Supporting information

Enhancing the performance of MnO by double carbon modification for advanced lithium-ion battery anode

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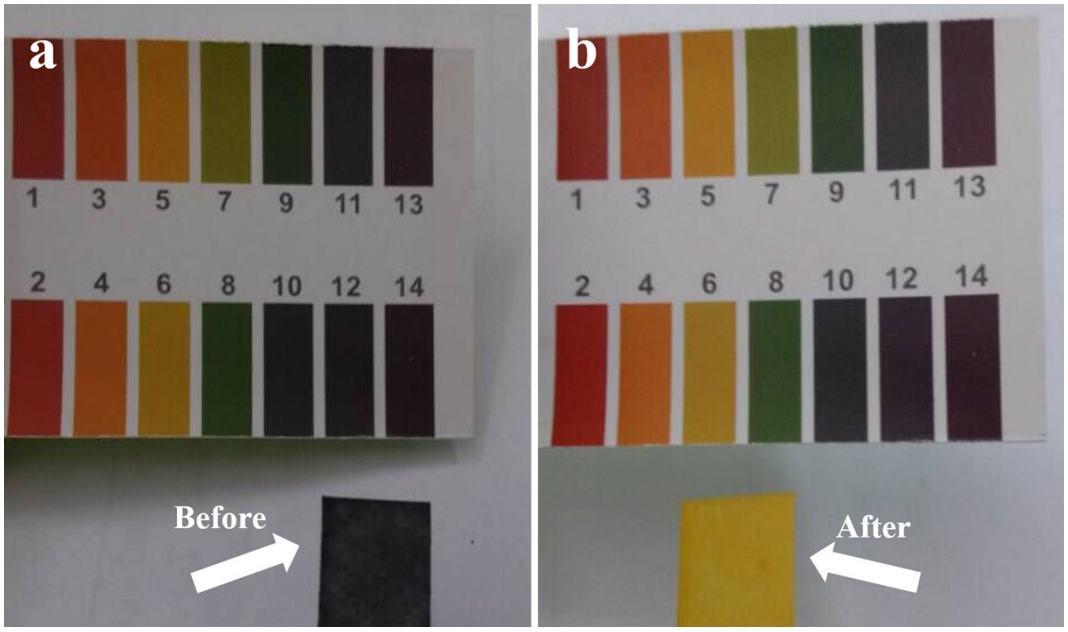

Fig. S1. The colour changes of pH before and after sodium hydroxide produced was washed by ultra-pure water.

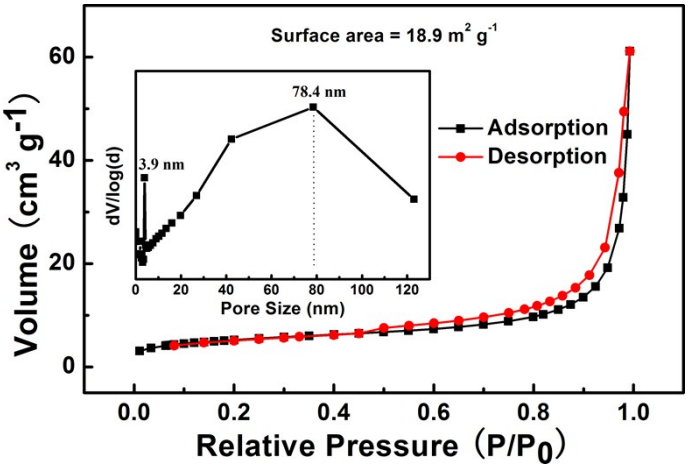

Fig. S2. The nitrogen adsorption-desorption isotherms of porous MnO@C/CNTs.

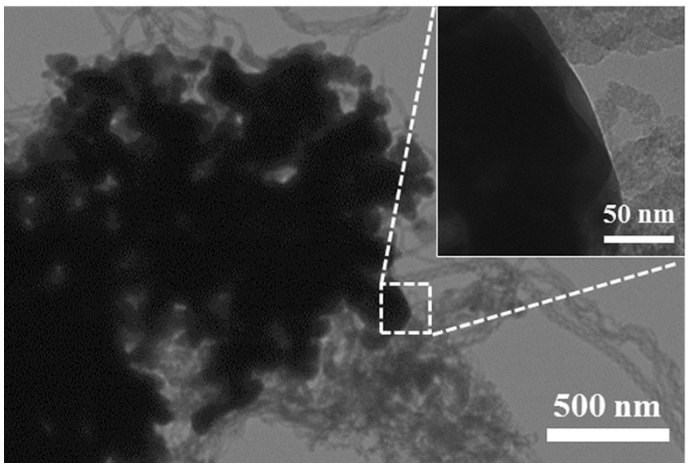

Fig. S3. TEM image of MnO/CNTs.

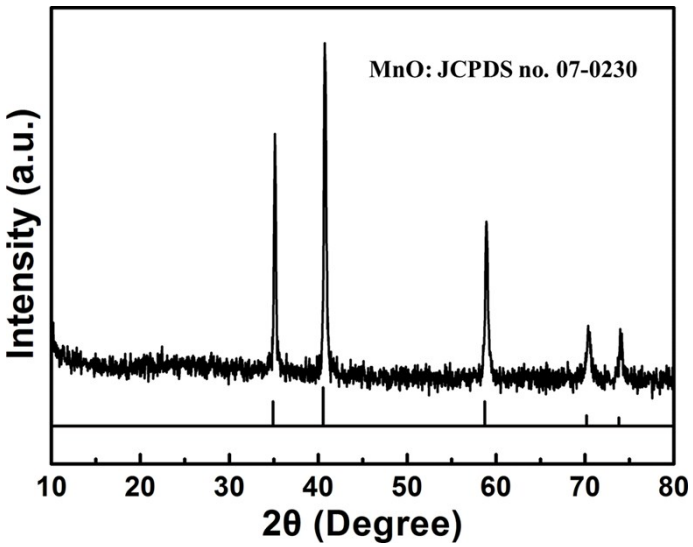

Fig. S4. XRD pattern of MnO/CNTs.

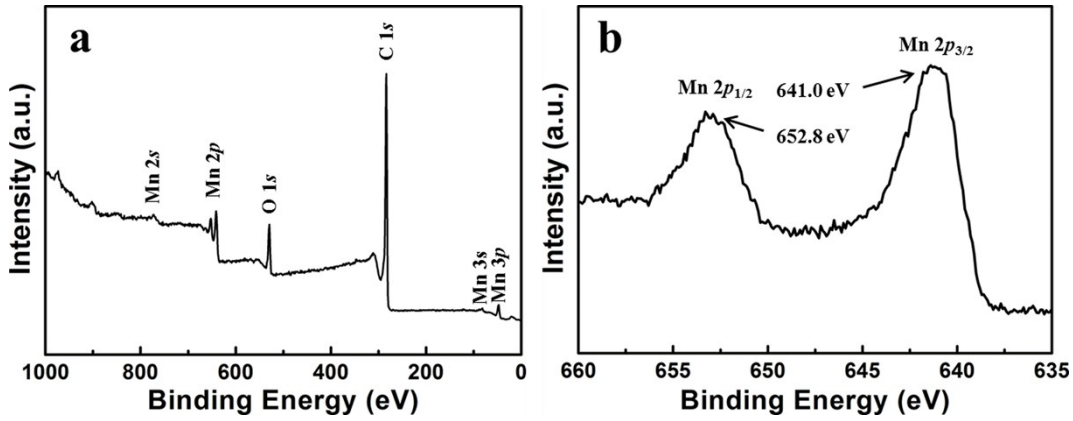

Fig. S5. XPS spectra of MnO@C/CNTs: (a) survey scan, (b) high-resolution Mn 2*p* peaks.

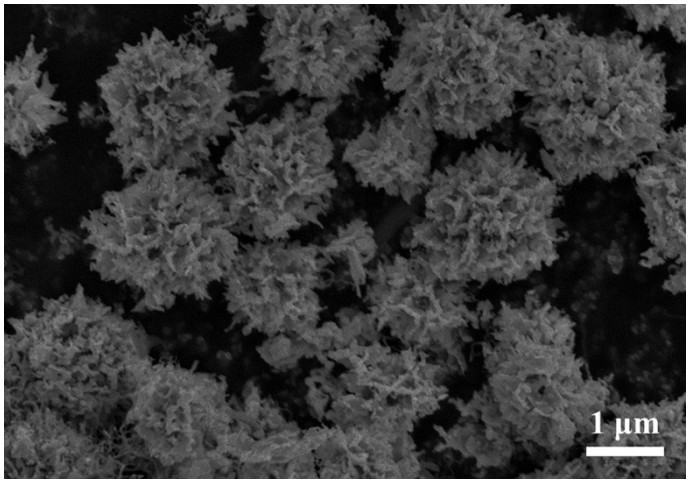

Fig. S6. SEM of porous MnO@C/CNTs.

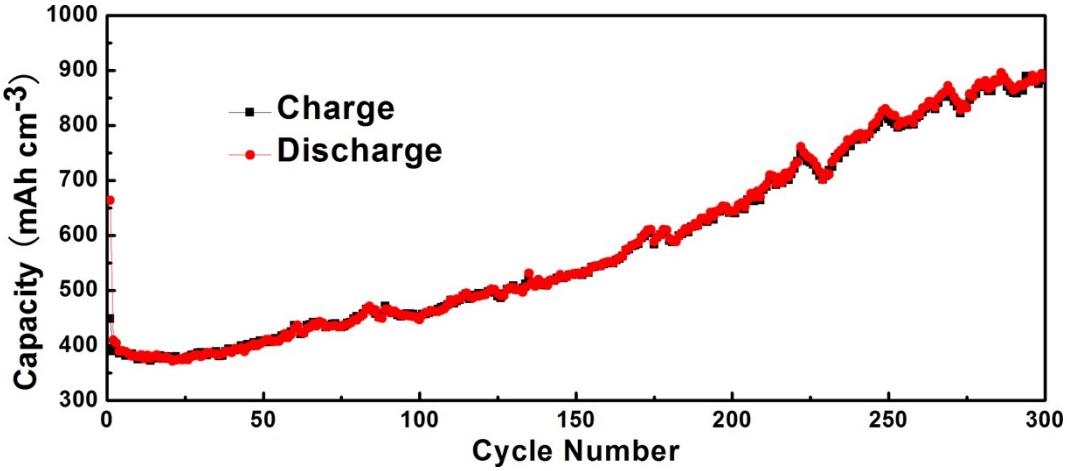

Fig. S7. Cycling volumetric capacity performance of porous MnO@C/CNTs at different cycles with a current density of 200 mA g^{-1} in the range of 0.05-3.0 V.

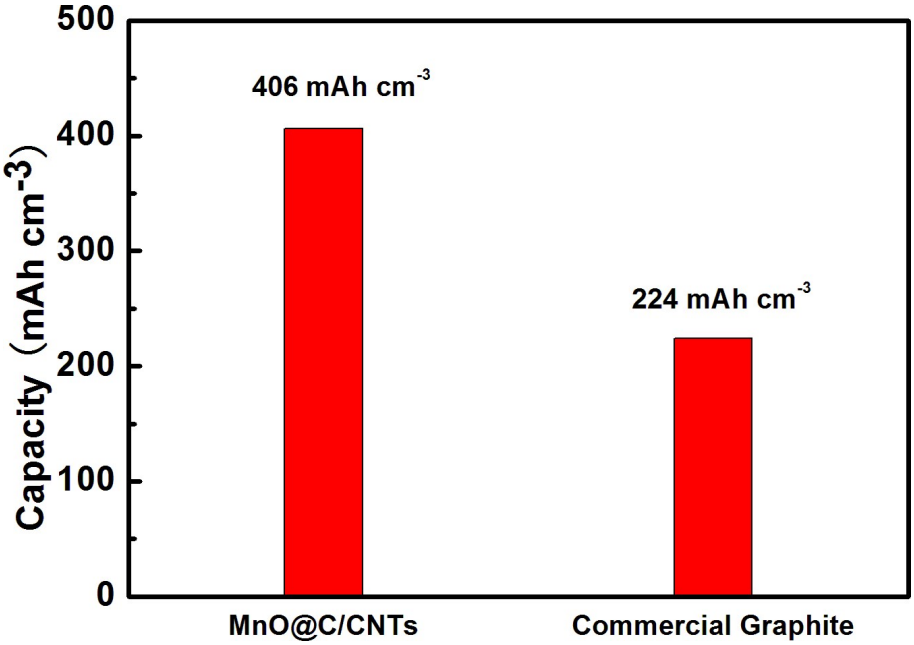

Fig. S8. Discharge capacities of MnO@C/CNTs and commercial graphite electrodes at 200 mA g^{-1} after 20 cycles.

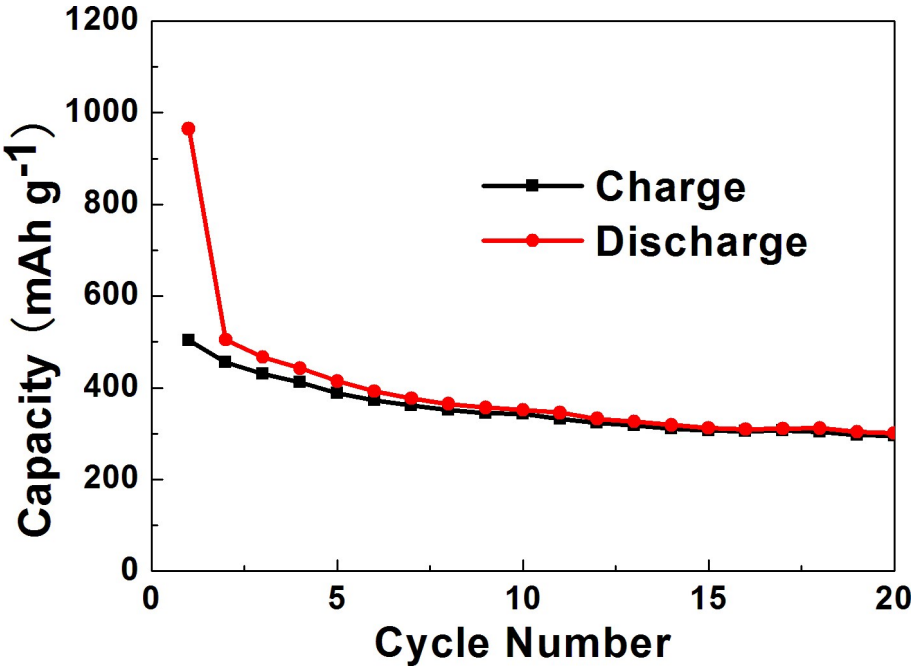

Fig. S9. Cycling performance of porous MnO@C/CNTs at different cycles with a current density of 200 mA g^{-1} in the range of 0.05-1.5 V.

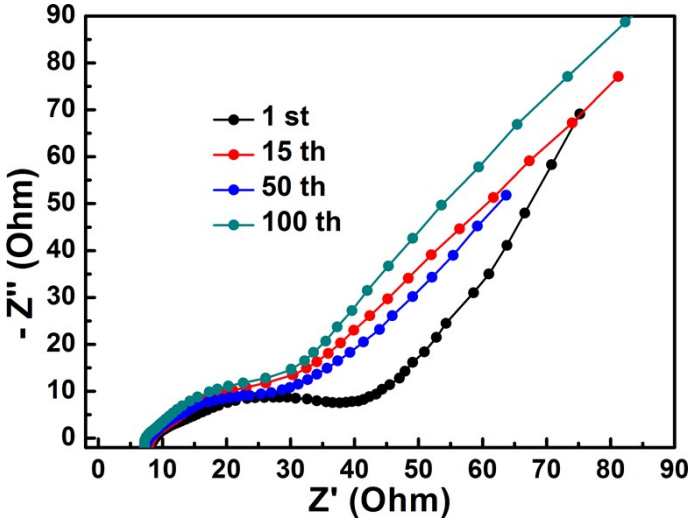

Fig. S10. Nyquist plots of porous MnO@C/CNTs electrodes charged to 3 V after different discharge/charge cycles at 500 mA g^{-1}.

Table S1. Comparison of cycling performances of MnO-based anode materials.

MnO-based anode materials	Current density	Cycle number	After cycle capacity (mA h g^{-1})	Ref.	Year
MnO/graphene oxide sheet	100 mA g^{-1}	50	665.5	38	2012
MnO@C Nanowires	500 mA g^{-1}	200	801	19	2013
Mesoporous MnO/C Networks	200 mA g^{-1}	200	1224	29	2013
Porous MnO/C microspheres	100 mA g^{-1}	50	700	11	2013
MnO/MWNTs composite rods	310 mA g^{-1}	200	455	17	2013
Porous MnO@C microspheres	100 mA g^{-1}	100	525.4	9	2014
MnO/Carbon Nanopeapods	500 mA g^{-1}	100	1119	8	2014
MnO/MWNTs composite sphere	130 mA g^{-1}	200	597	22	2014
Peanut-like MnO@C composites	200 mA g^{-1}	200	952	39	2014
Hollow MnO nanospheres	500 mA g^{-1}	150	1050	32	2014
MnO nanowire/graphene	500 mA g^{-1}	470	930	21	2014
Porous MnO_x microspheres	500 mA g^{-1}	100	757	12	2015
Porous MnO@C/CNTs	200 mA g^{-1}	300	1453	this work	this work
Porous MnO@C/CNTs	500 mA g^{-1}	300	1266	this work	this work