Rh-Catalyzed Enantioselective Hydrosilylation of Unactivated Alkenes

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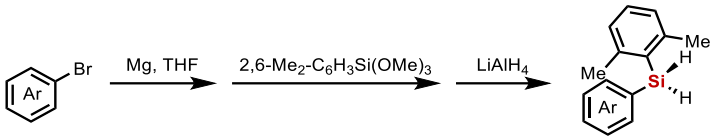
1. General Information

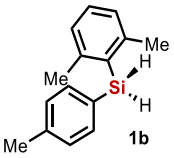
$[Rh(ethylene)_2Cl]_2$ was purchased from Rhawn. (*S*,*Sp*)-Bn-Phosferrox was purchased from Adamas-beta. Other reagents were purchased from TCI, Sigma-Aldrich, Bide Pharmatech, Adamas-beta, J&K, 9-Ding, Leyan and Energy Chemical of the highest purity grade and used without further purification, unless otherwise indicated. Diglyme was dried over sodium. Tetrahydrofuran (THF), diethyl ether (Et_2O) and toluene were dried using the solvent purification system. Other anhydrous solvents were purchased from J&K and Energy Chemical. The extent of reaction was monitored by thin-layer chromatography (TLC), performed on 0.25 mm silica gel HSGF254. The TLC plates were visualized by ultraviolet light (254 nm) or treatment with potassium permanganate stain followed by gentle heating. NMR spectra were recorded on Varian 400, Bruker 400 and Agilent 400 (400 MHz for ^1H; 375 MHz for ^{19}F; 100 MHz for ^{13}C; 80 or 119 MHz for ^{29}Si) spectrometer. The chemical shifts (δ) were quoted in parts per million (ppm) referenced to TMS (0.0 ppm for ^1H NMR) and $CDCl_3$ (77.0 ppm for ^{13}C NMR). The following abbreviations were used to explain multiplicities: s = singlet, d = doublet, t = triplet, q = quartet, p = pentet, sext = sextet, sep = septet, m = multiplet, br = broad. Coupling constants, *J*, were reported in Hertz unit (Hz). ^{13}C NMR spectra were fully decoupled by broad band proton decoupling. ^{19}F NMR spectra were fully decoupled by broad band proton decoupling. ESI-MS spectra were obtained on an Agilent LC/MSD SL spectrometer. HRMS (EI) and HRMS (ESI) were determined on a Waters Micromass GCT CA176 or a Premierand Bruker APEXIII 7.0 TESLA FTMS spectrometers, respectively. HPLC analysis were performed on a SHIMADZU LC-20AT liquid chromatograph or Thermo Fisher UltiMate 3000 liquid chromatograph.

2. Experimental Section

2.1 Preparation of Dihydrosilanes

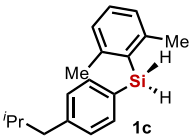


Grignard reagent (ArMgBr) was prepared in situ via the reaction between bromoarene (1.0 equiv.) and Mg (1.2 equiv.) in THF, initiated by the addition ofiodine. The resulted Grignard reagent was then added dropwise to the THF solution of 2,6-Me_2-$C_6H_3Si(OMe)_3$ (1.2 equiv.) under N_2. Then, the reaction was stirred at room temperature. Upon completion, $LiAlH_4$ (2.0 equiv.) was added to the above suspension under nitrogen at 0 °C, and the reaction mixture was stirred at room temperature for another 1.0 hour. The reaction was quenched with H_2O, 15 wt% NaOH, H_2O (H_2O:15 wt % NaOH:H_2O = 1:1:3) sequentially. The reaction mixture was then filtered through a pad of celite. The resulting solution was concentrated, and the residue was purified by silica gel chromatography.



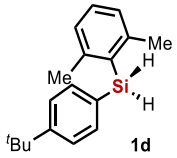
(2,6-Dimethylphenyl)(*p*-tolyl)silane

1b was prepared on 5.0 mmol scale. After purification by chromatography using hexane as the eluent, **1b** was obtained in 21% yield (237.7 mg) as a light yellow liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.40 (d, *J* = 7.6 Hz, 2H), 7.26–7.19 (m, 1H), 7.15 (d, *J* = 7.6 Hz, 2H), 7.04 (d, *J* = 7.6 Hz, 2H), 5.00 (s, 2H), 2.47 (s, 6H), 2.33 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.0, 139.6, 135.3, 130.0, 129.9, 129.0, 127.8, 127.3, 23.9, 21.5; HRMS (EI) *m/z* Calcd for $C_{15}H_{18}Si$ $[M]^+$: 226.1172, found: 226.1174.



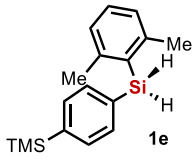
(2,6-Dimethylphenyl)(4-isobutylphenyl)silane

1c was prepared on 5.0 mmol scale. After purification by chromatography using hexane as the eluent, **1c** was obtained in 15% yield (201.4 mg) as a light yellow liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.42 (d, *J* = 8.0 Hz, 1H), 7.23 (t, *J* = 8.4 Hz, 2H), 7.11 (t, *J* = 7.6 Hz, 2H), 7.05 (d, *J* = 7.6 Hz, 2H) , 5.01 (s, 2H), 2.50–2.41 (m, 8H), 1.84 (dt, *J* = 13.6, 6.8 Hz, 1H), 0.89 (d, *J* = 6.8 Hz, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.0, 143.3, 135.1, 130.01, 129.99, 129.0, 128.04, 127.25, 45.4, 30.1, 23.9, 22.4; HRMS (EI) *m/z* Calcd for $C_{18}H_{24}Si$ $[M]^+$: 268.1642, found: 268.1648.



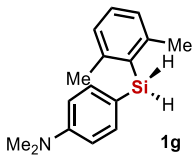
(4-(*tert*-Butyl)phenyl)(2,6-dimethylphenyl)silane

1d was prepared on 5.0 mmol scale. After purification by chromatography using hexane as the eluent, **1d** was obtained in 24% yield (322.2 mg) as a light yellow liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.45 (d, *J* = 8.4 Hz, 2H), 7.35 (d, *J* = 8.4 Hz, 2H), 7.22 (t, *J* = 7.6 Hz, 1H), 7.04 (d, *J* = 7.6 Hz, 2H), 5.01 (s, 2H), 2.48 (s, 6H), 1.29 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 152.7, 145.0, 135.6, 135.1, 130.0, 127.9, 127.3, 125.1, 34.7, 31.2, 23.9; HRMS (EI) *m/z* Calcd for $C_{18}H_{24}Si$ $[M]^+$: 268.1642, found: 268.1644.



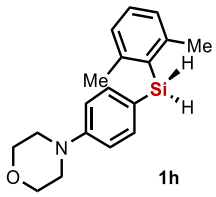
(4-((2,6-Dimethylphenyl)silyl)phenyl)trimethylsilane

1e was prepared on 5.0 mmol scale. After purification by chromatography using PE as the eluent, **1e** was obtained in 21% yield (297.5 mg) as a colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.52–7.46 (m, 4H), 7.23 (t, *J* = 7.6 Hz, 1H), 7.05 (d, *J* = 7.6 Hz, 2H), 5.01 (s, 2H), 2.48 (s, 6H), 0.25 (s, 9H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.0, 142.1, 134.4, 132.9, 132.0, 130.1, 129.6, 127.3, 23.9, -1.3; HRMS (EI) *m/z* Calcd for $C_{17}H_{24}Si_2$ $[M]^+$: 284.1411, found: 284.1414.



4-((2,6-Dimethylphenyl)silyl)-*N*,*N*-dimethylaniline

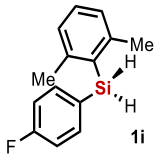
1g was prepared on 15 mmol scale. After purification by chromatography using PE/EA (80/1) as the eluent, **1g** was obtained in 30% yield (1.13 g) as a colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.36 (d, *J* = 8.8 Hz, 2H), 7.21 (t, *J* = 7.6 Hz, 1H), 7.03 (d, *J* = 7.6 Hz, 2H), 6.69 (d, *J* = 8.0 Hz, 2H), 4.99 (s, 2H), 2.95 (s, 6H), 2.48 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 151.3, 144.9, 136.3, 130.7, 129.7, 127.2, 115.6, 112.2, 40.1, 23.9; HRMS (ESI) *m/z* Calcd for $C_{16}H_{22}NSi$ $[M+H]^+$: 256.1516, found: 256.1513.



1h

4-(4-((2,6-Dimethylphenyl)silyl)phenyl)morpholine

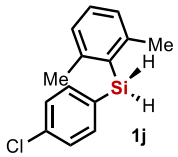
1h was prepared on 10 mmol scale. After purification by chromatography using PE/EA (10/1) as the eluent, **1h** was obtained in 29% yield (862.8 mg) as a white solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.40 (d, *J* = 8.7 Hz, 2H), 7.22 (t, *J* = 7.6 Hz, 1H), 7.04 (d, *J* = 7.6 Hz, 2H), 6.86 (d, *J* = 8.6 Hz, 2H), 4.99 (s, 2H), 3.88–3.80 (m, 4H), 3.19–3.12 (m, 4H), 2.47 (s, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 152.1, 145.0, 136.4, 129.9, 129.2, 127.2, 120.3, 114.9, 66.8, 48.5, 23.9; HRMS (ESI) *m/z* Calcd for $C_{18}H_{24}NOSi$ $[M+H]^+$: 298.1622, found: 298.1622.



1i

(2,6-Dimethylphenyl)(4-fluorophenyl)silane

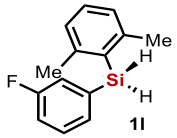
1i was prepared on 5.0 mmol scale. After purification by chromatography using PE as the eluent, **1i** was obtained in 60% yield (694.1 mg) as a light yellow liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.51–7.44 (m, 2H), 7.24 (t, J = 7.6 Hz, 1H), 7.08–6.97 (m, 4H), 5.01 (s, 2H), 2.46 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 164.1 (d, *J* = 249.1 Hz), 145.0, 137.2 (d, *J* = 7.6 Hz), 130.2, 129.4, 127.4, 127.0 (d, *J* = 4.0 Hz), 115.4 (d, *J* = 19.8 Hz), 23.8; ^{19}F NMR (375 MHz, CDCl3) δ -111.39–-111.51 (m); HRMS (EI) m/z Calcd for $C_{14}H_{15}FSi$ [M]+: 230.0922, found: 230.0924.



1j

(4-Chlorophenyl)(2,6-dimethylphenyl)silane

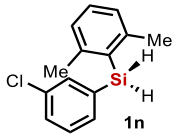
1j was prepared on 5.0 mmol scale. After purification by chromatography using PE as the eluent, **1j** was obtained in 56% yield (688.8 mg) as a light yellow liquid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.42 (d, *J* = 8.2 Hz, 2H), 7.30 (d, *J* = 8.2 Hz, 2H), 7.27–7.21 (m, 1H), 7.06 (d, *J* = 7.6 Hz, 2H), 5.00 (s, 2H), 2.45 (s, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.0, 136.5, 136.0, 130.3, 123.0, 129.0, 128.4, 127.4, 23.9; HRMS (EI) *m/z* Calcd for $C_{14}H_{15}ClSi$ $[M]^+$: 246.0626, found: 246.0619.



1l

(2,6-Dimethylphenyl)(3-fluorophenyl)silane

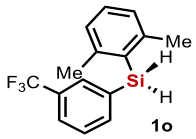
1l was prepared on 5.0 mmol scale. After purification by chromatography using PE as the eluent, **1l** was obtained in 54% yield (621.7 mg) as a green liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.34–7.24 (m, 3H), 7.19–7.15 (m, 1H), 7.09–7.02 (m, 3H), 5.02 (s, 2H), 2.46 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.6 (d, *J* = 248.8 Hz), 145.0, 134.7 (d, *J* = 4.4 Hz), 130.8 (d, *J* = 3.0 Hz), 130.4, 129.9 (d, *J* = 7.0 Hz), 128.9, 127.4, 121.4 (d, *J* = 19.3 Hz), 116.6 (d, *J* = 21.0 Hz), 23.9; ^{19}F NMR (375 MHz, $CDCl_3$) δ -113.62–-113.73 (m); HRMS (EI) *m/z* Calcd for $C_{14}H_{15}FSi$ $[M]^+$: 230.0922, found: 230.0926.



1n

(3-Chlorophenyl)(2,6-dimethylphenyl)silane

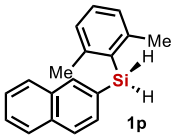
1n was prepared on 5.0 mmol scale. After purification by chromatography using PE as the eluent, **1n** was obtained in 17% yield (209.8 mg) as a colorless liquid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.46 (s, 1H), 7.38–7.32 (m, 2H), 7.28–7.23 (m, 2H), 7.06 (d, *J* = 7.6 Hz, 2H), 5.00 (s, 2H), 2.46 (s, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.0, 134.7, 134.4, 134.4, 133.1, 130.4, 129.7, 129.5, 128.7, 127.4, 77.3, 77.0, 76.7, 23.9; HRMS (EI) *m/z* Calcd for $C_{14}H_{15}ClSi$ $[M]^+$: 246.0626, found: 246.0629.



1o

(2,6-Dimethylphenyl)(3-(trifluoromethyl)phenyl)silane

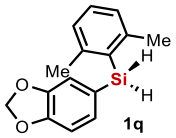
1o was prepared on 5.0 mmol scale. After purification by chromatography using PE as the eluent, **1o** was obtained in 22% yield (314.7 mg) as a colorless liquid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.79 (s, 1H), 7.66–7.60 (m, 2H), 7.44 (t, *J* = 7.6 Hz, 1H), 7.29–7.24 (m, 1H), 7.07 (d, *J* = 7.6 Hz, 2H), 5.06 (s, 2H), 2.47 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.1, 138.5, 133.4, 131.6 (q, *J* = 3.7 Hz), 130.5, 130.3 (q, *J* = 31.8 Hz), 128.44, 128.38, 127.5, 126.34 (q, *J* = 3.8 Hz), 124.2 (q, *J* = 216.6 Hz), 23.9; ^{19}F NMR (375 MHz, $CDCl_3$) δ -63.18; HRMS (EI) *m/z* Calcd for $C_{15}H_{15}F_3Si$ $[M]^+$: 280.0890, found: 280.0886.



1p

(2,6-Dimethylphenyl)(naphthalen-2-yl)silane

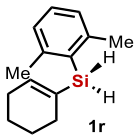
1p was prepared on 5.0 mmol scale. After purification by chromatography using PE/EA (80/1) as the eluent, **1p** was obtained in 30% yield (393.6 mg) as a white solid. ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.01 (s, 1H), 7.85–7.76 (m, 3H), 7.57 (d, *J* = 8.6 Hz, 1H), 7.51–7.44 (m, 2H), 7.29–7.24 (m, 1H), 7.08 (d, *J* = 7.6 Hz, 2H), 5.14 (s, 2H), 2.50 (s, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.2, 136.2, 133.9, 133.0, 131.0, 130.2, 129.6, 129.1, 128.0, 127.7, 127.4, 126.6, 126.0, 24.0; HRMS (EI) *m/z* Calcd for $C_{18}H_{18}Si$ $[M]^+$: 262.1172, found: 262.1178.



1q

Benzo[*d*][1,3]dioxol-5-yl(2,6-dimethylphenyl)silane

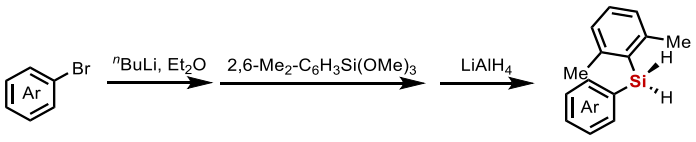
1q was prepared on 10 mmol scale. After purification by chromatography using PE/EA (80/1) as the eluent, **1q** was obtained in 40% yield (1.1 g) as a colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.27–7.19 (m, 1H), 7.04 (d, *J* = 7.6 Hz, 2H), 6.99 (d, *J* = 8.0 Hz, 1H), 6.93 (s, 1H), 6.81 (d, *J* = 7.6 Hz, 1H), 5.92 (s, 2H), 4.98 (s, 2H), 2.46 (s, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 149.0, 147.6, 145.0, 130.1, 129.7, 129.4, 127.3, 124.0, 114.3, 108.9, 100.6, 23.9; HRMS (EI) *m/z* Calcd for $C_{15}H_{16}O_2Si$ $[M]^+$: 256.0914, found: 256.0918.



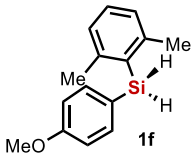
1r

Cyclohex-1-en-1-yl(2,6-dimethylphenyl)silane

1r was prepared on 5.0 mmol scale. After purification by chromatography using PE as the eluent, **1r** was obtained in 12% yield (133.1 mg) as a colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.18 (t, *J* = 7.6 Hz, 1H), 7.01 (d, *J* = 7.6 Hz, 2H), 6.13–6.07 (m, 1H), 4.55 (s, 2H), 2.46 (s, 6H), 2.11–1.99 (m, 4H), 1.63–1.56 (m, 4H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.0, 140.7, 130.8, 130.2, 129.6, 127.1, 28.0, 27.1, 23.8, 22.9, 22.1; HRMS (EI) *m/z* Calcd for $C_{14}H_{20}Si$ $[M]^+$: 216.1329, found: 216.1331.



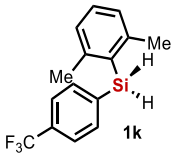
To a solution of bromoarene (1.0 equiv.) in ether (0.5 M) was added ^{n}BuLi (1.02 equiv., 2.5 M in hexane) dropwise at -78 °C under nitrogen. After stirring at -78 °C for 1.0 h, the Et_2O solution of 2,6-Me_2-$C_6H_3Si(OMe)_3$ (1.2 equiv.) was added dropwise to the above suspension, and the reaction mixture was stirred for another 30 min at the same temperature. The reaction mixture was then allowed to warm up to room temperature and stirred for 10 hours. $LiAlH_4$ was added to the above suspension under nitrogen at 0 °C, and the reaction mixture was stirred at room temperature until the reaction completed. The reaction was quenched with H_2O, 15 wt% NaOH, H_2O (H_2O:15 wt % NaOH:H_2O = 1:1:3) sequentially. The resulting mixture was filtered through a pad of celite. The filtrate was concentrated, and the residue was purified by silica gel chromatography.



1f

(2,6-Dimethylphenyl)(4-methoxyphenyl)silane

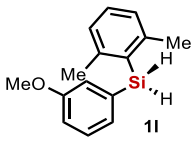
1f was prepared on 5.0 mmol scale. After purification by chromatography using PE as the eluent, **1f** was obtained in 14% yield (169.7 mg) as a colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.40-7.32 (m, 1H), 7.29 (dd, *J* = 7.2, 1.8 Hz, 1H), 7.20 (t, *J* = 7.2 Hz, 1H), 7.02 (d, *J* = 7.6 Hz, 2H), 6.90 (t, *J* = 7.2 Hz, 1H), 6.82 (d, *J* = 8.2 Hz, 1H), 4.97 (s, 2H), 3.79 (s, 3H), 2.47 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 160.9, 145.0, 136.7, 130.1, 130.0, 127.3, 122.0, 114.0, 55.0, 23.9; HRMS (EI) *m/z* Calcd for $C_{15}H_{18}OSi$ $[M]^+$: 242.1121, found: 242.1116.



1k

(2,6-Dimethylphenyl)(4-(trifluoromethyl)phenyl)silane

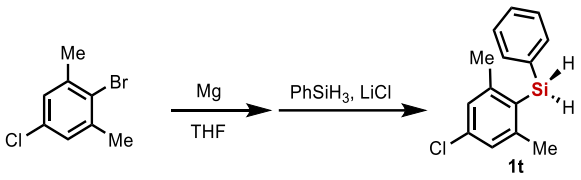
1k was prepared on 5.0 mmol scale. After purification by chromatography using PE as the eluent, **1k** was obtained in 16% yield (224.3 mg) as a colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.62 (d, *J* = 7.8 Hz, 2H), 7.56 (d, *J* = 7.8 Hz, 2H), 7.29–7.23 (m, 1H), 7.07 (d, *J* = 7.6 Hz, 2H), 5.05 (s, 2H), 2.46 (s, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.1, 136.9, 135.5, 131.5 (q, *J* = 32.5 Hz), 130.5, 128.5, 127.5, 124.1 (q, *J* = 216.6 Hz), 124.6 (q, *J* = 3.8 Hz), 23.9; ^{19}F NMR (375 MHz, $CDCl_3$) δ -63.53; HRMS (EI) *m/z* Calcd for $C_{15}H_{15}F_3Si$ $[M]^+$: 280.0890, found: 280.0896.



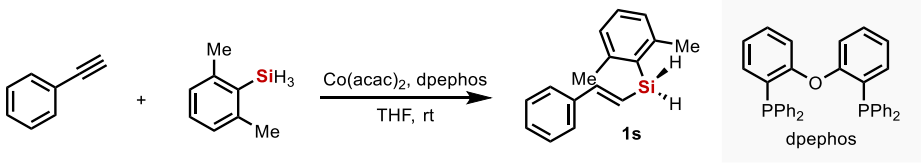
1l

(2,6-Dimethylphenyl)(3-methoxyphenyl)silane

1l was prepared on 5.0 mmol scale using ^{t}BuLi (2.0 equiv., 1.3 M in pentane) instead of ^{n}BuLi. After purification by chromatography using PE as the eluent, **1l** was obtained in 34% yield (412.3 mg) as a colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.31–7.21 (m, 2H), 7.11–7.02 (m, 4H), 6.91 (d, *J* = 8.4 Hz, 1H), 5.01 (s, 2H), 3.78 (s, 3H), 2.47 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 159.1, 145.0, 133.2, 130.1, 129.5, 129.3, 127.5, 127.3, 120.5, 114.9, 55.1, 23.9; HRMS (EI) *m/z* Calcd for $C_{15}H_{18}OSi$ $[M]^+$: 242.1121, found: 242.1116.



1t was prepared following the known procedure[1]. Grignard reagent was prepared in situ via the reaction between 2-bromo-5-chloro-1,3-dimethylbenzene (2.2 g, 10 mmol, 1.0 equiv.) and Mg (288.0 mg, 12 mmol, 1.2 equiv.) in THF, initiated by the addition of iodine. To resulted Grignard reagent was added a THF (10 mL) solution of LiCl (0.4 g, 10 mmol, 1.0 equiv.), followed by addition of $PhSiH_3$ (1.2 mL, 10 mmol, 1.0 equiv.) at room temperature. The reaction mixture was then heated at 50 °C overnight until the reaction completed. The reaction was quenched with NH_4Cl (aq) at room temperature and the organic layer was dried over Na_2SO_4. The resulting solution was concentrated, and the residue was purified by silica gel chromatography using PE as the eluent. **1t** was obtained in 44% (1.1 g) as a colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.48 (d, *J* = 8.0 Hz, 2H), 7.41–7.30 (m, 3H), 7.06 (s, 2H), 4.99 (s, 2H), 2.44 (s, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 146.8, 136.0, 135.1, 130.9, 129.8, 128.2, 128.1, 127.3, 23.7; HRMS (FI) *m/z* Calcd for $C_{14}H_{15}ClSi$ $[M]^+$: 246.0626, found: 246.0630.

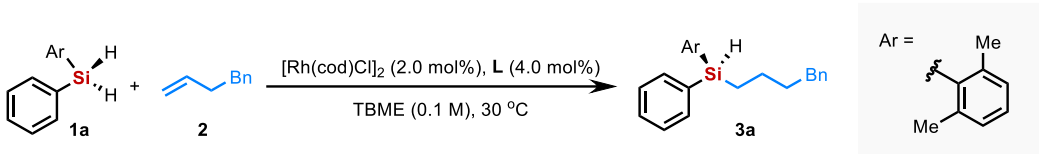


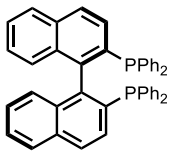
1s was prepared following the known procedure[2]. $Co(acac)_2$ (9.8 mg, 0.03 mmol, 1 mol%), dpephos (17.8 mg, 1.1 mol%), phenylacetylene (306.4 mg, 3.0 mmol, 1.0 equiv.) and anhydrous THF (6.0 mL) were charged in a sealed tube under N_2, followed by addition of 2,6-dimethylphenylsilane (599.6 mg, 4.5 mmol, 1.5 equiv.). The reaction mixture was then stirred at room temperature for 6 h. Next, the reaction mixture was concentrated and the purified by column chromatography using PE as the eluent, **1s** was obtained in 93% yield (664.0 mg) as a light yellow liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.41 (d, *J* = 7.4 Hz, 2H), 7.32 (t, *J* = 7.2 Hz, 2H), 7.28–7.18 (m, 2H), 7.07–6.98 (m, 3H), 6.47 (d, *J* = 18.8 Hz, 1H), 4.79 (s, 2H), 2.51 (s, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 148.0, 144.9, 137.8, 129.9,

129.7, 128.4, 127.3, 126.6, 119.5, 23.8; HRMS (EI) *m/z* Calcd for $C_{16}H_{18}Si$ $[M]^+$: 238.1172, found: 238.1172.

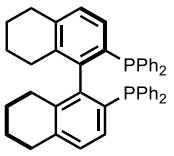
2.2 Evaluation of Reaction Parameters

Table S1. Screening of Chiral Ligands[a, b, c]

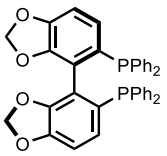




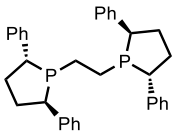
L1, (*R*)-BINAP
80%, -23% ee



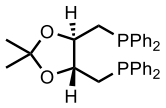
L2, (*R*)-H_8-BINAP
82%, -21% ee



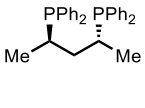
L3,(*R*,*R*)-SegPhos
4%, -26% ee



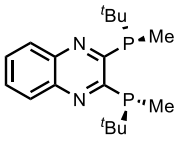
L4, (*R*,*R*)-Ph-BPE
4%, -23% ee



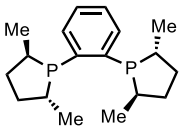
L5, (*R*)-DIOP
60%, -16% ee



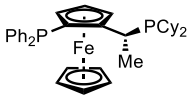
L6, (*R*)-BDPP
10%, 6% ee



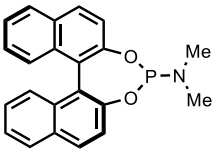
L7, (*R*)-QuinoxP
30%, 9% ee



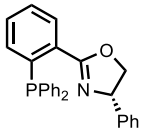
L8, (*R*,*R*)-Me-DuPhos
10%, 8% ee



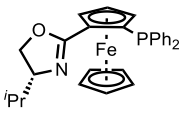
L9, (*R*,*S*)-Josiphos
84%, -4% ee



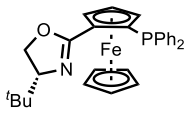
L10
48%, 13% ee



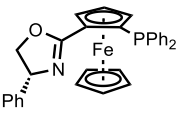
L11
6%, 17% ee



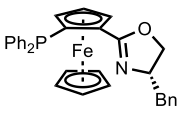
L12
20%, -61% ee



L13
30%, -45% ee



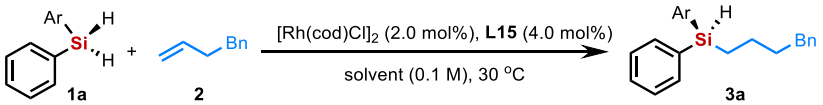
L14
20%, -57% ee

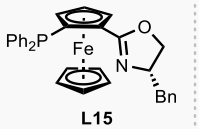


L15
52%, 74% ee

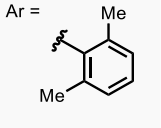
[a]Conditions: **1a** (0.1 mmol), **2** (0.12 mmol), [Rh(cod)Cl]$_2$ (2.0 mol%), Ligand (4.0 mol%), TBME (1.0 mL), 30 °C, 10 h, N_2. [b]The yield was determined by ^{1}H NMR using $C_2H_2Cl_4$ as an internal standard. [c]The ee value was determined by chiral HPLC analysis.

Table S2. Screening of Solvent[a, b, c]





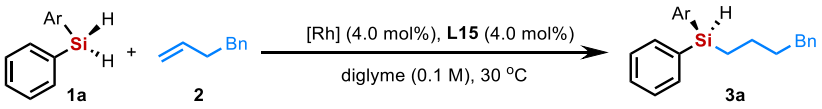
L15



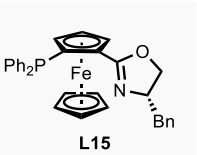
entry	solvent	yield (%)	ee (%)	entry	solvent	yield (%)	ee (%)
1	Hexane	57	66	7	Et_2O	72	80
2	Toluene	55	66	8	$^iPr_2O$	54	69
3	DCM	49	69	9	DME	16	71
4	MeCN	41	8	10	diglyme	52	87
5	DMF	4	34	11	THF	60	77
6	TBME	52	74	12	1,4-dioxane	38	61

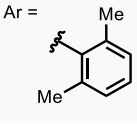
[a]Conditions: **1a** (0.1 mmol), **2** (0.12 mmol), [Rh(cod)Cl]$_2$ (2.0 mol%), **L15** (4.0 mol%), solvent (1.0 mL), 30 °C, 10 h, N_2. [b]The yield was determined by ^{1}H NMR using $C_2H_2Cl_4$ as an internal standard. [c]The ee value was determined by chiral HPLC analysis.

Table S3. Screening of the Catalyst[a, b, c]



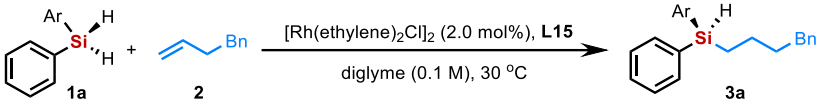
entry	[Rh]	yield (%)	ee (%)
1	$[Rh(cod)Cl]_2$	52	87
2	$[Rh(ethylene)_2Cl]_2$	82	87
3	$[Rh(1,5\text{-hexadiene})Cl]_2$	33	84
4	$Rh(cod)_2OTf$	62	28
5	$Rh(cod)_2BF_4$	48	27



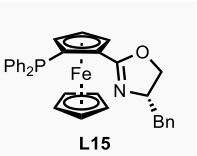


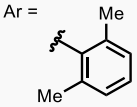
[a]Conditions: **1a** (0.1 mmol), **2** (0.12 mmol), [Rh] (4.0 mol%), **L15** (4.0 mol%), diglyme (1.0 mL), 30 °C, 10 h, N_2. [b]The yield was determined by ^1H NMR using $C_2H_2Cl_4$ as an internal standard. [c]The ee value was determined by chiral HPLC analysis.

Table S4. Screening of the Ratio of Rh and Ligand[a, b, c]



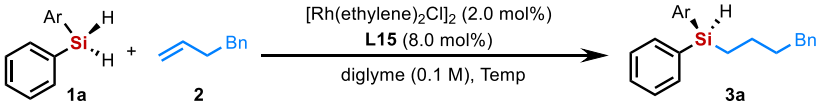
entry	[Rh] : **L15**	yield (%)	ee (%)
1	1 : 1	82	87
2	1 : 1.2	82	86
3	1 : 1.5	89	87
4	1 : 1.7	90	87
5	1 : 2.0	92	88
6	1 : 2.2	92	88



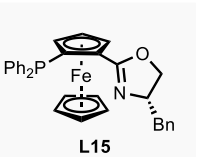


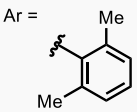
[a]Conditions: **1a** (0.1 mmol), **2** (0.12 mmol), $[Rh(ethylene)_2Cl]_2$ (2.0 mol%), diglyme (1.0 mL), 30 °C, 10 h, N_2. [b]The yield was determined by ^1H NMR using $C_2H_2Cl_4$ as an internal standard. [c]The ee value was determined by chiral HPLC analysis.

Table S5. Screening of the Reaction Temperature[a, b, c]



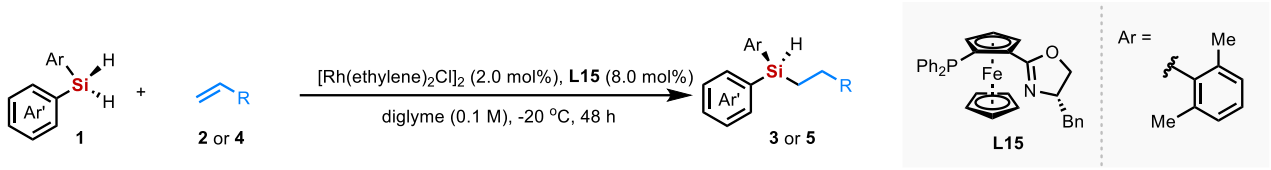
entry	Temp (°C)	yield (%)	ee (%)
1	30	92	88
2	0	75	89
3	-10	68	92
4	-20	64 (81)[d,e]	93 (93)[d,e]
5	-30	23	93



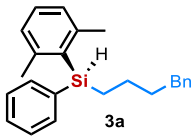


[a]Conditions: **1a** (0.1 mmol), **2** (0.12 mmol), $[Rh(ethylene)_2Cl]_2$ (2.0 mol%), **L15** (8.0 mol%), diglyme (1.0 mL), 10 h, N_2. [b]The yield was determined by ^1H NMR using $C_2H_2Cl_4$ as an internal standard. [c]The ee value was determined by chiral HPLC analysis. [d]48 h. [e]After isolation.

2.3 Rh-Catalyzed Enantioselective Hydrosilylation of Unactivated Alkenes



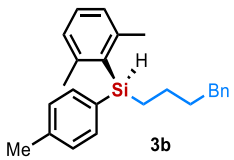
General procedure for Rh-Catalyzed Enantioselective Hydrosilylation of Unactivated Alkenes: In a nitrogen-filled glovebox, $[Rh(ethylene)_2Cl]_2$ (1.6 mg, 0.004 mmol, 2.0 mol%), (*S*,*Sp*)-Bn-Phosferrox (**L15**, 8.4 mg, 0.016 mmol, 8.0 mol%) were charged in a 10 mL tube, and the tube was sealed with an open-top cap fitted with a PTFE-lined cap. The vial was moved outside of the glovebox, followed by the addition of dry diglyme (2.0 mL). After stirring at 30 °C for 30 min, the mixture was cooled to -20 °C for another 5 min. Alkene **2** (0.24 mmol, 1.2 equiv.) and dihydrosilane **1** (0.2 mmol, 1.0 equiv.) were then added to the above solution, and the reaction was stirred at this temperature for either 24 or 48 h. The reaction mixture was diluted with PE and then filtered through a pad of silica gel using EA as the eluent to remove the Rh catalyst. The filtrate was concentrated, and the residue was then purified by prepared preparative thin-layer chromatography to afford products **3** or **5**.



3a

(*S*)-(2,6-Dimethylphenyl)(4-phenylbutyl)phenylsilane

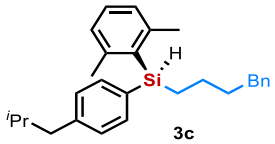
3a was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Light yellow liquid (55.8 mg, 81% yield); 93% ee, determined by HPLC analysis: Chiralcel IBN-5 column (25 cm); Hexane/2-propanol = 99.7/0.3; flow rate, 0.5 mL/min; 231 nm, t_R (major) = 18.93 min; t_R (minor) = 15.58 min; $[a]_D^{25}$ = -22.898 (c = 1.0, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 7.48 (d, *J* = 7.2 Hz, 2H), 7.37–7.28 (m, 3H), 7.28–7.10 (m, 6H), 7.00 (d, *J* = 7.6 Hz, 2H), 5.16 (t, *J* = 4.2 Hz, 1H), 2.60 (t, *J* = 7.8 Hz, 2H), 2.38 (s, 6H), 1.76–1.66 (m, 2H), 1.66–1.44 (m, 2H), 1.30–1.27 (m, 1H), 1.27–1.16 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.0, 142.6, 135.5, 134.6, 131.9, 129.7, 129.1, 128.3, 128.2, 127.9, 127.6, 125.6, 35.6, 35.0, 25.1, 24.4, 12.5; HRMS (FI) *m/z* Calcd for $C_{24}H_{28}Si$ $[M]^+$:344.1955, found: 344.1954.



3b

(*S*)-(2,6-Dimethylphenyl)(4-phenylbutyl)(*p*-tolyl)silane

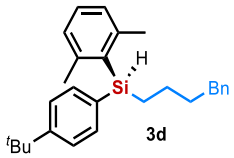
3b was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Light yellow liquid (65.1 mg, 91% yield); 92% ee, determined by HPLC analysis: Chiralcel OD-3 column (25 cm); CO_2/EtOH = 99/1; flow rate, 1.0 mL/min; 214 nm, t_R (major) =30.87 min; t_R (minor) = 21.22 min; $[a]_D^{23}$ = -27.055 (c = 1.0, $CHCl_3$); ^1H NMR (500 MHz, $CDCl_3$) δ 7.37 (d, *J* = 7.9 Hz, 2H), 7.28–7.23 (m, 2H), 7.20–7.12 (m, 6H), 7.00 (d, *J* = 7.6 Hz, 2H), 5.14 (t, *J* = 4.2 Hz, 1H), 2.60 (t, *J* = 7.8 Hz, 2H), 2.39 (s, 6H), 2.33 (s, 3H), 1.76–1.67 (m, 2H), 1.65–1.59 (m, 1H), 1.54–1.47 (m, 1H), 1.36–1.30 (m, 1H), 1.21–1.16 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.0, 142.6, 139.1, 134.7, 132.2, 131.6, 129.6, 128.8, 128.3, 128.2, 127.6, 125.6, 35.6, 35.0, 25.1, 24.4, 21.5, 12.6; HRMS (FI) *m/z* Calcd for $C_{25}H_{29}Si$ $[M-H]^+$: 357.2033, found: 357.2029.



3c

(*S*)-(2,6-Dimethylphenyl)(4-isobutylphenyl)(4-phenylbutyl)silane

3c was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Light yellow liquid (67.3 mg, 84% yield); 92% ee, determined by HPLC analysis: Chiralcel IBN-3 column (25 cm); CO_2/2-propanol = 93/7; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 24.15 min; t_R (minor) = 21.62 min; $[a]_D^{23}$ = -18.855 (c = 1.0, $CHCl_3$); ^1H NMR (500 MHz, $CDCl_3$) δ 7.38 (d, *J* = 7.6 Hz, 2H), 7.27–7.22 (m, 2H), 7.21–7.06 (m, 6H), 7.00 (d, *J* = 7.6 Hz, 2H), 5.15 (t, *J* = 4.2 Hz, 1H), 2.60 (t, *J* = 7.8 Hz, 2H), 2.45 (d, *J* = 7.2 Hz, 2H), 2.38 (s, 6H), 1.90–1.78 (m, 1H), 1.76–1.66 (m, 2H), 1.65–1.45 (m, 2H), 1.36–1.14 (m, 2H), 0.89 (d, *J* = 6.6 Hz, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.0, 142.8, 142.7, 134.5, 132.3, 131.9, 129.6, 128.8, 128.4, 128.2, 127.6, 125.6, 45.4, 35.6, 35.0, 30.1, 25.1, 24.4, 22.4, 12.6; HRMS (FI) *m/z* Calcd for $C_{28}H_{35}Si$ $[M-H]^+$: 399.2503, found: 399.2505.

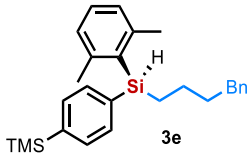


3d

(*S*)-(4-(*tert*-Butyl)phenyl)(2,6-dimethylphenyl)(4-phenylbutyl)silane

3d was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Light yellow liquid (61.5 mg, 77% yield); 91% ee, determined by HPLC analysis: Chiralcel IBN-5 column (25 cm); Hexane/2-propanol = 99.5/0.5; flow rate, 0.1 mL/min; 274 nm, t_R (major) =15.58 min; t_R (minor) = 11.25 min; $[a]_D^{23}$ = -20.449 (c = 1.0, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 7.42 (d, *J* =

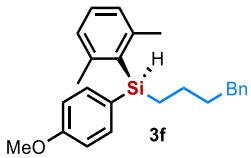
8.2 Hz, 2H), 7.33 (d, *J* = 8.0 Hz, 2H), 7.28–7.21 (m, 2H), 7.20–7.10 (m, 4H), 6.99 (d, *J* = 7.6 Hz, 2H), 5.15 (t, *J* = 4.3 Hz, 1H), 2.60 (t, *J* = 7.6 Hz, 2H), 2.39 (s, 6H), 1.76–1.64 (m 2H), 1.65–1.43 (m, 2H), 1.35–1.15 (m, 11H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 152.2, 145.0, 142.8, 142.7, 134.5, 129.6, 128.8, 128.3, 128.2, 127.6, 125.5, 124.9, 35.6, 35.0, 34.6, 31.2, 25.2, 24.4, 22.4; ^{31}Si NMR (119 MHz, $CDCl_3$) δ -24.43; HRMS (FI) *m/z* Calcd for $C_{28}H_{36}Si$ $[M]^+$: 400.2581, found: 400.2586.



3e

(*S*)-(4-((2,6-Dimethylphenyl)(4-phenylbutyl)silyl)phenyl)trimethylsilane

3e was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Colorless liquid (59.9 mg, 72% yield); 92% ee, determined by HPLC analysis: Chiralcel IBN-5 column (25 cm); Hexane/2-propanol = 99.7/0.3; flow rate, 0.5 mL/min; 254 nm, t_R (major) = 13.66 min; t_R (minor) = 10.43 min; $[a]_D^{23}$ = -18.496 (c = 1.0, $CHCl_3$); ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.47 (s, 4H), 7.28–7.23 (m, 2H), 7.22–7.12 (m, 4H), 7.01 (d, *J* = 7.6 Hz, 2H), 5.15 (t, *J* = 4.2 Hz, 1H), 2.60 (t, *J* = 8.0 Hz, 2H), 2.40 (s, 6H), 1.76–1.68 (m, 2H), 1.66–1.47 (m, 2H), 1.37–1.29 (m, 1H), 1.26–1.17 (m, 1H), 0.25 (s, 9H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.0, 142.6, 141.5, 135.9, 133.9, 132.8, 131.9, 129.6, 128.4, 128.2, 127.6, 125.6, 35.6, 35.0, 25.2, 24.4, 12.6, -1.2; ^{29}Si NMR (80 MHz, $CDCl_3$) δ -4.04, -24.62; HRMS (FI) *m/z* Calcd for $C_{27}H_{35}Si_2$ $[M-H]^+$: 415.2272, found: 415.2271.

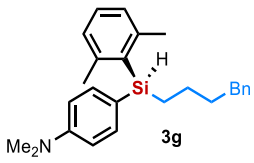


3f

(*S*)-(2,6-Dimethylphenyl)(4-methoxyphenyl)(4-phenylbutyl)silane

3f was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (80/1) as the eluent. Light yellow liquid (60.7 mg, 81% yield); 92% ee, determined by HPLC analysis: Chiralcel OD-3 column (15 cm); CO_2/MeOH = 95/5; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 9.60 min; t_R (minor) = 8.52 min; $[a]_D^{23}$ = -30.898 (c = 1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.39 (d, *J* = 8.8 Hz, 2H), 7.28–7.09 (m, 6H), 6.99 (d, *J* = 7.6 Hz, 2H), 6.86 (d, *J* = 8.4 Hz, 2H), 5.15 (t, *J* = 4.0 Hz, 1H), 3.77 (s, 3H), 2.60 (t, *J* = 8.0 Hz, 2H), 2.38 (s, 6H), 1.76–1.67 (m, 2H), 1.64–1.46 (m, 2H), 1.35–1.14 (m, 2H); ^{13}C NMR (100 MHz,

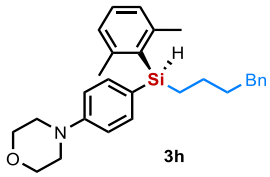
$CDCl_3$) δ 160.5, 144.9, 142.6, 136.1, 132.3, 129.6, 128.3, 128.2, 127.6, 126.0, 125.6, 113.8, 55.0, 35.6, 34.9, 25.1, 24.3, 12.8; HRMS (FI) *m/z* Calcd for $C_{25}H_{30}OSi$ $[M]^+$: 374.2060, found: 374.2054.



3g

(*S*)-4-((2,6-Dimethylphenyl)(4-phenylbutyl)silyl)-*N*,*N*-dimethylaniline

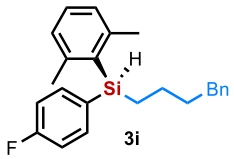
3g was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (20/1) as the eluent. Light yellow liquid (62.0 mg, 80% yield); 86% ee, determined by HPLC analysis: Chiralcel OJ-3 column (25 cm); CO_2/2-propanol = 85/15; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 18.16 min; t_R (minor) = 23.37 min; $[a]_D^{23}$ = -5.521 (c = 1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.33 (d, *J* = 8.6 Hz, 2H), 7.28–7.22 (m, 2H), 7.20–7.11 (m, 4H), 6.99 (d, *J* = 7.6 Hz, 2H), 6.69 (d, *J* = 8.6 Hz, 2H), 5.14 (t, *J* = 4.2 Hz, 1H), 2.94 (s, 6H), 2.60 (t, *J* = 7.8 Hz, 2H), 2.40 (s, 6H), 1.76–1.65 (m, 2H), 1.63–1.46 (m, 2H), 1.21–1.13 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 151.1, 144.9, 142.8, 135.8, 132.9, 129.3, 128.4, 128.2, 127.5, 125.5, 119.8, 112.0, 40.1, 35.6, 35.0, 25.2, 24.3, 13.0; HRMS (EI) *m/z* Calcd for $C_{26}H_{33}NSi$ $[M]^+$: 387.2377, found: 387.2381.



3h

(*S*)-4-(4-((2,6-Dimethylphenyl)(4-phenylbutyl)silyl)phenyl)morpholine

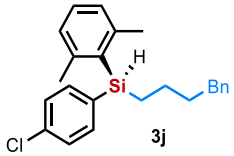
3h was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (5/1) as the eluent. Light yellow liquid (60.2 mg, 70% yield); 90% ee, determined by HPLC analysis: Chiralcel AD-3 column (15 cm); CO_2/2-propanol = 85/15; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 8.02 min; t_R (minor) = 7.27 min; $[a]_D^{23}$ = -30.951 (c = 1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.38 (d, *J* = 6.0 Hz, 2H), 7.28–7.21 (m, 2H), 7.21–7.11 (m, 4H), 7.00 (d, *J* = 7.6 Hz, 2H), 6.86 (d, *J* = 8.4 Hz, 2H), 5.14 (t, *J* = 4.0 Hz, 1H), 3.84 (t, *J* = 5.0 Hz, 4H), 3.17 (t, *J* = 5.0 Hz, 4H), 2.60 (t, *J* = 7.6 Hz, 2H), 2.39 (s, 6H), 1.75–1.65 (m, 2H), 1.64–1.43 (m, 2H), 1.34–1.15 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 151.8, 144.9, 142.7, 135.8, 132.4, 129.5, 128.3, 128.2, 127.6, 125.5, 124.5, 114.8, 66.8, 48.5, 35.6, 35.0, 25.1, 24.4, 12.8; HRMS (ESI) *m/z* Calcd for $C_{28}H_{36}NOSi$ $[M+H]^+$: 430.2561, found: 430.2556.



3i

(*S*)-(2,6-Dimethylphenyl)(4-fluorophenyl)(4-phenylbutyl)silane

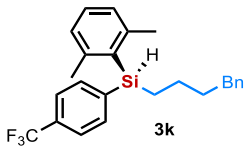
3i was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Colorless liquid (51.8 mg, 71% yield); 95% ee, determined by HPLC analysis: IBN-5 column (25 cm); Hexane/2-propanol = 99.7/0.3; flow rate, 0.5 mL/min; 254 nm, t_R (major) = 24.40 min; t_R (minor) = 17.10 min; $[a]_D^{23}$ = -18.814 (c = 1.0, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 7.43 (dd, *J* = 8.4, 6.2 Hz, 2H), 7.29–7.19 (m, 3H), 7.19–7.11 (m, 3H), 7.04–6.96 (m, 4H), 5.15 (t, *J* = 4.2 Hz, 1H), 2.66–2.53 (m, 2H), 1.71 (p, *J* = 7.4 Hz, 2H), 1.61–1.50 (m, 2H), 1.37–1.13 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 163.8 (d, *J* = 248.4 Hz), 144.9, 142.5, 136.5 (d, *J* = 7.5 Hz), 131.7, 130.9 (d, *J* = 4.3 Hz), 129.8, 128.3, 128.2, 127.7, 125.6, 115.2 (d, *J* =19.8 Hz), 35.5, 34.9, 25.0, 24.3, 12.7; ^{19}F NMR (375 MHz, $CDCl_3$) δ -112.13–-112.21; HRMS (FI) *m/z* Calcd for $C_{24}H_{26}FSi_2$ $[M-H]^+$: 361.1782, found: 361.1783.



3j

(*S*)-(4-Chlorophenyl)(2,6-dimethylphenyl)(4-phenylbutyl)silane

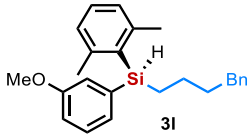
3j was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Light yellow liquid (53.1 mg, 70% yield); 93% ee, determined by HPLC analysis: Chiralcel OD-3 column (15 cm); CO_2/MeOH = 95/5; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 6.87 min; t_R (minor) = 6.26 min; $[a]_D^{23}$ = -11.729 (c = 1.0, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 7.39 (d, *J* = 8.4 Hz, 2H), 7.31–7.10 (m, 8H), 7.01 (d, *J* = 7.6 Hz, 2H), 5.13 (t, *J* = 4.4 Hz, 1H), 2.60 (t, *J* = 7.6 Hz, 2H), 2.36 (s, 6H), 1.76–1.67 (m, 2H), 1.64–1.47 (m, 2H), 1.35–1.14 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 144.9, 142.6, 135.4, 134.6, 131.9, 129.7, 129.1, 128.3, 128.2, 127.9, 127.6, 125.6, 35.6, 34.9, 25.1, 24.4, 12.5; ^{29}Si NMR (119 MHz, $CDCl_3$) δ -24.26; HRMS (FI) *m/z* Calcd for $C_{24}H_{26}ClSi$ $[M-H]^+$: 377.1487, found: 377.1491.



3k

(*S*)-(2,6-Dimethylphenyl)(4-phenylbutyl)(4-(trifluoromethyl)phenyl)silane

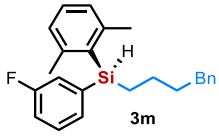
3k was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Colorless liquid (53.8 mg, 65% yield); 95% ee, determined by HPLC analysis: IBN-5 column (25 cm); Hexane/2-propanol = 99.7/0.3; flow rate, 0.5 mL/min; 214 nm, t_R (major) = 21.85 min; t_R (minor) = 15.47 min; $[a]_D^{23}$ = -16.743 (c = 1.0, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 7.56 (q, *J* = 8.0 Hz, 4H), 7.29–7.20 (m, 3H), 7.18–7.10 (m, 3H), 7.02 (d, *J* = 7.6 Hz, 2H), 5.17 (t, *J* = 4.4 Hz, 1H), 2.61 (t, *J* = 7.6 Hz, 2H), 2.37 (s, 6H), 1.78–1.68 (m, 2H), 1.64–1.47 (m, 2H), 1.39–1.18 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 144.9, 142.4, 140.8, 134.9, 131.0 (q, *J* = 32.1 Hz), 130.9, 130.0, 128.34, 128.26, 127.8, 124.4 (q, *J* = 3.8 Hz), 124.4 (q, *J* = 216.4 Hz), 35.5, 34.8, 24.9, 24.4, 12.4; ^{19}F NMR (375 MHz, $CDCl_3$) δ -63.43; HRMS (FI) *m/z* Calcd for $C_{25}H_{26}F_3Si$ $[M-H]^+$: 411.1750, found: 411.1756.



3l

(*S*)-(2,6-Dimethylphenyl)(3-methoxyphenyl)(4-phenylbutyl)silane

3l was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Light yellow liquid (58.5 mg, 78% yield); 93% ee, determined by HPLC analysis: Chiralcel OD-3 column (25 cm); Hexane/2-propanol = 98/2; flow rate, 0.7 mL/min; 214 nm, t_R (major) = 7.25 min; t_R (minor) = 6.92 min; $[a]_D^{23}$ = -11.581 (c = 1.0, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 7.28–7.21 (m, 3H), 7.21–7.11 (m, 4H), 7.08–6.97 (m, 4H), 6.88 (dd, *J* = 8.2, 2.8 Hz, 1H), 5.15 (t, *J* = 4.0 Hz, 1H), 3.76 (s, 3H), 2.60 (t, *J* = 7.8 Hz, 2H), 2.39 (s, 6H), 1.76–1.67 (m, 2H), 1.63–1.50(m, 2H), 1.38–1.27 (m, 1H), 1.24–1.15 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 159.0, 144.9, 142.6, 137.1, 131.8, 129.7, 129.1, 128.3, 128.2, 127.6, 126.9, 125.6, 120.2, 114.2, 55.0, 35.6, 34.9, 25.1, 24.4, 12.6; HRMS (FI) *m/z* Calcd for $C_{25}H_{30}OSi$ $[M]^+$: 374.2060, found: 374.2066.

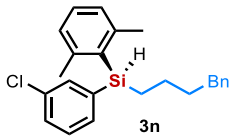


3m

(*S*)-(2,6-Dimethylphenyl)(3-fluorophenyl)(4-phenylbutyl)silane

3m was synthesized following the general procedure. After purification by silica gel chromatography using PE as the eluent. Light yellow liquid (58.0 mg, 80% yield); 93% ee, determined by HPLC analysis: Chiralcel AD-3 column (15 cm); CO_2/2-propanol = 98/2; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 6.50 min; t_R (minor) = 6.00 min; $[a]_D^{23}$ = -33.157 (c = 1.0, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 7.32–7.11 (m, 9H), 7.05–6.95 (m, 3H), 5.15 (t, *J* = 4.2

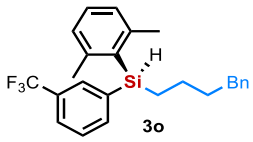
Hz, 1H), 2.61 (t, *J* = 7.6 Hz, 2H), 2.37 (s, 6H), 1.79–1.66 (m, 2H), 1.65–1.47 (m, 2H), 1.35–1.17 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.6 (d, *J* = 248.4 Hz), 144.9, 142.5, 138.7 (d, *J* = 4.1 Hz), 131.2, 130.2 (d, *J* = 3.0 Hz), 129.9, 129.7 (d, *J* = 6.9 Hz), 128.3, 128.2, 127.7, 125.6, 120.8 (d, *J* = 18.7 Hz), 116.1 (d, *J* = 21 Hz), 35.5, 34.8, 24.9, 24.4, 12.5; ^{19}F NMR (375 MHz, $CDCl_3$) δ -113.92–-113.99; HRMS (EI) *m/z* Calcd for $C_{24}H_{27}FSi$ $[M]^+$: 362.1861, found: 362.1856.



3n

(*S*)-(3-Chlorophenyl)(2,6-dimethylphenyl)(4-phenylbutyl)silane

3n was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Colorless liquid (56.2 mg, 74% yield); 95% ee, determined by HPLC analysis: IBN-5 column (25 cm); Hexane/2-propanol = 99.7/0.3; flow rate, 0.5 mL/min; 220 nm, t_R (major) = 21.07 min; t_R (minor) = 16.12 min; $[a]_D^{23}$ = -26.517 (c = 1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.48 (d, *J* = 8.0 Hz, 2H), 7.37–7.10 (m, 8H), 7.00 (d, *J* = 7.6 Hz, 2H), 5.16 (t, *J* = 4.4 Hz, 1H), 2.60 (t, *J* = 7.6 Hz, 2H), 2.38 (s, 6H), 1.76–1.67 (m, 2H), 1.66–1.52 (m, 2H), 1.37–1.16 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 144.9, 142.6, 135.5, 134.6, 131.9, 129.7, 129.1, 128.3, 128.2, 127.9, 127.7, 127.6, 125.6, 35.7, 34.9, 25.1, 24.4, 12.5; ^{29}Si NMR (80 MHz, $CDCl_3$) δ -23.11; HRMS (EI) *m/z* Calcd for $C_{24}H_{26}ClSi$ $[M-H]^+$: 377.1487, found: 377.1481.

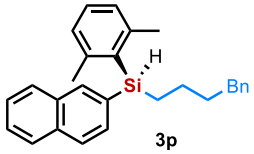


3o

(*S*)-(2,6-Dimethylphenyl)(4-phenylbutyl)(3-(trifluoromethyl)phenyl)silane

3o was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Light yellow liquid (64.4 mg, 78% yield); 92% ee, determined by HPLC analysis: Chiralcel AD-3 column (15 cm); CO_2/2-propanol = 98/2; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 14.83 min; t_R (minor) = 15.54 min; $[a]_D^{23}$ = -18.275 (c = 1.0, $CHCl_3$); ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.74 (s, 1H), 7.64–7.57 (m, 2H), 7.42 (t, *J* = 8.0 Hz, 1H), 7.28–7.19 (m, 3H), 7.19–7.10 (m, 3H), 7.02 (d, *J* = 7.6 Hz, 2H), 5.18 (t, *J* = 4.4 Hz, 1H), 2.61 (t, *J* = 7.6 Hz, 2H), 2.37 (s, 6H), 1.77–1.68 (m, 2H), 1.65–1.46 (m, 2H), 1.40–1.19 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 144.9, 142.4, 138.0, 137.1, 130.90 (q, *J* = 3.8 Hz), 130.8, 130.1 (q, *J* = 24.6 Hz), 130.04, 128.33, 128.25, 128.2, 127.8, 125.9 (q, *J* = 3.9 Hz), 125.6, 124.3 (q, *J* = 271.0 Hz), 35.5, 34.8, 24.9, 24.4, 12.4; ^{19}F

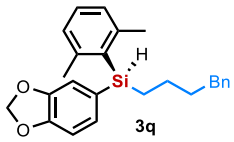
NMR (375 MHz, $CDCl_3$) δ -63.10; HRMS (EI) *m/z* Calcd for $C_{25}H_{27}F_3Si$ $[M]^+$:412.1829, found: 412.1835.



3p

(*S*)-(2,6-Dimethylphenyl)(naphthalen-2-yl)(4-phenylbutyl)silane

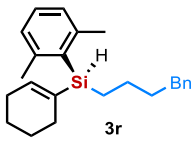
3p was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (80/1) as the eluent. Light yellow liquid (64.7 mg, 82% yield); 93% ee, determined by HPLC analysis: Chiralcel AD-3 column (15 cm); CO_2/2-propanol = 85/15; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 4.82 min; t_R (minor) = 4.43 min; $[a]_D^{23}$ = -20.646 (c = 1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 (s, 1H), 7.82–7.75 (m, 3H), 7.54–7.43 (m, 3H), 7.28–7.21 (m, 3H), 7.19–7.11 (m, 3H), 7.03 (d, *J* = 7.6 Hz, 2H), 5.28 (t, *J* = 4.2 Hz, 1H), 2.63 (t, *J* = 7.7 Hz, 2H), 2.41 (s, 6H), 1.79–1.69 (m, 2H), 1.68–1.55 (m, 2H), 1.48–1.37 (m, 1H), 1.35–1.24 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.1, 142.6, 135.3, 133.7, 133.01, 132.97, 131.9, 130.7, 129.7, 128.4, 128.2, 128.0, 127.7, 127.1, 126.4, 125.9, 125.6, 35.6, 35.0, 25.1, 24.5, 12.5; ^{29}Si NMR (119 MHz, $CDCl_3$) δ -21.43; HRMS (FI) *m/z* Calcd for $C_{28}H_{30}Si$ $[M]^+$: 394.2111, found: 394.2109.



3q

(*S*)-Benzo[*d*][1,3]dioxol-5-yl(2,6-dimethylphenyl)(4-phenylbutyl)silane

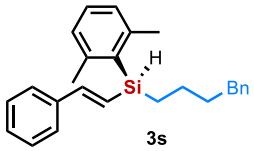
3q was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (50/1) as the eluent. Light yellow liquid (63.7 mg, 82% yield); 94% ee, determined by HPLC analysis: Chiralcel AD-3 column (15 cm); CO_2/2-propanol = 95/5; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 8.58 min; t_R (minor) = 8.10 min; $[a]_D^{22}$ = -31.124 (c = 0.5, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.24 (t, *J* = 7.4 Hz, 2H), 7.21–7.10 (m, 4H), 6.97 (dd, *J* = 12.8, 7.6 Hz, 3H), 6.91 (s, 1H), 6.79 (d, *J* = 7.6 Hz, 1H), 5.89 (s, 2H), 5.12 (t, *J* = 4.4 Hz, 1H), 2.59 (t, *J* = 8.0 Hz, 2H), 2.38 (s, 6H), 1.75–1.66 (m, 2H), 1.64–1.45 (m, 2H), 1.33–1.23 (m, 1H), 1.23–1.13 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 148.6, 147.5, 144.9, 142.6, 132.0, 129.7, 128.7, 128.3, 128.2, 128.1, 127.7, 125.6, 113.8, 108.8, 100.6, 35.6, 34.9, 25.1, 24.3, 12.8; HRMS (EI) *m/z* Calcd for $C_{25}H_{28}O_2Si$ $[M]^+$: 388.1853, found: 388.1850.



3r

(*S*)-Cyclohex-1-en-1-yl(2,6-dimethylphenyl)(4-phenylbutyl)silane

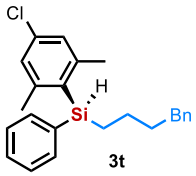
3r was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Light yellow liquid (44.7 mg, 64% yield); 92% ee, determined by HPLC analysis: Chiralcel OD-3 column (15 cm); CO_2/MeOH = 99/1; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 22.51 min; t_R (minor) = 20.61 min; $[a]_D^{23}$ = -25.676 (c = 1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.27–7.20 (m, 2H), 7.18–7.09 (m, 4H), 6.98 (d, *J* = 7.6 Hz, 2H), 6.07 (t, *J* = 2.0 Hz, 1H), 4.68 (t, *J* = 4.2 Hz, 1H), 2.57 (t, *J* = 7.8 Hz, 2H), 2.43 (s, 6H), 2.08–1.89 (m, 4H), 1.70–1.55 (m, 6H), 1.53–1.34 (m, 2H), 1.11–0.92 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 144.9, 142.7, 138.6, 134.2, 132.5, 129.2, 128.3, 128.2, 127.4, 125.5, 35.6, 35.0, 27.8, 27.0, 25.2, 24.2, 23.0, 22.3, 11.6; ^{29}Si NMR (119 MHz, $CDCl_3$) δ -24.90; HRMS (FI) *m/z* Calcd for $C_{24}H_{32}Si$ $[M]^+$: 348.2268, found: 348.2274.



3s

(*S*,*E*)-(2,6-Dimethylphenyl)(4-phenylbutyl)(styryl)silane

3s was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Light yellow liquid (30.6 mg, 41% yield); 71% ee, determined by HPLC analysis: Chiralcel IBN-5 column (25 cm); Hexane/2-propanol = 99.7/0.3; flow rate, 0.5 mL/min; 254 nm, t_R (major) = 24.39 min; t_R (minor) = 26.66 min ; $[a]_D^{23}$ = - 3.764 (c = 1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.42 (d, *J* = 7.6 Hz, 2H), 7.32 (t, *J* = 7.4 Hz, 2H), 7.27–7.23 (m, 3H), 7.19–7.10 (m, 4H), 7.04–6.96 (m, 3H), 6.59 (dd, *J* = 19.0, 3.2 Hz, 1H), 4.93 (q, *J* = 4.0 Hz, 1H), 2.60 (t, *J* = 7.8 Hz, 2H), 2.49 (s, 6H), 1.69 (p, *J* = 7.6 Hz, 1H), 1.65–1.42 (m, 2H), 1.19–1.03 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 146.5, 144.6, 142.7, 138.1, 132.6, 129.5, 128.5, 128.4, 128.2, 127.6, 126.6, 125.6, 123.9, 35.6, 34.9, 25.0, 24.4, 12.8; ^{29}Si NMR (119 MHz, $CDCl_3$) δ -24.04; HRMS (FI) *m/z* Calcd for $C_{26}H_{30}Si$ $[M]^+$: 370.2111, found: 370.2115.

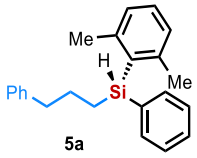


3t

(*S*)-(4-Chloro-2,6-dimethylphenyl)(phenyl)(4-phenylbutyl)silane

3t was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (80/1) as the eluent. Light yellow liquid (55.3 mg, 73% yield); 95% ee, determined by

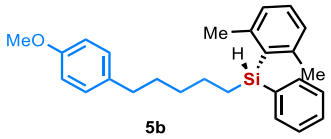
HPLC analysis: Chiralcel AD-3 column (15 cm); CO_2/2-propanol = 90/10; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 3.49 min; t_R (minor) = 3.29 min; $[a]_D^{23}$ = -18.705 (c = 1.0, $CHCl_3$); ^1H NMR (500 MHz, $CDCl_3$) δ 7.45 (dd, *J* = 7.8, 1.6 Hz, 2H), 7.38–7.29 (m, 3H), 7.28–7.21 (m, 2H), 7.19–7.09 (m, 3H), 7.01 (s, 2H), 5.13 (d, *J* = 4.4 Hz, 1H), 2.60 (t, *J* = 7.6 Hz, 2H), 2.35 (s, 6H), 1.76–1.66 (m, 2H), 1.64–1.42 (m, 2H), 1.37–1.26 (m, 1H), 1.25–1.13 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 146.8, 142.5, 135.4, 134.8, 134.5, 130.4, 129.3, 128.3, 128.2, 128.0, 127.5, 125.6, 35.5, 34.9, 24.9, 24.2, 12.2; HRMS (EI) *m/z* Calcd for $C_{24}H_{26}ClSi$ $[M-H]^+$: 377.1487, found: 377.1489.



5a

(*S*)-(2,6-Dimethylphenyl)(phenyl)(3-phenylpropyl)silane

5a was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Colorless liquid (44.7 mg, 68% yield), 87% ee, determined by HPLC analysis: Chiralcel IBN-5 column (25 cm); Hexane/2-propanol = 99.7/0.3; flow rate, 0.3 mL/min; 254 nm, t_R (major) = 22.84 min; t_R (minor) = 24.64 min; $[a]_D^{23}$ = -62.079 (c = 1.0, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 7.46 (d, *J* = 7.8 Hz, 2H), 7.33–7.21 (m, 5H), 7.19–7.09 (m, 4H), 6.98 (d, *J* = 7.6 Hz, 2H), 5.19 (t, *J* = 4.4 Hz, 1H), 2.68 (t, *J* = 7.6 Hz, 2H), 2.36 (s, 6H), 1.92–1.72 (m, 2H), 1.37–1.28 (m, 1H), 1.26–1.15 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.0, 142.2, 135.3, 134.6, 131.7, 129.7, 129.2, 128.5, 128.2, 127.9, 127.6, 125.7, 39.3, 27.3, 24.4, 12.3; HRMS (EI) *m/z* Calcd for $C_{23}H_{26}Si$ $[M]^+$: 330.1798, found: 330.1803.

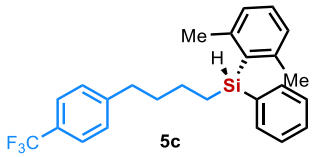


5b

(*S*)-(2,6-Dimethylphenyl)(5-(4-methoxyphenyl)pentyl)(phenyl)silane

5b was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (50/1) as the eluent. Light yellow liquid (57.9 mg, 74% yield), 95% ee, determined by HPLC analysis: Chiralcel IBN-3 column (25 cm); CO_2/2-propanol = 90/10; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 21.93 min; t_R (minor) = 23.68 min; $[a]_D^{22}$= -19.215 (c = 1.0, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 7.48 (d, *J* = 6.4 Hz, 2H), 7.37–7.27 (m, 3H), 7.19 (t, *J* = 7.6 Hz, 1H), 7.06 (d, *J* = 8.6 Hz, 2H), 7.00 (d, *J* = 7.6 Hz, 2H), 6.81 (d, *J* = 8.6 Hz, 2H), 5.15 (t, *J* = 4.4 Hz, 1H), 3.78 (s, 3H), 2.51 (t, *J* = 7.6 Hz, 2H), 2.38 (s, 6H), 1.63–1.37 (m, 6H), 1.34–1.11 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 157.5, 144.9, 135.6, 134.9, 134.6, 132.0, 129.6, 129.2, 129.1, 127.9,

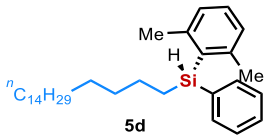
127.6, 113.6, 55.2, 34.9, 32.8, 31.3, 25.2, 24.4, 12.6; HRMS (EI) *m/z* Calcd for $C_{26}H_{32}OSi$ $[M]^+$: 388.2217, found: 388.2213.



5c

(*S*)-(2,6-Dimethylphenyl)(phenyl)(4-(4-(trifluoromethyl)phenyl)butyl)silane

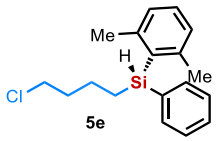
5c was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (50/1) as the eluent. Light yellow liquid (58.9 mg, 71% yield), 91% ee, determined by HPLC analysis: Chiralcel OD-3 column (15 cm); CO_2/2-propanol = 95/5; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 4.83 min; t_R (minor) = 5.14 min; $[a]_D^{24}$ = -22.588 (c = 1.0, $CHCl_3$); ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.52–7.45 (m, 4H), 7.37–7.29 (m, 3H), 7.24–7.18 (m, 3H), 7.00 (d, *J* = 7.6 Hz, 2H), 5.16 (t, *J* = 4.2 Hz, 1H), 2.65 (t, *J* = 7.7 Hz, 2H), 2.38 (s, 6H), 1.76–1.66 (m, 2H), 1.63–1.46 (m, 2H), 1.38–1.16 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 144.7, 144.9, 135.3, 134.6, 131.8, 129.7, 129.2, 128.6, 128.0, 127.8(q, *J* = 37.8 Hz), 127.7, 125.1 (q, *J* = 3.8 Hz), 124.4 (q, *J* = 270.6 Hz), 35.4, 34.5, 25.0, 24.4, 12.4; ^{19}F NMR (375 MHz, $CDCl_3$) δ -62.76; HRMS (EI) *m/z* Calcd for $C_{25}H_{26}F_3Si$ $[M-H]^+$: 411.1750, found: 411.1753.



5d

(*S*)-(2,6-Dimethylphenyl)(octadecyl)(phenyl)silane

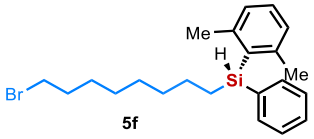
5d was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Light yellow liquid (72.9 mg, 78% yield), 94% ee, determined by HPLC analysis: Chiralcel OD-3 column (25 cm); CO_2/2-propanol = 90/10; flow rate, 1.0 mL/min; 230 nm, t_R (major) = 4.19 min; t_R (minor) = 4.49 min; $[a]_D^{24}$ = - 23.640 (c = 1.0, $CHCl_3$); ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.54–7.46 (m, 2H), 7.36–7.28 (m, 3H), 7.19 (t, *J* = 7.6 Hz, 1H), 7.00 (d, *J* = 7.6 Hz, 2H), 5.16 (t, *J* = 4.3 Hz, 1H), 2.39 (s, 6H), 1.58–1.10 (m, 34H), 0.88 (t, *J* = 6.8 Hz, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.0, 135.7, 134.6, 132.1, 129.6, 129.1, 127.9, 127.6, 33.3, 31.9, 29.71, 29.67, 29.6, 29.4, 29.3, 25.4, 24.4, 22.7, 14.1, 12.7; HRMS (FI) *m/z* Calcd for $C_{32}H_{52}Si$ $[M]^+$: 464.3833, found: 464.3838.



5e

(*S*)-(4-Chlorobutyl)(2,6-dimethylphenyl)(phenyl)silane

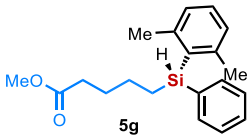
5e was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Light yellow liquid (37.9 mg, 63% yield), 81% ee, determined by HPLC analysis: Chiralcel IBN-5 column (25 cm); Hexane/2-propanol = 99.7/0.3; flow rate, 0.5 mL/min; 230 nm, t_R (major) = 14.61 min; t_R (minor) = 13.30 min; $[a]_D^{23}$ = - 21.139 (c =1.0, $CHCl_3$); ^1H NMR (500 MHz, $CDCl_3$) δ 7.54–7.45 (m, 2H), 7.38–7.28 (m, 3H), 7.20 (t, *J* = 7.6 Hz, 1H), 7.00 (d, *J* = 7.6 Hz, 2H), 5.18 (t, *J* = 4.2 Hz, 1H), 3.53 (t, *J* = 6.6 Hz, 2H), 2.39 (s, 6H), 1.86 (p, *J* = 6.8 Hz, 2H), 1.74–1.54 (m, 2H), 1.36–1.14 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.0, 135.1, 134.6, 131.5, 129.8, 129.3, 128.0, 127.7, 44.5, 35.8, 24.4, 22.7, 12.0; HRMS (FI) *m/z* Calcd for $C_{18}H_{23}ClSi$ $[M]^+$: 302.1252, found: 302.1249.



5f

(*S*)-(8-Bromooctyl)(2,6-dimethylphenyl)(phenyl)silane

5f was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Light yellow liquid (79.0 mg, 98% yield), 93% ee, determined by HPLC analysis: Chiralcel OD-3 column (25 cm); CO_2/MeOH = 88/12; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 11.05 min; t_R (minor) = 11.39 min; $[a]_D^{24}$ = -21.794 (c = 1.0, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 7.49 (d, *J* = 6.8 Hz, 2H), 7.38–7.28 (m, 3H), 7.19 (t, *J* = 7.6 Hz, 1H), 7.00 (d, *J* = 7.6 Hz, 2H), 5.16 (t, *J* = 4.4 Hz, 1H), 3.39 (t, *J* = 6.8 Hz, 2H), 2.39 (s, 6H), 1.88–1.77 (m, 2H), 1.58–1.44 (m, 2H), 1.42–1.22 (m, 9H), 1.22–1.12 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 144.9, 135.6, 134.6, 132.0, 129.6, 129.1, 127.9, 127.6, 34.0, 33.0, 32.8, 29.0, 28.6, 28.1, 25.3, 24.4, 12.7; HRMS (FI) *m/z* Calcd for $C_{22}H_{31}BrSi$ $[M]^+$: 402.1376, found: 402.1373.

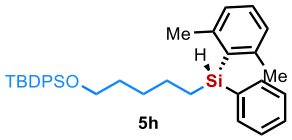


5g

Methyl (*S*)-5-((2,6-dimethylphenyl)(phenyl)silyl)pentanoate

5g was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (40/1) as the eluent. Light yellow liquid (52.9 mg, 81% yield), 88% ee, determined by HPLC analysis: Chiralcel IG-3 column (25 cm); CO_2/2-propanol = 95/5; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 8.61 min; t_R (minor) = 8.33 min; $[a]_D^{23}$ = -21.333 (c = 1.0, $CHCl_3$); ^1H NMR (500 MHz, $CDCl_3$) δ 7.50–7.46 (m,

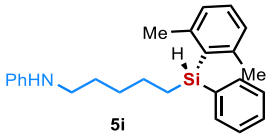
2H), 7.37–7.28 (m, 3H), 7.19 (t, *J* = 7.6 Hz, 1H), 7.00 (d, *J* = 7.6 Hz, 2H), 5.16 (t, *J* = 4.2 Hz, 1H), 3.64 (s, 3H), 2.39 (s, 6H), 2.32 (t, *J* = 7.5 Hz, 2H), 1.78–1.70 (m, 2H), 1.62–1.44 (m, 2H), 1.35–1.14 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 174.1, 145.0, 135.2, 134.6, 131.7, 129.7, 129.2, 128.0, 127.6, 51.5, 33.7, 28.4, 25.0, 24.4, 12.5; HRMS (EI) *m/z* Calcd for $C_{20}H_{25}O_2Si$ $[M-H]^+$: 325.1618, found: 325.1614.



5h

(*S*)-*tert*-Butyl((5-((2,6-dimethylphenyl)(phenyl)silyl)pentyl)oxy)diphenylsilane

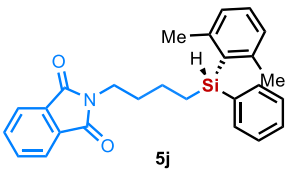
5h was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (20/1) as the eluent. Light yellow liquid (86.4 mg, 80% yield), 94% ee, determined by HPLC analysis: Chiralcel IBN-5 column (25 cm); Hexane/2-propanol = 99.5/0.5; flow rate, 0.5 mL/min; 254 nm, t_R (major) = 22.47 min; t_R (minor) = 17.70 min; $[a]_D^{23}$ = - 24.971 (c = 1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.68–7.62 (m, 4H), 7.50–7.45 (m, 2H), 7.42–7.26 (m, 9H), 7.18 (t, *J* = 7.6 Hz, 1H), 6.99 (d, *J* = 7.6 Hz, 2H), 5.16 (t, *J* = 4.4 Hz, 1H), 3.67–3.61 (m, 2H), 2.38 (s, 6H), 1.61–1.41 (m, 6H), 1.34–1.22 (m, 1H), 1.20–1.12 (m, 1H), 1.04 (s, 9H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 144.9, 135.6, 134.6, 134.1, 132.0, 129.6, 129.50, 129.47, 129.1, 127.9, 127.60, 127.55, 63.9, 32.2, 29.4, 26.9, 25.2, 24.4, 19.2, 12.7; ^{29}Si NMR (119 MHz, $CDCl_3$) δ -4.47, -24.13; HRMS (DART) *m/z* Calcd for $C_{35}H_{48}ONSi_2$ $[M+NH_4]^+$:554.3269, found: 554.3272.



5i

(*S*)-*N*-(5-((2,6-Dimethylphenyl)(phenyl)silyl)pentyl)aniline

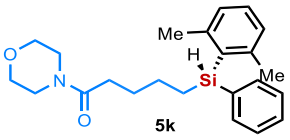
5i was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (20/1) as the eluent. Brown liquid (52.3 mg, 70% yield), 94% ee, determined by HPLC analysis: Chiralcel OD-3 column (15 cm); CO_2/MeOH = 80/20; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 9.69 min; t_R (minor) = 8.89 min; $[a]_D^{23}$ = -14.293 (c = 1.0, $CHCl_3$); ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.52–7.46 (m, 2H), 7.38–7.28 (m, 3H), 7.23–7.13 (m, 3H), 7.01 (d, *J* = 7.5 Hz, 2H), 6.68 (tt, *J* = 7.4, 1.1 Hz, 1H), 6.61–6.55 (m, 2H), 5.17 (t, *J* = 4.3 Hz, 1H), 3.55 (brs, 1H), 3.07 (t, *J* = 7.0 Hz, 2H), 2.39 (s, 6H), 1.65–1.46 (m, 6H), 1.36–1.16 (s, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 148.5, 144.9, 135.4, 134.6, 131.9, 129.7, 129.18, 129.16, 127.9, 127.6, 117.1, 112.7, 43.9, 30.6, 29.2, 25.2, 24.4, 12.7; HRMS (ESI) *m/z* Calcd for $C_{25}H_{32}NSi$ $[M+H]^+$: 374.2299; found: 374.2297.



5j

(*S*)-2-(4-((2,6-Dimethylphenyl)(phenyl)silyl)butyl)isoindoline-1,3-dione

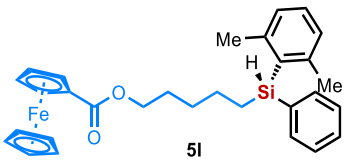
5j was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (20/1) as the eluent. White solid, mp: 92.6-93.4 °C (67.8 mg, 82% yield), 91% ee, determined by HPLC analysis: Chiralcel AD-3 column (15 cm); CO_2/2-propanol = 85/15; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 4.42 min; t_R (minor) = 4.10 min; $[a]_D^{23}$ = - 13.188 (c = 1.0, $CHCl_3$); ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.83 (dd, *J* = 5.4, 3.0 Hz, 2H), 7.71 (dd, *J* = 5.5, 3.0 Hz, 2H), 7.52–7.45 (m, 2H), 7.37–7.28 (m, 3H), 7.16 (t, *J* = 7.6 Hz, 1H), 6.98 (d, *J* = 7.6 Hz, 2H), 5.16 (t, *J* = 4.2 Hz, 1H), 3.68 (t, *J* = 6.7 Hz, 2H), 2.38 (s, 6H), 1.81–1.73 (m, 2H), 1.62–1.48 (m, 2H), 1.44–1.31 (m, 1H), 1.26–1.18 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 168.4, 145.0, 135.1, 134.6, 133.8, 132.1, 129.7, 129.2, 127.9, 127.6, 123.2, 37.6, 31.9, 24.4, 22.7, 12.2; ^{29}Si NMR (80 MHz, CDCl3) δ -24.73; HRMS (ESI) *m/z* Calcd for $C_{26}H_{27}NO_2NaSi$ $[M+Na]^+$: 436.1703, found: 436.1708.



5k

(*S*)-5-((2,6-Dimethylphenyl)(phenyl)silyl)-1-morpholinopentan-1-one

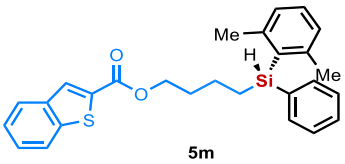
5k was synthesized following the general procedure. After purification by by prepared preparative thin-layer chromatography using PE/EA (20/1) as the eluent. Colorless liquid (48.3 mg, 63% yield), 92% ee, determined by HPLC analysis: Chiralcel OJH column (25 cm); Hexane/2-propanol = 90/10; flow rate, 1.0 mL/min; 254 nm, t_R (major) = 14.96 min; t_R (minor) = 18.08 min; $[a]_D^{23}$ = -24.686 (c = 1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.51–7.45 (m, 2H), 7.38–7.28 (m, 3H), 7.19 (t, *J* = 7.6 Hz, 1H), 7.00 (d, *J* = 7.6 Hz, 2H), 5.17 (t, *J* = 4.4 Hz, 1H), 3.67–3.56 (m, 6H), 3.44–3.36 (m, 2H), 2.39 (s, 6H), 2.31 (t, *J* = 7.6 Hz, 2H), 1.79–1.68 (m, 2H), 1.65–1.45 (m, 2H), 1.41–1.15 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 171.6, 144.9, 135.2, 134.6, 131.7, 129.7, 129.2, 127.9, 127.6, 66.9, 66.6, 46.0, 41.8, 32.8, 28.7, 25.3, 24.4, 12.6; HRMS (ESI) *m/z* Calcd for $C_{23}H_{31}NO_2NaSi$ $[M+Na]^+$: 404.2016, found: 404.2020.



5l

(*S*)-5-((2,6-Dimethylphenyl)(phenyl)silyl)pentyl ferrocenyl-1-carboxylate

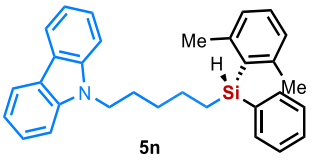
5l was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (20/1) as the eluent. Orange liquid (82.7 mg, 81% yield), 92% ee, determined by HPLC analysis: Chiralcel IA column (25 cm); Hexane/2-propanol = 99/1; flow rate, 1.0 mL/min; 254 nm, t_R (major) = 11.90 min; t_R (minor) = 11.24 min; $[a]_D^{23}$ = -15.116 (c = 1.0, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 7.49 (d, *J* = 6.8 Hz, 2H), 7.37–7.29 (m, 3H), 7.20 (t, *J* = 7.6 Hz, 1H), 7.01 (d, *J* = 7.6 Hz, 2H), 5.19 (t, *J* = 4.0 Hz, 1H), 4.78 (t, *J* = 2.0 Hz, 2H), 4.38 (t, *J* = 2.0 Hz, 2H), 4.18 (s, 5H), 2.40 (s, 6H), 1.78–1.68 (m, 2H), 1.68–1.51 (m, 6H), 1.41–1.28 (m, 1H), 1.28–1.16 (m, 1H); ^{13}C NMR (125MHz, $CDCl_3$) δ 171.7, 144.9, 135.3, 134.6, 131.8, 129.7, 129.2, 128.0, 127.6, 71.4, 71.2, 70.1, 69.7, 64.2, 29.7, 28.6, 25.2, 24.4, 12.8; HRMS (ESI) *m/z* Calcd for $C_{30}H_{34}O_2SiFe$ $[M]^+$: 510.1672, found: 510.1672.



5m

(*S*)-4-((2,6-Dimethylphenyl)(phenyl)silyl)butyl benzo[*b*]thiophene-3-carboxylate

5m was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (50/1) as the eluent. Light yellow liquid (77.0 mg, 87% yield), 89% ee, determined by HPLC analysis: Chiralcel IG-3 column (25 cm); CO_2/2-propanol = 70/30; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 13.58 min; t_R (minor) = 13.11 min; $[a]_D^{23}$ = - 10.820 (c = 1.0, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 8.01 (d, *J* = 0.8 Hz, 1H), 7.90–7.83 (m, 2H), 7.52–7.47 (m, 2H), 7.46–7.37 (m, 2H), 7.37–7.28 (m, 3H), 7.19 (t, *J* = 7.6 Hz, 1H), 6.99 (d, *J* = 7.6 Hz, 2H), 5.20 (t, *J* = 4.0 Hz, 1H), 4.39–4.32 (m, 2H), 2.40 (s, 6H), 1.94–1.85 (m, 2H), 1.77–1.62 (m, 2H), 1.43–1.33 (m, 1H), 1.31–1.20 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 162.8, 145.0, 142.2, 138.7, 135.1, 134.6, 133.8, 131.6, 130.3, 129.8, 129.2, 128.0, 127.7, 126.9, 125.5, 124.8, 122.7, 65.1, 31.8, 24.4, 21.8, 12.3; HRMS (ESI) *m/z* Calcd for $C_{27}H_{28}O_2NaSiS$ $[M+Na]^+$: 467.1472 found: 467.1475.

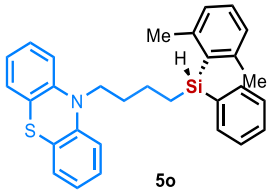


5n

(*S*)-9-(5-((2,6-Dimethylphenyl)(phenyl)silyl)pentyl)-9*H*-carbazole

5n was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (20/1) as the eluent. Light yellow liquid (81.2 mg, 91% yield), 91% ee, determined by

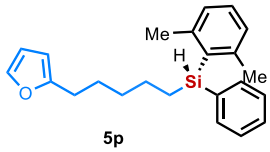
HPLC analysis: Chiralcel AD-3 column (15 cm); CO_2/2-propanol = 75/25; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 8.06 min; t_R (minor) = 4.18 min; $[a]_D^{23}$= -14.174 (c = 1.0, $CHCl_3$); ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.09 (d, *J* = 7.6 Hz, 2H), 7.49–7.41 (m, 4H), 7.38–7.27 (m, 5H), 7.25–7.15 (m, 3H), 6.99 (d, *J* = 7.5 Hz, 2H), 5.12 (t, *J* = 4.2 Hz, 1H), 4.26 (t, *J* = 7.1 Hz, 2H), 2.35 (s, 6H), 1.91–1.83 (m, 2H), 1.60–1.40 (m, 4H), 1.29–1.21(m, 1H), 1.17–1.06 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 144.9, 140.4, 135.3, 134.6, 131.8, 129.7, 129.2, 127.9, 127.6, 125.5, 122.8, 120.3, 118.7, 108.6, 42.9, 30.8, 28.6, 25.2, 24.4, 12.6; HRMS (ESI) *m/z* Calcd for $C_{31}H_{34}NSi$ $[M+H]^+$: 448.2455, found: 448.2448.



5o

(*S*)-10-(4-((2,6-Dimethylphenyl)(phenyl)silyl)butyl)-10*H*-phenothiazine

5o was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (20/1) as the eluent. Light yellow liquid (65.2 mg, 70% yield), 94% ee, determined by HPLC analysis: Chiralcel ODH column (25 cm); Hexane/2-propanol = 99.5/0.5; flow rate, 0.5 mL/min; 254 nm, t_R (major) = 19.41 min; t_R (minor) = 22.80 min; $[a]_D^{23}$ = -17.863 (c = 1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.47–7.40 (m, 2H), 7.37–7.25 (m, 3H), 7.19 (t, *J* = 7.6 Hz, 1H), 7.14–7.07 (m, 4H), 6.98 (d, *J* = 7.6 Hz, 2H), 6.88 (td, *J* = 7.6, 1.2 Hz, 2H), 6.81 (d, *J* = 8.4 Hz, 2H), 5.14 (t, *J* = 4.2 Hz, 1H), 3.84 (t, *J* = 7.0 Hz, 2H), 2.34 (s, 6H), 1.94–1.84 (m, 2H), 1.73–1.55 (m, 2H), 1.35–1.28 (m, 1H), 1.24–1.13 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.2, 145.0, 135.2, 134.6, 131.6, 129.7, 129.2, 127.9, 127.7, 127.4, 127.1, 125.1, 122.3, 115.4, 46.8, 30.1, 24.4, 22.7, 12.3; HRMS (ESI) *m/z* Calcd for $C_{30}H_{31}NSiS$ $[M]^+$: 465.1941, found: 465.1941.

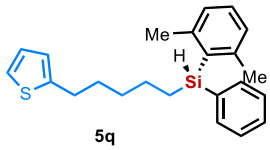


5p

(*S*)-(2,6-Dimethylphenyl)(5-(furan-2-yl)pentyl)(phenyl)silane

5p was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Light yellow liquid (59.7 mg, 86% yield), 92% ee, determined by HPLC analysis: Chiralcel IG-3 column (25 cm); CO_2/2-propanol = 98/2; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 10.95 min; t_R (minor) = 10.53 min; $[a]_D^{23}$ = - 30.011 (c = 1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.51–7.46 (m, 2H), 7.38–7.26 (m, 4H), 7.19 (t, *J* = 7.6 Hz, 1H), 7.00 (d, *J* = 7.6 Hz, 2H), 6.26 (dd, *J* = 3.2, 2.0 Hz, 1H), 5.99–5.90 (m,

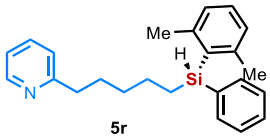
1H), 5.15 (t, *J* = 4.2 Hz, 1H), 2.59 (t, *J* = 7.6 Hz, 2H), 2.39 (s, 6H), 1.69–1.57 (m, 2H), 1.54–1.38 (m, 4H), 1.34–1.25 (m, 1H), 1.23–1.13 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 156.4, 145.0, 140.6, 135.5, 134.6, 131.9, 129.6, 129.1, 127.9, 127.6, 110.0, 104.6, 32.7, 27.8, 27.6, 25.1, 24.4, 12.6; HRMS (EI) *m/z* Calcd for $C_{23}H_{28}OSi$ [M]$^+$: 348.1904, found: 348.1913.



5q

(*S*)-(2,6-Dimethylphenyl)(phenyl)(5-(thiophen-2-yl)pentyl)silane

5q was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE as the eluent. Light yellow liquid (69.5 mg, 95% yield), 92% ee, determined by HPLC analysis: Chiralcel IG-3 column (25 cm); CO_2/2-propanol = 95/5; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 16.39 min; t_R (minor) = 15.65 min; $[a]_D^{23}$ = -30.057 (c = 1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.52–7.45 (m, 2H), 7.37–7.26 (m, 3H), 7.19 (t, *J* = 7.6 Hz, 1H), 7.08 (d, *J* = 5.2 Hz, 1H), 7.00 (d, *J* = 7.6 Hz, 2H), 6.91–6.85 (m, 1H), 6.74 (s, 1H), 5.16 (t, *J* = 4.2 Hz, 1H), 2.78 (t, *J* = 7.7 Hz, 2H), 2.38 (s, 6H), 1.68 (q, *J* = 7.6 Hz, 2H), 1.61–1.40 (m, 4H), 1.35–1.14 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 145.6, 144.9, 135.5, 134.6, 131.9, 129.6, 129.1, 127.9, 127.6, 126.6, 123.9, 122.7, 32.6, 31.4, 29.8, 25.1, 24.4, 12.6; HRMS (EI) *m/z* Calcd for $C_{23}H_{28}SiS$ [M]$^+$: 364.1686, found: 364.1675.



5r

(*S*)-2-(5-((2,6-Dimethylphenyl)(phenyl)silyl)pentyl)pyridine

5r was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (60/1) as the eluent. Light yellow liquid (70.1 mg, 97% yield), 93% ee, determined by HPLC analysis: Chiralcel OD-3 column (15 cm); CO_2/2-propanol = 95/5; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 9.62 min; t_R (minor) = 10.74 min; $[a]_D^{23}$ = - 4.755 (c = 1.0, $CHCl_3$); ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.50 (d, *J* = 4.5 Hz, 1H), 7.58–7.53 (m, 1H), 7.50–7.45 (m, 2H), 7.37–7.27 (m, 3H), 7.18 (t, *J* = 7.6 Hz, 1H), 7.12–7.04 (m, 2H), 6.99 (d, *J* = 7.6 Hz, 2H), 5.15 (t, *J* = 4.2 Hz, 1H), 2.75 (t, *J* = 6.4 Hz, 2H), 2.38 (s, 6H), 1.78–1.69 (m, 2H), 1.63–1.42 (m, 4H), 1.34–1.26 (m, 1H), 1.23–1.12 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 162.3, 149.1, 144.9, 136.2, 135.5, 134.6,

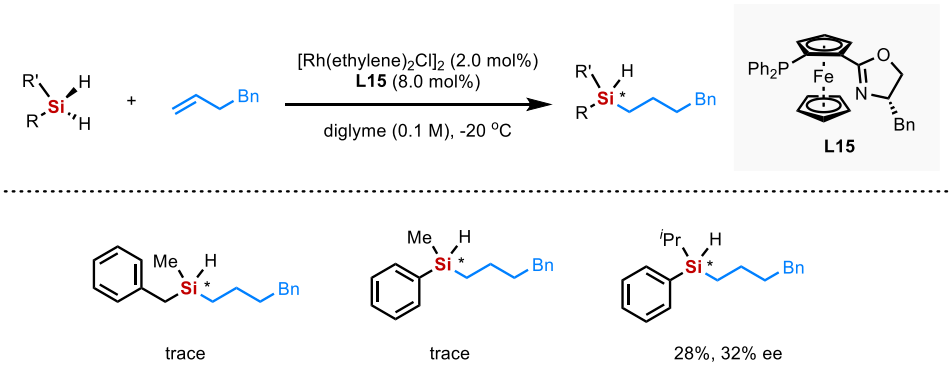
131.9, 129.6, 129.1, 127.9, 127.6, 122.6, 120.8, 38.3, 32.9, 29.5, 25.2, 24.4, 12.6; HRMS (ESI) *m/z* Calcd for $C_{24}H_{30}NSi$ $[M+H]^+$: 360.2142, found: 360.2137.

5s

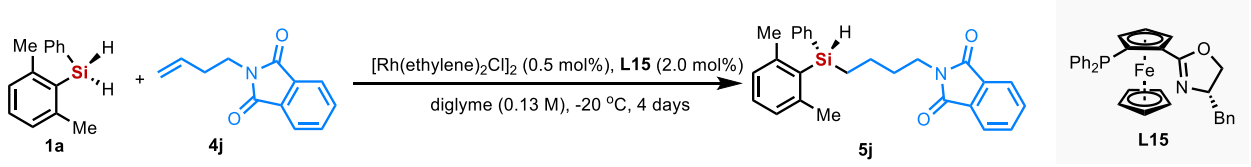
(*S*)-2-(6-((2,6-Dimethylphenyl)(phenyl)silyl)hexyl)quinoline

5s was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA/DCM (50/1/2) as the eluent. Colorless liquid (58.7 mg, 69% yield), 95% ee, determined by HPLC analysis: Chiralcel ODH column (25 cm); Hexane/2-propanol = 95/5; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 27.88 min; t_R (minor) = 21.84 min; $[a]_D^{25}$ = - 18.144 (c = 1.0065, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 8.03 (t, *J* = 7.6 Hz, 2H), 7.75 (d, *J* = 8.0 Hz, 1H), 7.69–7.61 (m, 1H), 7.50–7.42 (m, 3H), 7.35–7.21 (m, 4H), 7.17 (t, *J* = 7.6 Hz, 1H), 6.99 (d, *J* = 7.6 Hz, 2H), 5.16 (t, *J* = 4.2 Hz, 1H), 2.94 (d, *J* = 8.0 Hz, 2H), 2.38 (s, 6H), 1.78 (p, *J* = 7.6 Hz, 2H), 1.58–1.37 (m, 6H), 1.34–1.22 (m, 1H), 1.21–1.10 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 163.0, 147.8, 144.9, 136.1, 135.5, 134.6, 132.0, 129.6, 129.3, 129.1, 128.8, 127.9, 127.6, 127.4, 126.7, 125.6, 121.3, 39.3, 33.0, 29.9, 29.1, 25.2, 24.4, 12.6; HRMS (ESI) *m/z* Calcd for $C_{29}H_{34}NSi$ $[M+H]^+$: 424.2455, found:424.2459.

Unsuccessful Substrates



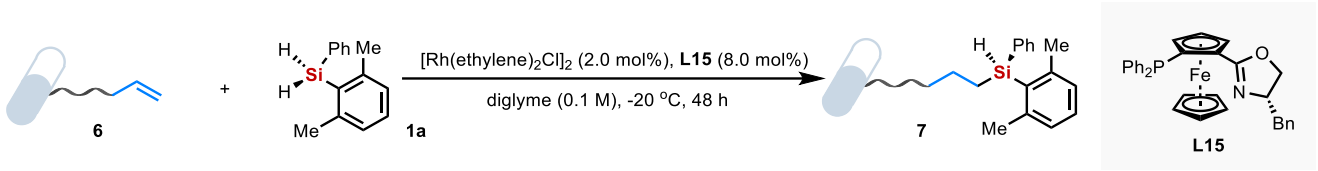
2.4 Gram-Scale Reaction



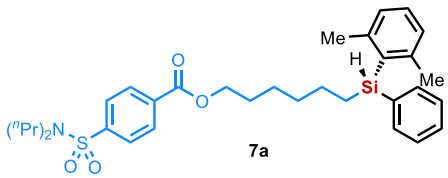
In a nitrogen-filled glovebox, $[Rh(ethylene)_2Cl]_2$ (6.7 mg, 0.0175 mmol, 0.5 mol%), (*S,Sp*)-Bn-Phosferrox (36.6 mg, 0.07 mmol, 2.0 mol%) were charged in a sealed tube. The tube was moved outside of the glovebox, followed by the addition of dry diglyme (8.75 mL). After stirring at 30 °C for 30 min and cooling to -20 °C for another 10 min, alkene

4j (845.1 mg, 4.2 mmol, 1.2 equiv.), dihydrosilane **1a** (743.3 mg, 3.5 mmol, 1.0 equiv.) and dry diglyme (26.25 mL) were added to the above solution, and the resulted mixture was stirred at this temperature for 4 d. The reaction mixture was diluted with hexane and then filtered through a pad of silica gel with EA as the eluent to remove the Rh catalyst. The diglyme was then removed via lyophilization process, and the residue was then purified by silica gel chromatography using PE/EA (20/1) as the eluent to afford product **5j** as white solid (1.03 g, 71% yield), 93% ee, determined by HPLC analysis: Chiralcel AD-3 column (15 cm); CO_2/2-propanol = 85/15; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 4.28 min; t_R (minor) = 3.97 min.

2.5 Late-Stage Functionalization



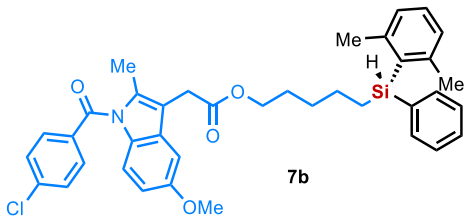
General procedure: In a nitrogen-filled glovebox, $[Rh(ethylene)_2Cl]_2$ (1.6 mg, 0.004 mmol, 2.0 mol%), (*S*,*Sp*)-Bn-Phosferrox (**L15**, 8.4 mg, 0.016 mmol, 8.0 mol%) were charged in a 10 mL tube, and the tube was sealed with an open-top cap with PTFE cap liner. The tube was moved outside of the glovebox, followed by the addition of dry diglyme (2.0 mL). After stirring at 30 °C for 30 min and cooling to -20 °C for another 5 min, alkene **6** (0.24 mmol, 1.2 equiv.) and dihydrosilane **1a** (0.2 mmol, 1.0 equiv.) were added to the above solution, and the resulted mixture was stirred at this temperature for 48 h. The reaction mixture was diluted with hexane and then filtered through a pad of silica gel with EA as the eluent to remove the Rh catalyst. The filtrate was concentrated, and the residue was then purified by prepared preparative thin-layer chromatography to afford products **7**.



(*S*)-6-((2,6-Dimethylphenyl)(phenyl)silyl)hexyl 4-(*N*,*N*-dipropylsulfamoyl)benzoate

7a was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (30/1) as the eluent. Light yellow liquid (64.5 mg, 56% yield), 94% ee, determined by HPLC analysis: Chiralcel IBN-5 column (25 cm); Hexane/2-propanol = 98/2; flow rate, 1.0 mL/min; 252 nm, t_R (major) = 13.81 min; t_R (minor) = 15.23 min; $[a]_D^{23}$ = -12.006 (c = 1.0, $CHCl_3$); ^1H NMR (500 MHz, $CHCl_3$) δ 8.14

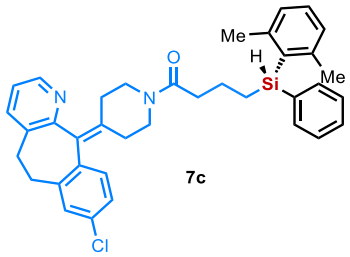
(d, *J* = 8.5 Hz, 2H), 7.87 (d, *J* = 8.5 Hz, 2H), 7.49 (dd, *J* = 7.8, 1.6 Hz, 2H), 7.38–7.29 (m, 3H), 7.20 (t, *J* = 7.6 Hz, 1H), 7.00 (d, *J* = 7.6 Hz, 2H), 5.16 (t, *J* = 4.2 Hz, 1H), 4.32 (t, *J* = 6.6 Hz, 2H), 3.15–3.00 (m, 4H), 2.39 (s, 6H), 1.79–1.72 (m, 2H), 1.62–1.42 (m, 10H), 1.36–1.15 (m, 2H), 0.87 (t, *J* = 7.4 Hz, 6H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 165.3, 144.9, 144.1, 135.4, 134.6, 133.7, 131.9, 130.1, 129.7, 129.2, 127.9, 127.6, 126.9, 65.7, 49.9, 32.8, 28.5, 25.6, 25.3, 24.4, 21.9, 12.6, 11.1; HRMS (ESI) *m/z* Calcd for $C_{33}H_{45}NO_4NaSiS$ $[M+Na]^+$: 602.2731, found: 602.2726.



7b

(*S*)-5-((2,6-dimethylphenyl)(phenyl)silyl)pentyl 2-(1-(4-chlorophenyl)-5-methoxy-2-methyl-1*H*-indol-3-yl)acetate

7b was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (20/1) as the eluent. Light yellow liquid (99.9 mg, 78% yield), 94% ee, determined by HPLC analysis: Chiralcel AD-3 column (25 cm); CO_2/2-propanol = 70/30; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 15.01 min; t_R (minor) = 14.56 min; $[a]_D^{23}$ = -13.520 (c =1.0, $CHCl_3$); ^{1}H NMR (500 MHz, $CDCl_3$) δ 7.64 (d, *J* = 8.5 Hz, 2H), 7.51–7.42 (m, 4H), 7.37–7.28 (m, 3H), 7.19 (t, *J* = 7.6 Hz, 1H), 7.00 (d, *J* = 7.6 Hz, 2H), 6.96 (d, *J* = 2.6 Hz, 1H), 6.85 (d, *J* = 9.0 Hz, 1H), 6.65 (dd, *J* = 9.0, 2.5 Hz, 1H), 5.14 (t, *J* = 4.3 Hz, 1H), 4.07 (t, *J* = 6.7 Hz, 2H), 3.81 (s, 3H), 3.64 (s, 2H), 2.38 (s, 9H), 1.65–1.57 (m, 2H), 1.54–1.34 (m, 4H), 1.32–1.08 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 170.9, 168.3, 156.0, 144.9, 135.9, 135.3, 134.6, 133.9, 131.7, 131.1, 130.7, 130.6, 129.7, 129.2, 129.1, 127.9, 127.6, 114.9, 112.7, 111.6, 101.2, 65.1, 55.6, 30.4, 29.4, 25.0, 24.4, 13.4, 12.6; HRMS (ESI) *m/z* Calcd for $C_{38}H_{40}HNO_4NaSiCl$ $[M+Na]^+$: 660.2307, found: 660.2300.

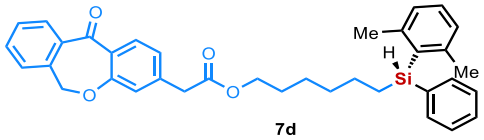


7c

(*S*)-1-(4-(8-Chloro-5,6-dihydro-11H-benzo[5,6]cyclohepta[1,2-*b*]pyridin-11-ylidene)piperidin-1-yl)-4-((2,6-dimethylphenyl)(phenyl)silyl)butan-1-one

7c was synthesized following the general procedure. After purification by prepared preparative thin-layer

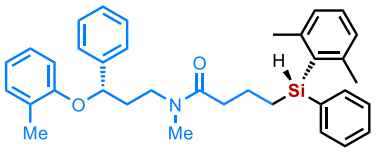
chromatography using PE/EA (1/1) as the eluent. White solid, mp 64.5-64.9 °C (89.3 mg, 76% yield), 92% ee, determined by HPLC analysis: Chiralcel ODH column (25 cm); Hexane/2-propanol = 90/10; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 19.27 min; t_R (minor) = 23.40 min; $[a]_D^{25}$ = -12.828 (c =1.0, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 8.40 (t, *J* = 5.2 Hz, 1H), 7.49 (d, *J* = 6.0 Hz, 2H), 7.43 (t, *J* = 7.2 Hz, 1H), 7.36–7.27 (m, 3H), 7.19–7.06 (m, 5H), 6.99–6.94 (m, 2H), 5.19 (t, *J* = 4.0 Hz, 1H), 4.12–3.96 (m, 1H), 3.59–3.49 (m, 1H), 3.43–3.27 (m, 2H), 3.22–3.05 (m, 2H), 2.90–2.73 (m, 2H), 2.54–2.22 (m, 12H), 1.96–1.75 (m, 2H), 1.44–1.32 (m, 1H), 1.32–1.20 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 171.0, 156.9, 146.6, 146.5, 144.8, 139.5, 139.4, 137.5, 137.3, 136.9, 134.9, 134.5, 134.3, 133.3, 133.2, 132.9, 131.4, 130.41, 130.35, 129.7, 129.1, 128.9, 127.9, 127.6, 126.1, 126.0, 122.2, 46.1, 42.5, 42.4, 36.3, 31.6, 31.4, 31.2, 31.0, 30.4, 30.2, 24.3, 21.3, 12.5; ^{29}Si NMR (80 MHz, $CDCl_3$) δ -25.21; HRMS (ESI) *m/z* Calcd for $C_{37}H_{40}N_2OSiCl$ $[M+H]^+$: 591.2593, found: 591.2596.



7d

(*S*)-6-((2,6-Dimethylphenyl)(phenyl)silyl)hexyl 2-(11-oxo-6,11-dihydrodibenzo[*b*,*e*]oxepin-3-yl)acetate

7d was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (50/1) as the eluent. Light yellow liquid (87.8 mg, 78% yield), 84% ee, determined by HPLC analysis: Chiralcel IG column (25 cm); Hexane/2-propanol = 99.5/0.5; flow rate, 0.5 mL/min; 257 nm, t_R (major) = 8.95 min; t_R (minor) = 8.40 min; $[a]_D^{23}$ = -11.289 (c =1.0, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 8.12 (s, 1H), 7.88 (d, *J* = 7.6 Hz, 1H), 7.59–7.39 (m, 5H), 7.38–7.27 (m, 4H), 7.19 (t, *J* = 7.6 Hz, 1H), 7.00 (t, *J* = 7.6 Hz, 3H), 5.20–5.14 (s, 3H), 4.07 (t, *J* = 6.8 Hz, 2H), 3.62 (s, 2H), 2.39 (s, 6H), 1.64–1.54 (m, 3H), 1.45–1.22 (m, 6H), 1.22–1.11 (m, 1H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 190.8, 171.5, 160.4, 144.9, 140.4, 136.3, 135.49, 135.45, 134.6, 132.7, 132.4, 131.9, 129.6, 129.4, 129.2, 129.1, 127.9, 127.8, 127.6, 125.1, 121.0, 73.6, 65.1, 40.2, 32.8, 28.4, 25.5, 25.2, 24.4, 12.6; HRMS (ESI) *m/z* Calcd for $C_{36}H_{38}O_4NaSi$ $[M+Na]^+$: 585.2432, found: 585.2430.

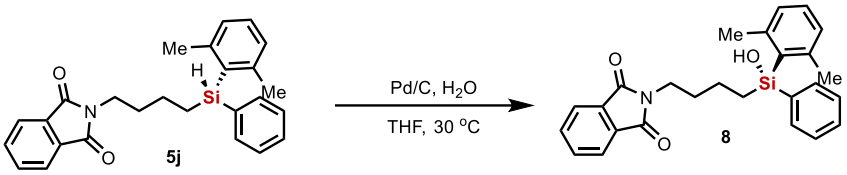


4-((*S*)-(2,6-Dimethylphenyl)(phenyl)silyl)-*N*-methyl-*N*-((*S*)-3-phenyl-3-(*o*-tolyloxy)propyl)butanamide

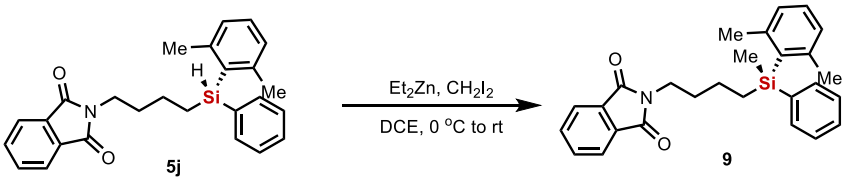
7e was synthesized following the general procedure. After purification by prepared preparative thin-layer chromatography using PE/EA (5/1) as the eluent. Colorless liquid (88.1 mg, 82% yield), 91% de, determined by

HPLC analysis: Chiralcel ODH column (25 cm); Hexane/2-propanol = 80/20; flow rate, 1.0 mL/min; 220 nm, t_R (major) = 21.81 min; t_R (minor) = 32.98 min; $[a]_D^{25}$ = -25.738 (c =1.0029, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 7.55–7.43 (m, 2H), 7.39–7.12 (m, 9H), 7.09 (d, *J* = 7.2 Hz, 1H), 7.01–6.87 (m, 3H), 6.78–6.69 (m, 1H), 6.55 (dd, *J* = 14.2, 8.0 Hz, 1H), 5.23–5.07 (m, 2H), 3.66–3.32 (m, 2H), 2.89 (s, 1.6H), 2.82 (s, 1.4H), 2.46–2.23 (m, 11H), 2.19–2.04 (m, 2H), 1.98–1.60 (m, 2H), 1.43–0.98 (m, 2H) (mixture of rotamers); ^{13}C NMR (100 MHz, $CDCl_3$) δ 172.5, 172.3, 155.6, 155.2, 144.8, 141.5, 140.9, 135.03, 134.97, 134.5, 131.5, 130.6, 130.5, 129.7, 129.6, 129.10, 129.07, 128.7, 128.5, 127.9, 127.8, 127.7, 127.6, 127.5, 127.4, 126.7, 126.6, 126.5, 126.4, 125.6, 125.4, 120.5, 120.2, 112.5, 112.3, 77.4, 75.7, 46.1, 45.2, 37.5, 36.43, 36.40, 35.8, 35.6, 33.1, 24.3, 21.2, 20.9, 16.5, 12.5 (mixture of rotamers); HRMS (ESI) *m/z* Calcd for $C_{35}H_{41}NO_2NaSi$ $[M+Na]^+$: 558.2799, found: 558.2803.

2.6 Synthetic Applications

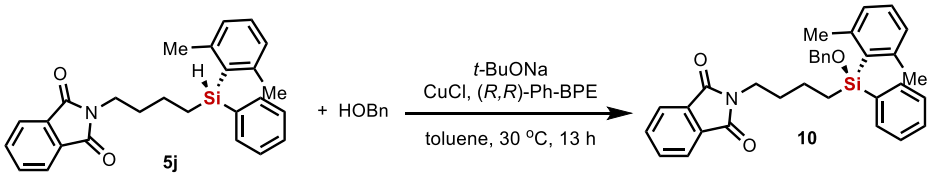


The procedure was followed the known literature[3]. To a 10 mL vial were charged with Pd/C (10.0 mg, 10 wt%) and **5j** (20.7 mg, 0.05 mmol) under N_2, followed by the addition of dry THF (1.0 mL) and H_2O (18 μL, 2.0 mmol). The resulted mixture was stirred at room temperature. Upon completion, the reaction mixture was filtered through a pad of silica gel with EA as the eluent. The filtrate was concentrated and purified by preparative thin-layer chromatography using PE/EA (5/2) as the eluent to afford **8** as a white solid (19.5 mg, 91% yield), 93% ee, determined by HPLC analysis: Chiralcel IBN-5 column (25 cm); Hexane/2-propanol = 93/7; flow rate, 0.7 mL/min; 292 nm, t_R (major) = 43.19 min; t_R (minor) = 41.08 min; $[a]_D^{24}$ = 6.834 (c = 0.2474, $CHCl_3$); ^1H NMR (400 MHz, $CDCl_3$) δ 7.85–7.78 (m, 2H), 7.73–7.67 (m, 2H), 7.53 (d, *J* = 6.8 Hz, 2H), 7.39–7.29 (m, 3H), 7.16 (t, *J* = 7.6 Hz, 1H), 6.96 (d, *J* = 7.6 Hz, 2H), 3.70 (t, *J* = 7.2 Hz, 2H), 2.49 (brs, 1H), 2.38 (s, 6H), 1.75 (p, *J* = 7.2 Hz, 2H), 1.61–1.49 (m, 2H), 1.37–1.21 (m, 2H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 168.6, 144.7, 138.9, 133.9, 133.5, 132.7, 132.1, 129.6, 129.5, 128.2, 128.0, 123.2, 37.3, 31.7, 24.4, 20.5, 16.8; HRMS (FI) *m/z* Calcd for $C_{26}H_{27}NO_3Si$ $[M]^+$: 429.1755, found: 429.1750.



The procedure was followed the known literature[4].To a 25 mL Schlenck tube were injected the hexane solution of

Et_2Zn (0.8 mL, 0.8 mmol, 1.0 M) under N_2 atmosphere and DCE (2.3 mL). The reaction mixture was then cooled to 0 °C, followed by the addition of **5j** (41.4 mg, 0.1 mmol). Next, CH_2I_2 (428.5 mg, 1.6 mmol) was added dropwise. The reaction was kept at 0 °C for 20 min and then warmed to room temperature. After the reaction was completed, the reaction mixture was cooled to 0 °C and the saturated aqueous solution of NH_4Cl was added. The aqueous layer was then extracted by DCM. The organic layer was washed with brine and dried over anhydrous Na_2SO_4. The resulting solution was concentrated and purified by preparative thin-layer chromatography using PE/EA (20/1) as the eluent to afford **8** as a light yellow liquid (30.4 mg, 74% yield), 91% ee, determined by HPLC analysis: Chiralcel IC column (25 cm); Hexane/2-propanol = 99/1; flow rate, 1.0 mL/min; 190 nm, t_R (major) = 15.06 min; t_R (minor) = 13.88 min; $[a]_D^{26}$ = -0.883 (c = 1.0185, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.84–7.78 (m, 2H), 7.73–7.67 (m, 2H), 7.46–7.39 (m, 2H), 7.33–7.22 (m, 3H), 7.13 (t, *J* = 7.6 Hz, 1H), 6.93 (d, *J* = 7.6 Hz, 2H), 3.68–3.60 (m, 2H), 2.27 (s, 6H), 1.76–1.66 (m, 2H), 1.45–1.33 (m, 2H), 1.30–1.12 (m, 2H), 0.61 (s, 3H); ^{13}C NMR (125 MHz, $CDCl_3$) δ 168.4, 145.0, 140.5, 133.9, 133.8, 133.5, 132.1, 129.2, 128.5, 128.1, 127.8, 123.1, 37.6, 32.2, 25.1, 21.6, 16.8, 1.8; ^{29}Si NMR (119 MHz, $CDCl_3$) δ -7.02; HRMS (ESI) *m/z* Calcd for $C_{27}H_{29}NO_2NaSi$ $[M+Na]^+$: 450.1860, found: 450.1867.

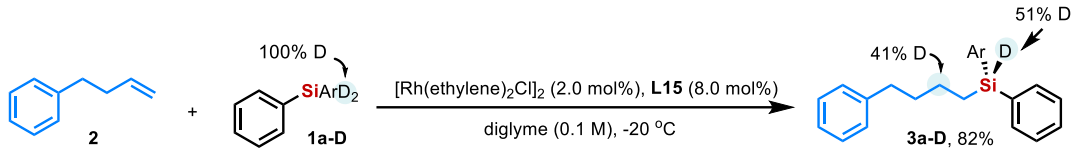


The procedure was followed the known literature[5]. In a nitrogen-filled glovebox, an oven-dried 10 mL reaction tube was charged with CuCl (1.0 mg, 0.01 mmol), (*R*,*R*)-Ph-BPE (5.6 mg, 0.011 mmol), *t*-BuONa (1.0 mg, 0.01 mmol) and anhydrous toluene (1.0 mL). The vial was moved outside of the glovebox, after stirring for 1 h at 30 °C, **5j** (41.3 mg, 0.1 mmol, 93% ee) and benzyl alcohol (16.2 mg, 0.15 mmol) were added successively. The resulting mixture was stirred at 30 °C for 13 h. The reaction mixture was diluted with hexane and then filtered through a pad of silica gel with hexane/EA (10/1) as the eluent to remove the Cu catalyst. The filtrate was concentrated, and the residue was then purified by preparative thin-layer chromatography with PE/EA (10/1) as the eluent to afford **10**. Colorless liquid (38.4 mg, 74% yield); 91% *ee*, determined by HPLC analysis: Chiralcel OD-3 column (25 cm); CO_2/2-propanol = 70/30; flow rate, 1.0 mL/min; 214 nm, t_R (major) = 10.25 min; t_R (minor) = 11.27 min; $[a]_D^{26}$ = -9.561 (c = 1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.82–7.77 (m, 2H), 7.72–7.65 (m, 2H), 7.56–7.52 (m, 2H), 7.40–7.29 (m, 3H), 7.28–7.18 (m, 5H), 7.15 (t, *J* = 7.6 Hz, 1H), 6.94 (d, *J* = 7.6 Hz, 2H), 4.64–4.54 (m, 2H), 3.61 (dd, *J* = 8.2, 6.4 Hz, 2H), 2.33 (s, 6H), 1.69 (p, *J* = 7.4 Hz, 2H), 1.55–1.41 (m, 2H), 1.37–1.19 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 168.3, 145.2, 140.6, 137.1, 133.9, 133.7, 132.2, 131.8, 129.7, 129.5, 128.2, 128.1, 127.9, 126.9, 126.5, 123.1, 64.9, 37.5, 31.9, 24.4, 20.7, 15.4; ^{29}Si NMR (119 MHz, $CDCl_3$) δ -0.48; HRMS (ESI) *m/z* Calcd for $C_{33}H_{33}NO_3SiNa$

$[M+Na]^+$: 542.2122, found: 542.2118.

3. Mechanistic Investigation

3.1 Deuterium Labeling Experiment



In a nitrogen-filled glovebox, $[Rh(ethylene)_2Cl]_2$ (0.8 mg, 0.002 mmol, 2.0 mol%), (*S*,*Sp*)-Bn-Phosferrox (**L15**, 4.2 mg, 0.008 mmol, 8.0 mol%) were charged in a 10 mL tube, and the tube was sealed with an open-top cap with PTFE cap liner. The tube was moved outside of the glovebox, followed by the addition of dry diglyme (1.0 mL). After stirring at 30 °C for 30 min and cooling to -20 °C for another 5 min, alkene **2** (15.9 mg, 0.12 mmol, 1.2 equiv.) and dihydrosilane **1a-D** (21.4 mg. 0.1 mmol, 1.0 equiv.) were added to the above solution, and the resulting mixture was stirred at this temperature. After completion, the reaction mixture was diluted with hexane and then filtered through a pad of silica gel with DCM as the eluent to remove the Rh catalyst. The filtrate was concentrated, and the residue was then purified by preparative thin-layer chromatography with PE as the eluent.

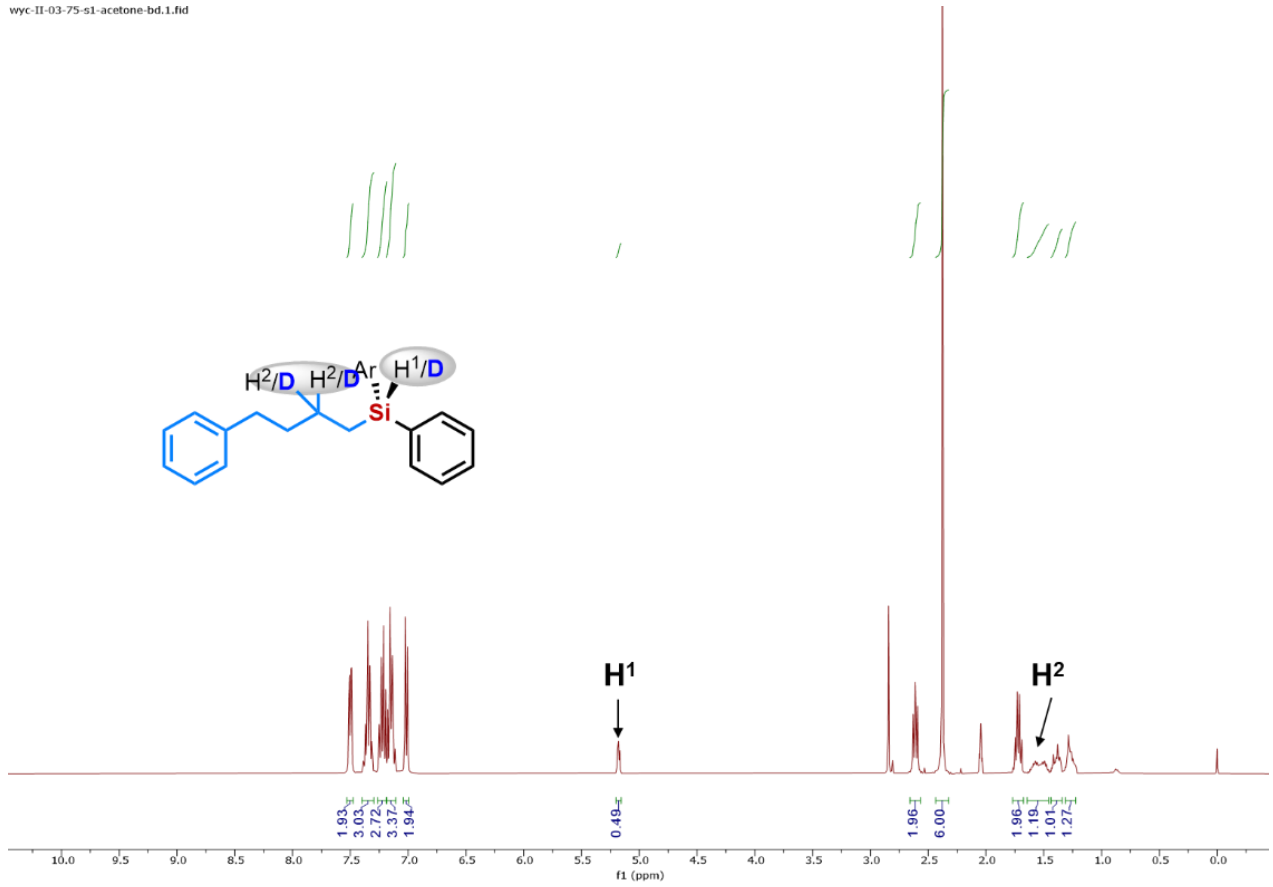


Figure S1. ^{1}H NMR of Isolated Product.

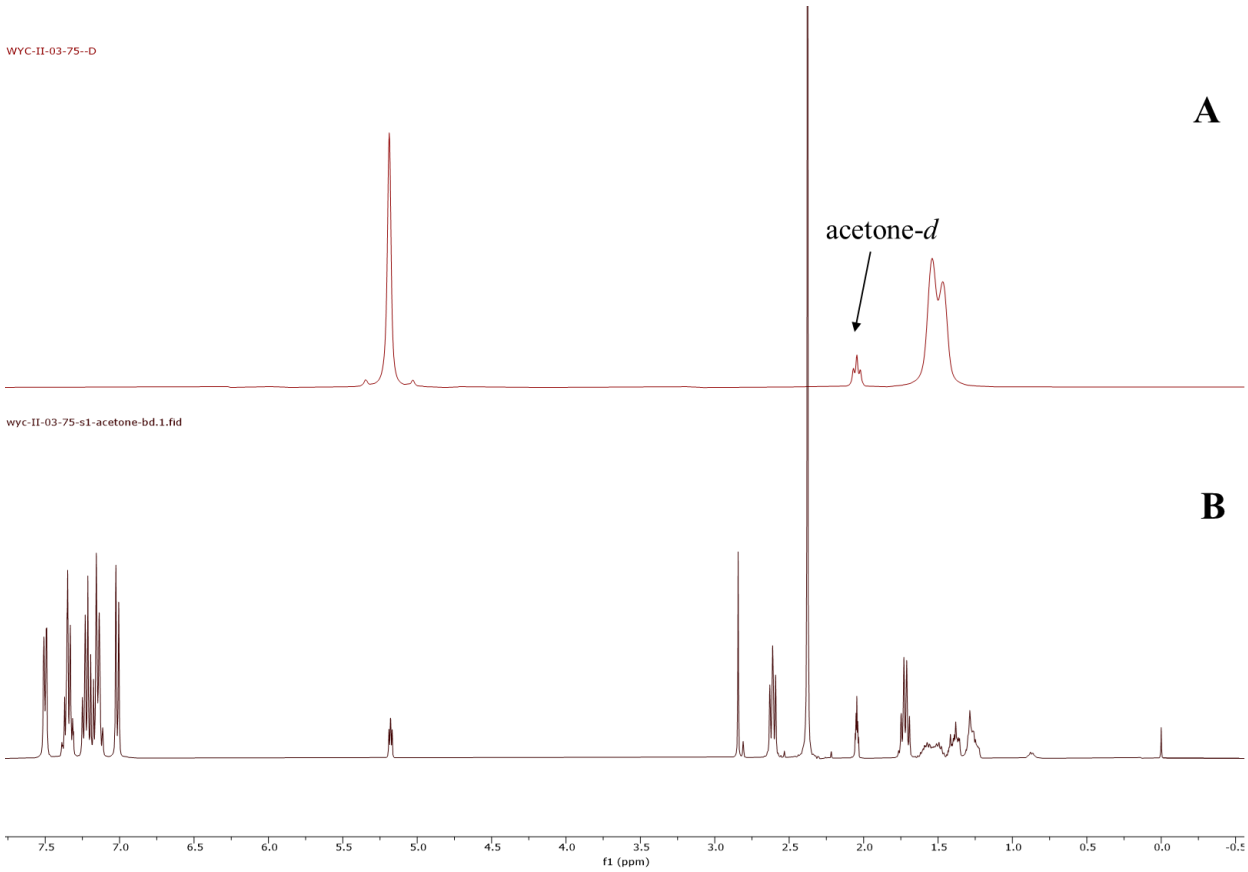
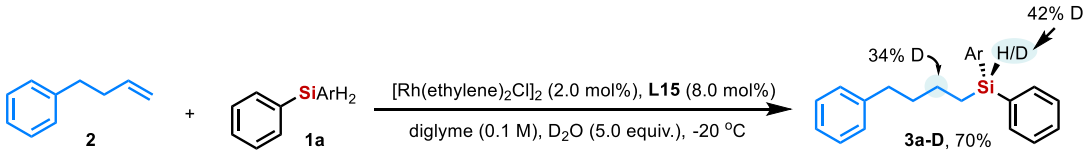


Figure S2. A) ^{1}H NMR of isolated product (in acetone_d_6). B) ^{2}H NMR of isolated product (in acetone).

49% of deuterium at silicon atom of the final product was replaced by hydrogen. To figure out the H source, the following experiment was performed.



In a nitrogen-filled glovebox, $[Rh(ethylene)_2Cl]_2$ (0.8 mg, 0.002 mmol, 2.0 mol%), (*S*,*Sp*)-Bn-Phosferrox (**L15**, 4.2 mg, 0.008 mmol, 8.0 mol%) were charged in a 10 mL tube, and the tube was sealed with an open-top cap with PTFE cap liner. The tube was moved outside of the glovebox, followed by the addition of dry diglyme (1.0 mL). After stirring at 30 °C for 30 min and cooling to -20 °C for another 5 min, alkene **2** (15.9 mg, 0.12 mmol, 1.2 equiv.). dihydrosilane **1a** (21.4 mg. 0.1 mmol, 1.0 equiv.) and D_2O (20 ul, 0.5 mmol, 5.0 equiv.) were added to the above solution, and the resulting mixture was stirred at this temperature. After completion, the reaction mixture was diluted with hexane and then filtered through a pad of silica gel with DCM as the eluent to remove the Rh catalyst. The filtrate was concentrated, and the residue was then purified by preparative thin-layer chromatography with PE as the eluent.

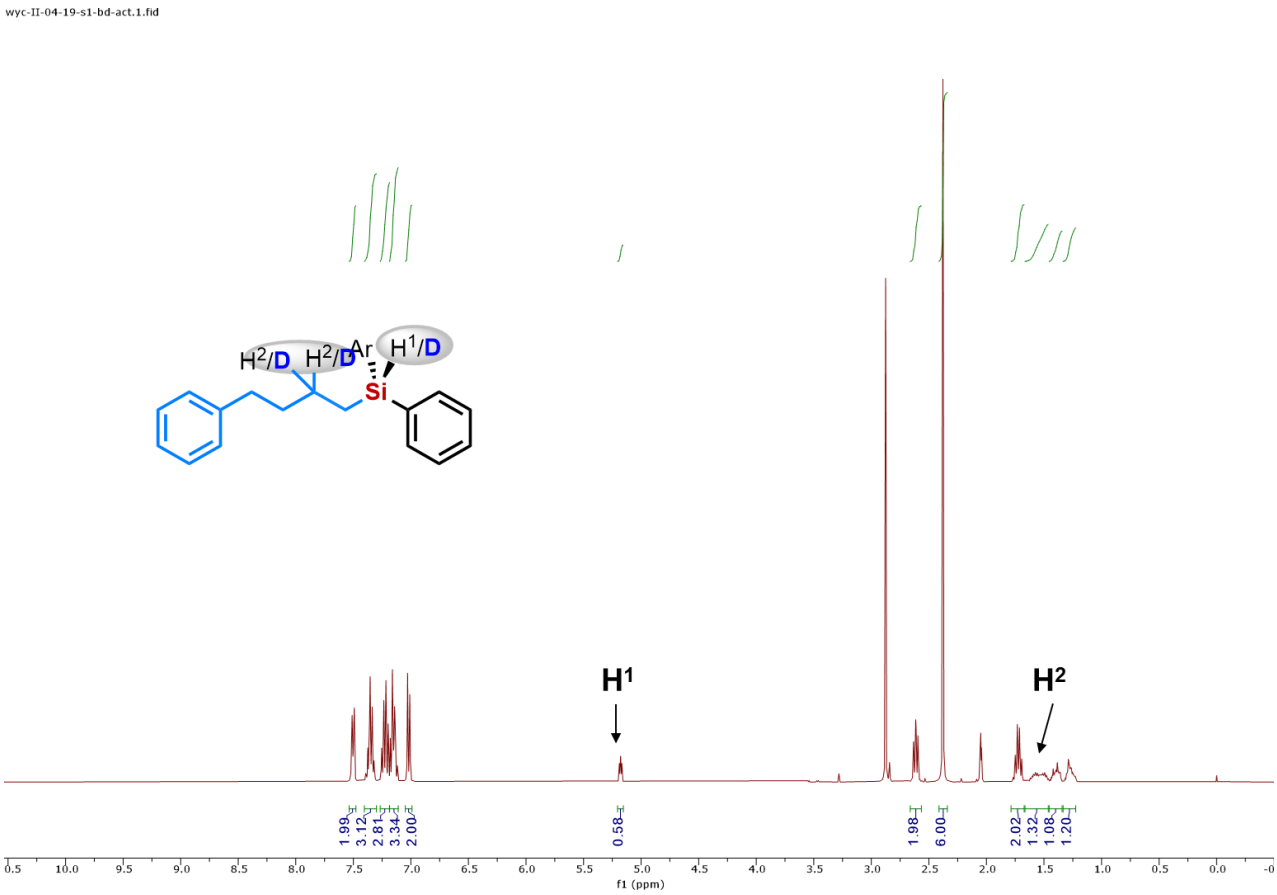
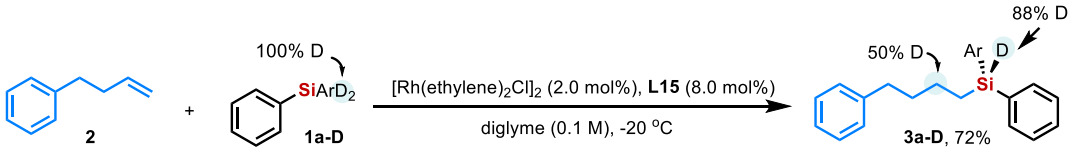


Figure S3. ^{1}H NMR of Isolated Product.

The incorporation of deuterium in the final product indicated that the water in the solvent is the one of the H sources. To avoid the loss of deuterium in the deuterium labeling experiments, the solvent (diglyme) was further dried in the following experiment.



After purification (distillation over Na), diglyme was added 4Å molecular sieve (50 mg/mL) was heated at 30 °C under nitrogen for 10 h. Filtration was performed under nitrogen to remove the 4Å molecular sieve. In a nitrogen-filled glovebox, $[Rh(ethylene)_2Cl]_2$ (0.8 mg, 0.002 mmol, 2.0 mol%), (*S*,*Sp*)-Bn-Phosferrox (**L15**, 4.2 mg, 0.008 mmol, 8.0 mol%) were charged in a 10 mL tube, and the tube was sealed with an open-top cap with PTFE cap liner. The tube was moved outside of the glovebox, followed by the addition of the above diglyme (1.0 mL). After stirring at 30 °C for 30 min and cooling to -20 °C for another 5 min, alkene **2** (15.9 mg, 0.12 mmol, 1.2 equiv.) and

dihydrosilane **1a-D** (21.4 mg. 0.1 mmol, 1.0 equiv.) were added to the above solution, and the resulting mixture was stirred at this temperature. After completion, the reaction mixture was diluted with hexane and then filtered through a pad of silica gel with DCM as the eluent to remove the Rh catalyst. The filtrate was concentrated, and the residue was then purified by preparative thin-layer chromatography with PE as the eluent.

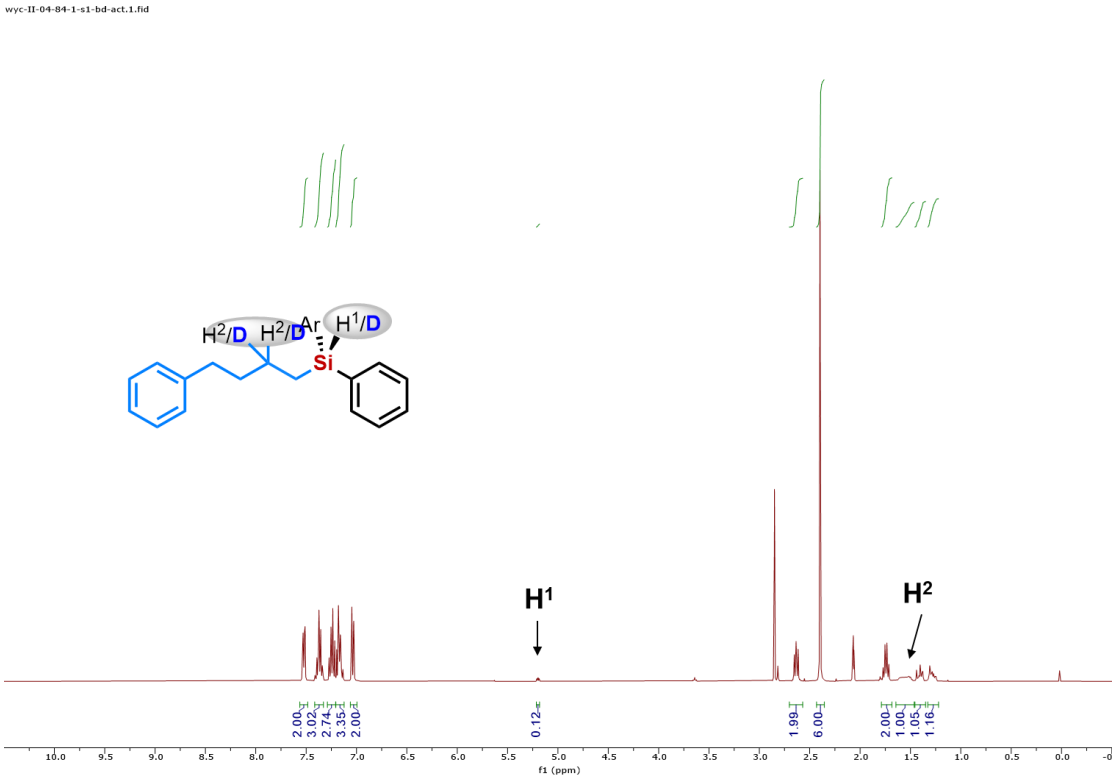
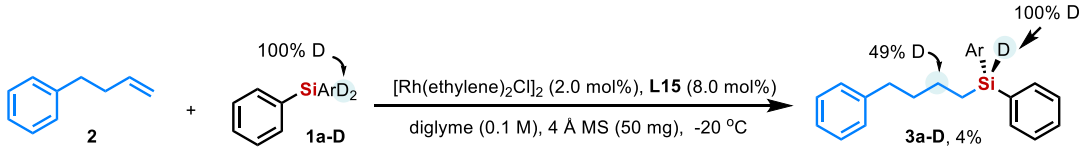


Figure S4. ^{1}H NMR of Isolated Product.

With the further dried diglyme, the deuterium at silicon atom was increased to 88% in the final product.

The experiment was also performed in the presence of 4Å molecular sieve. Although no deuterium loss in the final product, only 4% of the product was formed after 10 hours.



In a nitrogen-filled glovebox, $[Rh(ethylene)_2Cl]_2$ (0.88 mg, 0.0022 mmol), (*S*,*Sp*)-Bn-Phosferrox (**L15**, 4.6 mg, 0.0088 mmol) were charged in a 10 mL tube, and the tube was sealed with an open-top cap with PTFE cap liner. The tube was moved outside of the glovebox, followed by the addition of dry diglyme (1.1 mL). After stirring at 30 °C for 30 min. 1.0 mL of the above solution was injected to the tube containing 4Å molecular sieve (50 mg) and cooling to -20 °C for 5 min, followed by addition of alkene **2** (15.9 mg, 0.12 mmol, 1.2 equiv.) and dihydrosilane **1a-D** (21.4

mg. 0.1 mmol, 1.0 equiv.). The resulting mixture was stirred at this temperature. After completion, the reaction mixture was diluted with hexane and then filtered through a pad of silica gel with DCM as the eluent to remove the Rh catalyst. The filtrate was concentrated, and the residue was then purified by preparative thin-layer chromatography with PE as the eluent.

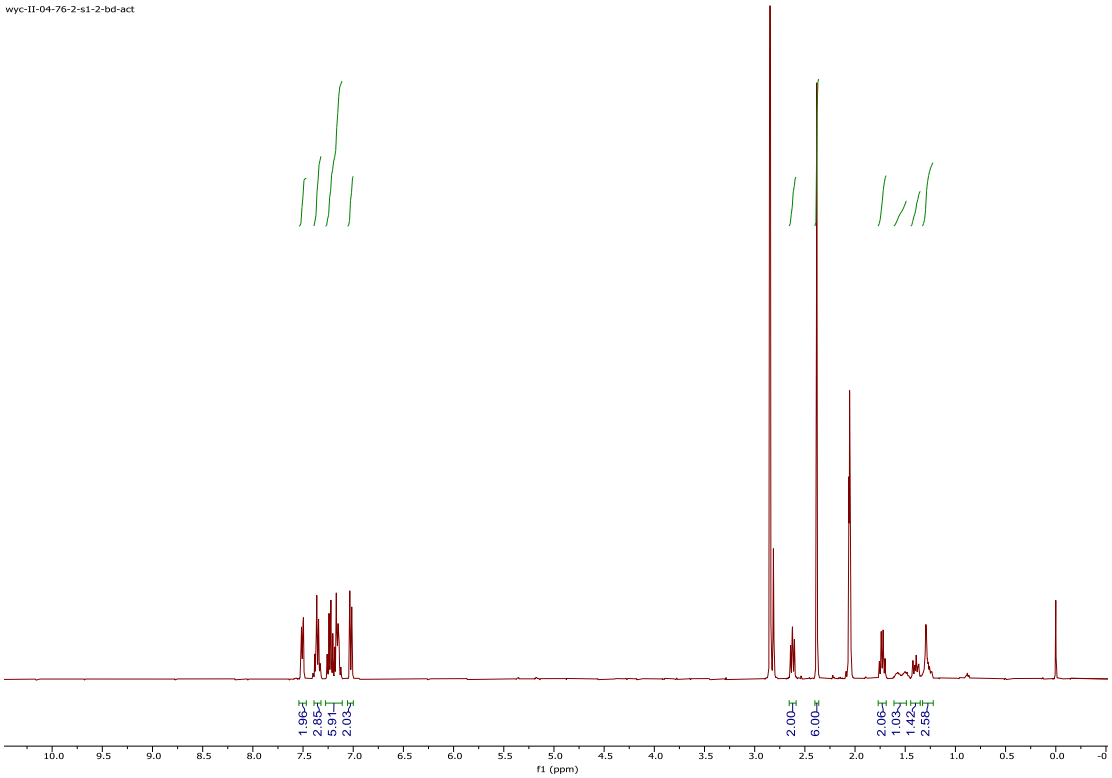
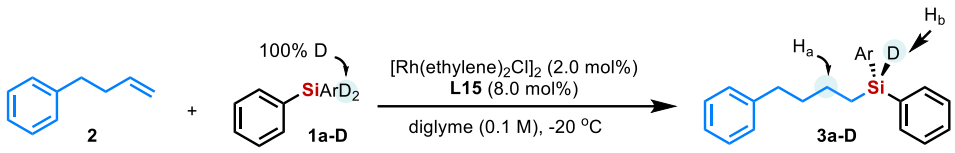


Figure S5. ^{1}H NMR of Isolated Product.

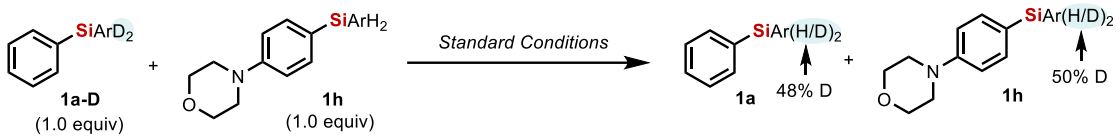
The above results were summarized in the following table.

Table S6. Rh-Catalyzed Enantioselective Hydrosilylation in Diglyme (Diglyme was purified with different procedures).



entry	diglyme	3a-D		
		yield	H_a	H_b
1	distilled over Na	82%	41% D	51% D
2	distilled over Na, then heated with 4 Å MS for 10 h and filtered	72%	50% D	88% D
3	distilled over Na, and the reaction was performed with 4 Å MS	4%	49% D	100% D

3.2 Crossover Study



In a nitrogen-filled glovebox, $[Rh(ethylene)_2Cl]_2$ (0.8 mg, 0.002 mmol, 2.0 mol%), (*S*,*Sp*)-Bn-Phosferrox (**L15**, 4.2 mg, 0.008 mmol, 8.0 mol%) were charged in a 10 mL tube, and the tube was sealed with an open-top cap with PTFE cap liner. The tube was moved outside of the glovebox, followed by the addition of dry diglyme (1.0 mL). After stirring at 30 ºC for 30 min and cooling to -20 °C for another 5 min, dihydrosilane **1a-D** (21.4 mg. 0.1 mmol, 1.0 equiv.) and **1h** (29.8 mg, 0.1 mmol, 1.0 equiv.) were added to the above solution, and the resulting mixture was stirred at this temperature for 16 h. The reaction mixture was diluted with hexane and then filtered through a pad of silica gel with EA as the eluent to remove the Rh catalyst. The filtrate was concentrated, and the distribution of the deuterium was determined by ^{1}H NMR.

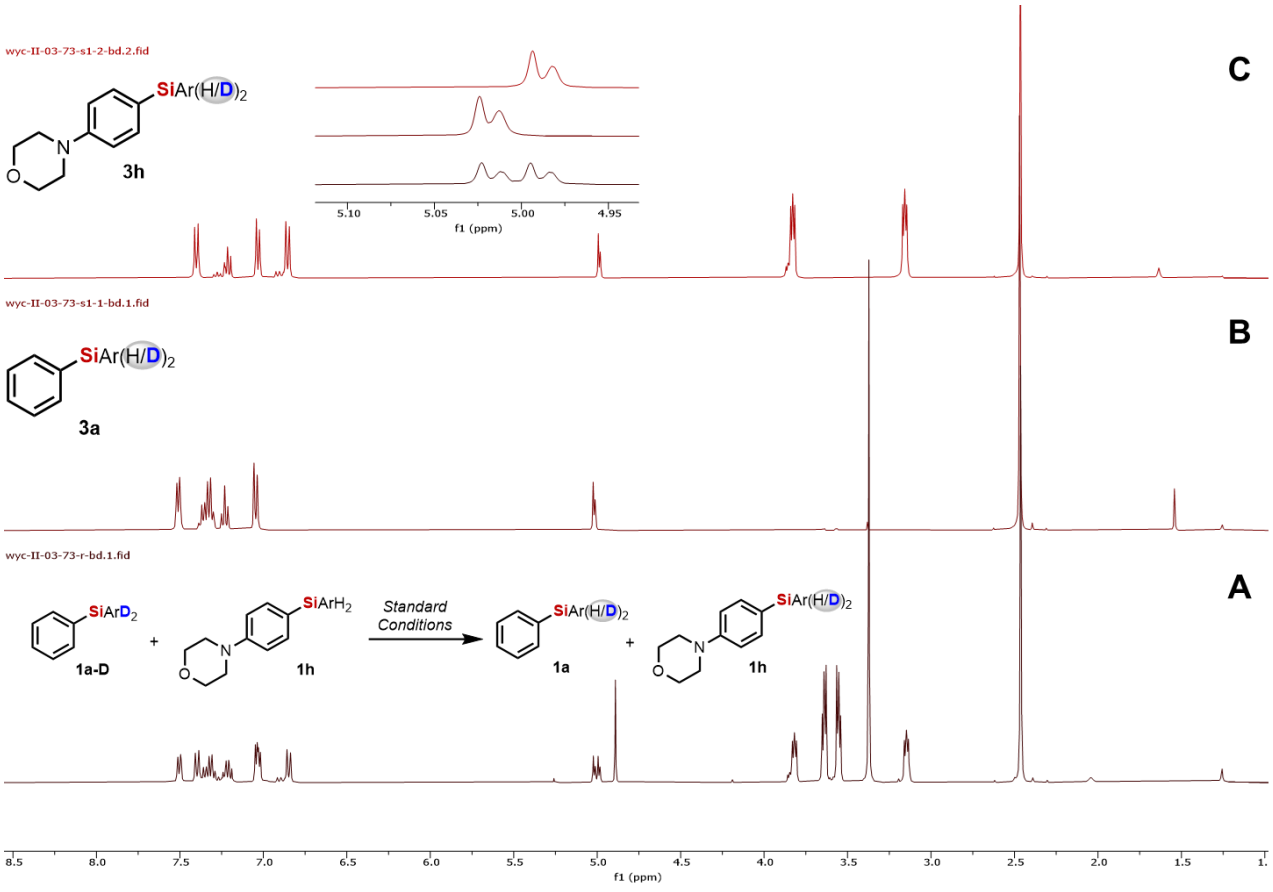


Figure S6. A) ^{1}H NMR of the crude reaction mixture; B) ^{1}H NMR of **3a** after isolation; C) ^{1}H NMR of **3h** after isolation.

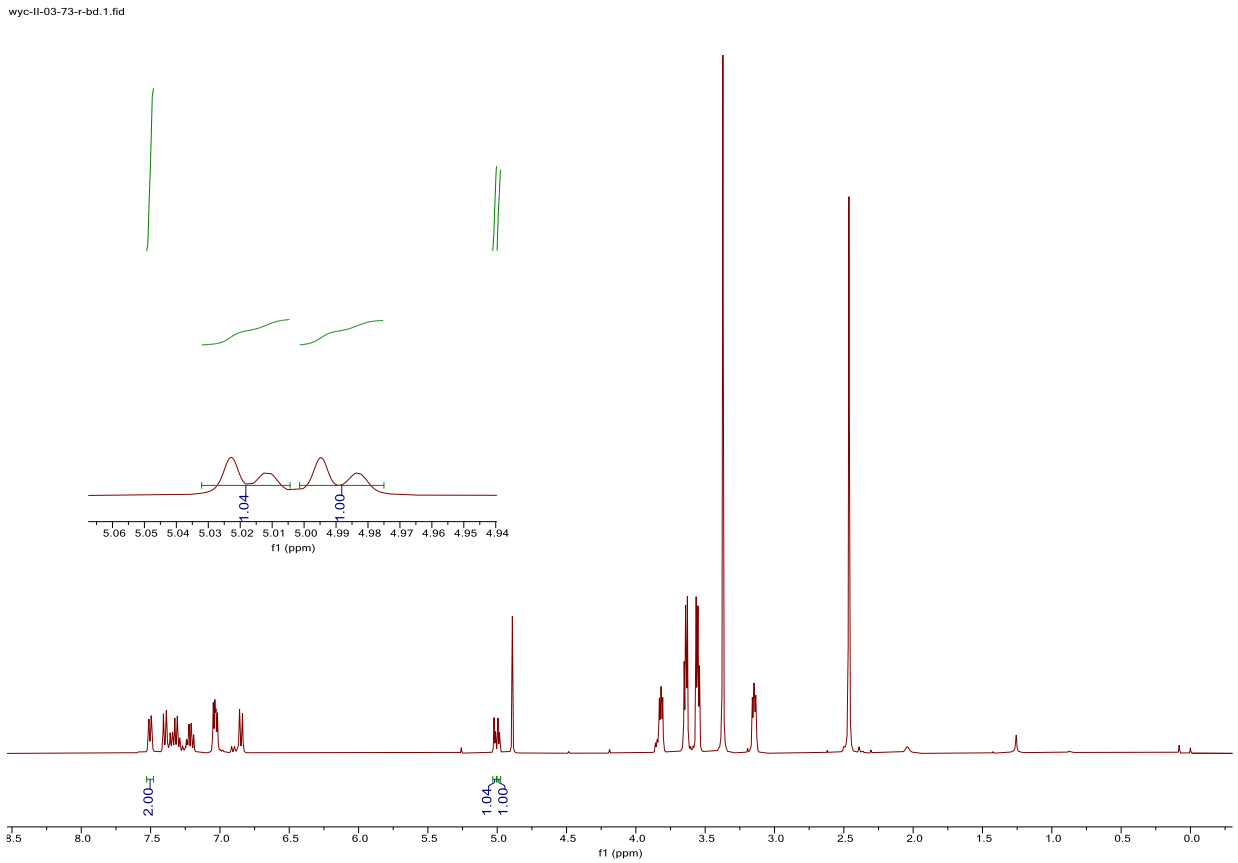
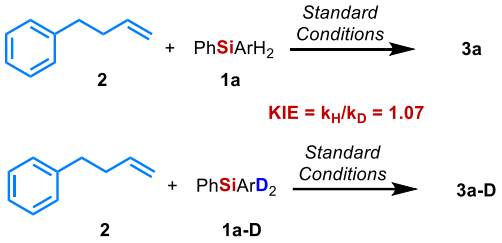


Figure S7. ^{1}H NMR of the Crude Reaction Mixture with the Integral for the Distribution of the Deuterium

3.3 Parallel KIE Experiments



After purification (distillation over Na), diglyme (7.0 mL) was added 4Å molecular sieve (350 mg) and *n*-dodecane (350 μL, internal standard) and was heated at 30 °C under nitrogen for 10 h. Filtration was performed under nitrogen to remove the 4Å molecular sieve. In a nitrogen-filled glovebox, $[Rh(ethylene)_2Cl]_2$ (4.2 mg, 0.0105 mmol), (*S*,*Sp*)-Bn-Phosferrox (**L15**, 22.6 mg, 0.043 mmol) were charged in a 25 mL tube, and the tube was sealed with an open-top cap with PTFE cap liner. The tube was moved outside of the glovebox, followed by the addition of the above diglyme (5.4 mL) and the mixture was stirring at 30 °C for 30 min. To another tube were added the resulted diglyme solution of $[Rh(ethylene)_2Cl]_2$, (*S*,*Sp*)-Bn-Phosferrox and *n*-dodecane (2.0 mL) under nitrogen atmosphere. After cooling to -20 °C, alkene **2** (31.8 mg, 0.24 mmol, 1.2 equiv.), dihydrosilane **1a** (42.5 mg, 0.2 mmol, 1.0 equiv.) or dihydrosilane **1a-D** (42.9 mg. 0.2 mmol, 1.0 equiv.) was added. The reaction progress was monitored by removing aliquots (~100 μL) from the reaction mixture via syringe. Each aliquot was quenched by PE (0.4 mL) at -78 °C, filtered through silica gel and detected by GC.

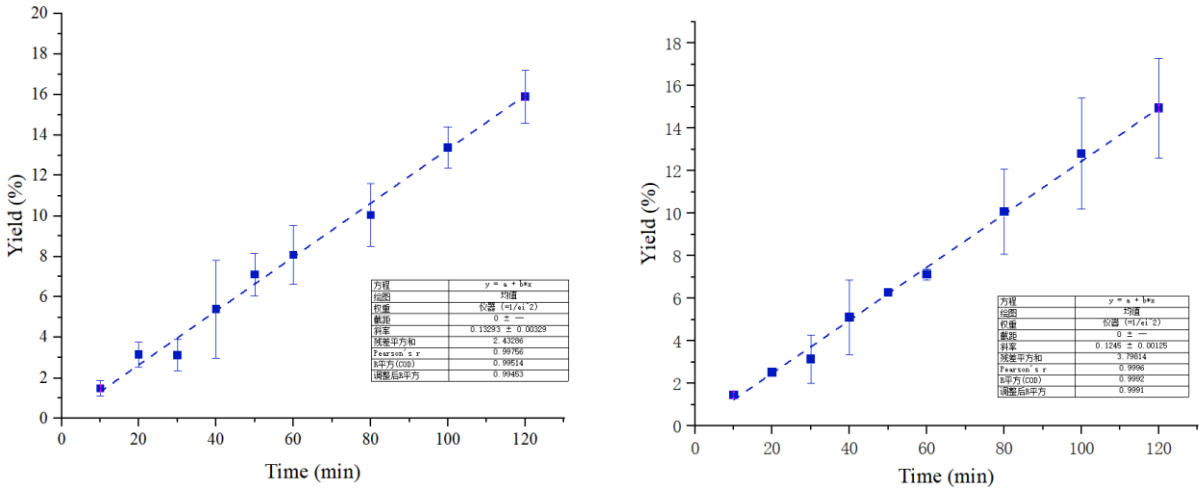


Figure S8. Left: Initial Reaction Rate of the Reaction between **2** and **1a**. Right: Initial Reaction Rate of the Reaction of between **2** and**1a-D.**

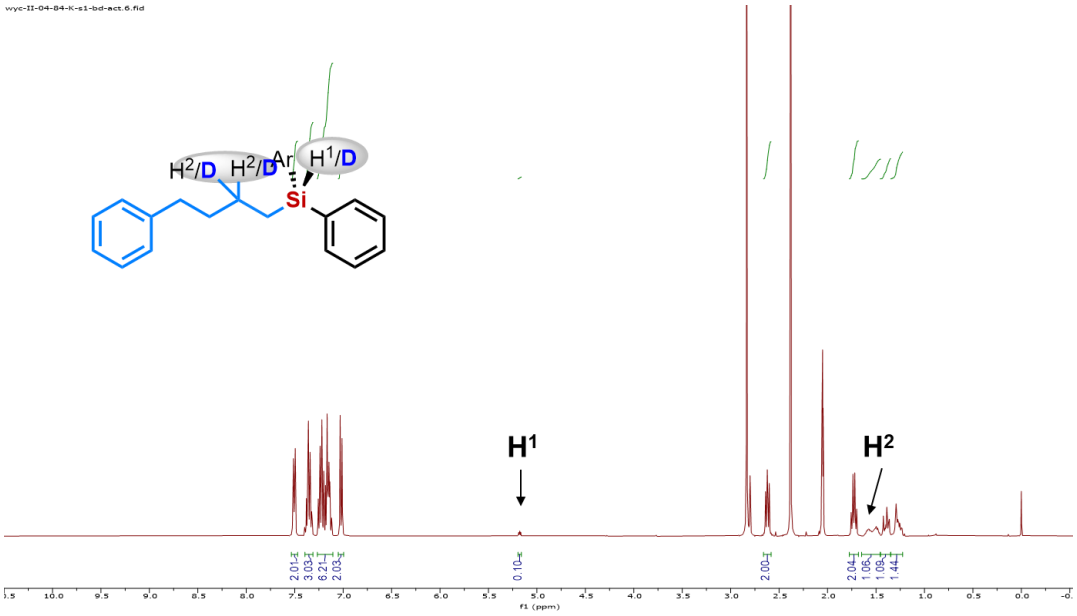
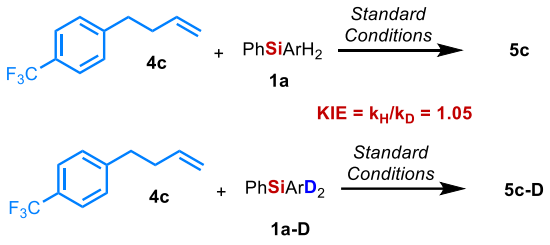


Figure S9. ^{1}H NMR of Isolated Product of the Reaction with **1a-D** after Parallel KIE Experiments.

This parallel KIE experiments were also performed under the conditions which afforded the product with deuterium loss occurred when the reaction with deuterium **1a-D** and the similar outcoming (KIE = 1.05) was observed indicated that the oxidative addition of Si–H bond is not involved in the rate-determining step of this reaction.



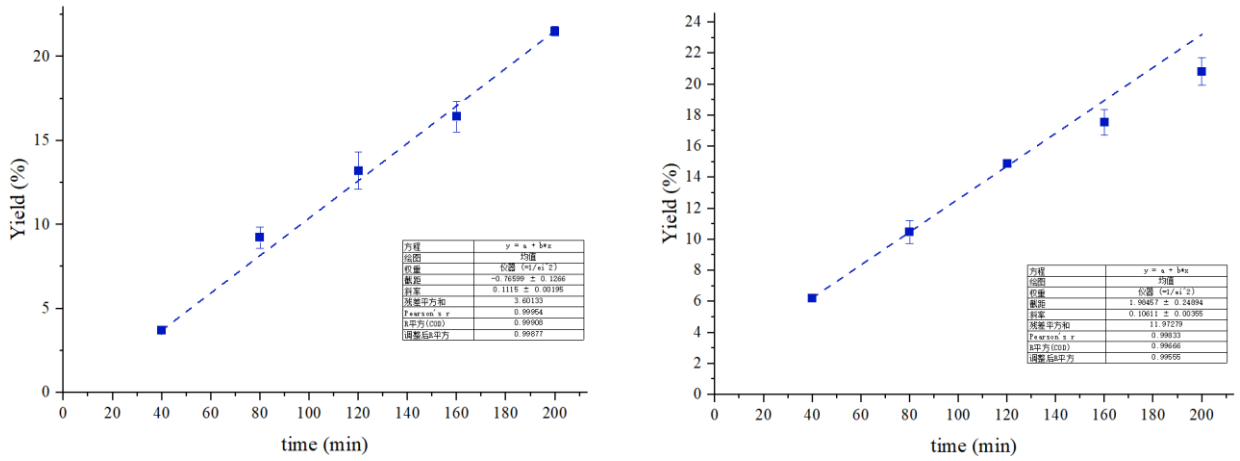


Figure S10. Left: Initial Reaction Rate of the Reaction between **4c** and **1a**. Right: Initial Reaction Rate of the Reaction between **4c** and **1a-D.**

3.4 Computational Study

The geometry optimization and vibrational analysis of all calculated structures were performed at the ωB97XD[6]/6-31G(d,p)[7] level of density functional theory (DFT). The effective core potential (ECP) Lanl2TZ[8] was applied for Rh atom, def2-SVP[9] basis set was applied for Fe, and 6-31G(d,p) basis set were used for other atoms. All transition states have been verified by manual IRC calculation together with the imaginary frequency. Single point energies were computed at the SMD (diglyme, ε_0=7.5) solvent model[10] correction at same level. All these DFT computations were completed using Gaussian 09 software package[11]. All discussed relative free energies and all vibrational analyses were computed at 298.15 K and 1 atm. The basis set of Lanl2TZ was downloaded from open source website basissetexchange.org[12]. All 3D structures are illustrated via CYLview20 software[13].

Computational Mechanism Study

We proposed a plausible mechanism shown in **Fig. S11** based on Chalk-Harrod model. The calculated result showed that the alkene coordination is exothermic, and relatively low activation barrier for Si–H oxidative addition and alkene insertion. Reductive elimination is stereo-determining and rate-determining step. Therefore, the stereoselectivity of product is mainly determined by reductive elimination step, which will be discussed in details.

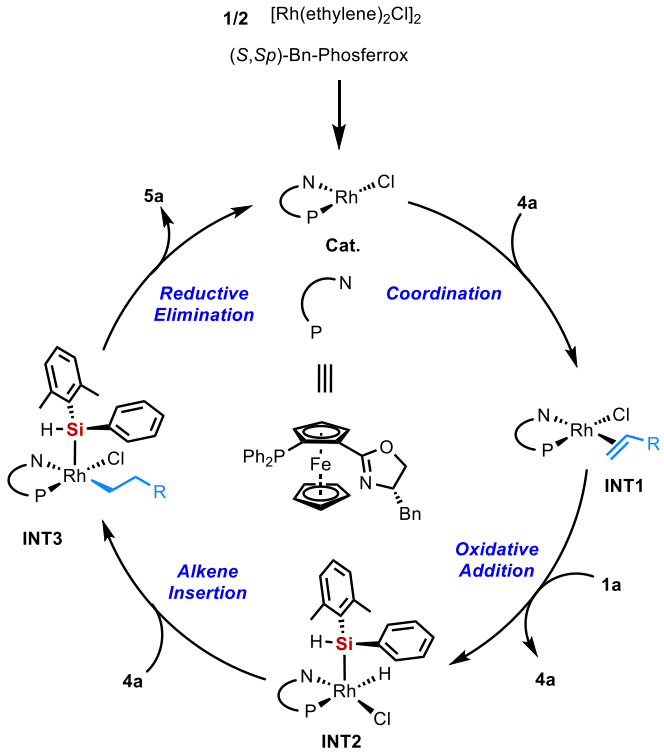
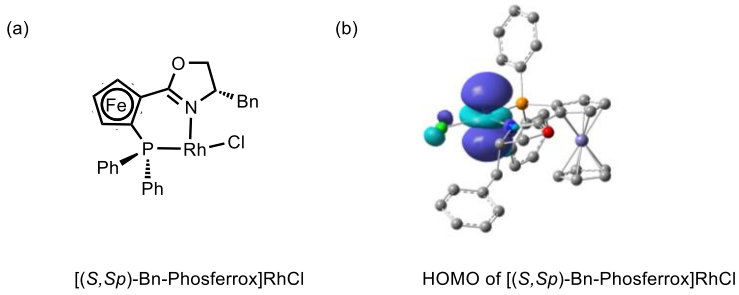


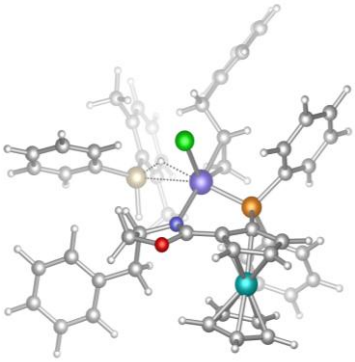
Figure S11. Proposed Mechanism.

Through our computational study, the oxidative addition can be suppressed by the alkene coordination due to the stabilized HOMO energy. As shown in **Table S7**, dz^2 orbitals are responsible for the oxidative addition. The dz^2 orbital energy is stabling from [(*S*,*Sp*)-Bn-Phosferrox]RhCl to **INT1**. The occurrence of oxidation addition reactions have to dissociate alkene **4a** coordination.

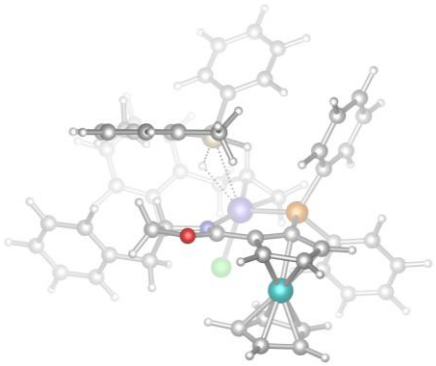
Table S7. Orbital Energy of HOMO before and after Coordinated by **4a**.

HOMO	[(*S*,*Sp*)-Bn-Phosferrox]RhCl	**INT1**
Orbital Energy (a.u.)	-0.24781	-0.26108

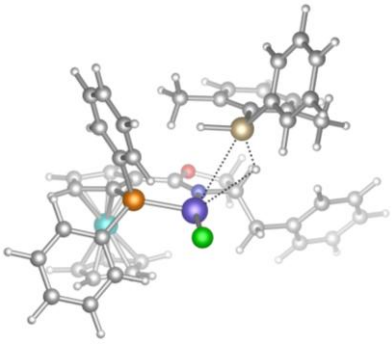




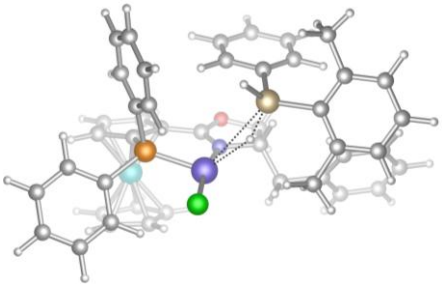
TS1-*S′*
24.7



TS1-*S″*
30.1



TS1-*S*
13.3



TS1-*R*
13.9

Figure S12. Energy Barrier of Oxidative Addition before and after Coordinated by **4a** (Unit :

kcal/mol).

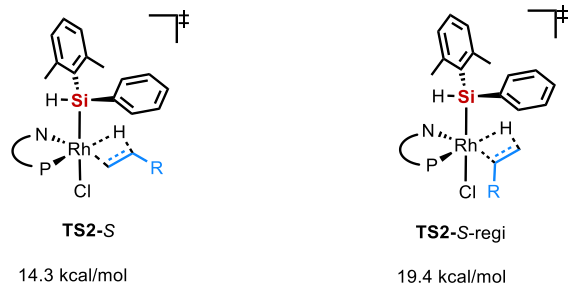


Figure S13. The High Regio-Selective Step of Alkene Insertion to Rh–H Bond.

For the stereo-control modes of the reductive elimination step, two major stereo-selectivity should be considered due to different reaction directions as shown in **Figure S14**.

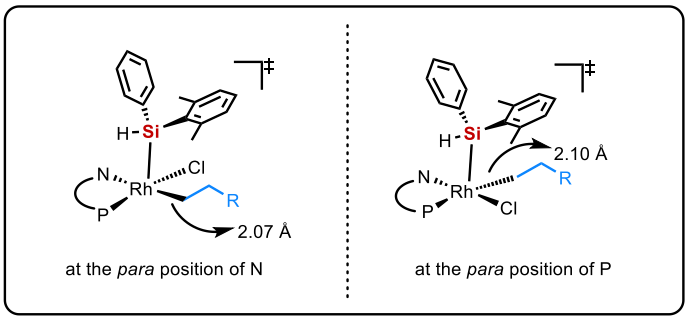


Figure S14. Two Modes of Intermediate.

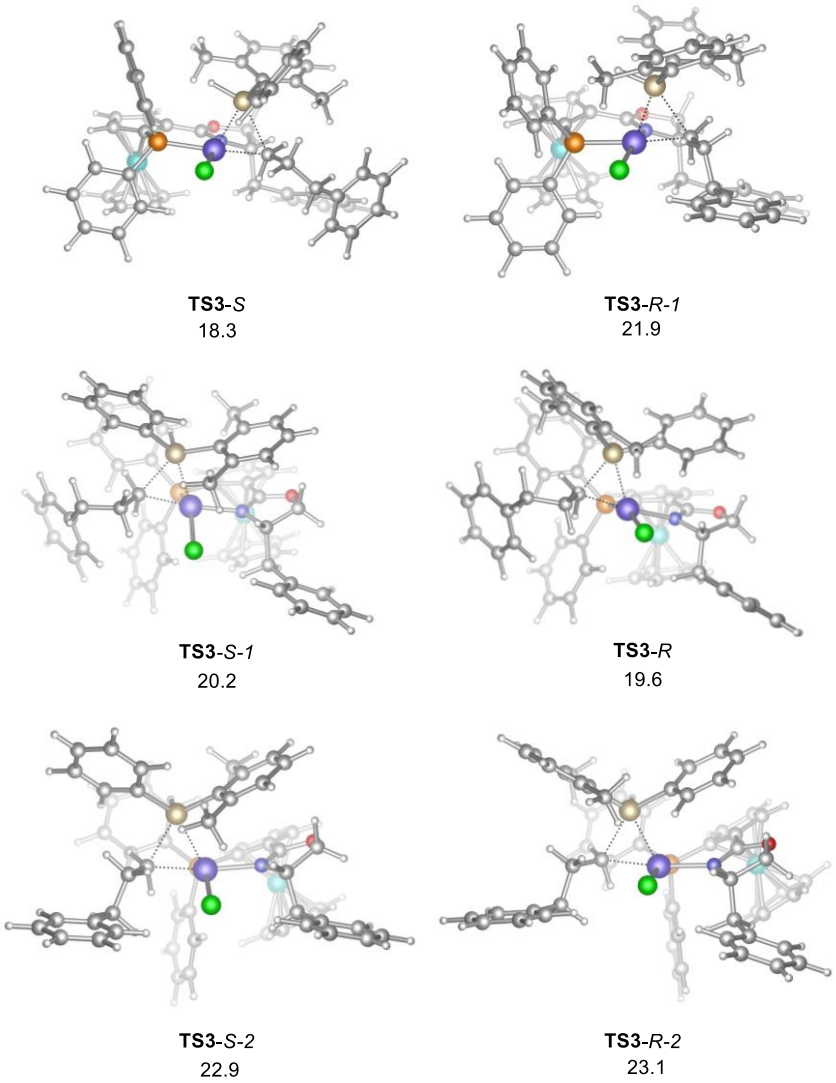


Figure S15. Energy Barrier of Reductive Elimination at the *trans*-Position of N or the *trans*-Position of P (Unit : kcal/mol).

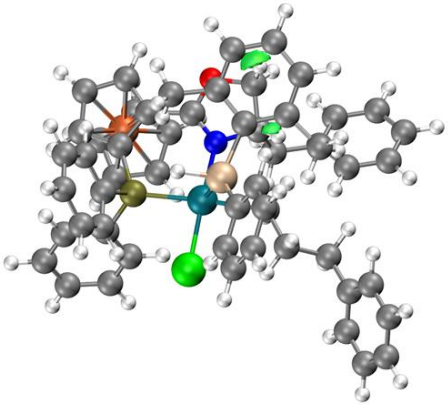


Figure S16. The C-H-π interaction between the Oxazoline and Arene Substituent of Silicane Group in **TS3**-*S*.

Table S8. The Thermodynamic Parameters of the Reduction Elimination Step.

	G(gas) (Hartree)	E(sol) (Hartree)	G (Hartree)
TS3S	0.8617	-4722.0125	-4721.15081
TS3R	0.8662	-4722.0149	-4721.148699
TS3S-1	0.8657	-4722.0135	-4721.147806
TS3R-1	0.8655	-4722.0106	-4721.145099

Table S9. Calculated Energy of the Reaction in Hartree. Thermal Corrections to Gibbs Free Energies (G) and Single-Point Energies (SPE).

Structures	G	SPE
Cat.	0.45952	-3540.615224
4a	0.131497	-348.867336
INT1	0.618269	-3889.529603
1a	0.215875	-832.479028
TS1-*S'*	0.858353	-4721.993537
TS1-*S*	0.700613	-4373.118085
TS1-*R*	0.700613	-4373.117285
INT2-*S*	0.702086	-4373.137806
INT2-*R*	0.698345	-4373.128691
TS2-*S*	0.866553	-4722.01823
TS2-*S*-regi	0.865573	-4722.009083
TS2-*R*	0.863026	-4722.01575
INT3-*S*	0.866279	-4722.046245
INT3-*R*	0.867545	-4722.046558
TS3-*S*	0.861692	-4722.012502
TS3-*R*	0.866194	-4722.014893
TS3-*S-1*	0.865672	-4722.013478
TS3-*R-1*	0.865518	-4722.010617
5a	0.375333	-1181.40255

Cartesian Coordinates of Calculated Structures

Cat.

P	1.383124	0.012828	-0.46128
Rh	0.590981	-2.00018	0.034849
Cl	0.256766	-4.32196	0.3689
C	-1.0747	1.188608	0.392725
C	-1.69036	2.467136	0.564431
C	0.271695	1.389039	-0.07433
H	-2.68803	2.635715	0.941289
C	-0.7382	3.452759	0.197733
C	0.463168	2.798551	-0.19066
H	-0.88889	4.521908	0.243211
H	1.375787	3.283872	-0.50425
C	0.764149	1.119586	3.224807
C	1.622103	2.22594	2.958523
H	2.64358	2.166936	2.610662
C	0.880364	3.41959	3.177929
H	1.243313	4.427257	3.032487
C	-0.50646	1.633366	3.613655
H	-1.3905	1.050269	3.833134
C	-0.43581	3.054839	3.582653
H	-1.24746	3.736245	3.795266
H	1.013259	0.074765	3.095381
Fe	-0.02435	2.275335	1.733863
C	1.753006	0.281422	-2.23727
C	0.854517	0.943011	-3.07818
C	2.916208	-0.27364	-2.7823
C	1.121899	1.059239	-4.43884
H	-0.05557	1.372207	-2.67029
C	3.180665	-0.15687	-4.14246
H	3.623735	-0.79139	-2.14004
C	2.284776	0.511762	-4.97304
H	0.41979	1.58012	-5.08225
H	4.087393	-0.58873	-4.55396
H	2.491491	0.604935	-6.03446
C	2.965358	0.467956	0.349769
C	3.724952	1.573232	-0.04861
C	3.391871	-0.29824	1.436972
C	4.870084	1.927881	0.656084
H	3.428458	2.148639	-0.92113
C	4.542999	0.052244	2.1384
H	2.807023	-1.16754	1.730011
C	5.276654	1.170893	1.754885
H	5.45079	2.790672	0.34498
H	4.863803	-0.54809	2.983556
H	6.172201	1.448263	2.302104
C	-1.63543	-0.06905	0.850724
N	-1.08996	-1.23781	0.826045
C	-3.2483	-1.34917	1.70671
C	-1.94015	-2.13685	1.642047
H	-3.73403	-1.37786	2.68254
O	-2.83904	0.009587	1.438866
H	-2.0519	-3.09057	1.126743
C	-1.27947	-2.36587	3.010616
H	-0.26974	-2.7428	2.822628
H	-1.18816	-1.40211	3.527413
H	-3.95829	-1.64624	0.929627
C	-2.06074	-3.34751	3.845891
C	-2.88358	-2.92179	4.889929
C	-1.99477	-4.71331	3.549916
C	-3.63057	-3.83814	5.627151
H	-2.93225	-1.86288	5.135573
C	-2.73864	-5.62876	4.285947
H	-1.34981	-5.04695	2.739691
C	-3.55958	-5.19425	5.325409
H	-4.26391	-3.4921	6.438402
H	-2.67309	-6.68666	4.051098
H	-4.13825	-5.9107	5.900194

4a

C	-0.19671	0.506285	-0.78316
H	0.504332	-0.18394	-1.24637
H	-1.23834	0.418408	-1.07476
C	0.205327	1.407921	0.107345
H	-0.52147	2.090177	0.546553
C	1.627199	1.585908	0.563612
H	2.263048	0.845957	0.061992
H	1.693591	1.376787	1.638382
C	2.167052	2.980072	0.304282
C	2.831637	3.689251	1.304963
C	2.020968	3.57405	-0.95199
C	3.346939	4.958902	1.058755

	H	2.949387	3.241564	2.288499	C	3.5425	-3.16969	-1.13536
	C	2.533848	4.842119	-1.20196	C	3.465846	-2.64658	1.216601
	H	1.494772	3.035236	-1.73535	C	4.828255	-3.67722	-0.98091
	C	3.199457	5.539249	-0.19664	H	3.069154	-3.2018	-2.11186
	H	3.86068	5.495318	1.85062	C	4.754834	-3.15036	1.371056
	H	2.411367	5.289495	-2.1836	H	2.918682	-2.2528	2.069841
	H	3.599486	6.52939	-0.39071	C	5.438404	-3.66339	0.272505
INT1					H	5.35239	-4.08802	-1.83802
	Rh	0.104989	-1.49234	1.746256	H	5.221813	-3.14502	2.350484
	Cl	-0.90617	-1.12409	3.924425	H	6.441014	-4.06151	0.392843
	P	1.198582	-1.85737	-0.18494	C	0.557053	1.382621	0.486583
	C	1.065576	0.958883	-0.8083	N	0.281805	0.655987	1.512664
	C	1.427838	1.856335	-1.8607	C	-0.17584	2.918623	1.923089
	C	1.522719	-0.35931	-1.15769	C	0.054053	1.588014	2.638118
	H	1.251294	2.921482	-1.86052	H	0.311569	3.770272	2.399631
	C	2.093014	1.102115	-2.86026	O	0.429432	2.710512	0.628593
	C	2.154554	-0.25156	-2.43303	H	-0.81758	1.260548	3.202543
	H	2.515774	1.497198	-3.77289	C	1.284653	1.58323	3.559058
	H	2.61344	-1.06586	-2.97436	H	1.46256	0.543596	3.849633
	C	4.076738	0.731378	0.719593	H	2.158706	1.930866	2.99334
	C	4.826028	0.151655	-0.34395	H	-1.23554	3.138752	1.764977
	H	5.102358	-0.88922	-0.43152	C	1.066538	2.443019	4.778673
	C	5.098081	1.173016	-1.29598	C	1.687254	3.685563	4.917375
	H	5.621176	1.043964	-2.23299	C	0.186739	2.012599	5.77791
	C	3.892459	2.112997	0.425623	C	1.43645	4.48728	6.029585
	H	3.320169	2.817668	1.013391	H	2.382527	4.025155	4.152399
	C	4.522387	2.386247	-0.82083	C	-0.06517	2.811818	6.886848
	H	4.528576	3.337701	-1.33346	H	-0.29572	1.043778	5.671498
	H	3.67361	0.207371	1.575205	C	0.557637	4.0523	7.016031
	Fe	3.070431	0.958022	-1.04649	H	1.9301	5.449708	6.125057
	C	0.33643	-2.89084	-1.43769	H	-0.75017	2.464857	7.654395
	C	-0.65366	-2.29848	-2.22866	H	0.360077	4.674371	7.883596
	C	0.514318	-4.2762	-1.50007	C	-3.74526	-6.06383	-0.33125
	C	-1.44002	-3.07471	-3.073	C	-3.17816	-4.88289	0.133398
	H	-0.81504	-1.22539	-2.17951	C	-2.97934	-4.6716	1.502153
	C	-0.27757	-5.05312	-2.34161	C	-3.36416	-5.67307	2.393343
	H	1.263329	-4.75609	-0.87736	C	-3.93907	-6.85577	1.932456
	C	-1.2542	-4.45447	-3.13071	C	-4.13071	-7.05561	0.568864
	H	-2.20313	-2.60168	-3.68294	H	-3.88946	-6.20946	-1.39801
	H	-0.13522	-6.12839	-2.37104	H	-2.87564	-4.11524	-0.57614
	H	-1.87419	-5.06117	-3.78304	H	-3.21065	-5.52313	3.458636
	C	2.852471	-2.64135	-0.03882	H	-4.23666	-7.62212	2.641993

H	-4.57765	-7.97712	0.208377
C	-2.31427	-3.39893	1.983413
H	-2.81767	-2.53344	1.53643
H	-2.39338	-3.285	3.065483
C	-0.86341	-3.40358	1.546465
H	-0.76285	-3.74083	0.520421
C	0.25713	-3.54117	2.370428
H	0.148498	-3.559	3.45079
H	1.157613	-4.01021	1.979294

1a

Si	-0.15794	-0.06465	-0.00582
H	0.517615	-1.38707	0.040259
H	-1.61938	-0.34152	-0.00952
C	0.2937	0.926633	1.527904
C	0.864236	2.201404	1.421648
C	0.069722	0.40786	2.811231
C	1.198985	2.934767	2.557748
H	1.049095	2.627112	0.438435
C	0.40308	1.135649	3.948264
H	-0.37214	-0.57919	2.928382
C	0.969527	2.40208	3.821846
H	1.641792	3.920558	2.453906
H	0.22343	0.715395	4.932986
H	1.231231	2.970924	4.708847
C	0.330386	0.891234	-1.55278
C	1.57163	0.668003	-2.18573
C	-0.53735	1.880559	-2.06354
C	1.905042	1.399173	-3.32691
C	-0.17494	2.596032	-3.2056
C	1.035089	2.351659	-3.84031
H	2.861326	1.224091	-3.81185
H	-0.84741	3.355377	-3.59485
H	1.306903	2.91311	-4.72907
C	-1.8509	2.200765	-1.38794
H	-2.56785	1.37968	-1.48887
H	-1.71652	2.385137	-0.31656
H	-2.30452	3.094643	-1.82255
C	2.566784	-0.33573	-1.6494
H	2.773593	-0.16919	-0.58718
H	2.198941	-1.36151	-1.75123
H	3.516068	-0.26594	-2.18575

TS1-*S'*

Rh	0.78856	-1.72369	1.753907
Cl	-1.74413	-0.93686	1.363841
P	1.684804	-1.7779	-0.29896
C	0.774047	0.930388	-0.67705
C	0.55615	1.859552	-1.73729
C	1.376013	-0.25068	-1.2244
H	0.145728	2.85143	-1.62184
C	1.018681	1.25943	-2.9369
C	1.525913	-0.0314	-2.62594
H	1.015218	1.718528	-3.91503
H	1.939023	-0.73886	-3.33052
C	4.041521	1.548101	-0.16986
C	4.565867	1.076103	-1.40677
H	5.056736	0.127115	-1.5622
C	4.290912	2.052799	-2.40293
H	4.533788	1.974527	-3.45324
C	3.447609	2.821897	-0.40159
H	2.910354	3.419043	0.322784
C	3.599979	3.132743	-1.7827
H	3.221224	4.01532	-2.27849
H	4.046373	1.006907	0.766051
Fe	2.53792	1.399626	-1.5475
C	0.896383	-3.03138	-1.36912
C	-0.42972	-2.79048	-1.75189
C	1.477713	-4.27223	-1.63733
C	-1.14741	-3.77346	-2.42097
H	-0.91387	-1.85761	-1.47556
C	0.751866	-5.25463	-2.3069
H	2.491375	-4.48506	-1.31347
C	-0.55785	-5.00543	-2.70127
H	-2.1776	-3.58387	-2.70403
H	1.209384	-6.21841	-2.5055
H	-1.12549	-5.77522	-3.21471
C	3.487204	-2.06291	-0.46925
C	4.086836	-2.38131	-1.69223
C	4.289354	-1.89126	0.660327
C	5.467515	-2.52748	-1.78044
H	3.476359	-2.52495	-2.57837
C	5.6724	-2.02168	0.568971
H	3.807312	-1.6598	1.607745
C	6.262546	-2.3421	-0.6503
H	5.924176	-2.78074	-2.7319

H	6.286675	-1.88166	1.452727
H	7.339853	-2.45324	-0.72204
C	0.680147	1.242781	0.737951
N	1.028011	0.490941	1.721279
C	0.135724	2.526158	2.462201
C	0.991247	1.343426	2.9192
H	0.484121	3.495282	2.821816
O	0.283057	2.490662	1.02864
H	0.495321	0.813368	3.726701
C	2.416101	1.727587	3.314894
H	3.004844	0.803943	3.371628
H	2.855157	2.315859	2.498698
H	-0.92278	2.383286	2.696654
C	2.550159	2.497675	4.611941
C	3.766442	3.130256	4.893543
C	1.523898	2.589246	5.554572
C	3.959363	3.818905	6.084327
H	4.571845	3.077016	4.164719
C	1.715118	3.278418	6.751081
H	0.561507	2.11889	5.381343
C	2.930975	3.893711	7.022301
H	4.912732	4.300117	6.28034
H	0.903188	3.322663	7.470348
H	3.079099	4.428148	7.955409
C	-2.08769	-7.59677	1.433143
C	-1.92971	-6.22207	1.583129
C	-1.03681	-5.70523	2.524328
C	-0.29949	-6.59434	3.310276
C	-0.45667	-7.96947	3.164006
C	-1.35203	-8.4753	2.224703
H	-2.78989	-7.98253	0.69976
H	-2.5036	-5.53643	0.964572
H	0.400391	-6.20117	4.044222
H	0.121164	-8.64698	3.786142
H	-1.47767	-9.54778	2.110505
C	-0.82327	-4.21459	2.652252
H	-1.75077	-3.66393	2.466234
H	-0.4934	-3.99685	3.66825
C	0.227767	-3.75863	1.662846
H	-0.04992	-3.99581	0.639956
C	1.602626	-3.69299	1.988465
H	1.906915	-3.90761	3.009639
H	2.359003	-3.95838	1.252577
C	2.631153	-3.742	5.531956
C	2.904421	-4.98766	6.099415
C	1.900357	-5.73207	6.704084
C	0.604325	-5.23826	6.743954
C	0.290413	-3.99947	6.18117
C	1.309414	-3.2357	5.565568
H	3.917094	-5.37917	6.061472
H	2.126867	-6.70071	7.139157
H	-0.18417	-5.82527	7.205918
Si	0.913127	-1.58607	4.76069
H	2.158077	-0.81957	4.564793
C	-0.28294	-0.51424	5.726935
C	-0.00774	-0.15817	7.053534
C	-1.43058	0.007751	5.110652
C	-0.84803	0.705799	7.748941
C	-2.26395	0.884483	5.802971
C	-1.97306	1.235313	7.11949
H	-0.62407	0.969956	8.778109
H	-3.14546	1.286813	5.313429
H	0.115704	-1.78752	3.476465
H	-2.62629	1.914703	7.658764
H	-1.66804	-0.25977	4.079285
H	0.874807	-0.55445	7.550617
C	-1.14516	-3.53208	6.263155
H	-1.27093	-2.78122	7.049384
H	-1.49921	-3.07924	5.332957
H	-1.80613	-4.3727	6.486757
C	3.775096	-2.98712	4.889312
H	3.55226	-2.71375	3.85261
H	3.998734	-2.06047	5.427397
H	4.680949	-3.59831	4.886253

TS1-*S*

C	-2.27873	1.612432	-0.10193
C	-2.43844	2.831053	0.562263
C	-3.24284	2.929134	1.691095
C	-3.90522	1.804973	2.165512
C	-3.77272	0.573898	1.518092
C	-2.94146	0.461354	0.379914
H	-1.91749	3.709789	0.192571
H	-3.35294	3.882273	2.20043
H	-4.52902	1.876974	3.052229

Si	-2.62073	-1.25556	-0.34518	H	-0.79741	-3.06963	-4.53453
H	-1.7159	-1.18176	-1.50797	H	-0.9388	-1.06273	-5.9917
C	-4.23239	-2.07714	-0.85984	C	3.427682	-1.90408	-1.42596
C	-5.2928	-1.32706	-1.38646	C	4.088436	-1.76264	-2.65057
C	-4.39855	-3.46257	-0.73611	C	3.944238	-2.77359	-0.46424
C	-6.48031	-1.93875	-1.77787	C	5.281467	-2.43686	-2.88662
C	-5.58412	-4.07942	-1.12747	H	3.661187	-1.1347	-3.42779
C	-6.62702	-3.31778	-1.64788	C	5.134562	-3.45498	-0.70519
H	-7.29259	-1.34053	-2.18007	H	3.39663	-2.9276	0.460193
H	-5.69681	-5.15402	-1.02011	C	5.810549	-3.27742	-1.90917
Rh	0.684295	-1.49526	0.641503	H	5.790393	-2.31731	-3.83797
Cl	0.622695	-3.79386	0.196213	H	5.526441	-4.13285	0.046285
H	-2.0219	-2.09074	0.736732	H	6.739929	-3.80714	-2.09447
P	1.927131	-0.92016	-1.05176	C	1.110383	1.53623	1.062163
C	2.05014	1.768064	-0.01901	N	0.578741	0.414391	1.396937
C	2.79515	2.975955	-0.19415	C	0.056463	2.112359	2.945914
C	2.57072	0.773838	-0.92302	C	-0.25503	0.64958	2.587778
H	2.653115	3.885579	0.370008	H	0.680679	2.202552	3.842017
C	3.762627	2.741915	-1.20392	O	0.81227	2.601308	1.823171
C	3.633407	1.397215	-1.64764	H	-1.30265	0.540228	2.297473
H	4.501278	3.451904	-1.54759	C	0.054029	-0.34196	3.713418
H	4.255702	0.910676	-2.38412	H	-0.11965	-1.36303	3.348765
C	4.361889	-0.08235	1.700011	H	1.11602	-0.27183	3.974007
C	5.458629	0.04787	0.799151	H	-0.83651	2.725879	3.055083
H	5.801126	-0.71151	0.109902	C	-0.82024	-0.06083	4.911509
C	5.974055	1.369158	0.923831	C	-2.19076	-0.32934	4.848447
H	6.791566	1.788396	0.354425	C	-0.30542	0.526839	6.067404
C	4.20329	1.158211	2.380605	C	-3.02782	-0.01016	5.910556
H	3.43013	1.392206	3.099721	H	-2.60162	-0.79331	3.956556
C	5.197685	2.05726	1.900919	C	-1.14103	0.846245	7.135869
H	5.32208	3.08828	2.200631	H	0.760432	0.730183	6.136039
H	3.712697	-0.94217	1.798372	C	-2.50458	0.582227	7.058426
Fe	4.002442	1.42102	0.363022	H	-4.08976	-0.22681	5.84366
C	1.047378	-0.91525	-2.66216	H	-0.72374	1.300049	8.029392
C	0.965231	0.211282	-3.48339	H	-3.15697	0.832235	7.889099
C	0.405191	-2.09799	-3.04929	H	-7.55375	-3.79722	-1.94866
C	0.249463	0.156795	-4.67771	H	-3.59341	-4.06758	-0.32543
H	1.44633	1.138761	-3.19012	H	-5.19406	-0.24731	-1.47834
C	-0.29887	-2.14985	-4.246	C	-4.5346	-0.60984	2.067481
H	0.438911	-2.96442	-2.39288	H	-5.37574	-0.87187	1.418434
C	-0.38064	-1.02232	-5.06138	H	-3.91074	-1.50728	2.143128
H	0.185709	1.039718	-5.3064	H	-4.93101	-0.39043	3.062585

C	-1.3748	1.566952	-1.31036	H	3.397205	0.662039	3.316924
H	-0.57884	0.831469	-1.17615	C	5.353314	1.427159	2.541358
H	-1.91549	1.28044	-2.2177	H	5.480305	2.360431	3.071684
H	-0.9094	2.540386	-1.48698	H	3.75714	-1.35949	1.594122
TS1-*R*				Fe	4.374462	1.221015	0.756108
C	-1.37361	1.419113	-1.31028	C	1.512709	-0.1571	-2.89019
C	-1.1059	2.757752	-1.04227	C	1.627431	1.101548	-3.48538
C	-1.8884	3.45435	-0.12387	C	0.659487	-1.11252	-3.45806
C	-2.94271	2.807419	0.517568	C	0.892931	1.40519	-4.63067
C	-3.19871	1.462737	0.253941	H	2.277353	1.854105	-3.04991
C	-2.41716	0.744221	-0.66073	C	-0.06542	-0.80648	-4.60374
H	-0.28005	3.25135	-1.54628	H	0.548238	-2.08259	-2.97883
H	-1.67969	4.49844	0.088802	C	0.045417	0.454109	-5.18907
H	-3.56193	3.347227	1.228035	H	0.982374	2.388268	-5.08259
Si	-2.54068	-1.11937	-0.90662	H	-0.73111	-1.54992	-5.03054
H	-2.51607	-1.42504	-2.36091	H	-0.53179	0.69481	-6.07646
C	-4.05327	-1.84525	-0.04904	C	3.795971	-1.57899	-1.84754
C	-5.33964	-1.35545	-0.37382	C	4.508105	-1.24893	-3.00504
C	-3.92406	-2.83555	0.95213	C	4.227677	-2.64367	-1.05484
C	-6.45121	-1.79127	0.348713	C	5.666316	-1.94417	-3.33731
C	-5.05872	-3.24862	1.656135	H	4.149924	-0.45433	-3.65437
C	-6.31052	-2.72022	1.371715	C	5.385054	-3.34065	-1.39062
H	-7.43576	-1.40565	0.098188	H	3.635359	-2.93706	-0.19397
H	-4.95529	-4.00174	2.43215	C	6.110789	-2.98484	-2.52422
Rh	0.926823	-1.4022	0.134214	H	6.215211	-1.68151	-4.23637
Cl	0.903603	-3.61668	-0.6552	H	5.711638	-4.16949	-0.77075
H	-1.29646	-1.67044	-0.29383	H	7.013149	-3.5292	-2.78553
P	2.344478	-0.59926	-1.31411	C	1.387929	1.520554	1.049896
C	2.527586	1.830648	0.207408	N	0.762182	0.399632	1.119005
C	3.378871	2.968349	0.365238	C	-0.08451	1.956117	2.676326
C	3.094015	0.970891	-0.79887	C	-0.32916	0.55539	2.091026
H	3.225947	3.769644	1.072833	H	0.271667	1.924776	3.711737
C	4.461287	2.823113	-0.54013	O	0.963179	2.505489	1.856281
C	4.293292	1.602168	-1.25103	H	-1.26719	0.536086	1.533153
H	5.294115	3.504235	-0.64245	C	-0.34674	-0.56188	3.13335
H	4.975118	1.193974	-1.98288	H	-0.32858	-1.52897	2.611804
C	4.45669	-0.55281	1.770375	H	0.569398	-0.51745	3.733268
C	5.677867	-0.32197	1.073334	H	-0.95342	2.610239	2.604253
H	6.08027	-0.94599	0.287452	C	-1.57329	-0.47365	4.011245
C	6.232197	0.900357	1.550523	C	-2.84655	-0.62109	3.451253
H	7.143044	1.364383	1.199317	C	-1.47126	-0.22595	5.380171
C	4.257216	0.527531	2.675244	C	-3.98782	-0.53984	4.239521

H	-2.95606	-0.81347	2.388359
C	-2.61331	-0.13551	6.173945
H	-0.48936	-0.11121	5.832515
C	-3.87355	-0.29446	5.606522
H	-4.96184	-0.67979	3.780604
H	-2.51446	0.053829	7.238368
H	-4.76263	-0.23139	6.226126
H	-7.18107	-3.05184	1.929947
H	-0.74472	0.886982	-2.01815
H	-4.00861	0.963245	0.781924
C	-5.55041	-0.38893	-1.51761
H	-5.12786	0.598646	-1.31064
H	-5.07801	-0.75515	-2.4355
H	-6.61541	-0.25776	-1.72376
C	-2.6014	-3.4863	1.292182
H	-2.05964	-3.83279	0.408277
H	-1.93388	-2.79643	1.818234
H	-2.75751	-4.34435	1.950131

INT2-*S*

C	-2.26442	2.045103	-0.47523
C	-2.68292	3.272343	0.043632
C	-3.57699	3.330303	1.104909
C	-4.04603	2.149993	1.66453
C	-3.6469	0.905497	1.166057
C	-2.75151	0.83453	0.073313
H	-2.29685	4.191404	-0.38963
H	-3.89707	4.289298	1.501788
H	-4.73265	2.187125	2.506267
Si	-2.12668	-0.82444	-0.63895
H	-1.85409	-0.56264	-2.08297
C	-3.54578	-2.06575	-0.65725
C	-4.67295	-1.7382	-1.42384
C	-3.56908	-3.2588	0.072167
C	-5.79545	-2.5619	-1.44531
C	-4.68567	-4.08983	0.049833
C	-5.80331	-3.7406	-0.70372
H	-6.66153	-2.28532	-2.03975
H	-4.6817	-5.01474	0.619243
Rh	-0.09132	-1.39284	0.275479
Cl	-0.171	-3.61564	-0.51156
H	-1.39807	-1.68148	1.169319
P	1.648687	-0.88604	-1.25734
C	1.864574	1.680998	0.044831
C	2.677465	2.857745	0.003381
C	2.387209	0.7345	-0.9115
H	2.549664	3.72429	0.634482
C	3.688266	2.652582	-0.96761
C	3.516867	1.356936	-1.52511
H	4.479164	3.347	-1.21258
H	4.150446	0.901272	-2.27171
C	3.946298	-0.3583	1.811188
C	5.072192	-0.31909	0.938085
H	5.360481	-1.09453	0.242209
C	5.711072	0.941332	1.104864
H	6.579308	1.288941	0.5631
C	3.892008	0.879073	2.515418
H	3.126689	1.183071	3.216304
C	4.981973	1.683199	2.078314
H	5.1964	2.691789	2.402253
H	3.230653	-1.16512	1.890038
Fe	3.771079	1.200227	0.501008
C	1.040892	-0.71155	-2.9753
C	1.081502	0.492408	-3.68124
C	0.447399	-1.83497	-3.56391
C	0.539208	0.572962	-4.96193
H	1.520669	1.377348	-3.23296
C	-0.08327	-1.75112	-4.84507
H	0.376171	-2.7627	-3.00279
C	-0.04072	-0.54762	-5.54619
H	0.569626	1.516149	-5.4986
H	-0.54544	-2.62625	-5.29017
H	-0.46773	-0.48218	-6.54214
C	3.095909	-1.9921	-1.4185
C	4.006657	-1.87608	-2.47311
C	3.315503	-2.9492	-0.42587
C	5.150119	-2.66693	-2.50196
H	3.811795	-1.17645	-3.28132
C	4.456633	-3.74608	-0.45855
H	2.577397	-3.08594	0.358242
C	5.380723	-3.59656	-1.48868
H	5.85719	-2.56735	-3.31957
H	4.617063	-4.48893	0.316016
H	6.27167	-4.21634	-1.51407
C	0.853736	1.456417	1.067993

N	0.123422	0.413779	1.271939	Si	-2.1224	-1.16178	-0.57335
C	-0.3906	2.103373	2.805249	H	-1.81418	-1.21894	-2.02955
C	-0.55876	0.603208	2.565316	C	-3.68307	-2.21774	-0.316
H	-0.12933	2.364857	3.831498	C	-4.75394	-1.96559	-1.21228
O	0.719231	2.455285	1.950226	C	-3.86909	-3.18685	0.698294
H	-1.60945	0.344273	2.45528	C	-5.96328	-2.64889	-1.07316
C	0.074801	-0.30093	3.631451	C	-5.09511	-3.85081	0.805801
H	0.020482	-1.32984	3.257615	C	-6.13941	-3.58632	-0.06682
H	1.135856	-0.04723	3.742611	H	-6.77183	-2.44251	-1.76948
H	-1.26443	2.67182	2.476283	H	-5.22417	-4.59487	1.587408
C	-0.6414	-0.17504	4.951728	Rh	0.093924	-1.40764	0.17878
C	-1.92144	-0.71661	5.10788	Cl	0.063566	-3.6147	-0.68989
C	-0.07344	0.521674	6.019155	H	-1.36397	-1.68366	0.92274
C	-2.61474	-0.56347	6.303022	P	1.786162	-0.78321	-1.26956
H	-2.37311	-1.26309	4.283376	C	1.938194	1.725991	0.136466
C	-0.76472	0.676313	7.218536	C	2.746305	2.906013	0.180124
H	0.923713	0.942586	5.911933	C	2.495658	0.830095	-0.84706
C	-2.03768	0.134312	7.362597	H	2.595174	3.738988	0.850144
H	-3.60512	-0.99483	6.410779	C	3.785951	2.75338	-0.77044
H	-0.30604	1.216268	8.041125	C	3.637262	1.48727	-1.39864
H	-2.57679	0.251317	8.297325	H	4.579756	3.462527	-0.95715
H	-6.67553	-4.38787	-0.7182	H	4.296929	1.070021	-2.14497
H	-2.69674	-3.54235	0.653711	C	3.991505	-0.41143	1.83219
H	-4.68301	-0.81771	-2.00498	C	5.145451	-0.29541	1.003673
C	-4.18959	-0.32487	1.857637	H	5.469268	-1.0173	0.267039
H	-4.98872	-0.79276	1.275309	C	5.757288	0.959945	1.278408
H	-3.42068	-1.09136	1.995832	H	6.637954	1.356378	0.793149
H	-4.59018	-0.06482	2.841567	C	3.892539	0.774334	2.615586
C	-1.28036	2.065288	-1.62159	H	3.099615	1.016323	3.310115
H	-0.47822	1.338907	-1.47866	C	4.983683	1.622237	2.274508
H	-1.75957	1.810408	-2.57208	H	5.170404	2.607979	2.676361
H	-0.82383	3.05363	-1.72608	H	3.284437	-1.23003	1.829776
INT2-*R*				Fe	3.835438	1.229971	0.623423
C	-1.88624	1.676533	-0.81666	C	1.084479	-0.49294	-2.93468
C	-2.14903	3.00883	-0.51534	C	0.987662	0.781294	-3.4985
C	-3.13911	3.329809	0.413175	C	0.548616	-1.59121	-3.61765
C	-3.86656	2.312256	1.025948	C	0.367952	0.954935	-4.73455
C	-3.59966	0.97914	0.713732	H	1.391803	1.643512	-2.97737
C	-2.59871	0.635636	-0.20315	C	-0.05923	-1.41319	-4.85403
H	-1.58498	3.798419	-1.00345	H	0.580772	-2.57611	-3.16016
H	-3.34713	4.369042	0.650163	C	-0.15295	-0.14065	-5.41455
H	-4.64587	2.556449	1.741973	H	0.292968	1.949135	-5.16405

H	-0.4753	-2.27064	-5.37311
H	-0.63719	-0.00367	-6.3764
C	3.25071	-1.83066	-1.57588
C	4.107477	-1.61678	-2.6602
C	3.540909	-2.84483	-0.66106
C	5.26991	-2.36829	-2.793
H	3.856535	-0.87043	-3.40903
C	4.702125	-3.60066	-0.79757
H	2.841064	-3.0542	0.141979
C	5.573497	-3.35359	-1.85455
H	5.935204	-2.19275	-3.63258
H	4.920507	-4.38635	-0.08169
H	6.4809	-3.94009	-1.95989
C	0.890868	1.442318	1.104336
N	0.185559	0.372689	1.233339
C	-0.45685	1.997948	2.794069
C	-0.59358	0.506218	2.477871
H	-0.24675	2.213474	3.842674
O	0.680523	2.409099	2.007956
H	-1.63466	0.251912	2.275973
C	-0.03482	-0.44241	3.548067
H	-0.09902	-1.46038	3.145893
H	1.028312	-0.22258	3.702155
H	-1.325	2.56949	2.454873
C	-0.78894	-0.32911	4.848631
C	-2.09776	-0.81064	4.951974
C	-0.21681	0.29403	5.958991
C	-2.81328	-0.67493	6.136236
H	-2.55709	-1.3002	4.096638
C	-0.93002	0.432138	7.147303
H	0.802124	0.668647	5.893784
C	-2.23076	-0.05239	7.238453
H	-3.82561	-1.06141	6.201579
H	-0.46697	0.914587	8.002506
H	-2.78711	0.050765	8.164645
H	-7.08443	-4.11199	0.034214
H	-4.18417	0.192326	1.186532
H	-1.10814	1.433737	-1.53833
C	-4.64365	-0.97511	-2.35143
H	-4.39782	0.031723	-2.00089
H	-3.86581	-1.26804	-3.06365
H	-5.58956	-0.91326	-2.89548
C	-2.79384	-3.57978	1.687427
H	-1.87532	-3.88956	1.181212
H	-2.53102	-2.75635	2.360289
H	-3.13902	-4.41006	2.309331

TS2-*S*

C	-2.74966	2.062898	0.008179
C	-3.45328	3.004363	0.763878
C	-4.24675	2.621542	1.837753
C	-4.36023	1.275618	2.146815
C	-3.67593	0.305454	1.405266
C	-2.83699	0.682212	0.331248
H	-3.37458	4.056588	0.504544
H	-4.78411	3.366894	2.416472
H	-4.99508	0.957797	2.970335
Si	-1.83423	-0.60287	-0.67916
H	-1.11756	0.214251	-1.68432
C	-3.07119	-1.60635	-1.71008
C	-2.59968	-2.35885	-2.7968
C	-4.4569	-1.58886	-1.49418
C	-3.46079	-3.08742	-3.61015
C	-5.32626	-2.31805	-2.30261
C	-4.83021	-3.07712	-3.35822
H	-3.05973	-3.65517	-4.44482
H	-6.39483	-2.28535	-2.11096
Rh	-0.15814	-1.79301	0.513448
Cl	1.457085	-2.8687	2.299261
H	-1.37328	-2.22526	1.467239
P	1.510573	-1.26868	-1.13162
C	1.443617	1.43791	-0.07383
C	2.075786	2.700359	-0.30917
C	1.997613	0.474577	-0.9975
H	1.884653	3.602503	0.251903
C	3.008326	2.531259	-1.36061
C	2.966061	1.176156	-1.78113
H	3.669438	3.292477	-1.74942
H	3.581892	0.740755	-2.55301
C	3.929375	-0.13682	1.63272
C	4.970073	-0.01771	0.665941
H	5.322288	-0.80639	0.015975
C	5.423934	1.331449	0.665764
H	6.186712	1.744883	0.020824
C	3.747	1.142706	2.230464

H	2.998521	1.394017	2.96942
C	4.665959	2.051645	1.633695
H	4.751021	3.107126	1.850824
H	3.341722	-1.02251	1.851176
Fe	3.426677	1.25642	0.215247
C	0.955287	-1.41697	-2.87796
C	0.50356	-0.32767	-3.6253
C	0.940115	-2.69115	-3.46076
C	0.018651	-0.51204	-4.91816
H	0.525862	0.668973	-3.1976
C	0.466123	-2.87218	-4.75507
H	1.310321	-3.54607	-2.90251
C	-0.00587	-1.7822	-5.48391
H	-0.34093	0.342789	-5.48177
H	0.461861	-3.86517	-5.19315
H	-0.38736	-1.92333	-6.49013
C	3.116808	-2.15918	-1.27728
C	3.927666	-1.96314	-2.40533
C	3.554884	-3.01862	-0.27059
C	5.170843	-2.57416	-2.4983
H	3.578206	-1.34936	-3.22952
C	4.800014	-3.64001	-0.37219
H	2.933092	-3.18701	0.604039
C	5.614007	-3.41219	-1.47508
H	5.788642	-2.40699	-3.37512
H	5.127711	-4.30209	0.42288
H	6.584335	-3.89354	-1.54889
C	0.575021	1.215223	1.073665
N	0.047903	0.119642	1.489774
C	-0.61275	1.945229	2.824676
C	-0.63151	0.409703	2.766791
H	-0.2467	2.335731	3.776151
O	0.334007	2.314726	1.801141
H	-1.64722	0.032078	2.688128
C	0.065353	-0.25009	3.945298
H	0.265163	-1.2937	3.687776
H	1.054534	0.208239	4.083576
H	-1.5751	2.398149	2.576348
C	-0.7141	-0.17984	5.238969
C	-1.98207	0.396811	5.34829
C	-0.1513	-0.75822	6.383193
C	-2.66783	0.391478	6.562523
H	-2.46586	0.844421	4.484209
C	-0.83212	-0.76656	7.593752
H	0.829478	-1.22089	6.309207
C	-2.09877	-0.18988	7.688931
H	-3.65374	0.842528	6.621791
H	-0.37702	-1.22726	8.465196
H	-2.63346	-0.1962	8.633491
H	-5.50687	-3.6473	-3.98773
C	-2.74202	-3.01245	5.049903
C	-1.87614	-3.45216	4.050875
C	-2.36903	-4.11912	2.926707
C	-3.74426	-4.34287	2.825152
C	-4.61269	-3.90053	3.818523
C	-4.11204	-3.23074	4.932466
H	-2.34458	-2.49847	5.918983
H	-0.80617	-3.28065	4.133759
H	-4.13832	-4.86419	1.955472
H	-5.67954	-4.0796	3.722273
H	-4.78619	-2.88333	5.709476
C	-1.43855	-4.54939	1.821165
H	-0.41384	-4.635	2.187771
H	-1.74615	-5.53307	1.442375
C	-1.45421	-3.63077	0.609388
H	-2.45352	-3.41088	0.234035
C	-0.42994	-3.70002	-0.37036
H	0.438258	-4.32172	-0.15882
H	-0.71289	-3.61928	-1.41468
H	-4.87189	-0.98168	-0.69509
H	-1.54019	-2.36356	-3.02696
C	-3.86983	-1.12664	1.842628
H	-4.89933	-1.29296	2.170482
H	-3.66373	-1.84753	1.053435
H	-3.22612	-1.38558	2.691291
C	-1.93353	2.599274	-1.14995
H	-0.86377	2.408112	-1.02912
H	-2.23497	2.147708	-2.0988
H	-2.06753	3.680728	-1.23507

TS2-*R*

C	-1.35379	2.047201	-0.59521
C	-1.58388	3.378376	-0.26697
C	-2.80857	3.755189	0.281534
C	-3.79976	2.796189	0.465753

C	-3.5544	1.462786	0.140214	H	0.962778	1.368881	-2.86018
C	-2.31489	1.050701	-0.36701	C	0.130914	-1.86218	-4.81382
H	-0.80793	4.119144	-0.43648	H	0.96972	-2.91946	-3.14754
H	-2.99385	4.792236	0.544841	C	-0.17725	-0.61813	-5.36036
H	-4.76768	3.084351	0.865527	H	-0.09884	1.512396	-5.07534
Si	-1.85237	-0.75411	-0.74495	H	-0.09665	-2.7712	-5.36182
H	-1.51058	-0.70494	-2.18422	H	-0.64982	-0.55254	-6.33513
C	-3.41474	-1.85056	-0.63465	C	3.117123	-2.03946	-1.41338
C	-3.84191	-2.59372	-1.7668	C	3.881231	-1.88722	-2.5781
C	-4.13414	-2.00515	0.572683	C	3.517305	-2.97214	-0.45503
C	-4.94782	-3.43953	-1.66889	C	5.041121	-2.62966	-2.76409
C	-5.24203	-2.85671	0.634031	H	3.562922	-1.1951	-3.35161
C	-5.64963	-3.5741	-0.47731	C	4.679523	-3.71748	-0.64634
H	-5.26336	-4.00217	-2.5435	H	2.940889	-3.08774	0.459205
H	-5.77026	-2.96248	1.578111	C	5.445995	-3.54499	-1.7939
Rh	0.009208	-1.5523	0.514763	H	5.624268	-2.4987	-3.67028
Cl	1.728256	-2.29968	2.358102	H	4.984294	-4.43108	0.112366
H	-1.14448	-2.0789	1.494126	H	6.353347	-4.12351	-1.93757
P	1.653414	-0.96525	-1.12179	C	0.983415	1.348331	1.305359
C	1.973381	1.549534	0.254513	N	0.17761	0.367871	1.50692
C	2.714335	2.766731	0.116705	C	-0.11146	2.079375	3.113582
C	2.378388	0.657759	-0.80091	C	-0.71453	0.75725	2.617268
H	2.640972	3.615282	0.779638	H	0.385838	1.973924	4.083097
C	3.568718	2.633344	-1.00619	O	0.880255	2.402608	2.129197
C	3.374026	1.34246	-1.5647	H	-1.69815	0.940376	2.172773
H	4.281168	3.36973	-1.34965	C	-0.81568	-0.29511	3.712471
H	3.898057	0.933208	-2.41582	H	-1.25424	-1.19945	3.287017
C	4.541419	-0.43225	1.536389	H	0.195296	-0.57292	4.025273
C	5.48556	-0.19765	0.49796	H	-0.83175	2.896618	3.155901
H	5.740463	-0.89263	-0.29079	C	-1.64137	0.153593	4.892861
C	5.985488	1.127809	0.649396	C	-2.92267	0.691396	4.728761
H	6.697202	1.618615	0.000065	C	-1.14474	0.008958	6.190406
C	4.453657	0.747214	2.325681	C	-3.68474	1.065955	5.83068
H	3.784682	0.888822	3.16284	H	-3.3346	0.816638	3.730944
C	5.345806	1.713787	1.78124	C	-1.90697	0.377104	7.296305
H	5.488848	2.723784	2.139331	H	-0.15132	-0.40869	6.332545
H	3.936504	-1.31552	1.688331	C	-3.18088	0.908215	7.119488
Fe	3.960087	1.166806	0.381396	H	-4.67665	1.482111	5.682203
C	1.024912	-0.78539	-2.83659	H	-1.50127	0.251919	8.295687
C	0.730783	0.45645	-3.39958	H	-3.77667	1.199385	7.978974
C	0.726523	-1.94503	-3.56139	H	-6.50634	-4.23913	-0.41972
C	0.12995	0.538971	-4.65357	C	-2.41451	-3.32481	5.109238

C	-1.44838	-3.57922	4.13755	C	-3.38448	-0.51662	-2.49943
C	-1.77953	-4.27384	2.972312	C	-3.93706	-3.22173	-2.29624
C	-3.08982	-4.73247	2.810167	C	-4.0608	-1.16177	-3.52862
C	-4.05421	-4.48905	3.7831	C	-4.3349	-2.52371	-3.43079
C	-3.71966	-3.77621	4.932635	H	-4.14317	-4.28456	-2.2089
H	-2.15016	-2.75924	5.997469	H	-4.37016	-0.60411	-4.4079
H	-0.43039	-3.2185	4.260693	Rh	-0.70833	-0.96119	1.609695
H	-3.36211	-5.26753	1.903362	Cl	-1.90662	-0.74893	3.687901
H	-5.06847	-4.84979	3.639479	P	0.834943	-1.41428	0.032533
H	-4.47244	-3.57286	5.687867	C	1.500732	1.420542	-0.11014
C	-0.76292	-4.47106	1.87571	C	2.319785	2.281102	-0.90375
H	0.253553	-4.32234	2.243842	C	1.74647	0.060478	-0.51481
H	-0.83891	-5.49561	1.48701	H	2.376001	3.354368	-0.79987
C	-1.01494	-3.57496	0.678121	C	3.075107	1.468139	-1.78637
H	-2.06605	-3.48673	0.419332	C	2.734253	0.110225	-1.54399
C	-0.09546	-3.47913	-0.39211	H	3.813324	1.818189	-2.49353
H	0.863152	-3.9851	-0.29847	H	3.141677	-0.75049	-2.05502
H	-0.49117	-3.41536	-1.40265	C	4.712669	-0.25627	1.233865
H	-0.3949	1.776557	-1.02784	C	5.458759	0.6841	0.471712
H	-4.34561	0.732885	0.283336	H	6.170049	0.4475	-0.30695
C	-3.74832	-1.32756	1.865873	C	5.075234	1.99255	0.88405
H	-2.97018	-0.57976	1.7349	H	5.438501	2.921752	0.468211
H	-4.61579	-0.83409	2.316449	C	3.865242	0.470963	2.11891
H	-3.38402	-2.06135	2.591756	H	3.147185	0.047946	2.806902
C	-3.14871	-2.52258	-3.11163	C	4.090461	1.860271	1.903047
H	-3.2032	-1.52075	-3.54719	H	3.562607	2.6729	2.383242
H	-2.08622	-2.77218	-3.04721	H	4.755438	-1.33117	1.133386
H	-3.61272	-3.22073	-3.8136	Fe	3.44844	0.96844	0.179251
INT3-*S*				C	0.360115	-2.18838	-1.55426
C	-3.10656	2.526922	0.453247	C	0.071163	-1.39011	-2.66589
C	-3.9271	3.430947	1.132836	C	0.144553	-3.56973	-1.63232
C	-4.93222	2.987956	1.982082	C	-0.44132	-1.95776	-3.82653
C	-5.1582	1.626848	2.119054	H	0.222627	-0.3173	-2.62042
C	-4.35416	0.694981	1.459589	C	-0.35439	-4.13258	-2.80128
C	-3.27839	1.135422	0.655017	H	0.366783	-4.21688	-0.7897
H	-3.7847	4.497581	0.977451	C	-0.65872	-3.329	-3.89543
H	-5.55512	3.702685	2.511774	H	-0.68607	-1.3217	-4.67065
H	-5.9703	1.273413	2.748235	H	-0.51535	-5.20398	-2.8418
Si	-2.06088	-0.11826	-0.08362	H	-1.07118	-3.76979	-4.79728
H	-1.16276	0.670617	-0.97464	C	2.15199	-2.50478	0.695617
C	-2.97198	-1.20189	-1.34497	C	2.992601	-3.25406	-0.13062
C	-3.26761	-2.5661	-1.26486	C	2.357901	-2.53165	2.077442

C	4.017408	-4.01941	0.417993
H	2.836953	-3.25644	-1.20463
C	3.378832	-3.29927	2.628435
H	1.714754	-1.94629	2.729808
C	4.209376	-4.04782	1.79762
H	4.66165	-4.60176	-0.23319
H	3.523726	-3.31272	3.703668
H	5.005253	-4.65016	2.223892
C	0.735473	1.863743	1.045424
N	0.013999	1.148145	1.828605
C	-0.11429	3.416262	2.394996
C	-0.38526	2.016979	2.951113
H	0.338481	4.100386	3.113677
O	0.839268	3.173246	1.333967
H	-1.44084	1.854039	3.172358
C	0.472175	1.676901	4.181255
H	0.3355	0.611872	4.386467
H	1.528062	1.845897	3.931622
H	-1.00489	3.870371	1.952481
C	0.081418	2.500425	5.381909
C	0.89894	3.530141	5.850467
C	-1.14087	2.265192	6.020941
C	0.510134	4.312638	6.935883
H	1.855226	3.715093	5.365793
C	-1.53114	3.046241	7.103023
H	-1.77787	1.4604	5.661829
C	-0.70777	4.072806	7.563388
H	1.160763	5.10633	7.290645
H	-2.48146	2.852398	7.590927
H	-1.01443	4.680247	8.409393
H	-4.85661	-3.0352	-4.23443
C	-0.70724	-7.04308	-0.79262
C	-1.29847	-6.4346	0.312381
C	-0.52314	-5.91228	1.349499
C	0.869983	-5.99845	1.239349
C	1.46577	-6.59751	0.134462
C	0.678816	-7.12662	-0.88687
H	-1.33303	-7.44921	-1.58231
H	-2.38126	-6.36539	0.375685
H	1.498067	-5.58498	2.024826
H	2.548513	-6.64815	0.070844
H	1.142355	-7.59696	-1.74859
C	-1.16003	-5.25604	2.552013
H	-2.24841	-5.37514	2.499084
H	-0.82968	-5.77795	3.45903
C	-0.81646	-3.76134	2.686421
H	-1.19691	-3.38955	3.641541
C	-1.39343	-2.91676	1.547523
H	-1.19116	-3.40689	0.590642
H	-2.48336	-2.88457	1.66782
H	-3.16936	0.545587	-2.60125
H	-2.97124	-3.13261	-0.39174
C	-4.68097	-0.76886	1.615745
H	-3.89108	-1.28443	2.168897
H	-5.61243	-0.8995	2.172305
H	-4.80121	-1.25468	0.64298
C	-2.11874	3.110574	-0.5373
H	-2.20345	4.200795	-0.55571
H	-1.07872	2.865863	-0.31745
H	-2.31501	2.748064	-1.55091
H	0.274266	-3.67586	2.730503

INT3-*R*

C	-2.13061	2.323215	-1.2302
C	-2.09654	3.71357	-1.12168
C	-2.51003	4.327746	0.054063
C	-2.95056	3.542421	1.119006
C	-2.96511	2.156829	1.00833
C	-2.56937	1.512759	-0.1738
H	-1.74682	4.312762	-1.95738
H	-2.4887	5.40967	0.145242
H	-3.28272	4.013359	2.040462
Si	-2.40312	-0.36577	-0.40718
H	-1.72628	-0.39653	-1.73285
C	-4.01252	-1.34694	-0.69489
C	-5.24398	-1.07486	-0.05247
C	-3.9733	-2.40334	-1.64106
C	-6.37395	-1.8406	-0.3507
C	-5.12249	-3.14973	-1.90998
C	-6.32095	-2.87567	-1.27032
H	-7.30882	-1.61755	0.156136
H	-5.06928	-3.95697	-2.63574
Rh	-0.94977	-1.09667	1.247818
Cl	-2.64377	-1.06043	2.948405
P	0.824275	-1.19265	-0.16972

C	1.064221	1.696918	0.052277	N	-0.22139	0.902727	1.979311
C	1.661567	2.783555	-0.6531	C	-0.20317	2.928819	3.184994
C	1.474426	0.464835	-0.57058	C	-0.5629	1.437577	3.302461
H	1.549959	3.826231	-0.39621	H	0.463374	3.280298	3.976104
C	2.448621	2.239413	-1.69962	O	0.501398	3.023768	1.930016
C	2.352874	0.822177	-1.63975	H	-1.62907	1.286804	3.475696
H	3.053257	2.8035	-2.39524	C	0.216742	0.683173	4.388568
H	2.841715	0.123762	-2.30383	H	0.012652	-0.38407	4.250422
C	4.539406	0.41449	1.047971	H	1.291221	0.847072	4.235973
C	5.131894	1.431268	0.25128	H	-1.0784	3.577376	3.125995
H	5.792186	1.275454	-0.59015	C	-0.19375	1.111737	5.774474
C	4.670655	2.69131	0.730164	C	0.620183	1.934154	6.554604
H	4.911024	3.657413	0.309211	C	-1.43714	0.715564	6.27898
C	3.708423	1.044268	2.017383	C	0.204479	2.357249	7.815596
H	3.095164	0.534296	2.746435	H	1.592774	2.239709	6.174853
C	3.792208	2.452358	1.824294	C	-1.85268	1.136214	7.537094
H	3.233369	3.202157	2.366245	H	-2.07256	0.073253	5.67302
H	4.669028	-0.64969	0.921981	C	-1.03359	1.958936	8.308922
Fe	3.081748	1.549975	0.134049	H	0.850014	2.99422	8.412656
C	0.714198	-1.99095	-1.81393	H	-2.81766	0.817955	7.919505
C	0.430818	-1.24255	-2.96223	H	-1.3595	2.285434	9.291675
C	0.803373	-3.38477	-1.92007	H	-7.20783	-3.4642	-1.48668
C	0.260999	-1.86935	-4.19137	C	0.466033	-6.98263	-1.25231
H	0.332128	-0.16518	-2.89894	C	-0.42838	-6.50301	-0.29765
C	0.634494	-4.0072	-3.15288	C	0.02526	-5.87604	0.864633
H	1.008389	-3.99594	-1.04649	C	1.406391	-5.72077	1.034854
C	0.364282	-3.25346	-4.29019	C	2.303147	-6.19147	0.081366
H	0.039034	-1.27331	-5.07087	C	1.836828	-6.82841	-1.06714
H	0.712925	-5.08688	-3.21046	H	0.087942	-7.47565	-2.14346
H	0.229552	-3.74276	-5.2497	H	-1.49725	-6.62102	-0.45282
C	2.230053	-2.05832	0.636183	H	1.786494	-5.22154	1.923034
C	3.260438	-2.67753	-0.0753	H	3.368979	-6.05731	0.23735
C	2.279001	-2.05729	2.0336	H	2.536524	-7.20019	-1.80945
C	4.309078	-3.2967	0.598721	C	-0.93801	-5.37498	1.914338
H	3.242577	-2.68887	-1.15982	H	-1.95739	-5.68218	1.655255
C	3.329497	-2.67067	2.708976	H	-0.69769	-5.85582	2.871043
H	1.493164	-1.56431	2.600717	C	-0.9076	-3.84716	2.106264
C	4.344594	-3.29848	1.991327	H	-1.49159	-3.59067	2.994771
H	5.100116	-3.77968	0.03359	C	-1.45188	-3.07398	0.902665
H	3.3521	-2.66035	3.793949	H	-1.03465	-3.4864	-0.02181
H	5.162668	-3.78318	2.514495	H	-2.5395	-3.18619	0.851585
C	0.390726	1.825808	1.336797	H	0.131302	-3.56044	2.322597

H	-1.79482	1.861043	-2.15517
H	-3.27214	1.5593	1.860776
C	-2.73256	-2.76942	-2.42041
H	-2.5257	-2.03924	-3.20918
H	-1.84328	-2.81976	-1.79354
H	-2.8529	-3.74628	-2.89594
C	-5.41246	0.029984	0.95747
H	-6.40944	-0.00652	1.403916
H	-4.68206	-0.06796	1.763997
H	-5.28883	1.013882	0.496055

TS3-*S*

C	-2.96039	2.056535	-0.25274
C	-3.38211	3.386363	-0.20737
C	-4.31018	3.815378	0.733019
C	-4.83147	2.897965	1.62915
C	-4.43828	1.553557	1.606196
C	-3.47538	1.105518	0.670863
H	-2.9759	4.095272	-0.924
H	-4.62778	4.853544	0.759814
H	-5.56913	3.216371	2.361568
Si	-2.81569	-0.69542	0.579246
H	-2.24762	-0.81571	-0.79657
C	-4.25752	-1.90453	0.375882
C	-4.02601	-3.28877	0.334369
C	-5.55275	-1.45206	0.090795
C	-5.05399	-4.18139	0.050632
C	-6.58481	-2.34316	-0.19703
C	-6.33928	-3.71178	-0.21102
H	-4.85187	-5.24841	0.038472
H	-7.58066	-1.96444	-0.40897
Rh	-0.66167	-0.98775	1.496751
Cl	-0.57979	-3.36408	1.457967
P	0.997183	-1.02939	-0.10818
C	1.22032	1.830445	0.116356
C	1.997846	2.909787	-0.41066
C	1.730672	0.597034	-0.42286
H	1.868361	3.95185	-0.16026
C	2.976267	2.355375	-1.27261
C	2.819983	0.942826	-1.27798
H	3.739581	2.908729	-1.80084
H	3.433517	0.239972	-1.82196
C	3.439158	0.662889	2.436775
C	4.522846	0.366394	1.560007
H	4.798261	-0.61694	1.204858
C	5.132868	1.59625	1.186811
H	5.96152	1.710374	0.502252
C	3.384962	2.076726	2.606203
H	2.647404	2.625095	3.175627
C	4.428865	2.654158	1.830929
H	4.629167	3.710663	1.722249
H	2.750164	-0.05486	2.85973
Fe	3.157324	1.585507	0.634497
C	0.352712	-1.48985	-1.76199
C	0.245146	-0.56418	-2.80242
C	-0.13618	-2.78865	-1.94746
C	-0.34541	-0.92917	-4.00992
H	0.610333	0.449216	-2.67474
C	-0.71861	-3.14928	-3.15606
H	-0.08686	-3.50407	-1.13265
C	-0.82851	-2.22036	-4.18879
H	-0.42917	-0.19758	-4.80758
H	-1.10263	-4.15603	-3.28561
H	-1.29508	-2.50205	-5.1276
C	2.461551	-2.10171	0.115857
C	3.319708	-2.40979	-0.94342
C	2.760029	-2.56826	1.397406
C	4.487226	-3.13045	-0.71274
H	3.067178	-2.09932	-1.95363
C	3.924846	-3.29367	1.627437
H	2.062683	-2.37969	2.207317
C	4.795178	-3.56529	0.575049
H	5.151622	-3.36317	-1.53903
H	4.146396	-3.65428	2.626676
H	5.705348	-4.12932	0.753674
C	0.242927	1.994064	1.179766
N	-0.4465	1.096513	1.802503
C	-0.99581	3.249962	2.541792
C	-1.07469	1.78393	2.951911
H	-0.74579	3.926378	3.359882
O	0.093768	3.25938	1.596578
H	-2.11152	1.47479	3.048646
C	-0.30745	1.474248	4.249336
H	-0.13797	0.395233	4.304409
H	0.679146	1.949995	4.201611

H	-1.89776	3.590418	2.028124
C	-1.07474	1.947342	5.458459
C	-2.17743	1.21099	5.902617
C	-0.75233	3.133542	6.118631
C	-2.94321	1.651391	6.974996
H	-2.42835	0.279425	5.403915
C	-1.51812	3.579148	7.19464
H	0.111484	3.709932	5.795013
C	-2.61683	2.841228	7.623027
H	-3.79203	1.062215	7.308459
H	-1.25305	4.503286	7.698957
H	-3.21263	3.187462	8.461575
H	-7.14222	-4.41	-0.42872
C	-6.50192	-4.48623	5.480058
C	-5.71119	-3.40237	5.113512
C	-4.32538	-3.43162	5.291684
C	-3.74929	-4.57775	5.842094
C	-4.53626	-5.66525	6.211881
C	-5.91598	-5.6222	6.033223
H	-7.57717	-4.44352	5.334227
H	-6.17146	-2.51857	4.677571
H	-2.67171	-4.61788	5.980372
H	-4.07049	-6.54731	6.641079
H	-6.53134	-6.4686	6.322548
C	-3.47643	-2.26929	4.841607
H	-3.99803	-1.32992	5.072705
H	-2.53164	-2.25519	5.399832
C	-3.18568	-2.31965	3.331806
H	-2.6487	-3.24098	3.092925
C	-2.38213	-1.10626	2.877996
H	-2.91225	-0.19347	3.144605
H	-1.46621	-1.08358	3.503378
H	-5.76394	-0.38557	0.086006
H	-3.03027	-3.66975	0.543966
C	-5.116	0.66799	2.634857
H	-6.1898	0.878037	2.654284
H	-4.99933	-0.39622	2.439723
H	-4.73164	0.874924	3.64145
C	-1.96451	1.702053	-1.33416
H	-1.13795	1.102103	-0.95483
H	-2.42882	1.112584	-2.1305
H	-1.54679	2.608857	-1.78086
H	-4.14468	-2.38263	2.811792

TS3-*R*

C	-2.30929	1.570183	-1.46342
C	-2.38488	2.959588	-1.53915
C	-2.90511	3.687363	-0.47404
C	-3.33647	3.010789	0.665557
C	-3.24044	1.624875	0.741705
C	-2.73984	0.865891	-0.32688
H	-2.04123	3.471183	-2.43371
H	-2.97603	4.769626	-0.53093
H	-3.74497	3.565256	1.506698
Si	-2.44006	-1.02715	-0.39504
H	-1.71012	-1.12887	-1.67286
C	-4.07766	-1.95782	-0.76018
C	-4.12625	-2.86317	-1.85338
C	-5.24416	-1.79859	0.020171
C	-5.30884	-3.5534	-2.13477
C	-6.40876	-2.50578	-0.28968
C	-6.44851	-3.37889	-1.36409
H	-5.32972	-4.24486	-2.9731
H	-7.29066	-2.36867	0.330472
Rh	-0.74548	-0.69819	1.30132
Cl	-2.204	-0.74856	3.236993
P	1.037365	-1.02899	-0.04973
C	1.563257	1.789103	0.023519
C	2.439571	2.750401	-0.56746
C	1.952602	0.482901	-0.43246
H	2.414665	3.813626	-0.38146
C	3.363364	2.047882	-1.38381
C	3.071898	0.659087	-1.3003
H	4.173332	2.490775	-1.94556
H	3.597324	-0.13573	-1.81017
C	3.598568	0.760566	2.511694
C	4.621393	0.149016	1.732342
H	4.739904	-0.91165	1.565648
C	5.424263	1.18217	1.174275
H	6.264241	1.044357	0.508054
C	3.776217	2.171766	2.442301
H	3.127702	2.918017	2.880701
C	4.903152	2.433092	1.613484
H	5.274701	3.409423	1.335999
H	2.799086	0.244997	3.025178

Fe	3.472851	1.404948	0.572831
C	0.86663	-1.81478	-1.69395
C	0.699412	-1.02919	-2.83906
C	0.786234	-3.20703	-1.80335
C	0.479226	-1.62534	-4.07531
H	0.734565	0.053338	-2.76327
C	0.570744	-3.79965	-3.04422
H	0.896614	-3.84114	-0.92805
C	0.418639	-3.01298	-4.18121
H	0.352458	-1.00503	-4.95689
H	0.510826	-4.8808	-3.10917
H	0.247159	-3.47834	-5.14666
C	2.247576	-2.13377	0.785675
C	3.313181	-2.72785	0.101237
C	2.111097	-2.36089	2.15758
C	4.229472	-3.52454	0.779275
H	3.421342	-2.58084	-0.96878
C	3.036571	-3.14659	2.839904
H	1.26869	-1.92238	2.687964
C	4.096931	-3.72911	2.152196
H	5.049096	-3.98548	0.237185
H	2.920257	-3.30937	3.906479
H	4.814956	-4.34737	2.681863
C	0.646672	2.080802	1.115325
N	-0.07941	1.257621	1.788515
C	-0.36475	3.456095	2.543581
C	-0.58845	2.002606	2.958197
H	0.012855	4.093577	3.344207
O	0.650909	3.358382	1.522437
H	-1.64301	1.773425	3.102543
C	0.201325	1.587449	4.209561
H	0.13216	0.498479	4.287476
H	1.256536	1.85244	4.0691
H	-1.25133	3.902215	2.087205
C	-0.34503	2.23866	5.454765
C	-1.55652	1.792662	5.993889
C	0.308561	3.311336	6.063872
C	-2.09772	2.408459	7.116438
H	-2.06528	0.955217	5.522445
C	-0.23328	3.930379	7.188718
H	1.256143	3.660568	5.658769
C	-1.43866	3.479927	7.717027
H	-3.0356	2.047883	7.527752
H	0.288364	4.762306	7.652291
H	-1.86213	3.958305	8.594744
H	-7.35774	-3.92582	-1.59576
C	0.2396	-6.69821	-0.94638
C	-1.01696	-6.19202	-0.61607
C	-1.24038	-5.55257	0.60486
C	-0.16107	-5.4284	1.488027
C	1.101049	-5.90793	1.154289
C	1.307461	-6.54656	-0.06747
H	0.384893	-7.20105	-1.89854
H	-1.83806	-6.28645	-1.32244
H	-0.30563	-4.92658	2.441315
H	1.927272	-5.77207	1.84528
H	2.292001	-6.92178	-0.32888
C	-2.59792	-4.96437	0.933238
H	-3.20497	-4.95011	0.019734
H	-3.12207	-5.61475	1.644688
C	-2.53799	-3.53517	1.501211
H	-3.55511	-3.14177	1.540081
C	-1.59994	-2.66357	0.661825
H	-0.58593	-2.82849	1.064681
H	-1.4796	-3.08037	-0.34548
H	-2.18484	-3.53682	2.535691
C	-5.29104	-0.8791	1.21369
H	-4.36699	-0.90844	1.799483
H	-5.45839	0.155881	0.899434
H	-6.10782	-1.15813	1.884863
C	-2.94805	-3.16169	-2.75716
H	-2.5869	-2.27483	-3.28381
H	-2.09226	-3.568	-2.21034
H	-3.22954	-3.90474	-3.5082
H	-1.89928	1.02235	-2.30872
H	-3.52784	1.131305	1.663425

TS3-*S-1*

C	-2.4228	1.971881	-0.67627
C	-2.82322	3.272567	-0.37716
C	-3.68197	3.532527	0.687344
C	-4.13192	2.479804	1.465931
C	-3.75471	1.159467	1.187214
C	-2.90249	0.88323	0.097267
H	-2.4576	4.094319	-0.98752

H	-3.98958	4.550924	0.906519	H	0.241696	-1.18065	-5.04875
H	-4.79342	2.670554	2.30759	H	0.140547	-4.97876	-3.03996
Si	-2.35023	-0.89927	-0.34645	H	-0.11548	-3.63445	-5.12104
H	-1.6578	-0.8977	-1.6543	C	2.293485	-2.19134	0.659318
C	-3.94552	-1.81871	-0.87326	C	3.319502	-2.80559	-0.06582
C	-3.84339	-3.00004	-1.62849	C	2.228466	-2.38105	2.042613
C	-5.23212	-1.29541	-0.69389	C	4.27204	-3.58406	0.5832
C	-4.9648	-3.65305	-2.12788	H	3.368638	-2.68694	-1.14391
C	-6.36283	-1.93988	-1.19308	C	3.191629	-3.14758	2.693423
C	-6.23516	-3.12889	-1.90095	H	1.416379	-1.9356	2.612878
H	-4.84651	-4.56872	-2.70028	C	4.214318	-3.74957	1.966184
H	-7.34451	-1.50494	-1.0298	H	5.0608	-4.06076	0.009817
Rh	-0.63886	-0.81032	1.289348	H	3.131288	-3.2825	3.768529
Cl	-1.53521	-1.12095	3.533904	H	4.960912	-4.35281	2.47322
P	1.059191	-1.09689	-0.15342	C	0.672209	2.005477	1.041971
C	1.578644	1.725633	-0.06173	N	0.021072	1.159157	1.760374
C	2.423318	2.697666	-0.67881	C	-0.45006	3.355687	2.407129
C	1.957239	0.424322	-0.54565	C	-0.52951	1.913474	2.905264
H	2.396627	3.759491	-0.48464	H	-0.13593	4.070879	3.168135
C	3.324681	2.008152	-1.53051	O	0.57877	3.29562	1.390726
C	3.04715	0.616329	-1.44744	H	-1.55615	1.597368	3.088041
H	4.112881	2.461018	-2.11485	C	0.333103	1.654626	4.151197
H	3.56223	-0.17132	-1.97875	H	0.392676	0.571696	4.286334
C	3.683138	0.742988	2.361963	H	1.345421	2.035117	3.964556
C	4.661889	0.090671	1.559262	H	-1.37471	3.684781	1.927782
H	4.749051	-0.97518	1.407557	C	-0.25345	2.307918	5.377069
C	5.469452	1.091272	0.95202	C	-1.40712	1.774787	5.962696
H	6.280187	0.918444	0.258335	C	0.305424	3.464225	5.92402
C	3.894164	2.14748	2.258782	C	-1.98443	2.388442	7.068448
H	3.284456	2.917884	2.710784	H	-1.8387	0.869294	5.54294
C	4.996667	2.363599	1.384451	C	-0.27171	4.080214	7.032931
H	5.382304	3.324261	1.073439	H	1.207803	3.882508	5.483006
H	2.887971	0.259497	2.912384	C	-1.4195	3.543624	7.606835
Fe	3.503854	1.352027	0.416954	H	-2.87657	1.960699	7.515696
C	0.827068	-1.90051	-1.77767	H	0.178403	4.976539	7.448987
C	0.682683	-1.15039	-2.94819	H	-1.87032	4.019441	8.472278
C	0.630545	-3.28622	-1.82592	H	-7.11457	-3.63482	-2.288
C	0.351183	-1.77375	-4.1465	C	0.395916	-6.73832	-0.67013
H	0.822119	-0.07437	-2.9258	C	-0.88664	-6.25674	-0.40993
C	0.292353	-3.90441	-3.02478	C	-1.18215	-5.59309	0.782472
H	0.741141	-3.89401	-0.93247	C	-0.15243	-5.42909	1.716846
C	0.150092	-3.15051	-4.18646	C	1.132867	-5.89129	1.45543

C	1.414656	-6.54538	0.257422	C	-6.65891	-3.31943	-0.44344
H	0.59974	-7.25316	-1.60494	H	-5.20729	-4.45008	-1.53971
H	-1.67107	-6.38669	-1.15181	H	-7.87204	-1.96959	0.697092
H	-0.3543	-4.90428	2.647562	Rh	-1.05644	-0.88883	1.564154
H	1.92089	-5.72875	2.183546	Cl	-1.06953	-3.26285	1.651655
H	2.419779	-6.90032	0.052361	P	0.770523	-1.14788	0.170936
C	-2.55815	-5.00963	1.022343	C	0.927453	1.730363	0.030995
H	-3.14145	-5.10564	0.099632	C	1.66016	2.750647	-0.65382
H	-3.08397	-5.5971	1.785299	C	1.44947	0.448632	-0.3676
C	-2.54433	-3.52757	1.454038	H	1.518434	3.812902	-0.52358
H	-3.56351	-3.14157	1.353146	C	2.615626	2.110481	-1.482
C	-1.53993	-2.71748	0.636383	C	2.492549	0.705762	-1.30585
H	-0.54042	-3.03747	0.962752	H	3.340072	2.607605	-2.11119
H	-1.52924	-3.04572	-0.41045	H	3.093341	-0.04807	-1.79316
H	-5.36287	-0.35475	-0.17073	C	3.241521	0.985075	2.417989
H	-2.86535	-3.42198	-1.85071	C	4.29046	0.537422	1.564453
C	-4.29355	0.097318	2.116392	H	4.553916	-0.49338	1.37559
H	-5.38318	0.173438	2.197681	C	4.887287	1.682338	0.967907
H	-4.04835	-0.91874	1.805835	H	5.691141	1.675029	0.245457
H	-3.86618	0.214845	3.115631	C	3.195882	2.407159	2.352253
C	-1.47253	1.781862	-1.83644	H	2.474008	3.046562	2.841708
H	-0.58245	1.226403	-1.53015	C	4.211525	2.838678	1.453926
H	-1.93415	1.223545	-2.65646	H	4.409128	3.861121	1.164609
H	-1.14281	2.748508	-2.2268	H	2.574857	0.35064	2.9852
H	-2.28653	-3.43104	2.510371	Fe	2.892094	1.596965	0.4978
TS3-*R-1*				C	0.376913	-1.92004	-1.44121
C	-2.76322	2.167772	-0.76387	C	-0.03147	-1.13068	-2.51991
C	-2.85025	3.548558	-0.92181	C	0.409832	-3.31048	-1.5844
C	-3.54321	4.314283	0.01032	C	-0.38283	-1.7206	-3.72979
C	-4.12675	3.683174	1.105745	H	-0.07604	-0.0509	-2.41791
C	-4.01293	2.303336	1.262956	C	0.061369	-3.89641	-2.79654
C	-3.34436	1.499116	0.327455	H	0.693004	-3.93404	-0.74282
H	-2.3833	4.023456	-1.77965	C	-0.33301	-3.10427	-3.87148
H	-3.6295	5.389344	-0.11451	H	-0.69872	-1.09697	-4.56012
H	-4.66999	4.265272	1.844781	H	0.09146	-4.97654	-2.89776
Si	-3.02005	-0.38942	0.371792	H	-0.60665	-3.56515	-4.81537
H	-2.32353	-0.50029	-0.94962	C	2.235138	-2.0823	0.745217
C	-4.53954	-1.51268	0.078607	C	3.247917	-2.49653	-0.1256
C	-4.33413	-2.67544	-0.70977	C	2.363111	-2.33862	2.111354
C	-5.84731	-1.27161	0.567087	C	4.385719	-3.12593	0.367978
C	-5.3925	-3.55762	-0.94837	H	3.139198	-2.34434	-1.19511
C	-6.88017	-2.17232	0.302322	C	3.504254	-2.96306	2.607149

H	1.555501	-2.06154	2.782769
C	4.518898	-3.35199	1.737111
H	5.165391	-3.44548	-0.31626
H	3.595384	-3.15503	3.671216
H	5.407141	-3.84225	2.122917
C	0.040057	1.99406	1.14915
N	-0.68088	1.160614	1.817772
C	-0.93193	3.339581	2.6385
C	-1.15538	1.875497	3.016494
H	-0.51968	3.945324	3.446872
O	0.04798	3.261676	1.58493
H	-2.21387	1.672921	3.17476
C	-0.3457	1.425331	4.244945
H	-0.35887	0.330796	4.282025
H	0.700108	1.725453	4.10628
H	-1.82831	3.809399	2.229204
C	-0.90319	2.001657	5.521098
C	-2.09382	1.494979	6.052285
C	-0.28071	3.069694	6.16849
C	-2.64736	2.044932	7.20263
H	-2.58486	0.657996	5.560102
C	-0.83376	3.624446	7.320585
H	0.651423	3.465738	5.771836
C	-2.01899	3.113664	7.839341
H	-3.56787	1.635643	7.606943
H	-0.33594	4.453972	7.813156
H	-2.45064	3.542626	8.738002
H	-7.46762	-4.01961	-0.63063
C	-5.64474	-5.19701	5.938406
C	-4.96893	-4.00802	5.673192
C	-3.95122	-3.95848	4.719691
C	-3.6255	-5.13007	4.028256
C	-4.29837	-6.31838	4.289175
C	-5.31037	-6.35691	5.246674
H	-6.43124	-5.21633	6.687205
H	-5.23387	-3.10319	6.215635
H	-2.83861	-5.09591	3.278967
H	-4.03175	-7.21956	3.744719
H	-5.8334	-7.28623	5.451482
C	-3.23822	-2.671	4.391825
H	-3.37718	-1.94869	5.207746
H	-2.16232	-2.85912	4.298951
C	-3.72794	-2.05739	3.071489
H	-3.64125	-2.81411	2.288139
C	-2.94824	-0.78863	2.705605
H	-3.59046	0.097368	2.738161
H	-2.20951	-0.59345	3.500849
H	-4.79779	-1.83815	3.162319
H	-2.22026	1.590396	-1.50765
H	-4.47097	1.859215	2.140219
C	-3.00763	-3.03311	-1.33441
H	-2.73449	-2.33776	-2.13348
H	-2.19844	-3.03303	-0.60303
H	-3.05212	-4.0349	-1.76923
C	-6.21875	-0.05163	1.373749
H	-5.62272	0.03349	2.286898
H	-6.08234	0.866691	0.798098
H	-7.26657	-0.10014	1.680223

5a

C	-2.23629	1.748839	3.02012
C	-2.86477	2.643268	3.887033
C	-4.24188	2.62513	4.054005
C	-5.0001	1.694296	3.362092
C	-4.40415	0.783609	2.485333
C	-3.00432	0.810676	2.28776
H	-2.26276	3.356291	4.443444
H	-4.71981	3.324553	4.733171
H	-6.07668	1.661851	3.506133
Si	-2.10797	-0.38435	1.119098
H	-0.85007	0.274256	0.675187
C	-3.08096	-0.77245	-0.44527
C	-3.14626	-2.07258	-0.96282
C	-3.72456	0.249753	-1.15749
C	-3.83893	-2.34511	-2.14007
C	-4.41703	-0.01591	-2.33388
C	-4.4776	-1.31777	-2.82643
H	-3.87717	-3.36259	-2.51766
H	-4.91115	0.791344	-2.86609
H	-5.01851	-1.52789	-3.7441
H	-3.69715	1.268929	-0.77693
H	-2.65582	-2.89627	-0.44967
C	-0.72792	1.822357	2.915593
H	-0.25502	0.849075	3.079742
H	-0.40529	2.173318	1.930677

H	-0.32776	2.511818	3.66298
C	-5.32186	-0.19245	1.783598
H	-4.8819	-1.1855	1.682308
H	-6.25784	-0.29933	2.337815
H	-5.56824	0.145908	0.772762
C	-2.63751	-6.12229	-0.43793
C	-2.98665	-5.46626	0.737353
C	-2.00983	-5.05615	1.650788
C	-0.67315	-5.32833	1.355943
C	-0.31765	-5.98621	0.180762
C	-1.29859	-6.38281	-0.72148
H	-3.41107	-6.43397	-1.13313
H	-4.03359	-5.26294	0.949314
H	0.098311	-5.01518	2.054458
H	0.728639	-6.18508	-0.02934
H	-1.02417	-6.89346	-1.63893
C	-2.40342	-4.27036	2.879448
H	-3.25218	-4.75897	3.371787
H	-1.57796	-4.26181	3.60036
C	-2.7949	-2.82487	2.524213
H	-3.59883	-2.87568	1.779683
C	-1.62649	-1.99259	1.980765
H	-0.92422	-1.76381	2.792706
H	-1.05449	-2.58141	1.251258
H	-3.22035	-2.33073	3.404933

4. X-Ray Structure of 5j

5j was first recrystallized from DCM and hexane to get the optical pure one which was then used to get single crystal by recrystallization from diglyme and hexane *via* slow evaporation. X-ray data was collected with a Bruker APEX-II CCD diffractometer. The molecular structure and X-ray diffraction data/refinement of **5j** (ccdc 2393477) were shown below with thermal ellipsoids at 30% probability.

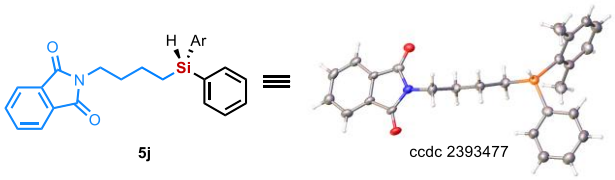


Table S10. Crystal Data and Structure Refinement for mj24004_0m.

Bond precision:	C-C = 0.0150 A		Wavelength=1.34139
Cell:	a=12.9119(10)	b=7.9060(7)	c=22.6326(18)
	alpha=90	beta=105.139(3)	gamma=90
Temperature:	173 K		

	Calculated	Reported
Volume	2230.2(3)	2230.2(3)
Space group	P 21	P 1 21 1
Hall group	P 2yb	P 2yb
Moiety formula	C26 H N O2 Si	C26 H27 N O2 Si
Sum formula	C26 H N O2 Si	C26 H27 N O2 Si
Mr	387.37	413.57
Dx,g cm-3	0.577	1.232
Z	2	4
Mu (mm-1)	0.352	0.708
F000	388.0	880.0
F000'	389.29	
h,k,lmax	15,9,27	15,9,27
Nref	8552[4607]	8087
Tmin,Tmax	0.887,0.965	0.541,0.751
Tmin'	0.887	

Correction method= # Reported T Limits: Tmin=0.541 Tmax=0.751 AbsCorr = MULTI-SCAN

Data completeness= 1.76/0.95	Theta(max)= 55.115
R(reflections)= 0.1022(5780)	wR2(reflections)= 0.2951(8087)
S = 1.022	Npar = 546

5. References

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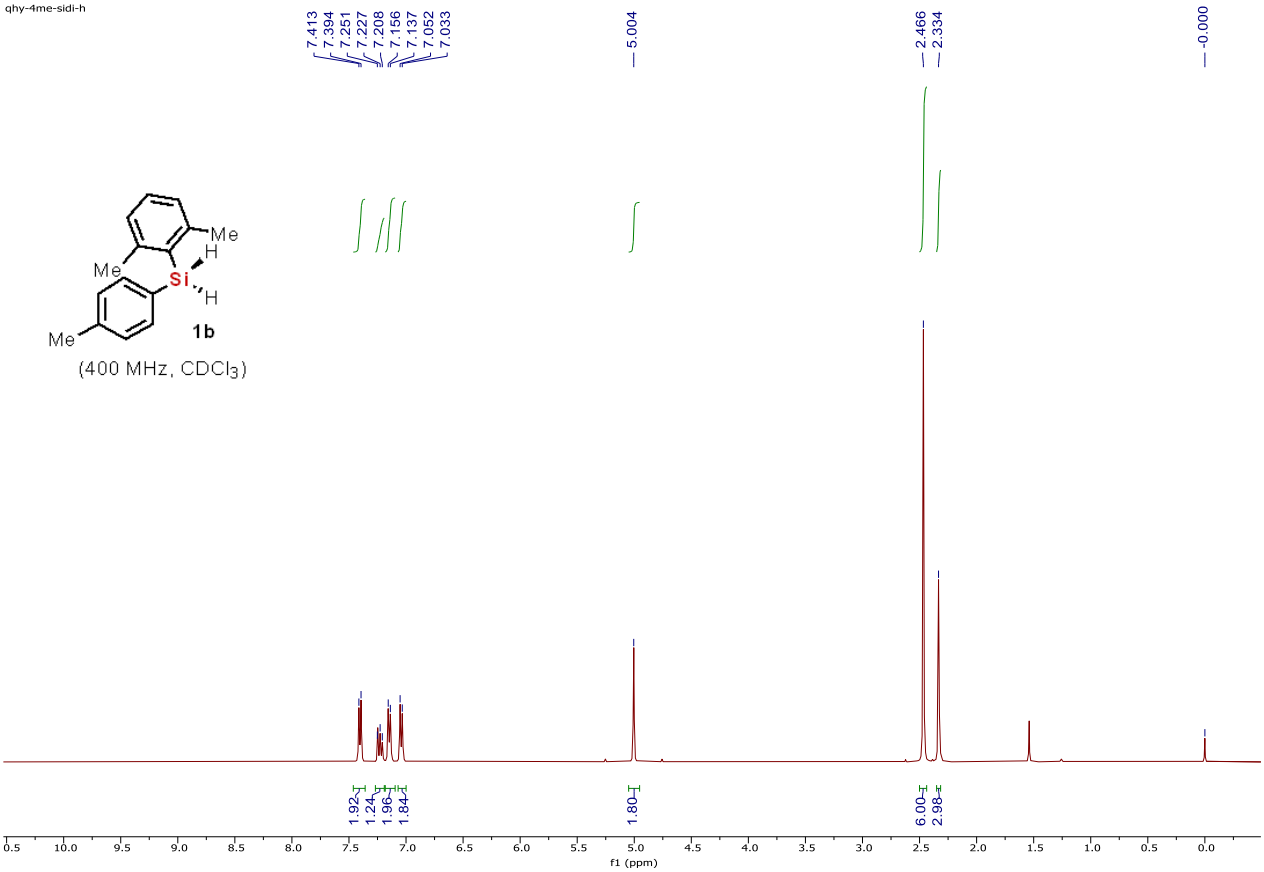
6. NMR Spectra

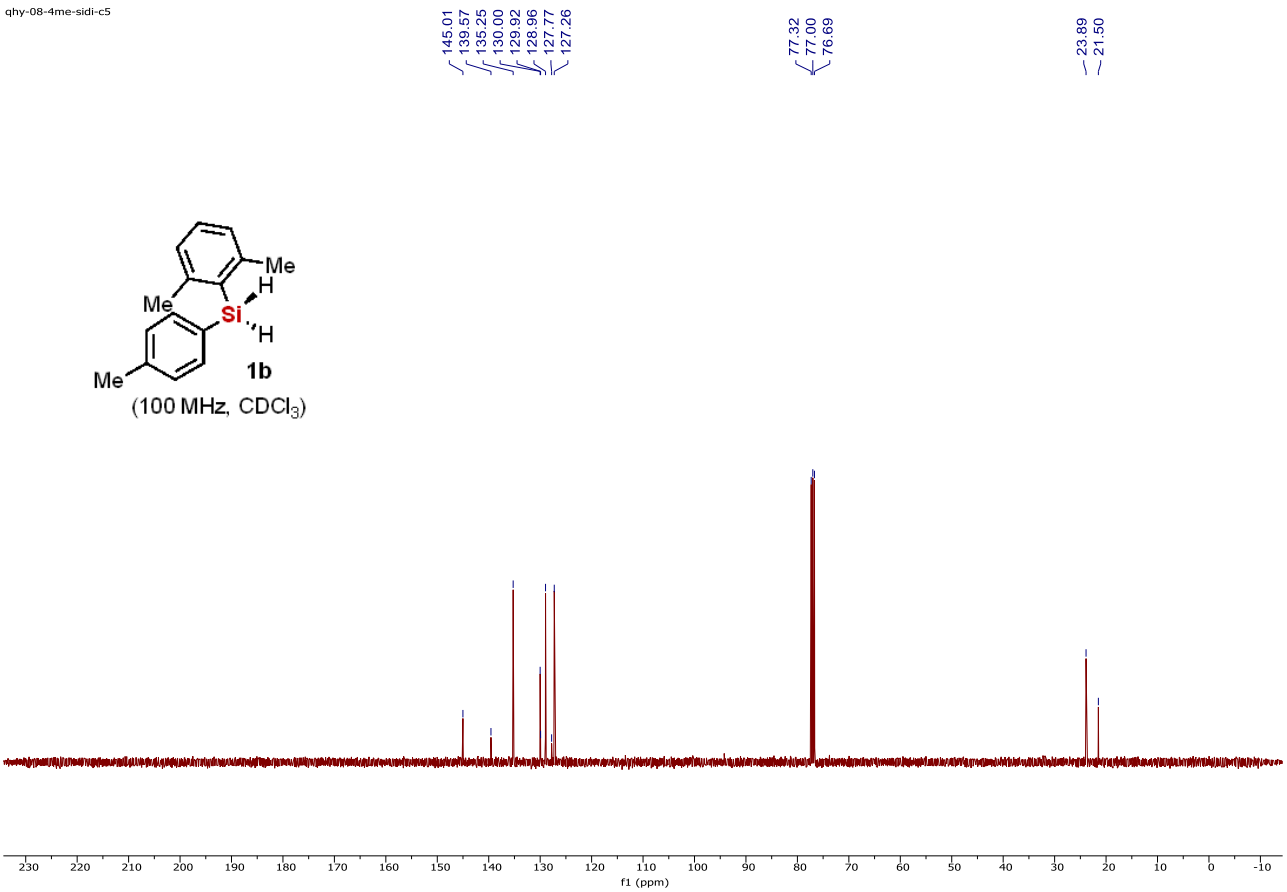
qhy-4me-sidi-h



1b

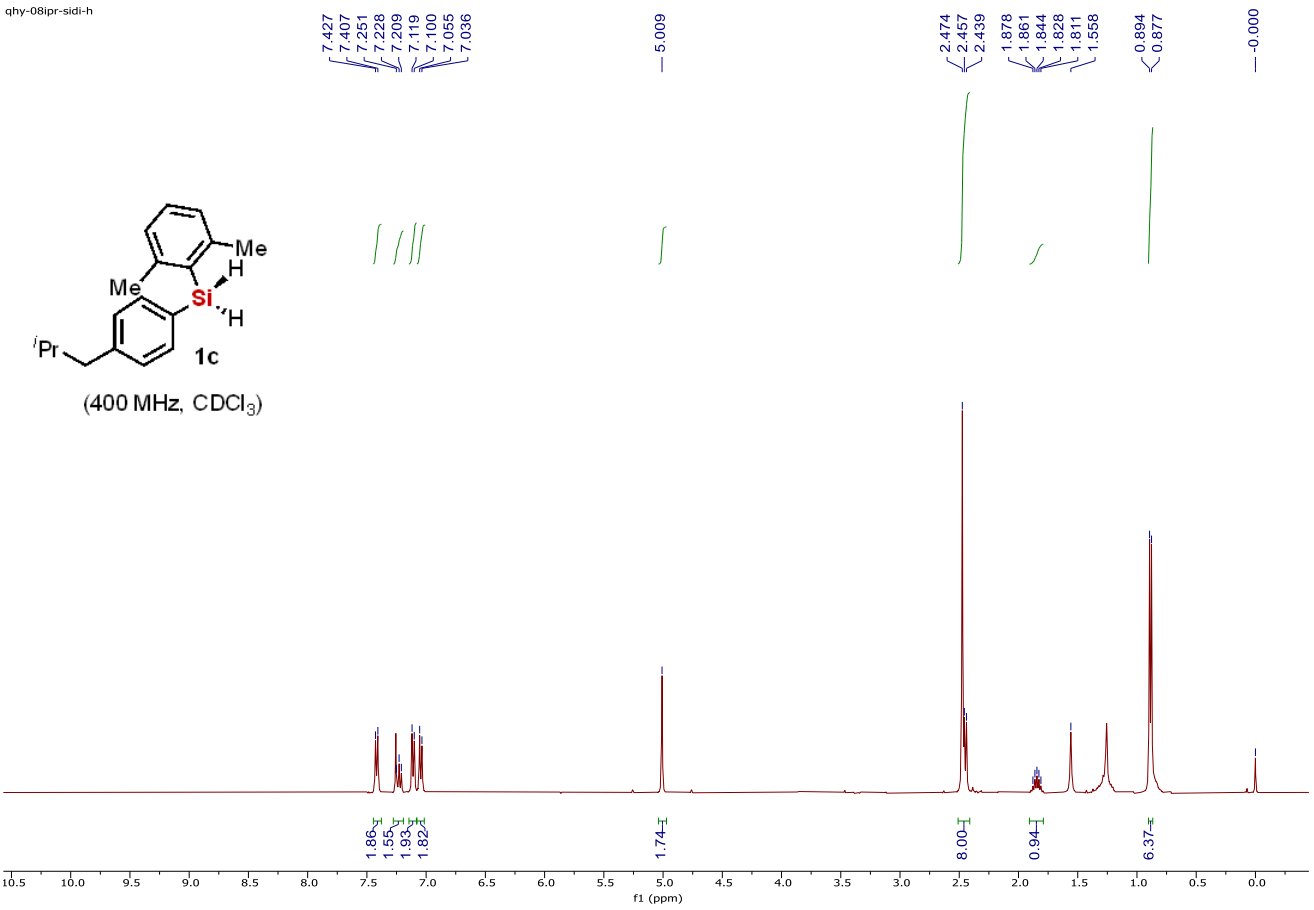
(400 MHz, $CDCl_3$)

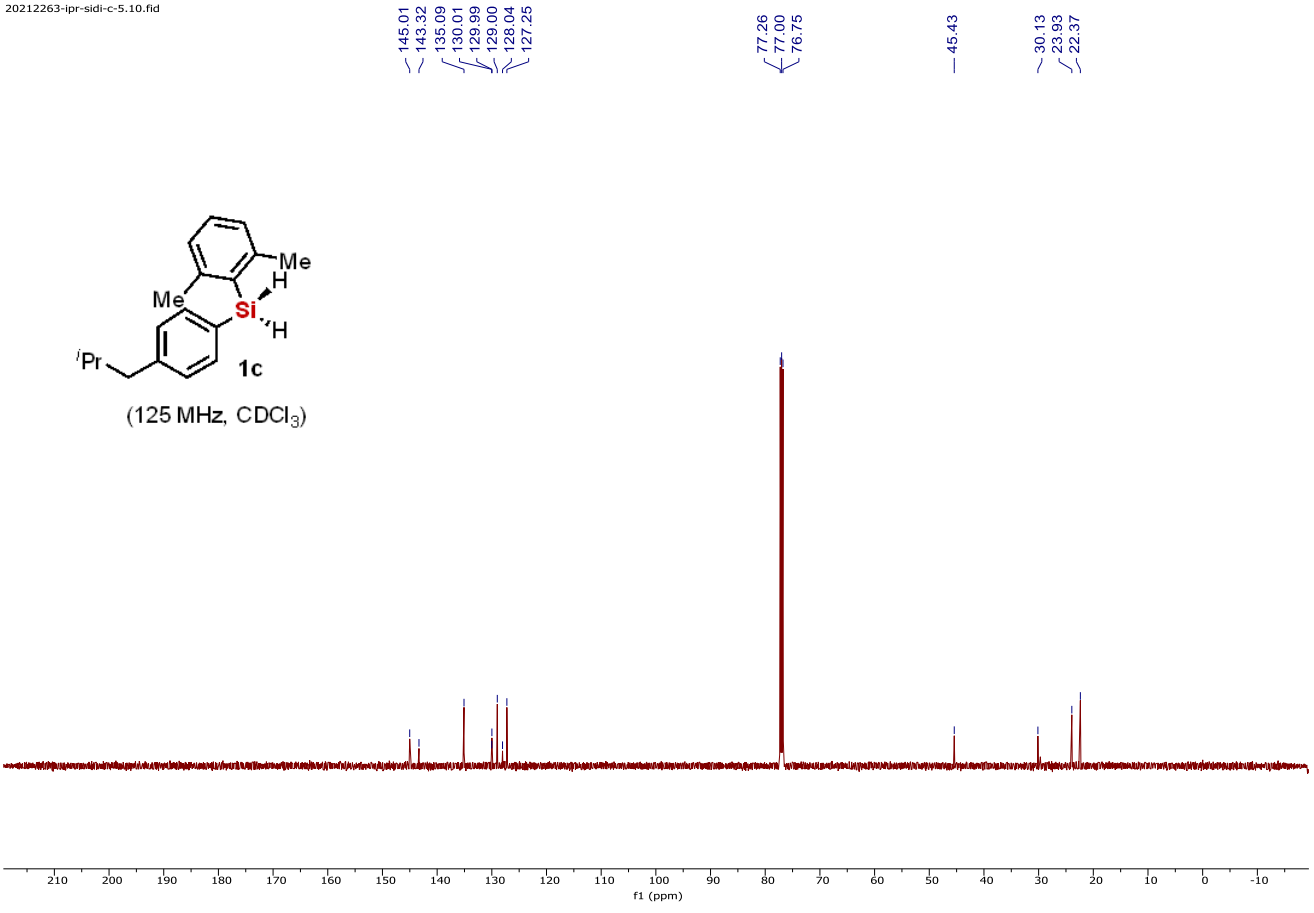
qhy-08-4me-sidi-c5



1b

(100 MHz, $CDCl_3$)


qhy-08ipr-sidi-h
7.427
7.407
7.251
7.228
7.209
7.119
7.100
7.055
7.036
5.009
2.474
2.457
2.439
1.878
1.861
1.844
1.828
1.811
1.558
0.894
0.877
-0.000
Me
H
Me
Si
H
iPr
1c
(400 MHz, CDCl3)
1.86
1.55
1.93
1.82
1.74
8.00
0.94
6.37
f1 (ppm)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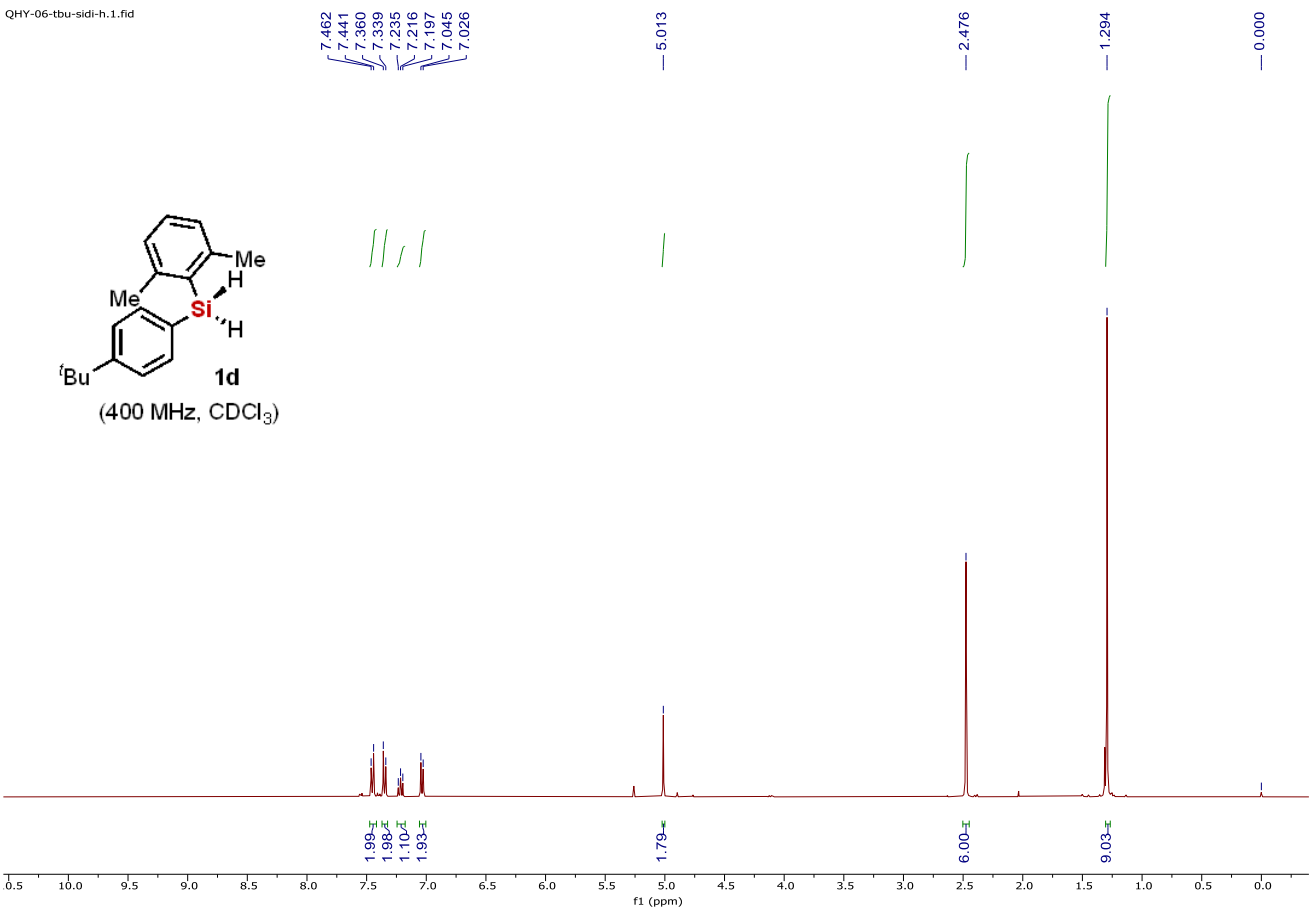
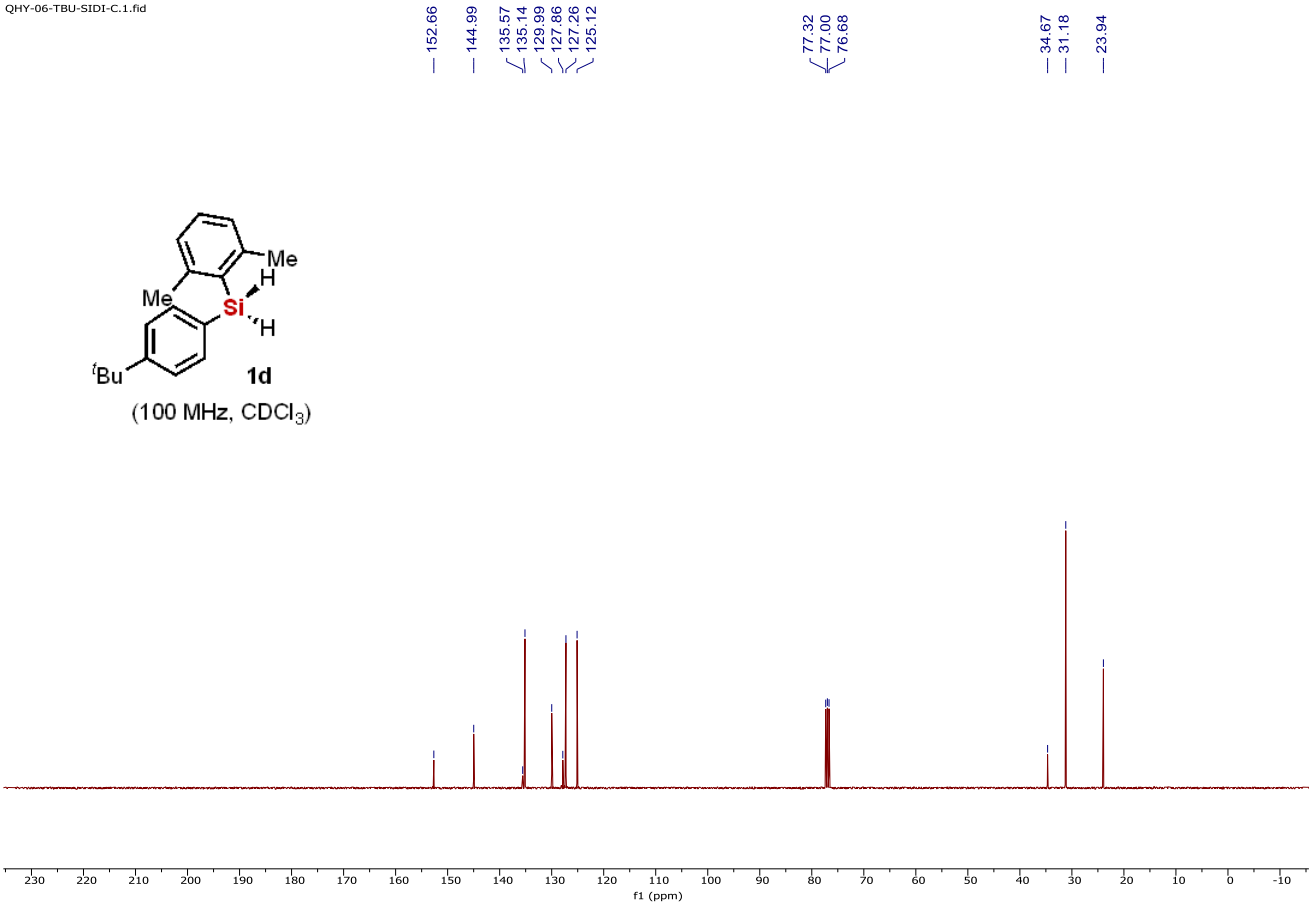
145.01
143.32
135.09
130.01
129.99
129.00
128.04
127.25
77.26
77.00
76.75
45.43
30.13
23.93
22.37
Me
H
Me
Si
H
iPr
1c
(125 MHz, CDCl3)
f1 (ppm)


QHY-06-tbu-sidi-h.1.fid
7.462
7.441
7.360
7.339
7.235
7.216
7.197
7.045
7.026
5.013
2.476
1.294
0.000
Me
H
Me
Si
H
tBu
1d
(400 MHz, CDCl3)
1.99
1.98
1.10
1.93
1.79
6.00
9.03
f1 (ppm)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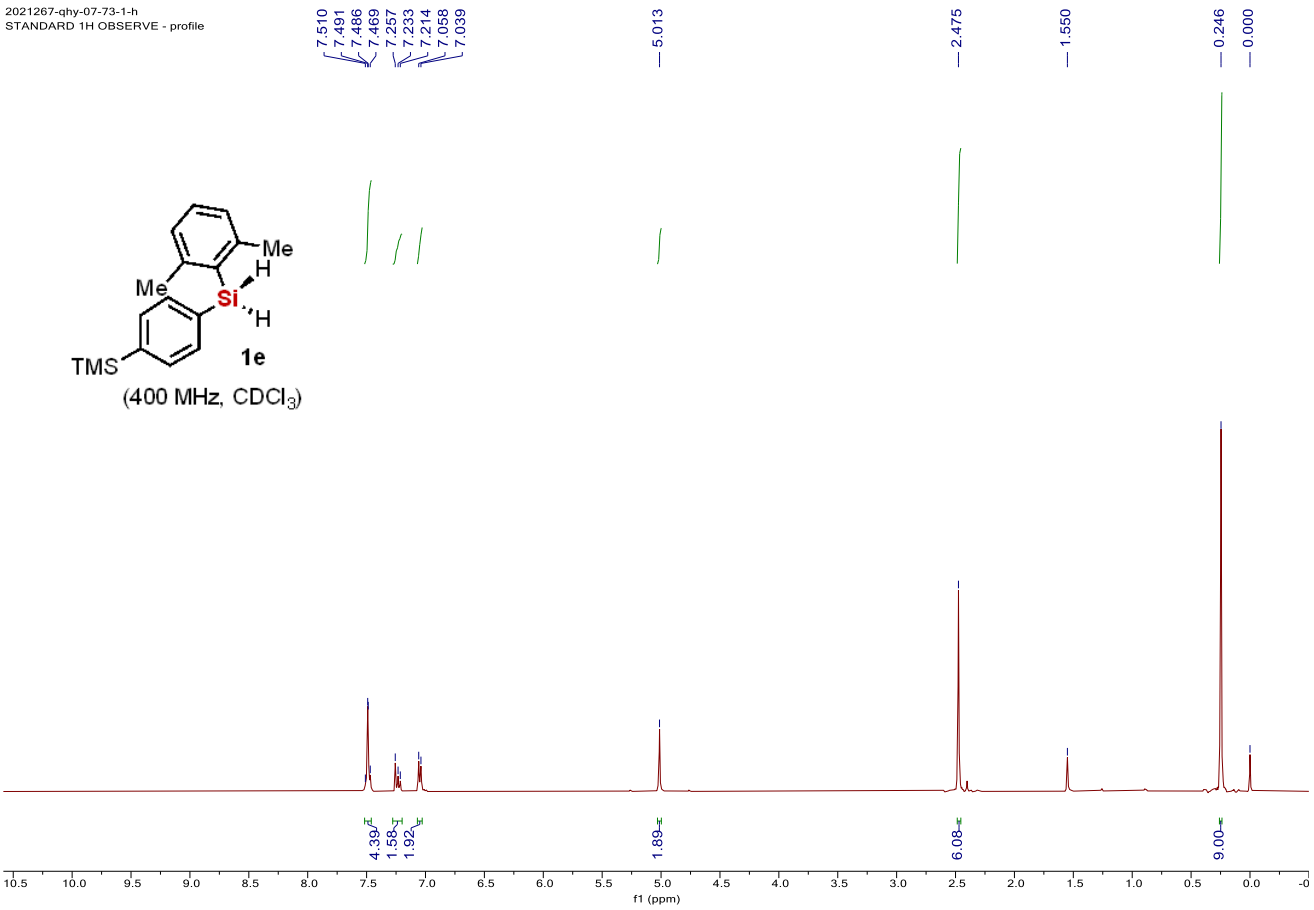
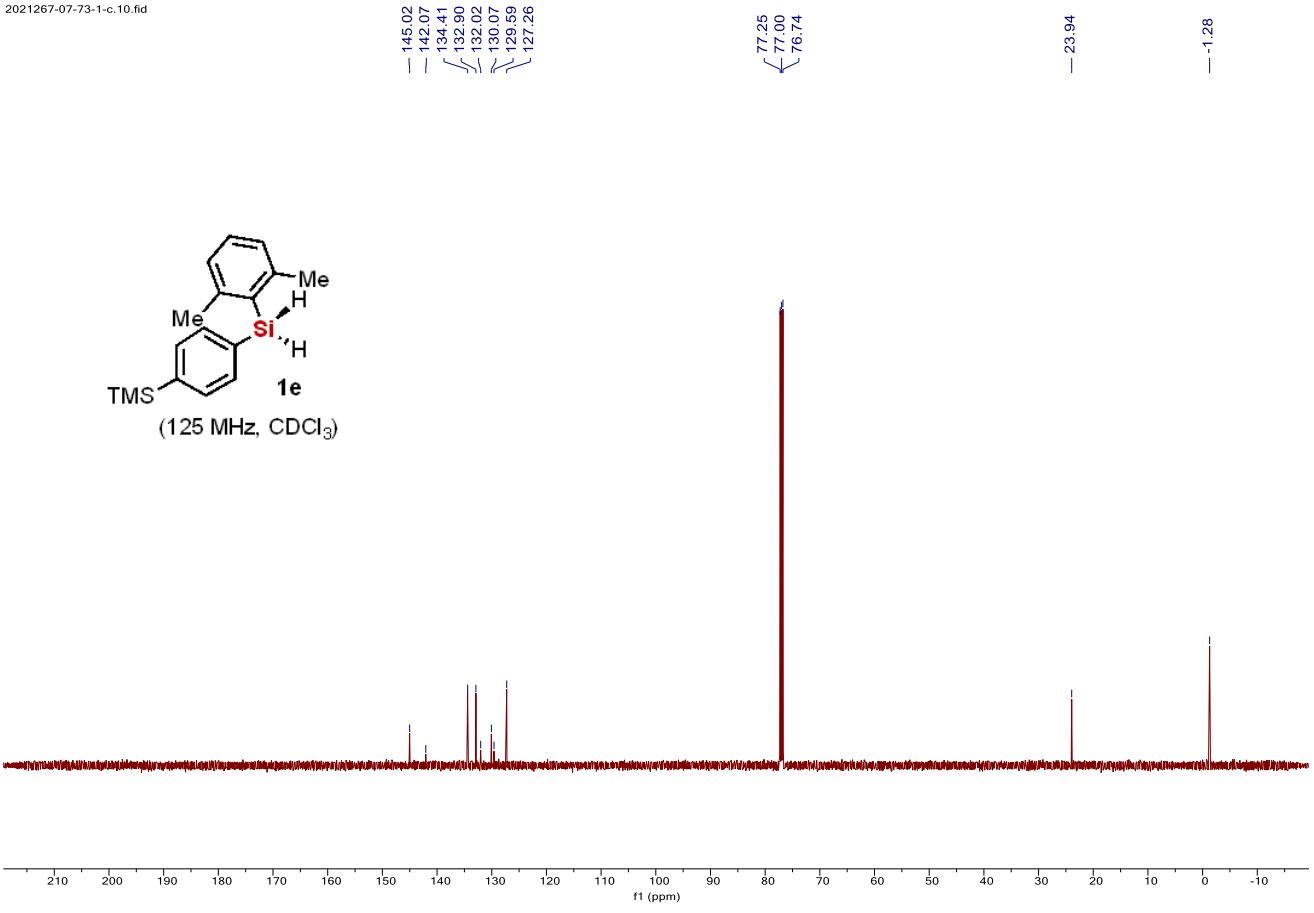
152.66
144.99
135.57
135.14
129.99
127.86
127.26
125.12
77.32
77.00
76.68
34.67
31.18
23.94
Me
H
Me
Si
H
tBu
1d
(100 MHz, CDCl3)
f1 (ppm)


2021267-qhy-07-73-1-h
STANDARD 1H OBSERVE - profile
7.510
7.491
7.486
7.469
7.257
7.233
7.214
7.058
7.039
5.013
2.475
1.550
0.246
0.000
Me
H
Me
Si
H
TMS
1e
(400 MHz, CDCl3)
4.39
1.58
1.92
1.89
6.08
9.00
f1 (ppm)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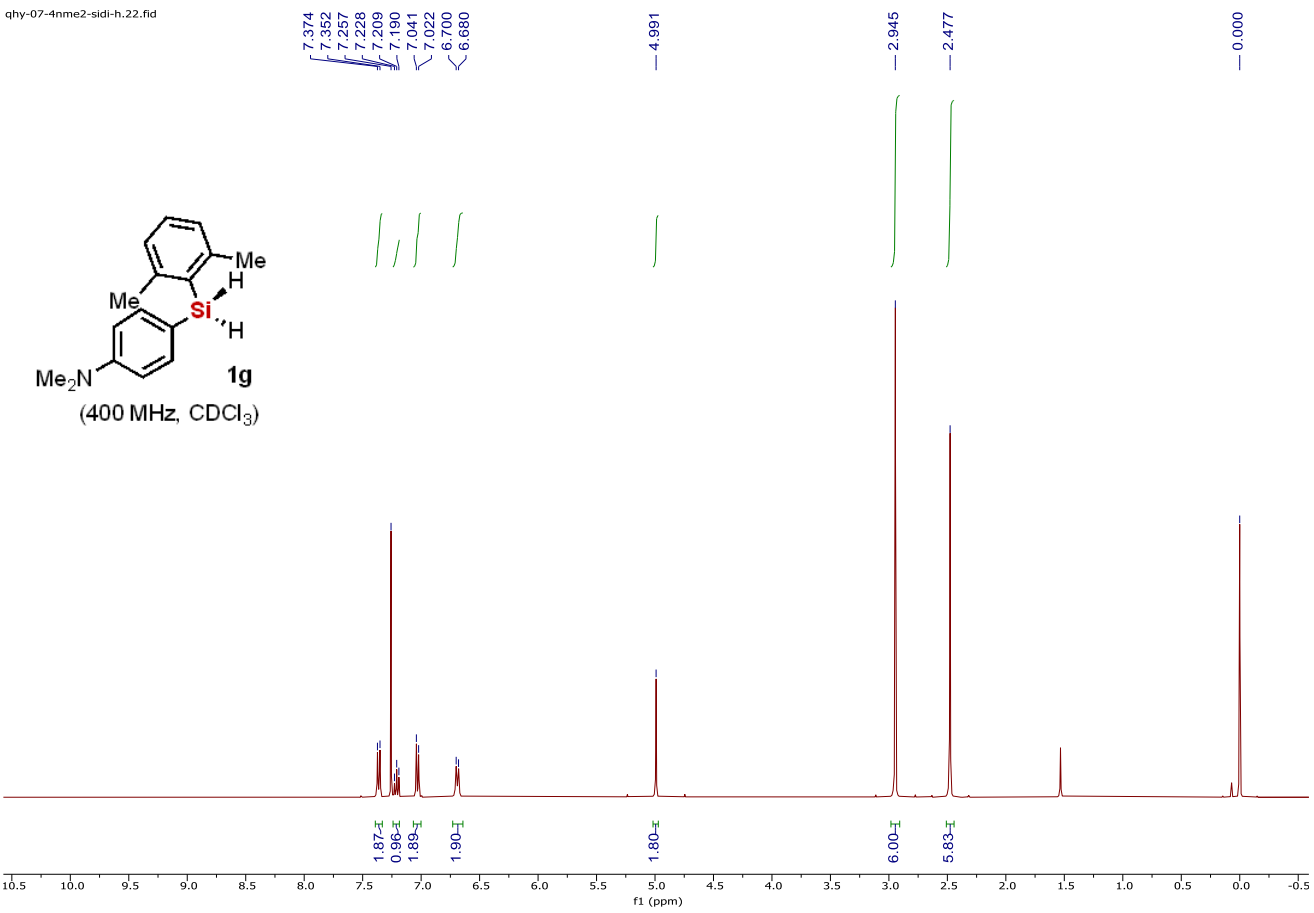
142.07
134.41
132.90
132.02
130.07
129.59
127.26
77.25
77.00
76.74
23.94
-1.28
Me
H
Me
Si
H
TMS
1e
(125 MHz, CDCl3)
f1 (ppm)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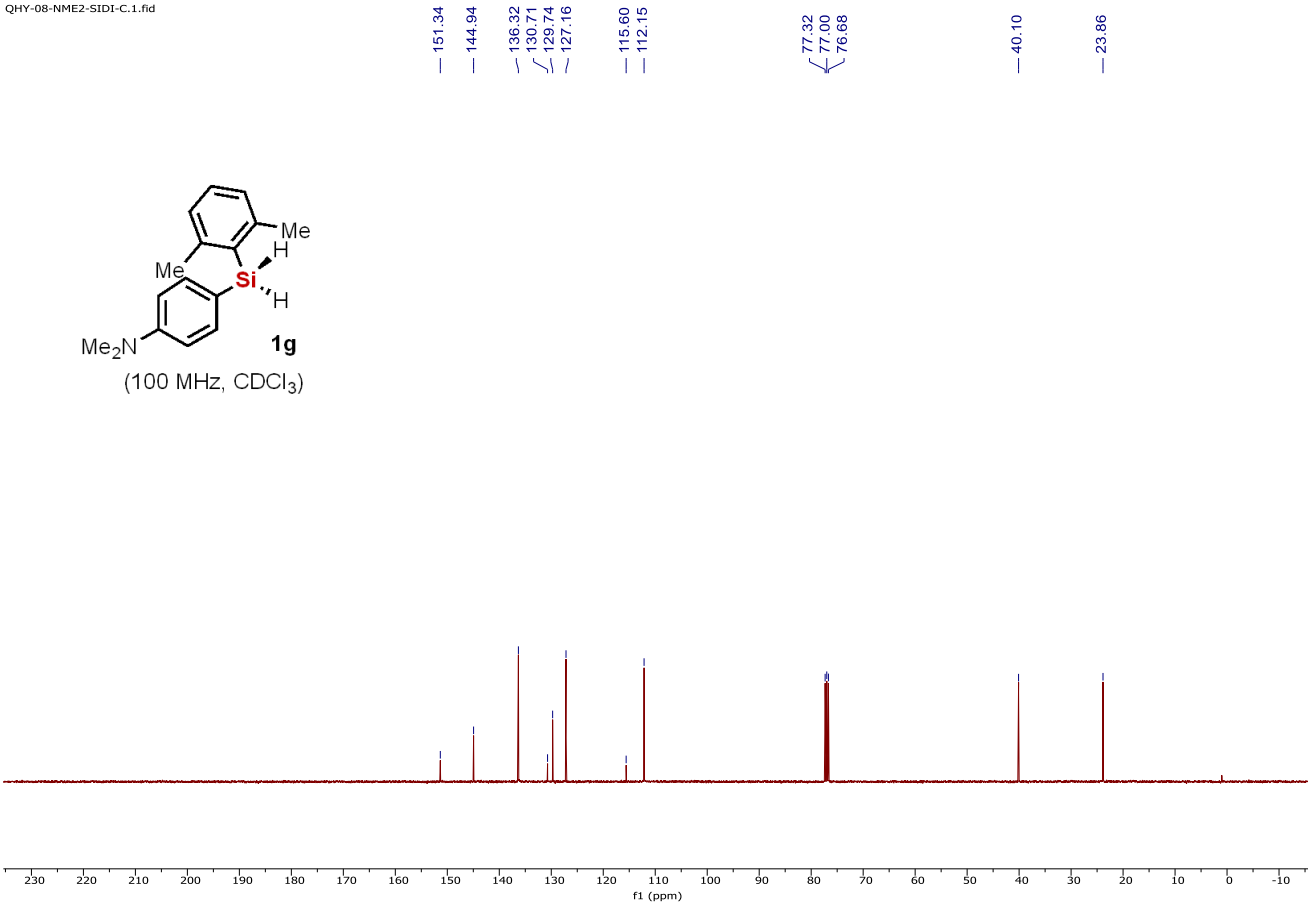
7.352
7.257
7.228
7.209
7.190
7.041
7.022
6.700
6.680
4.991
2.945
2.477
0.000
Me
H
Me
Si
H
Me2N
1g
(400 MHz, CDCl3)
1.87
0.96
1.89
1.90
1.80
6.00
5.83
f1 (ppm)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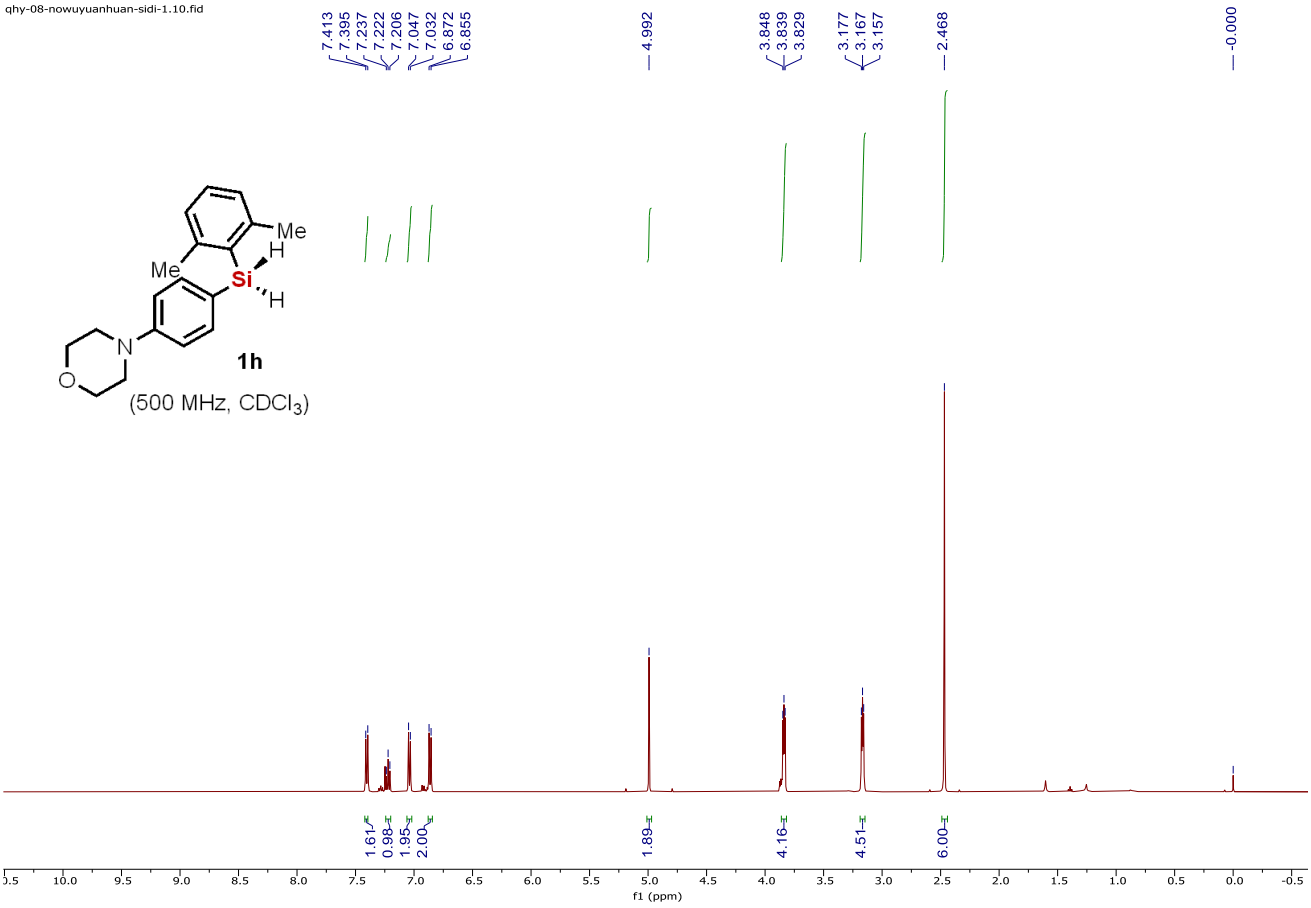
144.94
136.32
130.71
129.74
127.16
115.60
112.15
77.32
77.00
76.68
40.10
23.86
Me
H
Me
Si
H
Me2N
1g
(100 MHz, CDCl3)
f1 (ppm)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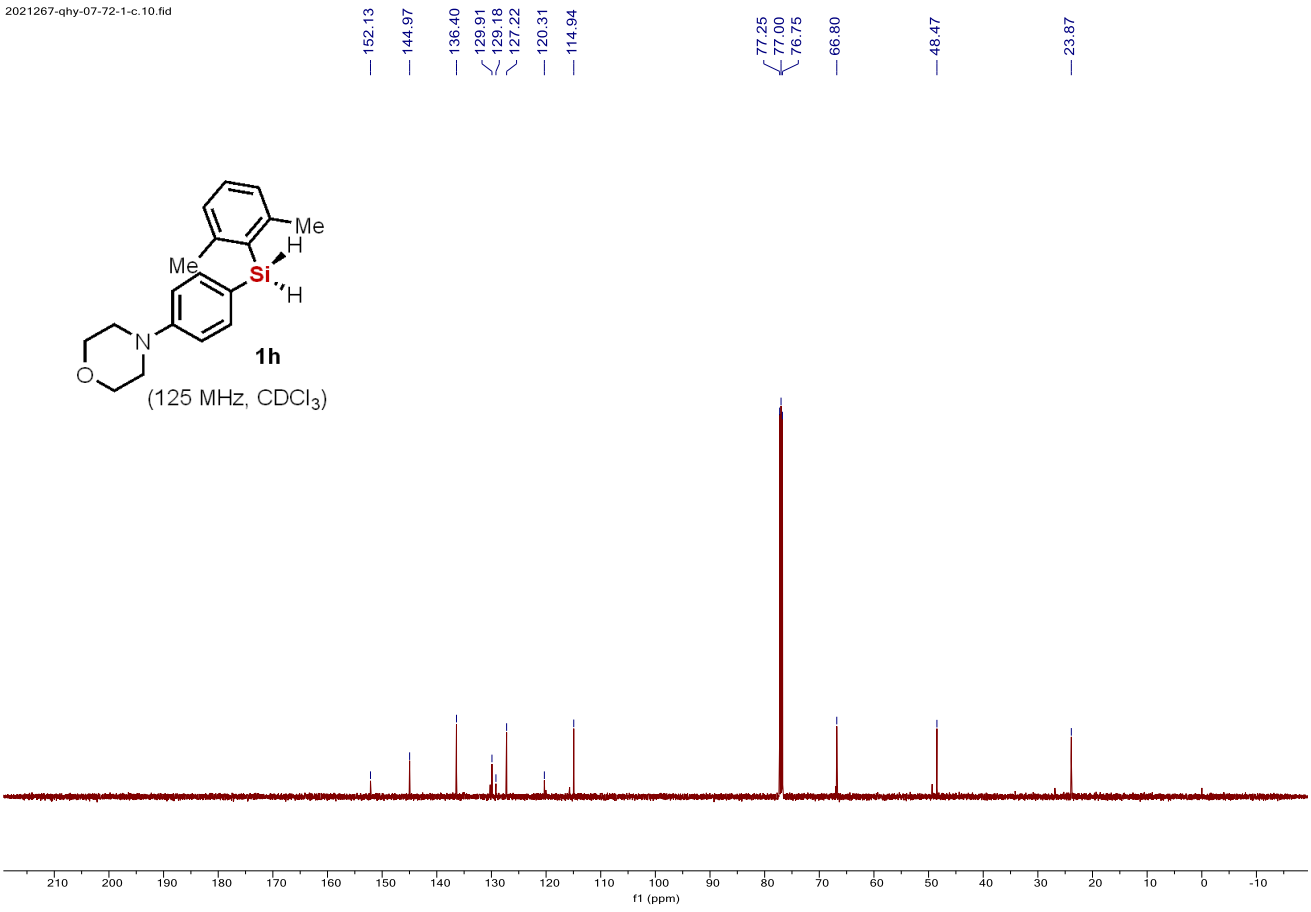
7.413
7.395
7.237
7.222
7.206
7.047
7.032
6.872
6.855
4.992
3.848
3.839
3.829
3.177
3.167
3.157
2.468
-0.000
Me
H
Me
Si
H
N
O
1h
(500 MHz, CDCl3)
1.61
0.98
1.95
2.00
1.89
4.16
4.51
6.00
f1 (ppm)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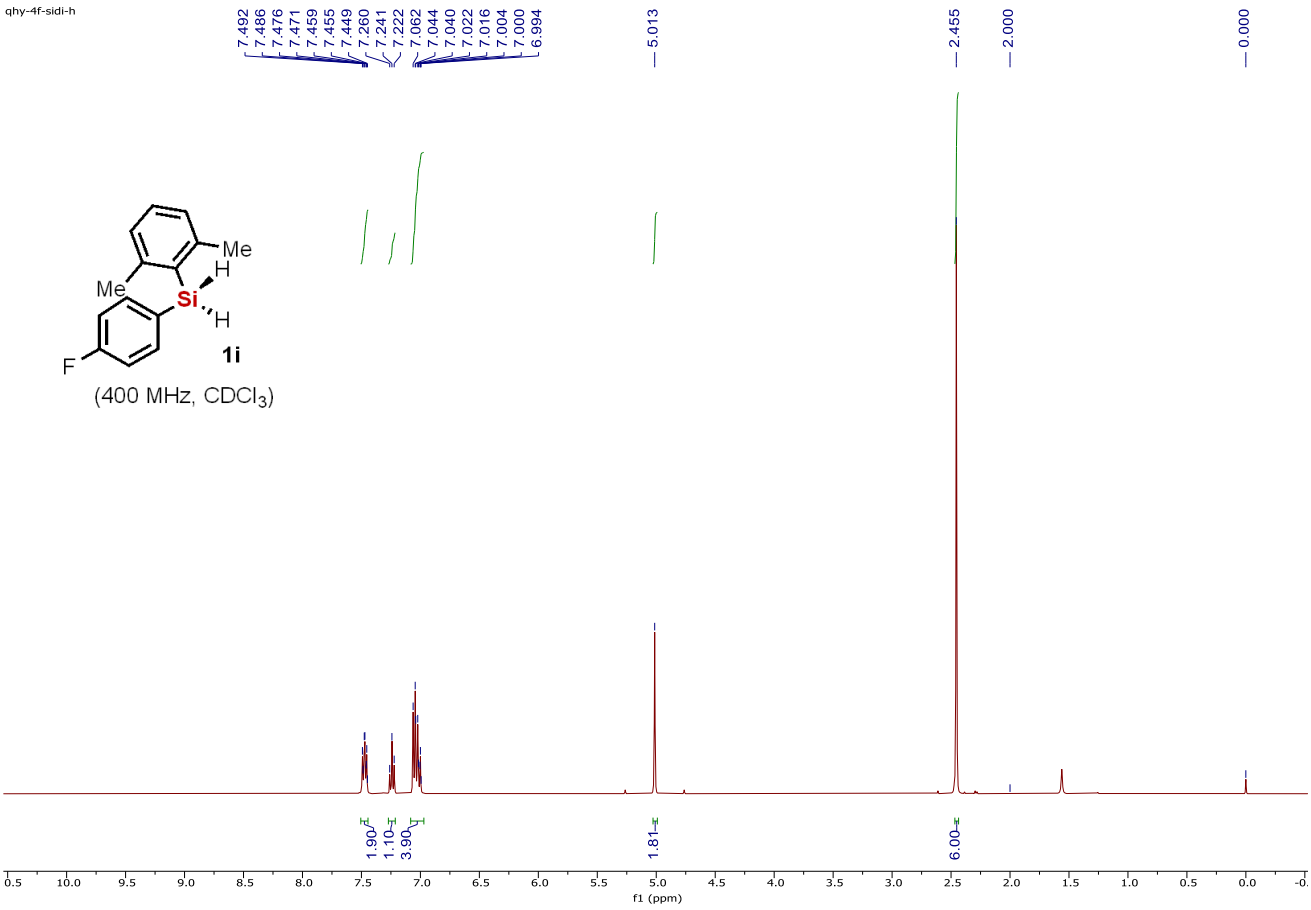
152.13
144.97
136.40
129.91
129.18
127.22
120.31
114.94
77.25
77.00
76.75
66.80
48.47
23.87
Me
H
Me
Si
H
N
O
1h
(125 MHz, CDCl3)
f1 (ppm)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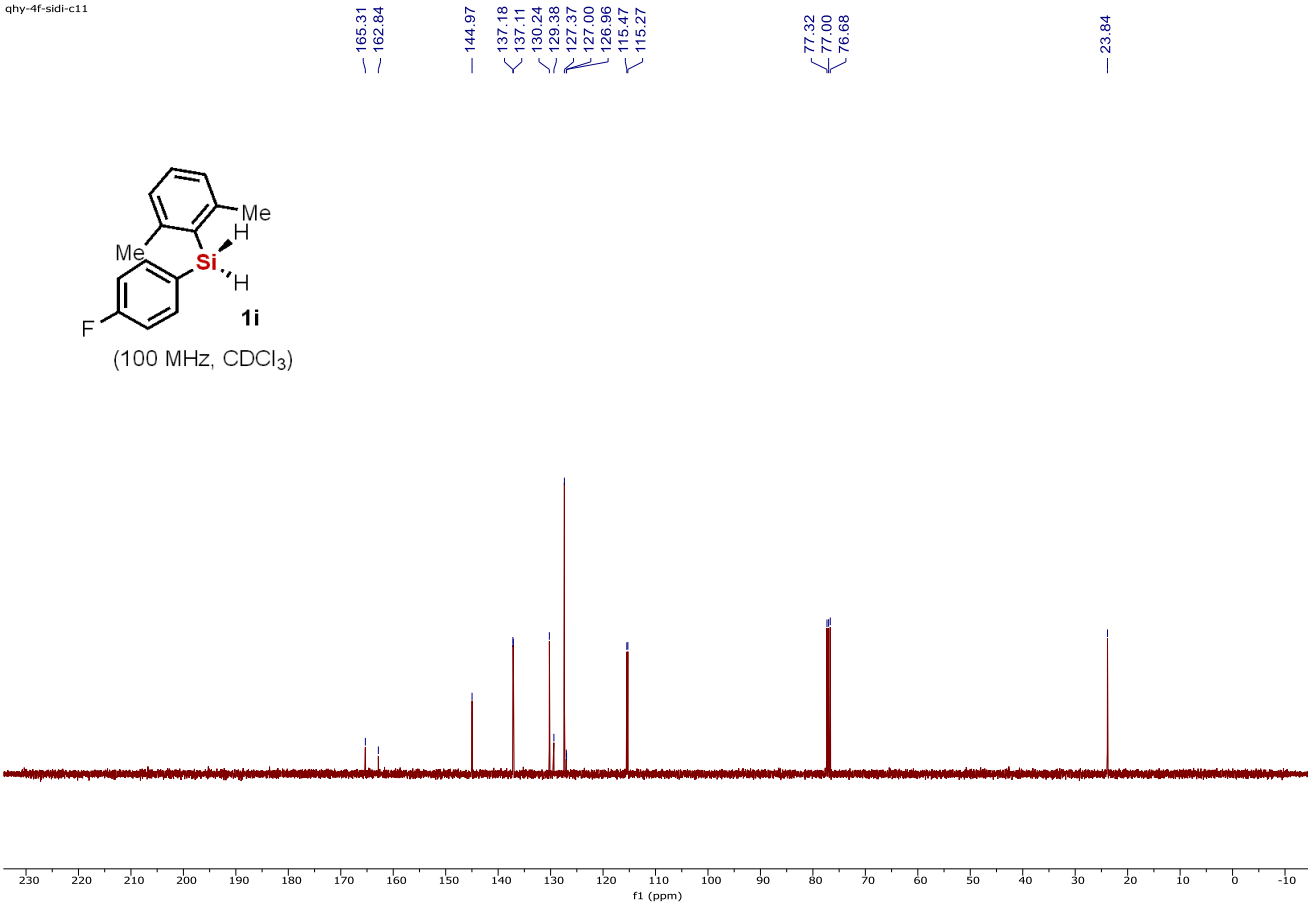
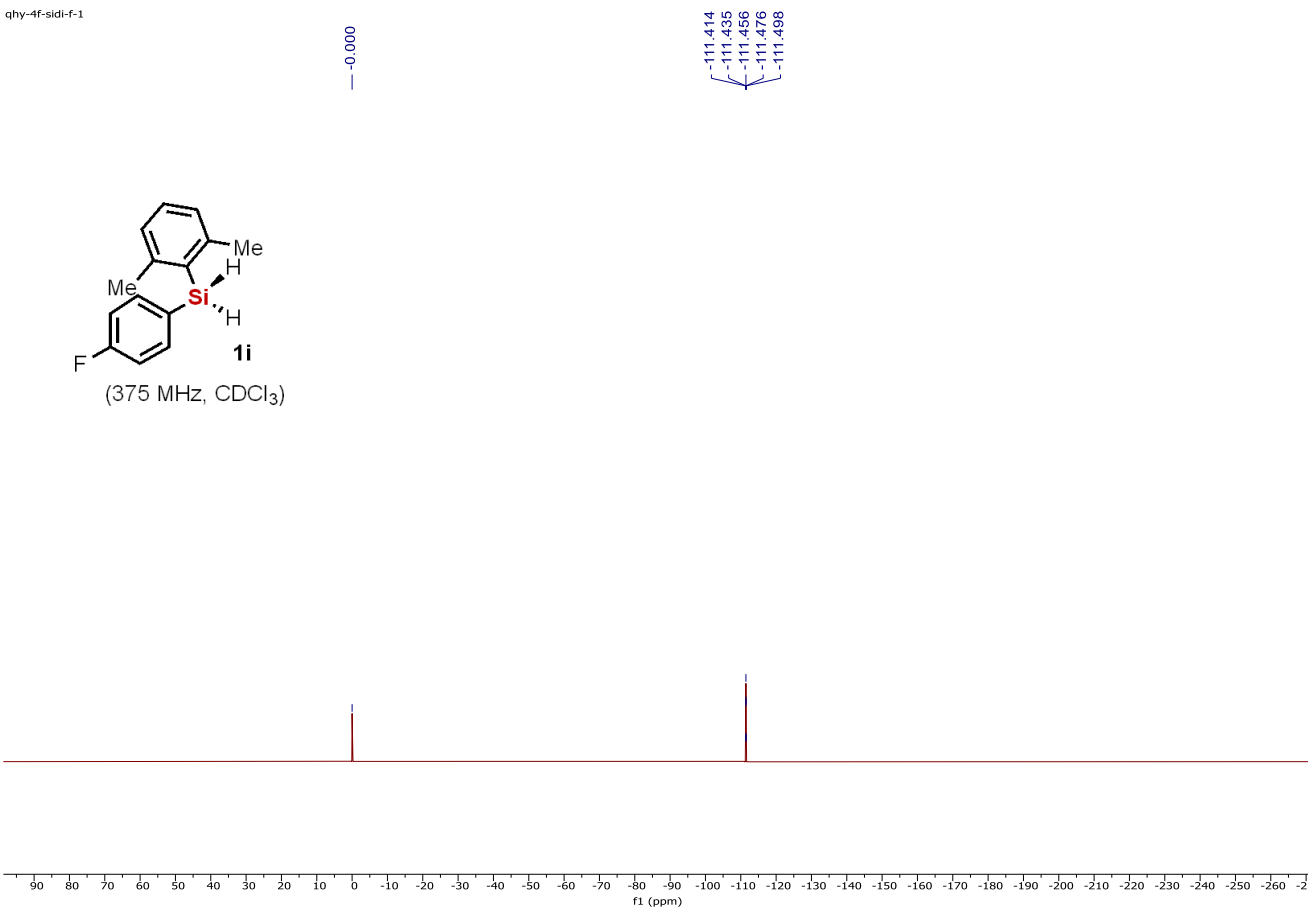
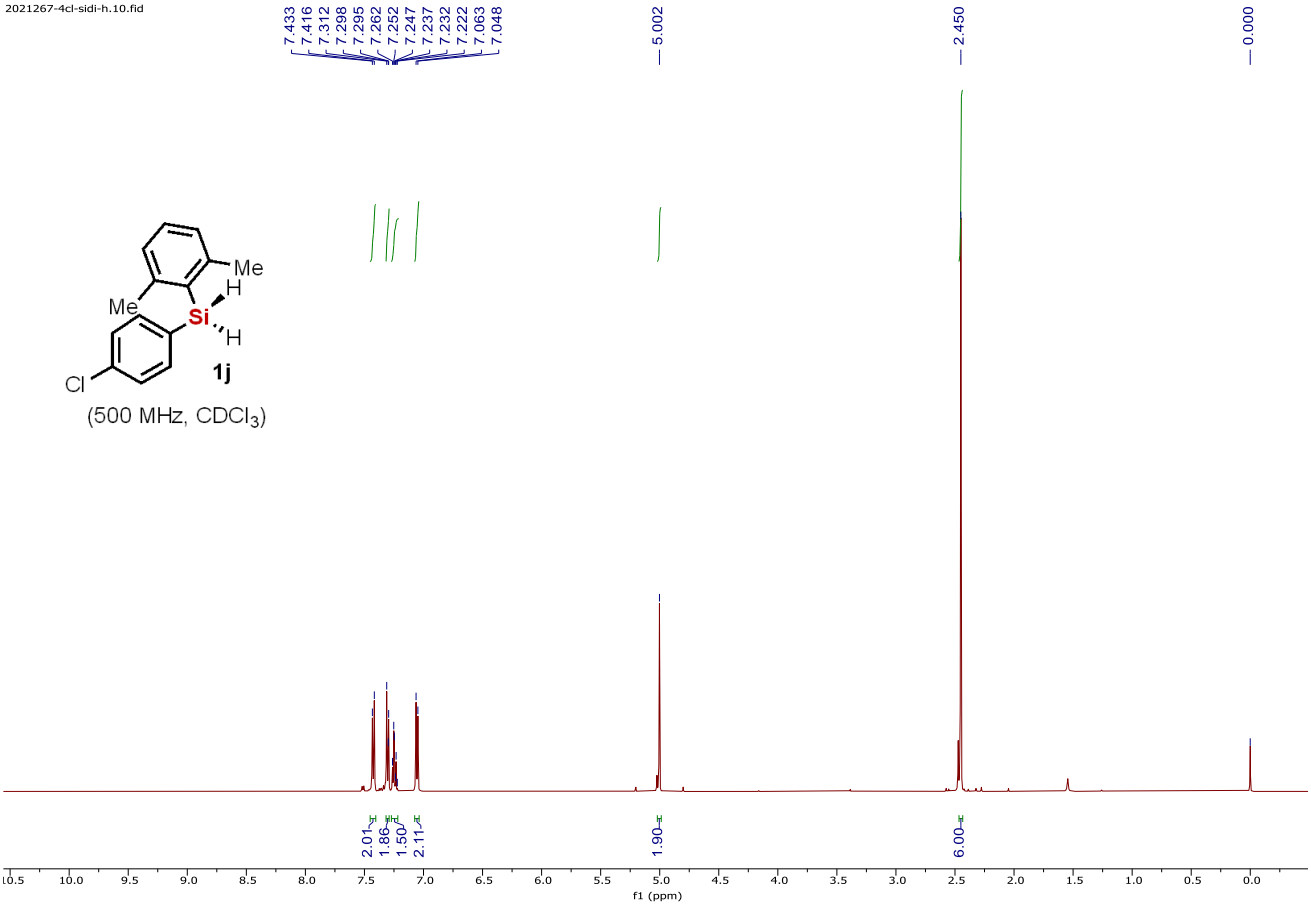
7.476
7.471
7.459
7.455
7.449
7.260
7.241
7.222
7.062
7.044
7.040
7.022
7.016
7.004
7.000
6.994
5.013
2.455
2.000
0.000
Me
H
Me
Si
H
F
1i
(400 MHz, CDCl3)
1.90
1.10
3.90
1.81
6.00
f1 (ppm)

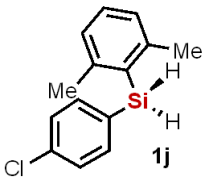

qhy-4f-sidi-c11
165.31
162.84
144.97
137.18
137.11
130.24
129.38
127.37
127.00
126.96
115.47
115.27
77.32
77.00
76.68
23.84
Me
H
Me
Si
H
F
1i
(100 MHz, CDCl3)
f1 (ppm)


qhy-4f-sidi-f-1
-0.000
-111.414
-111.435
-111.456
-111.476
-111.498
Me
H
Me
Si
H
F
1i
(375 MHz, CDCl3)
f1 (ppm)


2021267-4cl-sidi-h.10.fid
7.433
7.416
7.312
7.298
7.295
7.262
7.252
7.247
7.237
7.232
7.222
7.063
7.048
5.002
2.450
0.000
Me
H
Me
Si
H
Cl
1j
(500 MHz, CDCl3)
2.01
1.86
1.50
2.11
1.90
6.00
f1 (ppm)

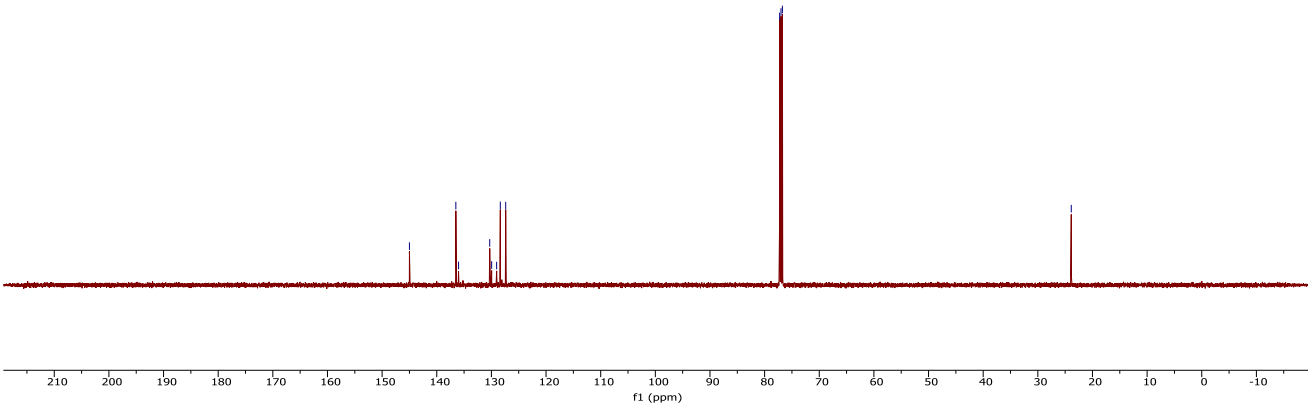
2021267-4cl-sidi-c-4.10.fid

145.00
136.51
136.01
130.31
129.95
129.04
128.37
127.39
77.25
77.00
76.75
23.88



1j

(125 MHz, $CDCl_3$)

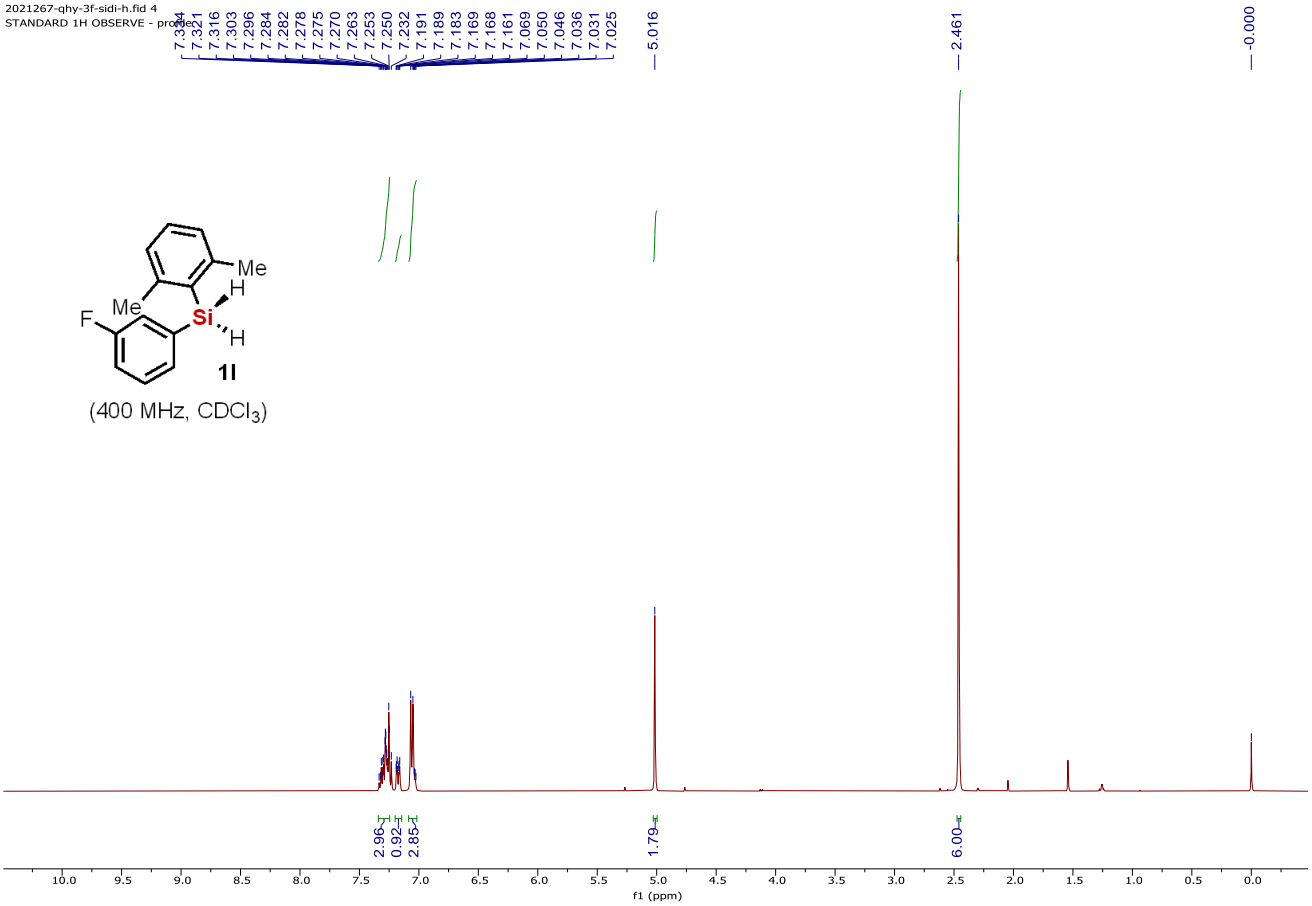


2021267-qhy-3f-sidi-h.fid 4
STANDARD 1H OBSERVE - proton

7.334
7.321
7.316
7.303
7.296
7.284
7.282
7.278
7.275
7.270
7.263
7.253
7.250
7.232
7.191
7.189
7.183
7.169
7.168
7.161
7.069
7.050
7.046
7.036
7.031
7.025
5.016
2.461
-0.000

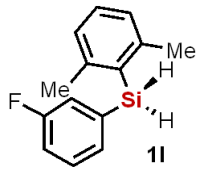
1l

(400 MHz, $CDCl_3$)



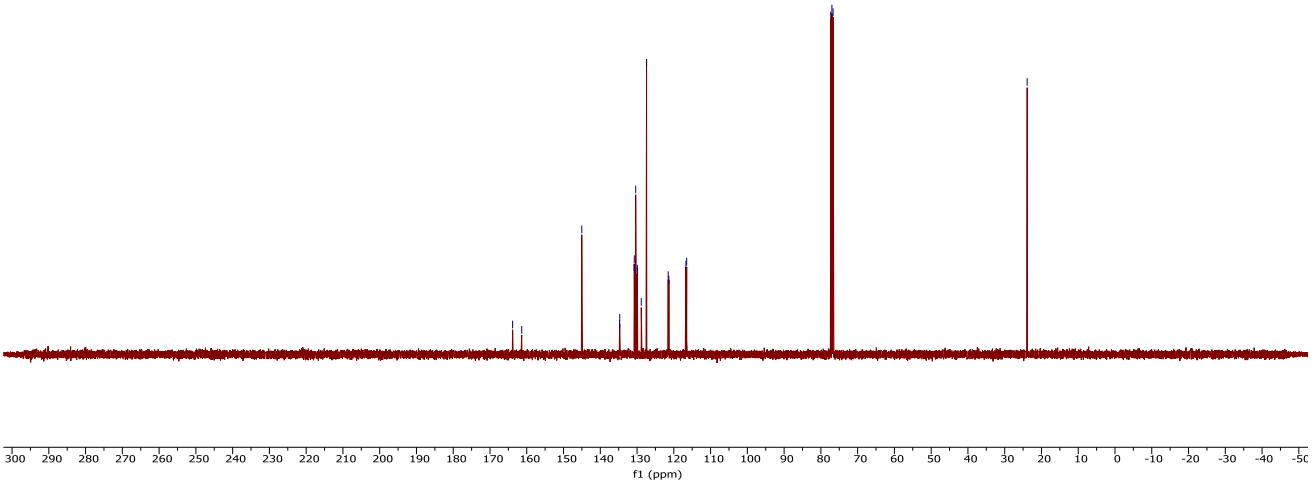
qhy-08-3f-sidi-c-4-3.2.fid

163.85
161.37
145.04
134.75
134.71
130.78
130.75
130.37
129.93
129.86
128.86
127.42
121.53
121.34
116.71
116.50
77.32
77.00
76.68
23.89



1l

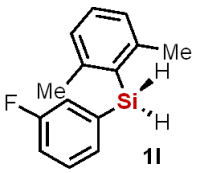
(100 MHz, $CDCl_3$)



qhy-08-3f-sidi-f

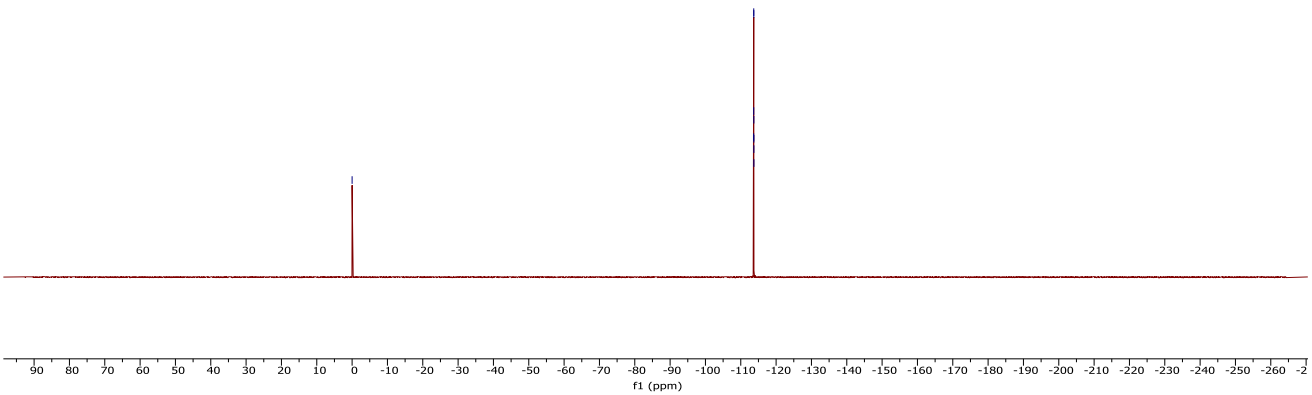
0.000

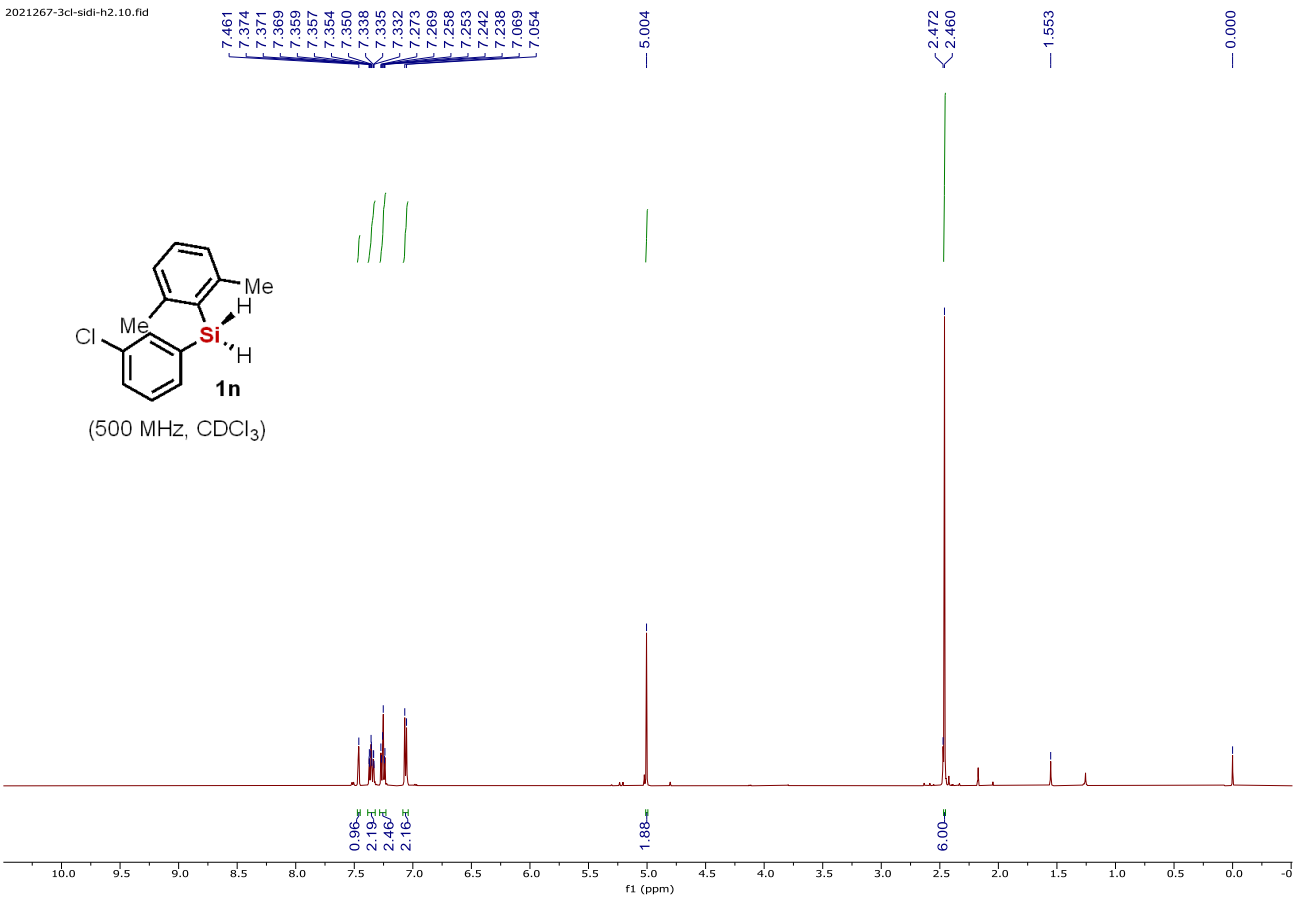
-113.647
-113.661
-113.670
-113.684
-113.693
-113.697
-113.706
-113.710

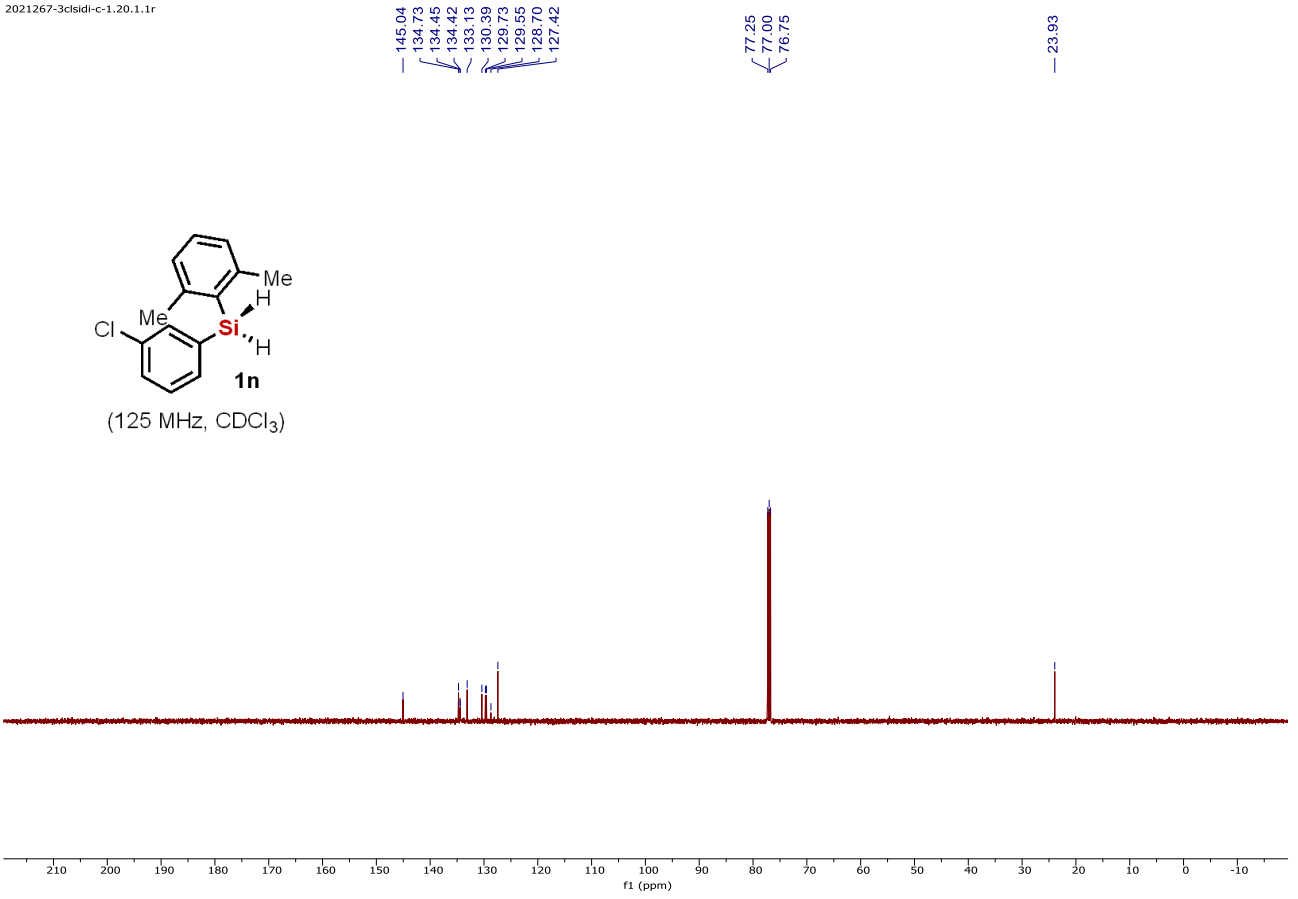


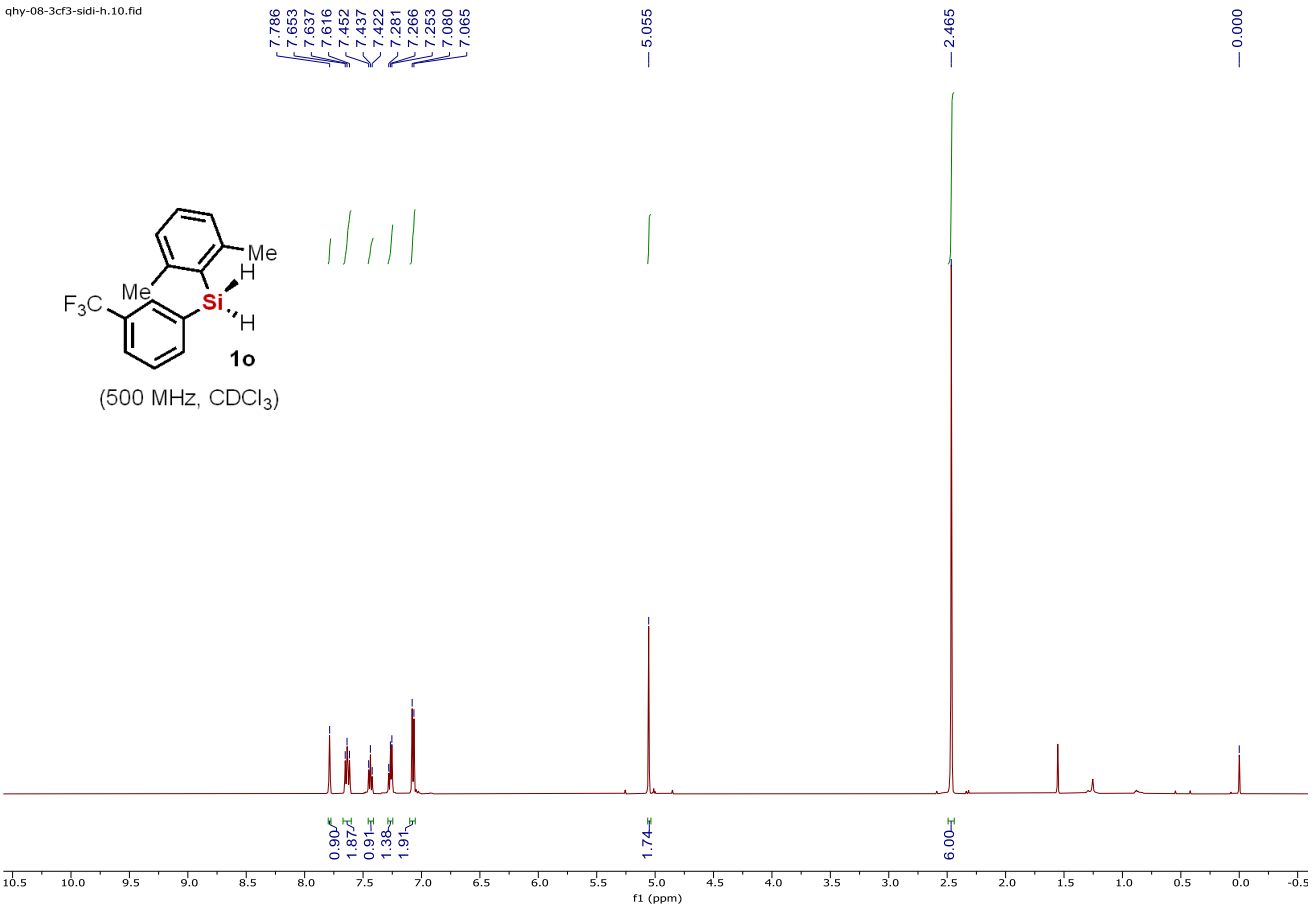
1l

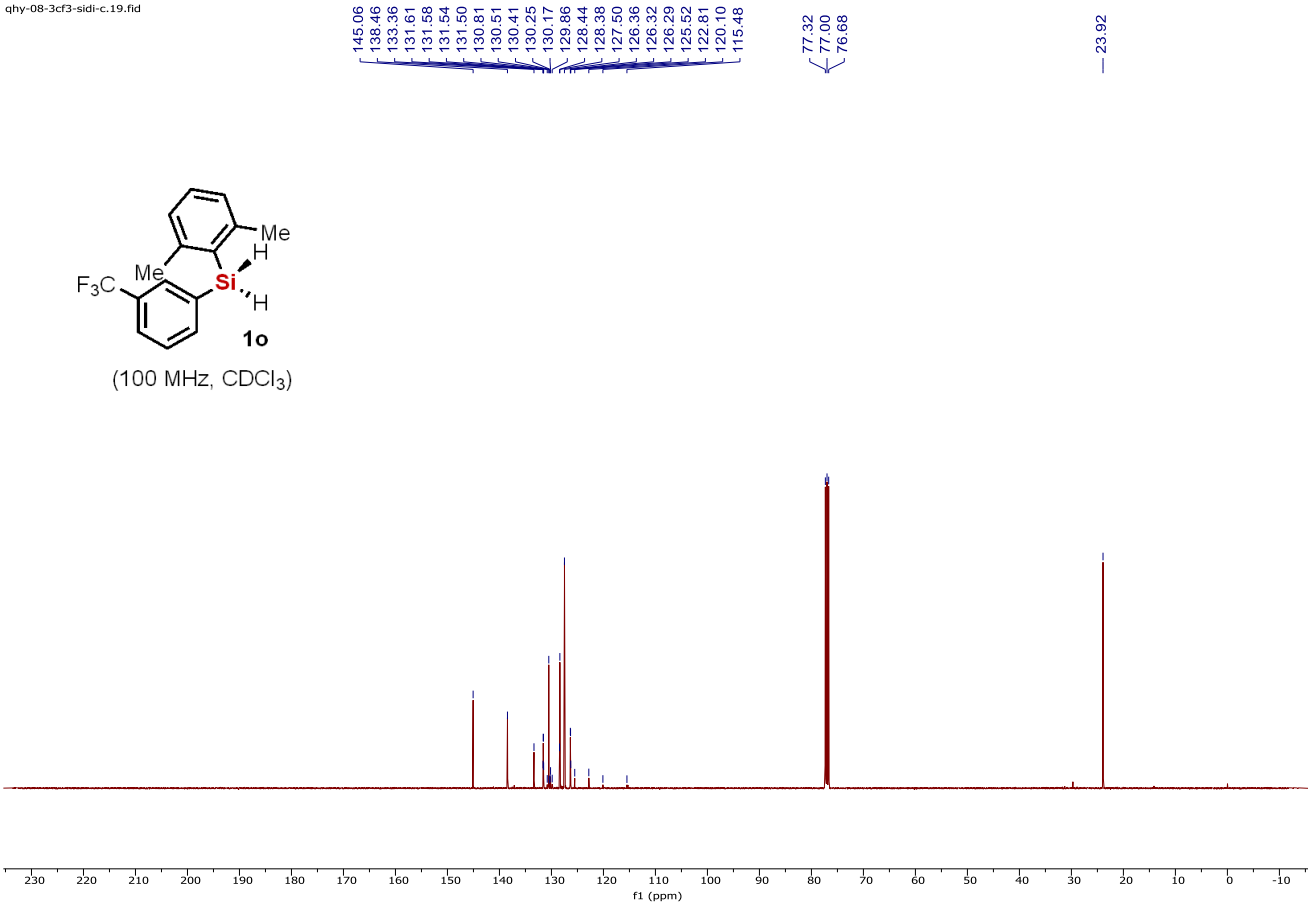
(375 MHz, $CDCl_3$)

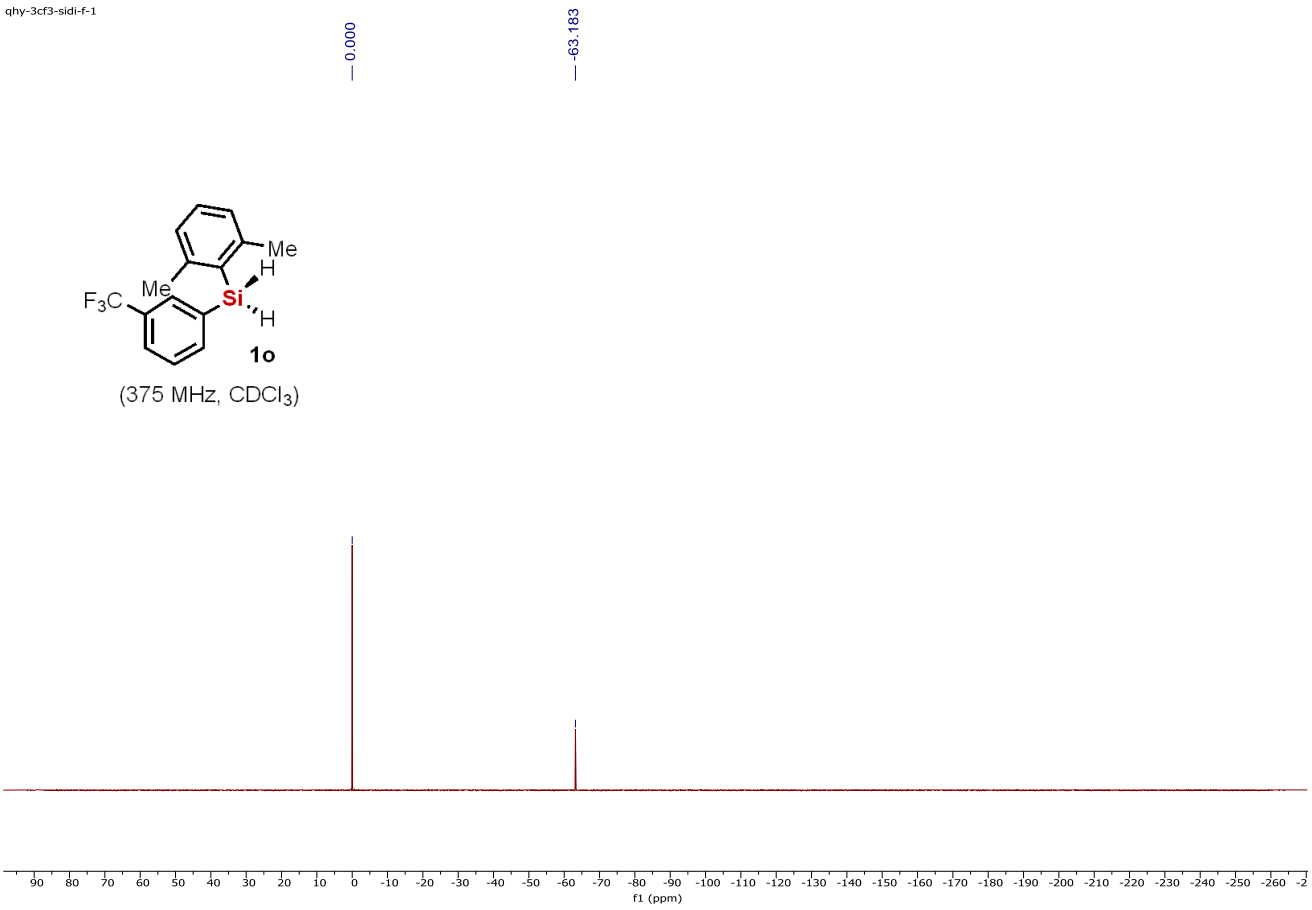


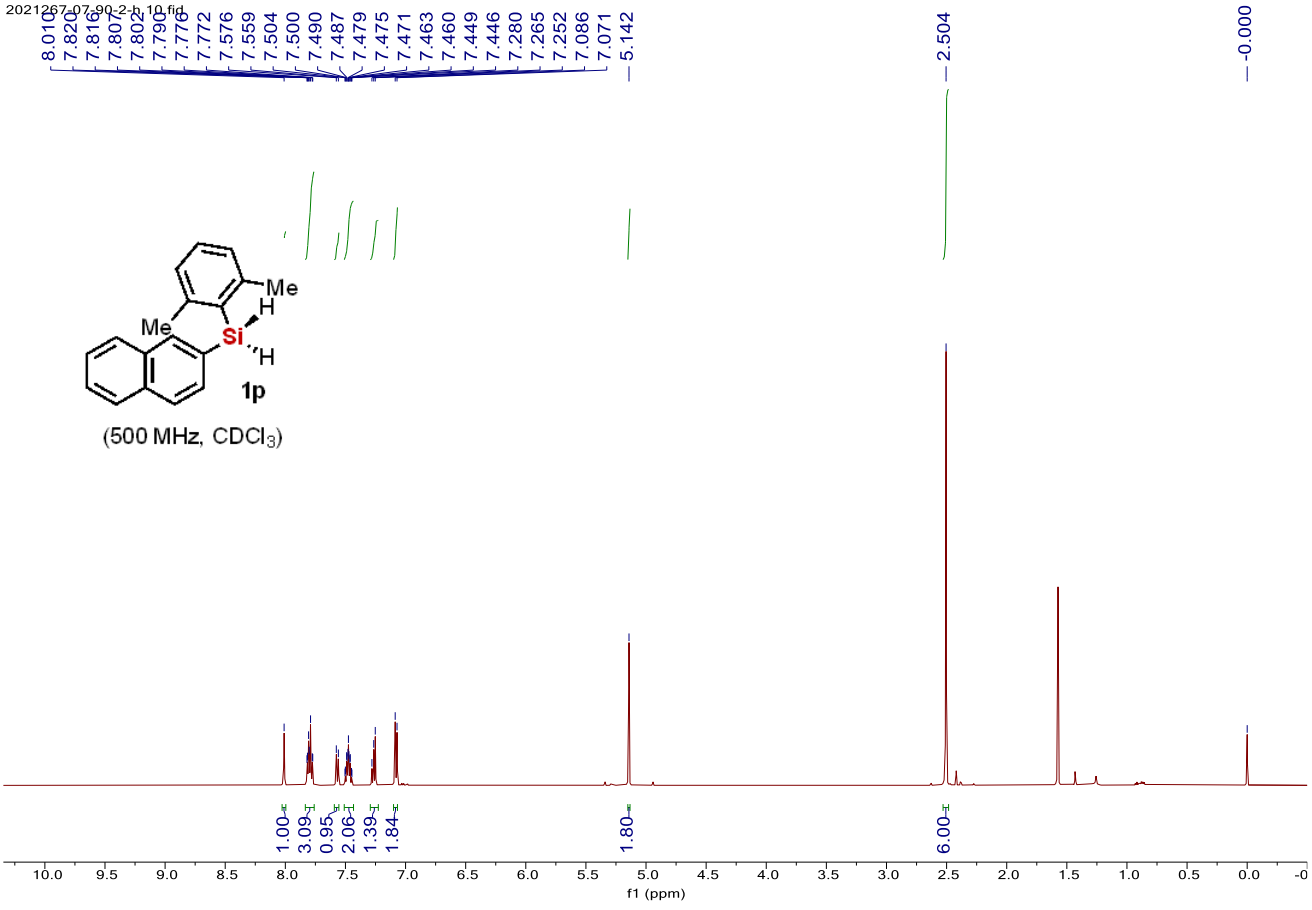

2021267-3cl-sidi-h2.10.fid
7.461
7.374
7.371
7.369
7.359
7.357
7.354
7.350
7.338
7.335
7.332
7.273
7.269
7.258
7.253
7.242
7.238
7.069
7.054
5.004
2.472
2.460
1.553
0.000
Me
H
Cl
Me
Si
H
1n
(500 MHz, CDCl3)
0.96
2.19
2.46
2.16
1.88
6.00
f1 (ppm)


2021267-3clsidi-c-1.20.1.1r
145.04
134.73
134.45
134.42
133.13
130.39
129.73
129.55
128.70
127.42
77.25
77.00
76.75
23.93
Me
H
Cl
Me
Si
H
1n
(125 MHz, CDCl3)
f1 (ppm)


qhy-08-3cf3-sidi-h.10.fid
7.786
7.653
7.637
7.616
7.452
7.437
7.422
7.281
7.266
7.253
7.080
7.065
5.055
2.465
0.000
Me
H
F3C
Me
Si
H
1o
(500 MHz, CDCl3)
0.90
1.87
0.91
1.38
1.91
1.74
6.00
f1 (ppm)


qhy-08-3cf3-sidi-c.19.fid
145.06
138.46
133.36
131.61
131.58
131.54
131.50
130.81
130.51
130.41
130.25
130.17
129.86
128.44
128.38
127.50
126.36
126.32
126.29
125.52
122.81
120.10
115.48
77.32
77.00
76.68
23.92
Me
H
F3C
Me
Si
H
1o
(100 MHz, CDCl3)
f1 (ppm)

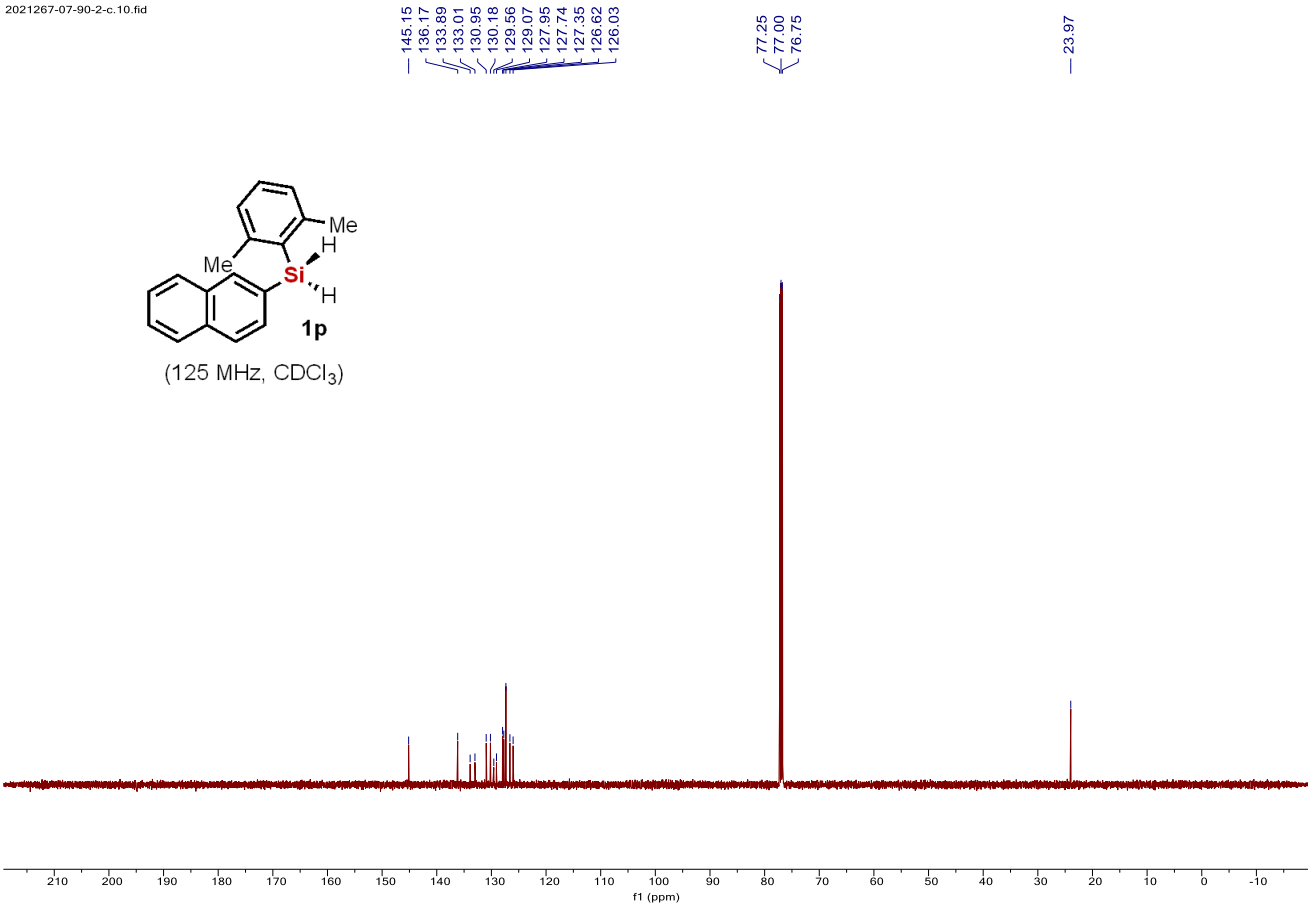

qhy-3cf3-sidi-f-1
0.000
-63.183
Me
H
F3C
Me
Si
H
1o
(375 MHz, CDCl3)
f1 (ppm)


2021267-07-90-2-h-10.fid
8.010
7.820
7.816
7.807
7.802
7.790
7.778
7.772
7.576
7.559
7.504
7.500
7.490
7.487
7.479
7.475
7.471
7.463
7.460
7.449
7.446
7.280
7.265
7.252
7.086
7.071
5.142
2.504
-0.000
Me
H
Me
Si
H
1p
(500 MHz, CDCl3)
1.00
3.09
0.95
2.06
1.39
1.84
1.80
6.00
f1 (ppm)

2021267-07-90-2-c.10.fid

1p

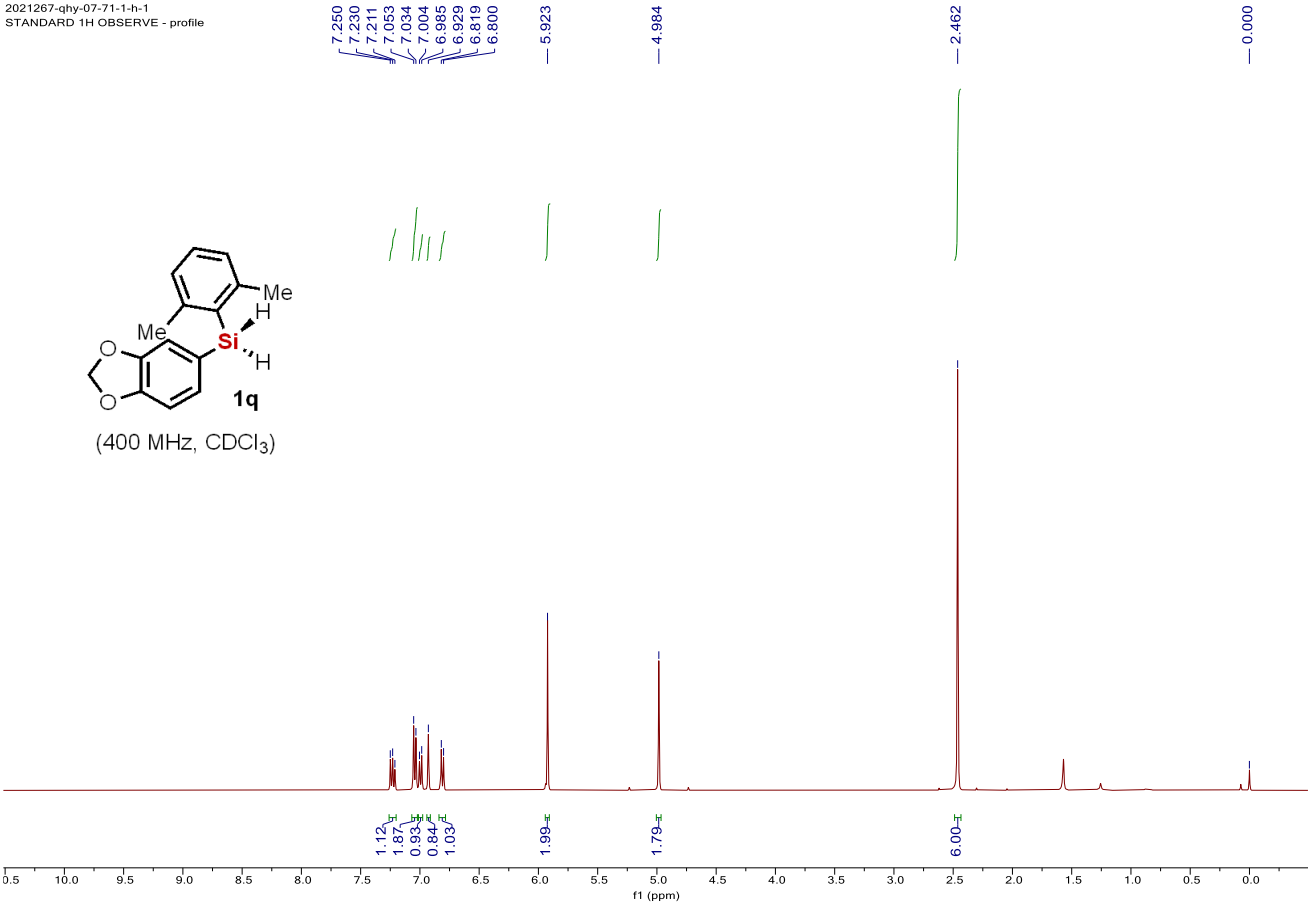
(125 MHz, $CDCl_3$)



2021267-qhy-07-71-1-h-1
STANDARD 1H OBSERVE - profile

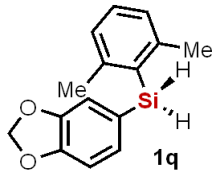
1q

(400 MHz, $CDCl_3$)



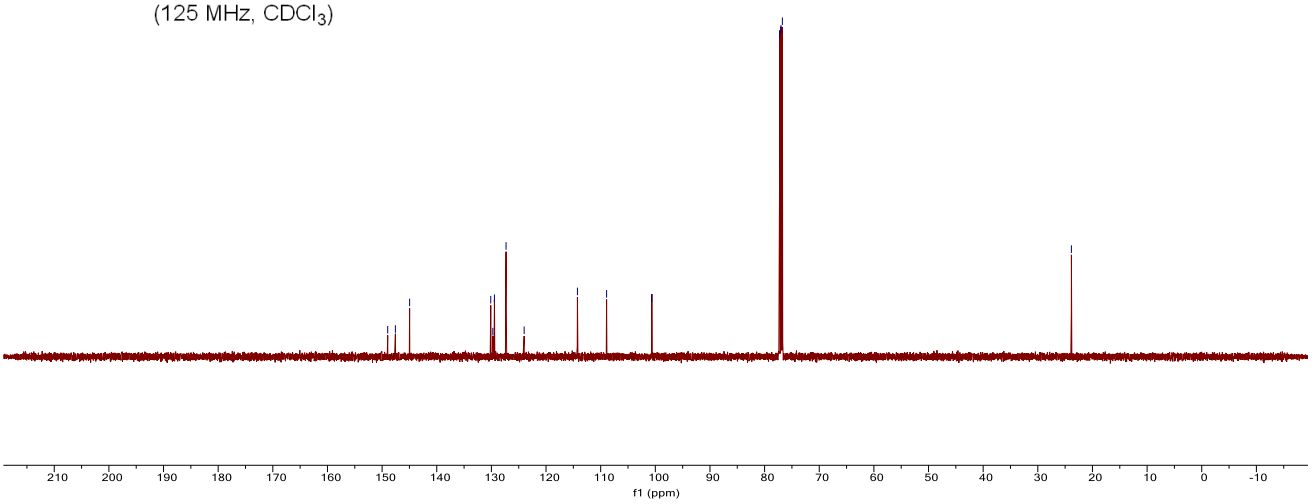
2021267-qhy-07-71-1-c.10.fid

148.97
147.57
144.97
130.12
129.74
129.44
127.31
124.00
114.25
108.92
100.64
77.26
77.00
76.75
23.85



1q

(125 MHz, $CDCl_3$)

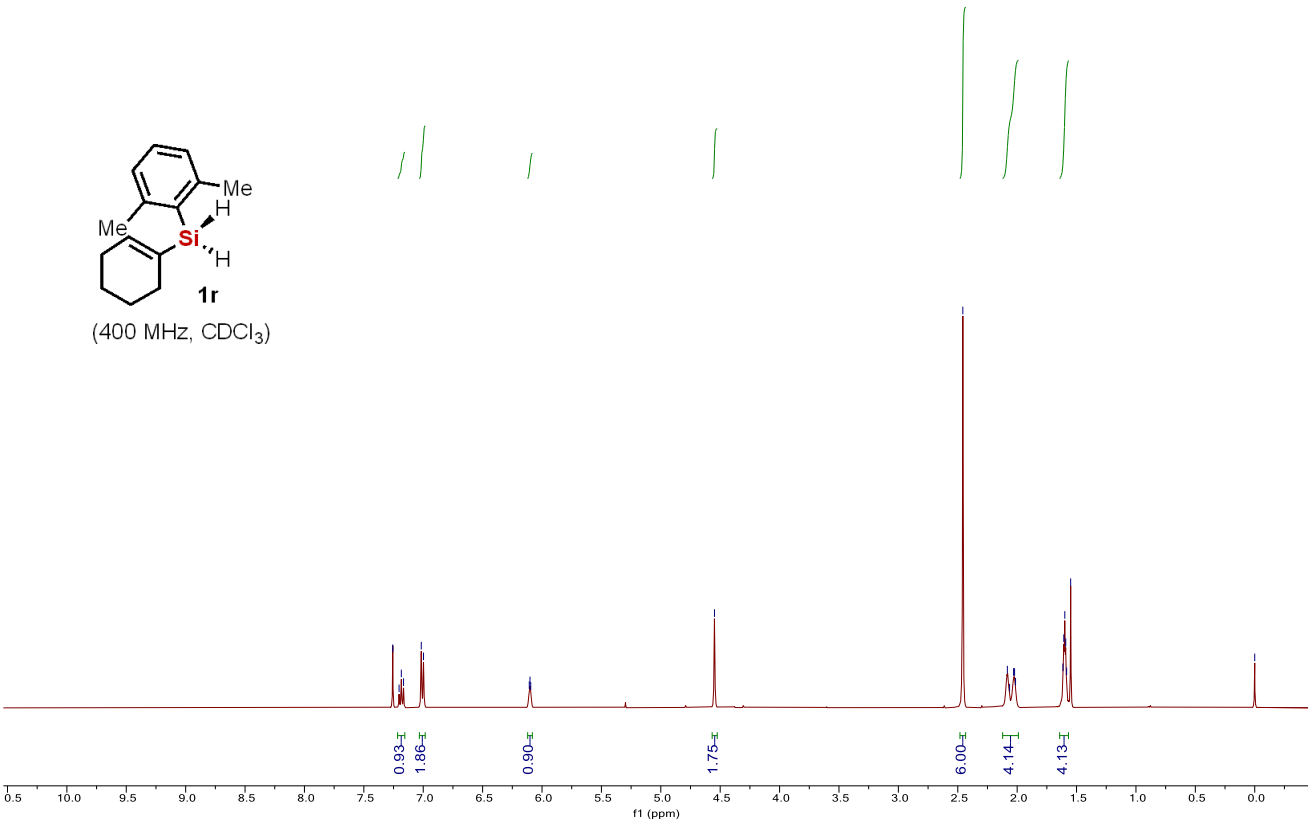


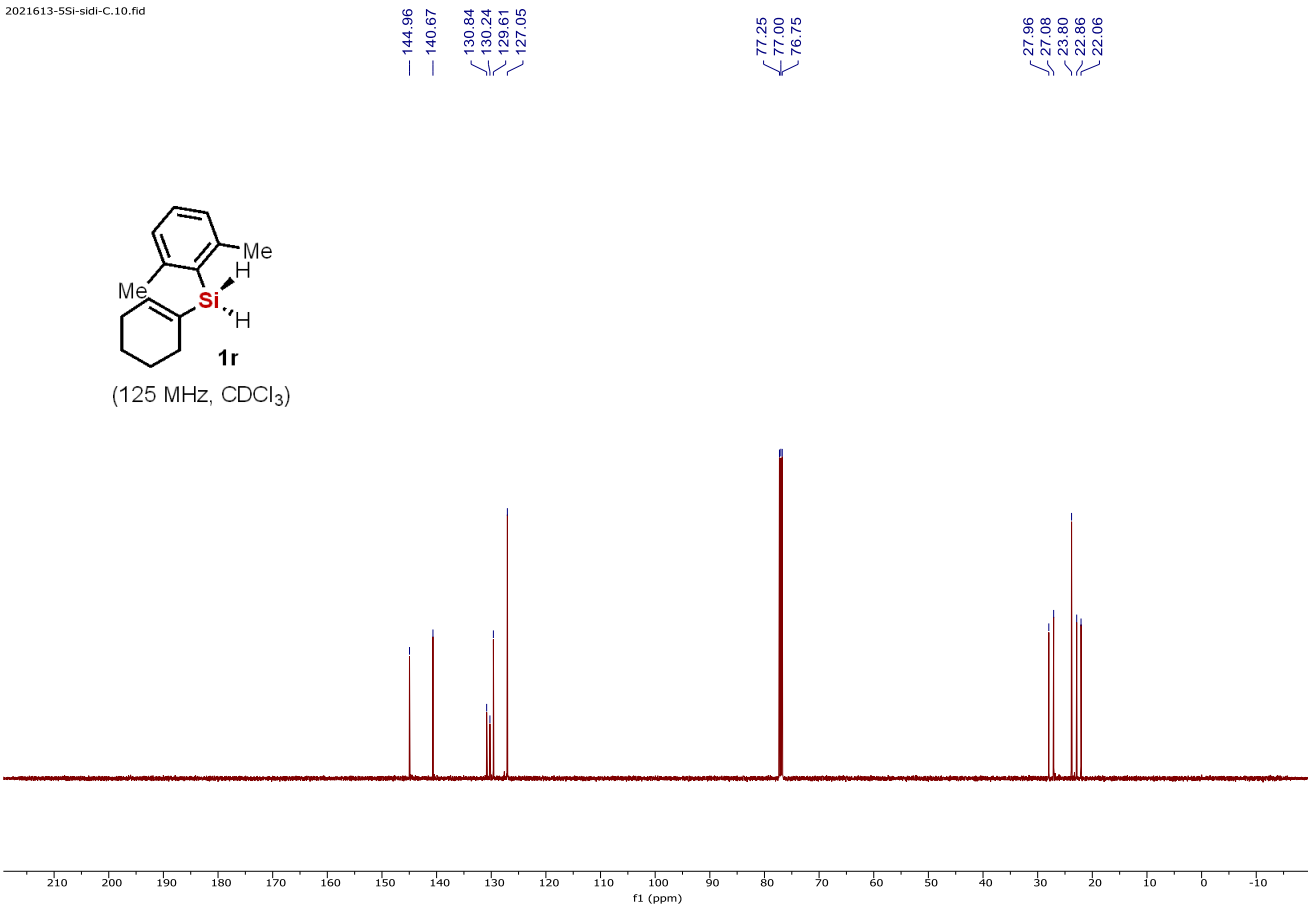
qhy-06-sixi-h-5

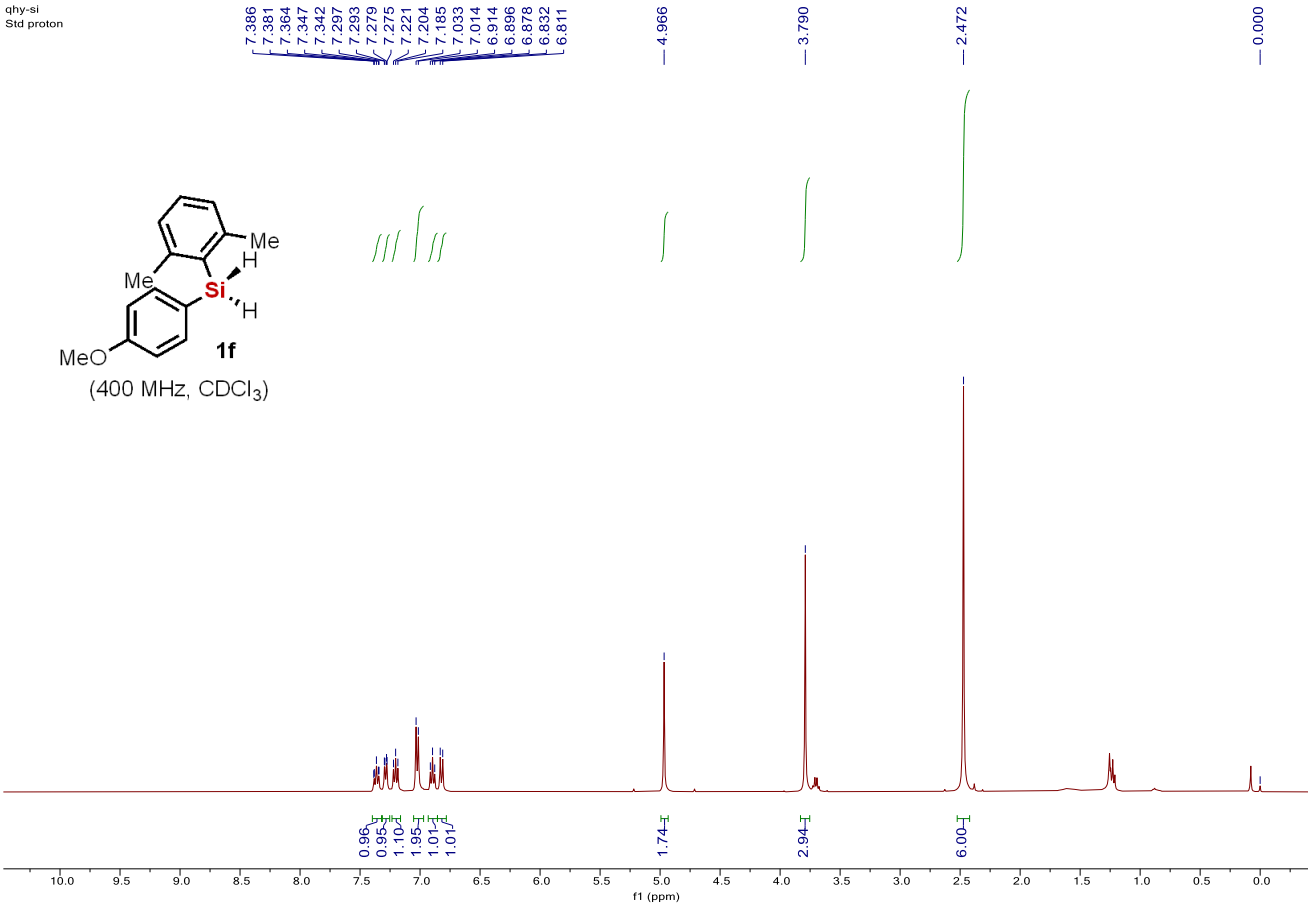
7.257
7.203
7.185
7.166
7.017
6.998
6.107
6.101
6.095
4.548
2.457
2.083
2.064
2.030
2.022
2.014
1.615
1.607
1.599
1.591
1.583
1.550
0.000

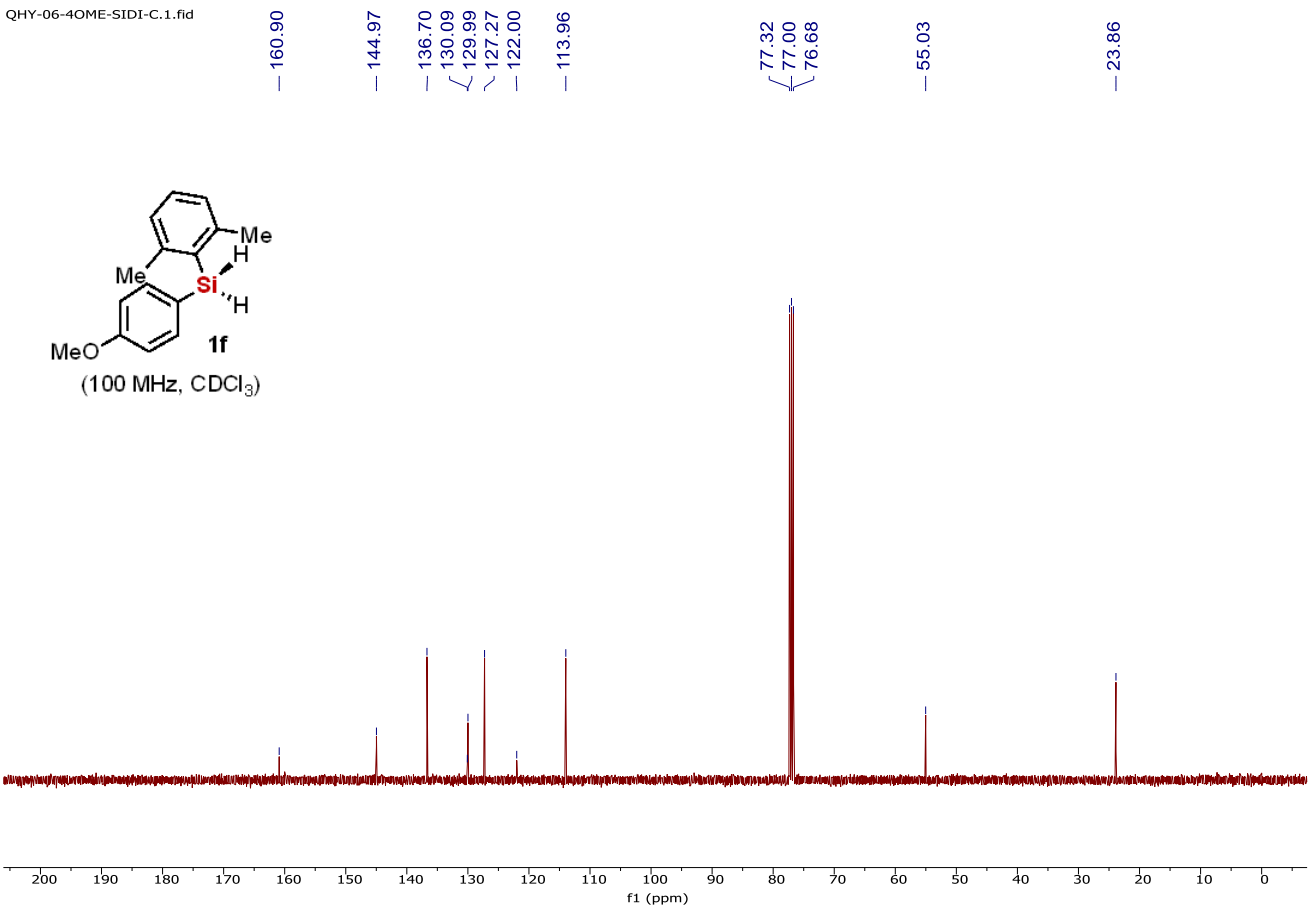
1r

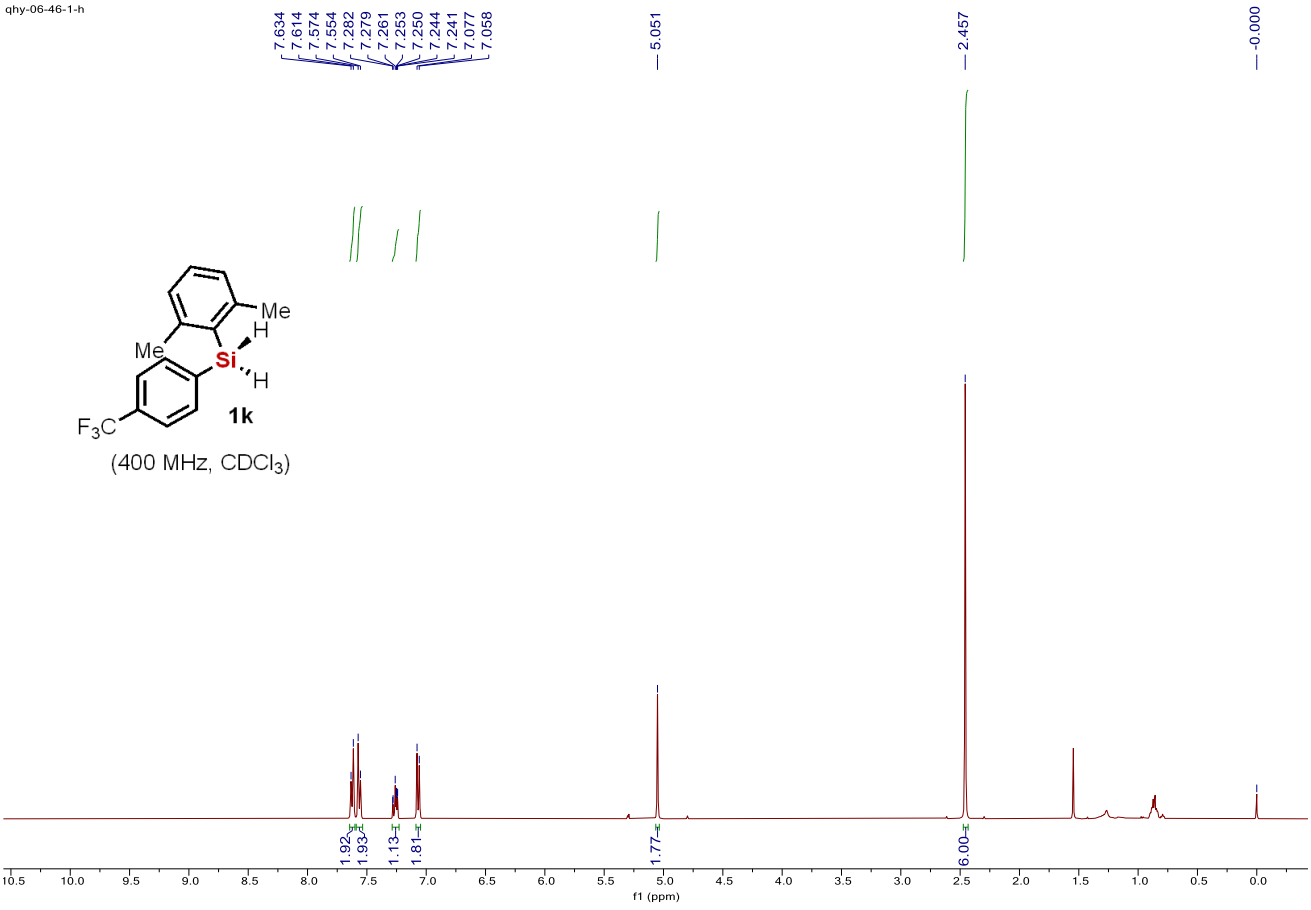
(400 MHz, $CDCl_3$)




2021613-5Si-sidi-C.10.fid
144.96
140.67
130.84
130.24
129.61
127.05
77.25
77.00
76.75
27.96
27.08
23.80
22.86
22.06
Me
H
Me
Si
H
1r
(125 MHz, CDCl3)
f1 (ppm)

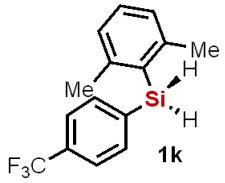

qhy-si
Std proton
7.386
7.381
7.364
7.347
7.342
7.297
7.293
7.279
7.275
7.221
7.204
7.185
7.033
7.014
6.914
6.896
6.878
6.832
6.811
4.966
3.790
2.472
0.000
Me
H
Me
Si
H
MeO
1f
(400 MHz, CDCl3)
0.96
0.95
1.10
1.95
1.01
1.01
1.74
2.94
6.00
f1 (ppm)


QHY-06-4OME-SIDI-C.1.fid
160.90
144.97
136.70
130.09
129.99
127.27
122.00
113.96
77.32
77.00
76.68
55.03
23.86
Me
H
Si
Me
H
MeO
1f
(100 MHz, CDCl3)
f1 (ppm)


qhy-06-46-1-h
7.634
7.614
7.574
7.554
7.282
7.279
7.261
7.253
7.250
7.244
7.241
7.077
7.058
5.051
2.457
-0.000
Me
H
Si
Me
H
F3C
1k
(400 MHz, CDCl3)
1.92
1.93
1.13
1.81
1.77
6.00
f1 (ppm)

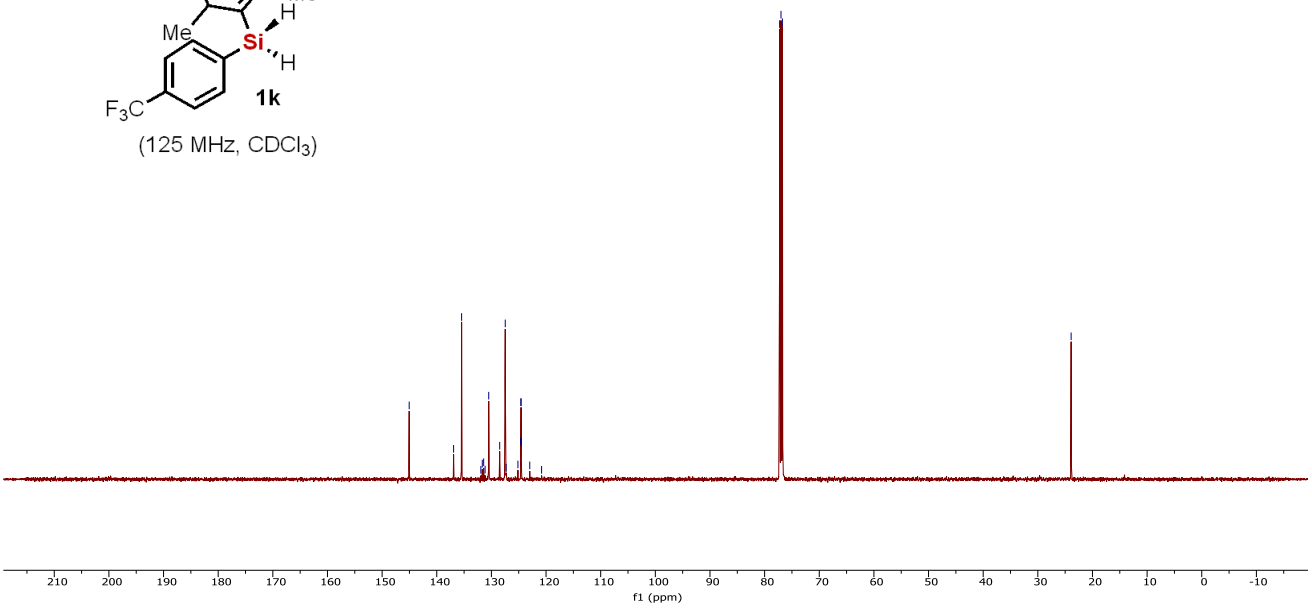
2021613-07-4CF3-sidi-C.10.fid

145.05
136.92
135.45
131.93
131.67
131.41
131.16
130.49
128.48
127.47
127.31
125.15
124.63
124.60
124.57
124.54
122.98
120.82
77.25
77.00
76.75
23.91



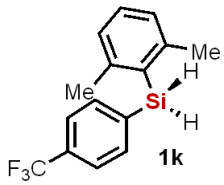
1k

(125 MHz, $CDCl_3$)



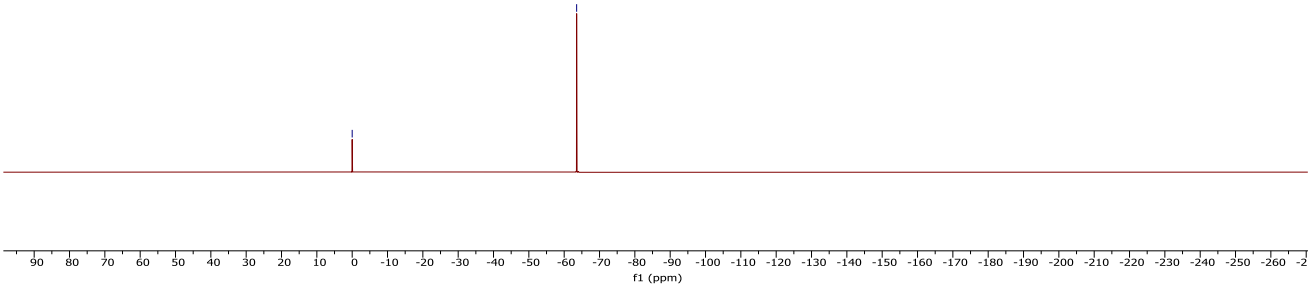
qhy-08-4cf3-sidi-f

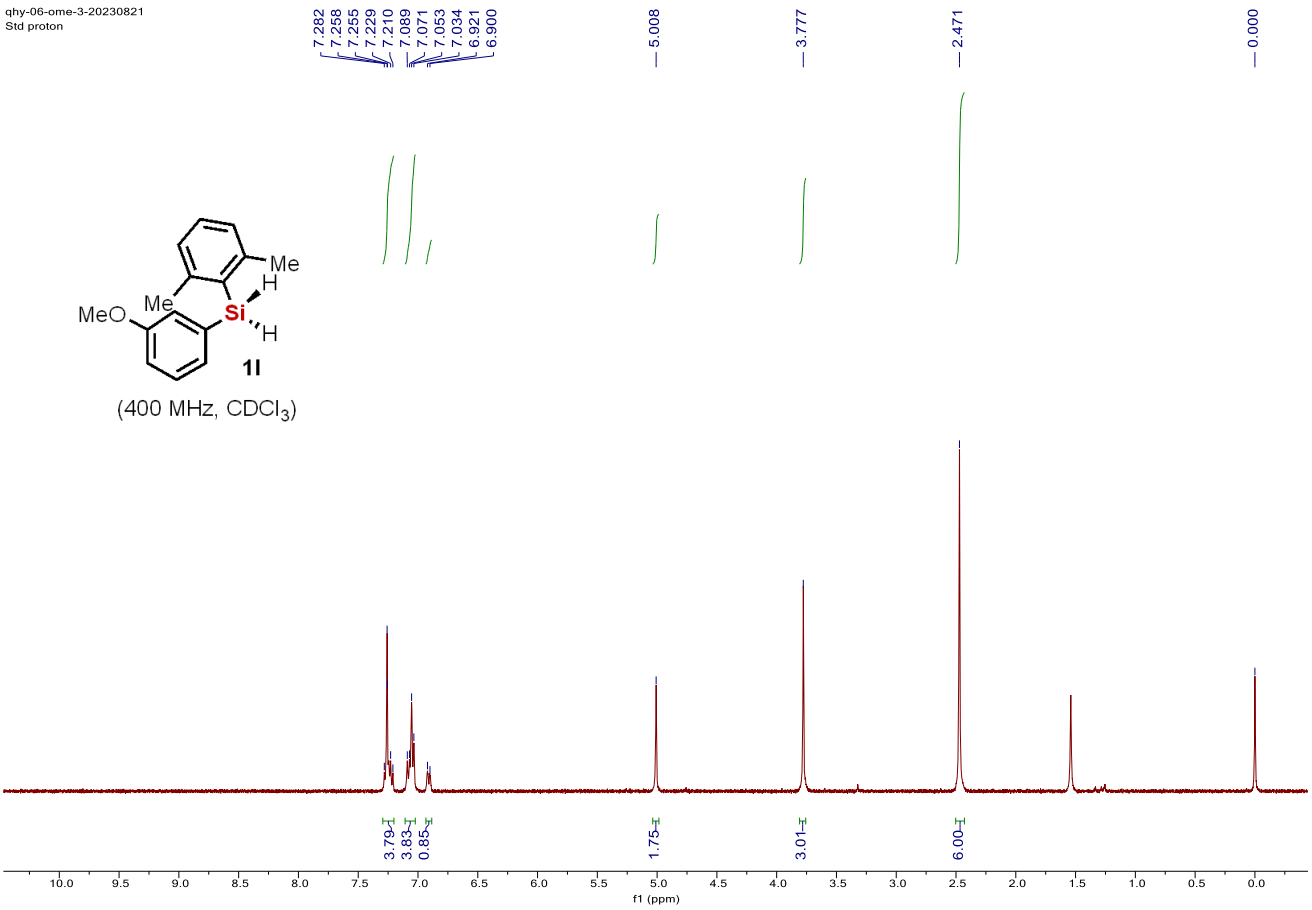
-0.000
-63.526

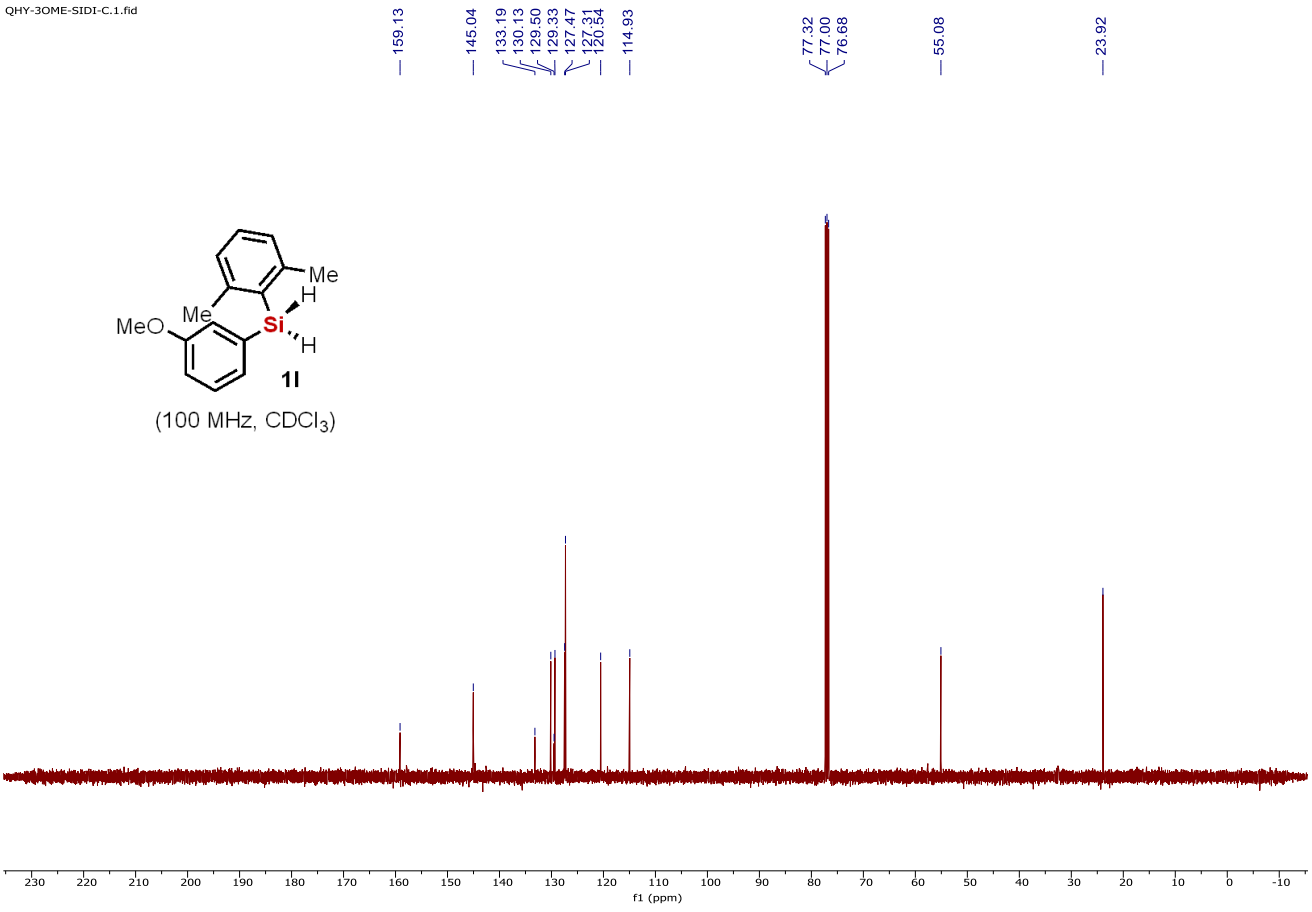


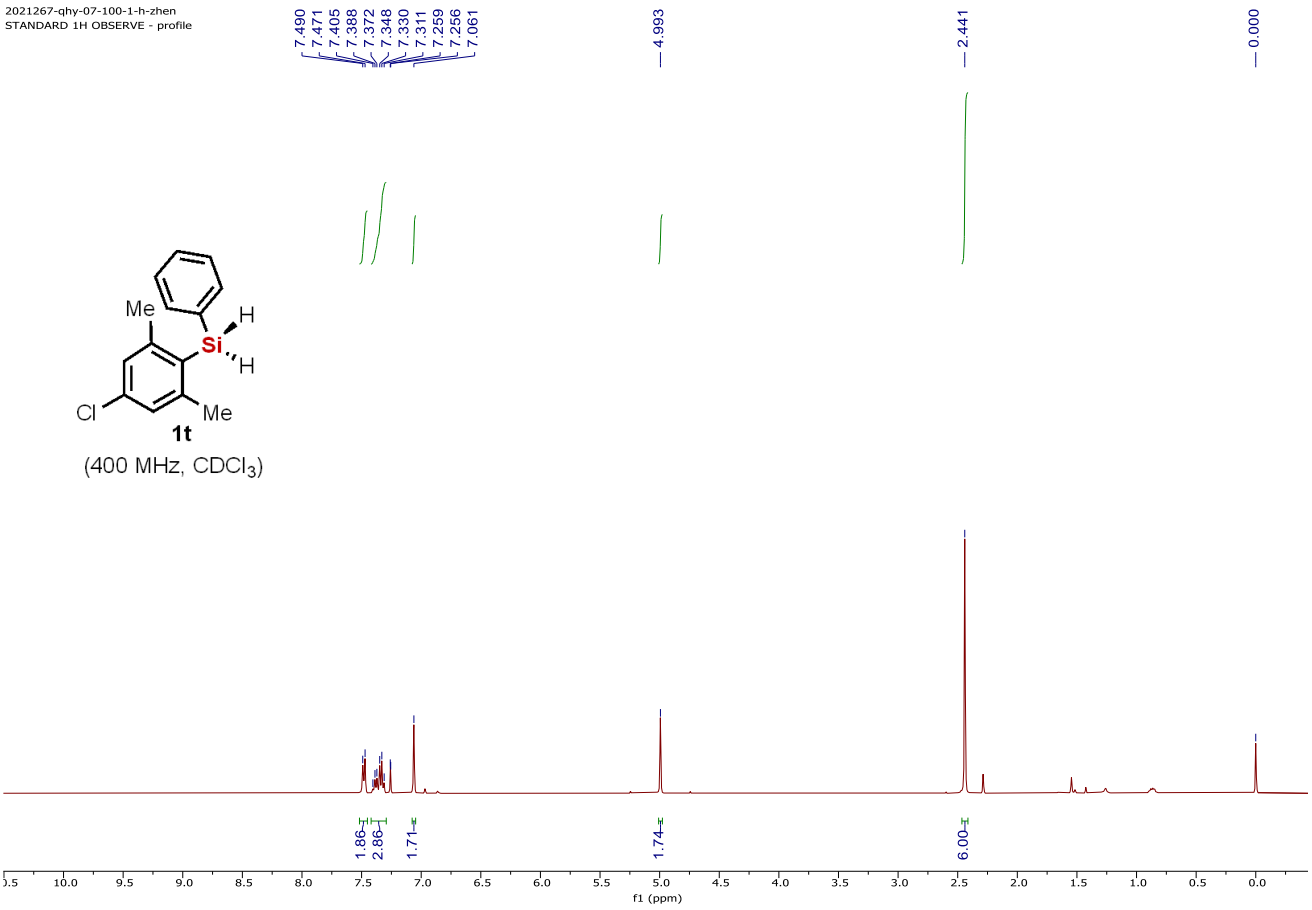
1k

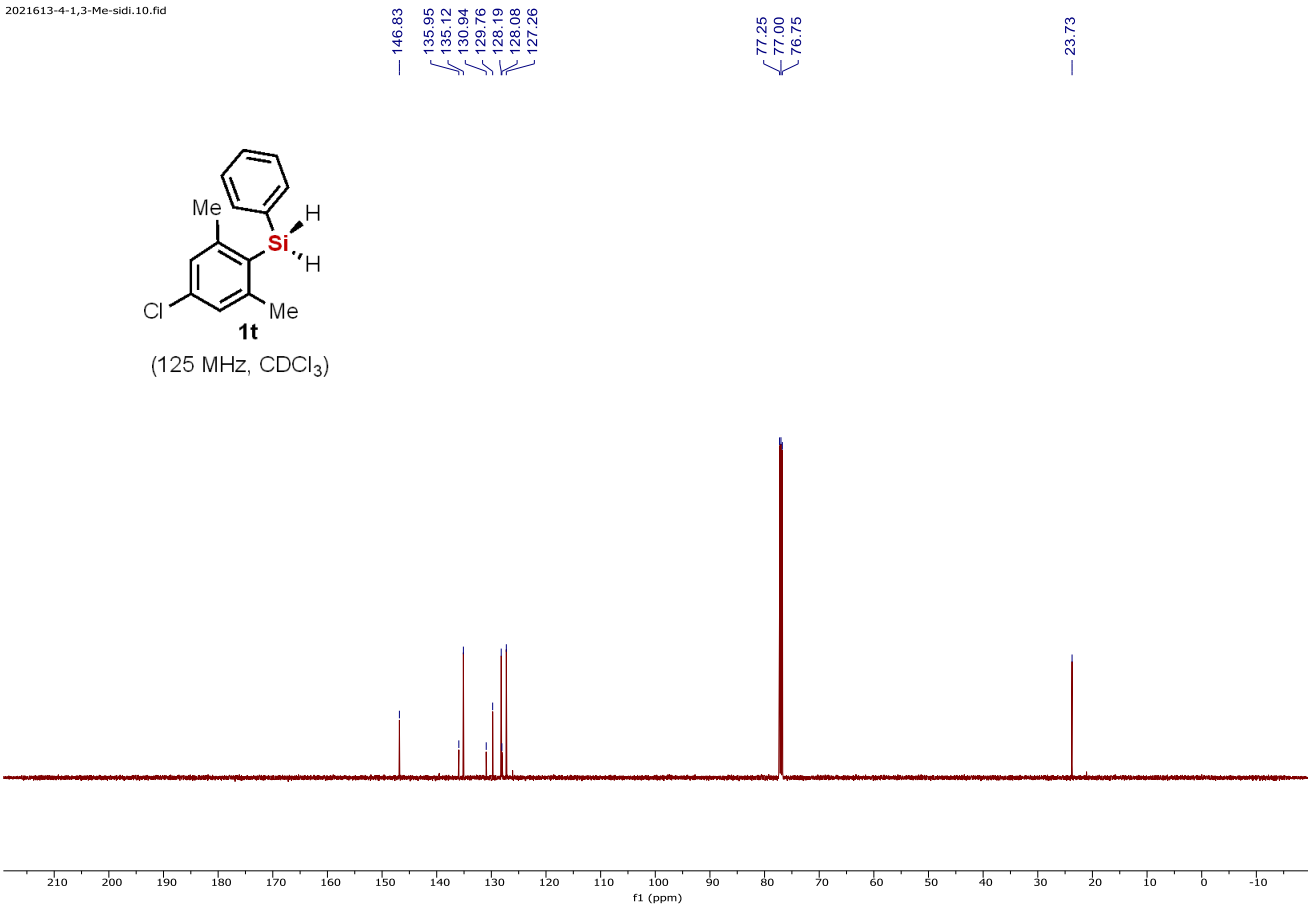
(375 MHz, $CDCl_3$)

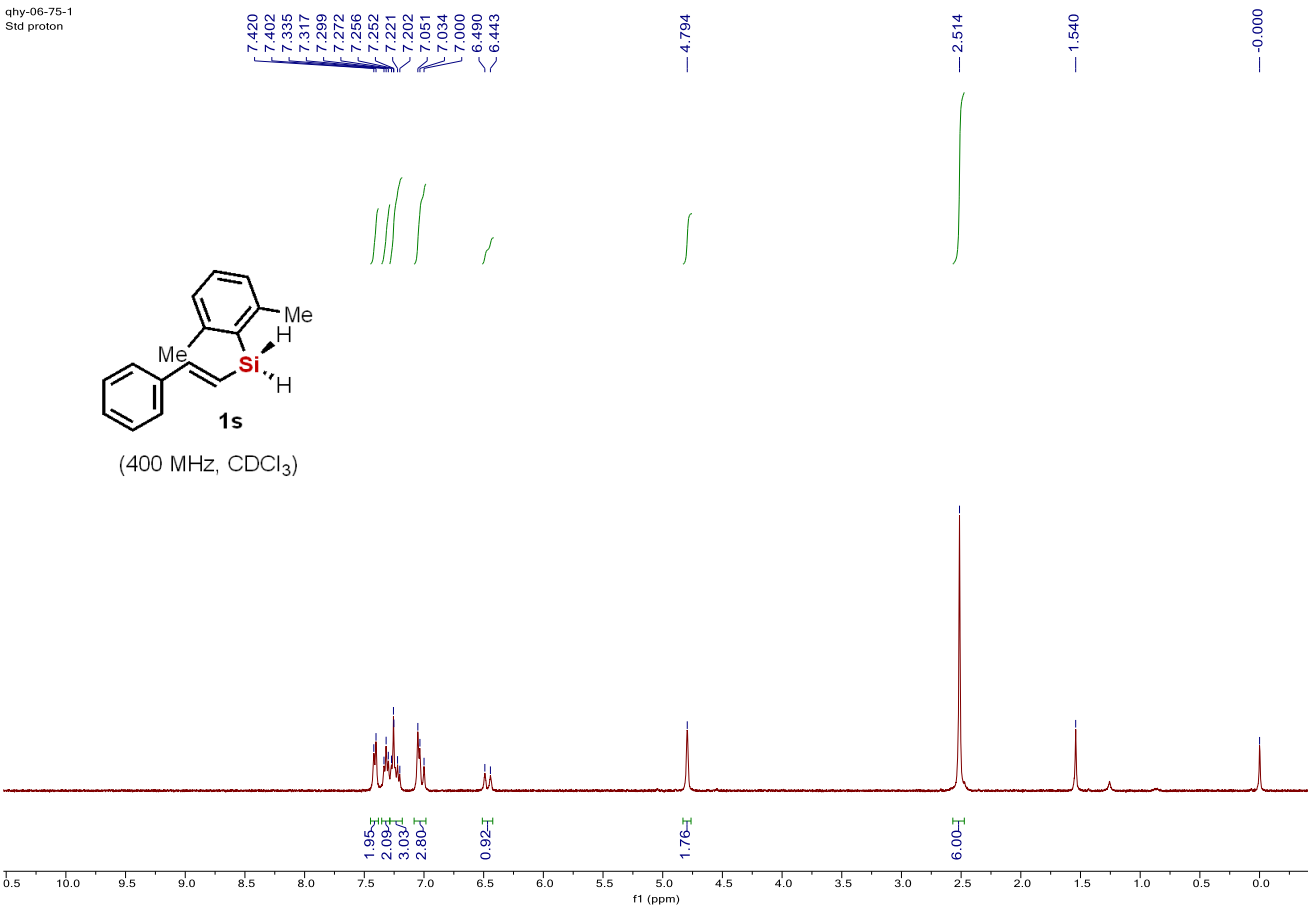


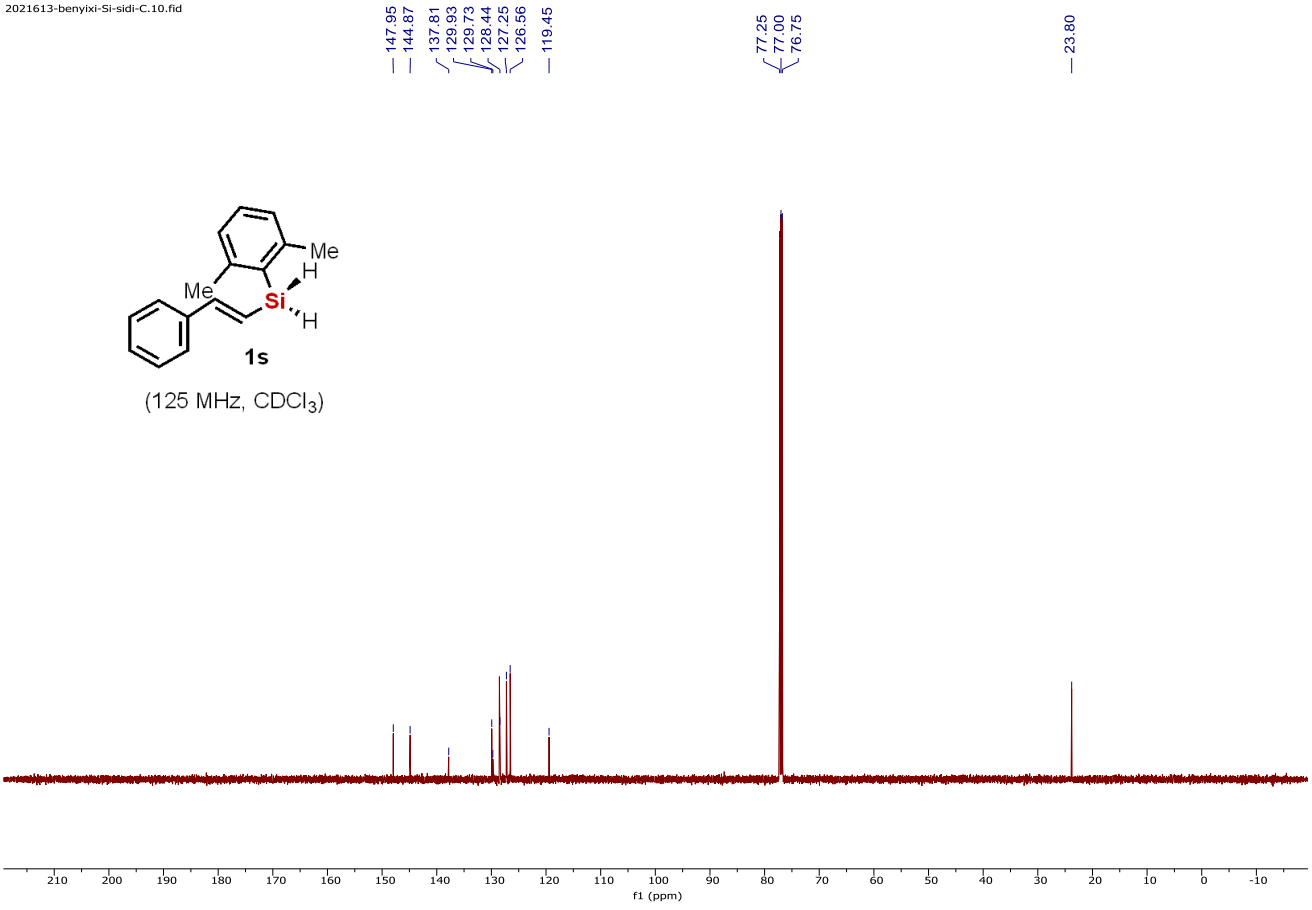

qhy-06-ome-3-20230821
Std proton
7.282
7.258
7.255
7.229
7.210
7.089
7.071
7.053
7.034
6.921
6.900
5.008
3.777
2.471
0.000
Me
H
Me
MeO
Si
H
1l
(400 MHz, CDCl3)
3.79
3.83
0.85
1.75
3.01
6.00
f1 (ppm)


QHY-3OME-SIDI-C.1.fid
159.13
145.04
133.19
130.13
129.50
129.33
127.47
127.31
120.54
114.93
77.32
77.00
76.68
55.08
23.92
Me
H
Me
MeO
Si
H
1l
(100 MHz, CDCl3)
f1 (ppm)

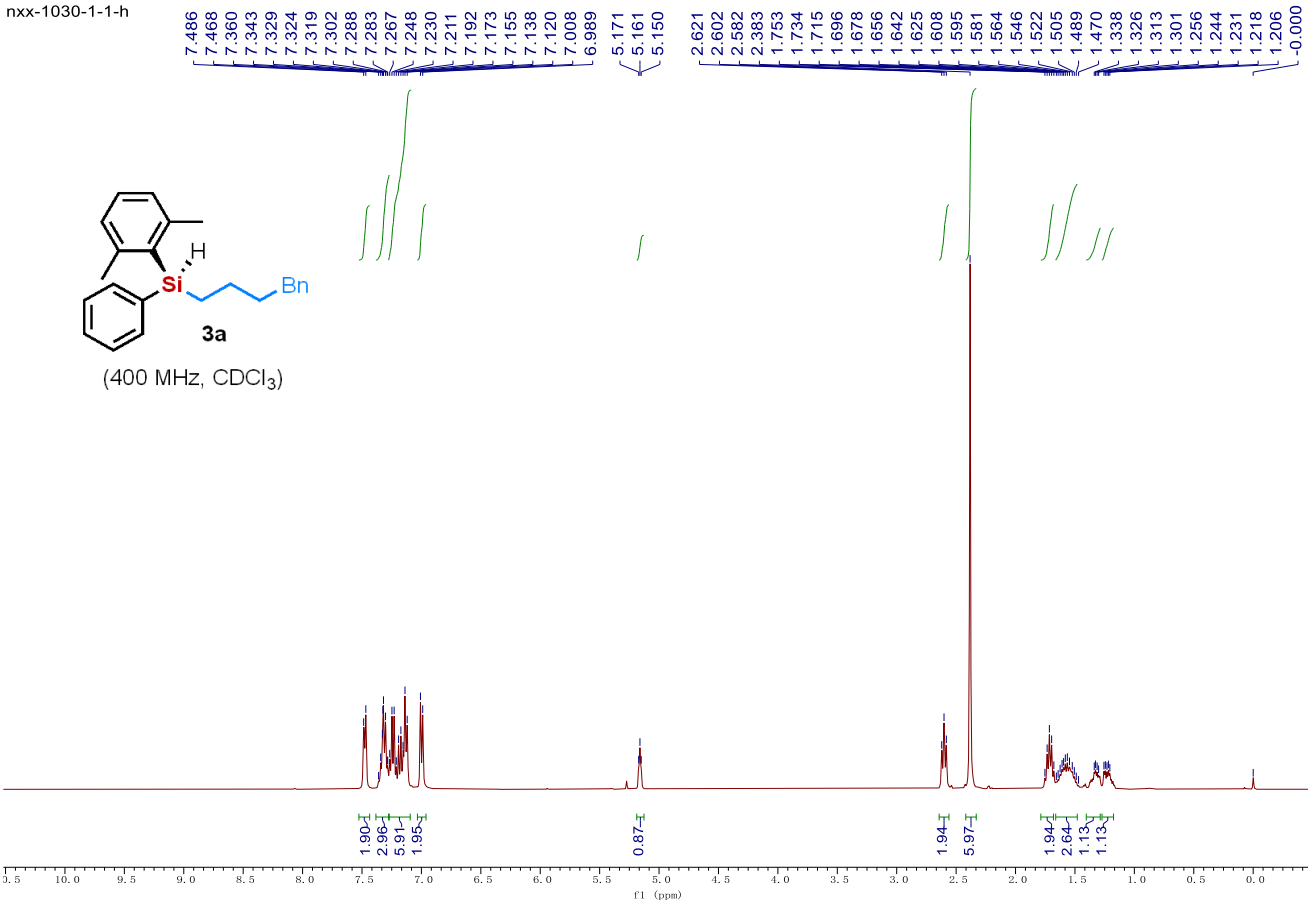

2021267-qhy-07-100-1-h-zhen
STANDARD 1H OBSERVE - profile
7.490
7.471
7.405
7.388
7.372
7.348
7.330
7.311
7.259
7.256
7.061
4.993
2.441
0.000
Me
H
Si
H
Cl
Me
1t
(400 MHz, CDCl3)
1.86
2.86
1.71
1.74
6.00
f1 (ppm)


2021613-4-1,3-Me-sidi.10.fid
146.83
135.95
135.12
130.94
129.76
128.19
128.08
127.26
77.25
77.00
76.75
23.73
Me
H
Si
H
Cl
Me
1t
(125 MHz, CDCl3)
f1 (ppm)


qhy-06-75-1
Std proton
7.420
7.402
7.335
7.317
7.299
7.272
7.256
7.252
7.221
7.202
7.051
7.034
7.000
6.490
6.443
4.794
2.514
1.540
-0.000
Me
H
Me
Si
H
1s
(400 MHz, CDCl3)
1.95
2.09
3.03
2.80
0.92
1.76
6.00
f1 (ppm)


2021613-benyixi-Si-sidi-C.10.fid
147.95
144.87
137.81
129.93
129.73
128.44
127.25
126.56
119.45
77.25
77.00
76.75
23.80
Me
H
Me
Si
H
1s
(125 MHz, CDCl3)
f1 (ppm)

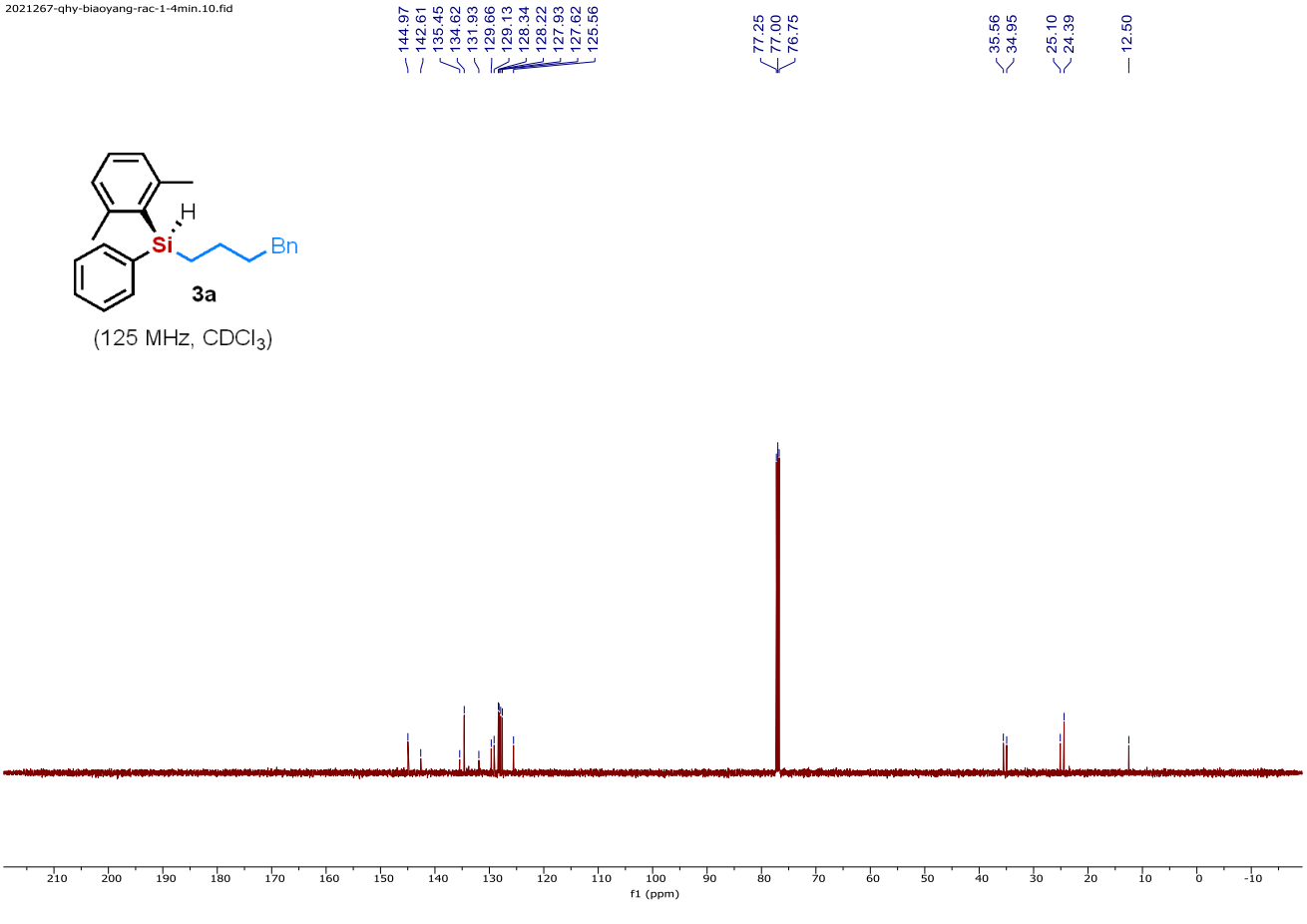
nxx-1030-1-1-h



3a

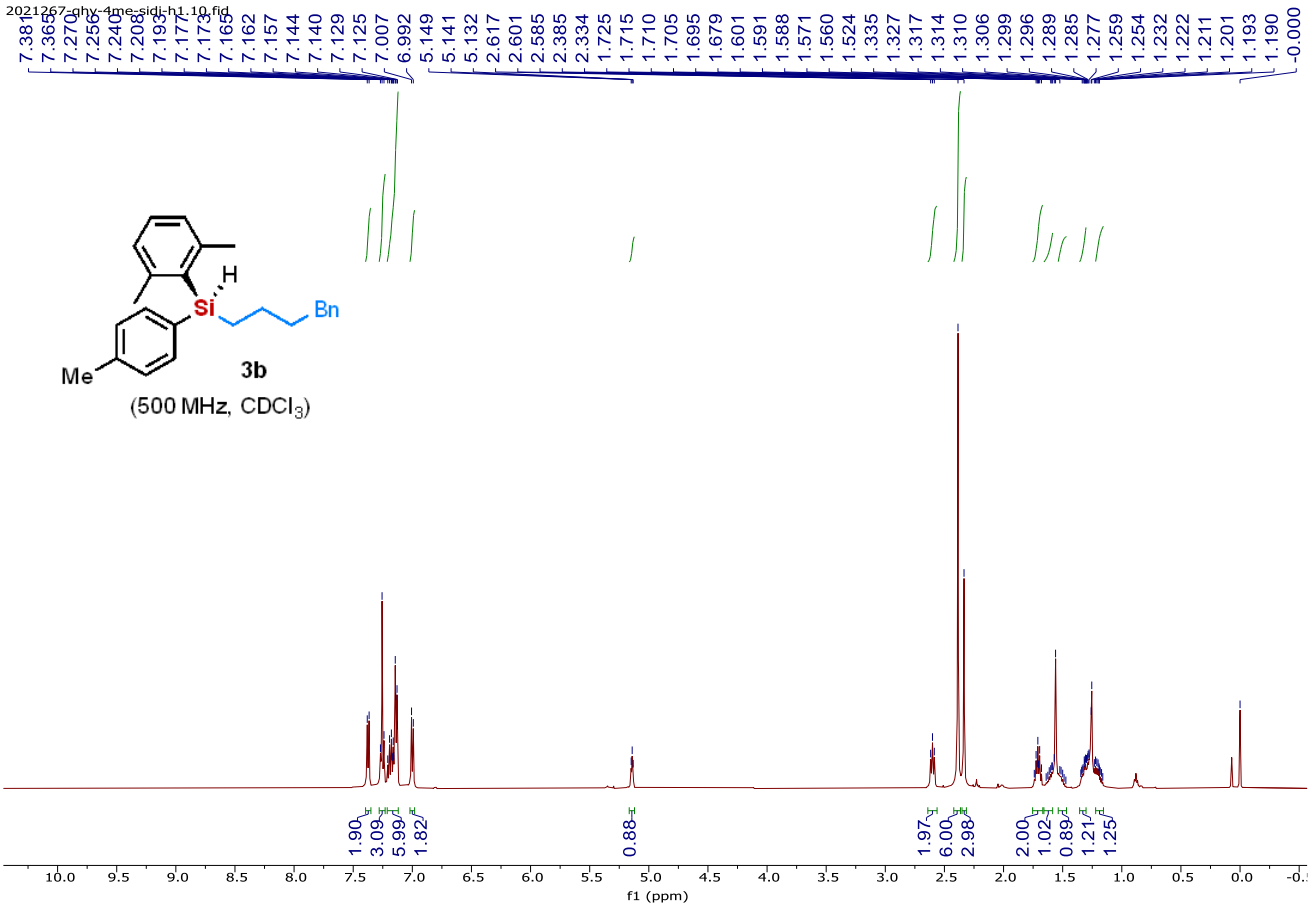
(400 MHz, $CDCl_3$)

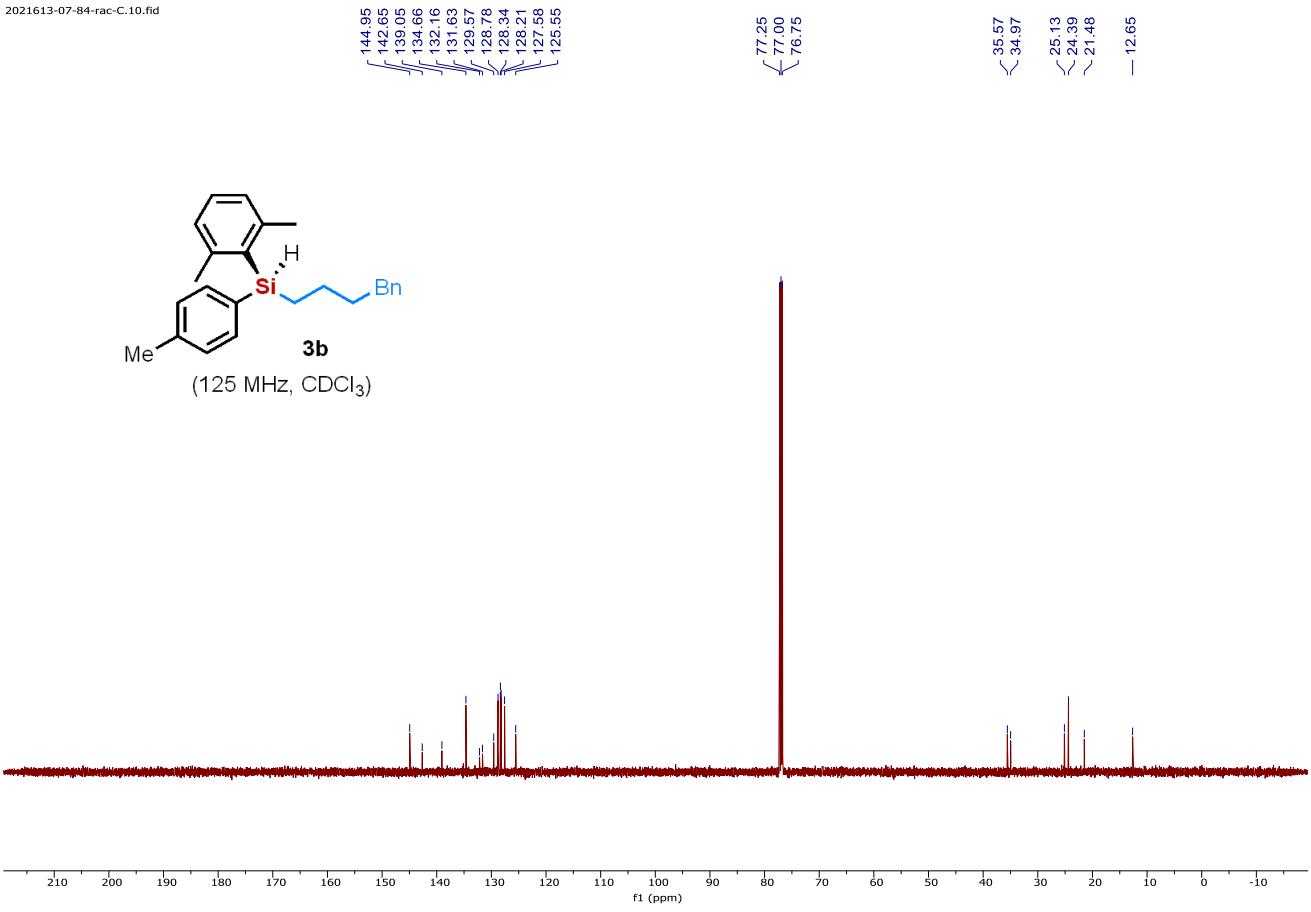
2021267-qhy-biaoyang-rac-1-4min.10.fid

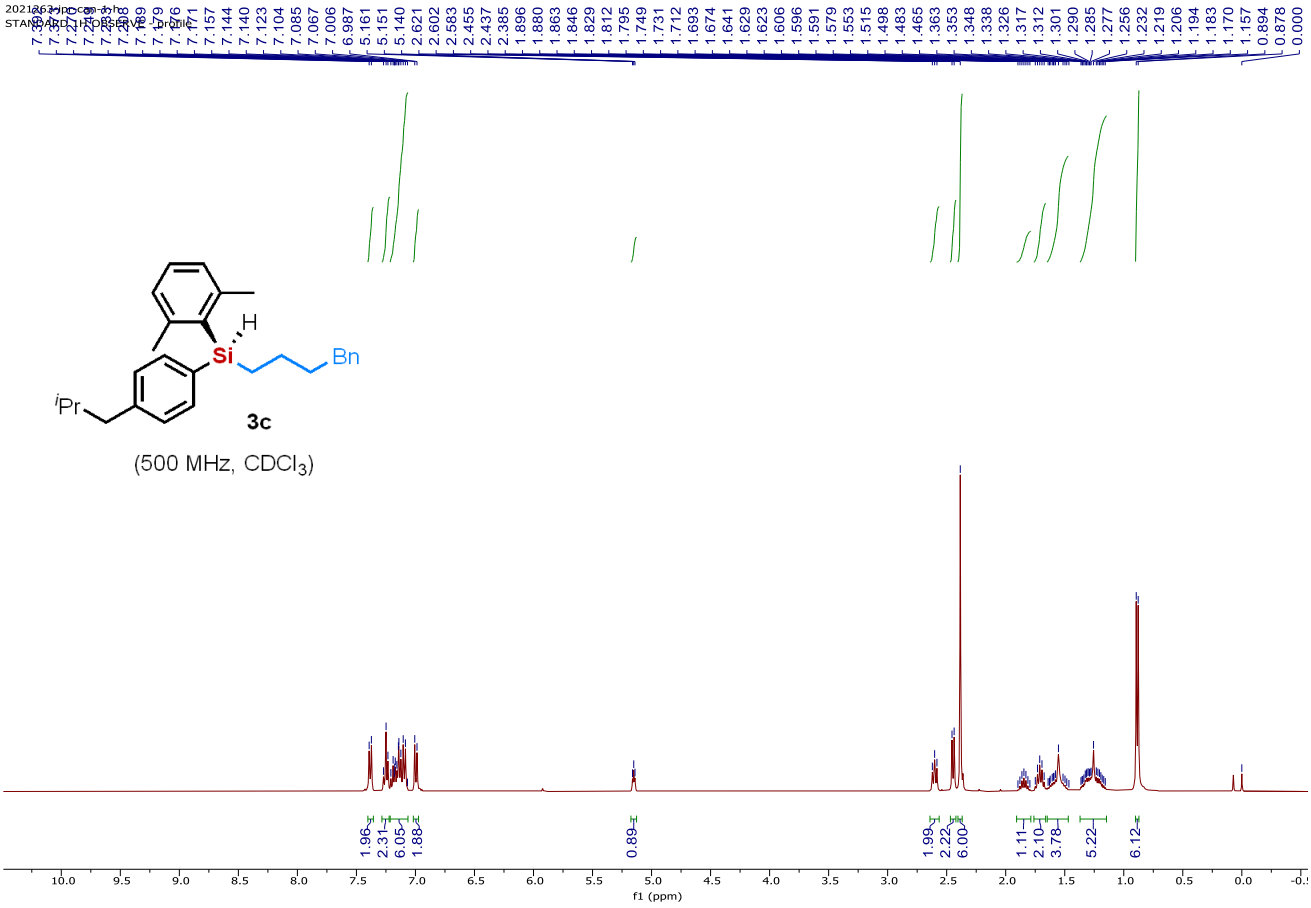


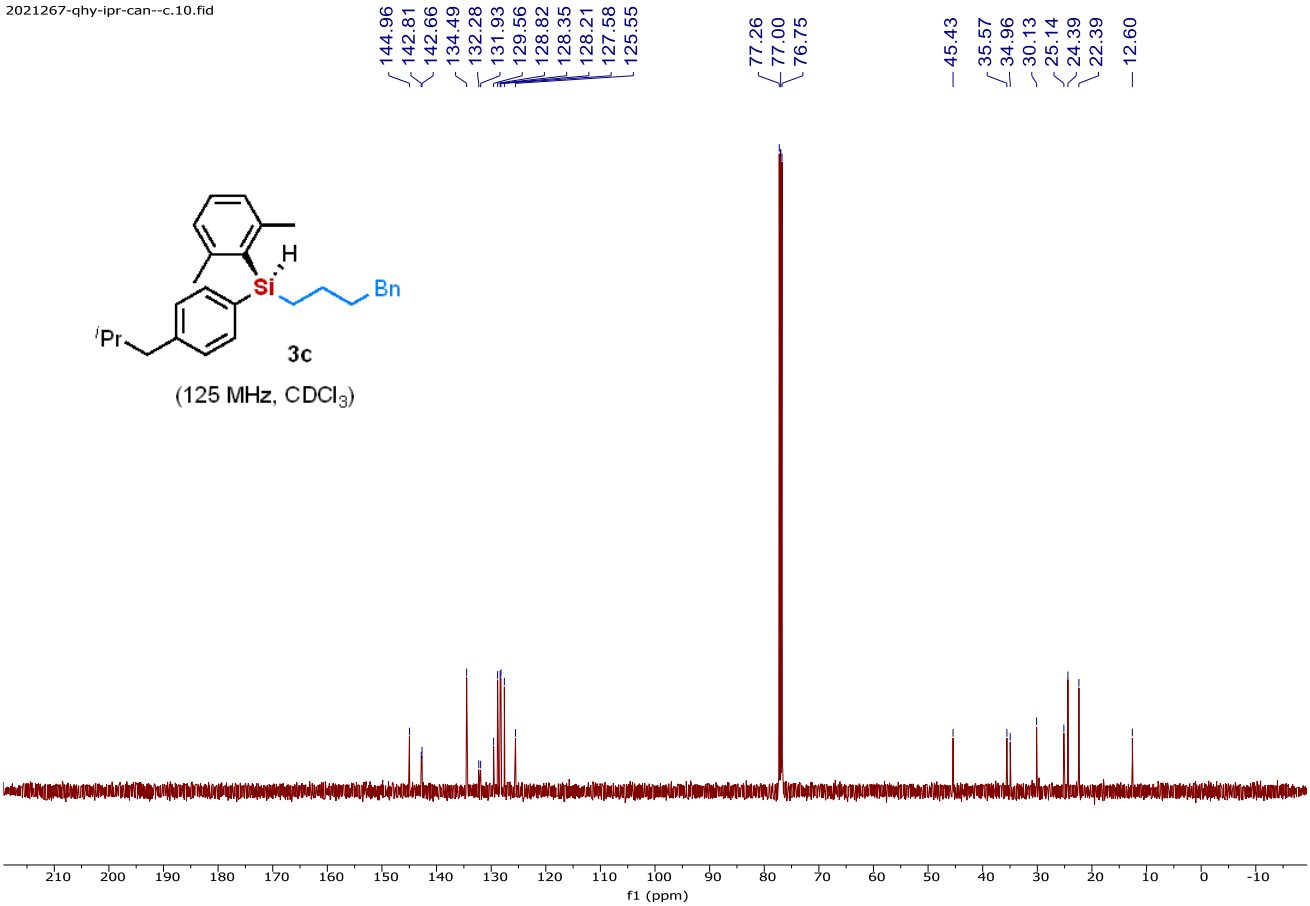
3a

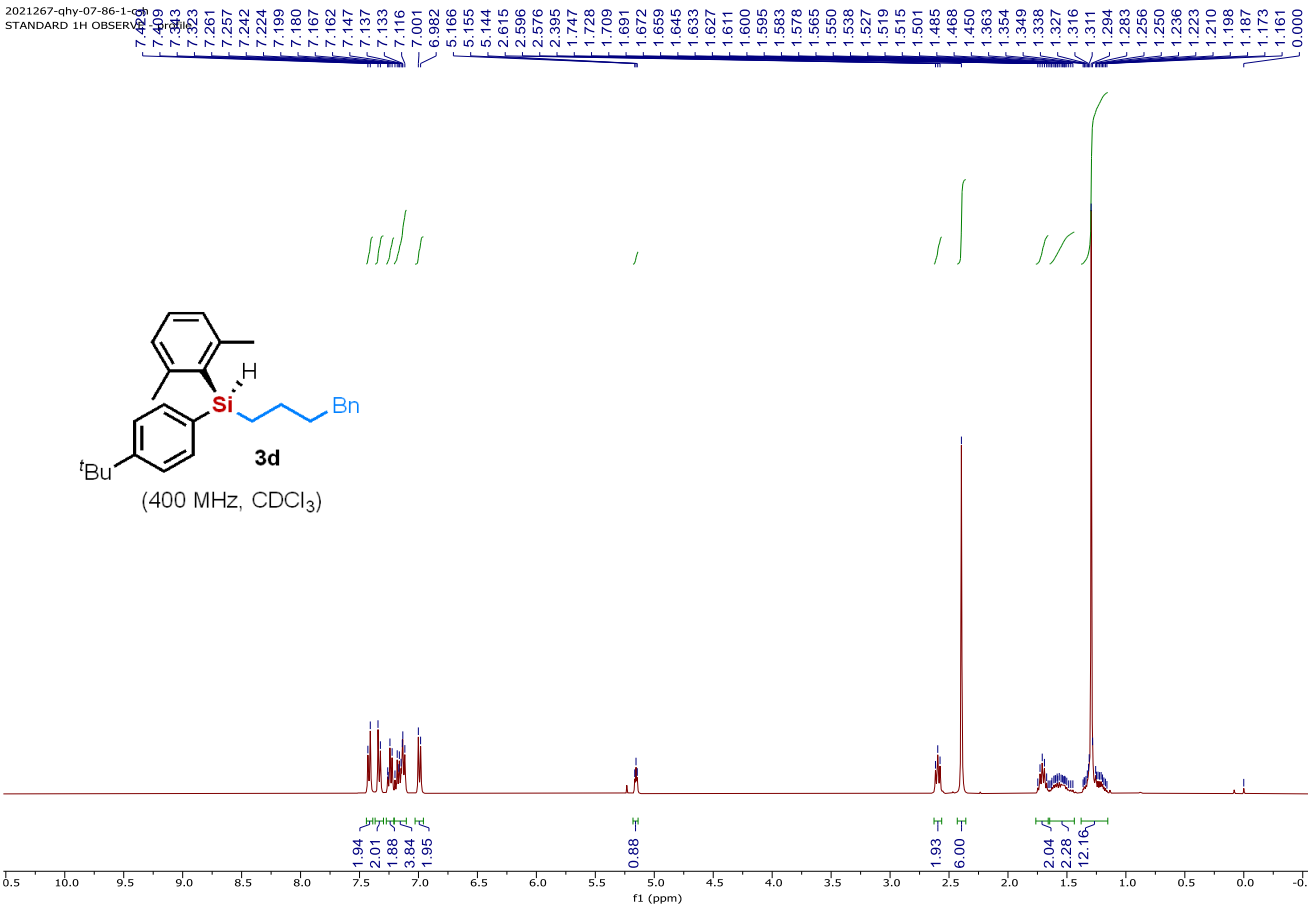
(125 MHz, $CDCl_3$)

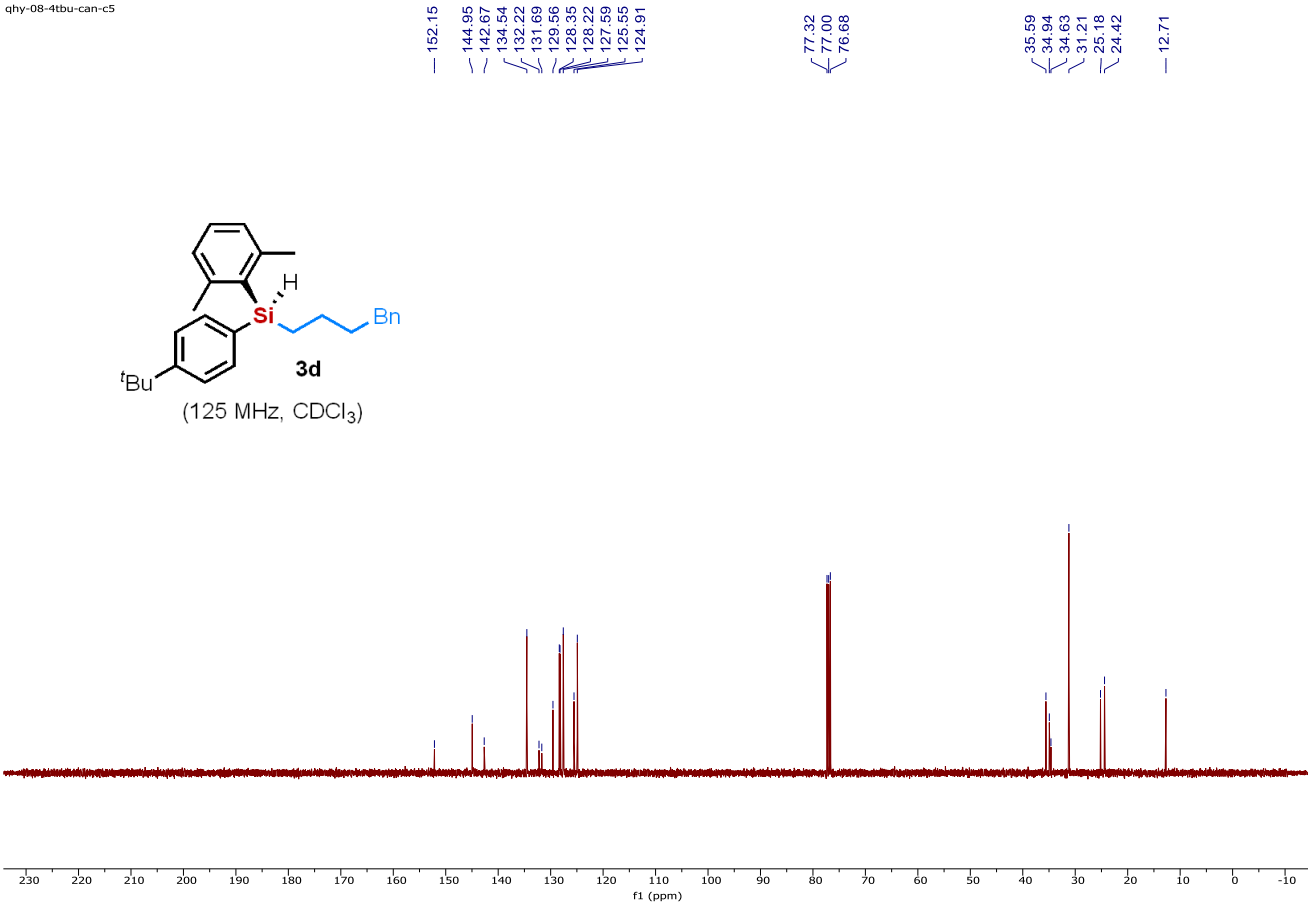

2021267-chy-4me-sidi-h1.10.fid
Me
H
Si
Bn
3b
(500 MHz, CDCl3)
f1 (ppm)


2021613-07-84-rac-C.10.fid
Me
H
Si
Bn
3b
(125 MHz, CDCl3)
f1 (ppm)


H
Si
Bn
iPr
3c
(500 MHz, CDCl3)
1.96
2.31
6.05
1.88
0.89
1.99
2.22
6.00
1.11
2.10
3.78
5.22
6.12
f1 (ppm)

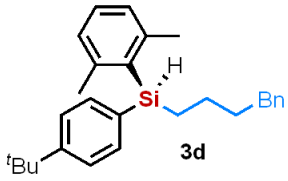

2021267-qhy-ipr-can--c.10.fid
144.96
142.81
142.66
134.49
132.28
131.93
129.56
128.82
128.35
128.21
127.58
125.55
77.26
77.00
76.75
45.43
35.57
34.96
30.13
25.14
24.39
22.39
12.60
H
Si
Bn
iPr
3c
(125 MHz, CDCl3)
f1 (ppm)


2021267-qhy-07-86-1-c5h
STANDARD 1H OBSERVE
7.429
7.409
7.343
7.323
7.261
7.257
7.242
7.224
7.199
7.180
7.167
7.162
7.147
7.137
7.133
7.116
7.001
6.982
5.166
5.155
5.144
2.615
2.596
2.576
2.395
1.747
1.728
1.709
1.691
1.672
1.659
1.645
1.633
1.627
1.611
1.600
1.595
1.583
1.578
1.565
1.550
1.538
1.527
1.519
1.515
1.501
1.485
1.468
1.450
1.363
1.354
1.349
1.338
1.327
1.316
1.311
1.294
1.283
1.256
1.250
1.236
1.223
1.210
1.198
1.187
1.173
1.161
0.000
H
Si
Bn
tBu
3d
(400 MHz, CDCl3)
1.94
2.01
1.88
3.84
1.95
0.88
1.93
6.00
2.04
2.28
12.16
f1 (ppm)


qhy-08-4tbu-can-c5
152.15
144.95
142.67
134.54
132.22
131.69
129.56
128.35
128.22
127.59
125.55
124.91
77.32
77.00
76.68
35.59
34.94
34.63
31.21
25.18
24.42
12.71
H
Si
Bn
tBu
3d
(125 MHz, CDCl3)
f1 (ppm)

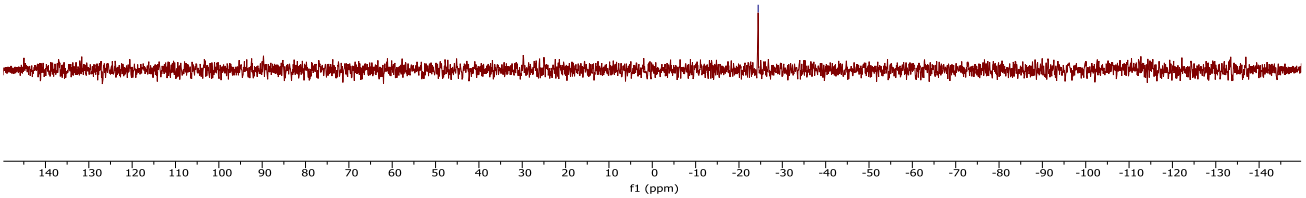
wyc-II-04-3d
single pulse decoupled gated NOE

-24.426



3d

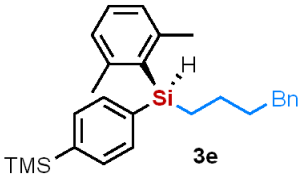
(119 MHz, $CDCl_3$)



2021613-08-3-1-H.30.fid

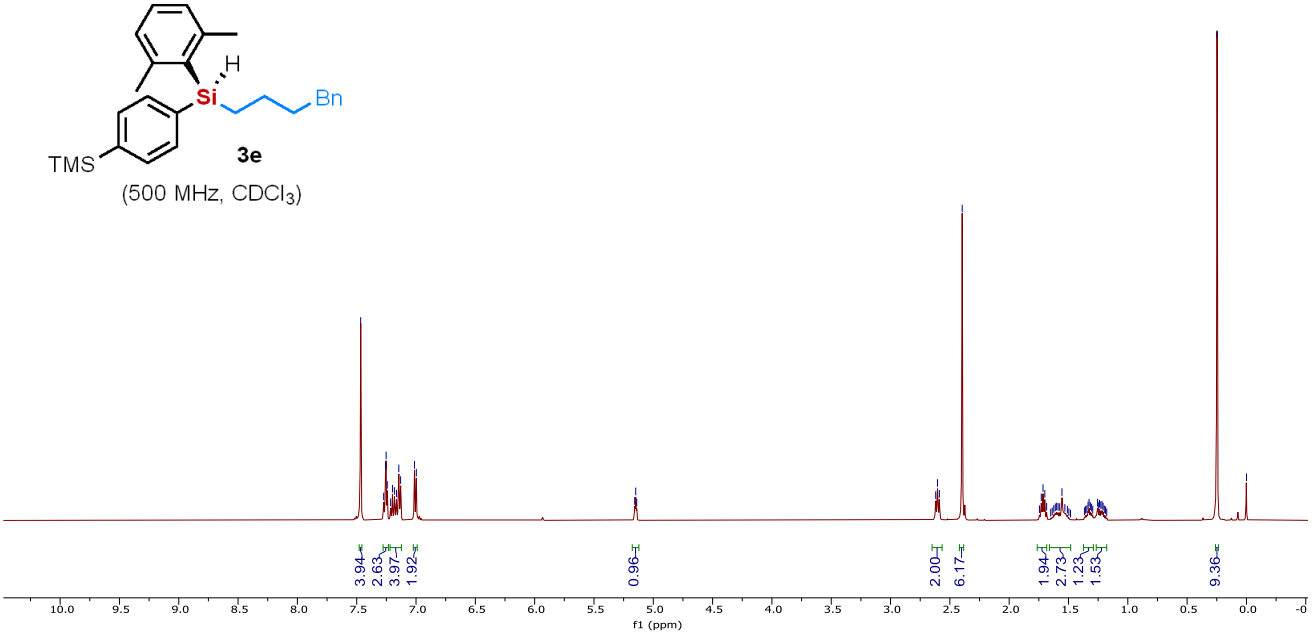
7.467 7.273 7.257 7.252 7.243 7.214 7.199 7.183 7.165 7.145 7.130 7.013 6.998

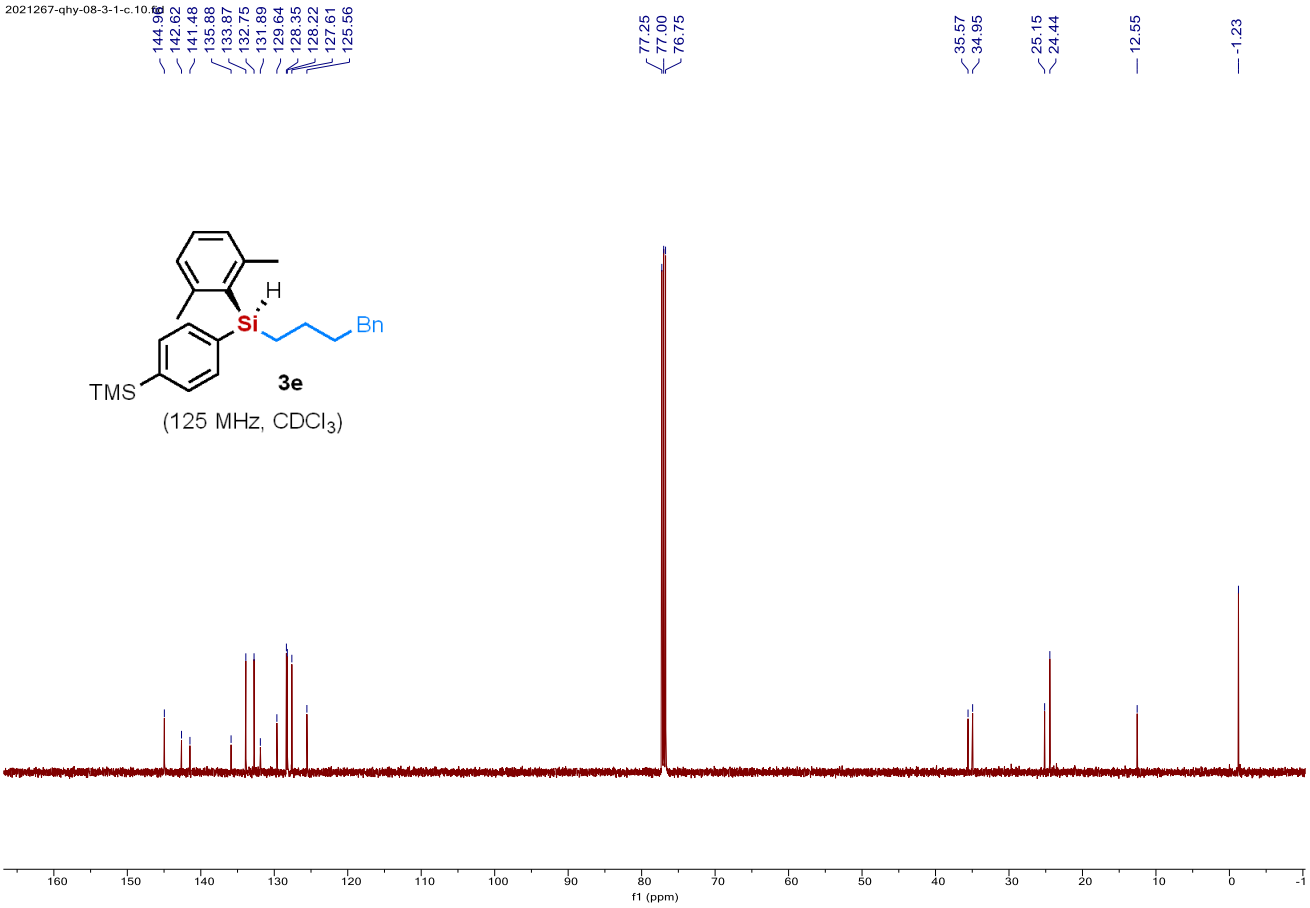
5.157 5.148 5.140 2.619 2.604 2.588 2.396 1.745 1.729 1.715 1.699 1.684 1.650 1.637 1.624 1.611 1.600 1.588 1.574 1.555 1.531 1.510 1.497 1.483 1.365 1.356 1.345 1.335 1.326 1.316 1.305 1.296 1.254 1.249 1.239 1.227 1.217 1.208 1.198 1.188 1.177 0.248 -0.000

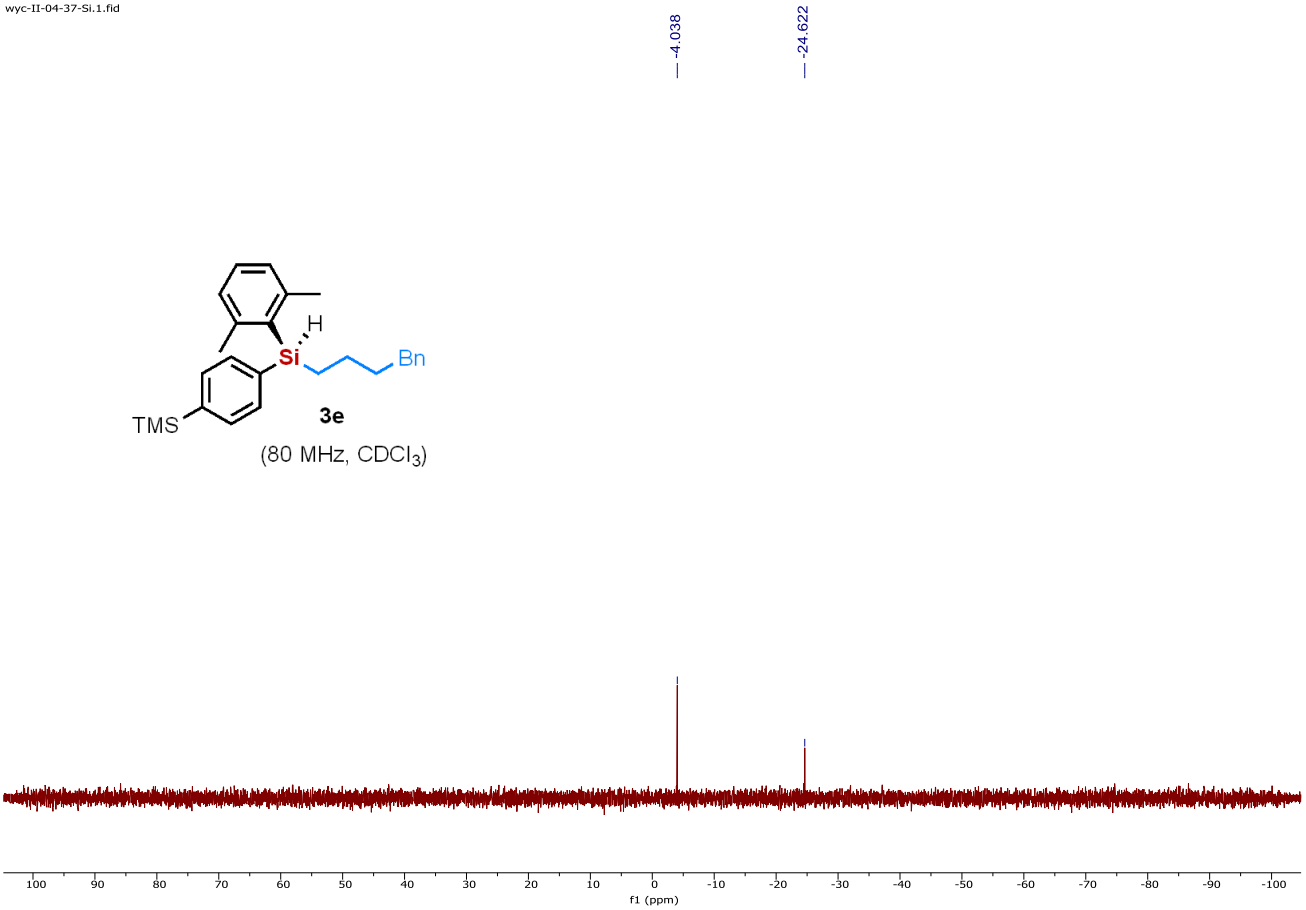


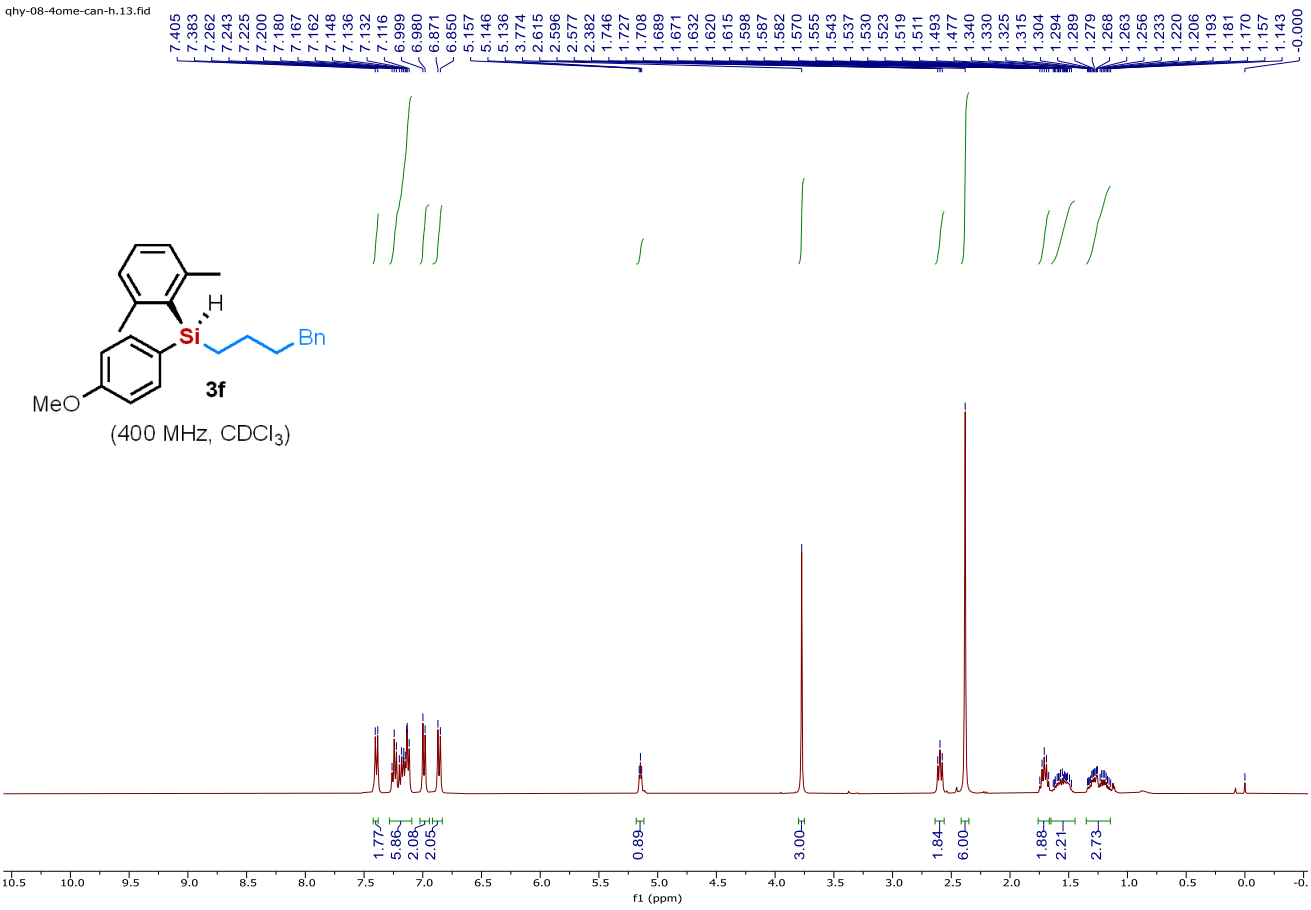
3e

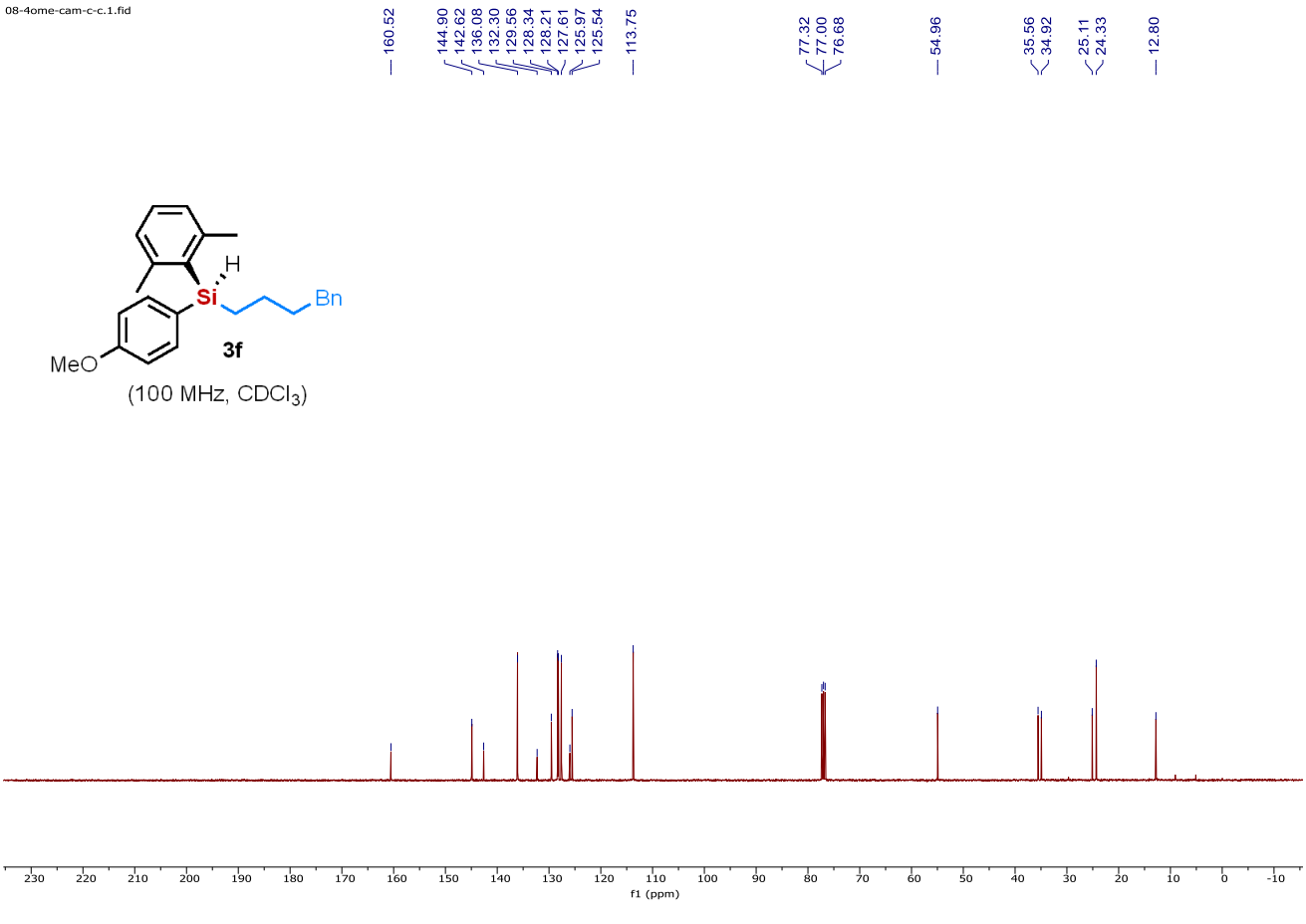
(500 MHz, $CDCl_3$)

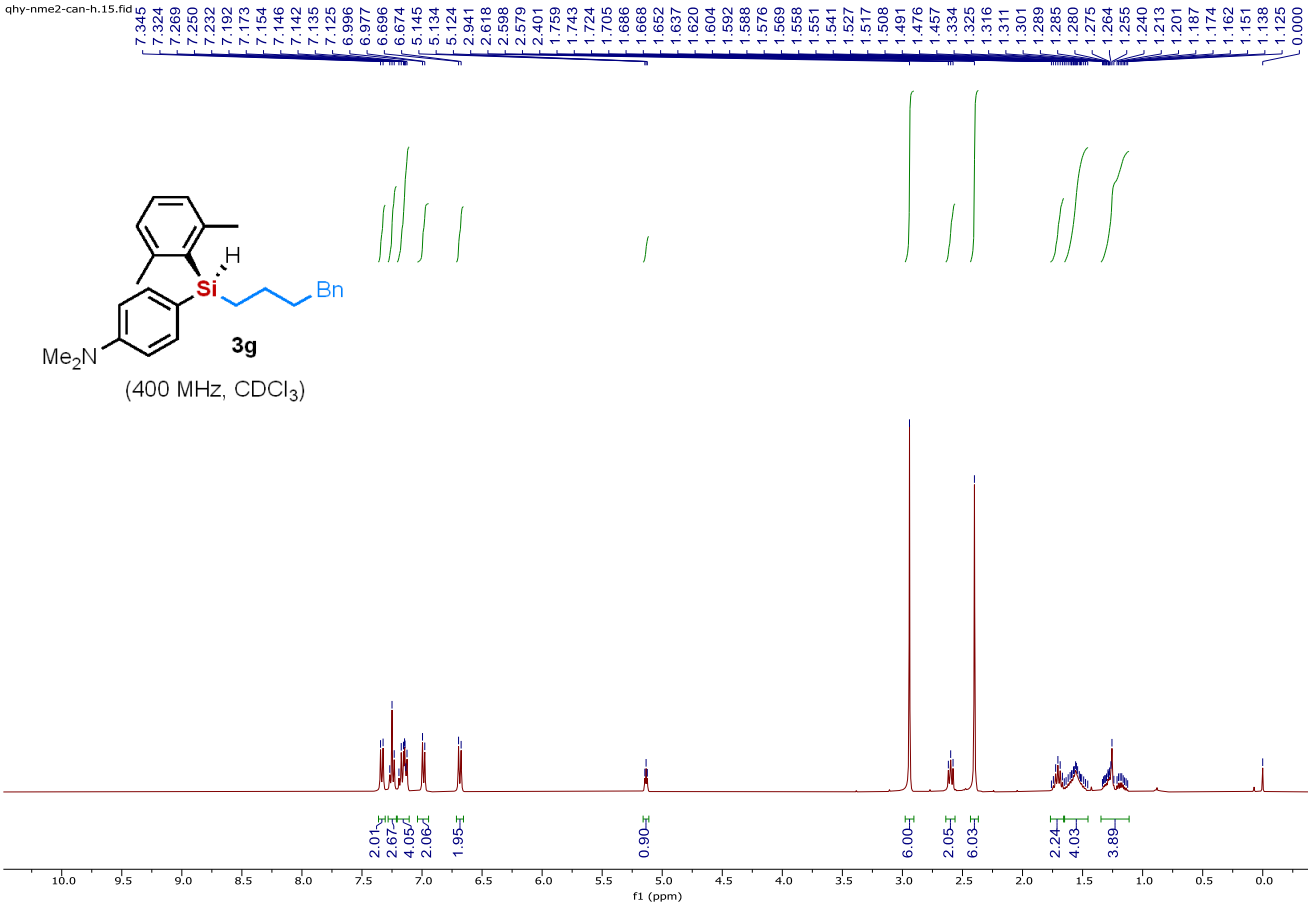


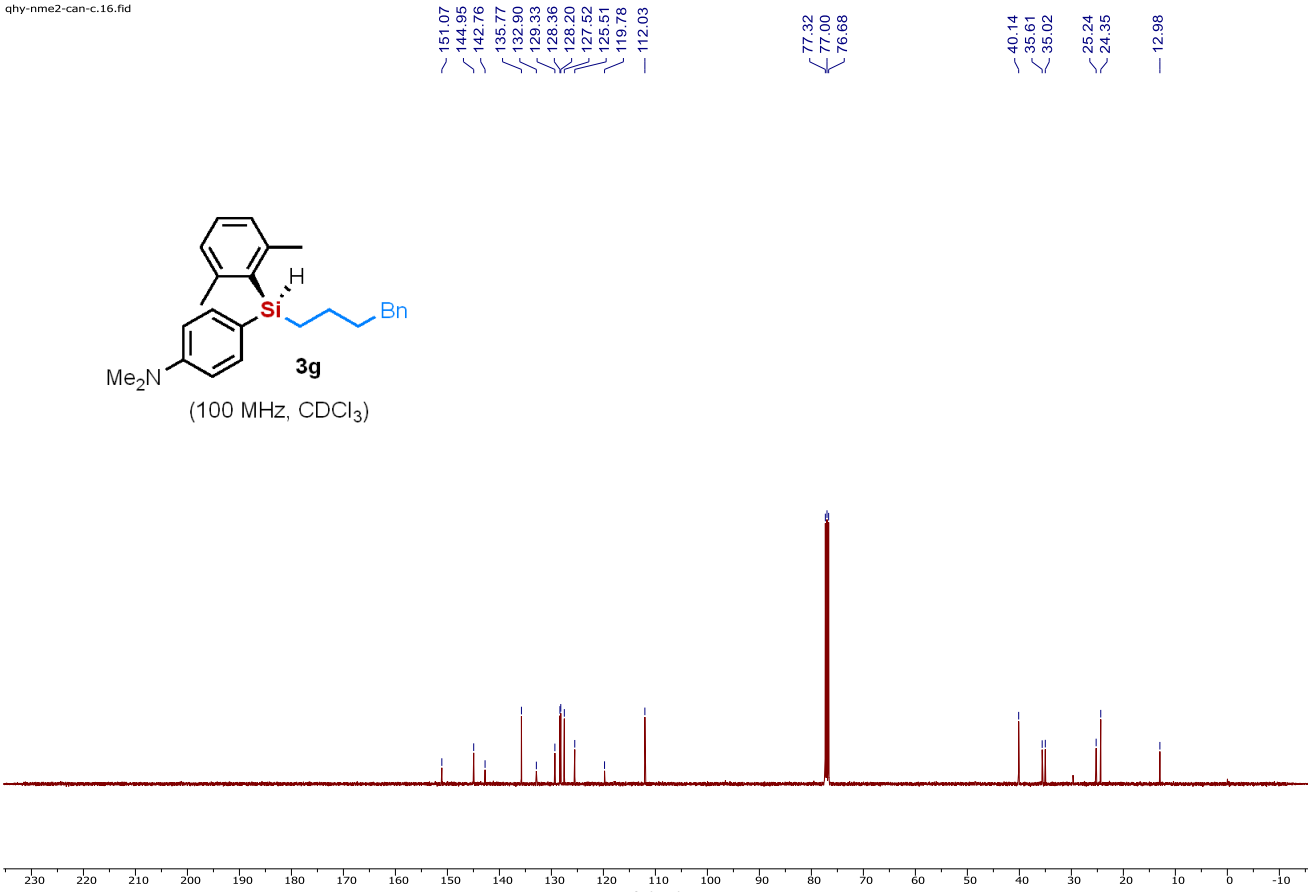

2021267-qhy-08-3-1-c.10.fid
144.96
142.62
141.48
135.88
133.87
132.75
131.89
129.64
128.35
128.22
127.61
125.56
77.25
77.00
76.75
35.57
34.95
25.15
24.44
12.55
-1.23
H
Si
Bn
TMS
3e
(125 MHz, CDCl3)
f1 (ppm)

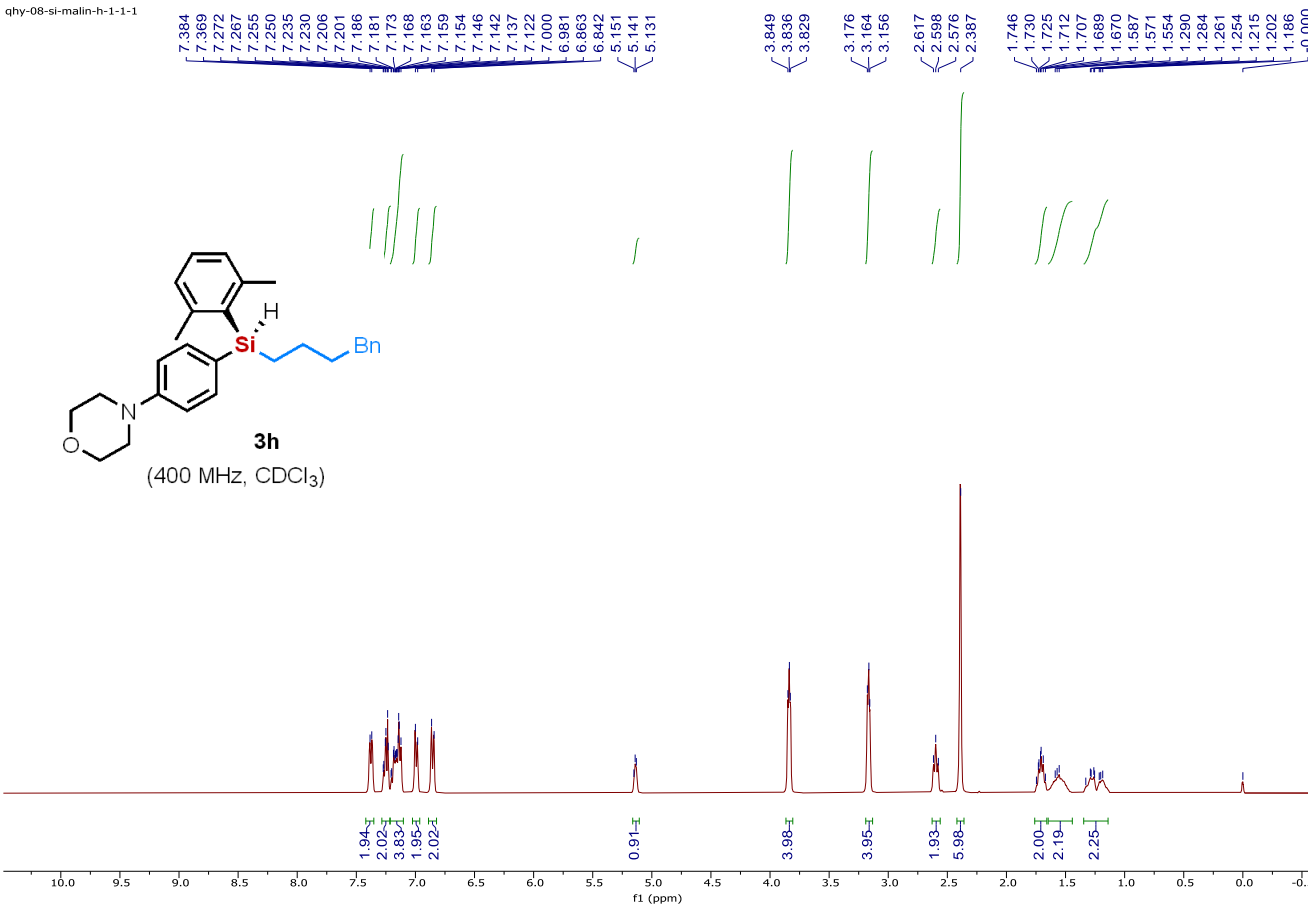

wyc-II-04-37-Si.1.fid
-4.038
-24.622
H
Si
Bn
TMS
3e
(80 MHz, CDCl3)
f1 (ppm)


qhy-08-4ome-can-h.13.fid
7.405
7.383
7.262
7.243
7.225
7.200
7.180
7.167
7.162
7.148
7.136
7.132
7.116
6.999
6.980
6.871
6.850
5.157
5.146
5.136
3.774
2.615
2.596
2.577
2.382
1.746
1.727
1.708
1.689
1.671
1.632
1.620
1.615
1.598
1.587
1.582
1.570
1.555
1.543
1.537
1.530
1.523
1.519
1.511
1.493
1.477
1.340
1.330
1.325
1.315
1.304
1.294
1.289
1.279
1.268
1.263
1.256
1.233
1.220
1.206
1.193
1.181
1.170
1.157
1.143
-0.000
H
Si
Bn
MeO
3f
(400 MHz, CDCl3)
1.77
5.86
2.08
2.05
0.89
3.00
1.84
6.00
1.88
2.21
2.73
10.5
10.0
9.5
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
f1 (ppm)


08-4ome-cam-c-c.1.fid
160.52
144.90
142.62
136.08
132.30
129.56
128.34
128.21
127.61
125.97
125.54
113.75
77.32
77.00
76.68
54.96
35.56
34.92
25.11
24.33
12.80
H
Si
Bn
MeO
3f
(100 MHz, CDCl3)
230
220
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)

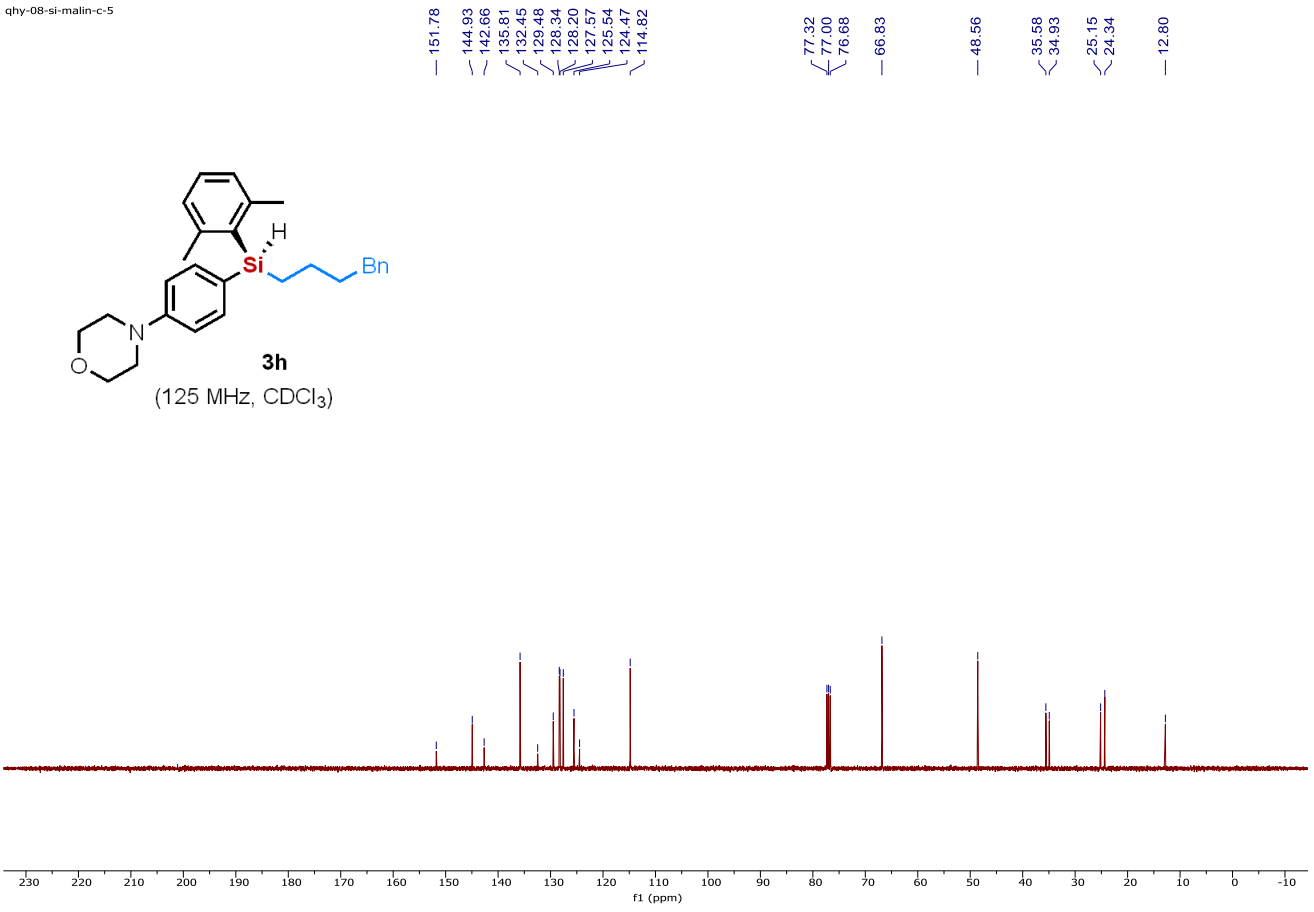

qhy-nme2-can-h.15.fid
7.345 7.324 7.269 7.250 7.232 7.192 7.173 7.154 7.146 7.142 7.135 7.125 6.996 6.977 6.696 6.674 5.145 5.134 5.124 2.941 2.618 2.598 2.579 2.401 1.759 1.743 1.724 1.705 1.686 1.668 1.652 1.637 1.620 1.604 1.592 1.588 1.576 1.569 1.558 1.551 1.541 1.527 1.517 1.508 1.491 1.476 1.457 1.334 1.325 1.316 1.311 1.301 1.289 1.285 1.280 1.275 1.264 1.255 1.240 1.213 1.201 1.187 1.174 1.162 1.151 1.138 1.125 0.000
H
Si
Bn
Me2N
3g
(400 MHz, CDCl3)
2.01 2.67 4.05 2.06 1.95 0.90 6.00 2.05 6.03 2.24 4.03 3.89
f1 (ppm)


qhy-nme2-can-c.16.fid
151.07 144.95 142.76 135.77 132.90 129.33 128.36 128.20 127.52 125.51 119.78 112.03
77.32 77.00 76.68
40.14 35.61 35.02 25.24 24.35 12.98
H
Si
Bn
Me2N
3g
(100 MHz, CDCl3)
f1 (ppm)



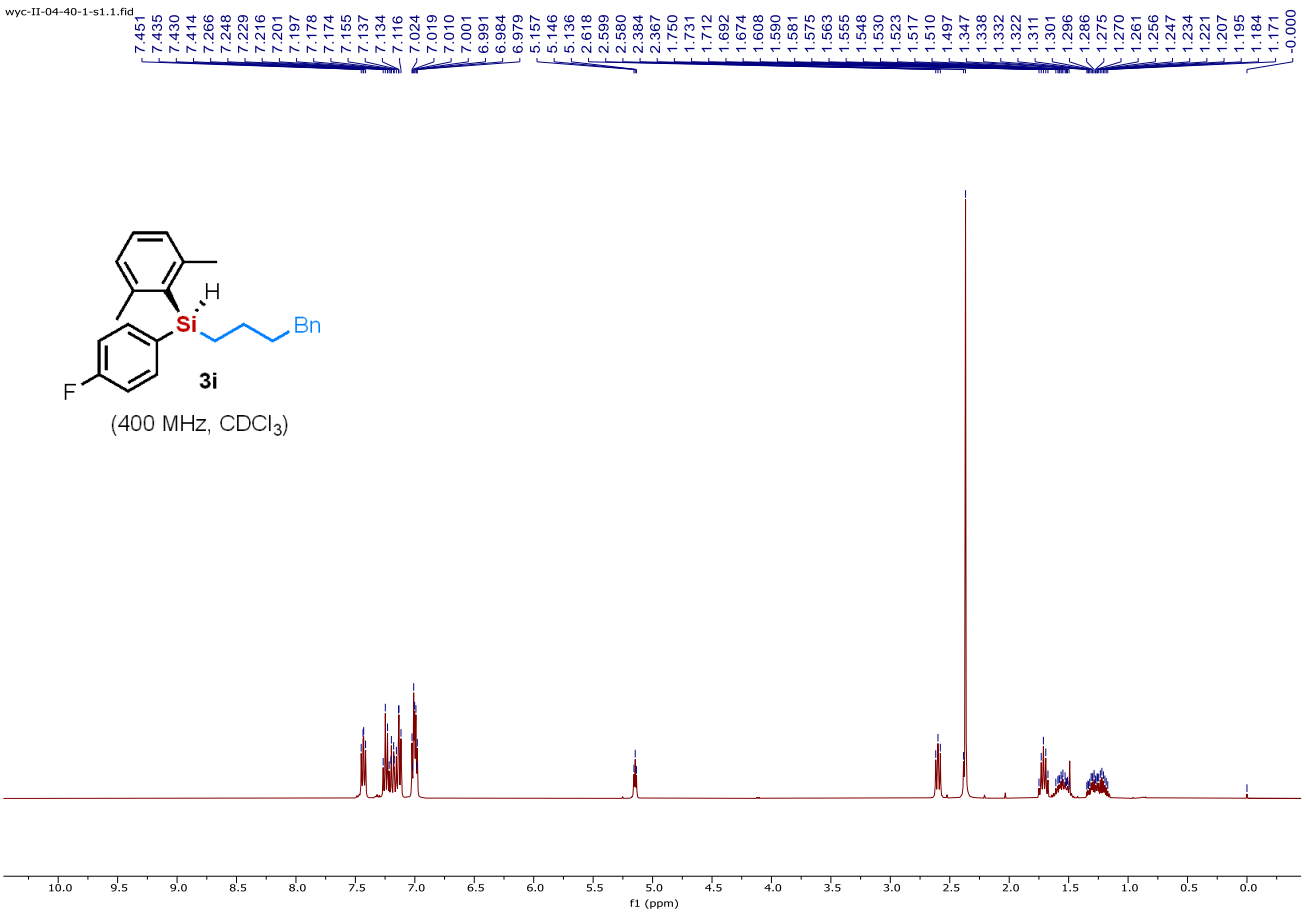
3h

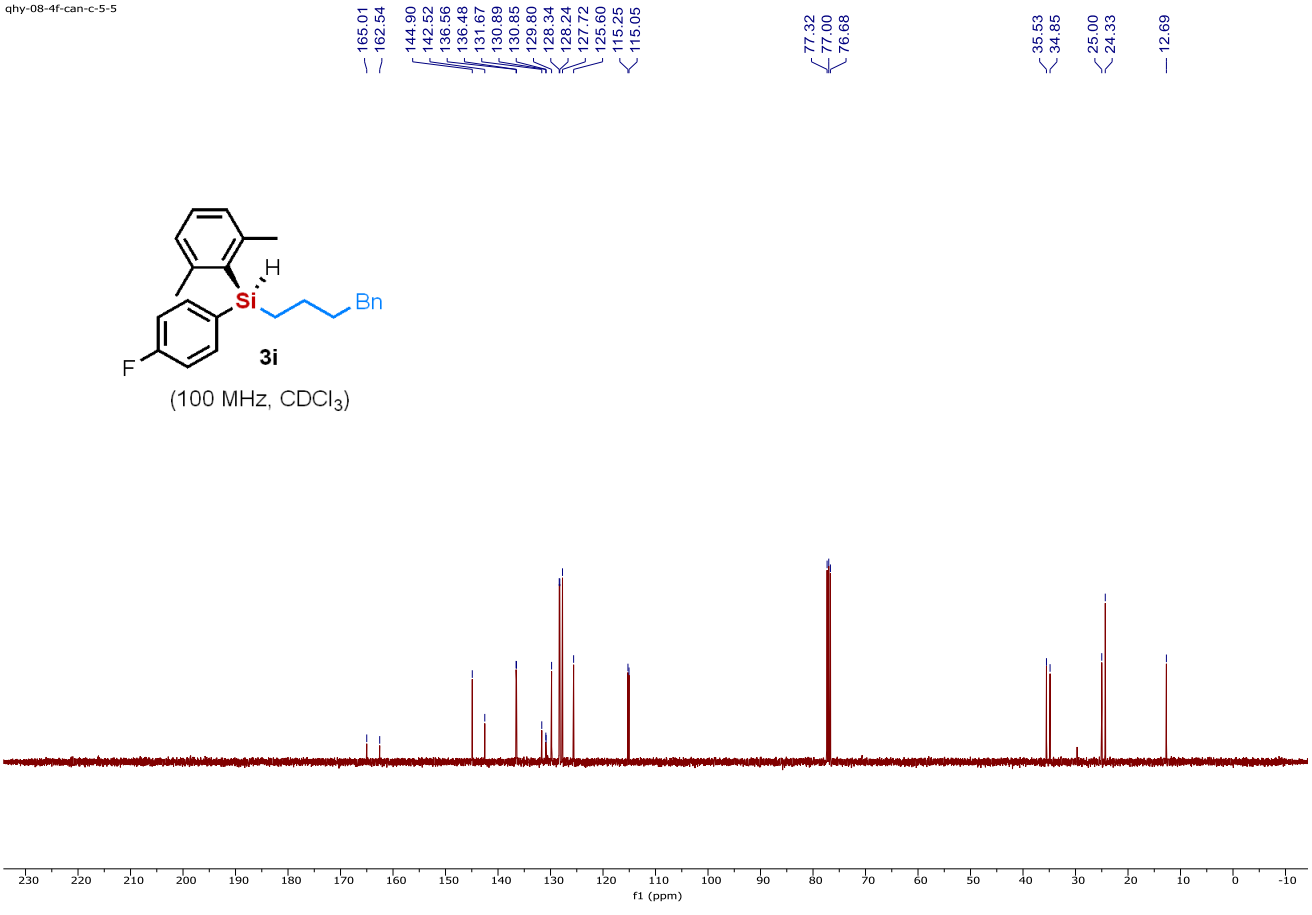
(400 MHz, $CDCl_3$)

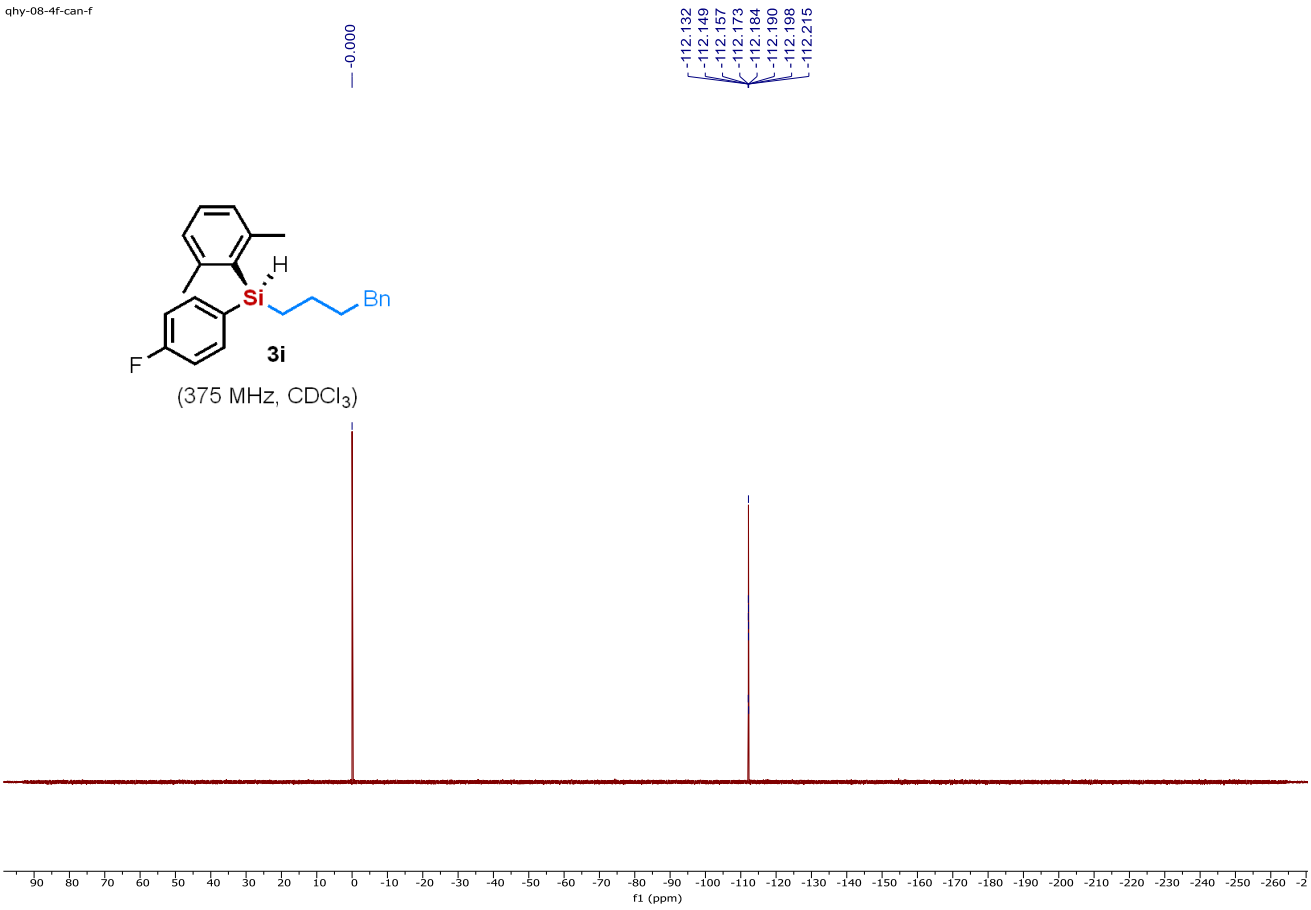


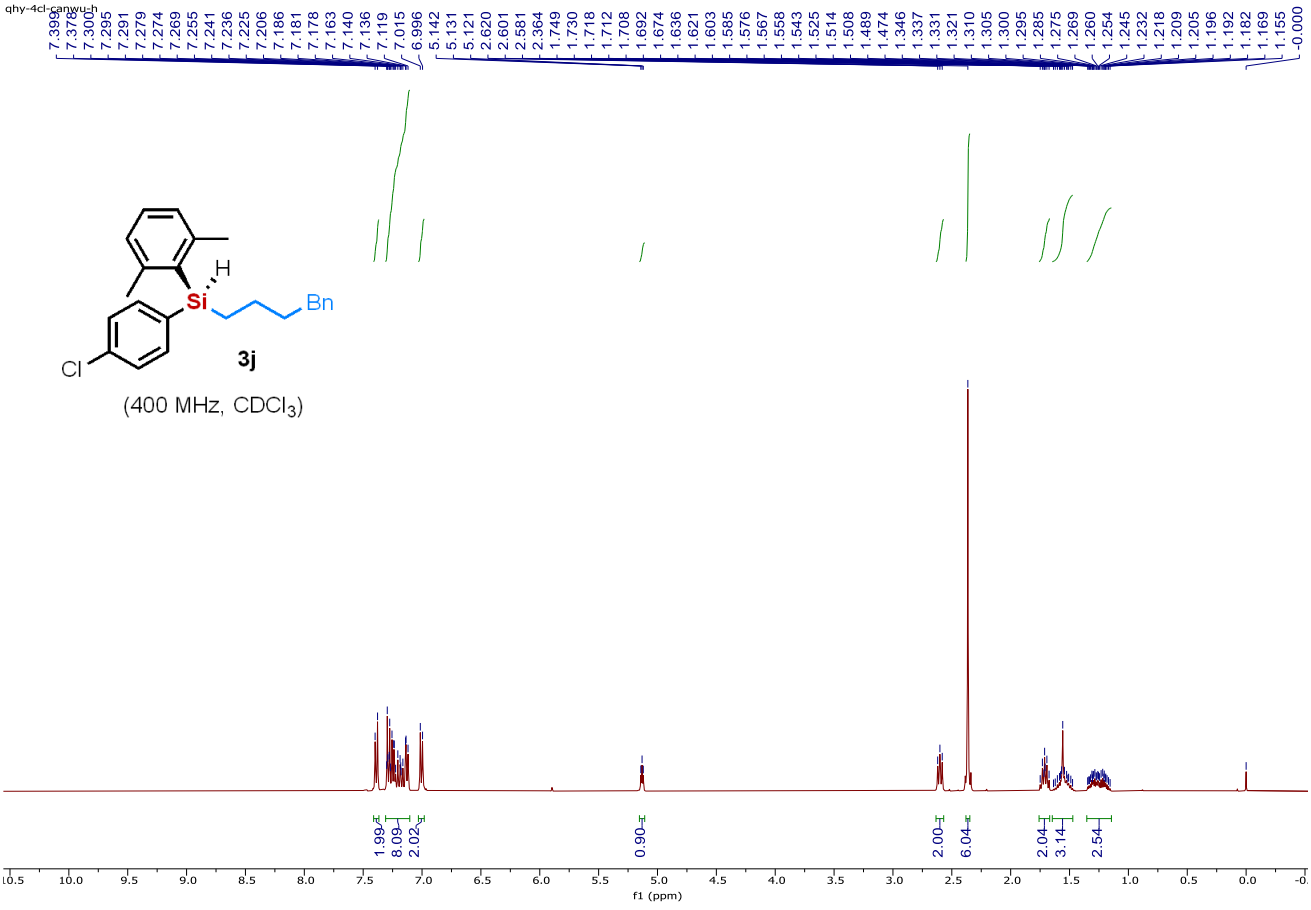
3h

(125 MHz, $CDCl_3$)


wyc-II-04-40-1-s1.1.fid
7.451
7.435
7.430
7.414
7.266
7.248
7.229
7.216
7.201
7.197
7.178
7.174
7.155
7.137
7.134
7.116
7.024
7.019
7.010
7.001
6.991
6.984
6.979
5.157
5.146
5.136
2.618
2.599
2.580
2.384
2.367
1.750
1.731
1.712
1.692
1.674
1.608
1.590
1.581
1.575
1.563
1.555
1.548
1.530
1.523
1.517
1.510
1.497
1.347
1.338
1.332
1.322
1.311
1.301
1.296
1.286
1.275
1.270
1.261
1.256
1.247
1.234
1.221
1.207
1.195
1.184
1.171
-0.000
H
Si
Bn
F
3i
(400 MHz, CDCl3)
10.0
9.5
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
f1 (ppm)

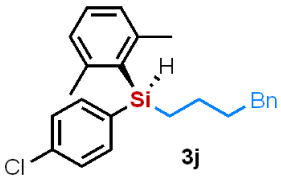

qhy-08-4f-can-c-5-5
165.01
162.54
144.90
142.52
136.56
136.48
131.67
130.89
130.85
129.80
128.34
128.24
127.72
125.60
115.25
115.05
77.32
77.00
76.68
35.53
34.85
25.00
24.33
12.69
H
Si
Bn
F
3i
(100 MHz, CDCl3)
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


qhy-08-4f-can-f
-0.000
-112.132
-112.149
-112.157
-112.173
-112.184
-112.190
-112.198
-112.215
H
Si
Bn
F
3i
(375 MHz, CDCl3)
f1 (ppm)


qhy-4cl-canwu-h
H
Si
Bn
Cl
3j
(400 MHz, CDCl3)
1.99
8.09
2.02
0.90
2.00
6.04
2.04
3.14
2.54
f1 (ppm)

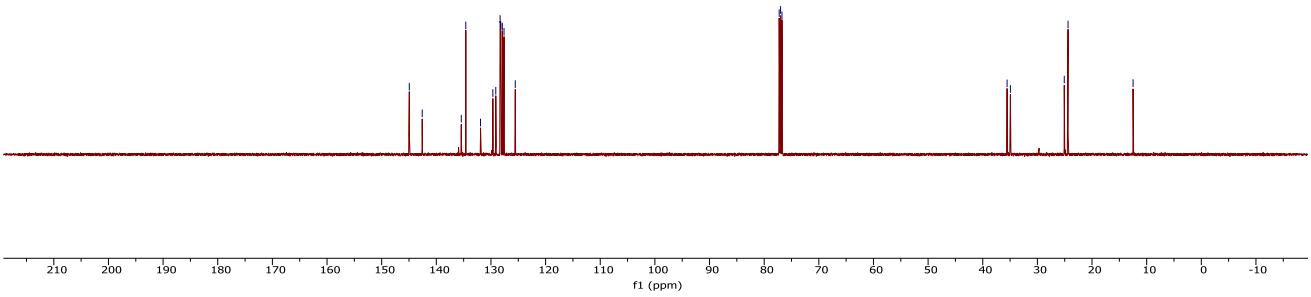
2021613-07-4-Cl-C.10.fid

144.94
142.58
135.43
134.60
131.91
129.65
129.12
128.33
128.21
127.92
127.61
125.55
77.25
77.00
76.75
35.55
34.94
25.08
24.39
12.49



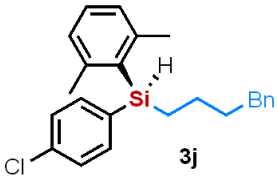
3j

(125 MHz, $CDCl_3$)



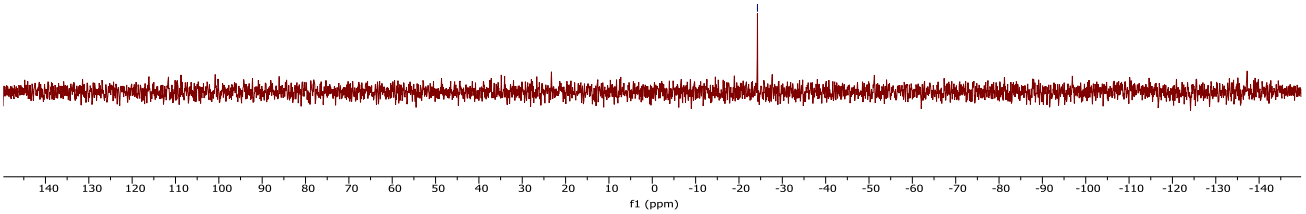
wyc-II-04-3j
single pulse decoupled gated NOE

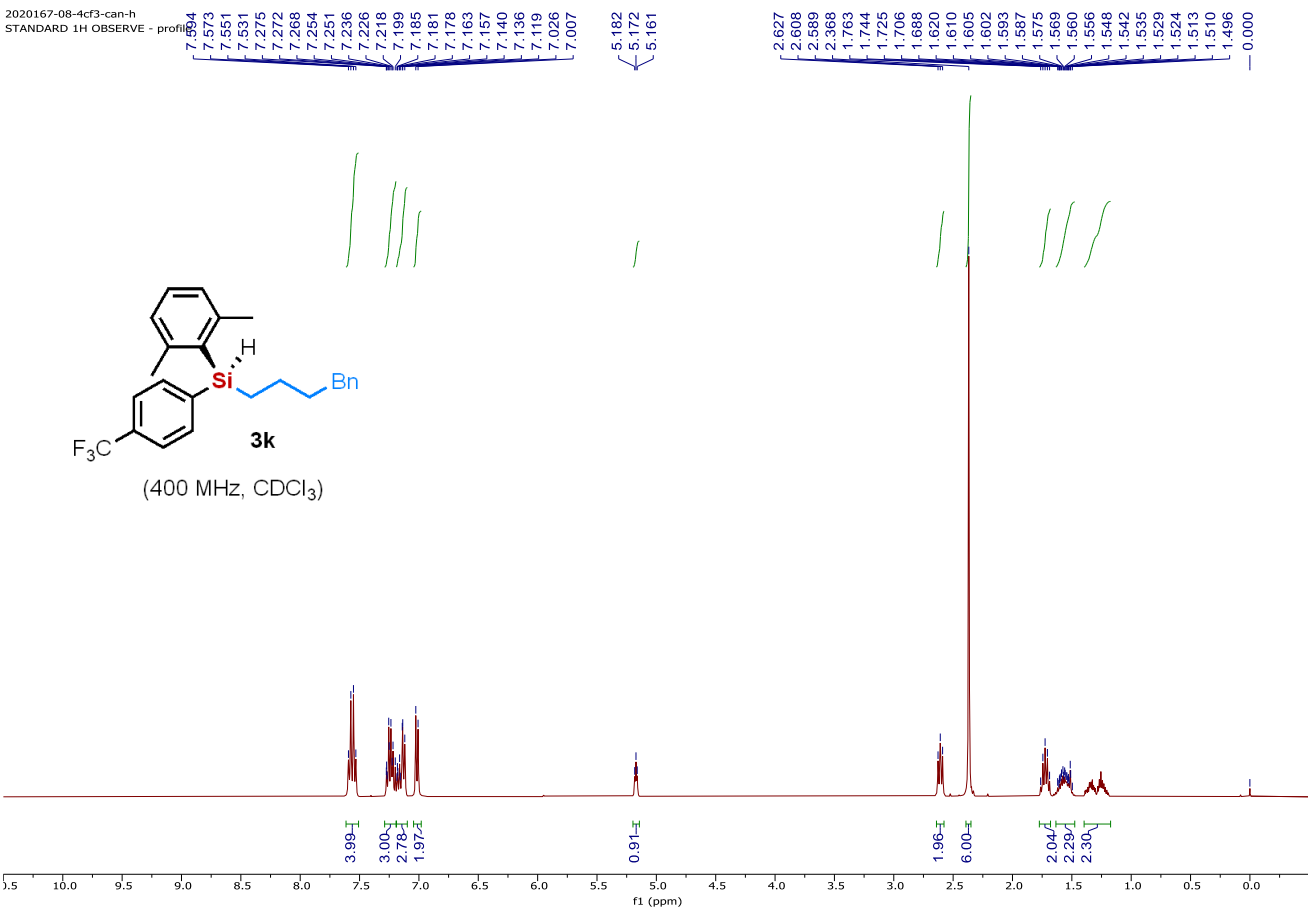
-24.263

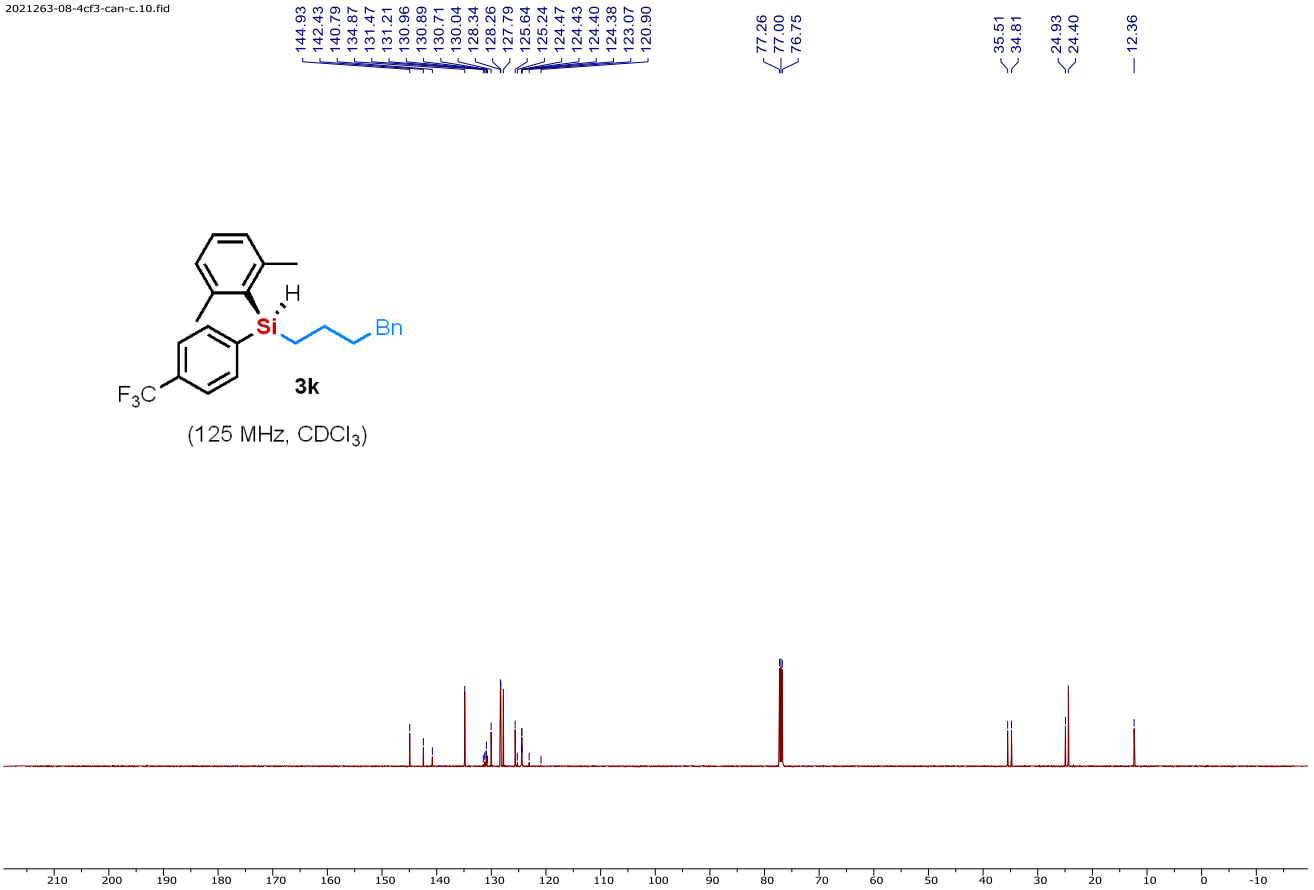


3j

(119 MHz, $CDCl_3$)



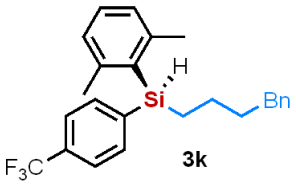

2020167-08-4cf3-can-h
STANDARD 1H OBSERVE - proton
7.594
7.573
7.551
7.531
7.275
7.272
7.268
7.254
7.251
7.236
7.226
7.218
7.199
7.185
7.181
7.178
7.163
7.157
7.140
7.136
7.119
7.026
7.007
5.182
5.172
5.161
2.627
2.608
2.589
2.368
1.763
1.744
1.725
1.706
1.688
1.620
1.610
1.605
1.602
1.593
1.587
1.575
1.569
1.560
1.556
1.548
1.542
1.535
1.529
1.524
1.513
1.510
1.496
0.000
H
Si
Bn
F3C
3k
(400 MHz, CDCl3)
3.99
3.00
2.78
1.97
0.91
1.96
6.00
2.04
2.29
2.30
f1 (ppm)


2021263-08-4cf3-can-c.10.fid
144.93
142.43
140.79
134.87
131.47
131.21
130.96
130.89
130.71
130.04
128.34
128.26
127.79
125.64
125.24
124.47
124.43
124.40
124.38
123.07
120.90
77.26
77.00
76.75
35.51
34.81
24.93
24.40
12.36
H
Si
Bn
F3C
3k
(125 MHz, CDCl3)
f1 (ppm)

qhy-08-4cf-can-f-1

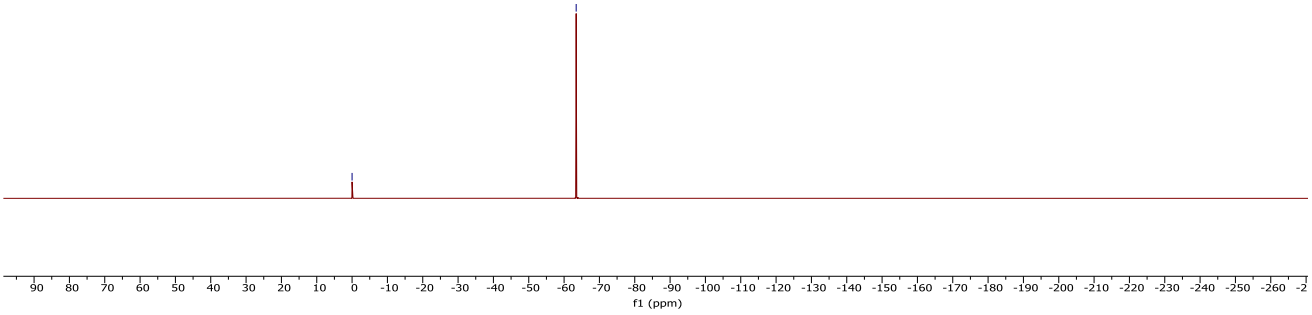
-0.000

-63.425



3k

(375 MHz, $CDCl_3$)

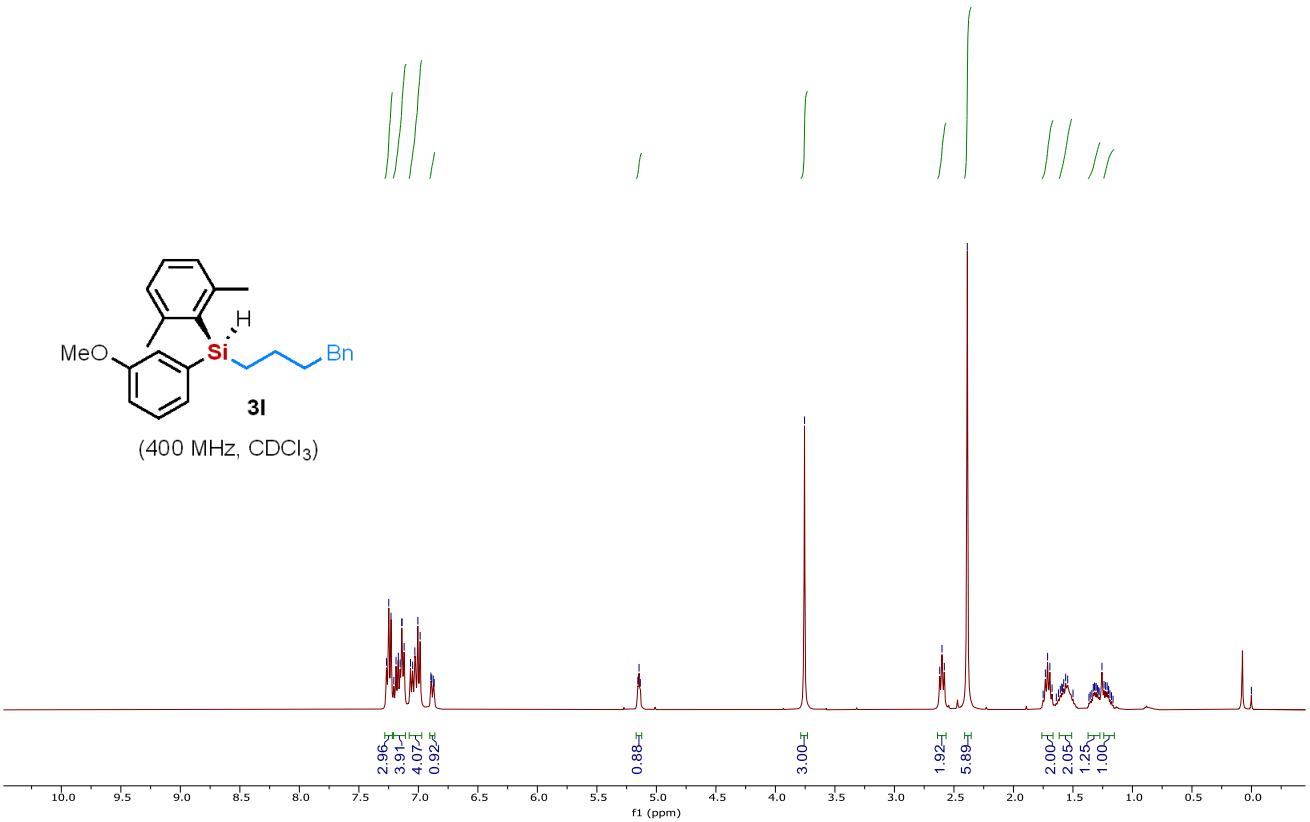


qhy-07-4-queren-h
Std proton

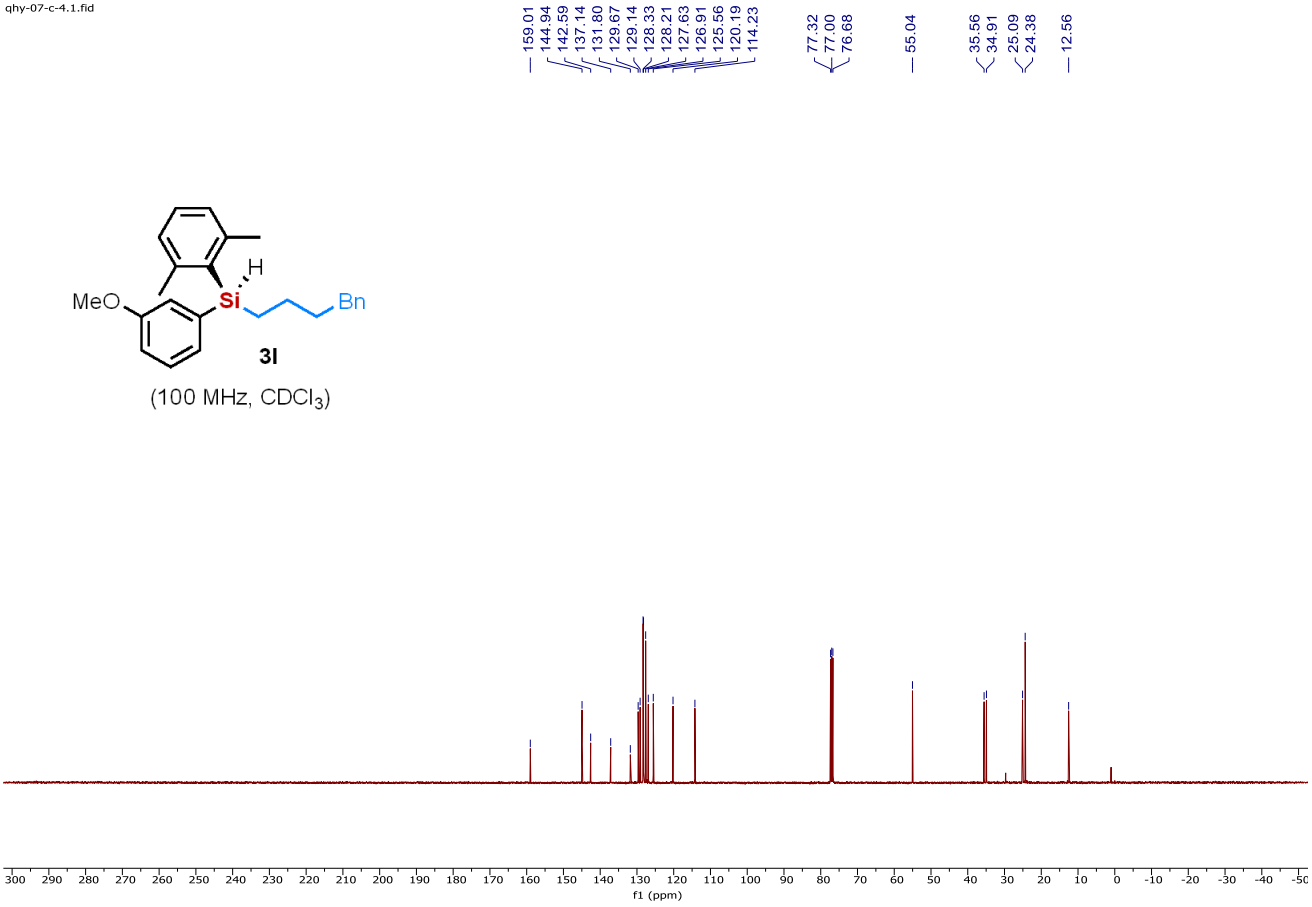
7.268 7.249 7.230 7.206 7.188 7.168 7.153 7.138 7.138 7.120 7.066 7.048 7.030 7.004 6.985 6.895 6.888 6.875 6.867
5.156 5.146 5.135 3.755 2.620 2.600 2.581 2.388 1.750 1.732 1.713 1.694 1.675 1.640 1.622 1.606 1.594 1.589 1.577 1.561 1.544 1.499 1.365 1.355 1.341 1.329 1.319 1.315 1.305 1.293 1.288 1.280 1.256 1.239 1.226 1.213 1.203 1.200 1.189 1.176 1.163 0.000

3l

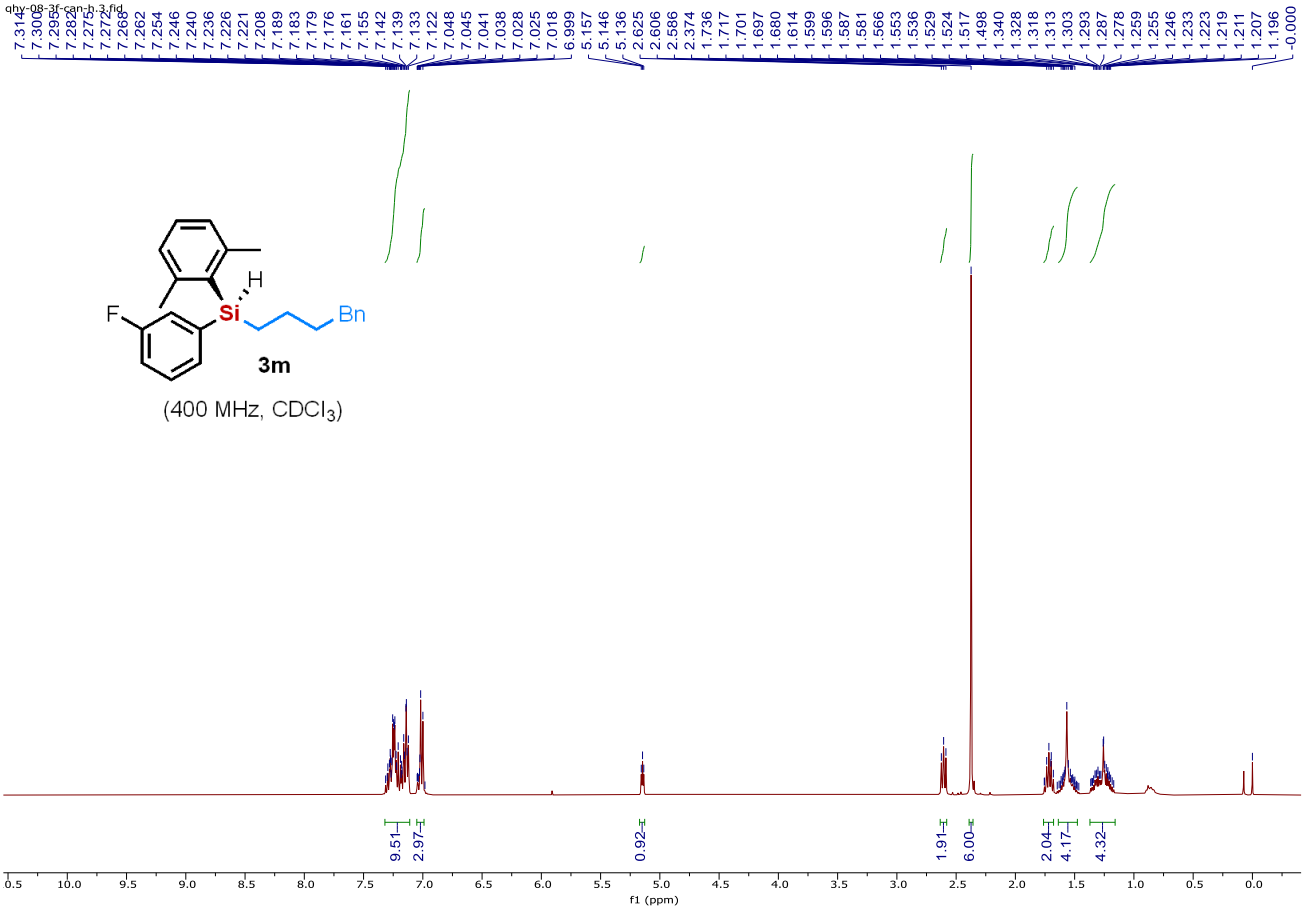
(400 MHz, $CDCl_3$)

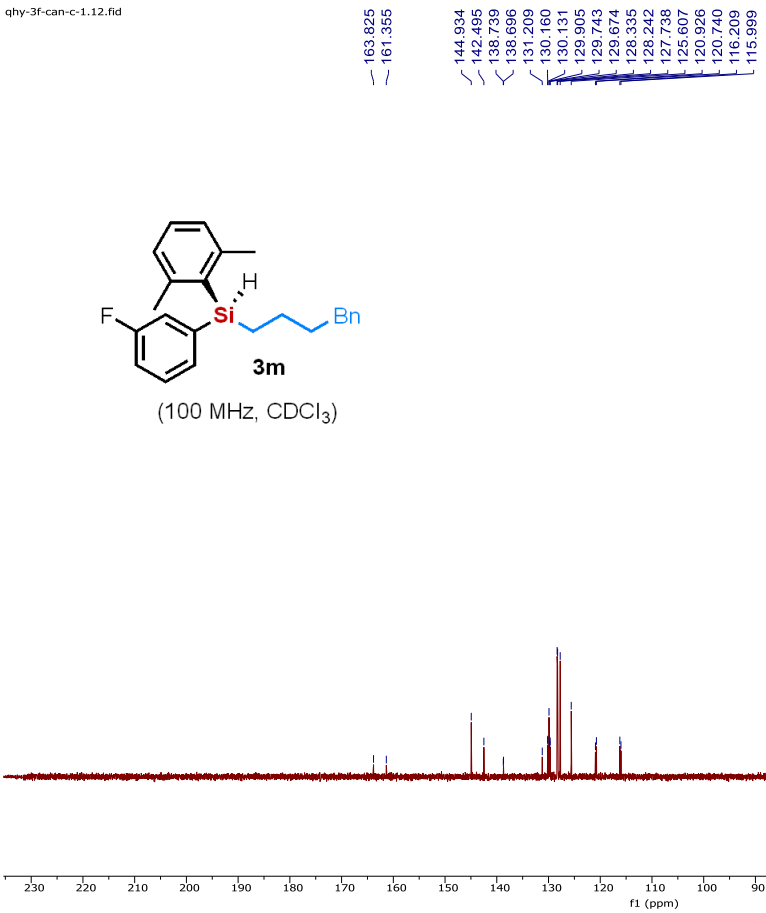


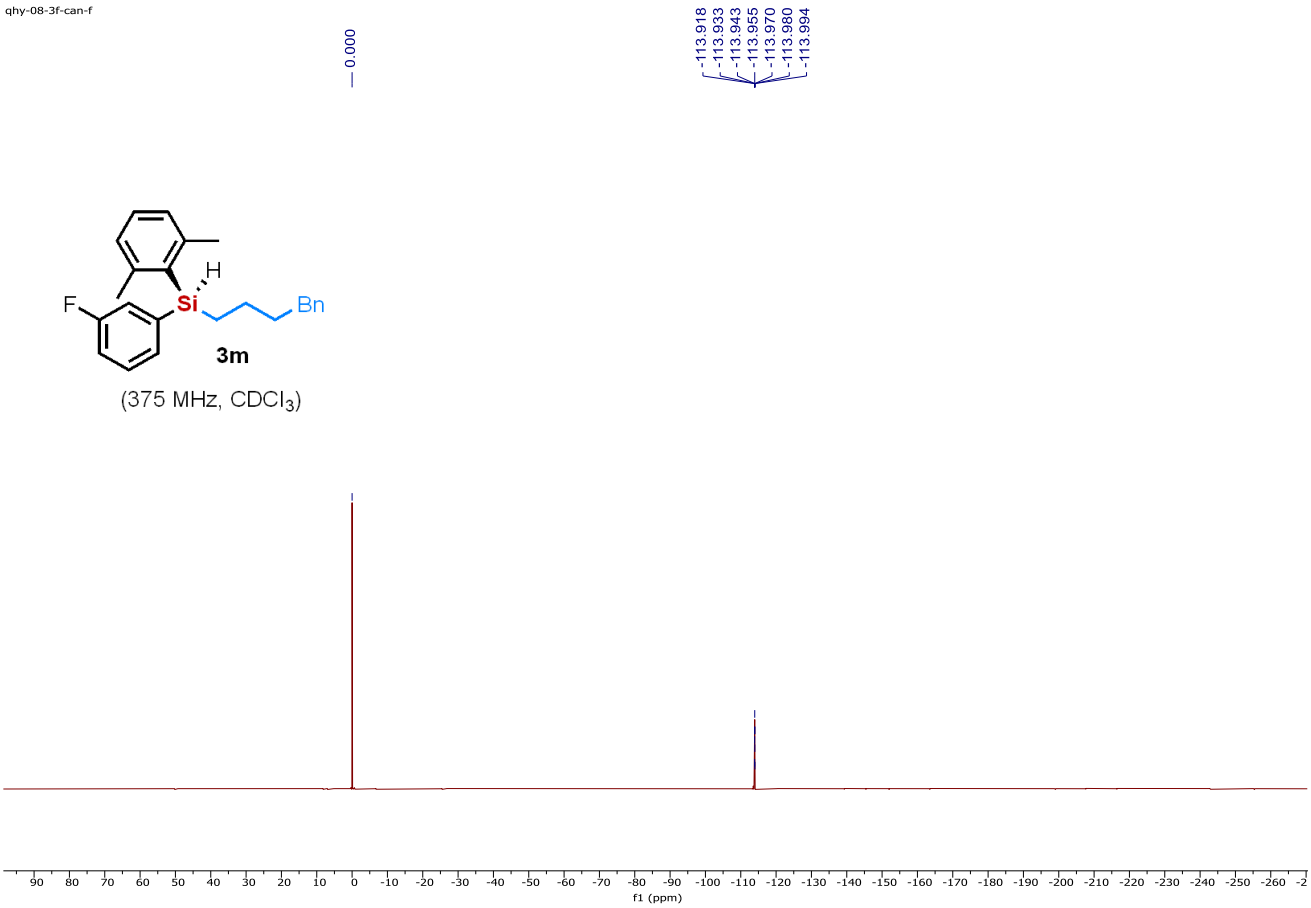
qhy-07-c-4.1.fid



qhy-08-3f-can-h-3.fid

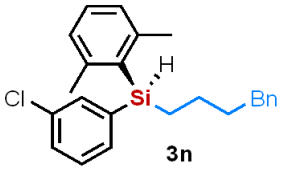



qhy-3f-can-c-1.12.fid
163.825
161.355
144.934
142.495
138.739
138.696
131.209
130.160
130.131
129.905
129.743
129.674
128.335
128.242
127.738
125.607
120.926
120.740
116.209
115.999
35.525
34.840
24.965
24.354
12.444
H
Si
F
Bn
3m
(100 MHz, CDCl3)
f1 (ppm)


qhy-08-3f-can-f
0.000
-113.918
-113.933
-113.943
-113.955
-113.970
-113.980
-113.994
H
Si
F
Bn
3m
(375 MHz, CDCl3)
f1 (ppm)

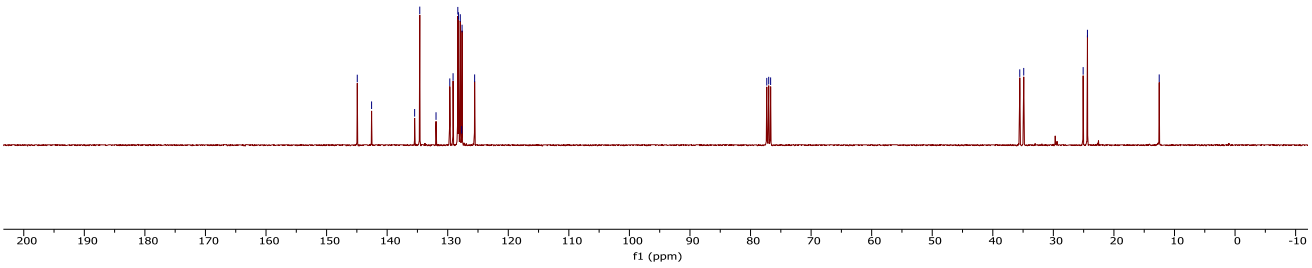
qhy-07-c-3.1.fid

144.93
142.57
135.46
134.61
131.93
129.66
129.12
128.33
128.21
127.92
127.69
127.63
125.56
77.32
77.00
76.68
35.55
34.89
25.08
24.37
12.52



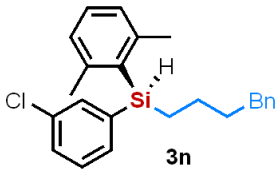
3n

(100 MHz, $CDCl_3$)



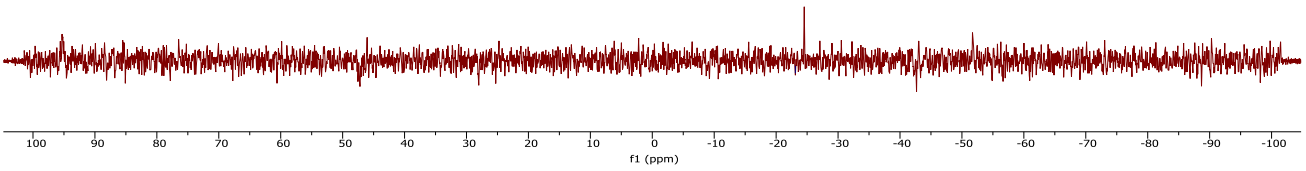
wyc-II-04-40-3-Si.4.fid

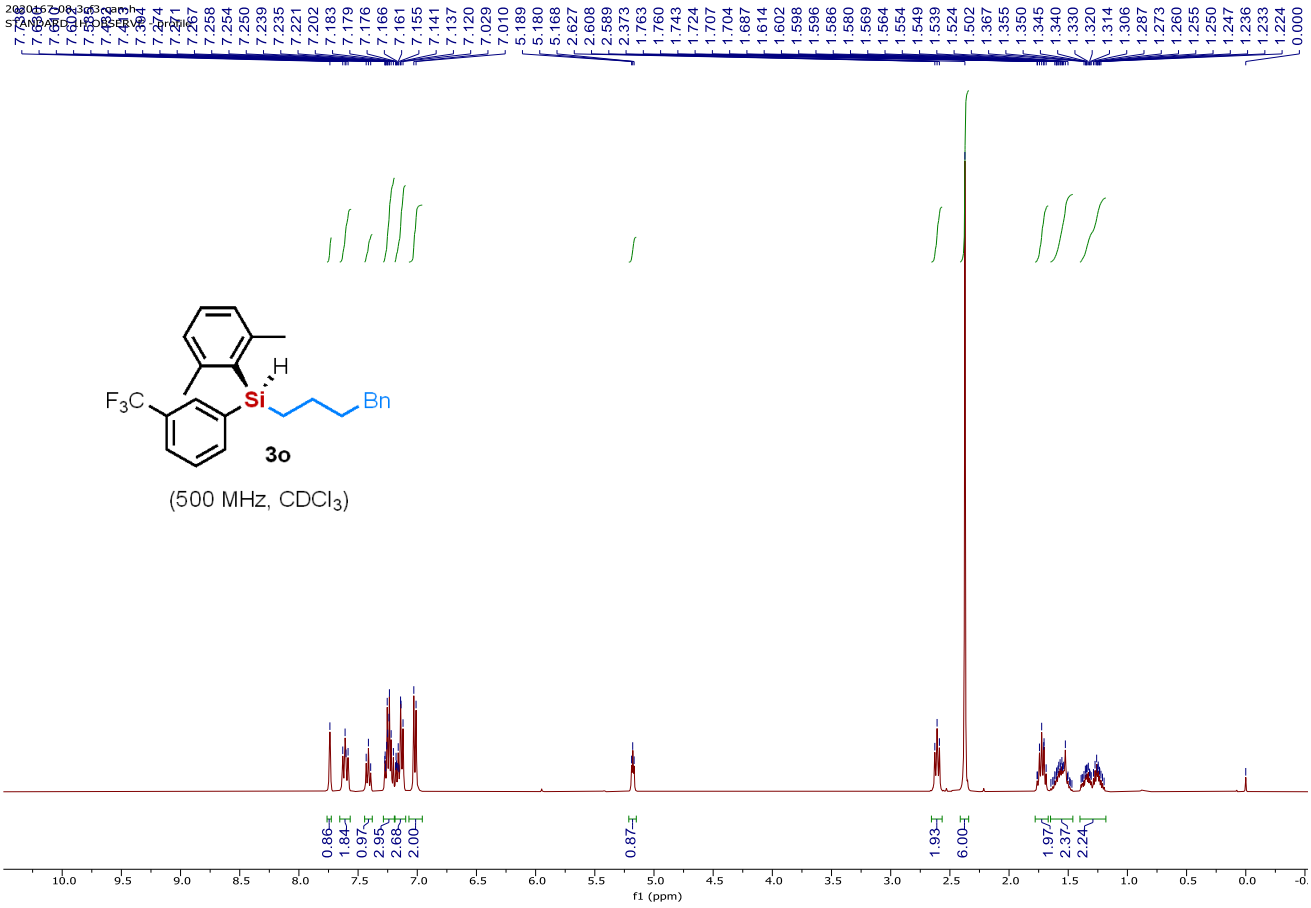
-23.106

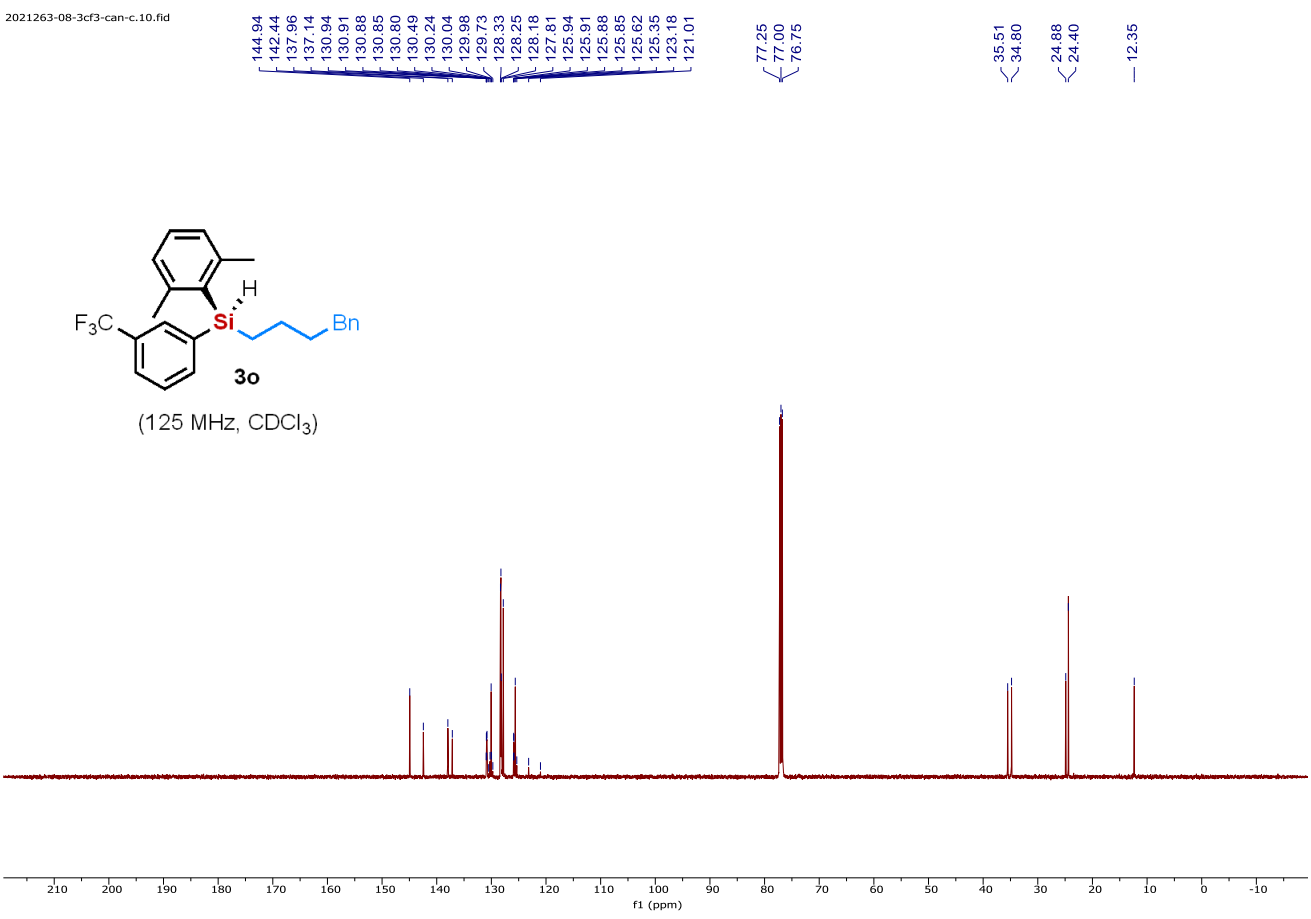


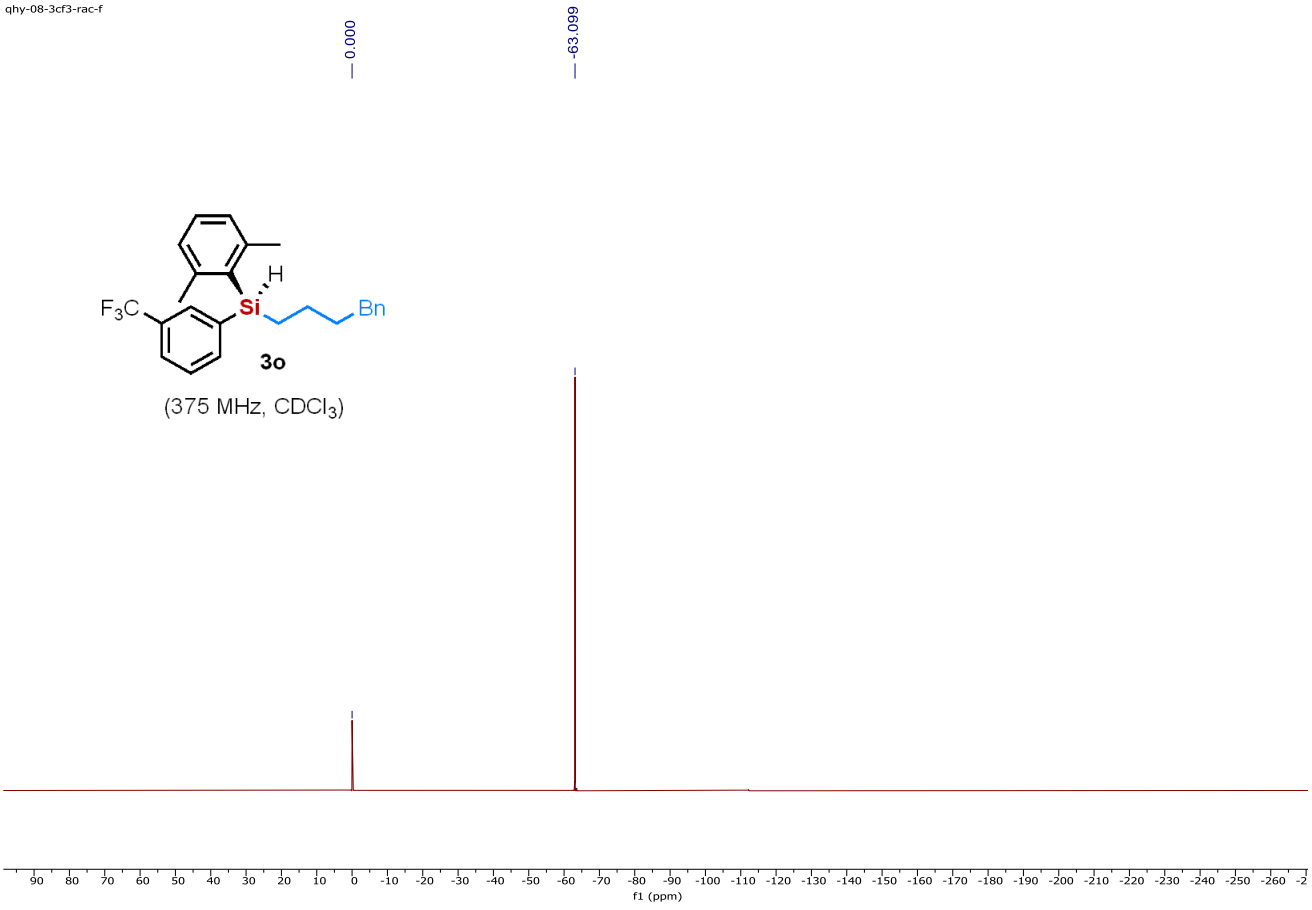
3n

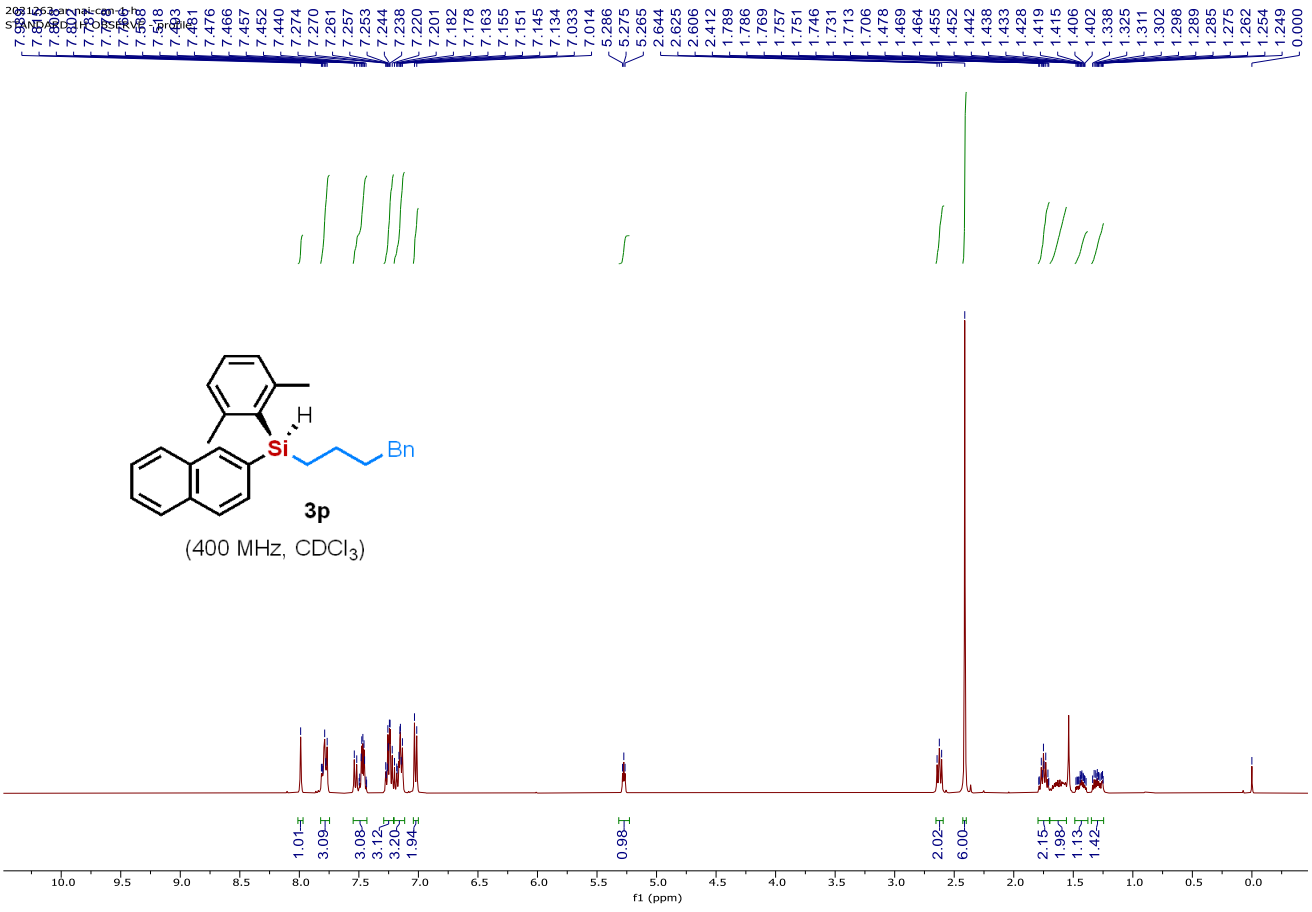
(80 MHz, $CDCl_3$)

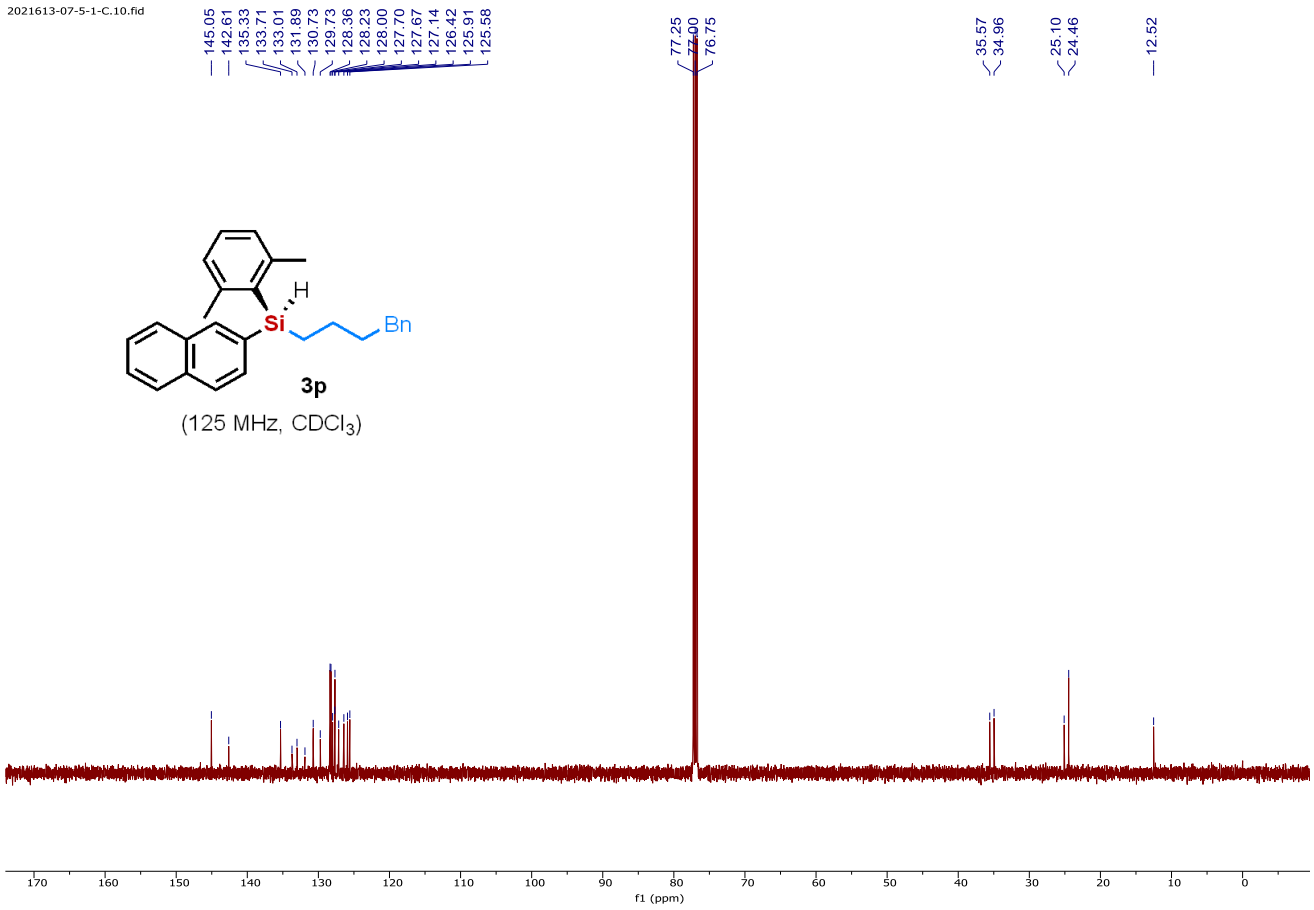


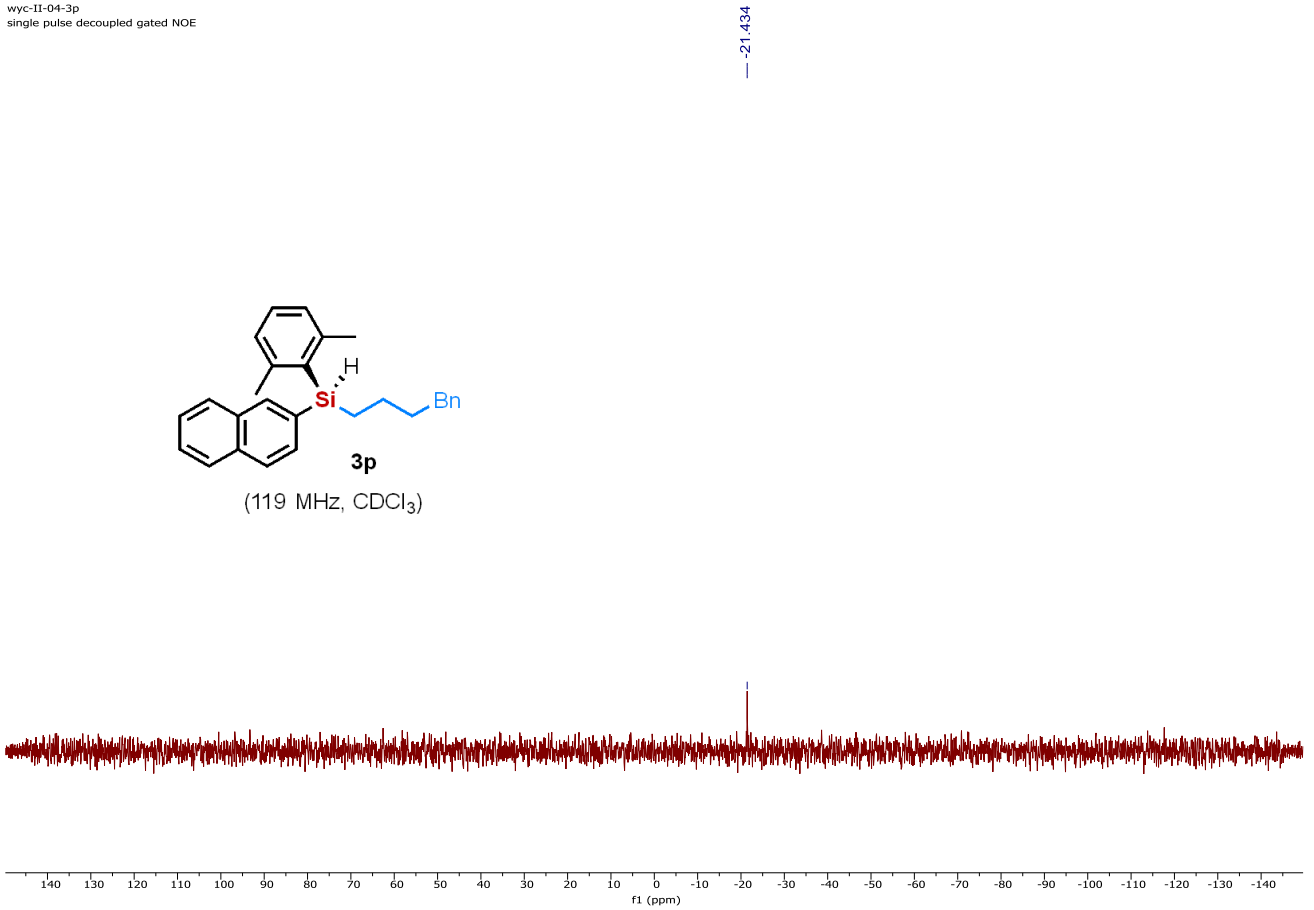

H
Si
Bn
F3C
3o
(500 MHz, CDCl3)
f1 (ppm)

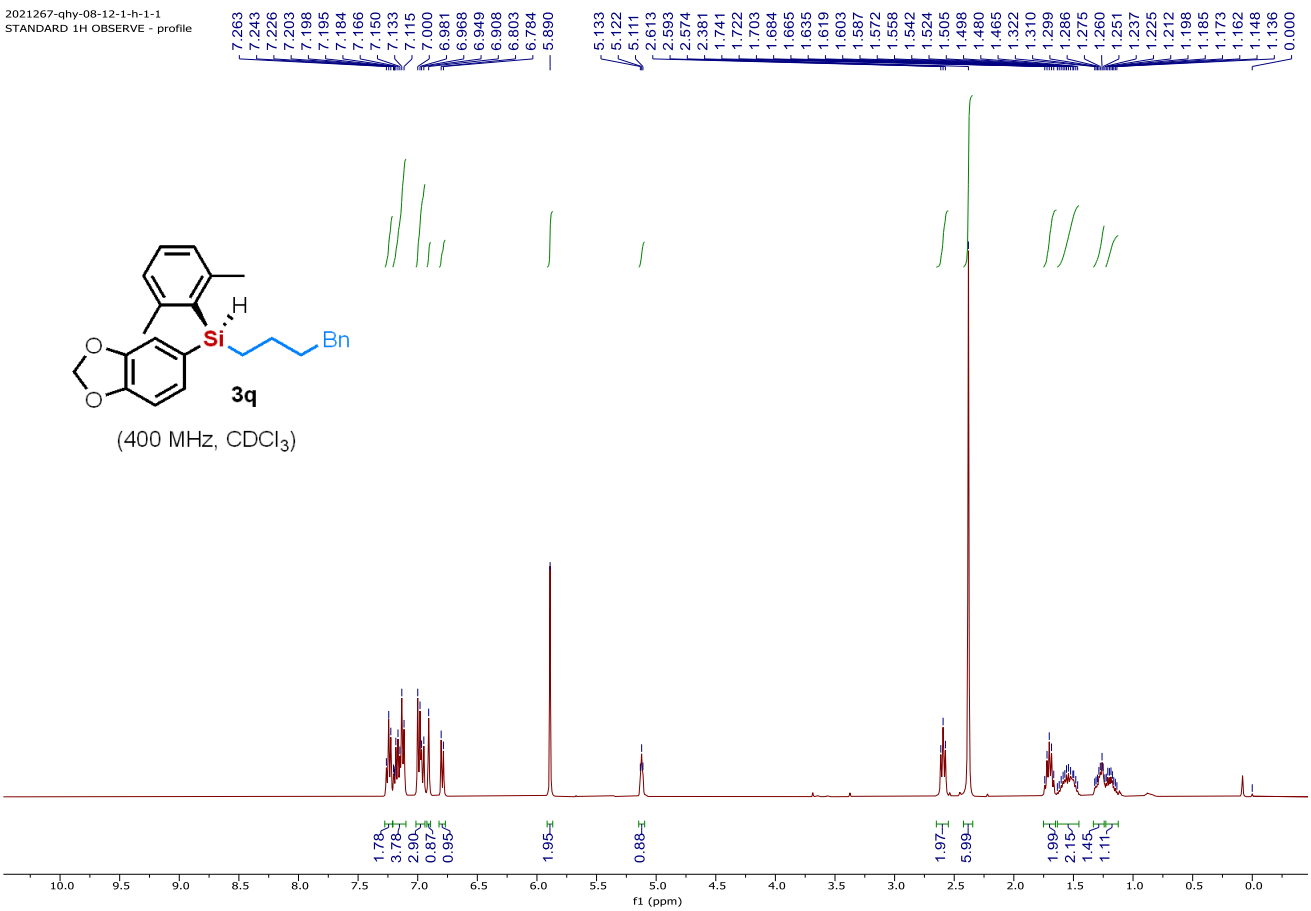

H
Si
Bn
F3C
3o
(125 MHz, CDCl3)
f1 (ppm)

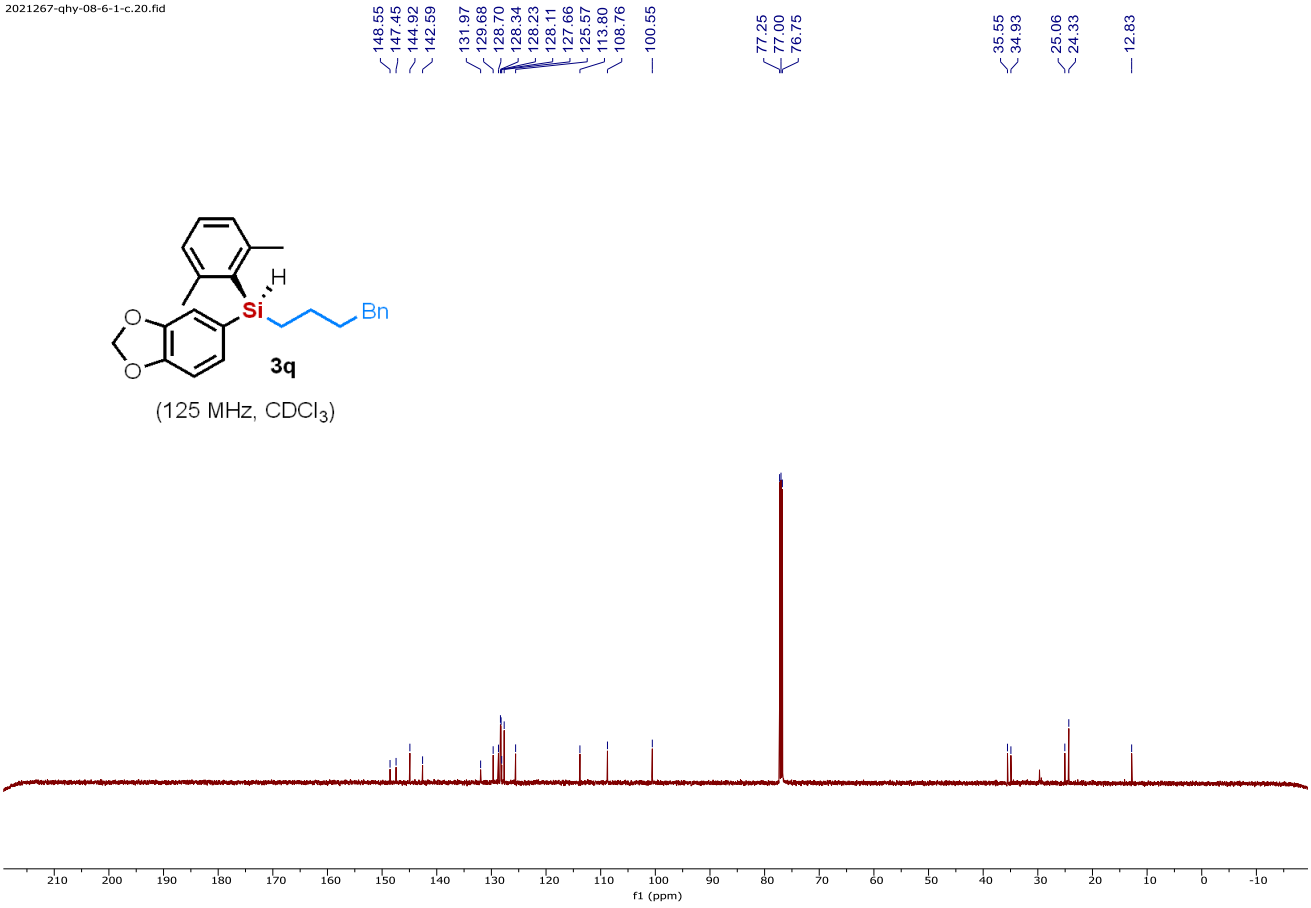

qhy-08-3cf3-rac-f
0.000
-63.099
H
Si
Bn
F3C
3o
(375 MHz, CDCl3)
f1 (ppm)

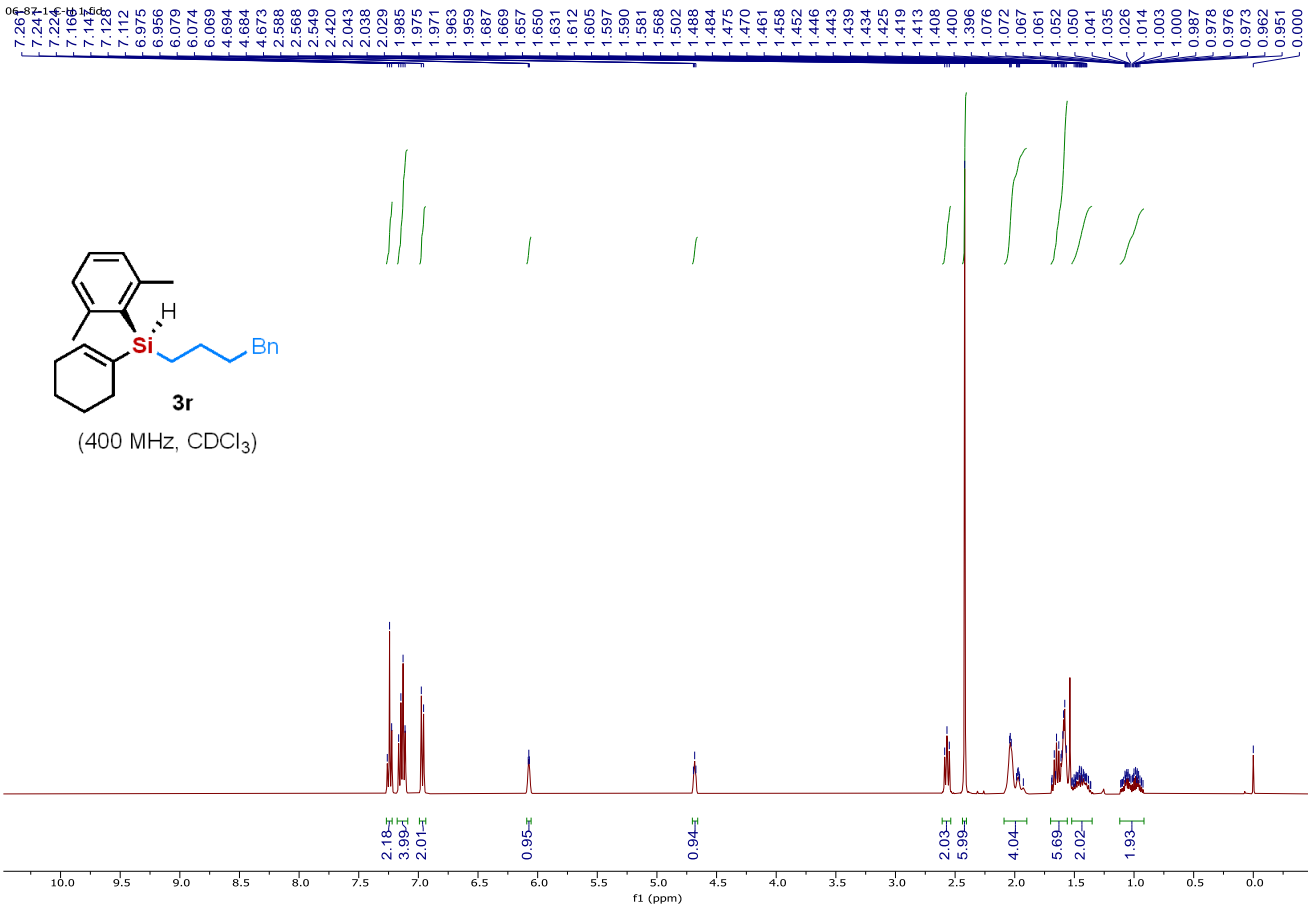

H
Si
Bn
3p
(400 MHz, CDCl3)
1.01
3.09
3.08
3.12
3.20
1.94
0.98
2.02
6.00
2.15
1.98
1.13
1.42
f1 (ppm)

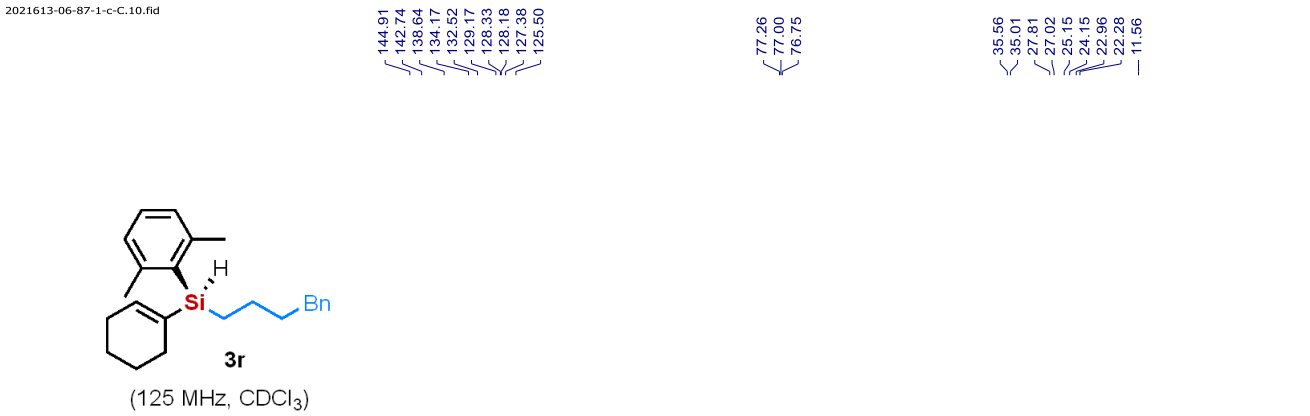

2021613-07-5-1-C.10.fid
145.05
142.61
135.33
133.71
133.01
131.89
130.73
129.73
128.36
128.23
128.00
127.70
127.67
127.14
126.42
125.91
125.58
77.25
77.00
76.75
35.57
34.96
25.10
24.46
12.52
H
Si
Bn
3p
(125 MHz, CDCl3)
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

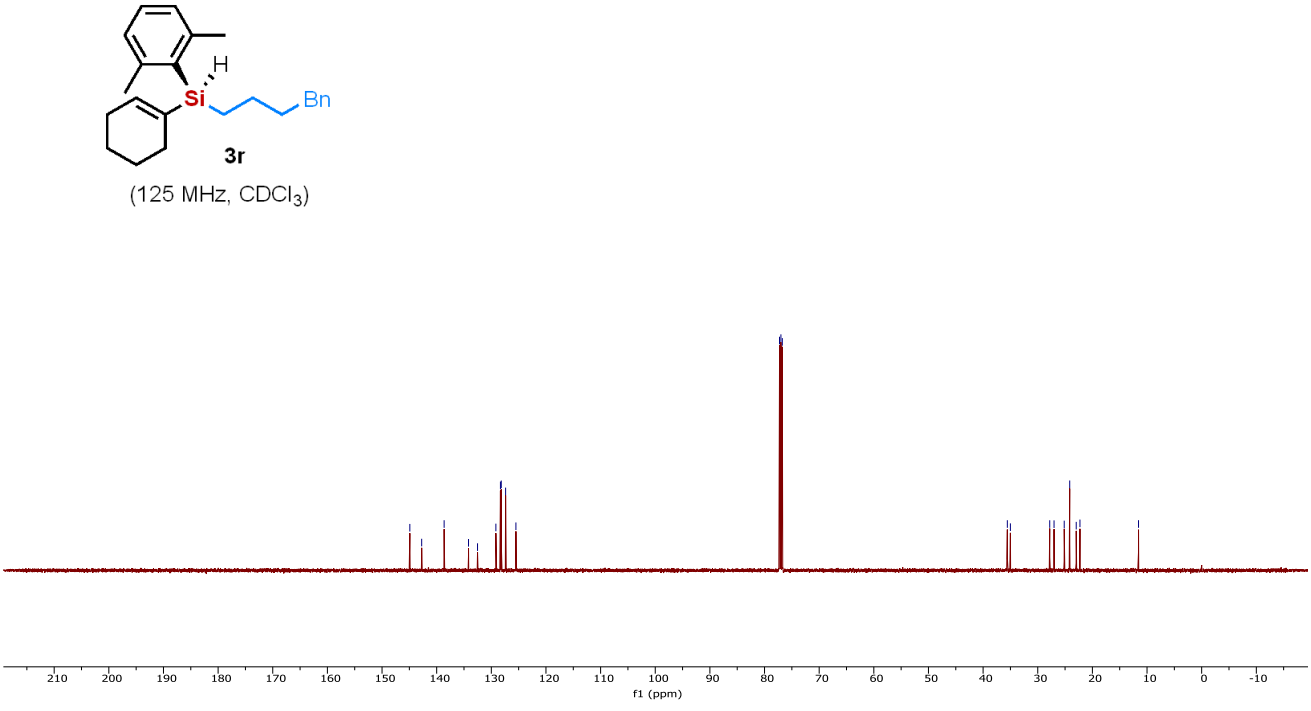

wyc-II-04-3p
single pulse decoupled gated NOE
-21.434
H
Si
Bn
3p
(119 MHz, CDCl3)
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
f1 (ppm)


2021267-qhy-08-12-1-h-1-1
STANDARD 1H OBSERVE - profile
7.263
7.243
7.226
7.203
7.198
7.195
7.184
7.166
7.150
7.133
7.115
7.000
6.981
6.968
6.949
6.908
6.803
6.784
5.890
5.133
5.122
5.111
2.613
2.593
2.574
2.381
1.741
1.722
1.703
1.684
1.665
1.635
1.619
1.603
1.587
1.572
1.558
1.542
1.524
1.505
1.498
1.480
1.465
1.322
1.310
1.299
1.286
1.275
1.260
1.251
1.237
1.225
1.212
1.198
1.185
1.173
1.162
1.148
1.136
0.000
H
Si
Bn
3q
(400 MHz, CDCl3)
1.78
3.78
2.90
0.87
0.95
1.95
0.88
1.97
5.99
1.99
2.15
1.45
1.11
f1 (ppm)

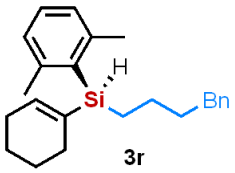

2021267-qhy-08-6-1-c.20.fid
148.55
147.45
144.92
142.59
131.97
129.68
128.70
128.34
128.23
128.11
127.66
125.57
113.80
108.76
100.55
77.25
77.00
76.75
35.55
34.93
25.06
24.33
12.83
H
Si
Bn
3q
(125 MHz, CDCl3)
f1 (ppm)


06-87-1-c-b.1.fid
7.261
7.241
7.224
7.166
7.148
7.120
7.112
6.975
6.956
6.079
6.074
6.069
4.694
4.684
4.673
2.588
2.568
2.549
2.420
2.043
2.038
2.029
1.985
1.975
1.971
1.963
1.959
1.687
1.669
1.657
1.650
1.631
1.612
1.605
1.597
1.590
1.581
1.568
1.502
1.488
1.484
1.475
1.470
1.461
1.458
1.452
1.446
1.443
1.439
1.434
1.425
1.419
1.413
1.408
1.400
1.396
1.076
1.072
1.067
1.061
1.052
1.050
1.041
1.035
1.026
1.014
1.003
1.000
0.987
0.978
0.976
0.973
0.962
0.951
0.000
H
Si
Bn
3r
(400 MHz, CDCl3)
2.18
3.99
2.01
0.95
0.94
2.03
5.99
4.04
5.69
2.02
1.93
f1 (ppm)


2021613-06-87-1-c-C.10.fid
144.91
142.74
138.64
134.17
132.52
129.17
128.33
128.18
127.38
125.50
77.26
77.00
76.75
35.56
35.01
27.81
27.02
25.15
24.15
22.96
22.28
11.56

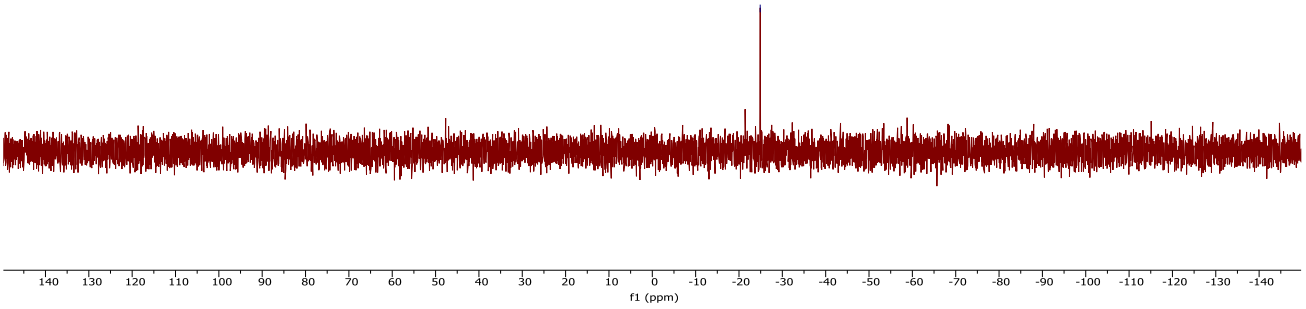

H
Si
Bn
3r
(125 MHz, CDCl3)
f1 (ppm)

wyc-II-04-3r
single pulse decoupled gated NOE

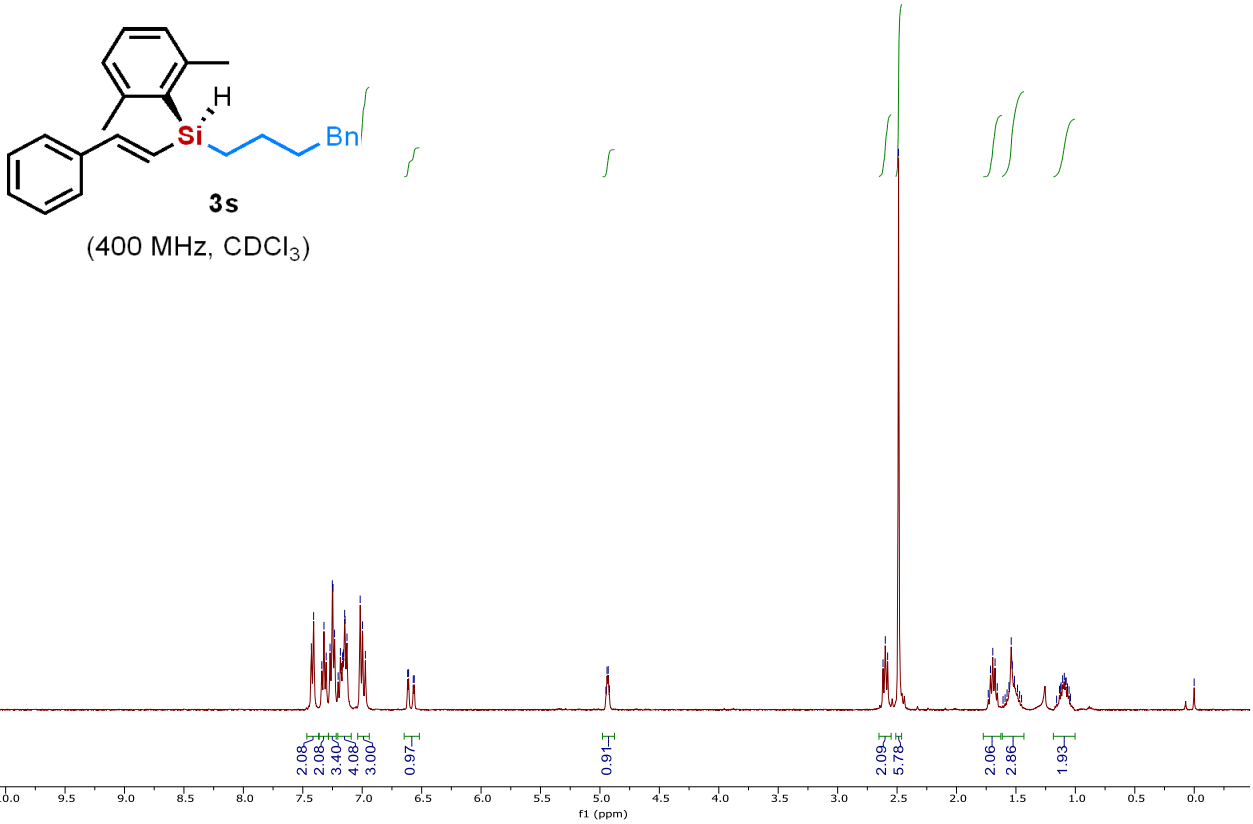


3r

(119 MHz, $CDCl_3$)



lyc-10-67-1h

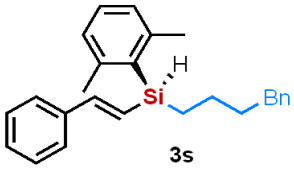


3s

(400 MHz, $CDCl_3$)

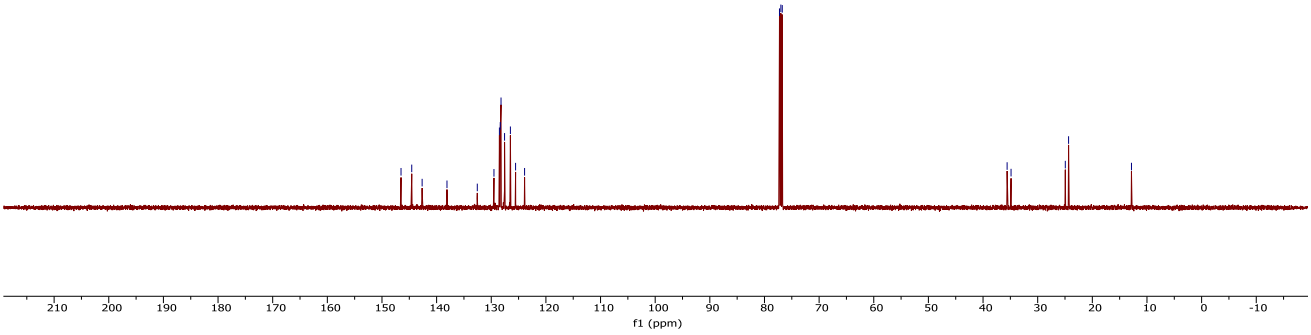
2021265-08-BENYIXISI-C-3.10.fid

146.51
144.55
142.65
138.10
132.56
129.51
128.51
128.35
128.21
127.57
126.50
125.55
123.90
77.25
77.00
76.74
35.59
34.88
24.95
24.34
12.84



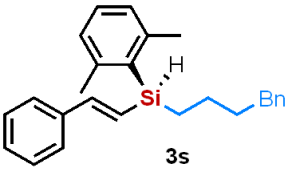
3s

(125 MHz, $CDCl_3$)



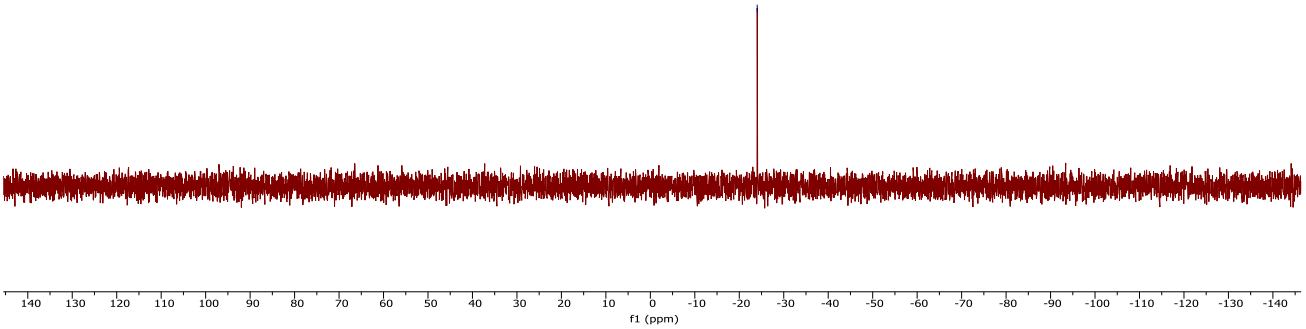
wyc-II-04-3s
single pulse decoupled gated NOE

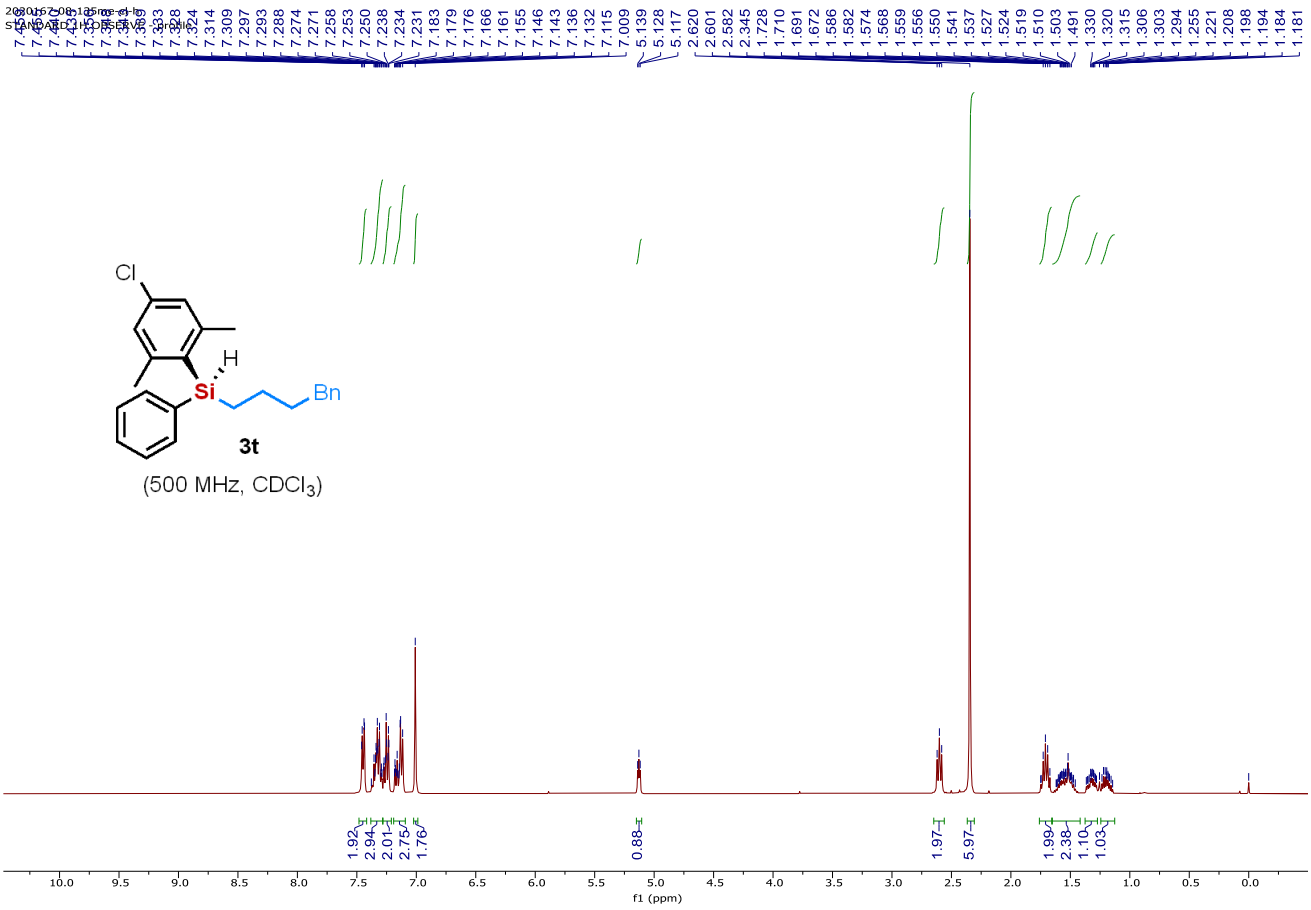
-24.038

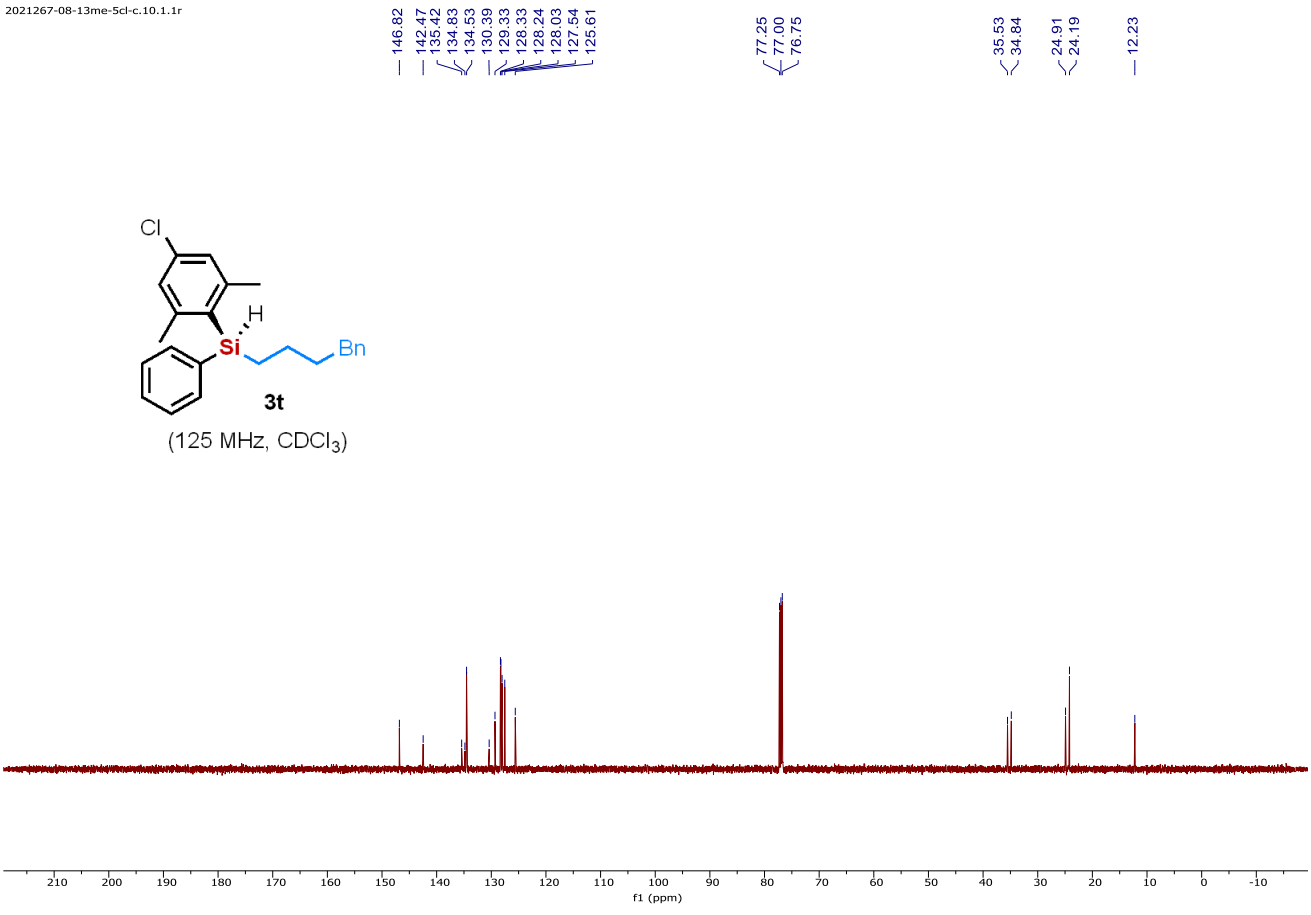


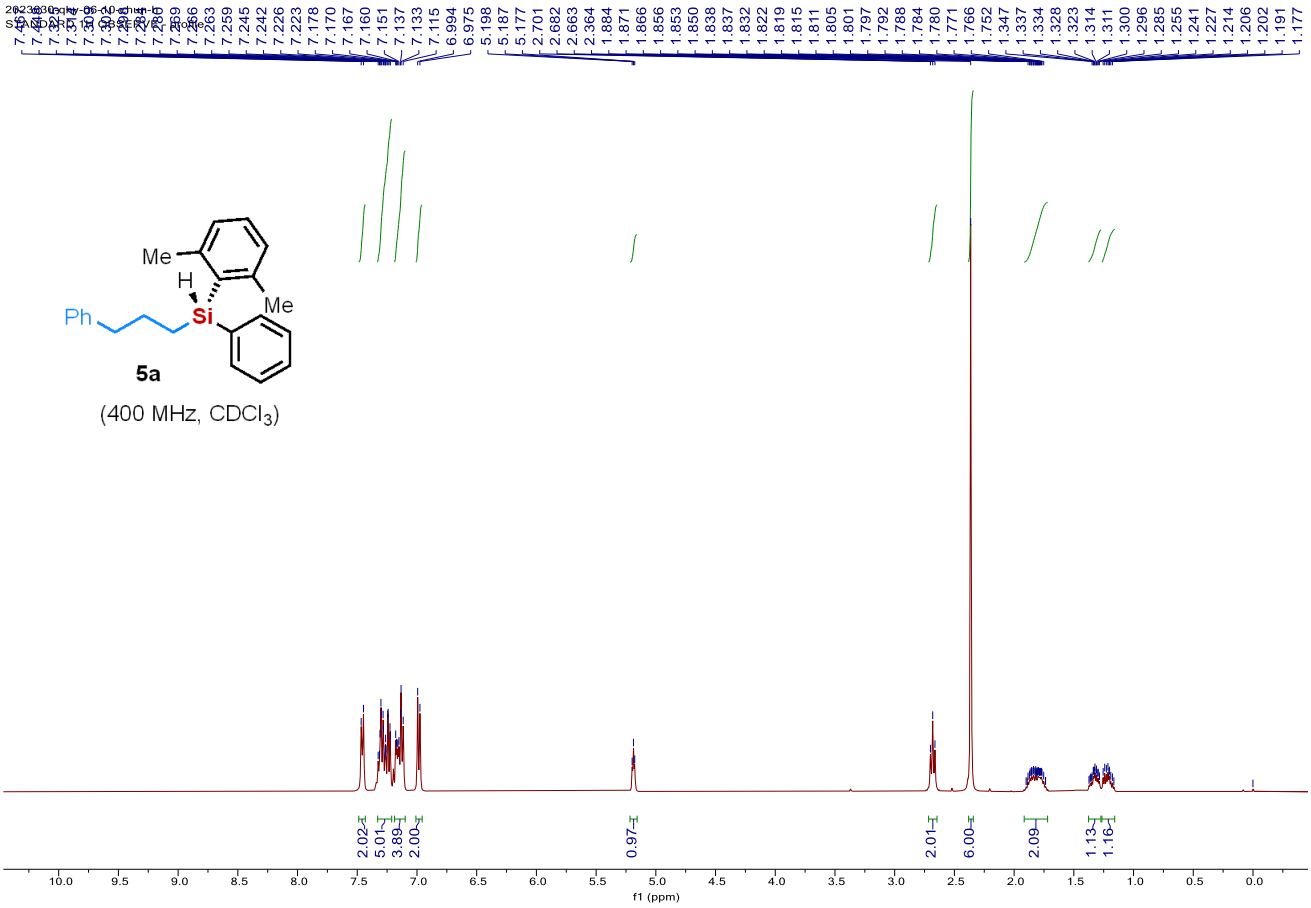
3s

(119 MHz, $CDCl_3$)

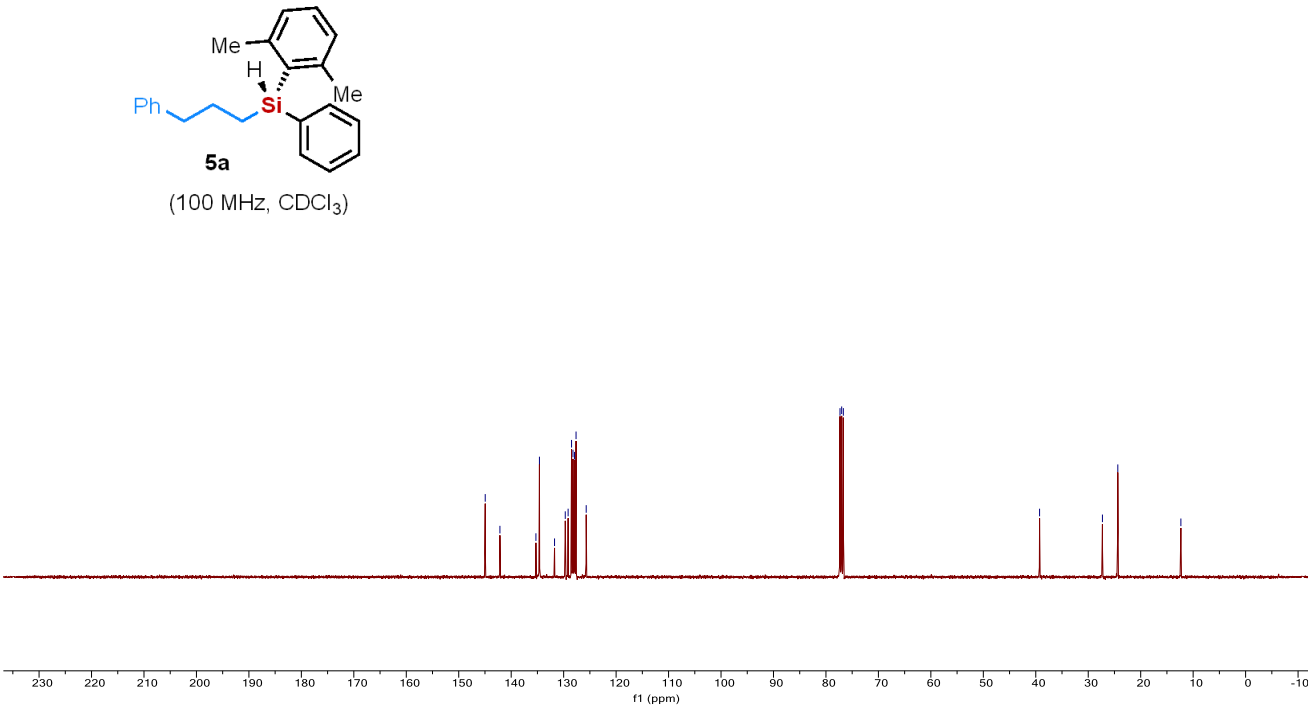


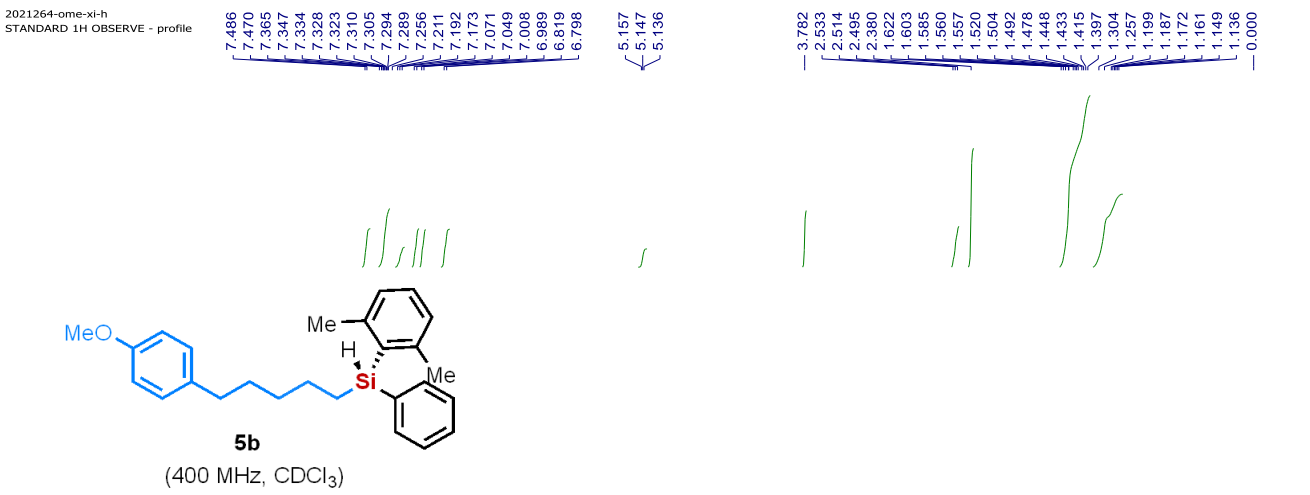

Cl
H
Si
Bn
3t
(500 MHz, CDCl3)
f1 (ppm)


Cl
H
Si
Bn
3t
(125 MHz, CDCl3)
f1 (ppm)


Me
H
Si
Me
Ph
5a
(400 MHz, CDCl3)
f1 (ppm)

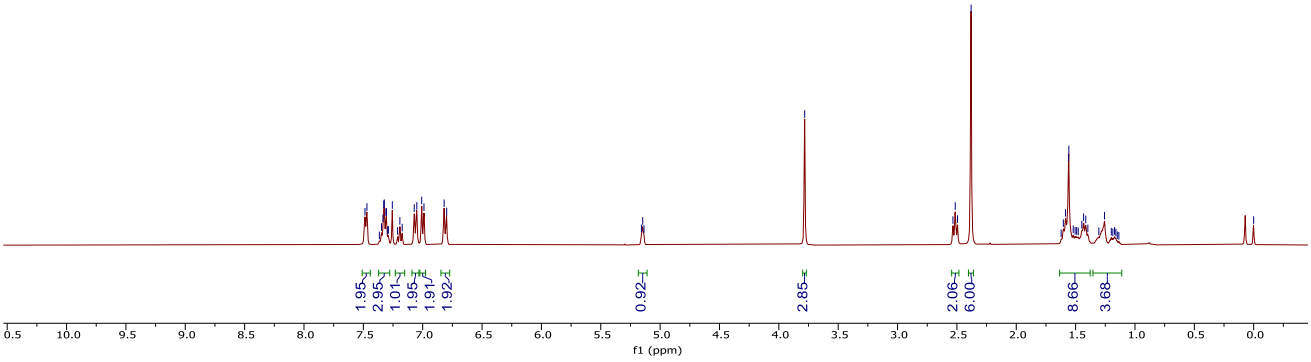

2023630-qhy-06-10-chun-c
new experiment
144.95
142.15
135.29
134.62
131.74
129.69
129.15
128.49
128.22
127.93
127.64
125.70
77.32
77.00
76.68
39.28
27.29
24.36
12.34

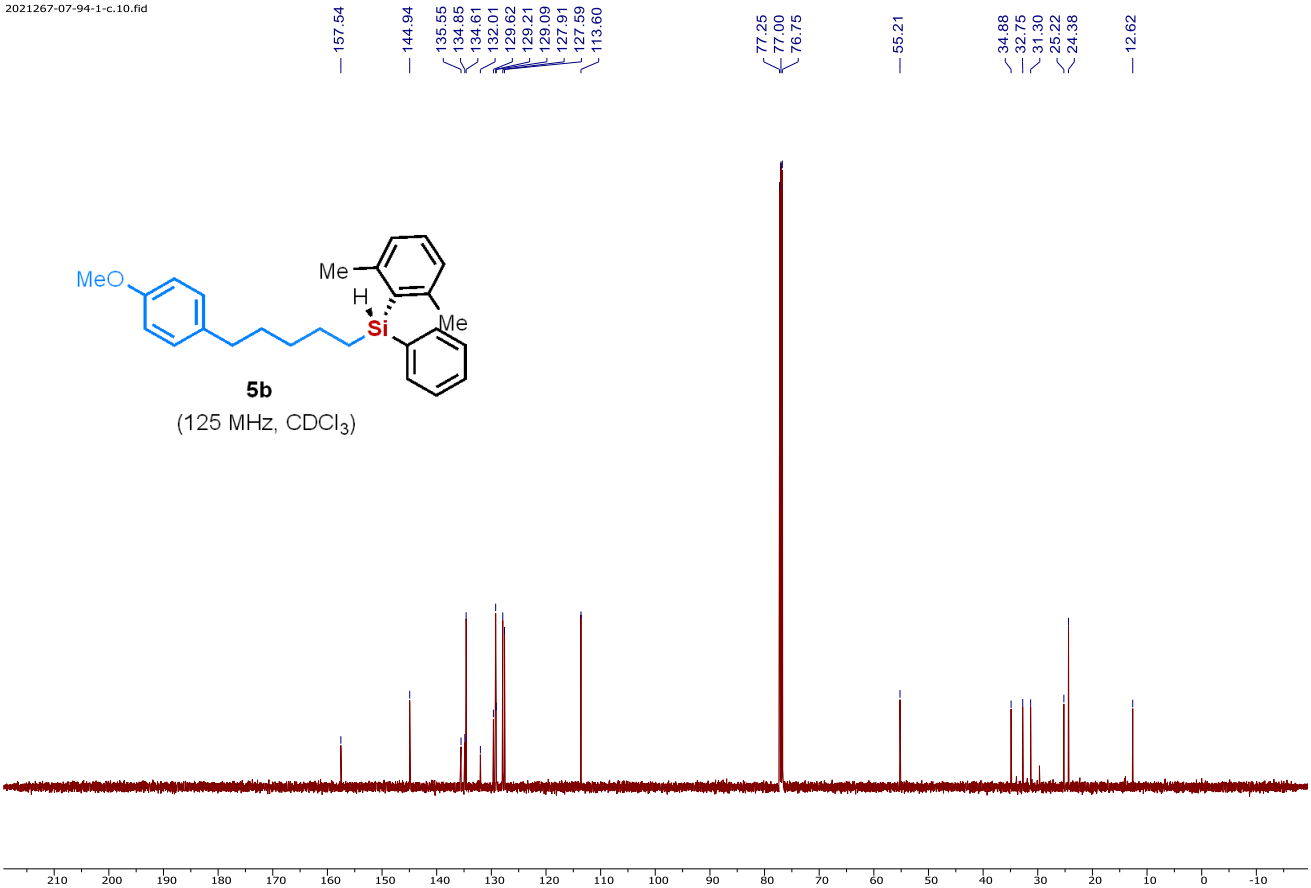

Me
H
Si
Me
Ph
5a
(100 MHz, CDCl3)
f1 (ppm)



5b

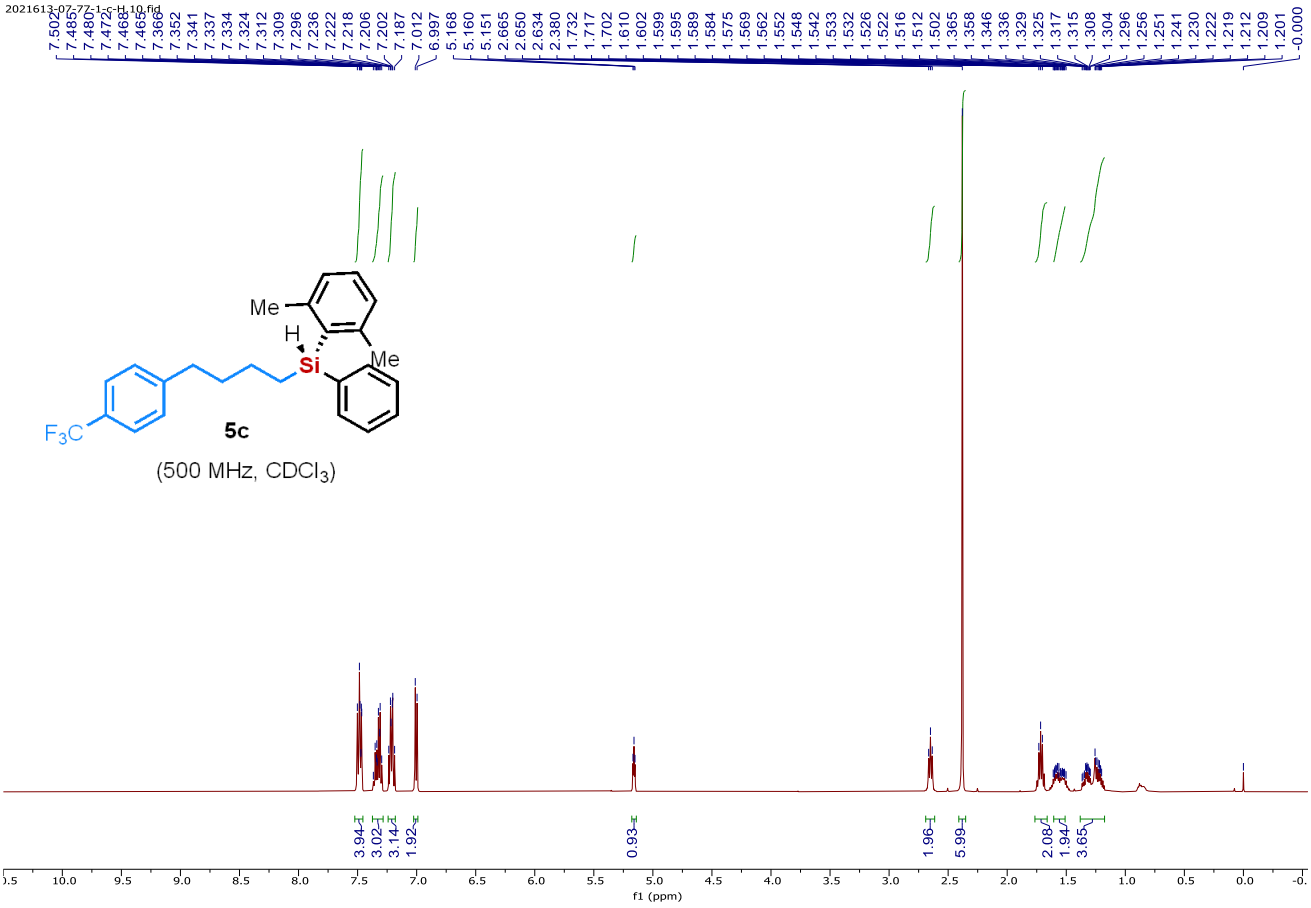
(400 MHz, $CDCl_3$)

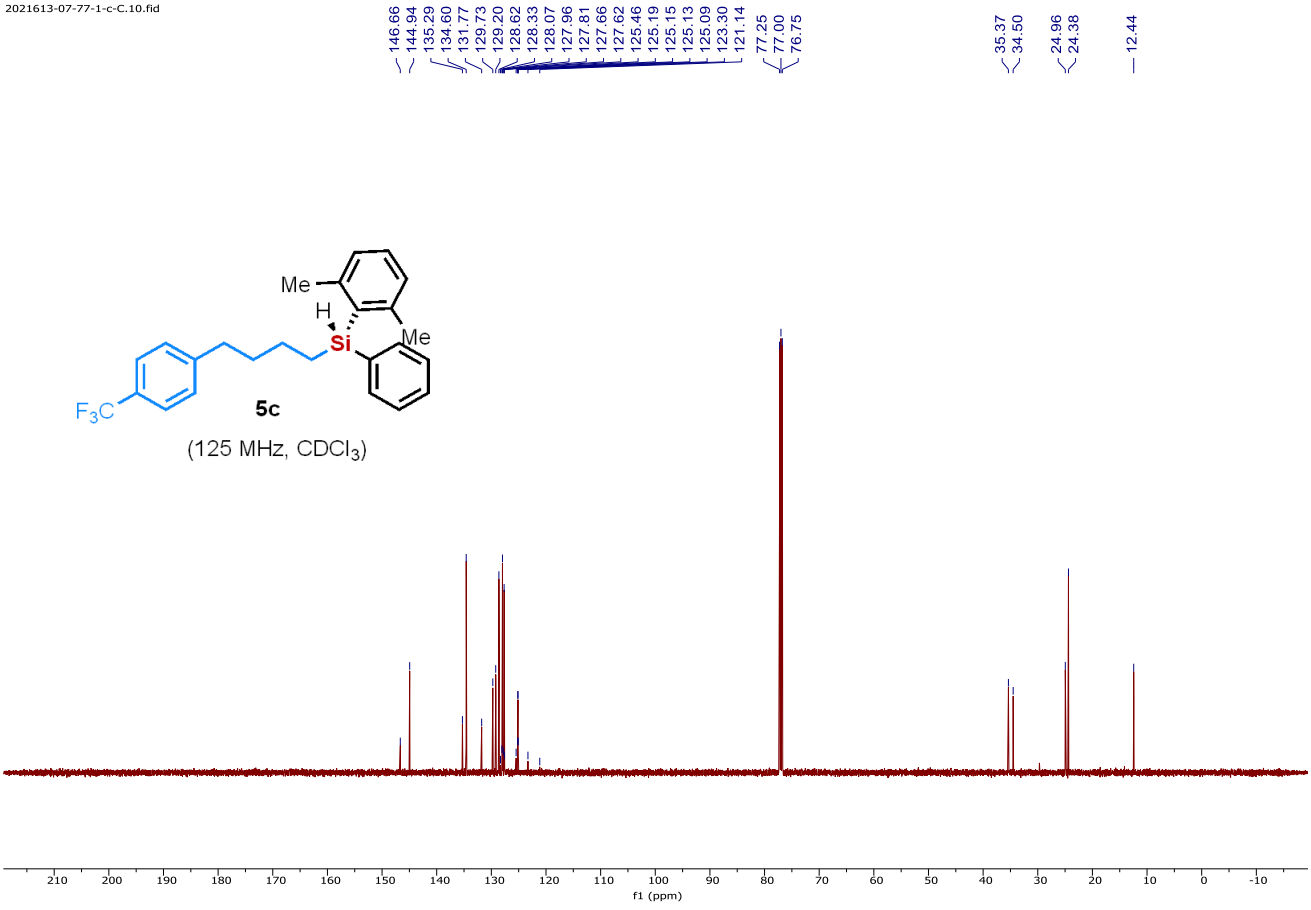


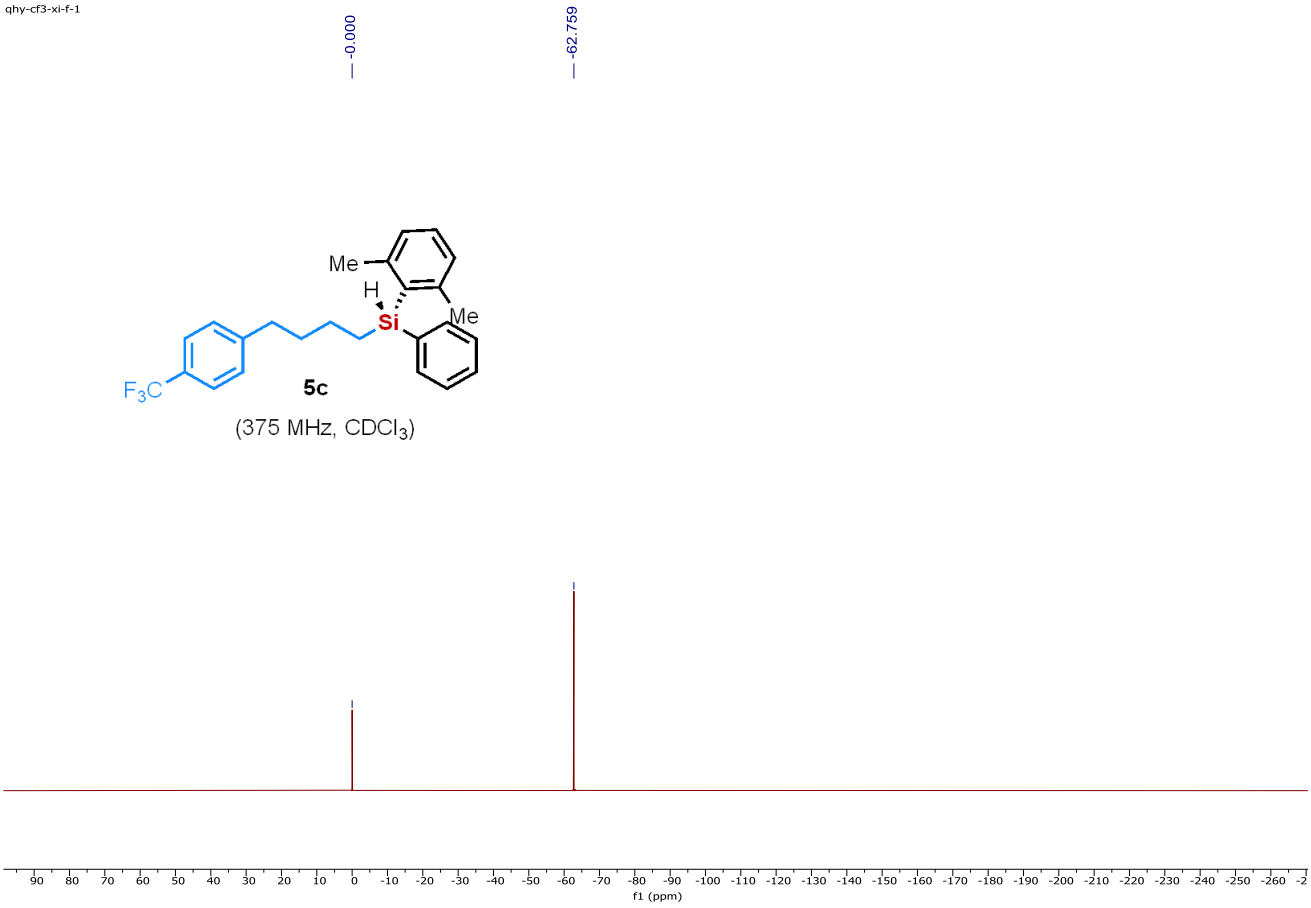


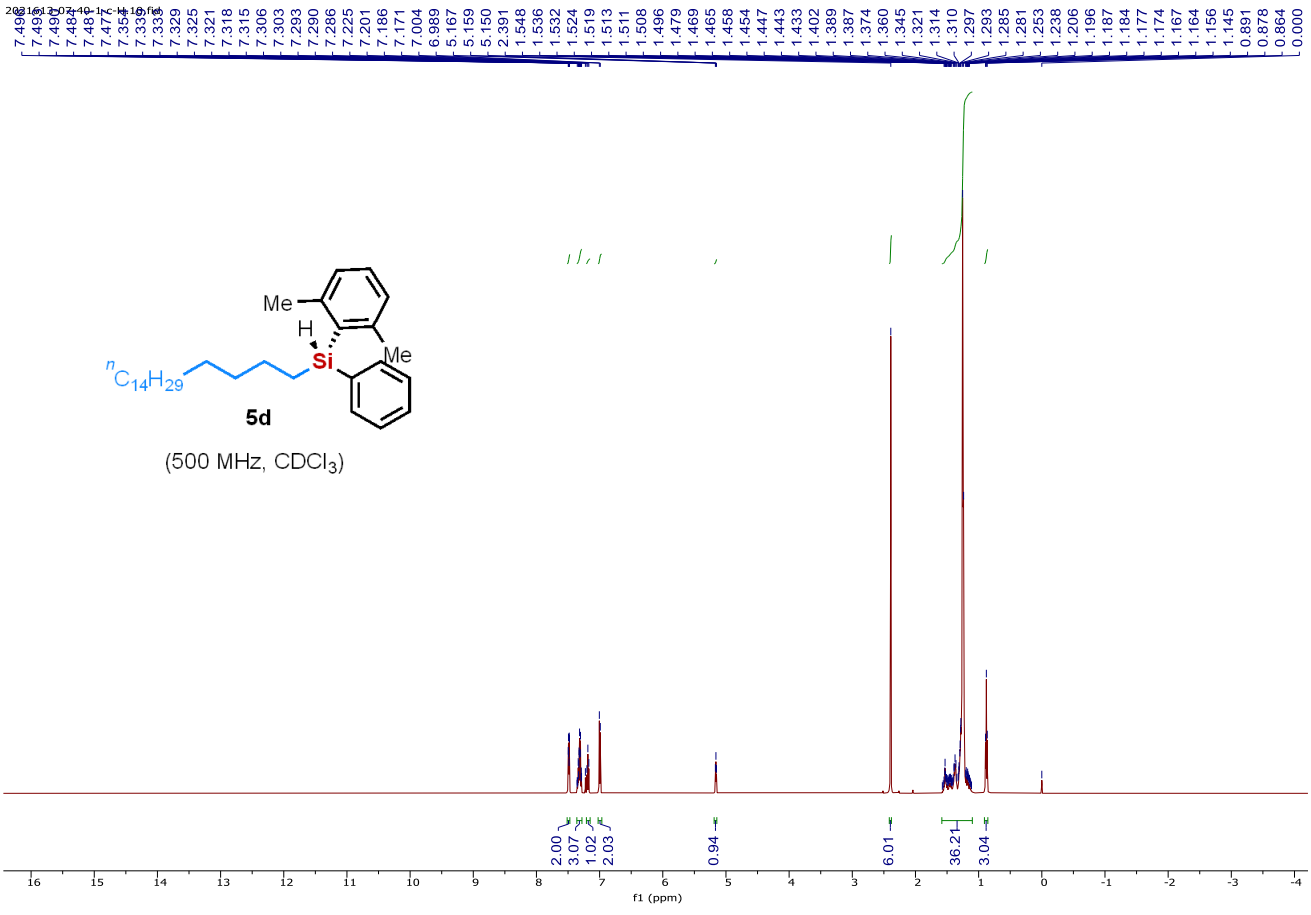
5b

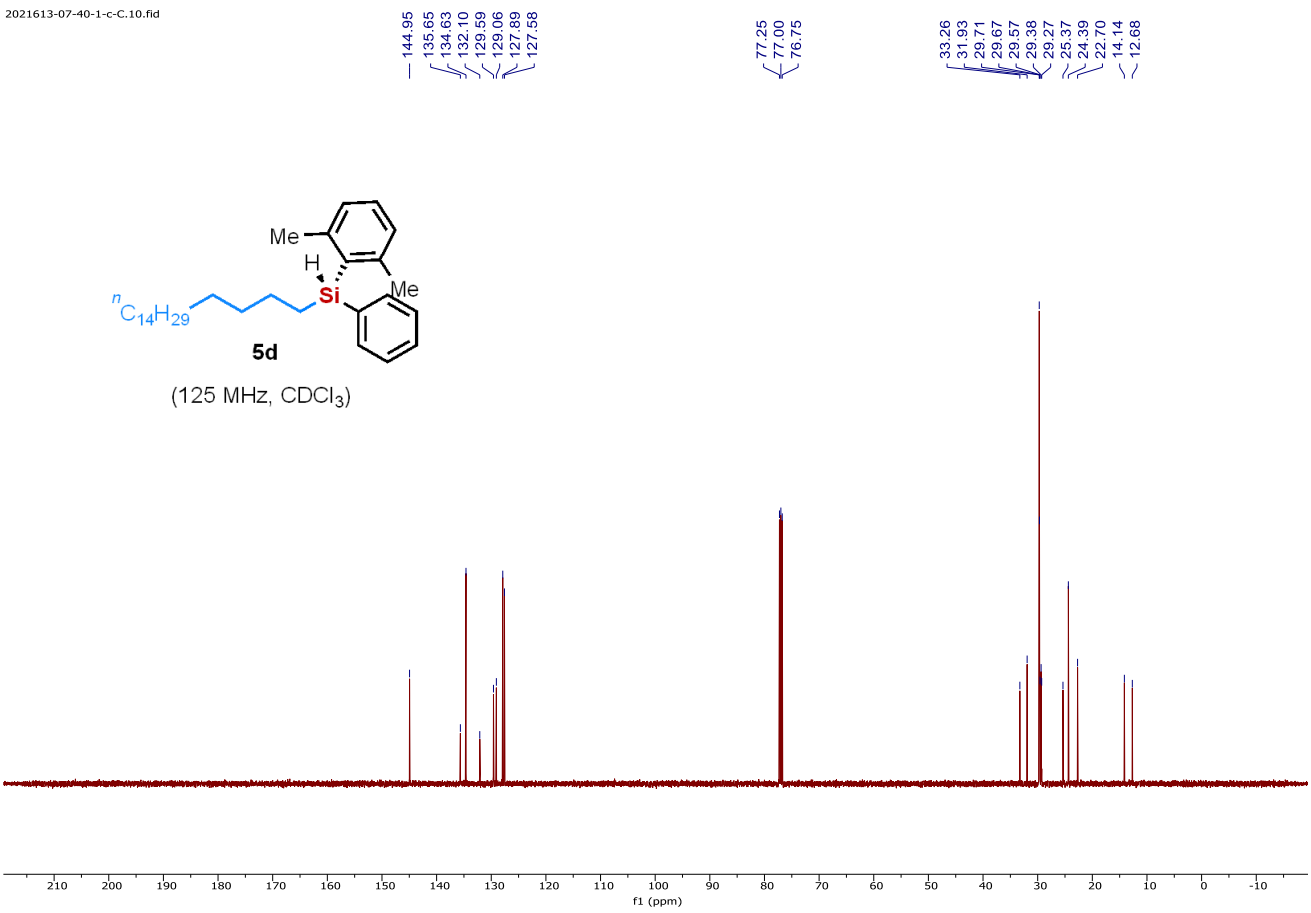
(125 MHz, $CDCl_3$)

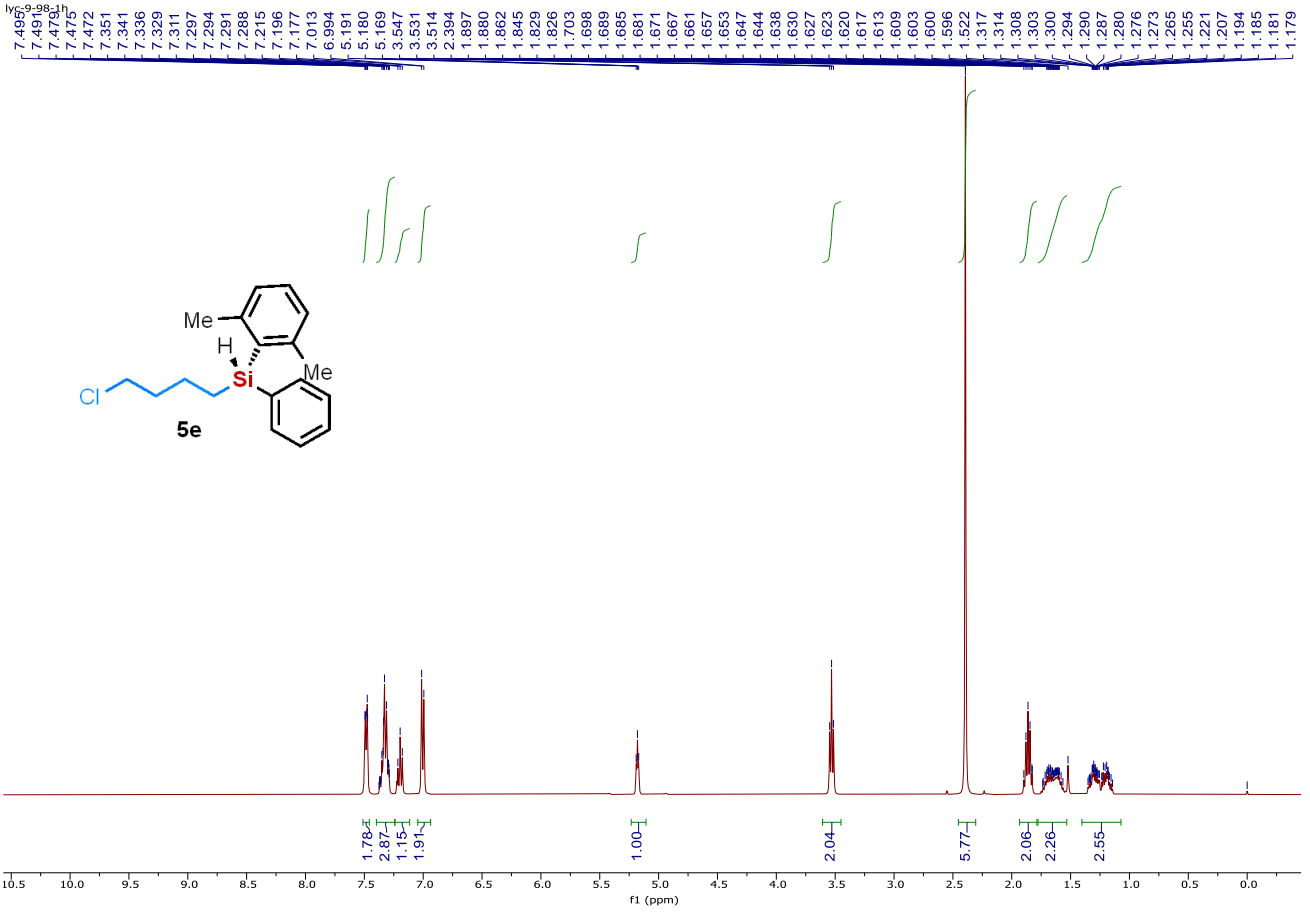

2021613-07-77-1-c-H.10.fid
Me
H
Si
Me
F3C
5c
(500 MHz, CDCl3)
f1 (ppm)


2021613-07-77-1-c-C.10.fid
Me
H
Si
Me
F3C
5c
(125 MHz, CDCl3)
f1 (ppm)


qhy-cf3-xi-f-1
-0.000
-62.759
Me
H
Si
Me
F3C
5c
(375 MHz, CDCl3)
f1 (ppm)

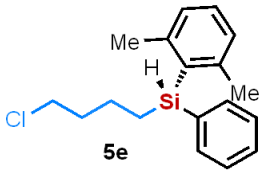

Me
H
Si
Me
nC14H29
5d
(500 MHz, CDCl3)
2.00
3.07
1.02
2.03
0.94
6.01
36.21
3.04
f1 (ppm)


2021613-07-40-1-c-C.10.fid
144.95
135.65
134.63
132.10
129.59
129.06
127.89
127.58
77.25
77.00
76.75
33.26
31.93
29.71
29.67
29.57
29.38
29.27
25.37
24.39
22.70
14.14
12.68
Me
H
Si
Me
$^{n}C_{14}H_{29}$
5d
(125 MHz, $CDCl_3$)
f1 (ppm)


lyc-9-98-1h
7.496
7.491
7.479
7.475
7.472
7.351
7.341
7.336
7.329
7.311
7.297
7.294
7.291
7.288
7.215
7.196
7.177
7.013
6.994
5.191
5.180
5.169
3.547
3.531
3.514
2.394
1.897
1.880
1.862
1.845
1.829
1.826
1.703
1.698
1.689
1.685
1.681
1.671
1.667
1.661
1.657
1.653
1.647
1.644
1.638
1.630
1.627
1.623
1.620
1.617
1.613
1.609
1.603
1.600
1.596
1.522
1.317
1.314
1.308
1.303
1.300
1.294
1.290
1.287
1.280
1.276
1.273
1.265
1.255
1.221
1.207
1.194
1.185
1.181
1.179
Me
H
Si
Me
Cl
5e
1.78
2.87
1.15
1.91
1.00
2.04
5.77
2.06
2.26
2.55
f1 (ppm)

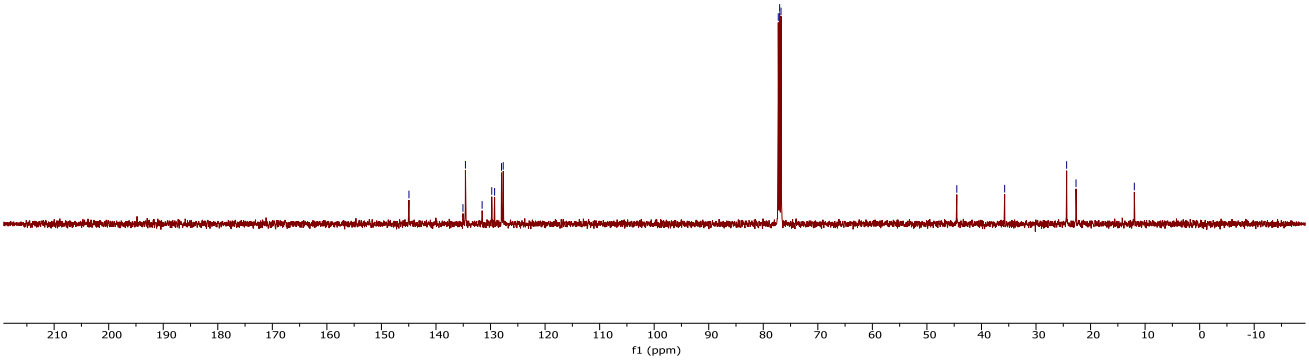
2021267-08-cl-xi-can-c-1.11.1.1r

144.96
135.06
134.60
131.54
129.78
129.25
127.99
127.67
77.25
77.00
76.75
44.52
35.75
24.39
22.67
11.98



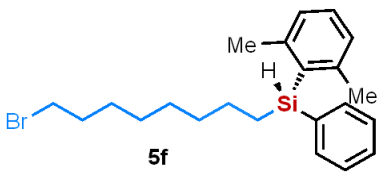
5e

(125 MHz, $CDCl_3$)



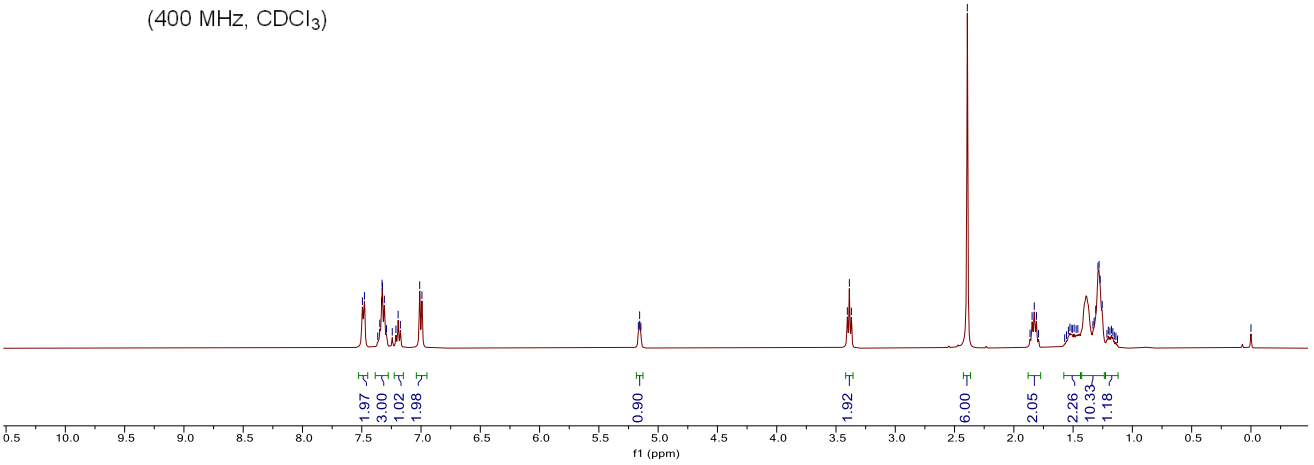
2021267-qhy-07-xicanwu-Br
STANDARD 1H OBSERVE - profile

7.494
7.477
7.365
7.348
7.333
7.329
7.325
7.309
7.291
7.243
7.212
7.193
7.174
7.011
6.992
5.167
5.156
5.145
3.404
3.387
3.370
2.392
1.863
1.846
1.828
1.809
1.792
1.571
1.556
1.540
1.527
1.510
1.507
1.492
1.474
1.460
1.332
1.323
1.309
1.291
1.281
1.272
1.254
1.215
1.203
1.189
1.176
1.165
1.153
1.139
1.126
-0.000



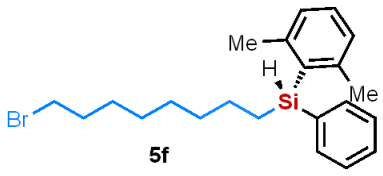
5f

(400 MHz, $CDCl_3$)



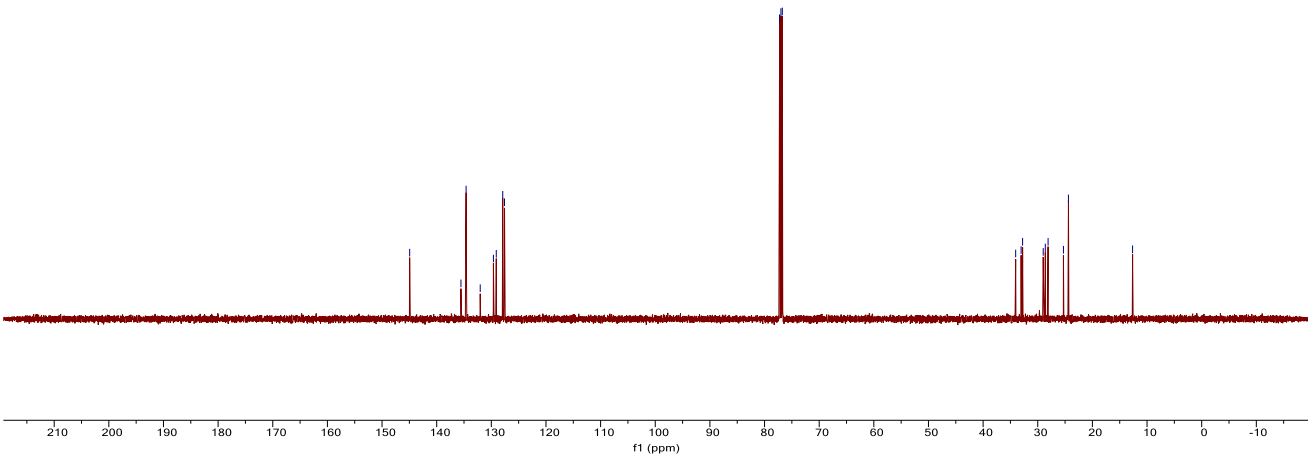
2021267-06-xi-chanwu-Br.10.fid

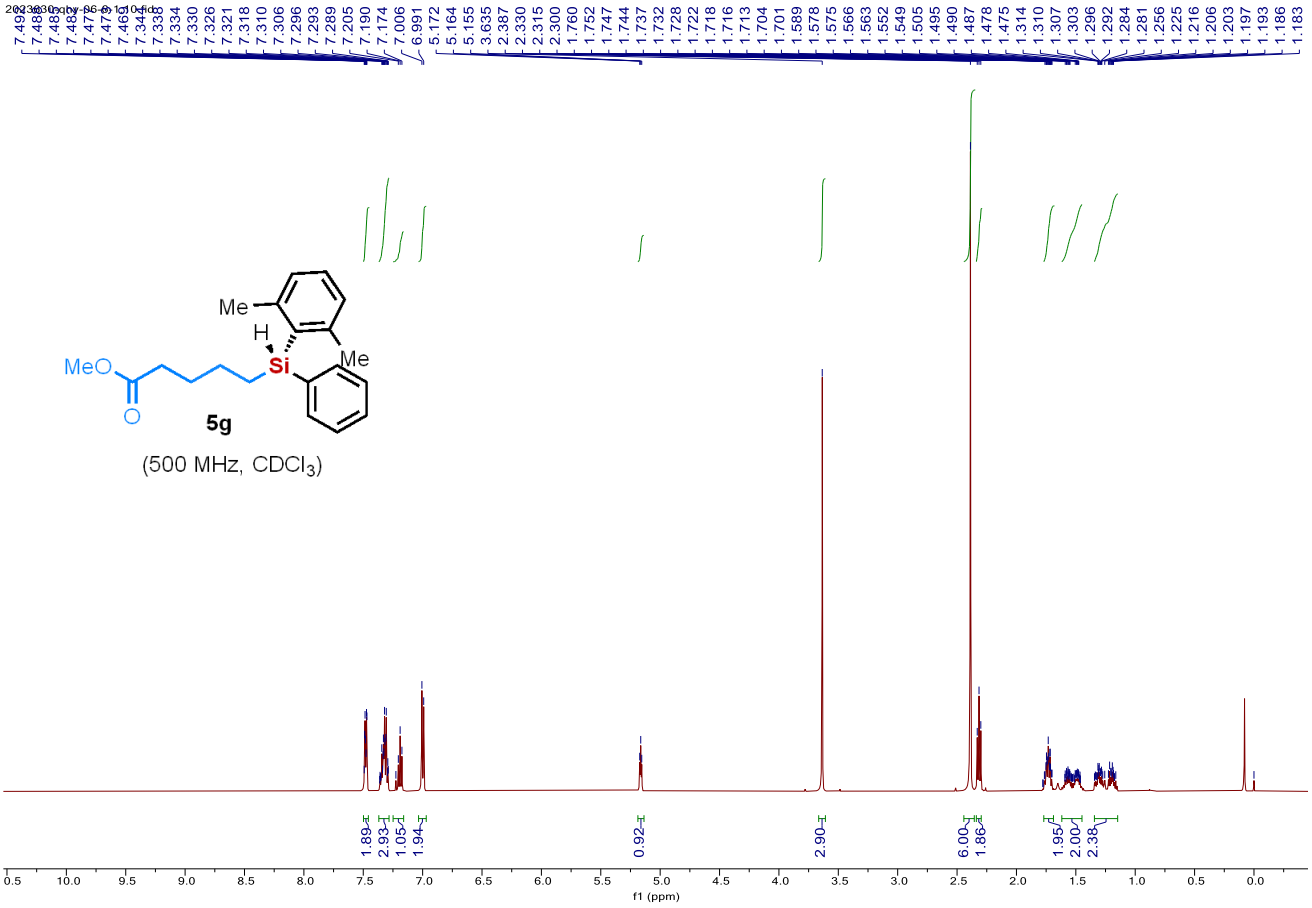
144.94
135.56
134.62
132.03
129.62
129.10
127.91
127.59
77.25
77.00
76.75
34.04
33.04
32.77
29.00
28.62
28.11
25.30
24.38
12.65



5f

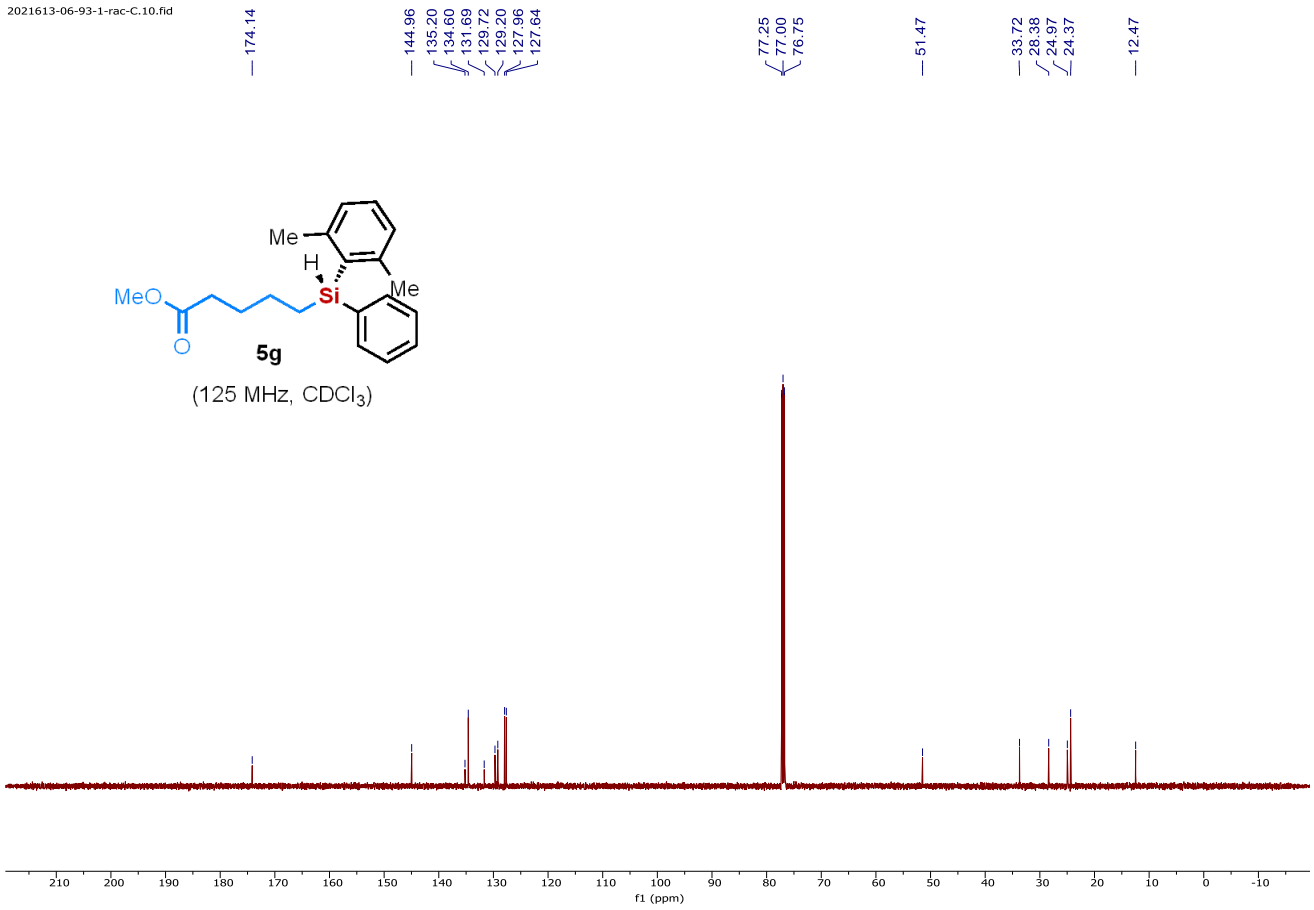
(125 MHz, $CDCl_3$)

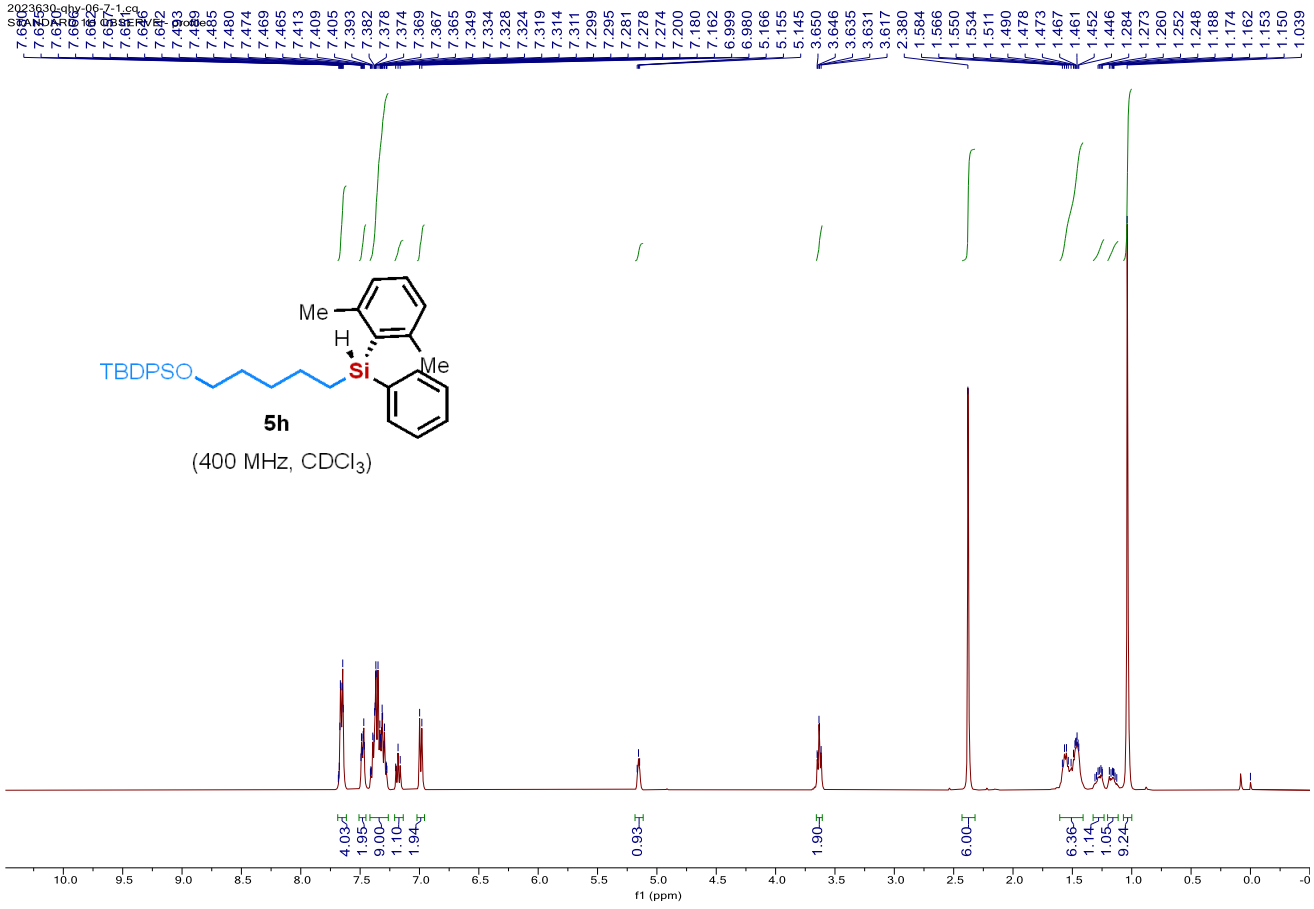




5g

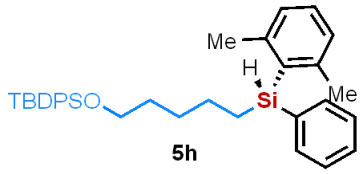
(500 MHz, $CDCl_3$)


2021613-06-93-1-rac-C.10.fid
174.14
144.96
135.20
134.60
131.69
129.72
129.20
127.96
127.64
77.25
77.00
76.75
51.47
33.72
28.38
24.97
24.37
12.47
Me
H
Si
Me
MeO
O
5g
(125 MHz, CDCl3)
f1 (ppm)


Me
H
Si
Me
TBDPSO
5h
(400 MHz, CDCl3)
4.03
1.95
9.00
1.10
1.94
0.93
1.90
6.00
6.36
1.14
1.05
9.24
f1 (ppm)

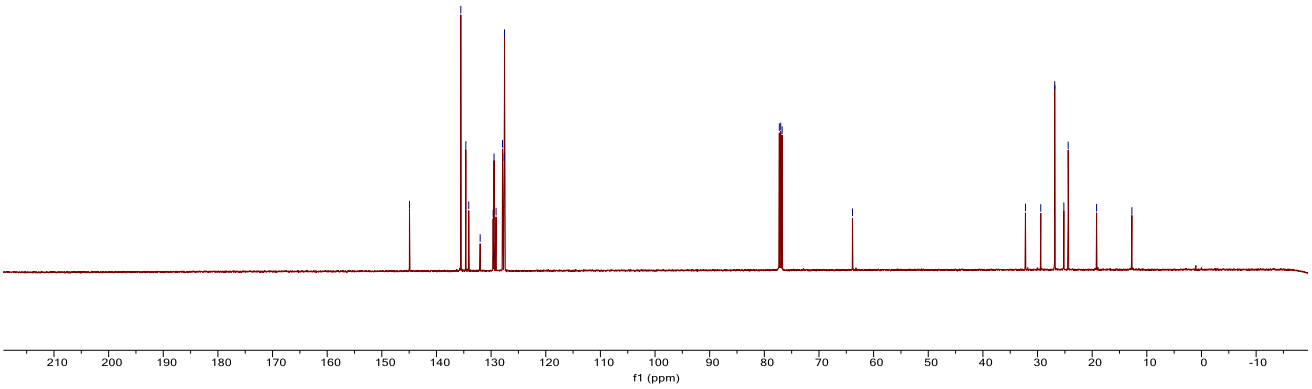
2023630-qhy-06-7-1-c.10.fid

144.94
135.55
134.63
134.09
132.00
129.63
129.50
129.47
129.10
127.91
127.60
127.55
77.25
77.00
76.75
63.87
32.21
29.41
26.85
25.18
24.39
19.19
12.73



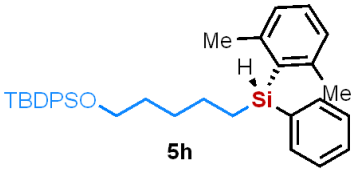
5h

(125 MHz, $CDCl_3$)



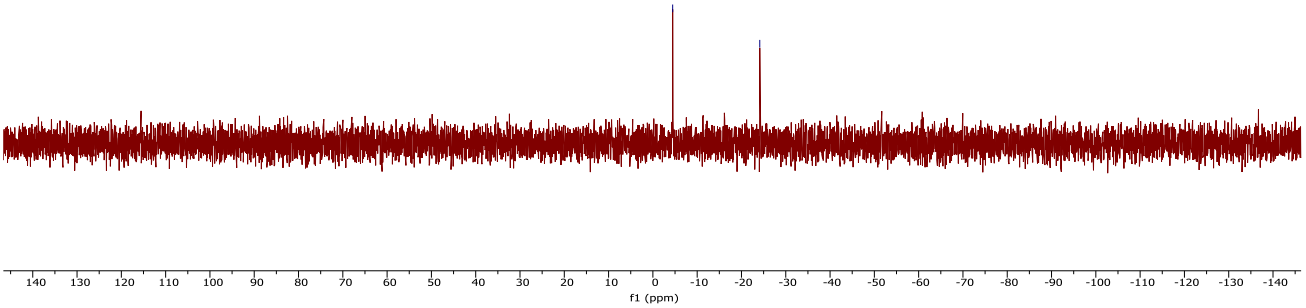
wyc-II-04-5h
single pulse decoupled gated NOE

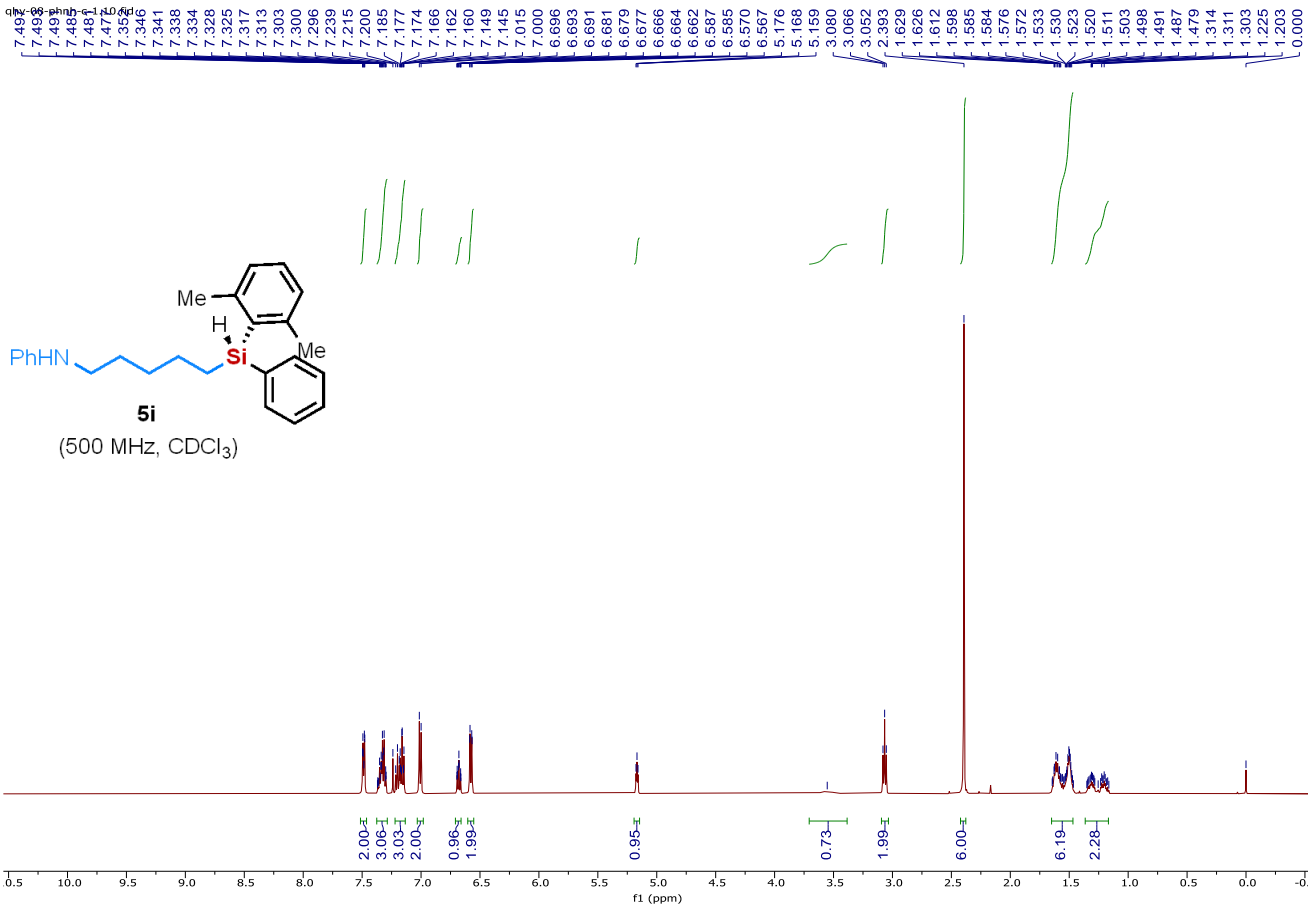
-4.465
-24.131

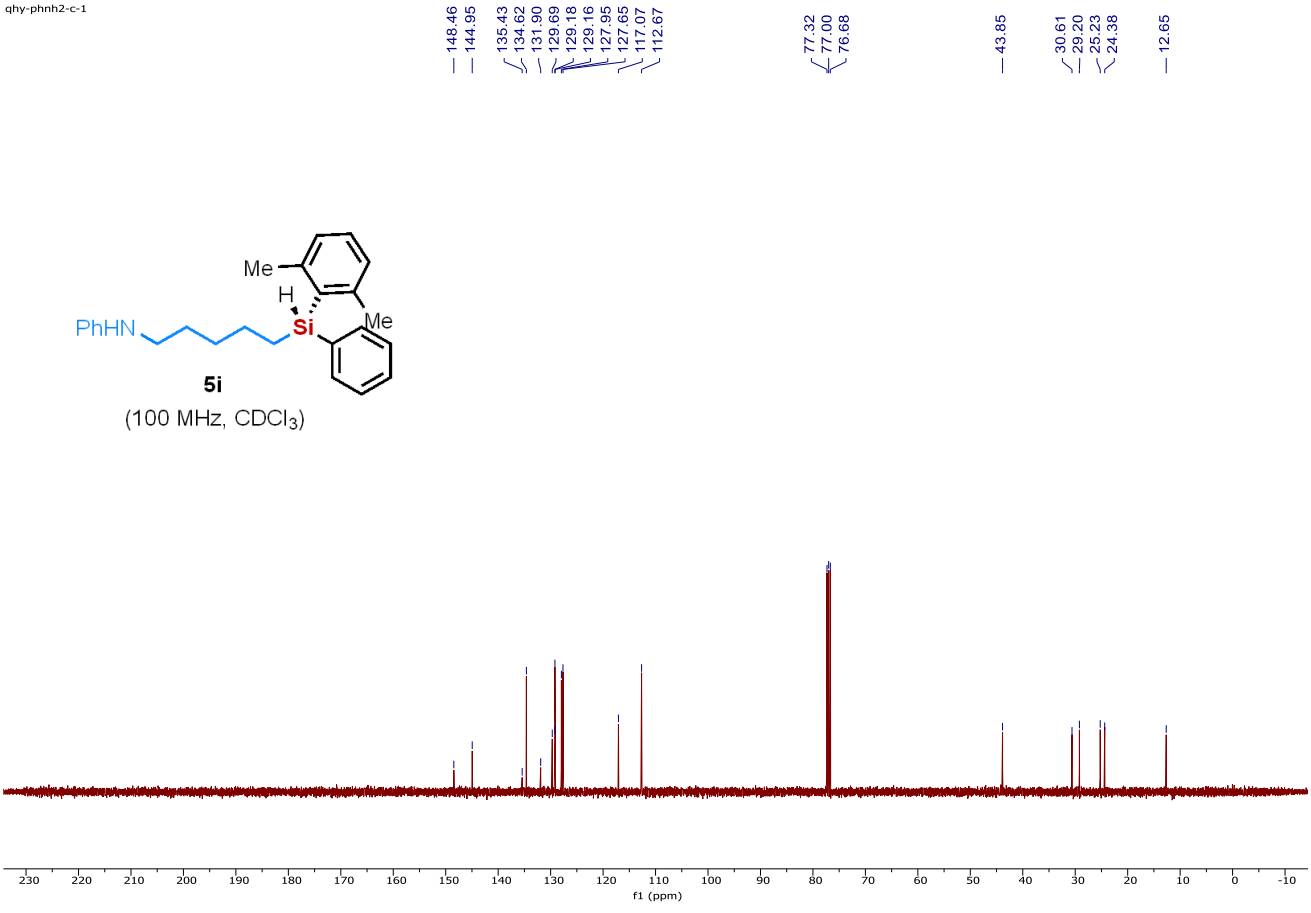


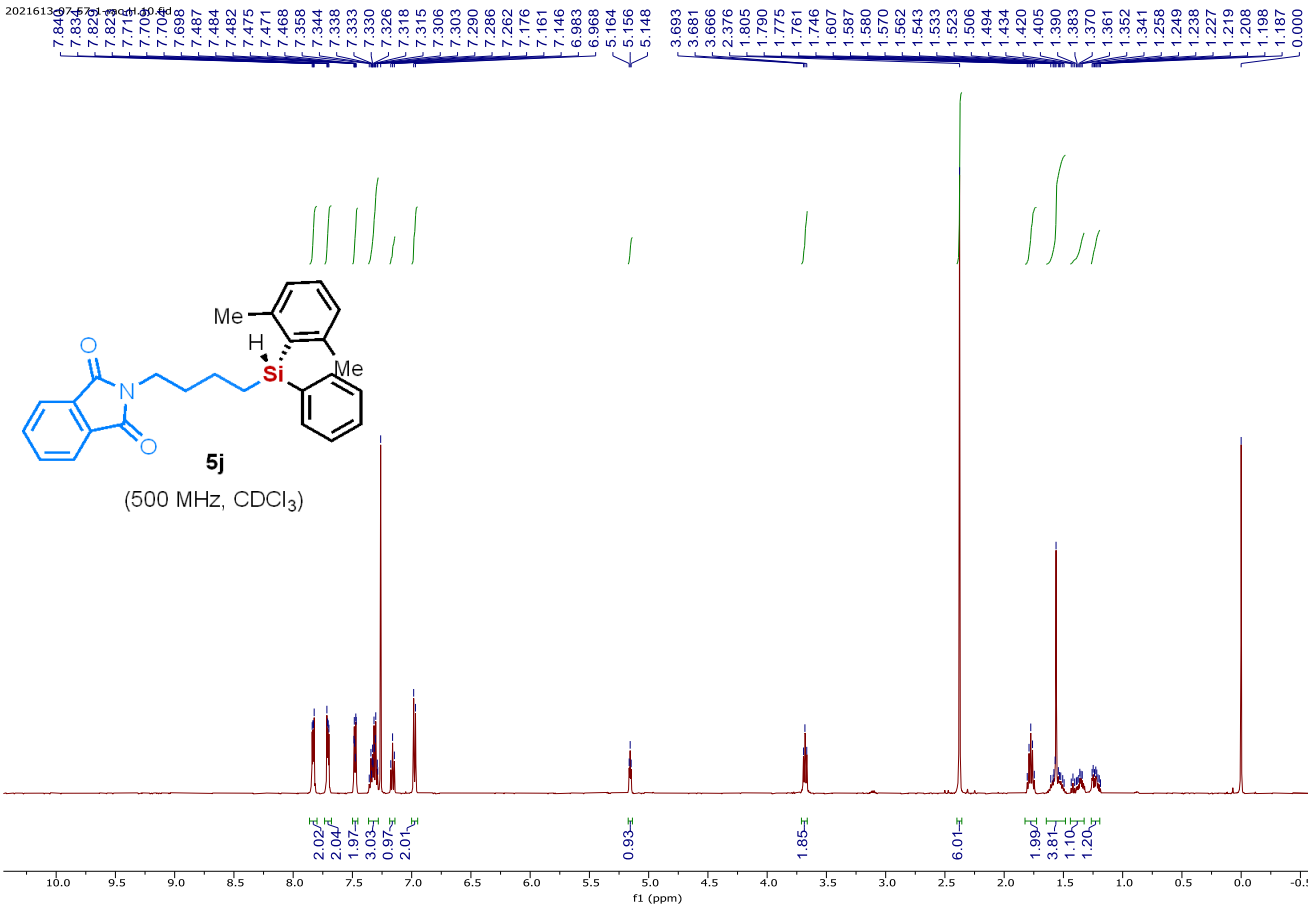
5h

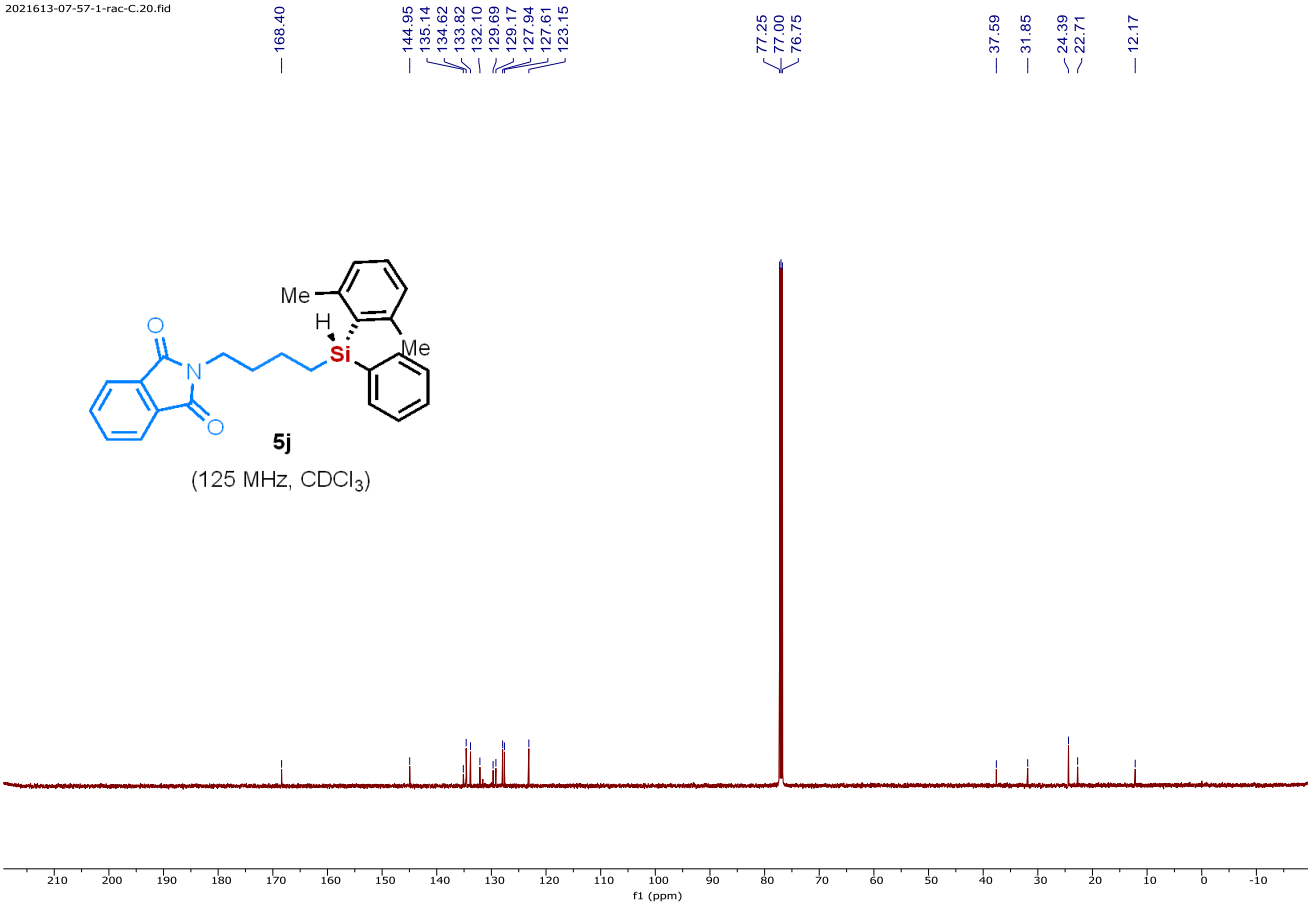
(119 MHz, $CDCl_3$)




Me
H
Si
Me
PhHN
5i
(500 MHz, CDCl3)
f1 (ppm)

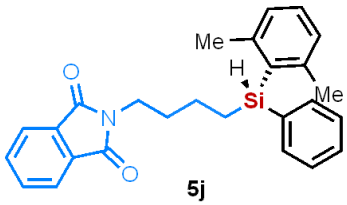

qhy-phnh2-c-1
Me
H
Si
Me
PhHN
5i
(100 MHz, CDCl3)
f1 (ppm)


Me
H
Si
Me
N
O
O
5j
(500 MHz, CDCl3)
f1 (ppm)


Me
H
Si
Me
N
O
O
5j
(125 MHz, CDCl3)
f1 (ppm)

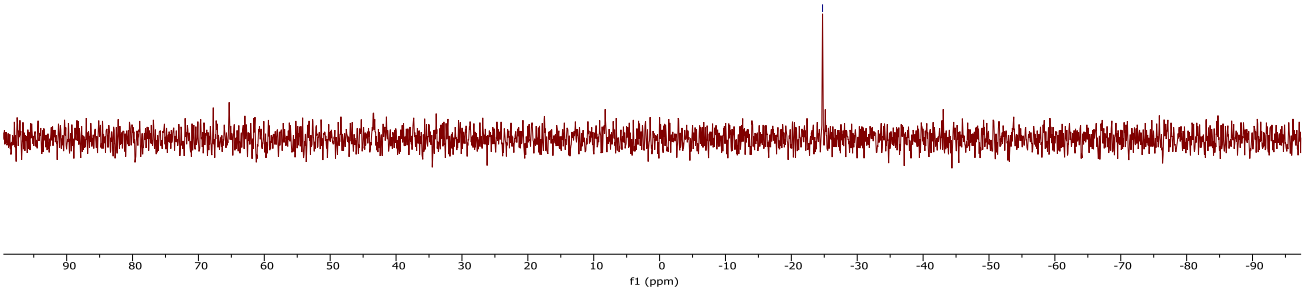
wyc-II-04-5j-Si.2.fid

-24.734



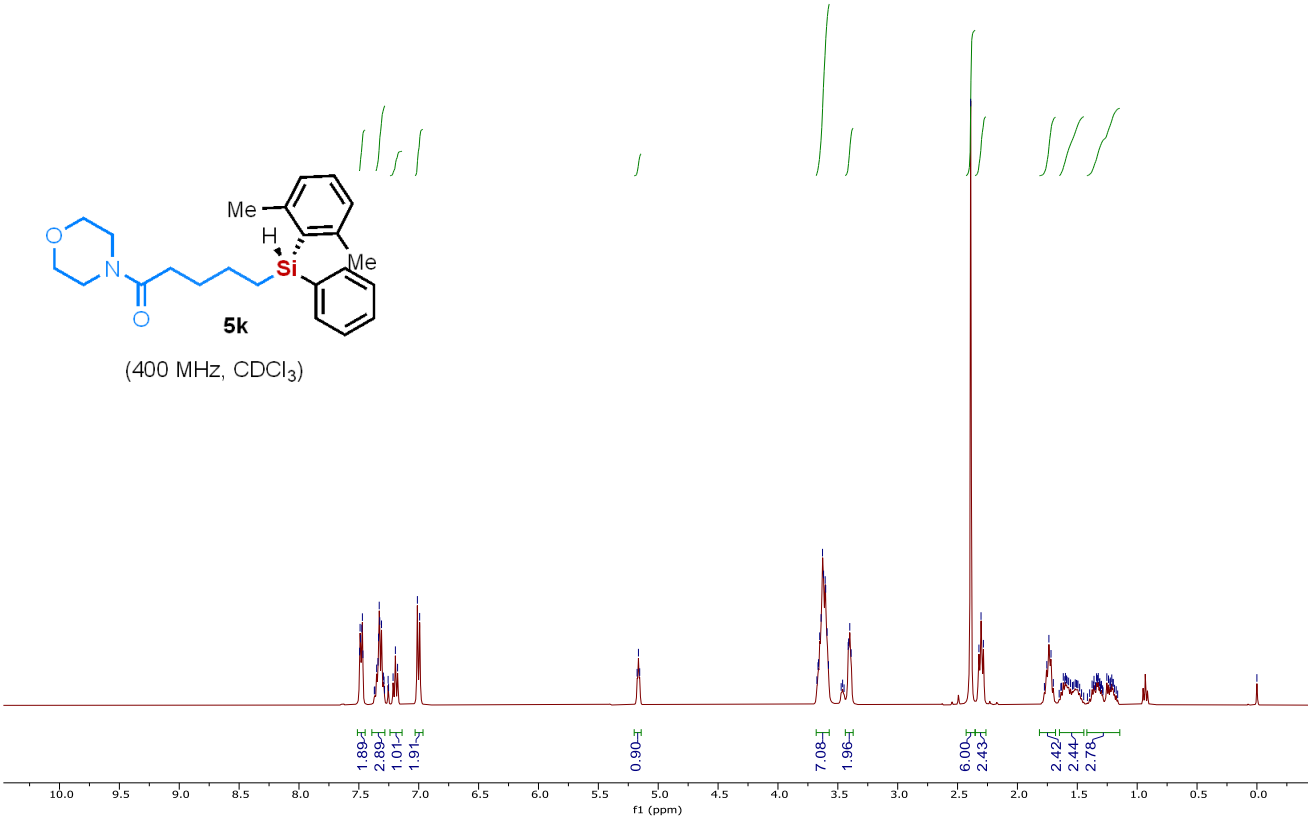
5j

(80 MHz, $CDCl_3$)



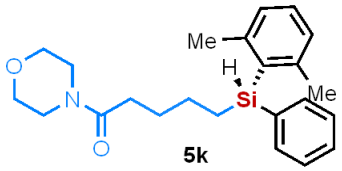
5k

(400 MHz, $CDCl_3$)



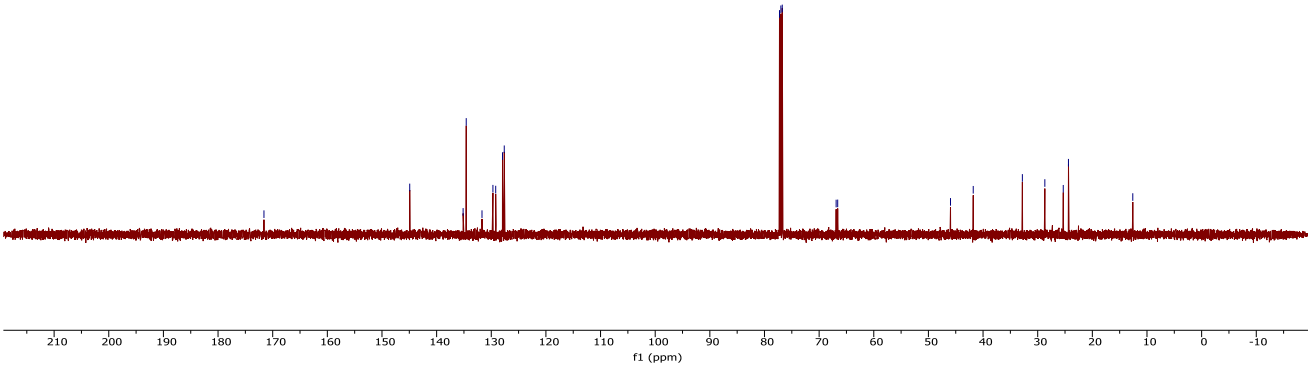
2021265-08-XIANAN-C-1.10.1.1r

171.60
144.92
135.15
134.58
131.70
129.70
129.19
127.94
127.62
77.25
77.00
76.75
66.89
66.60
45.96
41.80
32.81
28.70
25.32
24.37
12.60



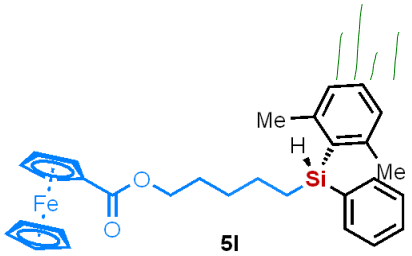
5k

(125 MHz, $CDCl_3$)



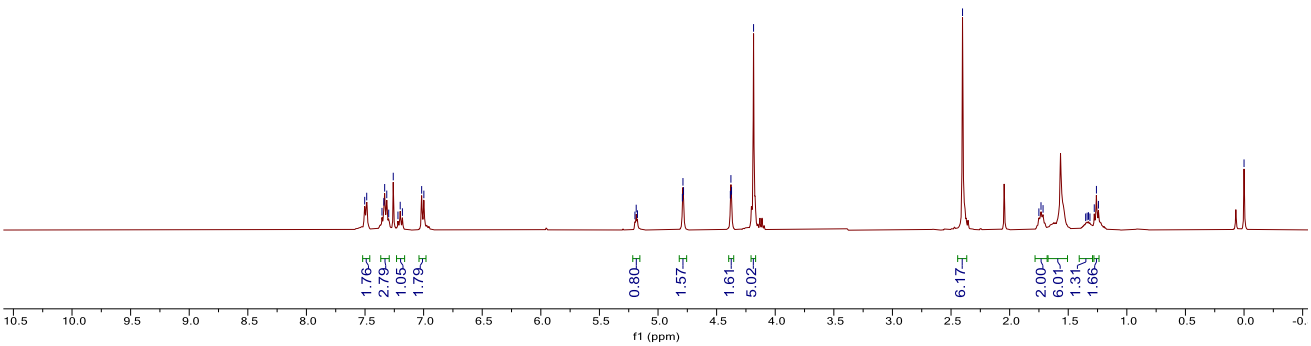
2021267-qhy-07-91-1-1
STANDARD 1H OBSERVE - profile

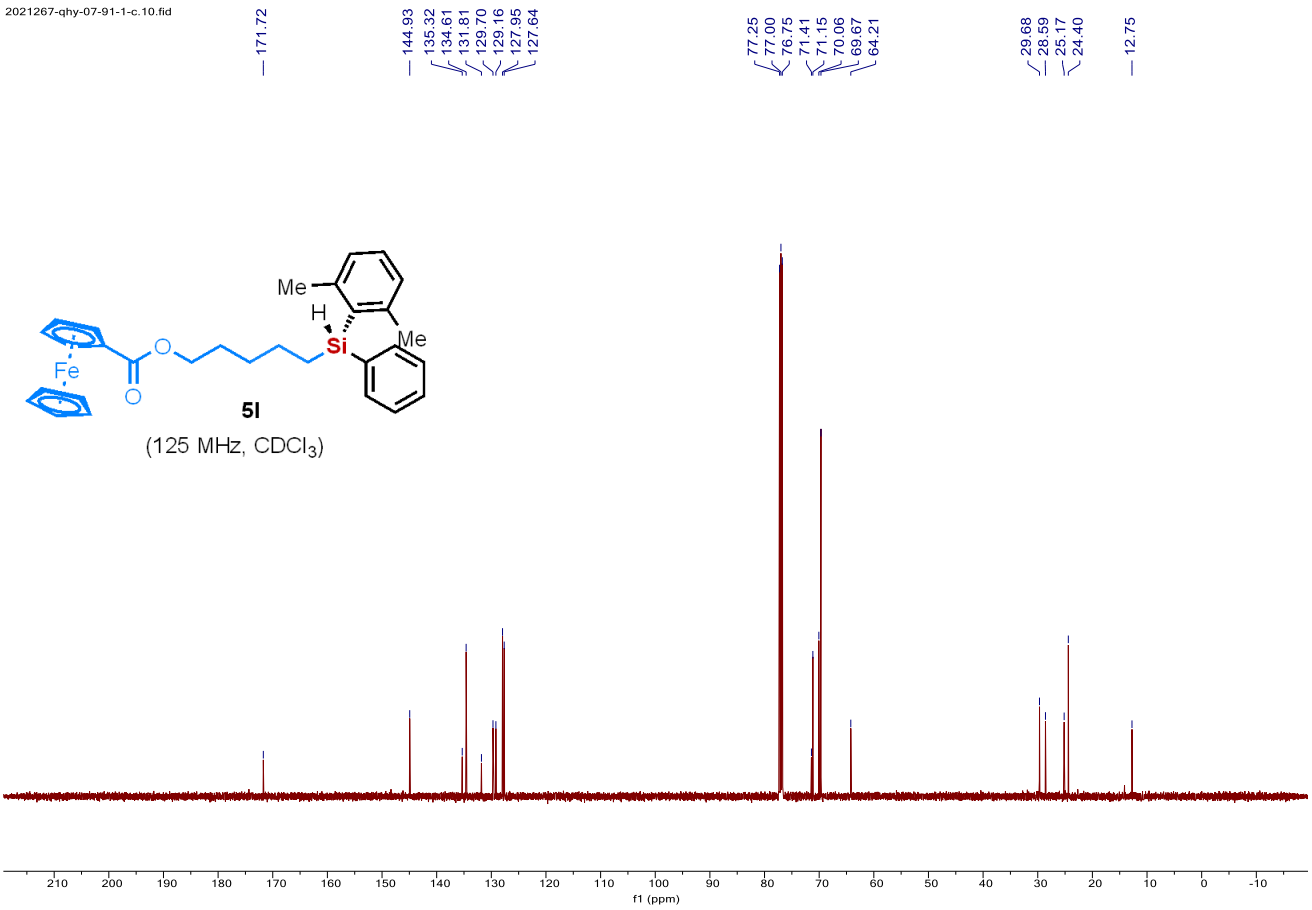
7.503
7.486
7.355
7.339
7.332
7.315
7.298
7.259
7.219
7.200
7.181
7.017
6.998
5.197
5.186
5.176
4.792
4.787
4.782
4.383
4.378
4.373
4.185
2.402
1.750
1.732
1.715
1.351
1.339
1.327
1.315
1.278
1.259
1.242
0.000

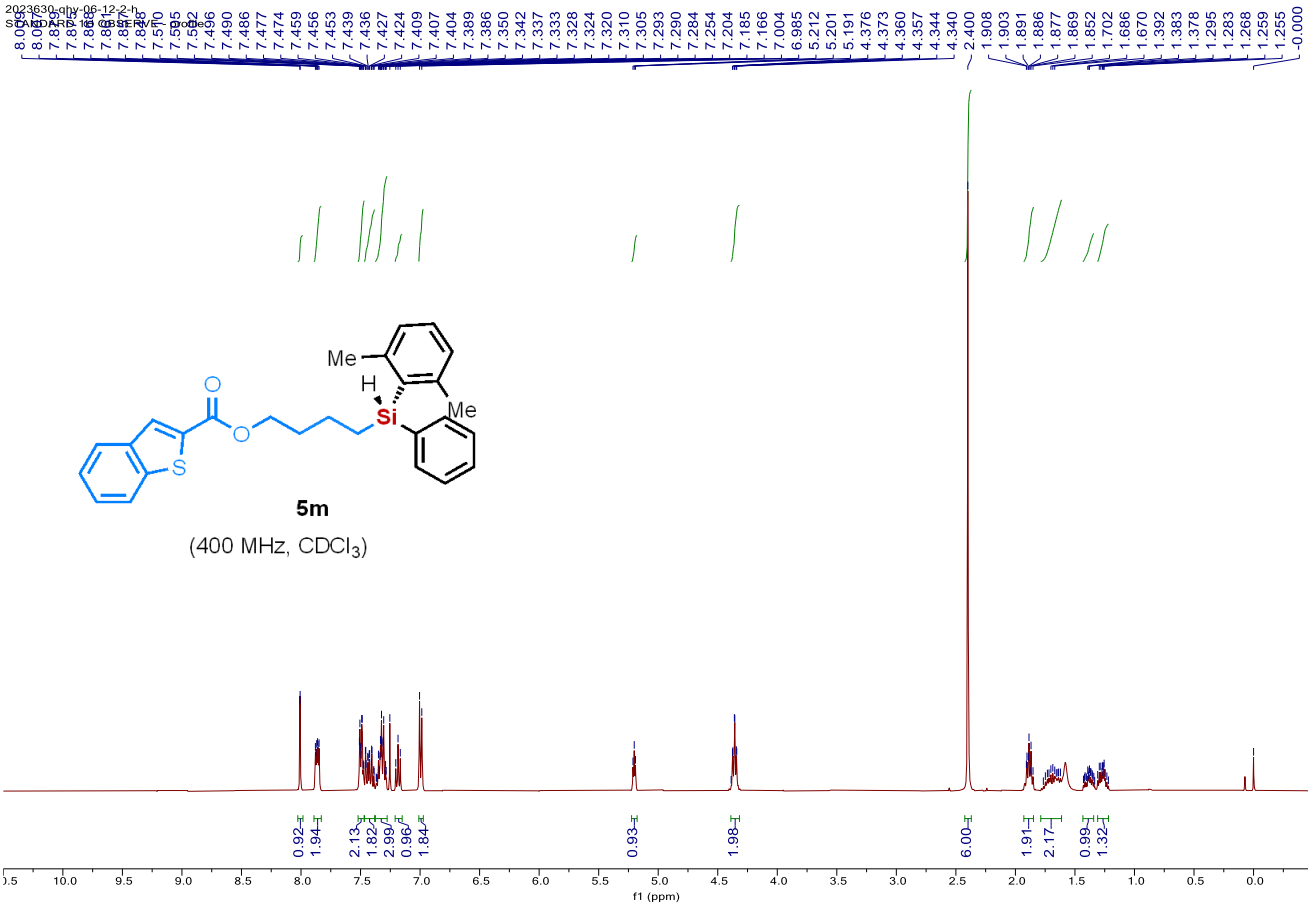


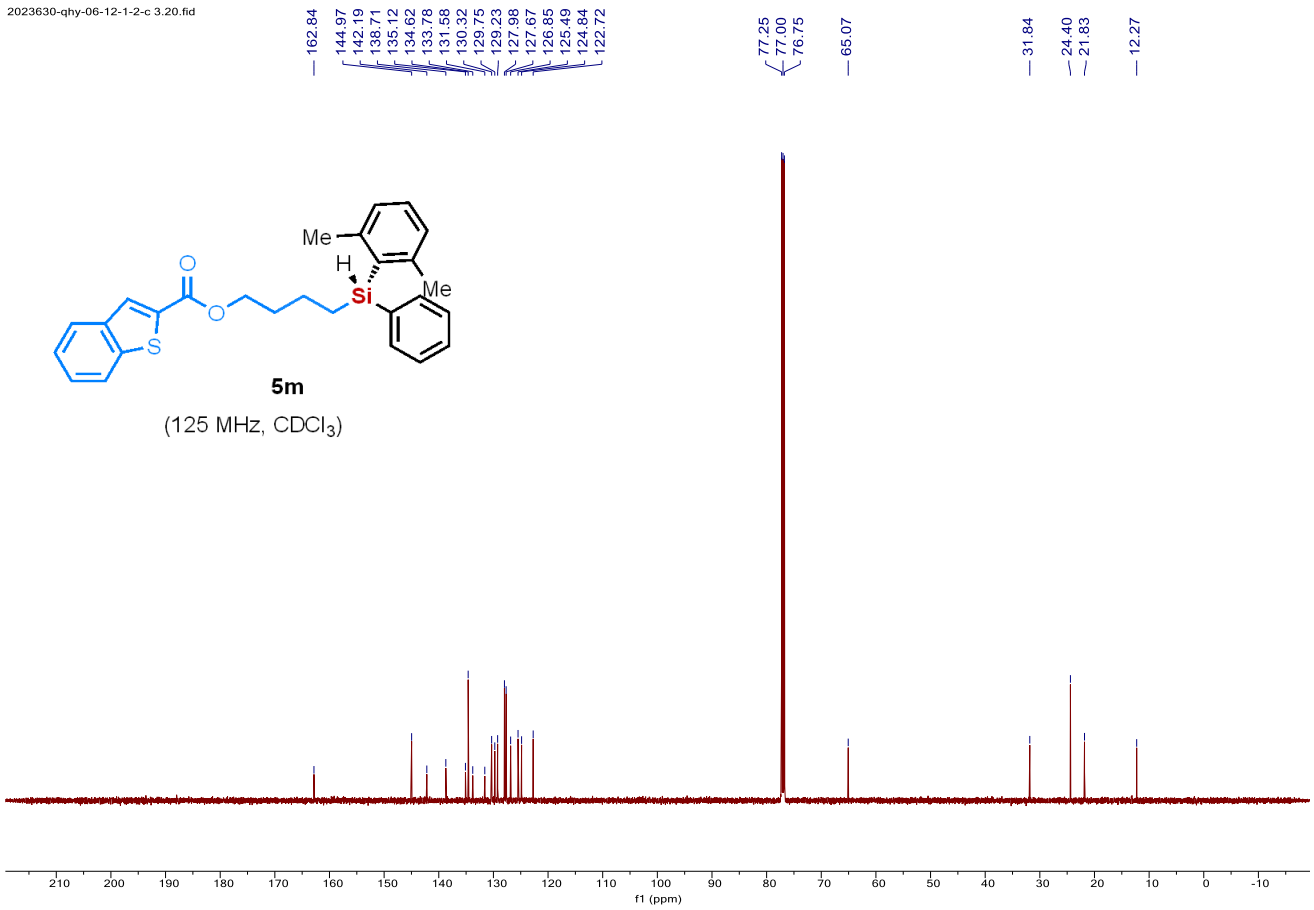
5l

(400 MHz, $CDCl_3$)



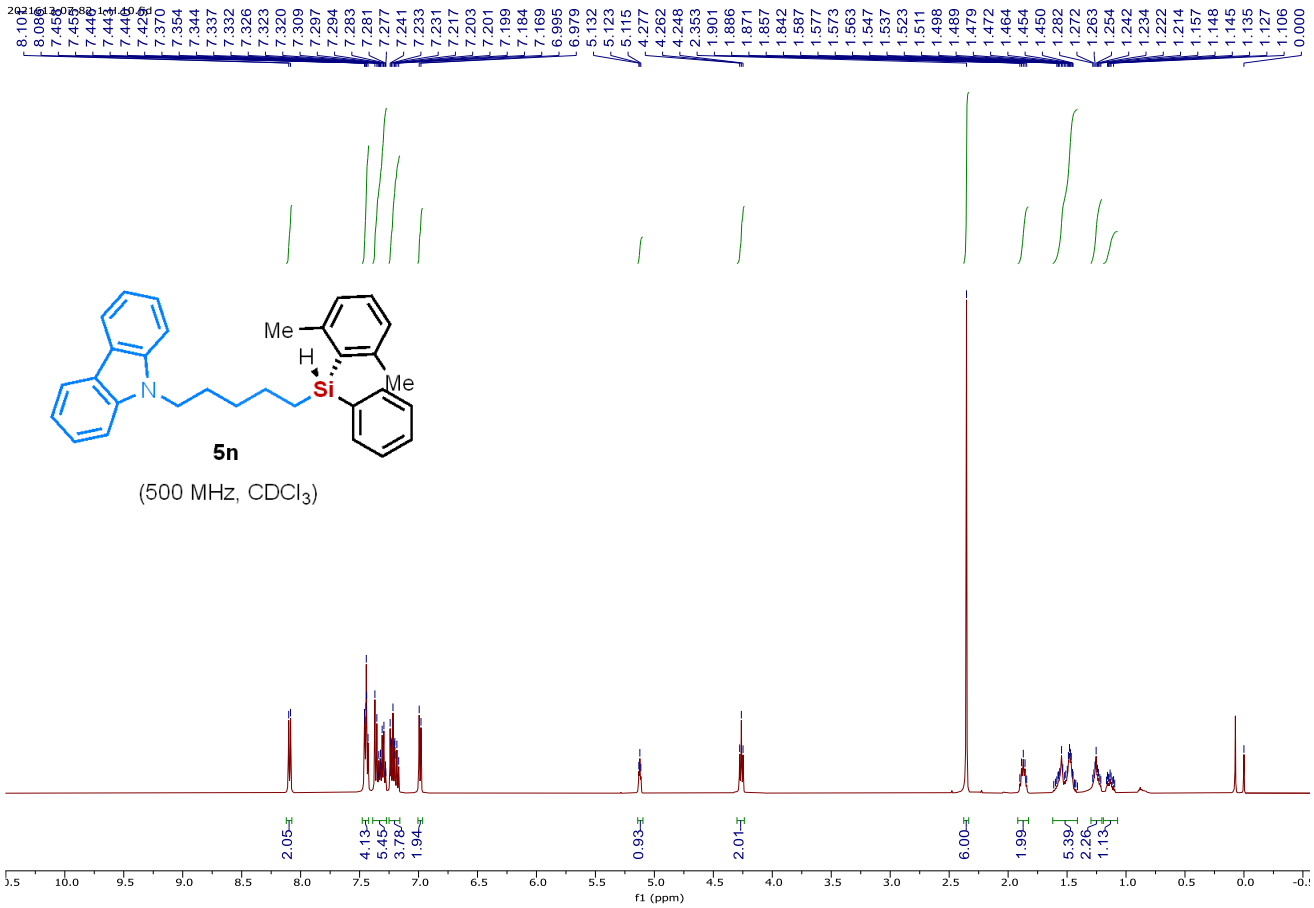

2021267-qhy-07-91-1-c.10.fid
171.72
144.93
135.32
134.61
131.81
129.70
129.16
127.95
127.64
77.25
77.00
76.75
71.41
71.15
70.06
69.67
64.21
29.68
28.59
25.17
24.40
12.75
Me
H
Si
Me
Fe
O
O
5l
(125 MHz, CDCl3)
f1 (ppm)


Me
H
Si
Me
O
O
S
5m
(400 MHz, CDCl3)
0.92
1.94
2.13
1.82
2.99
0.96
1.84
0.93
1.98
6.00
1.91
2.17
0.99
1.32
f1 (ppm)



5m

(125 MHz, $CDCl_3$)

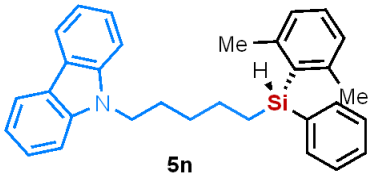


5n

(500 MHz, $CDCl_3$)

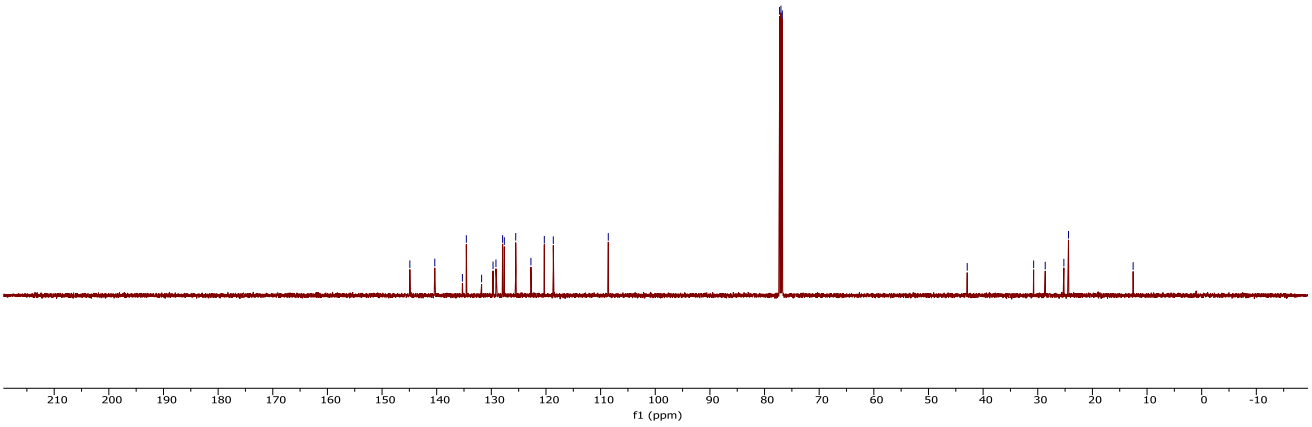
2021613-07-82-1-C.10.fid

144.91
140.35
135.30
134.58
131.78
129.69
129.15
127.94
127.62
125.54
122.75
120.30
118.66
108.60
77.25
77.00
76.75
42.91
30.76
28.63
25.22
24.38
12.55



5n

(125 MHz, $CDCl_3$)

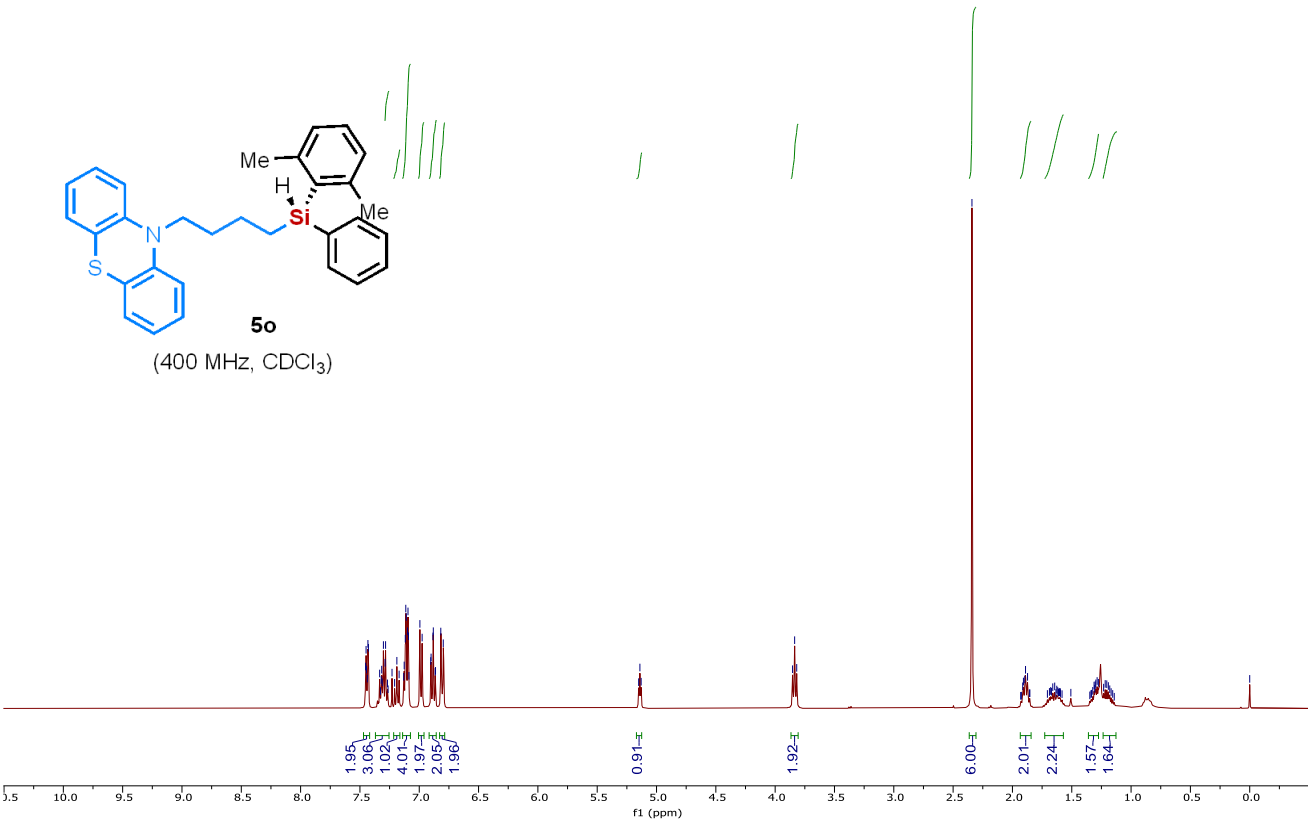


qhy-08-7-1-1h.4.fid

7.452
7.448
7.445
7.438
7.433
7.428
7.334
7.327
7.321
7.316
7.312
7.302
7.288
7.284
7.268
7.263
7.229
7.207
7.189
7.170
7.131
7.127
7.118
7.113
7.109
7.099
7.095
7.091
7.087
6.995
6.976
6.903
6.900
6.884
6.882
6.866
6.863
6.818
6.798
5.151
5.140
5.130
3.853
3.836
3.818
2.341
1.913
1.907
1.896
1.890
1.873
1.688
1.678
1.671
1.660
1.644
1.626
1.618
1.607
1.603
1.598
1.323
1.312
1.307
1.302
1.297
1.286
1.275
1.231
1.218
1.205
1.192
1.180
1.168
-0.000

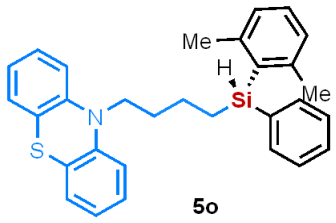
5o

(400 MHz, $CDCl_3$)



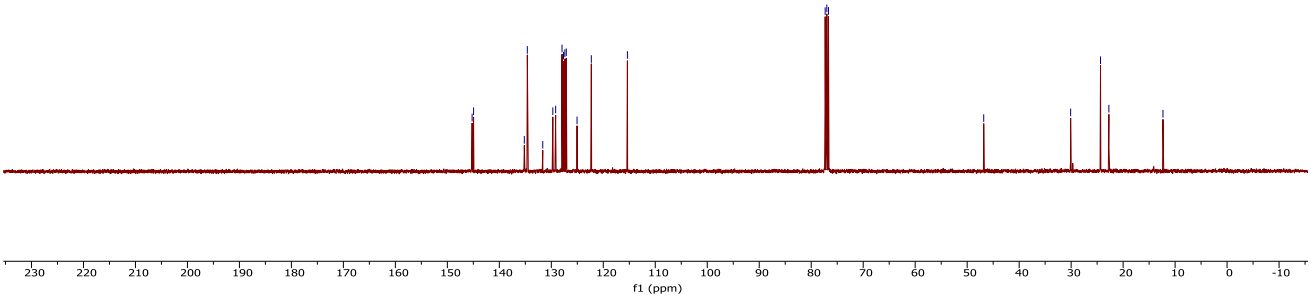
qhy-08-7-1-1.1.fid

145.23
144.95
135.19
134.61
131.64
129.71
129.16
127.94
127.65
127.40
127.12
125.05
122.30
115.36
77.32
77.00
76.68
46.82
30.10
24.35
22.74
12.34



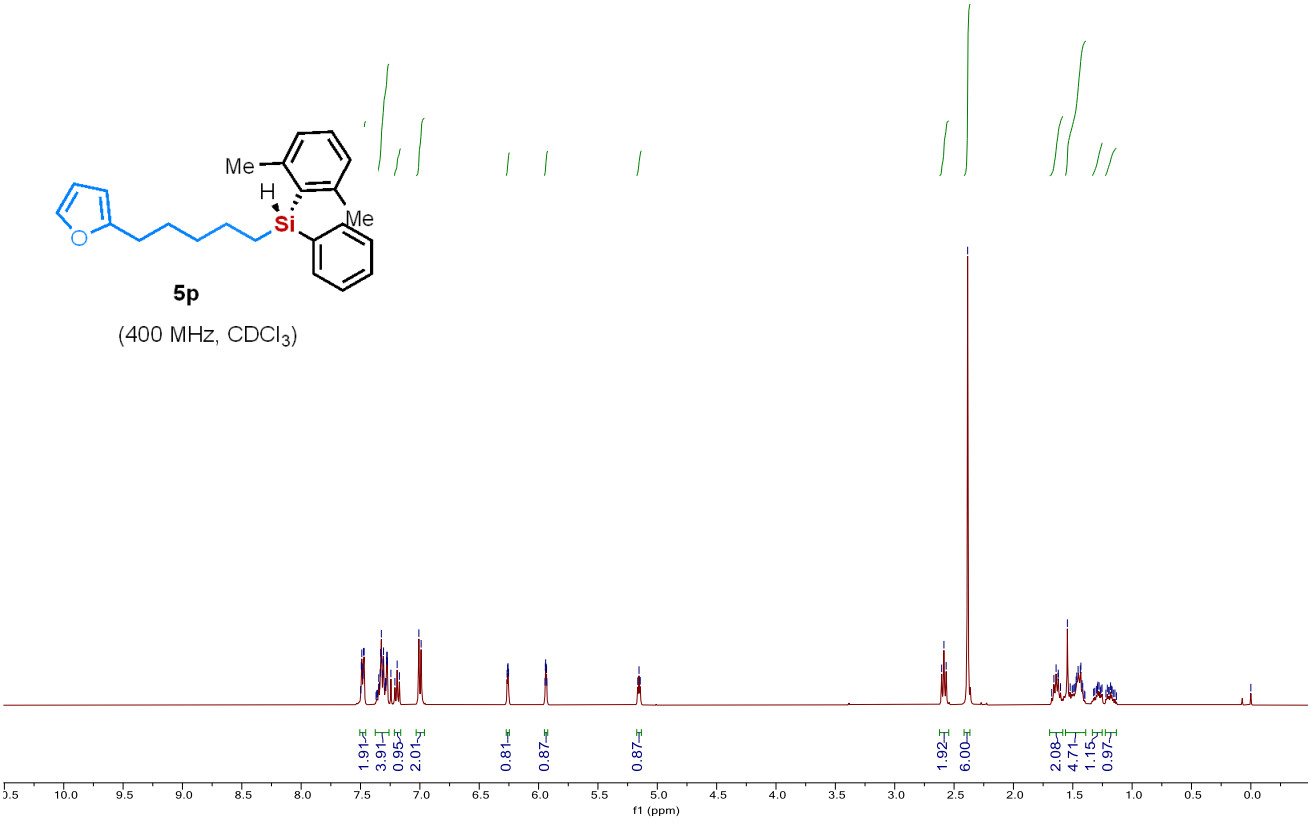
5o

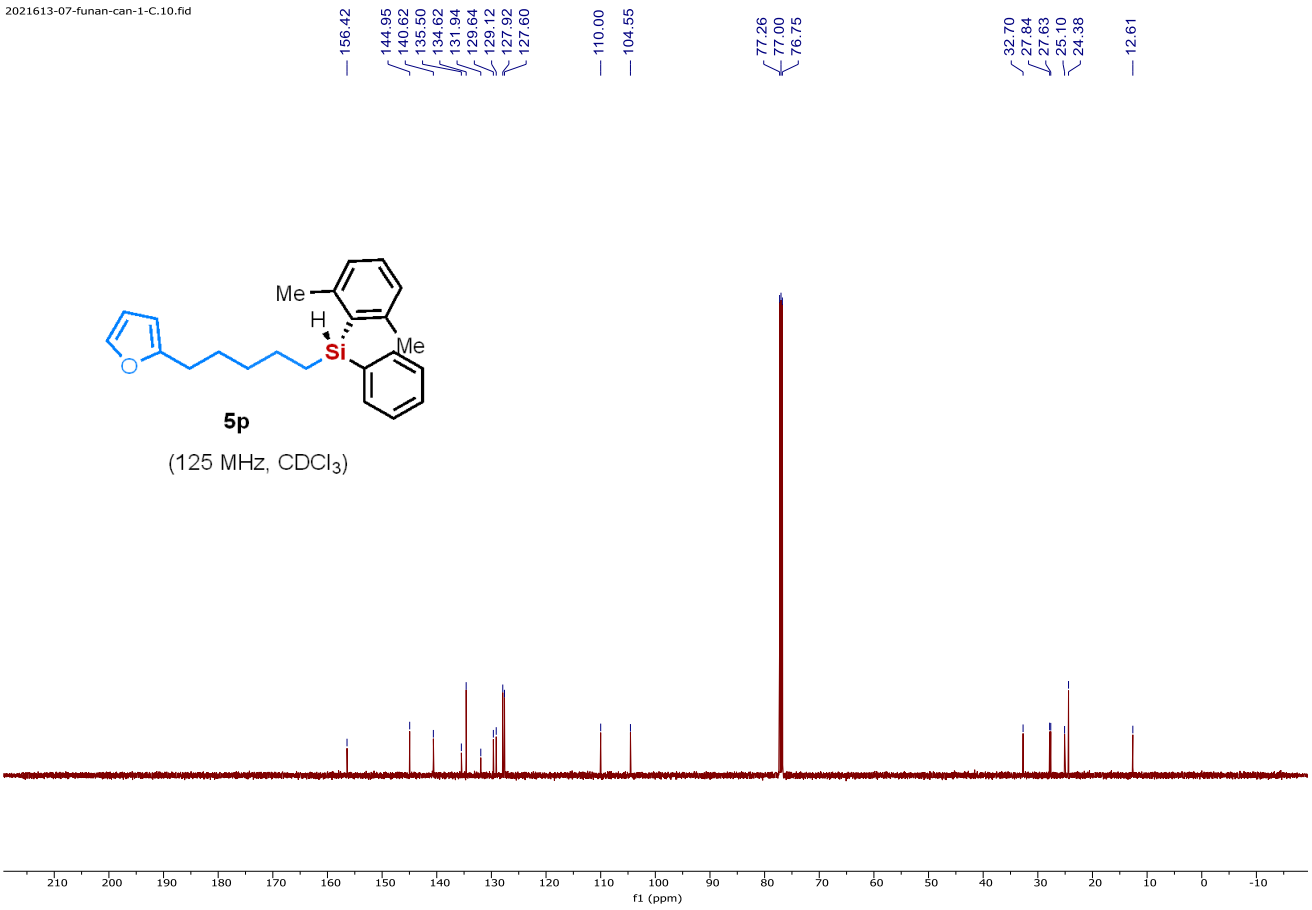
(100 MHz, $CDCl_3$)



5p

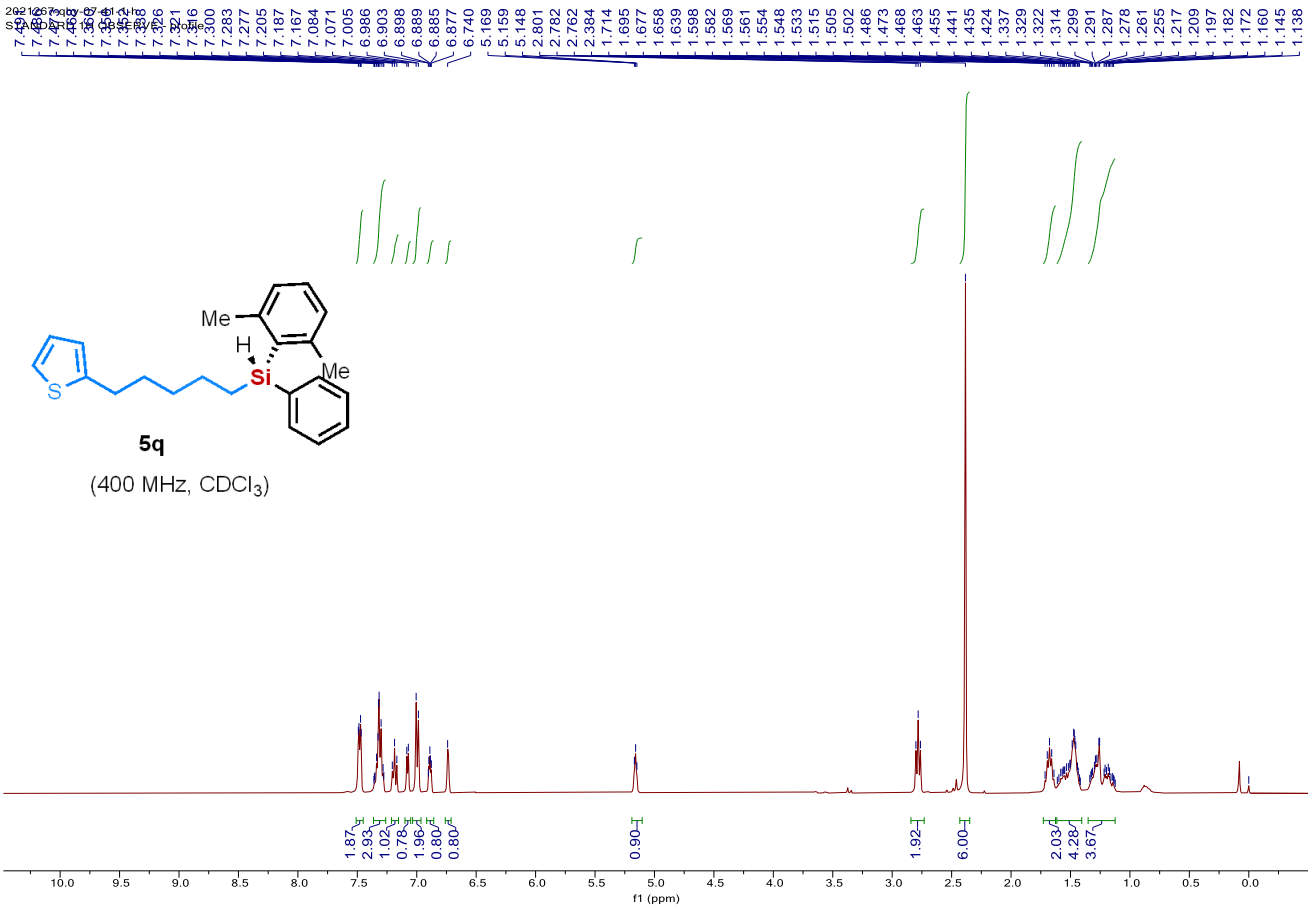
(400 MHz, $CDCl_3$)





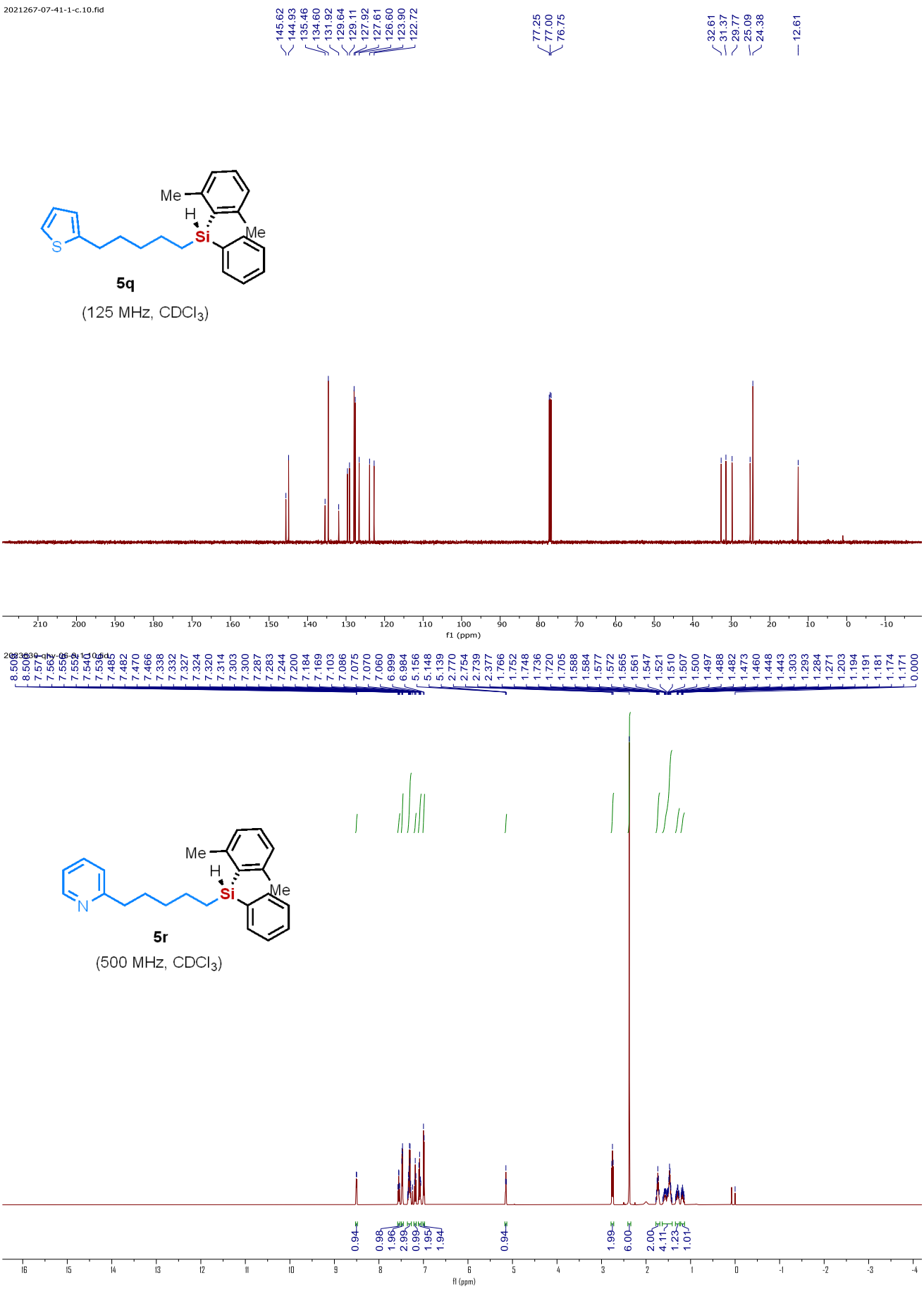
5p

(125 MHz, $CDCl_3$)



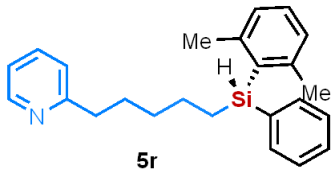
5q

(400 MHz, $CDCl_3$)


2021267-07-41-1-c.10.fid
145.62
144.93
135.46
134.60
131.92
129.64
129.11
127.92
127.61
126.60
123.90
122.72
77.25
77.00
76.75
32.61
31.37
29.77
25.09
24.38
12.61
Me
H
Si
Me
S
5q
(125 MHz, CDCl3)
f1 (ppm)
Me
H
Si
Me
N
5r
(500 MHz, CDCl3)
f1 (ppm)

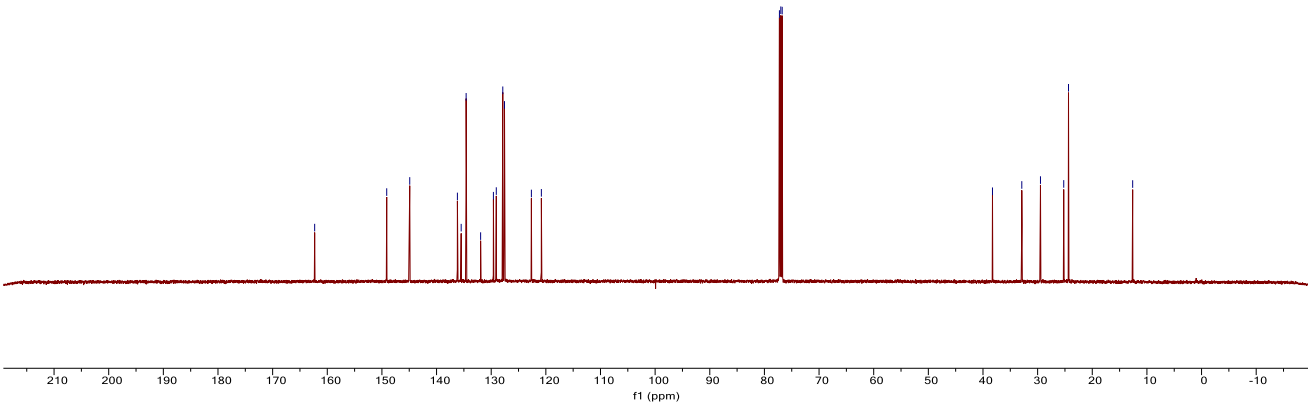
2023630-qhy-06-9-1-c 2.10.fid

162.31
149.12
144.91
136.18
135.50
134.59
131.94
129.59
129.07
127.88
127.57
122.64
120.82
77.25
77.00
76.74
38.26
32.90
29.48
25.22
24.35
12.61



5r

(125 MHz, $CDCl_3$)



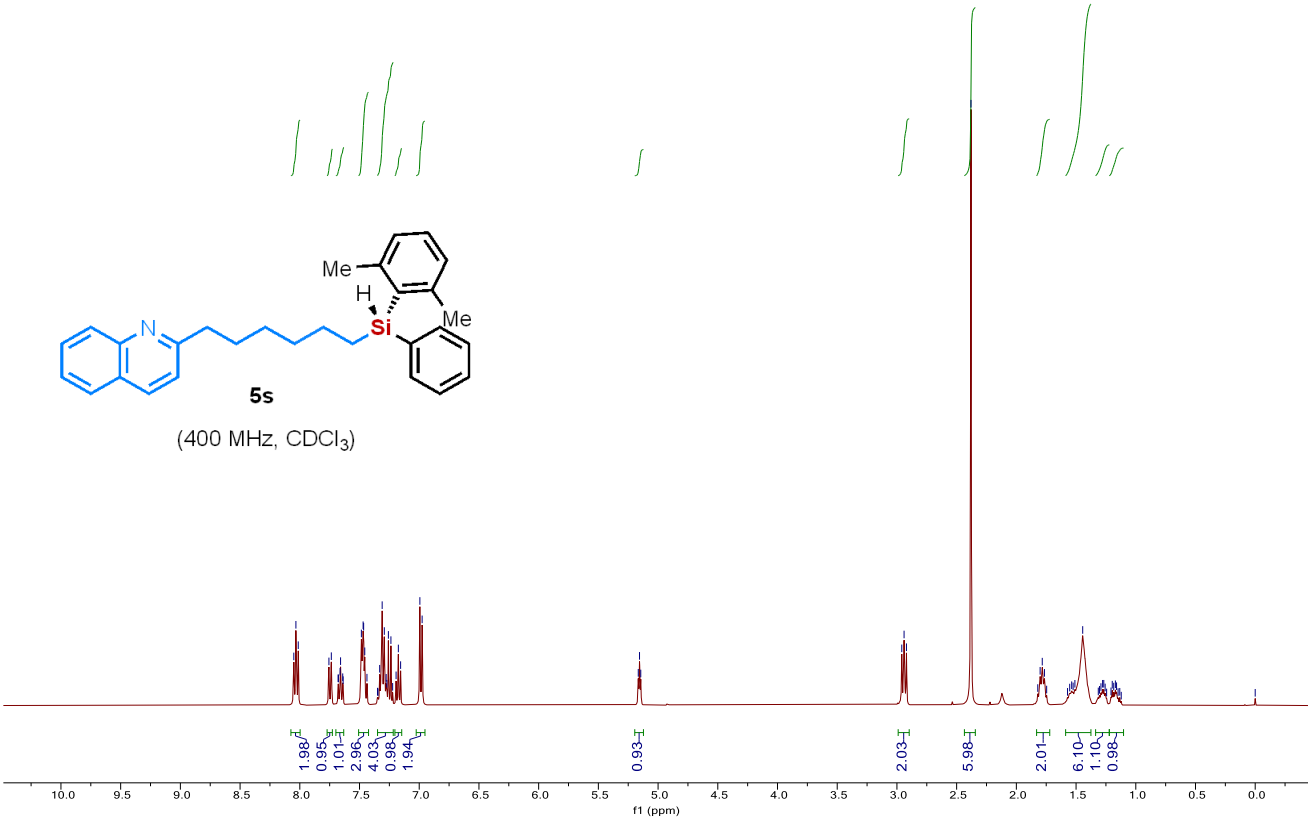
wyc-II-03-69-c1-3.1.fid

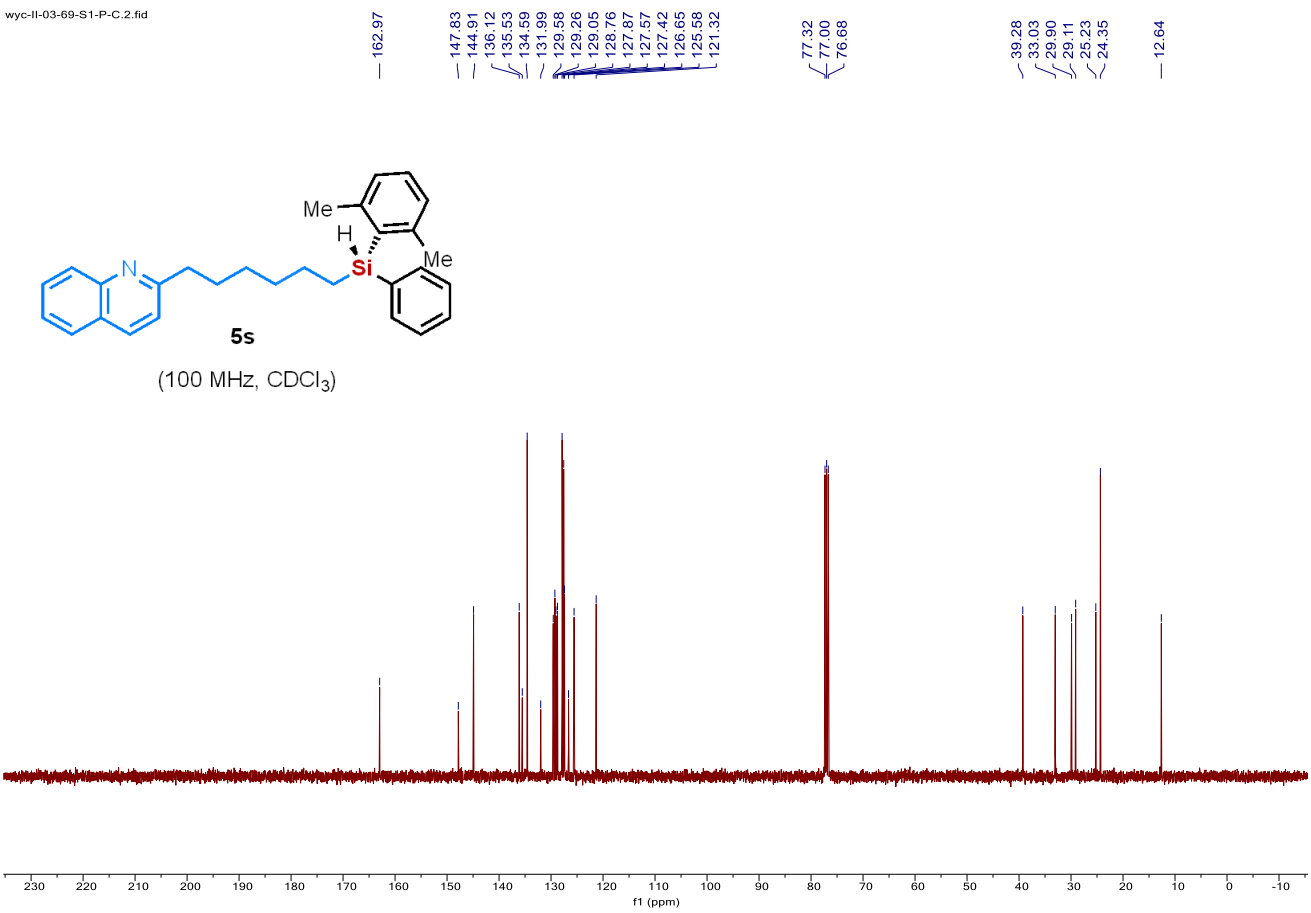
8.056
8.033
8.013
7.756
7.736
7.679
7.677
7.663
7.659
7.641
7.637
7.484
7.470
7.465
7.456
7.438
7.349
7.345
7.331
7.310
7.292
7.277
7.271
7.258
7.237
7.223
7.194
7.175
7.156
6.995
6.976
5.166
5.155
5.145

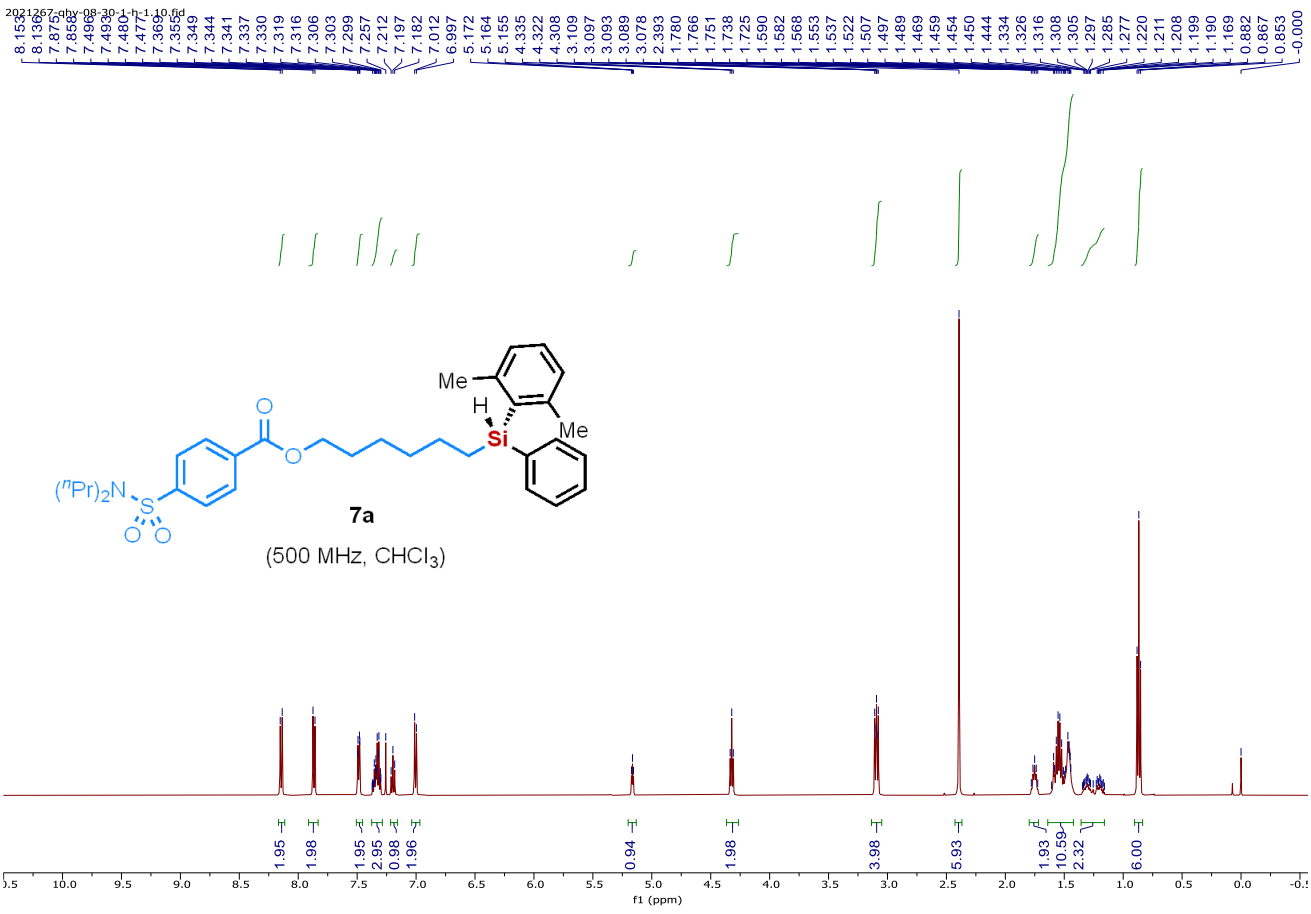
2.959
2.940
2.920
2.380
1.821
1.801
1.783
1.765
1.746
1.572
1.553
1.537
1.525
1.510
1.444
1.314
1.303
1.292
1.278
1.268
1.257
1.244
1.207
1.197
1.185
1.171
1.161
1.148
1.134
1.122
0.000

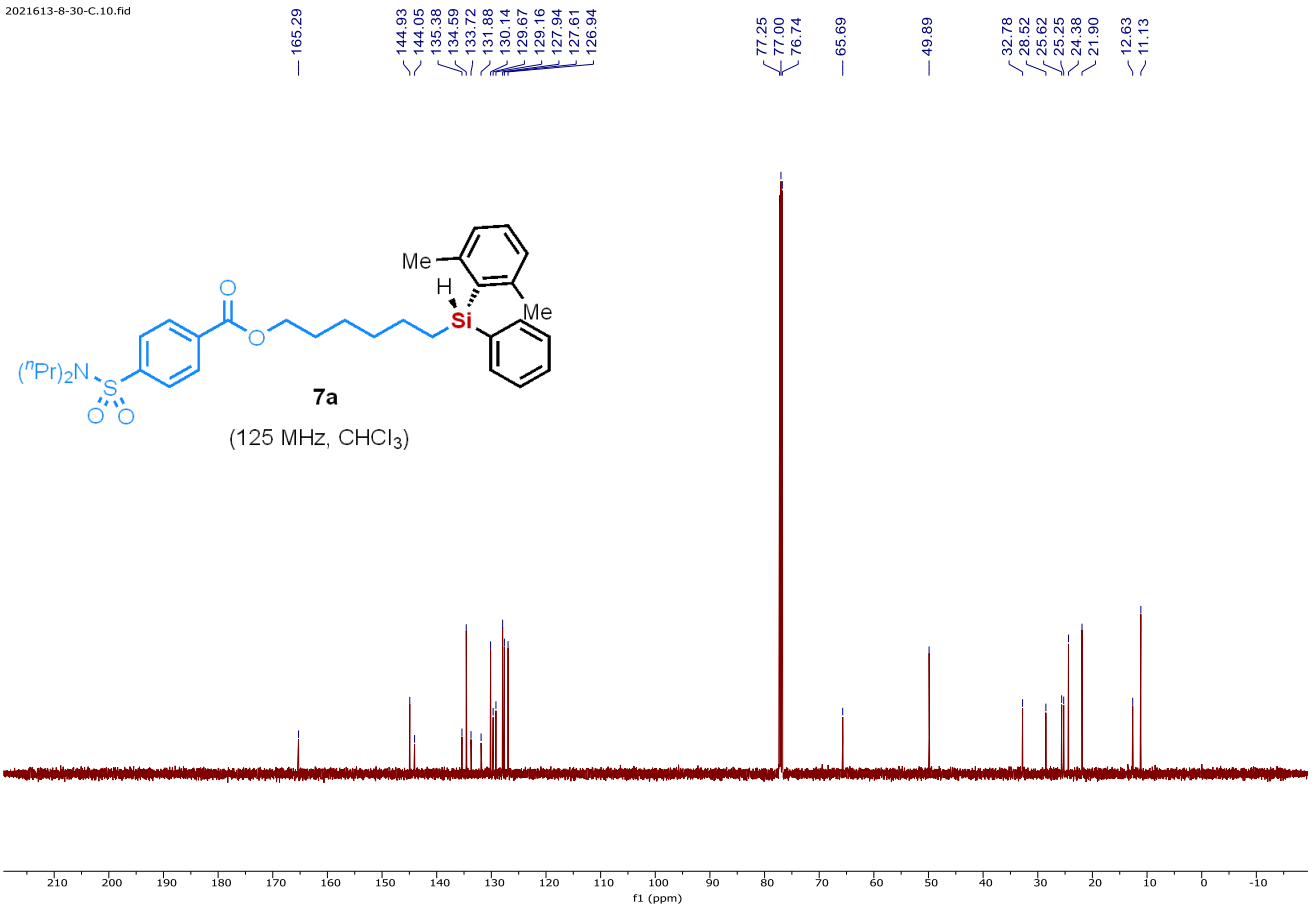
5s

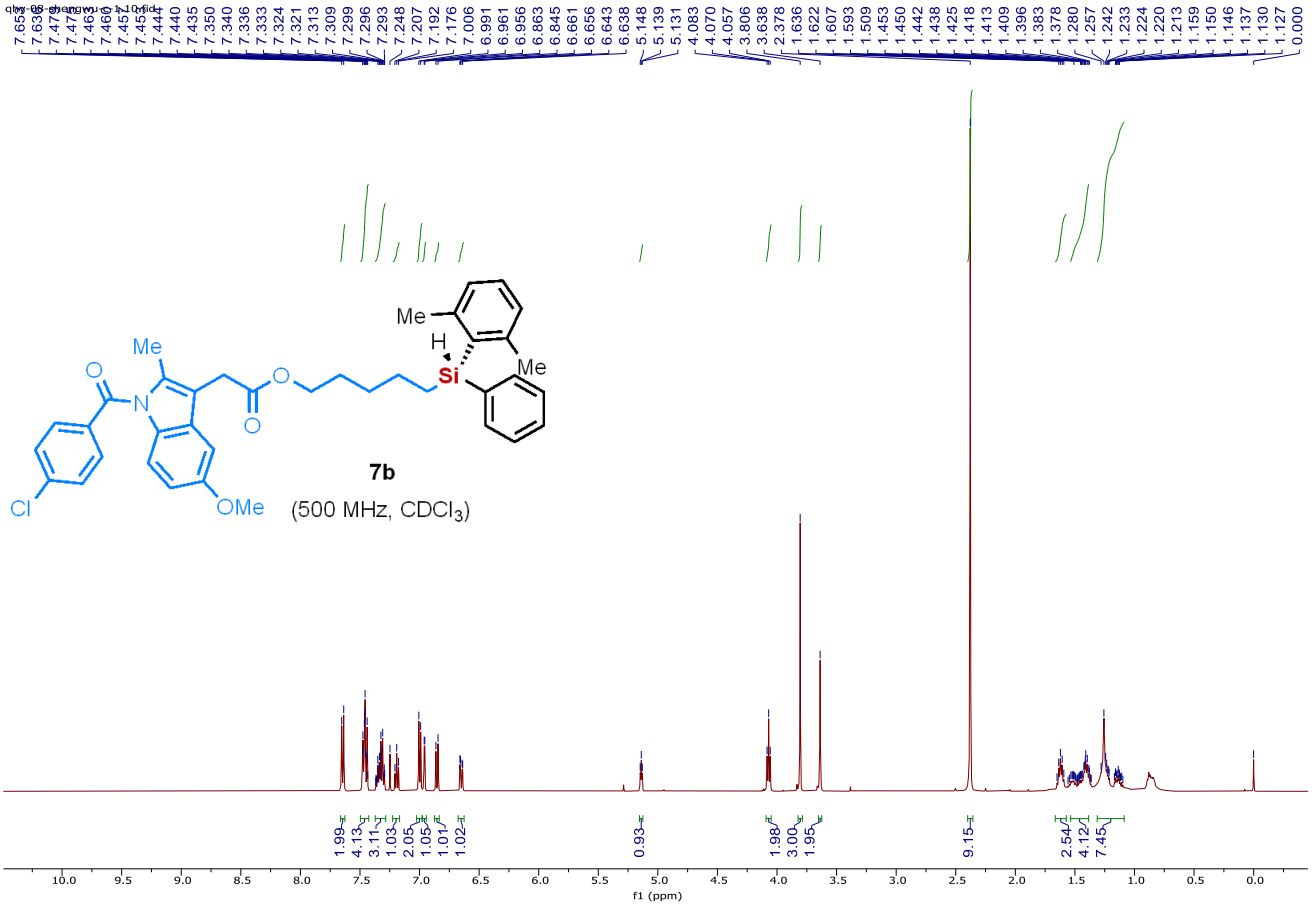
(400 MHz, $CDCl_3$)

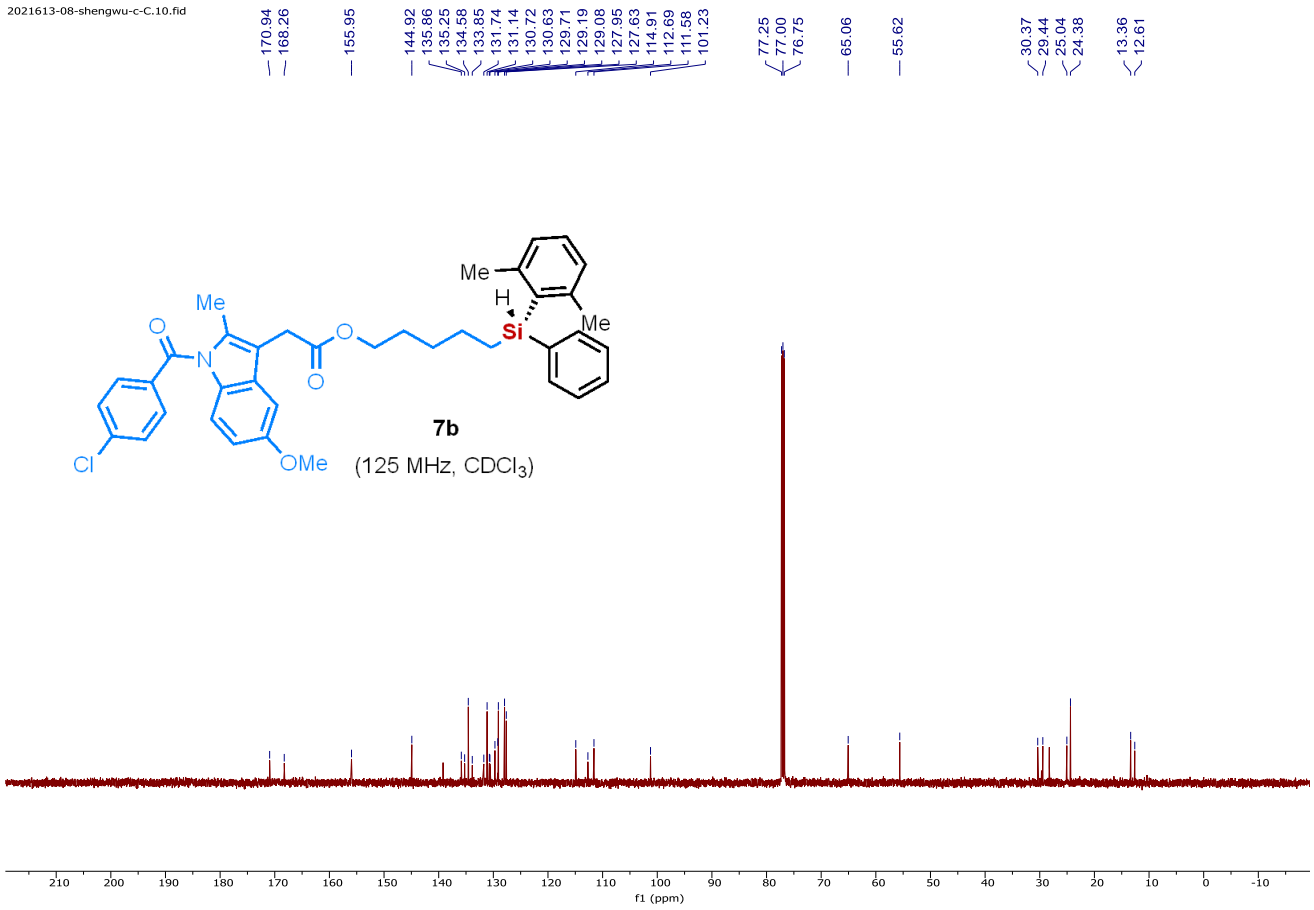


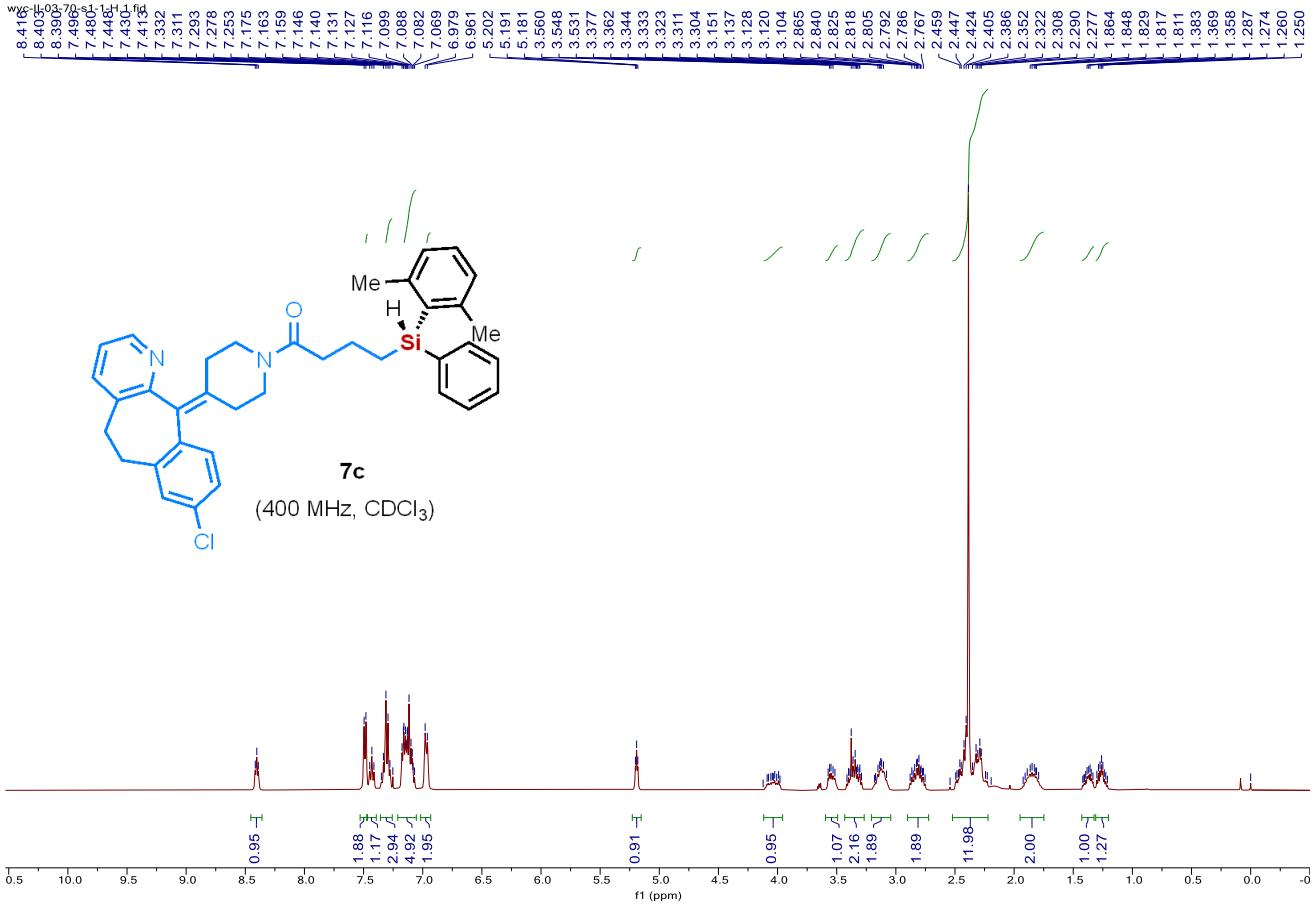

wyc-II-03-69-S1-P-C.2.fid
Me
H
Si
Me
N
5s
(100 MHz, CDCl3)
f1 (ppm)


2021267-chy-08-30-1-h-1.10.fid
Me
H
Si
Me
(nPr)2N
S
O
O
7a
(500 MHz, CHCl3)
f1 (ppm)


2021613-8-30-C.10.fid
165.29
144.93
144.05
135.38
134.59
133.72
131.88
130.14
129.67
129.16
127.94
127.61
126.94
77.25
77.00
76.74
65.69
49.89
32.78
28.52
25.62
25.25
24.38
21.90
12.63
11.13
Me
H
Si
Me
$(^nPr)_2N$
S
O
O
O
O
7a
(125 MHz, $CHCl_3$)
f1 (ppm)

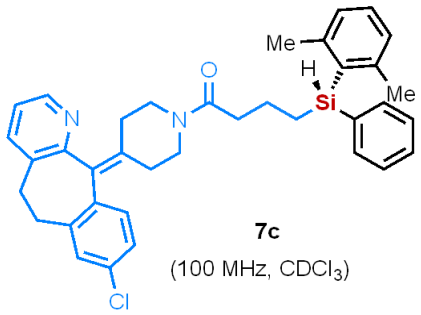

Me
H
Si
Me
Me
N
O
O
O
O
Cl
OMe
7b
(500 MHz, $CDCl_3$)
1.99
4.13
3.11
1.03
2.05
1.05
1.01
1.02
0.93
1.98
3.00
1.95
9.15
2.54
4.12
7.45
f1 (ppm)


2021613-08-shengwu-c-C.10.fid
170.94
168.26
155.95
144.92
135.86
135.25
134.58
133.85
131.74
131.14
130.72
130.63
129.71
129.19
129.08
127.95
127.63
114.91
112.69
111.58
101.23
77.25
77.00
76.75
65.06
55.62
30.37
29.44
25.04
24.38
13.36
12.61
Me
H
Si
Me
Me
O
N
O
O
Cl
OMe
7b
(125 MHz, CDCl3)
f1 (ppm)


wwc-ll-03-70-s1-1-H-1.fid
8.416
8.403
8.390
7.496
7.480
7.448
7.430
7.413
7.332
7.311
7.293
7.278
7.253
7.175
7.163
7.159
7.146
7.140
7.131
7.127
7.116
7.099
7.088
7.082
7.069
6.979
6.961
5.202
5.191
5.181
3.560
3.548
3.531
3.377
3.362
3.344
3.333
3.323
3.311
3.304
3.151
3.137
3.128
3.120
3.104
2.865
2.840
2.825
2.818
2.805
2.792
2.786
2.767
2.459
2.447
2.424
2.405
2.386
2.352
2.322
2.308
2.290
2.277
1.864
1.848
1.829
1.817
1.811
1.383
1.369
1.358
1.287
1.274
1.260
1.250
Me
H
Si
Me
O
N
N
Cl
7c
(400 MHz, CDCl3)
0.95
1.88
1.17
2.94
4.92
1.95
0.91
0.95
1.07
2.16
1.89
1.89
11.98
2.00
1.00
1.27
f1 (ppm)

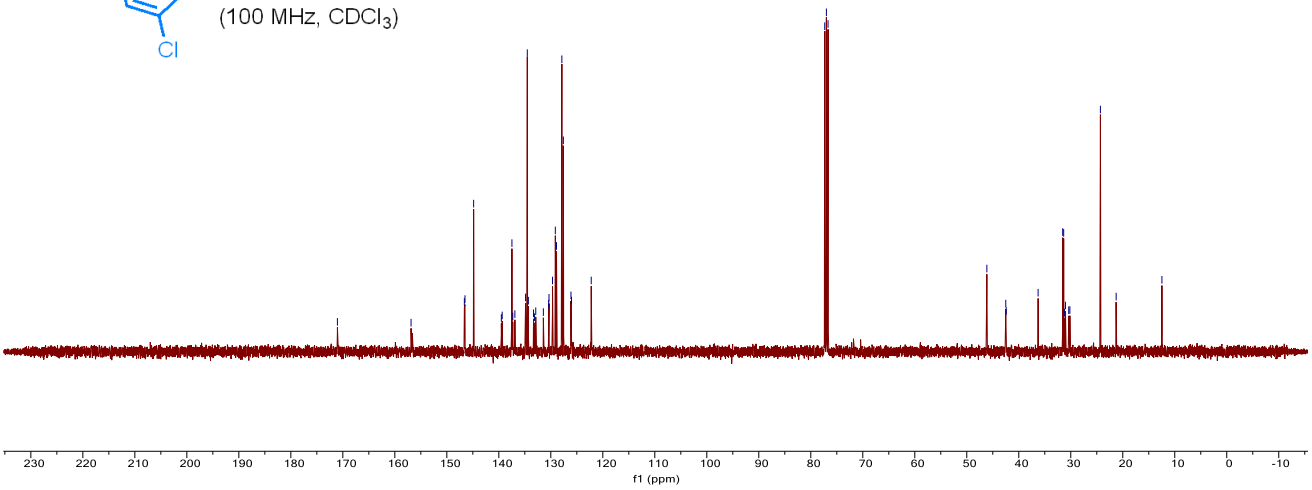
wyc-II-03-70-s1-1-C2.2.fid

171.04
156.88
146.63
146.50
144.84
139.51
139.35
137.48
137.31
136.91
134.86
134.52
134.32
133.32
133.15
132.89
131.43
130.41
130.35
129.67
129.13
128.91
127.87
127.59
126.12
126.02
122.23
77.32
77.00
76.68
46.14
42.50
42.41
36.28
31.56
31.36
31.22
31.02
30.39
30.17
24.30
21.27
12.47



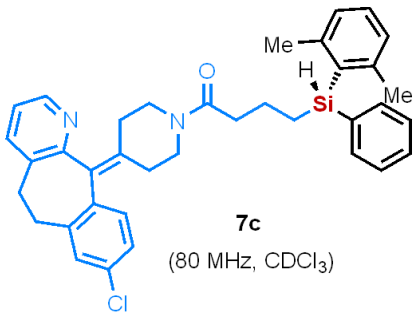
7c

(100 MHz, $CDCl_3$)



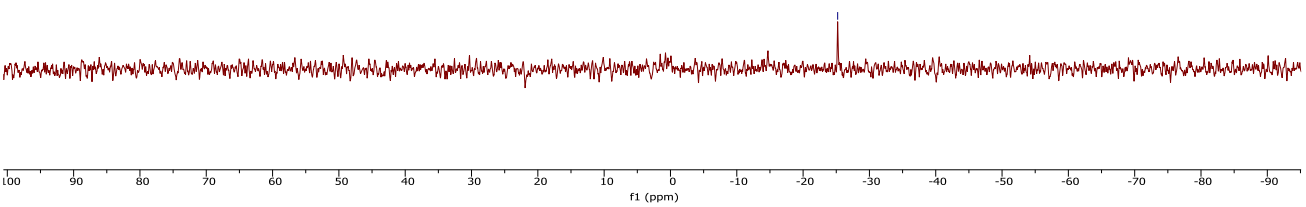
wyc-II-03-70-P-Si-b.1.fid

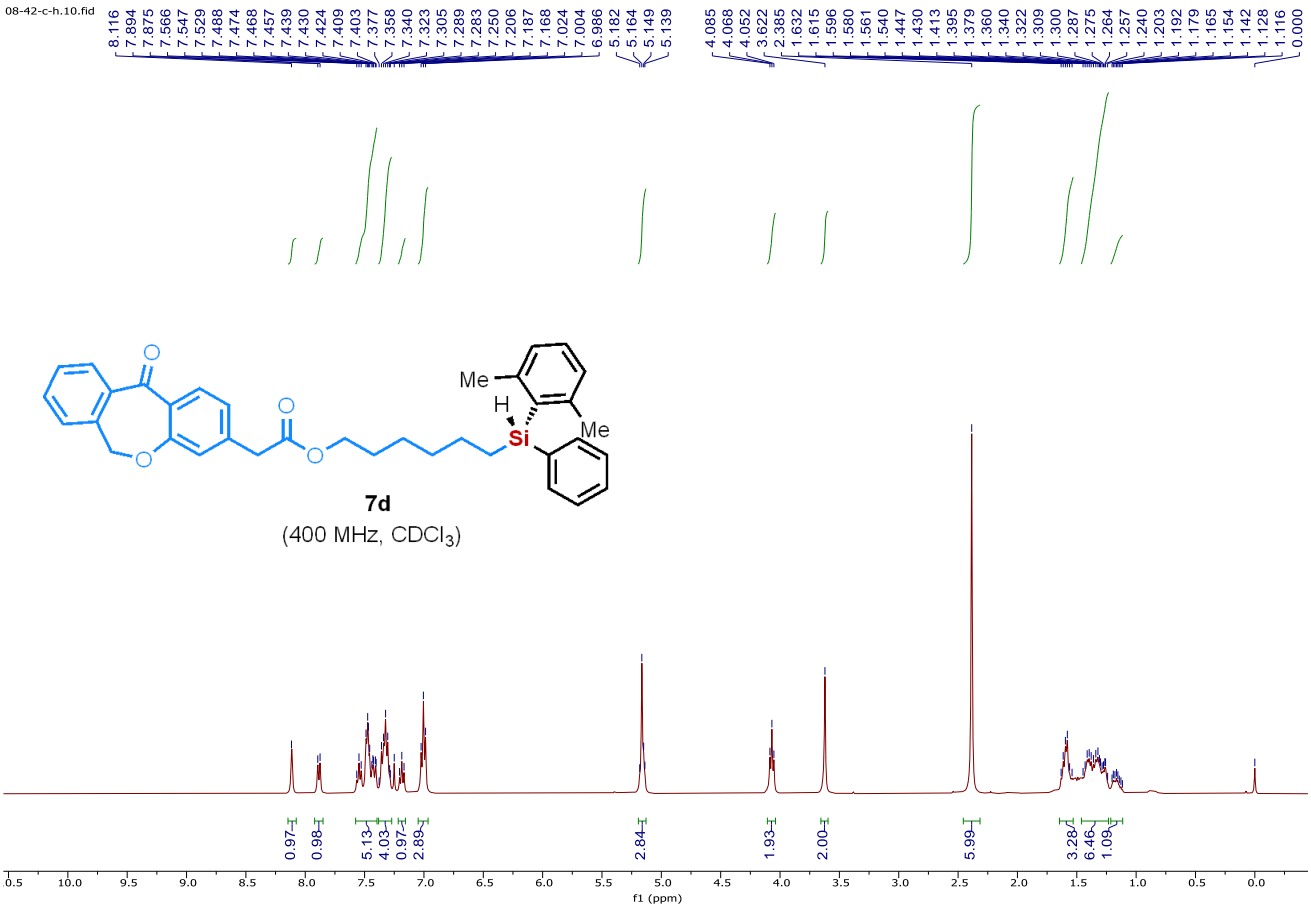
-25.213

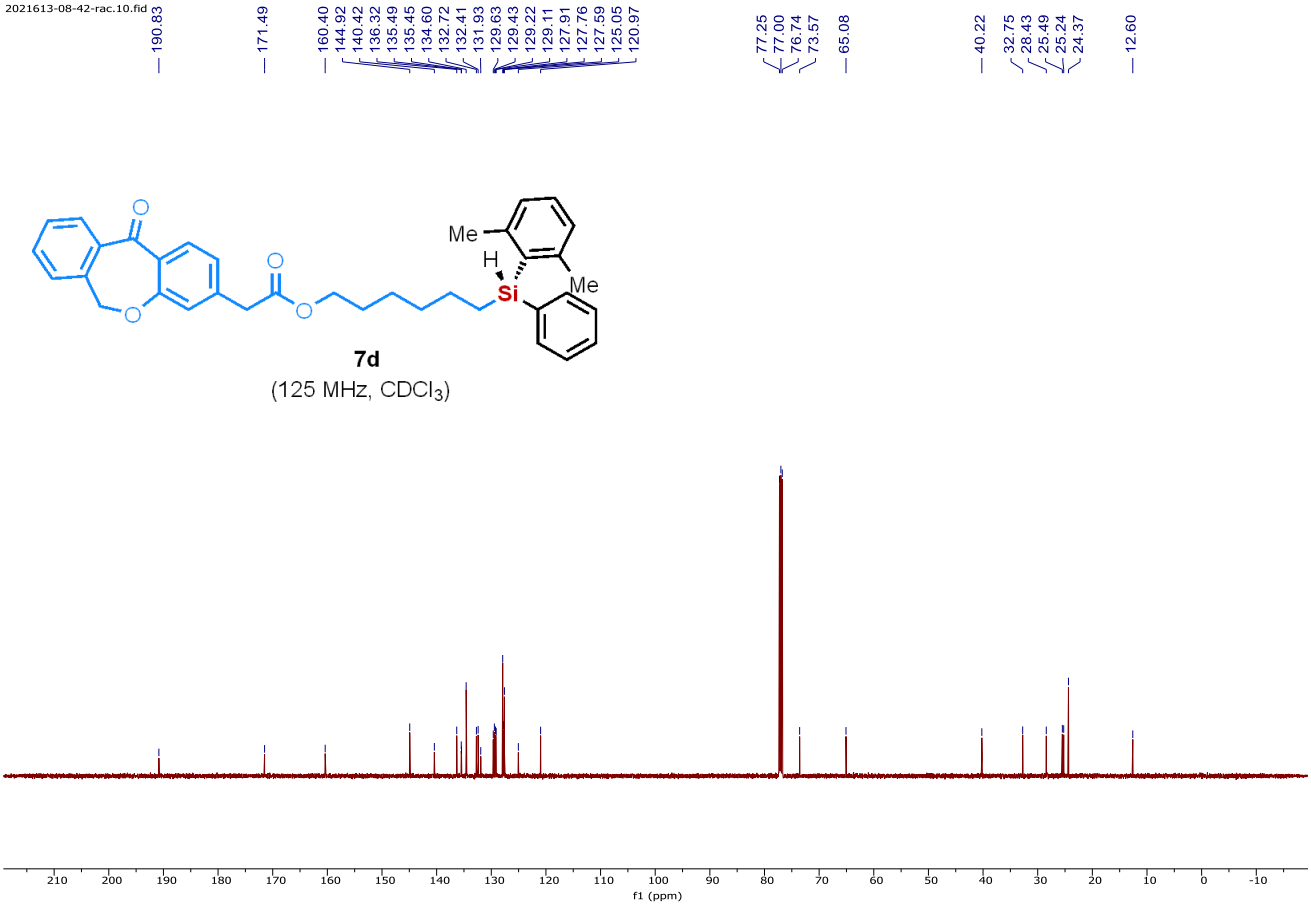


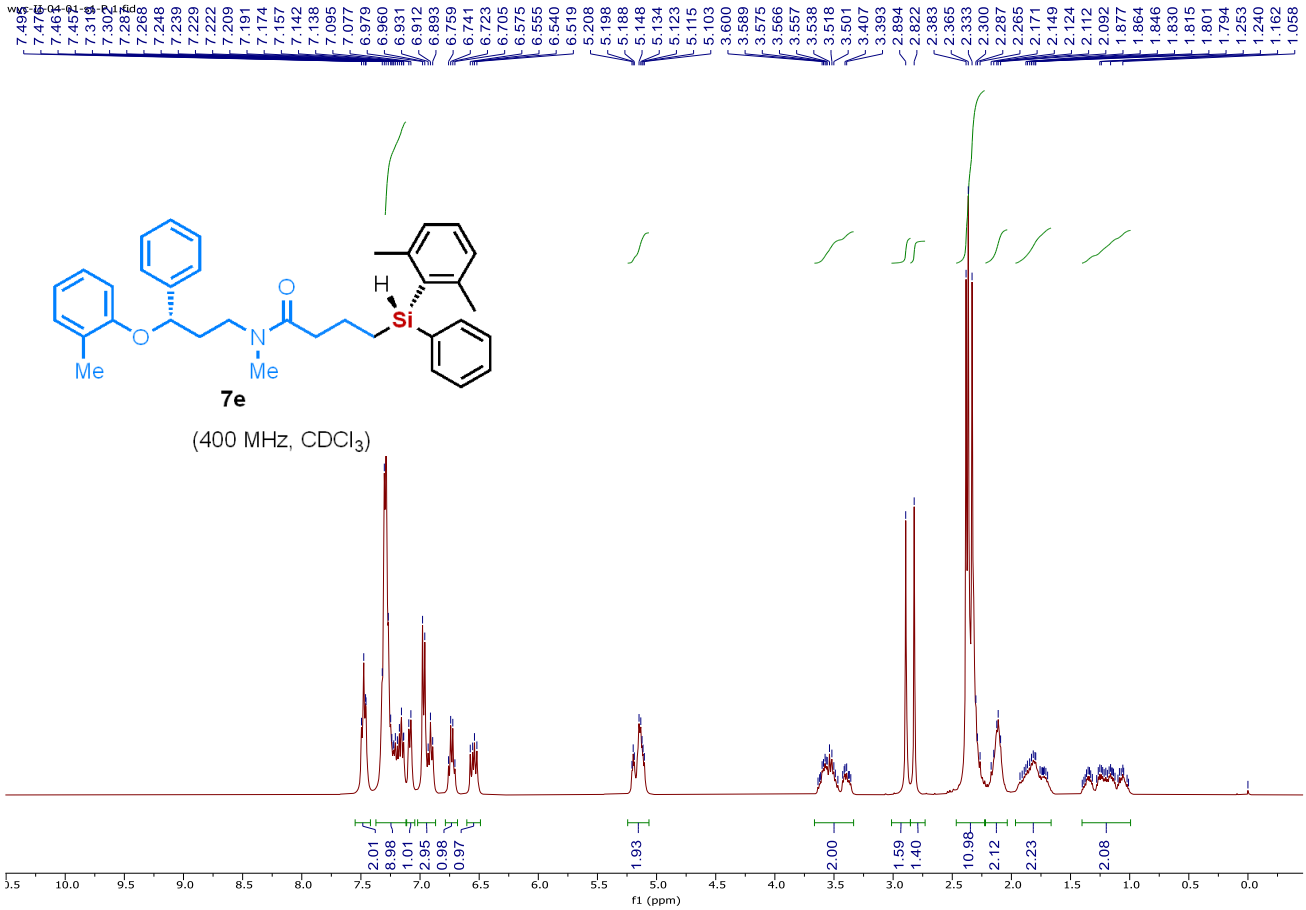
7c

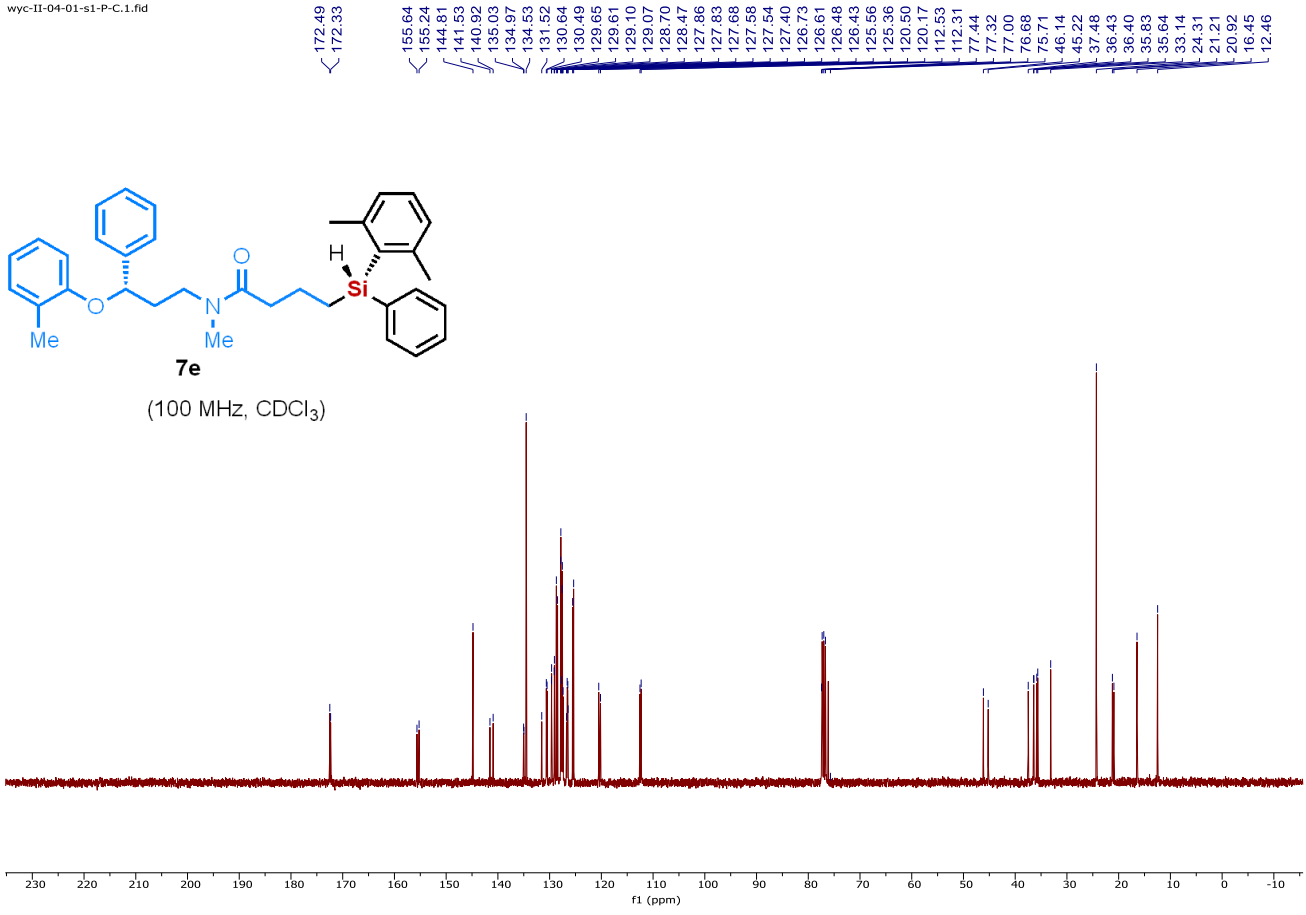
(80 MHz, $CDCl_3$)

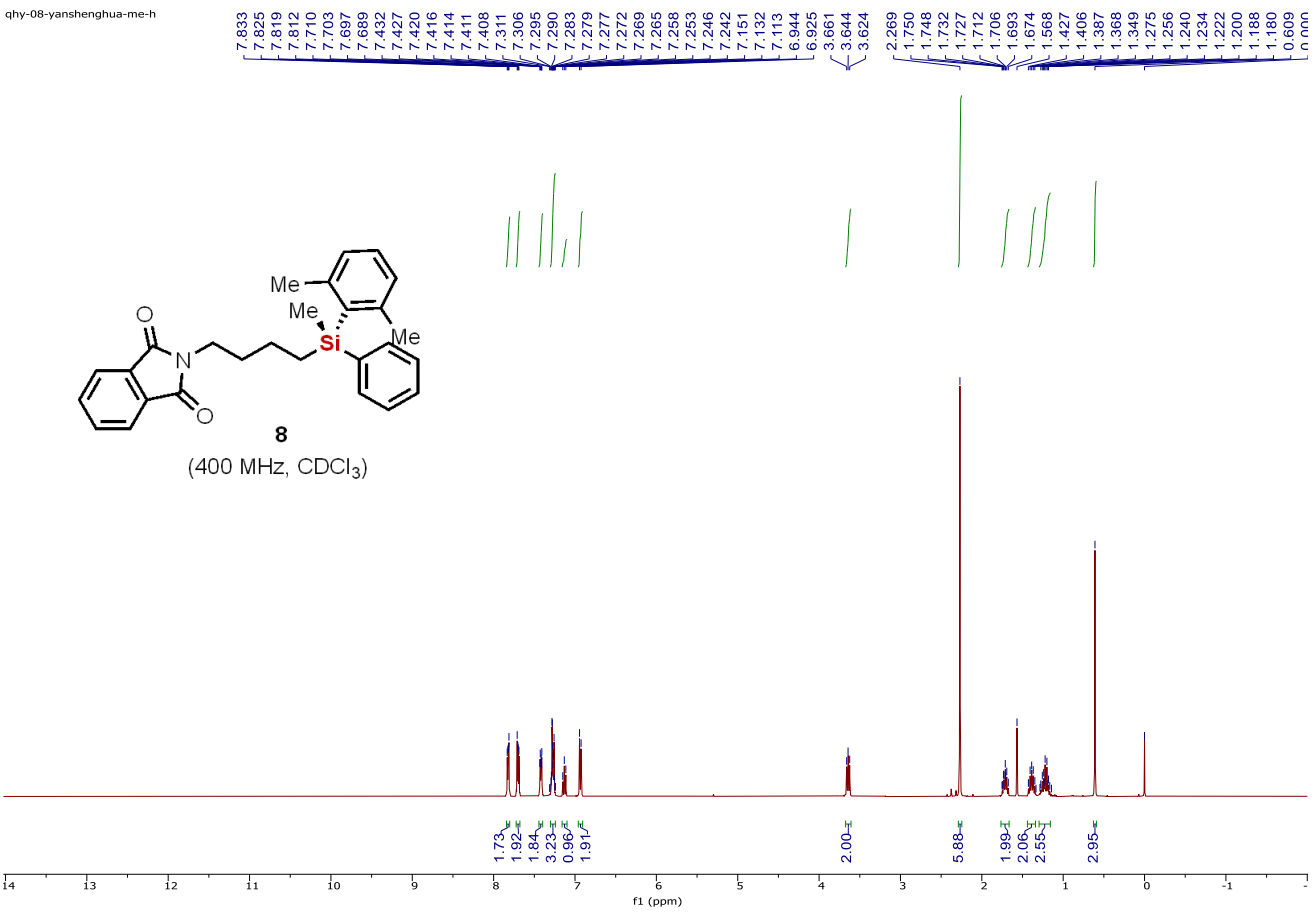



08-42-c-h.10.fid
Me
H
Si
Me
7d
(400 MHz, CDCl3)
f1 (ppm)


2021613-08-42-rac.10.fid
Me
H
Si
Me
7d
(125 MHz, CDCl3)
f1 (ppm)

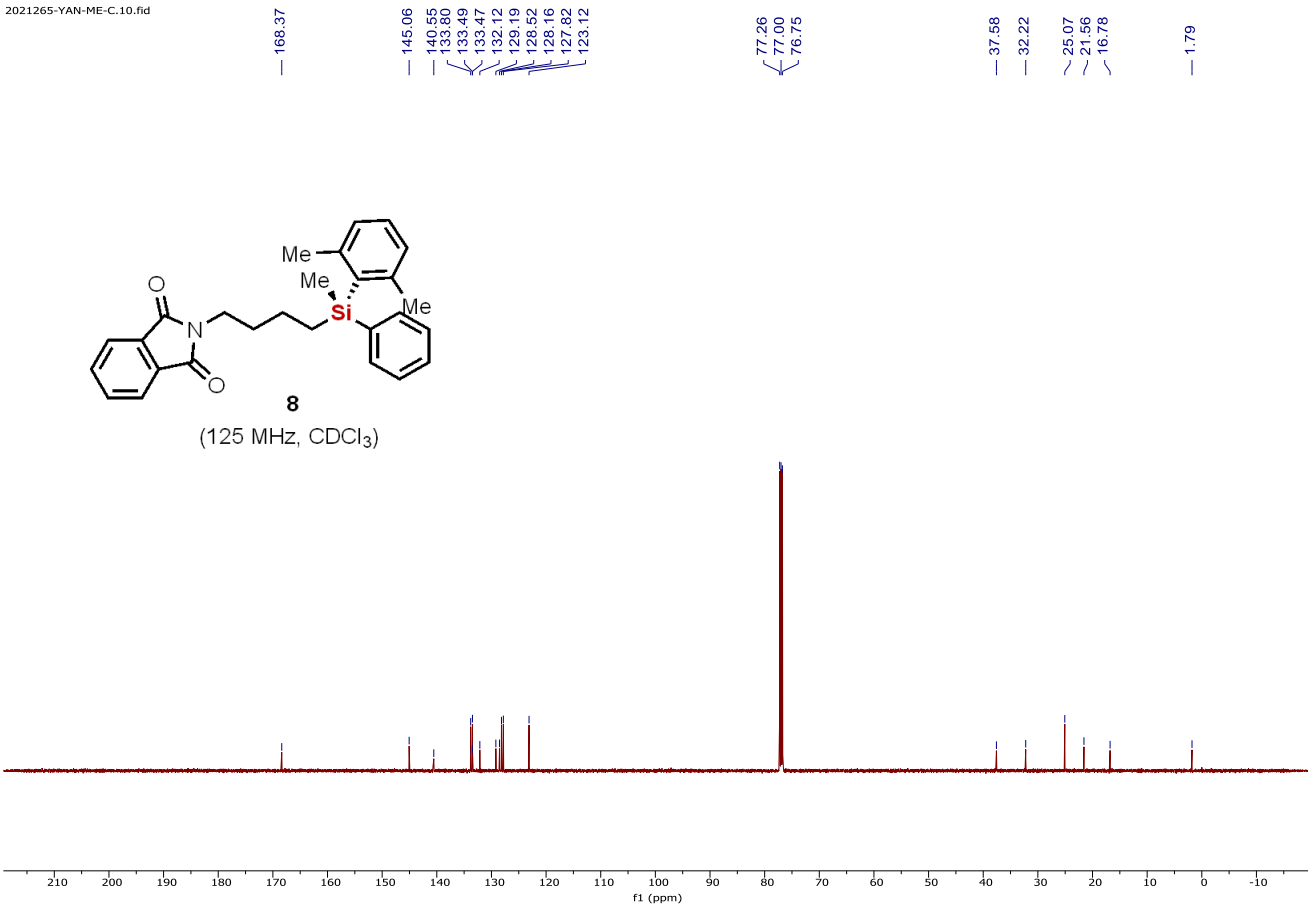

7e
(400 MHz, CDCl3)
f1 (ppm)


7e
(100 MHz, CDCl3)
f1 (ppm)



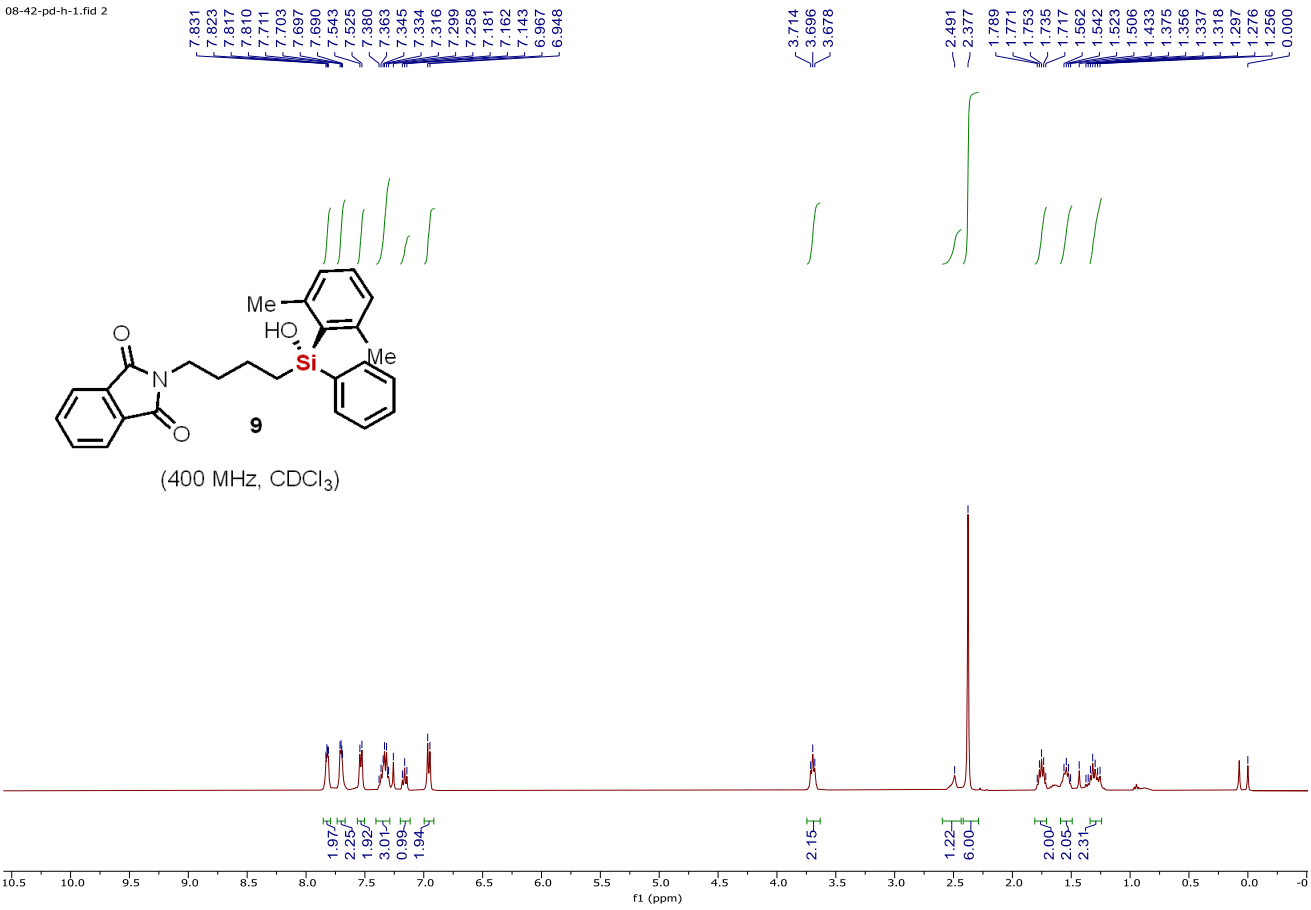
8

(400 MHz, $CDCl_3$)

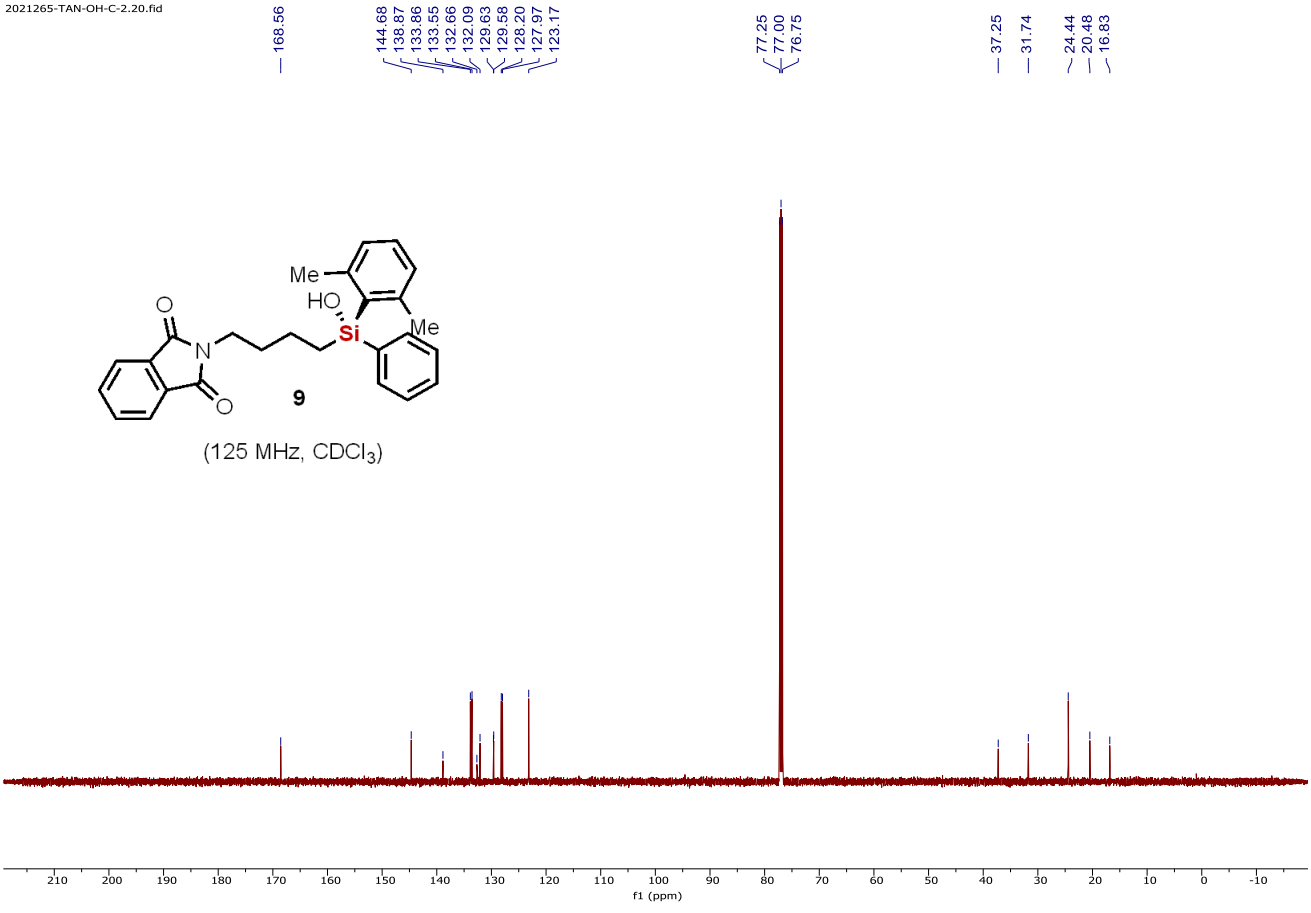


8

(125 MHz, $CDCl_3$)

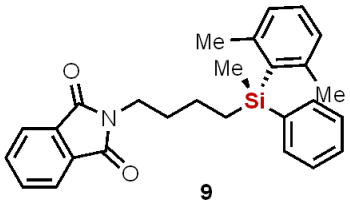


(400 MHz, $CDCl_3$)



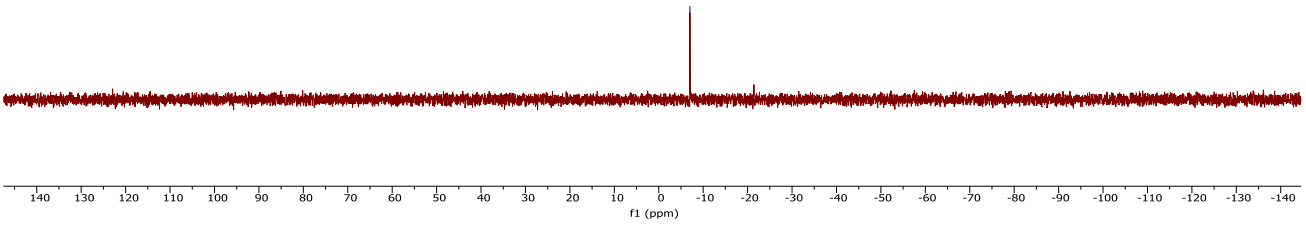
(125 MHz, $CDCl_3$)

wyc-II-04-9
single pulse decoupled gated NOE



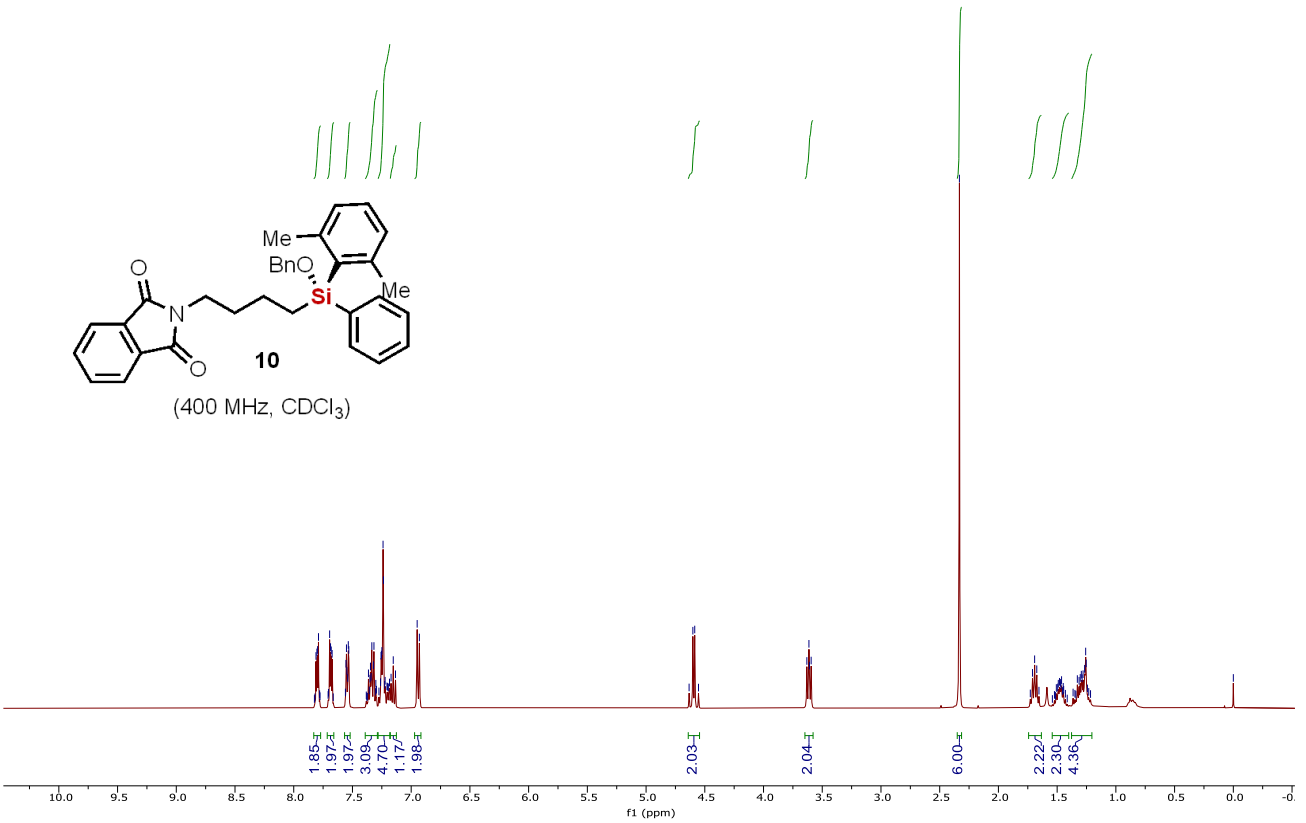
9

(119 MHz, $CDCl_3$)



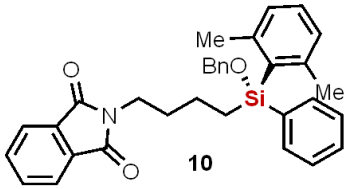
10

(400 MHz, $CDCl_3$)



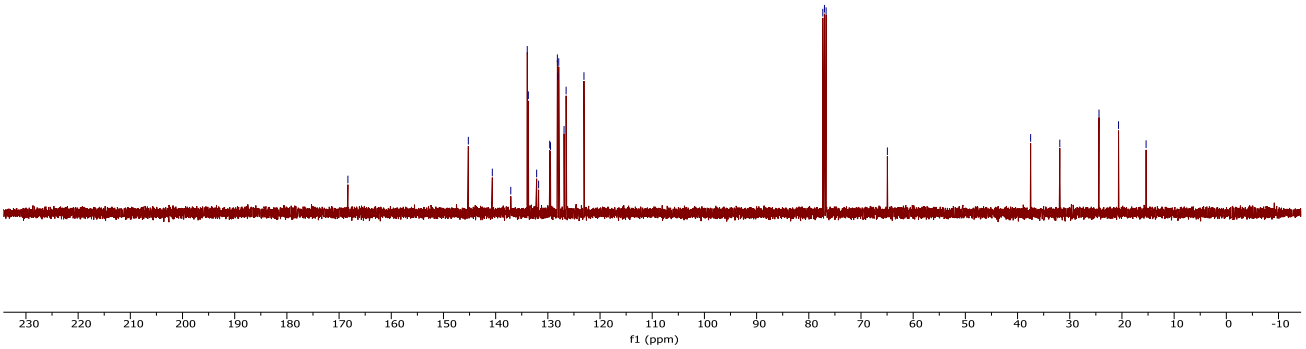
qhy-08-obn-2-c

168.31
145.23
140.64
137.10
133.94
133.74
132.15
131.77
129.65
129.50
128.17
128.09
127.91
126.89
126.50
123.08
77.32
77.00
76.68
64.94
37.50
31.91
24.40
20.65
15.37



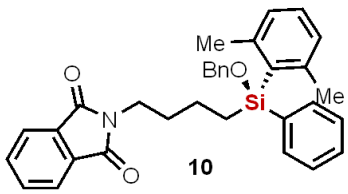
10

(100 MHz, $CDCl_3$)



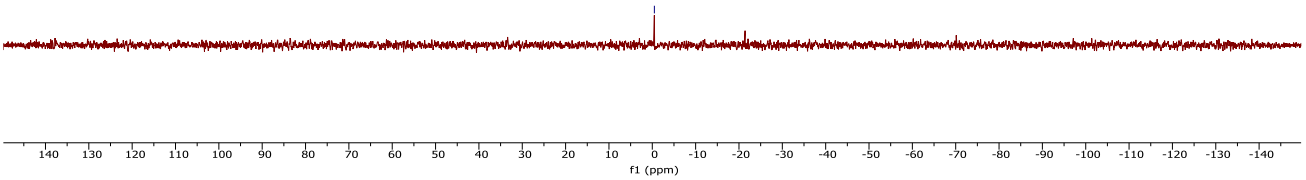
wyc-II-04-10
single pulse decoupled gated NOE

-0.479

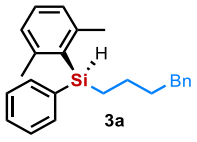


10

(119 MHz, $CDCl_3$)

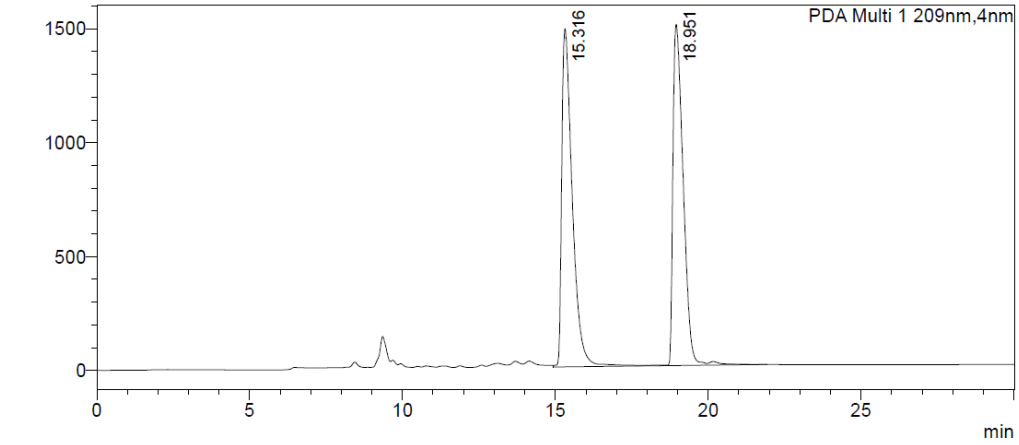


7. HPLC Chart



3a

<Chromatogram>

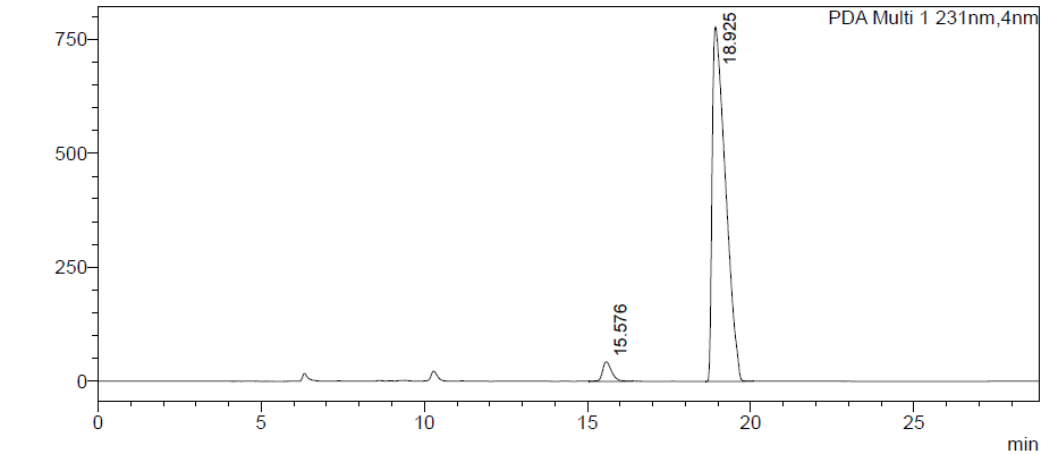


<Peak Table>

PDA Ch1 209nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	15.316	35699429	1484339	50.378		S	
2	18.951	35163863	1497334	49.622		V	
Total		70863292	2981673				

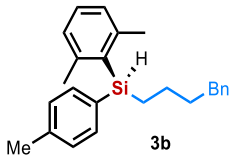
<Chromatogram>



<Peak Table>

PDA Ch1 231nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	15.576	826446	43018	3.612			
2	18.925	22056298	777527	96.388		S	
Total		22882744	820545				



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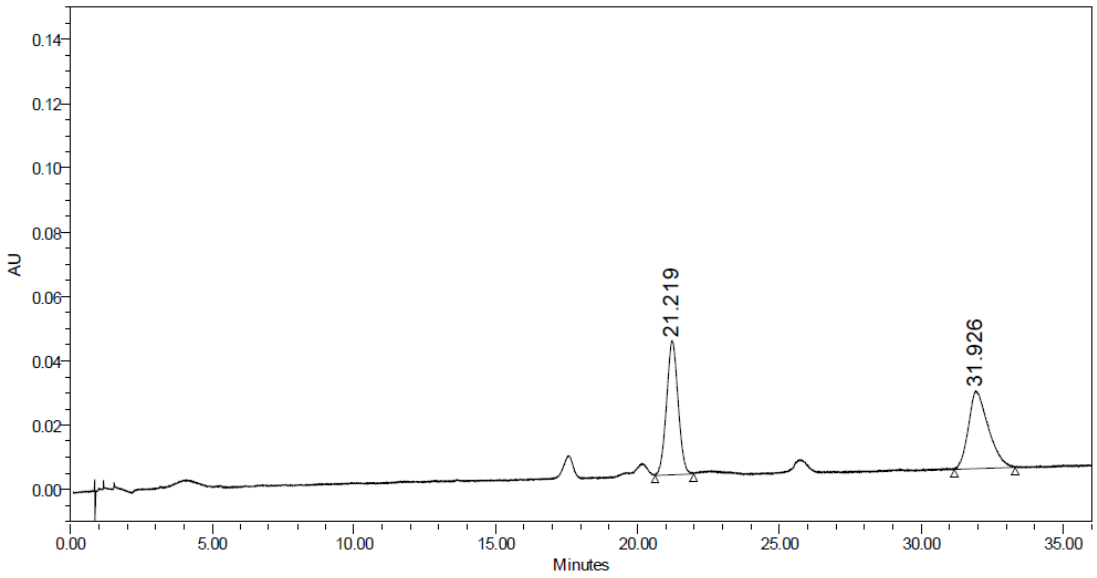
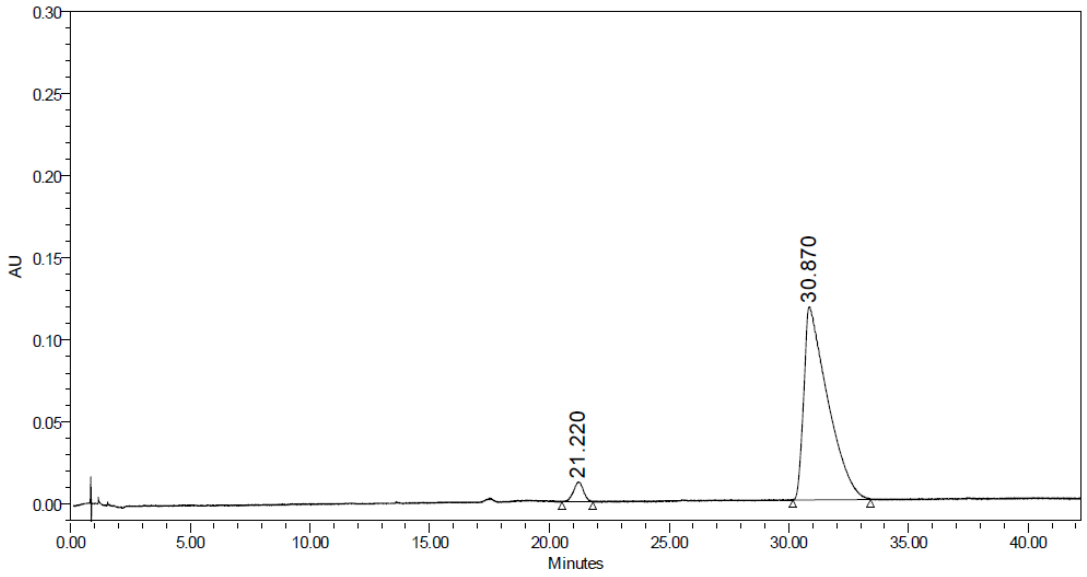
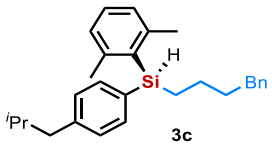


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	21.219	Unknown	41591	81.450	1183235	49.99
2	31.926	Unknown	24144	128.950	1183662	50.01



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	21.220	Unknown	12125	77.200	356844	4.22
2	30.870	Unknown	117720	195.100	8100983	95.78



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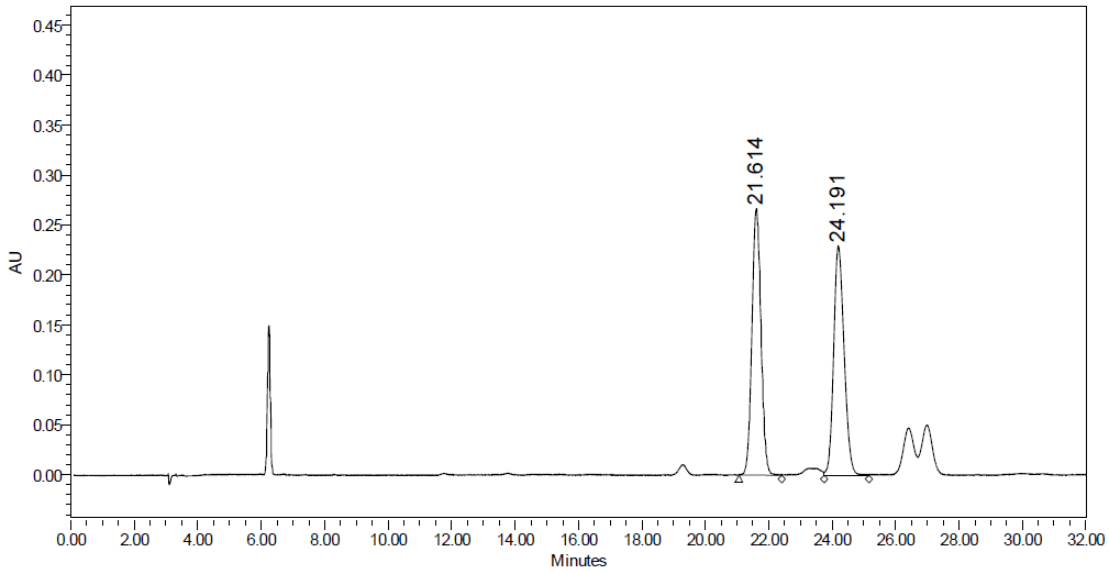
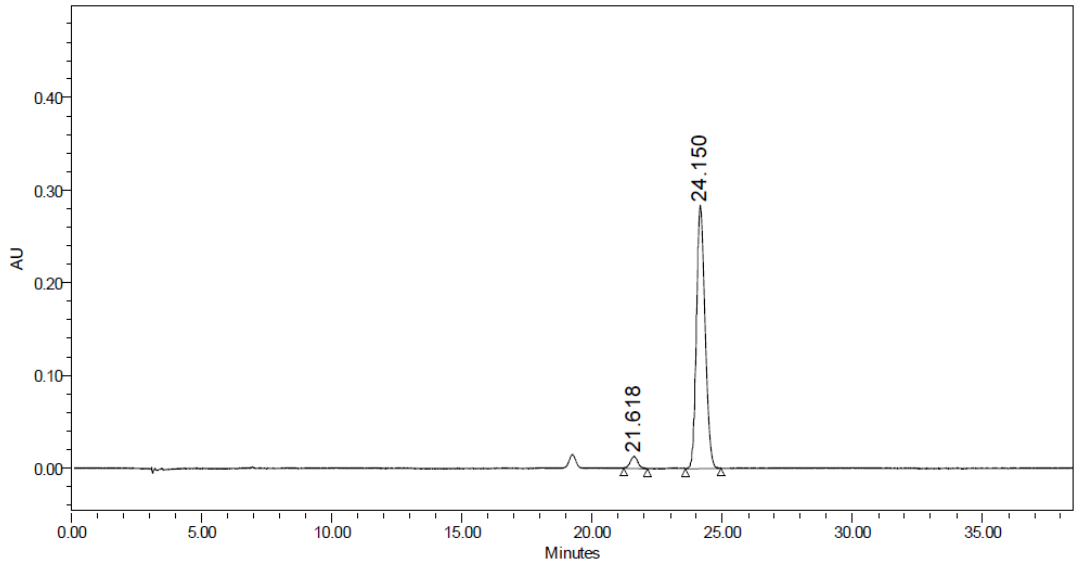
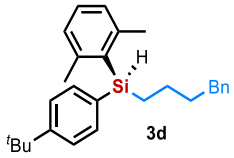


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	21.614	Unknown	266469	81.250	5236679	49.79
2	24.191	Unknown	229375	85.150	5280979	50.21



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	21.618	Unknown	12954	54.400	259218	3.82
2	24.150	Unknown	284130	81.650	6520970	96.18



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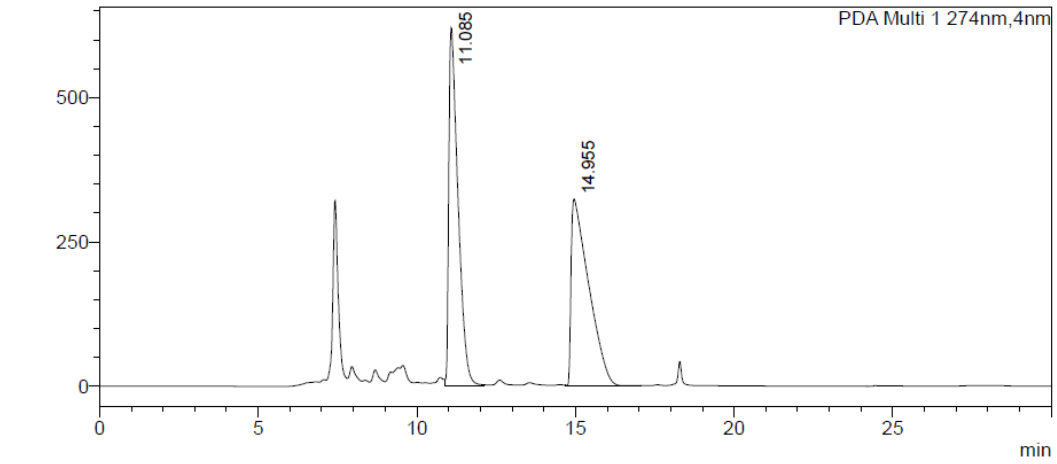
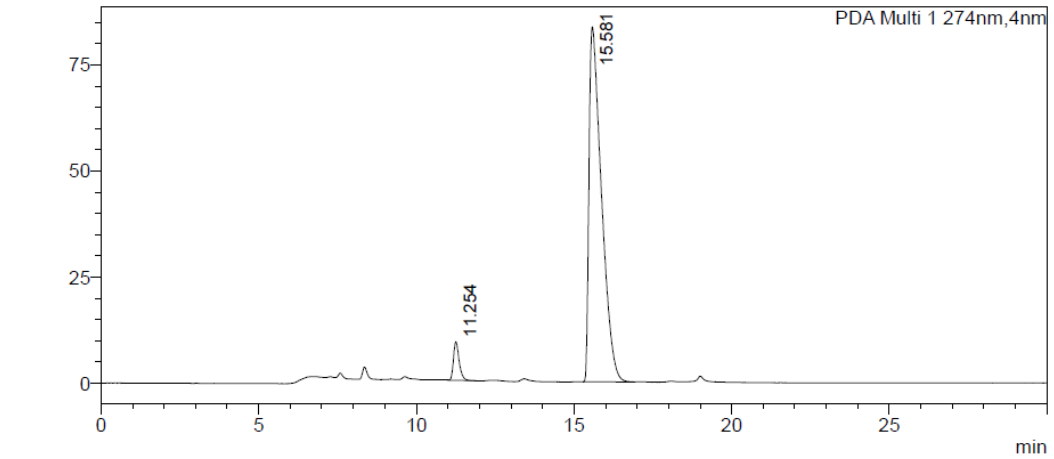


<Peak Table>

PDA Ch1 274nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	11.085	12590340	620912	50.162		M	
2	14.955	12509248	323604	49.838			
Total		25099588	944516				

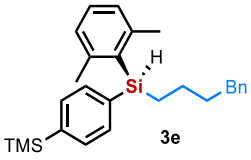
<Chromatogram>



<Peak Table>

PDA Ch1 274nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	11.254	113202	9105	4.692			
2	15.581	2299291	83553	95.308			
Total		2412493	92658				



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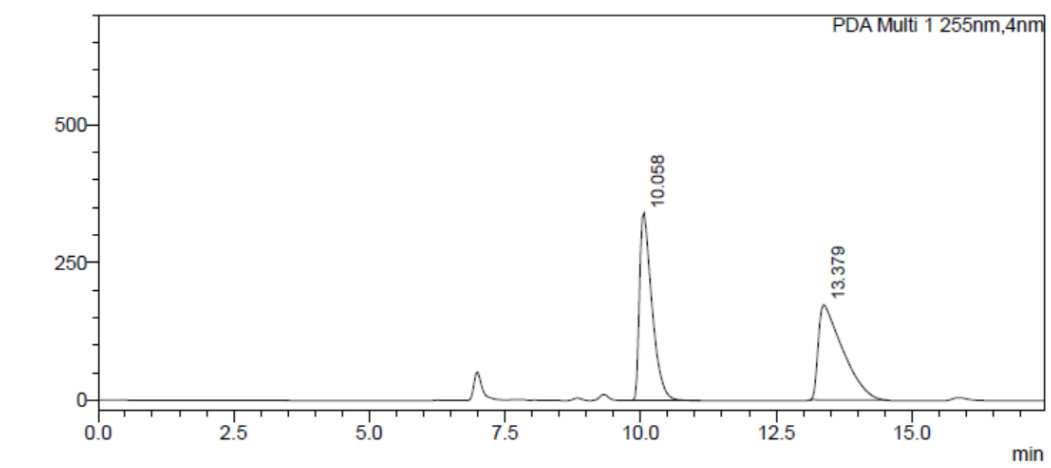
<Chromatogram>

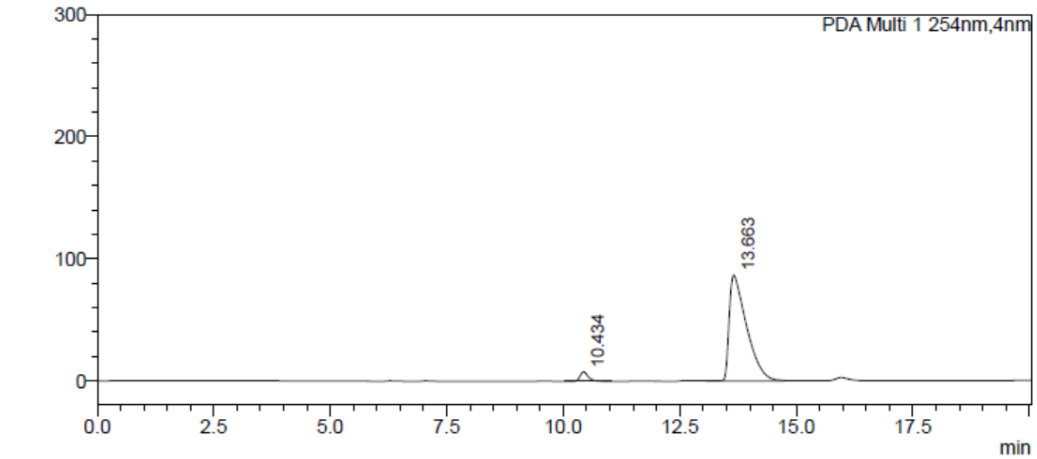


<Peak Table>

PDA Ch1 255nm

Peak#	Ret. Time	Area	Height	Area%
1	10.058	5423482	340902	49.959
2	13.379	5432302	172417	50.041
Total		10855784	513320	100.000

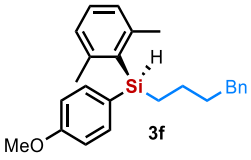
<Chromatogram>



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area	Height	Area%
1	10.434	93987	7872	4.011
2	13.663	2249278	86699	95.989
Total		2343265	94570	100.000



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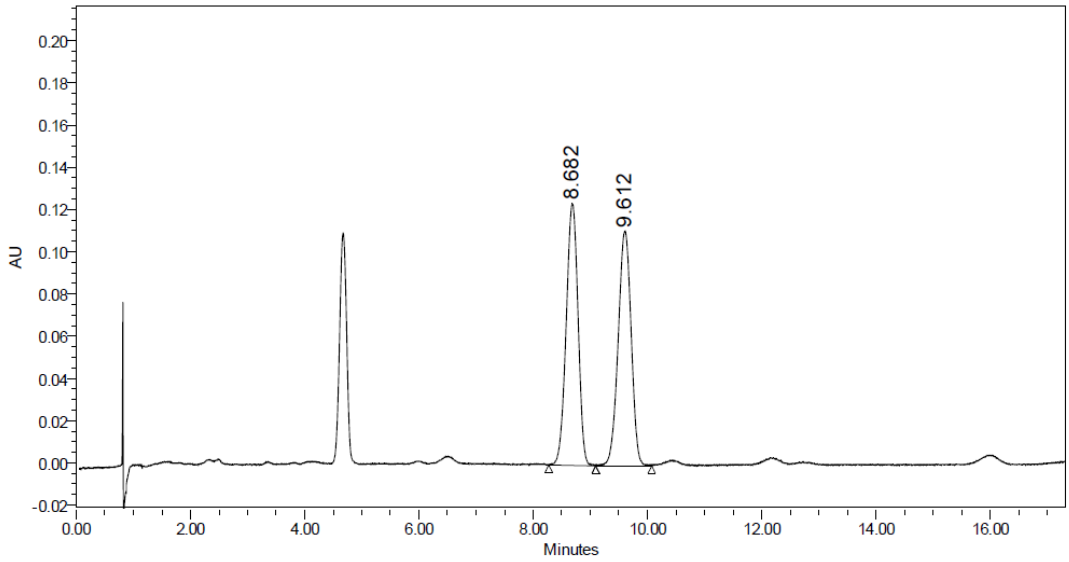
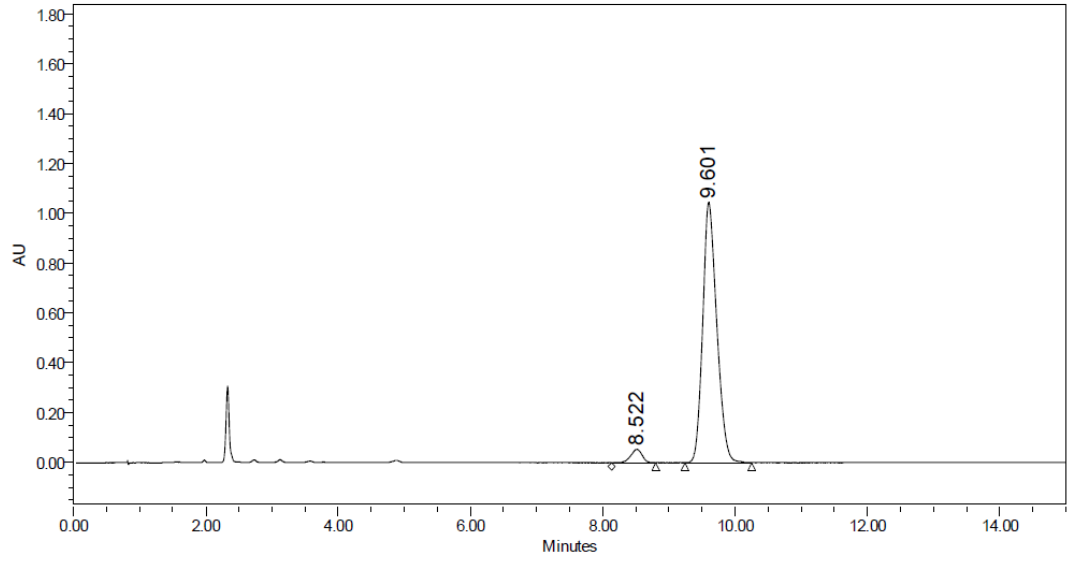
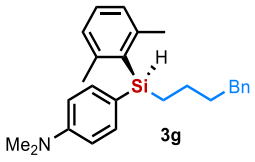


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	8.682	Unknown	123951	49.200	1790756	50.44
2	9.612	Unknown	111206	59.100	1759811	49.56



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	8.522	Unknown	53701	39.950	641519	3.97
2	9.601	Unknown	1044646	60.350	15528953	96.03



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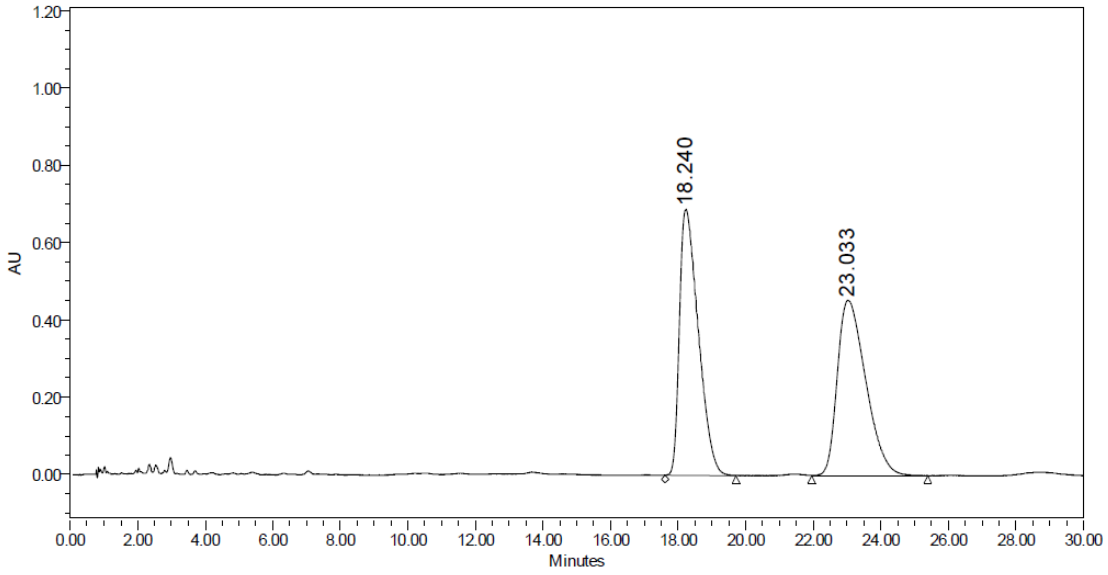
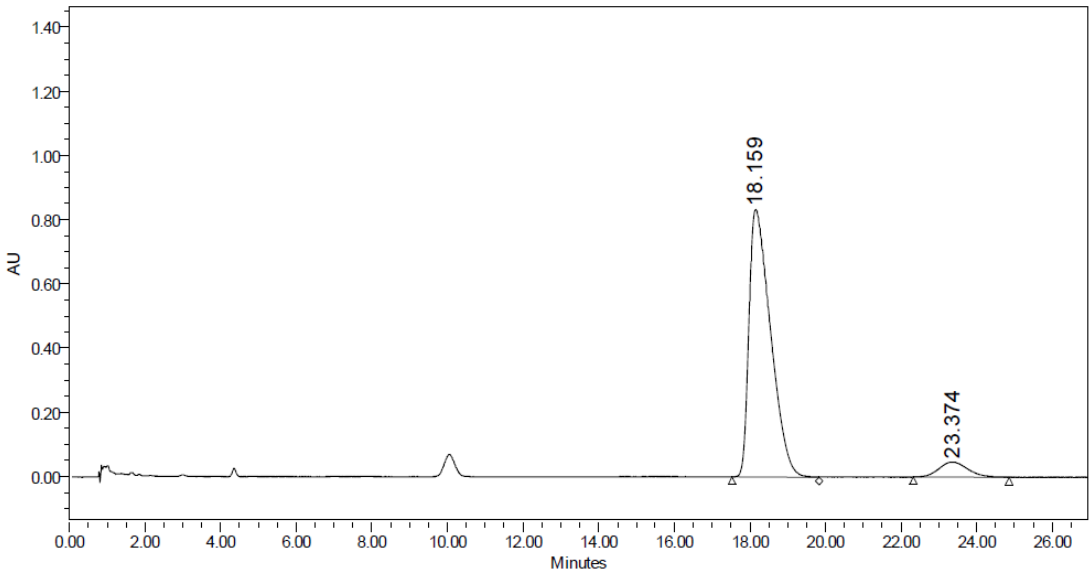
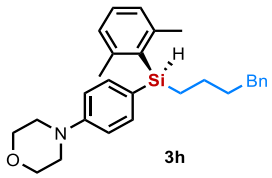


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	18.240	Unknown	688498	125.950	26533439	49.91
2	23.033	Unknown	453657	206.200	26633376	50.09



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	18.159	Unknown	833293	138.150	32843574	92.95
2	23.374	Unknown	46983	151.850	2491555	7.05



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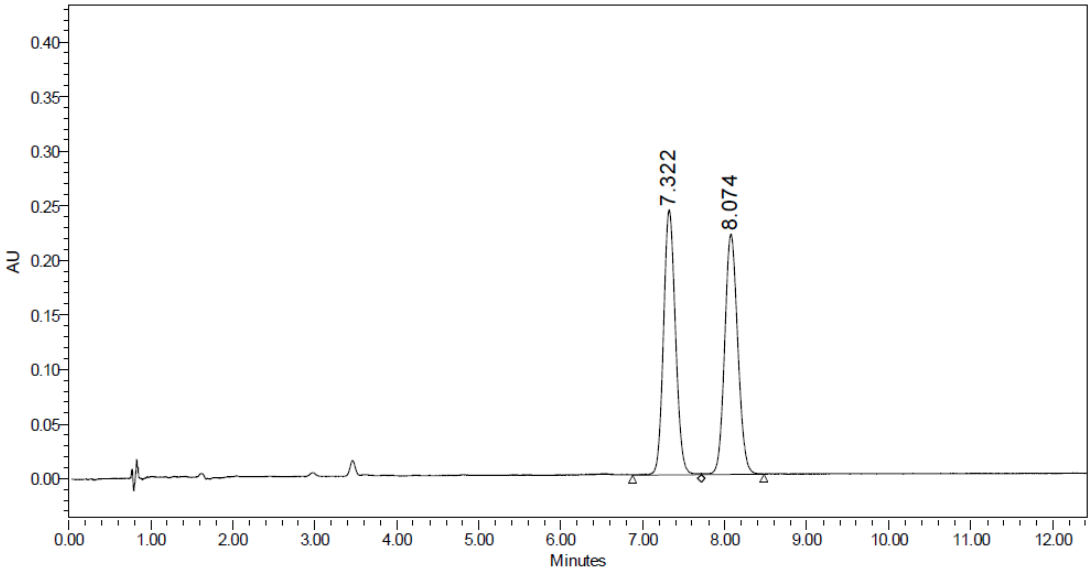
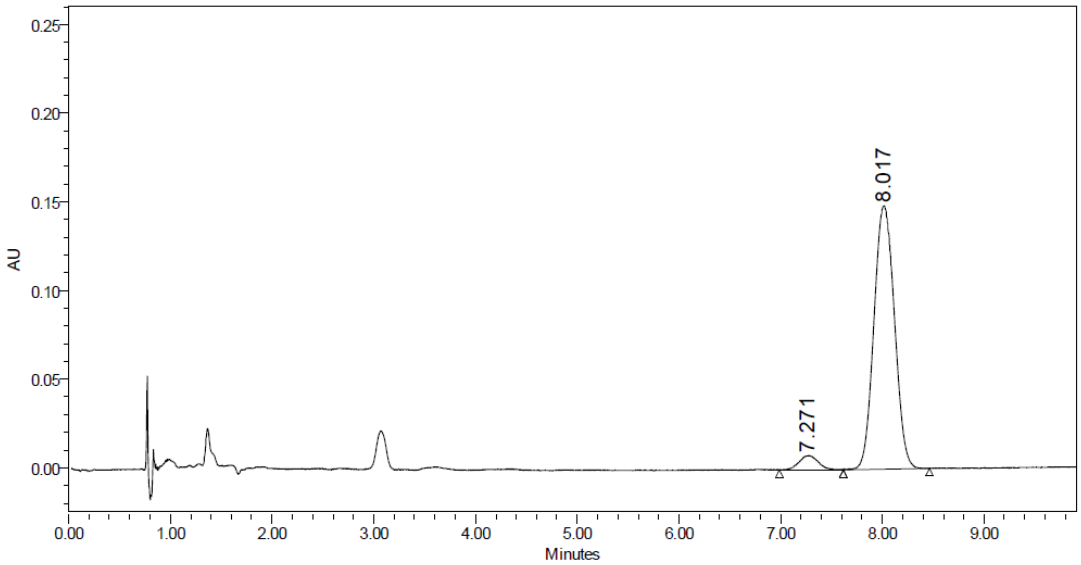
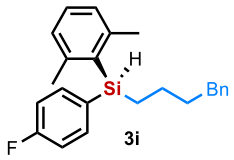


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	7.322	Unknown	242927	50.350	2469168	50.03
2	8.074	Unknown	219986	45.750	2466119	49.97



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	7.271	Unknown	8021	37.750	105239	4.84
2	8.017	Unknown	148344	50.700	2069258	95.16



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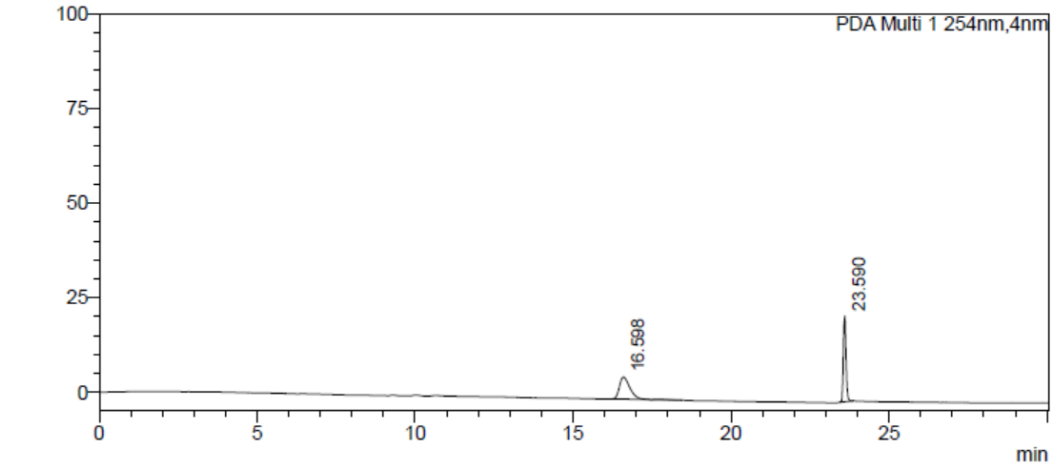

<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area	Height	Area%
1	16.598	136554	5887	50.234
2	23.590	135282	22799	49.766
Total		271836	28686	100.000

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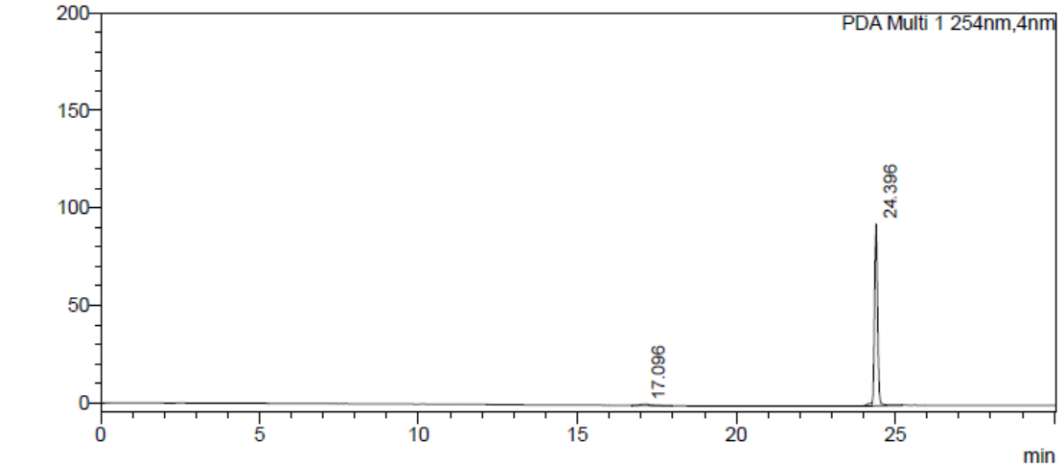
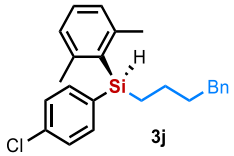


<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area	Height	Area%
1	17.096	16468	731	2.505
2	24.396	640909	93585	97.495
Total		657377	94316	100.000



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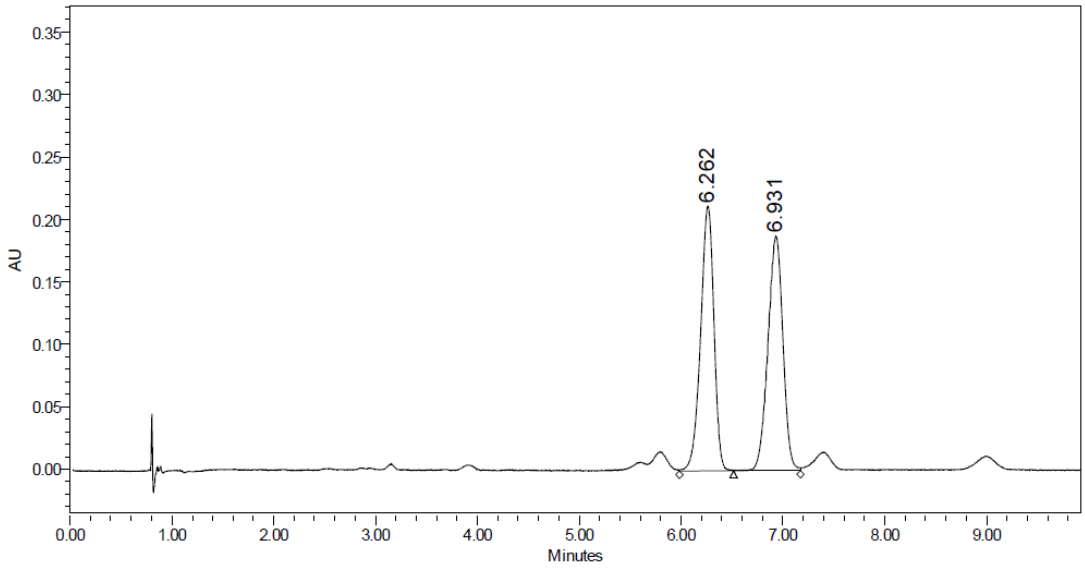
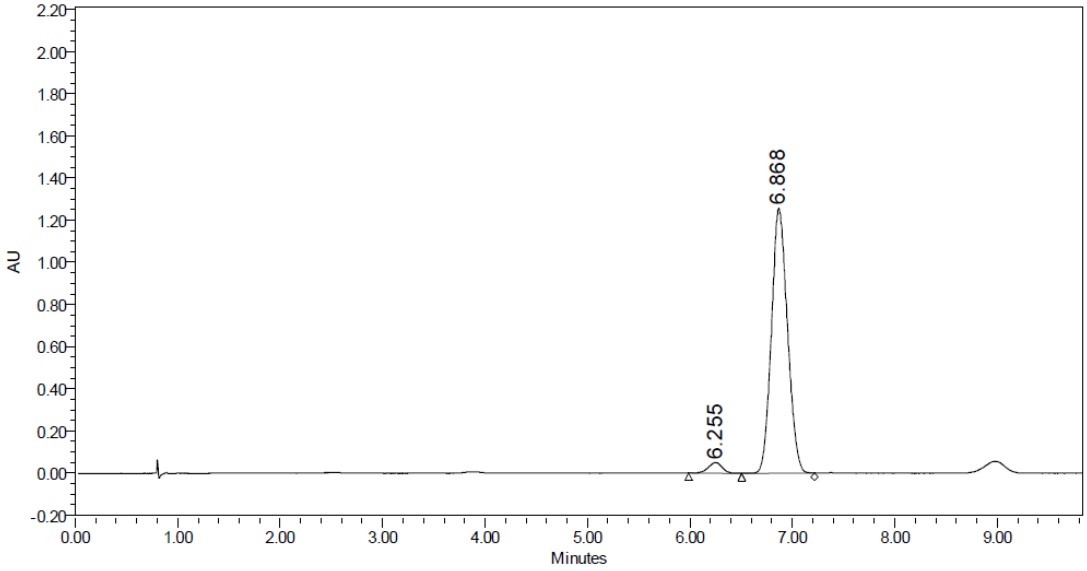
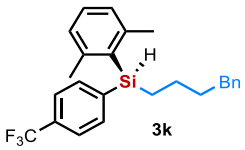


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	6.262	Unknown	211993	31.950	1943095	50.41
2	6.931	Unknown	187774	39.300	1911436	49.59



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	6.255	Unknown	50472	31.200	478036	3.40
2	6.868	Unknown	1256807	42.750	13569803	96.60



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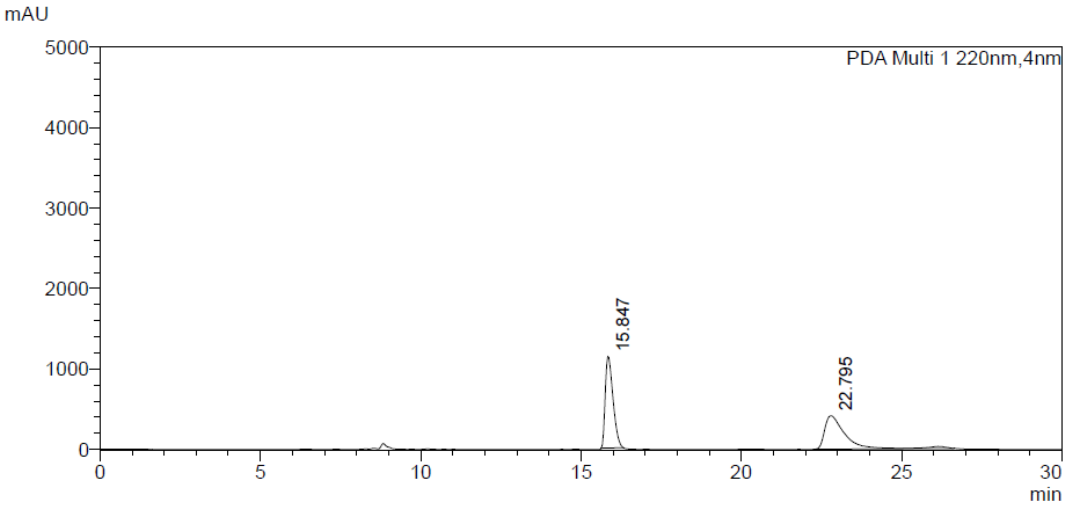

<Peak Table>

PDA Ch1 220nm

Peak#	Ret. Time	Area	Height	Area%
1	15.847	19324156	1139775	50.162
2	22.795	19199241	416543	49.838
Total		38523398	1556318	100.000

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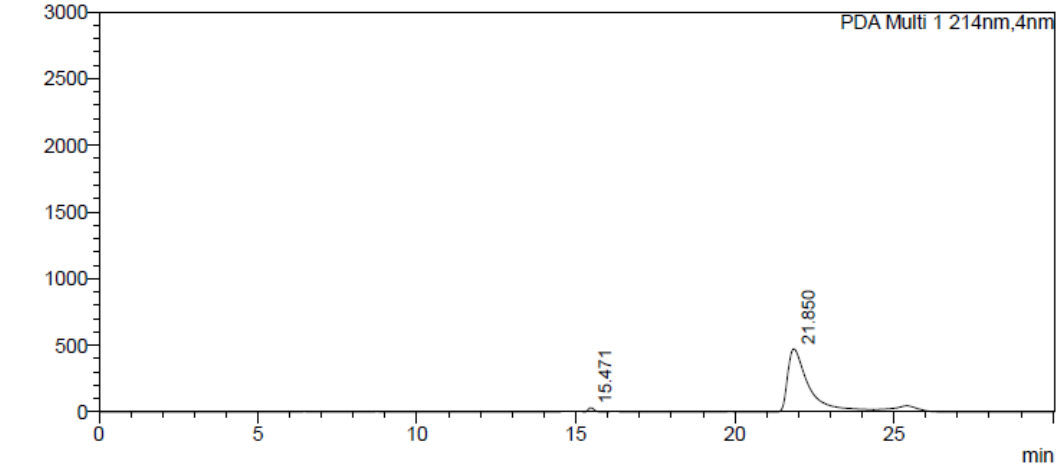
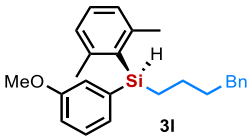


<Peak Table>

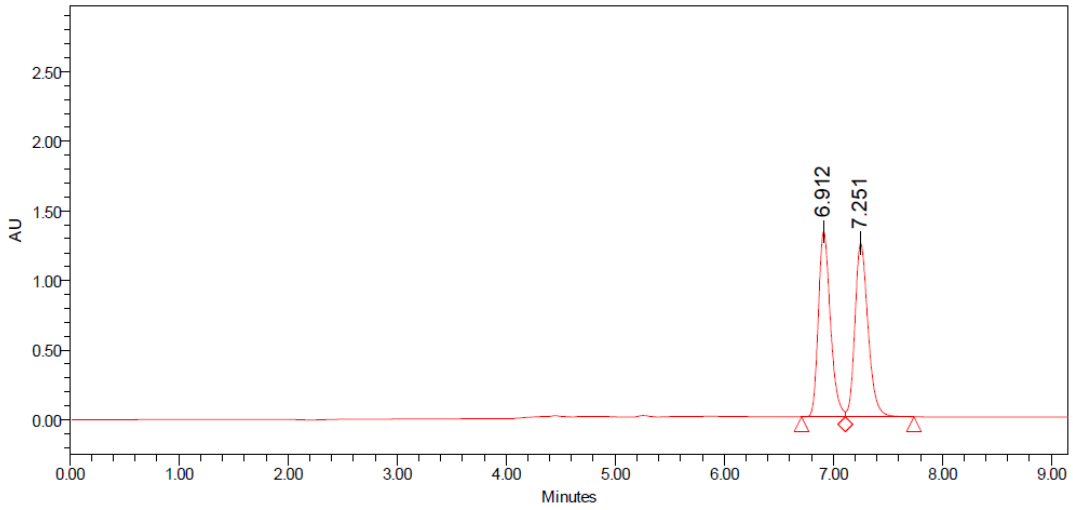
PDA Ch1 214nm

Peak#	Ret. Time	Area	Height	Area%
1	15.471	500347	35281	2.181
2	21.850	22445487	474412	97.819
Total		22945834	509693	100.000



3l

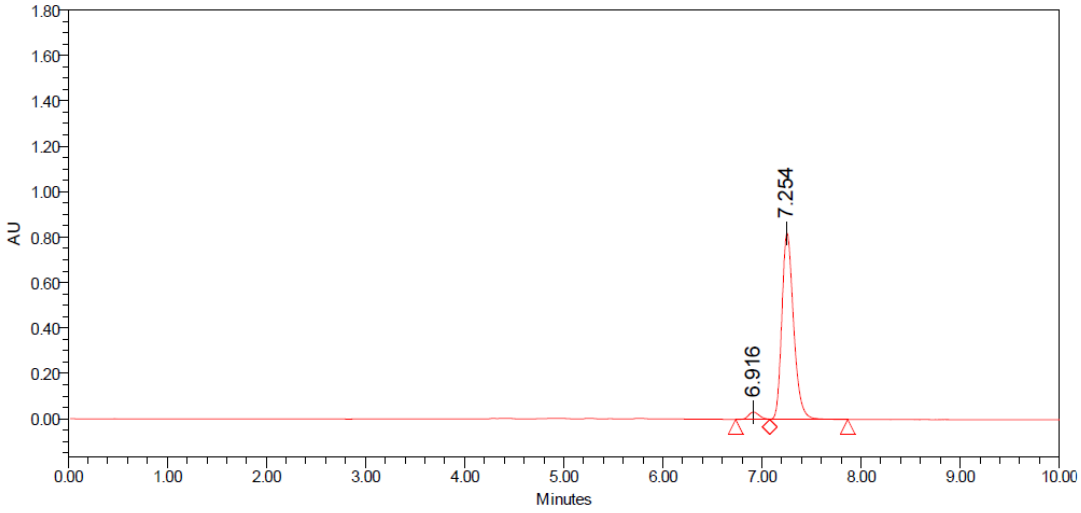
Auto-Scaled Chromatogram



Peak Results

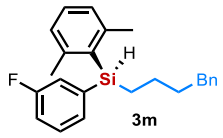
	SampleName	RT	Width (sec)	Height	Area	% Area
1	08-3ome-rac	6.912	24.150	1330739	10182982	49.53
2	08-3ome-rac	7.251	37.700	1246896	10374607	50.47

Auto-Scaled Chromatogram



Peak Results

	SampleName	RT	Width (sec)	Height	Area	% Area
1	08-3ome-c	6.916	20.500	32998	248367	3.53
2	08-3ome-c	7.254	47.200	820817	6779612	96.47



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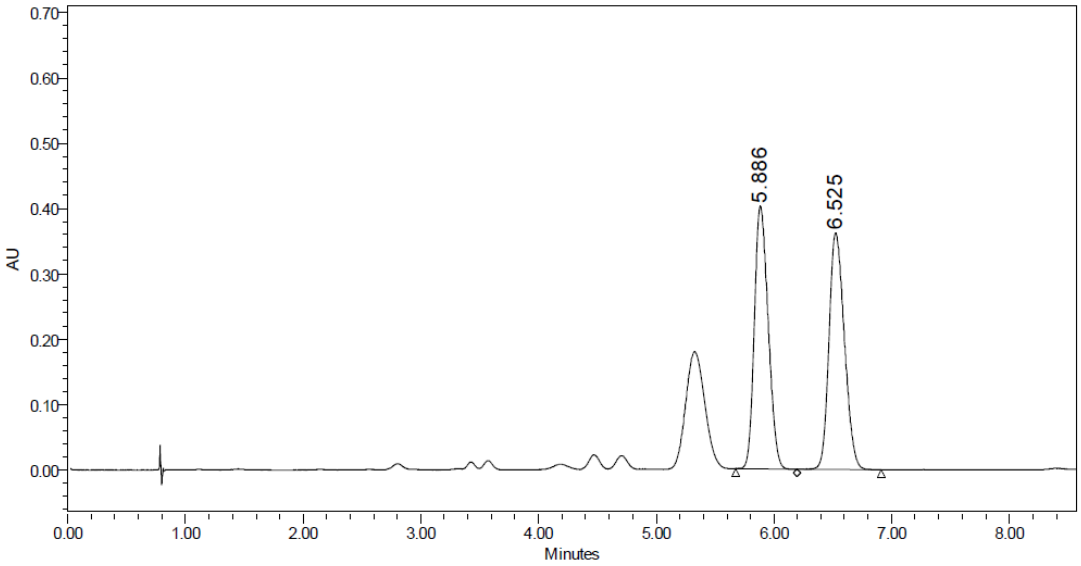
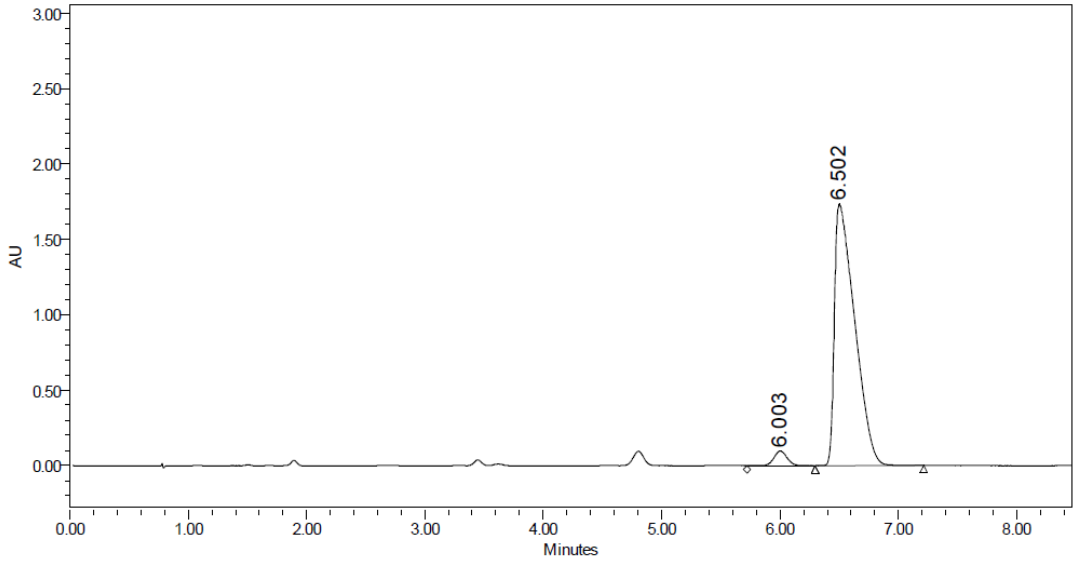
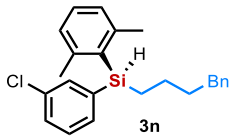


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	5.886	Unknown	401889	31.250	3255064	49.75
2	6.525	Unknown	361977	42.950	3287694	50.25



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	6.003	Unknown	96673	34.600	732127	3.44
2	6.502	Unknown	1736204	55.050	20533789	96.56



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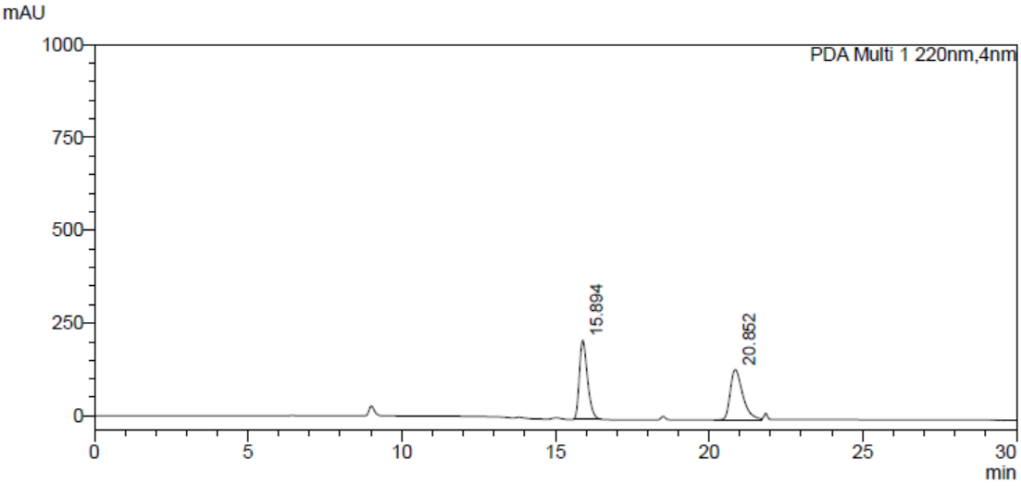

<Peak Table>

PDA Ch1 220nm

Peak#	Ret. Time	Area	Height	Area%
1	15.894	3891050	211643	49.993
2	20.852	3892101	135949	50.007
Total		7783151	347592	100.000

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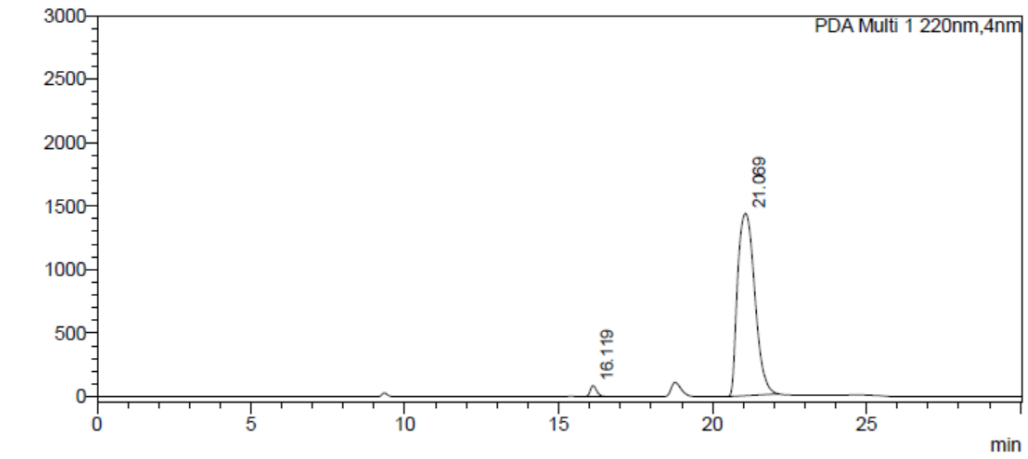
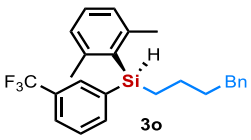


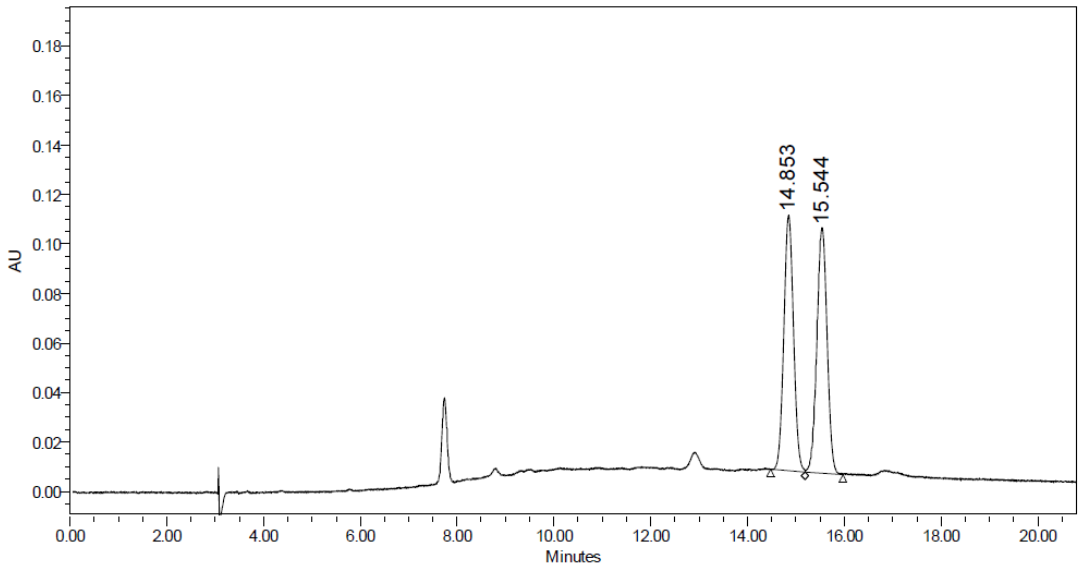
<Peak Table>

PDA Ch1 220nm

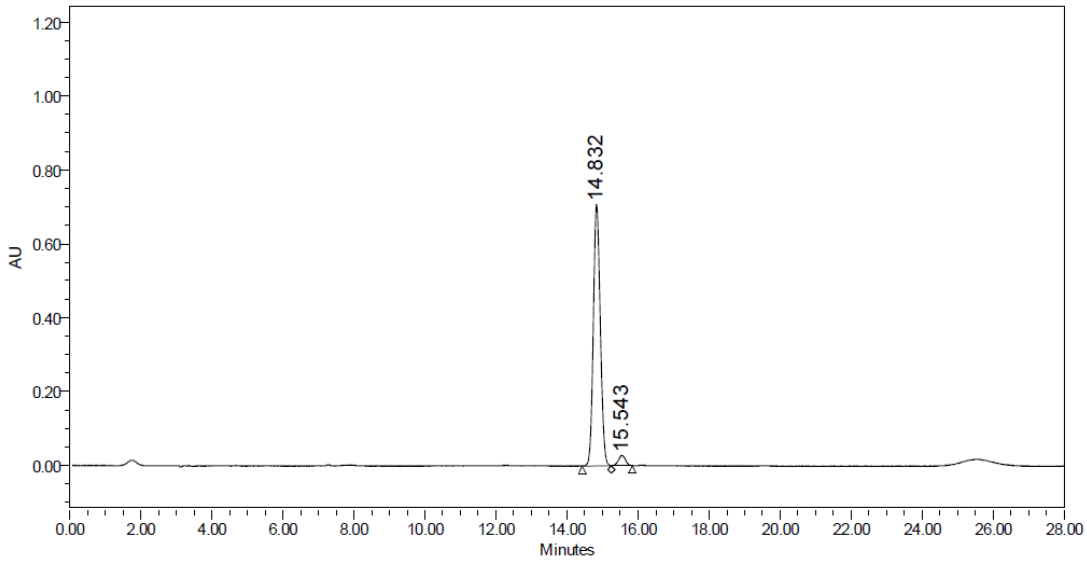
Peak#	Ret. Time	Area	Height	Area%
1	16.119	1329985	87715	2.322
2	21.069	55941441	1435770	97.678
Total		57271426	1523485	100.000



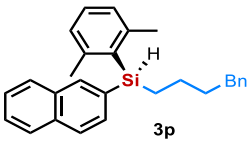
3o



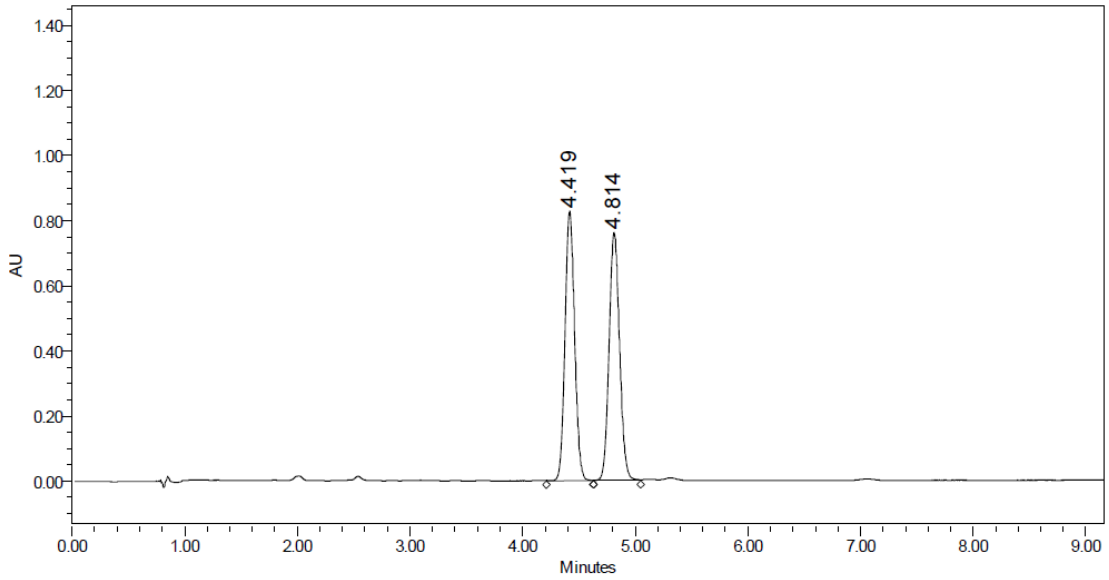
	RT	Peak Type	Height	Width (sec)	Area	% Area
1	14.853	Unknown	103153	42.950	1445423	49.90
2	15.544	Unknown	99014	47.000	1450940	50.10



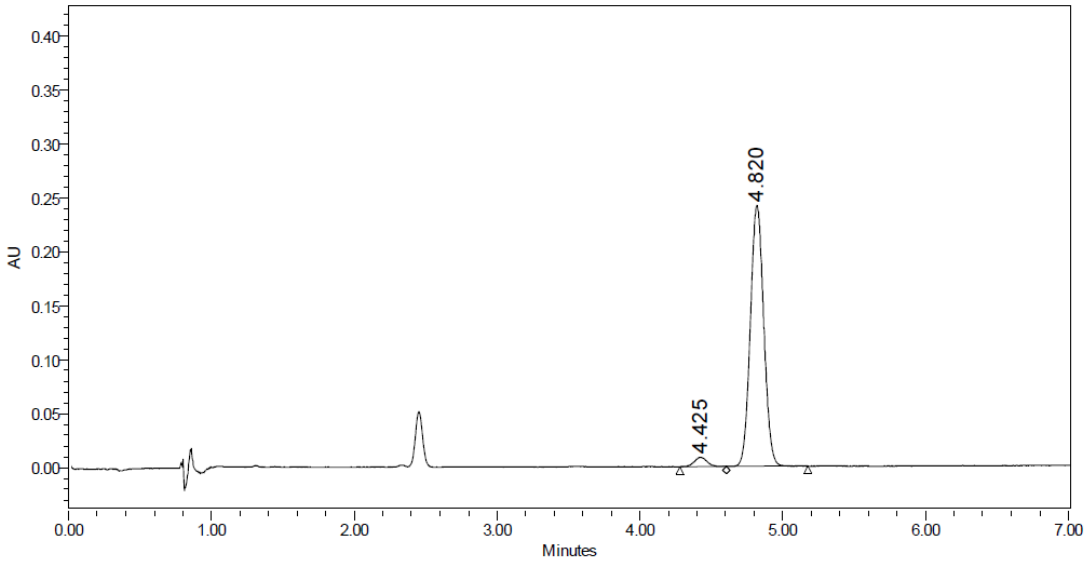
	RT	Peak Type	Height	Width (sec)	Area	% Area
1	14.832	Unknown	707569	48.900	9681224	96.03
2	15.543	Unknown	28532	35.500	400436	3.97



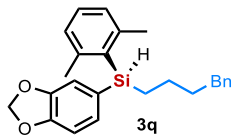
3p



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	4.419	Unknown	827814	25.150	4888359	49.88
2	4.814	Unknown	761822	25.100	4911804	50.12



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	4.425	Unknown	8653	19.500	53019	3.27
2	4.820	Unknown	241921	34.200	1568398	96.73



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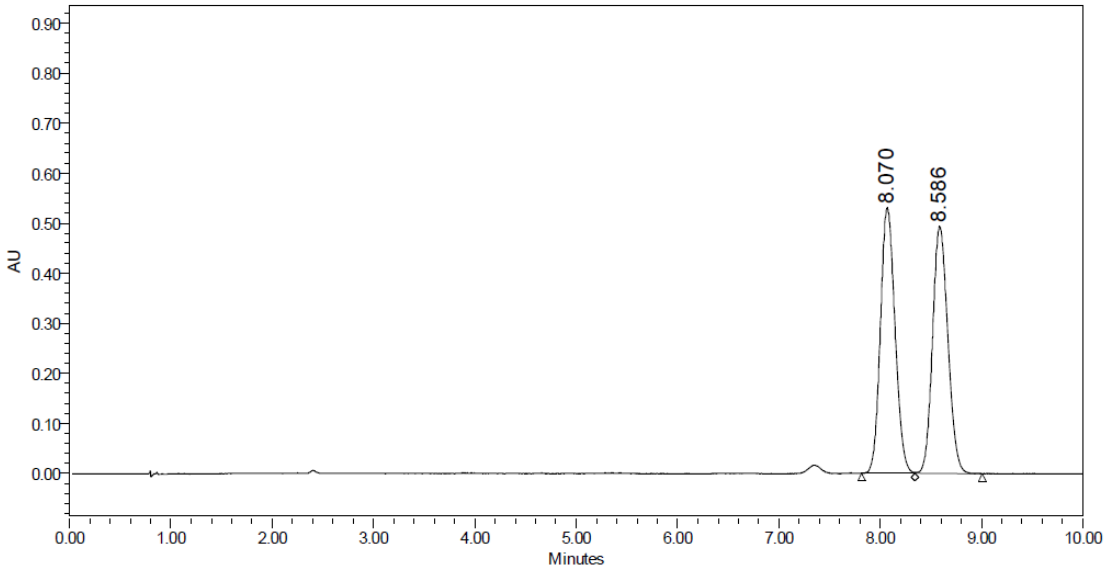
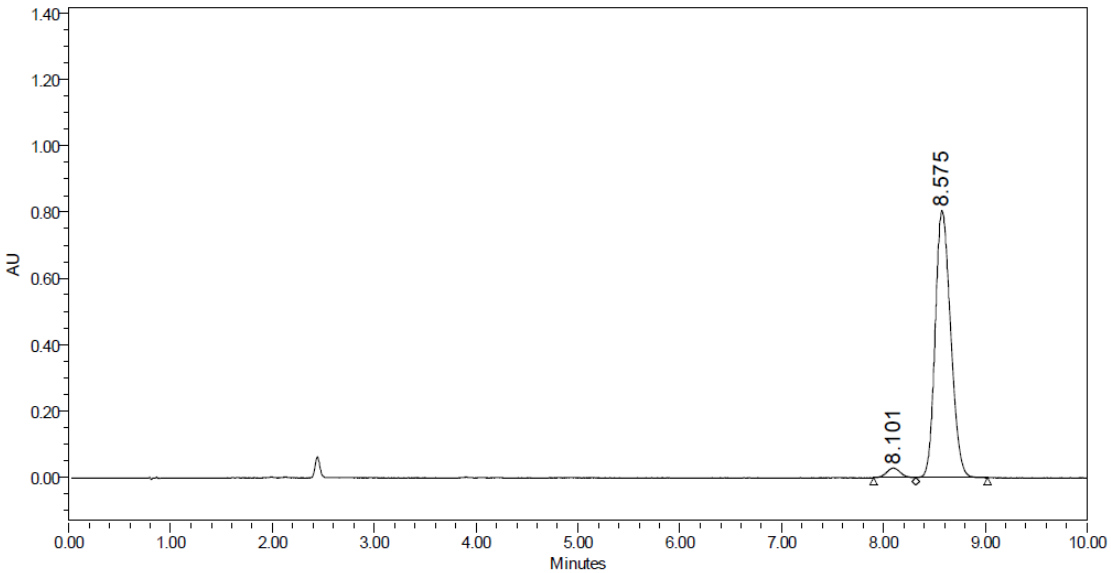
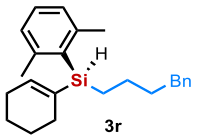


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	8.070	Unknown	530793	31.600	5277032	50.59
2	8.586	Unknown	493823	39.800	5154034	49.41



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	8.101	Unknown	28863	24.800	270739	3.12
2	8.575	Unknown	805234	42.400	8414858	96.88



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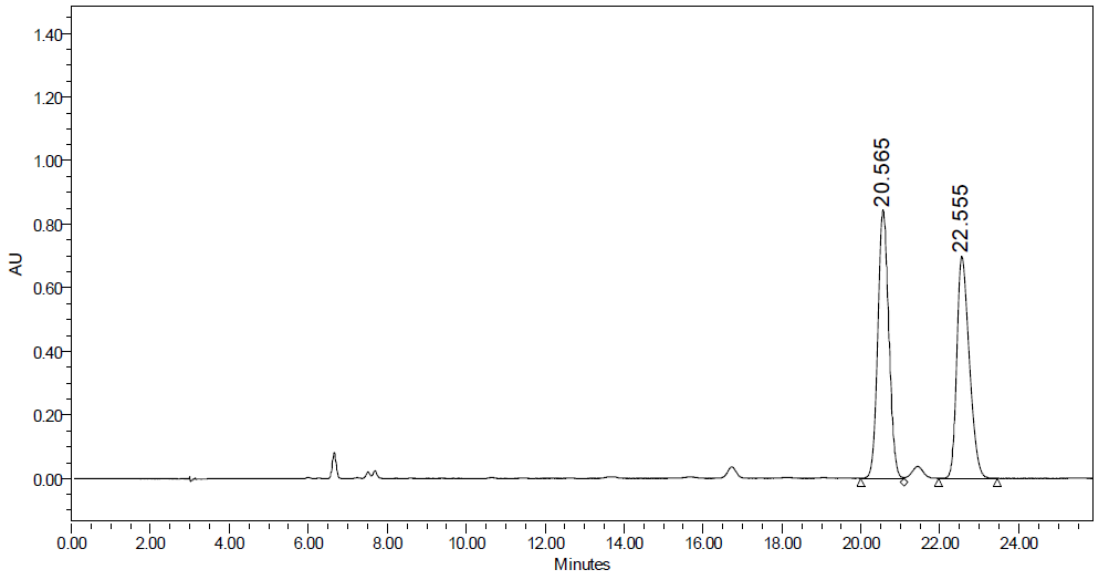
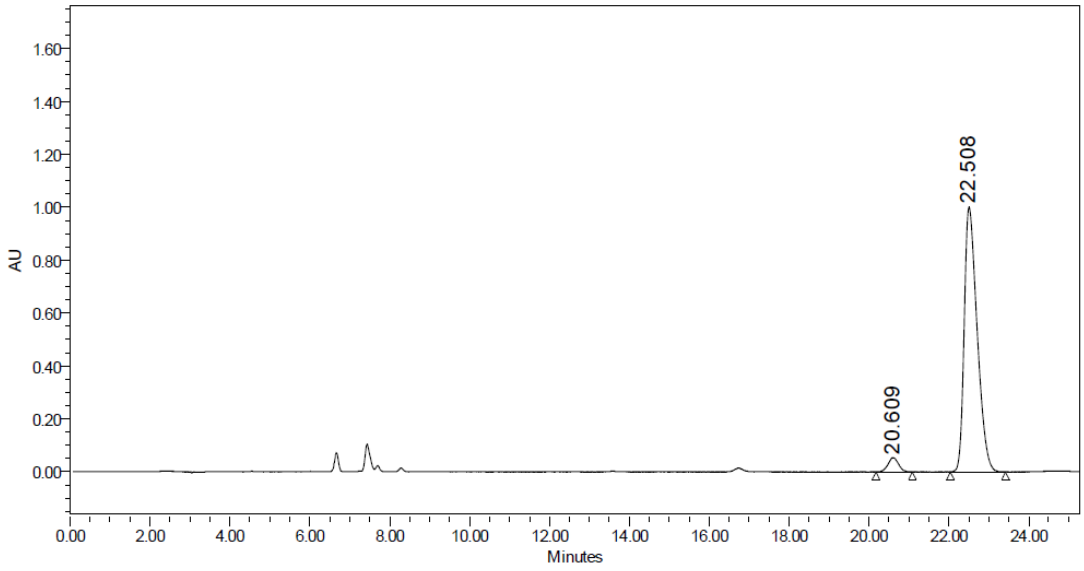
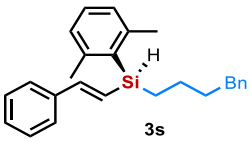


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	20.565	Unknown	843307	65.700	16117124	51.08
2	22.555	Unknown	697756	89.600	15433873	48.92



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	20.609	Unknown	53527	54.550	974696	4.13
2	22.508	Unknown	1001251	82.650	22643161	95.87



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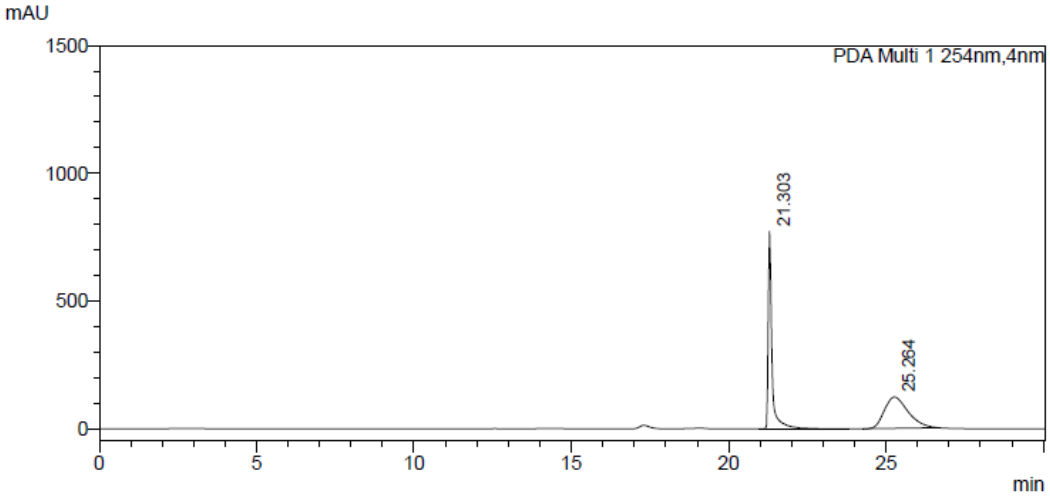
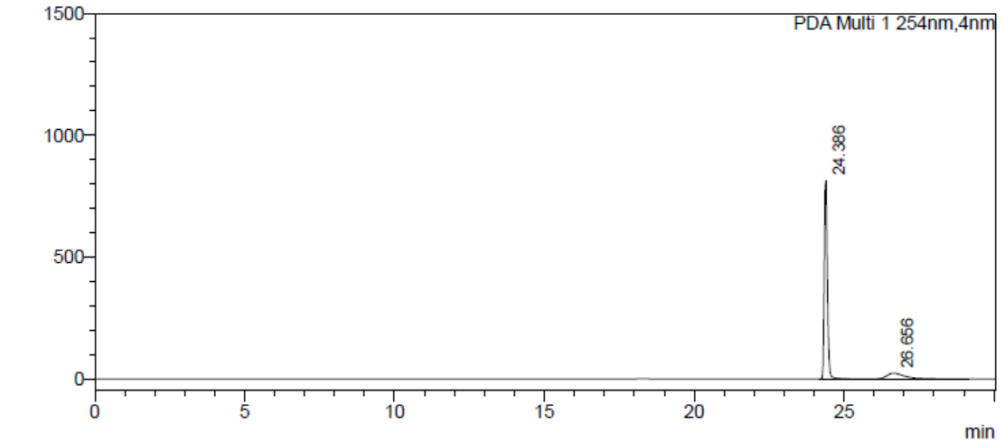


<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area	Height	Area%
1	21.303	6401720	774389	49.935
2	25.264	6418355	122611	50.065
Total		12820075	896999	100.000

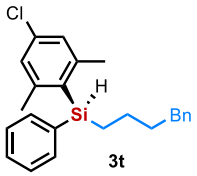
<Chromatogram>



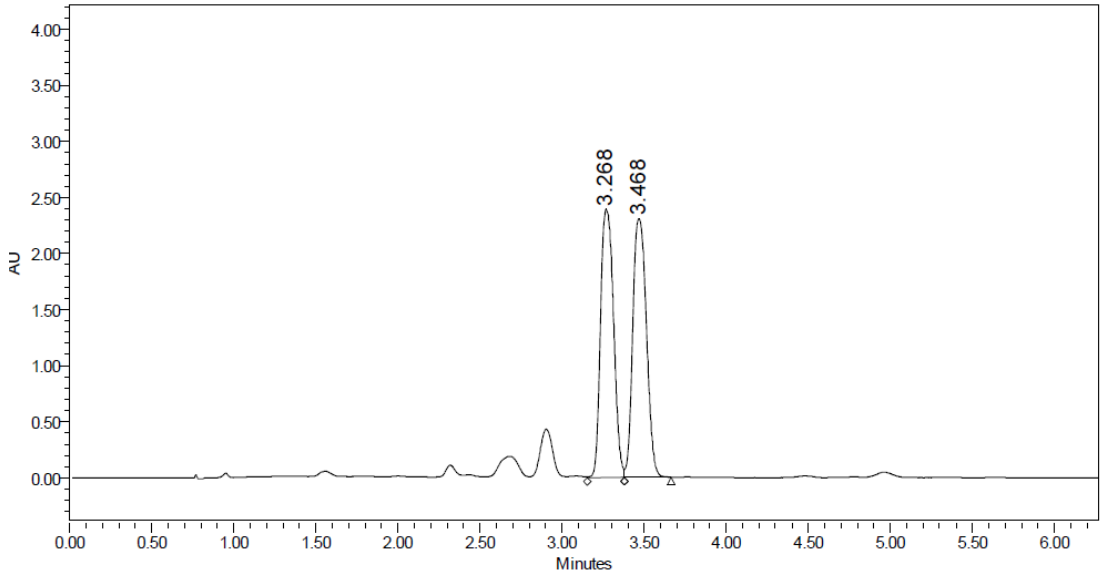
<Peak Table>

PDA Ch1 254nm

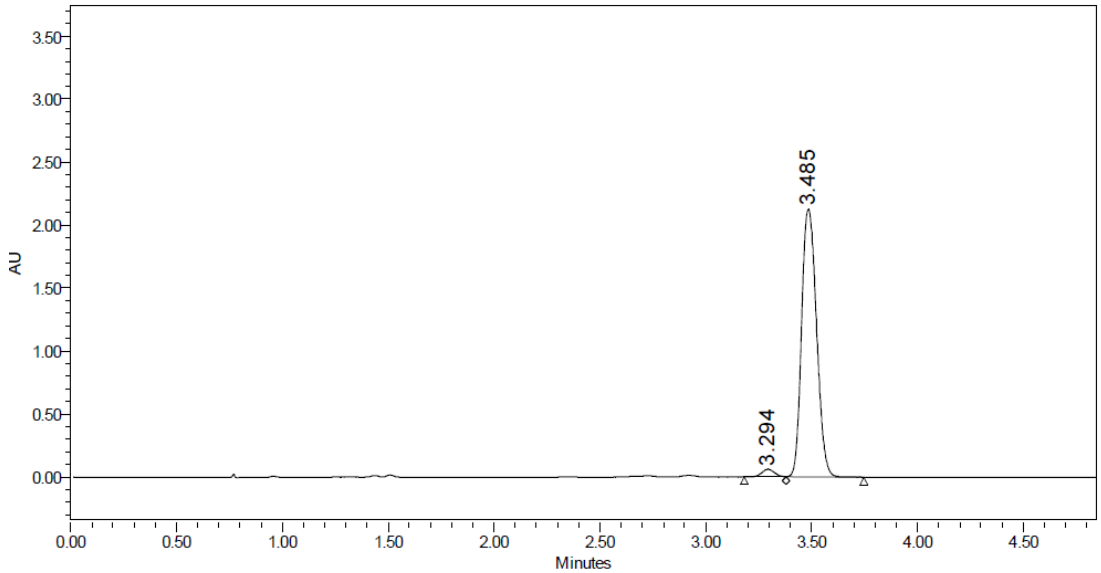
Peak#	Ret. Time	Area	Height	Area%
1	24.386	5894338	816456	85.708
2	26.656	982892	23448	14.292
Total		6877230	839904	100.000



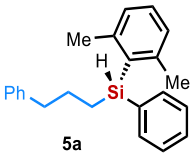
3t



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	3.268	Unknown	2392818	13.450	13120811	49.40
2	3.468	Unknown	2303878	17.100	13442182	50.60



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	3.294	Unknown	61086	11.800	257394	2.41
2	3.485	Unknown	2124445	22.100	10414654	97.59



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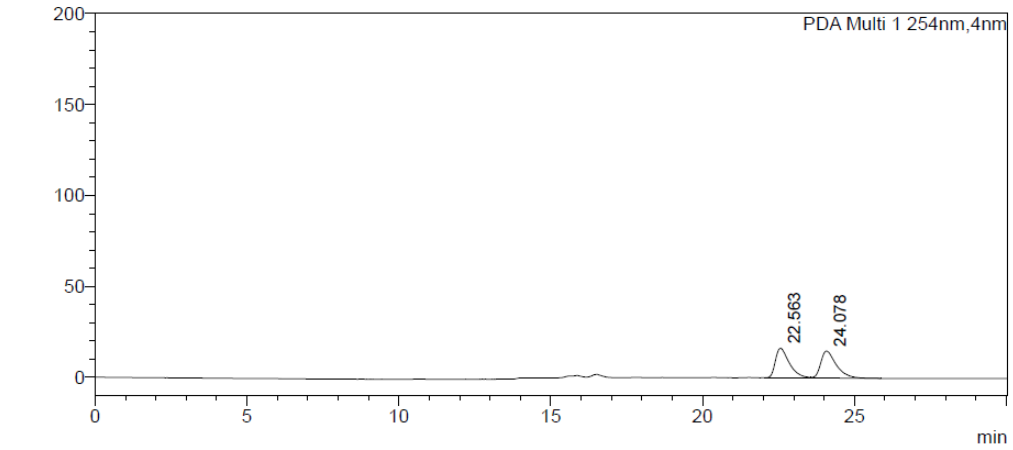
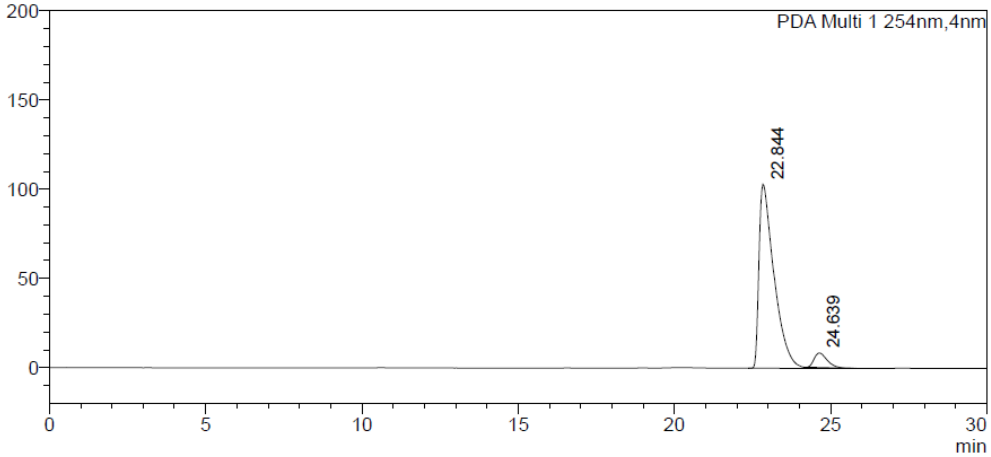


<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area	Height	Area%
1	22.563	521683	16273	49.781
2	24.078	526281	14876	50.219
Total		1047964	31150	100.000

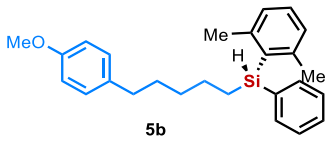
<Chromatogram>



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area	Height	Area%
1	22.844	3466153	103187	93.613
2	24.639	236470	8242	6.387
Total		3702623	111430	100.000



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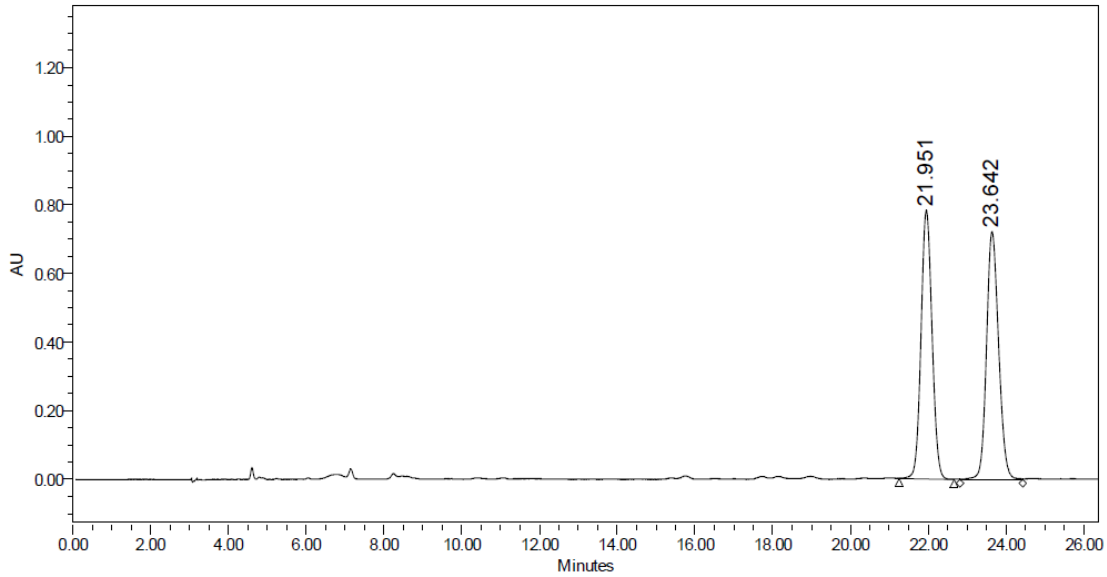
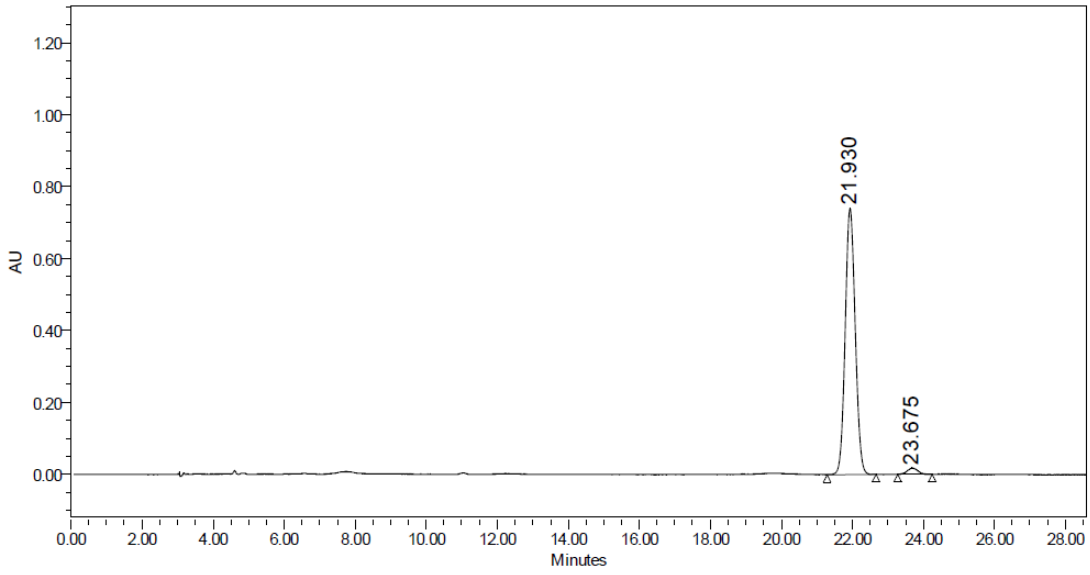
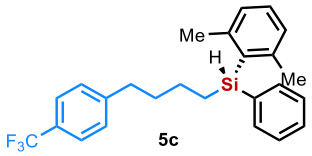


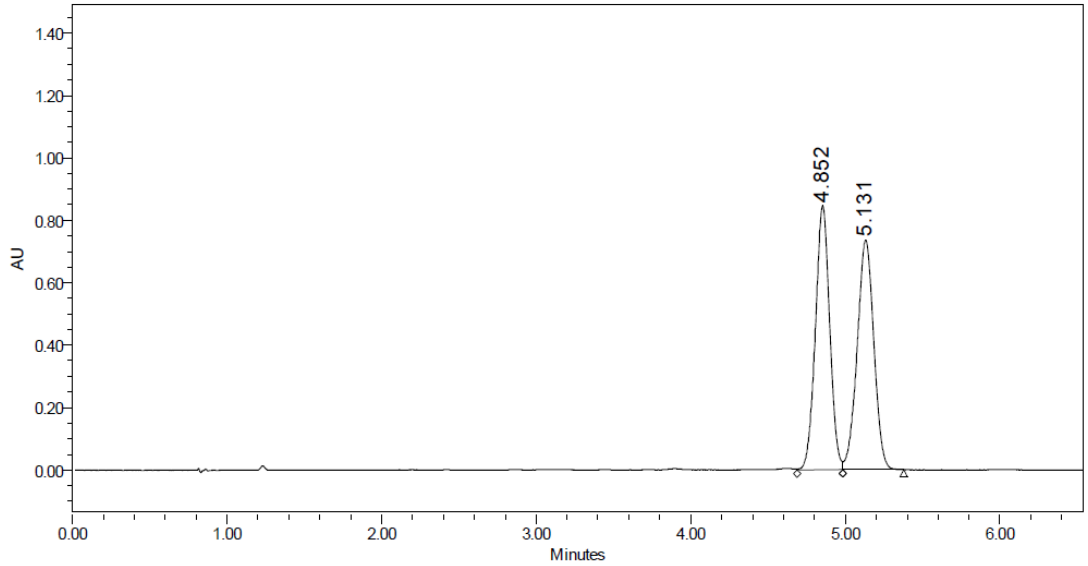
	RT	Peak Type	Height	Width (sec)	Area	% Area
1	21.951	Unknown	783176	84.800	15490181	49.67
2	23.642	Unknown	722748	96.900	15697188	50.33



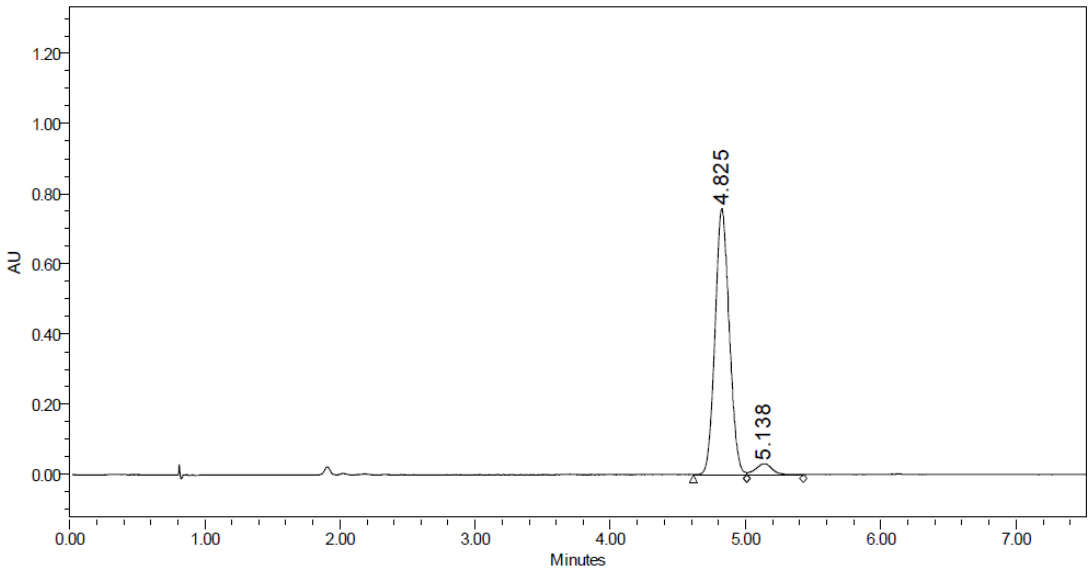
	RT	Peak Type	Height	Width (sec)	Area	% Area
1	21.930	Unknown	740124	82.650	14613939	97.47
2	23.675	Unknown	18027	58.400	379852	2.53



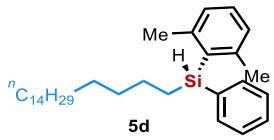
5c



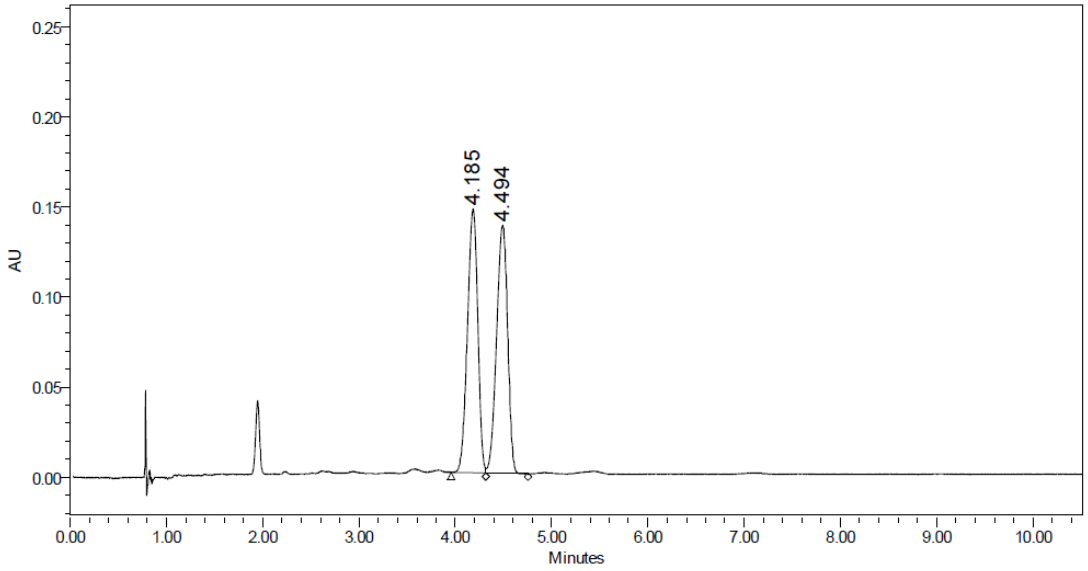
	RT	Peak Type	Height	Width (sec)	Area	% Area
1	4.852	Unknown	846345	17.750	5455581	49.69
2	5.131	Unknown	736318	23.600	5523273	50.31



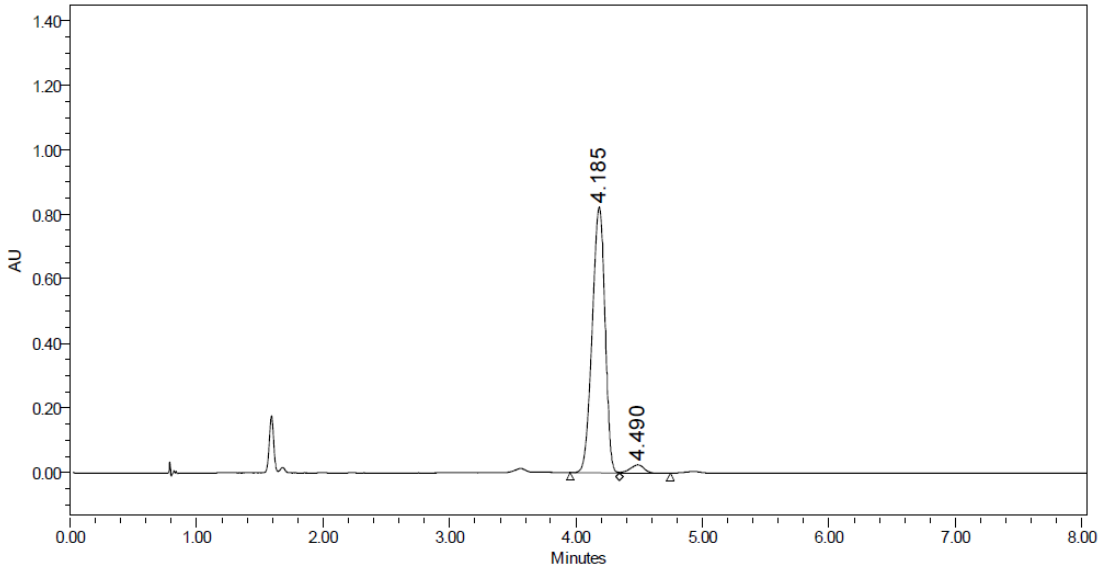
	RT	Peak Type	Height	Width (sec)	Area	% Area
1	4.825	Unknown	757637	23.750	5517801	95.47
2	5.138	Unknown	31359	25.100	261840	4.53



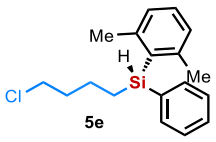
5d



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	4.185	Unknown	146204	21.600	1094730	50.07
2	4.494	Unknown	137322	26.150	1091712	49.93



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	4.185	Unknown	823597	23.350	5799583	96.93
2	4.490	Unknown	24891	24.200	183483	3.07



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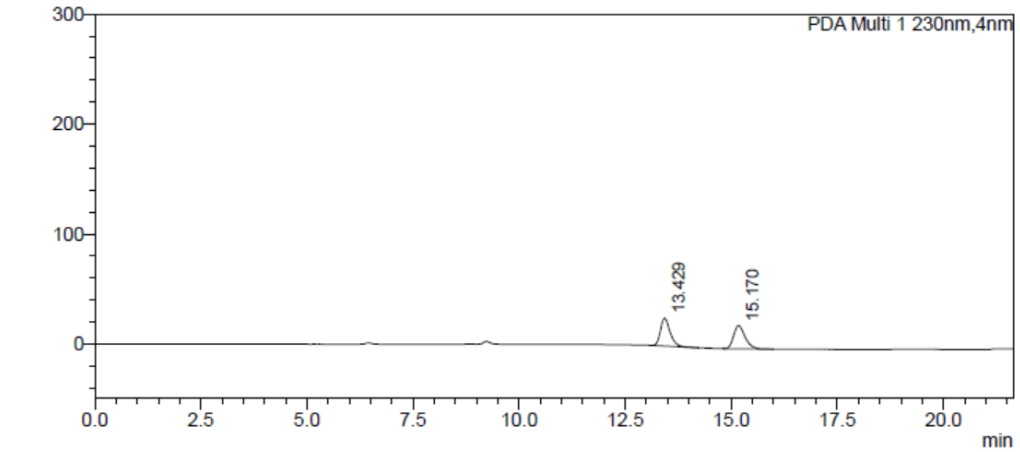

<Peak Table>

PDA Ch1 230nm

Peak#	Ret. Time	Area	Height	Area%
1	13.429	398119	25405	50.093
2	15.170	396646	21281	49.907
Total		794765	46686	100.000

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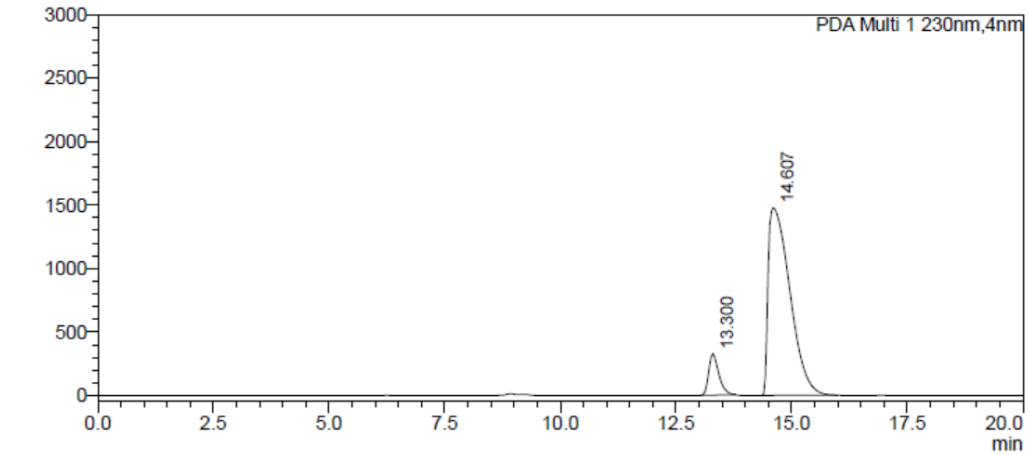
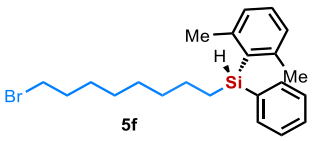


<Peak Table>

PDA Ch1 230nm

Peak#	Ret. Time	Area	Height	Area%
1	13.300	5000474	325251	9.428
2	14.607	48035254	1478356	90.572
Total		53035728	1803607	100.000



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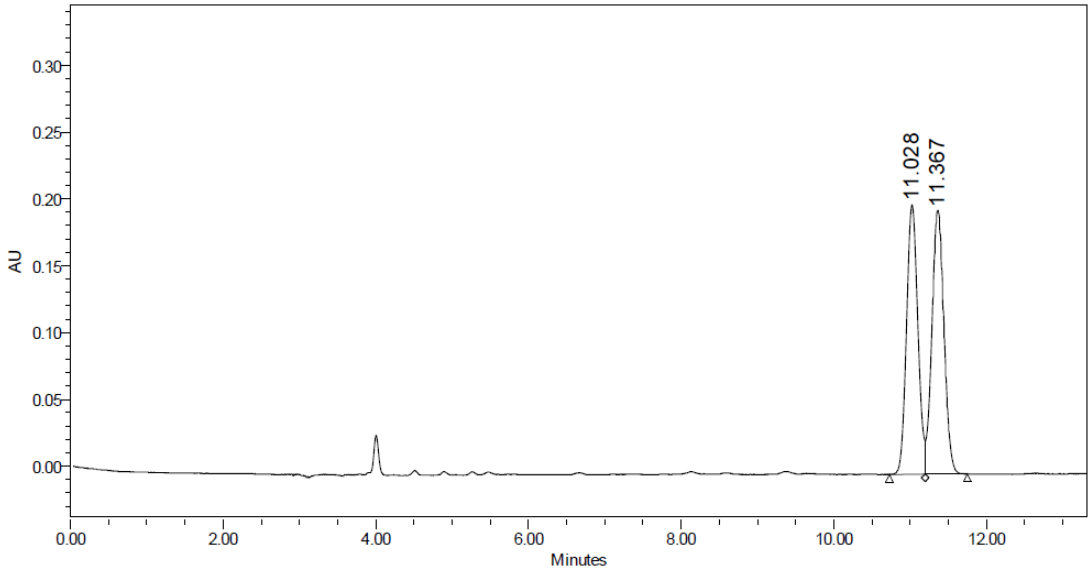
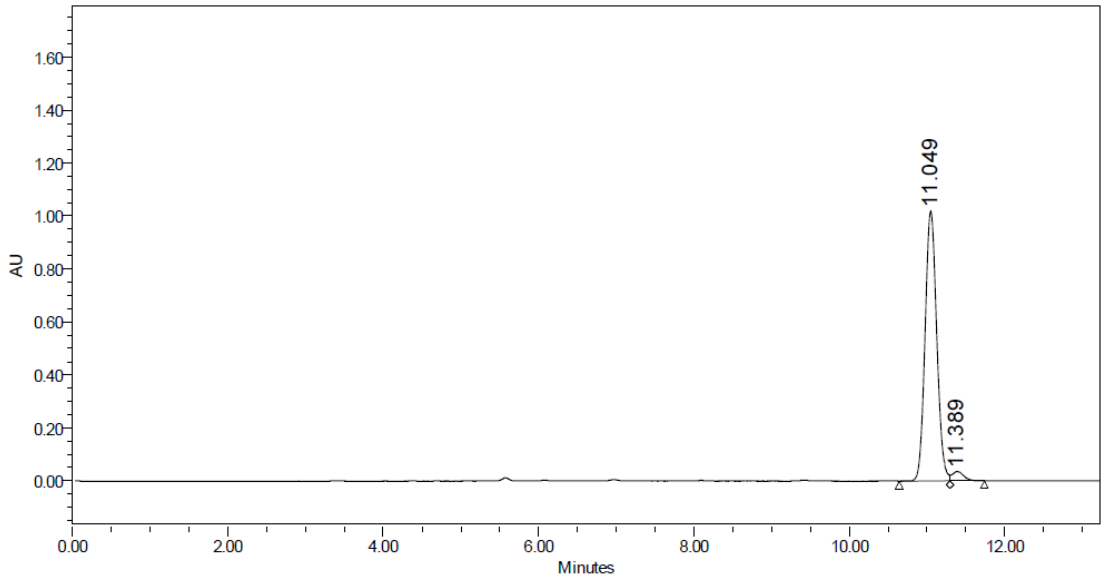
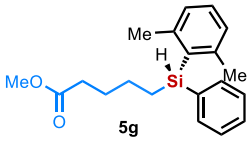


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	11.028	Unknown	201485	28.100	2092455	49.44
2	11.367	Unknown	197204	33.100	2140142	50.56



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	11.049	Unknown	1018878	39.250	10681845	96.68
2	11.389	Unknown	35350	26.500	366255	3.32



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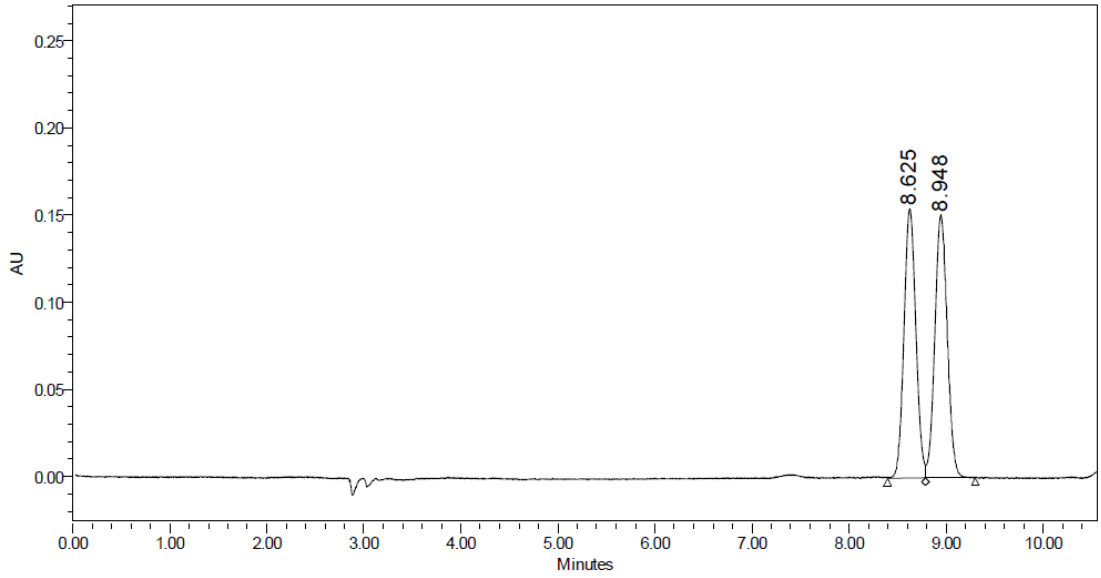
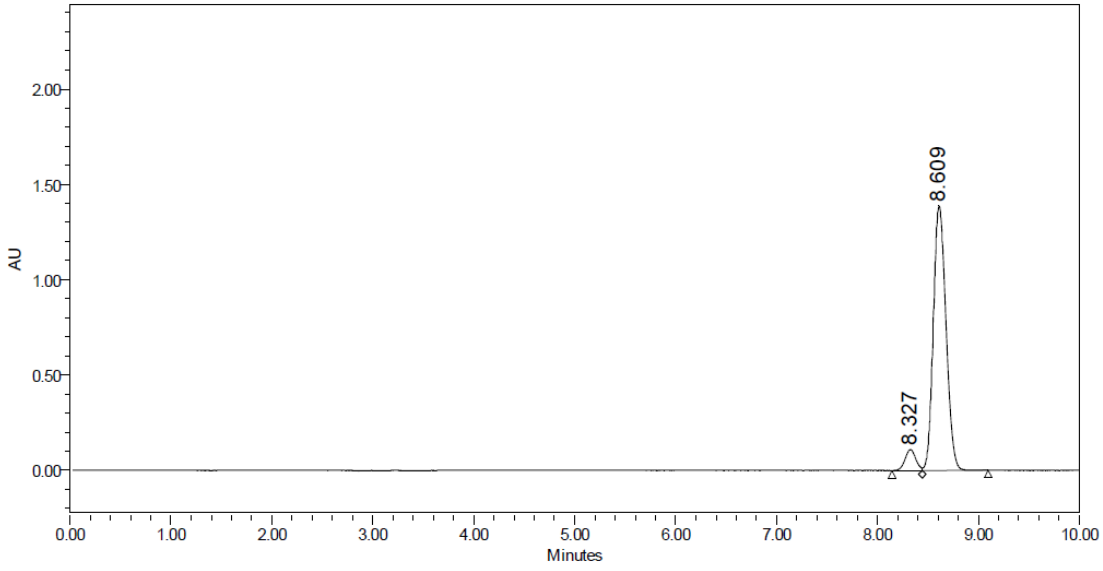
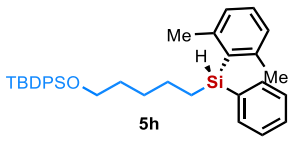


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	8.625	Unknown	154522	23.500	1318898	49.62
2	8.948	Unknown	150834	30.800	1338957	50.38



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	8.327	Unknown	109214	18.050	797181	6.22
2	8.609	Unknown	1388394	39.200	12016561	93.78



5h

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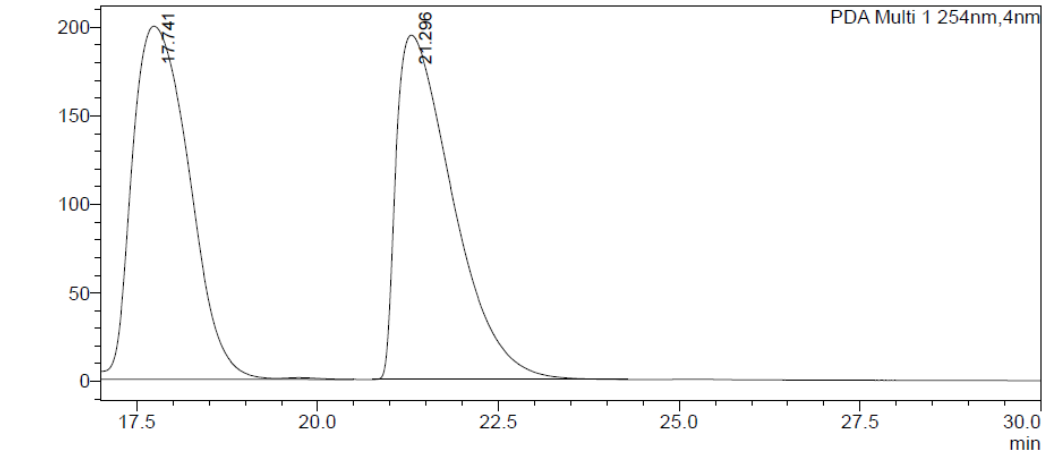
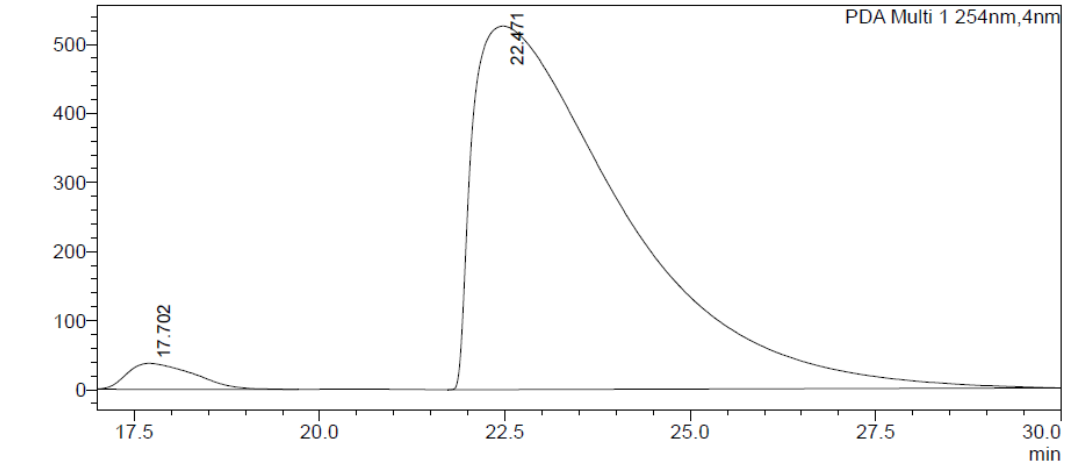


<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	17.741	10916768	199507	50.765			
2	21.296	10587961	194501	49.235			
Total		21504729	394008				

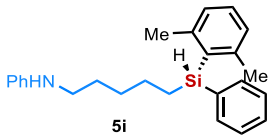
<Chromatogram>



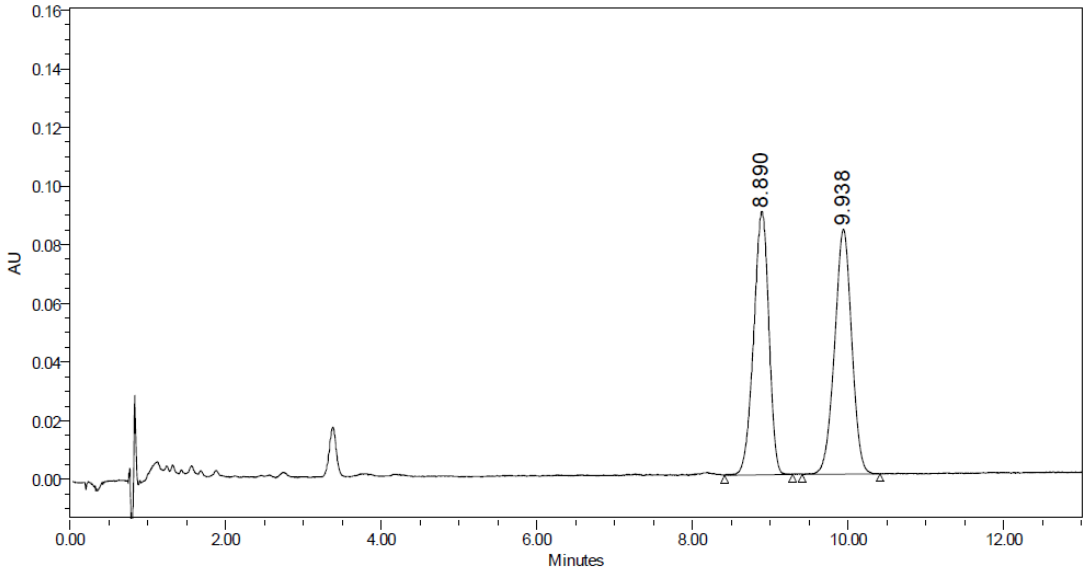
<Peak Table>

PDA Ch1 254nm

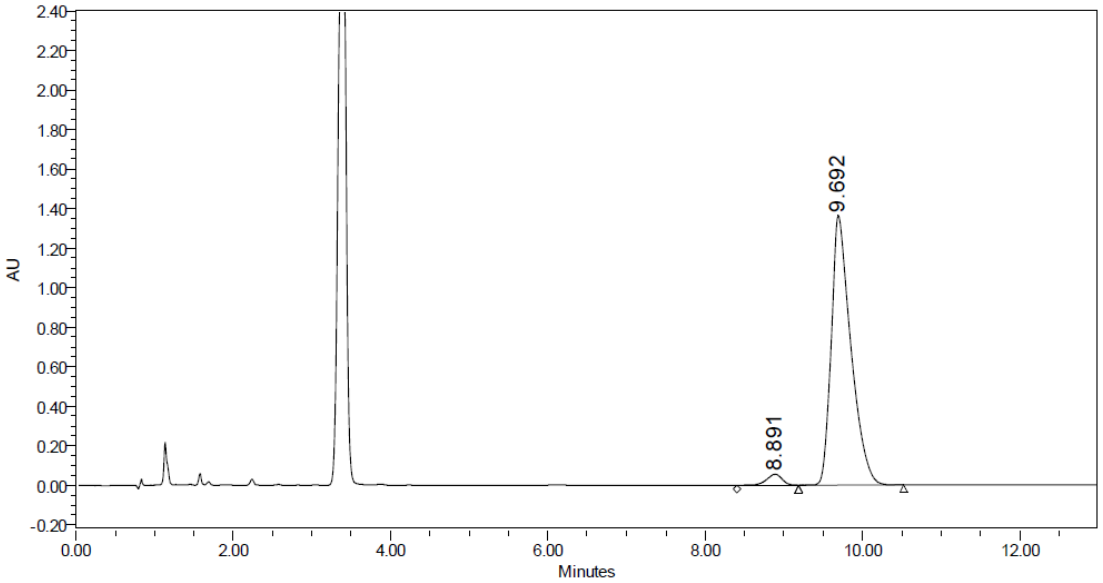
Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	17.702	2348200	37488	3.066			
2	22.471	74243676	526012	96.934			
Total		76591875	563500				



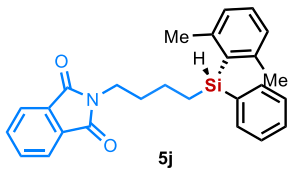
5i



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	8.890	Unknown	89823	52.550	1205928	48.31
2	9.938	Unknown	83546	60.050	1290070	51.69



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	8.891	Unknown	54734	47.200	728732	3.00
2	9.692	Unknown	1361919	80.050	23575436	97.00



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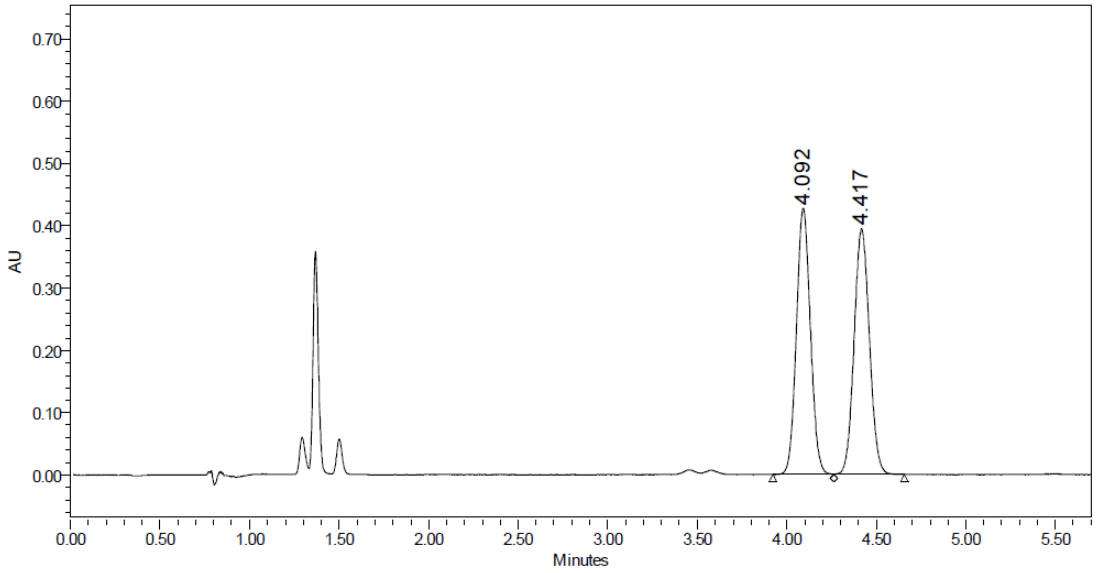
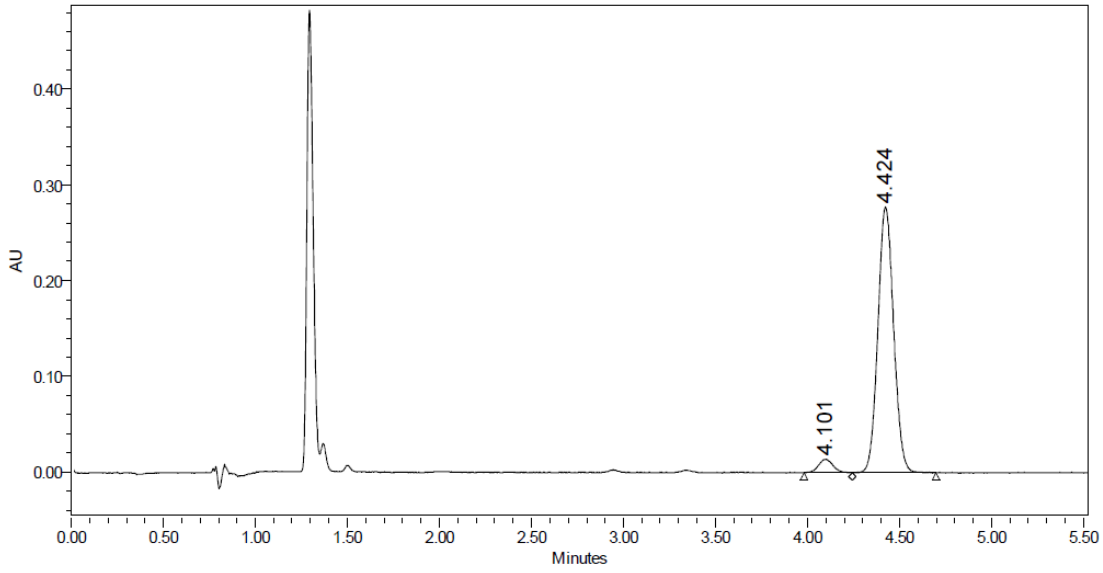
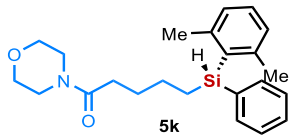


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	4.092	Unknown	427287	20.450	2332343	49.91
2	4.417	Unknown	394629	23.550	2341179	50.09



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	4.101	Unknown	14089	15.700	77295	4.48
2	4.424	Unknown	277341	27.200	1649245	95.52



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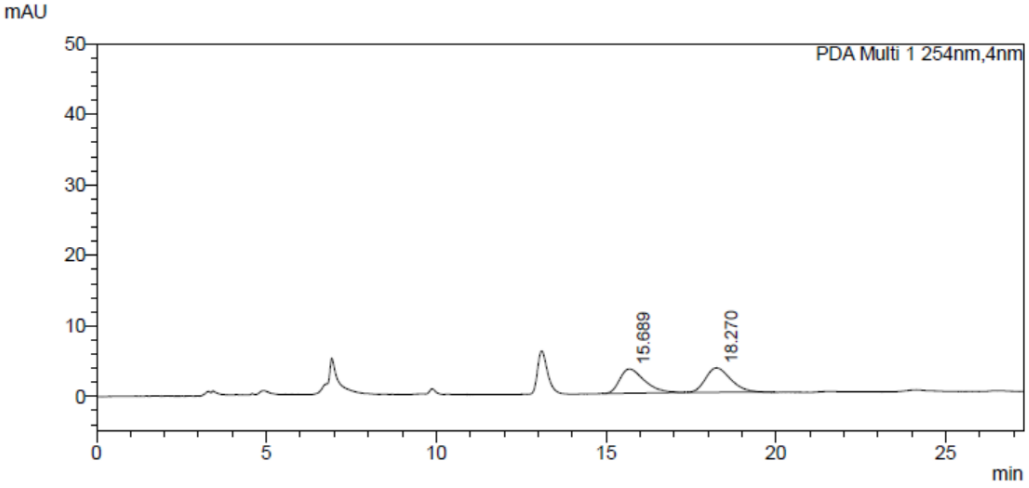
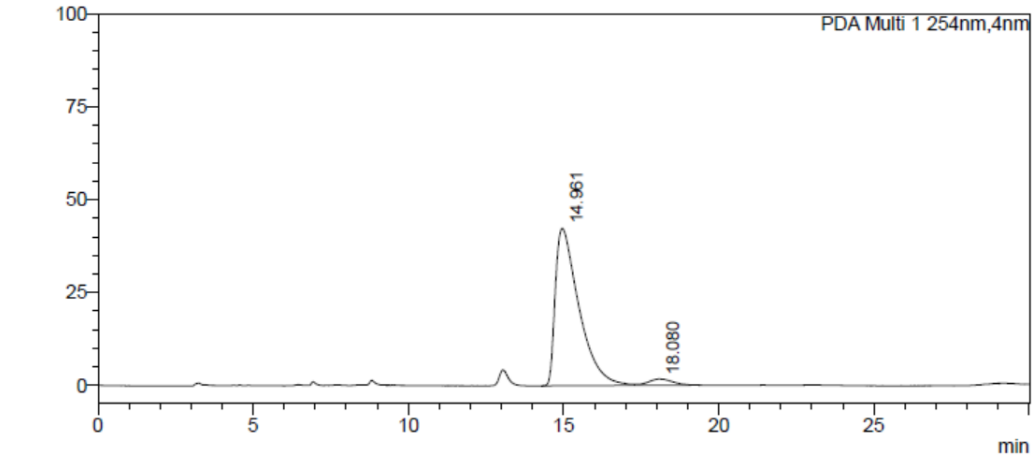


<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area	Height	Conc.
1	15.689	174620	3439	49.447
2	18.270	178526	3456	50.553
Total		353145	6895	

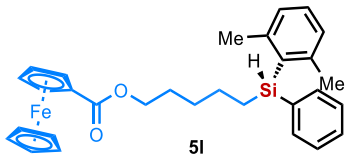
<Chromatogram>



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area	Height	Conc.
1	14.961	2239941	42306	96.116
2	18.080	90521	1688	3.884
Total		2330462	43994	



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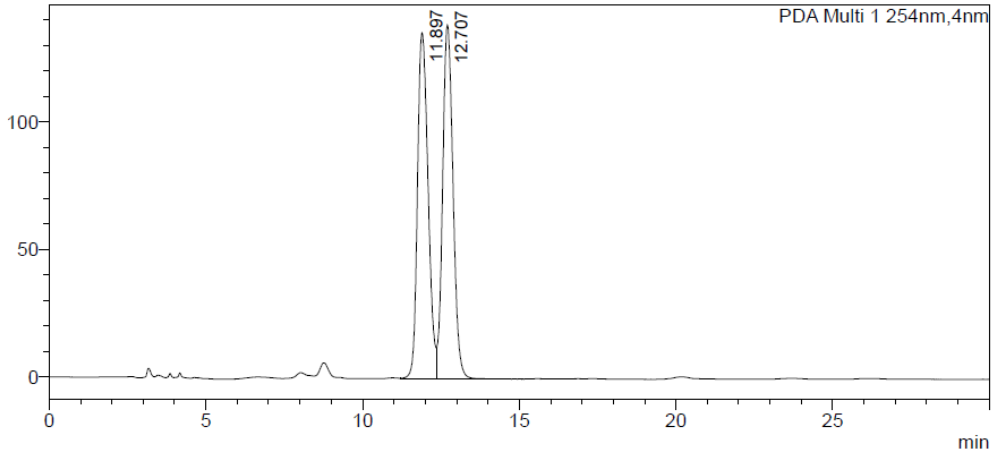
mAU



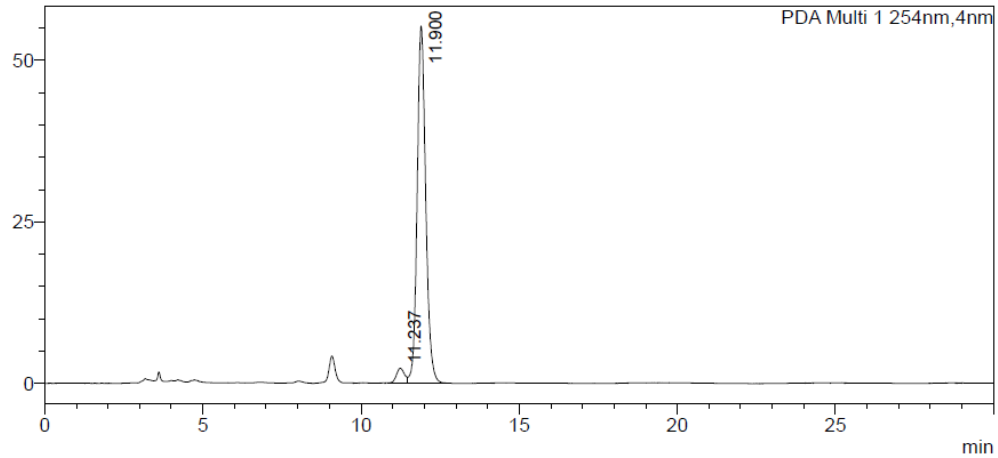
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	11.897	3199068	135719	49.879			
2	12.707	3214532	138726	50.121		V	
Total		6413600	274446				

<Chromatogram>

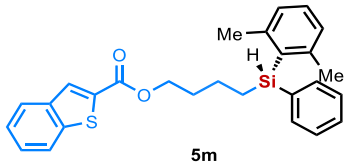
mAU



<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	11.237	41095	2293	3.786			
2	11.900	1044324	55189	96.214		V	
Total		1085419	57482				



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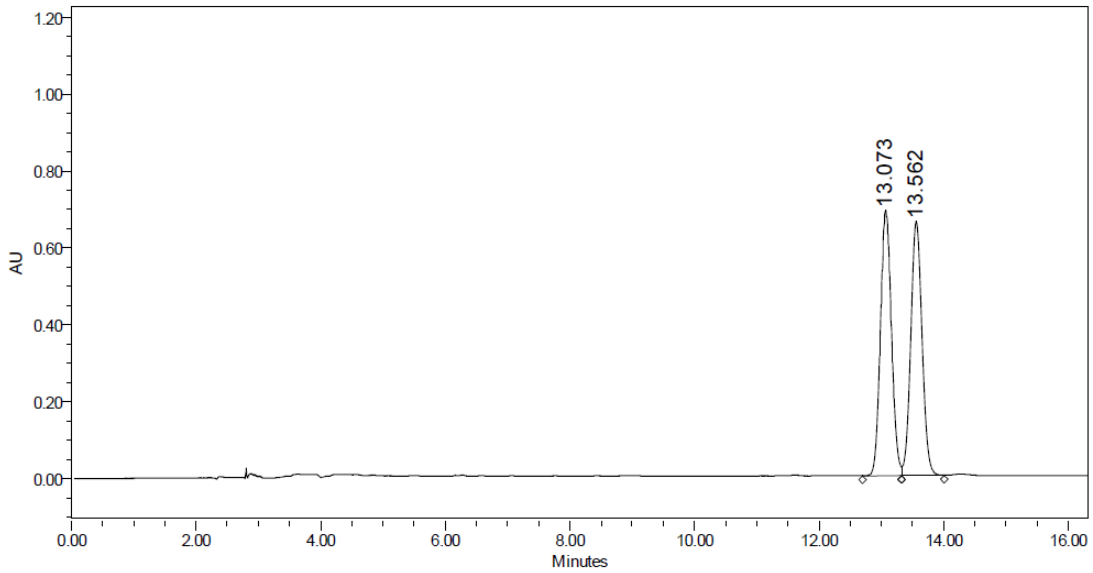
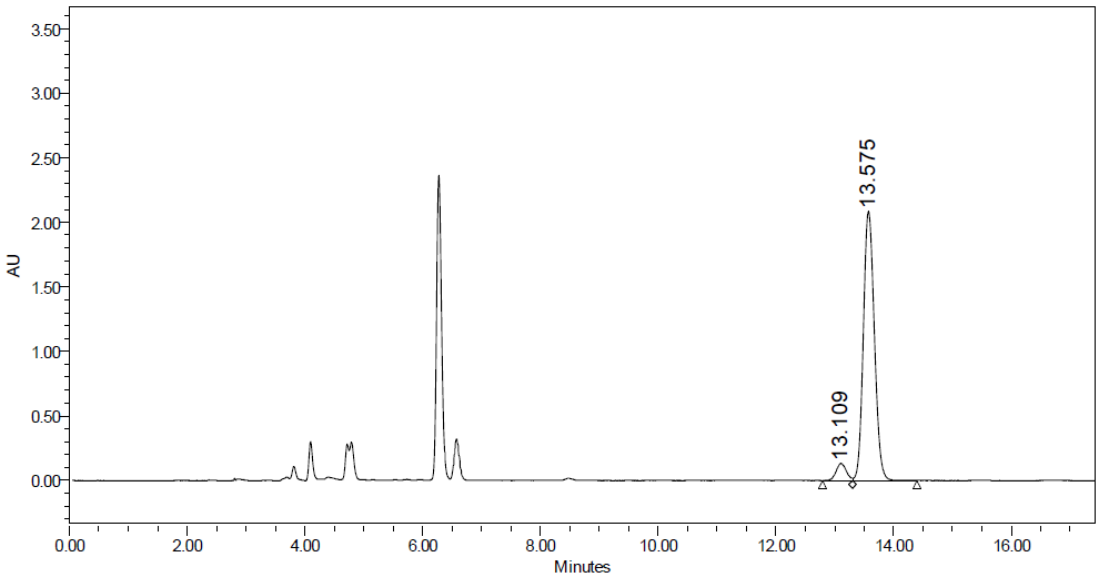
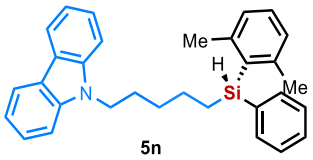


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	13.073	Unknown	690381	37.750	8347032	49.86
2	13.562	Unknown	661228	40.950	8394357	50.14



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	13.109	Unknown	131004	30.750	1576448	5.47
2	13.575	Unknown	2084368	65.600	27268889	94.53



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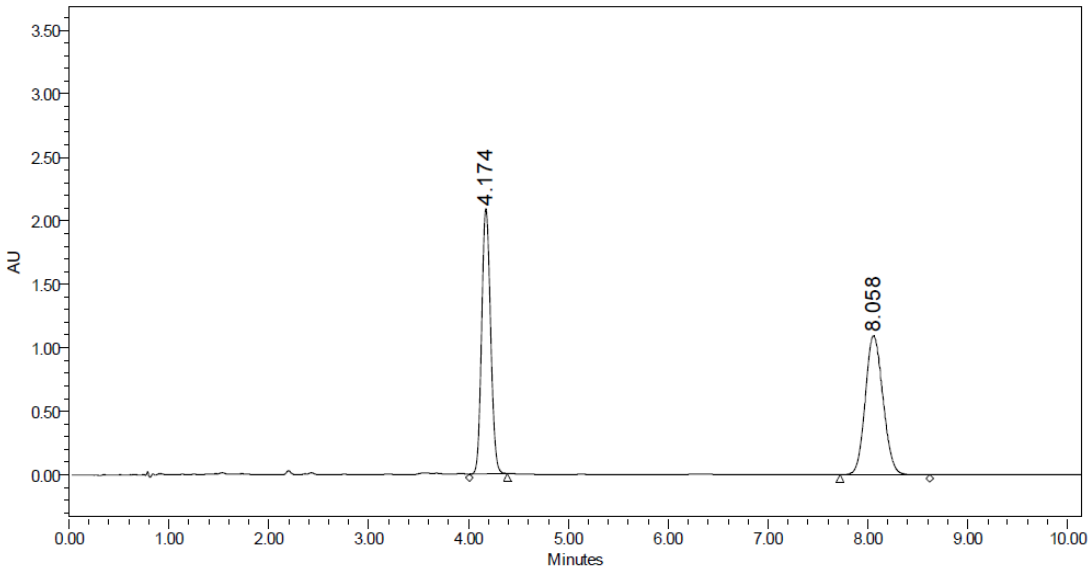
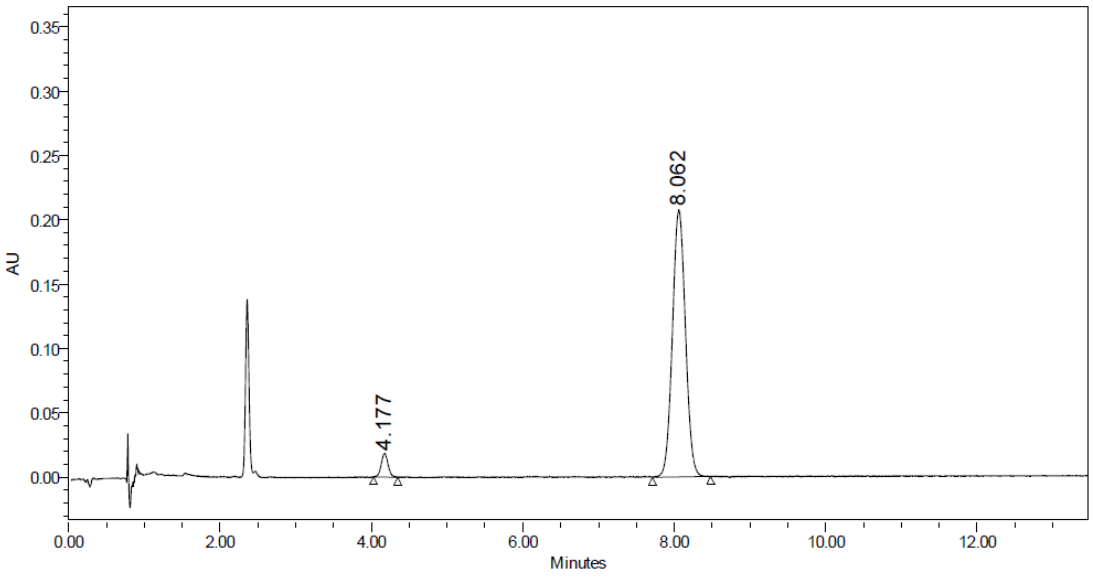
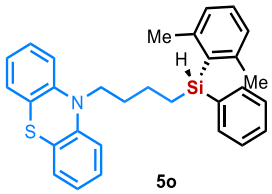


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	4.174	Unknown	2084676	22.800	13049622	49.52
2	8.058	Unknown	1091847	53.850	13304888	50.48



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	4.177	Unknown	18113	19.200	111796	4.29
2	8.062	Unknown	207411	46.150	2492045	95.71



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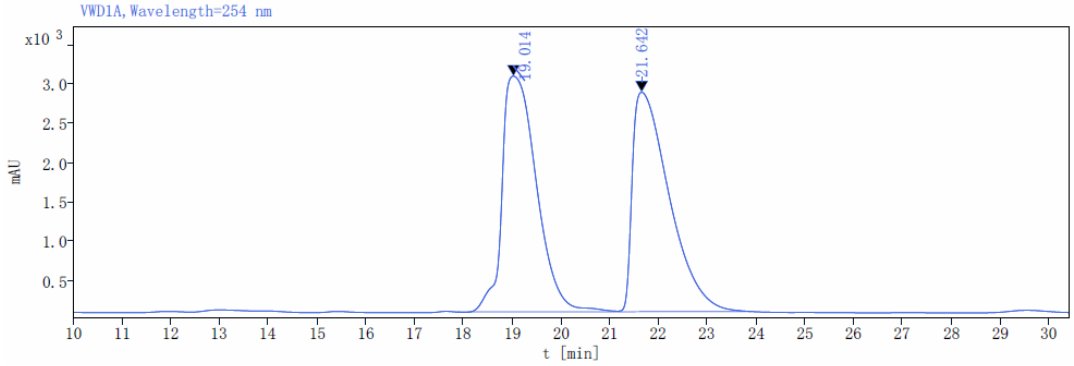
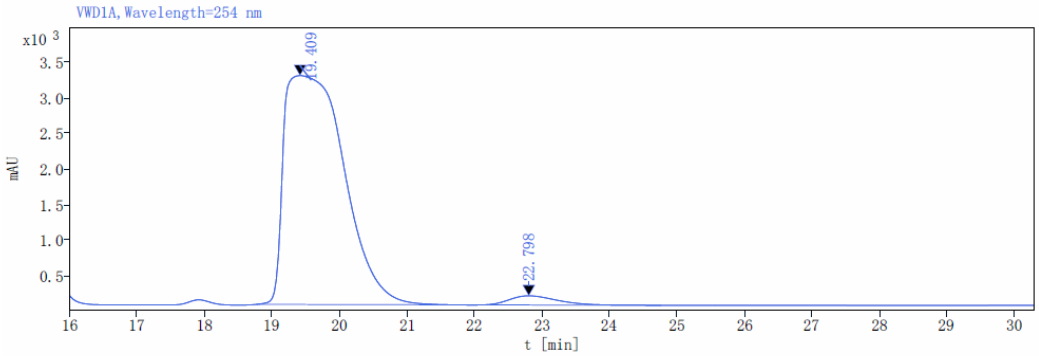


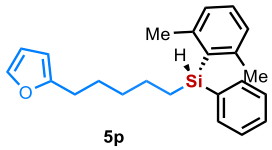
VWD1A, Wavelength=254 nm

Number	Time	Area%
1	19.014	50.18
2	21.642	49.82



VWD1A, Wavelength=254 nm

Number	Time	Area%
1	19.409	96.97
2	22.798	3.03



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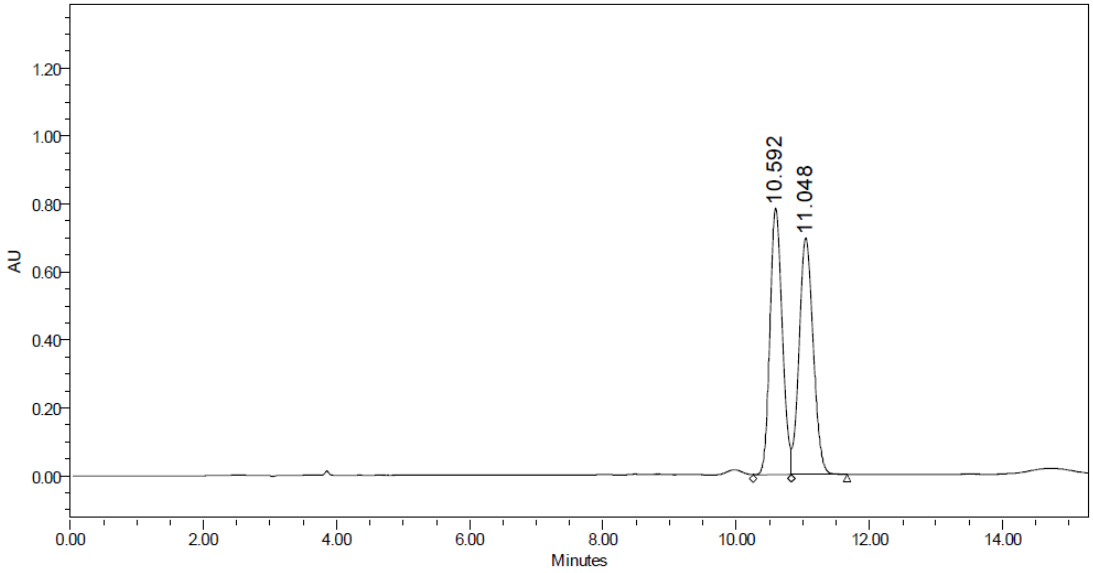
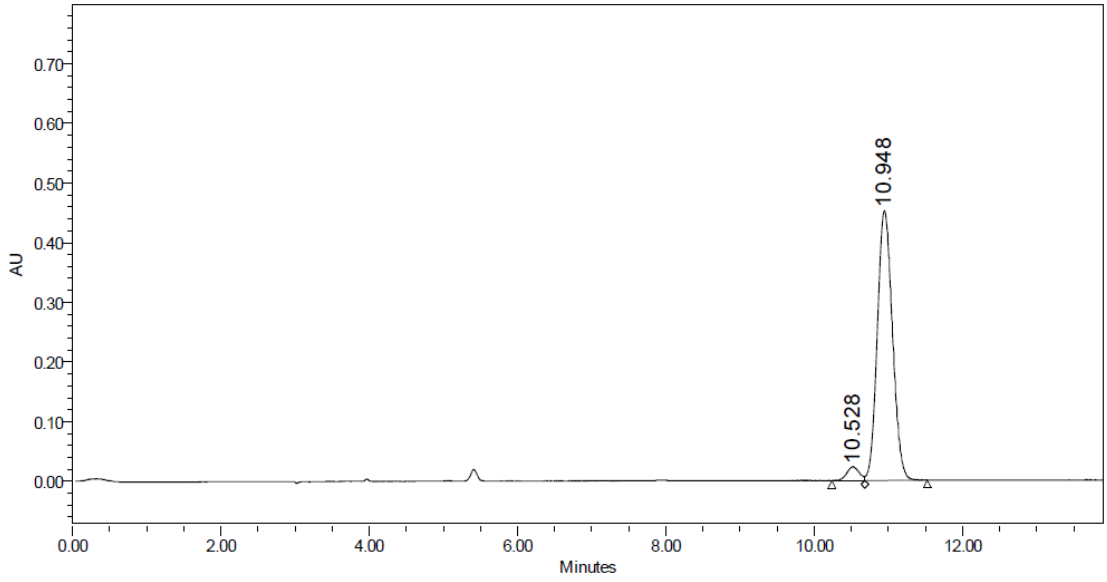
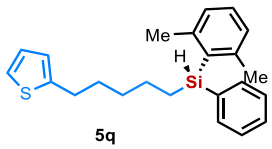


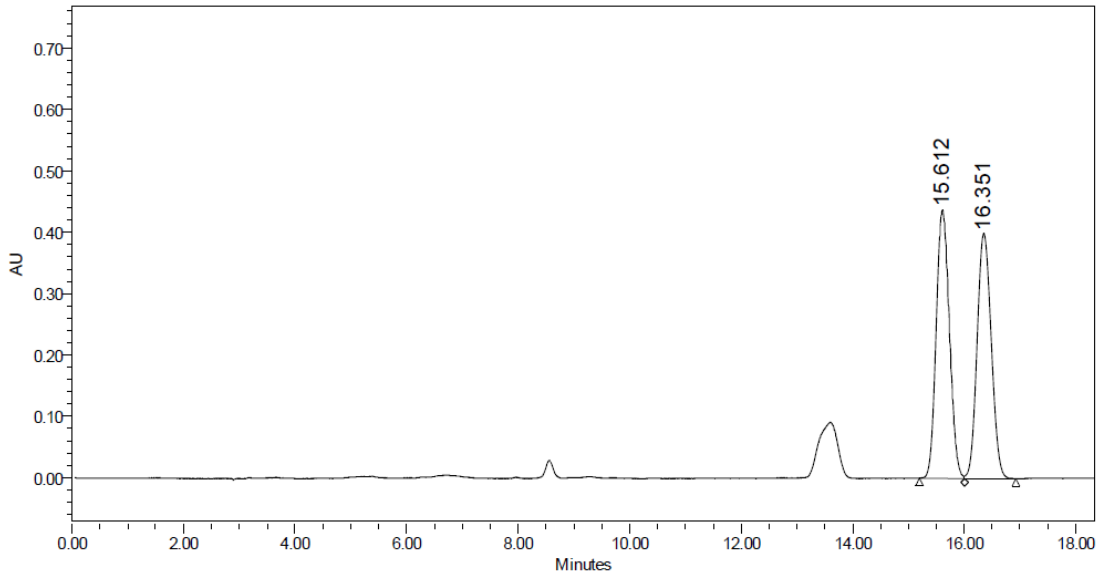
	RT	Peak Type	Height	Width (sec)	Area	% Area
1	10.592	Unknown	784223	34.350	10055747	49.52
2	11.048	Unknown	696445	50.200	10252449	50.48



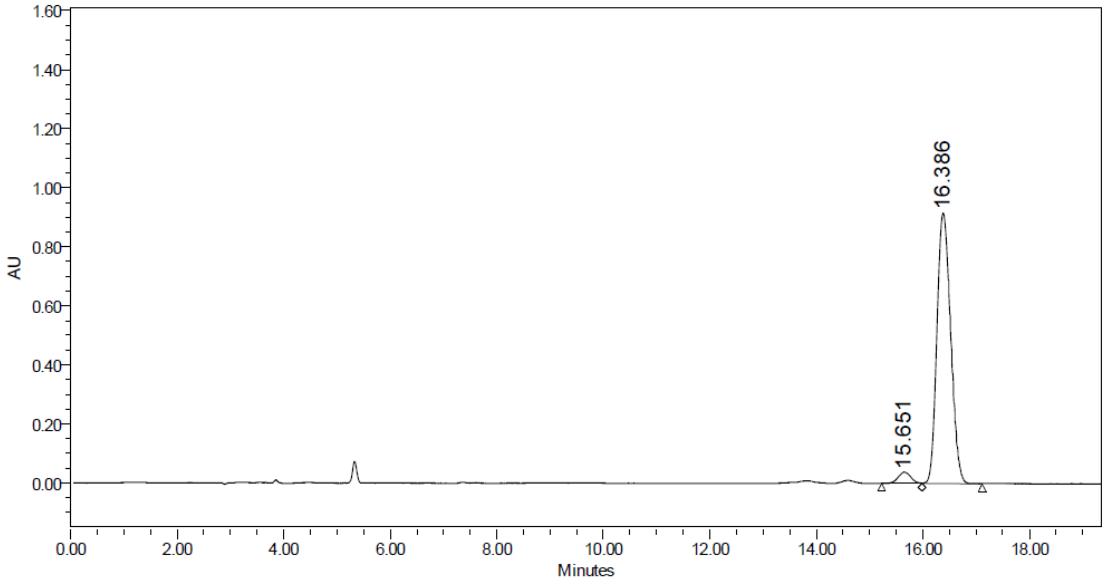
	RT	Peak Type	Height	Width (sec)	Area	% Area
1	10.528	Unknown	22621	26.650	260761	3.92
2	10.948	Unknown	451923	50.500	6393961	96.08



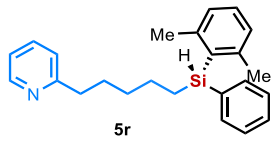
5q



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	15.612	Unknown	436617	48.600	7113390	50.09
2	16.351	Unknown	398529	55.150	7087057	49.91



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	15.651	Unknown	38667	45.400	652973	3.85
2	16.386	Unknown	915939	67.750	16326504	96.15



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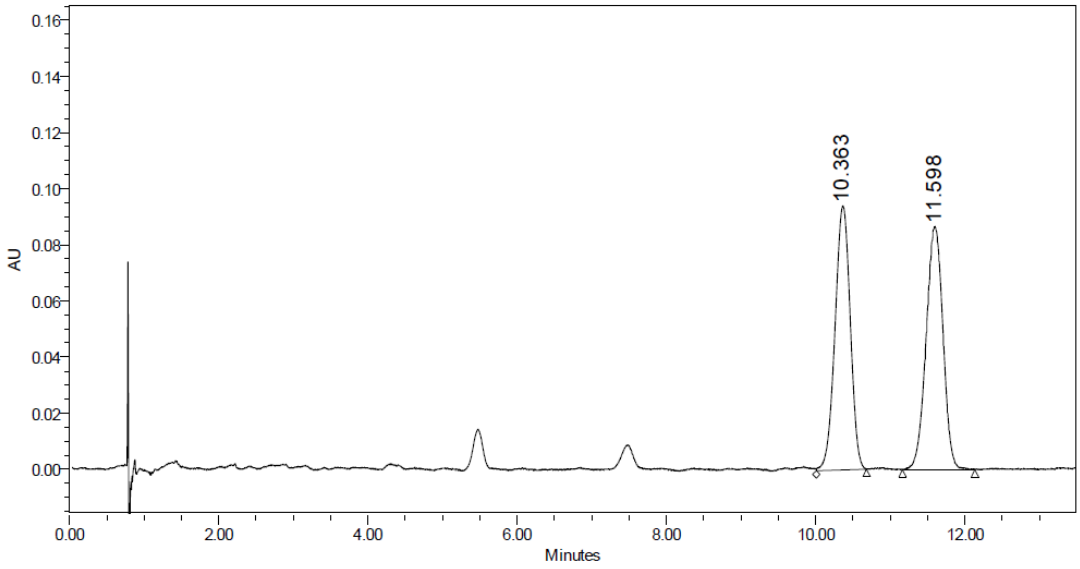
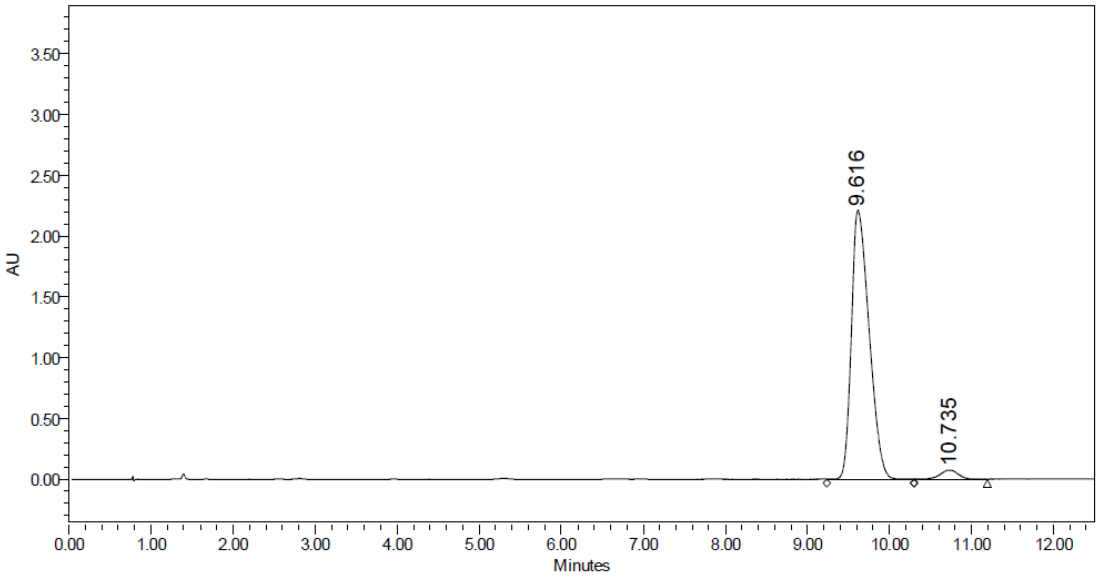
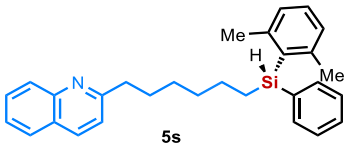


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	10.363	Unknown	94010	40.300	1346502	49.84
2	11.598	Unknown	86650	58.250	1355103	50.16



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	9.616	Unknown	2211534	63.850	33451219	96.74
2	10.735	Unknown	74545	53.550	1128080	3.26



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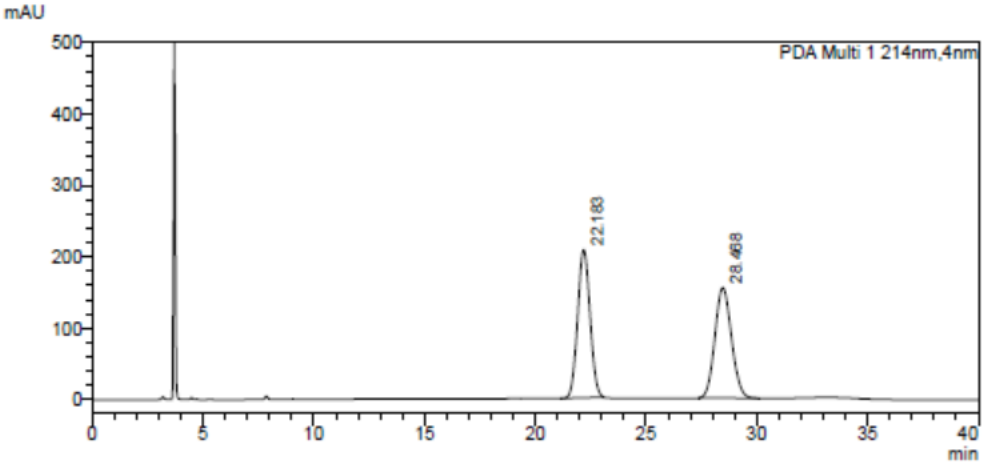

<Peak Table>

PDA Ch1 214nm

Peak#	Ret. Time	Area	Height	Conc.	Area%	Height%
1	22.183	8060802	206780	0.000	49.935	57.235
2	28.468	8081934	154505	0.000	50.065	42.765
Total		16142736	361284		100.000	100.000

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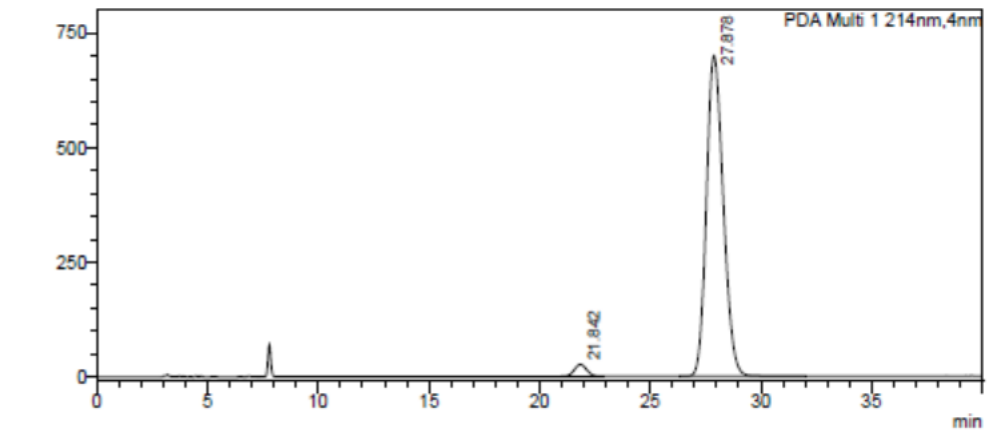
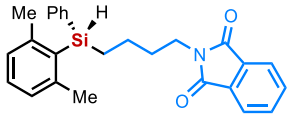


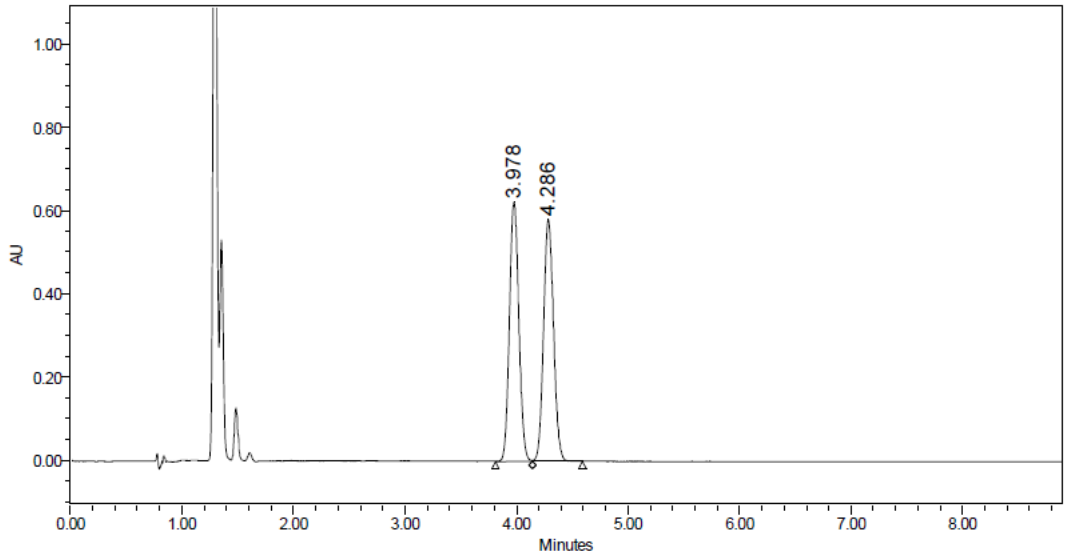
<Peak Table>

PDA Ch1 214nm

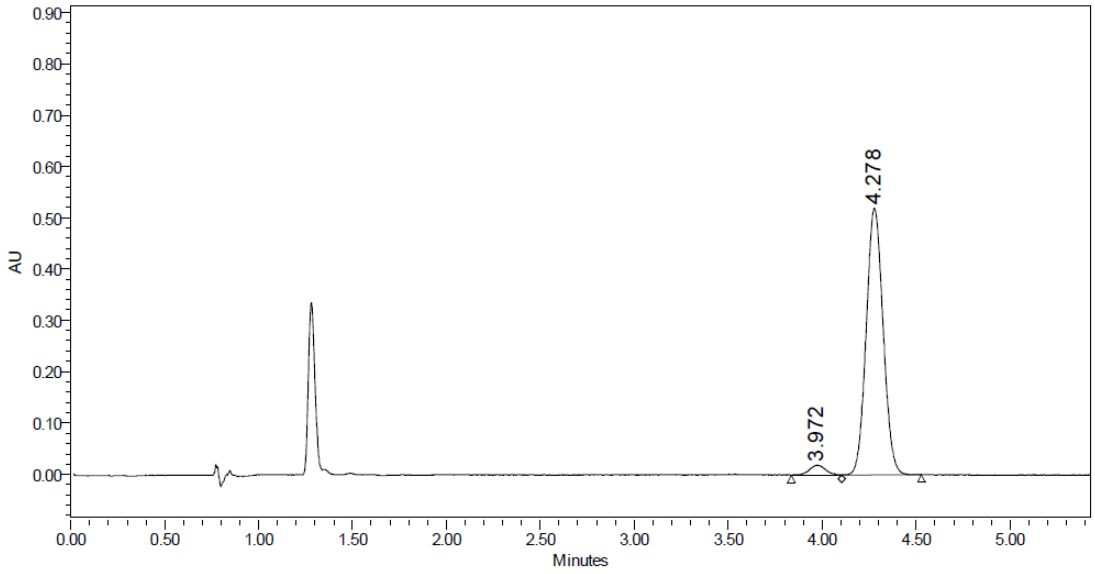
Peak#	Ret. Time	Area	Height	Conc.	Area%	Height%
1	21.842	1039224	26136	0.000	2.725	3.608
2	27.878	37090610	698302	0.000	97.275	96.392
Total		38129835	724439		100.000	100.000



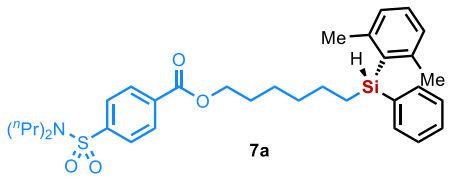
5j gram scale



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	3.978	Unknown	622359	19.900	3599110	49.93
2	4.286	Unknown	580664	26.850	3609801	50.07



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	3.972	Unknown	18851	16.000	109856	3.26
2	4.278	Unknown	519306	25.450	3262613	96.74



7a

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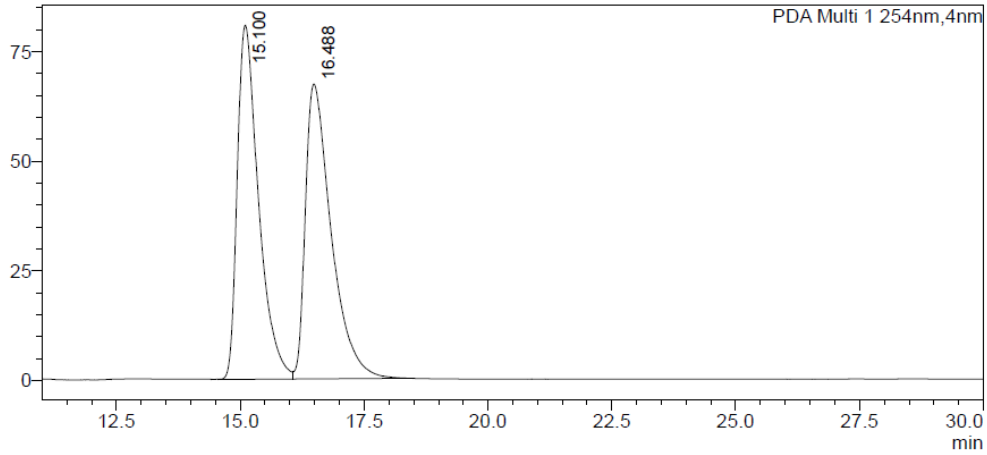
mAU



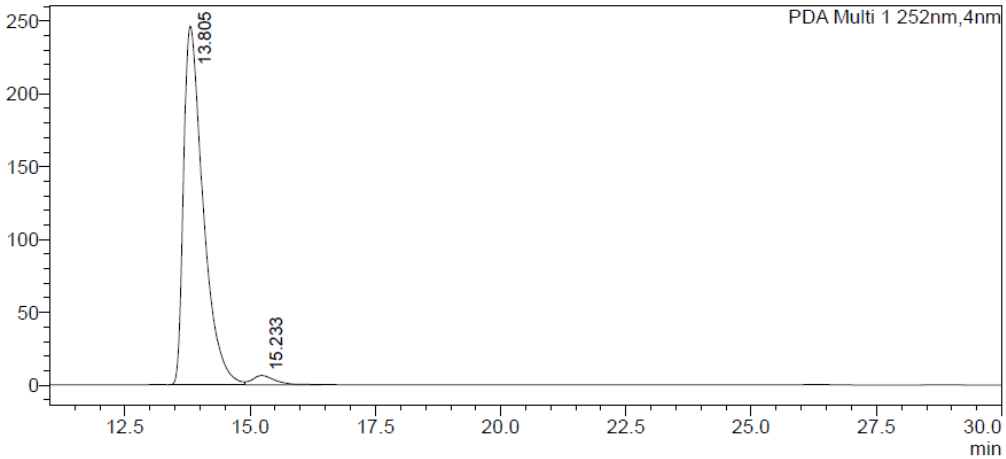
<Peak Table>

PDA Ch1 254nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	15.100	2416762	80802	49.734			
2	16.488	2442584	67299	50.266		V	
Total		4859346	148101				

<Chromatogram>

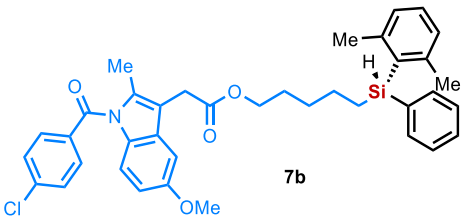
mAU



<Peak Table>

PDA Ch1 252nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	13.805	6692340	246441	96.993		M	
2	15.233	207484	6390	3.007		V M	
Total		6899824	252831				



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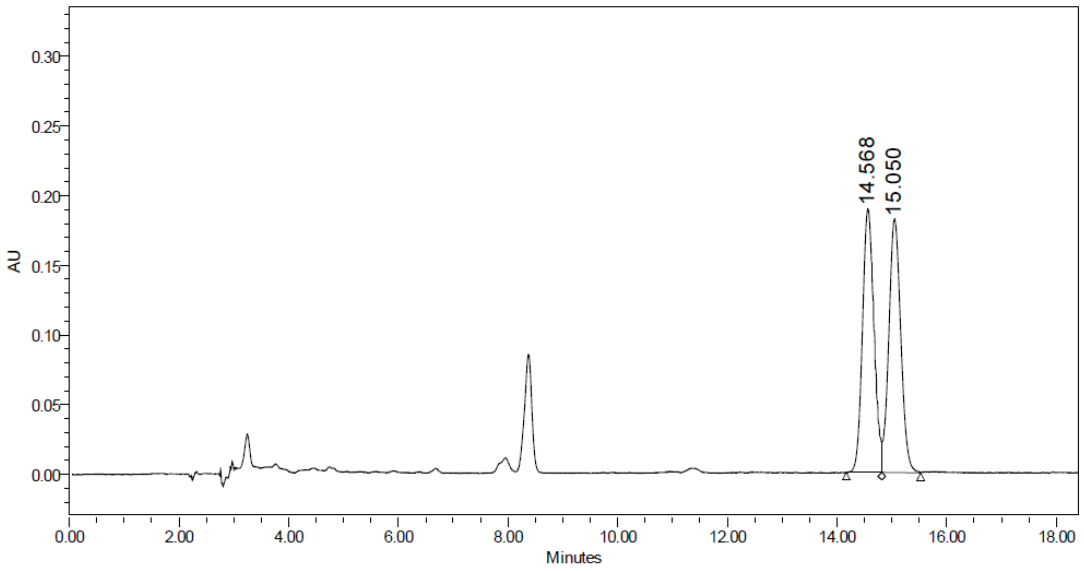
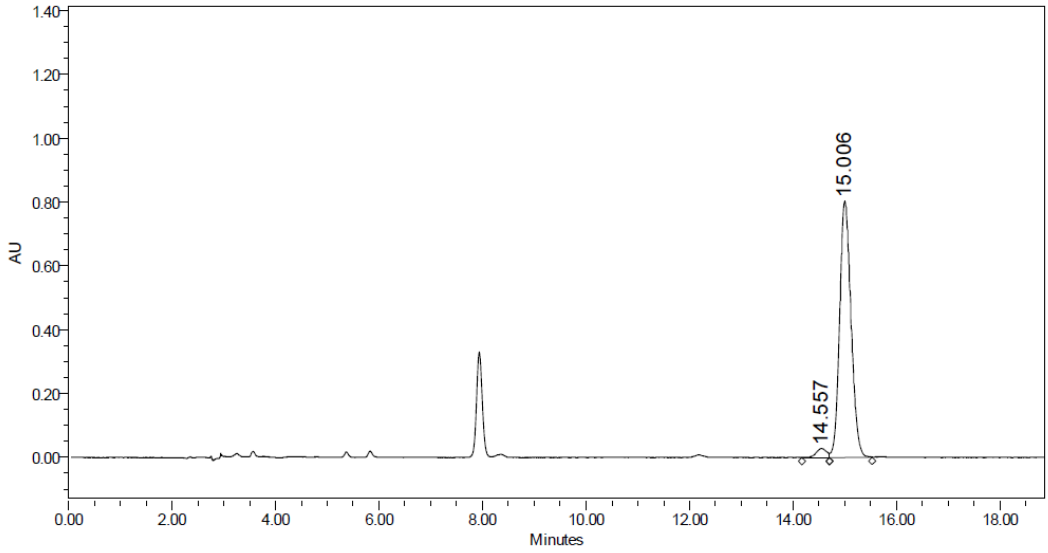
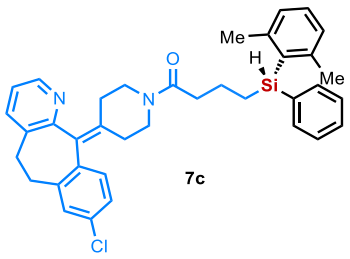


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	14.568	Unknown	189324	39.000	2747368	49.72
2	15.050	Unknown	181922	42.300	2778154	50.28



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	14.557	Unknown	28227	32.050	389964	3.11
2	15.006	Unknown	803103	49.400	12136668	96.89



7c

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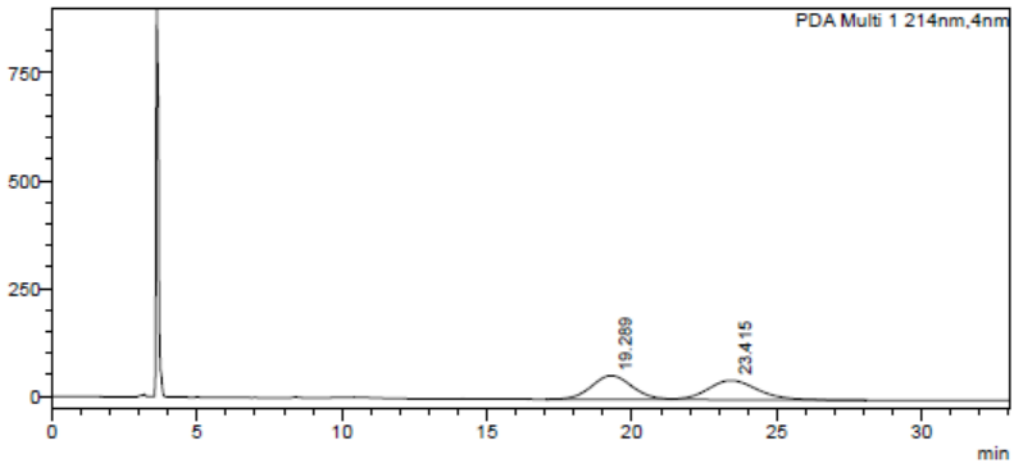
mAU



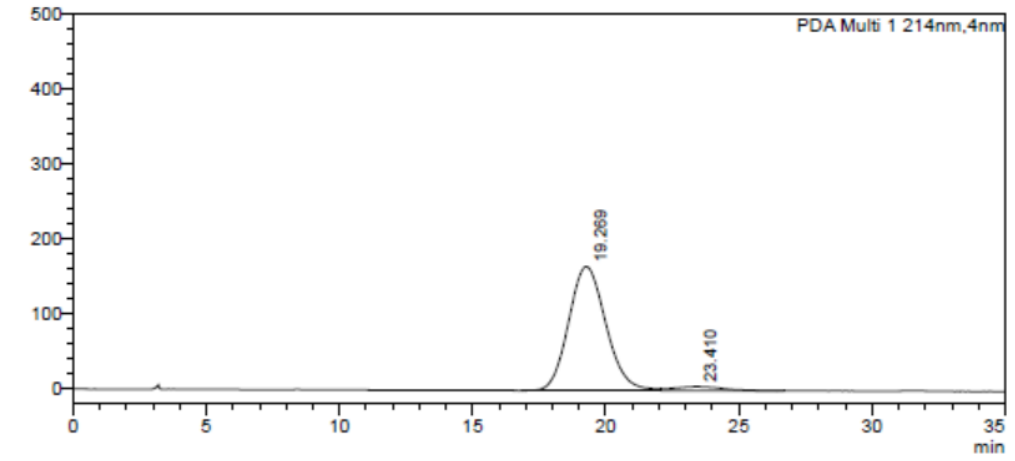
<Peak Table>

PDA Ch1 214nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Area%	Height%
1	19.289	5330094	54931	0.000		49.956	55.113
2	23.415	5339399	44738	0.000		50.044	44.887
Total		10669493	99670			100.000	100.000

<Chromatogram>

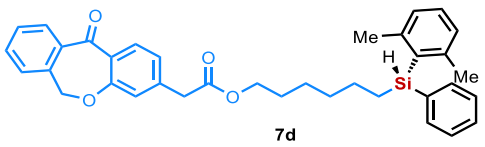
mAU



<Peak Table>

PDA Ch1 214nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Area%	Height%
1	19.269	16115992	165273	0.000		95.781	96.779
2	23.410	709803	5500	0.000		4.219	3.221
Total		16825796	170772			100.000	100.000



7d

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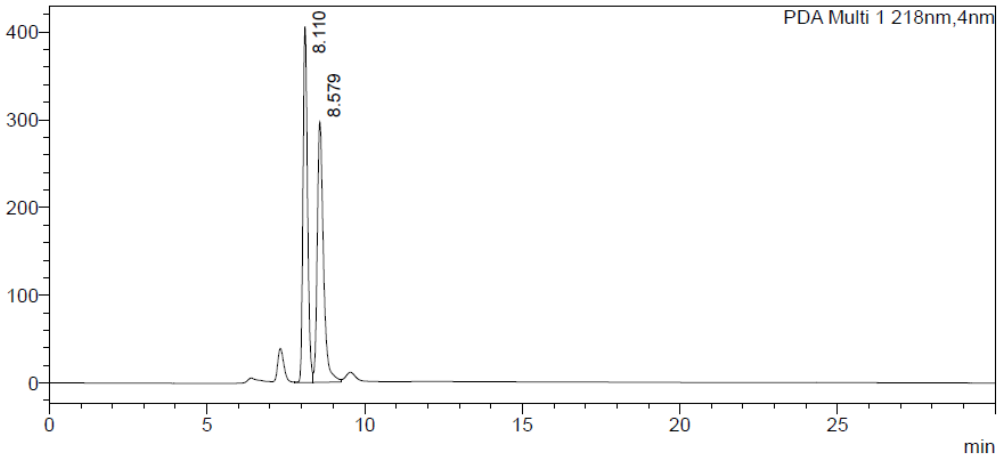
mAU



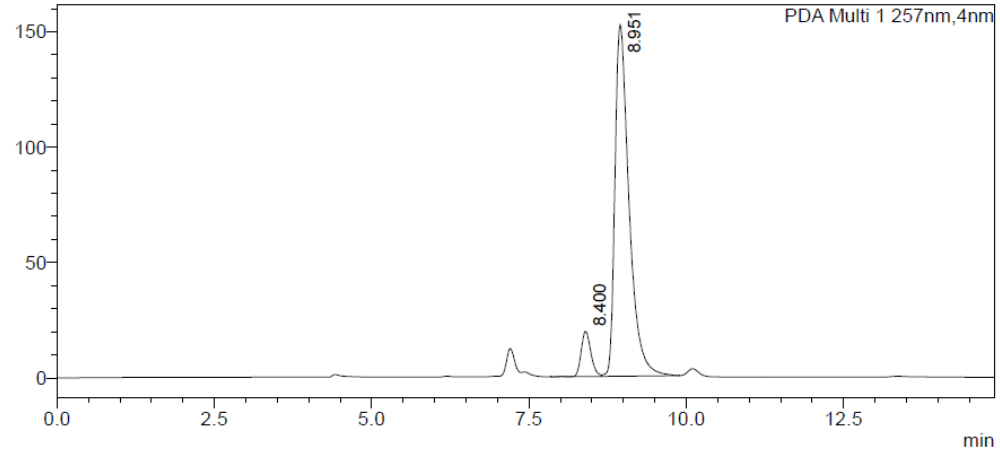
<Peak Table>

PDA Ch1 218nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	8.110	4027329	405853	49.836			
2	8.579	4053904	296931	50.164		V	
Total		8081233	702784				

<Chromatogram>

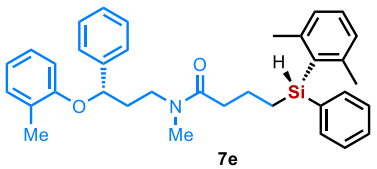
mAU



<Peak Table>

PDA Ch1 257nm

Peak#	Ret. Time	Area	Height	Conc.	Unit	Mark	Name
1	8.400	209979	19582	8.114		M	
2	8.951	2377896	152216	91.886		V M	
Total		2587875	171798				



7e

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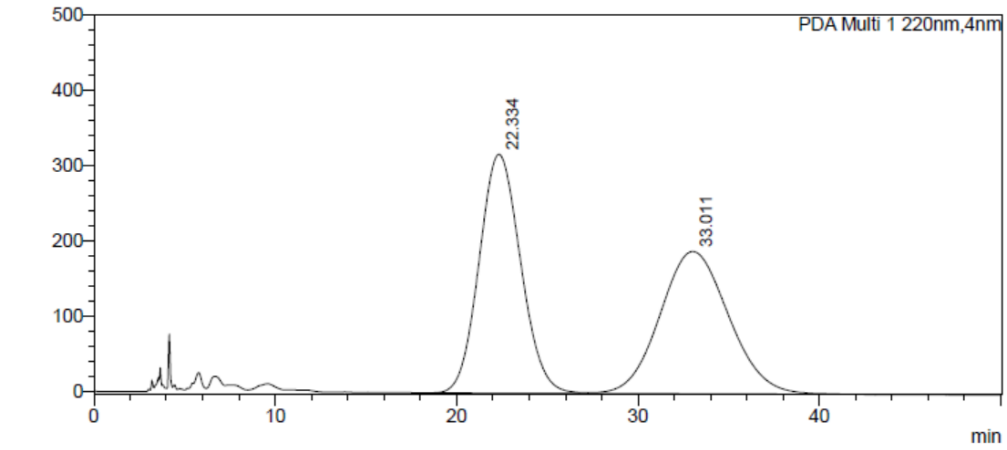
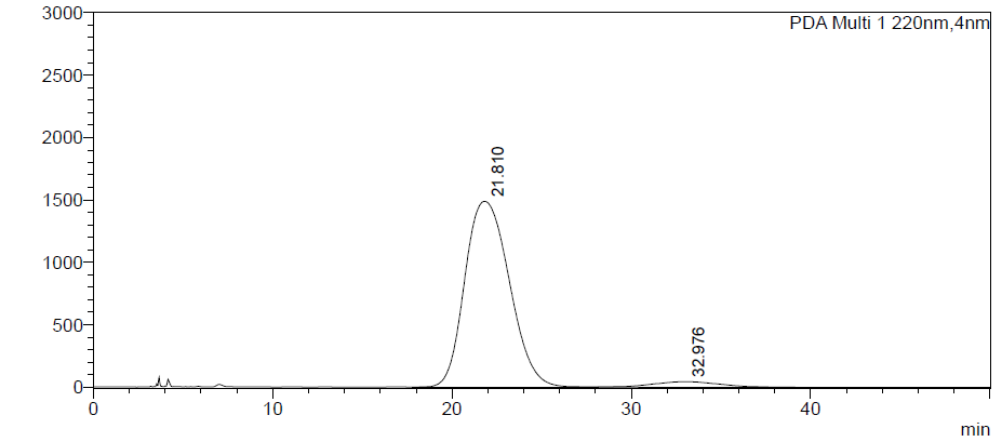


<Peak Table>

PDA Ch1 220nm

Peak#	Ret. Time	Area	Height	Unit	Area%
1	22.334	50560647	316923		50.353
2	33.011	49851873	188974		49.647
Total		100412520	505897		100.000

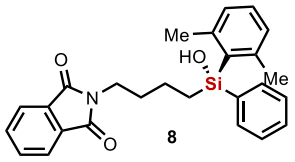
<Chromatogram>



<Peak Table>

PDA Ch1 220nm

Peak#	Ret. Time	Area	Height	Unit	Area%
1	21.810	258804367	1490420		95.534
2	32.976	12099859	45109		4.466
Total		270904226	1535530		100.000



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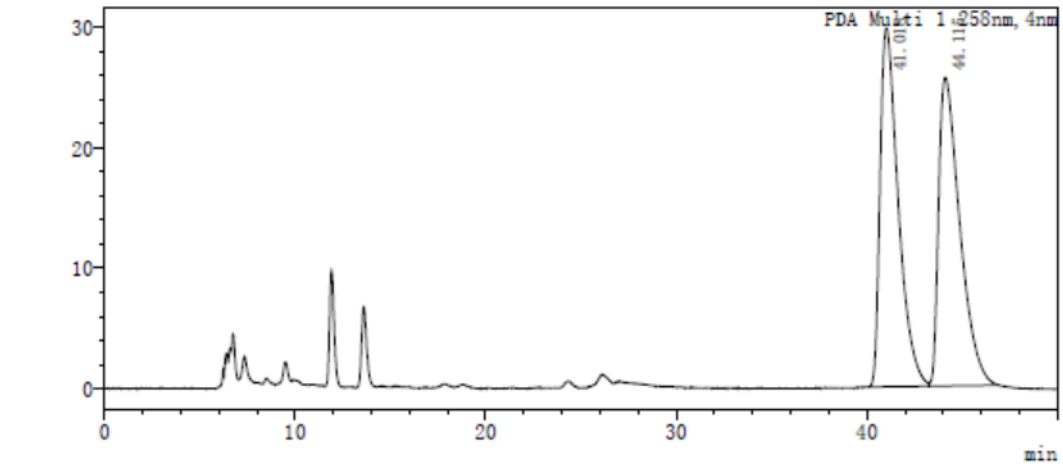
〈色谱图〉

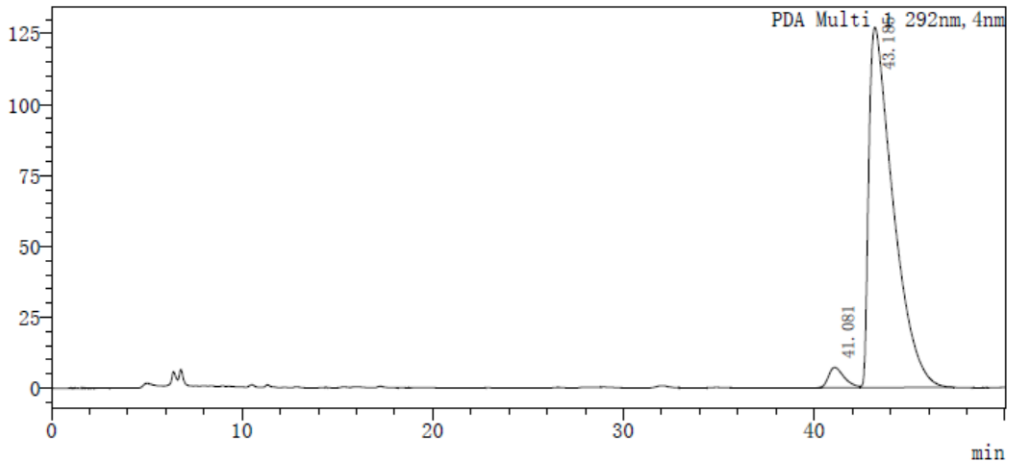


〈峰表〉

PDA Ch1 258nm

峰号	保留时间	面积	高度	浓度	浓度单位	标记	化合物名
1	41.018	1976655	29811	49.965			
2	44.115	1979387	25658	50.035		V	
总计		3956042	55469				

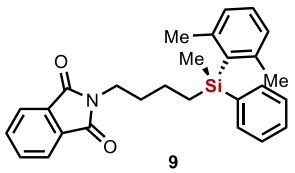
〈色谱图〉



〈峰表〉

PDA Ch1 292nm

峰号	保留时间	面积	高度	浓度	浓度单位	标记	化合物名
1	41.081	407522	7159	3.482			
2	43.185	11295577	127022	96.518		V	
总计		11703099	134181				



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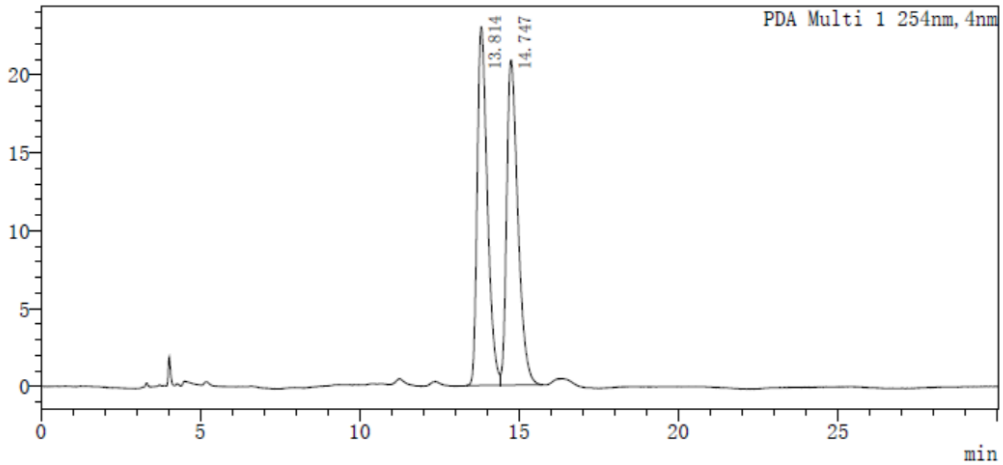
〈色谱图〉

mAU



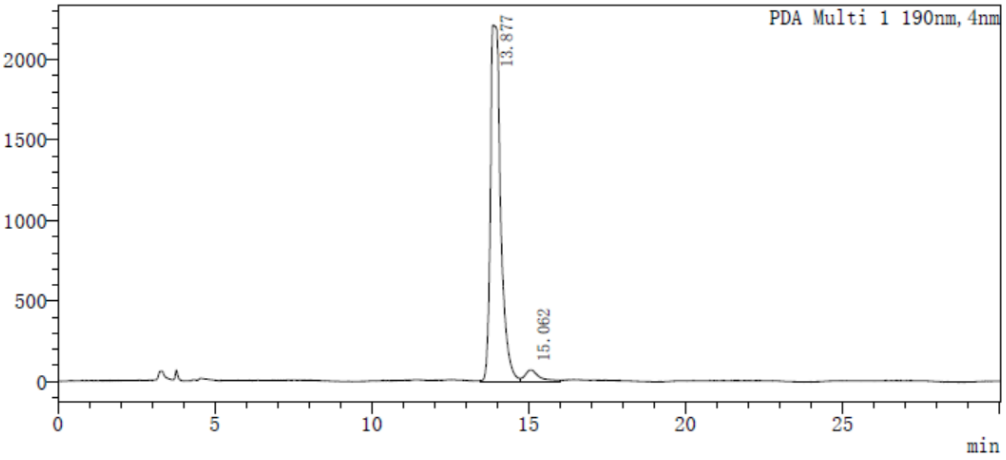
〈峰表〉

PDA Ch1 254nm

峰号	保留时间	面积	高度	浓度	浓度单位	标记	化合物名
1	13.814	509568	23024	49.907			
2	14.747	511475	20864	50.093		V	
总计		1021043	43888				

〈色谱图〉

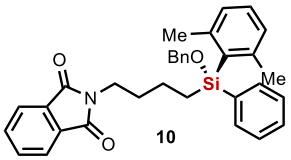
mAU



〈峰表〉

PDA Ch1 190nm

峰号	保留时间	面积	高度	浓度	浓度单位	标记	化合物名
1	13.877	50782075	2215269	95.491			
2	15.062	2397840	73213	4.509		V	
总计		53179915	2288482				



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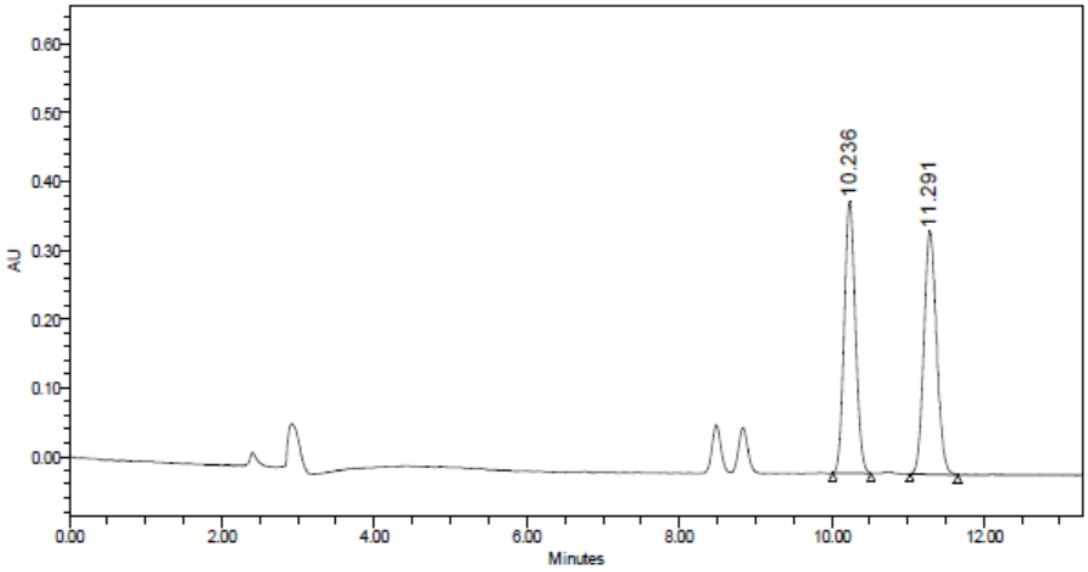
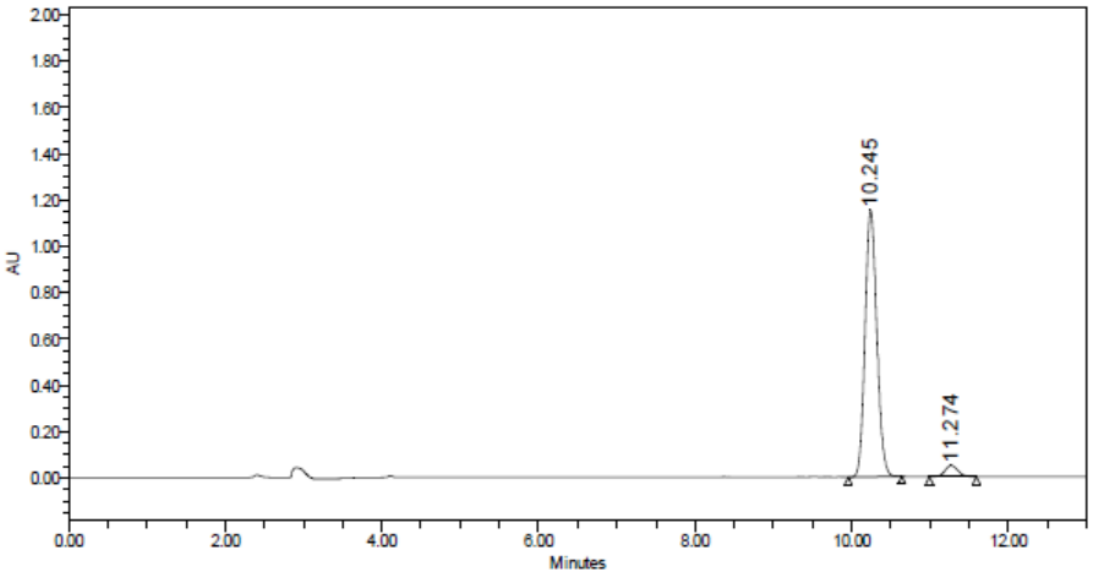


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	10.236	Unknown	394938	30.150	4048257	49.91
2	11.291	Unknown	352328	37.550	4063107	50.09



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	10.245	Unknown	1151763	40.950	12011247	95.53
2	11.274	Unknown	49047	36.100	562656	4.47