Supporting Information

MOF-Derived Ultrathin Cobalt Molybdenum Phosphide Nanosheets for Efficient Electrochemical Overall Water Splitting

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Supplementary Materials:

Figure S1. SEM images of CoMoP.
Figure S2. (a) SEM image of Co–Mo MOFs. (b–c) SEM images and (d) EDX spectrum of CoMoP.

Figure S3. (a) SEM image of Na₂MoO₄-ZIF-67. (b–c) SEM images and (d) EDX spectrum Mo–CoP.
Figure S4. (a) SEM image of ZIF-67. (b–c) SEM images and (d) EDX spectrum CoP.

Figure S5. (a–d) TEM image of CoMoP.
Figure S6. (a–d) HAADF-STEM micrographs of CoMoP.

Figure S7. EELS chemical composition maps obtained from the red squared area of the STEM micrograph. Individual Co L$_{2,3}$-edges at 779 eV (red), Mo M$_{4,5}$-edges at 230 eV (green), P L$_{2,3}$-edges at 132 eV (blue), N K-edge at 401 eV (pink) and C K-edge at 284 eV (orange).
Figure S8. (a) OER and (b) HER polarization curves of CoMoP with different Mo content in 1.0 M KOH.

Figure S9. Cyclic voltammograms for (a) CoMoP; (b) Mo–CoP; (c) CoP and (d) RuO$_2$ in the non-faradaic region of 1.12–1.22 V vs. RHE at various scan rates.
Figure S10. (a–c) SEM image and d) EDX spectrum of CoMoP after long term OER stability testing.

Figure S11. (a–c) SEM image and d) EDX spectrum of CoMoP after long term HER stability testing.
### Table S1. Comparison of OER performance of CoMoP with some previously reported CoP-based catalysts in 1.0 M KOH solution.

| Catalysts       | Electrolyte | Overpotentials (mV) | Tafel Slope (mV/dec) | Reference |
|-----------------|-------------|---------------------|----------------------|-----------|
| CoMoP           | 1.0 M KOH   | 273                 | 55                   | This work |
| O-CoP nanosheets| 1.0 M KOH   | 310                 | 83                   | [1]       |
| CoP/NCNHP       | 1.0 M KOH   | 310                 | 70                   | [2]       |
| Mo-CoOOH        | 1.0 M KOH   | 302                 | 56                   | [3]       |
| CoP/CoCrO₂      | 1.0 M KOH   | 290                 | 52                   | [4]       |
| CoP PNWs        | 1.0 M KOH   | 326                 | 80                   | [5]       |
| CoP/CNFs        | 1.0 M KOH   | 325                 | 29                   | [6]       |

### Table S2. Comparison of HER performance of CoMoP with some previously reported CoP-based catalysts in 1.0 M KOH solution.

| Catalysts       | Electrolyte | Overpotentials (mV) | Tafel Slope (mV/dec) | Reference |
|-----------------|-------------|---------------------|----------------------|-----------|
| CoMoP           | 1.0 M KOH   | 89                  | 70                   | This work |
| NiFeP@N-CS      | 1.0 M KOH   | 186                 | 112                  | [7]       |
| NiCo-P          | 1.0 M KOH   | 169                 | 68                   | [8]       |
| Nio₈Se/RGO      | 1.0 M KOH   | 169                 | 65                   | [9]       |
| NCTi@CoP@MoS₂   | 1.0 M KOH   | 195                 | 74                   | [10]      |
| Ce₁–CoP         | 1.0 M KOH   | 144                 | 70                   | [11]      |
| V-doped CoP     | 1.0 M KOH   | 235                 | 91                   | [12]      |

### Table S3. Comparison of OWS performance of CoMoP with some previously reported CoP-based catalysts in 1.0 M KOH solution.

| Catalysts       | Electrolyte | Potentials (V) | Reference |
|-----------------|-------------|----------------|-----------|
| CoMoP           | 1.0 M KOH   | 1.56           | This work |
| FeCoP UNSAs     | 1.0 M KOH   | 1.60           | [13]      |
| Cr-Co/P         | 1.0 M KOH   | 1.59           | [14]      |
| V-CoP@a-CeO₂    | 1.0 M KOH   | 1.56           | [15]      |
| NiCoP           | 1.0 M KOH   | 1.58           | [16]      |
| CoP–N/Co foam   | 1.0 M KOH   | 1.61           | [17]      |
| CoP@NPMG        | 1.0 M KOH   | 1.58           | [18]      |
| CoP/CoP         | 1.0 M KOH   | 1.57           | [19]      |

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