Electronic Supplementary Material (ESI) for RSC Advances.

Electronic Supplementary Information

Electrodeposition of ultrathin nickel-cobalt double hydroxide nanosheets on nickel foam as high-performance supercapacitor electrodes

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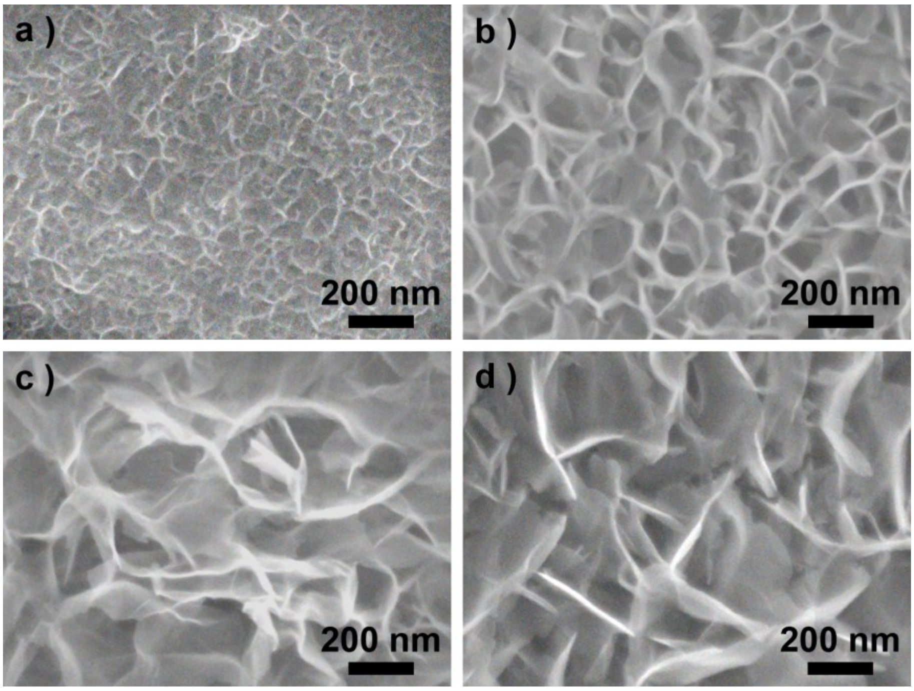


Figure S1 SEM images of electrodeposited Ni-Co DH nanosheets in solution with different Ni/Co molar ratios: (a) 1/0, (b) 2/1 (c) 1/2, and (d) 0/1.

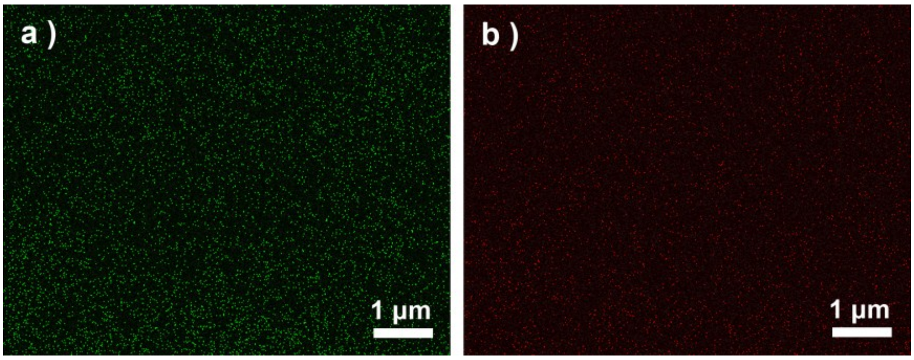


Figure S2 EDS mapping images of Ni-Co DH nanosheets obtained in solution of Ni/Co (1/1): (a) Ni, (b) Co. The green color is Ni and the red color indicates Co.

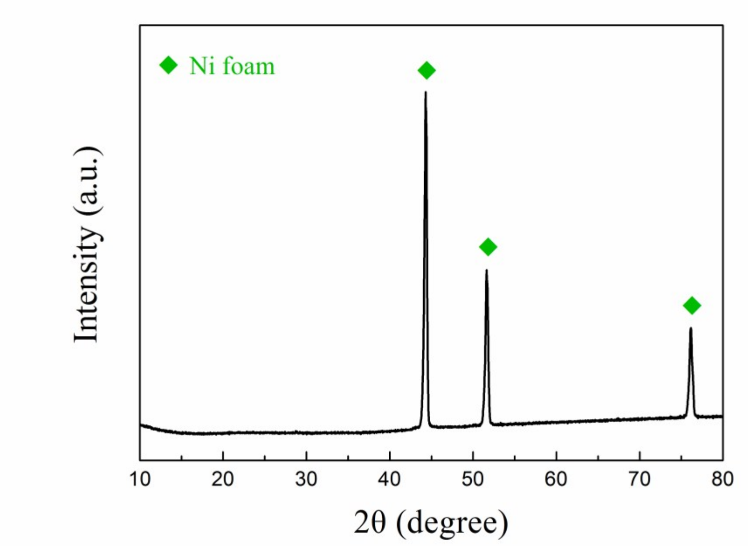


Figure S3 XRD patterns of Ni foam supported Ni-Co DHs obtained in solution of Ni/Co (1/1).

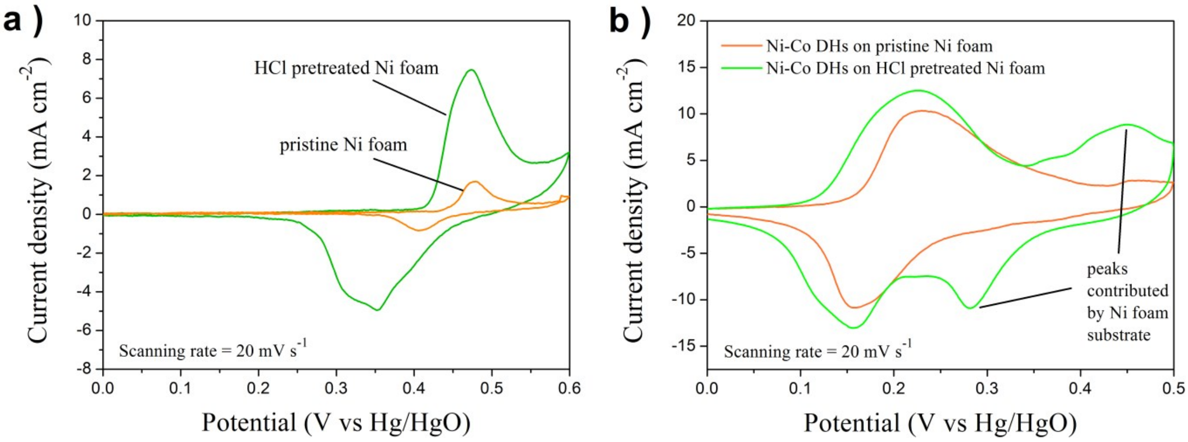
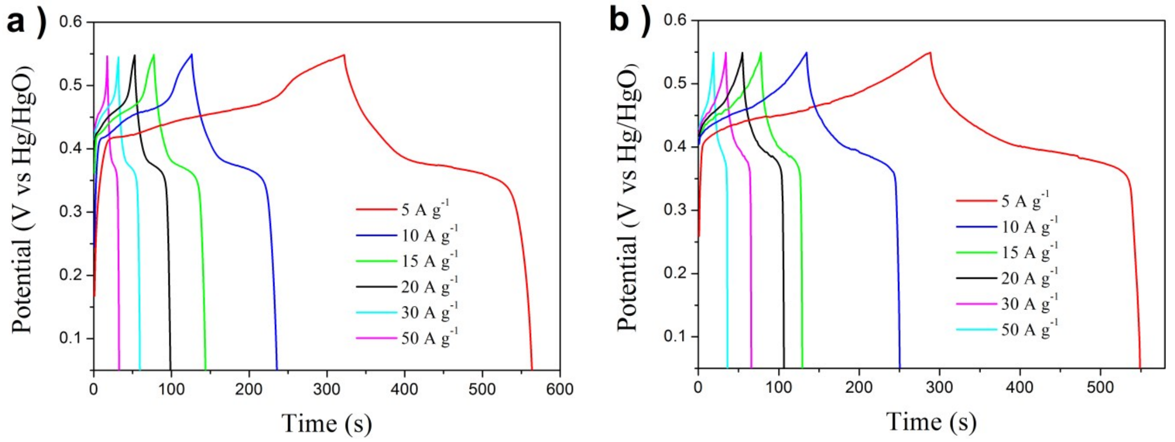


Figure S4 Comparison of CV curves of (a) pristine Ni foam and HCl pretreated Ni foam and (b) Ni-Co DHs deposited in the solution of Ni/Co (1/1) on Ni foam substrates without and with HCl pretreatment.



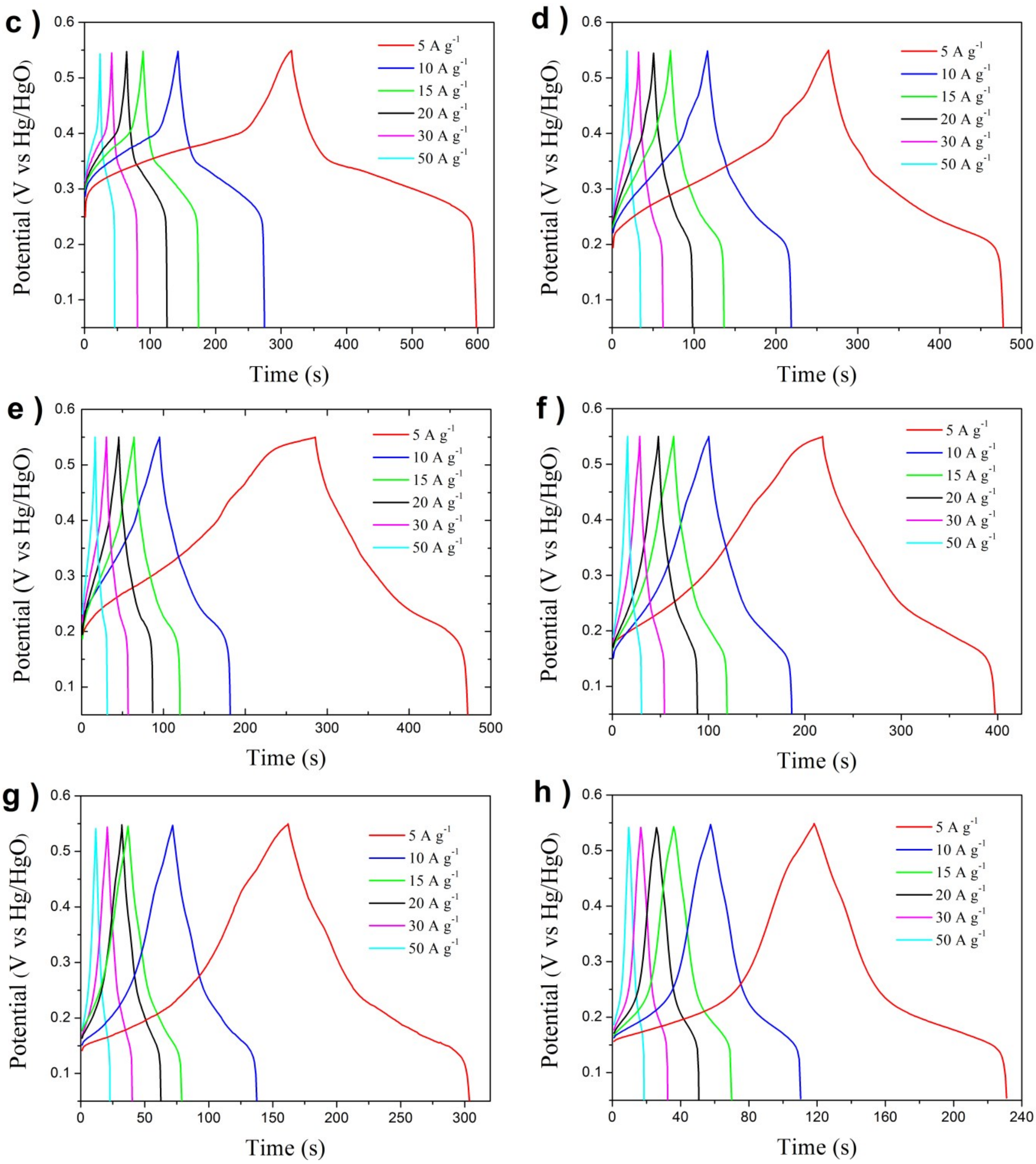


Figure S5 Galvanostatic charge/discharge curves at different current density of Ni foam supported Ni-Co DHs formed with different Ni/Co feeding molar ratios: (a) 1/0, (b) 9/1, (c) 4/1, (d) 3/2, (e) 1/1, (f) 1/2, (g) 1/3, and (h) 0/1.

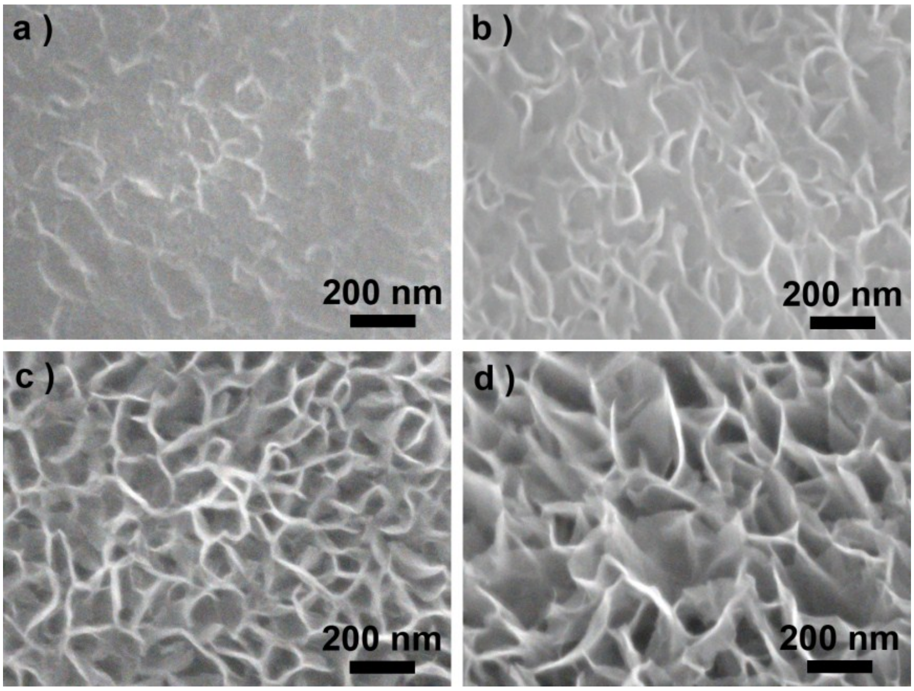


Figure S6 SEM images of Ni-Co DHs after 2000 cycles of charge/discharge tests: (a) Ni/Co (1/0), (b) Ni/Co (4/1), (c) Ni/Co (1/1), (d) Ni/Co (0/1).

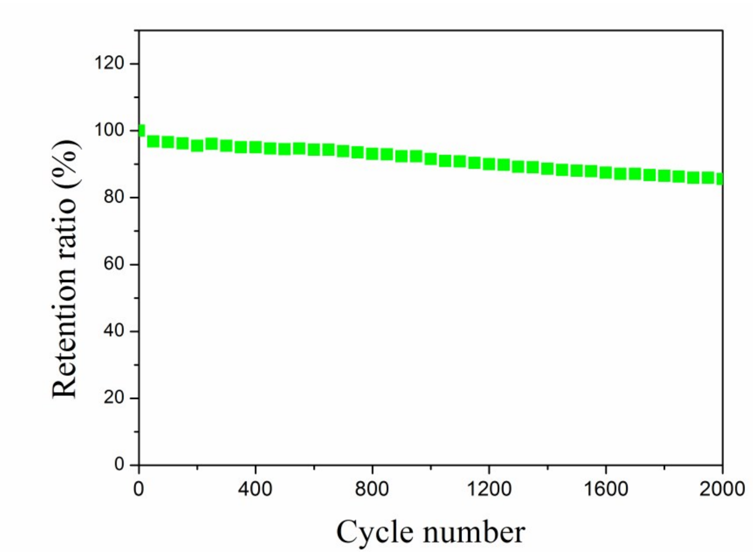


Figure S7 Cycle performance of Ni-Co DHs formed in solution of Ni/Co (1/1) without immersing pretreatment.

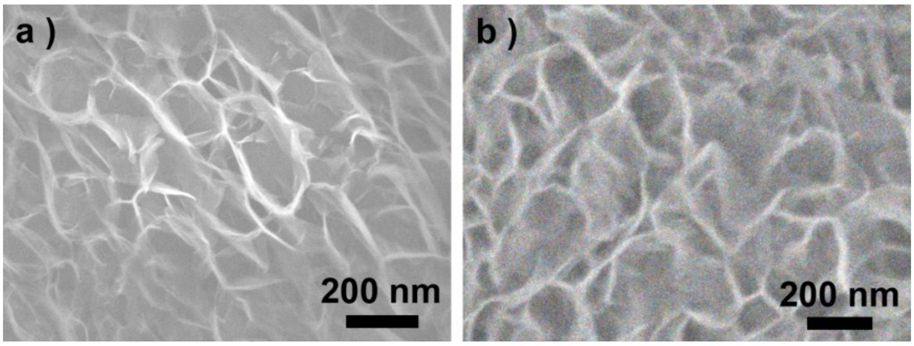


Figure S8 SEM images of Ni-Co DHs formed in solution of Ni/Co (1/1) without pre-immersing process (a) before and (b) after 2000 cycles of galvanostatic charge-discharge tests.

Table S1 Comparison of maximum (at low current density) and minimum (at high current density) C_s, cycle stability, and maximum (at low power density) and minimum (at high power density) energy density based on active materials of some reported supercapacitor electrodes of Ni-based oxides/hydroxides

Ref.	**Electrode materials**	**C_s (F g^{-1})**		**Stability***	**Energy density (Wh kg^{-1})**	
		Maximum	Minimum		Maximum	Minimum
1	$Ni(OH)_2$	3152 (4 A g^{-1})	280 (16 A g^{-1})	48% (after 300 cycles)	--	--
2	NiO	309 (1 A g^{-1})	221 (40 A g^{-1})	~ 91%**	--	--
3	Ni-Co LDHs***	2184 (1 A g^{-1})	1494 (20 A g^{-1})	88.5%	91.76 (0.826 kW kg^{-1})	~ 62 (~ 11 kW kg^{-1})
4	Ni-Co DH microspheres	2275.5 (1 A g^{-1})	1007.8 (25 A g^{-1})	~ 95%	--	--
5	Ni-Co LDHs/ZnO nanoflake	1624 (10 A g^{-1})	1311 (50 A g^{-1})	94 %	68.23 (2.75 kW kg^{-1})	48.32 (27.53 kW kg^{-1})
6	$NiCo(OH)_2$/graphene/carbon nanotube	2360 (0.5 A g^{-1})	2030 (20 A g^{-1})	~ 81%	--	--
7	$NiCo_2O_4$ nanowire/Ni-Co DHs	--	--	~ 69%	~ 96 (~ 1 kW kg^{-1})	58.4 (41.3 kW kg^{-1})
8	Ni-Co LDHs	2682 (3 A g^{-1})	1706 (20 A g^{-1})	--	77.3 (0.623 kW kg^{-1})	~ 40 (~ 1.3 kW kg^{-1})
9	Ni-Mn LDHs	881 (1 A g^{-1})	403 (10 A g^{-1})	88% (after 500 cycles)	--	--

10	Ni-Al LDHs/graphene	1255.8 (1 A g^{-1})	755.6 (6 A g^{-1})	~ 79%****	--	--
11	Ni-Al LDHs/graphene	1329 (3.6 A g^{-1})	851 (18 A g^{-1})	91% (after 500 cycles)	--	--
12	Ni-Al LDH/carbon nanotube	1500 (1 A g^{-1})	1054 (10 A g^{-1})	50%	--	--
This wor -k	Ni-Co DHs (electrodeposition)	3028 (2 A g^{-1})	2225 (50 A g^{-1})	94%	127.22 (0.605 kW kg^{-1})	93.48 (15.125 kW kg^{-1})

* C_s retention ratios after 2000 cycles galvanostatic charge-discharge tests

** based on the maximum C_s

*** LDHs (layered double hydroxides)

**** after 1500 cycles, based on the maximum C_s

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