*Appl Catal B*, 2023, **328**, 122474.
NiCo-LDH@FeOOH/CFP	224	https://doi.org/10.1016/j.nanoen.2019.104367	*Nano Energy*, 2020, **69**, 104367
NiCo-LDH@FeOOH	224	https://doi.org/10.1016/j.nanoen.2019.104367	*Nano Energy*,

			2020, **69**, 104367
rGO/SnTe	226	https://doi.org/10.1002/er.8685	*Int J Energy Res*, 2022, **46**, 24622–24632
Co_9Se_8/Co9S_8/CoO (Co-S-Se)	226	https://doi.org/10.1038/s41427-022-00398-0	*NPG Asia Mater*, 2022, **14**, 55.
FeOx@hcp Ni	226	https://doi.org/10.1016/j.apcatb.2020.119687	*Appl Catal B*, 2021, **284**, 119687.
NiFeCoPrO-Au/NF	228 at 60 mA cm^{-2}	http://dx.doi.org/10.1021/acs.inorgchem.9b02230	*Inorg Chem*, 2019, **58**, 15841–15852
FeCoNiP/CF	228	https://doi.org/10.1016/j.solidstatesciences.2023.107205	Solid State Sciences 141 (2023) 107205
Br-SSM	228	https://doi.org/10.1016/j.jcis.2024.07.043	*Colloid Interface Sci*, 2024, **675**, 1011–1020.
NiFeMo/NF	230 at 20 mA cm^{-2}	https://doi.org/10.1016/j.electacta.2017.12.110	*Electrochim Acta*, 2018, **260**, 477–482
CCW-KOH-600	230	https://doi.org/10.1016/j.chphi.2023.100175	*Chemical Physics Impact*, 2023, **6**, 100175
N–NiFe LDH	230	https://doi.org/10.1002/aenm.201500936	*Adv Energy Mater,, 2015,* ***5****, 1500936*
Ni4 Mo/MoO2 -550	230	https://doi.org/10.1002/smtd.202201659	*Small Methods, 2023, 7, 2201659*
Ni/NiO@CoFe	230	https://doi.org/10.1002/cssc.201900479	ChemSusChem 2019, 12, 2773 – 2779
$Co(OH)_2$	230	https://doi.org/10.1016/j.electacta.2022.140071	*Electrochim Acta*, 2022, **411**, 140071.

$CoFeWO_x$	231	https://doi.org/10.1002/aenm.202002593	*Adv Energy Mater, 2020, **10**, 2002593*
2h-Ni/NiO SPE	231	https://doi.org/10.1039/d0ra10597j	*RSC Adv*, 2021, **11**, 14654–14664
CoP@a-CoOx	232	https://doi.org/10.1002/advs.201800514	*Advanced Science, 2018, **5**, 1800514*
ZnFe2O4@Zn(Fe)OOH	232	https://doi.org/10.1002/celc.202000834	*ChemElectroChem*, 2020, **7**, 3478–3486
NFO-S5	232 at 100 mA cm^{-2}	https://doi.org/10.1016/j.apcatb.2021.121030	*Appl Catal B*, 2022, **305**, 121030.
AB@NiFeSx	232.2	https://doi.org/10.1007/s12274-021-3800-6	*Nano Res*, 2022, **15**, 1901–1908.
Cu@FeCN	234 at 20 mA cm^{-2}	https://doi.org/10.1021/acs.energyfuels.3c03233	*Energy & Fuels*, 2023, **37**, 16588–16598
RuCu NSs/C-350 °C	234	https://doi.org/10.1002/anie.201908092	*Angewandte Chemie International Edition, 2019, **58**, 13983–13988.*
FeCoNi AG	235	https://doi.org/10.1016/j.cej.2021.132955	*Chemical Engineering Journal*, 2022, **430**, 132955.
$Co_{0.75}Ni_{0.25}(OH)_2$	235	https://doi.org/10.1002/smll.201804832	*Small 2019, **15**, 1804832*
$Mn\text{-}FeP/Co_3(PO_4)_2$	237	https://doi.org/10.1002/cssc.201802437	*ChemSusChem, 2019, **12**, 1334–1341.*
$Ni_2P_2O_7·8H_2O/SS$	239	https://doi.org/10.1016/j.jallcom.2018.11.213	*J Alloys Compd, 2019, 7**79**, 49–58.*

NiFe/TiO_2	240	https://doi.org/10.1016/j.jallcom.2024.175729	*J Alloys Compd*, 2024, **1004**, 175729
5%-Ir-MnO_2	240	https://doi.org/10.1039/d2se00701k	Sustainable Energy Fuels, 2022, 6, 3649–3657
FeNi/CoCH/Ni	240 at 20 mA cm^{-2}	https://doi.org/10.1039/d1nr08035k	*Nanoscale*, 2022, **14**, 3191–3199
$Ru_xCr_{1-x}O_y$_20	240	https://doi.org/10.1039/d3ta05897b	*J Mater Chem A Mater, 2023,* ***11****, 26626–26635.*
Te@FeOOH/NF	241	https://doi.org/10.1002/celc.202100703	*ChemElectroChem*, 2021, **8**, 3643–3650
Ag/NCMO/NF	243	https://doi.org/10.1002/adfm.202107056	*Adv Funct Mater, 2022,* ***32****, 2107056*
Ag/NCMO/NF	243	https://doi.org/10.1002/adfm.202107056	*Adv Funct Mater*, 2021, **32**, 2107056
FeOOH/$Ni(OH)_2$	245 at 50 mA cm^{-2}	https://doi.org/10.1039/c9nr08297b	*Nanoscale, 2020,* ***12****, 983–990.*
Cobalt oxyhydroxide(CoOOH)	245	https://doi.org/10.1016/j.electacta.2019.02.083	*Electrochim Acta*, 2019, **303**, 231–238.
NiFeOOH/NFF	245 at 100 mA cm^{-2}	https://doi.org/10.1016/j.ijhydene.2023.11.221	*Int J Hydrogen Energy*, 2024, **55**, 464–473.
FeOOH/Ni/NiO/TM	246 at 50 mA cm^{-2}	https://doi.org/10.1039/d4nj01114g	*New Journal of Chemistry*, 2024, **48**, 9954–9960
Ru-NiFe LDH	246	http://dx.doi.org/10.1149/1945-7111/ac4cda	*J Electrochem Soc*, 2022,

			169, 024503.
n-MOF/CuO	247	https://doi.org/10.1016/j.fuel.2023.127638	*Fuel*, 2023, **341**, 127638
Ir–Te NWs	248	https://doi.org/10.1007/s12274-021-3603-9	*Nano Res, 2022, **15**, 1087–1093.*
Fe@Co-MOFs	248 at 50 mA cm^{-2}	https://doi.org/10.1039/D2DT01837C	*Dalton Transactions*, 2022, **51**, 15446–15457.
MIL-88A/Ni(OH)$_2$-CC	250	https://doi.org/10.1039/c9ta12865d	*J Mater Chem A Mater*, 2020, **8**, 3311–3321
FeNiO$_x$(OH)$_{y-2}$	250	https://doi.org/10.1016/j.jcis.2021.02.020	*Colloid Interface Sci*, 2021, **591**, 307–313
Ru/IrO$_x$ NPs	250 at 3 mA cm^{-2}	https://doi.org/10.1016/j.electacta.2020.136058	*Electrochim Acta, 2020, **341**, 136058.*
Mn$_{1-x}$Ni$_x$Co$_2$O$_4$/rGO (x=0.6)	250	https://doi.org/10.1016/j.ijhydene.2019.12.164	*Int J Hydrogen Energy, 2020, **45**, 6391–6403.*
(Fe, Hf)CoOOH/Co(OH)$_2$	250	https://doi.org/10.1039/D4QI00823E	*Inorg Chem Front*, 2024, **11**, 5449–5457.
r-BS+G	250	https://doi.org/10.1016/j.cej.2023.144489	*Chemical Engineering Journal*, 2023, **471**, 144489.
F$_3$S$_4$/NF	251	https://doi.org/10.1021/acs.jpcc.2c05196	*The Journal of Physical Chemistry C*, 2022, **126**, 16172–16186.
Ir-NFO/NF	251 at 100 mA cm^{-2}	https://doi.org/10.1002/adfm.202209543	*Adv Funct Mater*, 2023, **33**, 2209543.

FeCoNiOOH	252 at mA cm^{-2}	https://doi.org/10.1016/j.jmst.2021.08.083	*J Mater Sci Technol, 2022,* ***110****, 128–135.*
WCoP/CC	252	https://doi.org/10.1002/celc.201901417	*ChemElectroChem, 2019,* ***6****, 5229–5236.*
NiCe@NiFe/NF-N	254 at 100 mA cm^{-2}	https://doi.org/10.1016/j.apcatb.2019.118199	*Appl Catal B*, 2020, **260**, 118199
S-FeOOH$_{+1000}$/IF	254 at 100 mA cm^{-2}	https://doi.org/10.1016/j.apcatb.2022.121571	*Appl Catal B, 2022,* ***315****, 121571.*
Ni/NiFeMoO$_x$/NF	255	https://doi.org/10.1002/advs.201902034	*Advanced Science, 2020, 7, 1902034*
Ag@NiV0.2Co0.2	255	https://doi.org/10.1016/j.cej.2021.131662	*Chemical Engineering Journal*, 2021, **425**, 131662.
(CrFeCoNiMo)$_3$O$_4$	255.3	https://doi.org/10.1002/adfm.202309438	*Adv Funct Mater*, 2023, **34**, 2309438
FeOOH–NiCoMo LDH/NF	256 at 50 mA cm^{-2}	https://doi.org/10.1039/D2NJ00867J	*New Journal of Chemistry*, 2022, **46**, 7999–8009
NiFeCMo-30	256	https://doi.org/10.1016/j.ijhydene.2018.11.168	*Int J Hydrogen Energy, 2019,* ***44****, 1336–1344.*
NiFe-HD/pre-NF	256 at 100 mA cm^{-2}	https://doi.org/10.1039/D1DT02195H	*Dalton Transactions*, 2021, **50**, 12547–12554.
CoGa LDH/SSM	258	https://doi.org/10.1002/smtd.201800286	*Small Methods, 2019,* ***3****, 1800286*
NiFe-LDH pyramid	258	https://doi.org/10.1038/s41598-021-04347-9	*Sci Rep, 2022,* ***12,***

			346.
$Pt_{34}Fe_5Ni20Cu_{31}Mo_9Ru$ HEA	259	https://doi.org/10.1002/smll.202204255	*Small*, 2022, **18**, 2204255.
NiFe0.5Sn-A	260	https://doi.org/10.1002/advs.201903777	*Advanced Science, 2020, 7, 1903777*
FeCoNiS / NF	260 at mA cm^{-2}	https://doi.org/10.1002/cssc.202200590	*ChemSusChem, 2022, 15, e202200590.*
$Zn\text{-}NiCoO_{x\text{-}z}/SSM$	260 at 50 mA cm^{-2}	https://doi.org/10.1016/j.jcis.2023.02.142	*J Colloid Interface Sci*, 2023, **640**, 737–749.
FCMOS	260	https://doi.org/10.1039/D1TA00457C	*J Mater Chem A Mater*, 2021, **9**, 9858–9863.
Ag−Co(OH) 2 on DNA	260 at 50mA cm^{-2}	https://dx.doi.org/10.1021/acs.inorgchem.0c03569	*Inorg Chem*, 2021, **60**, 2680–2693.
FeOOH@NiOOH/NF	261 at 20 mA cm^{-2}	https://doi.org/10.1016/j.jcis.2024.09.219	*J Colloid Interface Sci*, 2025, **679**, 487–495.
$Ni_2P\text{-}Fe_2P$	261 at 100 mA cm^{-2}	https://doi.org/10.1002/adfm.202006484	*Adv Funct Mater*, 2020, **31**, 2006484
Ni_3N/NF	262	https://doi.org/10.1039/D1MA00130B	*Mater Adv*, 2021, **2**, 2299–2309.
Ni/Fe^{3+} *foam*	262	https://doi.org/10.1039/d0ta02858d	*J Mater Chem A Mater, 2020, 8, 12603–12612.*
FeNi-LDH/MOF/CC-36	263 at 100 mA cm^{-2}	https://doi.org/10.1016/j.cej.2024.152721	*Chemical Engineering Journal*, 2024, **493**, 152721
$CoCr_{0.7}Rh_{1.3}O_4$	263	https://doi.org/10.1002/adfm.202301559	*Adv Funct Mater, 2023, **33**, 2301559*
Fe−N−C/Fe NP 300	263	https://doi.org/10.1002/cctc.20240078	*ChemCatChe*

		6	*m*, 2024, **16**, e202400786
NiCeWO$_{x-2}$	263	https://doi.org/10.1002/celc.202200093	*ChemElectroChem*, 2022, **9**, e202200093
NiFeBx	263 ± 14	https://doi.org/10.1002/adfm.202101820	*Adv Funct Mater*, 2021, **31**, 2101820
FeCoMo-Se	264	https://doi.org/10.1039/C9TA14133B	*J Mater Chem A Mater*, 2020, **8**, 7925–7934.
np-NiMnFeMo	265	https://doi.org/10.1016/j.cej.2020.126530	*Chemical Engineering Journal*, 2021, **404**, 126530
CC/Co(OH)$_2$/CoSe	268 at 20 mA cm^{-2}	https://doi.org/10.1039/c9na00725c	*Nanoscale Adv, 2020,* ***2****, 792–797.*
S–Ni-800	268	https://doi.org/10.1039/d2qi00226d	*Inorg Chem Front, 2022,* ***9****, 1973–1983.*
Te-Co$_3$Se$_4$	269 at 50 mA cm^{-2}	https://doi.org/10.1016/j.jcis.2024.01.026	*J Colloid Interface Sci*, 2024, **659**, 767–775
CuWO4@rGO	270 at 1.0 mA cm^{-2}	https://doi.org/10.1039/d1nj04617a	*New Journal of Chemistry*, 2022, **46**, 1267–1272
Fe$_{1.0}$Co$_{1.1}$Ni$_{1.4}$–NC	270	https://doi.org/10.1039/C9TA13637A	*J Mater Chem A Mater*, 2020, **8**, 9021–9031.
La$_{0.9}$Ce$_{0.1}$NiO$_3$	270	https://doi.org/10.1002/aenm.202003755	*Adv Energy Mater, 2021,* ***11****, 2003755*
PtRu$_2$/PF	270	https://doi.org/10.1016/j.jcis.2021.01.049	*J Colloid Interface Sci*, 2021, **590**, 154–163

$Ru_{0.5}Ir_{0.5}O_2$ NPs	270	https://doi.org/10.1016/j.ijhydene.2019.10.179	*Int J Hydrogen Energy, 2020, **45**, 46–55.*
Cu_2S nanorods	270	https://doi.org/10.1039/d0nj00909a	*New Journal of Chemistry, 2020, **44**, 8771–8777.*
NiCo-LDH	270 at 20 mA cm^{-2}	https://doi.org/10.1039/d0se00899k	*Sustain Energy Fuels, 2020, **4**, 5254–5263.*
NiFeMn LH	270 at 50 mA cm^{-2}	https://doi.org/10.1016/j.cej.2024.154215	*Chemical Engineering Journal*, 2024, **496**, 154215.
Co S-$NiFe_2O_4$	270 at 500 mA cm^{-2}	https://doi.org/10.1016/j.colsurfa.2022.130682	*Colloids Surf A Physicochem Eng Asp*, 2023, **658**, 130682.
NiFeCo/C	271	https://doi.org/10.1039/d1ta07591h	*J Mater Chem A Mater*, 2021, **9**, 27034–27040
$(Co_{0.21}Ni_{0.25}Cu_{0.54})_3Se_2$	272	https://doi.org/10.1039/c9ta00863b	*J Mater Chem A Mater*, 2019, **7**, 9877–9889
FN-2	275	https://doi.org/10.1002/smll.201903410	Small,2019, **15**, 1903410
$CoFe_2O_4$	275	https://doi.org/10.1039/D0CE00401D	*CrystEngComm*, 2020, **22**, 4317–4323.
α-$Co(OH)_2$/Co_3O_4/CC	275	https://doi.org/10.1039/D1CY00240F	*Catal Sci Technol*, 2021, **11**, 3706–3714.

LiFeBPO/NF	276 at 100 mA cm^{-2}	https://doi.org/10.1002/adfm.202303702	*Adv Funct Mater*, 2023, **33**, 2303702
SS Mesh	277	https://doi.org/10.1039/c9ra07258f	*RSC Adv*, 2019, **9**, 31563–31571
Co_2C-NiTe/SS	279	https://doi.org/10.1016/j.fuel.2024.132445	*Fuel*, 2024, **375**, 132445
(Fe-Ni)Co_x−OH	280	https://doi.org/10.1016/j.apcatb.2019.118338	*Appl Catal B, 2020,* ***263****, 118338.*
$Ni_{0.34}Co_{0.46}Ir_{0.2}O$	280	https://doi.org/10.1016/j.apcatb.2018.10.041	*Appl Catal B, 2019,* ***244****, 295–302.*
CoO_x	280	https://doi.org/10.1021/acs.energyfuels.4c00433	*Energy & Fuels*, 2024, **38**, 6938–6949.
FeP–CoP/NC/CC	281	https://doi.org/10.1038/s41467-021-24284-5	*Nat Commun, 2021,* ***12****, 4143.*
Co-Fe-S NFs@MS/NF	281 at 100 mA cm^{-2}	https://doi.org/10.1016/j.electacta.2020.137038	*Electrochim Acta*, 2020, **361**, 137038
Fe-doped NiSe NSs/CNTs	282.7	https://doi.org/10.1039/D1TA07393A	*J Mater Chem A Mater*, 2022, **10**, 3102–3111.
CoPx@FeOOH	283 at 100 mA cm^{-2}	https://doi.org/10.1016/j.apcatb.2021.120256	*Appl Catal B*, 2021, **294**, 120256.
$Co(OH)_x$/Ag/$Co(OH)_2$	283	https://doi.org/10.1016/j.jallcom.2021.161674	*J Alloys Compd*, 2021, **889**, 161674.
CCHH/MWCNT	285	https://doi.org/10.1016/j.jpowsour.2014.12.092	*Power Sources*, 2015, **278**, 464–472
ZIF-67@CNT	285	https://doi.org/10.1016/j.electacta.2022.141593	*Electrochim Acta*, 2023, **439**, 141593.
$Fe_{59}Co_{41}$	285	https://doi.org/10.1016/j.apsusc.2022.	*Appl Surf*

		153041	*Sci*, 2022, **589**, 153041
$Co_{0.6}Fe_{0.2}W_{0.2}S_{\delta}$	286	https://doi.org/10.1002/smll.202107249	*Small, 2022, **18**, 2107249*
Co/$CoTe_2$-240	286	https://doi.org/10.1039/d0qi00372g	*Inorg Chem Front, 2020, 7, 2523–2532.*
N-Ni_1Co4-S	286.2	https://doi.org/10.1016/j.apsusc.2022.153173	*Appl Surf Sci*, 2022, **591**, 153173.
$CuCo_2O_4$/CC	288	https://doi.org/10.1016/j.jcis.2020.04.100	*J Colloid Interface Sci, 2020, **576**, 476–485.*
CuS@15%AgInSe2–NF	289	https://doi.org/10.1016/j.ceramint.2024.01.197	*Ceram Int*, 2024, **50**, 12905–12914
CNT-CoS_2	290	https://doi.org/10.1039/c7nr01293d	*Nanoscale*, 2017, **9**, 6886–6894
(Ni-Fe)S_x/NiFe$(OH)_y$	290 at 100 mA cm^{-2}	https://doi.org/10.1016/j.apcatb.2019.01.082	*Appl Catal B, 2019, **246**, 337–348.*
6MIM-MoCo	290	https://doi.org/10.1002/cssc.202101666	*ChemSusChem*, 2021, **15**, e202101666
Re/ ReS_2-7H/CC	290	https://doi.org/10.1002/smll.202003007	*Small 2020, **16,** 2003007*
FeVOx/NP	290 mV at 500 mA cm^{-2}	https://doi.org/10.1021/jacs.3c02288	*J Am Chem Soc*, 2023, **145**, 12206–12213.
$PrBa_{0.5}Sr_{0.5}Co_{2-x}Fe_xO_{5+\delta}$ (PBSCF)	290	https://doi.org/10.1039/D1TA08445C	*J Mater Chem A Mater*, 2022, **10**, 2271–2279.
Fe-SAC@COF	290	https://doi.org/10.1016/j.xpro.2022.101626	*STAR Protoc*, 2022, **3**, 101626.
P-NiO/NiCo2O4	290	https://doi.org/10.1016/j.jallcom.2022.166338	*J Alloys Compd*, 2022, **925**, 166338.

FeCoNiMnOOH	291 at 100 mA cm^{-2}	https://doi.org/10.1016/j.jclepro.2022.131680	*J Clean Prod, 2022, 356, 131680.*
$Ni_{0.26}$ Co $_{0.74}$ Se/NF	291 at 50 mA cm^{-2}	https://doi.org/10.1016/j.jpcs.2020.109658	*Journal of Physics and Chemistry of Solids, 2021, **148**, 109658.*
$Ni_{0.26}Co0_{.74}Se/NF$	291 at 50 mA cm^{-2}	https://doi.org/10.1016/j.jpcs.2020.109658	*Journal of Physics and Chemistry of Solids*, 2021, **148**, 109658
NiCo-Bpy-BTC	292	https://doi.org/10.1016/j.electacta.2022.141714	*Electrochim Acta*, 2023, **439**, 141714.
$CoCr_2O_4$	293	https://doi.org/10.1021/acs.inorgchem.2c03840	*Inorg Chem*, 2023, **62**, 2726–2737.
$CoFe(OH)_x$-2	293	https://doi.org/10.1039/c9cy02092f	*Catal Sci Technol*, 2020, **10**, 215–221
$W_{0.1}Ni(OH)_2/NiOOH$	293 at 50 mA cm^{-2}	https://doi.org/10.1021/acsanm.1c04359	*ACS Appl Nano Mater*, 2022, **5**, 2664–2677
Co−Fe−O−B-10	294	https://dx.doi.org/10.1021/acsaem.0c01040	*ACS Appl Energy Mater, 2020, **3**, 7619–7628.*
$Co_{3-x}Fe_xO_4$-0.01	294	https://doi.org/10.1039/D1DT03936A	*Dalton Transactions*, 2022, **51**, 3137–3145.
HN-Ru/RuO_2	295	https://doi.org/10.1039/d3na00899a	*Nanoscale Adv*, 2024, **6**, 867–875
$CoWO_{4-x}$/C	295	https://doi.org/10.1016/j.apcatb.2019.118090	*Appl Catal B, 2019, **259**, 118090.*
$NiCo_{2-x}Mn_xO_4$	296	https://doi.org/10.1039/d4ta02978j	*J Mater Chem A Mater*, 2024, **12**, 21956–

			21970
$NiCrFeO_4$	296	https://doi.org/10.1016/j.jiec.2021.06.015	*Journal of Industrial and Engineering Chemistry*, 2021, **101**, 178–185.
Fe-Co-S/Cu_2O/Cu	297 at 20 mA cm^{-2}	https://doi.org/10.1016/j.apsusc.2021.150757	*Appl Surf Sci, 2021, **567**, 150757.*
$Fe_{0.64}Ni_{0.36}$	298	https://doi.org/10.1016/j.cattod.2019.09.046	*Catal Today*, 2020, **352**, 27–33
DO-$IrTe_2$ HNSs	298	https://doi.org/10.1002/adfm.202004375	*Adv Funct Mater, 2020, **30**, 2004375*
Cl-doped α-$Co(OH)_2$	298	https://doi.org/10.1039/c9dt02141h	*Dalton Transactions, 2019, 48, 12127–12136.*
$SnCo_2O_4$/rGO	299	https://doi.org/10.1016/j.ijhydene.2023.06.238	*Int J Hydrogen Energy*, 2024, **51**, 436–447
RGO-$ZnCo_2O_4$	300	https://doi.org/10.1016/j.ijhydene.2018.11.163	*Int J Hydrogen Energy*, 2019, **44**, 1565–1578
$Ni_2(dtbh\text{-}PLY)_2$	300	https://doi.org/10.1021/acs.inorgchem.4c00078	*Inorg Chem*, 2024, **63**, 9771–9785.
MnFeCoNi	302	https://doi.org/10.1016/j.jpowsour.2019.05.030	*J Power Sources*, 2019, **430**, 104–111
Cu-Zn-Ag	303 at 1.0 mA cm^{-2}	https://doi.org/10.1002/er.5989	*Int J Energy Res*, 2021, **45**, 2931–2944
CoS_x/FeS_x	304	https://dx.doi.org/10.1021/acscatal.9b05170	*ACS Catal*, 2020, **10**, 1855–1864.

NiSe/NF	306 at 100 mA cm^{-2}	https://doi.org/10.1016/j.electacta.2019.135549	*Electrochim Acta, 2020,* ***334****, 135549.*
CoO/NF	307	https://doi.org/10.1016/j.ijhydene.2020.01.085	*Int J Hydrogen Energy, 2020,* ***45****, 8031–8040.*
Co3O4@MWCNT	309	https://doi.org/10.1039/c4ta04641b	*J Mater Chem A Mater*, 2015, **3**, 1761–1768
NiDHBT films	310 at 250 mA cm^{-2}	http://dx.doi.org/10.1021/acsaem.9b00860	*ACS Appl Energy Mater, 2019,* ***2****, 5734–5743.*
$MnFe_2O_4$/NF	310	https://doi.org/10.1016/j.apsusc.2021.149124	*Appl Surf Sci, 2021,* ***546****, 149124.*
$CoCO_3$ PNSs	310	https://doi.org/10.1016/j.cej.2020.128066	*Chemical Engineering Journal, 2021,* ***417****, 128066.*
5%Ru-CoPO	310	https://doi.org/10.1016/j.mtchem.2022.101267	*Mater Today Chem*, 2022, **26**, 101267.
NrN@Ni	313	https://doi.org/10.1007/s10008-019-04299-1	*Journal of Solid State Electrochemistry, 2019,* ***23****, 2051–2060.*
NiFeP-Composite	313	https://doi.org/10.1002/er.8710	*Int J Energy Res*, 2022, **46**, 22078–22088.
NiO-D2	314	https://doi.org/10.1039/d2se00829g	*Sustain Energy Fuels, 2022,* ***6****, 4498–4505.*
Co_3Mo_3C/N	316	https://doi.org/10.1016/j.ijhydene.2021.04.084	*Int J Hydrogen*

			*Energy, 2021, **46**, 22268–22276.*
O-Ni-Fe/200-3	318	https://doi.org/10.20517/energymater.2022.19	*Energy Materials*, 2022, **2**, 200019
$Ni_{40}Fe_{40}B_{20}$	319	https://doi.org/10.1016/j.ijhydene.2022.04.200	*Int J Hydrogen Energy*, 2022, **47**, 20718–20728.
Co−Fe	319	https://doi.org/10.1021/jacs.3c08099	*J Am Chem Soc*, 2023, **145**, 23691–23701
Ru/RuO_2-200	320	https://doi.org/10.1002/eem2.12031	*ENERGY & ENVIRONMENTAL MATERIALS, 2019**, 2**, 201–208.*
$Zn0.4Mn_{0.6}Co_2O_4$/rGO	320	https://doi.org/10.1016/j.ijhydene.2020.03.231	*Int J Hydrogen Energy*, 2020, **45**, 14713–14727.
$HfNiSe_2$/rGO	320 at 20 mA cm^{-2}	https://doi.org/10.1002/cctc.202300562	*ChemCatChem*, 2023, **15**, e202300562
HP Ni–P	323 at 100 mA cm^{-2}	https://doi.org/10.1039/d0ta03739g	*J Mater Chem A Mater, 2020, **8**, 12069–12079.*
CoNi-PBA-2	326	https://doi.org/10.1021/acsami.1c10441	*ACS Appl Mater Interfaces*, 2021, **13**, 42715–42723.
Co-COF@MOF	328	https://doi.org/10.1002/smll.202308598	*Small, 2024, **20**, 2308598,*

			1- 8
A-CNT-CoSnS	330	https://doi.org/10.1039/C9NR09588H	*Nanoscale*, 2020, **12**, 3879–3887.
a c-FeOOH	330 at 300 mA cm^{-2}	https://doi.org/10.1002/cssc.202001229	*ChemSusChem, 2020, **13**, 4911–4915.*
Ir-SAs, Ir1/$Ni_{1.6}Mn_{1.4}O_4$	330 at 100 mA cm^{-2}	https://doi.org/10.1002/advs.202200529	*Advanced Science*, 2022, **9**, 2200529
Co3O4@KNbO3	330	https://doi.org/10.1016/j.matlet.2023.135178	*Mater Lett*, 2023, **352**, 135178.
NiCoFe-rGO	332	https://doi.org/10.1016/j.jcat.2019.08.006	*J Catal, 2019, **377**, 619–628.*
Rh(nP)/nC	333 at 5 mA cm^{-2}	https://doi.org/10.1039/d0nr05659f	*Nanoscale, 2020, **12**, 20165–20170.*
$La_{0.7}K_{0.3}CoO_{3-\delta}$	335	https://doi.org/10.1039/D2CP04708J	*Physical Chemistry Chemical Physics*, 2022, **24**, 28584–28598.
$NiCo_2O_4$	340	https://doi.org/10.1039/c4dt03803g	*Dalton Transactions*, 2015, **44**, 4148–4154
$Fe(ox)(H_2O)_2$/NF-(−1.4)-15	340 at 100 mA cm^{-2}	https://doi.org/10.1021/acs.inorgchem.1c00170	*Inorg Chem*, 2021, **60**, 5140–5152
$NiFe_2O_4$/CC	340	https://doi.org/10.1016/j.electacta.2019.134883	*Electrochim Acta, 2019, **324**, 134883.*
$NiCo_2O_4$	340	https://doi.org/10.1021/acsami.3c01196	*ACS Appl Mater Interfaces*, 2023, **15**, 26093–26103.
NiO_200 nm	345	https://doi.org/10.1039/D0MA00467G	*Mater Adv, 2020, **1**,*

			1971–1979.
CC/NCL-75	350	https://doi.org/10.1016/j.jpowsour.2021.229468	*J Power Sources, 2021, 488, 229468.*
evo-FeOOH	350	https://doi.org/10.1002/smll.202301715	*Small*, 2023, **19**, 2301715
CoPO	350	https://doi.org/10.1002/cctc.201901803	*ChemCatChem*, 2020, **12**, 2091–2096.
FeCoNi-ATNs (H)/NF	350 at 400 mA cm^{-2}	https://doi.org/10.1002/aenm.201901312	*Adv Energy Mater, 2019, **9**, 1901312*
Co-H/NiCo@NF	350 at 100 mA cm^{-2}	https://doi.org/10.1002/admi.202202349	*Adv Mater Interfaces*, 2023, **10**, 2202349
(CoP@NG)	354	https://doi.org/10.1016/j.electacta.2019.03.208	*Electrochim Acta*, 2019, **307**, 543–552.
CuO/Ni@400	364	https://doi.org/10.1016/j.jiec.2019.04.019	*Journal of Industrial and Engineering Chemistry*, 2019, **76**, 515–523
MAC	366	https://doi.org/10.1039/c6ra19333a	*RSC Adv*, 2016, **6**, 102422–102427
NiCu@NiCuOOH-NF	366	https://doi.org/10.1016/j.ijhydene.2022.03.139	*Int J Hydrogen Energy, 2022, **47**, 16080–16091.*
$NiFe_2O_4/CuWO_4$	370	https://doi.org/10.1039/d4cp00473f	*Physical Chemistry Chemical Physics*, 2024, **26**, 14883–14897
FeNi (1:1)	370 at 5	https://doi.org/10.1002/celc.20190048	*ChemElectro*

	mA cm^{-2}	3	*Chem, 2019, **6**, 3478–3487.*
NiSn(OH)$_6$@OOH	370	https://doi.org/10.1039/D1TA08531J	*J Mater Chem A Mater*, 2022, **10**, 1369–1379.
CoMnNiS	371	https://doi.org/10.1007/s10854-021-05860-3	*Journal of Materials Science: Materials in Electronics*, 2021, **32**, 12292–12307
α-CoGd(OH)$_2$/FTO	371	https://doi.org/10.1039/D4NR01743A	*Nanoscale*, 2024, **16**, 15629–15639.
NiCo-MOF@NiSb@GB	379 at 100 mA cm^{-2}	https://doi.org/10.1021/acsami.3c03021	*ACS Appl Mater Interfaces*, 2023, **15**, 34682–34697
(Ba$_{0.5}$Sr$_{0.5}$)$_{1-x}$Co$_{0.8}$Fe$_{0.2}$O$_{0.05}$	380	https://doi.org/10.1002/cjoc.202100215	*Chin J Chem*, 2021, **39**, 2692–2698
porous Co−P	380	https://dx.doi.org/10.1021/acssuschemeng.0c02671	*ACS Sustain Chem Eng, 2020, **8**, 10193–10200.*
FeCoNiB@B-VG	387	https://doi.org/10.1016/j.electacta.2021.138459	*Electrochim Acta, 2021, **386**, 138459.*
AgNPs@SBA-NH2	390	https://doi.org/10.1039/c8dt04159h	*Dalton Transactions*, 2019, **48**, 2220–2227
NiOOH–MnOOH/NF	391 at 100 mA cm^{-2}	https://doi.org/10.1039/D4QM00512K	*Mater Chem Front*, 2024, **8**, 3290–3299.
Ba$_{0.5}$Sr$_{0.5}$CoO$_3$	395	https://doi.org/10.1021/acs.energyfuel	*Energy &*

		s.2c00357	*Fuels, 2022,* ***36****, 3219–3228.*
$Ni_xCo_{1−x}O_y$	404	https://doi.org/10.1039/d1ra07304d	*RSC Adv*, 2022, **12**, 1694–1703
Fe3C@C/CNT	407	https://doi.org/10.1021/acs.energyfuels.3c01711	*Energy & Fuels*, 2023, **37**, 13260–13270.
AgNW@Cu2O	409	https://doi.org/10.1039/d4na00364k	*Nanoscale Adv*, 2024, **6**, 4426–4433
Co_3O_4	409	https://doi.org/10.1016/j.jallcom.2020.154919	*J Alloys Compd*, 2020, **836**, 154919
S0.95NCF	420 at 5 mA cm^{-2}	https://doi.org/10.1016/j.electacta.2017.10.172	*Electrochim Acta*, 2018, **259**, 1004–1010
Co Coating	438	https://doi.org/10.3390/ma14010092	*Materials, 2020,* ***14****, 92.*
MnO_2-Ni 0.02(M)	445	https://doi.org/10.1021/acs.inorgchem.1c03236	*Inorg Chem*, 2021, **60**, 19429–19439.
$Ni_{0.3}Co_{0.7}O$	450	https://doi.org/10.1039/d0ra03050c	*RSC Adv*, 2020, **10**, 17845–17853
Cu–EA	470	https://doi.org/10.1039/c6cc00526h	*Chemical Communications*, 2016, **52**, 5546–5549
rGO/$CoMoO_4$	475	https://doi.org/10.1002/celc.201900055	*ChemElectroChem*, 2019, **6**, 2524–2530
Li-bir/rGO	490	http://dx.doi.org/10.1149/2.0901908jes	*Soc, 2019,* ***166****, A1543–A1549.*
Gr/AME-Ni Fe10%	519	https://doi.org/10.1002/celc.201901541	*ChemElectroChem, 2019,* ***6****, 5633–*

			5641.
CWO-NPs	570	https://doi.org/10.1002/celc.201801196	*ChemElectroChem*, 2018, **5**, 3938–3945

Table S2: Recently reported OER overpotentials measured for the current density of 10 mA cm^{-2} (unless otherwise specified) against Ag/AgCl reference electrode for various catalysts listed in Figure 2a and Figure 2b (in main text) in 1.0 M KOH since 2019.

Catalyst	*η^{10}/mV*	*DOI*	*Bibliography*
CuCo/CP	80	https://doi.org/10.1016/j.molliq.2022.118635	*J Mol Liq*, 2022, **351**, 118635
MCC@Ag_45W	83	https://pubs.acs.org/doi/10.1021/acsaem.2c03455	ACS Appl Energy Mater, 2023, **6**, 2286–2295
NiSe/NF	136 at 100 mA cm^{-2}	http://dx.doi.org/10.1016/j.electacta.2016.12.070	*Electrochim Acta*, 2017, **224**, 412–418
MnFeO-NF-0.4	157	https://doi.org/10.1039/d0nr05864e	*Nanoscale*, 2020, **12**, 19992–20001
NiFeCoMnAl	190	https://doi.org/10.1016/j.apcatb.2021.120764	*Appl Catal B*, 2022, **301**, 120764
Ag_2Se/rGO	192	https://doi.org/10.1016/j.jallcom.2024.174626	*J Alloys Compd*, 2024, **993**, 174626
V-NiFe-LDH/NF	195	https://doi.org/10.1039/d0dt01520b	*Dalton Transactions*, 2020, **49**, 11217–11225
NiFe-LDH/N10TC/NF	196	https://doi.org/10.1002/cssc.202100043	*ChemSusChem*, 2021, **14**, 1948–1954
FeCoPd	197	https://doi.org/10.1039/d2ta04436f	*J Mater Chem A Mater*, 2022, **10**, 23731–23743
FeS-RGS|NF	200	https://doi.org/10.1039/d1nr04138j	*Nanoscale*, 2021, **13**, 14837–14846
$CuCo_2B$	204 at 100 mA cm^{-2}	https://doi.org/10.1021/acssuschemeng.2c06708	*ACS Sustain Chem Eng*, 2023, **11**, 2541–2553
Ni_3Te_2 -Au	210	https://doi.org/10.1039/c8ta01760c	*J Mater Chem A*

			Mater, 2018, **6**, 7608–7622
FeNiSSe	213	https://doi.org/10.1016/j.jallcom.2020.156736	*J Alloys Compd*, 2021, **852**, 156736
NiMo-Fe	217	https://doi.org/10.1016/j.apcatb.2022.121150	*Appl Catal B*, 2022, **307**, 121150
$Ni_{3.2}Co_{4.2}MnP_{6.5}$	218 at 50 mA cm^{-2}	https://doi.org/10.1039/d4ee00042k	*Energy Environ Sci*, 2024, **17**, 5200–5215
NiFe-LDH/Raney-Ni	219	https://doi.org/10.1016/j.apcata.2024.119858	*Appl Catal A Gen*, 2024, **683**, 119858
$Fe\text{-}Co(OH)_2/Fe_2O_3$	219	https://doi.org/10.1002/adfm.202305243	*Adv Funct Mater, 2023,* ***33****, 2305243*
HS-Te-NiCo-LDH/NiO/NF	221	https://doi.org/10.1039/d1ma00688f	*Mater Adv*, 2022, **3**, 1286–1294
Ni-Fe-S	223	https://doi.org/10.1039/d1nj02382a	*New Journal of Chemistry*, 2021, **45**, 12996–13003
NiCo-LDH@FeOOH/CFP	224	https://doi.org/10.1016/j.nanoen.2019.104367	*Nano Energy*, 2020, **69**, 104367
rGO/SnTe	226	https://doi.org/10.1002/er.8685	*Int J Energy Res*, 2022, **46**, 24622–24632
NiFeCoPrO-Au/NF	228 at 60 mA cm^{-2}	http://dx.doi.org/10.1021/acs.inorgchem.9b02230	*Inorg Chem*, 2019, **58**, 15841–15852
NiFeMo/NF	230 at 20 mA cm^{-2}	https://doi.org/10.1016/j.electacta.2017.12.110	*Electrochim Acta*, 2018, **260**, 477–482
CCW-KOH-600	230	https://doi.org/10.1016/j.chphi.2023.100175	*Chemical Physics Impact*, 2023, **6**, 100175
N–NiFe LDH	230	https://doi.org/10.1002/aenm.201500936	*Adv Energy Mater,, 2015,* ***5****, 1500936*
Ni4 Mo/MoO2 -550	230	https://doi.org/10.1002/smtd.202201659	*Small Methods, 2023, 7, 2201659*
$CoFeWO_x$	231	https://doi.org/10.1002/aenm.202002593	*Adv Energy Mater, 2020,* ***10****, 2002593*
2h-Ni/NiO SPE	231	https://doi.org/10.1039/d0ra10597j	*RSC Adv*, 2021, **11**, 14654–

			14664
CoP@a-CoOx	232	https://doi.org/10.1002/advs.201800514	*Advanced Science, 2018, **5**, 1800514*
$ZnFe_2O_4$@Zn(Fe)OOH	232	https://doi.org/10.1002/celc.202000834	*ChemElectroChem*, 2020, **7**, 3478–3486
Cu@FeCN	234 at 20 mA cm^{-2}	https://doi.org/10.1021/acs.energyfuels.3c03233	*Energy & Fuels*, 2023, **37**, 16588–16598
NiFe/TiO_2	240	https://doi.org/10.1016/j.jallcom.2024.175729	*J Alloys Compd*, 2024, **1004**, 175729
5%-Ir-MnO_2	240	https://doi.org/10.1039/d2se00701k	Sustainable Energy Fuels, 2022, 6, 3649–3657
FeNi/CoCH/Ni	240 at 20 mA cm^{-2}	https://doi.org/10.1039/d1nr08035k	*Nanoscale*, 2022, **14**, 3191–3199
Te@FeOOH/NF	241	https://doi.org/10.1002/celc.202100703	*ChemElectroChem*, 2021, **8**, 3643–3650
FeOOH/Ni/NiO/TM	246 at 50 mA cm^{-2}	https://doi.org/10.1039/d4nj01114g	*New Journal of Chemistry*, 2024, **48**, 9954–9960
n-MOF/CuO	247	https://doi.org/10.1016/j.fuel.2023.127638	*Fuel*, 2023, **341**, 127638
MIL-88A/$Ni(OH)_2$-CC	250	https://doi.org/10.1039/c9ta12865d	*J Mater Chem A Mater*, 2020, **8**, 3311–3321
$FeNiO_x(OH)_{y-2}$	250	https://doi.org/10.1016/j.jcis.2021.02.020	*Colloid Interface Sci*, 2021, **591**, 307–313
NiCe@NiFe/NF-N	254 at 100 mA cm^{-2}	https://doi.org/10.1016/j.apcatb.2019.118199	*Appl Catal B*, 2020, **260**, 118199
FeOOH–NiCoMo LDH/NF	256 at 50 mA cm^{-2}	https://doi.org/10.1039/D2NJ00867J	*New Journal of Chemistry*, 2022, **46**, 7999–8009
CoGa LDH/SSM	258	https://doi.org/10.1002/smtd.201800286	*Small Methods, 2019, **3**, 1800286*
NiFe0.5Sn-A	260	https://doi.org/10.1002/advs.201903777	*Advanced Science, 2020, 7, 1903777*
FeNi-LDH/MOF/CC-36	263 at 100 mA cm^{-2}	https://doi.org/10.1016/j.cej.2024.152721	*Chemical Engineering Journal*, 2024, **493**, 152721

np-NiMnFeMo	265	https://doi.org/10.1016/j.cej.2020.126530	*Chemical Engineering Journal*, 2021, **404**, 126530
Te-Co_3Se_4	269 at 50 mA cm^{-2}	https://doi.org/10.1016/j.jcis.2024.01.026	*J Colloid Interface Sci*, 2024, **659**, 767–775
CuWO4@rGO	270 at 1.0 mA cm^{-2}	https://doi.org/10.1039/d1nj04617a	*New Journal of Chemistry*, 2022, **46**, 1267–1272
$La_{0.9}Ce_{0.1}NiO_3$	270	https://doi.org/10.1002/aenm.202003755	*Adv Energy Mater, 2021, **11**, 2003755*
$PtRu_2$/PF	270	https://doi.org/10.1016/j.jcis.2021.01.049	*J Colloid Interface Sci*, 2021, **590**, 154–163
NiFeCo/C	271	https://doi.org/10.1039/d1ta07591h	*J Mater Chem A Mater*, 2021, **9**, 27034–27040
$(Co_{0.21}Ni_{0.25}Cu_{0.54})_3Se_2$	272	https://doi.org/10.1039/c9ta00863b	*J Mater Chem A Mater*, 2019, **7**, 9877–9889
FN-2	275	https://doi.org/10.1002/smll.201903410	Small,2019, **15**, 1903410
SS Mesh	277	https://doi.org/10.1039/c9ra07258f	*RSC Adv*, 2019, **9**, 31563–31571
Co_2C-NiTe/SS	279	https://doi.org/10.1016/j.fuel.2024.132445	*Fuel*, 2024, **375**, 132445
CCHH/MWCNT	285	https://doi.org/10.1016/j.jpowsour.2014.12.092	*Power Sources*, 2015, **278**, 464–472
$Co_{0.6}Fe_{0.2}W_{0.2}S_\delta$	286	https://doi.org/10.1002/smll.202107249	*Small, 2022, **18**, 2107249*
CuS@15%$AgInSe_2$–NF	289	https://doi.org/10.1016/j.ceramint.2024.01.197	*Ceram Int*, 2024, **50**, 12905–12914
CNT-CoS_2	290	https://doi.org/10.1039/c7nr01293d	*Nanoscale*, 2017, **9**, 6886–6894
$CoFe(OH)_x$-2	293	https://doi.org/10.1039/c9cy02092f	*Catal Sci Technol*, 2020, **10**, 215–221
$W_{0.1}Ni(OH)_2$/NiOOH	293 at 50 mA cm^{-2}	https://doi.org/10.1021/acsanm.1c04359	*ACS Appl Nano Mater*, 2022, **5**, 2664–2677
HN-Ru/RuO_2	295	https://doi.org/10.1039/d3na00899a	*Nanoscale Adv*, 2024, **6**, 867–875

$NiCo_{2-x}Mn_xO_4$	296	https://doi.org/10.1039/d4ta02978j	*J Mater Chem A Mater*, 2024, **12**, 21956–21970
$Fe_{0.64}Ni_{0.36}$	298	https://doi.org/10.1016/j.cattod.2019.09.046	*Catal Today*, 2020, **352**, 27–33
$SnCo_2O_4$/rGO	299	https://doi.org/10.1016/j.ijhydene.2023.06.238	*Int J Hydrogen Energy*, 2024, **51**, 436–447
RGO-$ZnCo_2O_4$	300	https://doi.org/10.1016/j.ijhydene.2018.11.163	*Int J Hydrogen Energy*, 2019, **44**, 1565–1578
MnFeCoNi	302	https://doi.org/10.1016/j.jpowsour.2019.05.030	*J Power Sources*, 2019, **430**, 104–111
Cu-Zn-Ag	303 at 1.0 mA cm^{-2}	https://doi.org/10.1002/er.5989	*Int J Energy Res*, 2021, **45**, 2931–2944
Co_3O_4@MWCNT	309	https://doi.org/10.1039/c4ta04641b	*J Mater Chem A Mater*, 2015, **3**, 1761–1768
O-Ni-Fe/200-3	318	https://doi.org/10.20517/energymater.2022.19	*Energy Materials*, 2022, **2**, 200019
Co−Fe	319	https://doi.org/10.1021/jacs.3c08099	*J Am Chem Soc*, 2023, **145**, 23691–23701
Co-COF@MOF	328	https://doi.org/10.1002/smll.202308598	*Small, 2024, **20**, 2308598, 1- 8*
$NiCo_2O_4$	340	https://doi.org/10.1039/c4dt03803g	*Dalton Transactions*, 2015, **44**, 4148–4154
Fe(ox)$(H_2O)_2$/NF-(−1.4)-15	340 at 100 mA cm^{-2}	https://doi.org/10.1021/acs.inorgchem.1c00170	*Inorg Chem*, 2021, **60**, 5140–5152
CuO/Ni@400	364	https://doi.org/10.1016/j.jiec.2019.04.019	*Journal of Industrial and Engineering Chemistry*, 2019, **76**, 515–523
MAC	366	https://doi.org/10.1039/c6ra19333a	*RSC Adv*, 2016, **6**, 102422–102427
$NiFe_2O_4$/$CuWO_4$	370	https://doi.org/10.1039/d4cp00473f	*Physical Chemistry Chemical Physics*, 2024, **26**, 14883–14897

CoMnNiS	371	https://doi.org/10.1007/s10854-021-05860-3	*Journal of Materials Science: Materials in Electronics*, 2021, **32**, 12292–12307
NiCo-MOF@NiSb@GB	379 at 100 mA cm^{-2}	https://doi.org/10.1021/acsami.3c03021	*ACS Appl Mater Interfaces*, 2023, **15**, 34682–34697
$(Ba_{0.5}Sr_{0.5})_{1-x}Co_{0.8}Fe_{0.2}O_{0.05}$	380	https://doi.org/10.1002/cjoc.202100215	*Chin J Chem*, 2021, **39**, 2692–2698
AgNPs@SBA-NH2	390	https://doi.org/10.1039/c8dt04159h	*Dalton Transactions*, 2019, **48**, 2220–2227
$Ni_xCo_{1-x}O_y$	404	https://doi.org/10.1039/d1ra07304d	*RSC Adv*, 2022, **12**, 1694–1703
$AgNW@Cu_2O$	409	https://doi.org/10.1039/d4na00364k	*Nanoscale Adv*, 2024, **6**, 4426–4433
Co_3O_4	409	https://doi.org/10.1016/j.jallcom.2020.154919	*J Alloys Compd*, 2020, **836**, 154919
S0.95NCF	420 at 5 mA cm^{-2}	https://doi.org/10.1016/j.electacta.2017.10.172	*Electrochim Acta*, 2018, **259**, 1004–1010
$Ni_{0.3}Co_{0.7}O$	450	https://doi.org/10.1039/d0ra03050c	*RSC Adv*, 2020, **10**, 17845–17853
Cu–EA	470	https://doi.org/10.1039/c6cc00526h	*Chemical Communications*, 2016, **52**, 5546–5549
$rGO/CoMoO_4$	475	https://doi.org/10.1002/celc.201900055	*ChemElectroChem*, 2019, **6**, 2524–2530
NiCo-LDH@FeOOH	224	https://doi.org/10.1016/j.nanoen.2019.104367	*Nano Energy*, 2020, **69**, 104367
CWO-NPs	570	https://doi.org/10.1002/celc.201801196	*ChemElectroChem*, 2018, **5**, 3938–3945

Table S3: Recently reported OER overpotentials measured for the current density of 10 mA cm^{-2} (unless otherwise specified) against Hg/Hg_2Cl_2 reference electrode for various catalysts listed in Figure 2a and Figure 2c (in main text) in 1.0 M KOH since 2019.

Catalyst	η^{10} / mV	*DOI*	*Bibliography*
FF-Na$_{500}$Ni$_{500}$	150 at 20 mA cm^{-2}	https://doi.org/10.1002/smll.202000663	*Small 2020, **16**, 2000663*
Co(OH)$_2$@HOS/CP	153 at 100 mA cm^{-2}	https://doi.org/10.1002/adfm.201909610	*Adv Funct Mater, 2020, **30**, 1909610*
C-Qds-Mn	166.71	https://doi.org/10.1016/j.jics.2022.100775	*Journal of the Indian Chemical Society, 2022, **99**, 100775.*
Pd/NiFeO$_x$	180	https://doi.org/10.1002/adfm.202107181	*Adv Funct Mater, 2021, **31**, 2107181*
np-NiAl-LDH/NF	180	https://doi.org/10.1039/d0se00050g	*Sustain Energy Fuels, 2020, **4**, 2850–2858.*
NiFe(OH)$_x$/(Ni, Fe)Se$_2$/CC	180	https://doi.org/10.1002/smll.202007334	*Small 2021, **17**, 2007334*
VOOH-3Fe	195	https://doi.org/10.1002/smll.201904688	*Small 2019, **15**, 1904688*
β-NiFeOOH/NF	196	https://doi.org/10.1039/d2ta04688a	*J Mater Chem A Mater, 2022, **10**, 20847–20855*
HCl-c-NiFe	197 at 100 mA cm^{-2}	https://doi.org/10.1039/d0nr05458e	*Nanoscale, 2020, **12**, 21743–21749.*
Fe-CoP/Ni(OH)$_2$	206	https://doi.org/10.1002/adfm.202101578	*Adv Funct Mater, 2021, **31**, 2101578*
NiFeCoS$_x$/FeNi$_3$	210	https://doi.org/10.1039/d1ta07504g	*J Mater Chem A Mater, 2022, **10**, 5442–5451.*
SSF@NiFe-120	210	https://doi.org/10.1021/acssuschemeng.0c03017	*ACS Sustain Chem Eng, 2020, **8**, 9885–9895.*
FeNi (Oxy) Hydroxide	215	https://doi.org/10.1002/cctc.201900718	*ChemCatChem, 2019, **11**, 3004–3009.*
Cu$_{0.50}$Fe$_{0.50}$/NF	218	https://doi.org/10.1002/smll.201905884	*Small, 2020, **16**, 1905884*
Fe -NiFe(OH)	220	https://doi.org/10.1039/d1ta10103j	*J Mater Chem A Mater, 2022, **10**, 8989–9000.*
NiFe/NiFe−OH	222	https://doi.org/10.1016/j.apcatb.2020.119326	*Wang, Appl*

			*Catal B, 2020, **278**, 119326.*
RuCu NSs/C-350 °C	234	https://doi.org/10.1002/anie.201908092	*Angewandte Chemie International Edition, 2019, **58**, 13983–13988.*
$Co_{0.75}Ni_{0.25}(OH)_2$	235	https://doi.org/10.1002/smll.201804832	*Small 2019, **15**, 1804832*
$Mn\text{-}FeP/Co_3(PO_4)_2$	237	https://doi.org/10.1002/cssc.201802437	*ChemSusChem, 2019, **12**, 1334–1341.*
$Ni_2P_2O_7{\cdot}8H_2O/SS$	239	https://doi.org/10.1016/j.jallcom.2018.11.213	*J Alloys Compd, 2019, **779**, 49–58.*
$Ru_xCr_{1-x}O_y\_20$	240	https://doi.org/10.1039/d3ta05897b	*J Mater Chem A Mater, 2023, **11**, 26626–26635.*
Ag/NCMO/NF	243	https://doi.org/10.1002/adfm.202107056	*Adv Funct Mater, 2022, **32**, 2107056*
$FeOOH/Ni(OH)_2$	245 at 50 mA cm^{-2}	https://doi.org/10.1039/c9nr08297b	*Nanoscale, 2020, **12**, 983–990.*
Ir–Te NWs	248	https://doi.org/10.1007/s12274-021-3603-9	*Nano Res, 2022, **15**, 1087–1093.*
Ru/IrO_x *NPs*	250 at 3 mA cm^{-2}	https://doi.org/10.1016/j.electacta.2020.136058	*Electrochim Acta, 2020, **341**, 136058.*
$Mn_{1-x}Ni_xCo_2O_4/rGO$ $(x=0.6)$	250	https://doi.org/10.1016/j.ijhydene.2019.12.164	*Int J Hydrogen Energy, 2020, **45**, 6391–6403.*
FeCoNiOOH	252 at mA cm^{-2}	https://doi.org/10.1016/j.jmst.2021.08.083	*J Mater Sci Technol, 2022, **110**, 128–135.*
WCoP/CC	252	https://doi.org/10.1002/celc.201901417	*ChemElectroChem, 2019, **6**, 5229–5236.*
$S\text{-}FeOOH_{+1000}/IF$	254 at 100 mA cm^{-2}	https://doi.org/10.1016/j.apcatb.2022.121571	*Appl Catal B, 2022, **315**, 121571.*
$Ni/NiFeMoO_x/NF$	255	https://doi.org/10.1002/advs.201902034	*Advanced Science, 2020, **7**, 1902034*
NiFeCMo-30	256	https://doi.org/10.1016/j.ijhydene.2018.11.168	*Int J Hydrogen Energy, 2019, **44**, 1336–1344.*
NiFe-LDH pyramid	258	https://doi.org/10.1038/s41598-021-04347-9	*Sci Rep, 2022, **12,** 346.*

FeCoNiS / NF	260 at mA cm^{-2}	https://doi.org/10.1002/cssc.202200590	*ChemSusChem, 2022, 15, e202200590.*
Ni/Fe^{3+} foam	262	https://doi.org/10.1039/d0ta02858d	*J Mater Chem A Mater, 2020, 8, 12603–12612.*
$CoCr_{0.7}Rh_{1.3}O_4$	263	https://doi.org/10.1002/adfm.202301559	*Adv Funct Mater, 2023, **33**, 2301559*
CC/$Co(OH)_2$/CoSe	268 at 20 mA cm^{-2}	https://doi.org/10.1039/c9na00725c	*Nanoscale Adv, 2020, **2**, 792–797.*
S–Ni-800	268	https://doi.org/10.1039/d2qi00226d	*Inorg Chem Front, 2022, **9**, 1973–1983.*
$Ru_{0.5}Ir_{0.5}O_2$ NPs	270	https://doi.org/10.1016/j.ijhydene.2019.10.179	*Int J Hydrogen Energy, 2020, **45**, 46–55.*
Cu_2S nanorods	270	https://doi.org/10.1039/d0nj00909a	*New Journal of Chemistry, 2020, **44**, 8771–8777.*
NiCo-LDH	270 at 20 mA cm^{-2}	https://doi.org/10.1039/d0se00899k	*Sustain Energy Fuels, 2020, **4**, 5254–5263.*
(Fe-Ni)Co_x−OH	280	https://doi.org/10.1016/j.apcatb.2019.118338	*Appl Catal B, 2020, **263**, 118338.*
$Ni_{0.34}Co_{0.46}Ir_{0.2}O$	280	https://doi.org/10.1016/j.apcatb.2018.10.041	*Appl Catal B, 2019, **244**, 295–302.*
FeP–CoP/NC/CC	281	https://doi.org/10.1038/s41467-021-24284-5	*Nat Commun, 2021, **12**, 4143.*
Co/$CoTe_2$-240	286	https://doi.org/10.1039/d0qi00372g	*Inorg Chem Front, 2020, 7, 2523–2532.*
$CuCo_2O_4$/CC	288	https://doi.org/10.1016/j.jcis.2020.04.100	*J Colloid Interface Sci, 2020, **576**, 476–485.*
(Ni-Fe)S_x/NiFe$(OH)_y$	290 at 100 mA cm^{-2}	https://doi.org/10.1016/j.apcatb.2019.01.082	*Appl Catal B, 2019, **246**, 337–348.*
Re/ ReS_2-7H/CC	290	https://doi.org/10.1002/smll.202003007	*Small 2020, **16,** 2003007*
FeCoNiMnOOH	291 at 100 mA cm^{-2}	https://doi.org/10.1016/j.jclepro.2022.131680	*J Clean Prod, 2022, 356, 131680.*
$Ni_{0.26}Co_{0.74}$Se/NF	291 at 50 mA cm^{-2}	https://doi.org/10.1016/j.jpcs.2020.109658	*Journal of Physics and Chemistry of*

			Solids, 2021, ***148****, 109658.*
Co−Fe−O−B-10	294	https://dx.doi.org/10.1021/acsaem.0c01040	*ACS Appl Energy Mater, 2020,* ***3****, 7619–7628.*
$CoWO_{4-x}/C$	295	https://doi.org/10.1016/j.apcatb.2019.118090	*Appl Catal B, 2019,* ***259****, 118090.*
Fe-Co-S/Cu_2O/Cu	297 at 20 mA cm^{-2}	https://doi.org/10.1016/j.apsusc.2021.150757	*Appl Surf Sci, 2021,* ***567****, 150757.*
DO-$IrTe_2$ HNSs	298	https://doi.org/10.1002/adfm.202004375	*Adv Funct Mater, 2020,* ***30****, 2004375*
Cl-doped α-$Co(OH)_2$	298	https://doi.org/10.1039/c9dt02141h	*Dalton Transactions, 2019, 48, 12127–12136.*
NiSe/NF	306 at 100 mA cm^{-2}	https://doi.org/10.1016/j.electacta.2019.135549	*Electrochim Acta, 2020,* ***334****, 135549.*
CoO/NF	307	https://doi.org/10.1016/j.ijhydene.2020.01.085	*Int J Hydrogen Energy, 2020,* ***45****, 8031–8040.*
NiDHBT films	310 at 250 mA cm^{-2}	http://dx.doi.org/10.1021/acsaem.9b00860	*ACS Appl Energy Mater, 2019,* ***2****, 5734–5743.*
$MnFe_2O_4$/NF	310	https://doi.org/10.1016/j.apsusc.2021.149124	*Appl Surf Sci, 2021,* ***546****, 149124.*
$CoCO_3$ PNSs	310	https://doi.org/10.1016/j.cej.2020.128066	*Chemical Engineering Journal, 2021,* ***41****7, 128066.*
NrN@Ni	313	https://doi.org/10.1007/s10008-019-04299-1	*Journal of Solid State Electrochemistry, 2019,* ***23****, 2051–2060.*
NiO-D2	314	https://doi.org/10.1039/d2se00829g	*Sustain Energy Fuels, 2022,* ***6****, 4498–4505.*
Co_3Mo_3C/N	316	https://doi.org/10.1016/j.ijhydene.2021.04.084	*Int J Hydrogen Energy, 2021,* ***46****, 22268–22276.*
Ru/RuO_2-200	320	https://doi.org/10.1002/eem2.12031	*Energy & Environ. Mater., 2019****, 2****, 201–*

			208.
HP Ni–P	323 at 100 mA cm^{-2}	https://doi.org/10.1039/d0ta03739g	*J Mater Chem A Mater, 2020, **8**, 12069–12079.*
a c-FeOOH	330 at 300 mA cm^{-2}	https://doi.org/10.1002/cssc.202001229	*ChemSusChem, 2020, **13**, 4911–4915.*
NiCoFe-rGO	332	https://doi.org/10.1016/j.jcat.2019.08.006	*J Catal, 2019, **377**, 619–628.*
Rh(nP)/nC	333 at 5 mA cm^{-2}	https://doi.org/10.1039/d0nr05659f	*Nanoscale, 2020, **12**, 20165–20170.*
$NiFe_2O_4$/CC	340	https://doi.org/10.1016/j.electacta.2019.134883	*Electrochim Acta, 2019, **324**, 134883.*
NiO_200 nm	345	https://doi.org/10.1039/D0MA00467G	*Mater Adv, 2020, **1**, 1971–1979.*
CC/NCL-75	350	https://doi.org/10.1016/j.jpowsour.2021.229468	*J Power Sources, 2021, 488, 229468.*
FeCoNi-ATNs (H)/NF	350 at 400 mA cm^{-2}	https://doi.org/10.1002/aenm.201901312	*Adv Energy Mater, 2019, **9**, 1901312*
NiCu@NiCuOOH-NF	366	https://doi.org/10.1016/j.ijhydene.2022.03.139	*Int J Hydrogen Energy, 2022, **47**, 16080–16091.*
FeNi (1:1)	370 at 5 mA cm^{-2}	https://doi.org/10.1002/celc.201900483	*ChemElectroChem, 2019, **6**, 3478–3487.*
porous Co−P	380	https://dx.doi.org/10.1021/acssuschemeng.0c02671	*ACS Sustain Chem Eng, 2020, **8**, 10193–10200.*
FeCoNiB@B-VG	387	https://doi.org/10.1016/j.electacta.2021.138459	*Electrochim Acta, 2021, **386**, 138459.*
$Ba_{0.5}Sr_{0.5}CoO_3$	395	https://doi.org/10.1021/acs.energyfuels.2c00357	*Energy & Fuels, 2022, **36**, 3219–3228.*
Co Coating	438	https://doi.org/10.3390/ma14010092	*Materials, 2020, **14**, 92.*
Li-bir/rGO	490	http://dx.doi.org/10.1149/2.0901908jes	*Soc, 2019, **166**, A1543–A1549.*
Gr/AME-Ni Fe10%	519	https://doi.org/10.1002/celc.201901541	*ChemElectroChem, 2019, **6**, 5633–5641.*

Table S4: Recently reported OER overpotentials measured for the current density of 10 mA cm^{-2} (unless otherwise specified) against Hg/HgO reference electrode for various catalysts listed in Figure 2a and Figure 2d (in main text) in 1.0 M KOH since 2019.

Catalyst	η^{10} ***/ mV***	***DOI***	***Biblography***
NiS_x/C_3N_4	32	https://doi.org/10.1039/D1EE00509J	*Energy Environ Sci*, 2021, **14**, 5358–5365
NiFe-LDH/RGO/NF	150	https://doi.org/10.1016/j.ijhydene.2018.11.167	*Int J Hydrogen Energy*, 2019, **44**, 2656–2663.
$Co(OH)_2$@HOS/CP	155	https://doi.org/10.1002/adfm.201909610	*Adv Funct Mater*, 2020,**30**,1909610
$Ni_xFe_{3-x}O_4$-EDTA	180	https://doi.org/10.1016/j.jcis.2022.11.054	*J Colloid Interface Sci*, 2023, **632**, 44–53.
Fe-K_2WO_4	181	https://doi.org/10.1016/j.apcatb.2024.124423	*Applied Catalysis B: Environment and Energy*, 2024, **358**, 124423.
CF-FeSO	192	https://doi.org/10.1038/s41467-022-28260-5	*Nat Commun*, 2022, **13**, 605.
np-NiFeCoMnOOH	194	https://doi.org/10.1016/j.apcatb.2023.123331	*Appl Catal B*, 2024, **341**, 123331.
Ni−Fe−S@GIP	197	https://doi.org/10.1002/cssc.202100891	*ChemSusChem*, 2021, **14**, 3131–3138.
(Ni,Fe)O_xH_y/Ni/Cu	199	https://doi.org/10.1039/C9CY02328C	*Catal Sci Technol*, 2020, **10**, 1803–1808.
FeCoNiWCuOOH@Cu	200	https://doi.org/10.1002/advs.202406008	Adv. Sci. 2024, **11**, 2406008
Co_3O_4–C/FeMoP/NF	200 at 20 mA cm^{-2}	https://doi.org/10.1016/j.ijhydene.2021.07.103	*Int J Hydrogen Energy*, 2021, **46**, 32846–

			32857.
NiCoP/NF	203	https://doi.org/10.1016/j.ceramint.2022.09.035	*Ceram Int*, 2023, **49**, 659–668.
$NiFe_{A-S}$/NF	205	https://doi.org/10.1016/j.apcatb.2022.122165	*Appl Catal B*, 2023, **323**, 122165.
CCF-1	210	https://doi.org/10.1016/j.cej.2020.126513	*Chemical Engineering Journal*, 2021, **404**, 126513.
NSC@NiFe	214	https://doi.org/10.1016/j.carbon.2020.06.022	*Carbon N Y*, 2020, **167**, 548–558.
$NiCo_2O_4$ (MNCO)	218	https://doi.org/10.1016/j.jallcom.2024.175375	*J Alloys Compd*, 2024, **1002**, 175375.
$Fe_{0.5}Ni_{0.5}$/40% C	219	https://doi.org/10.1002/smll.202203340	*Small*, *2020,* ***18,*** *2203340*
Fe−Ni_3S_2/2OX	220	https://doi.org/10.1021/acssuschemeng.2c02456	*ACS Sustain Chem Eng*, 2022, **10**, 14396–14406.
$FeCoNiO_x$/C/NF	221	https://doi.org/10.1016/j.apcatb.2023.122717	*Appl Catal B*, 2023, **332**, 122717.
CoPx/FeOOH	222	https://doi.org/10.1016/j.apcatb.2020.119326	Applied Catalysis B: Environmental 294 (2021) 120256
Graphene quantum dots (GQDs)	223 at 50 mA cm^{-2}	https://doi.org/10.1016/j.cej.2024.151436	*Chemical Engineering Journal*, 2024, **489**, 151436.
Co_6Mo_6C/MoC/Co	223	https://doi.org/10.1016/j.apcatb.2023.122474	*Appl Catal B*, 2023, **328**, 122474.
Co_9Se_8/Co9S_8/CoO (Co-S-Se)	226	https://doi.org/10.1038/s41427-022-00398-0	*NPG Asia Mater*, 2022, **14**, 55.
FeOx@hcp Ni	226	https://doi.org/10.1016/j.apcatb.2020.119687	*Appl Catal B*, 2021, **284**, 119687.
FeCoNiP/CF	228	https://doi.org/10.1016/j.solidstatesciences.2023.107205	Solid State Sciences 141

			(2023) 107205
Br-SSM	228	https://doi.org/10.1016/j.jcis.2024.07.043	*Colloid Interface Sci*, 2024, **675**, 1011–1020.
Ni/NiO@CoFe	230	https://doi.org/10.1002/cssc.201900479	ChemSusChem 2019, 12, 2773 – 2779
$Co(OH)_2$	230	https://doi.org/10.1016/j.electacta.2022.140071	*Electrochim Acta*, 2022, **411**, 140071.
AB@NiFeSx	232.2	https://doi.org/10.1007/s12274-021-3800-6	*Nano Res*, 2022, **15**, 1901–1908.
NFO-S5	232 at 100 mA cm^{-2}	https://doi.org/10.1016/j.apcatb.2021.121030	*Appl Catal B*, 2022, **305**, 121030.
FeCoNi AG	235	https://doi.org/10.1016/j.cej.2021.132955	*Chemical Engineering Journal*, 2022, **430**, 132955.
Ag/NCMO/NF	243	https://doi.org/10.1002/adfm.202107056	*Adv Funct Mater*, 2021, **32**, 2107056
Cobalt oxyhydroxide(CoOOH)	245	https://doi.org/10.1016/j.electacta.2019.02.083	*Electrochim Acta*, 2019, **303**, 231–238.
NiFeOOH/NFF	245 at 100 mA cm^{-2}	https://doi.org/10.1016/j.ijhydene.2023.11.221	*Int J Hydrogen Energy*, 2024, **55**, 464–473.
Ru-NiFe LDH	246	http://dx.doi.org/10.1149/1945-7111/ac4cda	*J Electrochem Soc*, 2022, **169**, 024503.
Fe@Co-MOFs	248 at 50 mA cm^{-2}	https://doi.org/10.1039/D2DT01837C	*Dalton Transactions*, 2022, **51**, 15446–15457.
(Fe, Hf)CoOOH/$Co(OH)_2$	250	https://doi.org/10.1039/D4QI00823E	*Inorg Chem Front*, 2024, **11**, 5449–5457.
r-BS+G	250	https://doi.org/10.1016/j.cej.2023.144489	*Chemical Engineering Journal*, 2023, **471**, 144489.
F_3S_4/NF	251	https://doi.org/10.1021/acs.jpcc.2c051	*The Journal of*

		96	*Physical Chemistry C*, 2022, **126**, 16172–16186.
Ir-NFO/NF	251 at 100 mA cm^{-2}	https://doi.org/10.1002/adfm.202209543	*Adv Funct Mater*, 2023, **33**, 2209543.
$(CrFeCoNiMo)_3O_4$	255.3	https://doi.org/10.1002/adfm.202309438	*Adv Funct Mater*, 2023, **34**, 2309438
Ag@NiV0.2Co0.2	255	https://doi.org/10.1016/j.cej.2021.131662	*Chemical Engineering Journal*, 2021, **425**, 131662.
NiFe-HD/pre-NF	256 at 100 mA cm^{-2}	https://doi.org/10.1039/D1DT02195H	*Dalton Transactions*, 2021, **50**, 12547–12554.
$Pt_{34}Fe_5Ni20Cu_{31}Mo_9Ru$ HEA	259	https://doi.org/10.1002/smll.202204255	*Small*, 2022, **18**, 2204255.
$Zn\text{-}NiCoO_{x-z}/SSM$	260 at 50 mA cm^{-2}	https://doi.org/10.1016/j.jcis.2023.02.142	*J Colloid Interface Sci*, 2023, **640**, 737–749.
Ag−Co(OH) 2 on DNA	260 at 50mA cm^{-2}	https://dx.doi.org/10.1021/acs.inorgchem.0c03569	*Inorg Chem*, 2021, **60**, 2680–2693.
FCMOS	260	https://doi.org/10.1039/D1TA00457C	*J Mater Chem A Mater*, 2021, **9**, 9858–9863.
FeOOH@NiOOH/NF	261 at 20 mA cm^{-2}	https://doi.org/10.1016/j.jcis.2024.09.219	*J Colloid Interface Sci*, 2025, **679**, 487–495.
$Ni_2P\text{-}Fe_2P$	261 at 100 mA cm^{-2}	https://doi.org/10.1002/adfm.202006484	*Adv Funct Mater*, 2020, **31**, 2006484
Ni_3N/NF	262	https://doi.org/10.1039/D1MA00130B	*Mater Adv*, 2021, **2**, 2299–2309.
Fe−N−C/Fe NP 300	263	https://doi.org/10.1002/cctc.202400786	*ChemCatChem*, 2024, **16**, e202400786
$NiCeWO_{x-2}$	263	https://doi.org/10.1002/celc.202200093	*ChemElectroChem*, 2022, **9**, e202200093

NiFeBx	263 ± 14	https://doi.org/10.1002/adfm.202101820	*Adv Funct Mater*, 2021, **31**, 2101820
FeCoMo-Se	264	https://doi.org/10.1039/C9TA14133B	*J Mater Chem A Mater*, 2020, **8**, 7925–7934.
NiFeMn LH	270 at 50 mA cm^{-2}	https://doi.org/10.1016/j.cej.2024.154215	*Chemical Engineering Journal*, 2024, **496**, 154215.
Co S-$NiFe_2O_4$	270 at 500 mA cm^{-2}	https://doi.org/10.1016/j.colsurfa.2022.130682	*Colloids Surf A Physicochem Eng Asp*, 2023, **658**, 130682.
$Fe_{1.0}Co_{1.1}Ni_{1.4}$–NC	270	https://doi.org/10.1039/C9TA13637A	*J Mater Chem A Mater*, 2020, **8**, 9021–9031.
$CoFe_2O_4$	275	https://doi.org/10.1039/D0CE00401D	*CrystEngComm*, 2020, **22**, 4317–4323.
α-$Co(OH)_2$/Co_3O_4/CC	275	https://doi.org/10.1039/D1CY00240F	*Catal Sci Technol*, 2021, **11**, 3706–3714.
LiFeBPO/NF	276 at 100 mA cm^{-2}	https://doi.org/10.1002/adfm.202303702	*Adv Funct Mater*, 2023, **33**, 2303702
CoO_x	280	https://doi.org/10.1021/acs.energyfuels.4c00433	*Energy & Fuels*, 2024, **38**, 6938–6949.
Co-Fe-S NFs@MS/NF	281 at 100 mA cm^{-2}	https://doi.org/10.1016/j.electacta.2020.137038	*Electrochim Acta*, 2020, **361**, 137038
Fe-doped NiSe NSs/CNTs	282.7	https://doi.org/10.1039/D1TA07393A	*J Mater Chem A Mater*, 2022, **10**, 3102–3111.
CoPx@FeOOH	283 at 100 mA cm^{-2}	https://doi.org/10.1016/j.apcatb.2021.120256	*Appl Catal B*, 2021, **294**, 120256.
$Co(OH)_x$/Ag/$Co(OH)_2$	283	https://doi.org/10.1016/j.jallcom.2021.161674	*J Alloys Compd*, 2021, **889**, 161674.

$Fe_{59}Co_{41}$	285	https://doi.org/10.1016/j.apsusc.2022.153041	*Appl Surf Sci*, 2022, **589**, 153041
ZIF-67@CNT	285	https://doi.org/10.1016/j.electacta.2022.141593	*Electrochim Acta*, 2023, **439**, 141593.
N-Ni_1Co4-S	286.2	https://doi.org/10.1016/j.apsusc.2022.153173	*Appl Surf Sci*, 2022, **591**, 153173.
FeVOx/NP	290 mV at 500 mA cm^{-2}	https://doi.org/10.1021/jacs.3c02288	*J Am Chem Soc*, 2023, **145**, 12206–12213.
$PrBa_{0.5}Sr_{0.5}Co_{2-x}Fe_xO_{5+\delta}$ (PBSCF)	290	https://doi.org/10.1039/D1TA08445C	*J Mater Chem A Mater*, 2022, **10**, 2271–2279.
Fe-SAC@COF	290	https://doi.org/10.1016/j.xpro.2022.101626	*STAR Protoc*, 2022, **3**, 101626.
6MIM-MoCo	290	https://doi.org/10.1002/cssc.202101666	*ChemSusChem*, 2021, **15**, e202101666
P-NiO/NiCo2O4	290	https://doi.org/10.1016/j.jallcom.2022.166338	*J Alloys Compd*, 2022, **925**, 166338.
$Ni_{0.26}$Co0$_{.74}$Se/NF	291 at 50 mA cm^{-2}	https://doi.org/10.1016/j.jpcs.2020.109658	*Journal of Physics and Chemistry of Solids*, 2021, **148**, 109658
NiCo-Bpy-BTC	292	https://doi.org/10.1016/j.electacta.2022.141714	*Electrochim Acta*, 2023, **439**, 141714.
$CoCr_2O_4$	293	https://doi.org/10.1021/acs.inorgchem.2c03840	*Inorg Chem*, 2023, **62**, 2726–2737.
$Co_{3-x}Fe_xO_4$-0.01	294	https://doi.org/10.1039/D1DT03936A	*Dalton Transactions*, 2022, **51**, 3137–3145.
$NiCrFeO_4$	296	https://doi.org/10.1016/j.jiec.2021.06.015	*Journal of Industrial and Engineering Chemistry*, 2021, **101**,

			178–185.
Ni_2(dtbh-PLY)$_2$	300	https://doi.org/10.1021/acs.inorgchem.4c00078	*Inorg Chem*, 2024, **63**, 9771–9785.
CoS_x/FeS_x	304	https://dx.doi.org/10.1021/acscatal.9b05170	*ACS Catal*, 2020, **10**, 1855–1864.
5%Ru-CoPO	310	https://doi.org/10.1016/j.mtchem.2022.101267	*Mater Today Chem*, 2022, **26**, 101267.
NiFeP-Composite	313	https://doi.org/10.1002/er.8710	*Int J Energy Res*, 2022, **46**, 22078–22088.
$Ni_{40}Fe_{40}B_{20}$	319	https://doi.org/10.1016/j.ijhydene.2022.04.200	*Int J Hydrogen Energy*, 2022, **47**, 20718–20728.
$HfNiSe_2$/rGO	320 at 20 mA cm^{-2}	https://doi.org/10.1002/cctc.202300562	*ChemCatChem*, 2023, **15**, e202300562
Zn0.4$Mn_{0.6}Co_2O_4$/rGO	320	https://doi.org/10.1016/j.ijhydene.2020.03.231	*Int J Hydrogen Energy*, 2020, **45**, 14713–14727.
CoNi-PBA-2	326	https://doi.org/10.1021/acsami.1c10441	*ACS Appl Mater Interfaces*, 2021, **13**, 42715–42723.
Ir-SAs, Ir1/$Ni_{1.6}Mn_{1.4}O_4$	330 at 100 mA cm^{-2}	https://doi.org/10.1002/advs.202200529	*Advanced Science*, 2022, **9**, 2200529
Co3O4@KNbO3	330	https://doi.org/10.1016/j.matlet.2023.135178	*Mater Lett*, 2023, **352**, 135178.
A-CNT-CoSnS	330	https://doi.org/10.1039/C9NR09588H	*Nanoscale*, 2020, **12**, 3879–3887.
$La_{0.7}K_{0.3}CoO_{3-\delta}$	335	https://doi.org/10.1039/D2CP04708J	*Physical Chemistry Chemical Physics*, 2022, **24**, 28584–28598.

$NiCo_2O_4$	340	https://doi.org/10.1021/acsami.3c01196	*ACS Appl Mater Interfaces*, 2023, **15**, 26093–26103.
evo-FeOOH	350	https://doi.org/10.1002/smll.202301715	*Small*, 2023, **19**, 2301715
Co-H/NiCo@NF	350 at 100 mA cm^{-2}	https://doi.org/10.1002/admi.202202349	*Adv Mater Interfaces*, 2023, **10**, 2202349
CoPO	350	https://doi.org/10.1002/cctc.201901803	*ChemCatChem*, 2020, **12**, 2091–2096.
(CoP@NG)	354	https://doi.org/10.1016/j.electacta.2019.03.208	*Electrochim Acta*, 2019, **307**, 543–552.
$NiSn(OH)_6$@OOH	370	https://doi.org/10.1039/D1TA08531J	*J Mater Chem A Mater*, 2022, **10**, 1369–1379.
α-$CoGd(OH)_2$/FTO	371	https://doi.org/10.1039/D4NR01743A	*Nanoscale*, 2024, **16**, 15629–15639.
NiOOH–MnOOH/NF	391 at 100 mA cm^{-2}	https://doi.org/10.1039/D4QM00512K	*Mater Chem Front*, 2024, **8**, 3290–3299.
Fe3C@C/CNT	407	https://doi.org/10.1021/acs.energyfuels.3c01711	*Energy & Fuels*, 2023, **37**, 13260–13270.
MnO_2-Ni 0.02(M)	445	https://doi.org/10.1021/acs.inorgchem.1c03236	*Inorg Chem*, 2021, **60**, 19429–19439.