Bio-derived yellow porous TiO_2: Lithiation induced activation of oxygen-vacancy dominated TiO_2 lattice evoking a large boost in lithium storage performance

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Supporting information

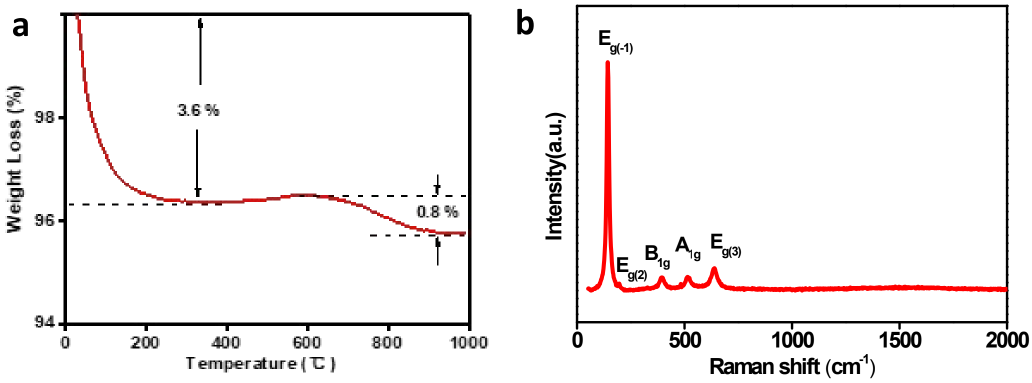

Figure S1. (a) TG curve and (b) RM spectrum of HPYT

As known from TG result (figure S1a), the amount of carbon can be negligible due to only 0.8 % amount was detected (Figure 2i, the 3.6 % weight loss should be assigned to the water loss in the samples), and no carbon peaks were identified in RM sperctrums (Figure S1b), both of which indicated that APTN was mainly constructed by TiO_2.

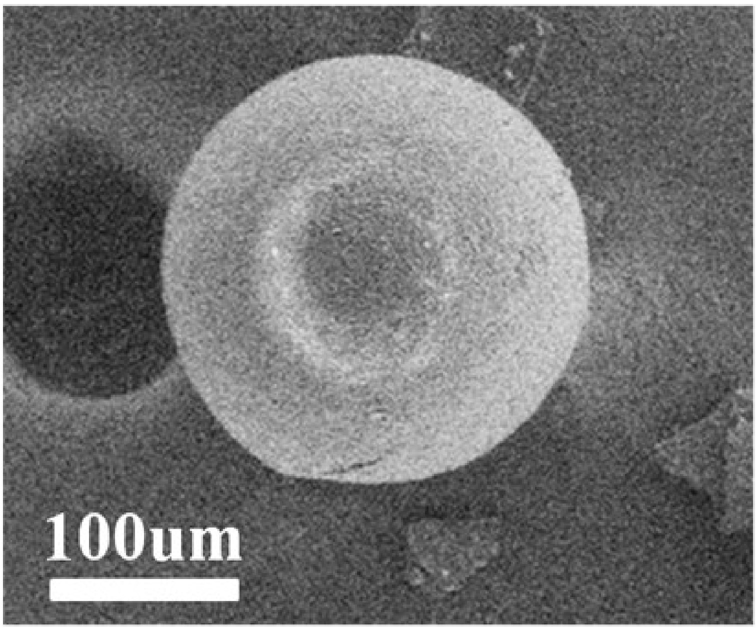

Figure S2. SEM image of the AES.

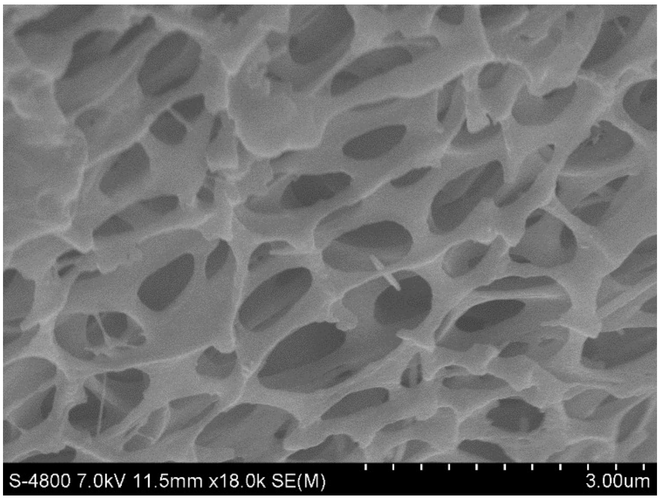

Figure S3. SEM image of the shell structure of AES.

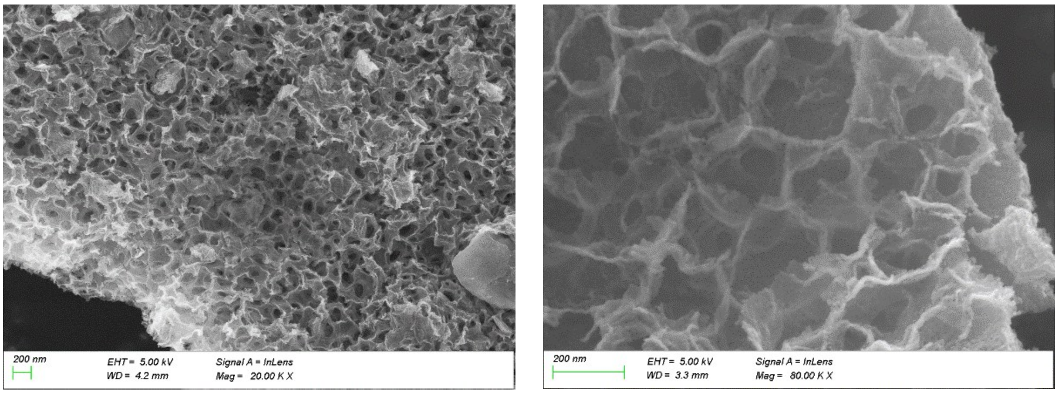

Figure S4. SEM images of the HPYT samples.

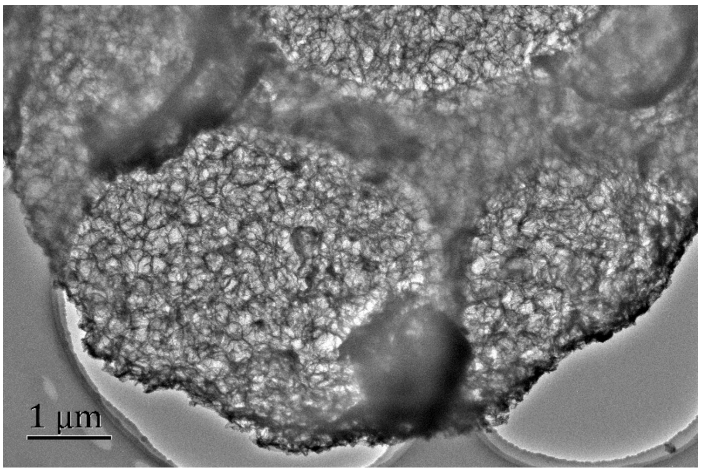

Figure S5. Low-magnification TEM of the HPYT sample.

Table S1. The performance comparison of HPYT and previously reported samples

Materials	High rate capacity	Cycling performance (≤5A g^{-1})	Cycling performance (≤10A g^{-1})	Ref
AmorphousTiO_2-100 @CNTs/CFP	271.2mAh g^{-1} at 0.1A g^{-1}, 132.6mAh g^{-1} at 40A g^{-1}	201.3mAh g^{-1} at 5A g^{-1} after 650 cycles		1
anatase/TiO_2-B nanosheets	280mAh g^{-1} at 85mA g^{-1}, 100mAh g^{-1} at 8.5A g^{-1}	180mAh g^{-1} at 3.4A g^{-1} after 1000 cycles	110mAh g^{-1} at 8.5A g^{-1} after 1000 cycles	2
HM-TiO_2 -NB	292mAh g^{-1} at 67mA g^{-1}, 112mAh g^{-1} at 3.4A g^{-1}	174mAh g^{-1} at 0.3A g^{-1} after 500 cycles	96mAh g^{-1} at 10A g^{-1} after 50 cycles	3
Olive-like anatase TiO_2/C	267mAh g^{-1} at 33.6mA g^{-1}, 110mAh g^{-1} at 6.7A g^{-1}	125mAh g^{-1} at 3.4A g^{-1} after 1000 cycles		4
TiO_2-graphene nanocomposite	268mAh g^{-1} at 37.2mA g^{-1}, 111mAh g^{-1} at 3.4A g^{-1}	126mAh g^{-1} at 3.4A g^{-1} after 18000 cycles		5
TiO_2@NFG HPHNSs	205mAh g^{-1} at 84mA g^{-1}, 101mAh g^{-1} at 20 A g^{-1}	129mAh g^{-1} at 3.4 A g^{-1} after 20000 cycles	116mAh g^{-1} at 6.7A g^{-1} after 10000 cycles	6
R-TiO_{2-x}-S	264.8mAh g^{-1} at 50mA g^{-1}, 128.5mAh g^{-1} at 10A g^{-1}	128.5mAh g^{-1} at 10000mA g^{-1} after 6500 cycles		7
M-TiO_2-GS	205mAh g^{-1} at 168 mA g^{-1}, 76mAh g^{-1} at 6.7A g^{-1}	94mAh g^{-1} at 1.7A g^{-1} after 3500 cycles		8
2D mesoporous TiO_2 nanosheets	220mAh g^{-1} at 0.1A g^{-1}, 67mAh g^{-1} at 10A g^{-1}		44mAh g^{-1} at 10A g^{-1} after 10000 cycles	9
C−TiO_2	215.8mAh g^{-1} at 0.1A g^{-1}, 70mAh g^{-1} at 10A g^{-1}	140mAh g^{-1} at 1A g^{-1} after 1000 cycles		10
NTiO_2@NC	515.3mAh g^{-1} at 0.2A g^{-1}, 300mAh g^{-1} at 2A g^{-1}	232.7mAh g^{-1} at 5A g^{-1} after 2000 cycles		11
blue TiO_2(B) nanobelts	204.6mAh g^{-1} at 84mA g^{-1}, 106.8mAh g^{-1} at 0.4A g^{-1}	80.9mAh g^{-1} at 3.4A g^{-1} after 5000 cycles		12
G/P-RTiO_2	202.4mAh g^{-1} at 84mA g^{-1}, 101.5mAh g^{-1} at 2.5A g^{-1}	74.6mAh g^{-1} at 3.4A g^{-1} after 4000 cycles		13
Hierarchical tubular TiO_2(B)	216mAh g^{-1} at 3.4A g^{-1}, 130mAh g^{-1} at 6.7A	160mAh g^{-1} at 1.7A g^{-1} after 400 cycles		14

structures	g^{-1}			
NCF@CNTs-TiO_2	252mAh g^{-1} at 33.5mA g^{-1}, 145mAh g^{-1} at 6.7A g^{-1}	154mAh g^{-1} at 3.4A g^{-1} after 2500 cycles		15
TiO_2/TiC@C	252mAh g^{-1} at 0.33A g^{-1}, 57mAh g^{-1} at 10A g^{-1}	150mAh g^{-1} at 1.5A g^{-1} after 5000 cycles		16
HPYT	**417mAh g^{-1} at 0.1A g^{-1}, 130mAh g^{-1} at 10A g^{-1}**	**480mAh g^{-1} at 5A g^{-1} after 2000 cycles**	**206mAh g^{-1} at 10A g^{-1} after 8000 cycles**	**This work**

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