Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting information

Chrysanthemum-like TiO_2 nanostructures with exceptional reversible capacity and high coulombic efficiency for lithium storage

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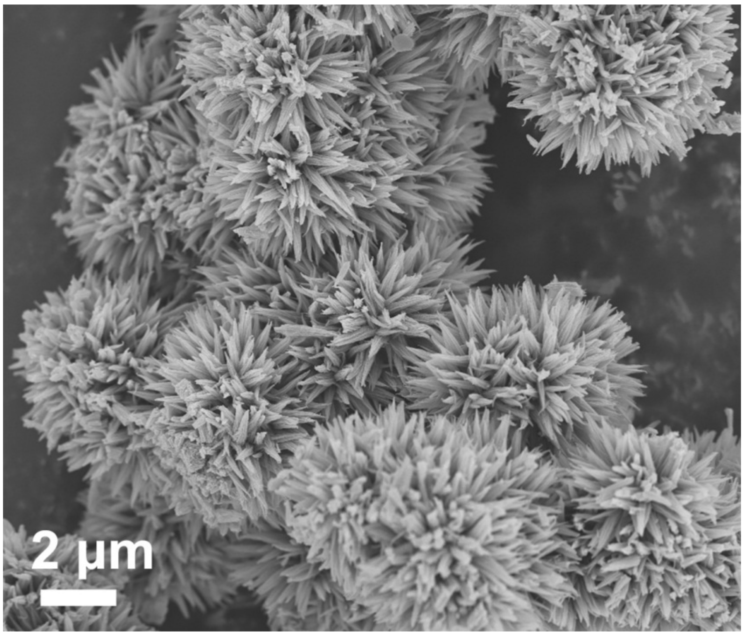

Fig. S1 FE-SEM images of CLNR-TiO_2 in a larger scale of nanostructures after annealing.

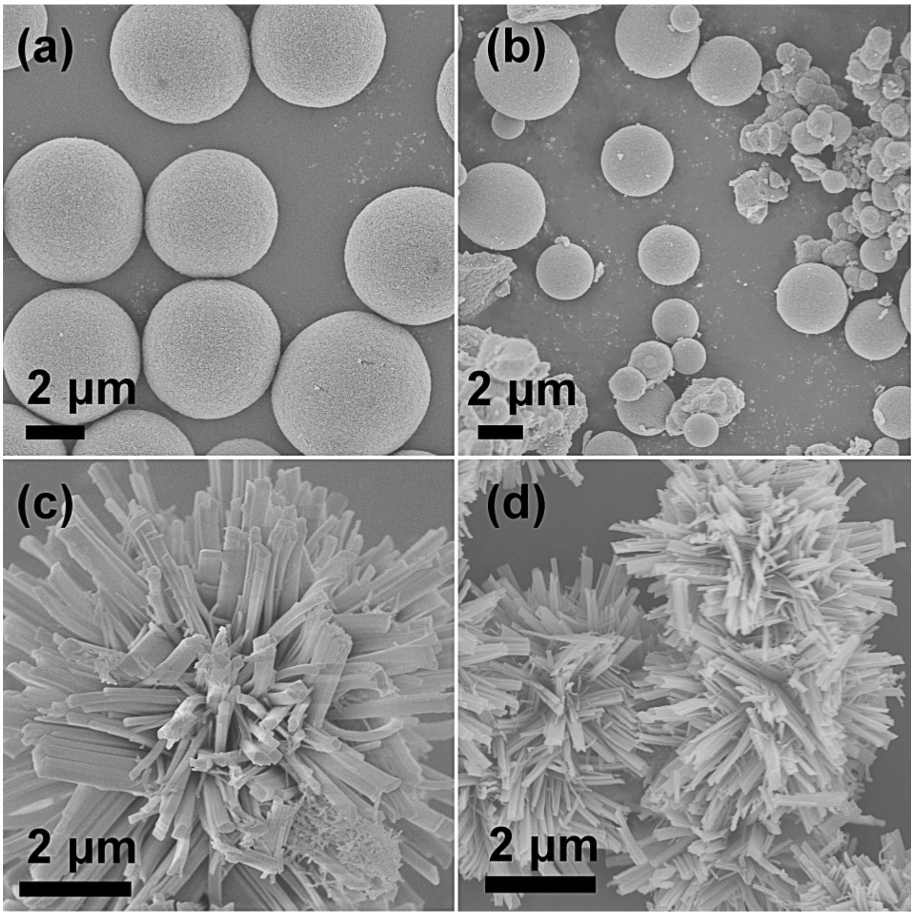

Fig. S2 FE-SEM images of the product prepared from solvothermal at 180 ℃ for 24 h: (a) only the use of IPA (isopropanol); (c) only the use of glycerol. (b) and (d) are the corresponding product of (a) and (c) after calcination at 450 ℃ for 10 h, respectively.

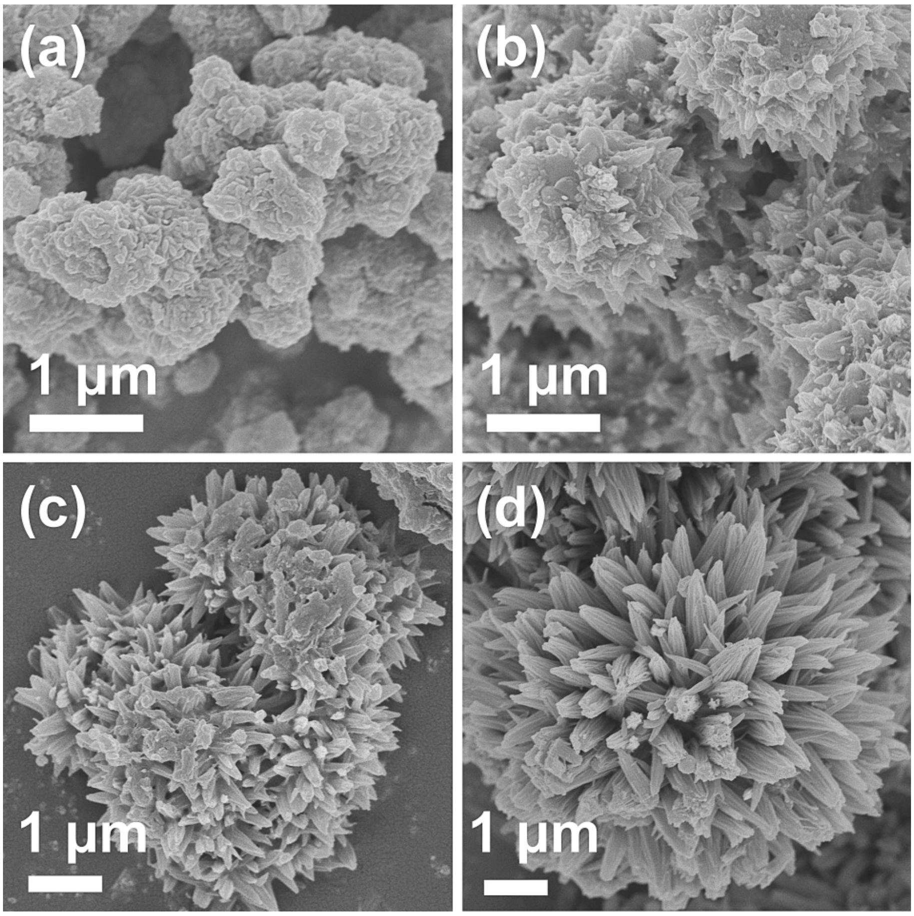

Fig. S3 FE-SEM images showing the morphological evolution of the obtained precursors of the CLNR-TiO_2 nanostructures prepared from different solvothermal reaction time: (a) 1 h; (b) 4 h; (c) 6 h; (d) 24 h.

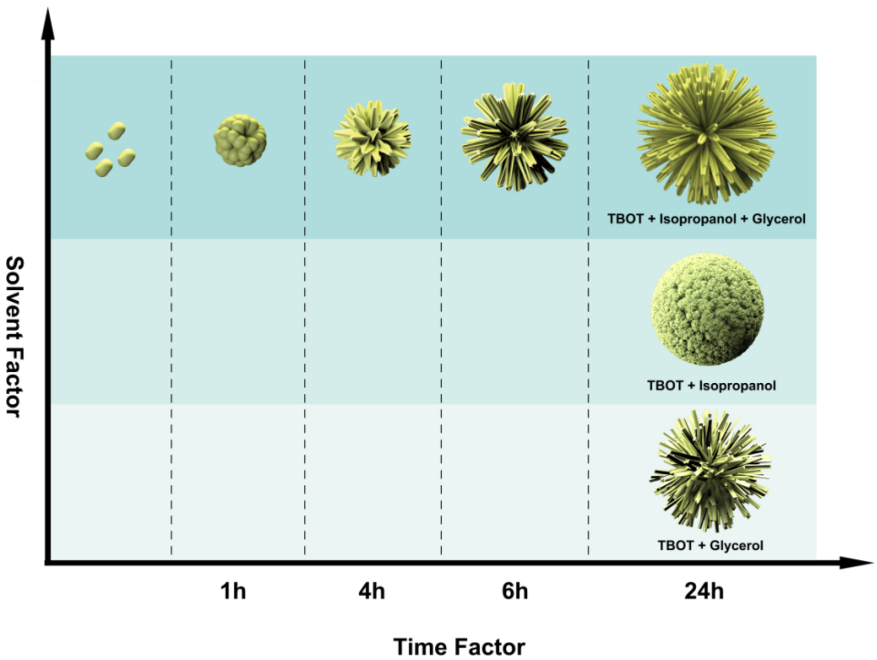

Fig. S4 Schematic illustration of growth mechanism of the hierarchical TiO_2 naostructures: time factor and solvent factor.

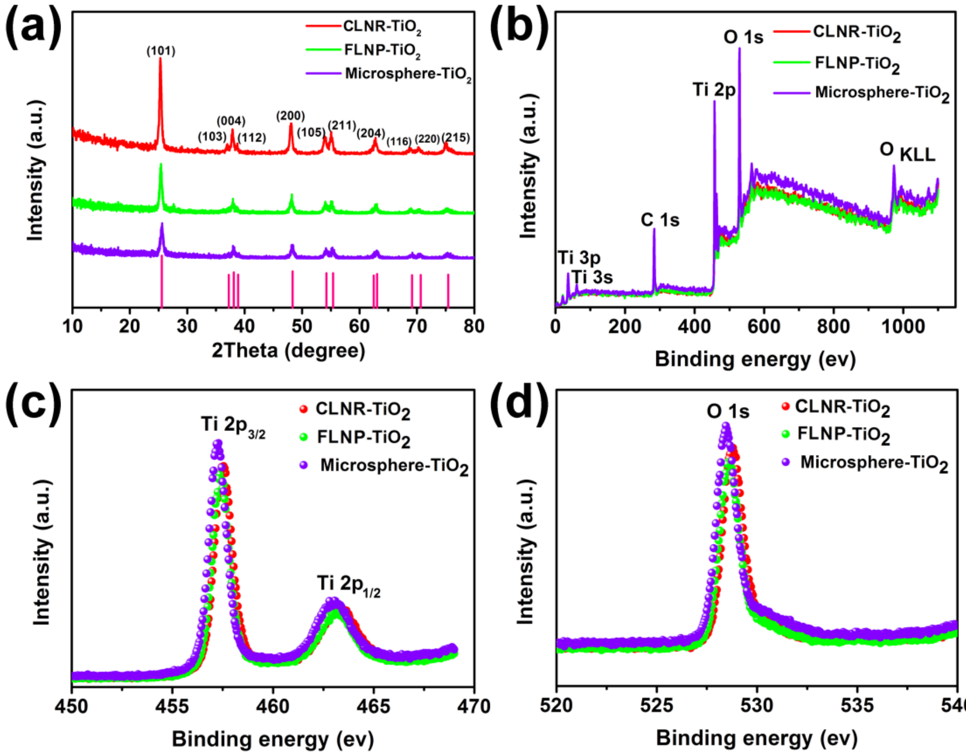

Fig. S5 (a) XRD patterns of the three TiO_2 samples. Vertical bars indicate peak position and intensity of anatase TiO_2 (JCPDS No. 73-1764). XPS spectra of the three TiO_2 samples: (b) wide-scan spectra of the three TiO_2 samples; (c) high-resolution XPS of Ti 2p peaks of the three TiO_2 samples; (d) high-resolution XPS of O 1s peaks of the three TiO_2 samples.

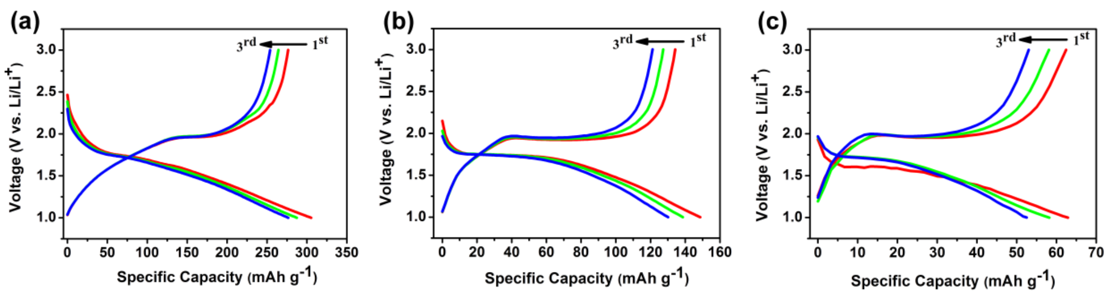

Fig. S6 Charge-discharge profiles at a current rate of 0.59 C (100 mA g^{-1}) between 1.0 and 3.0 V for the first, second, and third cycles of different TiO_2 electrode materials: (a) CLNR-TiO_2; (b) FLNP-TiO_2; (c) Microsphere-TiO_2,

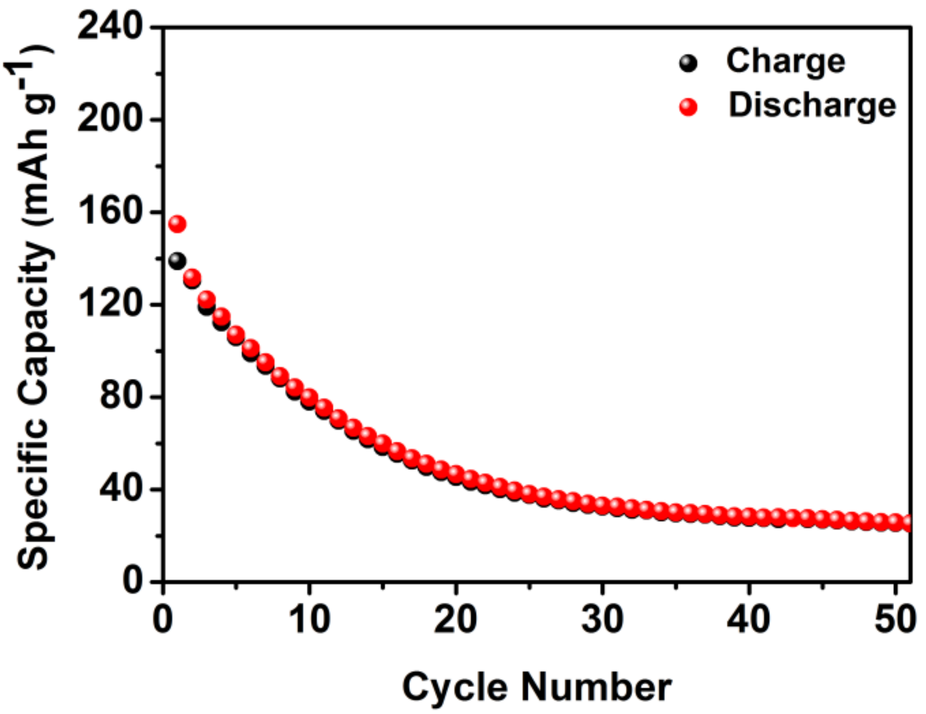

Fig. S7 Cycling performance of the commercial P25 electrode at a current rate of 2 C (1 C = 170 mA g^{-1}) between 1.0 and 3.0 V.

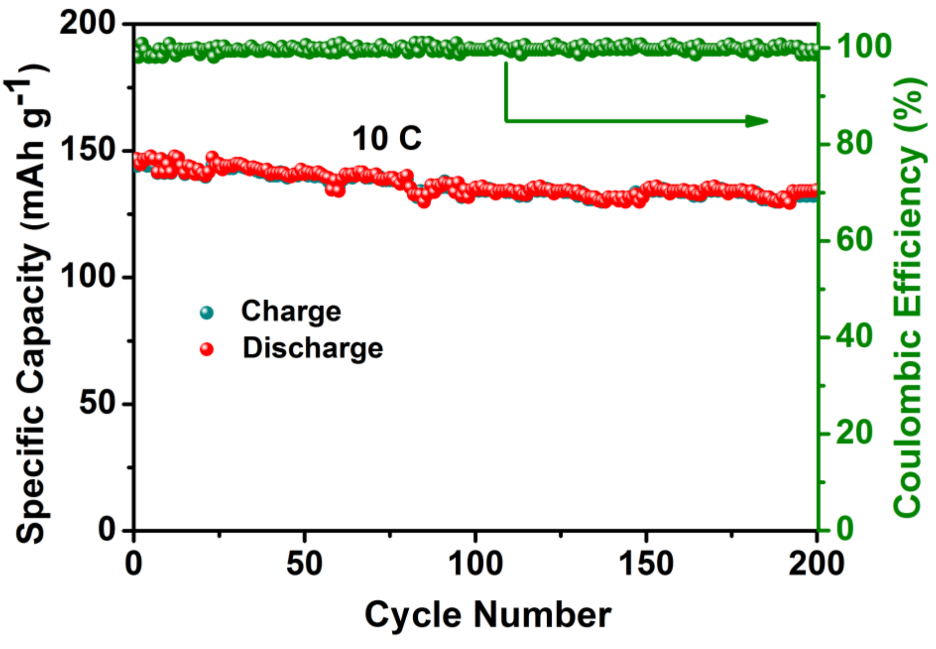

Fig. S8 Cycling performance at a current rate of 10 C (1 C = 170 mA g^{-1}) between 1.0 and 3.0 V of CLNR-TiO_2. The coulombic efficiency is plotted on the right axis (olive circles).

Table S1. Surface analysis data

Sample	Specific surface area (m^2 g^{-1})[a]	Average pore size (nm) [b]	Pore volume(cm^3 g^{-1})
CLNR-TiO_2	95.19	7.66	0.27
FLNP-TiO_2	56.25	7.45	0.15
Microsphere-TiO_2	23.82	9.16	0.049

a Specific surface area was calculated from the linear part of BET plot. b Average pore diameter was estimated from the Barrett–Joyner–Halenda formula.

Table S2. Summary of the CVs of the three samples

Sample	anodic peak	cathodic peak	ΔE_p
CLNR-TiO_2	2.00	1.72	0.28
FLNP-TiO_2	2.02	1.72	0.3
Microsphere-TiO_2	2.02	1.67	0.35

Table S3. Summary of the Charge and Discharge Capacities, Coulombic Efficiencies and Capacity Retentions of the three samples at 2C

	1st cycle			55th cycle	
	discharge capacity (mAh g^{-1})	charge capacity (mAh g^{-1})	coulombic efficiency (%)	discharge capacity (mAh g^{-1})	capacity retention (%)
CLNR-TiO_2	215.1	206.6	96.0	208.9	97.1
FLNP-TiO_2	69.7	68.4	98.1	40.2	57.7
Microsphere-TiO_2	52.9	50.6	95.7	42.3	80.0

Table S4. Summary of discharge capacities of TiO_2 reported from some previous works

Morphology	Initial discharge capacity at 5C ($mAh\ g^{-1}$)	Discharge capacity after cycles at 5C ($mAh\ g^{-1}$)
CLNR-TiO_2	**215.6 $mAh\ g^{-1}$**	**198.3 $mAh\ g^{-1}$ (100 cycles Present work)**
Hierarchical spheres	152 $mAh\ g^{-1}$	136 $mAh\ g^{-1}$ (100 cycles)[1]
Hollow spheres	150 $mAh\ g^{-1}$	123 $mAh\ g^{-1}$ (200 cycles)[2]
Ultrathin nanosheets	200 $mAh\ g^{-1}$	140 $mAh\ g^{-1}$ (200 cycles)[3]
Carbon-supported ultra-thin nanosheets	205 $mAh\ g^{-1}$	147.8 $mAh\ g^{-1}$ (100 cycles)[4]
Nanotubes grown on graphene	176 $mAh\ g^{-1}$	159 $mAh\ g^{-1}$(150 cycles)[5]

References

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