

Supplementary Materials

Fiber-reinforced CNT-integrated quartz fabrics as multifunctional electrodes for structural lithium-ion batteries

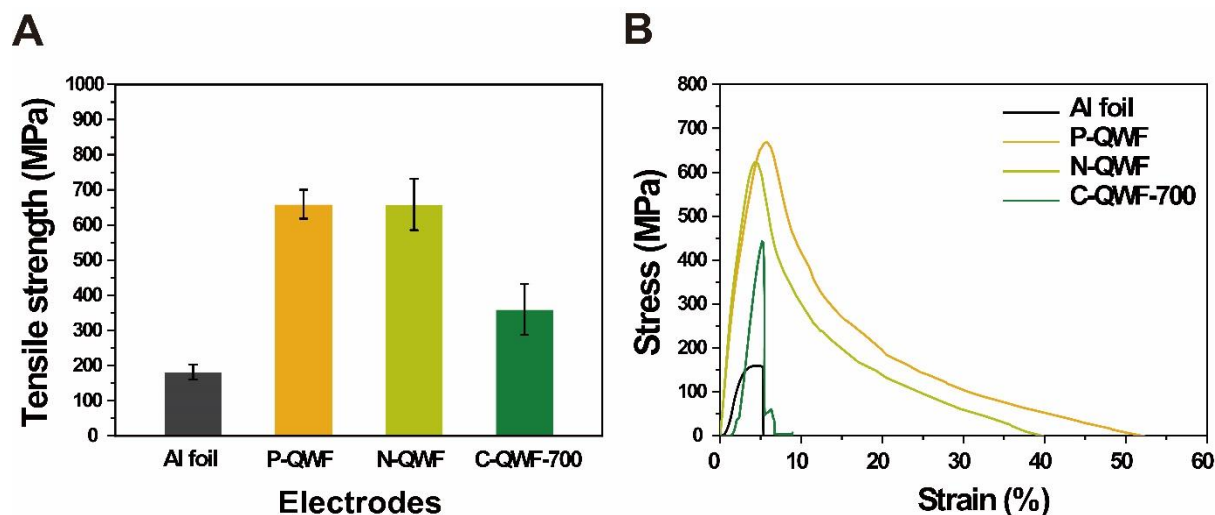
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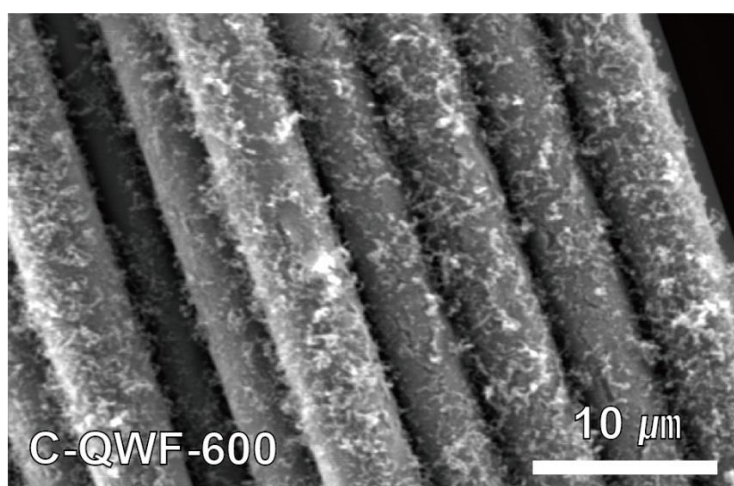
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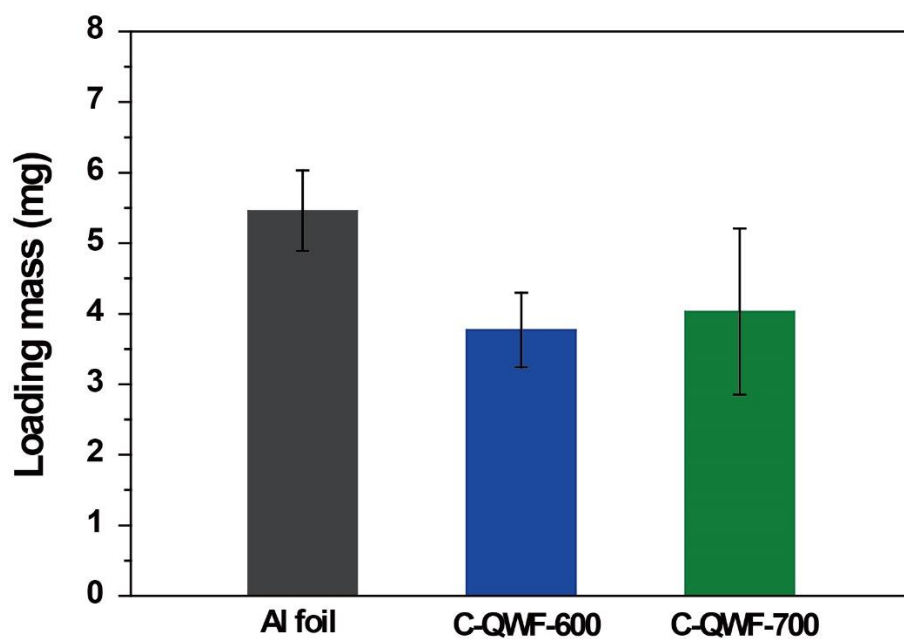
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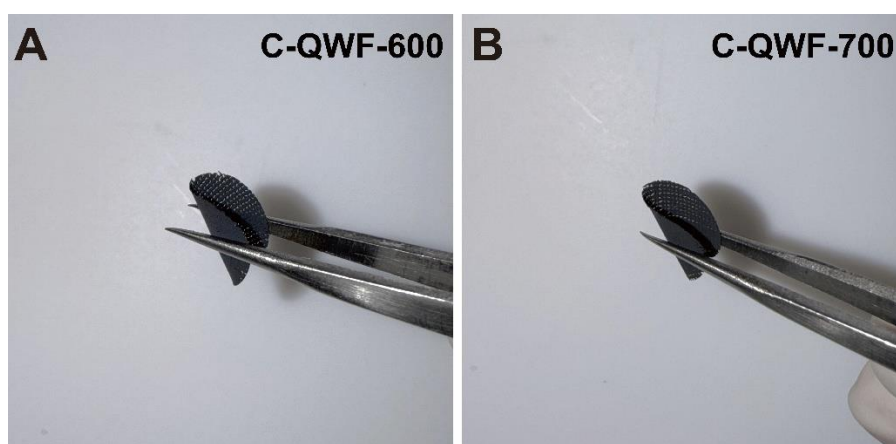
Supplementary Figure 1. (A) Tensile strength curves and (B) stress-strain curves of Al foil, P-QWF, N-QWF, C-QWF-700 electrodes.



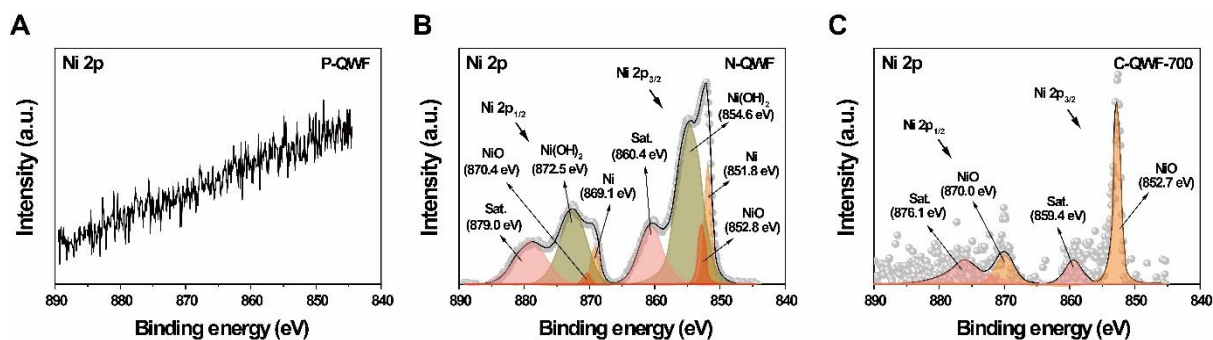
Supplementary Figure 2. Scanning electron microscopy images of the top view of the CNT-coated QWF that was heated to 600 °C (C-QWF-600)



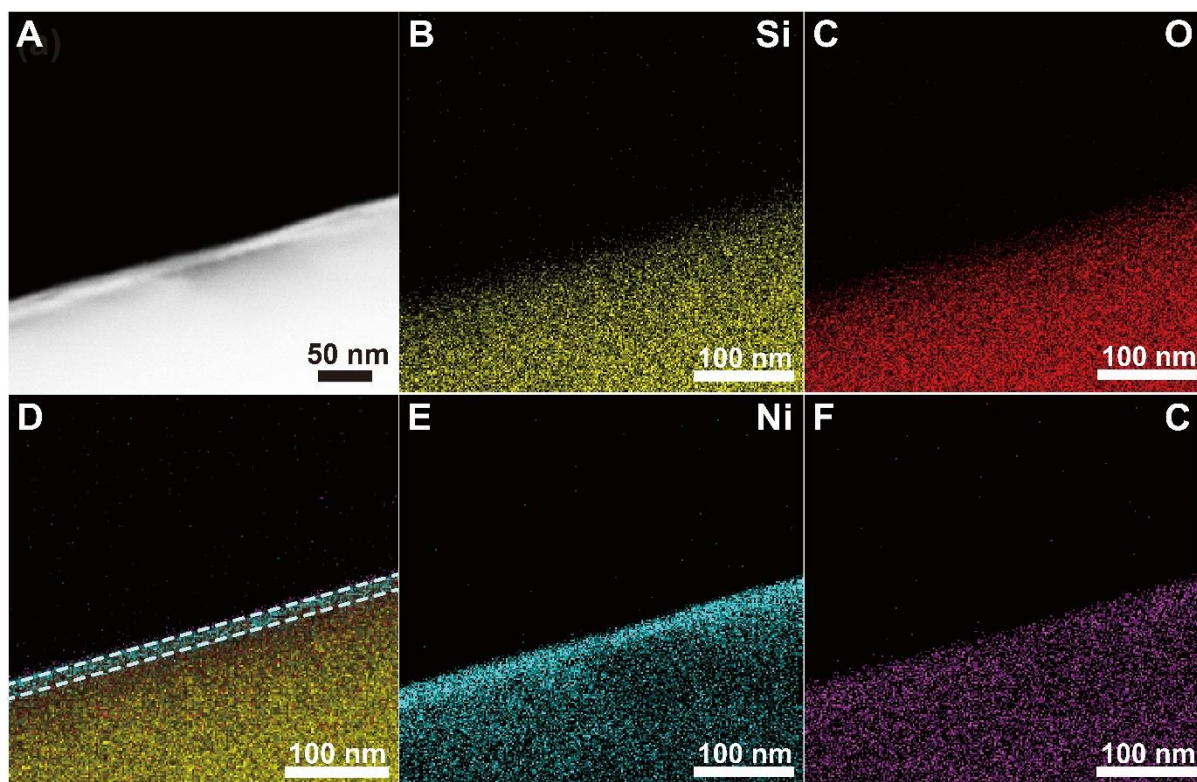
Supplementary Figure 3. Loading mass (mg) of CNTs grown from Al foil, C-QWF-600 and C-QWF-700.



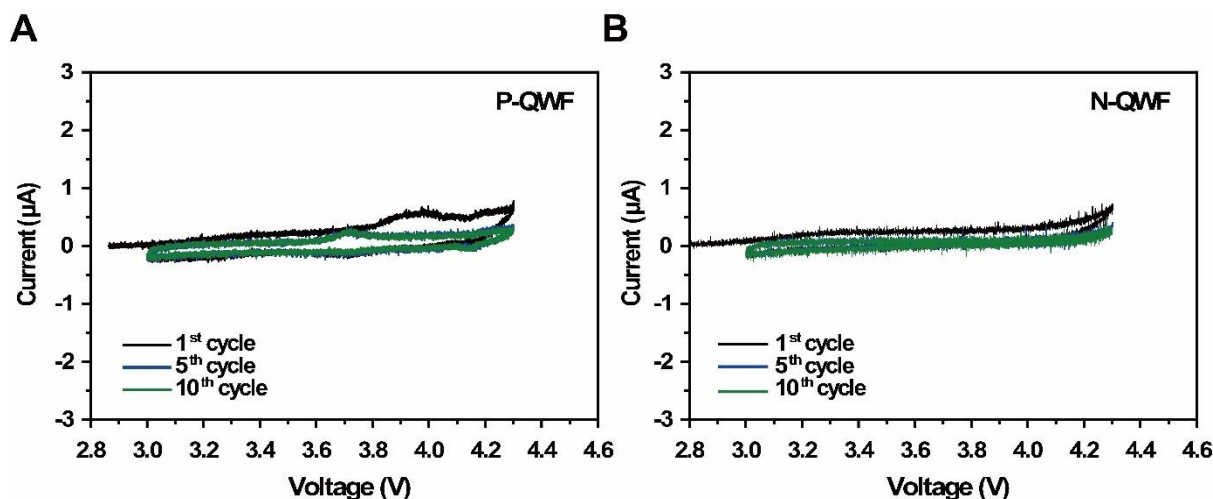
Supplementary Figure 4. Optical images of mechanical stability test of flexible electrode; (A) C-QWF-600, and (B) C-QWF-700.



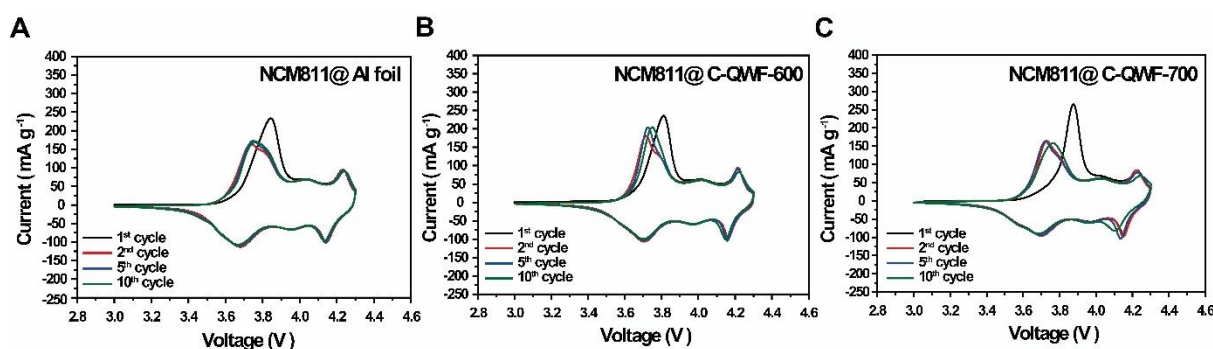
Supplementary Figure 5. Ni 2p XPS spectra of (A) P-QWF, (B) N-QWF, and (C) C-QWF-700.



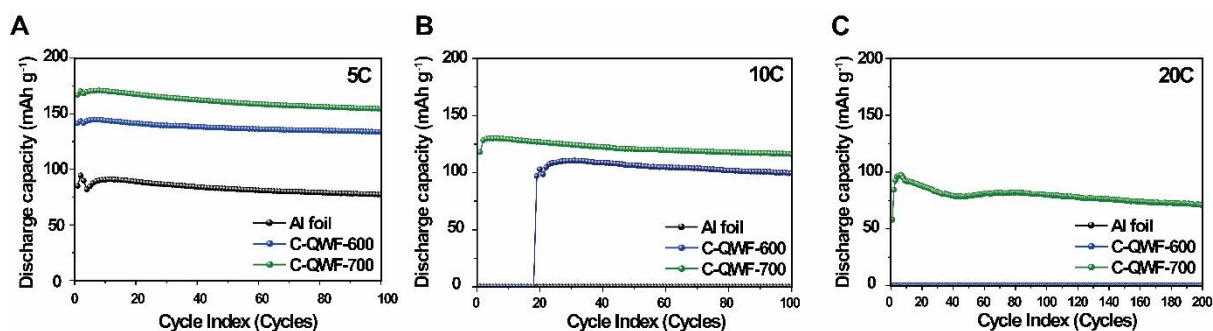
Supplementary Figure 6. (A) Scanning transmission electron microscopy (STEM) image of N-QWF (B-C, E-F) Energy dispersive X-ray spectroscopy (EDS) mapping results of N-QWF showing distributions of Si, Ni, O and C; (D) EDS image of an N-QWF with Ni sputtered to 10 nm thickness.



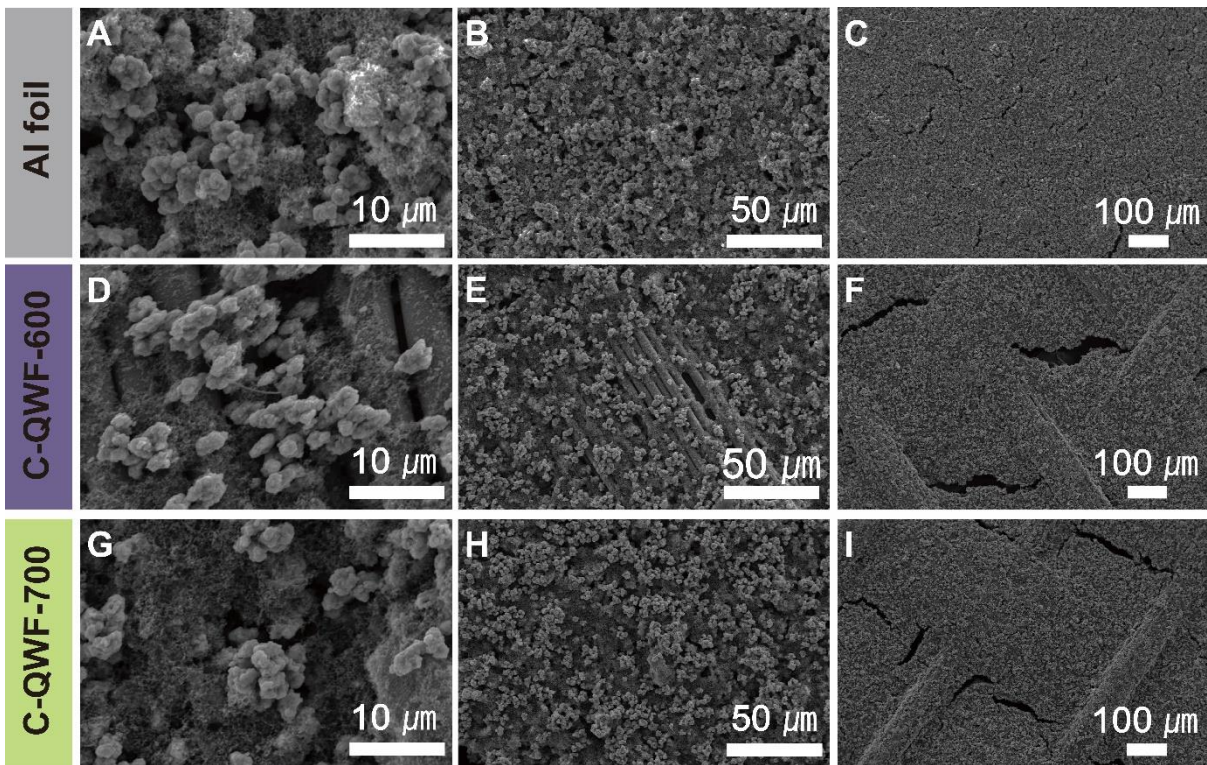
Supplementary Figure 7. Cyclic voltammetry studies at a scan rate of 0.1 mV s^{-1} of (A) P-QWF and (B) N-QWF.



Supplementary Figure 8. Cyclic voltammetry of electrodes at a scan rate of 0.1 mV s^{-1} (A) Al foil, (B) C-QWF-600, and (C) C-QWF-700.



Supplementary Figure 9. Cycle performance of Al foil and QWF electrode supports at (A) 5 C-rate, (B) 10 C-rate, and (C) 20 C-rate.



Supplementary Figure 10. *ex-situ* images of (A-C) Al foil, (D-F) C-QWF-600, and (G-I) C-QWF-700.

Supplementary Table 1. Comparison of electrochemical performance of NCM-based electrodes using different current collectors

ref	Current collector	Active materials	specific capacity (mAh g ⁻¹)	Cycles	Retention (%)	Working voltage
This work	CNT coated QWF	NCM811	201.5 (0.1 C)	50	89.8 %	3.0-4.3 V
			194.7 (0.5 C)	100	79.4 %	
			175.9 (2 C)	100	82.6 %	
[1]	Carbon fabric	NCM811	143 (0.5 C)	100	94 %	3.0-4.3 V
[2]	carbon-	NCM811	~200	200	71.75 %	2.8-4.3 V

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	incorporated		(0.1 C)			
	polyimide (CIPi)					
[3]	Al-PET SCC	NCM523	~150 (0.2 C)	-	-	2.7-4.2 V
[4]	Al foil	Carbon coated NCM811	190.5 (0.5 C)	80	77.8 %	3.0-4.3 V