

Supporting Information

Fluorinated Carbons as Rechargeable Li-Ion Battery Cathodes in the Voltage Window of 0.5-4.8 V

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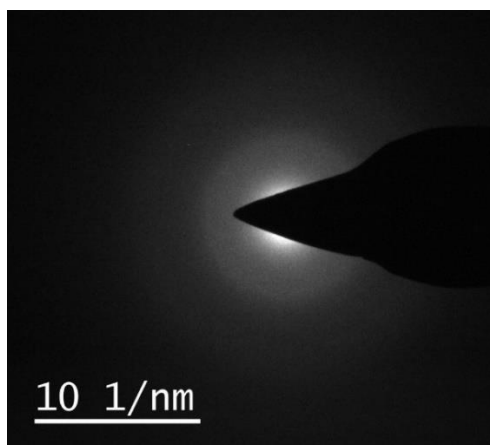


Figure S1. SAED pattern obtained from fluorinated graphite CF_{0.88}.

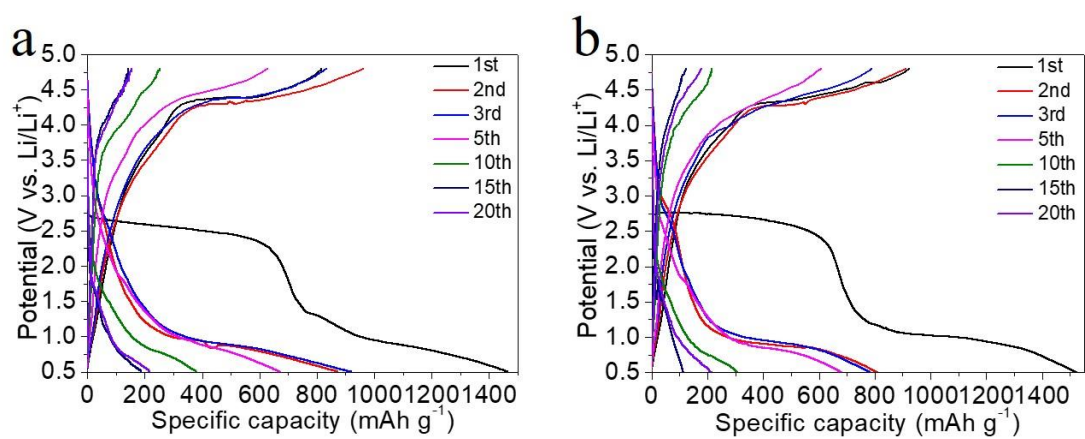


Figure S2. Discharge-charge profiles for the fluorinated graphene (a) and fluorinated carbon nanotubes (b) in the voltage window of 0.5-4.8 V.

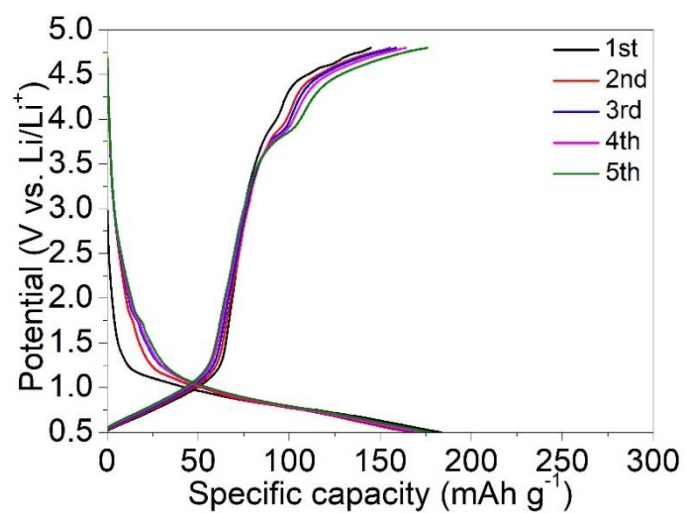


Figure S3. Galvanostatic discharge-charge profiles for the defluorinated graphite at a current rate of 0.05C in the voltage window of 1.5-4.8 V.

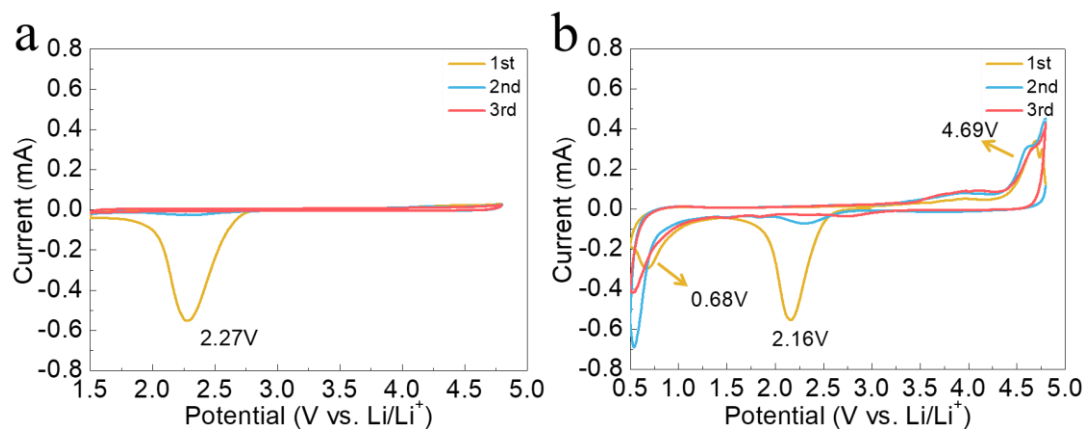


Figure S4. CV curves for the fluorinated graphite CF_{0.88} at a scan rate of 0.1 mV s⁻¹ in the voltage window of 1.5-4.8 V (a) and 0.5-4.8 V (b).

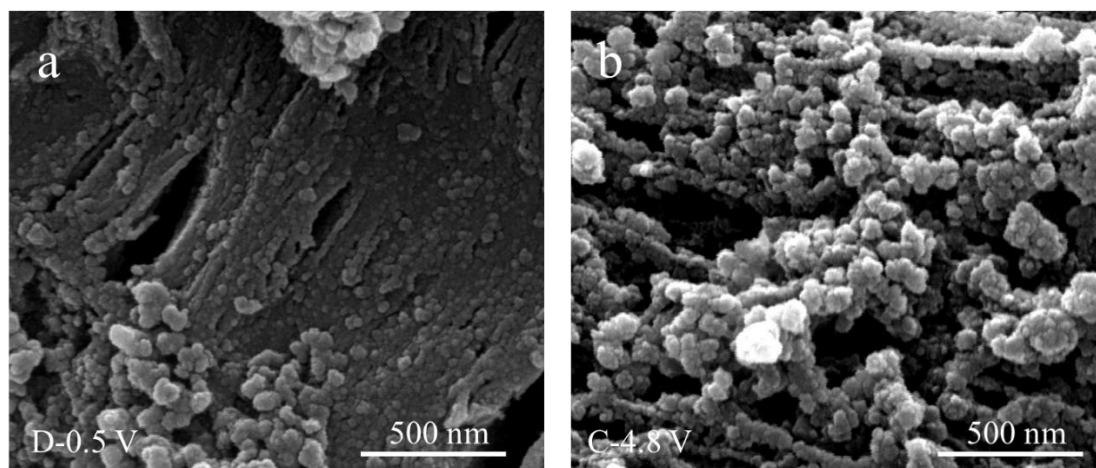


Figure S5. SEM images of fluorinated graphite CF_{0.88} after discharging to 0.5 V (a) and then charging to 4.8 V (b).

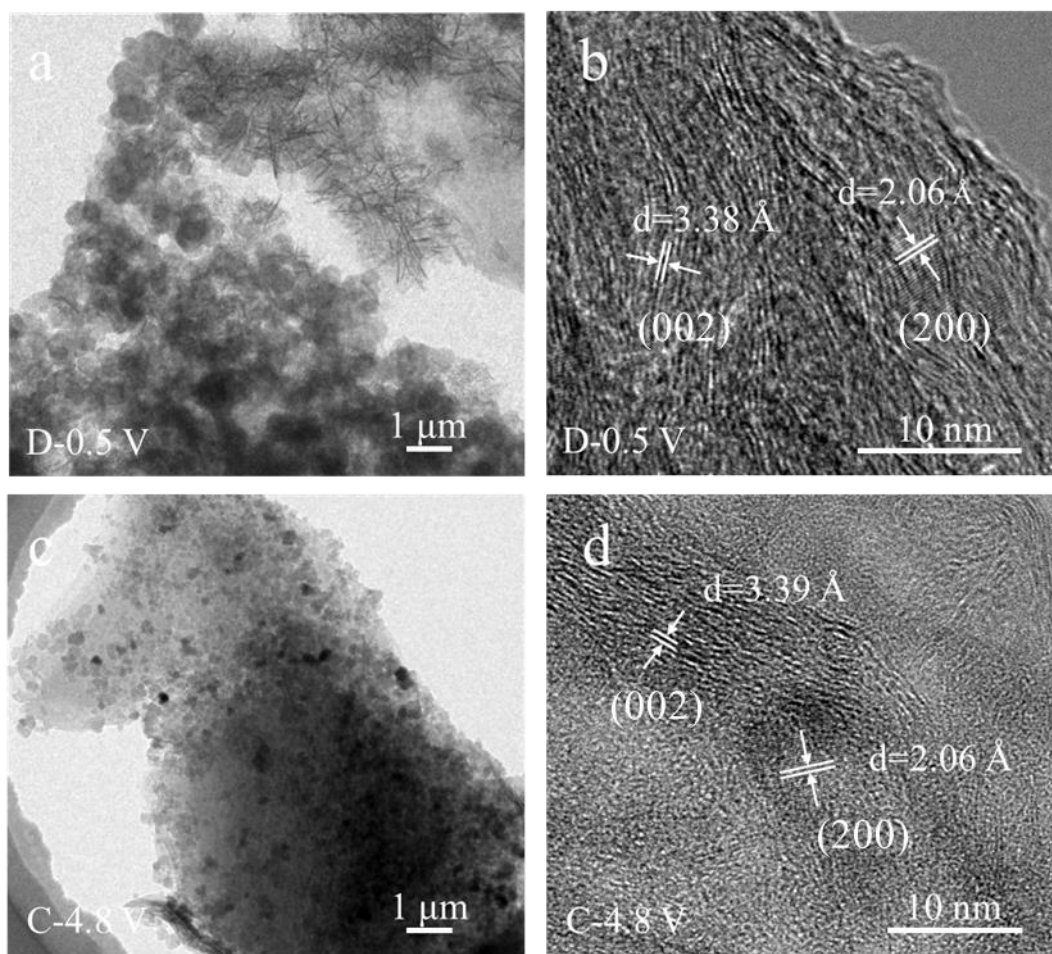


Figure S6. TEM images of fluorinated graphite $\text{CF}_{0.88}$ after discharging to 0.5 V (a-b) and charging to 4.8 V (c-d).

Table S1. Specific energy of different CF_xs under different cycles.

Materials	Cycle	Discharge specific energy (Wh/kg)	Charge specific energy (Wh/kg)
F-graphite	1	2362	2931
	2	929	3254
	3	983	3589
	5	1081	4028
	10	713	2337
	15	696	2280
	20	508	1952
F-graphene	1	2456	3164
	2	992	3786
	3	1078	3259
	5	834	2516
	10	411	972
	15	196	547
	20	225	594
F-CNTs	1	2608	3666
	2	970	3577
	3	971	3107
	5	817	2355
	10	342	822
	15	149	471
	20	241	693

Table S2. R_s , R_f , and R_{ct} of fluorinated graphite $CF_{0.88}$ at different states of charge and discharge.

Potential (V vs. Li/Li^+)	R_s/Ω	R_f/Ω	R_{ct}/Ω
OCV-3.1 V	2.8	-	102.4
1st D-1.5 V	3.3	-	106.6
1st D-0.5V	5.5	113.6	105.4
1st C-4.5 V	3.6	-	175.5
1st C-4.8 V	5.3	22.5	458.4
2nd D-3.0 V	4.6	-	88.4
2nd D-1.5 V	5.2	-	107.3
2nd D-0.5 V	7.9	99.2	139.8
2nd C-4.5 V	4.7	-	164.0
2nd C-4.8 V	6.8	84.7	248.5