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Supplementary Information

In-situ synthesis of porous Si dispersed in carbon nanotube intertwined expanded graphite for high-energy lithium-ion batteries

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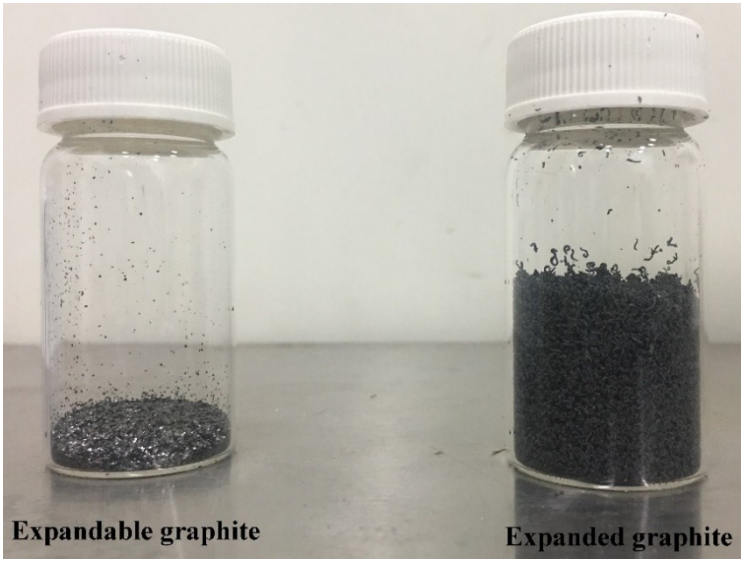

Fig. S1 Volume and morphology change of 1g expandable graphite transformed into expanded graphite.

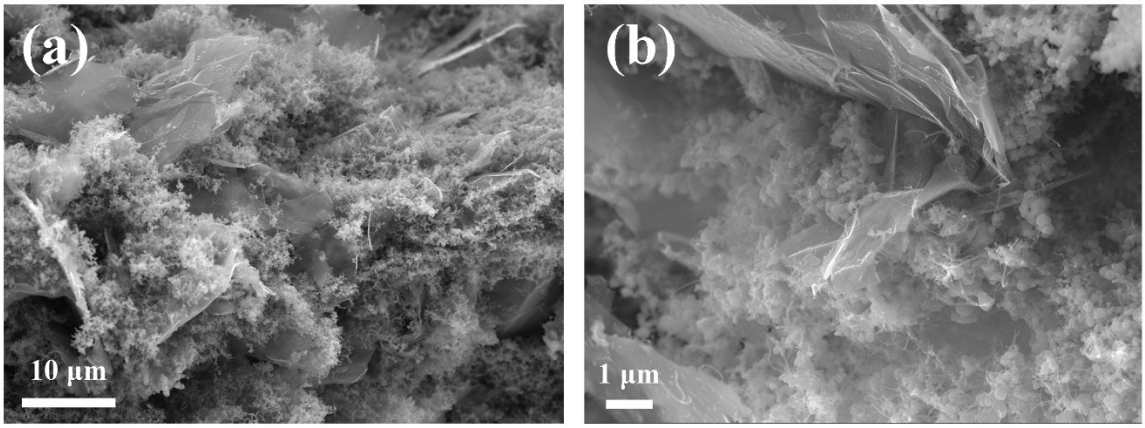

Fig. S2 (a-b) SEM images of the CNT/EG/SiO_2 composite at different magnifications.

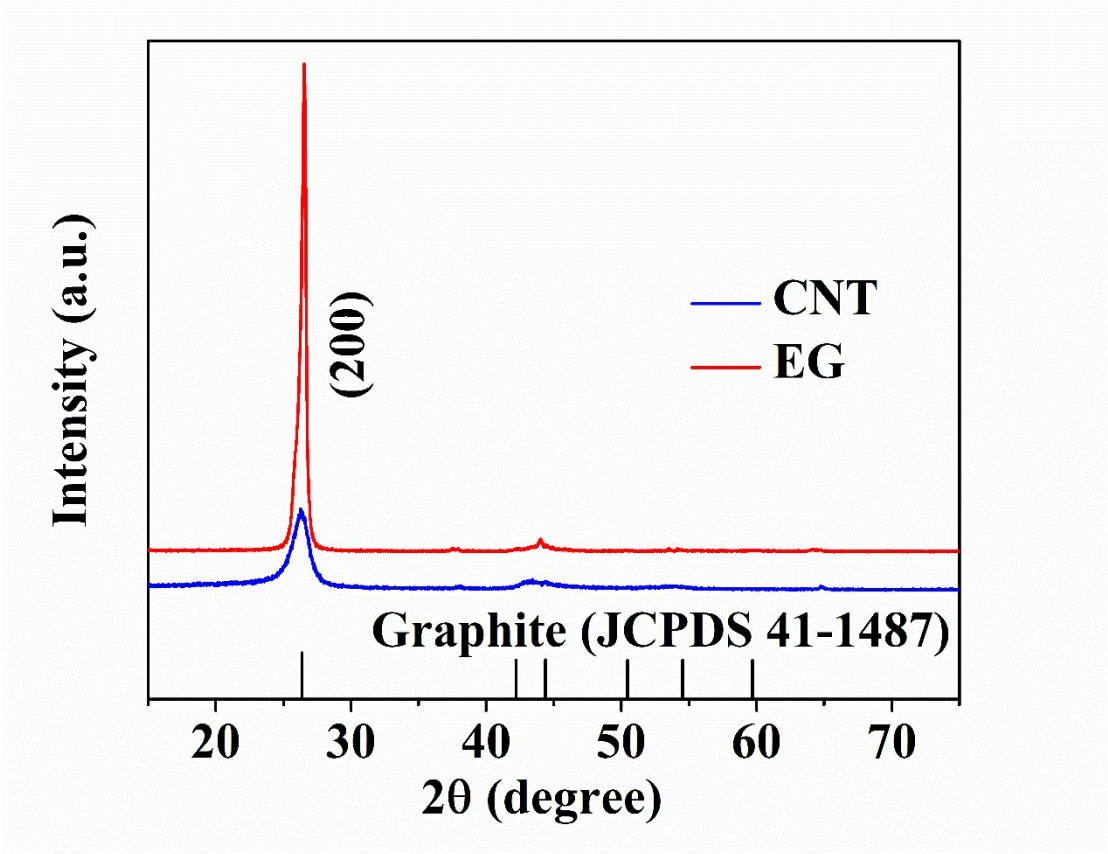

Fig. S3 XRD patterns of CNT and EG.

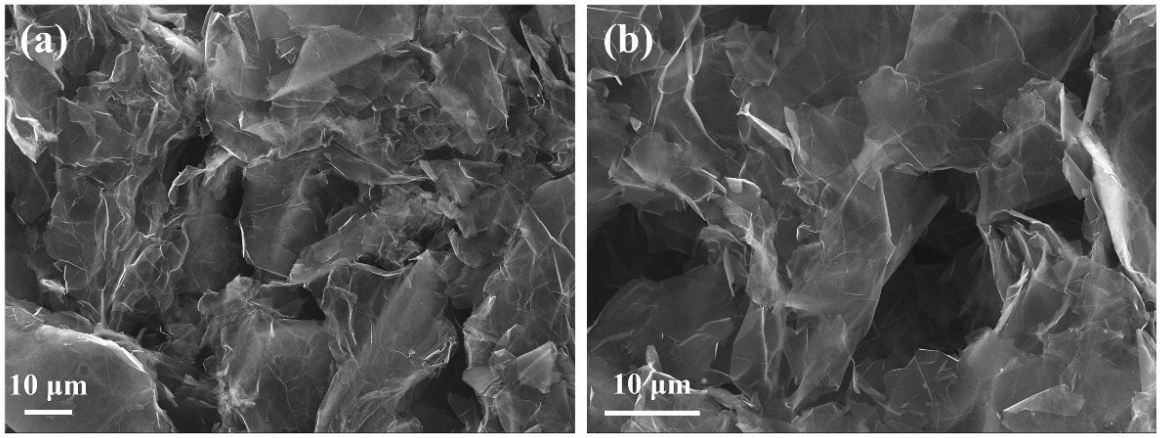

Fig. S4 (a-b) SEM images of EG after ultrasonic treatment at different magnifications.

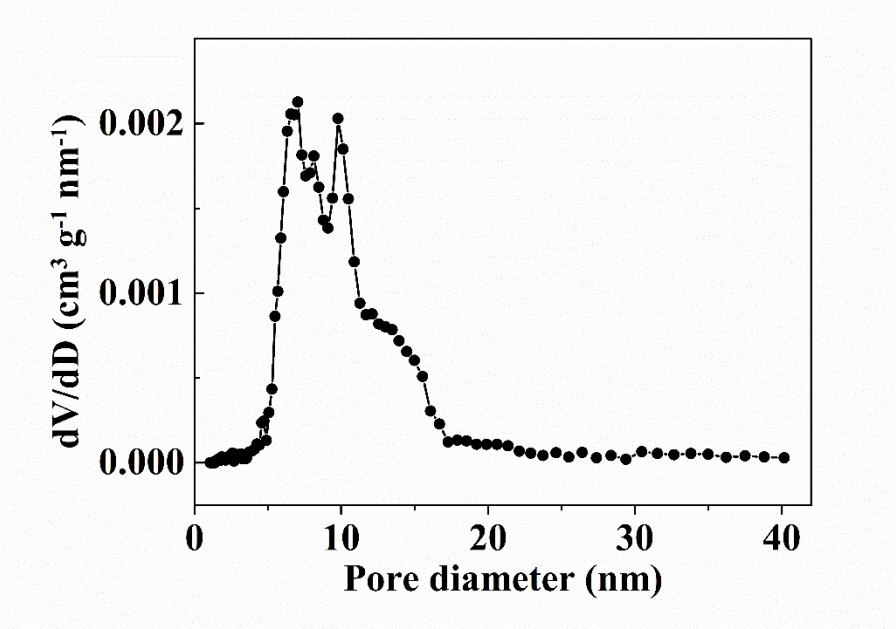

Fig. S5 Pore size distribution plots of the CNT/EG/pSi composite.

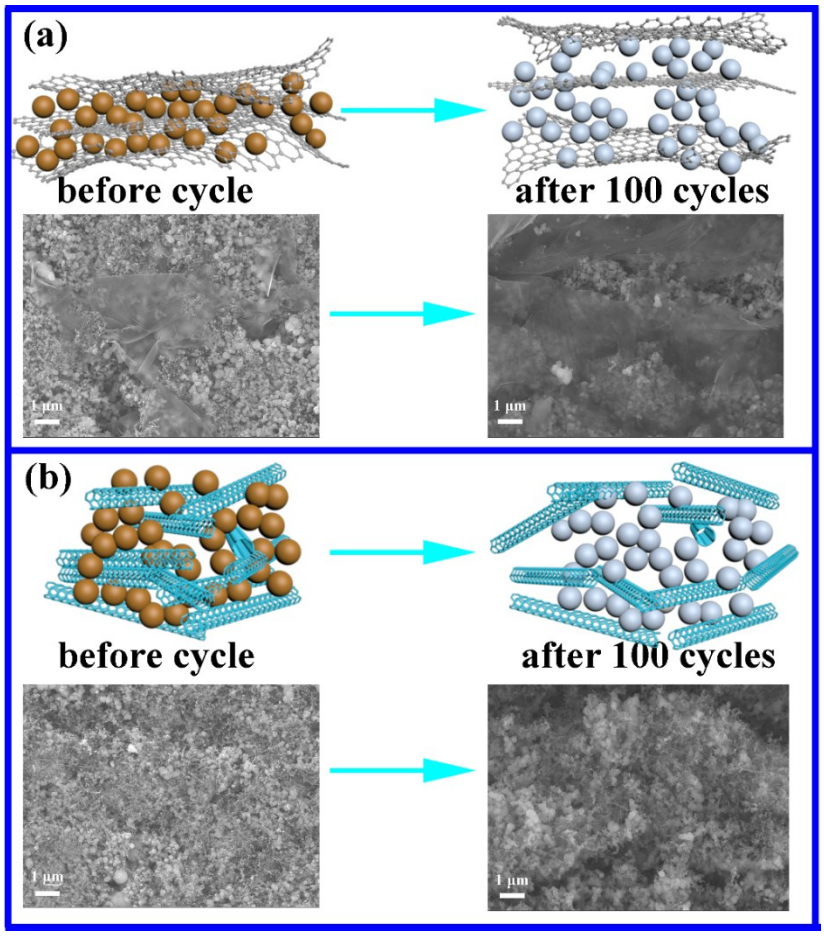

Fig. S6 Schematics and corresponding SEM images of (a) the EG/pSi and (b) CNT/pSi electrodes before and after 100 cycles.

Table S1. Comparison of the synthetic methods and electrochemical performances between Si-based anode materials in this work and some other literatures.

Structure	Synthetic method	1st delithiation specific capacity (mAh g^{-1})	ICE (%)	100th reversible capacity (mAh g^{-1})/ retention (%)/rate (A g^{-1})	Ref. # in the text
CNT/EG/pSi	*In-situ* magnesiothermic reduction	2618	81	2152/84/0.4	this work
CNT/pSi	*In-situ* magnesiothermic reduction	2545	78	1662/65/0.4	this work
EG/pSi	*In-situ* magnesiothermic reduction	2524	76	1019/41/0.4	this work
3D hierarchical macro-/mesoporous Si	Magnesiothermic reduction	1700	62.5	1240/73/0.2	20
Nitrogen-rich carbon/silicon	Amino-carboxyl self-assembly	2400	75.3	1700/70.8/0.1	24
Silicon@carbon@ graphene	Spray drying	1599	75.3	1517/94.9/0.2	25
Si/RGO layers on porous Ni foams	Dip-coating method	2300	73	1500/80/2.4	28
Si@void@graphene	*In situ* pyrolysis and metal-catalyzed graphitization	2411	65	1410 (600 cycles)/62.5/2.4	29