Supporting Information

One-step hydrothermal synthesis of Nb doped brookite TiO_2 nanosheets with enhanced lithium-ion intercalation properties †

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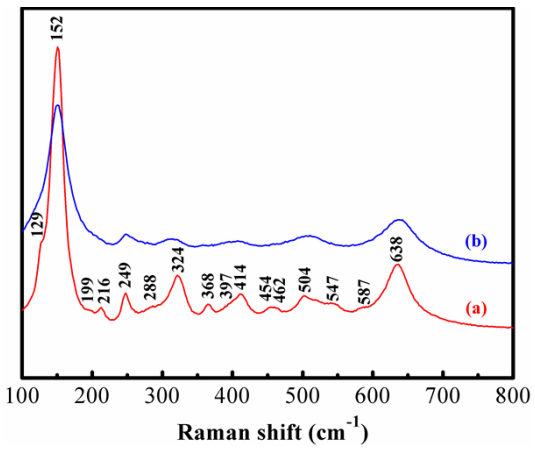

Fig. S1 Raman spectra of (a) TO and (b) NTO.

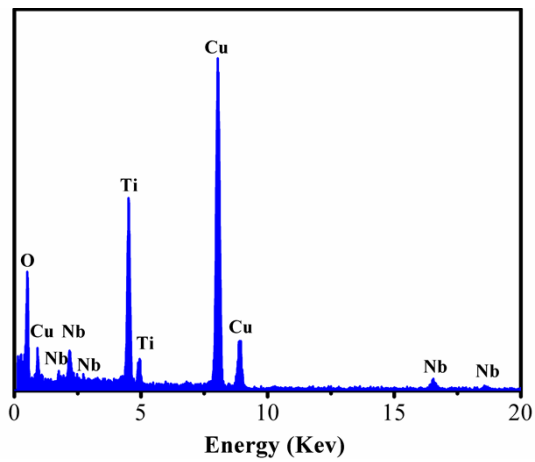

Fig. S2 EDX spectra of NTO.

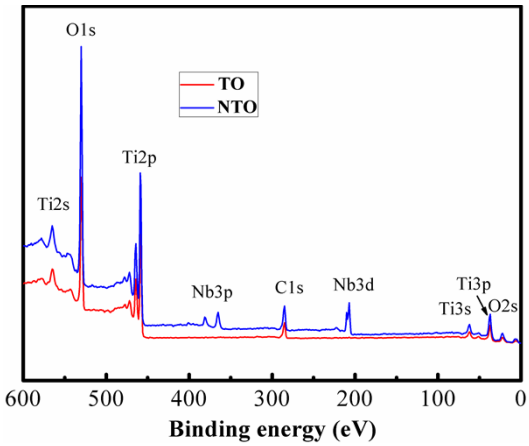

Fig. S3 XPS survey spectra of TO and NTO.

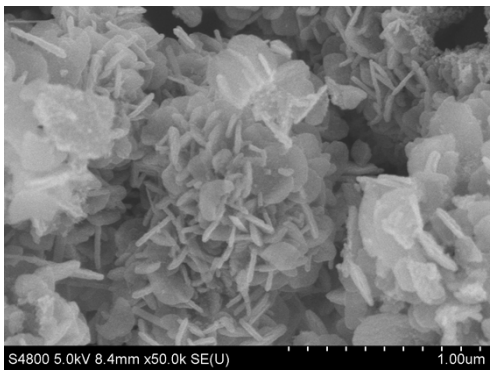

Fig. S4 SEM image of NTO-24.

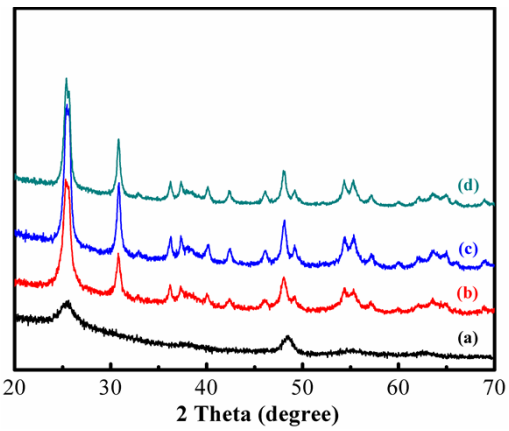

Fig. S5 XRD patterns of (a) TO-3, (b) TO-6, (c) TO and (d) TO-24.

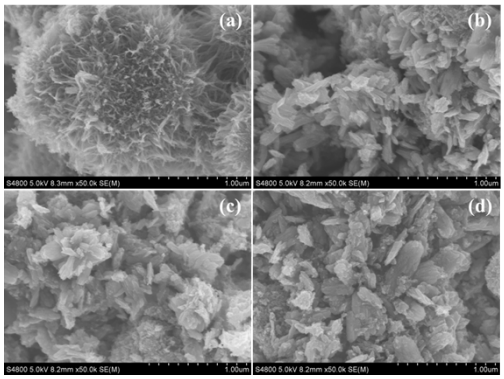

Fig. S6 SEM images of (a) TO-3, (b) TO-6, (c) TO and (d) TO-24.

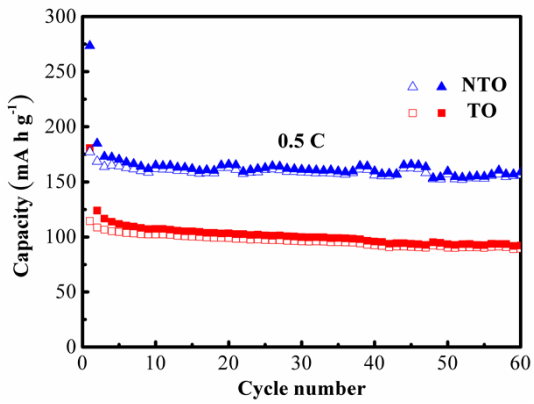

Fig. S7 Cycling performance of TO and NTO at 0.5 C.

Table S1 Impedance parameters calculated form equivalent circuit model

sample	Rs/ Ω	Rct/ Ω
TO	9.5	161.9
NTO	9.6	52.4

Samples with different Nb contents (0, 0.05, 0.1, 0.15 g of niobium oxalate hydrate, respectively) were prepared as shown in Experimental, and the samples were denoted as TO, NTO-0.05, NTO-0.1 and NTO-0.15, respectively. The corresponding results and discussion are list as follows.

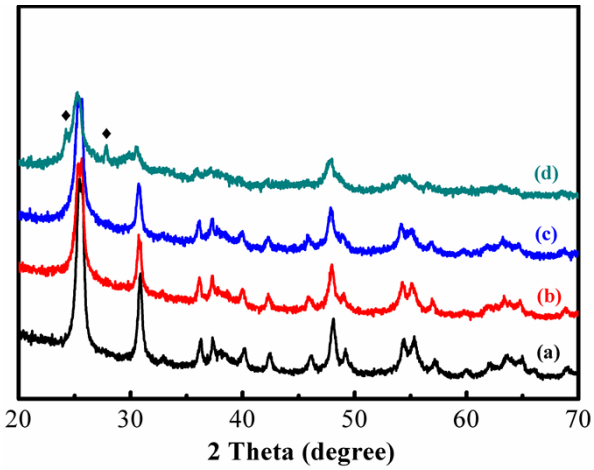

Fig. S8 XRD patterns of (a) TO, (b) NTO-0.05, (c) NTO-0.1 and (d) NTO-0.15.

As shown in Fig. S8, all the diffraction peaks of TO, NTO-0.05 and NTO-0.1 can be indexed to a pure brookite TiO_2 (JCPDS 29-1360). In addition, it can be clearly found that the diffraction peaks intensity decreased and the diffraction peaks of samples shifted to lower 2θ values with increasing Nb content. However, XRD pattern of NTO-0.15 shows some additional diffraction peaks (shown by quadrangle), which can be indexed to niobium compounds. Furubayashi et al [1] reported that it is difficult to achieve doping content of Nb above 20% in anatase TiO_2.

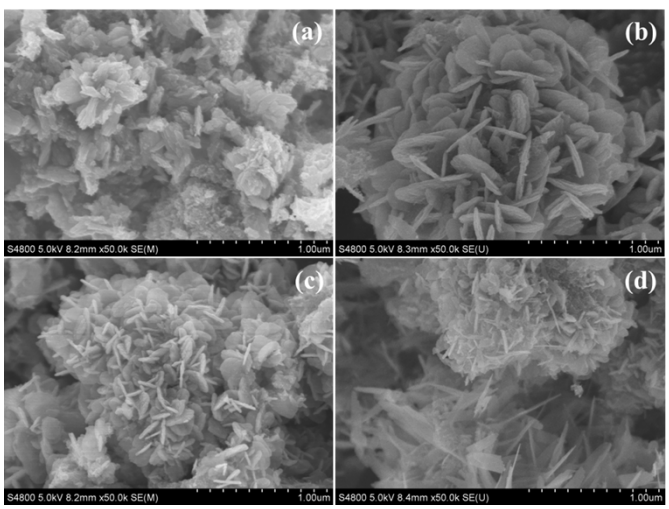

Fig. S9 SEM images of (a) TO, (b) NTO-0.05, (c) NTO-0.1 and (d) NTO-0.15.

Fig. S9 shows SEM images of TO, NTO-0.05, NTO-0.1 and NTO-0.15. Undoped TO exhibited nanorod-like morphology. Both NTO-0.05 and NTO-0.1 exhibited nanosheet-like morphology. However, it can be found that some nanobelts in impure NTO-0.15 (shown in Fig. S9d), which might be attributed to niobium compounds.

According to above results, we believe that Nb doped brookite TiO_2 with different Nb contents can be prepared in the present work. With further increasing Nb source, impure phase in Nb doped brookite TiO_2 was found.

[1] Y. Furubayashi, T. Hitosugi, Y. Yamamoto, K. Inaba, G. Kinoda, Y. Hirose, T. Shimada and T. Hasegawa, Appl. Phys. Lett., 2005, 86, 252120.