Supplementary Information

One-dimensional N-doped carbon nanofibers produced by pre-oxided treatment for effective lithium storage

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Experimental Section

Preparation Procedure

0.5 g polyvinylpyrrolidone (PVP) was dissolved into 10 mL absolute ethanol and stirred for 12 h. Then the pre-spinning solution was transferred to a syringe with a 20# stainless steel needle. The advancing speed of 0.1 mm min^{-1}, positive and negative pressures of 15 kV and -2 kV, and a needle-to-receiver distance of 11 cm were utilized for electrospinning. After that the spinning film was peeled off, dried at 60 °C overnight, and calcinated at 250, 300, 350 °C in an air atmosphere for 2 h with a heating rate of 1 °C min^{-1} and cooling rate of 2 °C min^{-1}. The as-obtained samples were labeled as NCNF-250, NCNF-300, and NCNF-350. The NCNF-300 was carbonized at 500 °C for 2 h under an N_2 atmosphere, and the as-obtained sample was named as NCNF-300-500.

Characterization Techniques

X-ray diffraction (XRD, Rigaku D/max 2500, Cu Kα radiation), and scanning electron microscopy (SEM, MAIA3 TESCAN) were performed to examine the structures and morphologies of the samples. N_2 adsorption-desorption measurements were used to evaluate the porosity of the samples with a 3H-2000PS2 analyzer (BeiShiDe Instruments S&T. Co., Beijing). The composition and functional groups of the samples were examined using Fourier-transform infrared spectroscopy (FT-IR, Nicolet IS50, USA) and X-ray photoelectron spectroscopy (XPS, Thermo Escalab 250Xi).

Electrochemical Measurements

The CR2025-type half cells were assembled in an Ar-filled glovebox utilizing the as-synthesized anode materials, PVDF binder, and conductive agent (Super P) coated on Cu foil in a mass ratio of 7:2:1 as the anode, PP membrane (Celguard 2400) as the separator, Li foil as the counter and reference electrodes, and 1.0 M $LiPF_6$ [V_{EC}: V_{DMC} = 1:1, 5 wt% FEC] as the electrolyte. The loading mass of active material was 2.0 mg·cm^{-2} for all of as-prepared samples The voltage window for the electrochemical performance test was set between 0.01 and 3.0 V. The galvanostatic charge/discharge

tests were measured on a LAND battery tester (CT3001A). Cyclic voltammetry (CV) curves and electrochemical impedance spectroscopy (EIS) were recorded by an electrochemical workstation (CHI660E).

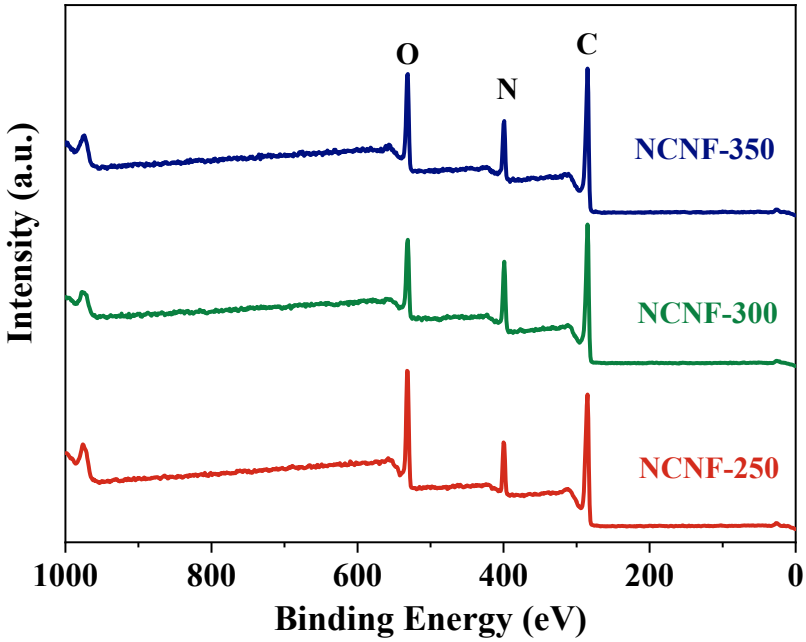

Figure S1. XPS full survey spectra of NCNF-250, NCNF-300, and NCNF-350

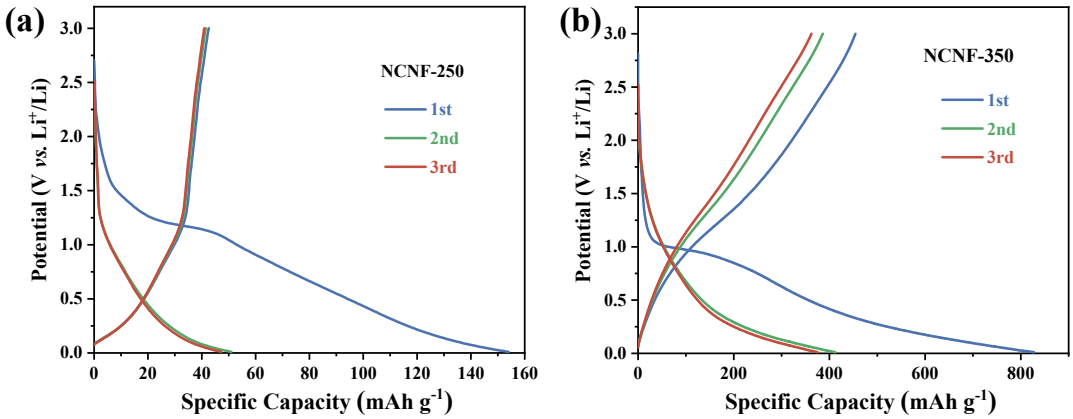

Figure S2. Galvanostatic charge/discharge profiles of NCNF-250 and NCNF-350 electrodes

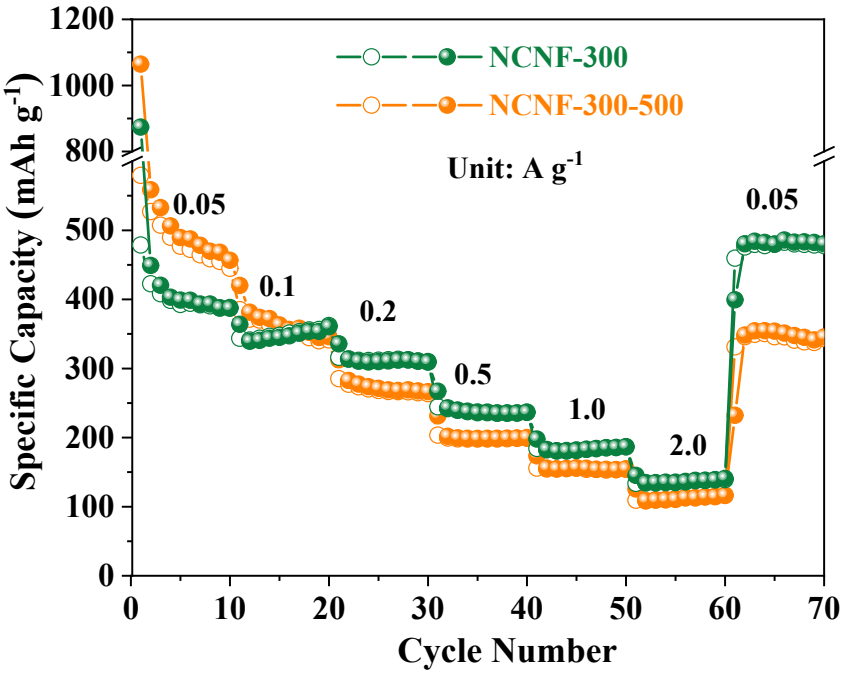

Figure S3. Rate performance comparison of NCNF-300 and NCNF-300-500 electrodes

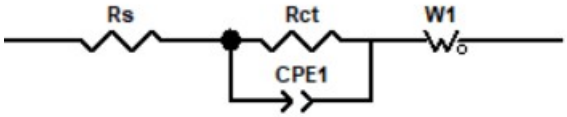

Figure S4. Fitted circuit of EIS analysis

Table S1. Porous structure parameters of NCNF-250, NCNF-300, and NCNF-350

Sample	BET surface area ($m^2 \cdot g^{-1}$)	Pore volume ($cm^3 \cdot g^{-1}$)	Average pore size (nm)
NCNF-250	10.5	0.013	7.1
NCNF-300	12.6	0.021	10.1
NCNF-350	19.5	0.027	6.0