The optimization of hydrogen evolution performance by removing guest molecule in Co-MOF

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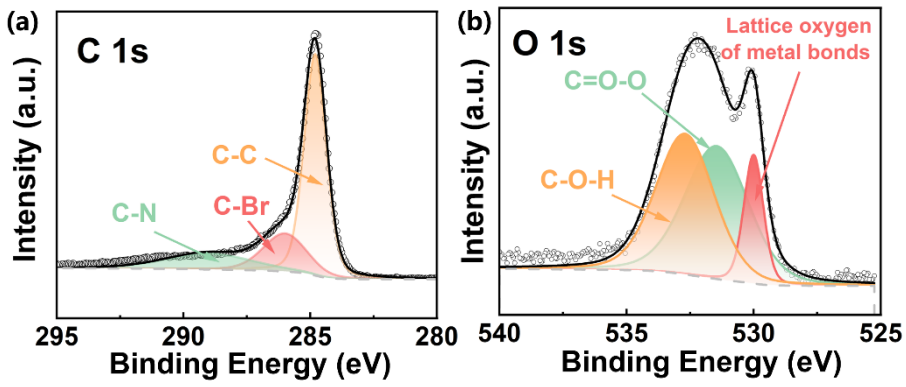
1.1 Characterization instrument

X-ray diffraction (XRD) is measured on a fixed target X-ray diffractometer (PANalytical X-Pert PRO MPD) using Cu-Kα radiation (1.5418 Å). X-ray photoelectron spectrum (XPS) measurement was performed on ESCALAB250Xi spectrometer (Thermo) using Al Kα radiation. The crystal data was collected on a Agilent Gemini E diffractometer (Mo, 50 kV, 40 mA or Cu, 40 kV, 40 mA) and reducted by CrysAlisPro (Rigaku). The structures were solved by direct methods using SHELXS-97. Refinements were performed with SHELXL-2018 using fullmatrix least-squares calculations on F^2, with anisotropic displacement parameters for all the nonhydrogen atoms. Thermogravimetric measurements are performed on the Thermogravimetric Analyzer (TGA 8000).

1.2 High-resolution spectrum of Co-PIPA-800 and Co-PIPA-ethanol-800.



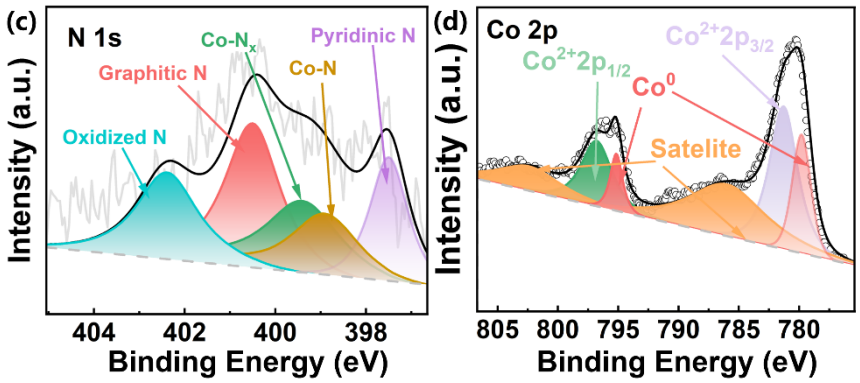


Fig S1 High-resolution spectrum of Co-PIPA-800: (a) C; (b) N; (c) O; (d) Co.

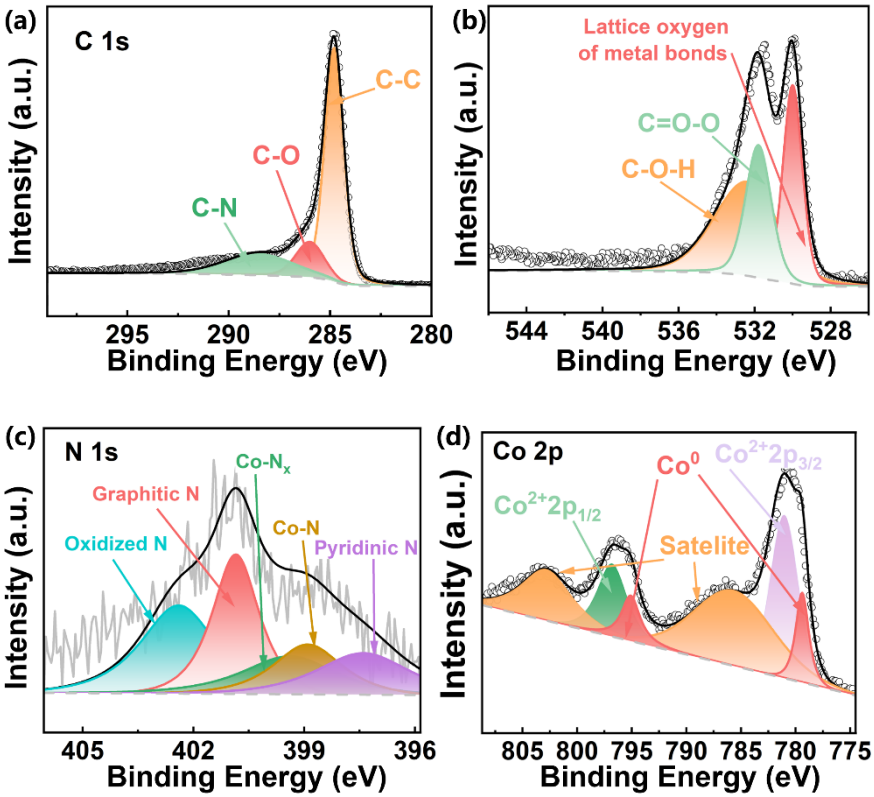


Fig S2 High-resolution spectrum of Co-PIPA-ethanol-800: (a) C; (b) N; (c) O; (d) Co.

Table S1 Comparison of HER performance of previous catalysts

Material	Testing condition	$E_{j=10}$ VS RHE (mV)	Tafel Slope ($mV \cdot dec^{-1}$)	REF
Co-PIPA-700	0.5 M H_2SO_4	551	349.6	This paper
Co-PIPA-800	0.5 M H_2SO_4	328	323.1	This paper
Co-PIPA-900	0.5 M H_2SO_4	399.1	154.4	This paper
Co-PIPA-ethanol-800	0.5 M H_2SO_4	151	70.4	This paper
Mo MOF/Zif67/Mo MOF (560 ℃)	0.5 M H_2SO_4	240	172	40
Cu/Cu_2S@C	0.5 M H_2SO_4	196	101	41