Supporting Information

Defect Engineering and Morphology Adjustment Assist $NH_4V_4O_{10}$ as a High-Performance Aqueous Zinc Ion Battery Cathode

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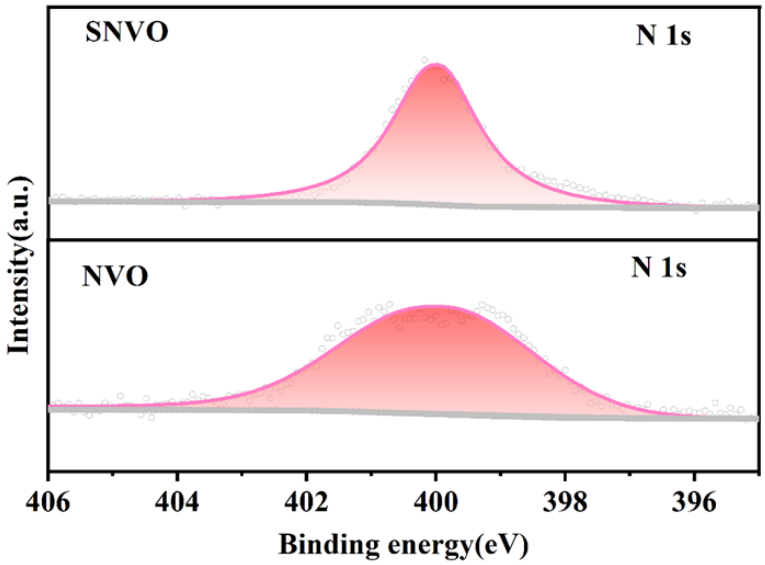

Fig. S1 XPS spectra of N 1s.

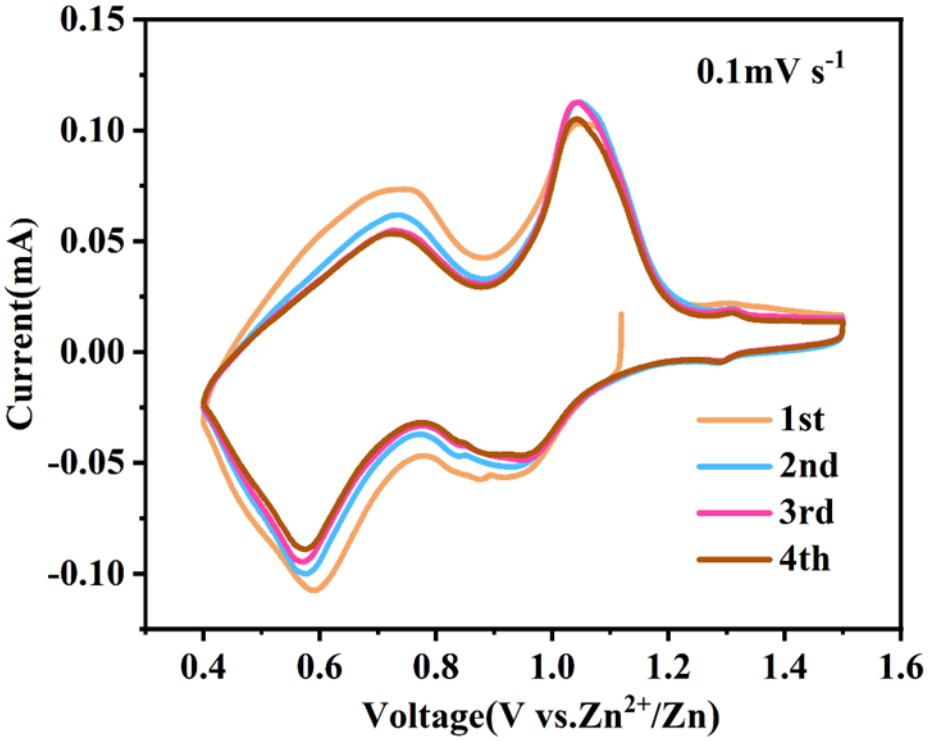

Fig. S2 CV curves of NVO cathode at 0.1 mV s^{-1}.

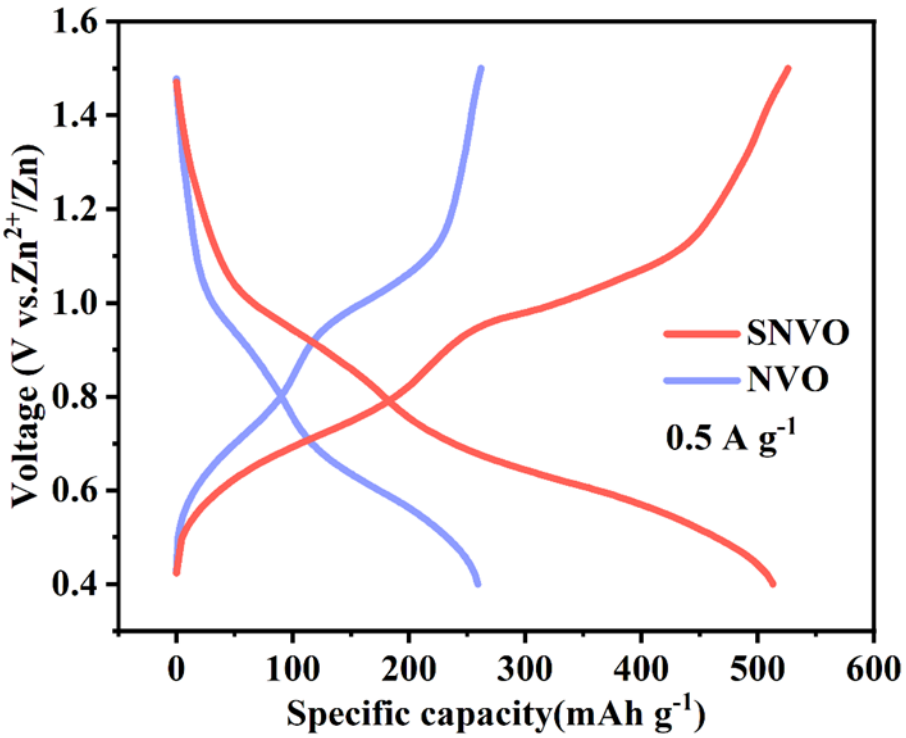

Fig. S3 Curves of galvanostatic charge/discharge at 0.5 A g^{-1}.

Table S1. Electrochemical properties of some positive electrode materials in AZIBs.

Materials	Discharge capacity (current density)	Cyclic stability (cycles, current density)	Ref.
This work	523 mAh g^{-1}(0.5 A g^{-1})	94.6% (1000, 10 A g^{-1})	
Mg-$NH_4V_4O_{10}$	420.5 mAh g^{-1}(0.1 A g^{-1})	83% (6000, 5 A g^{-1})	[1]
NVO-Ti	263 mAh g^{-1}(0.1 A g^{-1})	89.02% (2000, 2 A g^{-1})	[2]
F-NVO	465 mAh g^{-1}(0.1 A g^{-1})	88.1% (2000, 5A g^{-1})	[3]
KNVO	464 mAh g^{-1}(0.1 A g^{-1})	84.4% (3000, 5A g^{-1})	[4]
NVO-300	334.3 mAh g^{-1}(0.5 A g^{-1})	72% (1000, 3 A g^{-1})	[5]
NVO2	472.5 mAh g^{-1}(0.1 A g^{-1})	72.8% (2000, 5 A g^{-1})	[6]
DMF-NVO NFAs/CC	536 mAh g^{-1}(0.5 A g^{-1})	53.5% (1000, 5 A g^{-1})	[7]
MHVO	388 mAh g^{-1}(0.5 A g^{-1})	53% (400, 2 A g^{-1})	[8]
MnVO	433 mAh g^{-1}(0.1 A g^{-1})	81.47% (5000, 3 A g^{-1})	[9]

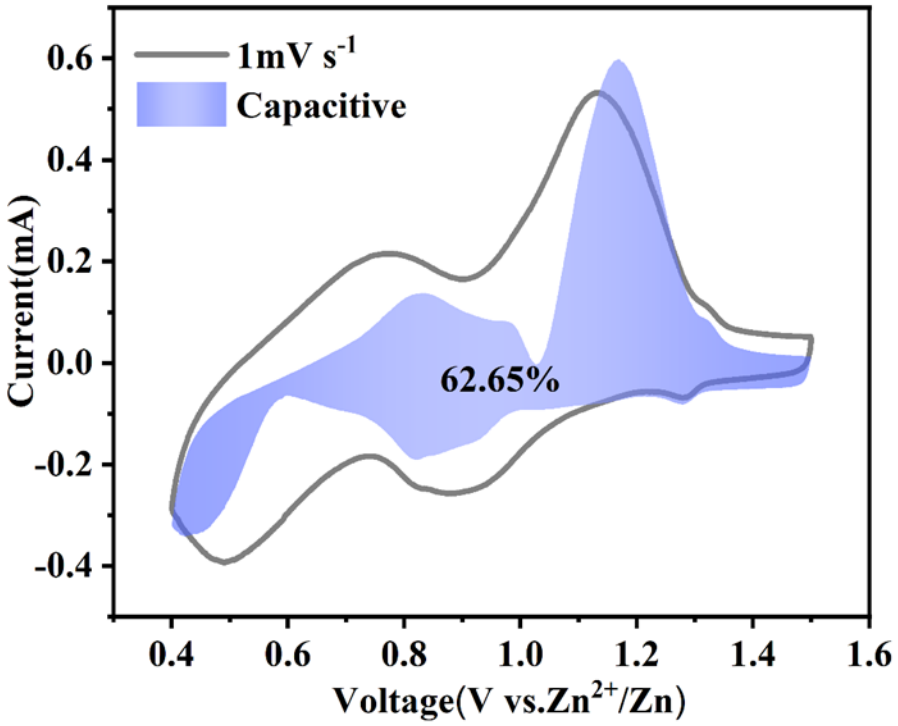

Fig. S4 Capacitance contribution at 1 mV s^{-1} of NVO.

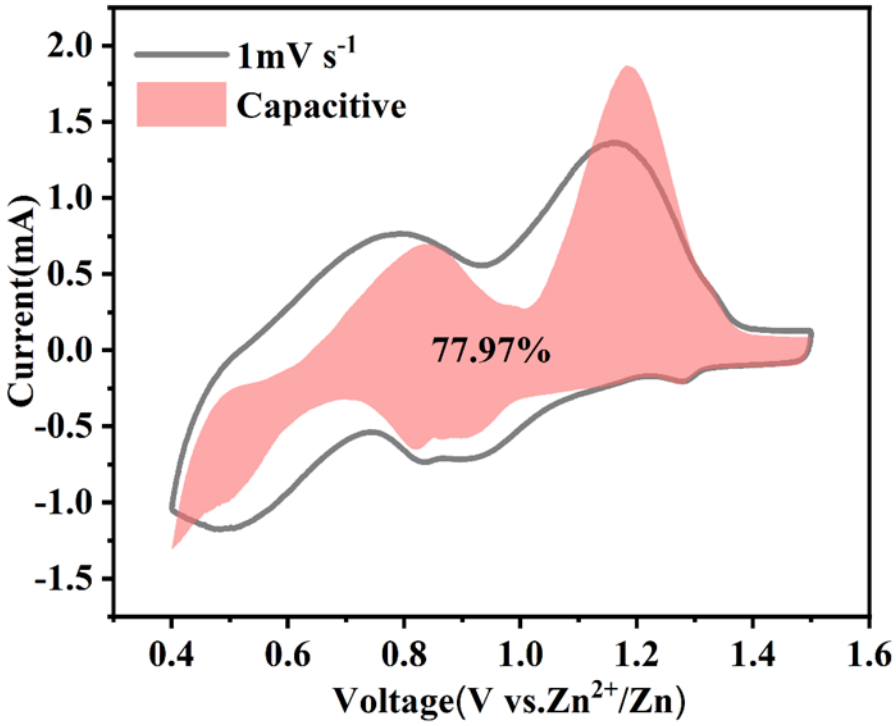

Fig. S5 Capacitance contribution at 1 mV s^{-1} of SNVO.

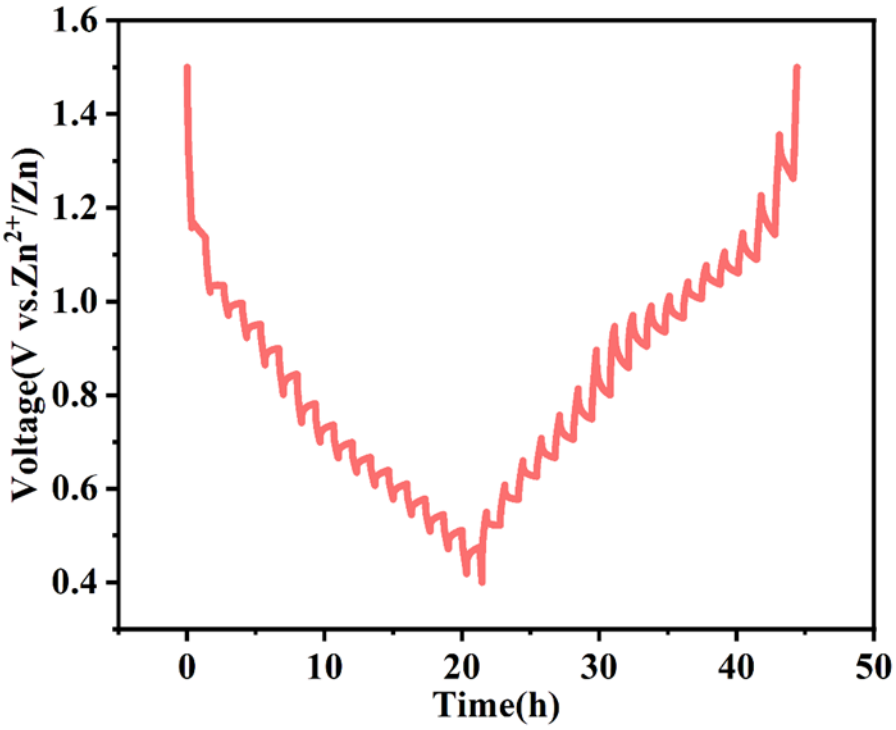

Fig. S6 Charge-discharge GITT profiles of SNVO.

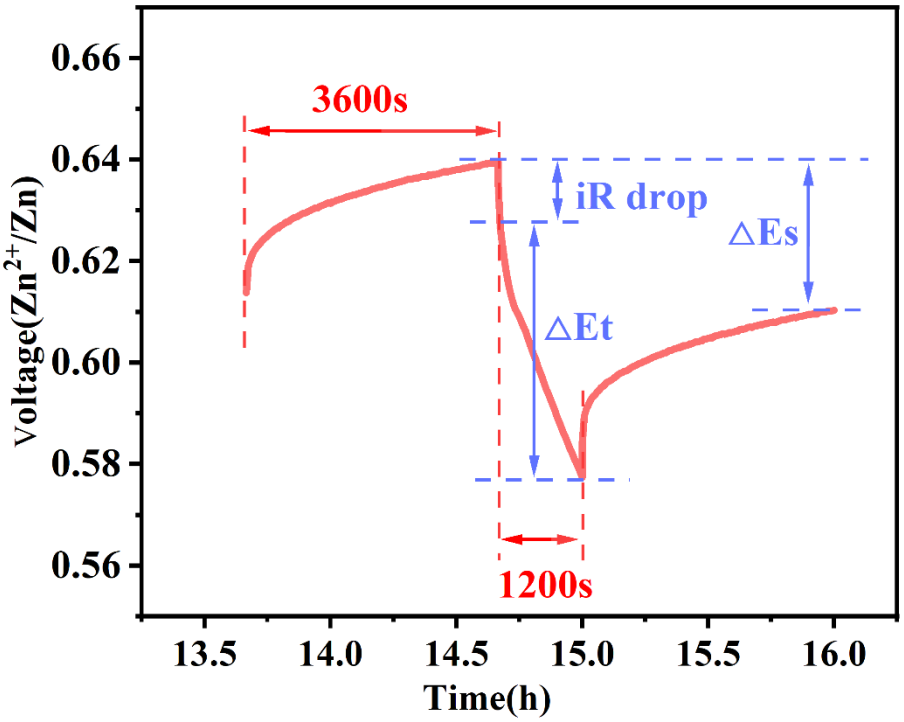

Fig. S7 Local diagram of GITT discharge curve of SNVO electrode.

The diffusivity of Zn^{2+} was determined by galvanostatic intermittent titration technique (GITT) using a series of galvanostatic discharge pulses at 0.02 A g^{-1} for 20 min followed by relaxation for

60 min. The ions diffusion coefficient is calculated by:

$$D_{Zn^{2+}} = \frac{4}{\pi\tau}\left(\frac{m_B V_M}{M_B S}\right)^2\left(\frac{\triangle E_s}{\triangle E_t}\right)^2$$

where M_B and m_B represent the molecular weight and mass of active material, respectively, V_M and S are the molar volume and surface area of active material, respectively. △Es and △Et stand for the change of steady-state voltage and total charge of cell voltage during the current pulse, respectively, and τ is the relaxation time.

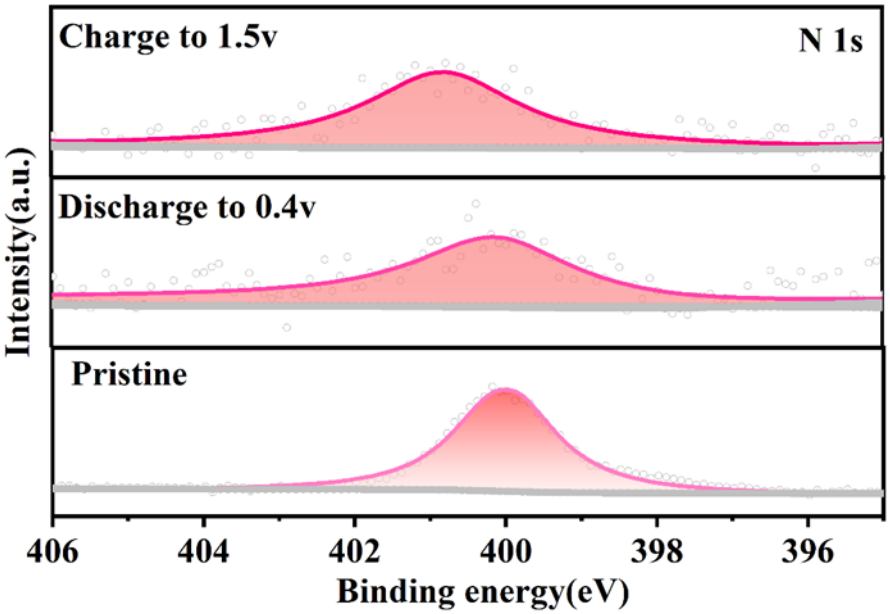

Fig. S8 XPS spectra of N 1s.

References

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