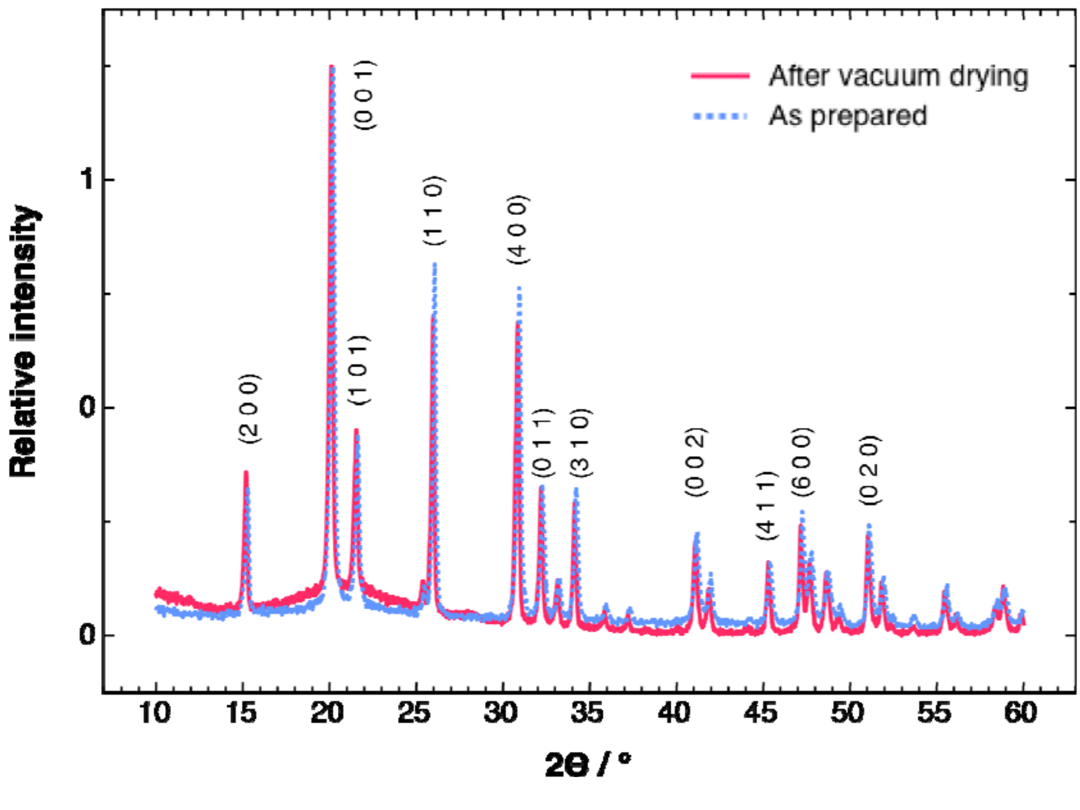
Supplementary information



a.

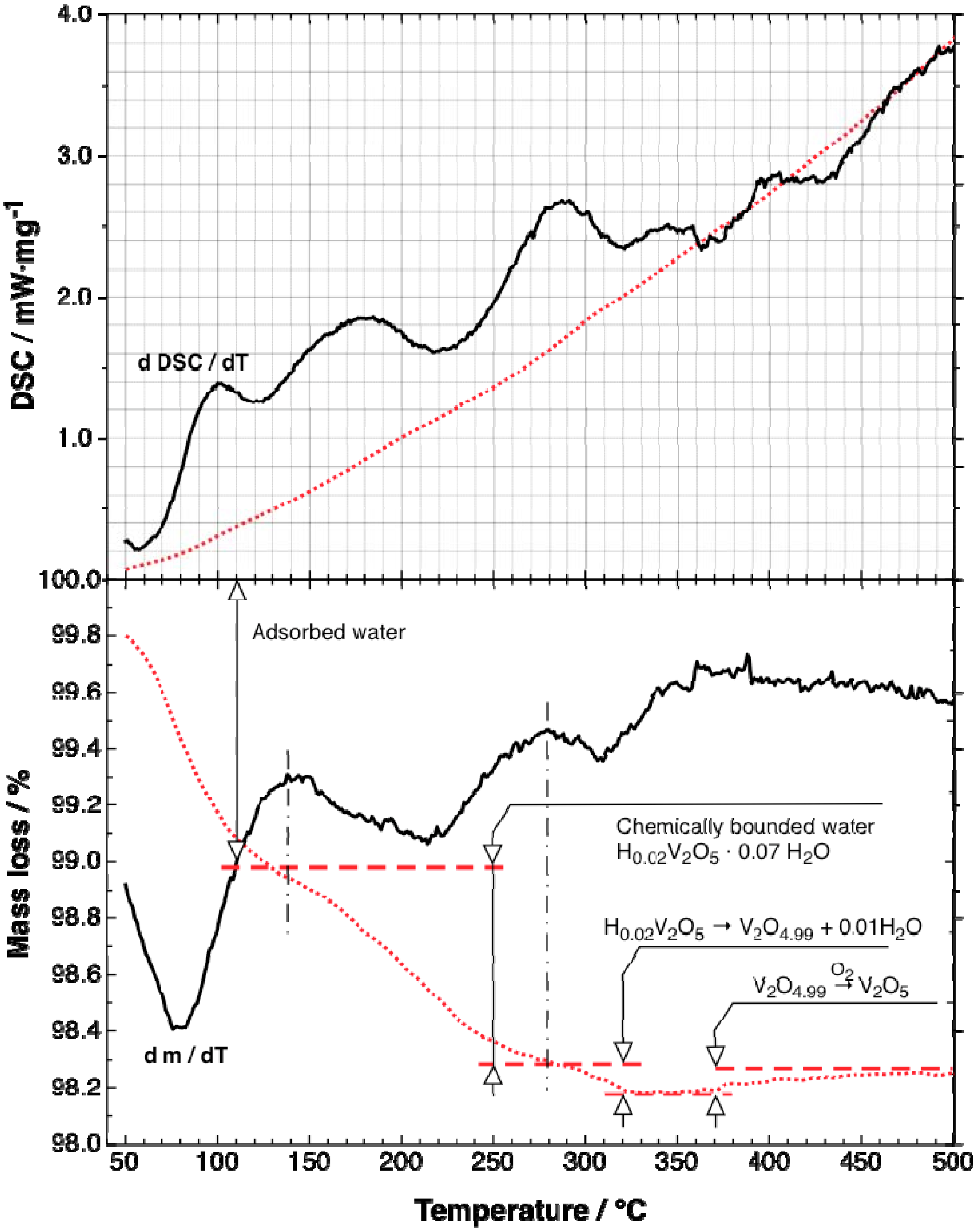


Fig. SI1. XRD and TGA analysis of nanobelts. (a) an XRD pattern of V_2O_5 nanobelts as-prepared and vacuum - heated (180°C, 10^{-5} atm), (b) an application of first derivatives of DSC and weight loss signals (dDSC/dT and dm/dT) to split a TG curve into regions associated with different water binding modes.

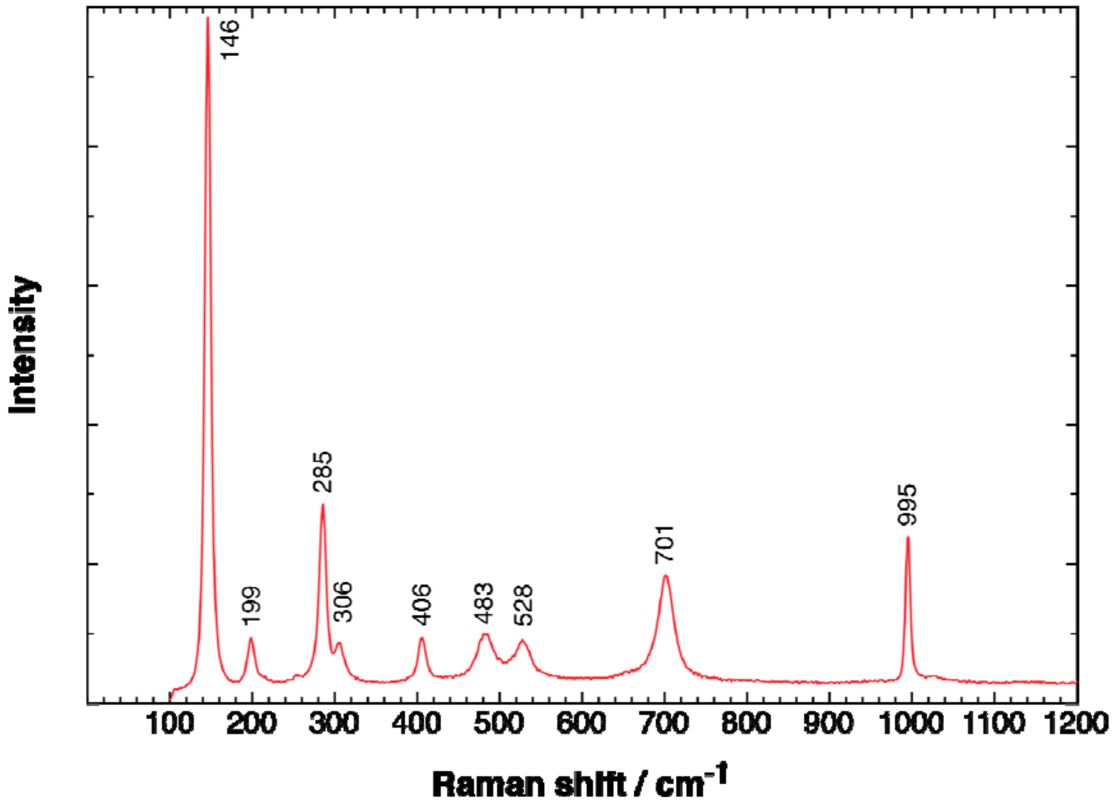
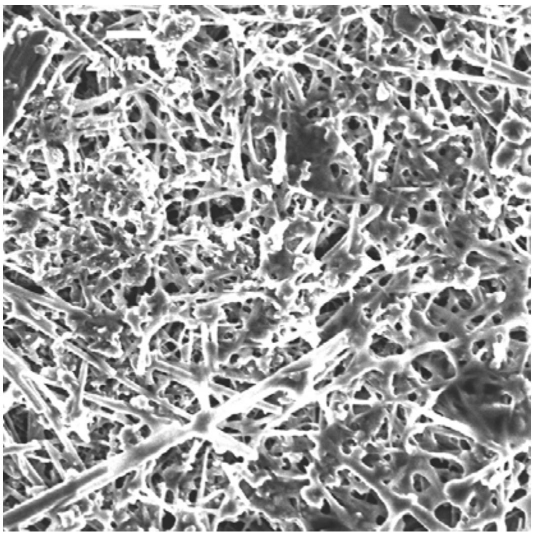


Fig. SI2. Raman scattering spectrum of as-prepared vanadia nanobelts dried at 50°C in air. Spectrum is similar to crystalline α-V_2O_5 (R. Baddour-Hadjean, E. Raekelboom, J.P. Pereira-Ramos, *Chem Mater,* 2006, **18**, 3548-3556).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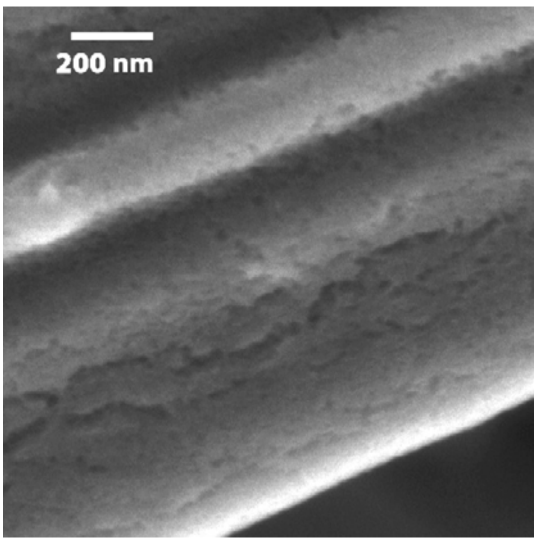

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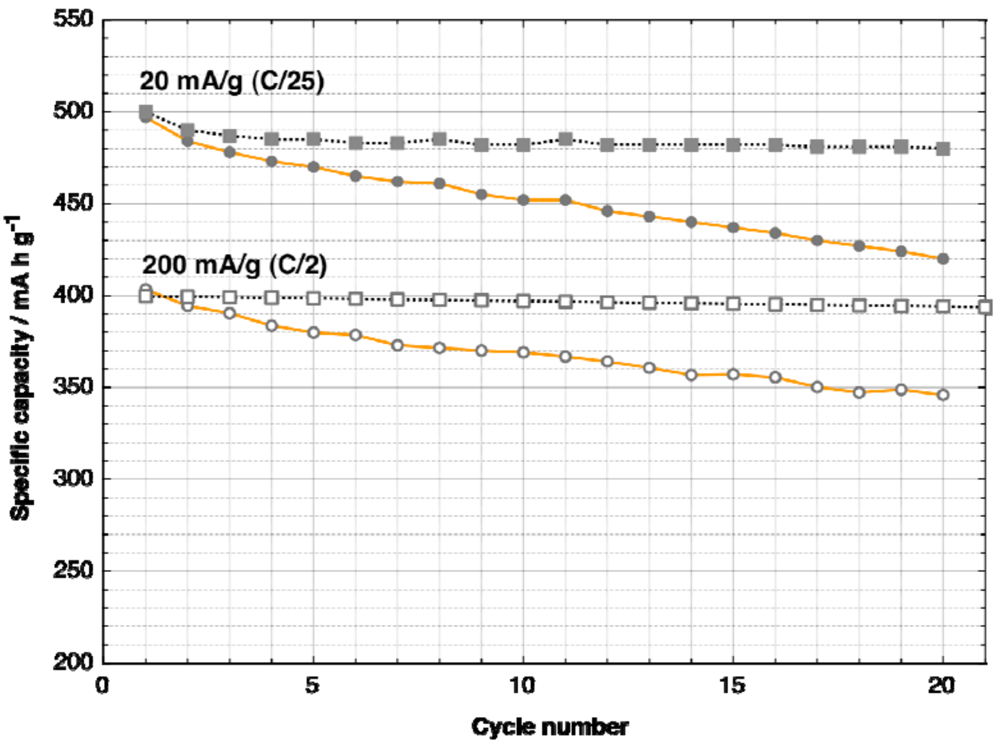

c.

Fig. SI3. SEM images of SEI (solid-electrolyte interface) passive films grown on the vanadia nanobelts during first lithium intercalation semi-cycle. Cathode material (a) and a close-up of vanadia nanobelt surface (b) discharged to 2.15 V vs. Li^0/Li^+, (c) a nanocomposite material with stable cycling due to prevention of the growth of SEI achieved for the same vanadia nanobelts coated with carbon.

Table SI1. Comparison of discharge capacities of different vanadia-based materials

Ref.	Material	Discharge rate	Voltage range, V	Discharge capacity, mAh/h 1st cycle	Discharge capacity, mAh/h 10th cycle	Number of cycles shown
1	Vanadium oxide nanofibers	0.1 mA/cm^2	2.0 – 4.0	180	115	10
2	$NH_4V_4O_{10}$ nanobelts[2]	12.5 mA/g	2.0 – 3.4	165	110	17
3	Nano-V_2O_5[3]	0.1 mA/cm^2	1.75 – 4.0	375	270	25
4	V_2O_5 nanoribbons[4]	440 mA/g	1.5 – 3.75	430	330	50
5	V_2O_5 nanorods[5]	150 mA/g	2.0 – 4.0	275	250	30
6	V_2O_5 nanorods[6]	10 mA/g	1.5 – 3.5	340	275	50
7	V_2O_5/CNT composite[7]	560 mA/g		440	430	20
This	V_2O_5	20 mA/g	2.15 –	500	450	20

work	nanobelts		4.0			
This work	V_2O_5 nanobelts	200 mA/g	2.15 – 4.0	400	370	20

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