Article

Reprocessible, Reusable, and Self-Healing Polymeric Adsorbent for Removing Perfluorinated Pollutants

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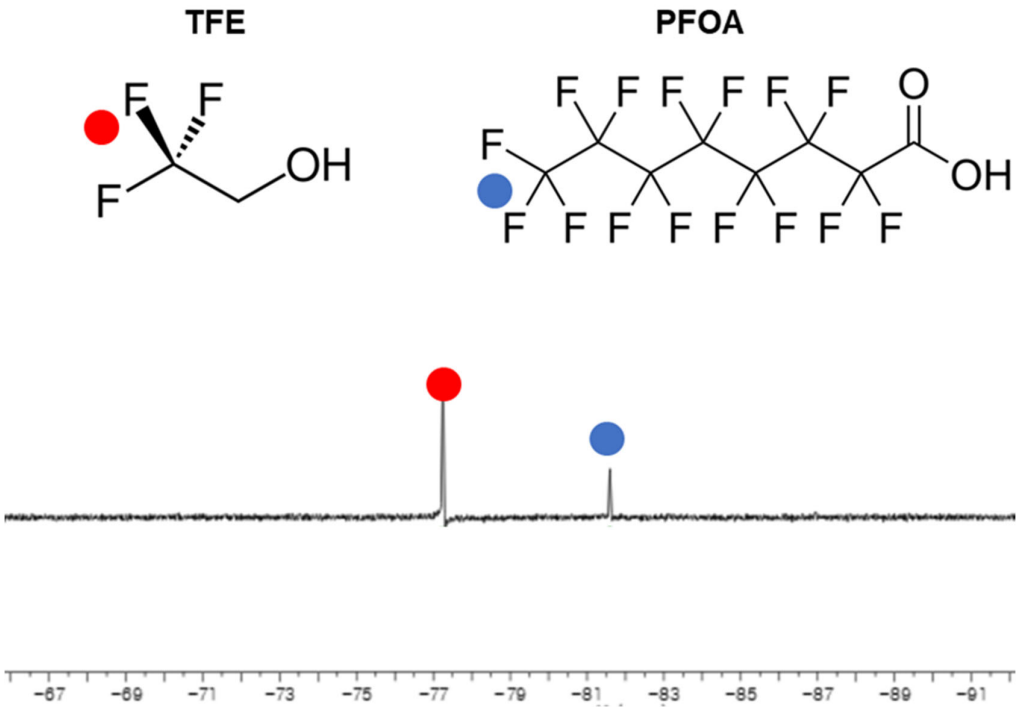
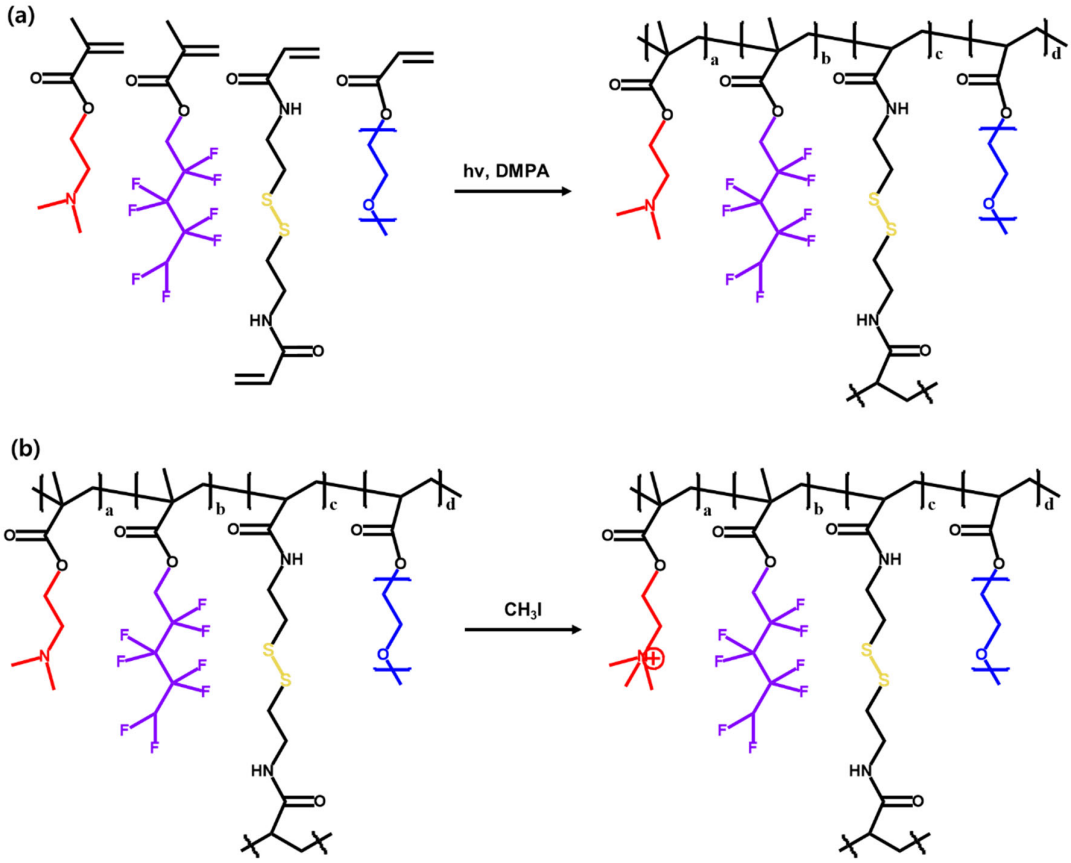


Figure S1. ^{19}F NMR spectra showing the residual PFOA in the aqueous solution with TFE as an internal standard. -CF_3 in TFE -76.0 ppm was referenced to the signal from -CF_3 in PFOA at -81.5 ppm to calculate the concentration of the residual amount of PFOA (C_r) after adsorption experiments.



Scheme S1. Scheme for the (a) synthesis of the fluorinated copolymer hydrogel by photoinitiated free-radical polymerization followed by (b) quaternization of tertiary amine groups.

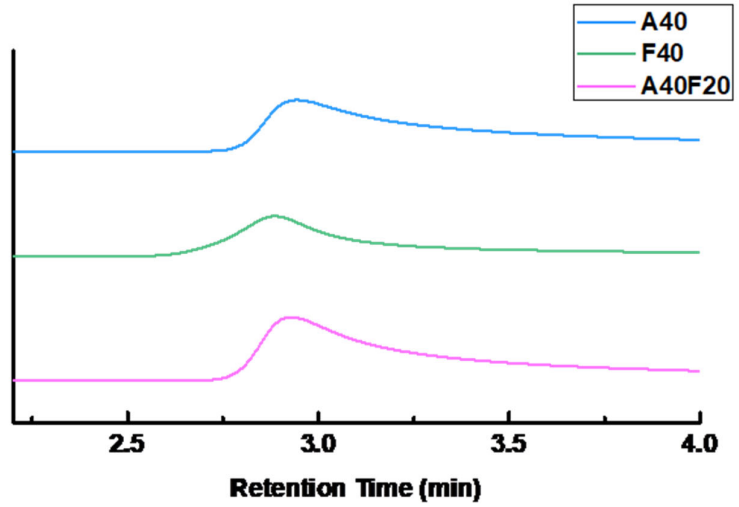


Figure S2. GPC results for the selected, representative hydrogels in Table 1.

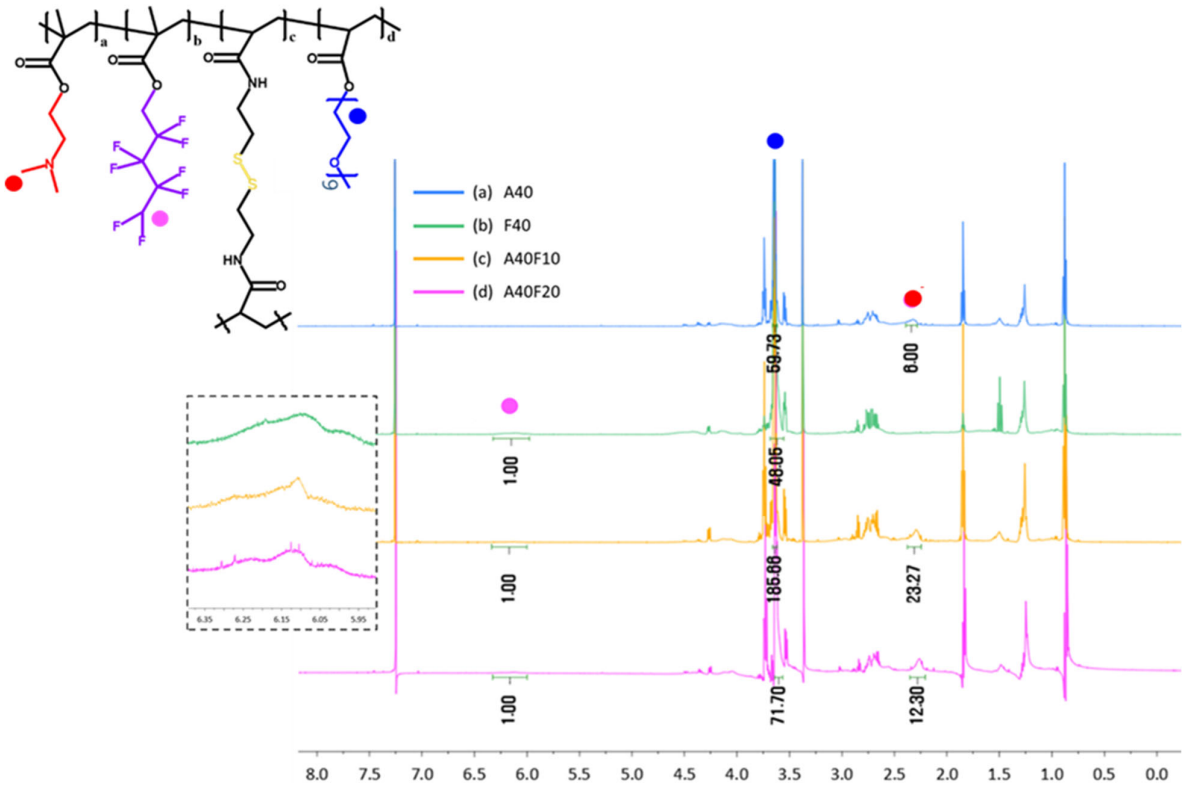


Figure S3. ^{1}H NMR results of hydrogels. Signals from protons of -N(CH_3)$_2$ in PDMAEMA, PEG, and -CF_2H in POFPMA appear in 2.3 ppm (pink), 3.5 ppm (blue), and 6.2 ppm (red), respectively.

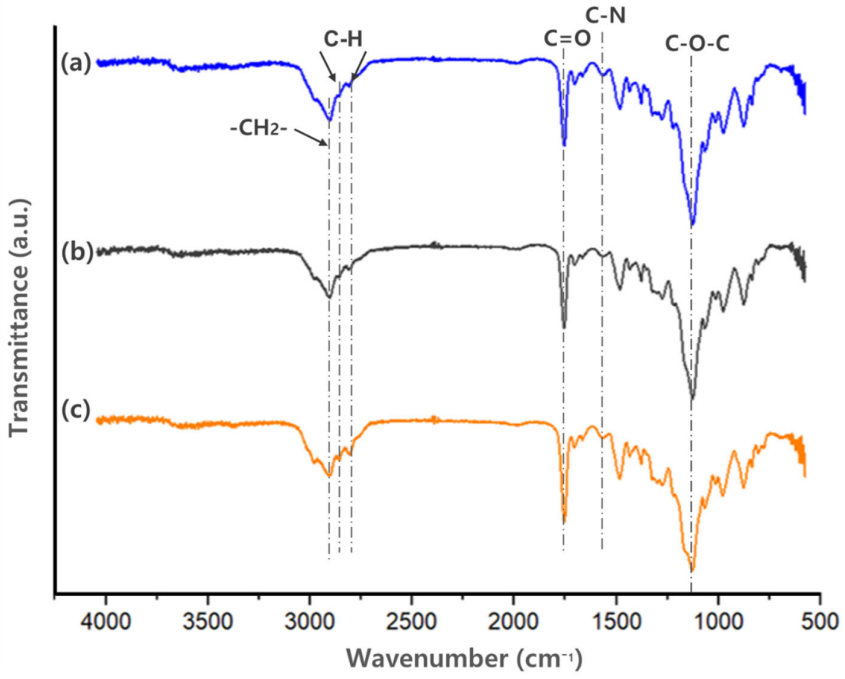


Figure S4. FT-IR spectra of (a) A20, (b) A30, and (c) A40.

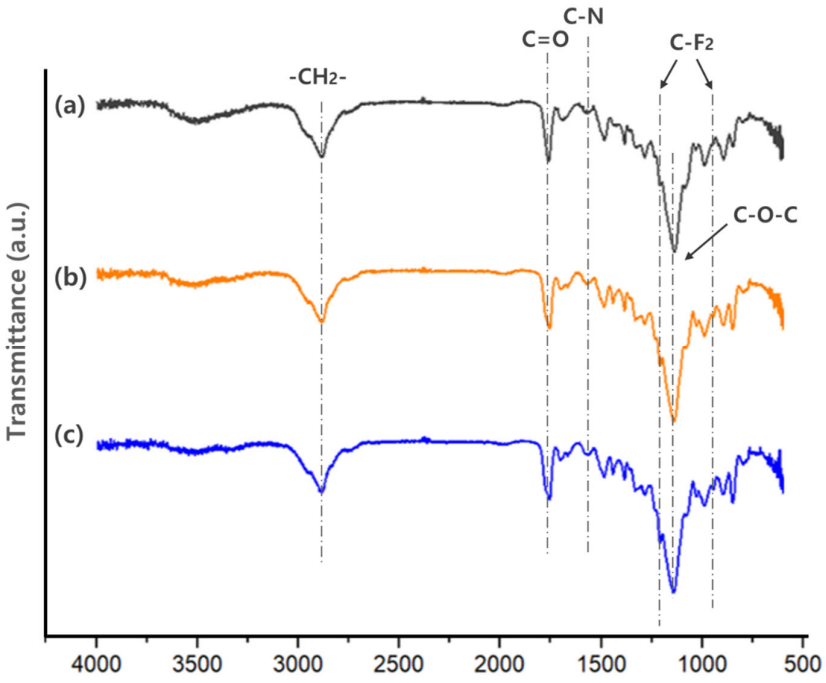


Figure S5. FT-IR spectra of (a) F20, (b) F30, and (c) F40.

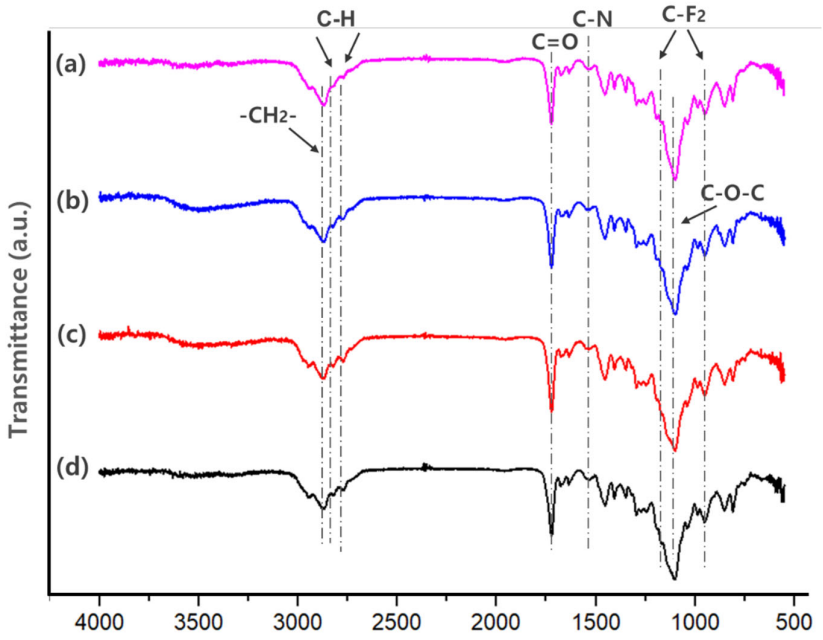


Figure S6. FT-IR spectra of (a) A20F10, (b) A30F10, (c) A40F10, (d) A40F20.

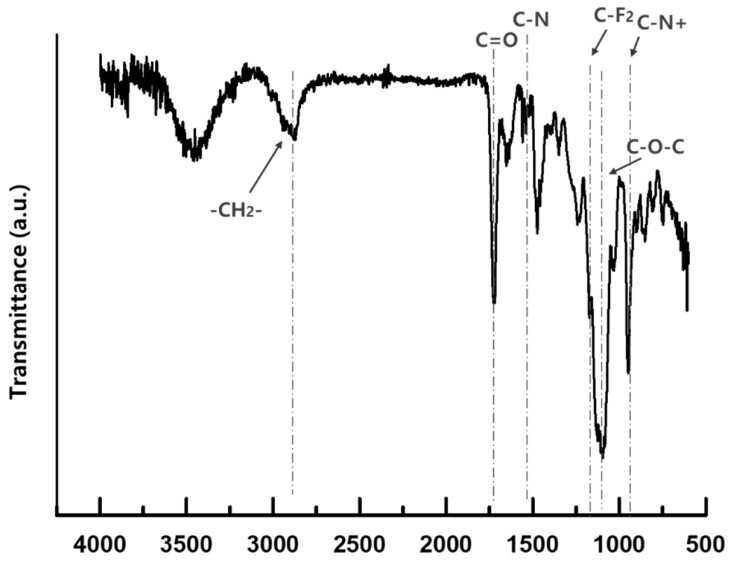


Figure S7. FT-IR spectra of A40F10+.

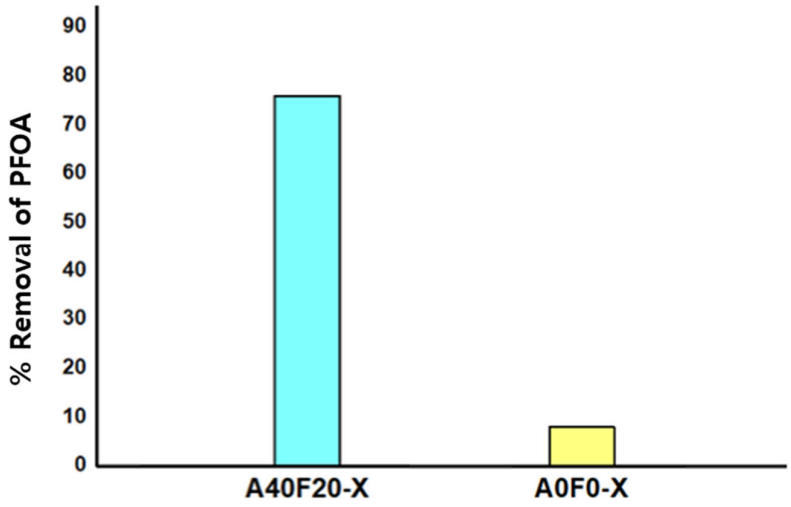


Figure S8. Removal efficiency of A40F20-X and A0F0-X.

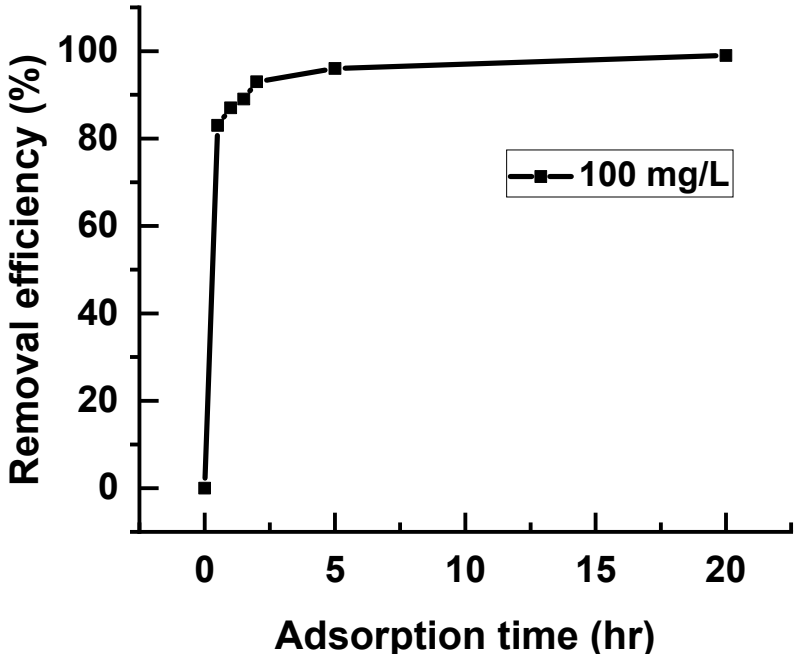


Figure S9. Adsorption kinetics of PFOA using A40F20+ hydrogel at 100 mg/L.

Table S1. Summary of estimated adsorption capacity.

Sample	Adsorption Capacity (mg/g)
A20F10	2.4
A30F10	2.6
A40F10	2.8
A40F20	3.4
A40F10+	4.0
A40F20+	4.0

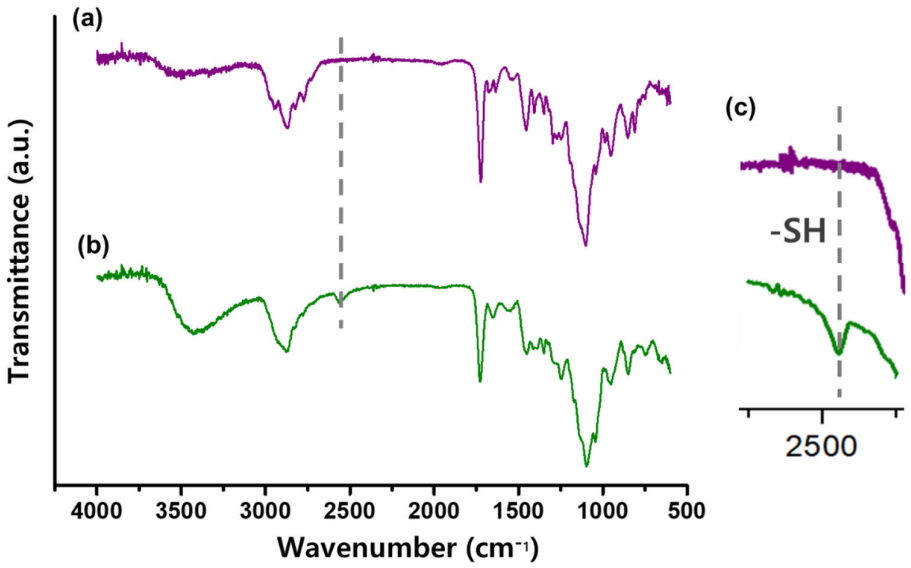


Figure S10. FT-IR spectra (a) before and (b) after DTT treatment. (c) Magnified spectra near 2460 cm^{-1} showing the presence of -SH peak after DTT treatment.

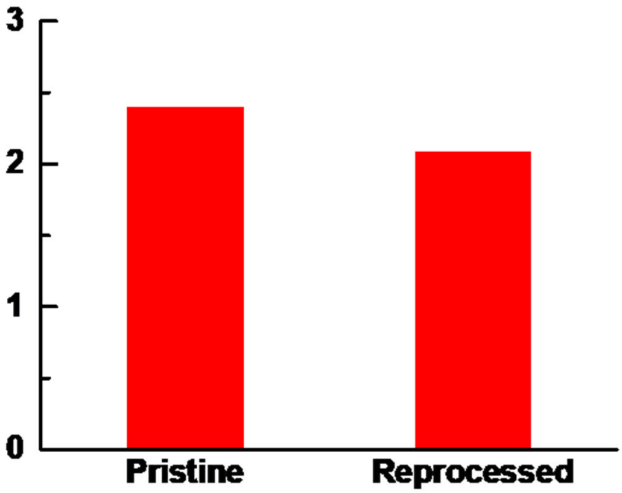


Figure S11. Adsorption capacity of pristine hydrogel and reprocessed hydrogel.

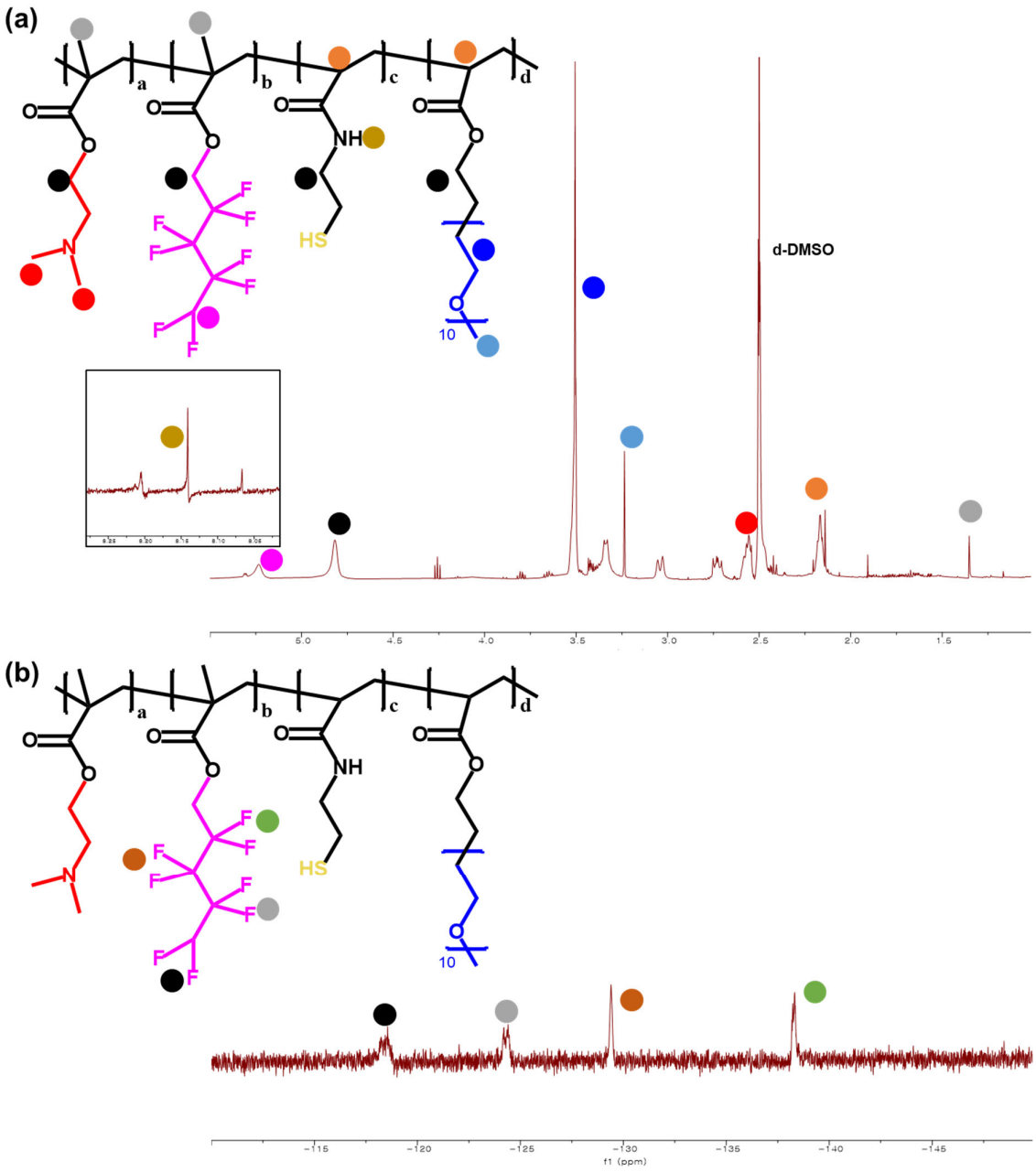


Figure S12. (a) ^{1}H and (b) ^{19}F NMR spectra of the polymer after cleavage of disulfide bond.

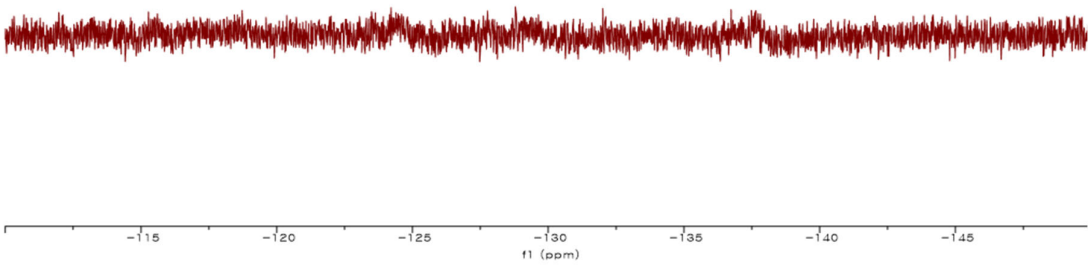


Figure S13. ^{19}F NMR of the micelle in D_2O after the self-assembly, showing disappearance of fluorine signals to reflect that the OFPMA groups constitute the core.