

Supporting Information

F-doped carbon nano-onion film as scaffold for highly efficient and stable Li metal anode: A novel laser direct-write process

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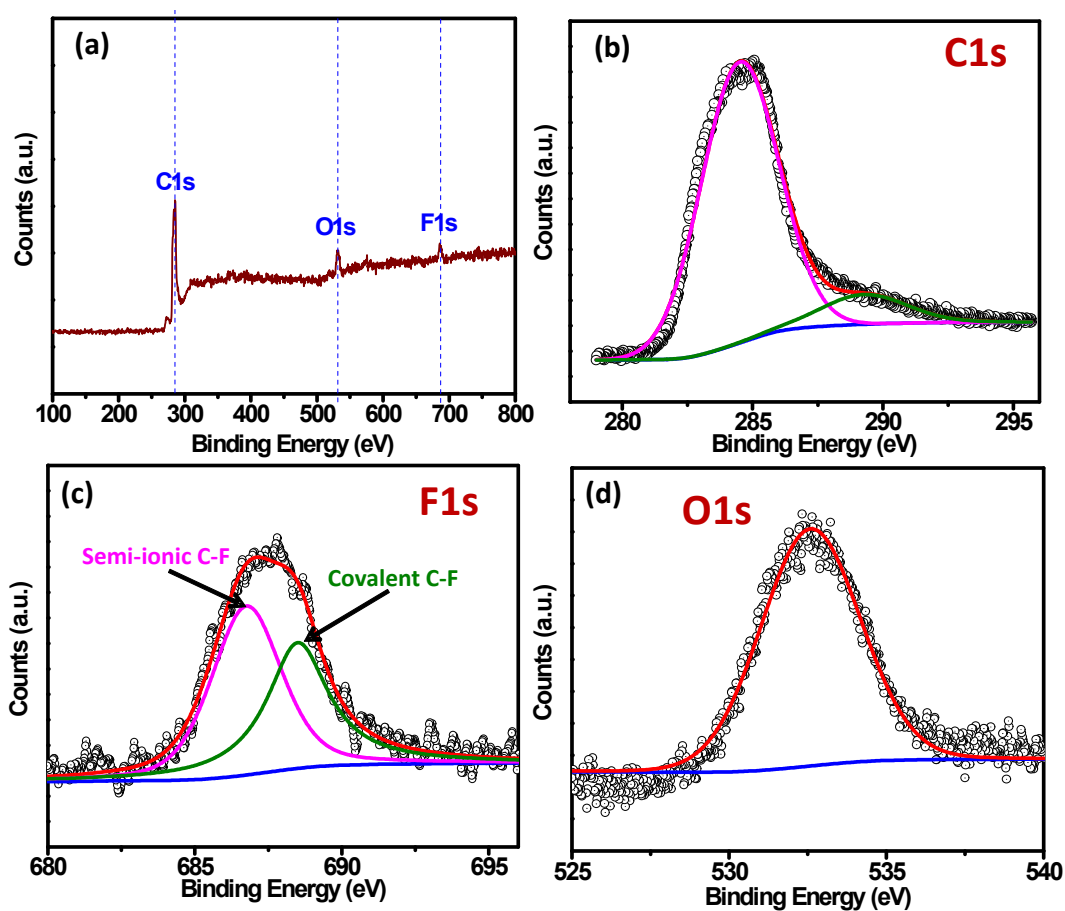


Figure S1. (a) XPS survey spectrum for F-CNOF. High resolution XPS spectra for (b) C1s , (c) F1s and (d) O1s

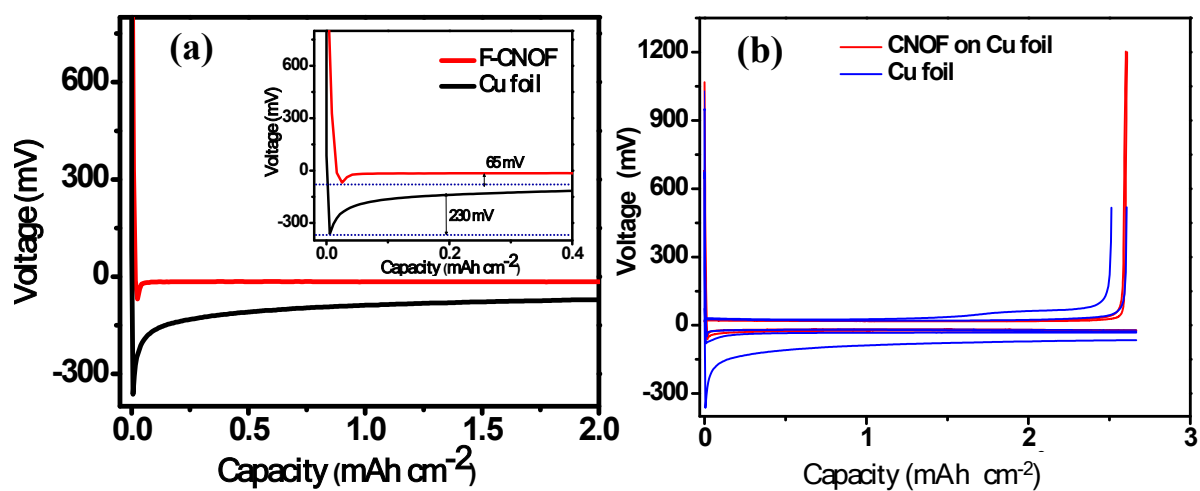


Figure S2. (a) Comparison of the overpotential for Li plating on Cu foil and F-CNOF for 1st cycle (b) and first two plating and stripping cycles

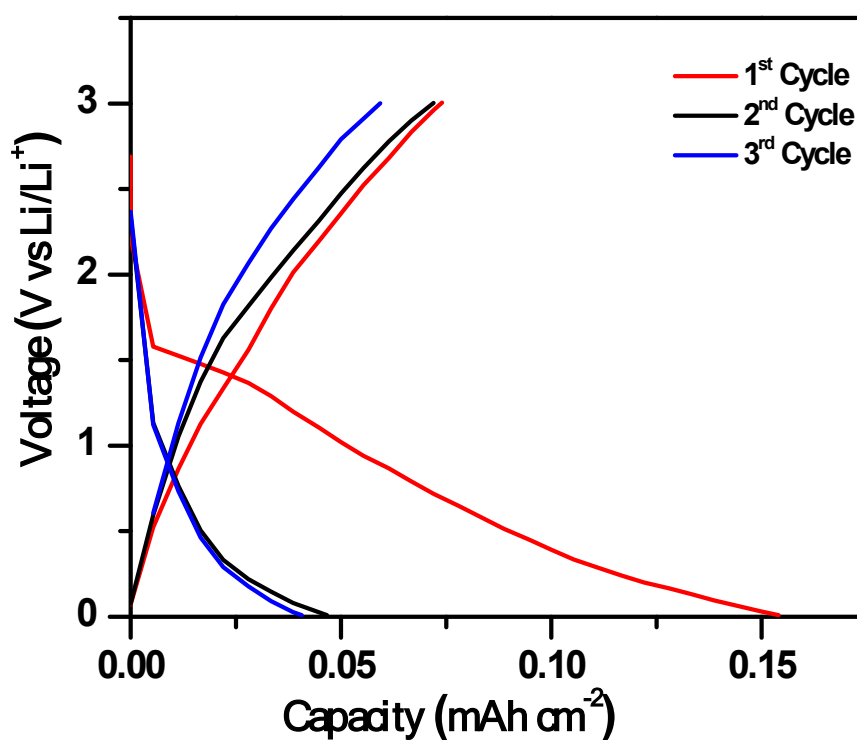


Figure S3. Charge discharge curve of first three cycles for F-CNOF in Li half-cell at current density of 0.05 mA cm⁻²

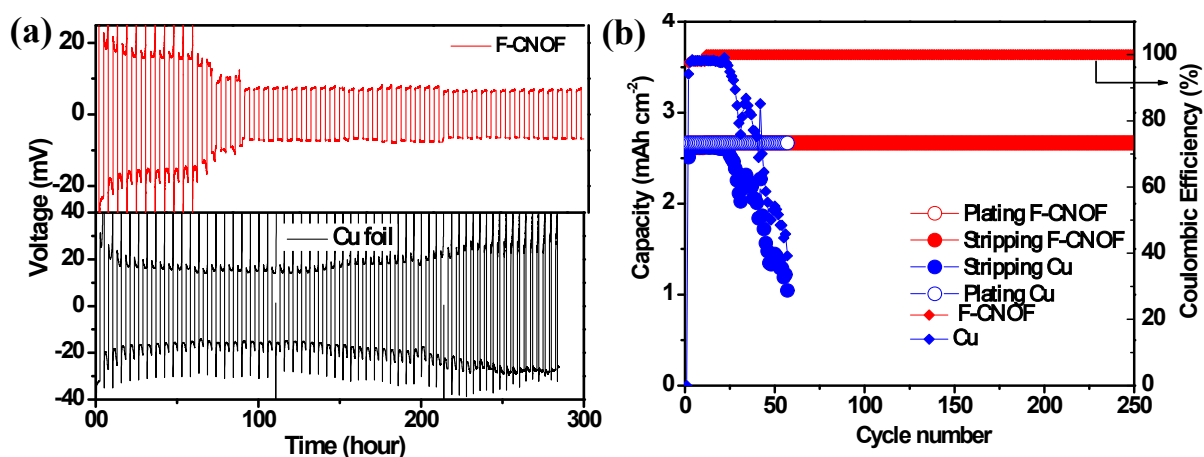


Figure S4. (a) Comparison of the voltage profile and (b) Coulombic efficiency for the plating/stripping cycles of F-CNOF and Cu foil

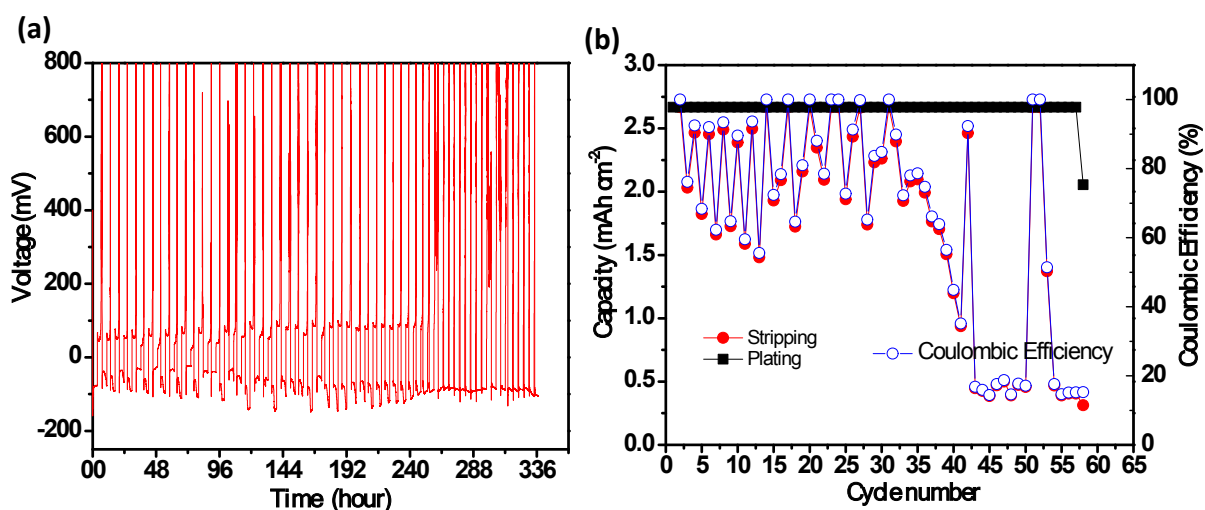


Figure S5. (a) Voltage-time profile and (b) Coulombic efficiency and cyclic stability for the plating/stripping cycles of F-CNOF in LiPF₆ EC:DMC electrolyte.

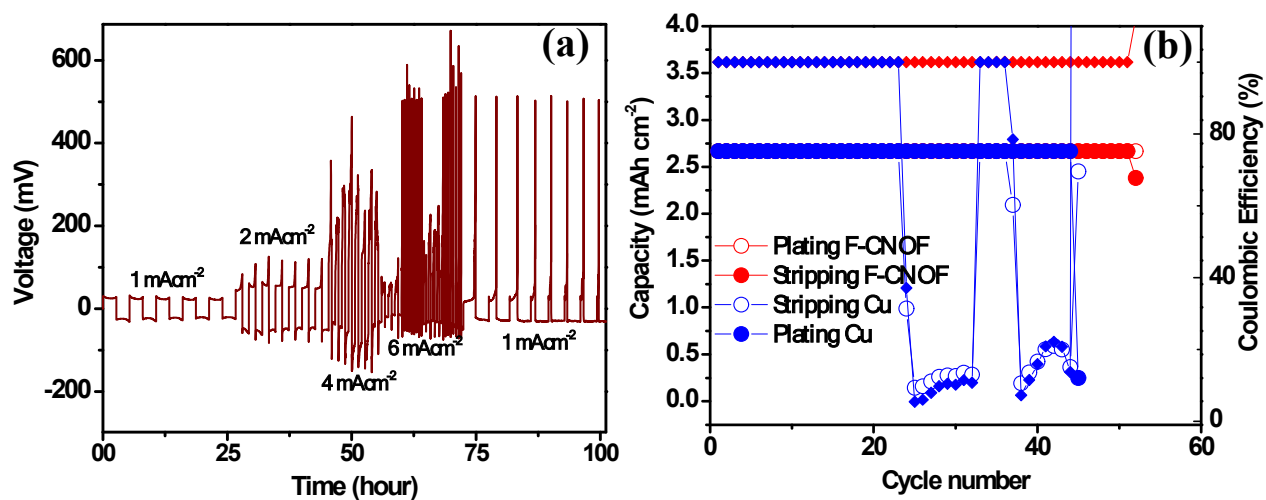


Figure S6. Rate performance of Cu foil at different current densities 1, 2, 4 and 6 mAcm⁻² respectively and (b) Coulombic efficiency comparison of Cu foil and F-CNOF for the rate performance

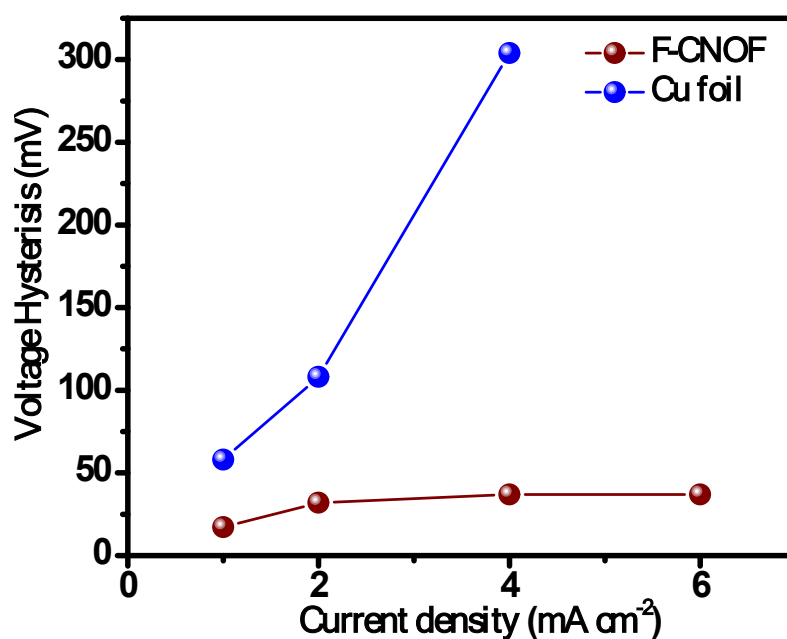


Figure S7. Comparison of voltage hysteresis of F-CNOF and Cu foil at different current densities 1, 2 and 4 mA cm⁻².

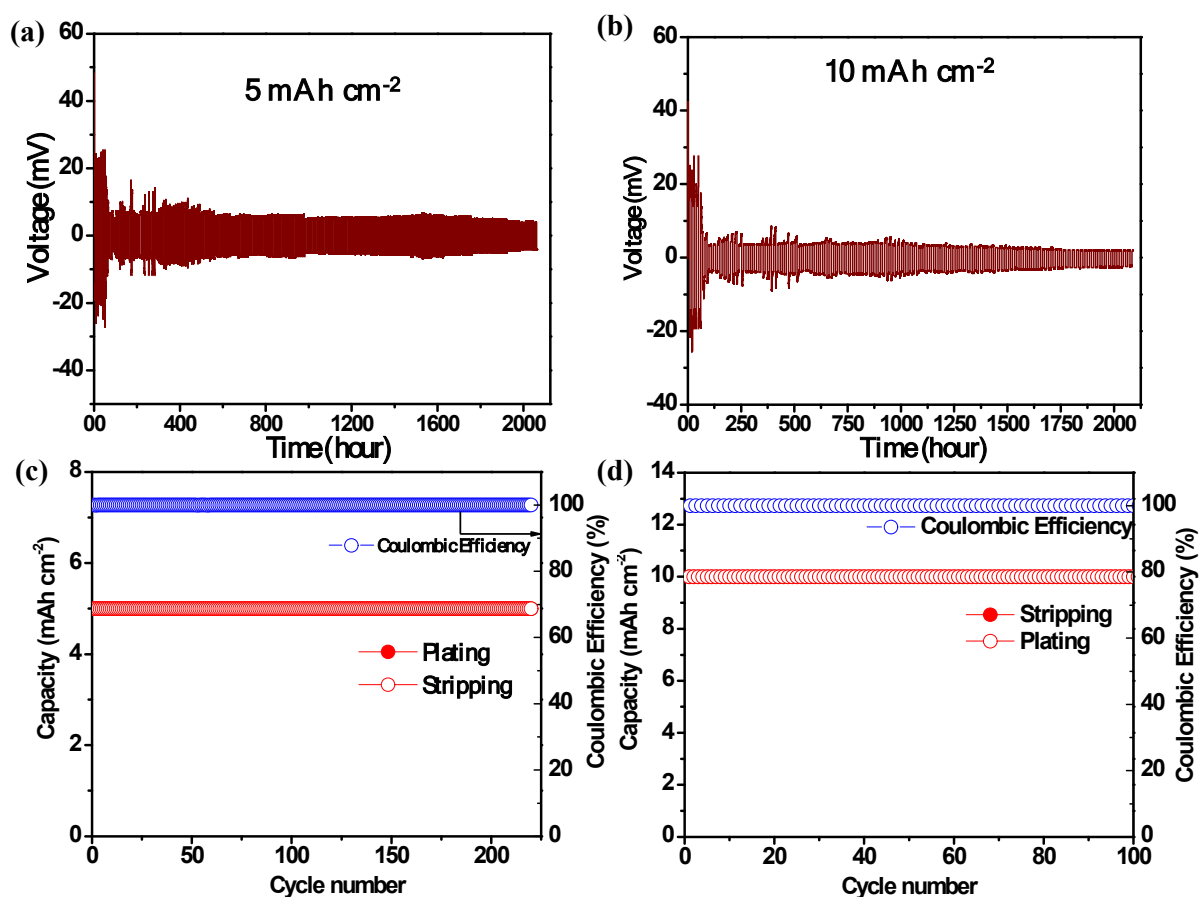


Figure S8. Voltage-time profile of F-CNOF for plating/stripping cycles for capacities (a) 5 mAh cm⁻² and (b) 10 mAh cm⁻² at current density of 1 mA cm⁻². Coulombic efficiency plots for different capacities (c) 5 mAh cm⁻² and (d) 10 mAh cm⁻²

Table S1: Summary of specific capacity obtained for different plating/stripping capacities on the basis of carbon loading and total loading including lithium

Total Plated/Stripped Capacity (mAh)	Area Capacity (mAh cm ⁻²)	Loading of F-CNOF on Cu foil (mg)	Li loading (mg)	Specific Capacity on the basis of F-CNOF weight (mAh g ⁻¹)	Specific Capacity on the basis of total weight (mAh g ⁻¹)
4	2.66	0.8	1.03	5000	2185
7.5	5	0.8	1.93	9375	2747
15	10	0.8	3.86	18750	3218

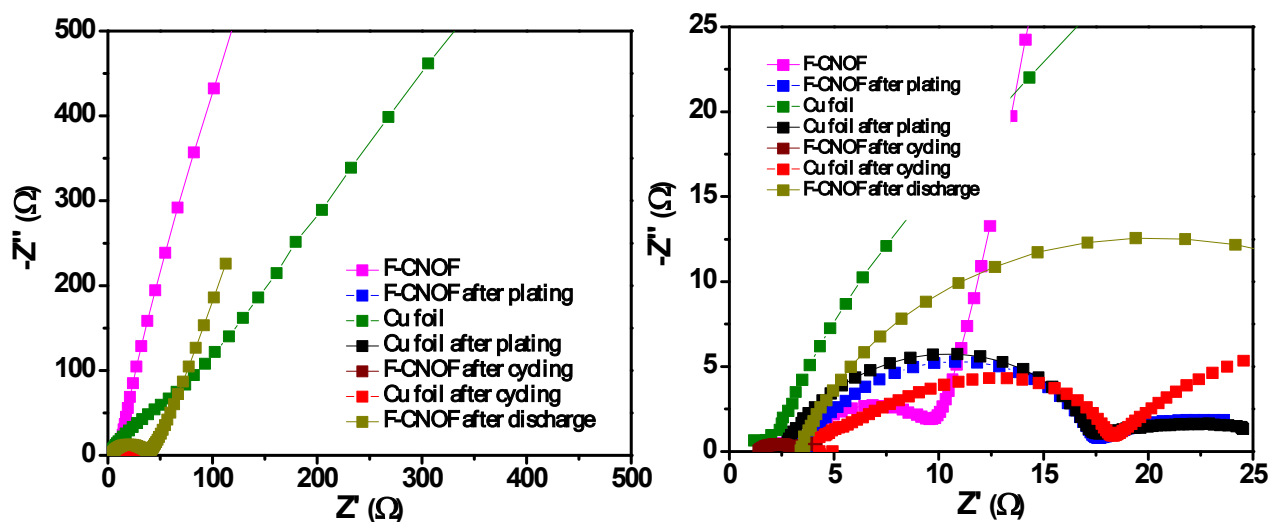


Figure S9. (a) Comparison of Nyquist plots obtained from the EIS measurement of F-CNOF electrode and Cu foil at different stages of plating/stripping (b) Magnified in the high frequency region

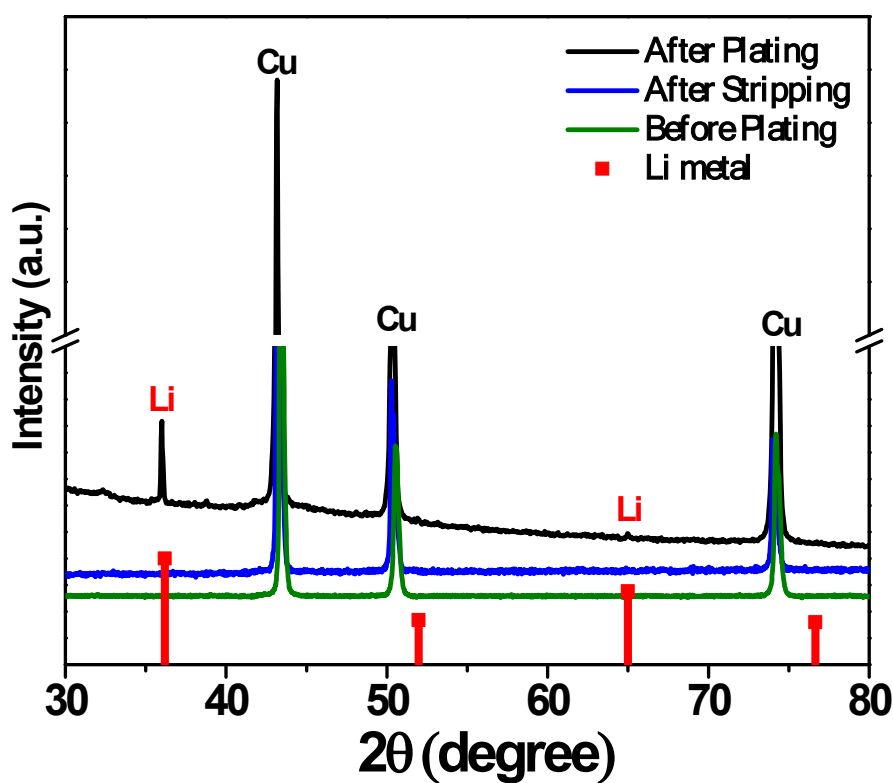


Figure S10. X-ray diffraction patterns of fresh F-CNOF, F-CNOF before and after plating.

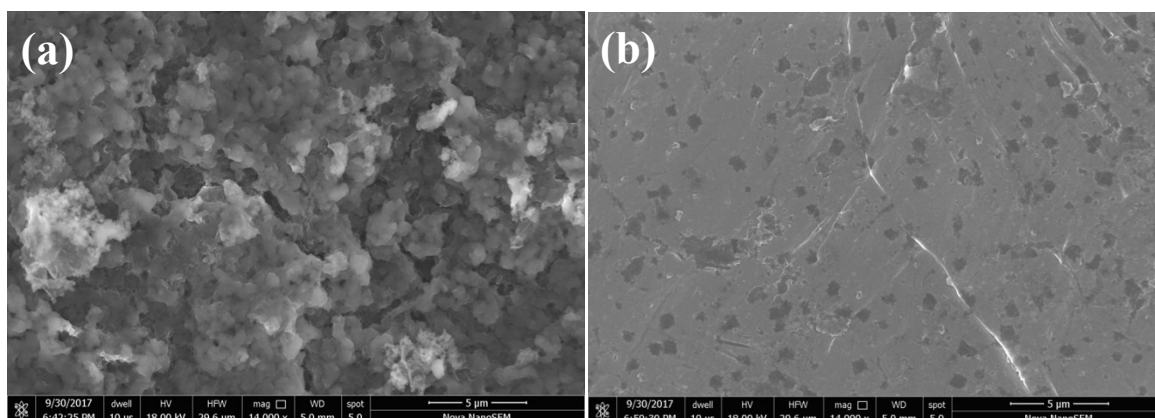


Figure S11. Surface morphologies of the F-CNOF electrodes after plating (a) 2.6 mAh cm^{-2} and (b) 5 mAh cm^{-2}

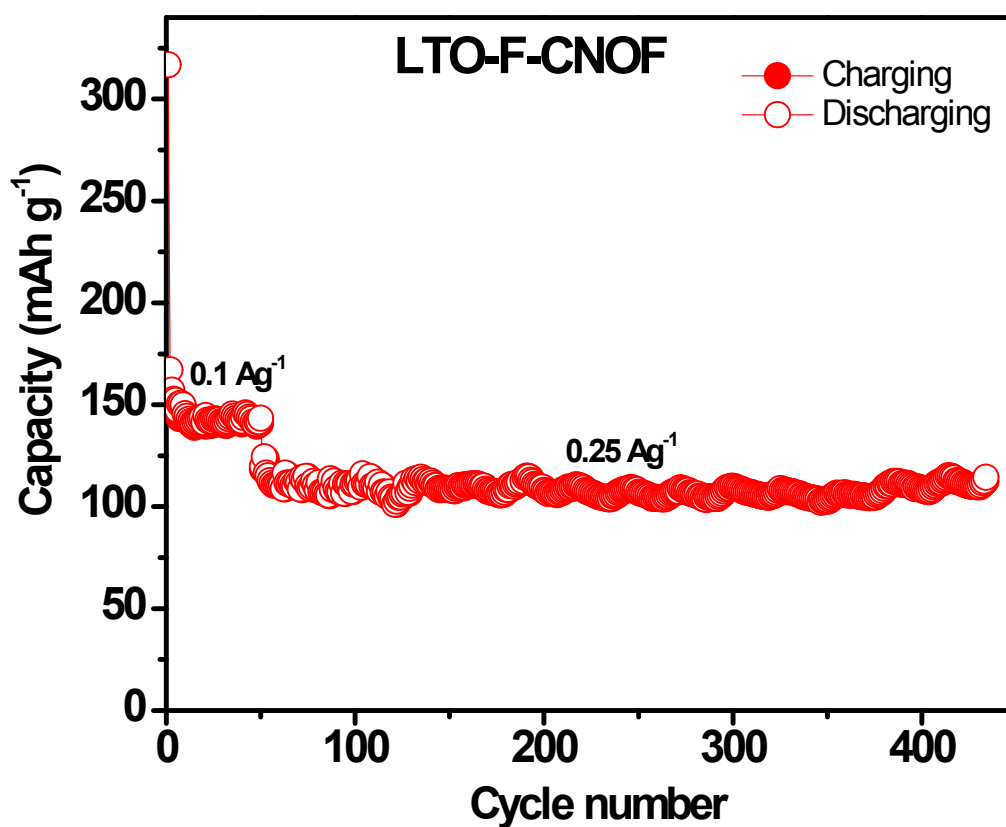


Figure S12: Charge-discharge cycling performance of the full cell with LTO as the positive and F-CNOF|Li as the negative electrode

