One-Step Synthesis of Well-structured NiS@$Ni_2P_2S_6$ Nanosheets On Nickel Foam for Efficient Overall Water Splitting

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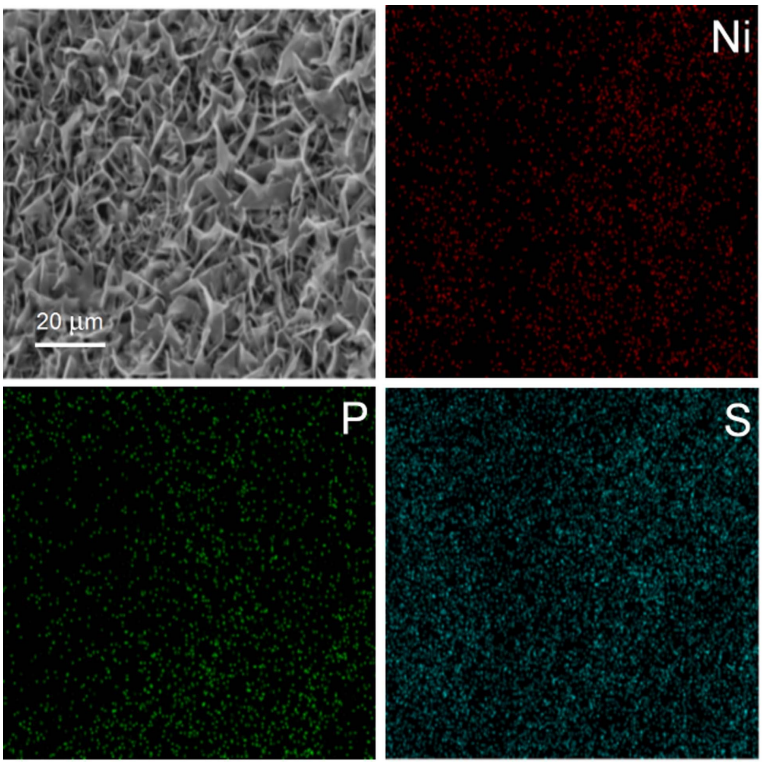

Figure S1. SEM image and the corresponding energy dispersive X-ray (EDX) elemental mapping of Ni, P and S for NiS@$Ni_2P_2S_6$/NF.

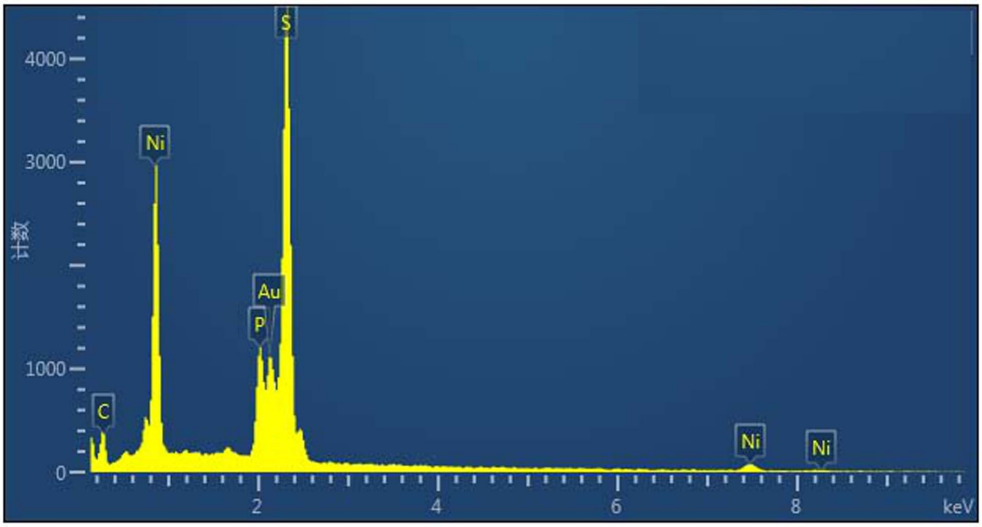

Figure S2. EDX spectrum of the NiS@$Ni_2P_2S_6$/NF nanosheets.

Table S1. Element percentage of NiS@$Ni_2P_2S_6$/NF and the relative molar percentage of NiS and $Ni_2P_2S_6$ obtained from EDX.

Elements	Weight% (EDX)	Atomic% (EDX)
Ni	47.72	33.15
P	8.06	10.61
S	44.22	56.24
Total	100	100
Ni:S (NiS)	22.54:24.41 = 1:1.08	
Ni:P:S ($Ni_2P_2S_6$)	10.61:10.61:31.83 = 1:1:3	
NiS:$Ni_2P_2S_6$	2.1:1	

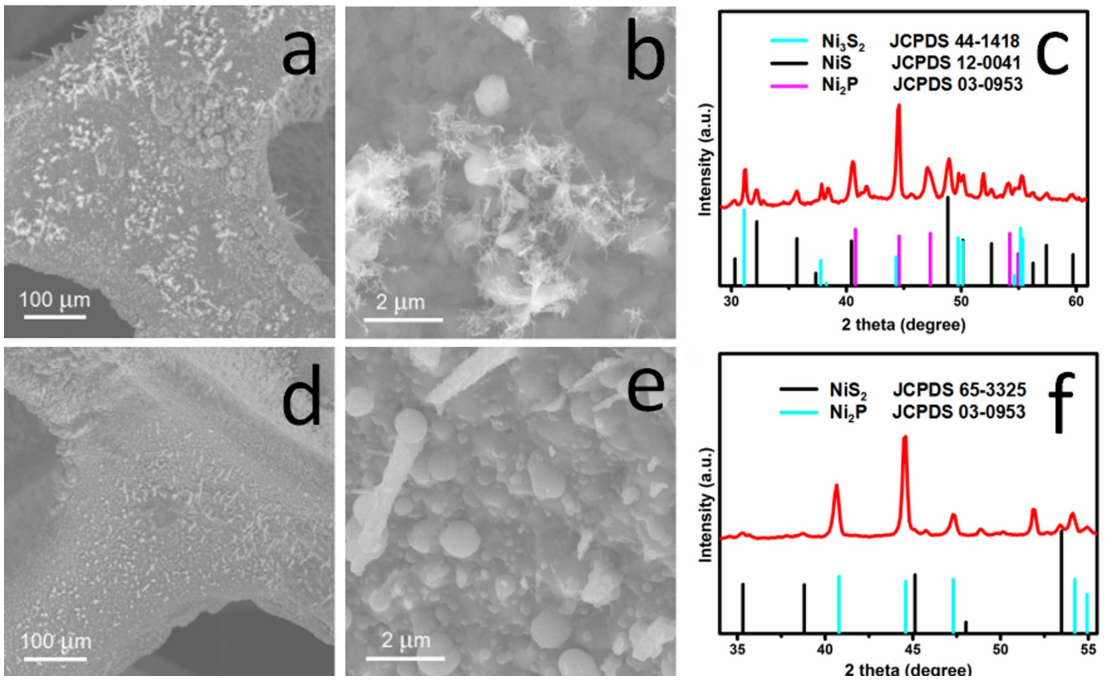

Figure S3. SEM images for (a-b) NiSP/NF, (d-e) NiPS/NF with different magnification. XRD patterns for (c) NiSP/NF and (f) NiPS/NF.

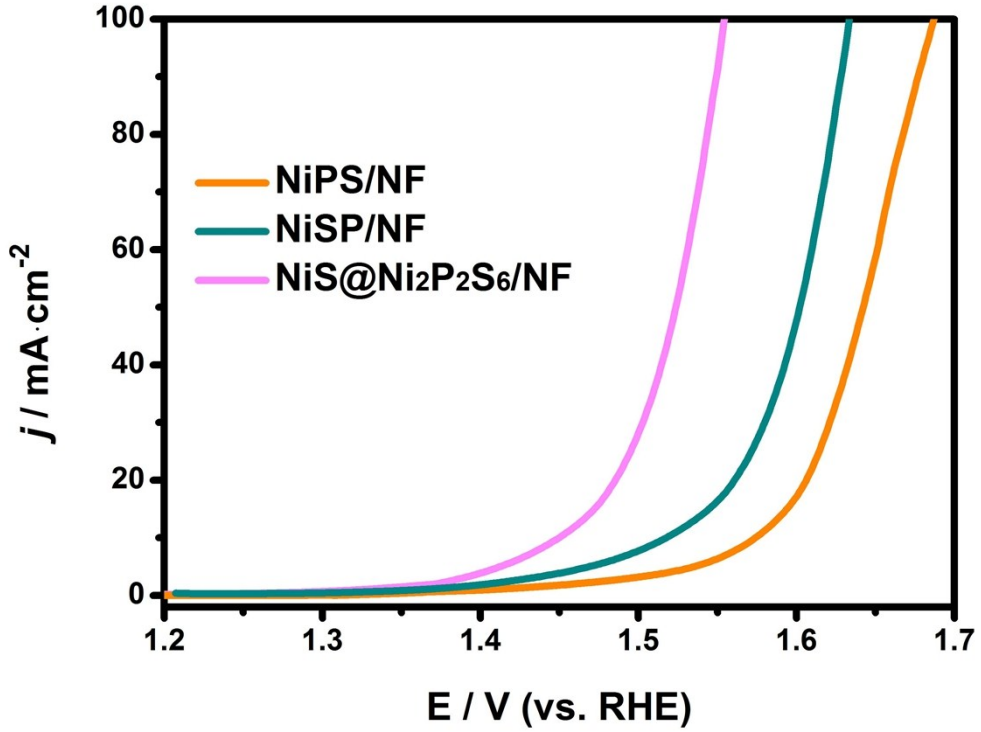

Figure S4. Polarization curves of NiSP/NF, NiPS/NF and NiS@$Ni_2P_2S_6$/NF for OER in 1.0 M KOH.

Table S2. Comparison of OER performance in basic media for $NiS@Ni_2P_2S_6$/NF with other reported OER electrocatalysts.

	OER		
Catalyst	Current density ($mA\ cm^{-2}$)	Corresponding Overpotential (mV)	Ref
$NiS@Ni_2P_2S_6$/NF	10	220	This work
CoP	10	280	S1
Co-P/NC	10	319	S2
CP/CTs/Co-S	10	306	S3
NiSe/NF	20	270	S4
Co-P film	10	345	S5
CoO_x@CN	10	260	S6
Ni_3S_2/NF	10	260	S7
CoP-MNA	10	290	S8
porous MoO_2	10	260	S9
CuCoO NWs	25	270	S10

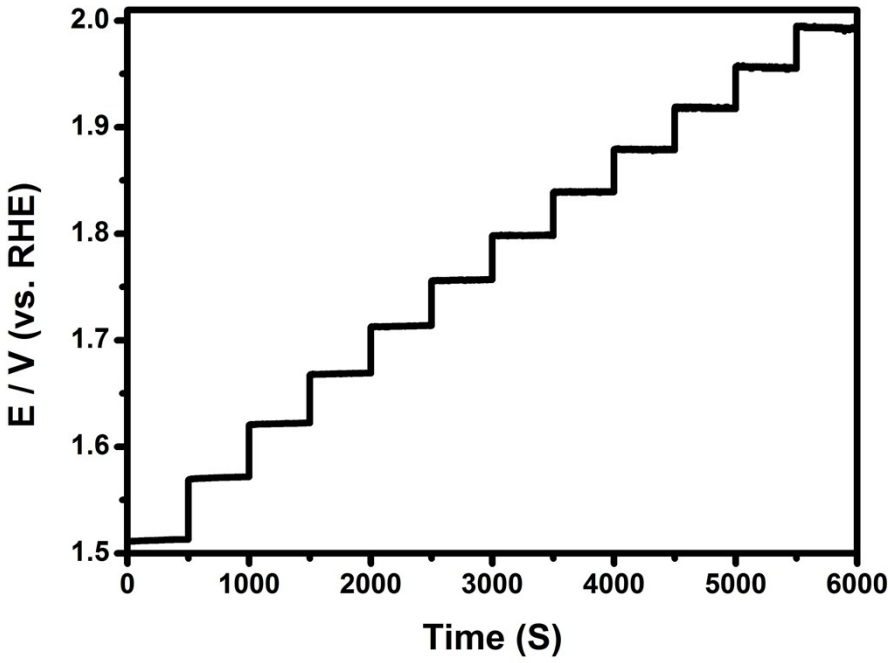

Figure S5. The multi-current process of $NiS@Ni_2P_2S_6$/NF. The current density started at 50 mA cm^{-2} and ended at 600 mA cm^{-2}, with an increment of 50 mA cm^{-2} per 500 seconds with no iR correction.

Table S3. Comparison of HER performance in basic media for $NiS@Ni_2P_2S_6/NF$ with other HER electrocatalysts.

	HER		
Catalyst	Current density ($mA\ cm^{-2}$)	Corresponding Overpotential (mV)	Ref
$NiS@Ni_2P_2S_6/NF$	10	140	This work
Co-P/NC	10	154	S2
CP/CTs/Co-S	10	190	S3
CoO_x@AC	10	232	S5
Ni_3S_2/NF	20	223	S7
CoP/CC	10	209	S11

Table S4. Comparison of water splitting performance in basic media for $NiS@Ni_2P_2S_6$/NF with other reported bifunctional electrocatalysts.

Water splitting			
Catalyst	Current density ($mA\ cm^{-2}$)	Corresponding potential (V)	Ref
$NiS@Ni_2P_2S_6$/NF	10	1.64	This work
CP/CTs/Co-S	10	1.743	S3
Ni_3S_2/NF	13	1.76	S7
NiFe LDH	10	1.70	S12
$NiCo_2O_4$	10	1.65	S13
ONPPGC/OCC	25	1.66	S14

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