

Supporting Information

Perfluoroaryl-Elemental Sulfur S_NAr Chemistry in Covalent Triazine Frameworks with High Sulfur Contents for Lithium-Sulfur Batteries

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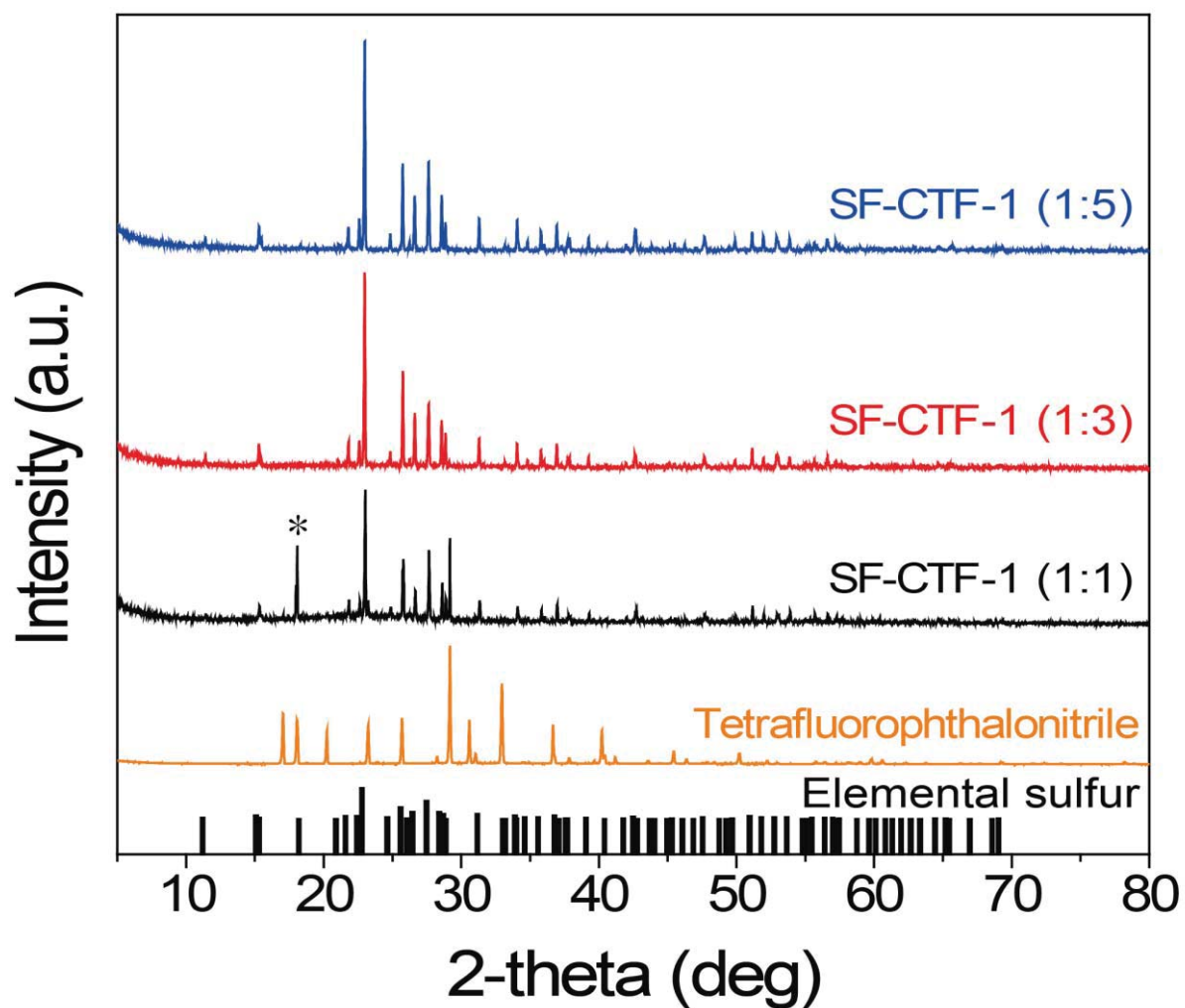


Figure S1. Powder X-ray diffraction patterns of SF-CTF-1 series, tetrafluorophthalonitrile and elemental sulfur. XRD pattern of elemental sulfur is referenced by JCPDS card (No. 08-0247).

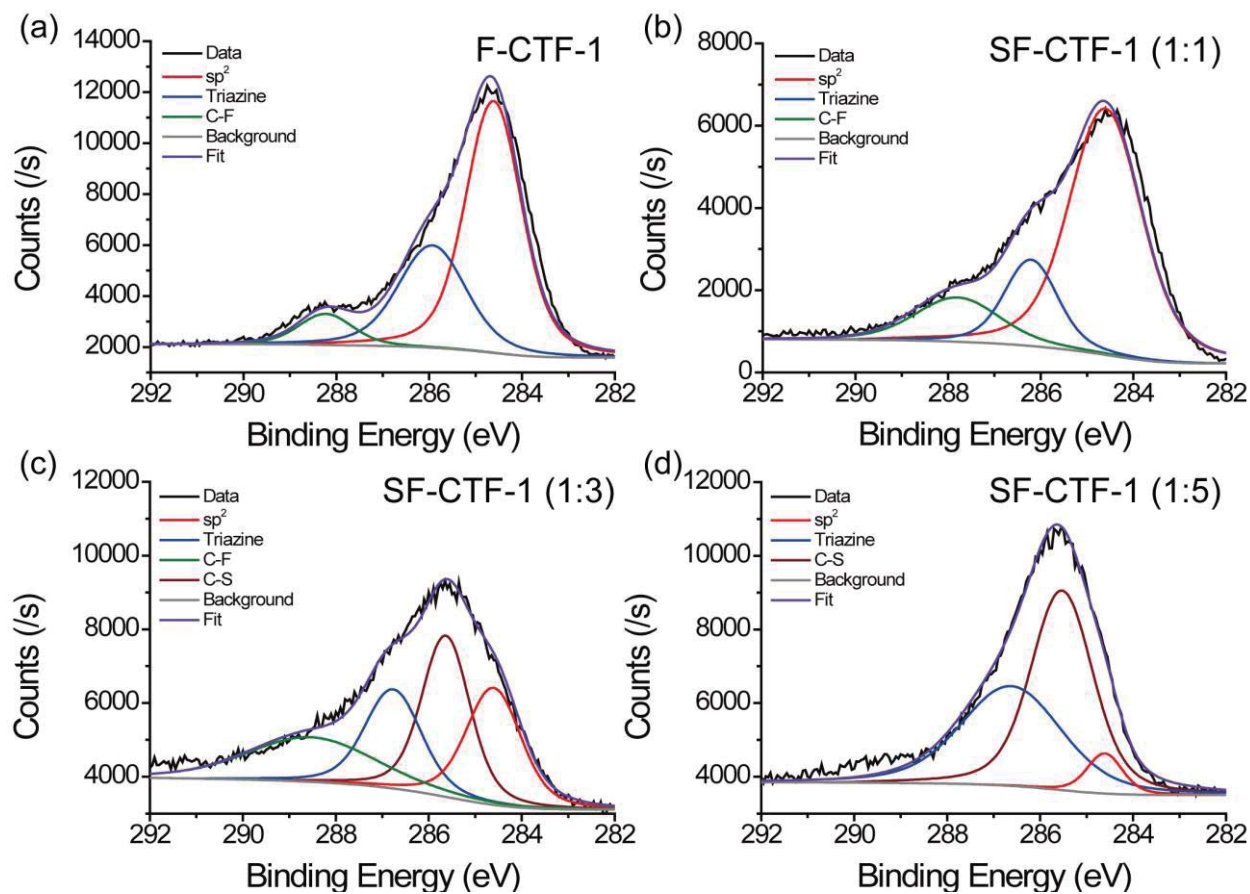


Figure S2. XPS C1s spectra of (a) F-CTF-1, (b) SF-CTF (1:1), (c) SF-CTF (1:3), and (d) SF-CTF (1:5).

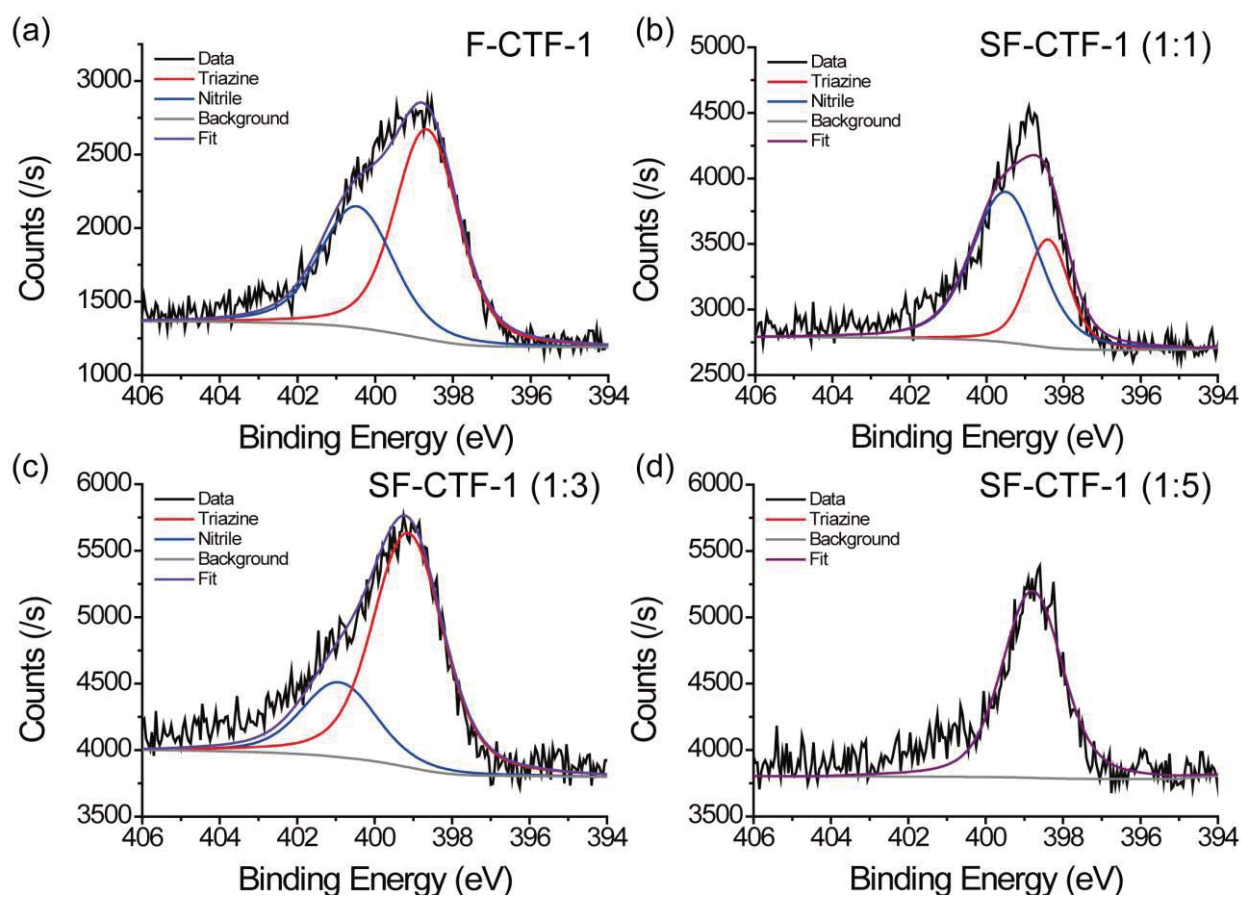


Figure S3. XPS N1s spectra of (a) F-CTF-1, (b) SF-CTF (1:1), (c) SF-CTF (1:3), and (d) SF-CTF (1:5).

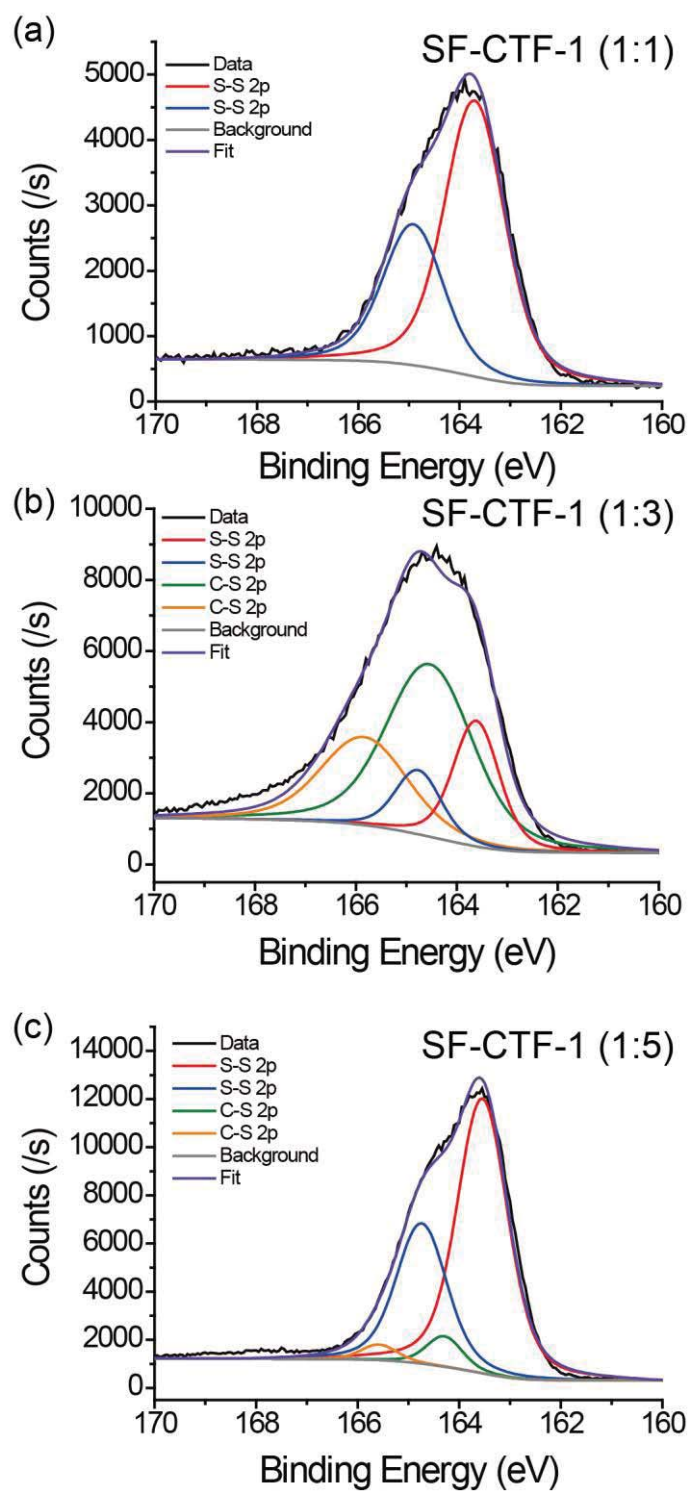


Figure S4. XPS S_{2p} spectra of (a) SF-CTF (1:1), (b) SF-CTF (1:3), and (c) SF-CTF (1:5).

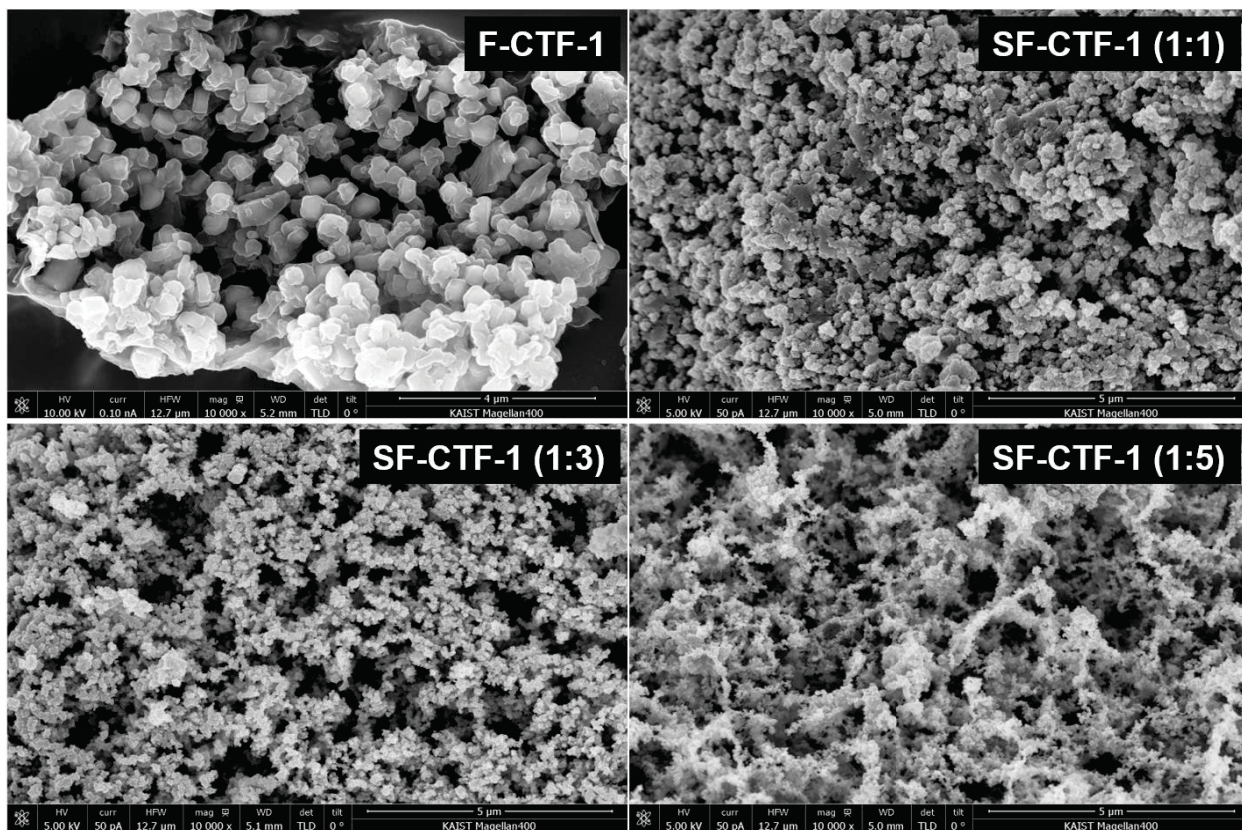


Figure S5. FE-SEM images of F-CTF-1 and SF-CTF-1s.

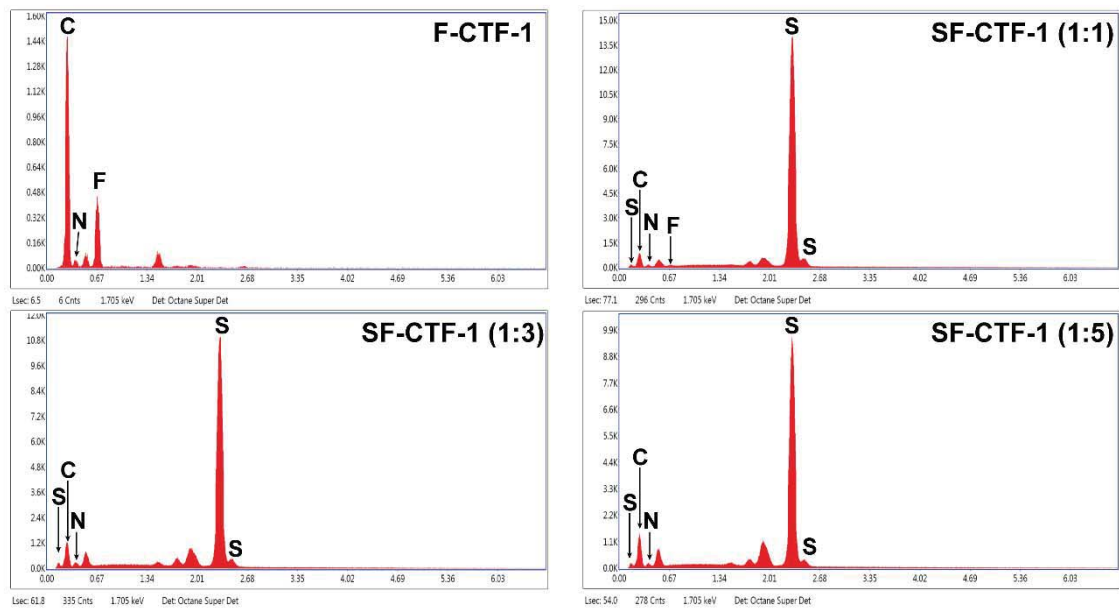


Figure S6. Energy-dispersive X-ray spectroscopy survey spectra of F-CTF-1 and SF-CTF-1s.

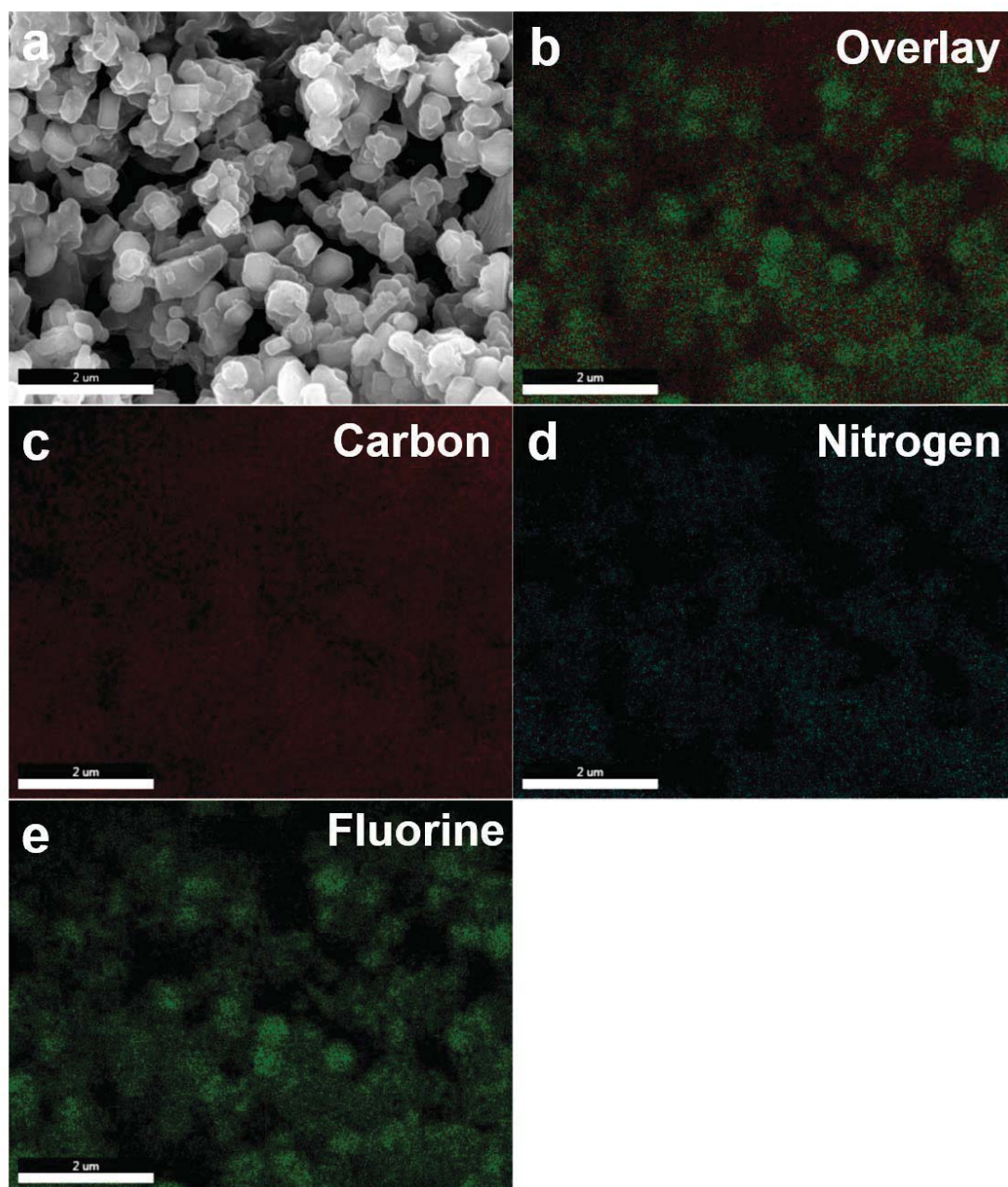


Figure S7. Elemental mapping of F-CTF-1. (a) SEM image, (b) an overlaid EDX image. EDX elemental mapping with respect to carbon (c), nitrogen (d), and fluorine (e).

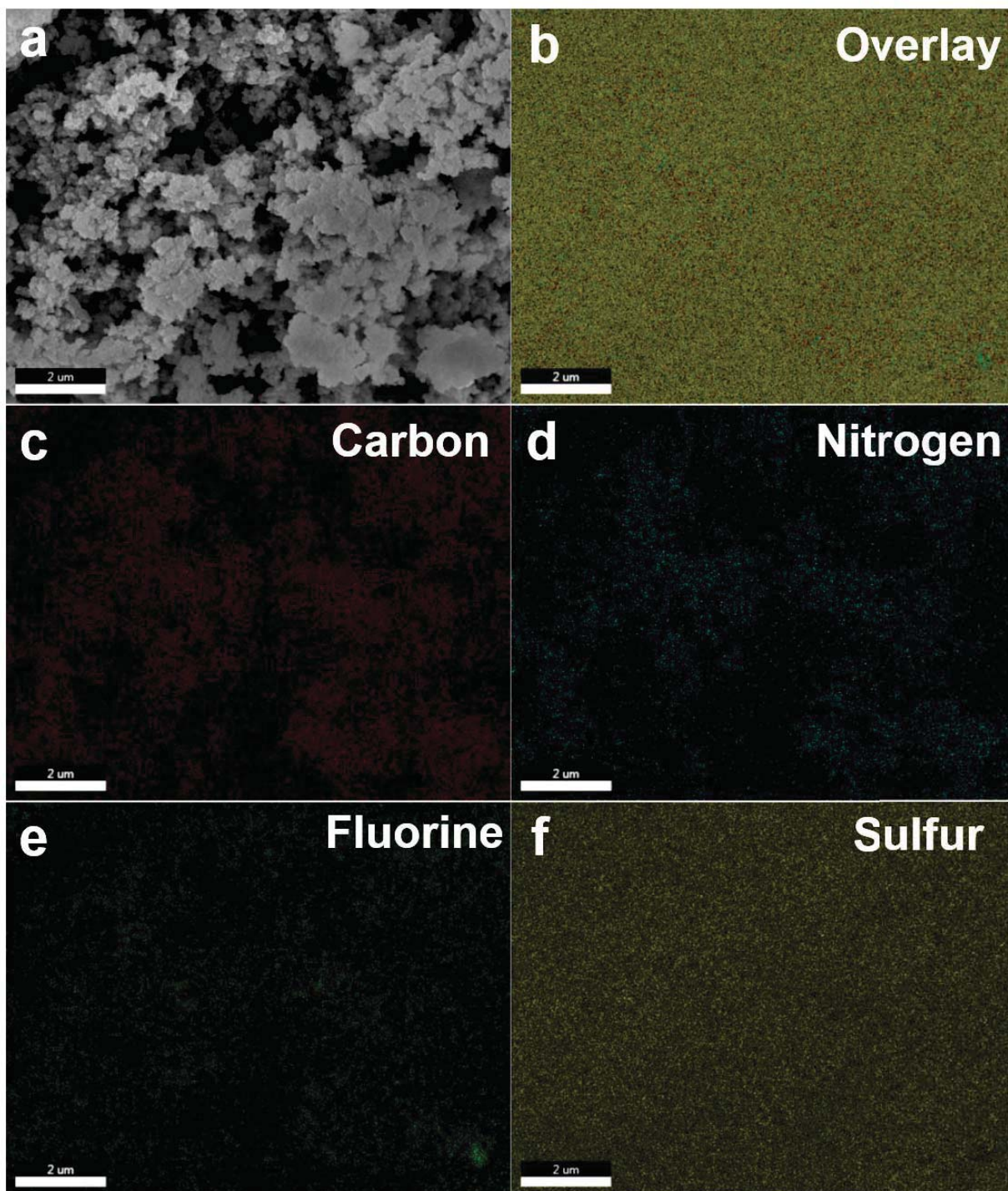


Figure S8. Elemental mapping of SF-CTF-1 (1:1). (a) SEM image, (b) an overlaid EDX image. EDX elemental mapping with respect to carbon (c), nitrogen (d), fluorine (e), and sulfur (f).

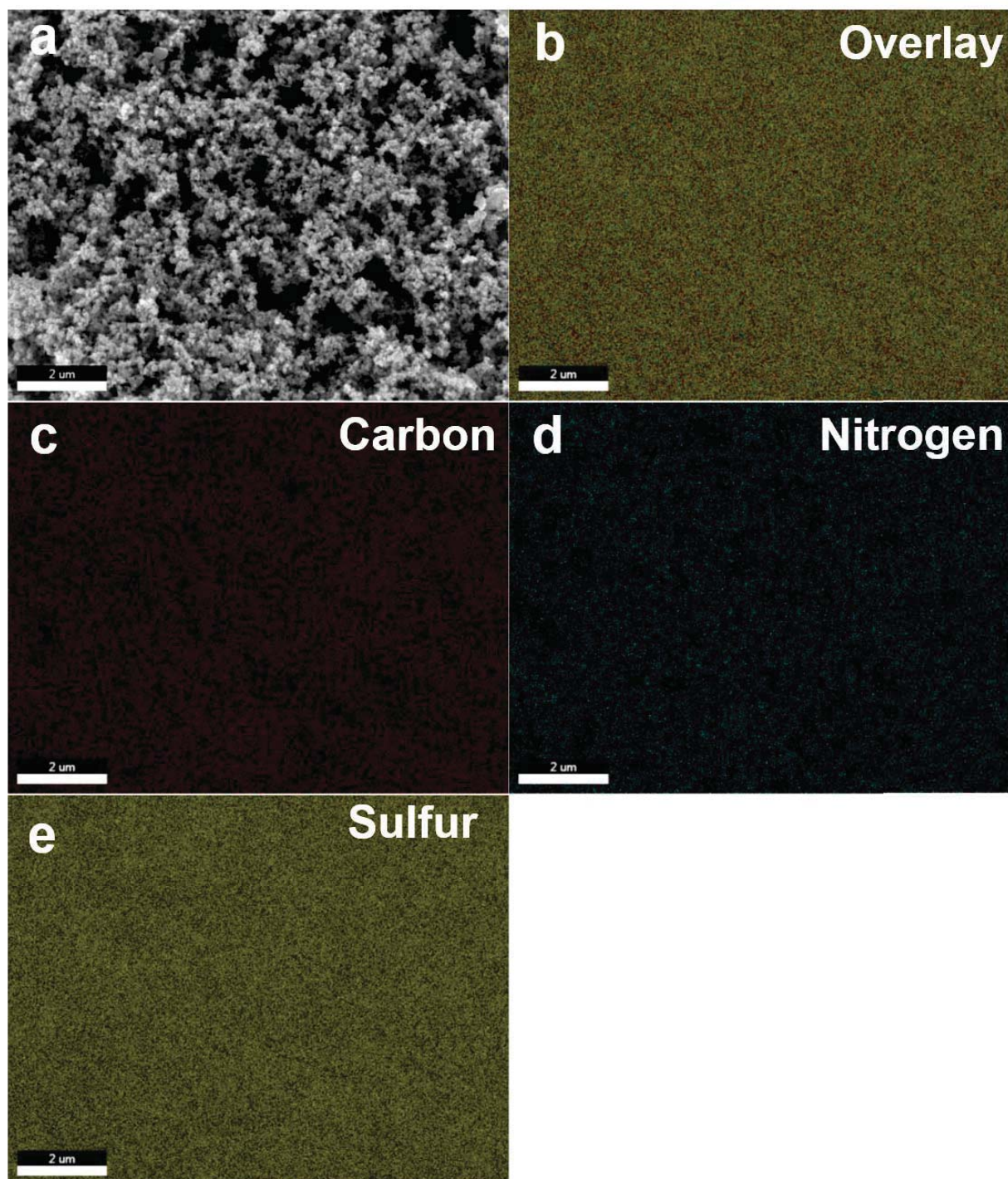


Figure S9. Elemental mapping of SF-CTF-1 (1:3). (a) SEM image, (b) an overlaid EDX image. EDX elemental mapping with respect to carbon (c), nitrogen (d), and sulfur (e).

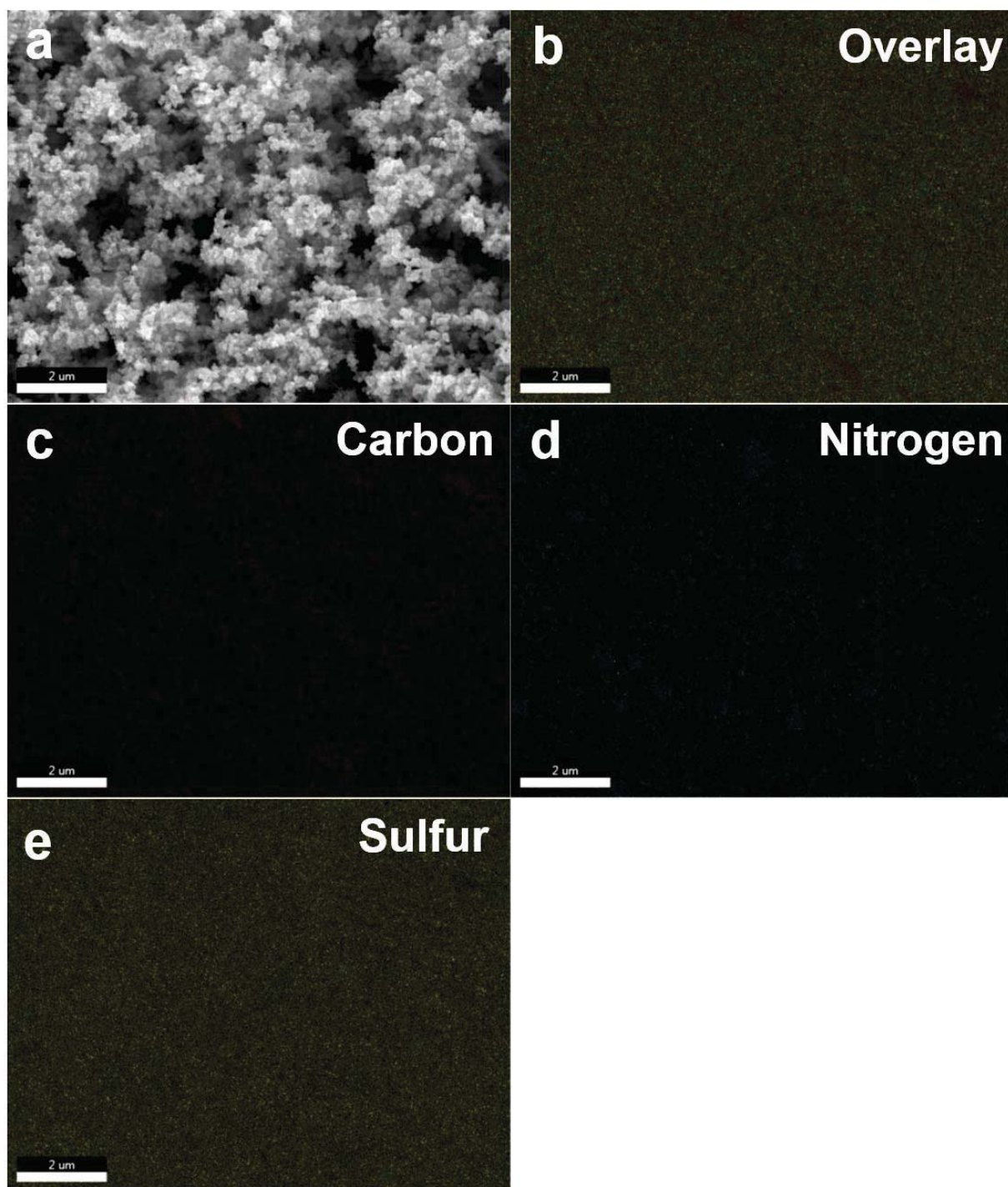


Figure S10. Elemental mapping of SF-CTF-1 (1:5). (a) SEM image, (b) an overlaid EDX image. EDX elemental mapping with respect to carbon (c), nitrogen (d), and sulfur (e).

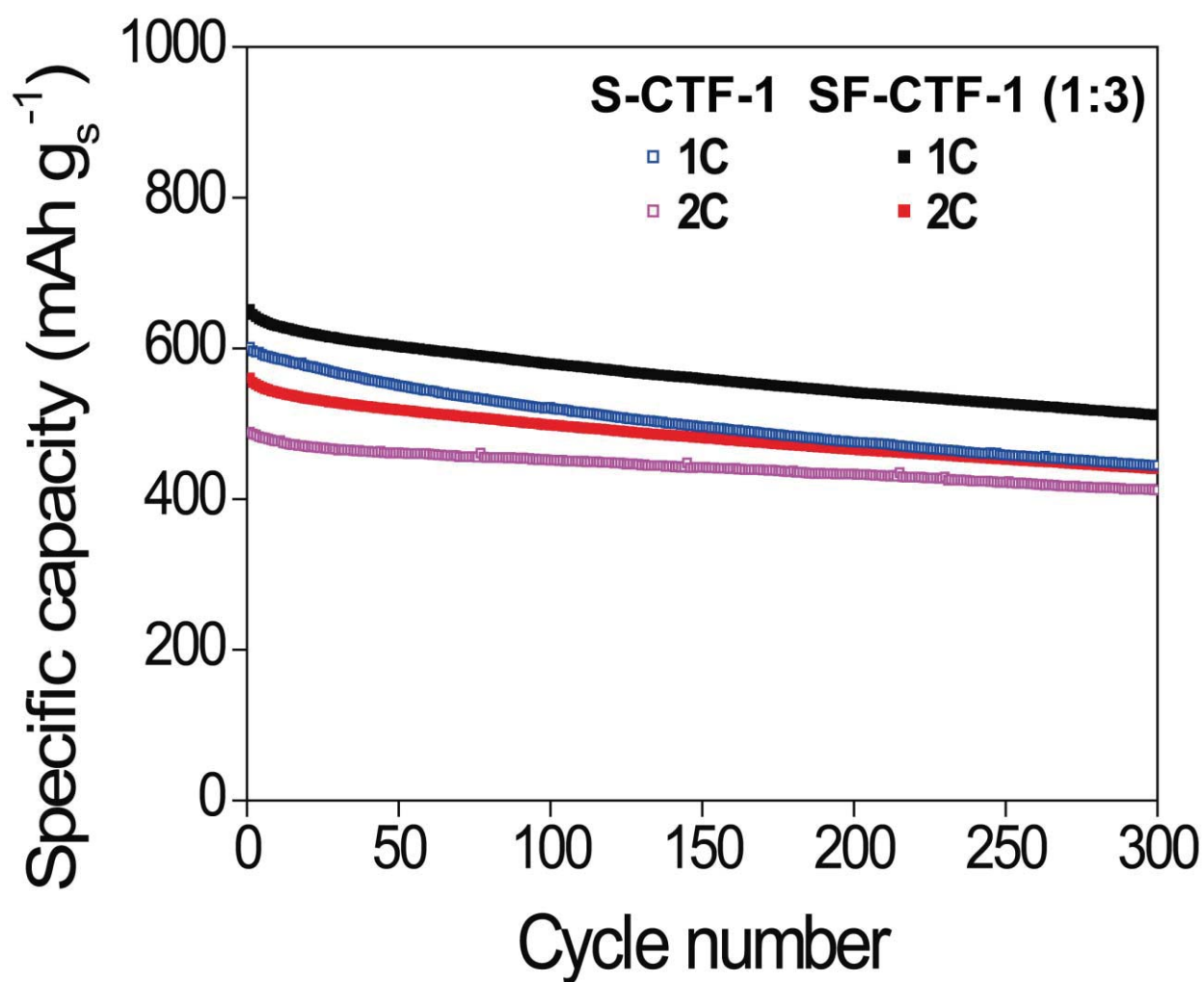


Figure S11. The comparison of the cycling performance of S-CTF-1 (1:3) and SF-CTF-1 (1:3). Areal mass loading = $0.70 \text{ mg}_{\text{sulfur}} \text{ cm}^{-2}$.

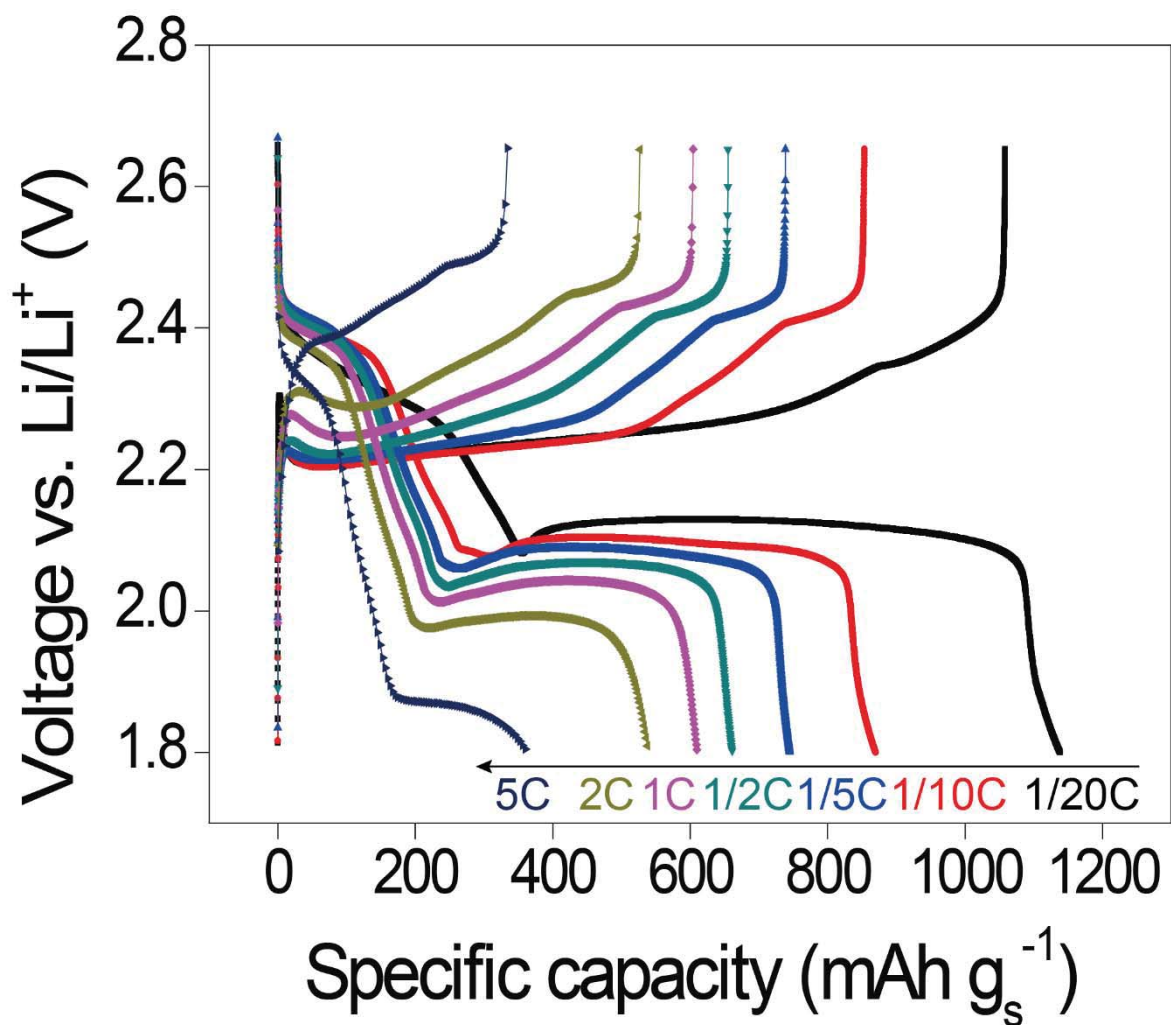


Figure S12. Voltage vs. capacity profiles of SF-CTF-1 (1:3) at various C-rates. At each C-rate, the charging and discharging rates were the same. 1C=1000 mA g⁻¹.

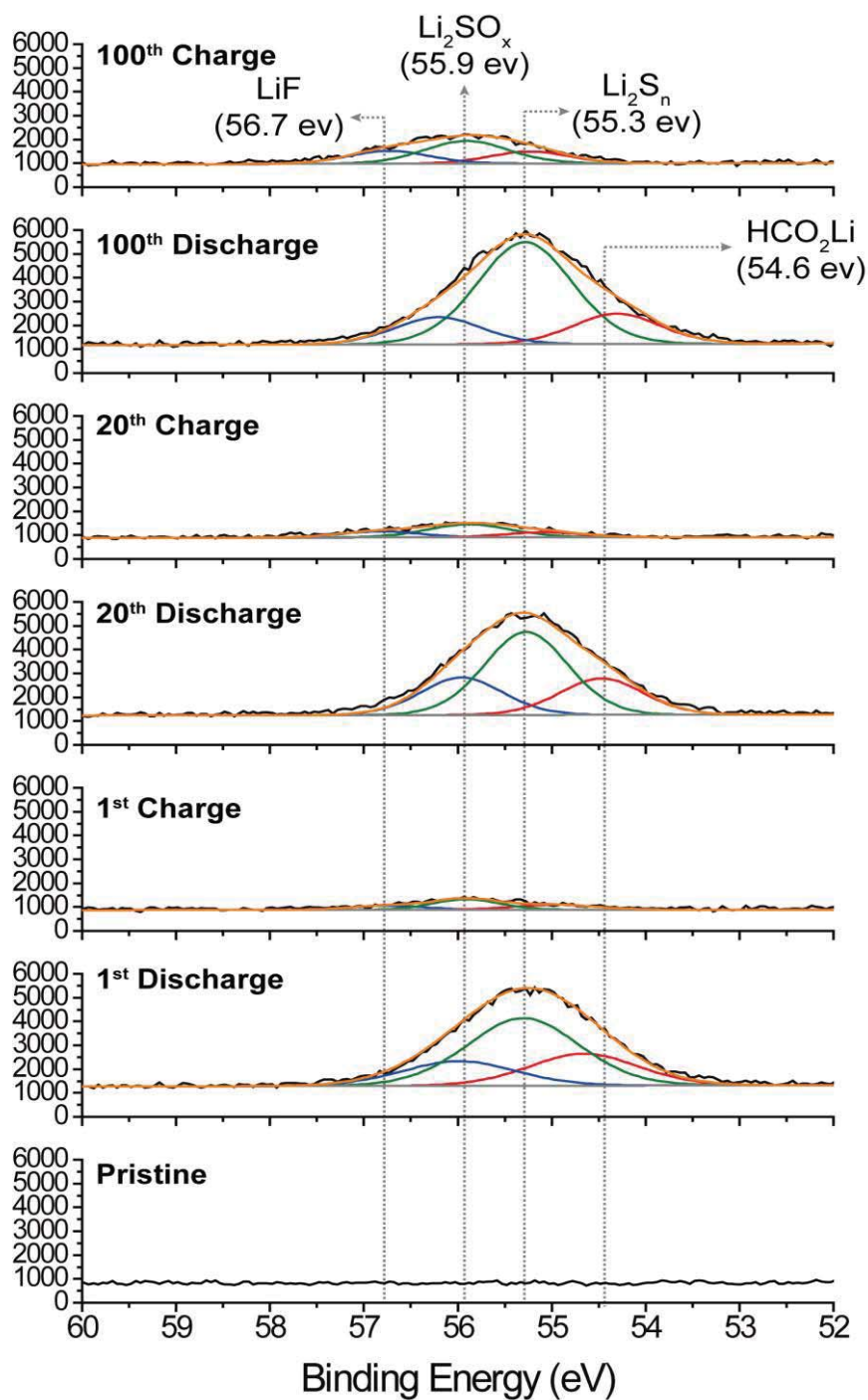


Figure S13. *Ex-situ* Li 1s XPS spectra of SF-CTF-1 (1:3) at the pristine, 1st, 20th, and 100th cycles. All cells were measured at 1C (1000 mA g⁻¹).