Electronic Supplementary information

Improved sodium-ion storage performance in TiO_2 nanotubes by Ni^{2+} doping

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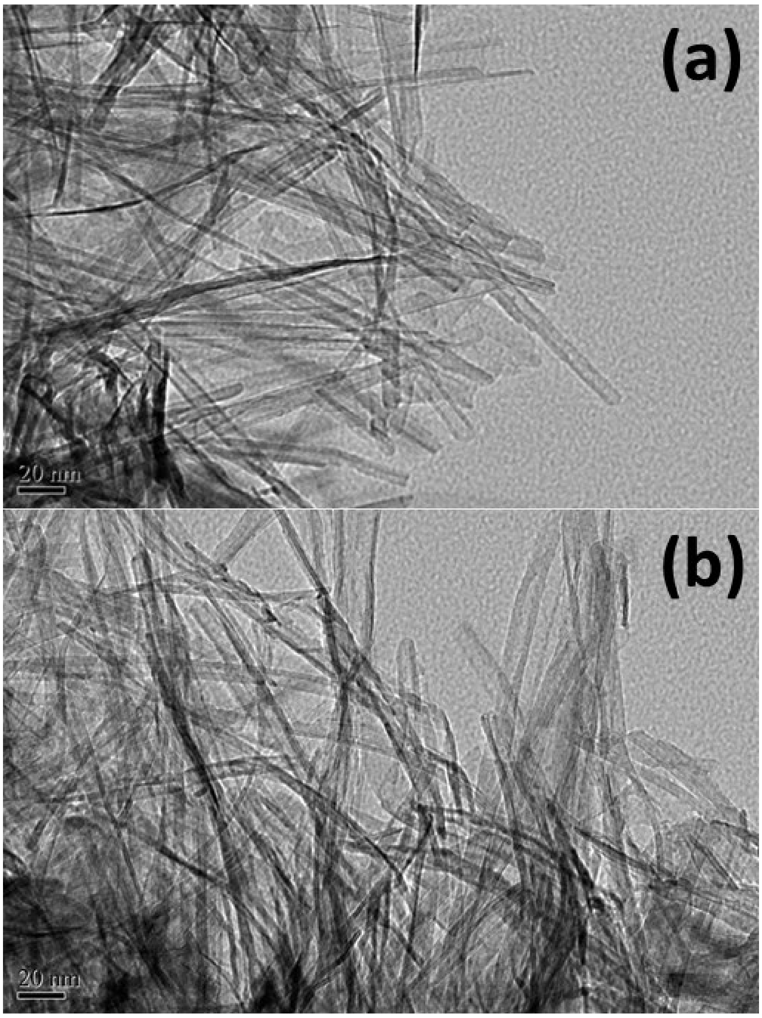

Fig. S1 TEM images of (a) TNTs and (b) NTNTs-2.

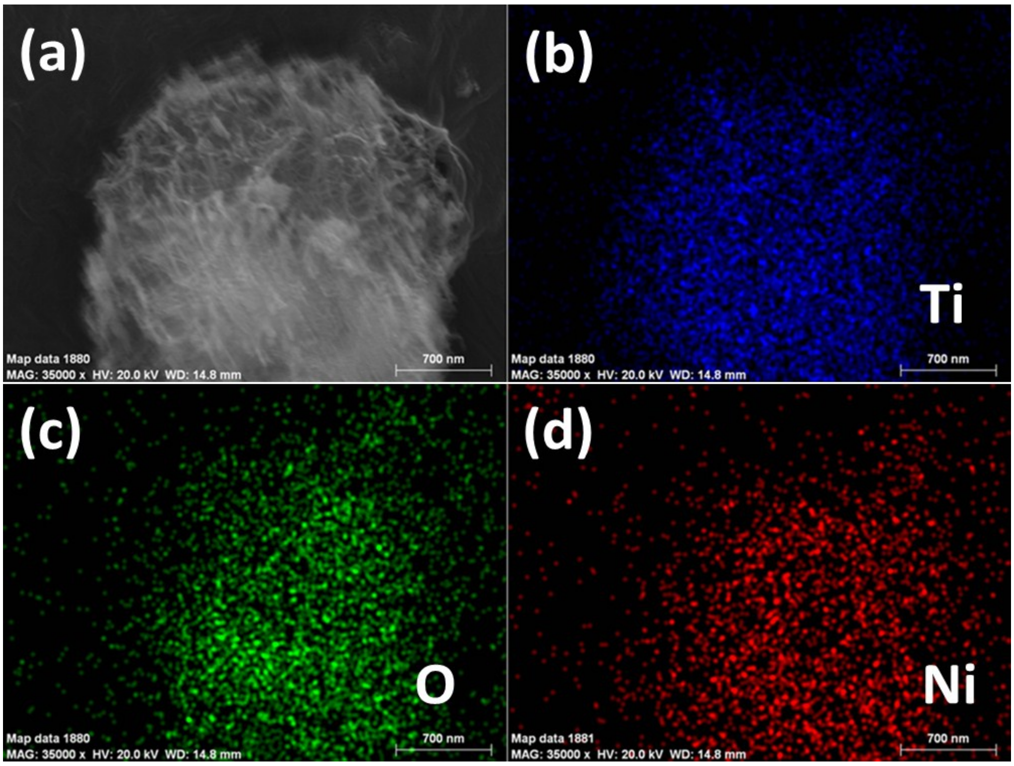

Fig. S2 SEM image of NTNTs-2 (a) and corresponding EDS mapping images of Ti (b), O (c) and Ni (d).

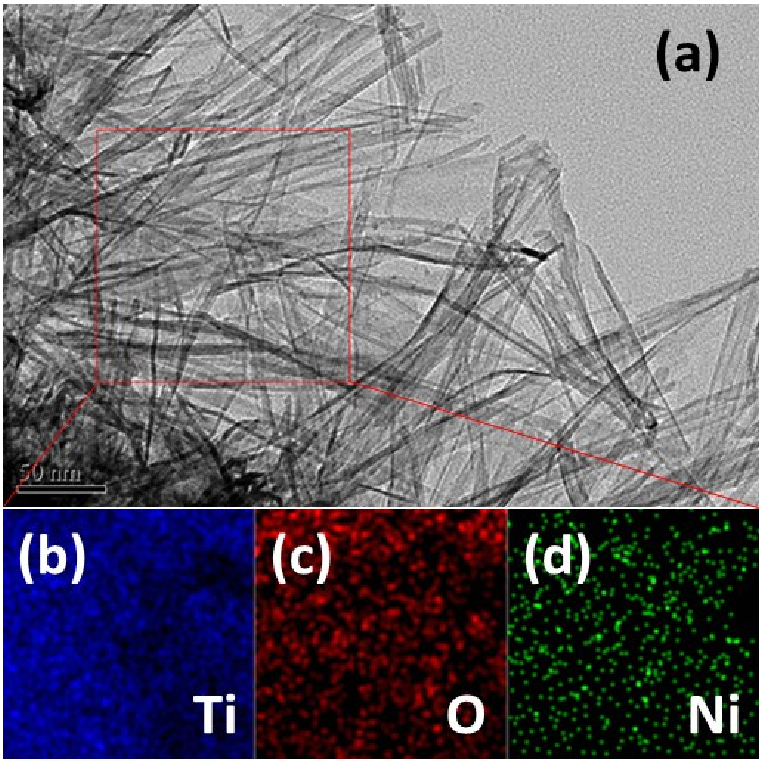

Fig. S3 TEM image of NTNTs-2 (a) and corresponding EDS mapping images of Ti (b), O (c) and Ni (d) in the area marked in (a).

Table S1 Comparison of the performance of NTNTs-2 with reported TiO_2 for SIBs, tested in half cell.

Sample	Potential range (V vs. Na/Na^+)	Charge capacity at low current density	Rate performance (charge capacity)	Long-term cycling Stability (charge capacity)
NTNTs-2 (This work)	0.005-3V	286 mAh g^{-1} at 50 mA g^{-1} after 100 cycles	286 mAh g^{-1} at 50 mA g^{-1} 247 mAh g^{-1} at 250mA g^{-1} 214 mAh g^{-1} at 1A g^{-1} 165 mAh g^{-1} at 2 A g^{-1} 122 mAh g^{-1} at 5 A g^{-1}	123 mA h g^{-1} after 2000 cycles at 5 A g^{-1}
N-doped graphene /TiO_2 [1]	0.005-3V	250 mAh g^{-1} at 100 mA g^{-1} after 100 cycles	400 mAh g^{-1} at 50 mA g^{-1} 280 mAh g^{-1} at 100 mA g^{-1} 230 mAh g^{-1} at 300 mA g^{-1} 200 mAh g^{-1} at 600 mA g^{-1} 175 mAh g^{-1} at 1 A g^{-1}	/
Anatase TiO_2 nanoparticles [2]	0.005-3V	150 mAh g^{-1} at 0.11C after 60 cycles (1C=369mA g^{-1})	150 mAh g^{-1} at 0.11 C 140 mAh g^{-1} at 0.22 C 130 mAh g^{-1} at 0.55 C 120 mAh g^{-1} at 1.1 C 100 mAh g^{-1} at 5.5 C 86 mAh g^{-1} at 11 C	100 mA h g^{-1} after 1000 cycles at 1.845 A g^{-1} (5.5C)
Anatase TiO_2 nanorodes [3]	0.005-3V	180 mAh g^{-1} at 10 mA g^{-1} after 200 cycles (1C=330mA g^{-1})	150 mAh g^{-1} at 1 C 130 mAh g^{-1} at 3 C 120 mAh g^{-1} at 5 C 90 mAh g^{-1} at 20 C 75 mAh g^{-1} at 50 C 60 mAh g^{-1} at 70 C 50 mAh g^{-1} at 100 C	/
Amorphous TiO_2 nanotube [4]	0.9-2.5V	140 mAh g^{-1} at 50 mA g^{-1} after 15 cycles	/	/
Anatase TiO_2 nanocubes [5]	0-2V	175 mAh g^{-1} at 0.2 C after 40 cycles (1C=168mA g^{-1})	174 mAh g^{-1} at 1 C 158 mAh g^{-1} at 2C 132 mAh g^{-1} at 5 C 108 mAh g^{-1} at 10 C 84 mAh g^{-1} at 20 C 68 mAh g^{-1} at 30 C 52 mAh g^{-1} at 50 C	160 mAh g^{-1} after 1000 cycles at 2C
Nb-doped anatase TiO_2 [6]	0-2.5V	177mAh g^{-1} at 0.1C after 100 cycles	175 mAh g^{-1} at 0.1 C 165 mAh g^{-1} at 0.2 C 155 mAh g^{-1} at 0.5 C	/

		(1C=330mA g^{-1})	145 mAh g^{-1} at 1 C 125 mAh g^{-1} at 2 C 100 mAh g^{-1} at 5 C	
Anatase TiO_2 hollow nanospheres [7]	0.005-3V	194 mAh g^{-1} at 40 mA g^{-1} after 500 cycles	250 mAh g^{-1} at 20 mA g^{-1} 225 mAh g^{-1} at 40 mA g^{-1} 210 mAh g^{-1} at 160 mA g^{-1} 175 mAh g^{-1} at 320 mA g^{-1} 125 mAh g^{-1} at 640 mA g^{-1}	/
Graphene/TiO_2 nanofibers [8]	0-2.5V	160 mAh g^{-1} at 1 C after 200 cycles (1C=335mA g^{-1})	210 mAh g^{-1} at 0.2 C 175 mAh g^{-1} at 0.5 C 165 mAh g^{-1} at 1 C 155 mAh g^{-1} at 2 C 125 mAh g^{-1} at 5 C 95 mAh g^{-1} at 10 C	/
TiO_2/graphene nanocomposites [9]	0.05-3V	265 mAh g^{-1} at 50 mA g^{-1} after 80 cycles	265 mAh g^{-1} at 50 mA g^{-1} 187 mAh g^{-1} at 200 mA g^{-1} 149 mAh g^{-1} at 500 mA g^{-1} 125 mAh g^{-1} at 1.5A g^{-1} 114 mAh g^{-1} at 3 A g^{-1} 102 mAh g^{-1} at 6 A g^{-1}	90 mAh g^{-1} after 4000 cycles at 500 mA g^{-1}
Carbon-coated anatase TiO_2 [10]	0-2V	227 mAh g^{-1} at 0.1 C after 300 cycles (1C=335 mA g^{-1})	227 mAh g^{-1} at 0.1 C 215 mAh g^{-1} at 0.2 C 205 mAh g^{-1} at 0.5 C 195 mAh g^{-1} at 1 C 175 mAh g^{-1} at 2 C 155 mAh g^{-1} at 5 C 135 mAh g^{-1} at 10 C	175 mAh g^{-1} after 500 cycles at 5 C

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