Supporting information

Highly stable lithium ion capacitor enabled by hierarchical polyimide derived carbon microspheres combined with 3D current collectors

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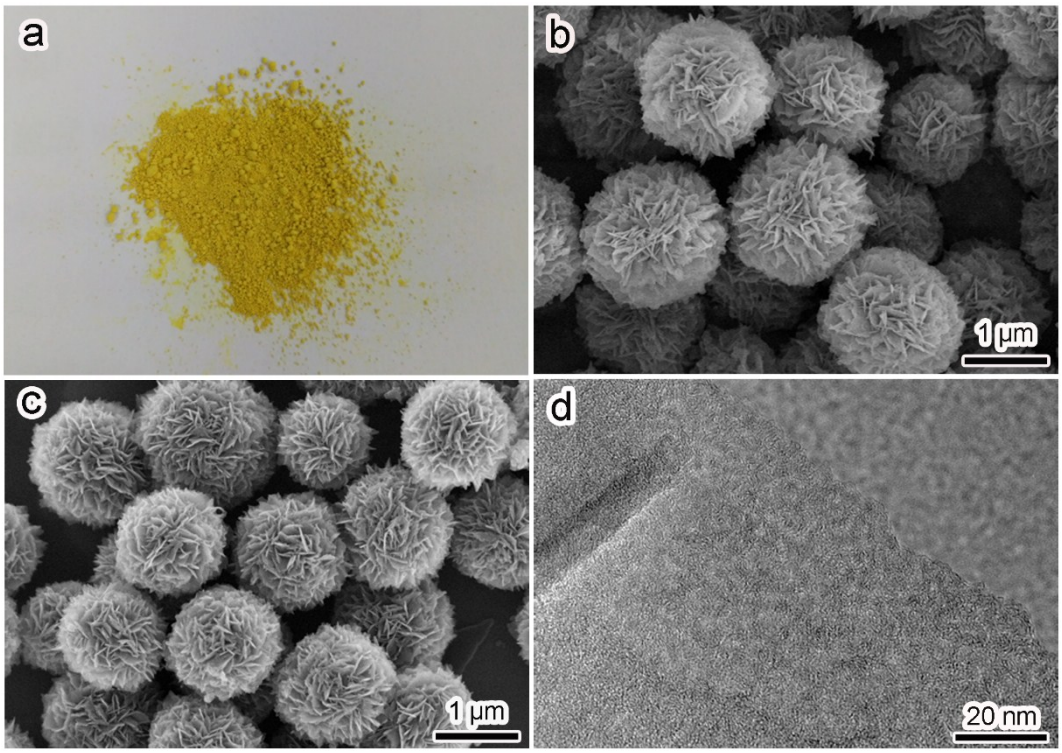

Figure S1. (a) The photograph and (b) SEM images of polyimide, (c) SEM image and (d) TEM image of NPCM700.

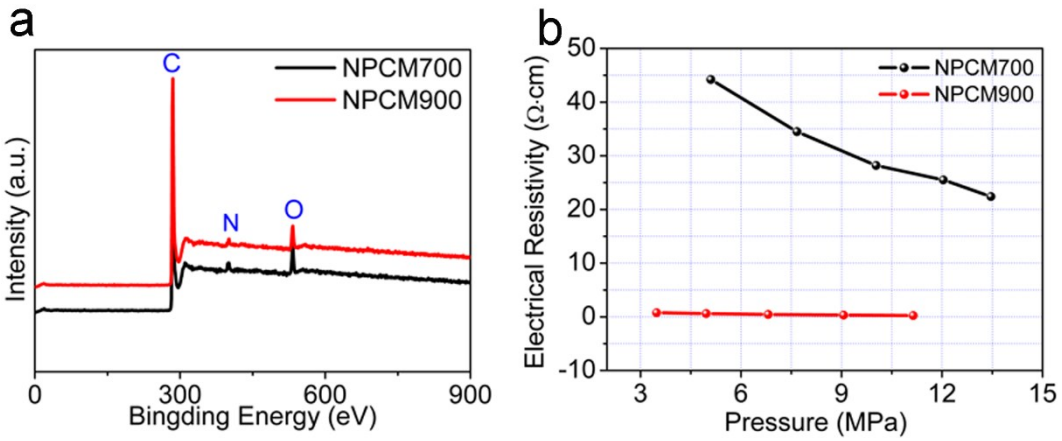

Figure S2. (a) XPS spectra and (b) The electrical resistivity of the NPCM700 and NPCM900.

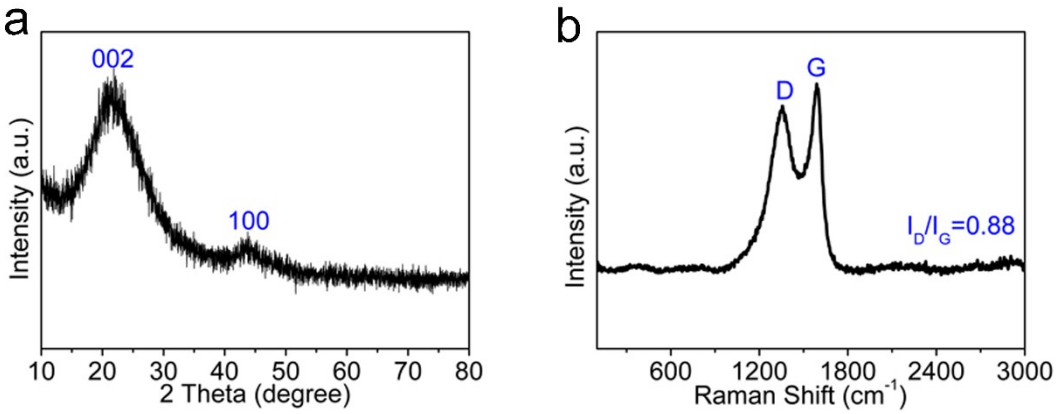

Figure S3. (a) XRD pattern (b) Raman spectrum of the NPCM-A.

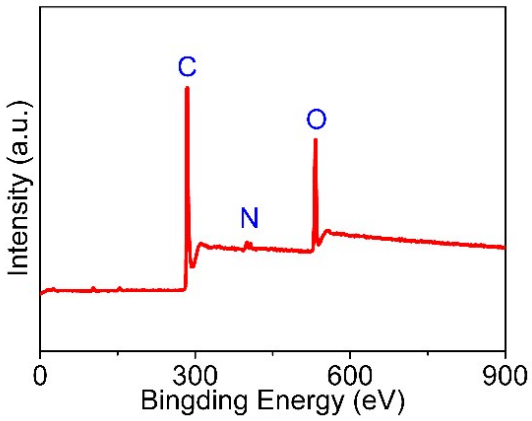

Figure S4. The XPS spectrum of the NPCM-A.

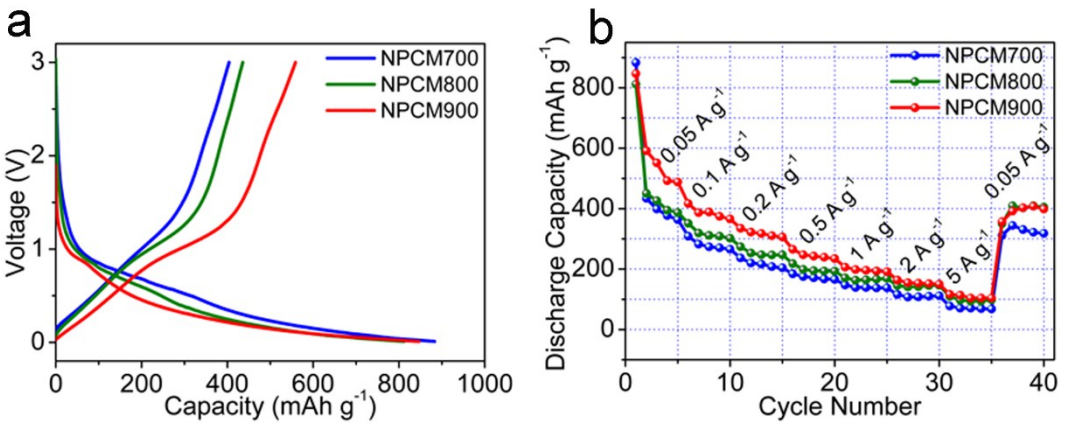

Figure S5. (a) The initial galvanostatic charge/discharge curves, (b) rate capability of NPCM700, NPCM800 and NPCM900 anode.

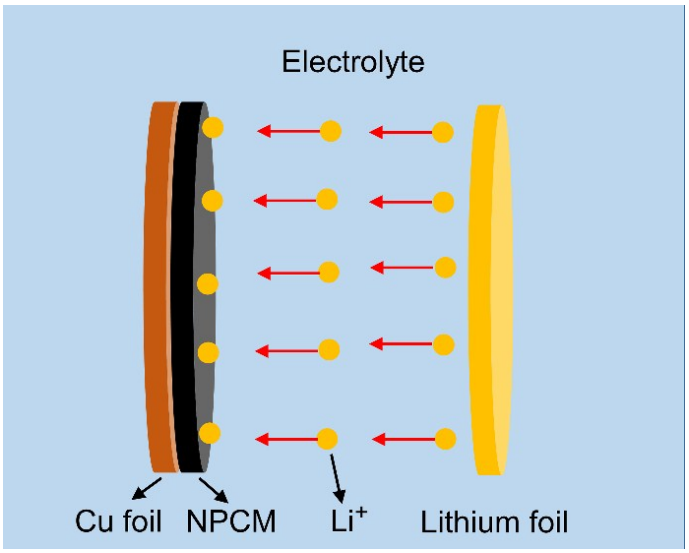

Figure S6. Schematic diagram of the pre-lithiation by an internal short method.

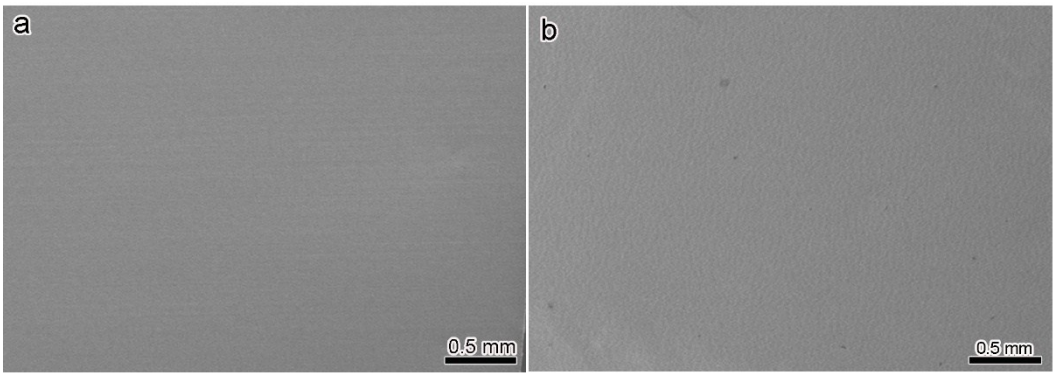

Figure S7.SEM images of conventional (a) Al foil and (b) Cu foil current collectors.

Table S1. Comparison of the electrochemical performance ofPCC-LIC and CCC-LIC with other systems reported in the literature.

LICs system	Voltage range *(V)*	Energy density *(Wh kg^{-1})*	Power density *(kW kg^{-1})*	Cycles *(Nos)*	Capacity retention *(%)*	Reference
PCC-LIC	2~4	95.08	15	3000/5000	87.7/80.1%	This work
CCC-LIC	2~4	90.0	15	3000/5000	85.5/71.1%	This work
Fe_3O_4//GO	1~4	86.0	2.6	1000	70%	S1
$H_2Ti_6O_{13}$//CMK-3	1~3.5	90.0	11	1000	80%	S2
$Li_4Ti_5O_{12}$//AC	1~2.5	50.0	15	1000	75%	S3
LiCrTiO4//AC	1~3	23.4	4	1000	85.5	S4
VN//APDC	0~4	64	10	1000	83.0	S5
TiO_2-B//AC	0~2.8	23	2.8	1200	73%	S6
TiNb2O7//AC	0~3.0	43	3	3000	84%	S7
$TiNb_2O_7$//GO	0~3	74	7.5	3000	81.2%	S8
$H_2Ti_8O_{17}$//AC	0~3	93.8	15	3000	78.8%	S9
MoS_2//GO	0~4	97.0	8.3	2000	78%	S10
$Li_4Ti_5O_{12}$//PGM	1~3	40	8.3	1000	65%	S11
Nb_2O_5//PSC	0.5~3	43.9	8.75	1000	87.3%	S12

Table S2. The capacity retention of the CCC-LIC and PCC-LIC during different cycles.

Sample/capacity retention	1000 cycles (%)	3000 cycles (%)	5000 cycles (%)
CCC-LIC	97.4	85.5	71.1
PCC-LIC	99.3	87.7	80.1

Supplementary references

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