Supporting Information

Palladium-Catalyzed Silylation Reaction between Benzylic Halides and Silylboronate

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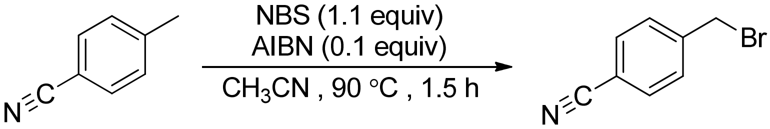
1. General information

Unless otherwise noted, all reagents and solvents were purchased from commercial suppliers and used without further purification. ^{1}H-NMR and ^{13}C-NMR spectra were recorded at 25 ºC on Bruker Advance 400M NMR spectrometers ($CDCl_3$ as solvent). Chemical shifts for ^{1}H NMR spectra are reported as δ in units of parts per million (ppm) downfield from $SiMe_4$ (δ 0.0) and relative to the signal of chloroform-d (δ 7.26 singlet). Multiplicities were given as: s (singlet); d (doublet); t (triplet); q (quartet); dd (doublet of doublets); dt (doublet of triplets); m (multiplets) and *etc*. Coupling constants are reported as a J value in Hz. ^{13}C NMR spectra are reported as δ in units of parts per million (ppm) downfield from $SiMe_4$ (δ 0.0) and relative to the signal of chloroform-d (δ 77.16 triplet). High-resolution EI mass spectra (HR-EI-MS) were recorded on a GCT CA127 Micronass UK mass Spectrometer. Flash chromatography was performed using 200-300 mesh silica gel with the indicated solvent system.

2. Procedure for the synthesis of benzylic halides 1a-1v

1a-1m were purchased from commercial suppliers and used without further purification, other benzylic halides were prepared following the procedure below and the analytical data of the products were consistent with the literature values.[1-7]

2.1 Representative Procedure for the synthesis of benzylic halides 1n-1q, 1s



4-methylbenzonitrile (1.17 g, 10 mmol, 1.0 equiv) was dissolved in acetonitrile (20 mL) under N_2, NBS (1.96 g, 1.1 equiv) and AIBN (0.16 g, 0.1 equiv) were slowly added and the mixture was stirred for 1.5 h at 90 ℃. After the reaction was completed, the solvent was removed in vacuo, following the residue was treated with toluene at 0 ℃ and the solution was filtrated. After removal of the solvent in vacuo, purification by silica gel column chromatography yielded the target products.

4-(bromomethyl)benzonitrile (1n)[1] , yield 42%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.64 (d, J = 8.3 Hz, 2H), 7.50 (d, J = 8.2 Hz, 2H), 4.48 (s, 2H).

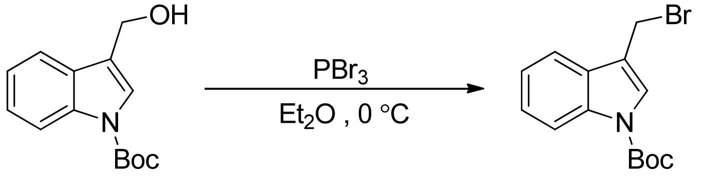
methyl 4-(bromomethyl)benzoate (1o)[2], yield 68%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (d, J = 8.3 Hz, 2 H), 7.46 (d, J =8.3 Hz, 2 H), 4.50 (s, 2 H), 3.92 (s, 3 H).

1-(4-(bromomethyl)phenyl)ethanone (1p)[1], yield 85%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.93 (d, J = 8.3 Hz, 2H), 7.48 (d, J = 8.2 Hz, 2H), 4.50 (s, 2H), 2.60 (s, 3H).

4-(bromomethyl)phenyl acetate (1q)[3], yield 48%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.42 (d, J = 8.6 Hz, 2H), 7.08 (d, J = 8.6 Hz, 2H), 4.50 (s, 2H), 2.32 (s, 3H).

1-(bromomethyl)-4-(phenylethynyl)benzene (1s)[4], yield 65%.^{1}H NMR (400 MHz, $CDCl_3$) δ 7.57 – 7.46 (m, 4H), 7.42 – 7.30 (m, 5H), 4.49 (s, 2H).

2.3 Representative Procedure for the synthesis of Benzylic Halides 1r, 1t

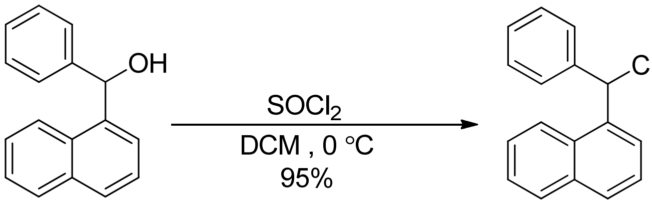


PBr_3 (0.35 equiv) was slowly added to a solution of the corresponding alcohol (5 mmol, 1.0 equiv) in Et_2O (20 mL) at 0 ℃, and the mixture was stirred for 2 h at 0 ℃. After the reaction was completed, the mixture was quenched with aqueous sodium bicarbonate slowly. The organic layer was extracted with Et_2O, washed with aqueous sodium bicarbonate and brine. The combined organic layer was dried over Na_2SO_4, filtered and concentrated under reduced pressure to give the target product which was used without further purification.

1-(bromomethyl)-4-vinylbenzene (1r), colorless liquid, yield 96%. ^1H NMR (400 MHz, $CDCl_3$) δ 7.36 (q, *J* = 8.3 Hz, 4H), 6.70 (dd, *J* = 17.6, 10.9 Hz, 1H), 5.76 (d, *J* = 17.6 Hz, 1H), 5.27 (d, *J* = 10.9 Hz, 1H), 4.49 (s, 2H).

***tert*-butyl-3-(bromomethyl)-1H-indole-1-carboxylate (1t)**[5], yield 94%. ^1H NMR (400 MHz, $CDC1_3$) δ 8.10 (bs, 1H), 7.63-7.61 (m, 2H), 7.31-7.26 (m, 2H), 4.62 (s, 2H), 1.62 (s, 9H).

2.2 Representative Procedure for the synthesis of Benzylic Halides 1u, 1v

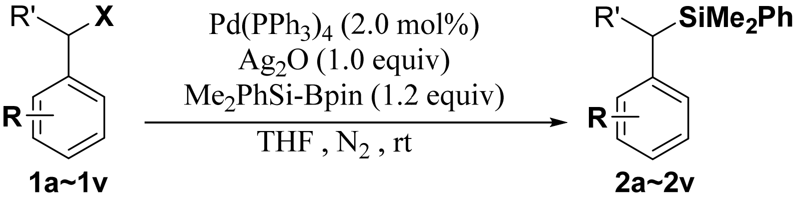


To a solution of the alcohol (10 mmol) in DCM（50 mL） at 0 ℃, $SOCl_2$ (2 mL , 2.0 equiv) was slowly added, the mixture was stirred for 2 h at 0 ℃. After the reaction was completed, the diluted aqueous sodium bicarbonate was slowly added to quench the reaction, after that Et_2O (50 ml) was added, the mixture was washed with diluted aqueous sodium bicarbonate for several times until the pH of the aqueous layer was larger than 7. Then the organic layer was washed with brine and dried over Na_2SO_4, filtered and concentrated under reduced pressure to give the target products as yellowish or white solid, which was used without further purification.

1-(chloro(phenyl)methyl)naphthalene (1u)[6], yield 95%. ^1H NMR (400 MHz, $CDCl_3$) δ 8.11 – 8.01 (m, 1H), 7.93 – 7.87 (m, 1H), 7.84 (d, *J* = 8.2 Hz, 1H), 7.66 (d, *J* = 7.0 Hz, 1H), 7.55 – 7.41 (m, 5H), 7.41 – 7.24 (m, 3H), 6.57 (s, 1H).

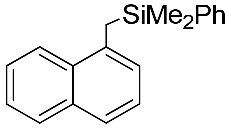
2-(chloro(phenyl)methyl)naphthalene (1v)[7], yield 92%. ^1H NMR (400 MHz, $CDCl_3$) δ 7.74 (m, 4H), 7.40 (m, 5H), 7.32 – 7.16 (m, 3H), 6.21 (s, 1H).

3. Procedure for the synthesis of benzylicsilanes 2a-2v



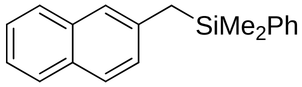
A dry 25-mL Schlenk tube containing a magnetic stirring bar was charged with compound **1** (0.3 mmol, if compound **1** was solid), $Pd(PPh_3)_4$ (2.0 mol%, 6.9 mg, 0.006 mmol), Ag_2O (1.0 equiv, 69.5 mg, 0.3 mmol), which was evacuated and backfilled with N_2. Then, the solvent THF (2 mL) was added into this mixture under N_2. After that, compound **1** (0.3 mmol, if compound **1** was liquid), $Ph(Me)_2SiB(pin)$ (94.4 mg, 0.36 mmol, 1.2 equiv) was added under N_2. The reaction was stirred at room temperature for 24 or 36 h. After the reaction was completed, the mixture was diluted with dichloromethane and filtered through a pad of Celite. The Celite bed was washed with 3×5 mL dichloromethane. The organic layer was concentrated in vacuo. Purification by silica gel column chromatography afforded the target product.

Characterization Data forbenzylicsilanes 2a-2v



2a

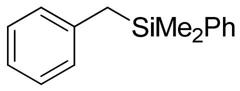
dimethyl(naphthalen-1-ylmethyl)(phenyl)silane (2a). White solid, yield 85%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.92 (d, *J* = 8.1 Hz, 1H), 7.86 (d, *J* = 7.7 Hz, 1H), 7.66 (d, *J* = 8.2 Hz, 1H), 7.58 – 7.51 (m, 2H), 7.51 – 7.33 (m, 6H), 7.15 (d, *J* = 7.0 Hz, 1H), 2.84 (s, 2H), 0.27 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 138.87, 136.54, 134.05, 133.79, 131.88, 129.23, 128.69, 127.91, 125.84, 125.58, 125.40, 125.13, 125.01, 124.84, 22.85, -2.74. HRMS (EI) calculated for $C_{19}H_{20}Si$: 276.1334, found: 276.1335. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -2.92.



2b

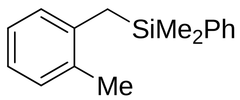
dimethyl(naphthalen-2-ylmethyl)(phenyl)silane (2b). White solid, yield 72%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.80 (d, *J* = 7.9 Hz, 1H), 7.71 (t, *J* = 7.2 Hz, 2H), 7.55 – 7.49 (m, 2H), 7.47 – 7.35 (m, 6H), 7.11 (dd, *J* = 8.4, 1.5 Hz, 1H), 2.51 (s, 2H), 0.31 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 138.57, 137.57, 133.90, 133.88, 131.22, 129.25, 128.14, 127.90, 127.70, 127.62, 127.16, 125.88, 125.73, 124.56, 26.65, -3.26. HRMS

(EI) calculated for $C_{19}H_{20}Si$: 276.1334, found: 276.1330. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -3.52.



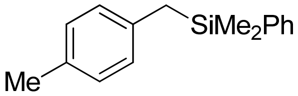
2c

benzyldimethyl(phenyl)silane (2c). Colorless oil, yield 81%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.54 – 7.46 (m, 2H), 7.44 – 7.35 (m, 3H), 7.22 (t, J = 7.6 Hz, 2H), 7.10 (t, J = 7.4 Hz, 1H), 6.98 (d, J = 7.6 Hz, 2H), 2.35 (s, 2H), 0.29 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 139.79, 138.61, 133.84, 129.18, 128.44, 128.24, 127.86, 124.21, 26.31, -3.33. HRMS (EI) calculated for $C_{15}H_{18}Si$: 226.1178, found: 226.1180. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -3.74.



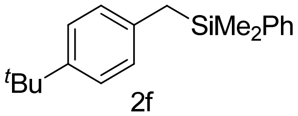
2d

dimethyl(2-methylbenzyl)(phenyl)silane (2d). Colorless oil, yield 62%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.54 – 7.44 (m, 2H), 7.44 – 7.31 (m, 3H), 7.15 – 6.99 (m, 3H), 6.98 – 6.89 (m, 1H), 2.34 (s, 2H), 2.11 (s, 3H), 0.30 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 138.92, 138.24, 135.02, 133.76, 130.24, 129.20, 129.05, 127.87, 125.71, 124.41, 23.16, 20.34, -2.94. HRMS (EI) calculated for $C_{16}H_{20}Si$: 240.1334, found: 240.1332. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -3.69.



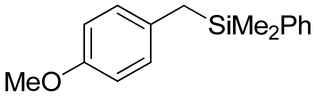
2e

dimethyl(4-methylbenzyl)(phenyl)silane (2e). Colorless oil, yield 79%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.55 – 7.49 (m, 2H), 7.43 – 7.38 (m, 3H), 7.05 (d, J = 7.9 Hz, 2H), 6.89 (d, J = 8.0 Hz, 2H), 2.34 (s, 3H), 2.32 (s, 2H), 0.30 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 138.82, 136.46, 133.85, 133.49, 129.13, 128.96, 128.34, 127.85, 25.64, 21.05, -3.30. HRMS (EI) calculated for $C_{16}H_{20}Si$: 240.1334, found: 240.1333. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -3.98.



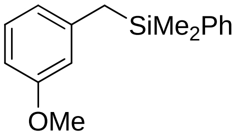
2f

(4-(tert-butyl)benzyl)dimethyl(phenyl)silane (2f). White solid, yield 81%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.61 – 7.51 (m, 2H), 7.45 – 7.40 (m, 3H), 7.29 (d, J = 8.4 Hz, 2H), 6.98 (d, J = 8.4 Hz, 2H), 2.36 (s, 2H), 1.38 (s, 9H), 0.34 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 145.95, 137.93, 135.48, 132.85, 128.11, 127.14, 126.84, 124.12, 76.48, 76.16, 75.84, 33.35, 30.62, 24.51, -4.18. HRMS (EI) calculated for $C_{19}H_{26}Si$: 282.1804, found: 282.1806. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -3.89.



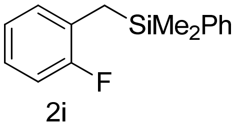
2g

(4-methoxybenzyl)dimethyl(phenyl)silane (2g). White solid, yield 59%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.50 – 7.42 (m, 2H), 7.39 – 7.32 (m, 3H), 6.85 (d, *J* = 8.7 Hz, 2H), 6.75 (d, *J* = 8.7 Hz, 2H), 3.77 (s, 3H), 2.24 (s, 2H), 0.24 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 156.79, 138.79, 133.86, 131.61, 129.24, 129.13, 127.84, 113.78, 55.37, 24.95, -3.32. HRMS (EI) calculated for $C_{16}H_{20}OSi$: 256.1283, found: 256.1280. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -3.99.



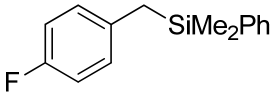
2h

(3-methoxybenzyl)dimethyl(phenyl)silane (2h). Colorless oil, yield 70%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.55 – 7.44 (m, 2H), 7.44 – 7.33 (m, 3H), 7.13 (t, *J* = 7.9 Hz, 1H), 6.65 (d, *J* = 7.8 Hz, 1H), 6.58 (d, *J* = 7.6 Hz, 1H), 6.48 (s, 1H), 3.72 (s, 3H), 2.32 (s, 2H), 0.30 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 159.53, 141.41, 138.59, 133.86, 129.18, 129.11, 127.85, 121.02, 113.93, 109.88, 55.09, 26.49, -3.31. HRMS (EI) calculated for $C_{16}H_{20}OSi$: 256.1283, found: 256.1285. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -3.69.



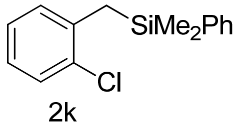
2i

(2-fluorobenzyl)dimethyl(phenyl)silane (2i). Colorless oil, yield 63%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.57 – 7.48 (m, 2H), 7.43 – 7.34 (m, 3H), 7.13 – 7.03 (m, 1H), 7.03 – 6.85 (m, 3H), 2.34 (s, 2H), 0.30 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 160.48 (d, J_{CF} = 242.9 Hz), 138.41, 133.76, 130.65 (d, J_{CF} = 5.0 Hz), 129.26, 127.89, 127.01 (d, J_{CF} = 16.7 Hz), 125.81 (d, J_{CF} = 7.8 Hz), 123.79 (d, J_{CF} = 3.5 Hz), 115.14 (d, J_{CF} = 22.4 Hz), 18.84 (d, J_{CF} = 2.2 Hz), -3.33. ^{19}F NMR (376 MHz, $CDCl_3$) δ -117.07. HRMS (EI) calculated for $C_{15}H_{17}FSi$: 244.1084 , found: 244.1086. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -3.06.



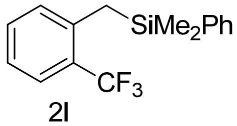
2j

(4-fluorobenzyl)dimethyl(phenyl)silane (2j). White solid, yield 87%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.56 – 7.42 (m, 2H), 7.42 – 7.31 (m, 3H), 6.98 – 6.78 (m, 4H), 2.30 (s, 2H), 0.28 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 160.51 (d, J_{CF} = 241.4 Hz), 138.26, 135.26 (d, J_{CF} = 3.0 Hz), 133.84, 129.47 (d, J_{CF} = 7.5 Hz), 129.27, 127.90, 114.95 (d, J_{CF} = 21.1 Hz), 25.39, -3.42. ^{19}F NMR (376 MHz, $CDCl_3$) δ -120.06. HRMS (EI) calculated for $C_{15}H_{17}FSi$: 244.1084, found: 244.1083. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -3.74.



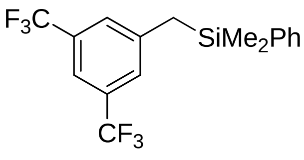
2k

(2-chlorobenzyl)dimethyl(phenyl)silane (2k). Colorless oil, yield 72%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.59 – 7.50 (m, 2H), 7.44 – 7.37 (m, 3H), 7.37 – 7.32 (m, 1H), 7.14 – 7.01 (m, 2H), 7.01 – 6.93 (m, 1H), 2.55 (s, 2H), 0.34 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 138.53, 138.22, 133.79, 133.01, 130.13, 129.52, 129.27, 127.91, 126.50, 125.65, 23.71, -3.01. HRMS (EI) calculated for $C_{15}H_{17}ClSi$: 260.0788, found: 260.0786. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -2.65.



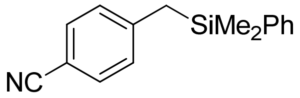
2l

dimethyl(phenyl)(2-(trifluoromethyl)benzyl)silane (2l). Colorless oil, yield 82%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.60 (d, J = 7.8 Hz, 1H), 7.56 – 7.50 (m, 2H), 7.43 – 7.36 (m, 3H), 7.32 (t, J = 7.6 Hz, 1H), 7.18 (t, J = 7.6 Hz, 1H), 7.00 (d, J = 7.8 Hz, 1H), 2.57 (s, 2H), 0.28 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 139.43 (q, J_{CF} = 1.7 Hz), 138.54, 133.82, 131.32, 130.80,129.34,128.00,127.51 (q, J_{CF} = 29.1 Hz), 126.24(q, J_{CF}=5.7 Hz), 124.86 (q, J_{CF}=273.5 Hz), 124.34, 23.11 (q, J_{CF} = 1.7 Hz), -3.01. ^{19}F NMR (376 MHz, $CDCl_3$) δ -59.51. HRMS (EI) calculated for $C_{16}H_{17}F_3Si$: 294.1052, found: 294.1048. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -2.57.



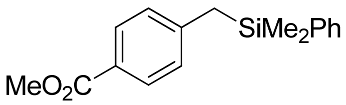
2m

(3,5-bis(trifluoromethyl)benzyl)dimethyl(phenyl)silane (2m). Colorless oil, yield 49%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.57 (s, 1H), 7.44 – 7.31 (m, 5H), 7.25 (bs, 2H), 2.42 (s, 2H), 0.30 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 142.67, 136.59, 133.74, 131.27 (q, J_{CF} = 32.9 Hz), 129.76, 128.17 (m), 128.11, 123.59 (q, J_{CF}= 272.6 Hz), 118.17 (m, J_{CF}=4.0 Hz), 27.17, -3.77. ^{19}F NMR (376 MHz, $CDCl_3$) δ -63.03. HRMS (EI) calculated for $C_{17}H_{16}F_6Si$: 362.0925, found: 362.0927. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -2.86.



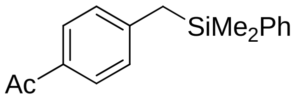
2n

4-((dimethyl(phenyl)silyl)methyl)benzonitrile (2n). White solid, yield 51%. ^{1}H NMR (400 MHz, CDCl$_3$) δ 7.44 (d, *J* = 8.3 Hz, 2H), 7.42 – 7.32 (m, 5H), 6.96 (d, *J* = 8.3 Hz, 2H), 2.38 (s, 2H), 0.28 (s, 6H). ^{13}C NMR (101 MHz, CDCl$_3$) δ 146.36, 137.19, 133.75, 132.02, 129.57, 128.89, 128.01, 119.54, 107.86, 27.76, -3.50. HRMS (EI) calculated for $C_{16}H_{17}NSi$: 251.1130, found: 251.1127. ^{29}Si NMR (79 MHz, CDCl$_3$) δ (ppm): -3.01.



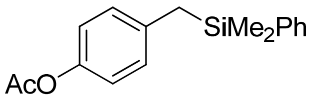
2o

methyl 4-((dimethyl(phenyl)silyl)methyl)benzoate (2o). White solid, yield 73%. ^{1}H NMR (400 MHz, CDCl$_3$) δ 7.86 (d, *J* = 8.3 Hz, 2H), 7.48 – 7.40 (m, 2H), 7.40 – 7.32 (m, 3H), 6.97 (d, *J* = 8.4 Hz, 2H), 3.89 (s, 3H), 2.38 (s, 2H), 0.27 (s, 6H). ^{13}C NMR (101 MHz, CDCl$_3$) δ 167.45, 146.09, 137.80, 133.79, 129.64, 129.39, 128.26, 127.94, 126.25, 51.97, 27.28, -3.42. HRMS (EI) calculated for $C_{17}H_{20}O_2Si$: 284.1233, found: 284.1231. ^{29}Si NMR (79 MHz, CDCl$_3$) δ (ppm): -3.33.



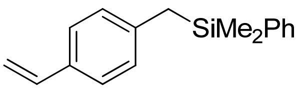
2p

1-(4-((dimethyl(phenyl)silyl)methyl)phenyl)ethanone(2p). White solid, yield 70%. ^{1}H NMR (400 MHz, CDCl$_3$) δ 7.87 – 7.73 (m, 2H), 7.47 – 7.42 (m, 2H), 7.41 – 7.32 (m, 3H), 6.99 (d, *J* = 8.2 Hz, 2H), 2.56 (s, 3H), 2.40 (s, 2H), 0.28 (s, 6H). ^{13}C NMR (101 MHz, CDCl$_3$) δ 197.89, 146.49, 137.73, 133.77, 133.68, 129.40, 128.52, 128.38, 127.94, 27.33, 26.53, -3.41. HRMS (EI) calculated for $C_{17}H_{20}OSi$: 268.1283, found: 268.1285. ^{29}Si NMR (79 MHz, CDCl$_3$) δ (ppm): -3.27.



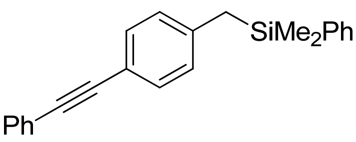
2q

4-((dimethyl(phenyl)silyl)methyl)phenyl acetate (2q). Colorless oil, yield 73%. ^{1}H NMR (400 MHz, CDCl$_3$) δ 7.51 – 7.44 (m, 2H), 7.41 – 7.34 (m, 3H), 6.99 – 6.88 (m, 4H), 2.32 (s, 2H), 2.29 (s, 3H), 0.29 (s, 6H). ^{13}C NMR (101 MHz, CDCl$_3$) δ 169.73, 147.72, 138.30, 137.35, 133.81, 129.22, 129.09, 127.87, 121.18, 25.72, 21.24, -3.38. HRMS (EI) calculated for $C_{17}H_{20}O_2Si$: 284.1233, found: 284.1234. ^{29}Si NMR (79 MHz, CDCl$_3$) δ (ppm): -3.74.



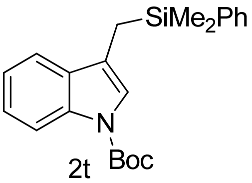
2r

dimethyl(phenyl)(4-vinylbenzyl)silane (2r). Colorless oil, yield 79%. ^{1}H NMR (400 MHz, CDCl$_3$) δ 7.50 – 7.41 (m, 2H), 7.37 – 7.31 (m, 3H), 7.25 – 7.20 (m, 2H), 6.88 (d, *J* = 8.1 Hz, 2H), 6.65 (dd, *J* = 17.6, 10.9 Hz, 1H), 5.65 (dd, *J* = 17.6, 1.0 Hz, 1H), 5.14 (dd, *J* = 10.9, 0.9 Hz, 1H), 2.29 (s, 2H), 0.24 (s, 6H). ^{13}C NMR (101 MHz, CDCl$_3$) δ 139.71, 138.50, 136.94, 133.84, 133.71, 129.21, 128.56, 127.88, 126.19, 112.24, 26.24, -3.33. HRMS (EI) calculated for $C_{17}H_{20}Si$: 252.1334, found: 252.1336. ^{29}Si NMR (79 MHz, CDCl$_3$) δ (ppm): -3.74.



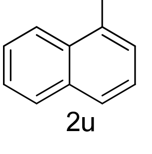
2s

dimethyl(phenyl)(4-(phenylethynyl)benzyl)silane (2s). White solid, yield 80%. ^{1}H NMR (400 MHz, CDCl$_3$) δ 7.62 – 7.53 (m, 2H), 7.53 – 7.46 (m, 2H), 7.45 – 7.31 (m, 8H), 6.95 (d, *J* = 8.2 Hz, 2H), 2.37 (s, 2H), 0.31 (s, 6H). ^{13}C NMR (101 MHz, CDCl$_3$) δ 140.67, 138.11, 133.82, 131.63, 131.56, 129.30, 128.43, 128.41, 128.10, 127.90, 123.72, 118.90, 89.92, 88.74, 26.82, -3.39. HRMS (EI) calculated for $C_{23}H_{22}Si$: 326.1491, found: 326.1494. ^{29}Si NMR (79 MHz, CDCl$_3$) δ (ppm): -3.54.



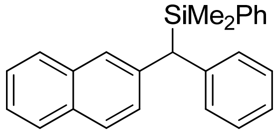
2t

tert-butyl-3-((dimethyl(phenyl)silyl)methyl)-1H-indole-1-carboxylate (2t). Colorless oil, yield 95%. ^{1}H NMR (400 MHz, CDCl$_3$) δ 8.00 (bs, 1H), 7.50 – 7.37 (m, 2H), 7.33 – 7.22 (m, 4H), 7.22 – 7.16 (m, 1H), 7.11 – 7.05 (m, 1H), 7.00 (bs, 1H), 2.20 (s, 2H), 1.55 (s, 9H), 0.20 (s, 6H). ^{13}C NMR (101 MHz, CDCl$_3$) δ 149.94, 138.76, 135.37, 133.79, 131.56, 129.27, 127.92, 124.13, 122.15, 121.56, 119.38, 117.80, 115.12, 83.16, 28.37, 13.30, -2.89. HRMS (EI) calculated for $C_{22}H_{27}NO_2Si$: 365.1811, found: 365.1810. ^{29}Si NMR (79 MHz, CDCl$_3$) δ (ppm): -3.55.



2u

dimethyl(naphthalen-1-yl(phenyl)methyl)(phenyl)silane(2u). Colorless oil, yield 76%. ^{1}H NMR (400 MHz, CDCl$_3$) δ 8.12 – 8.04 (m, 1H), 7.81 – 7.74 (m, 1H), 7.66 (d, *J* = 8.2 Hz, 1H), 7.52 (dd, *J* = 7.2, 1.1 Hz, 1H), 7.41 – 7.28 (m, 6H), 7.28 – 7.22 (m, 2H), 7.17 – 7.00 (m, 5H), 4.56 (s, 1H), 0.37 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 142.40, 138.39, 137.99, 134.56, 134.53, 133.00, 129.22, 128.94, 128.69, 128.16, 127.72, 126.73, 125.95, 125.44, 125.15, 125.11, 124.25, 40.07, -2.17, -2.78. HRMS (EI) calculated for $C_{25}H_{24}Si$: 352.1647, found: 352.1643. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -2.76.

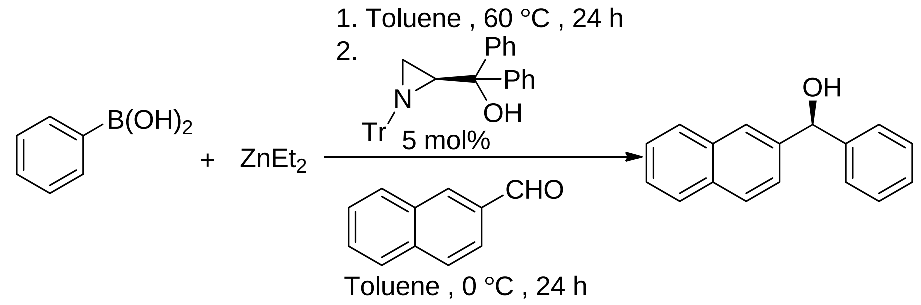


2v

dimethyl(naphthalen-2-yl(phenyl)methyl)(phenyl)silane (2v). Colorless oil, yield 68%. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.77 – 7.71 (m, 1H), 7.66 (d, *J* = 8.7 Hz, 2H), 7.56 (s, 1H), 7.42 – 7.22 (m, 8H), 7.22 – 7.16 (m, 4H), 7.14 – 7.07 (m, 1H), 3.91 (s, 1H), 0.32 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 142.34, 140.08, 137.67, 134.59, 133.70, 131.71, 129.31, 129.19, 128.39, 127.75, 127.72, 127.65, 127.61, 126.94, 125.91, 125.42, 125.12, 45.93, -2.92, -2.95. HRMS (EI) calculated for $C_{25}H_{24}Si$: 352.1647, found: 352.1645. ^{29}Si NMR (79 MHz, $CDCl_3$) δ (ppm): -2.38.

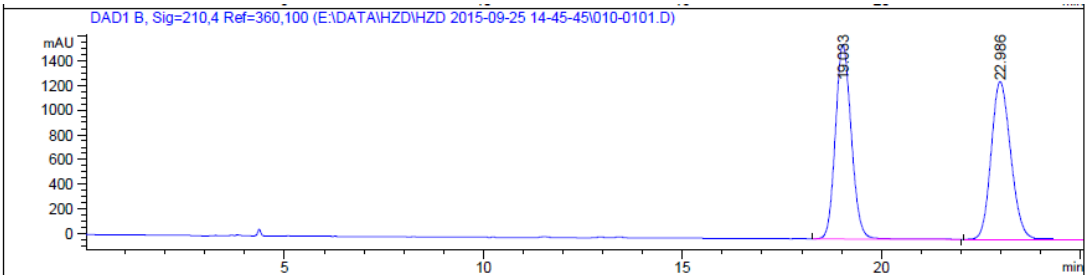
4. Enantiopecific Pd--catalyzed silylation of secondary benzylic halides

4.1 Preperation of Enantioenriched naphthalen-2-yl(phenyl)methanol



(S)-naphthalen-2-yl(phenyl)methanol was prepared following the reported procedure[8,9]. To a solution of boronic acid (2.4 equiv) in toluene was added diethylzinc (7.2 equiv, 1.0 M in toluene), the solution was heated and stirred at 65 ºC for 24 h. Upon cooling to 0 ºC, (S)-diphenyl(1-tritylaziridin-2-yl)methanol[10] (5 mol%) was added as a solution in toluene. After stirring for 10 min, aldehyde (0.8 g, 5 mmol, 1.0 equiv) was added as a solution in toluene, and the solution was stirred at 0 ºC for 20 h before quenching with 1N HCl. The product was extracted with EA, washed with brine, dried over $MgSO_4$, filtered and concentrated in vacuo. Purification by flash chromatography afforded the target compound. Analytical Data are consistent with the literature values. The alcohol product was determined to be 92% ee by chiral HPLC analysis (OD, *i*-PrOH/hexane = 10/90, 0.8 mL/min, 210 nm, tr (major) = 19.0 min, tr (minor) = 23.0 min).

Racemic Product



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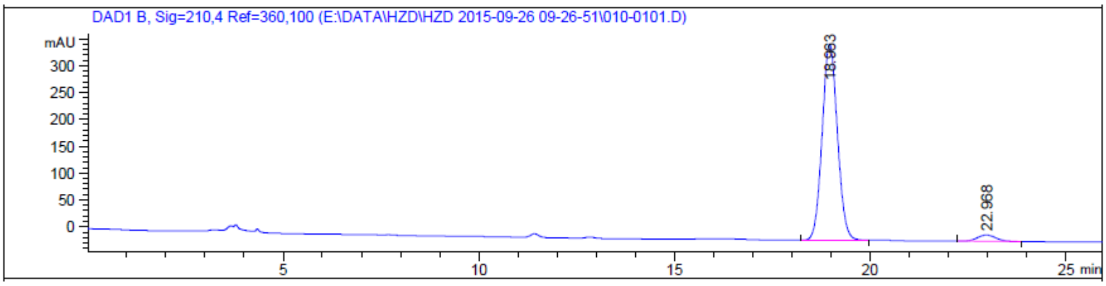
Signal 2: DAD1 B, Sig=210,4 Ref=360,100

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  19.033 BB     0.4308 4.35612e4  1574.48486  49.9084
   2  22.986 BBA    0.5331 4.37211e4  1278.21021  50.0916

Totals :                   8.72823e4  2852.69507
```

Enantioenriched Product



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Signal 2: DAD1 B, Sig=210,4 Ref=360,100

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]        %
----|-------|----|-------|----------|----------|--------|
   1  18.963 BB    0.4196 9896.63867  365.90189  96.1803
   2  22.968 BB    0.5130  393.03671   11.84835   3.8197

Totals :                  1.02897e4  377.75024
```
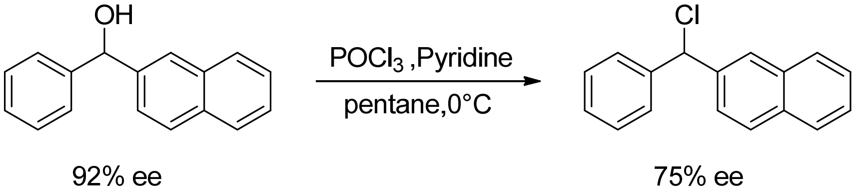
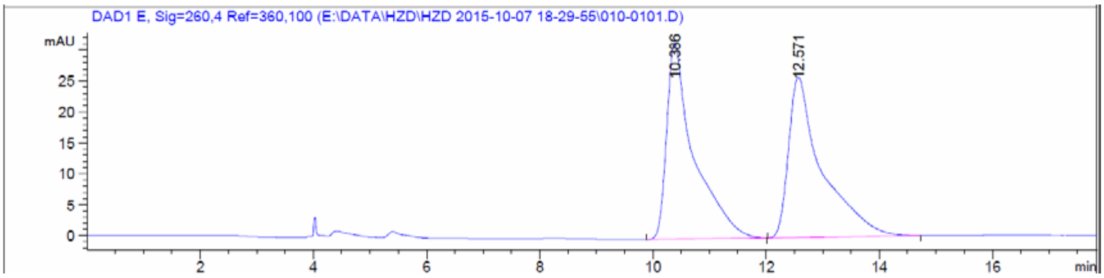
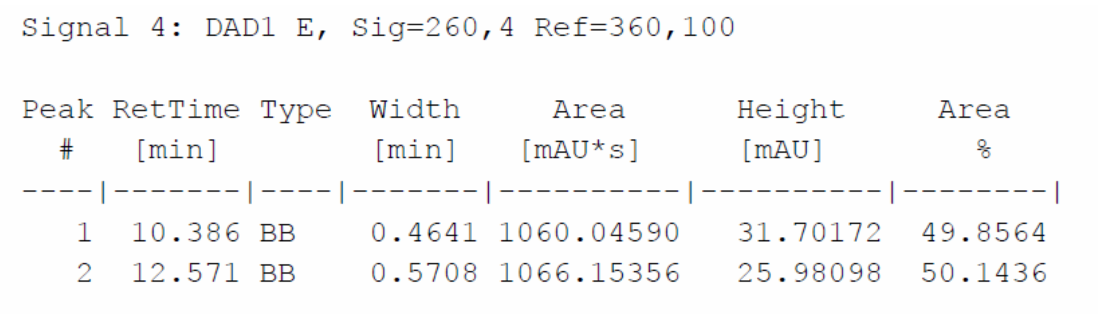

4.2 Preperation of Enantioenriched 2-(chloro(phenyl)methyl)naphthalene



Enantioenriched 2-(chloro(phenyl)methyl)naphthalene was prepared following the similar reported procedure[11]. A flame-dried 100 mL round-bottom flask was charged with (*R*)-(4-chlorophenyl)(phenyl)methanol (5 mmol, 92% ee). Hexane (60 mL) and pyridine (1.2 mL, 15 mmol) were added, and the mixture was cooled to 0 ºC. Phosphorus oxychloride (750 μL, 8 mmol) was added, and the reaction was stirred at 0 ºC for 5 h. Saturated sodium bicarbonate (~30 mL) was added, and the organic layer was extracted with Et_2O (3×15 mL). The combined organic layer was dried over Na_2SO_4, filtered and concentrated under reduced pressure to afford the target product as a white solid which was used in the next step without further purification. The chloride product was determined to be 75% ee by chiral HPLC analysis (AD-H, *i*-PrOH/hexane = 0/100, 0.8mL/min, 260 nm, tr (major) = 10.4 min, tr (minor) = 12.7 min). The absolute configuration of the chloride product was not determined.

Racemic Product





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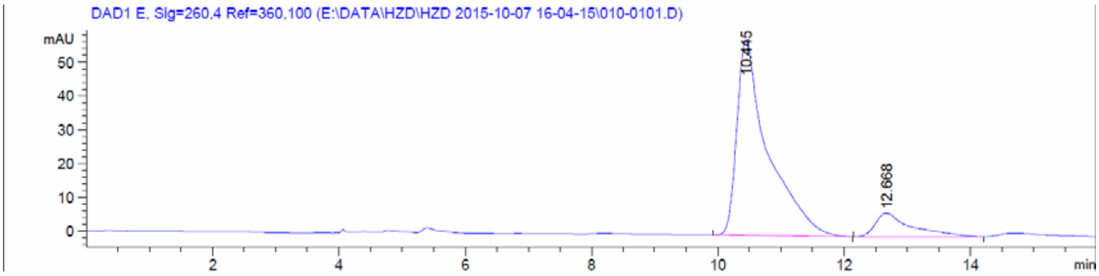
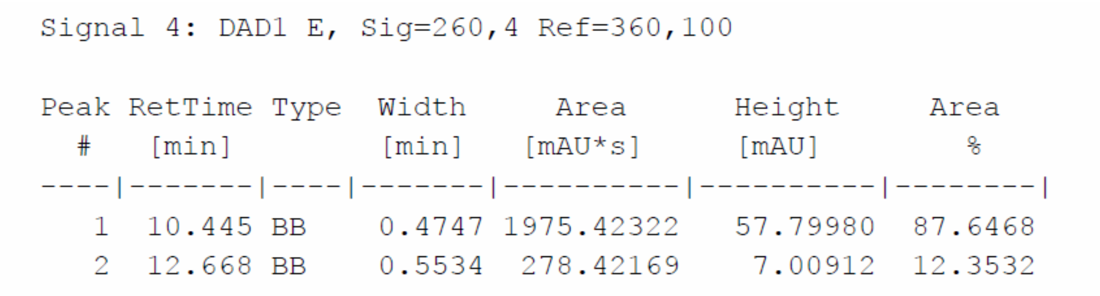
Signal 4: DAD1 E, Sig=260,4 Ref=360,100

Peak RetTime Type  Width     Area       Height      Area
  #    [min]        [min]    [mAU*s]     [mAU]        %
----|-------|----|-------|----------|----------|--------|
   1  10.386 BB    0.4641 1060.04590   31.70172  49.8564
   2  12.571 BB    0.5708 1066.15356   25.98098  50.1436
```

Enantioenriched Product





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Signal 4: DAD1 E, Sig=260,4 Ref=360,100

Peak RetTime Type  Width     Area       Height      Area
  #    [min]        [min]    [mAU*s]     [mAU]        %
----|-------|----|-------|----------|----------|--------|
   1  10.445 BB    0.4747 1975.42322   57.79980  87.6468
   2  12.668 BB    0.5534  278.42169    7.00912  12.3532
```
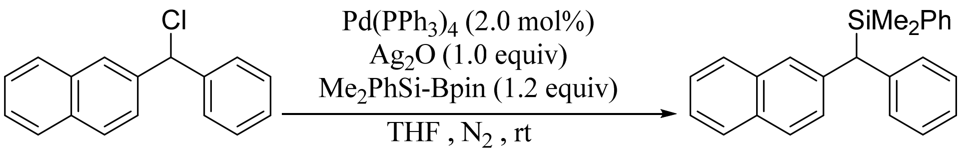

4.3 Enantionspecific silylation

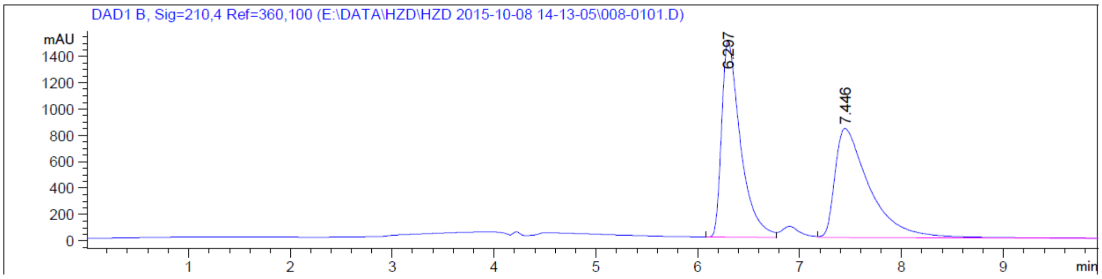


3a, 75% ee

4a, 67% yield, 75% ee

The procedure was following the method for the synthesis of benzylicsilanes 2v. The silane product was determined to be 75% ee by chiral HPLC analysis (IC, *i*-PrOH/hexane = 0/100, 0.8 mL/min, 210 nm, tr (major) = 6.5 min, tr (minor) = 7.8 min). The absolute configuration of the silane product was not determined.

Racemic Product



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Signal 2: DAD1 B, Sig=210,4 Ref=360,100

Peak RetTime Type  Width     Area      Height     Area
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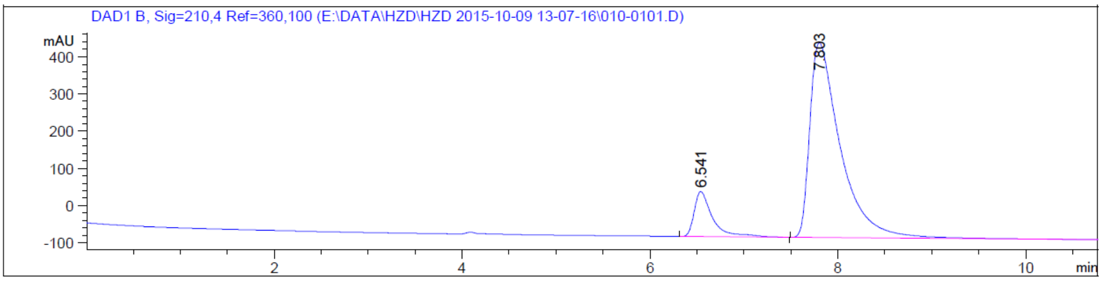
----|-------|----|-------|----------|----------|--------|
   1   6.297 BV    0.1899 1.91352e4 1489.42700  49.6075
   2   7.446 VBA   0.3443 1.94380e4  826.80048  50.3925

Totals :                  3.85732e4 2316.22748
```

Enantioenriched Product



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Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]        %
----|-------|----|-------|----------|----------|--------|
   1   6.541 BB    0.1995 1654.48108  120.99983  12.2554
   2   7.803 BBA   0.3318 1.18455e4   523.97119  87.7446
```

5. References for supporting information

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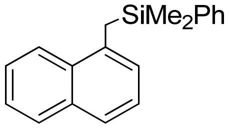
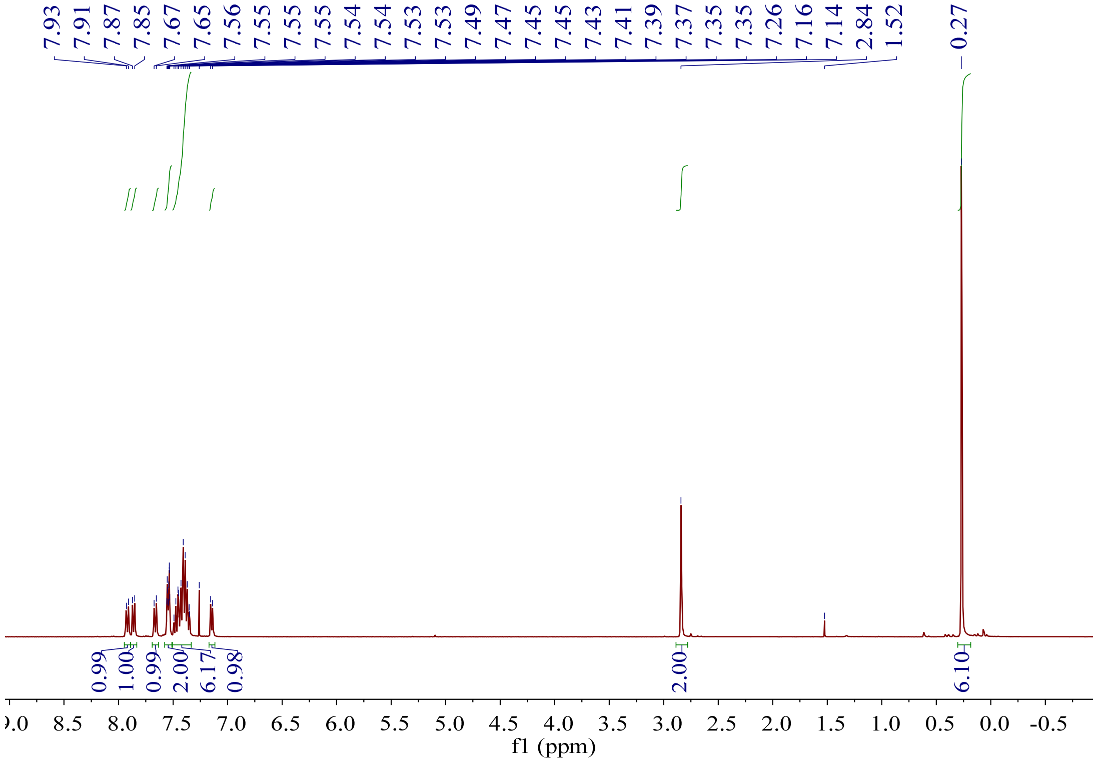
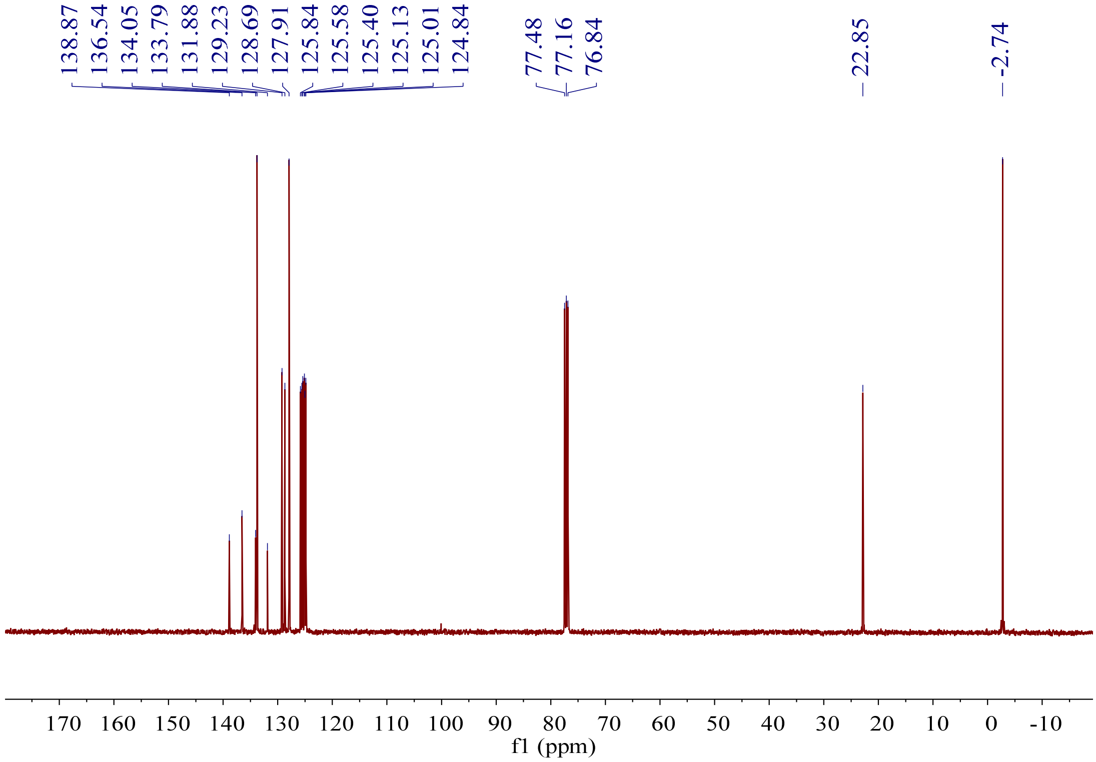
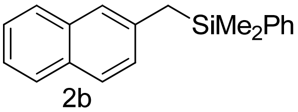
6. NMR spectra for the products



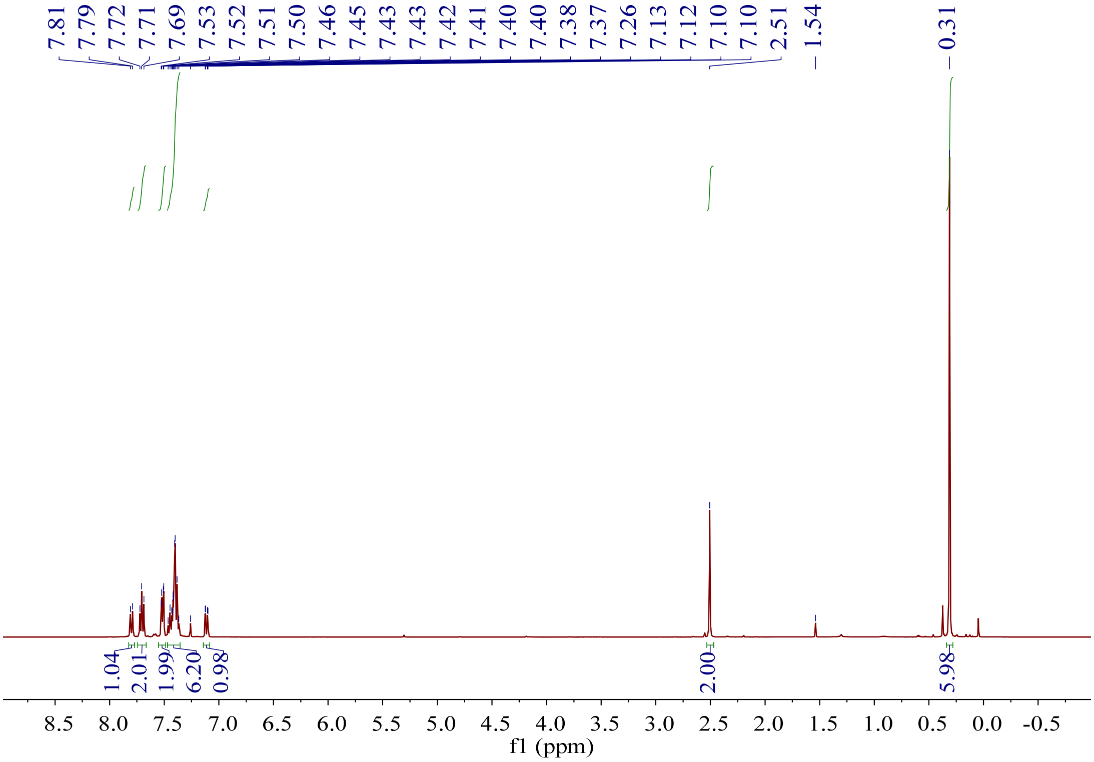
2a






SiMe2Ph

2b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7.71
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7.53
7.52
7.51
7.50
7.46
7.45
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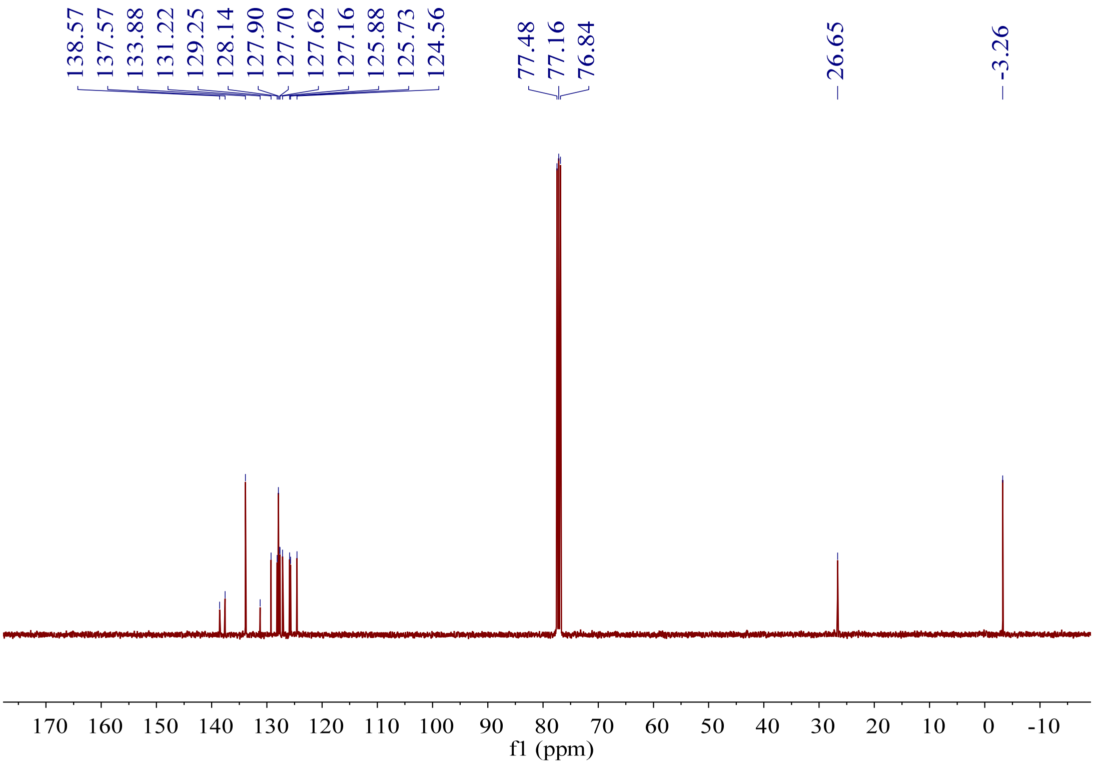
7.42
7.41
7.40
7.40
7.38
7.37
7.26
7.13
7.12
7.10
7.10
2.51
1.54
0.31
1.04
2.01
1.99
6.20
0.98
2.00
5.98
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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137.57
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128.14
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127.70
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127.16
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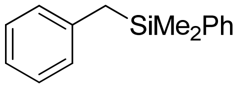
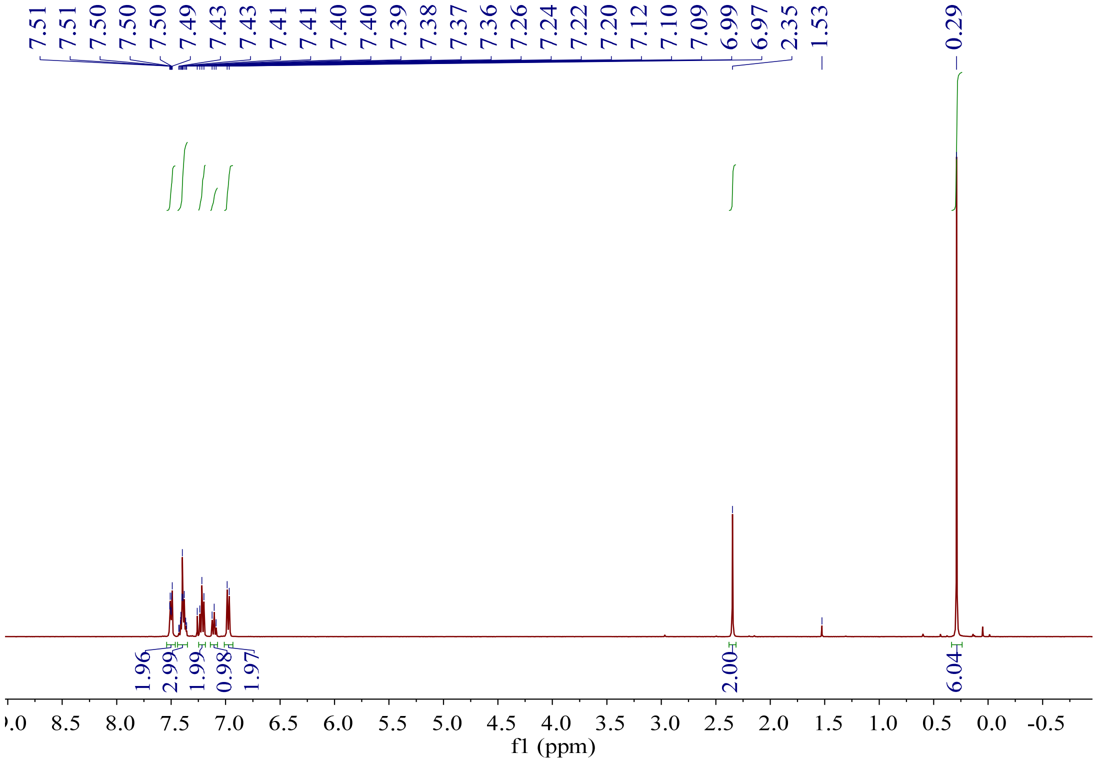
77.48
77.16
76.84
26.65
-3.26
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


SiMe2Ph

2c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7.41
7.40
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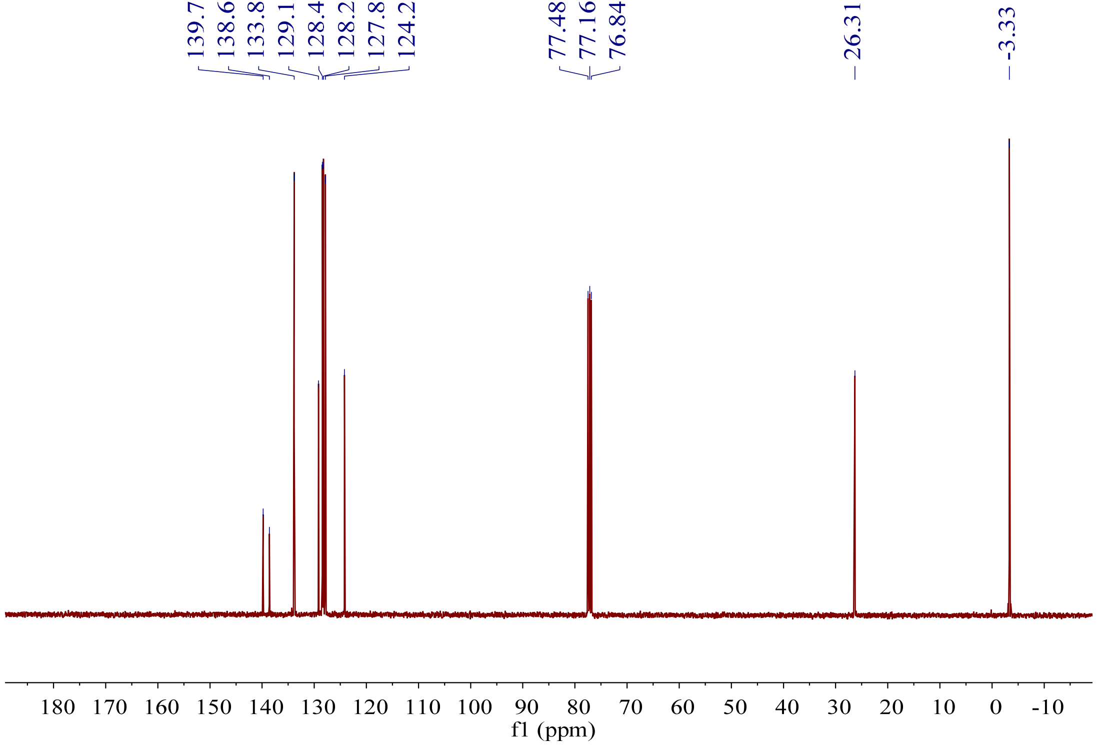
7.38
7.37
7.36
7.26
7.24
7.22
7.20
7.12
7.10
7.09
6.99
6.97
2.35
1.53
0.29
1.96
2.99
1.99
0.98
1.97
2.00
6.04
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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128.44
128.24
127.86
124.21
77.48
77.16
76.84
26.31
-3.33
180
170
160
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120
110
100
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80
70
60
50
40
30
20
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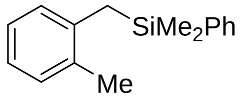
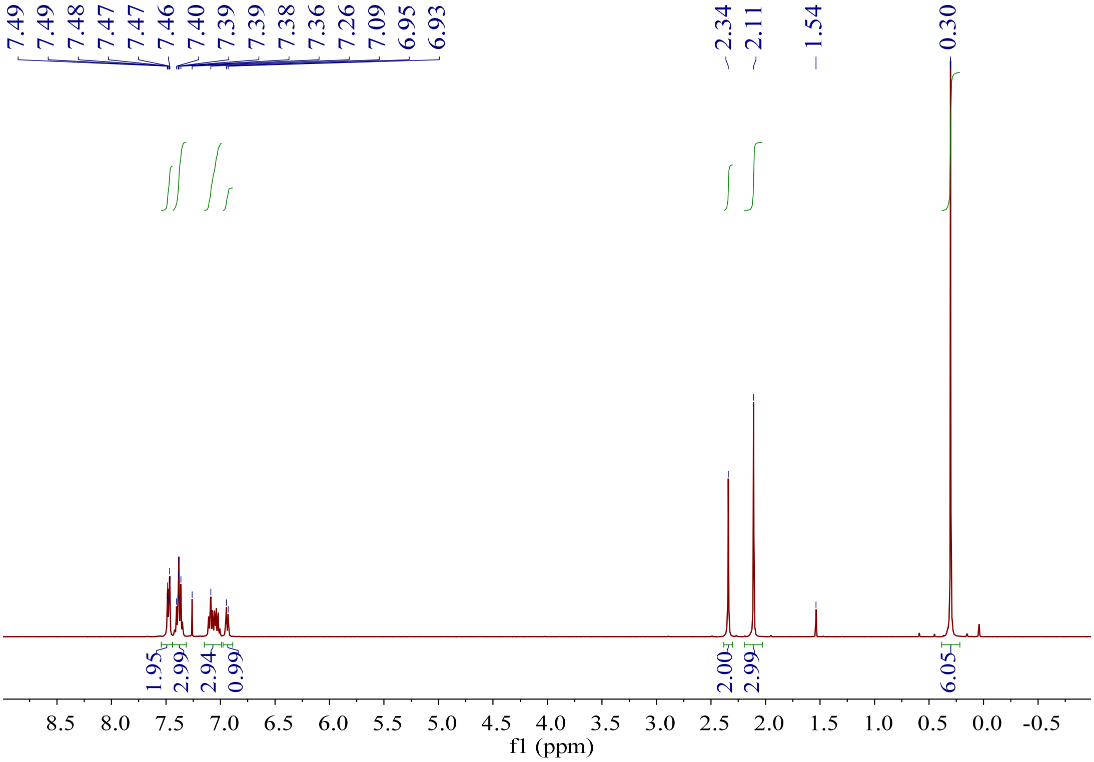
0
-10
f1 (ppm)


SiMe2Ph
Me

2d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7.36
7.26
7.09
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6.93
2.34
2.11
1.54
0.30
1.95
2.99
2.94
0.99
2.00
2.99
6.05
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
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2.5
2.0
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0.5
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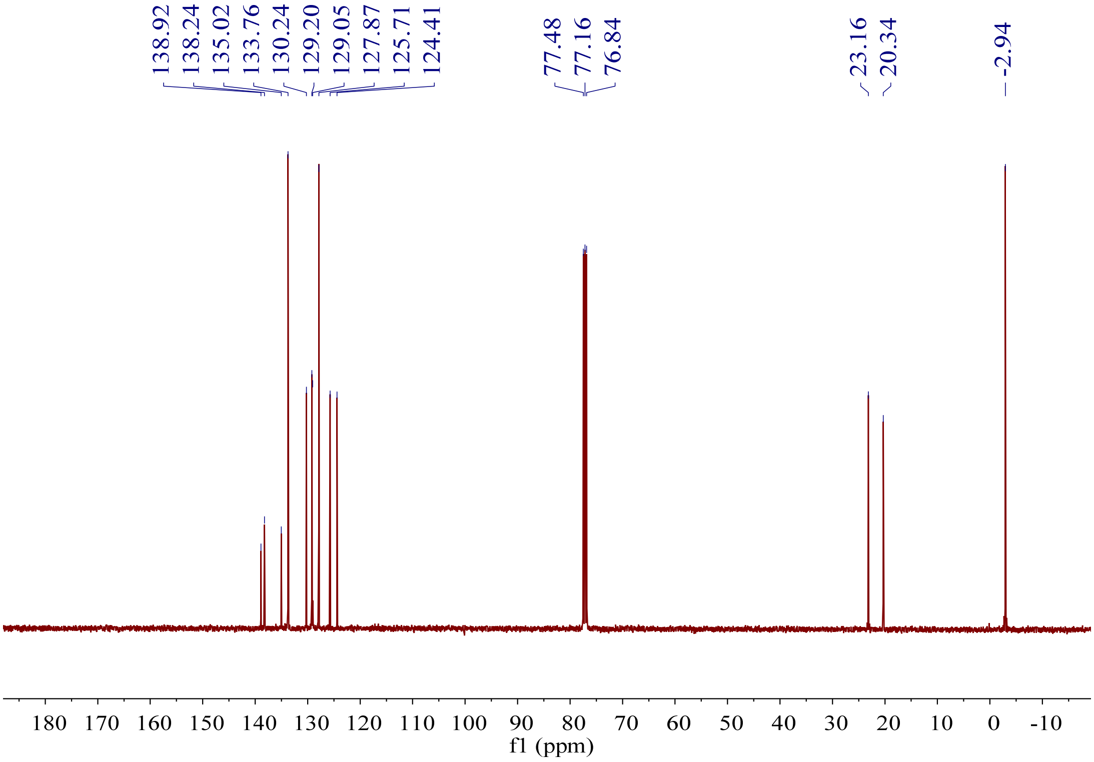
-0.5
f1 (ppm)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129.20
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127.87
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124.41
77.48
77.16
76.84
23.16
20.34
-2.94
180
170
160
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140
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120
110
100
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80
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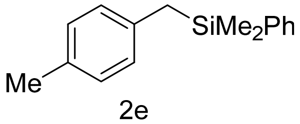
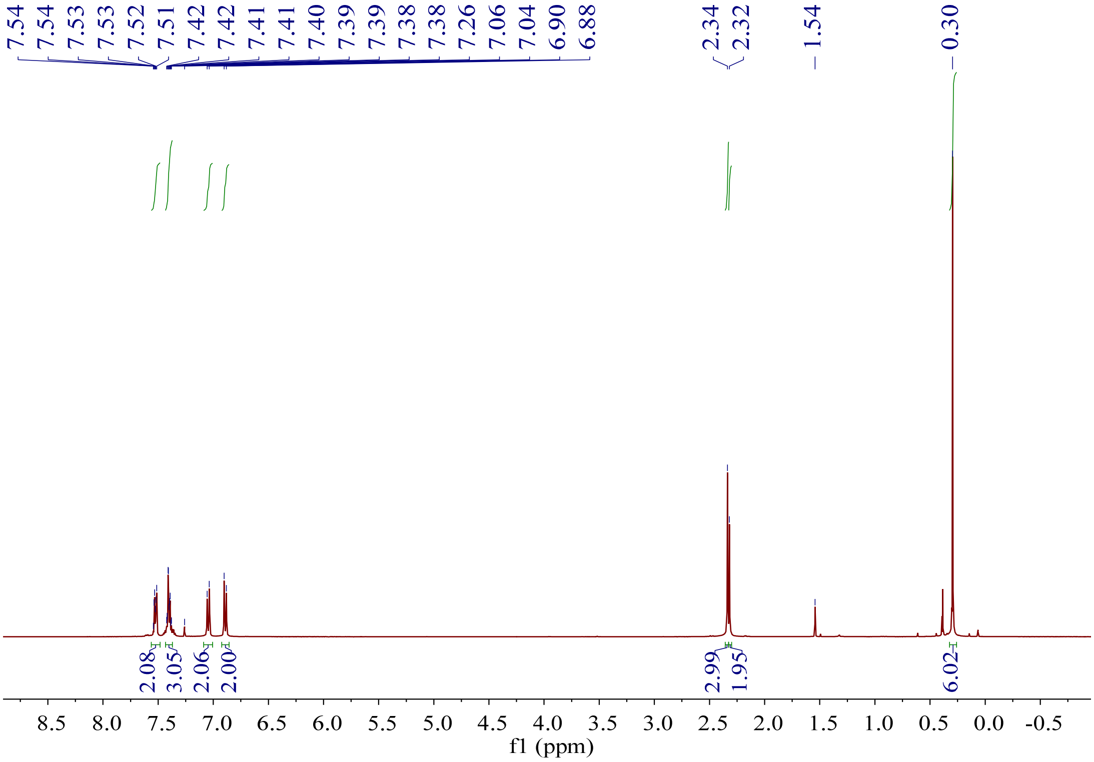
60
50
40
30
20
10
0
-10
f1 (ppm)


SiMe$_2$Ph
Me

2e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7.39
7.38
7.38
7.26
7.06
7.04
6.90
6.88
2.34
2.32
1.54
0.30
2.08
3.05
2.06
2.00
2.99
1.95
6.02
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
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3.0
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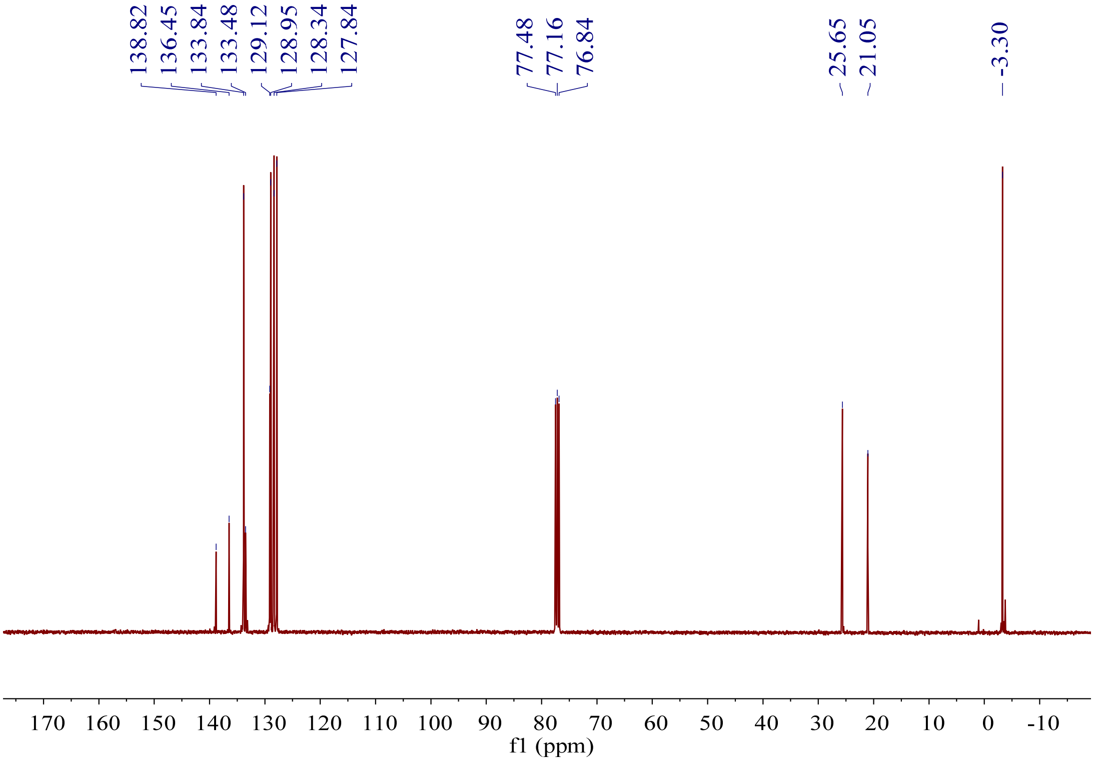
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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128.34
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77.16
76.84
25.65
21.05
-3.30
170
160
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140
130
120
110
100
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80
70
60
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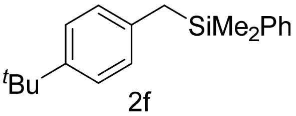
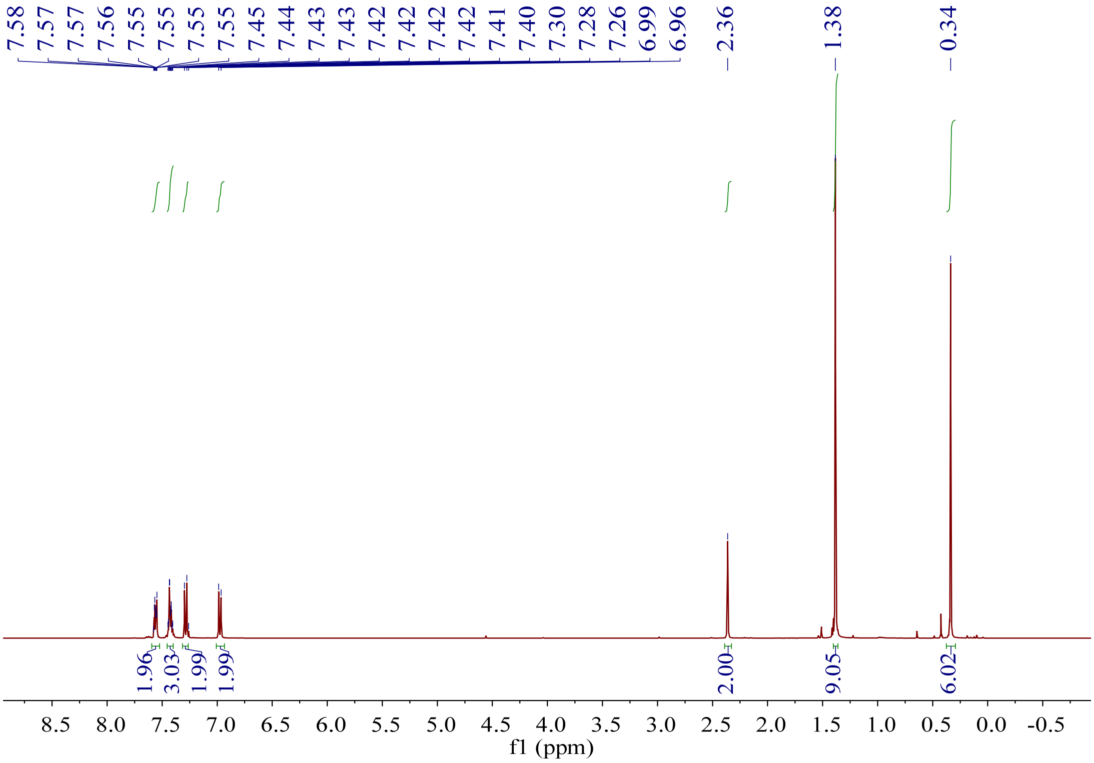
40
30
20
10
0
-10
f1 (ppm)


SiMe$_2$Ph
^{t}Bu

2f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7.55
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7.42
7.42
7.42
7.42
7.41
7.40
7.30
7.28
7.26
6.99
6.96
2.36
1.38
0.34
1.96
3.03
1.99
1.99
2.00
9.05
6.02
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
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2.0
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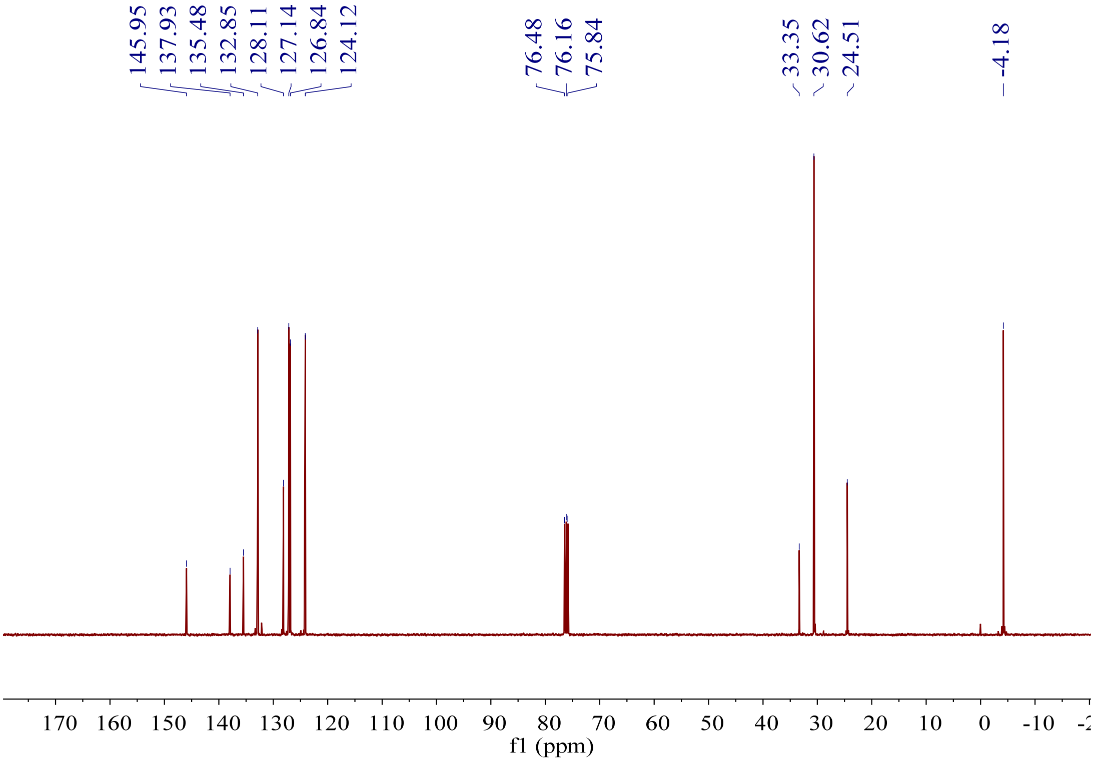
1.0
0.5
0.0
-0.5
f1 (ppm)


145.95
137.93
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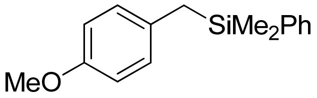
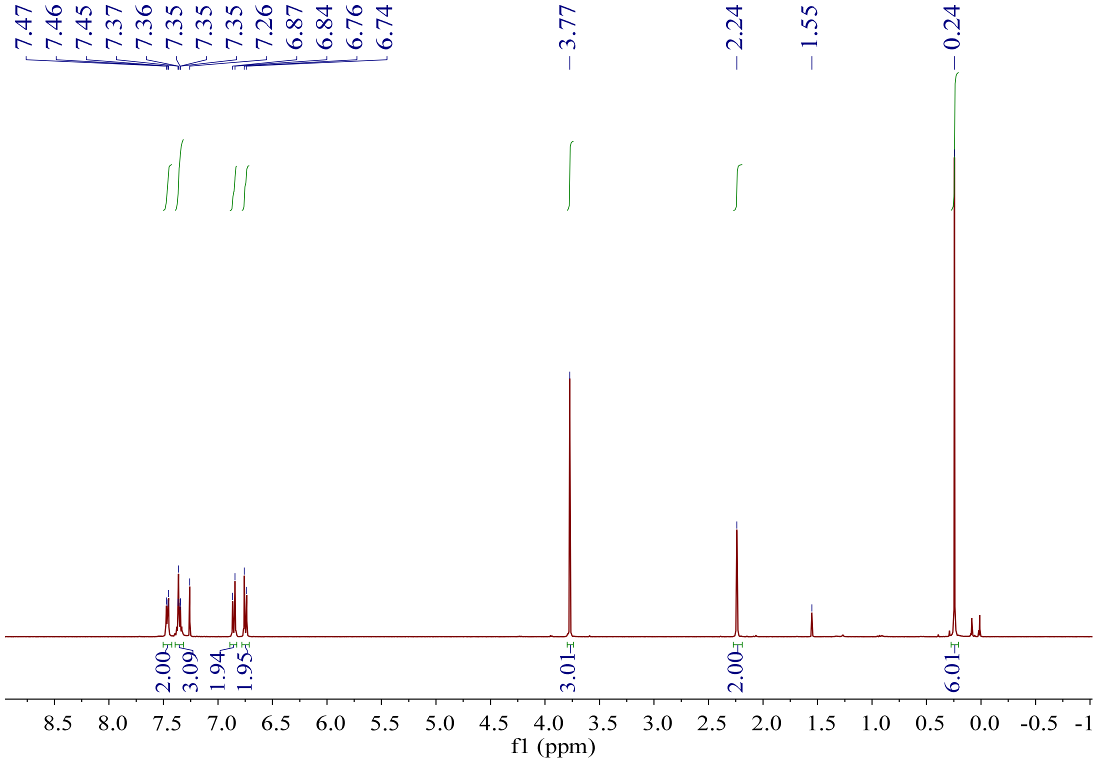
127.14
126.84
124.12
76.48
76.16
75.84
33.35
30.62
24.51
-4.18
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


SiMe2Ph
MeO

2g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7.45
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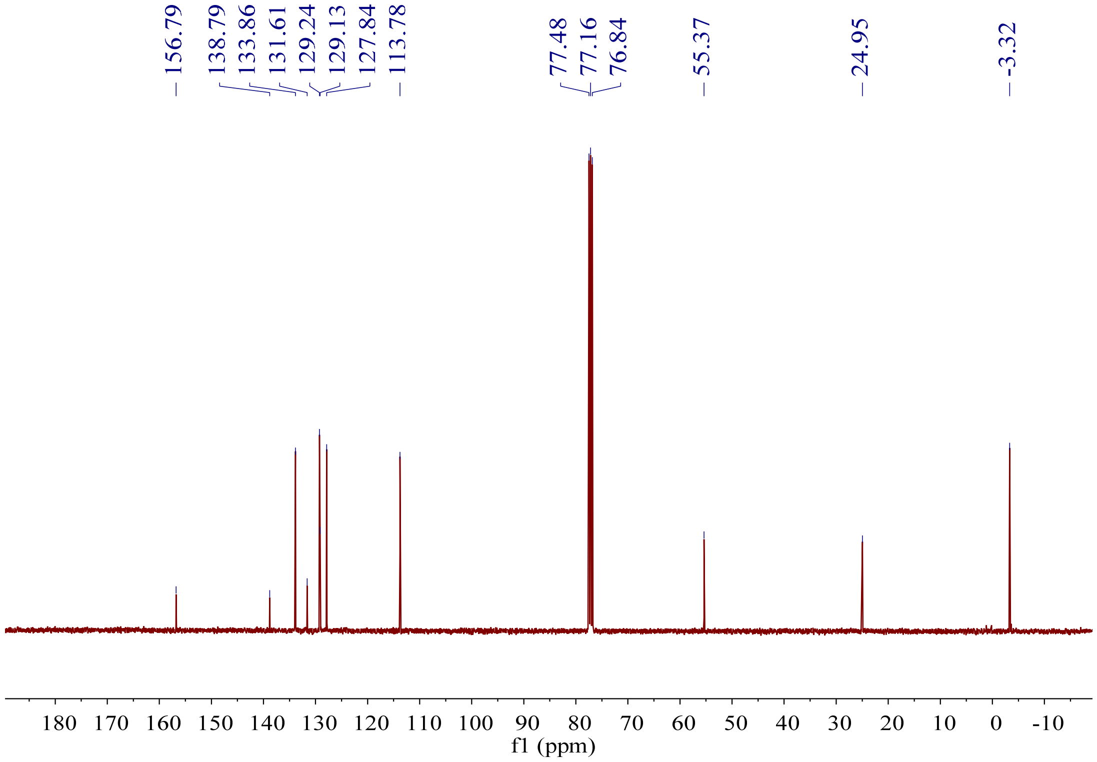
7.35
7.35
7.35
7.26
6.87
6.84
6.76
6.74
3.77
2.24
1.55
0.24
2.00
3.09
1.94
1.95
3.01
2.00
6.01
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1
f1 (ppm)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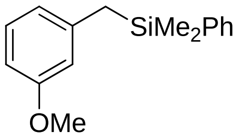
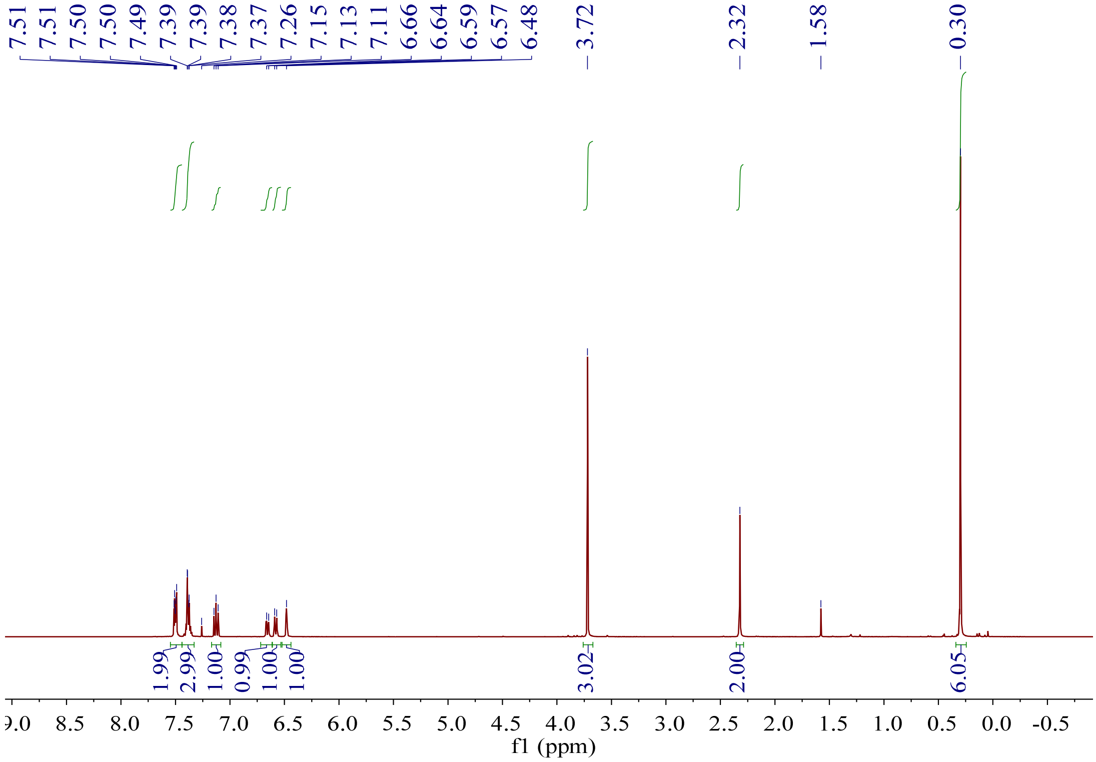
131.61
129.24
129.13
127.84
113.78
77.48
77.16
76.84
55.37
24.95
-3.32
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


SiMe2Ph
OMe

2h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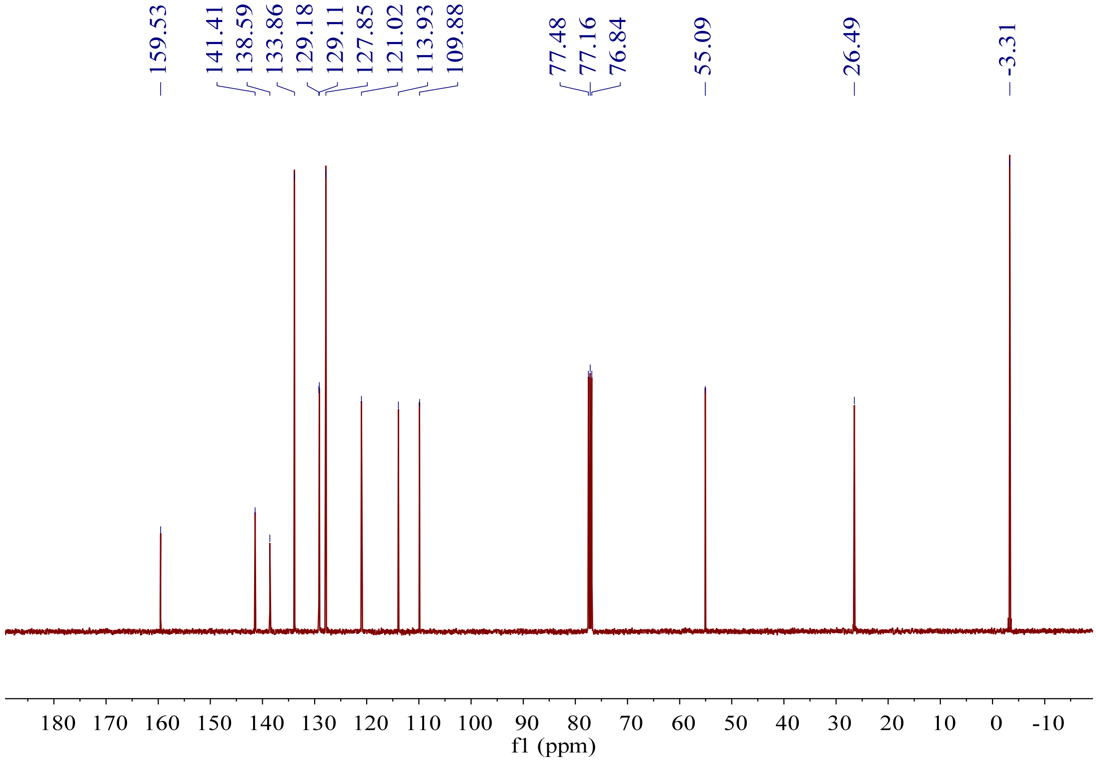
7.39
7.39
7.38
7.37
7.26
7.15
7.13
7.11
6.66
6.64
6.59
6.57
6.48
3.72
2.32
1.58
0.30
1.99
2.99
1.00
0.99
1.00
1.00
3.02
2.00
6.05
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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133.86
129.18
129.11
127.85
121.02
113.93
109.88
77.48
77.16
76.84
55.09
26.49
-3.31
180
170
160
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140
130
120
110
100
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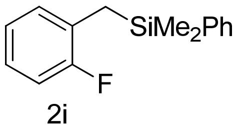
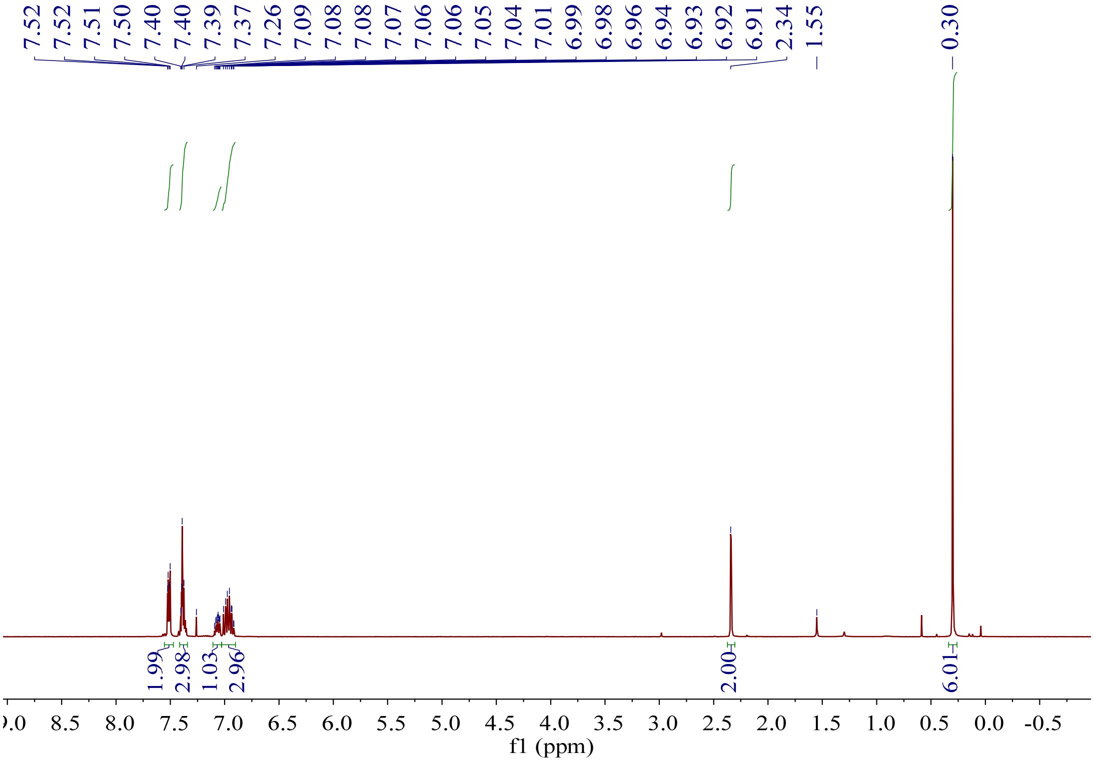
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


SiMe2Ph
F

2i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7.39
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7.26
7.09
7.08
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7.07
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7.05
7.04
7.01
6.99
6.98
6.96
6.94
6.93
6.92
6.91
2.34
1.55
0.30
1.99
2.98
1.03
2.96
2.00
6.01
.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
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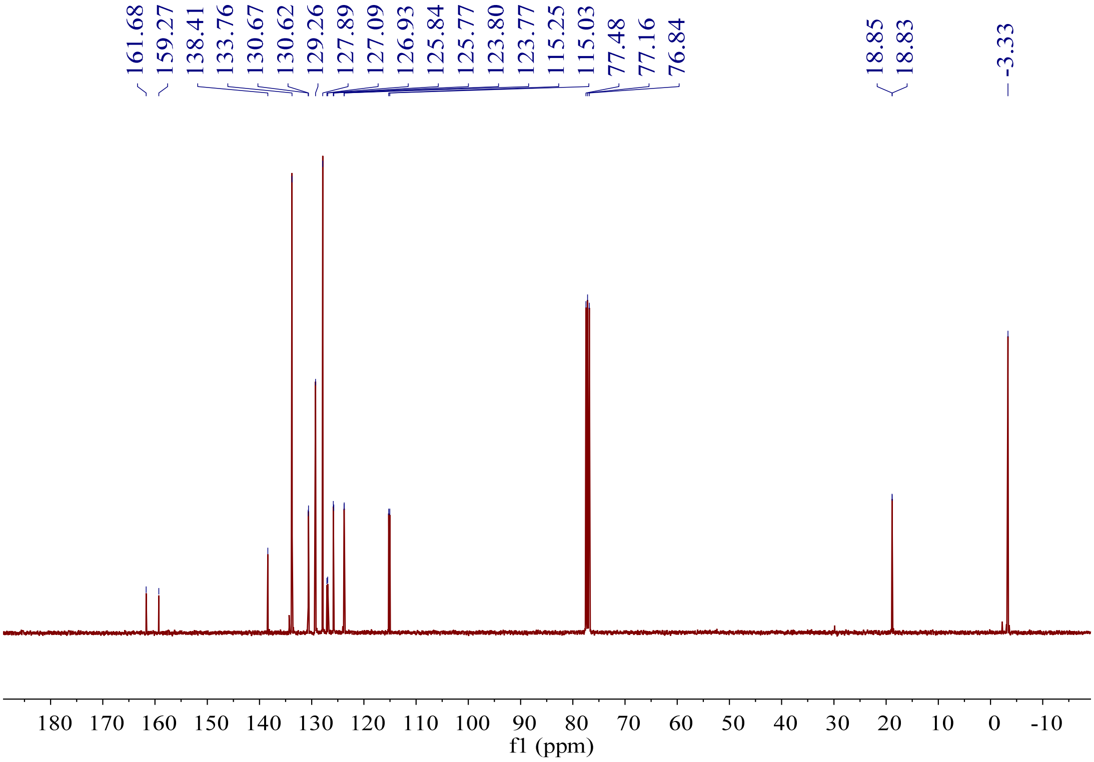
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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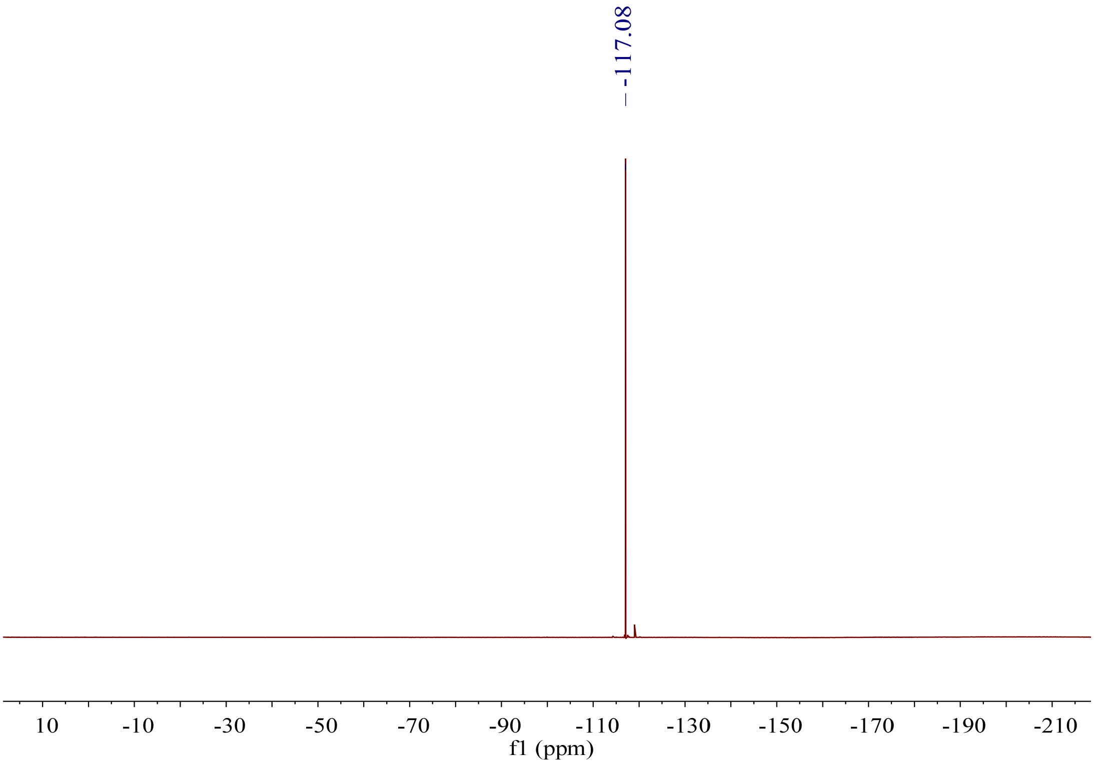
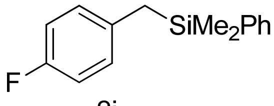
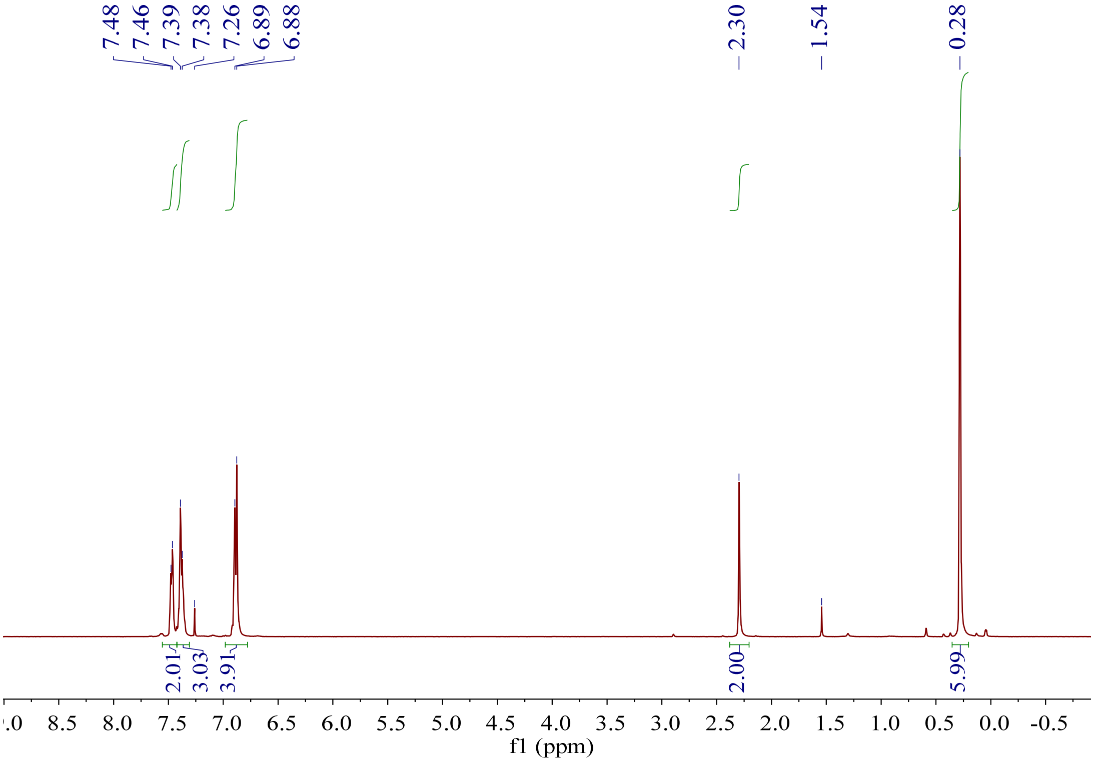
127.89
127.09
126.93
125.84
125.77
123.80
123.77
115.25
115.03
77.48
77.16
76.84
18.85
18.83
-3.33
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

^{19}F NMR




SiMe$_2$Ph
F

2j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7.38
7.26
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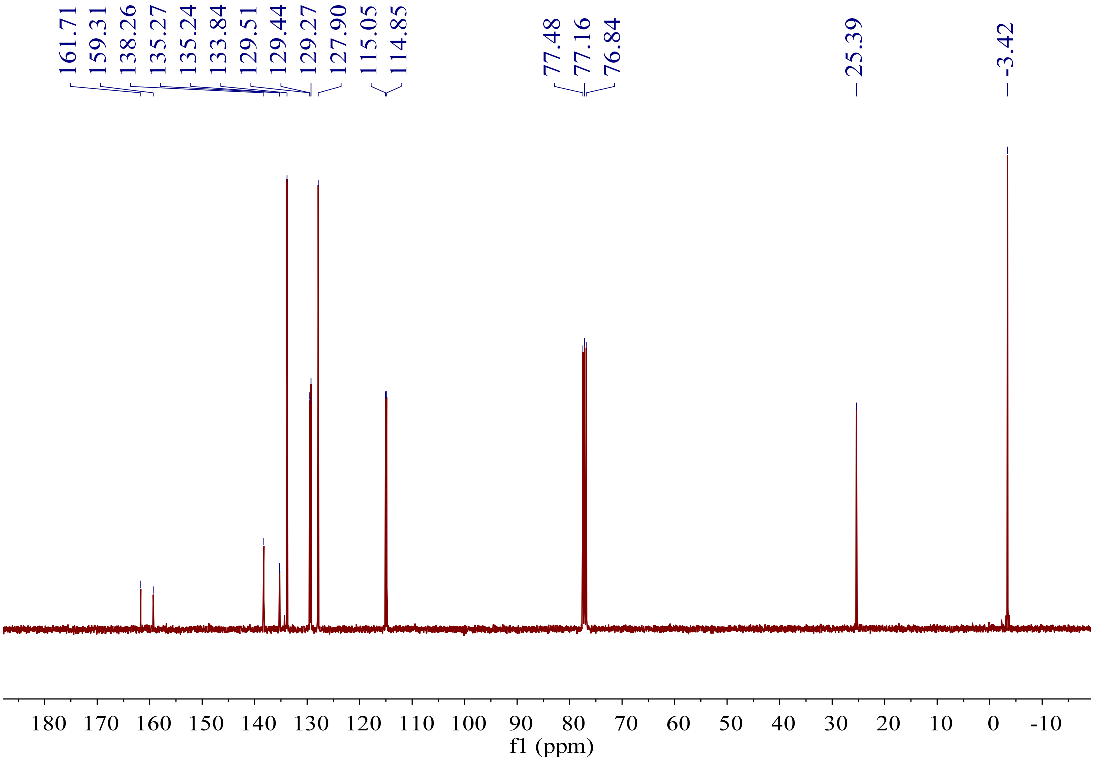
6.88
2.30
1.54
0.28
2.01
3.03
3.91
2.00
5.99
.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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133.84
129.51
129.44
129.27
127.90
115.05
114.85
77.48
77.16
76.84
25.39
-3.42
180
170
160
150
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100
90
80
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60
50
40
30
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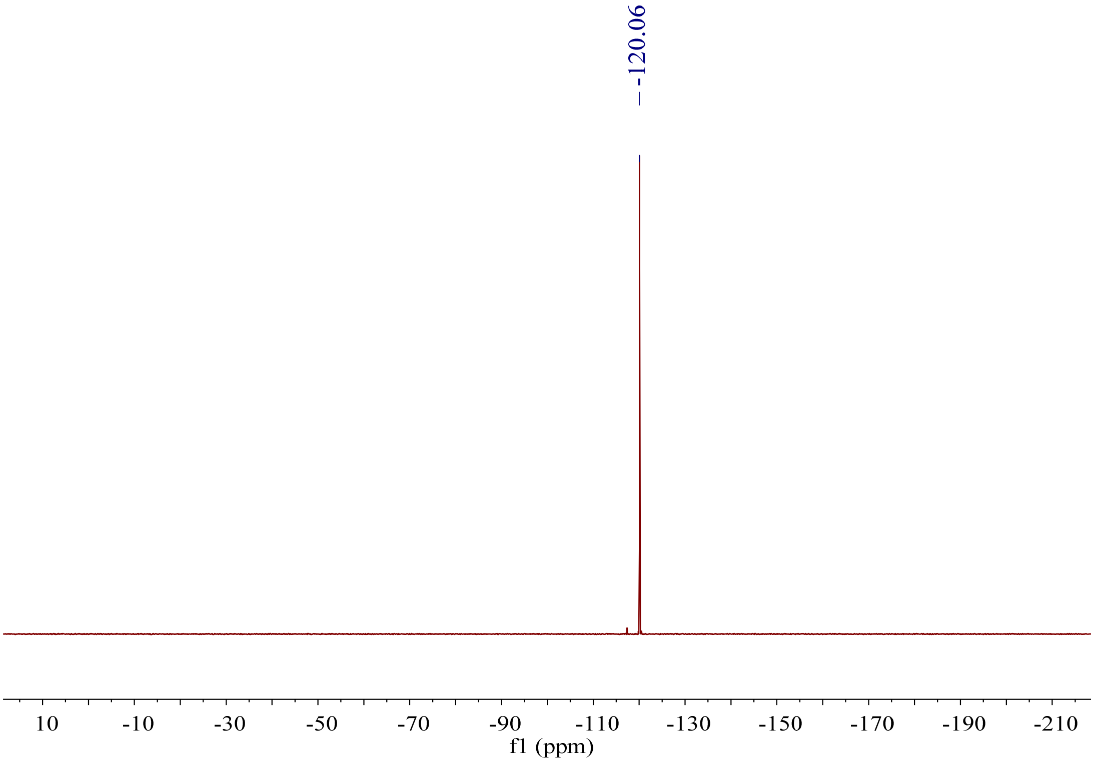
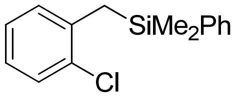
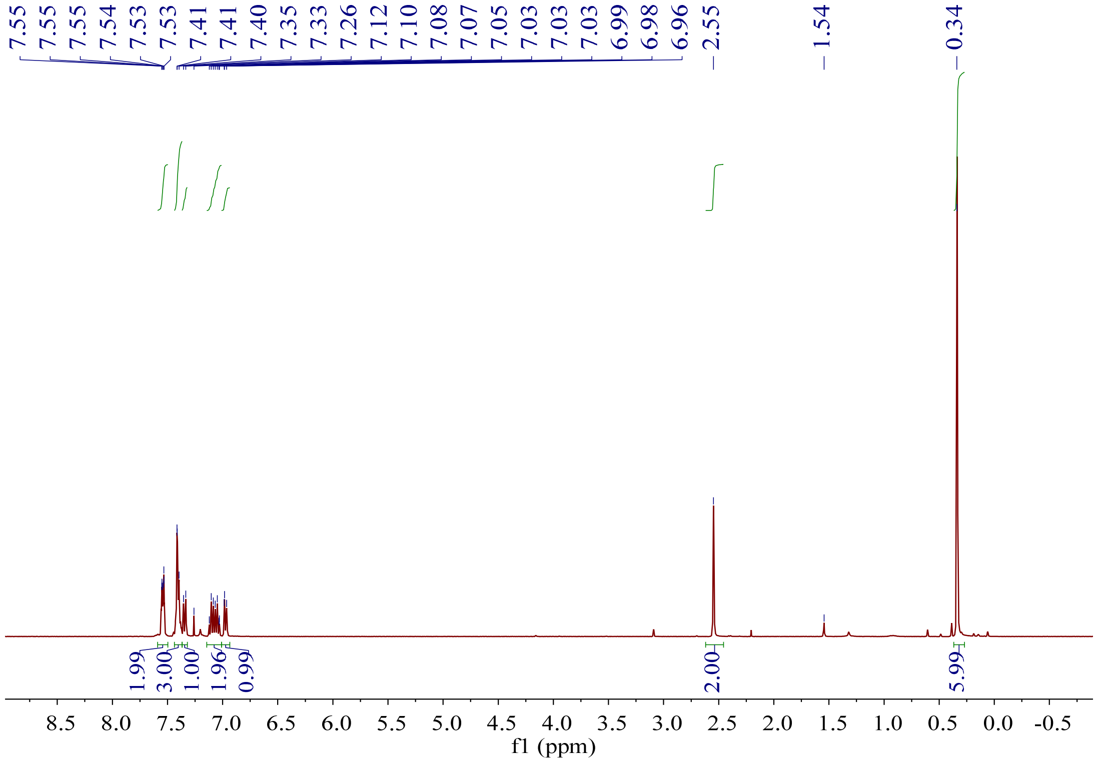
10
0
-10
f1 (ppm)

^{19}F NMR




SiMe2Ph
Cl

2k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7.10
7.08
7.07
7.05
7.03
7.03
7.03
6.99
6.98
6.96
2.55
1.54
0.34
1.99
3.00
1.00
1.96
0.99
2.00
5.99
8.5
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6.5
6.0
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5.0
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2.0
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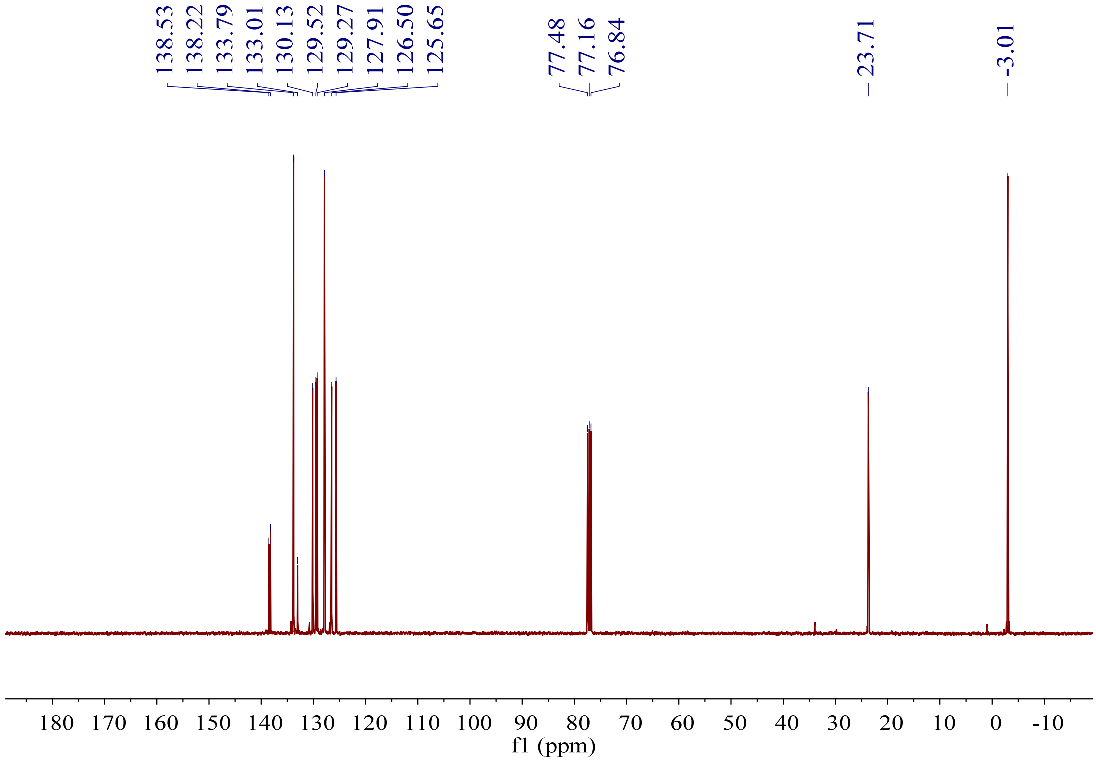
1.0
0.5
0.0
-0.5
f1 (ppm)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125.65
77.48
77.16
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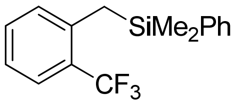
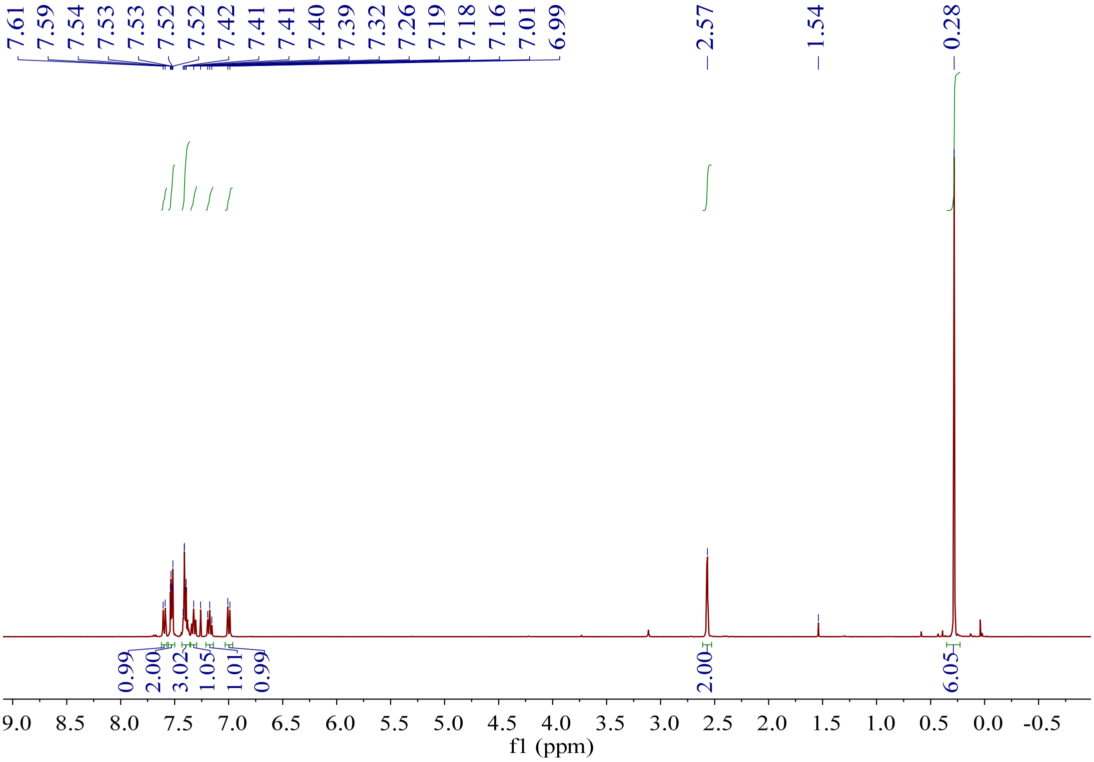
-3.01
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


SiMe2Ph
CF3

2l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7.39
7.32
7.26
7.19
7.18
7.16
7.01
6.99
2.57
1.54
0.28
0.99
2.00
3.02
1.05
1.01
0.99
2.00
6.05
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
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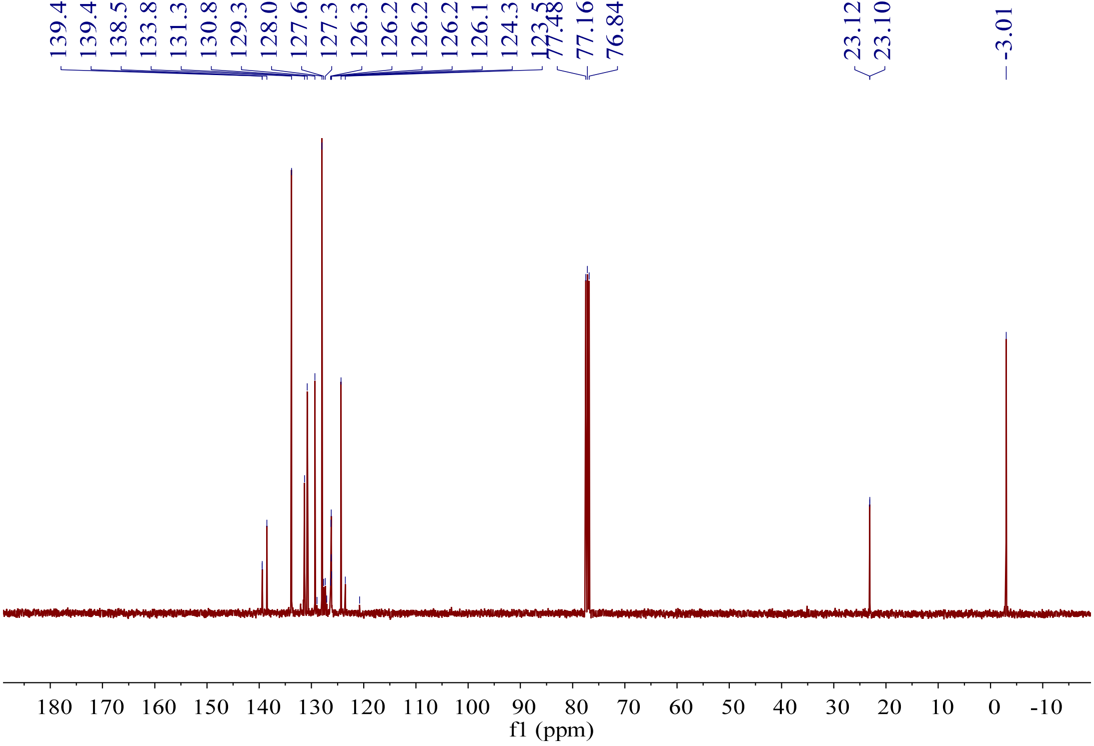
f1 (ppm)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126.21
126.15
124.34
123.51
77.48
77.16
76.84
23.12
23.10
-3.01
180
170
160
150
140
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120
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100
90
80
70
60
50
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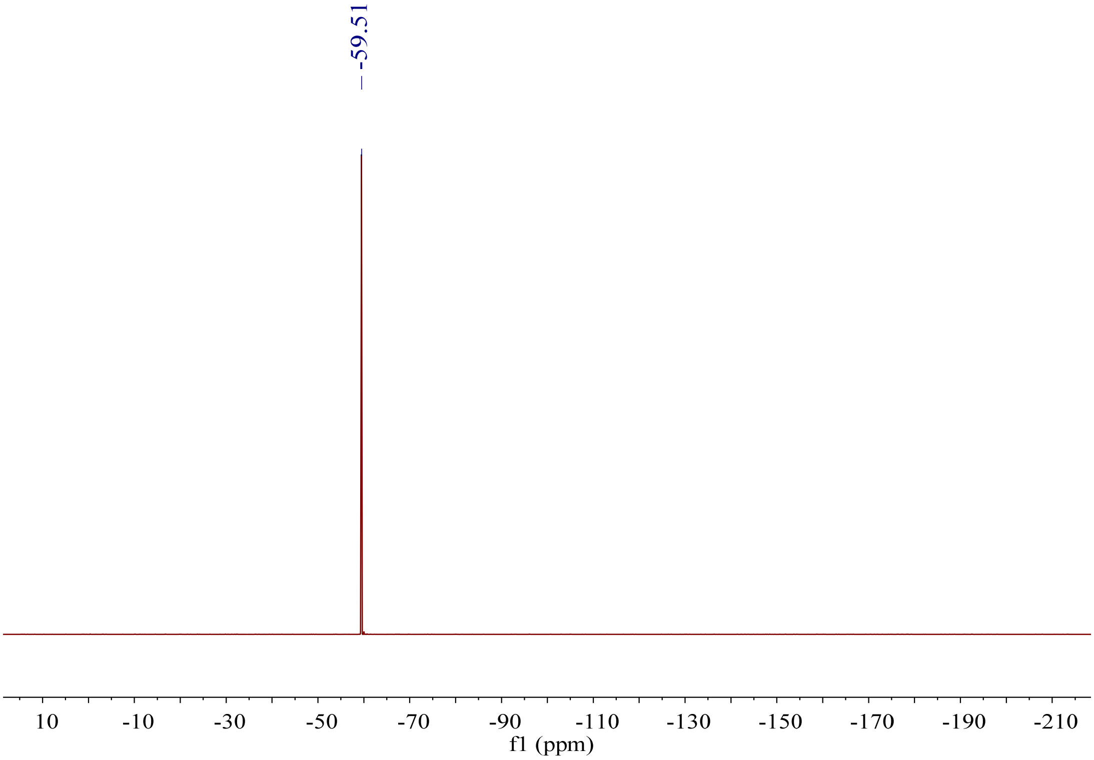
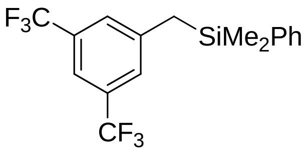
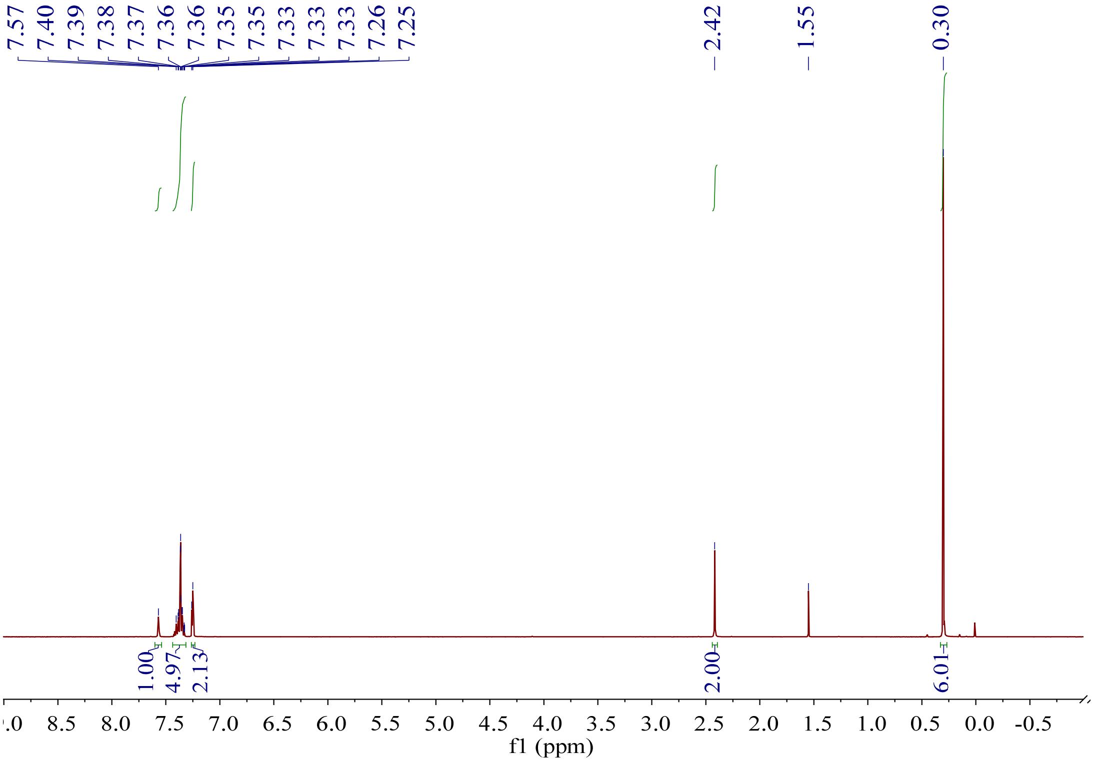
30
20
10
0
-10
f1 (ppm)

^{19}F NMR




F3C
SiMe2Ph
CF3

2m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7.26
7.25
2.42
1.55
0.30
1.00
4.97
2.13
2.00
6.01
.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
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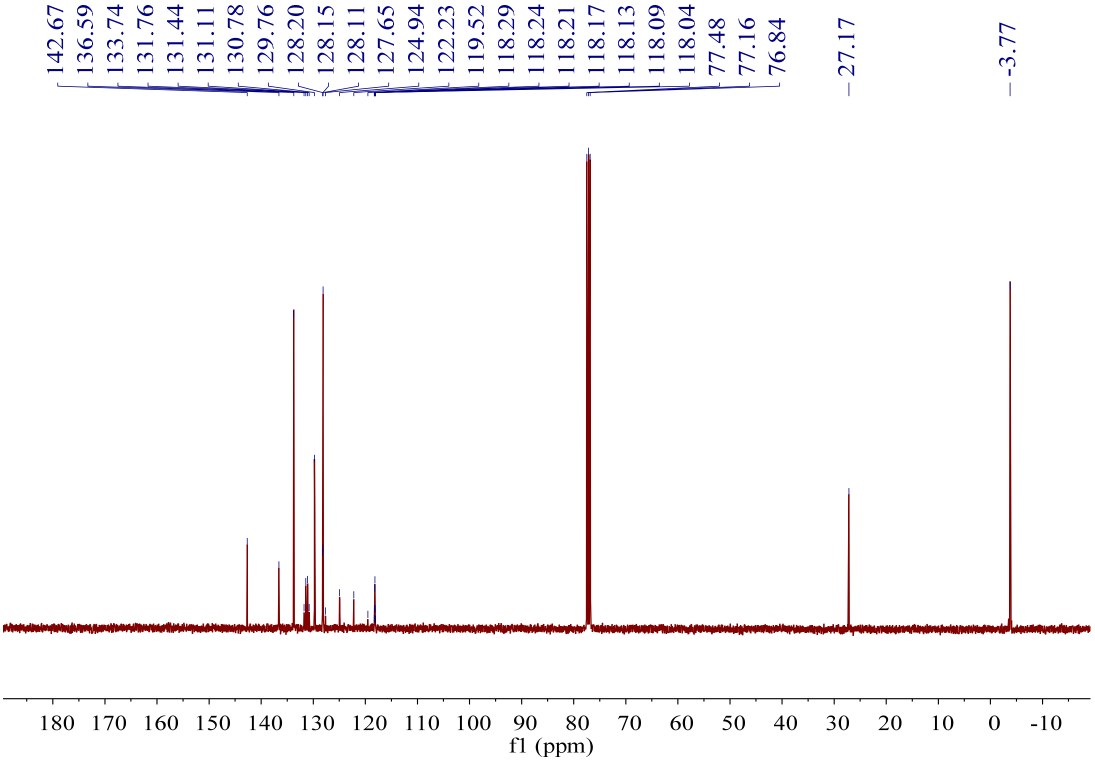
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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124.94
122.23
119.52
118.29
118.24
118.21
118.17
118.13
118.09
118.04
77.48
77.16
76.84
27.17
-3.77
180
170
160
150
140
130
120
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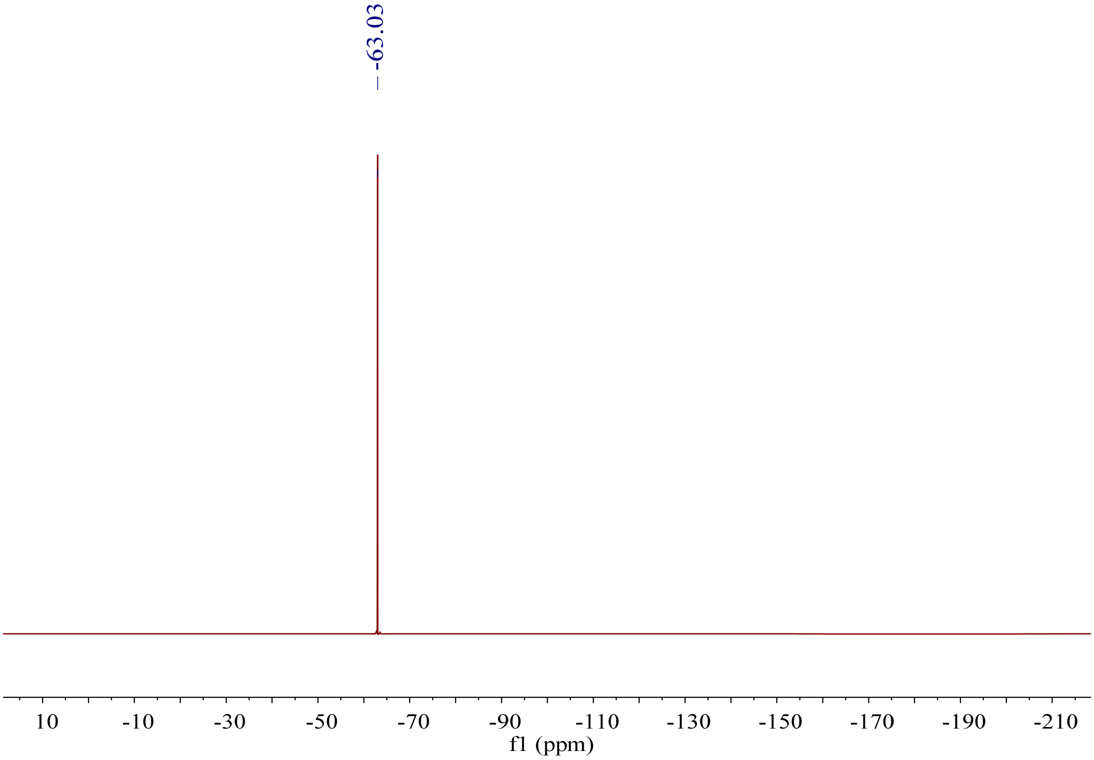
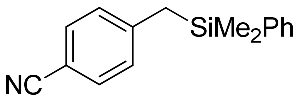
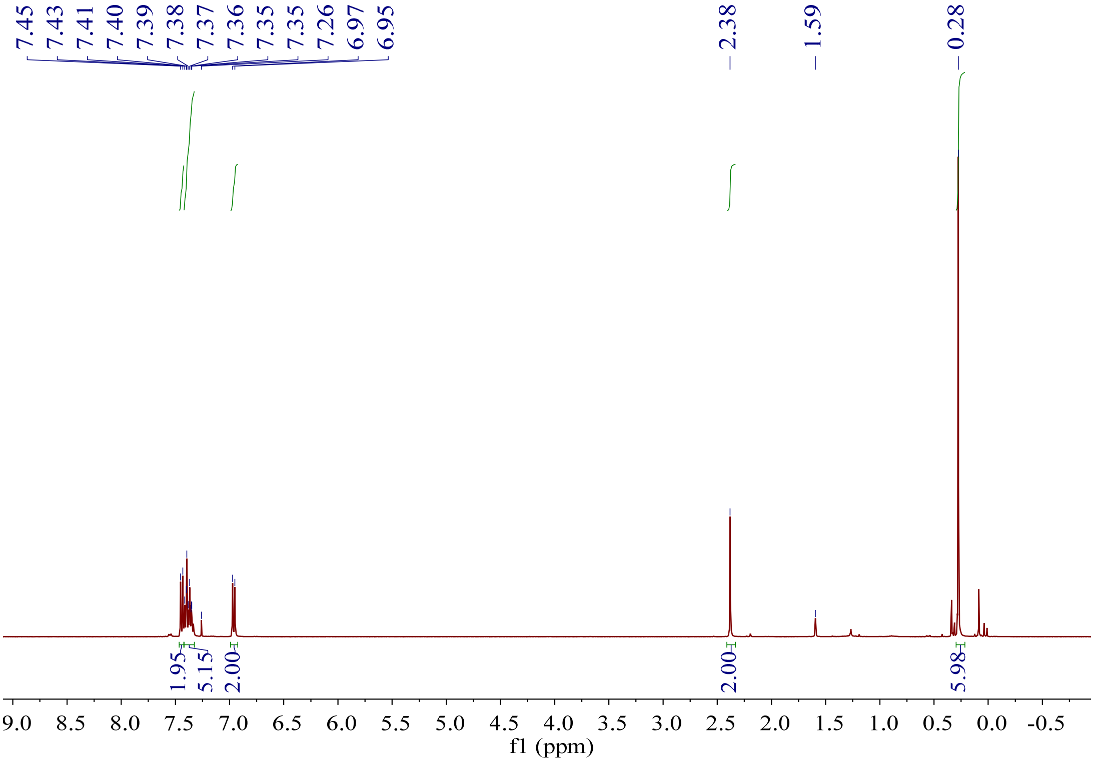
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

^{19}F NMR




SiMe2Ph
NC

2n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7.36
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7.35
7.26
6.97
6.95
2.38
1.59
0.28
1.95
5.15
2.00
2.00
5.98
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
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3.0
2.5
2.0
1.5
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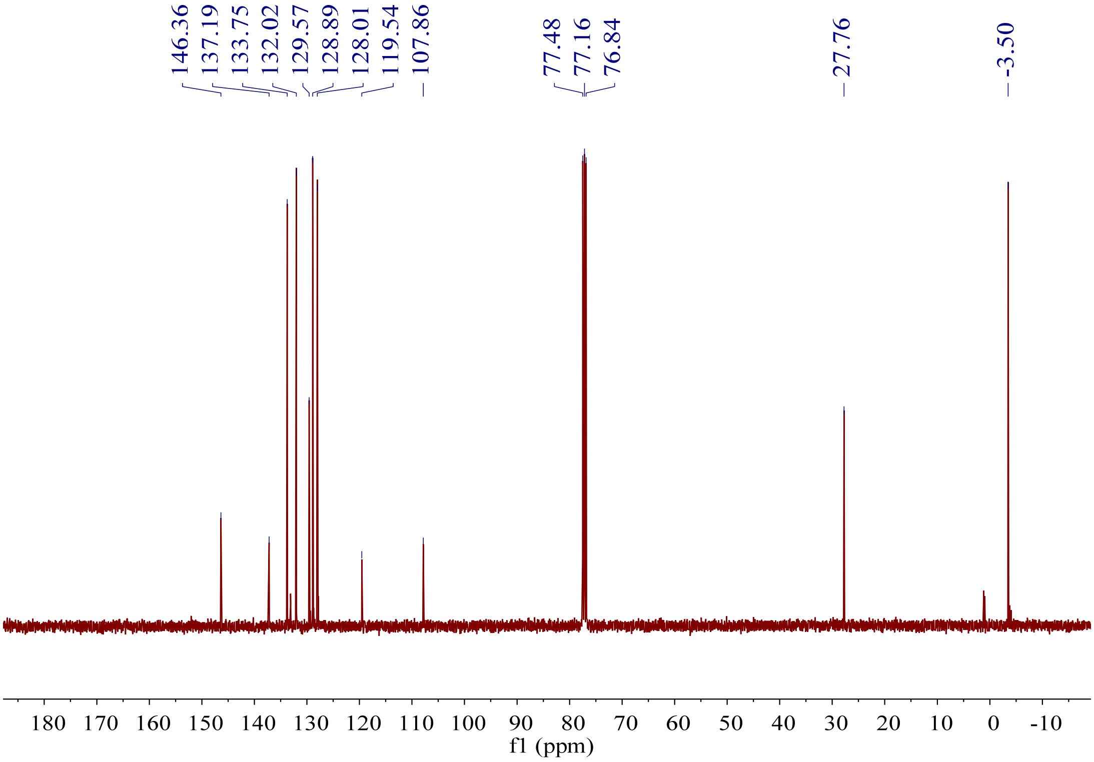
-0.5
f1 (ppm)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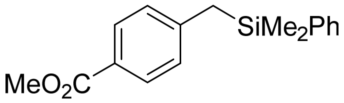
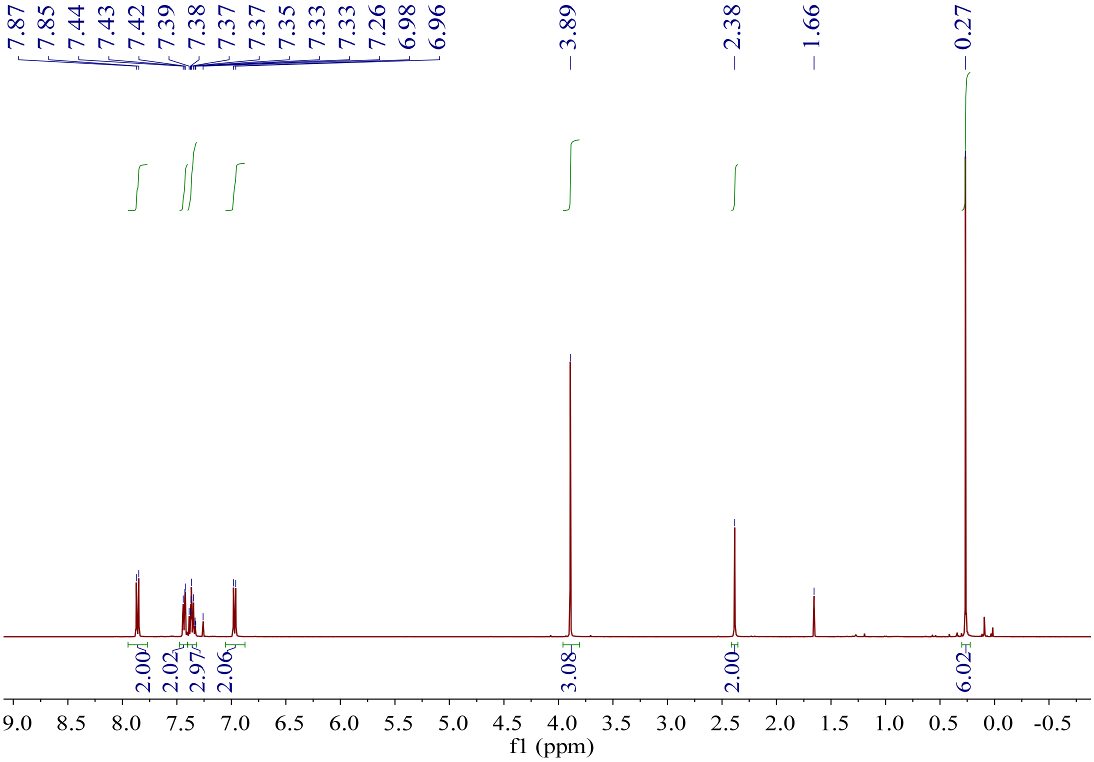
133.75
132.02
129.57
128.89
128.01
119.54
107.86
77.48
77.16
76.84
27.76
-3.50
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


SiMe$_2$Ph
MeO$_2$C

2o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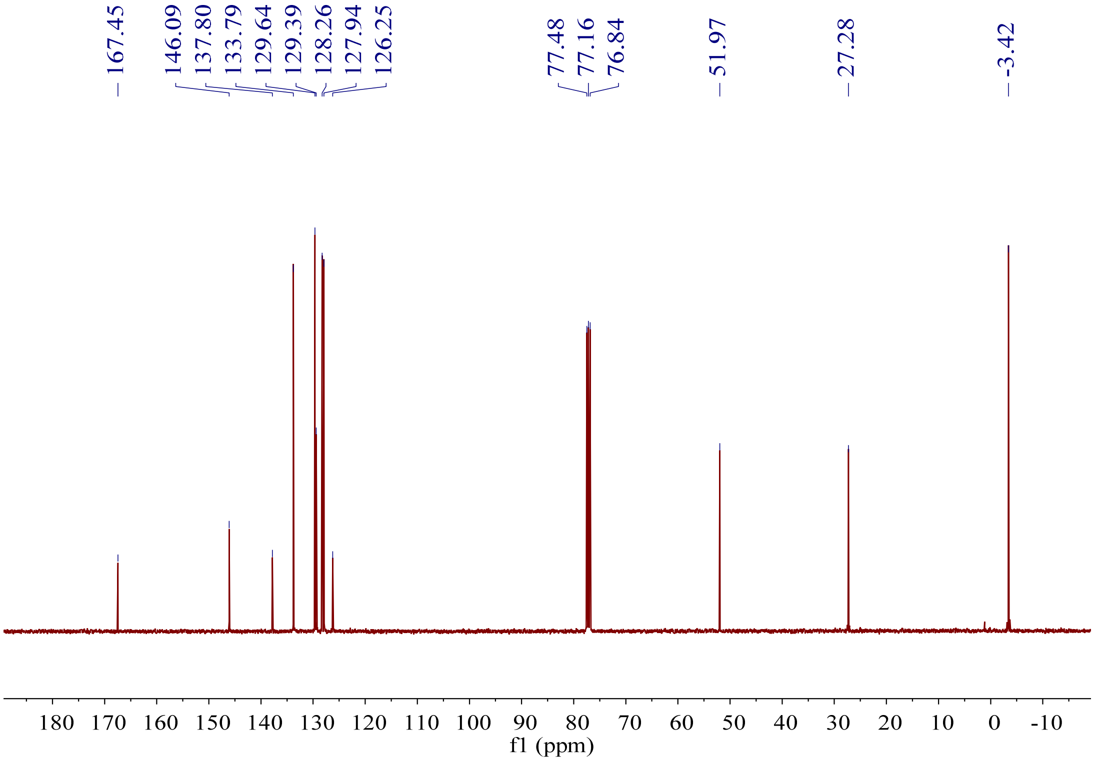
7.38
7.37
7.37
7.35
7.33
7.33
7.26
6.98
6.96
3.89
2.38
1.66
0.27
2.00
2.02
2.97
2.06
3.08
2.00
6.02
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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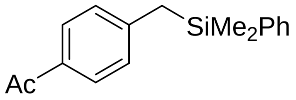
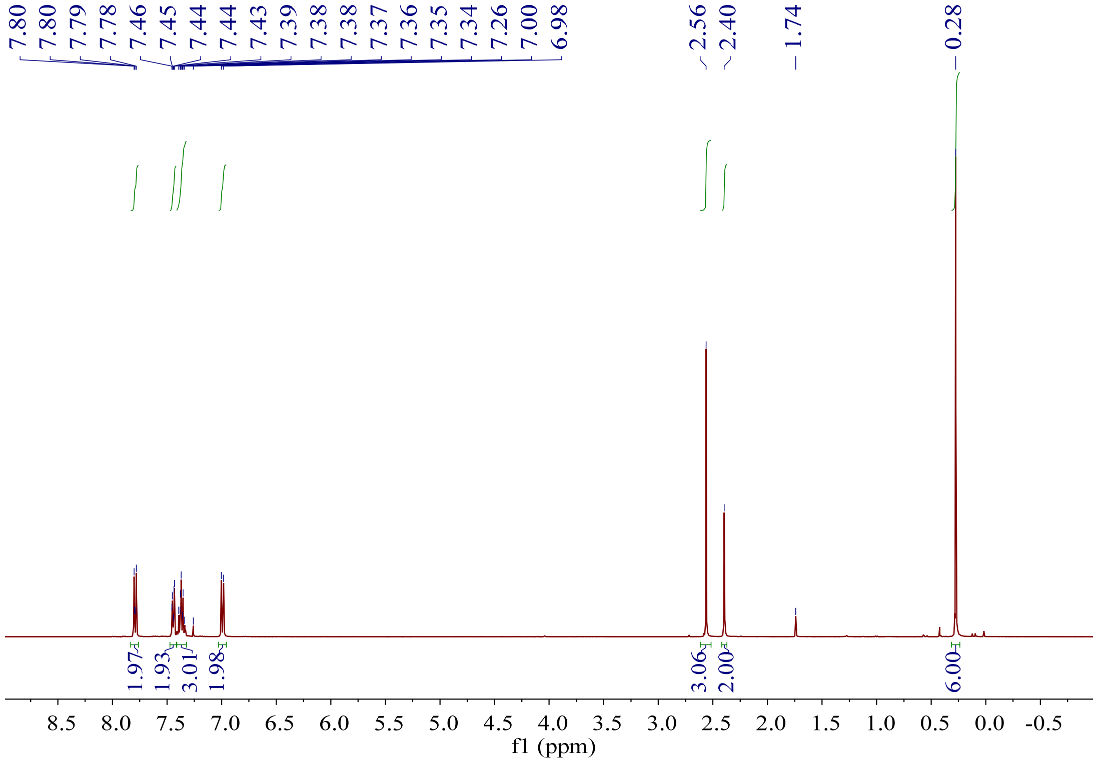
129.39
128.26
127.94
126.25
77.48
77.16
76.84
51.97
27.28
-3.42
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


SiMe2Ph
Ac

2p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7.45
7.44
7.44
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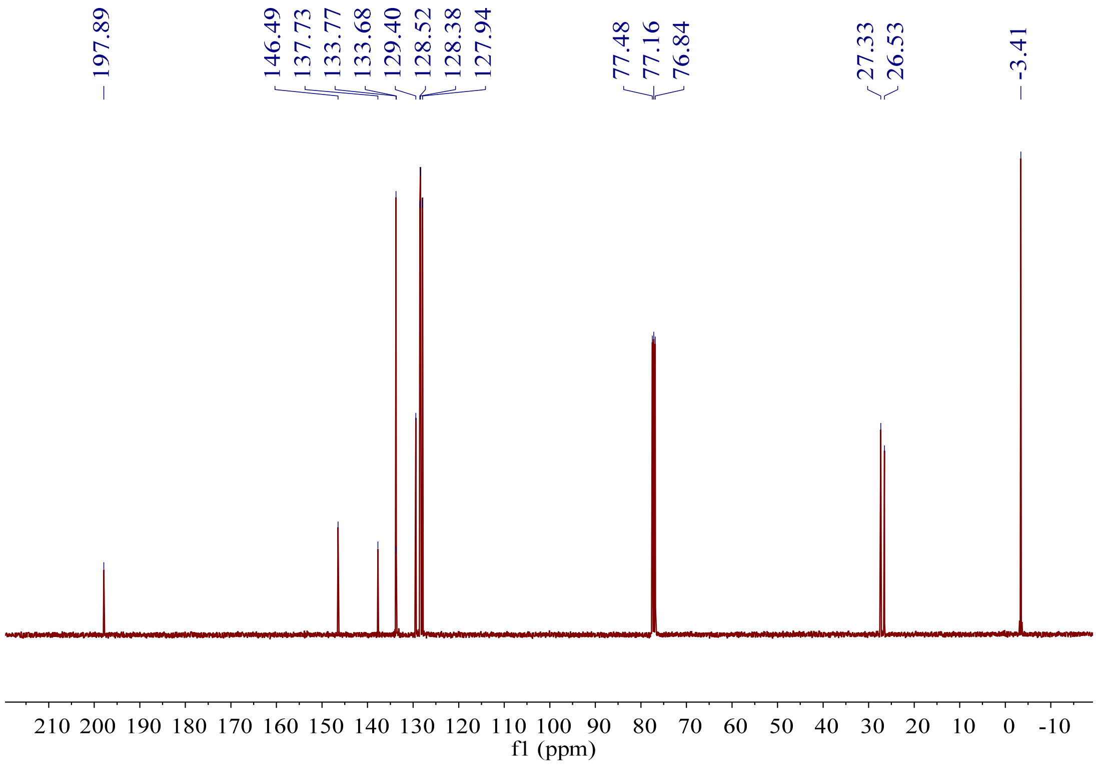
7.39
7.38
7.38
7.37
7.36
7.35
7.34
7.26
7.00
6.98
2.56
2.40
1.74
0.28
1.97
1.93
3.01
1.98
3.06
2.00
6.00
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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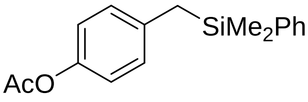
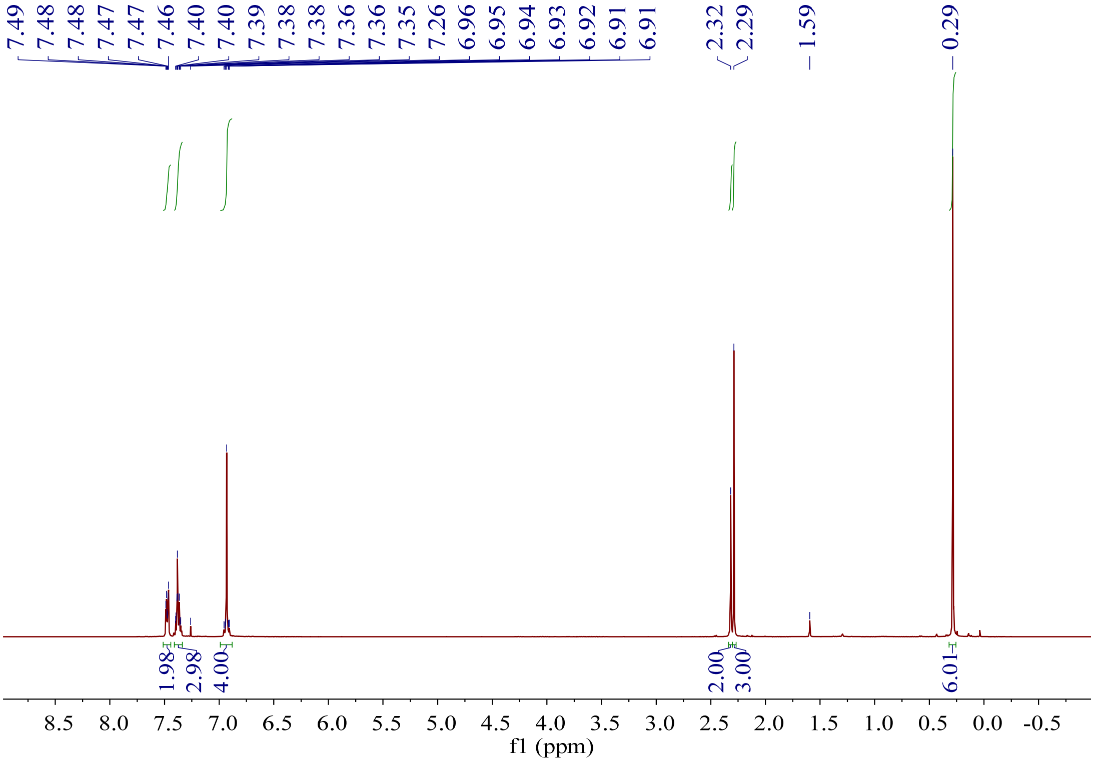
133.68
129.40
128.52
128.38
127.94
77.48
77.16
76.84
27.33
26.53
-3.41
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


SiMe2Ph
AcO

2q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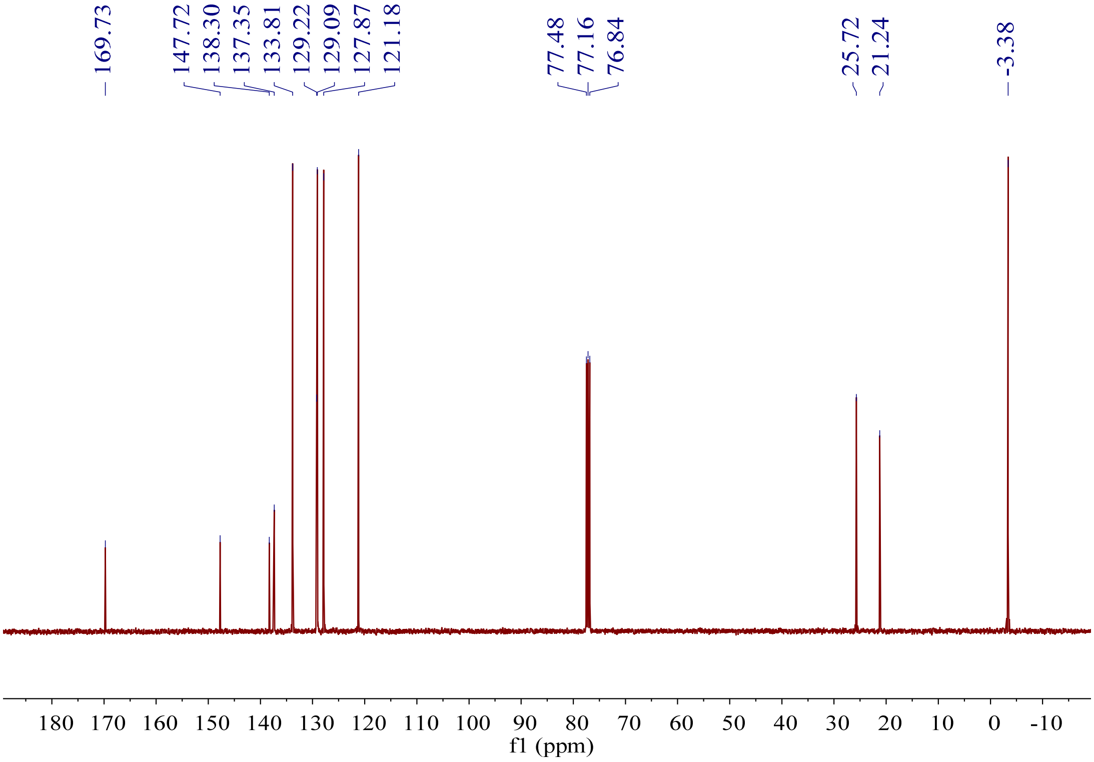
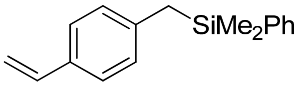
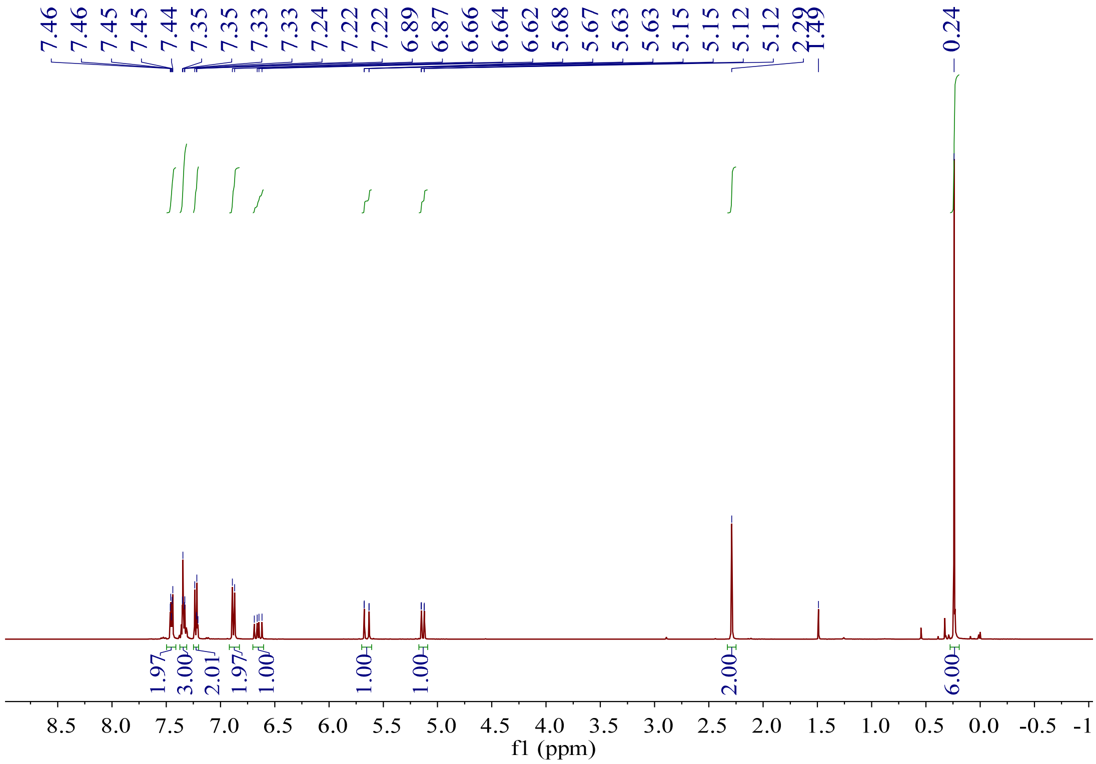
7.48
7.47
7.47
7.46
7.40
7.40
7.39
7.38
7.38
7.36
7.36
7.35
7.26
6.96
6.95
6.94
6.93
6.92
6.91
6.91
2.32
2.29
1.59
0.29
1.98
2.98
4.00
2.00
3.00
6.01
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


169.73
147.72
138.30
137.35
133.81
129.22
129.09
127.87
121.18
77.48
77.16
76.84
25.72
21.24
-3.38
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


SiMe$_2$Ph

2r


7.46
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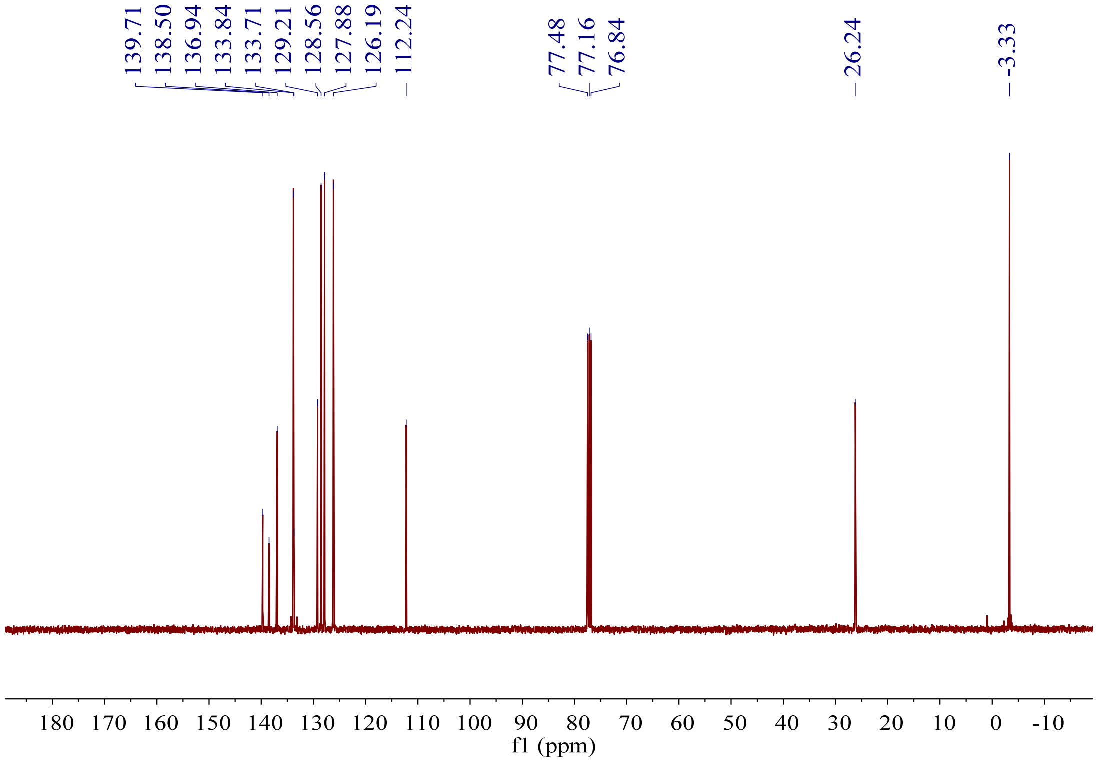
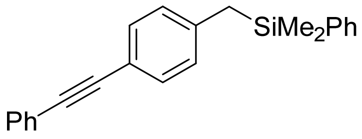
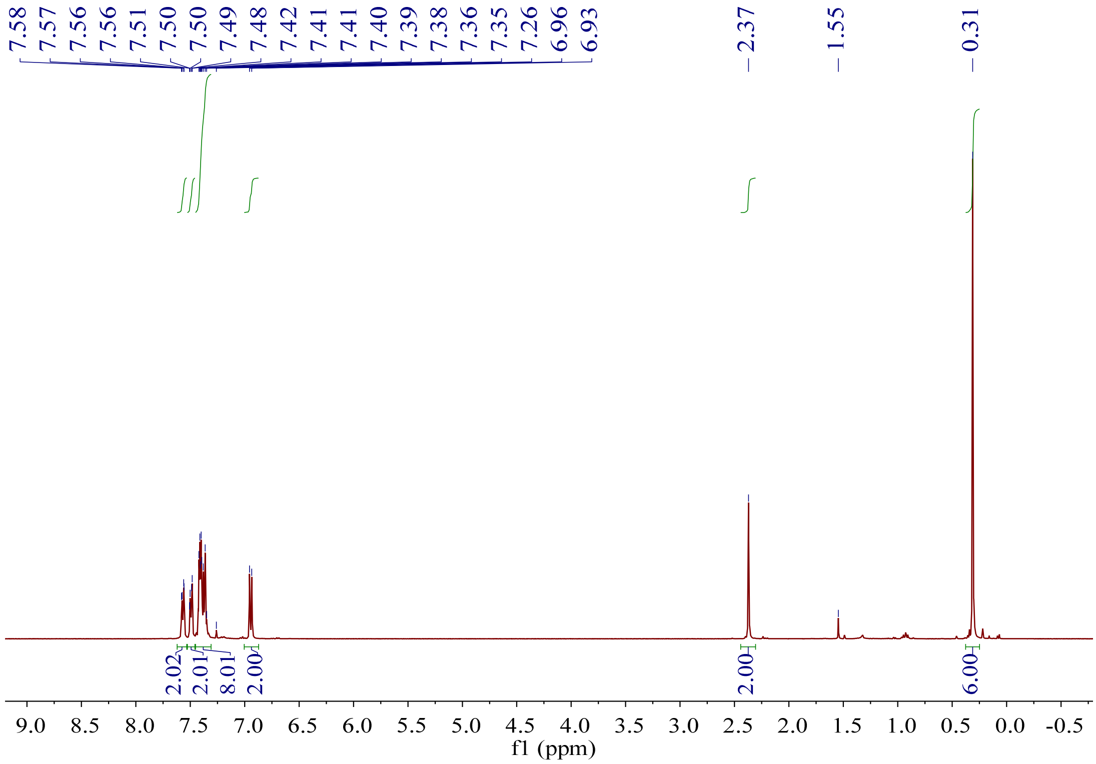
7.45
7.45
7.44
7.35
7.35
7.33
7.33
7.24
7.22
7.22
6.89
6.87
6.66
6.64
6.62
5.68
5.67
5.63
5.63
5.15
5.15
5.12
5.12
2.29
1.49
0.24
1.97
3.00
2.01
1.97
1.00
1.00
1.00
2.00
6.00
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1
f1 (ppm)


139.71
138.50
136.94
133.84
133.71
129.21
128.56
127.88
126.19
112.24
77.48
77.16
76.84
26.24
-3.33
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


SiMe2Ph
Ph

2s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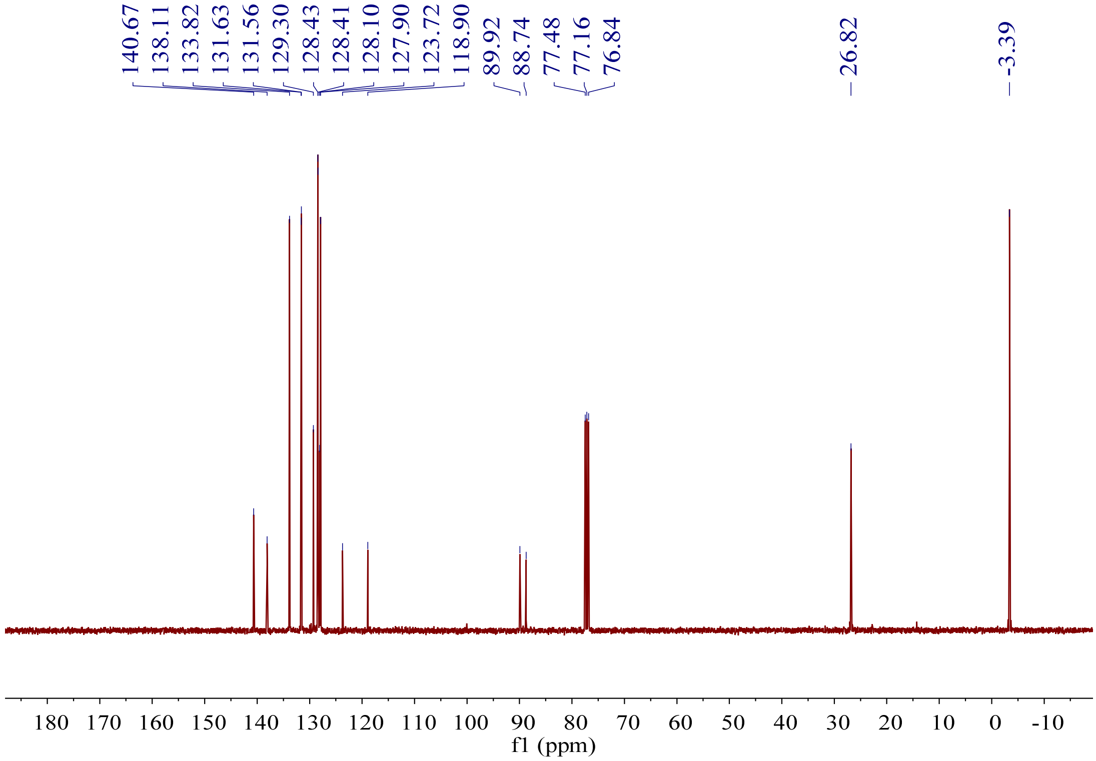
7.56
7.51
7.50
7.50
7.49
7.48
7.42
7.41
7.41
7.40
7.39
7.38
7.36
7.35
7.26
6.96
6.93
2.37
1.55
0.31
2.02
2.01
8.01
2.00
2.00
6.00
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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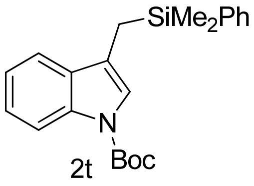
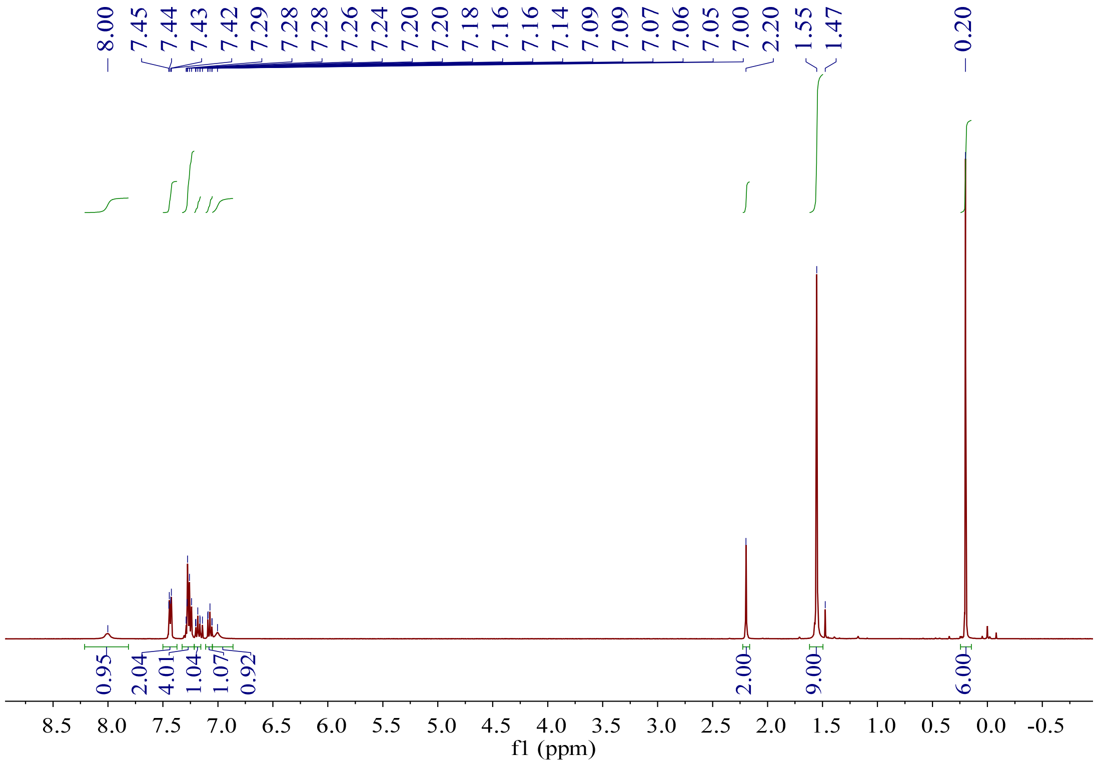
138.11
133.82
131.63
131.56
129.30
128.43
128.41
128.10
127.90
123.72
118.90
89.92
88.74
77.48
77.16
76.84
26.82
-3.39
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


SiMe2Ph
N
Boc

2t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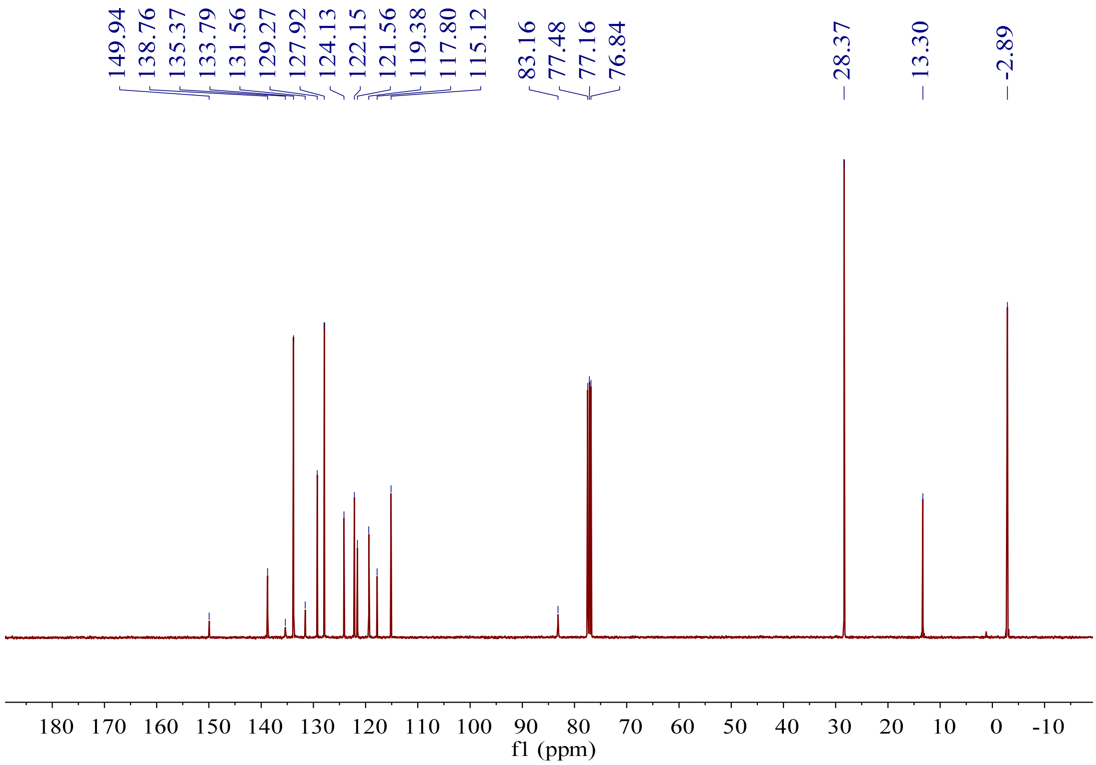
7.43
7.42
7.29
7.28
7.28
7.26
7.24
7.20
7.20
7.18
7.16
7.16
7.14
7.09
7.09
7.07
7.06
7.05
7.00
2.20
1.55
1.47
0.20
0.95
2.04
4.01
1.04
1.07
0.92
2.00
9.00
6.00
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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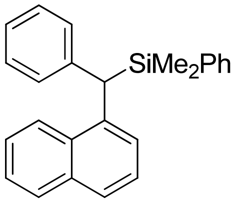
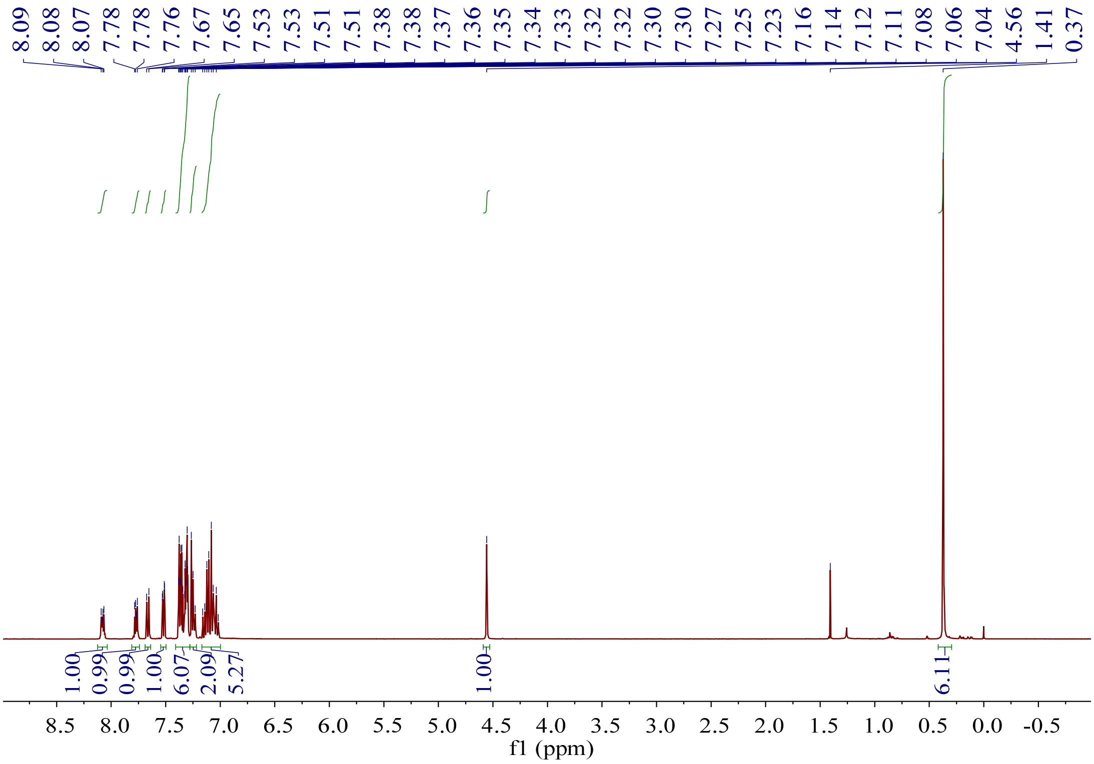
124.13
122.15
121.56
119.38
117.80
115.12
83.16
77.48
77.16
76.84
28.37
13.30
-2.89
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


SiMe2Ph

2u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7.38
7.38
7.37
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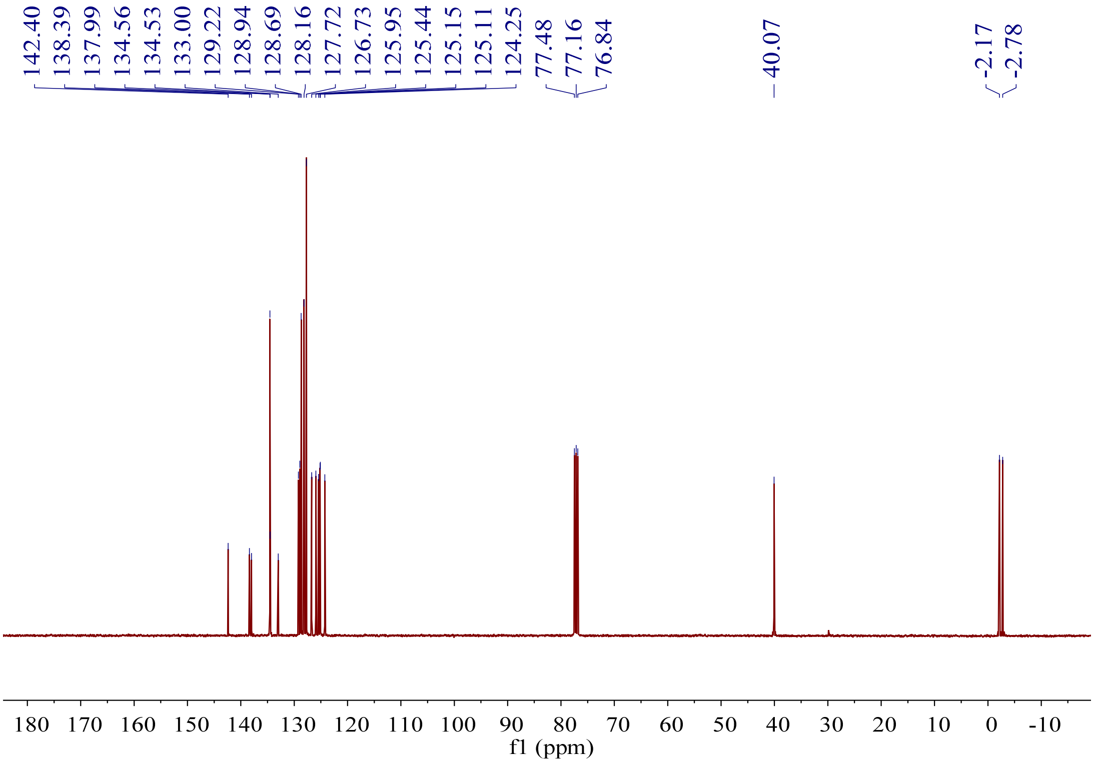
7.35
7.34
7.33
7.32
7.32
7.30
7.30
7.27
7.25
7.23
7.16
7.14
7.12
7.11
7.08
7.06
7.04
4.56
1.41
0.37
1.00
0.99
0.99
1.00
6.07
2.09
5.27
1.00
6.11
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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133.00
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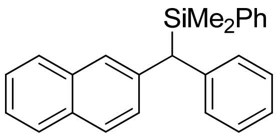
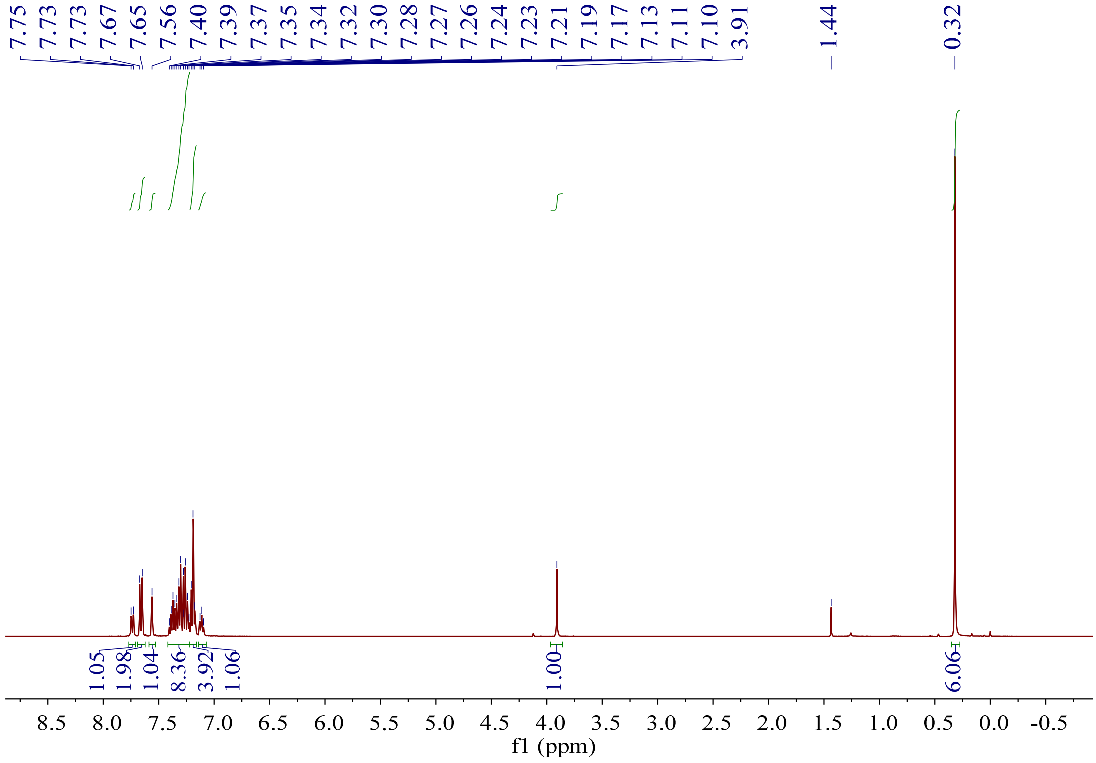
128.94
128.69
128.16
127.72
126.73
125.95
125.44
125.15
125.11
124.25
77.48
77.16
76.84
40.07
-2.17
-2.78
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)



2v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7.73
7.67
7.65
7.56
7.40
7.39
7.37
7.35
7.34
7.32
7.30
7.28
7.27
7.26
7.24
7.23
7.21
7.19
7.17
7.13
7.11
7.10
3.91
1.44
0.32
1.05
1.98
1.04
8.36
3.92
1.06
1.00
6.06
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
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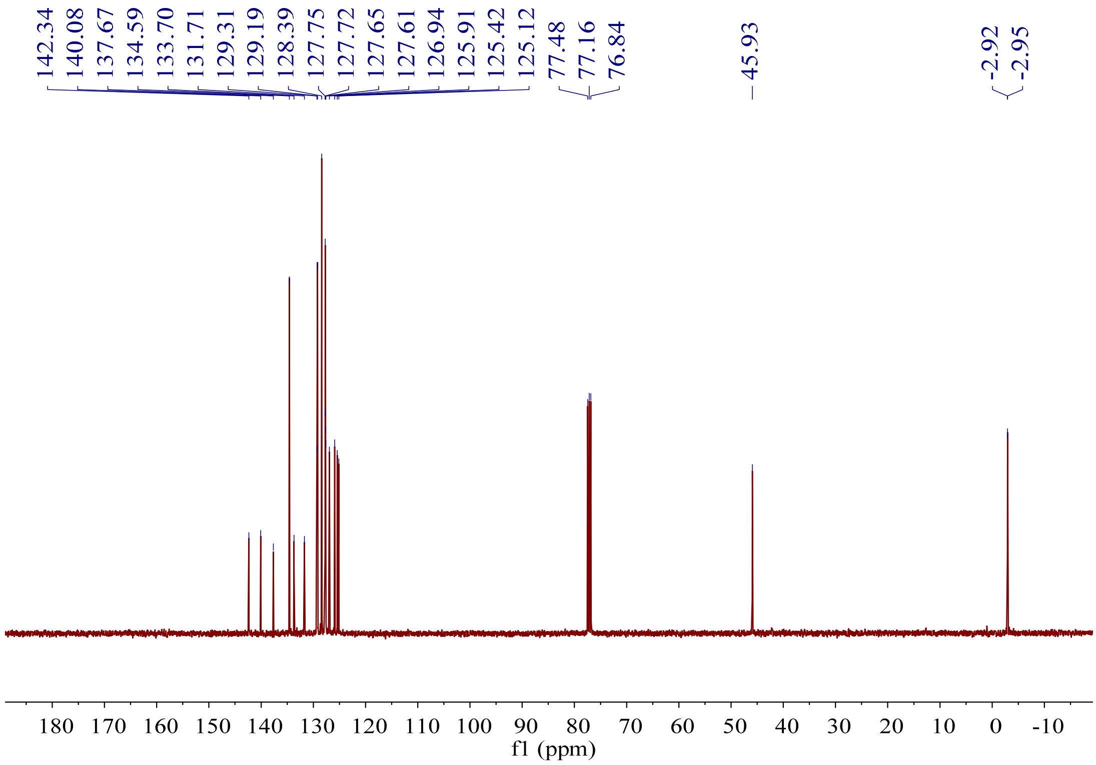
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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129.19
128.39
127.75
127.72
127.65
127.61
126.94
125.91
125.42
125.12
77.48
77.16
76.84
45.93
-2.92
-2.95
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)