Electronic Supplementary Material (ESI) for Materials Chemistry Frontiers.

Cobalt induced growth of hollow MOF spheres for high performance supercapacitors

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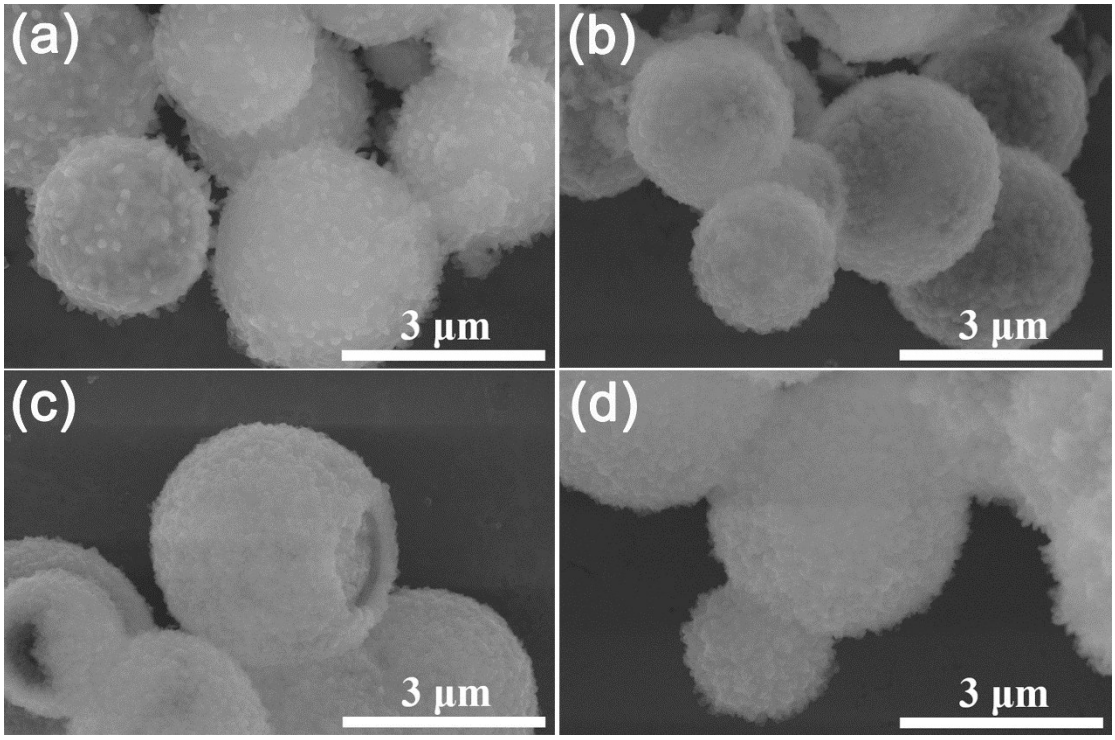

Fig. S1. SEM images of Ni-MOF and Ni/Co-MOFs under different magnifications: (a) Ni-MOF; (b) Ni/Co-MOF-1; (c) Ni/Co-MOF-2; (d) Ni/Co-MOF-3.

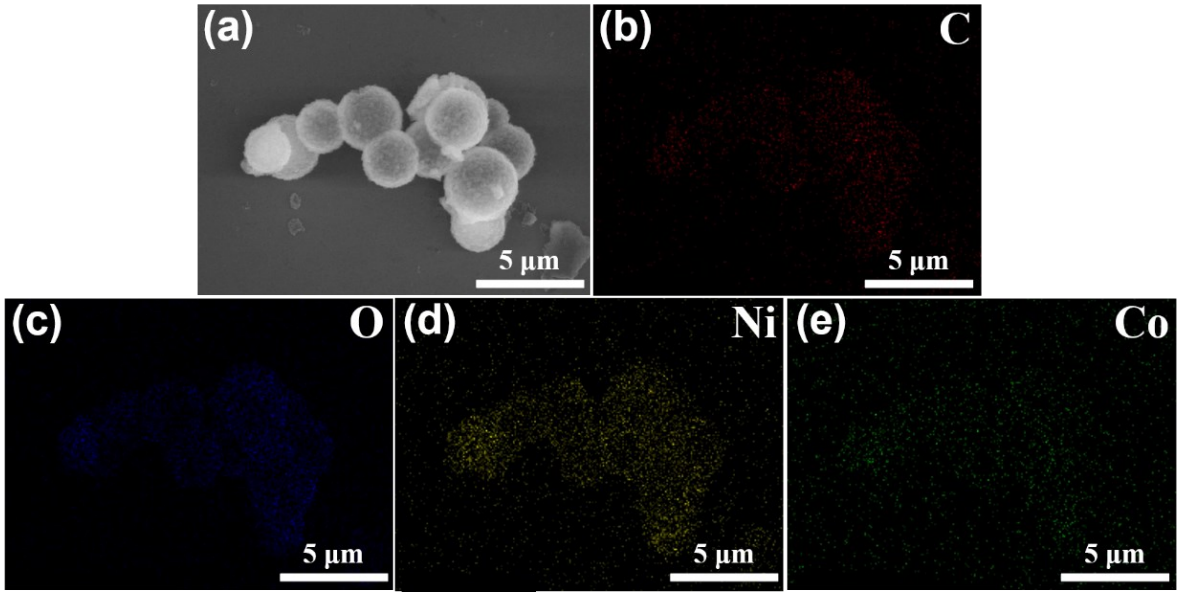

Fig. S2. SEM image of the (a) Ni/Co-MOF-1 and (b-e) the corresponding elemental mapping images of C, O, Ni, Co from the image.

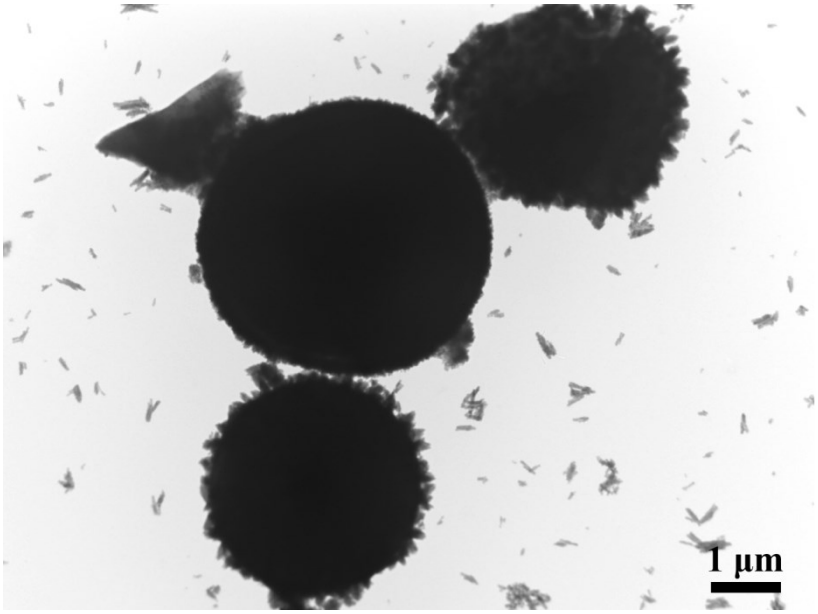

Fig. S3. TEM images of prepared Ni/Co-MOF-3.

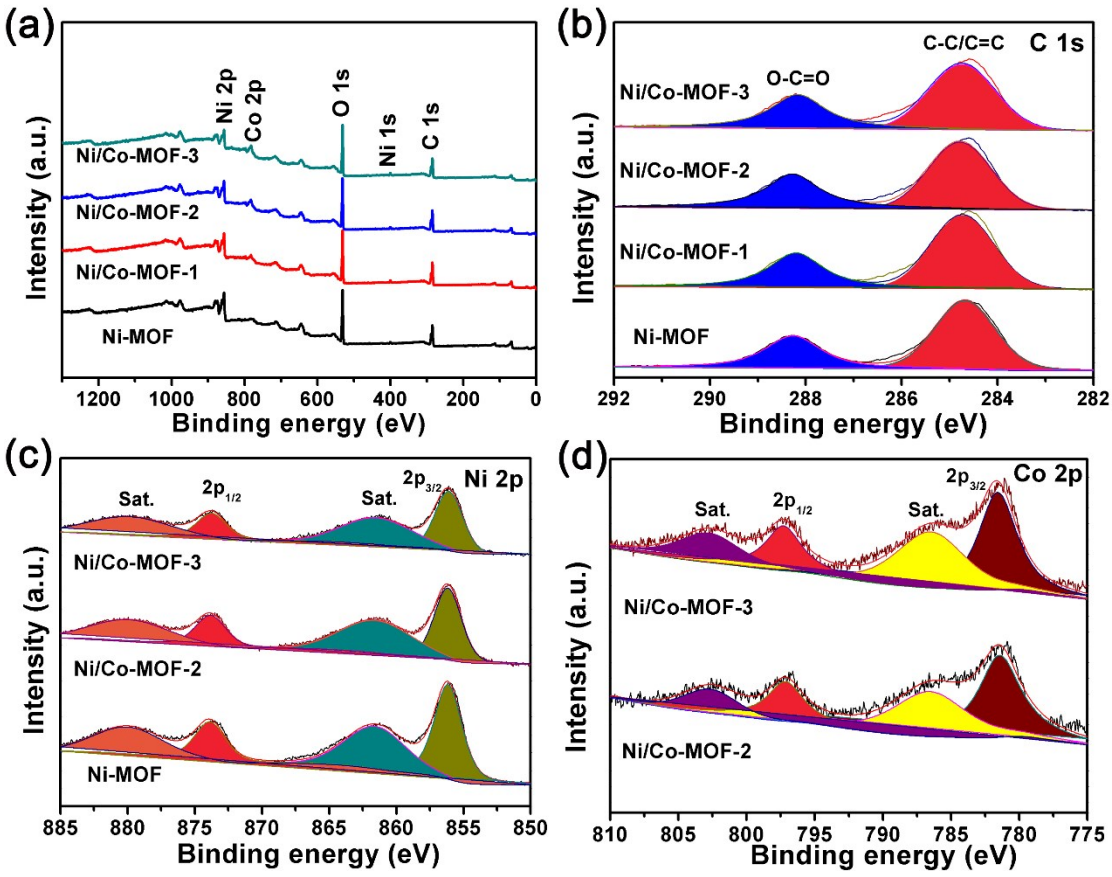

Fig. S4. XPS spectra of the prepared MOFs: (a) XPS survey; (b) C 1s; (c) Ni 2p; (d) Co 2p.

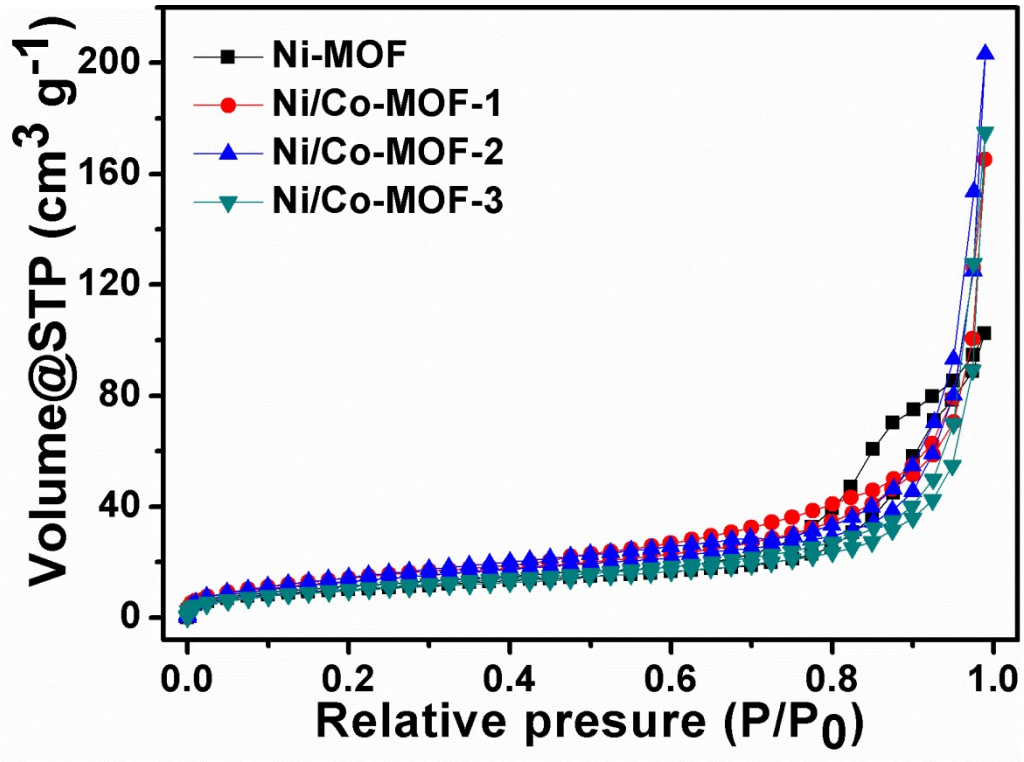

Fig. S5. Nitrogen adsorption-desorption isotherms of Ni-MOF and Ni/Co-MOFs

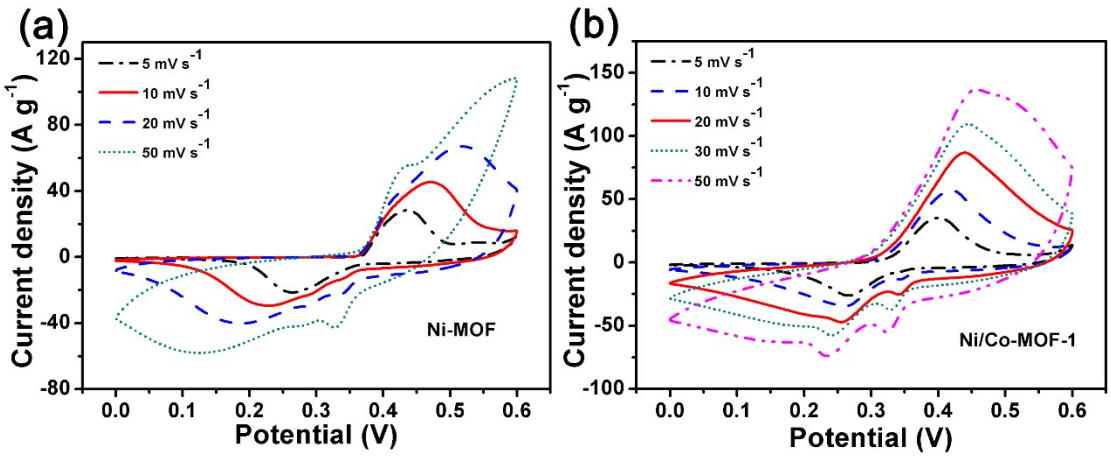

Fig. S6. The CV curves of (a) Ni-MOF and (b) Ni/Co-MOF-1 at scan rates from 5 mV s^{-1} to 50 mV s^{-1}.

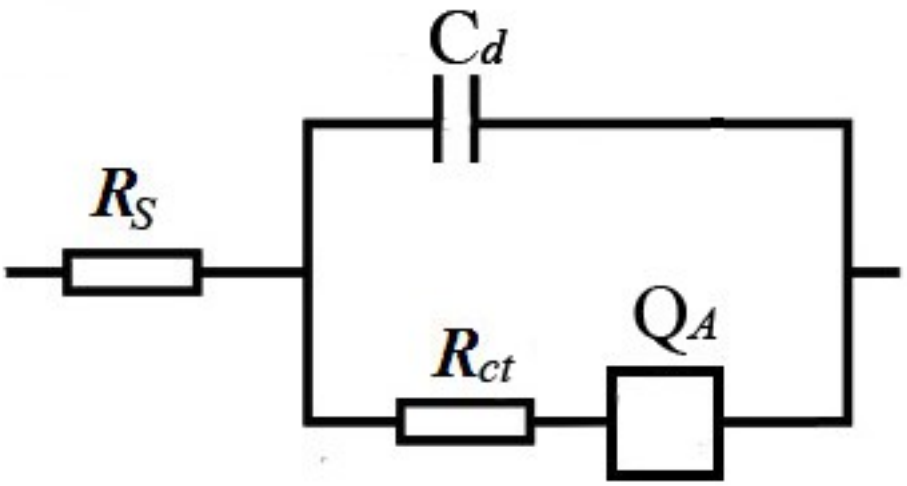

Fig. S7. Equivalent electrical circuit model of EIS.

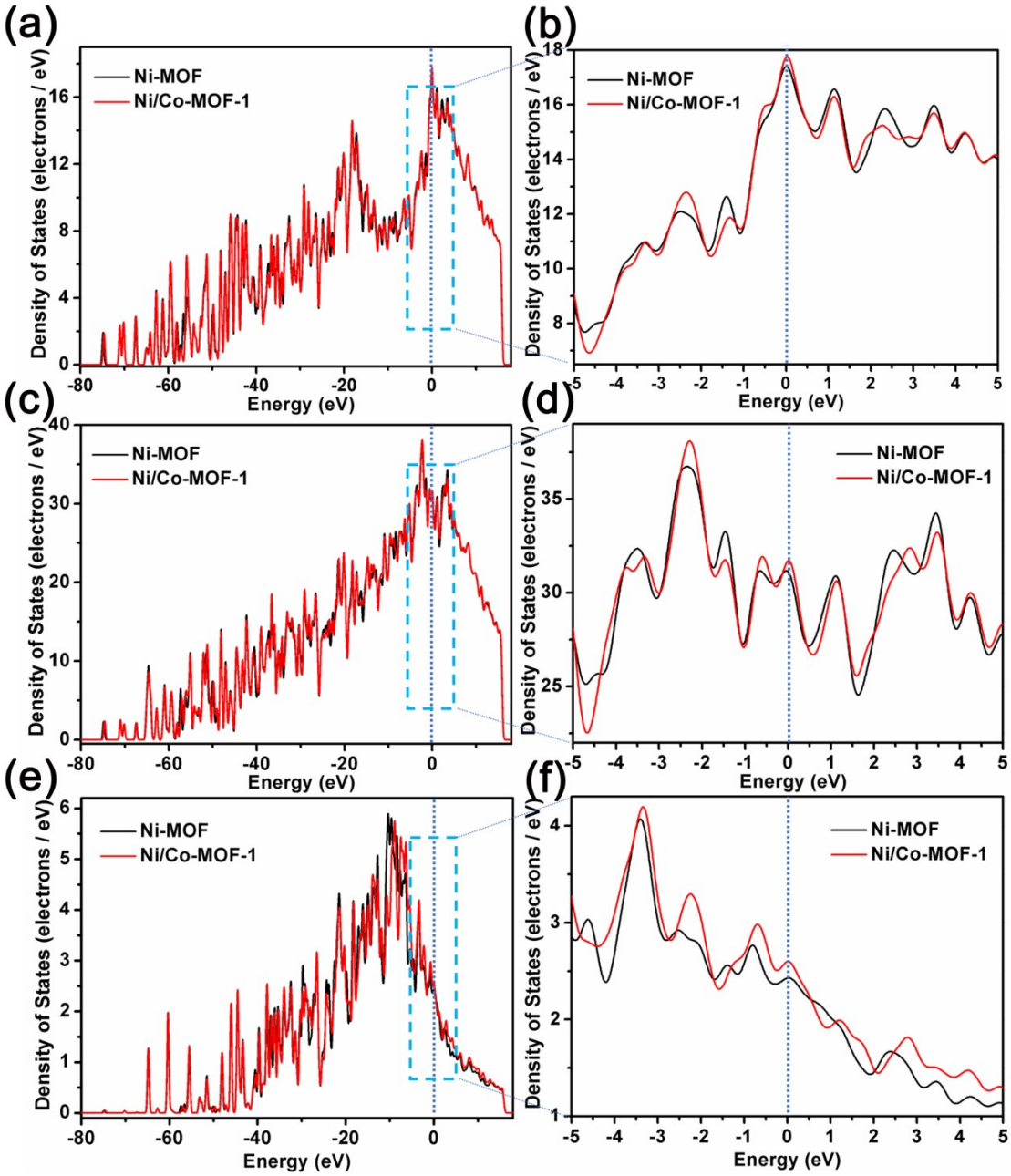

Fig. S8. (a, b) s, (c,d) p and (e, f) d orbit PDOS of Ni-MOF and Ni-MOF-1.

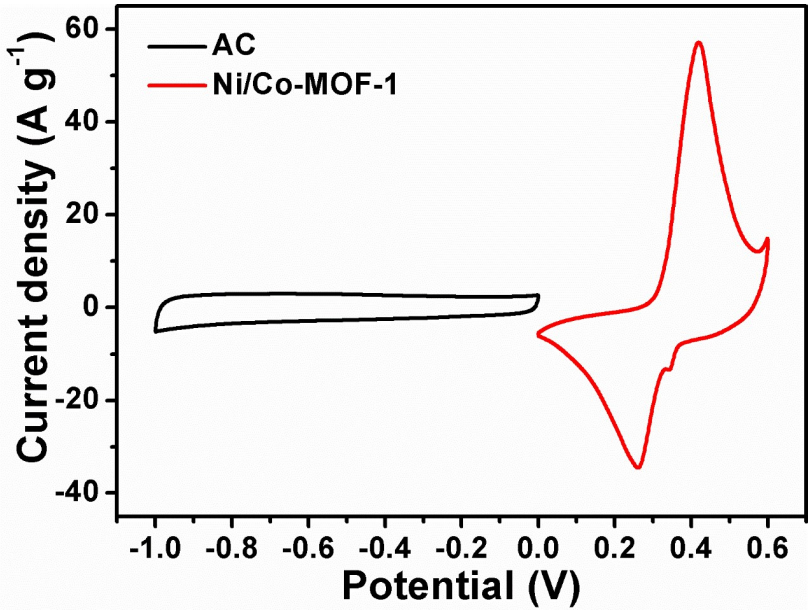

Fig. S9. CV curves of Ni/Co-MOF-1 and active carbon electrodes tested at a scan rate of 10 mV s^{-1}.

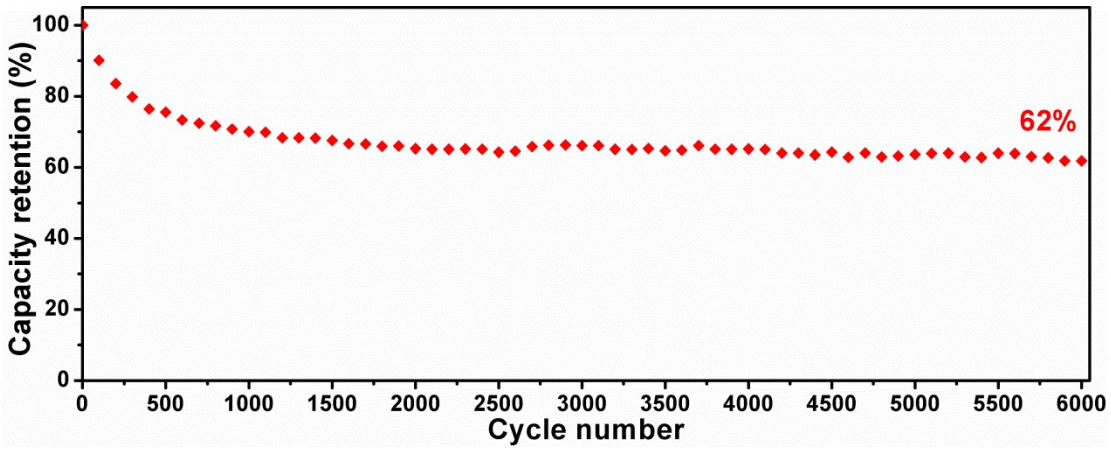

Fig. S10. The cycling performance of Ni/Co-MOF-1//AC asymmetric supercapacitor in the window of 0-1.5 V at a current density of 3 A g^{-1}.

Table S1. Capacitances of the representative MOF-based electrodes in aqueous electrolytes

NO.	Sample	Current density ($A\ g^{-1}$)	Specific capacitance ($F\ g^{-1}$)	References
1	Ni/Co-MOF-1	1	1498	This work
2	$CoNi(\mu_3\text{-tp})_2(\mu_2\text{-pyz})_2$	1	1049	[1]
3	Ni/Co-MOF	1	758	[2]
4	10PPNF@MOF	0.5	702.8	[3]
5	Ni-MOF-2	1	920	[4]
6	Ni/Co-MOF-0.25	1	1067	[5]
7	Co(II)-TMU-63	6	384	[6]
8	Co-MOF/150	0.25	952.5	[7]
9	Na/Co-MOF	4	321.8	[8]
10	Ni/Co-MOF	2.5	980	[9]

Table S2. The fitted values for different elements on EIS

samples	R_s (Ohm)	C_d (F)	R_{ct} (Ohm)	Q_A (F)
Ni-MOF	0.5851	0.003232	6.308	0.1799
Ni/Co-MOF-1	0.5517	0.003726	1.422	0.1369
Ni/Co -MOF-2	0.5585	0.004677	1.993	0.09588
Ni/Co -MOF-3	0.5873	0.003336	4.350	0.1064

Table S3. Capacitances of the representative asymmetric supercapacitors

NO.	Sample	Power density ($kW\ kg^{-1}$)	Energy density (W h kg-1)	References
1	Ni/Co-MOF-1//AC	0.8	56	This work
2	$NiCo_2S_4$/CA	0.8	33.8	[10]
3	CoS-NP/CoS-NS DSNB//AC	0.756	39.9	[11]
4	Ni2P/NF//HPAC-800	0.741	42.2	[12]
5	NiCo-NWs/G//AC	0.8	42.1	[13]
6	Ni-MOF-2//AC	0.8	42.4	[14]
7	NP-150// AC	0.7	32.02(jmca)	[15]
8	Co_9S_8/AC	0.2	31.4	[16]
9	HMNBs/AC	0.16	41.2	[17]

References

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