Supporting information

Construction of bimetallic oxy-hydroxides based on $Ni(OH)_2$ nanosheets for sensitive non-enzymatic glucose detection via electrochemical oxidation and incorporation

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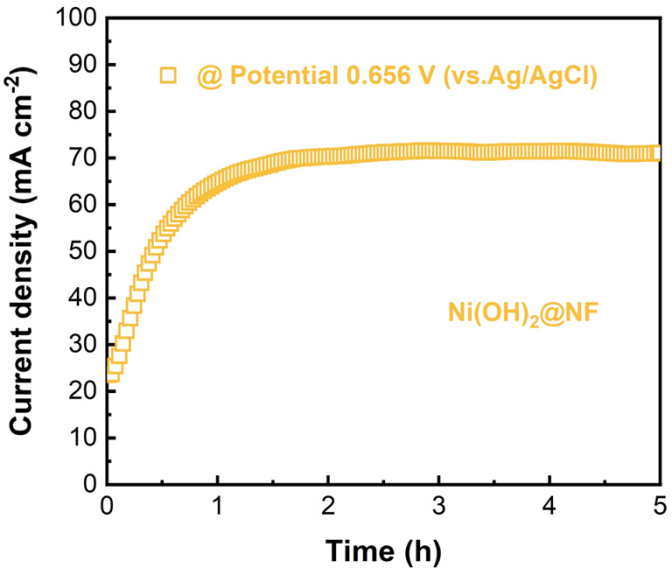

Figure S1. i-t curve of $Ni(OH)_2$@NF at the potential of 0.656 V (vs. Ag/AgCl) in 1 M KOH solution.

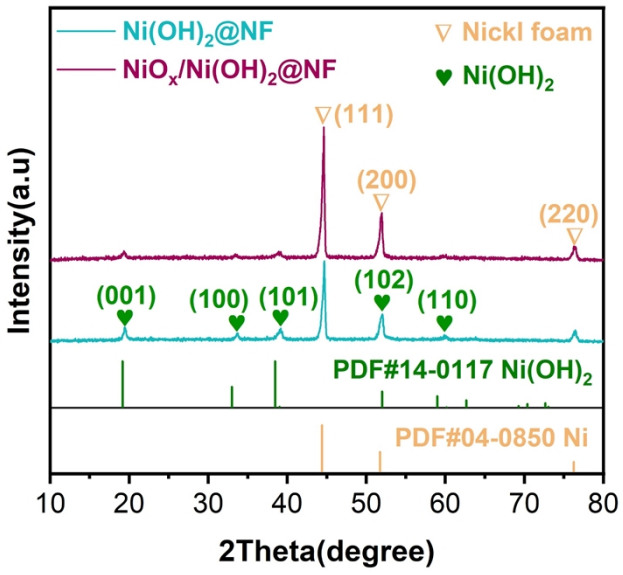

Figure S2. XRD pattern of $Ni(OH)_2$@NF and $NiO_x/Ni(OH)_2$@NF.

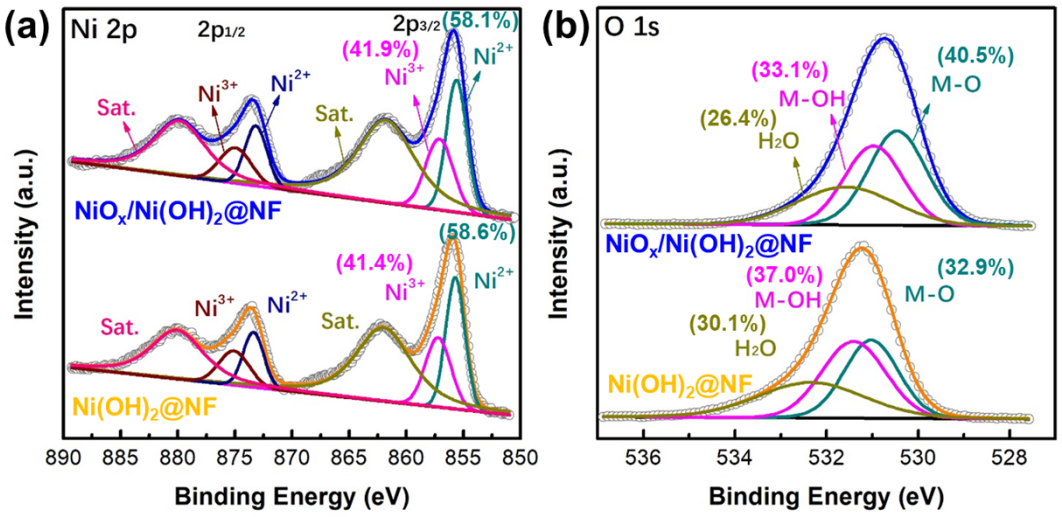

Figure S3. High-resolution XPS spectra: (a) Ni 2p, (b) O 1s.

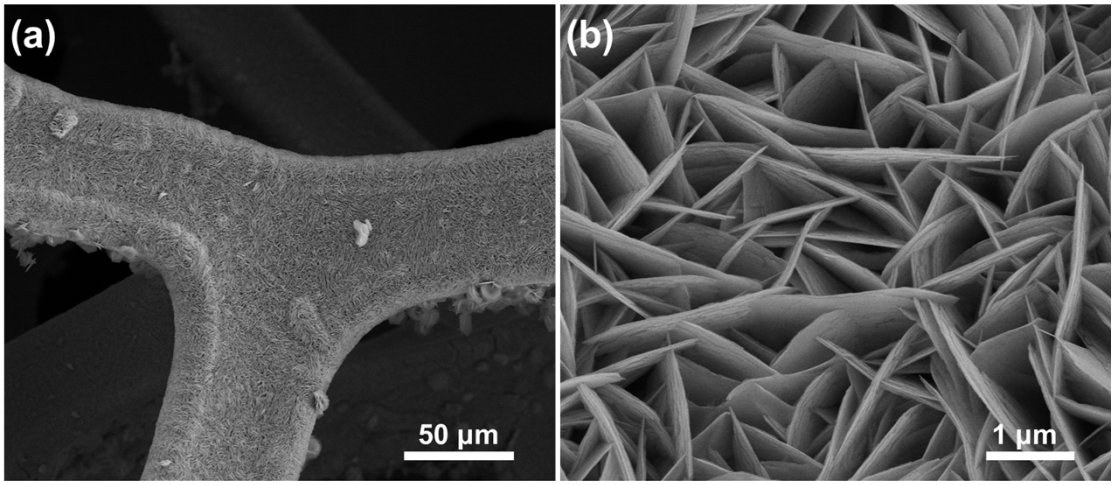

Figure S4. (a and b) SEM images of $Ni(OH)_2$@NF.

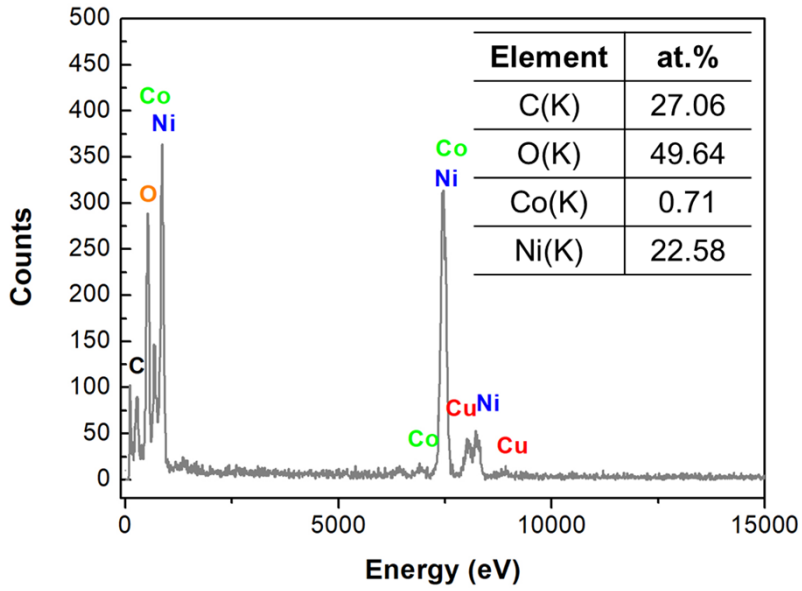

Figure S5. EDS pattern of $(CoNi)O_x/Ni(OH)_2$@NF.

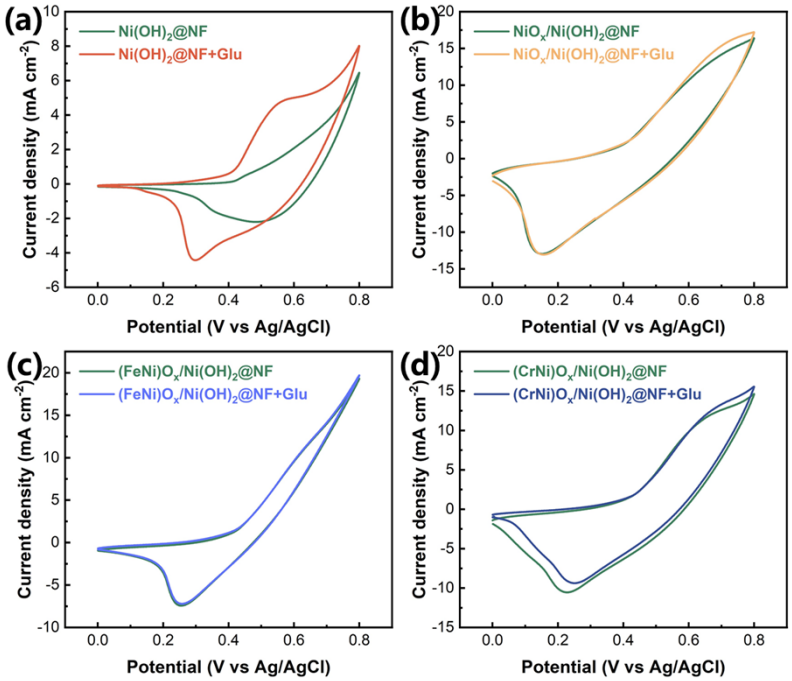

Figure S6. CV curves at scan rate of 10 mV s^{-1} with and without addition of 1 mM glucose: (a) $Ni(OH)_2$@NF, (b) $NiO_x/Ni(OH)_2$@NF, (c) $(FeNi)O_x/Ni(OH)_2$@NF, and (d) $(CrNi)O_x/Ni(OH)_2$@NF.

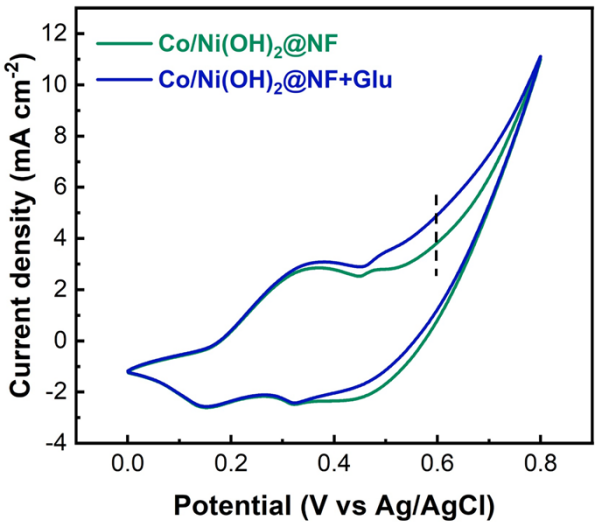

Figure S7. CV curves at scan rate of 10 mV s^{-1} with and without addition of 1 mM glucose.

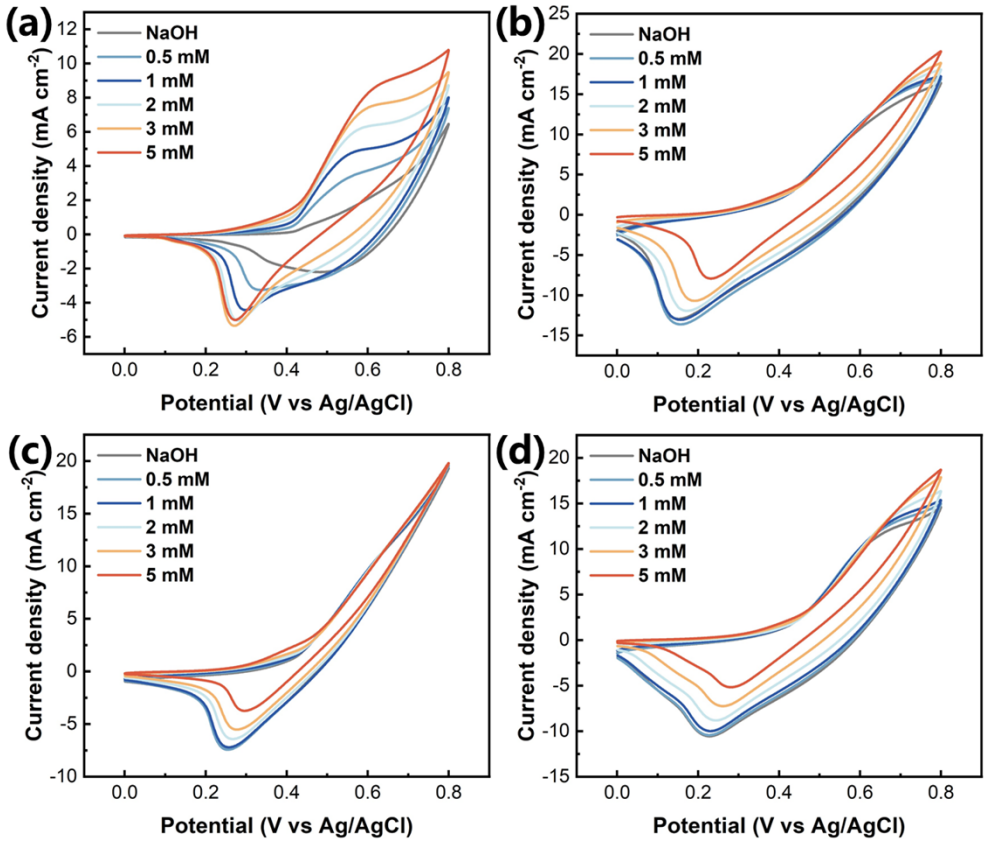

Figure S8. CV curves with addition of different concentration of glucose at scan rate of 10 mV s^{-1}: (a) $Ni(OH)_2$@NF, (b) $NiO_x/Ni(OH)_2$@NF, (c) $(FeNi)O_x/Ni(OH)_2$@NF, and (d) $(CrNi)O_x/Ni(OH)_2$@NF.

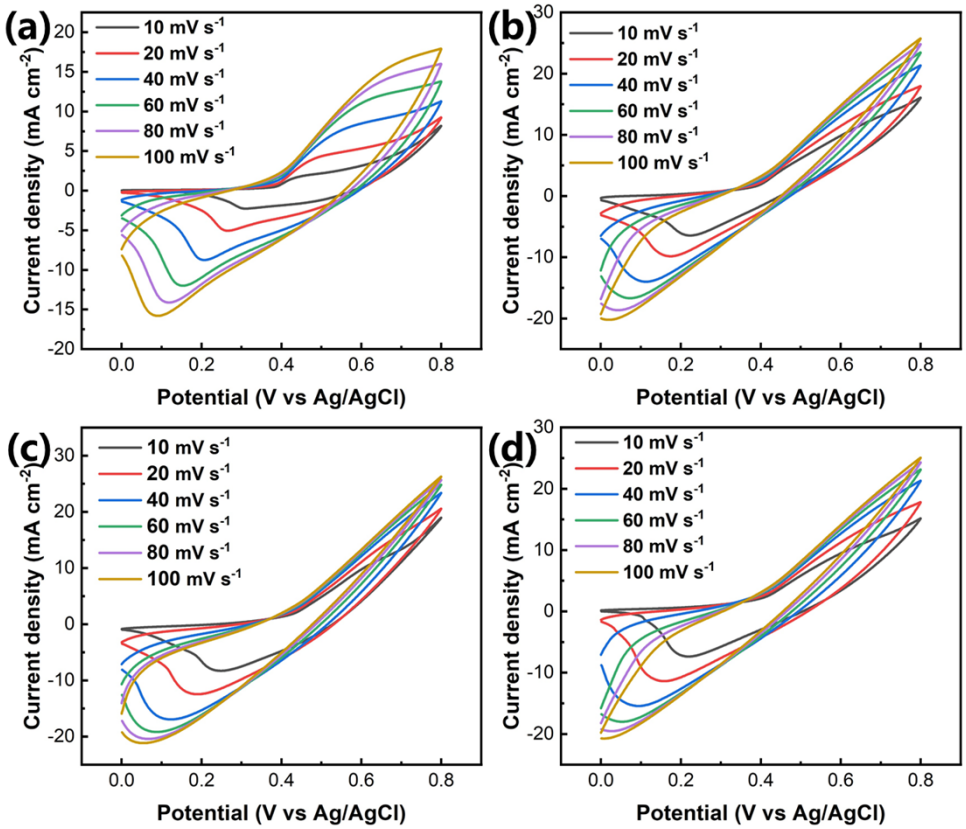

Figure S9. CV curves in a solution containing 0.1 M NaOH and 1 mM glucose with different scan rates ranging from 10 to 100 mV s^{-1}: (a) $Ni(OH)_2$@NF, (b) $NiO_x/Ni(OH)_2$@NF, (c) $(FeNi)O_x/Ni(OH)_2$@NF, and (d) $(CrNi)O_x/Ni(OH)_2$@NF.

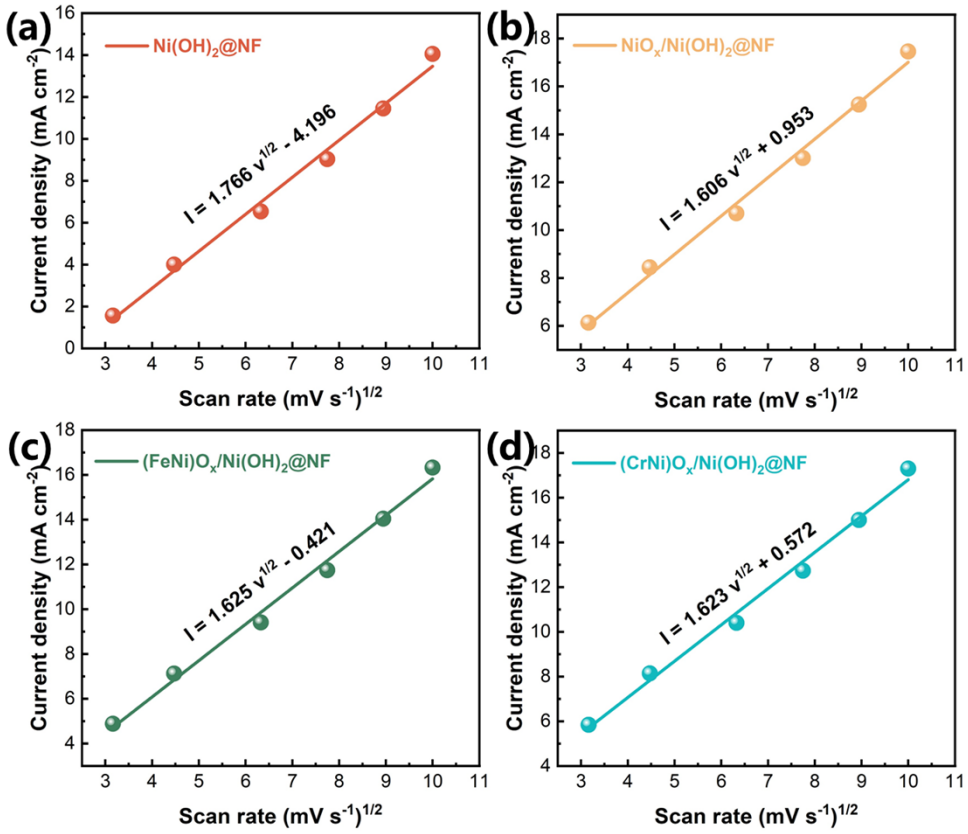

Figure S10. The current response verses the square root of the scan rate derived from the CV curves in Figure S8: (a) $Ni(OH)_2$@NF, (b) $NiO_x/Ni(OH)_2$@NF, (c) $(FeNi)O_x/Ni(OH)_2$@NF, and (d) $(CrNi)O_x/Ni(OH)_2$@NF.

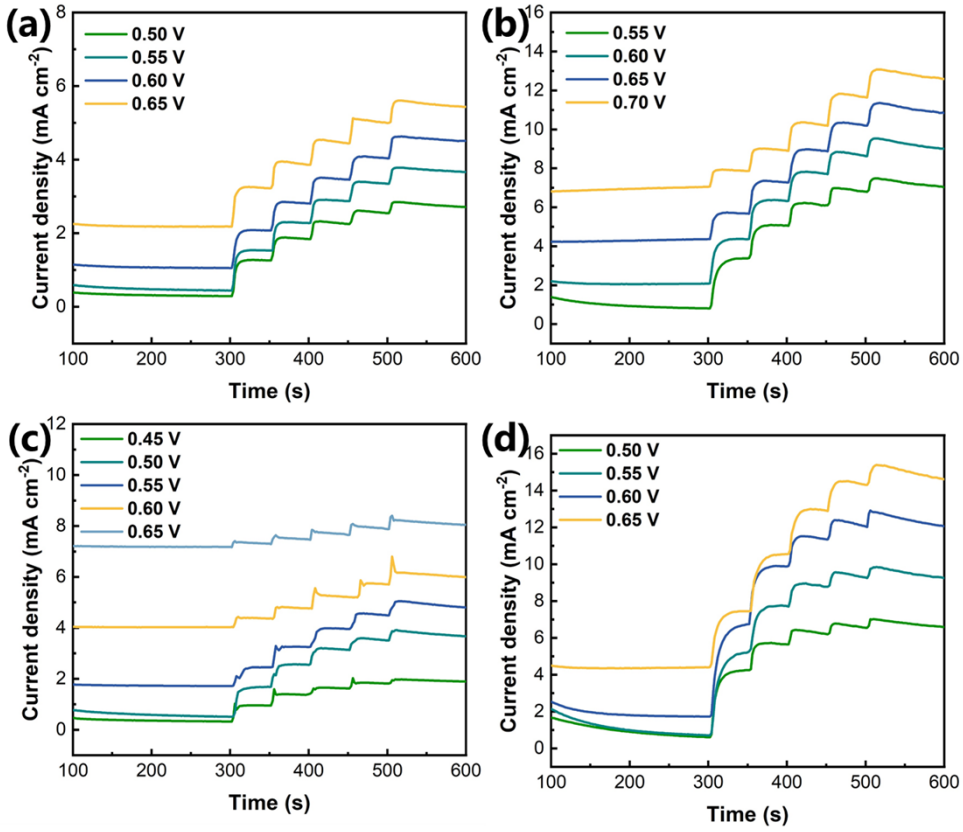

Figure S11. i-t curves at different voltages with incremental addition of 1 mM glucose: (a) $Ni(OH)_2$@NF, (b) $NiO_x/Ni(OH)_2$@NF, (c) $(FeNi)O_x/Ni(OH)_2$@NF, and (d) $(CrNi)O_x/Ni(OH)_2$@NF.

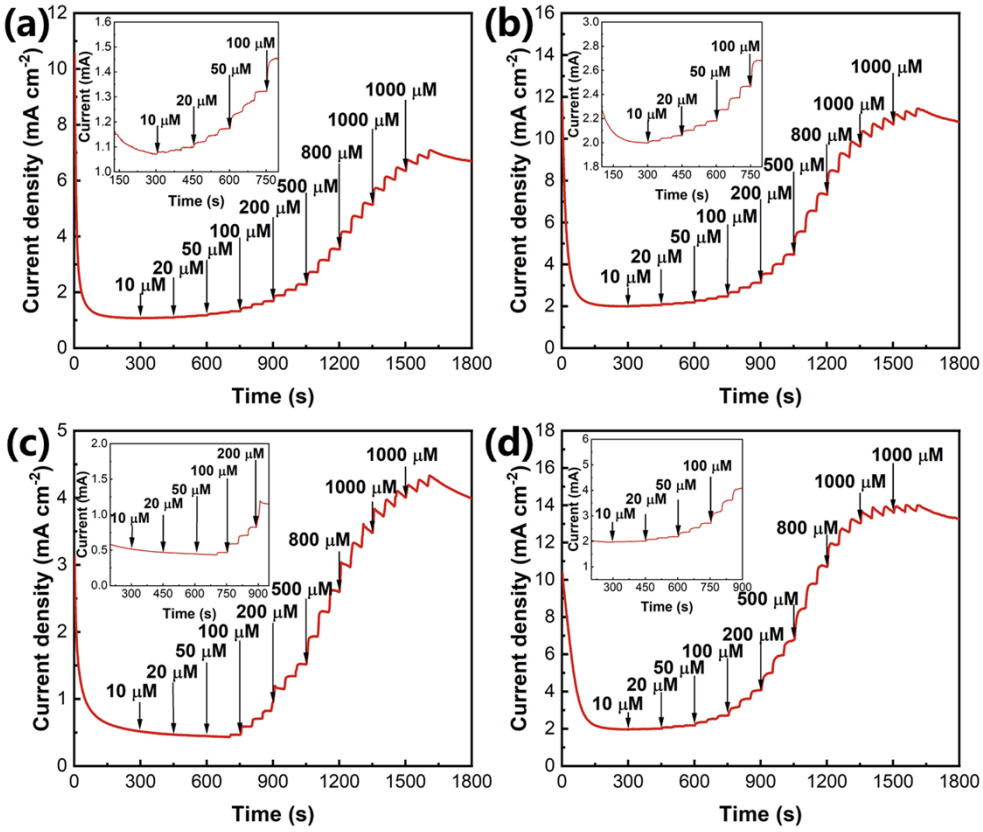

Figure S12. i-t curves with addition of different concentration of glucose: (a) $Ni(OH)_2$@NF, (b) $NiO_x/Ni(OH)_2$@NF, (c) $(FeNi)O_x/Ni(OH)_2$@NF, and (d) $(CrNi)O_x/Ni(OH)_2$@NF.

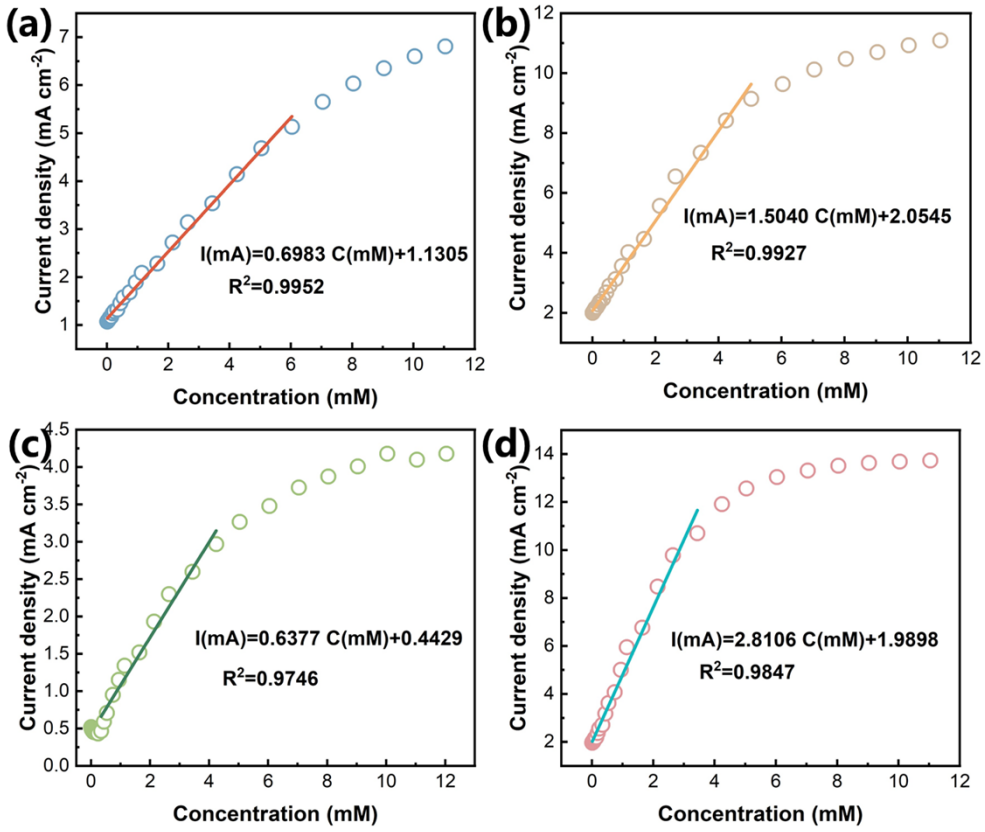

Figure S13. The corresponding concentration-current fitting curves derived from Figure S11: (a) $Ni(OH)_2$@NF, (b) $NiO_x/Ni(OH)_2$@NF, (c) $(FeNi)O_x/Ni(OH)_2$@NF, and (d) $(CrNi)O_x/Ni(OH)_2$@NF.

Table S1. Sensing performances of electrocatalysts in recent literatures.

Electrocatalysts	**Sensitivity /mA mM^{-1} cm^{-2}**	**Linear range /mM**	**References**
Pt/Au/BDD	1.7	0.01-7.5	Biosensors and Bioelectronics 98 (2017) 76-82
NiCoFe-LDH/FF	5.717	0.01-0.1	Dalton Trans., 2023, 52, 16661-16669
Hollow Ni(OH)2@CuS	2.74	0.01-6.64	Applied Surface Science 634 (2023) 157650
NiCo-LDH@NI-NTNW	3.4 4.6	~1.05 1.05-2.52	Journal of Colloid and Interface Science 591 (2021) 384-395
MOF-derived CuO/CNT	4.34	0.0005-0.1	Sensors & Actuators: B. Chemical 398 (2024) 134713
$Ni(OH)_2$&NiOOH film/Ni	5.7584	0.001-0.13	Journal of The Electrochemical Society, 166 (16) B1732-B1741 (2019)
$CuFeO_x$/CF	2.614	0.396-1.224	Colloids and Surfaces A: Physicochemical and Engineering Aspects 703 (2024) 135301
CuO nanowire array	1.95	0.1-6	Electrochimica Acta 299 (2019) 470-478
$(CoNi)O_x$/$Ni(OH)_2$@NF	**3.59**	**0.01-1.14**	**This work**

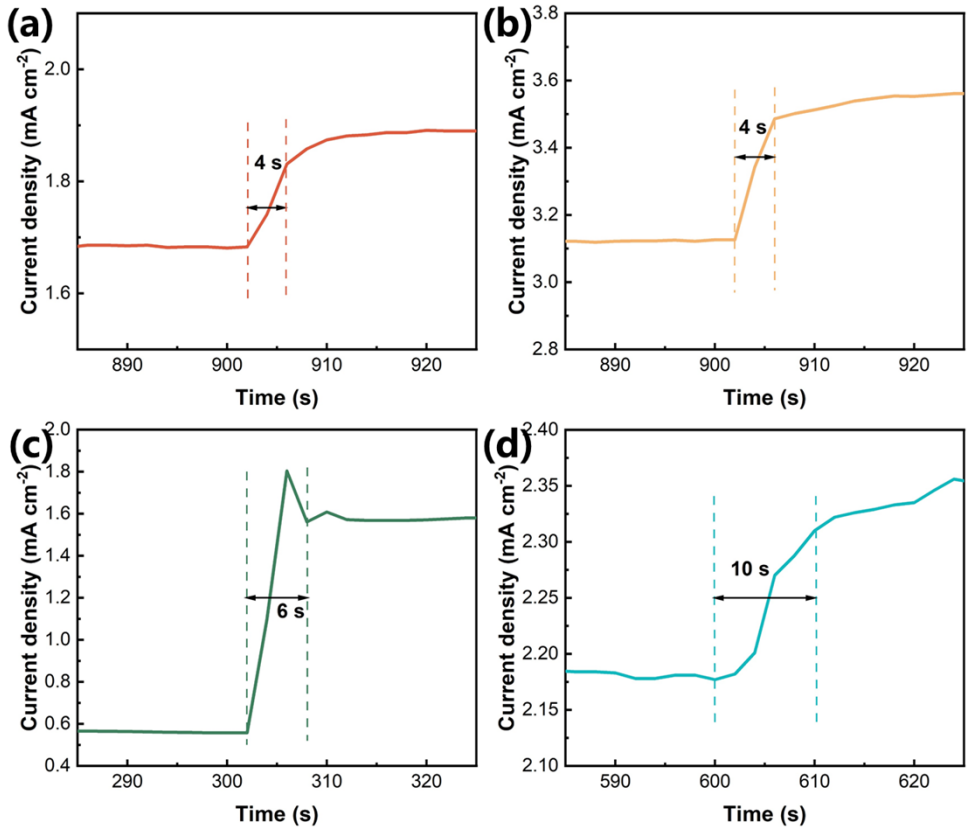

Figure S14. i-t curves with addition of 10 μM of glucose: (a) $Ni(OH)_2$@NF, (b) $NiO_x/Ni(OH)_2$@NF, (c) $(FeNi)O_x/Ni(OH)_2$@NF, and (d) $(CrNi)O_x/Ni(OH)_2$@NF.

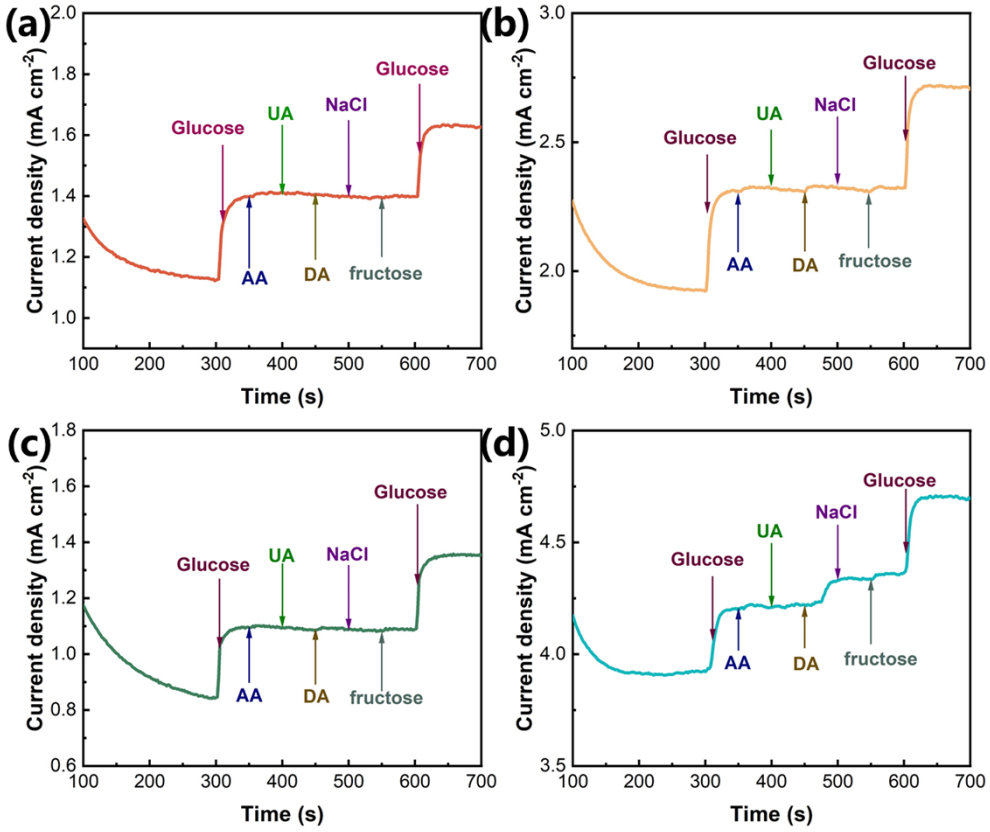

Figure S15. i-t curves with addition of with addition of glucose, AA, UA, DA, NaCl, and fructose: (a) $Ni(OH)_2$@NF, (b) $NiO_x/Ni(OH)_2$@NF, (c) $(FeNi)O_x/Ni(OH)_2$@NF, and (d) $(CrNi)O_x/Ni(OH)_2$@NF.

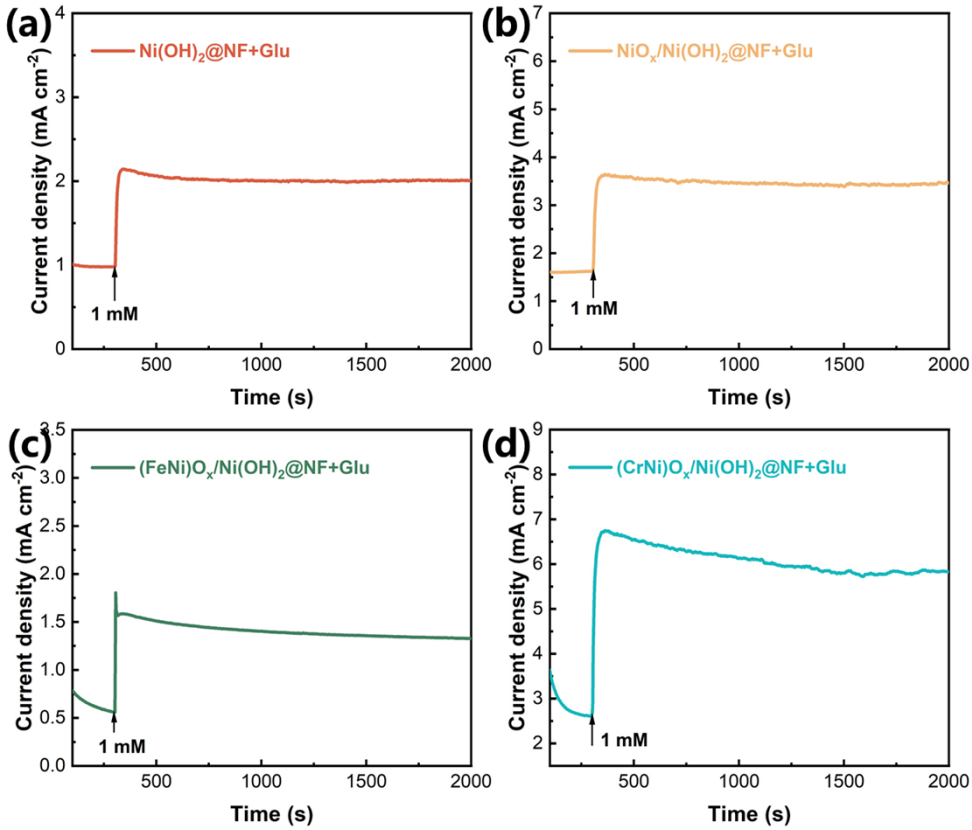

Figure S16. Long-term stability tests with addition of 1 mM glucose: (a) $Ni(OH)_2$@NF, (b) $NiO_x/Ni(OH)_2$@NF, (c) $(FeNi)O_x/Ni(OH)_2$@NF, and (d) $(CrNi)O_x/Ni(OH)_2$@NF.