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Electronic Supplimentary Information

Fluorinated graphene -based high performance electrodes for primary lithium batteries

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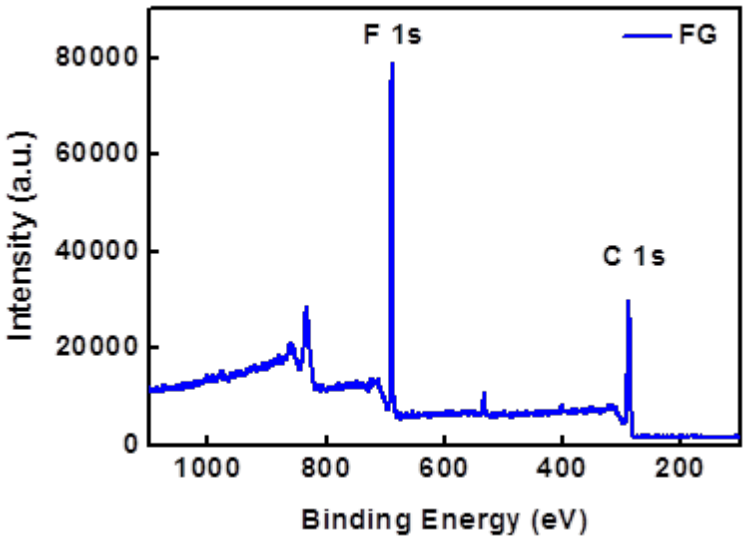
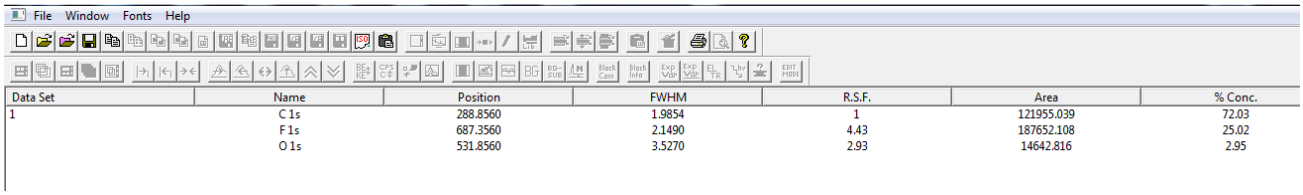


Fig. S1 Survey XPS spectra of FG.

Calculation of Empirical formula of FG:



Data Set	Name	Position	FWHM	R.S.F.	Area	% Conc.
1	C 1s	288.8560	1.9854	1	121955.039	72.03
	F 1s	687.3560	2.1490	4.43	187652.108	25.02
	O 1s	531.8560	3.5270	2.93	14642.816	2.95

C-72.03 %
Mole Fraction of Carbon = 72.03/12.01
= 5.997
F- 25.02 %
Mole Fraction of Fluorine = 25.02/18.99
= 1.317
O- 2.95 %
Mole Fraction of Fluorine = 2.95/16
= 0.184375
$C_{5.997}O_{0.184}F_{1.317}$

Dividing all by 5.997 gives the formula- $\mathbf{CO_{0.03}\ F_{0.22}}$

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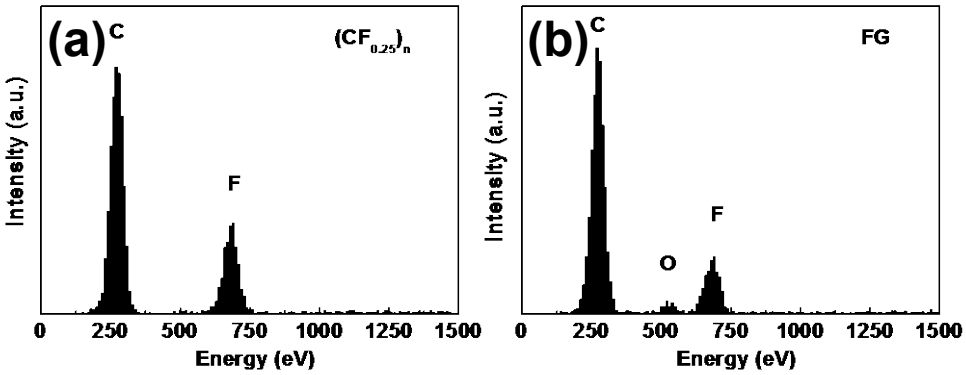

Fig. S2 EDX spectra of $(CF_{0.25})_n$ and FG, showing the presence of slight oxidation and reduced F content in FG.

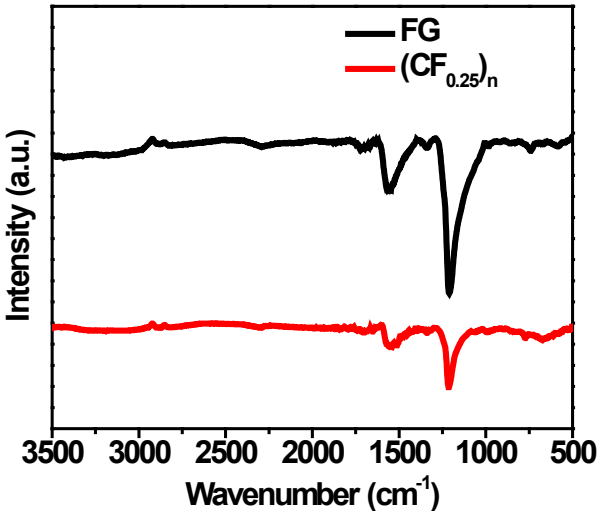

Fig. S3 FT-IR spectra of FG and $(CF_{0.25})_n$

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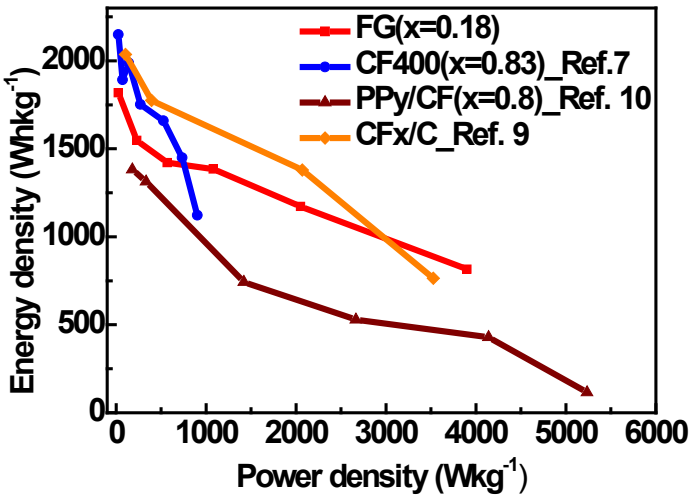

Fig. S4 Electrochemical performance of fluorinated graphene-based electrodes is compared with various $(CFx)_n$ systems reported. Different strategies have been undertaken to achieve enhanced performance in either power density or energy density for the $(CFx)_n$ systems. FG-based electrodes show improvements in both power density and energy density, along with exceptional Faradic yield, all in a single step.

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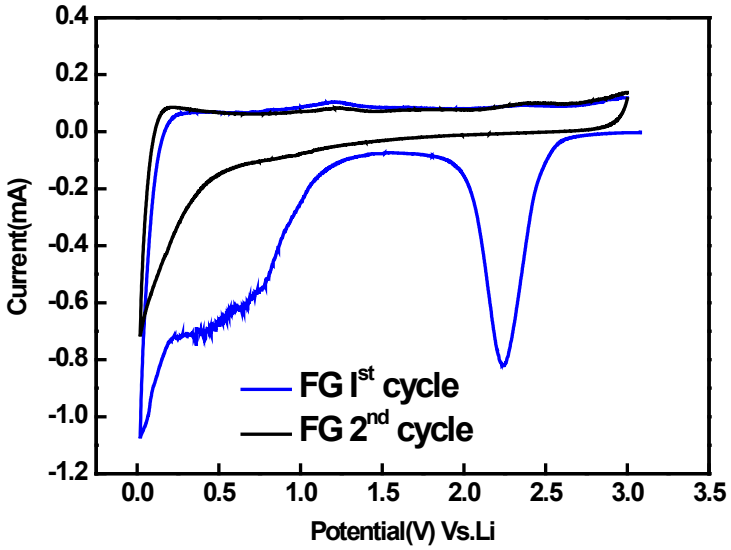

Fig. S5 Cyclic Voltammogram of FG electrode at a scan rate of $0.02 mVs^{-1}$ showing the discharge process by LiF formation. Single reduction peak also rules out the possibilities of unexpected side reactions which may contribute to the enhanced specific capacity.

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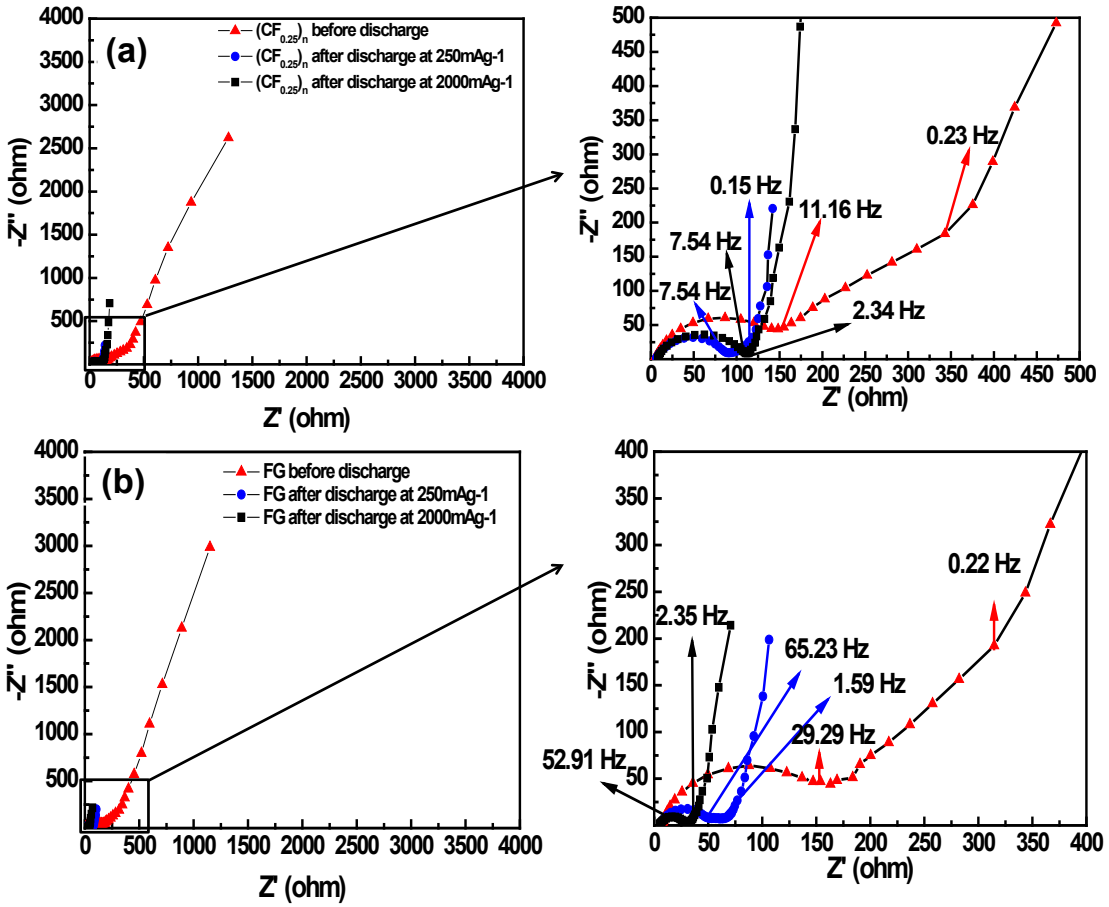

Fig. S6 Electrochemical impedance spectra of (a) parent $(CF_{0.25})_n$ and (b) FG electrodes before and after discharging at the specified current rates.