SUPPORTING INFORMATION

Synthesis of Polysubstituted 2-Iodoindenes via Iodonium-Induced Cyclization of Arylallenes

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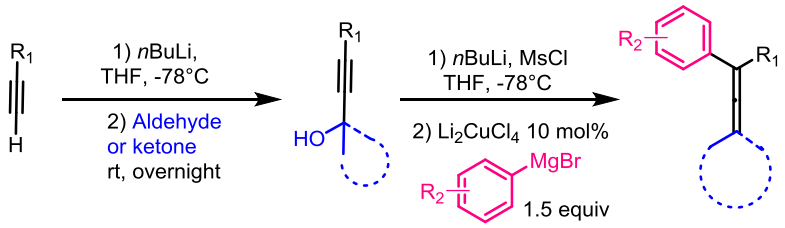
General information

^{1}H NMR and ^{13}C NMR were recorded on a Bruker AV 300 instrument. All signals were expressed as ppm (δ) and internally referenced to residual protio solvent signals. Coupling constants (*J*) are reported in Hz and refer to apparent peak multiplicities. Mass spectrometry analyses (direct introduction by chemical ionization with ammoniac or electrospray) were performed at the Ecole Nationale Supérieure de Chimie de Paris. High resolution mass spectra were performed at the University Pierre and Marie Curie (Paris) and in Faculty of Pharmacy (Châtenay-Malabry).

Substrates synthesis

The starting allenyl arenes derivatives were synthesized according the following procedure



The appropriate alkyne (1 equiv) was dissolved in distilled THF and the solution was cooled to -78°C. At this temperature, *n*BuLi (1.1 equiv) was added dropwise and then the reaction mixture was stirred for one hour before adding the corresponding aldehyde or ketone (1 equiv). The reaction mixture was then allowed to stir at room temperature overnight. The reaction was quenched with a saturated ammonium chloride solution and extracted three times with ethyl acetate. The combined organic phases were dried over magnesium sulfate, filtered and concentrated under reduced pressure to afford the crude compound which was then purified by flash chromatography to get the desired propargylic alcohol.

*n*BuLi (1.05 equiv) was added to a solution of the propargylic alcohol in THF at -78°C. After 5 minutes stirring, methanesulfonyl chloride (1.1 equiv) was then added, still at -78°C and the reaction mixture was stirred during 15 minutes. The solution of Li_2CuCl_4 (0.1equiv) and the corresponding Grignard reagent (1.5 equiv) (previously freshly prepared) were subsequently slowly added before allowing the solution to warm to room temperature and stir during two hours. The reaction was quenched with a saturated ammonium chloride solution and extracted three times with ethyl acetate. The combined organic layers were washed with a saturated sodium chloride solution, dried over magnesium sulfate,filtered and concentrated under reduced pressure to afford the crude compound which was then purified by flash chromatography to get the desired allenyl arene.

Typical procedure for iodocarbocyclization of allenyl arenes

The appropriate allenyl arene (0.2mmol, 1 equiv) was dissolved in nitromethane or acetonitrile (0.1M) and then N-iodosuccinimide (0.24mmol, 1.2 equiv) was added. After 5 minutes of stirring at room temperature, the TLC showed complete conversion of the substrate and the reaction mixture was quenched with 2mL of a saturated solution of sodium thiosulfate. After two extractions with ethyl acetate, the combined organics layers were washed with a saturated solution of sodium chloride, dried over magnesium sulfate, filtered and concentrated under reduced pressure to afford the crude product which was then purified by flash chromatography to get the desired 2-iodoindene.

Procedure for Sonogashira cross-coupling

4u (41.4 mg, 0.1 mmol, 1 equiv) was dissolved in a 3:1 mixture of triethylamine and toluene (0.1M) under argon. Phenylacetylene (16.5 µL, 0.15 mmol, 1.5 equiv), $PdCl_2(PPh_3)_2$ (3.5 mg, 6 mol%), and CuI (0.6mg, 3 mol%) were subsequently added and the reaction mixture was allowed to stir overnight at 50°C. the reaction mixture was washed with a saturated solution of ammonium chloride and extracted with ethyl acetate. After drying over magnesium sulfate and filtration, the combined organic layers were evaporated under reduced pressure. The crude material was purified by flash chromatography to afford the pure product with 67% yield.

Procedure for copper-catalyzed coupling of pyrrolidinone

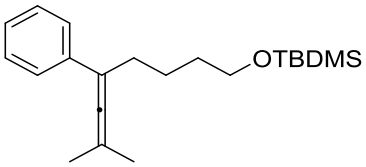
A schlenk tube was charged with CuI (2mg, 0.01mmol, 10 mol%), K_2CO_3 (27.6 mg, 0.2 mmol, 2 equiv) and the iodoindene **4u** (41.4 mg, 0.1 mmol, 1 equiv), N,N'-Dimethylethylenediamine (2µL, 0.02 mmol, 20 mol%) and pyrrolidinone (20µL, 0.24mmol, 2.4 equiv), evacuated and backfilled with argon. Degassed DMF (0.5mL) was then added under argon, and the reaction vessel was stirred at 100°C for 64h. The reaction mixture was then allowed to reach room temperature and evaporated under reduced pressure. The crude compound was then purified by flash chromatography to get the pure enamide.

Procedure for lithium-iodine exchange and nucleophilic addition on aldehyde

4u (41.4 mg, 0.1 mmol, 1 equiv) was dissolved in dry THF (1 mL) and the solution was cooled to -78°C. *n*BuLi 2.5M (42 µL, 0.105 mmol, 1.05 equiv) was added dropwise and the reaction mixture was allowed to stir at this temperature for 20 minutes. Then a solution of hexanal (25µL, 0.2 mmol, 2 equiv) in THF (0.5 mL) was slowly added and the reaction mixture was allowed to warm to room temperature and stirred overnight. The reaction was quenched with a saturated solution of ammonium chloride and extracted twice with ethyl acetate. The combined organic layers were dried over magnesium sulfate, filtered and concentrated under reduced pressure to afford the crude compound which was then purified by flash chromatography to get the desired product.

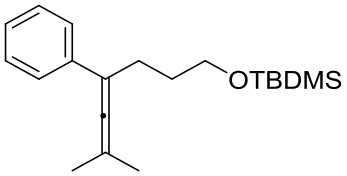
Characterization data of substrates 3a-w

Tert-butyldimethyl((7-methyl-5-phenylocta-5,6-dien-1-yl)oxy)silane (3a)



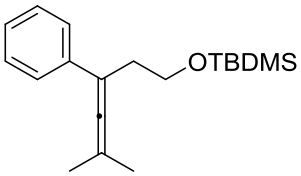
Colorless oil, 1.05 g, **58%.** Rf=0.6 (Cyclohexane/Dichloromethane 8/2).
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.35 – 7.28 (m, 2H), 7.28 – 7.17 (m, 2H), 7.15 – 7.06 (m, 1H), 3.59 (t, *J* = 6.1 Hz, 2H), 2.34 (t, 2H), 1.74 (s, 6H), 1.67 – 1.40 (m, 4H), 0.84 (s, 9H), -0.00 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 201.8(Cq), 138.5(Cq), 128.2(2CH), 126.0(CH), 126,0(2CH), 103.3(Cq), 98.3(Cq), 63.2(CH_2), 32.6(CH_2), 29.9(CH_2), 26,0(3CH_3), 24.3(CH_2), 20.5(2CH_3), 18.4(Cq), -5.3(2CH_3).
HRMS (ESI) calcd for $C_{21}H_{34}NaOSi$ (M + Na^+) 353,2271 found 353,2262.

Tert-butyldimethyl((6-methyl-4-phenylhepta-4,5-dien-1-yl)oxy)silane (3b)



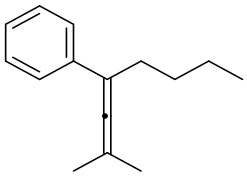
Colorless oil, 490 mg, **77%.** Rf=0.6 (Cyclohexane/Dichloromethane 8/2).
^{1}H NMR (300 MHz, $CDCl_3$) 7.41 – 7.34 (m, 2H), 7.33 – 7.25 (m, 2H), 7.21 – 7.12 (m, 1H), 3.70 (t, *J* = 6.4 Hz, 2H), 2.50 – 2.37 (m, 2H), 1.80 (s, 6H), 1.78 – 1.68 (m, 2H), 0.91 (s, 9H), 0.06 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 201.7(Cq), 138.4(Cq), 128.2(2CH), 126.1(CH), 126.0(2CH), 103.2(Cq), 98.5(Cq), 62.9(CH_2), 31.3(CH_2), 26.4(CH_2), 26.0(3CH_3), 20.4(2CH_3), 18.4(Cq), -5.3(2CH_3).
HRMS (APCI) calcd for $C_{20}H_{33}OSi$ (MH^+) 317.2295 found 317.2293.

Tert-butyldimethyl((5-methyl-3-phenylhexa-3,4-dien-1-yl)oxy)silane (3c)



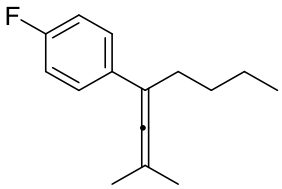
Colorless oil, 307 mg, **51%.** Rf=0.6 (Cyclohexane/Dichloromethane 8/2).
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.40 – 7.33 (m, 2H), 7.33 – 7.24 (m, 2H), 7.21 – 7.13 (m, 1H), 3.78 (dd, *J* = 7.9, 7.0 Hz, 2H), 2.63 (dd, *J* = 7.8, 7.1 Hz, 2H), 1.79 (s, 6H), 0.90 (s, 9H), 0.05 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 202.0(Cq), 138.1(Cq), 128.2(2CH), 126.1(CH), 126.0(2CH), 100.1(Cq), 98.2(Cq), 62.5(CH_2), 33.7(CH_2), 26.0(3CH_3), 20.4(2CH_3), 18.4(Cq), -5.3(2CH_3).
HRMS (ESI) calcd for $C_{19}H_{30}OSiNa$ (M + Na^+) 325.1958 found 325.1959.

(2-Methylocta-2,3-dien-4-yl)benzene (3d)



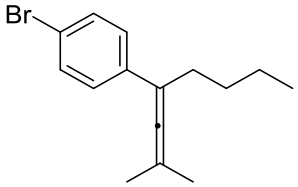
Colorless oil, 566mg, **57%,** Rf=0.45 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.43 – 7.35 (m, 2H), 7.34 – 7.27 (m, 2H), 7.22 – 7.10 (m, 1H), 2.43 (t, J=7Hz, 2H), 1.81 (s, 6H), 1.69-1.30 (m, 4H), 0.94 (t, *J* = 8.0 Hz, 3H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 201.8(Cq), 138.6(Cq), 128.2(2CH), 126.0(2CH), 103.4(Cq, 98.0(Cq), 30.2(CH_2), 29.9(CH_2), 22.4(CH_2), 20.4(2CH_3), 14.0(CH_3).
HRMS (APCI) calcd for $C_{15}H_{21}$ (MH^+) 201.1638 found 201.1637.

1-Fluoro-4-(2-methylocta-2,3-dien-4-yl)benzene (3e)



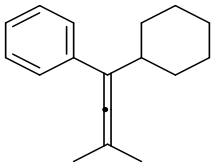
Pale yellow oil, 479 mg**, 44%,** Rf=0.5 (Petroleum Ether)
^{1}H NMR (300 MHz, Acetone d-6) δ 7.43 – 7.19 (m, 2H), 7.12 – 6.79 (m, 2H), 2.29 (t, *J* = 7.1 Hz, 2H), 1.70 (s, 6H), 1.51 – 1.08 (m, 4H), 0.82 (dd, *J* = 8.6, 5.7 Hz, 3H).
^{13}C NMR (75 MHz, Acetone d-6) δ 202.3 (Cq), 162.3(d, J=245Hz, CqF), 135.4(d, J= 3 Hz, Cq), 128.5(d, J=8Hz, 2CH), 115.7(d, J=22Hz, 2CH), 103.5(Cq), 99.1(Cq), 67.6(Cq), 30.9(CH_2), 30.7(CH_2), 23.0(CH_2), 20.5(2CH_3), 14.3(CH_3).
HRMS (APCI) calcd for $C_{15}H_{20}F$ (MH^+) 219.1544 found 219.1552.
^{19}F NMR (282 MHz, $CDCl_3$) δ -118.3.

1-bromo-4-(2-methylocta-2,3-dien-4-yl)benzene (3f)



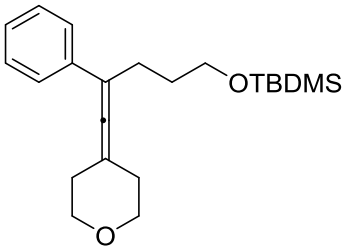
Colorless oil, 347 mg, **25%**, R_f= 0.64 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.51 – 7.32 (m, 2H), 7.28 – 7.10 (m, 2H), 2.58 – 2.16 (t, J= 6.7Hz, 2H), 1.79 (s, 6H), 1.43 (m, 4H), 0.92 (t, *J* = 7.2 Hz, 3H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 201.8(Cq), 137.6(Cq), 131.2 (2CH), 127.6 (2CH), 119.7(Cq), 102.7(Cq), 98.6(Cq), 30.0(CH_2), 29.8(CH_2), 22.4(CH_2), 20.3(2CH_3), 14.0(CH_3).
EI-MS m/z , 277.93,$M^{+\bullet}$, 199.00, $[M-Br]^+$.

(1-Cyclohexyl-3-methylbuta-1,2-dien-1-yl)benzene (3g)



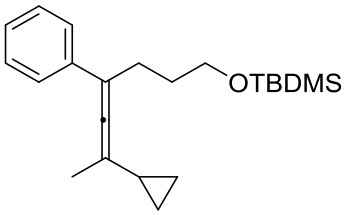
Colorless oil, 155mg, **34%,** Rf=0.38 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.42 – 7.26 (m, 4H), 7.22 – 7.14 (m, 1H), 2.43 (tt, *J* = 11.2, 3.3 Hz, 1H), 1.90 (d, *J* = 11.9 Hz, 2H), 1.82 (s, 6H), 1.79 – 1.62 (m, 2H), 1.50 – 1.05 (m, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 201.55(Cq), 138.3(Cq), 128.2(2CH), 126.5(2CH), 126.0(CH), 109.8(Cq), 98.7(Cq), 38.3(CH), 33.1(CH_2), 26.7(2CH_2), 26.5(2CH_2), 20.6(2CH_3).
HRMS (APCI) calcd for $C_{17}H_{23}$ (MH^+) 227.1722 found 227.1725.

Tert-butyldimethyl((4-phenyl-5-(tetrahydro-4H-pyran-4-ylidene)pent-4-en-1-yl)oxy)silane (3h)



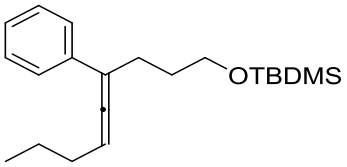
Yellow oil, 616 mg, **61%** Rf=0.25 (Petroleum Ether / Dichloromethane 6/4).
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.48 – 7.38 (m, 2H), 7.36 – 7.27 (m, 2H), 7.25 – 7.08 (m, 2H), 3.89 – 3.77 (m, 4H), 3.71 (t, *J* = 6.3 Hz, 2H), 2.48(t, J=7.3Hz, 2H), 2.40 – 2.21 (m, 4H), 1.91 – 1.67 (m, 2H), 0.91 (s, 9H), 0.06 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 198.3(Cq), 137.8(Cq), 128.35(2CH), 126.4(CH), 125.9 (2CH), 104.7(Cq), 101.5(Cq), 69.1(2CH_2), 62.7(CH_2), 31.7(2CH_2), 31.4(CH_2), 26.4(CH_2), 26.0(3CH_3), 18.4(Cq), -5.2(2CH_3).
HRMS (APCI) calcd for $C_{22}H_{35}$O2Si (MH^+) 359.2401 found 359.2398.

Tert-butyl((6-cyclopropyl-4-phenylhepta-4,5-dien-1-yl)oxy)dimethylsilane (3i)



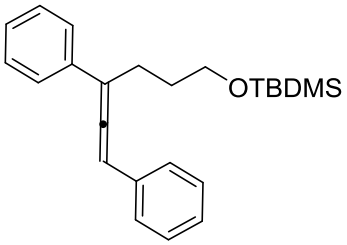
Colorless oil, 429 mg, **39%** Rf=0.57 (Cyclohexane/Dichloromethane 8/2).
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.41 – 7.32 (m, 2H), 7.32 – 7.23 (m, 2H), 7.21 – 7.10 (m, 1H), 3.70 (t, *J* = 6.4 Hz, 3H), 2.54 – 2.26 (m, 2H), 1.83 (s, 3H), 1.71 (dq, *J* = 8.9, 6.8 Hz, 2H), 1.25 (tt, *J* = 8.1, 5.0 Hz, 1H), 0.91 (s, 10H), 0.77 – 0.58 (m, 2H), 0.58 – 0.32 (m, 2H), 0.06 (s, 7H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 200.5 (Cq), 138.2(Cq), 128.2(2CH), 126.2(CH), 125.8(2CH), 106.0(2Cq), 62.9(CH_2), 31.4(CH_2), 26.6(CH_2), 26.0(3CH_3), 18.4(CH_3), 18.2(CH), 14.0(Cq), 6.1(2CH_2), -5.25(2CH_3).
HRMS (APCI) calcd for $C_{22}H_{35}$OSi (MH^+) 343.2449 found 343.2452.

Tert-butyldimethyl((4-phenylnona-4,5-dien-1-yl)oxy)silane (3j)



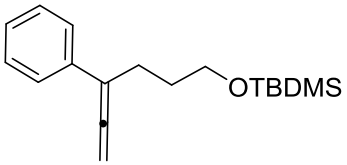
Pale yellow oil, 345 mg, **27%** Rf=0.43 (Cyclohexane/Dichloromethane 8/2).
^{1}H NMR (300 MHz, Acetone d-6) δ 7.40 – 7.34 (m, 2H), 7.30 – 7.19 (m, *J* = 10.4, 4.9 Hz, 2H), 7.12 (t, *J* = 7.3 Hz, 1H), 5.78 – 5.15 (m, 1H), 3.68 (t, *J* = 6.2 Hz, 3H), 2.50 – 2.40 (m, 2H), 2.12 – 1.99 (m, 3H), 1.77 – 1.63 (m, 2H), 1.45 (dd, *J* = 14.7, 7.4 Hz, 2H), 0.90 (t, *J* = 7.4 Hz, 3H), 0.84 (s, *J* = 2.7 Hz, 10H), -0.00 (s, 7H).
^{13}C NMR (75 MHz, Acetone d-6) δ 204.5(Cq), 138.2(Cq), 129.2(2CH), 127.3(CH), 126.7(2CH), 106.1(CH), 95.0(Cq), 63.2(CH_2), 32.2(CH_2), 31.9(CH_2), 26.9(CH_2), 26.3(3CH_3), 23.2(CH_2), 18.8(Cq), 14.1(CH_3), -5.1(2CH_3).
HRMS (ESI) calcd for $C_{21}H_{34}OSiNa$ (M + Na^+) 353.2271 found 353.2272.

Tert-butyl((4,6-diphenylhexa-4,5-dien-1-yl)oxy)dimethylsilane (3k)



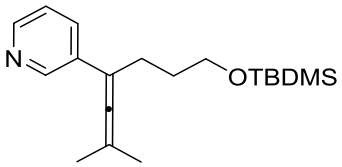
Colorless oil, 145 mg, **10%** Rf=0.34 (Petroleum Ether / Dichloromethane 9/1).
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.56 – 7.43 (m, 2H), 7.44 – 7.14 (m, 8H), 6.55 (t, *J* = 3.1 Hz, 1H), 3.72 (t, *J* = 6.2 Hz, 2H), 2.65 (ddd, *J* = 7.8, 6.6, 3.2 Hz, 2H), 2.01 – 1.67 (m, 2H), 0.90 (s, 9H), 0.04 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 206.4(Cq), 136.1(Cq), 134.6(Cq), 128.7(2CH), 128.5(2CH), 128.1(Cq), 127.0(2CH), 126.8(2CH), 126.1(2CH), 109.7(CH), 98.2(Cq), 62.7(CH_2), 31.2(CH_2), 26.5(CH_2), 26.0(3CH_3), 18.4(Cq), -5.3(2CH_3).
HRMS (APCI) calcd for $C_{24}H_{33}OSi$ (MH^+) 365.2290 found 365.2295.

Tert-butyldimethyl((4-phenylhexa-4,5-dien-1-yl)oxy)silane (3l)



Colorless oil, 135 mg, **19%** Rf=0.4 (Petroleum Ether / Dichloromethane 9/1).
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.54 – 7.37 (m, 2H), 7.37 – 7.27 (m, 2H), 7.25 – 7.12 (m, 1H), 5.08 (t, *J* = 3.4 Hz, 2H), 3.71 (t, *J* = 6.3 Hz, 2H), 2.49 (ddd, *J* = 9.7, 7.3, 3.4 Hz, 1H), 1.94 – 1.64 (m, 1H), 0.91 (s, 9H), 0.07 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 208.5(Cq), 136.4(Cq), 128.(2CH) 4, 126.6(CH), 126.0(2CH), 104.8(Cq), 78.3(CH_2), 62.7(CH_2), 31.1(CH_2), 26.0(3CH_3), 25.8(CH_2), 18.4(Cq), -5.3(2CH_3).
CI-MS (NH_3) m/z , 289.16 $[M+H]^+$.

3-(7-((Tert-butyldimethylsilyl)oxy)-2-methylhepta-2,3-dien-4-yl)pyridine (3m)

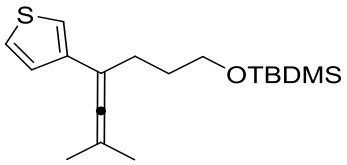


Yellow oil, 73 mg, **23%** Rf=0.4 (Petroleum Ether / Ethyl Acetate 9/1).

^{1}H NMR (300 MHz, $CDCl_3$) δ 8.61 (dd, *J* = 2.3, 0.8 Hz, 1H), 8.39 (dd, *J* = 4.8, 1.6 Hz, 1H), 7.61 (ddd, *J* = 8.0, 2.3, 1.6 Hz, 1H), 7.20 (ddd, *J* = 8.0, 4.8, 0.8 Hz, 1H), 3.70 (t, *J* = 6.3 Hz, 2H), 2.59 – 2.33 (m, 2H), 1.80 (s, 6H), 1.73 (dd, *J* = 14.1, 7.0 Hz, 2H), 0.90 (s, 9H), 0.05 (s, 6H).

^{13}C NMR (75 MHz, $CDCl_3$) δ 201.9 (Cq), 147.9(CH), 147.1(CH), 134.1(Cq), 132.9(CH), 123.0(CH), 100.7(Cq), 99.5(Cq), 62.6(CH_2), 31.1(CH_2), 26.0 (CH_2), 26.0 (3CH_3), 20.3(2CH_3), 18.4(Cq), -5.3(2CH_3).

Tert-butyldimethyl((6-methyl-4-(thiophen-3-yl)hepta-4,5-dien-1-yl)oxy)silane (3n)

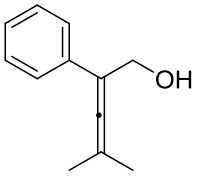


Yellow oil, 327 mg, **51%** Rf=0.4 (Petroleum Ether / Dichloromethane 9/1).

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.11 (dd, *J* = 5.1, 1.1 Hz, 1H), 6.94 (dd, *J* = 5.1, 3.6 Hz, 1H), 6.88 (dd, *J* = 3.5, 1.1 Hz, 1H), 3.69 (t, *J* = 6.4 Hz, 2H), 2.42 (t, *J* = 7.4 Hz, 2H), 1.79 (s, 6H), 1.78 – 1.69 (m, 2H), 0.91 (s, 9H), 0.06 (s, 6H).

^{13}C NMR (75 MHz, $CDCl_3$) δ 200.5 (Cq), 144.4 (Cq), 127.2(CH), 123.6(CH), 122.0(CH), 99.5(Cq), 99.2(Cq), 62.7(CH_2), 31.1(CH_2), 27.6(CH_2), 26.0(3CH_3), 20.4(2CH_3), 18.4(Cq), -5.3(2CH_3).

4-methyl-2-phenylpenta-2,3-dien-1-ol (3o)



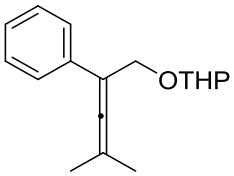
Pale yellow oil, 249 mg, Rf= 0.48 (Petroleum Ether/ Ethyl Acetate 8/2)

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.44 – 7.28 (m, 4H), 7.25 – 7.14 (m, 1H), 4.51 (s, 2H), 1.87 (s, 6H).

^{13}C NMR (75 MHz, $CDCl_3$) δ 199.95(Cq), 135.7(Cq), 128.5(2CH), 126.8(CH), 126.1(2CH), 104.9(Cq), 102.0(Cq), 61.7(CH_2), 20.5(2CH_3).

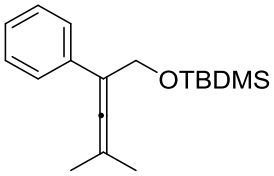
HRMS (ESI) calcd for $C_{12}H_{14}ONa$ (M + Na^+) 197.0937 found 197.0937.

2-((4-Methyl-2-phenylpenta-2,3-dien-1-yl)oxy)tetrahydro-2H-pyran (3p)



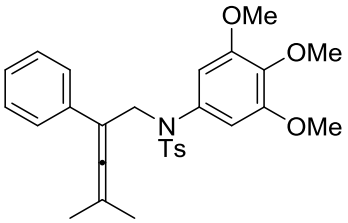
Colorless oil, 348 mg, **54%** Rf=0.2 (Petroleum Ether /Dichloromethane 8/2).
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.51 – 7.39 (m, 2H), 7.34 – 7.27 (m, 2H), 7.22 – 7.14 (m, 1H), 4.77 (t, *J* = 3.6 Hz, 1H), 4.63 (d, *J* = 11.9 Hz, 1H), 4.43 (d, *J* = 11.9 Hz, 1H), 4.06-3.82 (m, 1H), 3.66 – 3.38 (m, 1H), 1.83 (s, 3H), 1.81 (s, 3H), 1.78 – 1.38 (m, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 203.3(Cq), 136.5(Cq), 128.3(2CH), 126.4(3CH), 100.4(Cq), 98.2(Cq), 97.1(CH), 66.7(CH_2), 62.5(CH_2), 30.7(CH_2), 25.5(CH_2), 20.3(CH_3), 20.1(CH_3), 19.6(CH_2).
CI-MS (NH_3) m/z: 259.15 $[M+H]^+$.

Tert-butyldimethyl((4-methyl-2-phenylpenta-2,3-dien-1-yl)oxy)silane (3q)



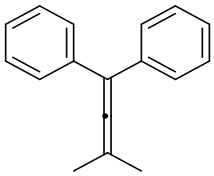
Colorless oil, 126 mg, **44%** Rf=0.3 (Petroleum Ether /Dichloromethane 8/2).
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.48 – 7.37 (m, 2H), 7.36 – 7.26 (m, 2H), 7.21 – 7.13 (m, 1H), 4.56 (s, 2H), 1.83 (s, 6H), 0.89 (s, 9H), 0.08 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 201.7(Cq), 136.6(Cq), 128.1(2CH), 126.4(2CH), 126.3(CH), 104.0(Cq), 98.8(Cq), 63.3(CH_2), 25.8(3CH_3), 20.2(2CH_3), 18.3(Cq), -5.2(2CH_3).
CI-MS (NH_3) m/z: 289.14 $[M+H]^+$.

4-Methyl-N-(4-methyl-2-phenylpenta-2,3-dien-1-yl)-N-(3,4,5-trimethoxyphenyl)benzenesulfonamide (3r)



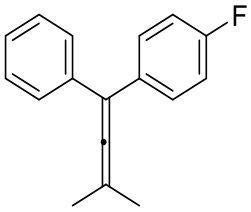
White solid, Rf=0.35 (Petroleum Ether / Ethyl Acetate 8/2).
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.61 (d, *J* = 8.2 Hz, 2H), 7.42 (d, *J* = 7.3 Hz, 2H), 7.32 (m, 4H), 7.20 (t, *J* = 7.2 Hz, 1H), 5.95 (s, 2H), 4.50 (s, 2H), 3.78 (s, 3H), 3.55 (s, 6H), 2.44 (s, 3H), 1.44 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 204.8(Cq), 152.7(Cq), 143.6(Cq), 137.6(Cq), 135.5(Cq), 135.1(Cq), 134,0(Cq), 129.4(2CH), 128.3(2CH), 128.1(2CH), 126.6(CH), 126.5(2CH), 106.8(2CH), 98.4(Cq), 98.3(Cq), 60.8(CH_3), 55.9(2CH_3), 52.2(CH_2), 21.6(CH_3), 19.8(2CH_3).
HRMS (ESI) calcd for $C_{28}H_{31}NNaO_5S$ (M + Na^+) 516,1815 found 516,1809.

(3-Methylbuta-1,2-diene-1,1-diyl)dibenzene (3s)



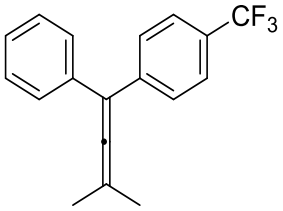
Colorless solid, 350 mg, **39%** Rf=0.3 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.39 – 7.18 (m, 10H), 1.89 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 203.8(Cq), 138.2(2Cq), 128.5(2CH), 128.2(2CH), 126.7(CH), 107.7(Cq), 98.4(Cq), 20.5(2CH_3).
HRMS (APCI) calcd for C17H17 (MH^+) 221.1325 found 221.1328.

1-fluoro-4-(3-methyl-1-phenylbuta-1,2-dien-1-yl)benzene (3t)



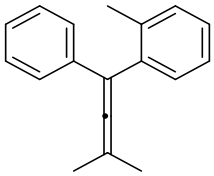
Colorless oil, 560mg, **24%.** R_f=0.47 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.38 – 7.14 (m, 7H), 7.01 (t, *J* = 8.8 Hz, 2H), 1.88 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 203.6(Cq), 161.9(d, J=246 Hz, CqF), 138.0(Cq), 134.1(d, J= 3 Hz, Cq), 130.1(d, J=8 Hz, 2CH), 128.4(2CH), 128.3(2CH), 126.9(CH), 115.1(d, J=21 Hz, 2CH), 106.8(Cq), 98.6(Cq), 20.5(2CH_3).
^{19}F NMR (282 MHz, $CDCl_3$) δ -117.0.
EI-MS m/z, 237.91$M^{+\bullet}$, 223.02 $[M-CH_3]^+$.

1-(3-Methyl-1-phenylbuta-1,2-dien-1-yl)-4-(trifluoromethyl)benzene (3u)



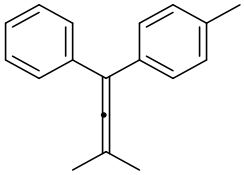
Colorless crystals, 500 mg, **43%** Rf=0.38 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.57 (d, *J* = 8.1 Hz, 2H), 7.44 (d, *J* = 8.6 Hz, 2H), 7.38 – 7.27 (m, 5H), 1.91 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 204.4(Cq), 142.1(Cq), 137.3(Cq), 128.6(2CH), 128.5(2CH), 127.1(CH), 125.2(CH), 124.2(Cq, q, J=272 Hz), 107.0(Cq), 99.3(Cq), 20.3(2CH_3).
^{19}F NMR (282 MHz, $CDCl_3$) δ -63.4.
HRMS (APCI) calcd for $C_{18}H_{16}F_3$ (MH^+) 289.1199 found 289.1205.

1-Methyl-2-(3-methyl-1-phenylbuta-1,2-dien-1-yl)benzene (3v)



Colorless oil, 248 mg, **26%** Rf=0.33 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.49 – 6.94 (m, 9H), 2.22 (s, 3H), 1.85 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 202.3(Cq), 138.3(Cq), 137.2(Cq), 136.8(Cq), 130.4(CH), 130.2(CH), 128.3(2CH), 127.3(CH), 126.8(2CH), 126.3(CH), 125.8(CH), 105.5(Cq), 97.9(Cq), 20.3(CH_3), 20.2(2CH_3).
HRMS (APCI) calcd for $C_{18}H_{19}$ (MH^+) 235.1481 found 235.1487.

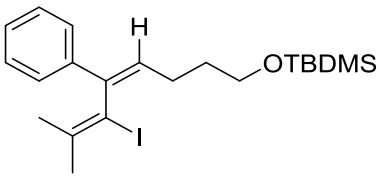
1-Methyl-4-(3-methyl-1-phenylbuta-1,2-dien-1-yl)benzene (3w)



Colorless oil, 205 mg, **22%** Rf=0.33 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.41 – 7.31 (m, 4H), 7.31 – 7.24 (m, 3H), 7.18 (d, *J* = 7.9 Hz, 2H), 2.40 (s, 3H), 1.92 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 203.6(Cq), 138.3(Cq), 136.5(Cq), 135.2(Cq), 128.5(2CH), 128.4(2CH), 128.2(2CH), 126,7 (CH), 107.5(Cq), 98.2(Cq), 21.1(CH_3), 20.5(2CH_3).
HRMS (APCI) calcd for $C_{18}H_{19}$ (MH^+) 235.1481 found 235.1489.

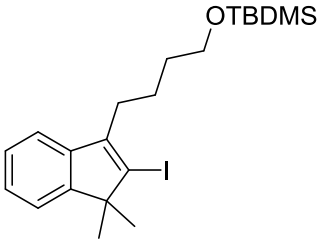
Characterization data of products 4a-w, 8, 10-13

(Z)-Tert-butyl((6-iodo-7-methyl-5-phenylocta-4,6-dien-1-yl)oxy)dimethylsilane (5a)



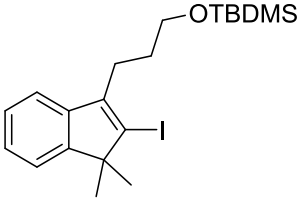
Pale yellow oil, 19 mg, **21%** R_f=0.31 (Petroleum Ether / Dichloromethane 8/2)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.52 – 7.04 (m, 5H), 6.30 – 5.65 (m, 1H), 3.68 (td, *J* = 6.5, 1.1 Hz, 2H), 2.40 – 2.14 (m, 2H), 2.10 (s, 3H), 1.80 (s, 3H), 1.76 – 1.66 (m, 2H), 0.91 (s, 9H), 0.07 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 142.6(Cq), 139.9(Cq), 138.3(Cq), 129.4(CH), 128.4(2CH), 127.3(CH), 126.1(2CH), 94.0(Cq), 63.0(CH_2), 31.6(CH_2), 29.7(CH_3), 26.4(CH_2), 26.0(3CH_3), 20.5(CH_3), 18.4(Cq), -5.2(2CH_3).
CI-MS (NH_3) m/z , 457.23 $[M+H]^+$

Tert-butyl(4-(2-iodo-1,1-dimethyl-1H-inden-3-yl)butoxy)dimethylsilane (4a)



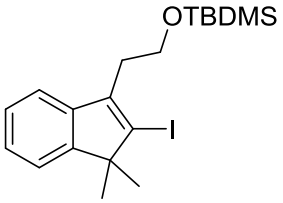
Pale yellow oil, 63 mg, **69%** R_f=0.4 (Petroleum Ether / Dichloromethane 8/2)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.39 – 7.33 (m, 1H), 7.33 – 7.27 (m, 1H), 7.19 (dtd, *J* = 17.0, 7.3, 1.4 Hz, 1H), 3.64 (t, *J* = 6.0 Hz, 2H), 2.60 (t, *J* = 7.3 Hz, 2H), 1.71 – 1.58 (m, 4H), 1.19 (s, 6H), 0.88 (s, 9H), 0.04 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 152.9(Cq), 144.7(Cq), 141.78(Cq), 126.4(CH), 125.0(CH), 121.8(CH), 119.1(CH), 116.9(Cq), 62.9(CH_2), 52.3(Cq), 32.6(CH_2), 29.4(CH_2), 26,0(3CH_3), 25.4(2CH_3), 24.2(CH_2), 18.3(Cq), -5.2(2CH_3).
HRMS (ESI) calcd for $C_{21}H_{33}INaOSi$ (M + Na^+) 479.1238, found 479.1239.

Tert-butyl(3-(2-iodo-1,1-dimethyl-1H-inden-3-yl)propoxy)dimethylsilane (4b)



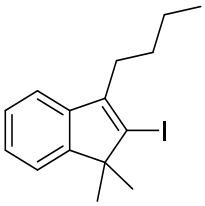
Pale yellow oil, 34 mg**, 77%** R_f=0.4 (Petroleum Ether / Dichloromethane 9/1)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.41 – 7.30 (m, 2H), 7.29 – 7.11 (m, 2H), 3.70 (t, *J* = 6.4 Hz, 2H), 2.72 – 2.58 (m, 2H), 1.87 – 1.73 (m, 2H), 1.20 (s, 6H), 0.93 (s, 9H), 0.08 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 152.95(Cq), 144.6(Cq), 141.8(Cq), 126.4(CH), 125.0(CH), 121.8(CH), 119.1(CH), 116.7(Cq), 62.7(CH_2), 52.3(Cq), 31.1(CH_2), 26.2(CH_2), 26.0(2CH_3), 25.4(3CH_3), 18.4(Cq), -5.2(2CH_3).
HRMS (ESI) calcd for $C_{20}H_{31}IOSiNa$ (M + Na^+) 465.1081 found 465.10797.

Tert-butyl(2-(2-iodo-1,1-dimethyl-1H-inden-3-yl)ethoxy)dimethylsilane (4c)



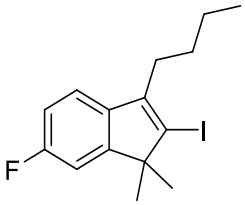
Pale yellow oil, 34 mg, **79**%. Rf_f=0.36 (Petroleum Ether / Dichloromethane 9/1)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.40 – 7.31 (m, 2H), 7.29 – 7.12 (m, 2H), 3.81 (t, *J* = 7.3 Hz, 2H), 2.85 (t, *J* = 7.3 Hz, 2H), 1.20 (s, 6H), 0.87 (s, 9H), 0.03 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 152.7(Cq), 142.1(Cq), 142.0(Cq), 126.4(CH), 125.0(CH), 121.7(CH), 119.3(CH), 118.2(Cq), 61.3(CH_2), 52.5(Cq), 33.5(CH_2), 26.0(3CH_3), 25.4(2CH_3), 18.3(Cq), -5.3(2CH_3).
HRMS (ESI) calcd for $C_{19}H_{29}IOSiNa$ (M + Na^+) 451.0925 found 451.0924.

3-Butyl-2-iodo-1,1-dimethyl-1H-indene (4d)



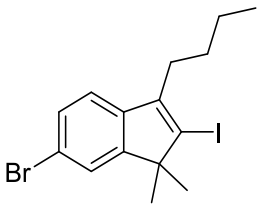
Colorless oil, 54 mg, **83**%. R_f=0.46 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.41 – 7.35 (m, 1H), 7.35 – 7.28 (m, 1H), 7.25 (td, *J* = 7.4, 1.4 Hz, 1H), 7.22 – 7.15 (m, 1H), 2.61 (t, J=7.4Hz, 2H), 1.68 – 1.51 (m, 2H), 1.50 – 1.33 (m, 2H), 1.22 (s, 6H), 0.97 (t, *J* = 7.2 Hz, 3H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 153.0(Cq), 144.9(Cq), 141.9(Cq), 126.4(CH), 125.0(CH), 121.8(CH), 119.0(CH), 116.6(Cq), 52.3(Cq), 30.2(CH_2), 29.5(CH_2), 25.4(2CH_3), 22.7(CH_2), 14.1(CH_3).
HRMS (APCI) calcd for $C_{15}H_{20}I$ (MH^+) 327.0604 found 327.0612.

3-Butyl-6-fluoro-2-iodo-1,1-dimethyl-1H-indene (4e)



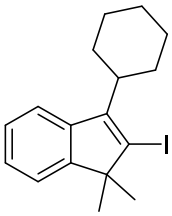
Colorless oil, 42 mg, **61%**. R_f=0.58 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.20 (dd, *J* = 8.3, 5.0 Hz, 1H), 7.06 (dd, *J* = 8.6, 2.4 Hz, 1H), 6.98 – 6.86 (m, 1H), 2.62 – 2.47 (m, 2H), 1.65 – 1.49 (m, 2H), 1.41 (t, J=7.8 Hz, 2H), 1.19 (s, 6H), 0.95 (t, *J* = 7.2 Hz, 3H).
13C NMR (75 MHz, $CDCl_3$) δ 161.4(d, J=245Hz, CqF), 155.1(Cq), 155.0(Cq), 144.3(Cq), 137.8(Cq), 119.7(d, J=9Hz,CH), 115.0(Cq), 114.9(CH), 113.0(d, J=23Hz, CH), 109.8(d, J=23Hz, CH), 52.3(Cq), 30.1(CH_2), 29.5(CH_2), 25.4(2CH_3), 22.6(CH_2), 14.1(CH_3).
^{19}F NMR (282 MHz, $CDCl_3$) δ -118.5
HRMS (APCI) calcd for $C_{18}H_{19}FI$ (MH^+) 345.0515 found 345.0506.

6-bromo-3-butyl-2-iodo-1,1-dimethyl-1H-indene (4f)



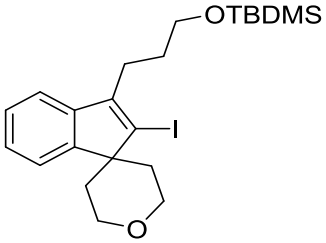
Colorless oil, 62 mg, **77%,** R_f= 0.71 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.47 (d, *J* = 1.6 Hz, 1H), 7.41 – 7.32 (m, 1H), 7.14 (d, *J* = 8.1 Hz, 1H), 2.64 – 2.49 (t, J=7.5 Hz, 2H), 1.66 – 1.47 (m, 2H), 1.39 (m, 2H), 1.19 (s, 6H), 0.94 (t, *J* = 7.2 Hz, 3H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 154.9(Cq), 144.4(Cq), 140.8(Cq), 129.5(CH), 125.4(CH), 120.3(CH), 119.3(Cq), 116.8(Cq), 52.5(Cq), 30.0(CH_2), 29.4(CH_2), 25.2(2CH_3), 22.6(CH_2), 14.0(CH_3).
EI-MS m/z , 403.81,$M^{+\bullet}$.

3-Cyclohexyl-2-iodo-1,1-dimethyl-1H-indene (4g)



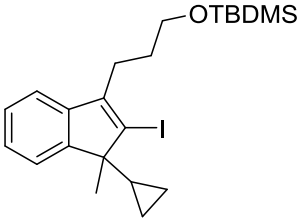
Yellowish solid, 59 mg, **84%**. R_f=0.45 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.73 – 7.50 (m, 1H), 7.45 – 7.32 (m, 1H), 7.32 – 7.00 (m, 1H), 2.87 (td, *J* = 12.3, 3.6 Hz, 1H), 2.19 – 1.61 (m, 3H), 1.61 – 1.25 (m, 2H), 1.21 (s, 3H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 154.0(Cq), 147.8(Cq), 140.7(Cq), 125.9(CH), 124.8(CH), 122.1(CH), 120.5(CH), 116.4(Cq), 51.9(Cq), 42.9(CH), 30.0(2CH_2), 26.7(2CH_2), 26.2(CH_2), 25.7(2CH_3).
HRMS (APCI) calcd for $C_{17}H_{22}I$ (MH^+) 353.0761 found 353.0762.

Tert-butyl(3-(2-iodo-2',3',5',6'-tetrahydrospiro[indene-1,4'-pyran]-3-yl)propoxy)dimethylsilane (4h)



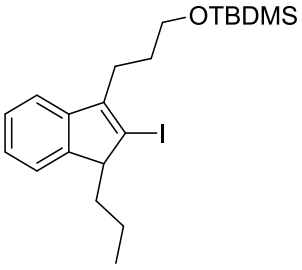
White solid, 65 mg, **67%** R_f=0.42 (Pentane / Dichloromethane 6/4)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.92 (d, *J* = 7.6 Hz, 1H), 7.34 (dtd, *J* = 8.5, 7.5, 0.9 Hz, 2H), 7.17 (td, *J* = 7.5, 1.4 Hz, 1H), 4.19 (td, *J* = 12.3, 2.1 Hz, 2H), 4.08 (dd, *J* = 11.8, 5.2 Hz, 2H), 3.70 (t, *J* = 6.3 Hz, 2H), 2.74 – 2.60 (m, 2H), 2.25 (td, *J* = 13.7, 5.6 Hz, 2H), 1.87 – 1.70 (m, 2H), 1.09 (d, *J* = 14.2 Hz, 2H), 0.94 (s, 9H), 0.08 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 150.8(Cq), 146.2(Cq), 142.7(Cq), 127.1(CH), 124.3(CH), 123.5(CH), 119.6(CH), 117.5(Cq), 63.8(2CH_2), 62.6(CH_2), 51.7(2CH_2), 32.6(CH_2), 31.0(CH_2), 26.7(CH_2), 26.0(3CH_3), 18.3(Cq), -5.23(2CH_3).
HRMS (APCI) calcd for $C_{22}H_{34}IO_2Si$ (MH^+) 485.1367 found 485.1369.

Tert-butyl(3-(1-cyclopropyl-2-iodo-1-methyl-1H-inden-3-yl)propoxy)dimethylsilane (4i)



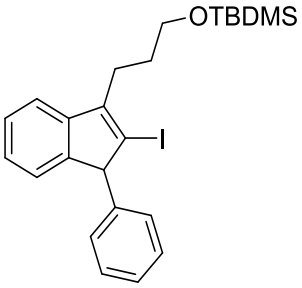
Colorless oil, 70 mg, **74**%. R_f=0.38 (Petroleum Ether / Dichloromethane 95/5)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.30 (t, *J* = 7.6 Hz, 2H), 7.27 – 7.20 (m, 1H), 7.13 (td, *J* = 7.3, 1.2 Hz, 1H), 3.71 (t, *J* = 6.4 Hz, 2H), 2.65 (dd, *J* = 8.8, 6.8 Hz, 2H), 1.93 – 1.69 (m, 2H), 1.12 (s, 3H), 0.94 (s, 9H), 0.88 (m, 2H), 0.75 – 0.41 (m, 2H), 0.22 (tt, *J* = 9.0, 5.2 Hz, 1H), 0.09 (s, 6H), -0.18 (td, *J* = 10.4, 5.7 Hz, 1H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 148.2(Cq), 142.6(Cq), 140.8(Cq), 124.6(CH), 122.3(CH), 120.5(CH), 116.8(CH), 114.1(Cq), 60.6(CH_2), 51.9(Cq), 29.0(CH_2), 24.0(CH_2), 23.9(3CH_3), 18.6(CH_3), 16.2(CH), 16.12(Cq), -0.0(CH_2), -2.7(CH_2), -7.4(2CH_3).
HRMS (APCI) calcd for $C_{22}H_{34}IOSi$ (MH^+) 469.1418, found 469.1413.

Tert-butyl(3-(2-iodo-1-propyl-1H-inden-3-yl)propoxy)dimethylsilane (4j)



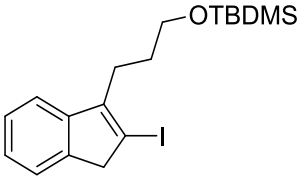
Pale yellow oil, 35 mg, **77**%. R_f=0.4 (Petroleum Ether / Dichloromethane 9/1)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.28 (dd, *J* = 13.4, 7.3 Hz, 2H), 7.20 – 7.12 (m, 1H), 7.07 (td, *J* = 7.4, 1.2 Hz, 1H), 3.62 (t, *J* = 6.4 Hz, 2H), 3.40 (t, *J* = 5.0 Hz, 1H), 2.68 – 2.49 (m, 2H), 1.98 – 1.82 (m, 1H), 1.73 (m, 3H), 0.86 (s, 9H), 0.82 – 0.68 (m, 4H), -0.00 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 148.0(Cq), 147.7(Cq), 143.7(Cq), 126.4(CH), 124.6(CH), 122.7(CH), 118.7(CH), 105.0(Cq), 62.7(CH_2), 55.4(CH), 33.1(CH_2), 31.1(CH_2), 26.2(CH_2), 26.0(3CH_3), 18.3(CH_2), 17.0(CH_3), 14.3(CH_3), -5.3(2CH_3).
HRMS (ESI) calcd for $C_{21}H_{33}IOSiNa$ (M+ Na^+) 479.1238 found 479.1237.

Tert-butyl(3-(2-iodo-1-phenyl-1H-inden-3-yl)propoxy)dimethylsilane (4k)



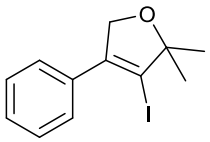
Pale yellow oil, 65 mg, **66%.** R_f=0.42 (Petroleum Ether / Dichloromethane 9/1)
1H NMR (300 MHz, $CDCl_3$) δ 7.36 (d, J = 7.5 Hz, 2H), 7.31 – 7.17 (m, 4H), 7.14 – 7.02 (m, 2H), 7.02 – 6.94 (m, 2H), 4.47 (s, 1H), 3.71 (t, J = 6.3 Hz, 2H), 2.85 – 2.41 (m, 2H), 2.03 – 1.67 (m, 2H), 0.91 (s, 9H), 0.06 (s, 6H).
13C NMR (75 MHz, $CDCl_3$) δ 149.5(Cq), 148.8(Cq), 143.0(Cq), 138.9(Cq), 128.7(2CH), 128.5(2CH), 127.3(CH), 126.8(CH), 125.4(CH), 124.0(CH), 118.9(CH), 104.8(Cq), 63.0(CH), 62.7(CH_2), 31.2(CH_2), 26.3(CH_2), 26.0(3CH_3), 18.4(Cq), -5.2(2CH_3).
HRMS (APCI) calcd for $C_{24}H_{32}IOSi$ (MH^+) 491.1262 found 491.1255.

tert-butyl(3-(2-iodo-1H-inden-3-yl)propoxy)dimethylsilane (4l)



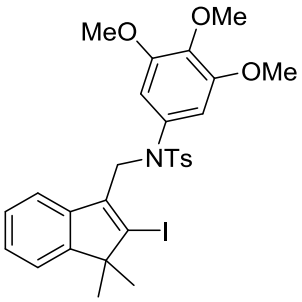
Colorless oil, 4 mg, 5%, Rf= 0.40 (Petroleum Ether/ Dichloromethane)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.48 – 7.31 (m, 2H), 7.29 – 7.22 (m, 1H), 7.15 (td, *J* = 7.4, 1.2 Hz, 1H), 3.70 (t, *J* = 6.3 Hz, 2H), 3.59 (s, 2H), 2.74 – 2.56 (m, 2H), 1.92 – 1.69 (m, 2H), 0.93 (s, 9H), 0.08 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 148.8 (Cq), 145.3(Cq), 143.6(Cq), 126.3(CH), 124.6(CH), 123.1(CH), 118.6(CH), 94.2(Cq), 62.7(CH_2), 48.3(CH_2), 31.1(CH_2), 26.1(CH_2), 26.0(3CH_3), 18.3(Cq), -5.3(2CH_3).
CI-MS (NH_3) m/z , 415.11 $[M+H]^+$

3-Iodo-2,2-dimethyl-4-phenyl-2,5-dihydrofuran (8)



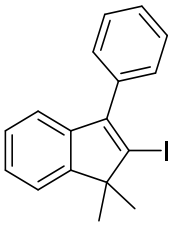
Pale yellow oil, 42 mg, **70%.** R_f=0.42 (Petroleum Ether / ethyl acetate 9/1).
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.62 – 7.48 (m, 2H), 7.49 – 7.31 (m, 3H), 4.94 (s, 2H), 1.45 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 139.9(Cq), 133.1(Cq), 128.6(2CH), 128.4(2CH), 127.3(CH), 97.4(Cq), 92.3(Cq), 75.9(CH_2), 26.7(2CH_3).
EI-MS m/z , 299.97,$M^{+\bullet}$.

N-((2-Iodo-1,1-dimethyl-1H-inden-3-yl)methyl)-4-methyl-N-(3,4,5-trimethoxyphenyl)benzenesulfonamide (4r)



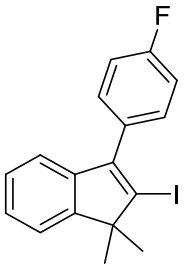
White solid, 90 mg, **73**%. R_f=0.38 (Toluene / Ethyl acetate 85/15).
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.86 (d, *J* = 7.5 Hz, 1H), 7.70 (d, *J* = 8.2 Hz, 2H), 7.37 (d, *J* = 8.1 Hz, 2H), 7.34 – 7.24 (m, 2H), 7.18 (td, *J* = 7.4, 0.9 Hz, 1H), 5.98 (s, 2H), 4.69 (s, 2H), 3.70 (s, 3H), 3.46 (s, 6H), 2.49 (s, 3H), 0.91 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 152.3(Cq), 152.2(Cq), 143.8(Cq), 140.2(Cq), 138.2(Cq), 137.9(Cq), 135.0(Cq), 133.2(Cq), 129.5(2CH), 128.1(2CH), 126.7(CH), 125.6(CH), 122.5(Cq), 121.6(CH), 120.5(CH), 107.1(2CH), 60.8(CH_3), 55.9(2CH_3), 52.9(Cq), 50.4(CH_2), 24.9(CH_3), 21.6(CH_3).
HRMS (ESI) calcd for $C_{28}H_{30}INNaO_5S$ (M + Na^+) 642,0787 found 642,0769.

2-Iodo-1,1-dimethyl-3-phenyl-1H-indene (4s)



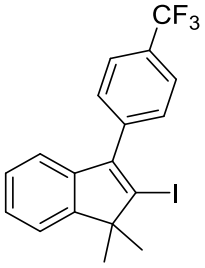
White solid, 66 mg, **95%.** R_f=0.26 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.61 – 7.12 (m, 9H), 1.38 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 152.7(Cq), 145.5(Cq), 142.3(Cq), 135.5(Cq), 129.2(2CH), 128.4(2CH), 128.1(CH), 126.6(CH), 125.4(CH), 122.1(CH), 120.2(CH), 117.3(Cq), 53.2(Cq), 25.6(2CH_3).
HRMS (APCI) calcd for $C_{17}H_{16}I$ (MH^+) 347.0291 found 347.0295.

3-(4-fluorophenyl)-2-iodo-1,1-dimethyl-1H-indene (4t)



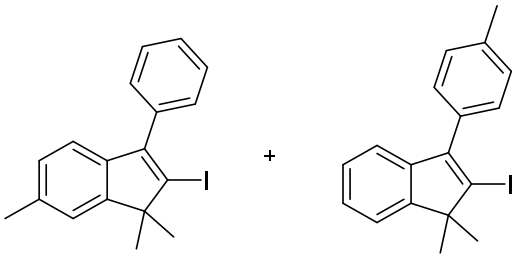
White solid, 63 mg, 87%. R_f=0.5 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.64 – 7.28 (m, 3H), 7.20 – 6.98 (m, 5H), 1.22 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 162.5(d, J= 247 Hz, CqF), 152.7(Cq), 144.6(Cq), 142.1(Cq), 131.4(d, J= 3 Hz, Cq), 131.0(d, J= 8 Hz, 2CH), 126.7(CH), 125.5(CH), 122.2(CH), 120.1(CH), 117.7(Cq), 115.5(d, J= 22 Hz, 2CH), 53.2(Cq), 25.6(2CH_3).
^{19}F NMR (282 MHz, $CDCl_3$) δ -114.3.
EI-MS m/z , 363.87,$M^{+\bullet}$, 236.93 $[M-I]^+$

2-Iodo-1,1-dimethyl-3-(4-(trifluoromethyl)phenyl)-1H-indene (4u)



Colorless crystals, 76 mg, **92%.** R_f=0.40 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.78 (d, *J* = 8.1 Hz, 2H), 7.64 (d, *J* = 8.0 Hz, 2H), 7.54 – 7.44 (m, 1H), 7.42 – 7.20 (m, 2H), 7.20 – 7.14 (m, 1H), 1.36 (s, 6H).
^{13}C NMR (75 MHz, $CDCl_3$) δ 152.6(Cq), 144.5(Cq), 141.7(Cq), 139.3(Cq), 130.1(q, J= 32Hz, Cq), 129.6(2CH), 126.8(CH), 125.7(CH), 125.5(CH), 125.5(CH),124.2(q, J= 272Hz, CF_3) 122.3(CH), 120.0(CH),118.3(Cq), 53.5(Cq), 25.5(2CH_3).
^{19}F NMR (282 MHz, $CDCl_3$) δ -63.5.
HRMS (APPI) calcd for $C_{18}H_{14}F_3I$ ($M^{+\cdot}$) 414.0087 found 414.0089.

2-Iodo-1,1,6-trimethyl-3-(p-tolyl)-1H-indene compound with 2-iodo-1,1,6-trimethyl-3-phenyl-1H-indene (4v and 4v')



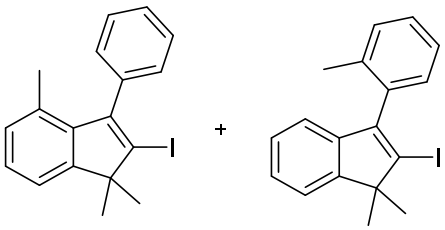
4t' **4t**

Pale yellow oil, 57 mg, **79%** R_f=0.48 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.54 – 7.38 (m, 6H), 7.31 (dd, *J* = 7.9, 0.5 Hz, 1H), 7.28 – 7.25 (m, 1H), 7.24 – 7.20 (m, 1H), 7.10 (d, *J* = 7.7 Hz, 1H), 7.05 – 7.00 (m, 1H), 2.45 (s, 1.13H), 2.42 (s, 3H), 1.33 (s,2.21H), 1.32 (s, 6H).

^{13}C NMR (75 MHz, $CDCl_3$) of 4t' δ 152.9(Cq), 145.3(Cq), 139.8(Cq), 135.7(Cq), 135.3(Cq), 129.1(2CH), 128.4(2CH), 128.0(CH), 127.2(CH), 123.0(CH), 120.0(CH), 115.9(Cq), 52.9(Cq), 25.7(2CH_3), 21.5(CH_3).

^{13}C NMR (75 MHz, $CDCl_3$) of 4t δ 152.7(Cq), 142.4(Cq), 137.8(Cq), 132.5(Cq), 129.0(CH), 126.6(CH), 125.3(CH), 122.0(CH), 120.3(CH), 117.1(CH), 53.1(Cq), 25.6(2CH_3), 21.5(CH_3).

2-Iodo-1,1,4-trimethyl-3-phenyl-1H-indene compound with 2-iodo-1,1-dimethyl-3-(o-tolyl)-1H-indene (4w and 4w')



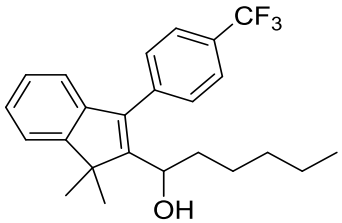
4u' **4u**

Pale yellow oil, 50 mg, **69%** R_f=0.48 (Petroleum Ether)
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.51 – 7.08 (Ar), 6.96 (d, *J* = 7.5 Hz, 0.28H), 6.91 (dd, *J* = 6.5, 1.6 Hz, 1H), 2.18 (s, 4H), 1.85 (s, 1H), 1.36(s, 3H), 1.35 (s, 3H), 1.33 (s, 1.71H).

^{13}C NMR (75 MHz, $CDCl_3$) of 4u' δ 153.3(Cq), 139.9(Cq), 139.5(Cq), 135.8(Cq), 131.2(Cq), 129.8(CH), 129.2(CH), 128.3(CH), 127.7(CH), 127.2(CH), 125.6(CH), 125.5(CH), 120.0(CH), 52.3(Cq), 25.9(2CH_3), 20.1(CH_3).

^{13}C NMR (75 MHz, $CDCl_3$) of 4u δ 152.4(Cq), 146.8(Cq), 142.8(Cq), 136.4(Cq), 135.6(Cq), 130.2(CH), 129.3(CH), 128.2(CH), 126.7(CH), 125.9(CH), 125.3(CH), 121.9(CH), 120.3(CH), 118.5(Cq), 53.1(Cq), 25.8(CH_3), 25.3(CH_3) 19.6(CH_3).

1-(1,1-Dimethyl-3-(4-(trifluoromethyl)phenyl)-1H-inden-2-yl)hexan-1-ol (10)



Yellow oil, 24 mg, **61**%. R_f=0.52 (dichloromethane)

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.74 (d, *J* = 8.0 Hz, 2H), 7.55 (d, *J* = 7.9 Hz, 2H), 7.39 (dd, *J* = 6.7, 1.2 Hz, 1H), 7.32 – 7.09 (m, 2H), 6.96 (dd, *J* = 6.8, 1.1 Hz, 1H), 4.62 (bs, 1H), 1.69 – 1.49 (m, 3H), 1.55 (s, 3H), 1.49 (s, 3H), 1.45 – 1.29 (m, 1H), 1.27 – 1.08 (m, 4H), 0.85 (t, *J* = 6.8 Hz, 3H).

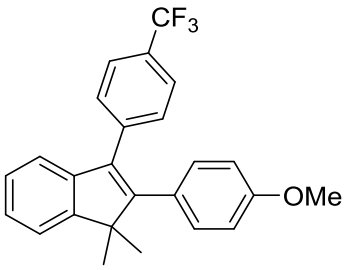
^{13}C NMR (75 MHz, $CDCl_3$) δ 154.3(Cq), 153.0(Cq), 143.0(Cq), 139.7(Cq), 137.5(Cq), 129.8(2CH), 126.7(CH), 126.0(CH), 125.8(CH), 125.4(CH), 125.3(CH), 124.2(Cq, q, J=272 Hz), 121.1(CH), 120.2(CH), 69.5(CH), 51.0(Cq), 37.0(CH_2), 31.5(CH_2), 26.2(CH_2), 25.0(CH_3), 24.9(CH_3), 22.5(CH_2), 13.9(CH_3).

^{19}F NMR (282 MHz, $CDCl_3$) δ -63.5.

ESI-MS (NH_3) m/z , 411.6 $[M+Na]^+$

HRMS (ESI) calcd for $C_{24}H_{25}F_3$ (MH^+-H_2O) 371.1908 found 371.1912.

2-(4-Methoxyphenyl)-1,1-dimethyl-3-(4-(trifluoromethyl)phenyl)-1H-indene (11)



Yellow solid, 39 mg**, 98%.** R_f=0.4 (Petroleum Ether / Dichloromethane 8/2).

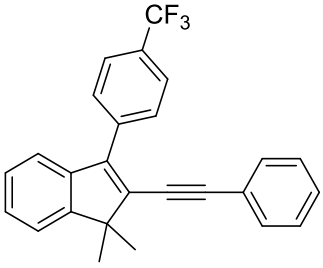
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.54 (d, *J* = 8.1 Hz, 2H), 7.50 – 7.35 (m, 3H), 7.31 (dd, *J* = 5.6, 3.6 Hz, 3H), 7.15 – 6.99 (m, 2H), 6.93 – 6.78 (m, 2H), 3.81 (s, 3H), 1.41 (s, 6H).

^{13}C NMR (75 MHz, $CDCl_3$) δ 158.8(Cq), 154.5(Cq), 153.3(Cq), 142.1(Cq), 139.3(Cq), 136.5(Cq), 130.8(2CH), 129.8(2CH), 128.8 (q, J= 33Hz, Cq), 128.2(Cq), 127.9(q, J=272Hz, CF_3), 126.6(CH), 125.7(CH), 125.1(CH), 125.1(CH), 121.7(CH), 120.2(CH), 113.7(2CH), 55.1(OCH_3), 51.6(Cq), 24.5(2CH_3).

^{19}F NMR (282 MHz, $CDCl_3$) δ -63.4.

HRMS (APCI) calcd for $C_{25}H_{22}F_3O$ (MH^+) 395.1623 found 395.1638.

1,1-Dimethyl-2-(phenylethynyl)-3-(4-(trifluoromethyl)phenyl)-1H-indene (12)



White solid, 29 mg, **75%.** R_f=0.40 (Cyclohexane)

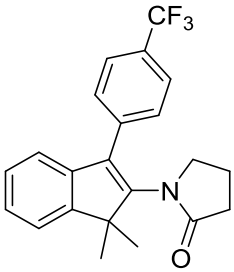
^{1}H NMR (300 MHz, $CDCl_3$) δ 7.93 (dd, *J* = 8.7, 0.7 Hz, 2H), 7.87 – 7.65 (m, 2H), 7.57 – 7.40 (m, 4H), 7.40 – 7.29 (m, 5H), 1.51 (s, 6H).

^{13}C NMR (75 MHz, $CDCl_3$) δ 153.4 (Cq), 142.8(Cq), 140.6(Cq), 138.2(Cq), 136.3(Cq), 131.6(2CH), 129.4 (q, J=32Hz).129.2(2CH), 128.4(2CH), 128.1 (q, J= 272 Hz), 127.0(CH), 126.7(CH), 125.3(CH), 125.2(CH), 123.3(Cq), 122.0(CH), 121.0(CH), 99.2(Cq), 85.1(Cq), 51.5(Cq), 24.7(2CH3).

^{19}F NMR (282 MHz, $CDCl_3$) δ -63.4.

HRMS (APCI) calcd for $C_{26}H_{20}F_3$ (MH^+) 389.1512 found 389.1510.

1-(1,1-Dimethyl-3-(4-(trifluoromethyl)phenyl)-1H-inden-2-yl)pyrrolidin-2-one (13)



Yellow solid, 20 mg, **55%.** R_f=0.3 (Petroleum Ether / ethyl acetate 6/4).

^{1}H NMR (300 MHz, $CDCl_3$) δ 7.70 (d, *J* = 8.1 Hz, 2H), 7.58 (d, *J* = 8.0 Hz, 2H), 7.45 – 7.34 (m, 1H), 7.34 – 7.21 (m, 3H), 3.41 (t, *J* = 6.9 Hz, 2H), 2.40 (t, *J* = 8.0 Hz, 2H), 2.14 – 1.87 (m, 2H), 1.45 (s, 6H).

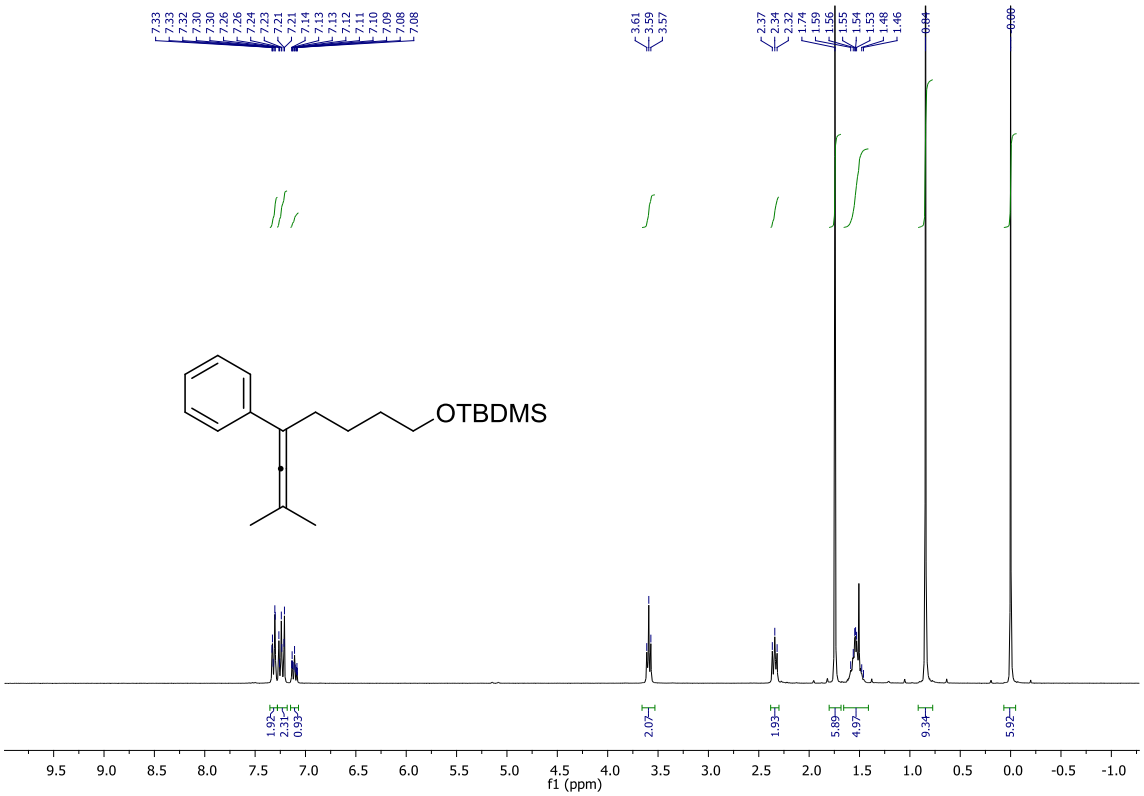
^{13}C NMR (75 MHz, $CDCl_3$) δ 175.7(Cq), 151.4(Cq), 148.5(Cq), 139.9(Cq), 137.3(Cq), 136.5(Cq), 130.0 (Cq, q, 32Hz), 128.7(2CH), 126.8(CH), 126.4(CH), 125.6(CH), 125.6(CH), 124.2(Cq, q, J=272 Hz), 121.5(CH), 120.5(CH), 50.8(Cq), 50.2(CH_2), 30.9(CH_2), 24.5(2CH_3), 19.6(CH_2).

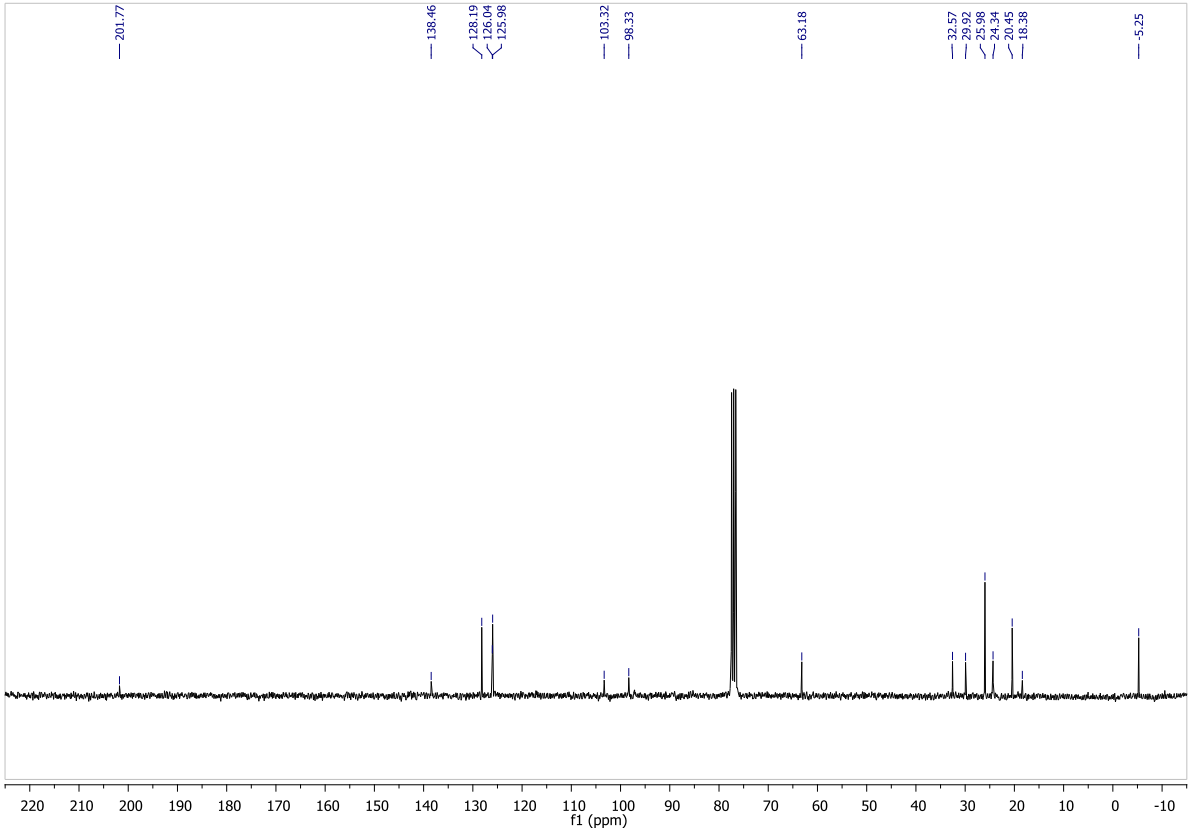
^{19}F NMR (282 MHz, $CDCl_3$) δ -63.5.

HRMS (ESI) calcd for $C_{22}H_{20}F_3NO$ (M+ H^+) 372.1571 found 372.1569.

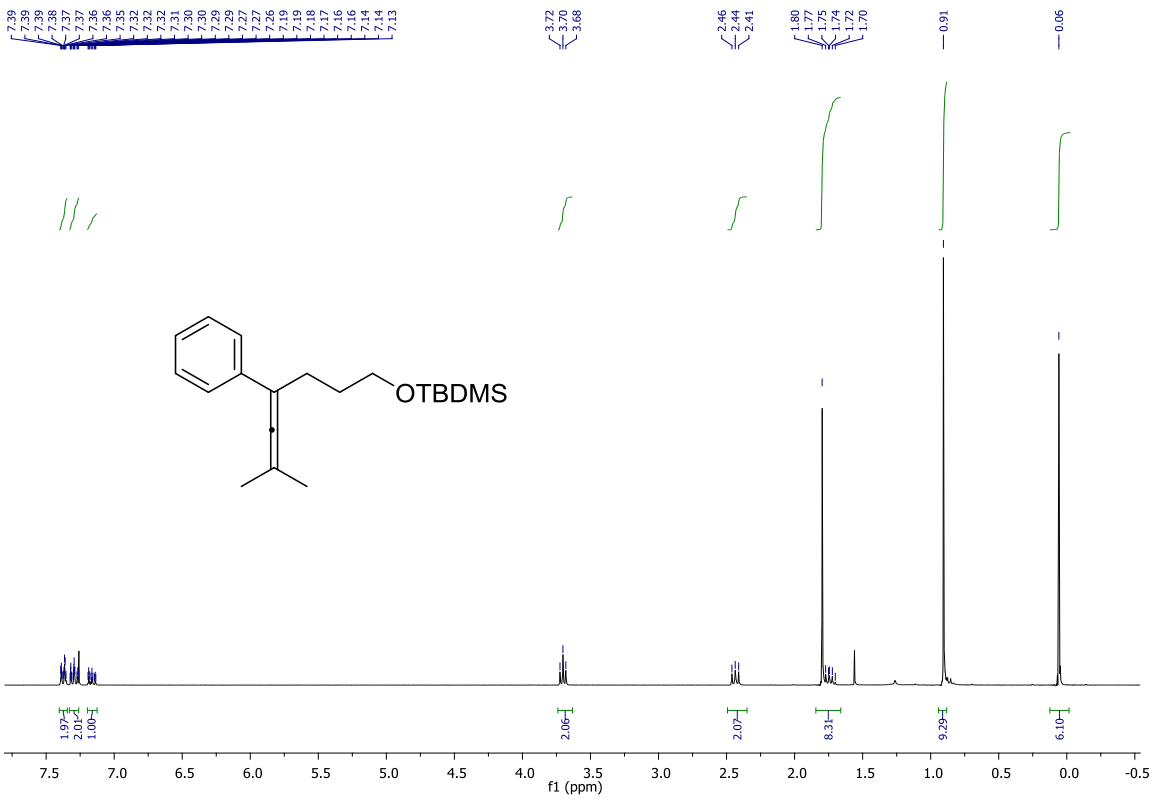
NMR Spectra

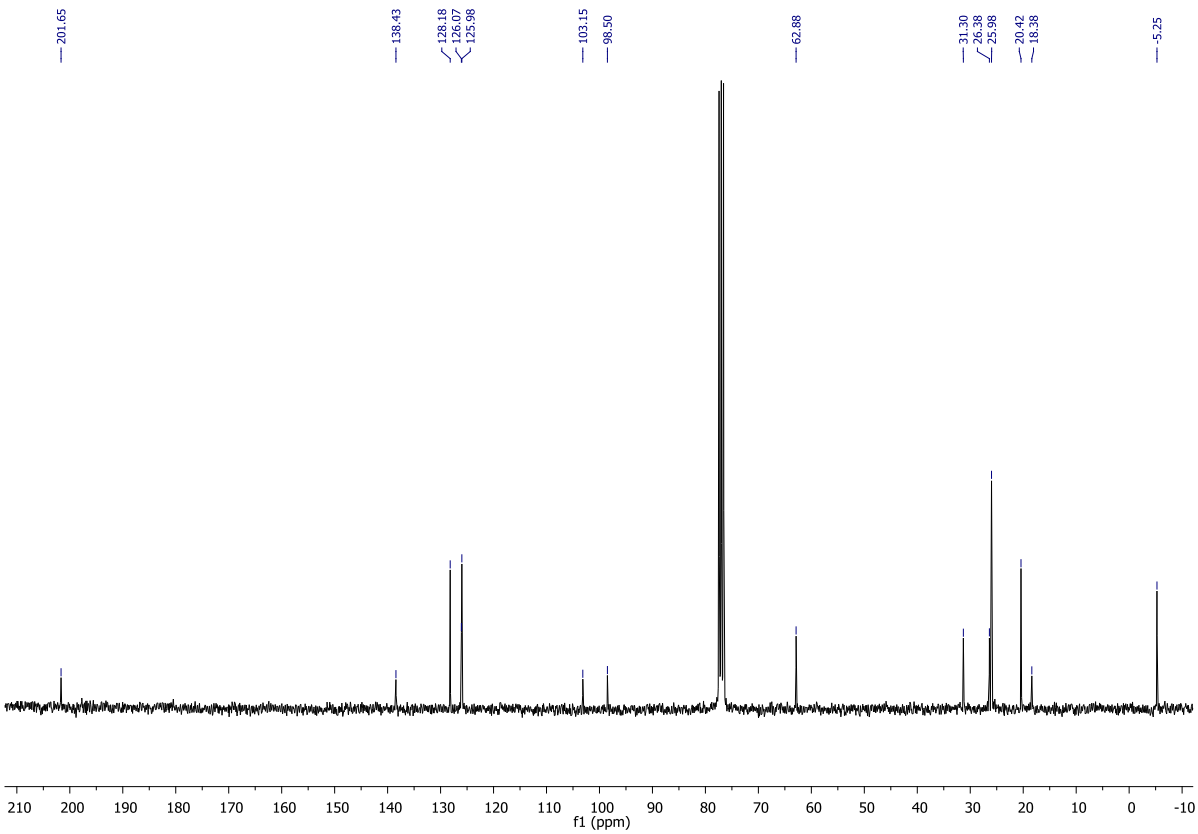
Tert-butyldimethyl((7-methyl-5-phenylocta-5,6-dien-1-yl)oxy)silane (3a)



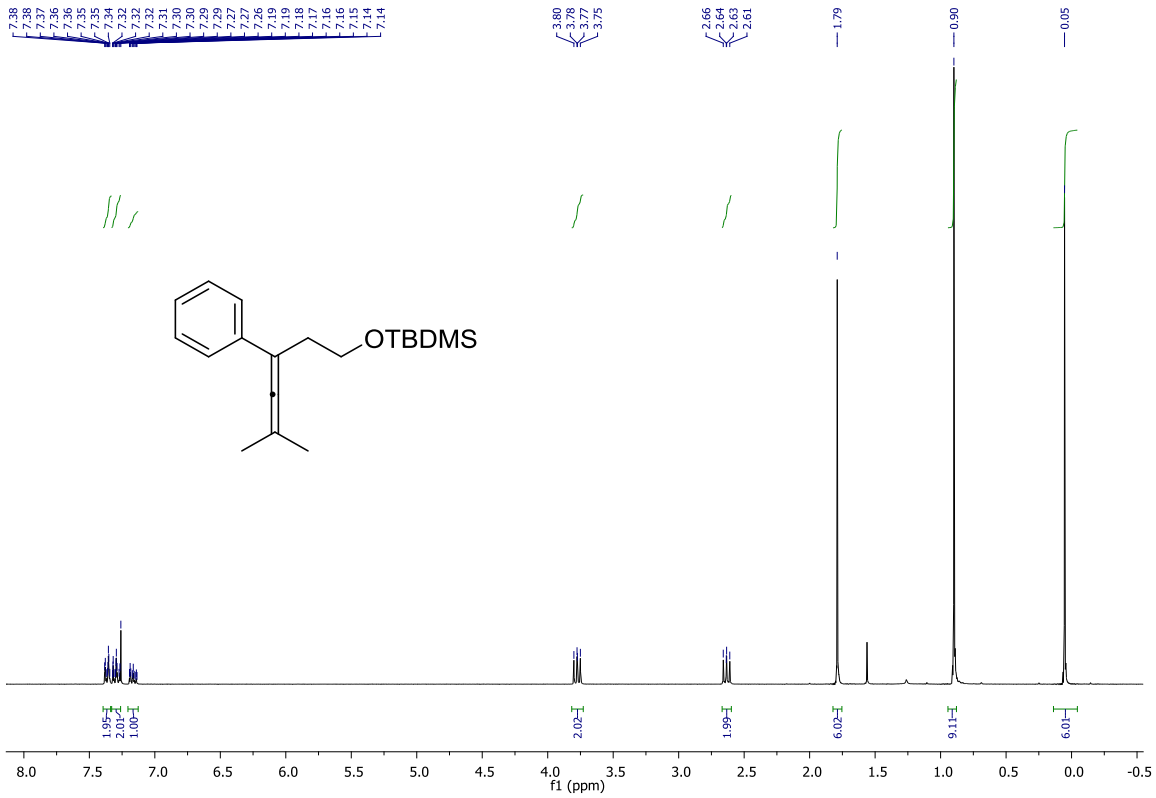


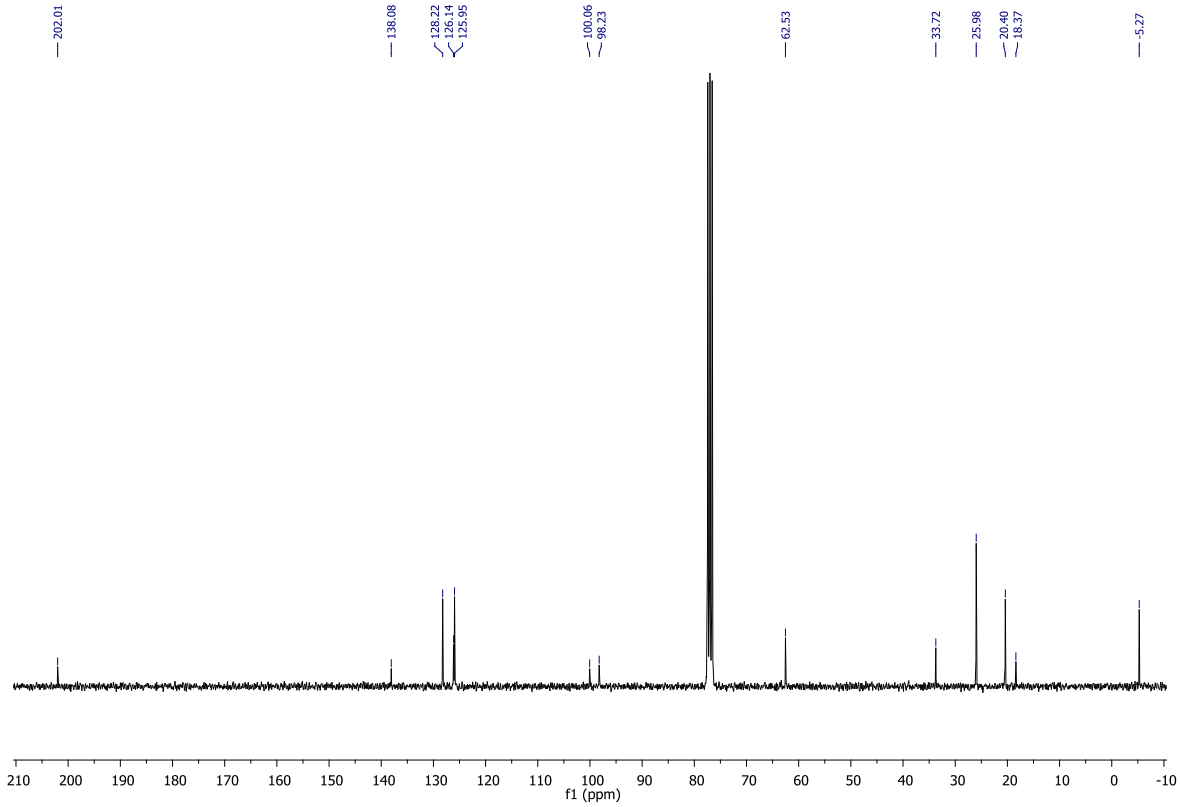
Tert-butyldimethyl((6-methyl-4-phenylhepta-4,5-dien-1-yl)oxy)silane (3b)



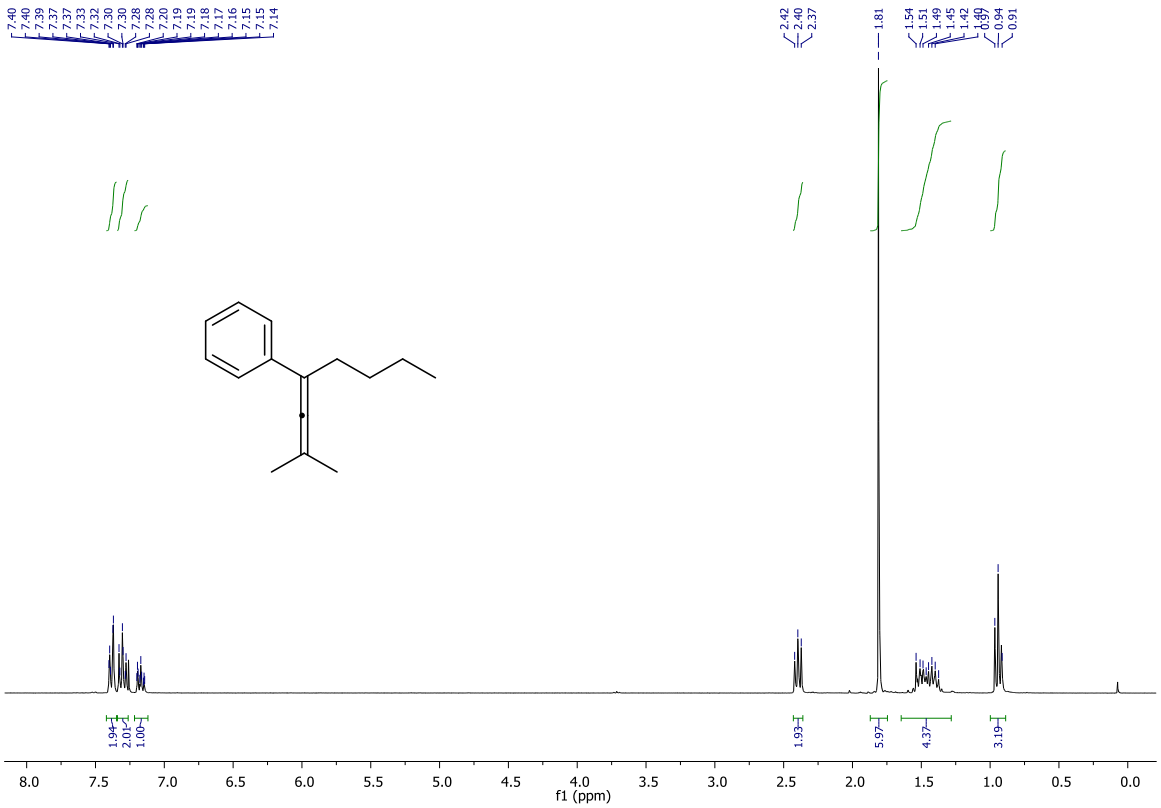


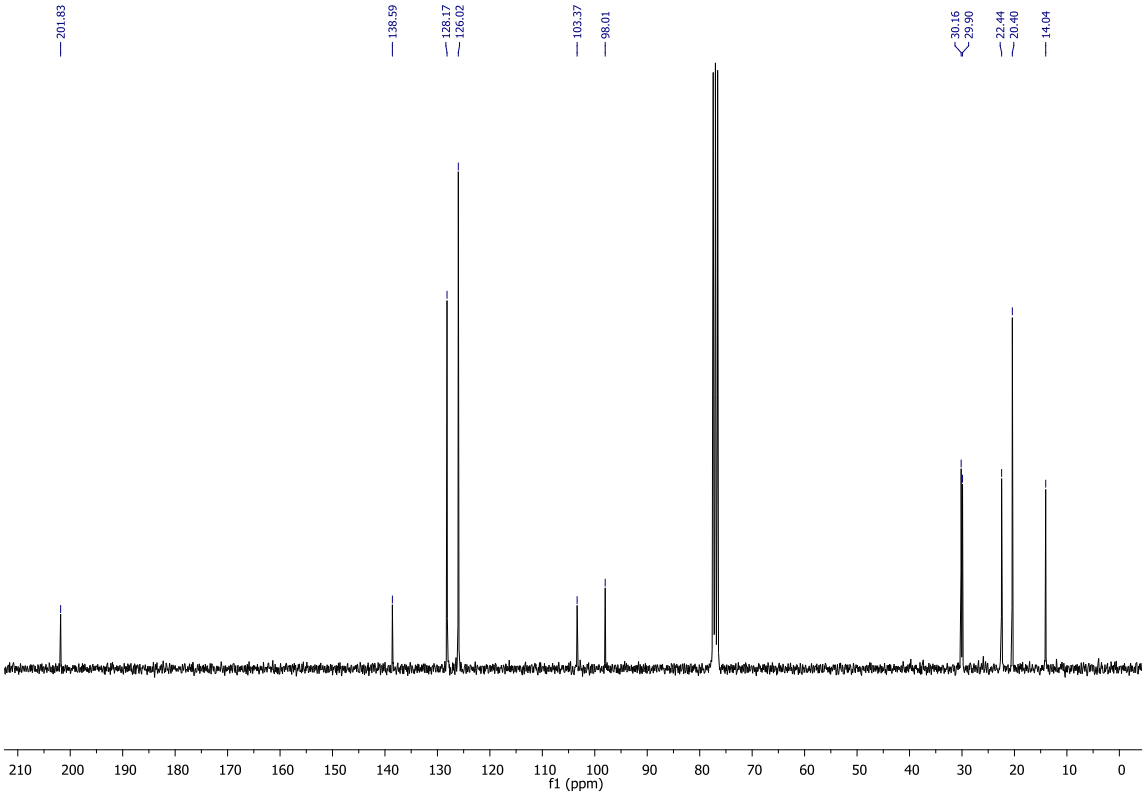
Tert-butyldimethyl((5-methyl-3-phenylhexa-3,4-dien-1-yl)oxy)silane (3c)



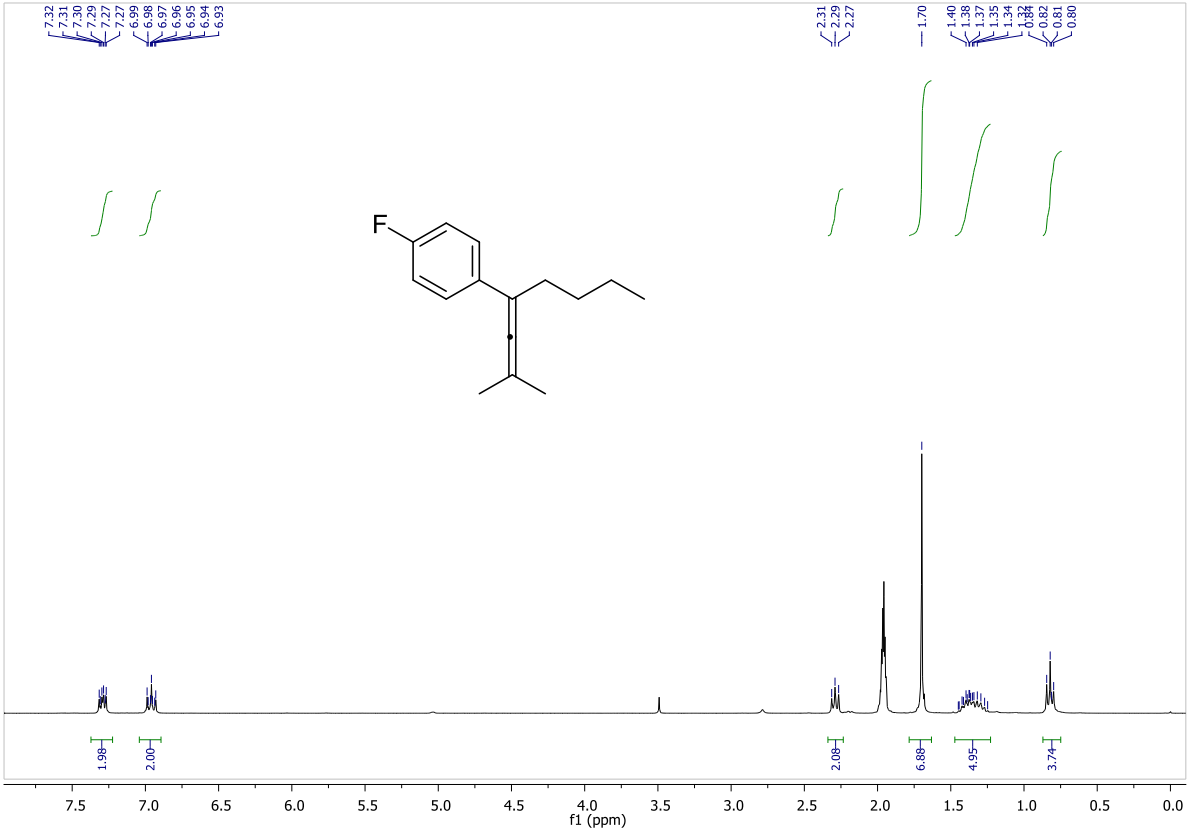


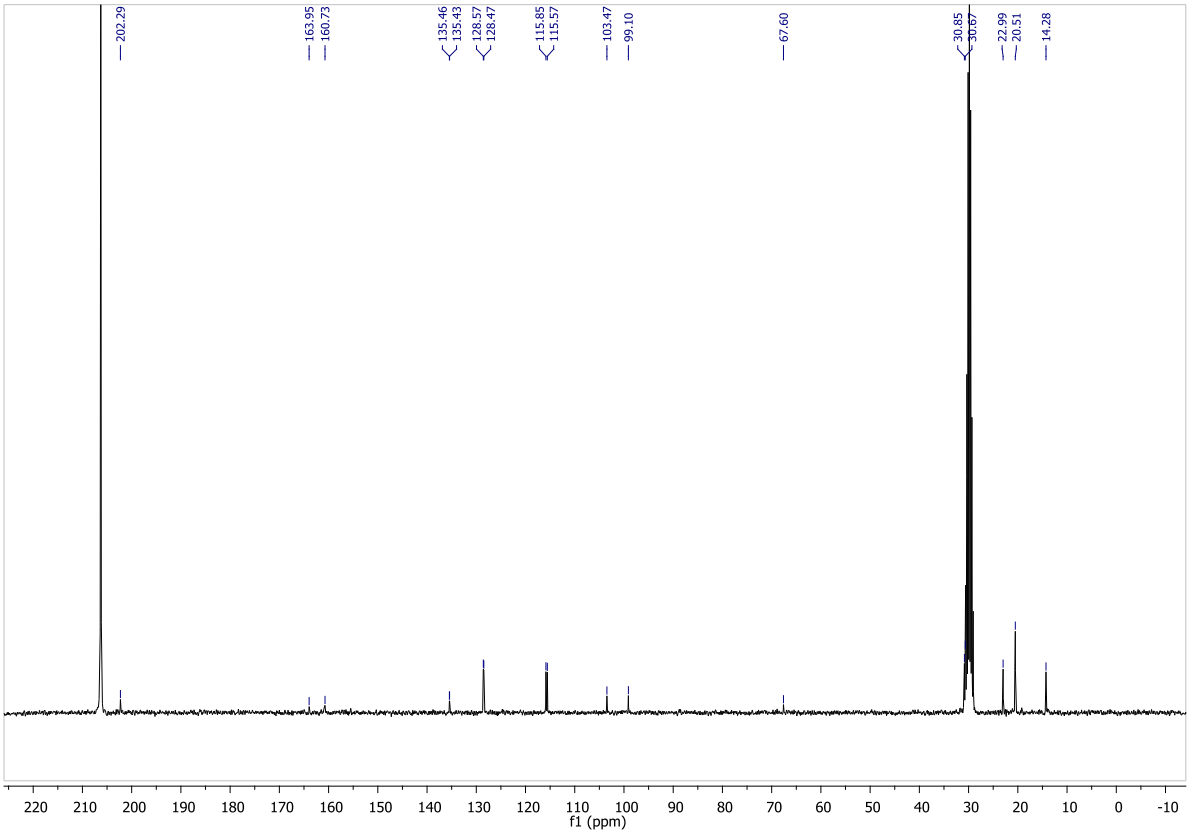
(2-Methylocta-2,3-dien-4-yl)benzene (3d)



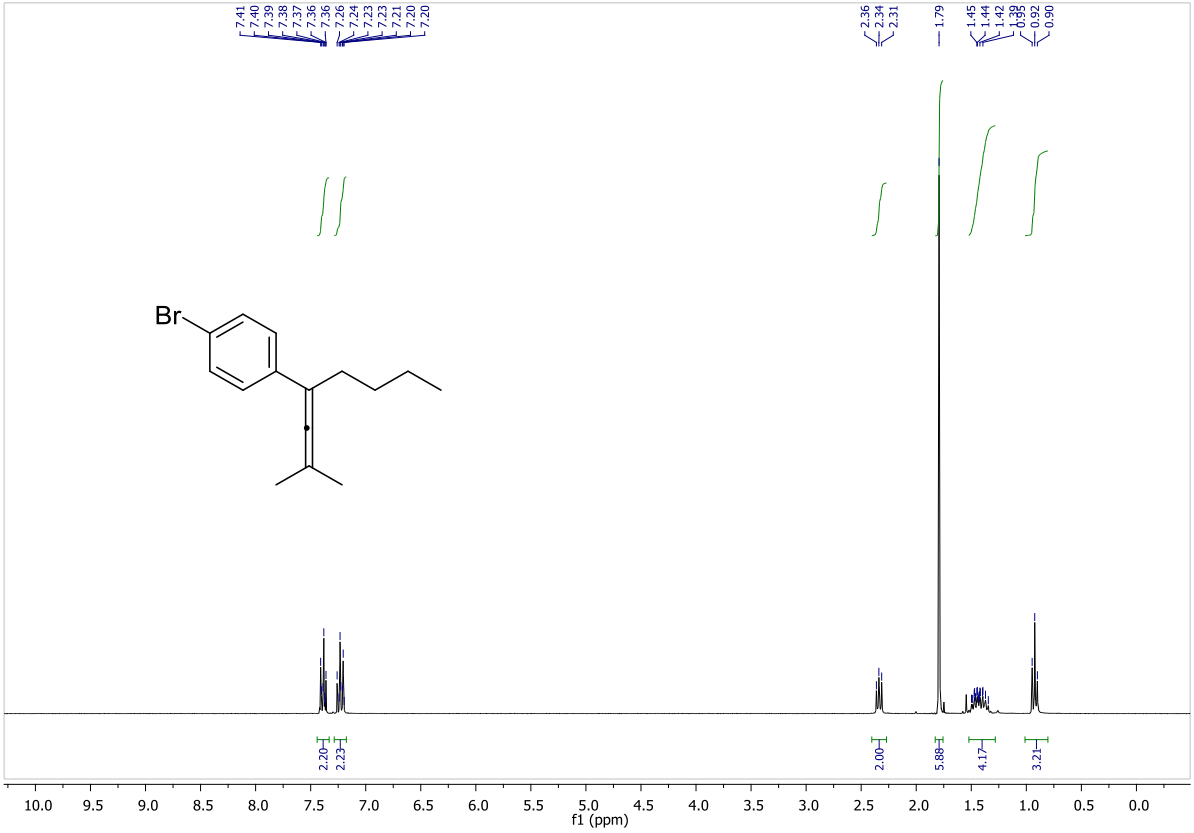


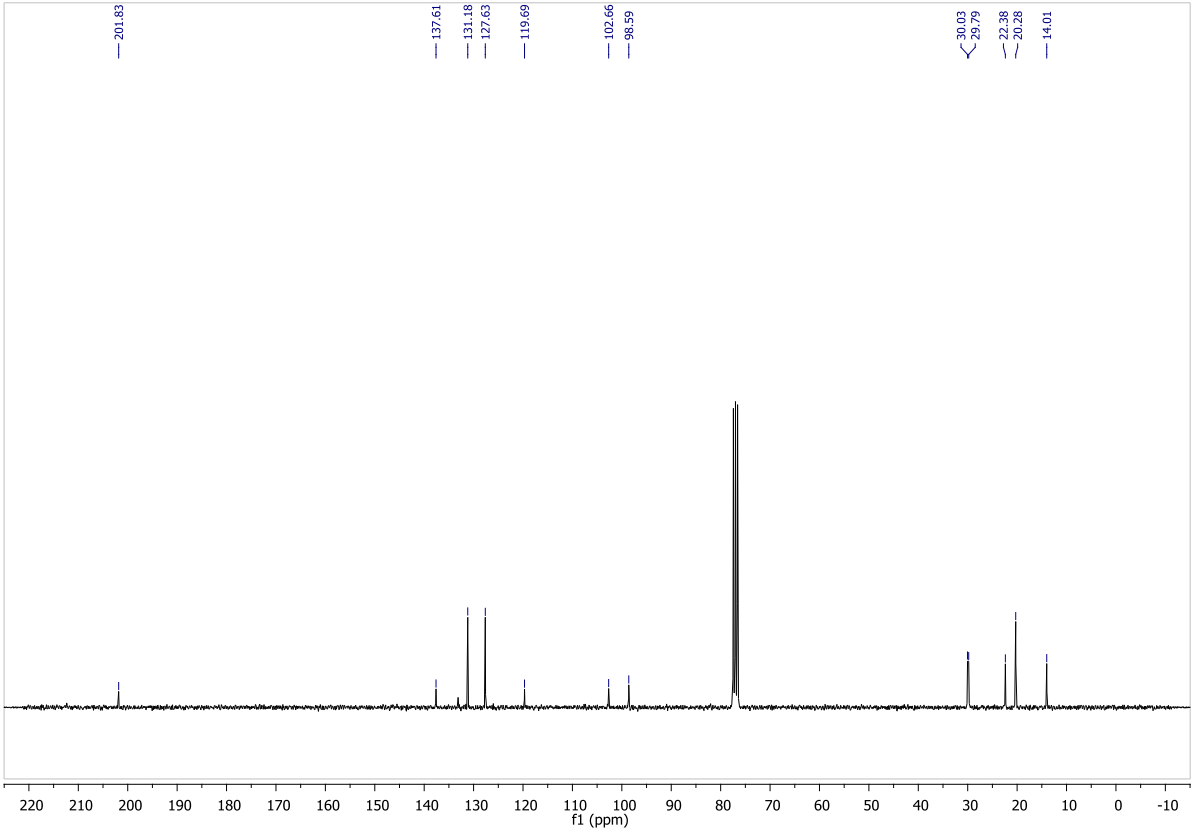
1-Fluoro-4-(2-methylocta-2,3-dien-4-yl)benzene (3e)



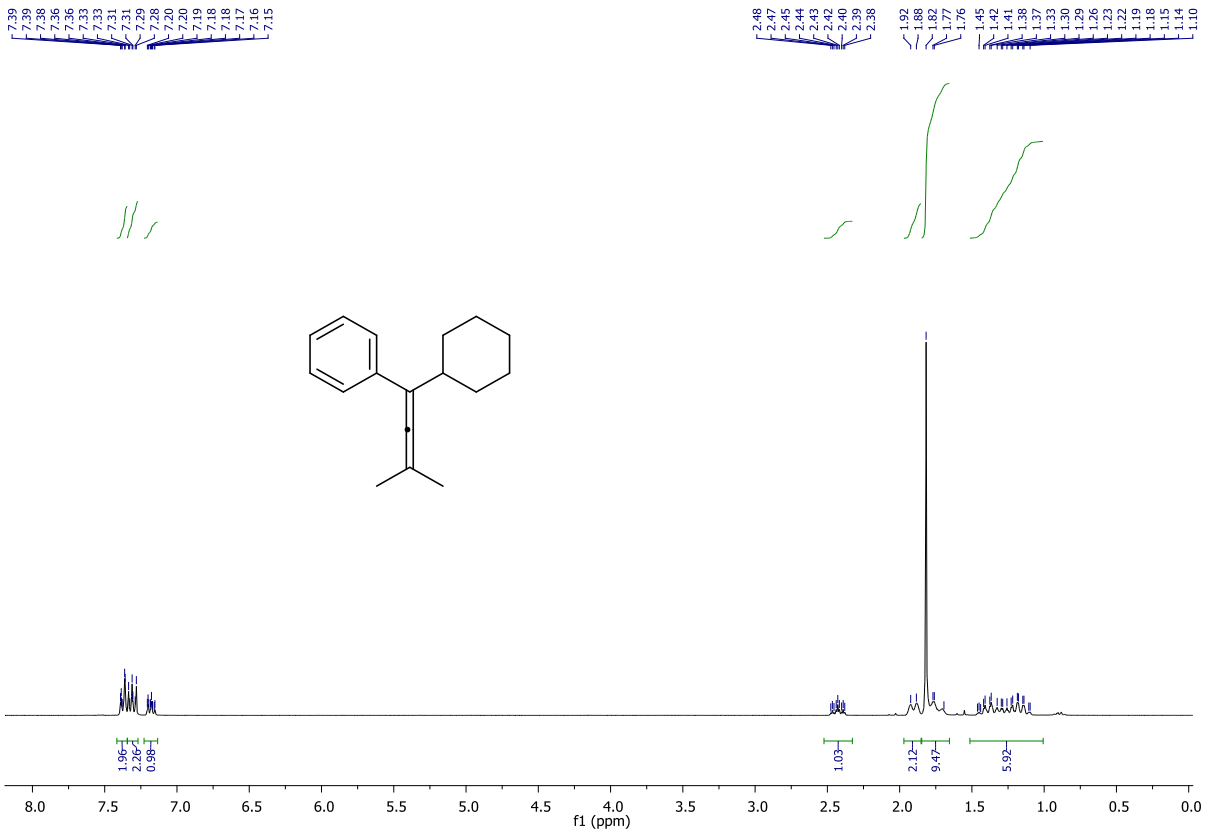


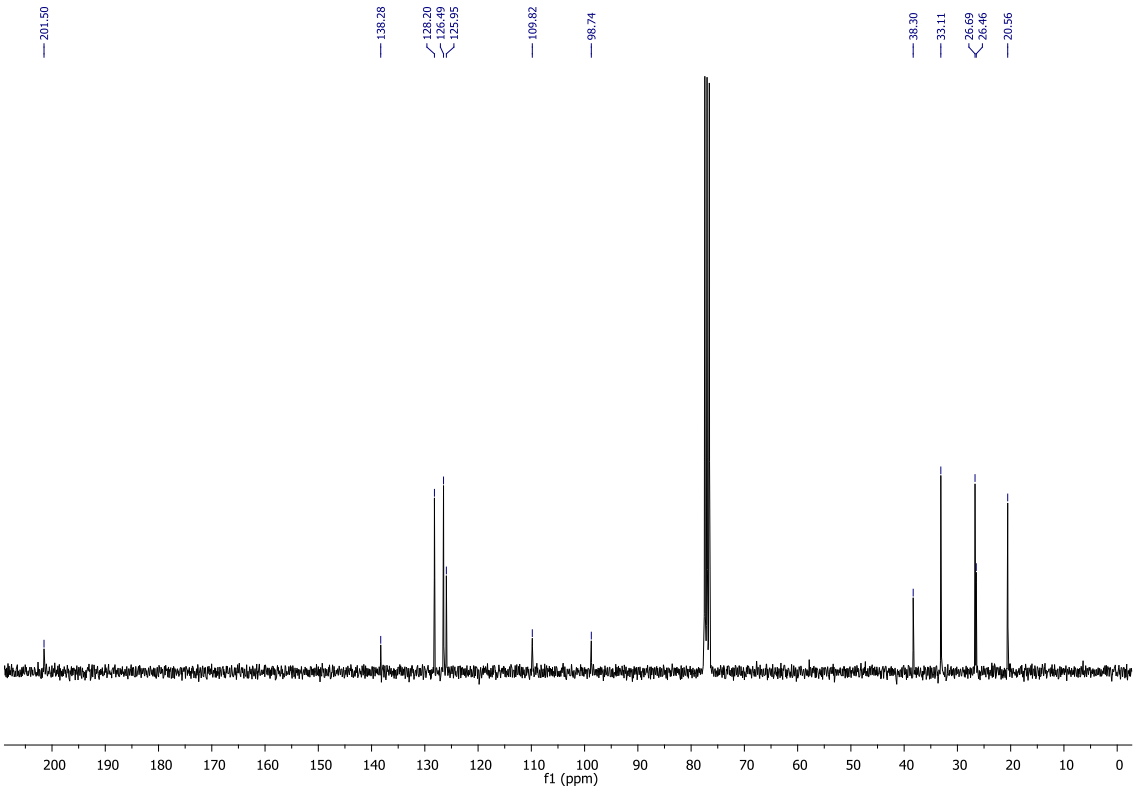
1-Bromo-4-(2-methylocta-2,3-dien-4-yl)benzene (3f)



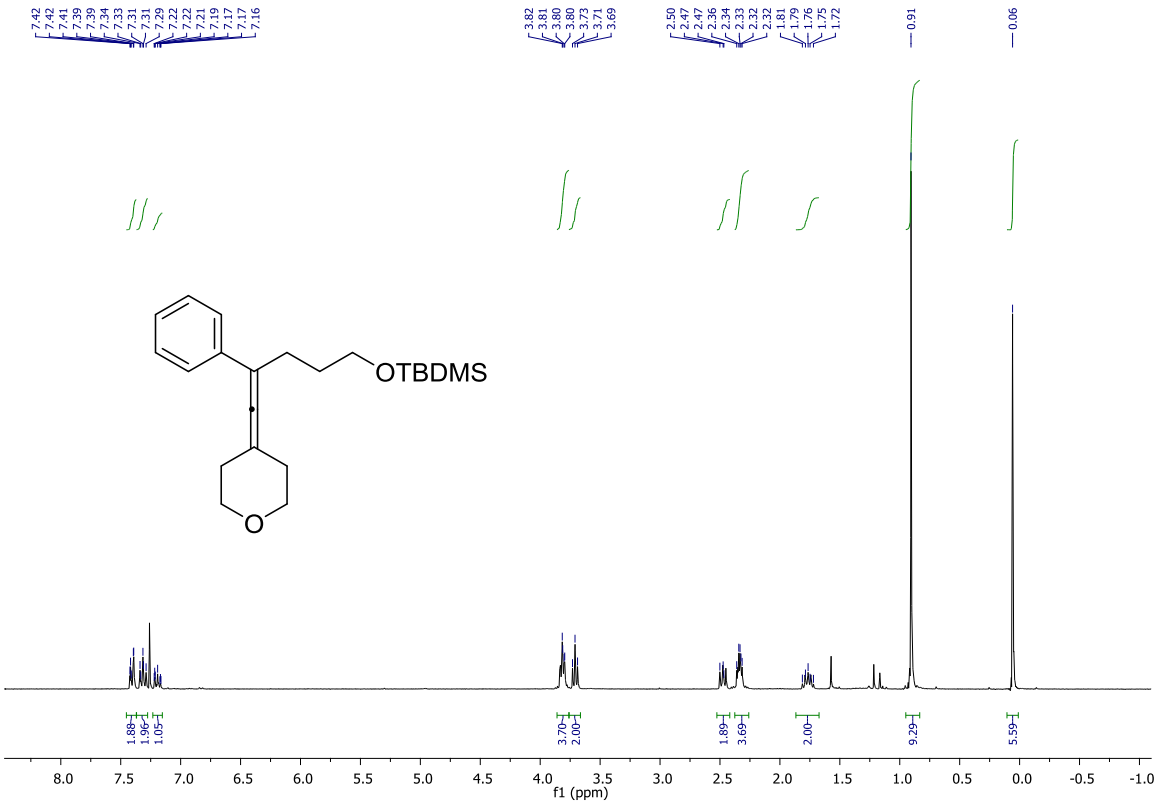


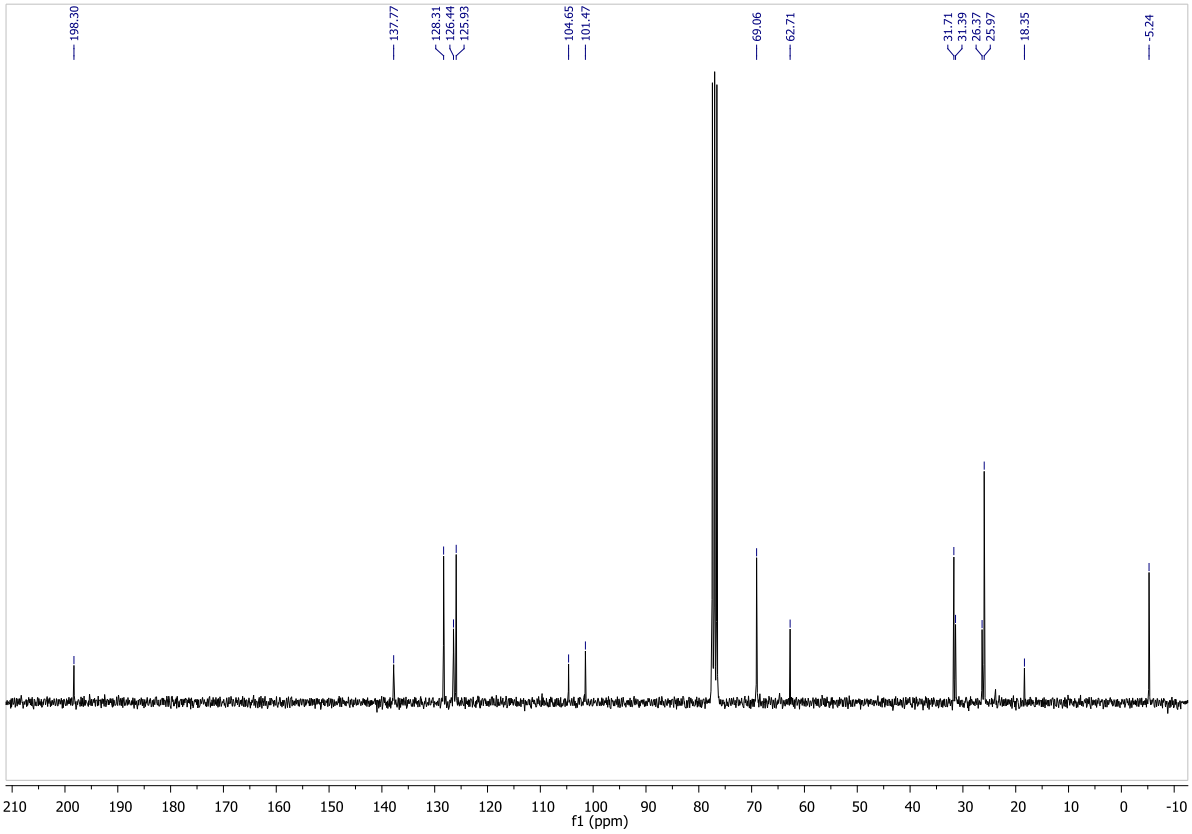
(1-Cyclohexyl-3-methylbuta-1,2-dien-1-yl)benzene (3g)



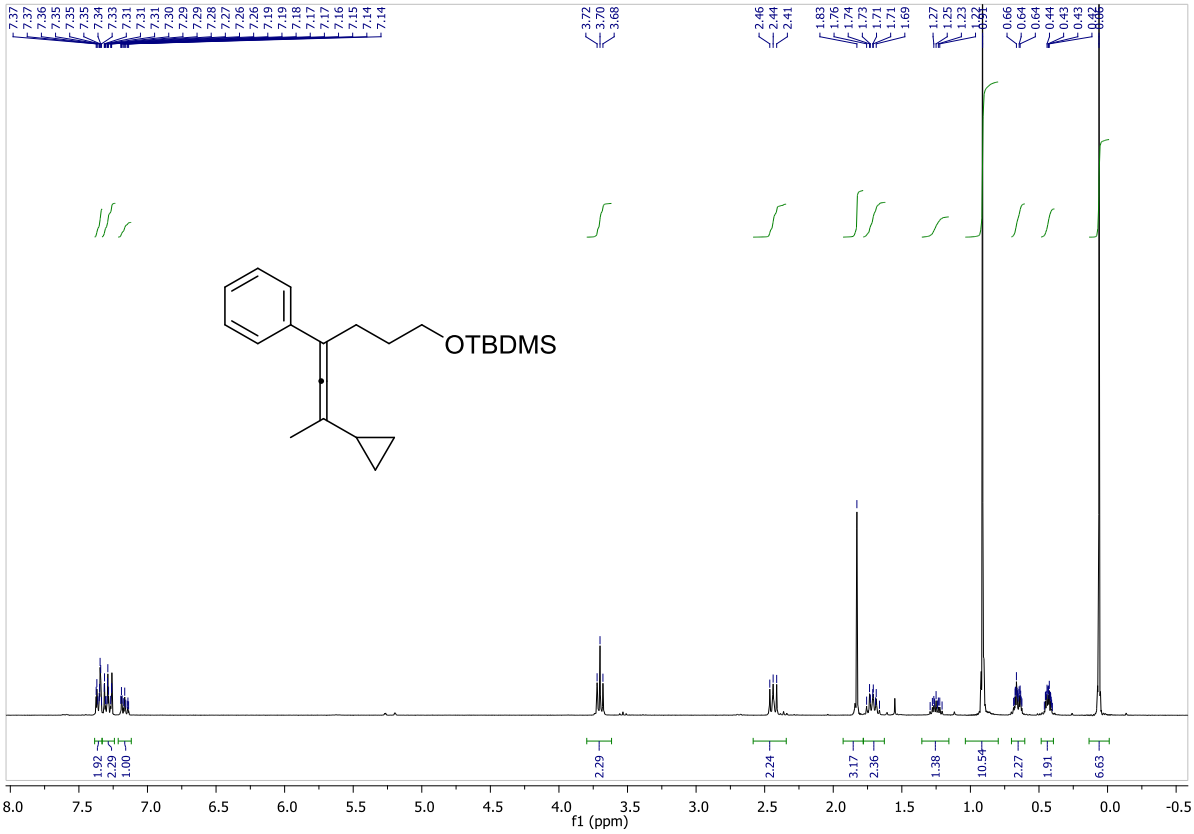


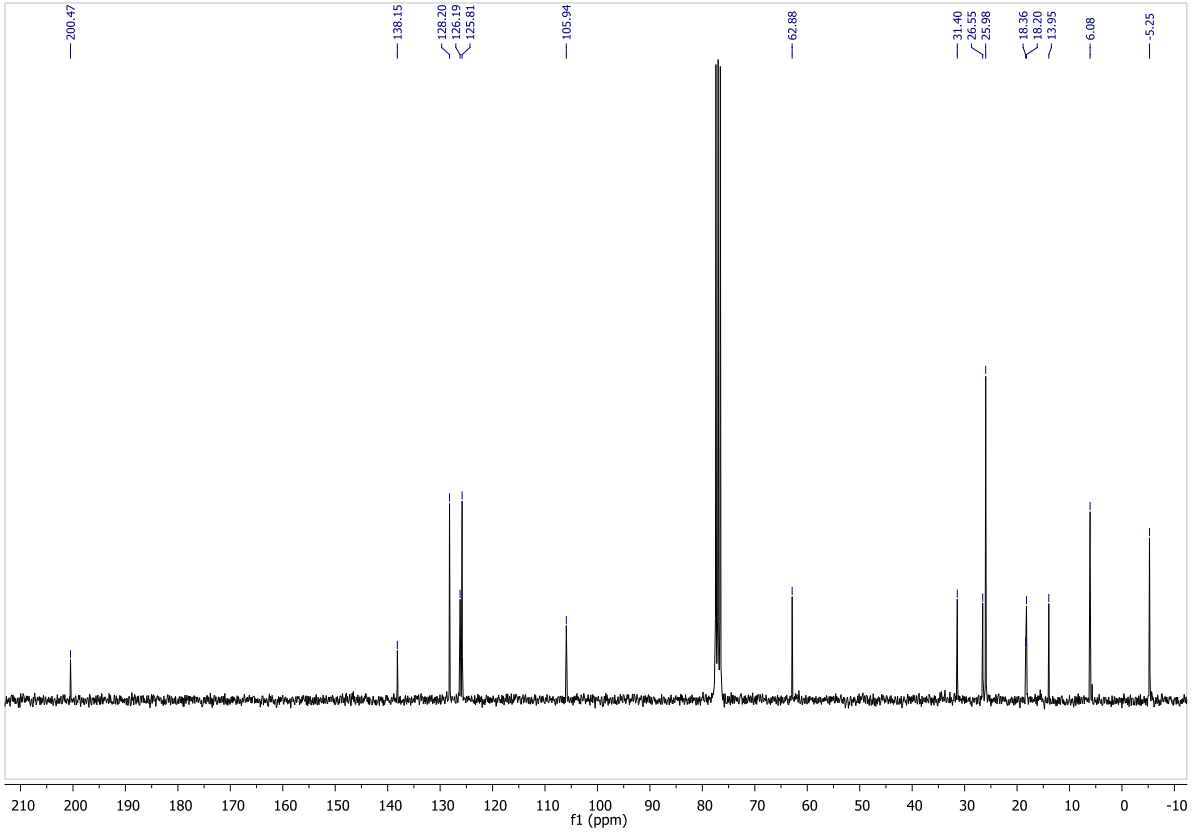
Tert-butyldimethyl((4-phenyl-5-(tetrahydro-4H-pyran-4-ylidene)pent-4-en-1-yl)oxy)silane (3h)



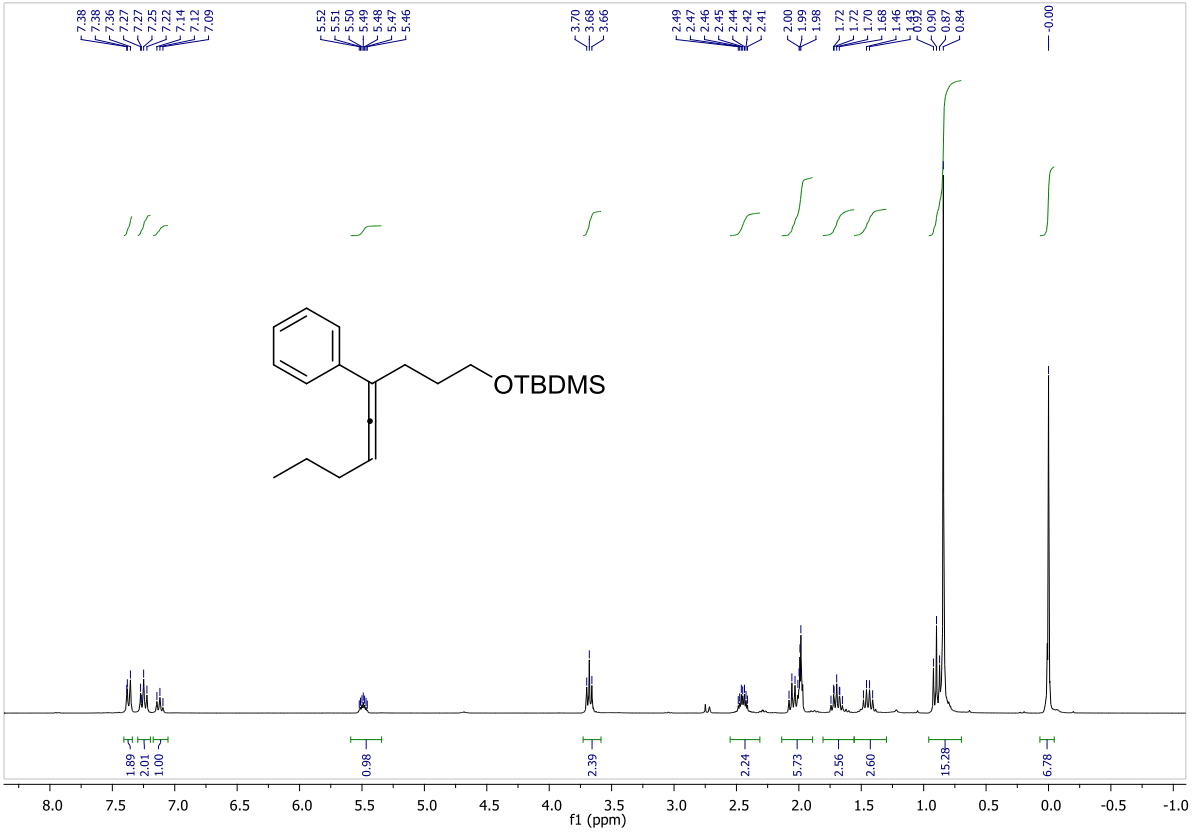


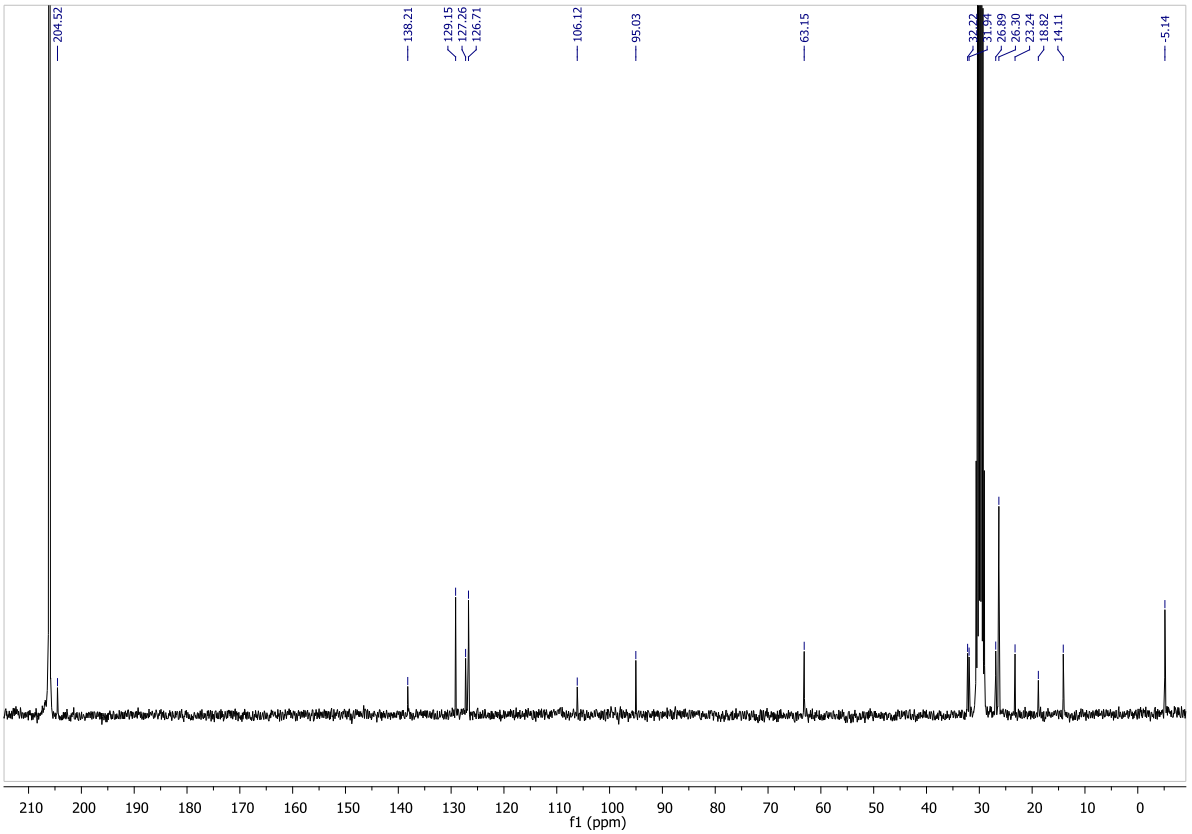
Tert-butyl((6-cyclopropyl-4-phenylhepta-4,5-dien-1-yl)oxy)dimethylsilane (3i)



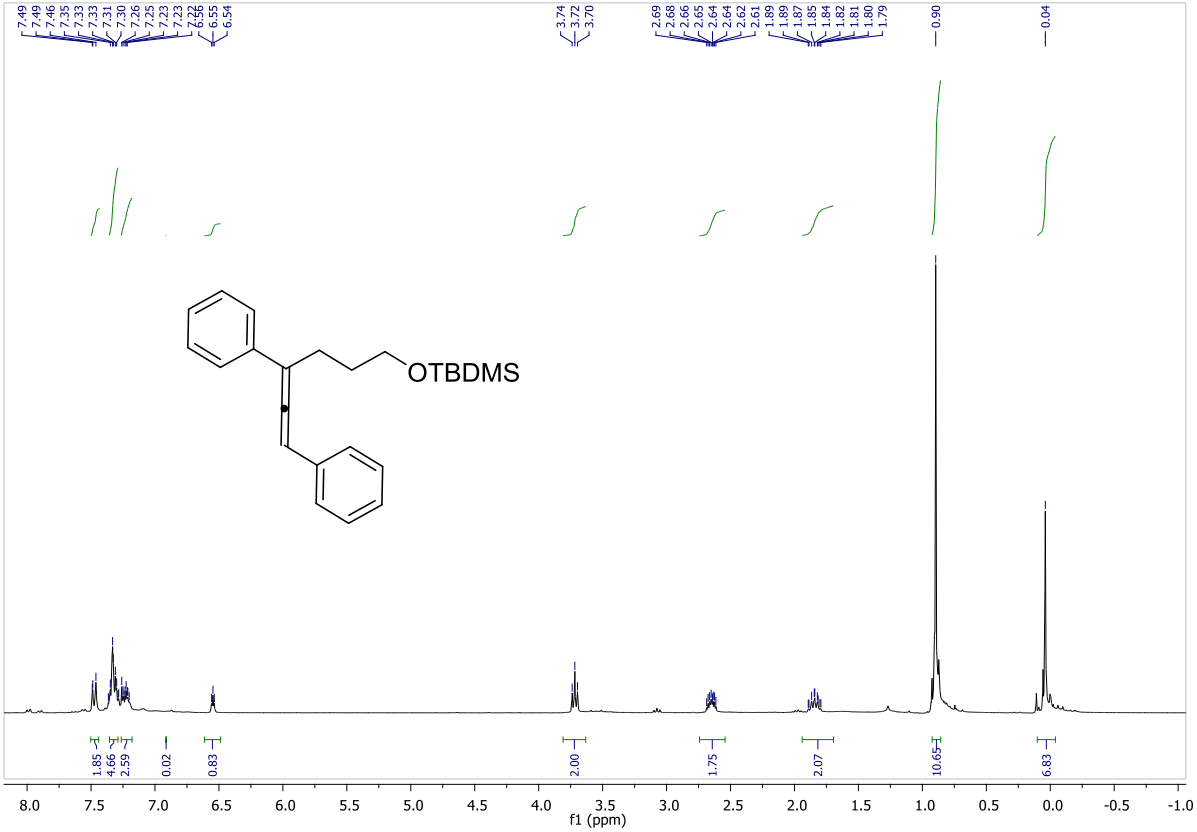


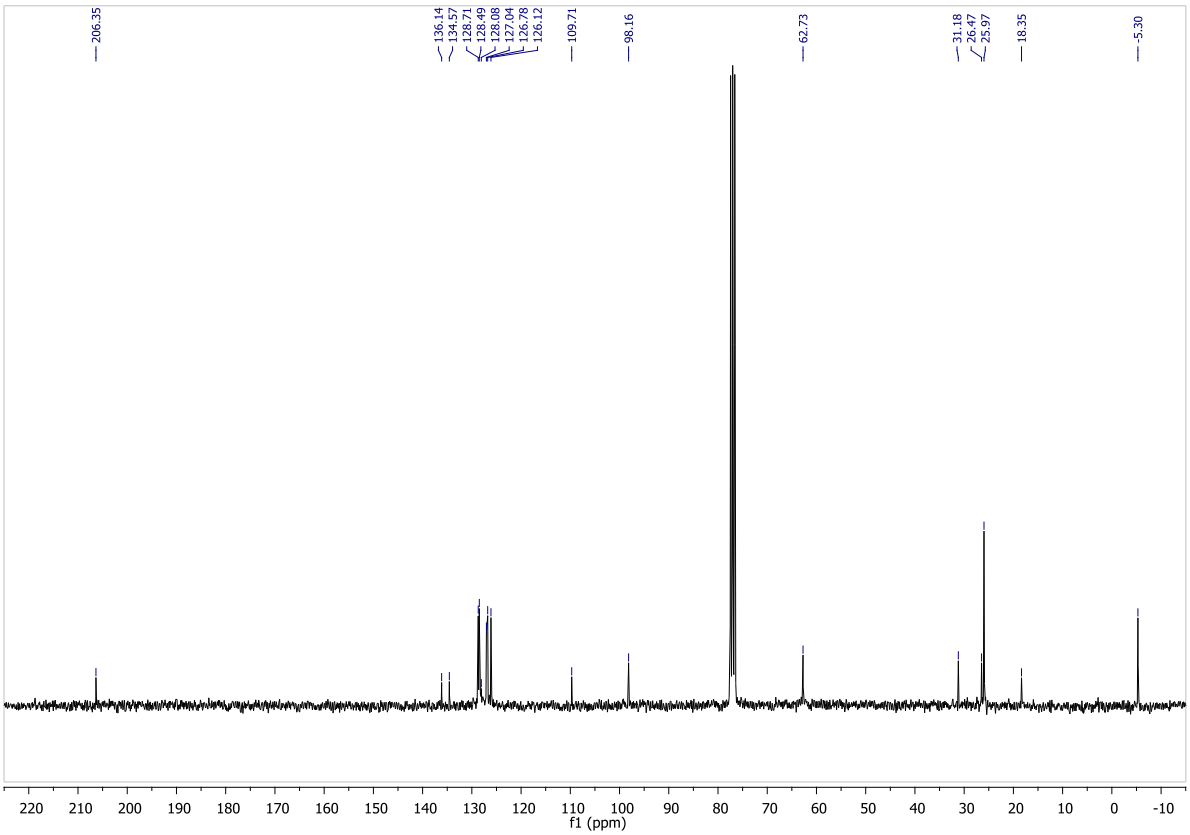
Tert-butyldimethyl((4-phenylnona-4,5-dien-1-yl)oxy)silane (3j)



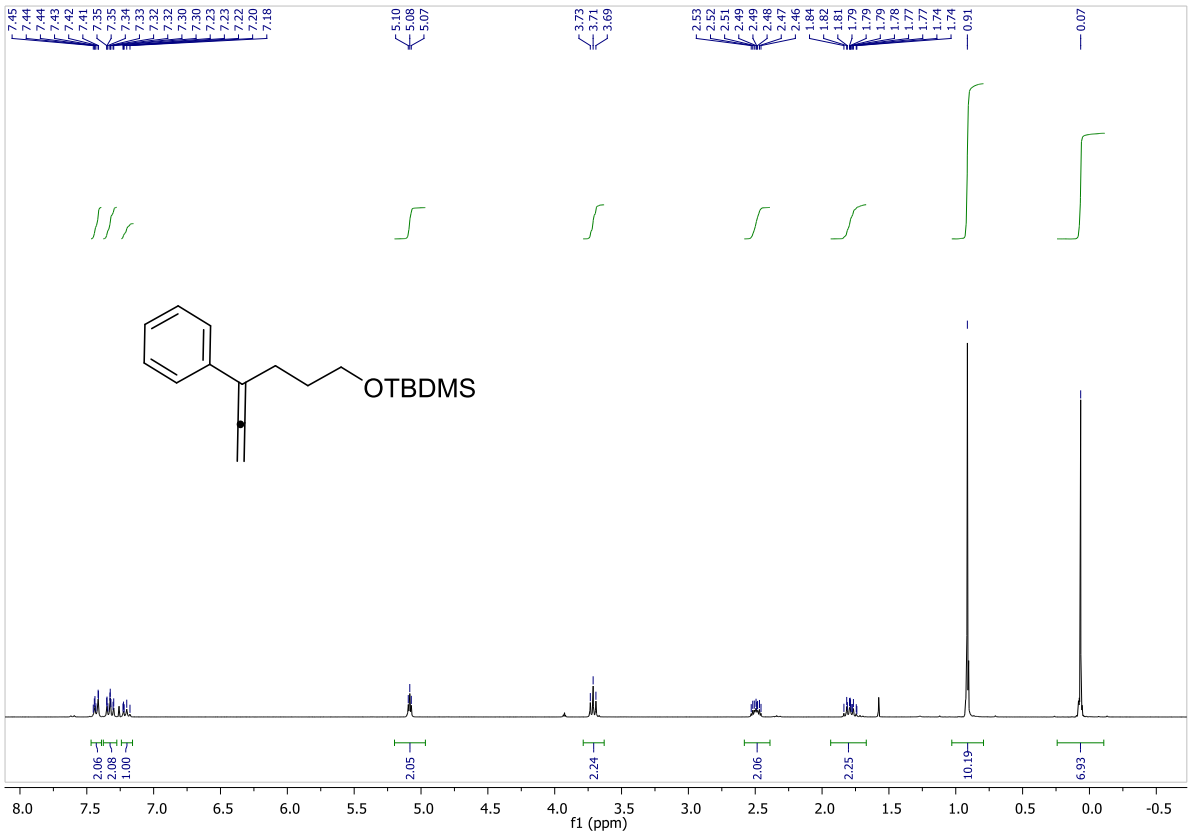


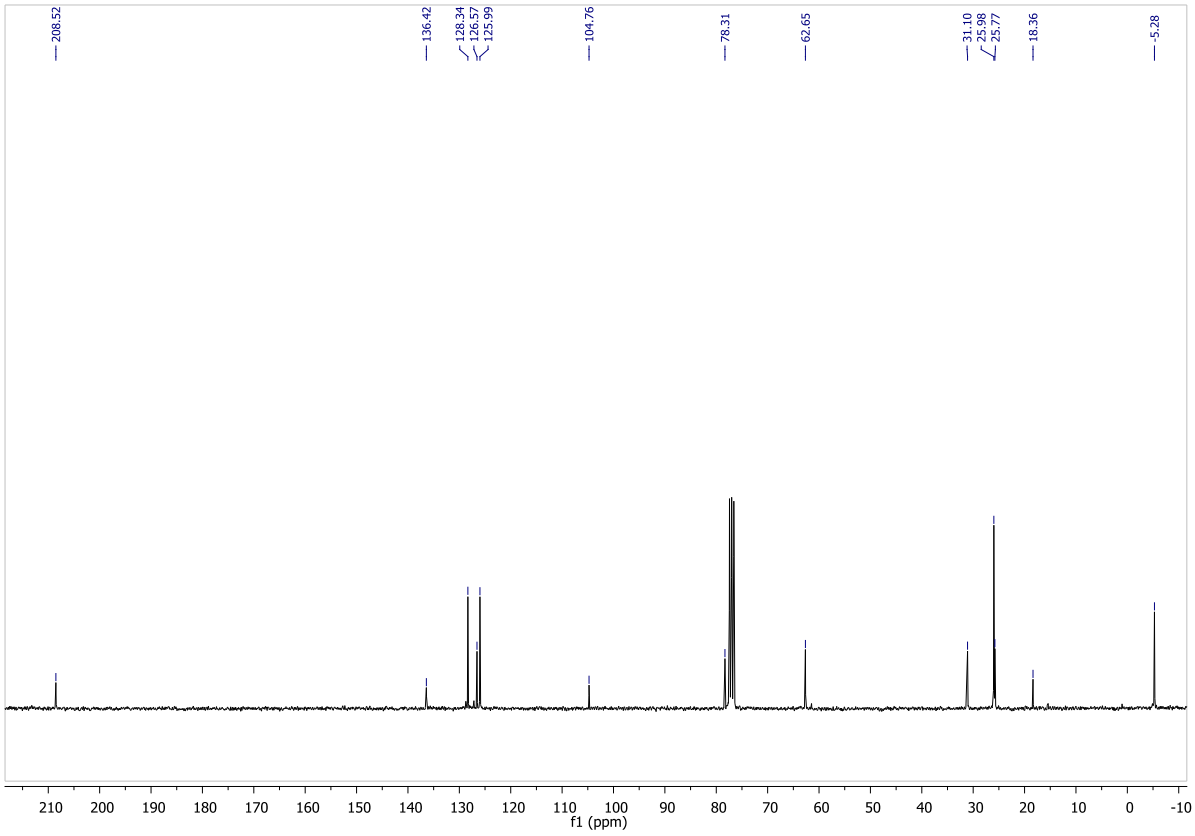
Tert-butyl((4,6-diphenylhexa-4,5-dien-1-yl)oxy)dimethylsilane (3k)



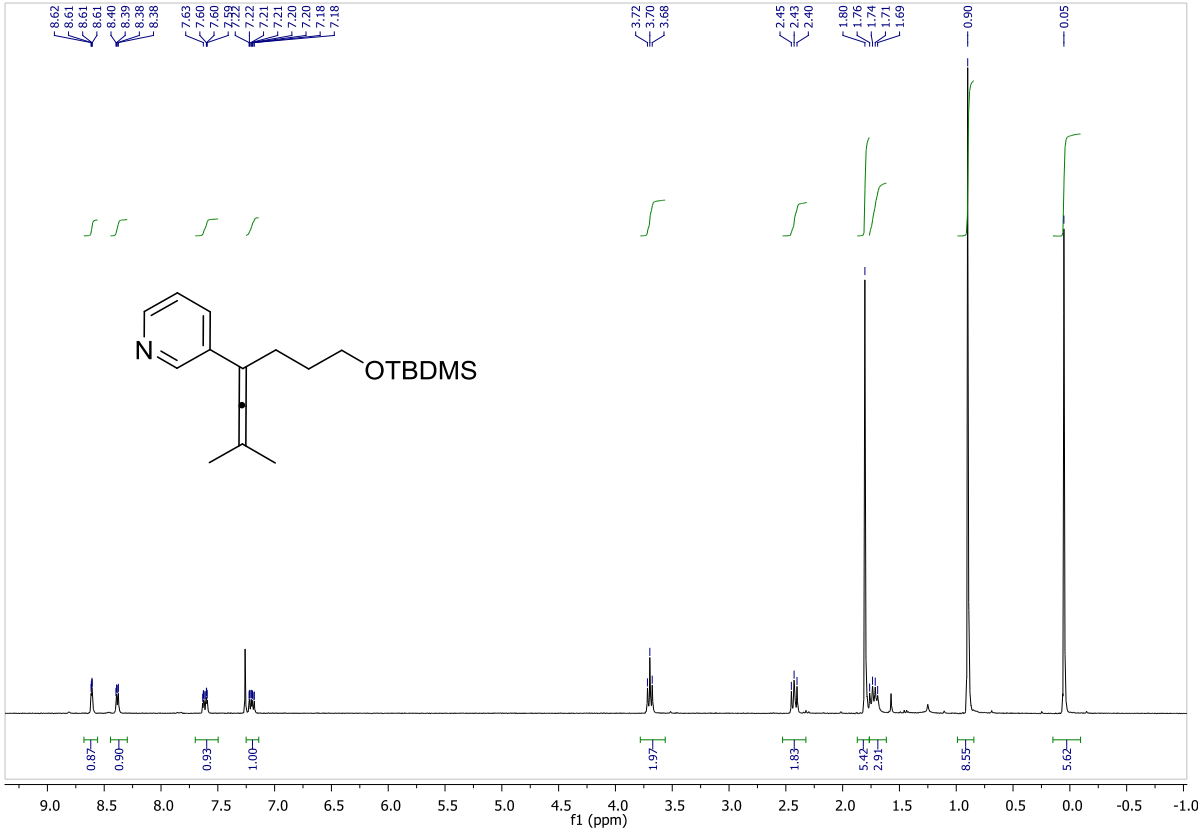


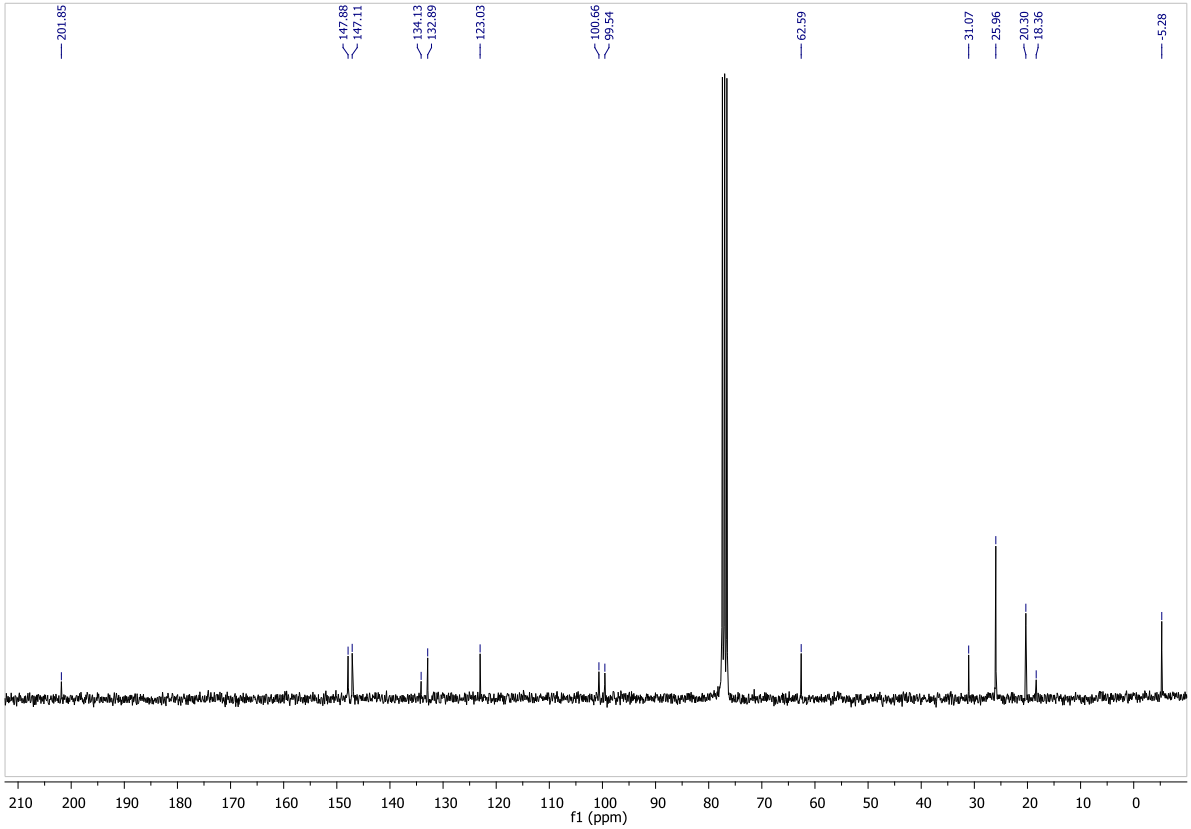
Tert-butyldimethyl((4-phenylhexa-4,5-dien-1-yl)oxy)silane (3l)



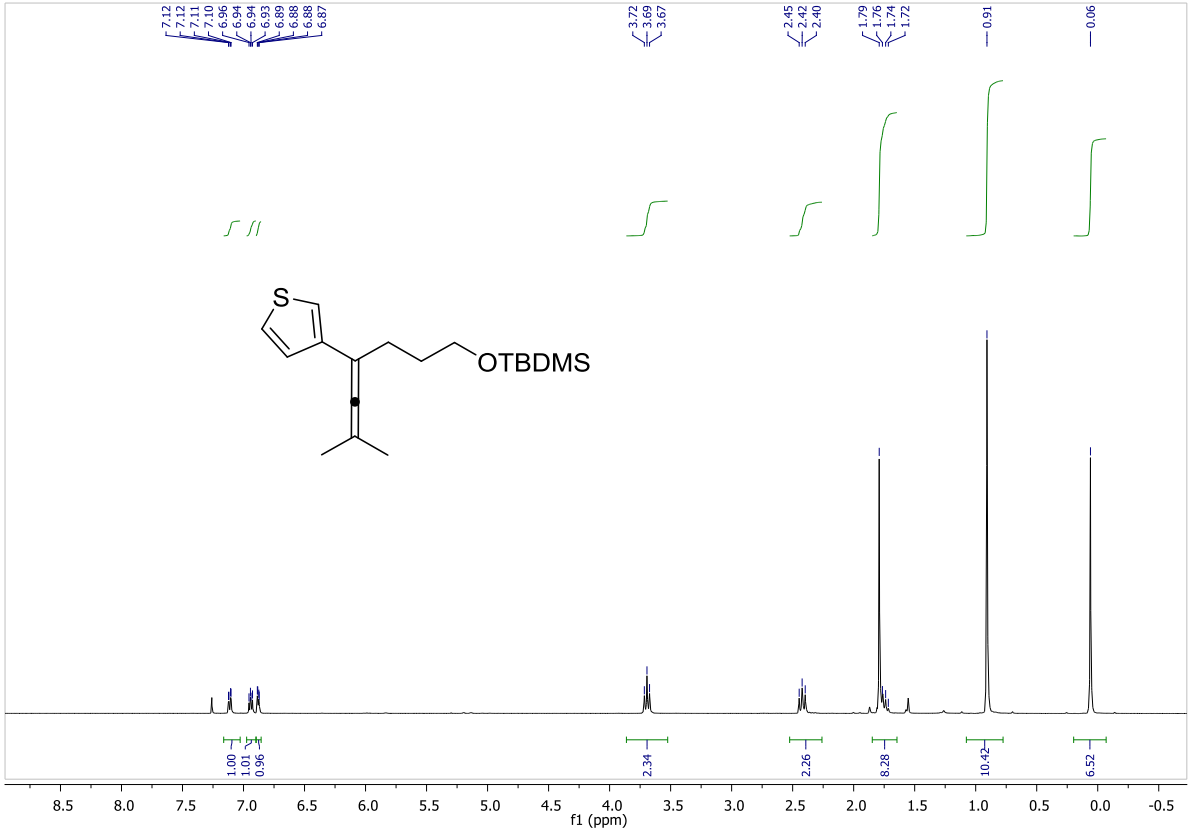


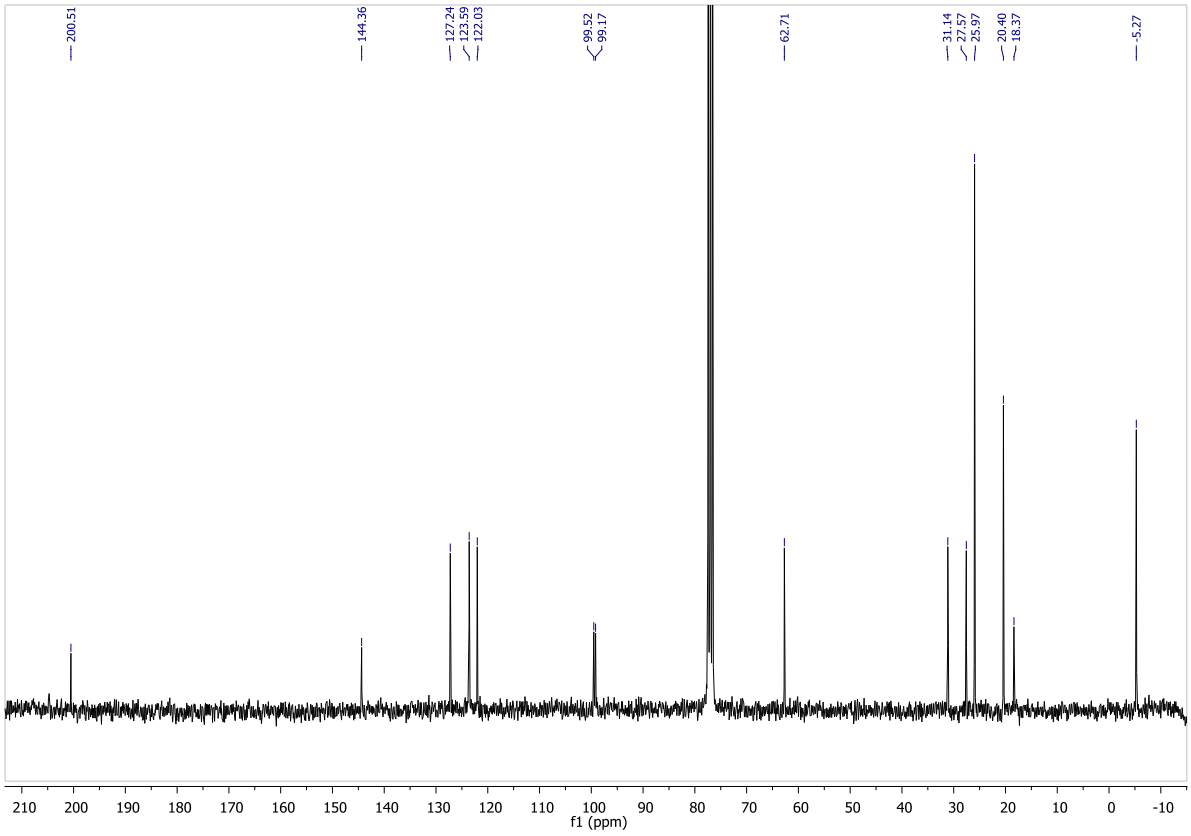
3-(7-((Tert-butyldimethylsilyl)oxy)-2-methylhepta-2,3-dien-4-yl)pyridine (3m)



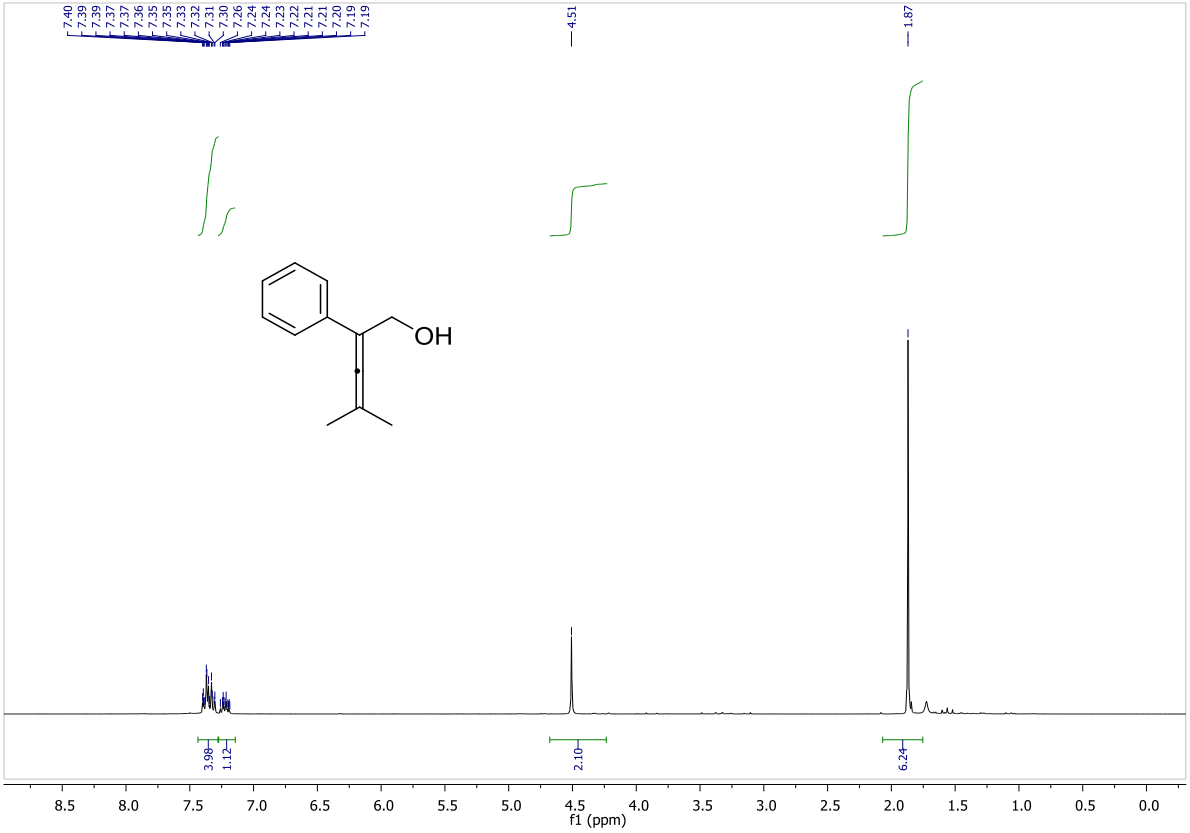


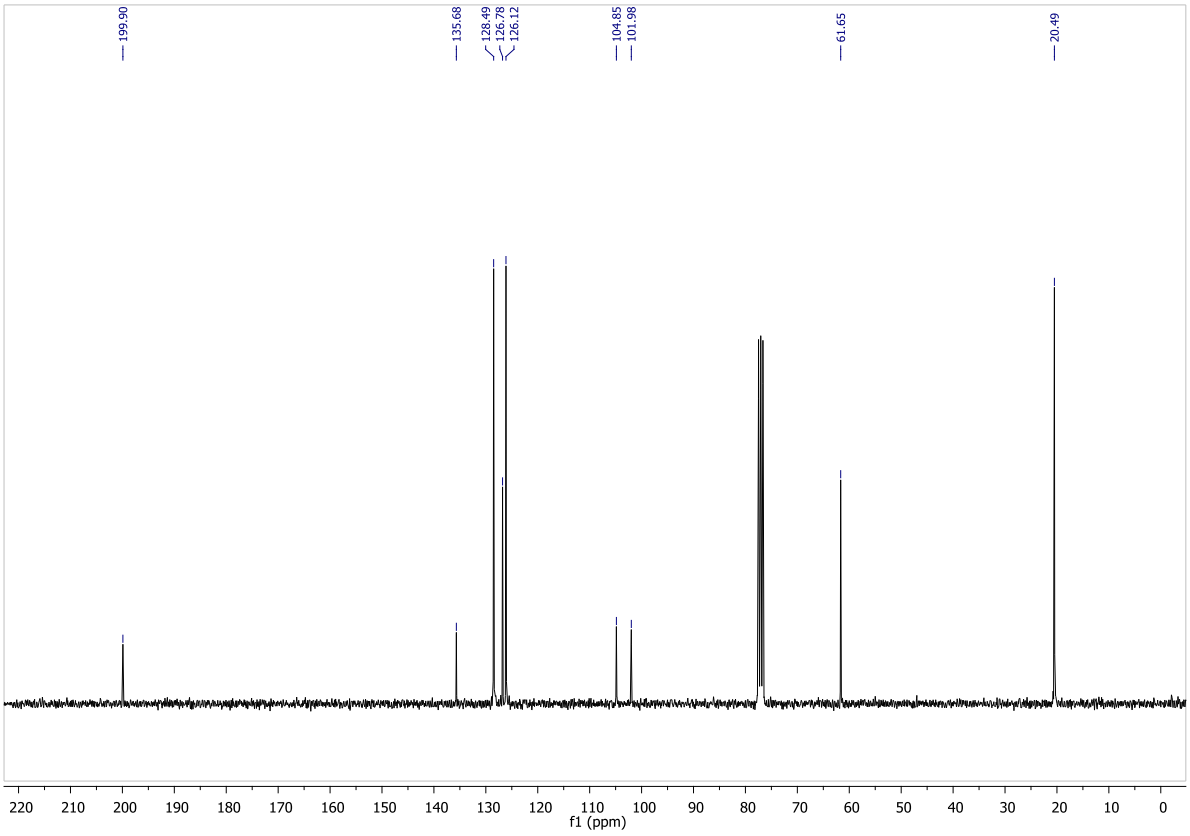
Tert-butyldimethyl((6-methyl-4-(thiophen-3-yl)hepta-4,5-dien-1-yl)oxy)silane (3n)



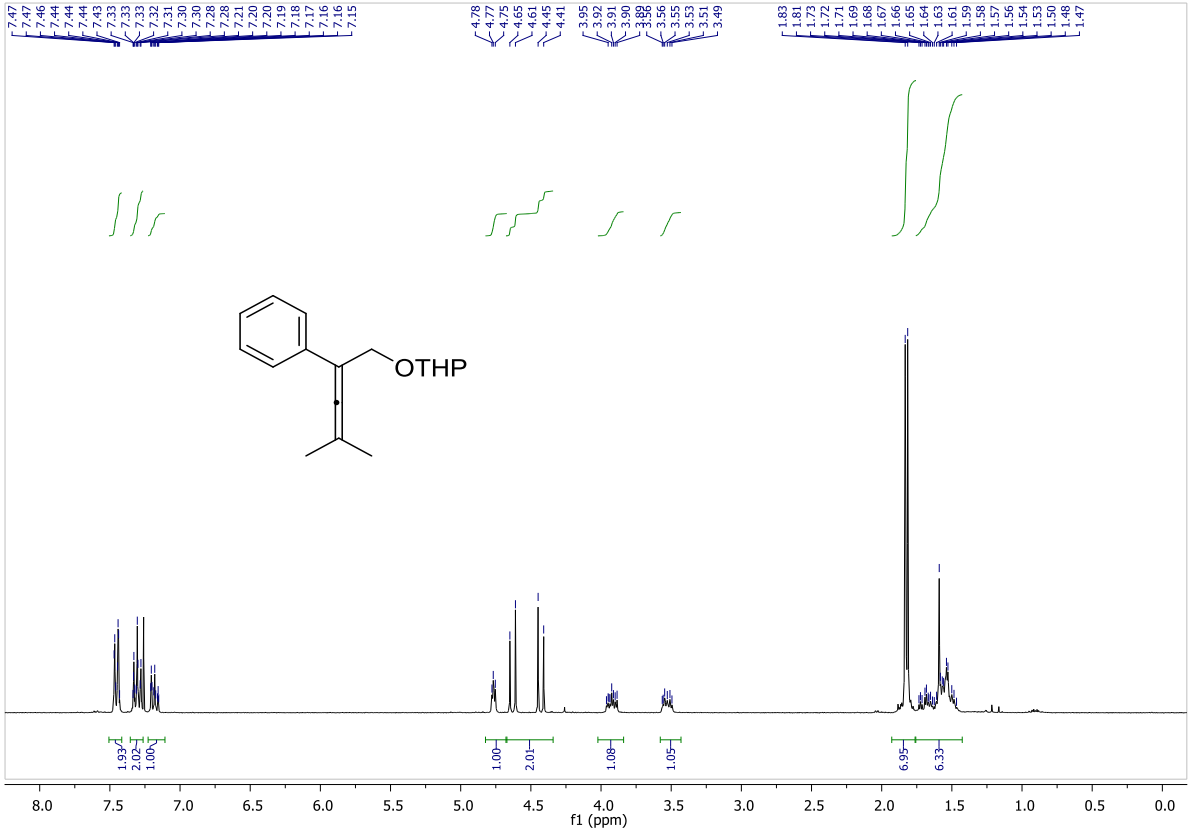


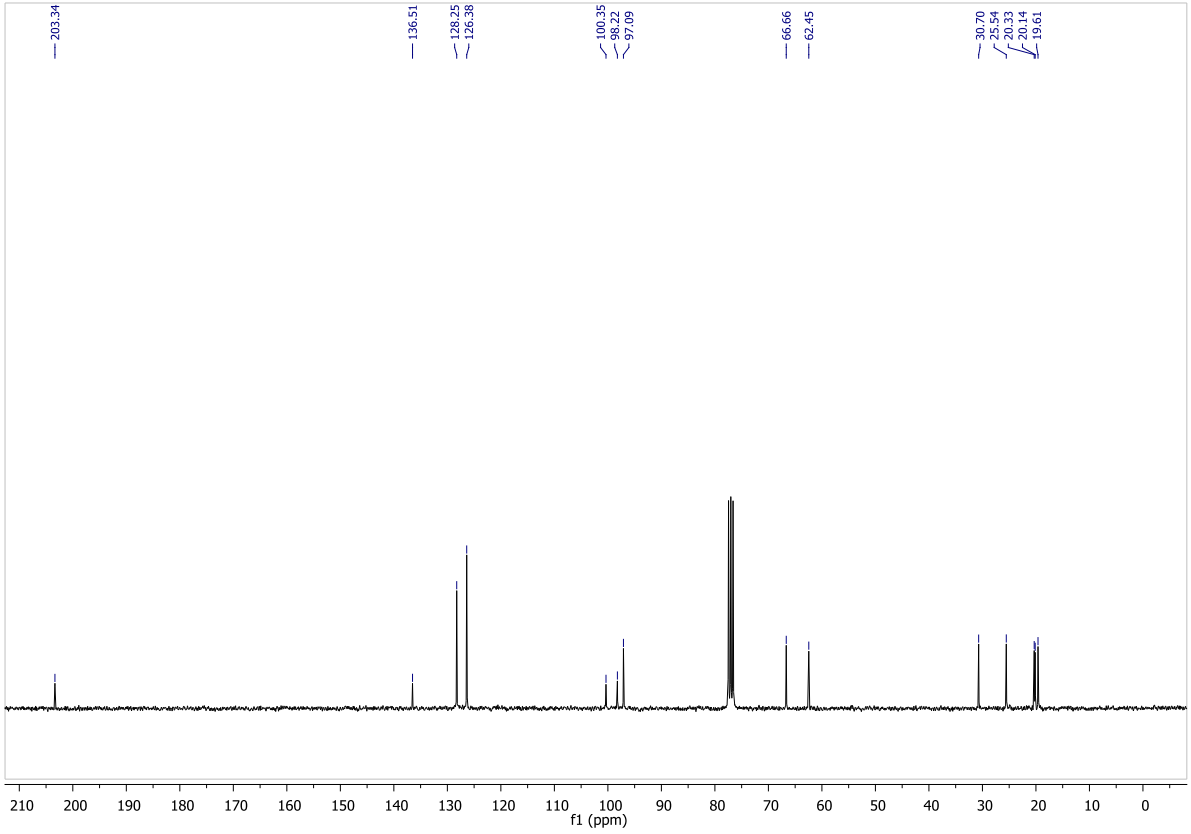
4-Methyl-2-phenylpenta-2,3-dien-1-ol (3o)



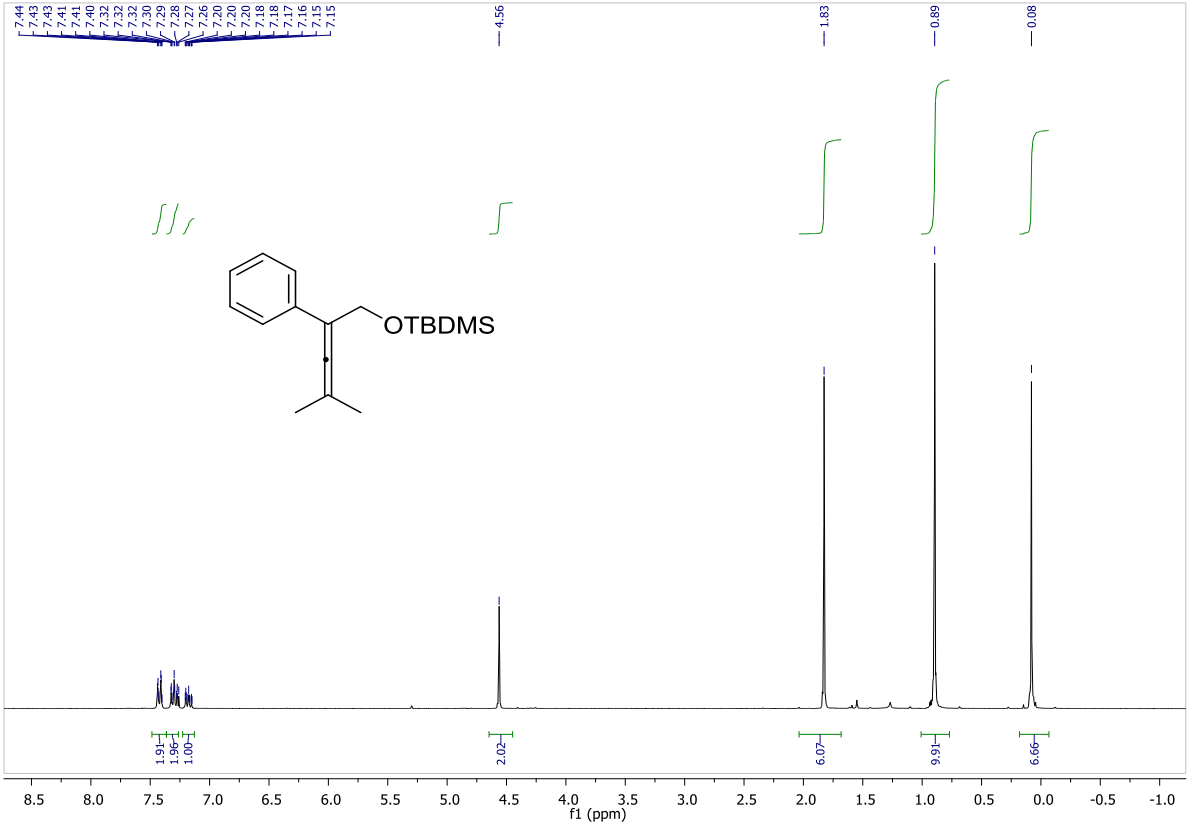


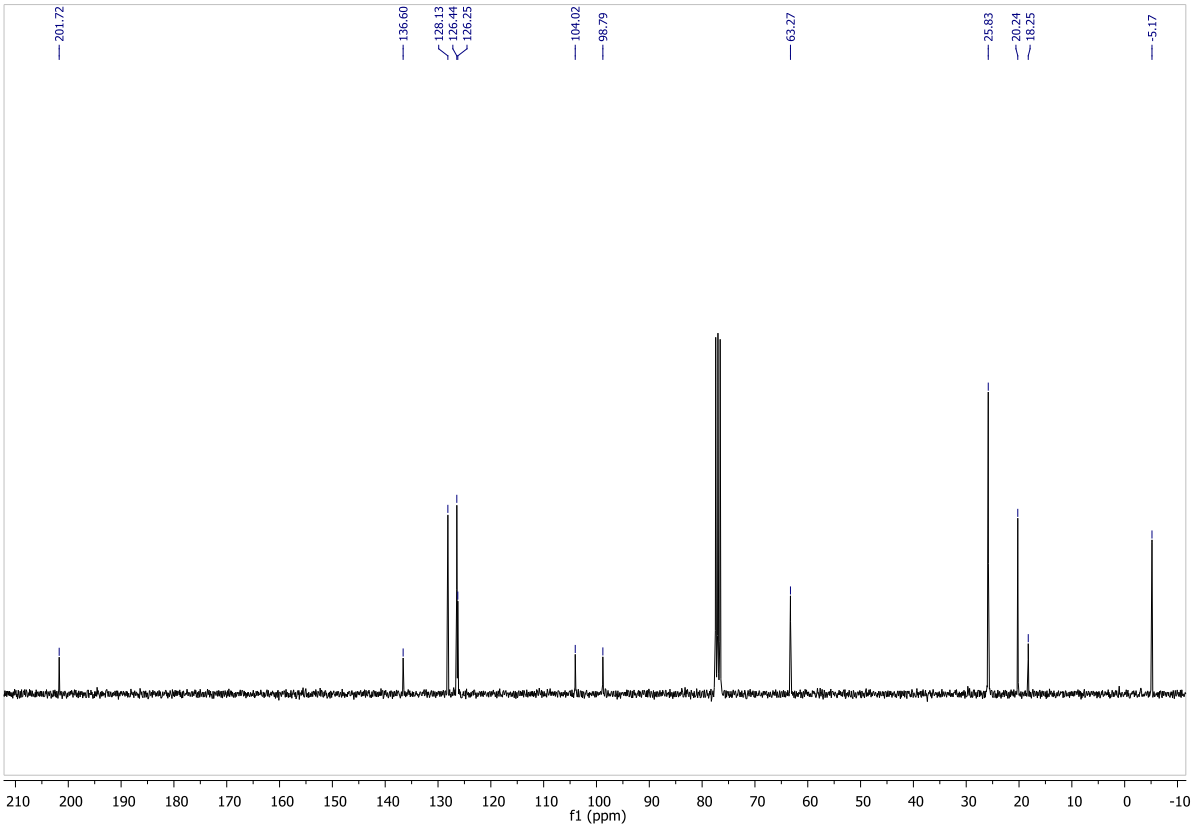
2-((4-Methyl-2-phenylpenta-2,3-dien-1-yl)oxy)tetrahydro-2H-pyran (3p)



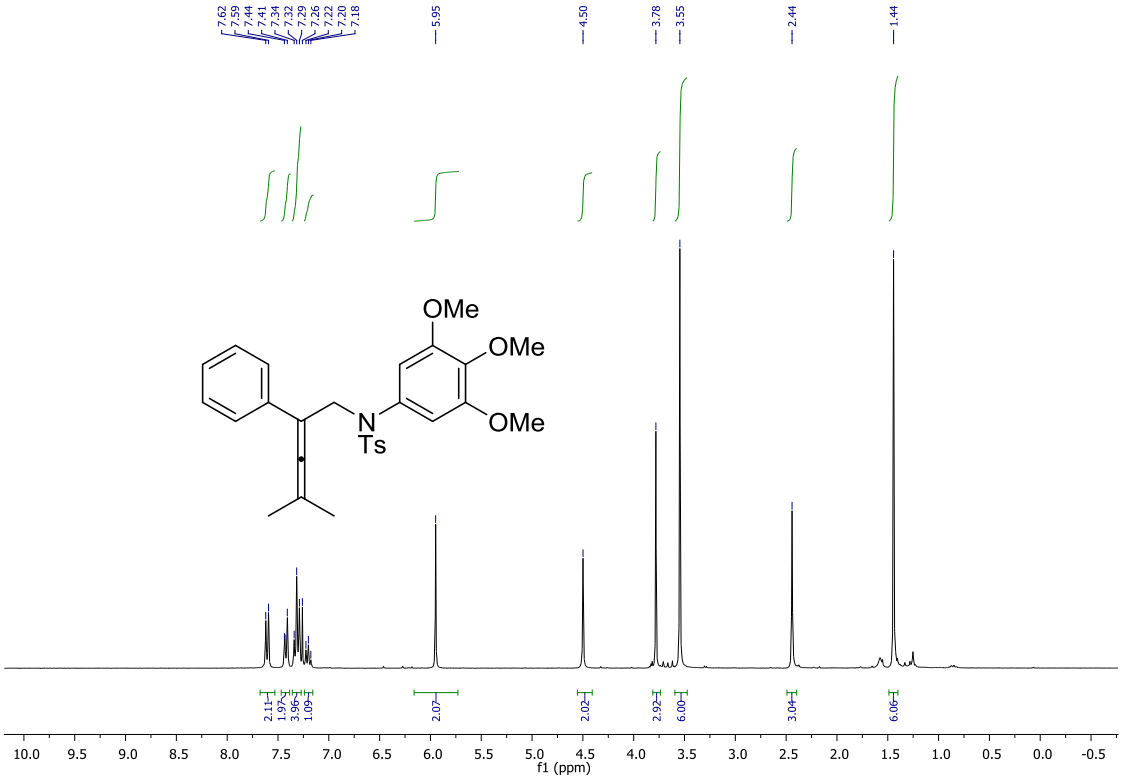


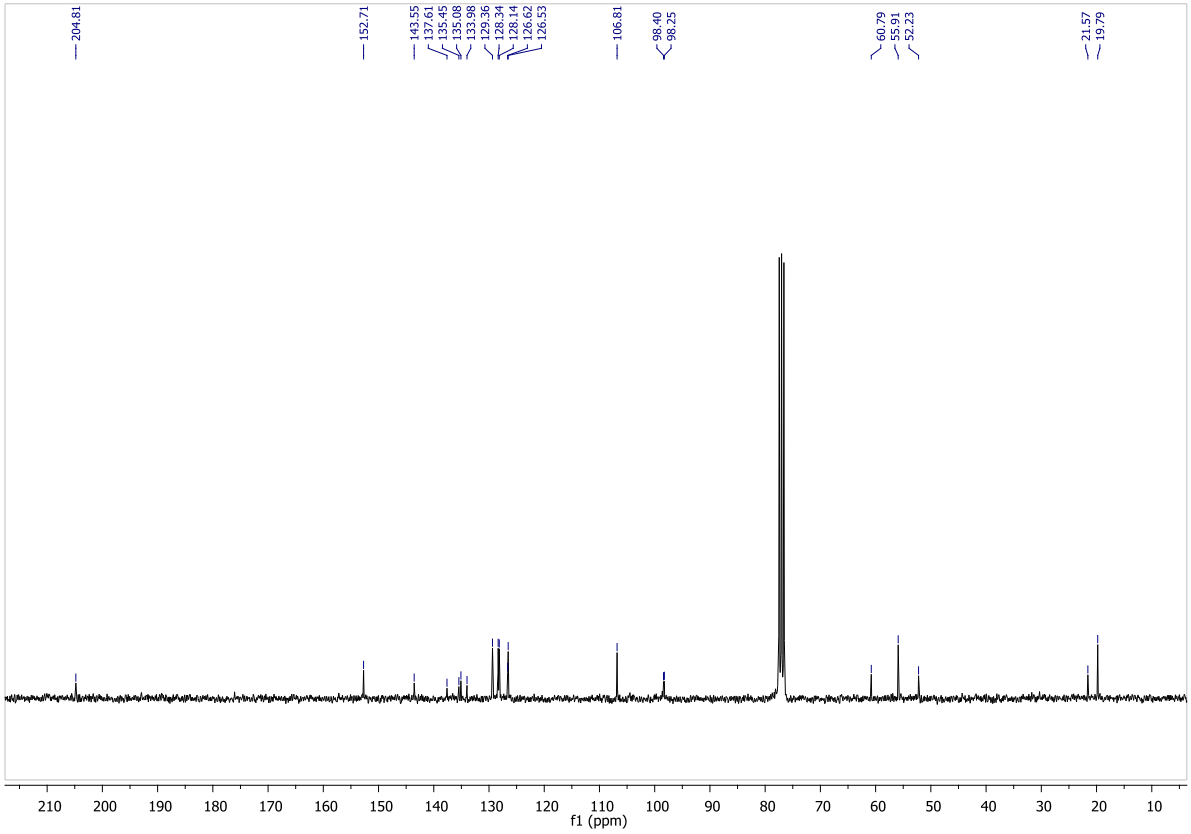
tert-butyldimethyl((4-methyl-2-phenylpenta-2,3-dien-1-yl)oxy)silane (3q)



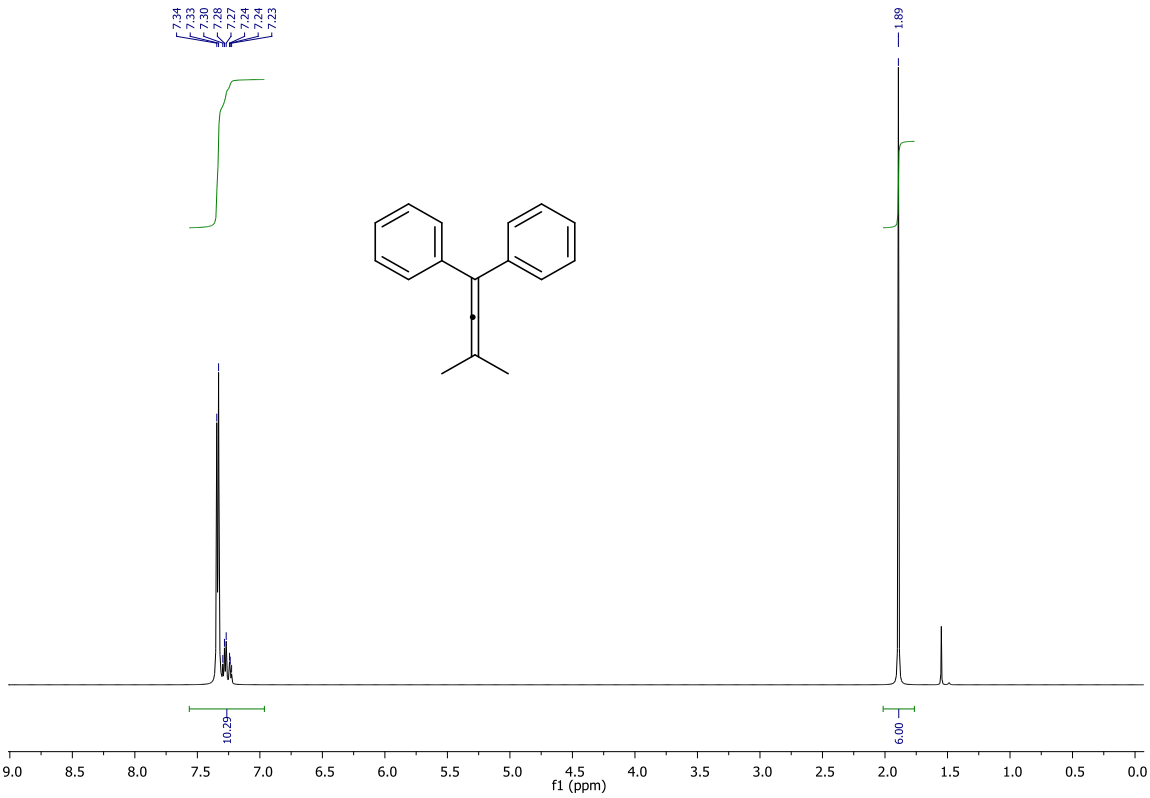


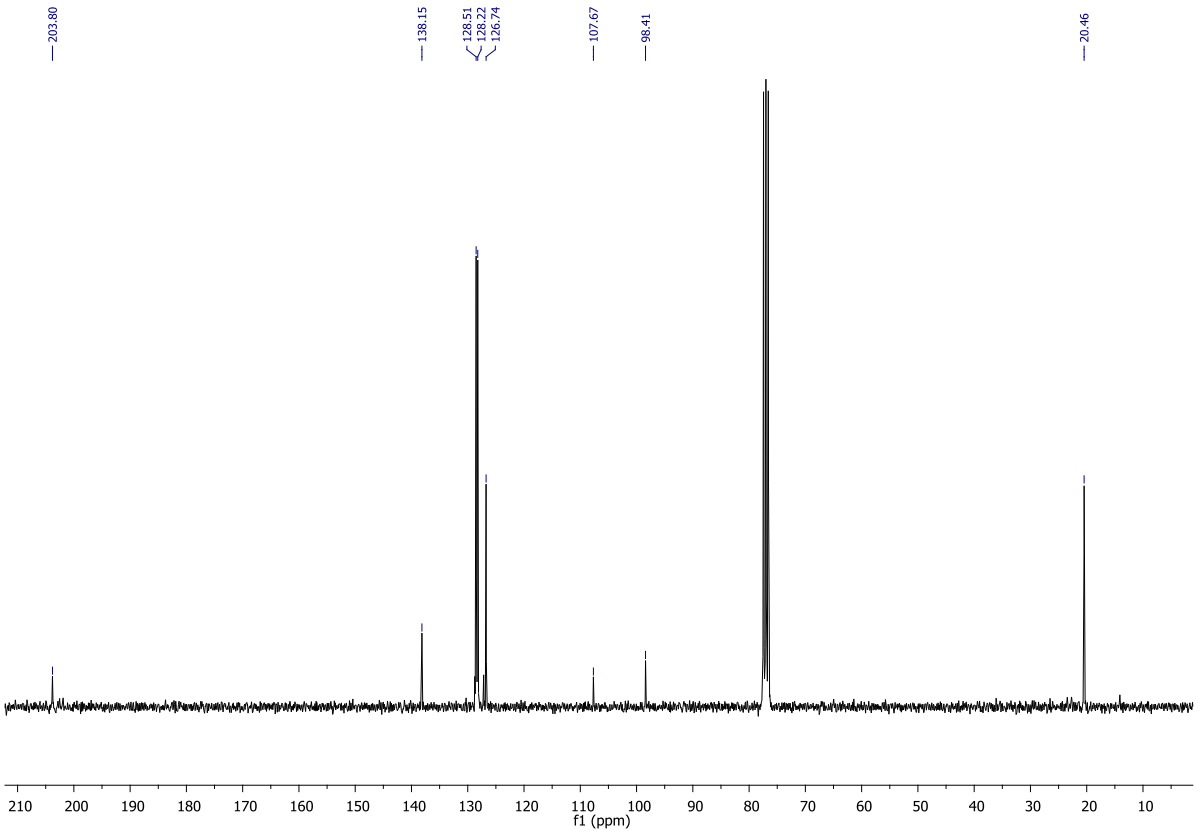
4-Methyl-N-(4-methyl-2-phenylpenta-2,3-dien-1-yl)-N-(3,4,5-trimethoxyphenyl)benzenesulfonamide (3r)



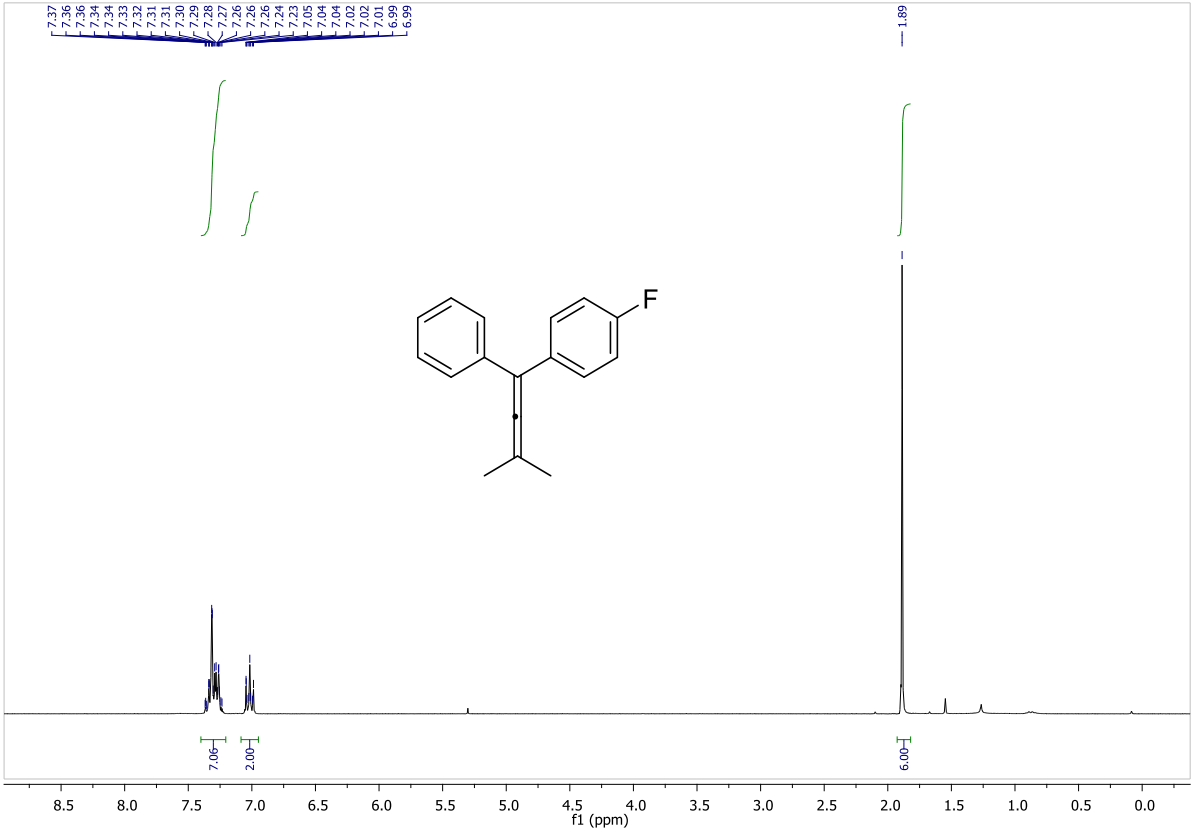


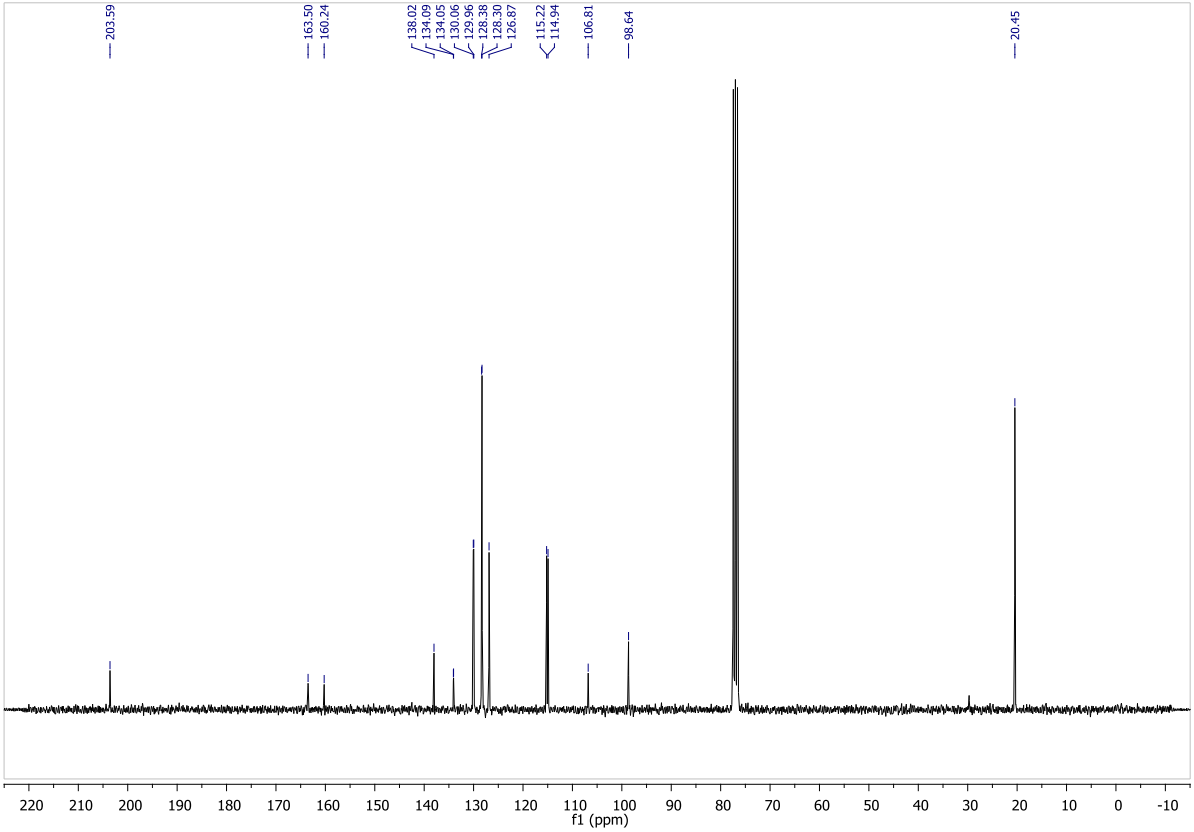
(3-Methylbuta-1,2-diene-1,1-diyl)dibenzene (3s)



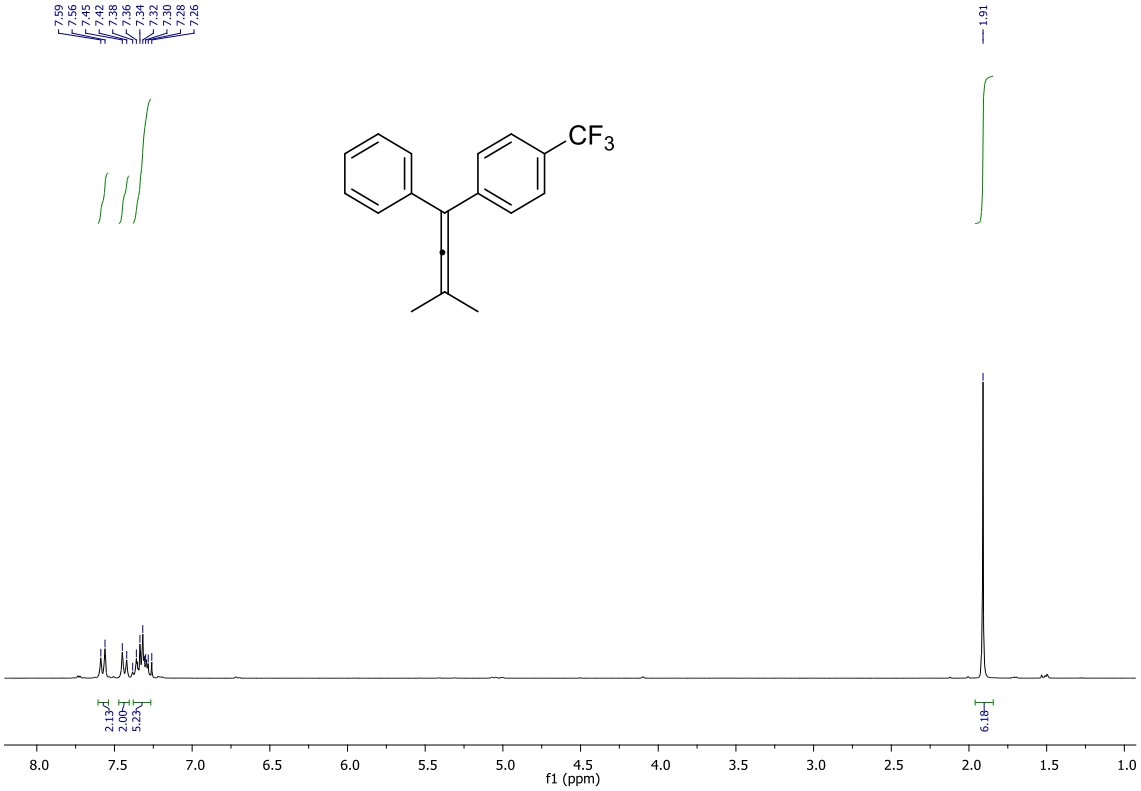


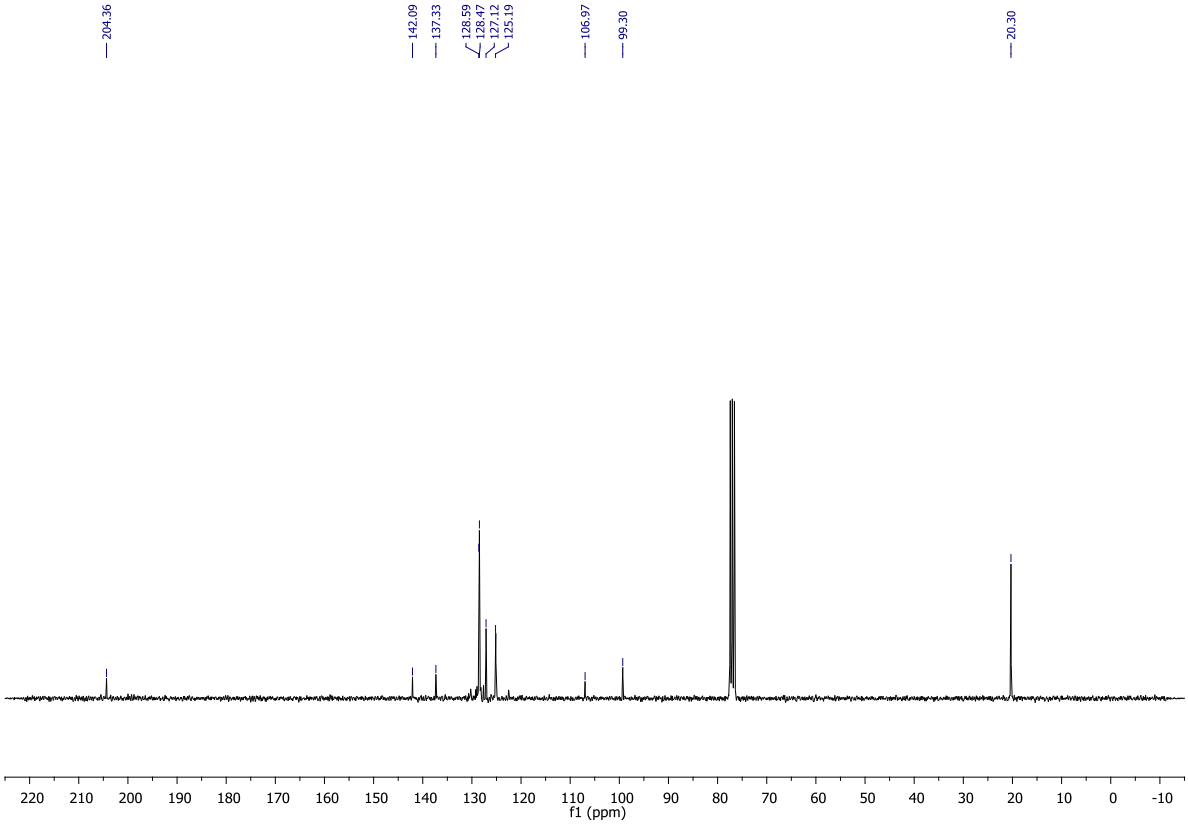
1-fluoro-4-(3-methyl-1-phenylbuta-1,2-dien-1-yl)benzene (3t)



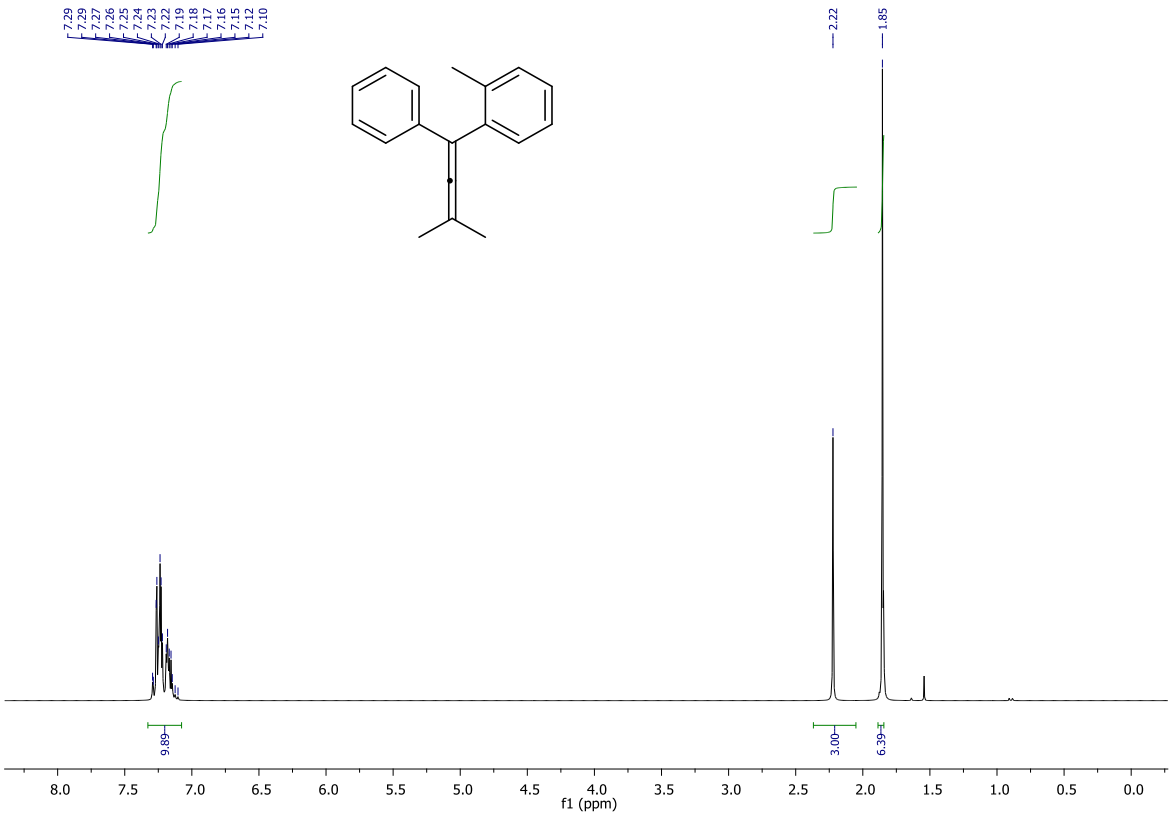


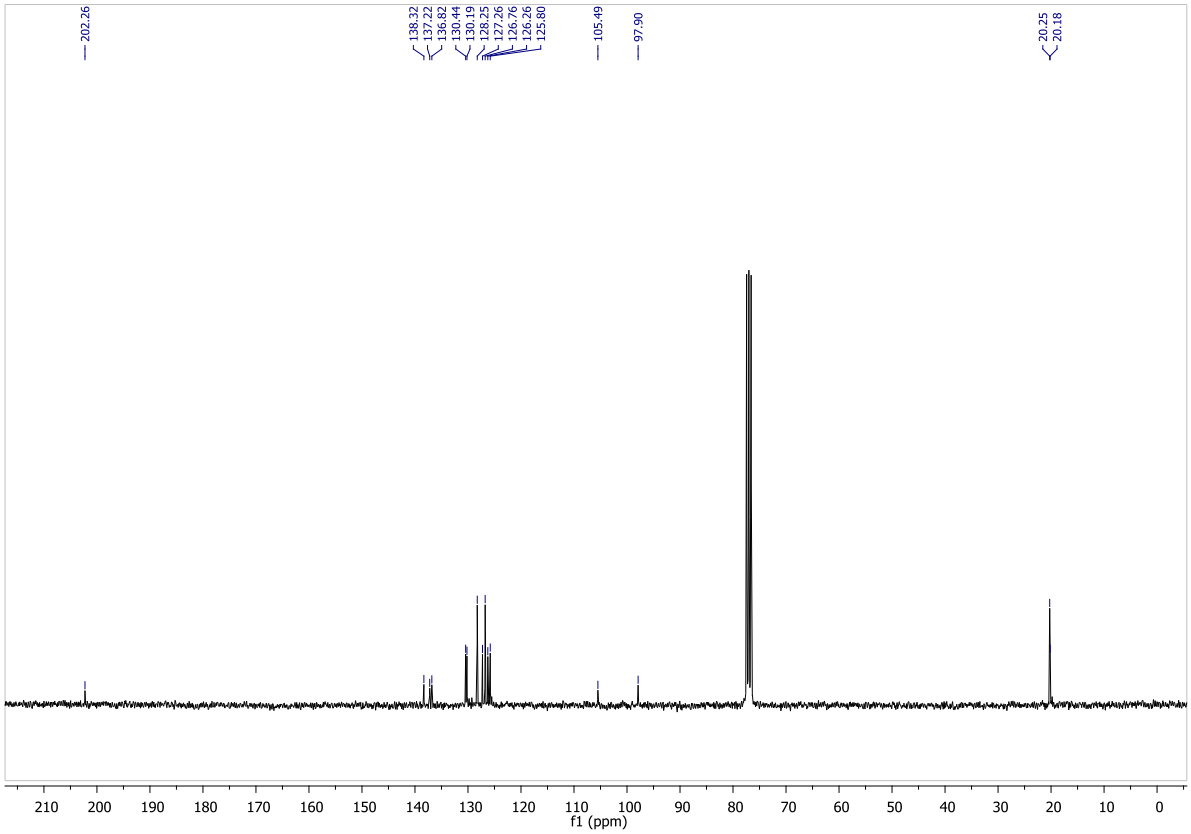
1-(3-Methyl-1-phenylbuta-1,2-dien-1-yl)-4-(trifluoromethyl)benzene (3u)



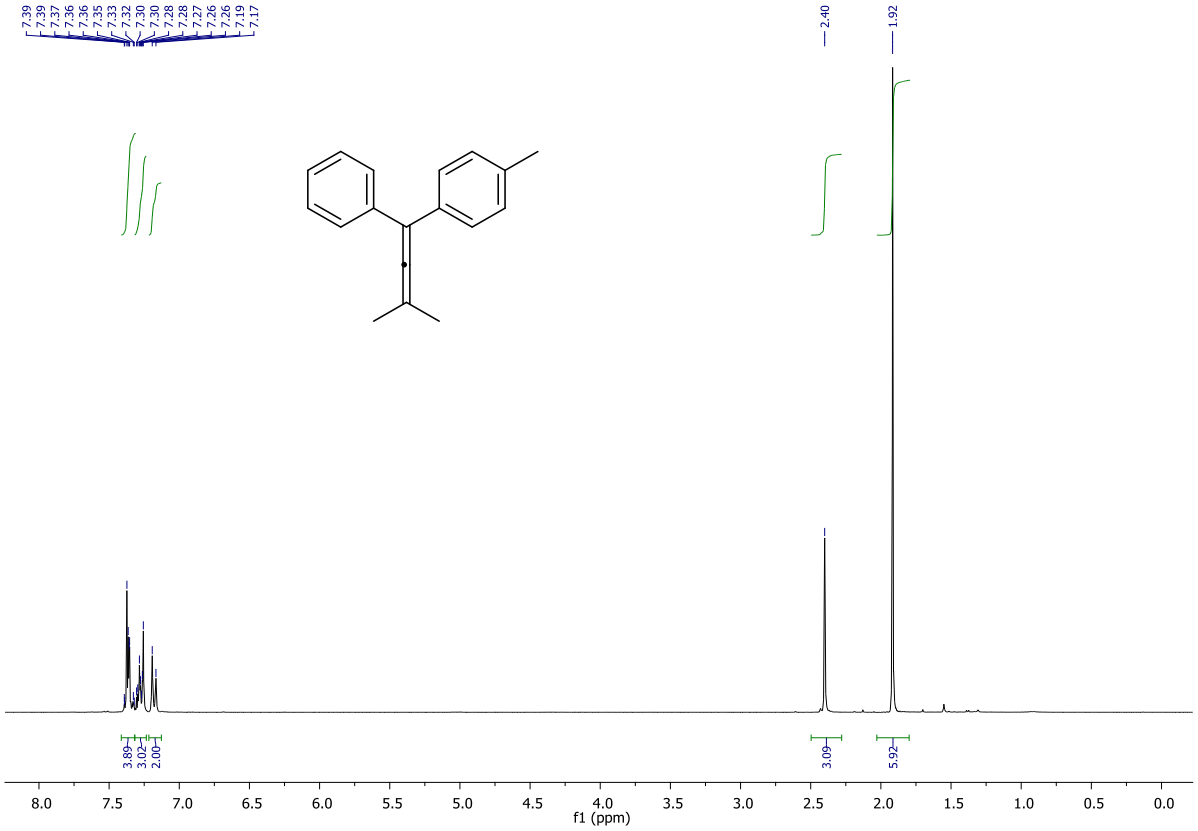


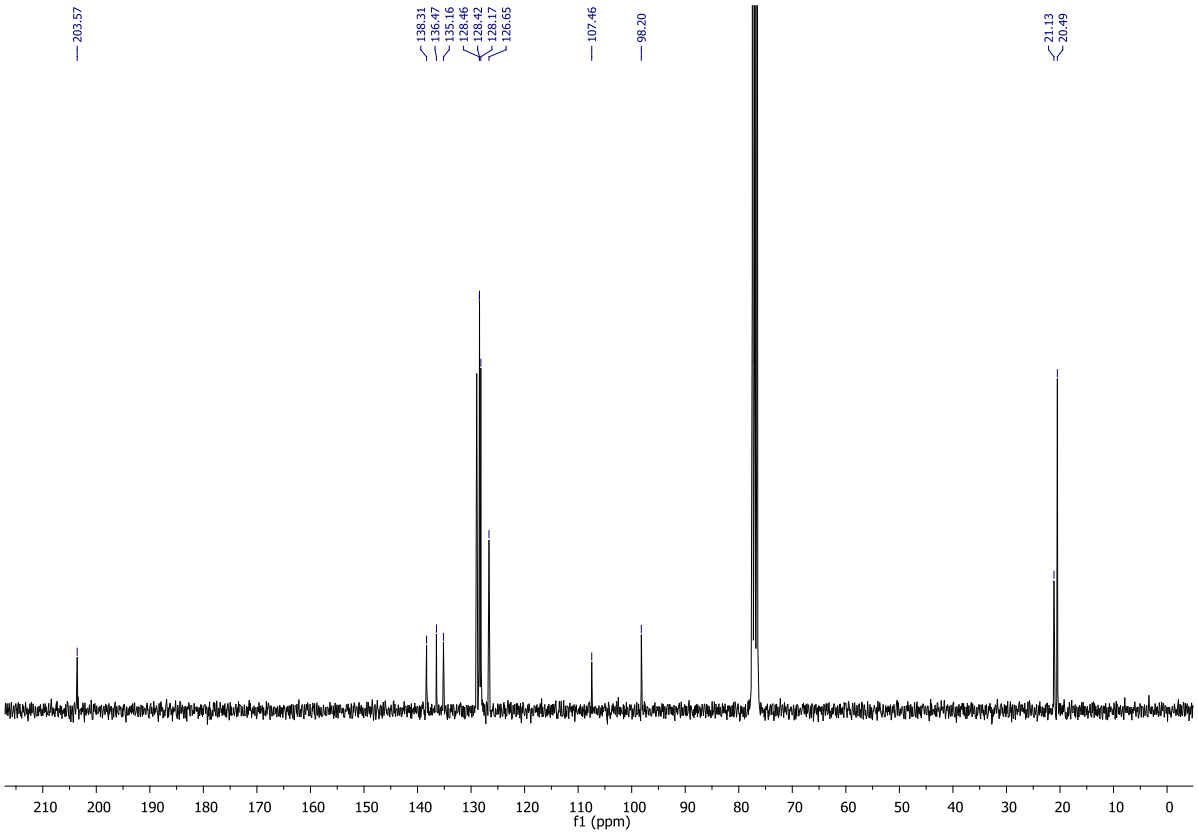
1-Methyl-2-(3-methyl-1-phenylbuta-1,2-dien-1-yl)benzene (3v)



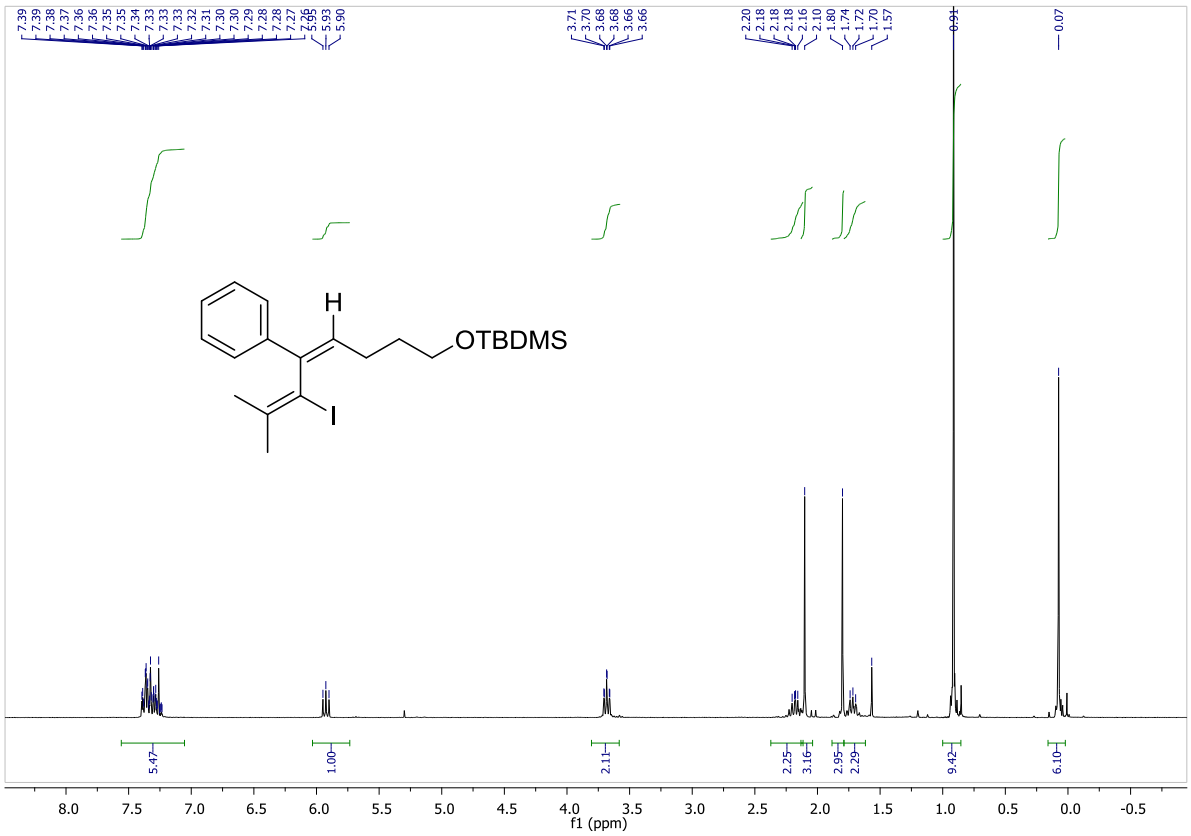


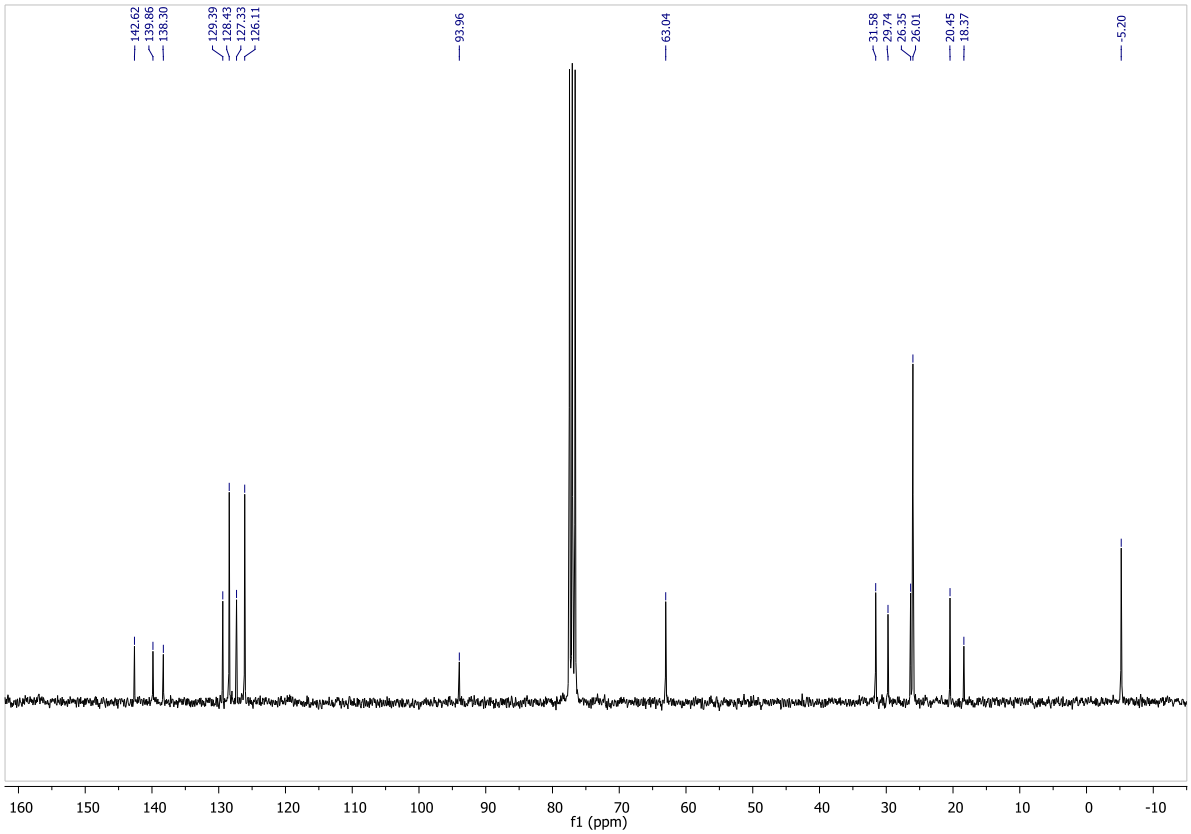
1-Methyl-4-(3-methyl-1-phenylbuta-1,2-dien-1-yl)benzene (3w)



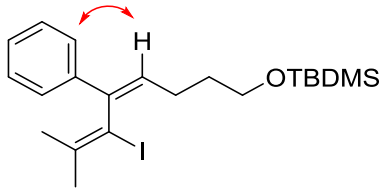


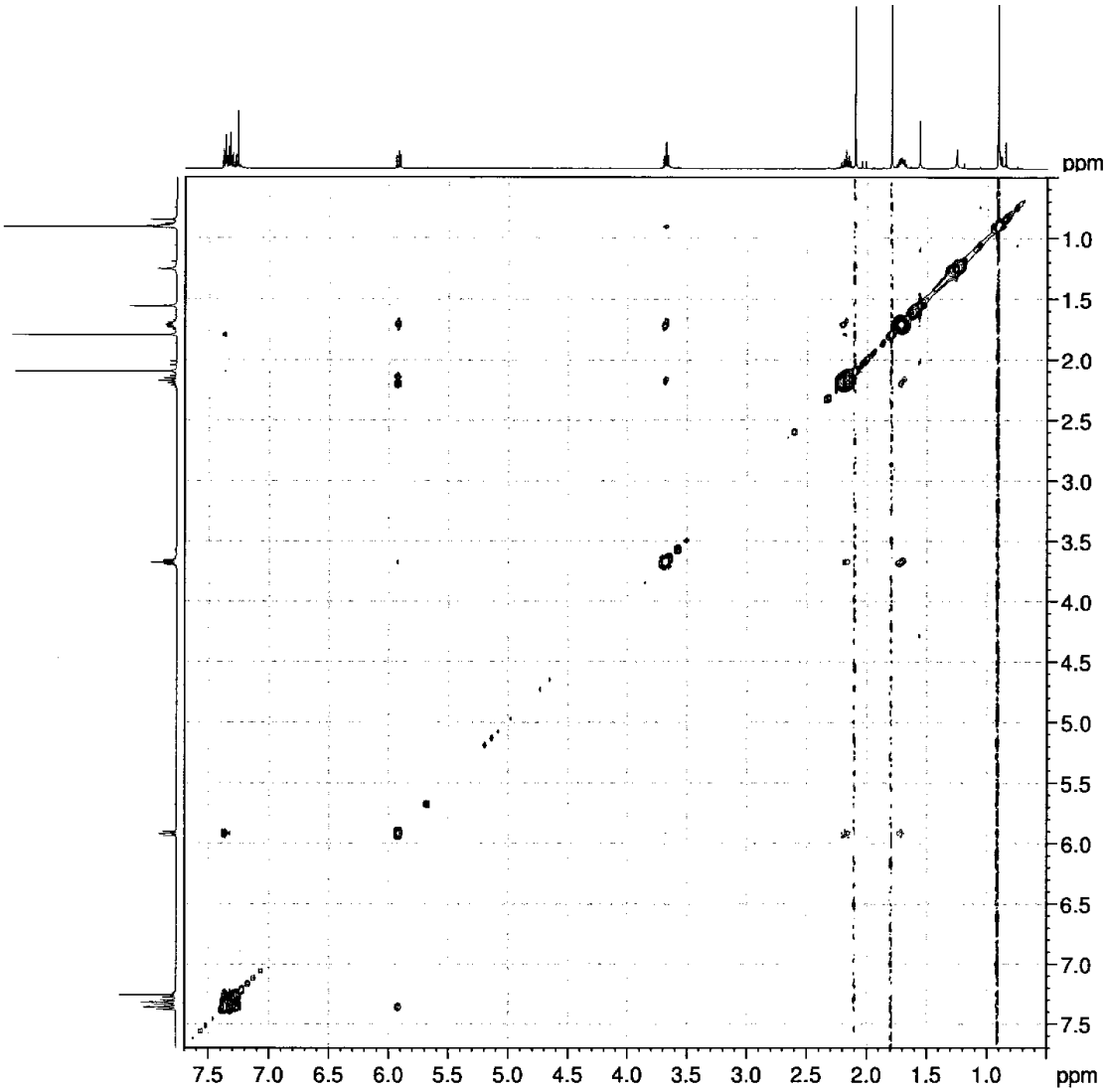
(Z)-Tert-butyl((6-iodo-7-methyl-5-phenylocta-4,6-dien-1-yl)oxy)dimethylsilane (5a)



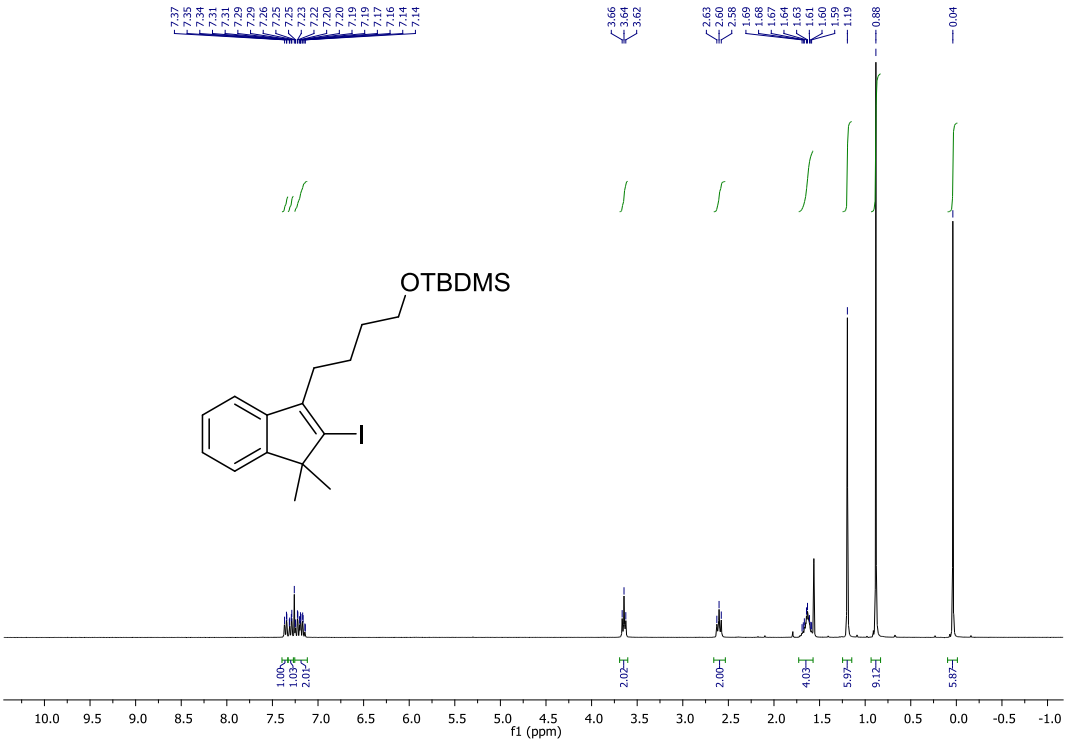


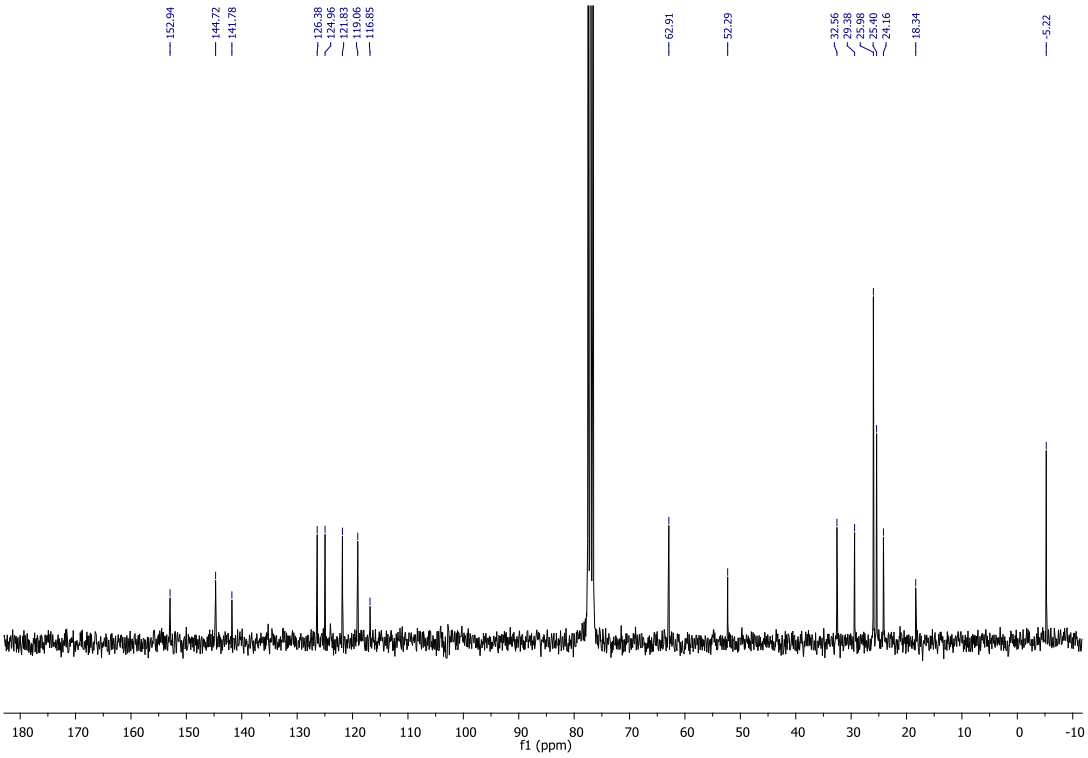
NOESY Experiment of 5a



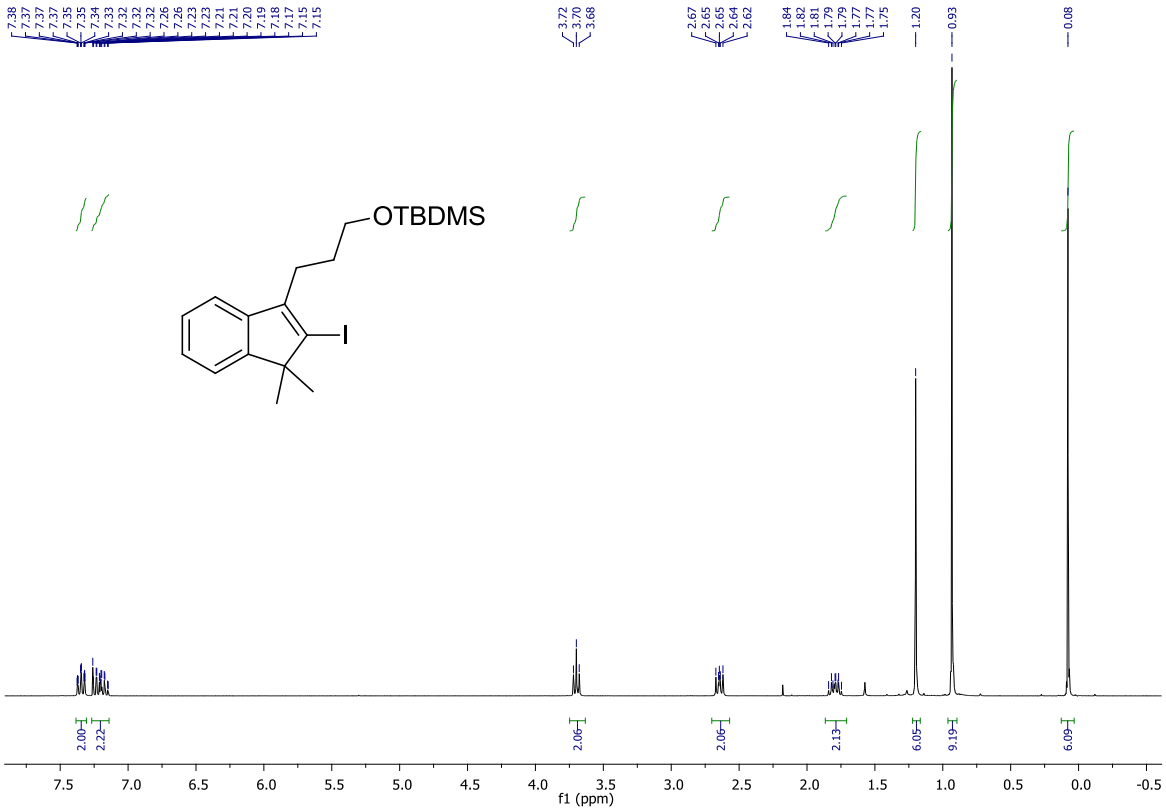


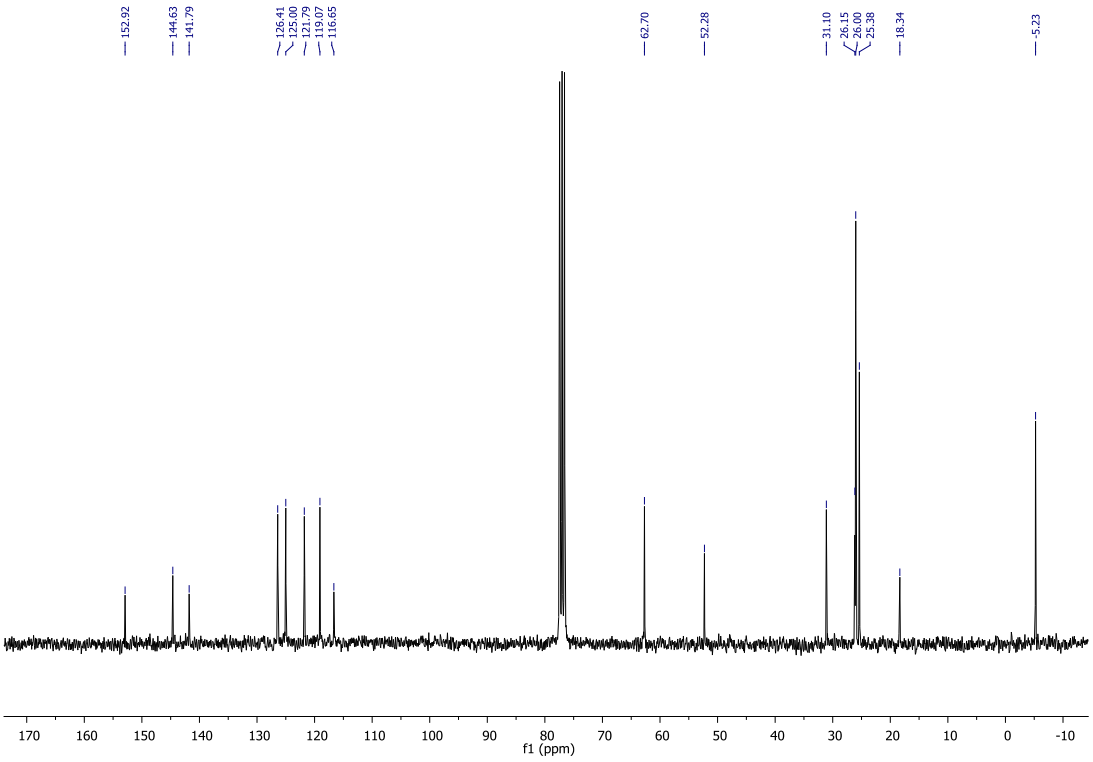
Tert-butyl(4-(2-iodo-1,1-dimethyl-1H-inden-3-yl)butoxy)dimethylsilane (4a)



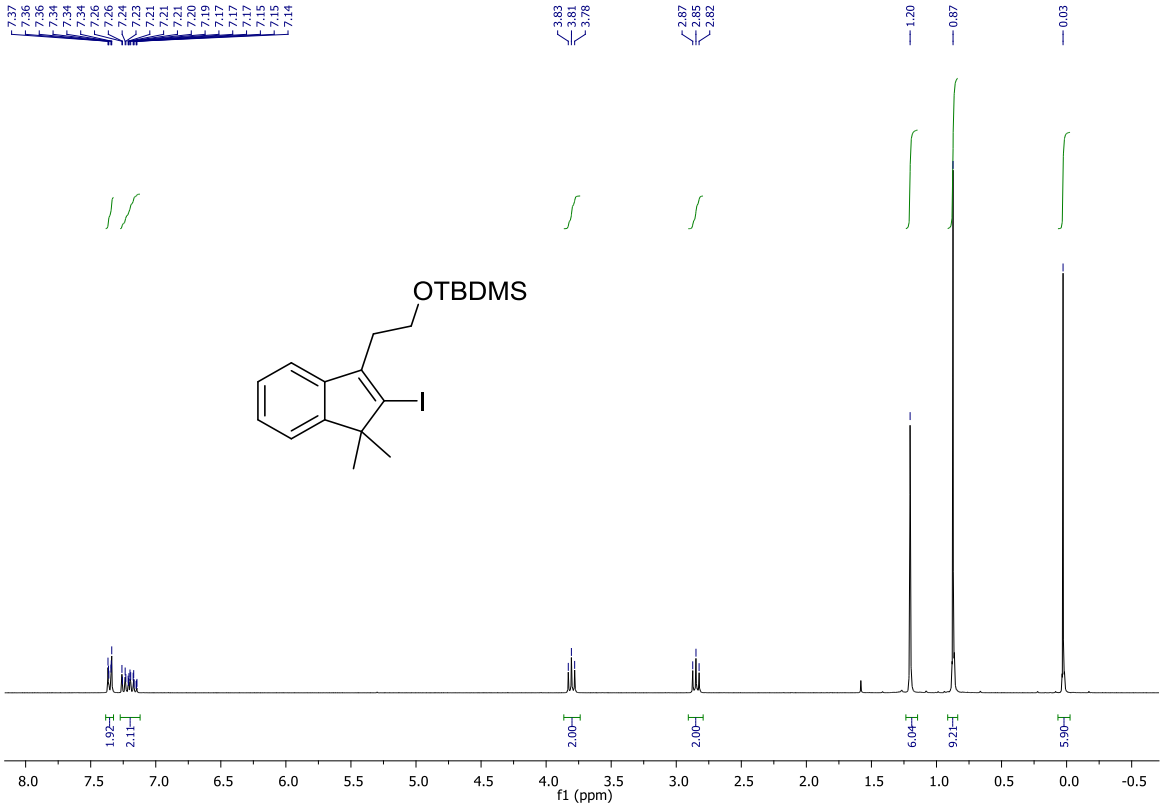


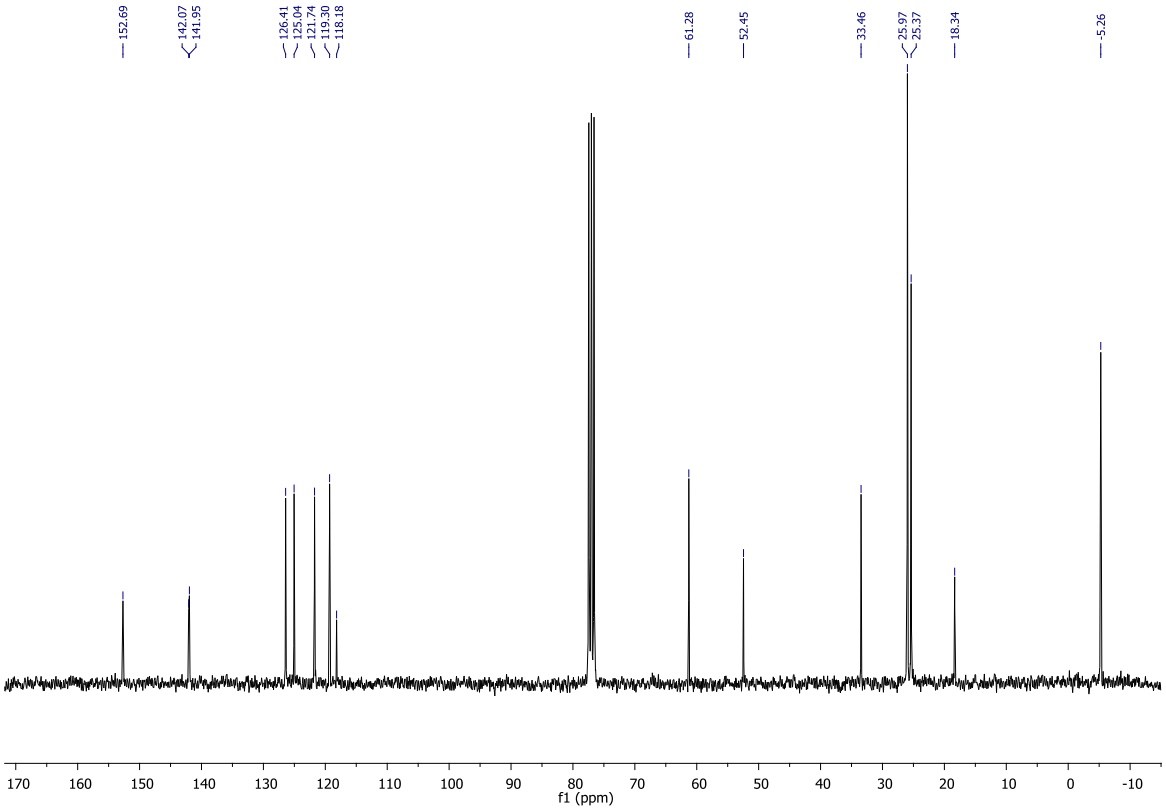
Tert-butyl(3-(2-iodo-1,1-dimethyl-1H-inden-3-yl)propoxy)dimethylsilane (4b)



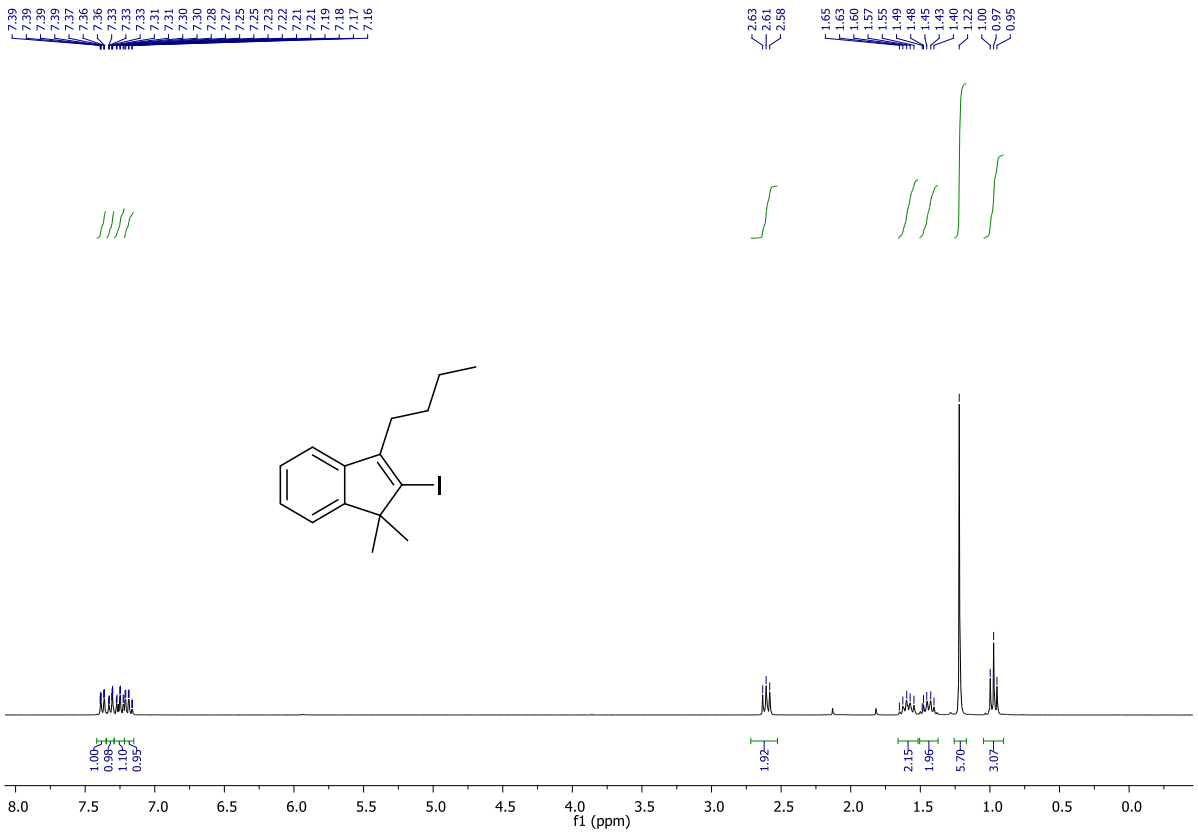


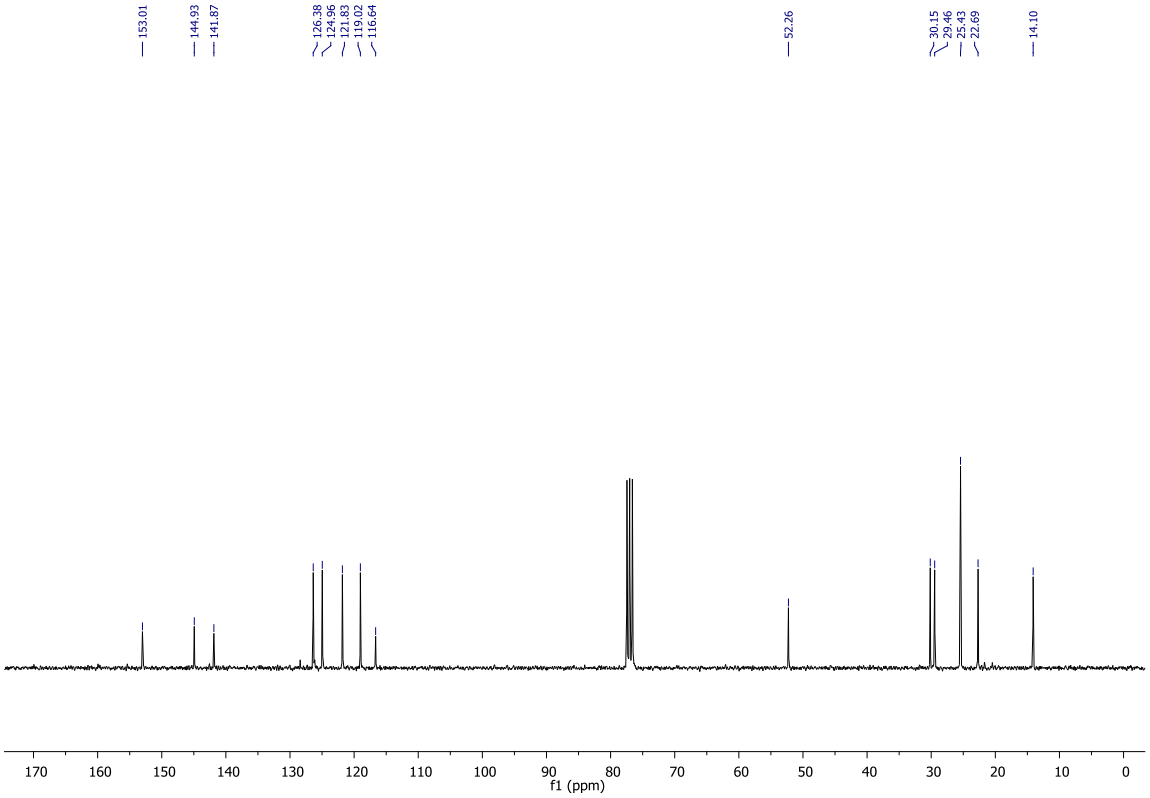
Tert-butyl(2-(2-iodo-1,1-dimethyl-1H-inden-3-yl)ethoxy)dimethylsilane (4c)



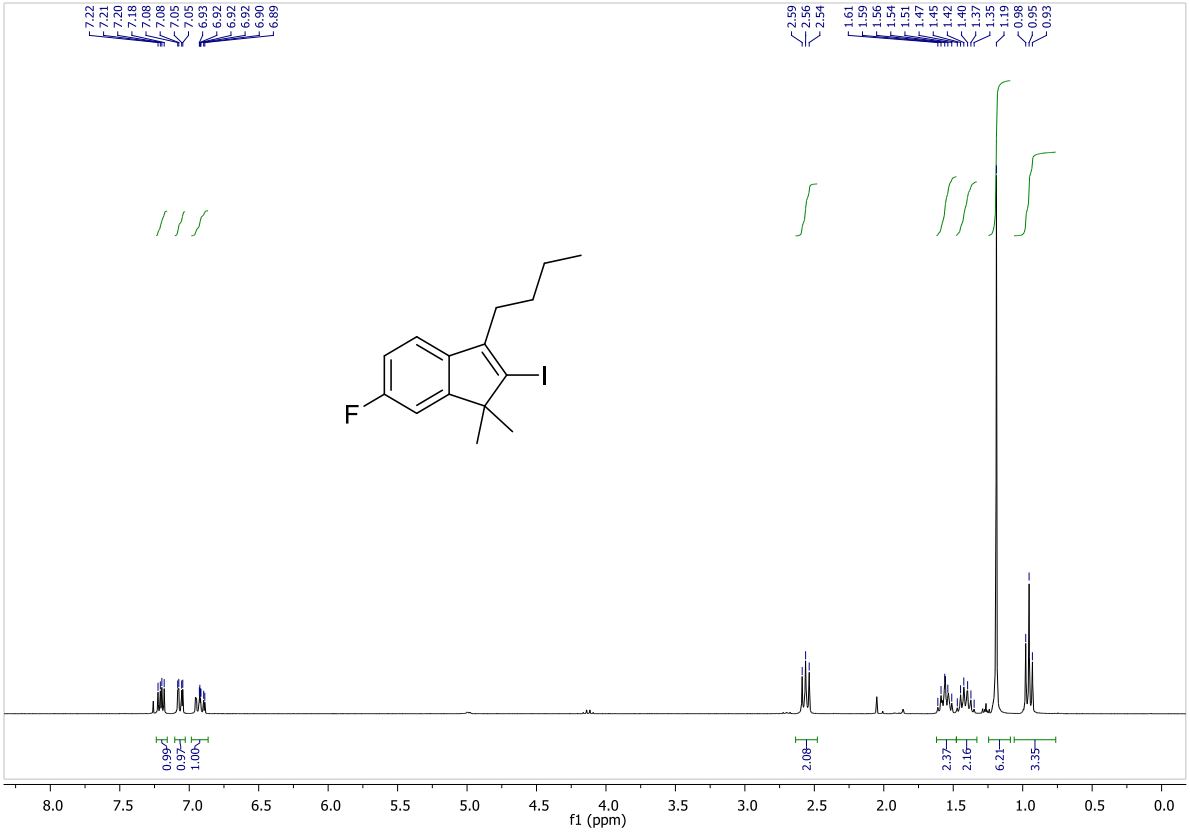


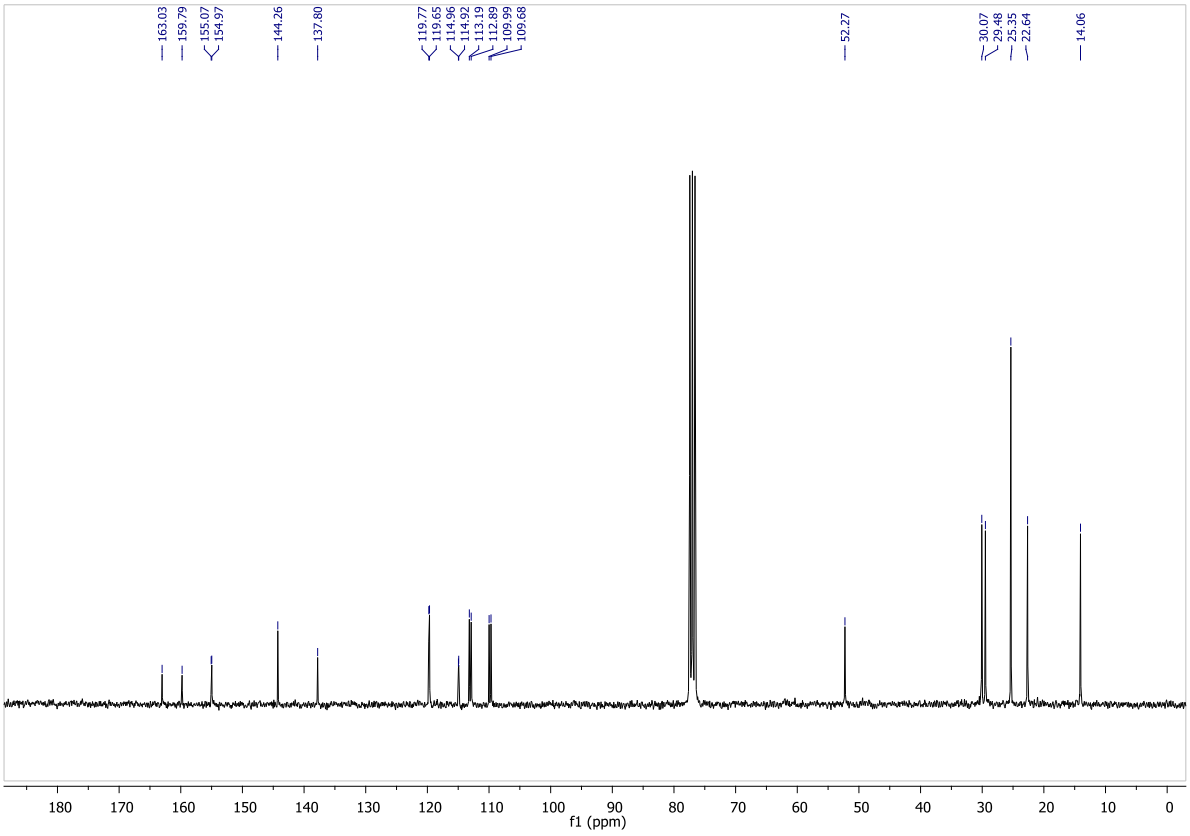
3-Butyl-2-iodo-1,1-dimethyl-1H-indene (4d)



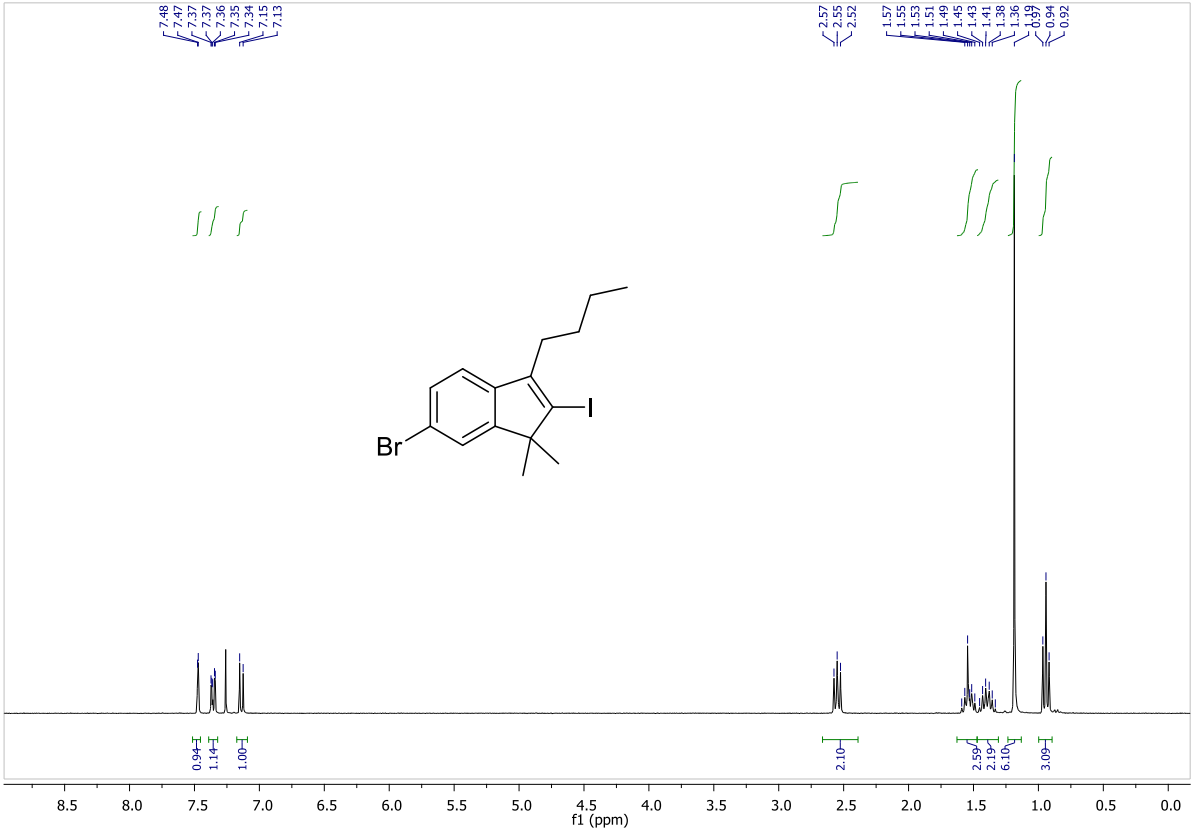


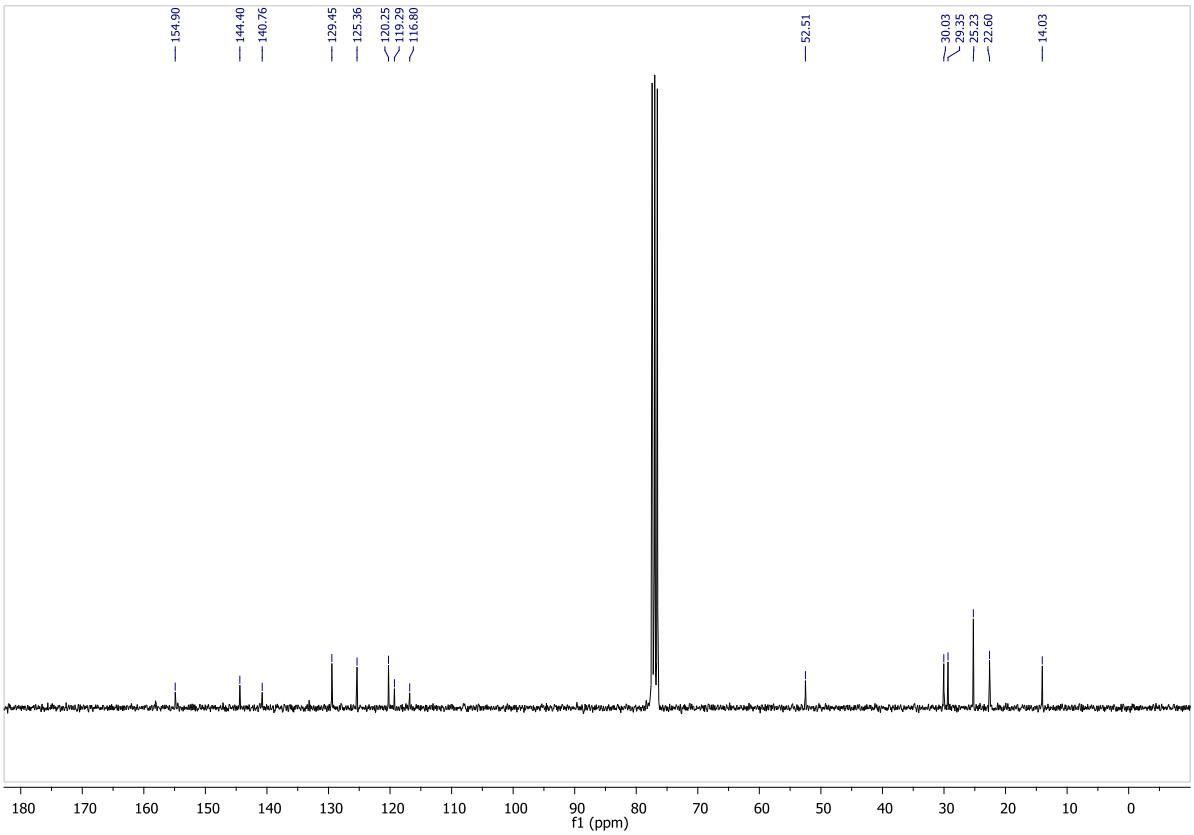
3-Butyl-6-fluoro-2-iodo-1,1-dimethyl-1H-indene (4e)



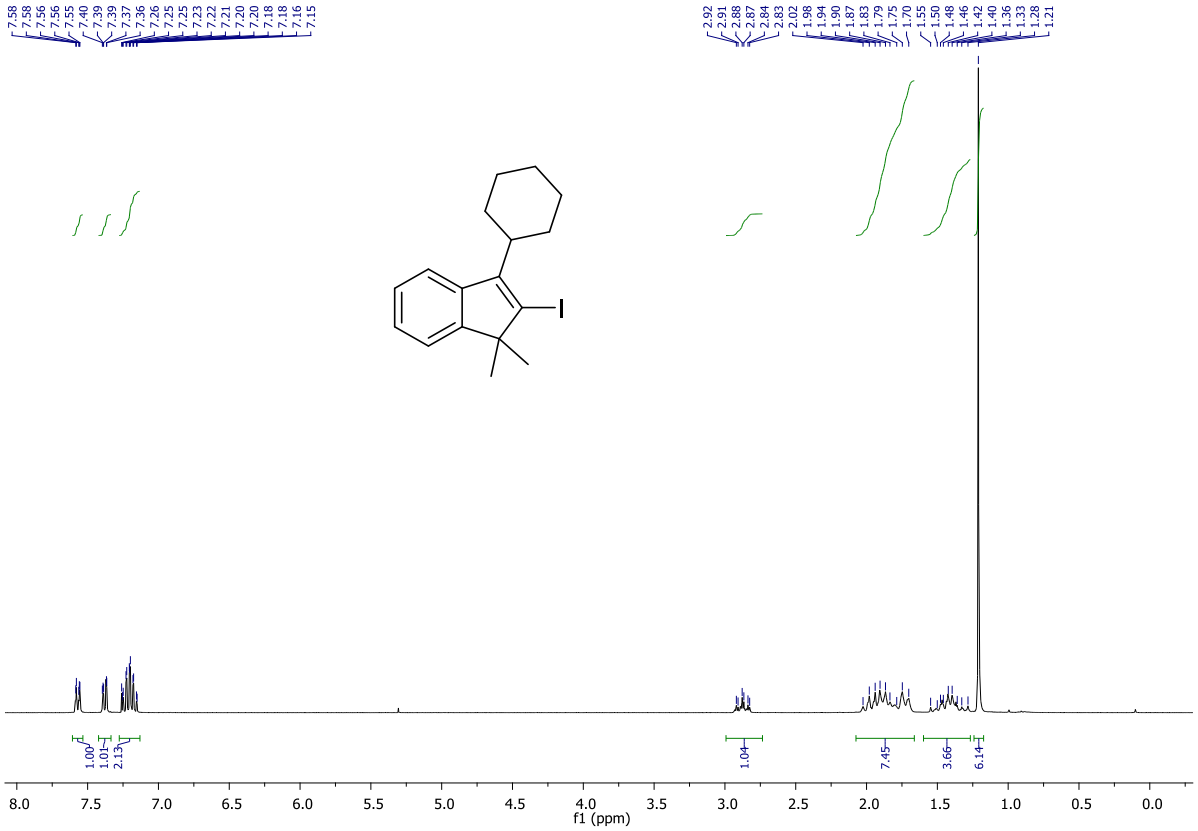


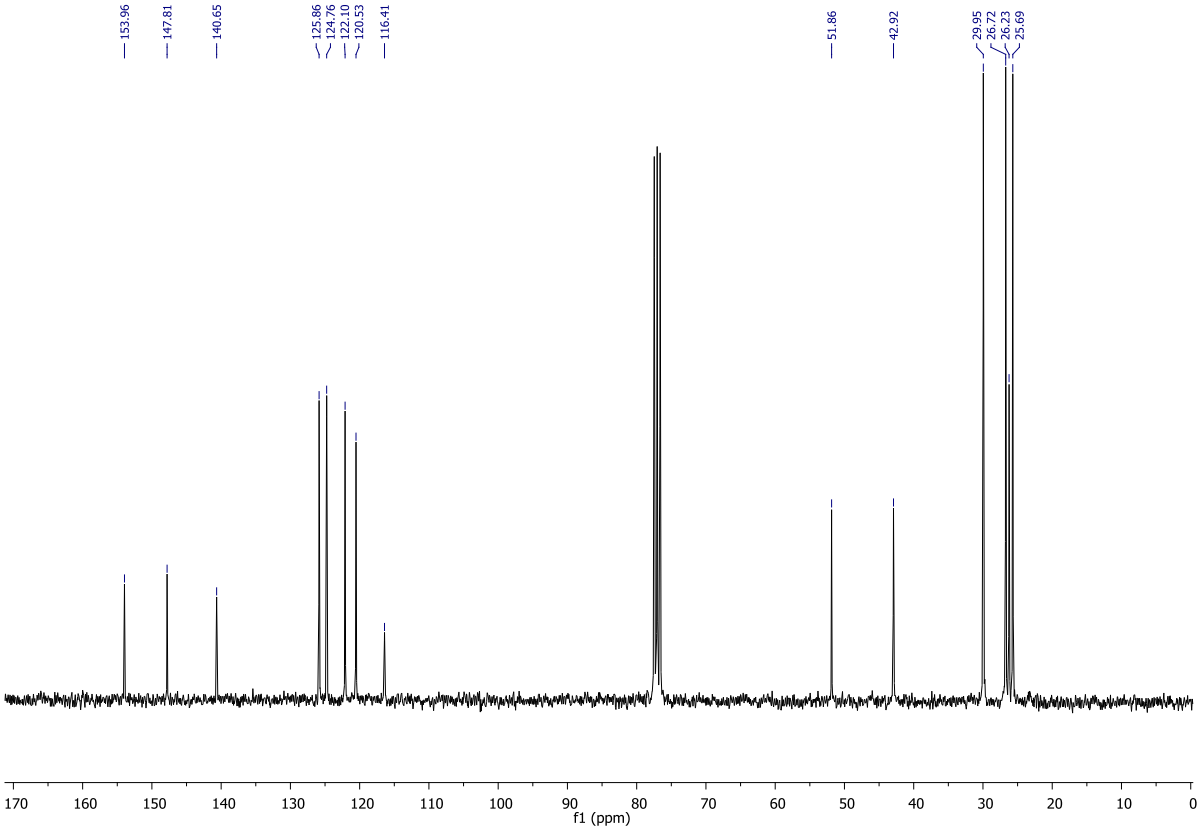
3-Butyl-6-bromo-2-iodo-1,1-dimethyl-1H-indene (4f)



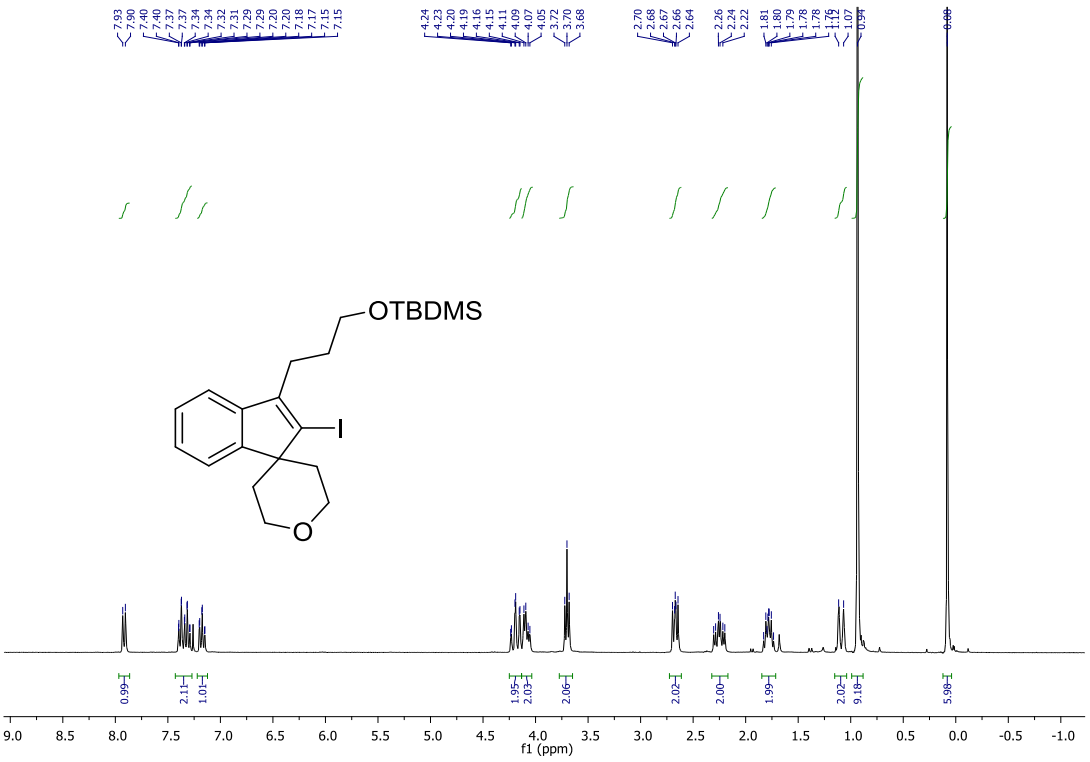


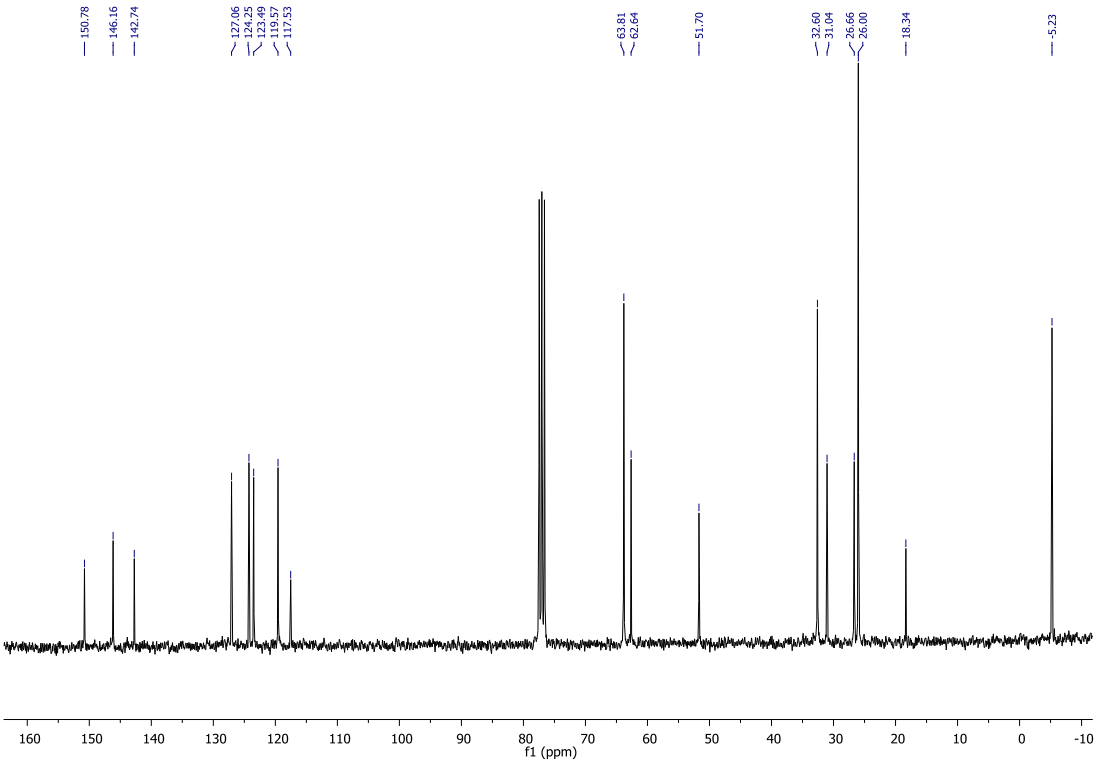
3-Cyclohexyl-2-iodo-1,1-dimethyl-1H-indene (4g)



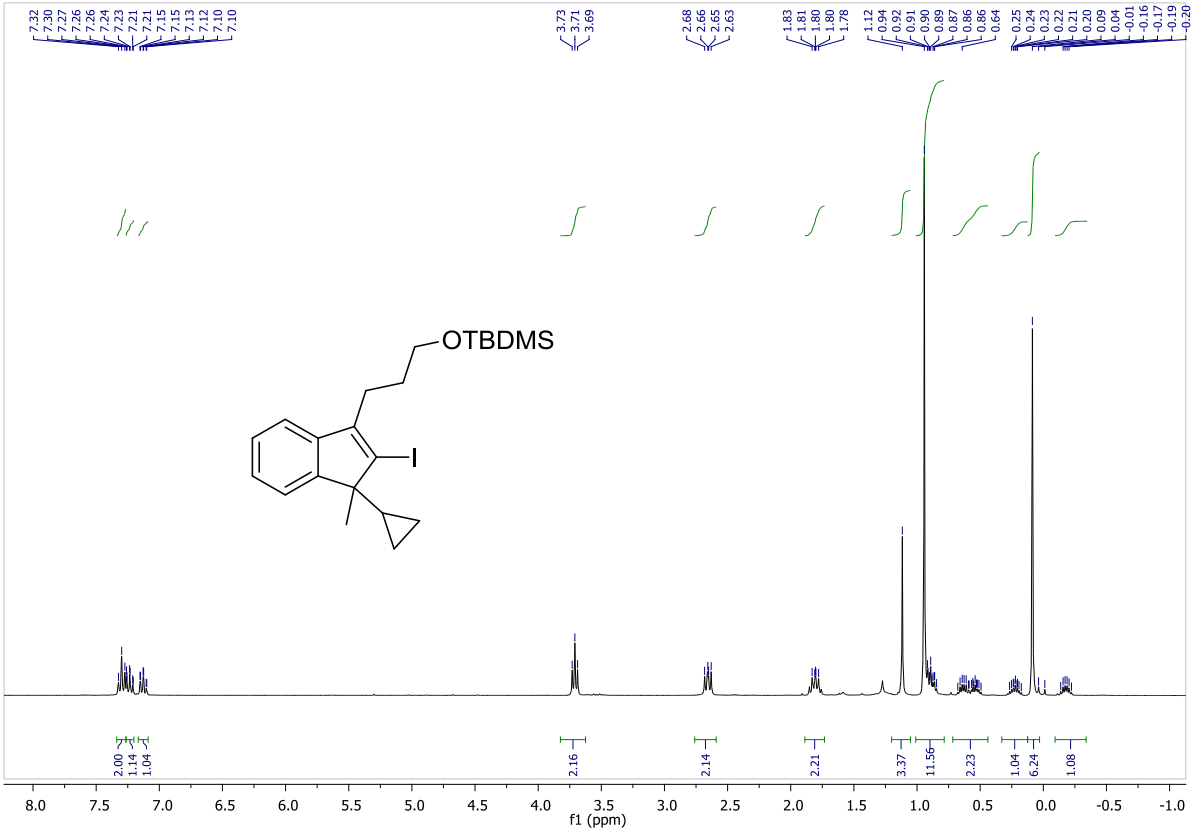


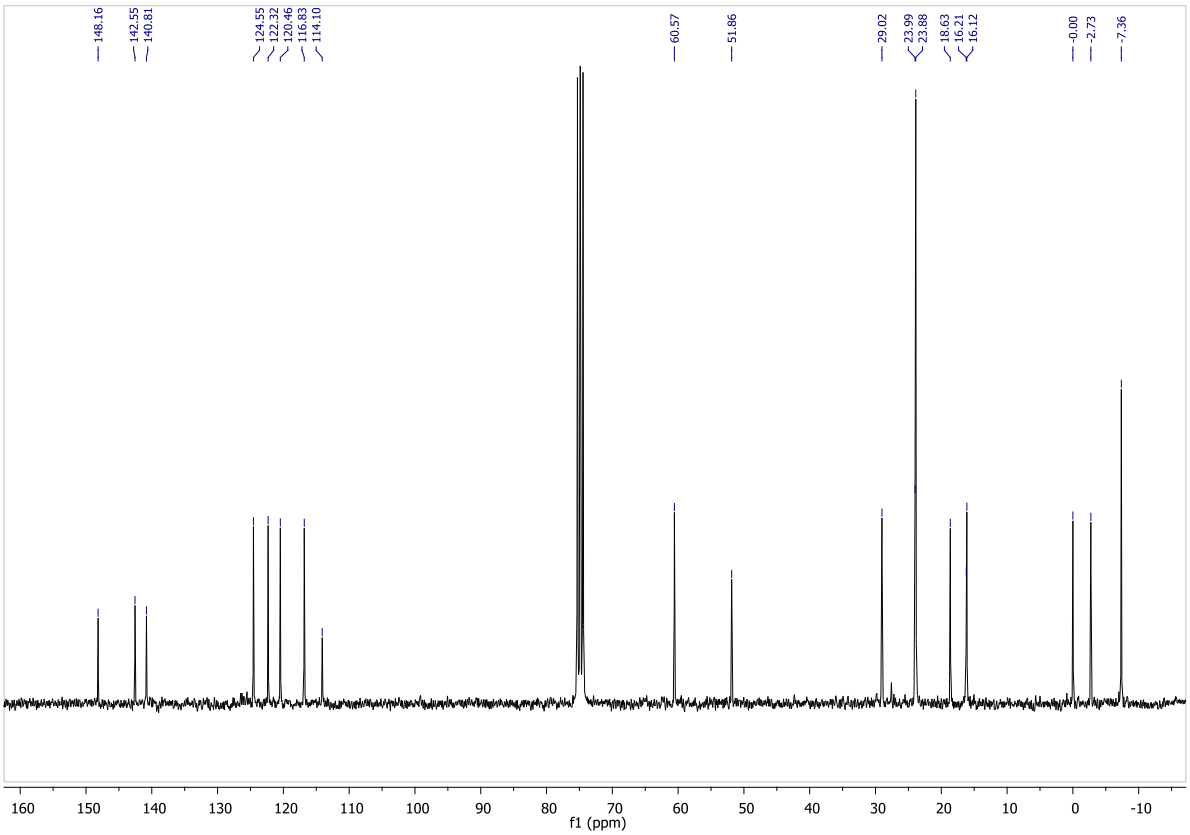
Tert-butyl(3-(2-iodo-2',3',5',6'-tetrahydrospiro[indene-1,4'-pyran]-3-yl)propoxy)dimethylsilane (4h)



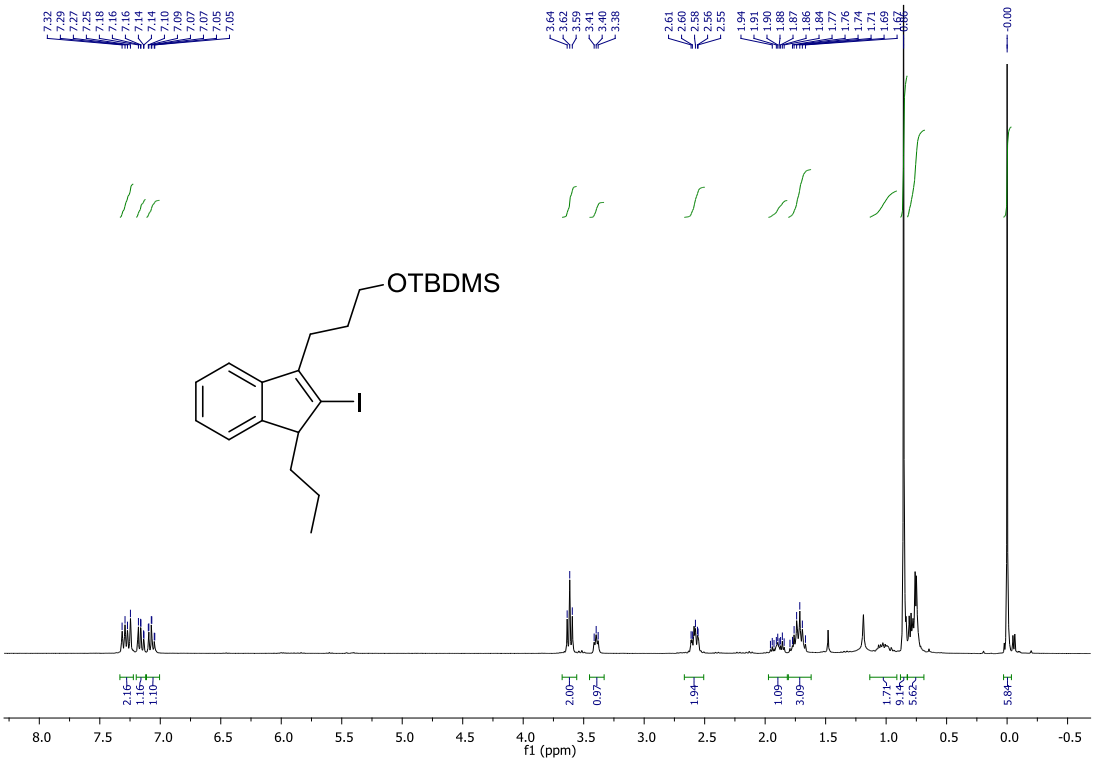


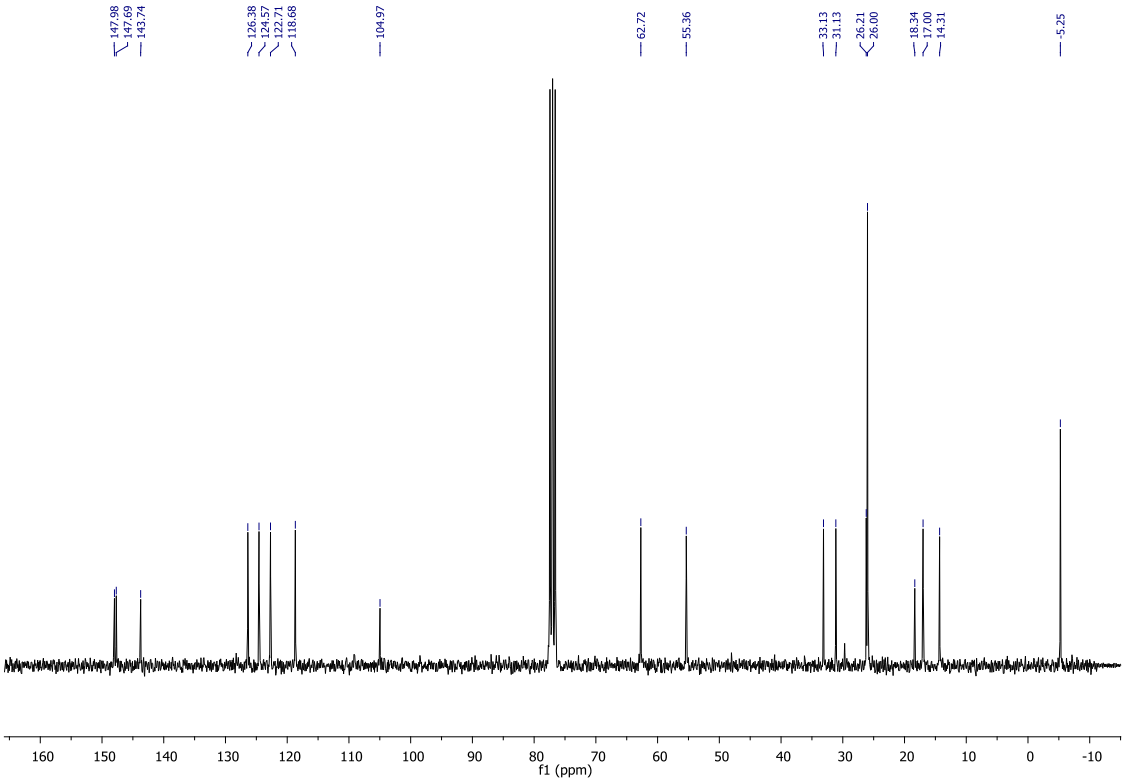
Tert-butyl(3-(1-cyclopropyl-2-iodo-1-methyl-1H-inden-3-yl)propoxy)dimethylsilane (4i)



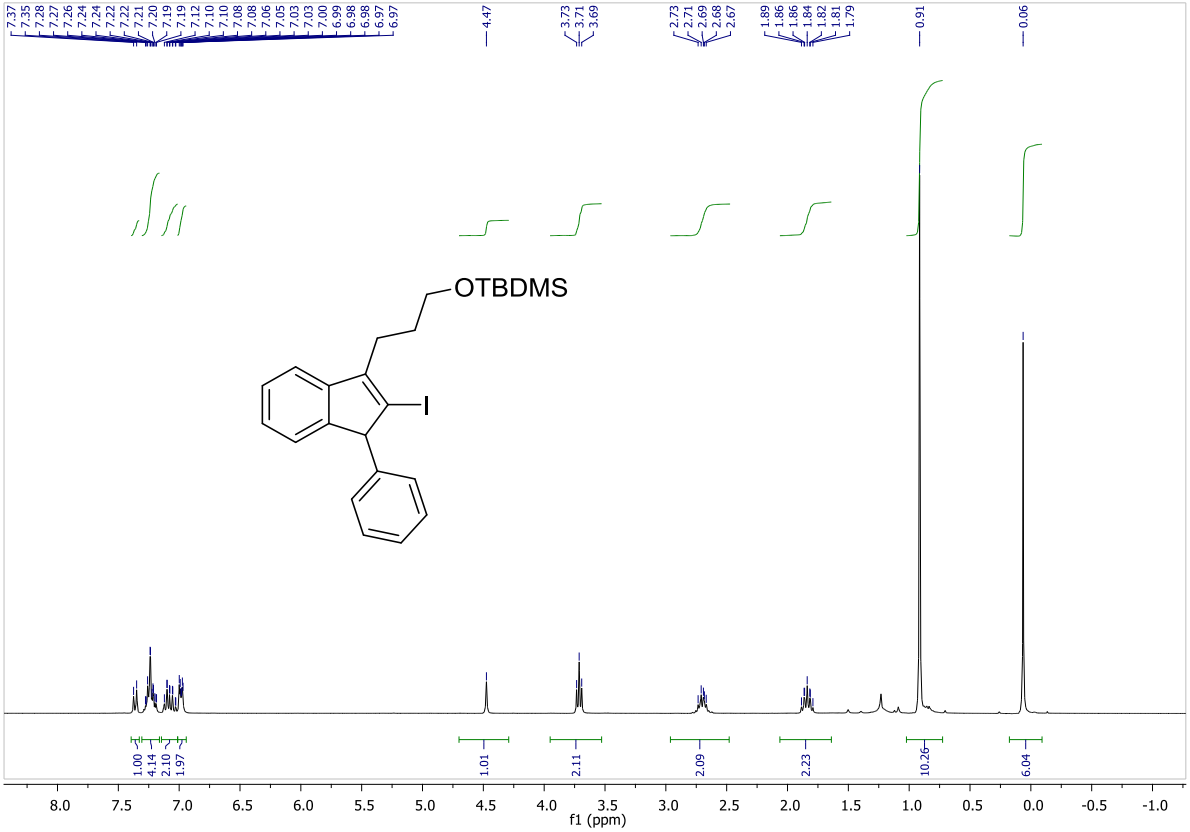


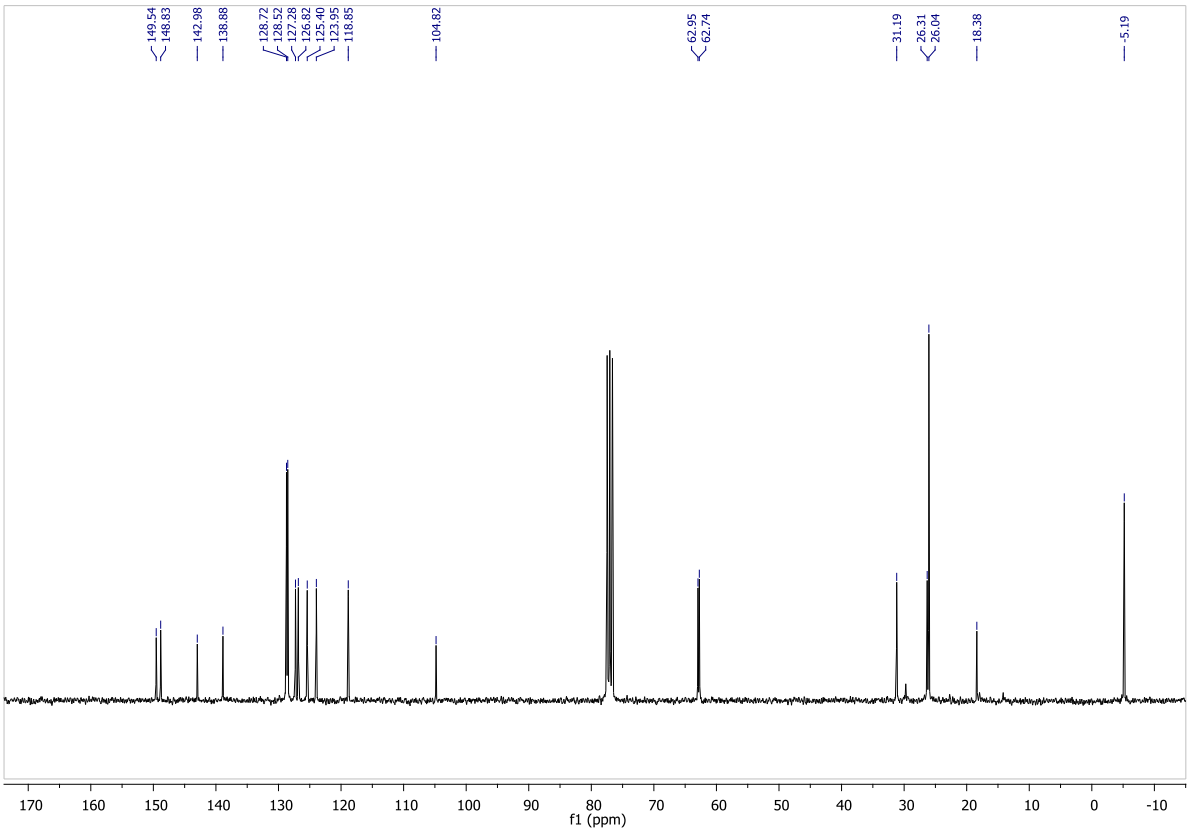
Tert-butyl(3-(2-iodo-1-propyl-1H-inden-3-yl)propoxy)dimethylsilane (4j)



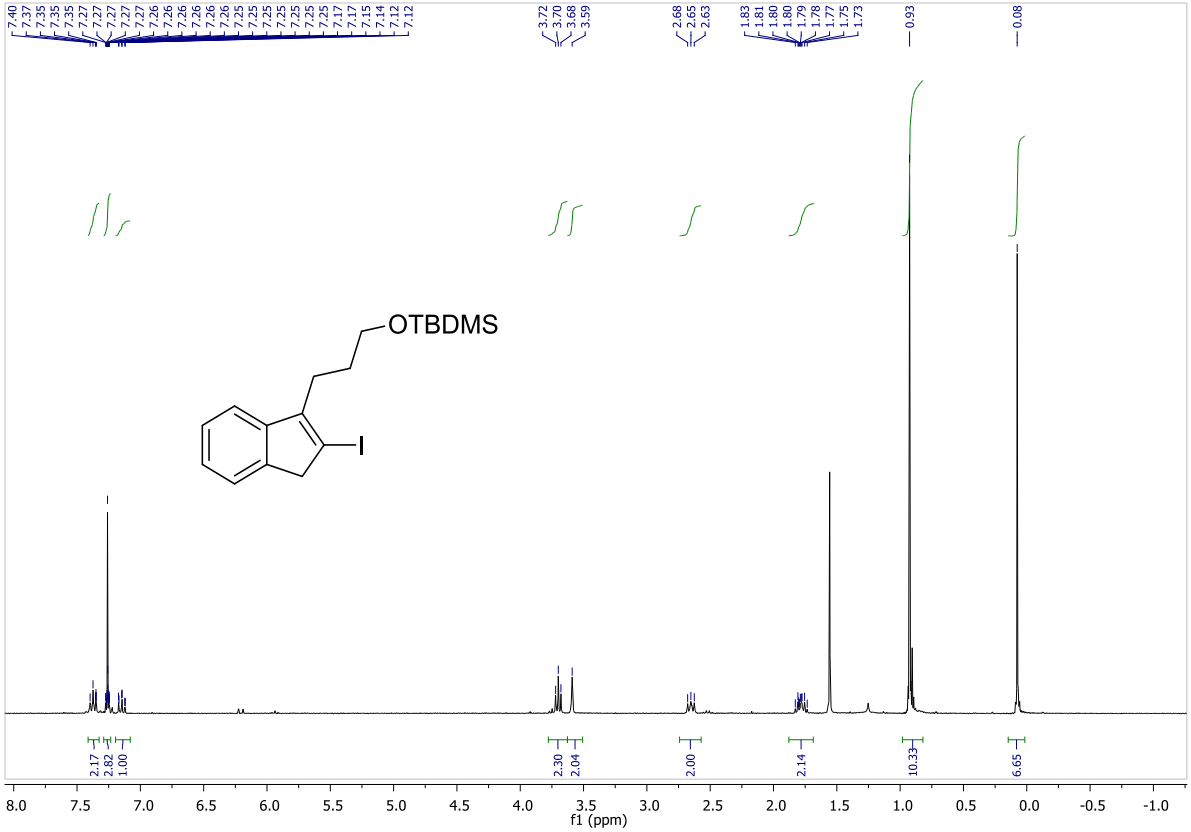


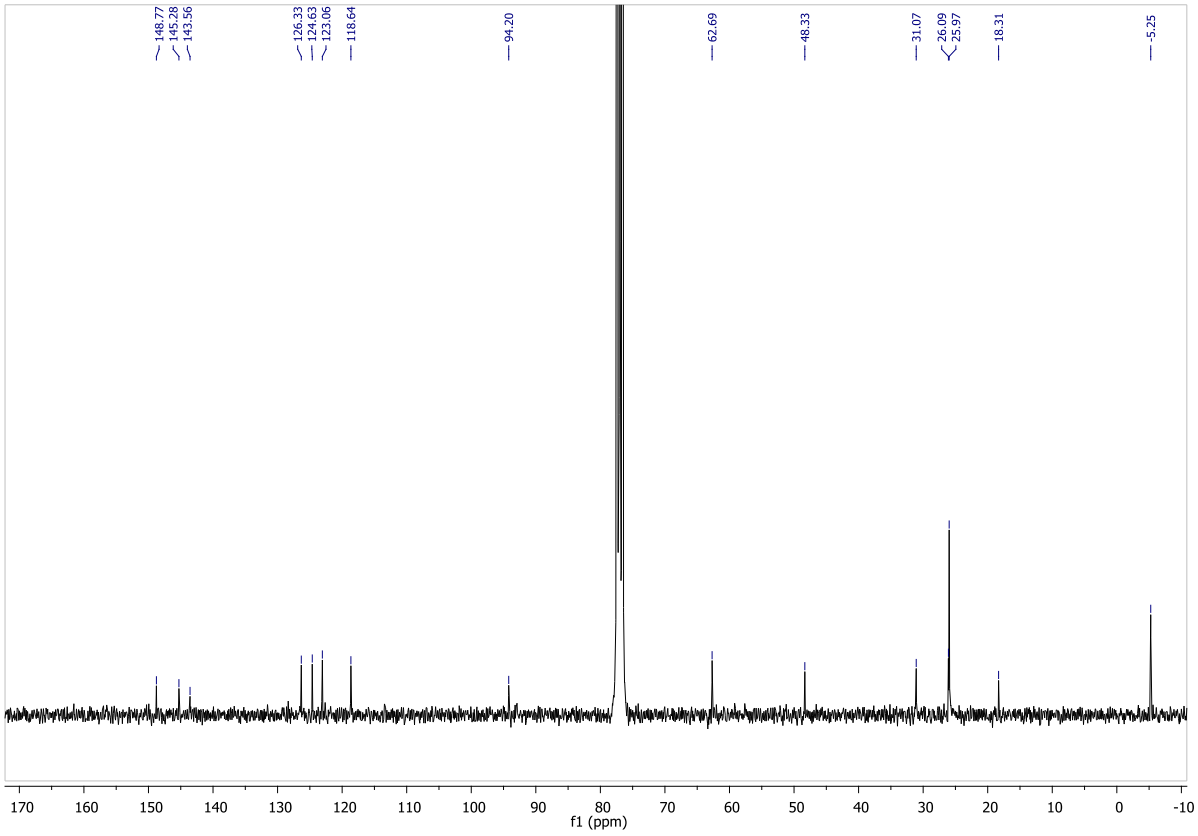
Tert-butyl(3-(2-iodo-1-phenyl-1H-inden-3-yl)propoxy)dimethylsilane (4k)



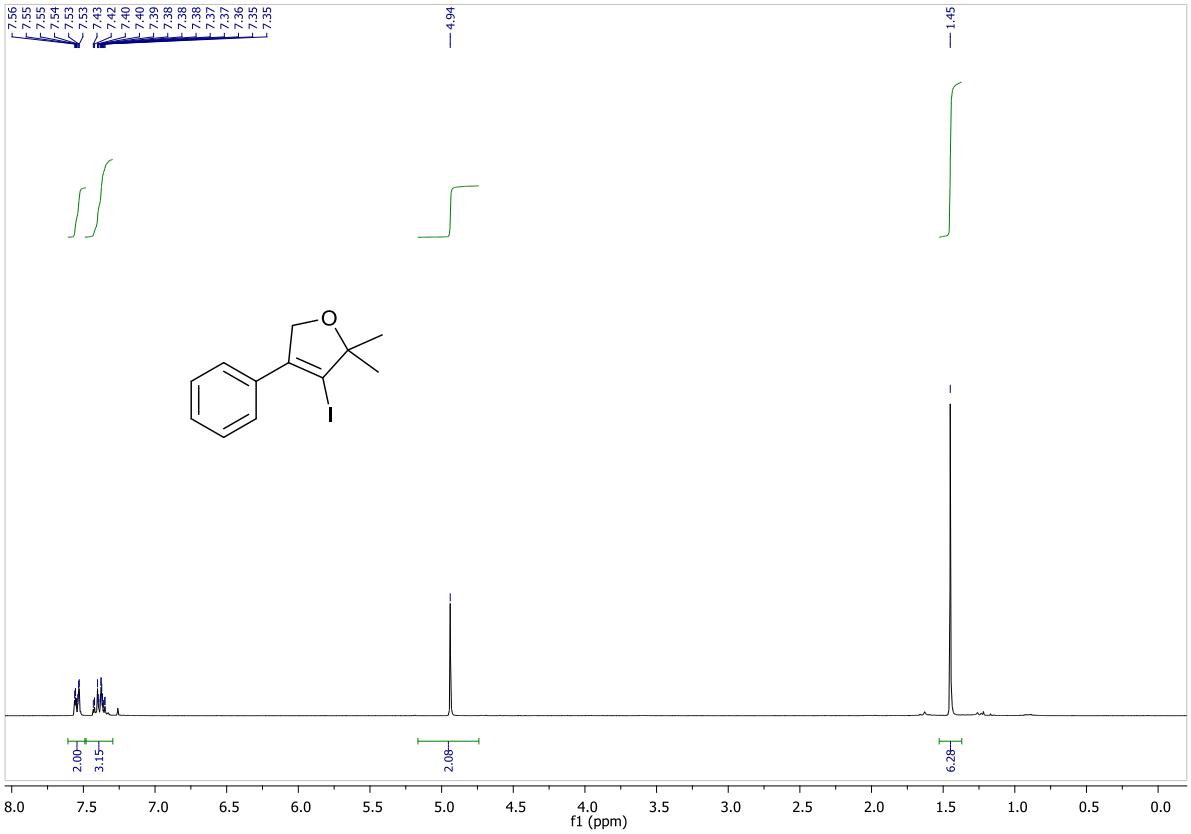


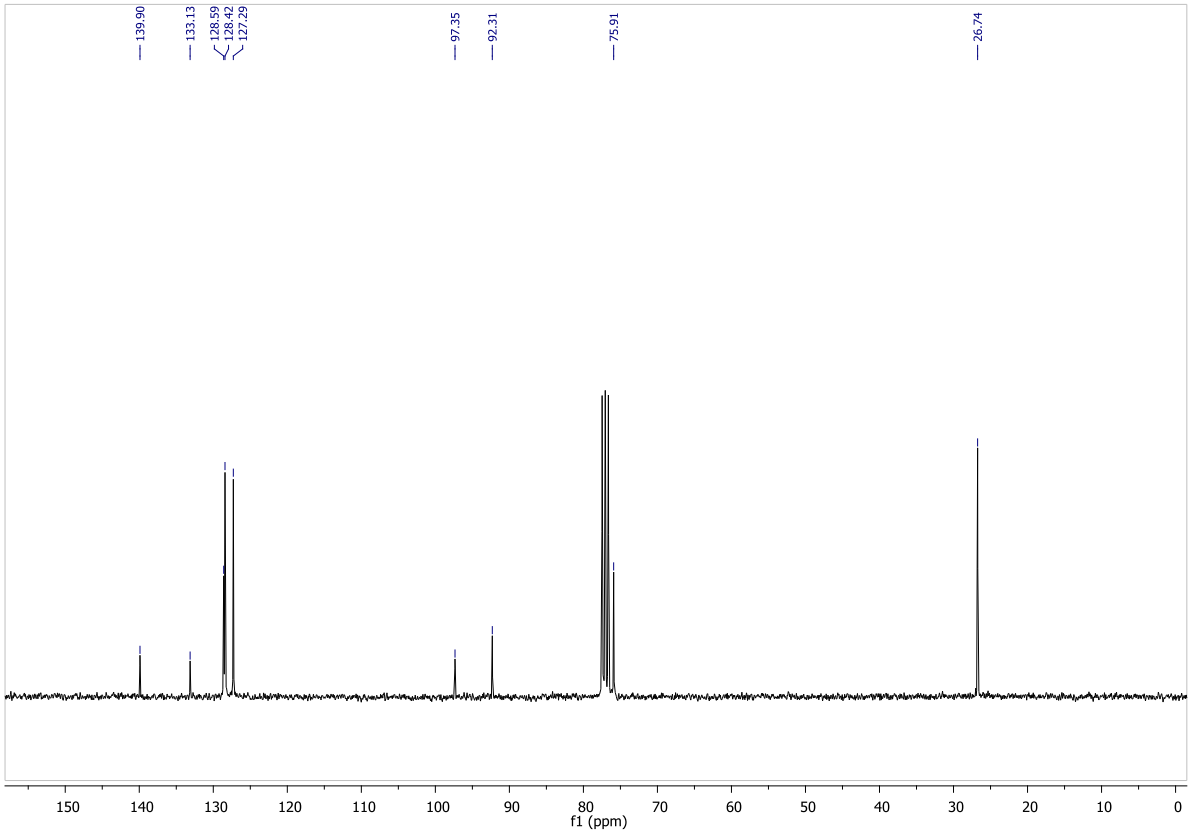
Tert-butyl(3-(2-iodo-1H-inden-3-yl)propoxy)dimethylsilane (4l)



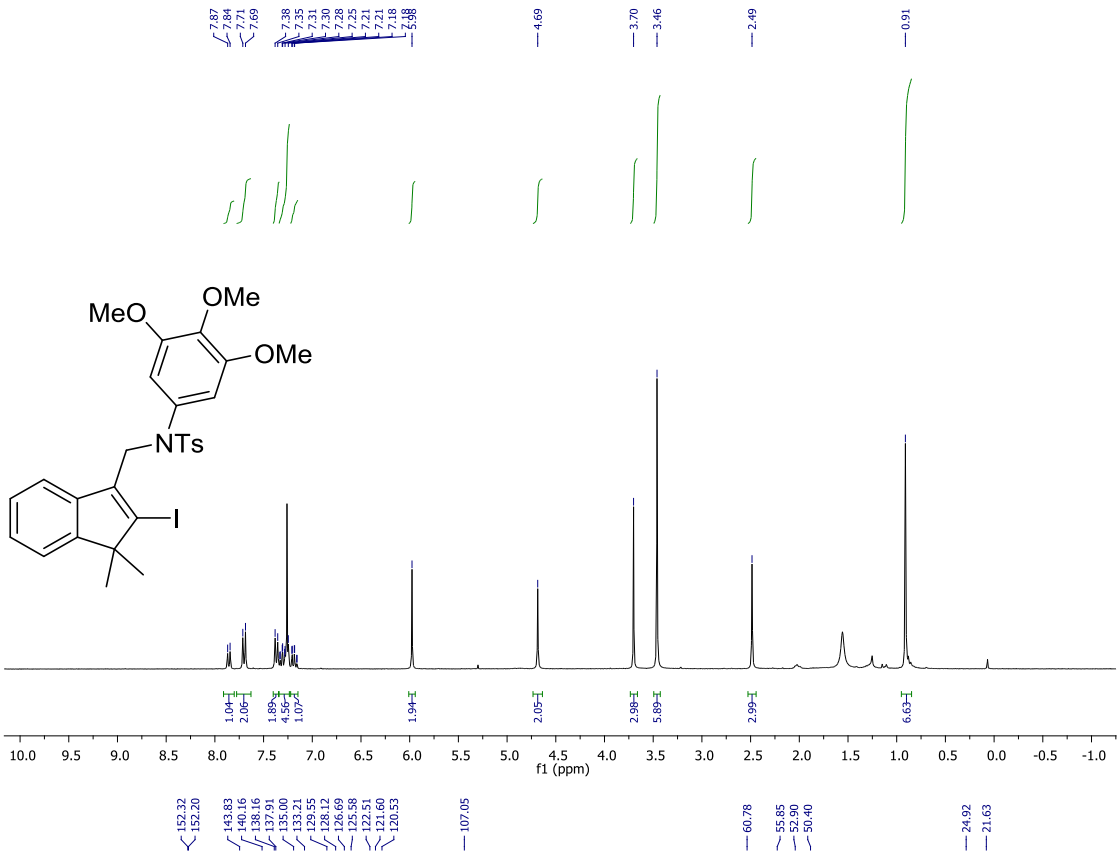


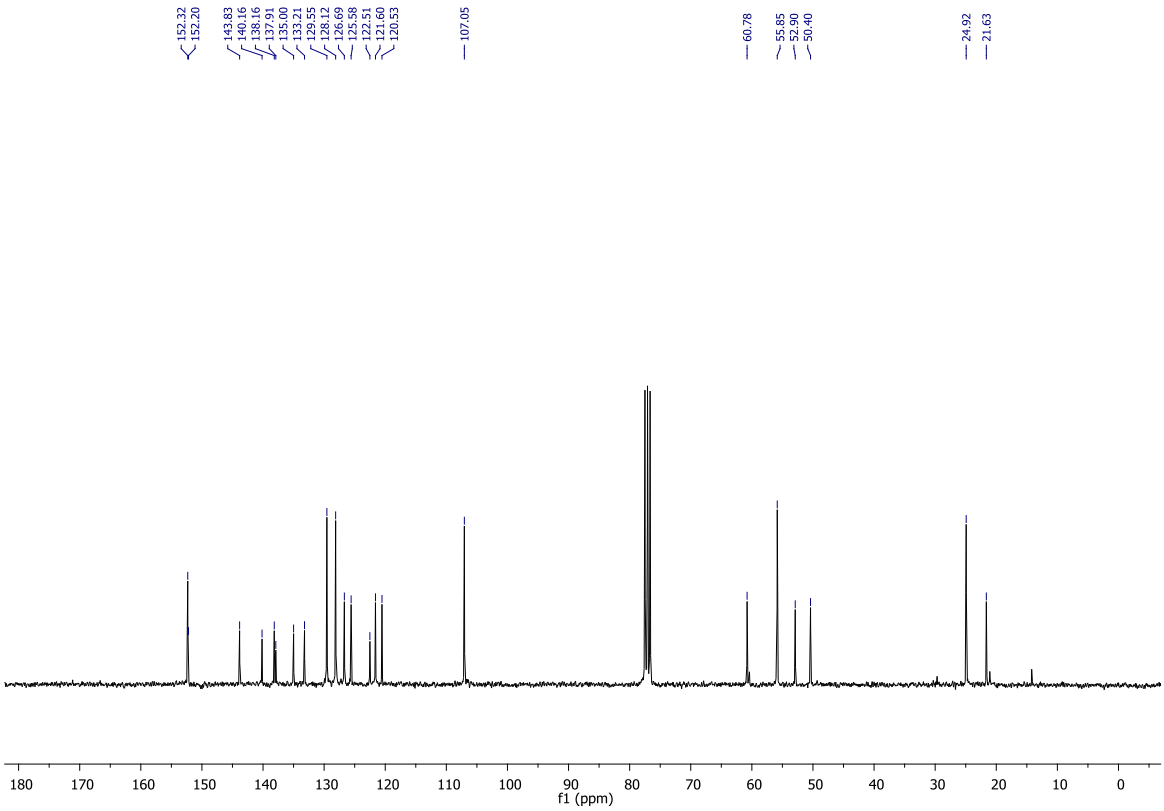
3-Iodo-2,2-dimethyl-4-phenyl-2,5-dihydrofuran (8)



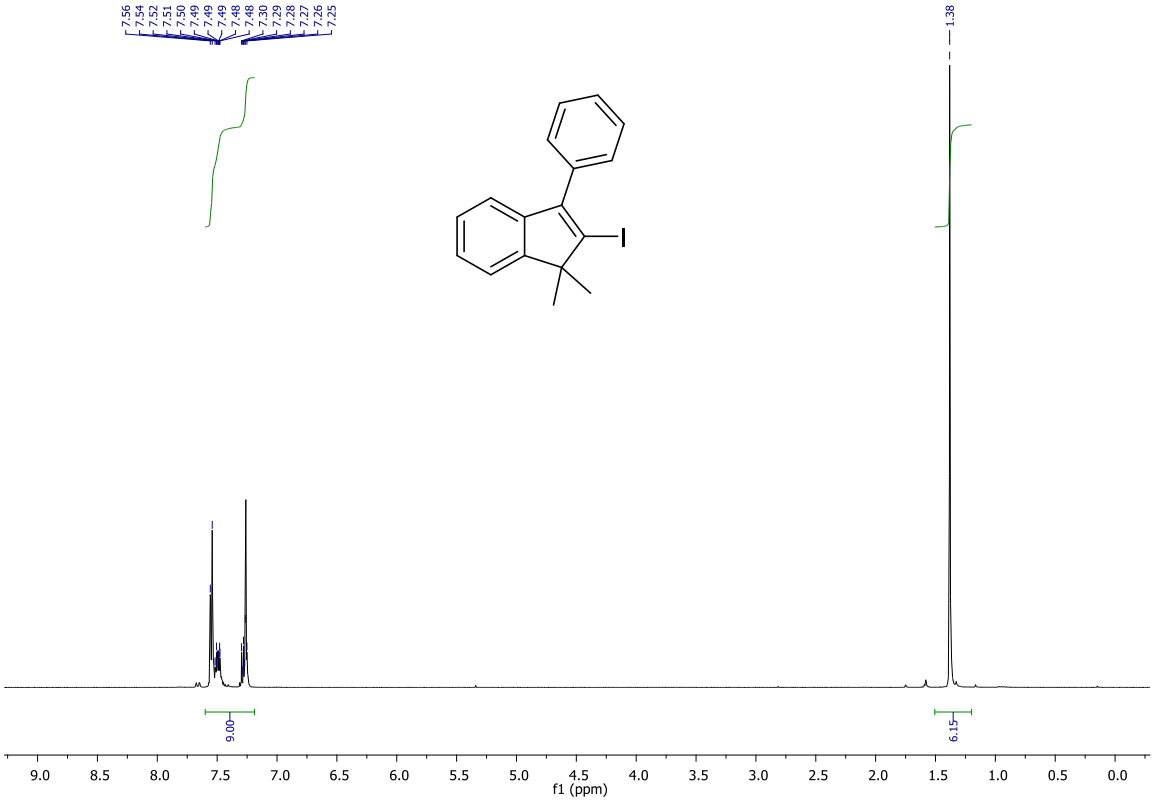


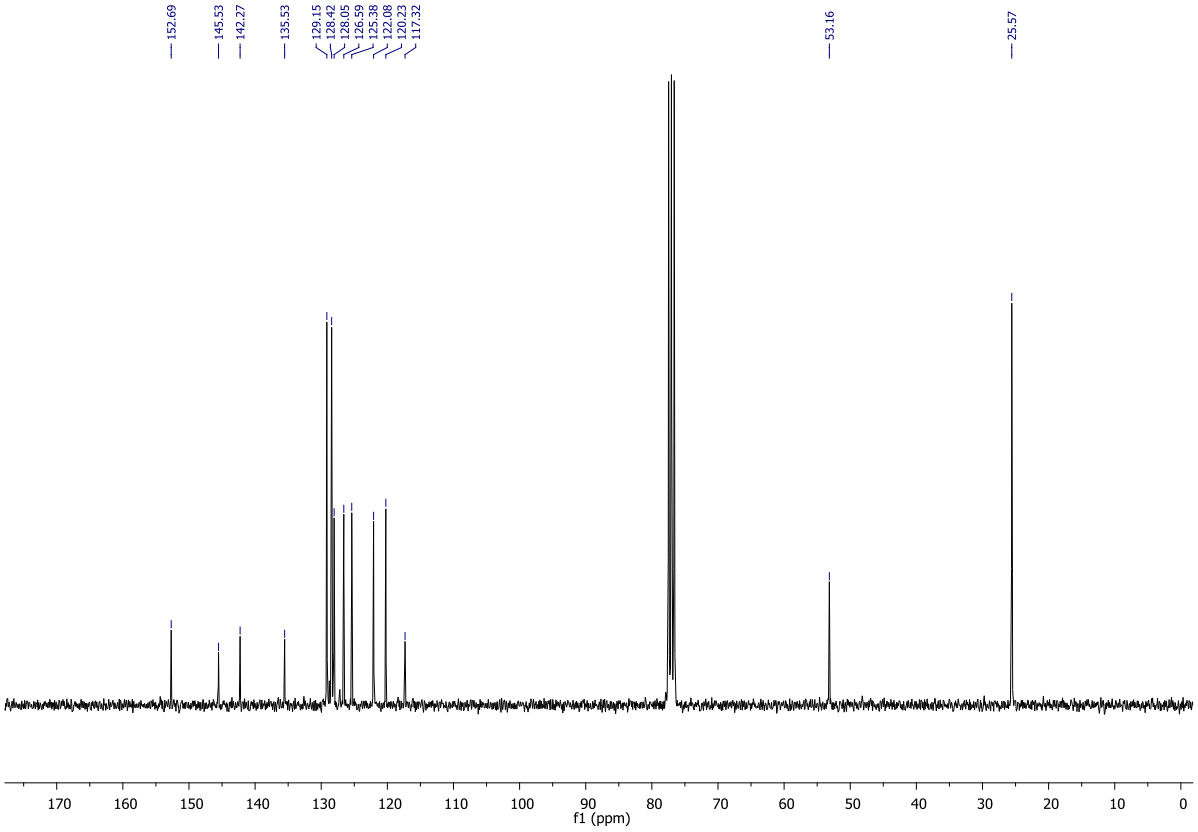
N-((2-Iodo-1,1-dimethyl-1H-inden-3-yl)methyl)-4-methyl-N-(3,4,5-trimethoxyphenyl)benzenesulfonamide (4r)



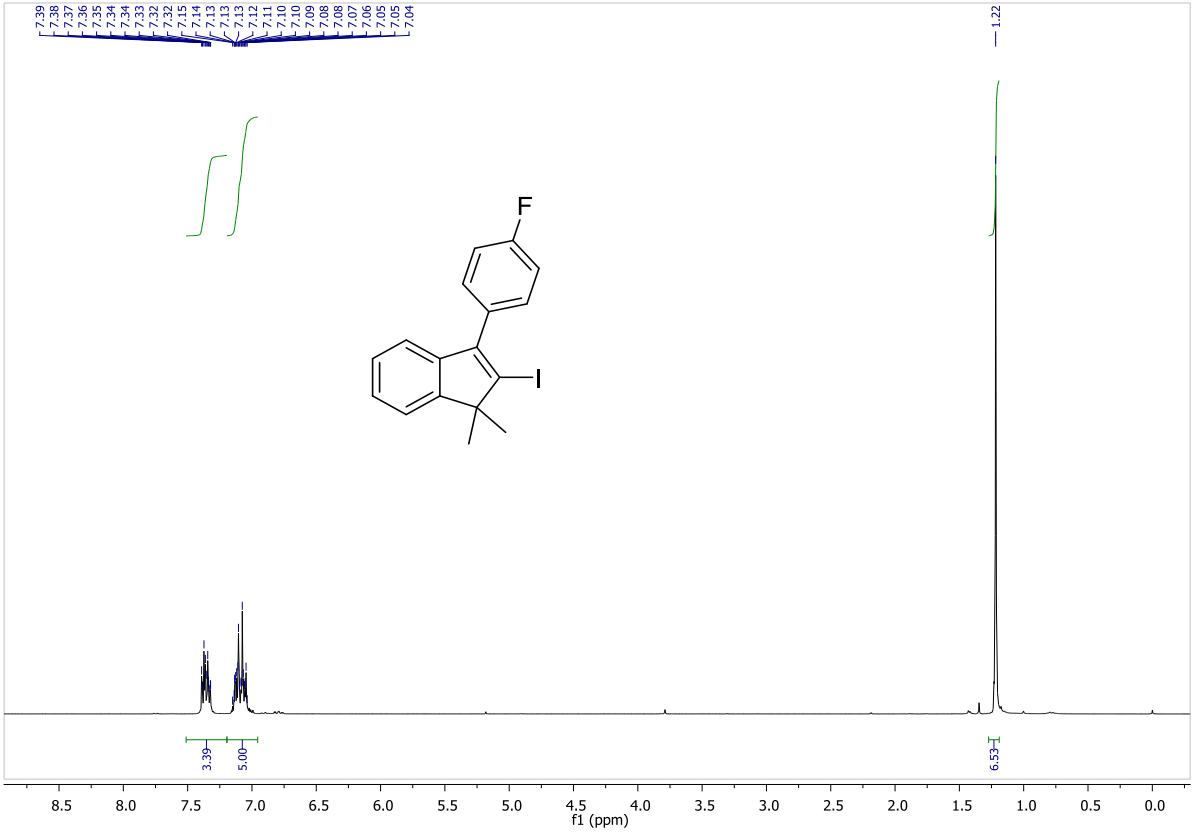


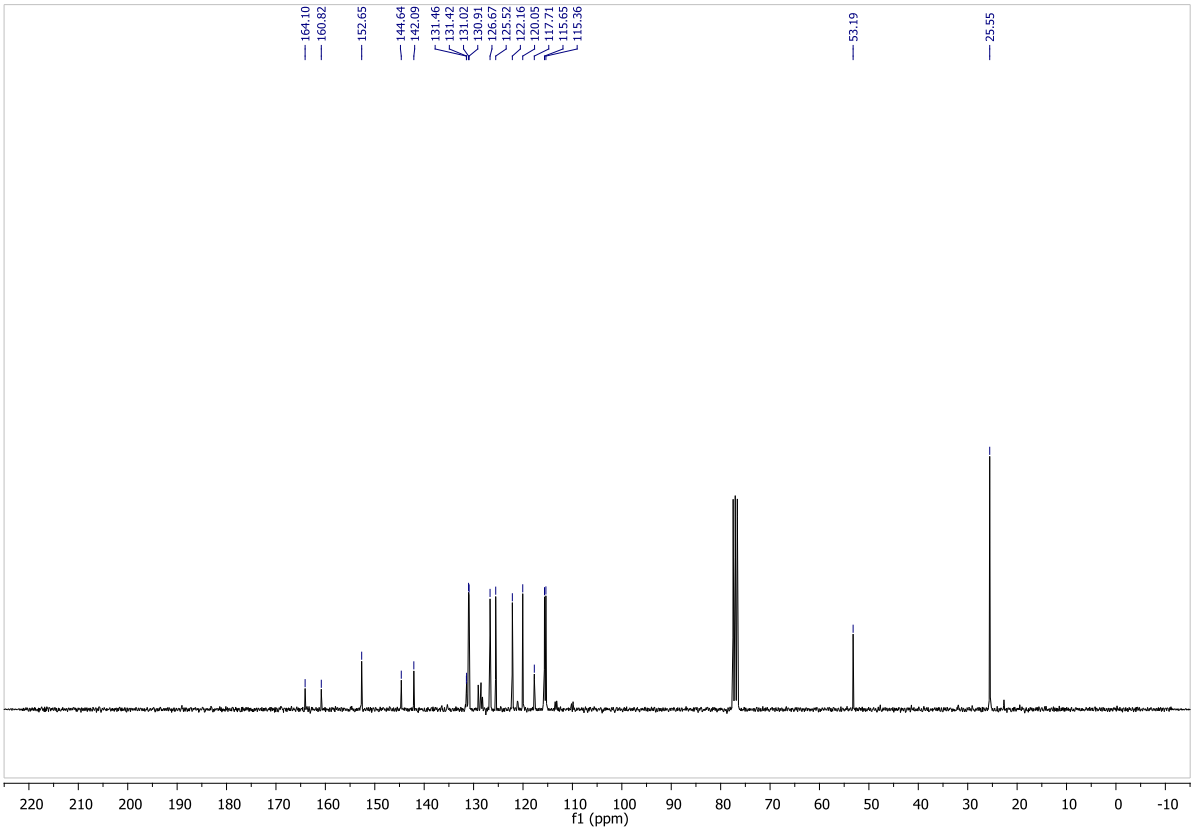
2-Iodo-1,1-dimethyl-3-phenyl-1H-indene (4s)



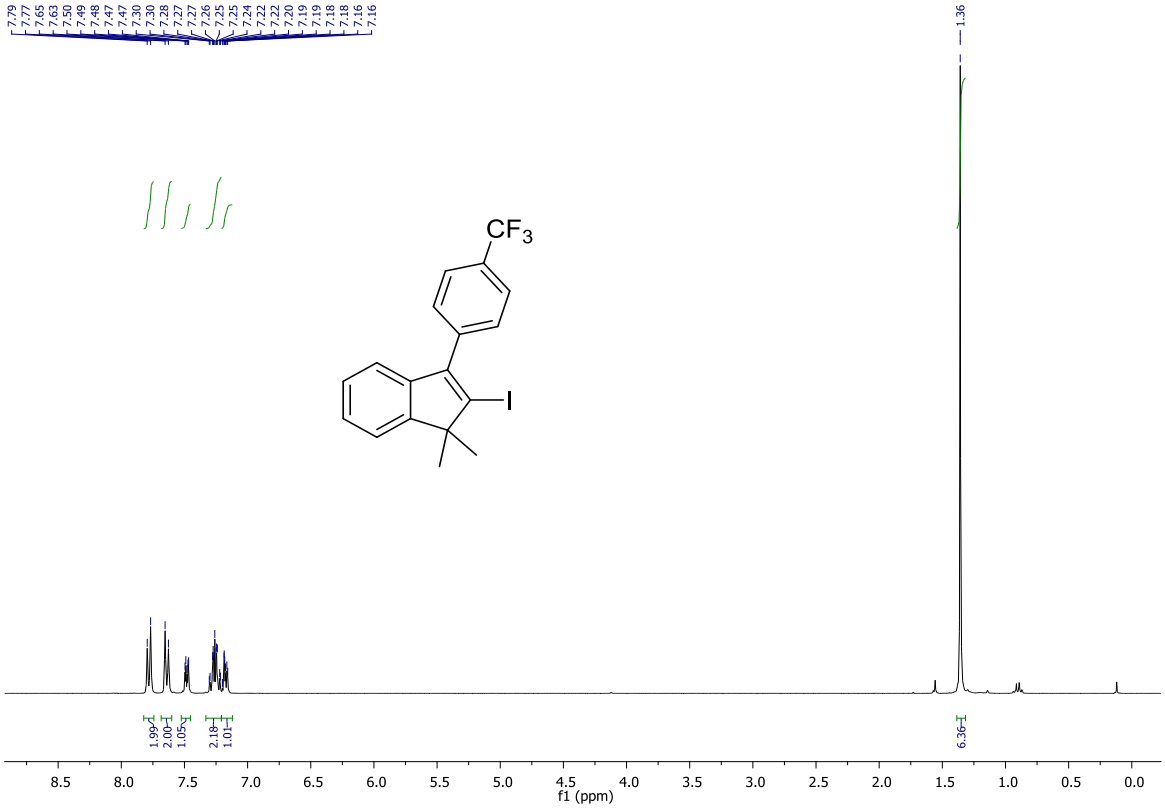


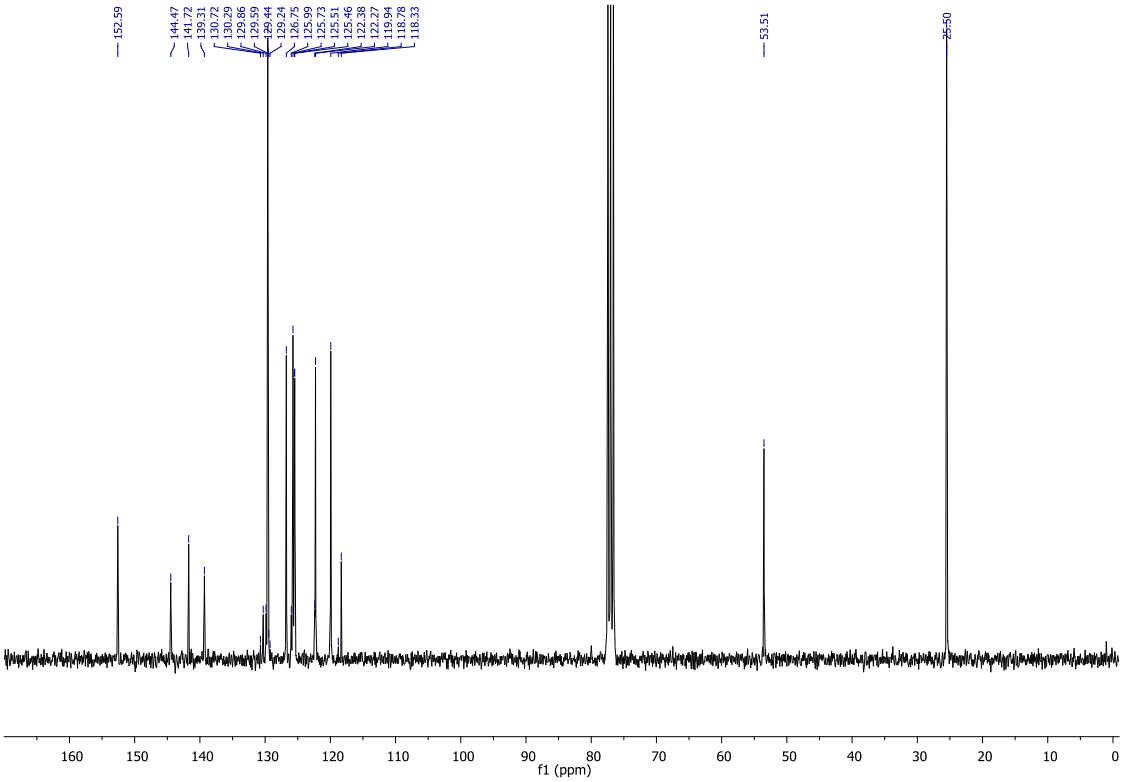
3-(4-fluorophenyl)-2-iodo-1,1-dimethyl-1H-indene (4t)



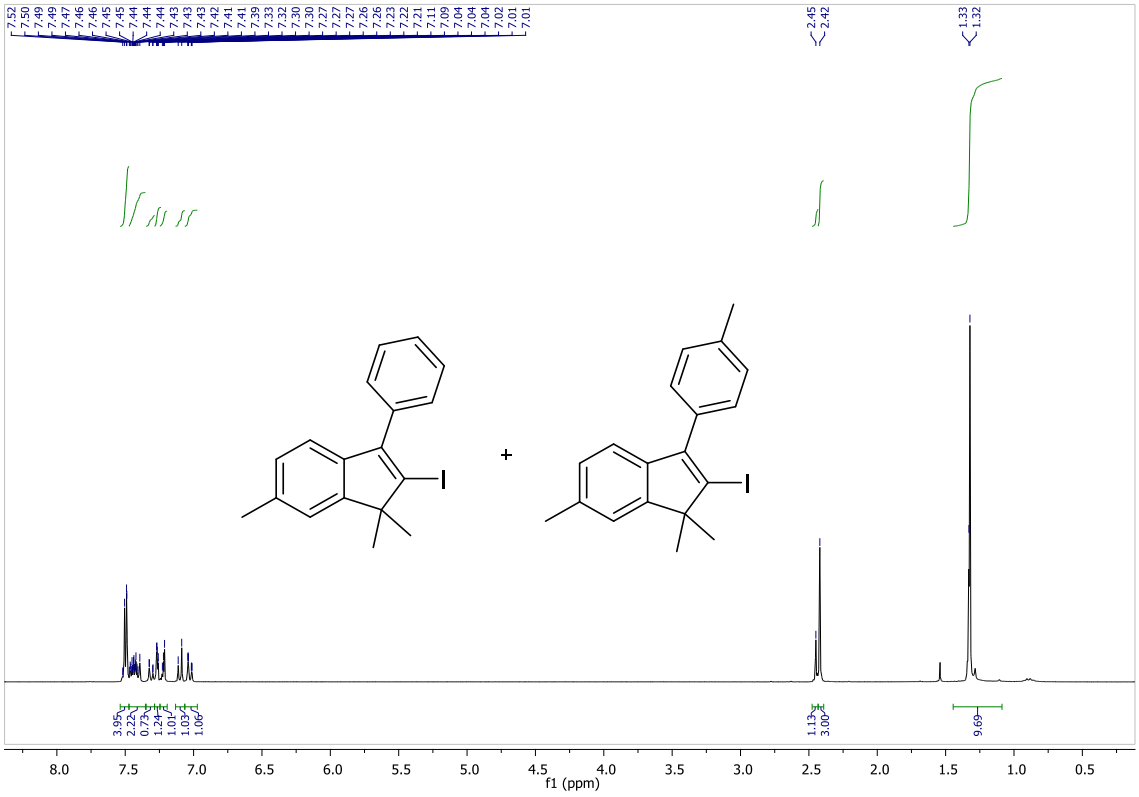


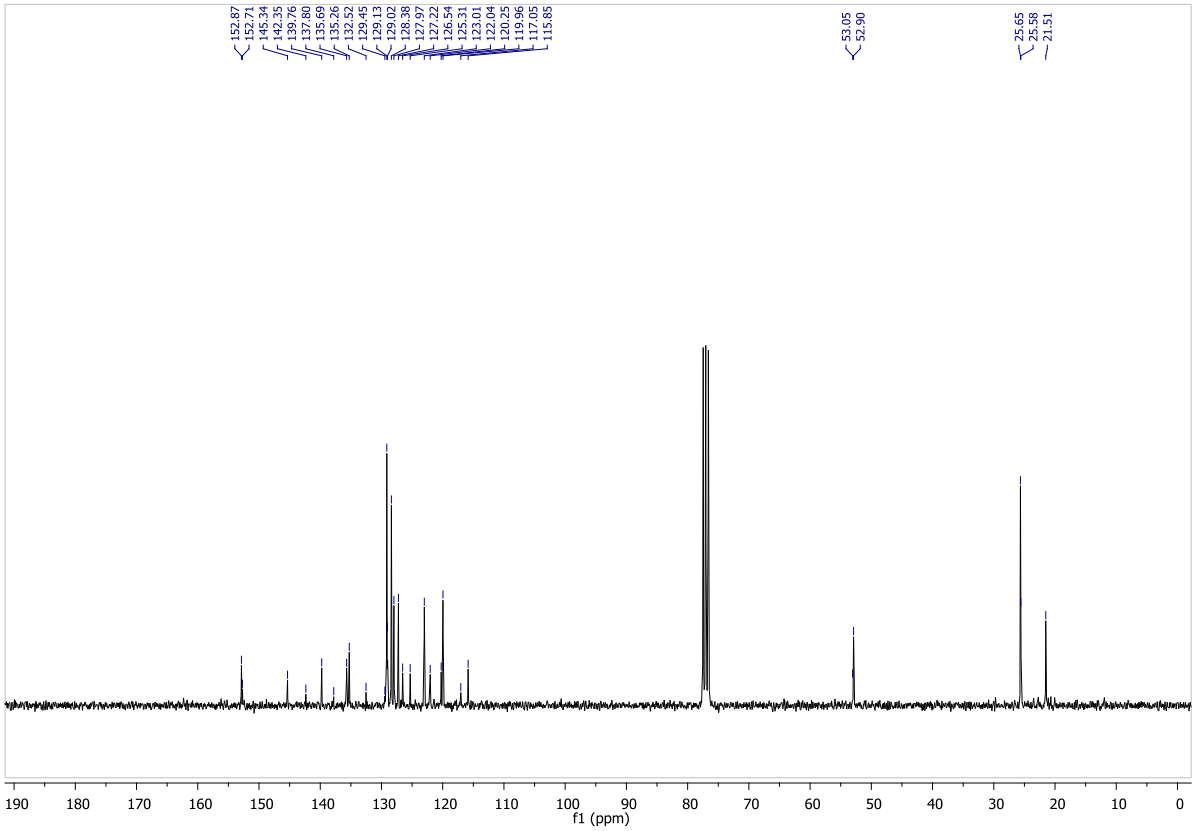
2-Iodo-1,1-dimethyl-3-(4-(trifluoromethyl)phenyl)-1H-indene (4u)



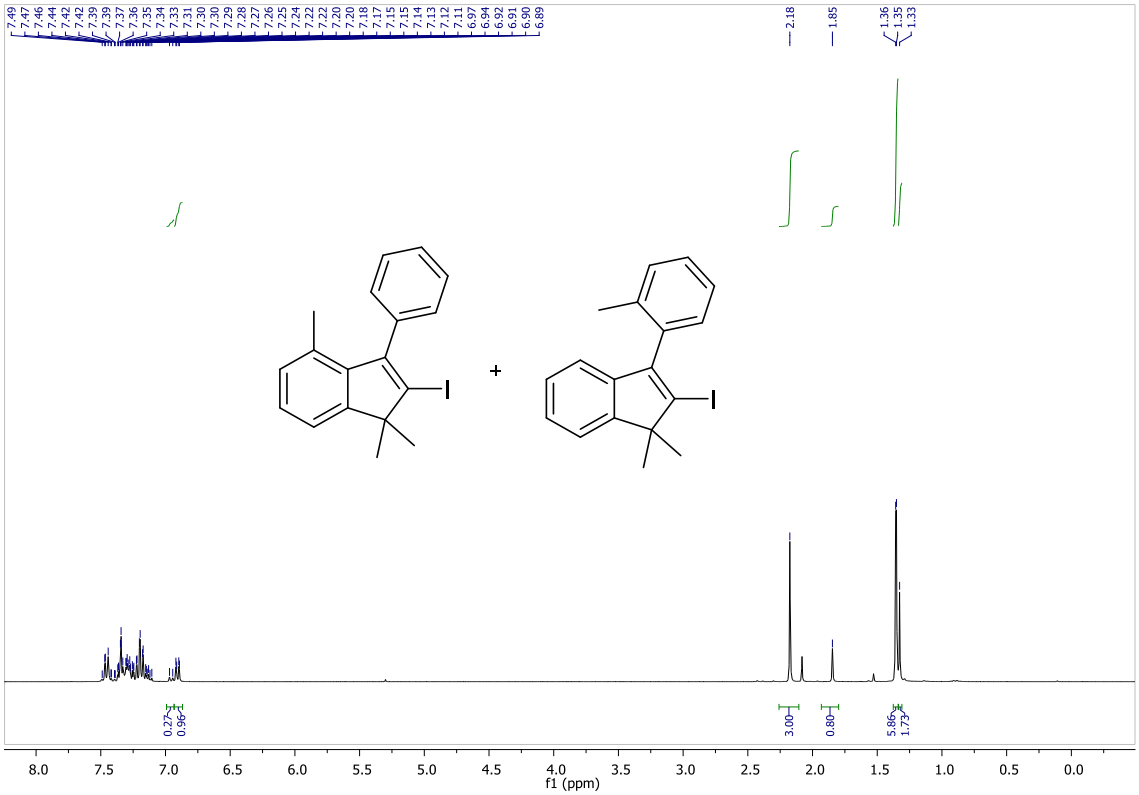


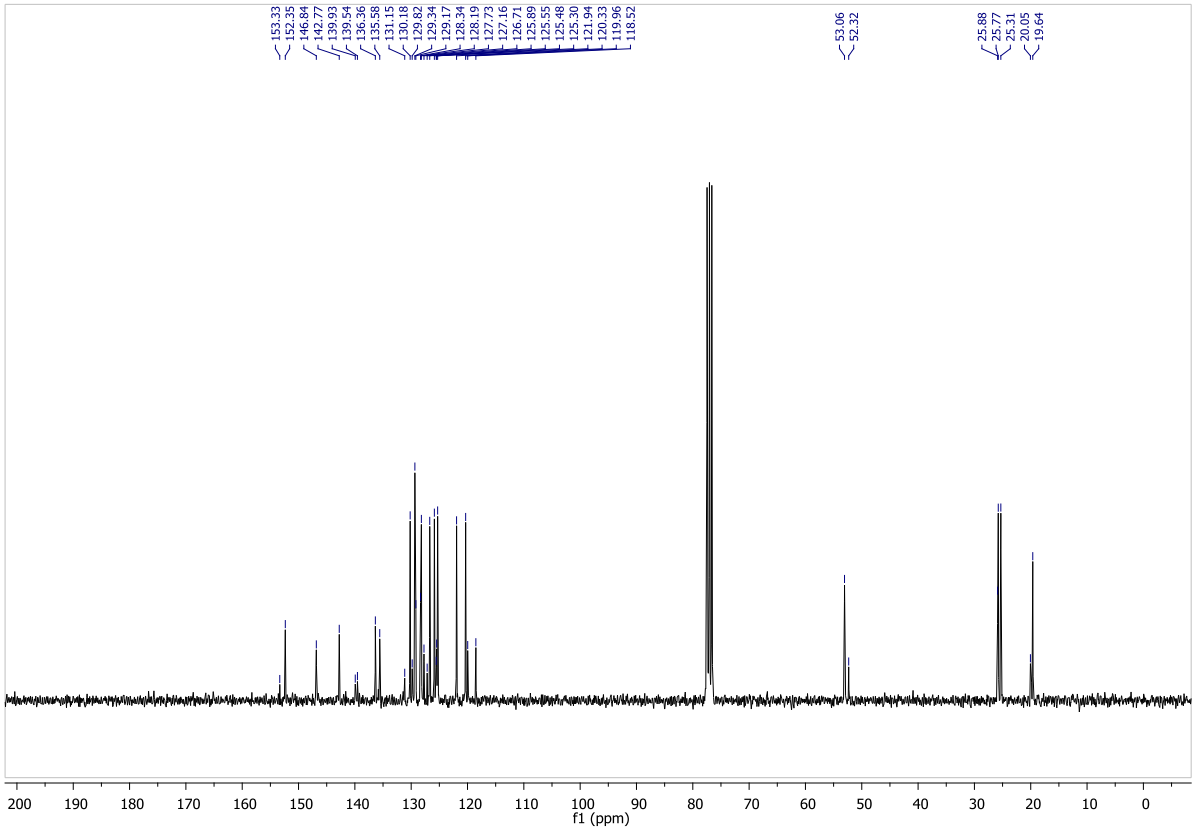
2-Iodo-1,1,6-trimethyl-3-(p-tolyl)-1H-indene compound with 2-iodo-1,1,6-trimethyl-3-phenyl-1H-indene (4v and 4v')



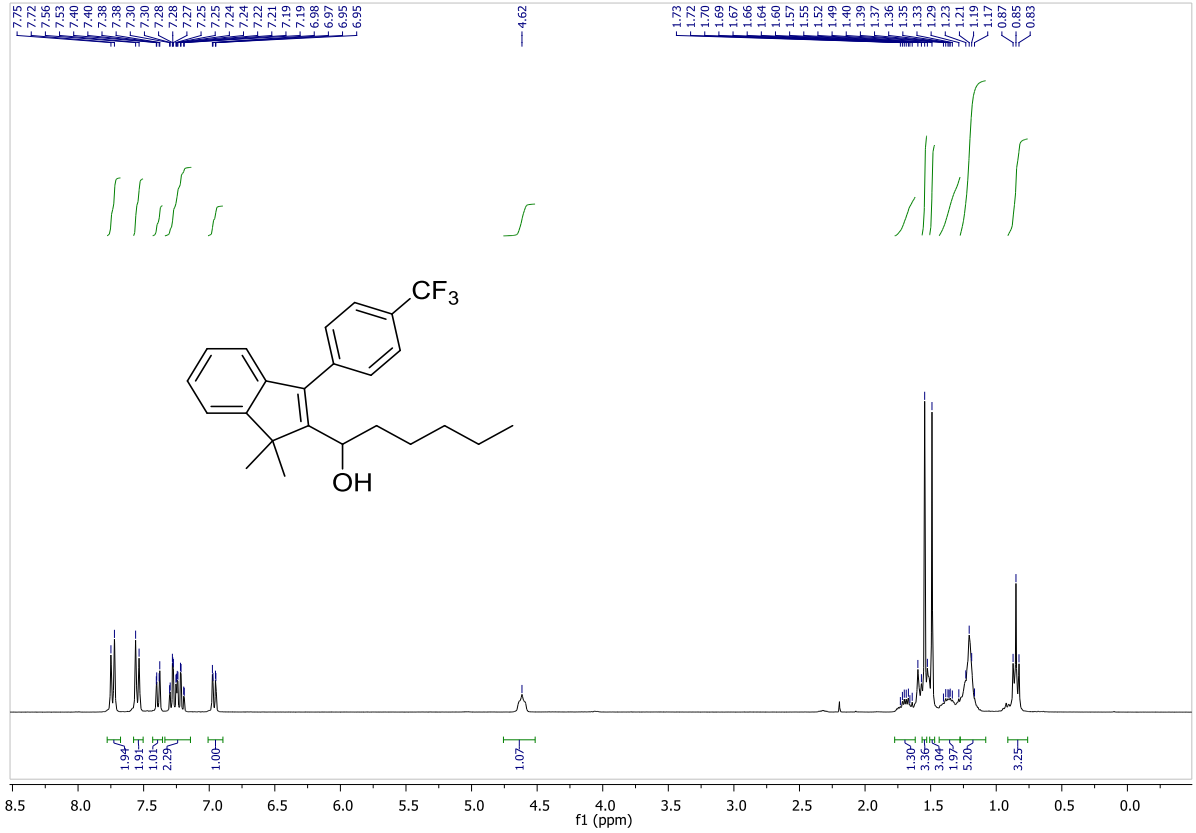


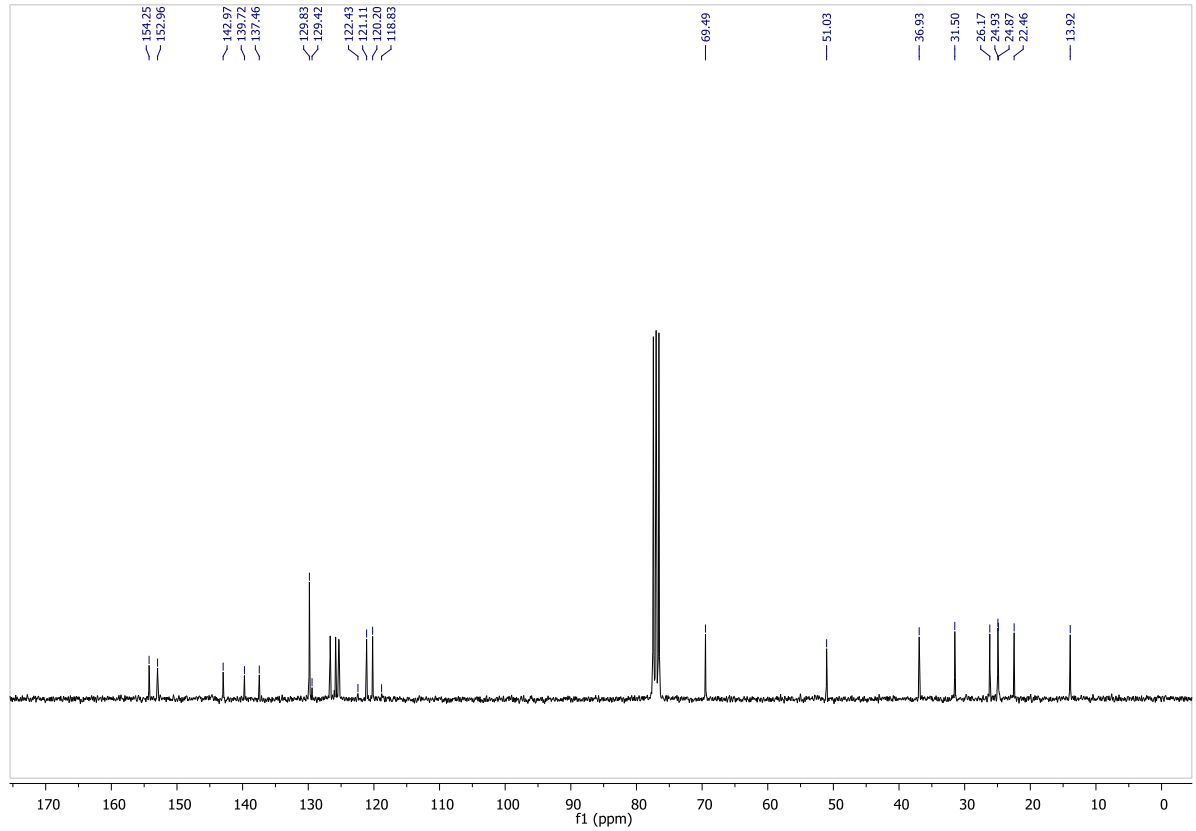
2-**Iodo-1,1,4-trimethyl-3-phenyl-1H-indene compound with 2-iodo-1,1-dimethyl-3-(o-tolyl)-1H-indene (4w and 4w')**



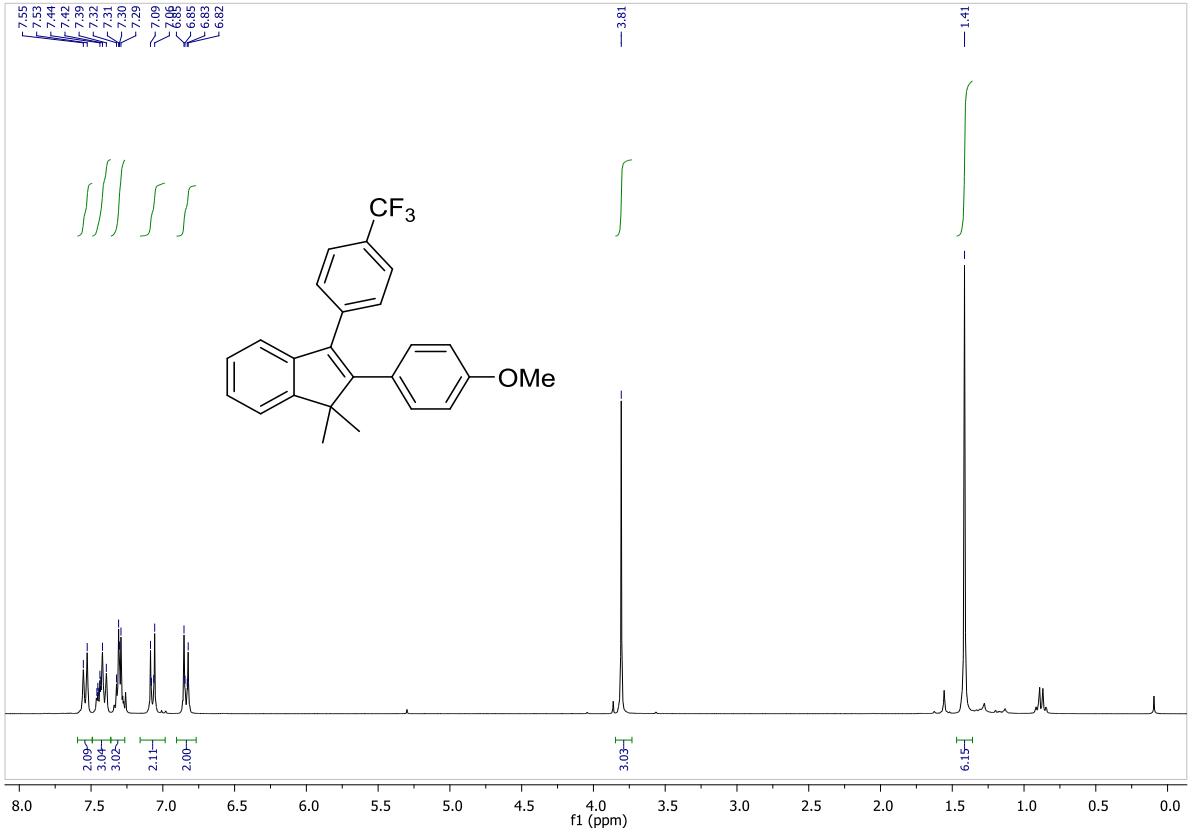


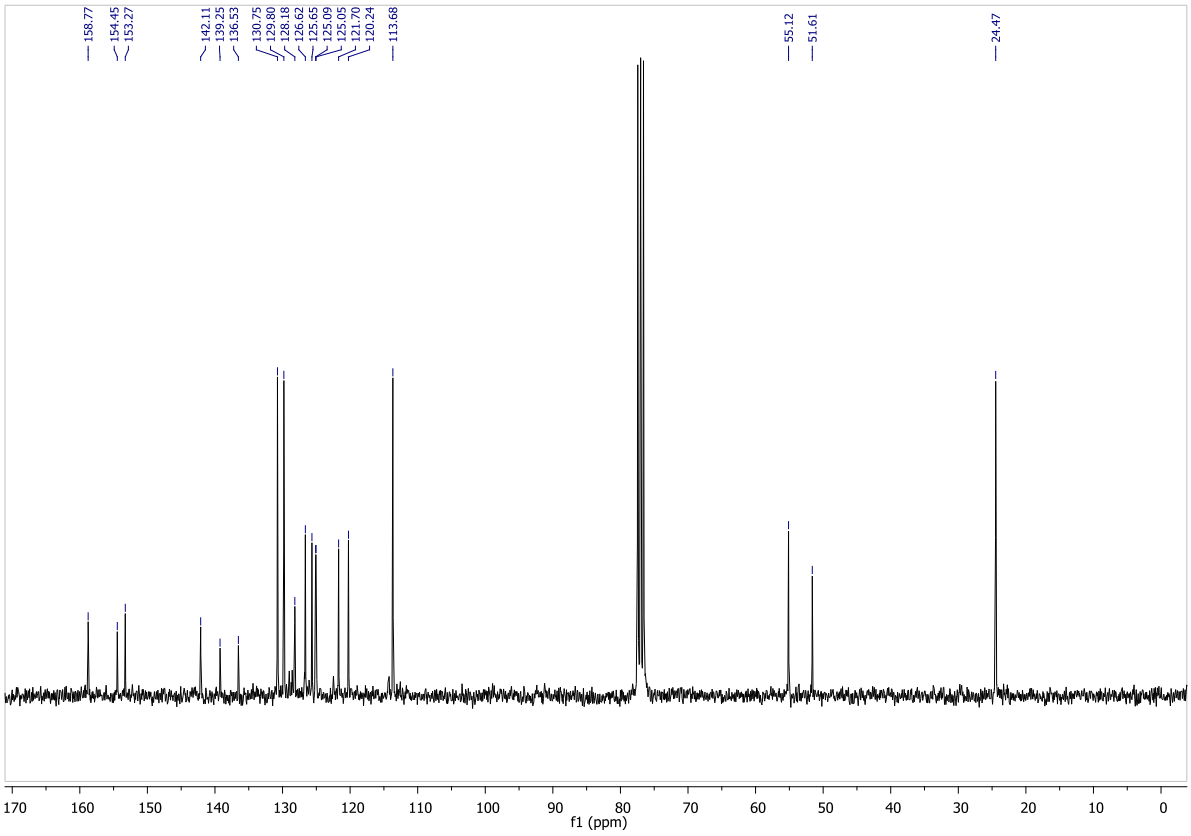
1-(1,1-Dimethyl-3-(4-(trifluoromethyl)phenyl)-1H-inden-2-yl)hexan-1-ol (10)



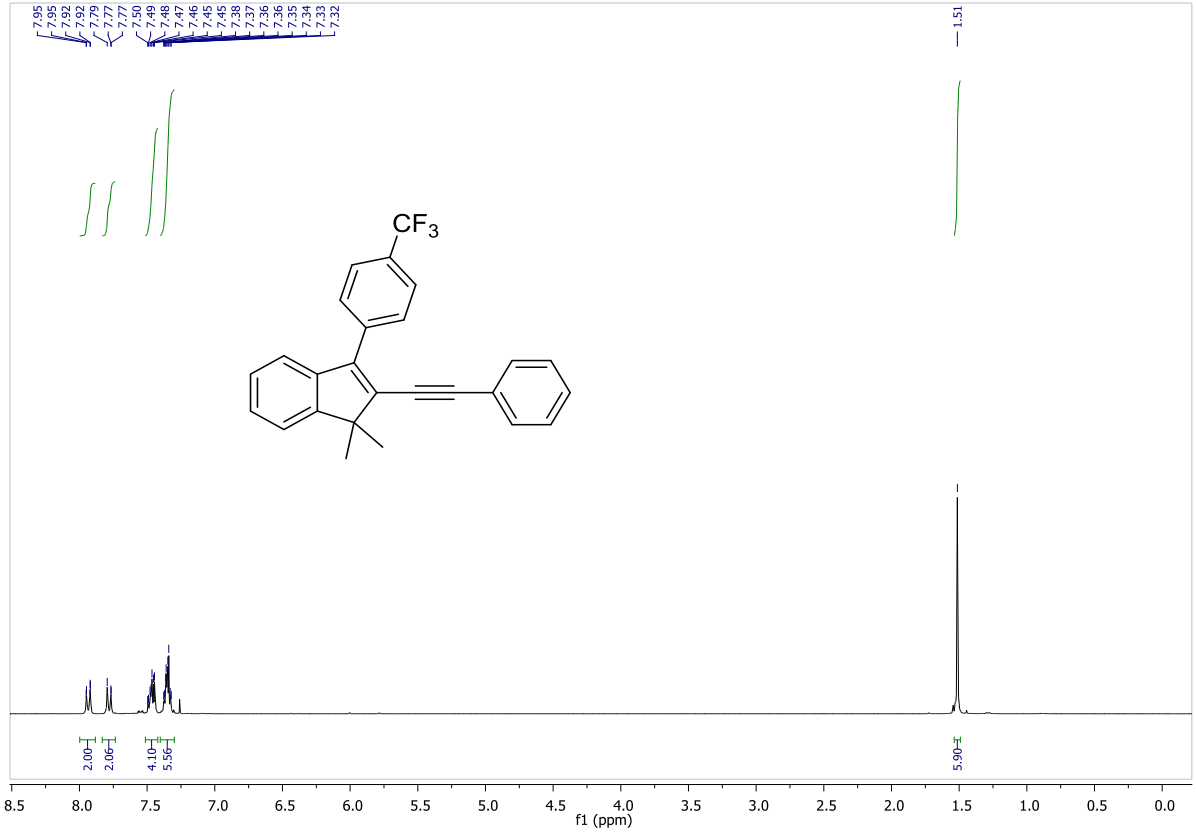


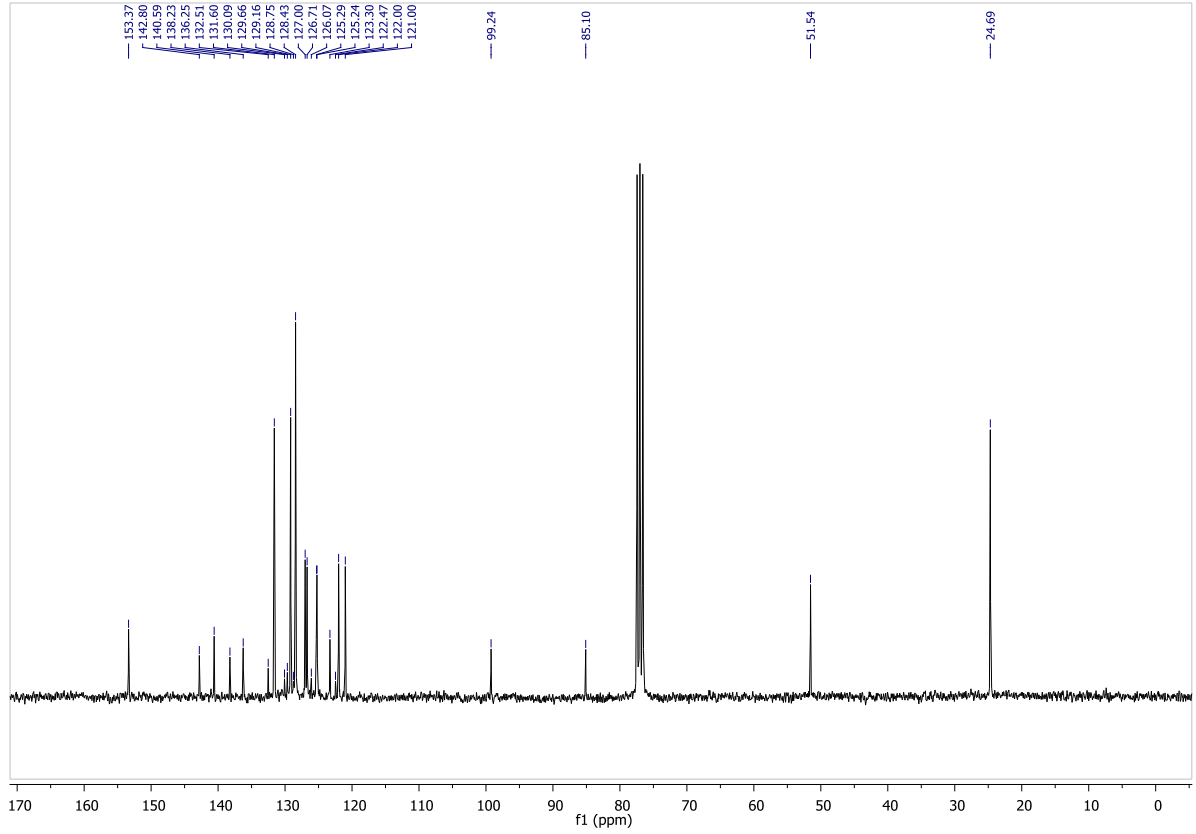
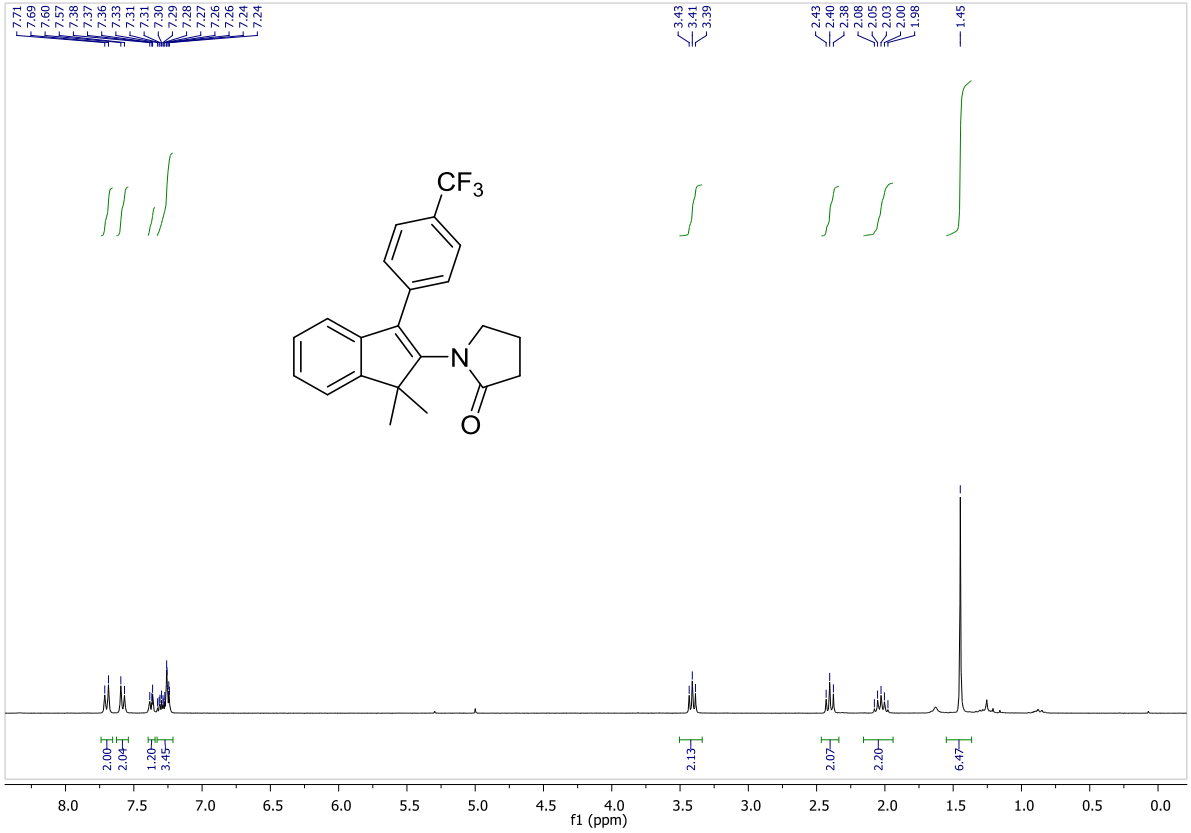
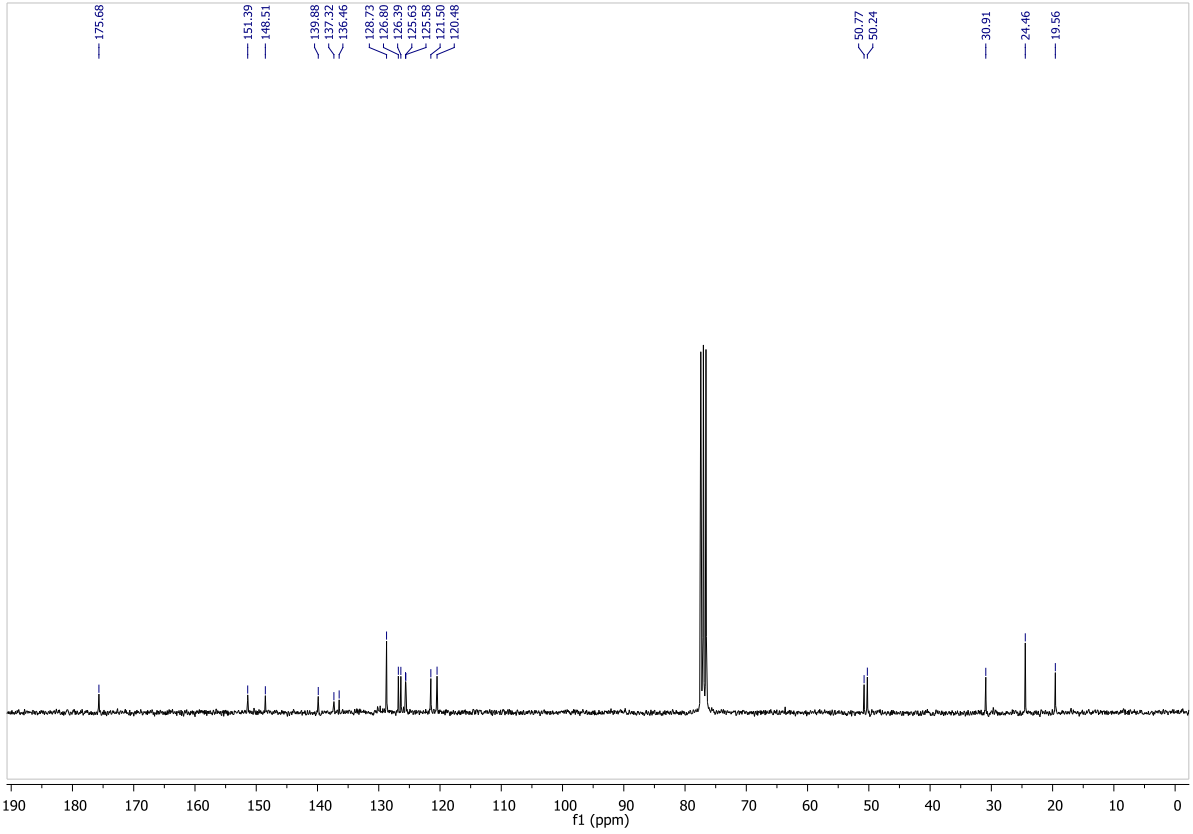
2-(4-Methoxyphenyl)-1,1-dimethyl-3-(4-(trifluoromethyl)phenyl)-1H-indene (11)





1,1-Dimethyl-2-(phenylethynyl)-3-(4-(trifluoromethyl)phenyl)-1H-indene (12)





1-(1,1-Dimethyl-3-(4-(trifluoromethyl)phenyl)-1H-inden-2-yl)pyrrolidin-2-one (13)