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

Core-shell structural PANC@Co-Ni LDH electrode for high-performance asymmetric supercapacitors

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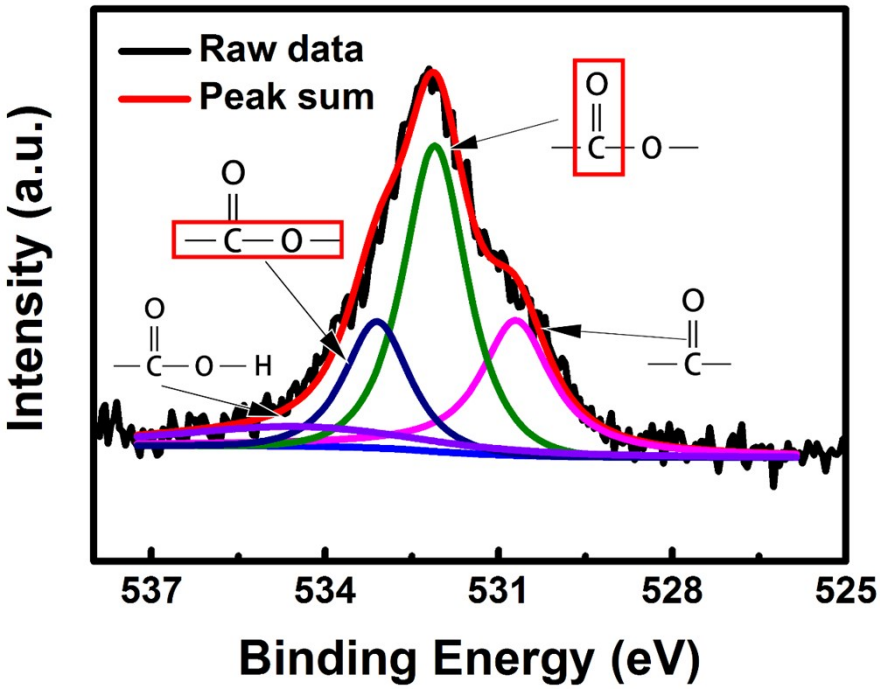

Fig. S1 High resolution XPS spectra for O 1s (PANC-35).

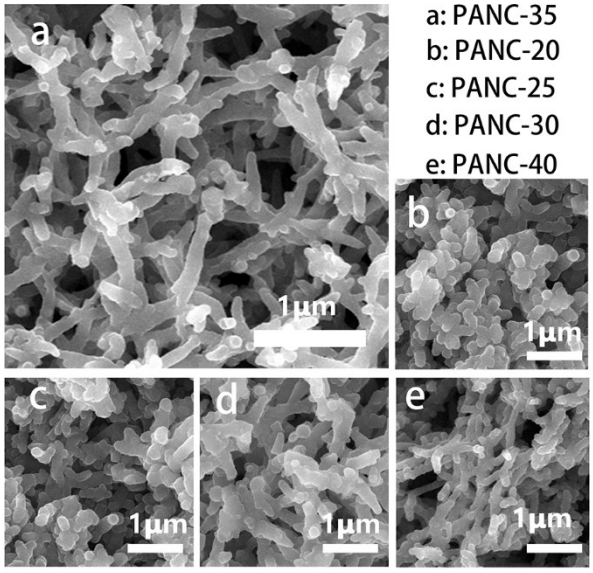

Fig. S2 SEM images of PANC-*x* samples.

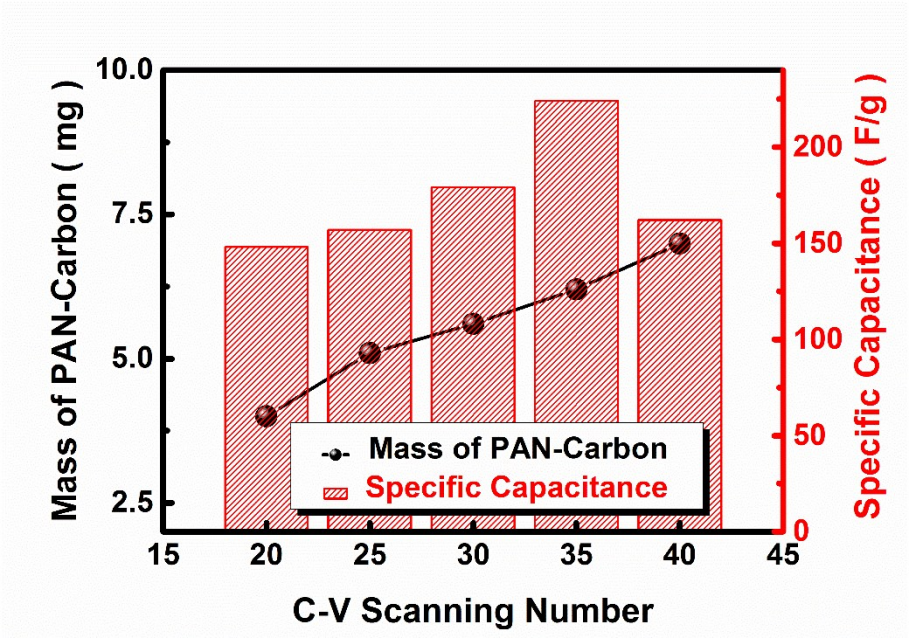

Fig. S3 Mass // specific capacitance of PANC at different C-V scanning number.

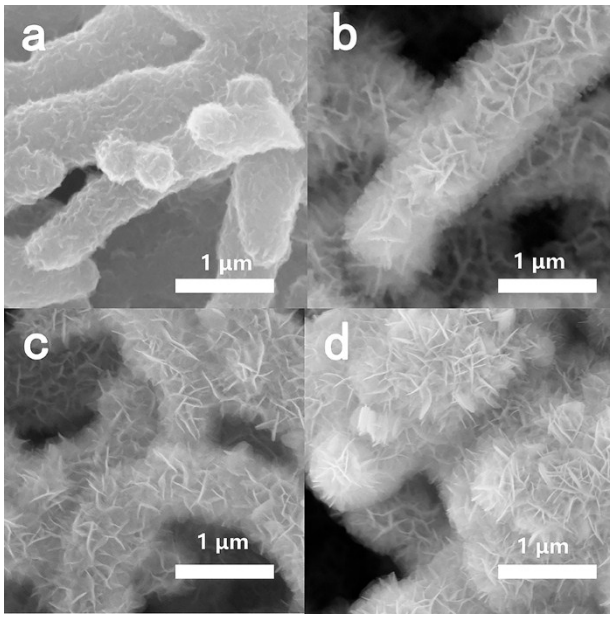

Fig. S4 SEM images of PANC@Co-Ni LDH -*T* samples, where *T* (a, b, c and d) = 100 s, 200 s, 300 s and 400 s, respectively.

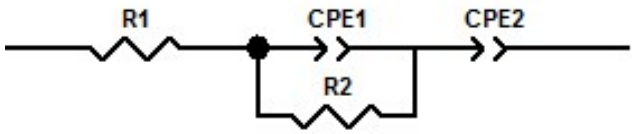

Fig. S5 Equivalent circuit used to fit Nyquist plots (R_1: Equivalent series resistance; R_2: Charge transfer resistance of PANC; *CPE1*: double layer capacitance of PANC).

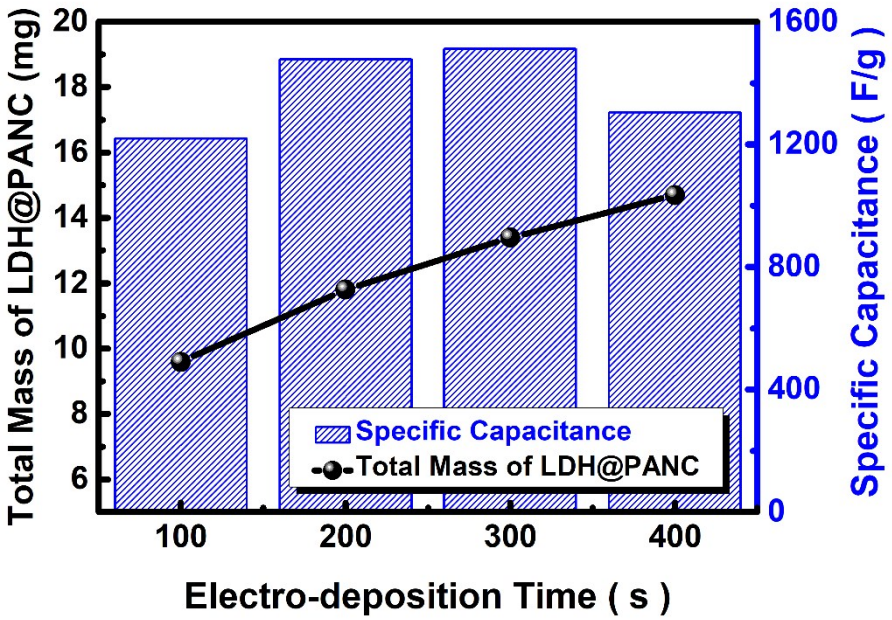

Fig. S6 Mass // specific capacitance of Co-Ni LDH@PANC at different electrodeposition time.

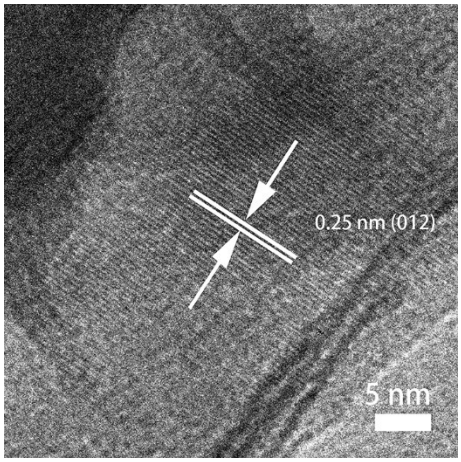

Fig. S7 HRTEM of PANC@LDH.

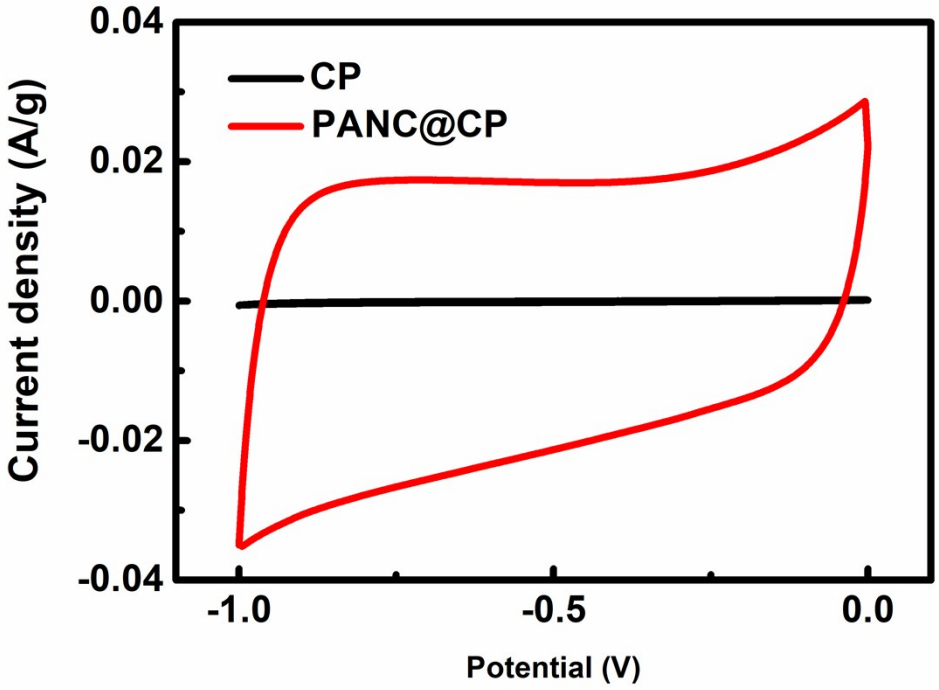

Fig. S8 The CV curves of CP and PANC-35@CP

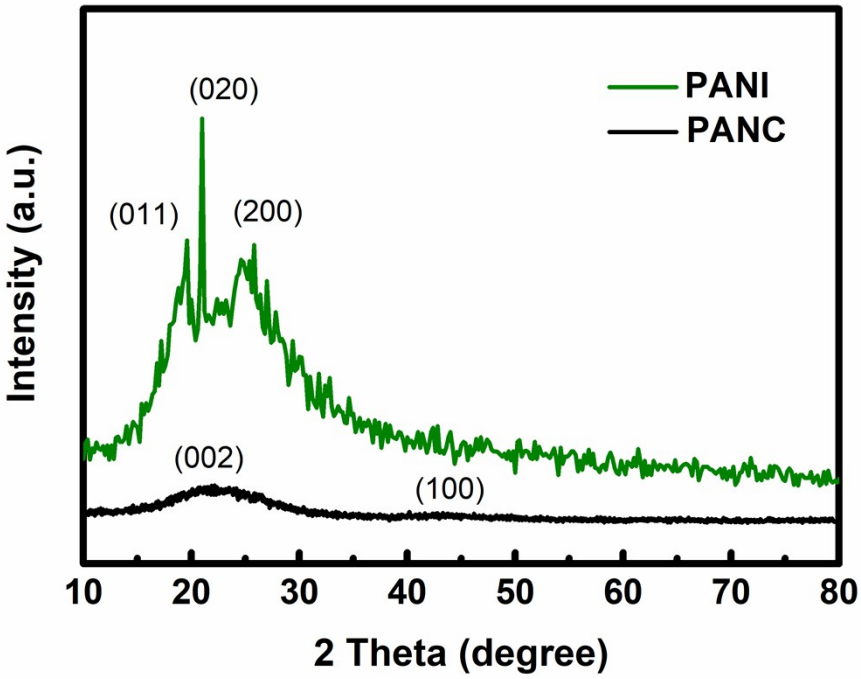

Fig. S9 The XRD patterns of PANI-35 and PANC-35

Table S1 Comparison of the specific capacitance of various N-doped carbon material in three-electrode system.

	Gravimetric Capacitance (F g^{-1}) at 1 A g^{-1}	Electrolyte	References
N-Carbon sphere	211	5 M H_2SO_4	1
N-CNC array	209	1 M KOH	2
Walnut shell N-carbon	218	1 M KOH	3
Zeo-derived N-carbon	208	6 M KOH	4
N-carbon nanotubes	174	3 M KOH	5
N-Carbon wire	202	6 M KOH	6
PANI N-Carbon	224	6 M KOH	This work

Table S2 Comparison of the electrochemical performance of the Co-Ni LDH@PANC electrode with those in previous reports

Electrode structure	C_s (F g^{-1})	Rate capability	Mass loading	Ref.
NiCo-LDH/NF	804 (3A g^{-1})	500 (15A g^{-1})	2.80 mg cm^{-2}	7
NiAl LDH-30 G/NF	1255 (1A g^{-1})	755 (6A g^{-1})	5.00 mg cm^{-2}	8
NiCo-LDH/CNT/SS	502 (5mV s^{-1})	276 (100mV s^{-1})	0.76 mg cm^{-2}	9
NiAl LDH-30 NF	701 (10mA cm^{-2})	276 (100mV s^{-1})	20.00 mg cm^{-2}	10
PANC@CoNi LDH	1510 (1A g^{-1})	1425 (10A g^{-1})	12.00 mg cm^{-2}	This work

*Estimated from the published graph. SS and G represent stained steel and graphene, respectively.

Table S3 Comparison of the electrochemical performance of the PANC@Co-Ni LDH //PANC ASC device with the ones in previous reports.

Asymmetric SCs	C_{sc} (F g^{-1})	Energy density maximum (W h kg^{-1})	Power density maximum (kW kg^{-1})	Ref.
Co_3O_4/NF//AC	107	34	1.5	11
GNCC//AC	288	19.5	5.6	12
$NiCo_2O_4$/Gra//PGra	114	48	1.9	13
$Ni(OH)_2$/CNT//AC	112	50.6	1.8	14
PANC@CoNi LDH //PANC	241.06	42.14	3.65	This work

Notes and references

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