Electronic Supplementary Information (ESI)

Enhanced Capacities of Carbon Nanosheets Derived from Functionalized Bacterial Cellulose as Anodes for Sodium Ion Batteries

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Supporting Figures

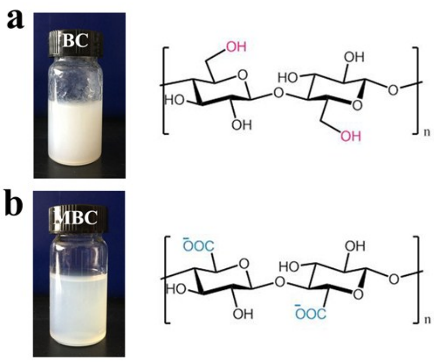

Fig. S1 Digital photos of (a) BC and (b) MBC suspension of 4 mg ml^{-1} after 30 days standing.

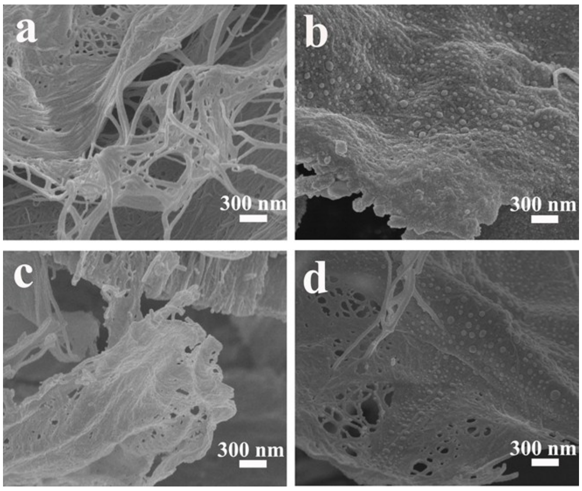

Fig. S2 SEM images of (a) p-BC900; (b) p-BC1100; (c) p-MBC900; (d) p-MBC1100.

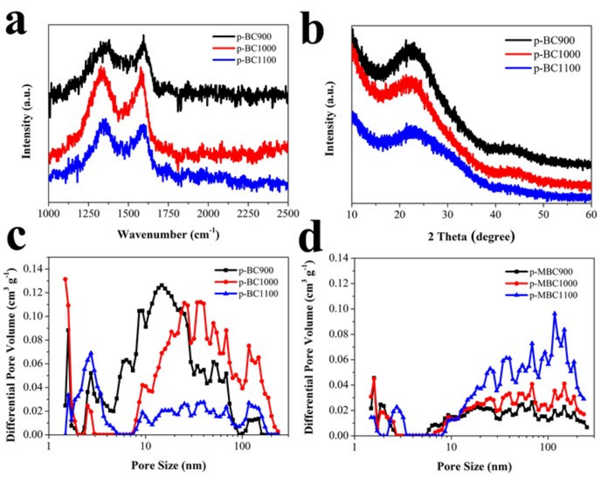

Fig. S3 (a) Raman spectra of p-BC; (b) XRD patterns of p-BC; The pore size distributions of (c) p-BC and (d) p-MBC.

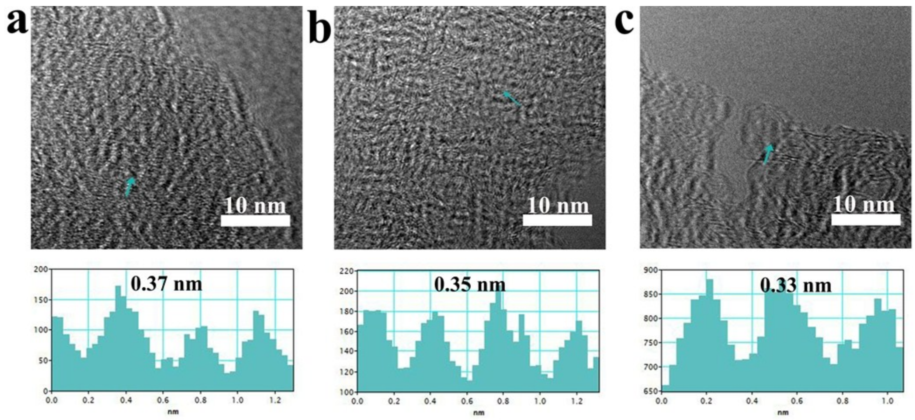

Fig. S4 HRTEM images of (a) p-BC900; (b) p-BC1000; (c) p-BC1100.

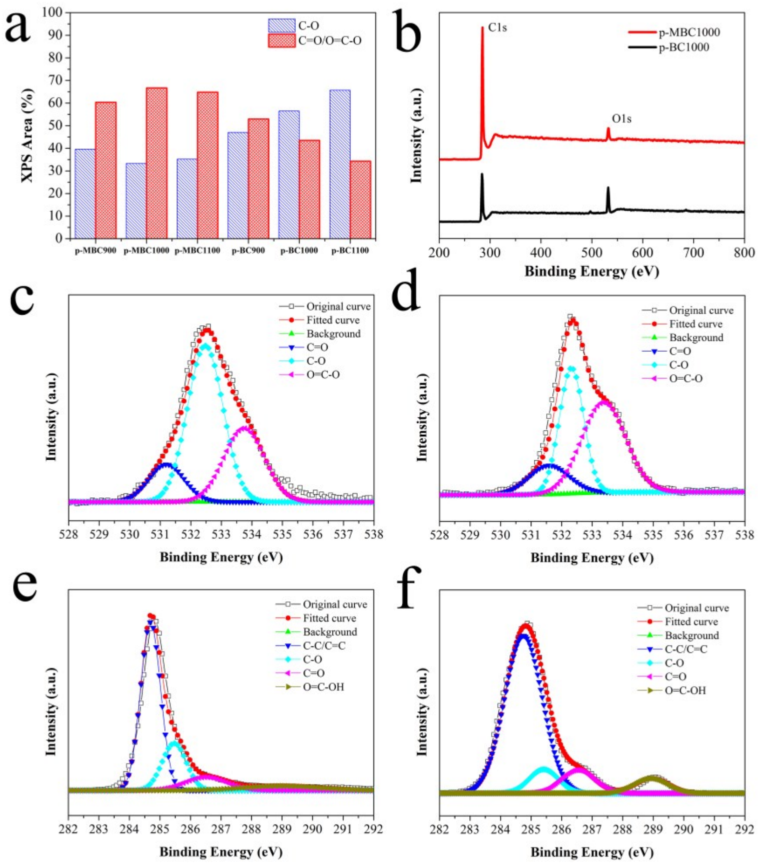

Fig. S5 (a) The variation of the amount of oxygen groups for samples; (b) XPS survey spectra of p-BC1000 and p-MBC1000 showing the relative intensities of carbon C1s and oxygen O 1s; (c) O 1s XPS spectra of p-BC1000; (d) O 1s XPS spectra of p-MBC1000; (e) C 1s XPS spectra of p-BC1000; (f) C 1s XPS spectra of p-MBC1000.

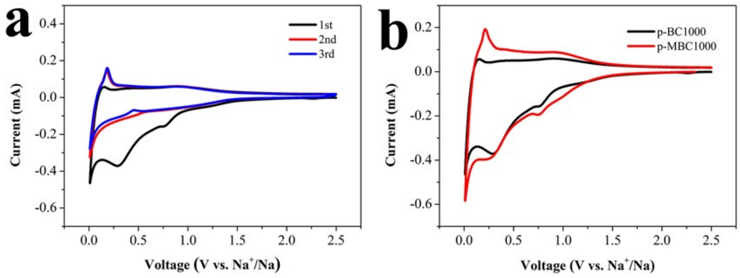

Fig. S6 (a) The cyclic voltammetry curves of p-BC1000; (b) Comparison of the 1st CV cycle for p-MBC1000 and p-BC1000.

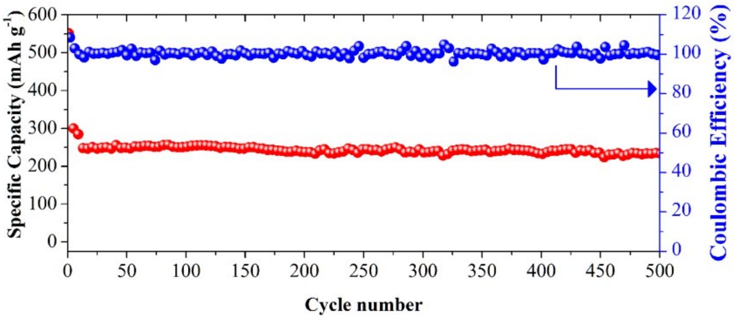

Fig. S7 Cycle performance of p-MBC1000 at a current density of 0.1 A g^{-1}. The current density of initial 10 cycles is 0.05 A g^{-1}.

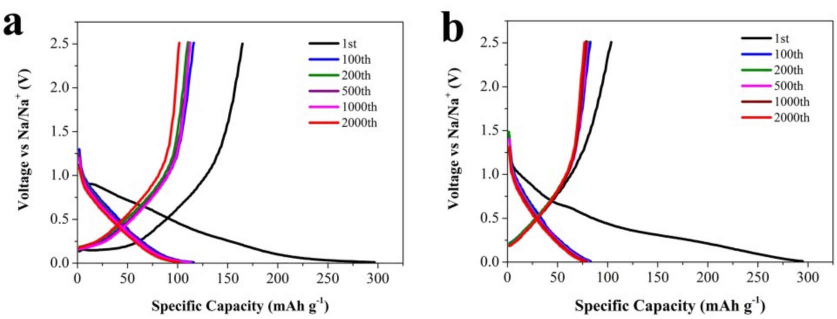

Fig. S8 Galvanostatic 1st, 100th, 200th, 500th, 1000th and 2000th discharge/charge profiles of (a)p-MBC1000 and (b)p-BC1000 at a current rate of 1 A g^{-1} in a voltage range of 0.01 - 2.5 V.

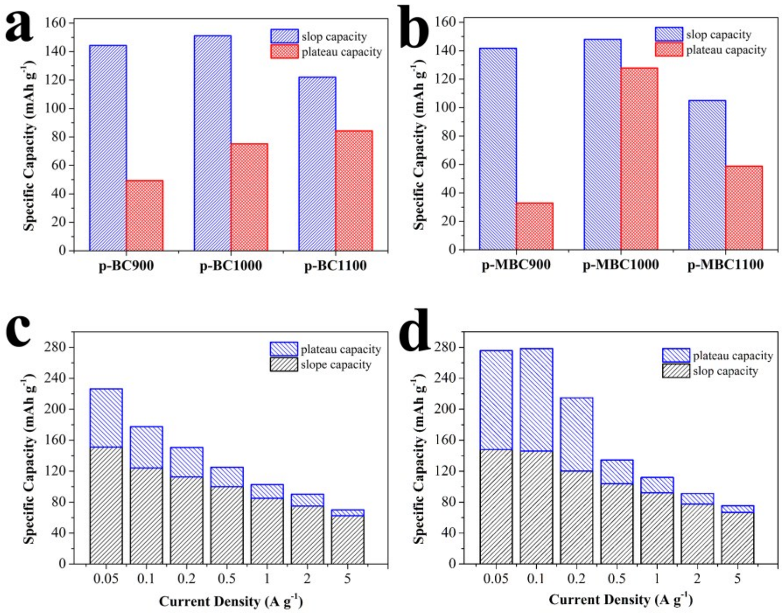

Fig. S9 Summary of the capacity potential distribution of (a) p-BCx; (b) p-MBCx; (c) p-BC1000; (d) p-MBC1000.

Table S1 Parameters for p-BCx and p-MBCx.

Sample	p-BC900	p-BC1000	p-BC1100	p-MBC900	p-MBC1000	p-MBC1100
S_{BET} ($m^2 g^{-1}$) [a]	487.76	342.46	167.12	198.46	153.15	39.64
V_t ($cm^3 g^{-1}$) [b]	0.40	0.33	0.16	0.13	0.12	0.09
I_D/I_G [c]	1.05	1.31	1.22	1.29	1.33	1.33
ICE (%) [d]	36	38	44	52	50	44

[a] Surface area was calculated with BET method.

[b] The total pore volume was determined at a relative pressure of 0.99.

[c] I_D/I_G are the integrated intensities of D- and G- band.

[d] The initial Coulombic efficiency (ICE).

Table S2 Performance comparison of p-BC1000 and p-MBC1000 versus state-of-the-art anode carbons derived cellulose of SIBs reported in literatures

Types of materials	Current density ($mA\ g^{-1}$)	Specific capacity ($mAh\ g^{-1}$)	Cycling stability	ICE (%)	Ref.s
Ordered cellulose nanocrystals	20 (200)	375 (220)	300 mAh g^{-1} after 400 cycles at 100 mA g^{-1}	22.7	1
Cellulose nanofibers	40 (2000)	255 (85)	176 mAh g^{-1} after 600 cycles at 200 mA g^{-1}	58.8	2
Cotton	30 (600)	315 (84)	305 mAh g^{-1} after 100 cycles at 30 mA g^{-1}	85	3
Filter paper (DPC-A)	20 (100)	289 (117)	286 mAh g^{-1} after 100 cycles at 20 mA g^{-1}	81	4
Tempo-cellulose	20	260	196 mAh g^{-1} after 200 cycles at 100 mA g^{-1}	72	5
PBC-750	30 (3000)	161 (9)	—	35.5	6
Ppy@BC					7
CNF	50 (1000)	71(36)	60.5 mAh g^{-1} after 400 cycles at 500 mA g^{-1}	—	
CNF@ NPC	50 (1000)	258.3 (146.5)	148.8 mAh g^{-1} after 400 cycles at 500 mA g^{-1}	29.4	
PANI/BC/KOH (NOC)	100 (5000)	650 (161)	240 mAh g^{-1} after 2000 cycles at 2 A g^{-1}	30	8
BN-CNF	200 (10000)	644 (314)	277 mAh g^{-1} after 1000 cycles at 10 A g^{-1}	36.6	9
EG	20 (200)	284 (91)	73.92 % after 2000 cycles at 100 mA g^{-1}	49.53	10
p-BC1000	**100 (5000)**	**185 (70)**	76 mAh g^{-1} after 2000 cycles at 1 A g^{-1}	**38**	**This work**
p-MBC1000	**100 (5000)**	**310 (81)**	102 mAh g^{-1} after 2000 cycles at 1 A g^{-1}	**50**	

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