

N-modified Carbon-coated $\text{NaTi}_2(\text{PO}_4)_3$ as an Anode with High Capacity and Long Lifetime for Sodium-ion Batteries

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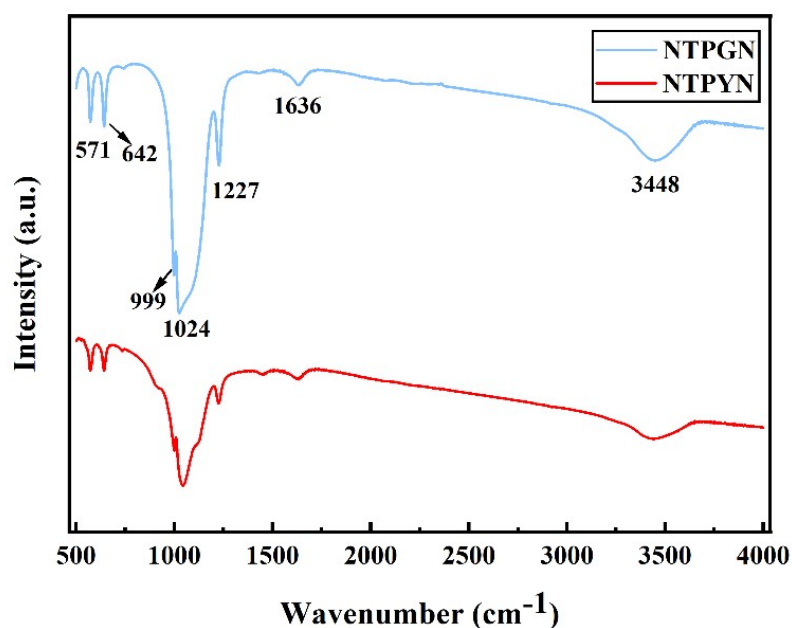


Fig. S1. FT-IR spectrum of NTPYN and NTPGN

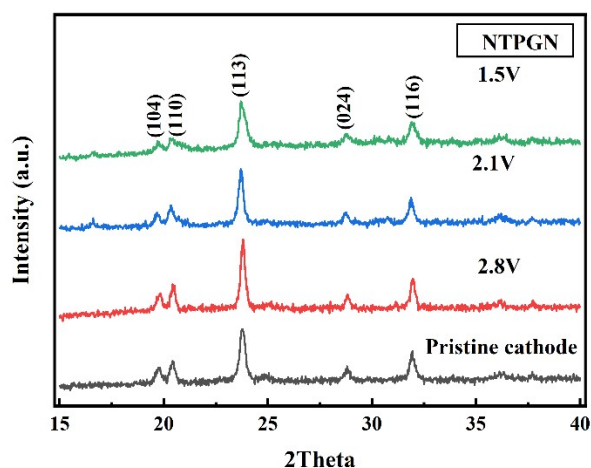


Fig.S2. ex-situ XRD patterns of the NTPGN half cells pristine cathode, during discharge and charge at 1C and a voltage range of 1.5-2.8 V after 3 cycles

Tab.S1. EIS fitting data of composites

	$R_s(\Omega)$	$R_{ct}(\Omega)$	Warburg($\Omega \text{ cm}^{-2}$)
NTPGN	6.175	16.80	0.1081
NTPYN	6.203	17.18	0.1329

Tab.S2. Electrochemical properties of current representative $\text{NaTi}_2(\text{PO}_4)_3$ materials for Na-ion battery

materials	Capacity(mA h g ⁻¹)	Cyclic stability
$\text{NaTi}_2(\text{PO}_4)_3$ / carbon nanofiber ¹	5C 104.7 10C 93.4	0.5C 20 cycles 99.6% 10C 20 cycles 92.6%
$\text{NaTi}_2(\text{PO}_4)_3$ /N-doped graphene ²	0.1 C 129.3	20C 200 cycles 88.6%
$\text{NaTi}_2(\text{PO}_4)_3/\text{C}^3$	100C 108 50C 83	50C 6000 cycles 83%
MWNTs@ $\text{NaTi}_2(\text{PO}_4)_3$ ⁴	0.2C 97.4	0.5C. 1000 cycles 76%
hollow $\text{NaTi}_2(\text{PO}_4)_3$ @rGO ⁵	1C 124 3C 118	3C 500 cycles 99.8%
$\text{NaTi}_2(\text{PO}_4)_3$ @CNT ⁶	0.1C 127	10 C 20 cycles 99.3 %
MWCNT/ $\text{NaTi}_2(\text{PO}_4)_3$ nanocrystals ⁷	2C 101.7 50C 74.3	1C 200 cycles 88%
$\text{NaTi}_2(\text{PO}_4)_3$ @C nanocomposite ⁸	0.1C 212 0.2C 187	20C 10000 cycles 68%
$\text{NaTi}_2(\text{PO}_4)_3$ Cubes/ Ti3C2 MXene ⁹	0.1A g ⁻¹ 208	1A g ⁻¹ 2,000 cycles 74%
$\text{NaTi}_2(\text{PO}_4)_3$ 3D graphene network ¹⁰	1C 112 5C 105	10C 1000 cycles 80%
$\text{NaTi}_2(\text{PO}_4)_3$ -graphene nanocomposites ¹¹	2C 110 5C 85	2C 100 cycles 95.7%

NaTi ₂ (PO ₄) ₃ Microspheres/3D Graphene ¹²	0.1C 130	20 C 1000 cycles 77%
NaTi ₂ (PO ₄) ₃ /CMK-3 ¹³	0.2C 101	0.5C 1000 cycles 82.7%
NaTi ₂ (PO ₄) ₃ /C ¹⁴	0.1C 125 1C 110	10C 120 cycles 82.4%
mesoporous NaTi ₂ (PO ₄) ₃ nanocrystals ¹⁵	1C 125 30C 73	10C 5000 cycles 82%
This work	1C 132.5 30C 98.2	20C 1,000 cycles 96%

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