Electronic Supplementary Information (ESI)

Enhanced oxygen evolution reaction of metallic nickel phosphide nanosheets by surface modification

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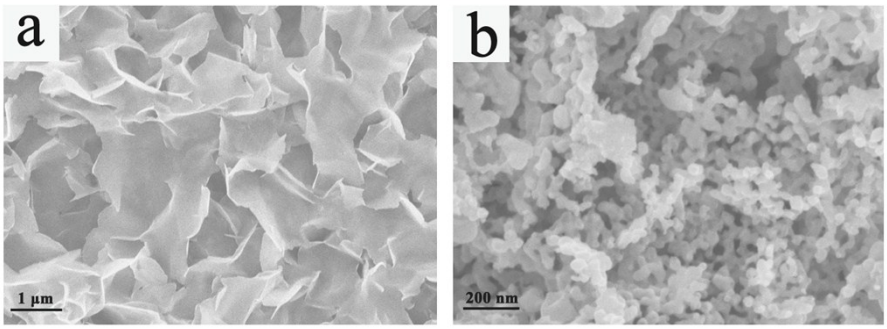

Figure S1. SEM images of the $Ni(OH)_2$ precursor and oxygen-incorporated Ni_2P production.

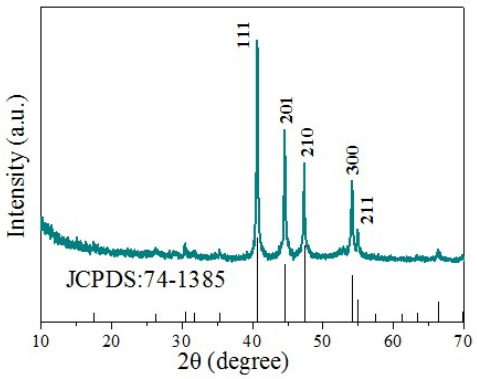

Figure S2. XRD pattern of the pure Ni_2P sample.

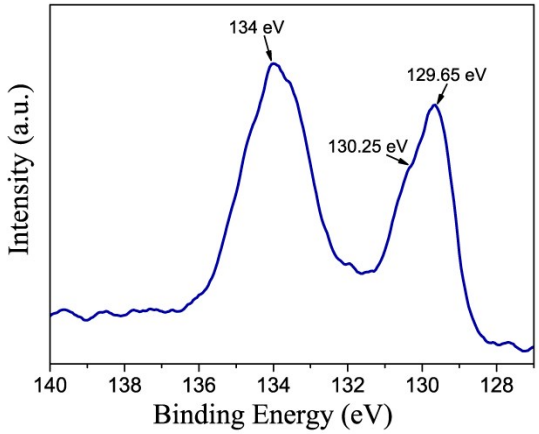

Figure S3. The high resolution XPS spectra of P 2p core level of the obtained oxygen-incorporated Ni_2P nanosheets. The two peaks located at 129.65 eV and 130.25 eV was corresponding to P $2p_{3/2}$ and P $2p_{1/2}$, respectively[S1]. Another peak at 134 eV was probably due to the partial oxidation of Ni_2P on the surface.

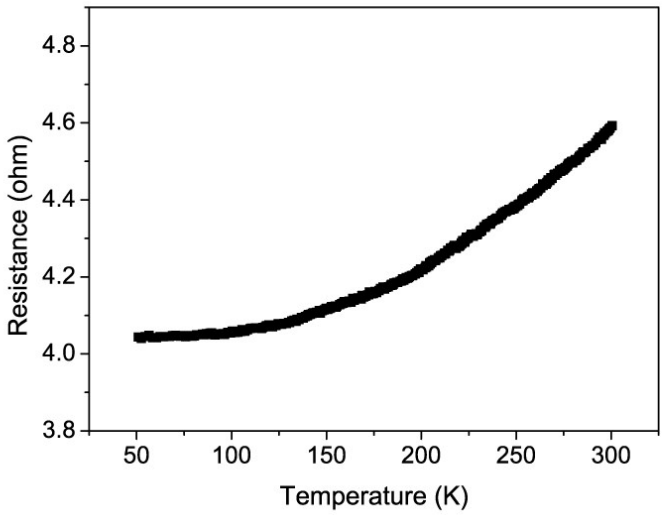

Figure S4. Temperature-dependent resistance of the pure Ni_2P sample. The resistance of the pure Ni_2P sample increased with temperature ranging from 50K to 300K, behaving metallic characteristic.

Temperature-dependent resistance measurements:

The temperature-dependent resistance of Ni_2P samples was measured using a Keithley 4200-SCS semiconductor characterization system. Typically, the obtained Ni_2P

samples were first pressed into pellets. Then the copper wires were connected to the Ni_2P pellets with silver paste. And the temperature-dependent resistance data were recorded from the Keithley 4200-SCS. The measured temperature range was from 50 K to 300 K.

Table S1. Comparison of OER performance in alkaline media for the current oxygen-incorporated Ni_2P with other OER electrocatalysts.

Catalyst	Electrolyte	Current density (j, mA/cm^2)	Overpotential at the corresponding j (mV)	Tafel slope(mV/dec)	Mass loading (mg /cm^2)	Reference
CoMnP	1 M KOH	10	330	61	0.284	J. Am. Chem. Soc., 2016, 138, 4006-4009.
CoP	1 M KOH	10	320	71	0.71	ACS Catal., 2015, 5, 6874 – 6878.
CoP hollow polyhedron	1 M KOH	10	400	57	0.102	ACS Appl. Mater. Interfaces, 2016, 8, 2158 – 2165
Ni-P	1 M KOH	10	300	64	0.2	Energy Environ. Sci., 2016, doi: 10.1039/C6EE00100A
NiCoP/Ti	1 M KOH	10	310	52	0.75	Adv. Mater. Interfaces. 2015, doi: 10.1002/admi.201500454
Mn_3O_4/ $CoSe_2$	0.1 M KOH	10	450	49	0.2	J. Am. Chem. Soc. 2012, 134, 2930
Co_3O_4/ N-rmGO	1 M KOH	10	310	67	1	Nat. Mater. 2011, 10, 780.
Au@Co_3O_4	0.1 M KOH	2.84	350	60	0.064	Adv. Mater. 2014, 26, 3950
Ni-doped Co_3O_4	0.1 M NaOH	10	530	62	0.14	Chem. Commun. 2013, 49, 7522.
oxygen-incorporated Ni_2P	0.1 M KOH	10	347	63	0.285	This work

Reference

S1. Z. Pu, Q. Liu, C. Tang, A. M. Asiri, X. Sun, Nanoscale 2014, 6, 11031-11034.