

Supporting information

Synthesis of a polymerizable fluorosurfactant for the construction of stable nanostructured proton-conducting membranes

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1. Sodium 5-iodooctafluoro-3-oxapentanesulfonate (6)

Figure S1. ¹⁹F NMR spectrum of 6.

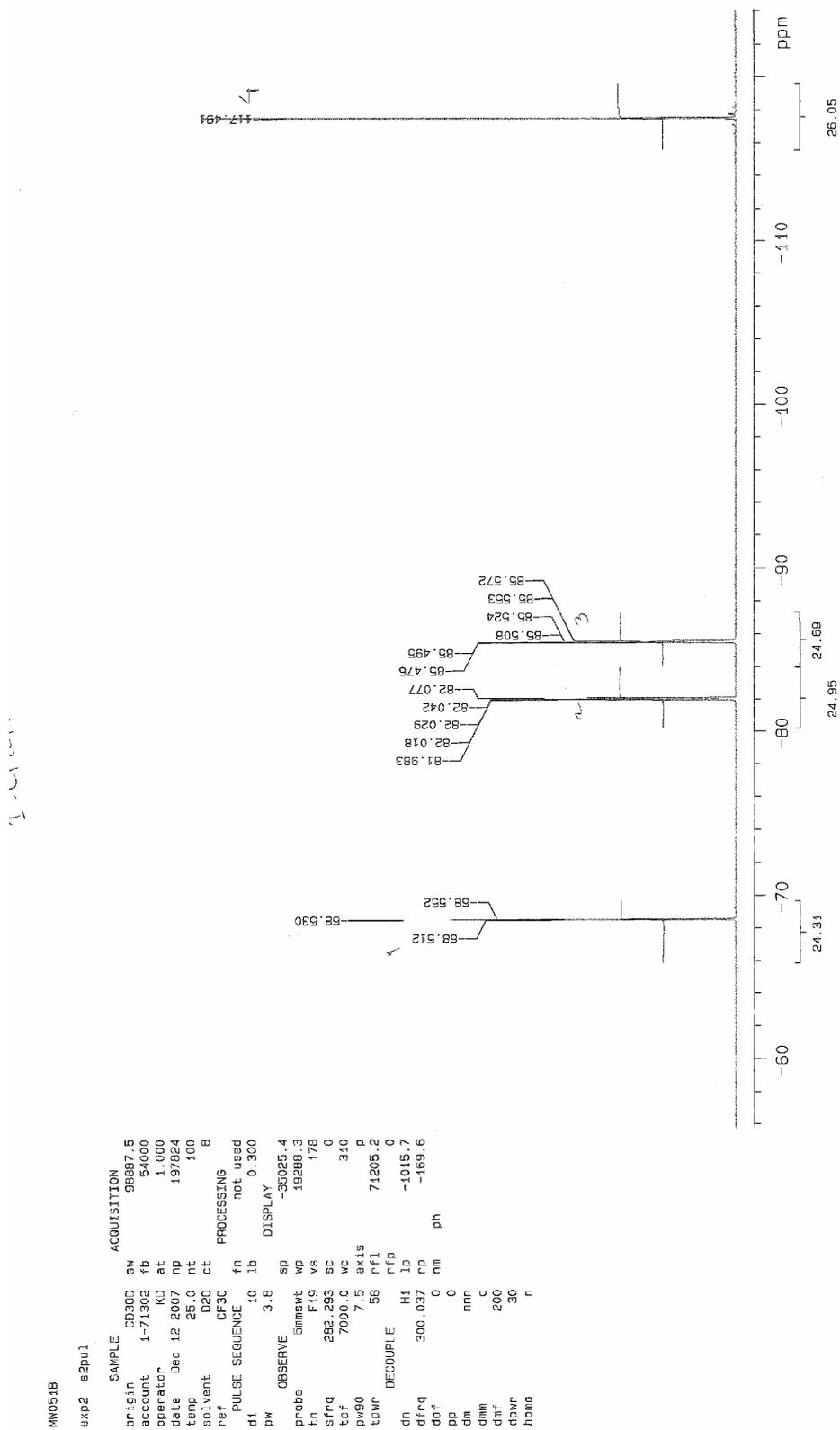
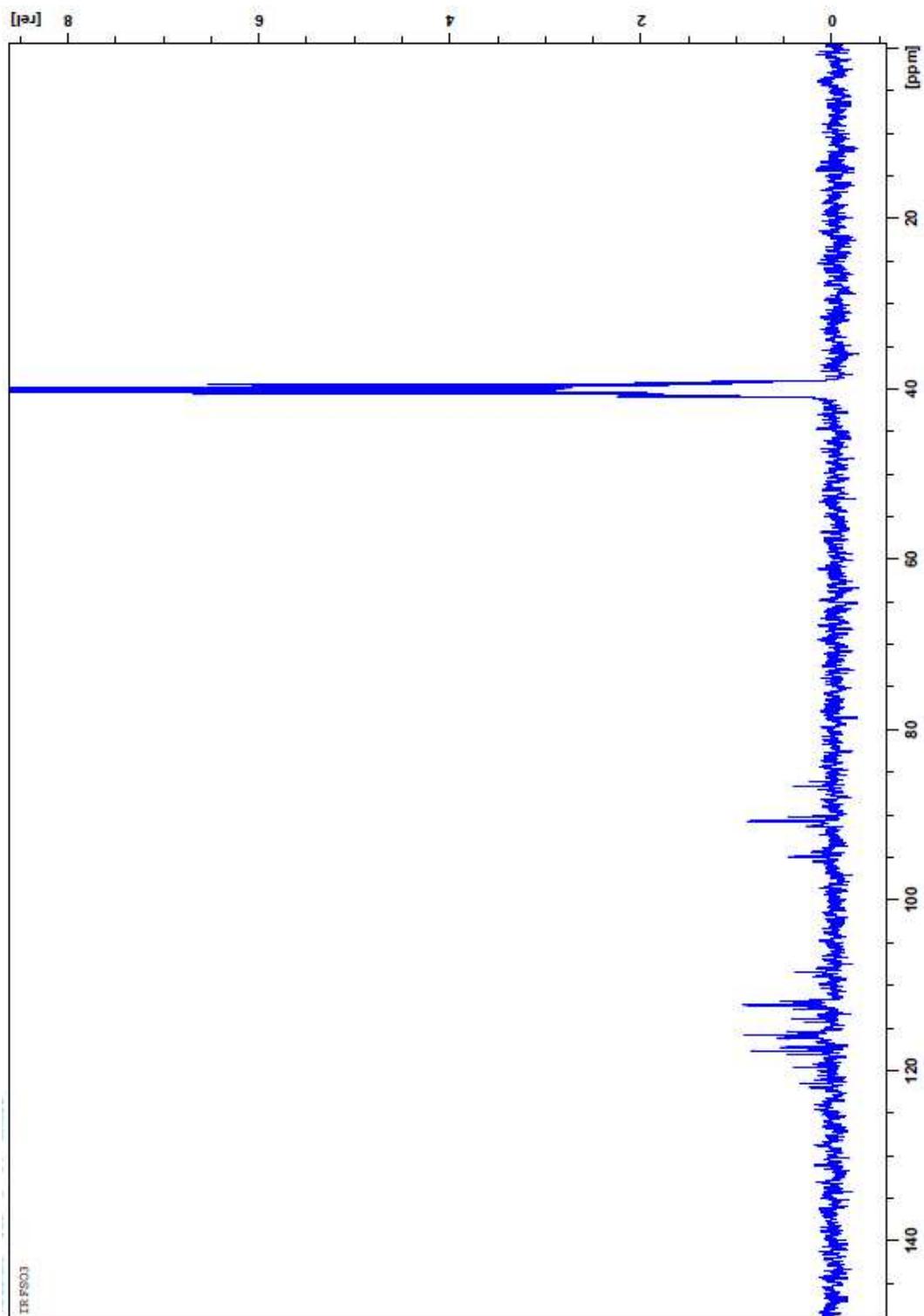


Figure S2. ^{13}C NMR spectrum of **6**.



2. 1-Ethyl-4-(perfluorohexyl)benzene (**5a**)

Figure S3. ¹H NMR spectrum of **6**.

5a

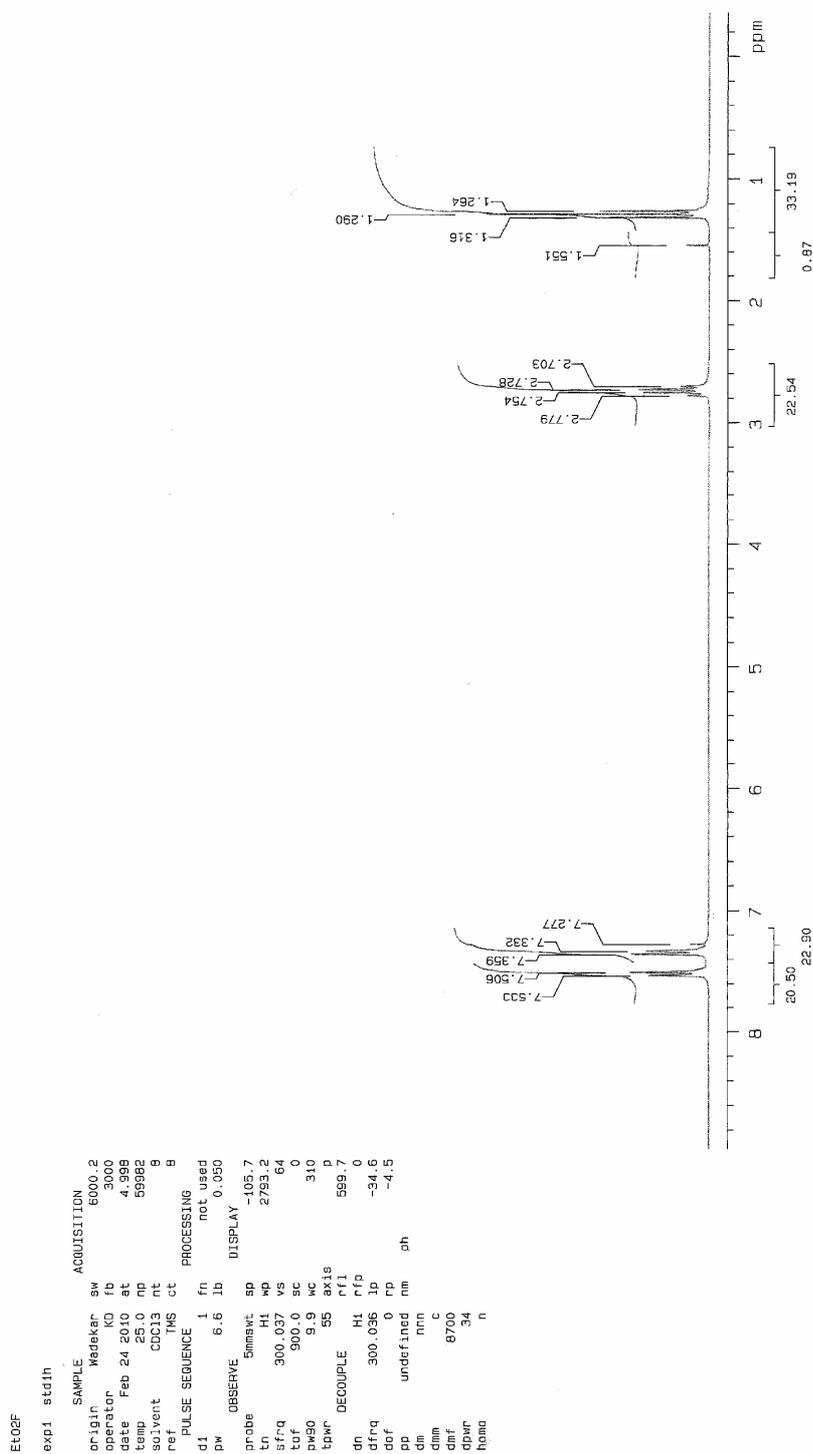


Figure S4. ¹⁹F NMR spectrum of **6**.

5
C1=CC=C(C=C1)C2=CC=CC=C2

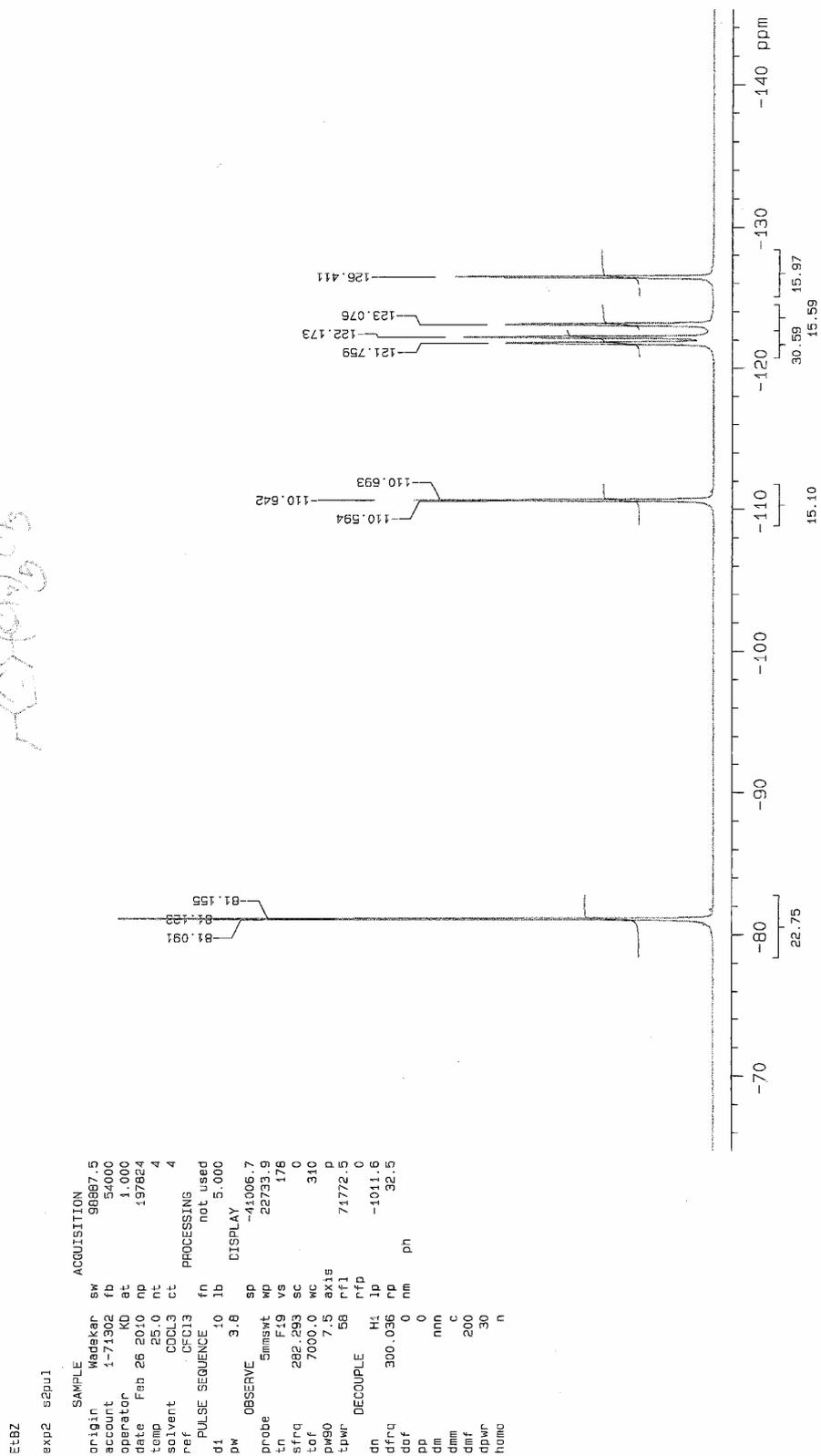


Figure S5. ^1H and ^{19}F coupled ^{13}C NMR spectrum of **6**.

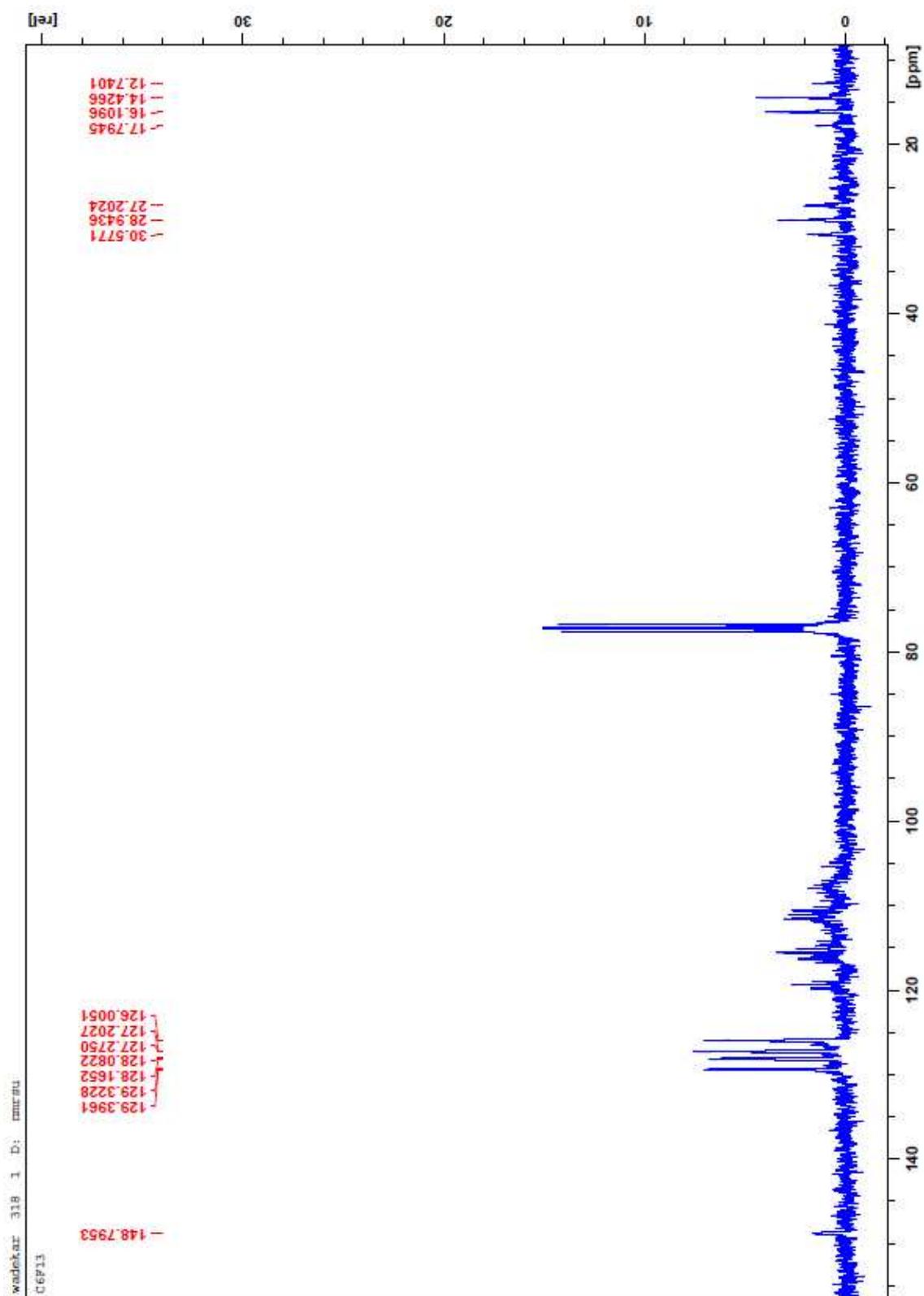


Figure S6. ^1H decoupled ^{13}C NMR spectrum of **6**.

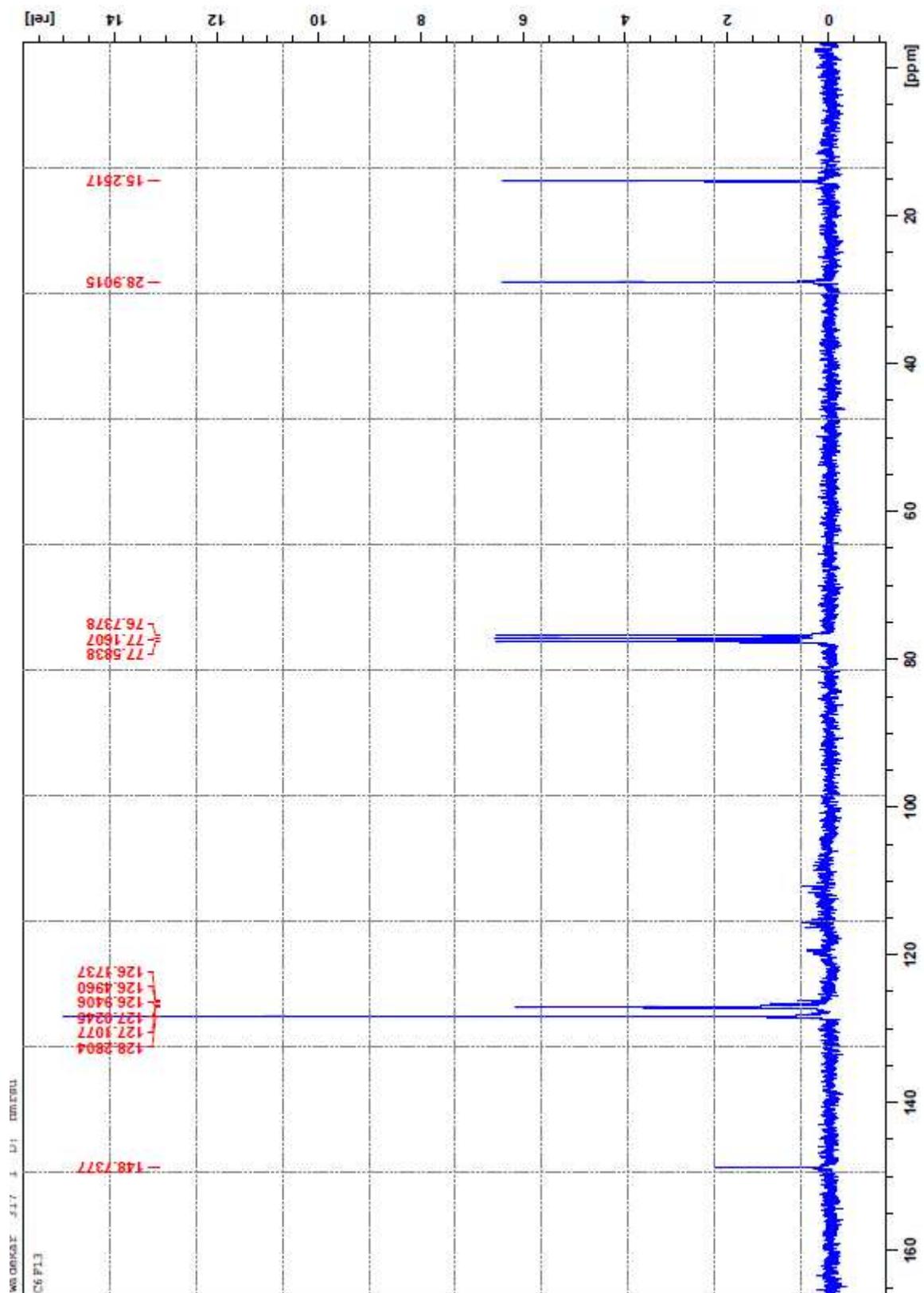
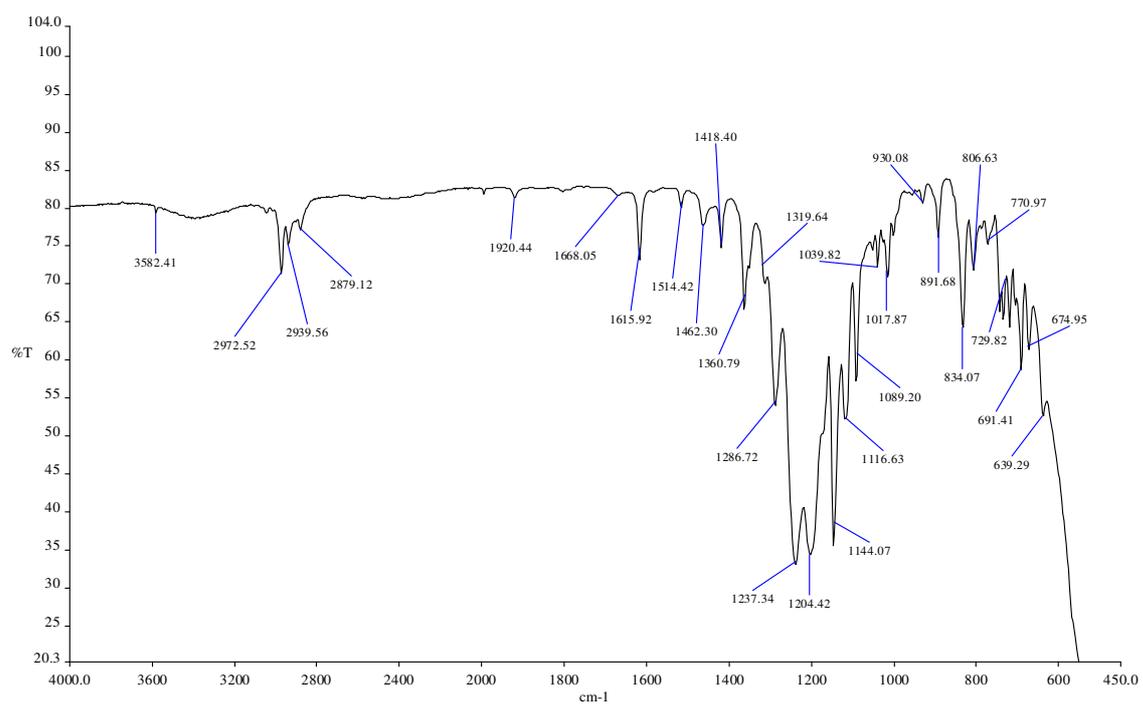


Figure S7. FTIR spectrum of **6**.



3. 4-(Perfluorohexyl)benzaldehyde (**5c**)

Figure S8. ^1H NMR spectrum of **5c**.

5C

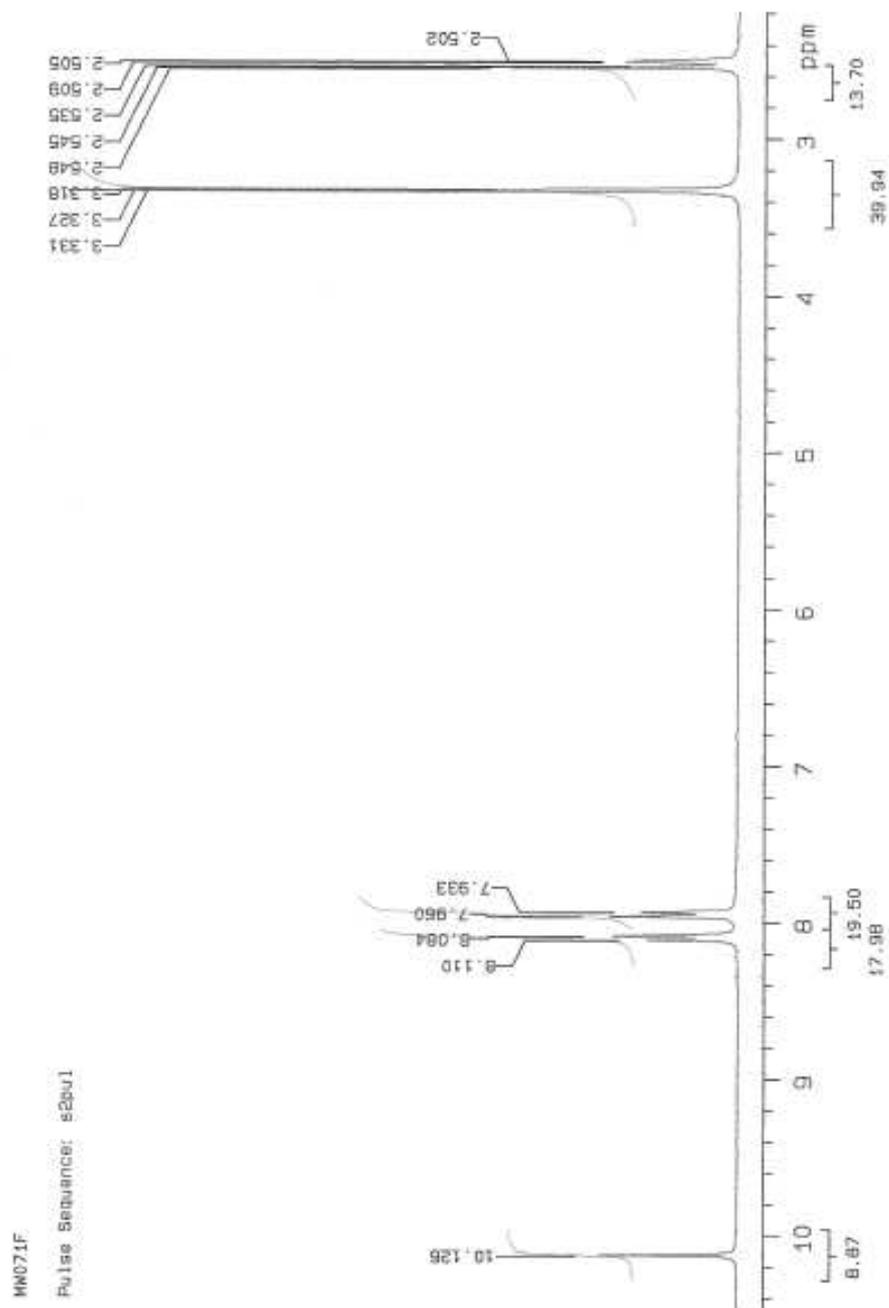
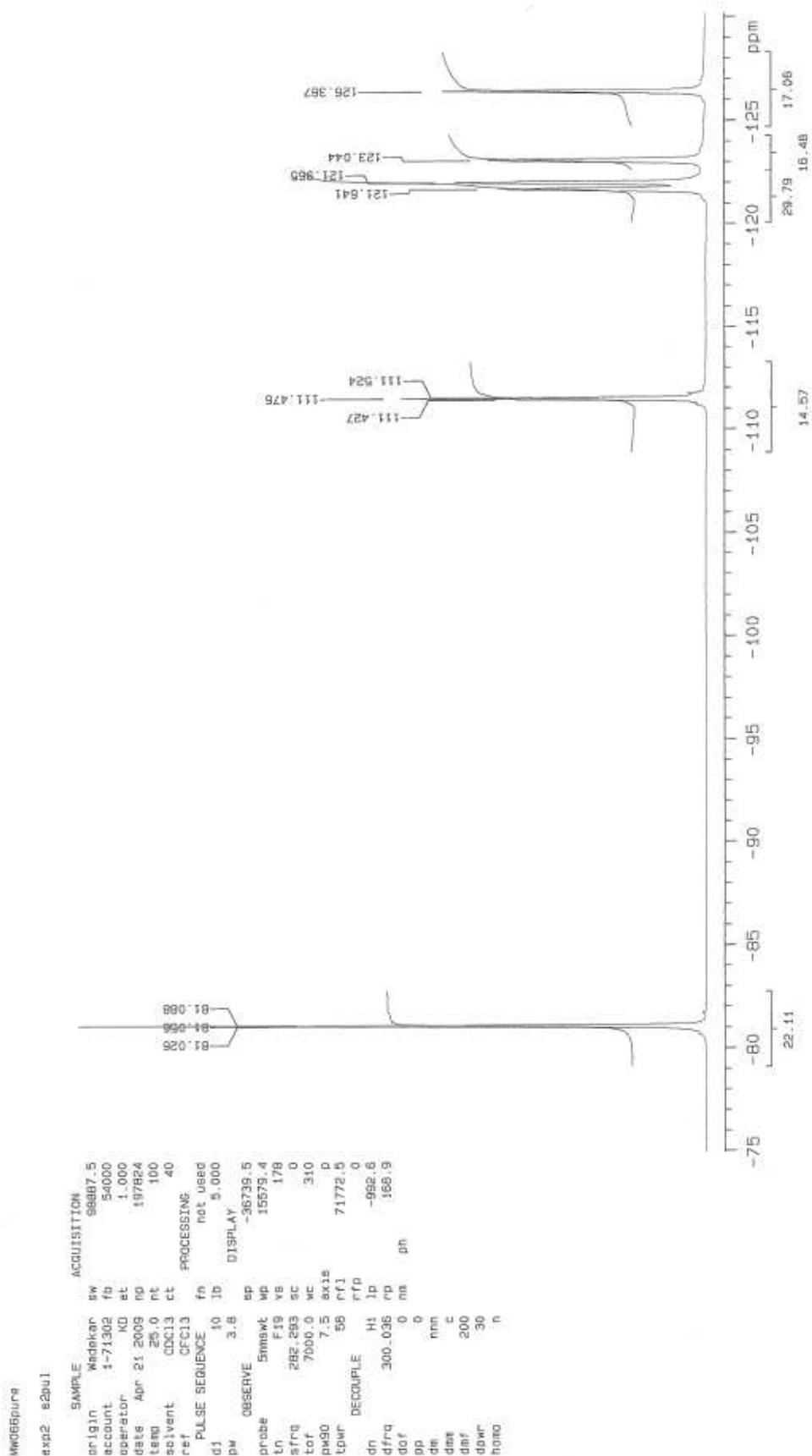
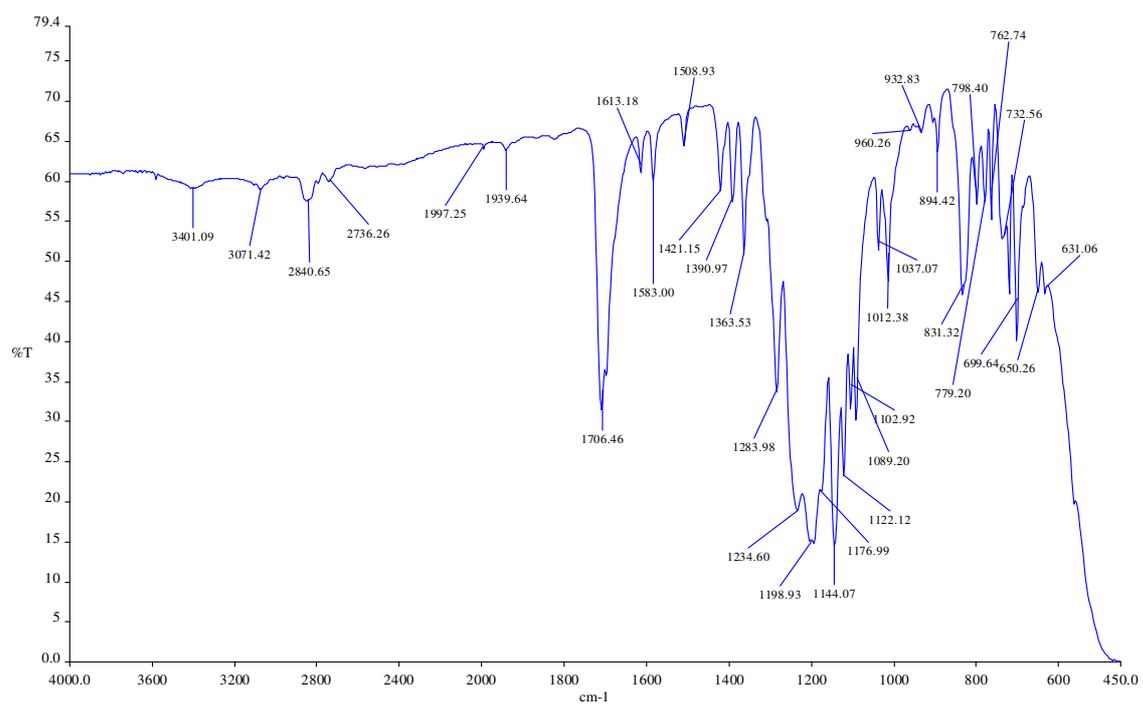


Figure S9. ¹⁹F NMR spectrum of **5c**.



Figures S10. FTIR spectrum of **5c**.



4. 1-(perfluorohexyl)-4-vinylbenzene (**5b**)

Figure S11. ¹H NMR spectrum of **5b**.

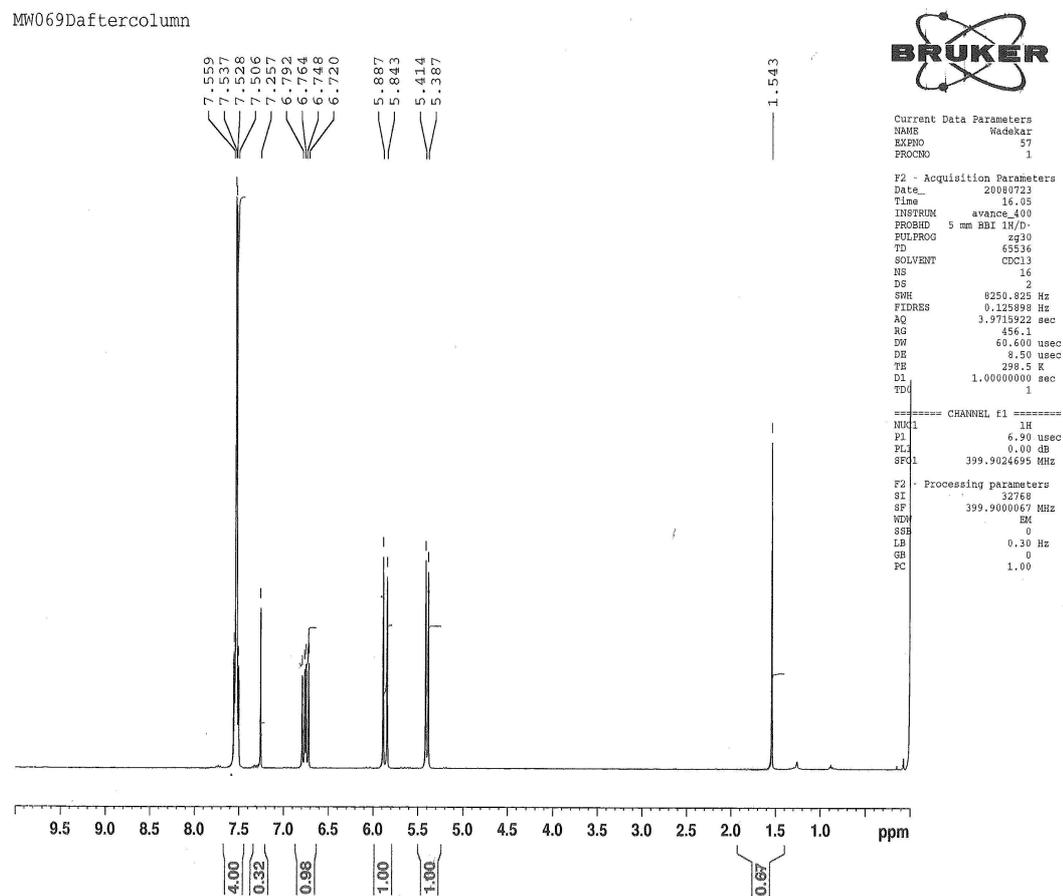


Figure S12. ¹⁹F NMR spectrum of **5b**.

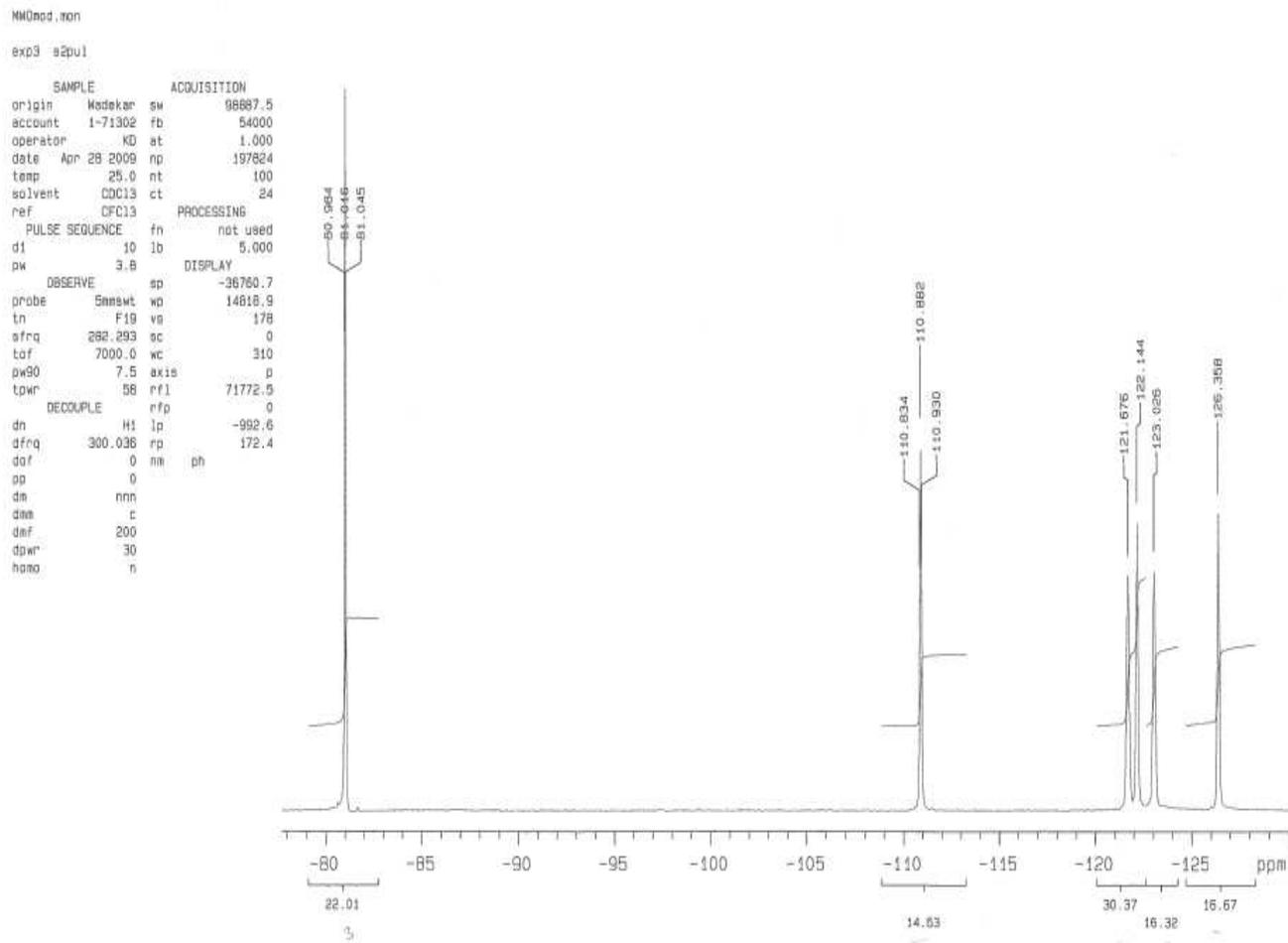
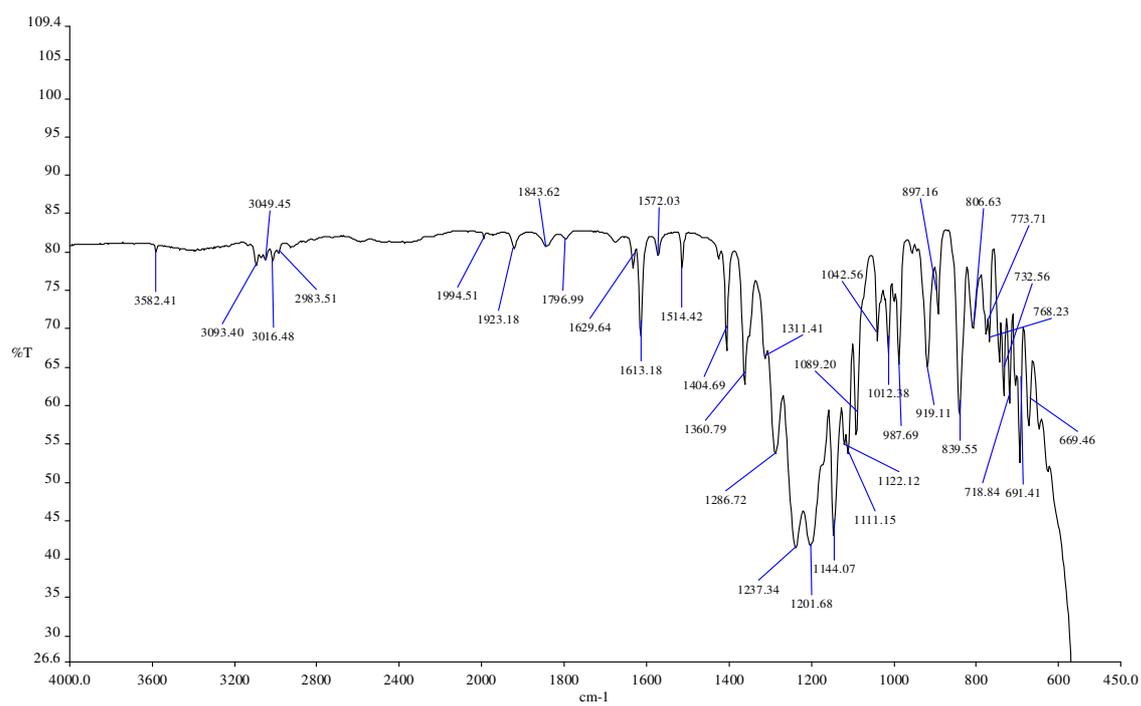


Figure S13. FTIR spectrum of **5b**.



5. Sodium 2-(2-(4-ethylphenyl)-1,1,2,2-tetrafluoroethoxy)-1,1,2,2-tetrafluoroethanesulfonate (2)

Figure S14. ¹H NMR spectrum of 2.

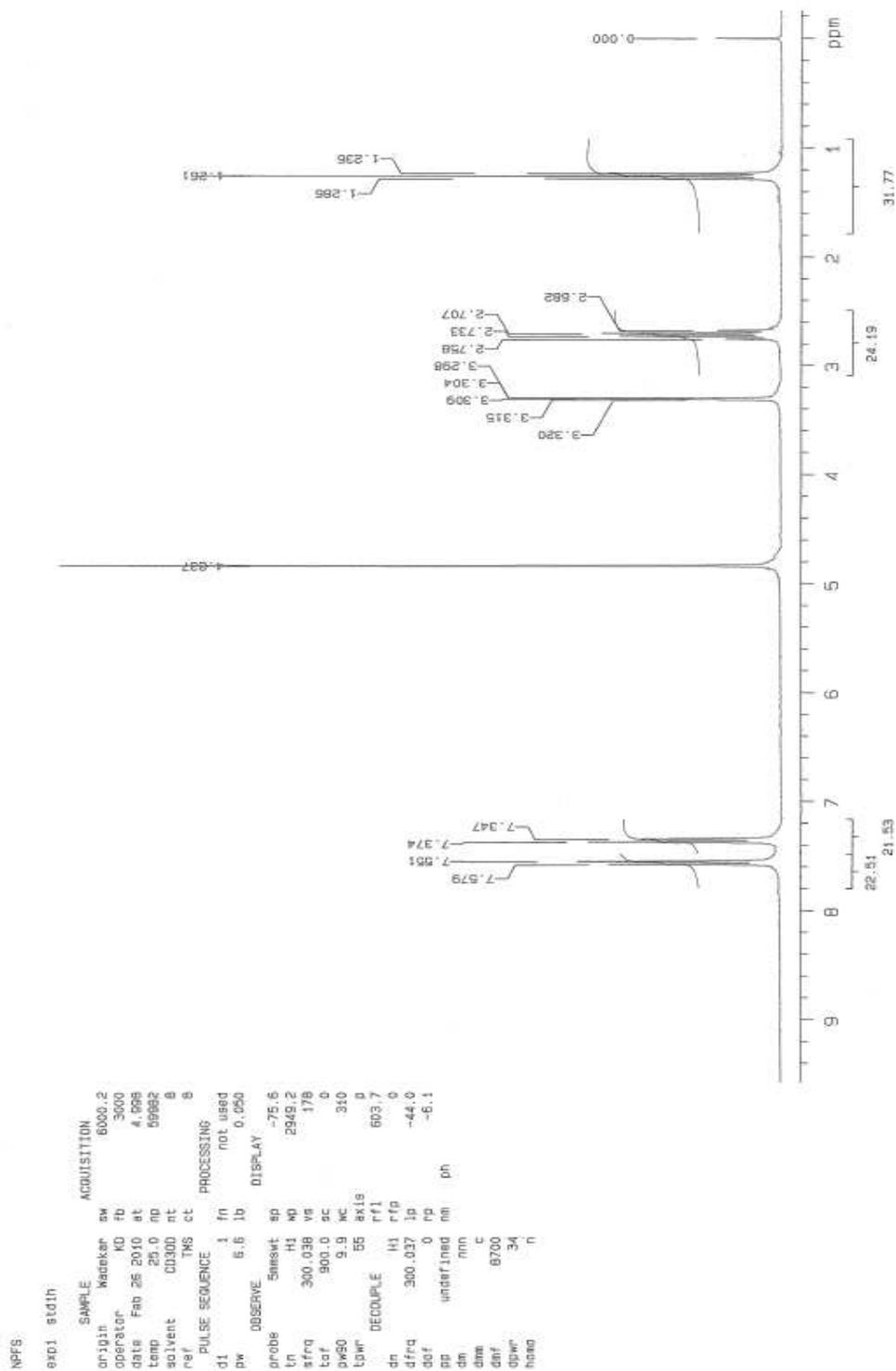


Figure S15. ¹⁹F NMR data spectrum of **2**.

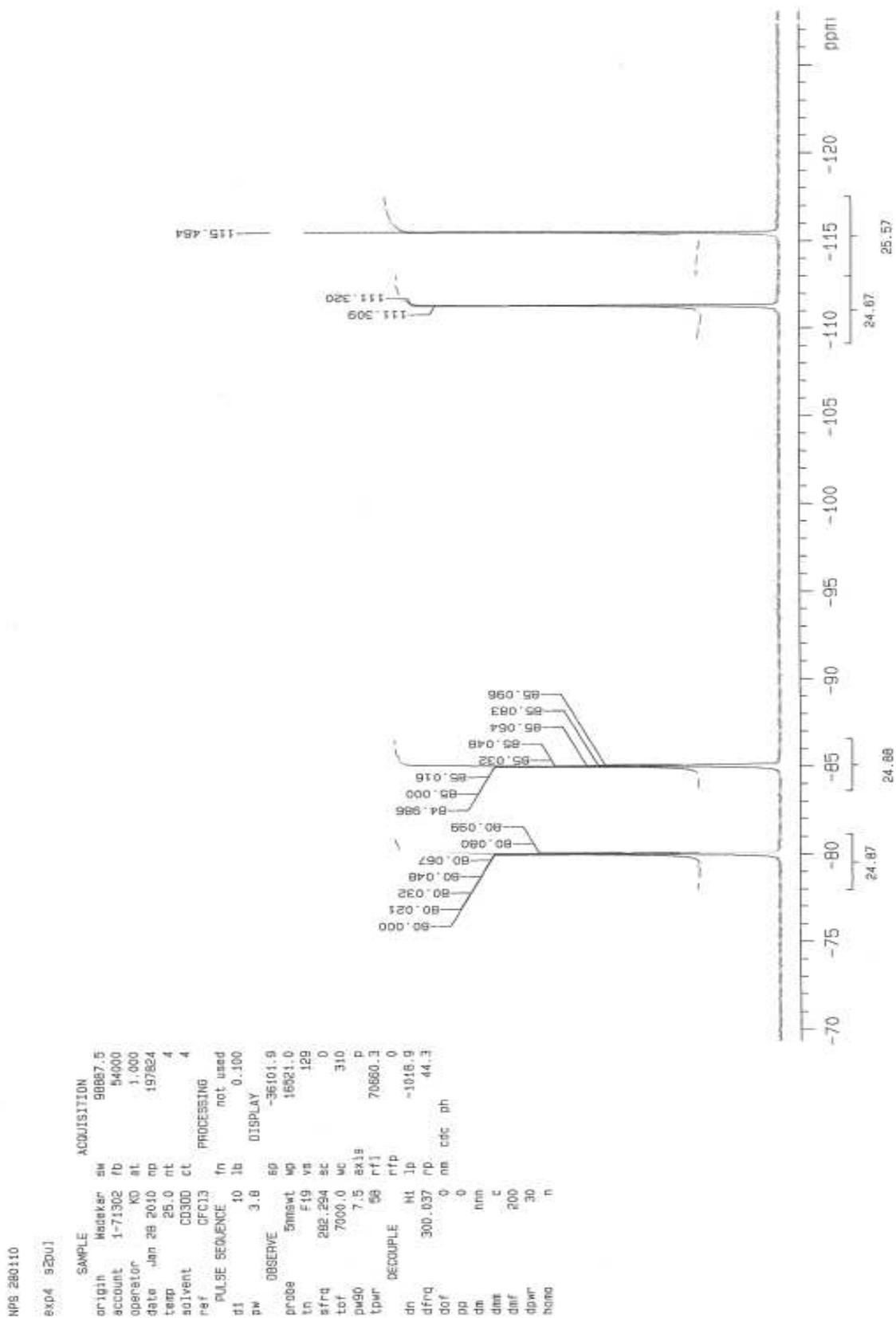


Figure S16. ^1H and ^{19}F coupled ^{13}C NMR spectrum of **2**.

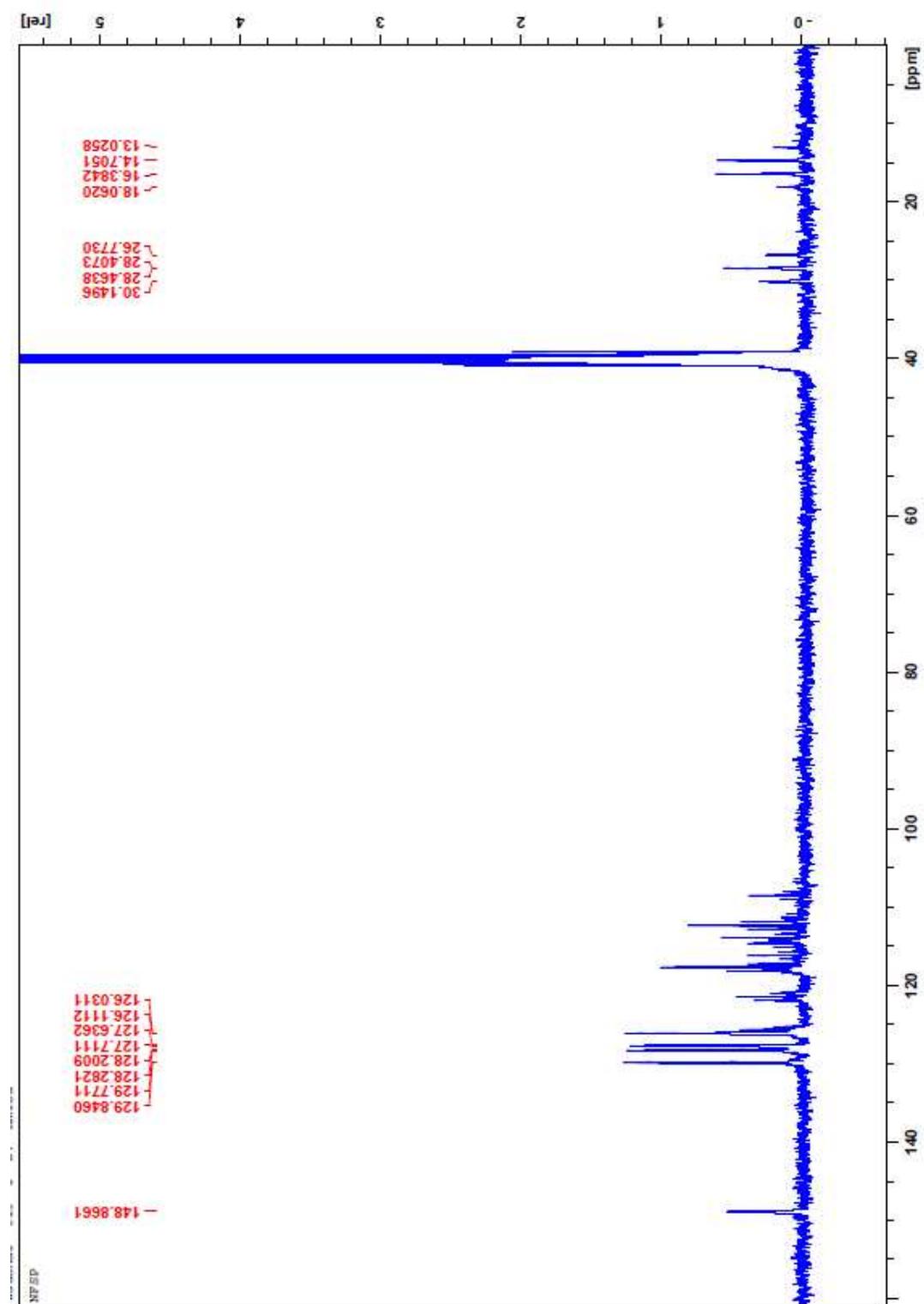


Figure S17. ^1H decoupled ^{13}C NMR spectrum of **2**.

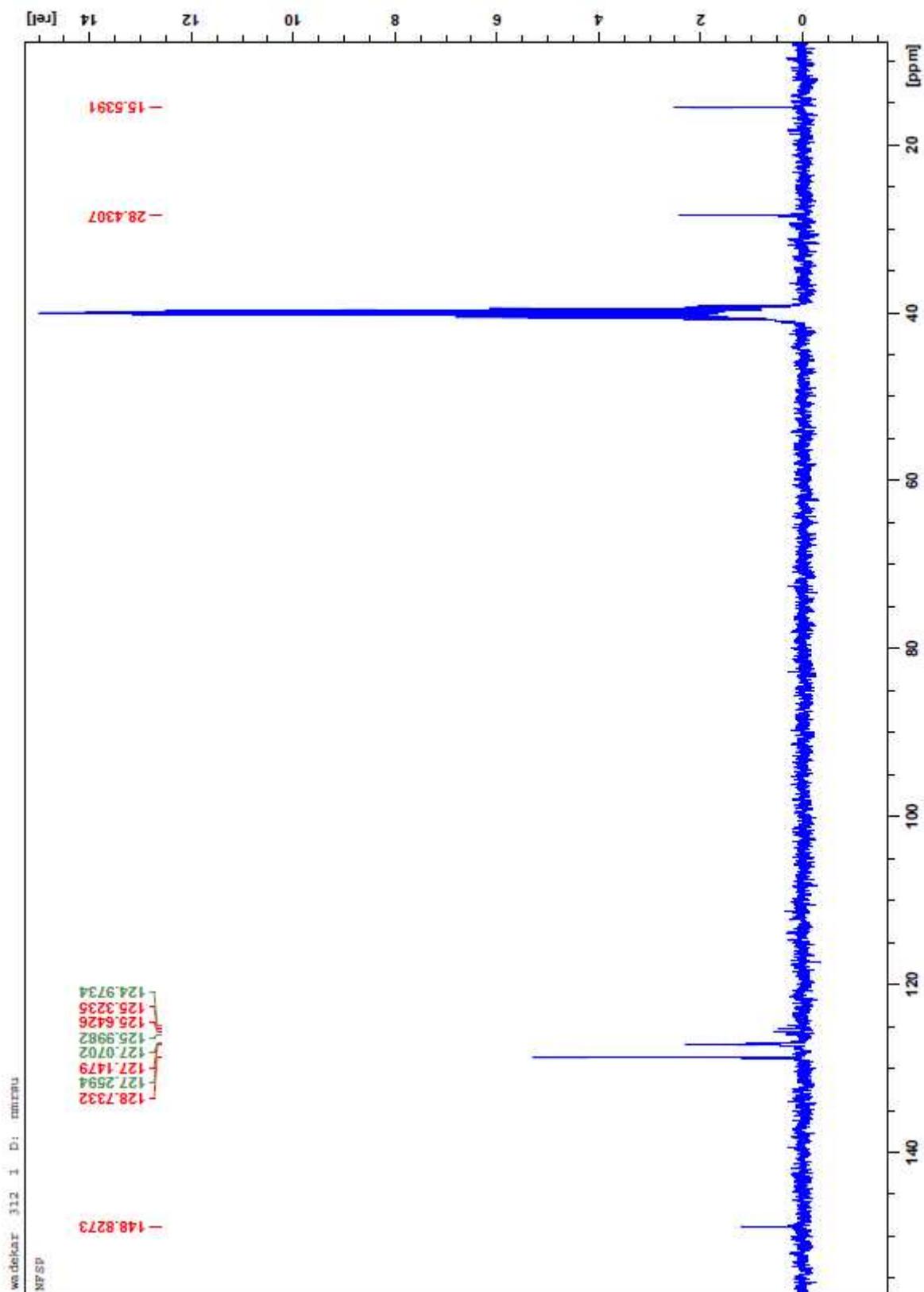
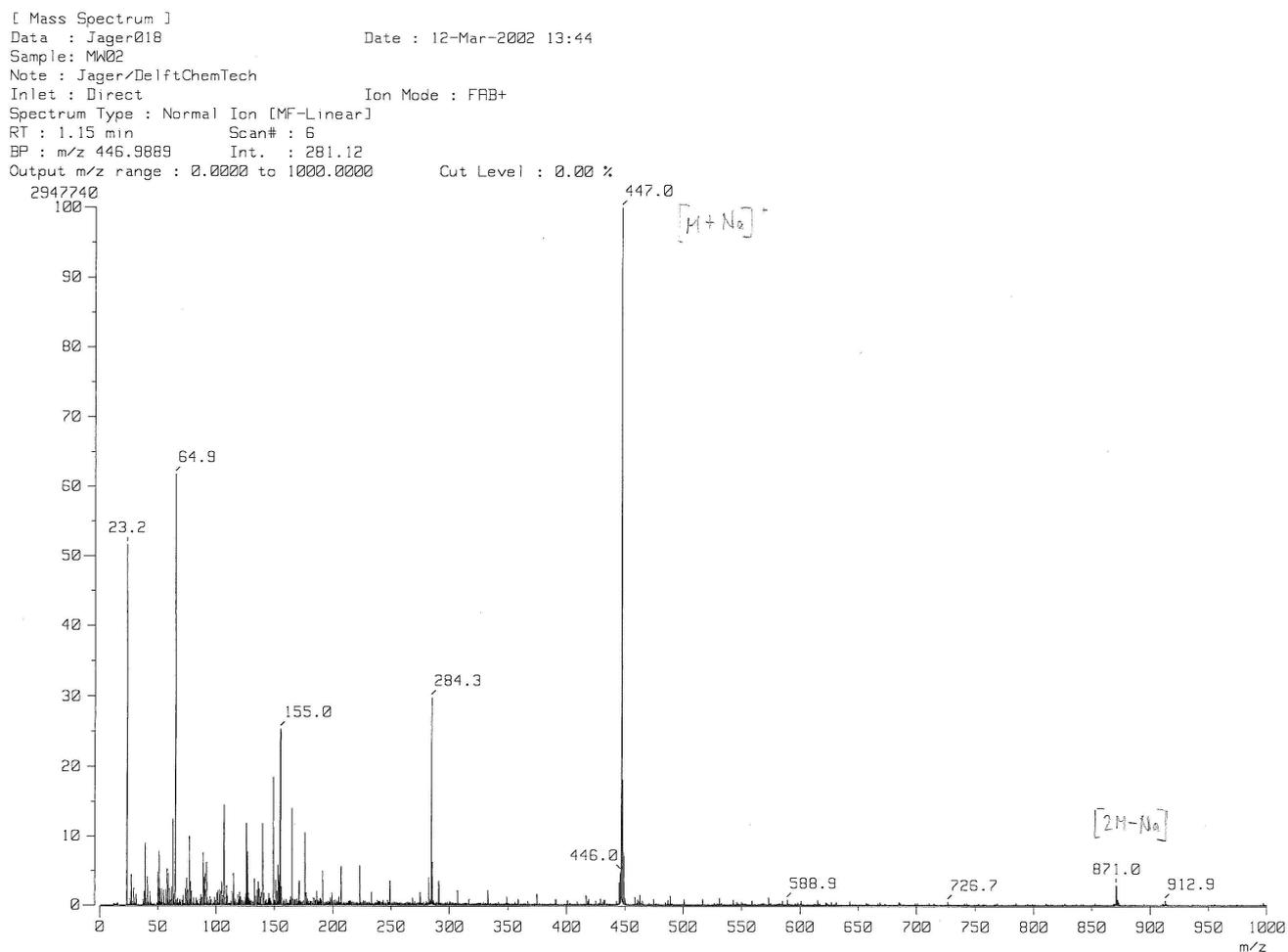


Figure S18. HR Mass spectrum of 2.



[Elemental Composition]

Data : Jager018 Date : 12-Mar-2002 13:44 Page: 1
 Sample: MW02
 Note : Jager/DelftChemTech
 Inlet : Direct Ion Mode : FAB+
 RT : 1.15 min Scan#: 6
 Elements : C 12/0, H 49/0, O 4/0, F 8/0, S 1/0, Na 2/0
 Mass Tolerance : 5ppm, 5mmu if m/z < 1000, 50mmu if m/z > 10000
 Unsaturation (U.S.) : -0.5 - 90.0

Observed m/z	Int%	Err [ppm / mmu]	U.S. Composition
446.9889	100.0	-0.1 / -0.1	4.5 C 12 H 9 O 4 F 8 S Na 2

Figure S19. FTIR spectrum of **2**.

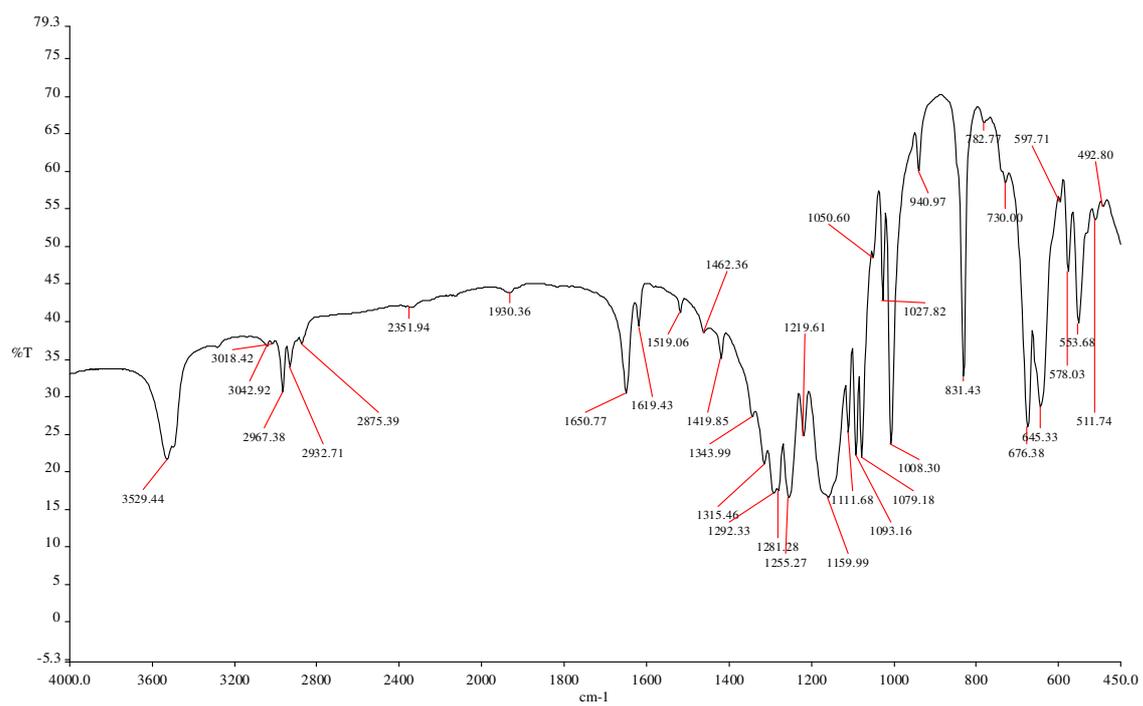


Figure S21. ^{19}F NMR spectrum of **8**.

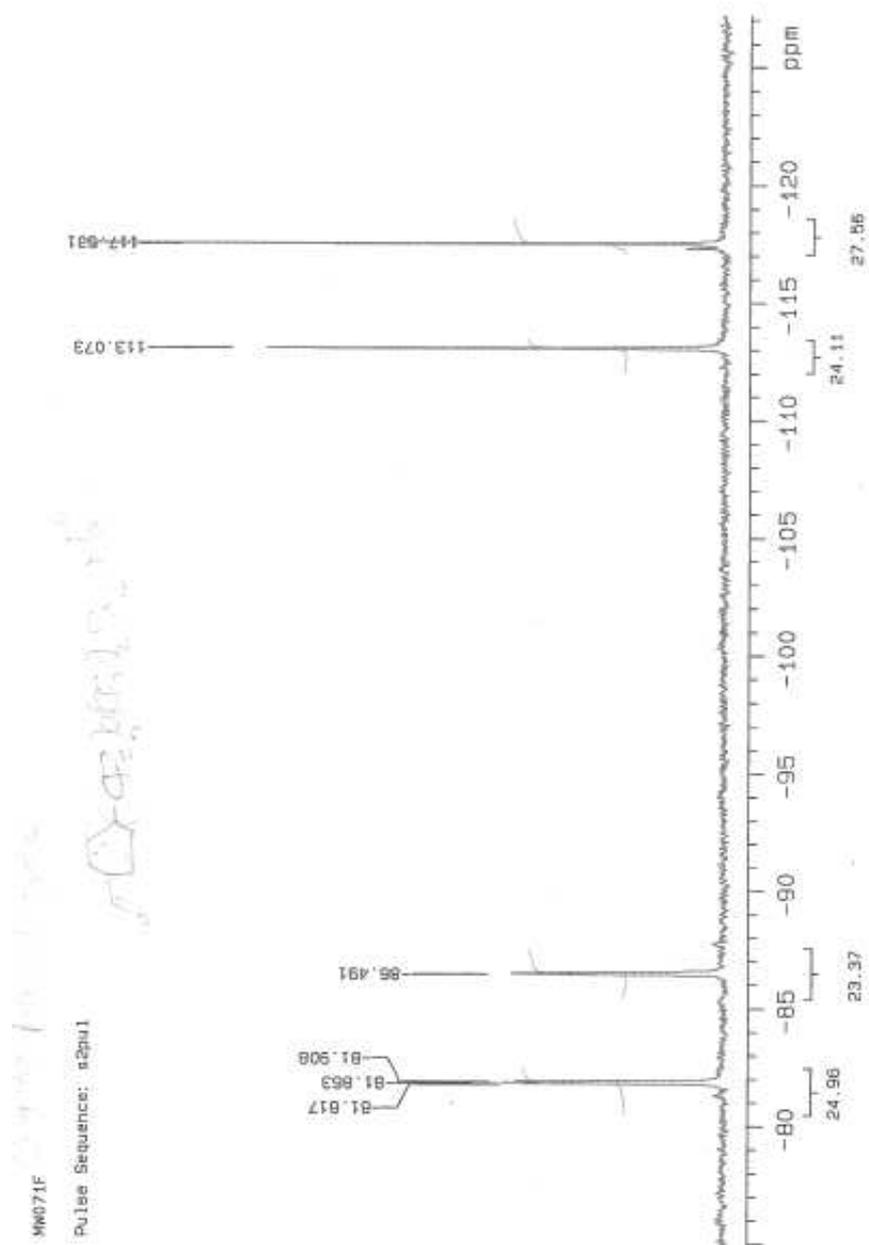


Figure S 22. ^1H and ^{19}F coupled ^{13}C NMR spectrum of **8**.

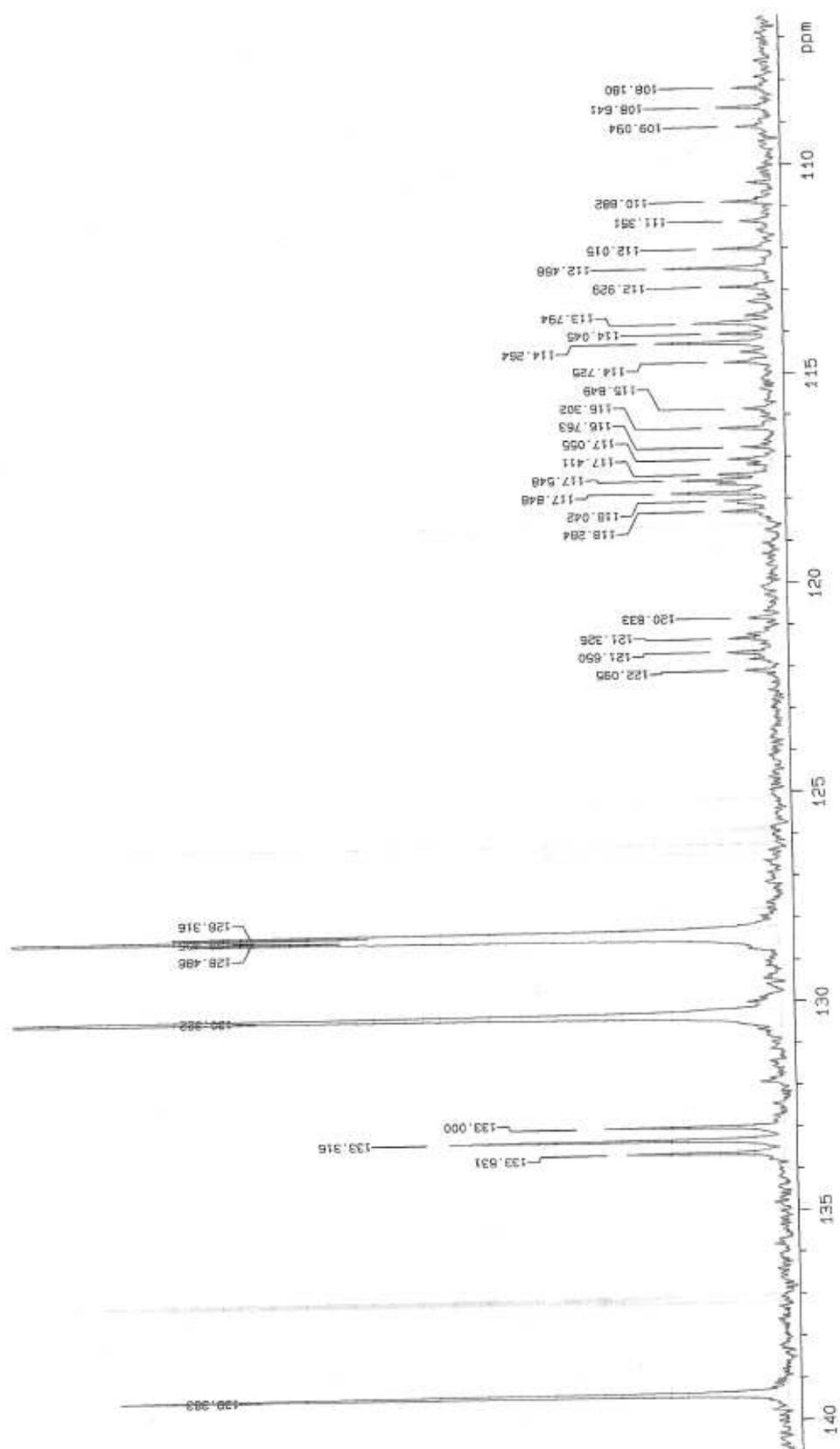


Figure S 23. ^1H decoupled ^{13}C NMR spectrum of **8**.

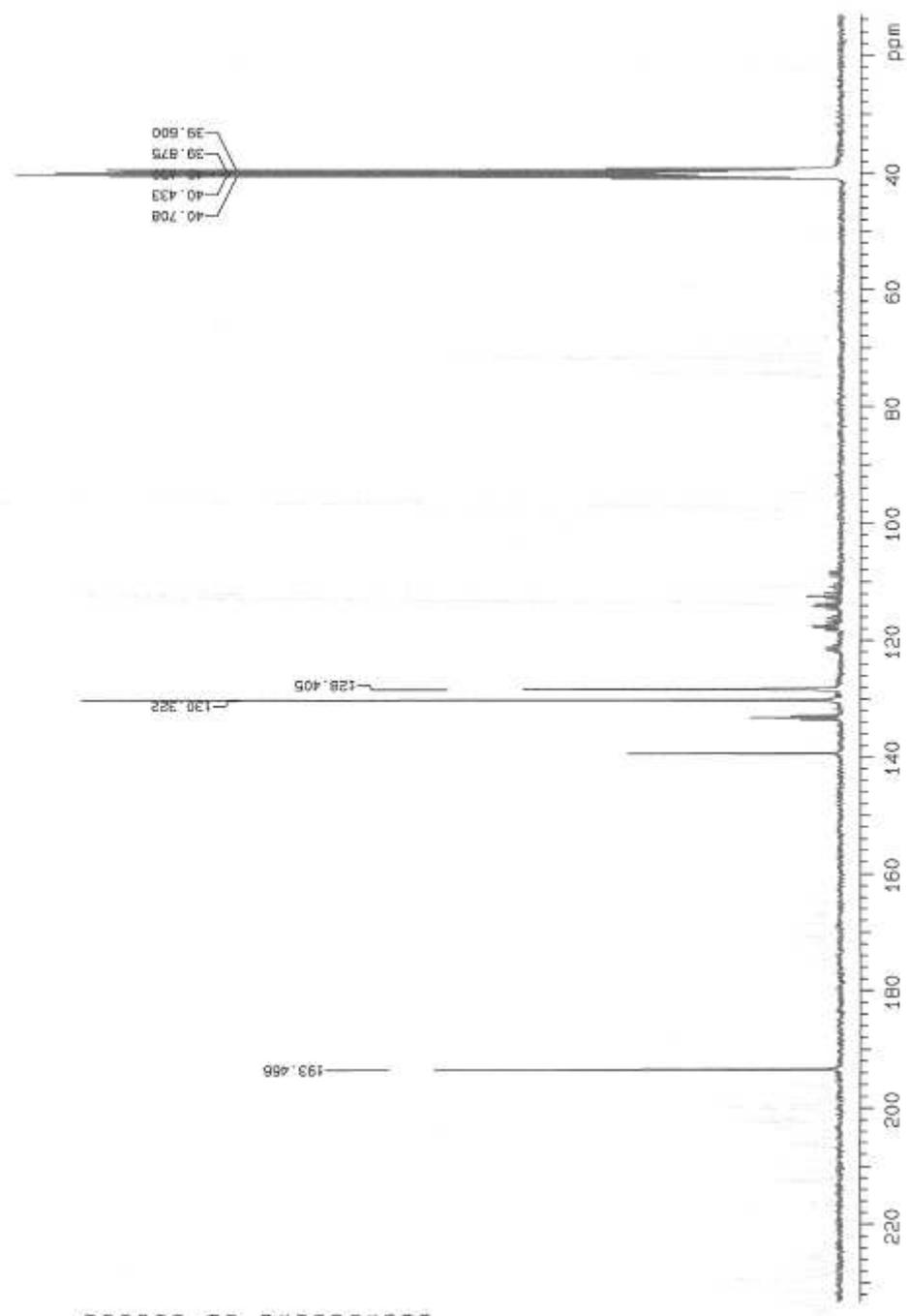
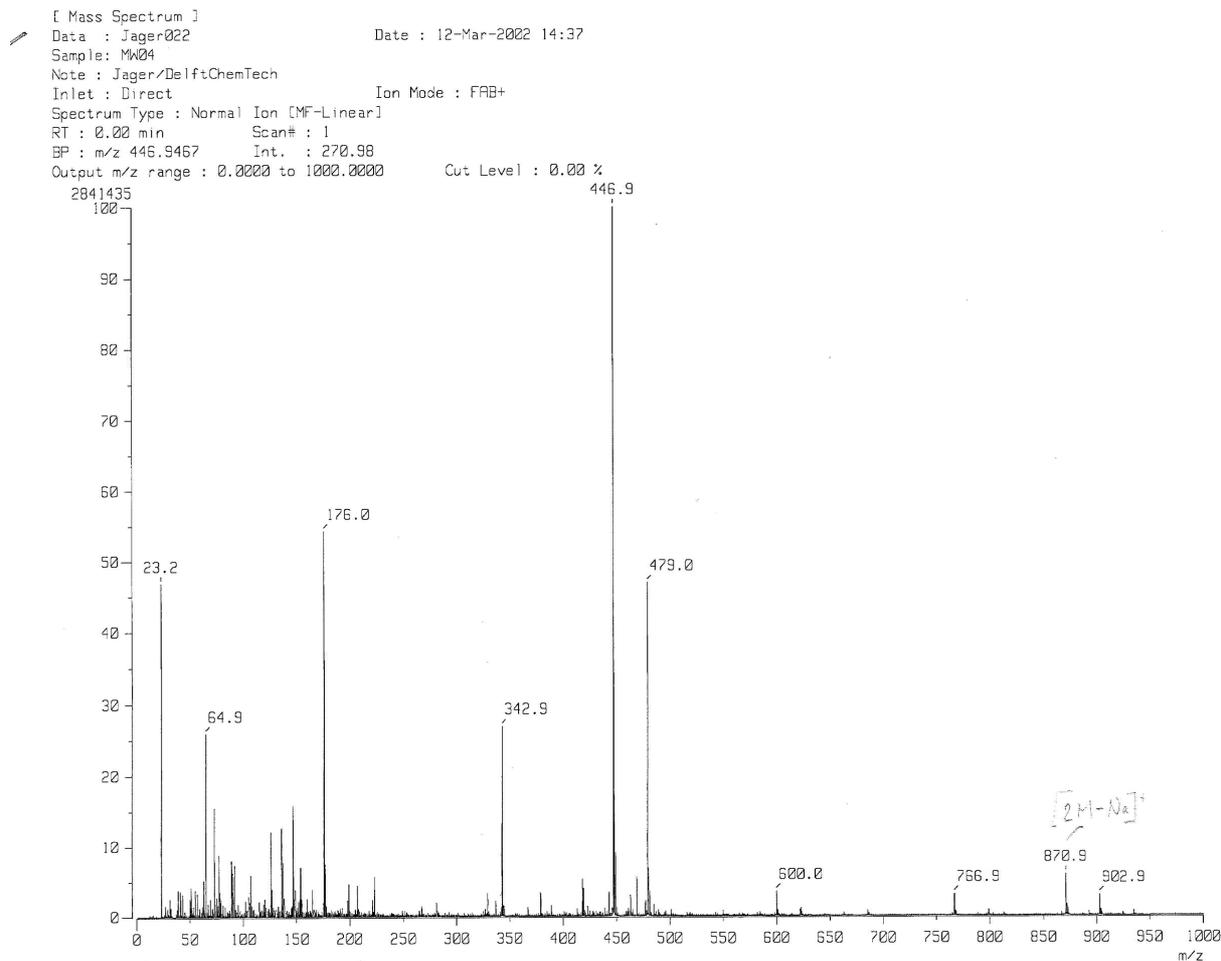


Figure S24. HR Mass spectrum of 8.



[Elemental Composition]
 Data : Jager022 Date : 12-Mar-2002 14:37
 Sample: MW04
 Note : Jager/DelftChemTech
 Inlet : Direct Ion Mode : FAB+
 RT : 2.29 min Scan# : 11
 Elements : C 12/0, H 49/0, O 5/0, F 8/0, S 1/0, Na 2/0
 Mass Tolerance : 5ppm, 5mmu if m/z < 1000, 50mmu if m/z > 10000
 Unsaturation (U.S.) : -0.5 - 90.0

Page:

Observed m/z	Int%	Err [ppm / mmu]	U.S. Composition
446.9521	100.0	-0.9 / -0.4	5.5 C 11 H 5 O 5 F 8 S Na 2

Figure S25. FTIR spectrum of **8**.

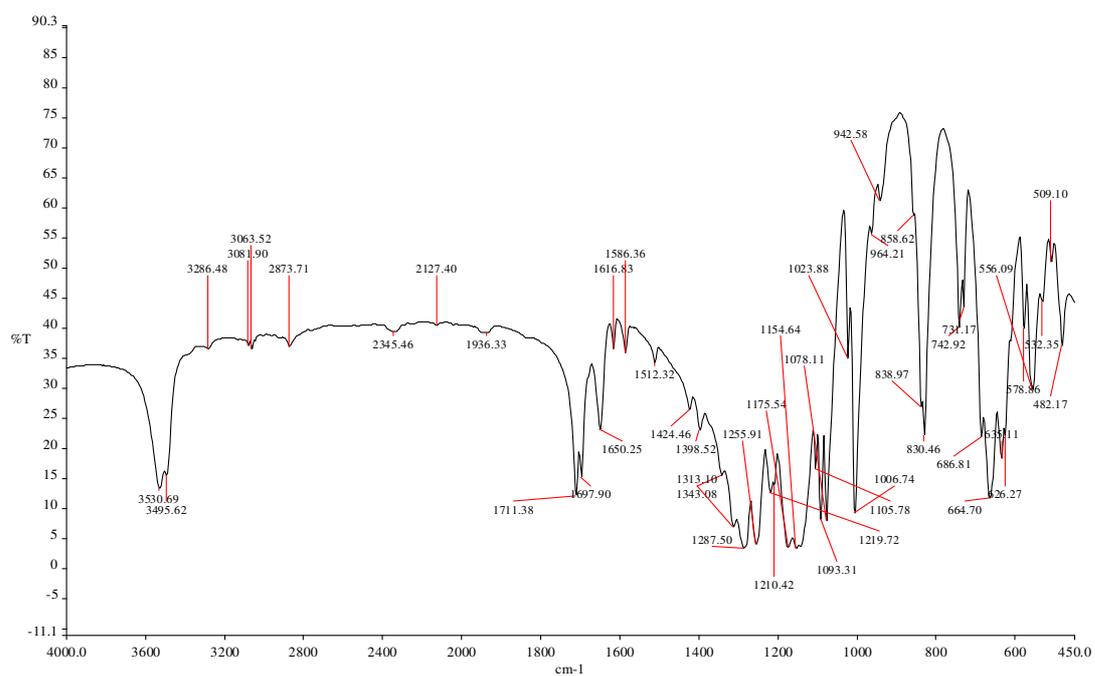
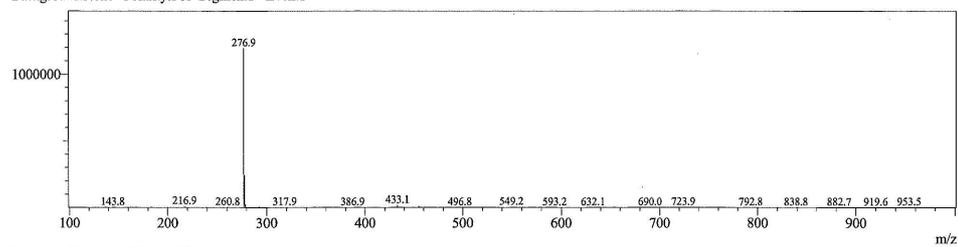


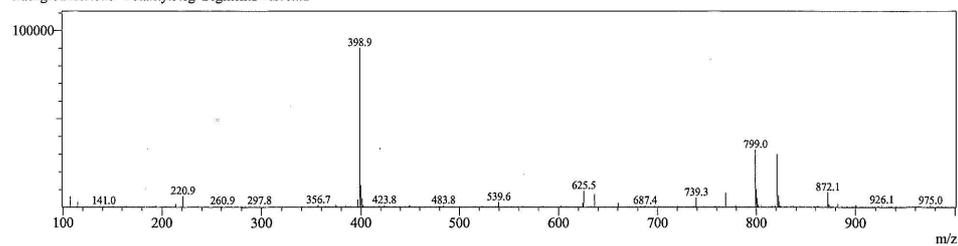
Figure S28. LR Mass spectra spectrum of **9**.

<Spectrum>

Retention Time:0.667(Scan#:41)
Max Peak:838 Base Peak:276.95(1194999)
Spectrum:Single 0.667(41)
Background:None Polarity:Pos Segment1 - Event1



Retention Time:0.683(Scan#:42)
Max Peak:790 Base Peak:398.85(90041)
Spectrum:Single 0.683(42)
Background:None Polarity:Neg Segment1 - Event2



C:\LabSolutions\Data\Project1\mohan\triphenphosph-polysurf.lcd

8) Sodium 1,1,2,2-tetrafluoro-2-(1,1,2,2-tetrafluoro-2-(4-vinylphenyl)ethoxy)ethanesulfonate (**1**)

Figure S29. ^1H NMR spectrum of **1**.

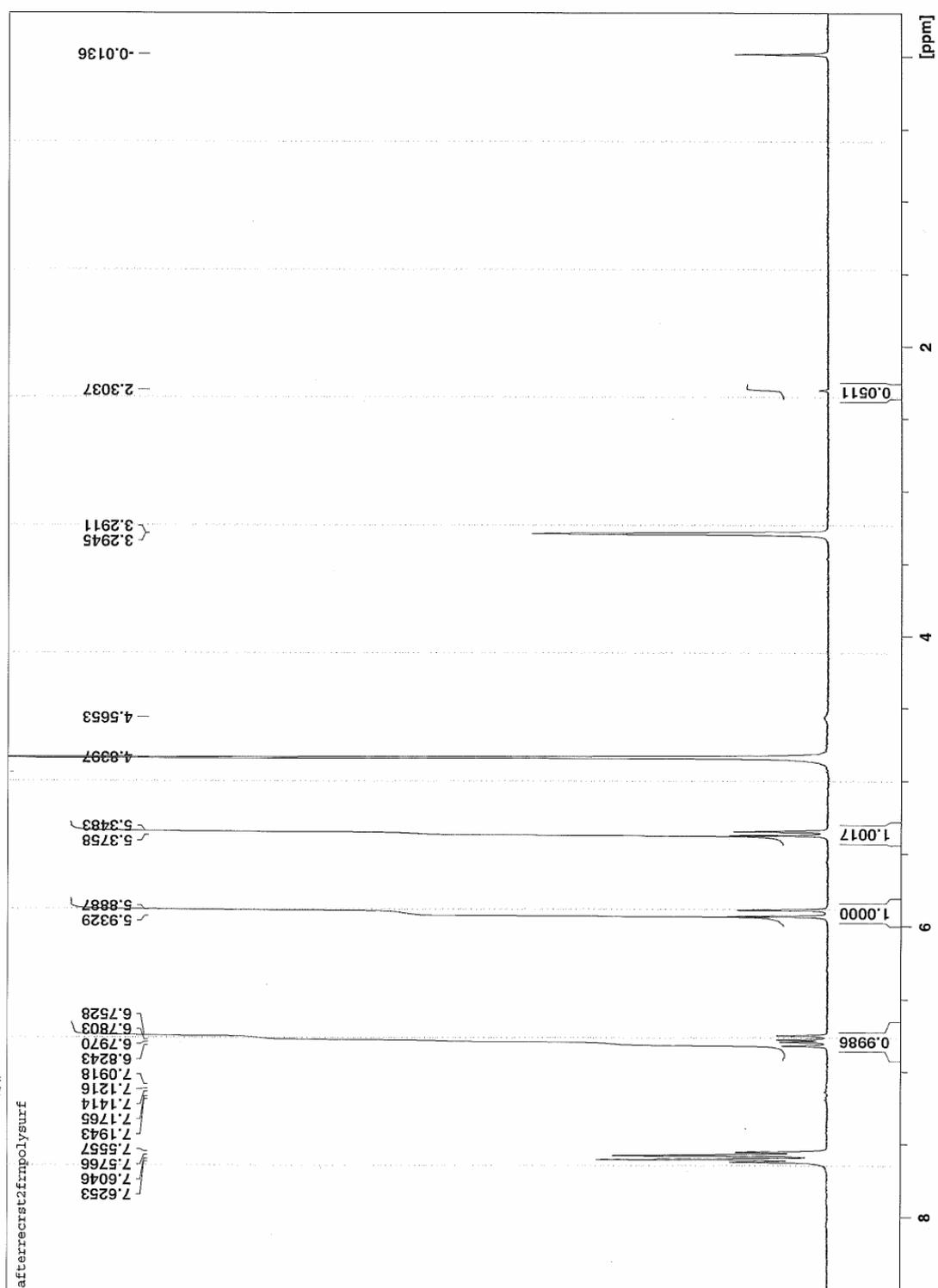


Figure S30. ¹⁹F NMR spectrum of **1**.

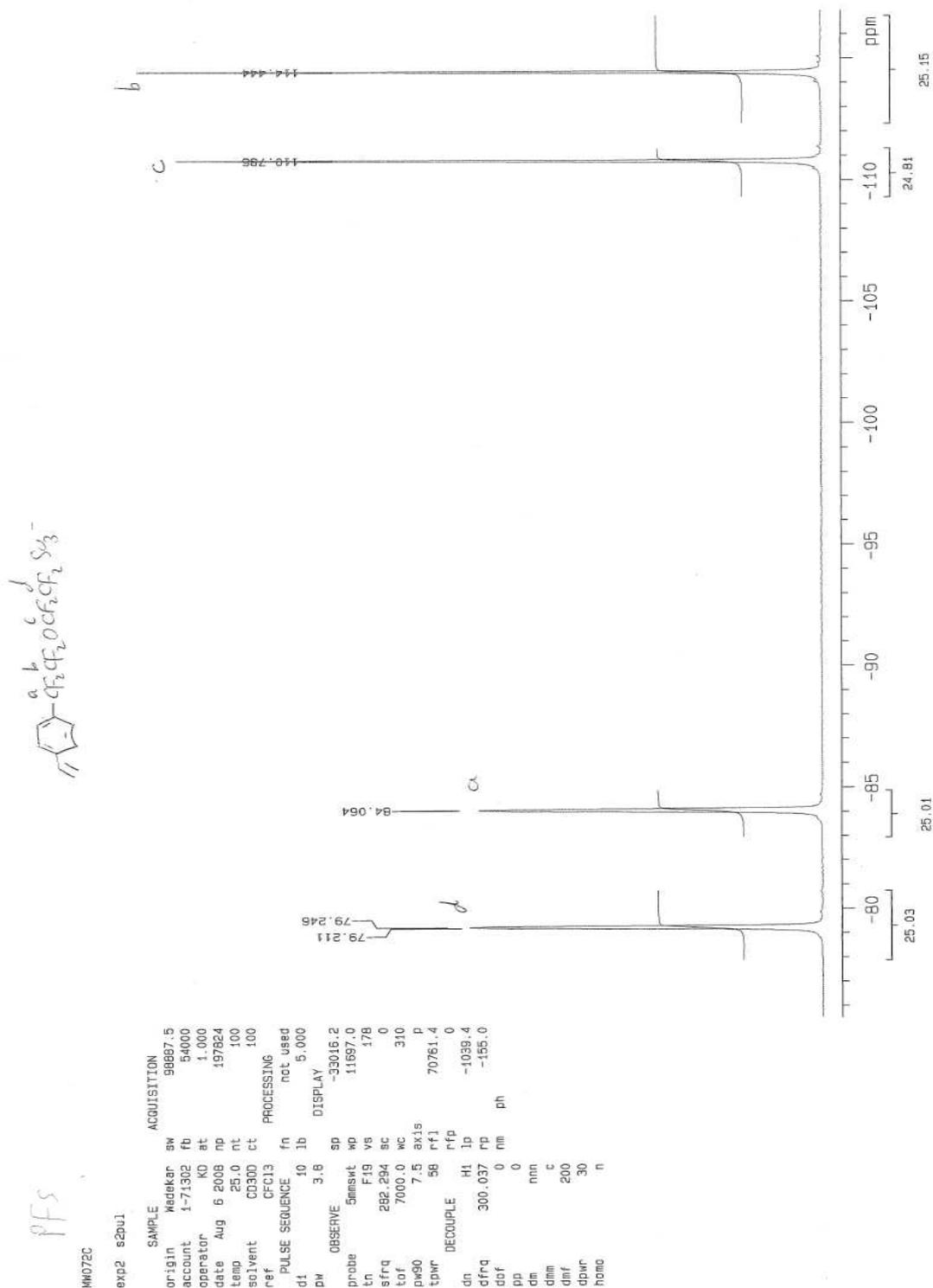


Figure S31. ^1H and ^{19}F coupled ^{13}C NMR spectrum of **1**.

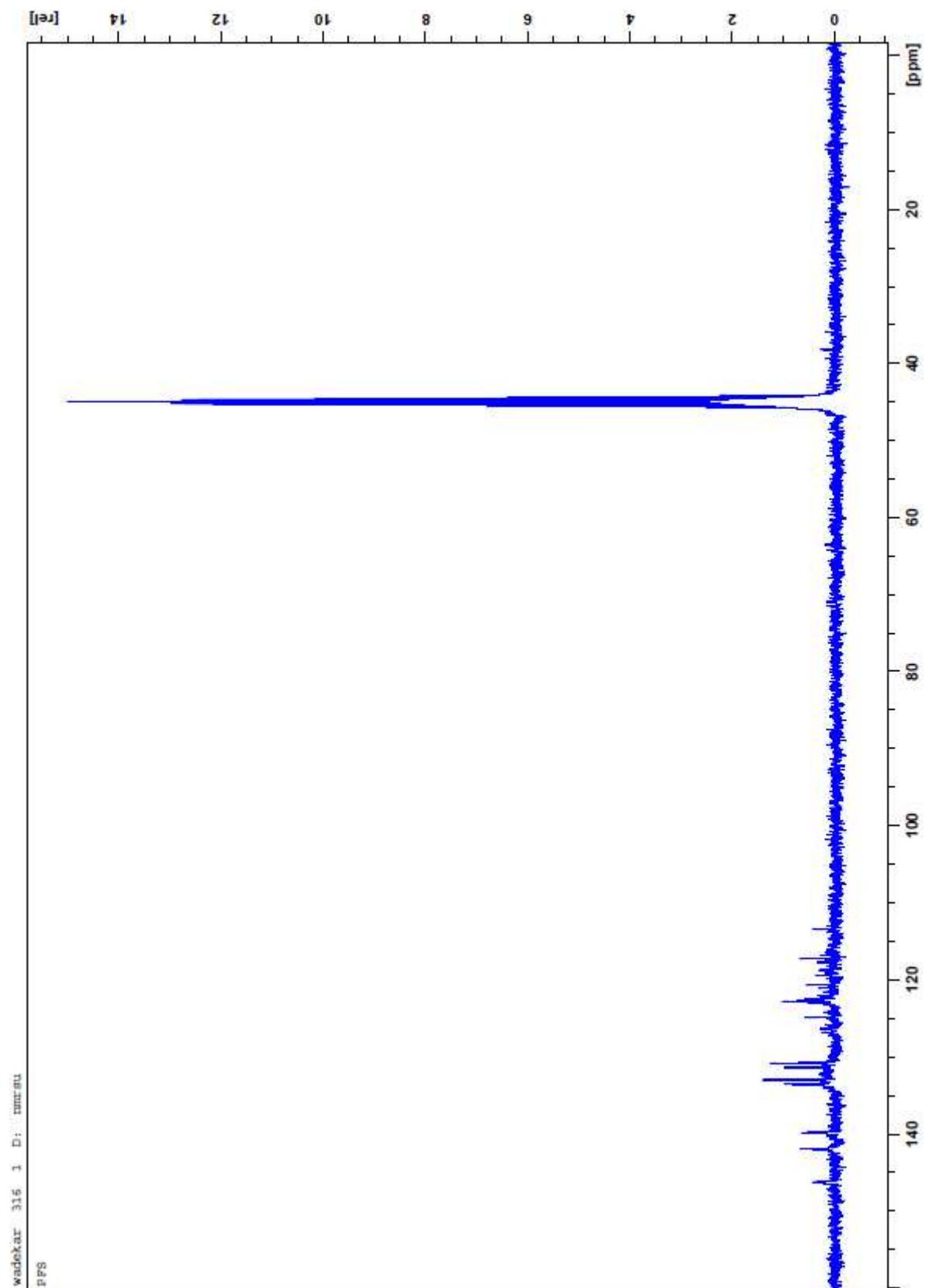


Figure S32. ^1H decoupled ^{13}C NMR spectrum of **1**.

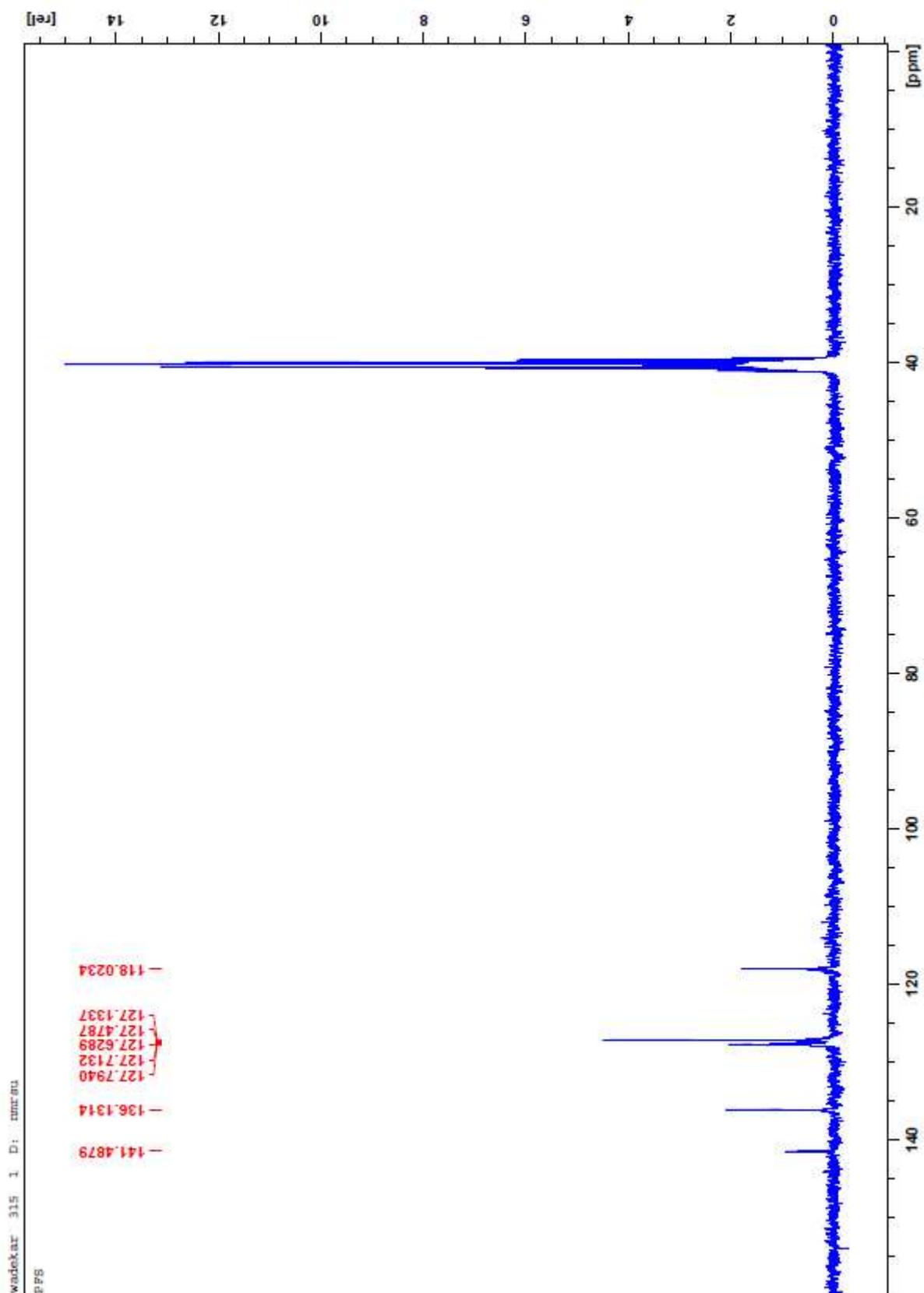


Figure S33. ^1H decoupled ^{13}C NMR expansion spectrum of **1**.

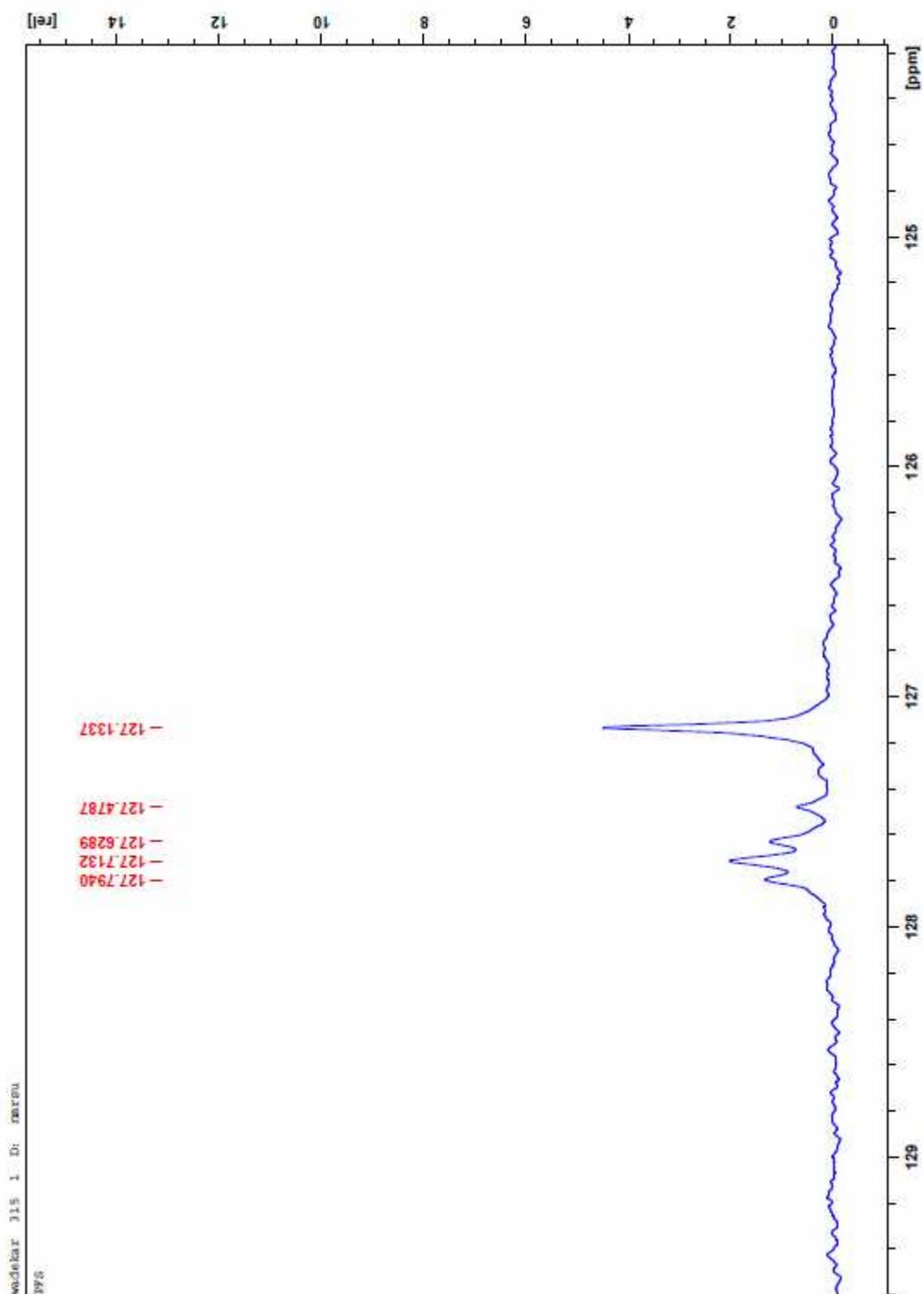
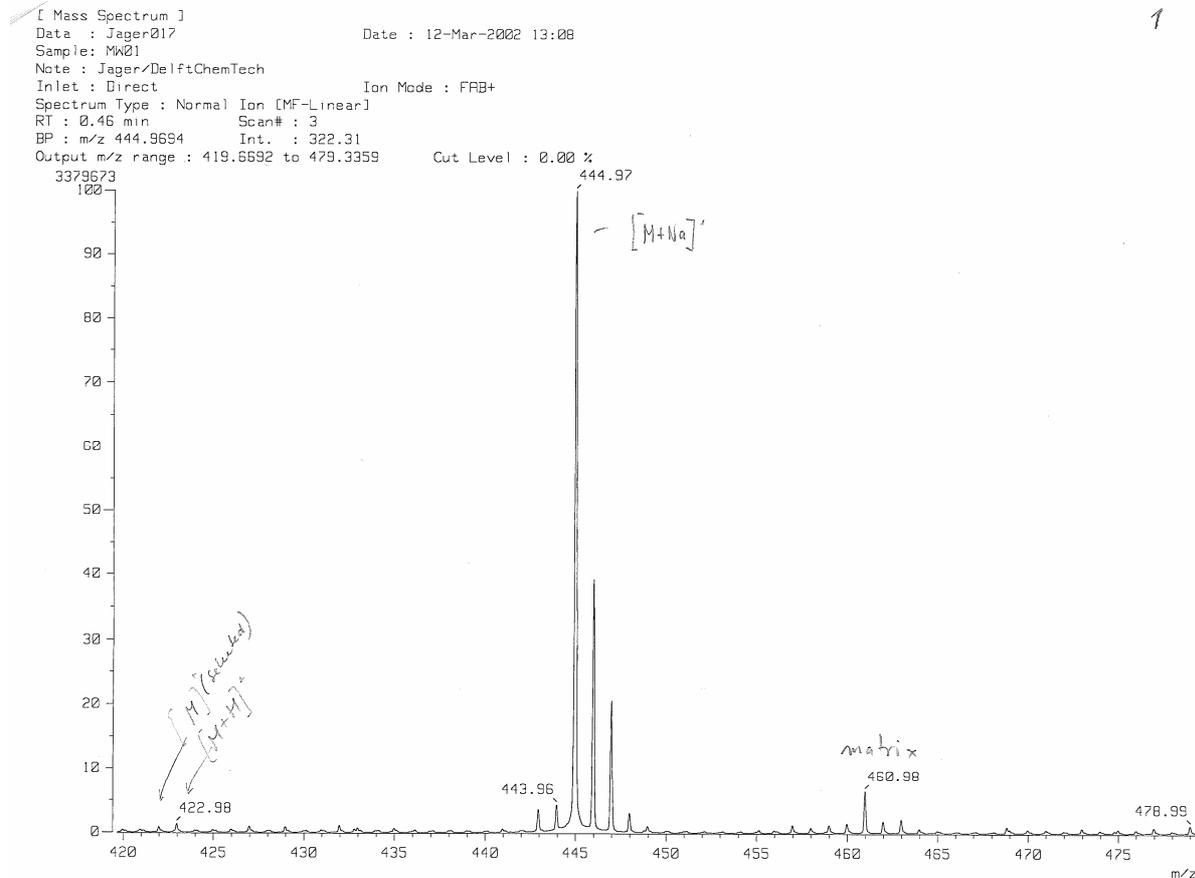


Figure S34. HR Mass spectrum of 1.



[Elemental Composition]

Data : Jager017 Date : 12-Mar-2002 13:08
 Sample: MW01
 Note : Jager/DelftChemTech
 Inlet : Direct Ion Mode : FAB+
 RT : 0.46 min Scan# : 3
 Elements : C 12/0, H 49/0, O 4/0, F 8/0, S 1/0, Na 1/0
 Mass Tolerance : 5ppm, 5mmu if m/z < 1000, 50mmu if m/z > 10000
 Unsaturation (U.S.) : -0.5 - 90.0

Page: 1

Observed m/z	Int%	Err [ppm / mmu]	U.S. Composition
421.9825	0.8	-2.4 / -1.0	6.0 C 12 H 7 O 4 F 8 S Na

Figure S35. FTIR spectrum of **1**.

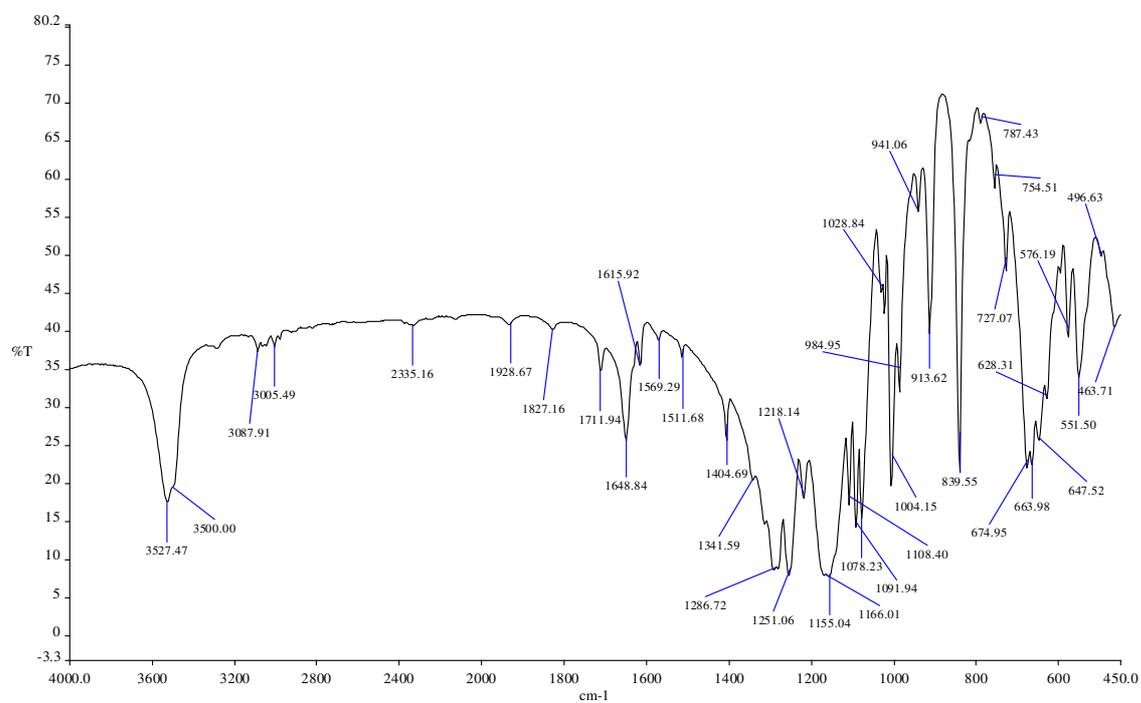


Figure S36. ^1H NMR spectrum of Poly[1]

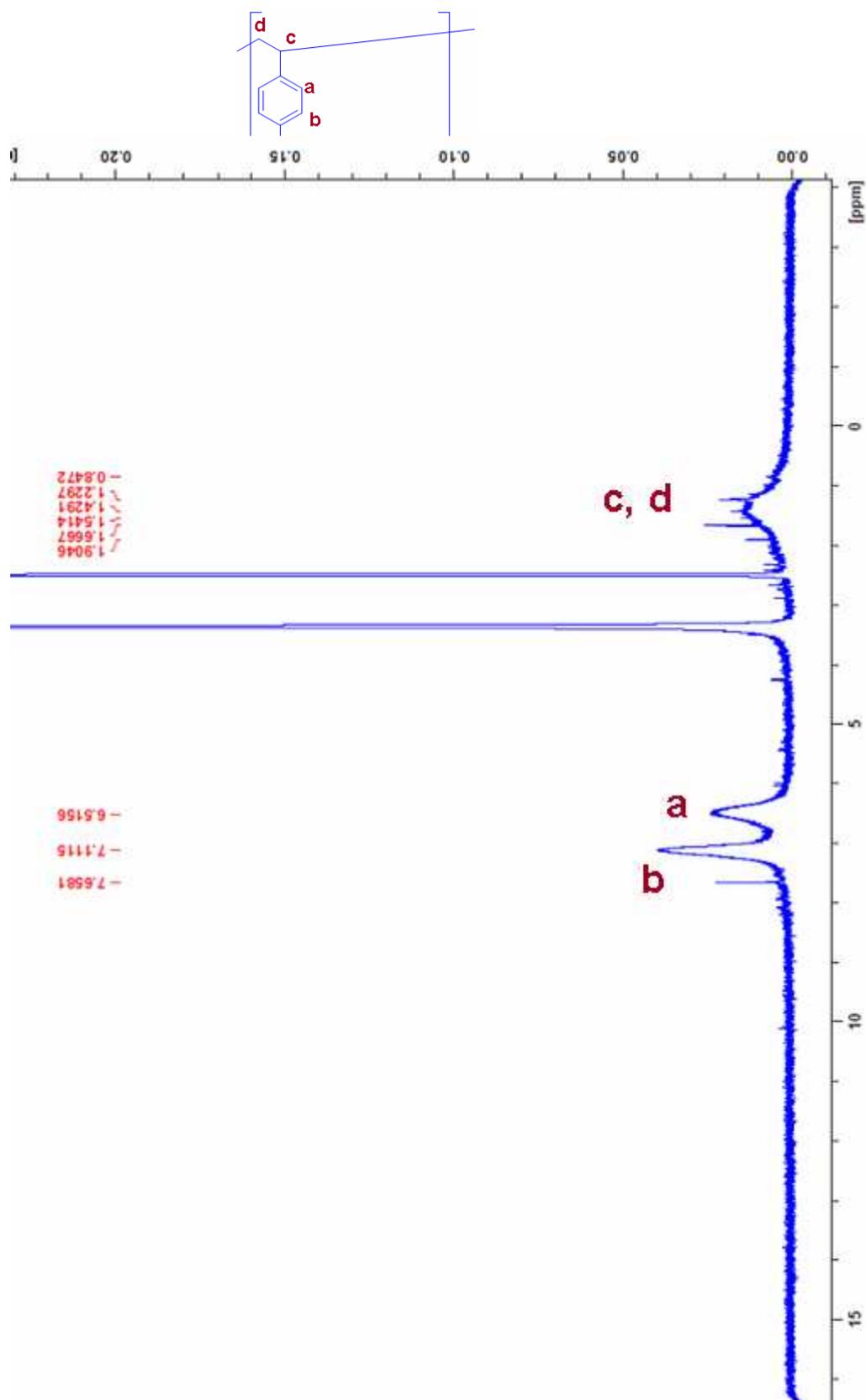


Figure S37. ^{19}F NMR spectrum of Poly[1]

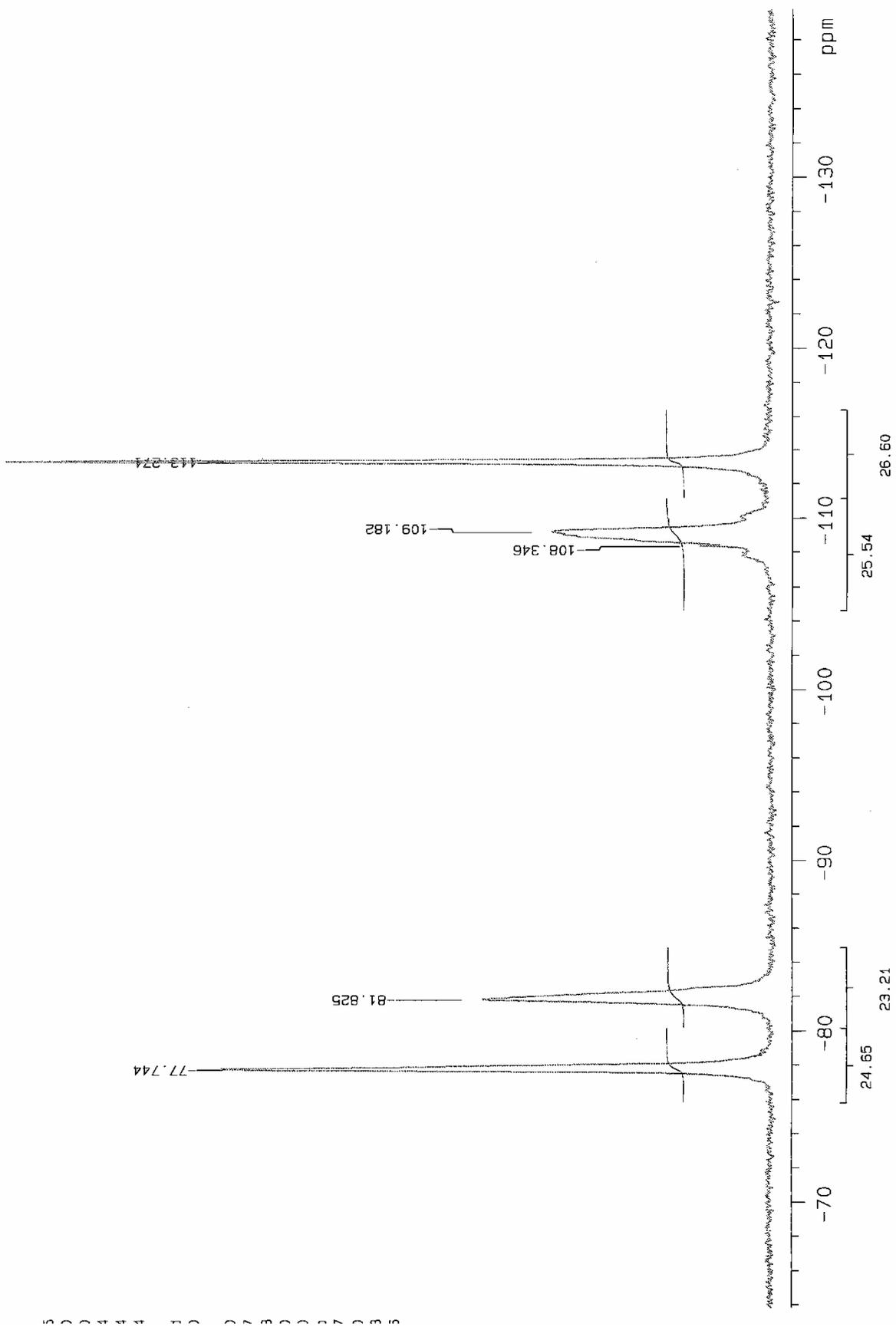


Figure S38. Cross polarized optical microscopy pictures of lyotropic LC phases of **2** showing birefringence.

