Supplementary Material for

Controllable Growth of Carbon Nanosheets in the Montmorillonite Interlayers for High-Rate and Stable Anode in Lithium ion Battery

Mao-Sung Chen[ab], Wenwu Fu[ab], Yanjie Hu[ab], Mao-Yuan Chen[c], Yuh-Jing Chiou[c], Hong-Ming Lin[d], Ming Zhang[ab*], Zhongrong Shen[ab*]

[a]*CAS Key Laboratory of Design and Assembly of Functional Nanostructures, and Fujian Key Laboratory of Nanomaterials, Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou 350002, China*

[b]*The Laboratory of Rare-Earth Functional Materials and Green Energy, Xiamen Institute of Rare Earth Materials, Haixi Institutes, Chinese Academy of Sciences, Xiamen 361021, China*

[c]*Department of Chemical Engineering, Tatung University, Taipei 104, Taiwan, China*

[d]*Department of Materials Engineering, Tatung University, Taipei 104, Taiwan, China*

[*]*Corresponding authors*
E-mail: z-shen@fjirsm.ac.cn (Z. Shen); mingzhang@fjirsm.ac.cn (M. Zhang)

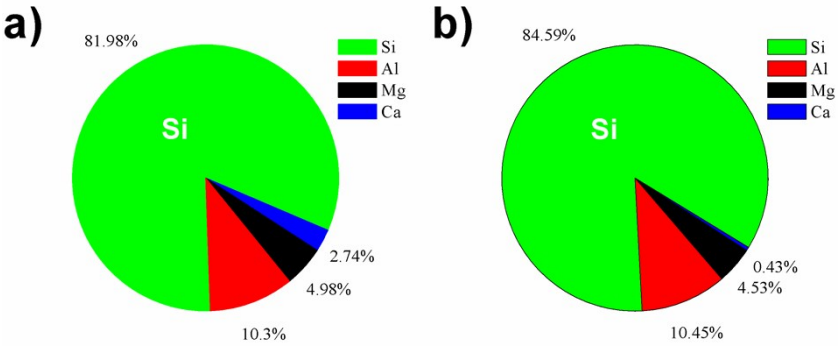

Fig. S1 Compositions of the (a) MMT and (b) HMMT powders measured by XRF.

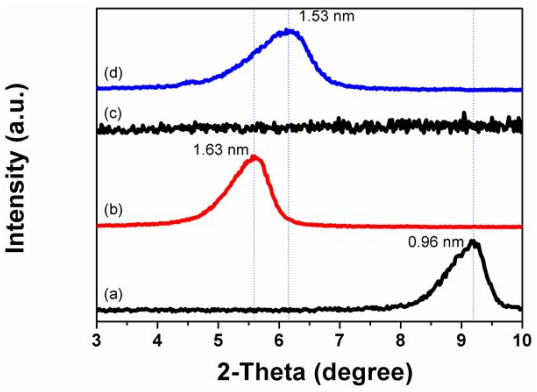

Fig. S2 X-ray diffraction patterns of (a) HMMT-700°C, (b) MMT/carbon-700°C, (c) HMMT-900°C, and (d) MMT/carbon-900°C.

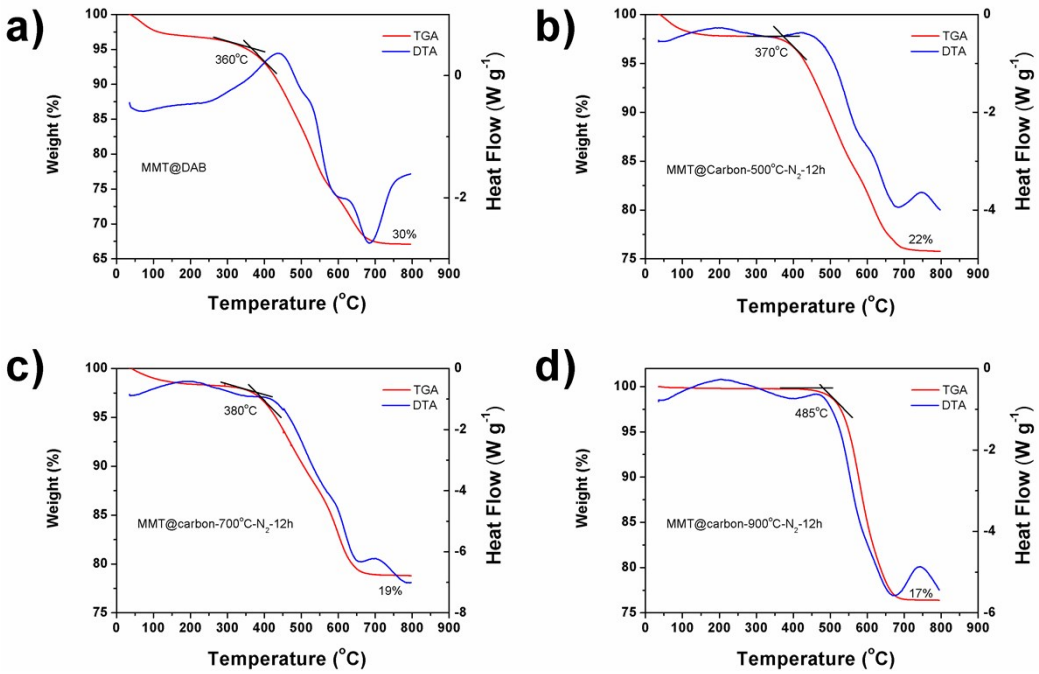

Fig. S3 Thermogravimetric analysis of (a) MMT@DAB, (b) MMT/carbon-500°C, (c) MMT/carbon-700°C, and (d) MMT/carbon-900°C.

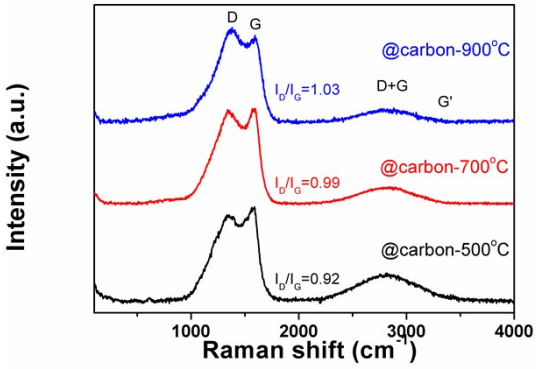

Fig. S4 Raman of the as prepared powders MMT/carbon-500°C, MMT/carbon-500°C, and MMT/carbon-900°C.

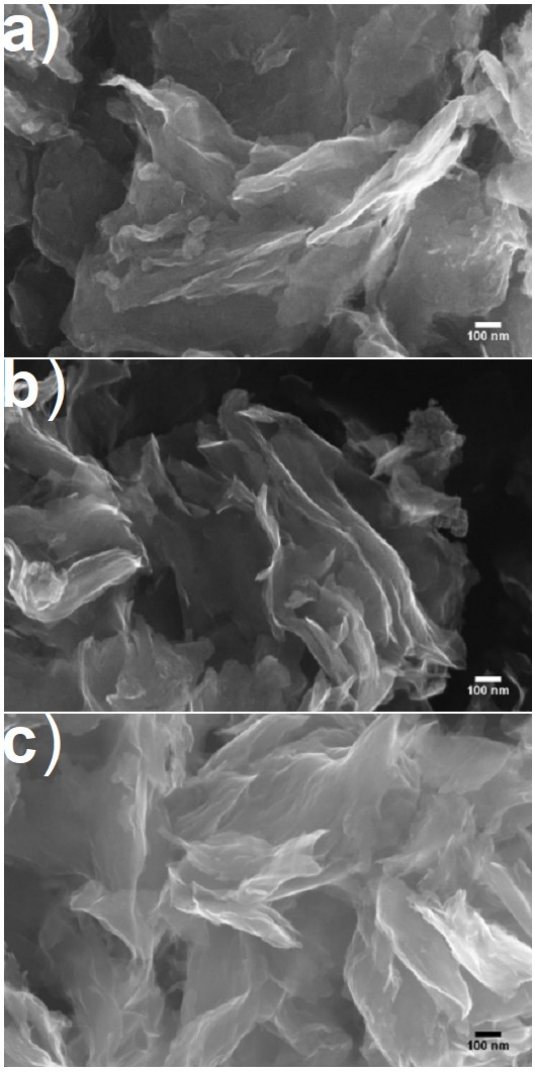

Fig. S5 SEM images of (a) MMT/carbon-500^{o}C, (b) MMT/carbon-700^{o}C, and (c) MMT/carbon-900^{o}C.

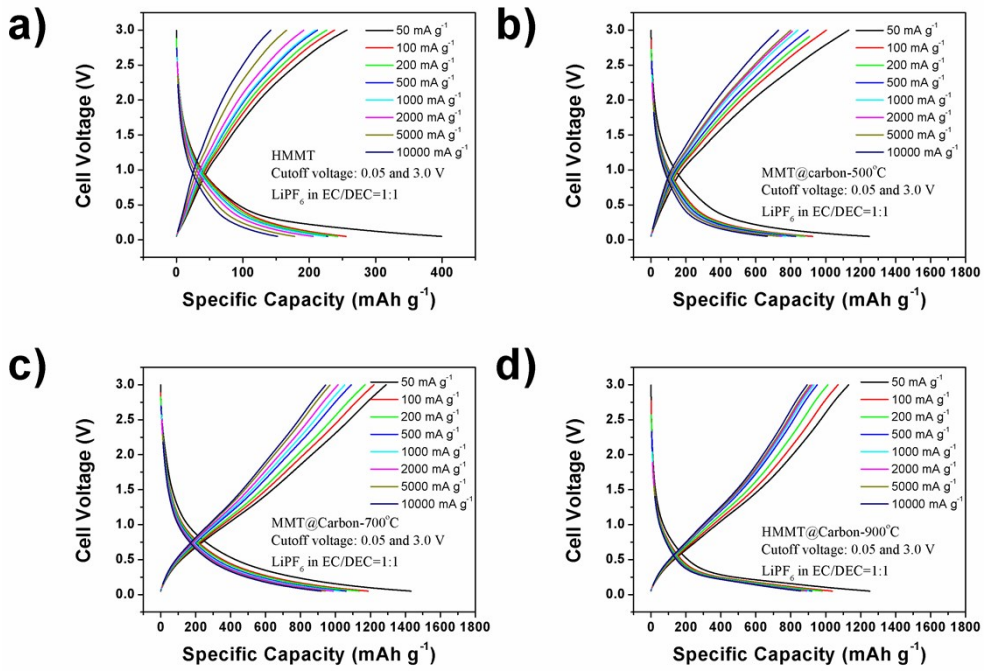

Fig. S6 Galvanostatic charge-discharge curves of (a) HMMT, (b) MMT/carbon-500°C, (c) MMT/carbon-700°C, and (d) MMT/carbon-900°C anodes at current densities from 50 to 10000 mA g^{-1}.

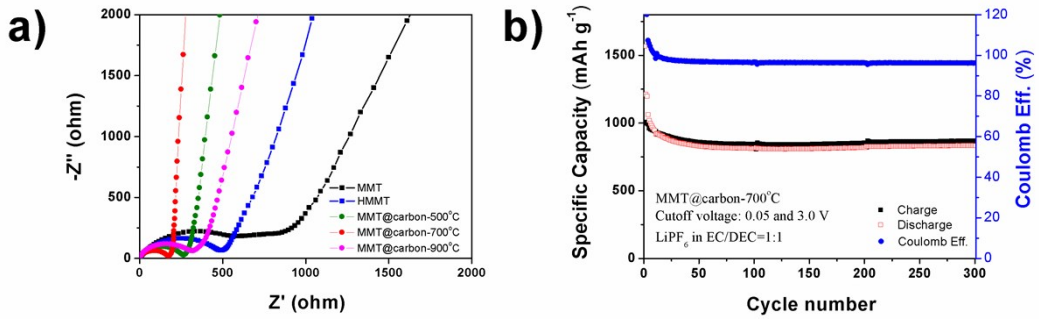

Fig. S7 (a) The AC impedance of MMT, HMMT, MMT/carbon-500°C, MMT/carbon-700°C, and MMT/carbon-900°C. (b) The cycling performance of MMT/carbon-700°C cycled at a current density of 10000 mA g^{-1}.

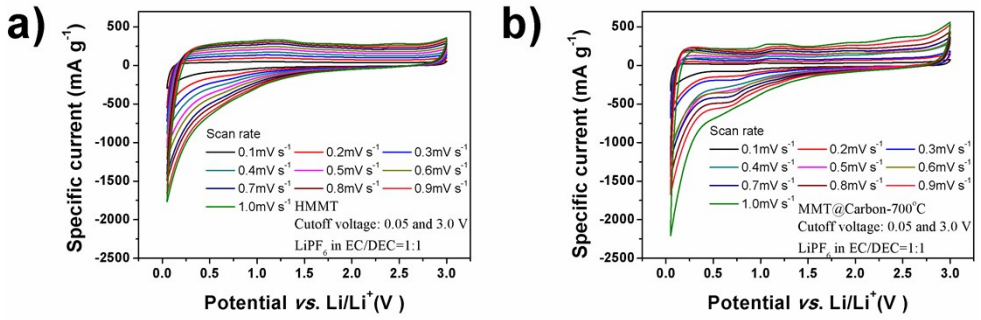

Fig. S8 The cyclic voltammogram curves of (a) HMMT and (b) MMT/carbon-700°C.

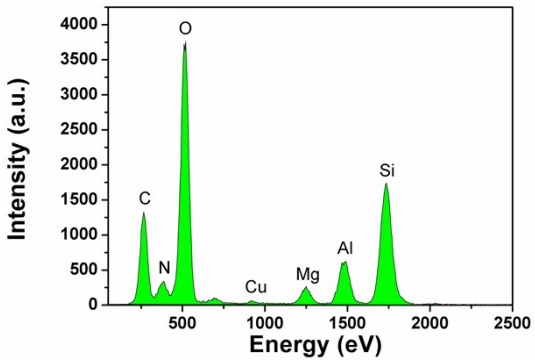

Fig. S9 TEM EDX of MMT/carbon-700°C.

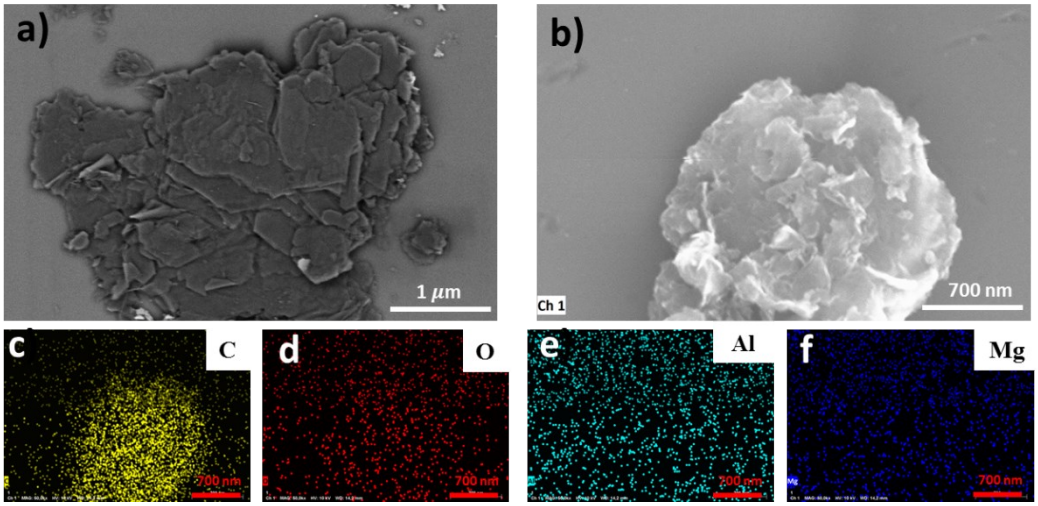

Fig. S10 SEM and elements mapping images of carbon nanosheet stacks treated by HF etching.

Table S1 Estimated the capacity of MMT and MMT/carbon from the results of electrochemical tests. Irreversible capacity obtains from discharge activation at current density 50 mA g^{-1}, and then charge in the first cycle.

Sample	Li^+ insertion capacity (mAh g^{-1})	Li^+ extraction capacity (mAh g^{-1})	Irreversible (mAh g^{-1})	Efficiency (%)
HMMT	400	257	143	64.3
MMT/carbon-500°C	1248	1131	117	90.6
MMT/carbon-700°C	1432	1290	142	90.0
MMT/carbon-900°C	1252	1131	121	90.3