Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

Facile Fabrication of Vanadium Nitride/Carbon Fibers Composite for Half/Full Sodium-Ion and Potassium-Ion Batteries with Long-Term Cycling Performance

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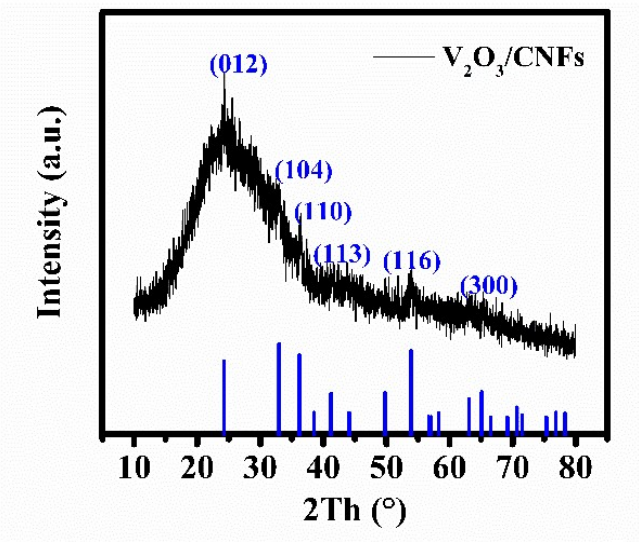

Fig. S1 XRD pattern of V_2O_3/CNFs composite.

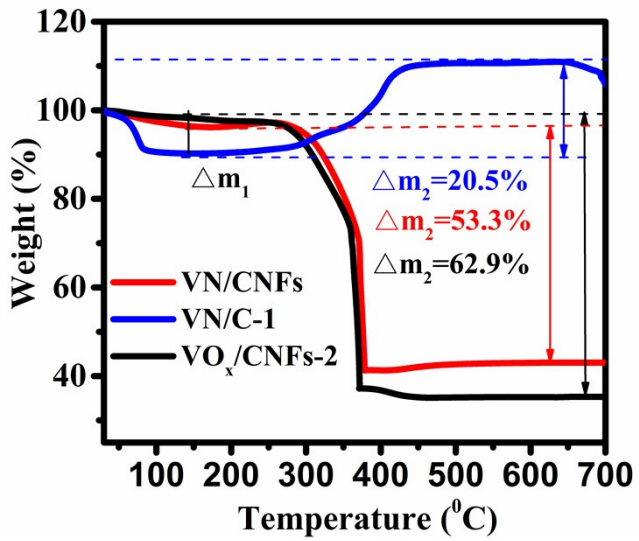

Fig. S2 TG curve of VN/CNFs, VN/C-1, VO_x/CNFs-2 composites.

Table S1 Electrochemical performance comparison of the VN/CNFs with other V-based anode materials for SIBs/PIBs.

Electrode Materials	Fields	Cycling capacity ($mAh\ g^{-1}$)	Rate capability ($mAh\ g^{-1}$)	Year/Ref.
VN-QDs/CM	PIBs	228 (100cycles /0.1 A/g) 215 (500cycles /0.5 A/g)	187 (1 A/g)	2019/[S1]
2D–0D graphene–VN	SIBs	254 (800 cycles /1C)		2017/[S2]
V_2O_3@PNCNFs	PIBs	~230 (500 cycles /0.05A/g)	134 (1.0 A/g)	2018/[S3]
V_5S_8 nanosheets	PIBs	501 (100 cycles /0.05 A/g) 190 (1000 cycles /2 A/g)	153 (10 A/g)	2019/[S4]
VS_2 nanosheets	SIBs	620 (50 cycles /0.1 A/g)	277 (20 A/g)	2018/[S5]
VSe_2 nanosheets	PIBs	366 (200 cycles /0.1A/g)	169 (500 cycles /2 A/g)	2018/[S6]
$FeVO_4$/C composite	PIBs	~250 (2000 cycles /0.3 A/g)	180 (2 A/g)	2019[S7]
VN/CNFs	SIBs	403 (100 cycles /0.1 A/g)	237 (4000 cycles /2 A/g)	This work
	PIBs	266 (200 cycles /0.1 A/g)	152 (1000 cycles /1 A/g)	

Ref.

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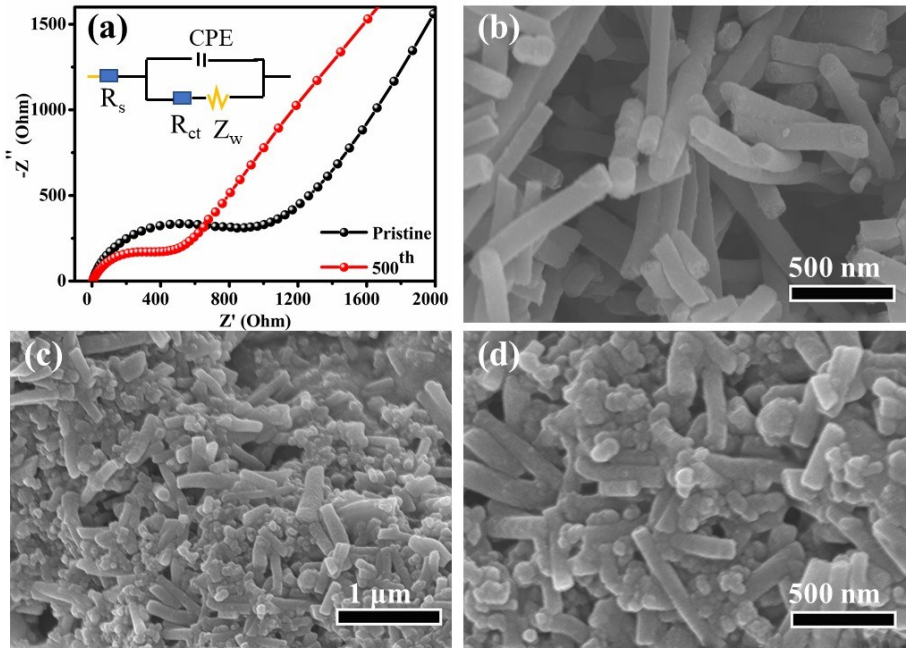

Fig. S3 (a) Nyquist plots for the VN/CNFs before cycling and after 500 cycles. The SEM images of the electrodes (b) before cycling and (c-d) after 500 cycles at 2 A g^{-1} for SIBs.

Table S2 Impedance parameters calculated from an equivalent circuit model.

Sample	R_s (Ω)	R_{ct} (Ω)
Pristine	6.9	1008.8
500th	4.8	625.4

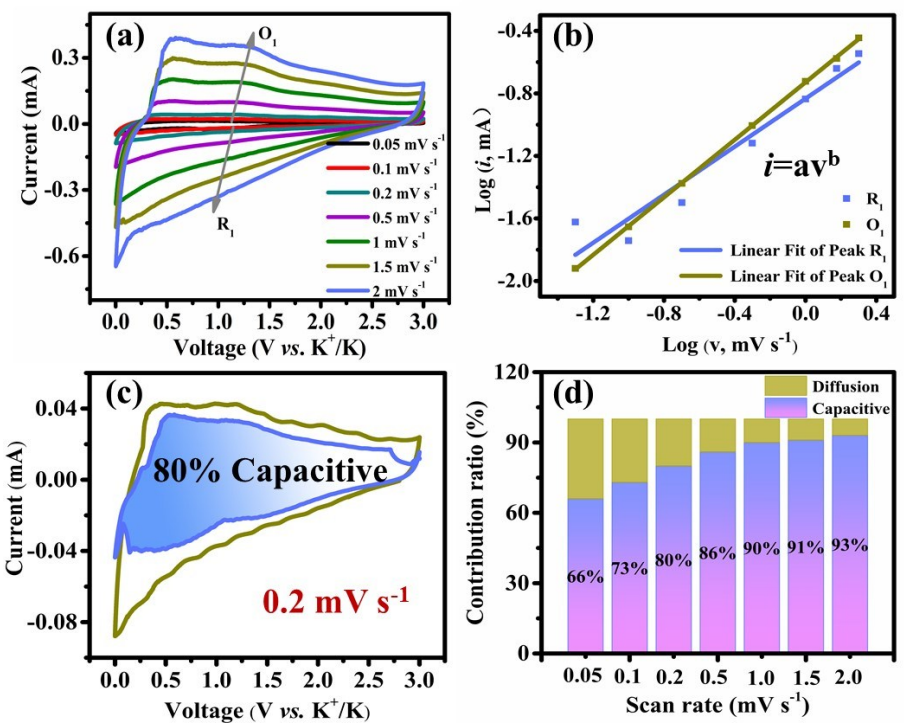

Fig. S4 Surface-dominated behavior analysis in VN/CNFs electrode for PIBs: (a) Cyclic voltammetry curves at various scan rates of 0.05, 0.1, 0.2, 0.5, 1, 1.5 and 2.0 mV s^{-1}; (b) b value determination; (c) Contribution of Capacitive (blue area) at 0.2 mV s^{-1}; (d) Capacitive capacities (blue and purple mixed zone) and the diffusion controlled (brown) at different scan rates.

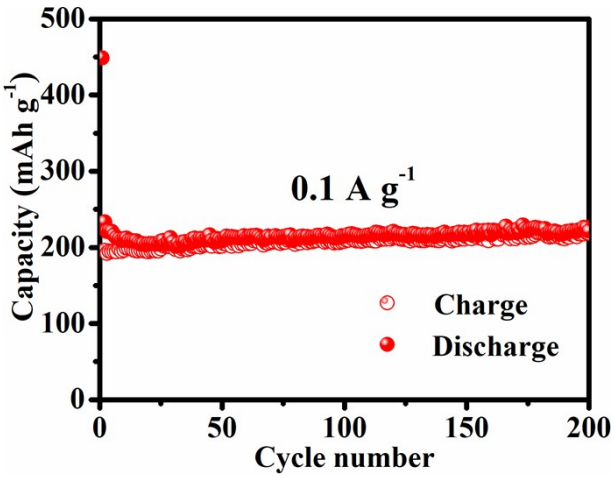

Fig. S5 Cycling performance of pure CNF electrode at a current density of 0.1 A g^{-1}.