

MOF-derived cobalt-nickel phosphide nanoboxes as electrocatalyst for the hydrogen evolution reaction

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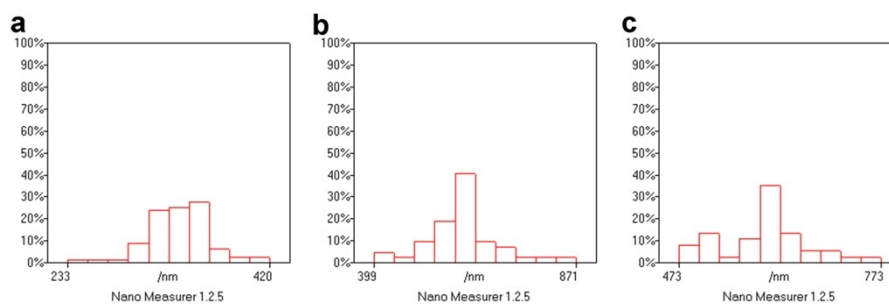


Figure S1. Particle size statistics for Co-MOF (a), CoNi-MOF (b) and CoNiP-4 (c).

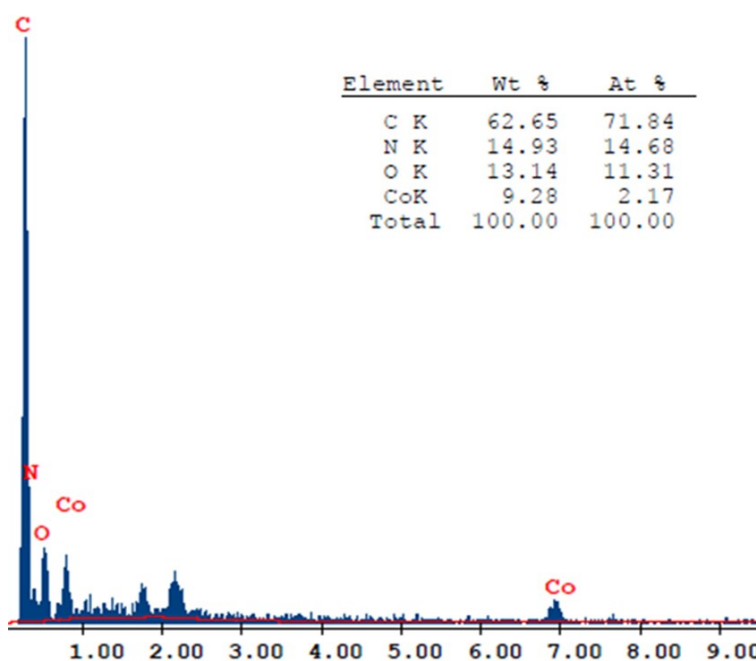


Figure S2. EDS spectrum of Co-MOF.

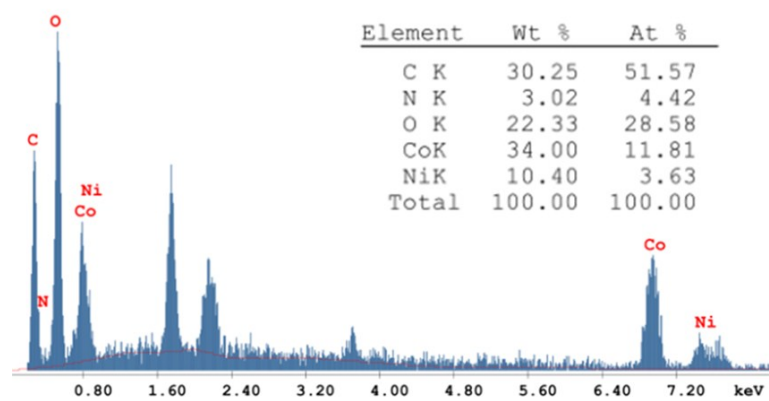


Figure S3. EDS spectrum of CoNi-MOF.

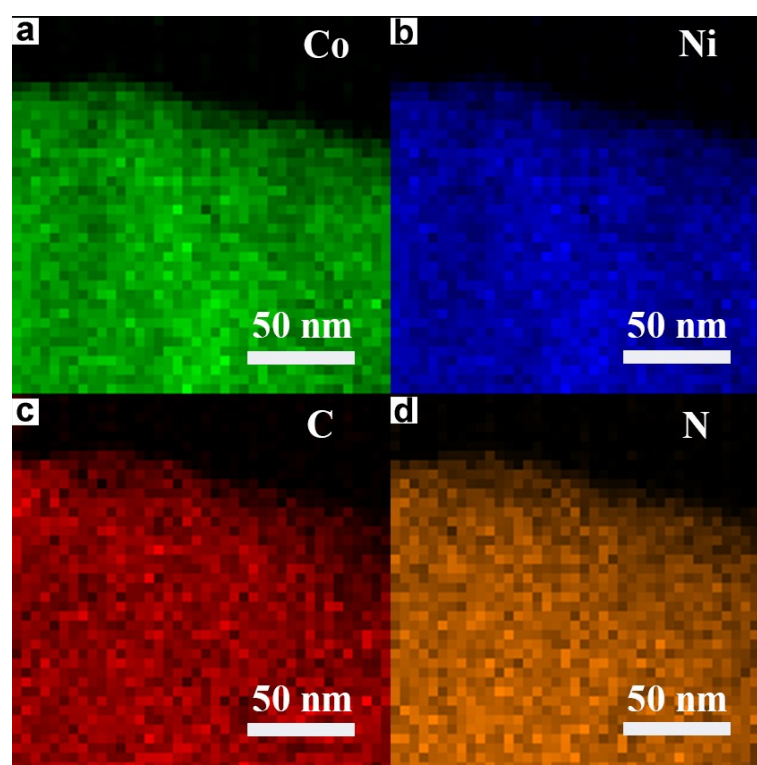


Figure S4. Element mapping images of CoNi-MOF of Co, Ni, C and N(a, b, c and d).

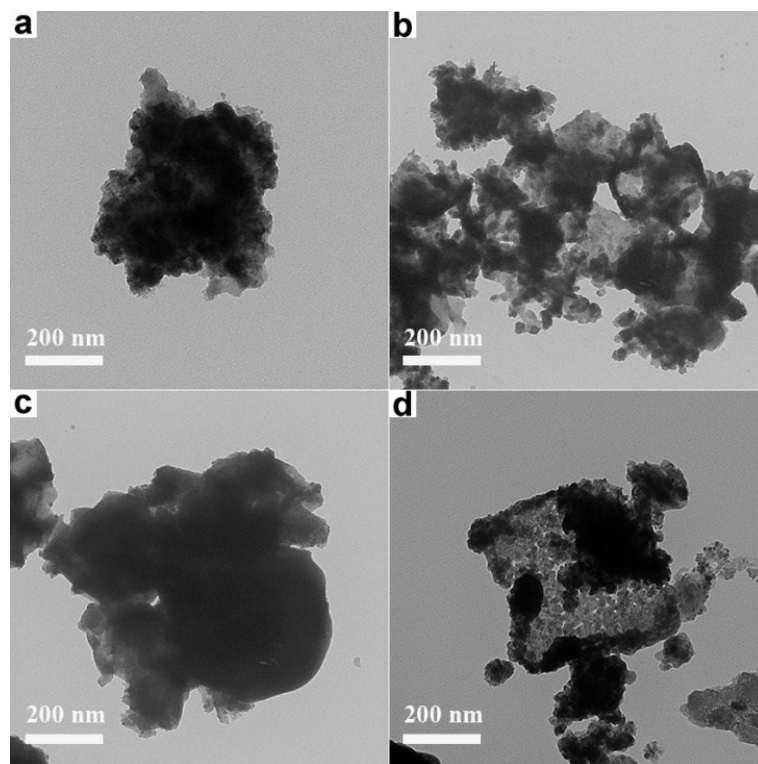


Figure S5. TEM of CoNiP-1 (a), CoNiP-2 (b), CoNiP-3 (c) and CoNiP-5 (d).

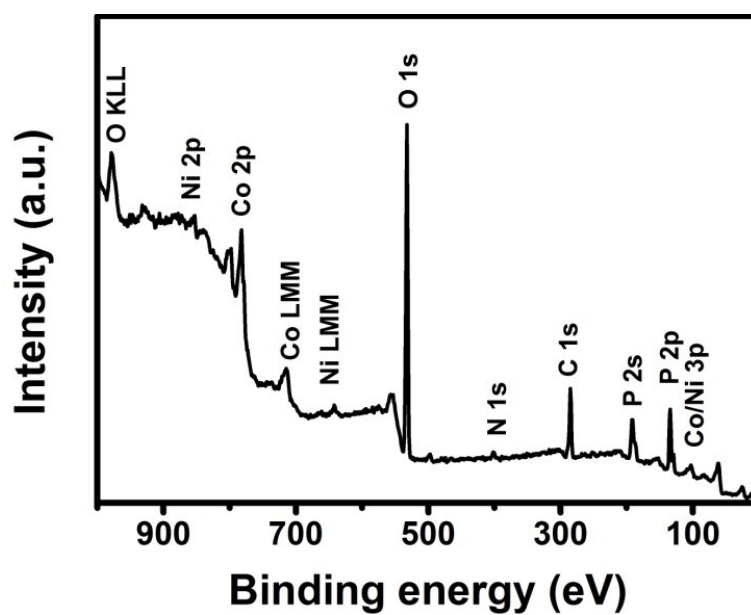


Figure S6. XPS survey spectrum of CoNiP-4.

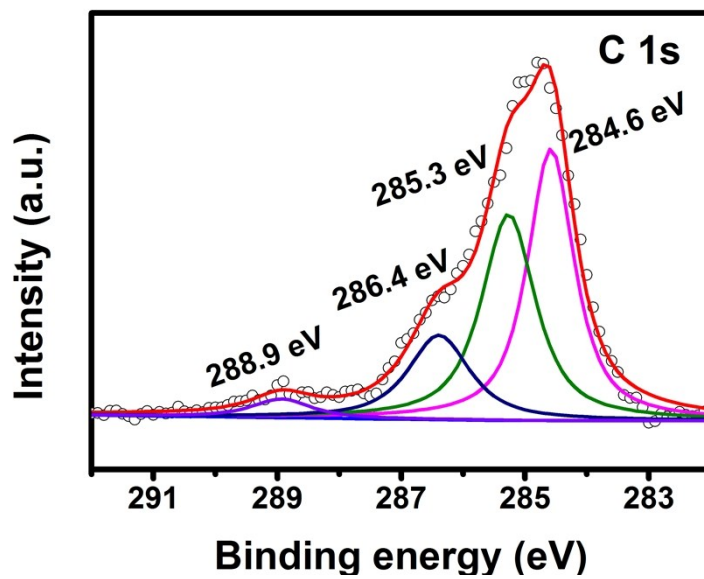


Figure S7. XPS spectra for C 1s.

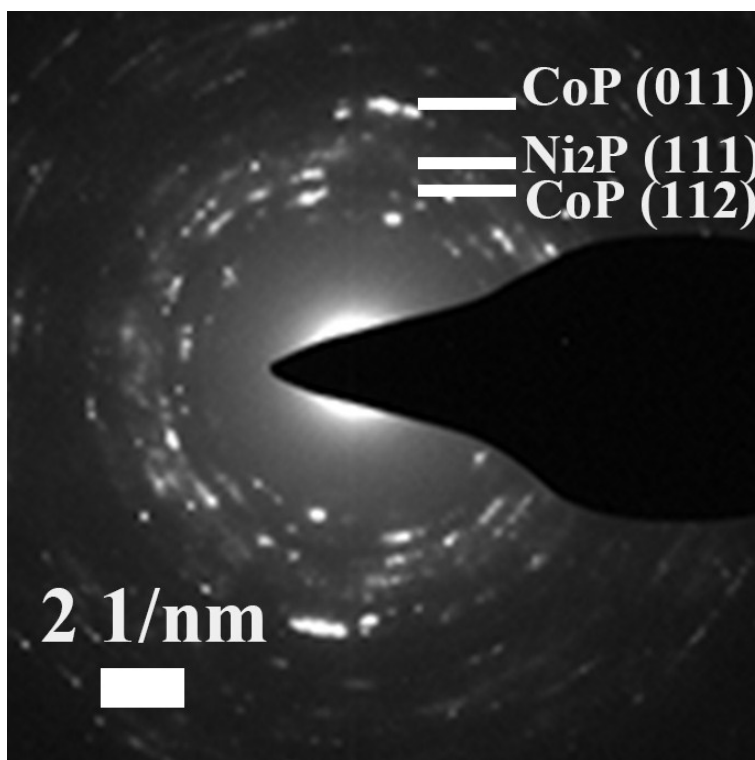


Figure S8. SAED pattern of CoNiP-4.

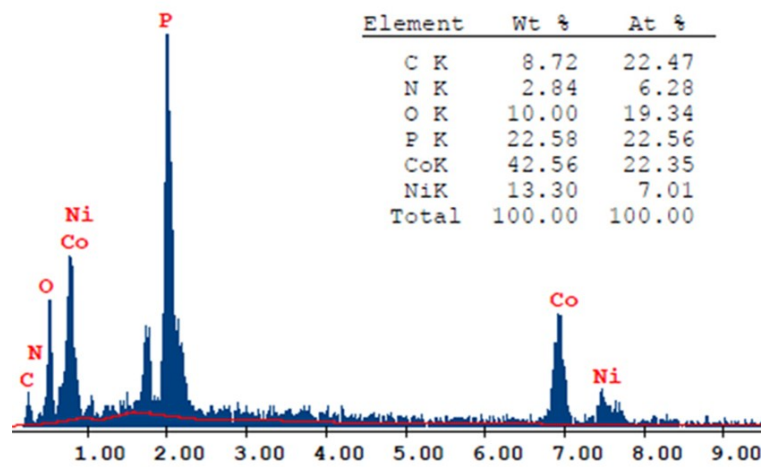


Figure S9. EDS spectrum of CoNiP-4.

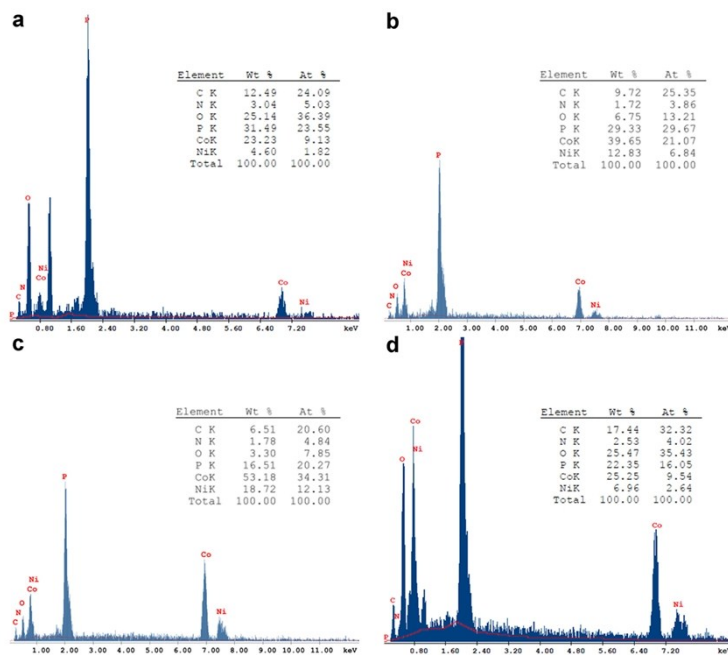


Figure S10. EDS spectrum of CoNiP-1 (a), CoNiP-2 (b), CoNiP-3 (c) and CoNiP-5 (d).

Table S1. ICP-MS of CoNi-MOF and CoNiP-4.

Sample	Co (Wt %)	Ni (Wt %)
CoNi-MOF	16.73	4.34
CoNiP-4	24.61	6.98

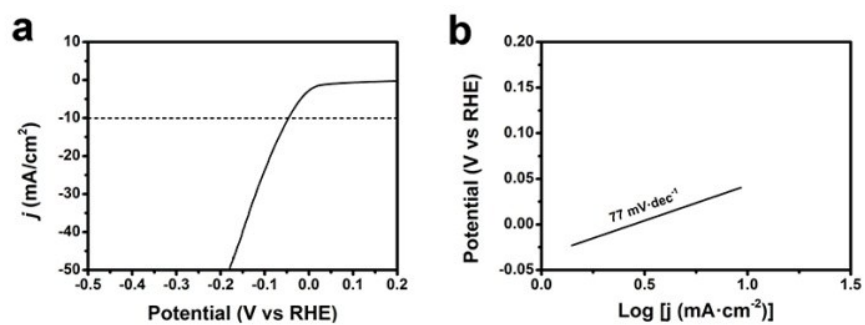


Figure S11. (a) Linear sweep voltammetry HER curves, (b) Tafel plots of Pt/C (20%).

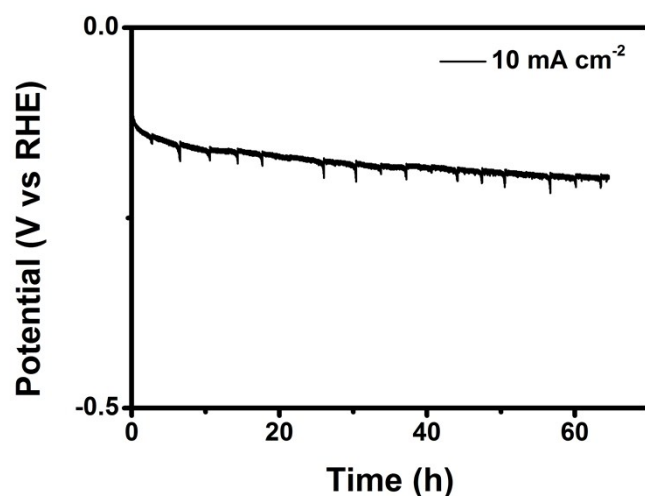


Figure S12. Chronopotentiometric curve of CoNiP-4 at 10 mA cm⁻² in 1 M KOH.

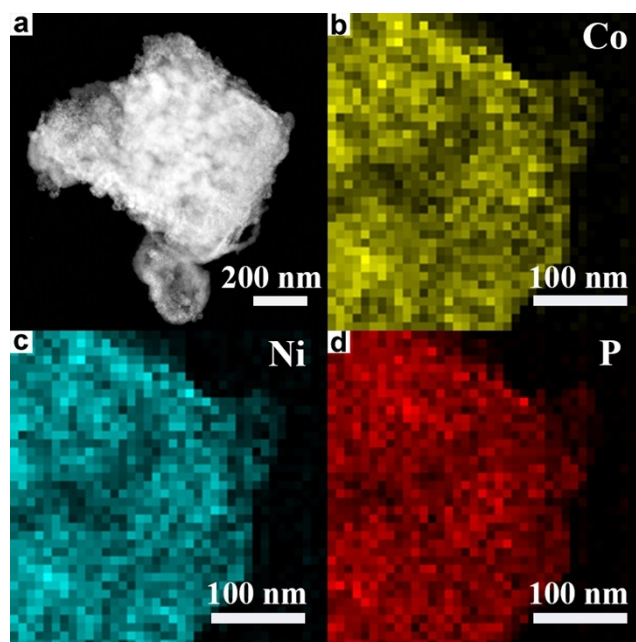


Figure S13. (a) HAADF-STEM image of CoNiP-4 after Chronopotentiometry test and its corresponding element mapping images of Co, Ni, and P (b, c and d).

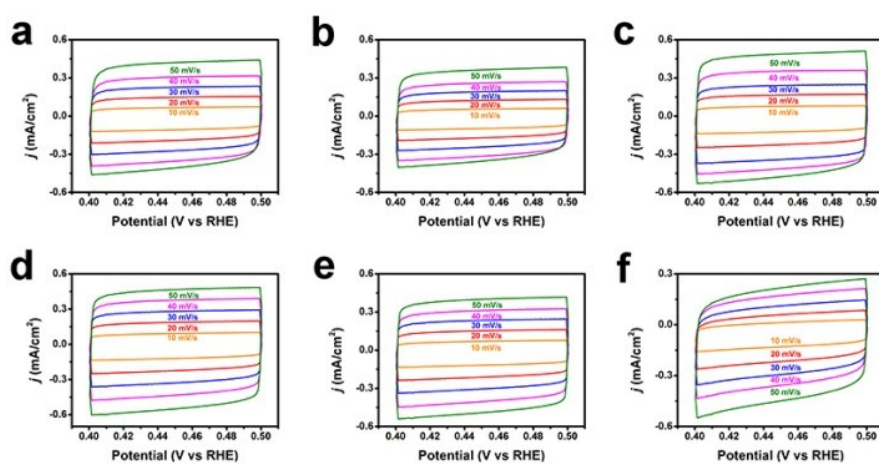


Figure S14. CV curves of CoNiP-1 (a), CoNiP-2 (b), CoNiP-3 (c), CoNiP-4 (d), CoNiP-5 (e) and CoNi-MOF (f) with different scan rates from 10 to 50 mV s^{-1} .

Table S2. Comparison of HER performance for various Co/Ni-based phosphides electrocatalysts.

Catalyst	η_{10} (mV)	Tafel slope (mV/dec)	Ref.
Amorphous CoP	143	63	<i>J. Mater. Chem. A</i> , 2019, 7 , 15749
CoP/NC	154	51	<i>Chem. Mater.</i> , 2015, 27 , 7636
CoP@NPCP	150	20	<i>Carbon</i> , 2019, 150 , 446
Ni ₉₀ P ₁₀	234	75.4	<i>Chem. Commun.</i> , 2018, 54 , 12408
Ni ₂ P@mesoG	188	99	<i>Mater. Chem. Front.</i> , 2017, 1 , 973
NiCoP	150	60	<i>Chem. Commun.</i> , 2016, 52 , 1633
CoNiP-4	138	65	This work