

Supplementary Information

Nb doped TiO₂ nanoparticles derived from titanate with improved lithium storage performance

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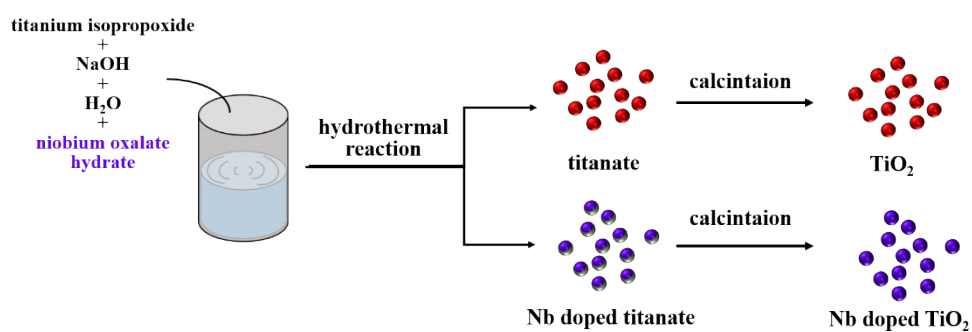


Fig. S1 Schematic illustration of the formation of TiO₂ and Nb doped TiO₂.

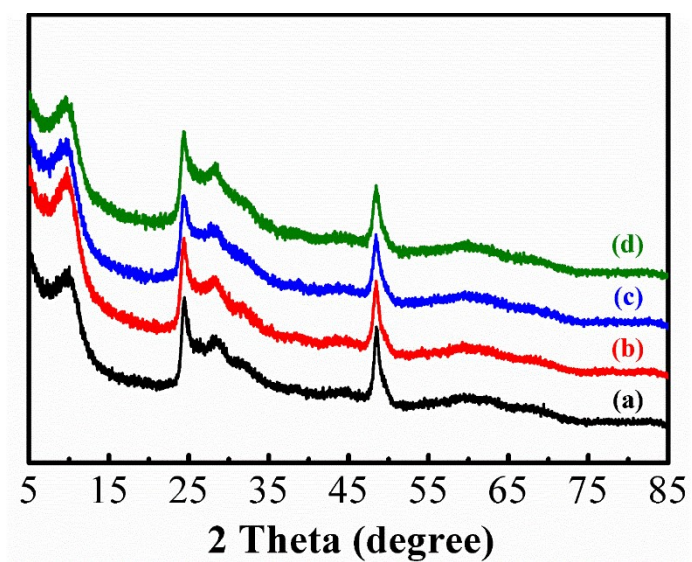


Fig.S2 XRD patterns of (a) titanate, (b) Nb-titanate-0.1, (c) Nb-titanate-0.2 and (d) Nb-titanate-0.4.

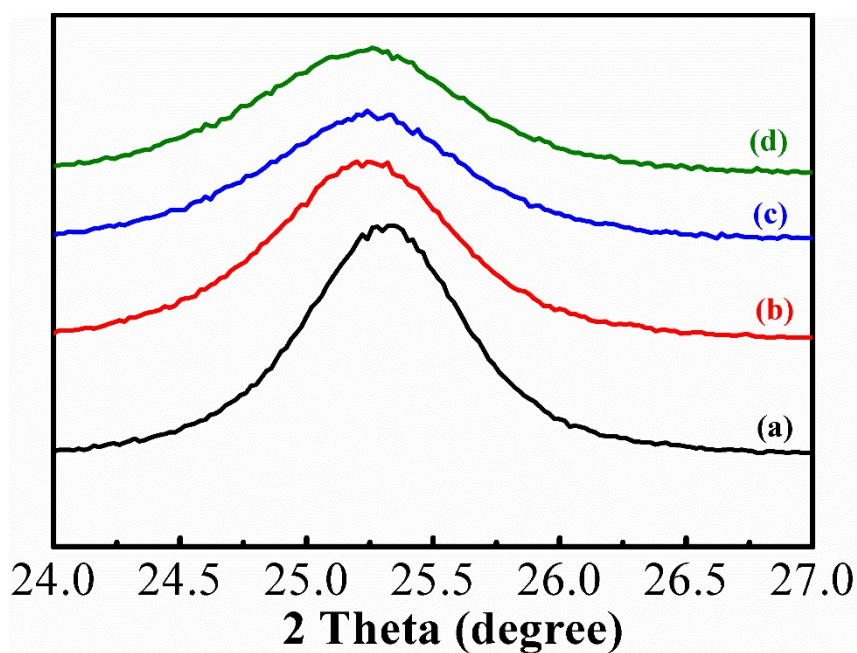


Fig.S3 Magnified XRD patterns of (a) TiO_2 , (b) $\text{Nb-TiO}_2\text{-0.1}$, (c) $\text{Nb-TiO}_2\text{-0.2}$ and (d) $\text{Nb-TiO}_2\text{-0.4}$ between 24° and 27° .

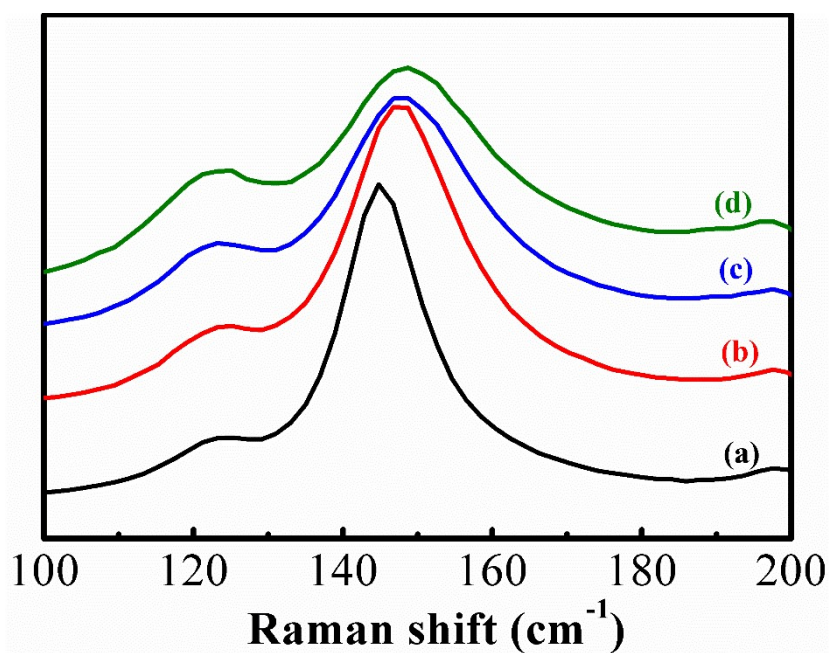


Fig.S4 Magnified Raman spectra of (a) TiO_2 , (b) $\text{Nb-TiO}_2\text{-0.1}$, (c) $\text{Nb-TiO}_2\text{-0.2}$ and (d) $\text{Nb-TiO}_2\text{-0.4}$ between 100 and 200 cm^{-1} .

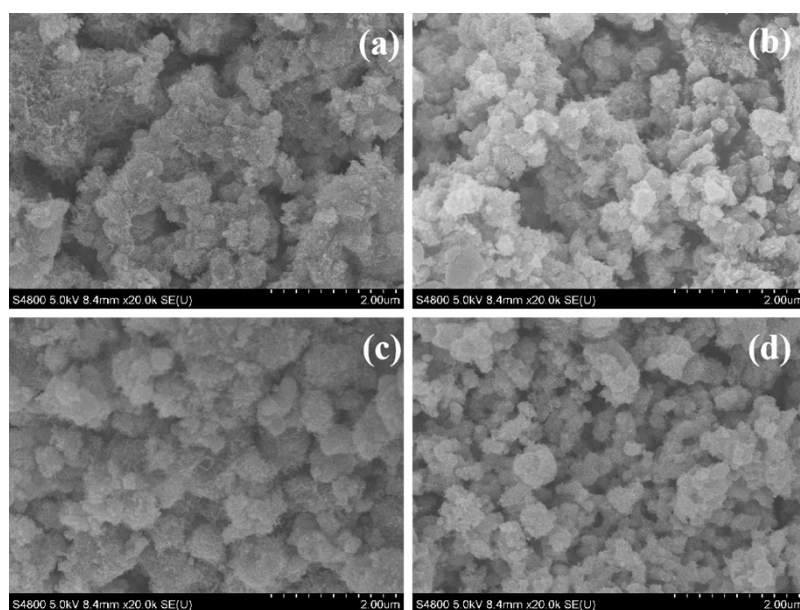


Fig.S5 SEM images of (a) TiO₂, (b) Nb-TiO₂-0.1, (c) Nb-TiO₂-0.2 and (d) Nb-TiO₂-0.4 .

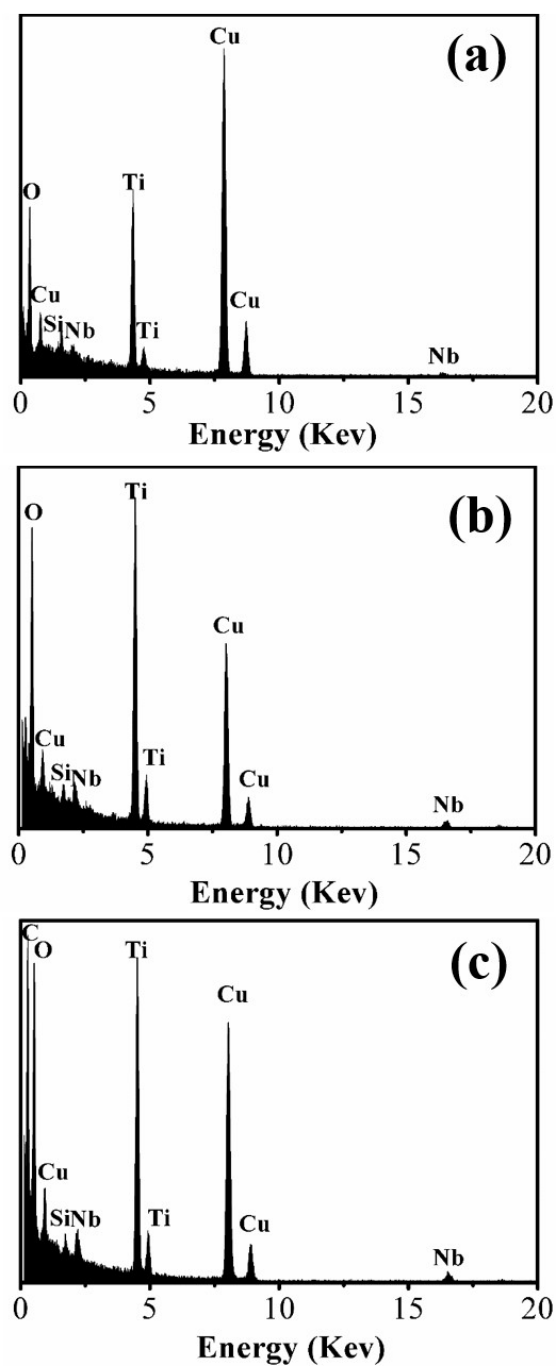
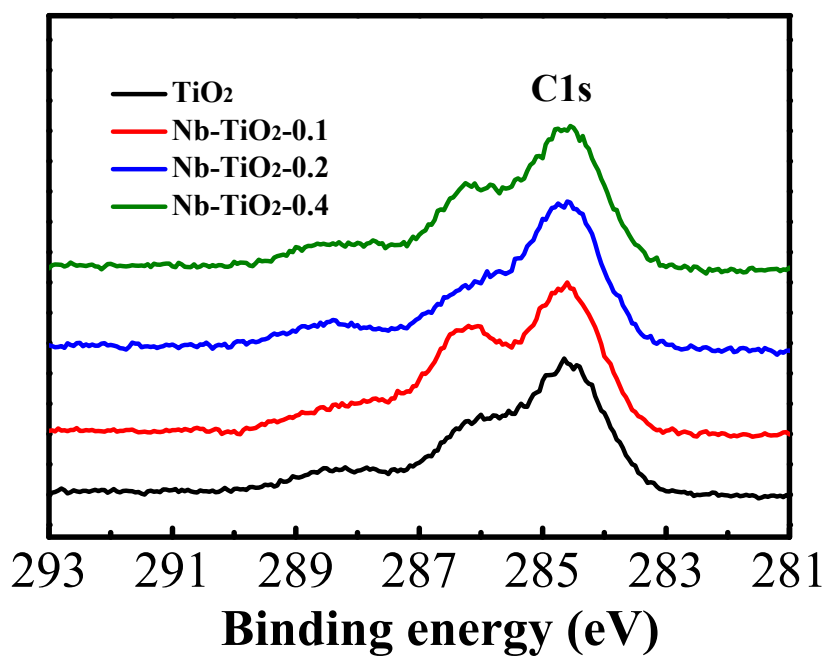


Fig.S6 EDX analysis of (a) Nb-TiO₂-0.1, (b) Nb-TiO₂-0.2 and (c) Nb-TiO₂-0.4.

Table S1 ICP-OES data of Nb-TiO₂-0.1, Nb-TiO₂-0.2 and Nb-TiO₂-0.4.

	Ti (mg L ⁻¹)	Nb (mg L ⁻¹)	The ratio of Nb to Ti (Atomic %)
Nb-TiO ₂ -0.1	7.200	0.343	2.37%
Nb-TiO ₂ -0.2	7.361	0.923	6.44%
Nb-TiO ₂ -0.4	7.548	1.433	9.76%

Fig.S7 High-resolution XPS spectra of C1s for TiO₂, Nb-TiO₂-0.1, Nb-TiO₂-0.2 and Nb-TiO₂-0.4.

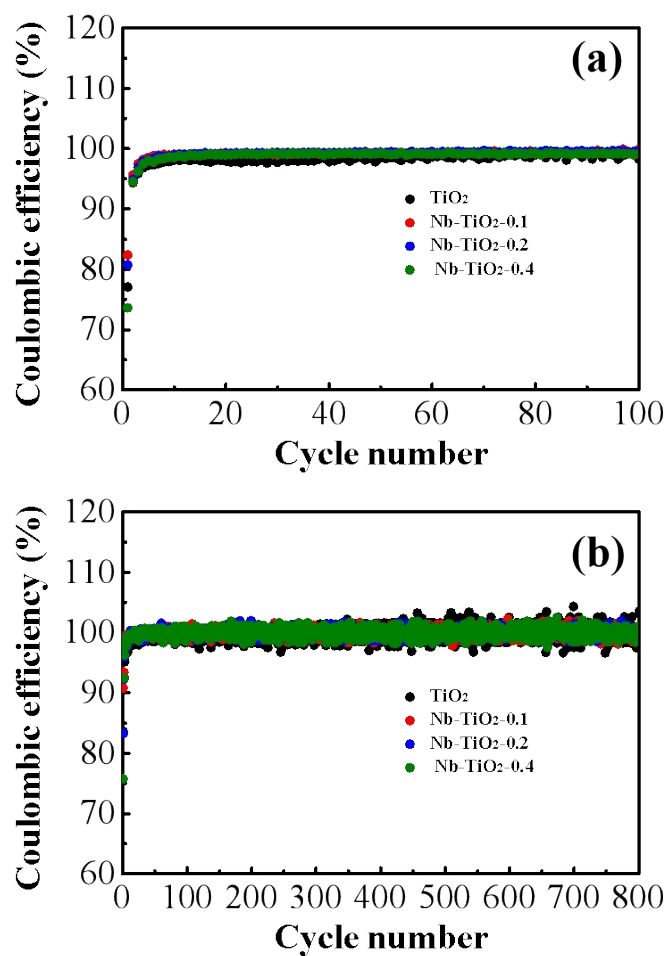


Fig.S8 Coulombic efficiency of TiO₂, Nb-TiO₂-0.1, Nb-TiO₂-0.2 and Nb-TiO₂-0.4 at (a) 1 C and (b) 10 C.

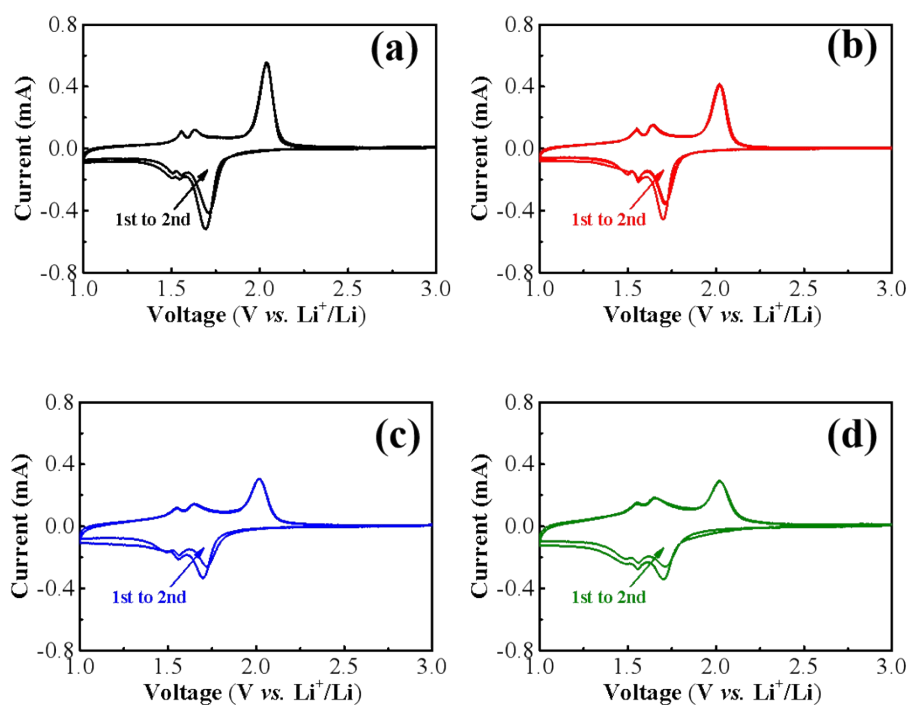


Fig.S9 CV curves of (a) TiO_2 , (b) $\text{Nb-TiO}_2\text{-0.1}$, (c) $\text{Nb-TiO}_2\text{-0.2}$ and (d) $\text{Nb-TiO}_2\text{-0.4}$.

Table S2 ΔE_p and Impedance parameters of TiO_2 , $\text{Nb-TiO}_2\text{-0.1}$, $\text{Nb-TiO}_2\text{-0.2}$ and $\text{Nb-TiO}_2\text{-0.4}$.

	ΔE_p (mV)	R_s (Ω)	R_f (Ω)	R_{ct} (Ω)
TiO_2	334.3	2.17	2.01	34.6
$\text{Nb-TiO}_2\text{-0.1}$	307.9	1.81	1.33	16.3
$\text{Nb-TiO}_2\text{-0.2}$	290.5	1.76	1.14	15.4
$\text{Nb-TiO}_2\text{-0.4}$	300.5	2.24	0.87	18.5