

Supporting Information

Design of niobium tungsten oxide/C micro-structured electrode for fast charging lithium-ion batteries

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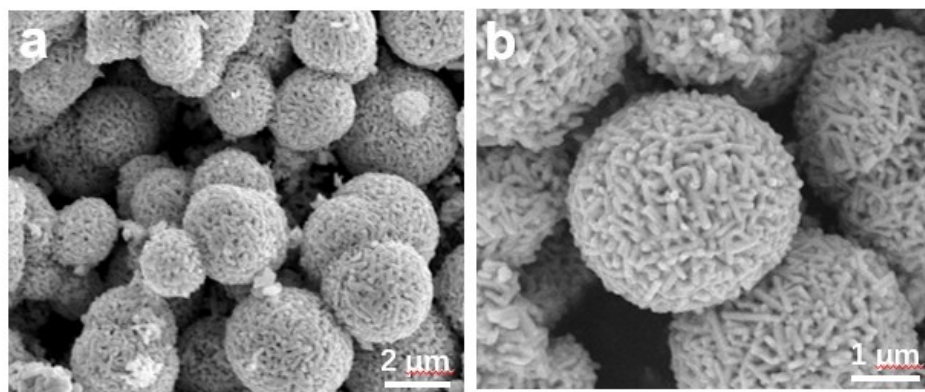


Figure S1. SEM images of NWO-C composite at different magnifications

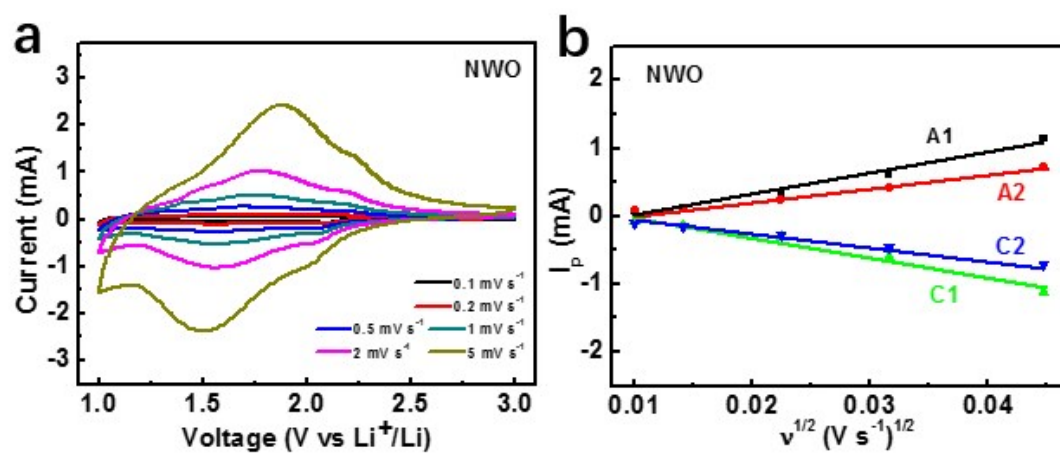


Figure S2. (a) CV tests of NWO electrode at different scan rates. (b) The derived linear relationship between peak current and square root of scan rate in lithiation and de-lithiation process of NWO electrode

Table S1. lithium ion diffusion coefficients of the NWO-C and NWO electrodes.

Sample	D_{Li} (cm ² s ⁻¹)			
	A1	A2	C1	C2
NWO-C	5.820×10^{-14}	4.926×10^{-14}	4.990×10^{-14}	4.079×10^{-14}
NWO	5.020×10^{-14}	2.933×10^{-14}	4.410×10^{-14}	2.649×10^{-14}

Table S2. A comparison between the lithium ion diffusion coefficient in $\text{Nb}_{18}\text{W}_{16}\text{O}_{93}$ and other reported anode materials.

Sample	D_{Li} ($\text{cm}^2 \text{s}^{-1}$)	Reference
NW- $\text{Nb}_{18}\text{W}_{16}\text{O}_{93}$	1.312×10^{-14}	[8]
$\text{Li}_4\text{Ti}_5\text{O}_{12}$	3.27×10^{-16}	[9]
$\text{Ti}_2\text{Nb}_{10}\text{O}_{29-x}$	6.56×10^{-17}	[20]
$\text{Ru}_{0.01}\text{Ti}_{0.99}\text{Nb}_2\text{O}_7$	1.72×10^{-15}	[21]
Nb_2O_5	$10^{-17} \sim 10^{-16}$	[22]
TiO_2	2.2×10^{-15}	[23]
$\text{Nb}_{18}\text{W}_{16}\text{O}_{93}$ -C microsphere	5.820×10^{-14}	This work

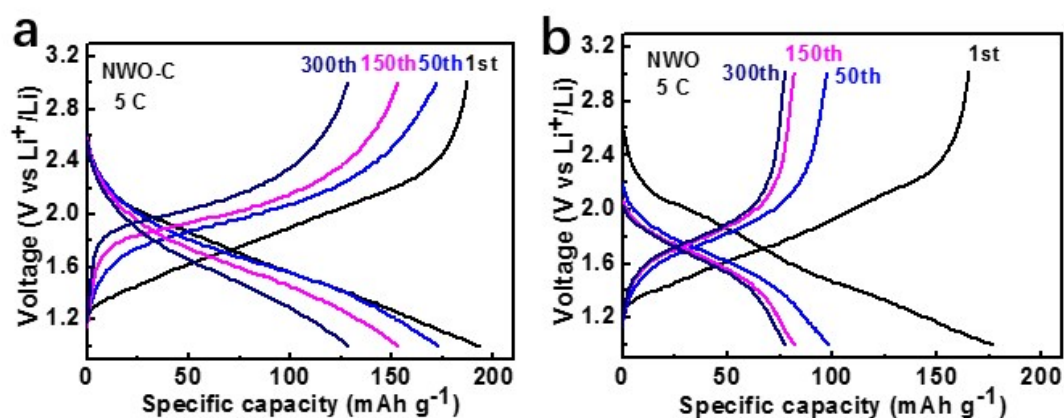


Figure S3. (a) The GDC curves of NWO-C and NWO electrode for different cycles at current density of 5C.