Self-supporting FeCoMoP nanosheets for efficient overall water splitting

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Fig. S4 (a) OER polarization curve (no iR compensated performed), (b) Histogram of overpotential at current densities of 10, 50, and 100 mA cm^{-2} and (c) Tafel slope of Fe-CoMoP/NF at phosphating temperature of 300 °C and different cation exchange time. (d) OER polarization curve (no iR compensated performed), (e) Histogram of overpotential at current densities of 10, 50, and 100 mA cm^{-2} and (f) Tafel slope of Fe-CoMoP/NF at different phosphatizing temperatures with cation exchange time of 24 h.

Fig. S5 (a–e) CV curves (f) C_{dl} of CoP/NF, MoP/NF, CoMoP/NF, $Fe-CoMo(OH)_x$/NF and Fe-CoMoP/NF, respectively.

Fig. S6 Measure the change in the amounts of H_2 and O_2 gases released over time through theoretical models and experiments.

Fig. S7 SEM images of Fe-CoMoP/NF after (a-b) HER and (b-c) OER duration test.

Fig. S8 (a) XPS high-resolution spectra of (a) Co 2p, (b) Mo 2p, (c) Fe 3d and (d) P 2p of Fe-CoMoP/NF before and after HER/OER test.

Table. S1 Atomic percentage of CoMoP measured by XPS.

Table. S2 Atomic percentage of Fe-CoMoP measured by XPS.
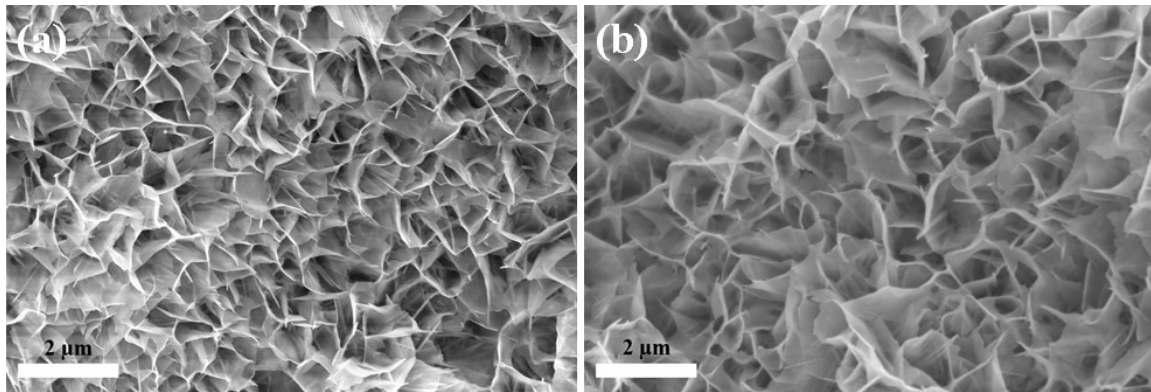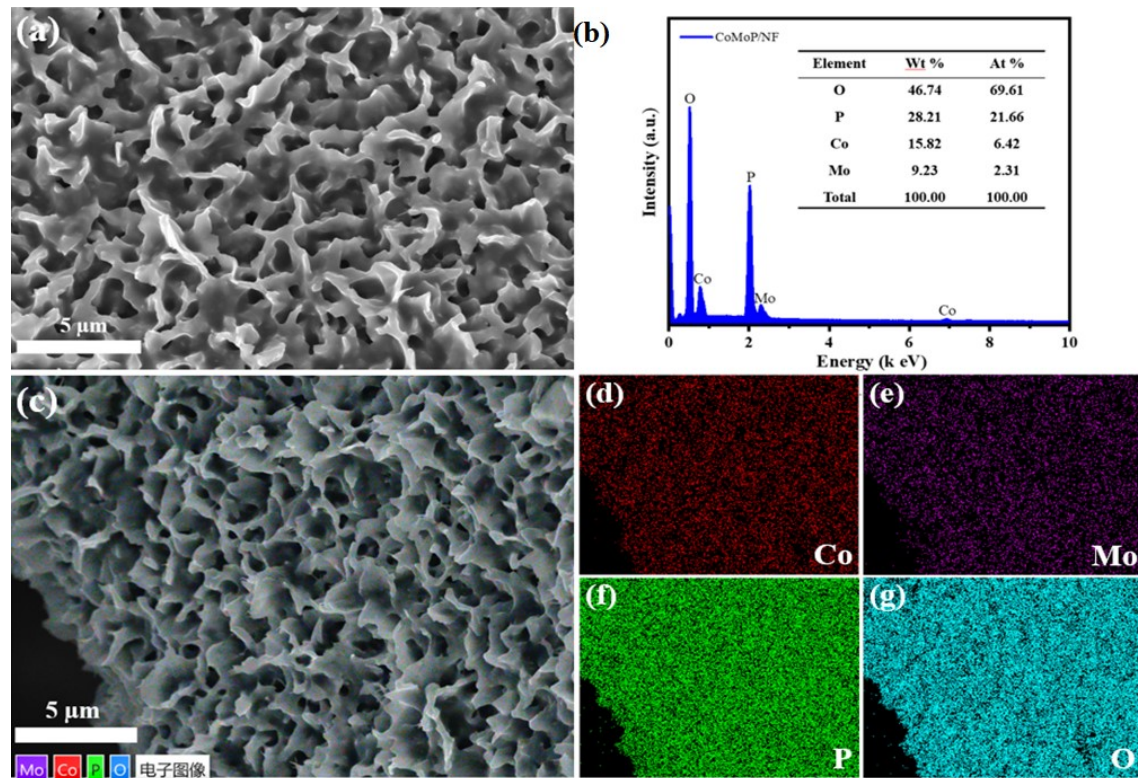

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Fig. S2 (a) SEM image, (b) EDS spectrum, (c–g) elemental mappings of Co, Mo, P and O of CoMoP/NF.

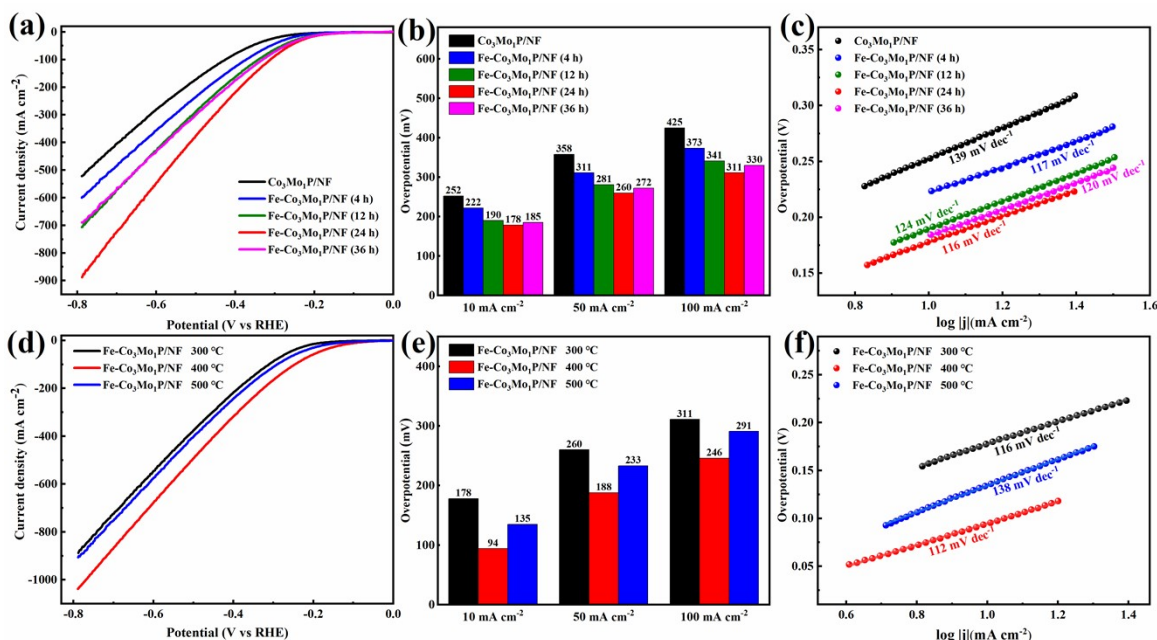**Fig. S3** (a) HER polarization curve (no iR compensated performed), (b) Histogram of overpotential at current densities of 10, 50, and 100 mA cm^{-2} and (c) Tafel slope of Fe-CoMoP/NF at phosphating temperature of 300℃ and different cation exchange time. (d) HER polarization curve (no iR compensated performed), (e) Histogram of overpotential at current densities of 10, 50, and 100 mA cm^{-2} and (f) Tafel slope of Fe-CoMoP/NF at different phosphatizing temperatures with cation exchange time of 24 h.
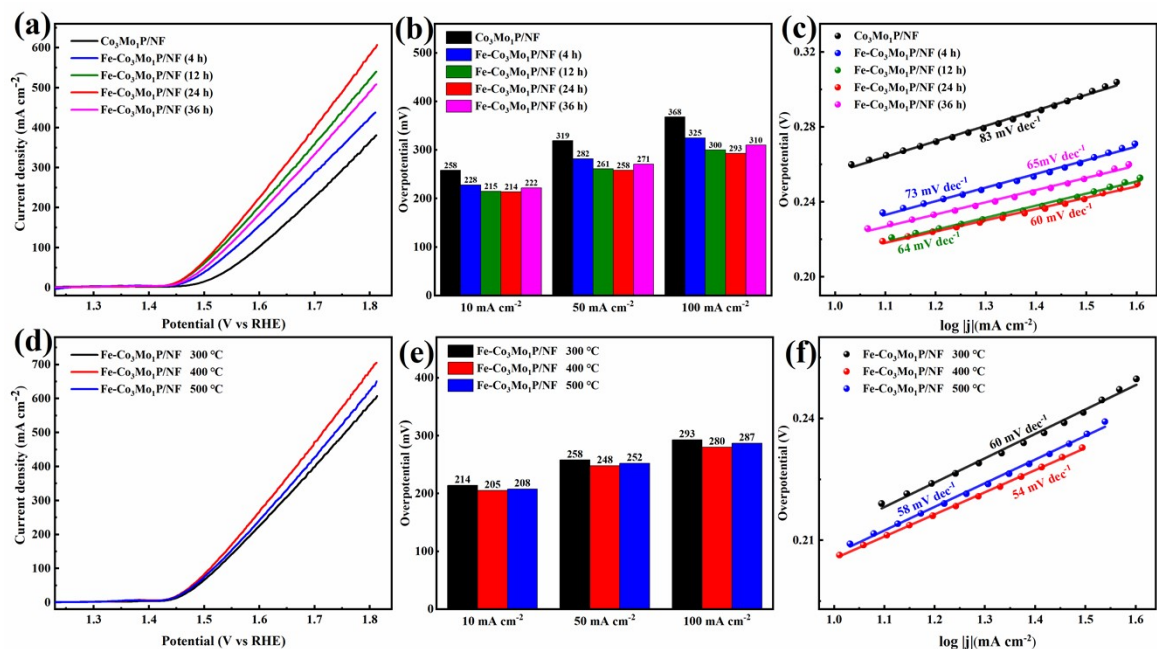

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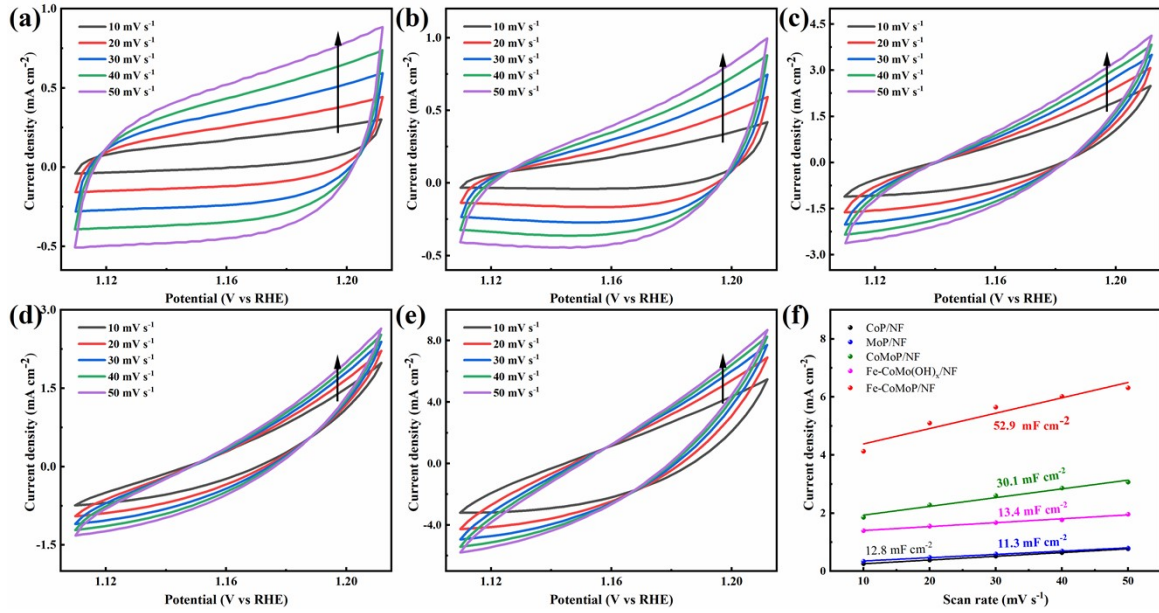
of 24 h.

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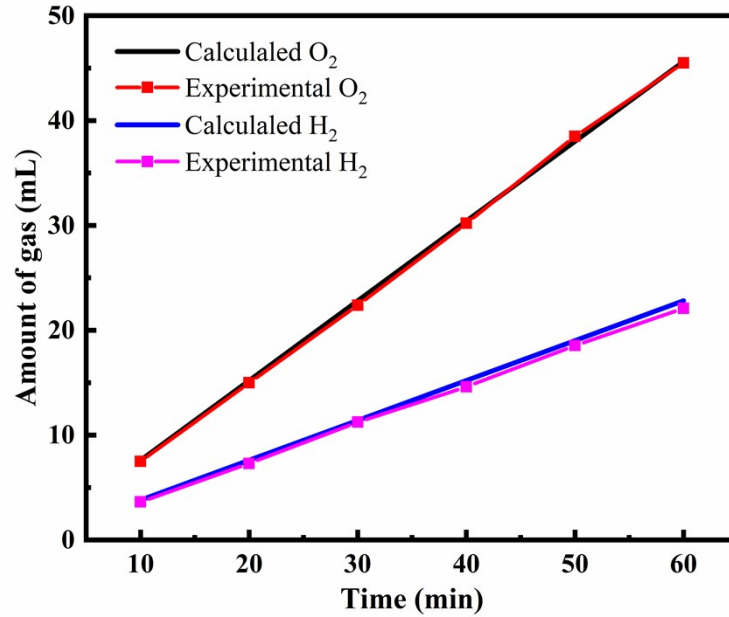

Fig. S6 Measure the change in the amounts of H$_2$ and O$_2$ gases released over time through theoretical models and experiments.

The Faradaic efficiency (FE) was evaluated by the following equation:

$$Q = It \qquad (1)$$

$$Vtheo = \frac{RT}{nFp}Q \qquad (2)$$

$$FE = \frac{Vex}{Vtheo}\% \qquad (3)$$

Here, Q is the charge, I is the electrolysis current, t is the recording time, R is the ideal gas constant, T

is the absolute temperature, n is the number of electrons required for a H_2 and O_2 molecule, F is Faraday's constant, p is the pressure, Vex (mL) is the amount of evolved gas record, $Vtheo$ is the calculated volume by the equation.
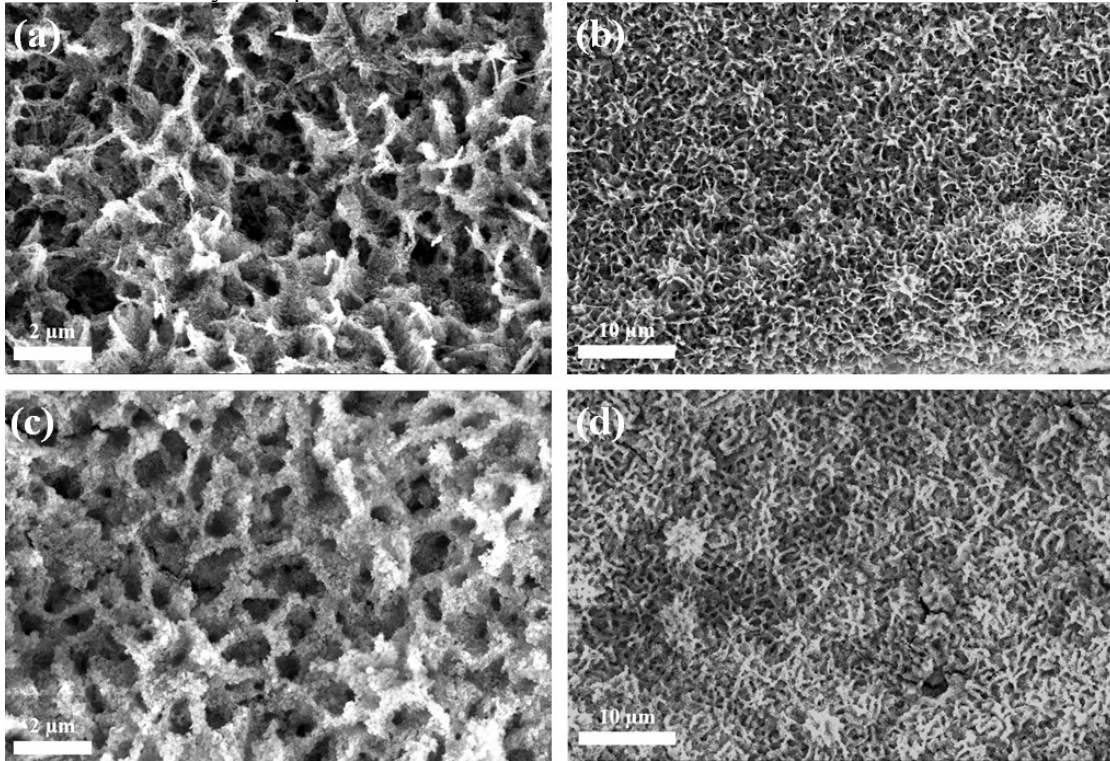

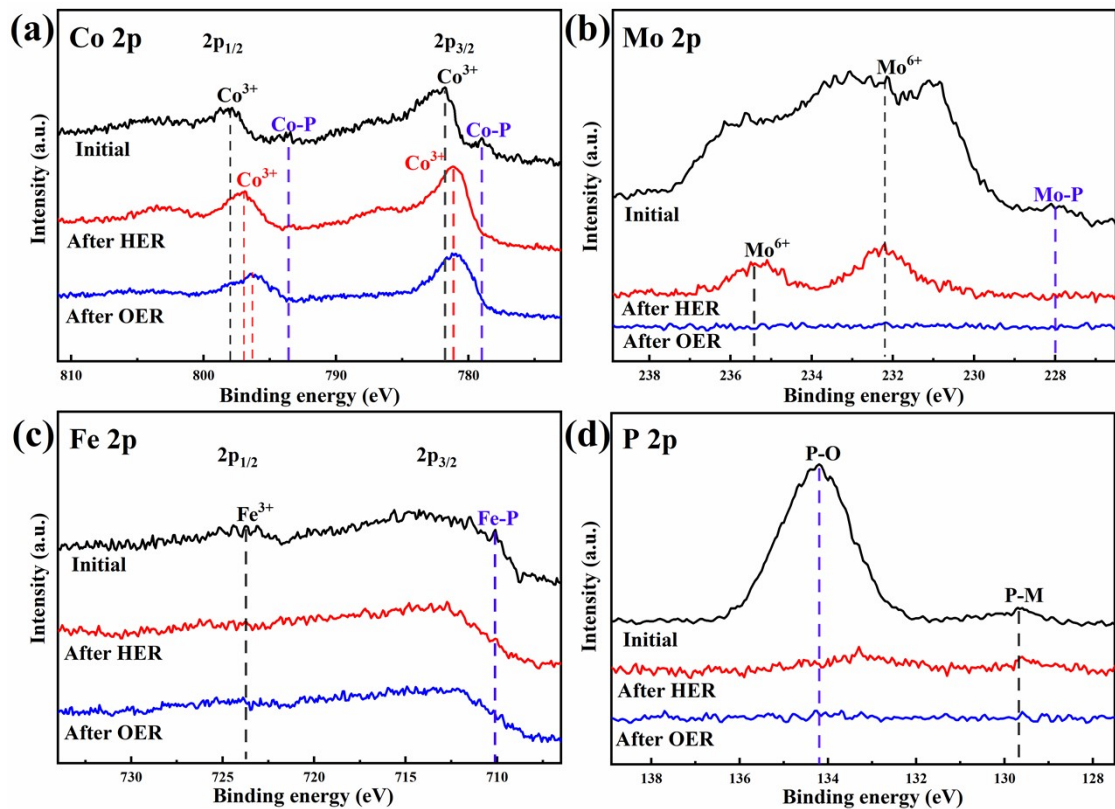**Fig. S7** SEM images of Fe-CoMoP/NF after (a-b) HER and (b-c) OER duration test.

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Table. S1 Atomic percentage of CoMoP measured by XPS.

Table of element content					
element	C 1s	O1s	P 2p	Co 2p	Mo 3d
Atomic %	14.96	57.77	17.52	7.3	2.45

Table. S2 Atomic percentage of Fe-CoMoP measured by XPS.

Table of element content						
element	C 1s	O1s	P 2p	Fe 2p	Co 2p	Mo 3d
Atomic %	18.1	54.7	17.26	2.87	4.87	2.2