Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Facile *In-situ* growth of Ni/Co-LDHs array by hypothermal chemical coprecipitation for all-solid-state asymmetric supercapacitors

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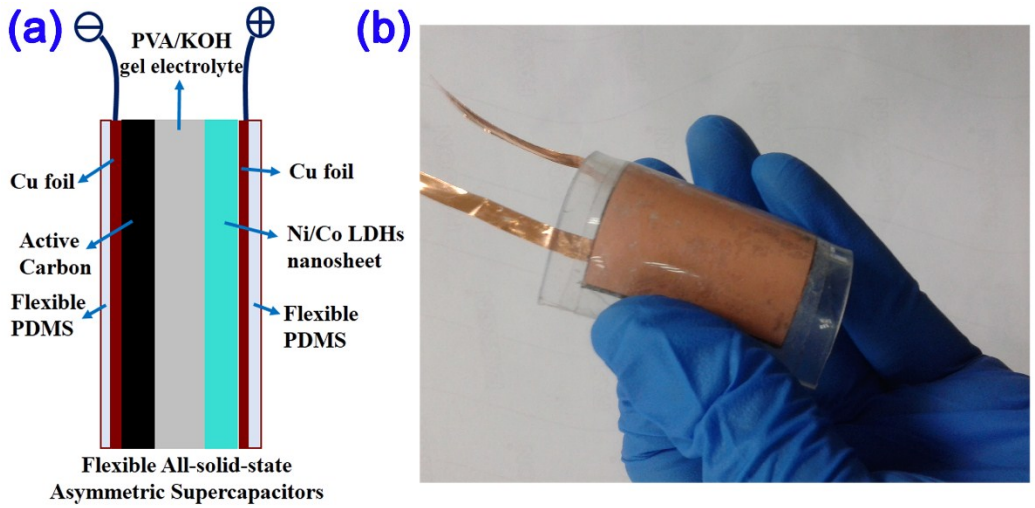

Fig. S1. (a) The scheme for assembly structure and (b) the actual photograph of the AAS based on the Ni/Co-LDHs nanosheet array growth on Cu foil and the active carbon.

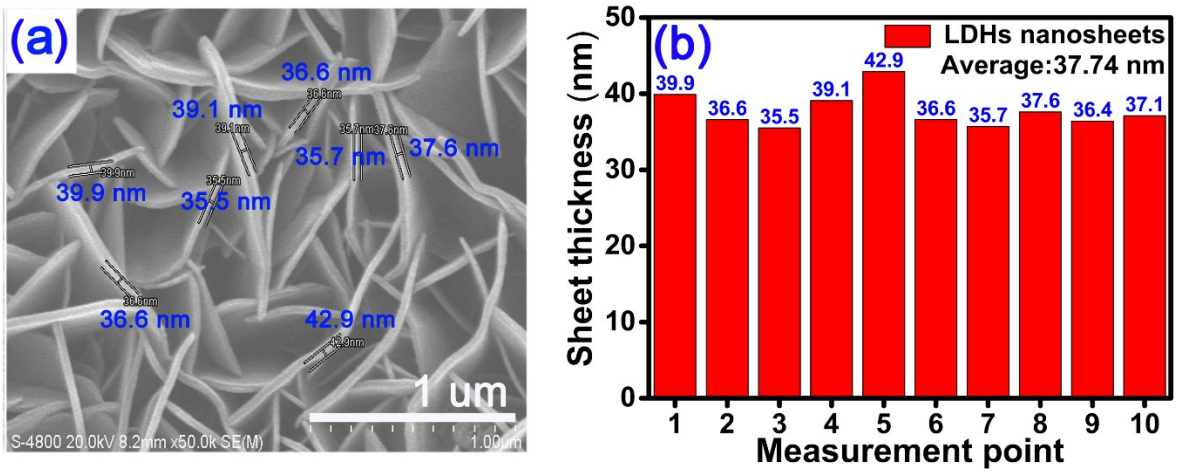

Fig. S2. (a) The dimension statistics and (b) the sheet thickness distribution of the obtained Ni/Co-LDHs array.

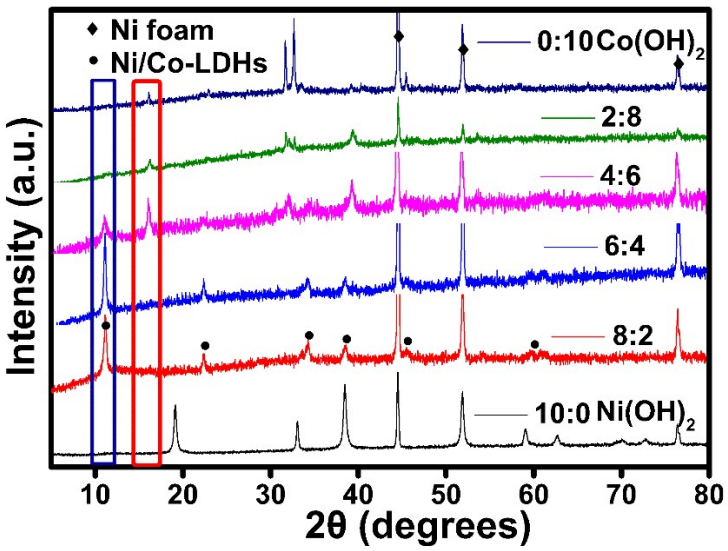

Fig. S3. The XRD patterns for Ni/Co-LDH arrays with different mole ratios: (a) 10:0, (b) 8:2, (c) 6:4, (d) 4:6, (e) 2:8, (f) 0:10.

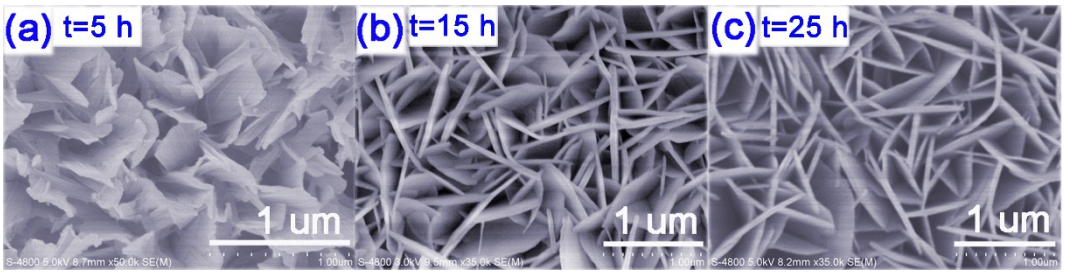

Fig. S4. SEM images of the Ni/Co-LDHs array obtained at various reaction times of (a) 1 h, (b) 15 h,and (c) 25 h.

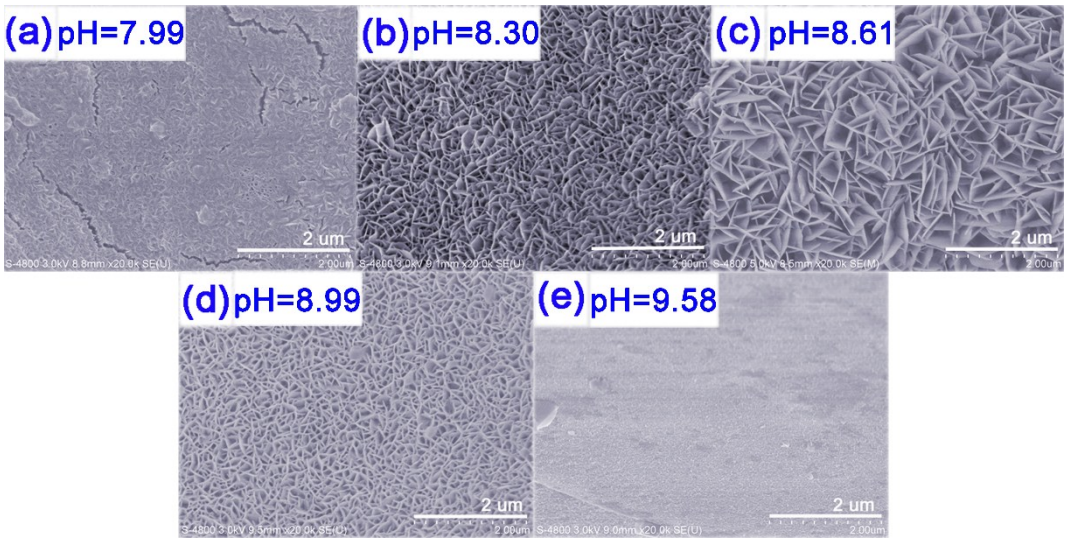

Fig. S5. SEM images of the as-synthesized Ni/Co-LDHs array obtained at 55 ºC for 15 h with various NaOH concentrations: (a)1/4, (b) 1/2, (c) 1, (d) 1.5 and (e) 2.5 times of initial 1.375 mmol.

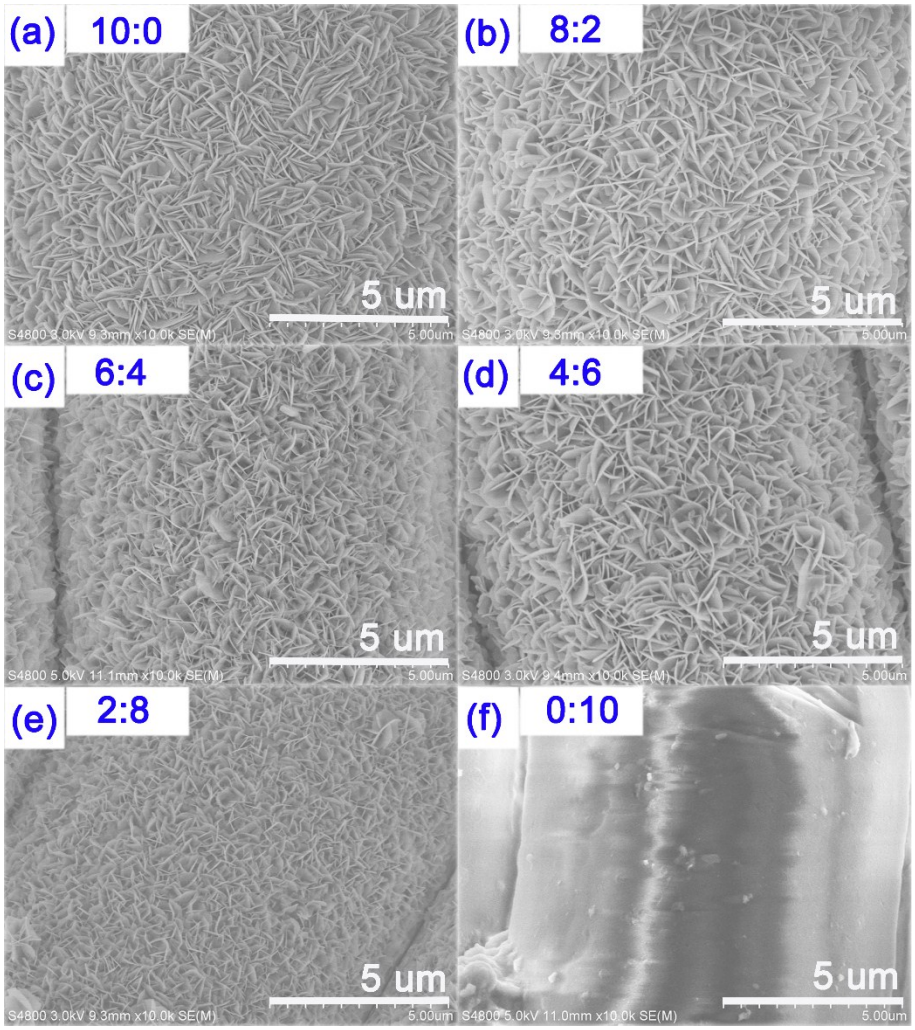

Fig. S6. SEM images of the Ni/Co-LDHs array growth on the fabric substrate obtained at different Ni:Co feeding mole ratios: (a) 10:0, (b) 8:2, (c) 6:4, (d) 4:6, (e) 2:8, (f) 0:10.

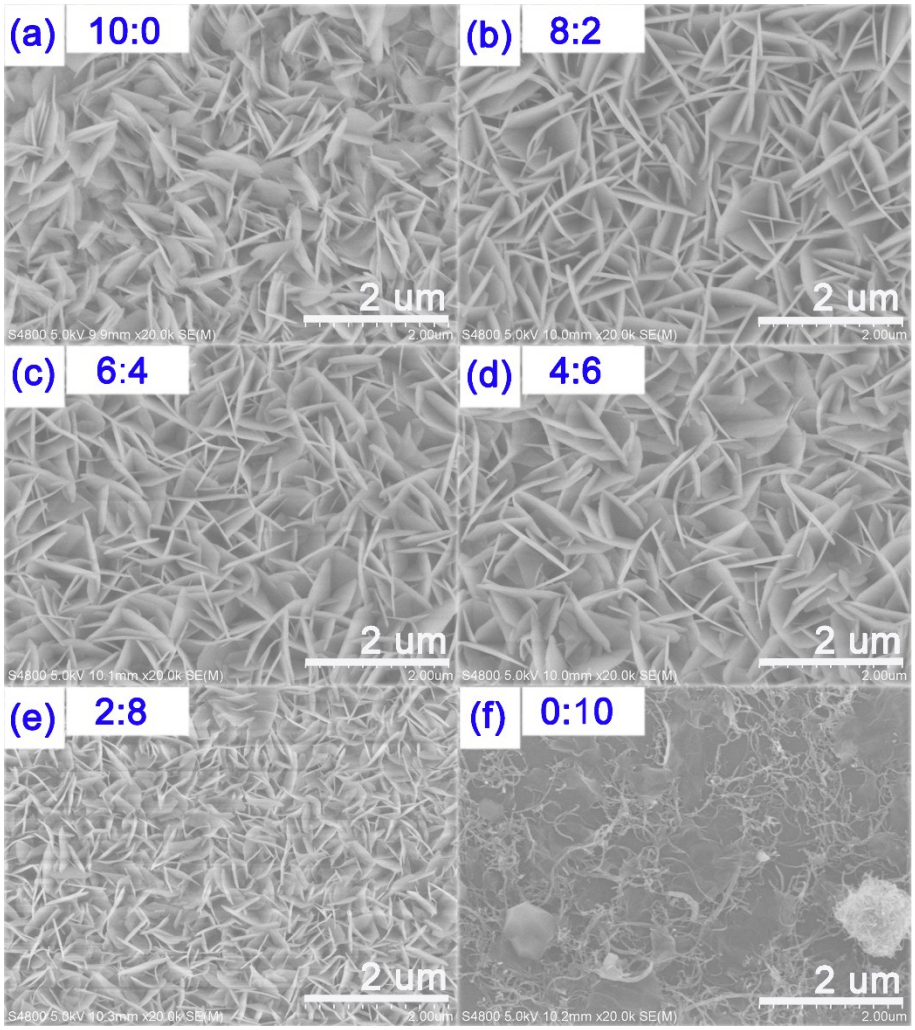

Fig. S7. SEM images of the Ni/Co-LDHs array growth on the CNT/rGO film substrate obtained at different Ni:Co feeding mole ratios: (a) 10:0, (b) 8:2, (c) 6:4, (d) 4:6, (e) 2:8, (f) 0:10.

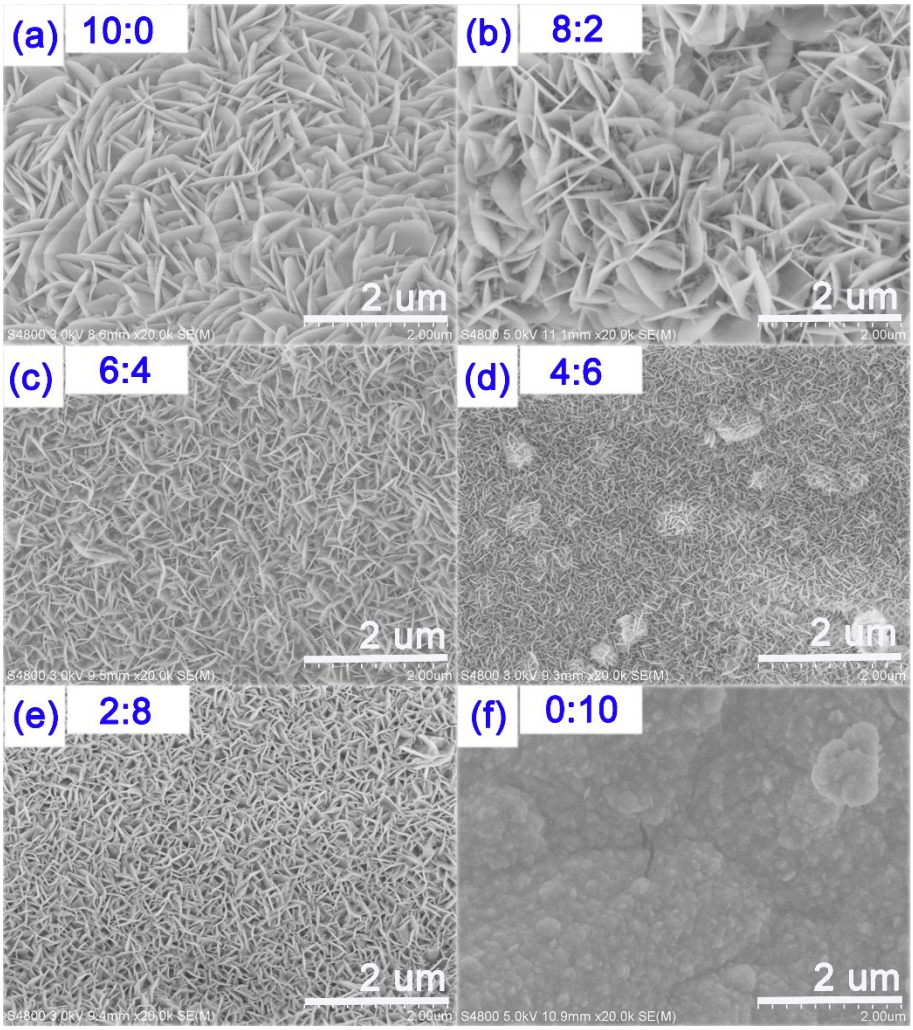

Fig. S8. SEM images of the Ni/Co-LDHs array growth on the Cu foil substrate obtained at different Ni:Co feeding mole ratios: (a) 10:0, (b) 8:2, (c) 6:4, (d) 4:6, (e) 2:8, (f) 0:10.

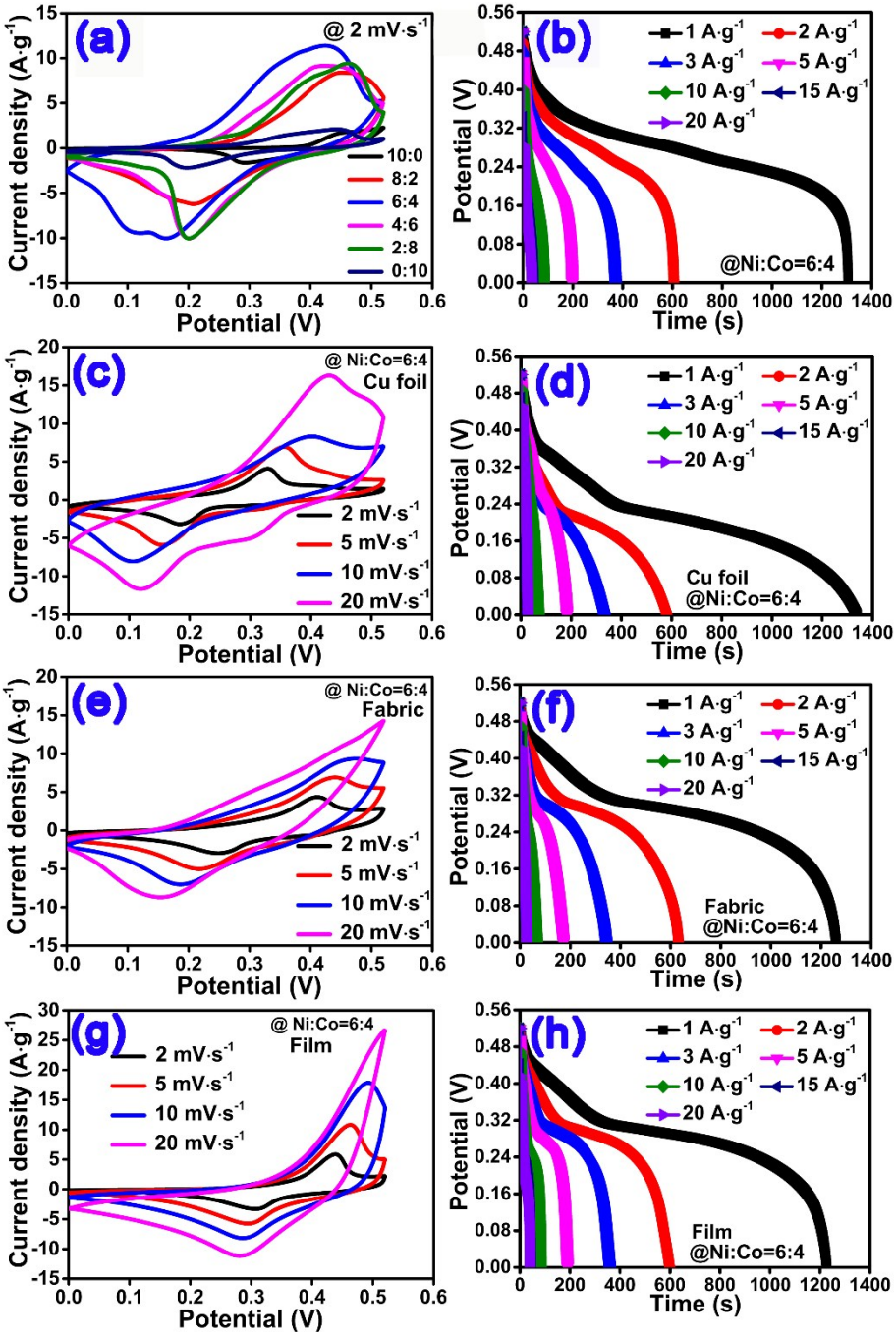

Fig. S9. (a) Comparison of CV curves of the Ni/Co-LDHs array growth on Ni foam substrate with different Ni:Co feeding mole ratios at a scan rate of 2 mV·s^{-1}; GCD curves of (b) the Ni/Co-LDHs array growth on Ni foam substrate with R=6:4 at various current densities; CV and GCD curves of the Ni/Co-LDHs array growth on various substrates: (c) and (d) Cu foil, (e) and (f) fabric, and (g) and (h) CNT/rGO film.

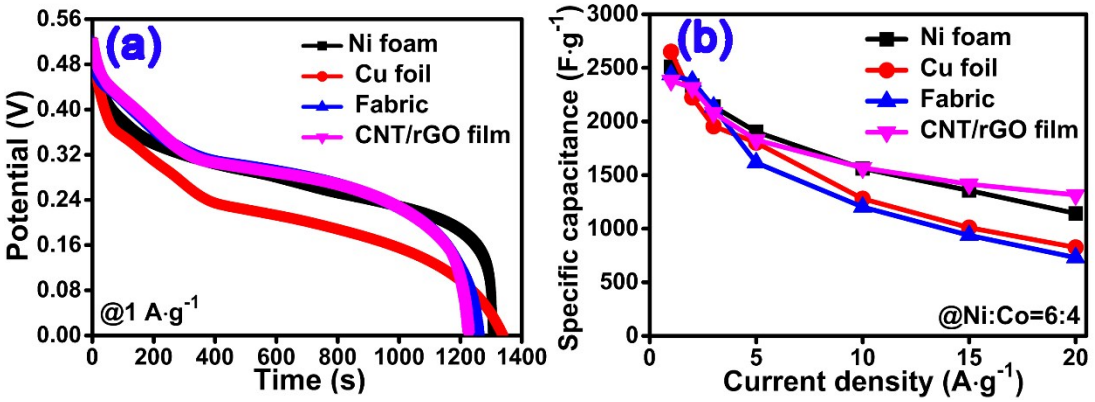

Fig. S10. Comparison of (a) GCD curves and (b) the specific capacitance of the Ni/Co-LDHs array growth on different substrates with Ni:Co ratio of 6:4 measured at 1 $A \cdot g^{-1}$.

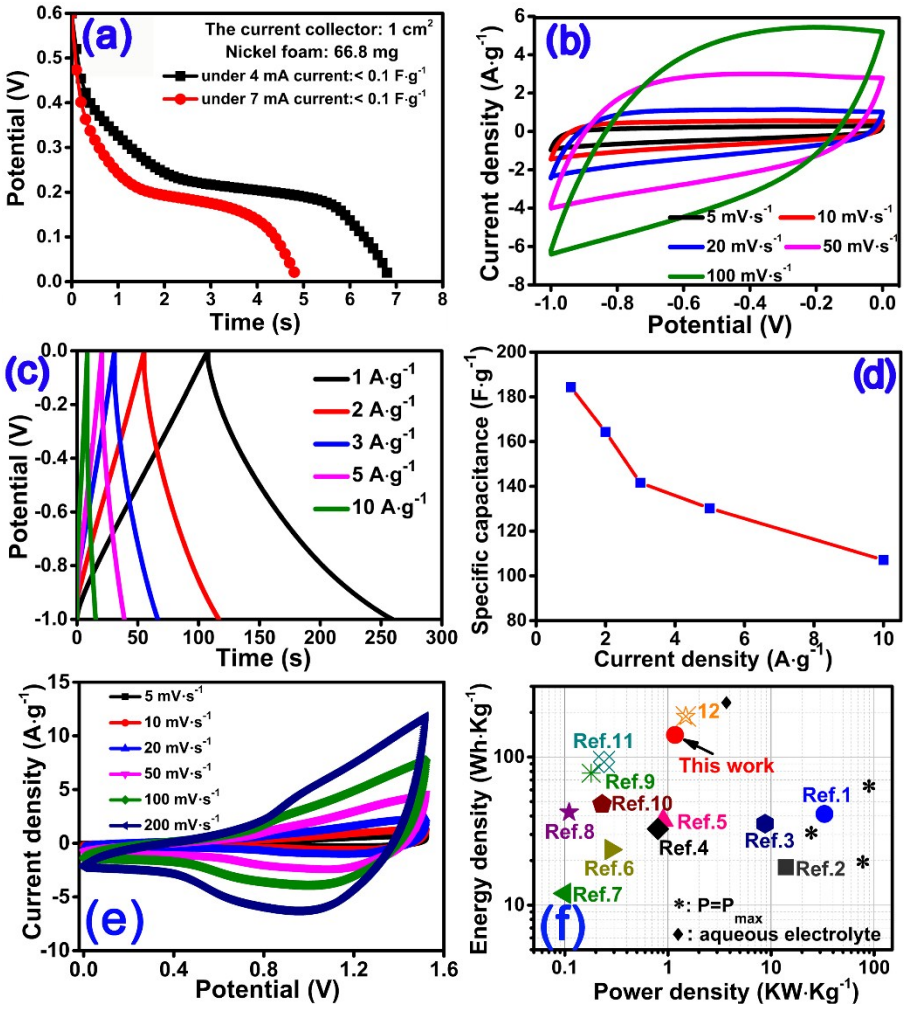

Fig. S11. (a) GCD curves of the pure Ni foam substrate; (b) CV and (b) GCD results and (d) the specific capacitance of the active carbon detected at various scan rates and current densities; (e) CV curves of the AFA-SCs device at scan rates of 5 $mV \cdot s^{-1}$ to 100 $mV \cdot s^{-1}$; (f) Comparison of Ragone plots of the AFA-SCs with references.

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Table S1. Comparison of the maximum specific capacitance (*C*) based on active materials of some reported nickel-cobalt oxide/hydroxide based pseudocapacitive materials and this as-prepared electrode materials.

Active materials	Specific capacitance (F·g-1)	References
Ni-Co LDH/Ni foam	2682 (3 A·g^{-1})	(12) (high temperature and pressure/ surfactant)
$Ni(OH)_2$/$Co(OH)_2$composites	2193 (2 A·g^{-1})	(13)
Ni-Co oxide nanocomposites	287 (0.2 A·g^{-1})	(14)
$NiCo_2O_4$ spinel	671 (1 A·g^{-1})	(15)
Co3O4/NiO nanowire arrays	853 (2 A·g^{-1})	(16)
Nickel-Cobalt Oxides (Sol-Gel)	1539 (1 A·g^{-1})	(17)
Ni-Co oxide/graphene oxide	1211.25 (1 A·g^{-1})	(18)
Ni-Co Hydroxide @Reduced Graphene Oxide	1691 (0.5 A·g^{-1})	(19)
Ni-Co Hydroxides on 3D Graphene Foam	1847 (5 A·g^{-1})	(20)
3D binary Ni-Co hydroxide/graphene	1410 (2 A·g^{-1})	(21)
Ni/Co-LDHs array	2510 (1 A·g^{-1})	This work

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