Electronic Supplementary Information

Nanofibrillar hydrogels outperform Pt/C for hydrogen evolution reactions under high-current conditions

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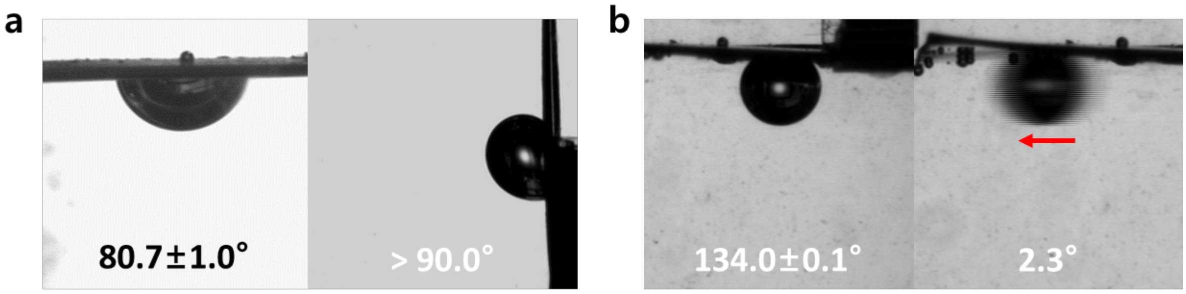

Fig. S1. Air contact and sliding angles of a) fNi and b) hydrogel-coated fNi (HG-fNi).

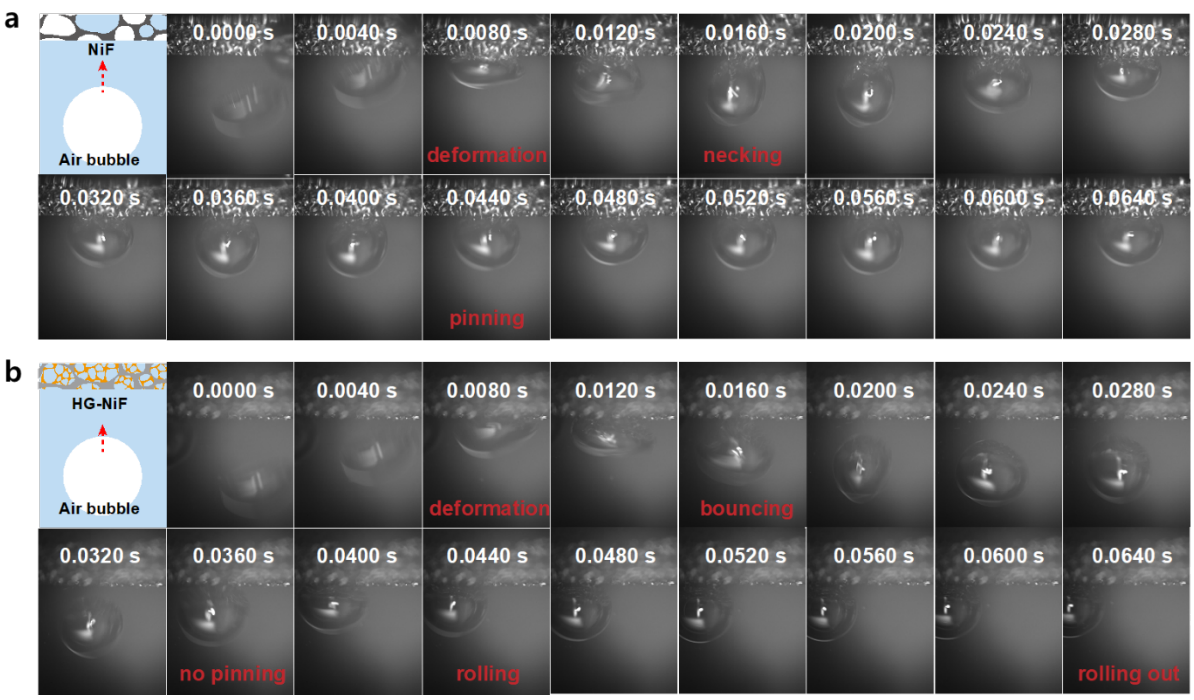

Fig. S2. High-speed camera images of air bubbles (volume = 25 μL) colliding with a) NiF and b) HG-NiF.

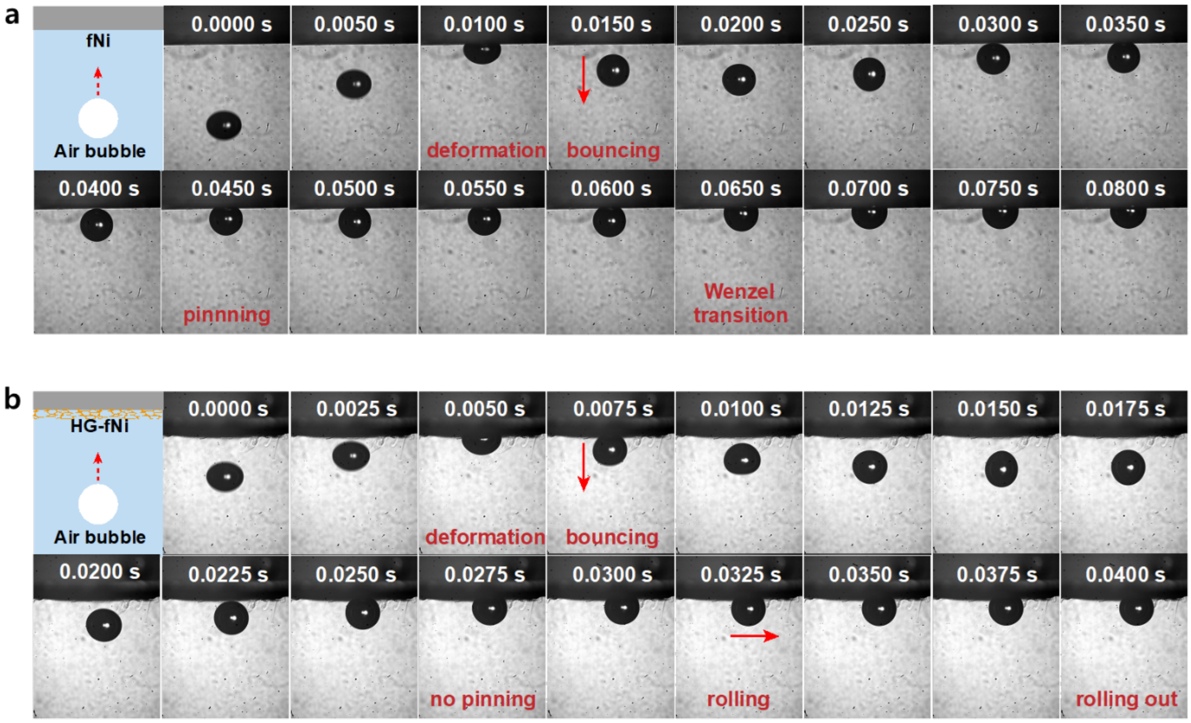

Fig. S3. High-speed camera images of air bubbles (volume = 1 μL) colliding with a) fNi and b) HG-fNi.

Table S1. Fitting results of electrochemical impedance spectra shown in Figure 4d.

	R_1 [a] (Ω)	R_2 [b] (Ω) CPE[c] (mF)
Ni	4.46	29.86 46.98
HG-NiF	3.877	21.85 30.78

[a]R_1 is a series resistance of electrical conduction through an external circuit and ionic conduction through an electrolyte.

[b]R_2 represents a resistance related to catalytic hydrogen evolution reaction.

[c]CPE represent a constant phase element.

Table S2. Overpotentials of various superaerophobic electrodes shown in Figure 4e for alkaline hydrogen evolution reaction.

Catalyst	Electrolyte	Overpotential (mV)	Ref.
HG-NiF	1.0 M KOH	-750 @ -1000 mA cm^{-2}	This work
Pt/C	1.0 M KOH	-750 @ -693 mA cm^{-2}	This work
$CoMoS_x$	1.0 M KOH	-280 @ -600 mA cm^{-2}	[1]
P-$Ni(OH)_2$/$NiMoO_4$	1.0 M KOH	-500 @ -300 mA cm^{-2}	[2]
NSF/CNT	1.0 M KOH	-320 @ -300 mA cm^{-2}	[3]
CoSF/CNT	1.0 M KOH	-700 @ -350 mA cm^{-2}	[3]
FeSF/CNT	1.0 M KOH	-500 @ -300 mA cm^{-2}	[3]
FeCoNi-HNTAs	1.0 M KOH	-280 @ -150 mA cm^{-2}	[4]
MoS_2	1.0 M KOH	-600 @ -150 mA cm^{-2}	[4]
Cu_3P	1.0 M KOH	-400 @ -120 mA cm^{-2}	[5]
CoMnP/Ni_2P	1.0 M KOH	-200 @ -50 mA cm^{-2}	[6]

Table S3. Comparison of HG-NiF to the efficiency and prices of various inorganic catalysts in 1.0 M KOH solution.

Catalyst	Electrolyte	Overpotential (mV)	Current density (mA cm^{-2})	Mass loading (mg cm^{-2})	Price (\$ mg^{-1})	Ref.
HG-NiF	1.0 M KOH	750	1000	0.002	22.5	This work
Pt/C	1.0 M KOH	750	693	28	0.0070	This work
Ru@Co-SAs	1.0 M KOH	7	10	0.285	0.0032	[7]
RuCo	1.0 M KOH	28	10	0.28	0.0021	[8]
Ni-MOF	1.0 M KOH	40	10	0.5	0.000018	[9]
$Ni(OH)_2$/CuS	1.0 M KOH	95	10	0.29	0.000012	[10]
CoSAs-CoNPs	1.0 M KOH	205	10	14	0.000053	[11]

Supporting References

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