Supporting Information

Reduction of CO_2 into Methylene Coupled with the Formation of C-S Bonds under $NaBH_4$ /I_2 System

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Contents

General Information

All solvents were dried and distilled before use according to the standard methods. Unless otherwise noted, the starting materials were commercially available and used without further purification. Thin layer chromatography (TLC) employed glass 0.25 mm silica gel plates. Flash chromatography columns were packed with 200-300 mesh neutral alumina in hexane and ethyl acetate.

^{1}H NMR, ^{13}C NMR, ^{19}F NMR, ^{11}B NMR data were recorded with 600 MHz, 400 MHz spectrometers with tetramethylsilane as an internal standard. All chemical shifts (δ) are reported in ppm and coupling constants (J) in Hz. All chemical shifts are reported relative to tetramethylsilane and d-solvent peaks (77.16 ppm, chloroform), respectively.

General procedure for the reductive functionalization of CO_2 with thiophenols to dithioacetals

To a 25 mL Schlenk tube equipped with a magnetic stir bar was added $NaBH_4$ (1.5 mmol), the tube was evacuated and filled CO_2 for three times. Then the thiol (0.5 mmol) and 1,4-dioxane (1.0 mL) were added to the tube under a positive CO_2 atmosphere. The reaction tube was sealed and stirred at 80 ºC for 30 min, After the reaction mixture allowed to room temperature, I_2 (0.5 mmol) was added under a positive CO_2 atmosphere, the reaction tube was sealed again and stirred for 24 h at 100 ºC. After completion, the residue was carefully quenched with water and the mixture was extracted with ethyl acetate (3 x 10 mL). The yields were determined by ^{1}H NMR technique using trichloroethylene (45 μL, 0.5 mmol) as an internal standard. The reaction mixture was purified by neutral alumina column chromatography with hexane/ethyl acetate as the eluent to afford the desired dithioacetals. All of the products were characterized by NMR techniques.

Typical example of preparation of 2a in 1 mmol scale:

To a 25 mL Schlenk tube equipped with a magnetic stir bar was added $NaBH_4$ (113.4 mg, 3.0 mmol), the tube was evacuated and filled CO_2 for three times. Then the 4-

methylbenzenethiol **1a** (124.2 mg, 1.0 mmol) and 1,4-dioxane (2.0 mL) were added to the tube under a positive CO_2 atmosphere. The reaction tube was sealed and stirred at 80 ºC for 30 min. After the reaction mixture cooled down to room temperature, I_2 (253.8 mg, 1.0 mmol) was added under CO_2 atmosphere, the reaction tube was sealed again and stirred for 24 h at 100 ºC. After reaction completed, the residue was carefully quenched with water and the mixture was extracted with ethyl acetate (3 x 10 mL). The yield was determined by ^1H NMR using trichloroethylene (90 μL, 1.0 mmol) as an internal standard. The reaction mixture was purified by neutral alumina column chromatography with hexane/ethyl acetate as the eluent to afford the colorless oil bis(*p*-tolylthio)methane at 92% yield (119.6 mg).

ORTEP diagram of compound 2p

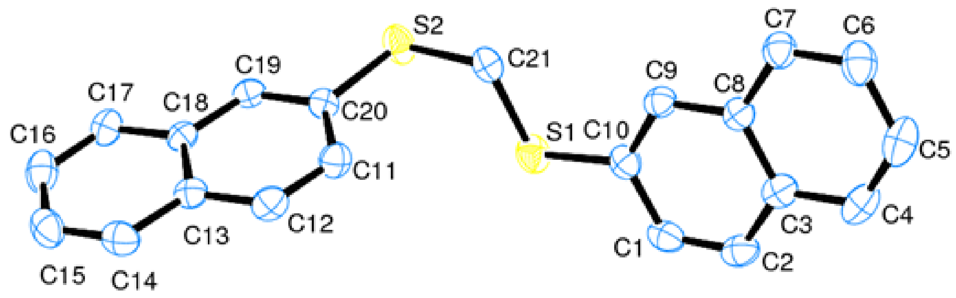


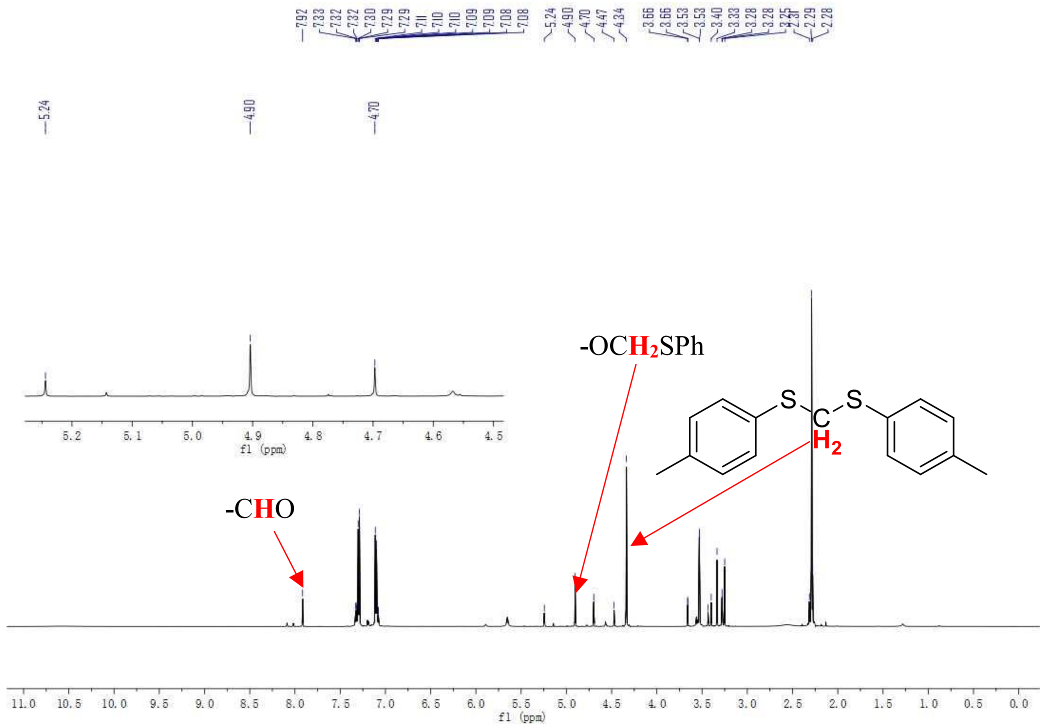
Figure S1. ORTEP diagram of compound **2p** with thermal ellipsoids at 30% probability (H not shown for clarity)

Crystal data and structure refinement details of 2p

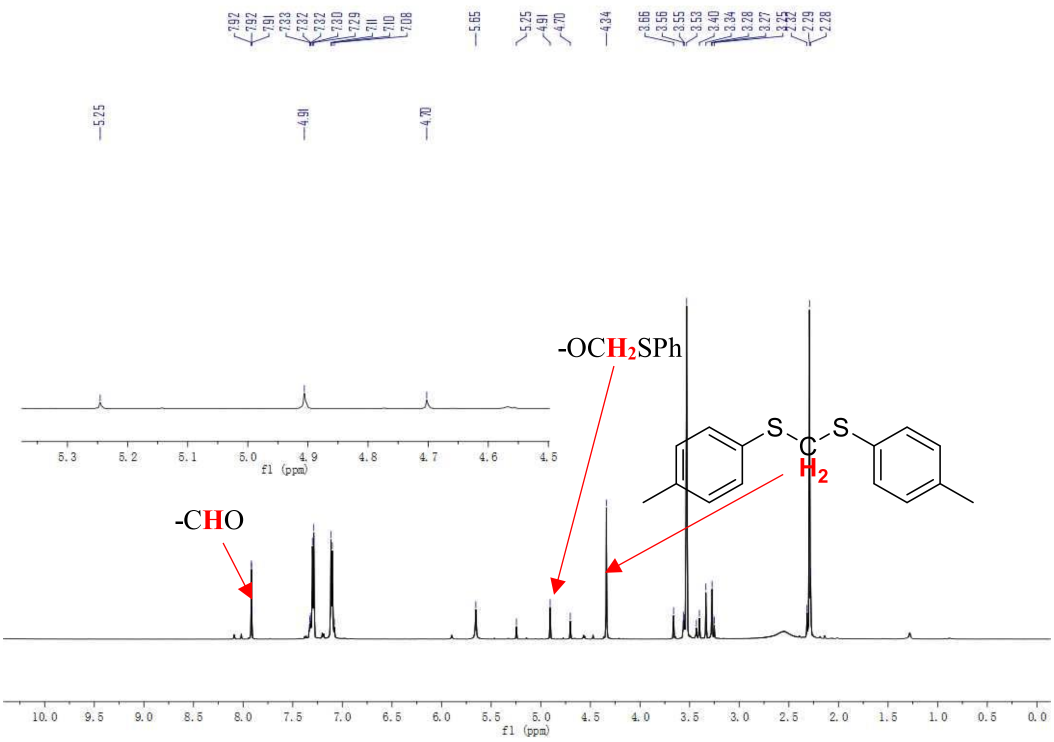
Table S1. Single crystal X-ray data and structure refinement details for **2p**

Identification code	**2p**
Empirical formula	$C_{21} H_{16} S_2$
Formula weight	332.46
Temperature	200 K
Wavelength	0.71073 Å
Crystal system	monoclinic
Space group	P 21/c
Unit cell dimensions	a = 16.6265(19) Å α= 90°
	b = 5.9931(6) Å β= 104.15°
	c = 16.6263(19) Å γ = 90°
Volume	1606.4 (3) $Å^3$
Z	4
Density (calculated)	1.375 g/cm^3
Absorption coefficient	0.328mm^{-1}
F(000)	696
Crystal size	0.16 x 0.16 x 0.15 mm^3
Theta range for data collection	2.52 to 25.04°.
Index ranges	-19<=h<=17, -7<=k<=7, -19<=l<=19
Reflections collected	8507
Independent reflections	2799 [R(int) = 0.0384]
Completeness to theta= 25.04°	98.7%
Absorption correction	Semi-empirical from equivalents
Max. and min. transmission	0.7456 and 0.6609
Refinement method	Full-matrix least-squares on F^2
Data / restraints / parameters	2799/0/208
Goodness-of-fit on F2	1.044
Final R indices [I>2sigma(I)]	R1 = 0.0361, wR2 = 0.0824
R indices (all data)	R1 = 0.0539, wR2 = 0.0910
Largest diff. peak and hole	0.19 and -0.22 e.$Å^{-3}$

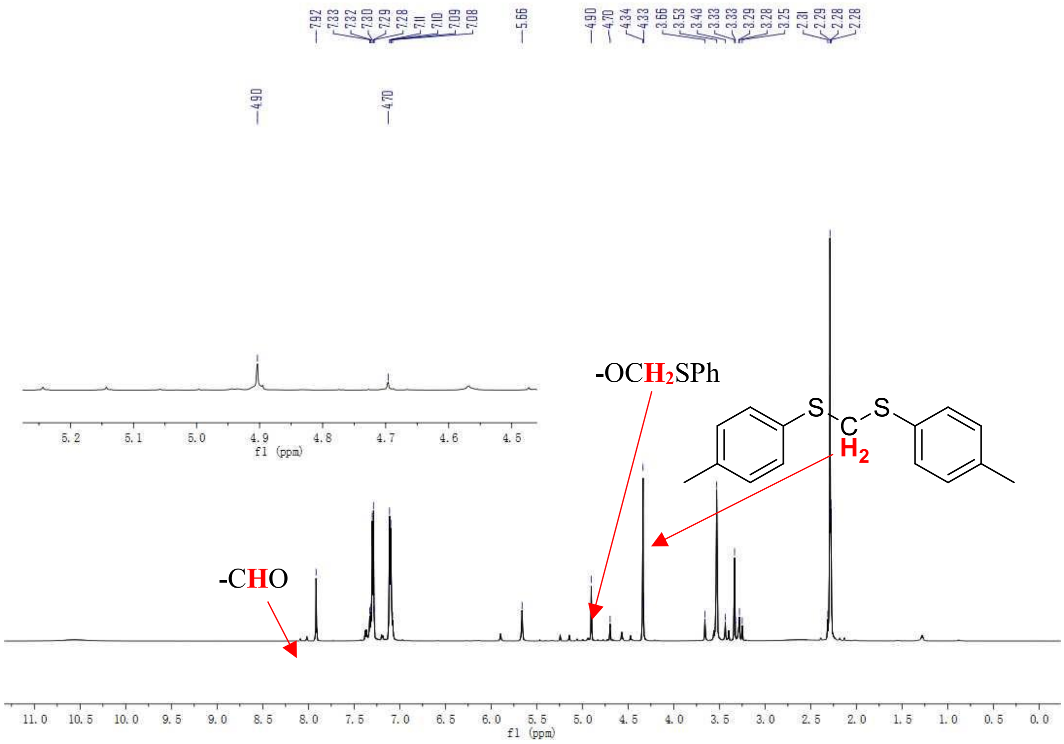
Monitering the reaction process by NMR in 1,4-dioxane-d8



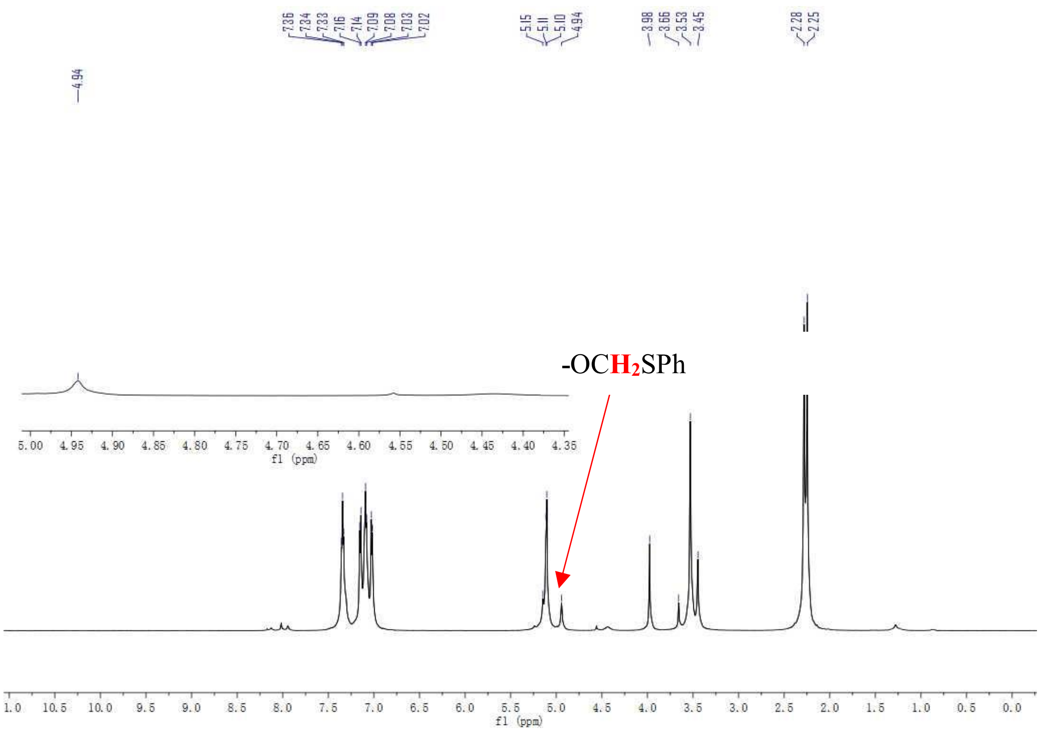
^{1}H NMR ($NaBH_4 + CO_2$ + MePhSH 80 °C 30 min + I_2 100 °C 3 h)



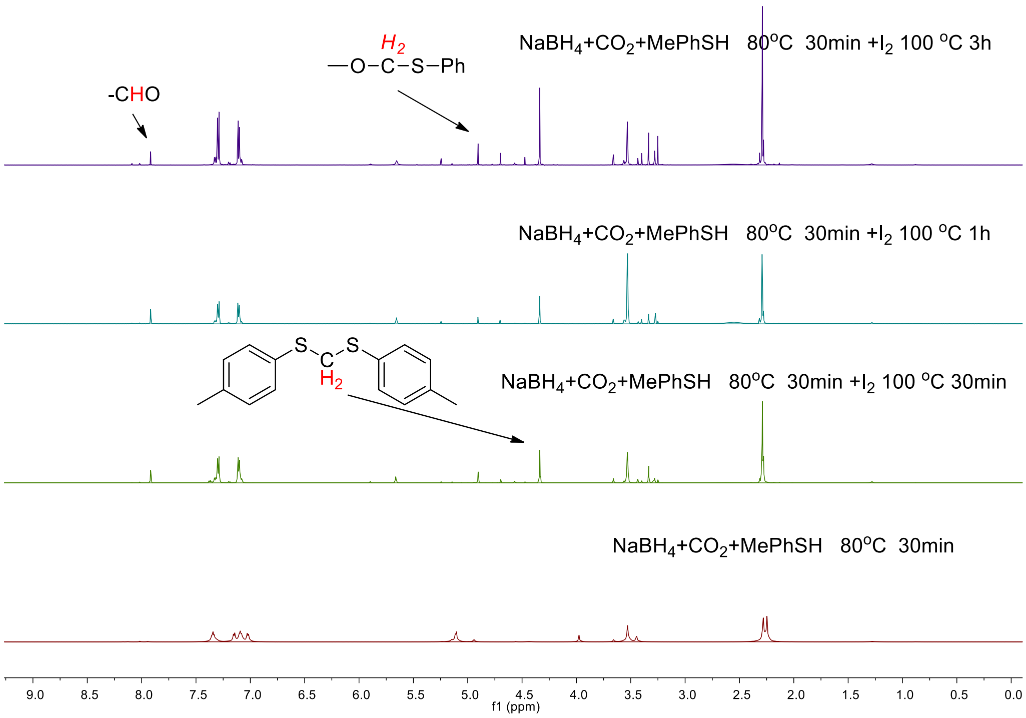
^{1}H NMR ($NaBH_4 + CO_2$ + MePhSH 80 °C 30 min + I_2 100 °C 1 h)



^{1}H NMR ($NaBH_4 + CO_2$ + MePhSH 80 °C 30 min + I_2 100 °C 30 min)

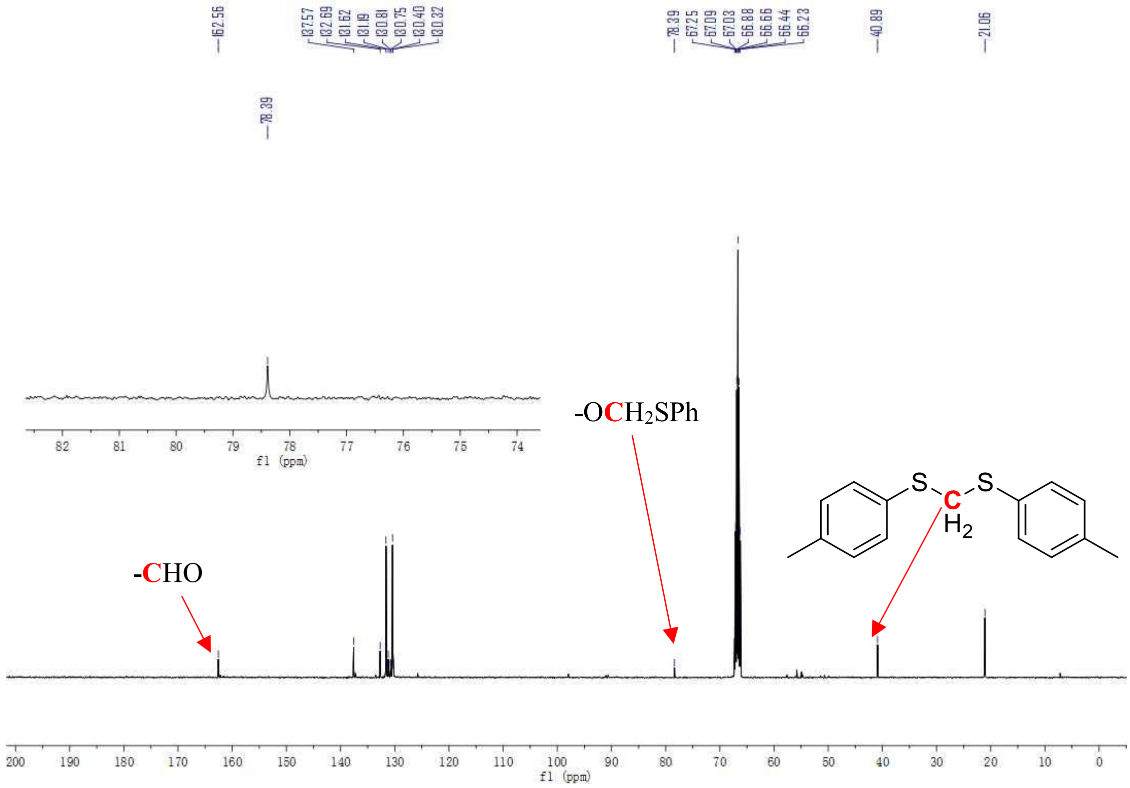


^{1}H NMR ($NaBH_4 + CO_2$ + MePhSH 80 °C 30 min)

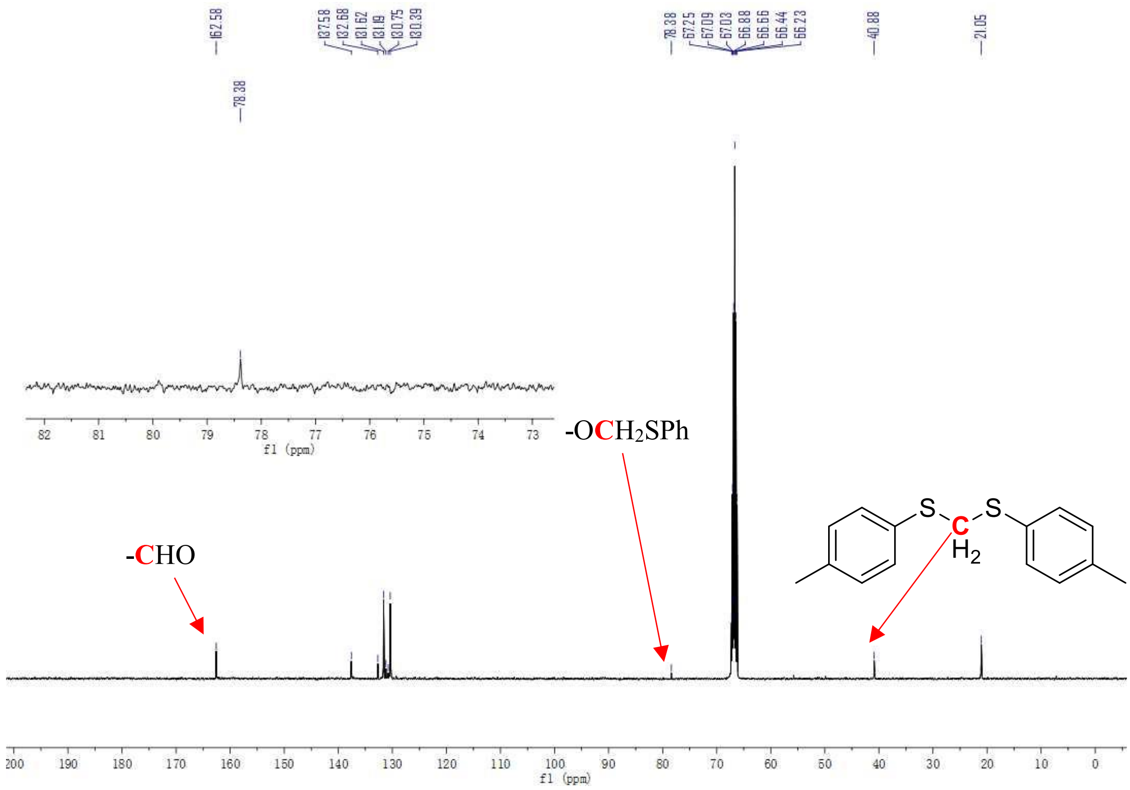


^{1}H NMR spectrum for the reaction process in 1,4-dioxane-d_8 in comparison

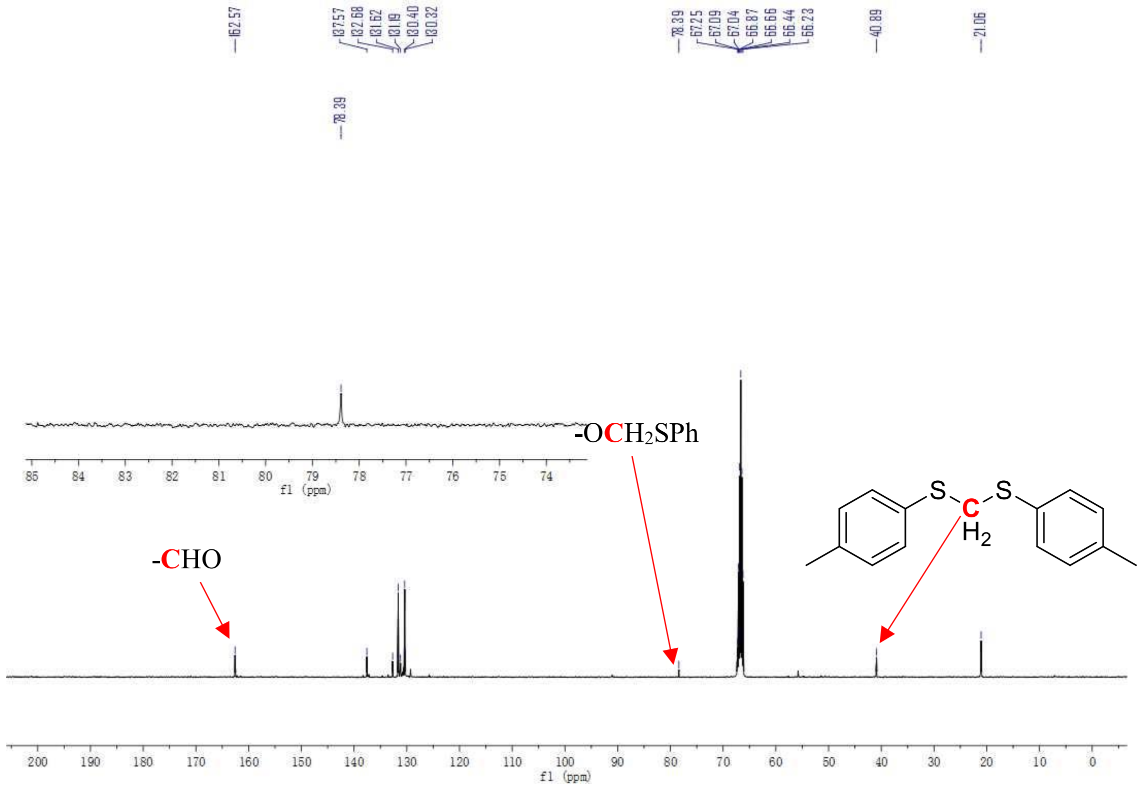
Figure S2. ^{1}H NMR spectrum for the reaction process in 1,4-dioxane-d_8



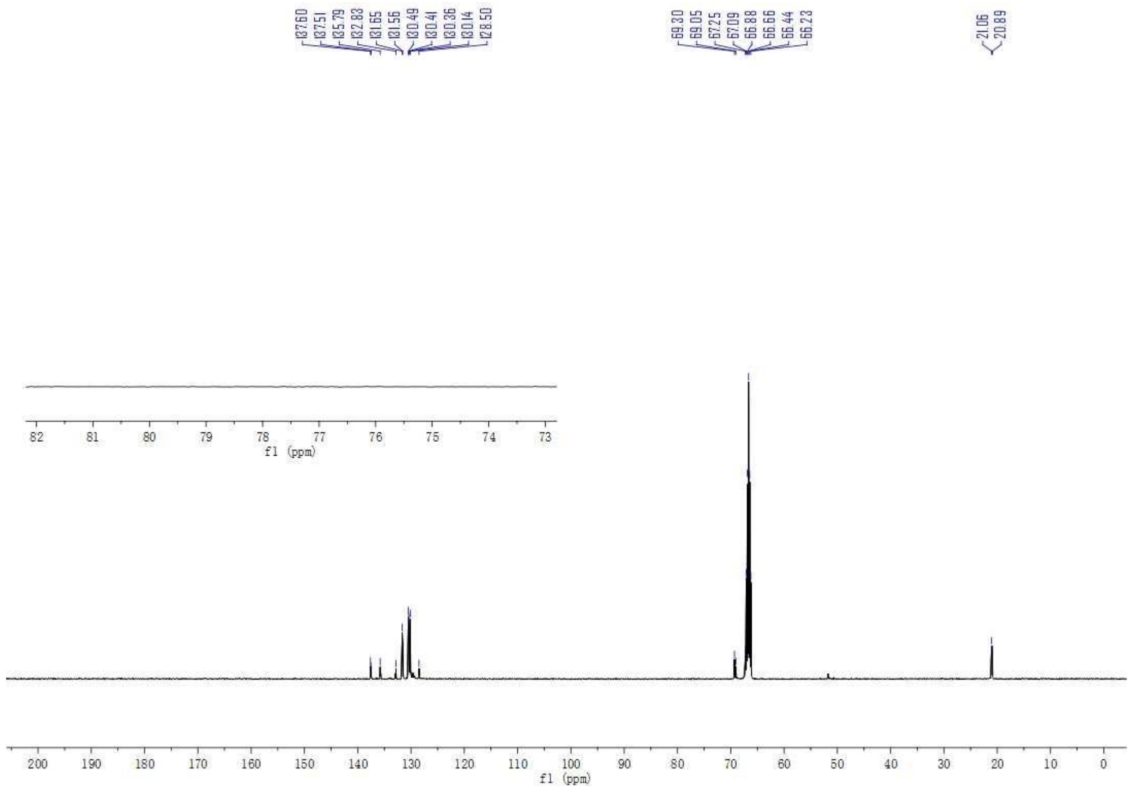
^{13}C NMR ($NaBH_4$ + CO_2 + MePhSH 80 °C 30 min + I_2 100 °C 3 h)



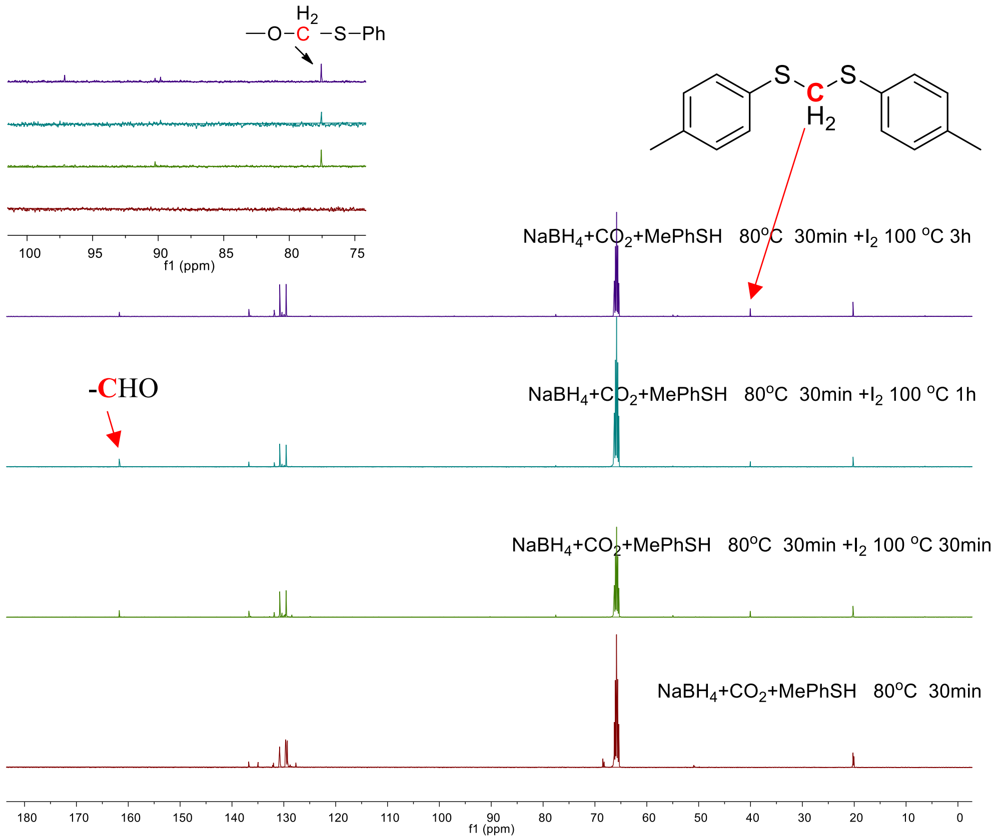
^{13}C NMR ($NaBH_4$ + CO_2 + MePhSH 80 °C 30 min + I_2 100 °C 1 h)



^{13}C NMR ($NaBH_4 + CO_2$ + MePhSH 80 °C 30 min + I_2 100 °C 30 min)



^{13}C NMR ($NaBH_4 + CO_2$ + MePhSH 80 °C 30 min)



^{13}C NMR spectrum for the reaction process in 1,4-dioxane-d_8 in comparison

Figure S3. ^{13}C NMR spectrum for the reaction process in 1,4-dioxane-d_8

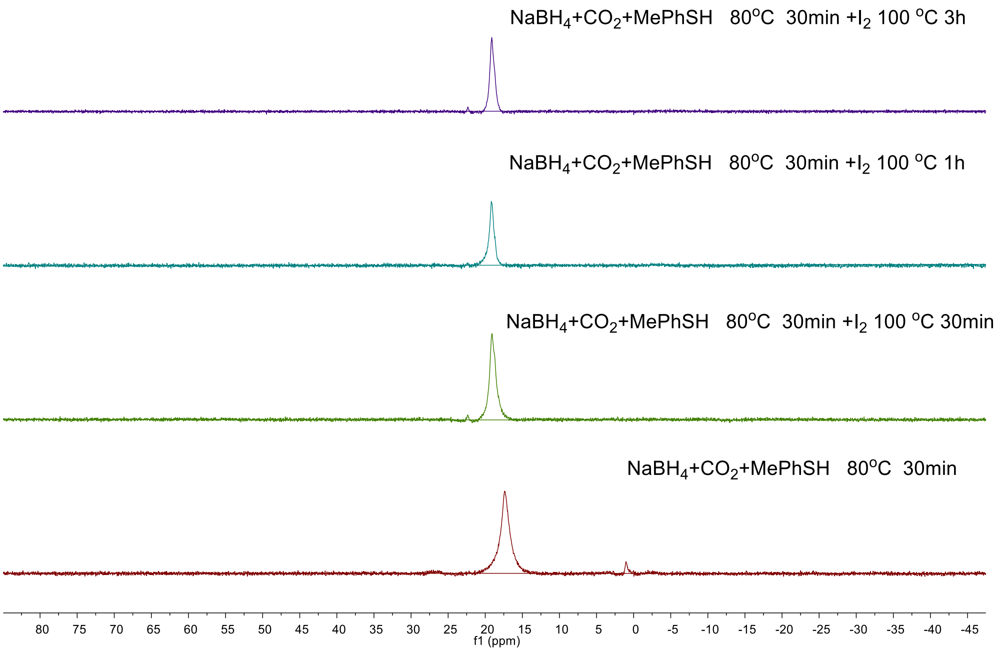


Figure S4. ^{11}B NMR spectrum for the reaction process in 1,4-dioxane-d_8

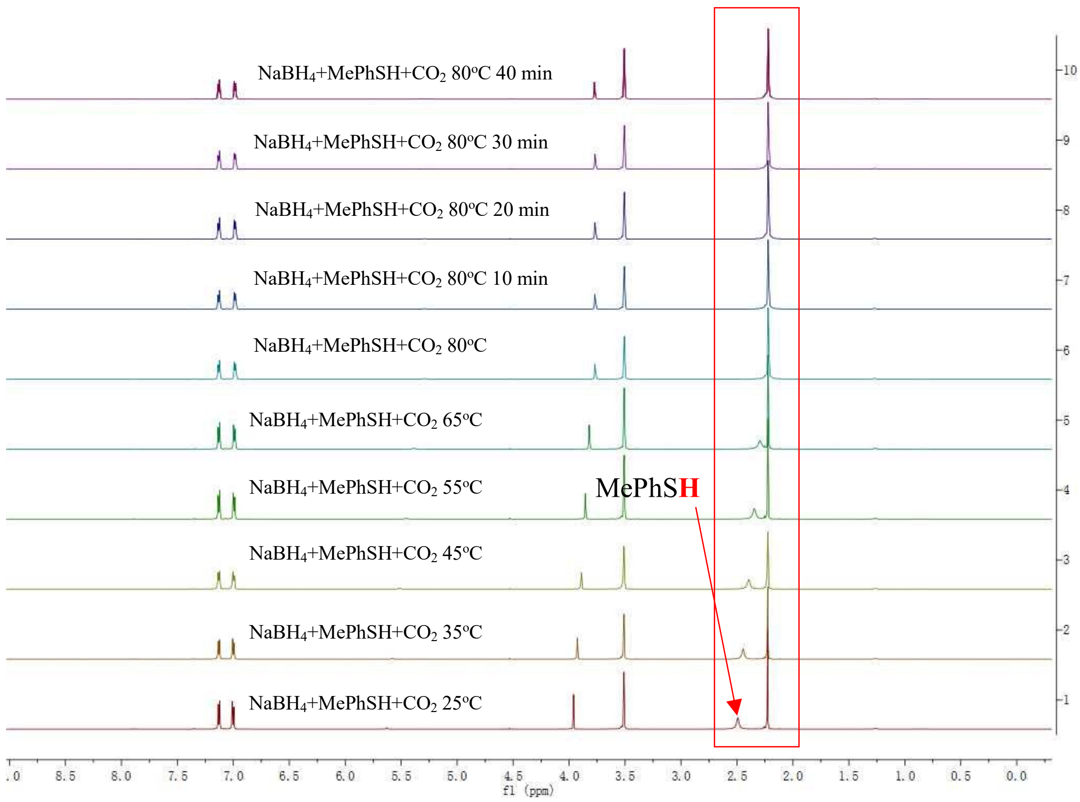
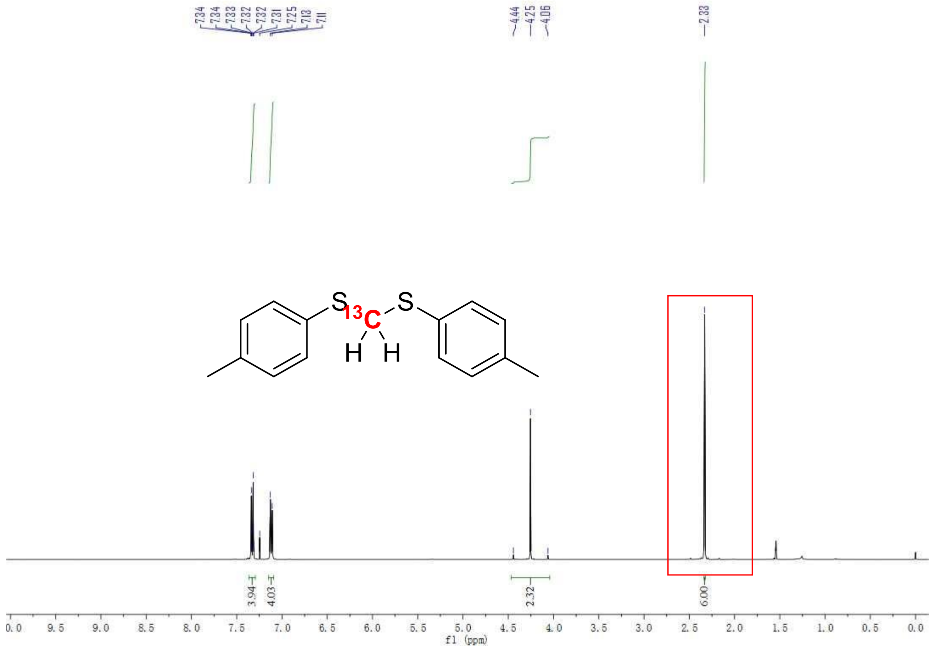


Figure S5. [1]H NMR monitoring of the reaction before I_2 addition



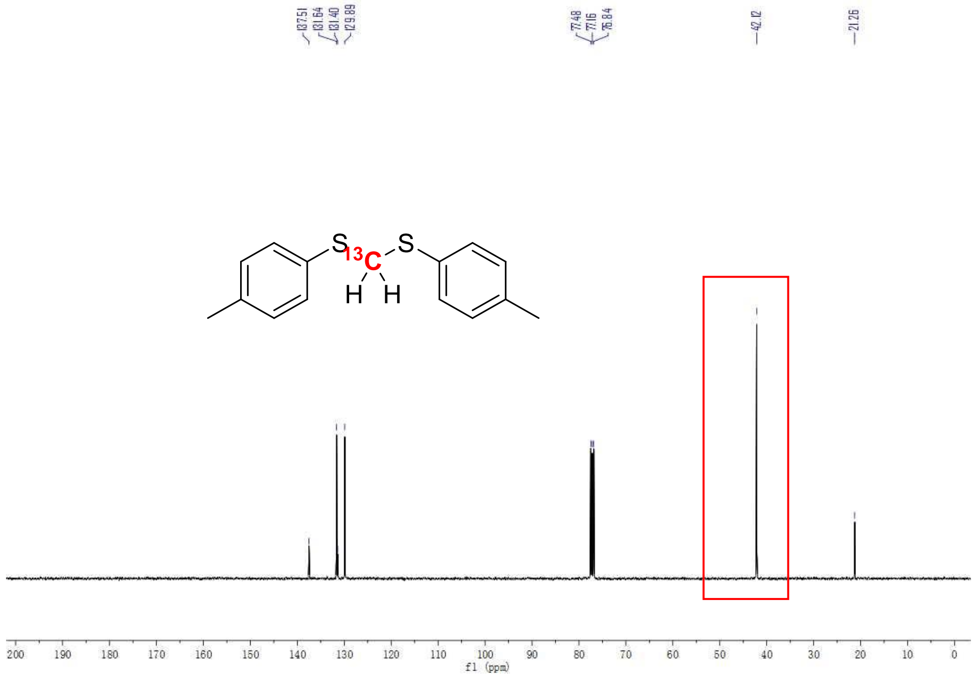
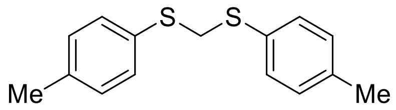


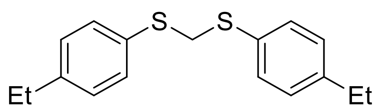
Figure S6. ^{1}H NMR and ^{13}C spectrum for ^{13}C-labelled **2a**

Characterization data of dithioacetals

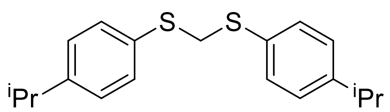
(Some dithioacetals were identified through comparisons with reported literatures for the corresponding compounds of ^{1}H NMR and ^{13}C NMR data.)



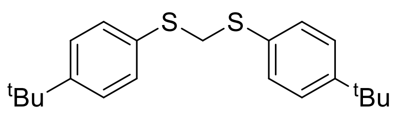
Bis(p-tolylthio)methane (2a)[1] Yellow oil (60 mg, 92%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.33 (d, J = 8.0 Hz, 4H), 7.11 (d, J = 6.8 Hz, 4H), 4.25 (s, 2H), 2.33 (s, 6H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 137.46, 131.59, 131.37, 129.86, 42.07, 21.23. GC-MS: 260.



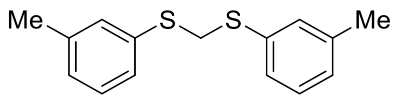
Bis((4-ethylphenyl)thio)methane (2b)[1] Colorless oil (62 mg, 86%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.35 (d, J = 8.2 Hz, 4H), 7.13 (d, J = 8.1 Hz, 4H), 4.27 (s, 2H), 2.88 (m, 1H), 2.62 (q, J = 7.6 Hz, 4H), 1.22 (t, J = 7.6 Hz, 6H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 143.74, 131.63 (d, J = 16.4 Hz), 128.68, 41.97, 28.60, 15.56. GC-MS: 288.



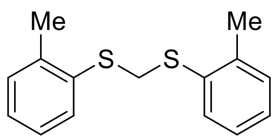
Bis((4-isopropylphenyl)thio)methane (2c) Colorless oil (70 mg, 88%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.36 (d, J = 8.2 Hz, 4H), 7.17 (d, J = 8.2 Hz, 4H), 4.28 (s, 2H), 2.88 (hept, J = 6.9 Hz, 1H), 1.25 (s, 6H), 1.23 (s, 6H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 148.32, 131.93, 131.42, 127.27, 41.84, 33.89, 24.02. GC-MS: 316. HRMS (APCI), m/z: $[M + H]^{+}$ calcd. for $C_{19}H_{25}S_2^{+}$ 317.1392; found 317.1389.



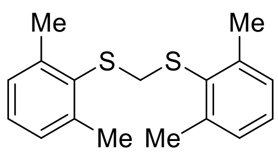
Bis((4-(tert-butyl)phenyl)thio)methane (2d)[1] Colorless oil (71 mg, 90%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.38-7.30 (m, 8H), 4.29 (s, 2H), 1.30 (s, 18H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 150.50, 131.73, 130.91, 126.16, 41.48, 34.66, 31.34. GC-MS: 344.



Bis(m-tolylthio)methane (2e)[1] Colorless oil (51 mg, 78%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.24-7.16 (m, 6H), 7.04 (d, J = 7.5 Hz, 2H), 4.33 (s, 2H), 2.32 (s, 6H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 138.90, 134.95, 131.37, 128.94, 128.07, 127.75, 40.62, 21.47. GC-MS: 260.

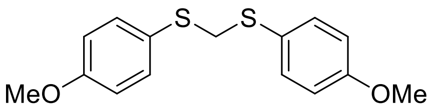


Bis(o-tolylthio)methane (2f)[1] Colorless oil (57 mg, 88%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.43-7.37 (m, 2H), 7.20-7.11 (m, 6H), 4.29 (s, 2H), 2.35 (s, 6H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 138.65, 134.61, 130.26, 129.97, 126.97, 126.64, 38.69, 20.57. GC-MS: 260.

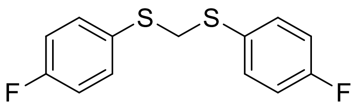


Bis((2,6-dimethylphenyl)thio)methane (2g) Colorless oil (41 mg, 57%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.14-7.05 (m, 6H), 3.84 (s, 2H), 2.43 (s, 12H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 143.34, 133.29, 128.84, 128.26, 41.76, 22.05. GC-

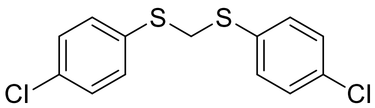
MS: 288. HRMS (APCI), *m/z*: $[M + H]^+$ calcd. for $C_{17}H_{21}S_2^+$ 289.1079; found 289.1071.



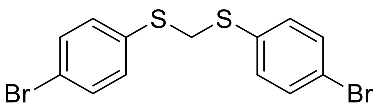
***Bis((4-methoxyphenyl)thio)methane (2h)*[1]** White solid (65 mg, 89%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.40 (d, *J* = 8.8 Hz, 4H), 6.85 (d, *J* = 8.7 Hz, 4H), 4.15 (s, 2H), 3.80 (s, 6H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 159.71, 134.57, 125.37, 114.71, 55.46, 44.63. GC-MS: 292.



***Bis((4-fluorophenyl)thio)methane (2i)*[1]** Colorless oil (42 mg, 63%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.41 (dd, *J* = 8.8, 5.2 Hz, 4H), 7.01 (t, *J* = 8.7 Hz, 4H), 4.21 (s, 2H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 163.86, 161.40, 134.17 (d, *J* = 8.3 Hz), 129.65 (d, *J* = 3.1 Hz), 116.39, 116.18, 43.28. GC-MS: 268.

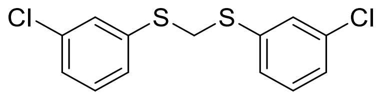


***Bis((4-chlorophenyl)thio)methane (2j)*[1]** White solid (54 mg, 72%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.32 (d, *J* = 8.6 Hz, 4H), 7.27 (d, *J* = 8.7 Hz, 4H), 4.26 (s, 2H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 133.68, 133.09, 132.49, 129.32, 41.31. GC-MS: 301.

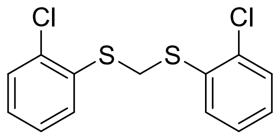


***Bis((4-bromophenyl)thio)methane (2k)*[1]** White solid (75 mg, 77%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.43 (d, *J* = 8.5 Hz, 4H), 7.26 (d, J = 8.5 Hz, 4H), 4.27 (s, 2H).

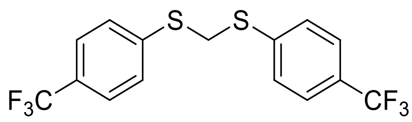
^{13}C NMR (101 MHz, CHLOROFORM-D) δ 133.75, 132.63, 132.26, 121.56, 40.92. GC-MS: 390.



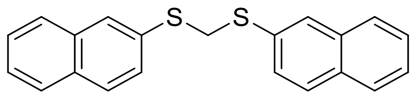
Bis((3-chlorophenyl)thio)methane (2l)[1] Colorless oil (60 mg, 80%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.37 (s, 2H), 7.29-7.20 (m, 7H), 4.33 (s, 2H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 136.68, 134.84, 130.24 (d, *J* = 15.5 Hz), 128.72, 127.53, 40.18. GC-MS: 301.



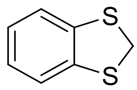
Bis((2-chlorophenyl)thio)methane (2m)[1] White solid (46 mg, 61%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.47 (dd, *J* = 7.7, 1.6 Hz, 2H), 7.38 (dd, *J* = 7.8, 1.5 Hz, 2H), 7.21 (dtd, *J* = 16.9, 7.4, 1.5 Hz, 4H), 4.40 (s, 2H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 135.06, 133.86, 131.24, 130.01, 128.22, 127.37, 37.26. GC-MS: 301.



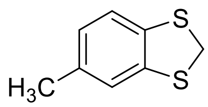
Bis((4-trifluoromrthylphenyl)thio)methane (2n) White solid (49mg, 53%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.55 (d, *J* = 8.5 Hz, 4H), 7.45 (d, *J* = 8.4 Hz, 4H), 4.43 (s, 2H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 139.78, 129.53, 129.27, 128.95, 128.62, 128.15, 126.02 (d, *J* = 3.6 Hz), 125.44, 122.73, 120.03, 38.30 (s). ^{19}F NMR (565 MHz, CHLOROFORM-D) δ -62.55. GC-MS: 368. HRMS (APCI), *m/z*: $[M + H]^+$ calcd. for $C_{15}H_{11}F_6S_2^+$ 369.0201; found 369.0195.



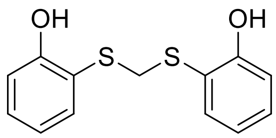
Bis(naphthalen-2-ylthio)methane (2p)[1] Colorless oil (70 mg, 84%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.87 (d, J = 1.5 Hz, 2H), 7.76 (dt, J = 17.5, 7.9 Hz, 6H), 7.51-7.42 (m, 6H), 4.53 (s, 2H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 133.77, 132.41 (d, J = 1.2 Hz), 129.54, 128.74, 128.36, 127.86, 127.52, 126.75, 126.31, 40.65 (s). GC-MS: 332.



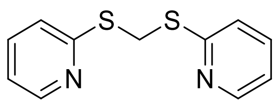
1,3-Benzodithiole (2q)[2] Colorless oil (45mg, 58%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.20 (dd, J = 5.9, 3.2 Hz, 1H), 7.00 (dd, J = 5.7, 3.3 Hz, 1H), 4.48 (s, 1H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 138.30, 125.64, 122.46, 36.09. GC-MS: 154.



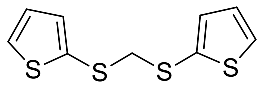
5-Methyl-1,3-benzodithiole (2r)[3] Colorless oil (51mg, 61%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.09 (d, J = 7.9 Hz, 1H), 7.04 (s, 1H), 6.81 (d, J = 8.3 Hz, 1H), 4.46 (s, 2H), 2.25 (s, 3H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 138.39, 135.70, 134.80, 126.52, 123.23, 122.17, 36.34, 20.99. GC-MS: 168.



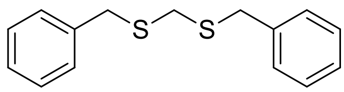
2,2'-(Methylenedithio)di-phenol (2s) Colorless oil (39 mg, 59%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.46 (dd, J = 7.7, 1.6 Hz, 2H), 7.34-7.27 (m, 2H), 7.00 (dd, J = 8.2, 1.3 Hz, 2H), 6.89 (td, J = 7.5, 1.2 Hz, 2H), 6.45 (s, 2H), 3.94 (s, 2H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 157.02, 136.22, 132.12, 121.21, 117.82, 115.55, 44.30. GC-MS: 264. HRMS (APCI), m/z: $[M + H]^+$ calcd. for $C_{13}H_{13}O_2S_2^+$ 265.0351; found 265.0344.



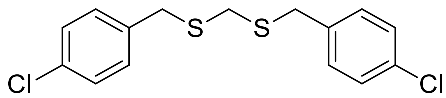
Bis(pyridin-2-ylthio)methane (2t)[4] The yield is low for getting desired product, so we could not isolate pure compound.



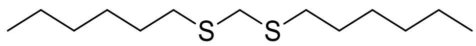
Bis(thiophen-2-ylthio)methane (2u)[4] Colorless oil (19 mg, 30%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.43-7.40 (m, 2H), 7.22 (dd, J = 3.5, 1.0 Hz, 2H), 7.02 (dd, J = 5.4, 3.6 Hz, 2H), 4.05 (s, 2H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 135.24, 132.35, 130.66, 127.75, 49.28. GC-MS: 244.



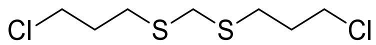
Bis(benzylthio)methane (2v)[4] White solid (28 mg, 43%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.29 (d, J = 4.4 Hz, 8H), 7.23 (dt, J = 5.5, 4.2 Hz, 2H), 3.83 (s, 4H), 3.37 (s, 2H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 137.81, 129.25, 128.55, 127.18, 34.57, 33.56. GC-MS: 260.



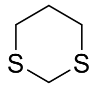
Bis(4-chloro-benzylthio)methane (2w) Colorless oil (60 mg, 73%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 7.29-7.24 (m, 4H), 7.24-7.19 (m, 4H), 3.77 (s, 4H), 3.32 (s, 2H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 136.21, 133.03, 130.55, 128.83, 33.76, 33.30. GC-MS: 329. HRMS (APCI), *m*/*z*: $[M + H]^+$ calcd. for $C_{15}H_{15}Cl_2S_2^+$ 328.9987; found 328.9973.



Bis-(hexylmercapto)methane (2x)[5] Colorless oil (36 mg, 58%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 3.66 (s, 2H), 2.66-2.59 (m, 4H), 1.62-1.56 (m, 4H), 1.40 (dd, J = 14.6, 7.6 Hz, 4H), 1.29 (d, J = 4.1 Hz, 8H), 0.89 (t, J = 6.9 Hz, 6H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 35.58, 31.57, 31.02, 29.21, 28.74, 22.70, 14.18. GC-MS: 248.



Bis((3-chloropropyl)thio)methane (2y) Colorless oil (36 mg, 62%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 3.68 (s, 2H), 3.66 (t, J = 7.0 Hz, 4H), 2.80 (t, J = 7.0 Hz, 4H), 2.10-2.03 (m, 4H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 43.56, 35.61, 31.79, 27.95. GC-MS: 233. HRMS (APCI), *m*/*z*: $[M + H]^+$ calcd. for $C_7H_{15}Cl_2S_2^+$ 232.9987; found 232.9979.



1,3-Dithiane (2z)[6] White solid (36 mg, 60%): ^{1}H NMR (400 MHz, CHLOROFORM-D) δ 3.78 (s, 2H), 2.86-2.79 (m, 4H), 2.11-2.04 (m, 2H). ^{13}C NMR (101 MHz, CHLOROFORM-D) δ 32.07, 30.04, 26.69. GC-MS: 120.

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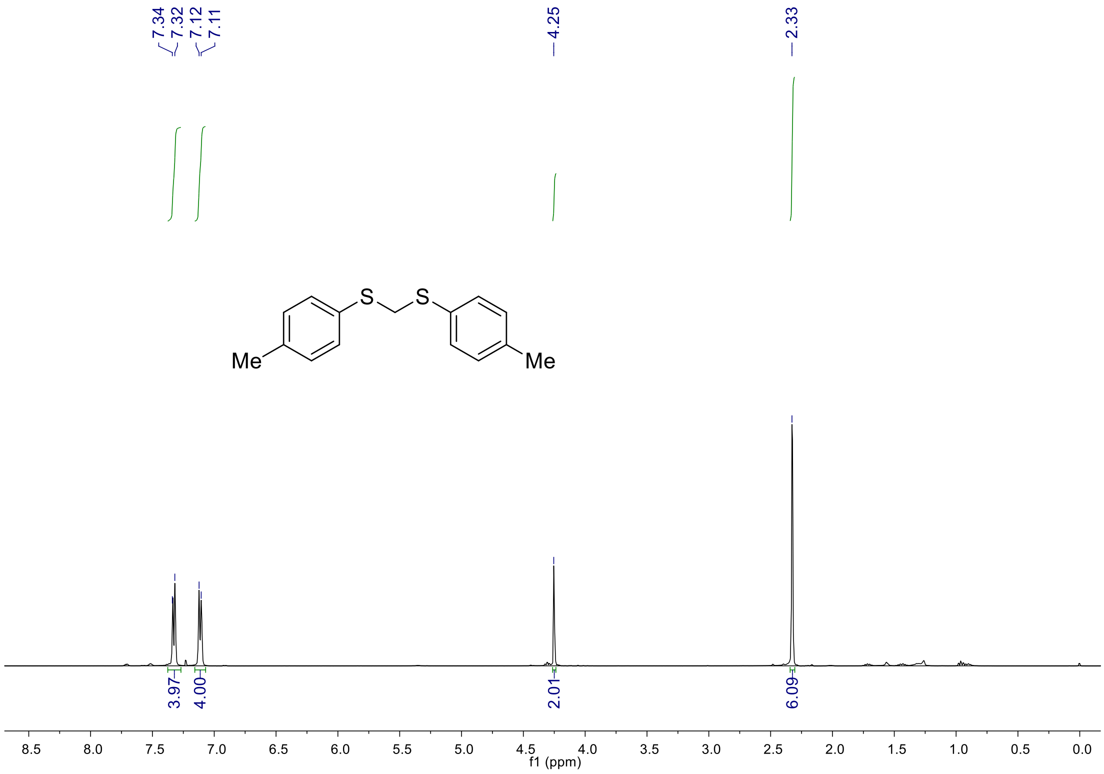
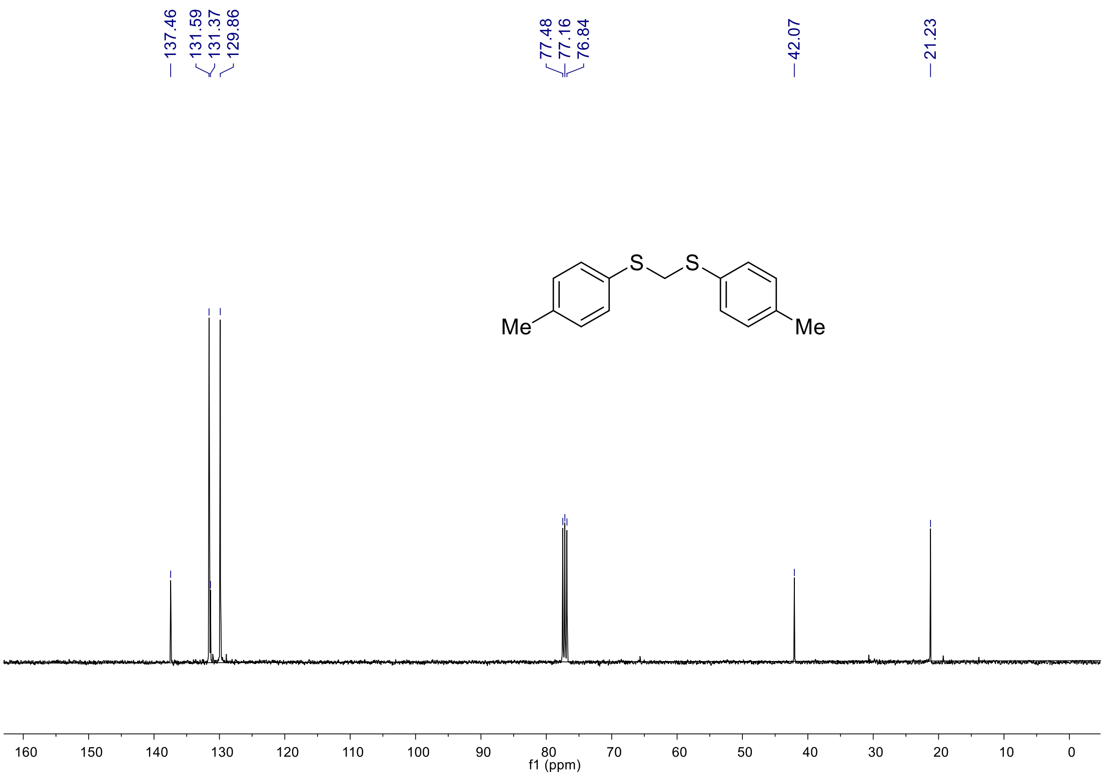
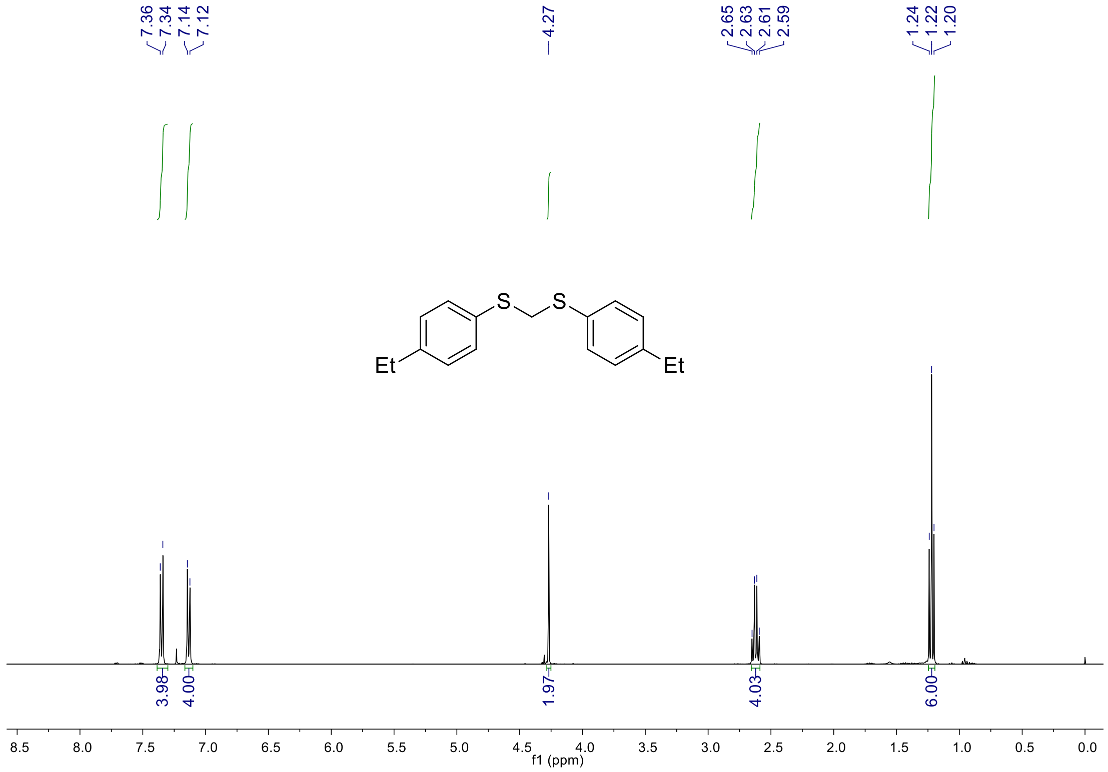
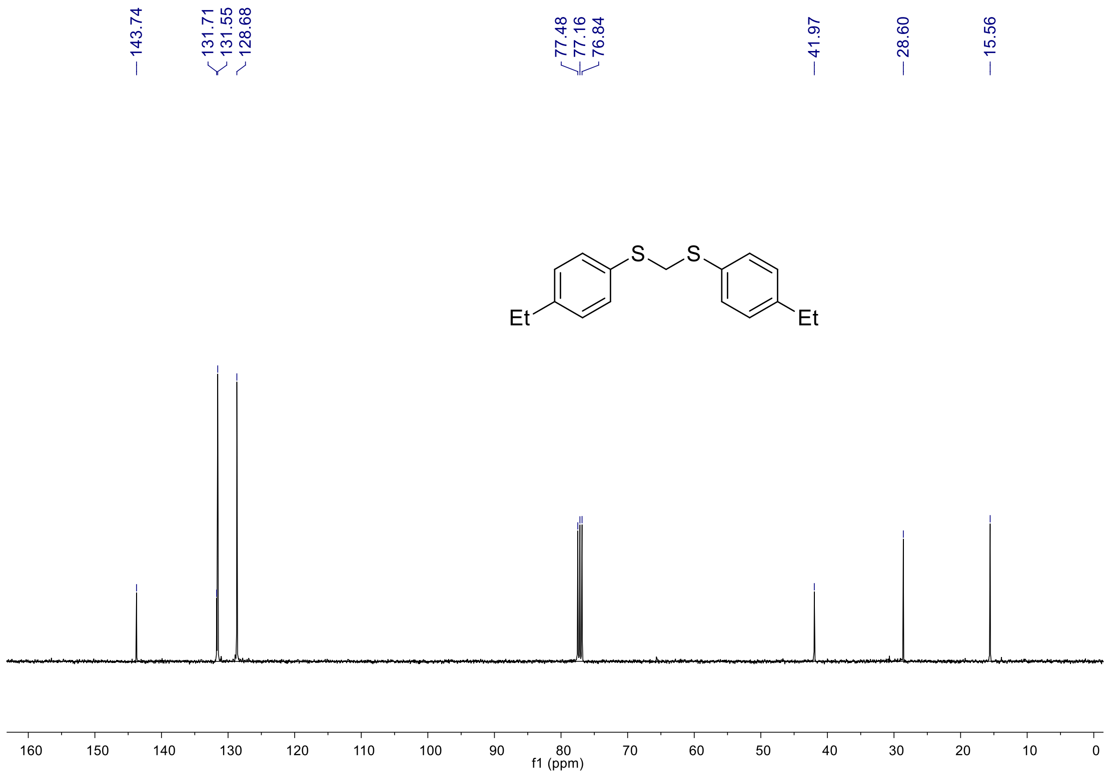
^{1}H and ^{13}C NMR Spectrum of Dithioacetals



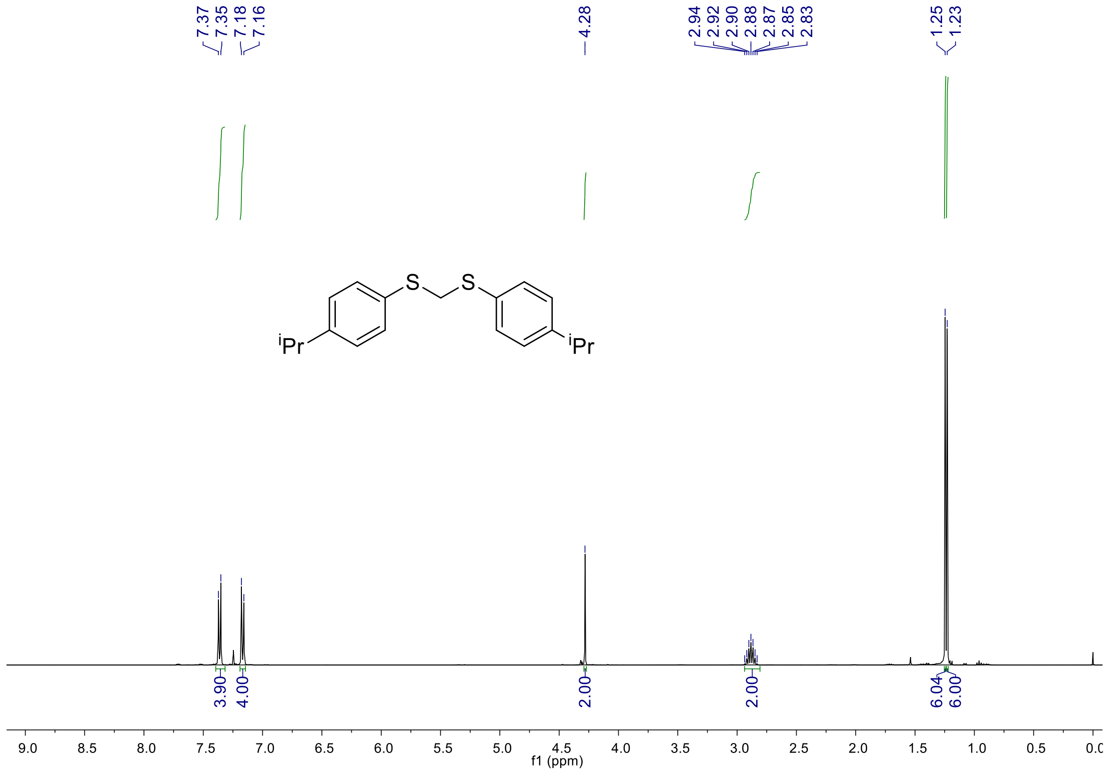


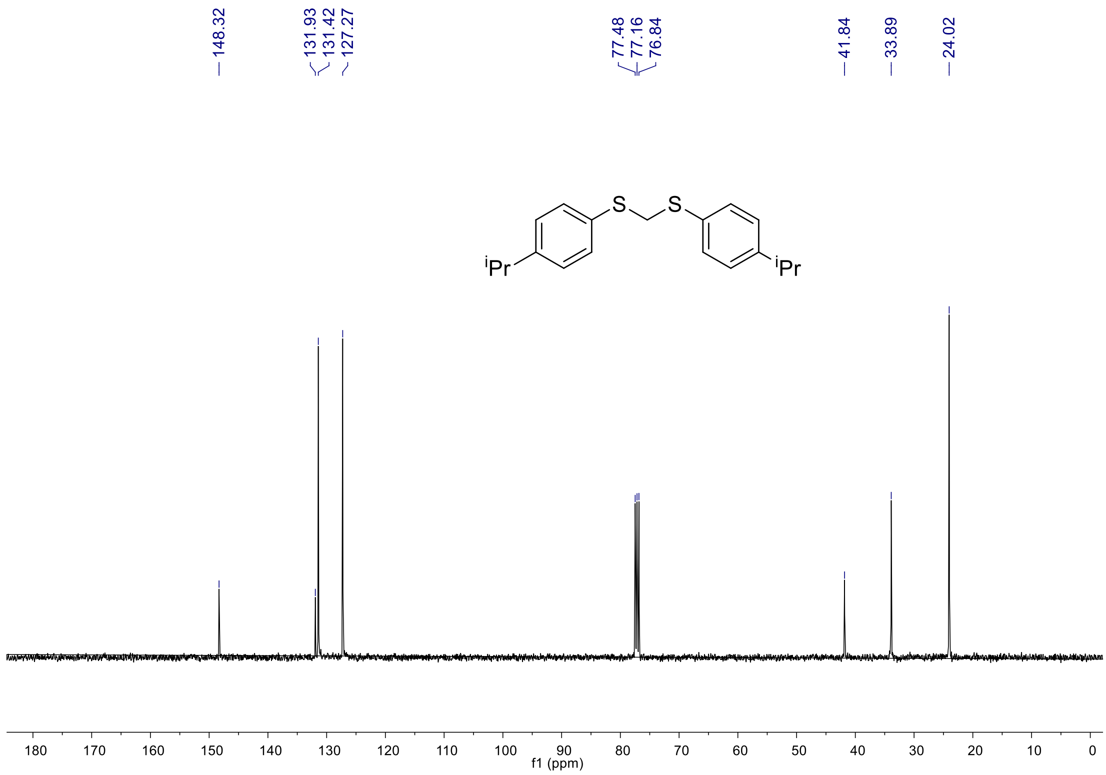
^{1}H and ^{13}C NMR Spectrum of **2a**



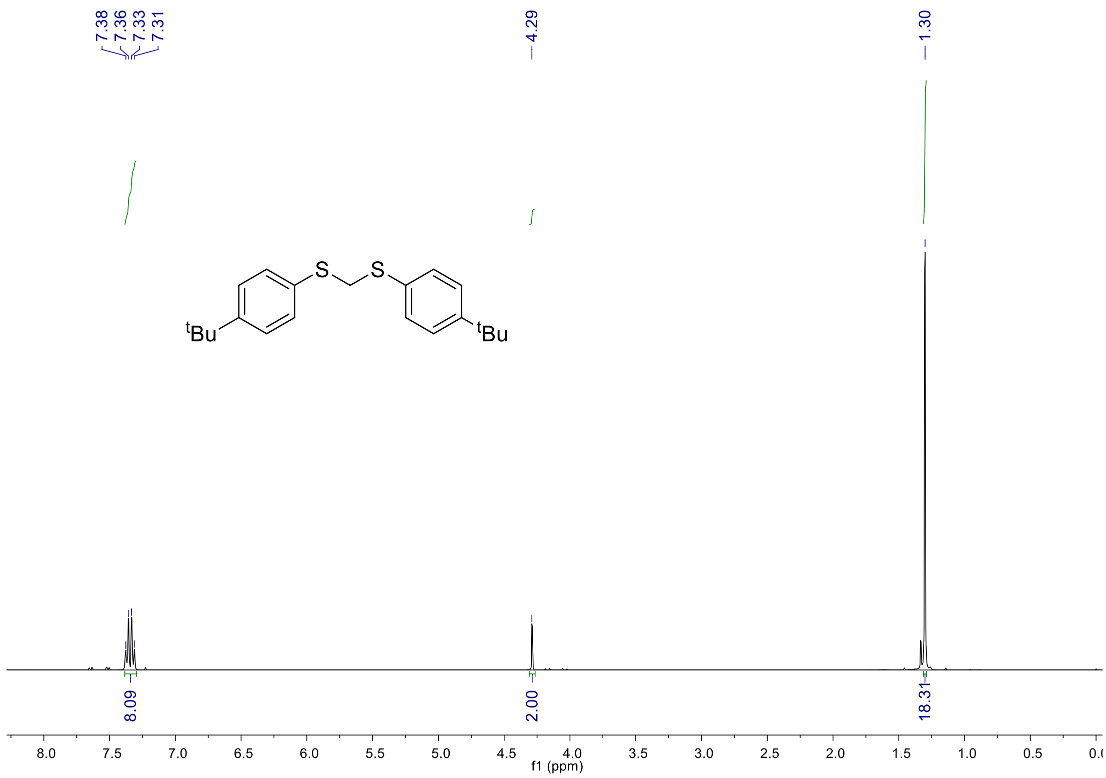


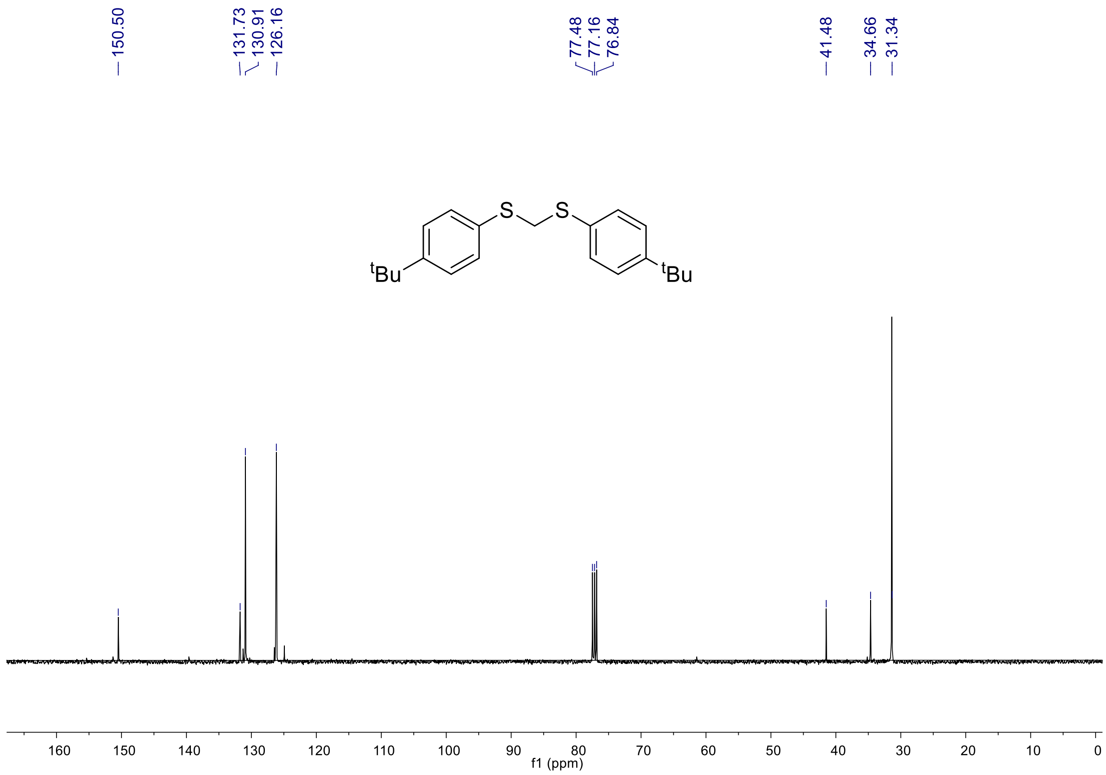
^{1}H and ^{13}C NMR Spectrum of **2b**



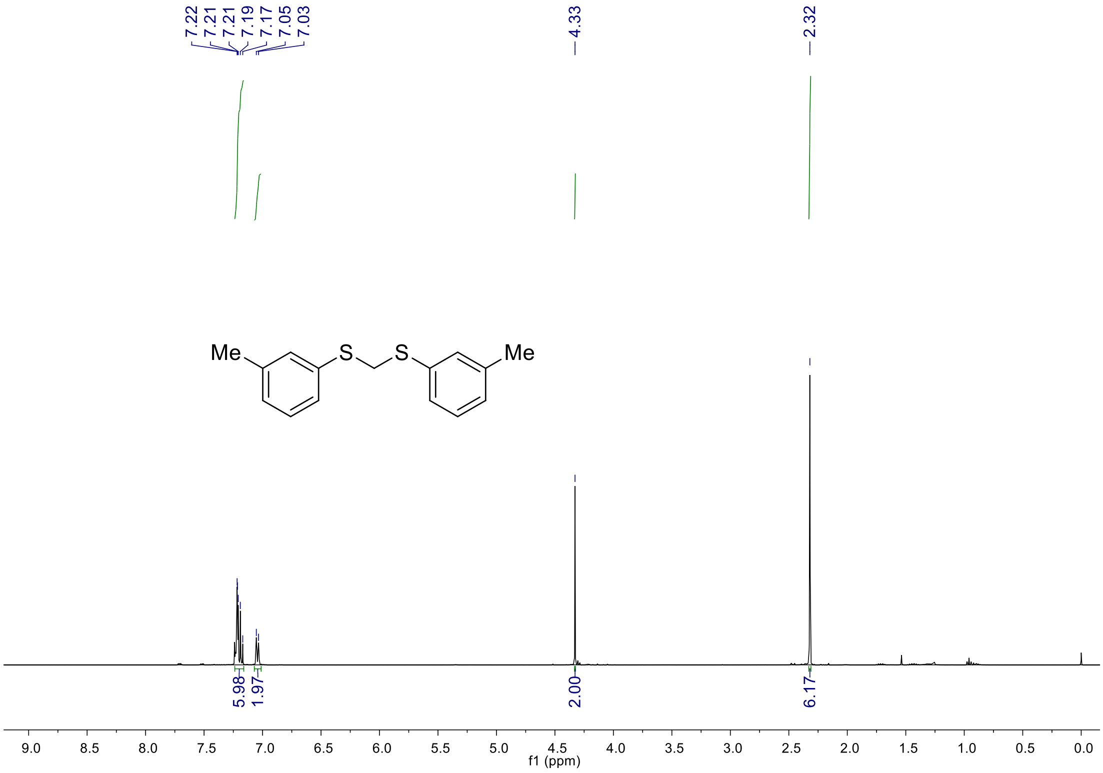


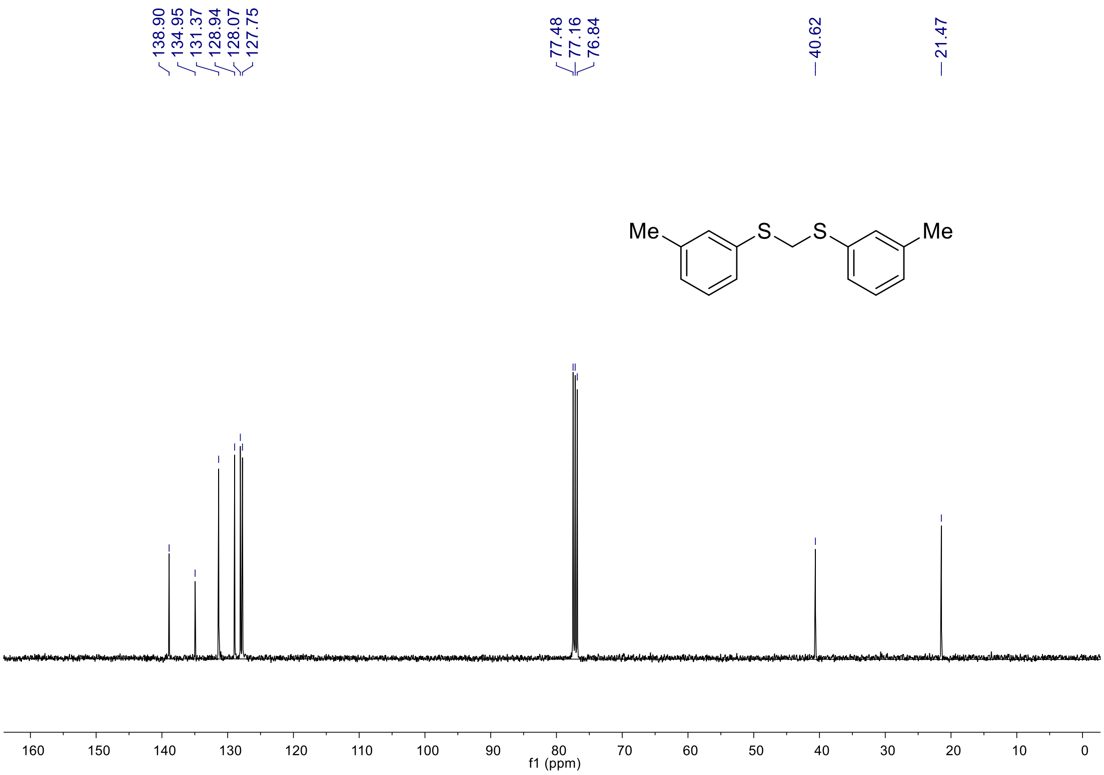
^{1}H and ^{13}C NMR Spectrum of **2c**



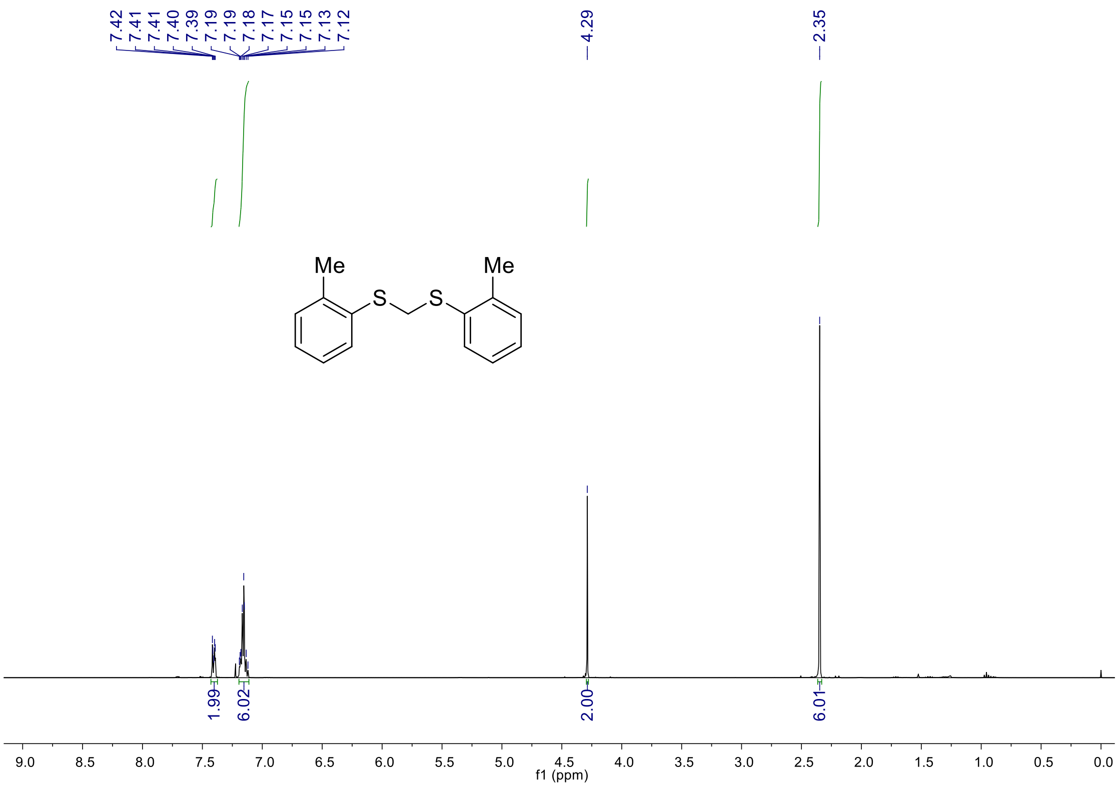


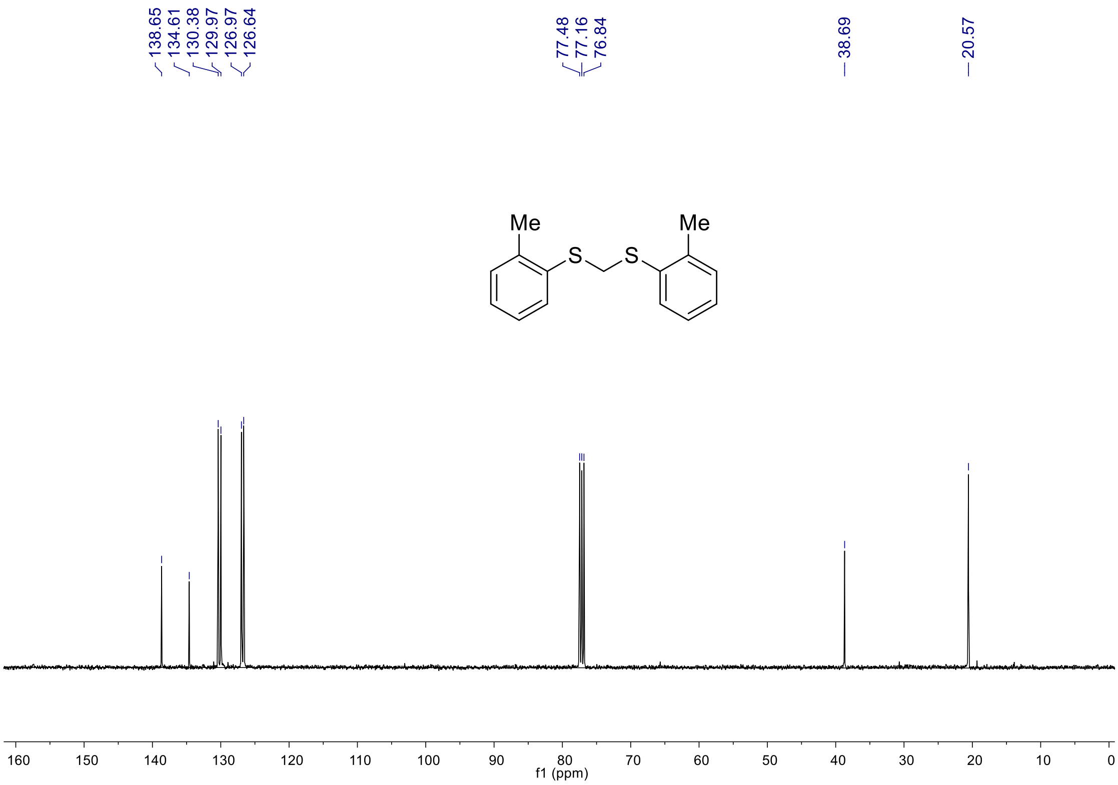
^{1}H and ^{13}C NMR Spectrum of **2d**



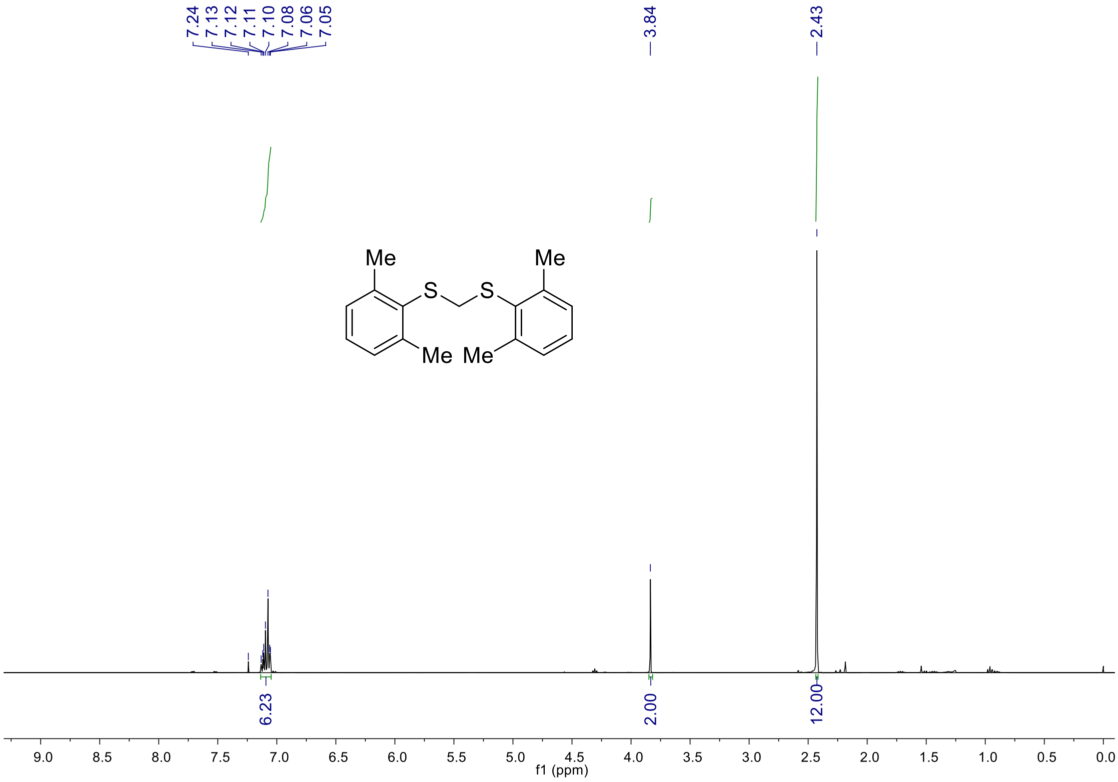


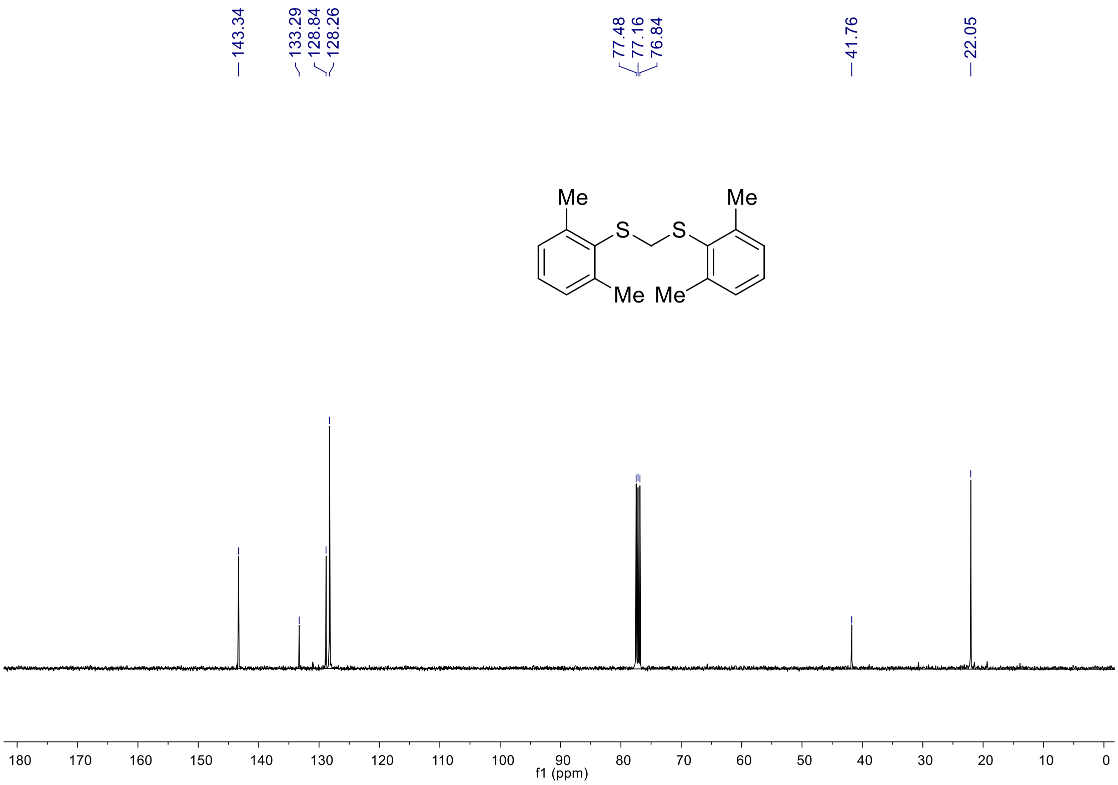
^{1}H and ^{13}C NMR Spectrum of **2e**



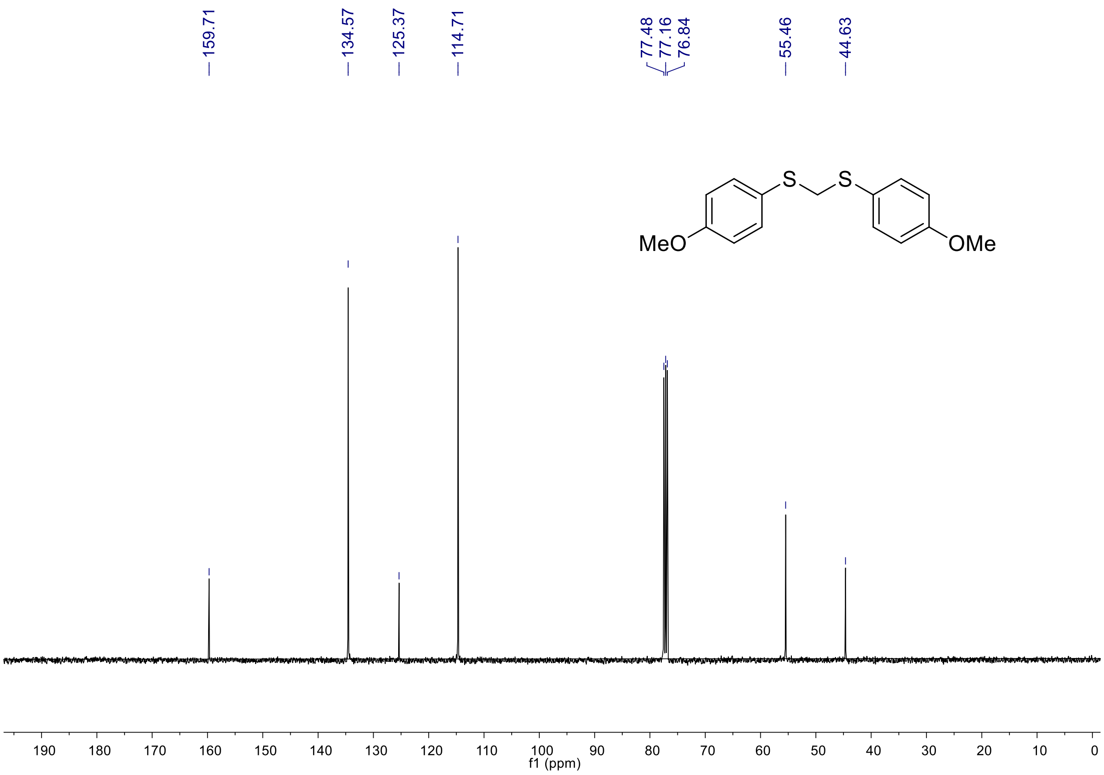


^{1}H and ^{13}C NMR Spectrum of **2f**

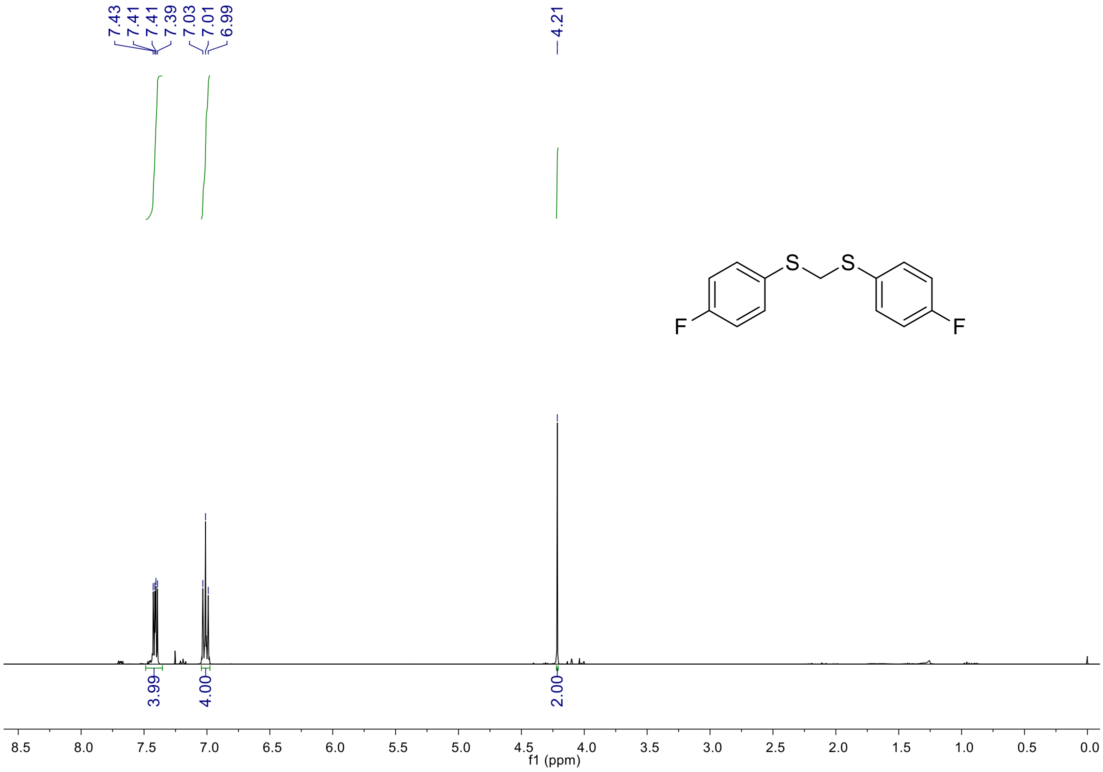


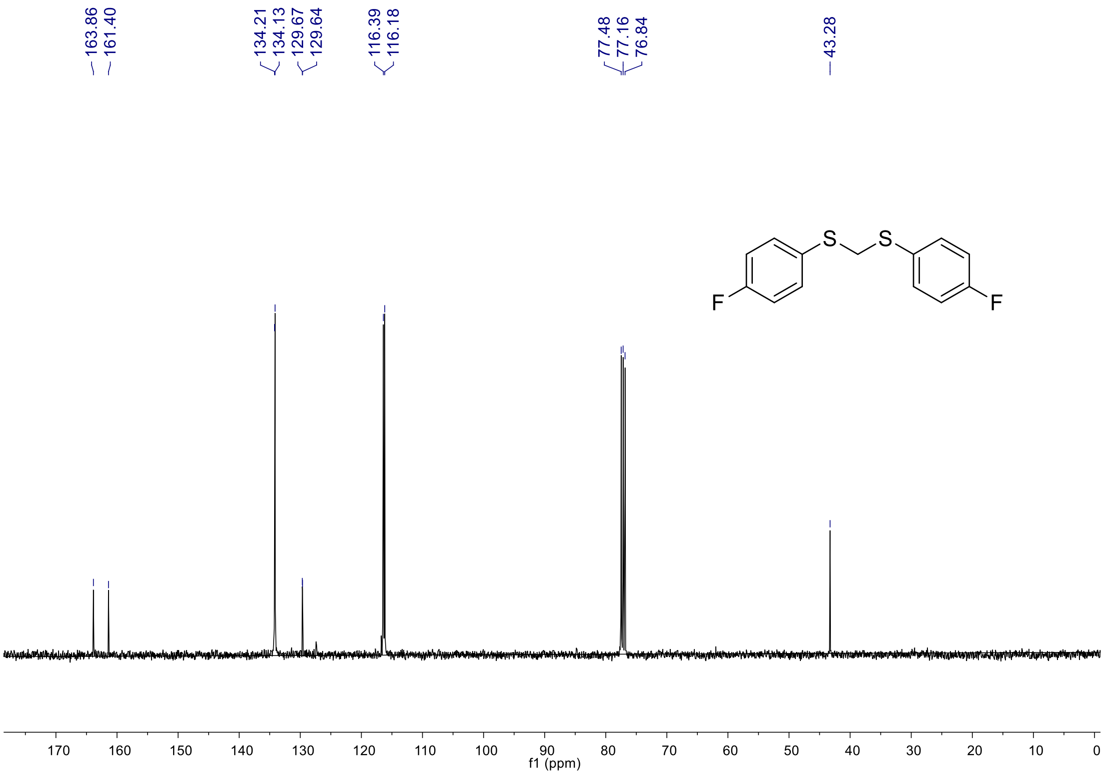


^{1}H and ^{13}C NMR Spectrum of **2g**

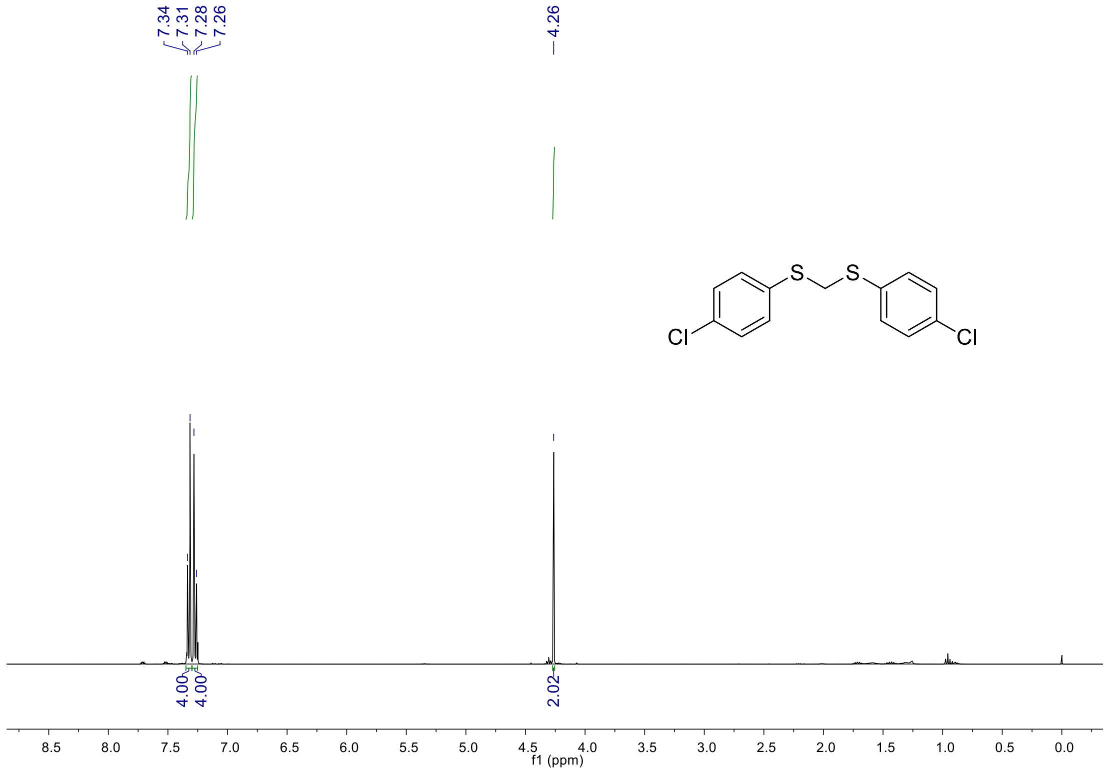


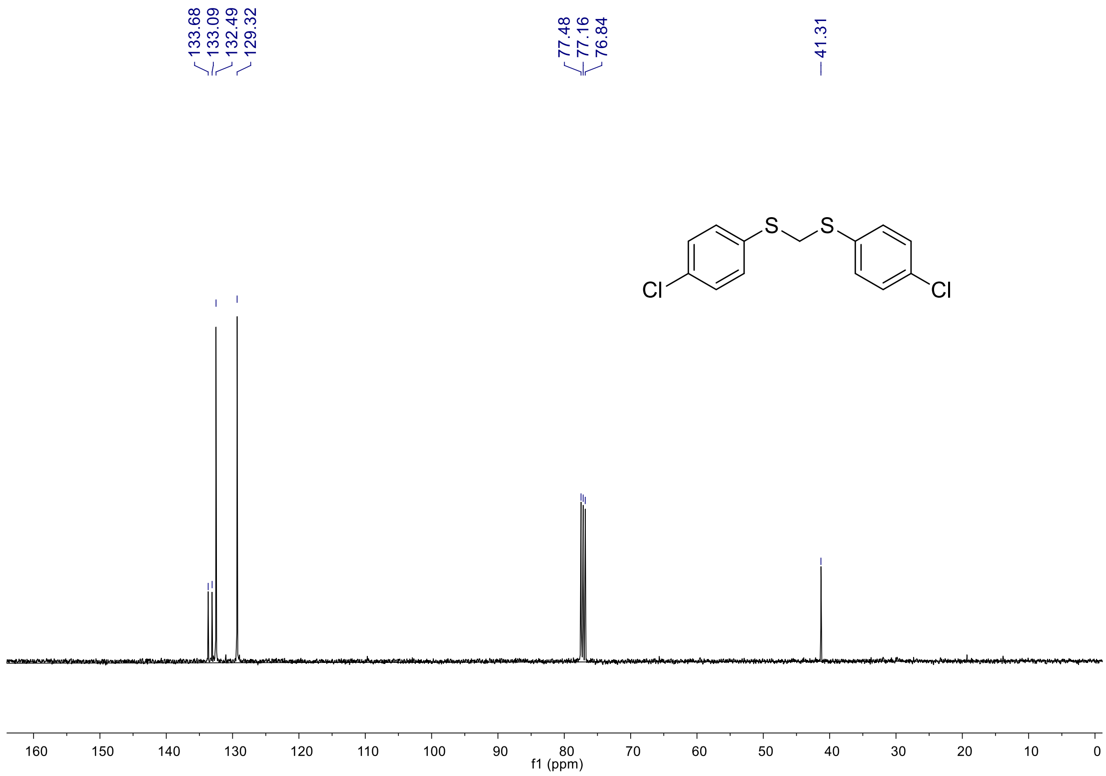
^{1}H and ^{13}C NMR Spectrum of **2h**



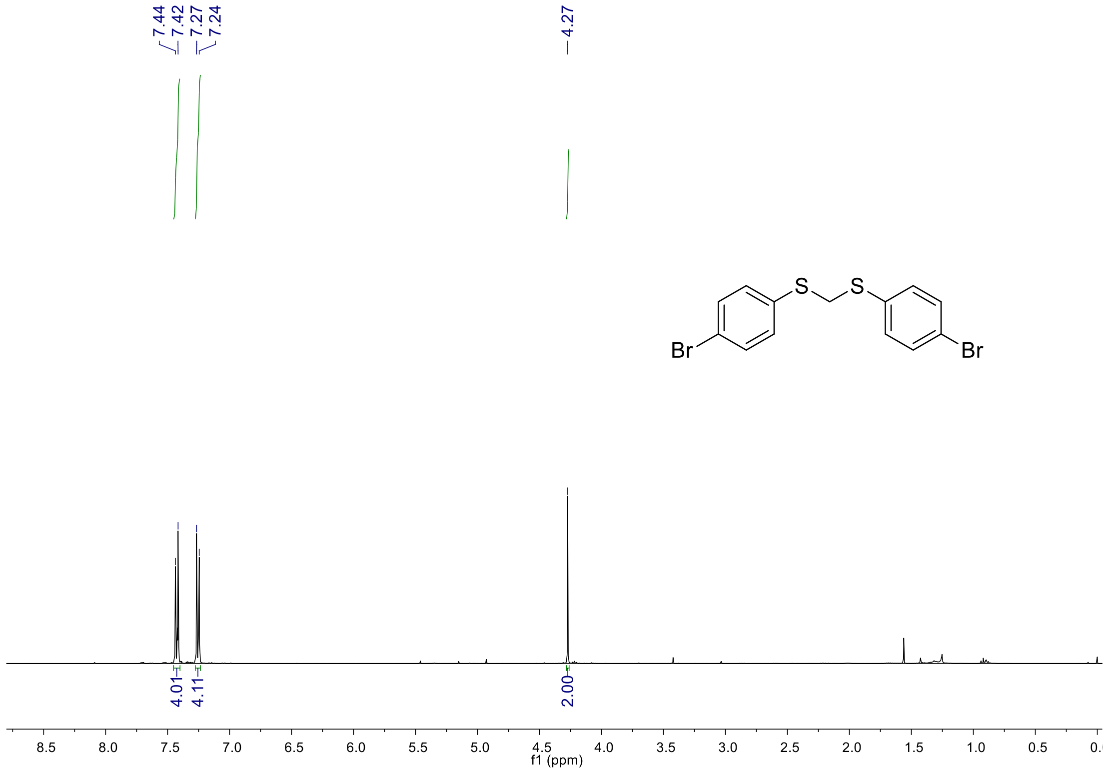


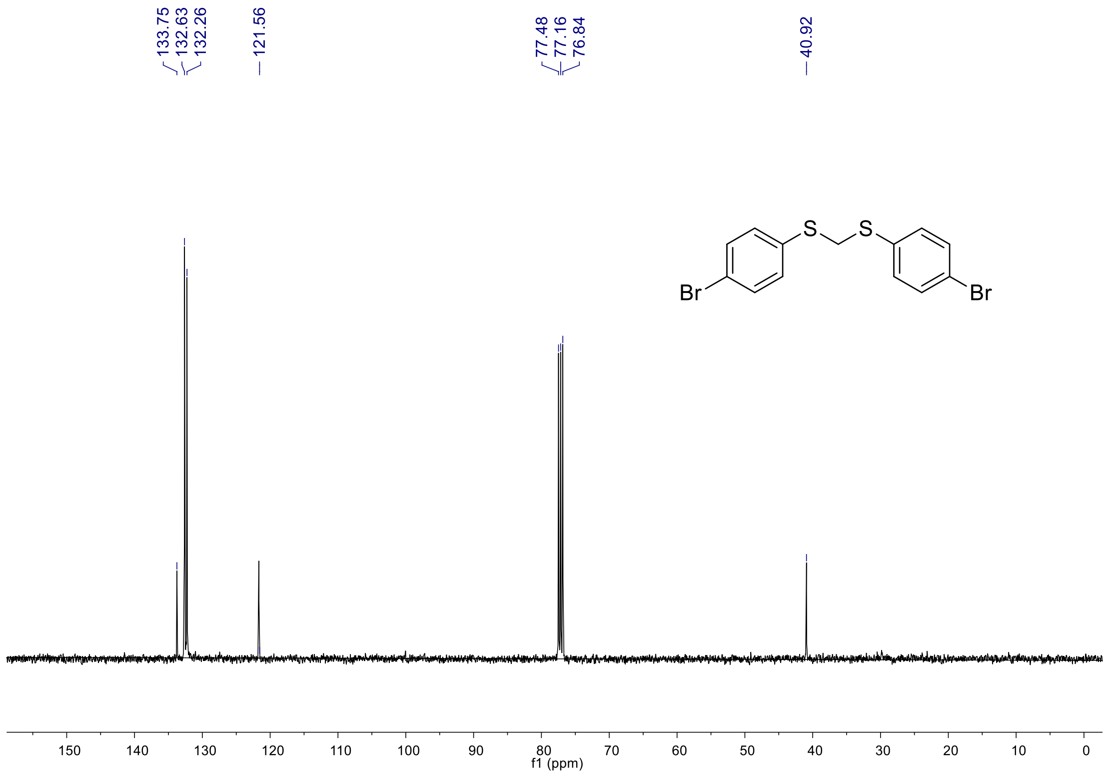
^{1}H and ^{13}C NMR Spectrum of **2i**



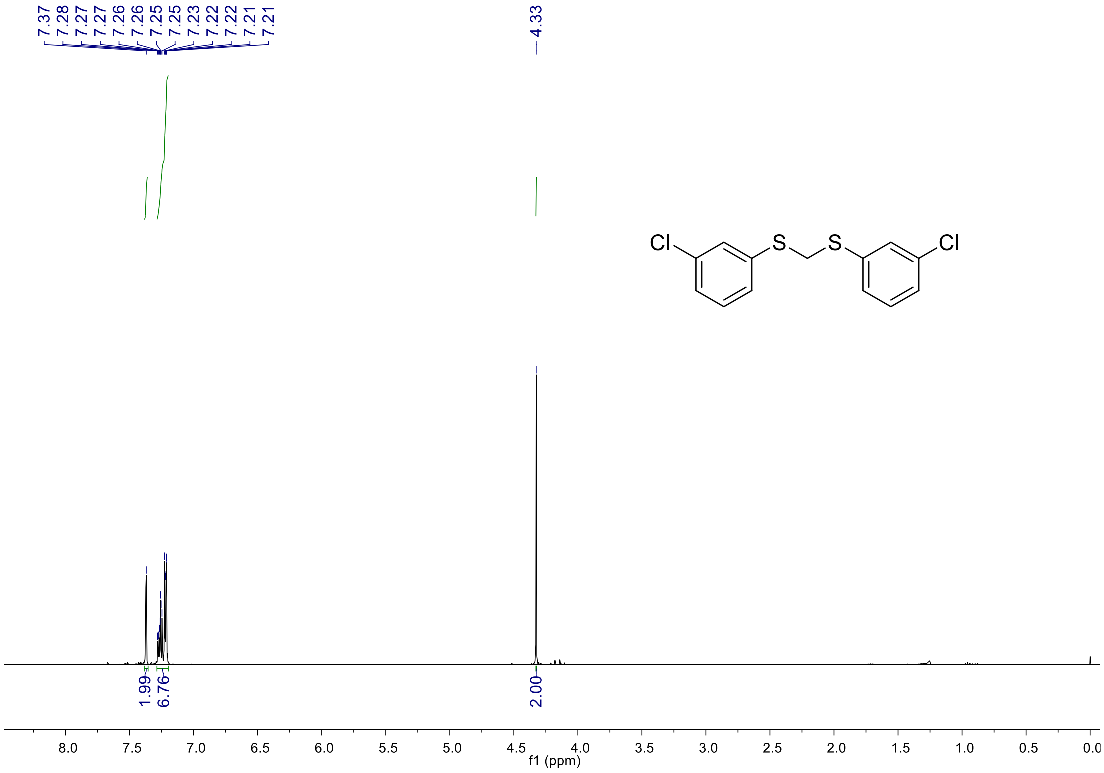


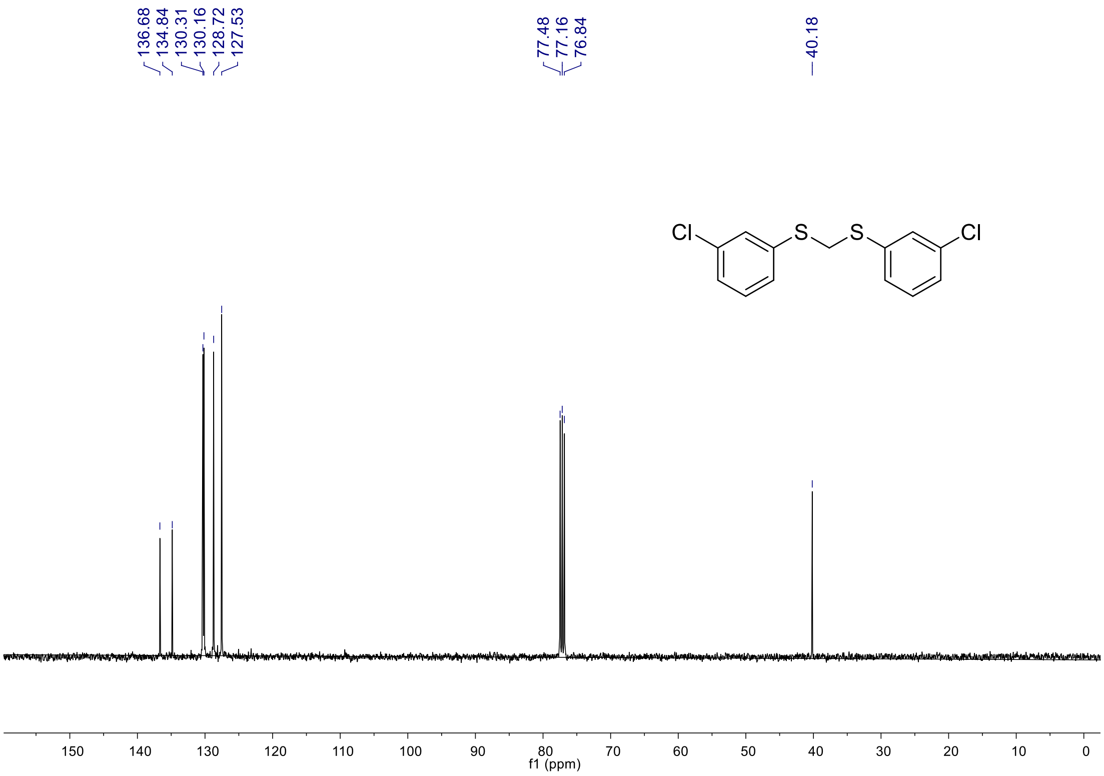
^{1}H and ^{13}C NMR Spectrum of **2j**



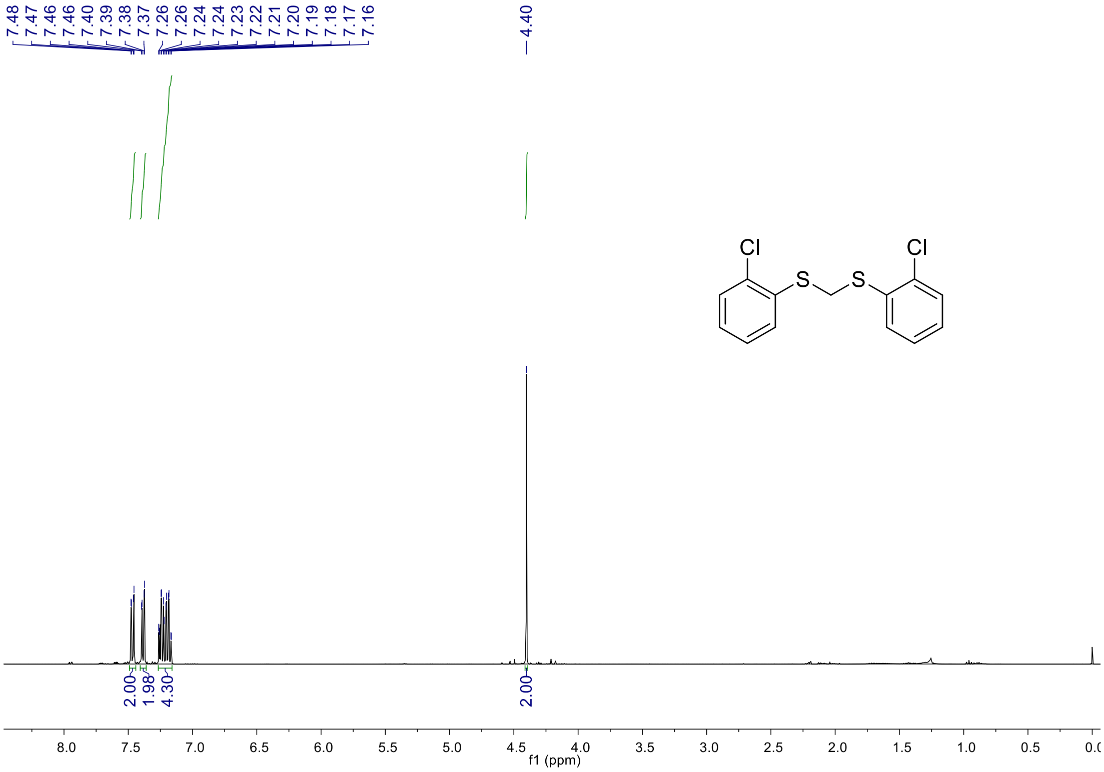


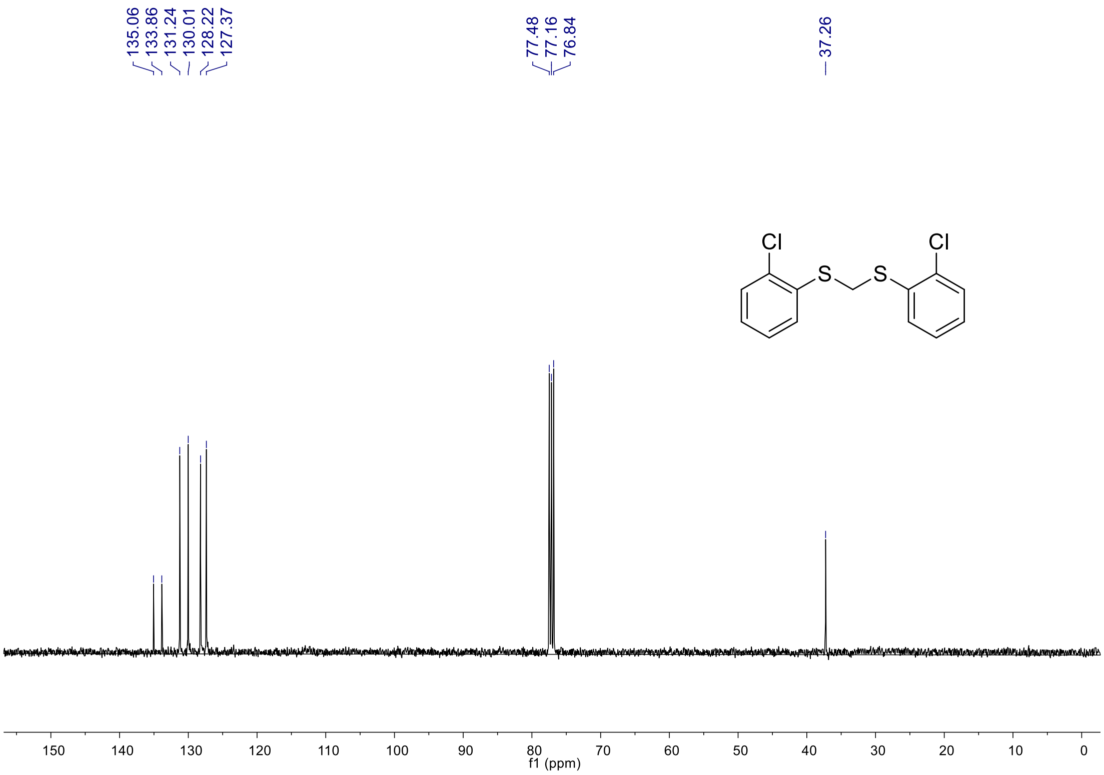
^{1}H and ^{13}C NMR Spectrum of **2k**



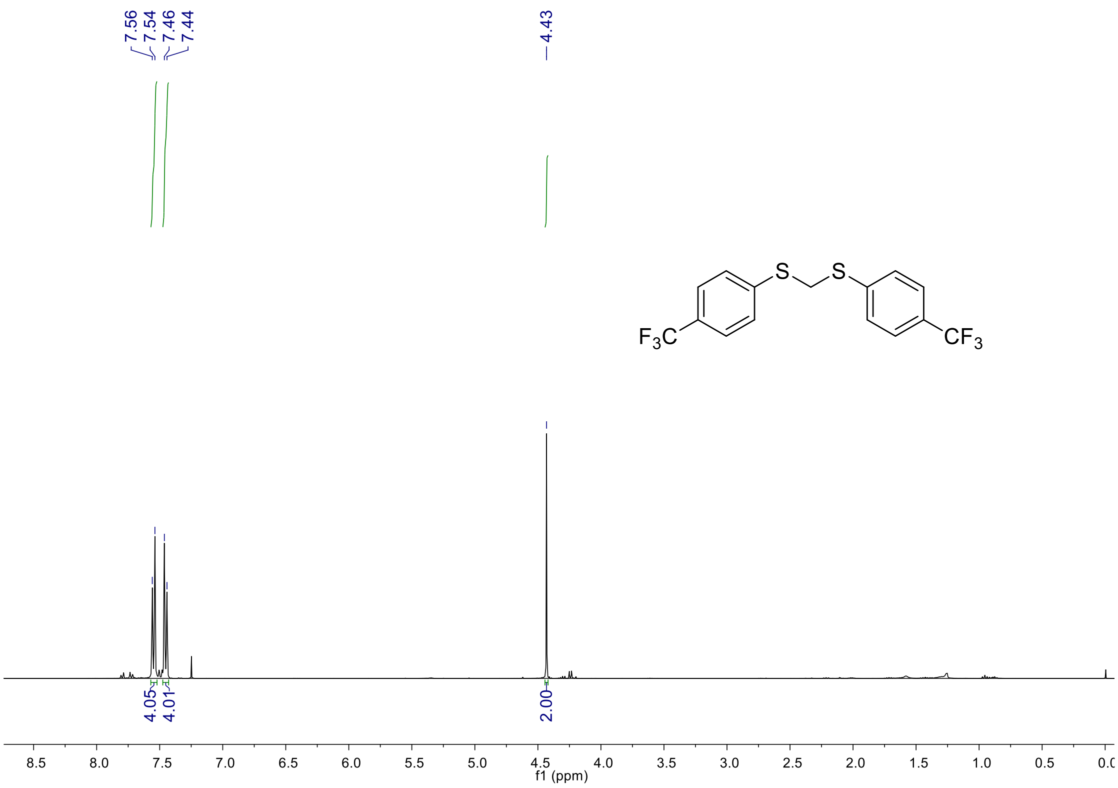


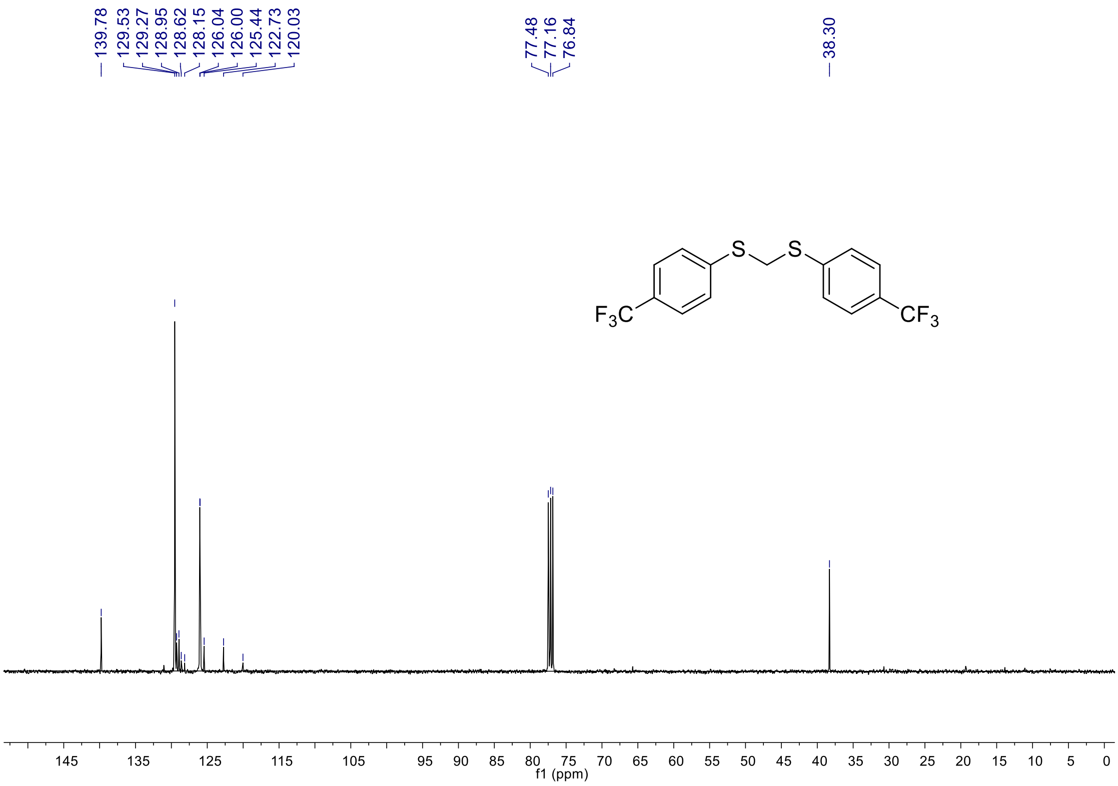
^{1}H and ^{13}C NMR Spectrum of **2l**





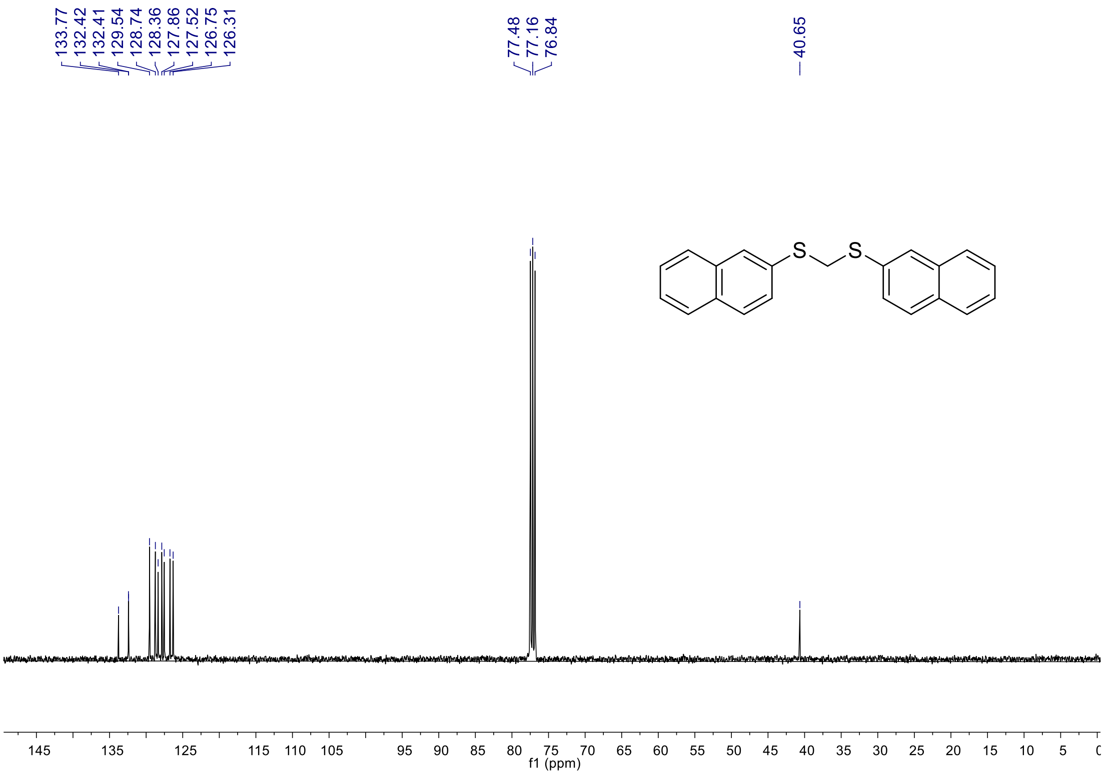
^{1}H and ^{13}C NMR Spectrum of **2m**



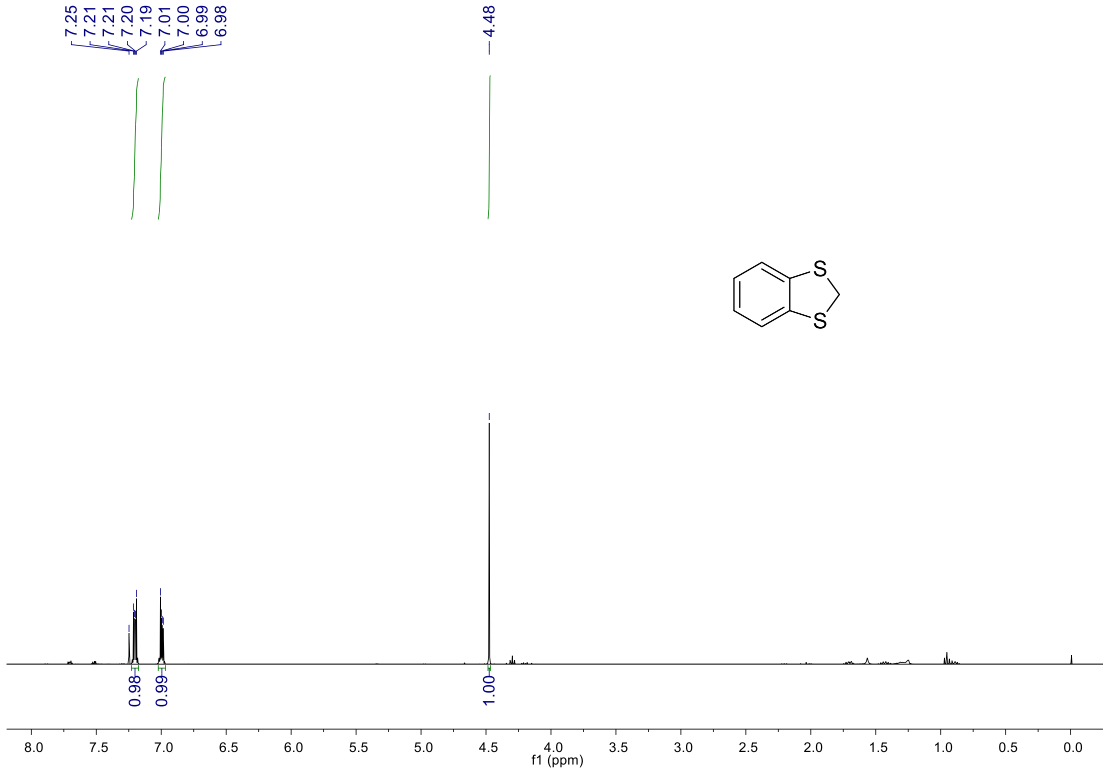


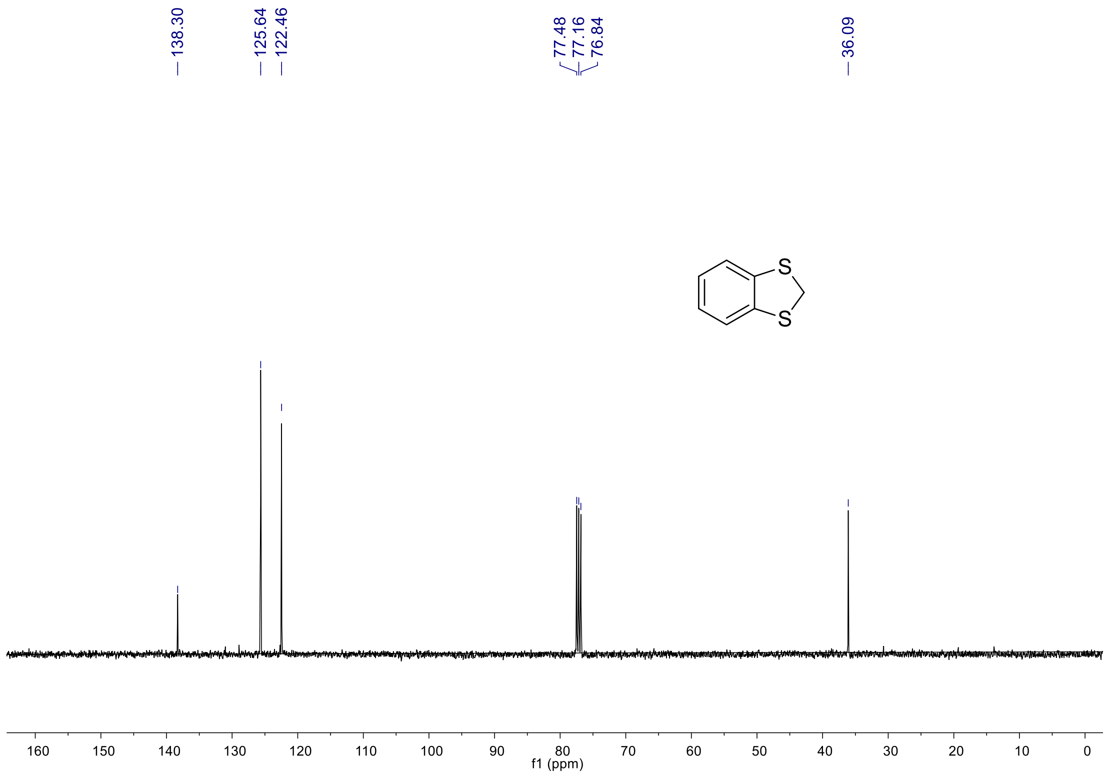
[1]H, and [13]C NMR Spectrum of **2n**

^{19}F NMR Spectrum of **2n**

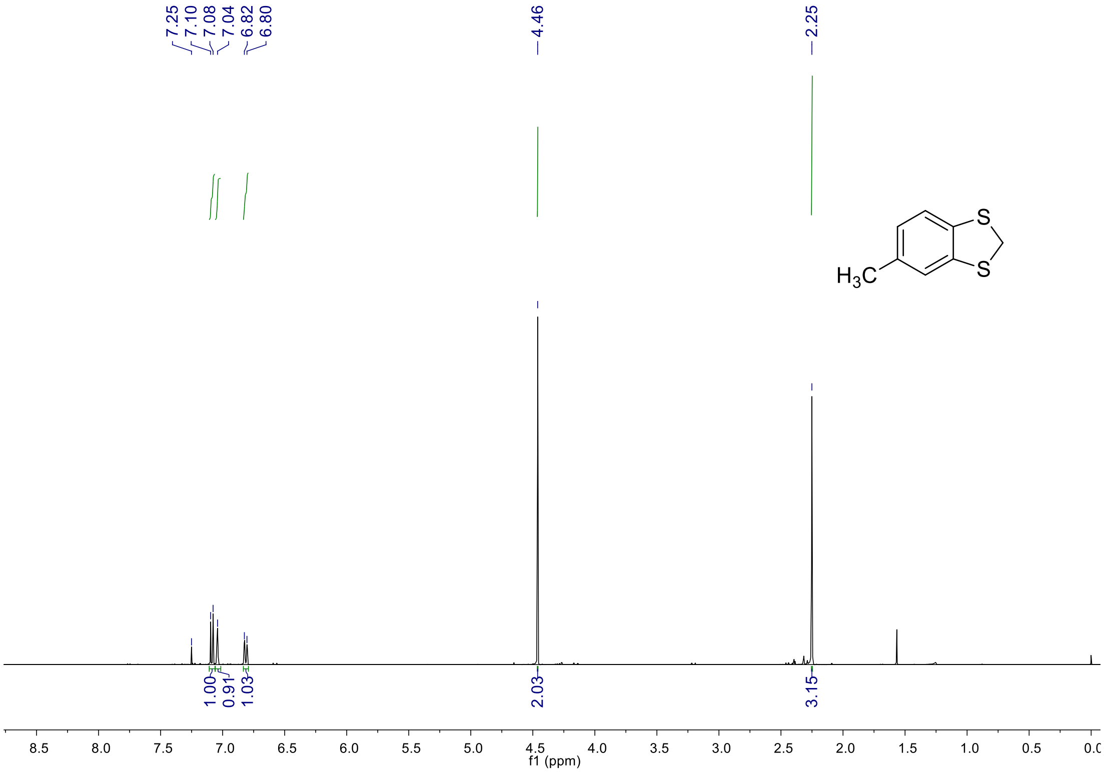


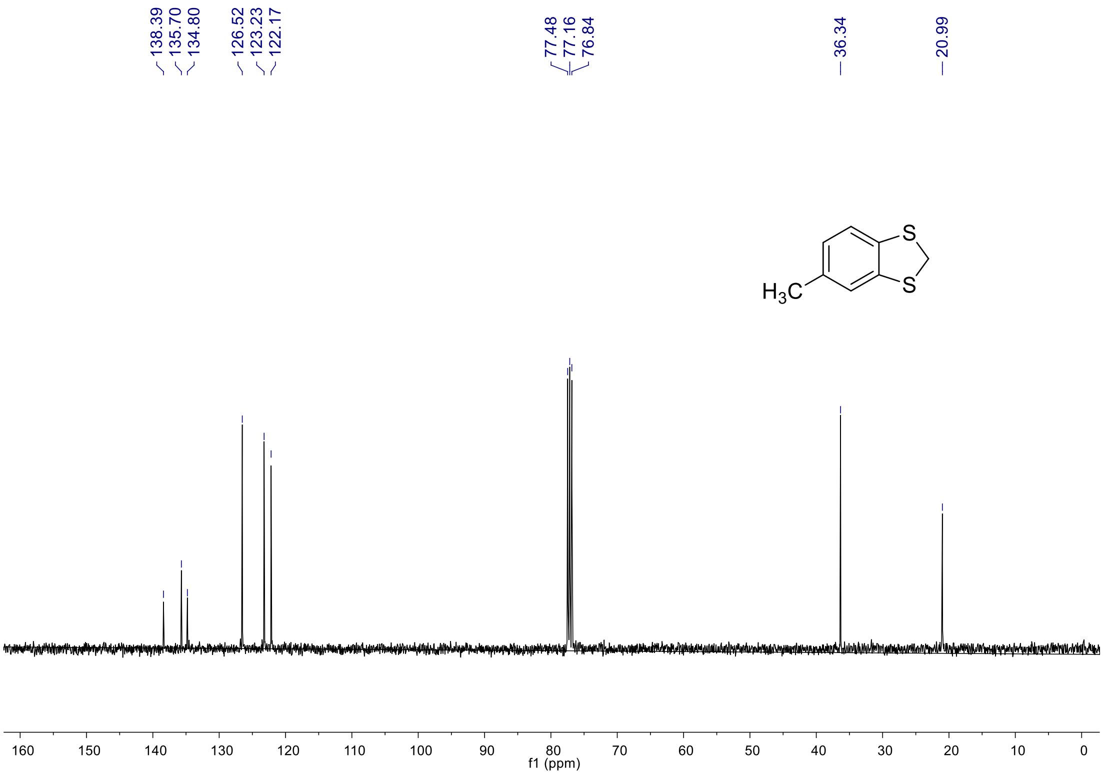
^{1}H and ^{13}C NMR Spectrum of **2p**



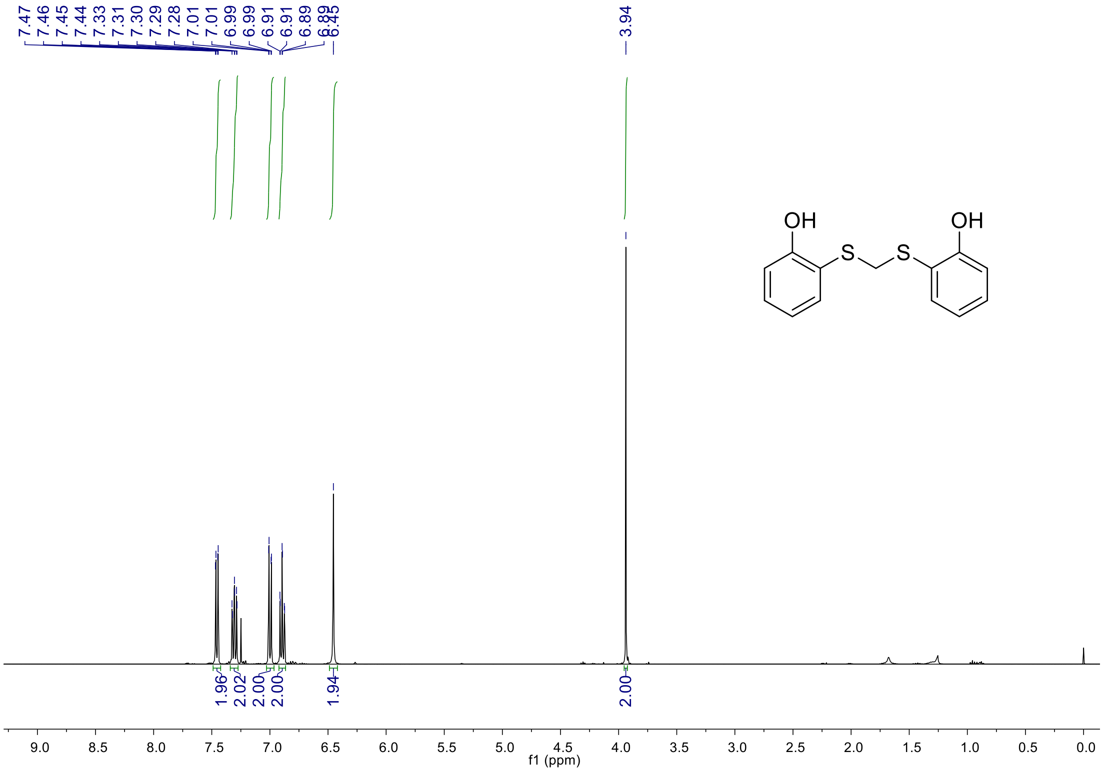


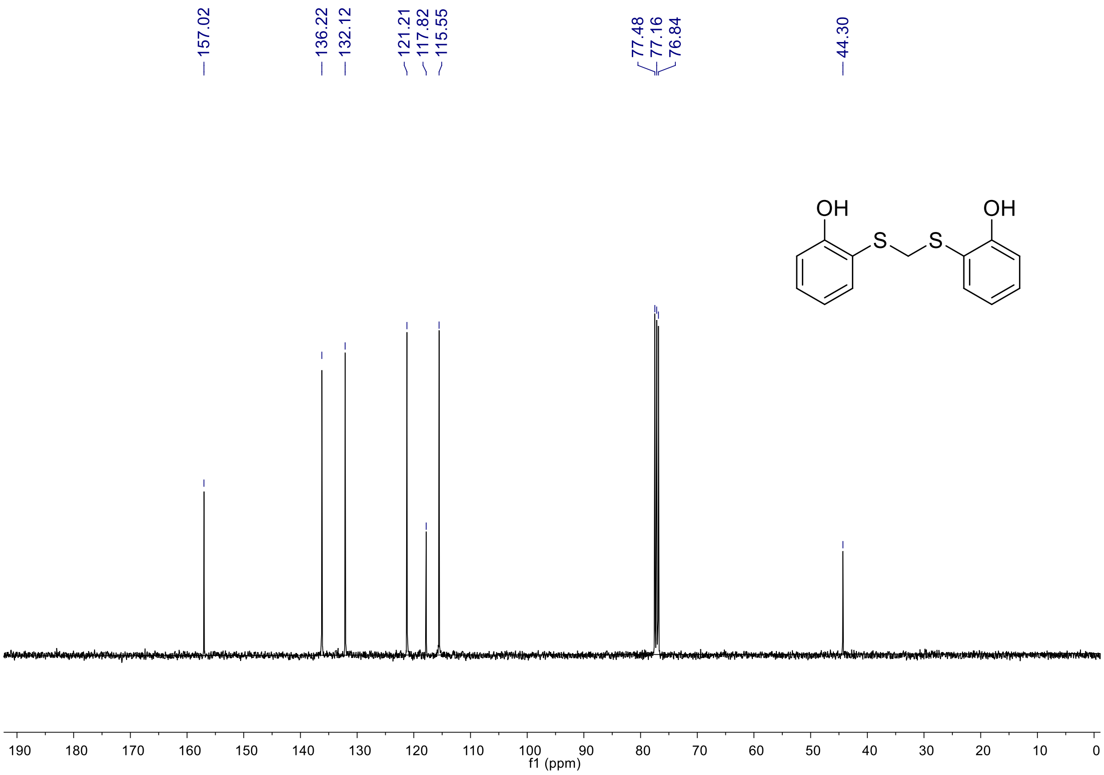
^{1}H and ^{13}C NMR Spectrum of **2q**



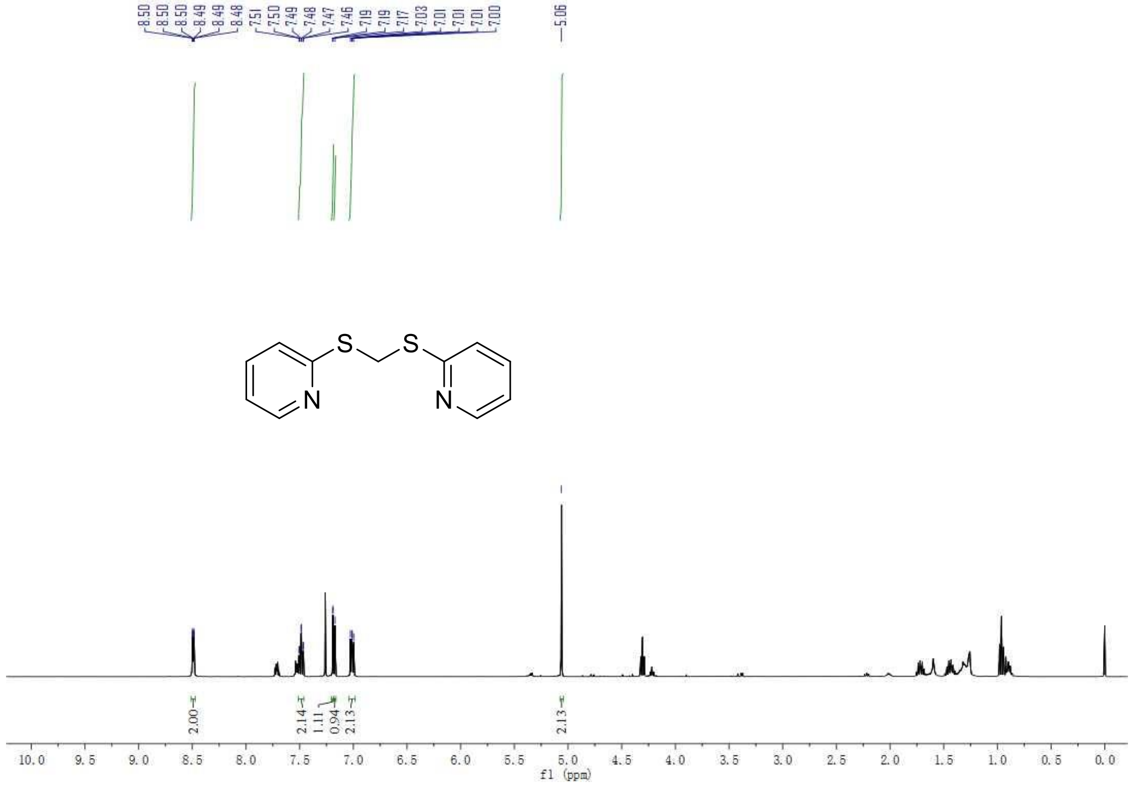


^{1}H and ^{13}C NMR Spectrum of **2r**

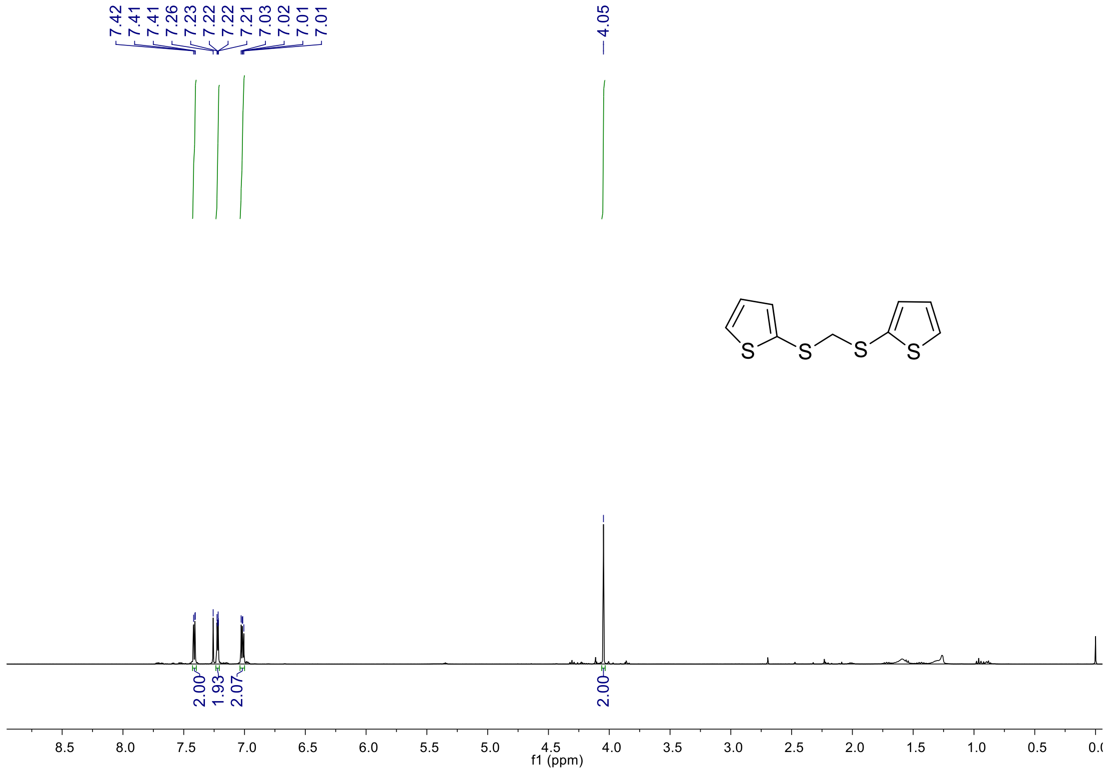


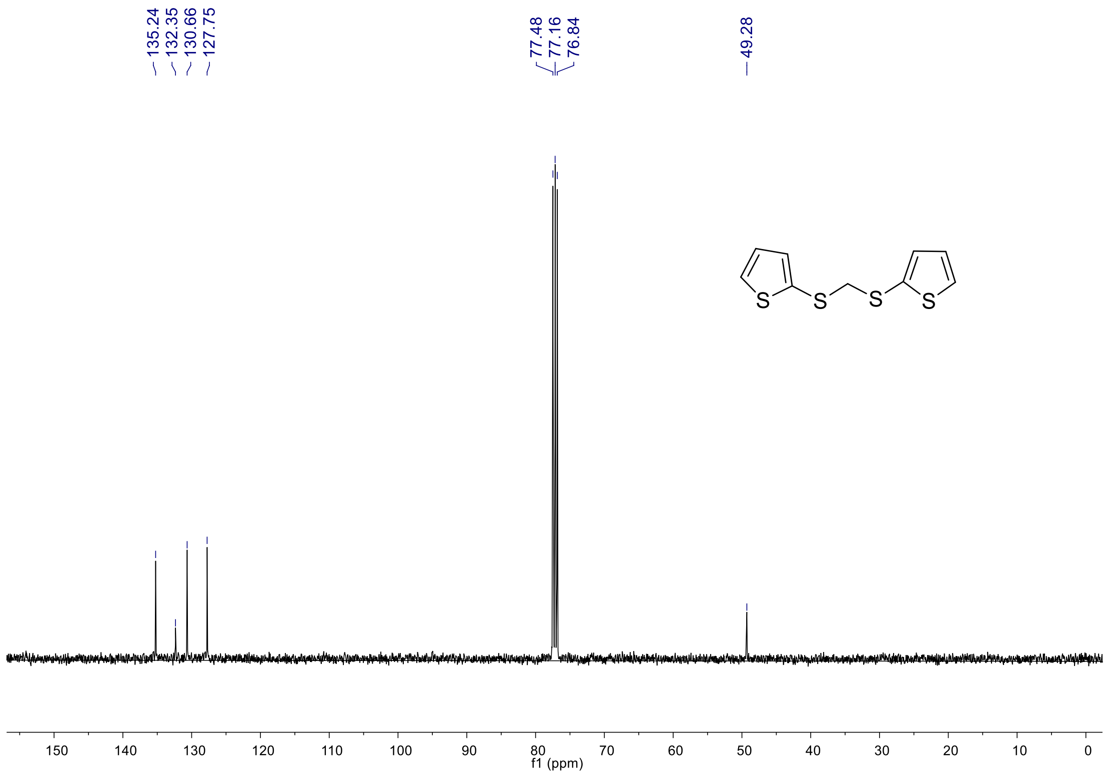


[1]H and [13]C NMR Spectrum of **2s**

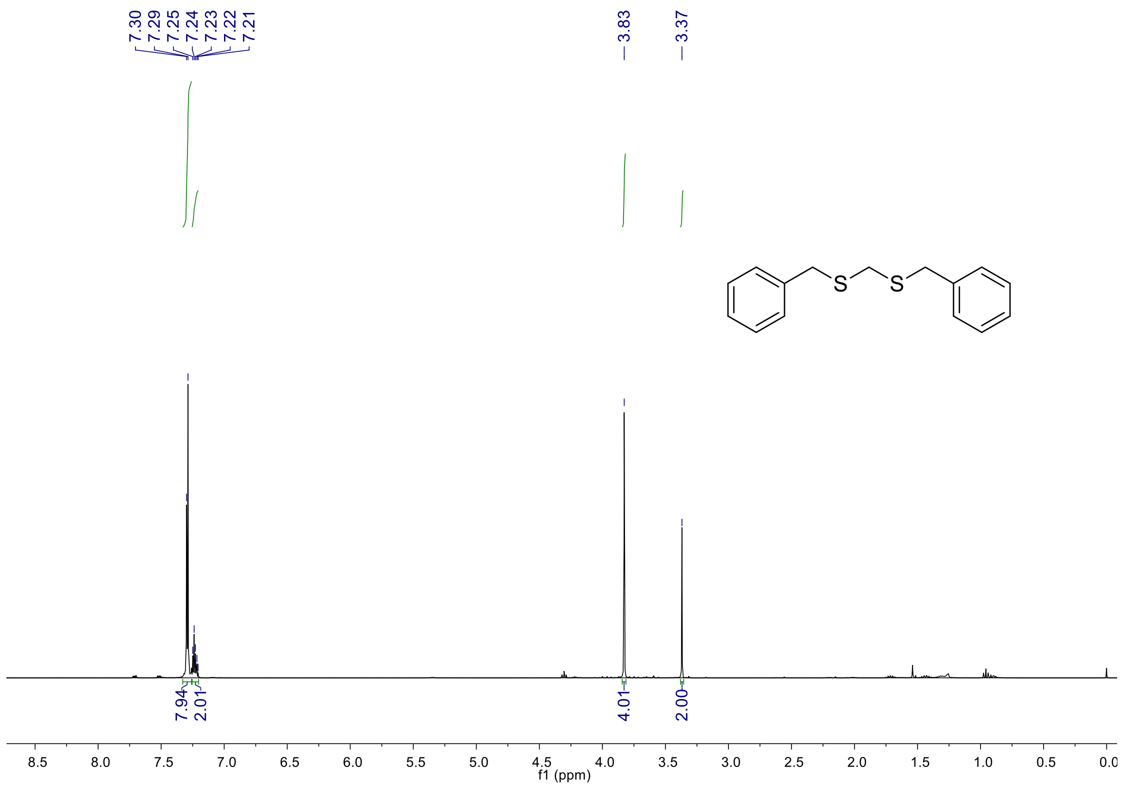


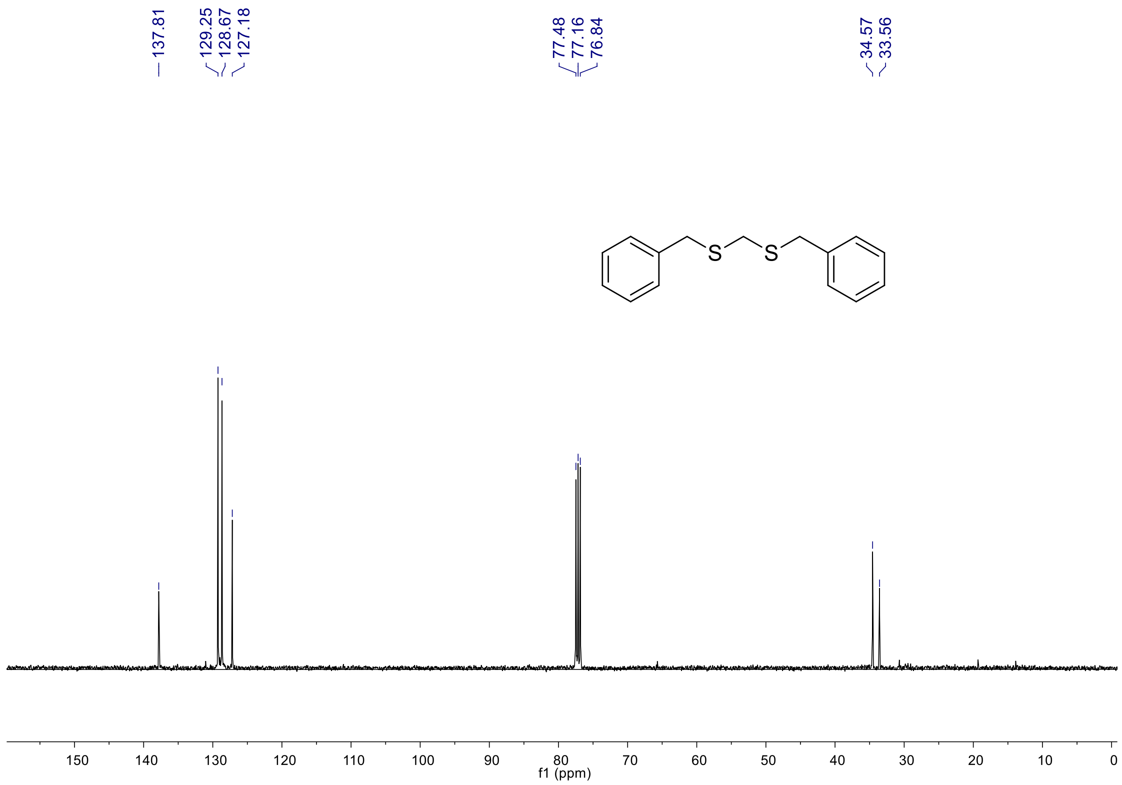
^{1}H NMR Spectra of **2t**



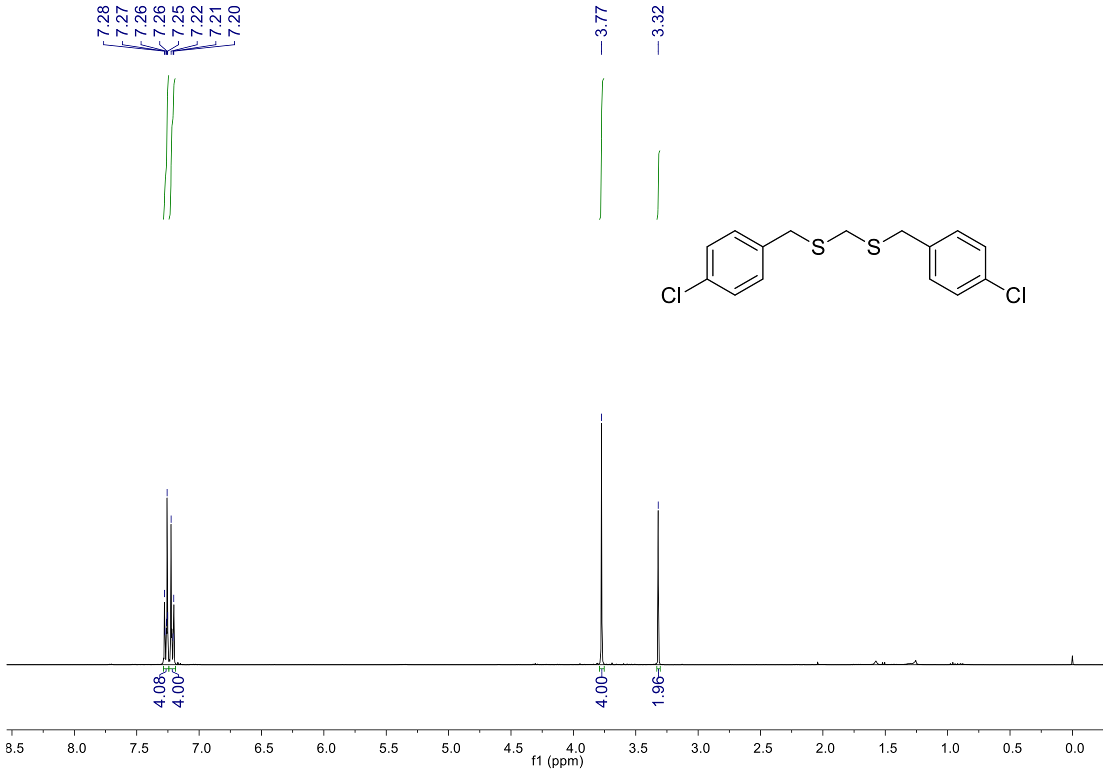


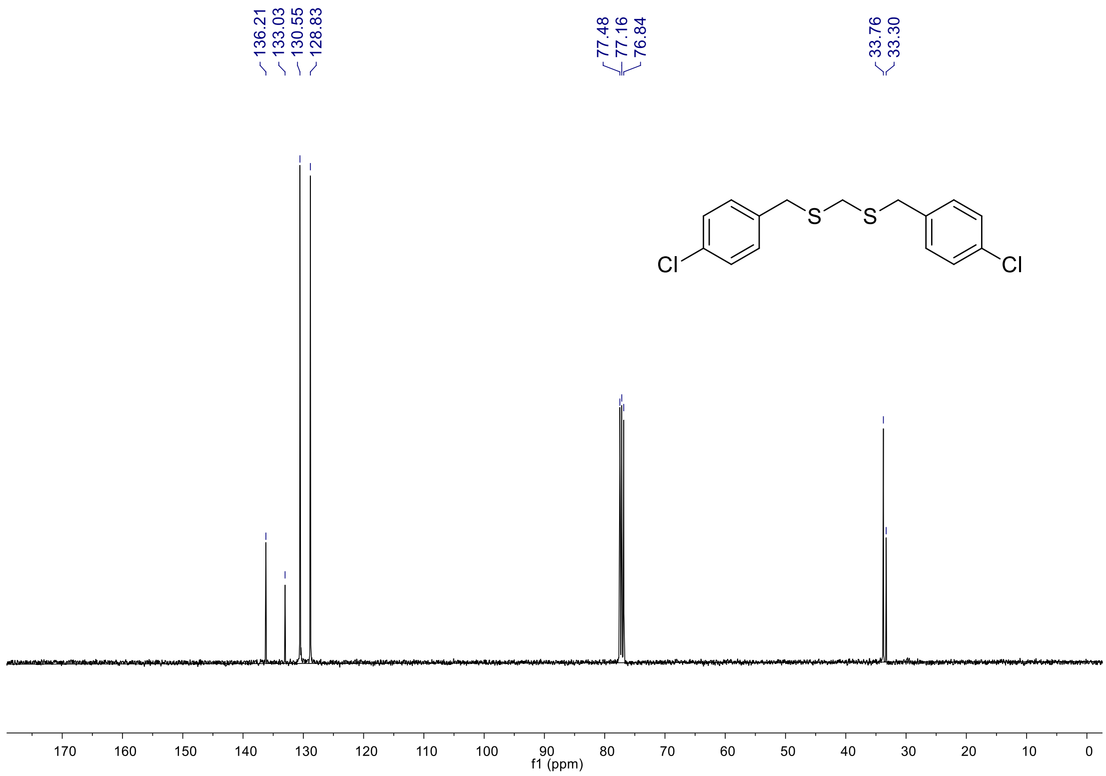
^{1}H and ^{13}C NMR Spectrum of **2u**



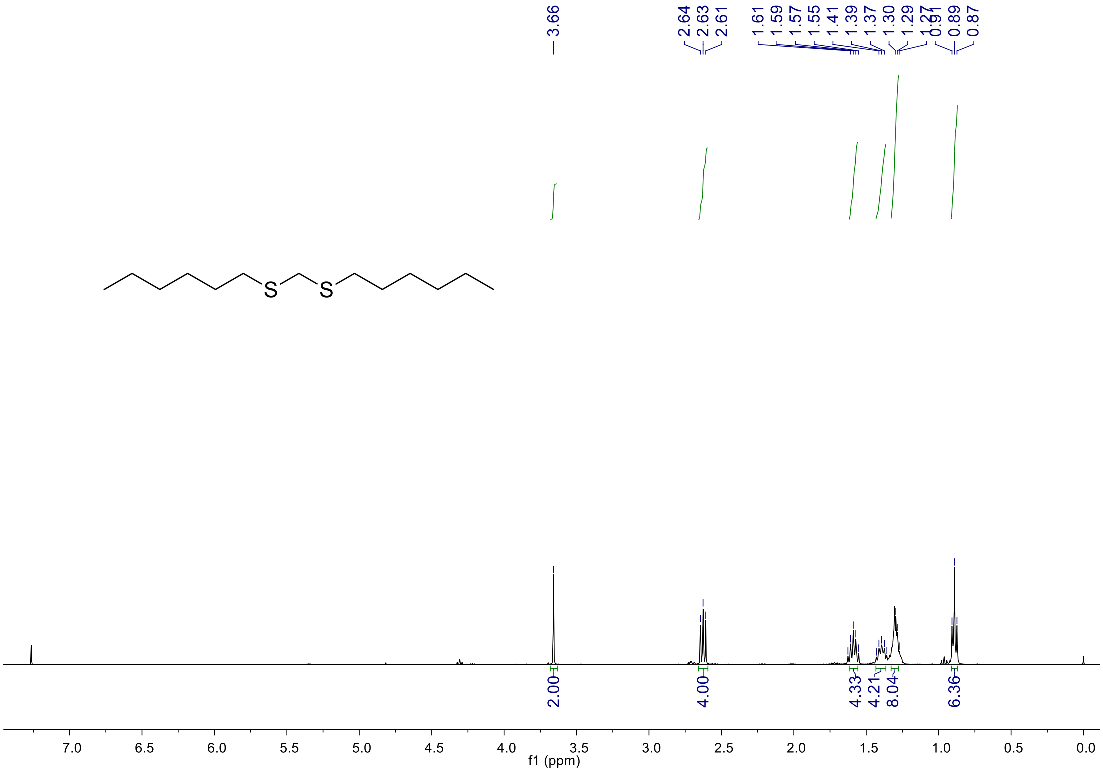


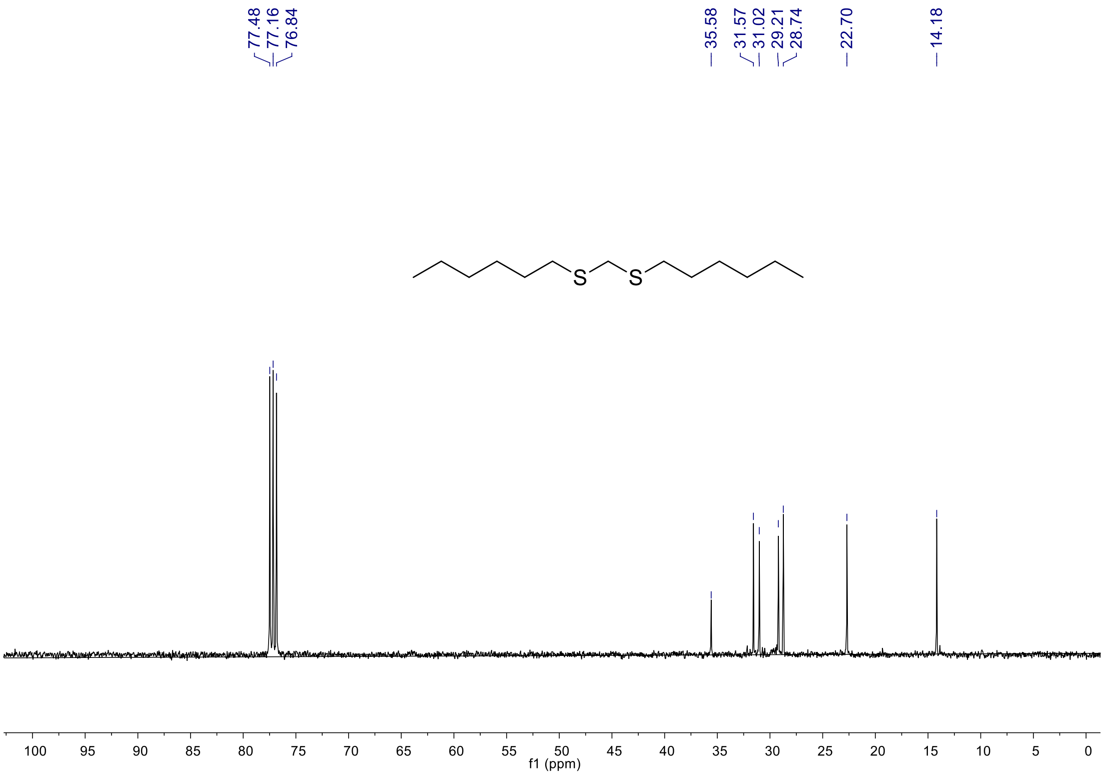
^{1}H and ^{13}C NMR Spectrum of **2v**



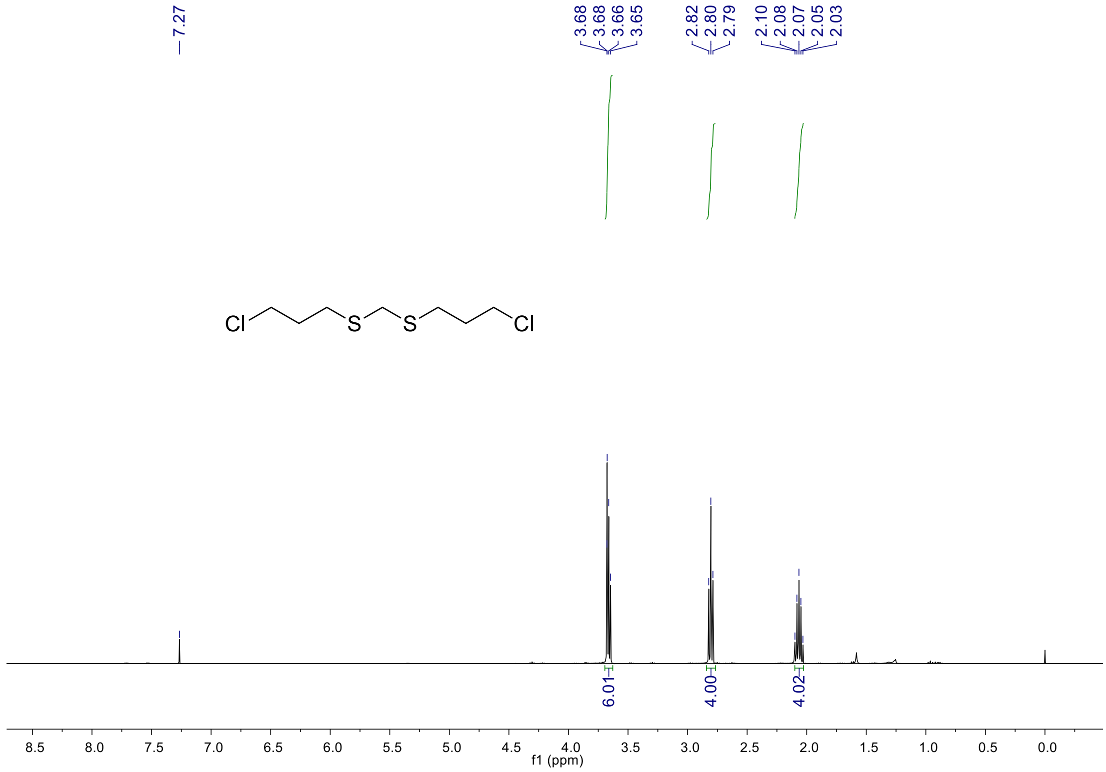


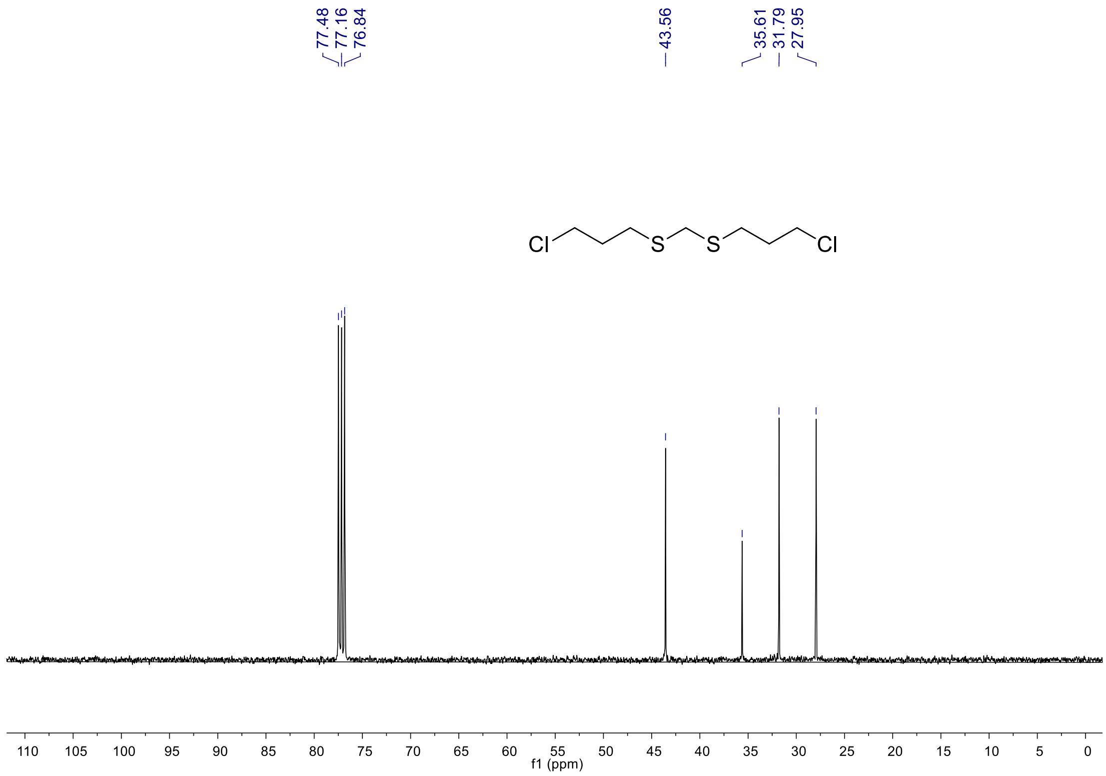
^{1}H and ^{13}C NMR Spectrum of **2w**



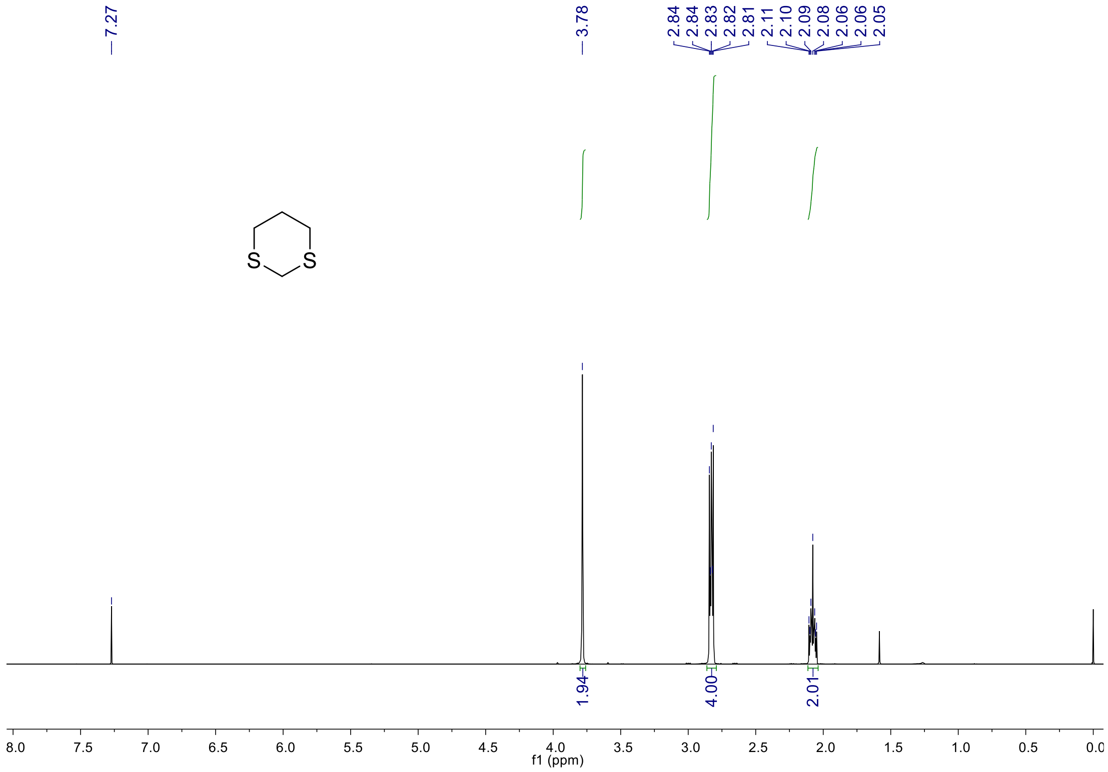


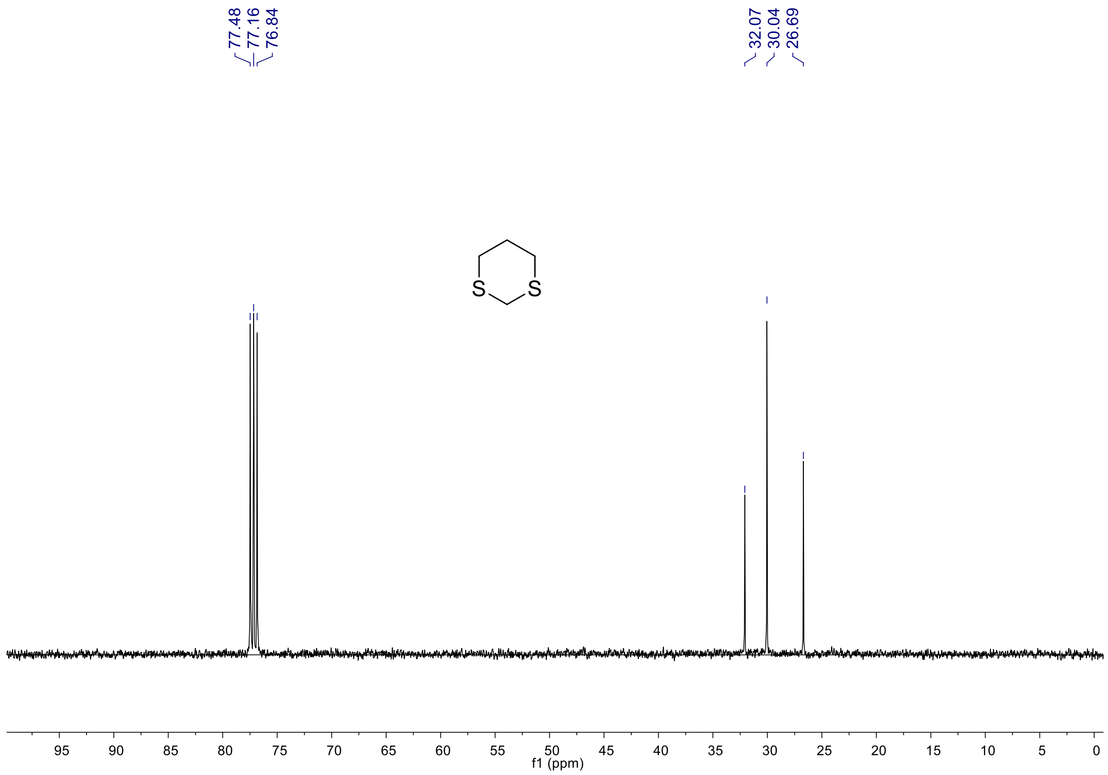
^{1}H and ^{13}C NMR Spectrum of **2x**





^{1}H and ^{13}C NMR Spectrum of **2y**





^{1}H and ^{13}C NMR Spectrum of **2z**