Electronic Supplementary Material (ESI) for Sustainable Energy & Fuels.

Supplementary Material

Enhanced OER Performance of Composite Co-Fe-based MOF Catalyst via One-pot Ultrasonic-assisted Synthetic Approach

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Table S1. The molar ratio of Co/Fe in different MOFs catalysts.

Molar ratio (Co/Fe)	**u-$CoFe_{0.5}$-BDC**	**s-$CoFe_{0.5}$-BDC**	**m-$CoFe_{0.5}$-BDC**
ICP	1:0.47	1:0.47	1:0.52
SEM-EDS	1:0.54	1:0.46	1:0.57
XPS	1:0.46	1:0.52	1:0.64

Table S2. Comparisons of OER performance for various transition-metal based MOFs electrocatalysts.

Materials	**preparation method**	**Electrolyte**	**Overpotential @10mA cm^{-2}**	**Stability**	**Substrate**	**Ref.**
CoFe-MOF-OH	hydrothermal method	1.0 M KOH	310 mV	40 h	GCE	1
FeTPyP-Co	Surface Preparation	0.1 M NaOH	330 mV @1mA cm^{-2}	--	GCE	2
Co-BDC/$Ti_3C_2T_x$	Exfoliation	1.0 M KOH	410 mV	15000 s	GCE	3
CoFe-PYZ	Stirring at room-temperature	0.1 M KOH	300 mV	--	GCE	4
NNU-23（Fe_2Ni-BPTC）	hydrothermal method	0.1 M KOH	365 mV	15 h	carbon cloth	5
Fe $(OH)_3$ @Co-MOF-74	“phenol–Fe” reaction	1.0 M KOH	292 mV	20 h	carbon paper	6

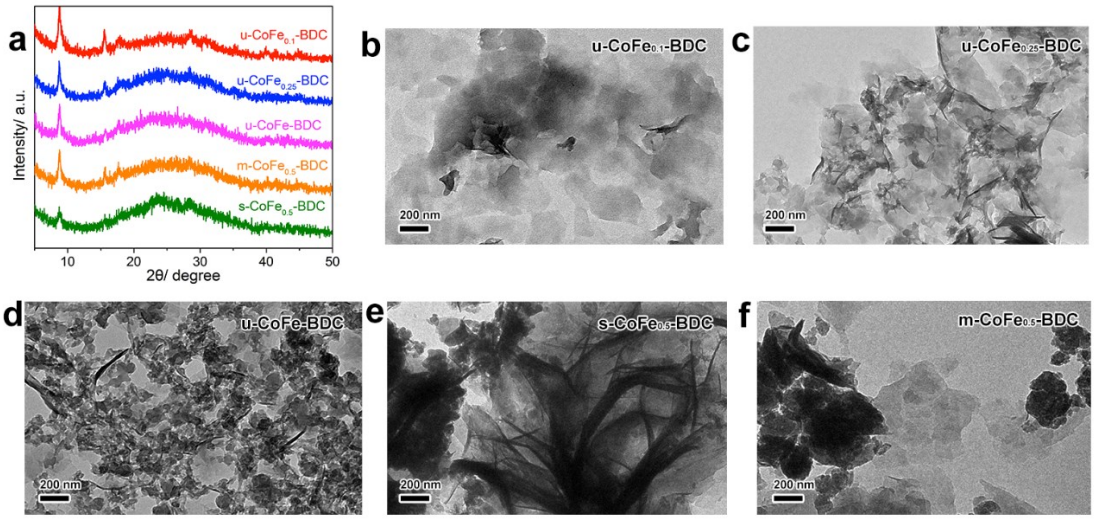

Figure S1. (a) XRD pattern and TEM image of (b) u-$CoFe_{0.1}$-BDC, (c) u-$CoFe_{0.25}$-BDC, (d) u-CoFe-BDC, (e) s-$CoFe_{0.5}$-BDC and (f) m-$CoFe_{0.5}$-BDC.

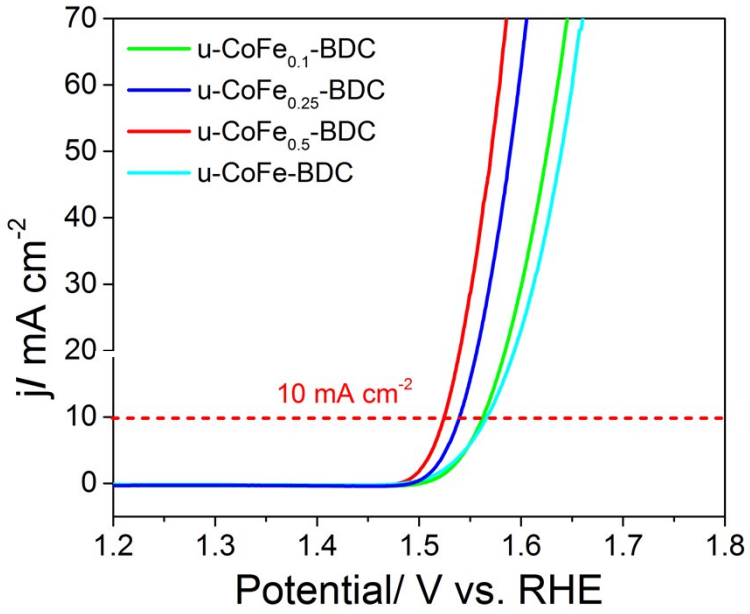

Figure S2. The polarization curve of the u-$CoFe_x$-BDC with controllable Co/Fe ratio.

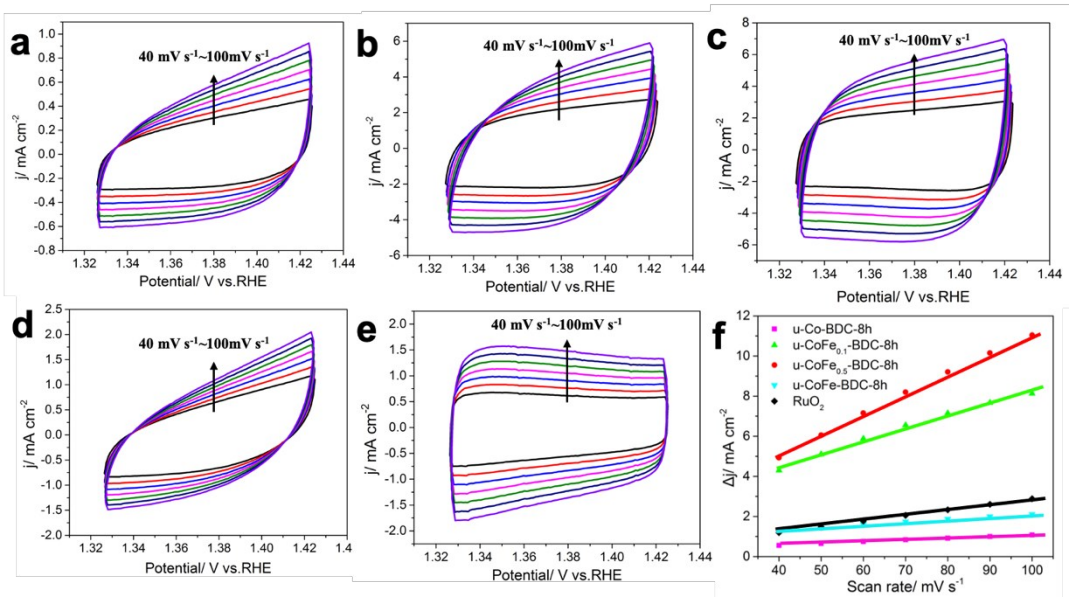

Figure S3. CV curves at different scan rates of (a) u-Co-BDC, (b) u-$CoFe_{0.1}$-BDC, (c)u-$CoFe_{0.5}$-BDC (d) u-CoFe-BDC, (e) RuO_2 measured at different scan rates; (f) plots of current density difference (Δj) at 1.32-1.42 V (vs. RHE) against scan rate for calculation of double layer capacitance (C_{dl}).

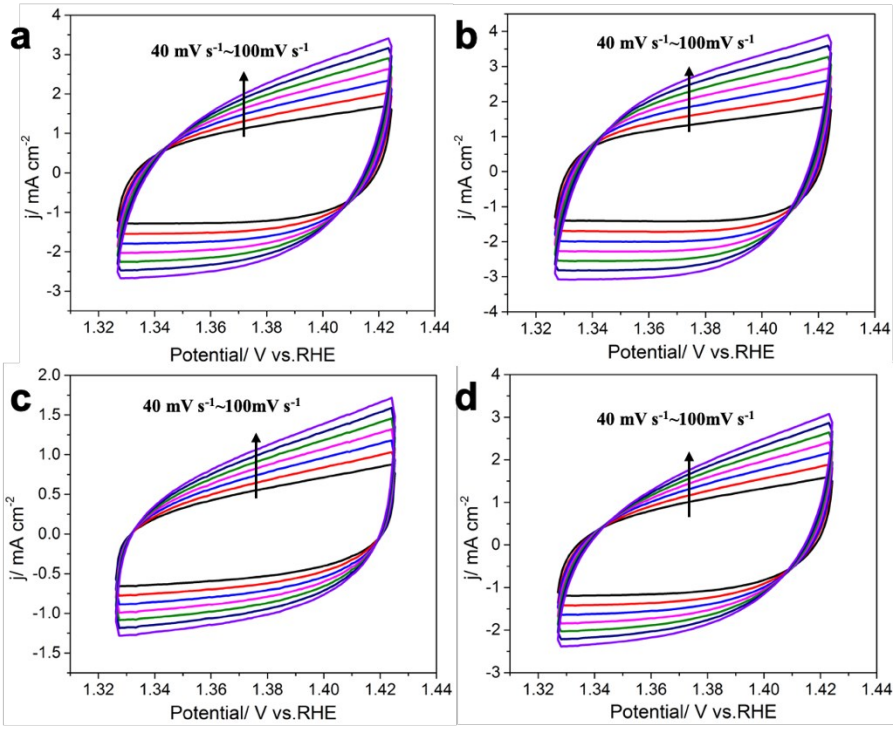

Figure S4. CV curves at different scan rates of (a)u-$CoFe_{0.5}$-BDC-2h, (b) u-$CoFe_{0.5}$-BDC-4h, (c) m-$CoFe_{0.5}$-BDC and (d) s-$CoFe_{0.5}$-BDC

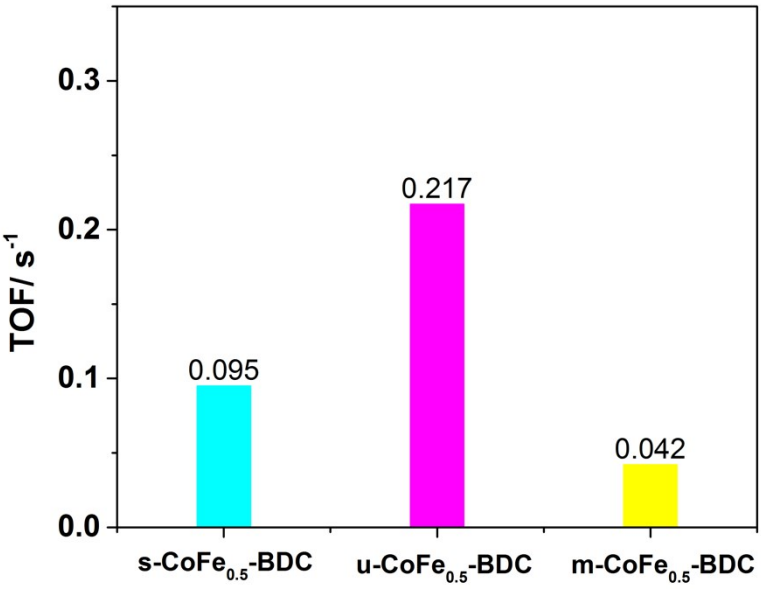

Figure S5. Turnover frequencies (TOFs) of OER of sample electrocatalysts calculated at 1.53 V (vs. RHE).

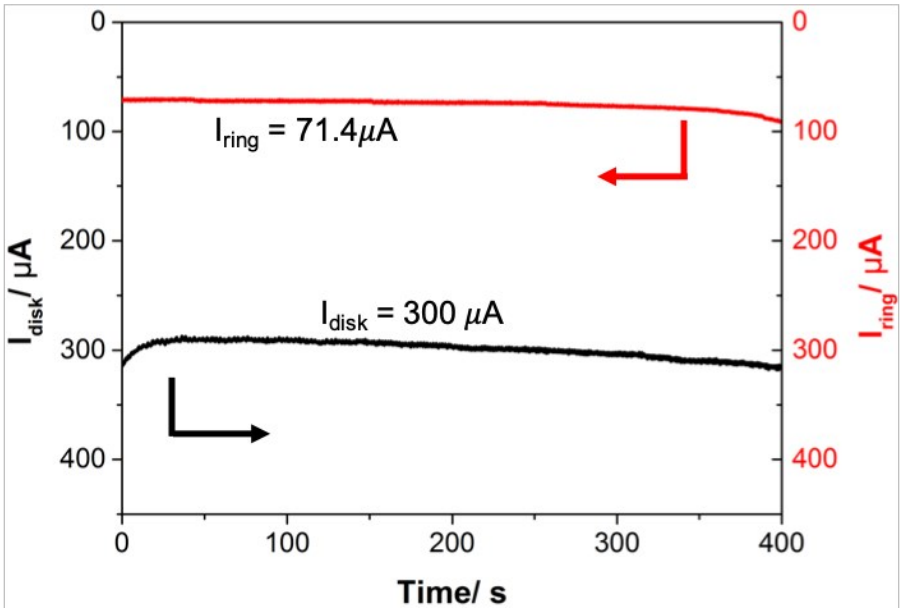

Figure S6. Disk and ring current of u-CoFe0.5-BDC tested on RRDE (1000 rpm) in 1.0 M KOH solution.

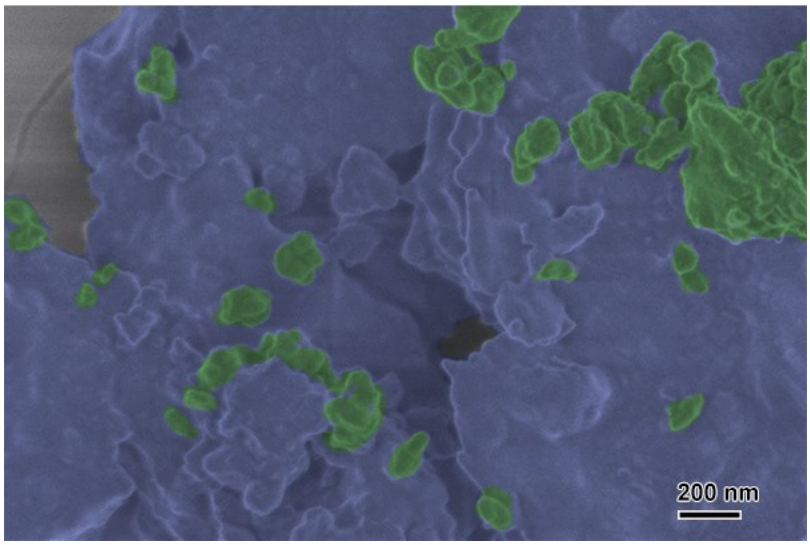

Figure S7. The FESEM image of u-$CoFe_{0.5}$-BDC after OER measurement in 1.0 M KOH.

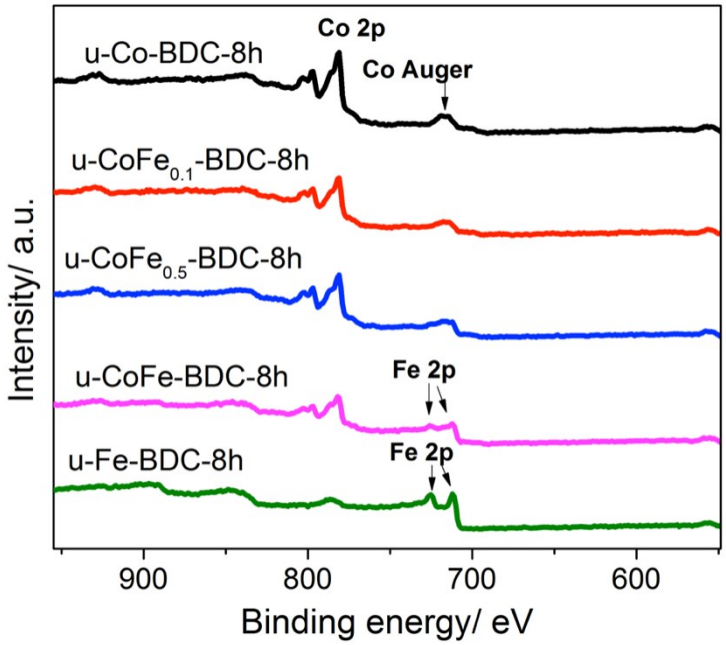

Figure S8. The magnification of XPS survey spectra of u-$CoFe_x$-BDC-8h.

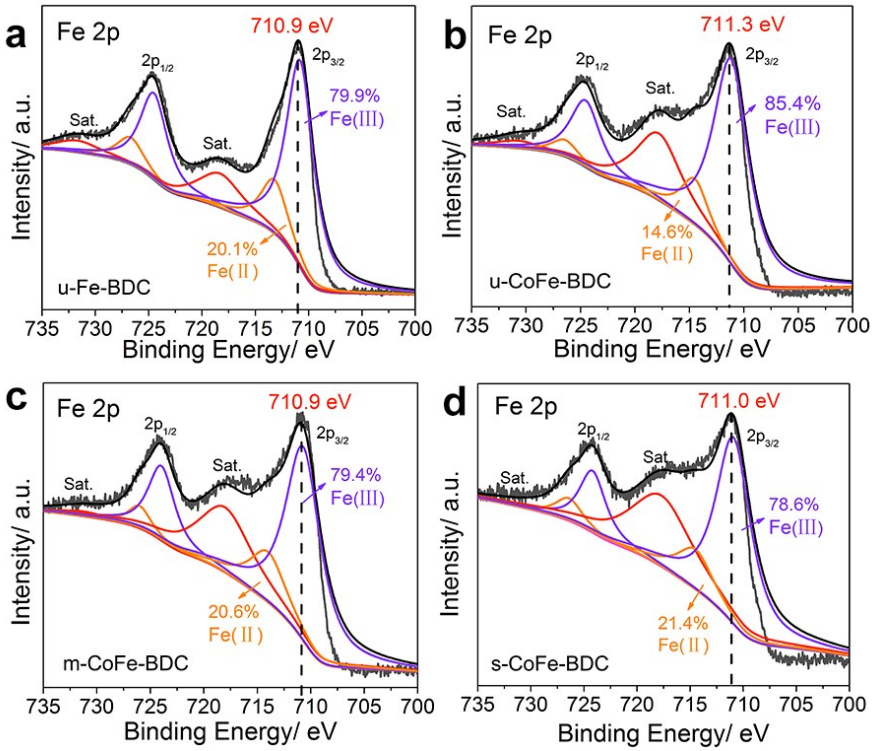

Figure S9. The high-resolution Fe 2p spectrum of (a) u-Fe-BDC, (b) u-CoFe-BDC, (c) m-CoFe-BDC and (d) s-CoFe-BDC.

Reference

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