

Supporting Information

Sol-gel synthesis of nanocrystals-constructed hierarchically porous

TiO₂ based composites for lithium ion batteries

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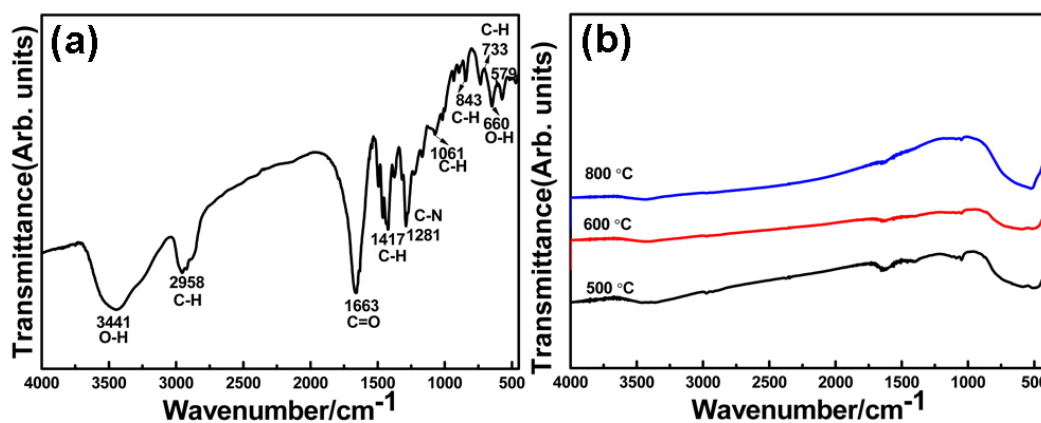


Fig. S1 FT-IR spectra of pure PVP (a) and TiO₂/C samples (b) calcined at different temperatures.

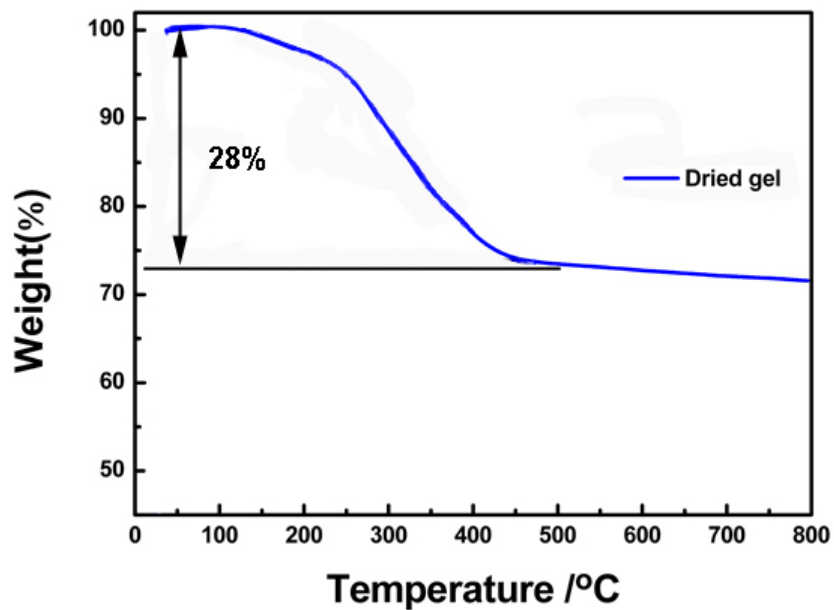


Fig. S2 TGA curve of dried gel in N₂ atmosphere.

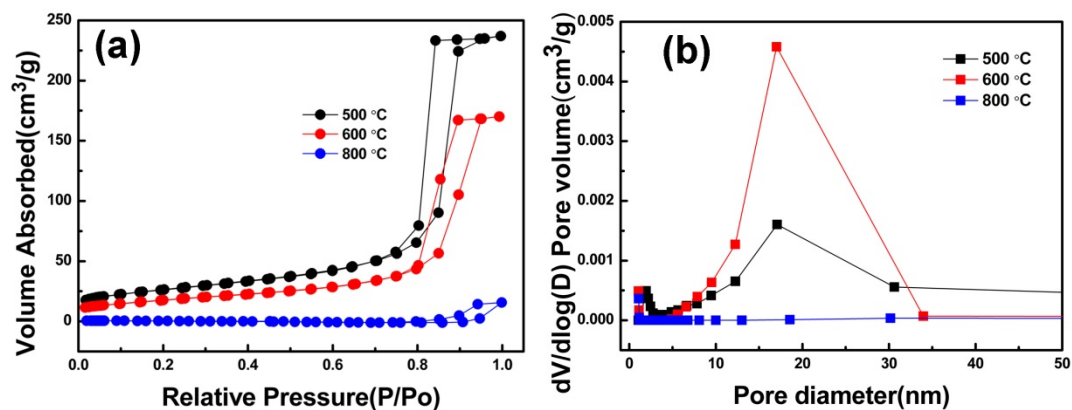


Fig. S3 Nitrogen adsorption-desorption isotherms (a) and pore size distributions curves (b) of pure TiO₂.

Sample	Calcination Temperature (°C)	O 1s		Ti 2p	
		Ti-O	OH	Ti 2p _{1/2}	Ti 2p _{3/2}
TiO ₂	500	530.54	532.18	464.98	459.26
TiO ₂	600	530.38		464.92	459.12
TiO ₂	800	530.23		464.38	458.75
TiO ₂ /C	500	530.45		464.78	459.15
TiO ₂ /C	600	530.40		464.65	459.12
TiO ₂ /C	800	530.16		464.38	458.68

Table S1 XPS core level binding energies of various elements (Ti, O, and C) of pure TiO₂ and TiO₂/C composite calcined at different temperatures.

Sample	Calcination		S _{BET} (m ² /g)	V _p (cm ³ /g)
	Temperature (°C)	Time (h)		
TiO ₂	500	4	90	0.26
TiO ₂	600	4	64	0.208
TiO ₂	800	4	2.56	0.024

Table S2 Pore characteristics of pure TiO₂ calcined at different temperature.

Sample	Voltage plateau (V)		Sample	Voltage plateau (V)	
	Charge	Discharge		Charge	Discharge
TiO ₂ , 500 °C	1.92	1.71	TiO ₂ /C, 500 °C	1.95	1.75
TiO ₂ , 600 °C	2.00	1.70	TiO ₂ /C, 600 °C	1.94	1.73
TiO ₂ , 800 °C	2.02	1.66	TiO ₂ /C, 800 °C	2.01	1.66

Table S3 Voltage plateau for the charge-discharge cycles of pure TiO₂ and TiO₂/C composite.

Rate	Voltage plateau (V)		Rate	Voltage plateau (V)	
	Charge	Discharge		Charge	Discharge
0.5 C	2.0	1.65	5 C	1.89	1.61
1 C	1.92	1.71	10 C	1.91	1.59
3 C	1.90	1.64	20 C	1.93	---

Table S4 Voltage plateau at different rates of TiO₂/C composite (500 °C).