Supporting Information

Controllable Synthesis of Disulfides and Thiosulfonates from Sodium Sulfinates Mediated by Hydroiodic Acid using Ethanol and H_2O as Solvent Respectively

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1. General Information

All reactions were performed in sealed tube with magnetic stirring. Unless otherwise stated, all commercially available reagents were used without further purification. ^{1}H and ^{13}C NMR spectra were recorded at ambient temperature on Bruker Advance III HD 600 or UltrashieldTM 300 instruments. All spectra were referenced to $CDCl_3$ (^{1}H @ δ 7.26 ppm and ^{13}C NMR @ δ 77.00 ppm). Data were reported as follows: chemical shift, multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, dd = doublet of doublets, td = triplet of doublets, qd = quartet of doublets, m = multiplet), coupling constants (Hz) and integration.

2. Experimental Procedure

(1) Synthesis of symmetric disulfide (2a-2o)

A 10 mL sealed tube was charged with substituted sodium sulfinate (0.6 mmol), EtOH (4 mL) and HI (55%-57% aqueous solution, 5 eq). The mixture was allowed to stir at room temperature and monitored by TLC until the reaction was complete. Saturated aqueous Na_2SO_3 solution was added to the reaction mixture and the aqueous phase was further extracted with DCM (3×10 mL). The combined organic layers were dried over anhydrous Na_2SO_4 and concentrated under a vacuum to give the crude product. The residue was purified by column chromatography on silica gel using petroleum and n-hexane as eluent to provide the desired product.

(2) Synthesis of asymmetric disulfide (3a-3k)

A 10 mL sealed tube was charged with substituted sodium sulfinate (**1**, 0.3 mmol) and another sodium sulfinate (**2**, 0.3 mmol), EtOH (4 mL), HI (55%-57% aqueous solution, 5 eq). The mixture was allowed to stir at room temperature and monitored by TLC until the reaction was complete. Saturated aqueous Na_2SO_3 solution was added to the reaction mixture and the aqueous phase was further extracted with DCM (3×10 mL). The combined organic layers were dried over anhydrous Na_2SO_4 and concentrated under a vacuum to give the crude product. The residue was purified by column chromatography on silica gel using petroleum, acetonitrile, and H_2O as eluent to provide the desired products.

(3) Synthesis of symmetric thiosulfonate

The general procedure for thiosulfonates (**4a**, **4d**-**4i**)

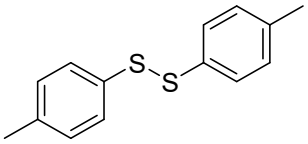
A 10 mL sealed tube was charged with substituted sodium sulfinate (0.6 mmol) in H_2O (4 mL), HI (55%-57% aqueous solution, 5 eq) was added to the mixture. The reaction mixture was allowed to stir at 50^{o}C and monitored by TLC until the reaction was complete. The solid crude product is filtered, washed with saturated Na_2SO_3, water, and dried in vacuo to obtain the target compound.

The general procedure for thiosulfonates (**4b**-**4c**, **4j**-**4k**)

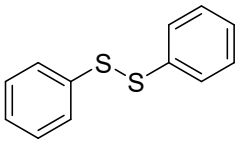
A 10 mL sealed tube was charged with substituted sodium sulfinate (0.6 mmol) in H_2O (4 mL), then HI (55%-57% aqueous solution, 5 eq) was added. The mixture was allowed to stir at 50^{o}C and monitored by TLC until the reaction was complete. Saturated aqueous Na_2SO_3 solution was

added to the mixture and the aqueous phase was further extracted with DCM (3×10 mL). The combined organic layers was dried over anhydrous Na_2SO_4 and concentrated. The residue was purified by column chromatography on silica gel using petroleum/n-hexane/ethyl acetate as eluent to provide the desired product.

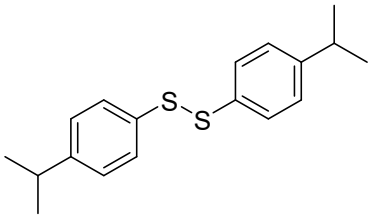
3.Analytical Data for the Products



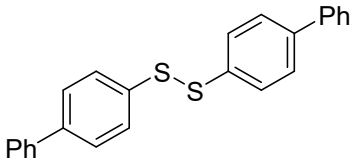
1,2-Di-*p*-tolydisulfide (2a) [1]**.** White solid. 71 mg, yield 95%.
^{1}H NMR (600 MHz, $CDCl_3$) δ 7.39 (d, *J* = 8.2 Hz, 4H), 7.11 (d, *J* = 8.0 Hz, 4H), 2.33 (s, 6H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 137.58, 134.04, 129.92, 128.68, 21.2.



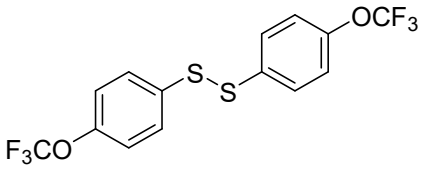
1,2-Diphenyldisulfide (2b)[1]**.** Pale yellow solid, 68 mg, yield 92%.
^{1}H NMR (600 MHz, $CDCl_3$) δ 7.49 (d, *J* = 7.2 Hz, 4H), 7.29 (t, *J* = 7.7 Hz, 4H), 7.24 – 7.20 (q, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 137.17, 129.20, 127.65, 127.29.



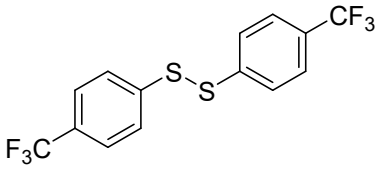
1,2-bis(4-isopropylphenyl) disulfide (2c) [1]**.** White solid, 85 mg, yield 94%.
^{1}H NMR (600 MHz, $CDCl_3$) δ 7.43 (d, *J* = 7.3 Hz, 4H), 7.17 (d, *J* = 7.6 Hz, 4H), 2.88 (h, *J* = 6.9 Hz, 2H), 1.23 (dd, *J* = 6.9, 1.3 Hz, 12H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 148.45, 134.43, 128.38, 127.36, 33.90, 24.05.



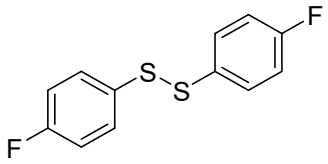
1,2-Di([1,1'-biphenyl]-4-yl) disulfide (2d) [1]**.** Pale yellow solid, 58 mg, yield 52%.
^{1}H NMR (600 MHz, $CDCl_3$) δ 7.60 (d, *J* = 8.4 Hz, 4H), 7.57 – 7.54 (t, 8H), 7.43 (t, *J* = 7.6 Hz, 4H), 7.36 – 7.33 (t, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 140.52, 140.35, 136.18, 129.00, 128.36, 127.95, 127.68, 127.13.



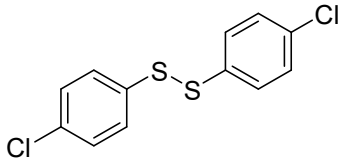
1,2-Bis(4-(trifluoromethoxy) phenyl) disulfide (2e) [1]**.** Colourless oil, 94 mg, yield 81%.
^{1}H NMR (600 MHz, $CDCl_3$) δ 7.53 – 7.49 (m, 4H), 7.18 (d, *J* = 7.9 Hz, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 148.83, 148.82, 135.32, 129.43, 121.87.



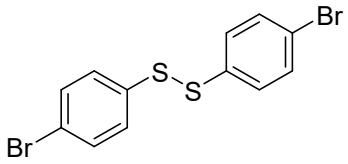
1,2-Bis(4-(trifluoromethyl) phenyl) disulfide (2f) [1]**.** Yellow solid, 91 mg, yield 81%.
^{1}H NMR (600 MHz, $CDCl_3$) δ 7.60 – 7.56 (m, 8H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 140.8, 129.4 (q, *J* = 33.0 Hz), 126.6, 126.1 (q, *J* = 3.7 Hz), 123.9 (q, *J*= 273.0 Hz). ^{19}F NMR (565 MHz, $CDCl_3$) δ -62.60.



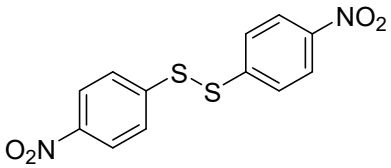
1,2-bis(4-fluorophenyl) disulfide (2g) [1]**.** Colourless oil, 71 mg, yield 92%.
^{1}H NMR (600 MHz, $CDCl_3$) δ 7.47 – 7.43 (m, 4H), 7.03 – 6.99 (m, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 163.56, 161.92, 132.32, 132.30, 131.44, 131.38, 116.49, 116.34. ^{19}F NMR (565 MHz, $CDCl_3$) δ -113.43 (ddd, *J* = 14.0, 8.7, 5.1 Hz).



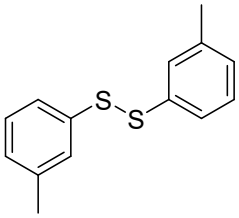
1,2-Bis(4-chlorophenyl) disulfide (2h) [1]**.** Pale yellow solid, 62 mg, yield 72%.
^{1}H NMR (600 MHz, $CDCl_3$) δ 7.39 (d, *J* = 8.7 Hz, 4H), 7.26 (d, *J* = 8.7 Hz, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 135.26, 133.76, 129.45, 129.42.



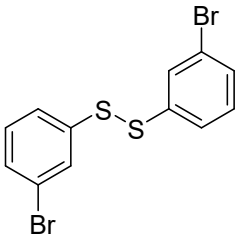
1,2-Bis(4-bromophenyl) disulfide (2i) [1]**.**·Pale yellow solid, 91 mg, yield 81%.
^{1}H NMR (600 MHz, $CDCl_3$) δ 7.44 – 7.41 (m, 4H), 7.35 – 7.32 (m, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 135.85, 132.33, 129.50, 121.66.



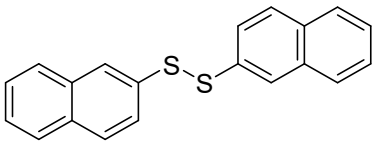
1,2-Bis (4-nitrophenyl) disulfide (2j) [2]**.** Yellow solid, 77 mg, yield 83%.
^{1}H NMR (600 MHz, $CDCl_3$) δ 8.21 – 8.17 (m, 4H), 7.64 – 7.60 (m, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 147.14, 144.20, 126.54, 124.61, 77.37, 76.95.



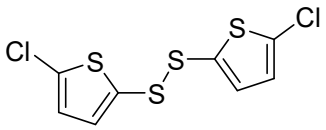
1,2-di-*m*-tolyldisulfide (2k) [2]**.** White solid, 65 mg, yield 88%.
^{1}H NMR (600 MHz, $CDCl_3$) δ 7.29 (d, J = 7.1 Hz, 4H), 7.17 (t, J = 7.9 Hz, 2H), 7.03 – 6.99 (m, 2H), 2.30 (s, 6H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 139.02, 137.04, 129.01, 128.13, 128.12, 124.68, 21.50.



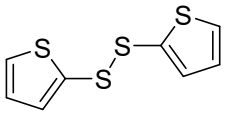
1,2-Bis(3-bromophenyl) disulfide (2l) [2]**.** Colourless oil, 81 mg, yield 72%.
^{1}H NMR (600 MHz, $CDCl_3$) δ 7.63 (t, J = 1.8 Hz, 2H), 7.40 (ddd, J = 7.9, 1.9, 0.9 Hz, 2H), 7.37 (ddd, J = 8.0, 1.9, 1.0 Hz, 2H), 7.18 (t, J = 7.9 Hz, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 138.76, 130.61, 130.05, 126.01, 123.26.



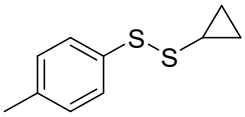
1,2-Di(naphthalen-2-yl) disulfide (2m) [2]**.** White solid, 78 mg, yield 82%.
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.99 (d, J = 1.6 Hz, 2H), 7.82 – 7.71 (m, 6H), 7.62 (dd, J = 8.7, 1.9 Hz, 2H), 7.50 – 7.42 (m, 4H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 134.35, 133.57, 132.59, 129.11, 127.90, 127.59, 126.87, 126.60, 126.36, 125.74.



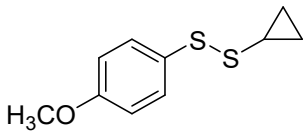
1,2-Bis(5-chlorothiophen-2-yl) disulfide (2n) [2]**.** Yellow oil, 67 mg, yield 75%.
^{1}H NMR (600 MHz, $CDCl_3$) δ 6.97 (d, *J* = 3.9 Hz, 2H), 6.84 (s, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 136.02, 135.87, 134.01, 127.28.



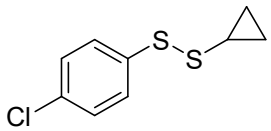
1,2-Di(thiophen-2-yl) disulfide (2o) [2]**.** Yellow solid, 65 mg, yield 93%.
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.50 (dd, *J* = 5.3, 1.3 Hz, 2H), 7.15 (dd, *J* = 3.6, 1.2 Hz, 2H), 7.01 (q, *J* = 5.3, 3.6 Hz, 2H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 135.73, 135.68, 132.36, 127.80.



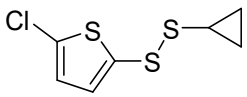
1-cyclopropyl-2-(*p*-tolyl) disulfide (2p) [3]**.** White solid. 34 mg, yield 57%.
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.47 (d, *J* = 8.2 Hz, 2H), 7.17 – 7.11 (d, 2H), 2.35 (s, 3H), 2.33 – 2.26 (m, 1H), 0.97 – 0.71 (m, 4H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 137.38, 134.44, 129.83, 129.31, 21.21, 19.32, 9.67.



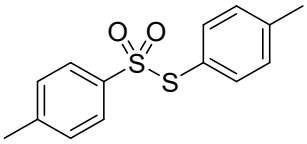
1-cyclopropyl-2-(4-methoxyphenyl) disulfide (2q) [3]**.** White solid. 38 mg, yield 60%.
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.52 (d, *J* = 8.7 Hz, 2H), 6.86 (d, *J* = 8.8 Hz, 2H), 3.81 (s, 3H), 2.29 (tt, *J* = 7.6, 4.3 Hz, 1H), 0.97 – 0.68 (m, 4H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 159.82, 132.68, 128.71, 114.71, 55.53, 19.25, 9.55.



1-(4-chlorophenyl)-2-cyclopropyl disulfide (2r) [3]**.** White solid. 34 mg, yield 53%.
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.50 (dd, *J* = 8.4, 1.4 Hz, 2H), 7.35 – 7.27 dd, 2H), 2.33 – 2.25 (m, 1H), 0.97 – 0.73 (m, 4H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 136.54, 133.09, 129.75, 129.19, 19.30, 9.78.

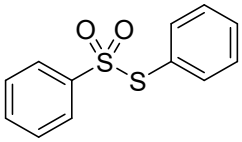


2-chloro-5-(cyclopropyldisulfaneyl) thiophene (2s) [3]**.** Colourless oil, 32 mg, yield 47%.
^{1}H NMR (600 MHz, $CDCl_3$) δ 7.50 (d, *J* = 8.6 Hz, 2H), 7.29 (d, *J* = 8.5 Hz, 2H), 2.28 (tt, *J* = 7.4, 4.3 Hz, 1H), 0.96 – 0.93 (m, 2H), 0.75 – 0.72 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 136.52, 133.06, 129.72, 129.17, 19.29, 9.78.



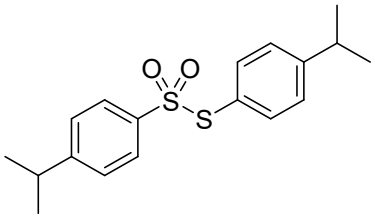
***S*-(*p*-tolyl) 4-methylbenzenesulfonothioate (3a)** [4]**.** White solid, 79 mg, yield 95%.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.45 (d, *J* = 8.3 Hz, 2H), 7.22 (t, *J* = 7.4 Hz, 4H), 7.14 (d, *J* = 8.0 Hz, 2H), 2.42 (s, 3H), 2.38 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 144.70, 142.16, 140.59, 136.61, 130.32, 129.48, 127.72, 124.72 21.79, 21.61.



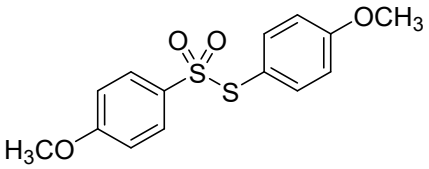
***S*-phenyl benzenesulfonothioate (3b)** [4]**.** Colorless oil, 61 mg, yield 81%.

^{1}H NMR (600 MHz, $CDCl_3$) δ 7.57 (dd, *J* = 11.1, 7.4 Hz, 3H), 7.47 (t, *J* = 7.0 Hz, 1H), 7.43 – 7.40 (m, 2H), 7.36 – 7.31 (m, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 143.07, 136.71, 133.76, 131.54, 129.56, 128.93, 127.96, 127.68.



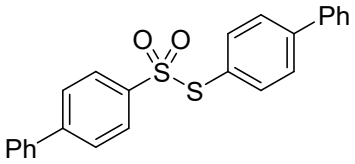
***S*-4-(Isopropyl) phenyl-4-isopropylbenzenesulfonothioate (3c)** [4]**.** Colourless oil. 62 mg, yield 62%.

^{1}H NMR (600 MHz, $CDCl_3$) δ 7.48 (d, *J* = 8.4 Hz, 2H), 7.28 – 7.26 (m, 2H), 7.24 (d, *J* = 8.4 Hz, 2H), 7.18 (d, *J* = 8.2 Hz, 2H), 2.99 – 2.89 (m, 2H), 1.25 (dd, *J* = 10.1, 6.9 Hz, 12H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 155.40, 152.91, 140.74, 136.79, 127.90, 127.69, 126.91, 125.0, 34.39, 34.18, 23.91, 23.77.



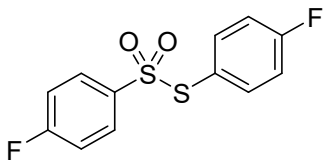
***S*-(4-methoxyphenyl)4-methoxybenzenesulfonothioate (3d)** [4]**.** White solid, 86 mg, yield 92%.

^{1}H NMR (600 MHz, $CDCl_3$) δ 7.50 (d, *J* = 5.5 Hz, 2H), 7.29 – 7.25 (m, 2H), 6.92 – 6.81 (m, 4H), 3.85 (d, *J* = 21.6 Hz, 6H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 163.66, 162.34, 138.51, 135.12, 130.05, 119.10, 115.05, 113.97, 55.84, 55.61.



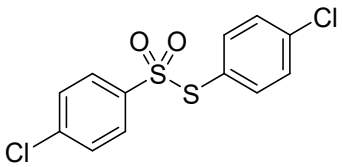
***S*-([1,1'-biphenyl]-4-yl)-[1,1'-biphenyl]-4-sulfonothioate (3e)** [5]**.** White solid, 97 mg, yield 81%.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.67 – 7.57 (m, 9H), 7.52 – 7.31 (m, 9H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 146.60, 144.40, 141.80, 139.51, 139.00, 137.15, 129.24, 129.14, 128.90, 128.45, 128.25, 128.18, 127.49, 127.47, 127.33, 126.62.



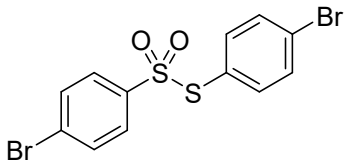
***S*-(4-fluorophenyl) 4-fluorobenzenesulfonothioate(3f)** [5]**.** White solid, 79 mg, yield 92%.

^{1}H NMR (600 MHz, $CDCl_3$) δ 7.59 (dd, *J* = 8.8, 5.0 Hz, 2H), 7.37 (d, *J* = 8.7 Hz, 2H), 7.12 (t, *J* = 8.5 Hz, 2H), 7.06 (t, *J* = 8.5 Hz, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.61, 165.87, 164.90, 164.19, 139.01, 138.95, 130.63, 130.57, 117.16, 117.02, 116.43, 116.28,5.^{19}F NMR (565 MHz, $CDCl_3$) δ -102.49, -106.82.



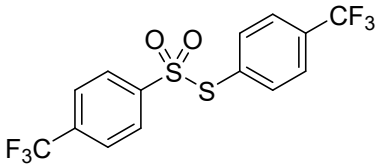
***S*-(4-chlorophenyl) 4-chlorobenzenesulfonothioate (3g)** [5]**.** White solid, 86 mg, yield 90%.

^{1}H NMR (600 MHz, $CDCl_3$) δ 7.52 (d, *J* = 8.4 Hz, 2H), 7.43 (d, *J* = 8.1 Hz, 2H), 7.38 – 7.29 (m, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 141.46, 140.72, 138.72, 137.84, 130.07, 129.42, 129.09, 126.18.



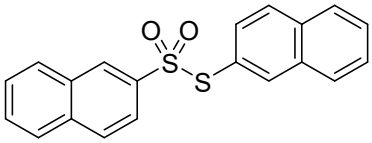
***S*-(4-bromophenyl) 4-bromobenzenesulfonothioate (3h)** [5]**.** White solid, 107 mg, yield 88%.

^{1}H NMR (600 MHz, $CDCl_3$) δ 7.60 (d, *J* = 8.6 Hz, 2H), 7.52 (d, *J* = 8.5 Hz, 2H), 7.44 (d, *J* = 8.8 Hz, 2H), 7.26 (d, *J* = 5.3 Hz, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 142.03, 137.99, 133.08, 132.44, 129.35, 129.10, 127.18, 126.76.



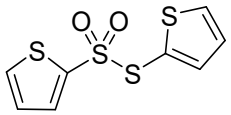
S-(4-(trifluoromethyl) phenyl) 4-(trifluoromethyl) benzenesulfonothioate (3i) [5]**.** White solid, 106 mg, yield 92%.

^{1}H NMR (600 MHz, $CDCl_3$) δ 7.73 (s, 4H), 7.65 (d, *J* = 8.0 Hz, 2H), 7.54 (d, *J* = 7.9 Hz, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) *δ*: 122.9 (q, *J* = 272 Hz), 123.3 (q, *J* = 272 Hz), 126.3 (q, *J* = 4 Hz), 126.5 (q, *J* = 4 Hz), 127.9, 131.6, 133.6 (q, *J* = 33 Hz), 135.5 (q, *J* = 33 Hz), 136.7, 146.1. ^{19}F NMR (565 MHz, $CDCl_3$) δ -63.11, -63.21.



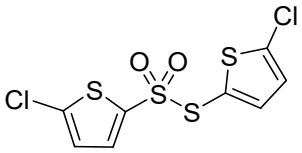
***S*-(naphthalen-2-yl) naphthalene-2-sulfonothioate (3j)** [5]**.** White solid, 63 mg, yield 60%.

^{1}H NMR (600 MHz, $CDCl_3$) δ 7.94 (s, 1H), 7.89 (dd, *J* = 8.4, 5.0 Hz, 2H), 7.85 – 7.82 (m, 2H), 7.74 (d, *J* = 8.5 Hz, 1H), 7.69 – 7.62 (m, 4H), 7.59 – 7.52 (m, 2H), 7.50 – 7.47 (m, 1H), 7.35 (dd, *J* = 8.5, 1.8 Hz, 1H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 139.84, 137.85, 135.27, 134.26, 133.41, 132.00, 131.77, 129.62, 129.51, 129.48, 129.45, 129.26, 128.55, 128.37, 128.02, 127.87, 127.80, 127.04, 125.33, 122.58.



***S*-(Thiophen-2-yl) thiophene-2-sulfonothioate (3k)** [5]**.** Yellow oil, 61 mg, yield 78%.

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.26 (d, *J* = 4.2 Hz, 2H), 7.10 (d, *J* = 4.0 Hz, 2H), 6.96 (dd, *J* = 9.1, 4.1 Hz, 4H). ^{13}C NMR (75 MHz, $CDCl_3$) δ 140.75, 140.12, 139.81, 139.70, 134.31, 128.20, 127.00, 123.29.

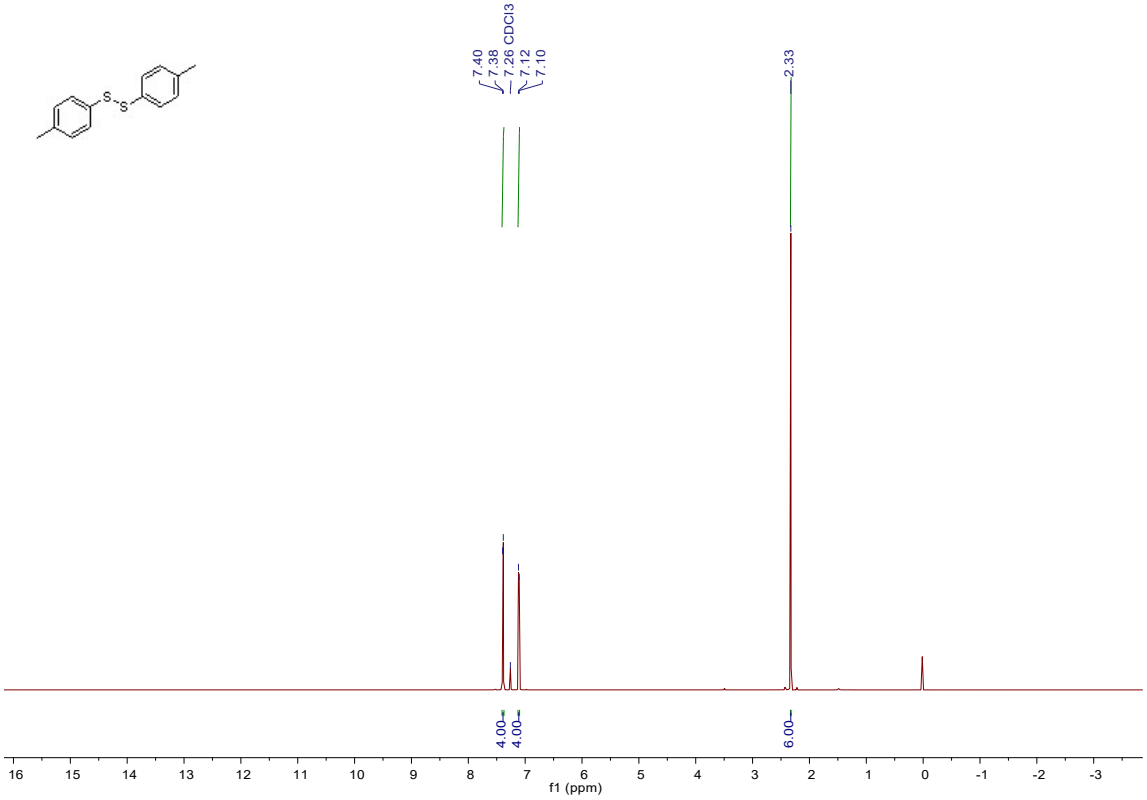


***S*-(5-Chlorothiophen-2-yl)5-chlorothiophene-2-sulfonothioatea (3l)** [5]**.** Yellow oil, 71 mg, yield 72%.

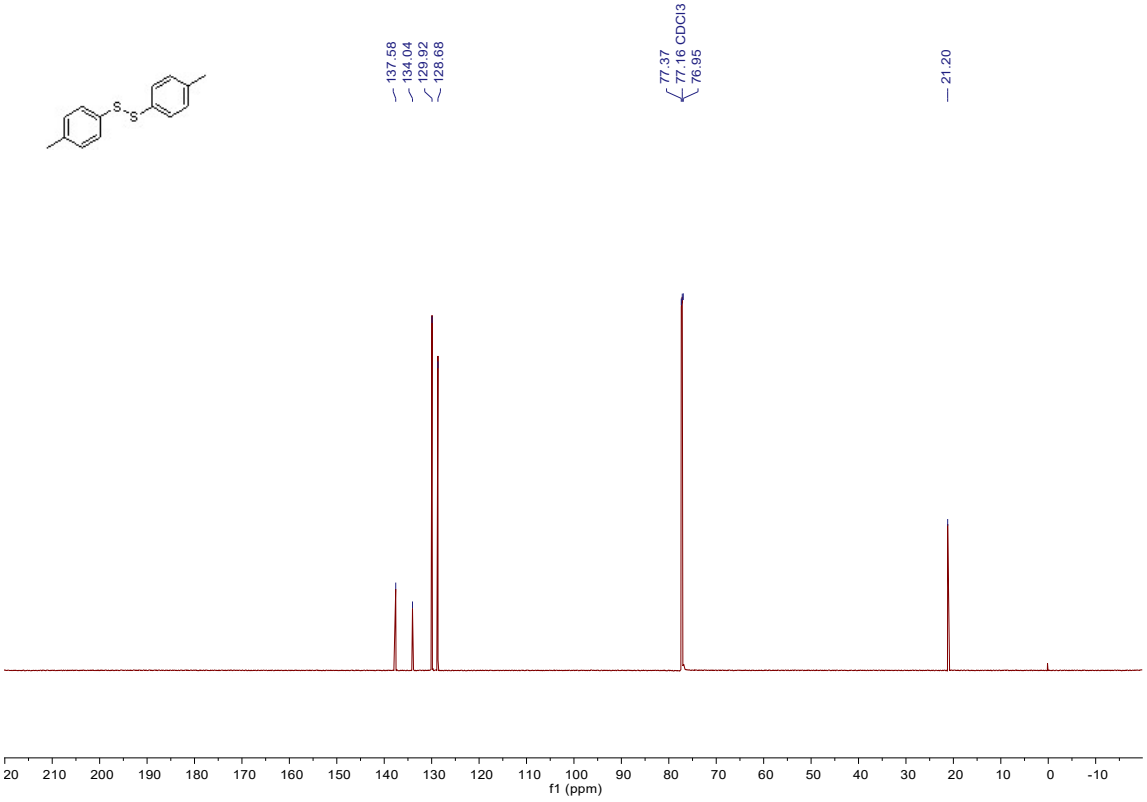
^{1}H NMR (600 MHz, $CDCl_3$) δ 7.27 (s, 1H), 7.10 (d, *J* = 4.0 Hz, 1H), 6.97 (d, *J* = 4.0 Hz, 1H), 6.94 (d, *J* = 4.1 Hz, 1H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 140.79, 140.31, 139.82, 139.75, 134.30, 128.21, 127.00, 123.43.

Copies of ^{1}H NMR, ^{13}C NMR and ^{19}F NMR spectra

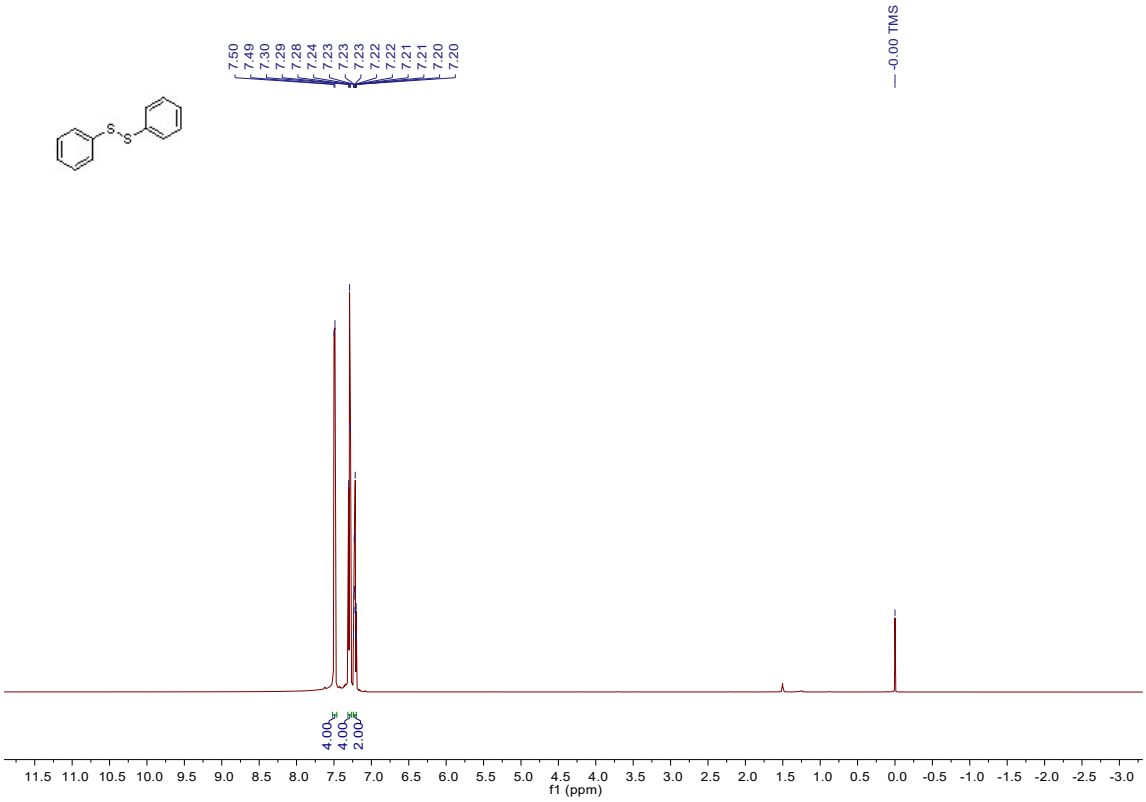
^{1}H NMR of 1,2-Di-*p*-tolydisulfane (**2a**)[1]



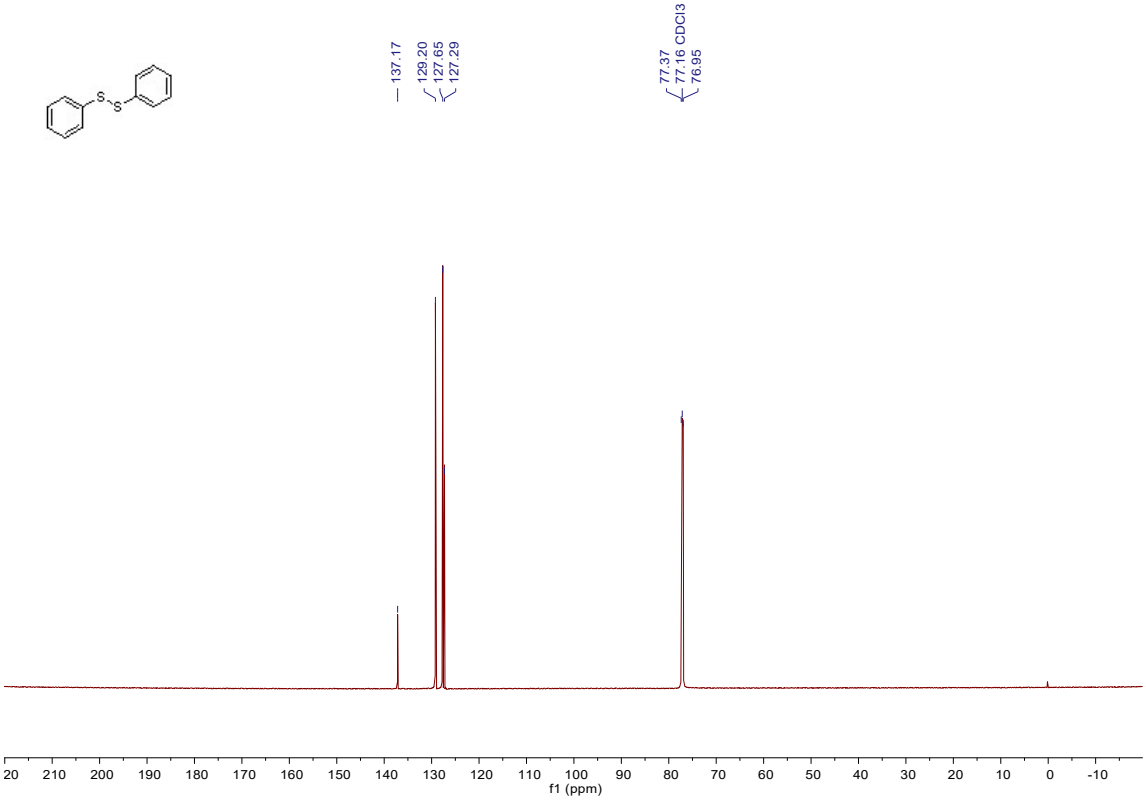
^{13}C NMR of 1,2-Di-*p*-tolydisulfane (**2a**) [1]



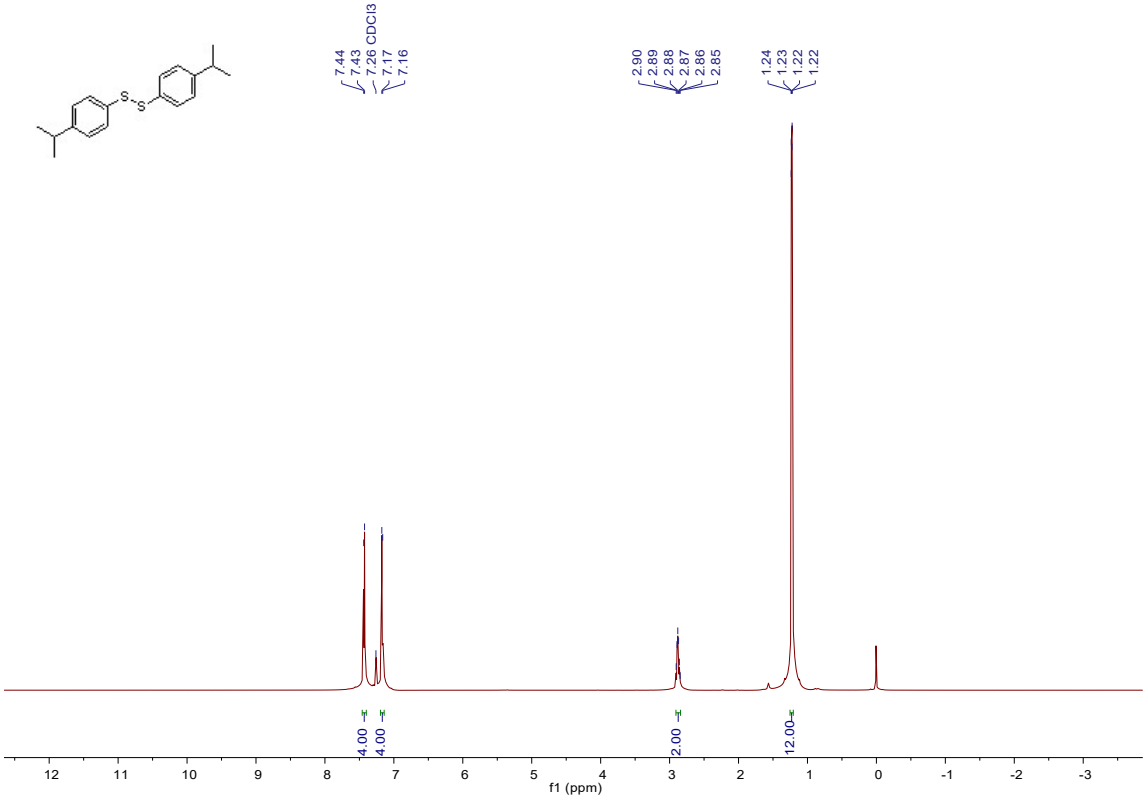
^{1}H NMR of 1,2-Diphenyldisulfide (**2b**) [1]



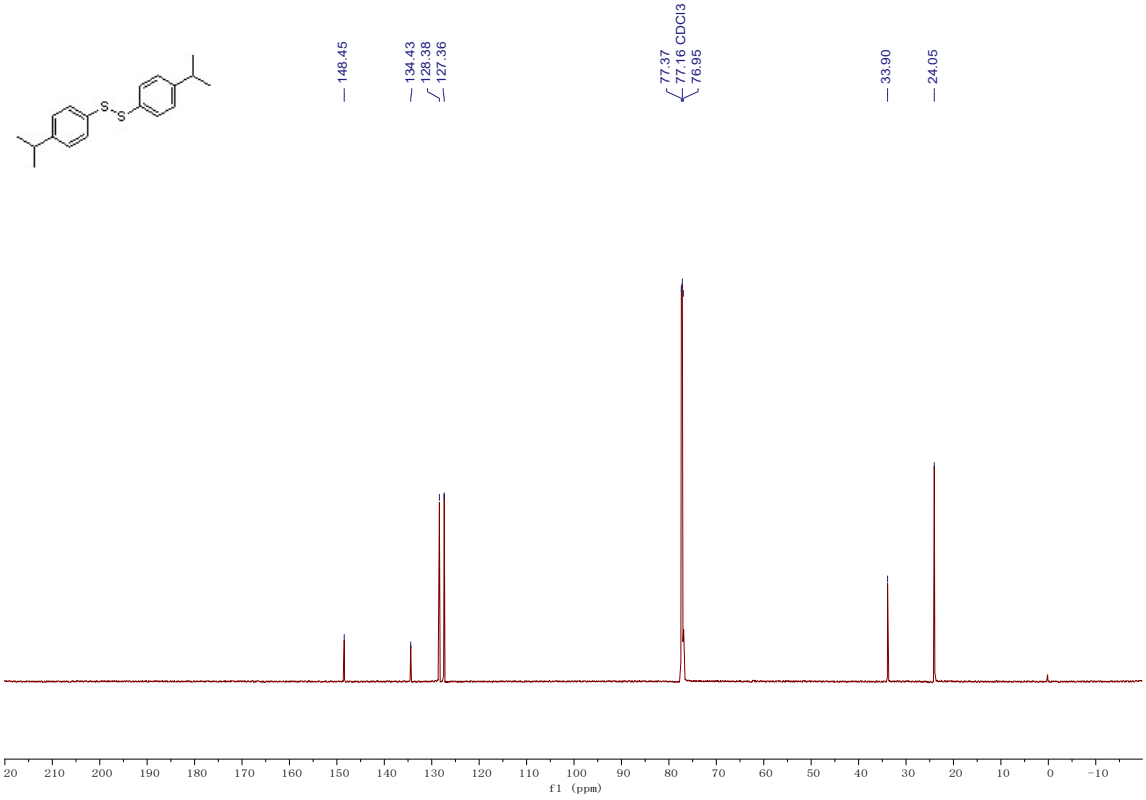
^{13}C NMR of 1,2-Diphenyldisulfide (**2b**) [1]



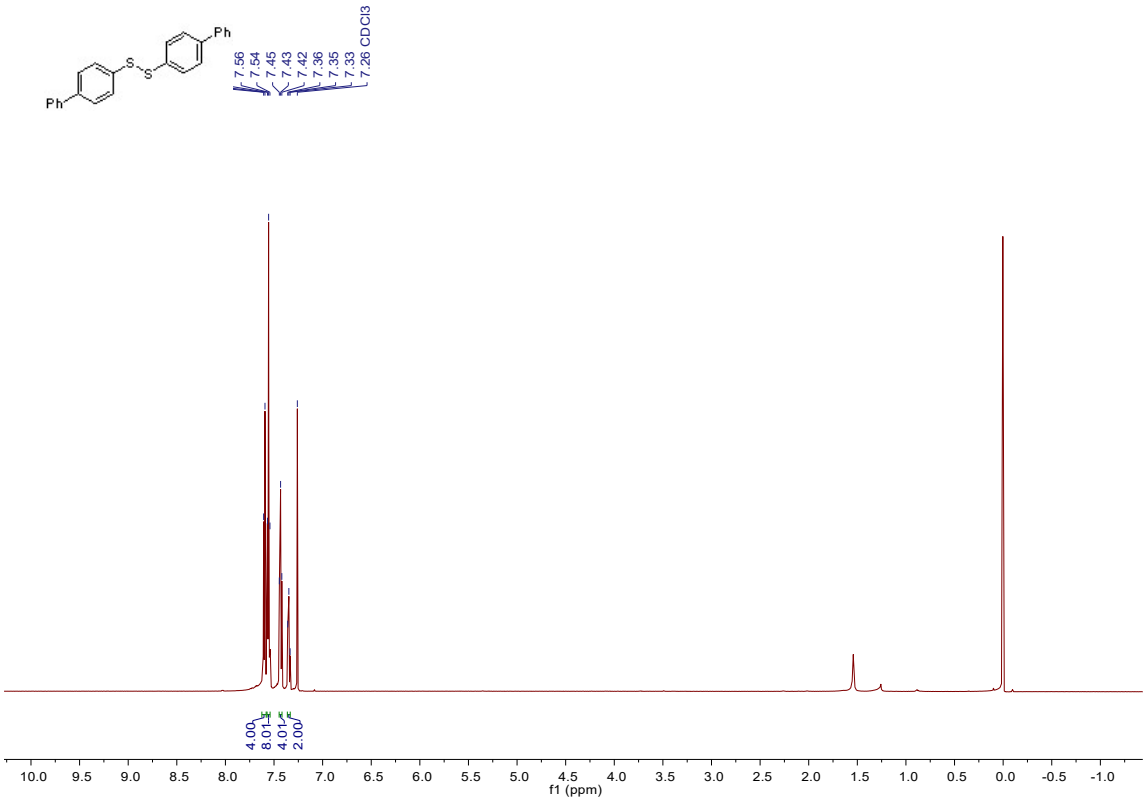
^{1}H NMR of 1,2-Bis(4-isopropylphenyl) disulfide (**2c**) [1]



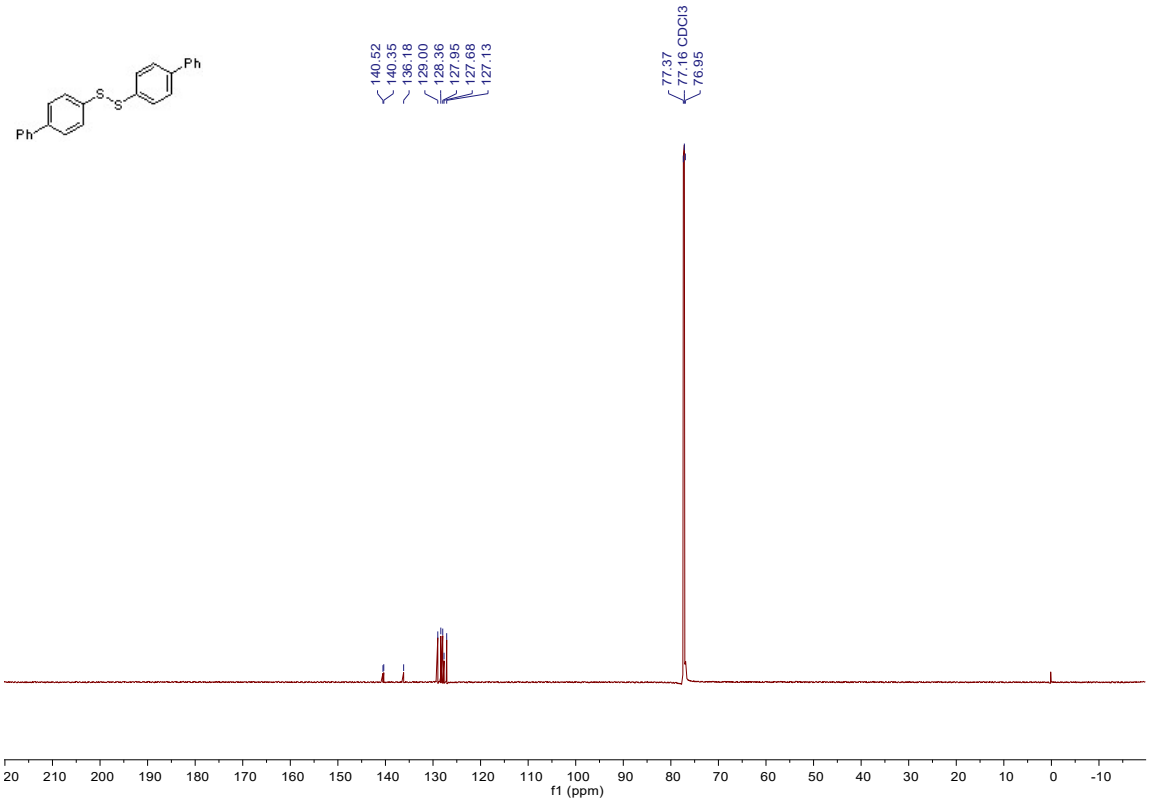
^{13}C NMR of 1,2-Bis(4-isopropylphenyl) disulfide (**2c**) [1]



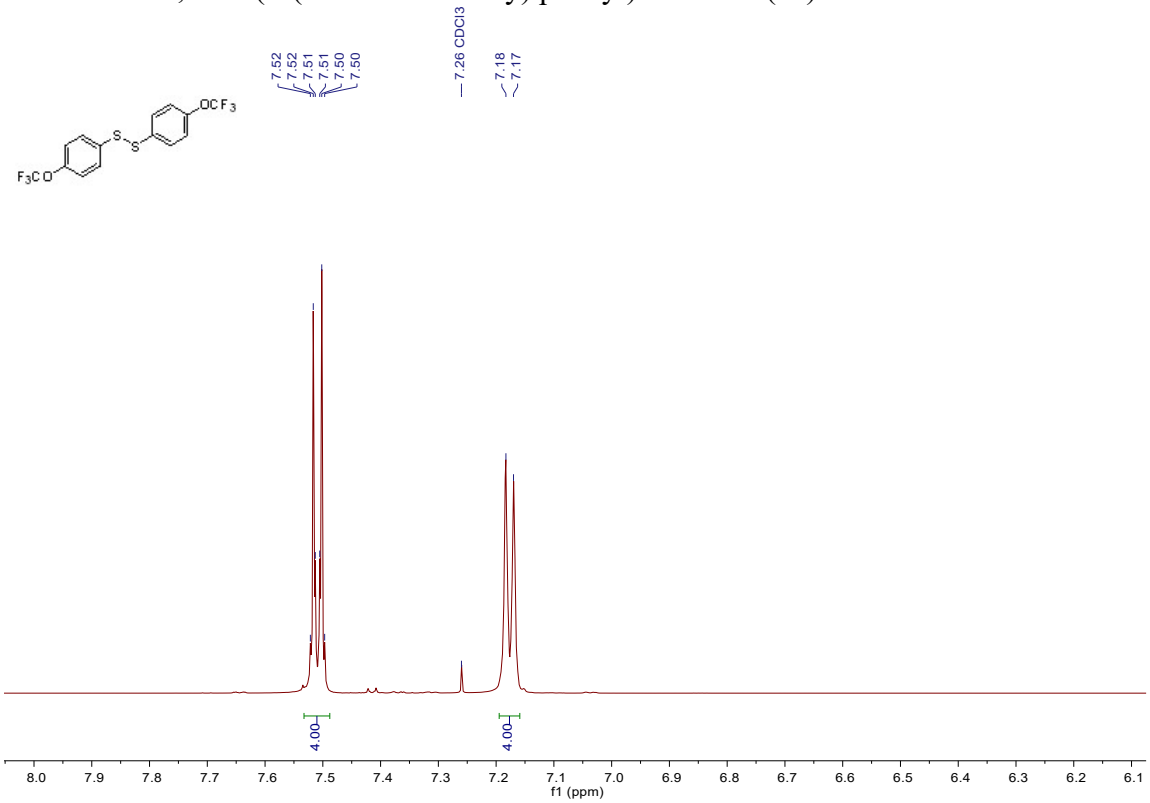
^{1}H NMR of 1,2-Di([1,1'-biphenyl]-4-yl) disulfide (**2d**) [1]



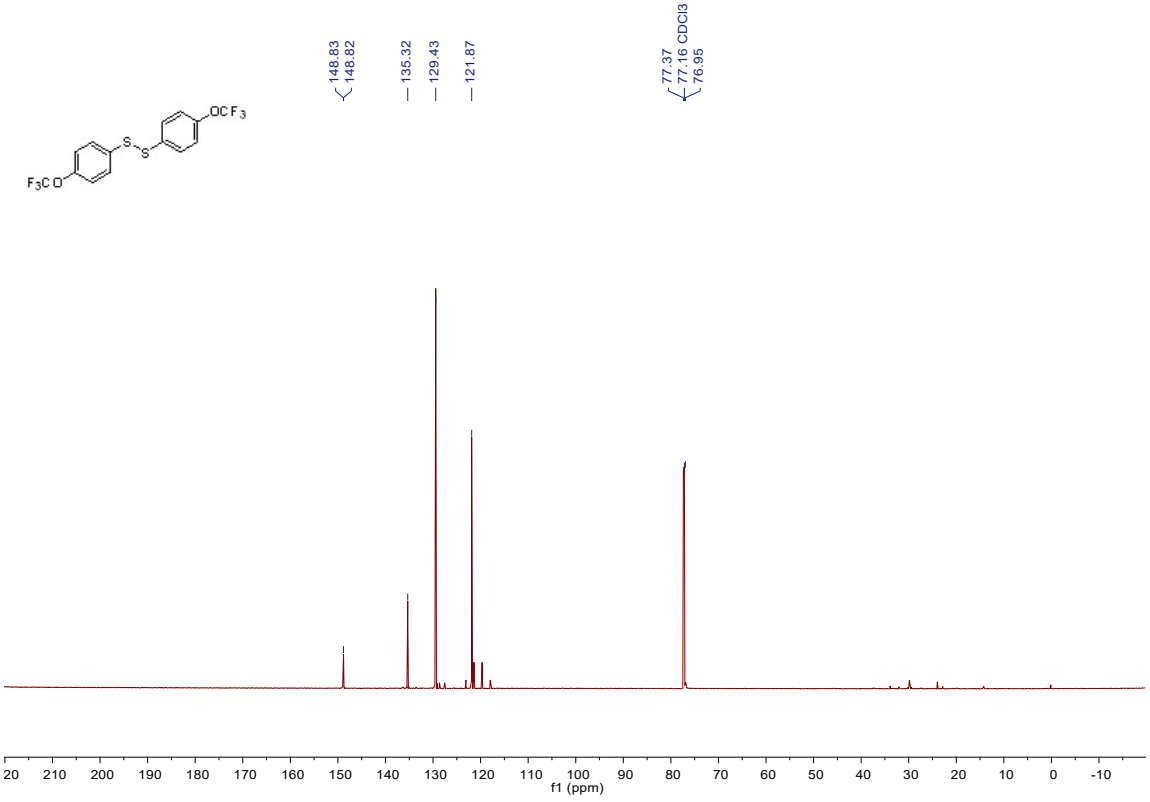
^{13}C NMR of 1,2-Di([1,1'-biphenyl]-4-yl) disulfide (**2d**) [1]



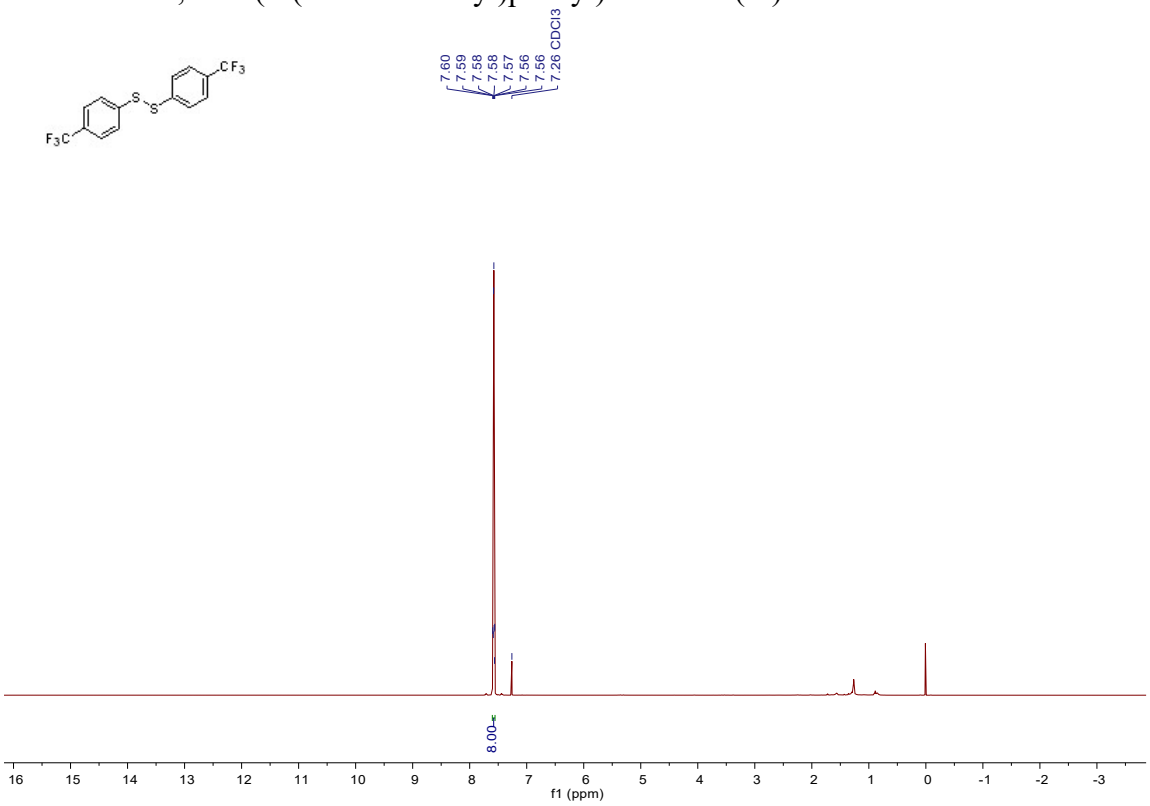
^{1}H NMR of 1,2-Bis(4-(trifluoromethoxy) phenyl) disulfide (**2e**) [1]



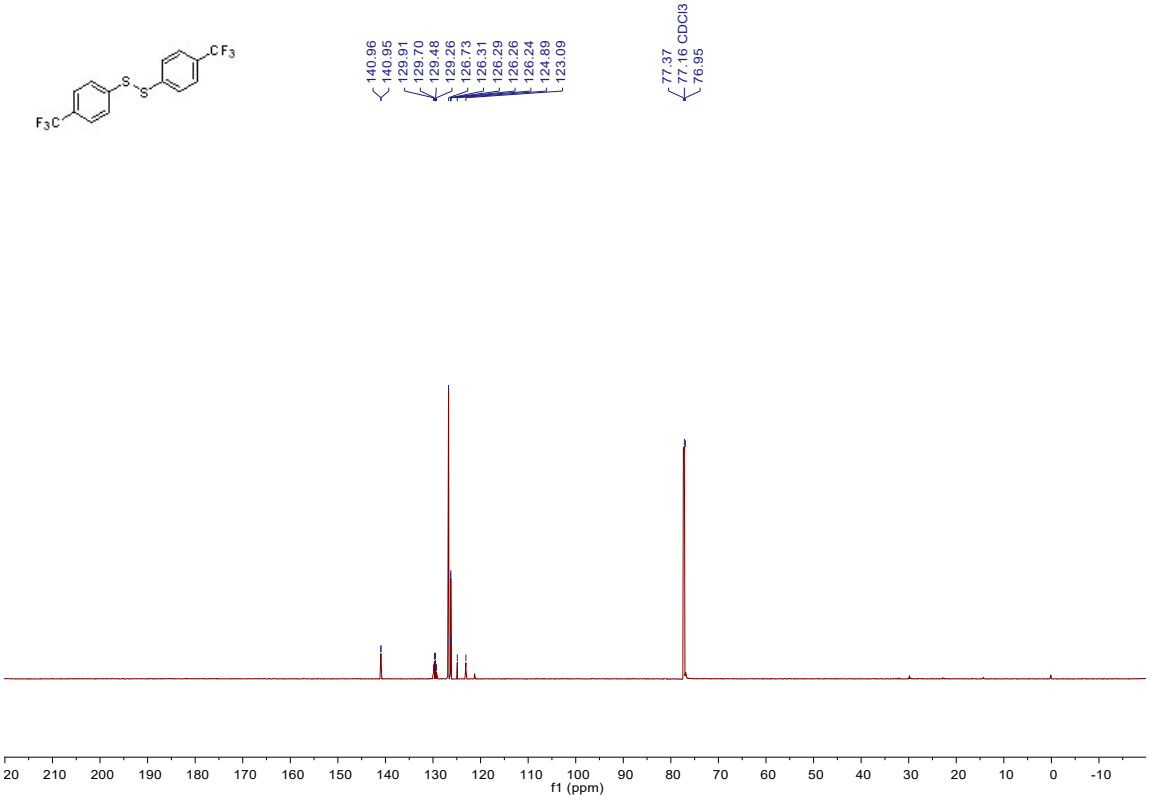
^{13}C NMR of 1,2-Bis(4-(trifluoromethoxy) phenyl) disulfide (**2e**) [1]



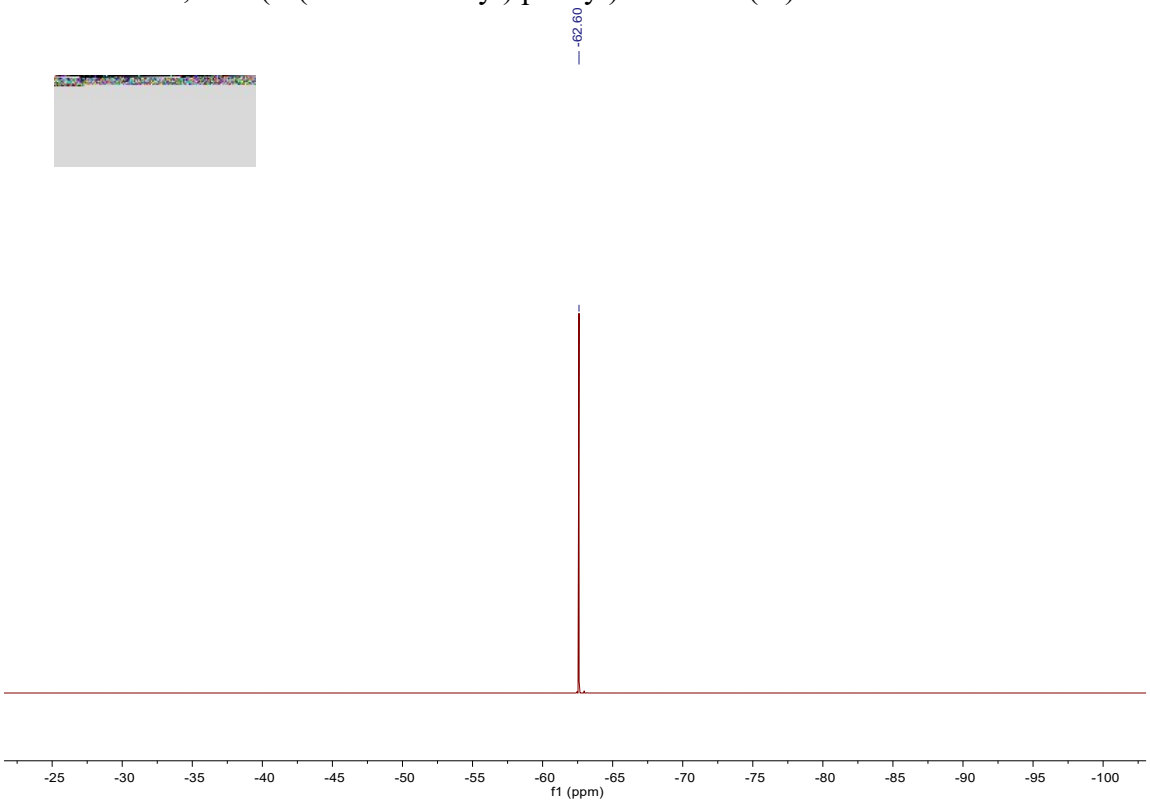
^{1}H NMR of 1,2-Bis(4-(trifluoromethyl)phenyl) disulfide (**2f**) [1]



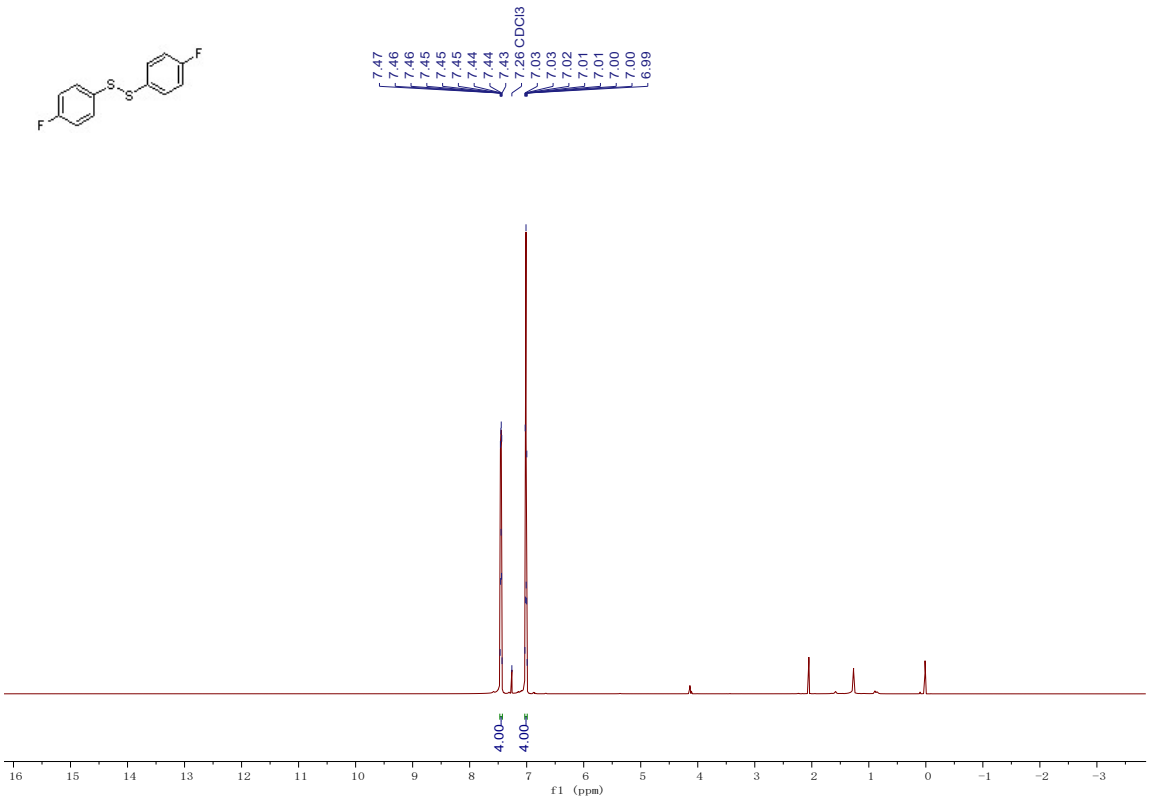
^{13}C NMR of 1,2-Bis(4-(trifluoromethyl) phenyl) disulfide (**2f**) [1]



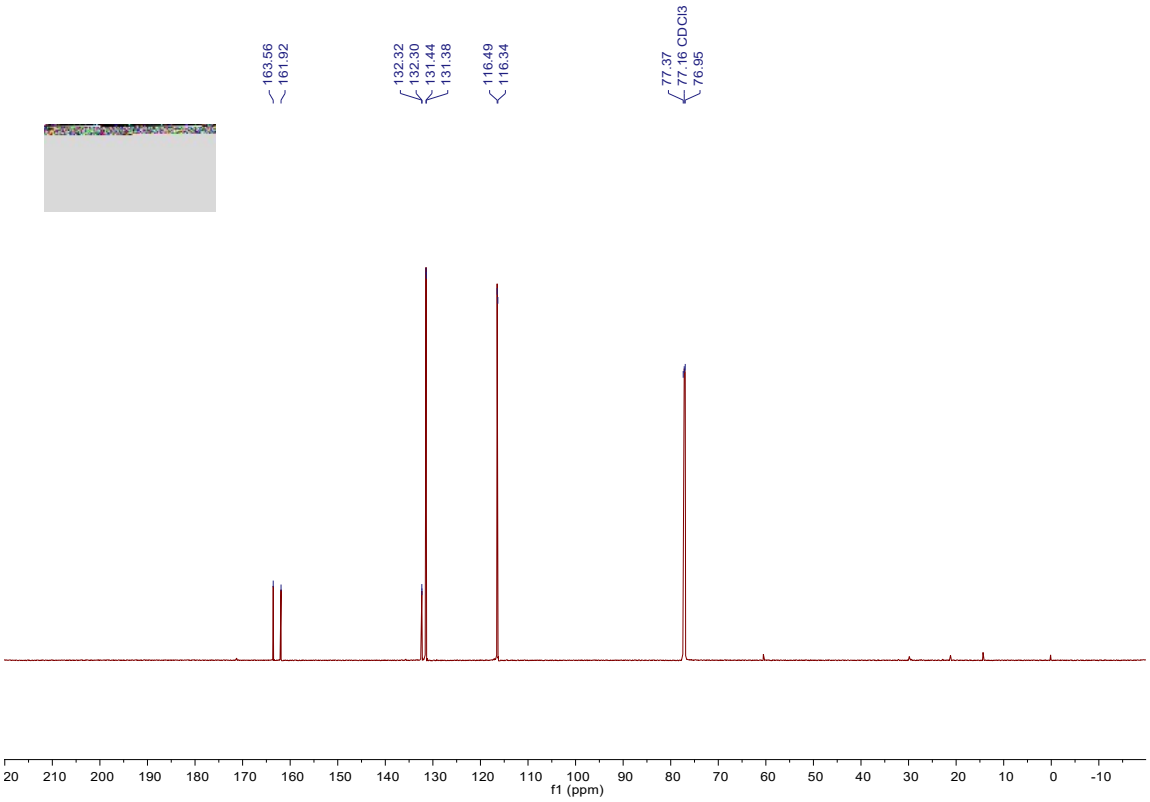
^{19}F NMR of 1,2-Bis(4-(trifluoromethyl) phenyl) disulfide (**2f**) [1]



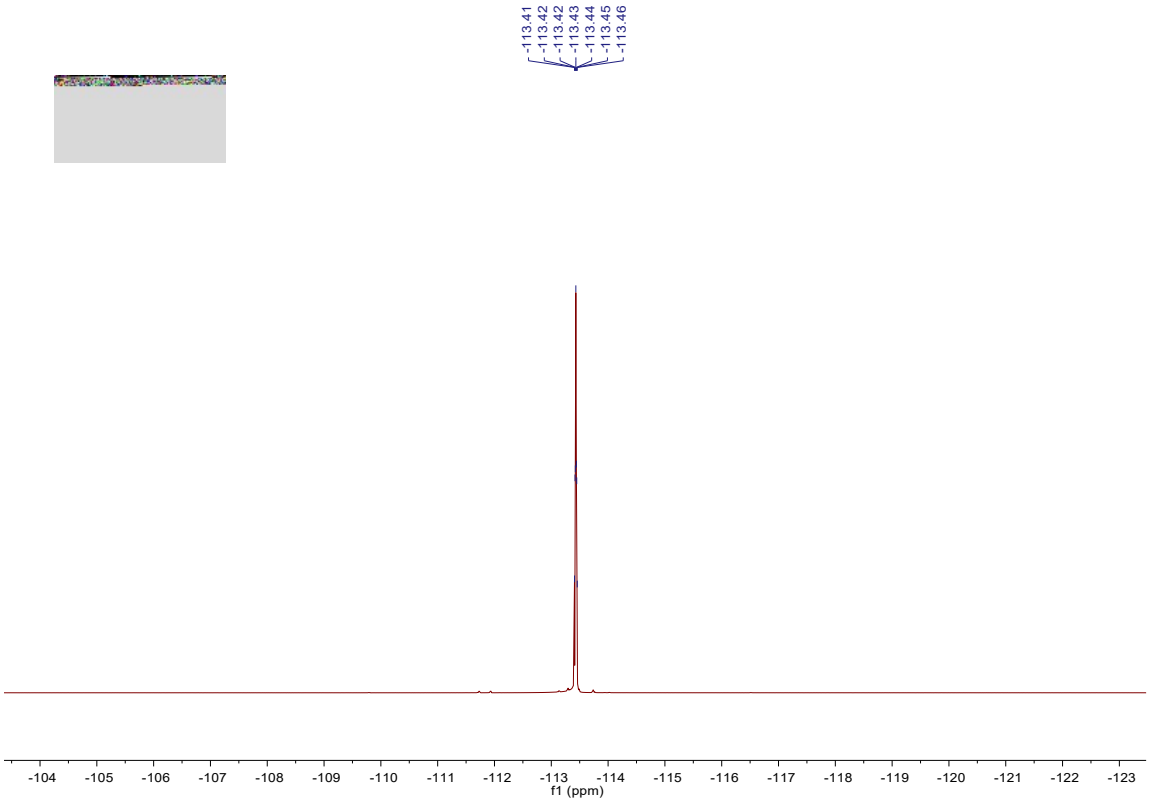
^{1}H NMR of 1,2-bis(4-fluorophenyl) disulfide (**2g**) [1]



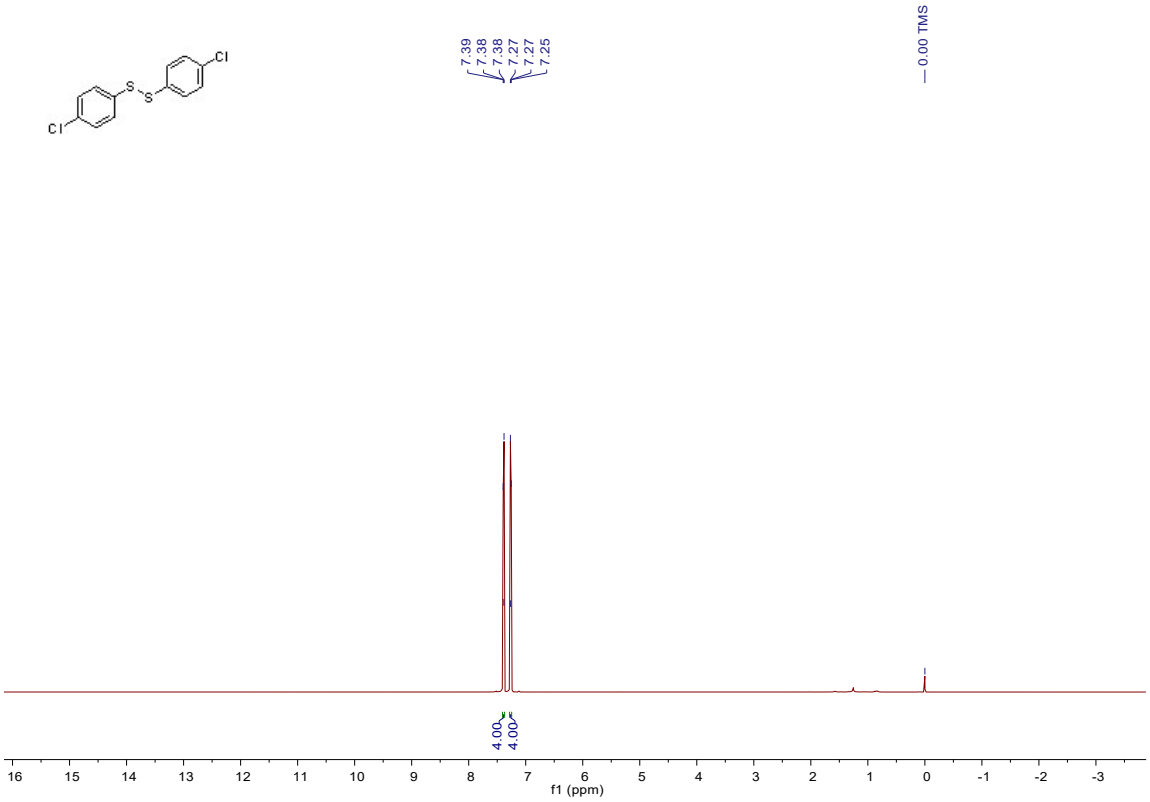
^{13}C NMR of 1,2-bis(4-fluorophenyl) disulfide (**2g**) [1]



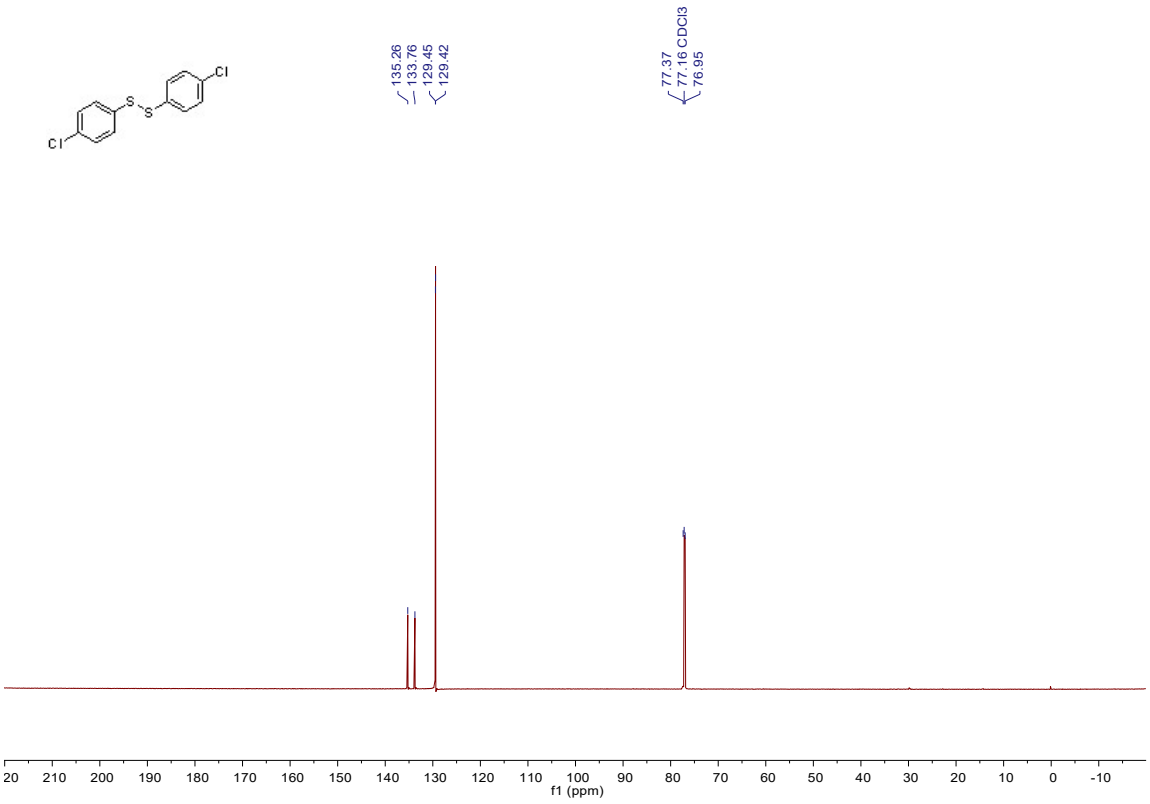
^{19}F NMR of 1,2-bis(4-fluorophenyl) disulfide (**2g**) [1]



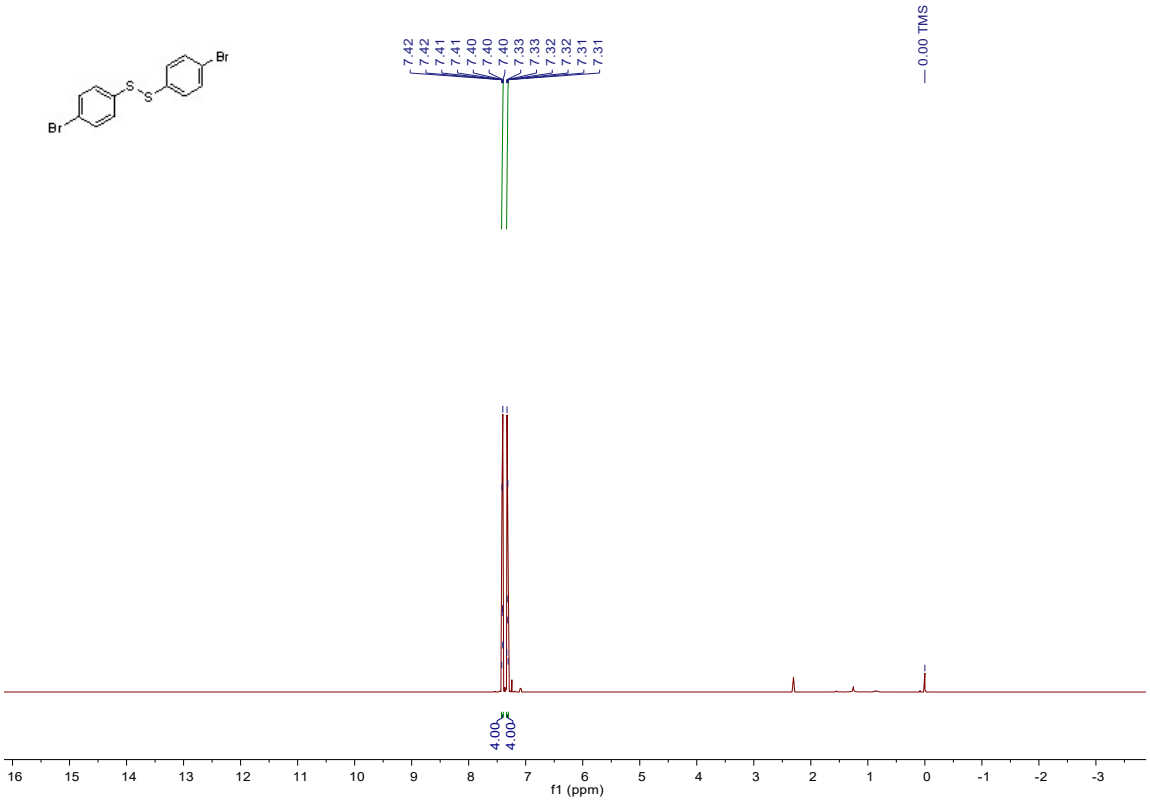
^{1}H NMR of 1,2-Bis(4-chlorophenyl) disulfide (**2h**) [1]



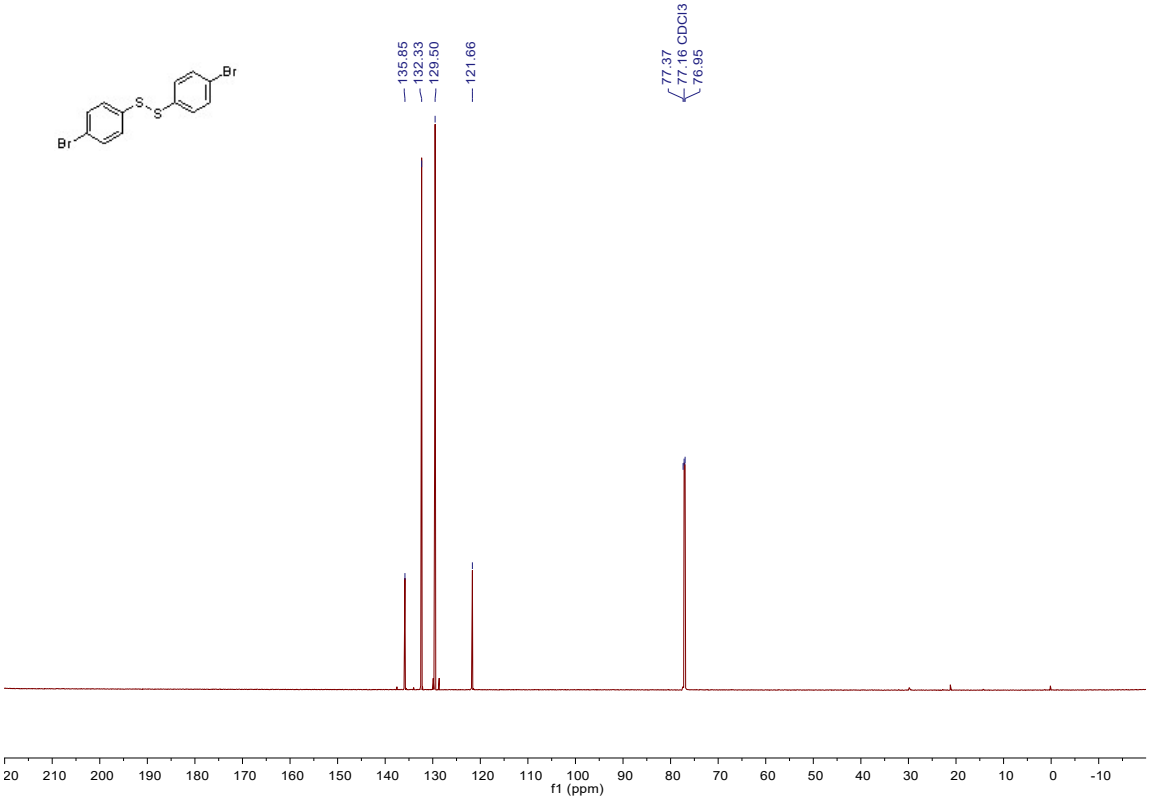
^{13}C NMR of 1,2-Bis(4-chlorophenyl) disulfide (**2h**) [1]



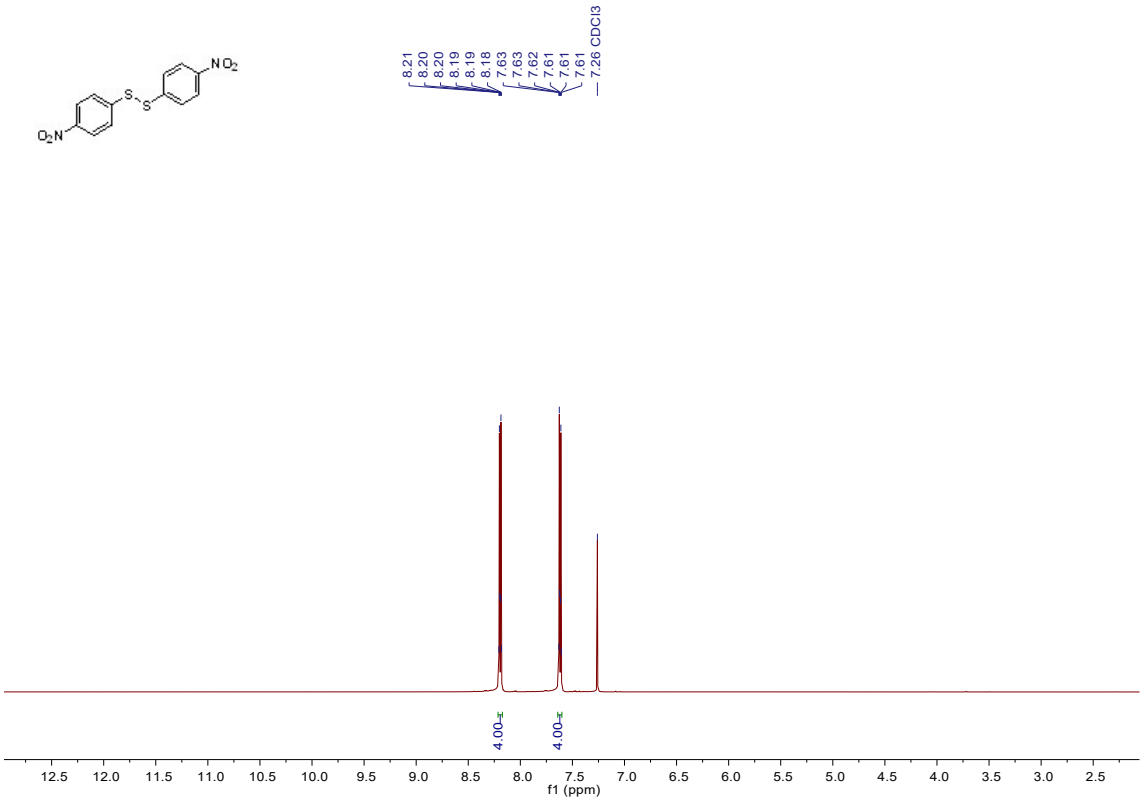
^{1}H NMR of 1,2-Bis(4-bromophenyl) disulfide (**2i**)



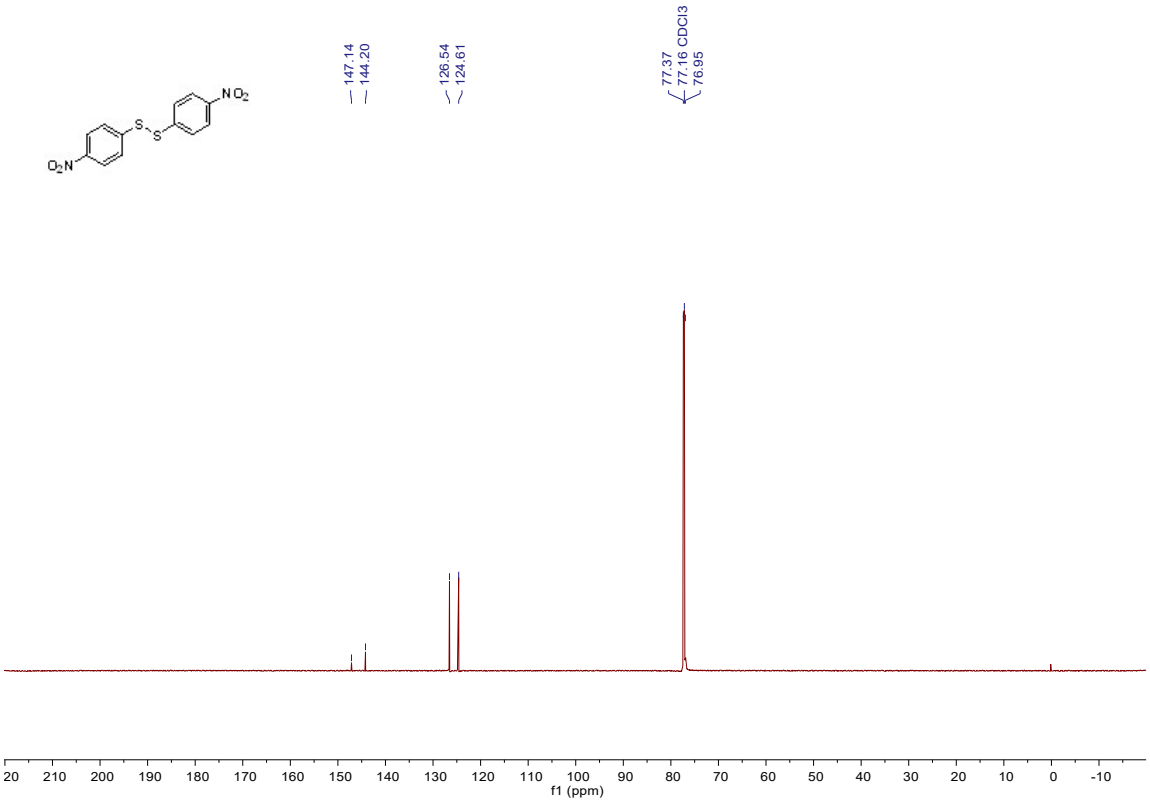
^{13}C NMR of 1,2-Bis(4-bromophenyl) disulfide (**2i**) [1]



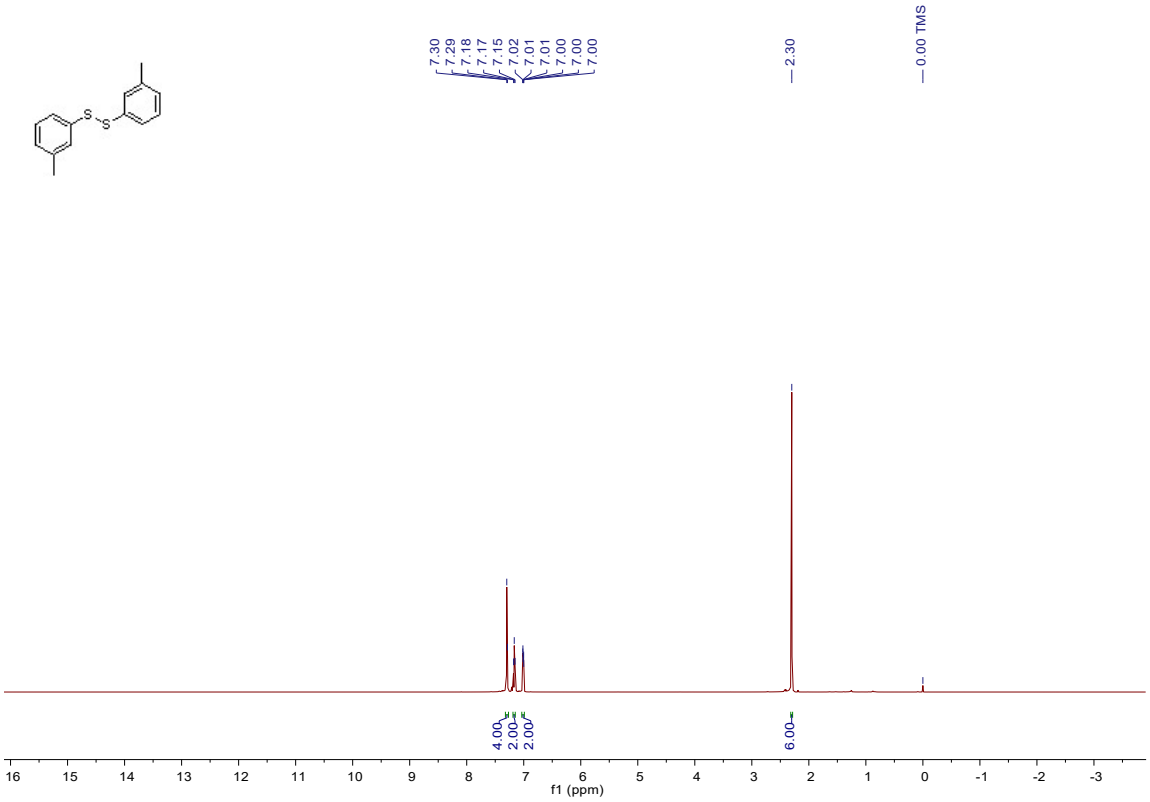
^{1}H NMR of 1,2-Bis(4-nitrophenyl) disulfide (**2j**) [2]



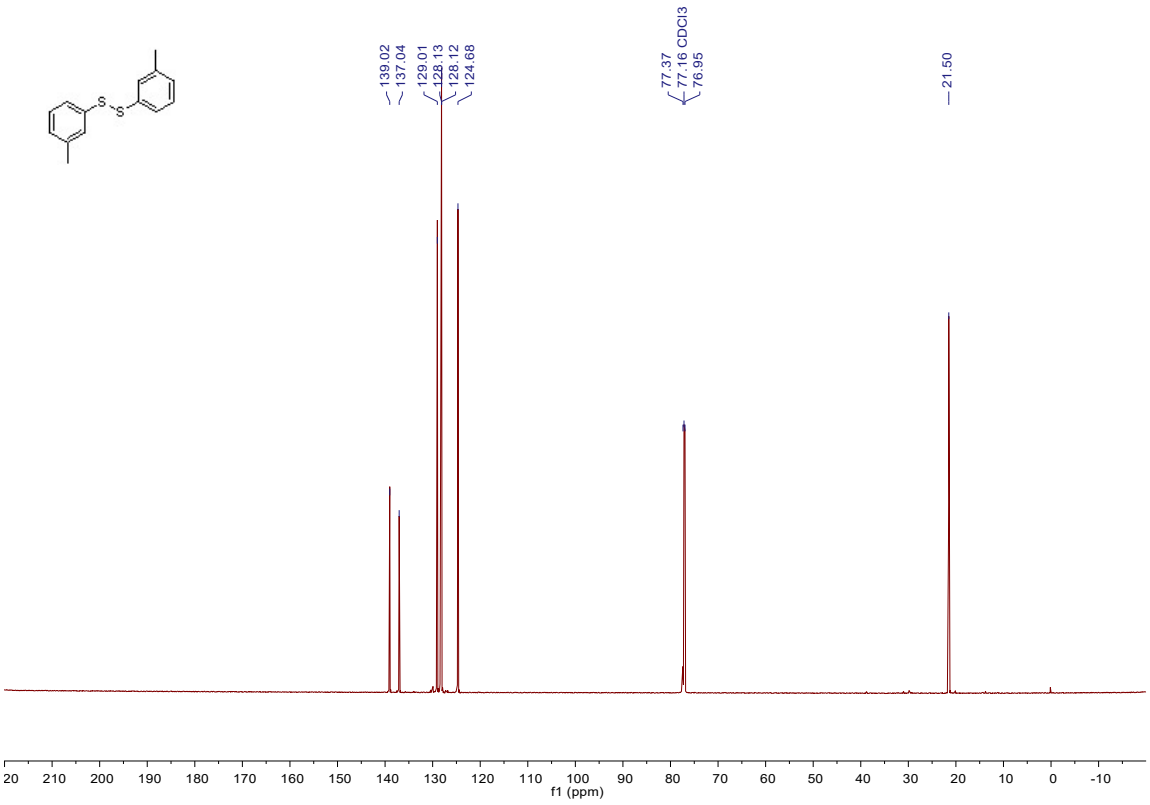
^{13}C NMR of 1,2-Bis(4-nitrophenyl) disulfide (**2j**) [2]



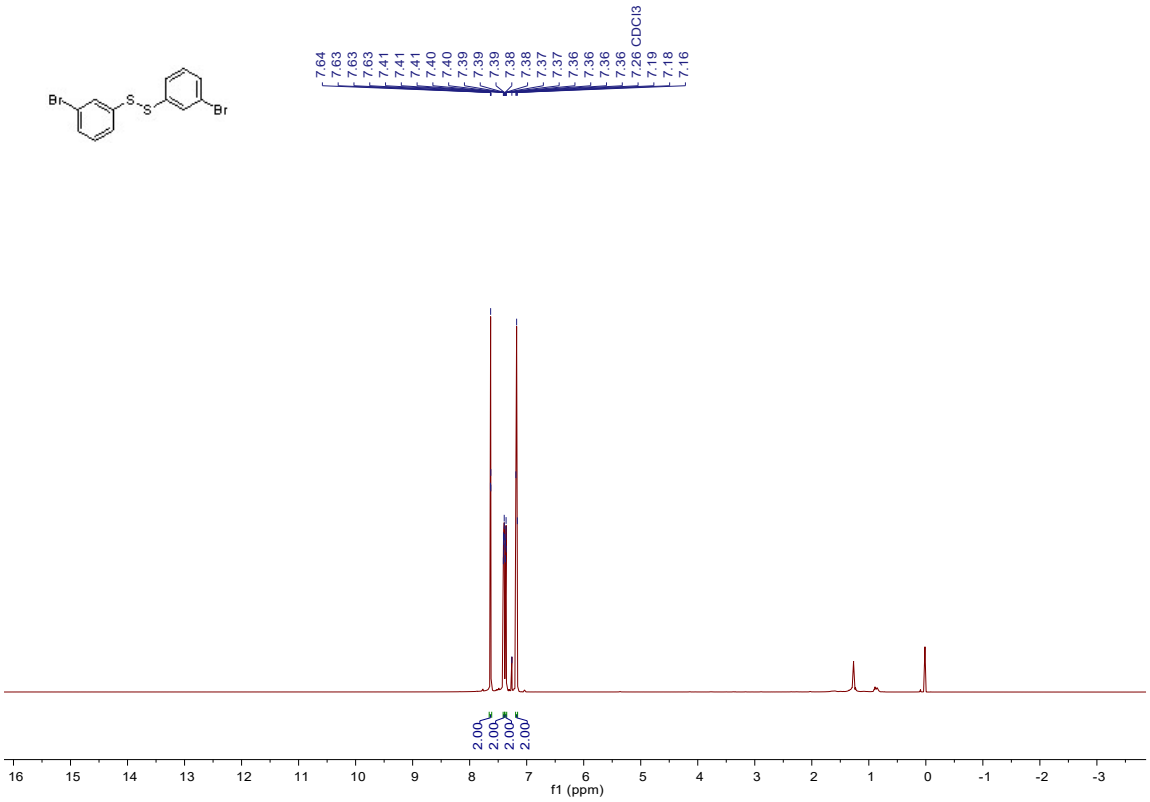
^{1}H NMR of 1,2-di-m-tolyldisulfide (**2k**) [2]



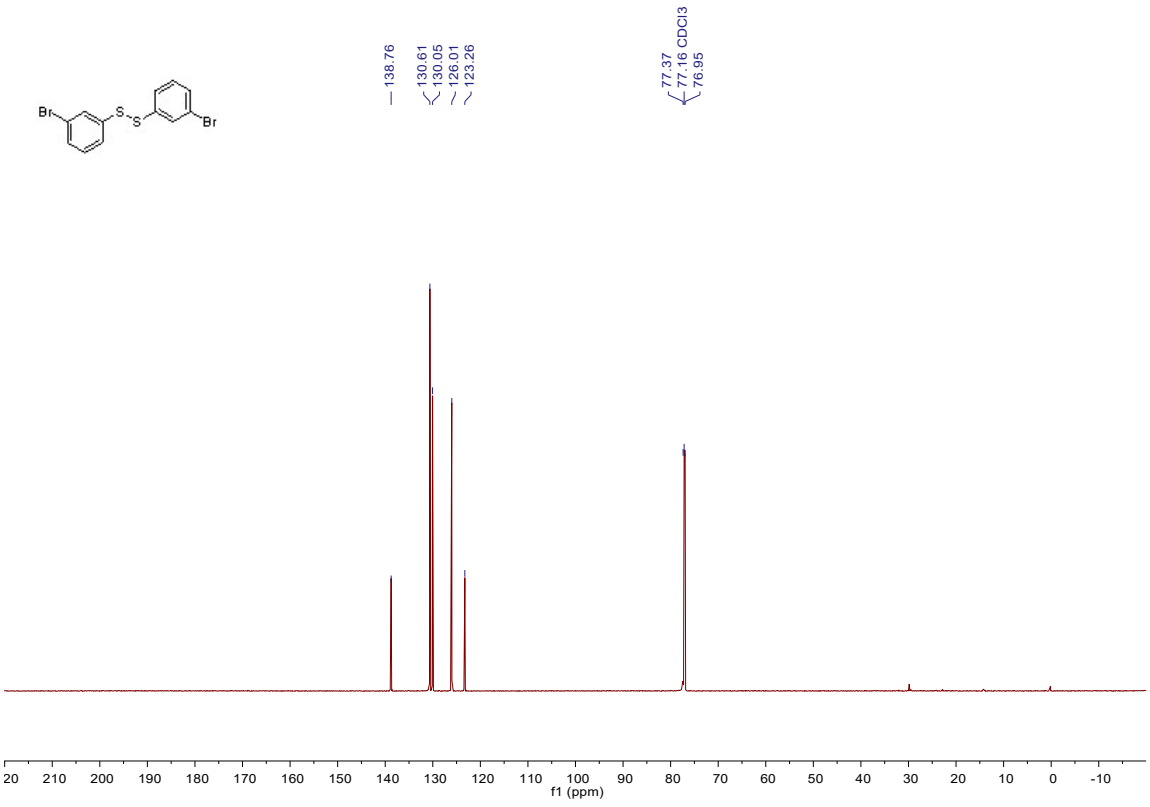
^{13}C NMR of 1,2-di-m-tolyldisulfide (**2k**) [2]



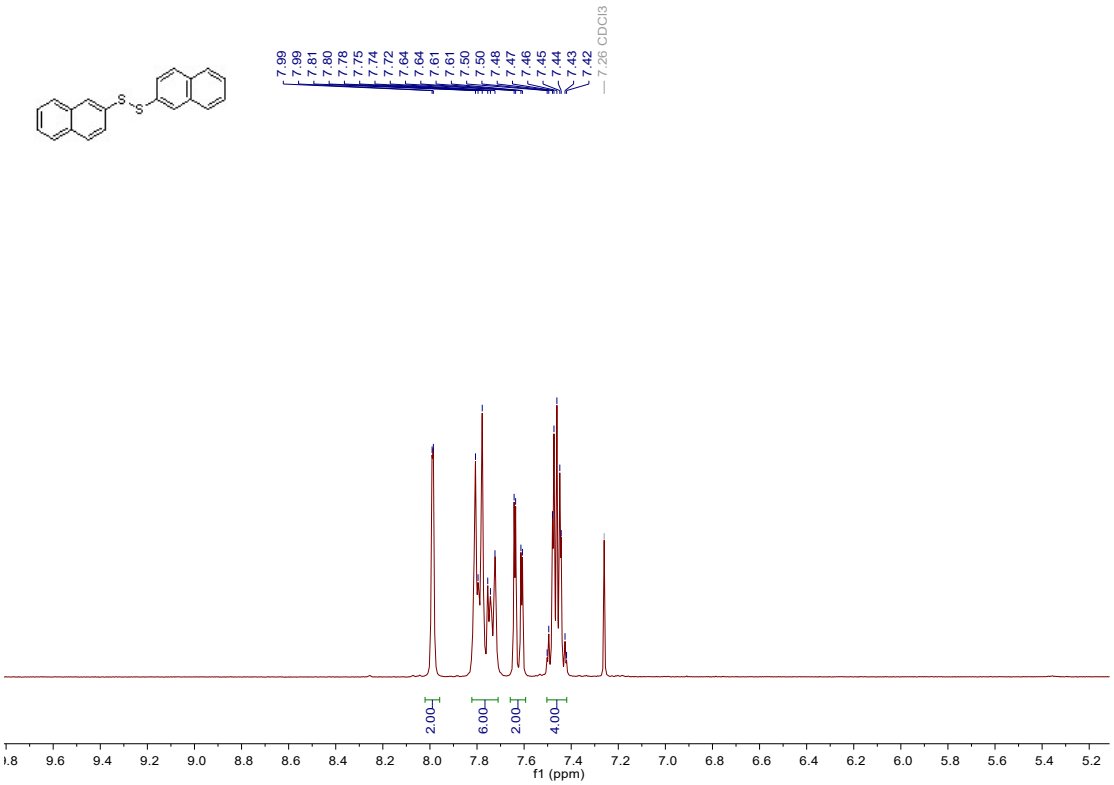
^{1}H NMR of 1,2-Bis(3-bromophenyl) disulfide (**2l**) [2]



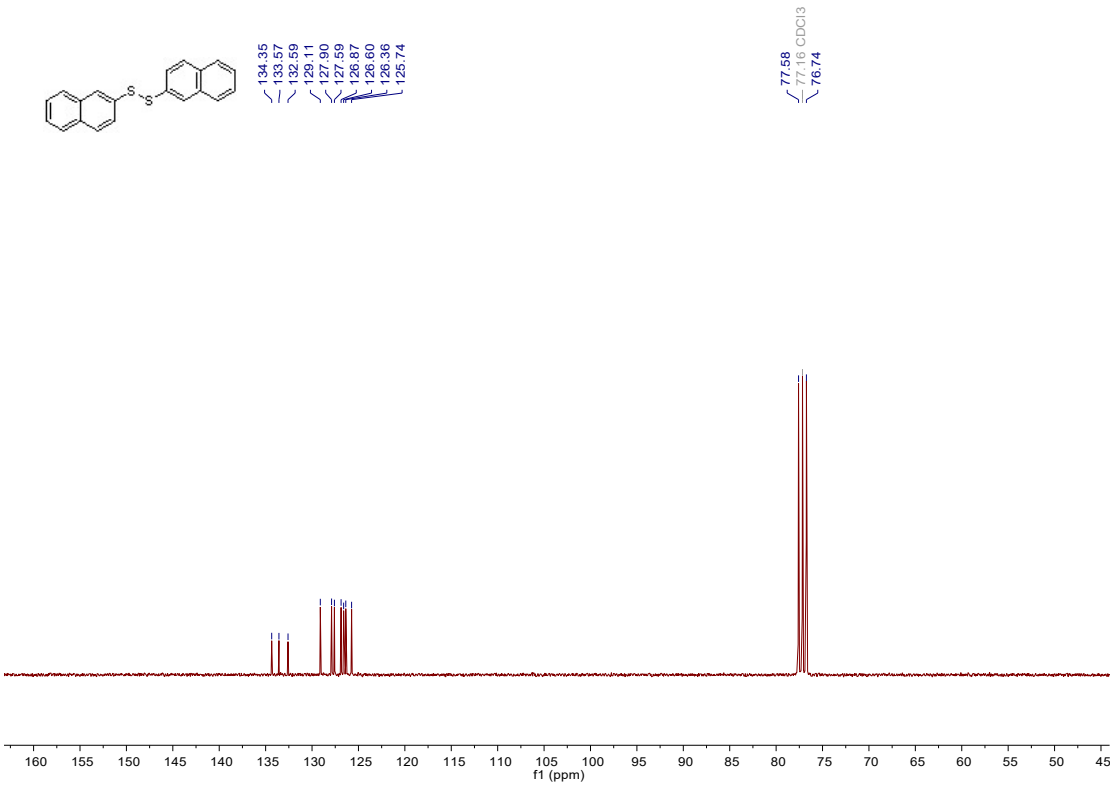
^{13}C NMR of 1,2-Bis(3-bromophenyl) disulfide (**2l**) [2]



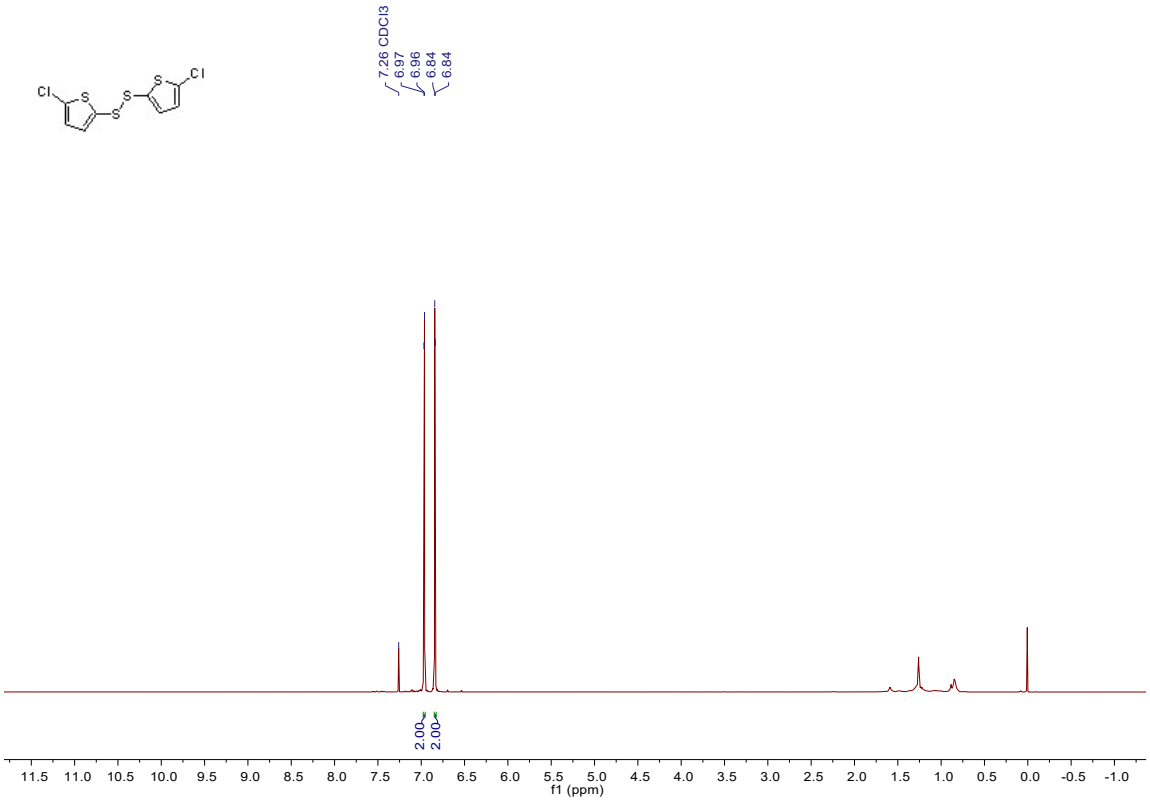
^{1}H NMR of 1,2-Di(naphthalen-2-yl) disulfide (**2m**) [2]



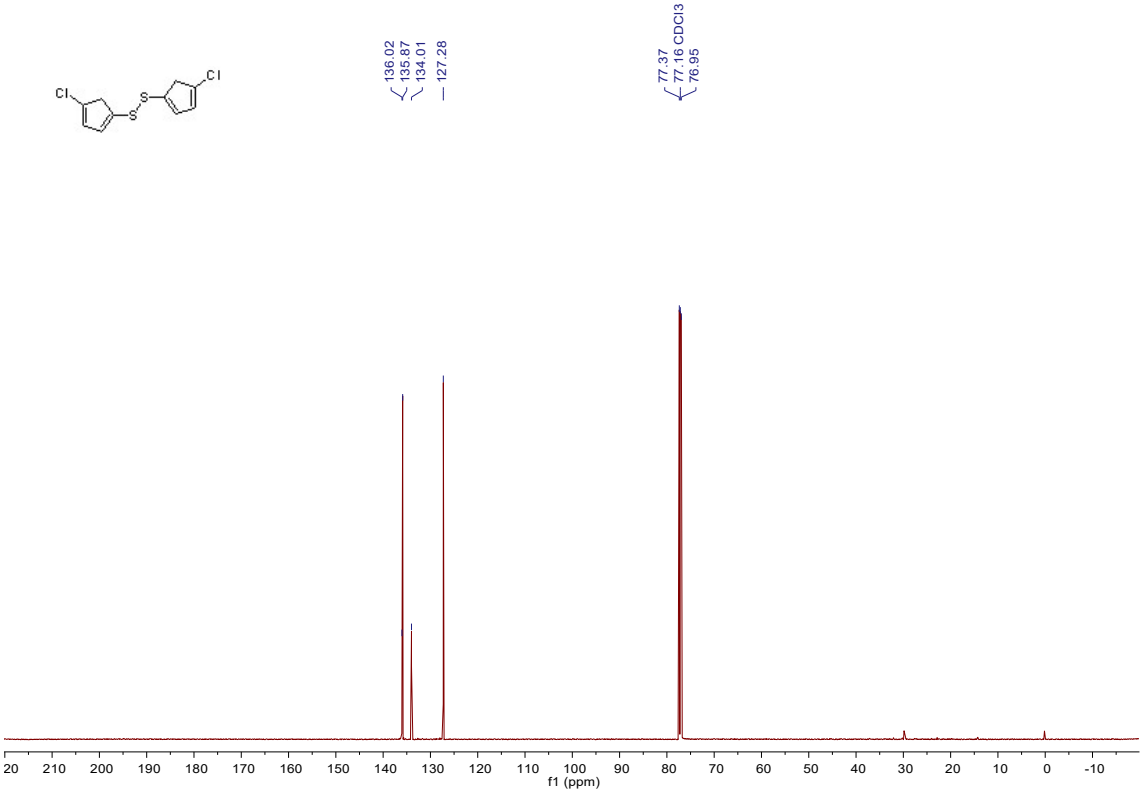
^{13}C NMR of 1,2-Di(naphthalen-2-yl) disulfide (**2m**) [2]



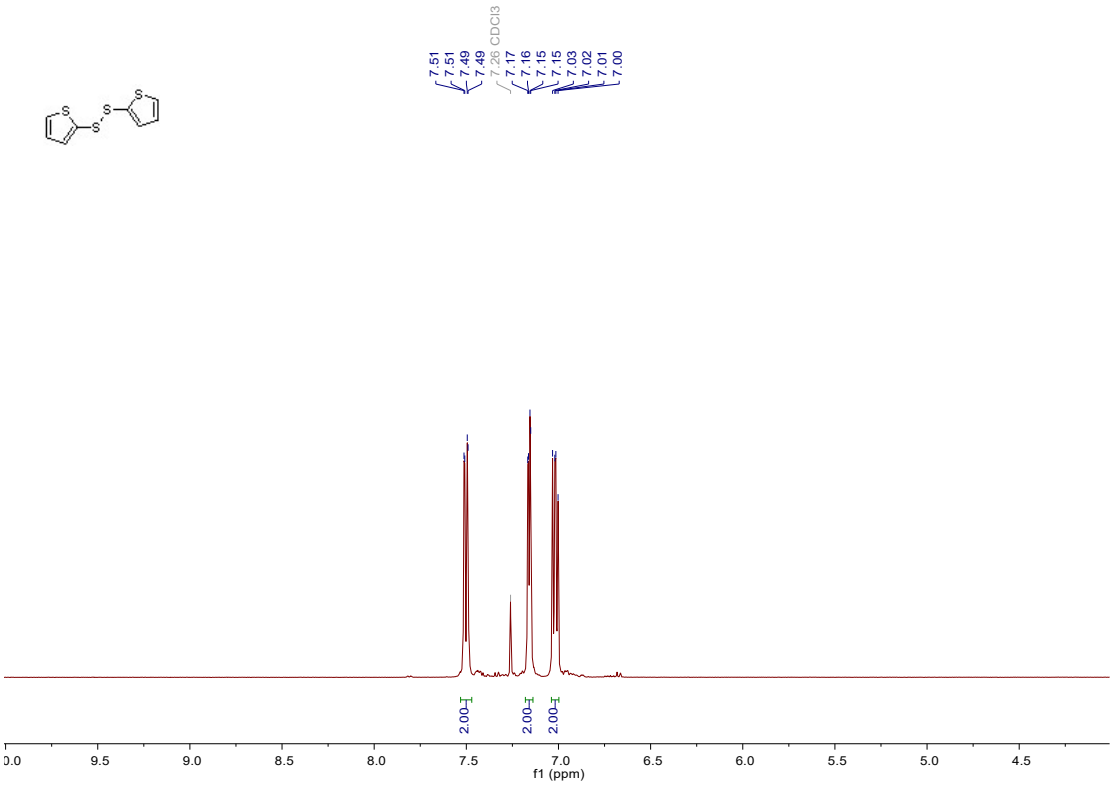
^{1}H NMR of 1,2-Bis(5-chlorothiophen-2-yl) disulfide (**2n**) [2]



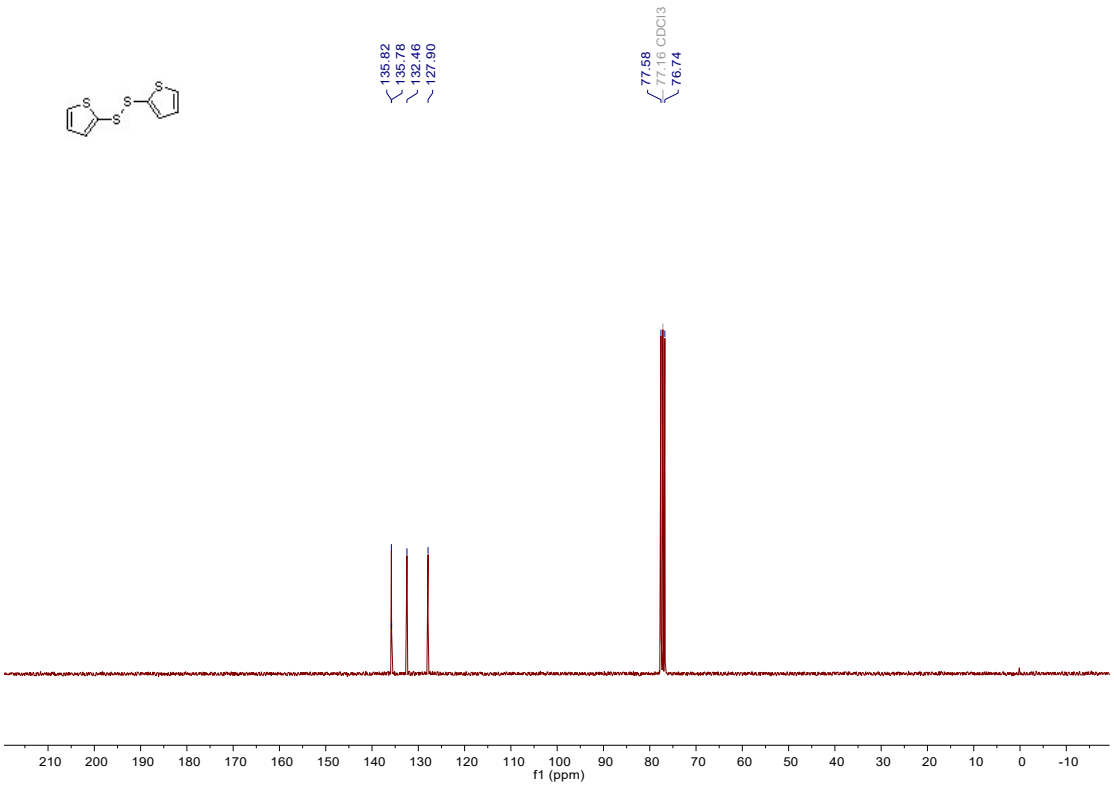
^{13}C NMR of 1,2-Bis(5-chlorothiophen-2-yl) disulfide (**2n**) [2]



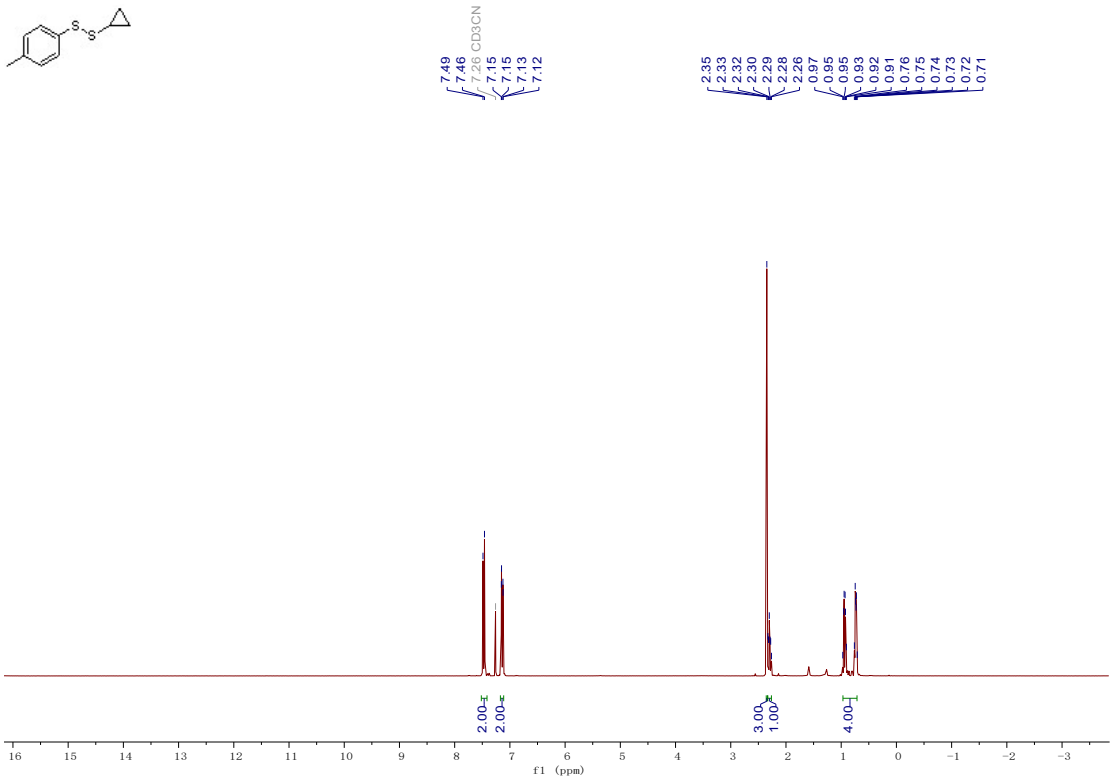
^{1}H NMR of 1,2-Di(thiophen-2-yl) disulfide (**2o**) [2]



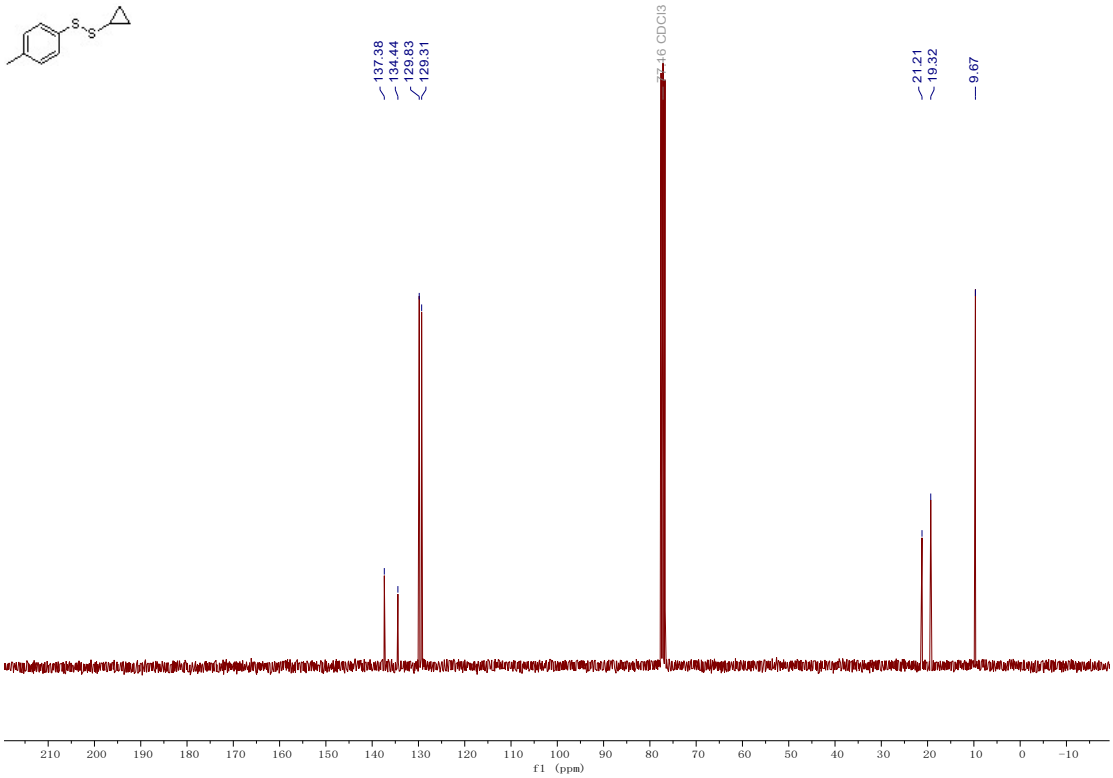
^{13}C NMR of 1,2-Di(thiophen-2-yl) disulfide (**2o**) [2]



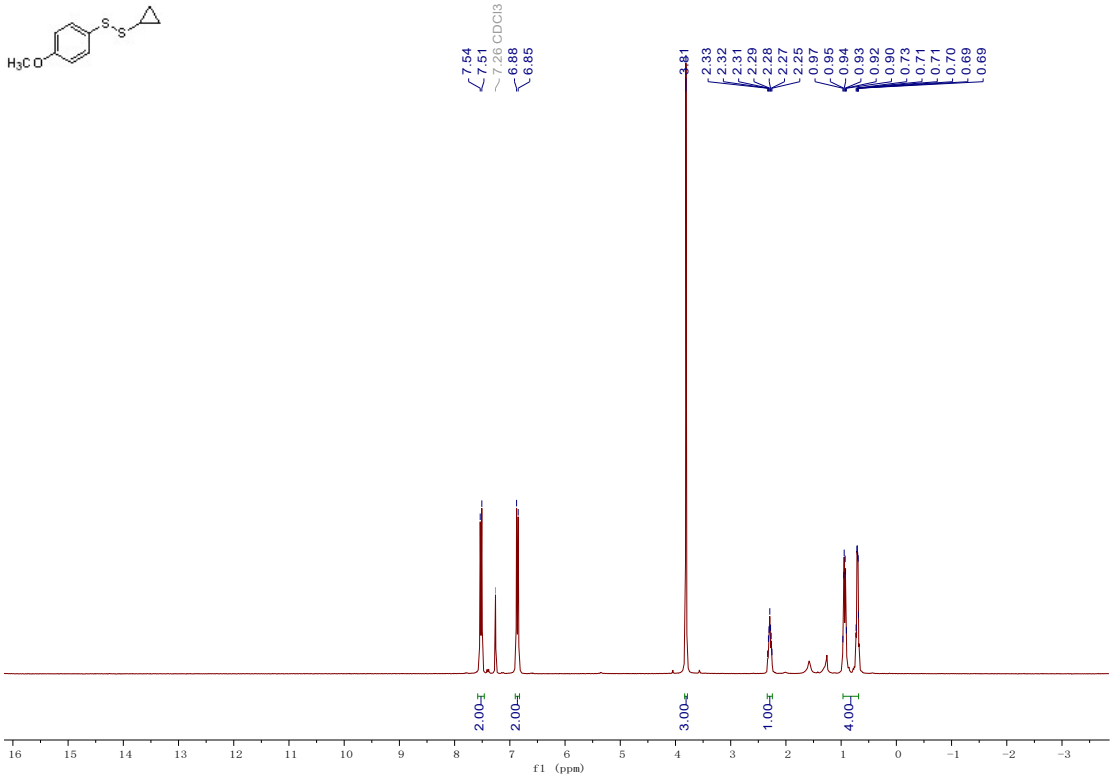
^{1}H NMR of 1-cyclopropyl-2-(*p*-tolyl) disulfide (**2p**) [3]



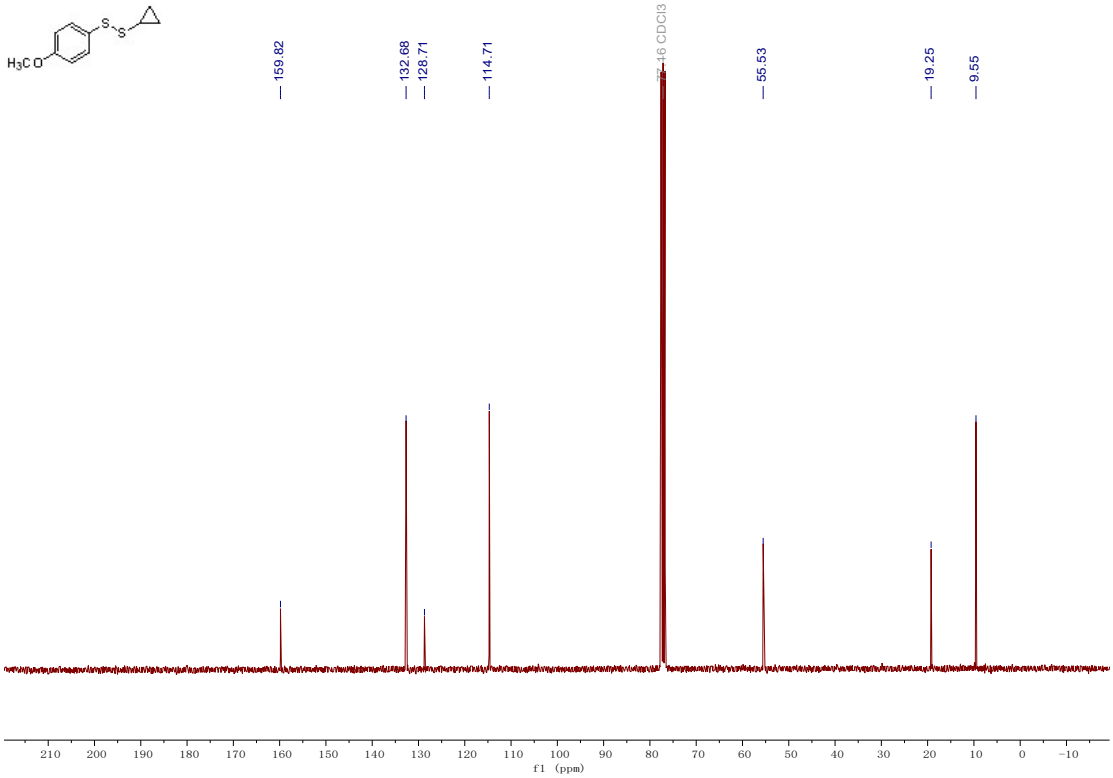
^{13}C NMR of 1-cyclopropyl-2-(p-tolyl) disulfide (**2p**) [3]



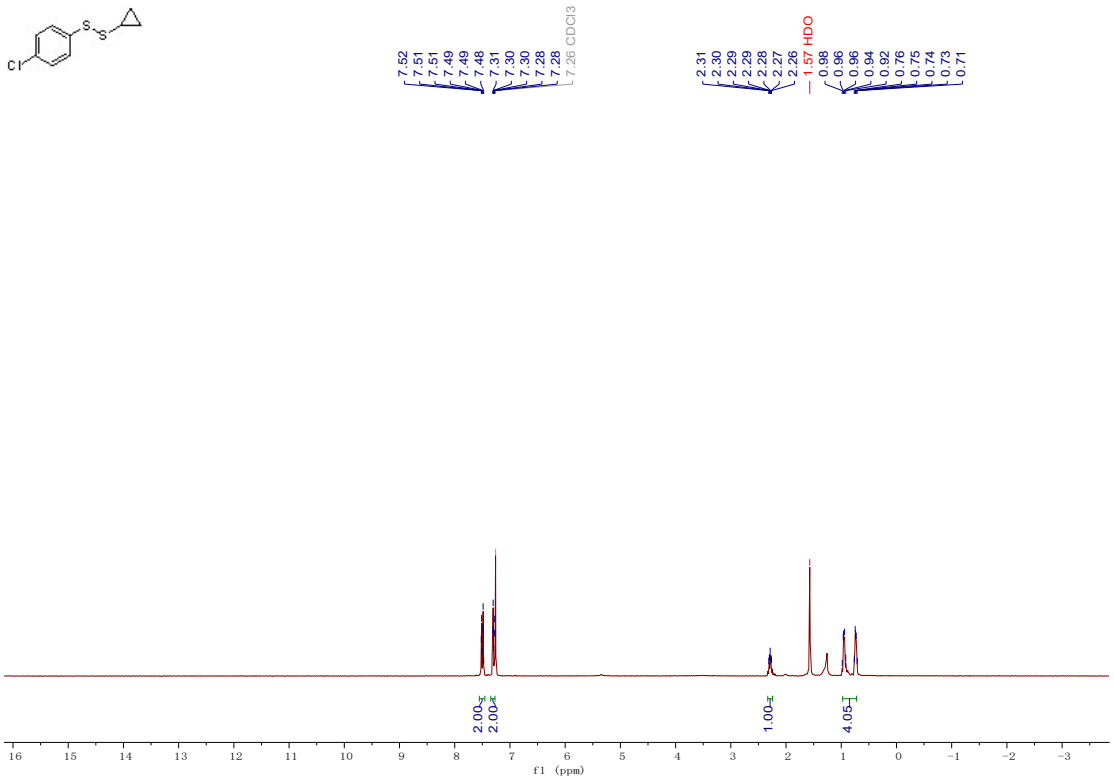
^{1}H NMR of 1-cyclopropyl-2-(4-methoxyphenyl) disulfide (**2q**) [3]



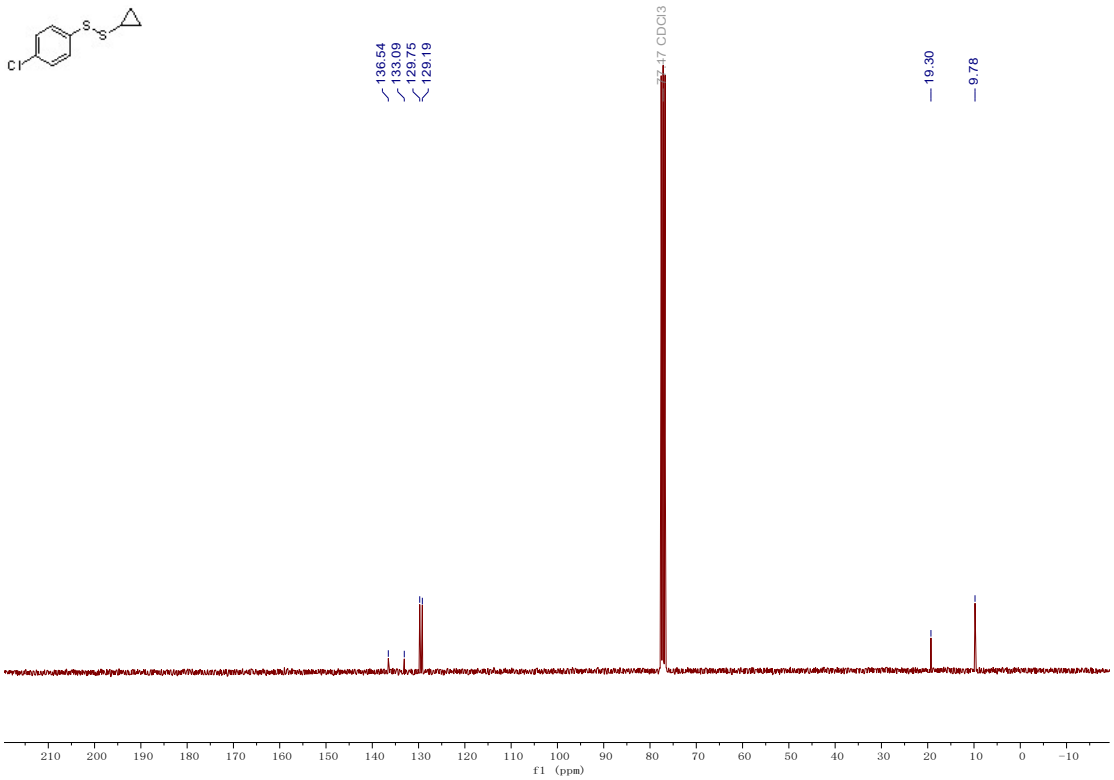
^{13}C NMR of 1-cyclopropyl-2-(4-methoxyphenyl) disulfide (**2q**) [3]



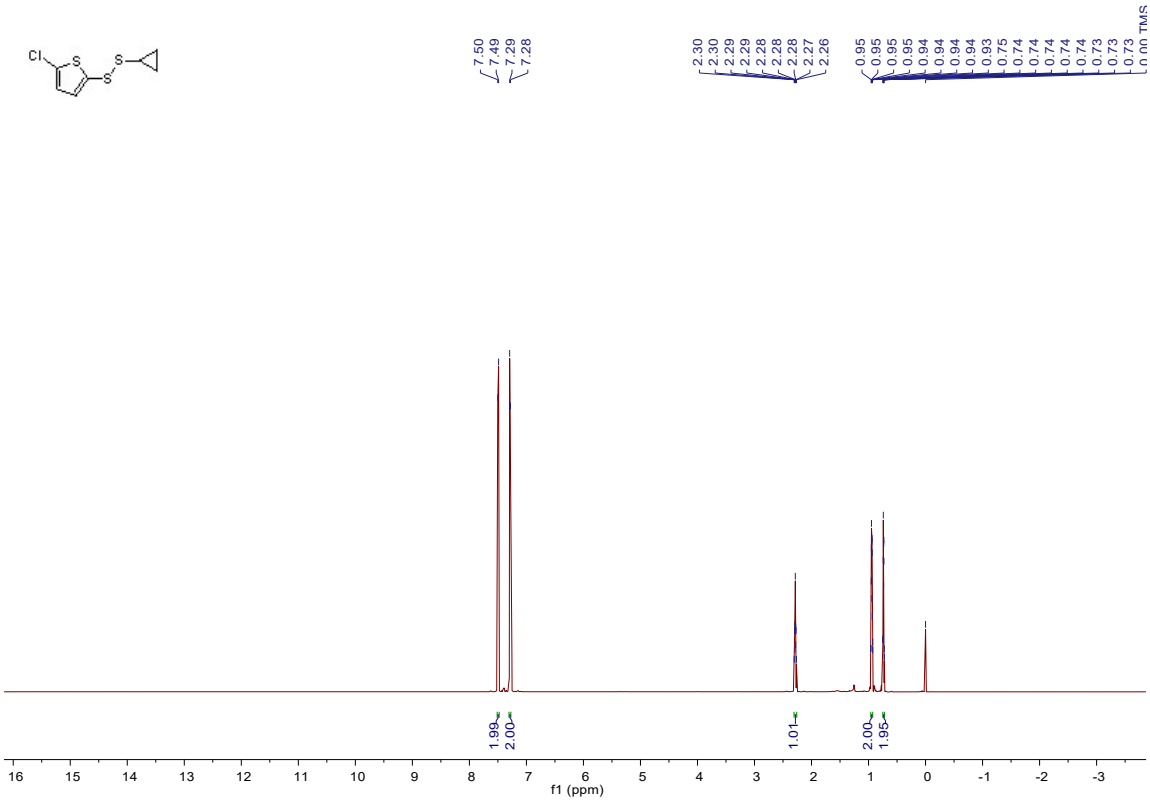
^{1}H NMR of 1-(4-chlorophenyl)-2-cyclopropyldisulfide (**2r**) [3]



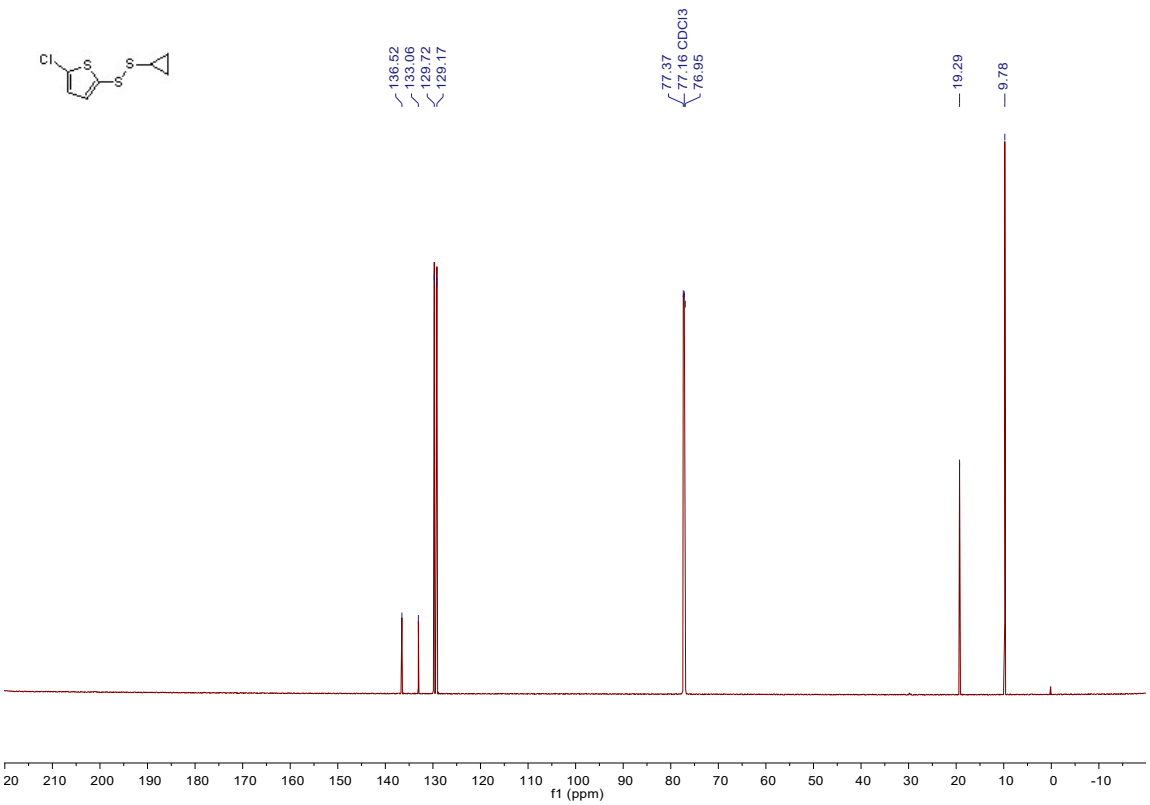
^{13}C NMR of 1-(4-chlorophenyl)-2-cyclopropyldisulfide (**2r**) [3]



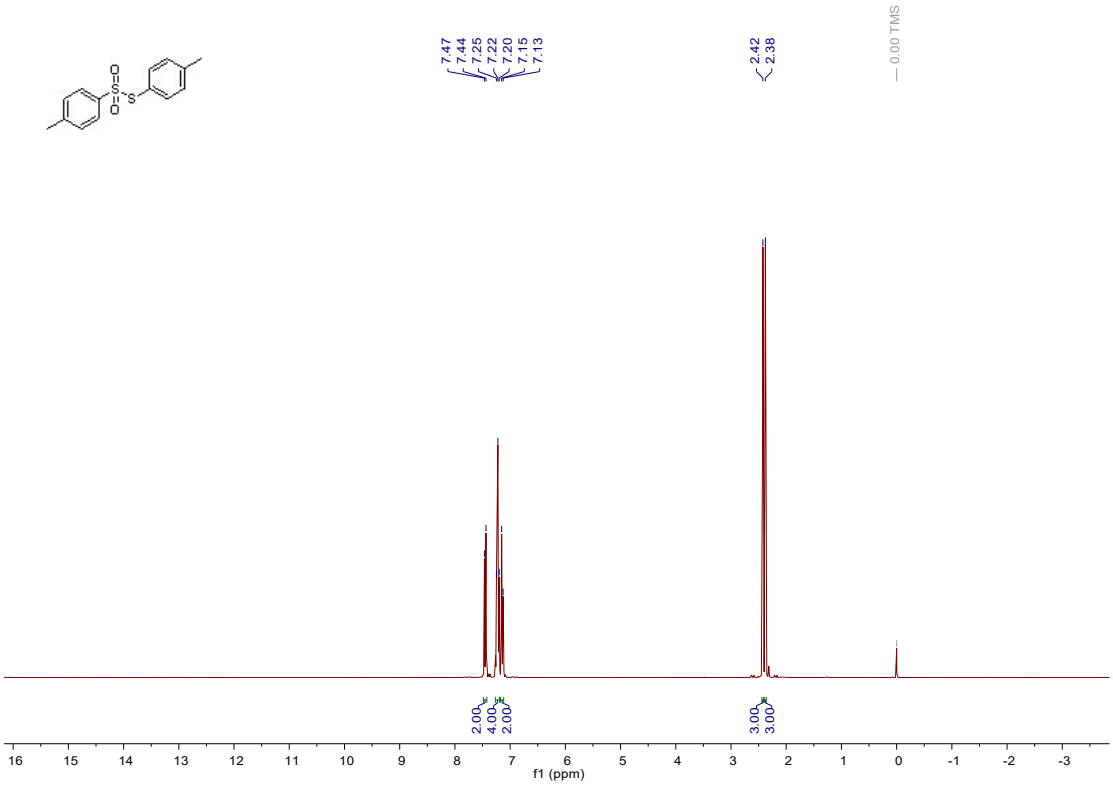
^{1}H NMR of 2-chloro-5-(cyclopropyldisulfaneyl) thiophene (**2s**) [3]



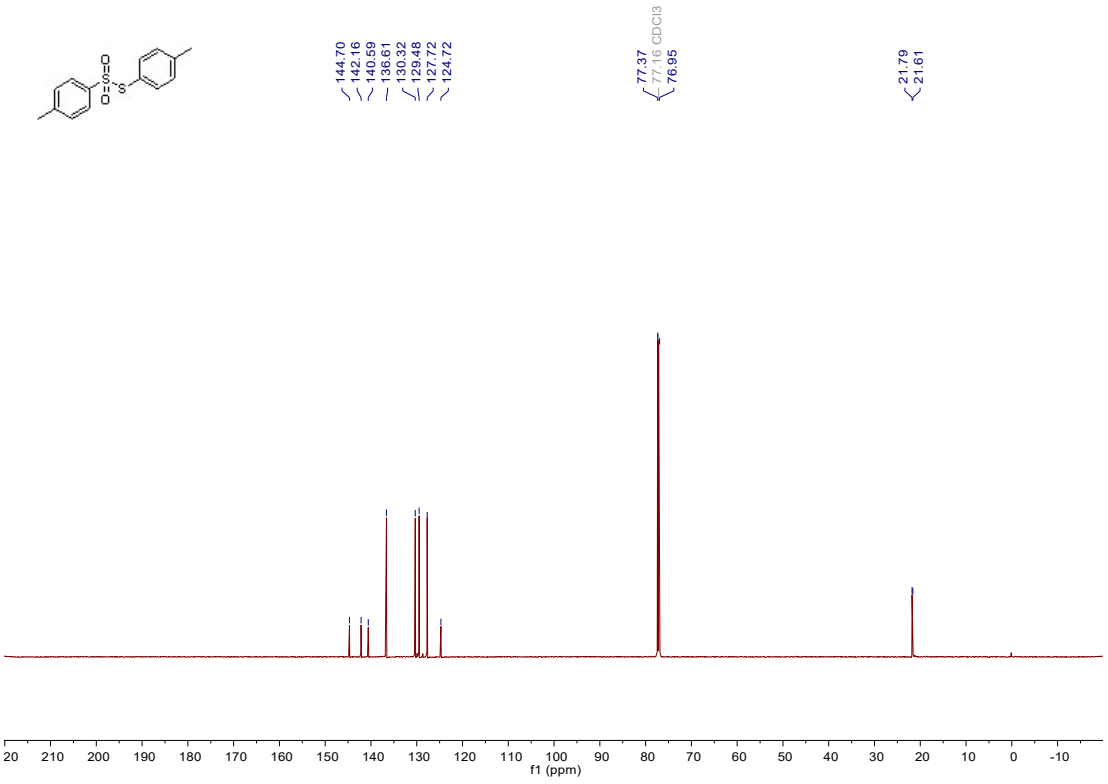
^{13}C NMR of 2-chloro-5-(cyclopropyldisulfaneyl) thiophene (**2s**) [3]



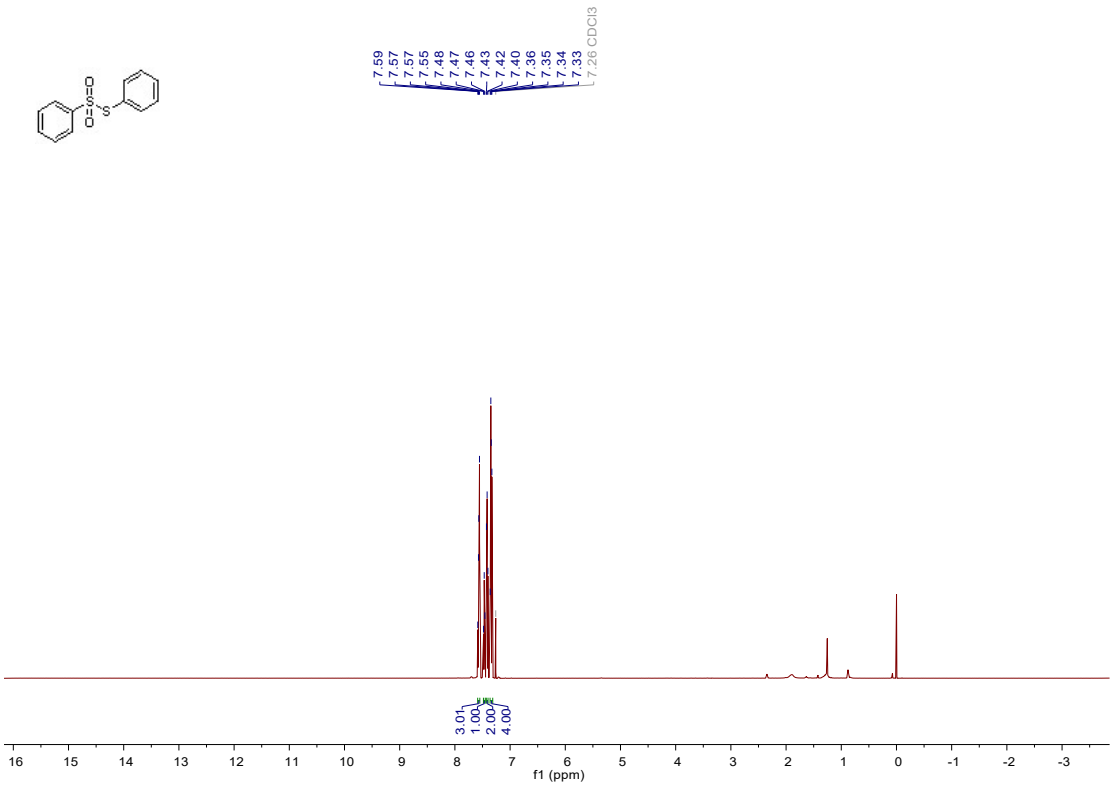
^{1}H NMR of S-(*p*-tolyl) 4-methylbenzenesulfonothioate (**3a**) [4]



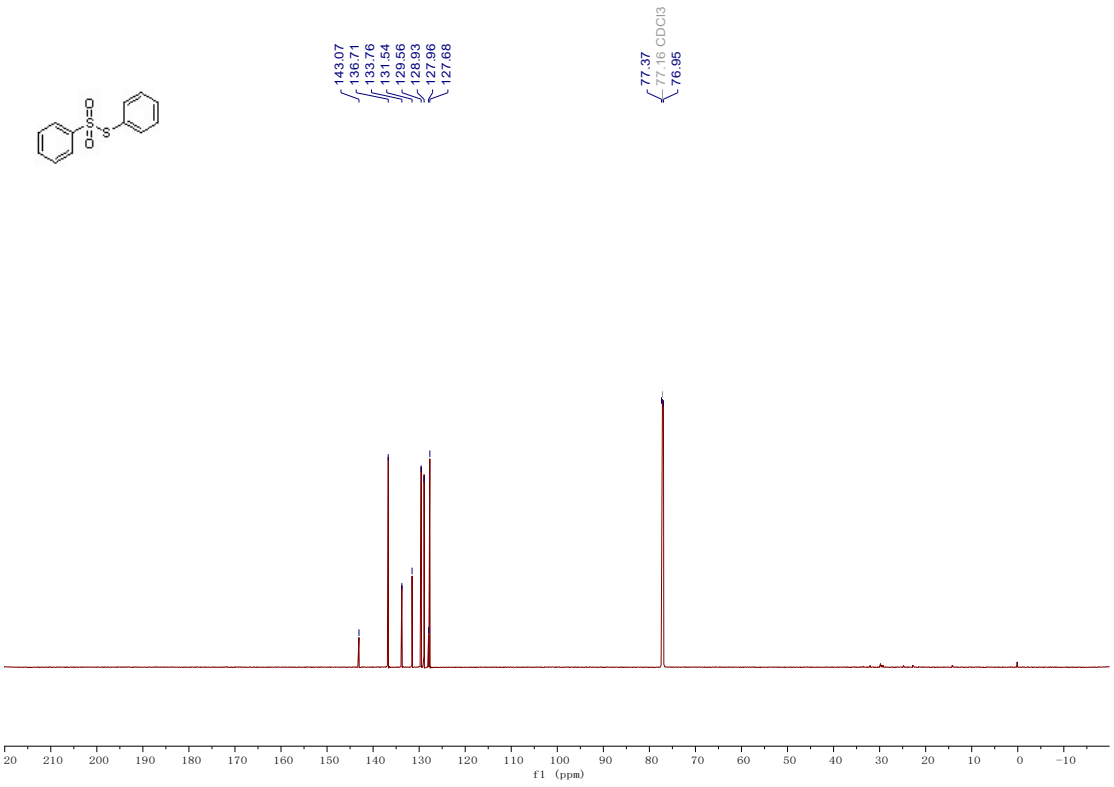
^{13}C NMR of S-(*p*-tolyl) 4-methylbenzenesulfonothioate (**3a**) [4]



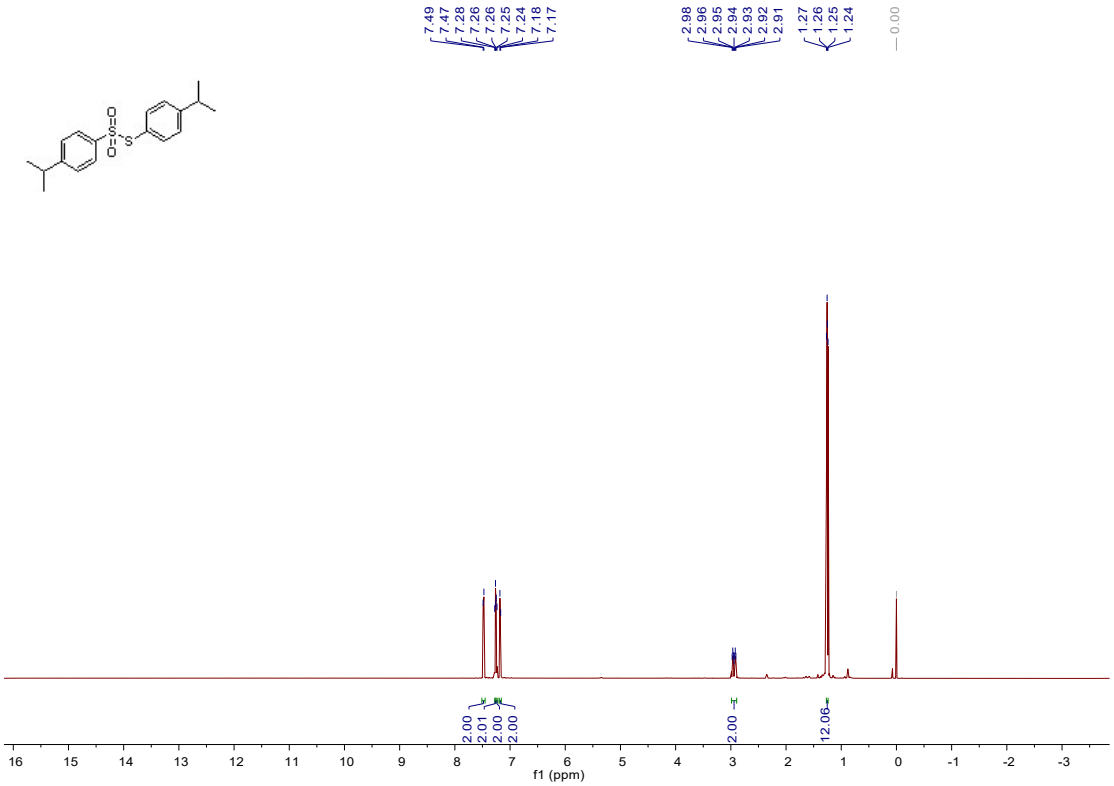
^{1}H NMR of S-phenyl benzenesulfonothioate (**3b**) [4]



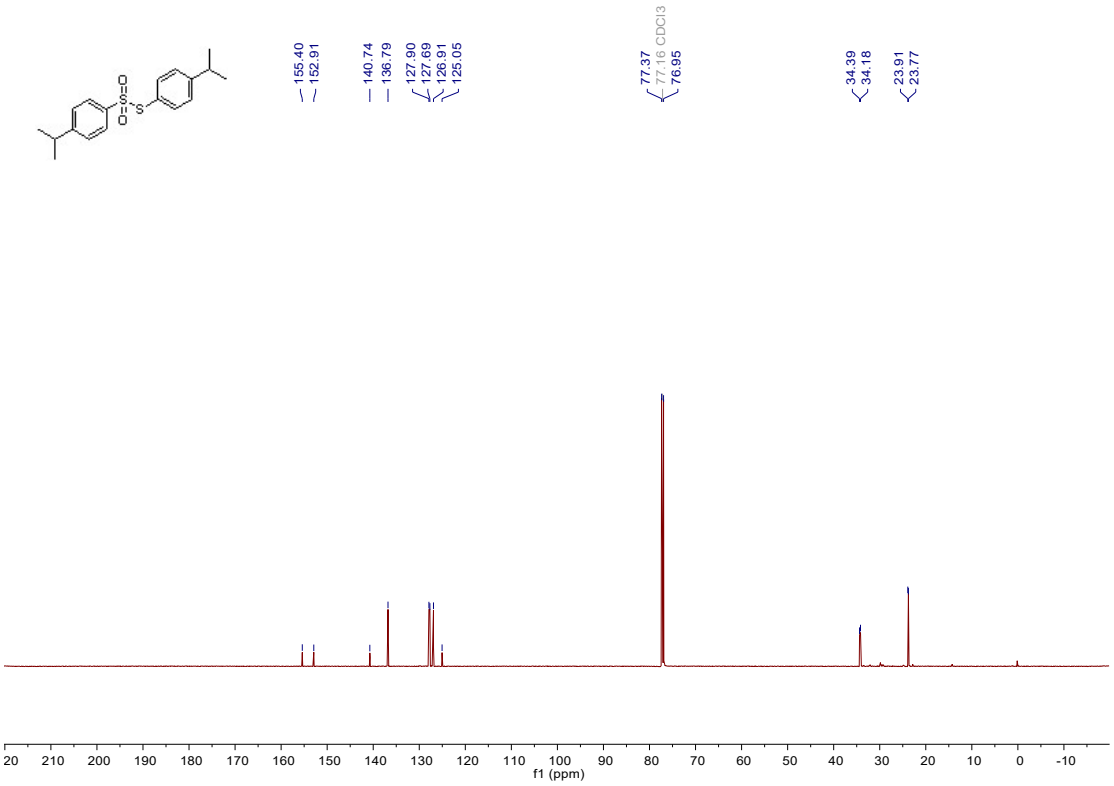
^{13}C NMR of S-phenyl benzenesulfonothioate (**3b**) [4]



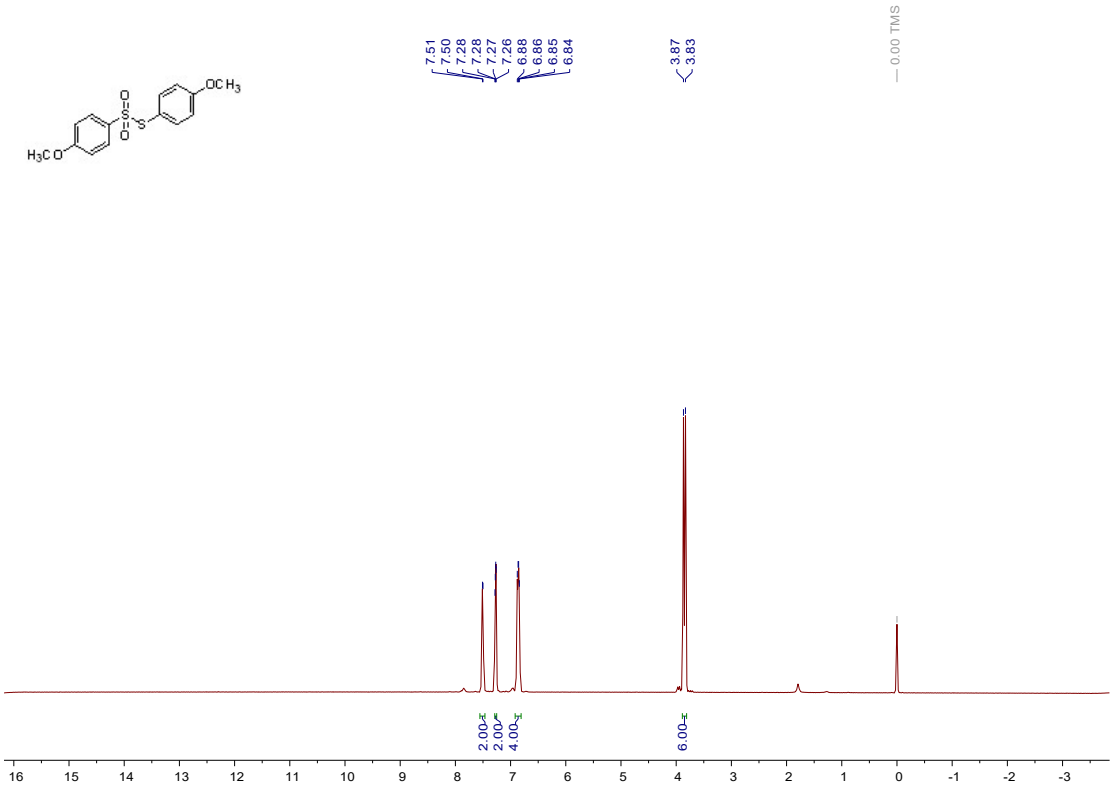
^{1}H NMR of S-4-(Isopropyl)phenyl-4-isopropylbenzenesulfonothioate (**3c**) [4]



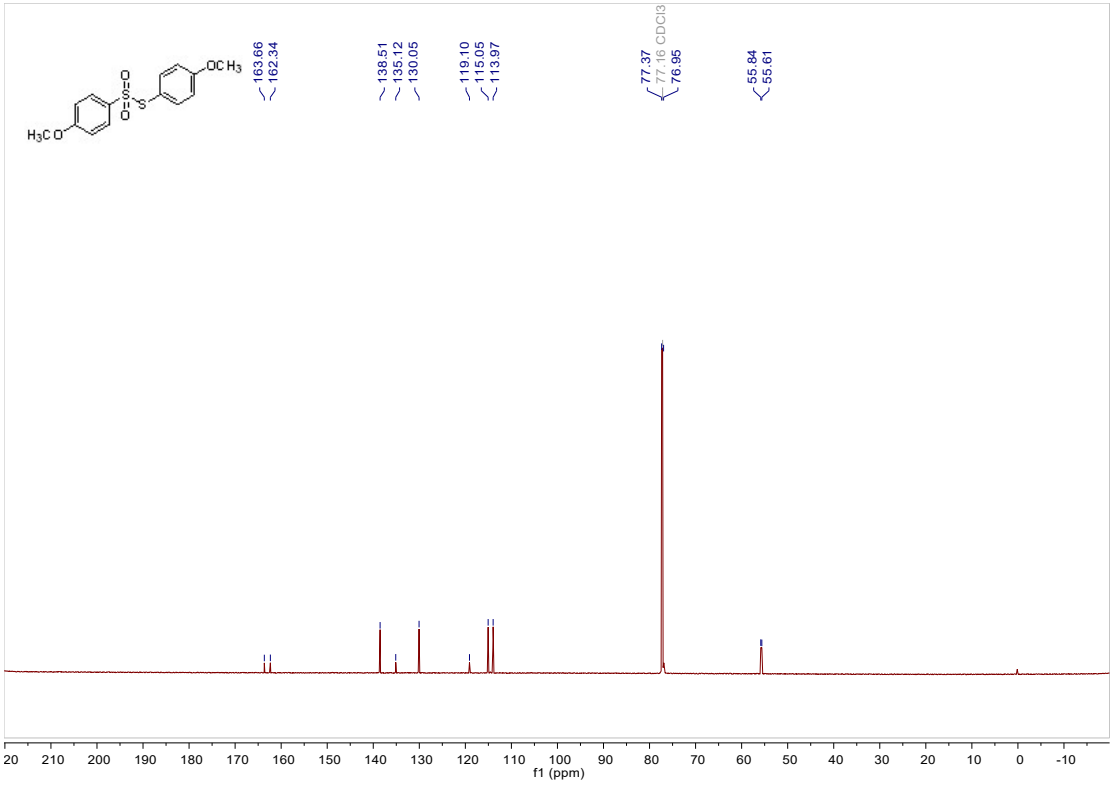
^{13}C NMR of S-4-(Isopropyl)phenyl-4-isopropylbenzenesulfonothioate (**3c**) [4]



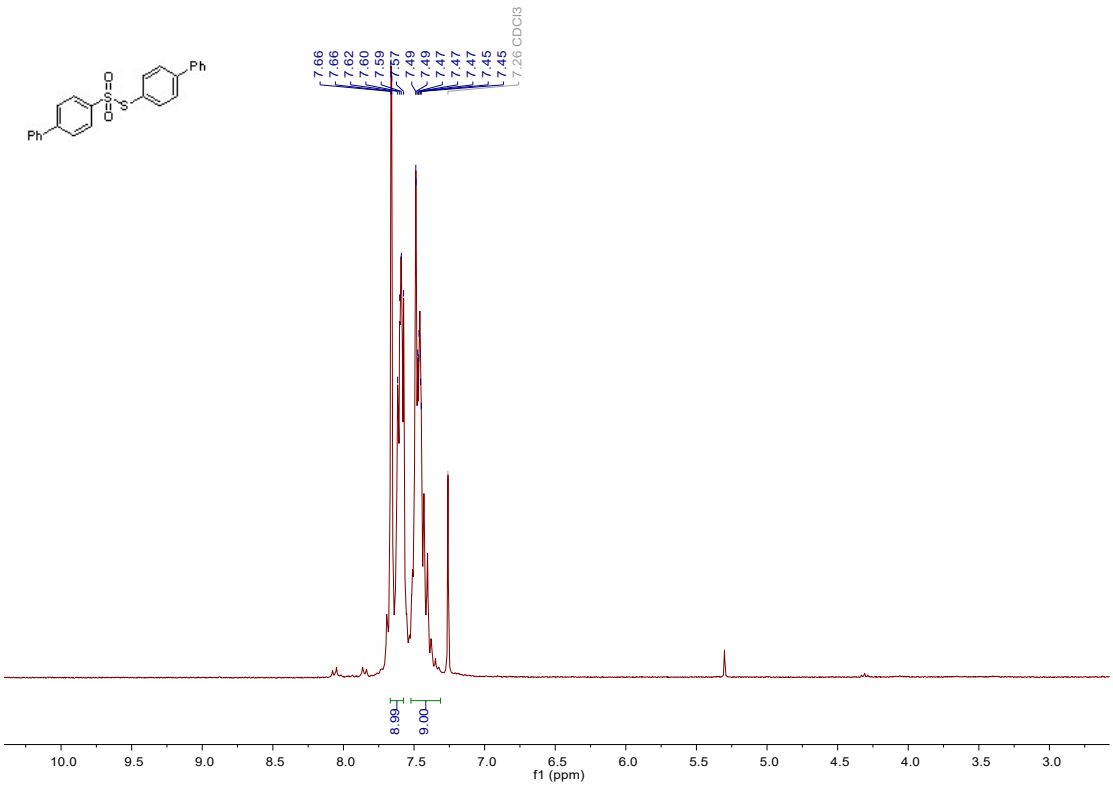
^{1}H NMR of S-(4-methoxyphenyl) 4-methoxybenzenesulfonothioate (**3d**) [4]



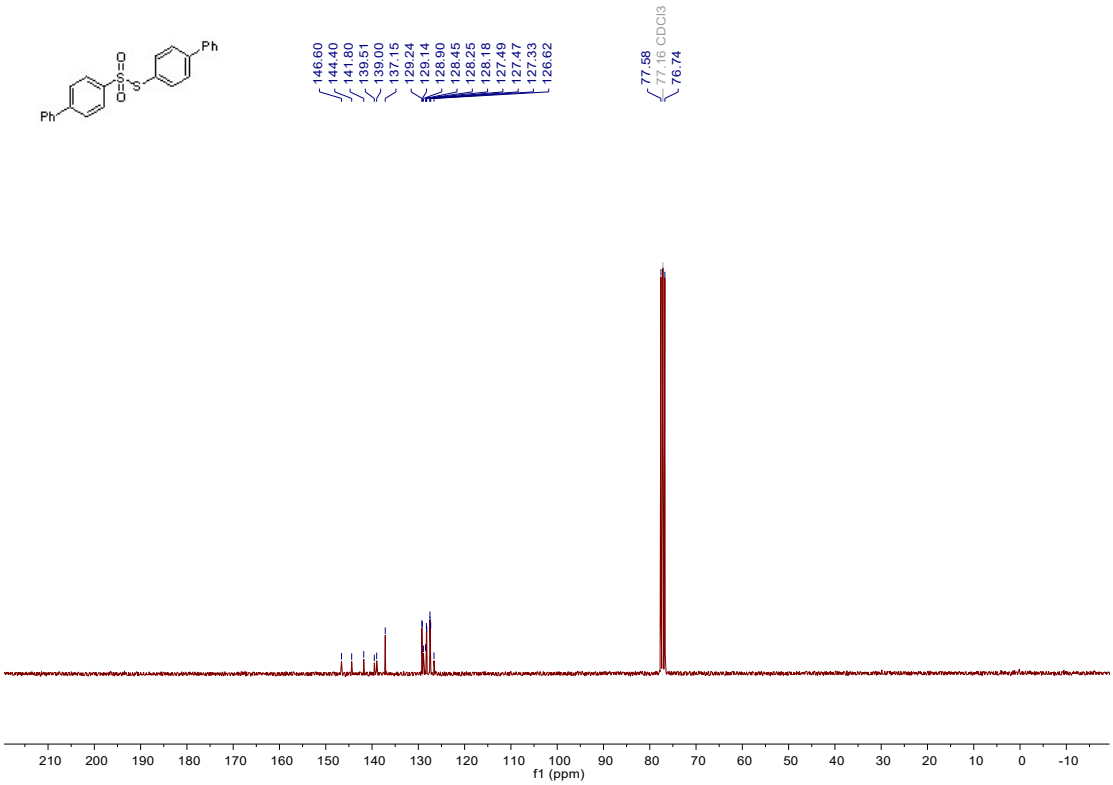
^{13}C NMR of S-(4-methoxyphenyl) 4-methoxybenzenesulfonothioate (**3d**) [4]



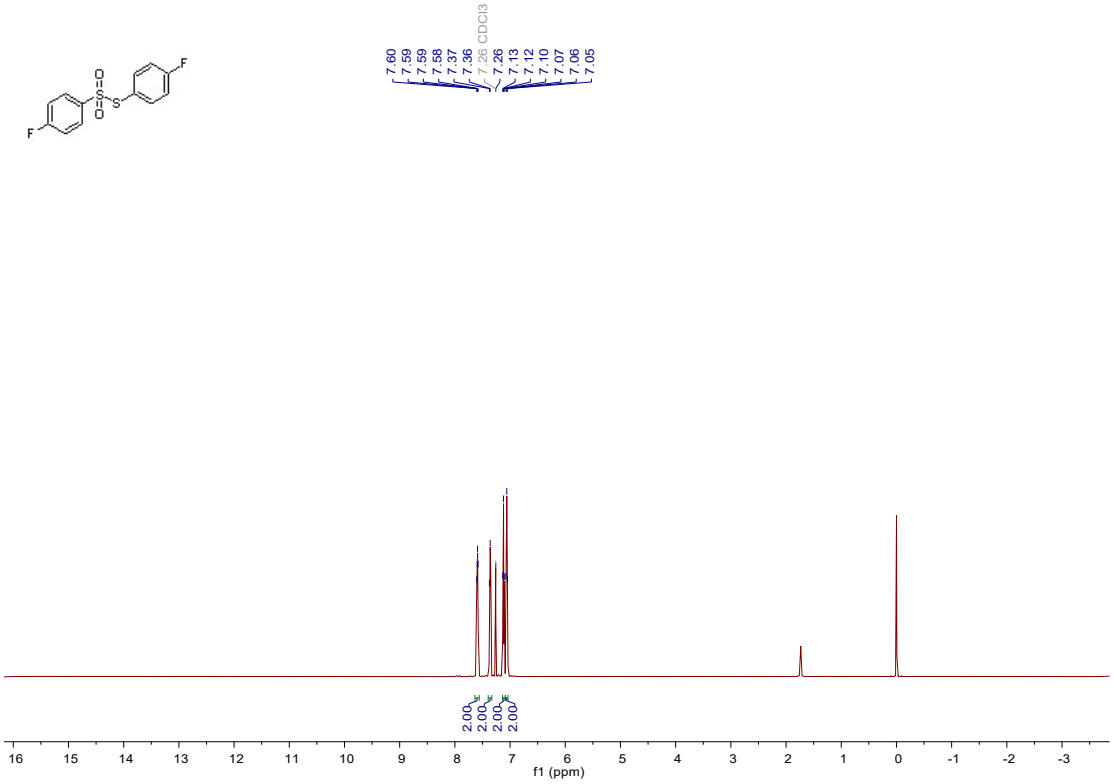
^{1}H NMR of S-([1,1'-biphenyl]-4-yl)-[1,1'-biphenyl]-4-sulfonothioate (**3e**) [5]



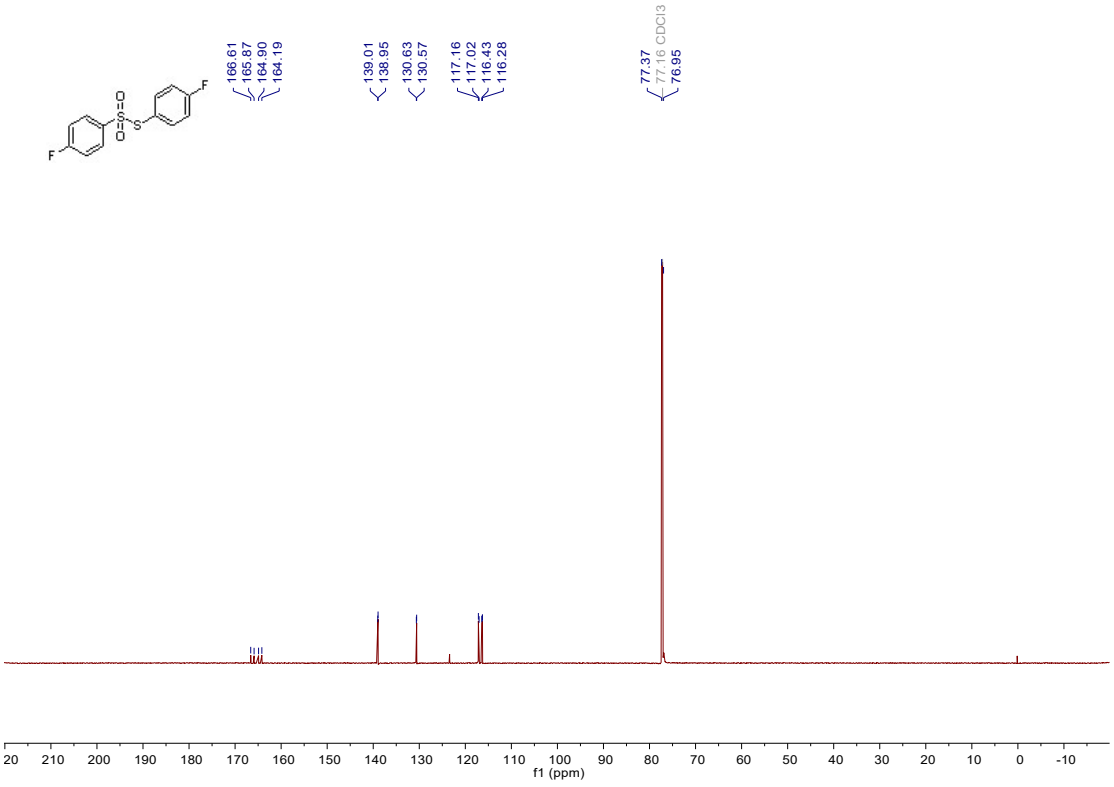
^{13}C NMR of S-([1,1'-biphenyl]-4-yl)-[1,1'-biphenyl]-4-sulfonothioate (**3e**) [5]



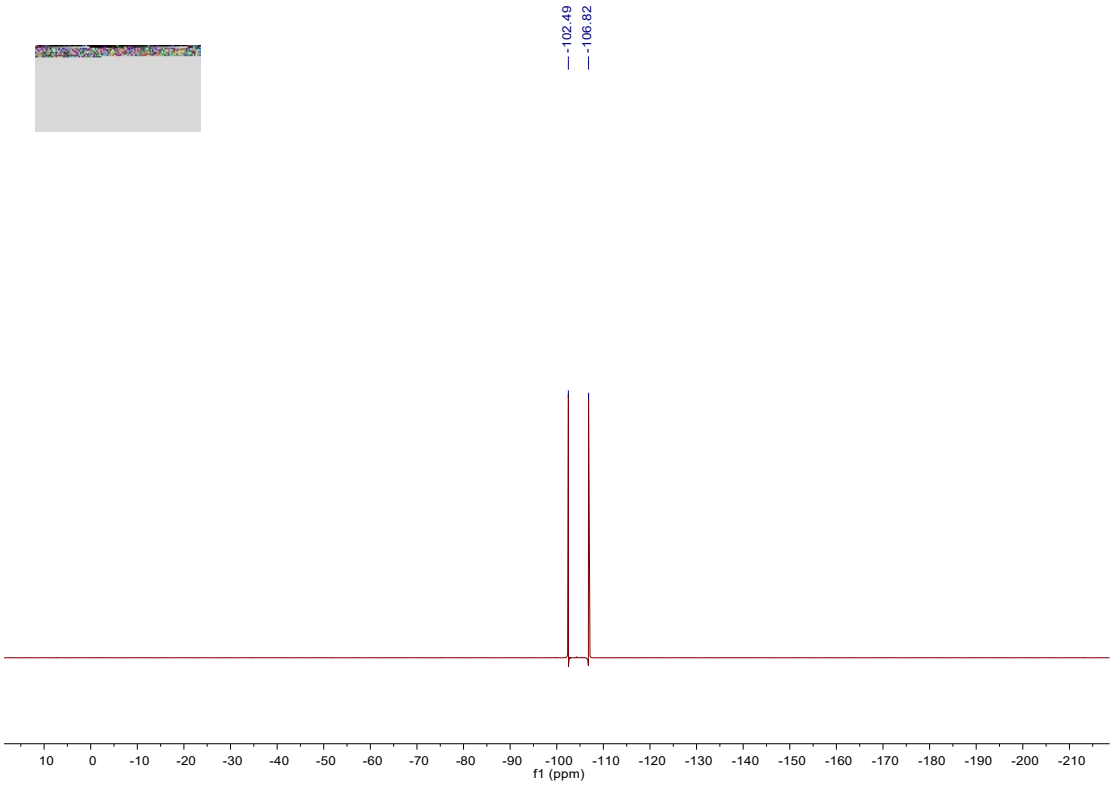
^{1}H NMR of S-(4-fluorophenyl) 4-fluorobenzenesulfonothioate (**3f**) [5]



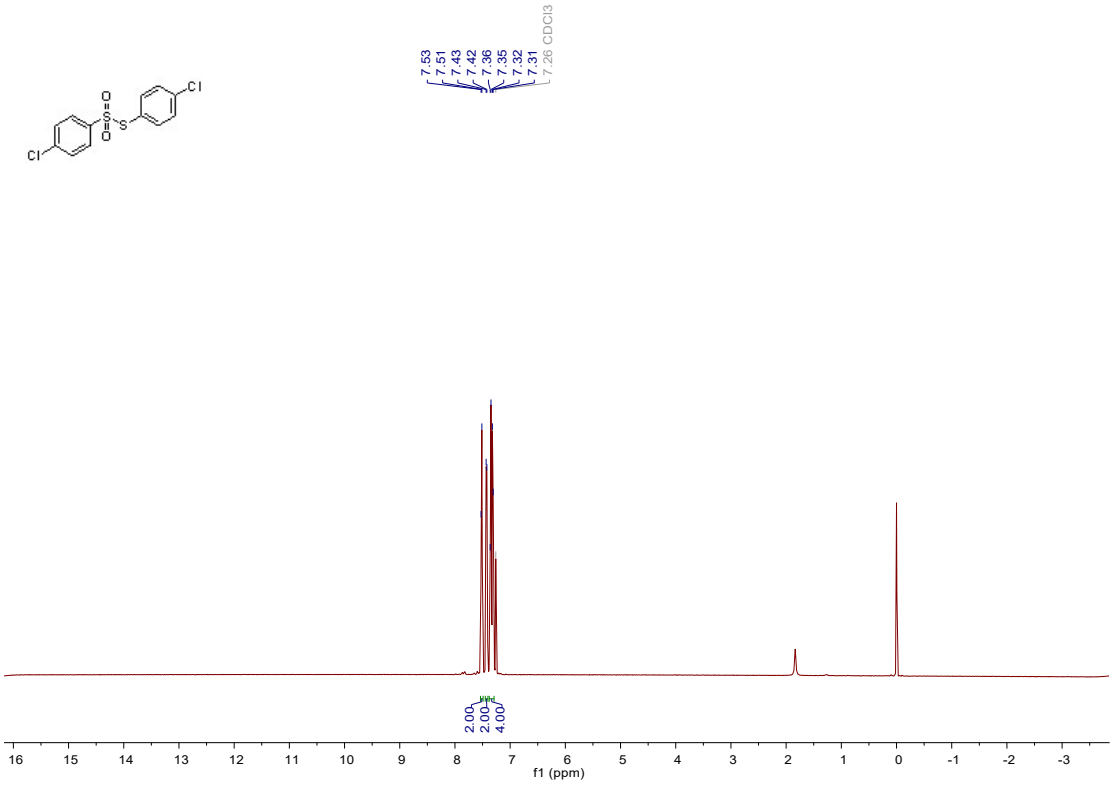
^{13}C NMR of S-(4-fluorophenyl) 4-fluorobenzenesulfonothioate (**3f**) [5]



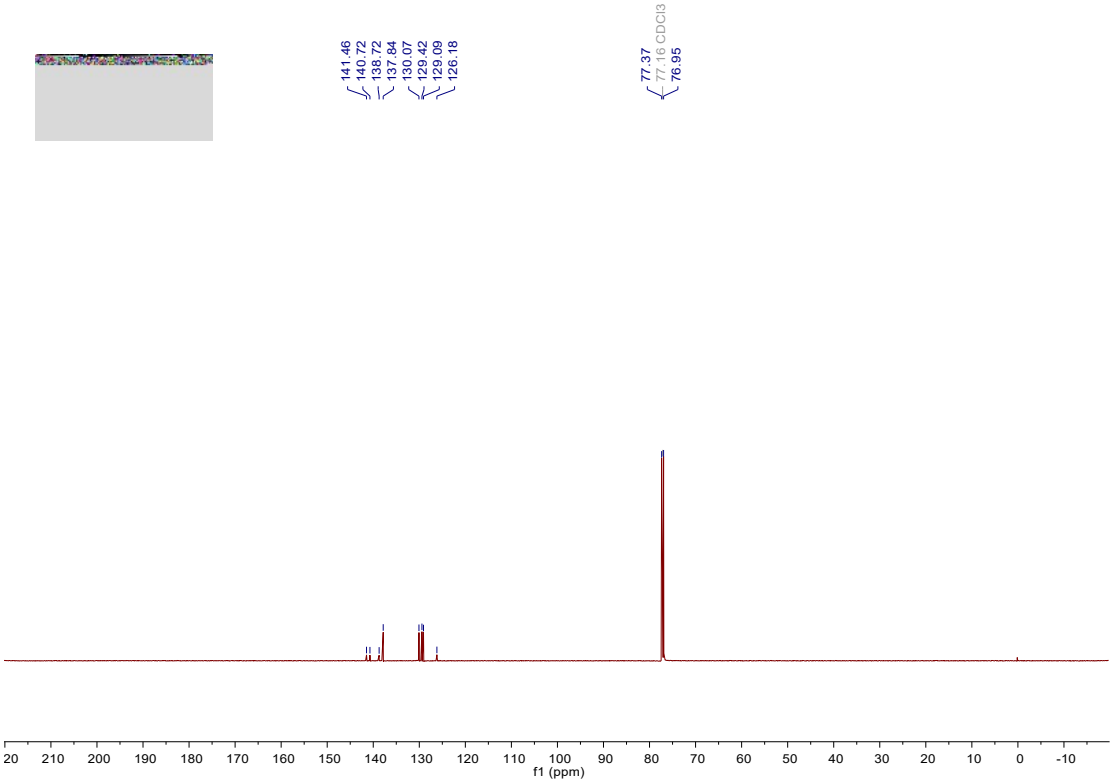
^{19}F NMR Of S-(4-fluorophenyl) 4-fluorobenzenesulfonothioate (**3f**) [5]



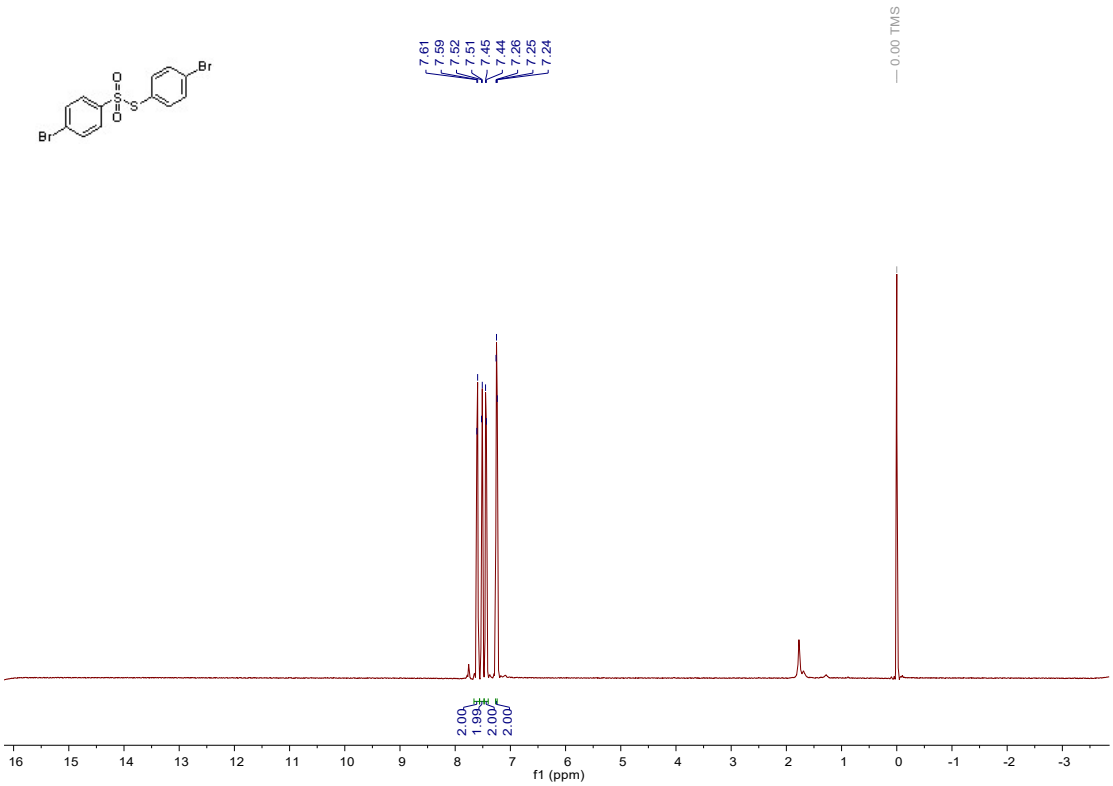
^{1}H NMR of S-(4-chlorophenyl) 4-chlorobenzenesulfonothioate (**3g**) [5]



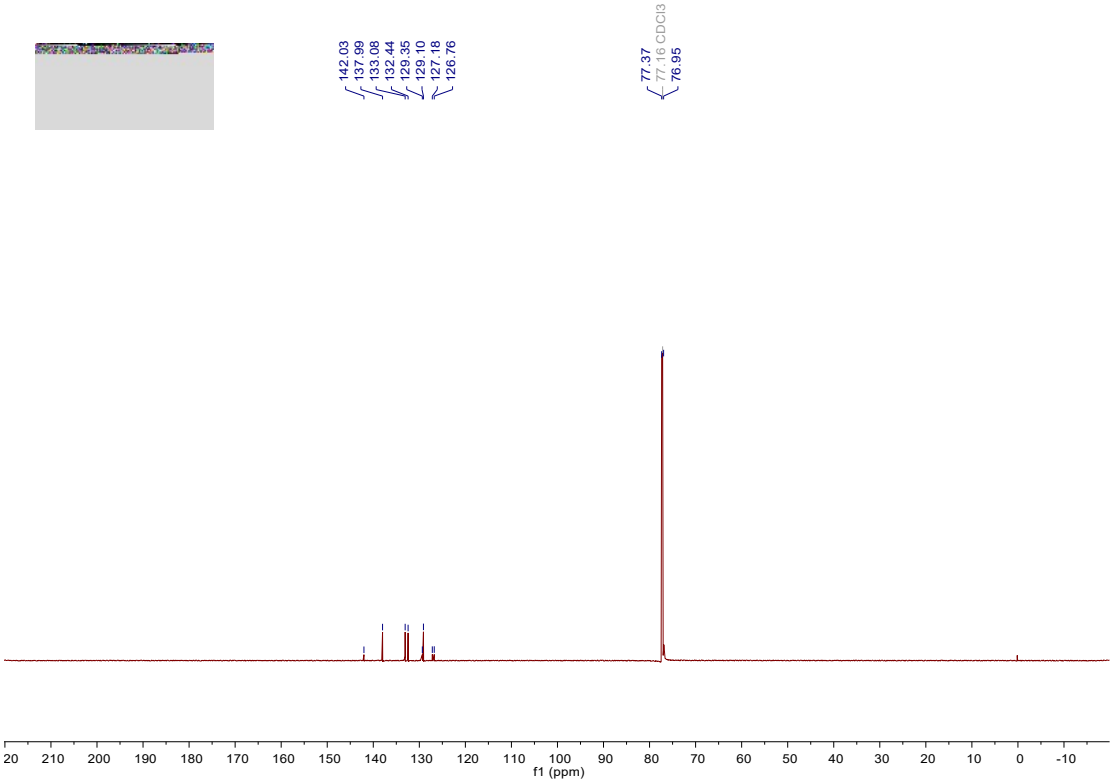
^{13}C NMR of S-(4-chlorophenyl) 4-chlorobenzenesulfonothioate (**3g**) [5]



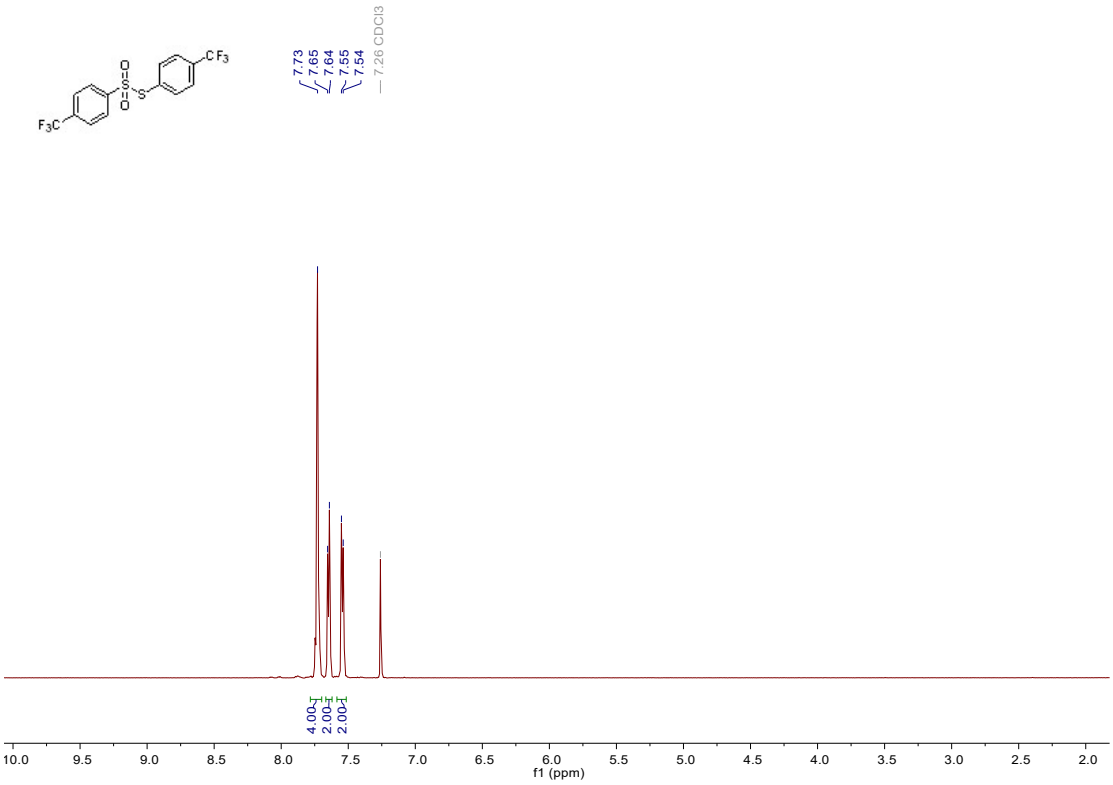
^{1}H NMR of S-(4-bromophenyl) 4-bromobenzenesulfonothioate (**3h**) [5]



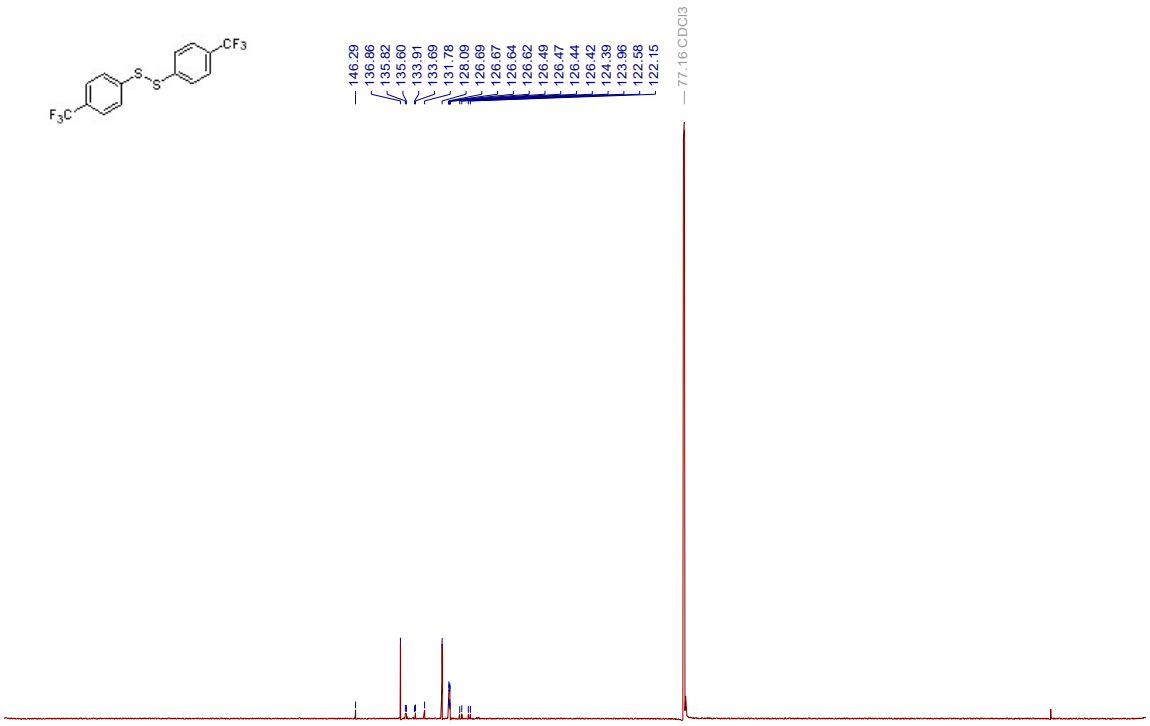
^{13}C NMR of S-(4-bromophenyl) 4-bromobenzenesulfonothioate (**3h**) [5]



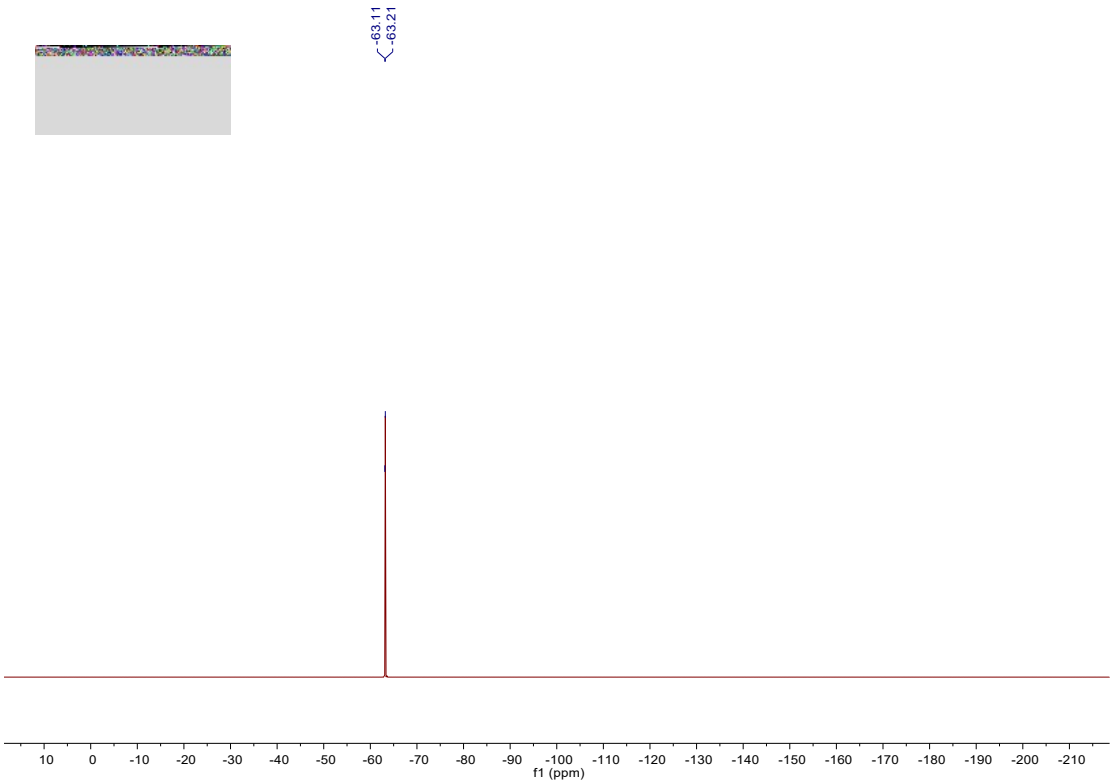
^{1}H NMR of S-(4(trifluoromethyl)phenyl)4(trifluoromethyl)benzenesulfonothioate (**3i**) [5]



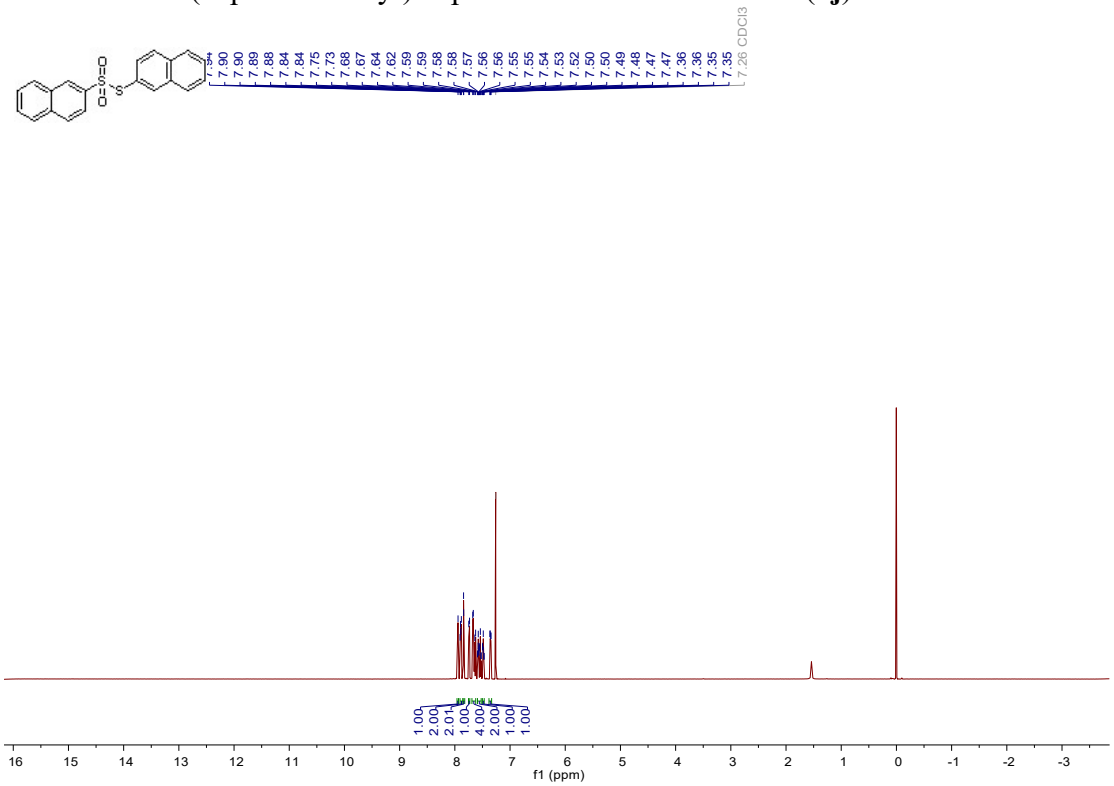
^{13}C NMR of S-(4-(trifluoromethyl)phenyl) 4i(trifluoromethyl)benzenesulfonothioate (**3i**) [5]



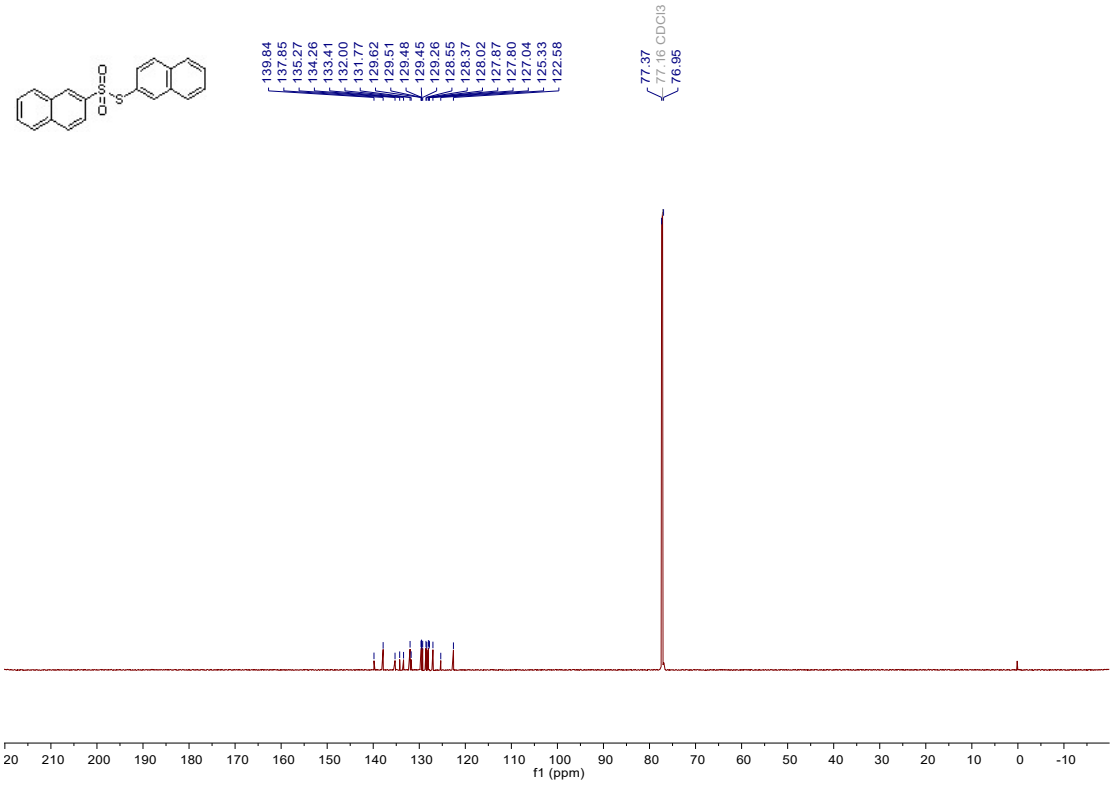
^{19}F NMR of S-(4-(trifluoromethyl)phenyl) 4-(trifluoromethyl) benzenesulfonothioate (**3i**) [5]



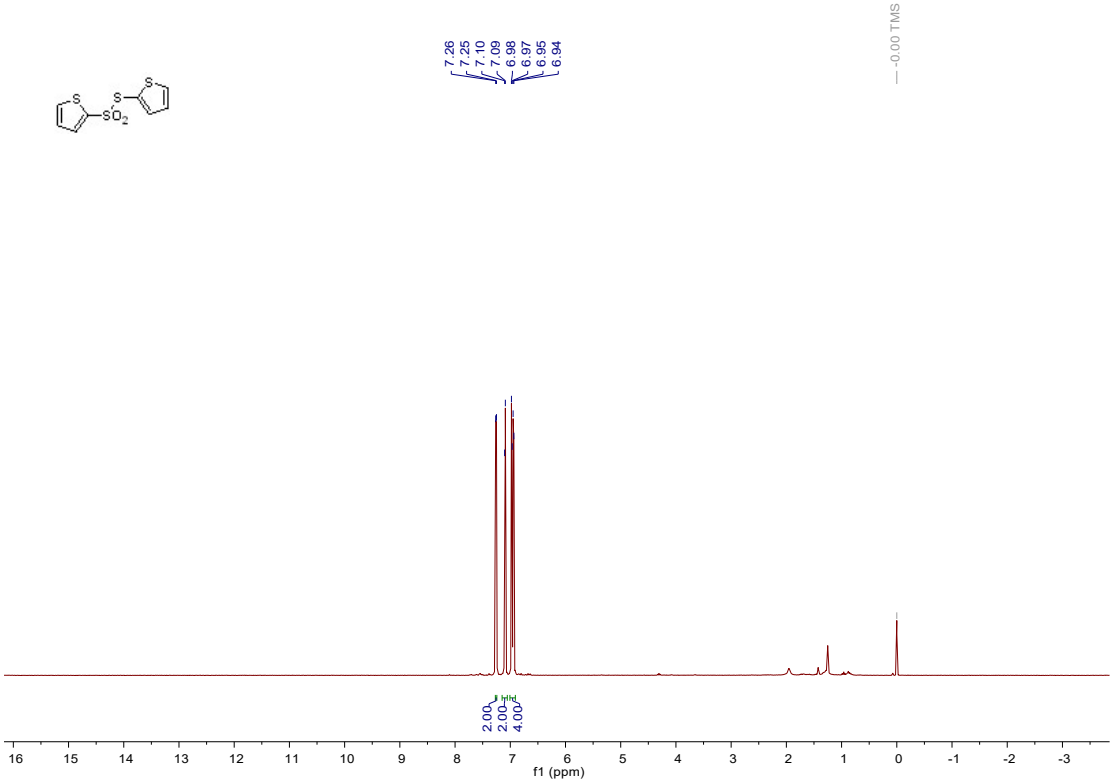
^{1}H NMR of S-(naphthalen-2-yl) naphthalene-2-sulfonothioate (**3j**)[5]



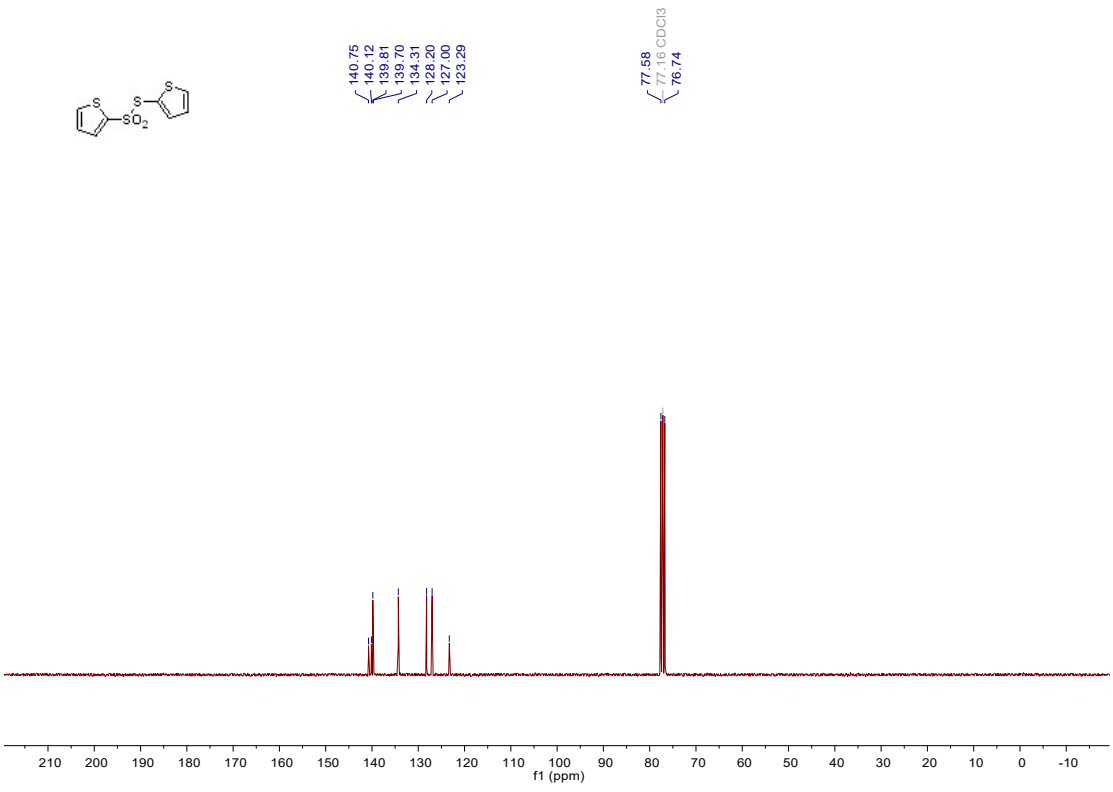
^{13}C NMR of (naphthalen-2-yl) naphthalene-2-sulfonothioate (**3j**) [5]



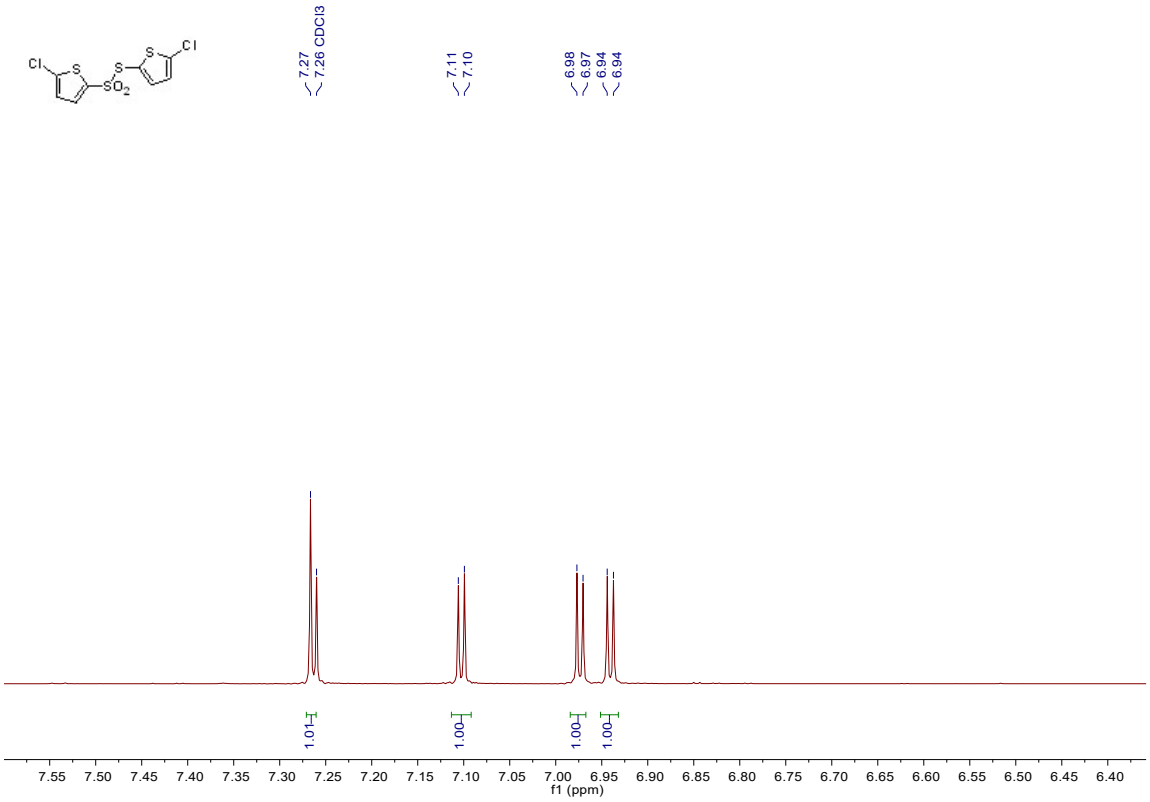
^{1}H NMR of S-(Thiophen-2-yl)thiophene-2-sulfonothioate (**3k**) [5]



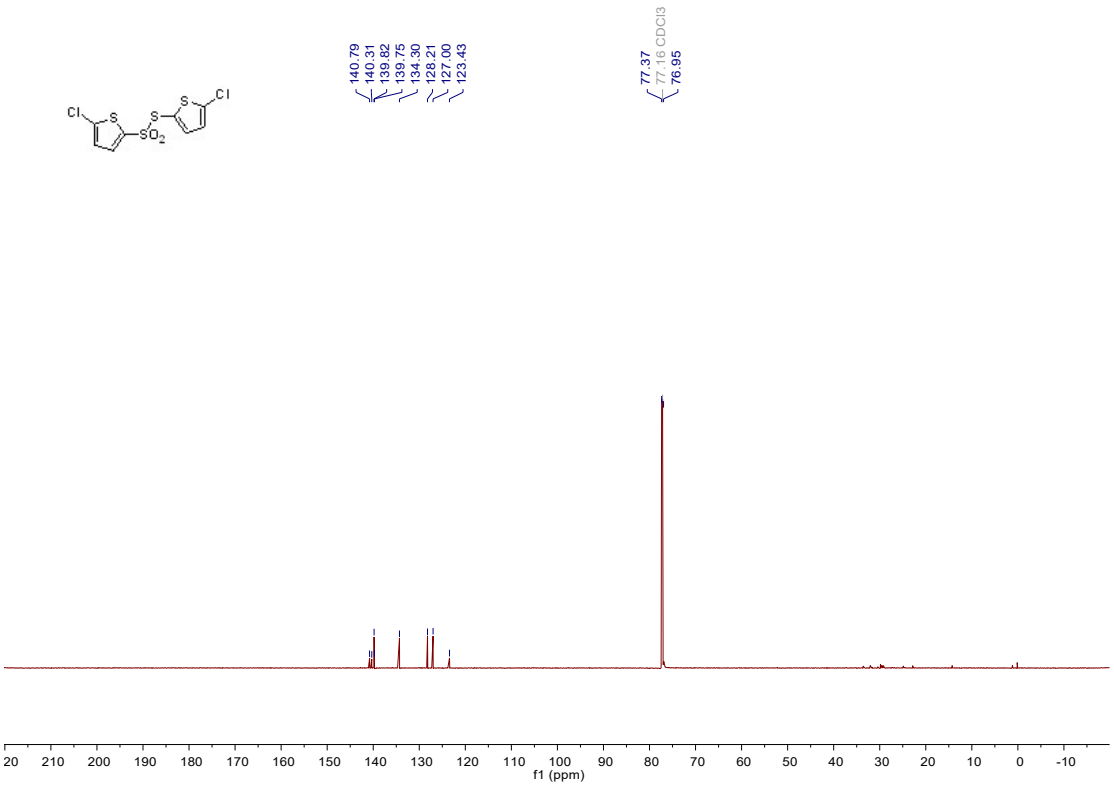
^{13}C NMR of S-(Thiophen-2-yl) thiophene-2-sulfonothioate (**3k**) [5]



^{1}H NMR of S-(5-Chlorothiophen-2-yl)5-chlorothiophene-2-sulfonothioatea (**3l**) [5]



^{13}C NMR of S-(5-Chlorothiophen-2-yl)5-chlorothiophene-2-sulfonothioatea (**3l**) [5]



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[2] X. Xiao, M. Feng and X. Jiang, *Chem. Commun.*, 2015, **51**, 4208.
[3] Y. Zheng, F.-L. Qing and Y.-G. Huang, *Adv. Synth. Catal.,* 2016, **358**, 3477.
[4] P. Mampuys, Y. Zhu and T. Vlaar, *Angew. Chem. Int. Ed*., 2014, **53**, 12849.
[5] W. Wang, X. Peng and Z. Xu, *Angew. Chem. Int. Ed*. 2016, **55**, 649.