

Supporting Information

Flower-like bimetal Ni/Co based metal-organic-framework materials with adjustable components toward high performance solid-state supercapacitors

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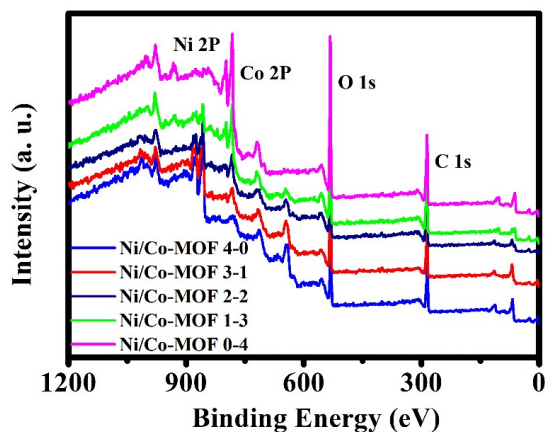


Fig. S1 XPS spectrum of all obtained Ni/Co-MOF.

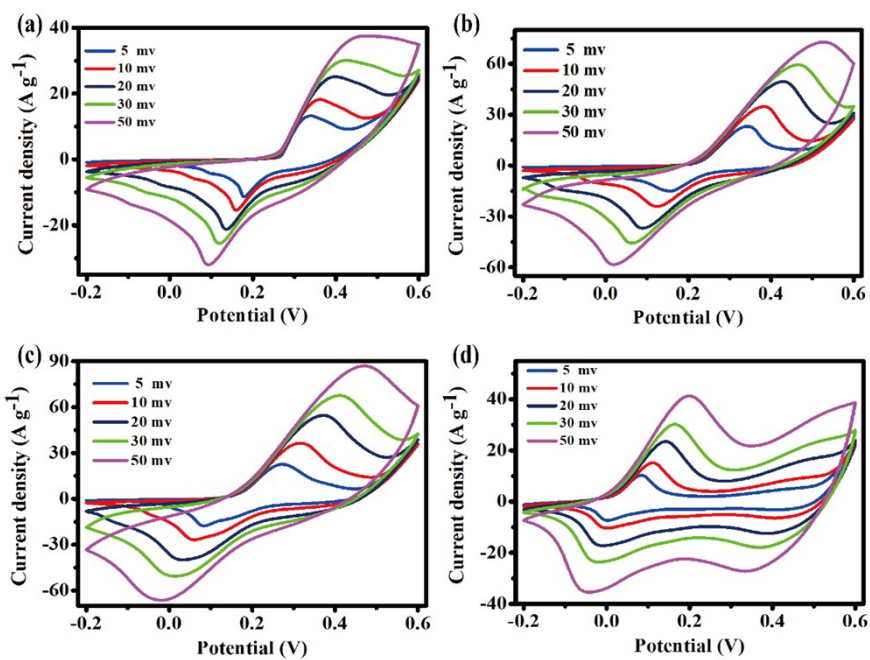


Fig. S2 The CV curves of (a) Ni/Co-MOF 4-0, (b) Ni/Co-MOF 3-1, (c) Ni/Co-MOF 2-2 and (d) Ni/Co-MOF 0-4.

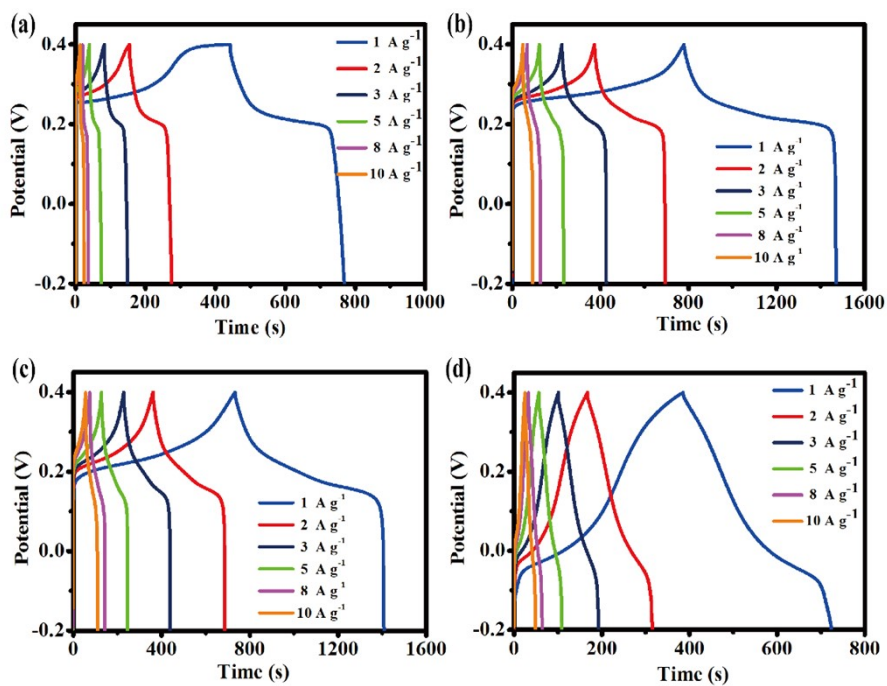


Fig. S3 The GCD curves of (a) Ni/Co-MOF 4-0, (b) Ni/Co-MOF 3-1, (c) Ni/Co-MOF 2-2 and (d) Ni/Co-MOF 0-4.

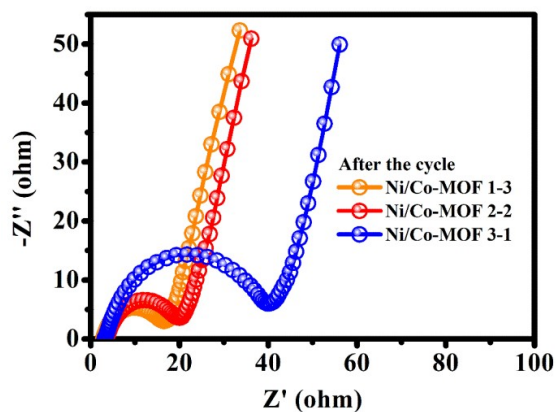


Fig. S4 The Nyquist plots of Ni/Co-MOF 3-1, Ni/Co-MOF 2-2 and Ni/Co-MOF 1-3 electrodes after 4000 cycles.

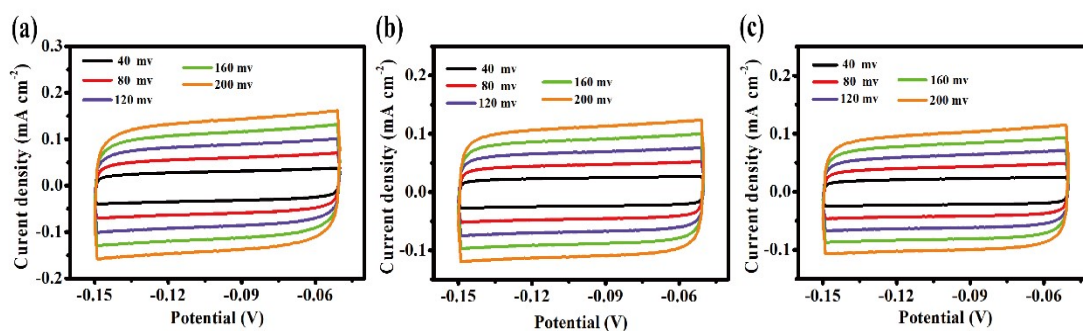


Fig. S5 The CV curves of (a) Ni/Co-MOF 1-3, (b) Ni/Co-MOF 2-2 and (c) Ni/Co-MOF 3-1 electrodes between -0.15 V to -0.05 V with different scanning rates.

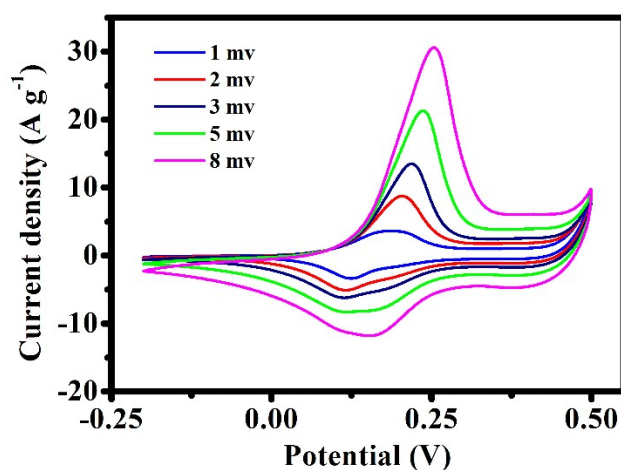


Fig. S6 The CV curves of Ni/Co-MOF 1-3 at the scan rate range from 1 mV s^{-1} to 8 mV s^{-1} .

Table S1 The detailed compositions and contents of all obtained electrode materials.

Materials	Ni (%)	Co (%)	C (%)	O (%)
Ni/Co-MOF 4-0	13.99	0	49.08	36.94
Ni/Co-MOF 3-1	14.21	4.10	42.74	38.95
Ni/Co-MOF 2-2	7.10	6.05	52.01	34.83
Ni/Co-MOF 1-3	3.67	9.06	52.66	34.61
Ni/Co-MOF 0-4	1.28*	14.47	45.04	39.21

*: Nickel element comes from Ni foam

Table S2 The specific capacitance of all electrode materials.

Materials	Specific capacities (F g ⁻¹)						Rate performance (%)
	1 A g ⁻¹	2 A g ⁻¹	3 A g ⁻¹	5 A g ⁻¹	8 A g ⁻¹	10 A g ⁻¹	
Ni/Co-MOF 4-0	544.5	401.7	334.5	281.7	224.0	193.3	35.5
Ni/Co-MOF 3-1	1150.3	168.7	1007.5	913.3	806.7	746.7	64.9
Ni/Co-MOF 2-2	1124.8	1085.3	1051.0	992.5	928.0	870.0	77.7
Ni/Co-MOF 1-3	1230.3	1199.3	1175.0	1138.3	1093.3	1070.0	87.0
Ni/Co-MOF 0-4	563.8	493.0	458.0	433.3	406.7	390.0	69.2

Table S3 The EIS data of all electrode materials after fitting.

Resistance type	Ni/Co-MOF 4-0	Ni/Co-MOF 3-1	Ni/Co-MOF 2-2	Ni/Co-MOF 1-3	Ni/Co-MOF 0-4
Series resistance (R _s , Ω)	2.828	2.733	1.928	1.342	2.289
Charge transfer resistance (R _{ct} , Ω)	3.858	1.594	0.917	0.501	1.525

Table S4 The electrochemical performance of some other reported devices.

Electrode materials	Energy density (Wh kg ⁻¹)	Power density (W kg ⁻¹)	Stability (Cycles)	Reference
CoNi@SNC//AC	55.7	0.8	90.6% (4000)	[1]
Co-Ni ₃ S ₂ //AC	59.1	1.276	94.9% (16000)	[2]
(Ni, Co)Se ₂ @rGO//AC	52.6	0.803	100% (10000)	[3]
Ni-Co/CP/PBI-KOH//AC	75.1	0.9	85.5% (8000)	[4]
Co-HKUST//AC	71.35	0.81	91.8% (5000)	[5]
Co ₃ O ₄ @CoNi ₂ S ₄ //AC	55.6	0.884	86% (10000)	[6]
Ni/C/rGO-4//AC	79.7	1.275	83.7% (8000)	[7]
Ni/C/rGO-7//AC	91.8	0.8	90.3% (8000)	[8]
Ni/Co-MOF 1-3//AC	116	0.795	92.1% (6000)	Our work

Reference:

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