Electronic Supplementary Information

Direct access to ultrahigh-rate and ultrastable lithium titanate composite core/shell arrays via synergistic vertical graphene and interwoven CNTs

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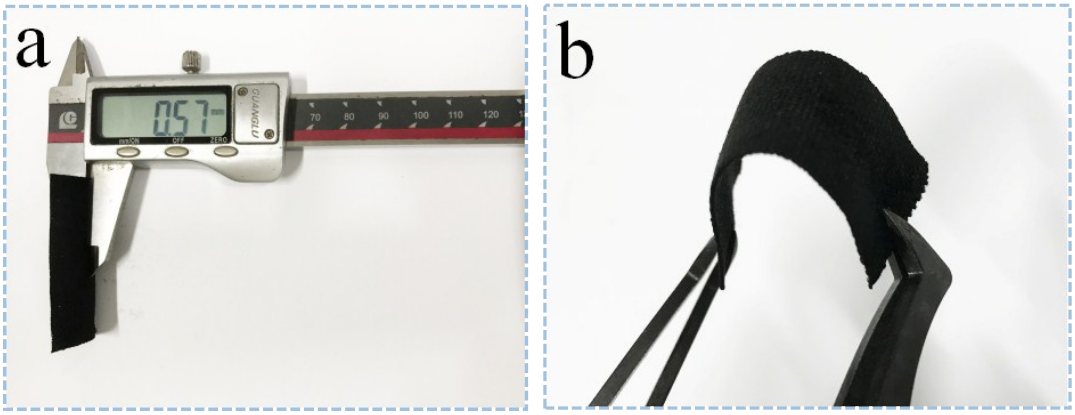

Figure S1. (a), (b) Photography of the VG/LTO-CNTs core/shell electrode.

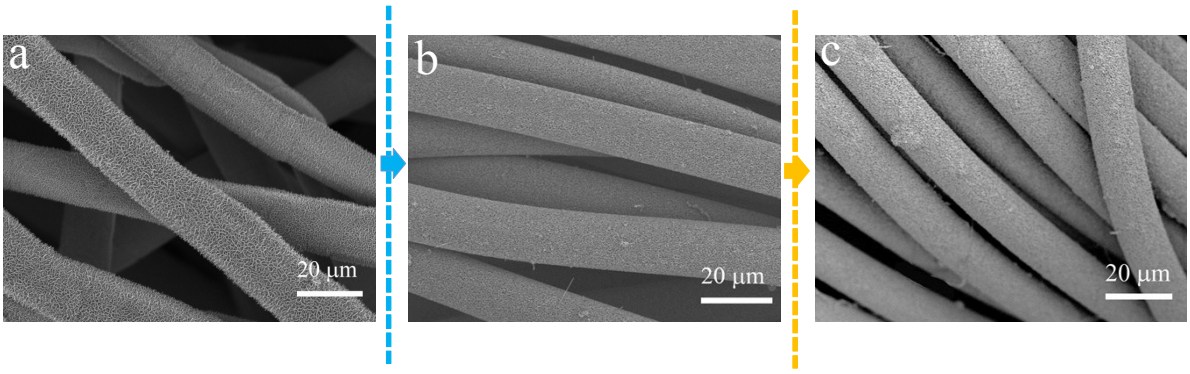

Figure S2. SEM images of (a) pristine VG arrays, (b) VG/LTO core/shell arrays and (c) VG/LTO-CNTs core/shell arrays.

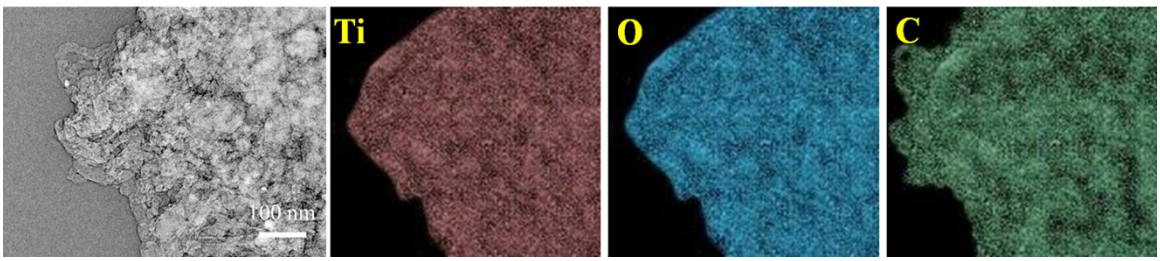

Figure S3. EDX mapping images of Ti, O, and C elements in VG/LTO-CNTs core/shell structure.

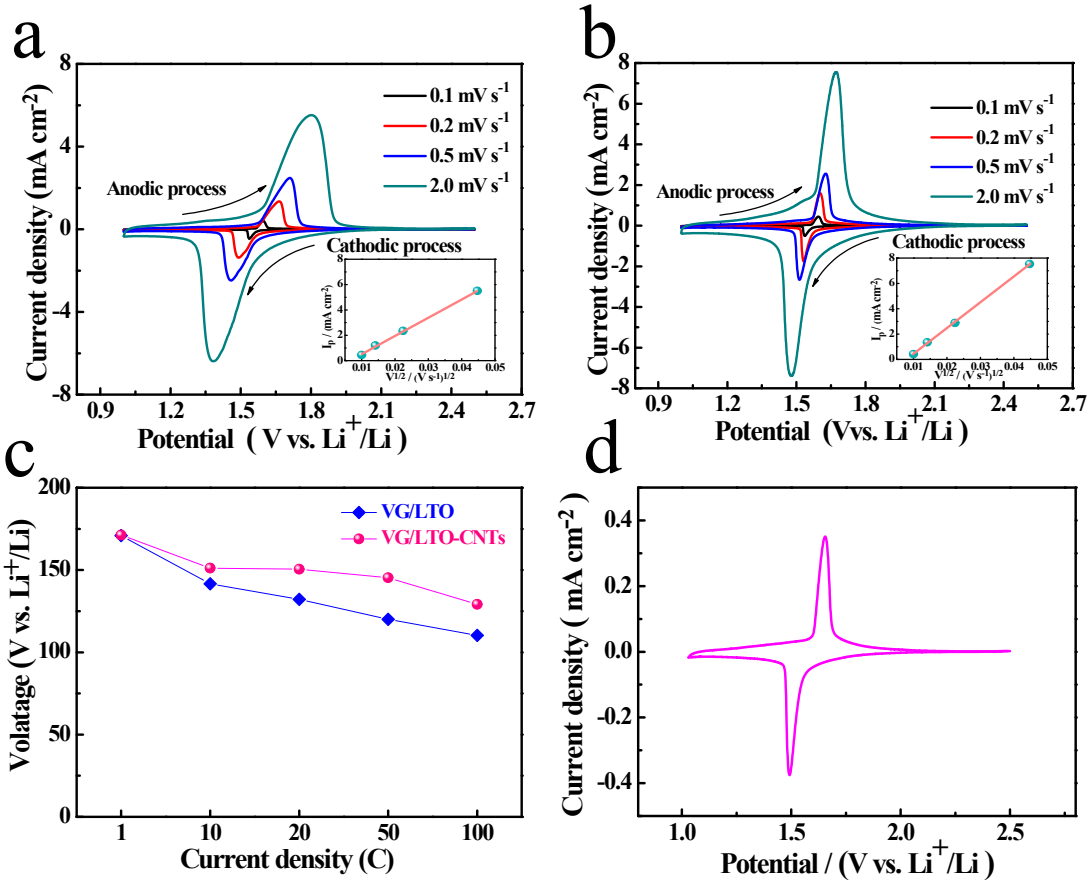

Figure S4. CV curves at different scan rates and Peak current I_p as a function of square root of scan rate $v^{1/2}$ of (a) VG/LTO and (b) VG/LTO-CNTs electrodes; (c) Specific capacities (at different current rates) of VG/LTO and VG/LTO-CNTs electrodes; (d) CV curves of VG/LTO-CNTs electrodes at 0.1 mV S^{-1} after 10000 cycles.

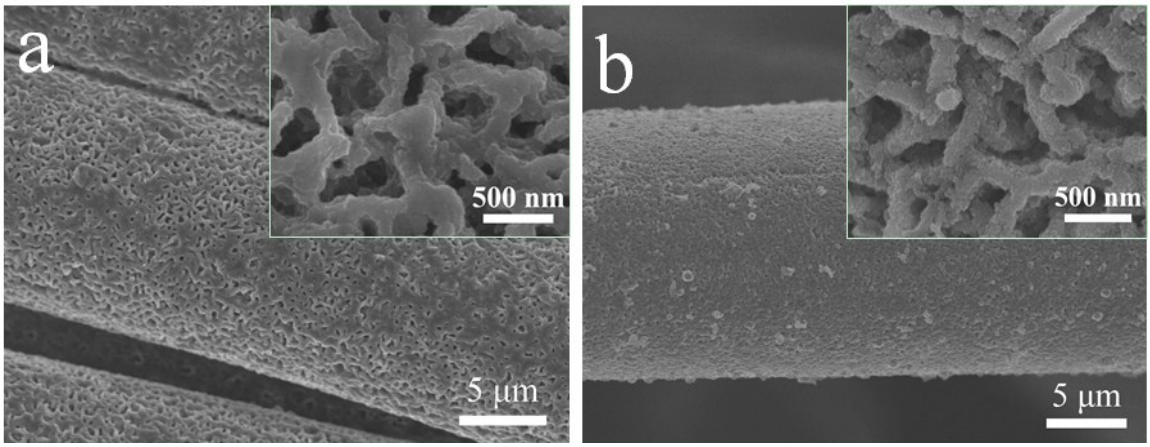

Figure S5. SEM images of (a) VG/LTO and (b) VG/LTO-CNTs electrodes after 10000 cycles at 20 C.

Table S1 Rate capacities and cycling performances of some LTO based composites reported in the recent literatures

Materials of electrodes	Current rate (C)	Cycle number	Capacity (mA h g^{-1})	Degradation rate per 100 cycles (%)	Reference
LTO/RGO on copper foil	90	1000	125	0.5	1
LTO/C powder	20	1000	103	0.56	2
LTO/CNT/CNF film	10	500	140	0.72	3
$Li_4Ti_5O_{12}/Li_2TiO_3$ powder	10	500	106	0.36	4
LTO/C powder	10	200	140	2.15	5
LTO/SiO_2 powder	10	100	142	3	6
LTO/C powder	10	1000	131	0.5	7
LTO nanowire arrays	5	100	149	5	8
LTO hollow spheres powder	5	300	120	4	9
LTO powder on Al foil	5	500	160	0.4	10
LTO/CNT powder	5	100	150	2	11
LTO/C powder	2	2200	124	0.773	12
LTO/C powder	1	100	157	2.4	13
LTO powder	1	50	113	13.4	14
VG/LTO-CNTs	**20**	**10000**	**136**	**0.105**	**Our work**

References

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