

Supporting Information

Unlocking the catalytic potential of nickel sulfide for sugar-electrolysis: A green hydrogen generation from kitchen feedstock

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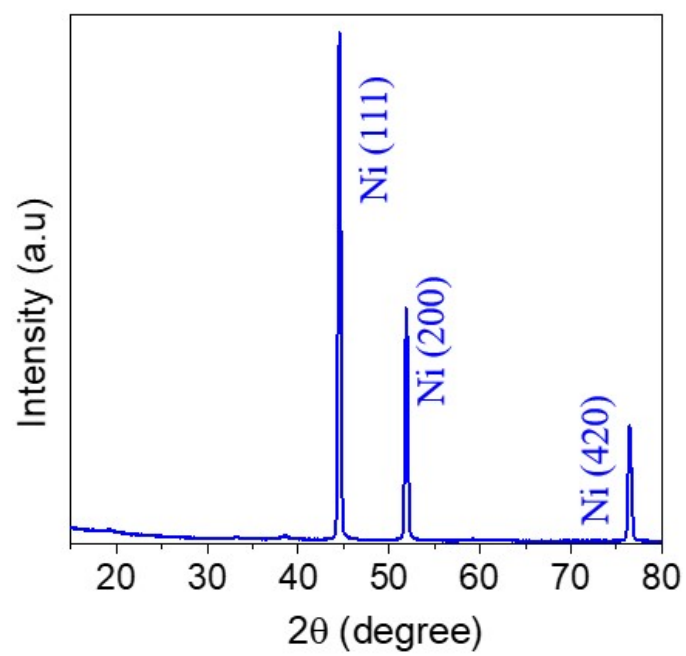


Figure S1. XRD pattern of a Ni_7S_6 film deposited in a NF-substrate.

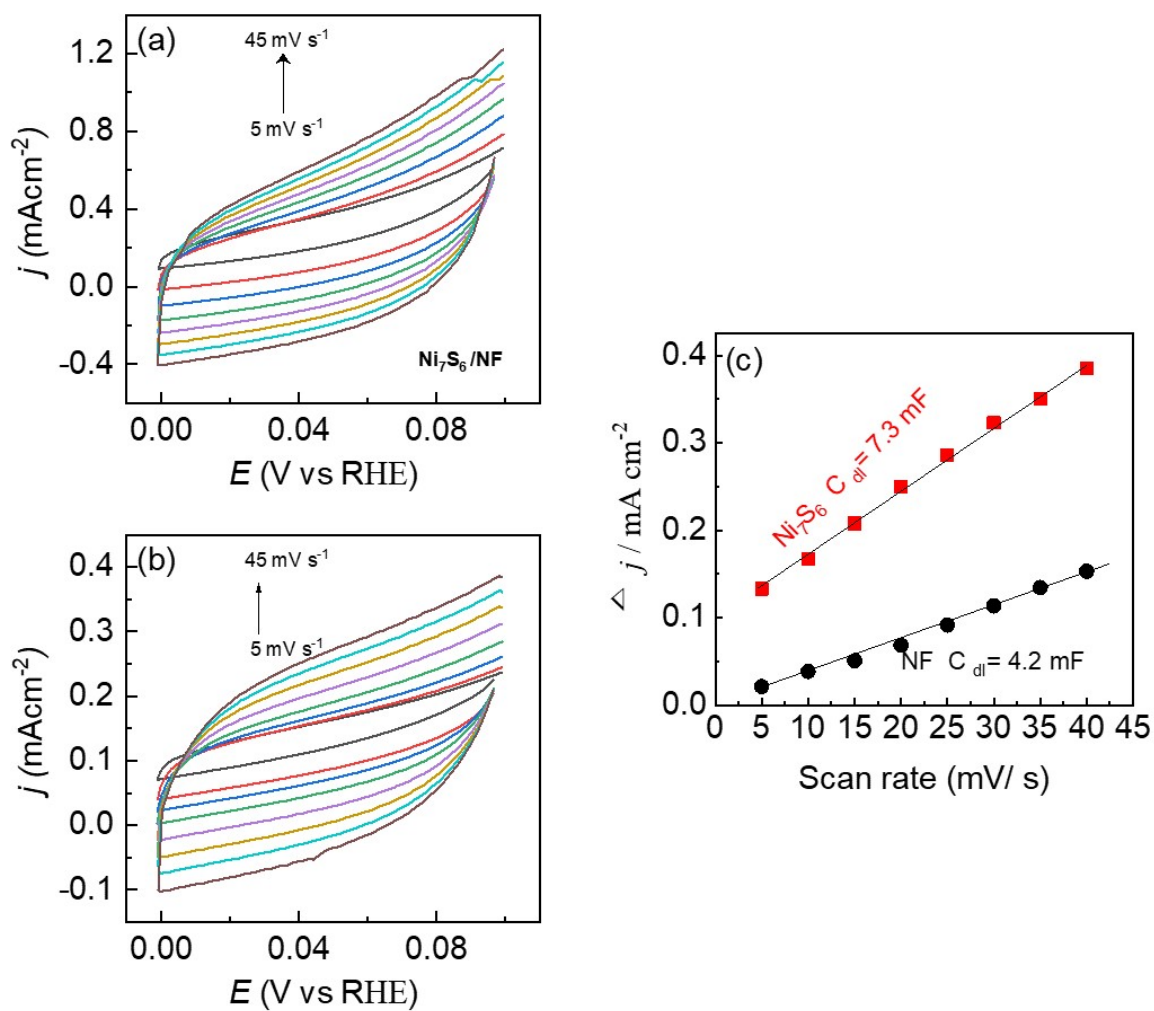


Figure S2. (a)-(b) Cyclic voltammetry of Ni₇S₆/NF and bare NF electrode at various scan rates. (c) Capacitive current densities vs scan rate plot for electrodes in 0.1 M glucose added 1.0 M KOH solution.

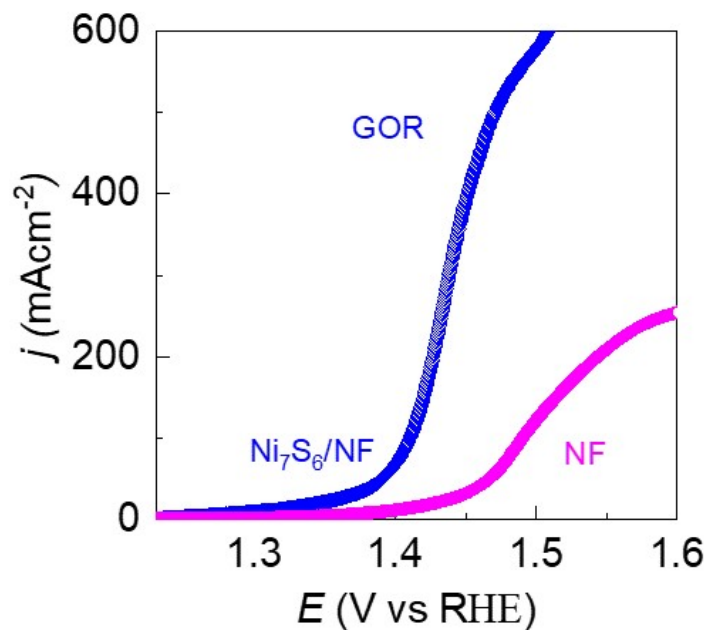


Figure S3. GOR LSV of bare NF

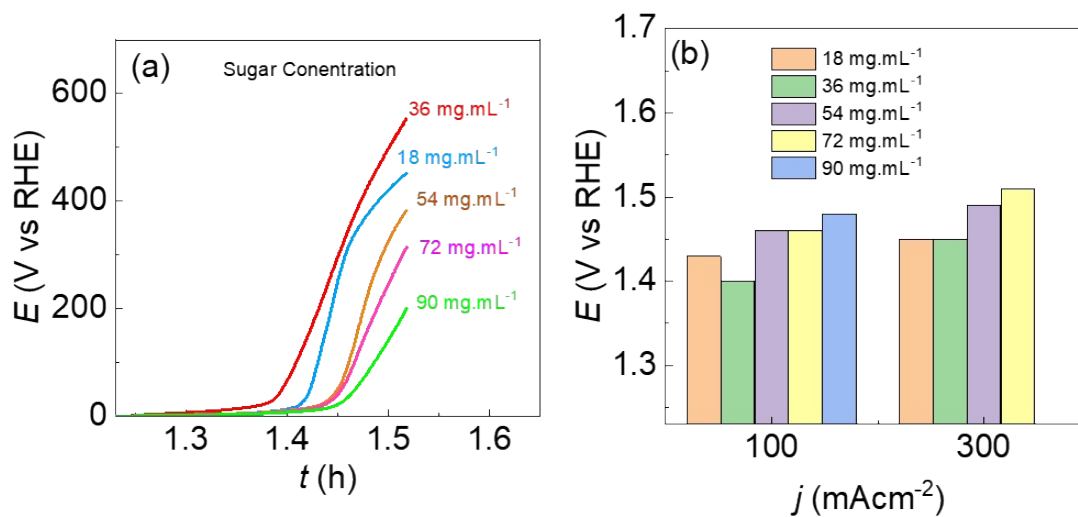


Figure S4. (a) SOR with various sugar concentrations* in 1.0 M KOH solution. (b) Potential vs. SOR current density profile. * This is concentration based on the weight of the local brand sugar we used in the experiment, not the sucrose concentration.

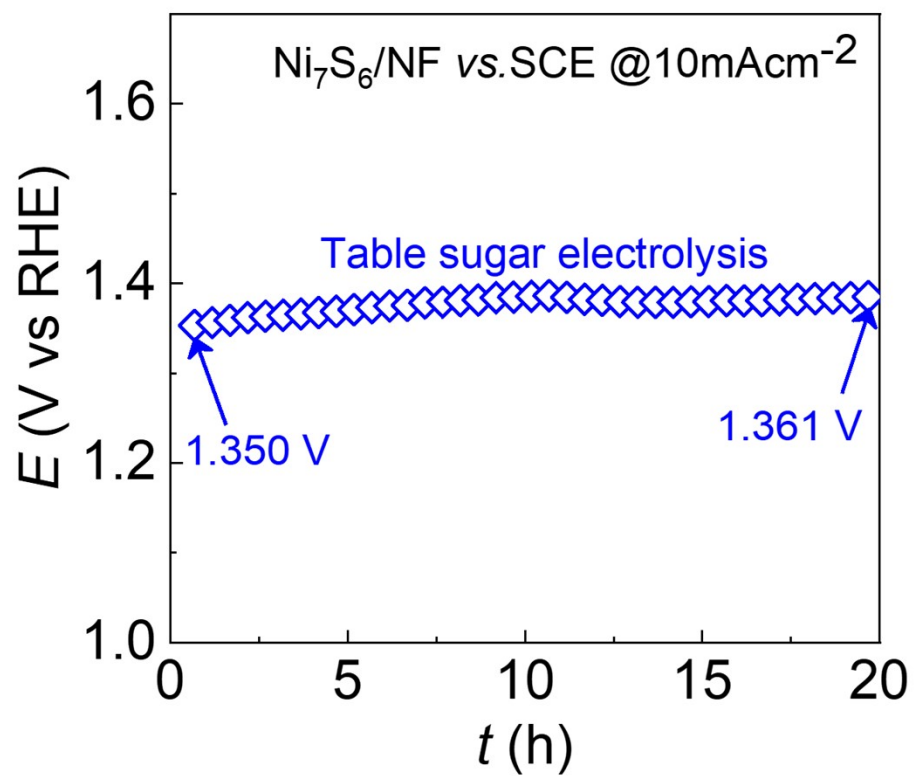


Figure S5. Chronopotentiometric response of the Ni₇S₆/NF anode during electrolysis of 36 mg.mL⁻¹ of table-sugar in 1.0 M KOH solution, showing a long-term durability of the catalyst.

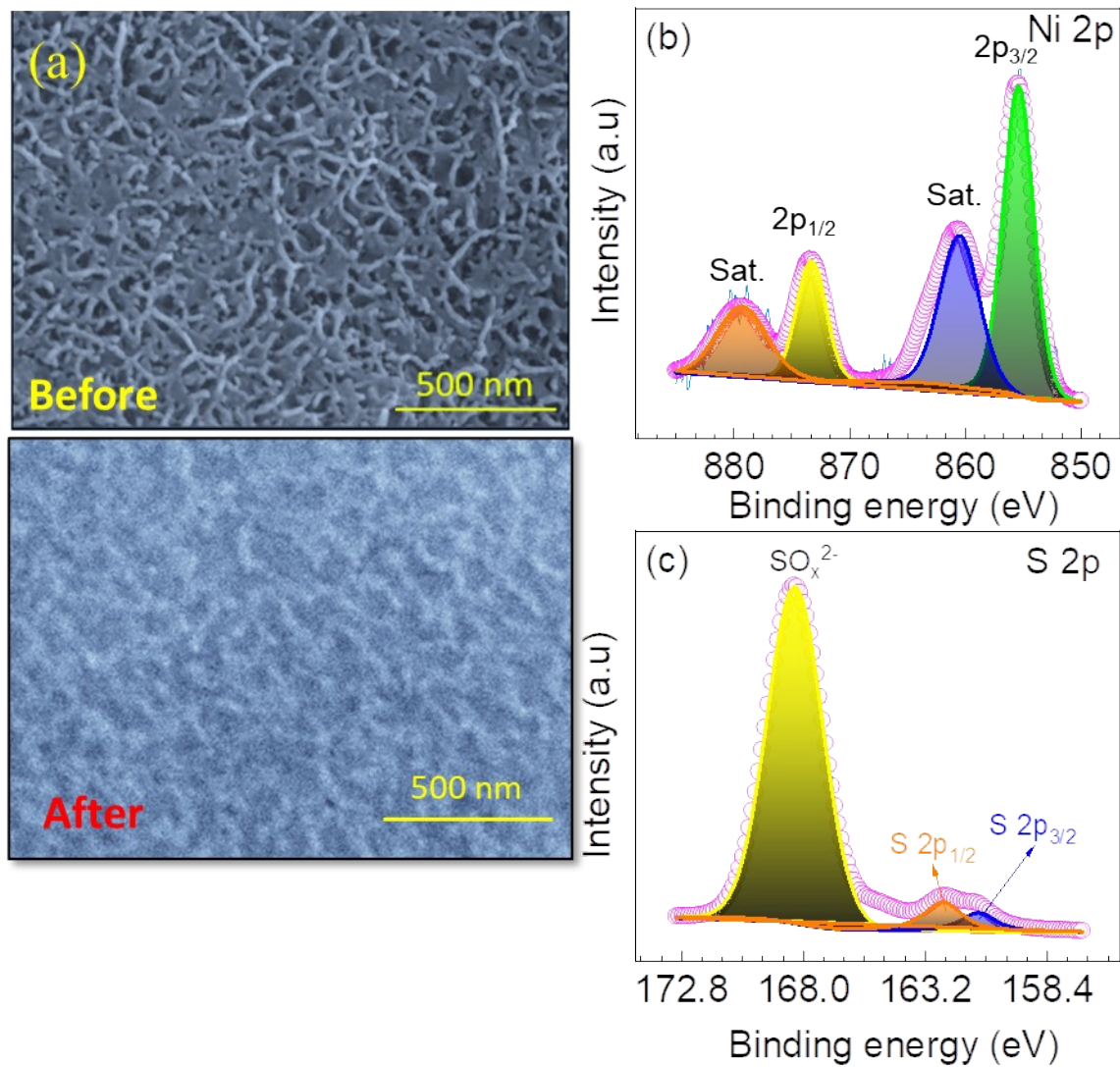


Figure S6. Structural, morphological, and activity analysis of $\text{Ni}_7\text{S}_6/\text{NF}$ electrode after long-term stability test, (a) SEM images, (b)-(c) XPS,

Table S1. Literature and comparative analysis of GOR for various electrocatalysts.

Sr.no	Name	Electrolyte	Current density (mA.cm ⁻²)	GOR potential V vs RHE	Ref.
	Ni ₇ S ₆ /NF	1M KOH +0.1M Glucose	10 100 400	1.30 1.41 1.45	This work
	Ni ₇ S ₆ /NF	Table Sugar	10 100 400	1.34 1.41 1.48	This work
	Ni ₇ S ₆ /NF	Juice	10 100 200	1.37 1.47 1.54	This work
1	Cu-doped@MIL-88B/NF	1M KOH +0.1M Glucose	10 100 200	1.35 1.42 1.46	<i>Dalton Trans.</i> , 2023, Advance Article
2	NiCoSe	1M KOH +0.1M Glucose	200	1.32	<i>Inorg. Chem.</i> 2023, 62, 26, 10513–10521
3	NiFeOx	1M KOH +0.1M Glucose	10 100	1.31 1.36	<i>Nat. Commun.</i> 2020, 11, 265.
4	Fe ₂ P/SSM	1M KOH +0.1M Glucose	10 100	1.35 1.40	<i>Electrochem. Commun.</i> 2017, 83, 11–15
5	Co@NPC-800	1M KOH +0.1M Glucose	10	1.46	<i>Chem. Eng. J.</i> 2022, 430 (1), 132783
6	Cu (OH) ₂	1M KOH +0.1M Glucose	100	1.49	<i>Adv. Mater.</i> 2021, 33, 2104791