Supporting Information

Copper-Catalyzed *anti*-Stereoselective 1,2-Silylamination of Alkynes

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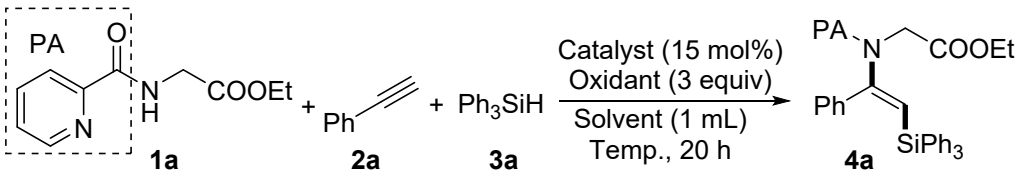
1. Experimental Section:

General Considerations. All products were prepared under argon atmosphere using standard Schlenk technique. ^{1}H, ^{13}C, and ^{19}F data were recorded with Bruker Advance III (500 MHz) spectrometers with tetramethylsilane as an internal standard. All chemical shifts (δ) are reported in ppm and coupling constants (*J*) in Hz. All chemical shifts are reported relative to tetramethylsilane and d-solvent peaks, respectively. Multiplicities are reported as follows: singlet (s), doublet (d), doublet of doublets (dd), triplet (t), quartet (q), and multiplet (m). Column chromatography was performed on silica gel 200–300 mesh. Analytical thin-layer chromatography (TLC) was performed on pre-coated, glass-backed silica gel plates. Visualization of the developed chromatogram was performed by UV absorbance (254 nm). High-resolution mass spectrometry (HRMS) were done on an electrospray ionization (ESI) Fourier transform mass spectrometer (FTMS, Thermo QExactive Focus). Gas chromatograms were completed on a gas chromatograph (Shimazu: Nexis GC-2030). X-ray diffraction (XRD) patterns were recorded on a Rigaku smartlab system at 45 kV and 200 mA with Cu-Kα radiation. 2-Picolinamidederivatives were prepared following a literature procedure.[1] Unless otherwise noted below, all other compounds have been reported in the literature or are commercially available from Aldrich, Acros, Alfa Aesar, and Energy Chemical Company and used as received without any further purification.

2. Table S1. Optimization of the Reaction Conditions[a]



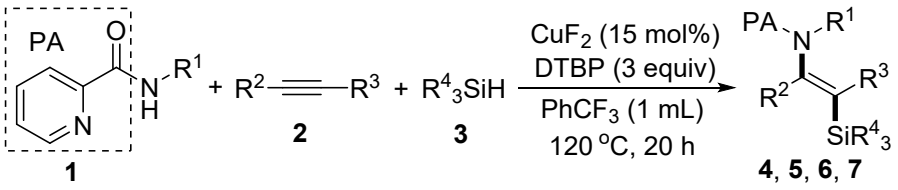
Entry	Catalyst	Oxidant	Solvent	T (°C)	Yield (%)[b]
1	CuF_2	DTBP	Toluene	100	63
2	$Cu(OAc)_2$	DTBP	Toluene	100	47
3	$Cu(OTf)_2$	DTBP	Toluene	100	0
4	$Cu(acac)_2$	DTBP	Toluene	100	45
5	$CuSO_4$	DTBP	Toluene	100	60
6	$CuCl_2$	DTBP	Toluene	100	52
7	$CuBr_2$	DTBP	Toluene	100	30

8	Cu_2O	DTBP	Toluene	100	58
9	CuCl	DTBP	Toluene	100	53
10	CuBr	DTBP	Toluene	100	40
11	CuI	DTBP	Toluene	100	35
12	$ZnCl_2$	DTBP	Toluene	100	17
13	$MnCl_2$	DTBP	Toluene	100	15
14	$FeCl_2$	DTBP	Toluene	100	24
15	$FeCl_3$	DTBP	Toluene	100	27
16	$NiCl_2$	DTBP	Toluene	100	39
17	-	DTBP	Toluene	100	0
18	CuF_2	TBHP	Toluene	100	37
19	CuF_2	TBPB	Toluene	100	55
20	CuF_2	DCP	Toluene	100	48
21	CuF_2	BPO	Toluene	100	41
22	CuF_2	$K_2S_2O_8$	Toluene	100	0
23	CuF_2	-	Toluene	100	0
24	CuF_2	DTBP	*o*-xylene	100	54
25	CuF_2	DTBP	*m*-xylene	100	61
26	CuF_2	DTBP	*p*-xylene	100	55
27	CuF_2	DTBP	mesitylene	100	50
28	CuF_2	DTBP	4-chlorotoluene	100	48
29	CuF_2	DTBP	$PhCF_3$	100	74
30	CuF_2	DTBP	DCE	100	16
31	CuF_2	DTBP	DMF	100	11
32	CuF_2	DTBP	$PhCF_3$	110	79
33	**CuF_2**	**DTBP**	**$PhCF_3$**	**120**	**82**
34	CuF_2	DTBP	$PhCF_3$	130	81
35[c]	CuF_2	DTBP	$PhCF_3$	120	54

[a] Reaction conditions: **1a** (0.2 mmol), **2a** (0.3 mmol), **3a** (0.6 mmol), catalyst (15 mol%), oxidant (3 equiv) and in the solvent (1 mL) for 20 h under nitrogen atmosphere. DTBP = di-*tert*-butyl peroxide. TBHP = *tert*-Butyl hydroperoxide. TBPB = *tert*-Butyl peroxybenzoate. DCP = Dicumyl peroxide. BPO = Benzoyl Peroxide. PA = 2-Pyridylacyl. [b] Isolated yields. [c] Under air.

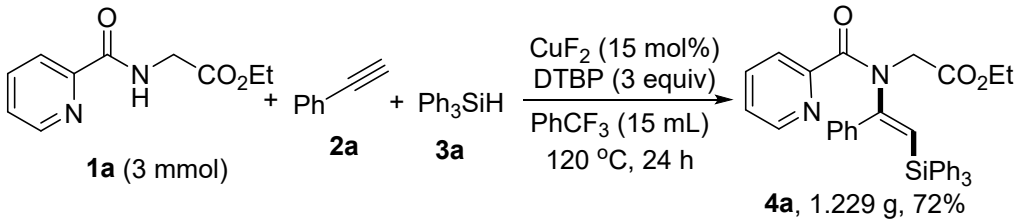
3. Synthetic Procedures

(a) General Procedure for the Copper-Catalyzed Preparation of 4, 5, 6 and 7



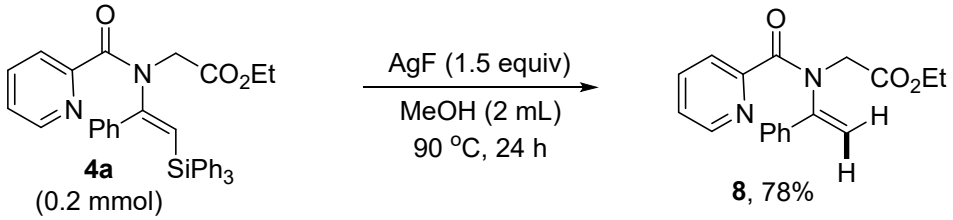
A mixture of substituted amides (**1**) (0.2 mmol, 1.0 equiv), alkynes (**2**) (0.3 mmol, 1.5 equiv), silanes (**3**) (0.6 mmol, 3.0 equiv), CuF_2 (0.03 mmol, 15 mol%), and DTBP (0.6 mmol, 3 equiv) were weighted in a Schlenk tube equipped with a stir bar. Dry $PhCF_3$ (1 mL) was added and the mixture was stirred at 120 °C in a pre-heated oil bath for 20 h under N_2 atmosphere. Then, the mixture was cooled to room temperature and concentrated in vacuo and the resulting residue was purified by column chromatography on silica gel with EtOAc/petroleum ether.

(b) Gram-Scale Preparation of 4a



A mixture of ethyl picolinoylglycinate (**1a**) (3 mmol, 1.0 equiv), phenylacetylene (**2a**) (4.5 mmol, 1.5 equiv), triphenylsilane (**3a**) (9 mmol, 3.0 equiv), CuF_2 (15 mol%), and DTBP (3 equiv) were weighted in a Schlenk tube equipped with a stir bar. Dry $PhCF_3$ (15 mL) was added and the mixture was stirred at 120 °C in a pre-heated oil bath for 20 h under N_2 atmosphere. Then, the mixture was cooled to room temperature and concentrated in vacuo and the resulting residue was purified by flash column chromatography on silica gel with EtOAc/petroleum ether, the product **4a** was affored as a yellow solid in 72% yield (1.229 g, 2.16 mmol).

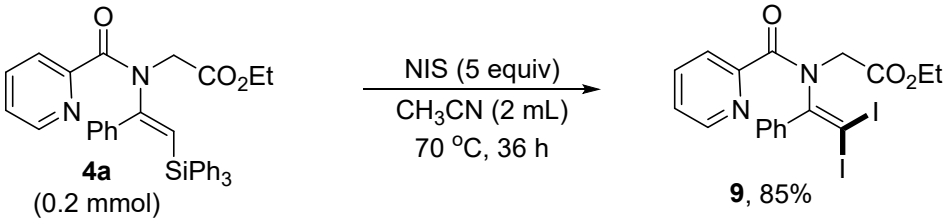
(c) Derivatization Reaction of 4a for the Preparation of 8[2]



A mixture of ethyl (*E*)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (**4a**)

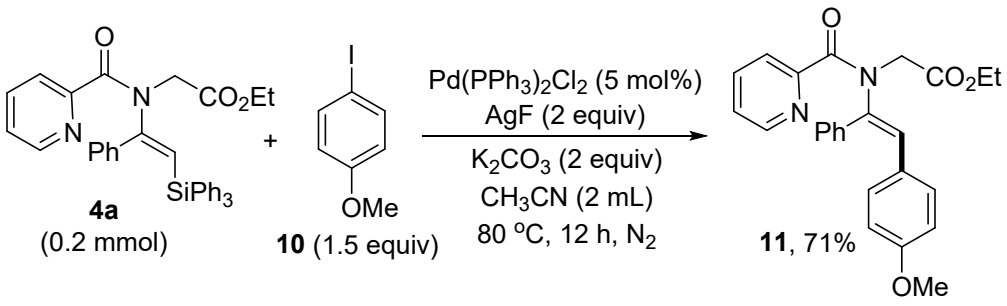
(0.2 mmol, 1.0 equiv), and AgF (1.5 equiv) were weighted in a Schlenk tube equipped with a stir bar. Dry MeOH (2 mL) was added and the mixture was stirred at 90 °C in a pre-heated oil bath for 24 h. Then, the mixture was cooled to room temperature and concentrated in vacuo and the resulting residue was purified by flash column chromatography on silica gel with EtOAc/petroleum ether, the product **8** was afforded as a yellow solid in 78% yield (48.5 mg, 0.156 mmol).

(d) Derivatization Reaction of 4a for the Preparation of 9[3]



A mixture of ethyl (*E*)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (**4a**) (0.2 mmol, 1.0 equiv), and NIS (5 equiv) were weighted in a Schlenk tube equipped with a stir bar. Dry CH_3CN (2 mL) was added and the mixture was stirred at 70 °C in a pre-heated oil bath for 36 h. Then, the mixture was cooled to room temperature and concentrated in vacuo and the resulting residue was purified by flash column chromatography on silica gel with EtOAc/petroleum ether, the product **9** was afforded as a yellow solid in 85% yield (95.5 mg, 0.170 mmol).

(e) Derivatization Reaction of 4a for the Preparation of 11[4]



A mixture of ethyl (*E*)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (**4a**) (0.2 mmol, 1.0 equiv), 1-iodo-4-methoxybenzene (**10**), $Pd(PPh_3)_2Cl_2$ (5 mol%), AgF (2 equiv), and K_2CO_3 (2 equiv) were weighted in a Schlenk tube equipped with a stir bar. Dry CH_3CN (2 mL) was added and the mixture was stirred at 80 °C in a pre-heated oil bath for 12 h under N_2 atmosphere. Then, the mixture was cooled to room temperature and concentrated in vacuo

and the resulting residue was purified by flash column chromatography on silica gel with EtOAc/petroleum ether, the product **11** was affored as a yellow solid in 71% yield (59.1 mg, 0.142 mmol).

4. X-ray Crystallography of 4a

Crystal preparation of compound 4a.

Compound **4a** (25 mg) was dissolved in 5 mL of dichloromethane/*n*-hexane (v1/v2 = 1:1), and it was crystallized to give crystal as colorless prisms after the solvent was slowly volatilized in 4 days at room temperature (~ 25 °C).

CCDC-2348897 (**4a**), contain the supplementary crystallographic data. These data can be obtained free of charge from the Cambridge Crystallographic Data Centre (http://www.ccdc.cam.ac.uk/). Thermal ellipsoids are shown at the 30% level. Hydrogen atoms have been omitted for clarity. X-ray crystallographic data is available as Figure S1.

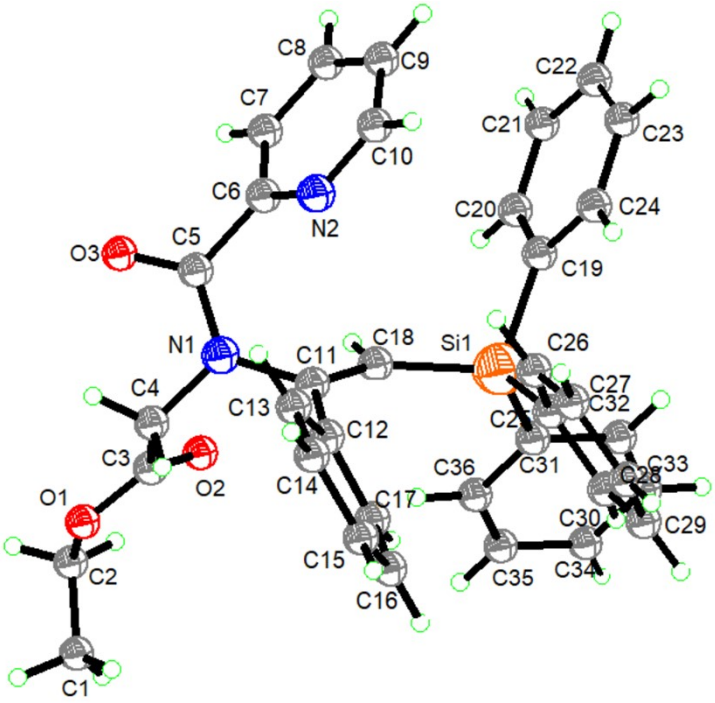


Figure S1. The molecular structure of **4a**

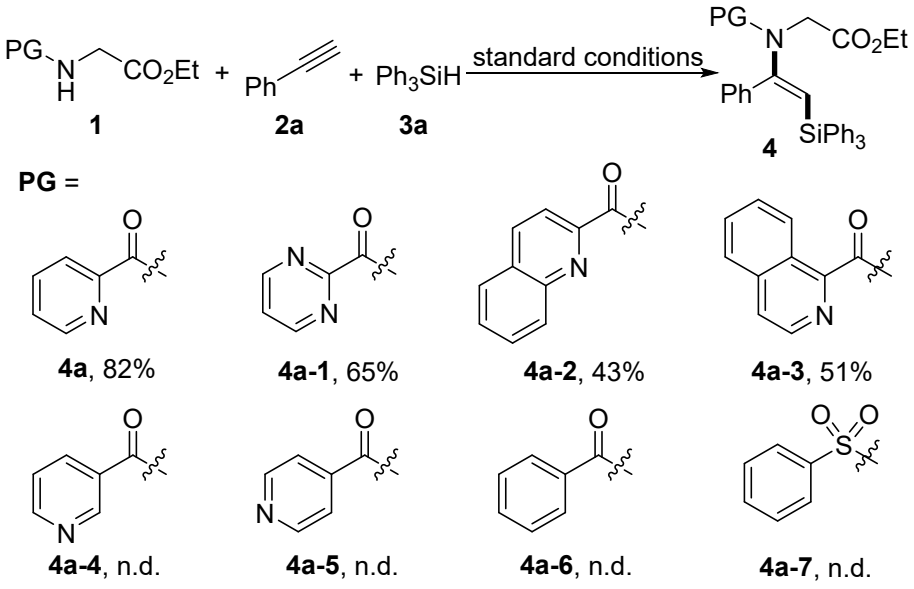
Table S2. Crystal Data and Summary of X-ray Data Collection for 4a

Empirical formula	$C_{36}H_{32}N_2O_3Si$
Formula weight	568.72
Temperature	273.15 K
Wavelength	0.71073 A
Crystal system, space group	triclinic, P-1

Unit cell dimensions	a = 9.4969(10) A alpha = 78.497(3) deg. b = 10.0179(11) A beta = 81.332(3) deg. c = 19.138(2) A gamma = 77.856(3) deg.
Volume	1733.0(3) A^3
Z, Calculated density	2, 1.09 g/cm^3
Absorption coefficient	0.102 mm^-1
F(000)	600
Crystal size	0.1 x 0.05 x 0.05 mm
Radiation	MoKα (λ = 0.71073)
Theta range for data collection	4.222 to 50.698 deg.
Limiting indices	-11<=h<=11, -12<=k<=12, -23<=l<=23
Reflections collected / unique	19028 / 6328 [Rint = 0.0783, Rsigma = 0.1201]
Completeness to theta = 25.24	99.7 %
Absorption correction	Semi-empirical from equivalents
Max. and min. transmission	0.7457 and 0.6402
Refinement method	Full-matrix least-squares on F^2
Data / restraints / parameters	6328/49/380
Goodness-of-fit on F^2	0.976
Final R indices [I>2sigma(I)]	R1 = 0.0761, wR2 = 0.1870
R indices (all data)	R1 = 0.1700, wR2 = 0.2328
Largest diff. peak and hole	0.43 and -0.40 e.A^-3

5. Mechanism Research

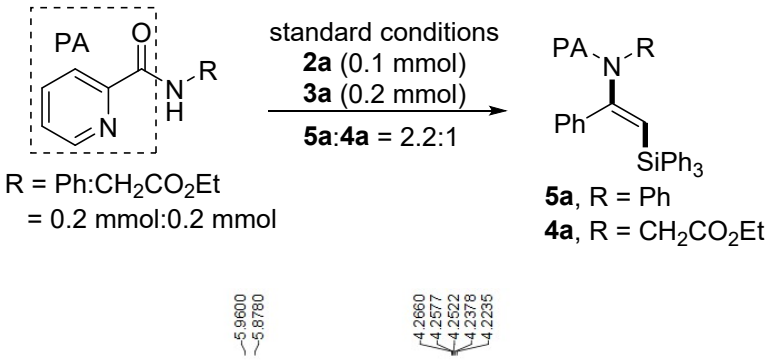
(a) The Effect of *N*-Protecting Groups



A mixture of substituted amides (**1**) (0.2 mmol, 1.0 equiv), phenylacetylene (**2a**) (0.3 mmol,

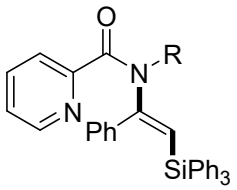
1.5 equiv), triphenylsilane (**3a**) (0.6 mmol, 3.0 equiv), CuF_2 (15 mol%), and DTBP (3 equiv) were weighted in a Schlenk tube equipped with a stir bar. Dry $PhCF_3$ (1 mL) was added and the mixture was stirred at 120 °C in a pre-heated oil bath for 20 h under N_2 atmosphere. Then, the mixture was cooled to room temperature and concentrated in vacuo and the resulting residue was purified by column chromatography on silica gel with EtOAc/petroleum ether.

(b) Intermolecular Competition Experiments

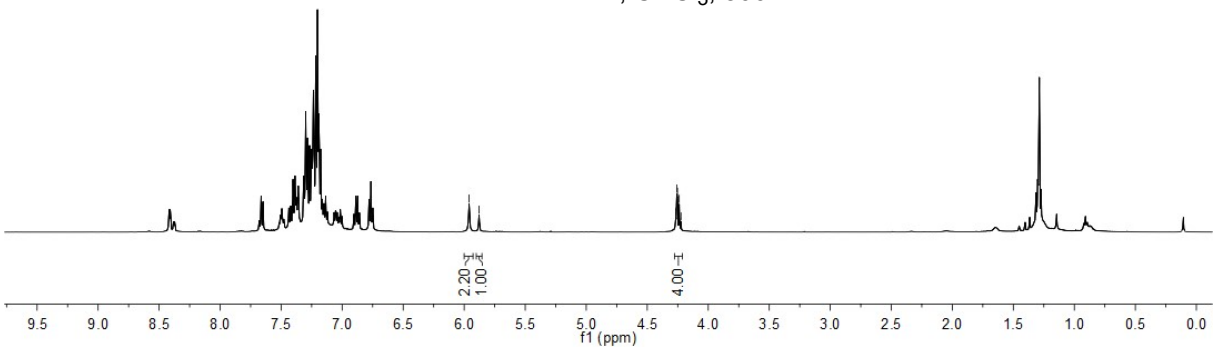


R = Ph:CH_2CO_2Et
= 0.2 mmol:0.2 mmol

5a, R = Ph
4a, R = CH_2CO_2Et

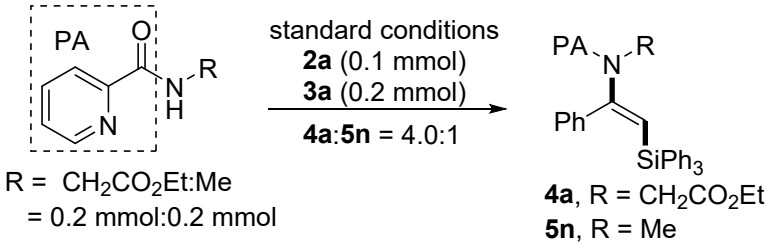


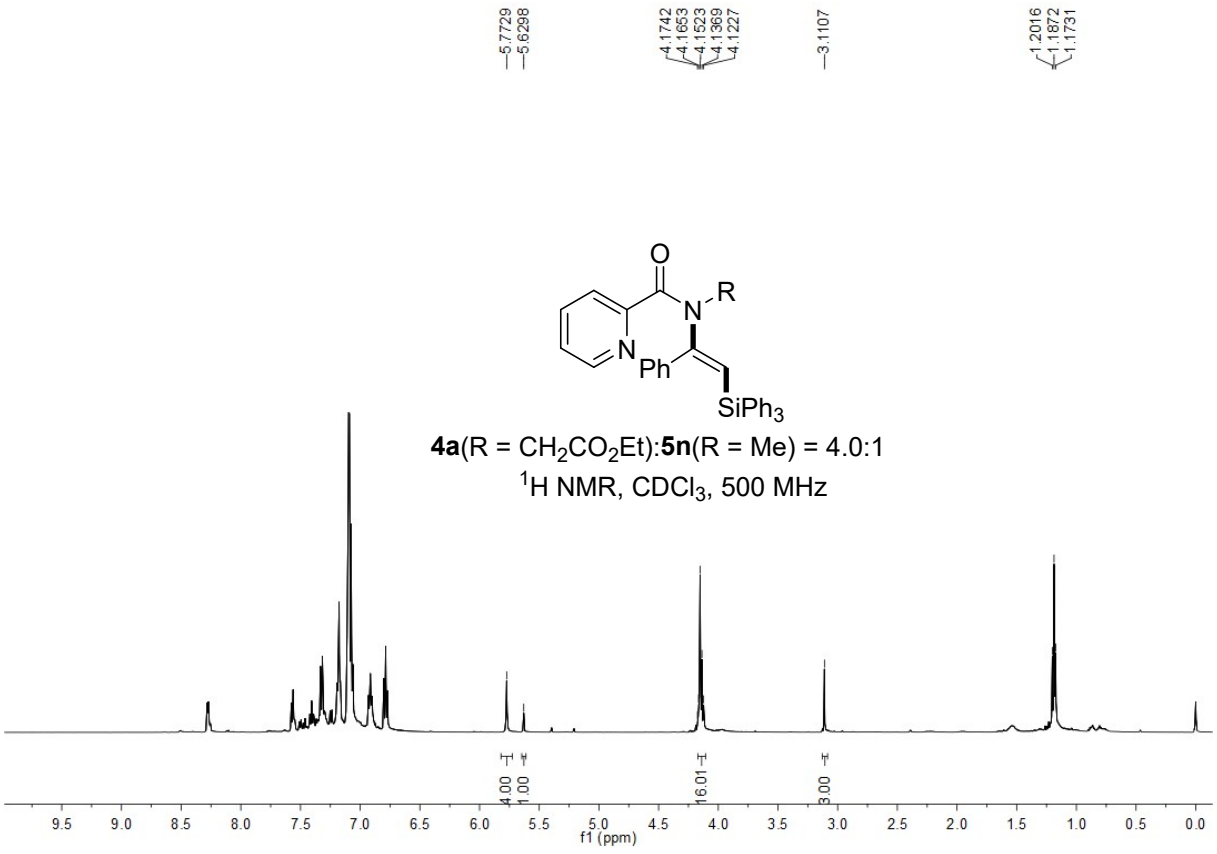
5a(R = Ph):**4a**(R = CH_2CO_2Et) = 2.2:1
^1H NMR, $CDCl_3$, 500 MHz



A mixture of *N*-phenylpicolinamide (39.6 mg, 0.2 mmol, 2.0 equiv), ethyl picolinoylglycinate (41.6 mg, 0.2 mmol, 2.0 equiv), phenylacetylene (**2a**) (10.2 mg, 0.1 mmol, 1.0 equiv), triphenylsilane (**3a**) (52.0 mg, 0.2 mmol, 2.0 equiv), CuF_2 (1.5 mg, 0.015 mmol, 15 mol%), and DTBP (52 uL, 0.3 mmol, 3 equiv) were weighted in a Schlenk sealed tube equipped with a stir bar. Dry $PhCF_3$ (1.5 mL) was added and the mixture was stirred at 120 °C

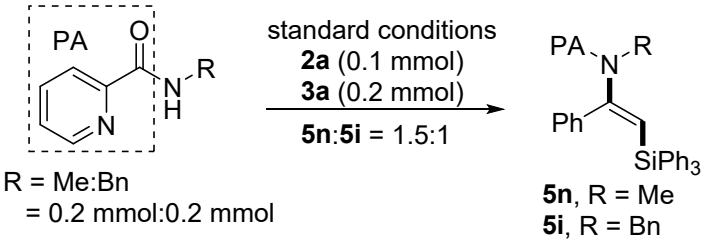
in a pre-heated oil bath for 20 h under N_2 atmosphere. Then, the mixture was cooled to room temperature and concentrated in vacuo and the resulting residue was purified by flash column chromatography on silica gel with EtOAc/petroleum ether to give a mixture of products **5a** and **4a** at a ratio of 2.2:1.

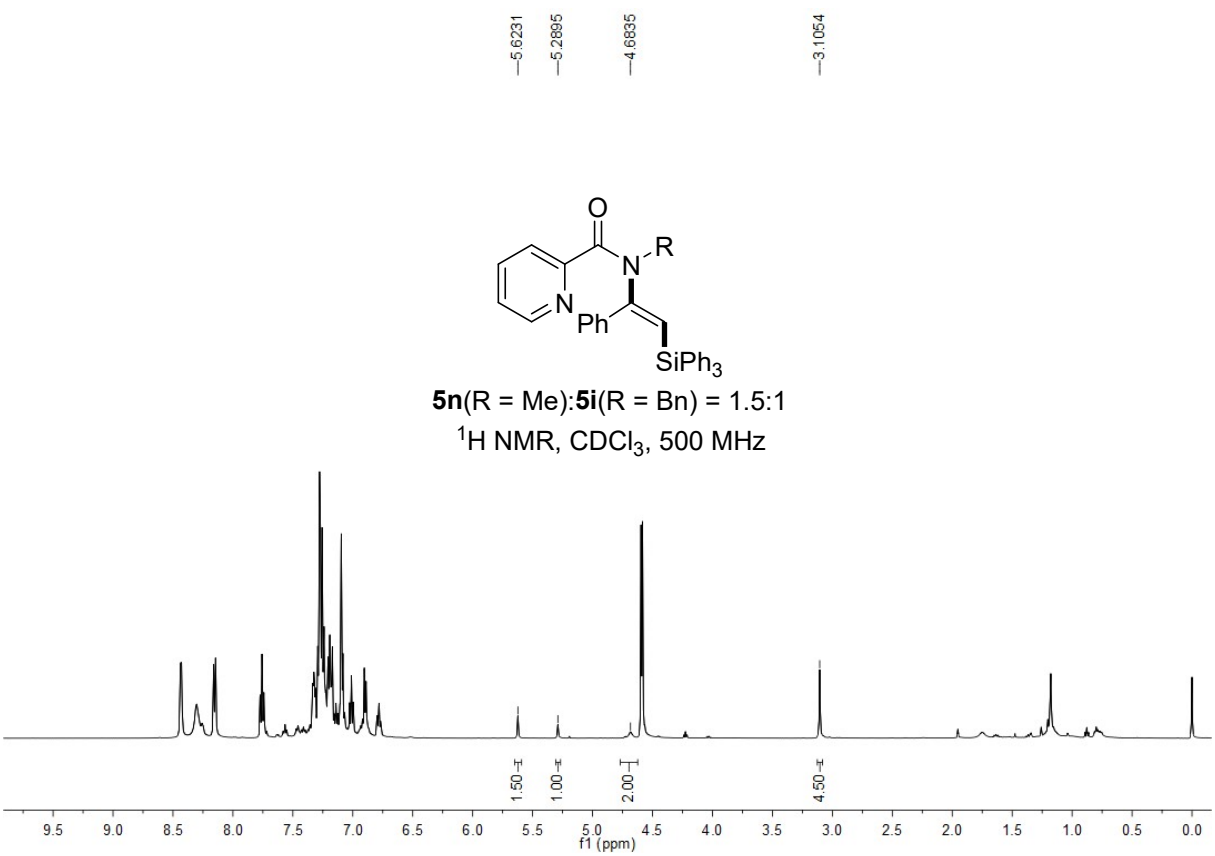




A mixture of ethyl picolinoylglycinate (41.6 mg, 0.2 mmol, 2.0 equiv), *N*-methylpicolinamide (27.2 mg, 0.2 mmol, 2.0 equiv), phenylacetylene (**2a**) (10.2 mg, 0.1 mmol, 1.0 equiv), triphenylsilane (**3a**) (52.0 mg, 0.2 mmol, 2.0 equiv), CuF_2 (1.5 mg, 0.015 mmol, 15 mol%), and DTBP (52 uL, 0.3 mmol, 3 equiv) were weighted in a Schlenk sealed tube equipped with a stir bar. Dry $PhCF_3$ (1.5 mL) was added and the mixture was stirred at 120 °C in a pre-heated oil bath for 20 h under N_2 atmosphere. Then, the mixture was cooled to room temperature and concentrated in vacuo and the resulting residue was purified by flash

column chromatography on silica gel with EtOAc/petroleum ether to give a mixture of products **4a** and **5n** at a ratio of 4.0:1.





A mixture of *N*- methylpicolinamide (27.2 mg, 0.2 mmol, 2.0 equiv), *N*-benzylpicolinamide (42.4 mg, 0.2 mmol, 2.0 equiv), phenylacetylene (**2a**) (10.2 mg, 0.1 mmol, 1.0 equiv), triphenylsilane (**3a**) (52.0 mg, 0.2 mmol, 2.0 equiv), CuF_2 (1.5 mg, 0.015 mmol, 15 mol%), and DTBP (52 uL, 0.3 mmol, 3 equiv) were weighted in a Schlenk sealed tube equipped with a stir bar. Dry $PhCF_3$ (1.5 mL) was added and the mixture was stirred at 120 ^oC in a pre-heated oil bath for 20 h under N_2 atmosphere. Then, the mixture was cooled to room temperature and concentrated in vacuo and the resulting residue was purified by flash column chromatography on silica gel with EtOAc/petroleum ether to give a mixture of products **5n** and **5i** at a ratio of 1.5:1.

Computational details: All calculations were performed at the DFT level using the Gaussian

09 (Rev D.01) suite of programs. The structure of minima was fully optimized using the hybrid functional M06-2X'. C, H, O and N were described using the triple-ζ Pople-type basis sets (6-311+G(dp)). Bulk solvent effects were represented using the SMD implicit solvent model as implemented in Gaussian. The default cavity parameters, static, and optical dielectric constants for Benzene were used. The nature of optimized stationary points was checked by analytical frequency calculations. Harmonic frequencies were computed to estimate Gibbs energies at 298 K under 1atm pressure using the usual harmonic approximation.

Gibbs free energies account for the change in standard states on going from the gas-phase 1 atm state to the more relevant 1 mol L^{-1} solution state: $\square_r G_{1atm} \rightarrow \square_r G_{1M}$ = 1.89 kcal mol^{-1} for an associative pathway ($\triangle_r n$ = -1)..Gas-phase calculations were performed using the CBS-QB3 method, with no additional basis set specified.

Theoretical calculation of pK_a: Continuum solvent pK_a calculations using the direct method employ a thermodynamic cycle (Fig. S2).

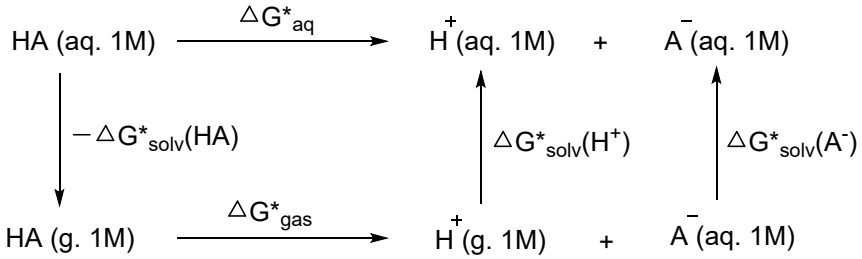


Figure S2. Thermodynamic Cycle Used in pK_a Calculations with Direct Method.

The dissociation of an acid can be represented as follows

$$HA(aq) \longrightarrow H^+(aq) + H^+(aq) \qquad (1)$$

The directly calculated pK_a is obtained using the equation: $pK_a = \frac{\Delta G^*_{aq}}{2.303RT}$ (1) (the unit of ΔG^*_{aq} is J mol^-), where ΔG^*_{aq} represents the difference in free energies in solution between the acid (HA), its conjugate base (A^-), and the free proton (H^+). For computational efficiency, ΔG^*_{aq} can using the thermodynamic cycle shown in Fig. S3, following Eqs. (2)–(5).

$$\Delta G^*_{aq} = \Delta G^*_{gas} + \delta \Delta G^*_{solv} \quad (2)$$

where ΔG^{*}_{gas} and $\delta\Delta G^{*}_{solv}$ are

$$\Delta G^{*}_{gas} = \Delta G^{*}_{gas}(H^{+}) + \Delta G^{*}_{gas}(HA) \quad (3)$$

$$\delta\Delta G^{*}_{solv} = \Delta G^{*}_{solv}(H^{+}) + \Delta G^{*}_{solv}(A^{-}) + \Delta G^{*}_{solv}(HA) \quad (4)$$

In this work, the gas-phase Gibbs free energies and solvation energies of HA and its anion A^- were calculated. The most recent experimental-theoretical values were used for the gas-phase Gibbs free energy of H^+ ($G^{*}_{gas}(H^{+}) = 6.28\ kcal\ mol^{-}$) and the solvation energy of H^+ in water ($G^{*}_{gas}(H^{+}) = 265.9\ kcal\ mol^{-}$) Gas-phase energy calculations were performed for a standard state of 1 atm, while solvation energies were referenced to 1 mol/L. To account for this difference, a correction factor of 1.89 kcal mol^{-} ($RT^{\ln 24.46}$) was added to the gas-phase energies.

Therefore, ΔG^{*}_{aq} is obtained as:

$$\Delta G^{*}_{aq} = \Delta G^{*}_{gas}(A^{-}) + \Delta G^{*}_{gas}(HA) + \Delta G^{*}_{solv}(A^{-}) - \Delta G^{*}_{solv}(HA) - 270\ kcal\ mol^{-1} \quad (5)$$

Table **S2** presents the gas-phase energies of **A, B, C, and D**, along with their corresponding anions, calculated at different levels of theory. Using these energy values, the theoretically derived **pKa** values are computed and shown in Figure S3.

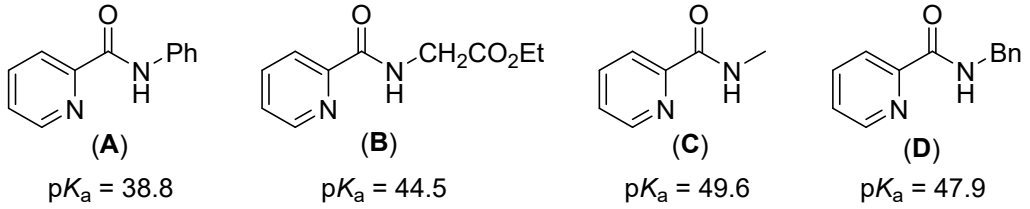


Figure S3. Theoretically Derived pK_a Values.

Table S3. Gas-phase and Solvation Energies of **A**, **B**, **C**, **D** and Its Anion Calculated at Different Levels of Theory.

Geometry	G^{*}_{gas}	E_{gas}[b]	E_{solv}[c]	ΔG^{*}_{solv}[d]
A	-646.981271	-639.884102	-639.897197	-0.013095
A-anion	-646.423282	-639.184449	-639.239031	-0.054582
B	-722.384729	-714.161957	-714.174223	-0.012265

B-anion	-721.816134	-713.441661	-713.493412	-0.051752
C	-455.581328	-450.479504	-450.487637	-0.00813
C-anion	-454.994512	-449.740482	-449.794922	-0.05444
D	-686.208528	-678.068795	-678.082827	-0.014031
D-anion	-685.630554	-677.987684	-678.043076	-0.055392

[a]The free energy calculated by CBS-QB3. [b]The electronic energy calculated by M06-2X in gas phase. [c]The electronic energy calculated by M06-2X in benzene phase. [d] $\Delta G^{*}_{solv} = E_{solv}$ - E_{gas}, unit is a.u.

Geometries for all the optimized compounds

A, gas phase, CBS-QB3

C	2.44432100	1.61425000	-2.10929300
C	2.03401800	3.86892300	-2.06236700
C	0.65362700	3.67447400	-2.07706800
C	0.17234200	2.37082000	-2.10959700
C	1.08281200	1.31761500	-2.12609300
H	3.18499700	0.82032500	-2.12133400
H	0.00353900	4.53894800	-2.06280500
H	-0.89440500	2.17840200	-2.12189400
H	0.75107100	0.28676000	-2.15143400
C	2.57338400	5.28378800	-2.02700100
N	3.93626500	5.32620600	-2.01606800
H	4.36464300	4.40652200	-2.03329500
O	1.81952800	6.24450100	-2.01124400
N	2.91605600	2.86146000	-2.07809700
C	4.79190500	6.44071700	-1.98541900
C	6.17264600	6.19347400	-1.98138000
C	4.32889100	7.76345500	-1.95923700
C	7.07634000	7.24763200	-1.95177000
H	6.53256100	5.16955000	-2.00162800
C	5.24874900	8.80836900	-1.92971100
H	3.26660200	7.95270900	-1.96236800
C	6.61986600	8.56446000	-1.92569300
H	8.14011900	7.03803400	-1.94909600
H	4.88118600	9.82839400	-1.90960300
H	7.32412600	9.38778000	-1.90258200

A-anion, gas phase, CBS-QB3

C	1.28552000	2.44027200	-3.52886100

C	2.28032200	3.68921800	-1.87845100
C	1.61896900	2.93813000	-0.89101600
C	0.76772000	1.90865300	-1.26374000
C	0.58954800	1.64465600	-2.62106500
H	1.17394800	2.26672600	-4.59925300
H	1.80943600	3.20473400	0.14002400
H	0.24967900	1.31933200	-0.51202100
H	-0.06453000	0.85141300	-2.96874300
C	3.20842700	4.81439500	-1.39893600
N	3.79984600	5.47832000	-2.38513300
O	3.27933700	4.94974500	-0.15145900
N	2.10726200	3.43319400	-3.18559300
C	4.66699700	6.52104800	-2.14424400
C	5.06924000	7.05324900	-0.88704000
C	5.22736800	7.13987400	-3.29339900
C	5.96177600	8.11940700	-0.81334600
H	4.65900200	6.60220600	0.00422800
C	6.11547600	8.20125800	-3.20619200
H	4.92384500	6.73783700	-4.25429500
C	6.49713000	8.70852000	-1.95965000
H	6.24586000	8.49916700	0.16612300
H	6.51674100	8.64069100	-4.11669700
H	7.19238200	9.53965600	-1.88627400

A, solvent phase, M06-2X, 6-311+G(dp)

C	2.45170500	1.62751600	-2.13744700
C	1.99200100	3.89448100	-2.05517800
C	0.61037500	3.66393800	-2.05783000
C	0.14806300	2.34611100	-2.10186900
C	1.08625500	1.31035100	-2.14321200
H	3.20271200	0.82631200	-2.16884100
H	-0.07146500	4.51954600	-2.02492400
H	-0.92490100	2.12855500	-2.10474300
H	0.77029200	0.26409100	-2.17916400
C	2.53502800	5.34093900	-2.00527700
N	3.95053400	5.30479600	-2.00863600
H	4.31839600	4.32959700	-2.04286800
O	1.81360000	6.35380300	-1.96900900
N	2.94626000	2.90408100	-2.09342500
C	4.83858100	6.41436600	-1.98148600
C	6.23047400	6.18867500	-1.98821500
C	4.34510800	7.73427000	-1.94916500
C	7.10766600	7.27120500	-1.96269500
H	6.60627500	5.16269100	-2.01328800
C	5.23826200	8.80457800	-1.92423600

H	3.26096600	7.87341600	-1.94456000
C	6.61920400	8.58207200	-1.93093100
H	8.18624400	7.08935500	-1.96794500
H	4.85037700	9.82715800	-1.89973500
H	7.31317500	9.42566700	-1.91139800

A, gas phase, M06-2X, 6-311+G(dp)

C	2.44246700	1.61781300	-2.12832600
C	2.00056600	3.88750300	-2.05707400
C	0.61690900	3.66738400	-2.06256000
C	0.14351200	2.35366600	-2.10316500
C	1.07472200	1.31076300	-2.13665300
H	3.18684100	0.81058300	-2.15435000
H	-0.05353200	4.53202600	-2.03513300
H	-0.93076400	2.14431700	-2.10882400
H	0.75095600	0.26713900	-2.16921300
C	2.54559800	5.33414600	-2.01311300
N	3.96085000	5.29824300	-2.01793100
H	4.33013700	4.32422400	-2.04864500
O	1.82043100	6.34460200	-1.97953600
N	2.94936900	2.89091900	-2.08909400
C	4.84546900	6.41231000	-1.98652600
C	6.23801800	6.19369600	-1.99684000
C	4.34322200	7.72855400	-1.94536500
C	7.10964000	7.28116400	-1.96624700
H	6.62014600	5.17050300	-2.02876600
C	5.23077100	8.80361600	-1.91520100
H	3.25793900	7.85940200	-1.93857600
C	6.61333300	8.58888900	-1.92537300
H	8.18904100	7.10584500	-1.97442400
H	4.83759200	9.82375200	-1.88345800
H	7.30195400	9.43651300	-1.90168400

A-anion, solvent phase, M06-2X, 6-311+G(dp)

C	2.25499600	1.43794200	-2.05174000
C	2.18709400	3.75639900	-2.04771300
C	0.78153300	3.72027500	-2.13376500
C	0.10560500	2.50541400	-2.17830600
C	0.86349000	1.33043400	-2.13688700
H	2.86395000	0.52405200	-2.01727000
H	0.27510400	4.69033100	-2.16041100
H	-0.98598000	2.46466600	-2.24392600
H	0.38733200	0.34772100	-2.16836500
C	2.84917300	5.18287900	-1.99819900
N	4.24167700	5.09026900	-1.95598400
O	2.04308400	6.16221700	-2.00666400

N	2.96303400	2.61481200	-2.00366600
C	4.91014400	6.32757300	-1.91522000
C	6.34426700	6.28503800	-1.87186200
C	4.33027400	7.63743100	-1.91265800
C	7.11402000	7.43730700	-1.83309100
H	6.82288000	5.30307600	-1.87249700
C	5.11658900	8.78249100	-1.87316700
H	3.23784400	7.66422500	-1.94501700
C	6.51311000	8.70487700	-1.83270000
H	8.20483300	7.35748400	-1.80204000
H	4.63478000	9.76561300	-1.87281700
H	7.12246800	9.60917800	-1.80106400

A-anion, gas phase, M06-2X,6-311+G(dp)

C	2.24169200	1.42633600	-2.07379500
C	2.20455200	3.74441800	-2.05414300
C	0.79568100	3.72309100	-2.11496300
C	0.10314700	2.51869800	-2.15584900
C	0.84777800	1.33408900	-2.13474500
H	2.83913800	0.50464000	-2.05636900
H	0.31219600	4.70562900	-2.12654400
H	-0.98943300	2.49090500	-2.20300900
H	0.36011300	0.35752600	-2.16464200
C	2.86643200	5.17359100	-2.01242800
N	4.25657500	5.07993200	-1.95673000
O	2.05021200	6.14643100	-2.03594700
N	2.96947400	2.59289600	-2.03163800
C	4.91937900	6.32249300	-1.91695700
C	6.35347400	6.29116700	-1.85881800
C	4.32901700	7.62846100	-1.92787600
C	7.11320500	7.45049400	-1.81597800
H	6.83875300	5.31262100	-1.84910800
C	5.10554400	8.77979100	-1.88436800
H	3.23631500	7.64325000	-1.97252700
C	6.50285700	8.71377000	-1.82794100
H	8.20408400	7.37978400	-1.77231400
H	4.61618100	9.75893900	-1.89437100
H	7.10493600	9.62275100	-1.79396900

B, gas phase, CBS-QB3

C	2.09440100	1.83292500	-1.66054700
C	1.67159100	4.06493200	-1.96693400
C	0.45532600	3.79301100	-2.60163200
C	0.06770100	2.46941100	-2.75807400
C	0.90321900	1.46351900	-2.27814800
H	2.77290600	1.07799200	-1.27323700

H	-0.14322700	4.62342400	-2.94996000
H	-0.86920300	2.22461200	-3.24557100
H	0.64166400	0.41686700	-2.37814800
C	2.05701200	5.52211600	-1.81733200
N	3.22574300	5.86235900	-1.20544500
H	3.37741000	6.86422100	-1.16315600
O	1.30662400	6.38641800	-2.25241000
N	2.47746500	3.10289500	-1.50429800
C	4.28297200	5.07361000	-0.60587400
H	4.75460500	4.39111600	-1.31639600
H	3.92847800	4.44993400	0.21780100
C	5.34213500	6.02258500	-0.07184600
O	5.29401100	7.22590800	-0.14509800
O	6.34323000	5.33487900	0.49503100
C	7.43217000	6.11906200	1.05132800
H	7.86090900	6.73117000	0.25490800
H	7.02339700	6.79259400	1.80765800
C	8.43807200	5.14793000	1.63229400
H	8.82547600	4.47963900	0.86038100
H	9.27761200	5.69928000	2.06336000
H	7.98471700	4.54124200	2.41902100

B-anion, gas phase, CBS-QB3

C	2.30604400	1.89640300	-1.96998200
C	2.20509700	4.18743400	-2.21810700
C	1.01462700	4.22408400	-1.46593400
C	0.49459900	3.05568900	-0.94155200
C	1.14973500	1.84694300	-1.20573200
H	2.84455100	0.97921600	-2.20690600
H	0.52740000	5.18152100	-1.33942200
H	-0.41302800	3.07256500	-0.34429800
H	0.77375100	0.90034600	-0.83120000
C	2.67602200	5.50373200	-2.86747000
N	3.90781800	5.95922700	-2.78752400
O	1.72354000	6.06904200	-3.46143300
N	2.84122700	3.02662900	-2.45446600
C	4.89349100	5.24082400	-2.03259300
H	5.89744600	5.46669600	-2.41673900
H	4.80895900	4.14040100	-2.06208400
C	4.93763600	5.57296700	-0.54783200
O	4.04561800	5.97938000	0.15124500
O	6.19036000	5.30940800	-0.02555200
C	6.32700400	5.50459300	1.38543100
H	6.07461200	6.53891400	1.63917800
H	5.61616800	4.86263600	1.91601500

C	7.76166100	5.17252500	1.75598700
H	8.45804500	5.82358000	1.22138500
H	7.91983700	5.30392600	2.83127200
H	7.99733900	4.13767800	1.49506400

B, solvent phase, M06-2X, 6-311+G(dp)

C	2.18875000	1.82673700	-2.31536900
C	1.73670900	4.07839800	-2.06107900
C	0.35407600	3.83401400	-2.02132500
C	-0.11099000	2.52310300	-2.12835800
C	0.82795100	1.49784900	-2.27708900
H	2.93860600	1.03316000	-2.43654200
H	-0.32317200	4.68677800	-1.91233500
H	-1.18264800	2.30240800	-2.09870000
H	0.51510100	0.45377100	-2.36506400
C	2.19296400	5.55038200	-1.96717400
N	3.60120700	5.76322500	-1.83962700
H	3.84400900	6.75810200	-1.60477400
O	1.38951000	6.49421700	-2.08614800
N	2.69126000	3.09947000	-2.21204100
C	4.47802500	4.88483200	-1.02897700
H	5.07193200	4.19596000	-1.65482100
H	3.91722600	4.27920300	-0.29675200
C	5.43194600	5.86593000	-0.27510500
O	5.33438600	7.09905700	-0.36303500
O	6.37859300	5.18017200	0.48637500
C	7.25953900	6.12774800	1.18123900
H	7.77795600	6.77280600	0.44665200
H	6.66397100	6.78366200	1.84420200
C	8.27497900	5.30395700	1.99774900
H	8.86894800	4.66465300	1.33513000
H	8.94961100	5.98167300	2.53323700
H	7.75597200	4.67238500	2.72740600

B, gas phase, M06-2X, 6-311+G(dp)

C	2.17451700	1.80684100	-2.23642600
C	1.72766000	4.06517200	-2.04643700
C	0.34311700	3.83295900	-2.10804600
C	-0.12623100	2.52576400	-2.23419500
C	0.81178000	1.49027900	-2.29882800
H	2.92364700	1.00548200	-2.29006600
H	-0.32683000	4.69725500	-2.06209500
H	-1.19882900	2.31503800	-2.28400400
H	0.49630400	0.44841500	-2.39861100
C	2.17412800	5.54038400	-1.94085900
N	3.57410500	5.76862800	-1.77352000

H	3.80621000	6.76545700	-1.54132700
O	1.36362300	6.47549000	-2.08160700
N	2.68237400	3.07675000	-2.11081500
C	4.45565800	4.89062500	-0.97063100
H	5.03522700	4.19261500	-1.59937800
H	3.90165700	4.29107200	-0.22790100
C	5.42439700	5.87114500	-0.23493700
O	5.32564600	7.10464000	-0.31149900
O	6.39323400	5.18345000	0.50185100
C	7.28538700	6.13453700	1.17561700
H	7.77351500	6.79040500	0.43021600
H	6.70396400	6.78160600	1.85934000
C	8.33345500	5.31337200	1.95516600
H	8.90770900	4.68223400	1.26839100
H	9.02063700	5.99099100	2.47379700
H	7.84035700	4.67304700	2.69448100

B-anion, solvent phase, M06-2X, 6-311+G(dp)

C	1.33314400	1.91666500	-0.91690000
C	1.98517000	3.89097600	-1.95919800
C	1.18434200	3.55125100	-3.06983600
C	0.45272700	2.37446500	-3.10394800
C	0.53059300	1.52740700	-1.98888500
H	1.40268100	1.26664500	-0.03365200
H	1.22347500	4.32622100	-3.84984600
H	-0.16853100	2.10667700	-3.96439300
H	-0.02134200	0.58549700	-1.95175500
C	2.72622900	5.31804300	-2.17782300
N	3.62286500	5.86833000	-1.30152900
O	2.37777700	5.86688400	-3.27350500
N	2.07573300	3.07550300	-0.85004900
C	3.87583900	5.02755500	-0.08303400
H	4.27896600	4.01759700	-0.28980700
H	2.99245700	4.88400000	0.56879900
C	4.94399800	5.77098400	0.77704200
O	4.76741700	6.59788600	1.68167700
O	6.25187000	5.38611300	0.37236200
C	7.25286000	6.13331800	1.13046000
H	7.14407900	7.22137300	0.95875800
H	7.13186100	5.96185600	2.21758600
C	8.64666300	5.65728600	0.66628700
H	8.77308800	5.84001300	-0.40655000
H	9.42893600	6.19924200	1.21024300
H	8.76666300	4.58457100	0.85424300

B-anion, gas phase, M06-2X, 6-311+G(dp)

C	1.84738900	2.02561400	-2.36509300
C	2.32274500	4.29651300	-2.10575900
C	1.27821700	4.39003000	-1.15557900
C	0.53245600	3.27282500	-0.79652400
C	0.82412300	2.05216000	-1.41665200
H	2.08356900	1.08086700	-2.87398200
H	1.07023600	5.37217100	-0.72258300
H	-0.26680700	3.34186100	-0.05279400
H	0.26743900	1.14478700	-1.17452200
C	3.02012400	5.68359700	-2.55631700
N	4.38468000	5.84504000	-2.60882700
O	2.16330100	6.57882100	-2.83214400
N	2.61868500	3.10050900	-2.74025300
C	5.12903900	4.61580200	-2.17476800
H	6.17556000	4.69823200	-2.51546300
H	4.71274800	3.66162400	-2.54332700
C	5.17722200	4.52295900	-0.61614500
O	4.34319000	4.04527700	0.16616700
O	6.33428200	5.20358000	-0.11820200
C	6.28921400	5.25458800	1.33896000
H	5.36026000	5.74347800	1.68968800
H	6.29971600	4.23627200	1.77454100
C	7.52564700	6.05055700	1.81767800
H	7.50640700	7.06224200	1.39850200
H	7.53392700	6.12060400	2.91133300
H	8.44619300	5.55634400	1.48881500

C, gas phase, CBS-QB3

C	2.05715800	1.80464100	-3.07195000
C	2.14711600	3.76604300	-1.89113400
C	0.95762900	3.48151100	-1.22226900
C	0.30537600	2.28906800	-1.51336600
C	0.86387600	1.43098000	-2.45695400
H	2.52277500	1.16129400	-3.81286000
H	0.58254200	4.19547600	-0.50121400
H	-0.62203600	2.03228900	-1.01402400
H	0.38975200	0.49160200	-2.71466300
C	2.86787500	5.06233900	-1.58309300
N	4.00912300	5.23168400	-2.29018500
H	4.24388400	4.48586300	-2.93104700
C	4.85628500	6.39930800	-2.15429900
O	2.42348200	5.85456400	-0.76324500
H	4.40224600	7.05573300	-1.41331700
H	5.85979100	6.12184100	-1.81747200
N	2.69137200	2.94658800	-2.79997100

H	4.94136300	6.93784000	-3.10309800

C-anion, gas phase, CBS-QB3

C	2.33951200	2.07821900	-2.86662700
C	2.04063300	4.23604700	-2.11117600
C	0.94577800	3.81567200	-1.32910800
C	0.58412200	2.48100800	-1.30481700
C	1.29360200	1.57695100	-2.10422600
H	2.90890600	1.41187700	-3.51498200
H	0.39865300	4.57649400	-0.78768700
H	-0.24488500	2.14139800	-0.68908800
H	1.03945500	0.52216800	-2.13758700
C	2.33779000	5.74955800	-2.16576600
N	3.54644800	6.24407100	-2.07771000
C	4.69084700	5.37984700	-1.89781300
O	1.26566300	6.40871700	-2.28496700
H	5.47336000	5.93570500	-1.35660700
H	4.51387600	4.45154000	-1.32396600
N	2.72782100	3.36076900	-2.86689400
H	5.14720500	5.05582700	-2.85058200

C, solvent phase, M06-2X, 6-311+G(dp)

C	2.08034200	1.82855800	-3.07632800
C	2.13464700	3.77587900	-1.82735200
C	0.91658500	3.46526000	-1.20796300
C	0.26821300	2.27584500	-1.54801900
C	0.86311800	1.44204000	-2.49961500
H	2.55891800	1.18599400	-3.82795500
H	0.50397900	4.16366100	-0.47345900
H	-0.68355800	2.00262700	-1.08134200
H	0.39261300	0.50118900	-2.79780300
C	2.86271500	5.09490700	-1.47725200
N	4.15292100	5.11313600	-2.05548000
H	4.26434200	4.38228200	-2.78936400
C	4.87576000	6.38703100	-2.20061300
O	2.38380700	5.98446700	-0.75206100
H	4.52041100	7.06145600	-1.40813300
H	5.95925400	6.23198500	-2.08109000
N	2.74957700	2.98543600	-2.77193700
H	4.69596600	6.86691100	-3.17839400

C, gas phase, M06-2X, 6-311+G(dp)

C	2.06862400	1.82368100	-3.08343700
C	2.13605900	3.77286900	-1.84006400
C	0.92496900	3.46343400	-1.20581300
C	0.27290700	2.27342900	-1.53582700
C	0.85798700	1.43780600	-2.49241300

H	2.53881000	1.18002100	-3.83905200
H	0.52459800	4.16627200	-0.46863700
H	-0.67318400	2.00020000	-1.05839800
H	0.38464700	0.49645800	-2.78332900
C	2.86350700	5.09288100	-1.49302600
N	4.13999200	5.12529900	-2.09544900
H	4.26563200	4.38963000	-2.82006000
C	4.87857200	6.39327600	-2.19215900
O	2.39144400	5.97491800	-0.75421600
H	4.46163500	7.06592300	-1.42846400
H	5.95061500	6.24079400	-1.99221900
N	2.74260900	2.98172600	-2.79014000
H	4.77018800	6.87004800	-3.18145700

C-anion, solvent phase, M06-2X, 6-311+G(dp)

C	2.26560500	2.14167900	-3.16568600
C	2.04558300	4.29314900	-2.28655700
C	1.15744500	3.79063200	-1.30983900
C	0.83722800	2.43626000	-1.26332200
C	1.40597800	1.58510800	-2.21559700
H	2.71761500	1.49009300	-3.92666400
H	0.72334600	4.48632300	-0.58661900
H	0.15682600	2.04381300	-0.50128600
H	1.18692500	0.51530700	-2.22398300
C	2.31673300	5.88248700	-2.37692300
N	3.53014400	6.38465100	-1.99646400
C	4.46827000	5.30646100	-1.54656200
O	1.31632200	6.54621600	-2.79137600
H	5.39964800	5.77902000	-1.19106200
H	4.09928400	4.68532500	-0.70646100
N	2.61690500	3.46725300	-3.24283200
H	4.76493100	4.59209200	-2.33837000

C-anion, gas phase, M06-2X, 6-311+G(dp)

C	2.21132100	2.10694600	-3.17110600
C	2.09767800	4.28062300	-2.32211400
C	1.18825600	3.82723700	-1.33657600
C	0.80445700	2.49139600	-1.27043800
C	1.32887900	1.60139900	-2.21366500
H	2.63006000	1.42475600	-3.92422700
H	0.78973900	4.55347300	-0.62310600
H	0.10936500	2.14066400	-0.50173900
H	1.05976600	0.54352700	-2.20829500
C	2.40058700	5.87098600	-2.44653800
N	3.58724700	6.37347200	-1.99726300
C	4.48289400	5.28851300	-1.47540900

O	1.42585900	6.51276700	-2.94774400
H	5.40274400	5.75299400	-1.08225200
H	4.05766700	4.69208500	-0.64366900
N	2.62822500	3.41284000	-3.26845400
H	4.80404300	4.55219000	-2.23700600

D, gas phase, CBS-QB3

C	2.34904500	2.20926500	-3.40817600
C	2.13715400	3.78242700	-1.75666000
C	0.74509600	3.73634800	-1.81462400
C	0.15113400	2.87232900	-2.72734300
C	0.96682800	2.09182400	-3.54210500
H	3.01735100	1.61670300	-4.02604300
H	0.17431800	4.37161400	-1.15052100
H	-0.92844100	2.80783100	-2.80266700
H	0.54685000	1.40497500	-4.26700700
C	2.79770200	4.71909100	-0.76677100
N	4.15206000	4.68454300	-0.80068700
H	4.56555800	4.04191100	-1.46404900
C	4.99025100	5.48975500	0.07100100
O	2.13300700	5.42867300	-0.02432800
H	4.31194400	6.15686200	0.60912200
H	5.47746400	4.85329800	0.81825500
C	6.04399200	6.28197100	-0.67889300
C	5.70409600	7.04974600	-1.79809500
C	7.37133800	6.27940700	-0.24530200
C	6.66952500	7.79940100	-2.46282700
H	4.67787000	7.05528700	-2.14853600
C	8.34035200	7.03210700	-0.90730600
H	7.65012800	5.68301900	0.61788600
C	7.99168300	7.79406700	-2.01870800
H	6.39039000	8.39082300	-3.32789200
H	9.36659200	7.01755500	-0.55729500
H	8.74347400	8.37792100	-2.53772400
N	2.92927000	3.03497800	-2.53566200

D, gas phase, CBS-QB3

C	2.11356400	2.06630100	-1.15373700
C	2.31466500	3.93791800	-2.48324600
C	0.91523600	4.09478900	-2.49024600
C	0.11999400	3.21791400	-1.77372000
C	0.73016200	2.16268100	-1.08802900
H	2.62912300	1.25188800	-0.64561300
H	0.50852600	4.89616400	-3.09261900
H	-0.95987400	3.33782800	-1.75465000
H	0.15144300	1.43736600	-0.52528700

C	3.13901200	4.90604800	-3.35865300
N	4.31478100	5.36518200	-2.99470500
C	4.92001400	5.02700300	-1.73808500
O	2.53626200	5.19832000	-4.42414600
H	4.21872100	4.98752800	-0.88322700
H	5.39163000	4.02801200	-1.74443200
C	6.01069900	6.02342700	-1.35592400
C	6.73385600	5.86973500	-0.16624800
C	6.31990500	7.10694100	-2.18158300
C	7.73260600	6.77132300	0.19371000
H	6.50619700	5.02961000	0.48608000
C	7.31995100	8.01205600	-1.82596000
H	5.74555300	7.19166100	-3.09708400
C	8.03178800	7.85184400	-0.63809400
H	8.27866200	6.63316100	1.12293500
H	7.54557000	8.84890500	-2.48152900
H	8.80998900	8.55733100	-0.36177900
N	2.89717500	2.93000000	-1.81253500

D, solvent phase, M06-2X,6-311+G(dp)

C	2.43084100	2.20414500	-3.32722500
C	2.09918400	3.85548600	-1.72154300
C	0.70420200	3.82319000	-1.91087300
C	0.16695900	2.93425400	-2.85560800
C	1.04742500	2.10967100	-3.57649400
H	3.13723700	1.56065300	-3.88743200
H	0.06999500	4.49785700	-1.31159700
H	-0.92118800	2.88318900	-3.02927100
H	0.67059100	1.39711200	-4.32752800
C	2.73059100	4.82940000	-0.67684900
N	4.12485000	4.63547800	-0.68810500
H	4.42894500	3.91594500	-1.38661000
C	5.05633200	5.39173100	0.16292900
O	2.09116900	5.62792700	0.03867800
H	4.41231100	6.05633900	0.78408300
H	5.61390700	4.71458800	0.84942100
C	6.07046300	6.23579600	-0.64128000
C	5.64612600	6.99264100	-1.75321900
C	7.42863600	6.26628500	-0.26825100
C	6.56457000	7.76879600	-2.47693900
H	4.58462500	6.96336500	-2.04931900
C	8.34845600	7.04466700	-0.99087600
H	7.76576100	5.67274700	0.59747500
C	7.91804100	7.79731700	-2.09605300
H	6.22412100	8.35724900	-3.34444500

H	9.40889700	7.06118400	-0.69106700
H	8.63925300	8.40623600	-2.66462400
N	3.00373200	3.06048400	-2.41033500

D-anion, gas phase, M06-2X, 6-311+G(dp)

C	2.51109800	2.18558100	-3.27171600
C	2.15949800	3.88027600	-1.71779900
C	0.77887300	3.91061600	-1.99514900
C	0.25890300	3.02930700	-2.95636300
C	1.14271900	2.15025900	-3.60601600
H	3.21944400	1.50013600	-3.77662100
H	0.14529400	4.62817000	-1.44727300
H	-0.81725100	3.02545900	-3.19757200
H	0.77988400	1.44167800	-4.36729800
C	2.76699400	4.85560000	-0.66076100
N	4.13790600	4.55545200	-0.52295300
H	4.46284100	3.83519400	-1.21128400
C	5.05464800	5.38725200	0.27602400
O	2.12815100	5.73273000	-0.04353900
H	4.39220000	6.06680000	0.85979000
H	5.63539400	4.76318100	0.99137700
C	6.03210500	6.21486200	-0.58817700
C	5.53695000	7.00723500	-1.64512600
C	7.41792900	6.18949100	-0.33909800
C	6.41371300	7.76361300	-2.43773600
H	4.45194500	7.02185700	-1.84009100
C	8.29725200	6.94847500	-1.13086600
H	7.80984800	5.56951400	0.48390800
C	7.79678900	7.73584400	-2.18104800
H	6.01842100	8.38049600	-3.26087800
H	9.38007600	6.92269800	-0.92807200
H	8.48566400	8.32931600	-2.80319200
N	3.06874600	3.03263900	-2.33542800

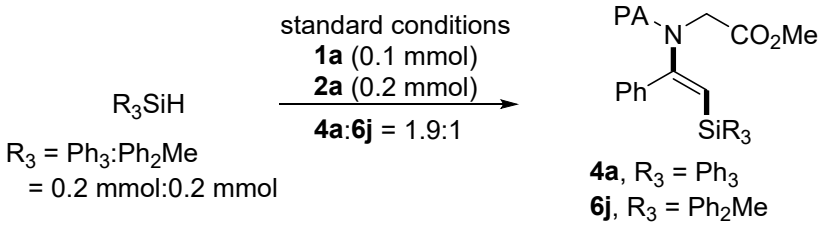
D-anion, solvent phase, M06-2X, 6-311+G(dp)

C	2.16247800	1.93208400	-1.31877700
C	2.40997000	3.89119900	-2.56076600
C	1.06406900	4.22180500	-2.28835200
C	0.27146600	3.39572800	-1.49658000
C	0.83402200	2.21726700	-0.99570400
H	2.61873100	1.00492400	-0.94470700
H	0.65834100	5.14028300	-2.72110500
H	-0.76741100	3.65632400	-1.27220400
H	0.25537200	1.53136400	-0.37327800
C	3.22999400	4.82240600	-3.58946100
N	4.43741100	5.36212900	-3.24575300

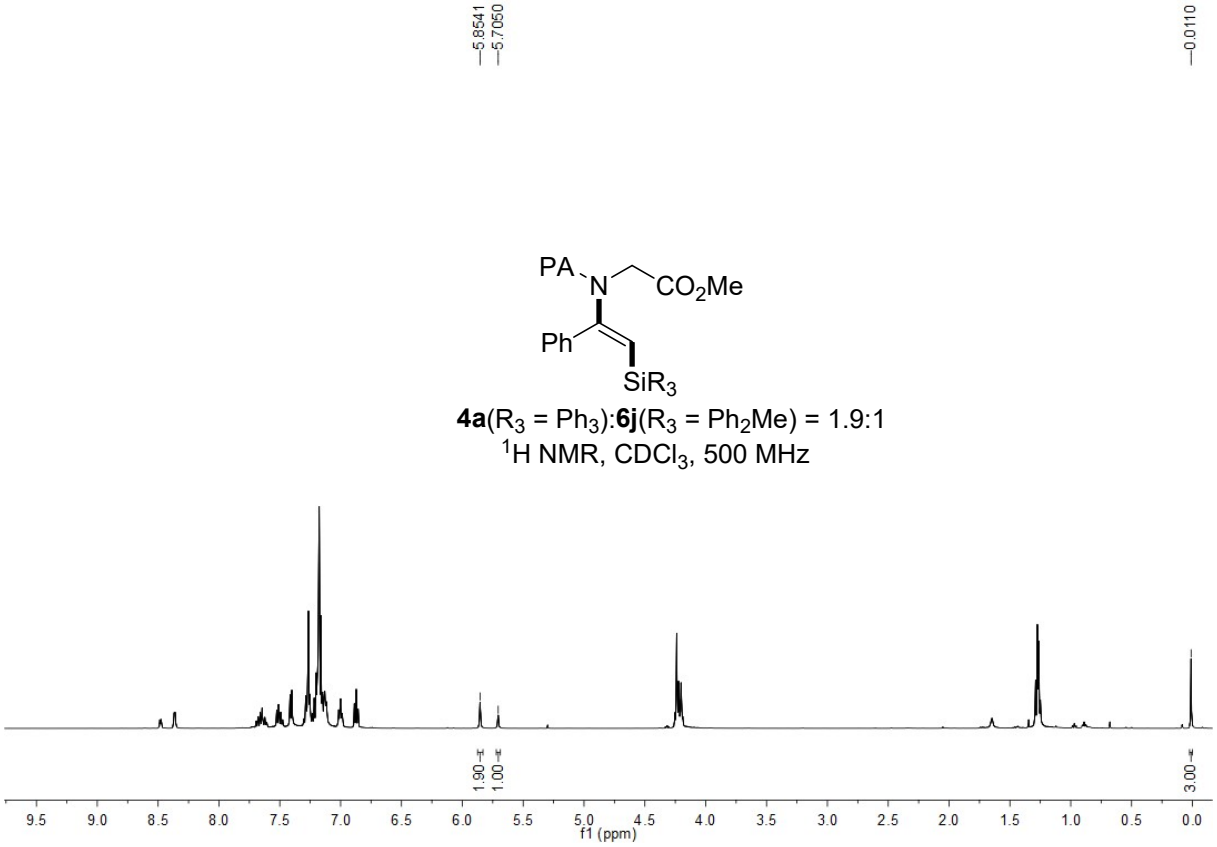
C	4.88090100	4.99320000	-1.87136200
O	2.62357500	4.99030000	-4.69280000
H	4.07969900	4.98781200	-1.10337500
H	5.34017500	3.98324600	-1.80688400
C	5.95572700	5.99823700	-1.38171600
C	6.58189400	5.87601600	-0.13042800
C	6.31622300	7.06801400	-2.21064700
C	7.54332500	6.80411300	0.27784700
H	6.31241600	5.04554900	0.52879800
C	7.27653900	7.99898200	-1.80791900
H	5.79310500	7.10289500	-3.17441100
C	7.89319900	7.86837000	-0.55936600
H	8.02436900	6.69918100	1.25435200
H	7.54921300	8.83000800	-2.46492600
H	8.64579800	8.59315100	-0.23829100
N	2.98460900	2.72634900	-2.08059000

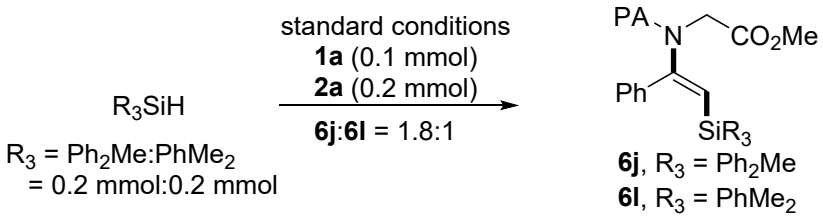
D -anion, gas phase, M06-2X, 6-311+G(dp)

C	2.15836400	1.92870800	-1.32533000
C	2.40357700	3.90525200	-2.54155700
C	1.04221600	4.20444500	-2.30045600
C	0.24524000	3.35787800	-1.53663700
C	0.81722600	2.18461100	-1.03218400
H	2.62194000	1.00595000	-0.94967100
H	0.63265300	5.11716800	-2.74163500
H	-0.80356500	3.59607000	-1.33641600
H	0.23629800	1.48250600	-0.43102700
C	3.21498500	4.87067700	-3.55573200
N	4.41116300	5.42346800	-3.19666000
C	4.84604900	5.03551400	-1.82403300
O	2.59775500	5.04259100	-4.65189700
H	4.04819100	5.05888900	-1.05217700
H	5.27284500	4.01196800	-1.75953900
C	5.95387900	6.01107000	-1.34853000
C	6.58903100	5.90121800	-0.10134700
C	6.33552200	7.04881400	-2.20951000
C	7.58152800	6.81271400	0.27290100
H	6.30370300	5.09592400	0.58177600
C	7.32591400	7.96127600	-1.84127000
H	5.78585300	7.05258200	-3.16158400
C	7.95235500	7.84439100	-0.59492200
H	8.06991200	6.71981300	1.24666200
H	7.61616100	8.76758500	-2.52080300
H	8.72834300	8.55498400	-0.29984100
N	2.98807300	2.74487000	-2.05698400

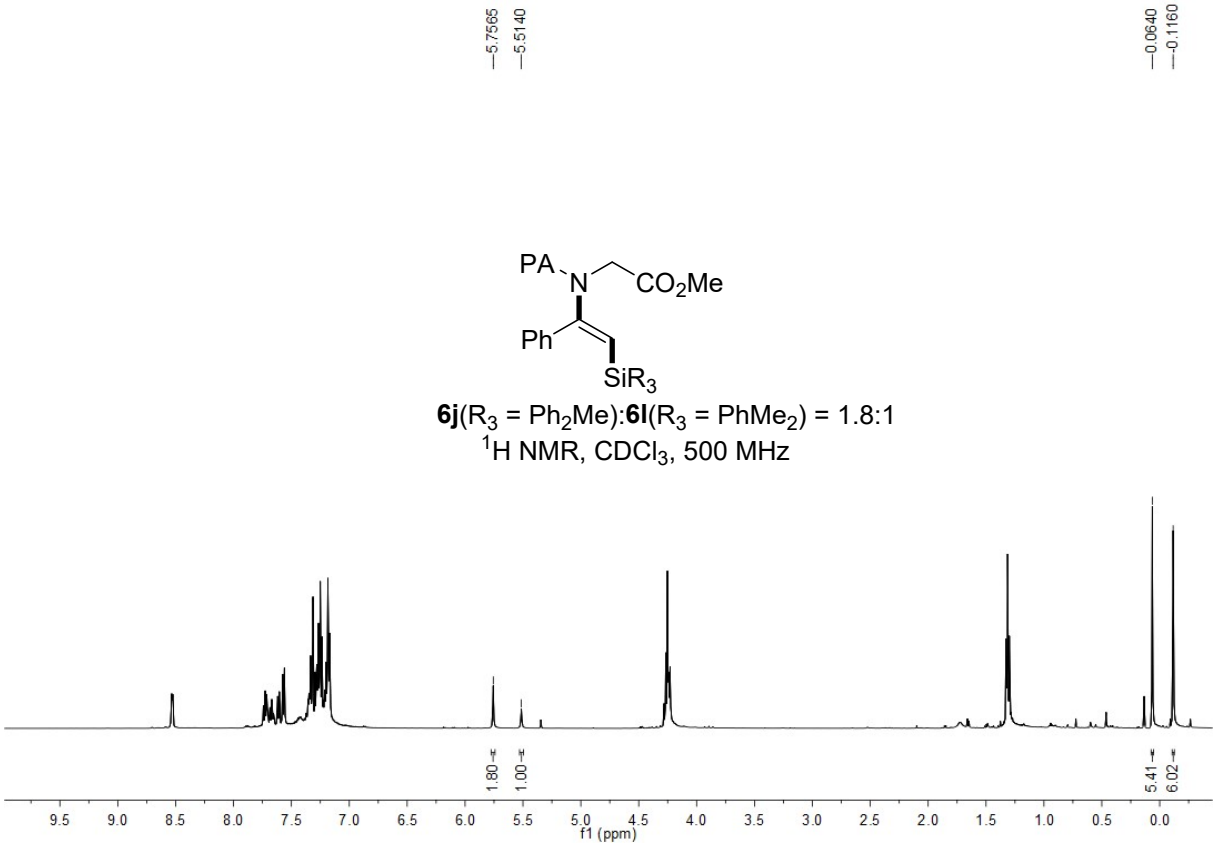


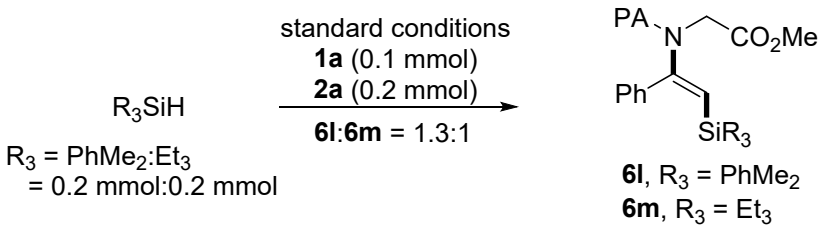
A mixture of ethyl picolinoylglycinate (**1a**) (20.8 mg, 0.1 mmol, 1.0 equiv), phenylacetylene (**2a**) (20.4 mg, 0.2 mmol, 2.0 equiv), triphenylsilane (52.0 mg, 0.2 mmol, 2.0 equiv), methyldiphenylsilane (39.6 mg, 0.2 mmol, 2.0 equiv), CuF_2 (1.5 mg, 0.015 mmol, 15 mol%), and DTBP (52 uL, 0.3 mmol, 3 equiv) were weighted in a Schlenk sealed tube equipped with a stir bar. Dry $PhCF_3$ (1.5 mL) was added and the mixture was stirred at 120 °C in a pre-heated oil bath for 20 h under N_2 atmosphere. Then, the mixture was cooled to room temperature and concentrated in vacuo and the resulting residue was purified by flash column chromatography on silica gel with EtOAc/petroleum ether to give a mixture of products **4a** and **6j** at a ratio of 1.9:1.



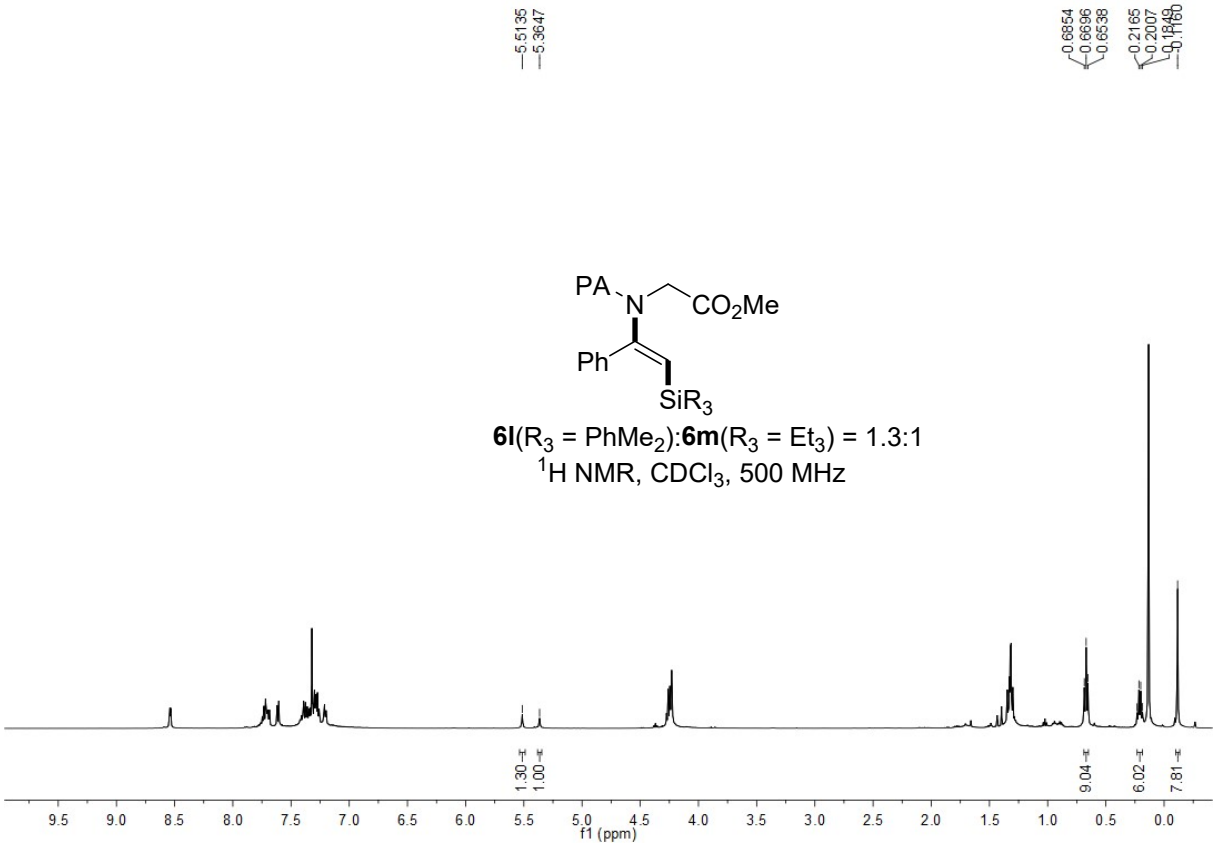


A mixture of ethyl picolinoylglycinate (**1a**) (20.8 mg, 0.1 mmol, 1.0 equiv), phenylacetylene (**2a**) (20.4 mg, 0.2 mmol, 2.0 equiv), methyldiphenylsilane (39.6 mg, 0.2 mmol, 2.0 equiv), dimethyl(phenyl)silane (27.2 mg, 0.2 mmol, 2.0 equiv), CuF_2 (1.5 mg, 0.015 mmol, 15 mol%), and DTBP (52 uL, 0.3 mmol, 3 equiv) were weighted in a Schlenk sealed tube equipped with a stir bar. Dry $PhCF_3$ (1.5 mL) was added and the mixture was stirred at 120 °C in a pre-heated oil bath for 20 h under N_2 atmosphere. Then, the mixture was cooled to room temperature and concentrated in vacuo and the resulting residue was purified by flash column chromatography on silica gel with EtOAc/petroleum ether to give a mixture of products **6j** and **6l** at a ratio of 1.8:1.





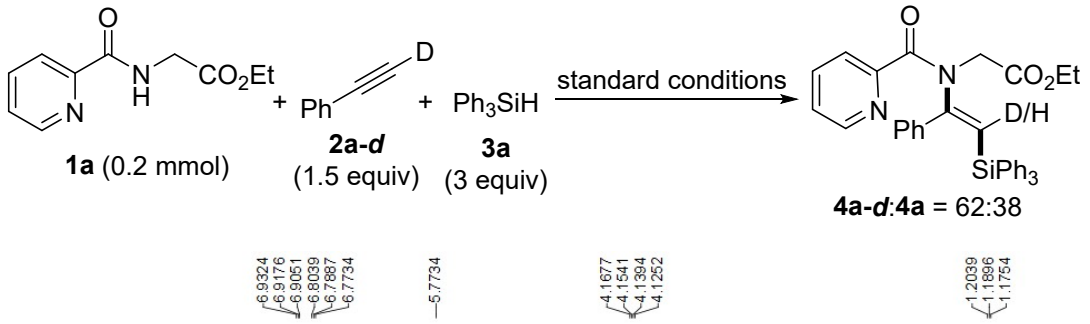
A mixture of ethyl picolinoylglycinate (**1a**) (20.8 mg, 0.1 mmol, 1.0 equiv), phenylacetylene (**2a**) (20.4 mg, 0.2 mmol, 2.0 equiv), dimethyl(phenyl)silane (27.2 mg, 0.2 mmol, 2.0 equiv), triethylsilane (23.2 mg, 0.2 mmol, 2.0 equiv), CuF_2 (1.5 mg, 0.015 mmol, 15 mol%), and DTBP (52 uL, 0.3 mmol, 3 equiv) were weighted in a Schlenk sealed tube equipped with a stir bar. Dry $PhCF_3$ (1.5 mL) was added and the mixture was stirred at 120 °C in a pre-heated oil bath for 20 h under N_2 atmosphere. Then, the mixture was cooled to room temperature and concentrated in vacuo and the resulting residue was purified by flash column chromatography on silica gel with EtOAc/petroleum ether to give a mixture of products **6l** and **6m** at a ratio of 1.3:1.

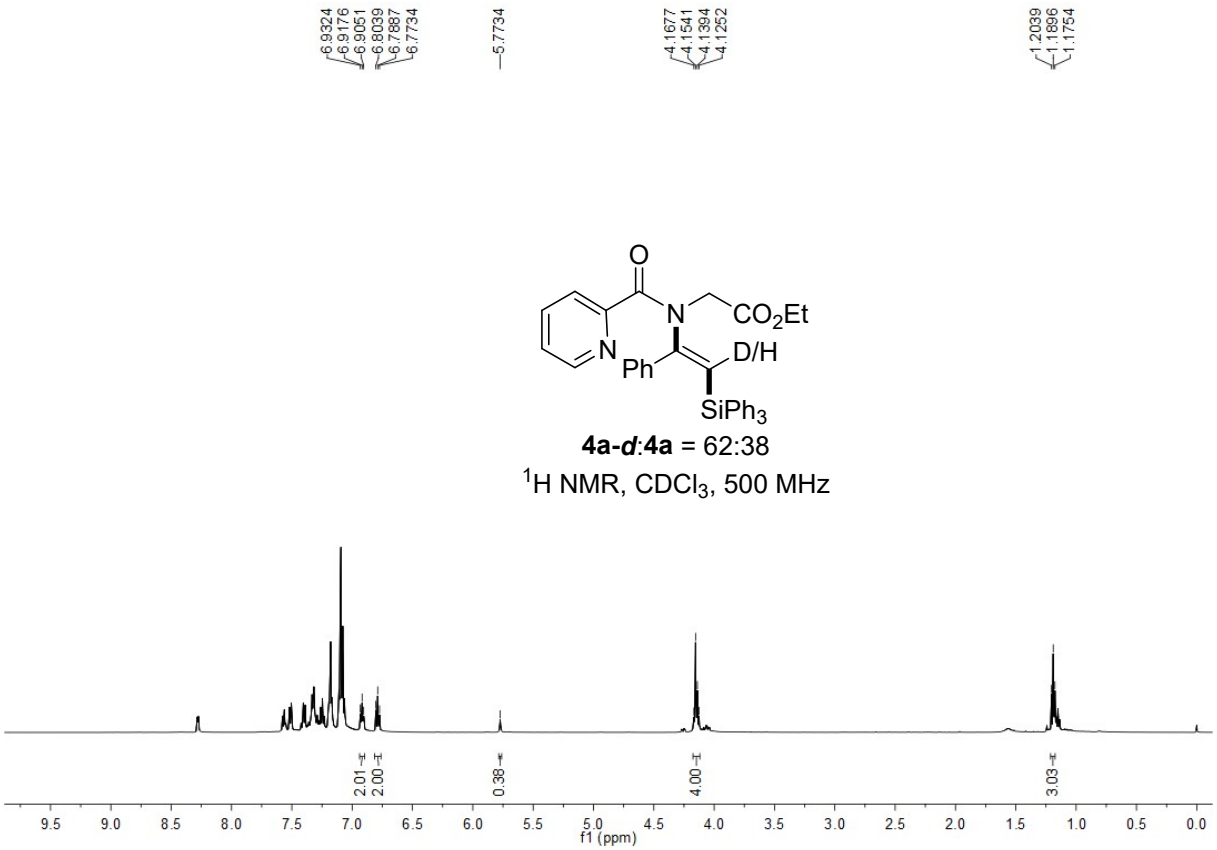


(c) Deuterium-Labeling Experiments

A mixture of ethyl picolinoylglycinate (**1a**) (0.2 mmol, 1.0 equiv), (ethynyl-d)benzene (***2a-d***) (0.3 mmol, 1.5 equiv), triphenylsilane (**3a**) (0.6 mmol, 3.0 equiv), CuF_2 (15 mol%), and

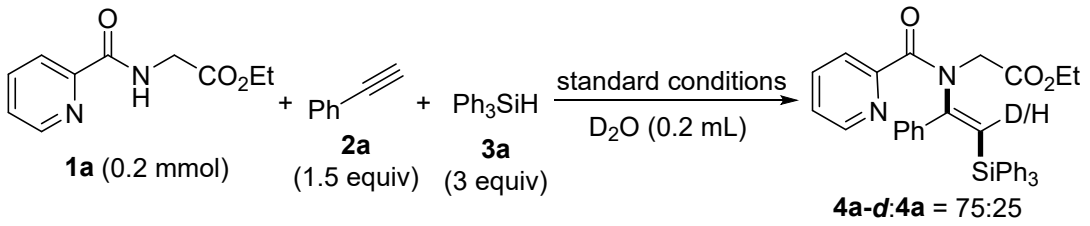
DTBP (3 equiv) were weighted in a Schlenk tube equipped with a stir bar. Dry $PhCF_3$ (1.5 mL) was added and the mixture was stirred at 120 °C in a pre-heated oil bath for 20 h under N_2 atmosphere. Then, the mixture was cooled to room temperature and concentrated in vacuo and the resulting residue was purified by flash column chromatography on silica gel with EtOAc/petroleum ether to give products **4a-*d*** and **4a**. The ratio of **4a-*d*** and **4a** was 62:38 according to the ^1H NMR.

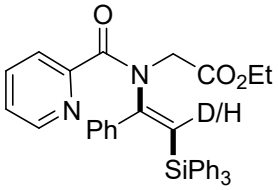




A mixture of ethyl picolinoylglycinate (**1a**) (0.2 mmol, 1.0 equiv), phenylacetylene (**2a**) (0.3 mmol, 1.5 equiv), triphenylsilane (**3a**) (0.6 mmol, 3.0 equiv), CuF_2 (15 mol%), DTBP (3 equiv), and D_2O (0.2 mL) were weighted in a Schlenk tube equipped with a stir bar. Dry $PhCF_3$ (1.5 mL) was added and the mixture was stirred at 120 °C in a pre-heated oil bath for 20 h under N_2 atmosphere. Then, the mixture was cooled to room temperature and concentrated in vacuo and the resulting residue was purified by flash column chromatography

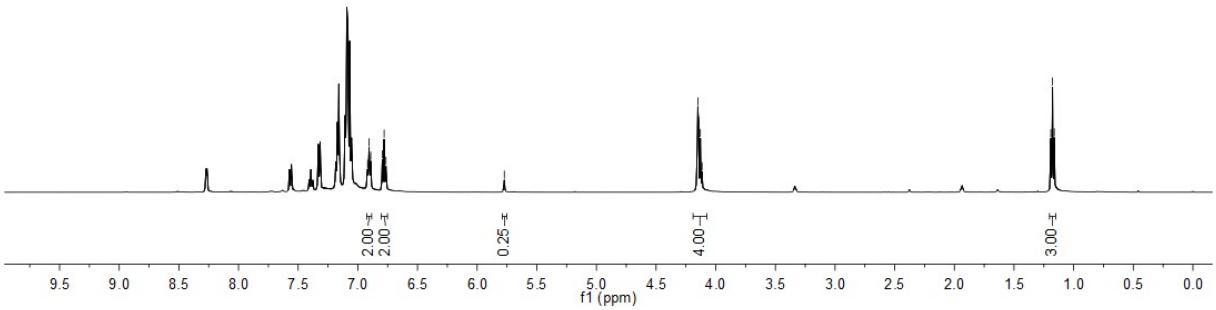
on silica gel with EtOAc/petroleum ether to give products **4a-*d*** and **4a**. The ratio of **4a-*d*** and **4a** was 75:25 according to the ^{1}H NMR.





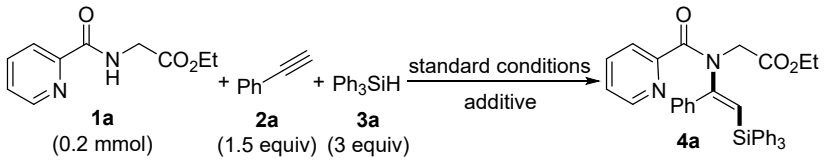
4a-*d*:4a = 75:25

^{1}H NMR, $CDCl_3$, 500 MHz

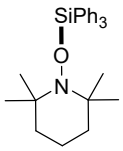


(d) Radical Scavenger Experiments

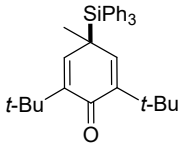
A mixture of ethyl picolinoylglycinate (**1a**) (0.2 mmol, 1.0 equiv), phenylacetylene (**2a**) (0.3 mmol, 1.5 equiv), triphenylsilane (**3a**) (0.6 mmol, 3.0 equiv), CuF_2 (15 mol%), DTBP (3 equiv), and additive (0.4 mmol, 2.0 equiv) were weighted in a Schlenk tube equipped with a stir bar. Dry $PhCF_3$ (1.5 mL) was added and the mixture was stirred at 120 ^{o}C in a pre-heated oil bath for 20 h under N_2 atmosphere. Then, the mixture was cooled to room temperature and quenched with brine, the aqueous phase was extracted with EtOAc. The crude mixture was firstly analyzed by HRMS (High Resolution Mass Spectrometry).Then the solvent was concentrated in vacuo and the resulting residue was purified by flash column chromatography on silica gel with EtOAc/petroleum ether to give product **4a**.



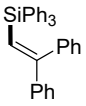
additive:
no, 82% yield of **4a**
TEMPO (2equiv), trace
BHT (2equiv), 5% yield of **4a**
1,1-DPE (2equiv), 28% yield of **4a**



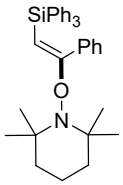
Detected by HRMS:
calculated for $C_{27}H_{34}NOSi$
$[M+H]^+$ 416.24042, found: 416.24094



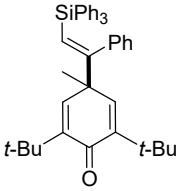
Detected by HRMS:
calculated for $C_{33}H_{38}NaOSi$
$[M+Na]^+$ 501.25841, found: 501.25922



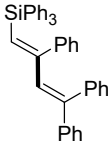
Detected by HRMS:
calculated for $C_{32}H_{26}NaSi$
$[M+Na]^+$ 461.16960, found: 461.17102



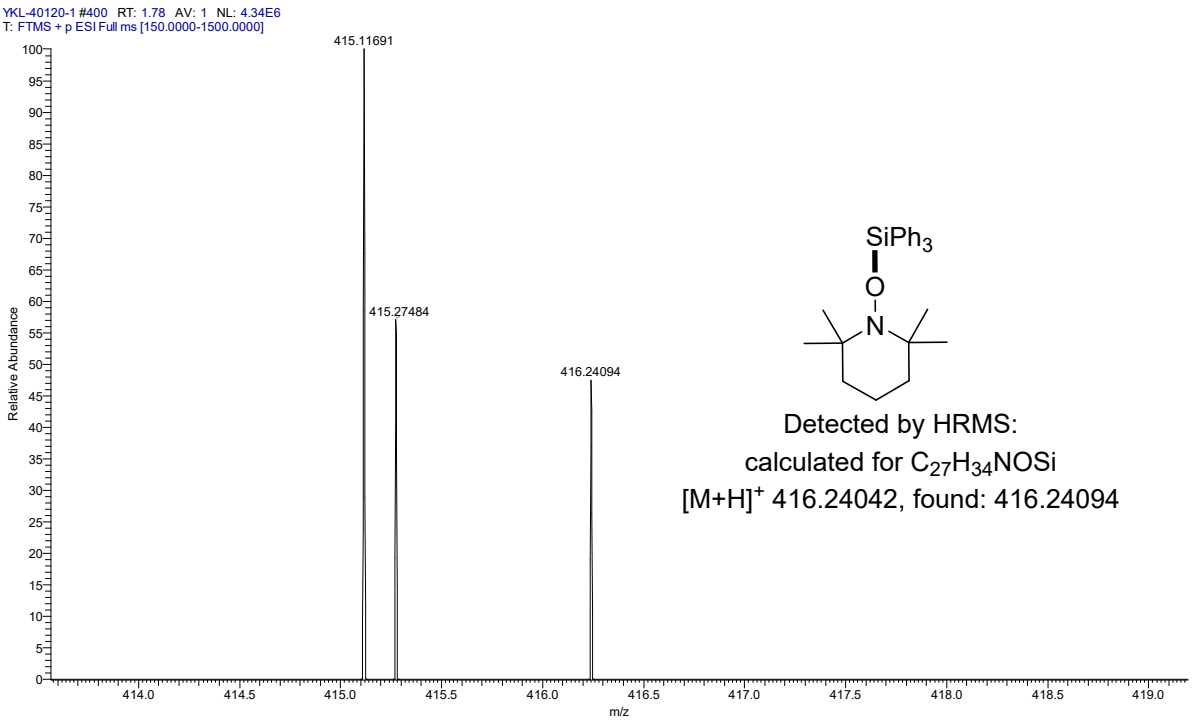
Detected by HRMS:
calculated for $C_{35}H_{40}NOSi$
$[M+H]^+$ 518.28737, found: 518.28717



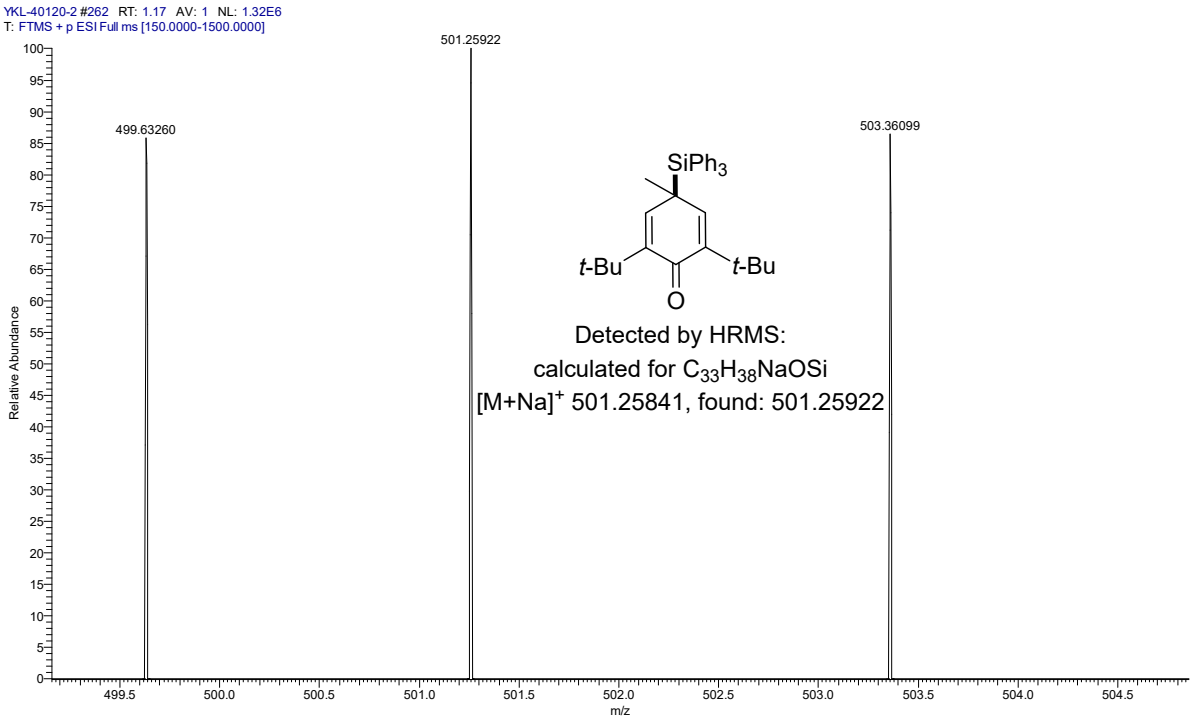
Detected by HRMS:
calculated for $C_{41}H_{45}OSi$
$[M+H]^+$ 581.32342, found: 581.32245



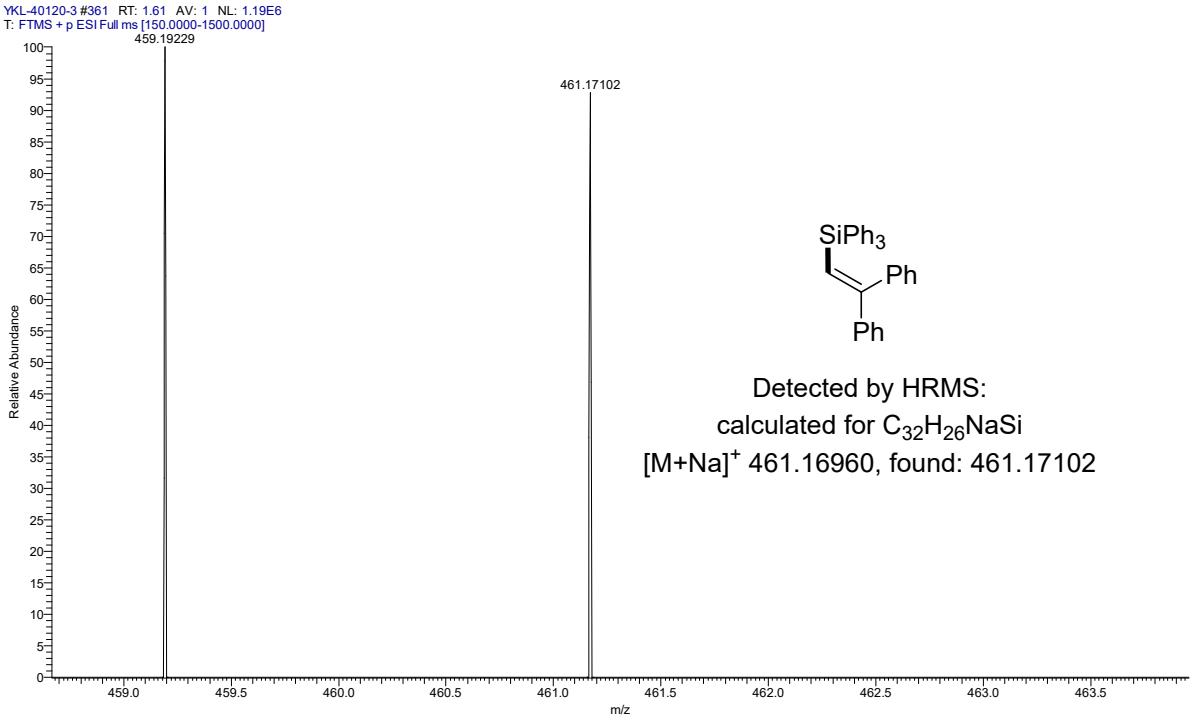
Detected by HRMS:
calculated for $C_{40}H_{33}Si$
$[M+H]^+$ 541.23460, found: 541.23474



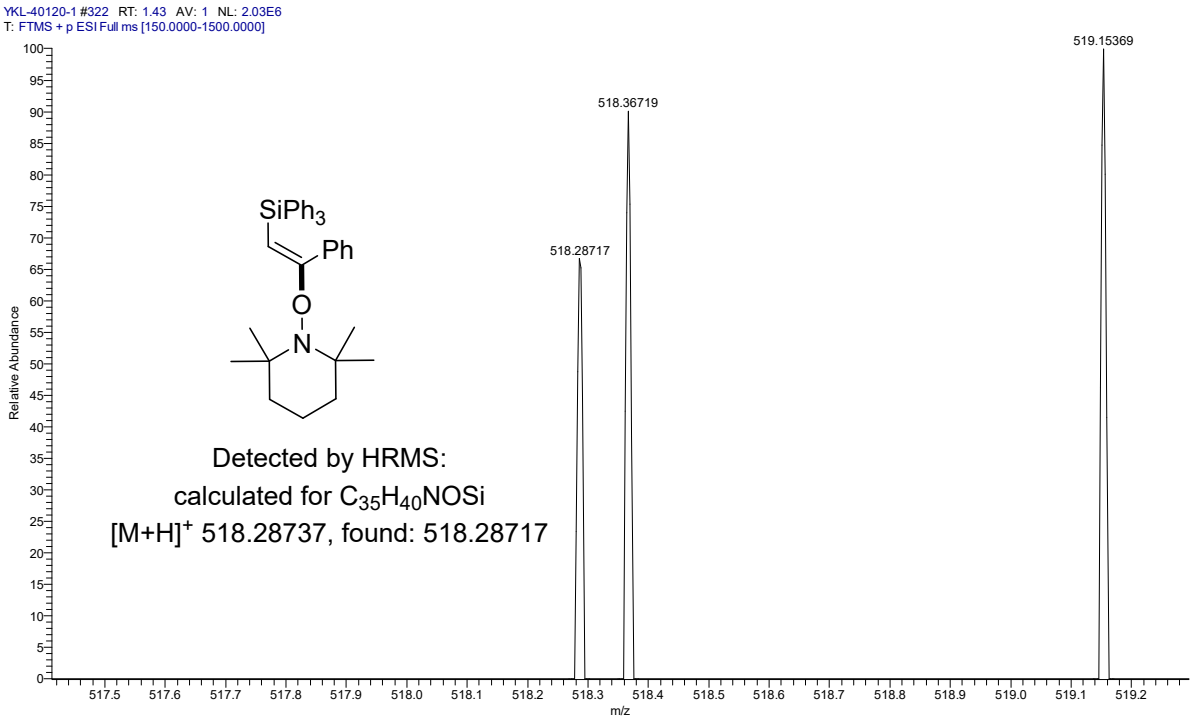
Detected by HRMS:
calculated for $C_{27}H_{34}NOSi$
$[M+H]^+$ 416.24042, found: 416.24094

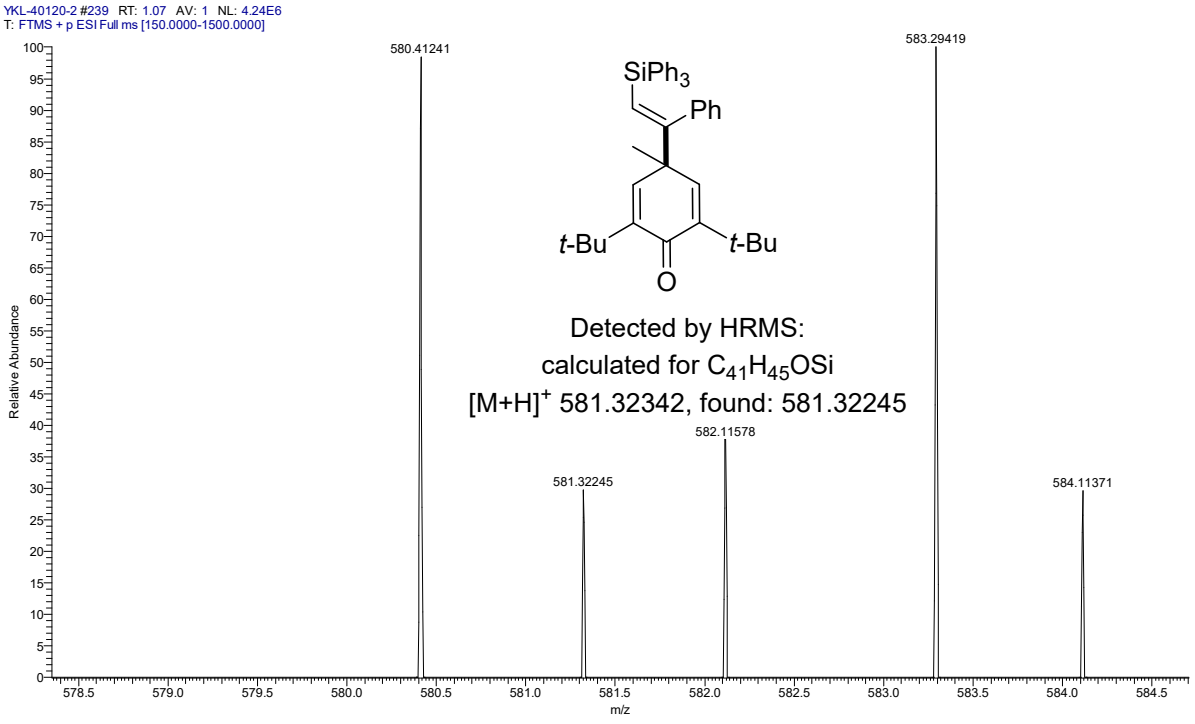


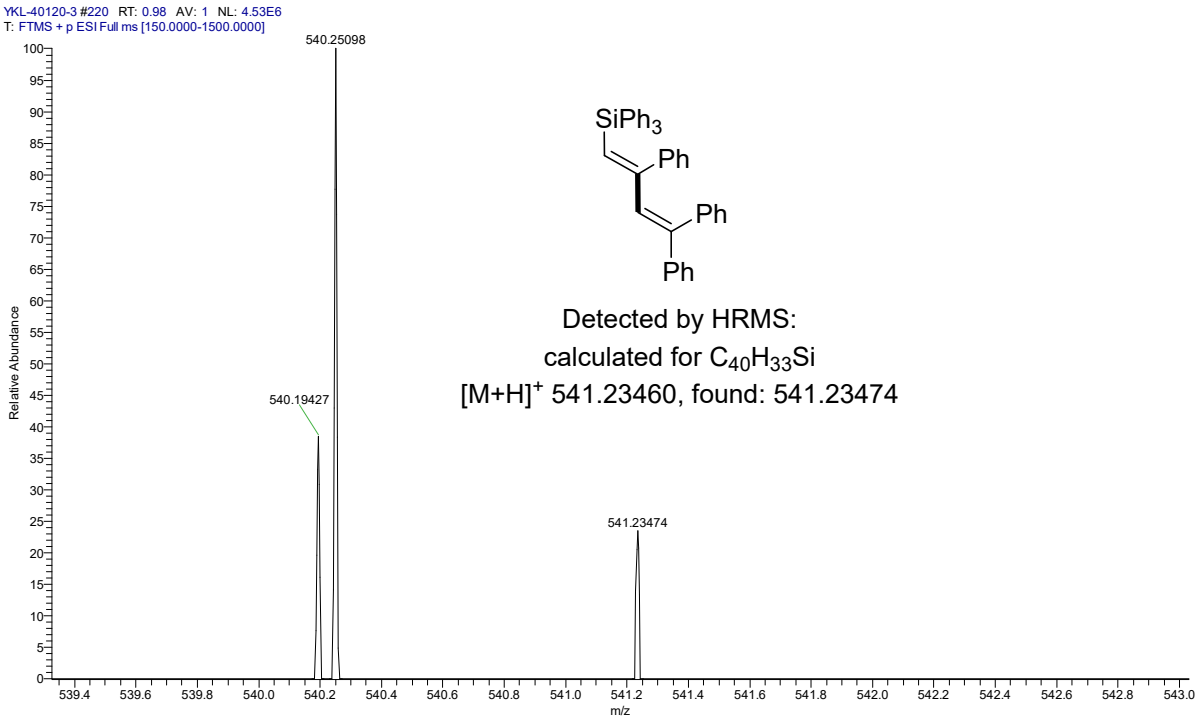
Detected by HRMS:
calculated for $C_{33}H_{38}NaOSi$
$[M+Na]^+$ 501.25841, found: 501.25922



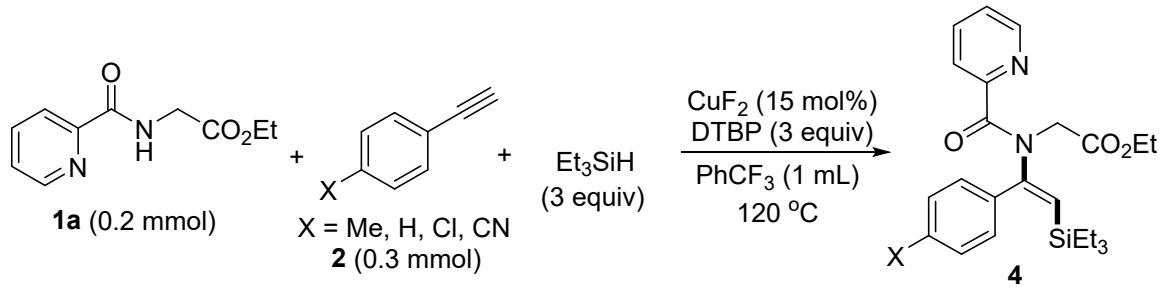
Detected by HRMS:
calculated for $C_{32}H_{26}NaSi$
$[M+Na]^+$ 461.16960, found: 461.17102


YKL-40120-1 #322 RT: 1.43 AV: 1 NL: 2.03E6
T: FTMS + p ESI Full ms [150.0000-1500.0000]
519.15369
518.36719
518.28717
SiPh3
Ph
O
N
Relative Abundance
m/z
Detected by HRMS:
calculated for C35H40NOSi
[M+H]+ 518.28737, found: 518.28717


YKL-40120-2 #239 RT: 1.07 AV: 1 NL: 4.24E6
T: FTMS + p ESI Full ms [150.0000-1500.0000]
580.41241
583.29419
582.11578
581.32245
584.11371
SiPh3
Ph
t-Bu
t-Bu
O
Relative Abundance
m/z
Detected by HRMS:
calculated for C41H45OSi
[M+H]+ 581.32342, found: 581.32245



(e) Competition Experiments for the Hammett Study



A mixture of ethyl picolinoylglycinate (**1a**) (0.2 mmol, 1.0 equiv), alkyne (**2**) (0.3 mmol, 1.5 equiv), triethylsilane (0.6 mmol, 3.0 equiv), CuF_2 (15 mol%), and DTBP (3 equiv) were weighted in a Schlenk tube equipped with a stir bar. Dry $PhCF_3$ (1 mL) was added and the mixture was stirred at 120 °C in a pre-heated oil bath under N_2 atmosphere. Then, the small potion solution (50 μl) was taken with a syringe every 10 minutes and diluted immediately by brine to quench reaction, and the aqueous phase was extracted with EtOAc. The yields of products **4** were obtained by further gas chromatography analysis.

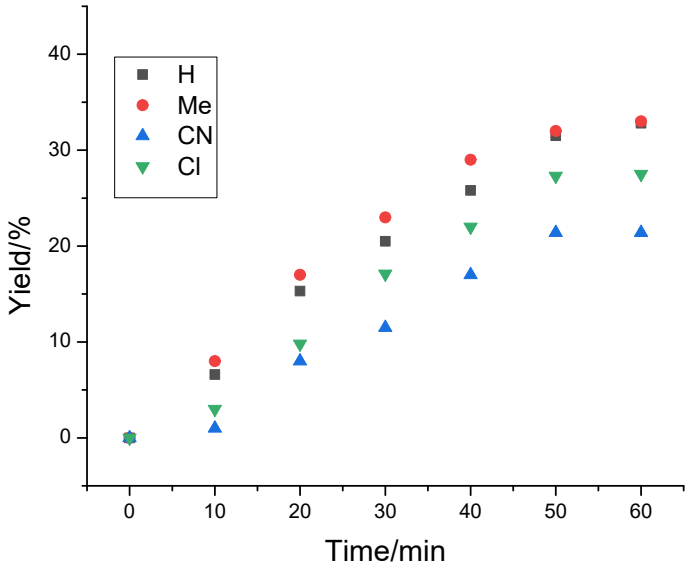


Figure S2. The kinetic data of *para*-substituted aryl alkynes for the silylamination reaction

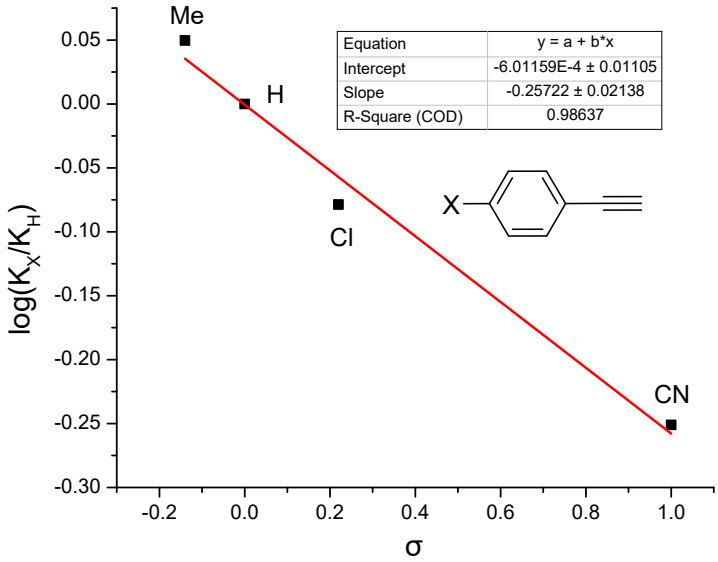
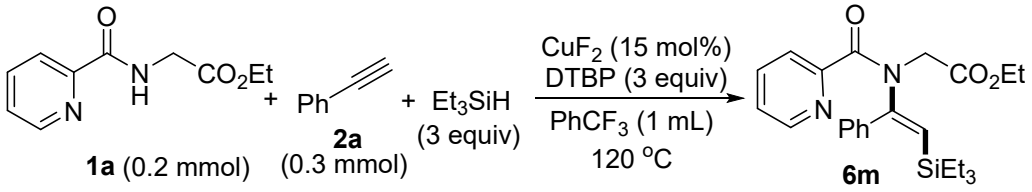


Figure S3. Hammett plots for the silylamination reaction of *para*-substituted aryl alkynes using σ values from the literature (log(*kX/kH*) vs σ)

(f) Reaction Progress Kinetic Analysis



A mixture of ethyl picolinoylglycinate (**1a**) (0.2 mmol, 1.0 equiv), phenylacetylene (**2a**) (0.3 mmol, 1.5 equiv), triethylsilane (0.6 mmol, 3.0 equiv), CuF_2 (15 mol%), and DTBP (3 equiv) were weighted in a Schlenk tube equipped with a stir bar. Dry $PhCF_3$ (1 mL) was added and the mixture was stirred at 120 °C in a pre-heated oil bath under N_2 atmosphere. Then, the small potion solution (50 μl) was taken with a syringe every 5 minutes and diluted immediately by brine to quench reaction, and the aqueous phase was extracted with EtOAc. The yields of product **6m** were obtained by further gas chromatography analysis.

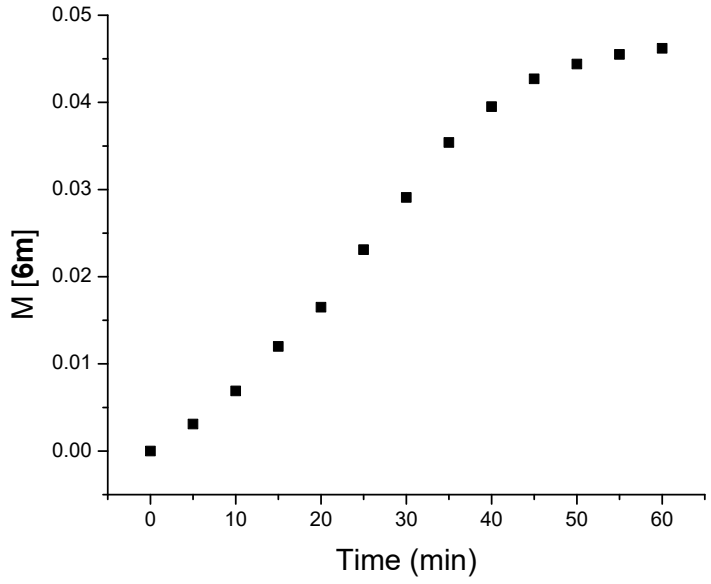
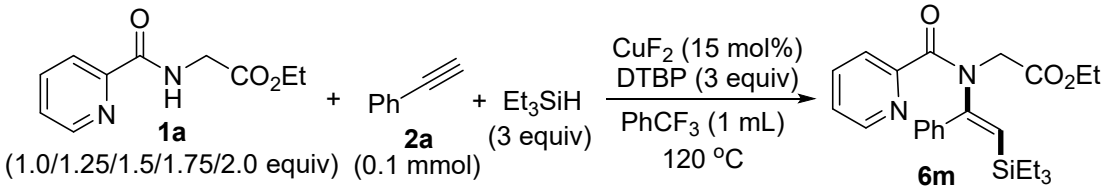


Figure S4. Monitor of the reaction profile.

The rate on the concentration of ethyl picolinoylglycinate 1a



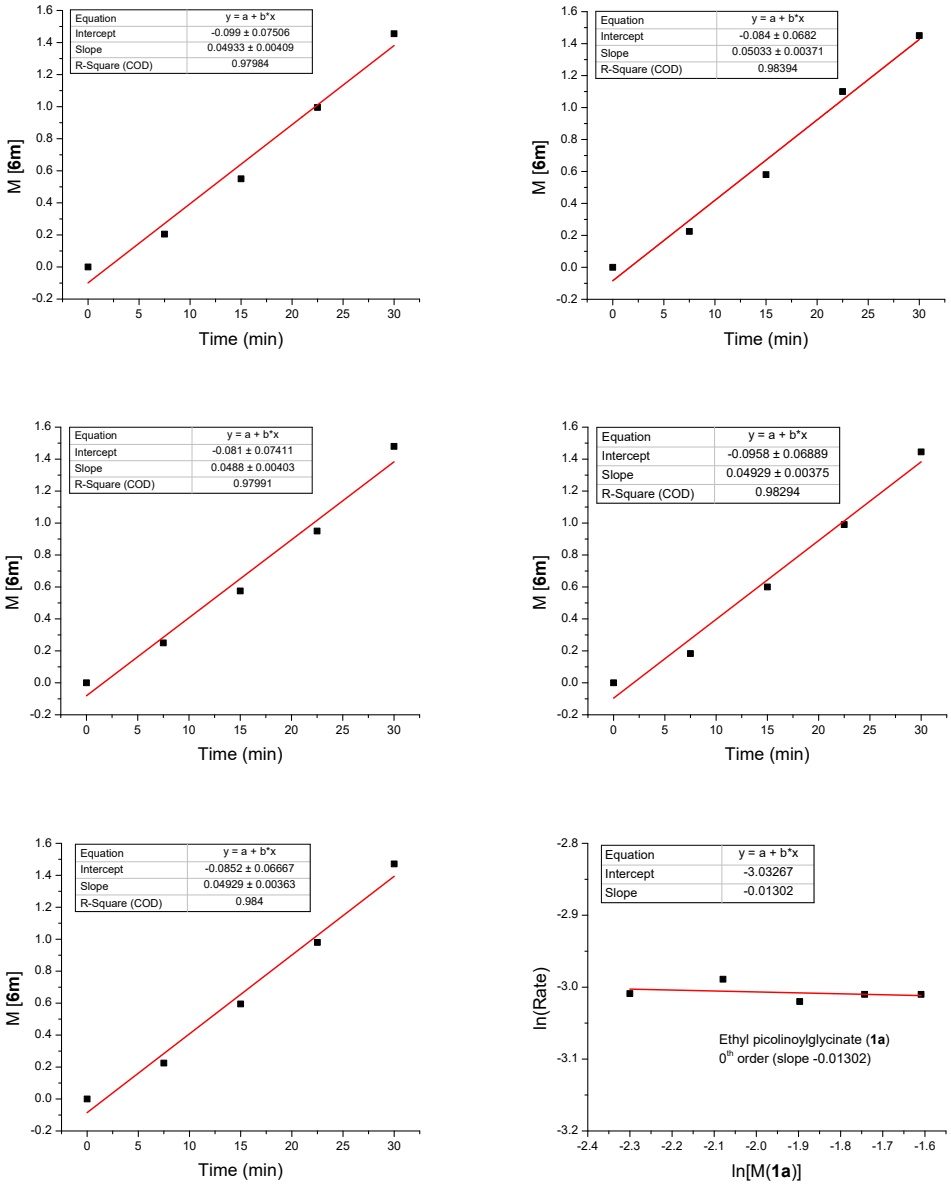
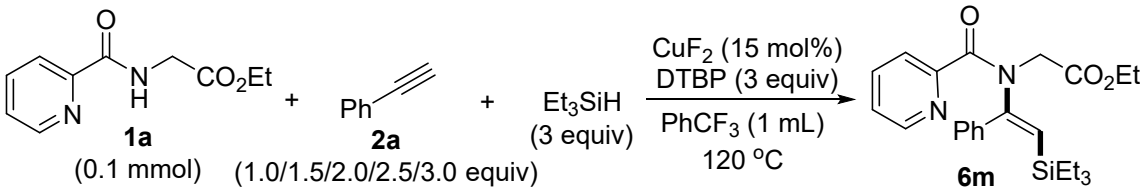


Figure S5. The rate on the concentration of ethyl picolinoylglycinate **1a** from the reaction of **2a** (0.1 mmol), Et_3SiH (3 equiv), CuF_2 (15 mol%), DTBP (3 equiv) with (1.0/1.25/1.5/1.75/2.0 equiv) of **1a** in $PhCF_3$ (1 mL).

The rate on the concentration of phenylacetylene 2a



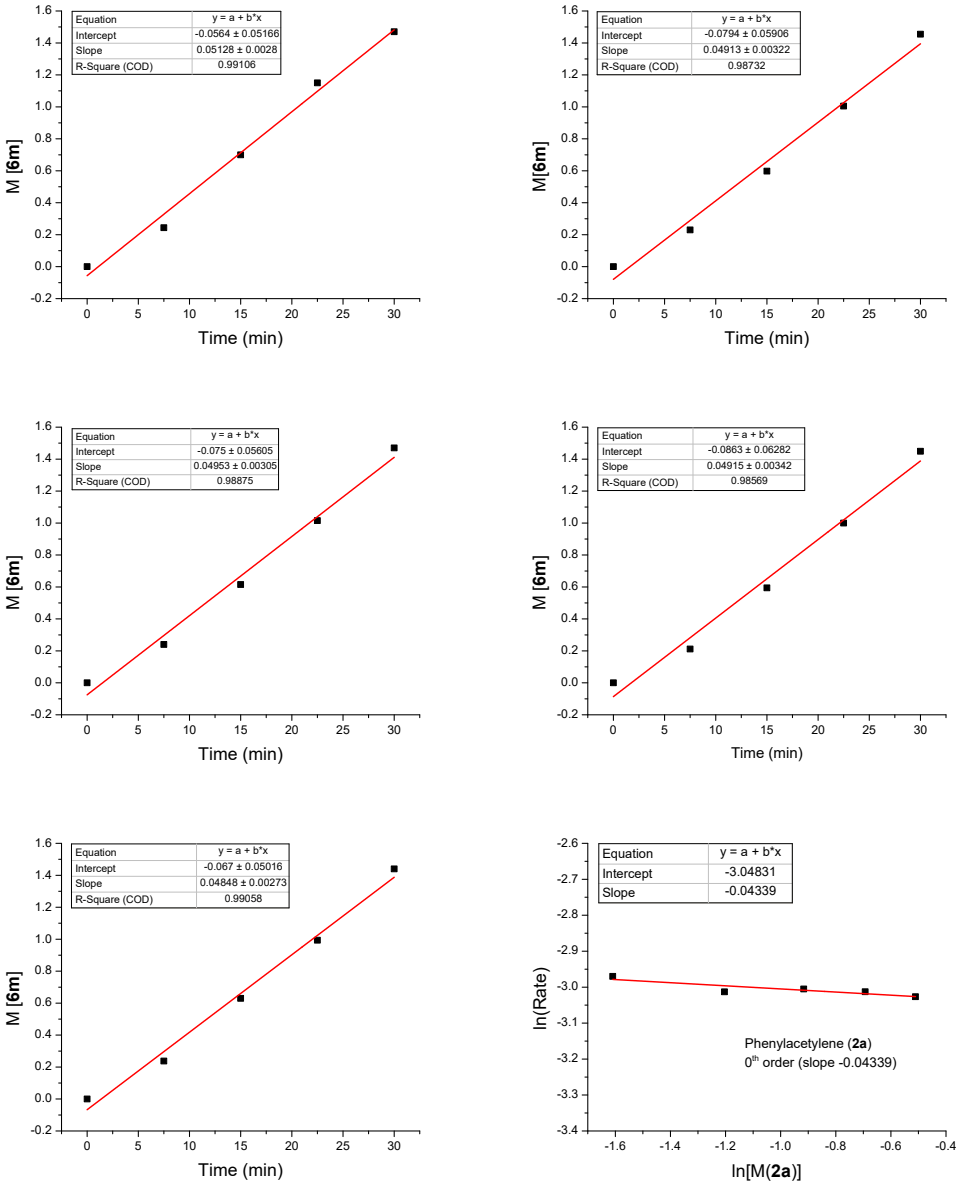
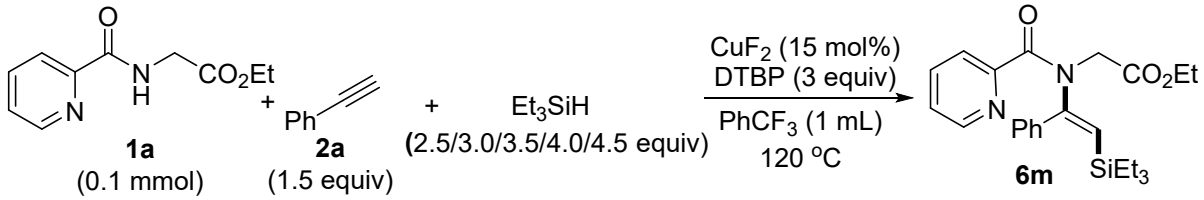


Figure S6. The rate on the concentration of phenylacetylene **2a** from the reaction of **1a** (0.1 mmol), Et_3SiH (3 equiv), CuF_2 (15 mol%), DTBP (3 equiv) with (1.0/1.5/2.0/2.5/3.0 equiv) of **2a** in $PhCF_3$ (1 mL).

The rate on the concentration of Et_3SiH



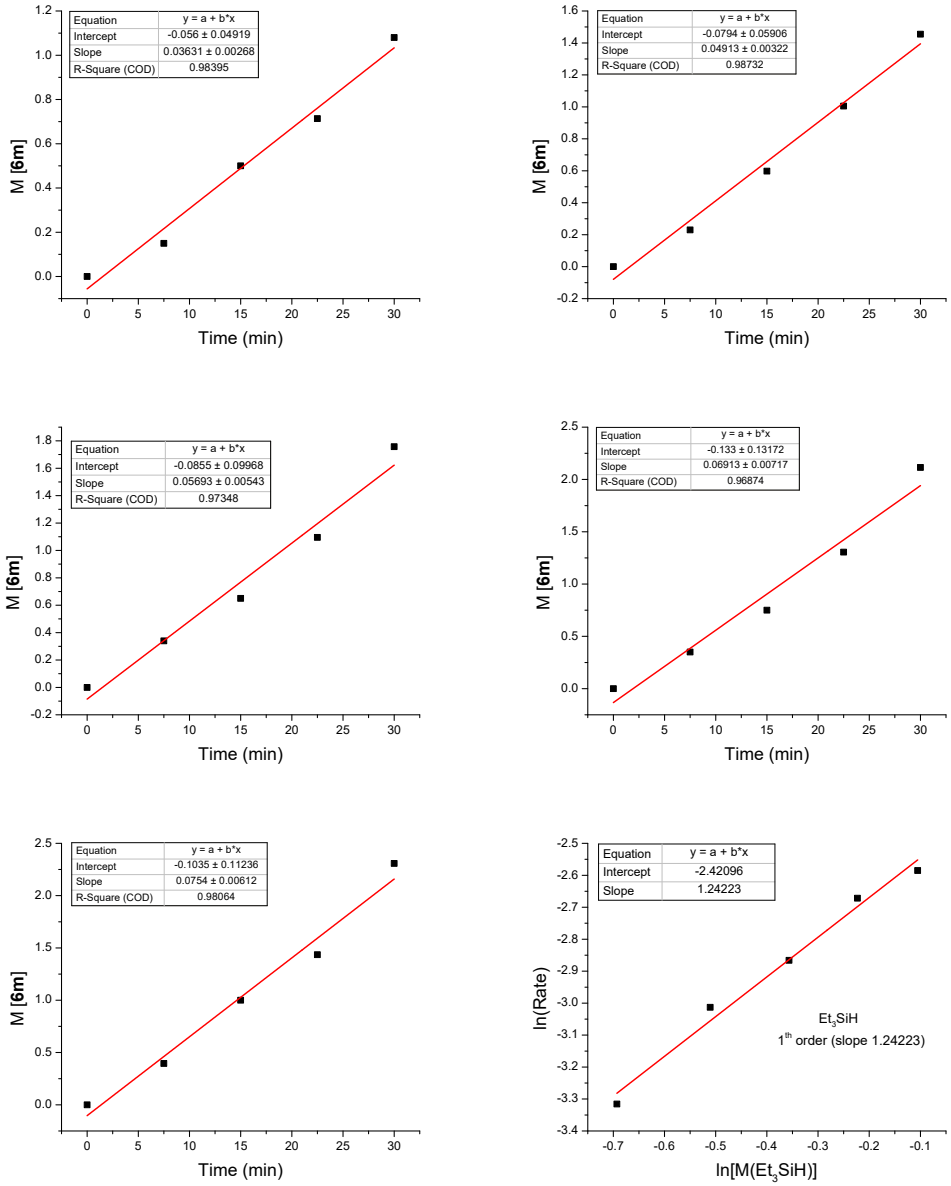
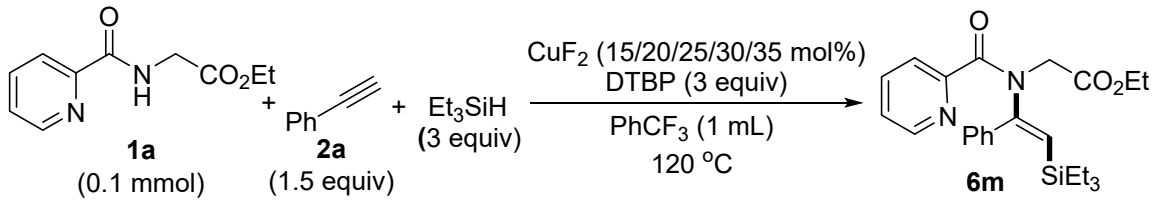


Figure S7. The rate on the concentration of Et_3SiH from the reaction of **1a** (0.1 mmol), **2a** (1.5 equiv), CuF_2 (15 mol%), DTBP (3 equiv) with (2.5/3.0/3.5/4.0/4.5 equiv) of Et_3SiH in $PhCF_3$ (1 mL).

The rate on the concentration of CuF_2



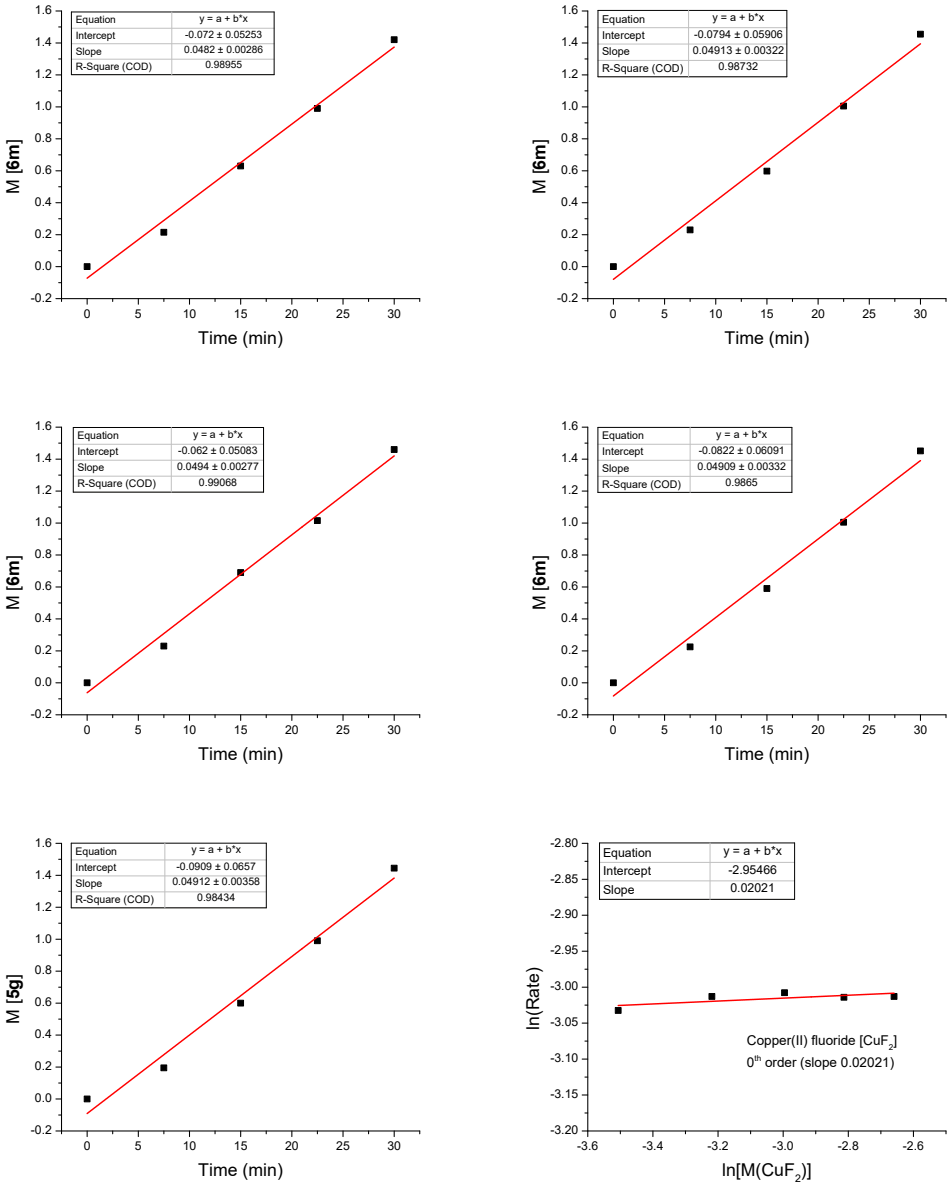
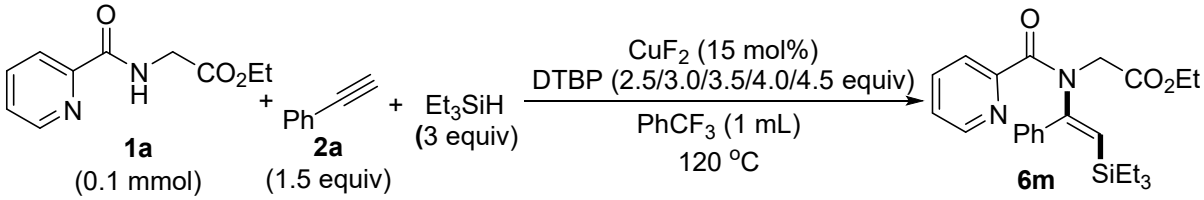


Figure S8. The rate on the concentration of CuF_2 from the reaction of **1a** (0.1 mmol), **2a** (1.5 equiv), Et_3SiH (3 equiv), DTBP (3 equiv) with (15/20/25/30/35 mol%) of CuF_2 in $PhCF_3$ (1 mL).

The rate on the concentration of DTBP



1a (0.1 mmol) + **2a** (1.5 equiv) → **6m**

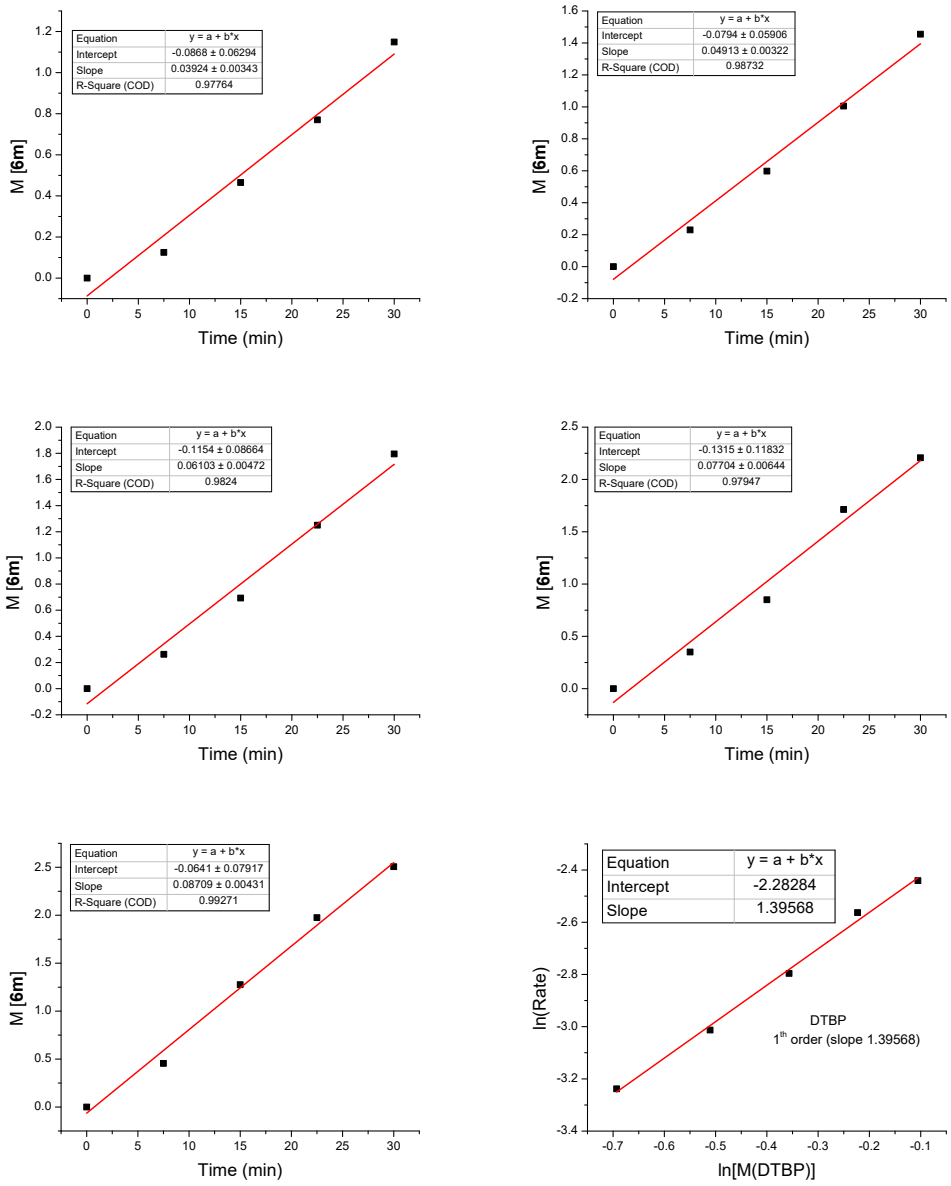
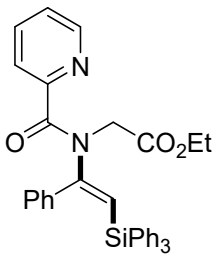


Figure S9. The rate on the concentration of DTBP from the reaction of **1a** (0.1 mmol), **2a** (1.5 equiv), Et_3SiH (3 equiv), CuF_2 (15 mol%), with (2.5/3.0/3.5/4.0/4.5 equiv) of DTBP in $PhCF_3$ (1 mL).

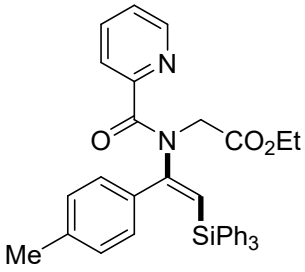
6. Characterization of Products 4, 5, 6, 7, 8, 9 and 11



ethyl (*E*)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4a)

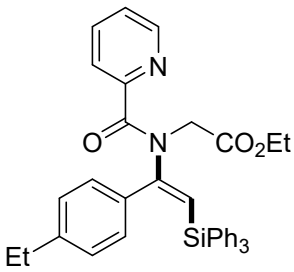
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 82% yield (93.2 mg, 0.164 mmol). Mp: 102 – 103 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.34 (d, *J* = 4.5 Hz, 1H), 7.63 (d, *J* = 7.8 Hz, 1H), 7.47 (t, *J* = 7.7 Hz, 1H), 7.39 (d,

J = 7.3 Hz, 2H), 7.25 – 7.22 (m, 3H), 7.19 – 7.12 (m, 12H), 6.98 (t, J = 6.8 Hz, 2H), 6.85 (t, J = 7.7 Hz, 2H), 5.84 (s, 1H), 4.24 – 4.17 (m, 4H), 1.27 (t, J = 5.4 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 168.7, 155.4, 153.6, 148.0, 136.2, 136.0, 135.5, 134.3, 129.8, 129.1, 127.5, 127.5, 124.3, 123.9, 122.1, 61.1, 48.9, 14.1. **HRMS (ESI):** Calcd for $C_{36}H_{32}N_2NaO_3Si$ $[M+Na]^+$ 591.2074, found: 591.2078.



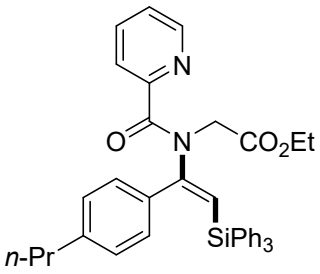
ethyl (*E*)-*N*-picolinoyl-*N*-(1-(*p*-tolyl)-2-(triphenylsilyl)vinyl)glycinate (4b)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 84% yield (97.8 mg, 0.168 mmol). Mp: 127 – 128 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.33 (d, J = 4.4 Hz, 1H), 7.63 (d, J = 7.8 Hz, 1H), 7.46 (t, J = 7.7 Hz, 1H), 7.26 – 7.22 (m, 5H), 7.17 – 7.11 (m, 12H), 6.98 – 6.93 (m, 1H), 6.63 (d, J = 7.9 Hz, 2H), 5.77 (s, 1H), 4.24 – 4.17 (m, 4H), 2.11 (s, 3H), 1.25 (t, J = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 168.7, 155.4, 153.6, 148.0, 139.1, 136.2, 135.6, 134.4, 133.1, 129.7, 128.9, 128.2, 127.4, 124.3, 123.8, 121.5, 61.1, 48.8, 21.1, 14.1. **HRMS (ESI):** Calcd for $C_{37}H_{34}N_2NaO_3Si$ $[M+Na]^+$ 605.2231, found: 605.2232.



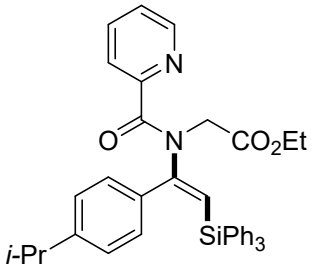
ethyl (*E*)-*N*-(1-(4-ethylphenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4c)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 88% yield (104.9 mg, 0.176 mmol). Mp: 151 – 152 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.34 (d, J = 4.6 Hz, 1H), 7.63 (d, J = 7.8 Hz, 1H), 7.45 (t, J = 7.7 Hz, 1H), 7.29 (d, J = 8.0 Hz, 2H), 7.25 – 7.23 (m, 3H), 7.18 – 7.12 (m, 12H), 6.98 – 6.95 (m, 1H), 6.67 (d, J = 8.0 Hz, 2H), 5.78 (s, 1H), 4.24 – 4.20 (m, 4H), 2.41 (q, J = 7.6 Hz, 2H), 1.26 (t, J = 7.1 Hz, 3H), 1.07 (t, J = 7.6 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 168.7, 155.4, 153.7, 148.0, 145.4, 136.2, 135.6, 134.4, 133.3, 129.8, 129.0, 127.4, 127.0, 124.3, 123.8, 121.5, 61.1, 48.9, 28.5, 15.4, 14.1. **HRMS (ESI):** Calcd for $C_{38}H_{36}N_2NaO_3Si$ $[M+Na]^+$ 619.2387, found: 619.2385.



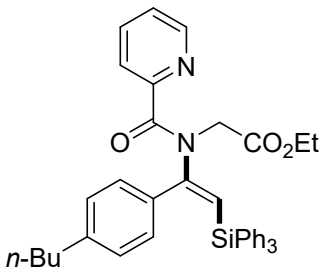
ethyl (*E*)-*N*-picolinoyl-*N*-(1-(4-propylphenyl)-2-(triphenylsilyl)vinyl)glycinate (4d)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 83% yield (101.3 mg, 0.166 mmol). Mp: 134 – 135 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.34 (d, *J* = 4.5 Hz, 1H), 7.62 (d, *J* = 7.8 Hz, 1H), 7.45 (t, *J* = 7.7 Hz, 1H), 7.29 (d, *J* = 8.0 Hz, 2H), 7.25 – 7.22 (m, 3H), 7.19 – 7.12 (m, 12H), 6.99 – 6.95 (m, 1H), 6.66 (d, *J* = 8.0 Hz, 2H), 5.79 (s, 1H), 4.24 – 4.20 (m, 4H), 2.35 (t, *J* = 7.7 Hz, 2H), 1.49 – 1.42 (m, 2H), 1.26 (t, *J* = 7.1 Hz, 3H), 0.85 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 168.7, 155.5, 153.7, 148.0, 143.8, 136.2, 135.6, 134.4, 133.4, 129.7, 129.0, 127.6, 127.4, 124.2, 123.8, 121.4, 61.1, 48.9, 37.7, 24.2, 14.1, 13.8. **HRMS (ESI):** Calcd for $C_{39}H_{38}N_2NaO_3Si$ $[M+Na]^+$ 633.2544, found: 633.2548.



ethyl (*E*)-*N*-(1-(4-isopropylphenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4e)

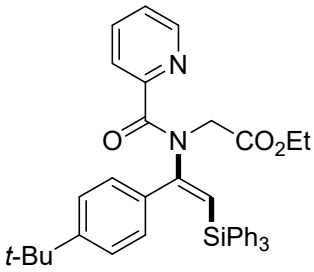
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 78% yield (95.2 mg, 0.156 mmol). Mp: 146 – 147 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.35 (d, *J* = 4.5 Hz, 1H), 7.62 (d, *J* = 7.8 Hz, 1H), 7.44 (t, *J* = 7.2 Hz, 1H), 7.31 (d, *J* = 8.1 Hz, 2H), 7.26 – 7.23 (m, 3H), 7.19 – 7.13 (m, 12H), 6.98 – 6.94 (m, 1H), 6.70 (d, *J* = 8.1 Hz, 2H), 5.78 (s, 1H), 4.25 – 4.21 (m, 4H), 2.67 (dq, *J* = 13.8, 6.9 Hz, 1H), 1.27 (t, *J* = 7.2 Hz, 3H), 1.08 (d, *J* = 6.9 Hz, 6H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.1, 168.7, 155.4, 153.7, 150.0, 148.0, 136.1, 135.6, 134.3, 133.4, 129.7, 129.0, 127.4, 125.5, 124.2, 123.7, 121.4, 61.1, 48.9, 33.7, 23.7, 14.1. **HRMS (ESI):** Calcd for $C_{39}H_{38}N_2NaO_3Si$ $[M+Na]^+$ 633.2544, found: 633.2540.



ethyl (*E*)-*N*-(1-(4-butylphenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4f)

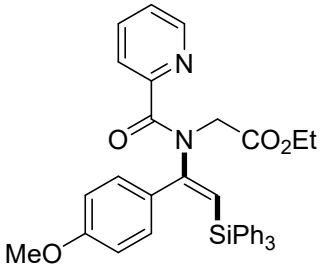
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 81%

yield (101.1 mg, 0.162 mmol). Mp: 152 – 153 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.34 (d, *J* = 4.5 Hz, 1H), 7.62 (d, *J* = 7.8 Hz, 1H), 7.45 (t, *J* = 7.2 Hz, 1H), 7.29 (d, *J* = 8.0 Hz, 2H), 7.24 – 7.23 (m, 3H), 7.19 – 7.13 (m, 12H), 6.99 – 6.96 (m, 1H), 6.66 (d, *J* = 7.9 Hz, 2H), 5.78 (s, 1H), 4.23 – 4.19 (m, 4H), 2.37 (t, *J* = 7.6 Hz, 2H), 1.43 – 1.38 (m, 2H), 1.27 – 1.22 (m, 5H), 0.90 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.1, 168.7, 155.5, 153.7, 148.1, 144.1, 136.2, 135.6, 134.4, 133.4, 129.7, 129.0, 127.6, 127.4, 124.3, 123.8, 121.4, 61.1, 48.9, 35.3, 33.4, 22.2, 14.2, 13.9. **HRMS (ESI):** Calcd for $C_{40}H_{40}N_2NaO_3Si$ $[M+Na]^+$ 647.2700, found: 647.2704.



ethyl (*E*)-*N*-(1-(4-(tert-butyl)phenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4g)

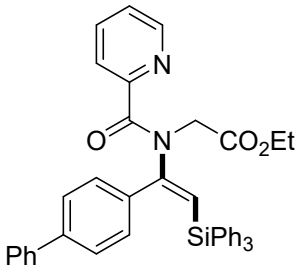
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 77% yield (96.1 mg, 0.154 mmol). Mp: 159 – 160 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.38 (d, *J* = 4.4 Hz, 1H), 7.64 (d, *J* = 7.8 Hz, 1H), 7.46 (t, *J* = 7.6 Hz, 1H), 7.33 (d, *J* = 8.2 Hz, 2H), 7.29 – 7.26 (m, 3H), 7.22 – 7.15 (m, 12H), 7.00 – 6.96 (m, 1H), 6.88 (d, *J* = 8.3 Hz, 2H), 5.80 (s, 1H), 4.28 – 4.24 (m, 4H), 1.30 (t, *J* = 7.1 Hz, 3H), 1.17 (s, 9H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.1, 168.8, 155.3, 153.7, 152.2, 148.0, 136.1, 135.6, 134.3, 132.9, 129.4, 129.0, 127.4, 124.4, 124.2, 123.7, 121.4, 61.1, 48.9, 34.4, 31.1, 14.2. **HRMS (ESI):** Calcd for $C_{41}H_{43}N_2NaO_3Si$ $[M+Na]^+$ 647.2700, found: 647.2698.



ethyl (*E*)-*N*-(1-(4-methoxyphenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4h)

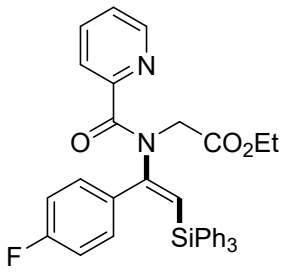
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 74% yield (88.5 mg, 0.148 mmol). Mp: 155 – 156 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.33 (d, *J* = 4.6 Hz, 1H), 7.61 (d, *J* = 7.8 Hz, 1H), 7.44 (t, *J* = 7.7 Hz, 1H), 7.29 (d, *J* = 8.6 Hz, 2H), 7.25 – 7.23 (m, 3H), 7.17 – 7.13 (m, 12H), 6.97 – 6.94 (m, 1H), 6.35 (d, *J* = 8.6 Hz, 2H), 5.72 (s, 1H), 4.23 – 4.18 (m, 4H), 3.61 (s, 3H), 1.25 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.1, 168.7, 160.3, 155.2, 153.8, 148.0, 136.2, 135.6, 134.5,

131.2, 129.0, 128.6, 127.5, 124.3, 123.8, 120.6, 112.9, 61.1, 55.1, 49.0, 14.2. **HRMS (ESI):** Calcd for $C_{37}H_{34}N_2NaO_4Si$ $[M+Na]^+$ 621.2180, found: 621.2183.



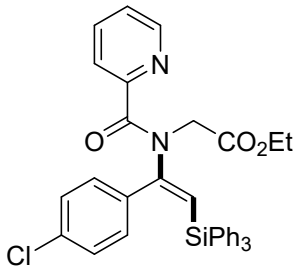
ethyl (*E*)-*N*-(1-([1,1'-biphenyl]-4-yl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4i)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 71% yield (91.5 mg, 0.142 mmol). Mp: 161 – 162 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.30 (d, *J* = 3.5 Hz, 1H), 7.58 (d, *J* = 7.7 Hz, 1H), 7.41 – 7.28 (m, 7H), 7.26 – 7.23 (m, 1H), 7.19 – 7.12 (m, 9H), 7.09 – 7.06 (m, 6H), 6.96 (d, *J* = 8.1 Hz, 2H), 6.92 – 6.88 (m, 1H), 5.79 (s, 1H), 4.22 (s, 2H), 4.16 (q, *J* = 7.1 Hz, 2H), 1.20 (t, *J* = 7.2 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.1, 168.7, 155.1, 153.6, 148.0, 141.8, 140.7, 136.3, 135.6, 135.0, 134.2, 130.2, 129.1, 128.6, 127.5, 127.3, 127.0, 126.2, 124.4, 123.9, 122.1, 61.2, 49.0, 14.2. **HRMS (ESI):** Calcd for $C_{42}H_{36}N_2NaO_3Si$ $[M+Na]^+$ 667.2387, found: 667.2390.



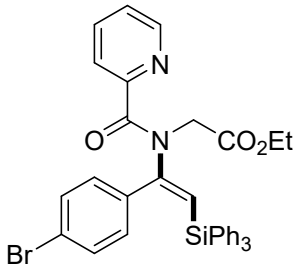
ethyl (*E*)-*N*-(1-(4-fluorophenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4j)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 70% yield (82.1 mg, 0.140 mmol). Mp: 116 – 117 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.37 (d, *J* = 2.5 Hz, 1H), 7.65 (d, *J* = 7.4 Hz, 1H), 7.50 (t, *J* = 7.6 Hz, 1H), 7.40 – 7.38 (m, 2H), 7.31 – 7.27 (m, 3H), 7.22 – 7.15 (m, 12H), 7.04 – 7.00 (m, 1H), 6.52 (t, *J* = 8.7 Hz, 2H), 5.85 (s, 1H), 4.25 – 4.21 (m, 4H), 1.28 – 1.26 (m, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.9, 168.6, 163.1 (d, *J* = 249.2 Hz), 154.4, 153.5, 147.9, 136.4, 135.5, 134.0, 132.3, 131.7 (d, *J* = 8.5 Hz), 129.2, 127.6, 124.5, 124.0, 122.0, 114.3 (d, *J* = 21.7 Hz), 61.2, 48.9, 14.1. **^{19}F NMR ($CDCl_3$, 471 MHz):** δ -112.0. **HRMS (ESI):** Calcd for $C_{36}H_{31}FN_2NaO_3Si$ $[M+Na]^+$ 609.1980, found: 609.1982.



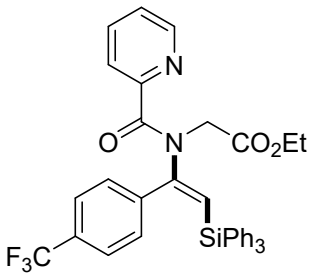
ethyl (*E*)-*N*-(1-(4-chlorophenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4k)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 73% yield (87.9 mg, 0.146 mmol). Mp: 158 – 159 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.37 (d, *J* = 4.0 Hz, 1H), 7.71 – 7.60 (m, 1H), 7.54 – 7.51 (m, 1H), 7.33 – 7.28 (m, 5H), 7.18 – 7.17 (d, *J* = 4.5 Hz, 12H), 7.02 (d, *J* = 4.6 Hz, 1H), 6.79 (d, *J* = 8.4 Hz, 2H), 5.88 (s, 1H), 4.23 (m, 4H), 1.28 (t, *J* = 7.4 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.8, 168.5, 154.3, 153.3, 147.8, 136.3, 135.5, 134.9, 134.6, 133.8, 131.1, 129.1, 127.6, 127.5, 124.5, 124.0, 122.6, 61.1, 48.8, 14.1. **HRMS (ESI):** Calcd for $C_{36}H_{31}ClN_2NaO_3Si$ $[M+Na]^+$ 625.1685, found: 625.1687.



ethyl (*E*)-*N*-(1-(4-bromophenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4l)

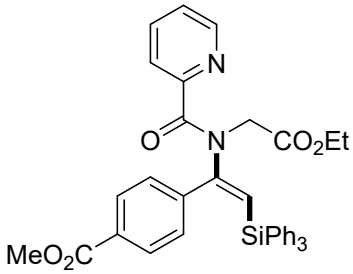
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 71% yield (91.8 mg, 0.142 mmol). Mp: 125 – 126 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.37 (d, *J* = 4.7 Hz, 1H), 7.66 (d, *J* = 7.8 Hz, 1H), 7.51 (t, *J* = 7.7 Hz, 1H), 7.31 (dt, *J* = 8.8, 4.3 Hz, 3H), 7.27 (d, *J* = 8.0 Hz, 2H), 7.22 – 7.15 (m, 12H), 7.03 – 7.00 (m, 1H), 6.95 (d, *J* = 8.4 Hz, 2H), 5.89 (s, 1H), 4.23 (q, *J* = 7.2 Hz, 4H), 1.28 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.8, 168.5, 154.3, 153.3, 147.9, 136.4, 135.5, 135.1, 133.9, 131.4, 130.5, 129.2, 127.6, 124.5, 124.0, 123.4, 122.8, 61.2, 48.8, 14.1. **HRMS (ESI):** Calcd for $C_{36}H_{31}BrN_2NaO_3Si$ $[M+Na]^+$ 669.1180 and 671.1159, found: 669.1180 and 671.1158.



ethyl (*E*)-*N*-picolinoyl-*N*-(1-(4-(trifluoromethyl)phenyl)-2-(triphenylsilyl)vinyl)glycinate (4m)

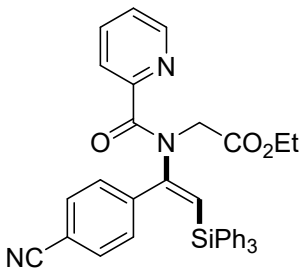
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 69% yield (87.8 mg, 0.138 mmol). Mp: 143 – 144 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.38 (d, *J* = 4.5 Hz, 1H), 7.67 (d, *J* = 7.8 Hz, 1H), 7.51 (t, *J* = 8.8 Hz, 3H), 7.30 – 7.27 (m, 3H), 7.21 – 7.14 (m, 12H), 7.07 (d, *J* = 8.2 Hz, 2H), 7.02 (dd, *J* = 7.0, 5.1 Hz, 1H), 5.98 (s, 1H), 4.29 – 4.18 (m, 4H), 1.28 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.8, 168.5, 154.0, 153.2, 147.8, 139.6, 136.5, 135.5, 133.6, 130.7 (q, *J* = 32.3 Hz), 130.1,

129.4, 127.7, 124.7, 124.3 (q, J = 3.8 Hz), 124.2, 123.9, 123.7 (q, J = 272.3 Hz), 61.3, 48.8, 14.1. **^{19}F NMR ($CDCl_3$, 471 MHz):** δ -63.0. **HRMS (ESI):** Calcd for $C_{37}H_{31}F_3N_2NaO_3Si$ $[M+Na]^+$ 659.1948, found: 659.1948.



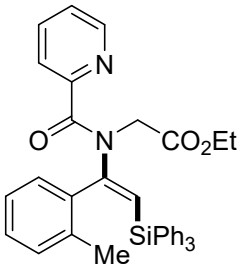
methyl (*E*)-4-(1-(*N*-(2-ethoxy-2-oxoethyl)picolinamido)-2-(triphenylsilyl)vinyl)benzoate (4n)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 71% yield 88.9 mg, 0.142 mmol). Mp: 106 – 107 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.49 (d, J = 15.5 Hz, 1H), 7.75 (d, J = 7.9 Hz, 1H), 7.62 (d, J = 8.3 Hz, 2H), 7.58 (d, J = 8.3 Hz, 2H), 7.40 – 7.36 (m, 4H), 7.31– 7.27 (m, 11H), 7.15 (d, J = 20.0 Hz, 2H), 6.09 (s, 1H), 4.36 – 4.32 (m, 4H), 3.97 (s, 3H), 1.39 (t, J = 8.2 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.8, 168.5, 166.5, 154.4, 153.2, 147.9, 140.7, 136.4, 135.5, 133.8, 130.2, 129.8, 129.2, 128.7, 127.6, 124.6, 124.1, 123.8, 61.2, 52.0, 48.9, 14.1. **HRMS (ESI):** Calcd for $C_{38}H_{34}N_2NaO_5Si$ $[M+Na]^+$ 649.2129, found: 649.2136.



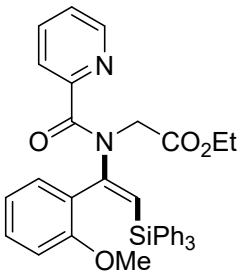
ethyl (*E*)-*N*-(1-(4-cyanophenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4o)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 72% yield (85.4 mg, 0.144 mmol). Mp: 174 – 175 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.38 (d, J = 4.4 Hz, 1H), 7.65 (d, J = 7.7 Hz, 1H), 7.51 (d, J = 8.1 Hz, 3H), 7.33 – 7.28 (m, 3H), 7.23 – 7.14 (m, 12H), 7.08 (d, J = 8.1 Hz, 2H), 7.05 – 7.02 (m, 1H), 6.03 (s, 1H), 4.27 – 4.21 (m, 4H), 1.29 – 1.26 (t, J = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.7, 168.5, 153.0, 147.8, 140.8, 136.6, 135.5, 133.4, 131.1, 130.4, 129.5, 127.8, 124.8, 124.3, 118.5, 112.3, 61.4, 49.0, 14.1. **HRMS (ESI):** Calcd for $C_{37}H_{31}N_3NaO_3Si$ $[M+Na]^+$ 616.2027, found: 616.2029.



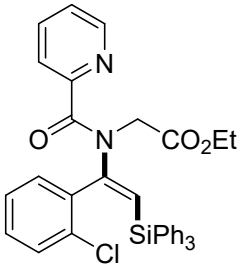
ethyl (*E*)-*N*-picolinoyl-*N*-(1-(o-tolyl)-2-(triphenylsilyl)vinyl)glycinate (4p)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 75% yield (87.3 mg, 0.150 mmol). Mp: 121 – 122 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.44 (d, *J* = 4.5 Hz, 1H), 7.75 (d, *J* = 7.8 Hz, 1H), 7.67 (t, *J* = 7.7 Hz, 1H), 7.32 – 7.27 (m, 4H), 7.23 – 7.17 (m, 12H), 7.12 (dd, *J* = 6.7, 5.1 Hz, 1H), 6.90 (t, *J* = 7.1 Hz, 1H), 6.69 (t, *J* = 6.2 Hz, 2H), 6.06 (s, 1H), 4.30 – 4.26 (m, 4H), 2.15 (s, 3H), 1.33 (t, *J* = 7.2 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.7, 169.0, 154.6, 153.9, 148.0, 136.9, 136.4, 135.8, 135.5, 134.3, 131.6, 130.0, 128.9, 128.7, 127.4, 125.1, 124.4, 124.1, 120.2, 61.2, 49.0, 19.9, 14.2. **HRMS (ESI):** Calcd for $C_{37}H_{35}N_2O_3Si$ $[M+H]^+$ 583.2411, found: 583.2414.



ethyl (*E*)-*N*-(1-(2-methoxyphenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4q)

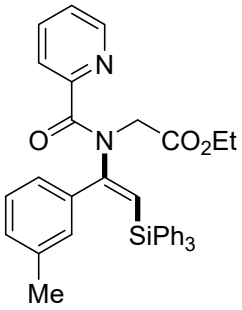
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 72% yield (86.1 mg, 0.144 mmol). Mp: 108 – 109 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.43 (d, *J* = 4.6 Hz, 1H), 7.64 (d, *J* = 7.8 Hz, 1H), 7.52 (d, *J* = 7.5 Hz, 1H), 7.48 (t, *J* = 7.6 Hz, 1H), 7.26 – 7.12 (m, 15H), 6.99 (dd, *J* = 6.9, 5.3 Hz, 1H), 6.88 (t, *J* = 7.8 Hz, 1H), 6.57 (t, *J* = 7.5 Hz, 1H), 6.11 (d, *J* = 8.3 Hz, 1H), 6.07 (s, 1H), 4.33 – 4.22 (m, 4H), 3.22 (s, 3H), 1.30 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.5, 168.9, 156.9, 154.0, 150.2, 148.1, 136.0, 135.5, 134.2, 131.4, 130.0, 128.8, 127.2, 124.9, 124.0, 123.5, 123.2, 119.7, 109.4, 61.0, 54.0, 49.0, 14.2. **HRMS (ESI):** Calcd for $C_{37}H_{35}N_2O_4Si$ $[M+H]^+$ 599.2361, found: 599.2363.



ethyl (*E*)-*N*-(1-(2-chlorophenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4r)

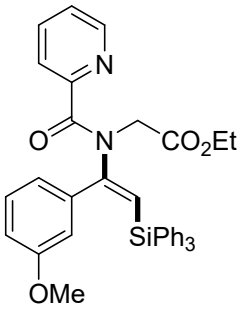
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 66% yield (79.5 mg, 0.132 mmol). Mp: 131 – 132 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.43 (d, *J* = 4.4 Hz, 1H), 7.67 (d, *J* = 7.7 Hz, 1H), 7.59 (t, *J* = 7.5 Hz, 1H), 7.54 (d, *J* = 7.5 Hz, 1H), 7.27 – 7.19 (m, 9H), 7.16 – 7.13 (m, 6H), 7.10 – 7.07 (m, 1H), 6.79 (t, *J* = 6.9 Hz, 1H), 6.73 – 6.70 (m, 2H), 6.26 (s, 1H), 4.38 (s, 2H), 4.25 (q, *J* = 7.1 Hz, 2H), 1.29 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.0, 153.8, 148.0, 136.4, 135.6, 135.4, 133.9, 133.5, 132.7,

129.6, 129.1, 128.9, 127.5, 125.9, 124.5, 124.0, 123.2, 61.2, 49.7, 14.2. **HRMS (ESI):** Calcd for $C_{36}H_{31}ClN_2NaO_3Si$ $[M+Na]^+$ 625.1685, found: 625.1683.



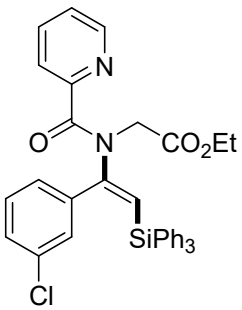
ethyl (*E*)-*N*-picolinoyl-*N*-(1-(m-tolyl)-2-(triphenylsilyl)vinyl)glycinate (4s)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 80% yield (93.2 mg, 0.160 mmol). Mp: 109 – 110 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.32 (d, *J* = 4.5 Hz, 1H), 7.64 (d, *J* = 7.8 Hz, 1H), 7.47 (t, *J* = 7.7 Hz, 1H), 7.34 (d, *J* = 7.6 Hz, 1H), 7.26 – 7.23 (m, 3H), 7.16 – 7.13 (m, 12H), 7.04 (s, 1H), 6.97 (dd, *J* = 7.1, 5.1 Hz, 1H), 6.86 (t, *J* = 7.6 Hz, 1H), 6.79 (d, *J* = 7.5 Hz, 1H), 5.81 (s, 1H), 4.22 – 4.19 (m, 4H), 1.89 (s, 3H), 1.25 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.9, 168.6, 155.6, 153.6, 148.0, 137.0, 136.1, 136.0, 135.5, 134.4, 130.9, 129.8, 129.0, 127.6, 127.4, 126.5, 124.2, 123.8, 121.7, 61.0, 48.8, 20.9, 14.1. **HRMS (ESI):** Calcd for $C_{37}H_{34}N_2NaO_3Si$ $[M+Na]^+$ 605.2231, found: 605.2228.



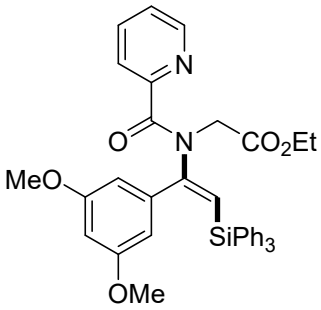
ethyl (*E*)-*N*-(1-(3-methoxyphenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4t)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 74% yield (88.5 mg, 0.148 mmol). Mp: 106 – 107 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.35 (d, *J* = 4.7 Hz, 1H), 7.62 (d, *J* = 7.8 Hz, 1H), 7.49 (t, *J* = 7.0 Hz, 1H), 7.24 – 7.23 (m, 3H), 7.19 – 7.11 (m, 12H), 7.03 – 7.00 (m, 2H), 6.94 – 6.91 (m, 1H), 6.80 (t, *J* = 7.9 Hz, 1H), 6.52 (dd, *J* = 8.2, 2.5 Hz, 1H), 5.82 (s, 1H), 4.23 – 4.19 (m, 4H), 3.35 (s, 3H), 1.26 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 168.7, 158.7, 155.5, 153.7, 148.1, 137.8, 136.3, 135.5, 134.4, 129.1, 128.8, 127.5, 124.4, 123.9, 122.1, 121.9, 115.8, 114.6, 61.1, 54.8, 48.9, 14.2. **HRMS (ESI):** Calcd for $C_{37}H_{34}N_2NaO_4Si$ $[M+Na]^+$ 621.2180, found: 621.2179.



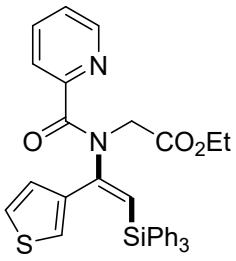
ethyl (*E*)-*N*-(1-(3-chlorophenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4u)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 71% yield (85.5 mg, 0.142 mmol). Mp: 134 – 135 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.36 (d, *J* = 4.5 Hz, 1H), 7.63 (d, *J* = 7.8 Hz, 1H), 7.49 (t, *J* = 7.6 Hz, 1H), 7.35 – 7.30 (m, 2H), 7.26 – 7.21 (m, 3H), 7.19 – 7.12 (m, 12H), 7.00 (dd, *J* = 7.0, 5.1 Hz, 1H), 6.91 (d, *J* = 8.1 Hz, 1H), 6.77 (t, *J* = 7.8 Hz, 1H), 5.89 (s, 1H), 4.24 – 4.14 (m, 4H), 1.24 (t, *J* = 5.4 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.8, 168.5, 154.0, 153.3, 148.0, 138.1, 136.4, 135.5, 133.9, 133.4, 130.0, 129.2, 129.0, 128.8, 127.9, 127.6, 124.5, 124.1, 123.2, 61.2, 48.8, 14.1. **HRMS (ESI):** Calcd for $C_{36}H_{31}ClN_2NaO_3Si$ $[M+Na]^+$ 625.1685, found: 625.1683.



ethyl (*E*)-*N*-(1-(3,5-dimethoxyphenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4v)

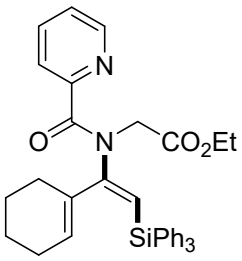
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 70% yield (88.0 mg, 0.140 mmol). Mp: 114 – 115 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.36 (d, *J* = 4.5 Hz, 1H), 7.64 (d, *J* = 7.8 Hz, 1H), 7.52 (t, *J* = 7.5 Hz, 1H), 7.26 – 7.22 (m, 3H), 7.18 – 7.14 (m, 12H), 7.04 (dd, *J* = 7.0, 5.2 Hz, 1H), 6.61 (d, *J* = 2.1 Hz, 2H), 6.07 (t, *J* = 2.1 Hz, 1H), 5.81 (s, 1H), 4.25 – 4.20 (m, 4H), 3.37 (s, 6H), 1.26 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.9, 168.7, 160.0, 155.5, 153.7, 148.1, 138.6, 136.3, 135.4, 134.5, 129.0, 127.4, 124.4, 123.9, 121.7, 107.7, 102.3, 61.1, 55.0, 48.8, 14.2. **HRMS (ESI):** Calcd for $C_{38}H_{36}N_2NaO_5Si$ $[M+Na]^+$ 651.2286, found: 651.2283.



ethyl (*E*)-*N*-picolinoyl-*N*-(1-(thiophen-3-yl)-2-(triphenylsilyl)vinyl)glycinate (4w)

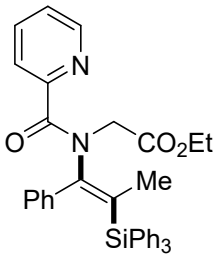
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 82% yield (94.2 mg, 0.164 mmol). Mp: 74 – 75 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.33 (d, *J* = 4.6 Hz, 1H), 7.54 (d, *J* = 7.8 Hz, 1H), 7.46 (t, *J* = 7.7 Hz, 1H), 7.26 – 7.22 (m, 3H), 7.20 – 7.14 (m, 12H), 7.09 (d, *J* = 1.9 Hz, 1H), 7.05 (d, *J* = 5.0 Hz, 1H), 7.00 (dd, *J* = 6.7, 5.0 Hz, 1H), 6.78 (dd, *J* = 4.9, 3.0 Hz, 1H), 5.78 (s, 1H), 4.28 (s, 2H), 4.18 (q, *J* = 7.1 Hz, 2H), 1.23 (t, *J* = 7.2 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.8, 168.7, 153.7, 150.6, 148.1, 138.6,

136.3, 135.5, 134.3, 129.2, 128.5, 128.0, 127.6, 125.0, 124.4, 123.8, 121.2, 61.2, 49.2, 14.2. **HRMS (ESI):** Calcd for $C_{34}H_{30}N_2NaO_3SSi$ $[M+Na]^+$ 597.1639, found: 597.1638.



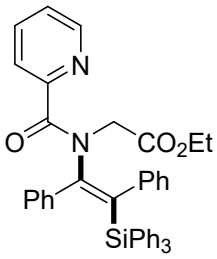
ethyl (*E*)-*N*-(1-(cyclohex-1-en-1-yl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4x)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 55% yield (62.9 mg, 0.110 mmol). Mp: 101 – 102 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.39 (d, *J* = 4.6 Hz, 1H), 7.55 (d, *J* = 3.8 Hz, 1H), 7.47 (t, *J* = 7.8 Hz, 1H), 7.32 – 7.28 (m, 1H), 7.25 – 7.16 (m, 14H), 6.98 (dd, *J* = 6.7, 5.4 Hz, 1H), 5.60 – 5.60 (m, 1H), 5.41 (s, 1H), 4.26 – 4.12 (m, 4H), 1.95 – 1.95 (m, 2H), 1.33 (t, *J* = 11.8 Hz, 2H), 1.22 (t, *J* = 7.2 Hz, 3H), 1.10 (m, 2H), 0.91 (m, 2H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 168.7, 157.9, 153.9, 148.0, 136.1, 135.4, 135.1, 134.7, 134.3, 129.0, 127.5, 124.1, 123.9, 119.8, 61.0, 48.3, 26.2, 24.9, 21.6, 20.8, 14.1. **HRMS (ESI):** Calcd for $C_{36}H_{36}N_2NaO_3Si$ $[M+Na]^+$ 595.2387, found: 595.2383.



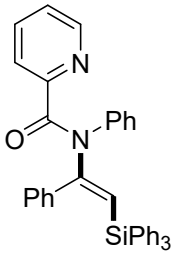
ethyl (*E*)-*N*-(1-phenyl-2-(triphenylsilyl)prop-1-en-1-yl)-*N*-picolinoylglycinate (4y)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 46% yield (53.6 mg, 0.092 mmol). Mp: 159 – 160 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.80 (d, *J* = 4.3 Hz, 1H), 7.89 (d, *J* = 7.8 Hz, 1H), 7.81 (t, *J* = 8.3 Hz, 1H), 7.63 (d, *J* = 7.3 Hz, 2H), 7.50 – 7.47 (m, 1H), 7.39 – 7.30 (m, 11H), 7.26 – 7.23 (m, 4H), 6.96 (t, *J* = 7.3 Hz, 1H), 6.88 (t, *J* = 7.5 Hz, 2H), 4.47 (d, *J* = 16.8 Hz, 1H), 4.29 (q, *J* = 7.1 Hz, 2H), 3.96 (d, *J* = 16.8 Hz, 1H), 1.78 (s, 3H), 1.35 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.5, 168.8, 154.4, 150.9, 147.3, 137.3, 136.5, 136.1, 135.8, 134.1, 130.9, 128.8, 128.7, 127.4, 126.5, 124.9, 124.3, 61.0, 49.5, 21.6, 14.1. **HRMS (ESI):** Calcd for $C_{37}H_{34}N_2NaO_3Si$ $[M+Na]^+$ 605.2231, found: 605.2233.



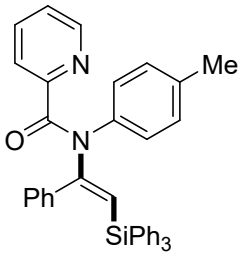
ethyl (*E*)-*N*-(1,2-diphenyl-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (4z)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 37% yield (47.7 mg, 0.074 mmol). Mp: 189 – 190 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.78 (d, *J* = 4.3 Hz, 1H), 7.53 (d, *J* = 7.4 Hz, 2H), 7.44 (t, *J* = 7.7 Hz, 2H), 7.40 – 7.39 (m 5H), 7.26 – 7.23 (m, 4H), 7.17 – 7.13 (m, 7H), 7.01 (t, *J* = 7.2 Hz, 1H), 6.95 (t, *J* = 7.5 Hz, 2H), 6.73 – 6.71 (m, 3H), 6.61 (t, *J* = 7.7 Hz, 2H), 4.11 – 3.99 (m, 3H), 3.88 (d, *J* = 16.6 Hz, 1H), 1.18 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 168.7, 168.2, 153.7, 153.4, 146.9, 140.2, 138.4, 136.3, 136.2, 134.6, 131.3, 130.8, 130.6, 128.8, 128.4, 127.5, 127.2, 126.8, 126.0, 124.8, 124.8, 60.8, 52.9, 14.0. **HRMS (ESI):** Calcd for $C_{42}H_{36}N_2NaO_3Si$ $[M+Na]^+$ 667.2387, found: 667.2386.



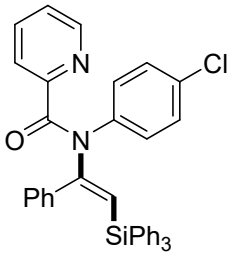
(*E*)-*N*-phenyl-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5a)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 84% yield (93.8 mg, 0.168 mmol). Mp: 130 – 131 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.43 (s, 1H), 7.41 – 7.11 (m, 25H), 6.87 (t, *J* = 7.3 Hz, 1H), 6.76 (t, *J* = 7.2 Hz, 2H), 5.96 (s, 1H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 156.5, 154.5, 148.0, 141.1, 136.7, 136.2, 135.5, 134.3, 129.6, 129.1, 128.8, 128.4, 127.5, 127.1, 126.8, 126.3, 124.4, 124.0, 122.6. **HRMS (ESI):** Calcd for $C_{38}H_{30}N_2NaOSi$ $[M+Na]^+$ 581.2020, found: 581.2023.



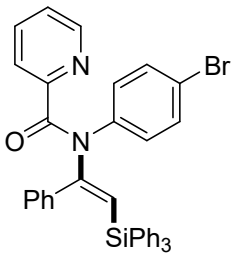
(*E*)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)-*N*-(*p*-tolyl)picolinamide (5b)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 85% yield (97.3 mg, 0.170 mmol). Mp: 167 – 168 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.36 (d, *J* = 4.4 Hz, 1H), 7.61 (d, *J* = 7.8 Hz, 1H), 7.43 (t, *J* = 7.1 Hz, 1H), 7.36 (d, *J* = 7.4 Hz, 2H), 7.26 – 7.13 (m, 17H), 7.05 (d, *J* = 8.1 Hz, 2H), 6.98 (dd, *J* = 7.4, 4.9 Hz, 1H), 6.83 (t, *J* = 7.4 Hz, 1H), 6.72 (t, *J* = 7.6 Hz, 2H), 5.90 (s, 1H), 2.21 (s, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 156.6, 154.7, 148.0, 136.8, 136.2, 136.1, 135.5, 134.4, 129.7, 129.5, 129.1, 128.4, 127.5, 127.1, 126.6, 124.3, 124.0, 122.4, 21.0. **HRMS (ESI):** Calcd for $C_{39}H_{32}N_2NaOSi$ $[M+Na]^+$ 595.2176, found: 595.2174.



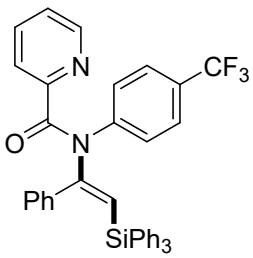
(*E*)-*N*-(4-chlorophenyl)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5c)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 80% yield (94.7 mg, 0.160 mmol). Mp: 173 – 174 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.35 (d, *J* = 4.6 Hz, 1H), 7.62 (d, *J* = 7.8 Hz, 1H), 7.44 (t, *J* = 7.7 Hz, 1H), 7.34 (d, *J* = 7.8 Hz, 2H), 7.26 – 7.12 (m, 19H), 6.99 (dd, *J* = 7.1, 5.2 Hz, 1H), 6.85 (t, *J* = 7.4 Hz, 1H), 6.73 (t, *J* = 7.7 Hz, 2H), 5.89 (s, 1H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 156.0, 154.2, 148.1, 139.6, 136.4, 136.4, 135.5, 134.2, 131.8, 129.8, 129.2, 129.0, 128.7, 128.0, 127.6, 127.2, 124.6, 124.1, 123.3. **HRMS (ESI):** Calcd for $C_{38}H_{29}ClN_2NaOSi$ $[M+Na]^+$ 615.1630, found: 615.1628.



(*E*)-*N*-(4-bromophenyl)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5d)

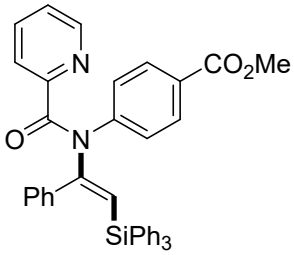
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 77% yield (98.0 mg, 0.154 mmol). Mp: 175 – 176 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.35 (d, *J* = 4.4 Hz, 1H), 7.62 (d, *J* = 7.8 Hz, 1H), 7.44 (t, *J* = 7.4 Hz, 1H), 7.37 – 7.34 (m, 4H), 7.25 – 7.23 (m, 3H), 7.20 – 7.13 (m, 14H), 6.99 (dd, *J* = 7.1, 5.0 Hz, 1H), 6.85 (t, *J* = 7.4 Hz, 1H), 6.73 (t, *J* = 7.6 Hz, 2H), 5.89 (s, 1H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.9, 155.9, 154.1, 148.1, 140.1, 136.4, 135.5, 134.1, 132.0, 129.7, 129.2, 128.7, 128.3, 127.6, 127.2, 124.6, 124.1, 123.4, 119.8. **HRMS (ESI):** Calcd for $C_{38}H_{29}BrN_2NaOSi$ $[M+Na]^+$ 659.1125 and 661.1104, found: 659.1123 and 661.1104.



(*E*)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)-*N*-(4-(trifluoromethyl)phenyl)picolinamide (5e)

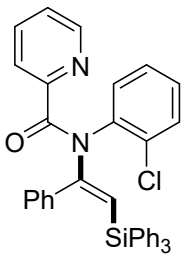
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 72% yield (90.2 mg, 0.144 mmol). Mp: 187 – 188 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.42 (d, *J* = 2.9 Hz, 1H), 7.69 (d, *J* = 7.6 Hz, 1H), 7.57 (d, *J* = 8.3 Hz, 2H), 7.52 – 7.48 (m, 3H), 7.42 (d, *J* = 7.5 Hz, 2H), 7.33 – 7.30 (m, 3H), 7.24 – 7.20 (m, 12H), 7.09 – 7.06 (m, 1H), 6.91

(t, *J* = 7.4 Hz, 1H), 6.79 (t, *J* = 7.6 Hz, 2H), 5.98 (s, 1H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.1, 155.8, 153.9, 148.1, 144.3, 136.4, 136.3, 135.5, 134.1, 129.8, 129.2, 128.9, 127.9 (q, *J* = 32.9 Hz), 127.6, 127.3, 126.7, 126.0 (q, *J* = 3.6 Hz), 124.8, 124.2, 123.9 (q, *J* = 272.2 Hz). **^{19}F NMR ($CDCl_3$, 471 MHz):** δ -62.3. **HRMS (ESI):** Calcd for $C_{39}H_{29}F_3N_2NaOSi$ $[M+Na]^+$ 649.1893, found: 649.1892.



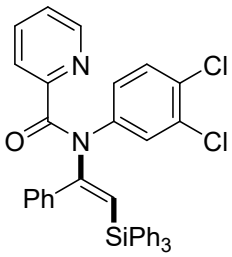
methyl (*E*)-4-(*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamido)benzoate (5f)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 75% yield (92.4 mg, 0.150 mmol). Mp: 156 – 157 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.38 (d, *J* = 4.5 Hz, 1H), 7.95 (d, *J* = 8.4 Hz, 2H), 7.65 (d, *J* = 7.8 Hz, 1H), 7.47 (t, *J* = 7.6 Hz, 1H), 7.41 – 7.37 (m, 4H), 7.29 – 7.26 (m, 3H), 7.23 – 7.16 (m, 12H), 7.03 (dd, *J* = 7.4, 4.9 Hz, 1H), 6.85 (t, *J* = 7.4 Hz, 1H), 6.75 (t, *J* = 7.6 Hz, 2H), 5.96 (s, 1H), 3.83 (s, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 166.4, 155.8, 154.0, 148.1, 145.3, 136.4, 136.3, 135.5, 134.1, 130.2, 129.7, 129.2, 128.7, 127.6, 127.5, 127.2, 126.3, 124.7, 124.1, 123.9, 52.0. **HRMS (ESI):** Calcd for $C_{40}H_{32}N_2NaO_3Si$ $[M+Na]^+$ 639.2074, found: 639.2072.



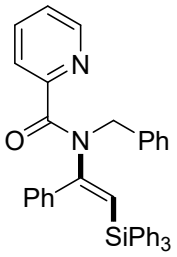
(*E*)-*N*-(2-chlorophenyl)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5g)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 75% yield (88.8 mg, 0.150 mmol). Mp: 162 – 163 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.39 (d, *J* = 0.5 Hz, 1H), 7.76 (d, *J* = 7.8 Hz, 1H), 7.53 (t, *J* = 7.5 Hz, 1H), 7.40 (d, *J* = 7.5 Hz, 2H), 7.33 – 7.31 (m, 2H), 7.25 – 7.23 (m, 3H), 7.19 – 7.03 (m, 15H), 6.85 (t, *J* = 7.3 Hz, 1H), 6.74 (t, *J* = 7.5 Hz, 2H), 5.84 (s, 1H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.4, 156.1, 153.7, 148.3, 136.3, 135.6, 135.0, 134.5, 132.4, 130.5, 129.6, 129.1, 128.7, 128.3, 127.9, 127.5, 127.4, 127.2, 124.7, 124.3. **HRMS (ESI):** Calcd for $C_{38}H_{29}ClN_2NaOSi$ $[M+Na]^+$ 615.1630, found: 615.1632.



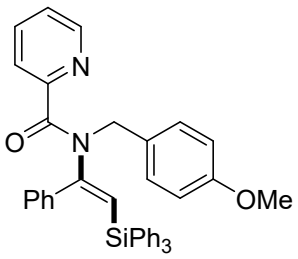
(*E*)-*N*-(3,4-dichlorophenyl)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5h)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 80% yield (100.2 mg, 0.160 mmol). Mp: 187 – 188 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.42 (d, *J* = 4.6 Hz, 1H), 7.69 (d, *J* = 7.8 Hz, 1H), 7.54 – 7.49 (m, 2H), 7.41 (d, *J* = 7.3 Hz, 2H), 7.36 (d, *J* = 8.6 Hz, 1H), 7.34 – 7.30 (m, 3H), 7.24 – 7.20 (m, 13H), 7.08 (dd, *J* = 7.1, 5.0 Hz, 1H), 6.93 (t, *J* = 7.4 Hz, 1H), 6.81 (t, *J* = 7.7 Hz, 2H), 5.95 (s, 1H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.9, 155.6, 153.7, 148.1, 140.5, 136.4, 136.1, 135.5, 134.0, 132.6, 130.4, 130.1, 129.7, 129.2, 128.9, 128.6, 127.6, 127.3, 126.0, 124.8, 124.1, 124.0. **HRMS (ESI):** Calcd for $C_{38}H_{28}Cl_2N_2NaOSi$ $[M+Na]^+$ 649.1240, found: 649.1244.



(*E*)-*N*-benzyl-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5i)

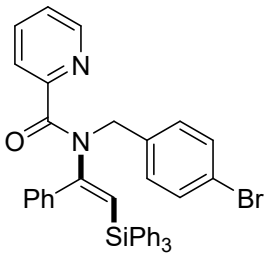
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 71% yield (81.3 mg, 0.142 mmol). Mp: 127 – 128 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.44 – 8.44 (m, 1H), 7.71 (d, *J* = 7.0 Hz, 1H), 7.54 (d, *J* = 7.3 Hz, 1H), 7.41 – 7.27 (m, 8H), 7.19 – 6.86 (m, 18H), 5.42 (s, 1H), 4.81 (s, 2H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.6, 154.8, 154.6, 148.0, 137.2, 136.2, 136.0, 135.5, 134.1, 129.8, 129.4, 129.0, 128.9, 128.4, 127.4, 127.4, 127.3, 124.2, 124.1, 123.7, 49.4. **HRMS (ESI):** Calcd for $C_{39}H_{33}N_2OSi$ $[M+H]^+$ 573.2357, found: 573.2360.



(*E*)-*N*-(4-methoxybenzyl)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5j)

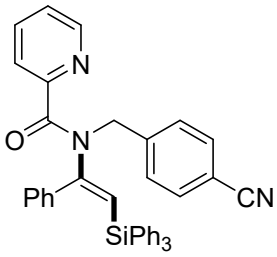
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 64% yield (77.1 mg, 0.128 mmol). Mp: 157 – 158 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.40 (d, *J* = 4.6 Hz, 1H), 7.66 (d, *J* = 7.8 Hz, 1H), 7.50 (t, *J* = 7.7 Hz, 1H), 7.33 (d, *J* = 7.4 Hz, 2H), 7.26 – 7.21 (m, 5H), 7.13 – 7.10 (m, 6H), 7.04 – 7.00 (m, 8H), 6.92 – 6.86 (m, 4H), 5.36 (s, 1H), 4.72 (s, 2H), 3.86 (s, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.5, 159.0, 154.8,

154.6, 148.0, 136.1, 136.0, 135.5, 134.2, 130.8, 129.8, 129.3, 129.0, 128.8, 127.4, 127.4, 124.2, 124.1, 123.7, 113.7, 55.2, 48.7. **HRMS (ESI):** Calcd for $C_{40}H_{34}N_2NaO_2Si$ $[M+Na]^+$ 625.2282, found: 625.2286.



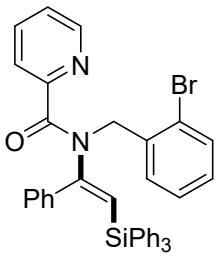
(*E*)-*N*-(4-bromobenzyl)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5k)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 62% yield (80.6 mg, 0.124 mmol). Mp: 165 – 166 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.39 (d, *J* = 4.4 Hz, 1H), 7.67 (d, *J* = 7.8 Hz, 1H), 7.56 – 7.44 (m, 3H), 7.31 (d, *J* = 7.1 Hz, 2H), 7.27 – 7.21 (m, 5H), 7.17 – 7.08 (m, 7H), 7.05 – 7.00 (m, 2H), 6.98 – 6.97 (m, 5H), 6.88 (t, *J* = 7.7 Hz, 2H), 5.33 (s, 1H), 4.70 (s, 2H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.6, 154.6, 154.2, 148.1, 136.2, 135.8, 135.4, 134.0, 131.5, 131.2, 129.8, 129.1, 129.0, 127.6, 127.5, 127.4, 124.5, 124.3, 123.8, 121.4, 48.7. **HRMS (ESI):** Calcd for $C_{39}H_{31}BrN_2NaOSi$ $[M+Na]^+$ 673.1281 and 675.1261, found: 673.1285 and 675.1265.



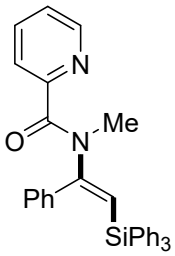
(*E*)-*N*-(4-cyanobenzyl)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5l)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 70% yield (83.6 mg, 0.140 mmol). Mp: 181 – 182 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.42 (d, *J* = 4.6 Hz, 1H), 7.71 (d, *J* = 7.8 Hz, 1H), 7.66 (d, *J* = 8.1 Hz, 2H), 7.57 (t, *J* = 7.7 Hz, 1H), 7.42 (d, *J* = 8.1 Hz, 2H), 7.33 (d, *J* = 7.5 Hz, 2H), 7.29 – 7.26 (m, 3H), 7.16 – 7.13 (m, 6H), 7.09 – 7.05 (m, 2H), 7.00 – 6.99 (m, 6H), 6.92 (t, *J* = 7.6 Hz, 2H), 5.38 (s, 1H), 4.81 (s, 2H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.8, 154.7, 153.8, 148.1, 142.7, 136.3, 135.6, 135.3, 133.9, 132.2, 130.0, 129.7, 129.2, 127.7, 127.5, 124.5, 124.4, 123.9, 118.8, 111.2, 49.2. **HRMS (ESI):** Calcd for $C_{40}H_{31}N_3NaOSi$ $[M+Na]^+$ 620.2129, found: 620.2125.



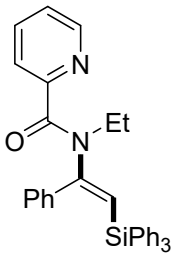
(*E*)-*N*-(2-bromobenzyl)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5m)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 57% yield (74.1 mg, 0.114 mmol). Mp: 115 – 116 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.38 (d, *J* = 4.6 Hz, 1H), 7.60 (d, *J* = 7.9 Hz, 1H), 7.54 (d, *J* = 7.9 Hz, 1H), 7.46 (t, *J* = 7.7 Hz, 1H), 7.29 (t, *J* = 8.2 Hz, 2H), 7.24 – 7.17 (m, 6H), 7.11 – 7.08 (m, 6H), 7.01 – 6.94 (m, 8H), 6.80 (t, *J* = 7.6 Hz, 2H), 5.63 (s, 1H), 4.97 (s, 2H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.6, 154.9, 154.6, 148.1, 136.2, 136.0, 135.7, 135.5, 134.1, 132.8, 130.9, 129.7, 129.0, 128.9, 128.7, 127.4, 127.4, 127.3, 124.0, 123.9, 123.5, 123.4, 49.7. **HRMS (ESI):** Calcd for $C_{39}H_{31}BrN_2NaOSi$ $[M+Na]^+$ 673.1281 and 675.1261, found: 673.1284 and 675.1265.



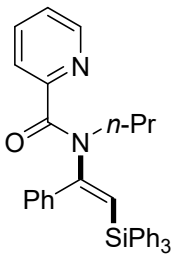
(*E*)-*N*-methyl-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5n)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 74% yield (73.4 mg, 0.148 mmol). Mp: 94 – 95 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.35 – 8.35 (m, 1H), 7.55 (d, *J* = 5.9 Hz, 1H), 7.45 (t, *J* = 7.6 Hz, 1H), 7.33 (d, *J* = 7.6 Hz, 2H), 7.30 – 7.26 (m, 3H), 7.21 – 7.15 (m, 12H), 7.03 – 6.96 (m, 2H), 6.87 (t, *J* = 7.6 Hz, 2H), 5.72 (s, 1H), 3.20 (s, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.9, 157.4, 154.5, 148.0, 136.7, 136.2, 135.6, 134.3, 129.4, 129.1, 128.9, 127.5, 127.5, 124.0, 123.5, 120.3, 35.6. **HRMS (ESI):** Calcd for $C_{33}H_{29}N_2OSi$ $[M+H]^+$ 497.2044, found: 497.2046.



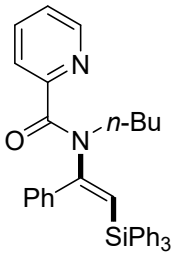
(*E*)-*N*-ethyl-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5o)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 70% yield (71.4 mg, 0.140 mmol). Mp: 96 – 97 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.35 – 8.35 (m, 1H), 7.60 – 7.60 (m, 1H), 7.47 – 7.47 (m, 1H), 7.41 (d, *J* = 7.4 Hz, 2H), 7.28 – 7.28 (s, 3H), 7.18 – 7.17 (m, 12H), 7.01 (dd, *J* = 15.7, 8.2 Hz, 2H), 6.90 (t, *J* = 7.2 Hz, 2H), 5.67 (s, 1H), 3.63 – 3.62 (m, 2H), 1.26 (t, *J* = 6.8 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 155.6, 136.4, 135.7, 135.5, 134.9, 134.3, 129.9, 129.6, 129.0, 128.9, 128.0, 127.8, 127.5, 127.4, 122.4, 41.4, 12.7. **HRMS (ESI):** Calcd for $C_{34}H_{30}N_2NaOSi$ $[M+Na]^+$ 533.2020, found: 533.2018.



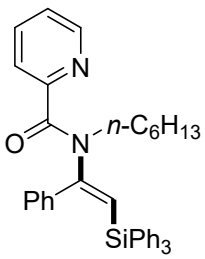
(*E*)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)-*N*-propylpicolinamide (5p)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 73% yield (76.5 mg, 0.146 mmol). Mp: 107 – 108 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** 8.32 (d, *J* = 4.7 Hz, 1H), 7.59 (d, *J* = 7.8 Hz, 1H), 7.46 (t, *J* = 7.7 Hz, 1H), 7.40 (d, *J* = 7.3 Hz, 2H), 7.29 – 7.26 (m, 3H), 7.19 – 7.13 (m, 12H), 7.02 (t, *J* = 7.4 Hz, 1H), 6.97 (dd, *J* = 7.5, 4.9 Hz, 1H), 6.89 (t, *J* = 7.7 Hz, 2H), 5.66 (s, 1H), 3.57 – 3.42 (m, 2H), 1.75 – 1.67 (m, 2H), 0.94 (t, *J* = 7.4 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.6, 156.0, 154.8, 148.0, 136.4, 136.1, 135.5, 134.4, 129.7, 129.1, 128.9, 127.5, 127.5, 123.9, 123.5, 122.3, 47.9, 21.0, 11.4. **HRMS (ESI):** Calcd for $C_{35}H_{32}N_2NaOSi$ $[M+Na]^+$ 547.2176, found: 547.2174.



(*E*)-*N*-butyl-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5q)

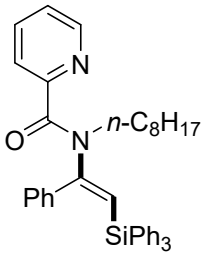
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 67% yield (72.1 mg, 0.134 mmol). Mp: 87 – 88 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.33 (d, *J* = 4.2 Hz, 1H), 7.59 (d, *J* = 7.8 Hz, 1H), 7.47 (t, *J* = 7.7 Hz, 1H), 7.40 (d, *J* = 7.1 Hz, 2H), 7.29 – 7.26 (m, 3H), 7.19 – 7.14 (m, 12H), 7.02 (t, *J* = 7.4 Hz, 1H), 6.97 (dd, *J* = 7.0, 5.4 Hz, 1H), 6.89 (t, *J* = 7.7 Hz, 2H), 5.65 (s, 1H), 3.54 – 3.54 (m, 2H), 1.70 – 1.63 (m, 2H), 1.41 – 1.33 (m, 2H), 0.92 (t, *J* = 7.4 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.6, 156.0, 154.9, 148.0, 136.4, 136.1, 135.5, 134.4, 129.7, 129.1, 128.9, 127.5, 127.5, 123.9, 123.5, 122.3, 46.0, 29.9, 20.1, 13.9. **HRMS (ESI):** Calcd for $C_{36}H_{34}N_2NaOSi$ $[M+Na]^+$ 561.2333, found: 561.2330.



(*E*)-*N*-hexyl-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5r)

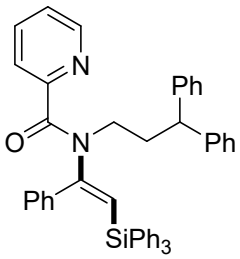
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 60% yield (68.0 mg, 0.120 mmol). Mp: 111 – 112 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.33 (d, *J* = 4.6 Hz, 1H), 7.59 (d, *J* = 7.8 Hz, 1H), 7.47 (t, *J* = 7.7 Hz, 1H), 7.39 (d, *J* = 7.2 Hz, 2H), 7.29 – 7.26 (m, 3H), 7.19 – 7.14 (m, 12H), 7.02 (t, *J* = 7.4 Hz, 1H), 6.97 (dd, *J* = 7.0, 5.3 Hz, 1H), 6.89 (t, *J* = 7.7 Hz, 2H), 5.65 (s, 1H), 3.53 – 3.52 (m, 2H), 1.71 – 1.65 (m,

2H), 1.35 – 1.27 (m, 6H), 0.88 (t, J = 6.9 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.5, 156.0, 154.9, 148.0, 136.4, 136.1, 135.6, 134.4, 129.7, 129.1, 128.9, 127.5, 127.5, 123.9, 123.5, 122.3, 46.3, 31.6, 27.7, 26.6, 22.5, 14.1. **HRMS (ESI):** Calcd for $C_{38}H_{38}N_2NaOSi$ $[M+Na]^+$ 589.2646, found: 589.2643.



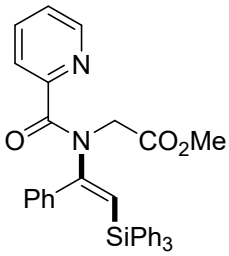
(*E*)-*N*-octyl-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5s)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 56% yield (66.6 mg, 0.112 mmol). Mp: 101 – 102 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.33 (d, J = 4.5 Hz, 1H), 7.59 (d, J = 7.8 Hz, 1H), 7.46 (t, J = 7.7 Hz, 1H), 7.39 (d, J = 7.5 Hz, 2H), 7.30 – 7.26 (m, 3H), 7.20 – 7.12 (m, 12H), 7.01 (t, J = 7.4 Hz, 1H), 6.97 (dd, J = 6.9, 5.4 Hz, 1H), 6.89 (t, J = 7.6 Hz, 2H), 5.65 (s, 1H), 3.53 – 3.53 (m, 2H), 1.73 – 1.65 (m, 2H), 1.34 – 1.27 (m, 10H), 0.88 (t, J = 6.8 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.5, 156.0, 154.9, 148.0, 136.4, 136.1, 135.5, 134.4, 129.7, 129.1, 128.9, 127.5, 127.5, 123.9, 123.5, 122.3, 46.3, 31.8, 29.4, 29.1, 27.7, 26.9, 22.6, 14.1. **HRMS (ESI):** Calcd for $C_{40}H_{42}N_2NaOSi$ $[M+Na]^+$ 617.2959, found: 617.2954.



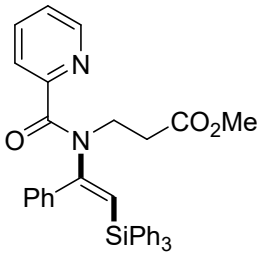
(*E*)-*N*-(3,3-diphenylpropyl)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5t)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 70% yield (94.7 mg, 0.140 mmol). Mp: 125 – 126 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.33 (d, J = 4.5 Hz, 1H), 7.60 (d, J = 7.8 Hz, 1H), 7.49 (t, J = 7.7 Hz, 1H), 7.34 (d, J = 7.2 Hz, 2H), 7.30 – 7.26 (m, 3H), 7.22 – 7.11 (m, 22H), 7.03 – 6.98 (m, 2H), 6.87 (t, J = 7.7 Hz, 2H), 5.61 (s, 1H), 3.92 (t, J = 7.8 Hz, 1H), 3.59 – 3.42 (m, 2H), 2.49 (q, J = 7.9 Hz, 2H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.4, 156.1, 154.6, 148.0, 144.2, 136.4, 136.1, 135.6, 134.3, 129.7, 129.1, 128.9, 128.4, 127.7, 127.5, 127.5, 126.2, 124.0, 123.6, 122.3, 48.9, 45.7, 33.1. **HRMS (ESI):** Calcd for $C_{47}H_{40}N_2NaOSi$ $[M+Na]^+$ 699.2802, found: 699.2802.



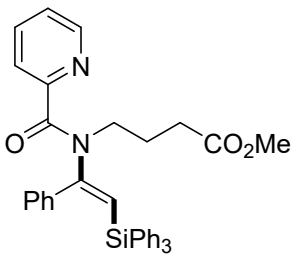
methyl (*E*)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (5u)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 86% yield (95.3 mg, 0.172 mmol). Mp: 94 – 95 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.37 (d, *J* = 3.8 Hz, 1H), 7.66 (t, *J* = 11.3 Hz, 1H), 7.50 (t, *J* = 7.5 Hz, 1H), 7.42 (d, *J* = 7.6 Hz, 2H), 7.29 – 7.24 (m, 3H), 7.20 – 7.15 (m, 12H), 7.03 – 6.99 (m, 2H), 6.88 (t, *J* = 7.5 Hz, 2H), 5.87 (s, 1H), 4.25 (s, 2H), 3.77 (s, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 169.1, 155.3, 153.5, 148.0, 136.3, 135.9, 135.5, 134.2, 129.8, 129.1, 129.1, 127.5, 127.5, 124.4, 123.9, 122.2, 52.0, 48.7. **HRMS (ESI):** Calcd for $C_{35}H_{30}N_2NaO_3Si$ $[M+Na]^+$ 577.1918, found: 577.1915.



methyl (*E*)-3-(*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamido)propanoate (5v)

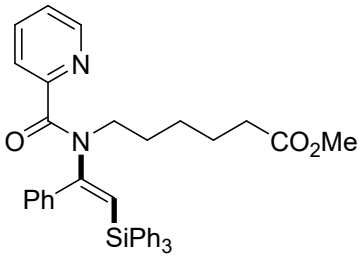
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 80% yield (90.9 mg, 0.160 mmol). Mp: 105 – 106 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.32 (d, *J* = 4.6 Hz, 1H), 7.62 (d, *J* = 7.8 Hz, 1H), 7.48 (t, *J* = 7.7 Hz, 1H), 7.44 (d, *J* = 7.5 Hz, 2H), 7.29 – 7.26 (m, 3H), 7.20 – 7.13 (m, 12H), 7.04 (t, *J* = 7.4 Hz, 1H), 6.98 (dd, *J* = 7.5, 4.8 Hz, 1H), 6.92 (t, *J* = 7.7 Hz, 2H), 5.64 (s, 1H), 3.83 (t, *J* = 7.1 Hz, 2H), 3.64 (s, 3H), 2.76 (t, *J* = 7.3 Hz, 2H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 171.9, 169.7, 155.5, 154.1, 148.1, 136.2, 136.0, 135.5, 134.2, 129.7, 129.2, 129.1, 127.6, 127.5, 124.1, 123.6, 122.8, 51.7, 42.6, 32.3. **HRMS (ESI):** Calcd for $C_{36}H_{32}N_2NaO_3Si$ $[M+Na]^+$ 591.2074, found: 591.2069.



methyl (*E*)-4-(*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamido)butanoate (5w)

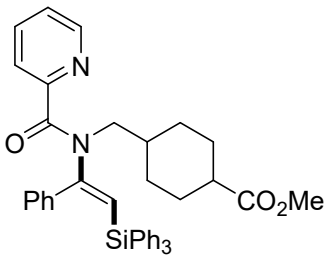
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 75% yield (87.3 mg, 0.150 mmol). Mp: 121 – 122 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.33 (d, *J* = 4.6 Hz, 1H), 7.61 (d, *J* = 7.8 Hz, 1H), 7.48 (t, *J* = 8.4 Hz, 1H), 7.41 (d, *J* = 7.7 Hz, 2H), 7.29 – 7.26 (m, 3H), 7.19 – 7.13 (m, 12H), 7.03 (t, *J* = 7.4 Hz, 1H), 6.98 (dd, *J* = 7.4,

4.9 Hz, 1H), 6.90 (t, *J* = 7.6 Hz, 2H), 5.65 (s, 1H), 3.63 (s, 3H), 3.60 – 3.54 (m, 2H), 2.42 (t, *J* = 7.6 Hz, 2H), 2.05 – 1.98 (m, 2H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 173.3, 169.7, 155.8, 154.5, 148.0, 136.2, 136.1, 135.6, 134.2, 129.7, 129.1, 129.0, 127.5, 124.0, 123.6, 122.7, 51.5, 45.4, 31.5, 23.2. **HRMS (ESI):** Calcd for $C_{37}H_{34}N_2NaO_3Si$ $[M+Na]^+$ 605.2231, found: 605.2225.



methyl (*E*)-6-(*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamido)hexanoate (5x)

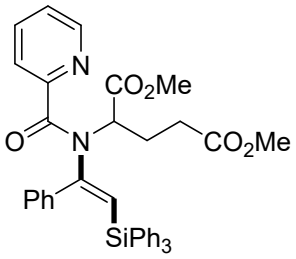
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 54% yield (65.9 mg, 0.108 mmol). Mp: 130 – 131 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.32 (d, *J* = 4.6 Hz, 1H), 7.60 (d, *J* = 7.8 Hz, 1H), 7.47 (t, *J* = 7.7 Hz, 1H), 7.39 (d, *J* = 7.2 Hz, 2H), 7.29 – 7.26 (m, 3H), 7.20 – 7.11 (m, 12H), 7.02 (t, *J* = 7.4 Hz, 1H), 6.97 (dd, *J* = 7.0, 5.1 Hz, 1H), 6.90 (t, *J* = 7.7 Hz, 2H), 5.64 (s, 1H), 3.64 (s, 3H), 3.54 (t, *J* = 5.8 Hz, 2H), 2.30 (t, *J* = 7.5 Hz, 2H), 1.71 – 1.62 (m, 4H), 1.40 – 1.34 (m, 2H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 174.0, 169.6, 155.9, 154.7, 148.0, 136.3, 136.1, 135.5, 134.3, 129.7, 129.1, 129.0, 127.5, 123.9, 123.5, 122.4, 51.4, 46.0, 33.9, 27.4, 26.4, 24.7. **HRMS (ESI):** Calcd for $C_{39}H_{38}N_2NaO_3Si$ $[M+Na]^+$ 633.2544, found: 633.2540.



methyl (*E*)-4-((*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamido)methyl)cyclohexane-1-carboxylate (5y)

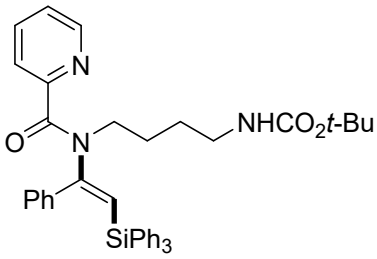
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 42% yield (53.4 mg, 0.084 mmol). Mp: 181 – 182 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ^{1}H NMR (500 MHz, $CDCl_3$) δ 8.32 (d, *J* = 4.7 Hz, 1H), 7.62 (d, *J* = 7.8 Hz, 1H), 7.49 (t, *J* = 7.7 Hz, 1H), 7.39 (d, *J* = 7.2 Hz, 2H), 7.29 – 7.26 (m, 3H), 7.20 – 7.09 (m, 12H), 7.03 (t, *J* = 7.4 Hz, 1H), 6.97 (dd, *J* = 7.5, 4.8 Hz, 1H), 6.90 (t, *J* = 7.7 Hz, 2H), 5.64 (s, 1H), 3.68 (s, 3H), 3.39 (s, 2H), 2.29 – 2.22 (m, 1H), 2.02 – 2.00 (m, 2H), 1.88 – 1.86 (m, 2H), 1.77 – 1.72 (m, 1H), 1.47 – 1.38 (m, 2H), 1.11 – 1.02 (m, 2H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 176.4, 169.9, 156.1, 154.8, 148.1, 136.2, 136.0, 135.5, 134.3, 129.7, 129.1, 129.0, 127.6, 127.6, 123.9, 123.5,

122.9, 51.5, 51.3, 43.2, 36.6, 29.8, 28.7. **HRMS (ESI):** Calcd for $C_{41}H_{40}N_2NaO_3Si$ $[M+Na]^+$ 659.2700, found: 659.2705.



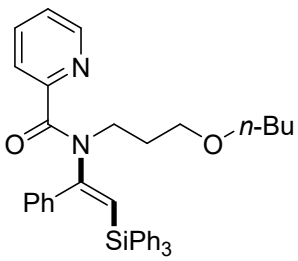
dimethyl (*E*)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)-*N*-picolinoylglutamate (5z)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 65% yield (83.2 mg, 0.130 mmol). Mp: 81 – 82 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.37 (d, *J* = 4.3 Hz, 1H), 7.69 (d, *J* = 7.8 Hz, 1H), 7.53 (d, *J* = 7.4 Hz, 2H), 7.30 – 7.24 (m, 4H), 7.19 – 7.12 (m, 12H), 7.04 (t, *J* = 6.9 Hz, 2H), 6.91 (t, *J* = 7.1 Hz, 2H), 5.74 (s, 1H), 4.20 (t, *J* = 6.2 Hz, 1H), 3.72 (s, 3H), 3.56 (s, 3H), 2.62 – 2.56 (m, 1H), 2.55 – 2.47 (m, 2H), 2.43 – 2.38 (m, 1H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 173.1, 170.4, 169.7, 156.2, 153.7, 148.2, 136.3, 135.8, 135.5, 134.2, 130.4, 129.3, 129.1, 127.5, 127.5, 124.4, 123.8, 123.5, 59.1, 52.2, 51.5, 30.9, 24.7. **HRMS (ESI):** Calcd for $C_{39}H_{36}N_2NaO_5Si$ $[M+Na]^+$ 663.2286, found: 663.2292.



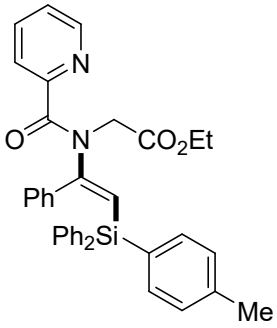
***tert*-butyl (*E*)-(4-(*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamido)butyl)carbamate (5aa)**

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 47% yield (61.4 mg, 0.094 mmol). Mp: 135 – 136 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.33 (d, *J* = 4.7 Hz, 1H), 7.61 (d, *J* = 7.8 Hz, 1H), 7.48 (t, *J* = 7.7 Hz, 1H), 7.40 (d, *J* = 7.4 Hz, 2H), 7.29 – 7.26 (m, 3H), 7.20 – 7.11 (m, 12H), 7.03 (t, *J* = 7.4 Hz, 1H), 6.98 (dd, *J* = 7.0, 5.0 Hz, 1H), 6.90 (t, *J* = 7.7 Hz, 2H), 5.63 (s, 1H), 4.60 (s, 1H), 3.53 – 3.52 (m, 2H), 3.13 – 3.12 (m, 2H), 1.73 – 1.67 (m, 2H), 1.56 – 1.50 (m, 2H), 1.44 (s, 9H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.6, 155.9, 154.6, 148.1, 136.2, 136.2, 135.5, 134.3, 129.7, 129.1, 129.0, 127.5, 124.0, 123.5, 122.5, 79.0, 45.9, 40.3, 28.4, 27.3, 25.1. **HRMS (ESI):** Calcd for $C_{41}H_{43}N_3NaO_3Si$ $[M+Na]^+$ 676.2966, found: 676.2969.



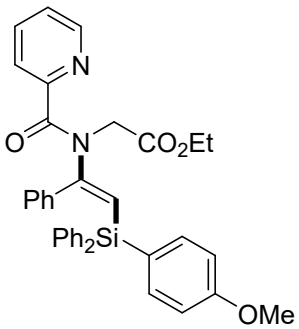
(*E*)-*N*-(3-butoxypropyl)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (5ab)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 51% yield (60.8 mg, 0.102 mmol). Mp: 92 – 93 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.33 (d, *J* = 4.7 Hz, 1H), 7.60 (d, *J* = 7.8 Hz, 1H), 7.47 (t, *J* = 8.3 Hz, 1H), 7.40 (d, *J* = 7.8 Hz, 2H), 7.30 – 7.26 (m, 3H), 7.19 – 7.13 (m, 12H), 7.02 (t, *J* = 7.4 Hz, 1H), 6.98 (dd, *J* = 7.5, 4.8 Hz, 1H), 6.89 (t, *J* = 7.6 Hz, 2H), 5.67 (s, 1H), 3.63 (t, *J* = 6.9 Hz, 2H), 3.50 (t, *J* = 6.5 Hz, 2H), 3.36 (t, *J* = 6.6 Hz, 2H), 2.03 – 1.95 (m, 2H), 1.52 – 1.44 (m, 2H), 1.33 – 1.26 (m, 2H), 0.88 (t, *J* = 7.4 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.6, 156.1, 154.7, 148.1, 136.4, 136.1, 135.5, 134.4, 129.7, 129.1, 128.9, 127.5, 127.5, 123.9, 123.5, 122.3, 70.5, 68.4, 44.0, 31.8, 28.0, 19.3, 13.9. **HRMS (ESI):** Calcd for $C_{39}H_{40}N_2NaO_2Si$ $[M+Na]^+$ 619.2751, found: 619.2749.



ethyl (*E*)-*N*-(2-(diphenyl(*p*-tolyl)silyl)-1-phenylvinyl)-*N*-picolinoylglycinate (6a)

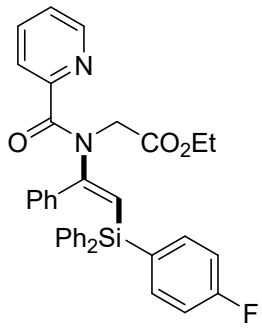
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 91% yield (106.0 mg, 0.182 mmol). Mp: 60 – 61 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.39 (d, *J* = 4.4 Hz, 1H), 7.68 (d, *J* = 7.8 Hz, 1H), 7.52 (t, *J* = 7.3 Hz, 1H), 7.43 (d, *J* = 7.3 Hz, 2H), 7.29 – 7.26 (m, 2H), 7.22 – 7.12 (m, 10H), 7.04 – 7.01 (m, 4H), 6.90 (t, *J* = 7.7 Hz, 2H), 5.89 (s, 1H), 4.33 – 4.18 (m, 4H), 2.34 (s, 3H), 1.30 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 168.6, 155.2, 153.6, 148.0, 139.0, 136.2, 136.0, 135.6, 135.5, 134.5, 130.5, 129.8, 128.9, 128.4, 127.5, 127.4, 124.3, 123.8, 122.4, 61.1, 48.9, 21.4, 14.1. **HRMS (ESI):** Calcd for $C_{37}H_{34}N_2NaO_3Si$ $[M+Na]^+$ 605.2231, found: 605.2233.



ethyl (*E*)-*N*-(2-((4-methoxyphenyl)diphenylsilyl)-1-phenylvinyl)-*N*-picolinoylglycinate (6b)

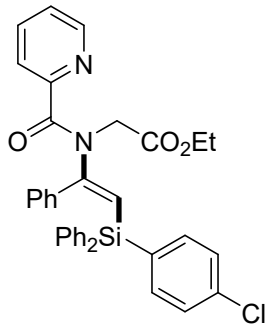
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 83% yield (99.3 mg, 0.166 mmol). Mp: 146 – 147 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.38 (d, *J* = 4.5 Hz, 1H), 7.67 (d, *J* = 7.8 Hz, 1H), 7.52 (t, *J* = 7.7 Hz, 1H), 7.43 (d, *J* = 7.6 Hz, 2H), 7.29 – 7.26 (m, 2H), 7.22 – 7.11 (m, 10H), 7.03 (t, *J* = 6.6

Hz, 2H), 6.90 (t, *J* = 7.7 Hz, 2H), 6.75 (d, *J* = 8.5 Hz, 2H), 5.87 (s, 1H), 4.27 – 4.23 (m, 4H), 3.80 (s, 3H), 1.30 (t, *J* = 7.2 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 168.7, 160.5, 155.2, 153.7, 148.0, 137.1, 136.2, 136.1, 135.5, 134.7, 129.8, 129.0, 129.0, 127.5, 127.5, 124.9, 124.3, 123.9, 122.5, 113.4, 61.1, 55.0, 48.9, 14.2. **HRMS (ESI):** Calcd for $C_{37}H_{34}N_2NaO_4Si$ $[M+Na]^+$ 621.2180, found: 621.2178.



ethyl (*E*)-*N*-(2-((4-fluorophenyl)diphenylsilyl)-1-phenylvinyl)-*N*-picolinoylglycinate (6c)

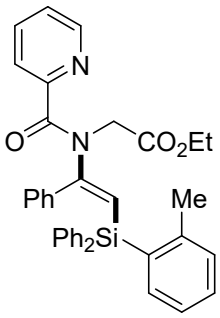
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 76% yield (89.1 mg, 0.152 mmol). Mp: 132 – 133 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.36 (d, *J* = 4.6 Hz, 1H), 7.67 (d, *J* = 7.8 Hz, 1H), 7.51 (t, *J* = 7.7 Hz, 1H), 7.40 (d, *J* = 7.8 Hz, 2H), 7.30 – 7.27 (m, 2H), 7.19 – 7.18 (m, 8H), 7.14 – 7.10 (m, 2H), 7.04 – 7.00 (m, 2H), 6.89 (t, *J* = 7.7 Hz, 2H), 6.84 (t, *J* = 8.9 Hz, 2H), 5.83 (s, 1H), 4.25 – 4.21 (m, 4H), 1.27 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.9, 168.6, 163.6 (d, *J* = 248.9 Hz), 155.6, 153.6, 148.0, 137.5 (d, *J* = 7.7 Hz), 136.3, 136.0, 135.5, 134.2, 129.8, 129.6 (d, *J* = 3.6 Hz), 129.2, 129.2, 127.6, 127.6, 124.4, 124.0, 121.7, 114.6 (d, *J* = 19.9 Hz), 61.1, 48.8, 14.1. **^{19}F NMR ($CDCl_3$, 471 MHz):** δ -111.5. **HRMS (ESI):** Calcd for $C_{36}H_{31}FN_2NaO_3Si$ $[M+Na]^+$ 609.1980, found: 609.1979.



ethyl (*E*)-*N*-(2-((4-chlorophenyl)diphenylsilyl)-1-phenylvinyl)-*N*-picolinoylglycinate (6d)

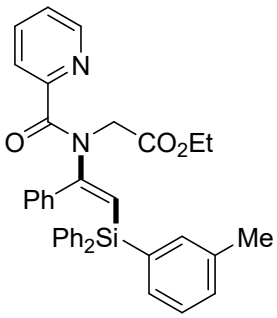
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 75% yield (90.3 mg, 0.150 mmol). Mp: 115 – 116 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.35 (d, *J* = 4.6 Hz, 1H), 7.67 (d, *J* = 7.8 Hz, 1H), 7.51 (t, *J* = 7.7 Hz, 1H), 7.39 (d, *J* = 7.1 Hz, 2H), 7.30 – 7.27 (m, 2H), 7.20 – 7.17 (m, 8H), 7.11 (d, *J* = 8.2 Hz, 2H), 7.06 (d, *J* = 8.3 Hz, 2H), 7.04 – 7.00 (m, 2H), 6.89 (t, *J* = 7.7 Hz, 2H), 5.81 (s, 1H), 4.27 – 4.18 (m, 4H), 1.27 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.9, 168.6, 155.8, 153.6, 148.0, 136.8, 136.3, 136.0, 135.5, 133.9, 132.7, 129.8, 129.3, 129.2, 127.7, 127.6,

127.6, 124.4, 124.0, 121.4, 61.1, 48.8, 14.1. **HRMS (ESI):** Calcd for $C_{36}H_{31}ClN_2NaO_3Si$ $[M+Na]^+$ 625.1685, found: 625.1682.



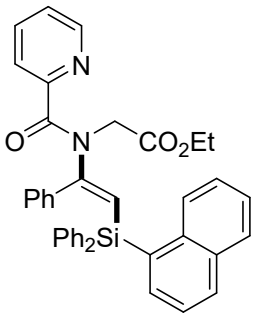
ethyl (*E*)-*N*-(2-(diphenyl(o-tolyl)silyl)-1-phenylvinyl)-*N*-picolinoylglycinate (6e)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 80% yield (93.2 mg, 0.160 mmol). Mp: 77 – 78 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.27 (d, *J* = 4.2 Hz, 1H), 7.66 (d, *J* = 7.7 Hz, 1H), 7.50 (t, *J* = 7.6 Hz, 1H), 7.37 (d, *J* = 7.6 Hz, 2H), 7.31 – 7.26 (m, 3H), 7.22 (t, *J* = 7.5 Hz, 1H), 7.19 – 7.12 (m, 8H), 7.07 (t, *J* = 7.4 Hz, 1H), 7.01 – 6.94 (m, 3H), 6.84 (t, *J* = 7.7 Hz, 2H), 5.97 (s, 1H), 4.26 – 4.21 (m, 4H), 1.89 (s, 3H), 1.28 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 168.7, 154.9, 153.6, 148.1, 144.5, 137.1, 136.2, 135.7, 135.4, 134.5, 133.0, 129.8, 129.7, 129.0, 127.6, 127.3, 124.8, 124.3, 123.8, 122.4, 61.1, 49.0, 23.4, 14.1. **HRMS (ESI):** Calcd for $C_{37}H_{34}N_2NaO_3Si$ $[M+Na]^+$ 605.2231, found: 605.2228.



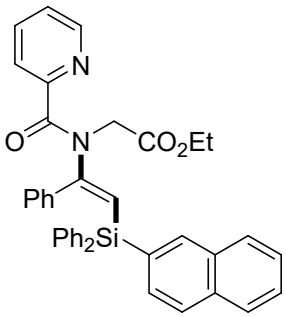
ethyl (*E*)-*N*-(2-(diphenyl(m-tolyl)silyl)-1-phenylvinyl)-*N*-picolinoylglycinate (6f)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 82% yield (95.5 mg, 0.164 mmol). Mp: 65 – 66 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.36 (d, *J* = 4.6 Hz, 1H), 7.66 (d, *J* = 7.7 Hz, 1H), 7.49 (t, *J* = 7.6 Hz, 1H), 7.42 (d, *J* = 7.7 Hz, 2H), 7.29 – 7.26 (m, 2H), 7.20 – 7.15 (m, 8H), 7.08 (d, *J* = 4.8 Hz, 2H), 7.03 – 6.98 (m, 4H), 6.88 (t, *J* = 7.6 Hz, 2H), 5.86 (s, 1H), 4.26 – 4.22 (m, 4H), 2.22 (s, 3H), 1.28 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 168.7, 155.3, 153.6, 148.0, 136.6, 136.2, 136.2, 136.1, 135.6, 134.5, 133.8, 132.7, 129.9, 129.8, 129.0, 127.5, 127.4, 124.3, 123.9, 122.4, 61.1, 48.9, 21.4, 14.2. **HRMS (ESI):** Calcd for $C_{37}H_{34}N_2NaO_3Si$ $[M+Na]^+$ 605.2231, found: 605.2229.



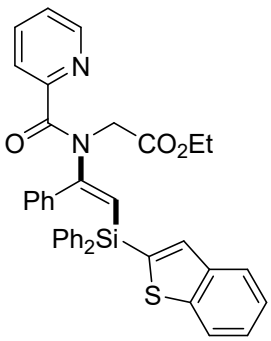
ethyl (*E*)-*N*-(2-(naphthalen-1-yldiphenylsilyl)-1-phenylvinyl)-*N*-picolinoylglycinate (6g)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 77% yield (95.2 mg, 0.154 mmol). Mp: 147 – 148 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.30 (d, *J* = 1.3 Hz, 1H), 7.75 (d, *J* = 8.2 Hz, 1H), 7.67 (d, *J* = 8.1 Hz, 1H), 7.55 – 7.44 (m, 3H), 7.35 – 7.27 (m, 3H), 7.23 – 7.20 (m, 3H), 7.17 – 7.08 (m, 10H), 6.89 (d, *J* = 1.3 Hz, 1H), 6.72 (t, *J* = 7.4 Hz, 1H), 6.55 (t, *J* = 7.7 Hz, 2H), 5.98 (s, 1H), 4.20 – 4.15 (m, 4H), 1.22 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.1, 168.7, 155.1, 153.7, 147.9, 136.9, 136.6, 136.1, 135.7, 135.6, 134.5, 133.3, 132.4, 130.6, 129.4, 129.2, 129.1, 128.7, 128.4, 127.6, 126.8, 125.4, 125.3, 125.0, 124.2, 123.7, 122.2, 61.1, 49.0, 14.1. **HRMS (ESI):** Calcd for $C_{40}H_{34}N_2NaO_3Si$ $[M+Na]^+$ 641.2231, found: 641.2233.



ethyl (*E*)-*N*-(2-(naphthalen-2-yldiphenylsilyl)-1-phenylvinyl)-*N*-picolinoylglycinate (6h)

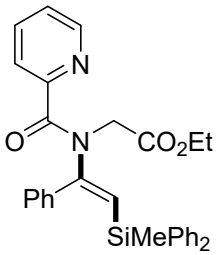
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 82% yield (101.4 mg, 0.164 mmol). Mp: 133 – 134 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.35 (d, *J* = 4.6 Hz, 1H), 7.80 – 7.74 (m, 2H), 7.70 – 7.66 (m, 2H), 7.63 (d, *J* = 8.2 Hz, 1H), 7.50 – 7.44 (m, 4H), 7.40 (t, *J* = 7.2 Hz, 1H), 7.29 (t, *J* = 7.2 Hz, 2H), 7.25 – 7.23 (m, 5H), 7.20 – 7.17 (m, 4H), 6.94 – 6.88 (m, 2H), 6.83 (t, *J* = 7.6 Hz, 2H), 5.94 (s, 1H), 4.35 – 4.16 (m, 4H), 1.29 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 168.7, 155.5, 153.6, 148.0, 136.9, 136.2, 136.1, 135.6, 134.3, 133.6, 132.7, 131.8, 131.3, 129.8, 129.1, 129.1, 128.1, 127.6, 127.5, 126.6, 126.5, 125.7, 124.3, 123.9, 122.1, 61.1, 48.8, 14.1. **HRMS (ESI):** Calcd for $C_{40}H_{34}N_2NaO_3Si$ $[M+Na]^+$ 641.2231, found: 641.2230.



ethyl (*E*)-*N*-(2-(benzo[*b*]thiophen-2-yldiphenylsilyl)-1-phenylvinyl)-*N*-picolinoylglycinate (6i)

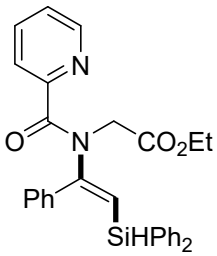
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 73% yield (91.1 mg,

0.146 mmol). Mp: 143 – 144 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.33 (d, *J* = 4.5 Hz, 1H), 7.80 (d, *J* = 8.0 Hz, 1H), 7.53 (d, *J* = 7.7 Hz, 1H), 7.37 – 7.26 (m, 8H), 7.24 – 7.22 (m, 4H), 7.19 – 7.16 (m, 4H), 7.10 (t, *J* = 7.2 Hz, 1H), 6.95 (dd, *J* = 7.0, 5.1 Hz, 1H), 6.88 (t, *J* = 7.4 Hz, 1H), 6.76 (t, *J* = 7.7 Hz, 2H), 5.94 (s, 1H), 4.26 – 4.18 (m, 4H), 1.27 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.1, 168.7, 155.6, 153.6, 147.9, 142.8, 141.4, 138.2, 136.0, 135.6, 135.4, 133.8, 131.5, 129.5, 129.3, 129.0, 127.7, 127.1, 125.3, 124.2, 123.9, 123.8, 123.7, 122.1, 121.1, 61.1, 48.8, 14.2. **HRMS (ESI):** Calcd for $C_{38}H_{32}N_2NaO_3SSi$ $[M+Na]^+$ 647.1795, found: 647.1799.



ethyl (*E*)-*N*-(2-(methyldiphenylsilyl)-1-phenylvinyl)-*N*-picolinoylglycinate (6j)

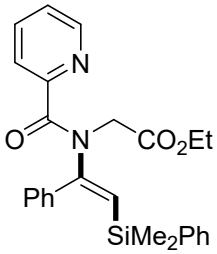
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 77% yield (78.0 mg, 0.154 mmol). Mp: 45 – 46 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.48 (d, *J* = 4.7 Hz, 1H), 7.68 (d, *J* = 7.7 Hz, 1H), 7.62 (t, *J* = 7.7 Hz, 1H), 7.52 (d, *J* = 7.8 Hz, 2H), 7.28 (t, *J* = 7.4 Hz, 2H), 7.23 – 7.16 (m, 6H), 7.15 – 7.11 (m, 6H), 5.71 (s, 1H), 4.23 – 4.19 (q, *J* = 7.1 Hz, 4H), 1.28 – 1.25 (m, 3H), 0.01 (s, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.8, 168.6, 154.8, 153.8, 148.1, 137.0, 137.0, 136.4, 134.3, 130.0, 129.3, 128.9, 127.9, 127.6, 124.5, 124.1, 123.8, 61.1, 48.7, 14.1, -4.0. **HRMS (ESI):** Calcd for $C_{31}H_{30}N_2NaO_3Si$ $[M+Na]^+$ 529.1918, found: 529.1920.



ethyl (*E*)-*N*-(2-(diphenylsilyl)-1-phenylvinyl)-*N*-picolinoylglycinate (6k)

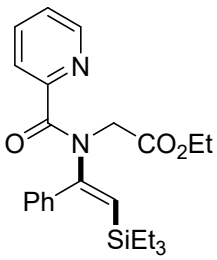
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 64% yield (63.0 mg, 0.128 mmol). Mp: 53 – 54 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.36 (d, *J* = 4.5 Hz, 1H), 7.62 – 7.59 (m, 3H), 7.54 (t, *J* = 7.3 Hz, 1H), 7.33 – 7.27 (m, 3H), 7.26 – 7.18 (m, 10H), 7.06 (dd, *J* = 6.6, 5.4 Hz, 1H), 5.69 (d, *J* = 5.4 Hz, 1H), 4.75 (d, *J* = 5.5 Hz, 1H), 4.26 (s, 2H), 4.21 (q, *J* = 7.1 Hz, 2H), 1.26 (t, *J* = 7.0 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 168.6, 156.0, 153.6, 148.2, 136.8, 136.3, 135.0, 134.0, 129.8, 129.4,

129.4, 128.0, 127.8, 124.4, 123.8, 120.0, 61.2, 49.1, 14.1. **HRMS (ESI):** Calcd for $C_{30}H_{28}N_2NaO_3Si$ $[M+Na]^+$ 515.1761, found: 515.1765.



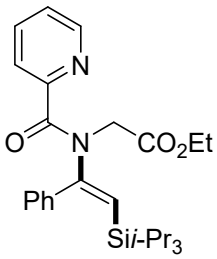
ethyl (*E*)-*N*-(2-(dimethyl(phenyl)silyl)-1-phenylvinyl)-*N*-picolinoylglycinate (6l)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 68% yield (60.4 mg, 0.136 mmol). Mp: 41 – 42 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.54 (d, *J* = 4.7 Hz, 1H), 7.72 (d, *J* = 4.3 Hz, 2H), 7.61 (d, *J* = 7.3 Hz, 2H), 7.38 – 7.27 (m, 7H), 7.21 (d, *J* = 6.9 Hz, 2H), 5.52 (s, 1H), 4.28 – 4.23 (m, 4H), 1.32 (t, *J* = 2.1 Hz, 3H), -0.12 (s, 6H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.9, 168.6, 154.1, 153.6, 148.1, 138.8, 137.3, 136.4, 133.5, 130.0, 129.3, 128.7, 128.0, 127.6, 125.9, 124.4, 123.9, 61.1, 48.5, 14.1, -1.9. **HRMS (ESI):** Calcd for $C_{26}H_{28}N_2NaO_3Si$ $[M+Na]^+$ 467.1761, found: 467.1760.



ethyl (*E*)-*N*-(1-phenyl-2-(triethylsilyl)vinyl)-*N*-picolinoylglycinate (6m)

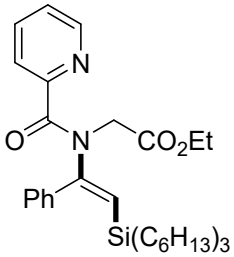
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 65% yield (55.1 mg, 0.130 mmol). Mp: 55 – 56 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.47 (d, *J* = 4.6 Hz, 1H), 7.71 – 7.65 (m, 2H), 7.62 (d, *J* = 6.6 Hz, 2H), 7.35 – 7.29 (m, 3H), 7.23 (t, *J* = 5.7 Hz, 1H), 5.30 (s, 1H), 4.21 – 4.16 (m, 4H), 1.27 – 1.24 (m, 3H), 0.60 (t, *J* = 7.9 Hz, 9H), 0.14 (q, *J* = 7.9 Hz, 6H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.9, 168.7, 154.3, 152.8, 148.3, 137.8, 136.4, 129.8, 129.1, 127.9, 125.1, 124.3, 123.8, 61.0, 48.6, 14.1, 7.2, 4.3. **HRMS (ESI):** Calcd for $C_{24}H_{32}N_2NaO_3Si$ $[M+Na]^+$ 447.2074, found: 447.2072.



ethyl (*E*)-*N*-(1-phenyl-2-(triisopropylsilyl)vinyl)-*N*-picolinoylglycinate (6n)

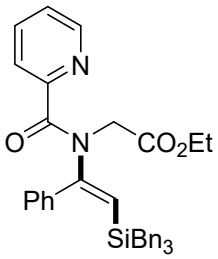
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 67% yield (62.5 mg, 0.134 mmol). Mp: 86 – 87 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.47 (d, *J* = 4.6 Hz, 1H), 7.72 – 7.66 (m, 4H), 7.33 – 7.27 (m, 3H), 7.23 – 7.20 (m, 1H), 5.41 (s, 1H),

4.20 – 4.16 (m, 4H), 1.26 – 1.24 (m, 3H), 0.78 – 0.68 (m, 21H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 168.7, 154.0, 153.0, 148.3, 138.3, 136.5, 129.8, 129.0, 127.8, 124.5, 124.2, 123.6, 61.0, 48.9, 18.8, 14.1, 12.3. **HRMS (ESI):** Calcd for $C_{27}H_{38}N_2NaO_3Si$ $[M+Na]^+$ 489.2544, found: 489.2542.



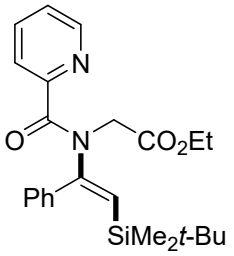
ethyl (*E*)-*N*-(1-phenyl-2-(trihexylsilyl)vinyl)-*N*-picolinoylglycinate (6o)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 58% yield (68.7 mg, 0.116 mmol). Mp: 61 – 62 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.45 (d, *J* = 4.7 Hz, 1H), 7.66 (d, *J* = 3.9 Hz, 2H), 7.61 (d, *J* = 7.7 Hz, 2H), 7.35 – 7.28 (m, 3H), 7.24 – 7.21 (m, 1H), 5.27 (s, 1H), 4.21 – 4.08 (m, 4H), 1.26 – 1.19 (m, 10H), 1.14 – 1.08 (m, 6H), 1.07 – 1.00 (m, 6H), 0.91 – 0.83 (m, 15H), 0.12 – 0.07 (m, 5H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.8, 168.5, 154.3, 152.2, 148.2, 137.7, 136.3, 129.8, 129.1, 127.9, 126.0, 124.1, 123.8, 60.9, 48.5, 33.3, 31.4, 23.5, 22.5, 14.1, 13.3. **HRMS (ESI):** Calcd for $C_{36}H_{56}N_2NaO_3Si$ $[M+Na]^+$ 615.3952, found: 615.3958.



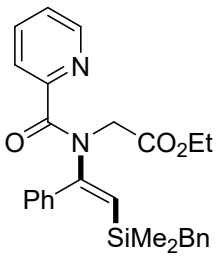
ethyl (*E*)-*N*-(1-phenyl-2-(tribenzylsilyl)vinyl)-*N*-picolinoylglycinate (6p)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 53% yield (64.7 mg, 0.106 mmol). Mp: 60 – 61 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.44 (d, *J* = 4.7 Hz, 1H), 7.64 (d, *J* = 3.8 Hz, 2H), 7.23 – 7.20 (m, 2H), 7.18 – 7.15 (m, 6H), 7.12 – 7.05 (m, 8H), 6.72 – 6.70 (d, *J* = 7.6 Hz, 5H), 5.30 (s, 1H), 4.23 (q, *J* = 7.1 Hz, 2H), 4.14 (s, 2H), 1.71 (s, 6H), 1.28 (t, *J* = 5.8 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 168.6, 154.7, 153.8, 147.9, 138.7, 137.9, 136.5, 129.9, 129.3, 128.7, 128.3, 128.0, 124.5, 124.4, 124.2, 120.2, 61.1, 49.4, 22.3, 14.2. **HRMS (ESI):** Calcd for $C_{39}H_{38}N_2NaO_3Si$ $[M+Na]^+$ 633.2544, found: 633.2542.



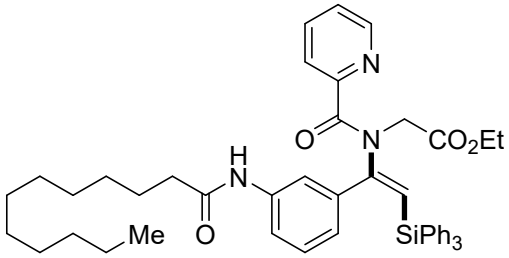
ethyl (*E*)-*N*-(2-(tert-butyldimethylsilyl)-1-phenylvinyl)-*N*-picolinoylglycinate (6q)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 62% yield (52.6 mg, 0.124 mmol). Mp: 48 – 49 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.50 (d, *J* = 4.7 Hz, 1H), 7.74 – 7.63 (m, 4H), 7.34 – 7.29 (m, 3H), 7.24 – 7.21 (m, 1H), 5.40 (s, 1H), 4.21 – 4.17 (m, 4H), 1.27 – 1.24 (m, 3H), 0.59 (s, 9H), -0.45 (s, 6H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 168.7, 154.0, 153.6, 148.1, 137.8, 136.6, 130.3, 129.0, 127.8, 124.7, 124.5, 124.2, 61.0, 48.5, 26.2, 16.4, 14.2, -5.0. **HRMS (ESI):** Calcd for $C_{24}H_{32}N_2NaO_3Si$ $[M+Na]^+$ 447.2074, found: 447.2073.



ethyl (*E*)-*N*-(2-(benzyldimethylsilyl)-1-phenylvinyl)-*N*-picolinoylglycinate (6r)

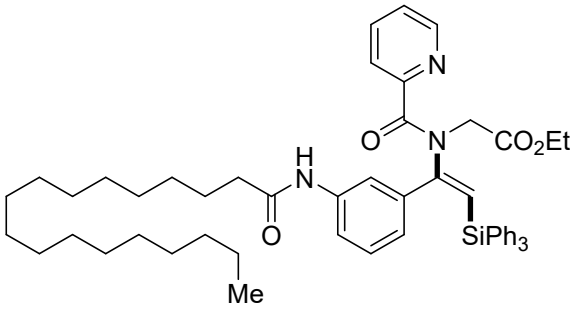
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 60% yield (55.0 mg, 0.120 mmol). Mp: 54 – 55 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.42 (d, *J* = 4.6 Hz, 1H), 7.63 – 7.56 (m, 2H), 7.42 (d, *J* = 7.0 Hz, 2H), 7.24 – 7.17 (m, 4H), 7.08 (t, *J* = 7.6 Hz, 2H), 6.97 (t, *J* = 7.4 Hz, 1H), 6.73 (d, *J* = 7.4 Hz, 2H), 5.20 (s, 1H), 4.18 – 4.07 (m, 4H), 1.65 (s, 2H), 1.21 – 1.18 (m, 3H), -0.53 (s, 6H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.8, 168.6, 154.3, 153.3, 148.0, 139.5, 137.6, 136.4, 129.9, 129.3, 128.1, 128.0, 125.7, 124.3, 124.1, 123.9, 61.1, 48.6, 26.2, 14.1, -2.6. **HRMS (ESI):** Calcd for $C_{27}H_{30}N_2NaO_3Si$ $[M+Na]^+$ 481.1918, found: 481.1917.



ethyl (*E*)-*N*-(1-(3-dodecanamidophenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (7a)

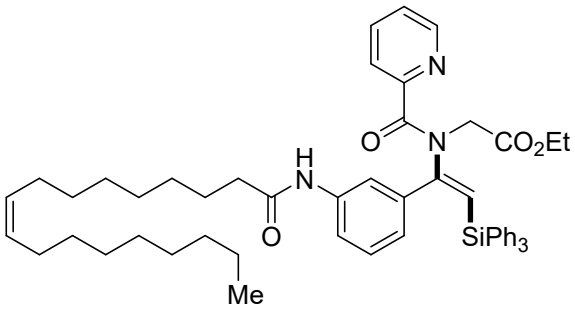
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/3) as a yellow solid in 75% yield (114.8 mg, 0.150 mmol). Mp: 98 – 99 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.27 (d, *J* = 3.9 Hz, 1H), 7.71 (d, *J* = 9.0 Hz, 1H), 7.67 (d, *J* = 7.8 Hz, 1H), 7.52 (t, *J* = 7.8 Hz, 1H), 7.31 – 7.28 (m, 3H), 7.26 – 7.24 (m, 1H), 7.22 – 7.10 (m, 12H), 7.01 – 6.97 (m, 1H), 6.95 (t, *J* = 7.9 Hz, 1H), 6.91 (s, 1H), 6.48 (s, 1H), 5.85 (s, 1H), 4.23 – 4.18 (m, 4H), 2.21 (t, *J* = 7.5 Hz, 2H), 1.67 – 1.62 (m, 3H), 1.33 – 1.24 (m, 18H), 0.88 (t, *J* = 6.9 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 171.0, 169.9,

168.6, 155.1, 153.4, 148.1, 137.3, 136.8, 136.3, 135.6, 134.5, 129.2, 128.7, 127.6, 125.4, 124.4, 123.9, 122.5, 121.2, 121.0, 61.2, 48.8, 37.7, 31.9, 29.6, 29.6, 29.5, 29.4, 29.3, 29.3, 25.5, 22.7, 14.1, 14.1. **HRMS (ESI):** Calcd for $C_{48}H_{55}N_3NaO_4Si$ $[M+Na]^+$ 788.3854, found: 788.3857.



ethyl (*E*)-*N*-picolinoyl-*N*-(1-(3-stearamidophenyl)-2-(triphenylsilyl)vinyl)glycinate (7b)

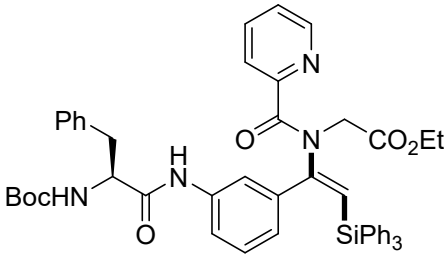
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/3) as a yellow solid in 71% yield (120.6 mg, 0.142 mmol). Mp: 105 – 106 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.27 (d, *J* = 4.3 Hz, 1H), 7.71 (d, *J* = 7.9 Hz, 1H), 7.67 (d, *J* = 7.8 Hz, 1H), 7.52 (t, *J* = 7.1 Hz, 1H), 7.31 – 7.24 (m, 3H), 7.26 – 7.24 (m, 1H), 7.20 – 7.12 (m, 12H), 6.99 (dd, *J* = 6.8, 5.4 Hz, 1H), 6.95 (t, *J* = 7.9 Hz, 1H), 6.91 (s, 1H), 6.47 (s, 1H), 5.85 (s, 1H), 4.23 – 4.19 (m, 4H), 2.21 (t, *J* = 7.5 Hz, 2H), 1.69 – 1.62 (m, 3H), 1.29 – 1.25 (m, 30H), 0.87 (t, *J* = 7.0 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.9, 169.9, 168.6, 155.1, 153.4, 148.1, 137.3, 136.8, 136.3, 135.6, 134.5, 129.2, 128.7, 127.6, 125.4, 124.4, 123.9, 122.5, 121.2, 121.0, 61.1, 48.8, 37.7, 31.9, 29.7, 29.6, 29.6, 29.5, 29.4, 29.3, 29.3, 25.5, 22.7, 14.1, 14.1. **HRMS (ESI):** Calcd for $C_{54}H_{67}N_3NaO_4Si$ $[M+Na]^+$ 872.4793, found: 872.4799.



ethyl *N*-((*E*)-1-(3-oleamidophenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (7c)

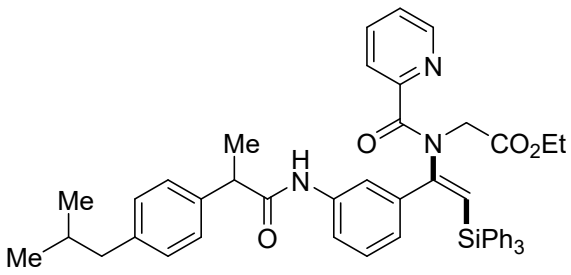
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/3) as a yellow solid in 54% yield (91.5 mg, 0.108 mmol). Mp: 78 – 79 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.36 (d, *J* = 4.3 Hz, 1H), 7.67 (d, *J* = 7.8 Hz, 1H), 7.51 (t, *J* = 7.7 Hz, 1H), 7.37 (d, *J* = 8.4 Hz, 2H), 7.29 – 7.26 (m, 3H), 7.20 – 7.16 (m, 11H), 7.06 – 7.00 (m, 3H), 6.97 (s, 1H), 5.82 (s, 1H), 5.38 – 5.36 (m,

2H), 4.30 – 4.19 (m, 4H), 2.31 (t, *J* = 7.4 Hz, 2H), 2.05 – 2.01 (m, 4H), 1.75 – 1.68 (m, 2H), 1.36 – 1.26 (m, 23H), 0.90 (t, *J* = 6.9 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 168.6, 154.9, 153.6, 148.1, 138.7, 136.3, 135.6, 134.3, 130.7, 130.0, 129.7, 129.0, 127.5, 124.4, 123.9, 121.8, 118.3, 61.1, 48.9, 37.8, 31.9, 29.8, 29.7, 29.5, 29.3, 29.3, 29.2, 29.1, 27.2, 27.2, 25.5, 22.7, 14.2, 14.1. **HRMS (ESI):** Calcd for $C_{54}H_{65}N_3NaO_4Si$ $[M+Na]^+$ 870.4637, found: 870.4642.



ethyl (*S*,*E*)-*N*-(1-(3-(2-((tert-butoxycarbonyl)amino)-3-phenylpropanamido)phenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (7d)

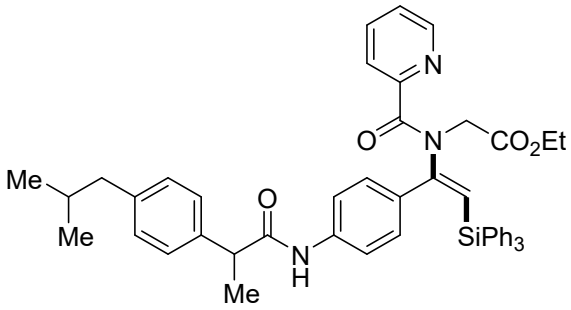
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/1) as a yellow solid in 45% yield (74.7 mg, 0.090 mmol). Mp: 186 – 187 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.26 (d, *J* = 4.4 Hz, 1H), 7.62 (d, *J* = 7.8 Hz, 1H), 7.46 (t, *J* = 7.3 Hz, 1H), 7.36 (d, *J* = 7.7 Hz, 1H), 7.25 – 7.16 (m, 9H), 7.12 – 7.08 (m, 11H), 7.04 (s, 1H), 6.97 – 6.92 (m, 2H), 6.84 (t, *J* = 7.9 Hz, 1H), 5.81 (s, 1H), 5.25 (s, 1H), 4.97 (s, 1H), 4.31 (s, 1H), 4.21 – 4.13 (m, 4H), 3.05 (d, *J* = 6.6 Hz, 2H), 1.38 (s, 9H), 1.23 – 1.21 (m, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.9, 169.0, 168.6, 154.7, 153.4, 148.0, 136.8, 136.4, 136.3, 135.5, 134.2, 129.3, 129.2, 128.8, 128.4, 127.6, 127.1, 126.1, 124.4, 123.9, 122.7, 121.6, 121.1, 61.2, 53.4, 48.7, 38.4, 29.7, 28.2, 14.2. **HRMS (ESI):** Calcd for $C_{50}H_{50}N_4NaO_6Si$ $[M+Na]^+$ 853.3392, found: 853.3398.



ethyl (*E*)-*N*-(1-(3-(2-(4-isobutylphenyl)propanamido)phenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (7e)

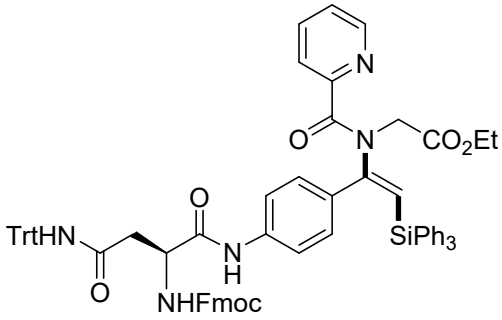
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/3) as a yellow solid in 60% yield (92.6 mg, 0.120 mmol). Mp: 90 – 91 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.24 (d, *J* = 4.1 Hz, 1H), 7.60 (d, *J* = 7.6 Hz, 1H), 7.49 – 7.42 (m, 2H), 7.25 – 7.20 (m, 4H), 7.15 (d, *J* = 8.0 Hz, 2H),

7.12 – 7.05 (m, 14H), 6.91 (t, *J* = 8.0 Hz, 2H), 6.78 (s, 1H), 6.40 (s, 1H), 5.79 (s, 1H), 4.23 – 4.08 (m, 4H), 3.49 (q, *J* = 7.1 Hz, 1H), 2.44 (d, *J* = 7.1 Hz, 2H), 1.83 (dt, *J* = 13.4, 6.7 Hz, 1H), 1.49 (d, *J* = 7.1 Hz, 3H), 1.23 (t, *J* = 7.1 Hz, 3H), 0.88 (d, *J* = 6.6 Hz, 6H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 171.9, 169.9, 168.6, 154.9, 153.5, 148.0, 141.0, 138.1, 136.9, 136.5, 136.3, 135.5, 134.2, 129.7, 129.1, 128.5, 127.5, 127.3, 125.3, 124.3, 123.9, 122.4, 121.7, 121.1, 61.1, 48.8, 47.6, 45.0, 30.1, 22.4, 18.6, 14.1. **HRMS (ESI):** Calcd for $C_{49}H_{49}N_3NaO_4Si$ $[M+Na]^+$ 794.3385, found: 794.3388.



ethyl (*E*)-*N*-(1-(4-(2-(4-isobutylphenyl)propanamido)phenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (7f)

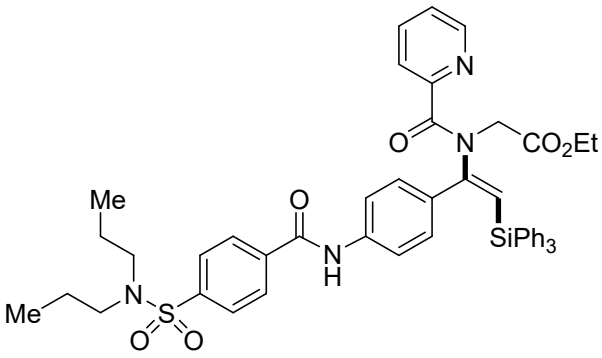
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/3) as a yellow solid in 64% yield (98.7 mg, 0.128 mmol). Mp: 92 – 93 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.33 (d, *J* = 4.5 Hz, 1H), 7.64 (d, *J* = 7.8 Hz, 1H), 7.48 (t, *J* = 7.7 Hz, 1H), 7.31 (d, *J* = 8.5 Hz, 2H), 7.25 – 7.11 (m, 19H), 7.04 (s, 1H), 6.99 (dd, *J* = 7.1, 5.1 Hz, 1H), 6.94 (d, *J* = 8.4 Hz, 2H), 5.79 (s, 1H), 4.22 – 4.18 (m, 4H), 3.64 (q, *J* = 7.0 Hz, 1H), 2.49 (d, *J* = 7.2 Hz, 2H), 1.88 (dt, *J* = 13.5, 6.7 Hz, 1H), 1.55 (d, *J* = 7.1 Hz, 3H), 1.25 (t, *J* = 7.2 Hz, 3H), 0.92 (d, *J* = 6.6 Hz, 6H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 172.3, 170.0, 168.6, 154.9, 153.5, 148.0, 141.0, 138.8, 138.1, 136.2, 135.5, 134.2, 131.7, 130.5, 129.7, 128.9, 127.5, 127.2, 124.4, 123.8, 121.8, 118.2, 61.1, 48.8, 47.6, 44.9, 30.1, 22.3, 18.4, 14.1. **HRMS (ESI):** Calcd for $C_{49}H_{49}N_3NaO_4Si$ $[M+Na]^+$ 794.3385, found: 794.3389.



ethyl (*S*,*E*)-*N*-(1-(4-(2-((((9*H*-fluoren-9-yl)methoxy)carbonyl)amino)-4-oxo-4-(tritylamino)butanamido)phenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (7g)

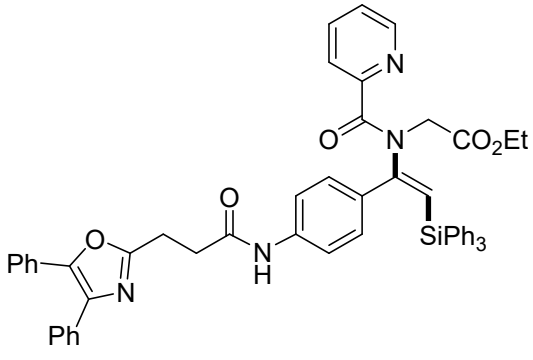
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether =

1/1) as a yellow solid in 33% yield (76.7 mg, 0.066 mmol). Mp: 122 – 123 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.66 (s, 1H), 8.37 (d, *J* = 4.6 Hz, 1H), 7.77 (d, *J* = 7.5 Hz, 2H), 7.69 (d, *J* = 7.8 Hz, 1H), 7.59 (d, *J* = 5.1 Hz, 2H), 7.53 (t, *J* = 7.7 Hz, 1H), 7.41 – 7.37 (m, 4H), 7.31 – 7.16 (m, 33H), 7.05 – 7.02 (m, 1H), 6.92 (d, *J* = 8.4 Hz, 2H), 6.46 (d, *J* = 5.1 Hz, 1H), 5.85 (s, 1H), 4.62 – 4.62 (m, 1H), 4.46 – 4.42 (m, 2H), 4.26 – 4.20 (m, 5H), 3.15 (d, *J* = 15.4 Hz, 1H), 2.67 – 2.62 (m, 1H), 1.28 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 168.6, 156.3, 155.0, 153.6, 148.1, 144.0, 143.6, 143.6, 141.3, 138.1, 136.3, 135.6, 134.4, 132.4, 130.6, 129.1, 128.6, 128.1, 127.8, 127.6, 127.2, 127.1, 125.0, 124.4, 124.0, 120.1, 118.9, 71.1, 67.3, 61.2, 48.9, 47.1, 38.8, 14.2. **HRMS (ESI):** Calcd for $C_{74}H_{63}N_5NaO_7Si$ $[M+Na]^+$ 1184.4389, found: 1184.4393.



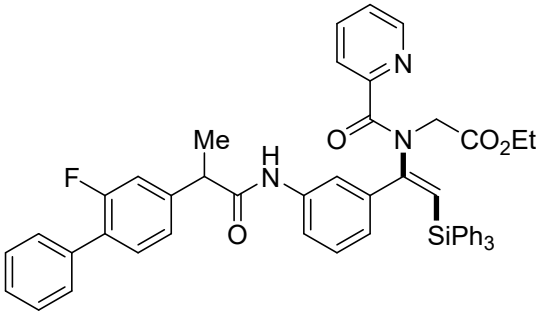
ethyl (*E*)-*N*-(1-(4-(4-(*N*,*N*-dipropylsulfamoyl)benzamido)phenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (7h)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/3) as a yellow solid in 63% yield (107.1 mg, 0.126 mmol). Mp: 151 – 152 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.37 (d, *J* = 4.4 Hz, 1H), 8.01 (s, 1H), 7.92 (d, *J* = 8.3 Hz, 2H), 7.83 (d, *J* = 8.3 Hz, 2H), 7.66 (d, *J* = 7.8 Hz, 1H), 7.51 (t, *J* = 7.7 Hz, 1H), 7.43 (d, *J* = 8.5 Hz, 2H), 7.30 – 7.26 (m, 3H), 7.24 – 7.15 (m, 14H), 7.02 (dd, *J* = 7.0, 5.2 Hz, 1H), 5.86 (s, 1H), 4.25 – 4.21 (m 4H), 3.12 – 3.07 (m, 4H), 1.60 – 1.52 (m, 4H), 1.28 (t, *J* = 7.1 Hz, 3H), 0.88 (t, *J* = 7.4 Hz, 6H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 168.6, 164.1, 154.8, 153.5, 148.1, 143.0, 138.4, 136.3, 135.6, 134.2, 132.6, 130.8, 129.1, 127.9, 127.6, 127.3, 124.5, 123.9, 122.2, 119.0, 61.2, 50.0, 48.9, 21.9, 14.2, 11.1. **HRMS (ESI):** Calcd for $C_{19}H_{50}N_4NaO_6SSi$ $[M+Na]^+$ 873.3113, found: 873.3118.



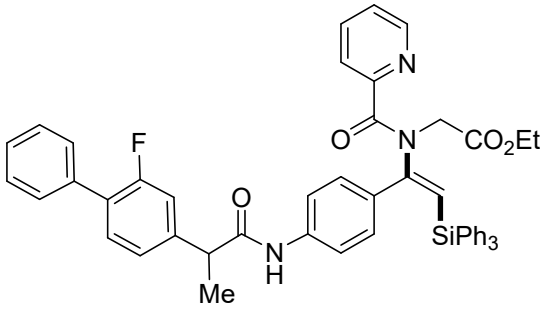
ethyl (*E*)-*N*-(1-(4-(3-(4,5-diphenyloxazol-2-yl)propanamido)phenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (7i)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/3) as a yellow solid in 55% yield (94.4 mg, 0.110 mmol). Mp: 81 – 82 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.34 – 8.33 (m, 2H), 7.66 – 7.61 (m, 3H), 7.59 – 7.57 (m, 2H), 7.48 (t, *J* = 8.4 Hz, 1H), 7.39 – 7.30 (m, 9H), 7.25 – 7.21 (m, 3H), 7.18 – 7.11 (m, 11H), 7.04 – 6.96 (m, 3H), 5.80 (s, 1H), 4.32 – 4.10 (m, 4H), 3.25 (t, *J* = 6.8 Hz, 2H), 2.90 (t, *J* = 6.6 Hz, 2H), 1.25 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 169.5, 168.6, 162.4, 154.9, 153.6, 148.1, 145.7, 138.8, 136.3, 135.6, 135.0, 134.8, 134.3, 132.2, 131.8, 130.6, 129.0, 128.7, 128.7, 128.6, 128.3, 127.8, 127.5, 126.5, 124.4, 123.9, 121.8, 118.4, 61.1, 48.9, 34.1, 24.0, 14.1. **HRMS (ESI):** Calcd for $C_{54}H_{46}N_4NaO_5Si$ $[M+Na]^+$ 881.3130, found: 881.3133.



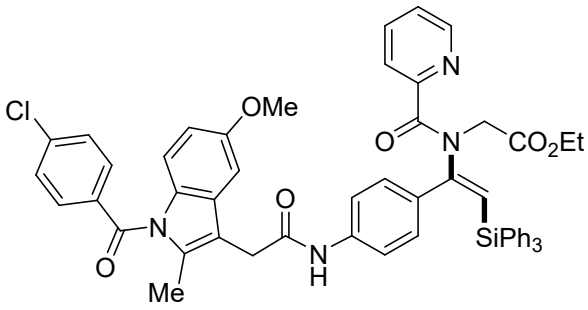
ethyl (*E*)-*N*-(1-(3-(2-(2-fluoro-[1,1'-biphenyl]-4-yl)propanamido)phenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (7j)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/3) as a yellow solid in 56% yield (90.6 mg, 0.112 mmol). Mp: 94 – 95 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.28 (d, *J* = 4.4 Hz, 1H), 7.64 (d, *J* = 7.8 Hz, 1H), 7.58 – 7.53 (m, 3H), 7.49 – 7.44 (m, 3H), 7.41 – 7.37 (m, 2H), 7.30 (d, *J* = 7.6 Hz, 1H), 7.25 – 7.23 (m, 3H), 7.14 – 7.11 (m, 14H), 6.97 – 6.94 (m, 2H), 6.89 (s, 1H), 6.54 (s, 1H), 5.82 (s, 1H), 4.22 – 4.18 (m, 4H), 3.57 (q, *J* = 7.0 Hz, 1H), 1.56 (d, *J* = 7.1 Hz, 3H), 1.25 (t, *J* = 7.2 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 171.0, 170.0, 168.6, 159.8 (d, *J* = 248.9 Hz), 154.8, 153.4, 148.0, 142.3, 142.2, 136.8, 136.7, 136.3, 135.5, 135.2, 134.2, 131.2 (d, *J* = 4.0 Hz), 129.2, 128.9 (d, *J* = 2.6 Hz), 128.6, 128.5, 127.8, 127.5, 125.5, 124.4, 123.9, 123.5 (d, *J* = 3.2 Hz), 122.6, 121.7, 121.1, 115.3 (d, *J* = 23.6 Hz), 61.2, 48.8, 47.5, 18.6, 14.1. **^{19}F NMR ($CDCl_3$, 471 MHz):** δ -116.7. **HRMS (ESI):** Calcd for $C_{51}H_{44}FN_3NaO_4Si$ $[M+Na]^+$ 832.2977, found: 832.2980.



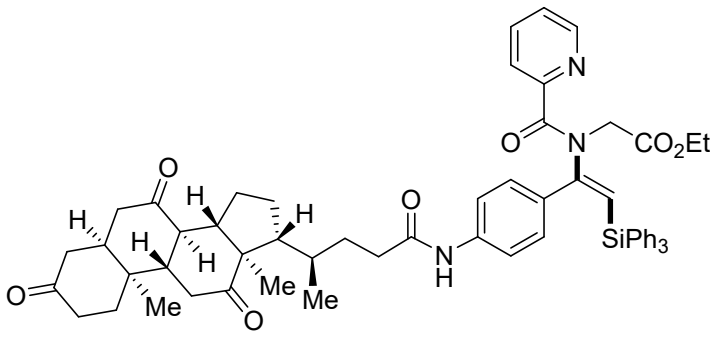
ethyl (*E*)-*N*-(1-(4-(2-(2-fluoro-[1,1'-biphenyl]-4-yl)propanamido)phenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (7k)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/3) as a yellow solid in 54% yield (87.4 mg, 0.108 mmol). Mp: 97 – 98 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.33 (d, *J* = 4.4 Hz, 1H), 7.65 (d, *J* = 7.8 Hz, 1H), 7.55 (d, *J* = 8.2 Hz, 2H), 7.50 – 7.43 (m, 4H), 7.39 – 7.33 (m, 3H), 7.23 – 7.10 (m, 17H), 7.03 – 6.97 (m, 4H), 5.80 (s, 1H), 4.22 – 4.18 (m, 4H), 3.67 (q, *J* = 7.0 Hz, 1H), 1.58 (d, *J* = 7.1 Hz, 3H), 1.25 (t, *J* = 6.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 171.2, 170.0, 168.6, 159.9 (d, *J* = 249.1 Hz), 154.8, 153.5, 148.1, 142.3, 142.3, 138.6, 136.3, 135.6, 135.2, 134.3, 132.1, 131.2 (d, *J* = 3.4 Hz), 130.6, 129.0, 128.9 (d, *J* = 2.7 Hz), 128.5, 127.8, 127.5, 124.4, 123.9, 123.5 (d, *J* = 3.3 Hz), 122.0, 118.4, 115.2 (d, *J* = 23.5 Hz), 61.1, 48.9, 47.6, 18.6, 14.1. **^{19}F NMR ($CDCl_3$, 471 MHz):** δ -116.7. **HRMS (ESI):** Calcd for $C_{51}H_{44}FN_3NaO_4Si$ $[M+Na]^+$ 832.2977, found: 832.2983.



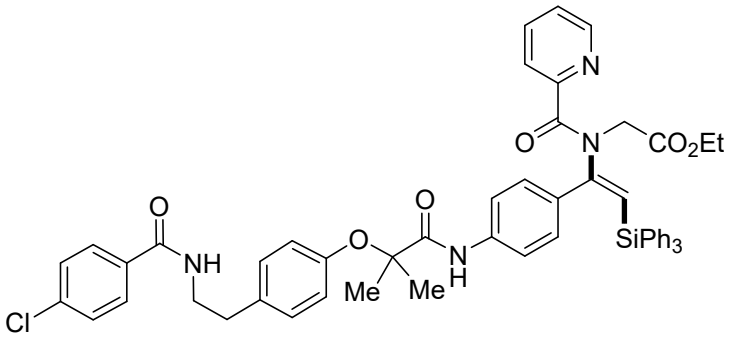
ethyl (*E*)-*N*-(1-(4-(2-(1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1H-indol-3-yl)acetamido)phenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (7l)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/1) as a yellow solid in 41% yield (75.6 mg, 0.082 mmol). Mp: 112 – 113 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.32 (d, *J* = 4.4 Hz, 1H), 7.69 (d, *J* = 8.5 Hz, 2H), 7.65 (d, *J* = 7.8 Hz, 1H), 7.51 – 7.48 (m, 3H), 7.32 (d, *J* = 8.5 Hz, 2H), 7.23 – 7.18 (m, 3H), 7.16 – 7.10 (m, 11H), 7.06 (s, 1H), 7.00 (dd, *J* = 6.9, 5.0 Hz, 1H), 6.94 – 6.86 (m, 4H), 6.73 (dd, *J* = 9.1, 2.5 Hz, 1H), 5.79 (s, 1H), 4.25 – 4.13 (m, 4H), 3.83 (s, 3H), 3.75 (s, 2H), 2.45 (s, 3H), 1.27 – 1.25 (m, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 168.6, 168.3, 156.4, 154.8, 153.6, 148.0, 139.7, 138.1, 137.3, 136.6, 136.3, 135.6, 134.3, 133.5, 132.3, 131.2, 131.0, 130.6, 130.1, 129.3, 129.0, 127.5, 126.4, 124.4, 123.9, 118.6, 115.2, 112.3, 112.2, 101.0, 100.0, 61.1, 55.8, 48.8, 33.4, 14.2, 13.3. **HRMS (ESI):** Calcd for $C_{55}H_{47}ClN_4NaO_6Si$ $[M+Na]^+$ 945.2846, found: 945.2850.



ethyl N-((*E*)-1-(4-((*R*)-4-((5*S*,8*R*,9*S*,10*S*,13*R*,14*S*,17*R*)-10,13-dimethyl-3,7,12-trioxohexadecahydro-1*H*-cyclopenta[*a*]phenanthren-17-yl)pentanamido)phenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (7m)

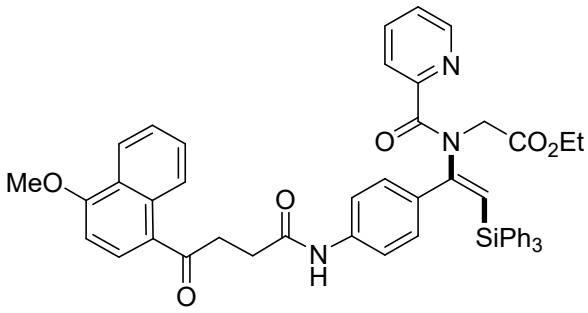
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/1) as a yellow solid in 26% yield (50.3 mg, 0.052 mmol). Mp: 133 – 134 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.27 (d, *J* = 4.3 Hz, 1H), 7.69 – 7.66 (m, 2H), 7.51 (t, *J* = 7.7 Hz, 1H), 7.31 – 7.27 (m, 3H), 7.23 (d, *J* = 7.7 Hz, 1H), 7.20 – 7.17 (m, 6H), 7.14 – 7.13 (m, 6H), 6.99 (dd, *J* = 6.9, 5.1 Hz, 1H), 6.95 – 6.92 (m, 2H), 6.57 (s, 1H), 5.84 (s, 1H), 4.24 – 4.16 (m, 4H), 2.93 – 2.82 (m, 3H), 2.38 – 2.12 (m, 12H), 2.08 – 1.80 (m, 8H), 1.65 – 1.58 (m, 1H), 1.39 (s, 3H), 1.27 – 1.24 (m, 3H), 1.08 (s, 3H), 0.89 (d, *J* = 6.4 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 212.0, 208.9, 208.7, 171.0, 169.9, 168.6, 155.1, 153.4, 148.1, 137.3, 136.3, 135.6, 134.5, 129.2, 128.7, 127.6, 125.4, 124.4, 123.9, 121.2, 121.0, 61.1, 56.9, 51.8, 49.0, 46.8, 45.6, 45.5, 45.0, 42.8, 38.6, 36.4, 36.0, 35.4, 35.3, 34.4, 30.8, 27.6, 25.1, 21.9, 18.8, 14.1, 11.9. **HRMS (ESI):** Calcd for $C_{60}H_{65}N_3NaO_7Si$ $[M+Na]^+$ 990.4484, found: 990.4489.



ethyl (*E*)-*N*-(1-(4-(2-(4-(2-(4-chlorobenzamido)ethyl)phenoxy)-2-methylpropanamido)phenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (7n)

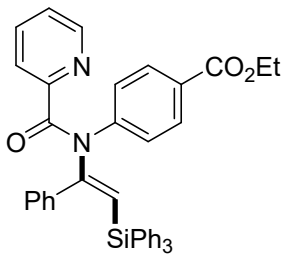
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/1) as a yellow solid in 37% yield (68.5 mg, 0.074 mmol). Mp: 92 – 93 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.35 – 8.34 (m, 2H), 7.67 (d, *J* = 7.8 Hz, 1H), 7.63 – 7.62 (m, *J* = 8.5 Hz, 3H), 7.51 (t, *J* = 7.7 Hz, 1H), 7.39 – 7.36 (m, 4H), 7.24 – 7.21 (m, 3H), 7.20 – 7.13 (m, 13H), 7.08 (d, *J* = 8.5 Hz, 2H), 7.01 (dd, *J* = 7.1, 4.9 Hz, 1H), 6.92 (d, *J* = 8.4 Hz, 2H), 6.12 – 6.07 (m, 1H), 5.81 (s, 1H), 4.31 – 4.14 (m,

4H), 3.71 – 3.67 (m, 2H), 2.92 (t, *J* = 7.0 Hz, 2H), 1.55 (s, 6H), 1.27 (t, *J* = 7.2 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 172.6, 170.0, 168.6, 166.4, 154.8, 153.5, 152.6, 148.1, 138.2, 137.7, 136.3, 135.6, 134.3, 132.9, 132.2, 130.7, 129.7, 129.0, 128.8, 128.2, 127.5, 124.4, 123.9, 122.1, 121.8, 118.5, 81.9, 61.1, 48.9, 41.3, 34.9, 24.9, 14.1. **HRMS (ESI):** Calcd for $C_{55}H_{51}ClN_4NaO_6Si$ $[M+Na]^+$ 949.3159, found: 949.3163.



ethyl (*E*)-*N*-(1-(4-(4-(4-methoxynaphthalen-1-yl)-4-oxobutanamido)phenyl)-2-(triphenylsilyl)vinyl)-*N*-picolinoylglycinate (7o)

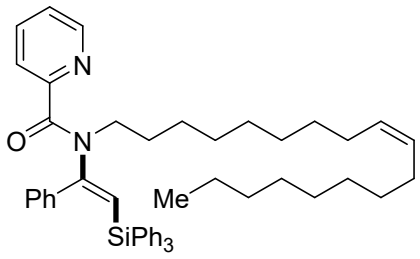
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/1) as a yellow solid in 61% yield (100.4 mg, 0.122 mmol). Mp: 85 – 86 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.95 (d, *J* = 8.7 Hz, 1H), 8.35 – 8.30 (m, 2H), 8.12 (d, *J* = 8.2 Hz, 1H), 7.67 – 7.61 (m, 3H), 7.53 (t, *J* = 7.6 Hz, 1H), 7.48 (t, *J* = 7.7 Hz, 1H), 7.34 (d, *J* = 8.3 Hz, 2H), 7.25 – 7.21 (m, 3H), 7.19 – 7.11 (m, 12H), 7.04 (d, *J* = 8.1 Hz, 2H), 6.99 (dd, *J* = 7.0, 5.0 Hz, 1H), 6.82 (d, *J* = 8.3 Hz, 1H), 5.80 (s, 1H), 4.23 – 4.19 (m, 4H), 4.07 (s, 3H), 3.50 (t, *J* = 6.2 Hz, 2H), 2.81 (t, *J* = 5.9 Hz, 2H), 1.26 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 200.9, 170.0, 168.6, 159.5, 155.0, 153.6, 148.1, 136.2, 135.6, 135.0, 134.3, 132.0, 131.4, 130.6, 129.0, 128.8, 127.9, 127.5, 126.7, 125.9, 125.9, 125.8, 124.4, 123.9, 122.2, 121.7, 118.4, 102.2, 61.1, 55.8, 48.9, 36.2, 32.1, 14.1. **HRMS (ESI):** Calcd for $C_{51}H_{45}N_3NaO_6Si$ $[M+Na]^+$ 846.2970, found: 846.2972.



ethyl (*E*)-4-(*N*-(1-phenyl-2-(triphenylsilyl)vinyl)picolinamido)benzoate (7p)

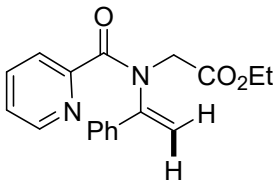
The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 77% yield (97.1 mg, 0.154 mmol). Mp: 117 – 118 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.41 (d, *J* = 4.4 Hz, 1H), 7.98 (d, *J* = 8.6 Hz, 2H), 7.68 (d, *J* = 7.8 Hz, 1H), 7.50 (t, *J* = 7.1 Hz, 1H), 7.41 (t, *J* = 8.6 Hz, 4H), 7.32 – 7.28 (m, 3H), 7.25 – 7.17 (m, 13H), 7.06 (dd, *J* = 7.0,

5.1 Hz, 1H), 6.88 (t, *J* = 7.4 Hz, 1H), 6.77 (t, *J* = 7.7 Hz, 2H), 5.98 (s, 1H), 4.33 (q, *J* = 7.1 Hz, 2H), 1.35 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.0, 165.9, 155.8, 154.0, 148.1, 136.4, 136.3, 135.5, 134.1, 130.2, 129.8, 129.2, 128.7, 127.9, 127.6, 127.2, 126.3, 124.7, 124.2, 123.9, 60.9, 14.2. **HRMS (ESI):** Calcd for $C_{41}H_{34}N_2NaO_3Si$ $[M+Na]^+$ 653.2231, found: 653.2233.



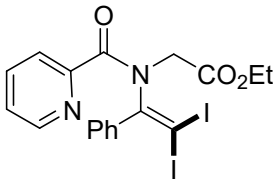
_N_-((_Z_)-octadec-9-en-1-yl)-_N_-((_E_)-1-phenyl-2-(triphenylsilyl)vinyl)picolinamide (7q)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/3) as a yellow solid in 42% yield (61.5 mg, 0.084 mmol). Mp: 94 – 95 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.40 (d, *J* = 4.5 Hz, 1H), 7.67 (d, *J* = 7.8 Hz, 1H), 7.54 (t, *J* = 7.7 Hz, 1H), 7.47 (d, *J* = 7.9 Hz, 2H), 7.36 – 7.34 (m, 4H), 7.24 – 7.23 (m, 11H), 7.09 (t, *J* = 7.3 Hz, 1H), 7.05 (dd, *J* = 7.2, 5.1 Hz, 1H), 6.97 (t, *J* = 7.6 Hz, 2H), 5.72 (s, 1H), 5.44 – 5.42 (m, 2H), 3.61 – 3.61 (m, 2H), 2.09 – 2.04 (m, 4H), 1.79 – 1.73 (m, 2H), 1.41 – 1.33 (m, 22H), 0.96 (t, *J* = 6.8 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.5, 156.1, 154.9, 148.0, 136.5, 136.1, 135.6, 134.4, 129.9, 129.8, 129.7, 129.1, 128.9, 127.5, 127.5, 123.9, 123.5, 122.3, 46.4, 32.6, 31.9, 29.8, 29.7, 29.7, 29.5, 29.4, 29.4, 29.3, 27.7, 27.2, 27.2, 26.9, 22.7, 14.1. **HRMS (ESI):** Calcd for $C_{50}H_{60}N_2NaOSi$ $[M+Na]^+$ 755.4367, found: 755.4369.



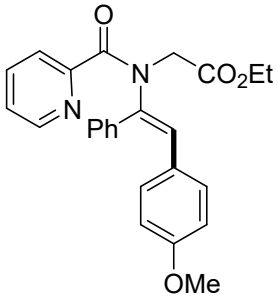
ethyl _N_-(1-phenylvinyl)-_N_-picolinoylglycinate (8)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 78% yield (48.4 mg, 0.156 mmol). Mp: 42 – 43 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.40 (s, 1H), 7.68 – 7.54 (m, 4H), 7.33 – 7.30 (m, 3H), 7.20 (s, 1H), 5.23 (s, 1H), 4.99 (s, 1H), 4.29 (s, 2H), 4.23 (q, *J* = 6.9 Hz, 2H), 1.28 (t, *J* = 7.0 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 168.6, 148.2, 136.3, 136.2, 128.8, 128.4, 127.3, 124.5, 123.6, 112.4, 61.2, 49.4, 14.1. **HRMS (ESI):** Calcd for $C_{18}H_{18}N_2NaO_3$ $[M+Na]^+$ 333.1210, found: 333.1206.



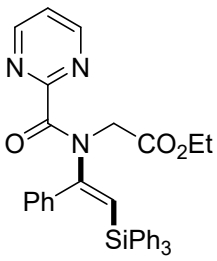
ethyl _N_-(2,2-diiodo-1-phenylvinyl)-_N_-picolinoylglycinate (9)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 85% yield (95.5 mg, 0.170 mmol). Mp: 67 – 68 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.54 (d, *J* = 4.5 Hz, 1H), 8.13 (d, *J* = 7.9 Hz, 1H), 7.99 (dd, *J* = 7.5, 2.0 Hz, 2H), 7.83 (t, *J* = 7.7 Hz, 1H), 7.43 – 7.38 (m, 4H), 4.23 (d, *J* = 16.8 Hz, 1H), 4.11 – 4.06 (m, 2H), 3.93 (d, *J* = 16.8 Hz, 1H), 1.19 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 167.7, 167.5, 153.3, 152.4, 147.0, 136.5, 136.5, 131.7, 129.7, 128.2, 125.6, 125.5, 61.2, 48.8, 14.1. **HRMS (ESI):** Calcd for $C_{18}H_{16}I_2N_2NaO_3$ $[M+Na]^+$ 584.9142, found: 584.9152.



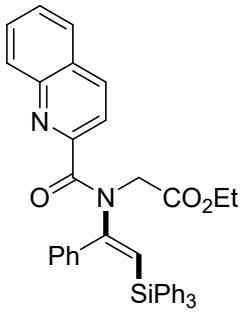
ethyl (*E*)-*N*-(2-(4-methoxyphenyl)-1-phenylvinyl)-*N*-picolinoylglycinate (11)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 71% yield (59.1 mg, 0.142 mmol). Mp: 55 – 56 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.48 (d, *J* = 4.2 Hz, 1H), 7.79 (d, *J* = 7.8 Hz, 1H), 7.66 – 7.59 (m, 3H), 7.31 – 7.26 (m, 3H), 7.16 – 7.12 (m, 1H), 6.83 (d, *J* = 8.6 Hz, 2H), 6.58 (d, *J* = 8.7 Hz, 2H), 6.28 (s, 1H), 4.23 (q, *J* = 7.1 Hz, 2H), 4.14 (s, 2H), 3.69 (s, 3H), 1.29 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.7, 168.7, 158.6, 153.7, 148.0, 139.4, 136.4, 134.9, 130.8, 130.2, 128.6, 128.4, 128.3, 128.0, 124.4, 124.0, 113.4, 61.1, 55.0, 48.1, 14.2. **HRMS (ESI):** Calcd for $C_{25}H_{24}N_2NaO_4$ $[M+Na]^+$ 439.1628, found: 439.1626.



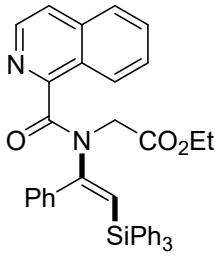
ethyl (*E*)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)-*N*-(pyrimidine-2-carbonyl)glycinate (4a-1)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 65% yield (74.0 mg, 0.130 mmol). Mp: 131 – 132 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.38 (d, *J* = 4.8 Hz, 2H), 7.38 (d, *J* = 7.3 Hz, 2H), 7.29 – 7.27 (m, 3H), 7.20 – 7.12 (m, 12H), 7.01 (t, *J* = 7.4 Hz, 1H), 6.88 (t, *J* = 7.7 Hz, 2H), 6.74 (t, *J* = 4.8 Hz, 1H), 5.95 (s, 1H), 4.25 – 4.21 (m, 4H), 1.28 (t, *J* = 7.2 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 168.2, 167.5, 162.2, 156.4, 154.2, 135.6, 135.0, 133.9, 129.8, 129.4, 129.2, 127.7, 127.6, 123.2, 120.4, 61.3, 47.9, 14.2. **HRMS (ESI):** Calcd for $C_{35}H_{31}N_3NaO_3Si$ $[M+Na]^+$ 592.2027, found: 592.2031.



ethyl (*E*)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)-*N*-(quinoline-2-carbonyl)glycinate (4a-2)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 43% yield (53.2 mg, 0.086 mmol). Mp: 126 – 127 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.38 (d, *J* = 7.8 Hz, 1H), 8.31 (d, *J* = 5.6 Hz, 1H), 7.66 – 7.61 (m, 3H), 7.40 – 7.38 (m, 3H), 7.22 – 7.19 (m, 3H), 7.06 – 7.03 (m, 6H), 6.96 – 6.92 (m, 7H), 6.83 (t, *J* = 7.6 Hz, 2H), 5.99 (s, 1H), 4.37 (s, 2H), 4.32 (q, *J* = 7.1 Hz, 2H), 1.35 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 169.1, 168.7, 154.9, 154.9, 141.0, 136.1, 136.0, 135.3, 134.0, 130.3, 129.7, 129.0, 128.9, 128.0, 127.5, 127.4, 127.1, 126.6, 126.4, 121.4, 121.4, 61.3, 48.4, 14.2. **HRMS (ESI):** Calcd for $C_{40}H_{35}N_2O_3Si$ $[M+H]^+$ 619.2411, found: 619.2406.



ethyl (*E*)-*N*-(isoquinoline-1-carbonyl)-*N*-(1-phenyl-2-(triphenylsilyl)vinyl)glycinate (4a-3)

The title compound was isolated by column chromatography (eluent: EtOAc/petroleum ether = 1/5) as a yellow solid in 51% yield (63.1 mg, 0.102 mmol). Mp: 118 – 119 °C. **^{1}H NMR ($CDCl_3$, 500 MHz):** δ 8.05 (d, *J* = 8.5 Hz, 1H), 7.89 (d, *J* = 8.4 Hz, 1H), 7.74 – 7.66 (m, 2H), 7.64 (d, *J* = 8.4 Hz, 1H), 7.55 – 7.50 (m, 3H), 7.23 – 7.20 (m, 3H), 7.10 – 6.97 (m, 13H), 6.88 (t, *J* = 7.6 Hz, 2H), 5.90 (s, 1H), 4.33 (s, 2H), 4.27 (q, *J* = 7.1 Hz, 2H), 1.31 (t, *J* = 7.1 Hz, 3H). **^{13}C NMR ($CDCl_3$, 125 MHz):** δ 170.4, 168.7, 155.3, 153.6, 146.6, 136.5, 135.9, 135.4, 133.9, 129.8, 129.8, 129.6, 129.1, 128.9, 128.1, 127.7, 127.4, 127.4, 127.2, 122.8, 120.6, 61.1, 48.7, 14.2. **HRMS (ESI):** Calcd for $C_{40}H_{34}N_2NaO_3Si$ $[M+Na]^+$ 641.2231, found: 641.2228.

7. References:

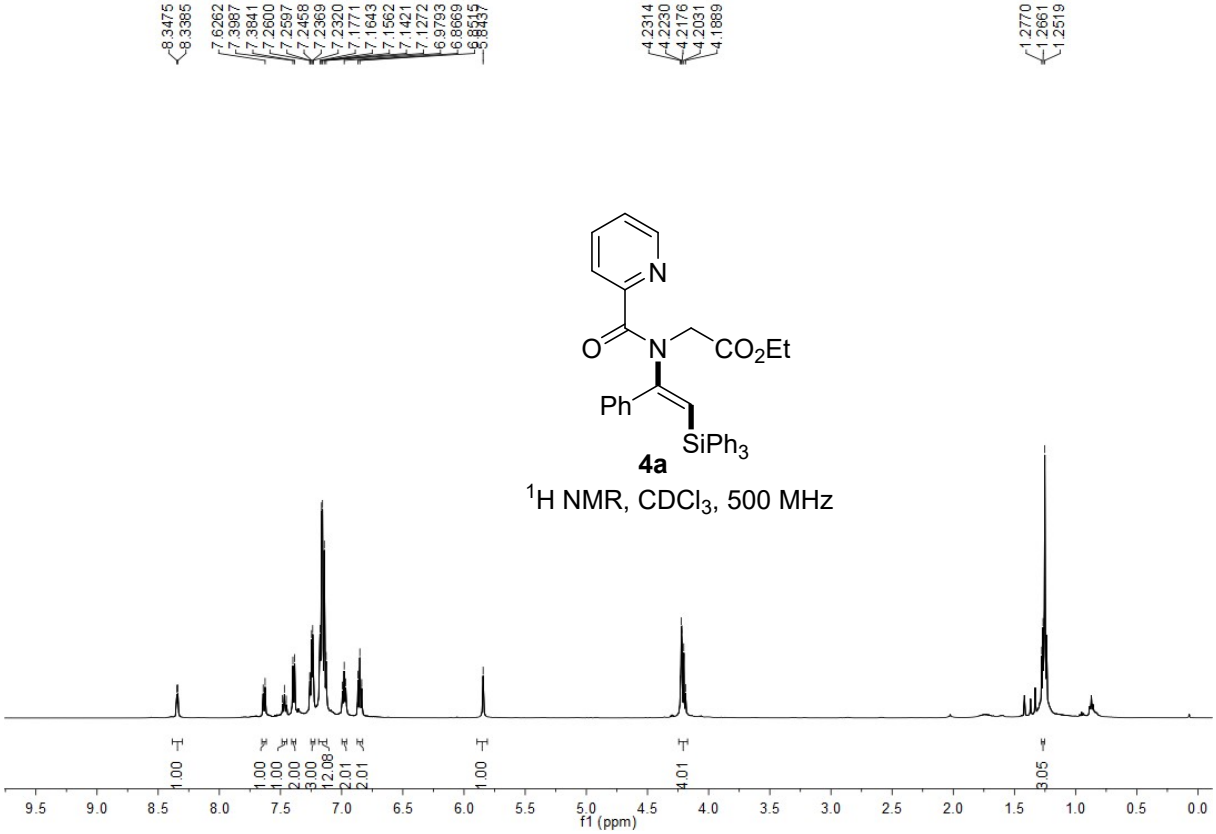
(1) (a) Li, K.; Tan, G.; Huang, J.; Song, F.; You, J. *Angew. Chem., Int. Ed.* **2013**, *52*, 12942−12945. (b) Tan, M.; Li, K.; Yin, J.; You, J. *Chem. Commun.* **2018**, *54*, 1221–1224.

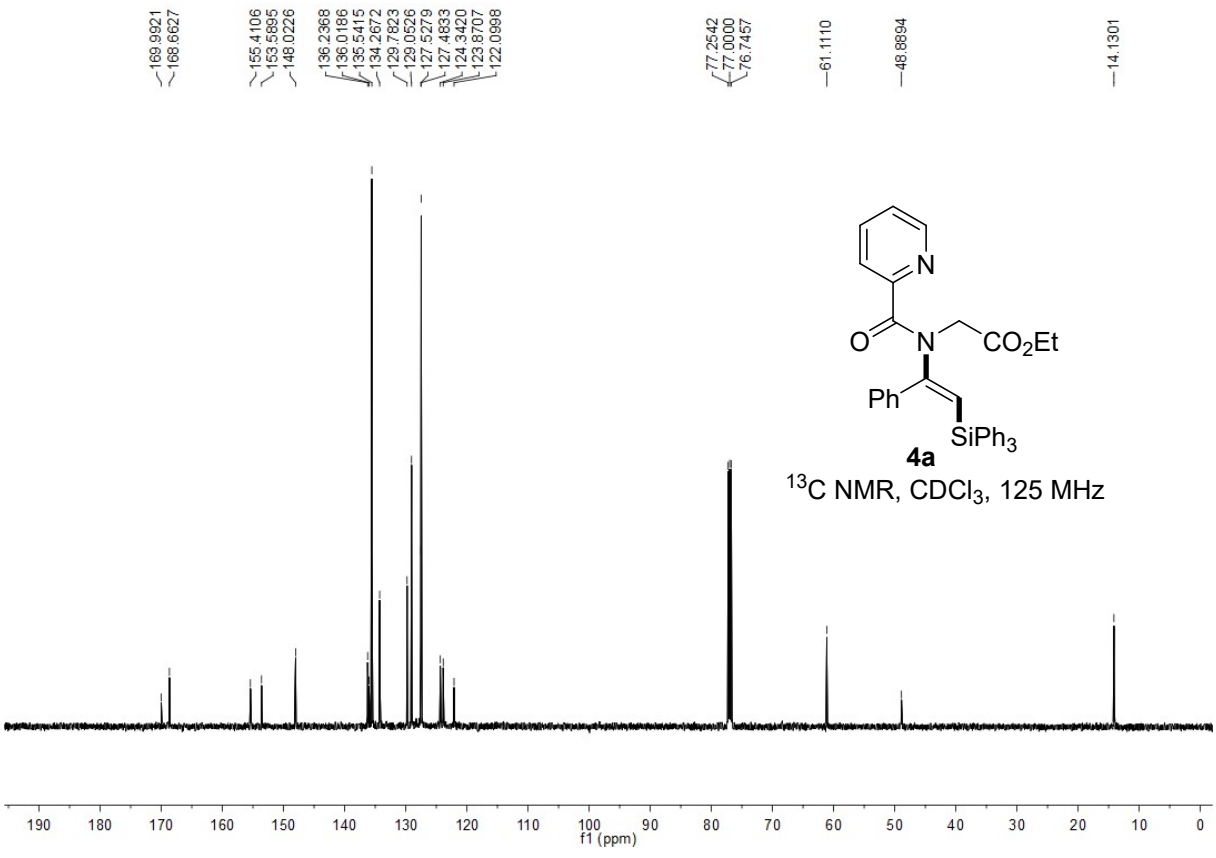
(2) Zheng, N.; Song, W.; Zhang, T.; Li, M.; Zheng, Y.; Chen, L. *J. Org. Chem.* **2018**, *83*, 6210−6216.

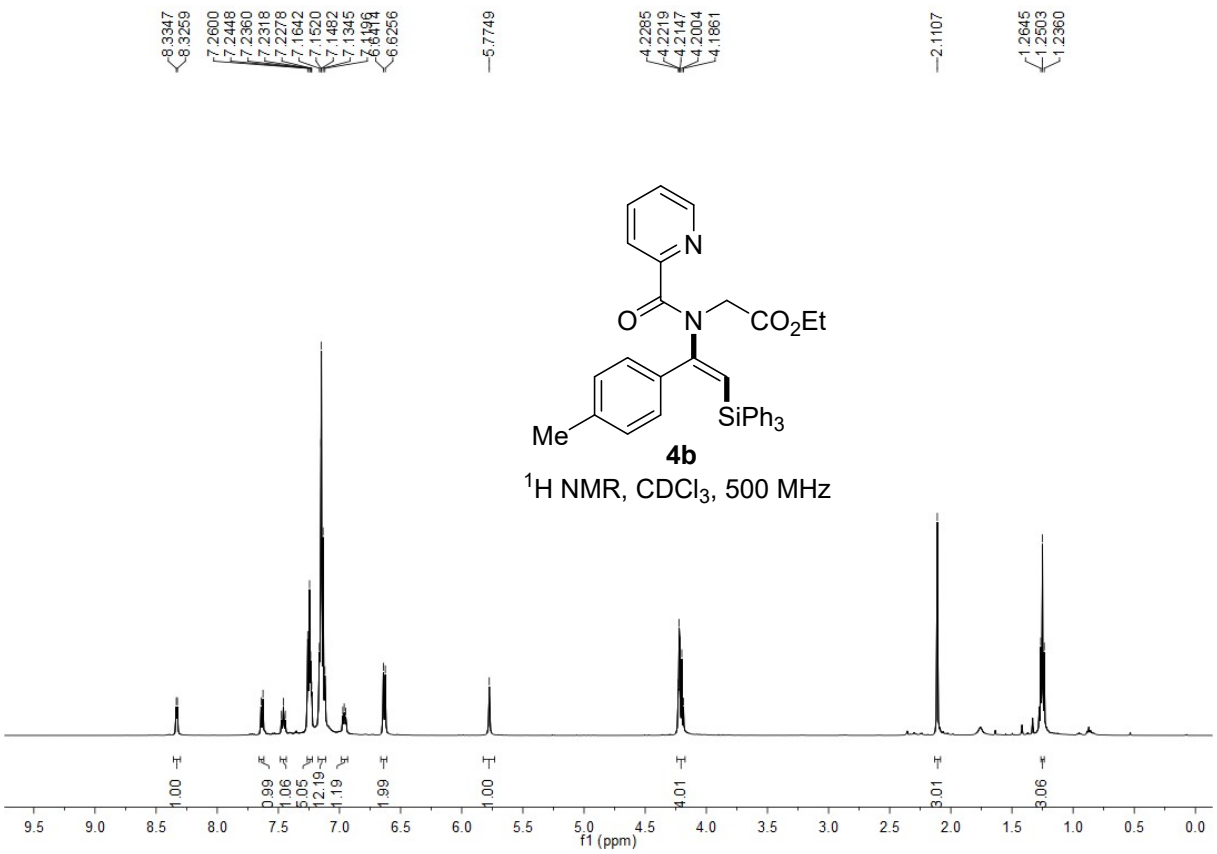
(3) Chang, X.-H.; Wang, Z.-L.; Zhao, M.; Yang, C.; Li, J.-J.; Ma, W.-W.; Xu, Y.-H. *Org. Lett.* **2020**, *22*, 1326−1330.

(4) Song, L.-J.; Ding, S.; Wang, Y.; Zhang, X.; Wu, Y.-D.; Sun, J. *J. Org. Chem.* **2016**, *81*, 6157−6164.

8. NMR Spectra



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7.2448
7.2360
7.2318
7.2278
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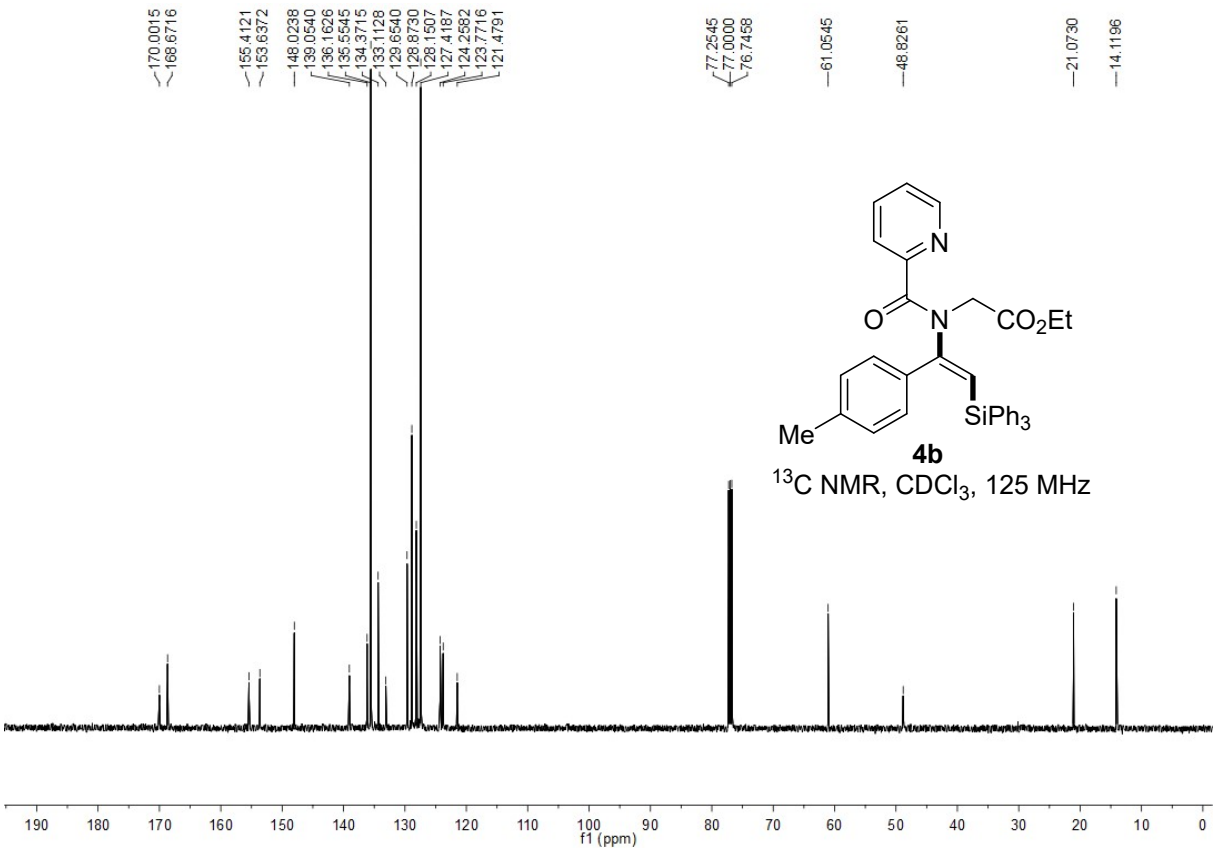
7.1345
6.6256
5.7749
4.2285
4.2219
4.2147
4.2004
4.1861
2.1107
1.2645
1.2503
1.2360
N
O
N
CO2Et
SiPh3
Me
4b
1H NMR, CDCl3, 500 MHz
1.00
0.99
1.06
5.05
2.19
1.19
1.99
1.00
4.01
3.01
3.06
f1 (ppm)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136.1626
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129.6540
128.8730
128.1507
127.4187
124.2582
123.7716
121.4791
77.2545
77.0000
76.7458
61.0545
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CO2Et
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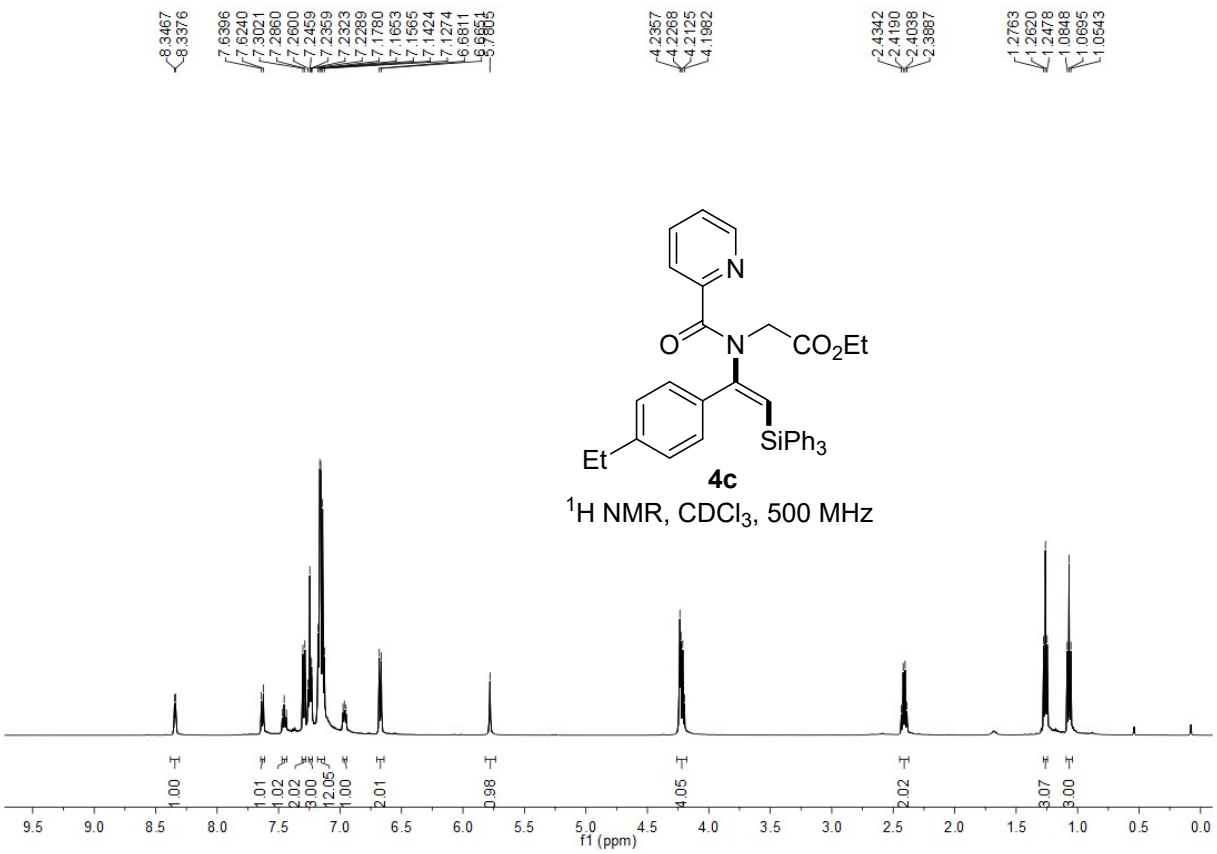
Me
4b
13C NMR, CDCl3, 125 MHz
f1 (ppm)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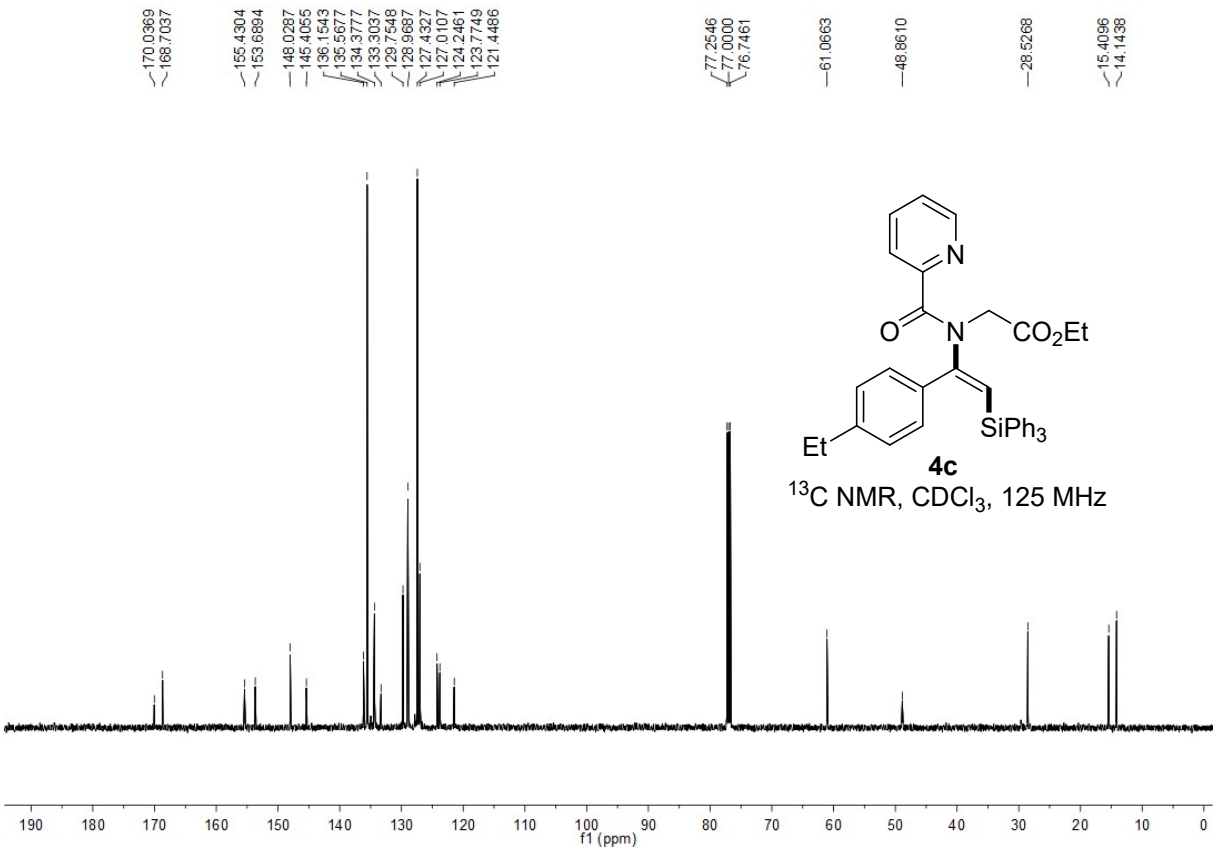
7.2289
7.1780
7.1653
7.1565
7.1424
7.1274
6.6811
6.6651
5.7805
4.2357
4.2268
4.2125
4.1982
2.4342
2.4190
2.4038
2.3887
1.2763
1.2620
1.2478
1.0848
1.0695
1.0543
N
O
N
CO2Et
Et
SiPh3
4c
1H NMR, CDCl3, 500 MHz
1.00
1.01
1.02
2.02
3.00
12.05
1.00
2.01
0.98
4.05
2.02
3.07
3.00
f1 (ppm)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123.7749
121.4486
77.2546
77.0000
76.7461
61.0663
48.8610
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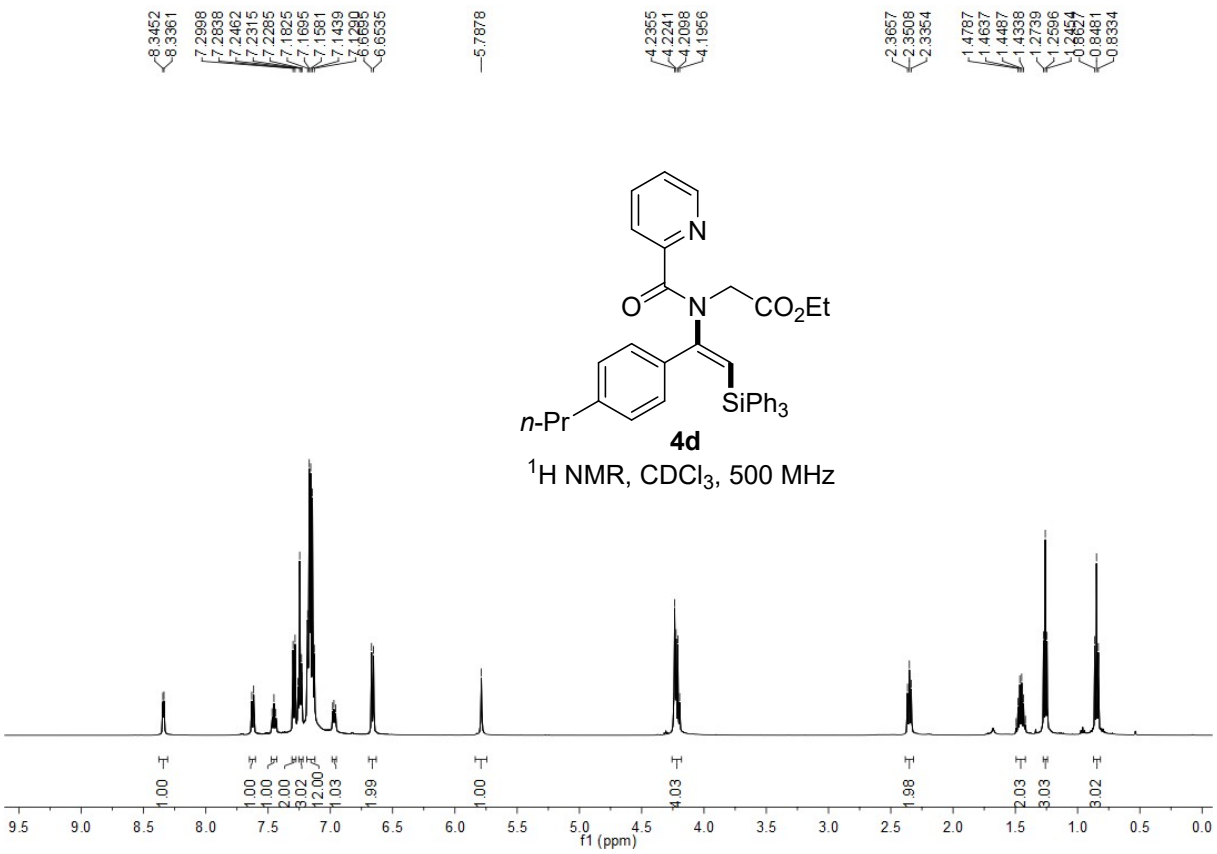
N
CO2Et
Et
SiPh3
4c
13C NMR, CDCl3, 125 MHz
f1 (ppm)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2.3354
1.4787
1.4637
1.4487
1.4338
1.2739
1.2596
1.2454
0.8627
0.8481
0.8334
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O
N
CO2Et
SiPh3
n-Pr
4d
1H NMR, CDCl3, 500 MHz
1.00
1.00
1.00
2.00
3.02
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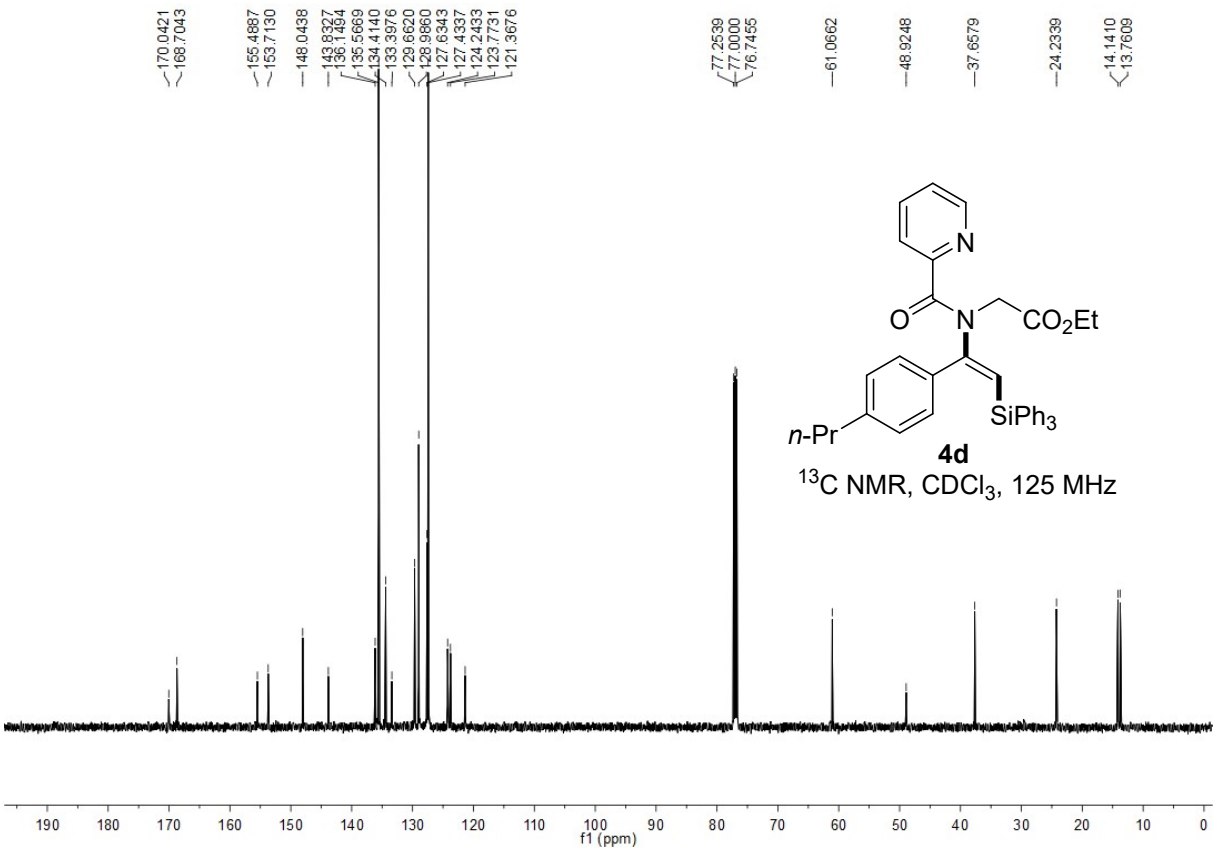
1.98
2.03
3.03
3.02
f1 (ppm)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123.7731
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77.0000
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61.0662
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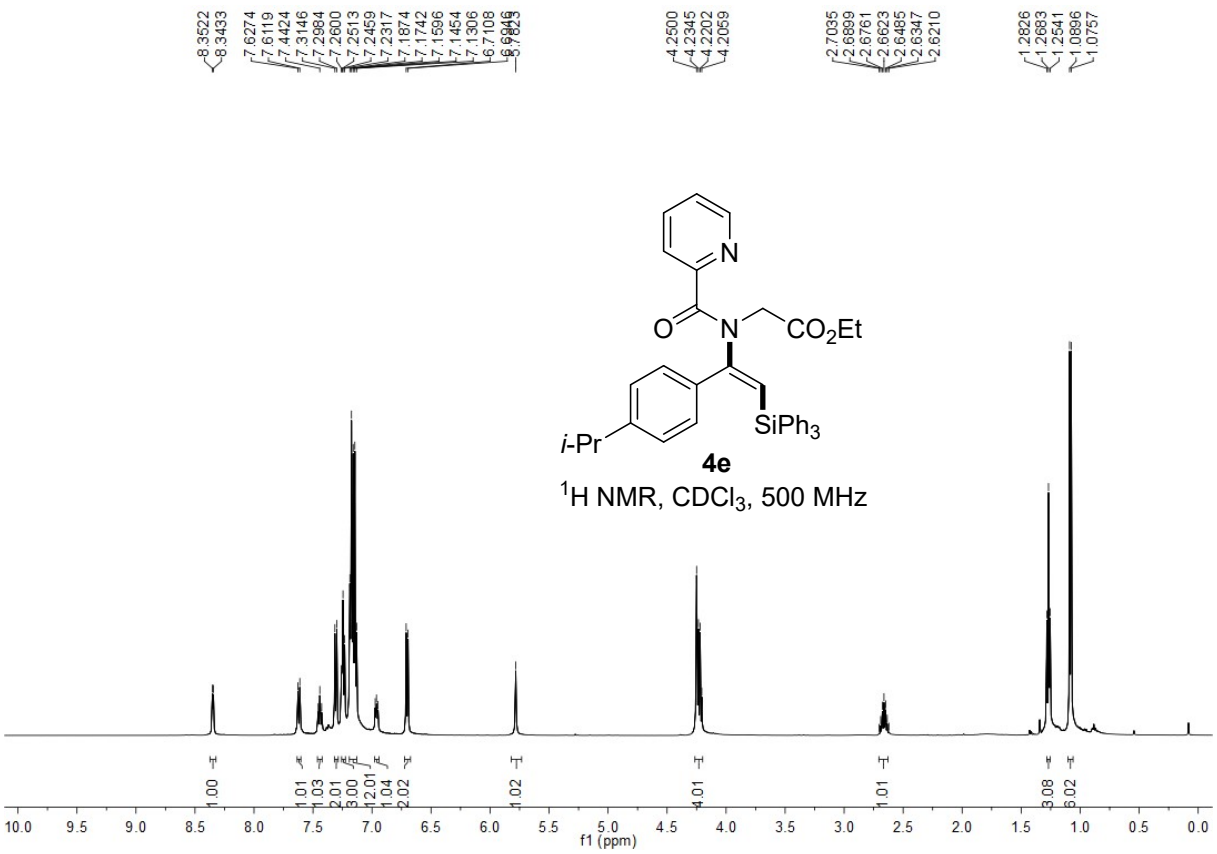
n-Pr
4d
13C NMR, CDCl3, 125 MHz
f1 (ppm)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2.6761
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2.6347
2.6210
1.2826
1.2683
1.2541
1.0896
1.0757
N
O
N
CO2Et
SiPh3
i-Pr
4e
1H NMR, CDCl3, 500 MHz
1.00
1.01
1.03
2.01
3.00
12.01
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1.02
4.01
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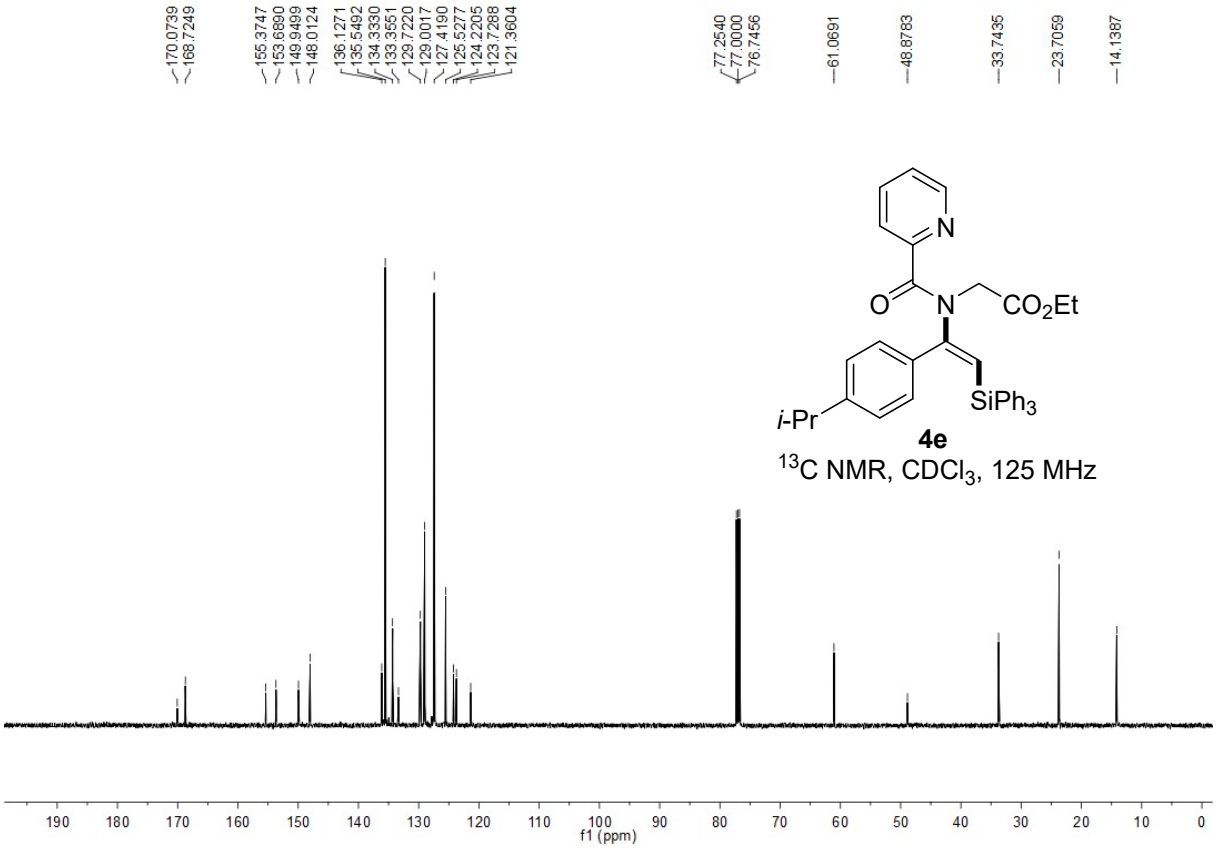
6.02
f1 (ppm)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33.7435
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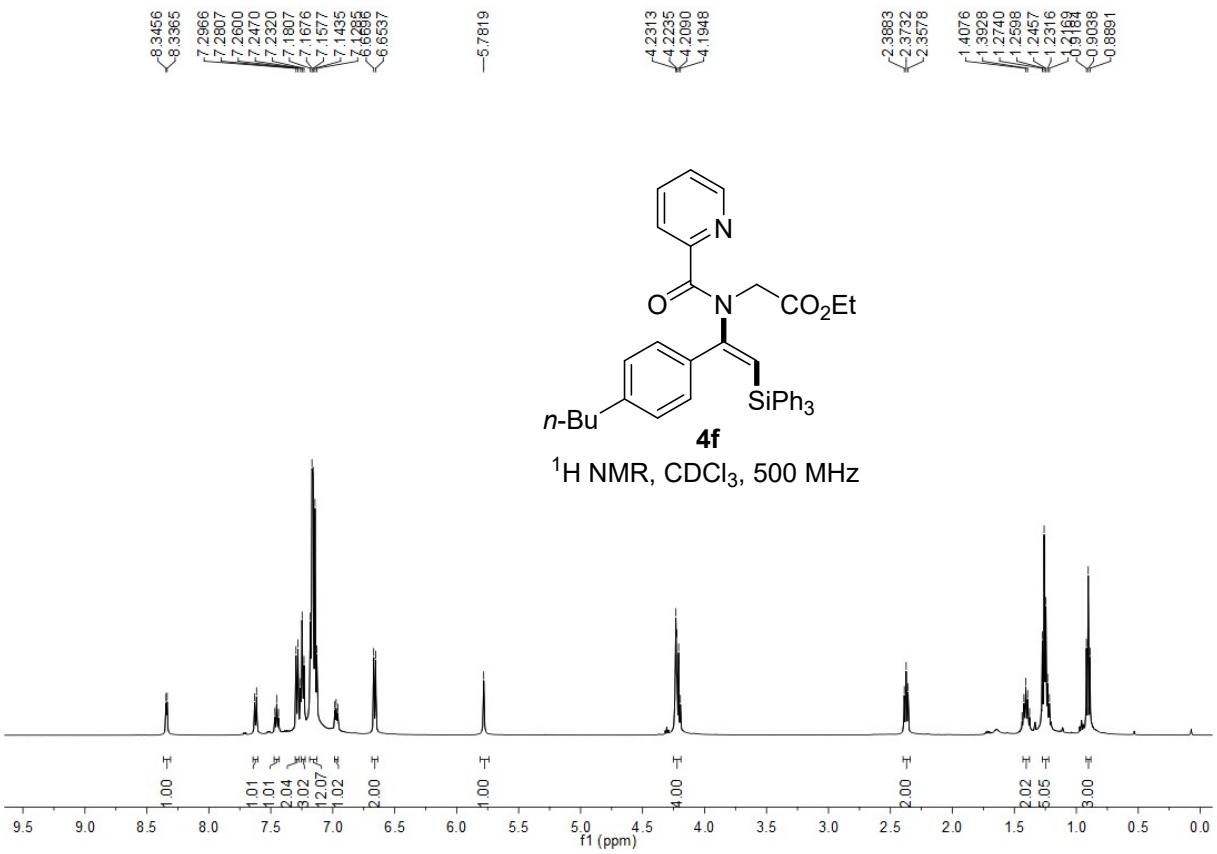
4e
13C NMR, CDCl3, 125 MHz
f1 (ppm)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7.1435
7.1285
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6.6537
5.7819
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4.2235
4.2090
4.1948
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2.3732
2.3578
1.4076
1.3928
1.2740
1.2598
1.2457
1.2316
0.9184
0.9038
0.8891
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O
N
CO2Et
SiPh3
n-Bu
4f
1H NMR, CDCl3, 500 MHz
1.00
1.01
1.01
2.04
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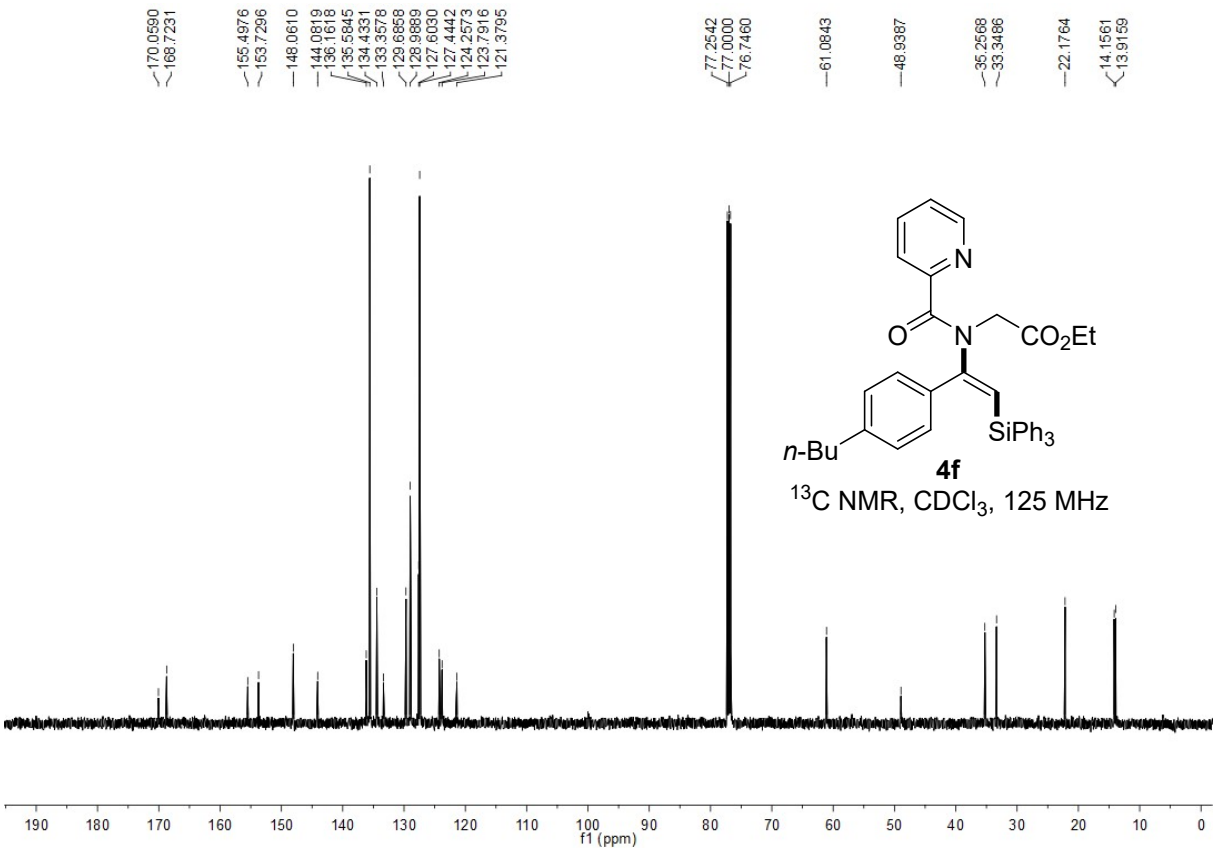
3.00
f1 (ppm)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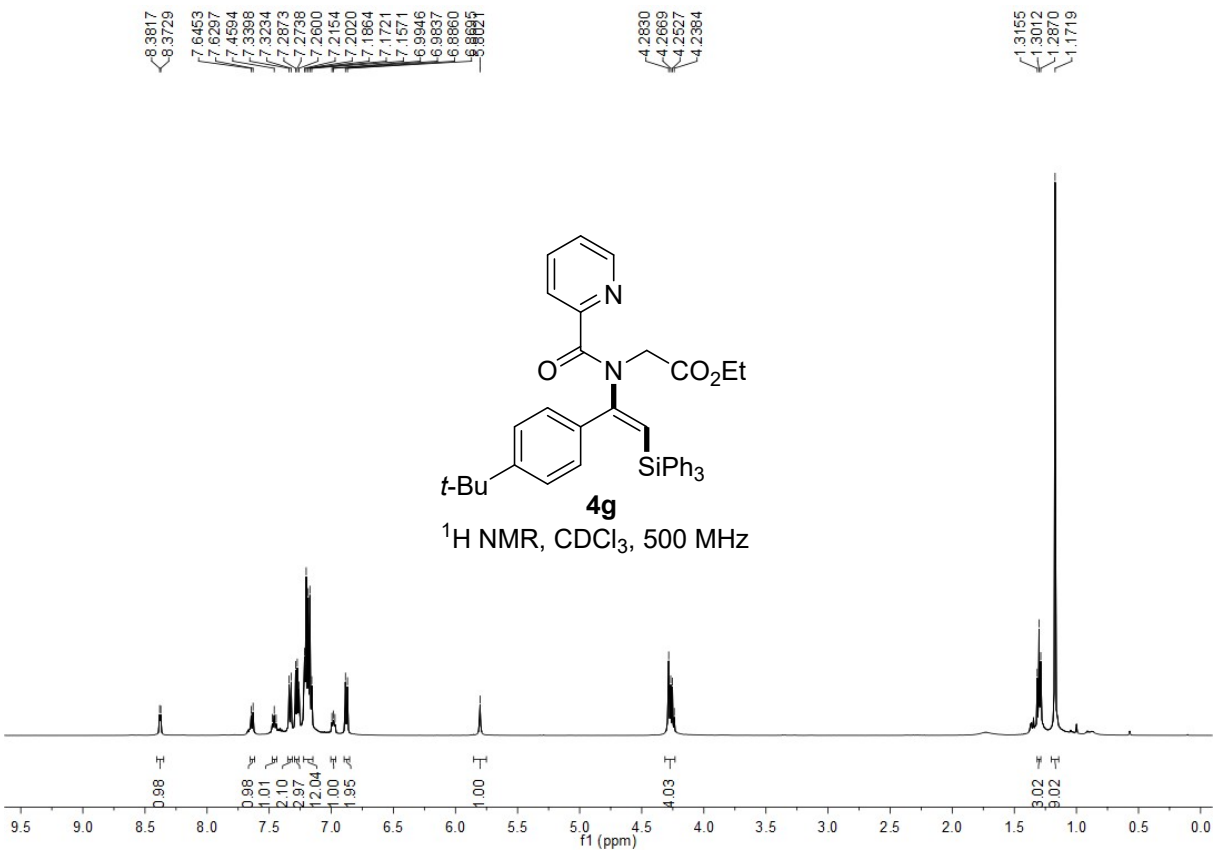
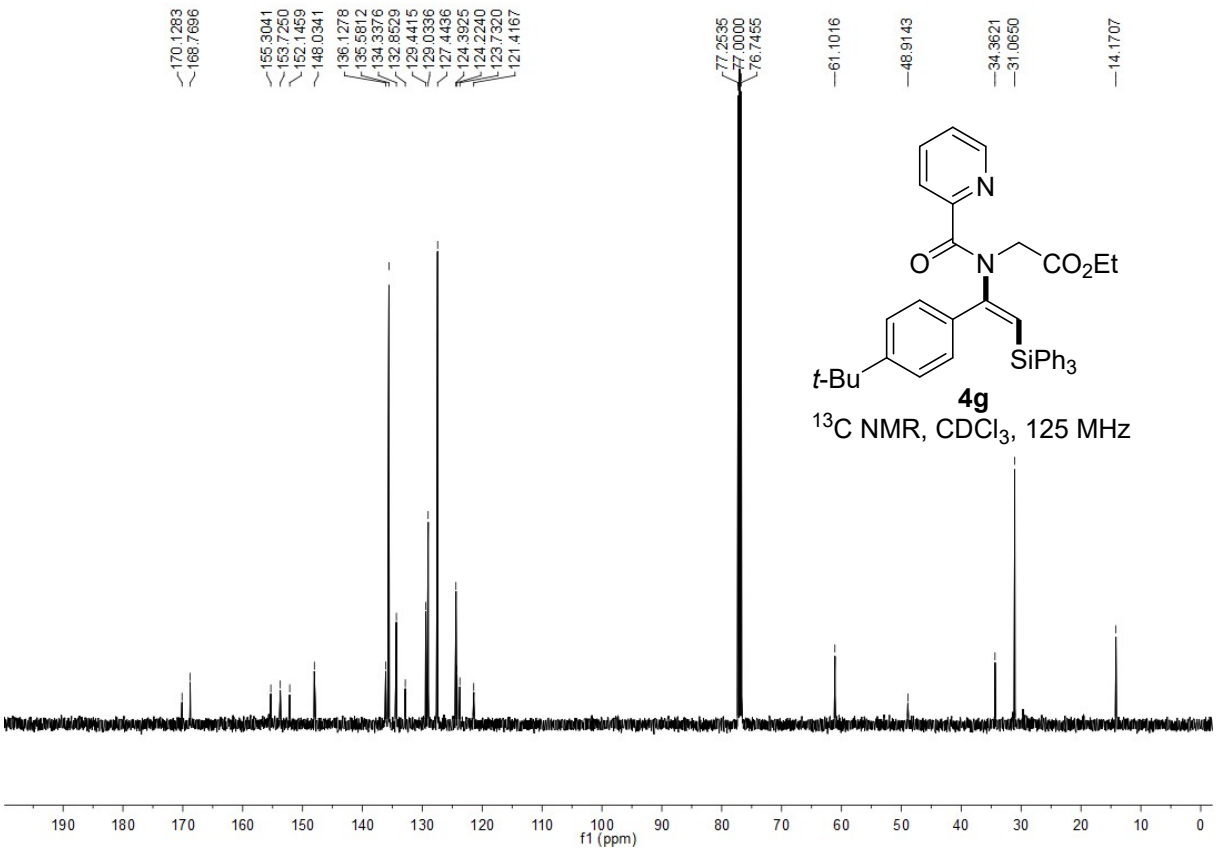
13C NMR, CDCl3, 125 MHz
f1 (ppm)



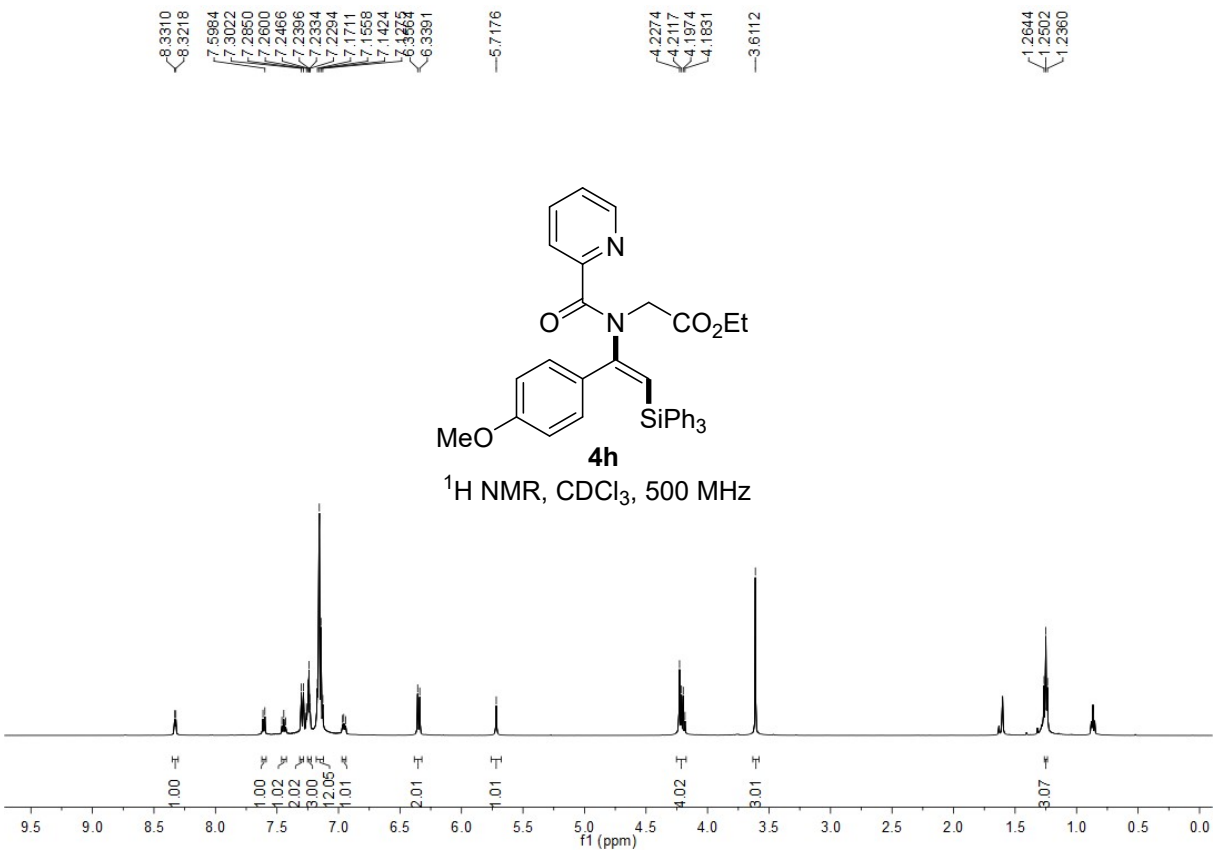
4g

^{1}H NMR, $CDCl_3$, 500 MHz



4g

^{13}C NMR, $CDCl_3$, 125 MHz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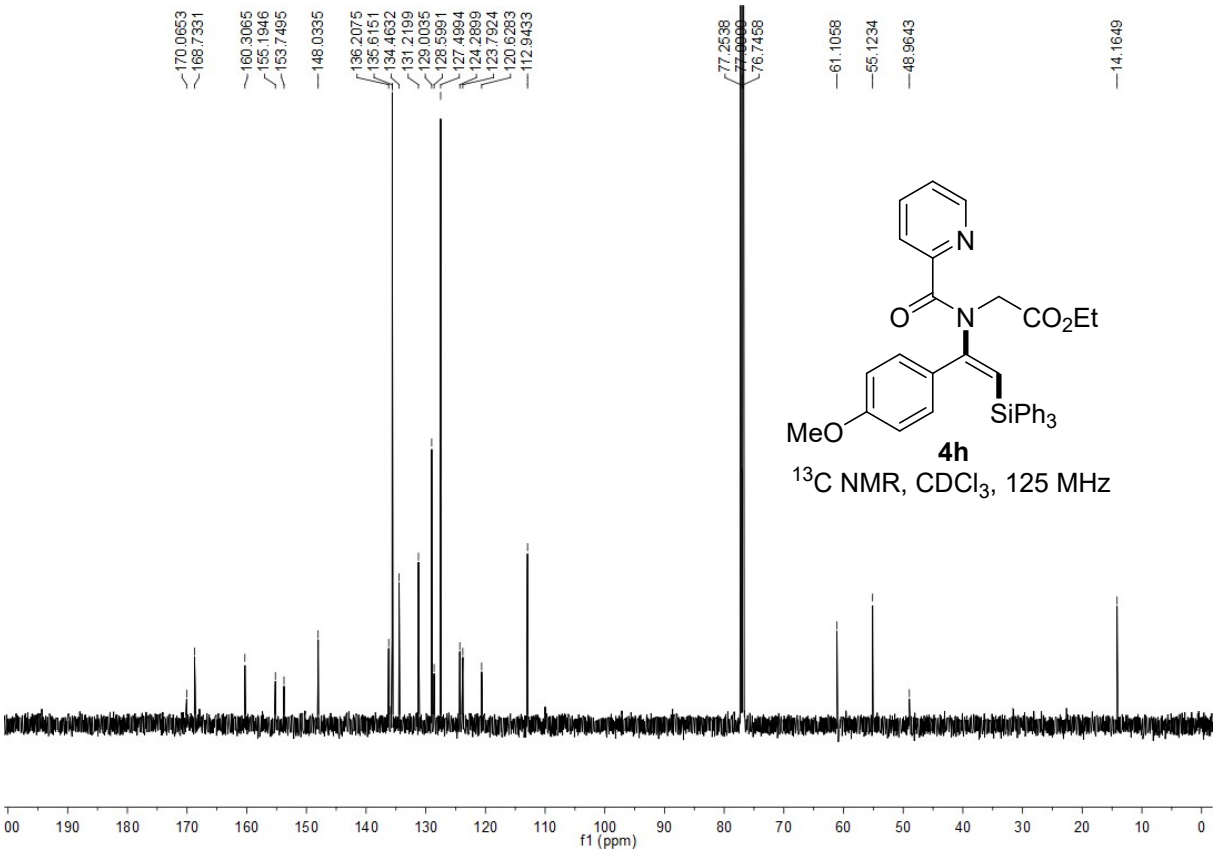
CO2Et
SiPh3
MeO
4h
1H NMR, CDCl3, 500 MHz
f1 (ppm)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61.1058
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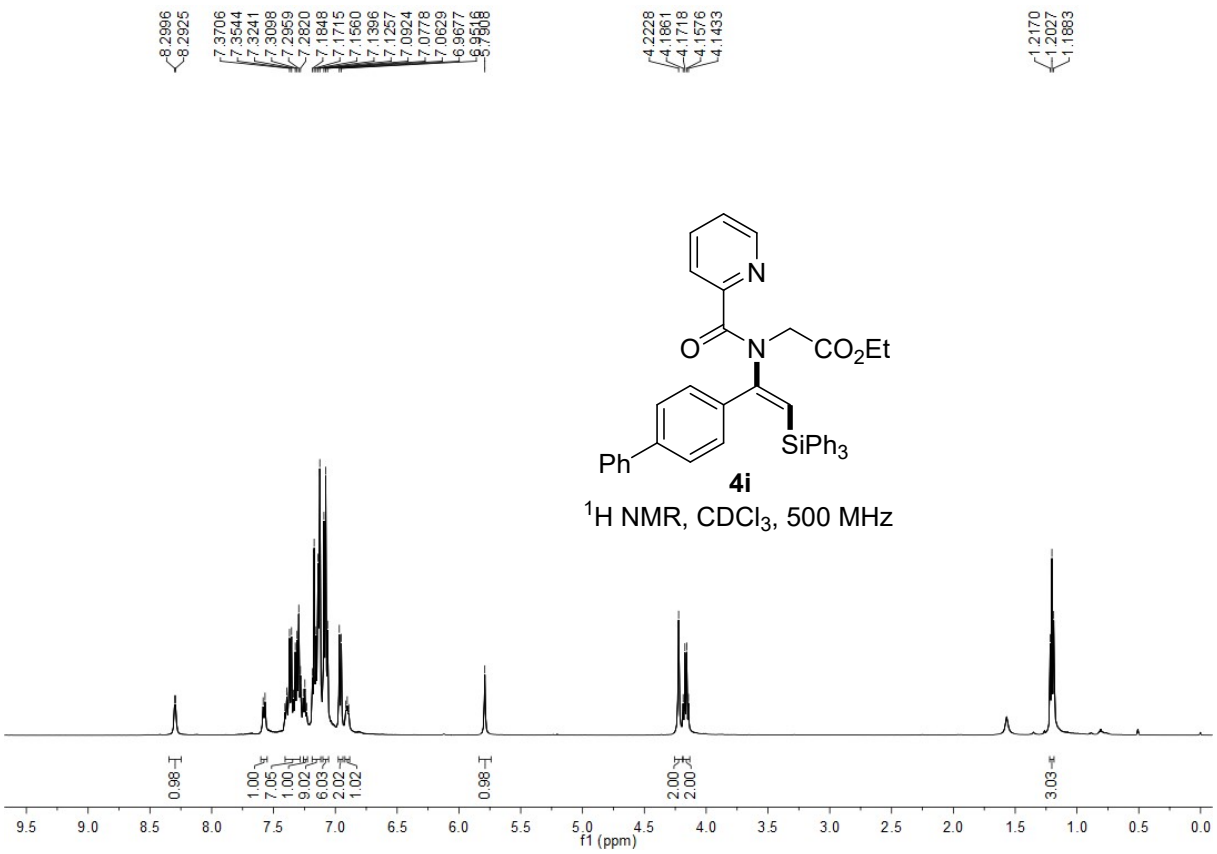
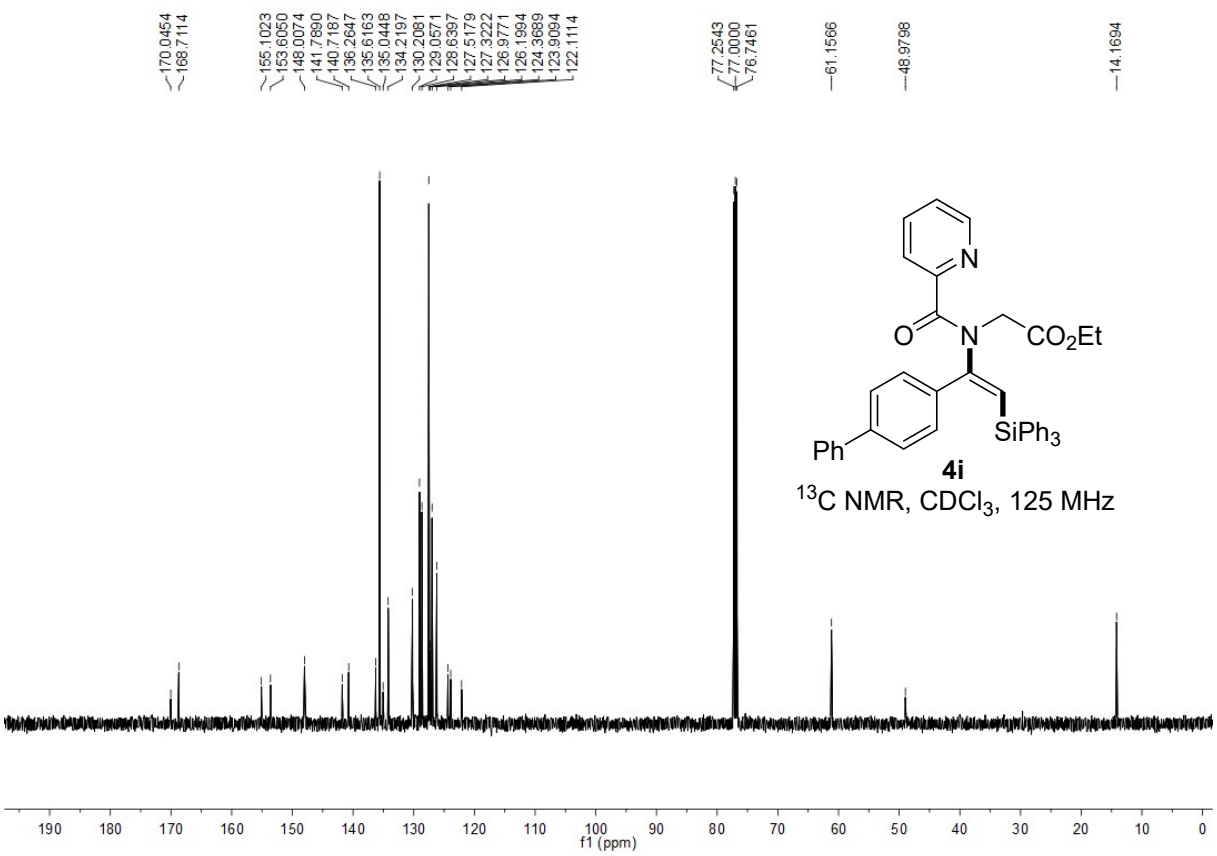
MeO
4h
13C NMR, CDCl3, 125 MHz
f1 (ppm)



4i

^{1}H NMR, $CDCl_3$, 500 MHz



4i

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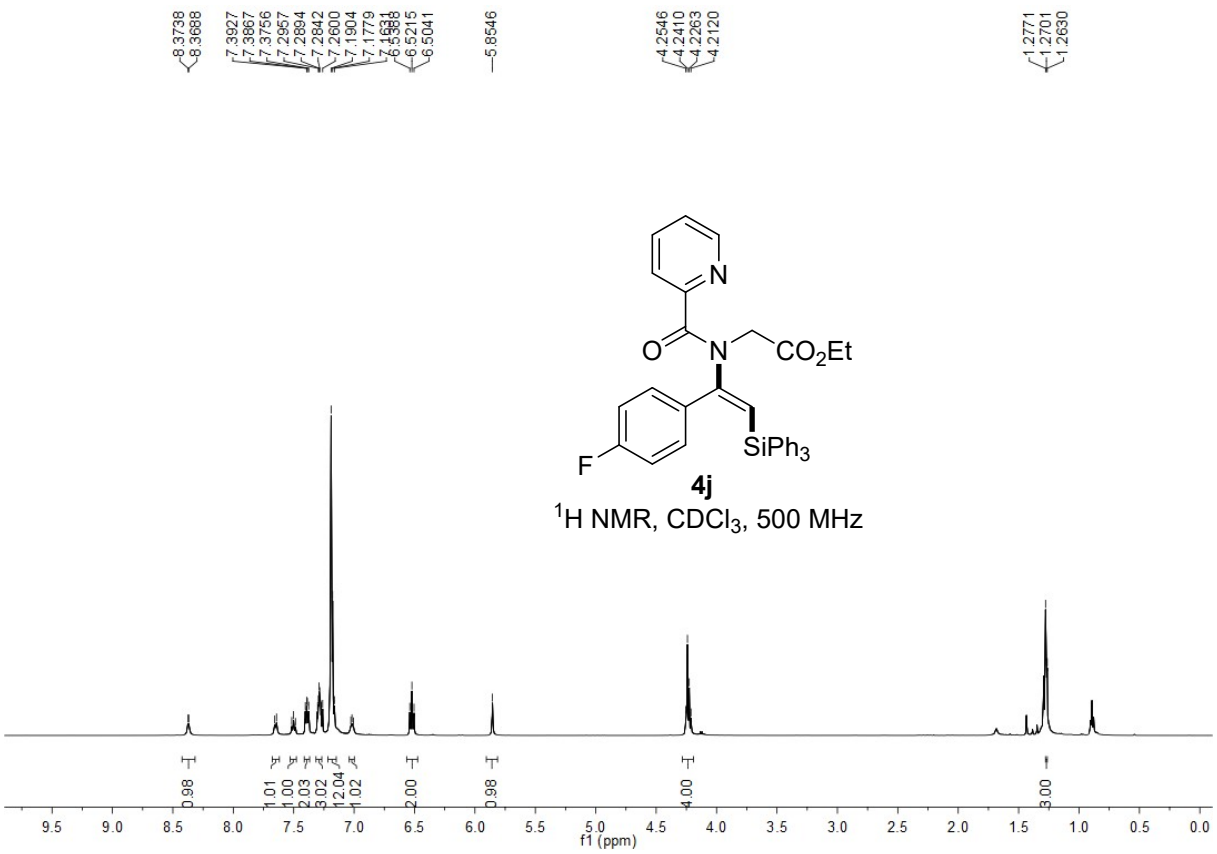

4j

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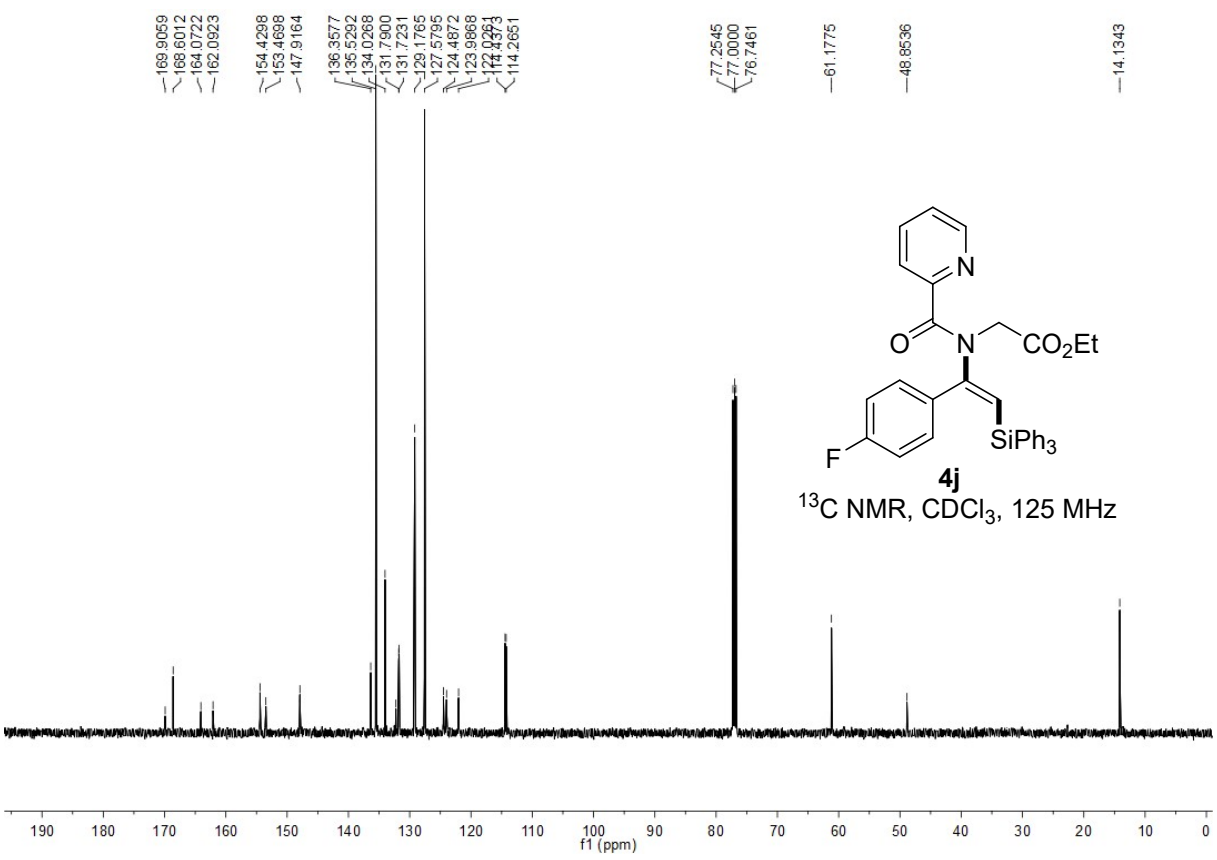

4j

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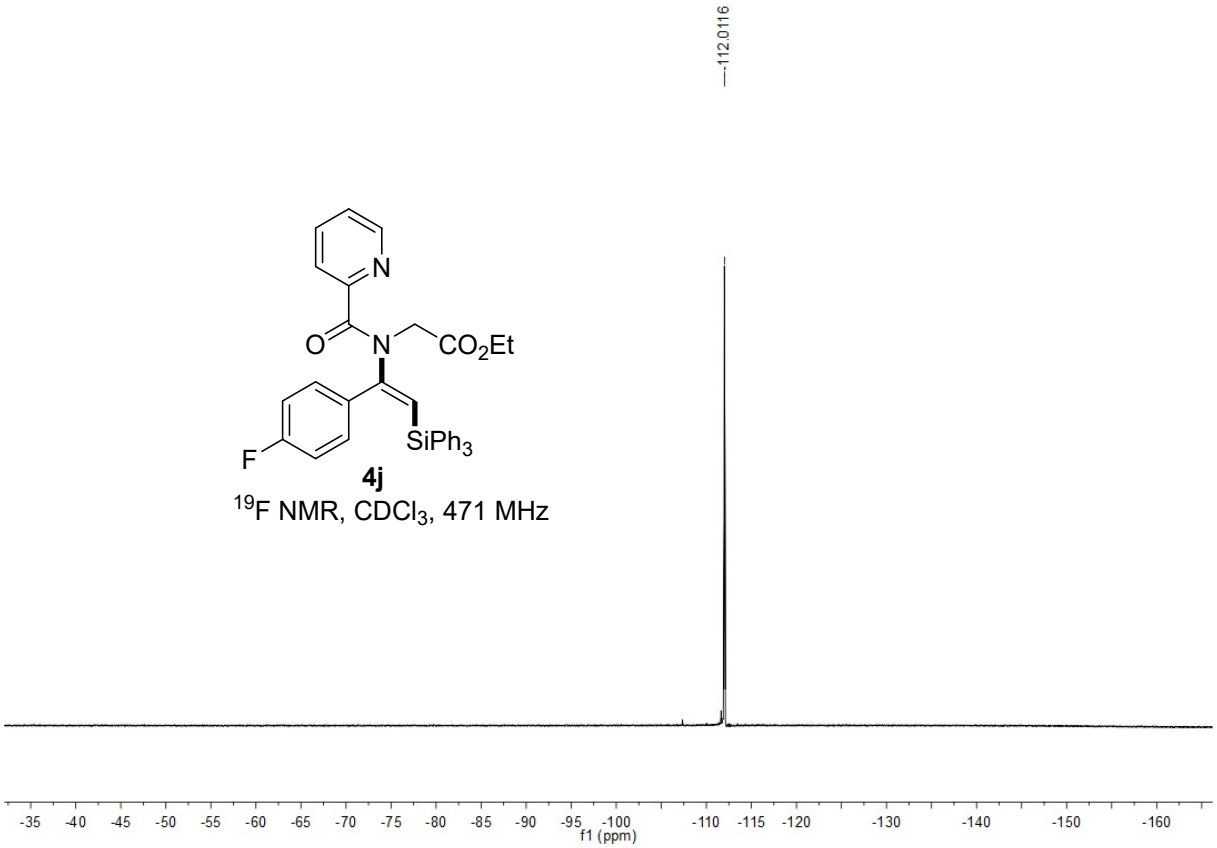
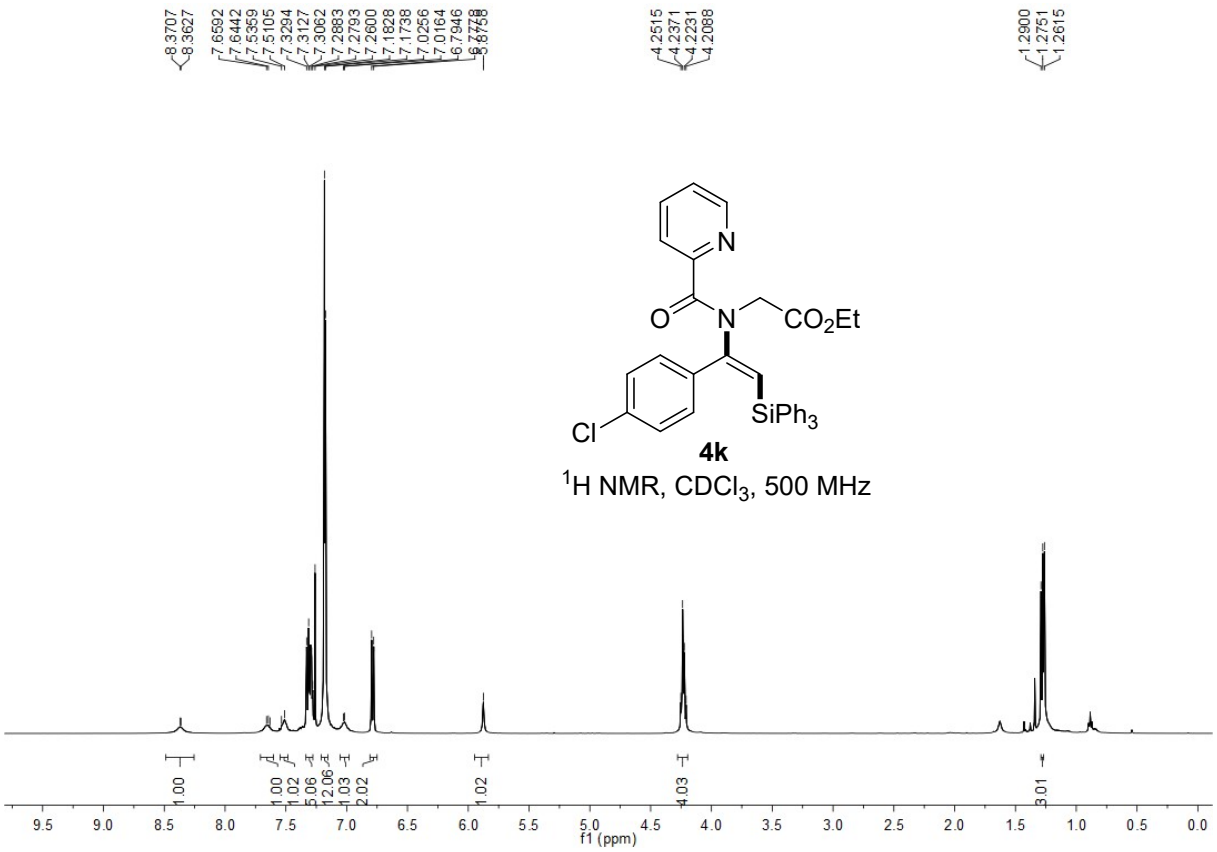


4j

^{19}F NMR, $CDCl_3$, 471 MHz



4k

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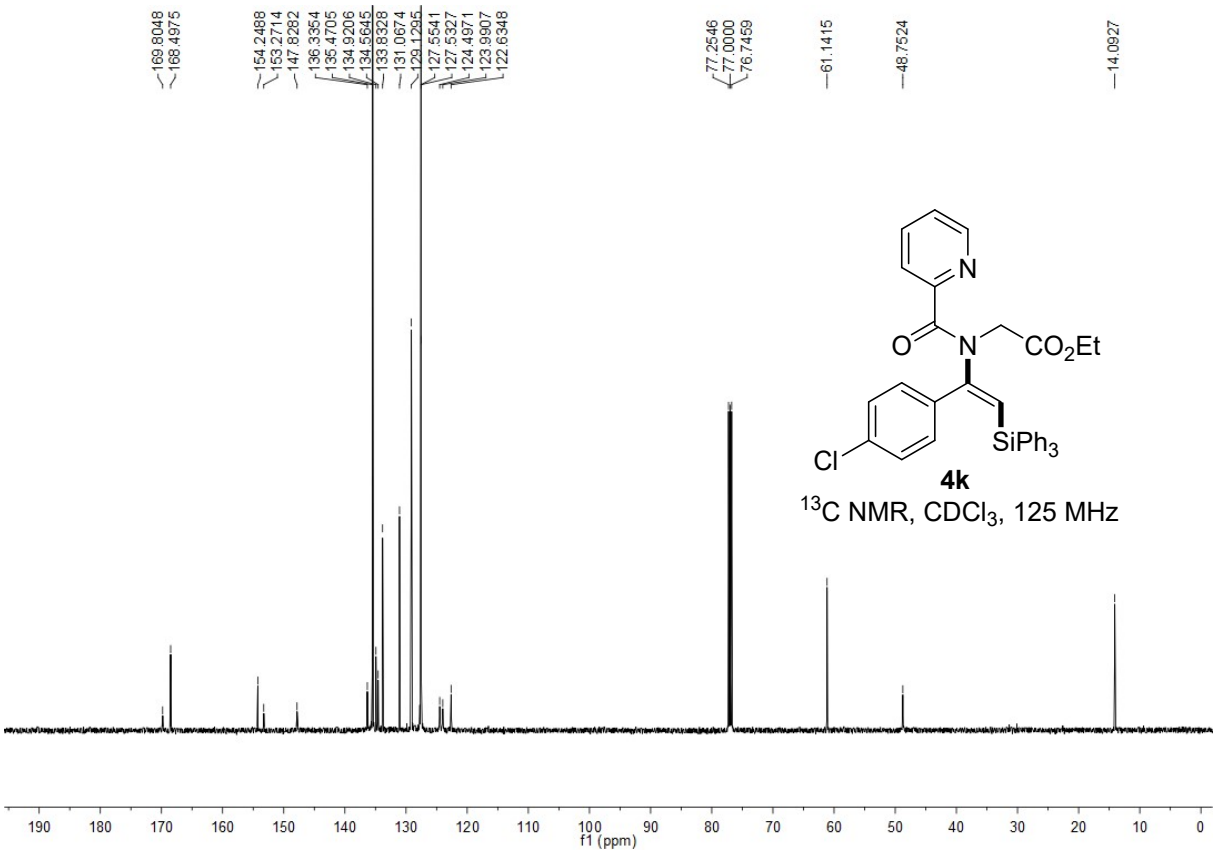

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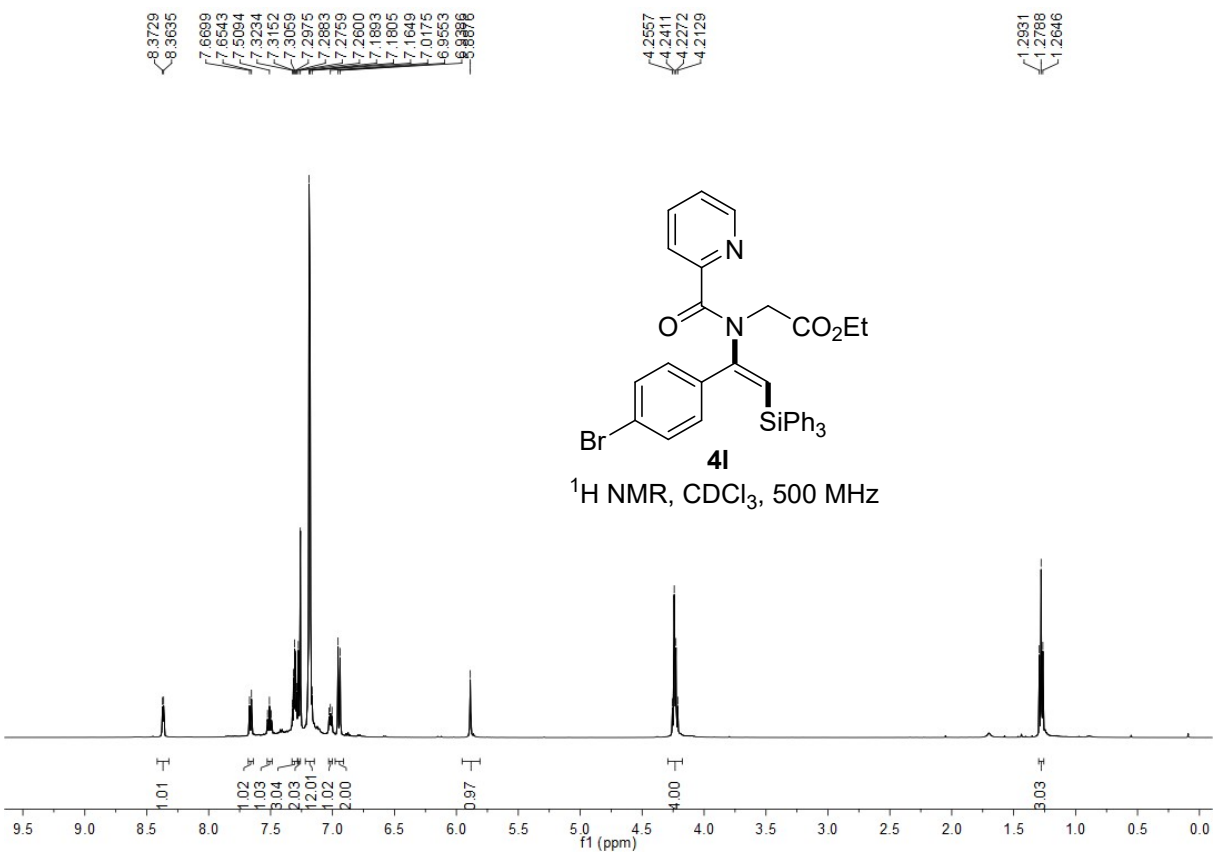
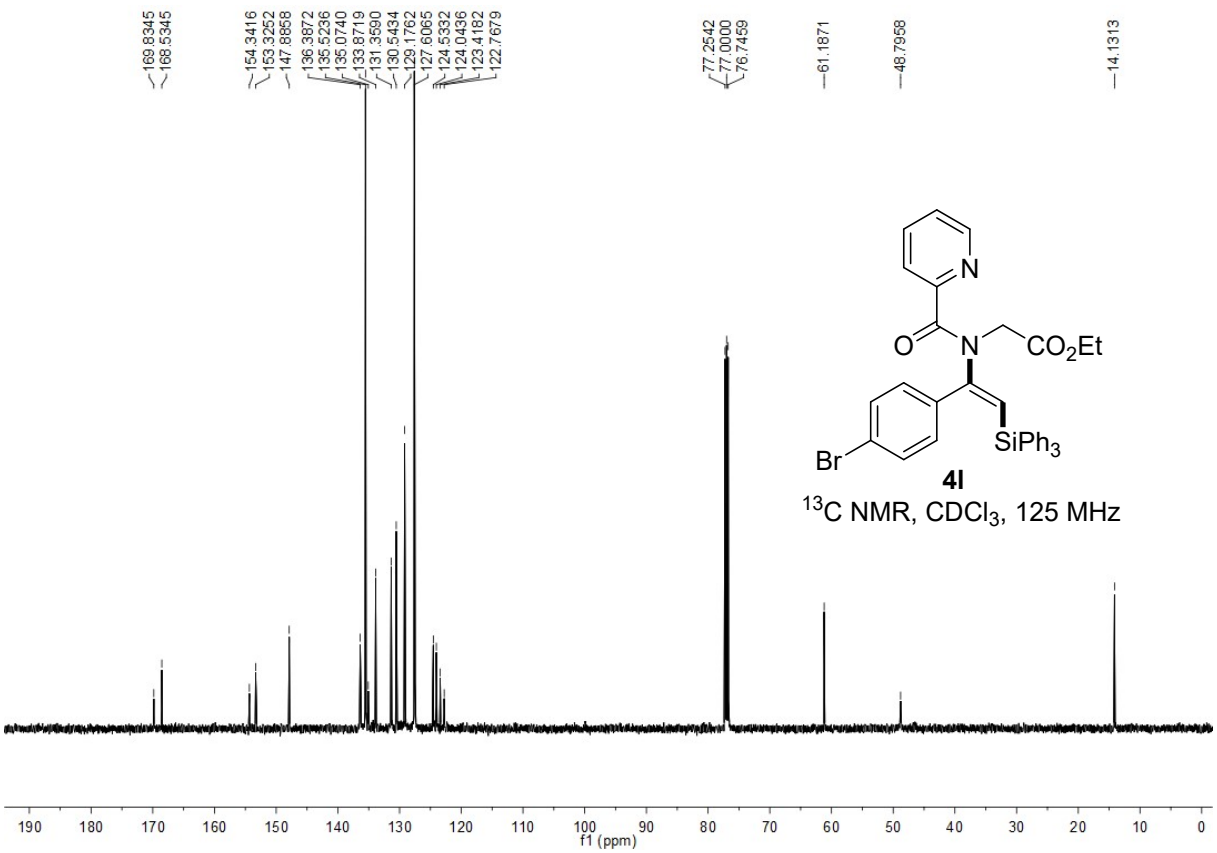


4l

^{1}H NMR, $CDCl_3$, 500 MHz



4l

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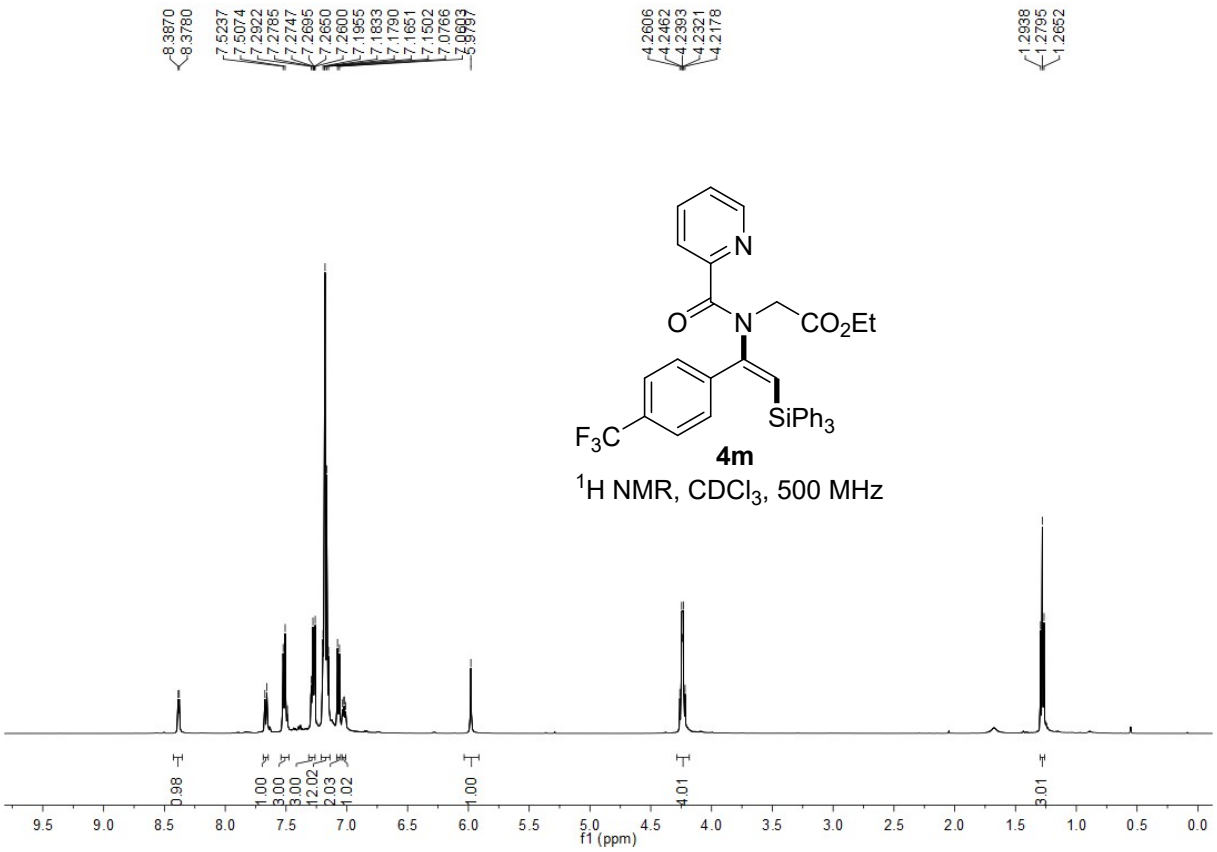

4m

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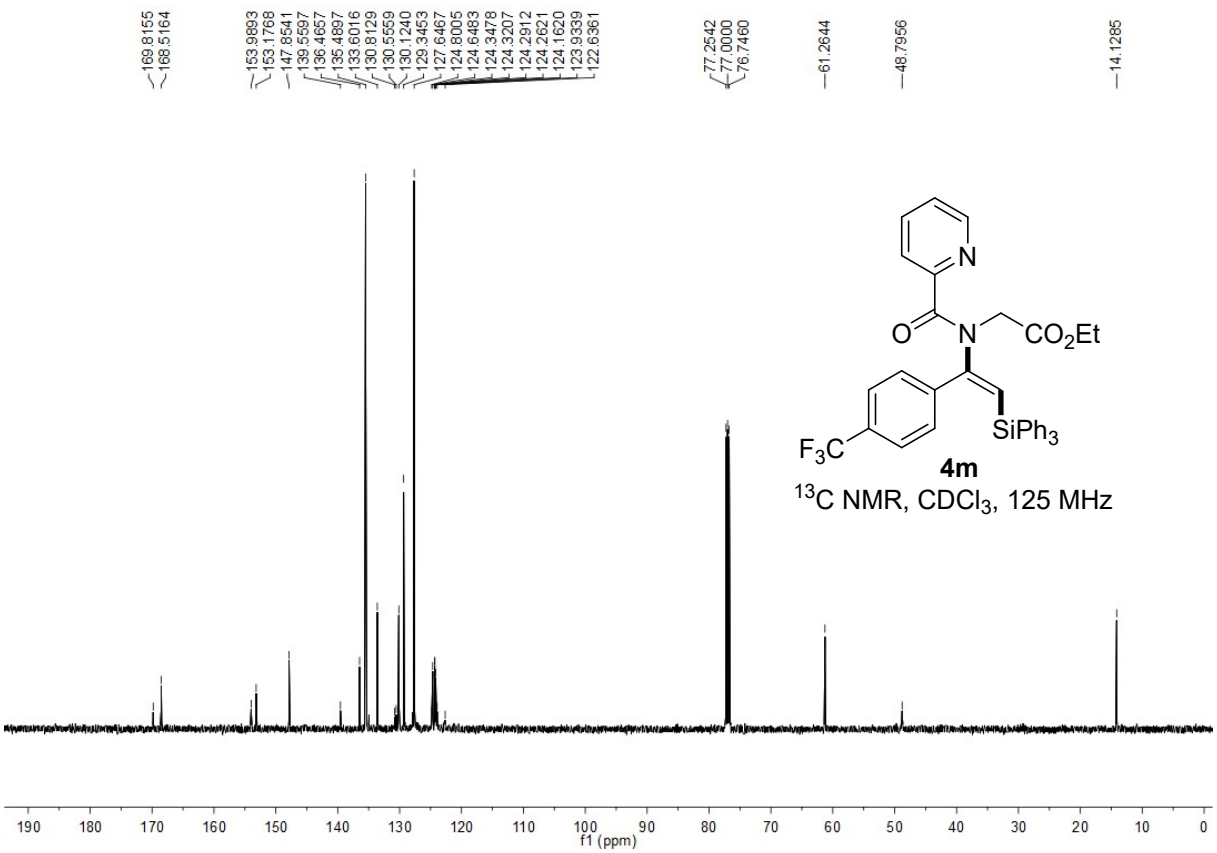
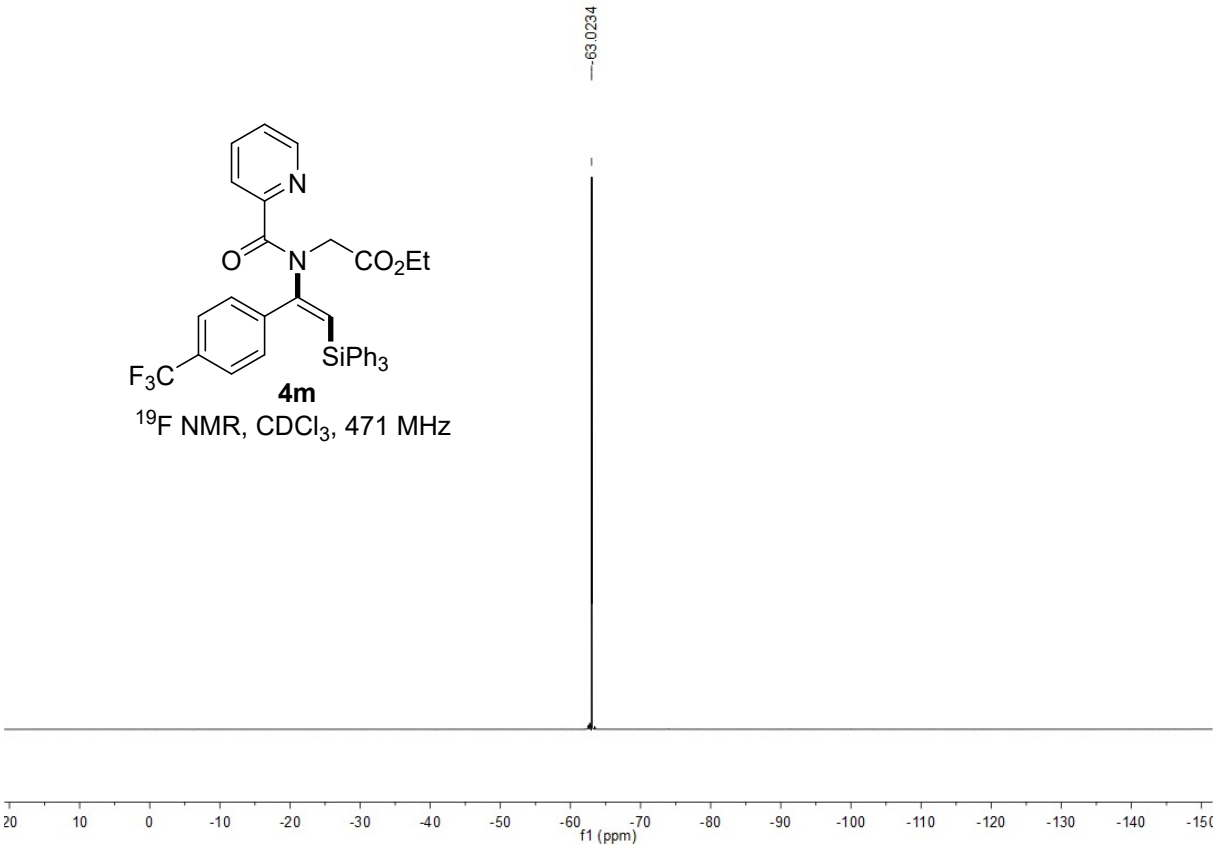


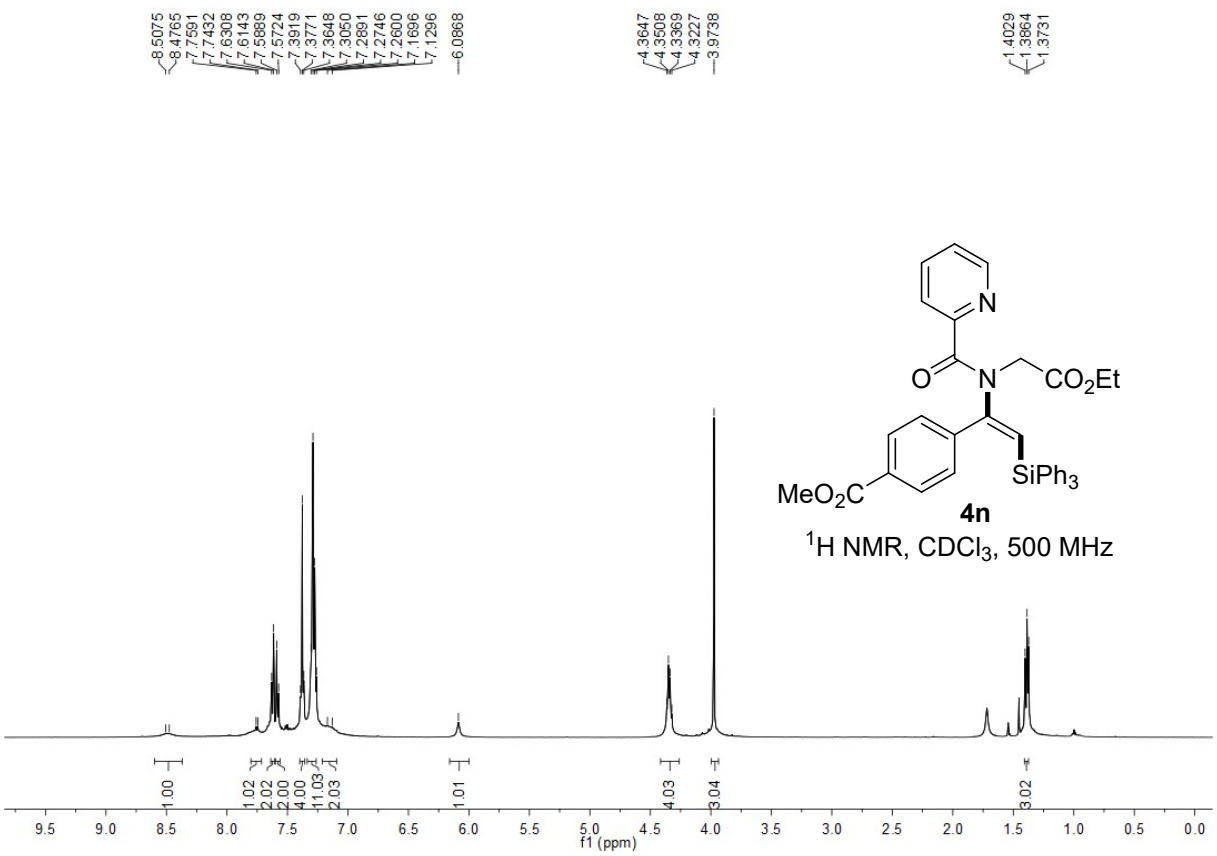
4m

^{13}C NMR, $CDCl_3$, 125 MHz



4m

^{19}F NMR, $CDCl_3$, 471 MHz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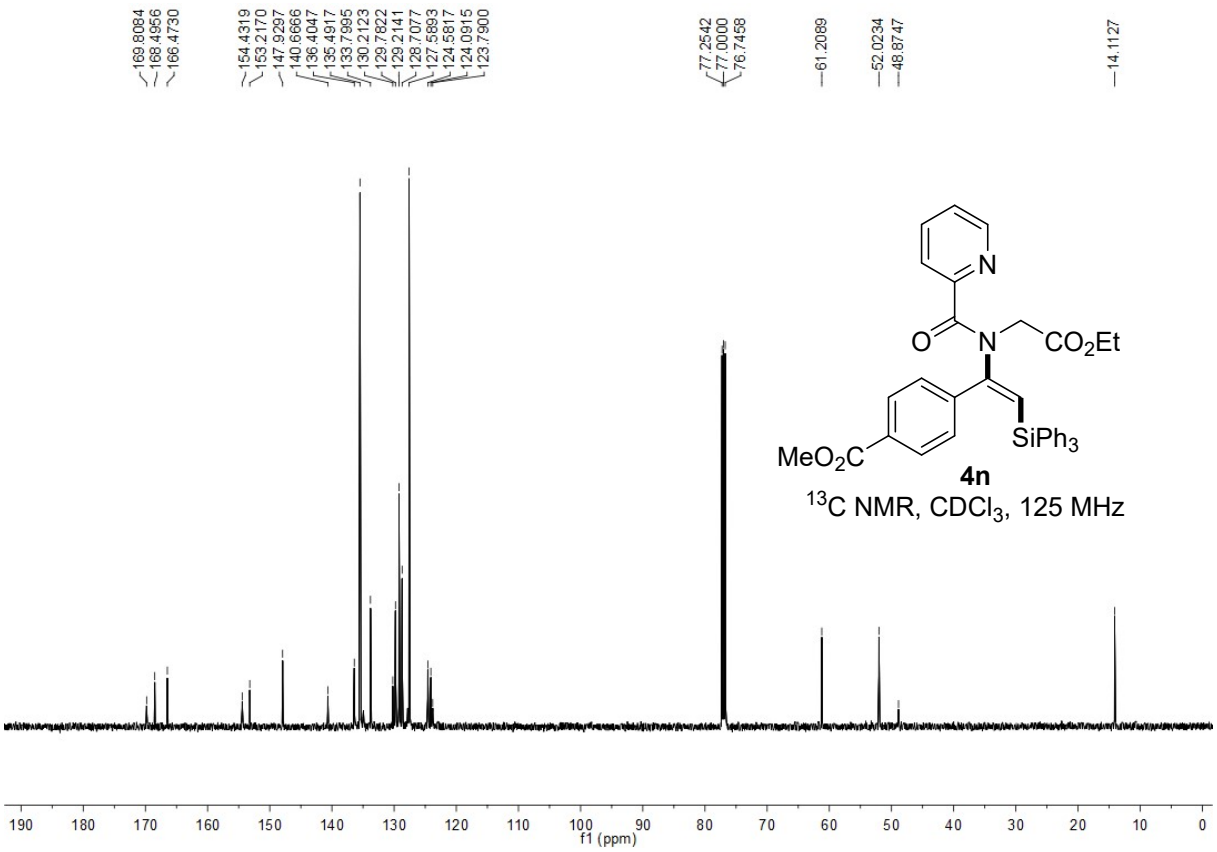
7.7432
7.6308
7.6143
7.5889
7.5724
7.3919
7.3771
7.3648
7.3050
7.2891
7.2746
7.2600
7.1696
7.1296
6.0868
4.3647
4.3508
4.3369
4.3227
3.9738
1.4029
1.3864
1.3731
N
O
N
CO2Et
MeO2C
SiPh3
4n
1H NMR, CDCl3, 500 MHz
1.00
1.02
2.02
2.00
4.00
11.03
2.03
1.01
4.03
3.04
3.02
f1 (ppm)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168.4956
166.4730
154.4319
153.2170
147.9297
140.6666
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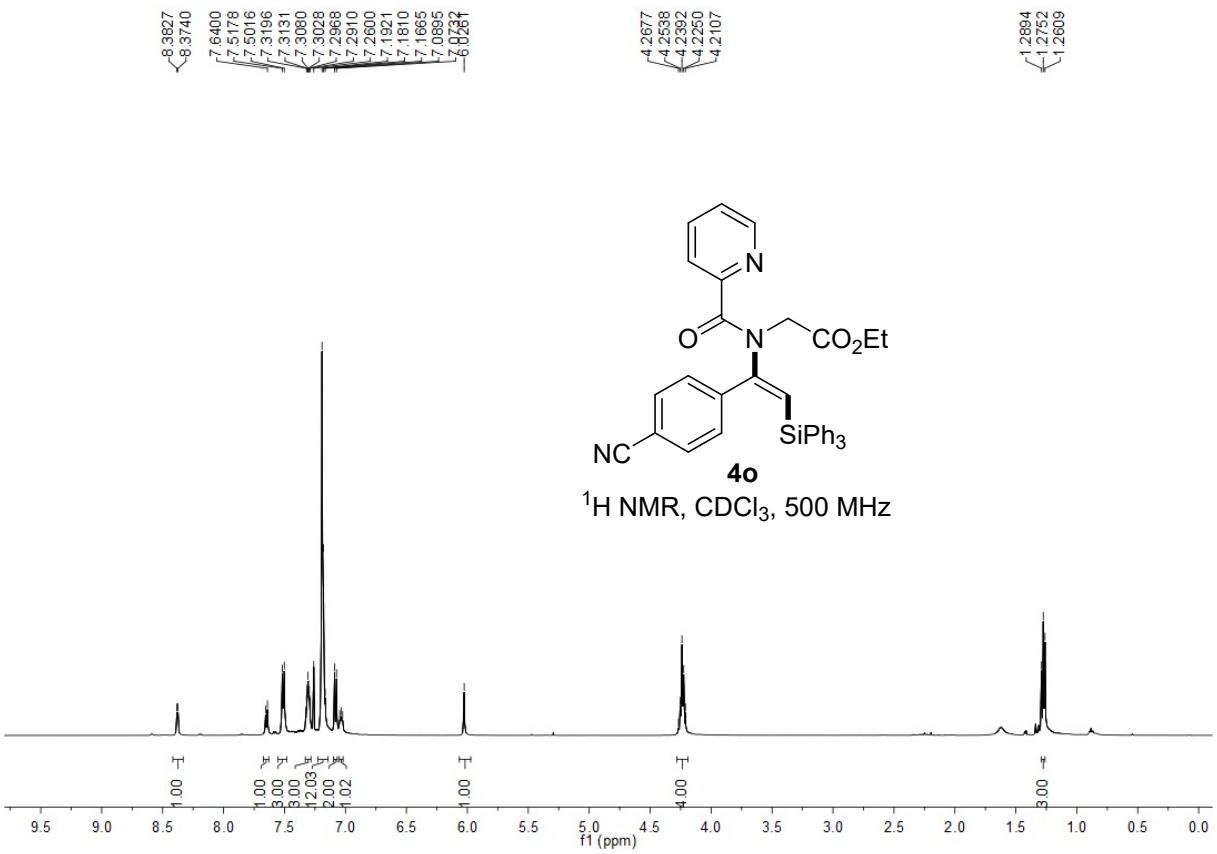
135.4917
133.7995
130.2123
129.7822
129.2141
128.7077
127.5893
124.5817
124.0915
123.7900
77.2542
77.0000
76.7458
61.2089
52.0234
48.8747
14.1127
N
O
N
CO2Et
MeO2C
SiPh3
4n
13C NMR, CDCl3, 125 MHz
f1 (ppm)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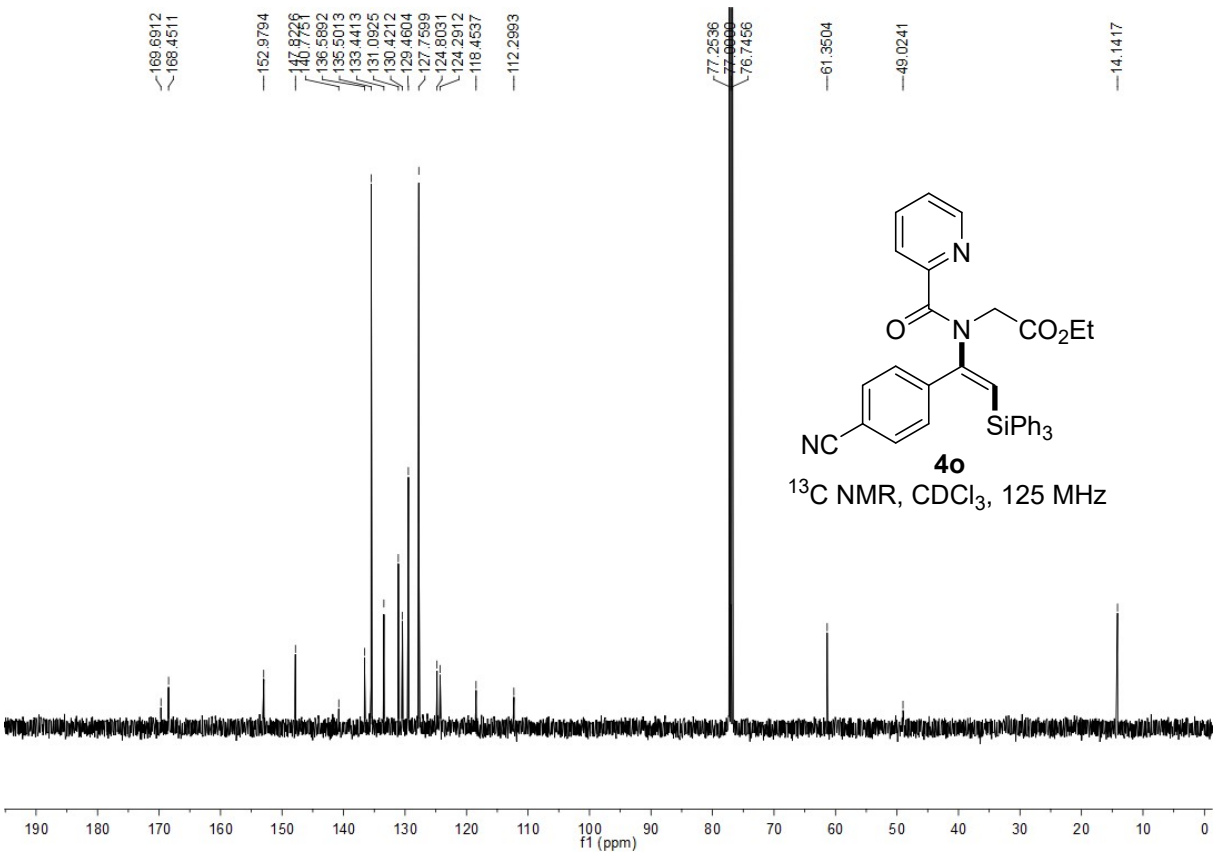
8.3740
7.6400
7.5178
7.5016
7.3196
7.3131
7.3080
7.3028
7.2968
7.2910
7.2600
7.1921
7.1810
7.1665
7.0895
6.0732
6.0261
4.2677
4.2538
4.2392
4.2250
4.2107
1.2894
1.2752
1.2609
N
O
N
CO2Et
SiPh3
NC
4o
1H NMR, CDCl3, 500 MHz
1.00
1.00
3.00
3.00
12.03
2.00
1.02
1.00
4.00
3.00
f1 (ppm)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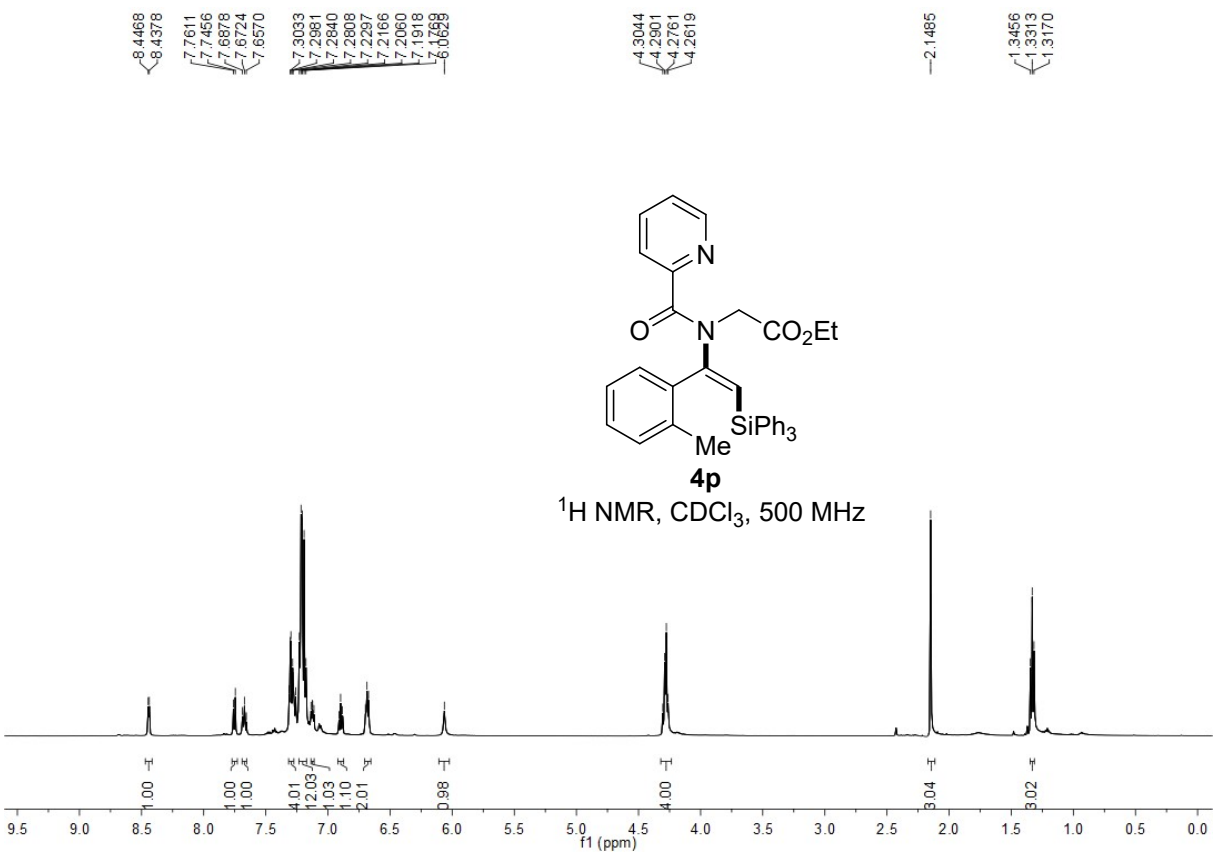
152.9794
147.9226
140.7751
136.5892
135.5013
133.4413
131.0925
130.4212
129.4604
127.7599
124.8031
124.2912
118.4537
112.2993
77.2536
77.0000
76.7456
61.3504
49.0241
14.1417
N
O
N
CO2Et
SiPh3
NC
4o
13C NMR, CDCl3, 125 MHz
f1 (ppm)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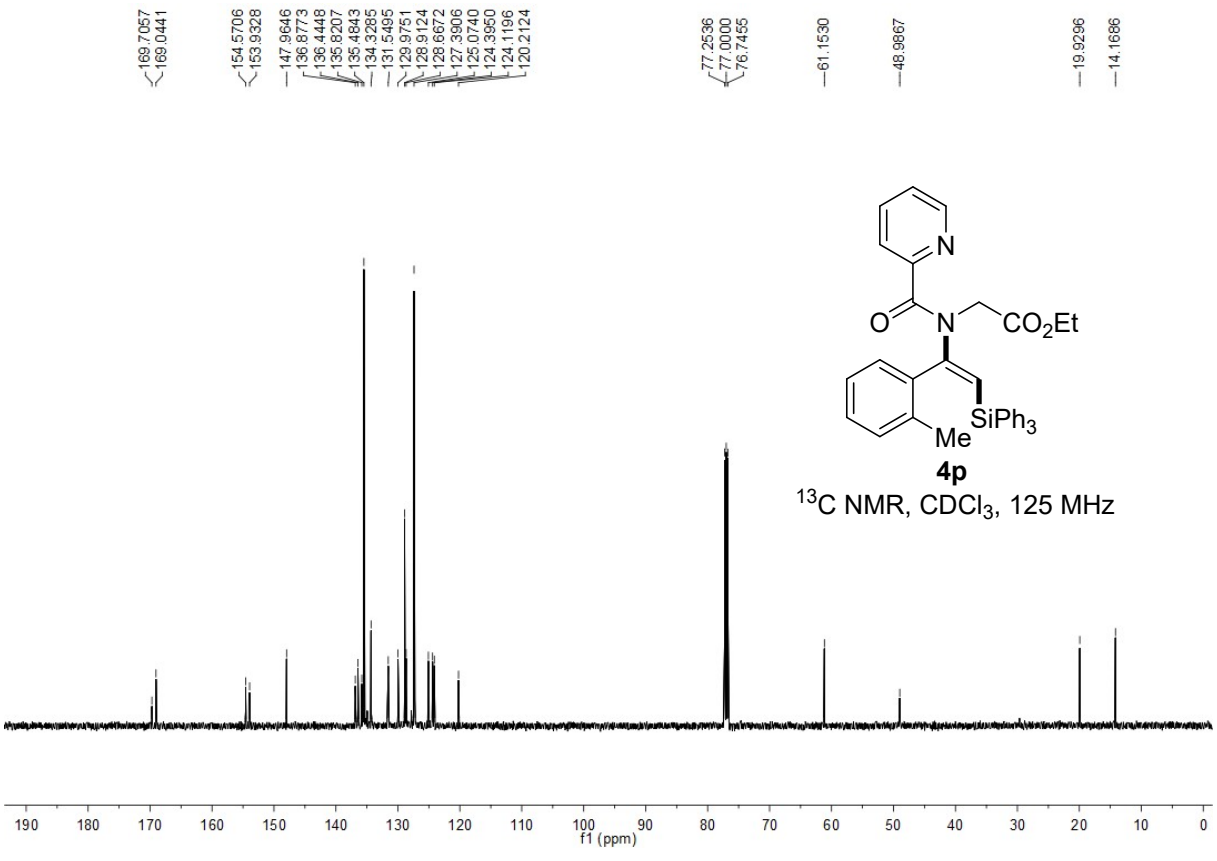
7.7611
7.7456
7.6878
7.6724
7.6570
7.3033
7.2981
7.2840
7.2808
7.2297
7.2166
7.2060
7.1918
6.0629
4.3044
4.2901
4.2761
4.2619
2.1485
1.3456
1.3313
1.3170
N
O
N
CO2Et
SiPh3
Me
4p
1H NMR, CDCl3, 500 MHz
1.00
1.00
1.00
4.01
2.03
1.03
1.10
2.01
0.98
4.00
3.04
3.02
f1 (ppm)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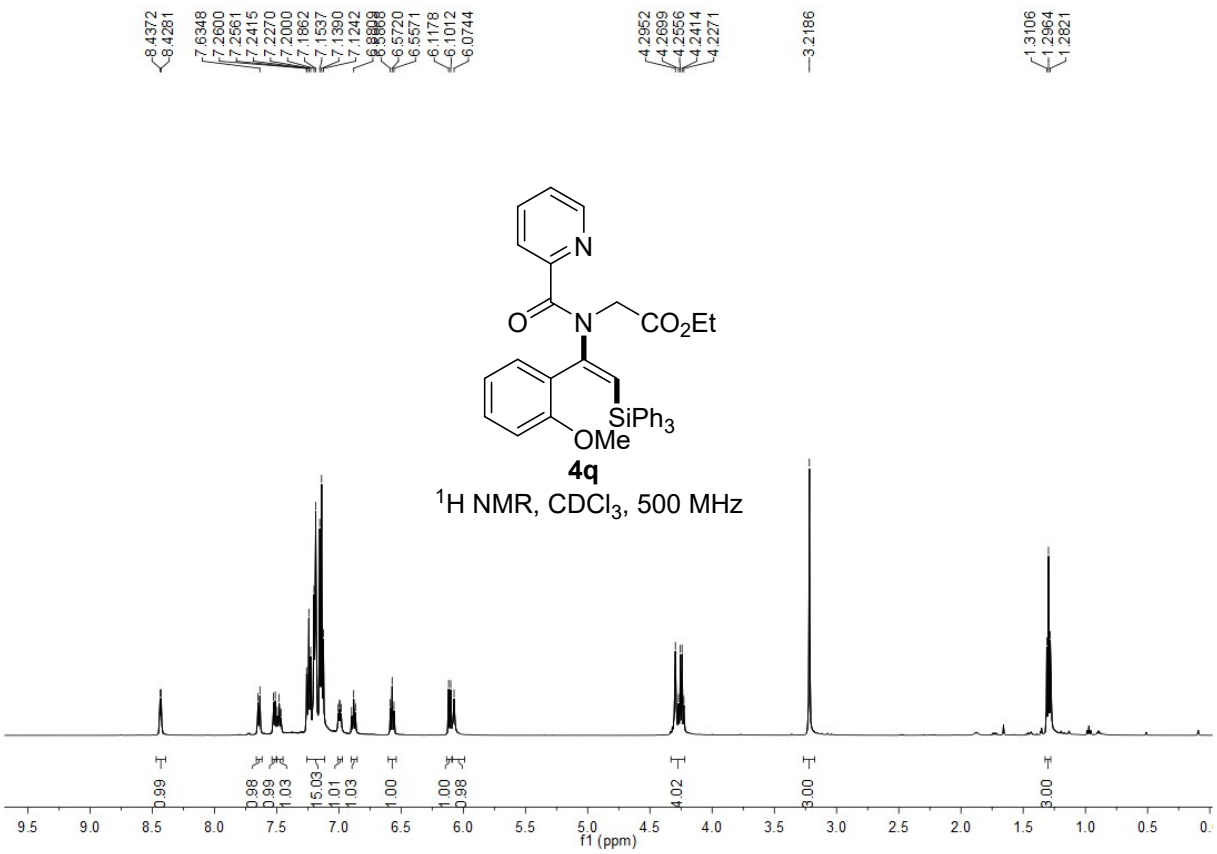
153.9328
147.9646
136.8773
136.4448
135.8207
135.4843
134.3285
131.5495
129.9751
128.9124
128.6672
127.3906
125.0740
124.3950
124.1196
120.2124
77.2536
77.0000
76.7455
61.1530
48.9867
19.9296
14.1686
N
O
N
CO2Et
SiPh3
Me
4p
13C NMR, CDCl3, 125 MHz
f1 (ppm)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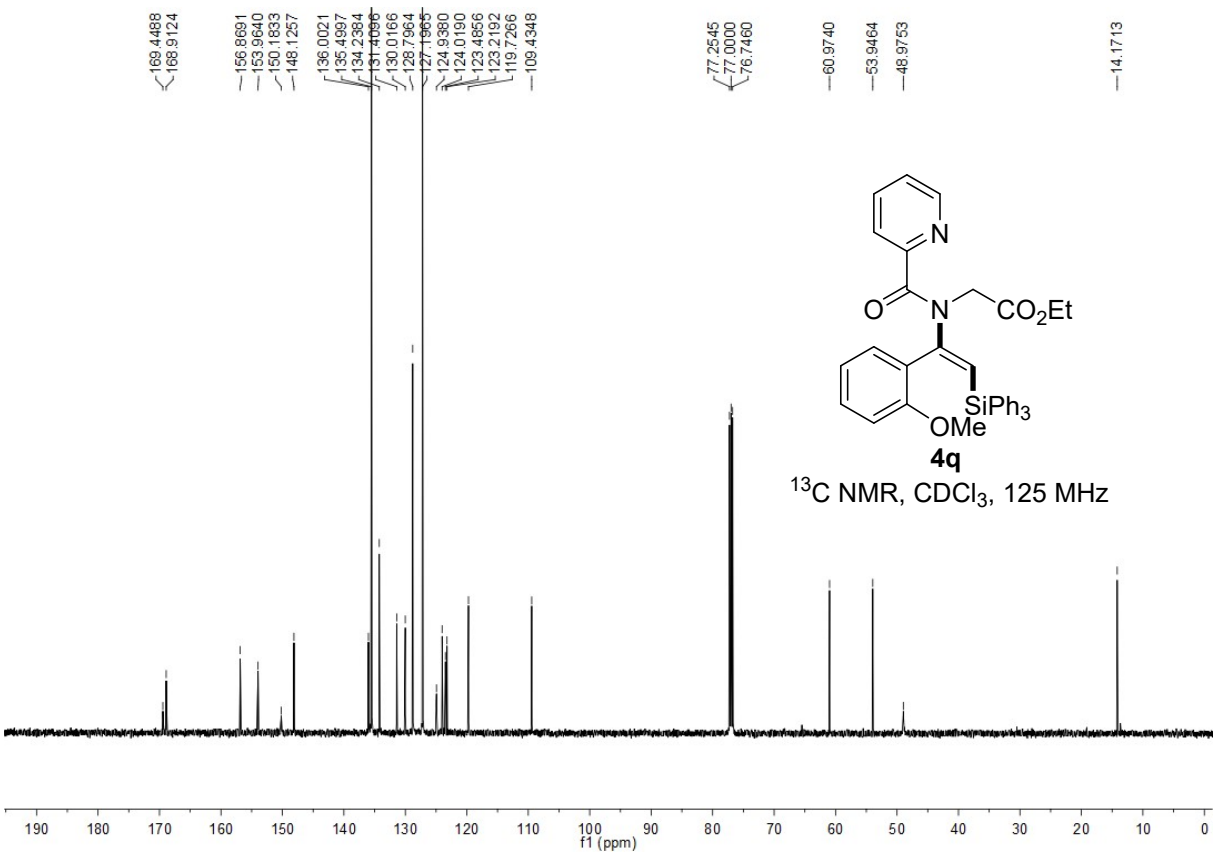
7.6348
7.2600
7.2561
7.2415
7.2270
7.2000
7.1862
7.1537
7.1390
7.1242
6.5720
6.5571
6.1178
6.1012
6.0744
4.2952
4.2699
4.2556
4.2414
4.2271
3.2186
1.3106
1.2964
1.2821
N
O
N
CO2Et
SiPh3
OMe
4q
1H NMR, CDCl3, 500 MHz
0.99
0.98
0.99
1.03
15.03
1.01
1.03
1.00
1.00
0.98
4.02
3.00
3.00
f1 (ppm)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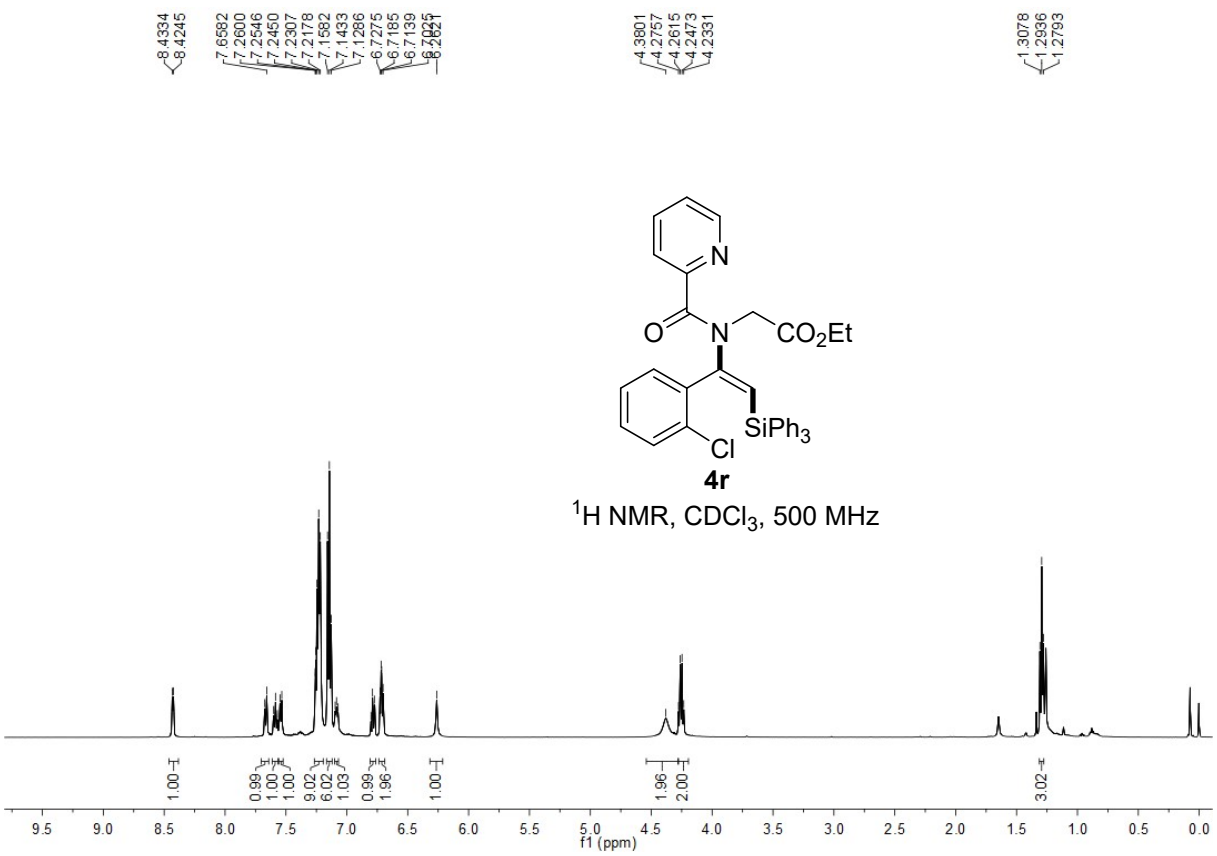
156.8691
153.9640
150.1833
148.1257
136.0021
135.4997
134.2384
131.4096
130.0166
128.7964
127.1965
124.9380
124.0190
123.4856
123.2192
119.7266
109.4348
77.2545
77.0000
76.7460
60.9740
53.9464
48.9753
14.1713
N
O
N
CO2Et
SiPh3
OMe
4q
13C NMR, CDCl3, 125 MHz
f1 (ppm)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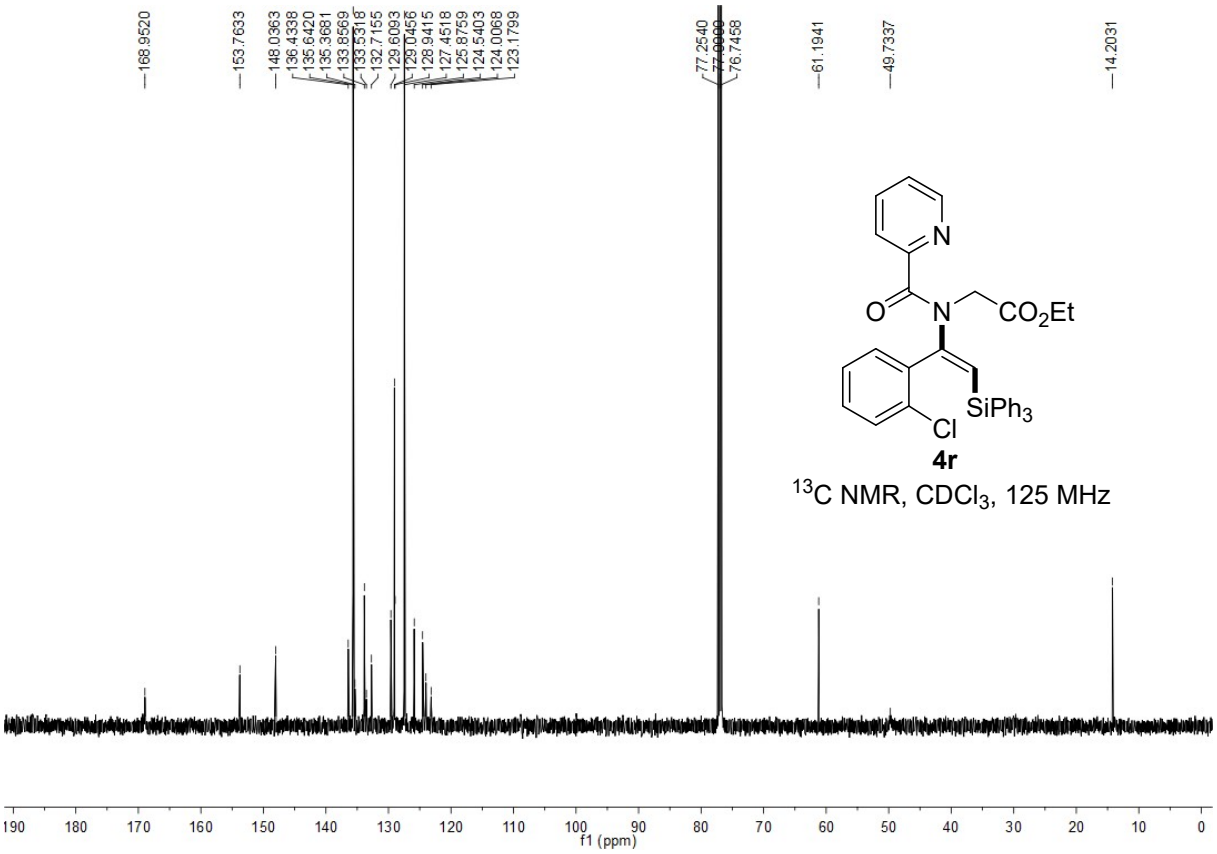
8.4245
7.6582
7.2600
7.2546
7.2450
7.2307
7.2178
7.1582
7.1433
7.1286
6.7275
6.7185
6.7139
4.3801
4.2757
4.2615
4.2473
4.2331
1.3078
1.2936
1.2793
N
O
N
CO2Et
SiPh3
Cl
4r
1H NMR, CDCl3, 500 MHz
f1 (ppm)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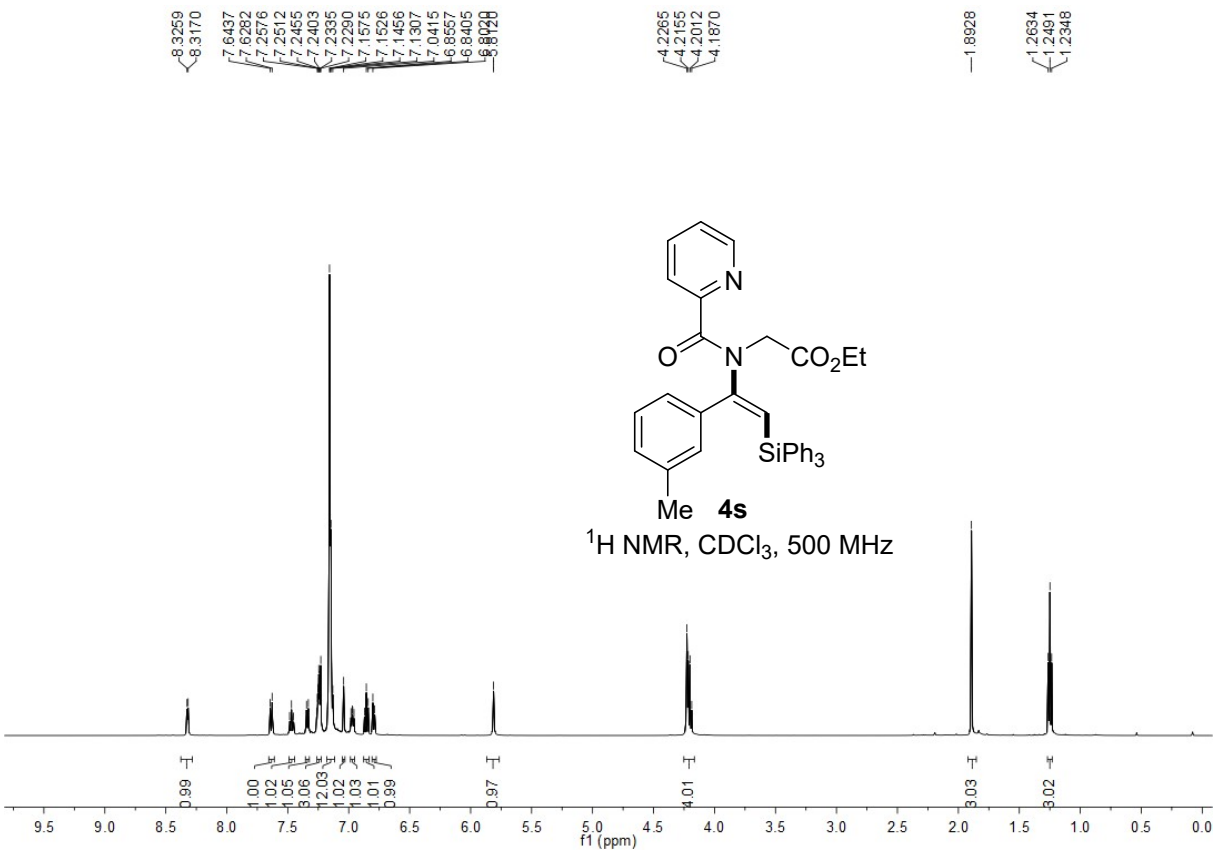
136.4338
135.6420
135.3681
133.8569
133.5318
132.7155
129.6093
129.0456
128.9415
127.4518
125.8759
124.5403
124.0068
123.1799
77.2540
77.0990
76.7458
61.1941
49.7337
14.2031
N
O
N
CO2Et
SiPh3
Cl
4r
13C NMR, CDCl3, 125 MHz
f1 (ppm)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8.3170
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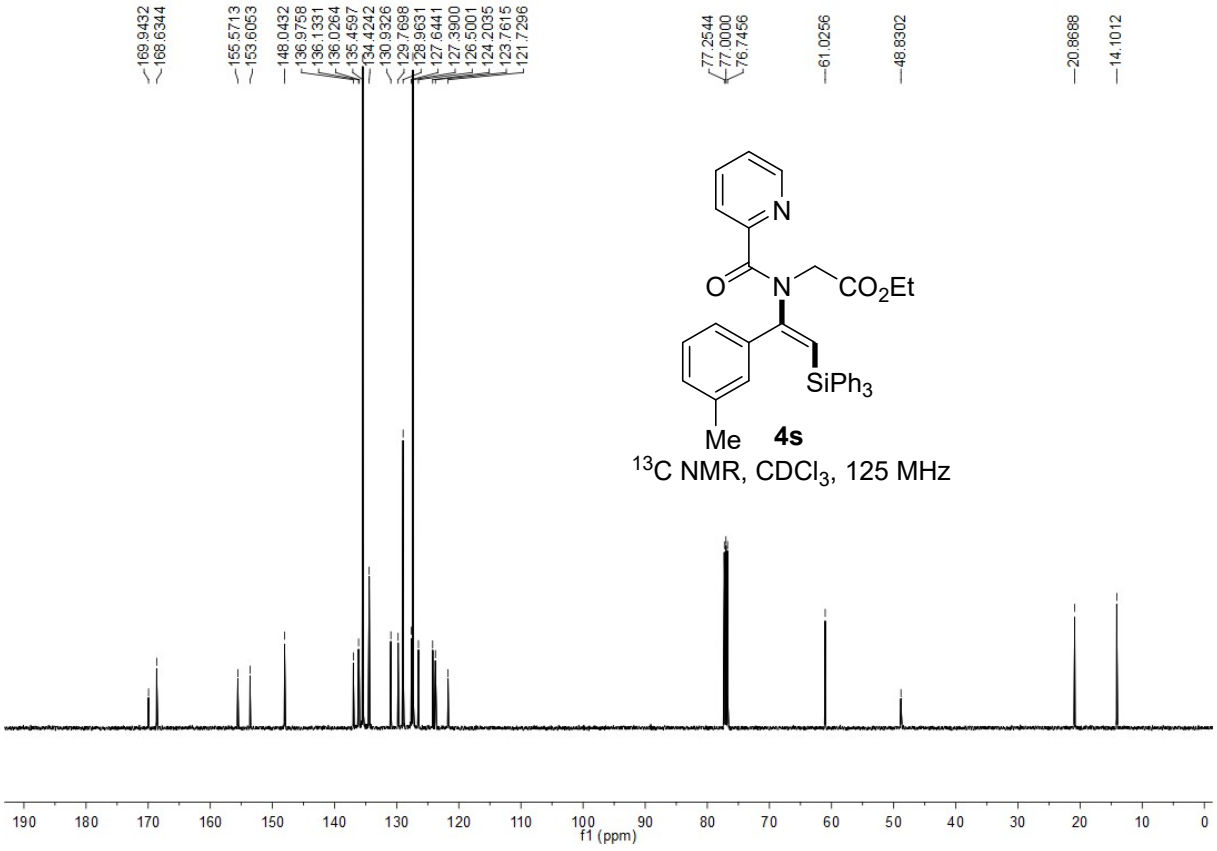
7.6282
7.2576
7.2512
7.2455
7.2403
7.2335
7.2290
7.1575
7.1526
7.1456
7.1307
7.0415
6.8557
6.8405
4.2265
4.2155
4.2012
4.1870
1.8928
1.2634
1.2491
1.2348
N
O
N
CO2Et
SiPh3
Me
4s
1H NMR, CDCl3, 500 MHz
0.99
1.00
1.02
1.05
3.06
2.03
1.02
1.03
1.01
0.99
0.97
4.01
3.03
3.02
f1 (ppm)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155.5713
153.6053
148.0432
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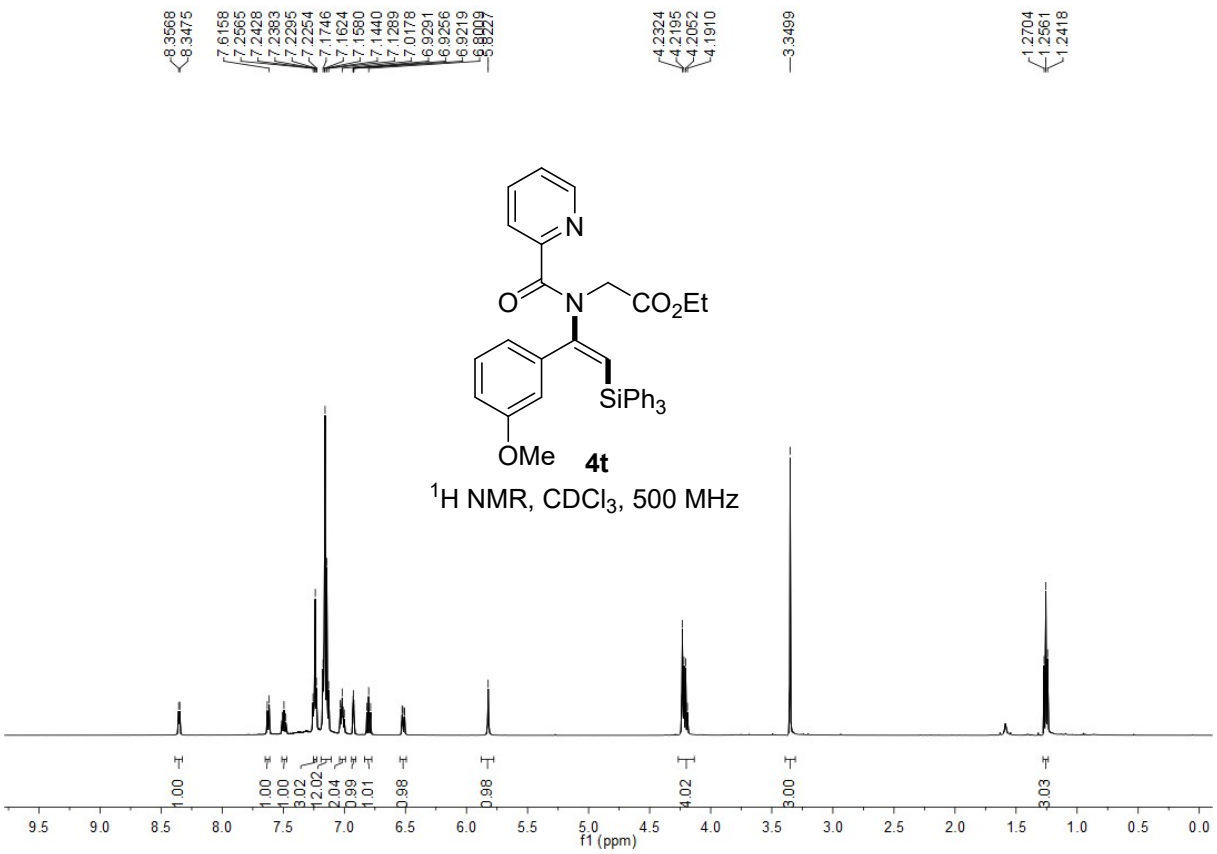
130.9326
129.7698
128.9631
127.6441
127.3900
126.5001
124.2035
123.7615
121.7296
77.2544
77.0000
76.7456
61.0256
48.8302
20.8688
14.1012
N
O
N
CO2Et
SiPh3
Me
4s
13C NMR, CDCl3, 125 MHz
f1 (ppm)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7.2428
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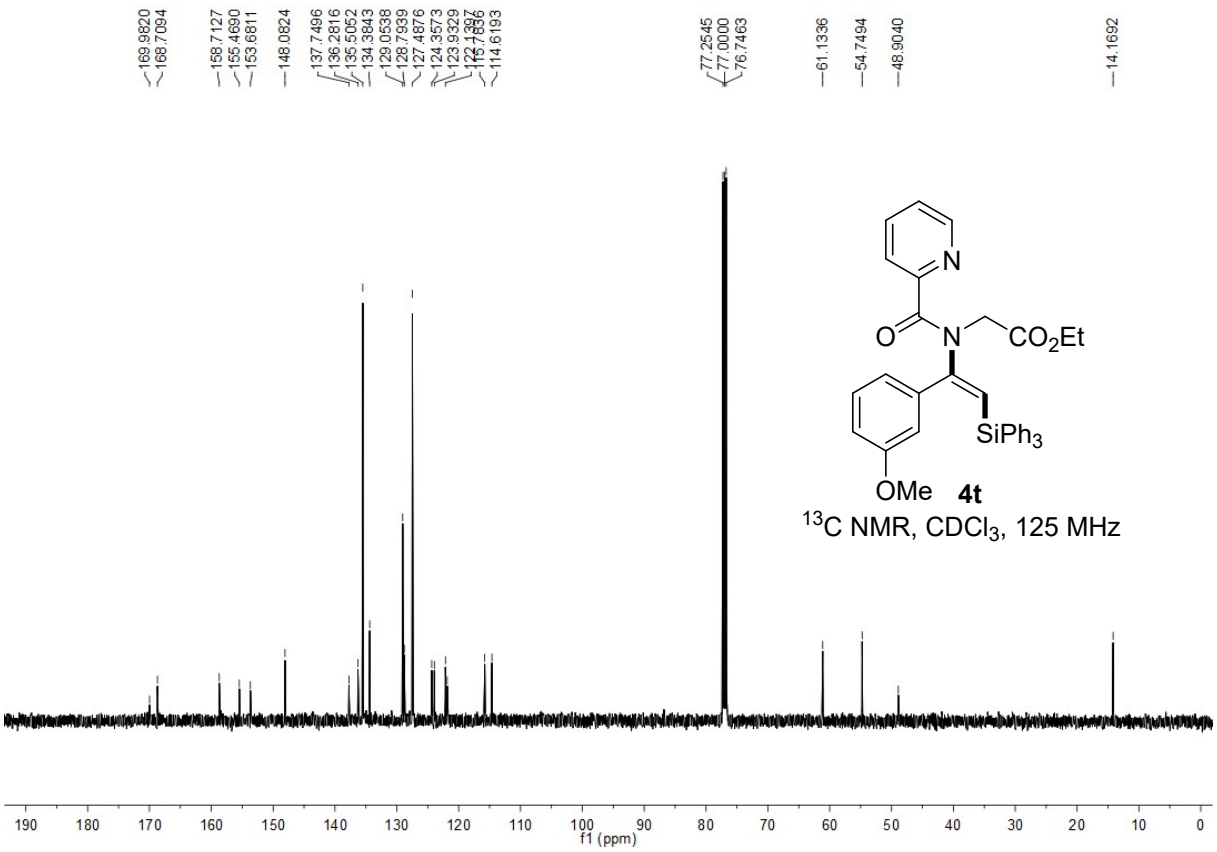
7.2295
7.2254
7.1746
7.1624
7.1580
7.1440
7.1289
7.0178
6.9291
6.9256
6.9219
6.8809
5.8227
4.2324
4.2195
4.2052
4.1910
3.3499
1.2704
1.2561
1.2418
N
O
N
CO2Et
SiPh3
OMe
4t
1H NMR, CDCl3, 500 MHz
1.00
1.00
1.00
3.02
12.02
2.04
0.99
1.01
0.98
0.98
4.02
3.00
3.03
f1 (ppm)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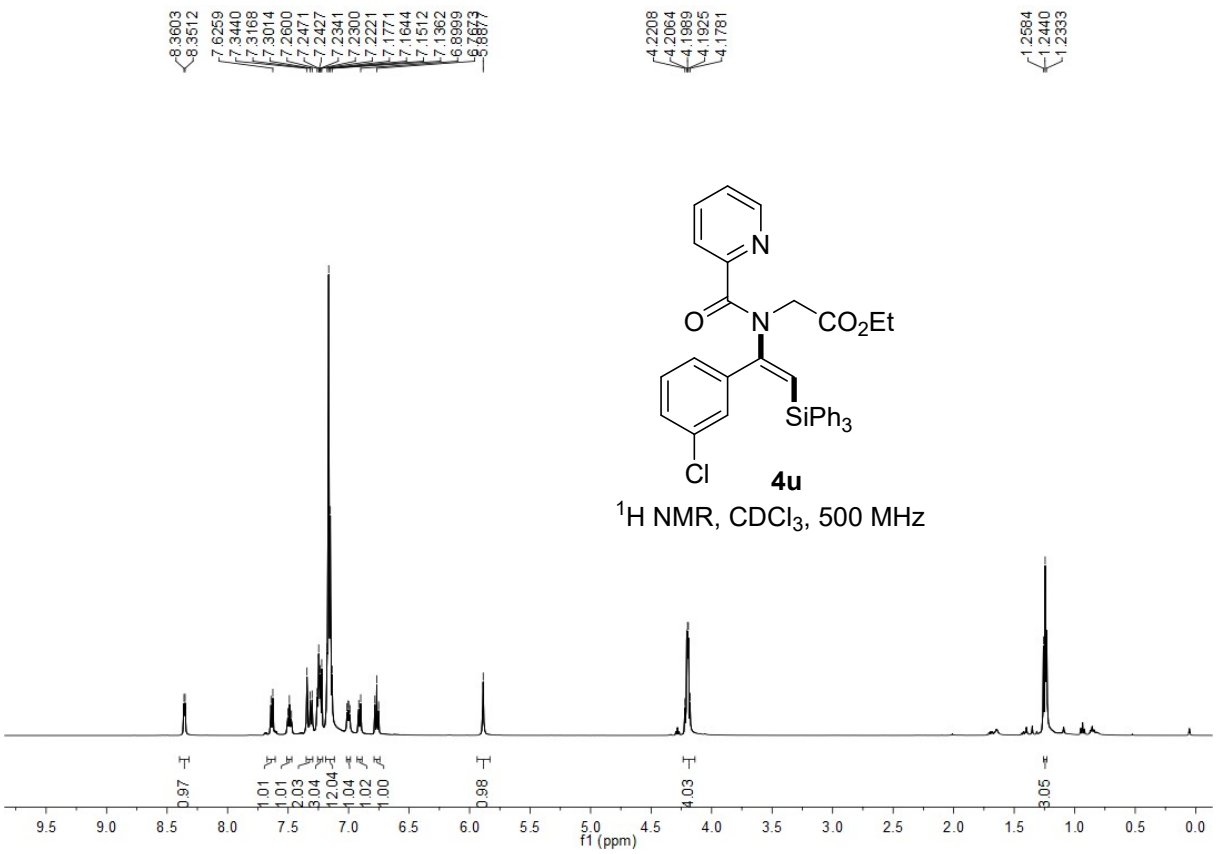
168.7094
158.7127
155.4690
153.6811
148.0824
137.7496
136.2816
135.5052
134.3843
129.0538
128.7939
127.4876
124.3573
123.9329
122.1397
115.7836
114.6193
77.2545
77.0000
76.7463
61.1336
54.7494
48.9040
14.1692
N
O
N
CO2Et
SiPh3
OMe
4t
13C NMR, CDCl3, 125 MHz
f1 (ppm)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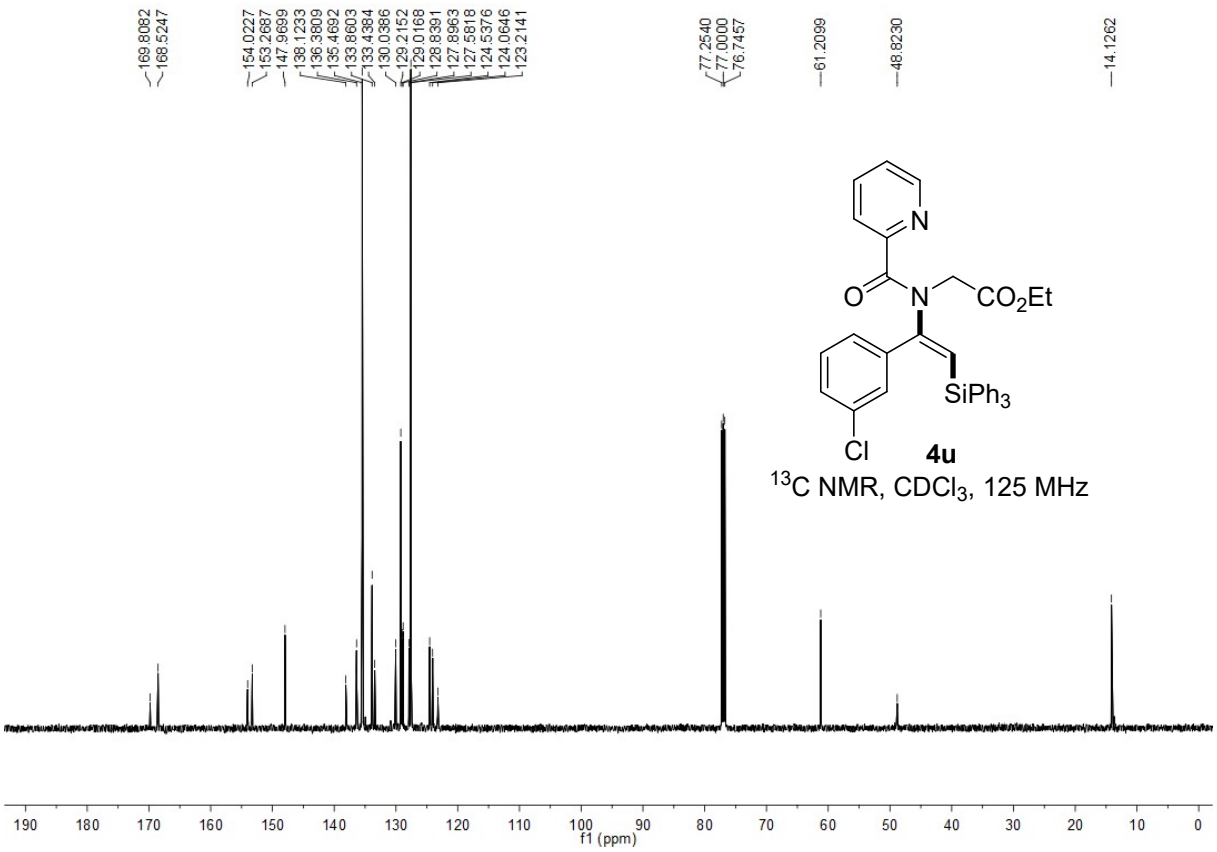
7.2600
7.2471
7.2427
7.2341
7.2300
7.2221
7.1771
7.1644
7.1512
7.1362
6.8999
6.8677
4.2208
4.2064
4.1989
4.1925
4.1781
1.2584
1.2440
1.2333
N
O
N
CO2Et
SiPh3
Cl
4u
1H NMR, CDCl3, 500 MHz
0.97
1.01
1.01
2.03
3.04
12.04
1.04
1.02
1.00
0.98
4.03
3.05
f1 (ppm)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153.2687
147.9699
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136.3809
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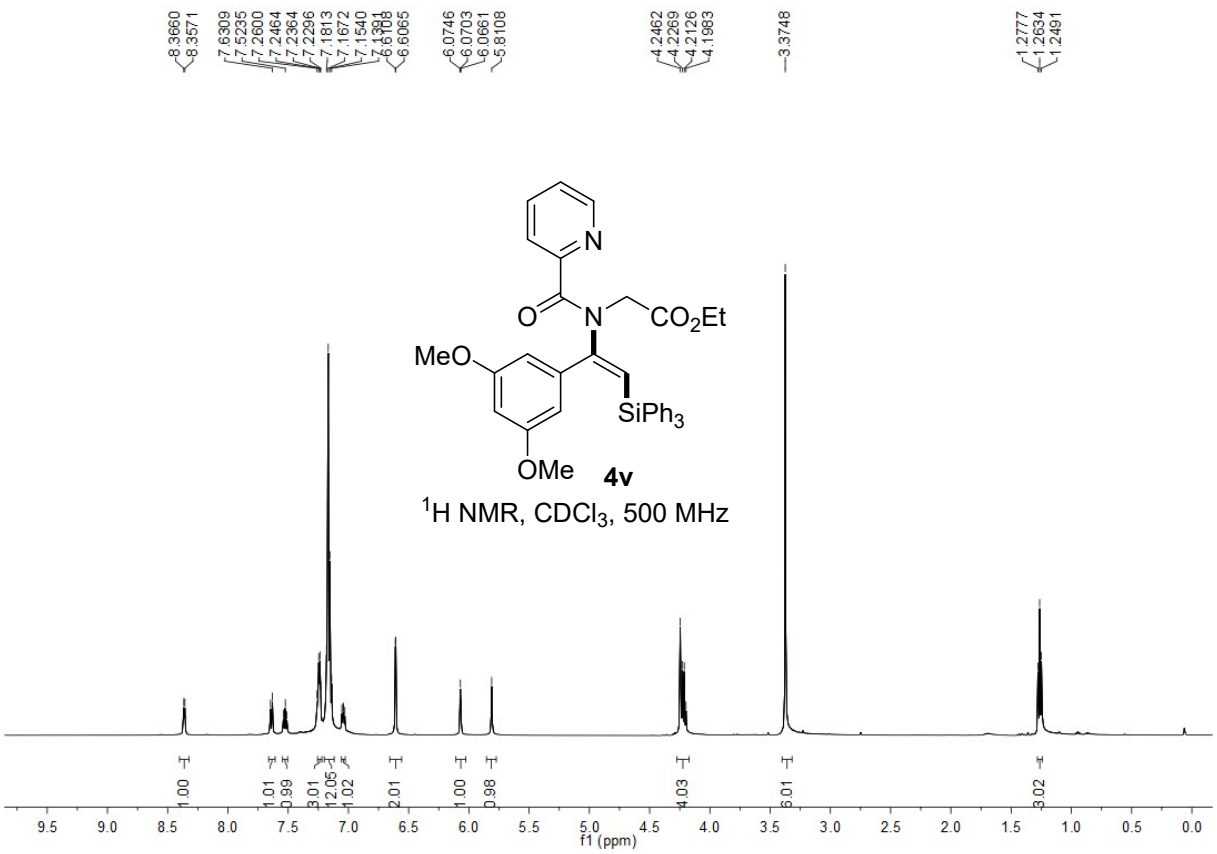
133.8603
133.4384
130.0386
129.2152
129.0168
128.8391
127.8963
127.5818
124.5376
124.0646
123.2141
77.2540
77.0000
76.7457
61.2099
48.8230
14.1262
N
O
N
CO2Et
SiPh3
Cl
4u
13C NMR, CDCl3, 125 MHz
f1 (ppm)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7.2364
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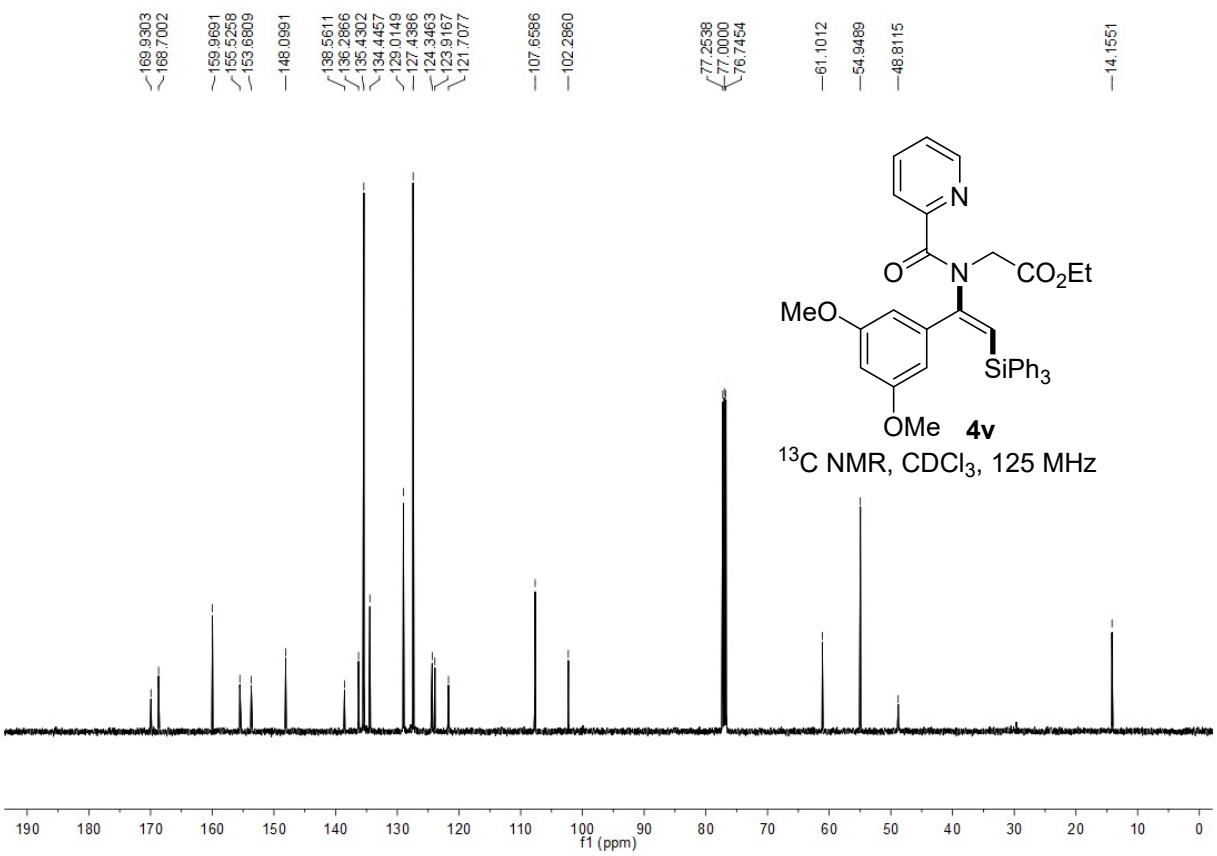
7.1540
6.6088
6.6065
6.0746
6.0703
6.0661
5.8108
4.2462
4.2269
4.2126
4.1983
3.3748
1.2777
1.2634
1.2491
N
O
N
CO2Et
MeO
SiPh3
OMe
4v
1H NMR, CDCl3, 500 MHz
1.00
1.01
0.99
3.01
12.05
1.02
2.01
1.00
0.98
4.03
6.01
3.02
f1 (ppm)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153.6809
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138.5611
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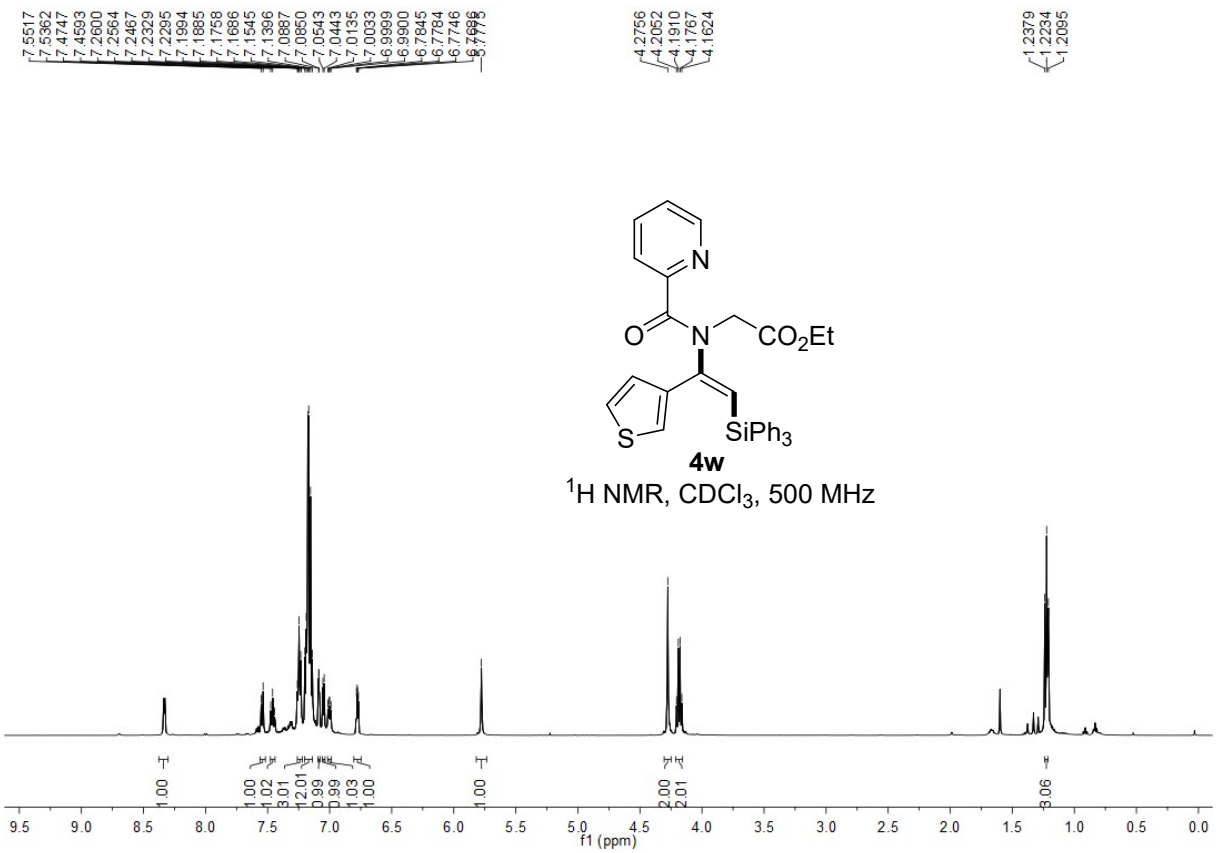
135.4302
134.4457
129.0149
127.4386
124.3463
123.9167
121.7077
107.6586
102.2860
77.2538
77.0000
76.7454
61.1012
54.9489
48.8115
14.1551
N
O
N
CO2Et
MeO
SiPh3
OMe
4v
13C NMR, CDCl3, 125 MHz
f1 (ppm)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7.2600
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7.2467
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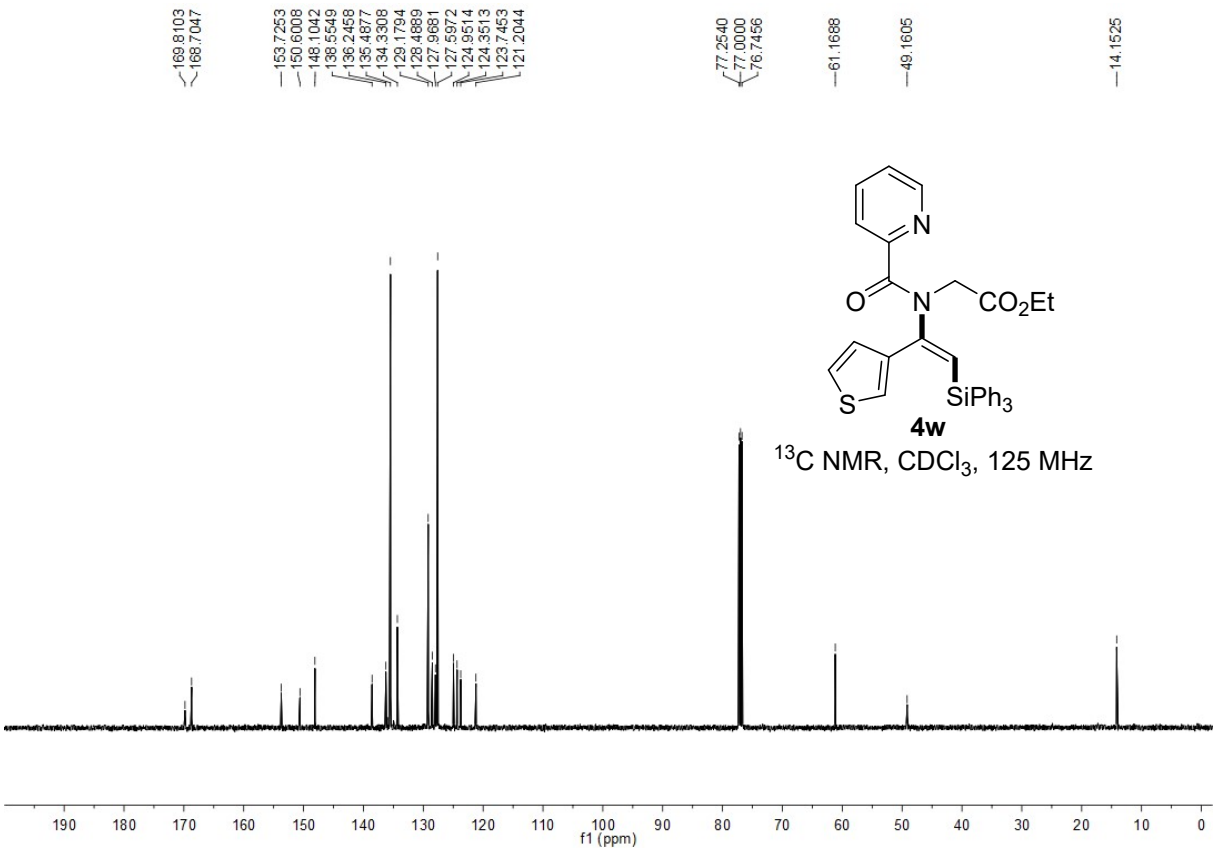
7.2295
7.1994
7.1885
7.1758
7.1686
7.1545
7.1396
7.0887
7.0850
7.0543
7.0443
7.0135
7.0033
6.9999
6.9900
6.7845
6.7784
6.7746
6.7686
4.2756
4.2052
4.1910
4.1767
4.1624
1.2379
1.2234
1.2095
N
O
N
CO2Et
S
SiPh3
4w
1H NMR, CDCl3, 500 MHz
1.00
1.00
1.02
3.01
12.01
0.99
0.99
1.03
1.00
1.00
2.00
2.01
3.06
f1 (ppm)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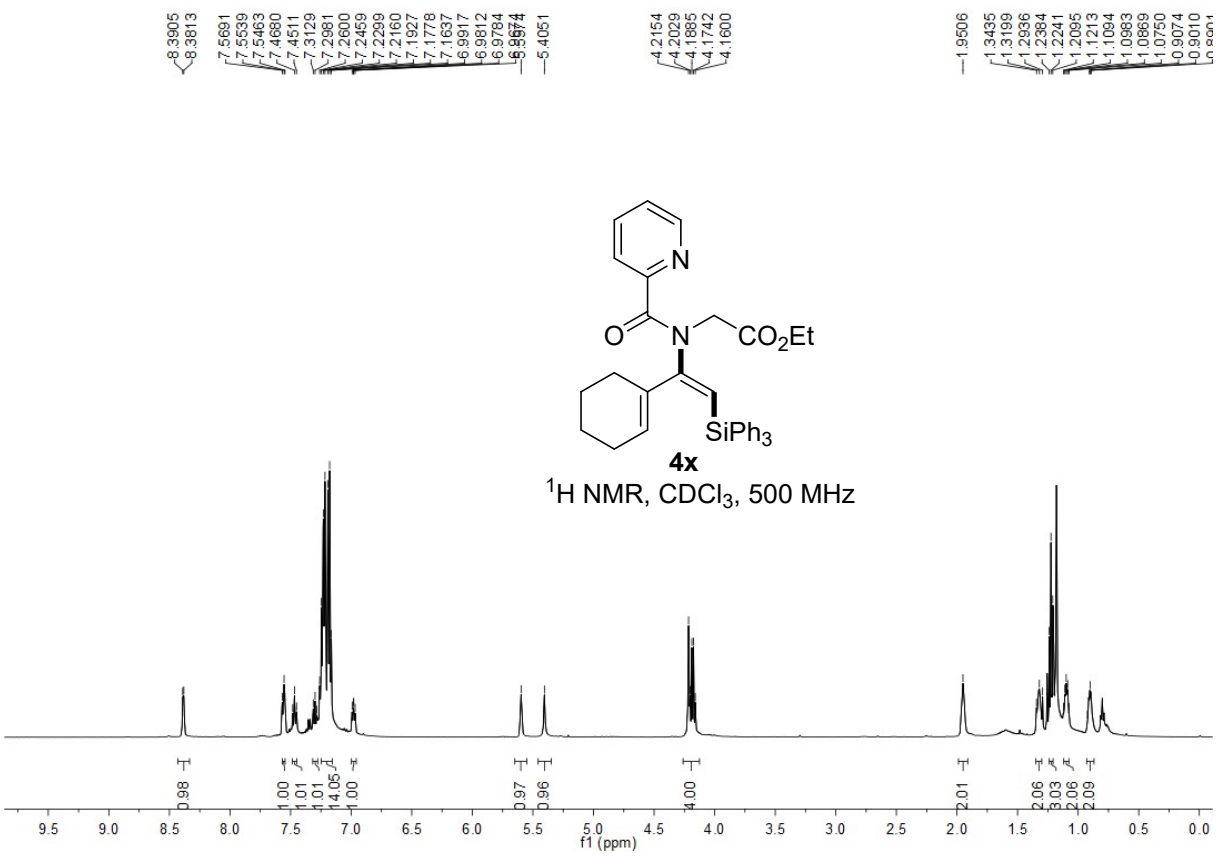
127.5972
124.9514
124.3513
123.7453
121.2044
77.2540
77.0000
76.7456
61.1688
49.1605
14.1525
N
O
N
CO2Et
S
SiPh3
4w
13C NMR, CDCl3, 125 MHz
f1 (ppm)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7.4511
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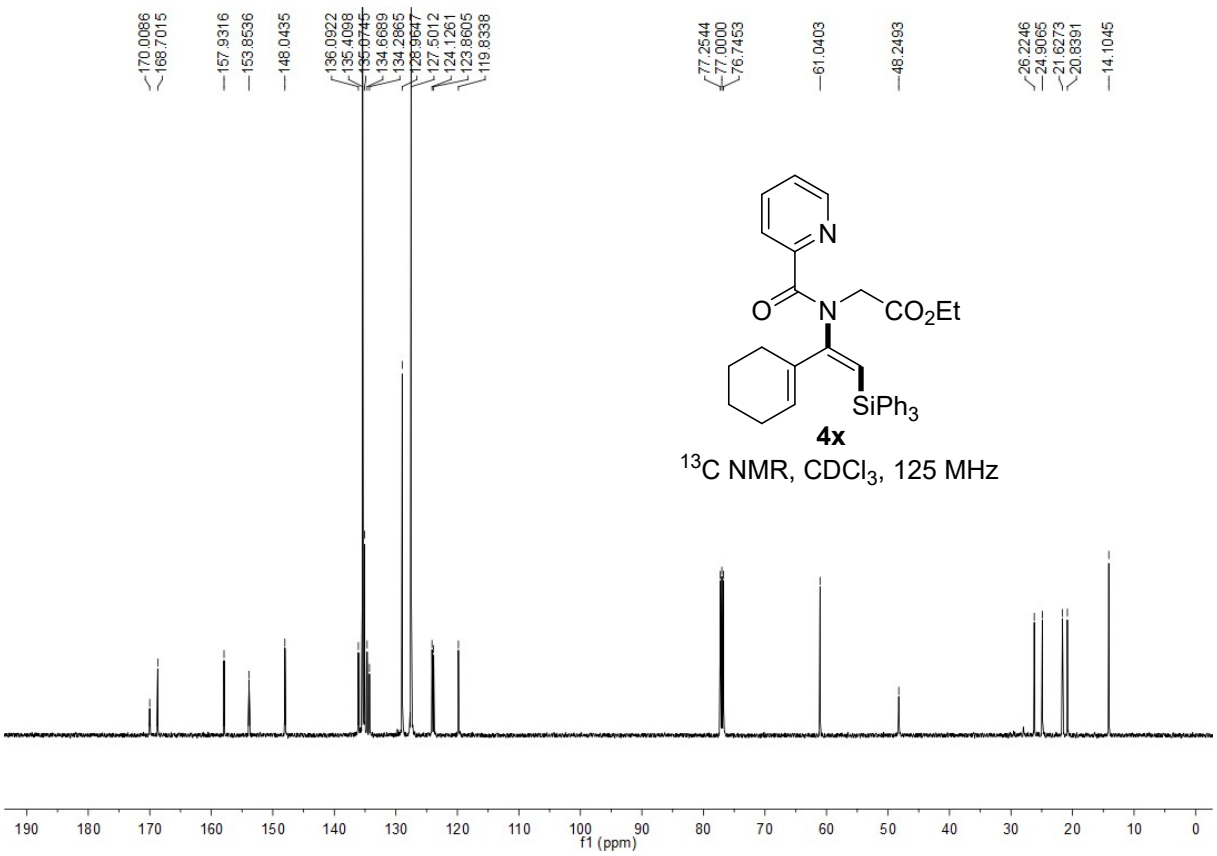
7.2981
7.2600
7.2459
7.2299
7.2160
7.1927
7.1778
7.1637
6.9917
6.9812
6.9784
5.4051
4.2154
4.2029
4.1885
4.1742
4.1600
1.9506
1.3435
1.3199
1.2936
1.2384
1.2241
1.2095
1.1213
1.1094
1.0983
1.0869
1.0750
0.9074
0.9010
N
O
N
CO2Et
SiPh3
4x
1H NMR, CDCl3, 500 MHz
0.98
1.00
1.01
1.01
4.05
1.00
0.97
0.96
4.00
2.01
2.06
3.03
2.06
2.09
f1 (ppm)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157.9316
153.8536
148.0435
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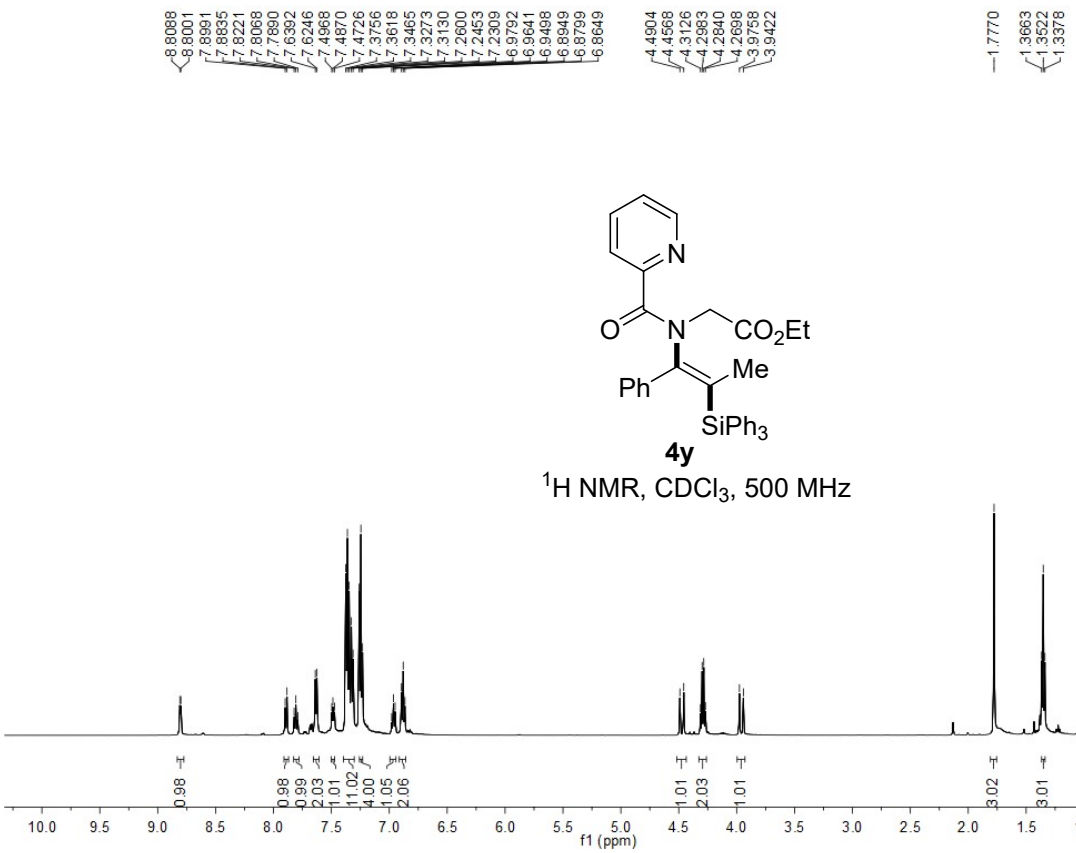
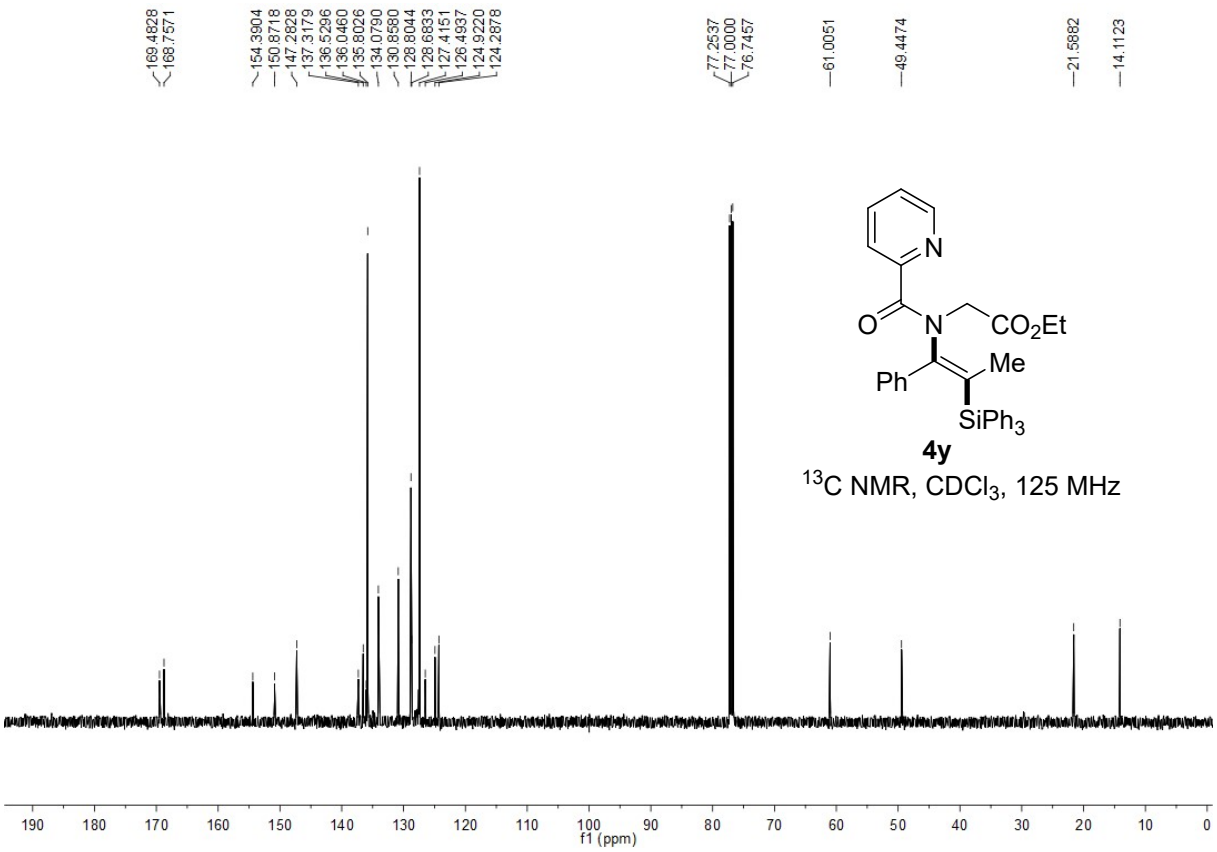
124.1261
123.8605
119.8338
77.2544
77.0000
76.7453
61.0403
48.2493
26.2246
24.9065
21.6273
20.8391
14.1045
N
O
N
CO2Et
SiPh3
4x
13C NMR, CDCl3, 125 MHz
f1 (ppm)



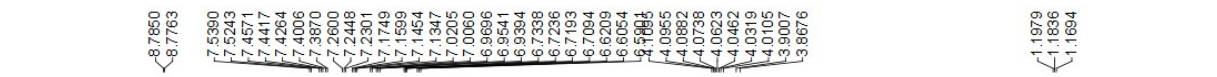
4y

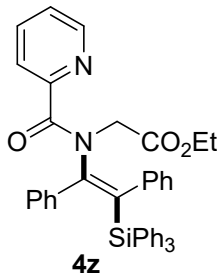
^{1}H NMR, $CDCl_3$, 500 MHz



4y

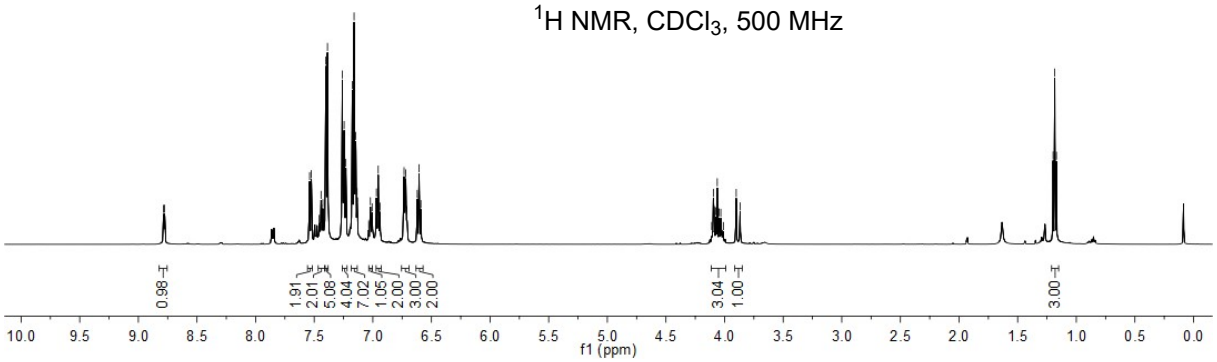
^{13}C NMR, $CDCl_3$, 125 MHz

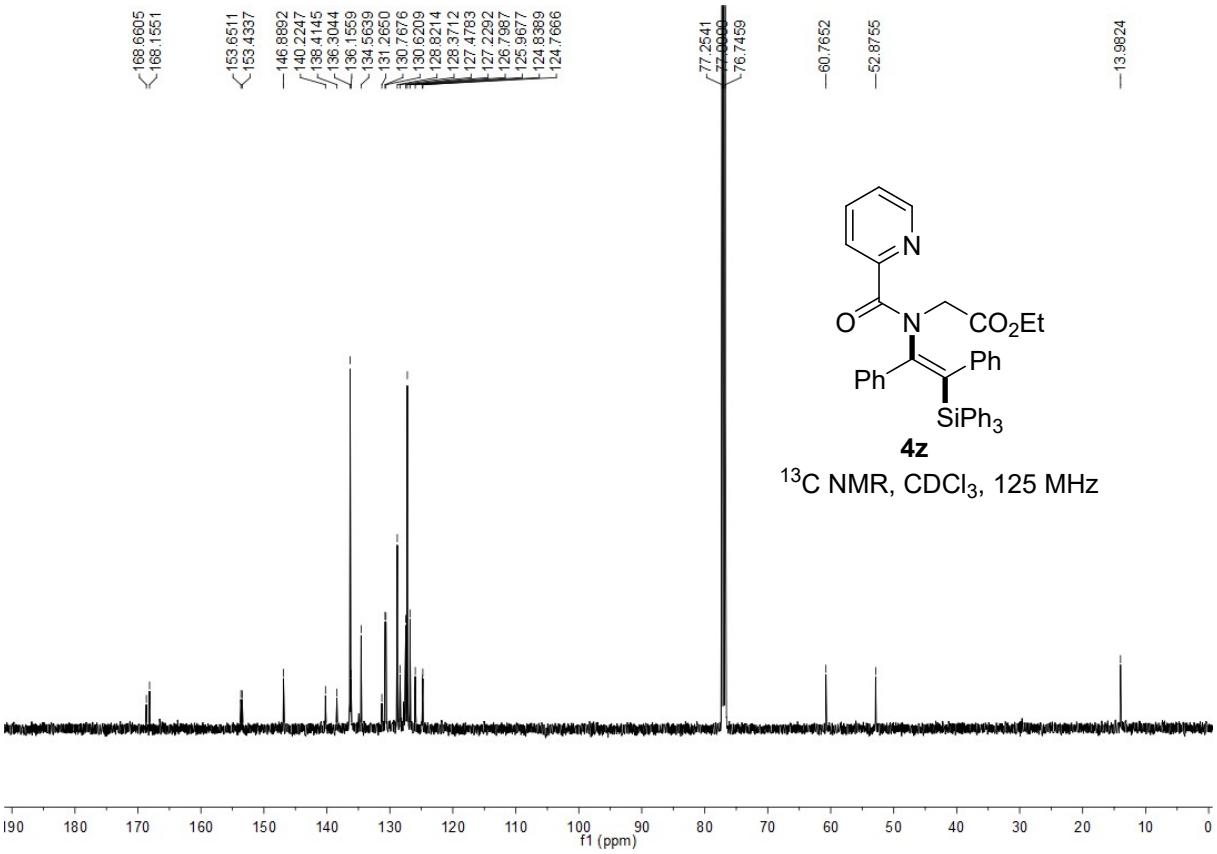




4z

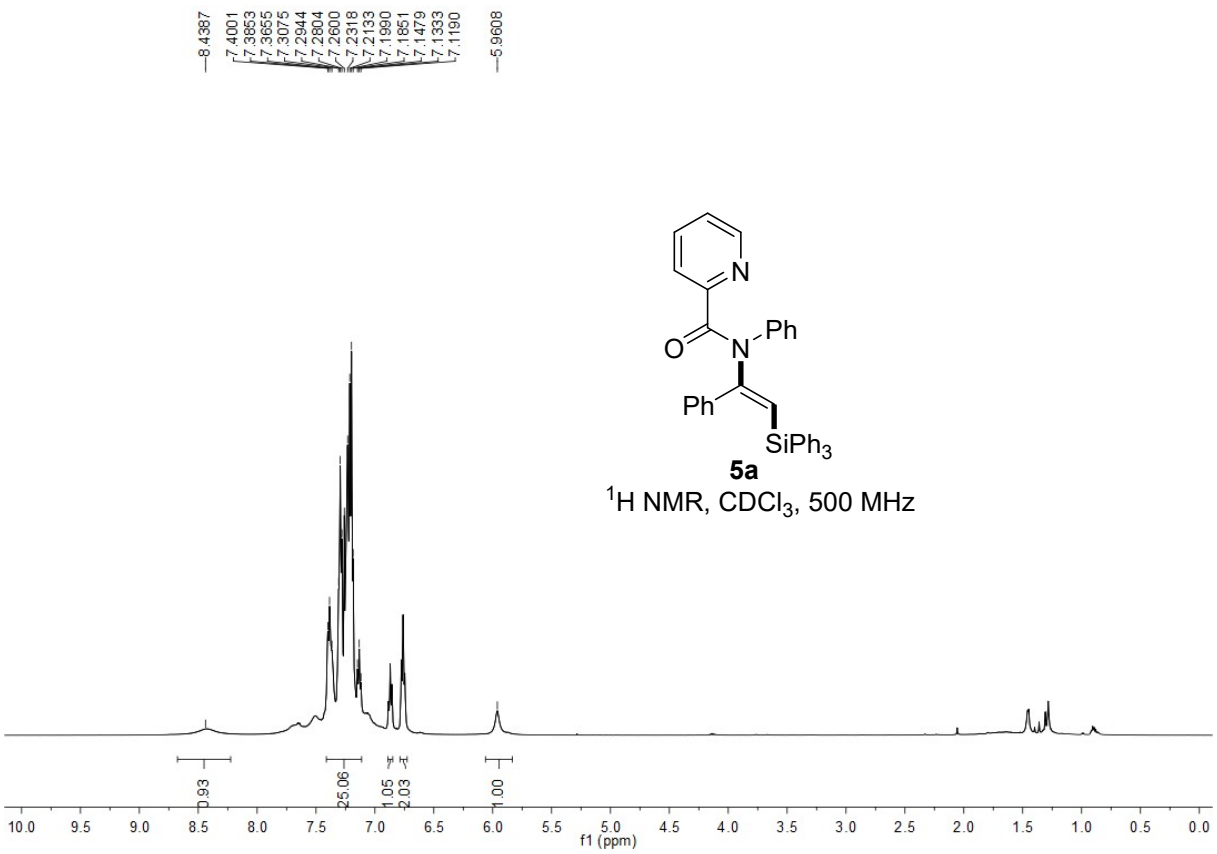
^{1}H NMR, $CDCl_3$, 500 MHz





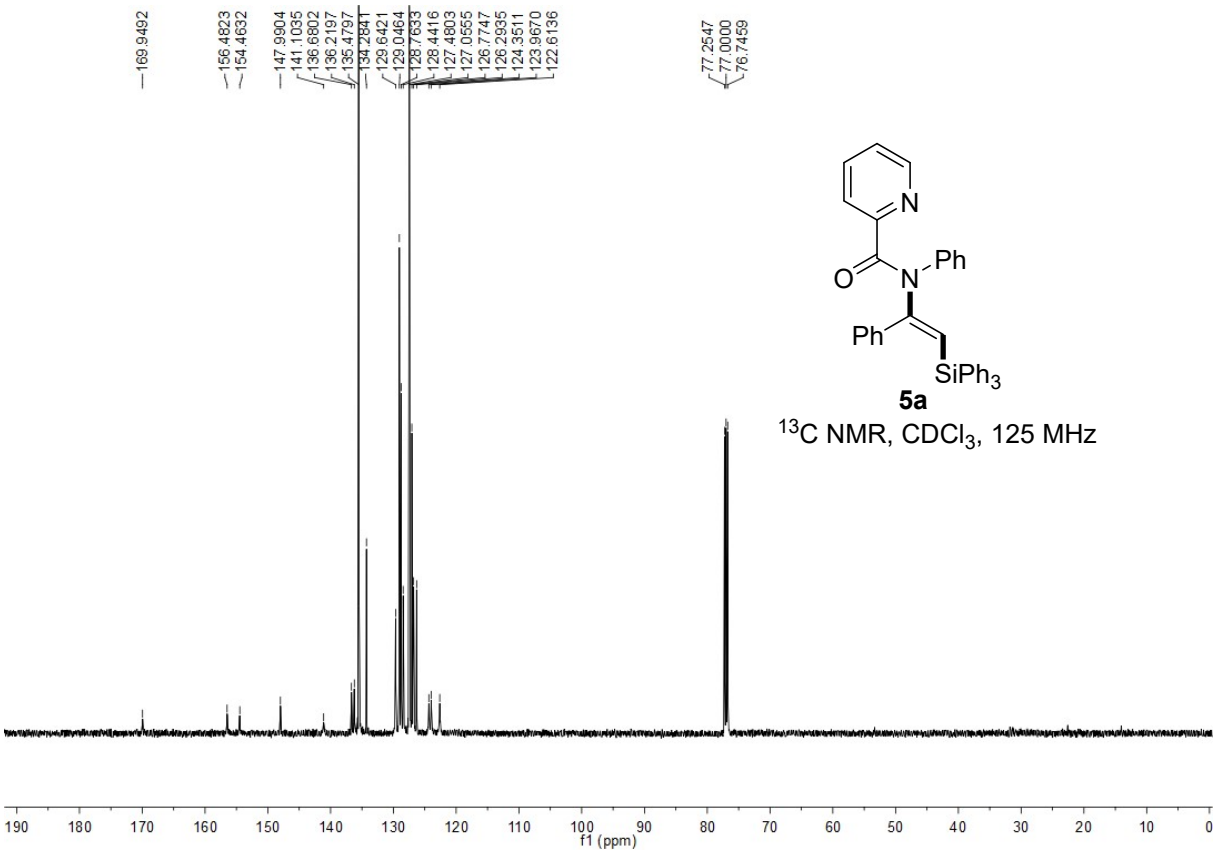
4z

^{13}C NMR, $CDCl_3$, 125 MHz



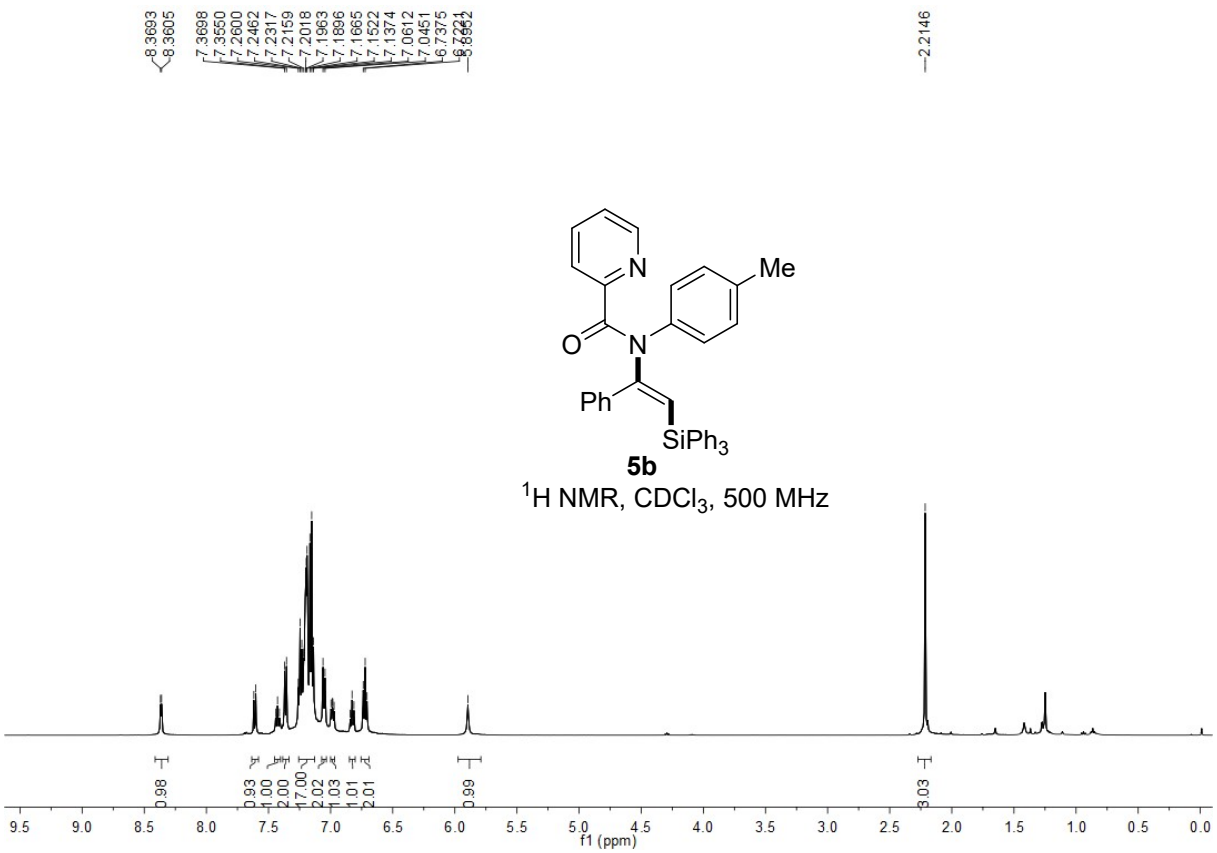
5a

^{1}H NMR, $CDCl_3$, 500 MHz



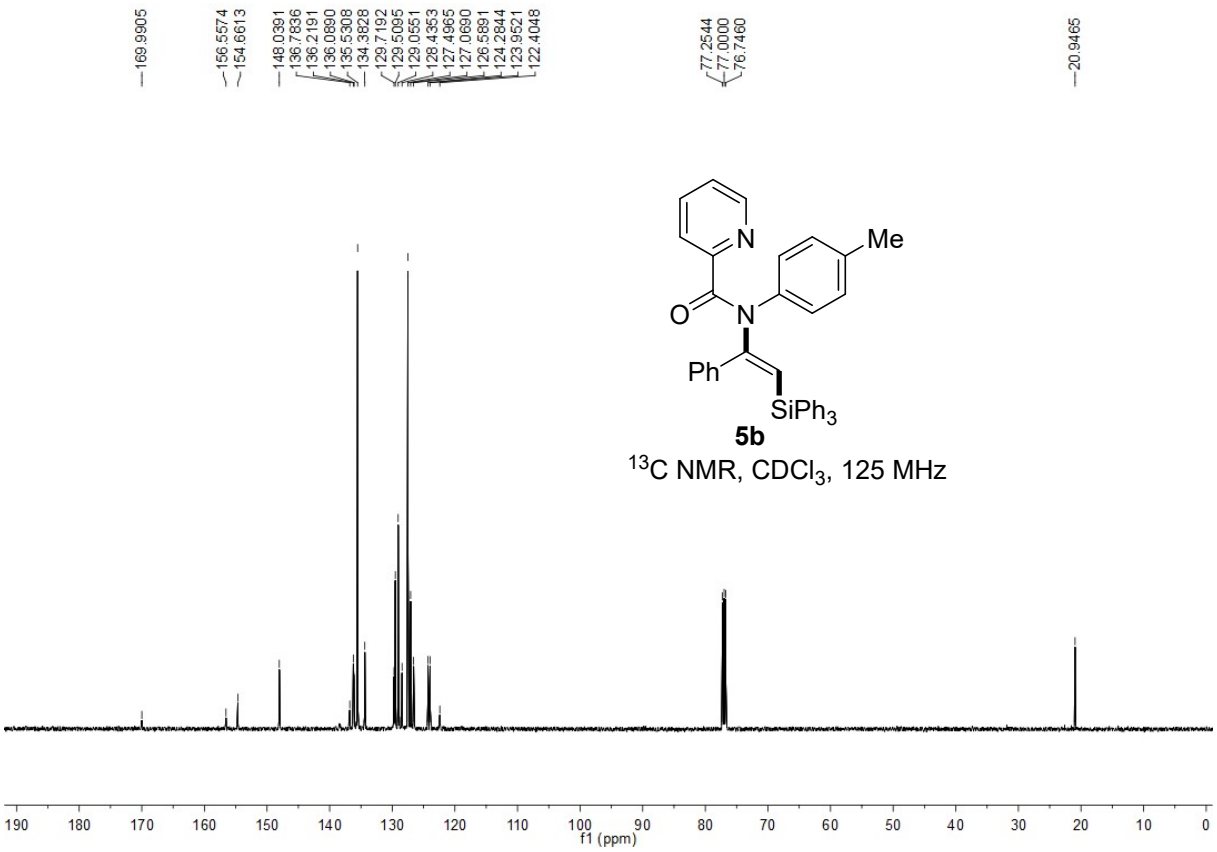
5a

^{13}C NMR, $CDCl_3$, 125 MHz



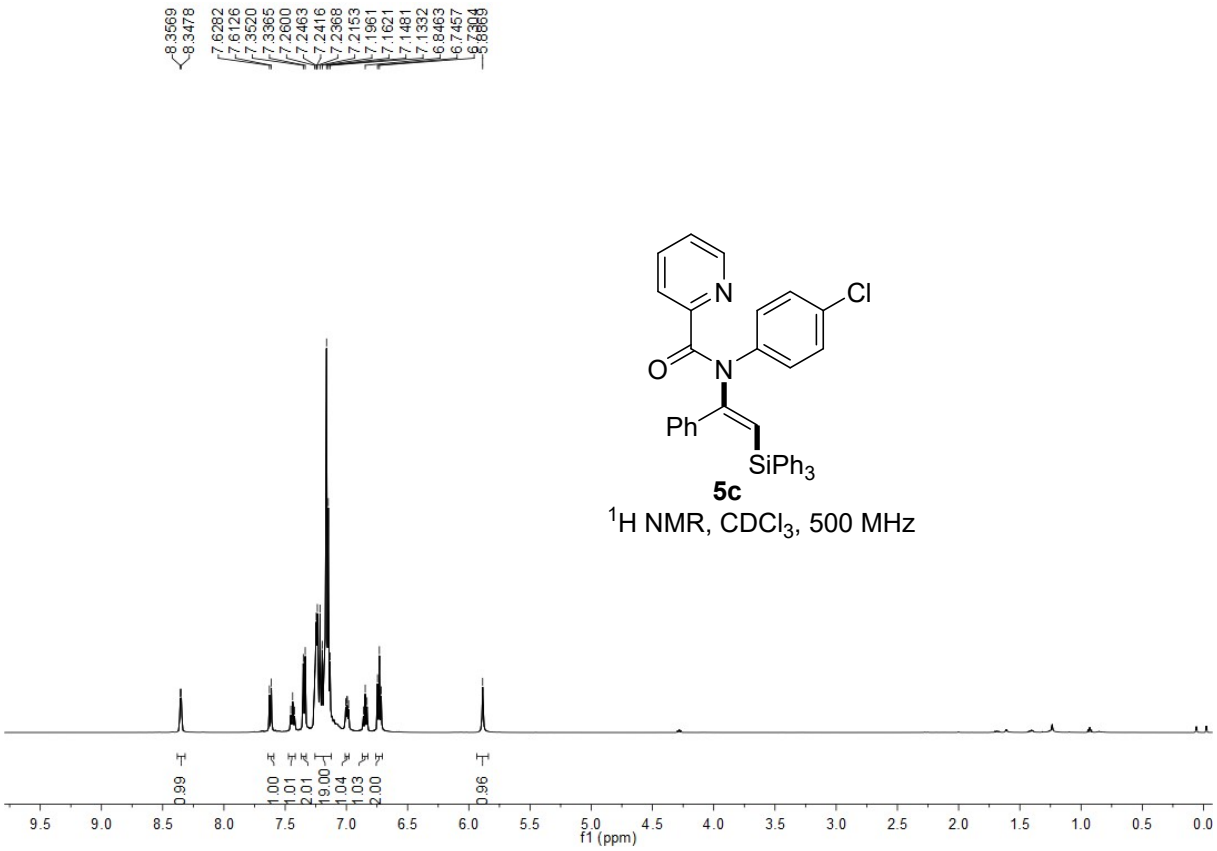
5b

^{1}H NMR, $CDCl_3$, 500 MHz



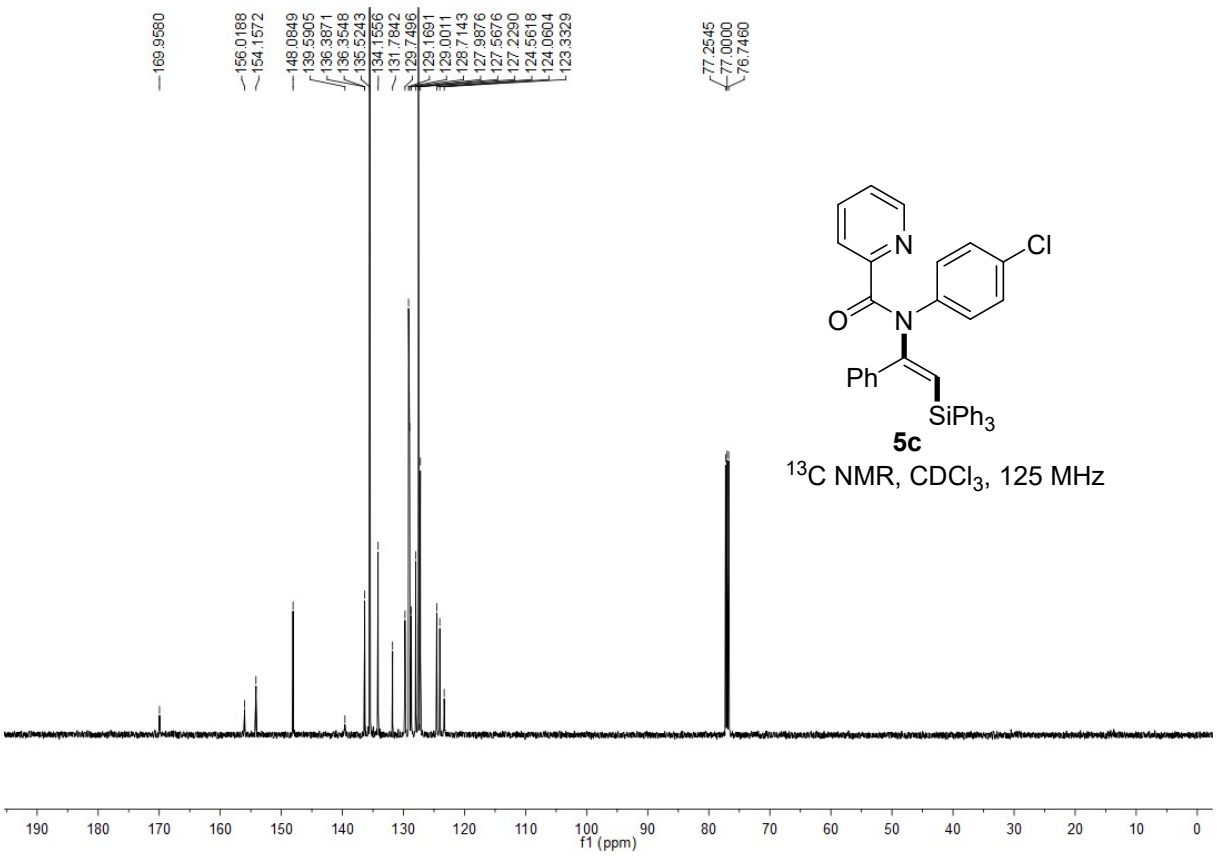
5b

^{13}C NMR, $CDCl_3$, 125 MHz



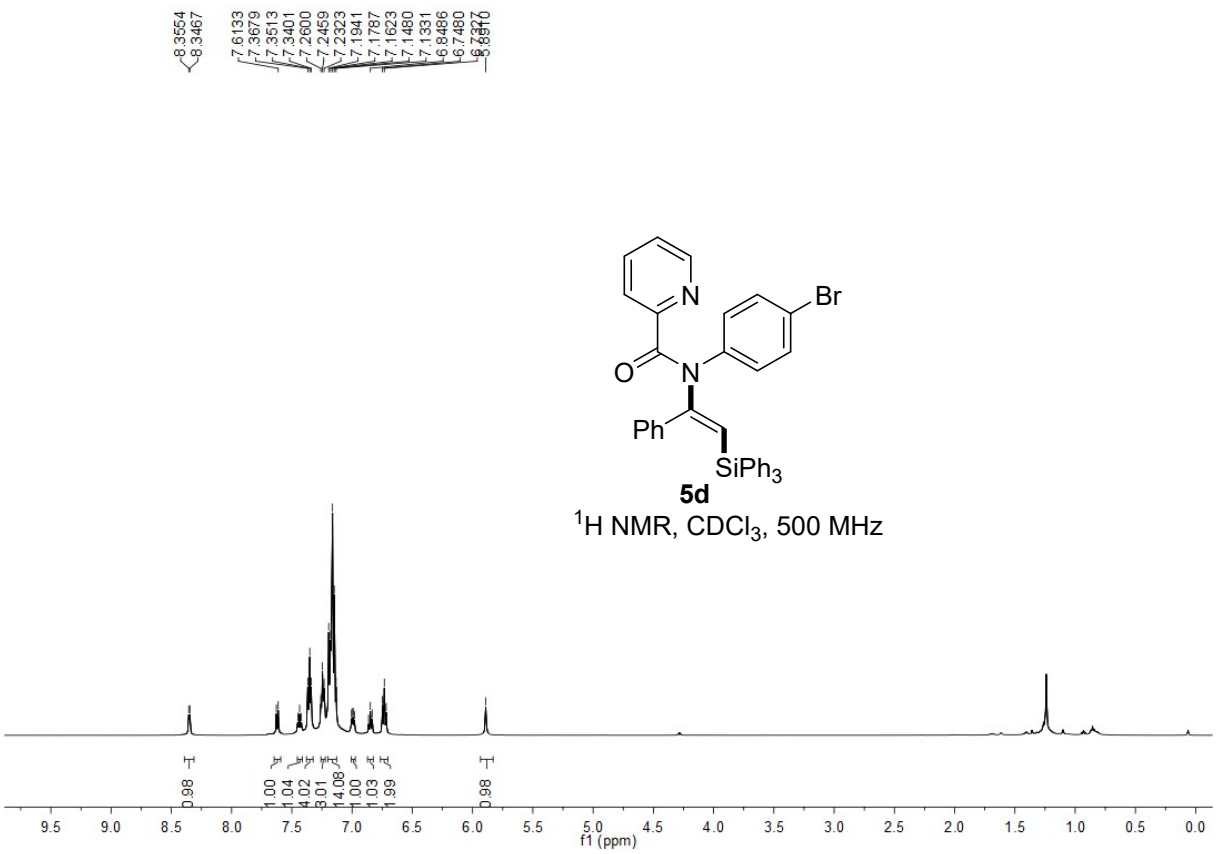
5c

^{1}H NMR, $CDCl_3$, 500 MHz



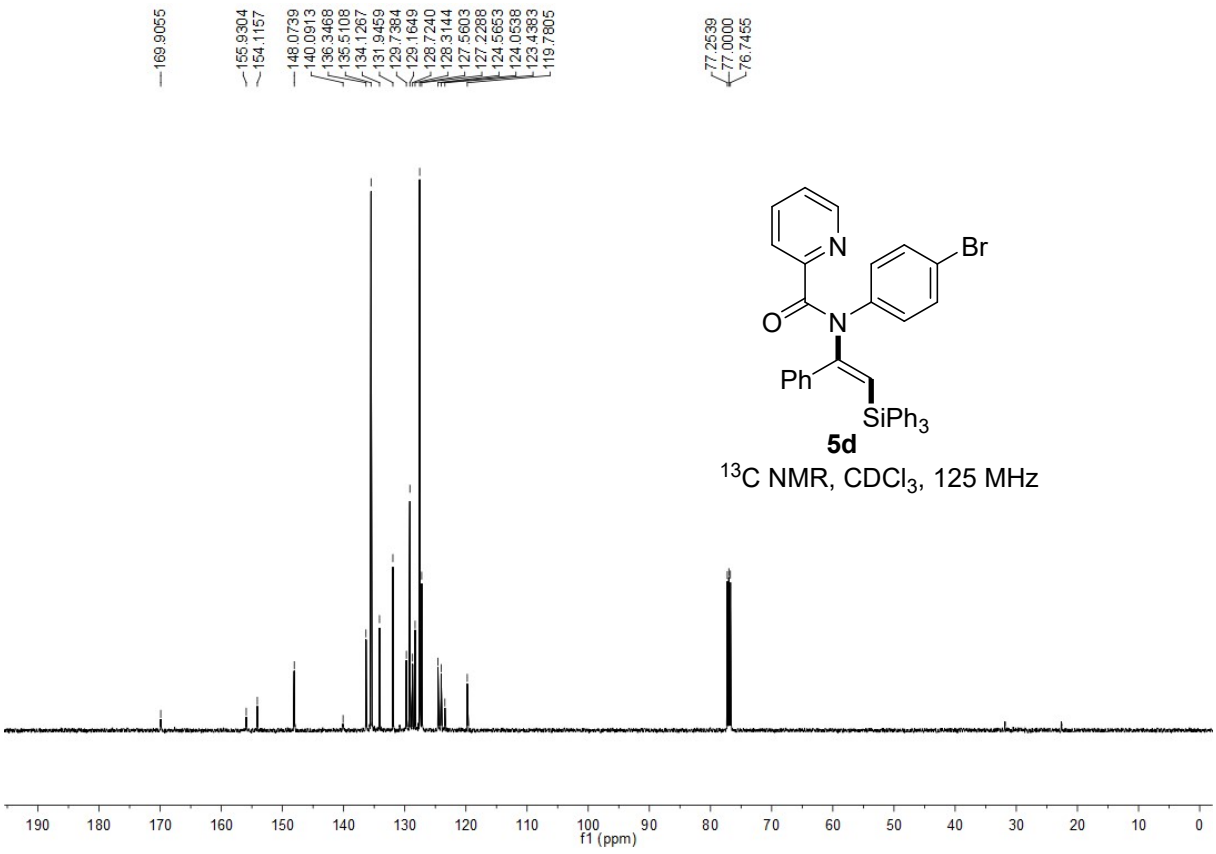
5c

^{13}C NMR, $CDCl_3$, 125 MHz



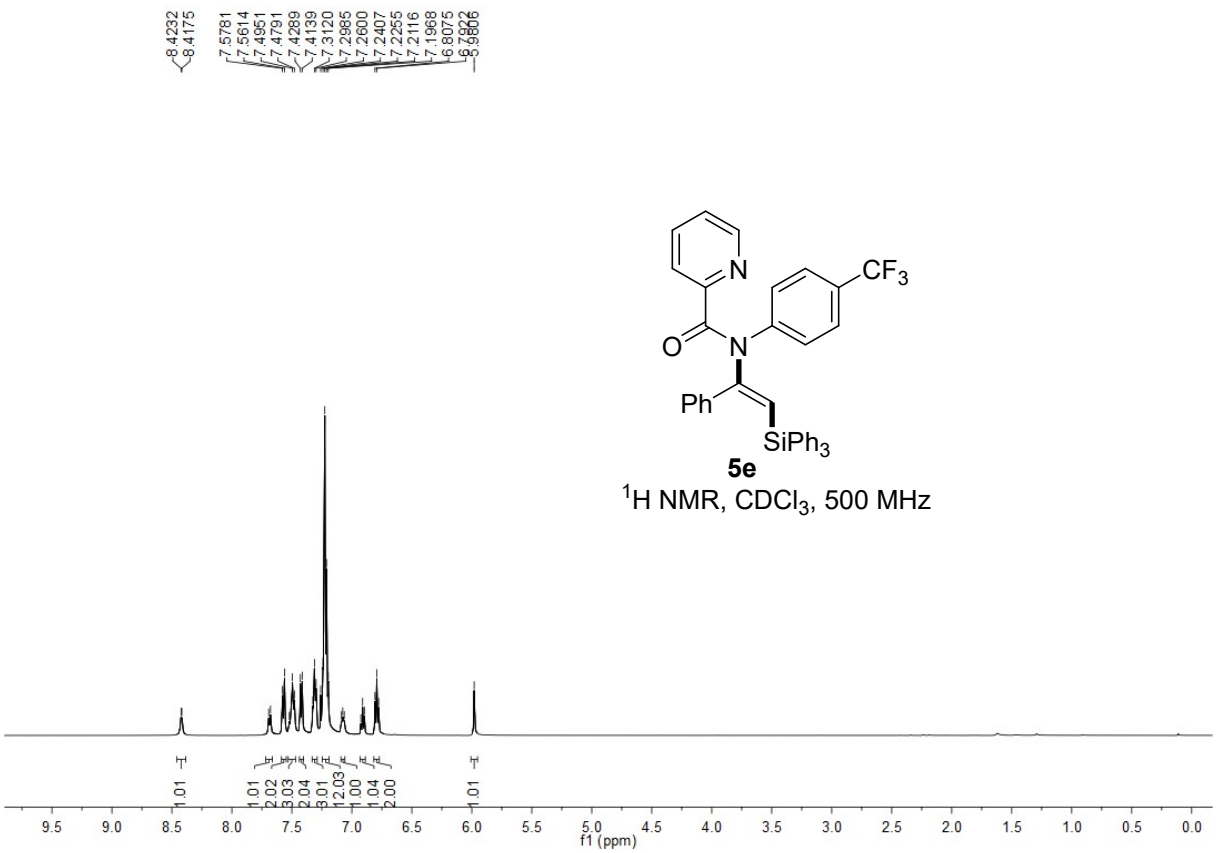
5d

^{1}H NMR, $CDCl_3$, 500 MHz



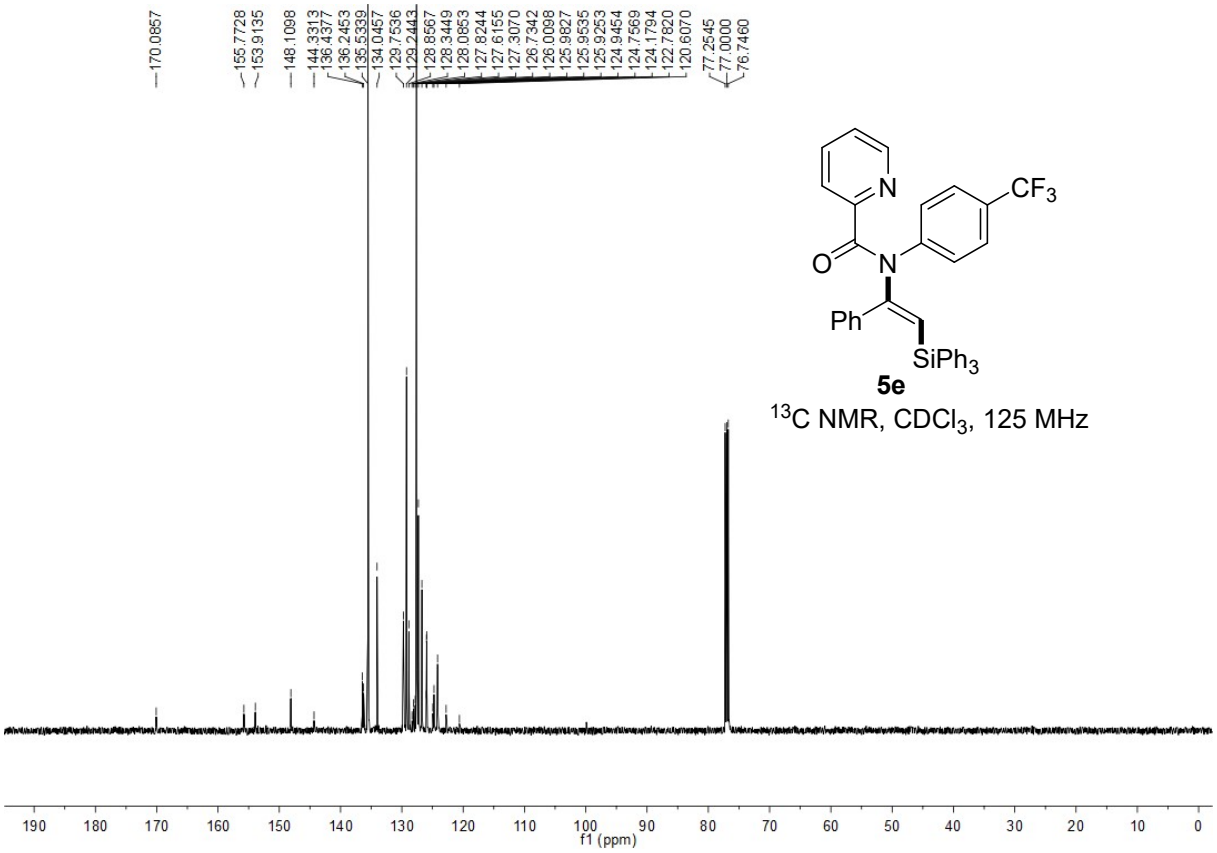
5d

^{13}C NMR, $CDCl_3$, 125 MHz



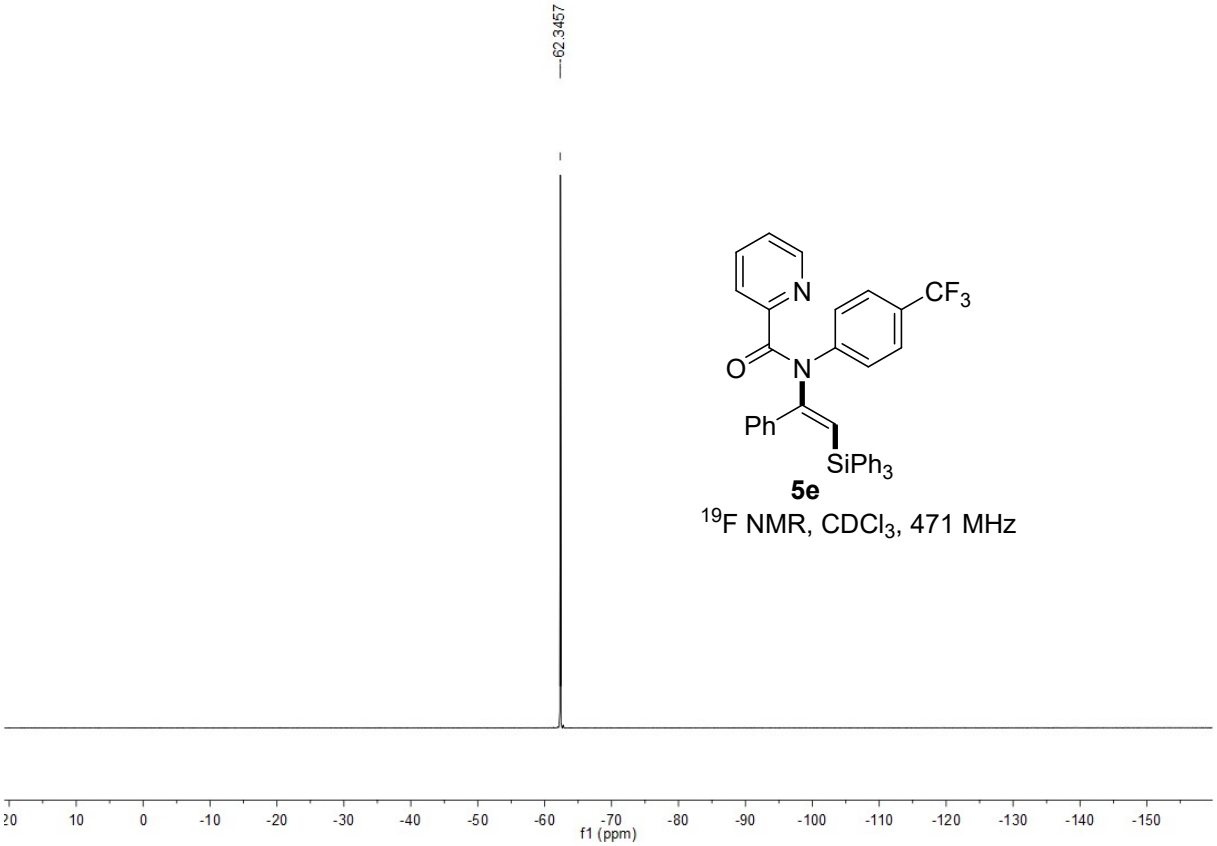
5e

^{1}H NMR, $CDCl_3$, 500 MHz



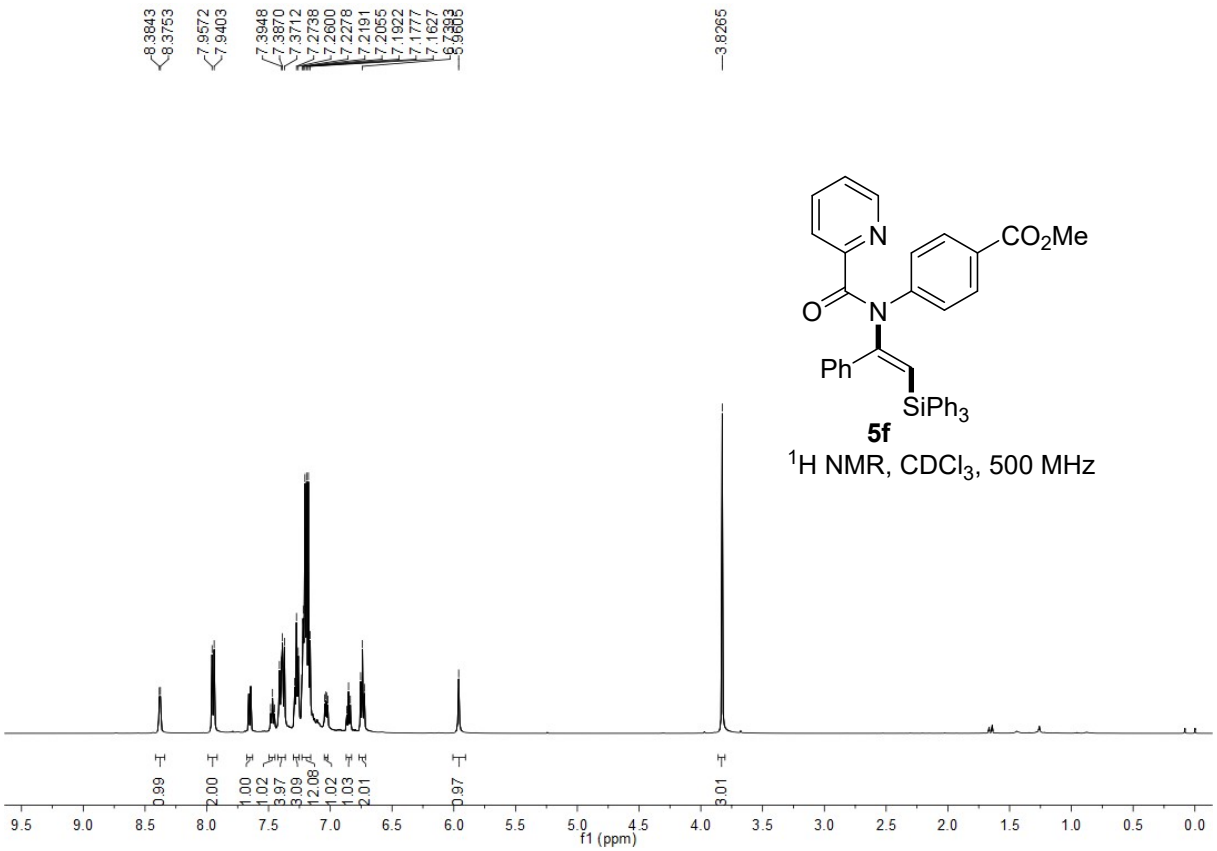
5e

^{13}C NMR, $CDCl_3$, 125 MHz



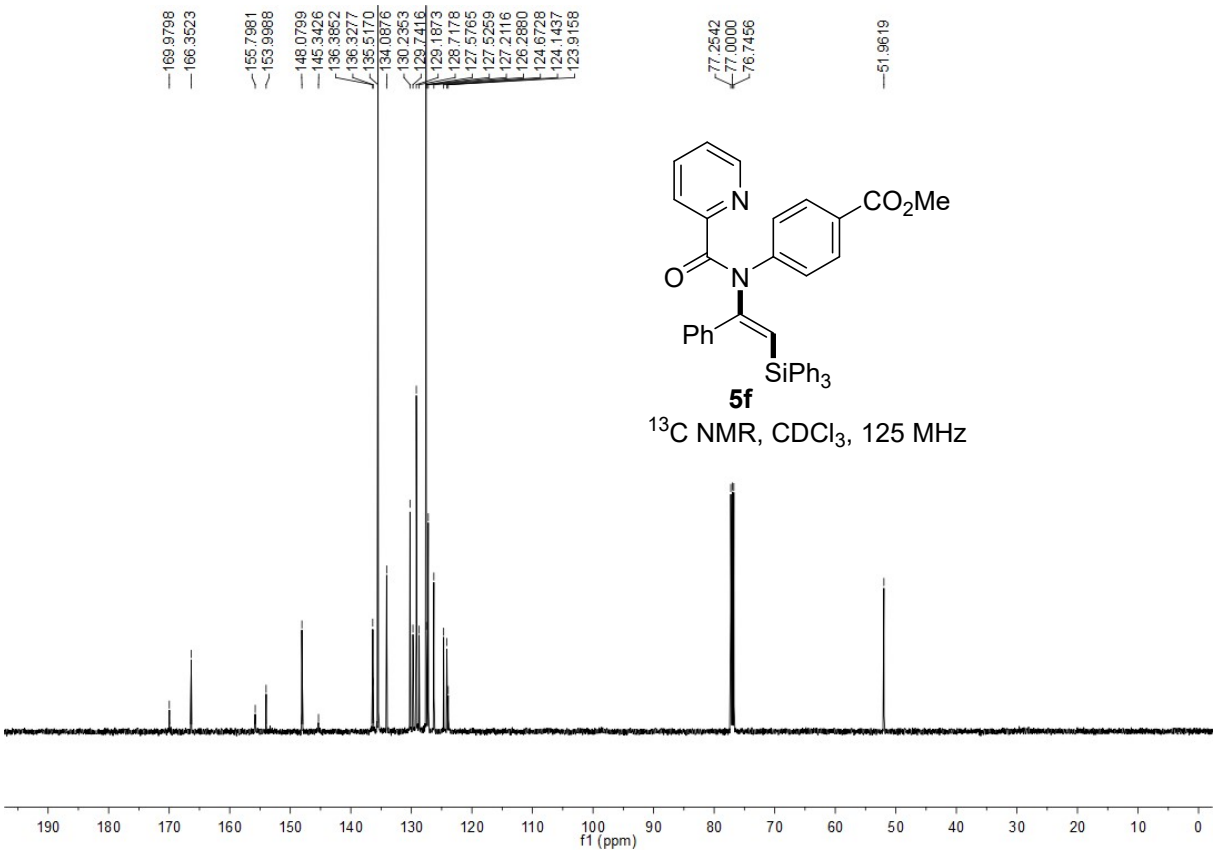
5e

^{19}F NMR, $CDCl_3$, 471 MHz



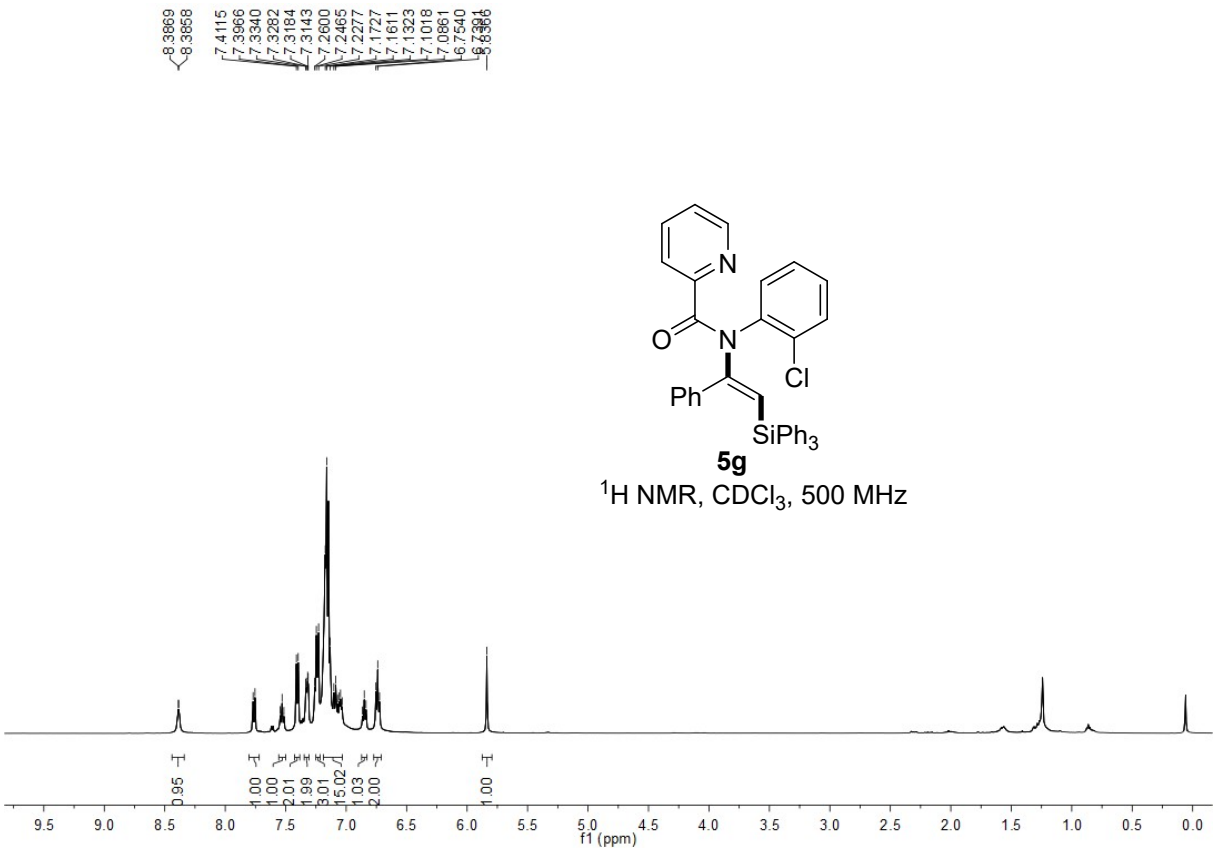
5f

^{1}H NMR, $CDCl_3$, 500 MHz



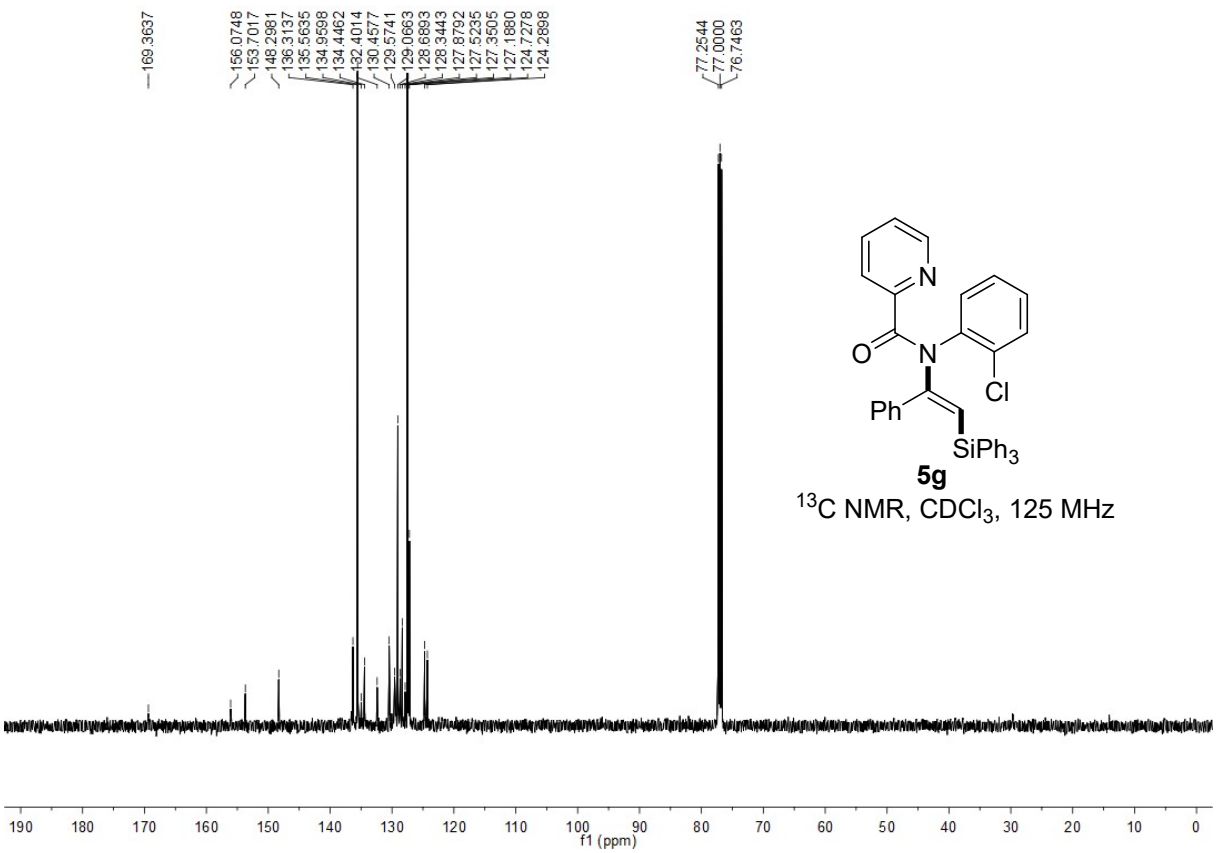
5f

^{13}C NMR, $CDCl_3$, 125 MHz



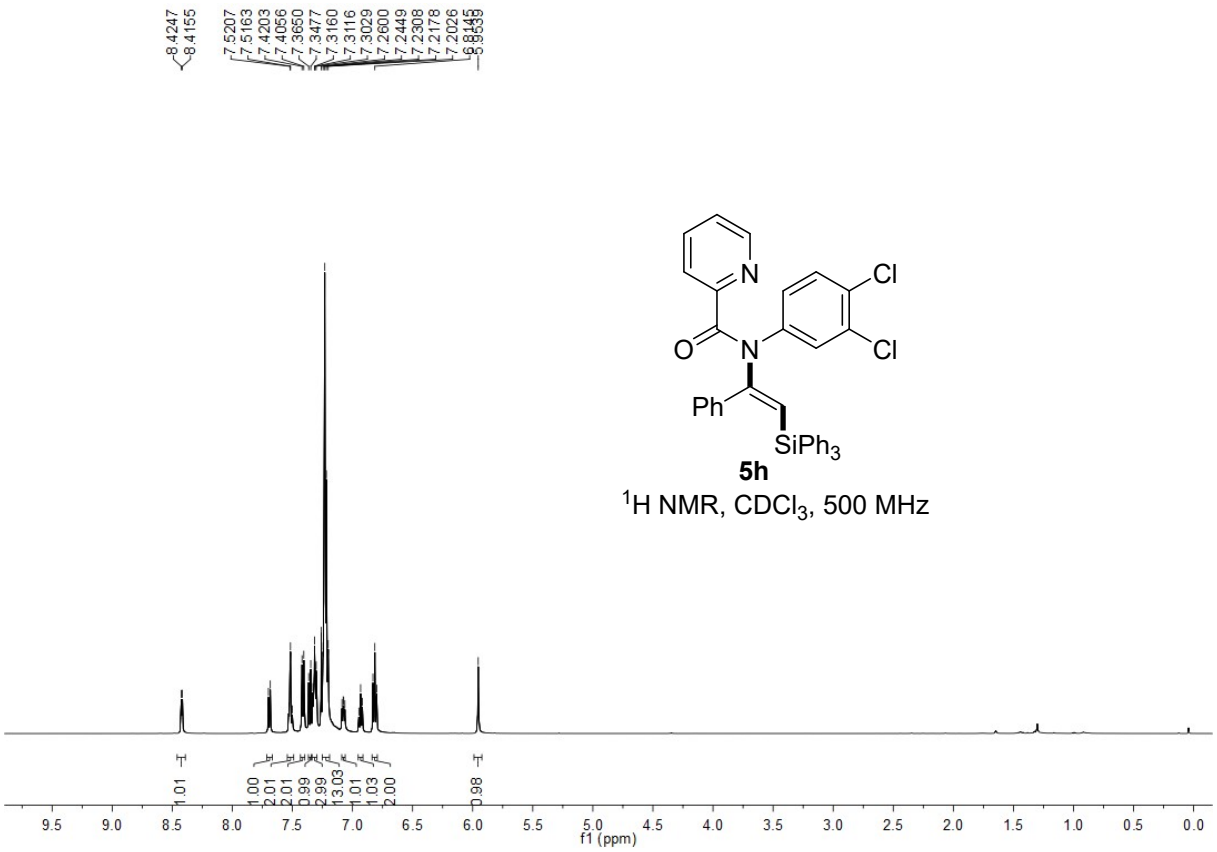
5g

^{1}H NMR, $CDCl_3$, 500 MHz



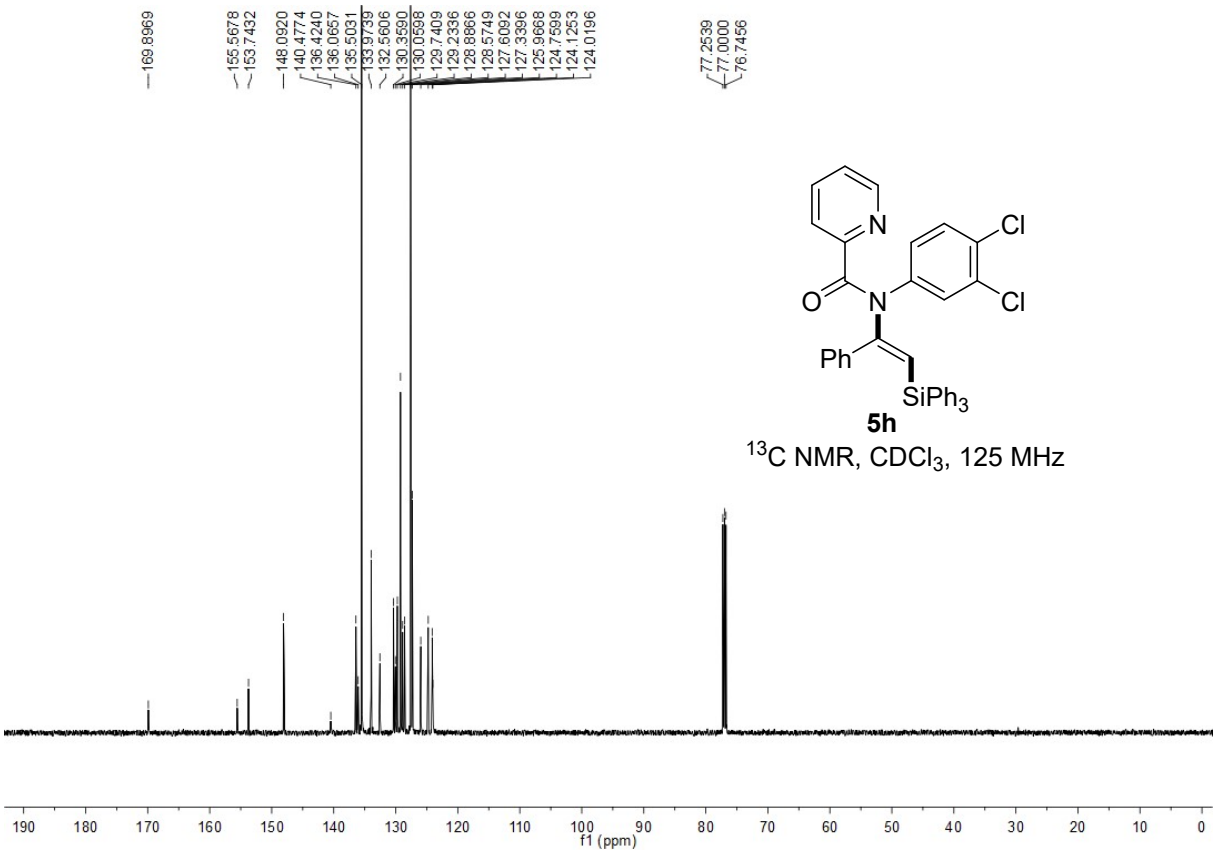
5g

^{13}C NMR, $CDCl_3$, 125 MHz



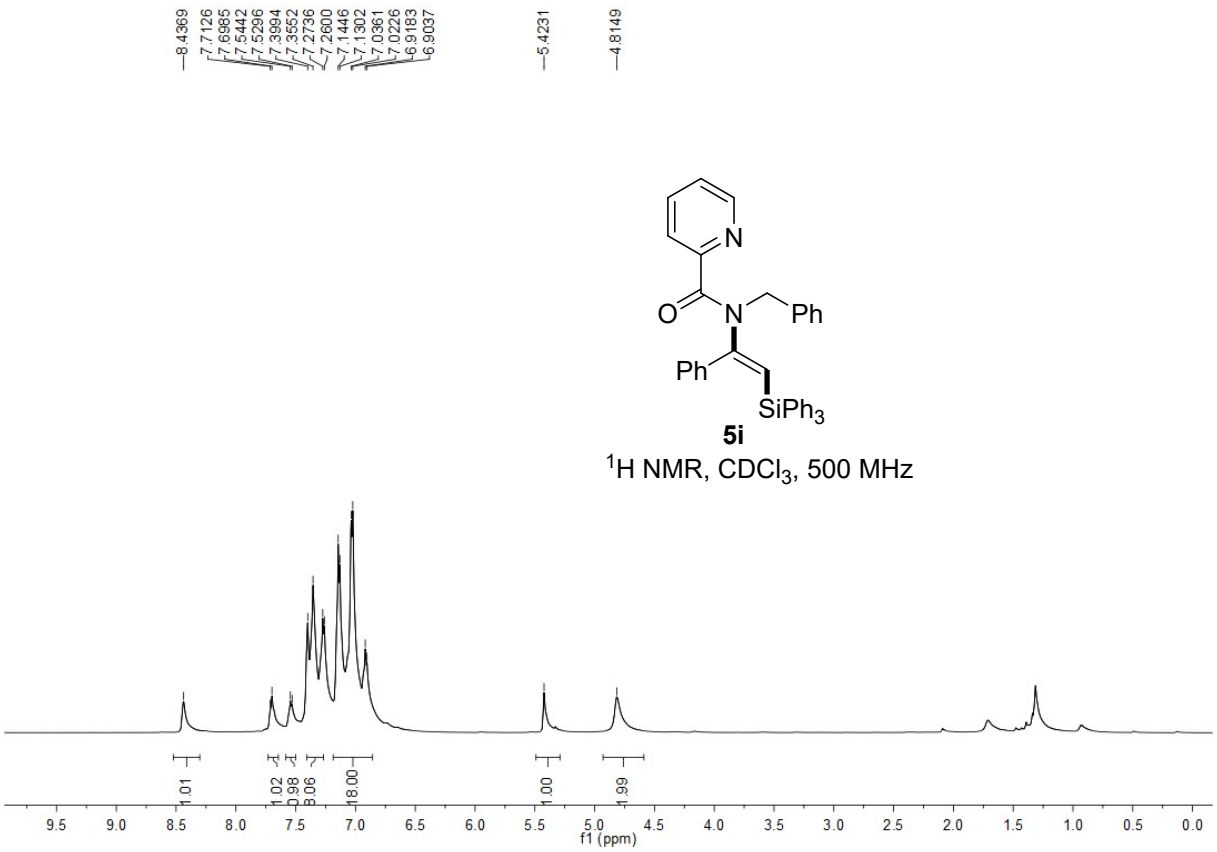
5h

^{1}H NMR, $CDCl_3$, 500 MHz



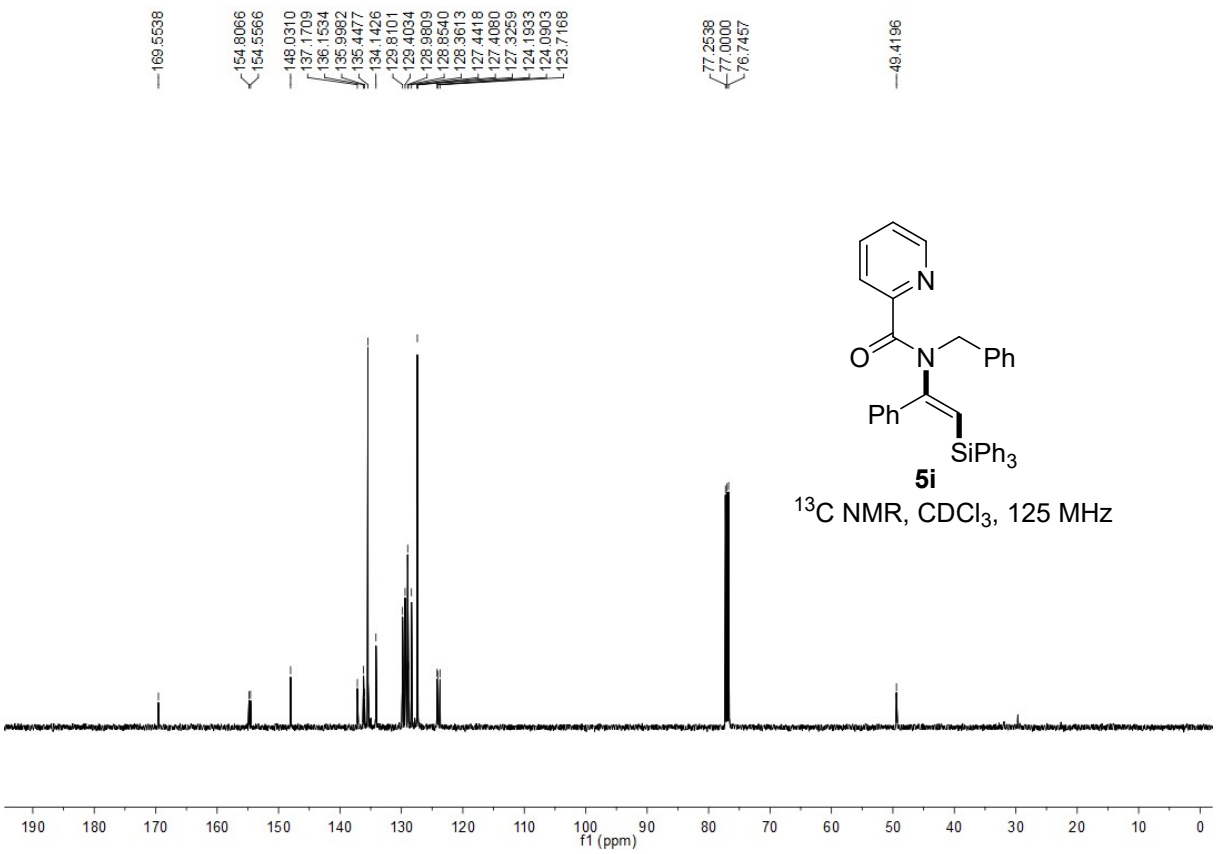
5h

^{13}C NMR, $CDCl_3$, 125 MHz



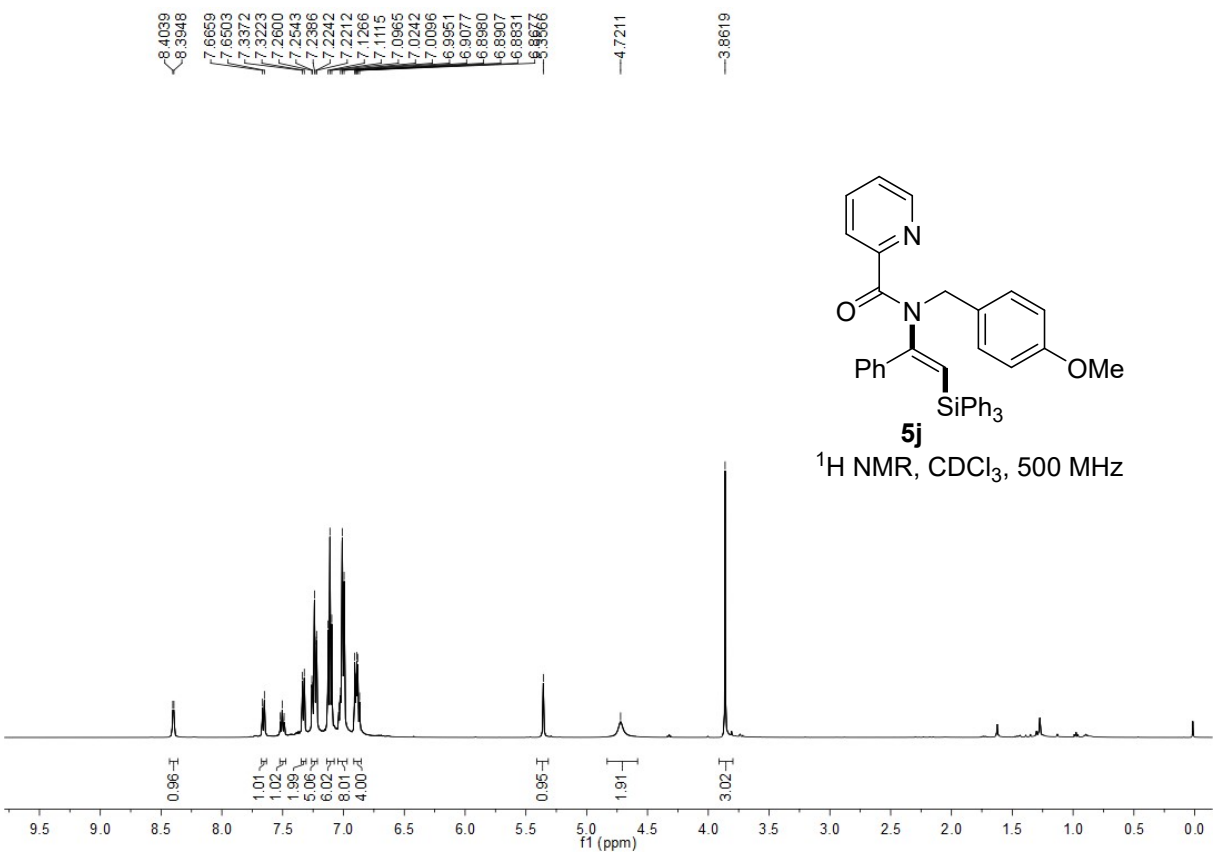
5i

^{1}H NMR, $CDCl_3$, 500 MHz



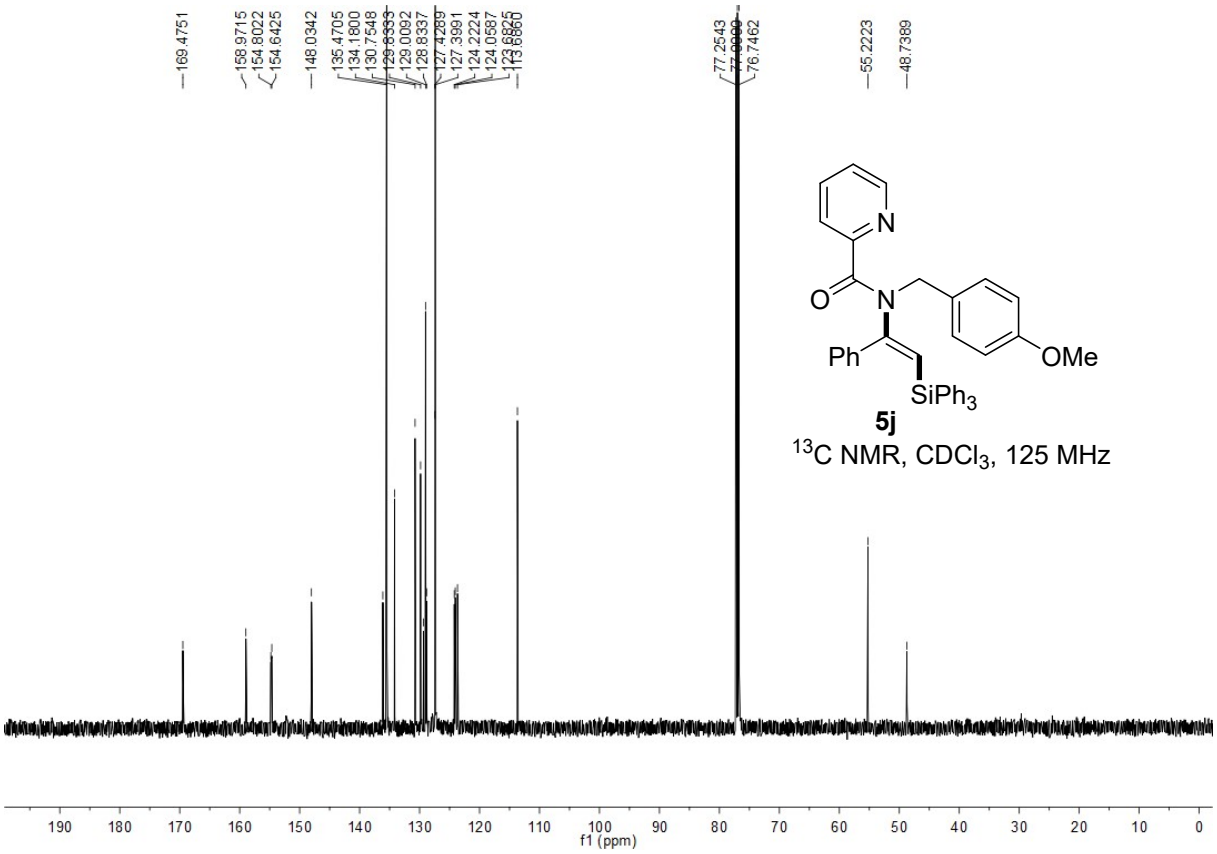
5i

^{13}C NMR, $CDCl_3$, 125 MHz



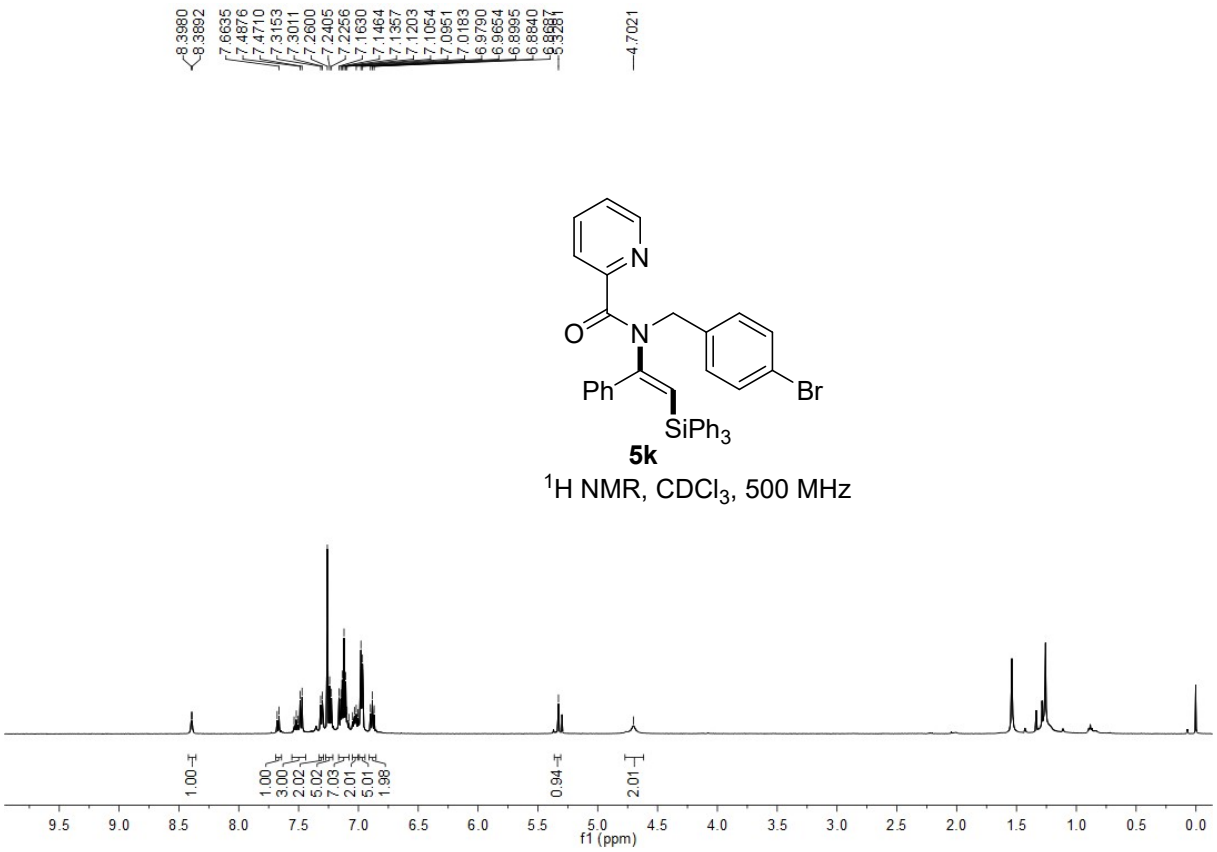
5j

^{1}H NMR, $CDCl_3$, 500 MHz



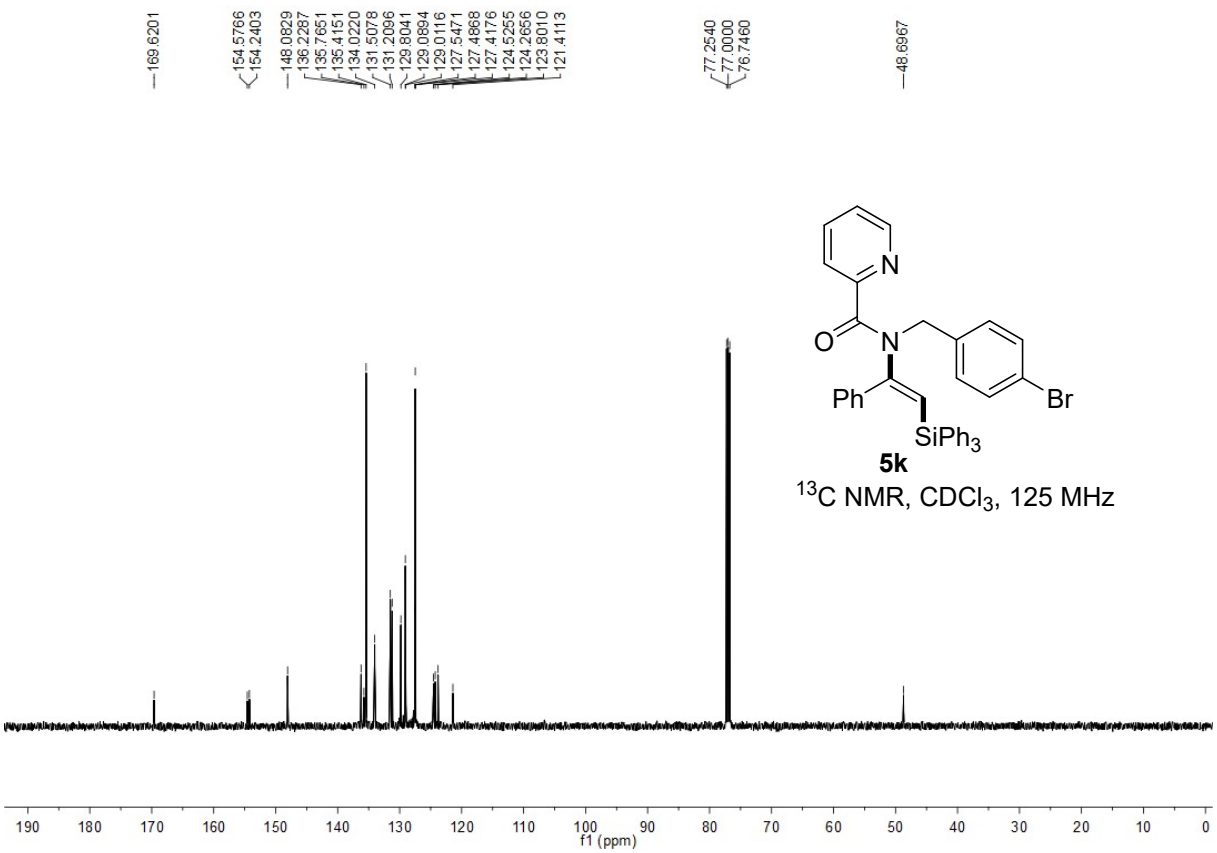
5j

^{13}C NMR, $CDCl_3$, 125 MHz



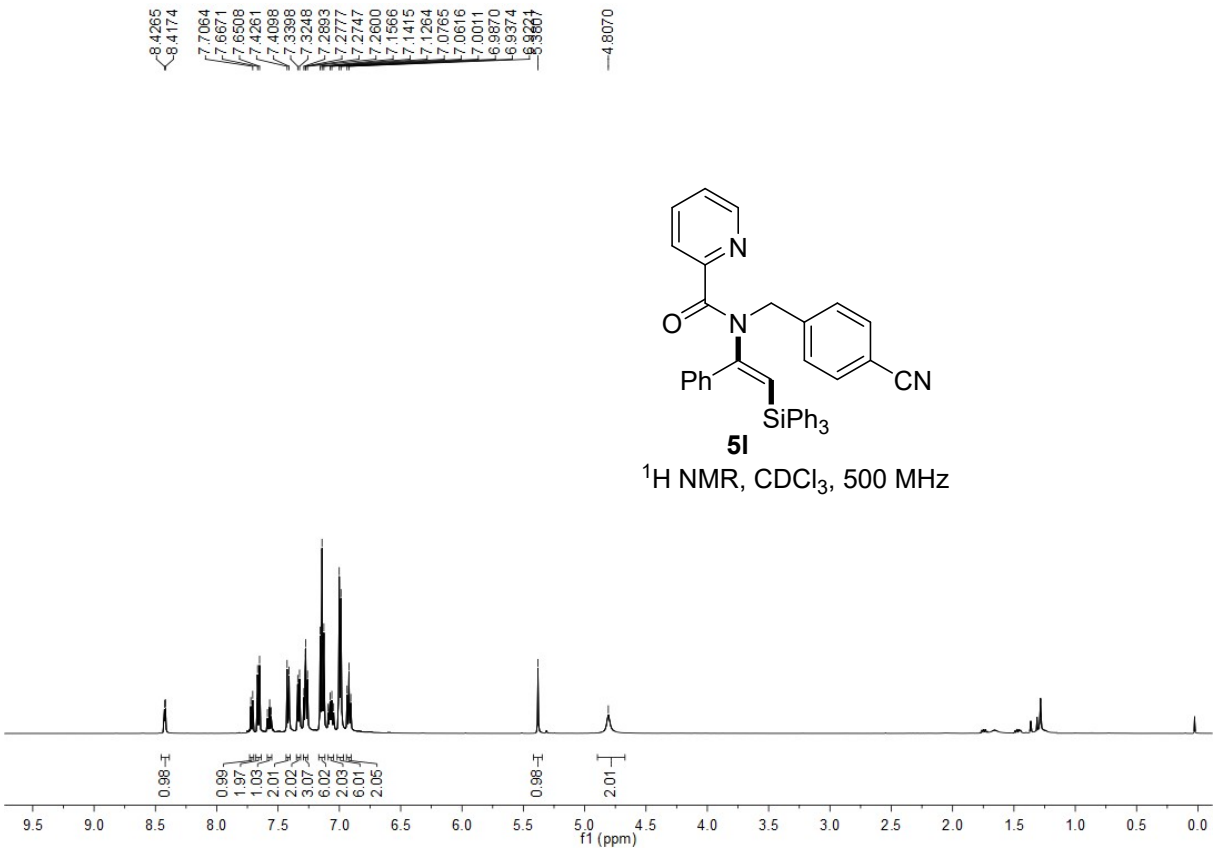
5k

^{1}H NMR, $CDCl_3$, 500 MHz



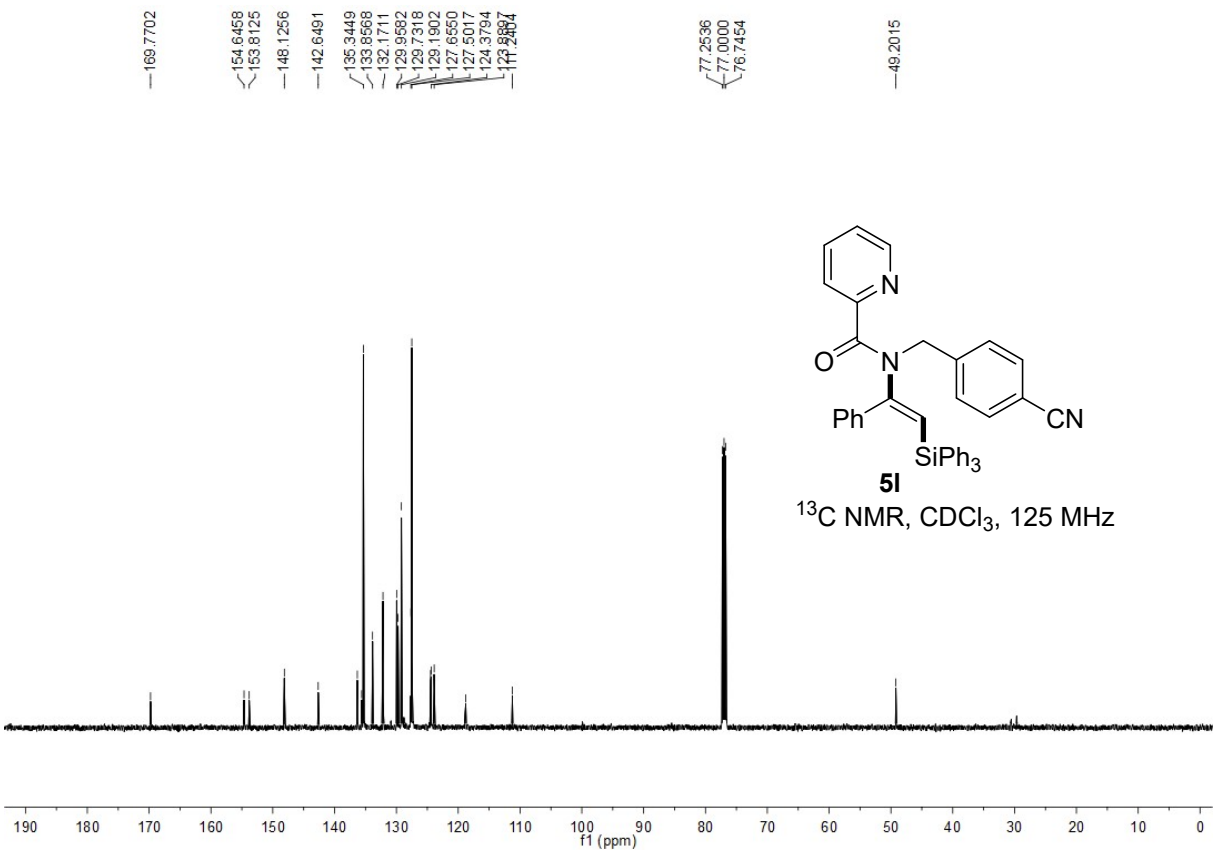
5k

^{13}C NMR, $CDCl_3$, 125 MHz



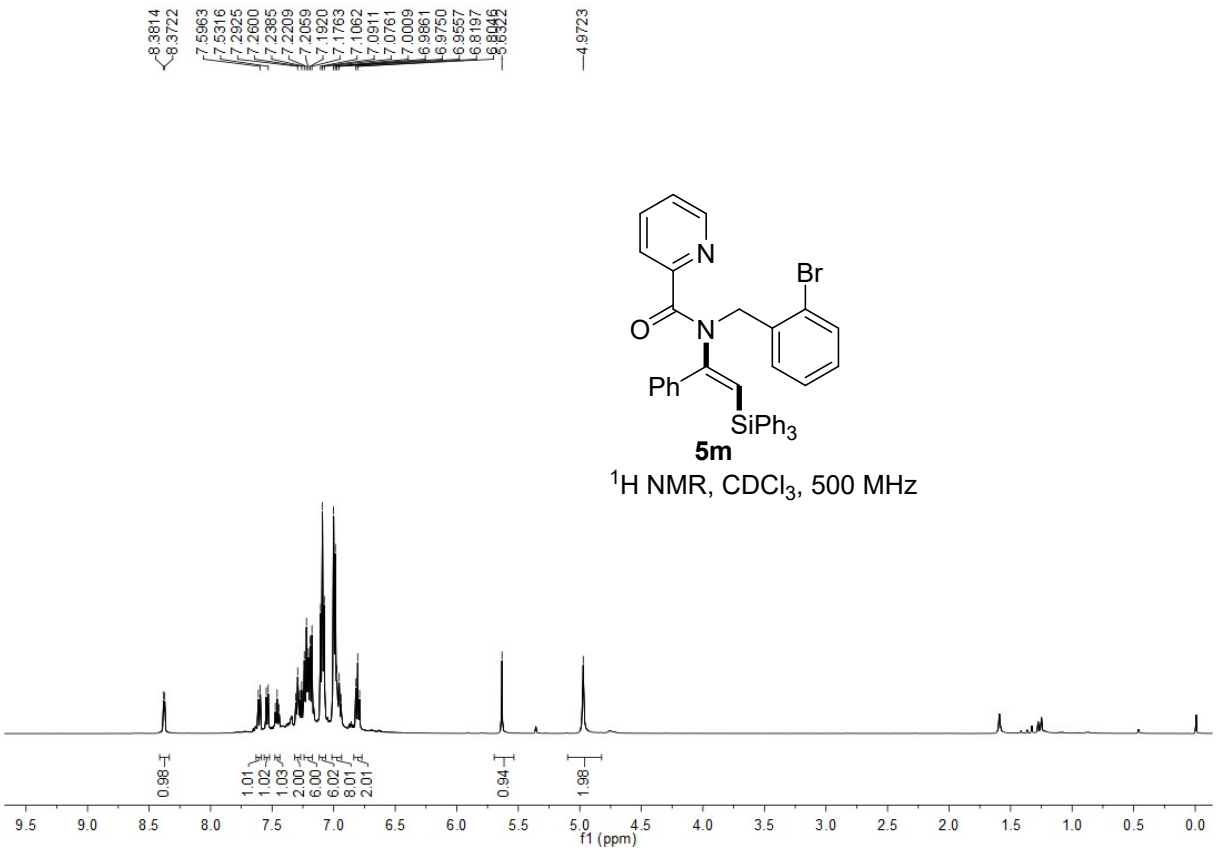
5l

^{1}H NMR, $CDCl_3$, 500 MHz



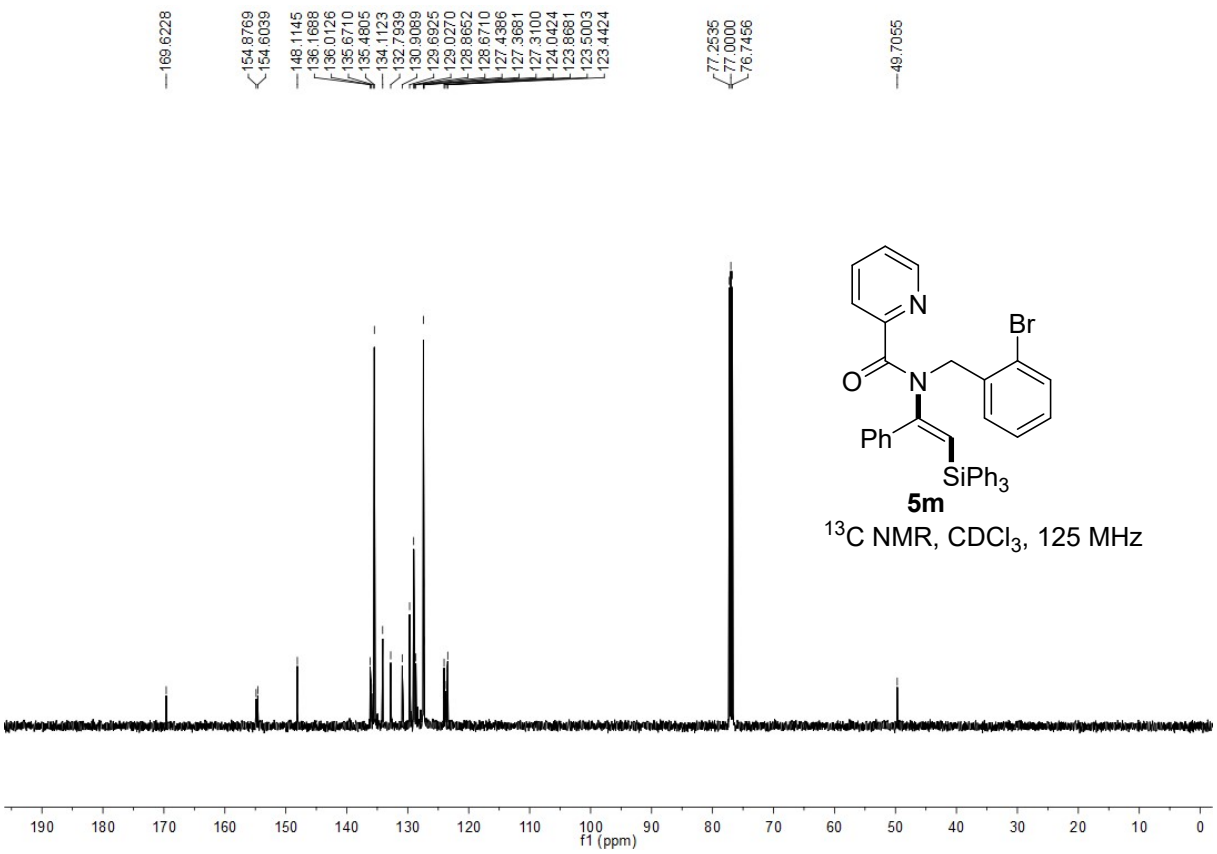
5l

^{13}C NMR, $CDCl_3$, 125 MHz



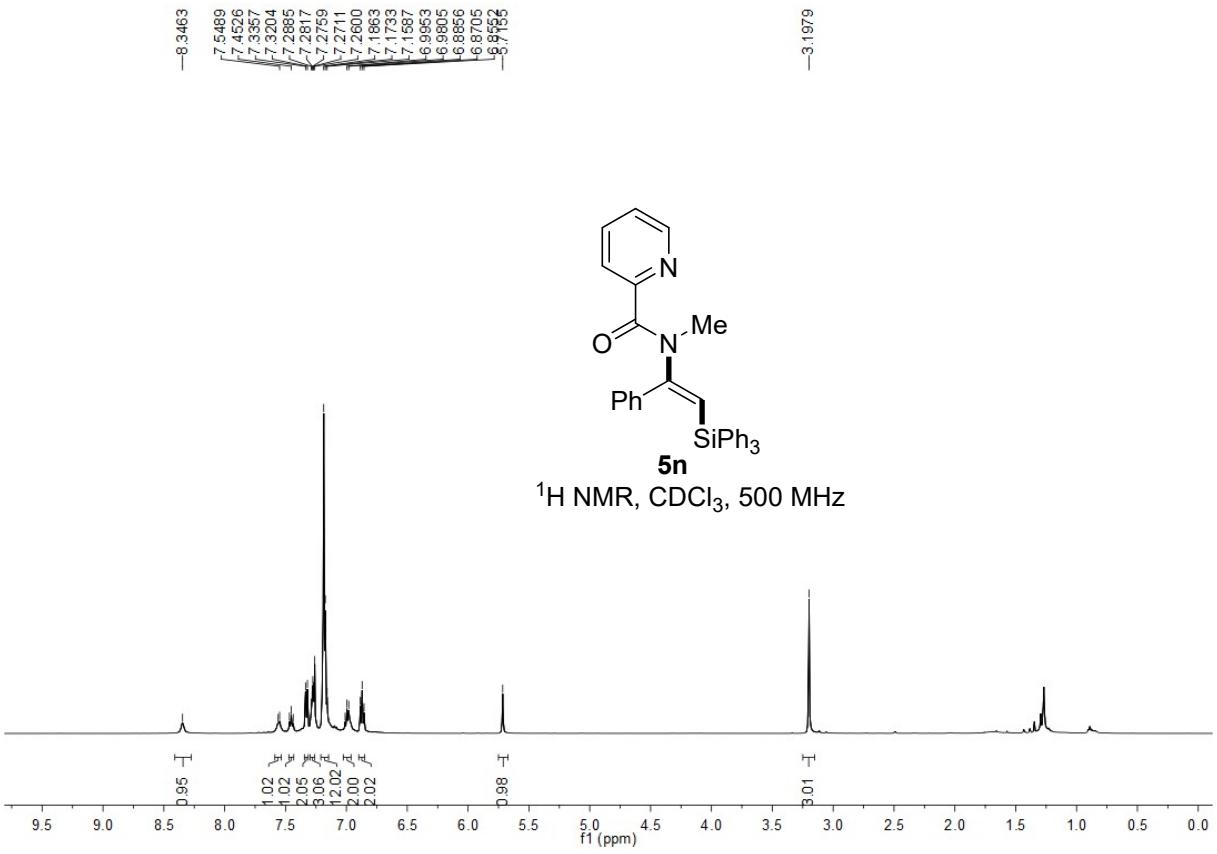
5m

^{1}H NMR, $CDCl_3$, 500 MHz



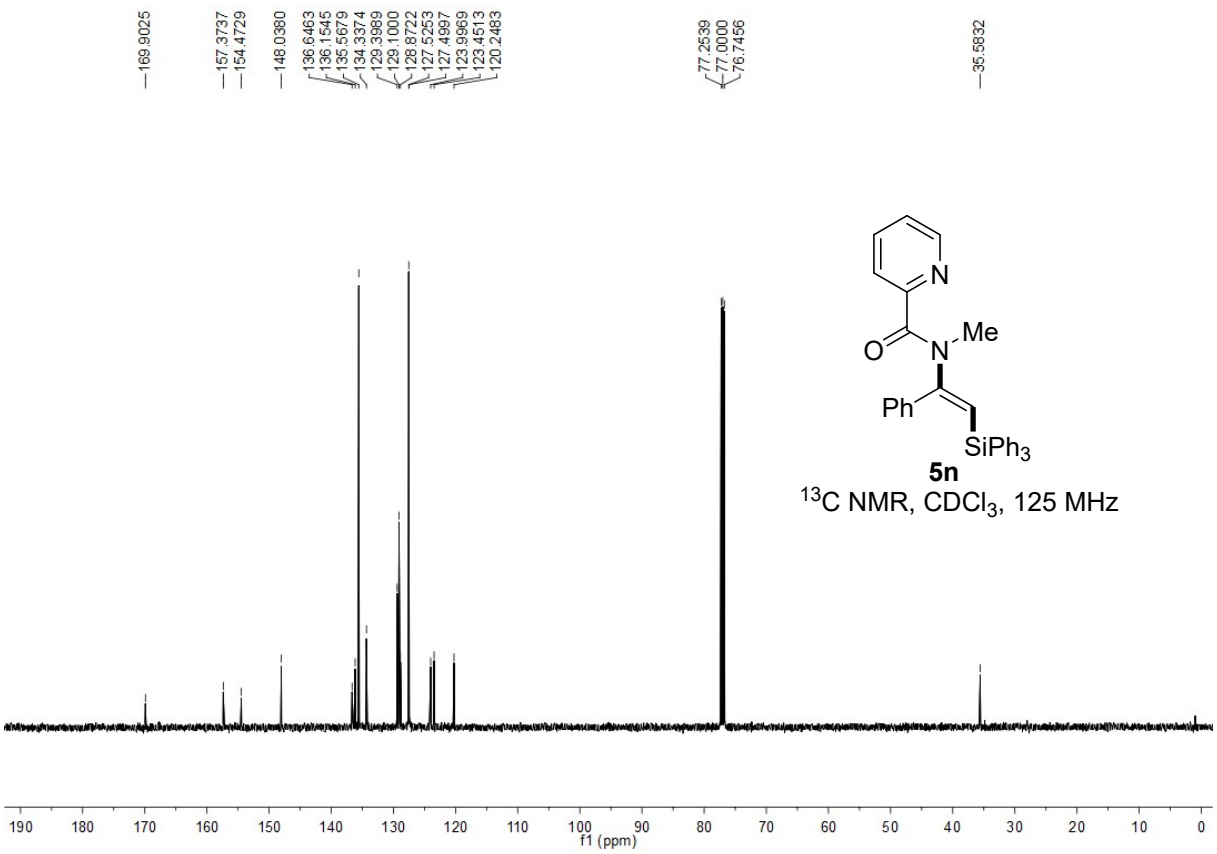
5m

^{13}C NMR, $CDCl_3$, 125 MHz



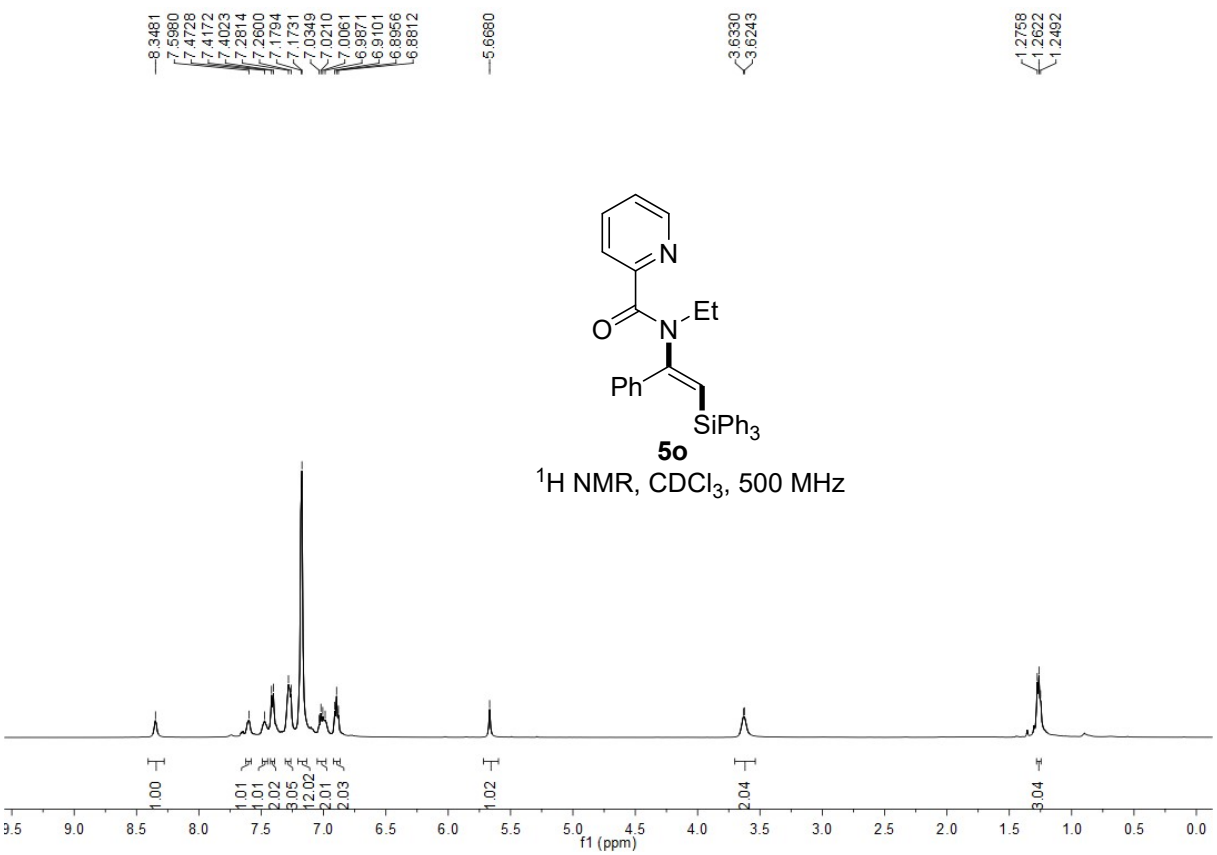
5n

^{1}H NMR, $CDCl_3$, 500 MHz



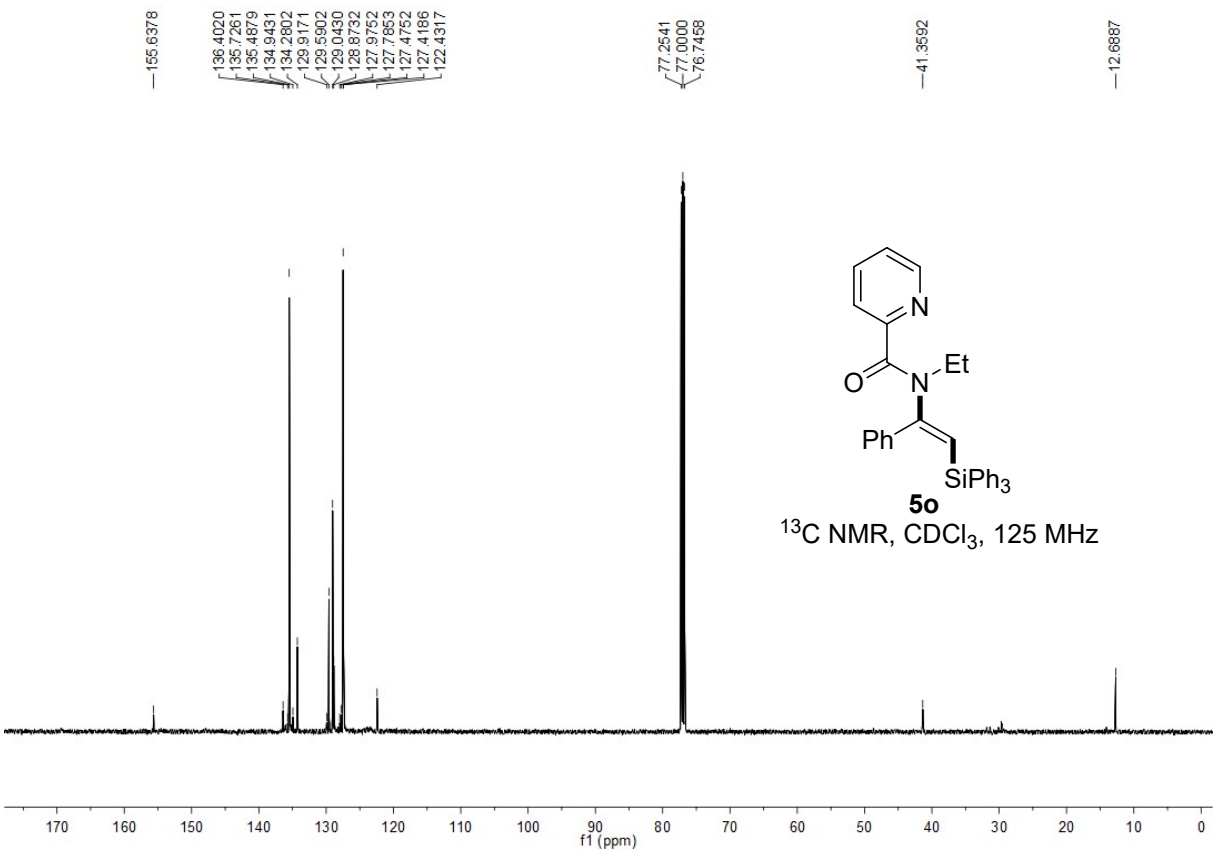
5n

^{13}C NMR, $CDCl_3$, 125 MHz



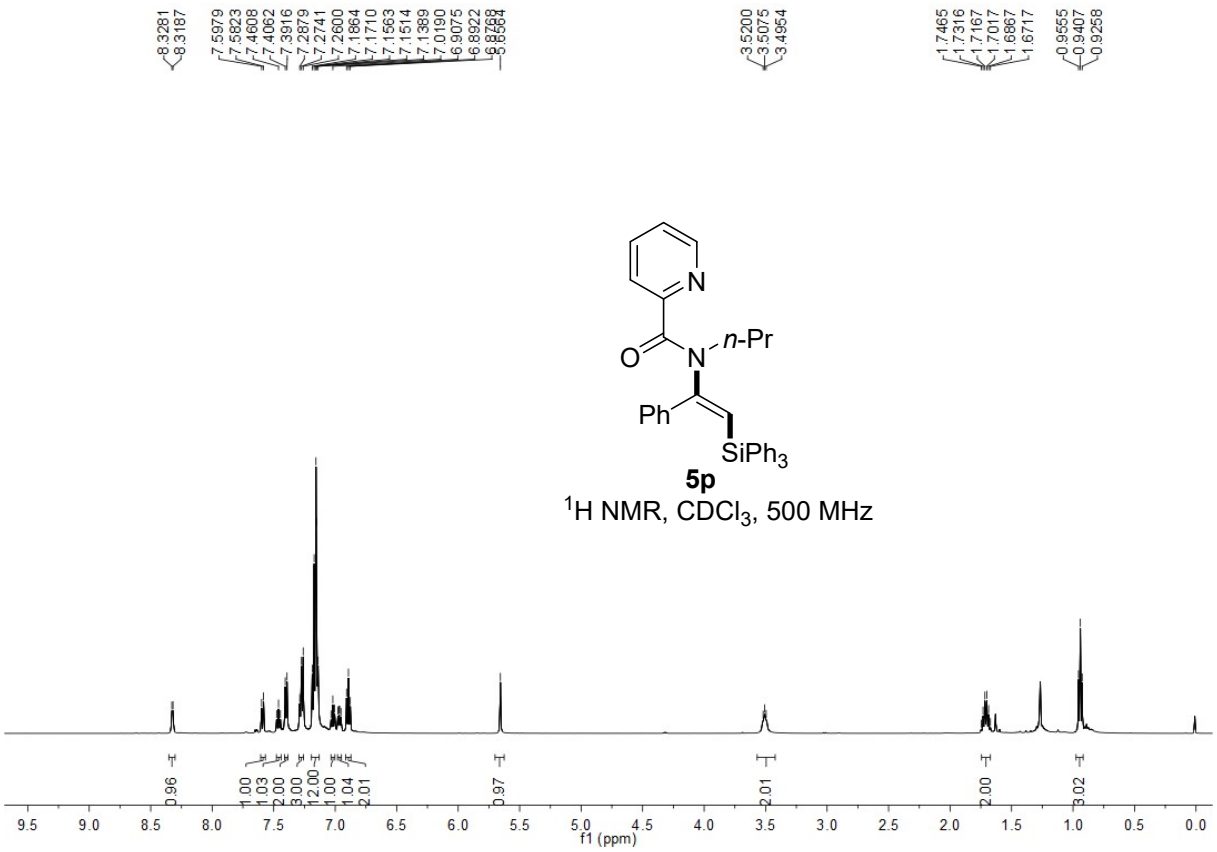
5o

^{1}H NMR, $CDCl_3$, 500 MHz



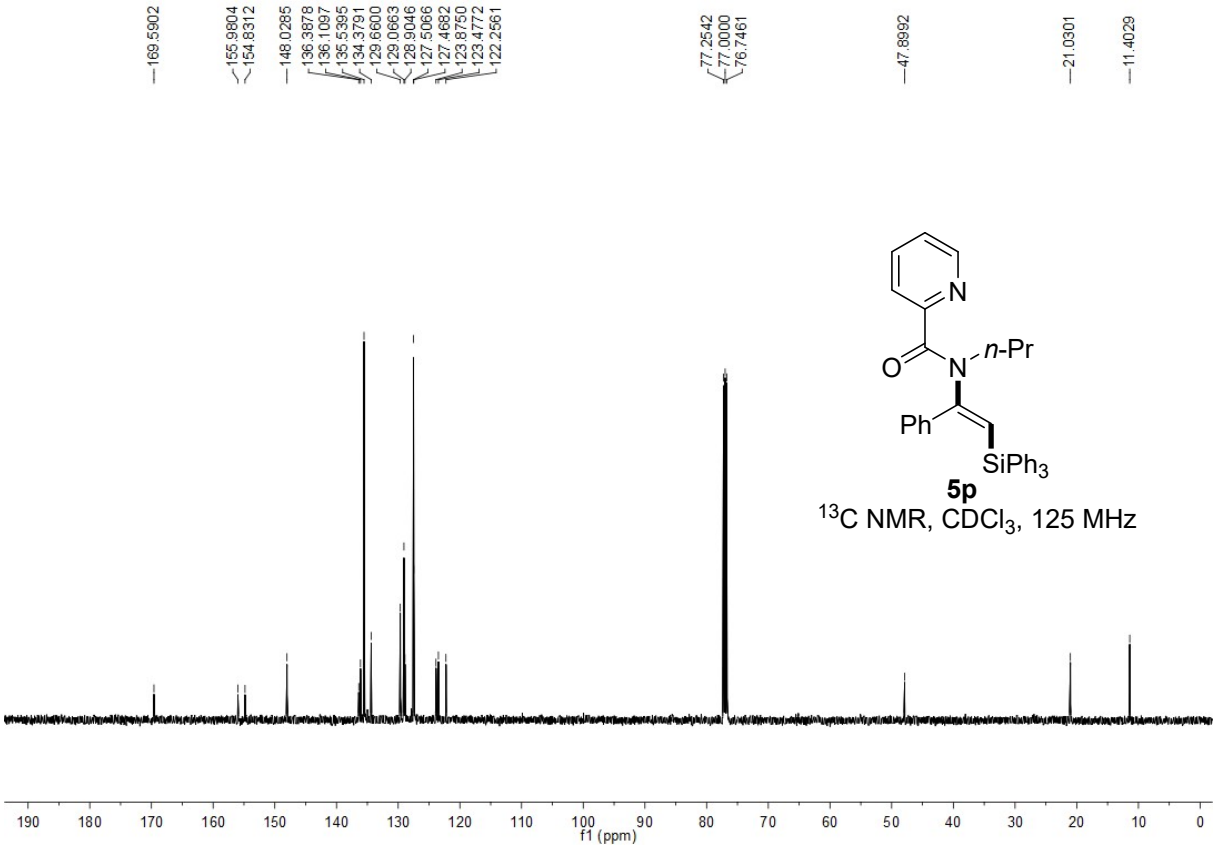
5o

^{13}C NMR, $CDCl_3$, 125 MHz



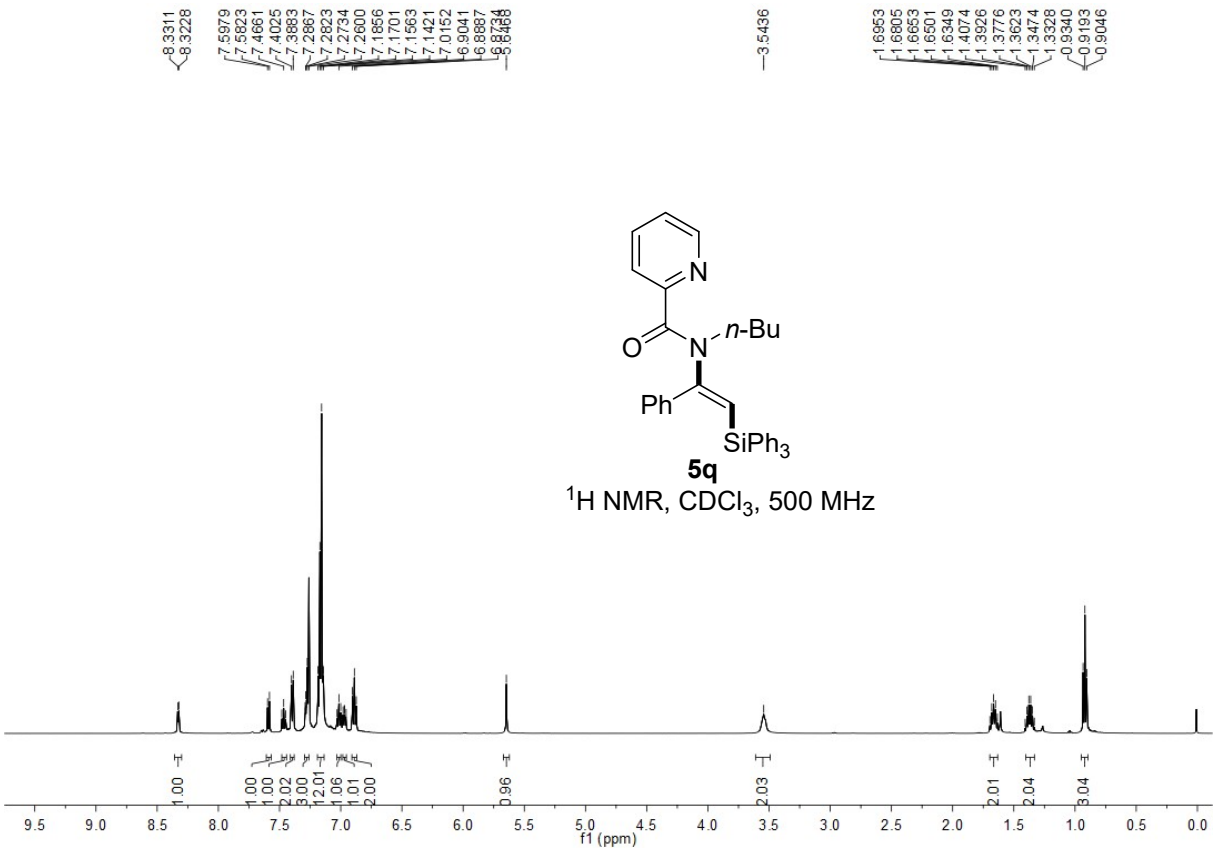
5p

^{1}H NMR, $CDCl_3$, 500 MHz



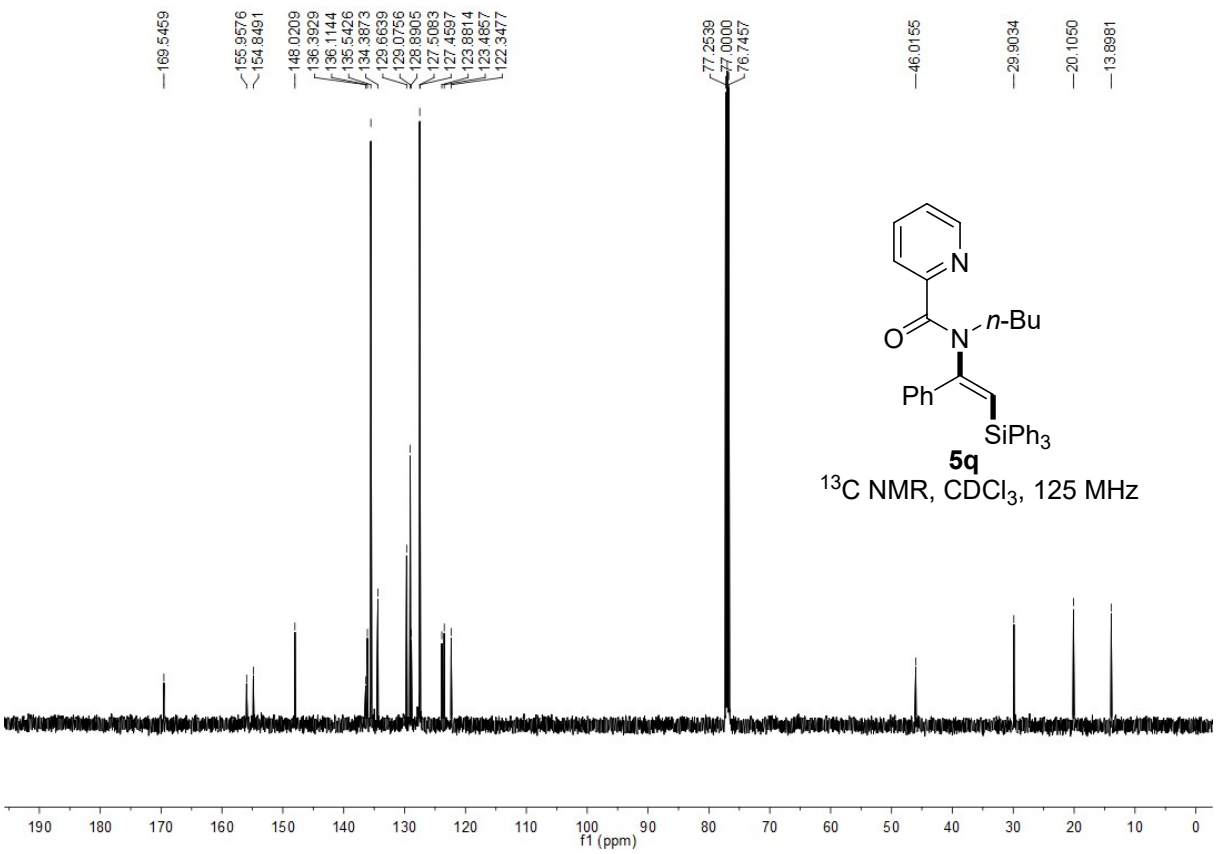
5p

^{13}C NMR, $CDCl_3$, 125 MHz



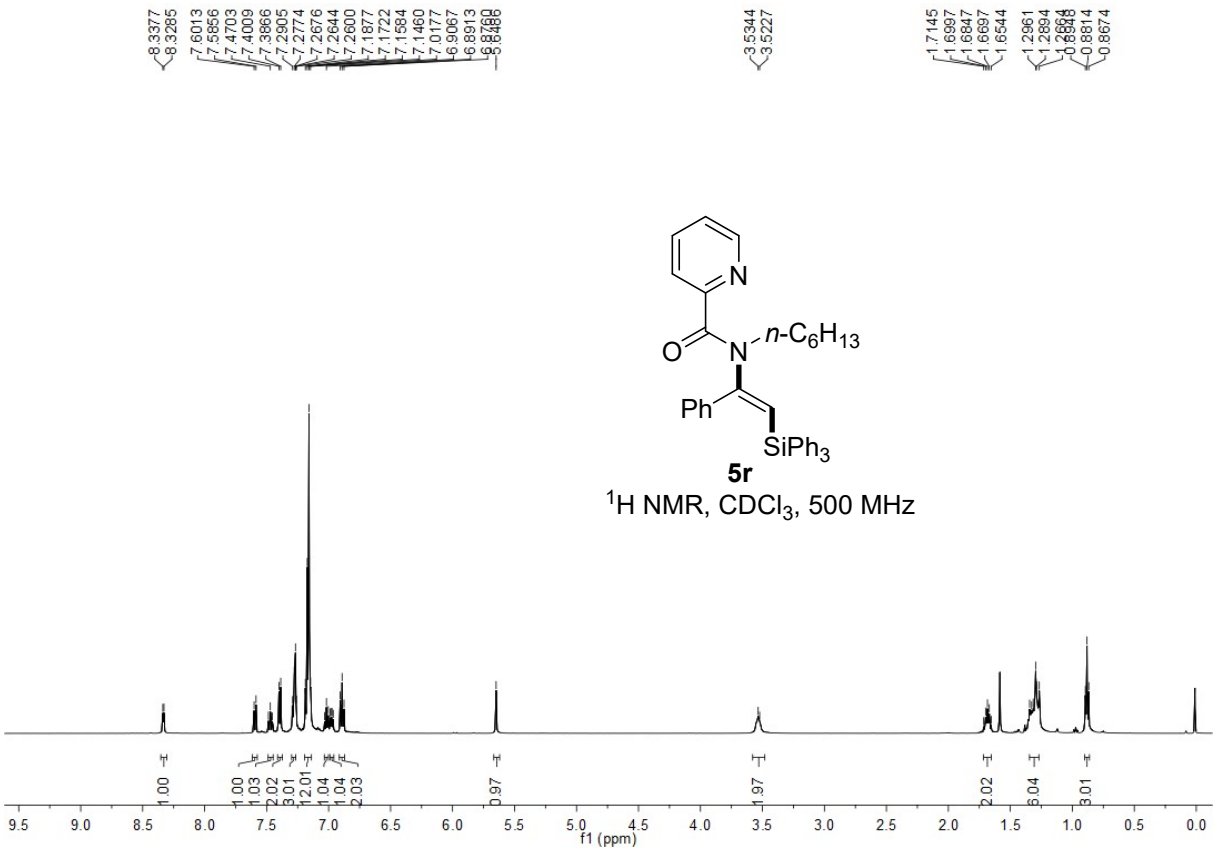
5q

^{1}H NMR, $CDCl_3$, 500 MHz



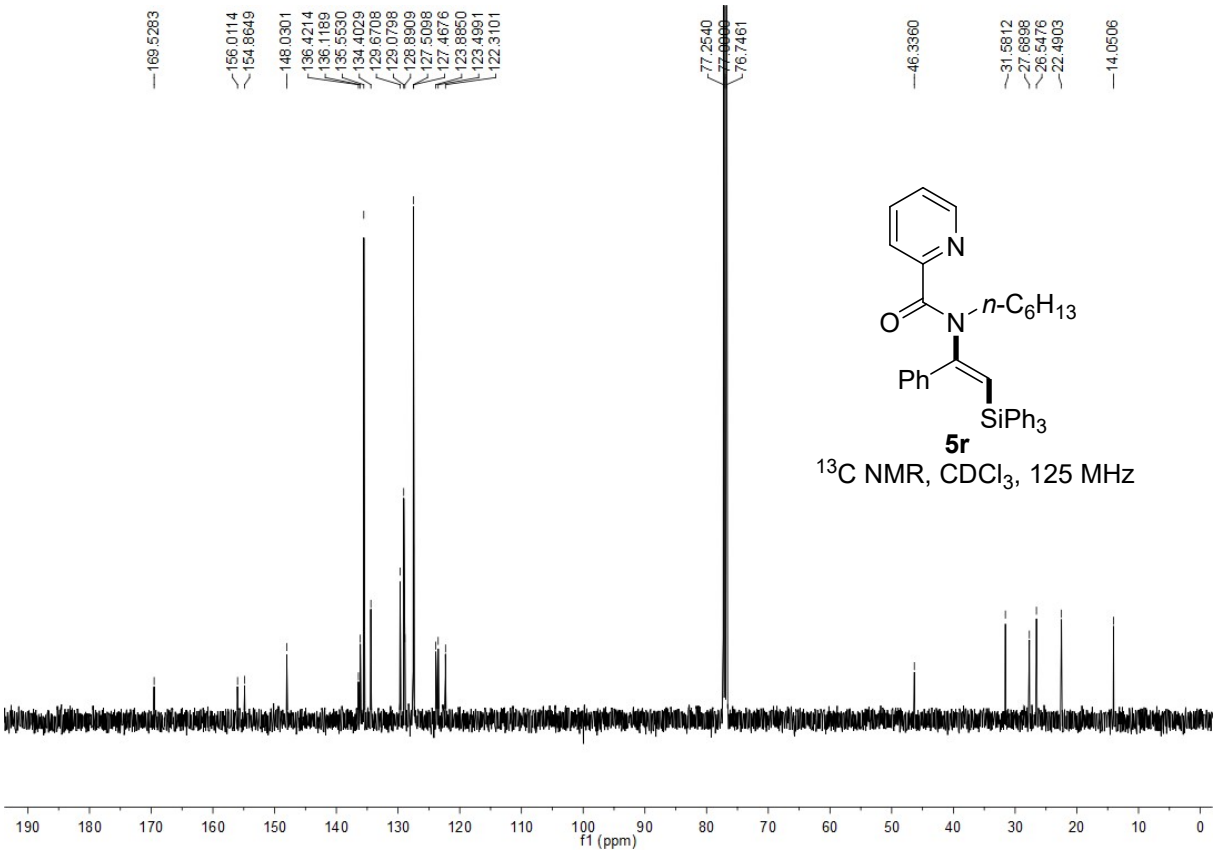
5q

^{13}C NMR, $CDCl_3$, 125 MHz



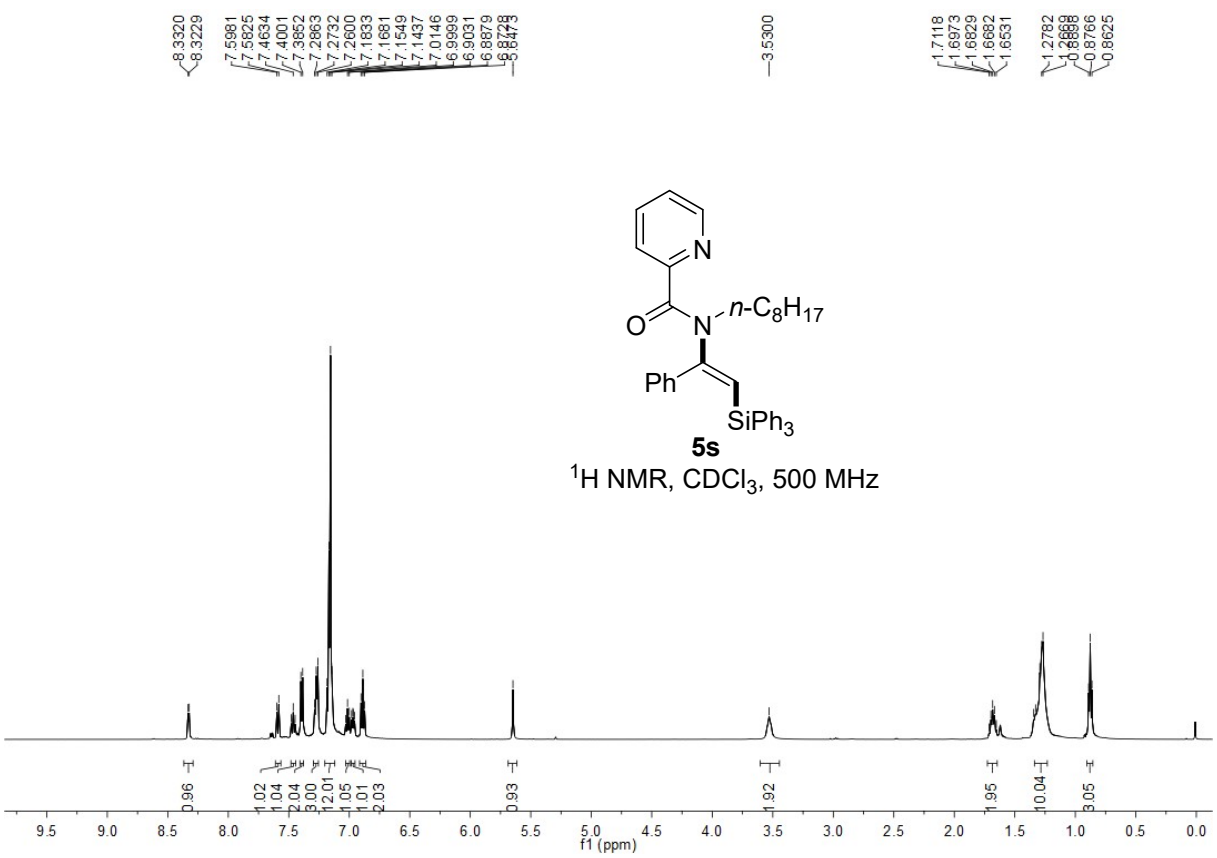
5r

^{1}H NMR, $CDCl_3$, 500 MHz



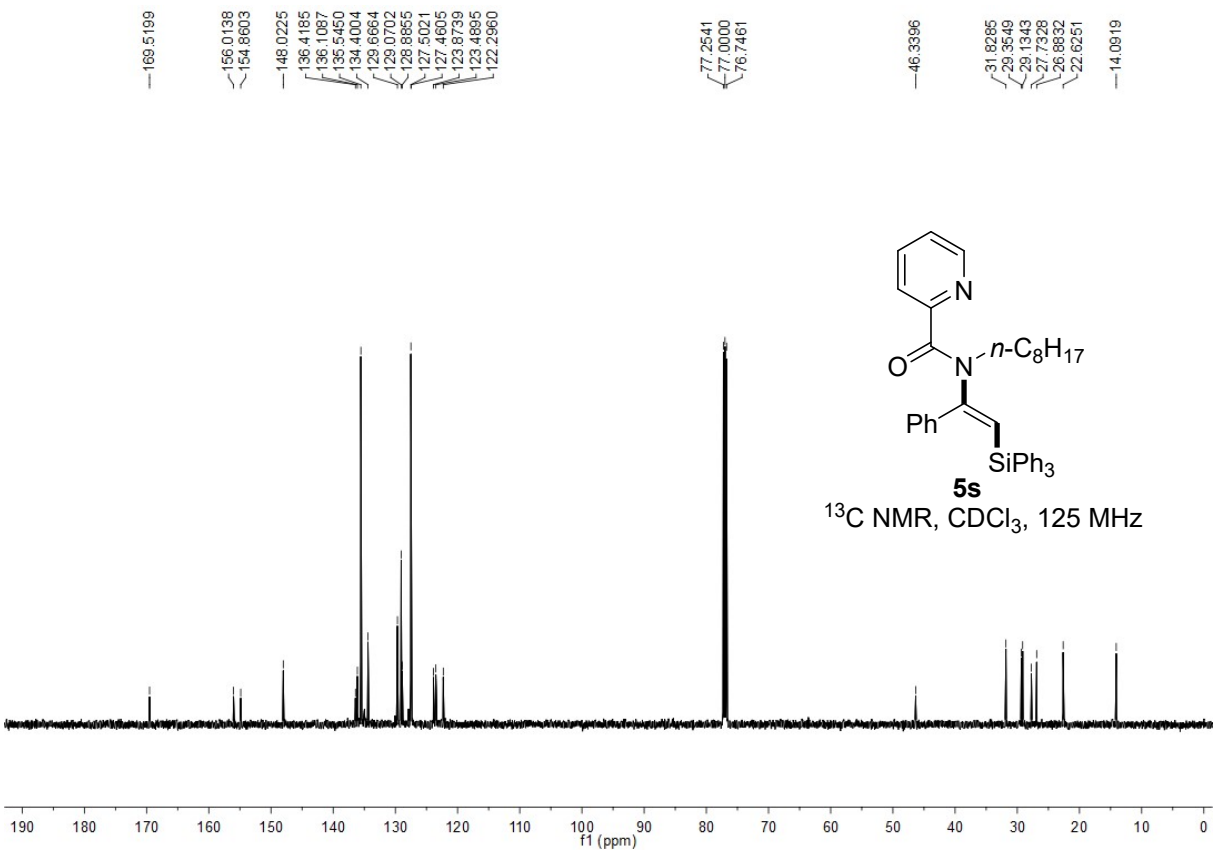
5r

^{13}C NMR, $CDCl_3$, 125 MHz



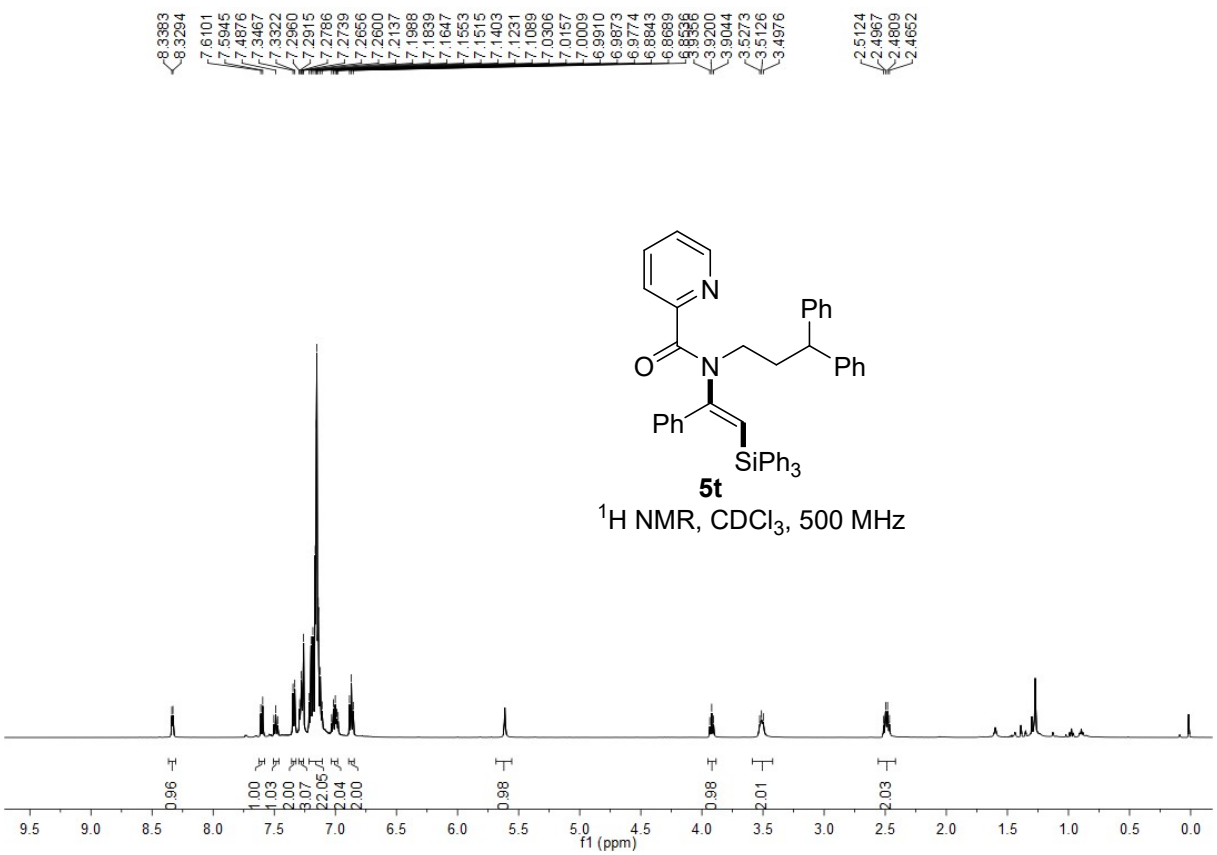
5s

^{1}H NMR, $CDCl_3$, 500 MHz



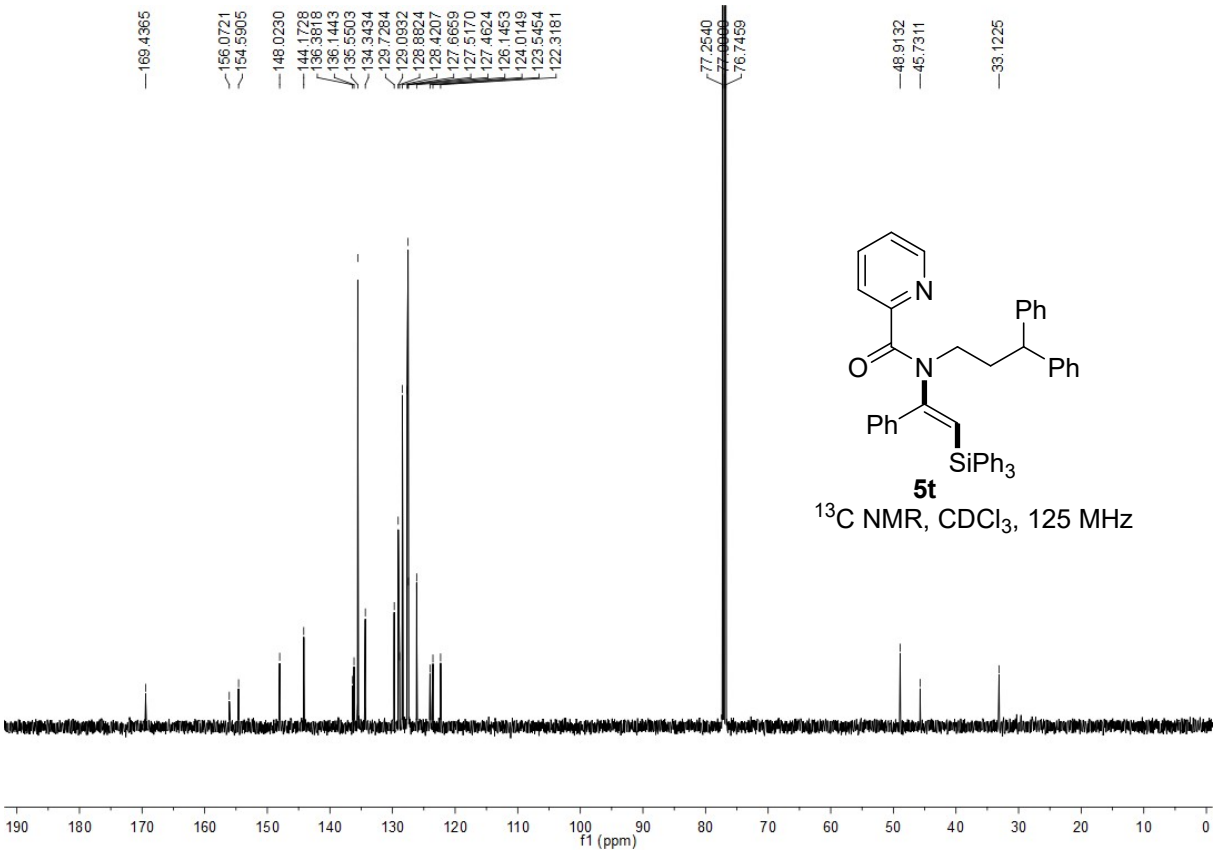
5s

^{13}C NMR, $CDCl_3$, 125 MHz



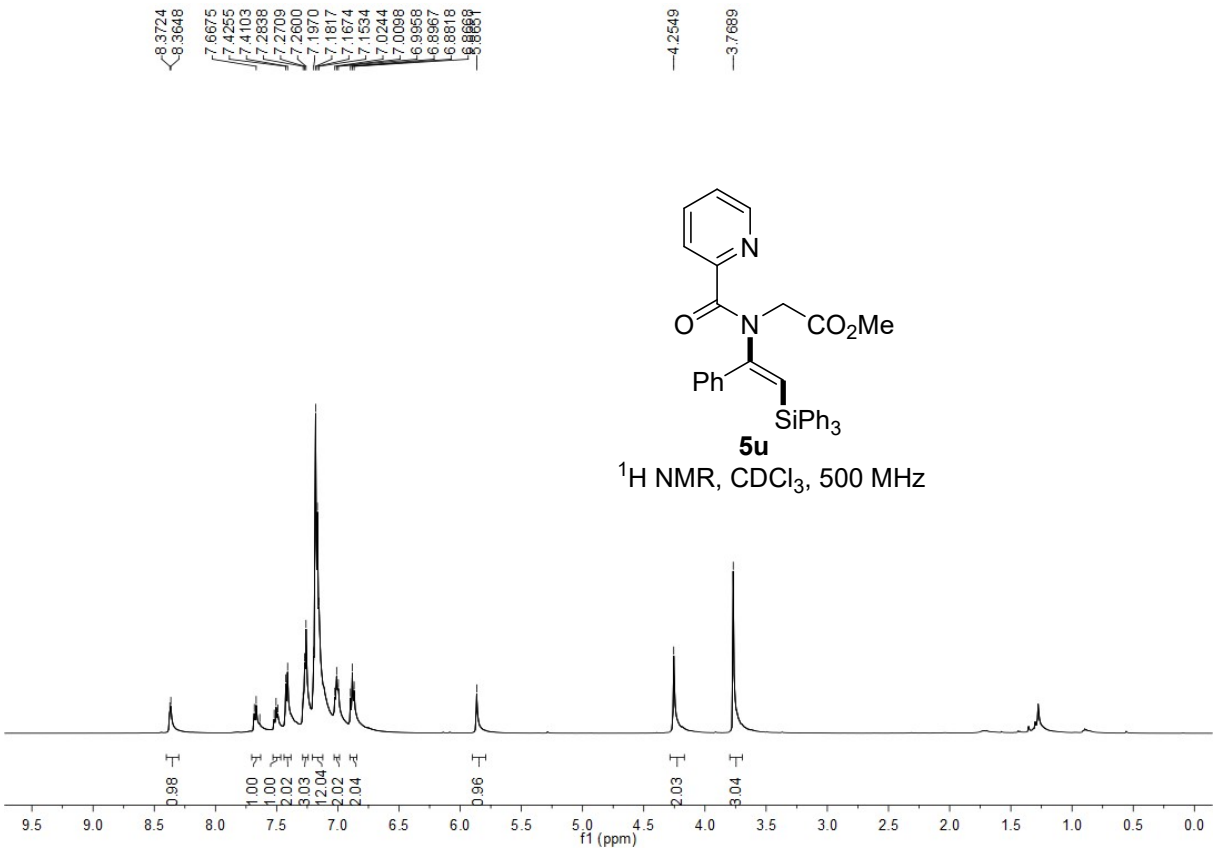
5t

^{1}H NMR, $CDCl_3$, 500 MHz



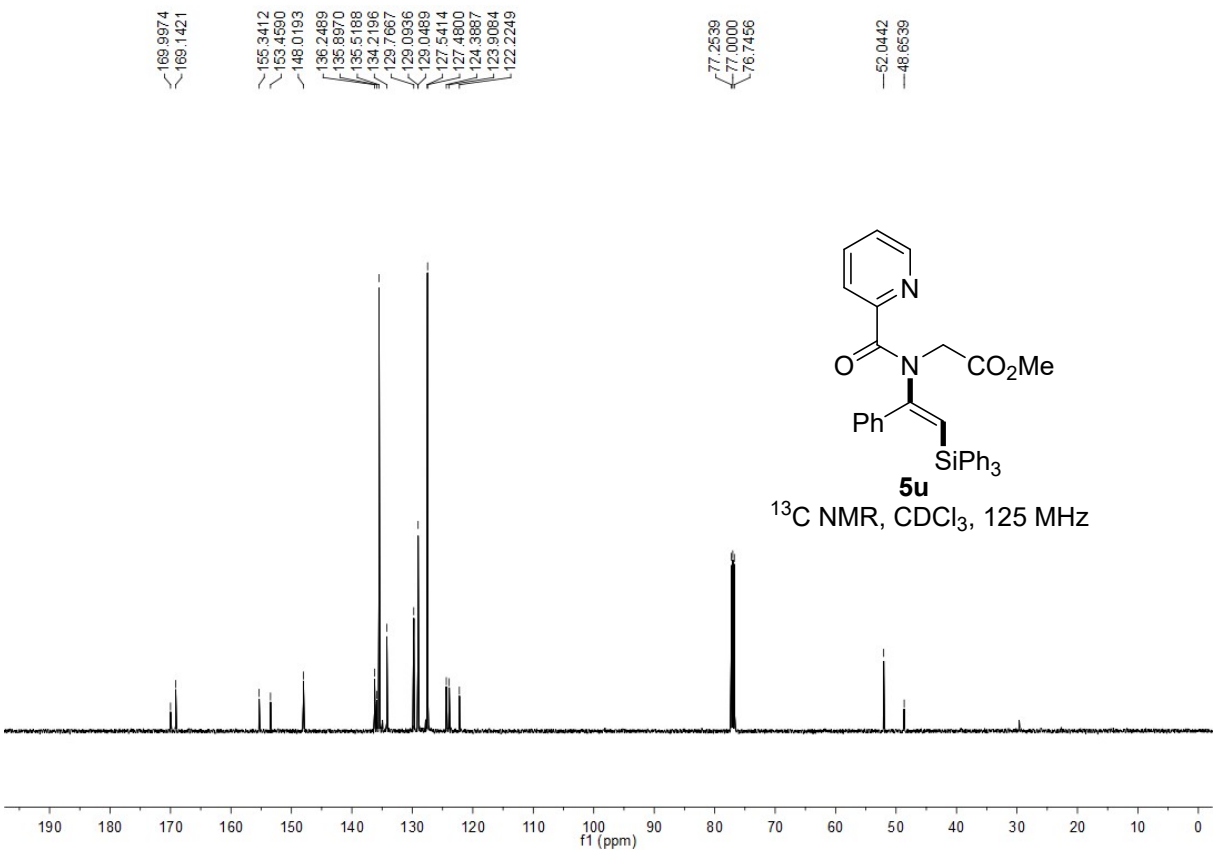
5t

^{13}C NMR, $CDCl_3$, 125 MHz



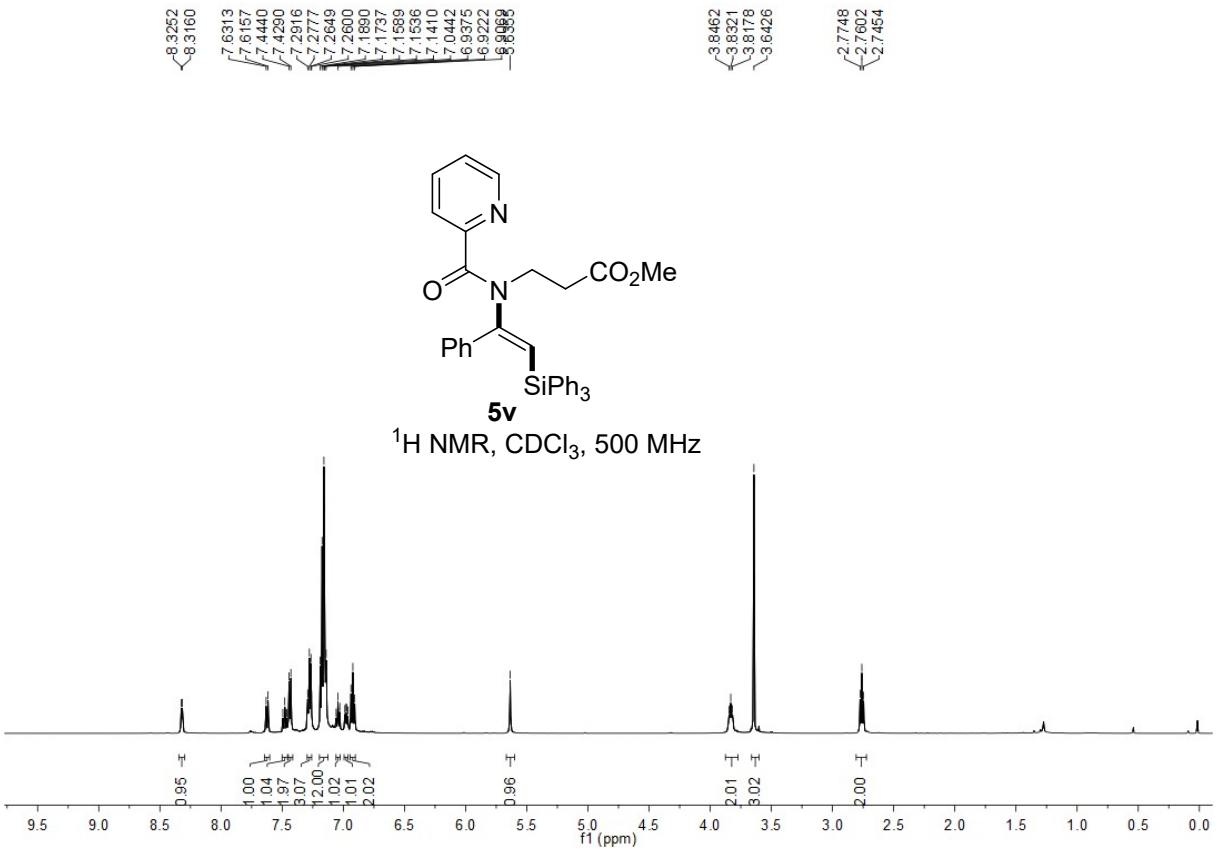
5u

^{1}H NMR, $CDCl_3$, 500 MHz



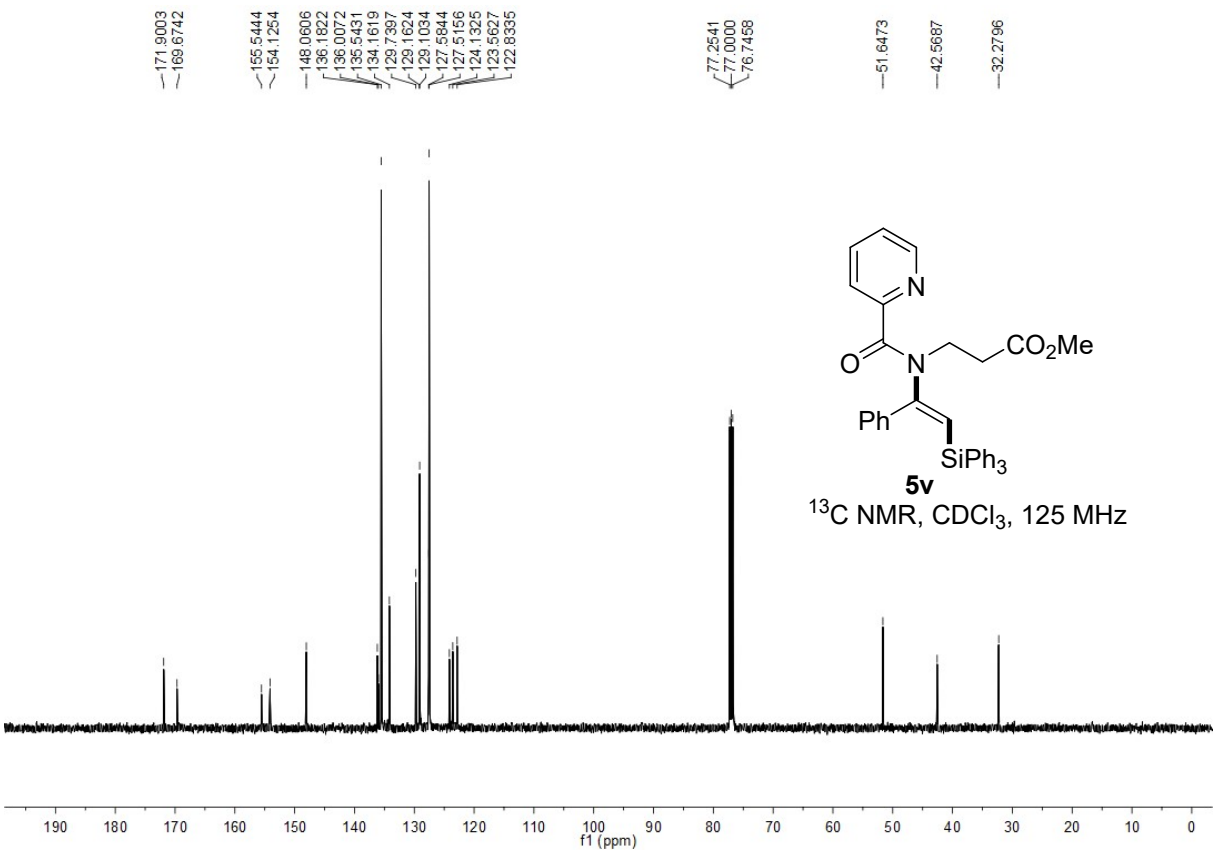
5u

^{13}C NMR, $CDCl_3$, 125 MHz



5v

^{1}H NMR, $CDCl_3$, 500 MHz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124.1325
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77.0000
76.7458
51.6473
42.5687
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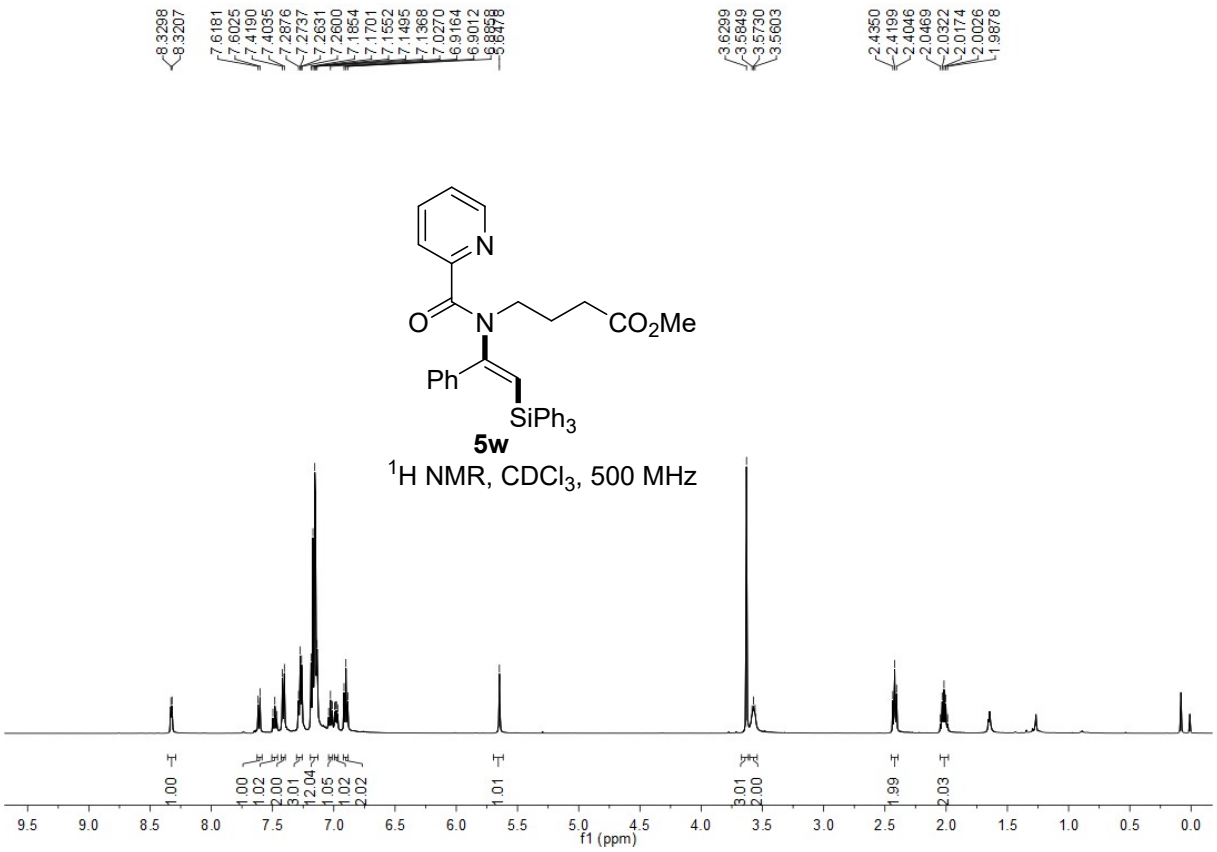
N
O
N
CO2Me
Ph
SiPh3
5v
13C NMR, CDCl3, 125 MHz
f1 (ppm)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2.0026
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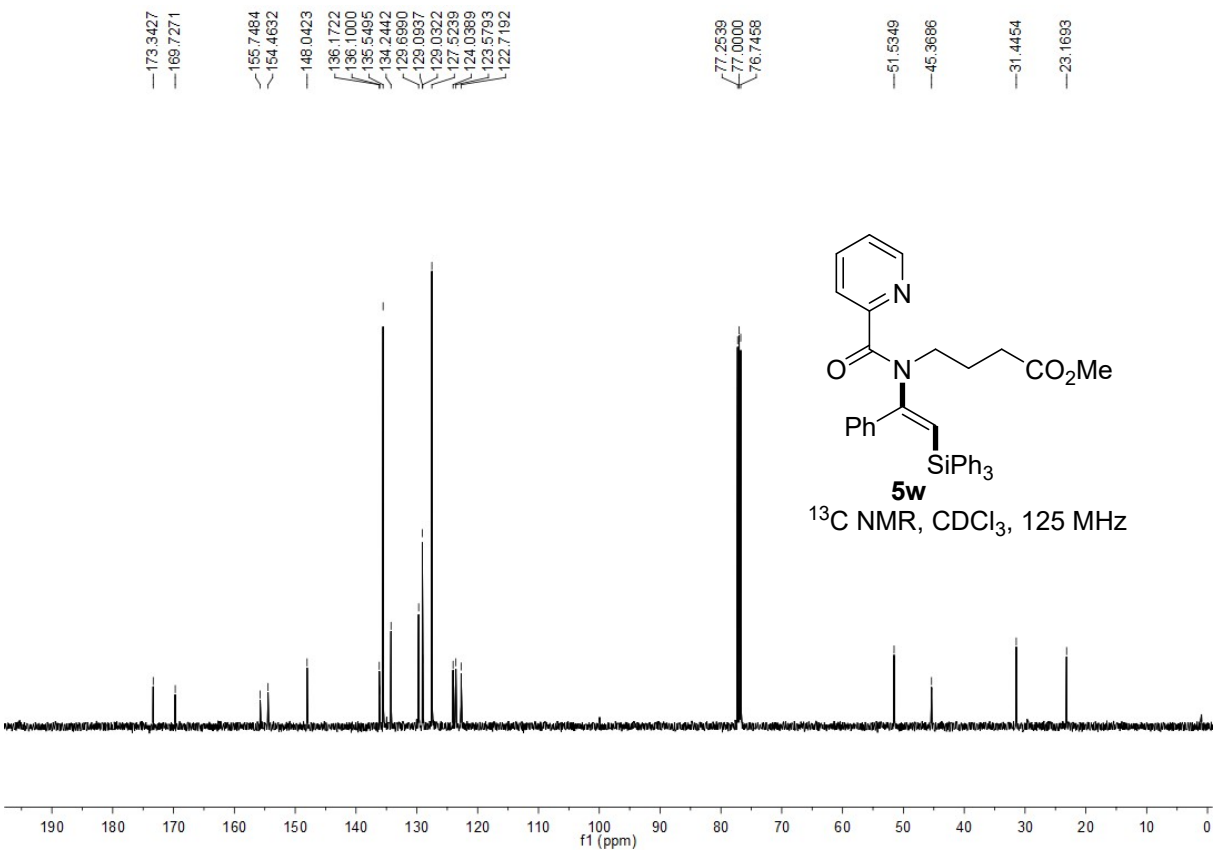
N
O
N
CO2Me
Ph
SiPh3
5w
1H NMR, CDCl3, 500 MHz
f1 (ppm)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154.4632
148.0423
136.1722
136.1000
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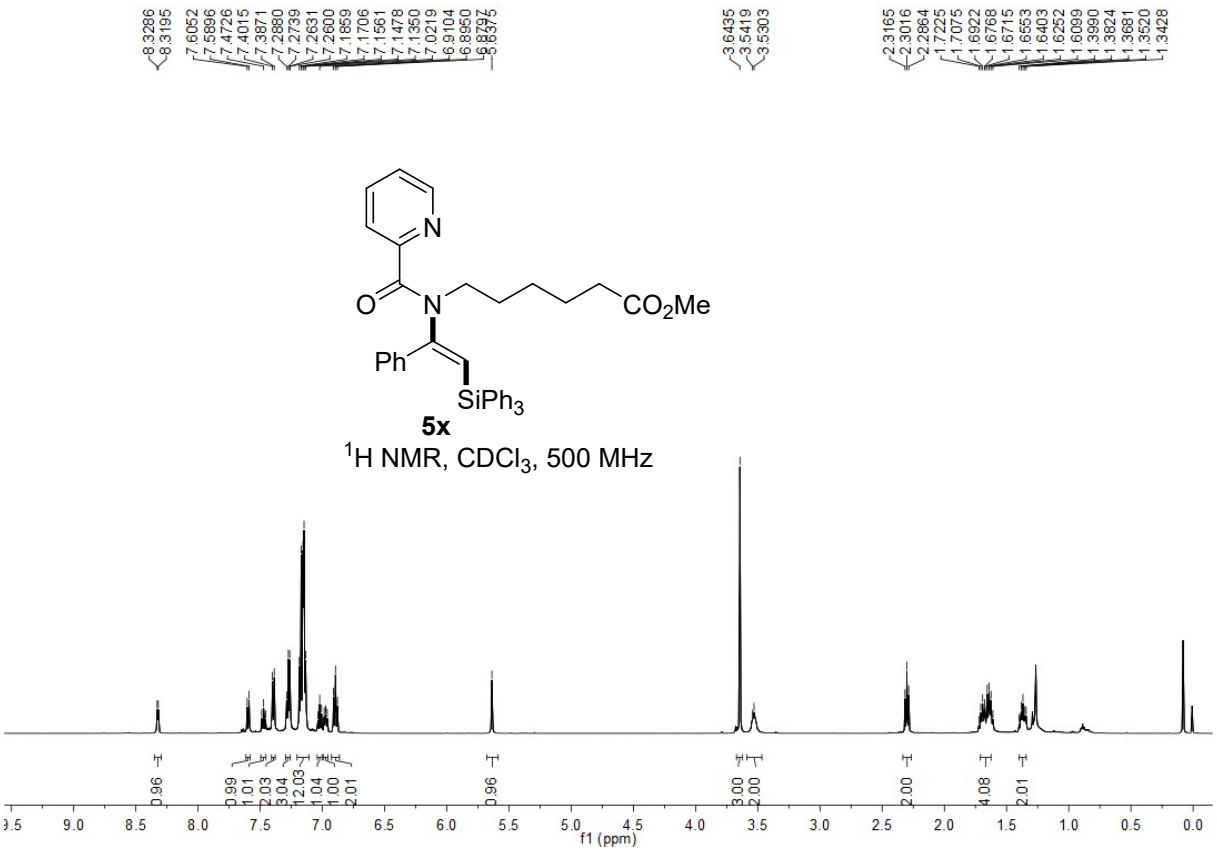
134.2442
129.6980
129.0937
129.0322
127.5239
124.0389
123.5793
122.7192
77.2539
77.0000
76.7458
51.5349
45.3686
31.4454
23.1693
N
O
N
CO2Me
Ph
SiPh3
5w
13C NMR, CDCl3, 125 MHz
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)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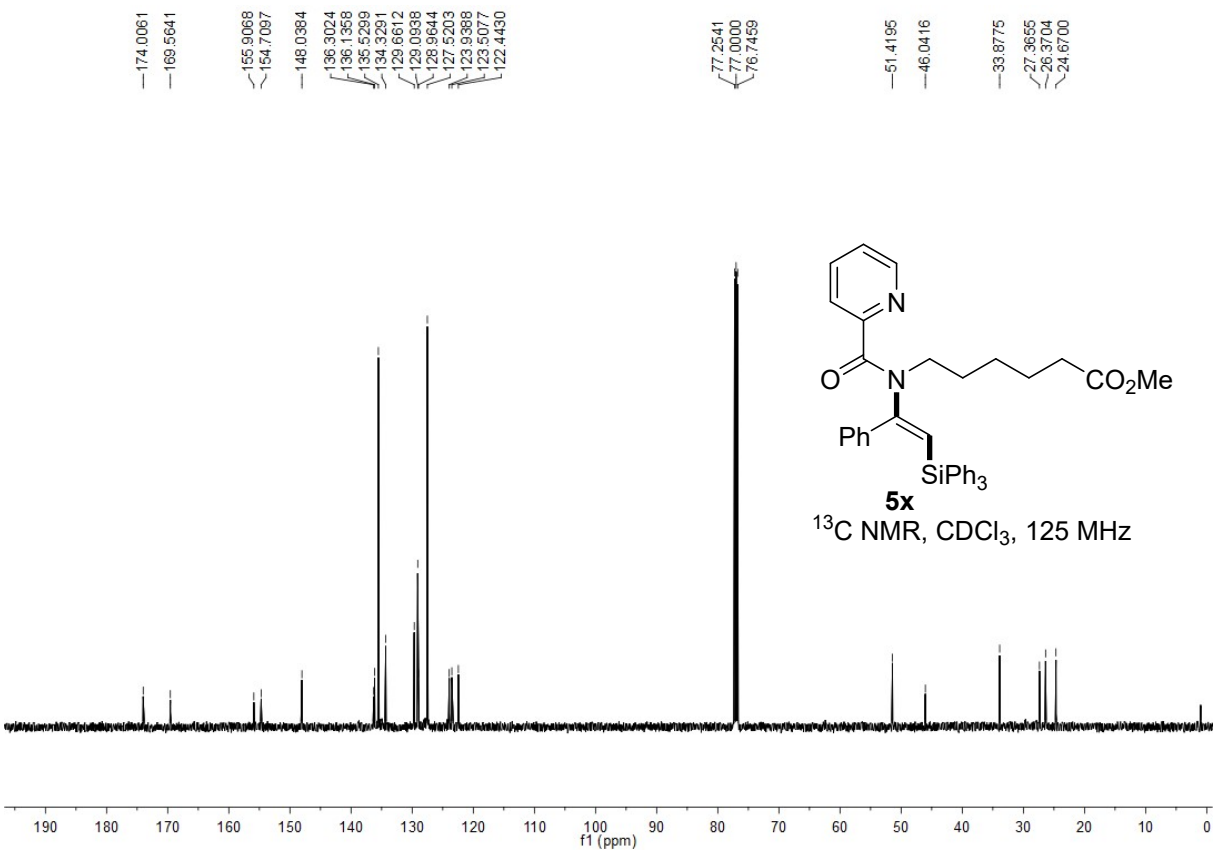
8.3195
7.6052
7.5896
7.4726
7.4015
7.3871
7.2880
7.2739
7.2631
7.2600
7.1859
7.1706
7.1561
7.1478
7.1350
7.0219
6.9104
6.8950
6.8797
6.8375
3.6435
3.5419
3.5303
2.3165
2.3016
2.2864
1.7225
1.7075
1.6922
1.6768
1.6715
1.6553
1.6403
1.6252
1.6099
1.3990
1.3824
1.3681
1.3520
1.3428
N
O
N
CO2Me
Ph
SiPh3
5x
1H NMR, CDCl3, 500 MHz
0.96
0.99
1.01
2.03
3.04
12.03
1.04
1.00
2.01
0.96
3.00
2.00
2.00
4.08
2.01
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)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155.9068
154.7097
148.0384
136.3024
136.1358
135.5299
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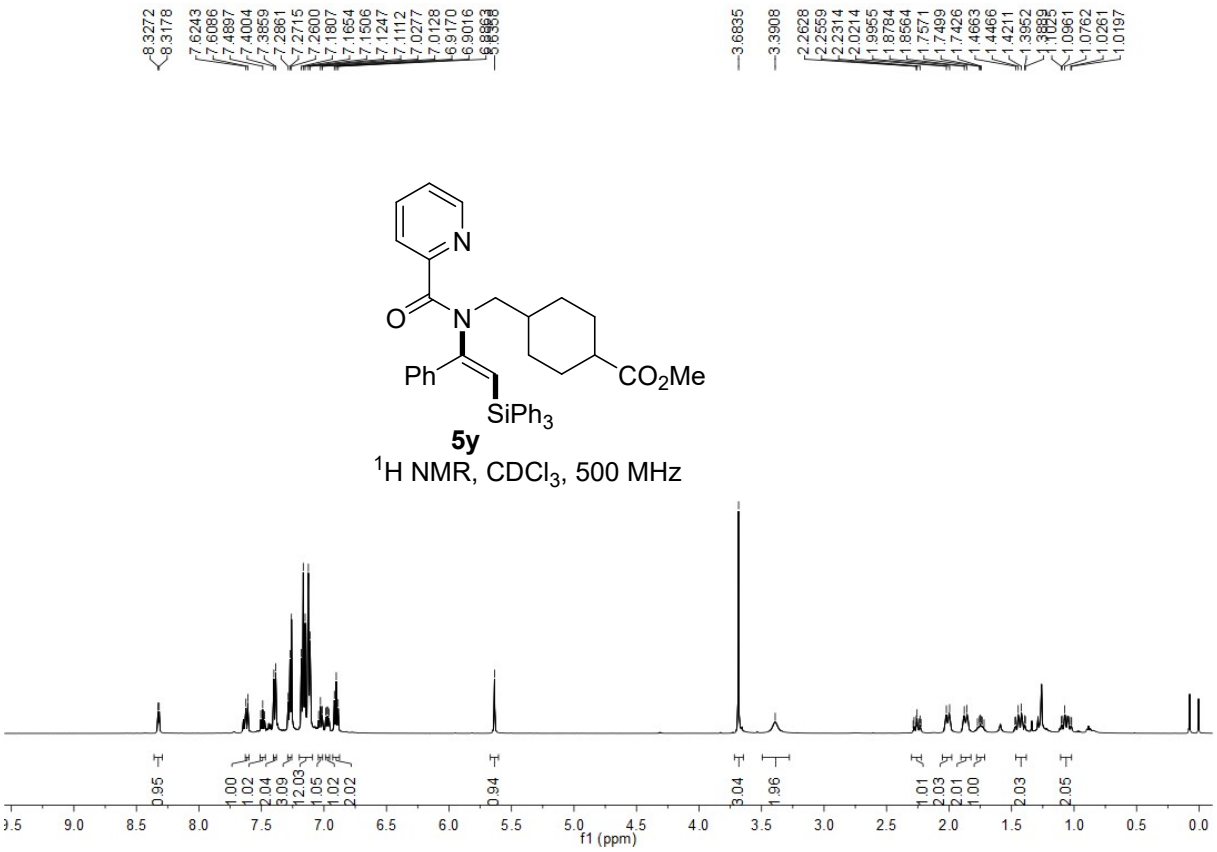
129.0938
128.9644
127.5203
123.9388
123.5077
122.4430
77.2541
77.0000
76.7459
51.4195
46.0416
33.8775
27.3655
26.3704
24.6700
N
O
N
CO2Me
Ph
SiPh3
5x
13C NMR, CDCl3, 125 MHz
f1 (ppm)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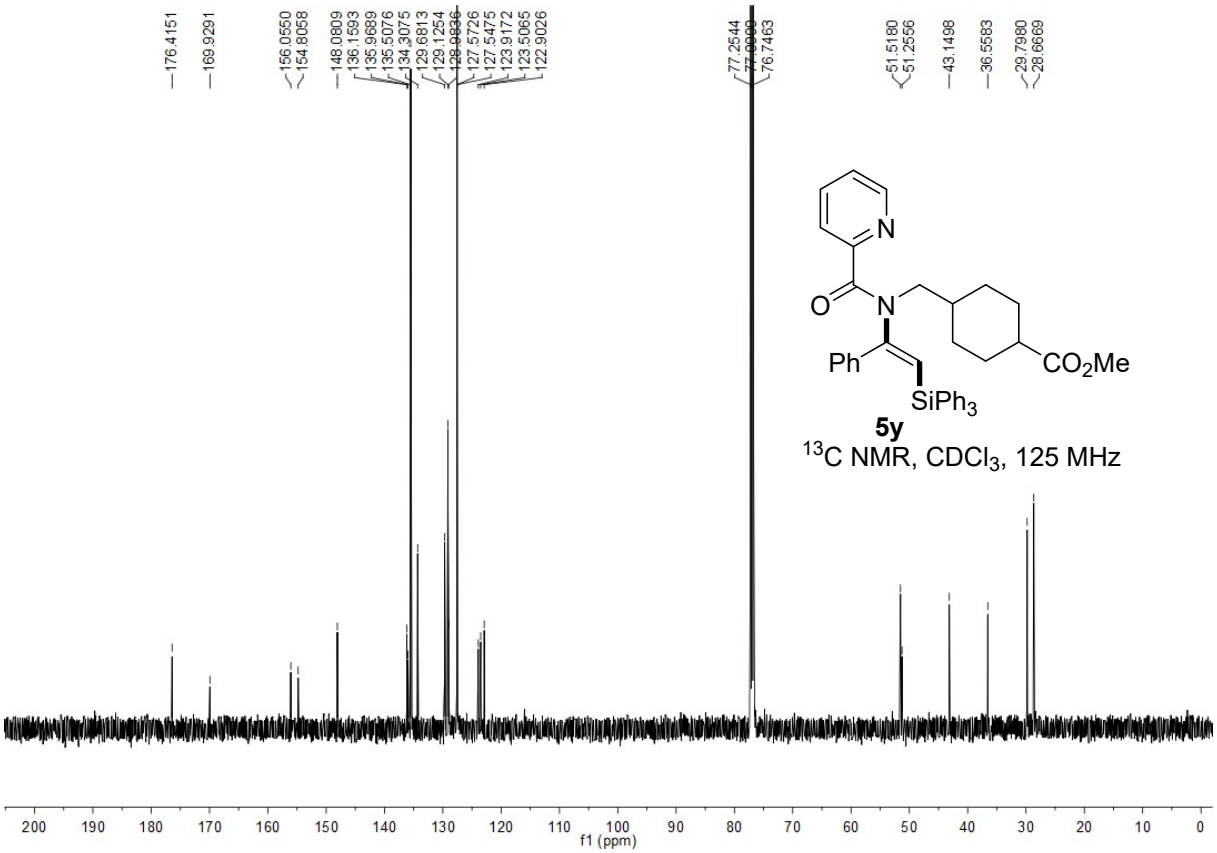
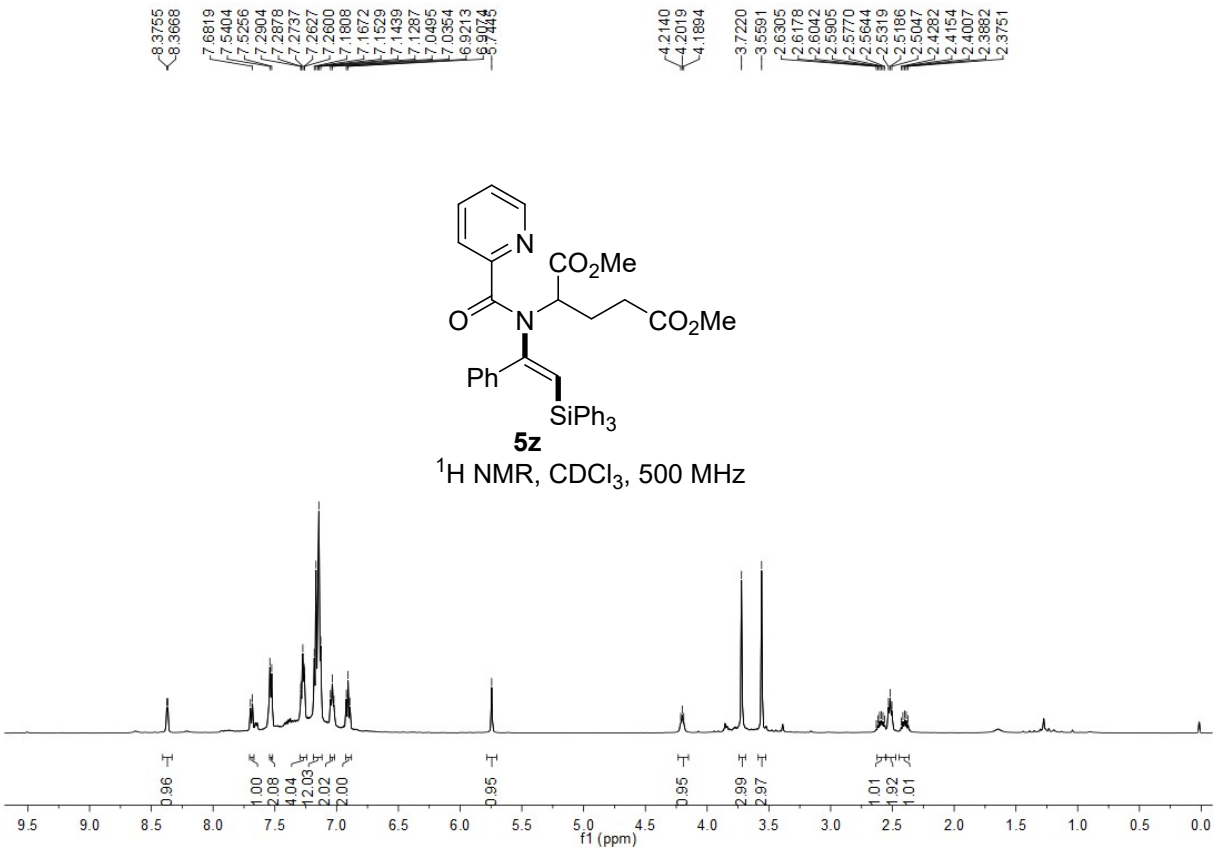
7.6243
7.6086
7.4897
7.4004
7.3859
7.2861
7.2715
7.2600
7.1807
7.1654
7.1506
7.1247
7.1112
7.0277
7.0128
6.9170
6.9016
3.6835
3.3908
2.2628
2.2559
2.2314
2.0214
1.9955
1.8784
1.8564
1.7571
1.7499
1.7426
1.4663
1.4466
1.4211
1.3952
1.0961
1.0762
1.0261
1.0197
N
O
N
CO2Me
Ph
SiPh3
5y
1H NMR, CDCl3, 500 MHz
0.95
1.00
1.02
2.04
3.09
12.03
1.05
1.02
2.02
0.94
3.04
1.96
1.01
2.03
2.01
1.00
2.03
2.05
f1 (ppm)



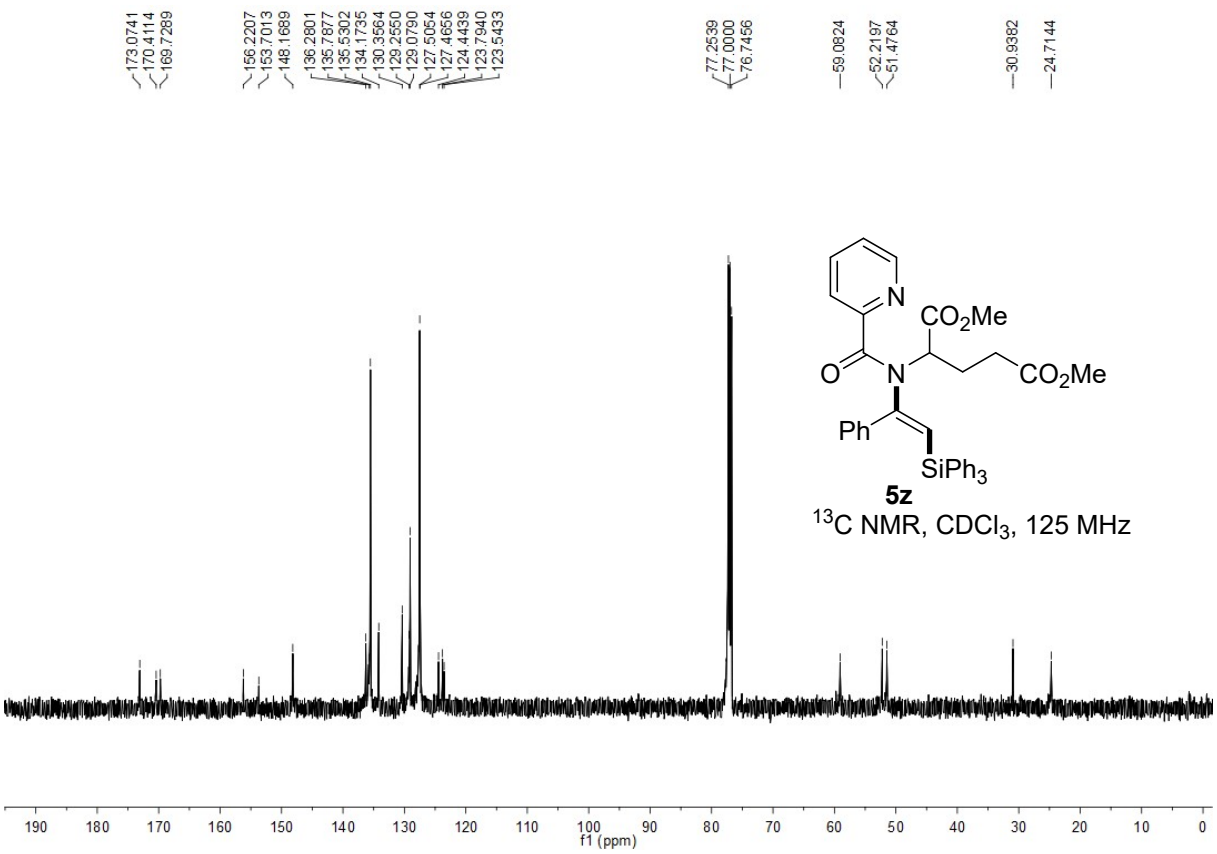
5y

^{13}C NMR, $CDCl_3$, 125 MHz



5z

^{1}H NMR, $CDCl_3$, 500 MHz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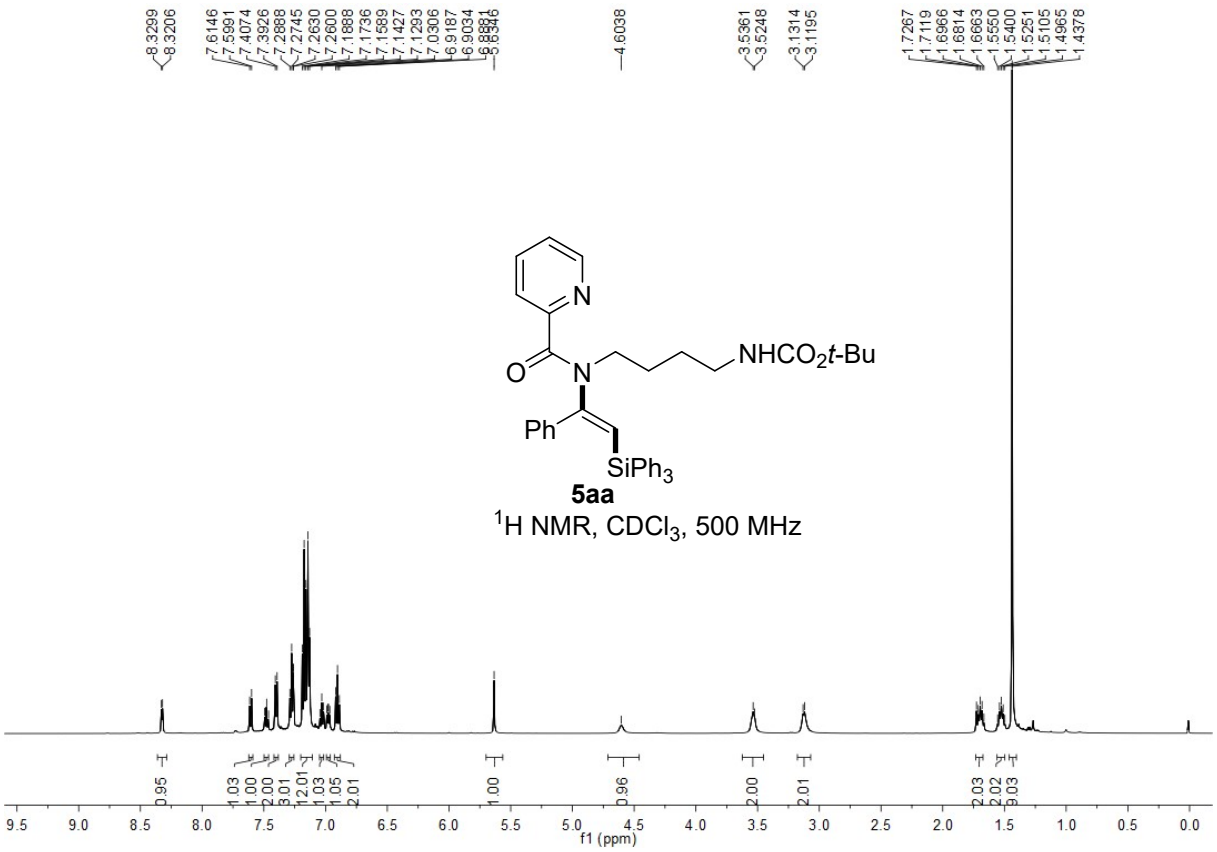
169.7289
156.2207
153.7013
148.1689
136.2801
135.7877
135.5302
134.1735
130.3564
129.2550
129.0790
127.5054
127.4656
124.4439
123.7940
123.5433
77.2539
77.0000
76.7456
59.0824
52.2197
51.4764
30.9382
24.7144
N
CO2Me
O
N
CO2Me
Ph
SiPh3
5z
13C NMR, CDCl3, 125 MHz
f1 (ppm)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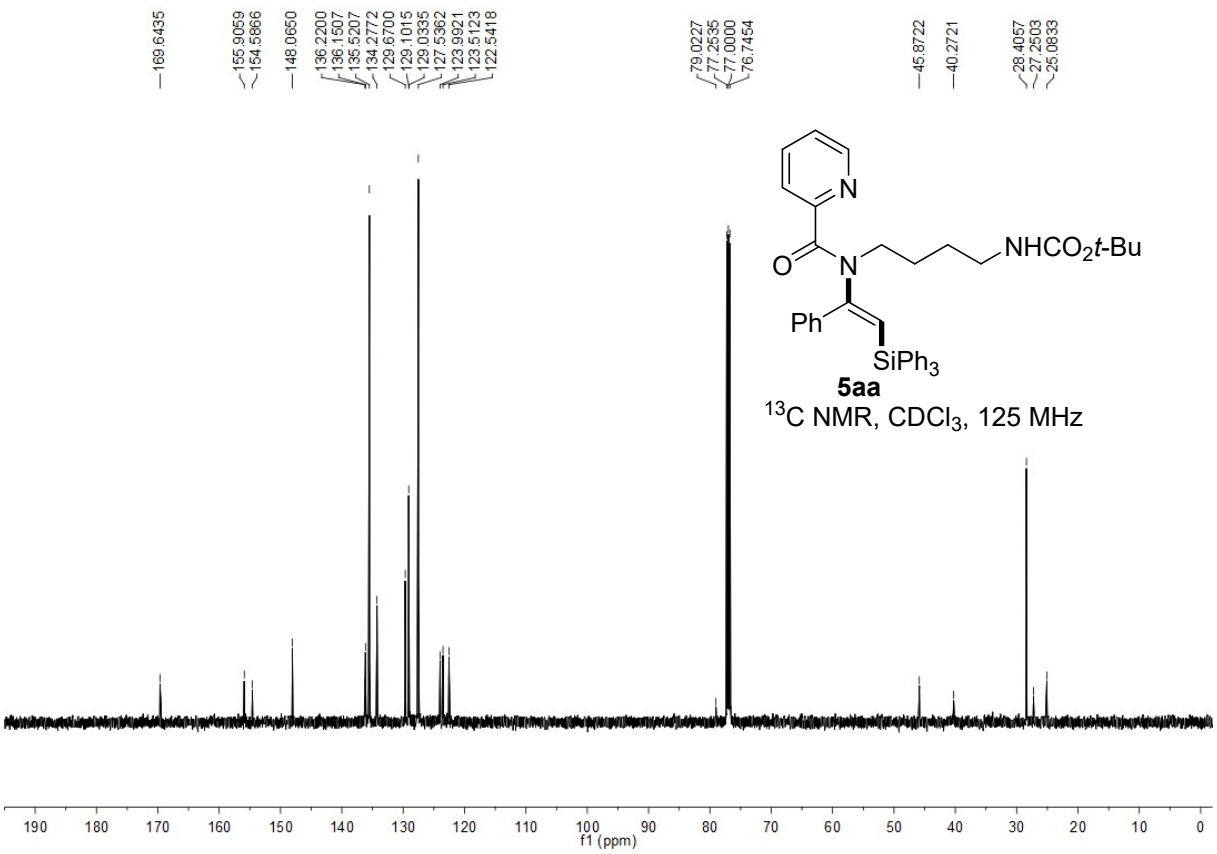
7.5991
7.4074
7.3926
7.2888
7.2745
7.2630
7.2600
7.1888
7.1736
7.1589
7.1427
7.1293
7.0306
6.9187
6.9034
4.6038
3.5361
3.5248
3.1314
3.1195
1.7267
1.7119
1.6966
1.6814
1.6663
1.5550
1.5400
1.5251
1.5105
1.4965
1.4378
N
O
N
NHCO2t-Bu
Ph
SiPh3
5aa
1H NMR, CDCl3, 500 MHz
f1 (ppm)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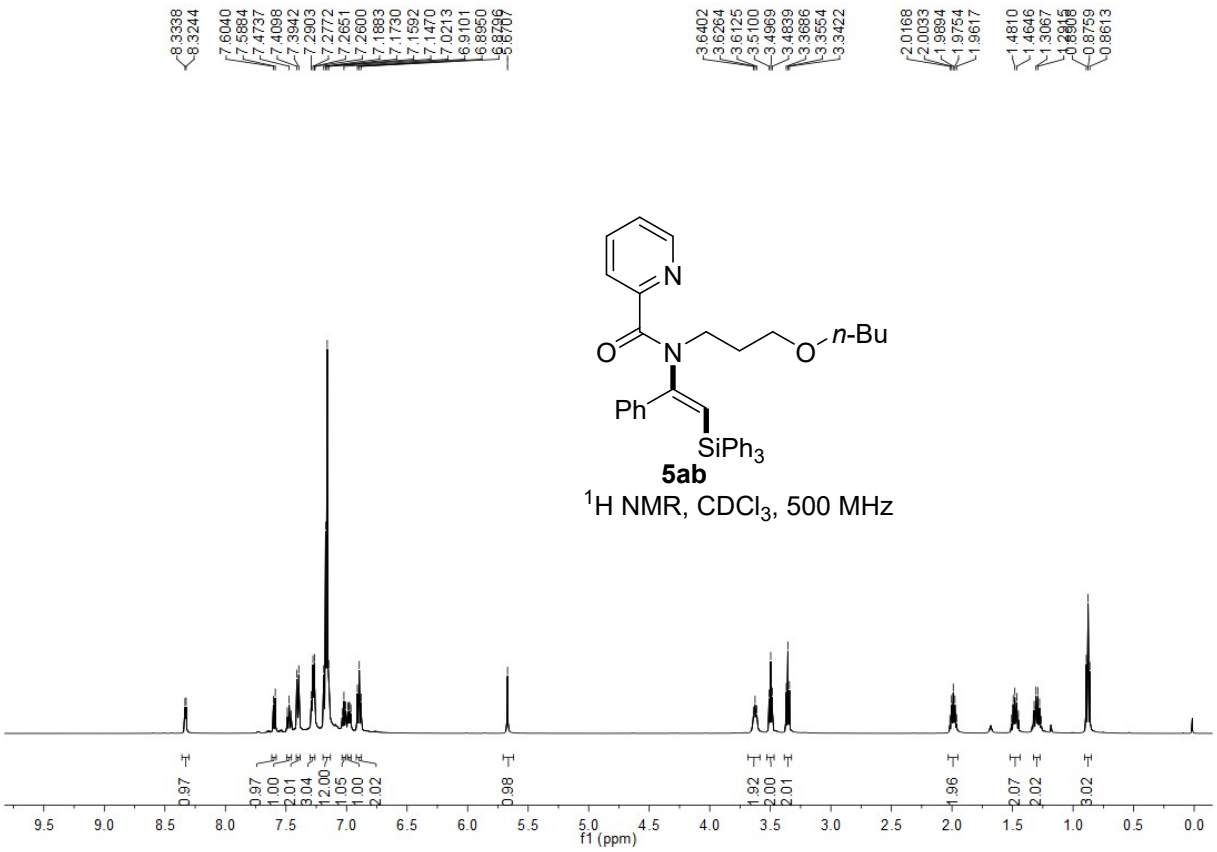
154.5866
148.0650
136.2200
136.1507
135.5207
134.2772
129.6700
129.1015
129.0335
127.5362
123.9921
123.5123
122.5418
79.0227
77.2535
77.0000
76.7454
45.8722
40.2721
28.4057
27.2503
25.0833
N
O
N
NHCO2t-Bu
Ph
SiPh3
5aa
13C NMR, CDCl3, 125 MHz
f1 (ppm)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7.5884
7.4737
7.4098
7.3942
7.2903
7.2772
7.2651
7.2600
7.1883
7.1730
7.1592
7.1470
7.0213
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6.8950
6.8796
6.8707
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3.6264
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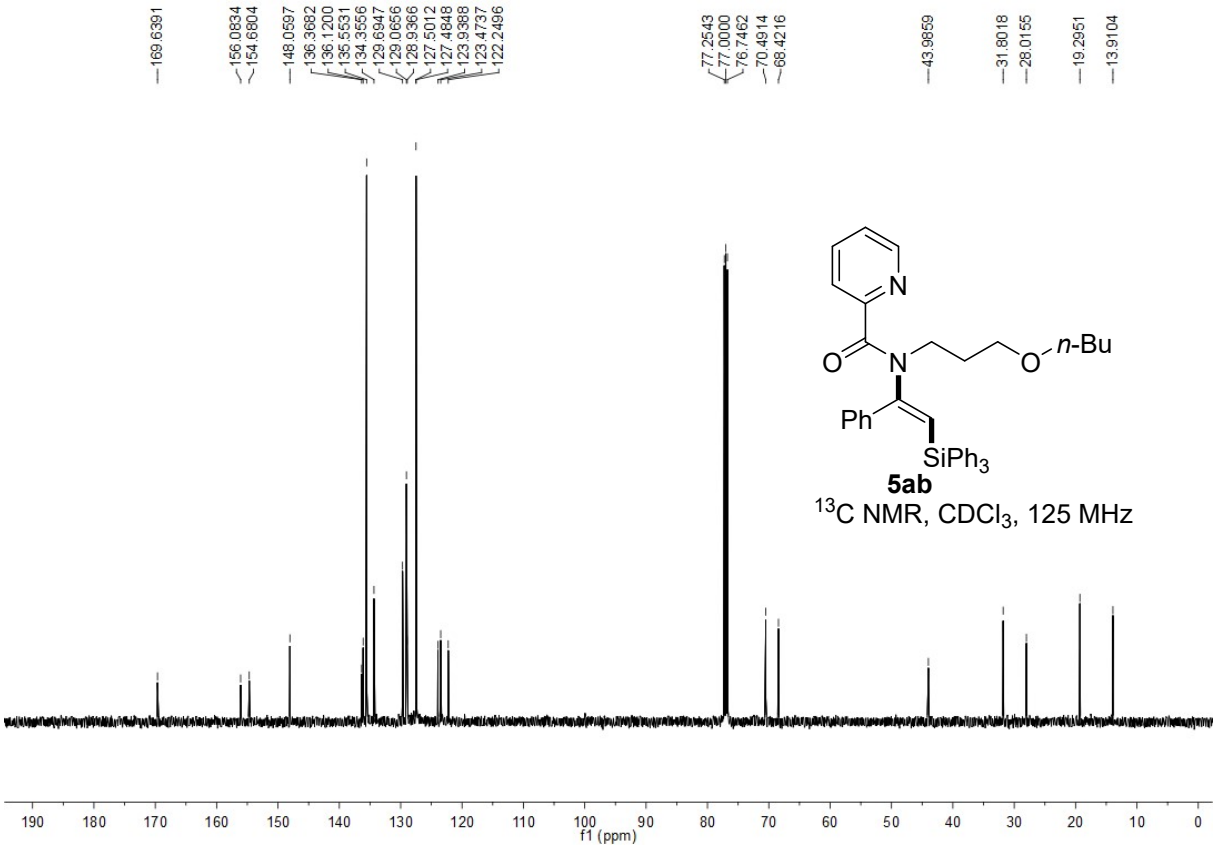
3.4969
3.4839
3.3686
3.3554
3.3422
2.0168
2.0033
1.9894
1.9754
1.9617
1.4810
1.4646
1.3067
0.8759
0.8613
N
O
N
O
n-Bu
Ph
SiPh3
5ab
1H NMR, CDCl3, 500 MHz
0.97
0.97
1.00
2.01
3.04
12.00
1.05
1.00
2.02
0.98
1.92
2.00
2.01
1.96
2.07
2.02
3.02
f1 (ppm)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154.6804
148.0597
136.3682
136.1200
135.5531
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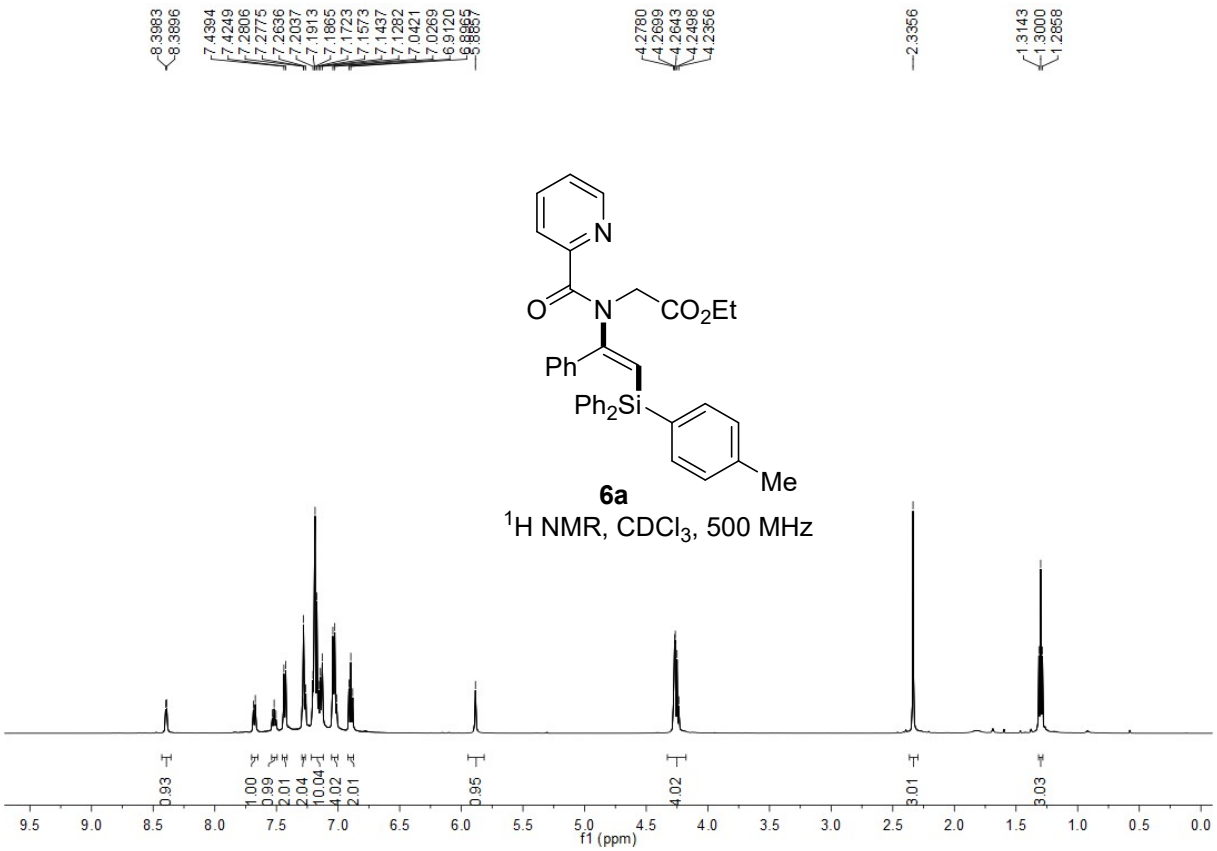
129.0656
128.9366
127.5012
127.4848
123.9388
123.4737
122.2496
77.2543
77.0000
76.7462
70.4914
68.4216
43.9859
31.8018
28.0155
19.2951
13.9104
N
O
N
O
n-Bu
Ph
SiPh3
5ab
13C NMR, CDCl3, 125 MHz
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


8.3983
8.3896
7.4394
7.4249
7.2806
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7.2636
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7.1865
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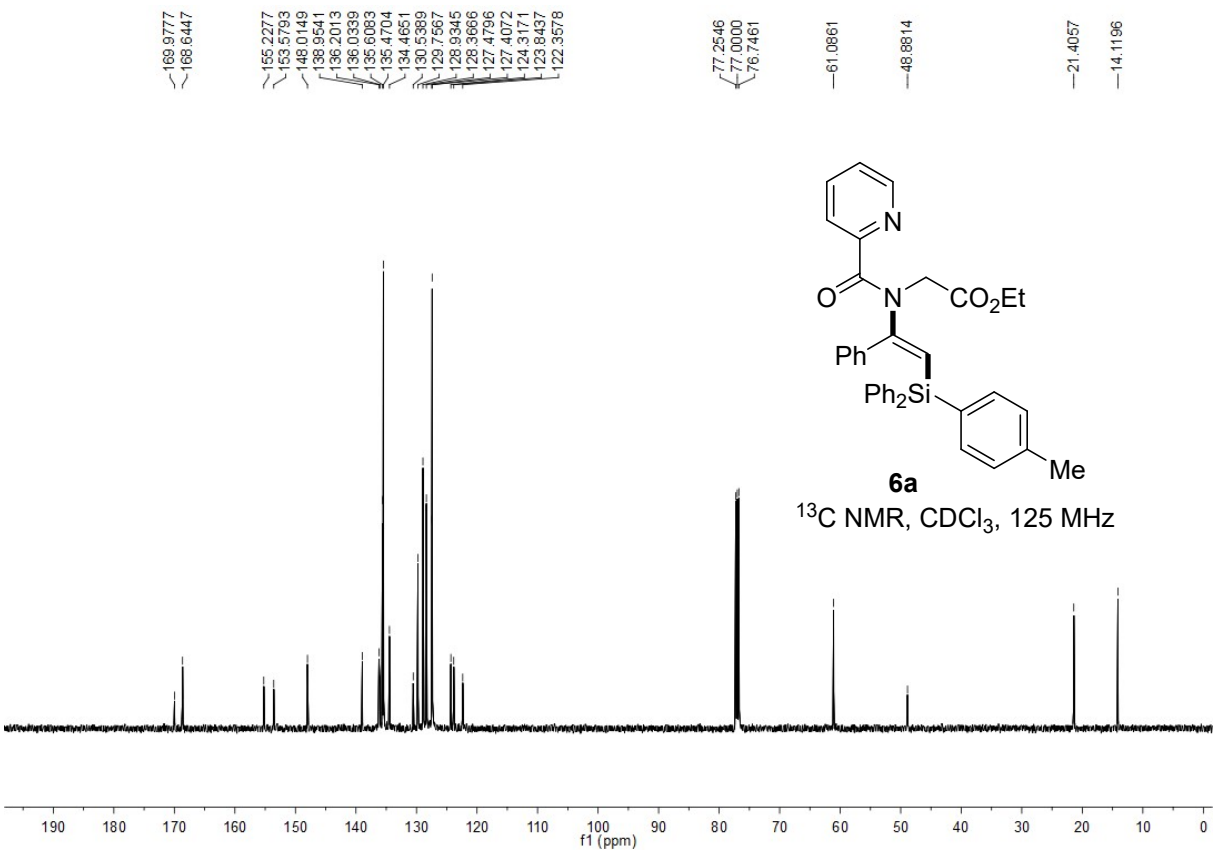
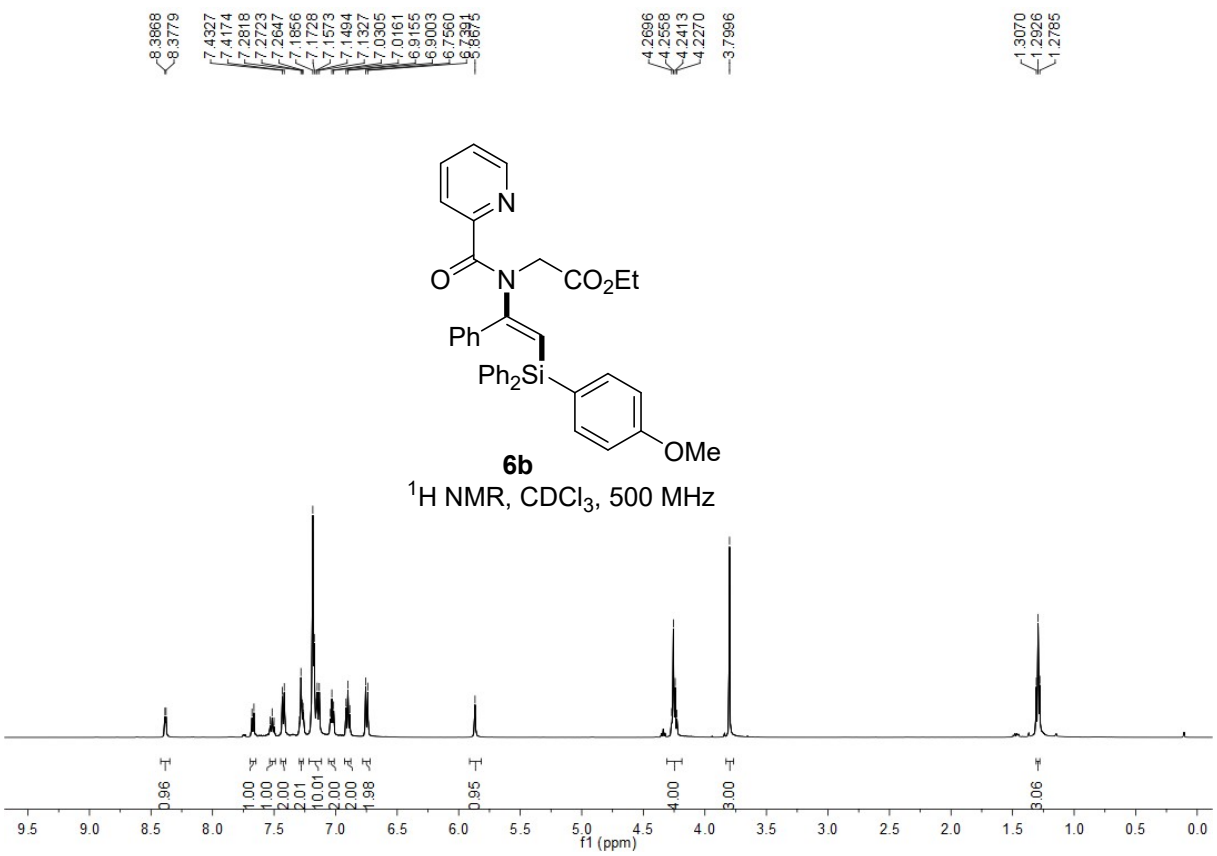
7.1573
7.1437
7.1282
7.0421
7.0269
6.9120
4.2780
4.2699
4.2643
4.2498
4.2356
2.3356
1.3143
1.3000
1.2858
N
O
N
CO2Et
Ph
Ph2Si
Me
6a
1H NMR, CDCl3, 500 MHz
0.93
1.00
0.99
2.01
2.04
10.04
4.02
2.01
0.95
4.02
3.01
3.03
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)



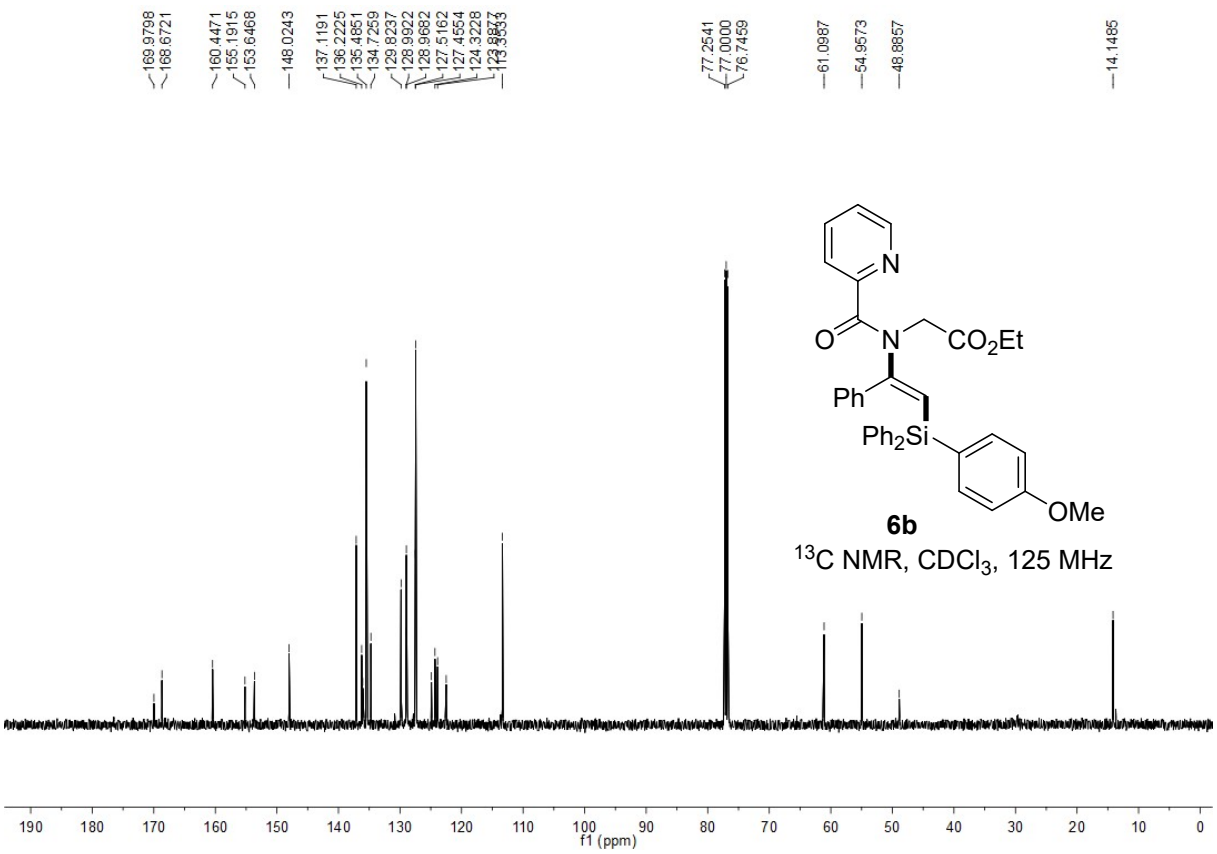
6a

^{13}C NMR, $CDCl_3$, 125 MHz



6b

^{1}H NMR, $CDCl_3$, 500 MHz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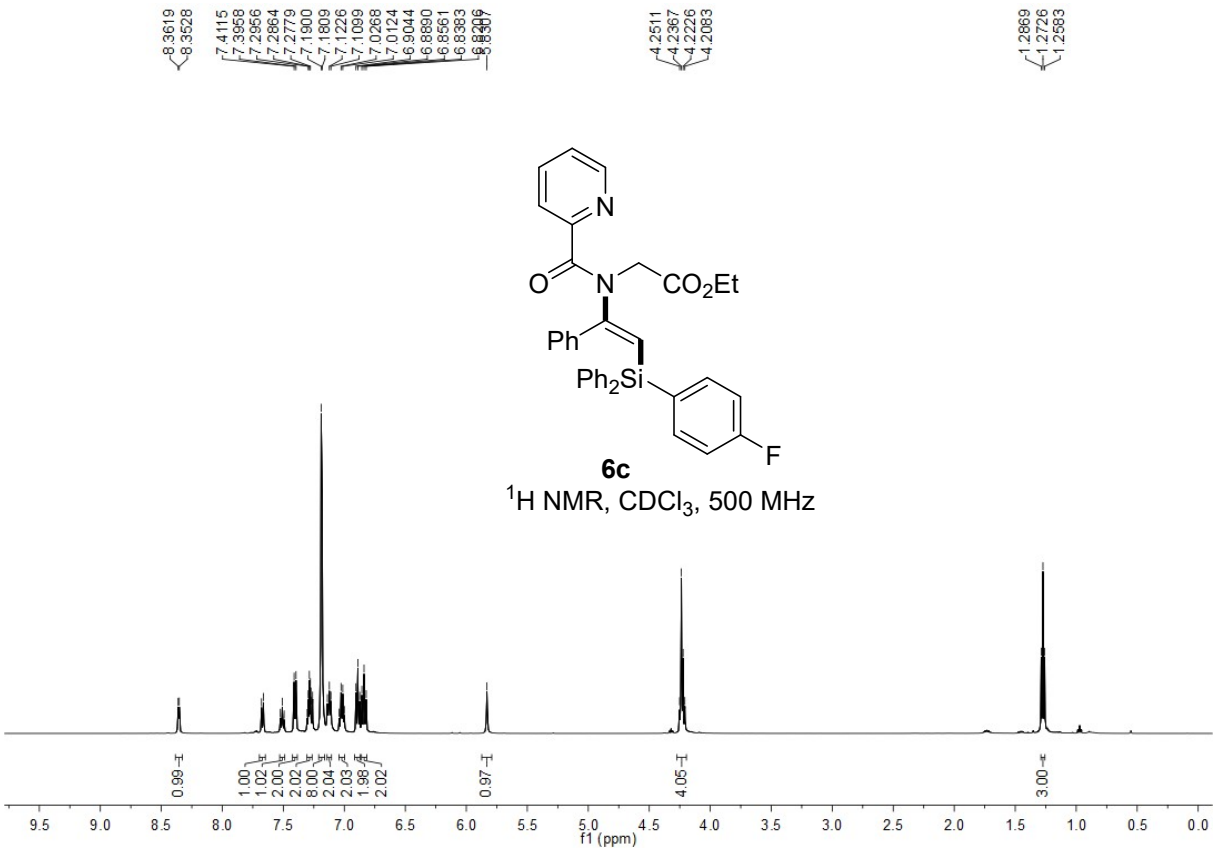
168.6721
160.4471
155.1915
153.6468
148.0243
137.1191
136.2225
135.4851
134.7259
129.8237
128.9922
128.9682
127.5162
127.4554
124.3228
77.2541
77.0000
76.7459
61.0987
54.9573
48.8857
14.1485
N
O
N
CO2Et
Ph
Ph2Si
OMe
6b
13C NMR, CDCl3, 125 MHz
f1 (ppm)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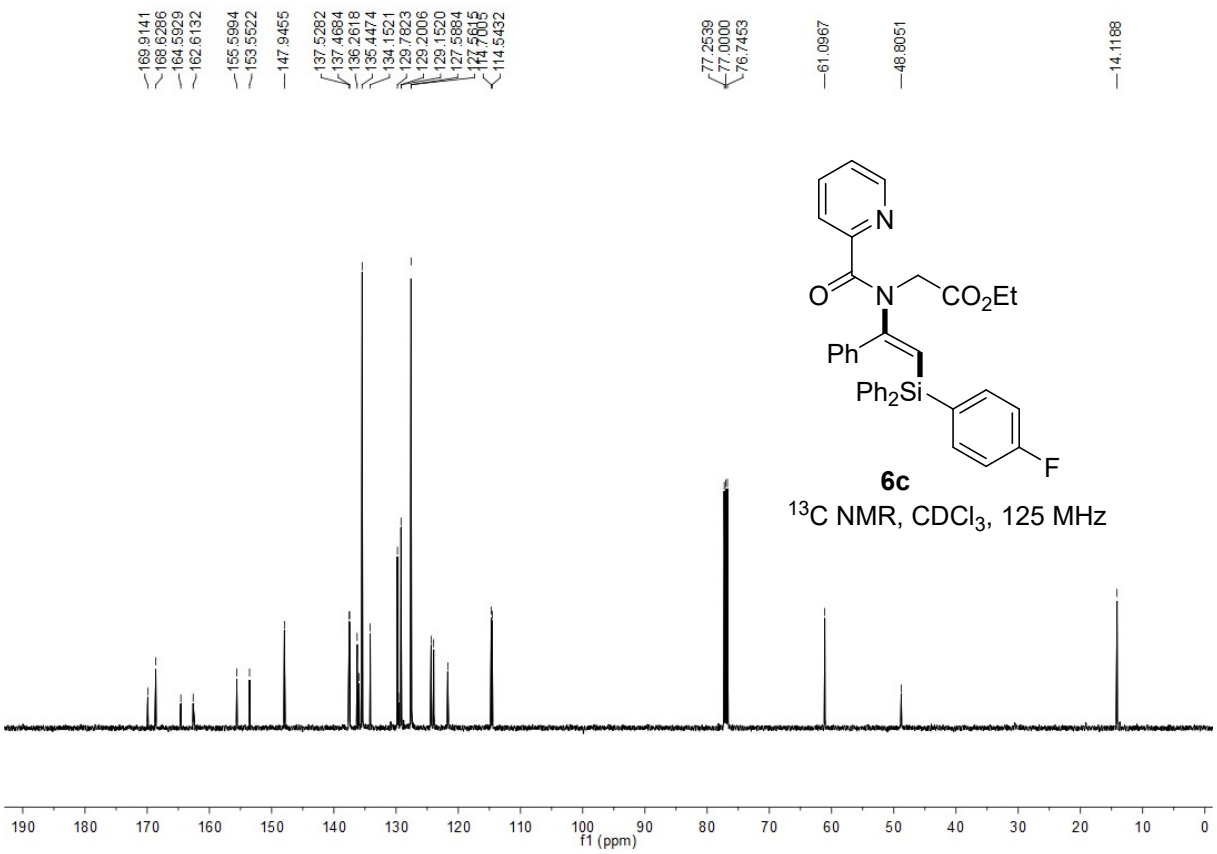
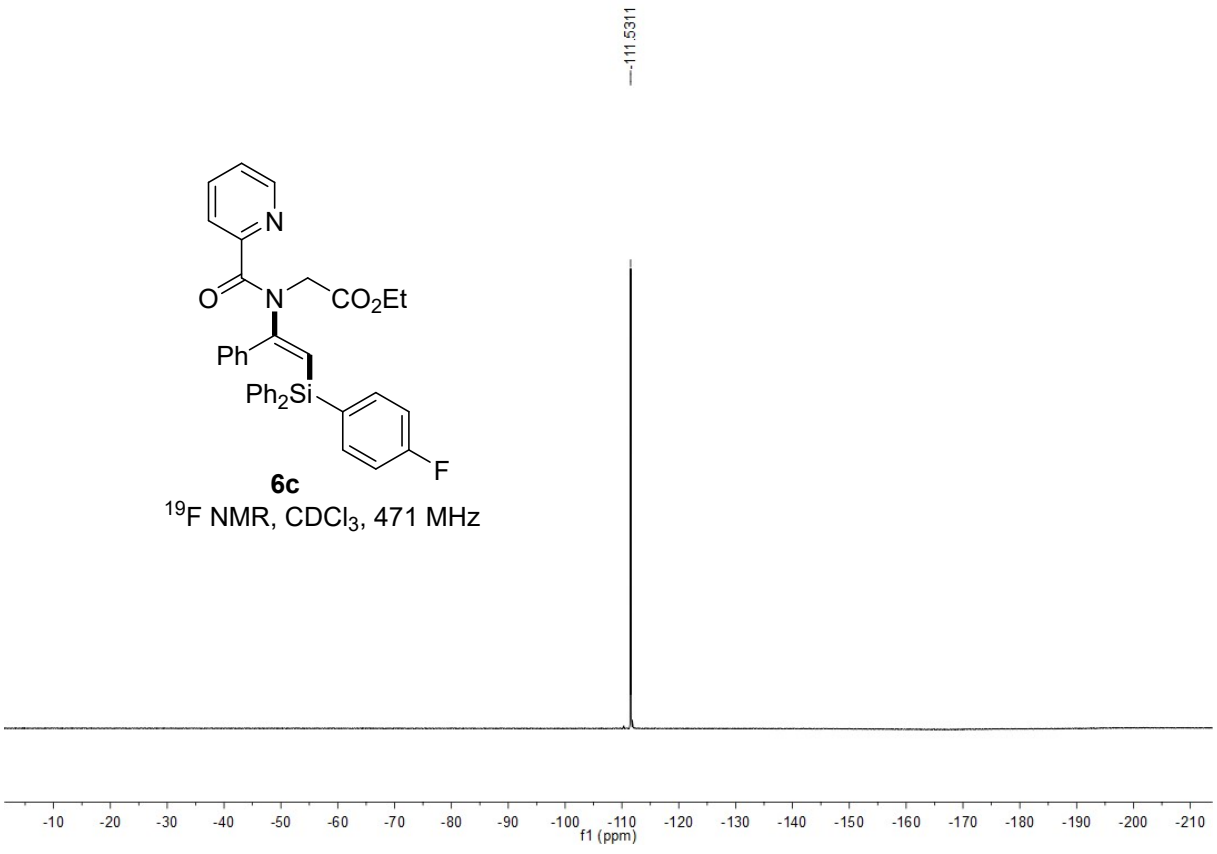
8.3528
7.4115
7.3958
7.2956
7.2864
7.2779
7.1900
7.1809
7.1226
7.1099
7.0268
7.0124
6.9044
6.8890
6.8561
6.8383
4.2511
4.2367
4.2226
4.2083
1.2869
1.2726
1.2583
N
O
N
CO2Et
Ph
Ph2Si
F
6c
1H NMR, CDCl3, 500 MHz
0.99
1.00
1.02
2.00
2.02
8.00
2.04
2.03
1.98
2.02
0.97
4.05
3.00
f1 (ppm)



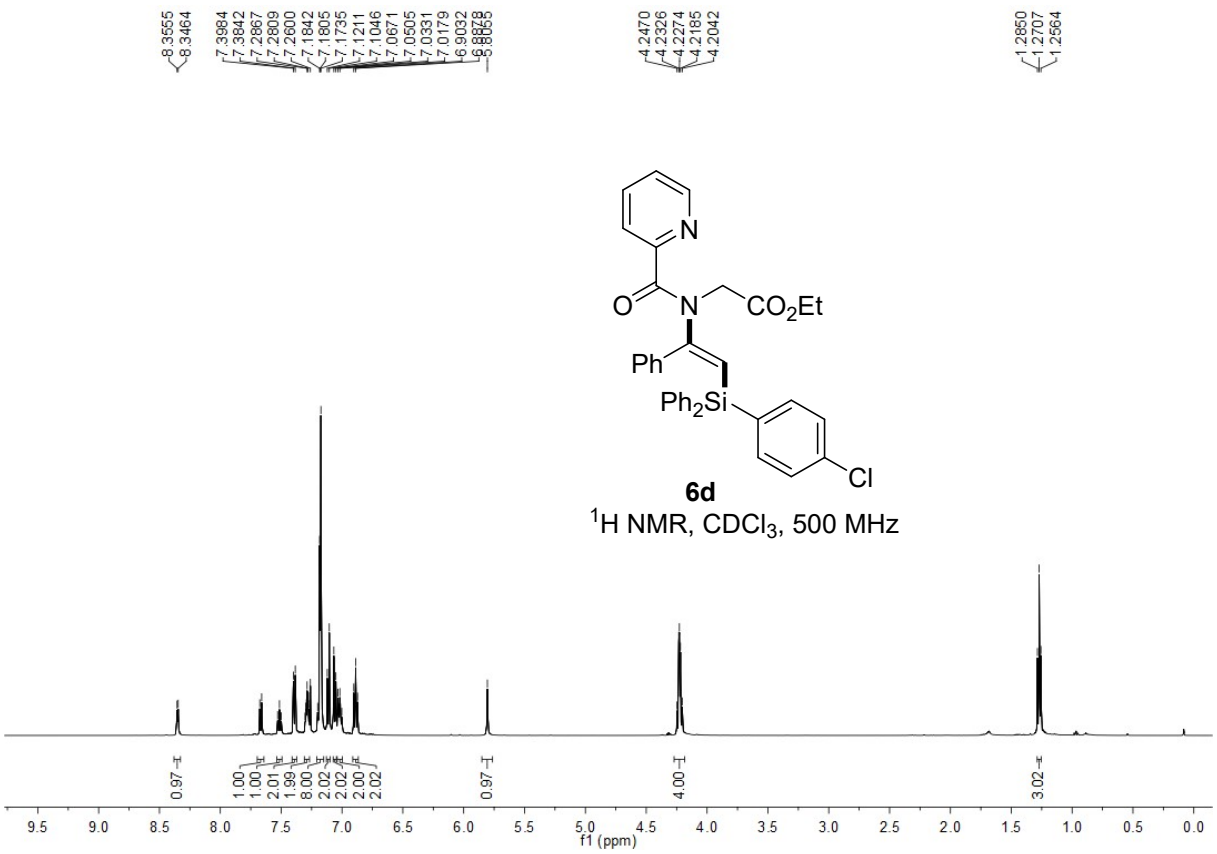
6c

^{13}C NMR, $CDCl_3$, 125 MHz



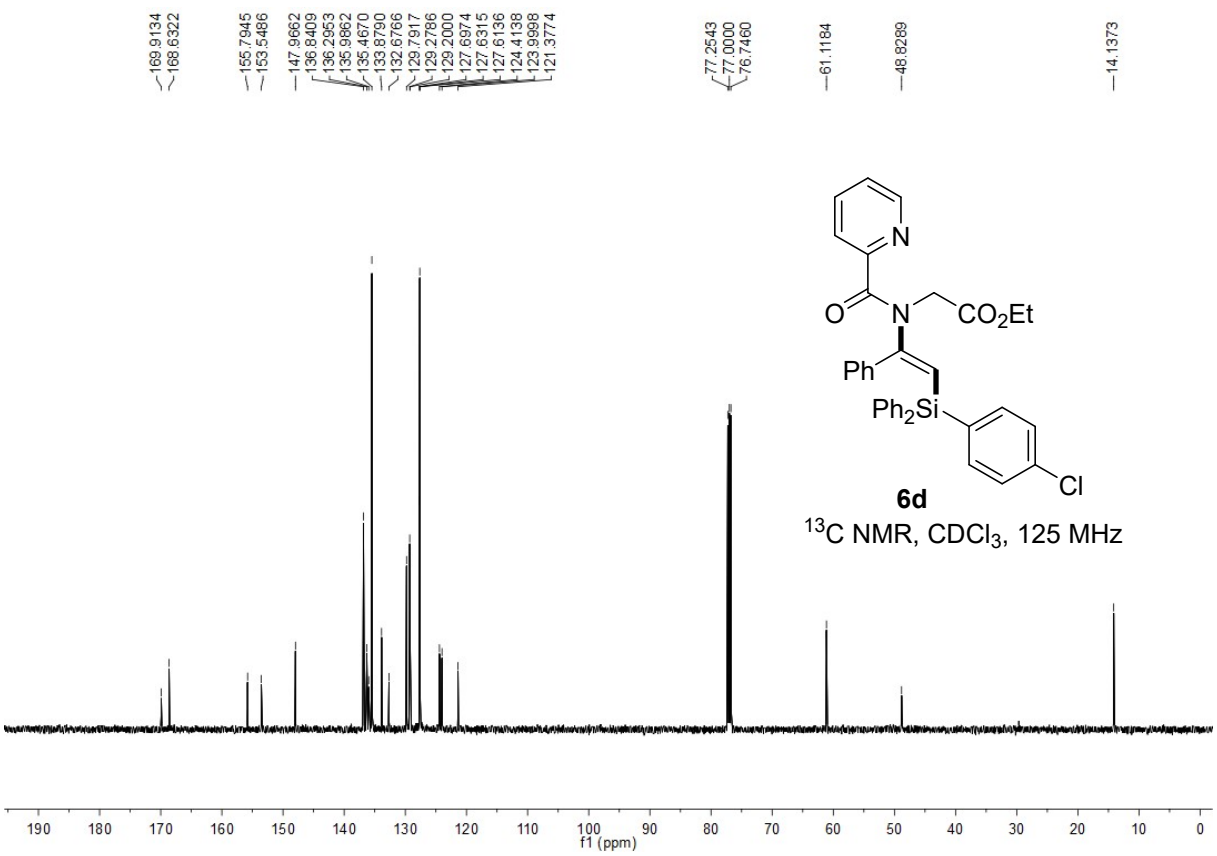
6c

^{19}F NMR, $CDCl_3$, 471 MHz



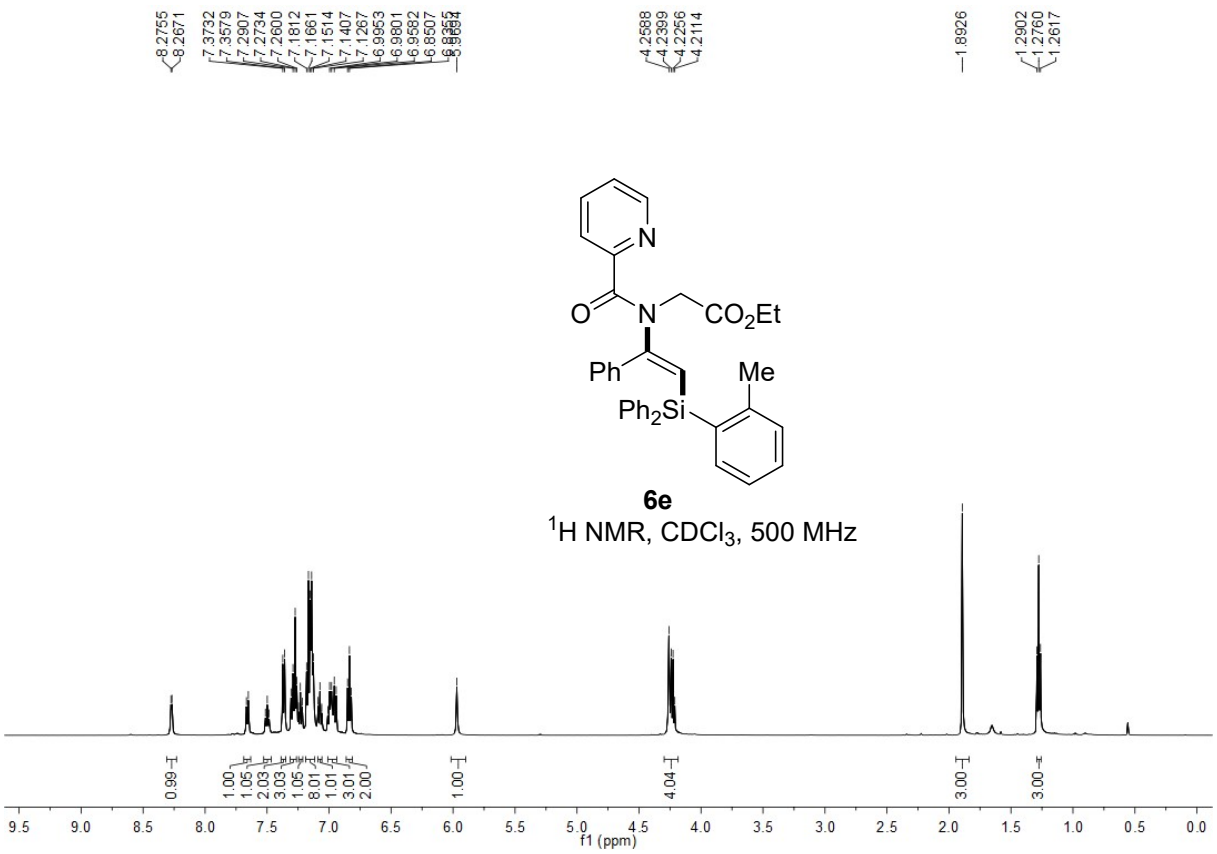
6d

^{1}H NMR, $CDCl_3$, 500 MHz



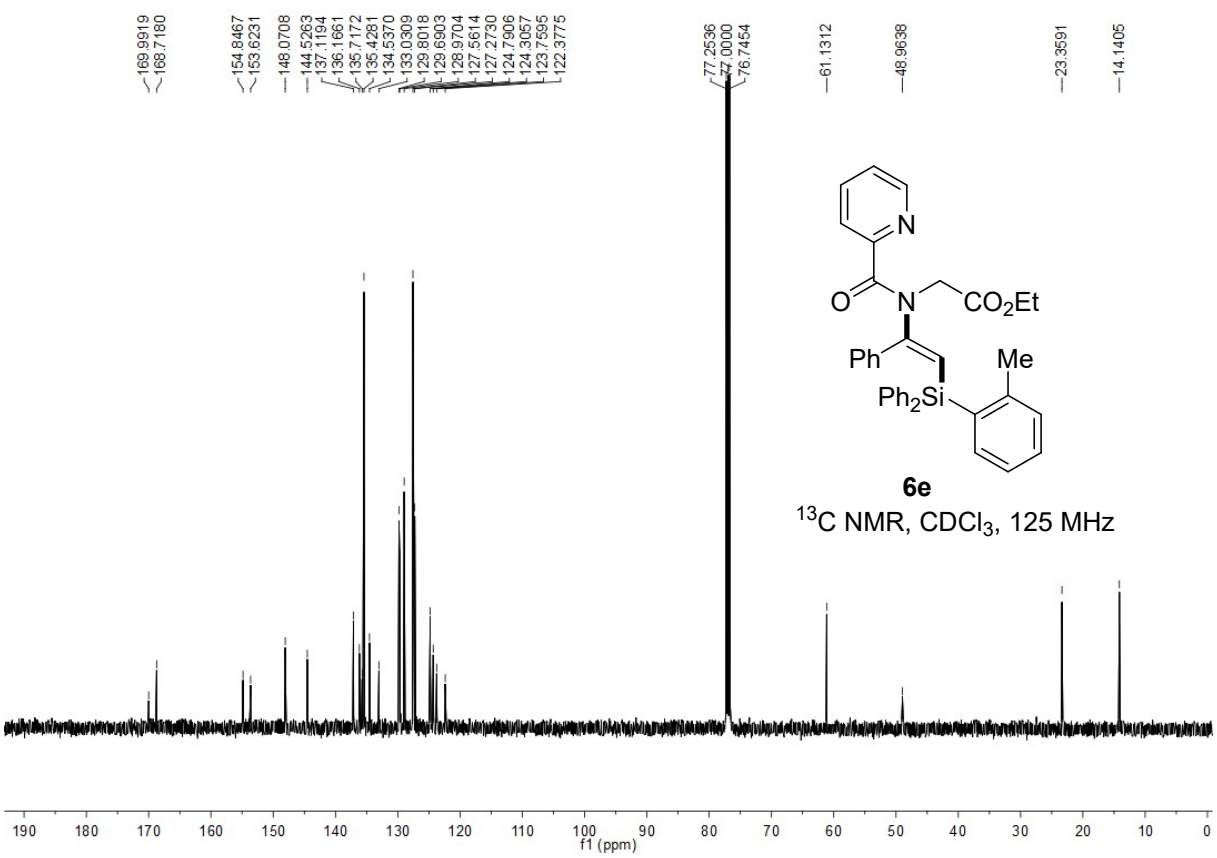
6d

^{13}C NMR, $CDCl_3$, 125 MHz



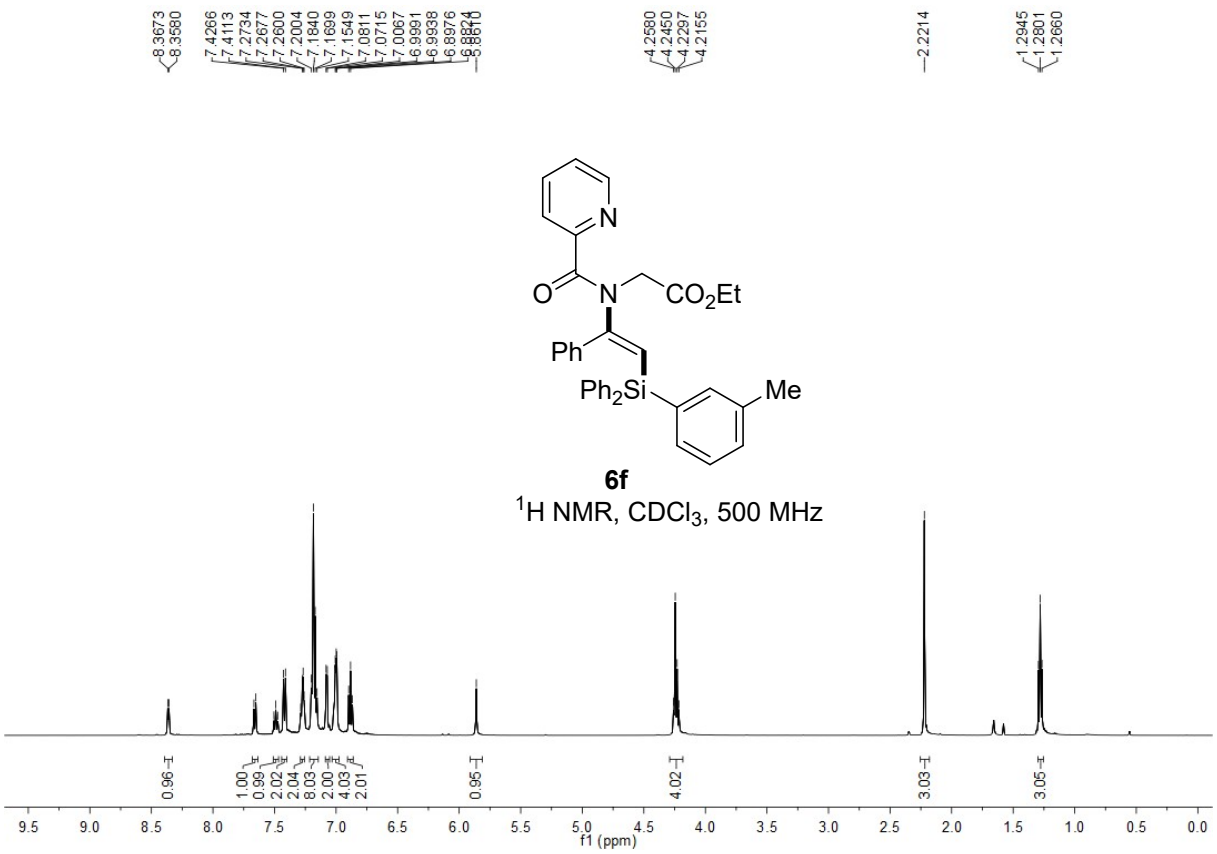
6e

^{1}H NMR, $CDCl_3$, 500 MHz



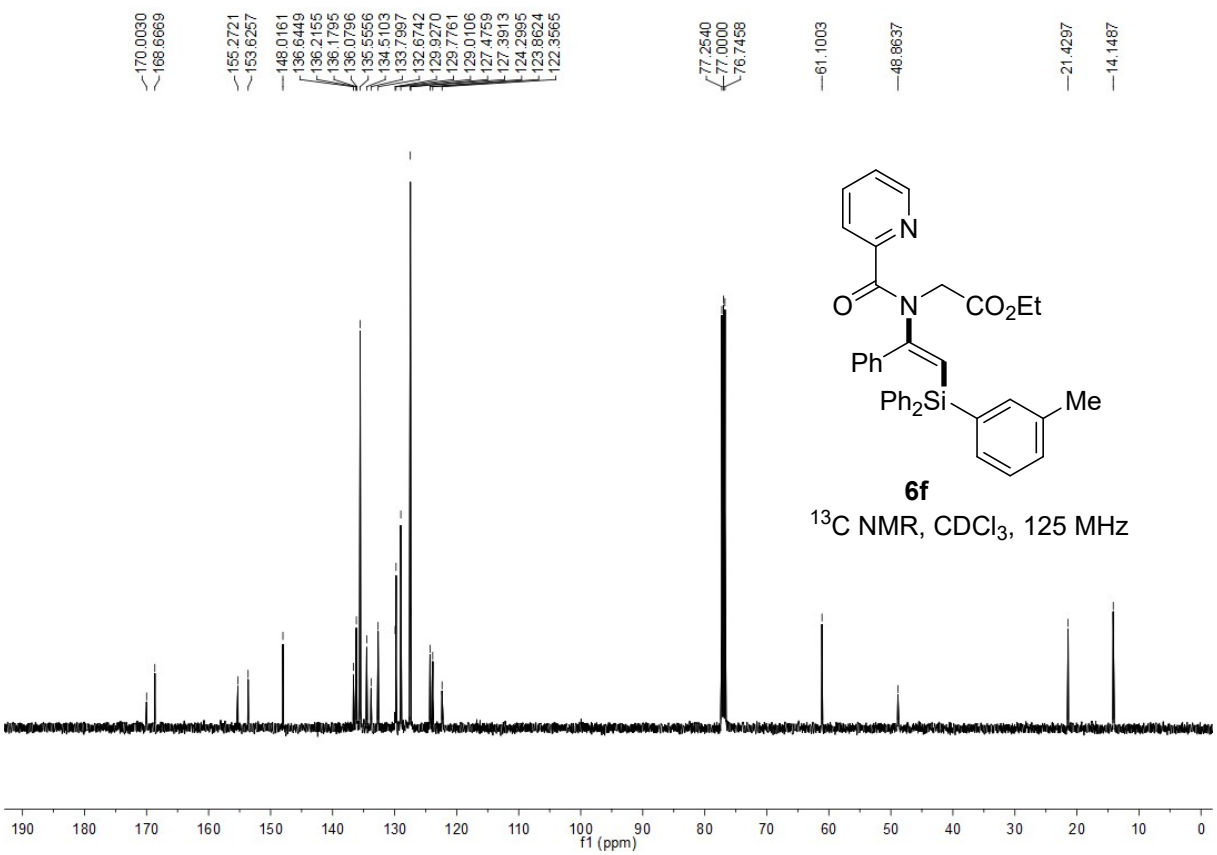
6e

^{13}C NMR, $CDCl_3$, 125 MHz



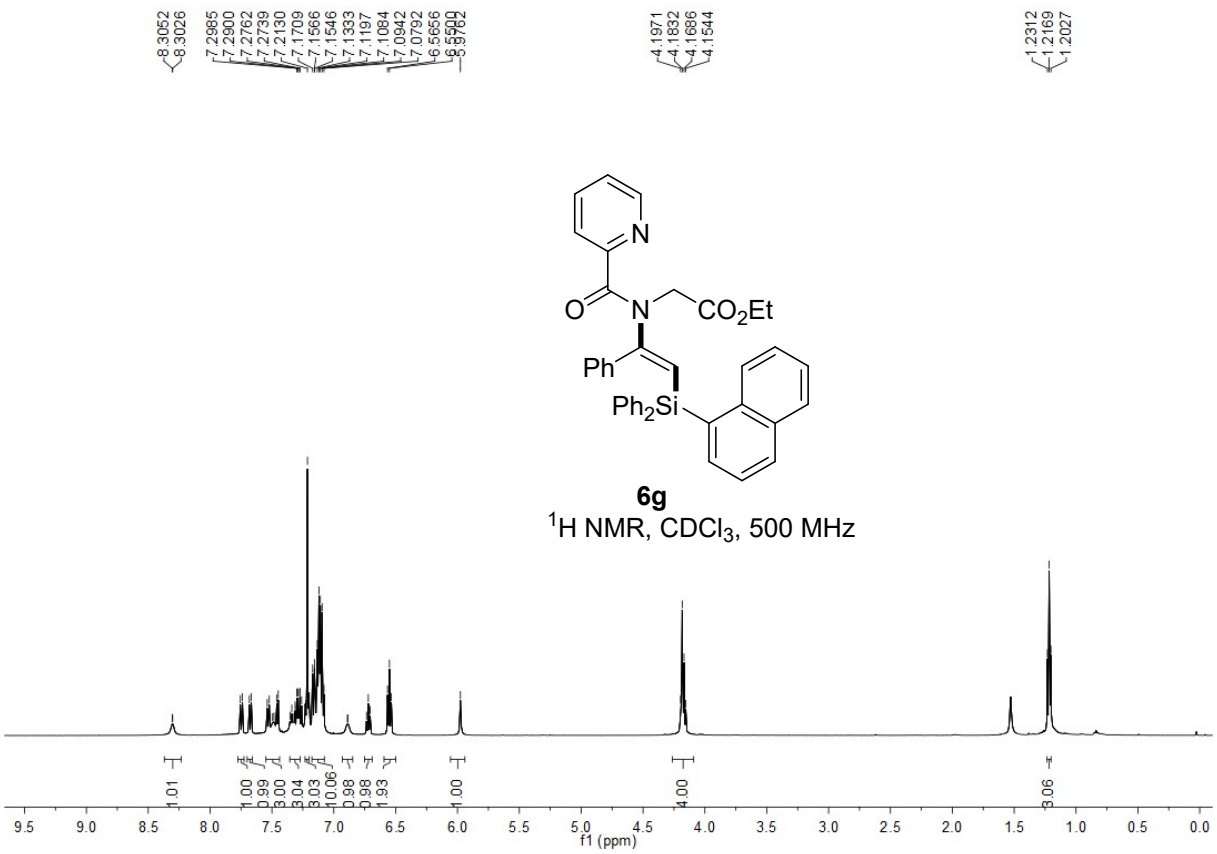
6f

^{1}H NMR, $CDCl_3$, 500 MHz



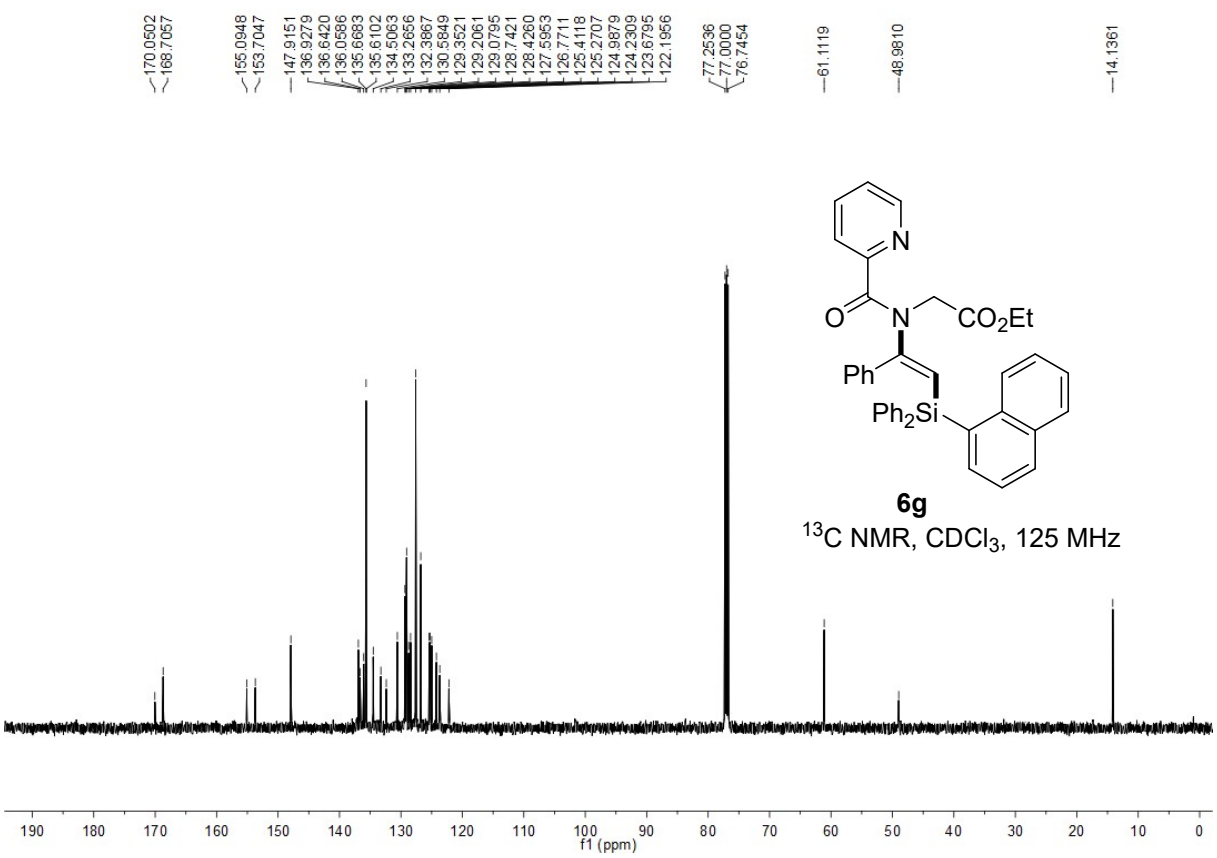
6f

^{13}C NMR, $CDCl_3$, 125 MHz



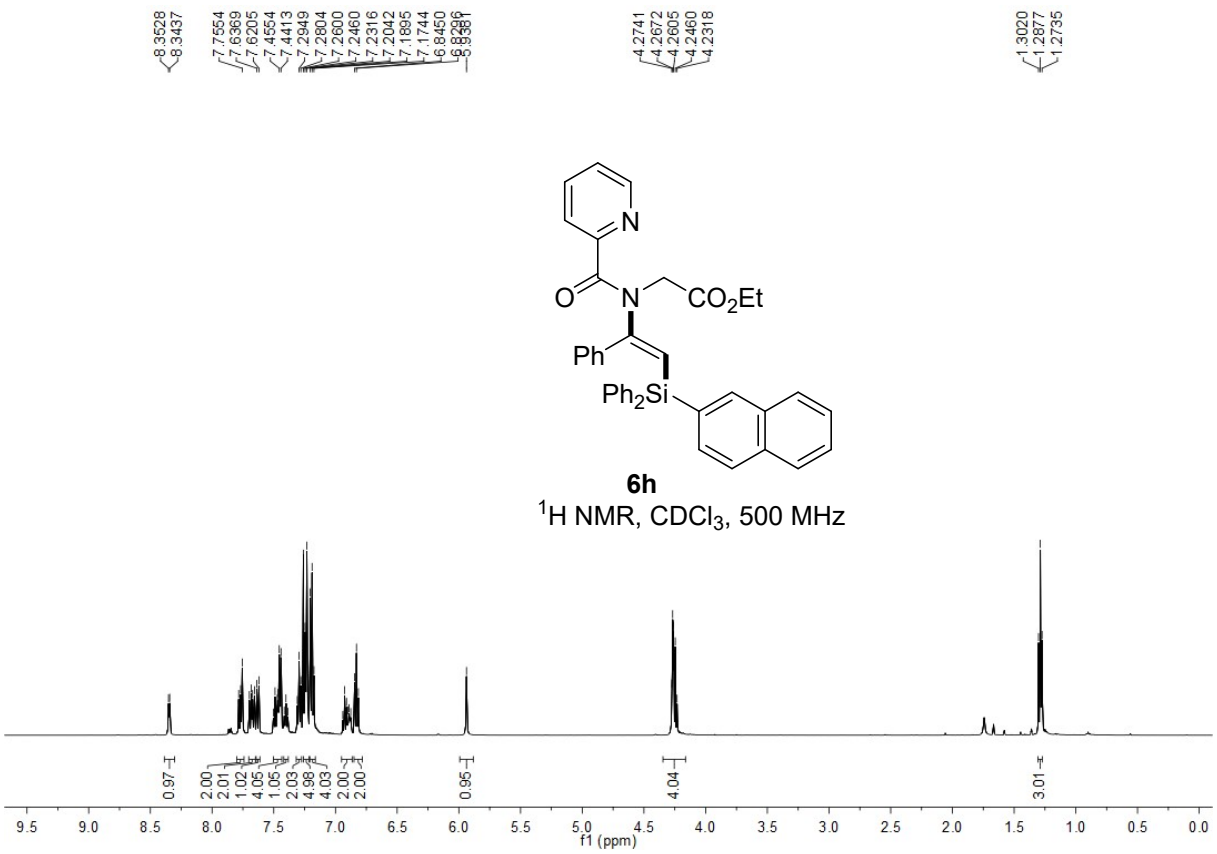
6g

^{1}H NMR, $CDCl_3$, 500 MHz



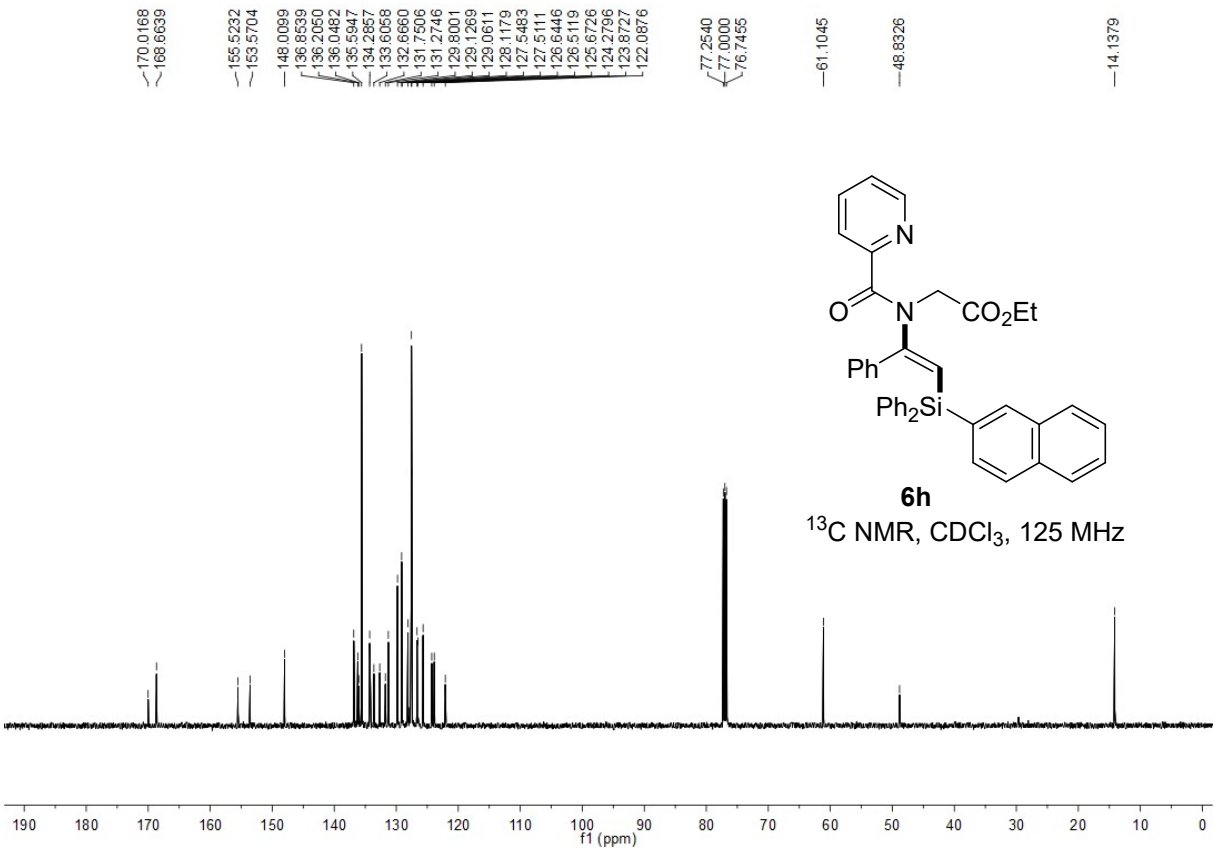
6g

^{13}C NMR, $CDCl_3$, 125 MHz



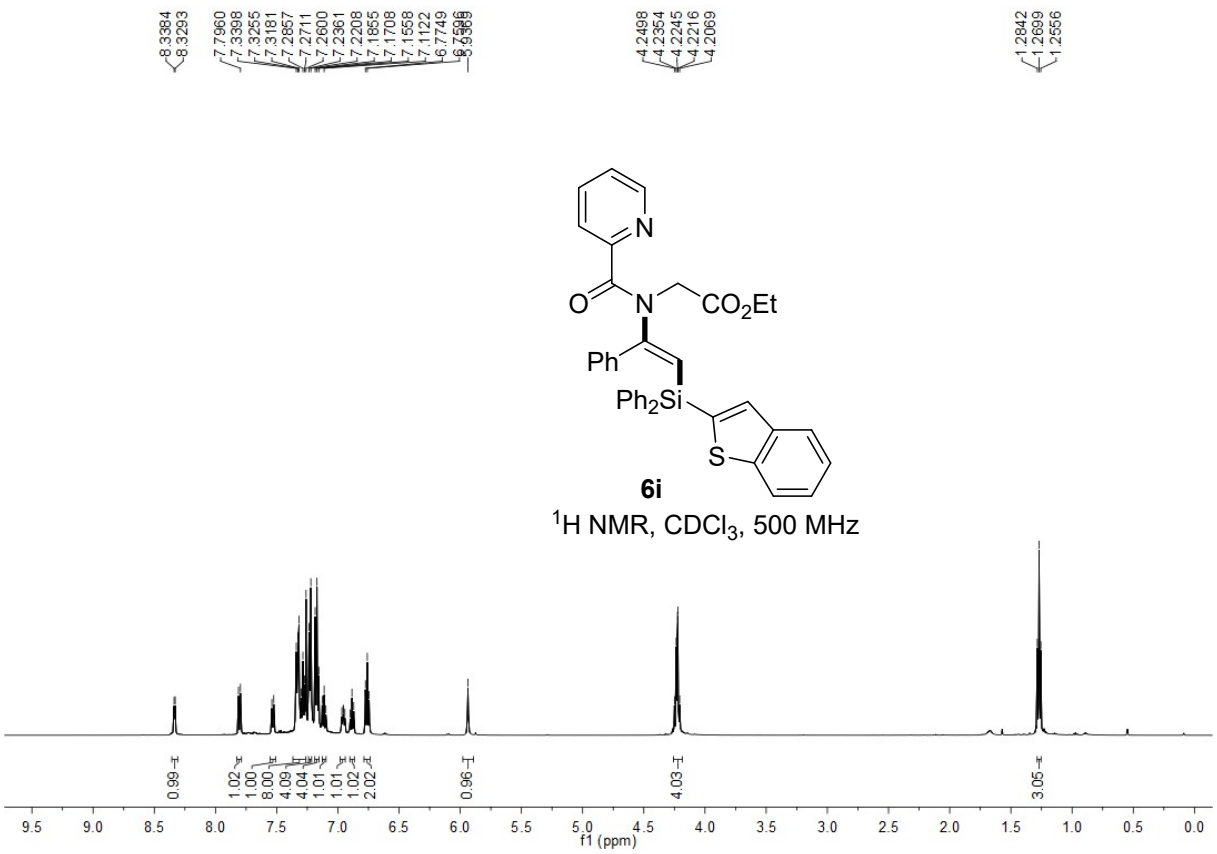
6h

^{1}H NMR, $CDCl_3$, 500 MHz



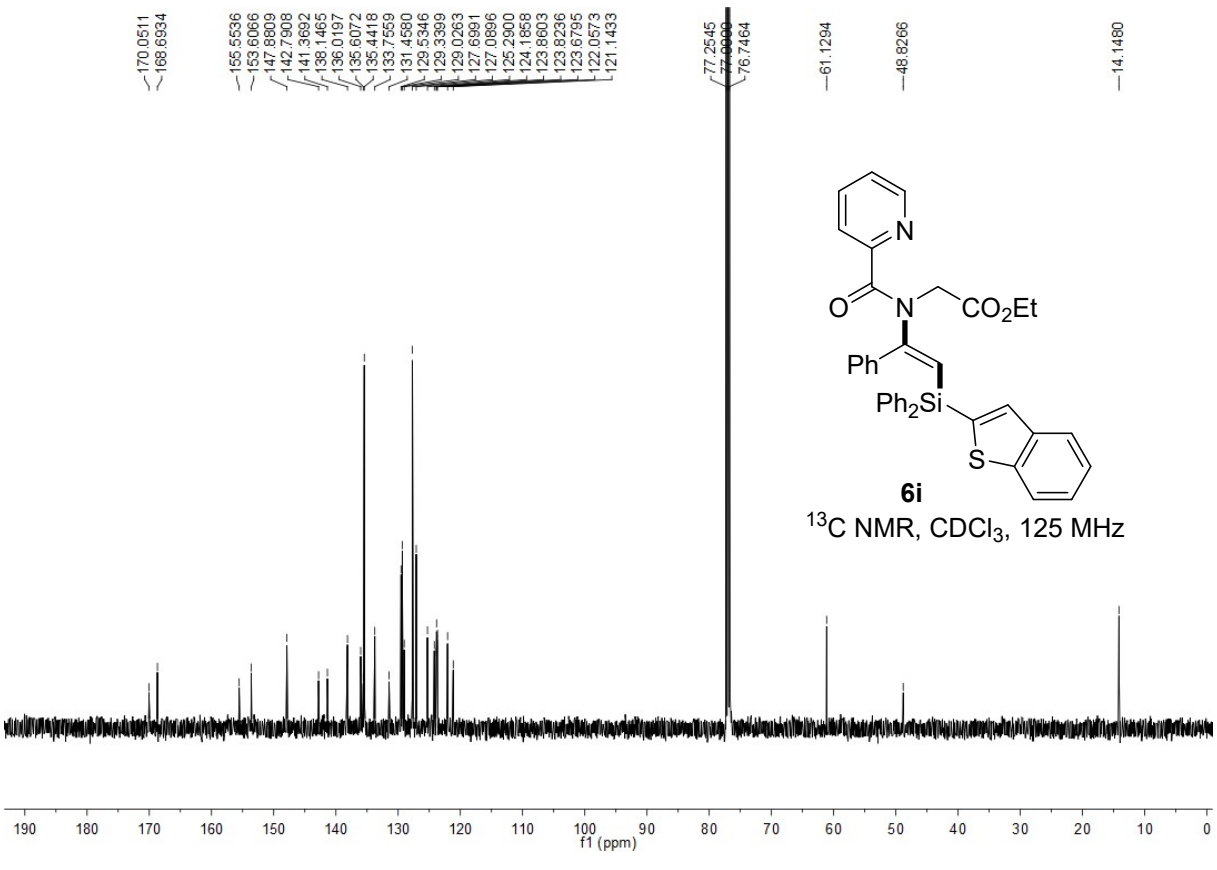
6h

^{13}C NMR, $CDCl_3$, 125 MHz



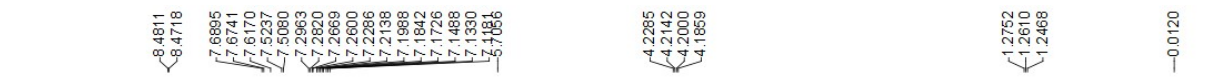
6i

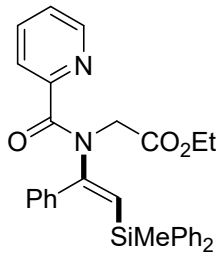
^{1}H NMR, $CDCl_3$, 500 MHz



6i

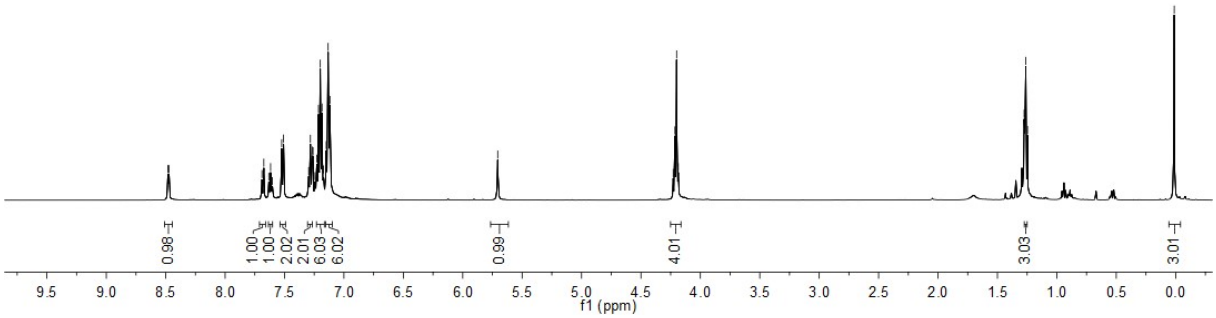
^{13}C NMR, $CDCl_3$, 125 MHz

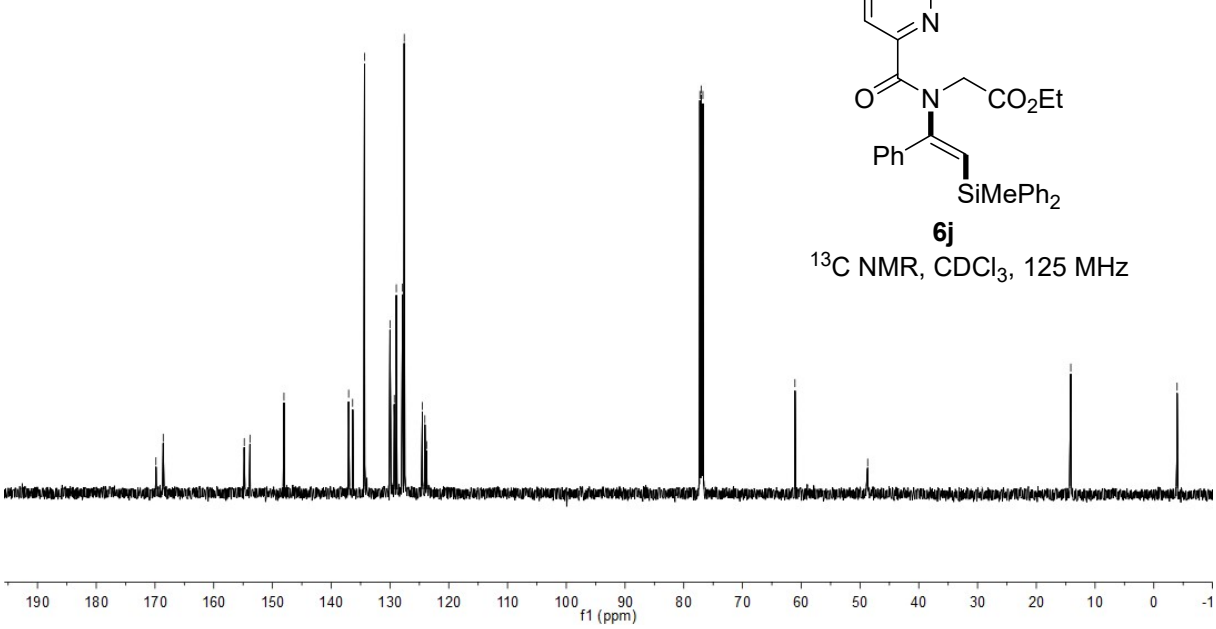




6j

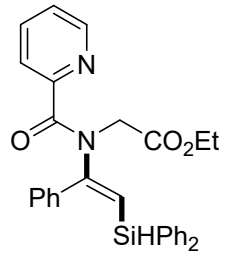
^{1}H NMR, $CDCl_3$, 500 MHz





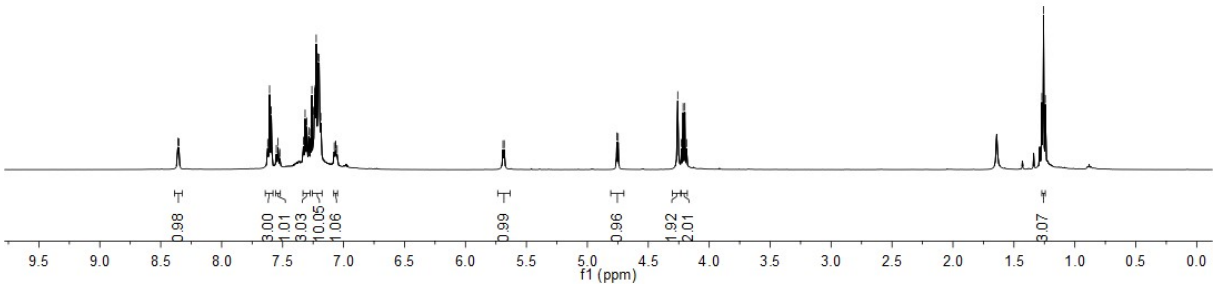
6j

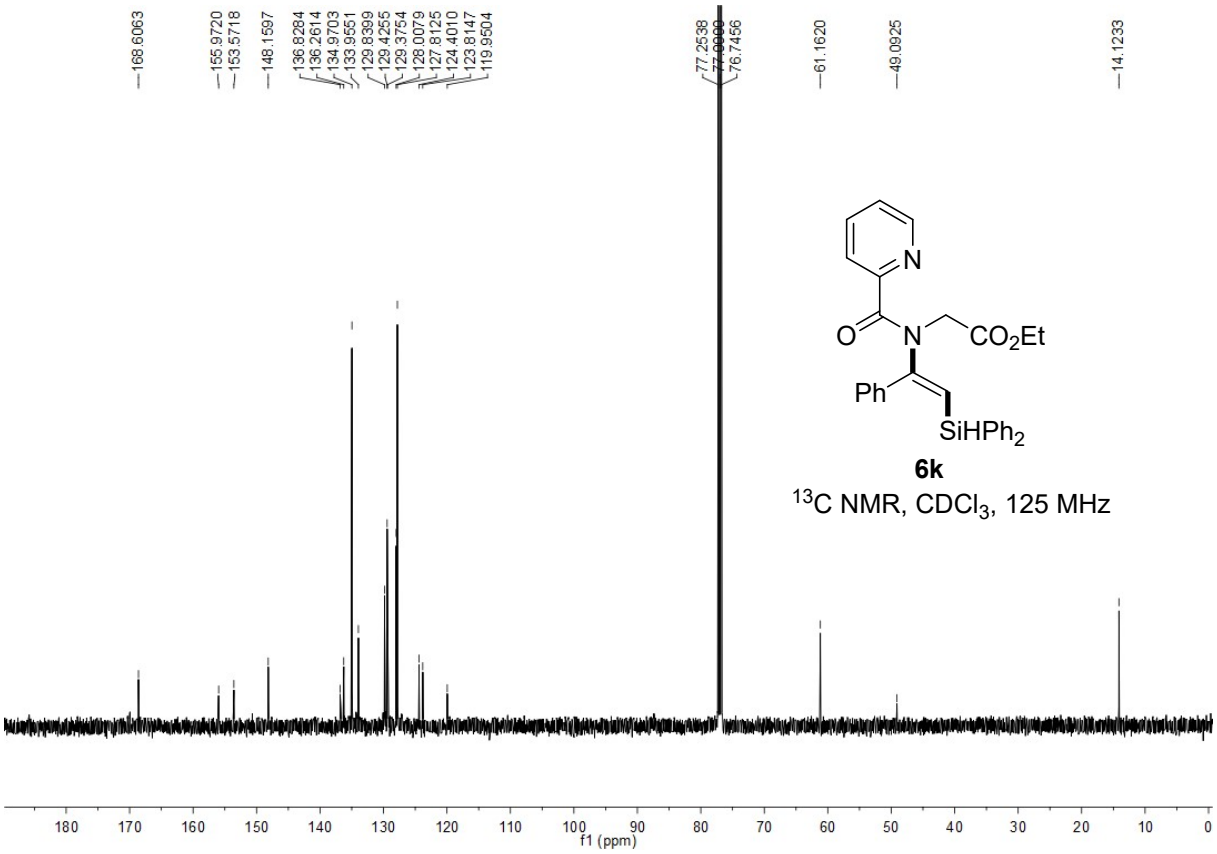
^{13}C NMR, $CDCl_3$, 125 MHz



6k

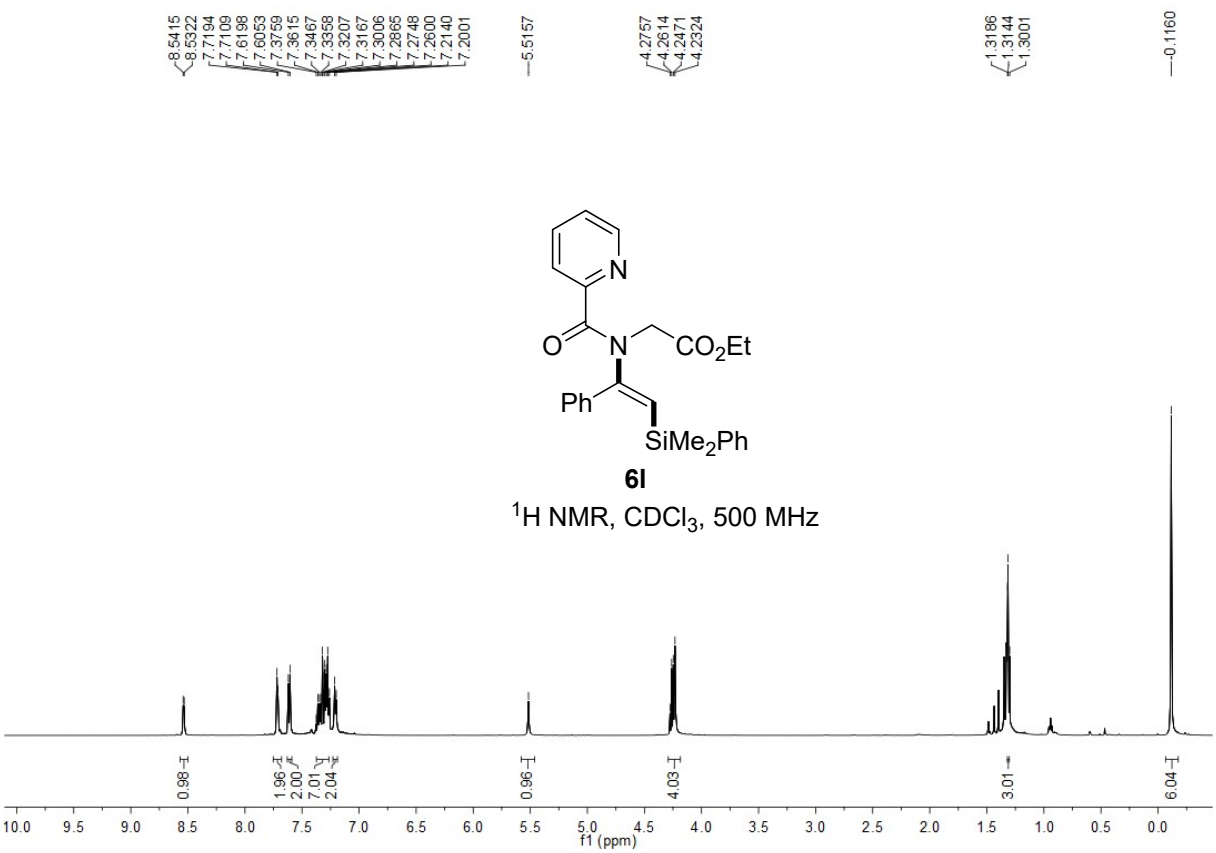
^{1}H NMR, $CDCl_3$, 500 MHz





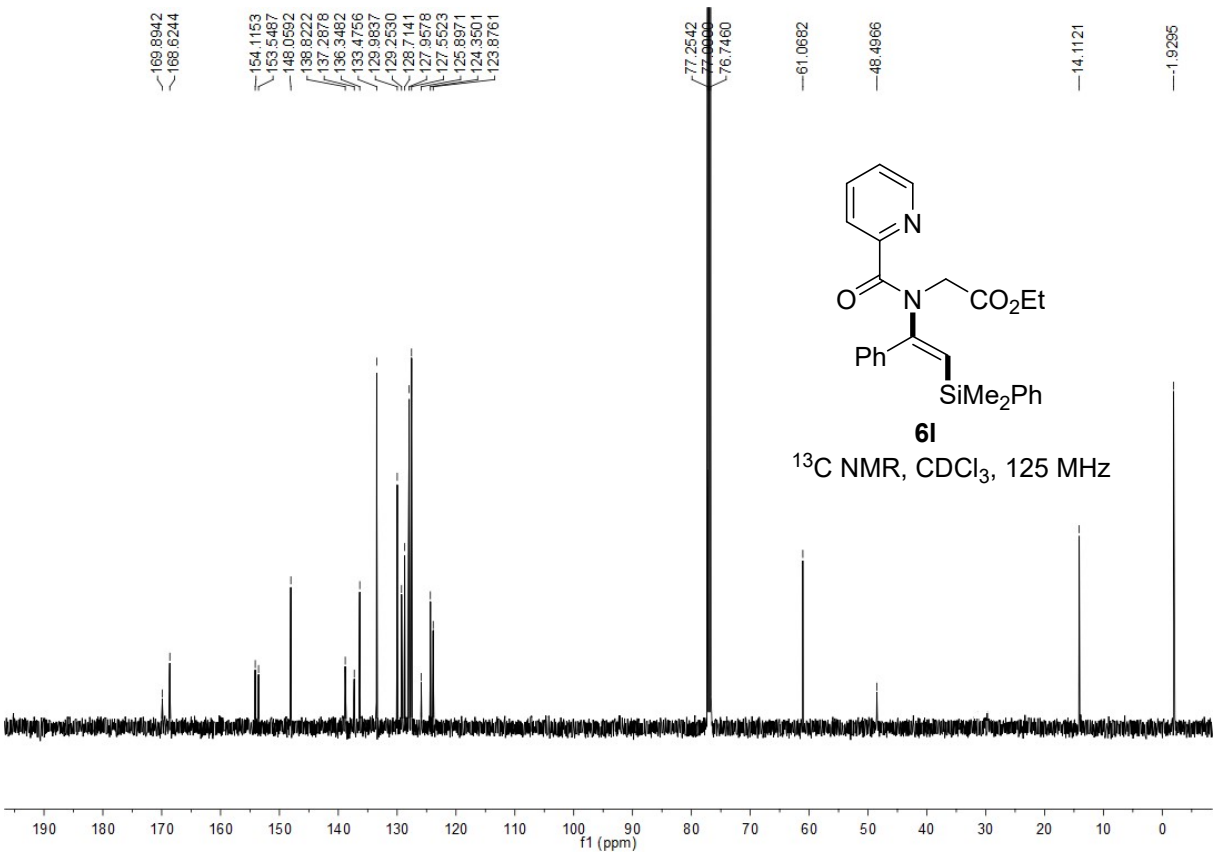
6k

^{13}C NMR, $CDCl_3$, 125 MHz



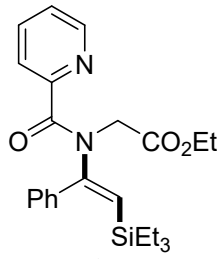
6l

^{1}H NMR, $CDCl_3$, 500 MHz



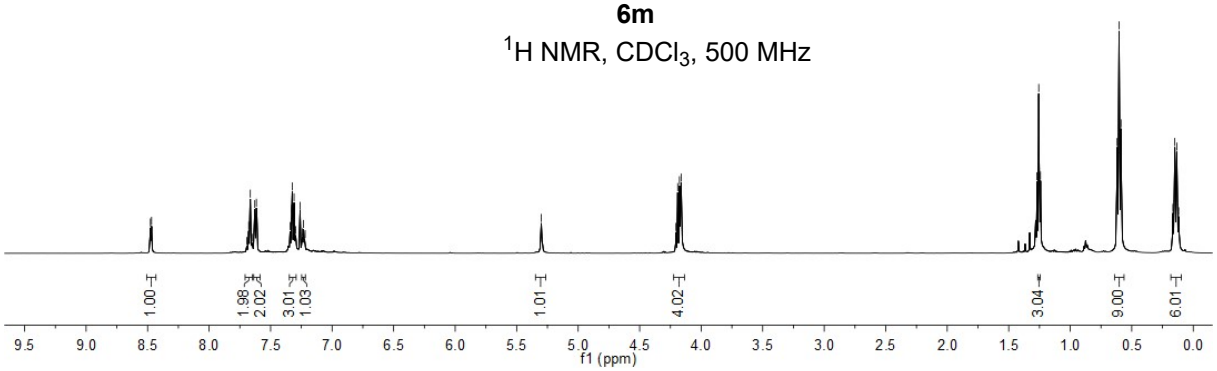
6l

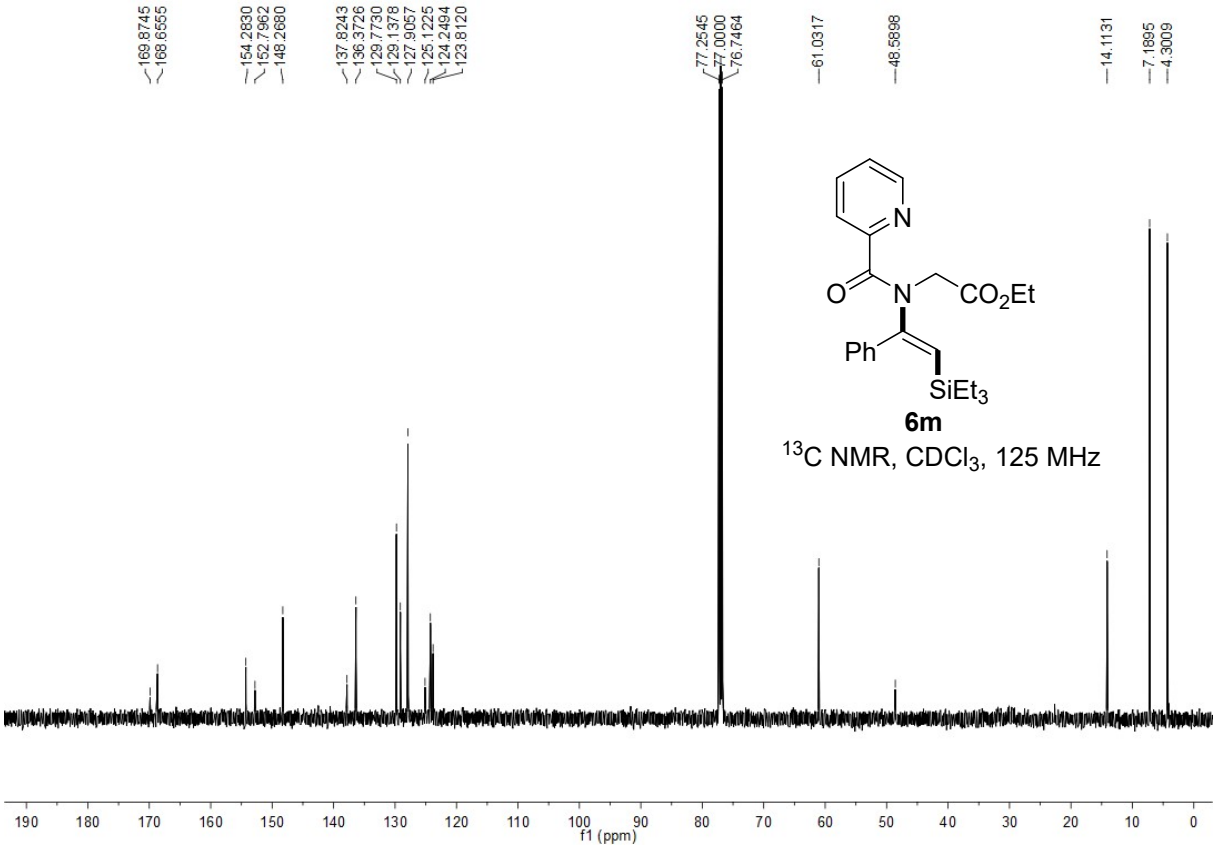
^{13}C NMR, $CDCl_3$, 125 MHz



6m

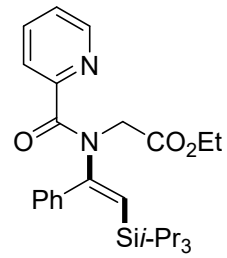
^{1}H NMR, $CDCl_3$, 500 MHz





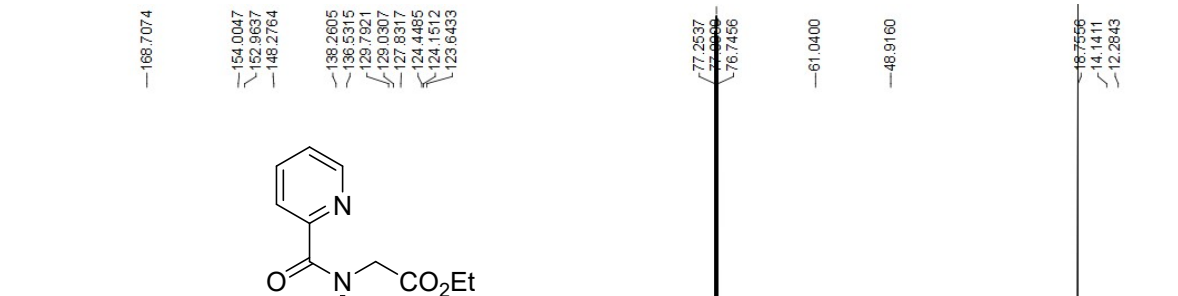
6m

^{13}C NMR, $CDCl_3$, 125 MHz



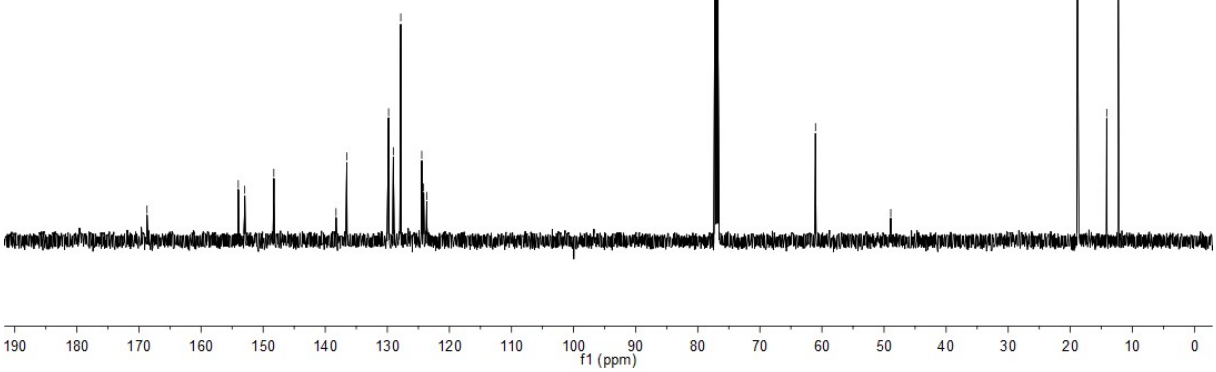
6n

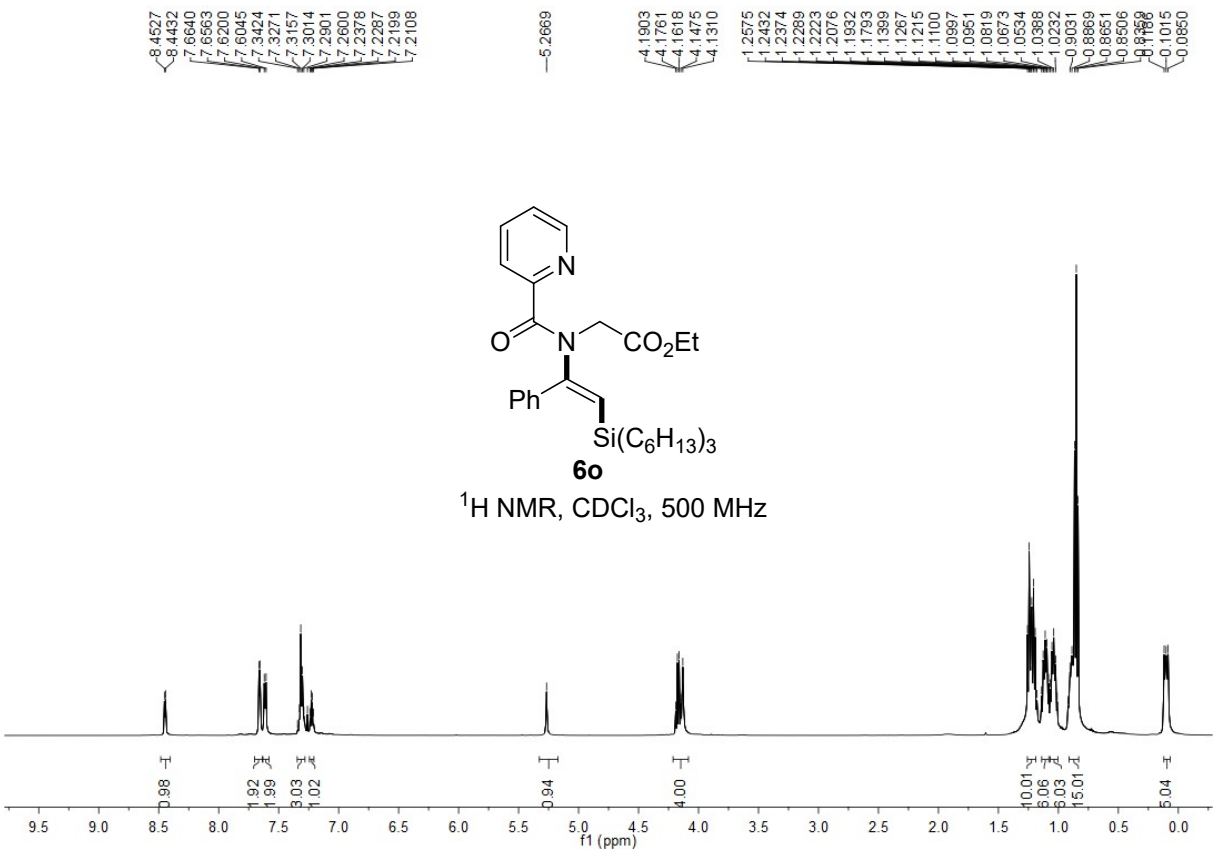
^{1}H NMR, $CDCl_3$, 500 MHz



6n

^{13}C NMR, $CDCl_3$, 125 MHz

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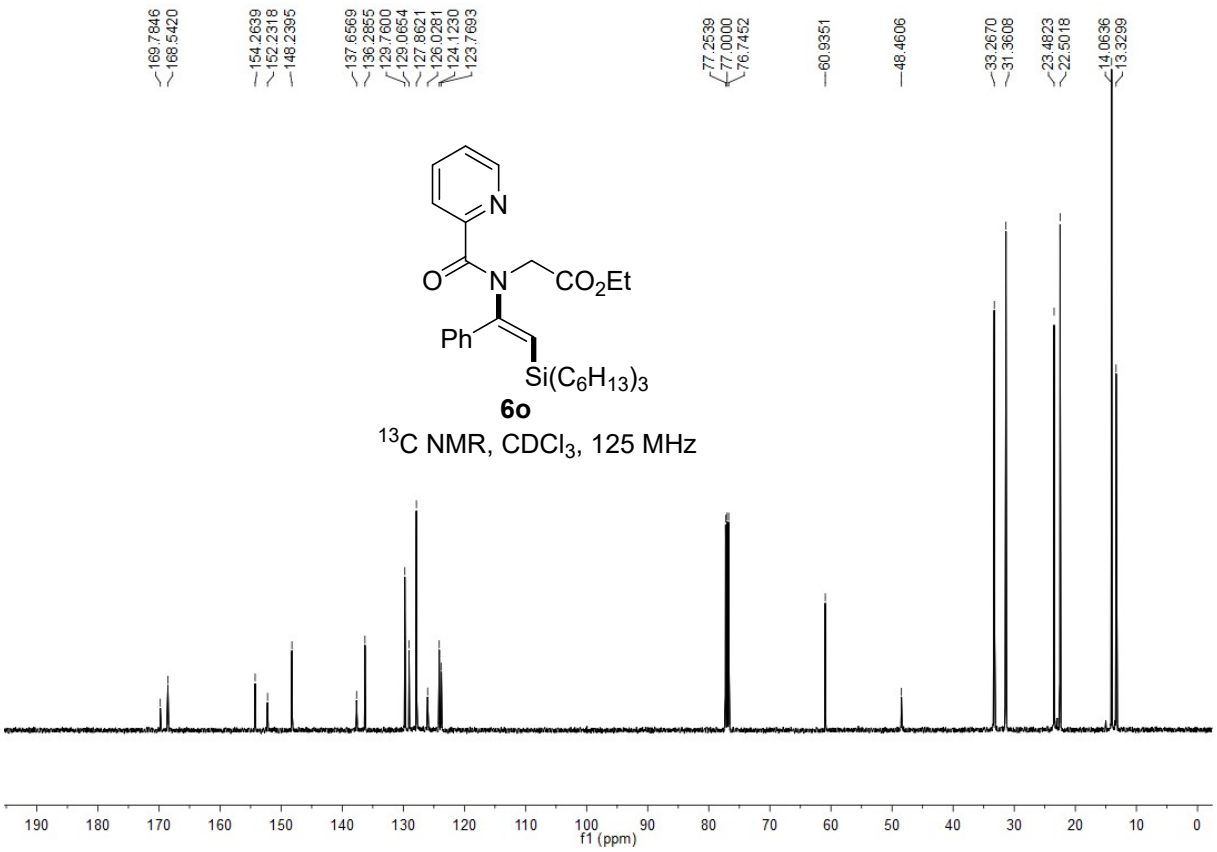
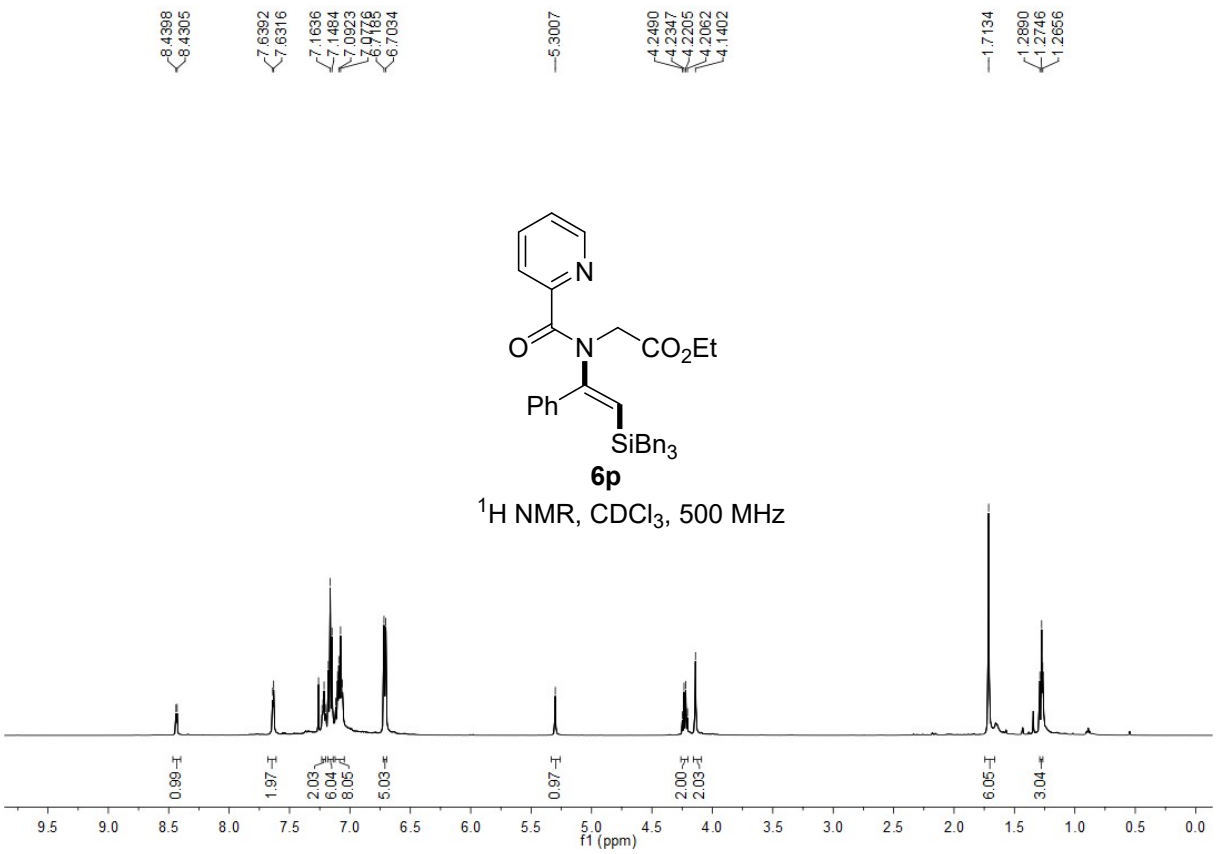
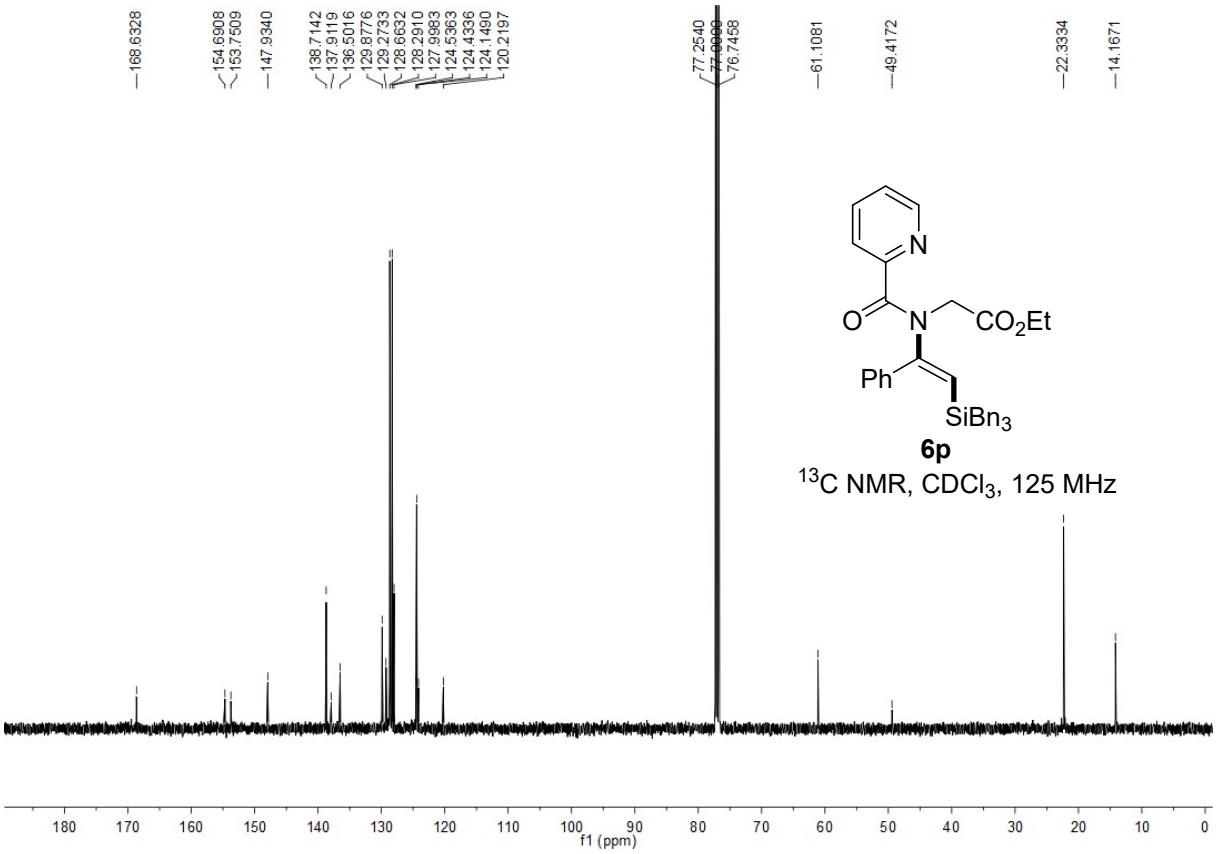
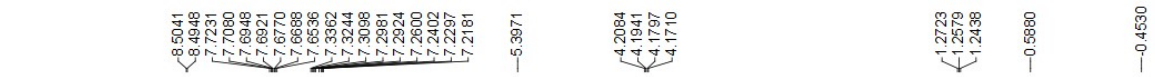
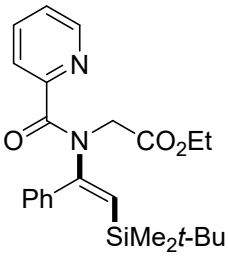
8.4432
7.6640
7.6563
7.6200
7.6045
7.3424
7.3271
7.3157
7.3014
7.2901
7.2600
7.2378
7.2287
7.2199
7.2108
5.2669
4.1903
4.1761
4.1618
4.1475
4.1310
1.2575
1.2432
1.2374
1.2289
1.2223
1.2076
1.1932
1.1793
1.1399
1.1267
1.1215
1.1100
1.0997
1.0951
1.0819
1.0673
1.0534
1.0388
1.0232
0.9031
0.8869
0.8651
0.8506
0.1015
0.0850
N
O
N
CO2Et
Ph
Si(C6H13)3
6o
1H NMR, CDCl3, 500 MHz
0.98
1.92
1.99
3.03
1.02
0.94
4.00
10.01
6.06
6.03
15.01
5.04
f1 (ppm)


169.7846
168.5420
154.2639
152.2318
148.2395
137.6569
136.2855
129.7600
129.0654
127.8621
126.0281
124.1230
123.7693
77.2539
77.0000
76.7452
60.9351
48.4606
33.2670
31.3608
23.4823
22.5018
14.0636
13.3299
N
O
N
CO2Et
Ph
Si(C6H13)3
6o
13C NMR, CDCl3, 125 MHz
f1 (ppm)


8.4398
8.4305
7.6392
7.6316
7.1636
7.1484
7.0923
7.0776
6.7185
6.7034
5.3007
4.2490
4.2347
4.2205
4.2062
4.1402
1.7134
1.2890
1.2746
1.2656
N
O
N
CO2Et
Ph
SiBn3
6p
1H NMR, CDCl3, 500 MHz
0.99
1.97
2.03
6.04
8.05
5.03
0.97
2.00
2.03
6.05
3.04
f1 (ppm)

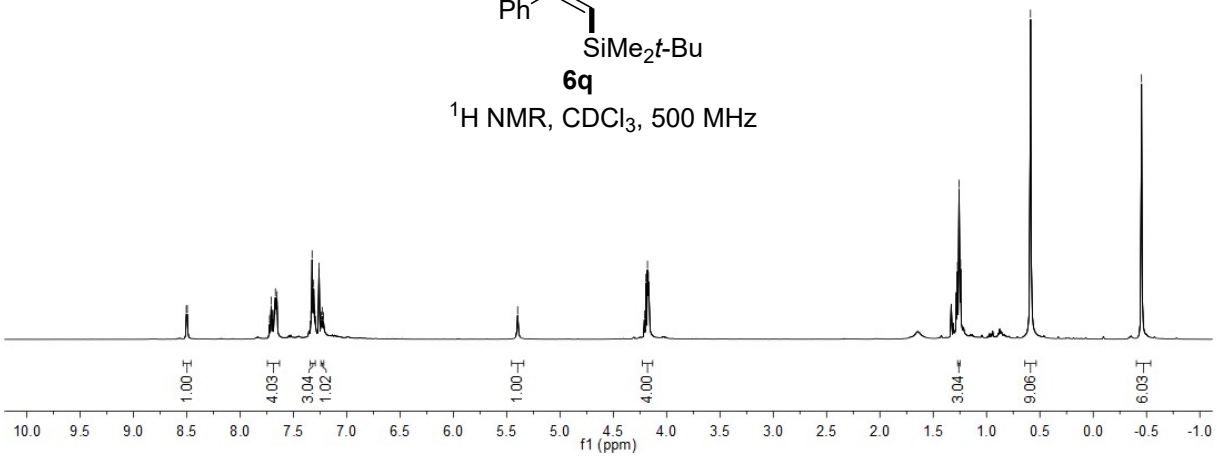

168.6328
154.6908
153.7509
147.9340
138.7142
137.9119
136.5016
129.8776
129.2733
128.6632
128.2910
127.9983
124.5363
124.4336
124.1490
120.2197
77.2540
77.0000
76.7458
61.1081
49.4172
22.3334
14.1671
N
O
N
CO2Et
Ph
SiBn3
6p
13C NMR, CDCl3, 125 MHz
f1 (ppm)

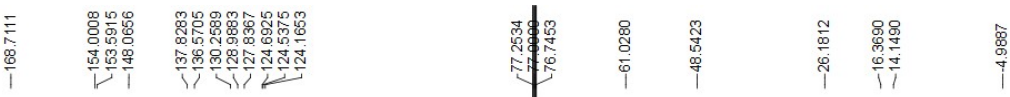


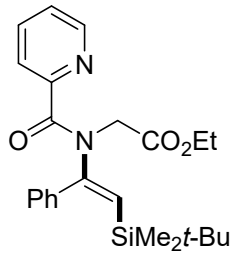


6q

^{1}H NMR, $CDCl_3$, 500 MHz

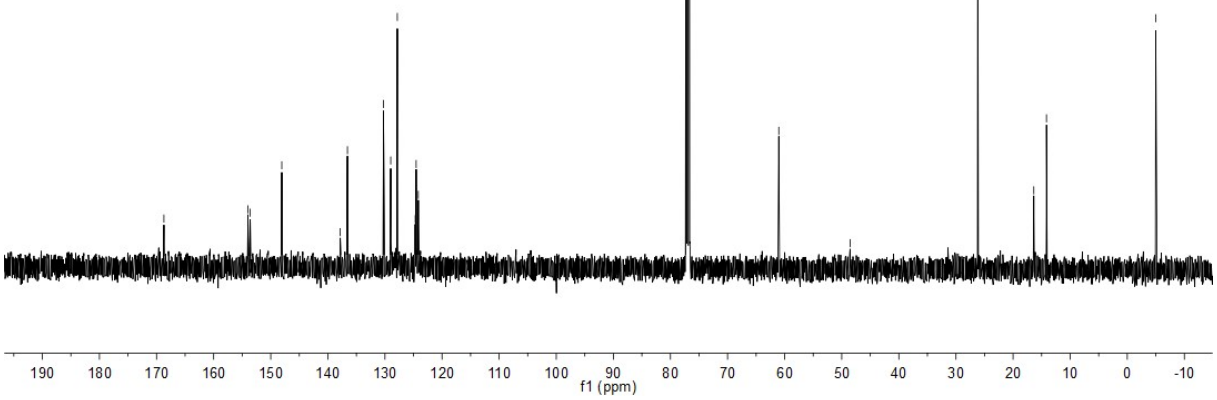


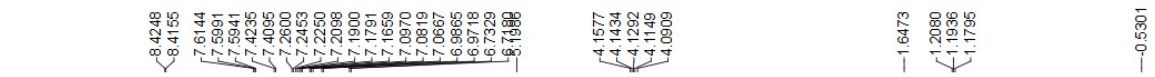


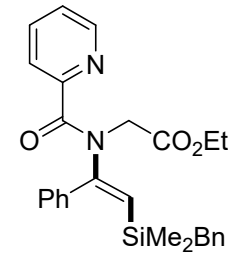


6q

^{13}C NMR, $CDCl_3$, 125 MHz

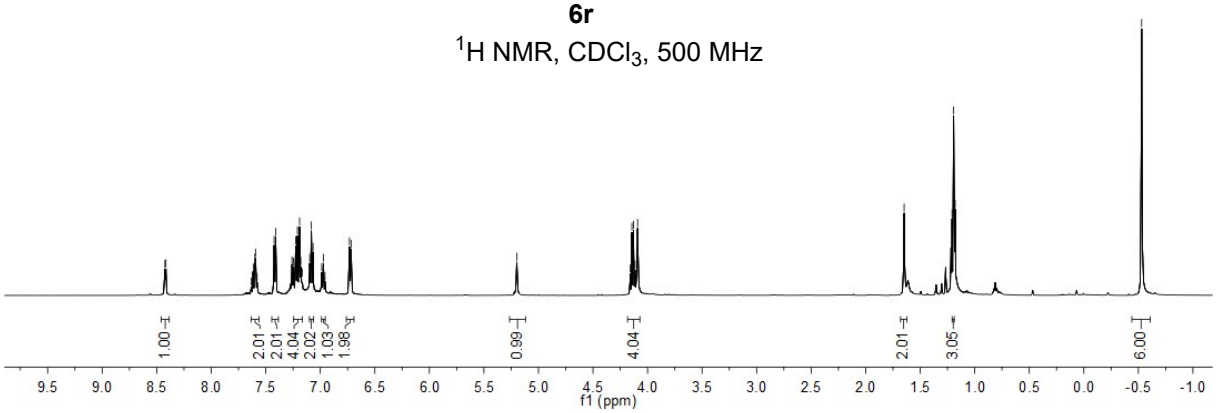


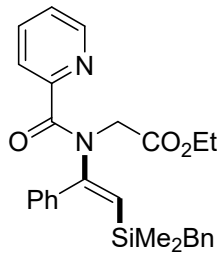




6r

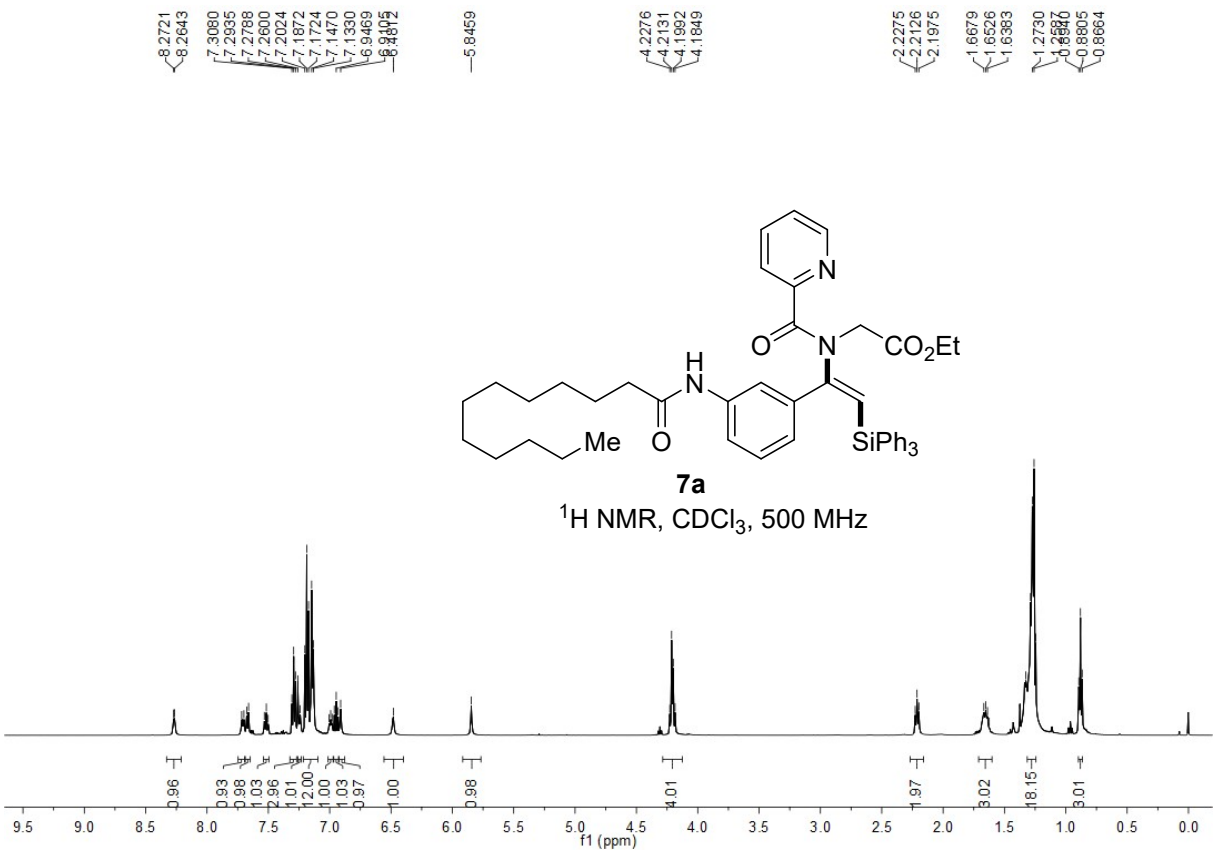
^{1}H NMR, $CDCl_3$, 500 MHz





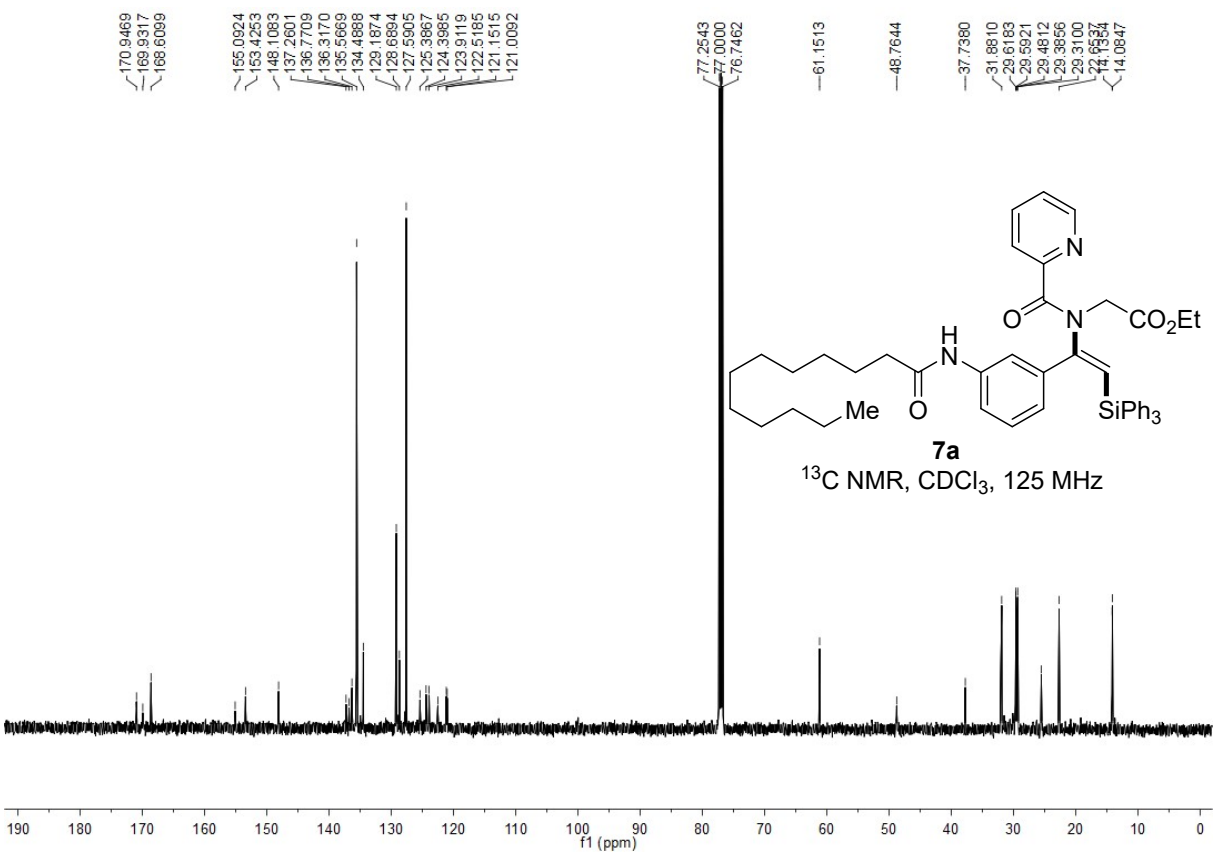
6r

^{13}C NMR, $CDCl_3$, 125 MHz



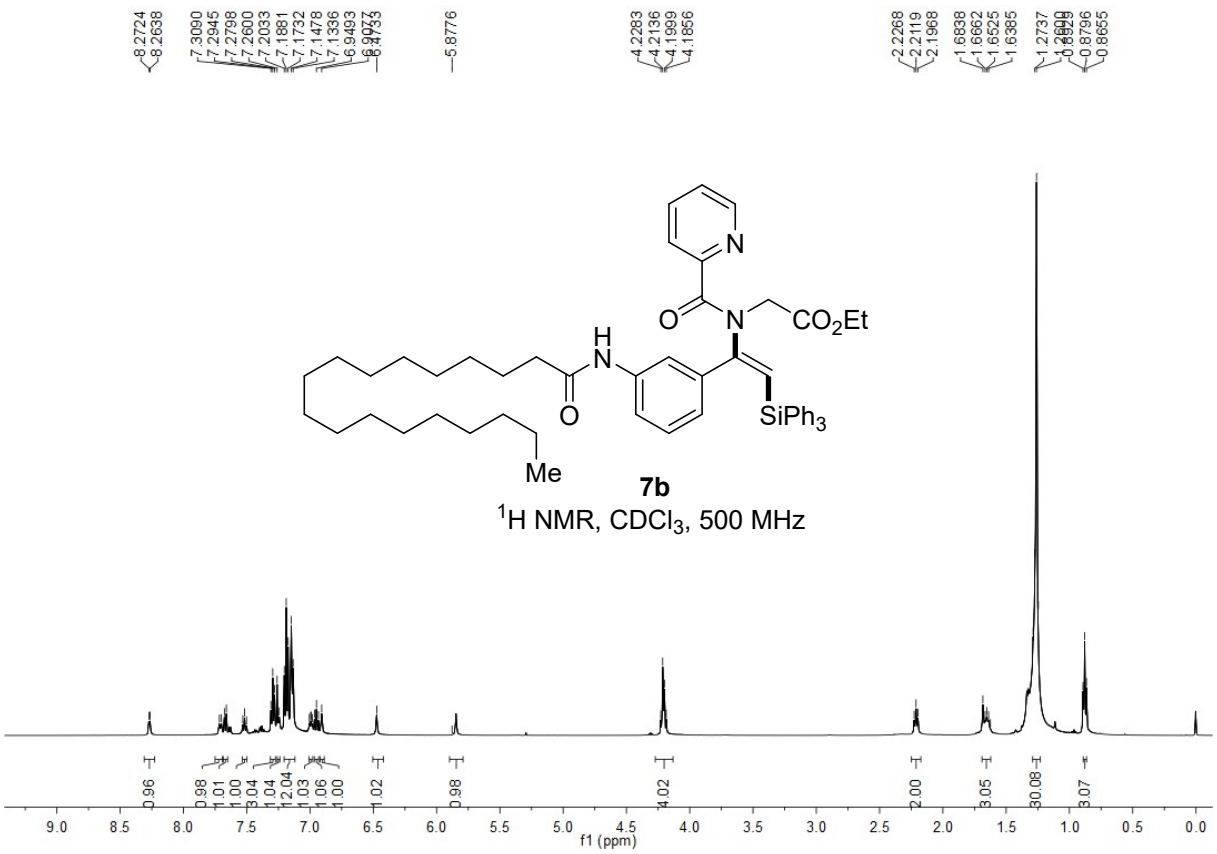
7a

^{1}H NMR, $CDCl_3$, 500 MHz



7a

^{13}C NMR, $CDCl_3$, 125 MHz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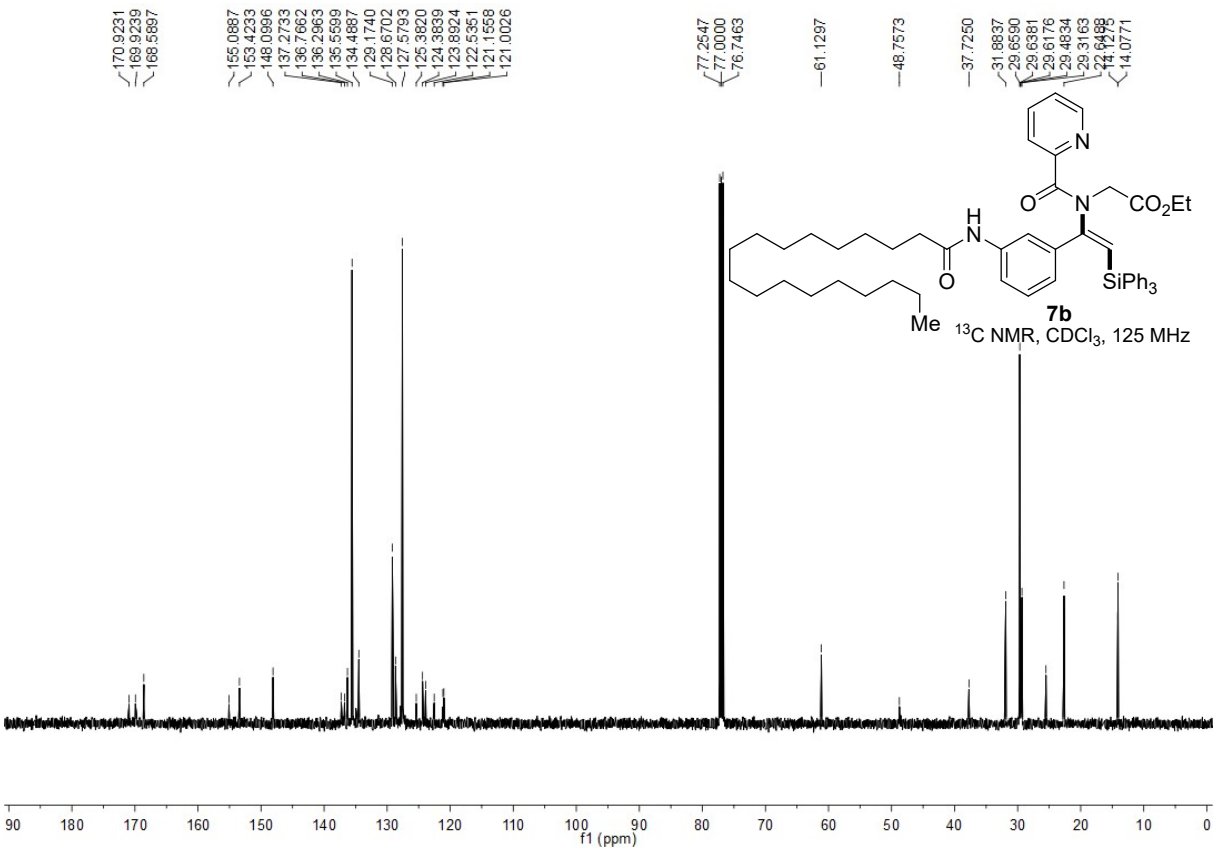
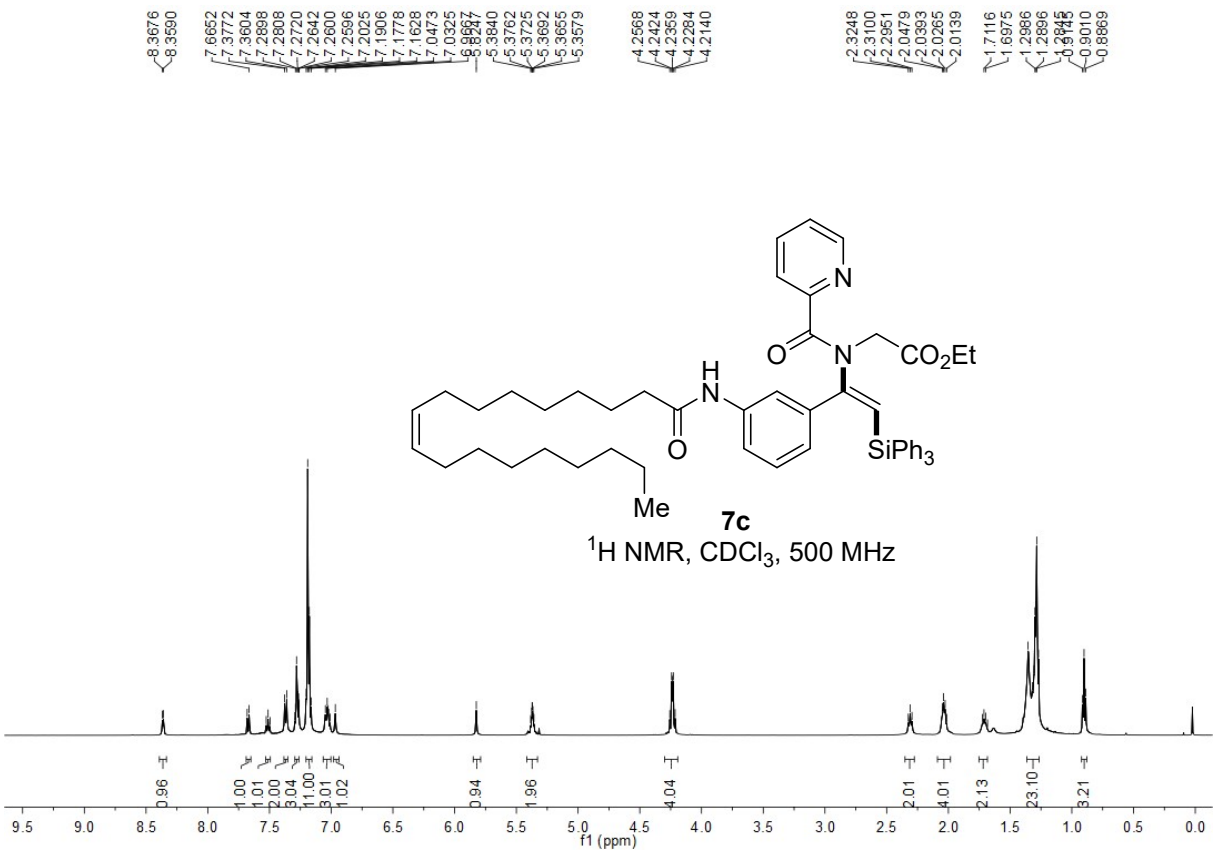
8.2638
7.3090
7.2945
7.2798
7.2600
7.2033
7.1881
7.1732
7.1478
7.1336
6.9493
5.8776
4.2283
4.2136
4.1999
4.1856
2.2268
2.2119
2.1968
1.6838
1.6662
1.6525
1.6385
1.2737
0.8796
0.8655
N
O
N
CO2Et
H
N
O
SiPh3
Me
7b
1H NMR, CDCl3, 500 MHz
0.96
0.98
1.01
1.00
3.04
1.04
2.04
1.03
1.06
1.00
1.02
0.98
4.02
2.00
3.05
30.08
3.07
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)


170.9231
169.9239
168.5897
155.0887
153.4233
148.0996
137.2733
136.7662
136.2963
135.5599
134.4887
129.1740
128.6702
127.5793
125.3820
124.3839
123.8924
122.5351
121.1558
121.0026
77.2547
77.0000
76.7463
61.1297
48.7573
37.7250
31.8837
29.6590
29.6381
29.6176
29.4834
29.3163
22.6488
14.1275
14.0771
N
O
N
CO2Et
H
N
O
SiPh3
Me
7b
13C NMR, CDCl3, 125 MHz
90
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)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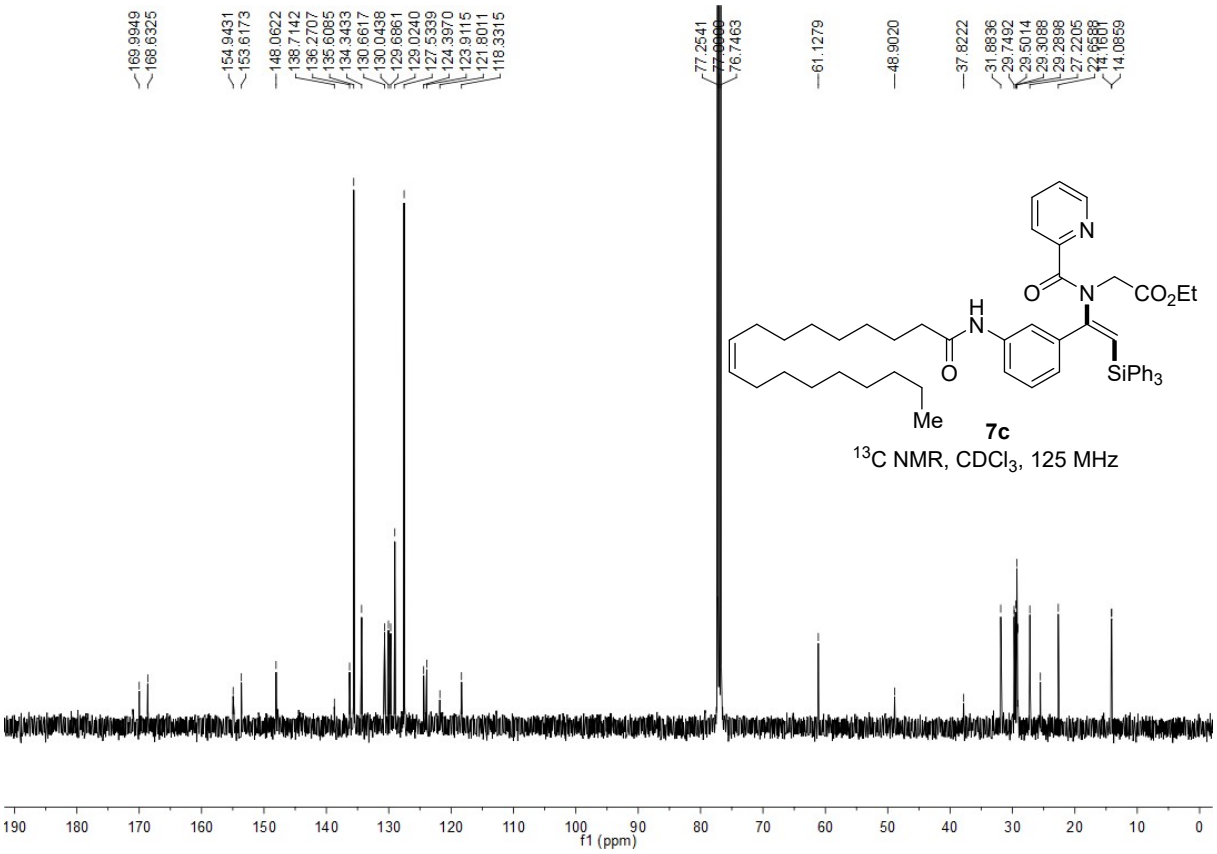
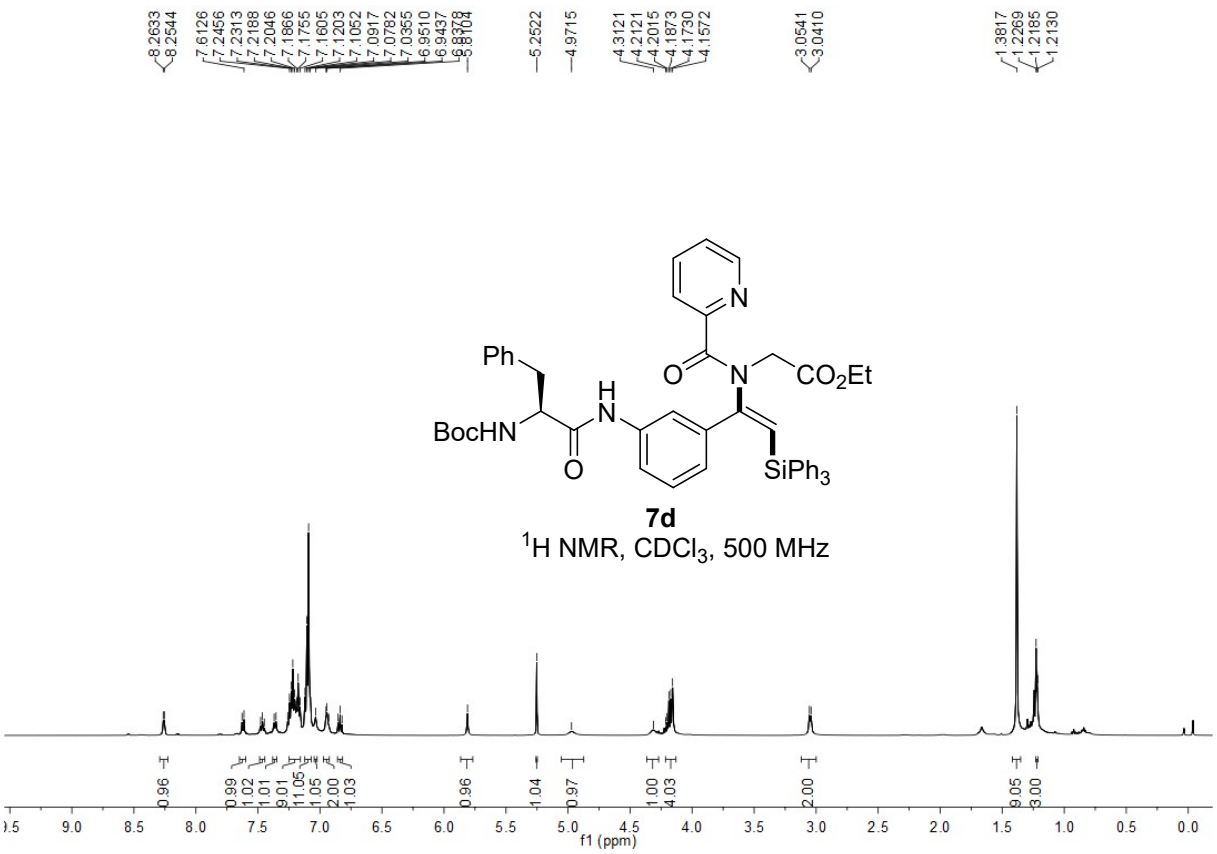
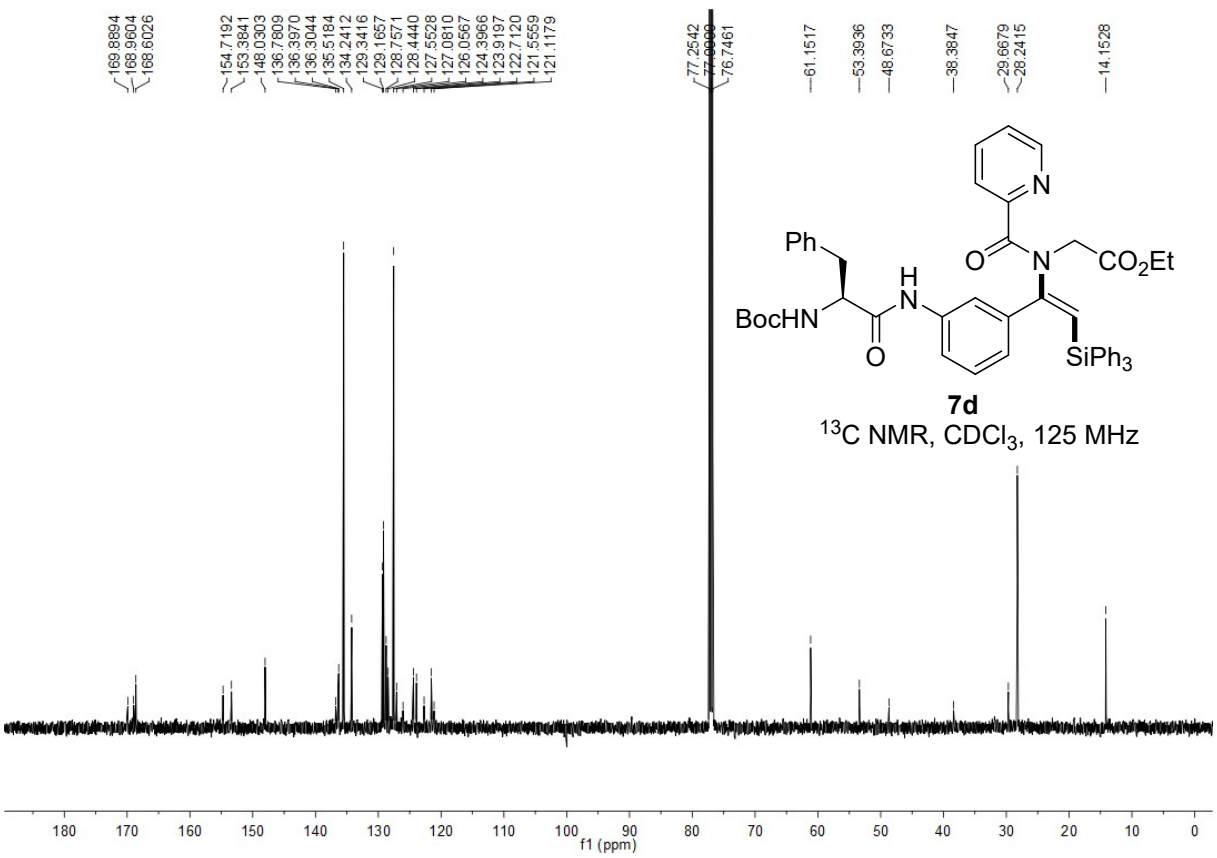
7.6652
7.3772
7.3604
7.2898
7.2808
7.2720
7.2642
7.2600
7.2596
7.2025
7.1906
7.1778
7.1628
7.0473
7.0325
6.9667
6.8247
5.3840
5.3762
5.3725
5.3692
5.3655
5.3579
4.2568
4.2424
4.2359
4.2284
4.2140
2.3248
2.3100
2.2951
2.0479
2.0393
2.0265
2.0139
1.7116
1.6975
1.2986
1.2896
1.2845
0.9145
0.9010
0.8869
N
O
N
CO2Et
H
N
O
SiPh3
Me
7c
1H NMR, CDCl3, 500 MHz
0.96
1.00
1.01
2.00
3.04
11.00
3.01
1.02
0.94
1.96
4.04
2.01
4.01
2.13
23.10
3.21
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)


169.9949
168.6325
154.9431
153.6173
148.0622
138.7142
136.2707
135.6085
134.3433
130.6617
130.0438
129.6861
129.0240
127.5339
124.3970
123.9115
121.8011
118.3315
77.2541
77.0000
76.7463
61.1279
48.9020
37.8222
31.8836
29.7492
29.5014
29.3088
29.2898
27.2205
14.1681
14.0859
N
O
N
CO2Et
H
N
O
SiPh3
Me
7c
13C NMR, CDCl3, 125 MHz
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)



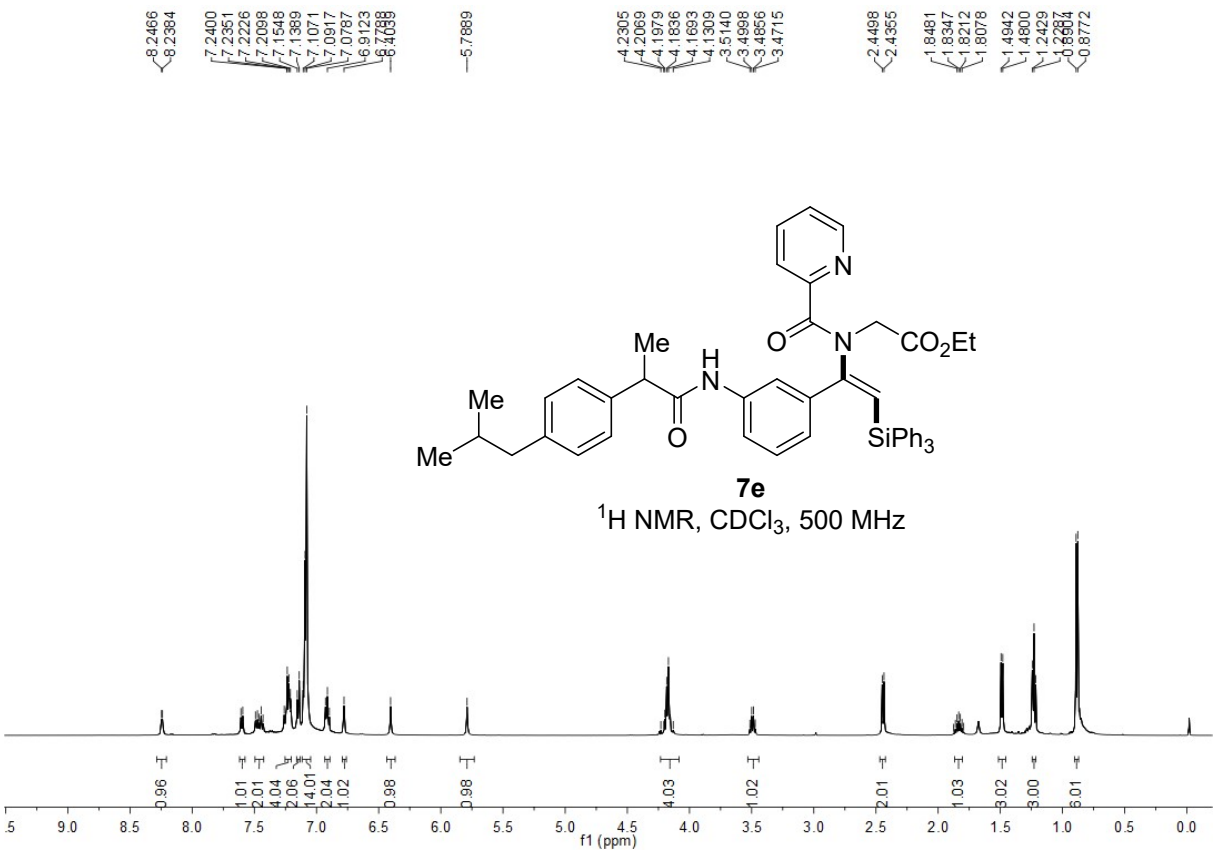
7d

^{1}H NMR, $CDCl_3$, 500 MHz



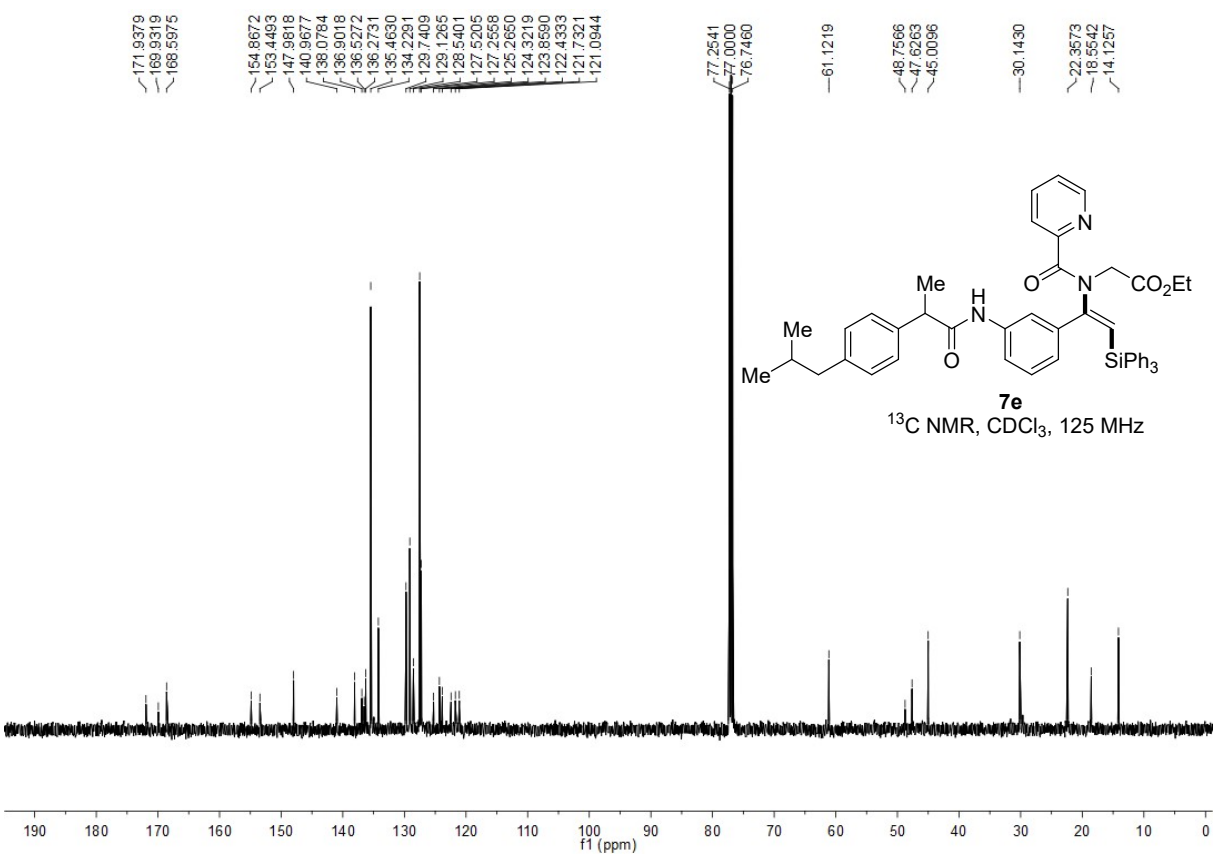
7d

^{13}C NMR, $CDCl_3$, 125 MHz



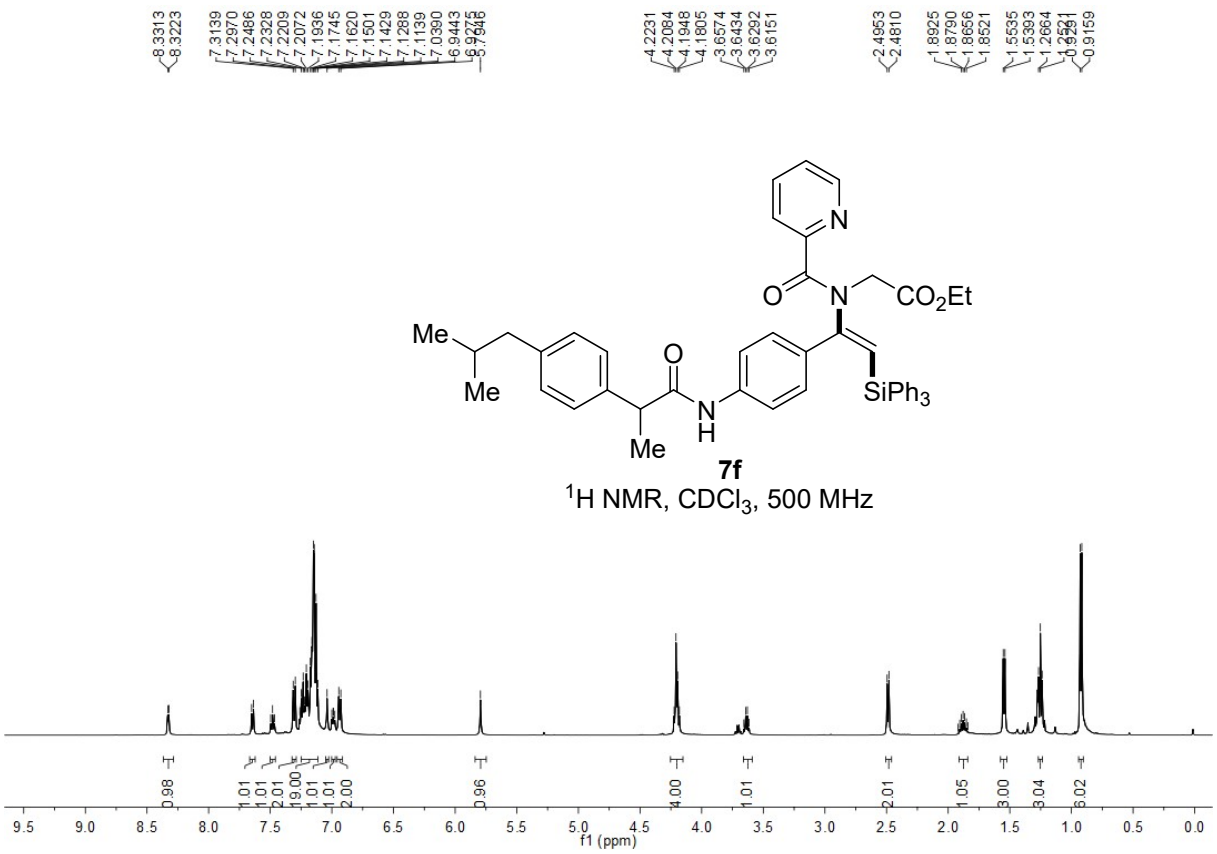
7e

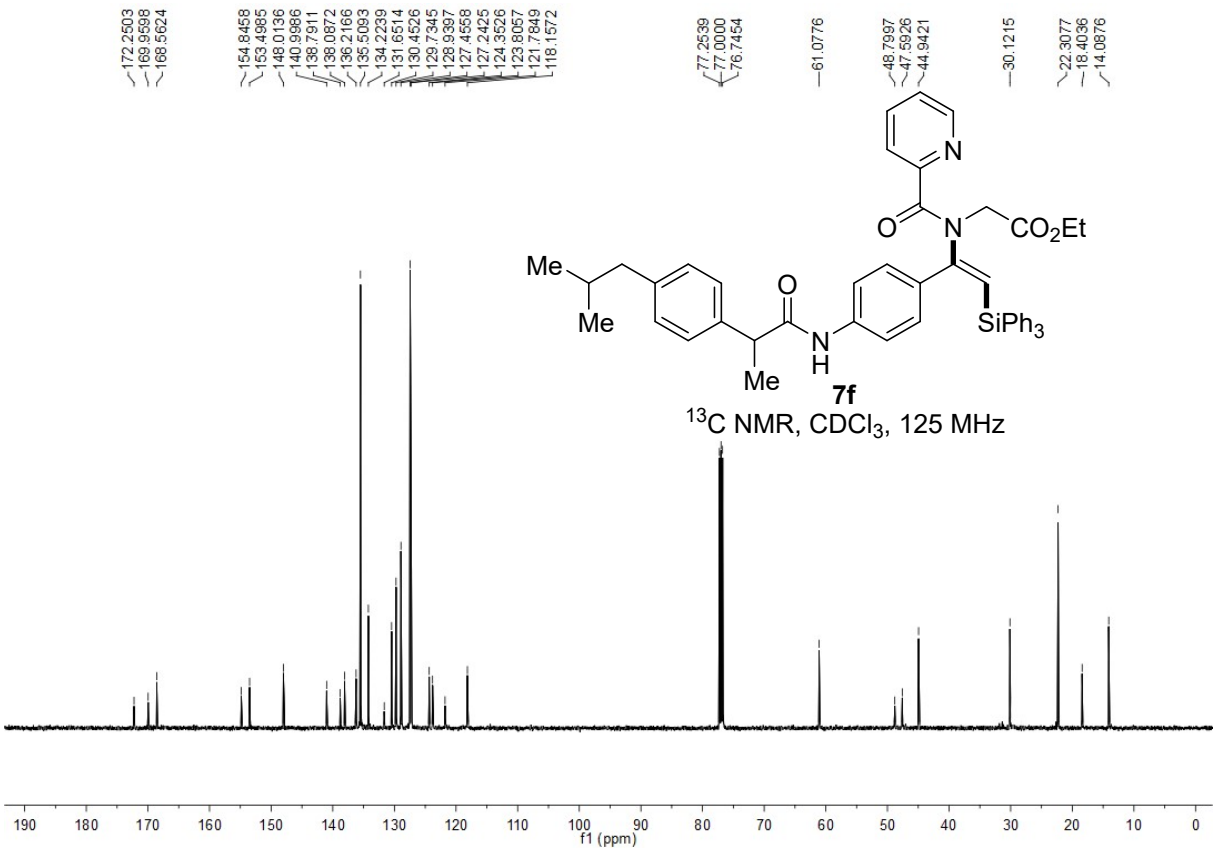
^{1}H NMR, $CDCl_3$, 500 MHz



7e

^{13}C NMR, $CDCl_3$, 125 MHz


8.3313
8.3223
7.3139
7.2970
7.2486
7.2328
7.2209
7.2072
7.1936
7.1745
7.1620
7.1501
7.1429
7.1288
7.1139
7.0390
6.9443
6.9275
5.7946
4.2231
4.2084
4.1948
4.1805
3.6574
3.6434
3.6292
3.6151
2.4953
2.4810
1.8925
1.8790
1.8656
1.8521
1.5535
1.5393
1.2664
1.2521
0.9159
N
O
N
CO2Et
Me
Me
O
N
H
SiPh3
Me
7f
1H NMR, CDCl3, 500 MHz
0.98
1.01
1.01
2.01
19.00
1.01
1.01
2.00
0.96
4.00
1.01
2.01
1.05
3.00
3.04
6.02
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)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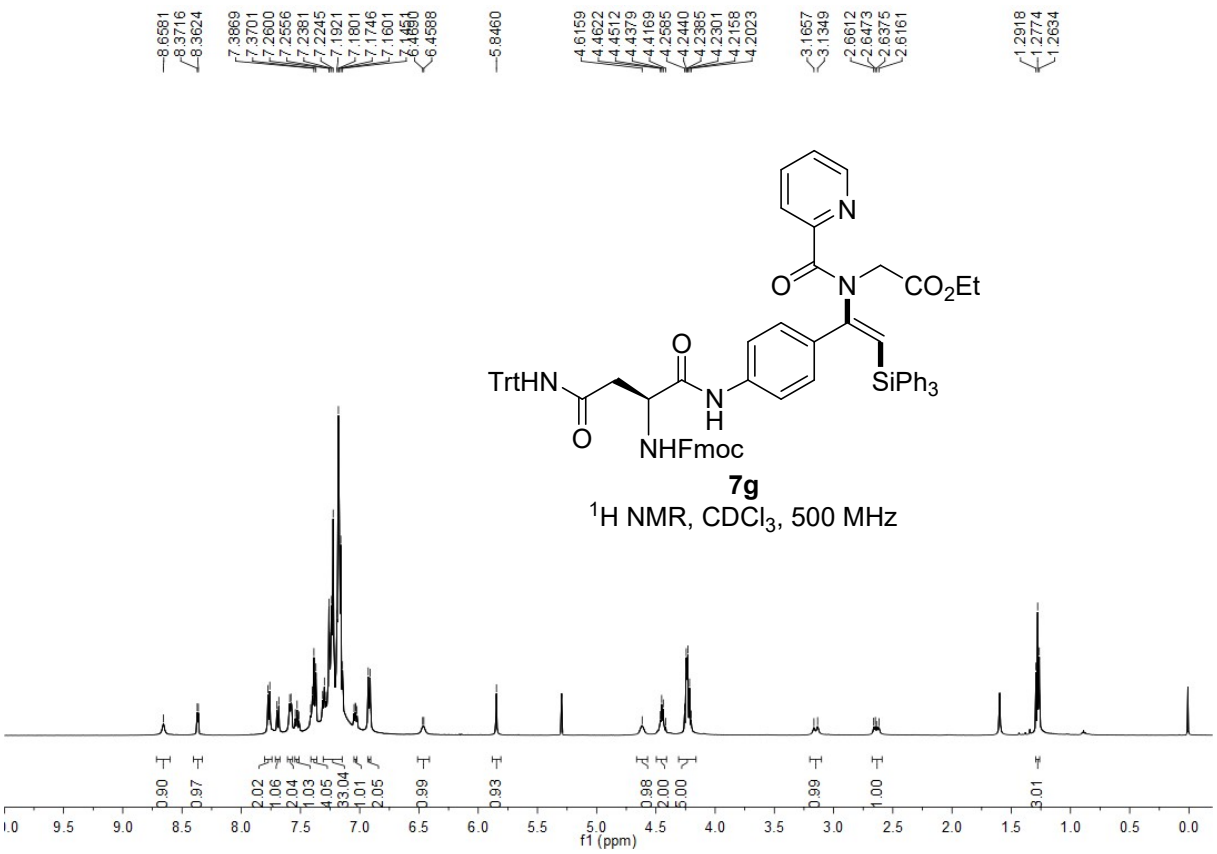
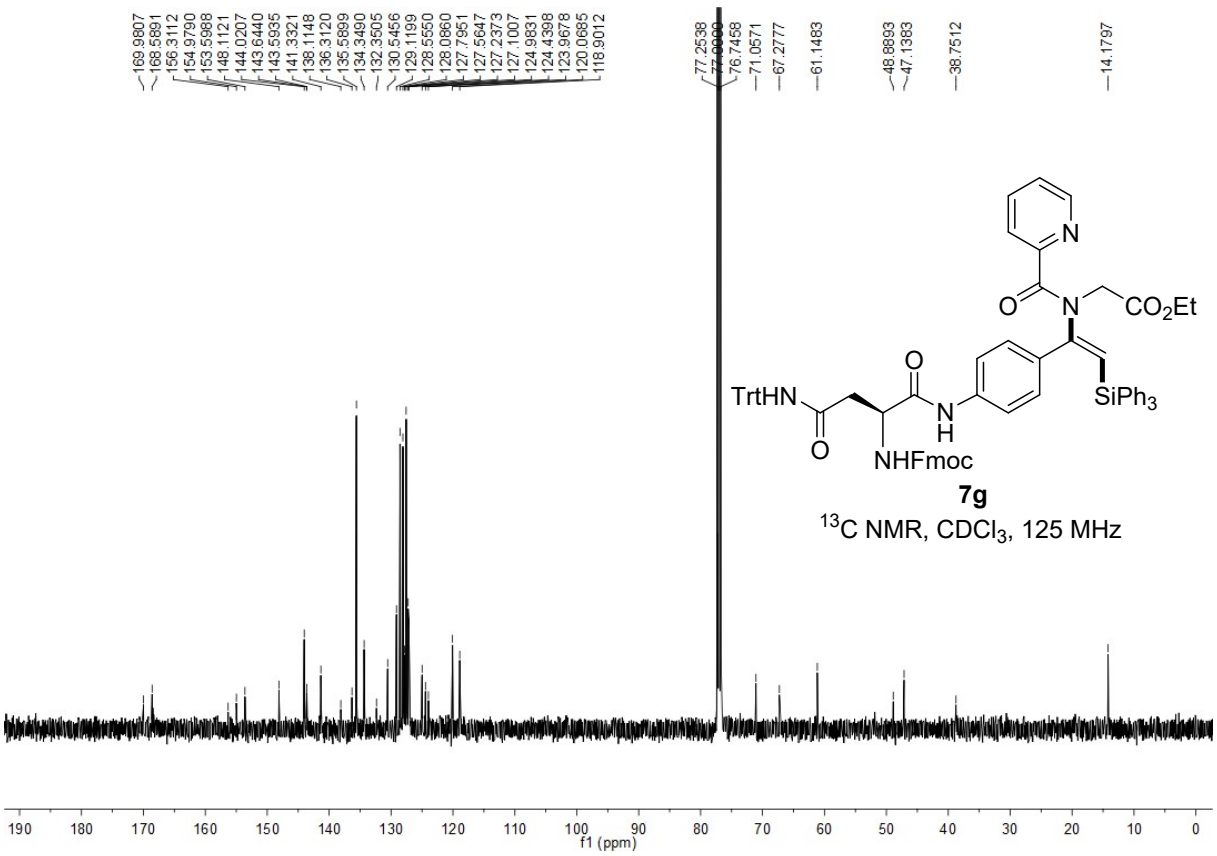
169.9598
168.5624
154.8458
153.4985
148.0136
140.9986
138.7911
138.0872
136.2166
135.5093
134.2239
131.6514
130.4526
129.7345
128.9397
127.4558
127.2425
124.3526
123.8057
121.7849
118.1572
77.2539
77.0000
76.7454
61.0776
48.7997
47.5926
44.9421
30.1215
22.3077
18.4036
14.0876
N
O
N
CO2Et
Me
Me
O
N
H
SiPh3
Me
7f
13C NMR, CDCl3, 125 MHz
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)



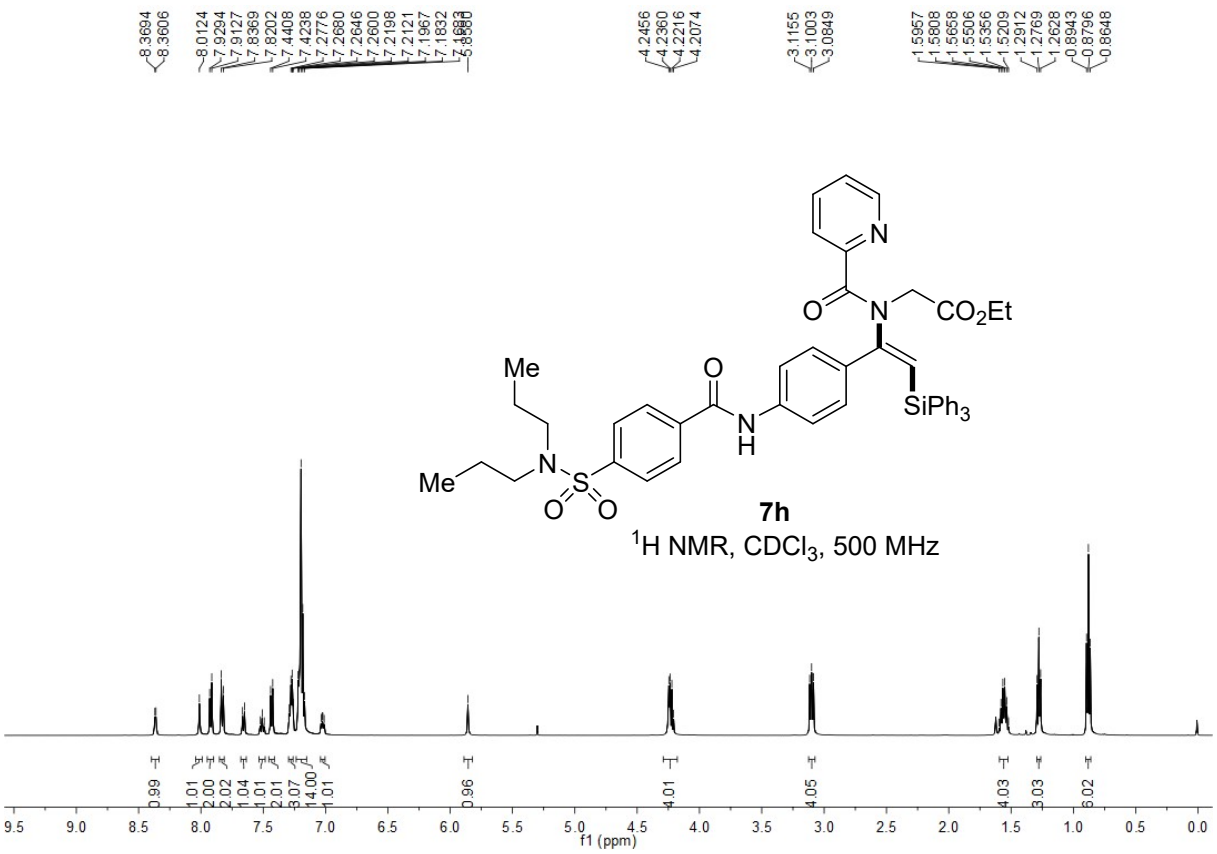
7g

^{1}H NMR, $CDCl_3$, 500 MHz



7g

^{13}C NMR, $CDCl_3$, 125 MHz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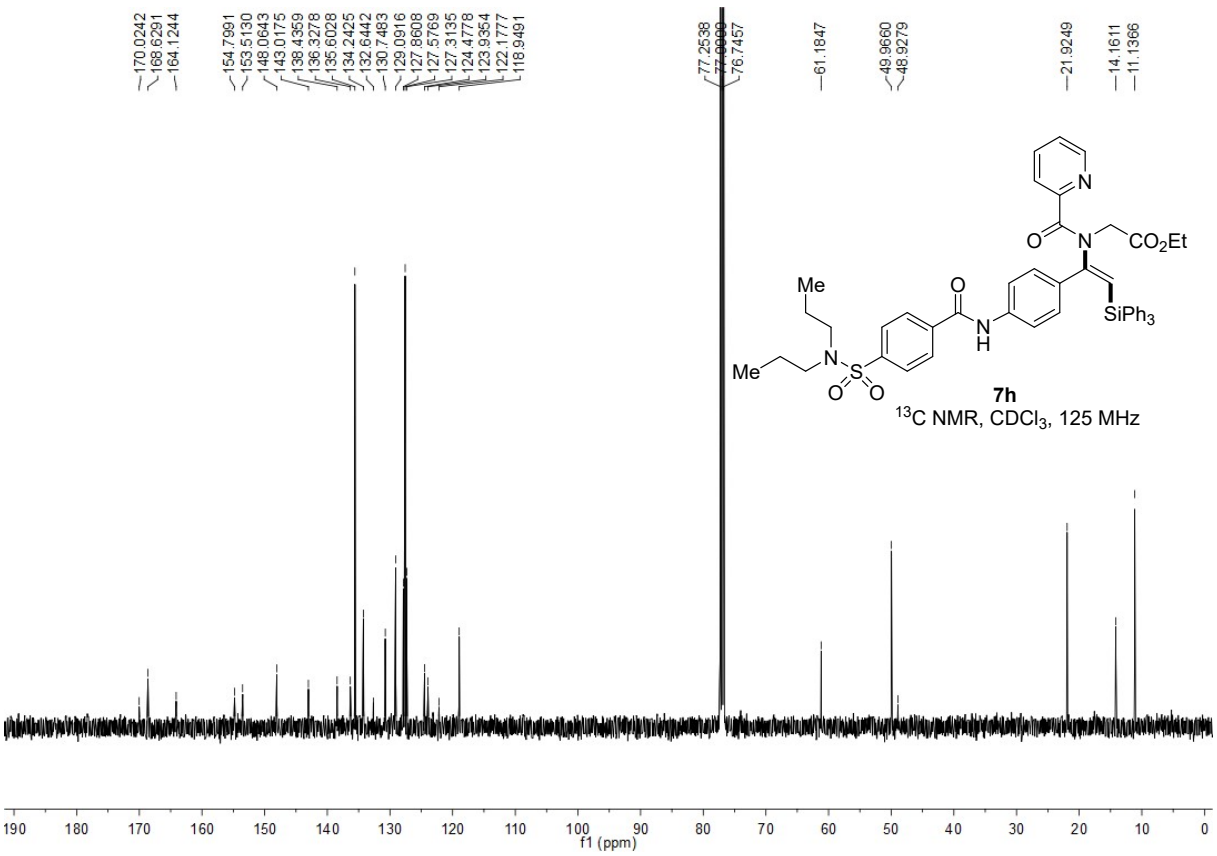
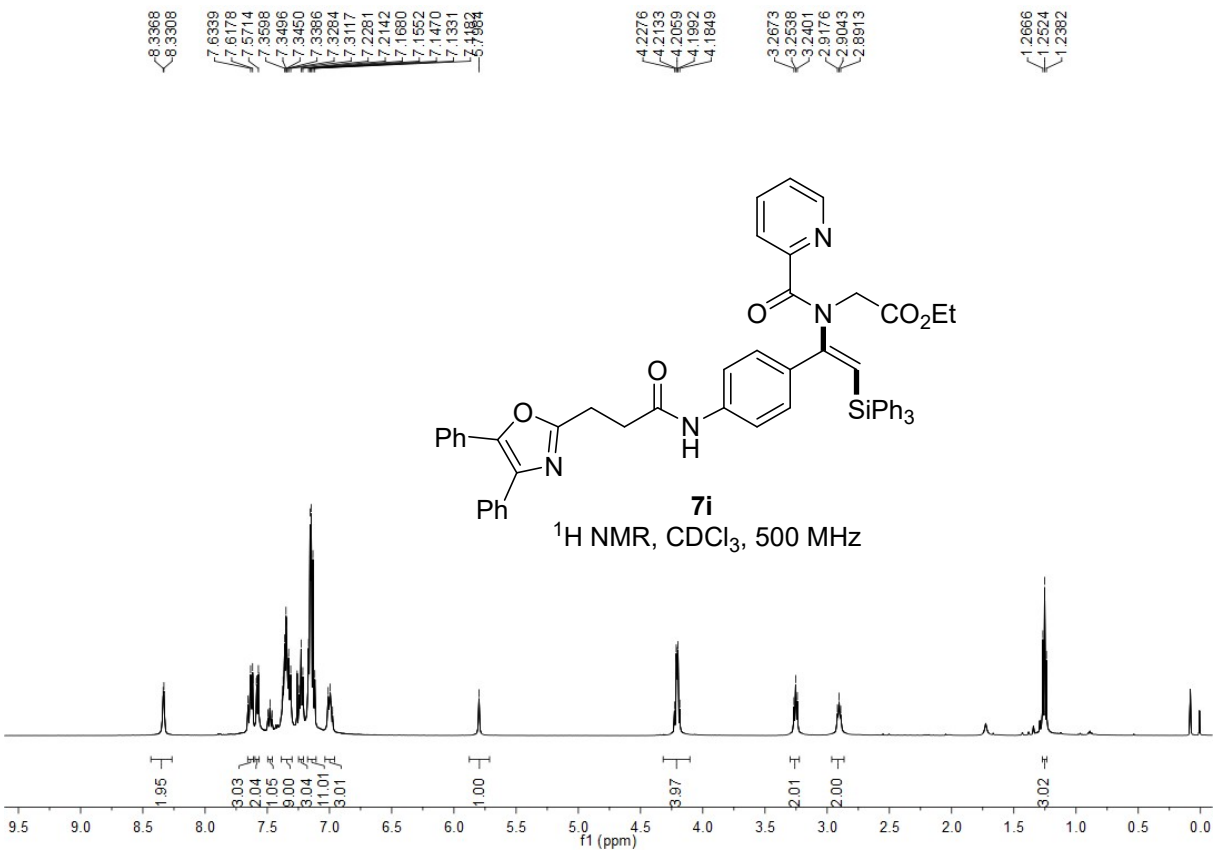
8.0124
7.9294
7.9127
7.8369
7.8202
7.4408
7.4238
7.2776
7.2680
7.2646
7.2600
7.2198
7.2121
7.1967
7.1832
4.2456
4.2360
4.2216
4.2074
3.1155
3.1003
3.0849
1.5957
1.5808
1.5658
1.5506
1.5356
1.5209
1.2912
1.2769
1.2628
0.8943
0.8796
0.8648
Me
Me
N
S
O
O
O
N
H
N
O
N
CO2Et
SiPh3
7h
1H NMR, CDCl3, 500 MHz
0.99
1.01
2.00
2.02
1.04
1.01
2.01
3.07
14.00
1.01
0.96
4.01
4.05
4.03
3.03
6.02
f1 (ppm)


170.0242
168.6291
164.1244
154.7991
153.5130
148.0643
143.0175
138.4359
136.3278
135.6028
134.2425
132.6442
130.7483
129.0916
127.8608
127.5769
127.3135
124.4778
123.9364
122.1777
118.9491
77.2538
77.0000
76.7457
61.1847
49.9660
48.9279
21.9249
14.1611
11.1366
Me
Me
N
S
O
O
O
N
H
N
O
N
CO2Et
SiPh3
7h
13C NMR, CDCl3, 125 MHz
f1 (ppm)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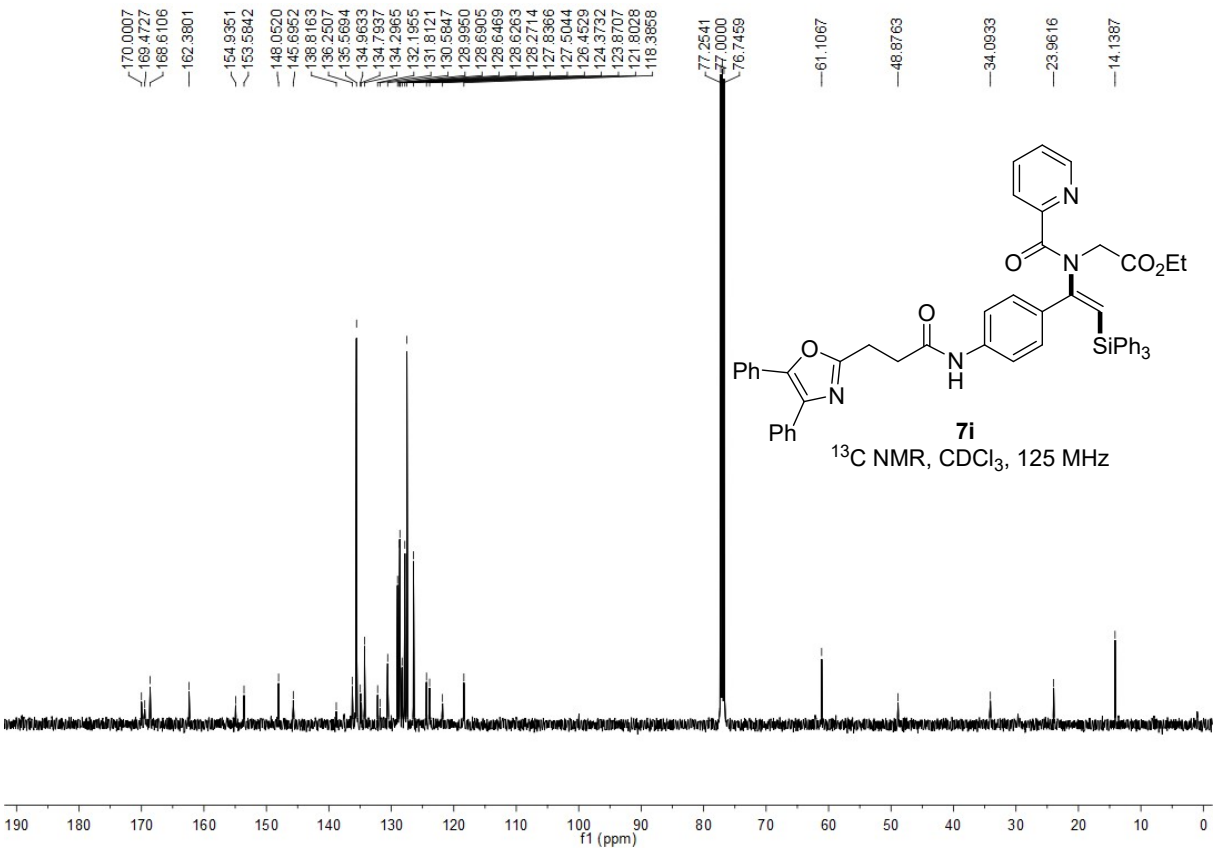
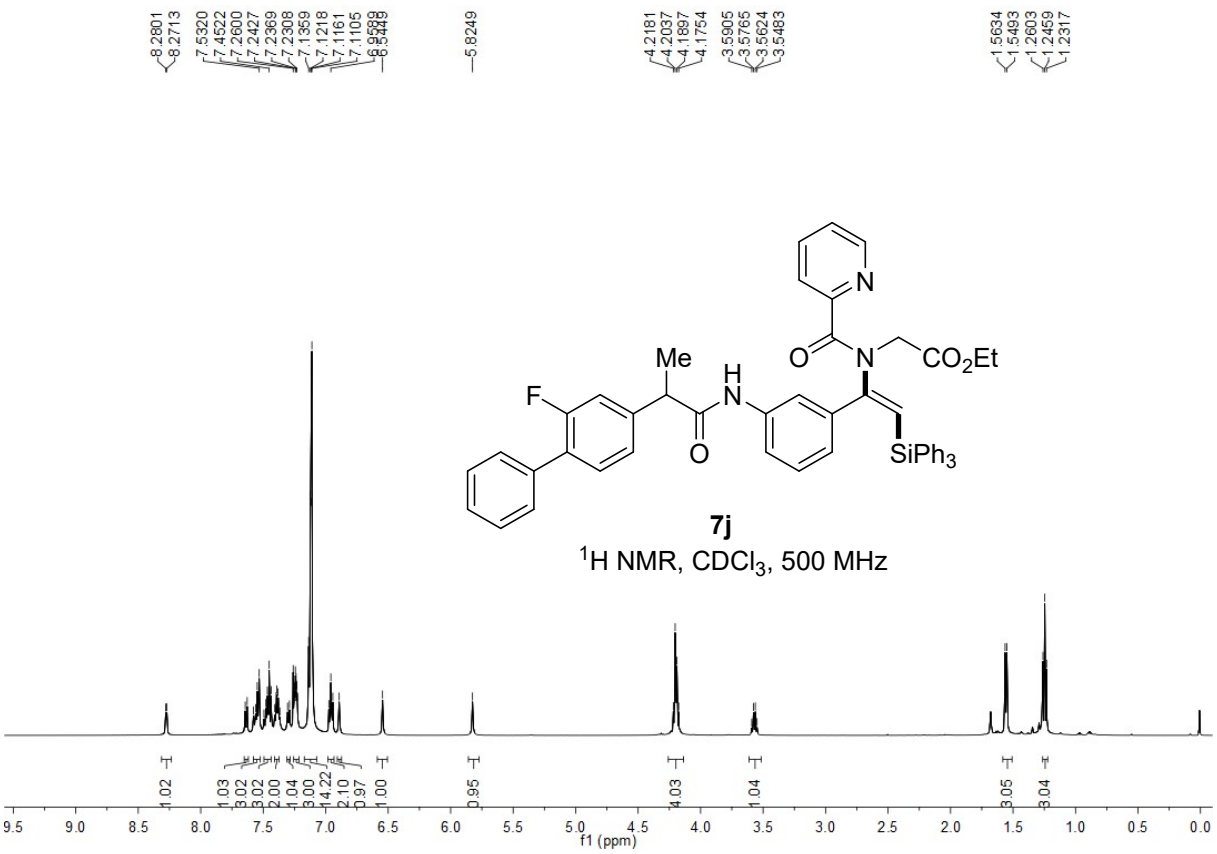
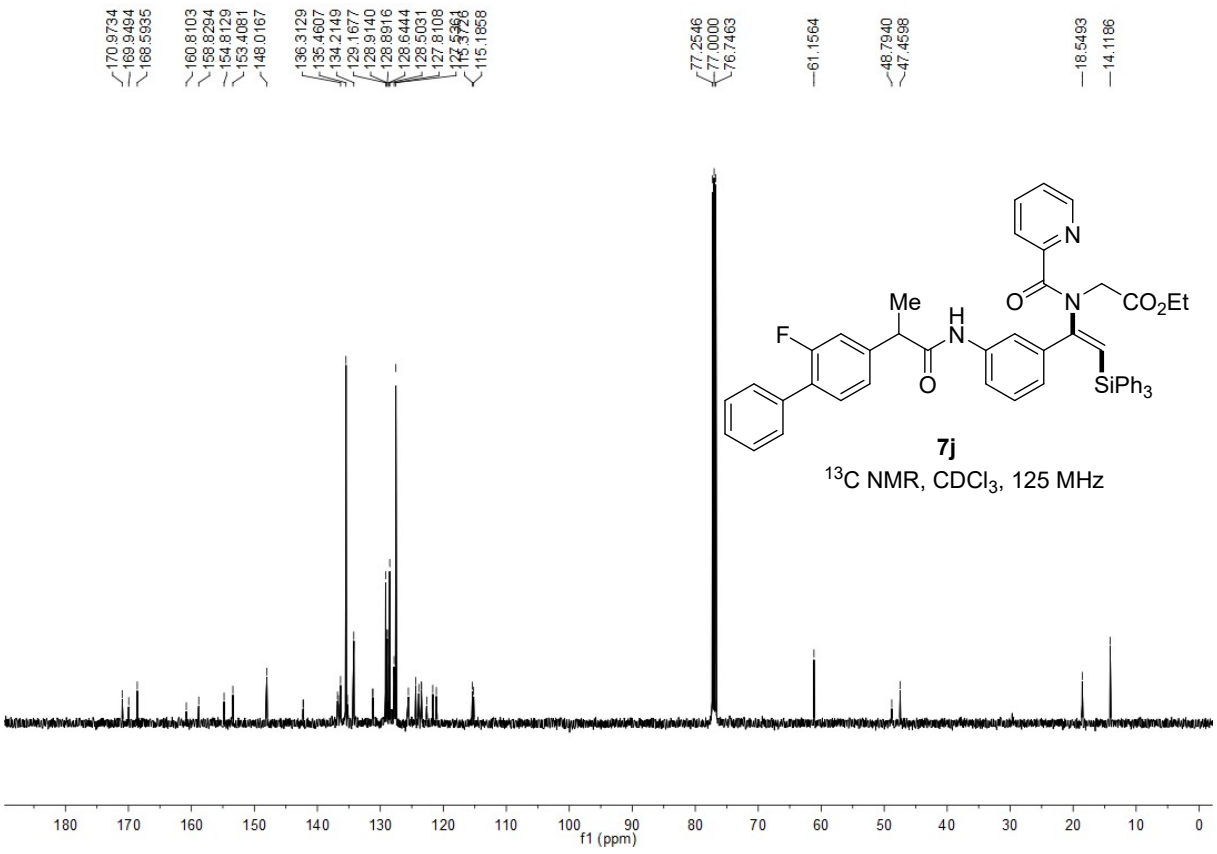
8.3308
7.6339
7.6178
7.5714
7.3598
7.3496
7.3450
7.3386
7.3284
7.3117
7.2281
7.2142
7.1680
7.1552
7.1470
7.1331
4.2276
4.2133
4.2059
4.1992
4.1849
3.2673
3.2538
3.2401
2.9176
2.9043
2.8913
1.2666
1.2524
1.2382
N
O
N
CO2Et
O
N
H
SiPh3
O
Ph
N
Ph
7i
1H NMR, CDCl3, 500 MHz
1.95
3.03
2.04
1.05
9.00
3.04
11.01
3.01
1.00
3.97
2.01
2.00
3.02
f1 (ppm)


170.0007
169.4727
168.6106
162.3801
154.9351
153.5842
148.0520
145.6952
138.8163
136.2507
135.5694
134.9633
134.7937
134.2965
132.1955
131.8121
130.5847
128.9950
128.6905
128.6469
128.6263
128.2714
127.8366
127.5044
126.4529
124.3732
123.8707
121.8028
118.3858
77.2541
77.0000
76.7459
61.1067
48.8763
34.0933
23.9616
14.1387
N
O
N
CO2Et
O
N
H
SiPh3
O
Ph
N
Ph
7i
13C NMR, CDCl3, 125 MHz
f1 (ppm)



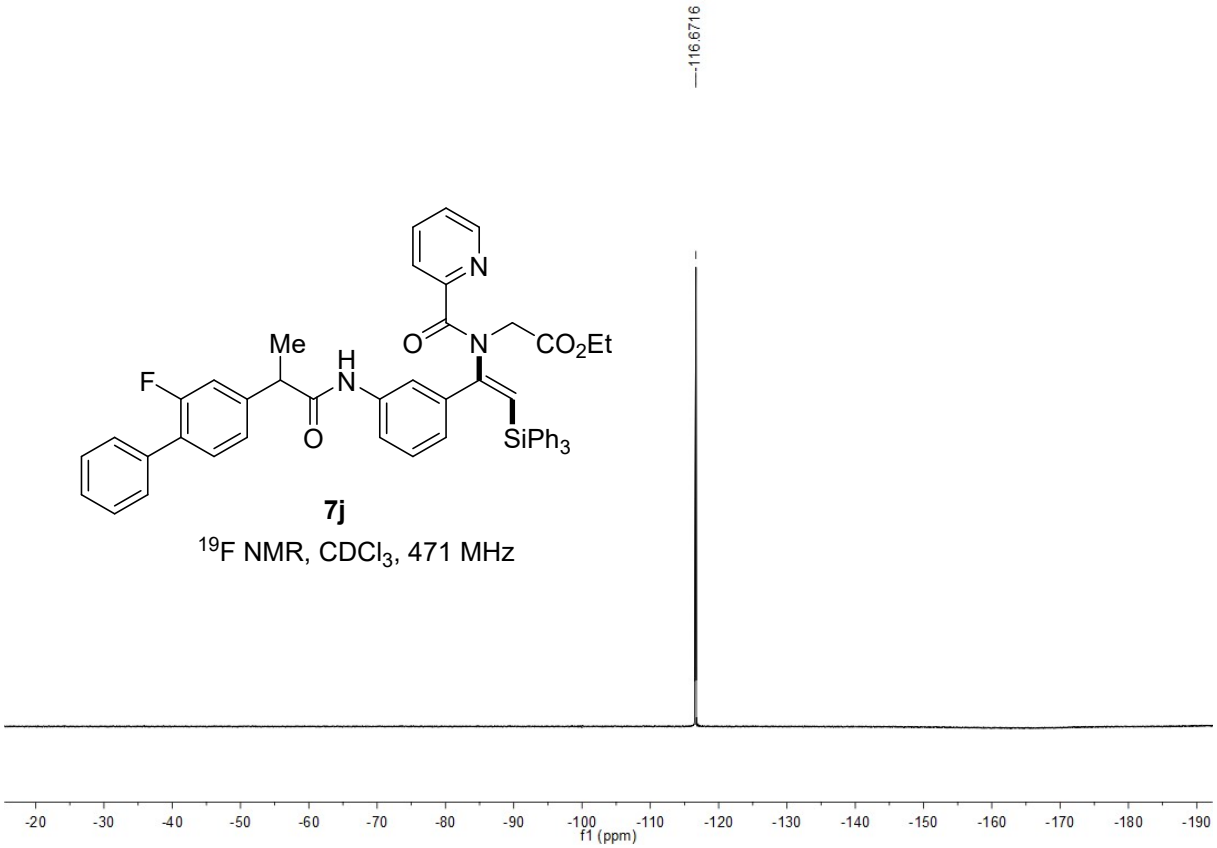
7j

^{1}H NMR, $CDCl_3$, 500 MHz



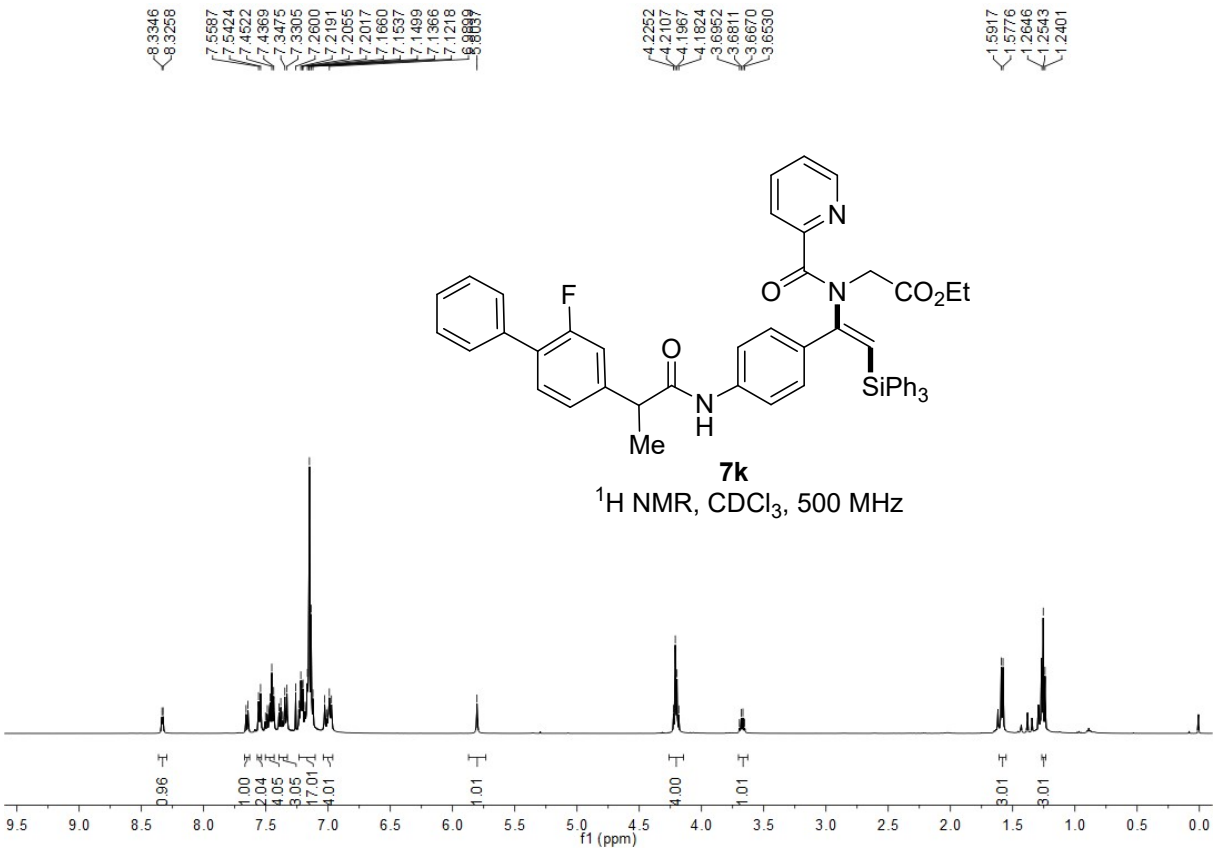
7j

^{13}C NMR, $CDCl_3$, 125 MHz



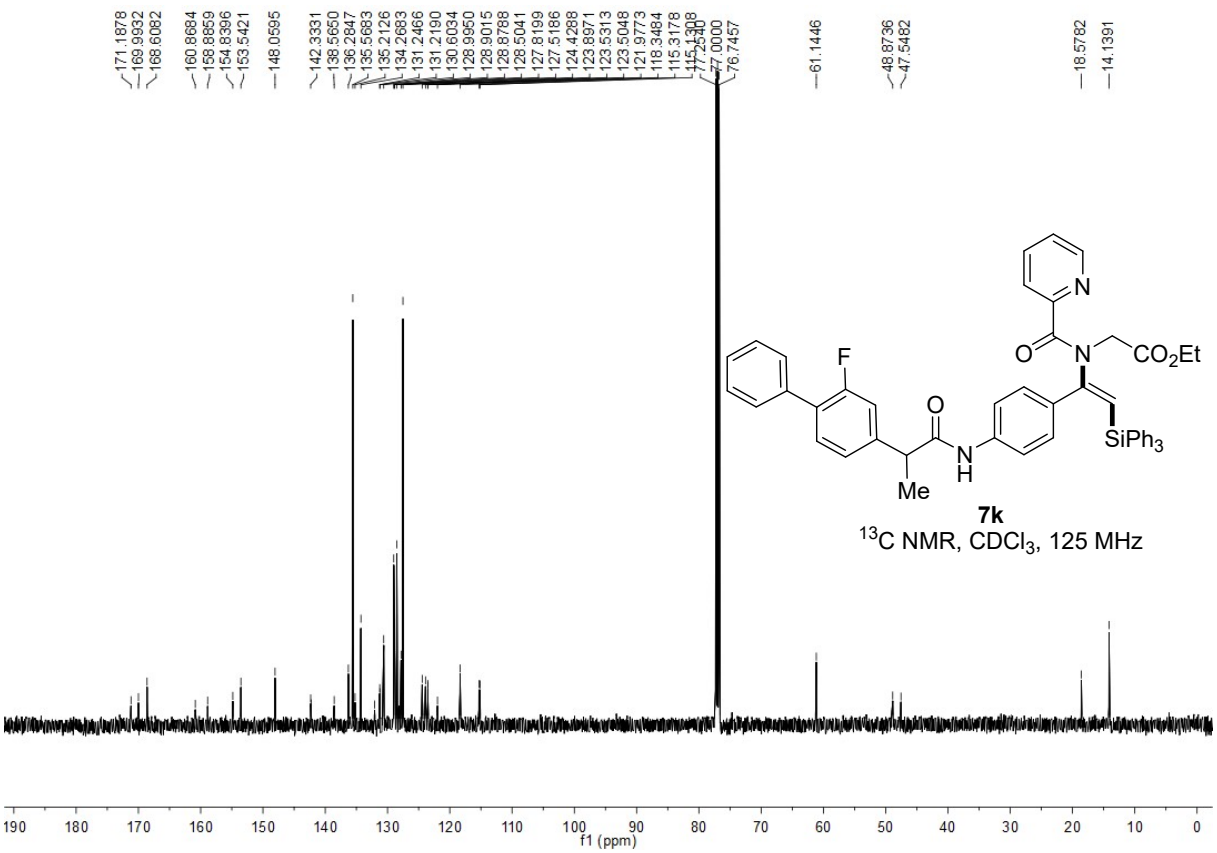
7j

^{19}F NMR, $CDCl_3$, 471 MHz



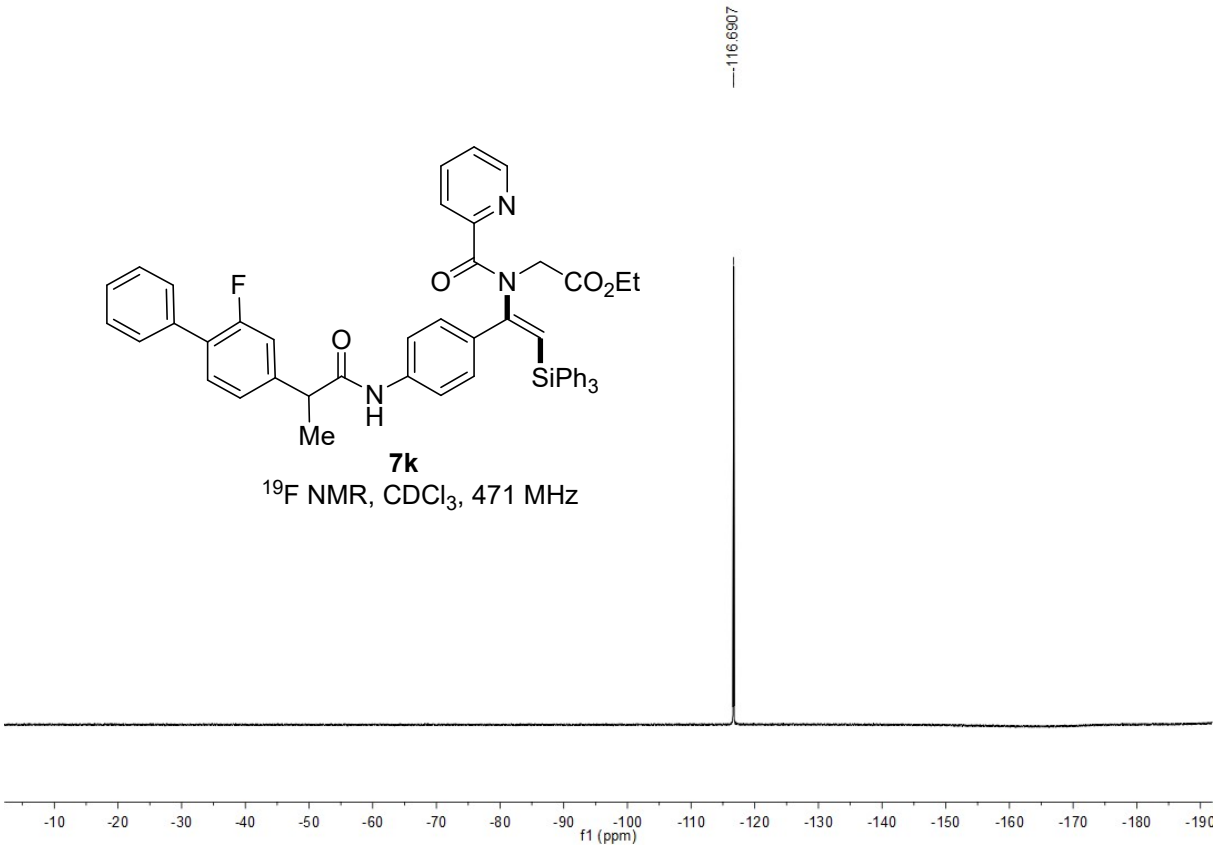
7k

^{1}H NMR, $CDCl_3$, 500 MHz



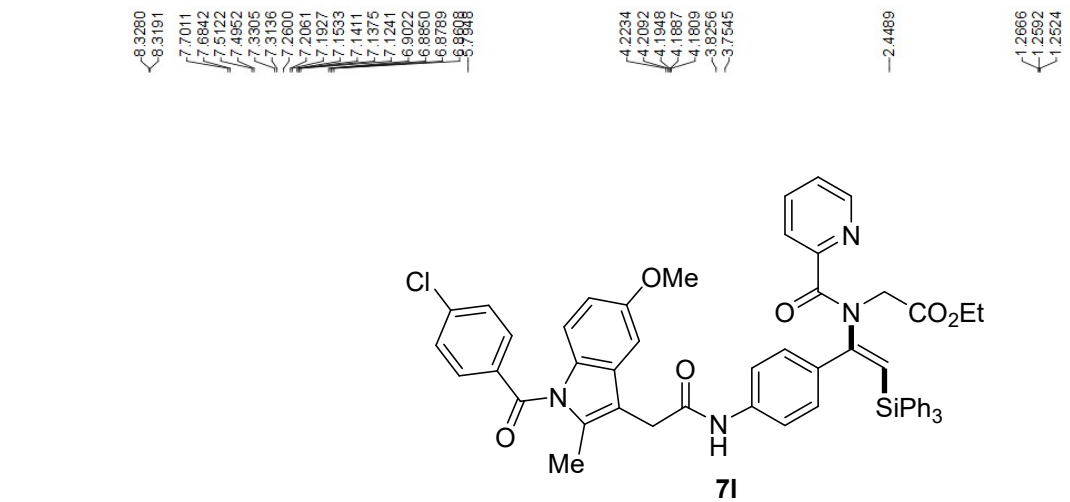
7k

^{13}C NMR, $CDCl_3$, 125 MHz



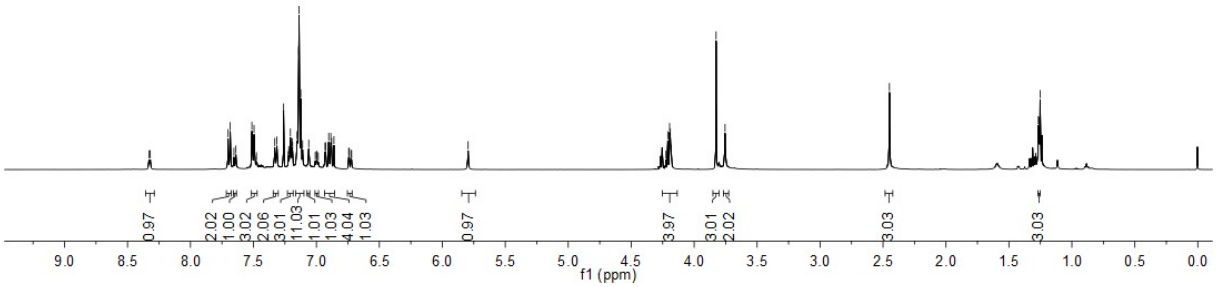
7k

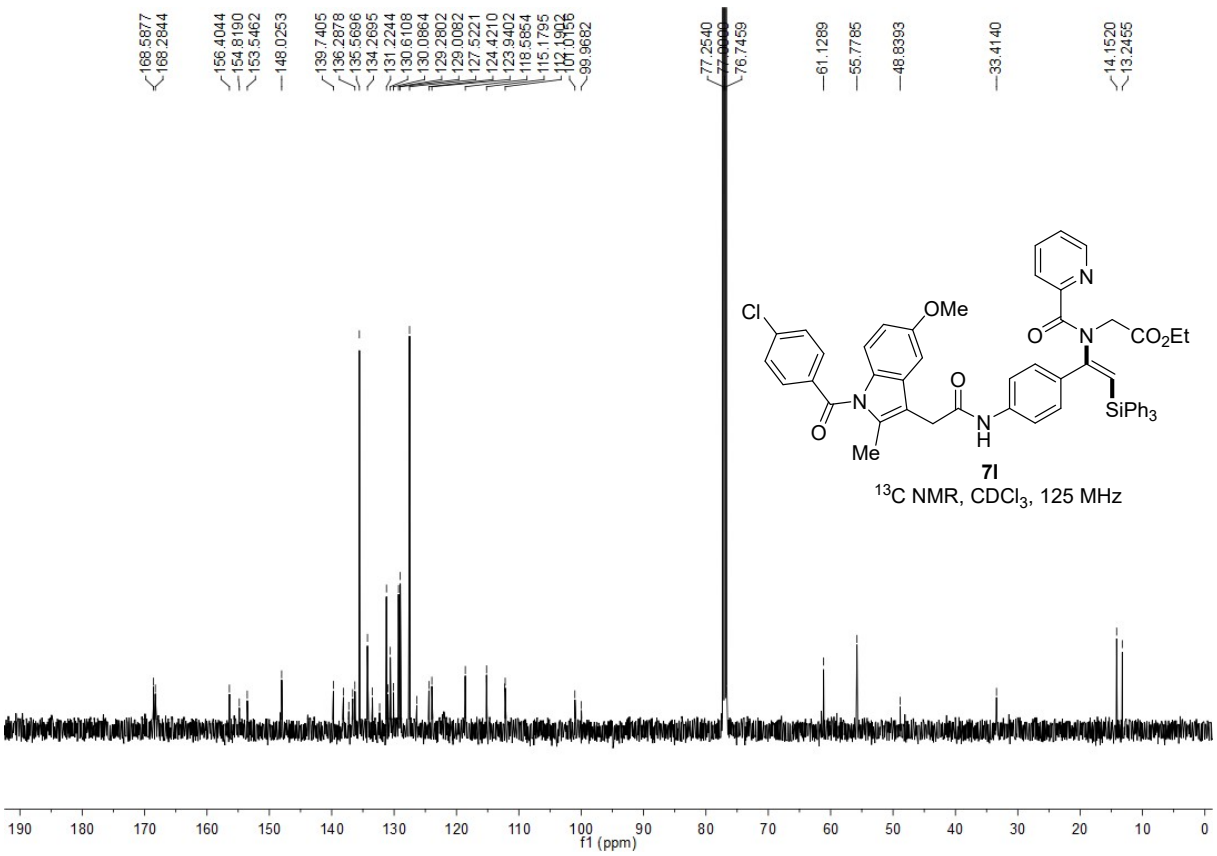
^{19}F NMR, $CDCl_3$, 471 MHz



7l

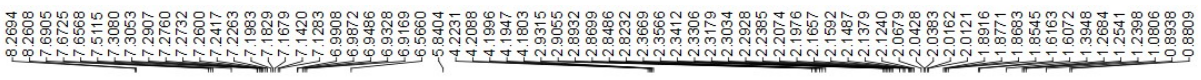
^{1}H NMR, $CDCl_3$, 500 MHz

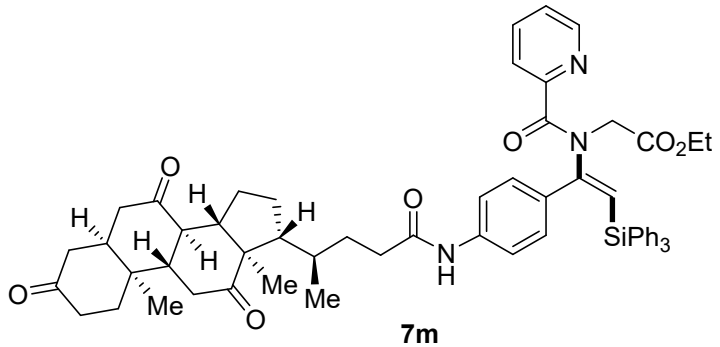




7l

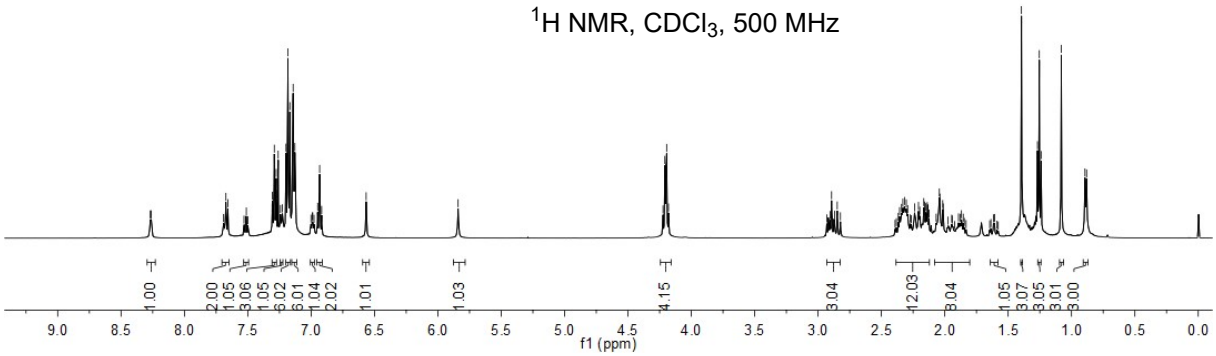
^{13}C NMR, $CDCl_3$, 125 MHz

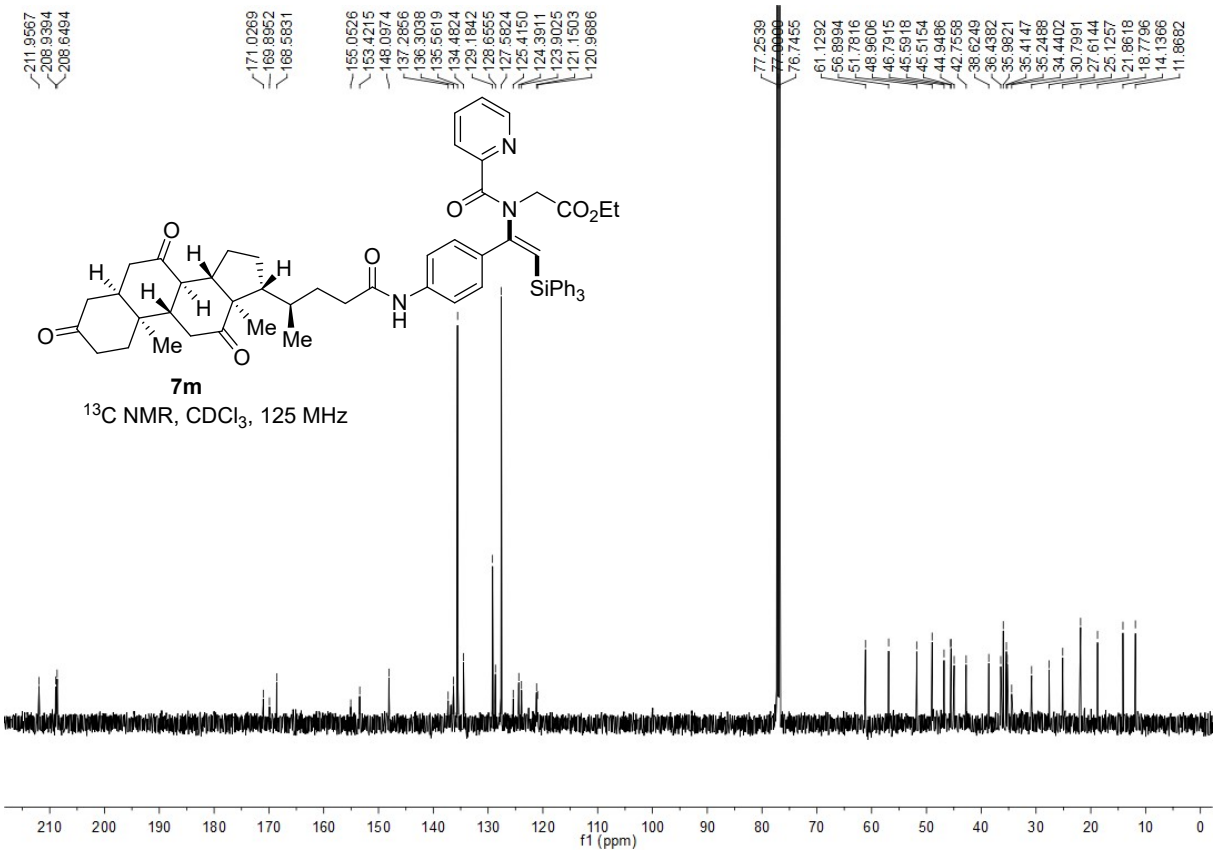




7m

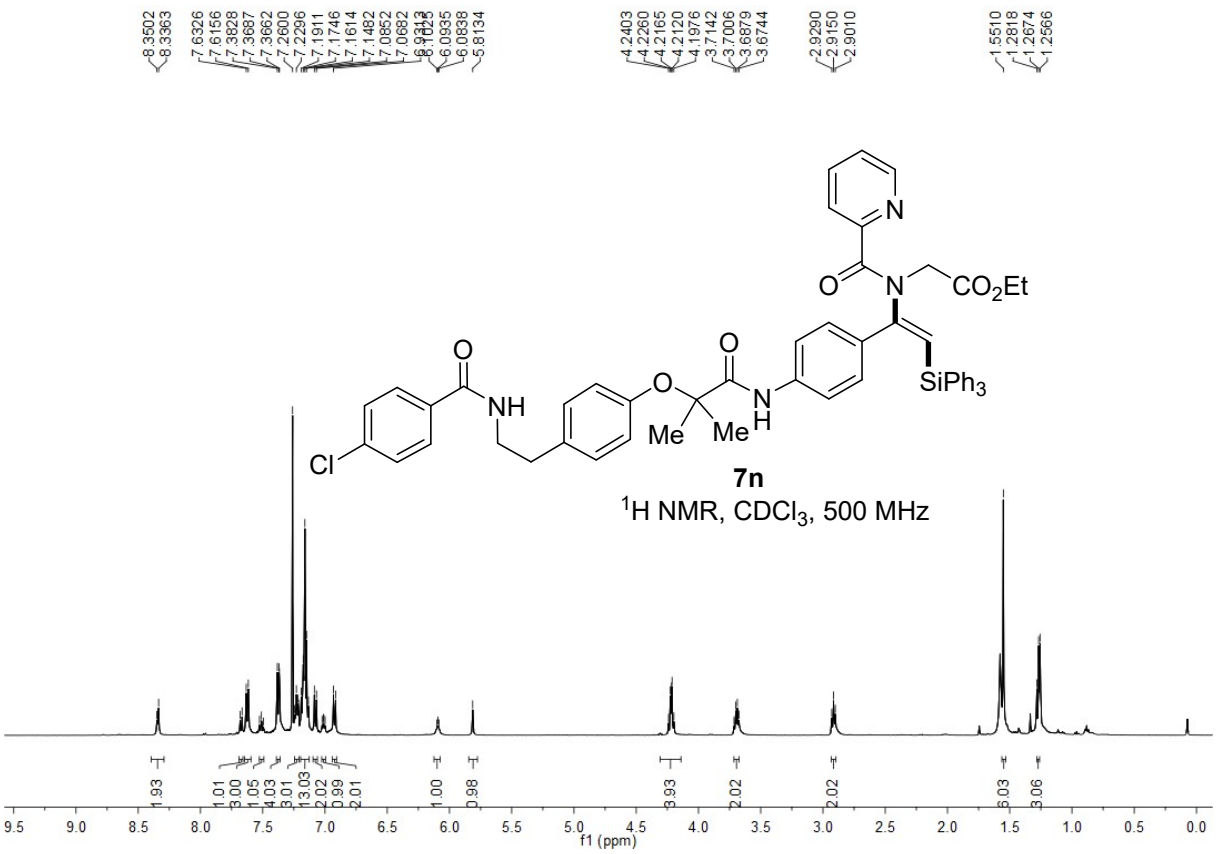
^{1}H NMR, $CDCl_3$, 500 MHz





7m

^{13}C NMR, $CDCl_3$, 125 MHz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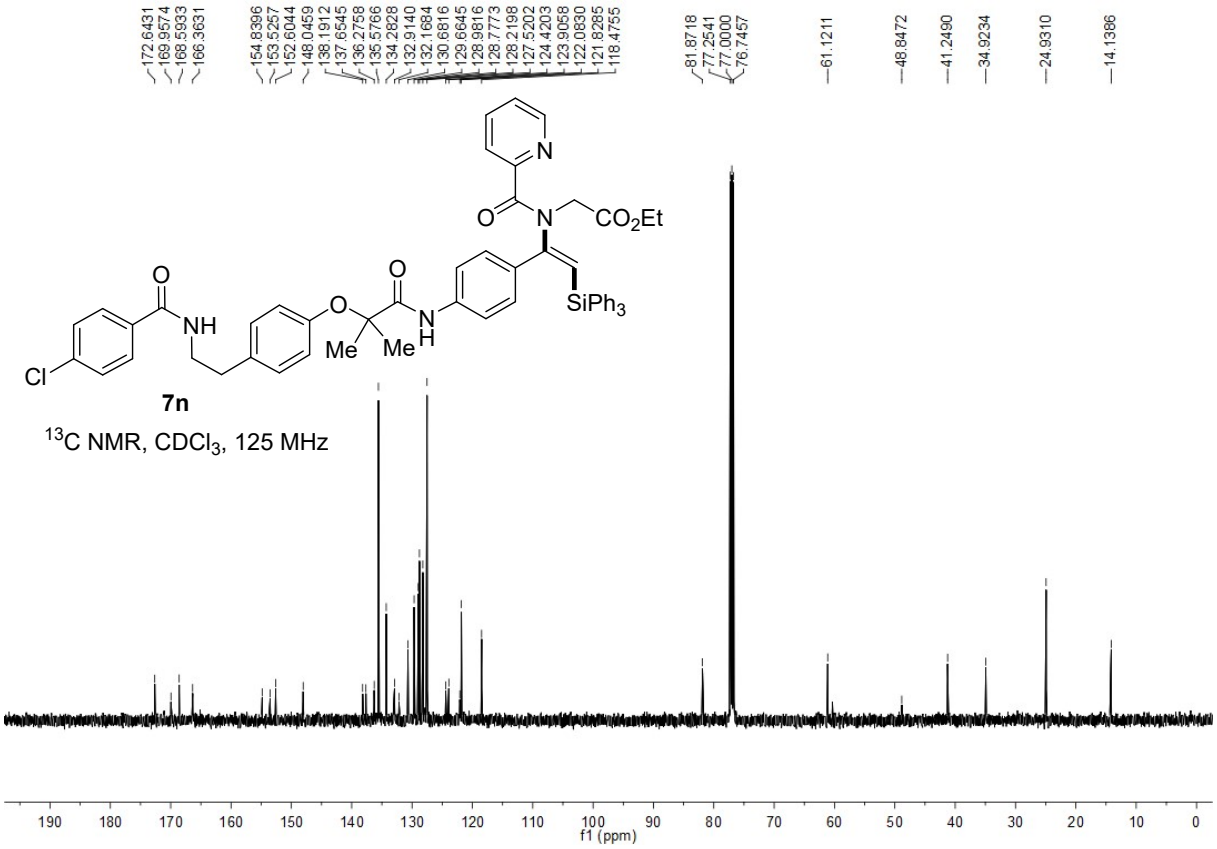
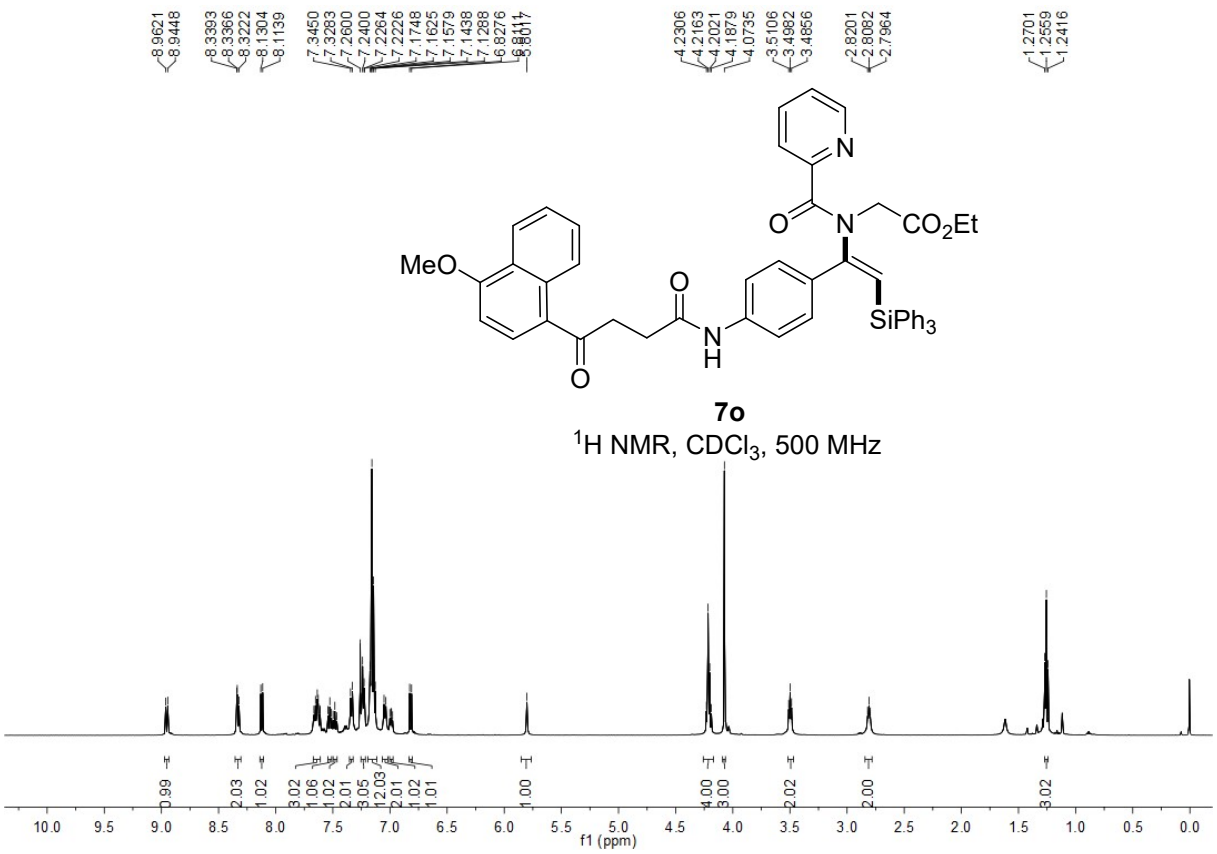
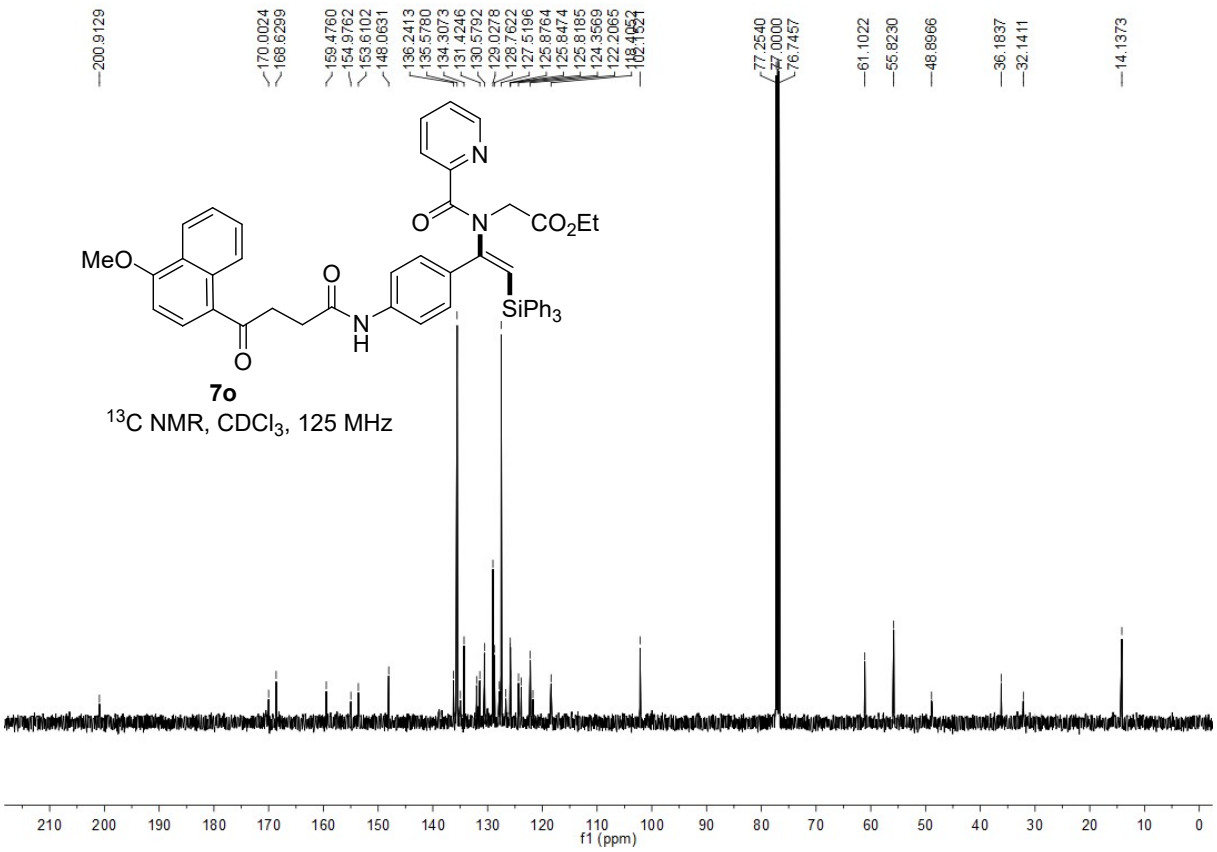
8.3363
7.6326
7.6156
7.3828
7.3687
7.3662
7.2600
7.2296
7.1911
7.1746
7.1614
7.1482
7.0852
7.0682
6.0935
6.0838
5.8134
4.2403
4.2260
4.2165
4.2120
4.1976
3.7142
3.7006
3.6879
3.6744
2.9290
2.9150
2.9010
1.5510
1.2818
1.2674
1.2566
N
O
N
CO2Et
SiPh3
O
NH
O
N
H
O
Me
Me
Cl
7n
1H NMR, CDCl3, 500 MHz
1.93
1.01
3.00
1.05
4.03
3.01
13.03
2.02
0.99
2.01
1.00
0.98
3.93
2.02
2.02
6.03
3.06
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)


172.6431
169.9574
168.5933
166.3631
154.8396
153.5257
152.6044
148.0459
138.1912
137.6545
136.2758
135.5766
134.2828
132.9140
132.1684
130.6816
129.6645
128.9816
128.7773
128.2198
127.5202
124.4203
123.9058
122.0830
121.8285
118.4755
81.8718
77.2541
77.0000
76.7457
61.1211
48.8472
41.2490
34.9234
24.9310
14.1386
N
O
N
CO2Et
SiPh3
O
NH
O
N
H
O
Me
Me
Cl
7n
13C NMR, CDCl3, 125 MHz
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)



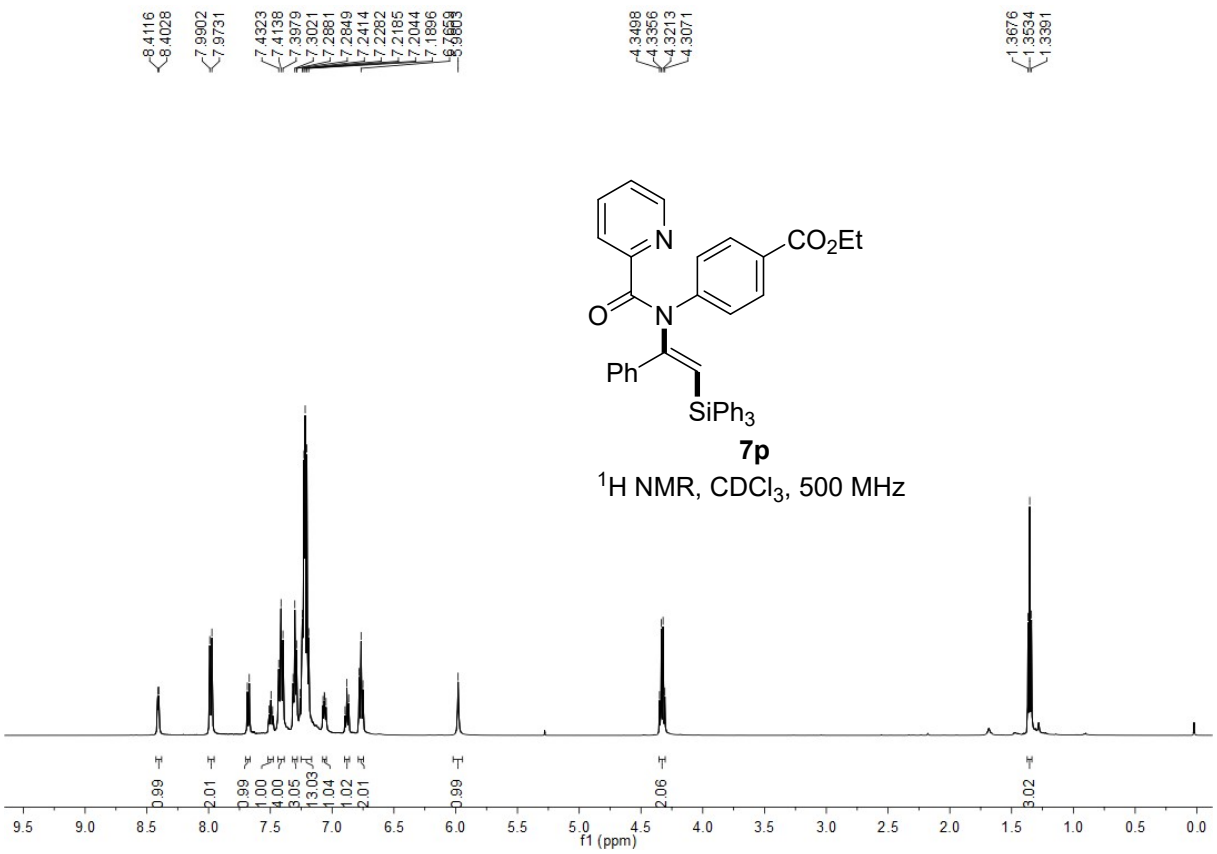
7o

^{1}H NMR, $CDCl_3$, 500 MHz



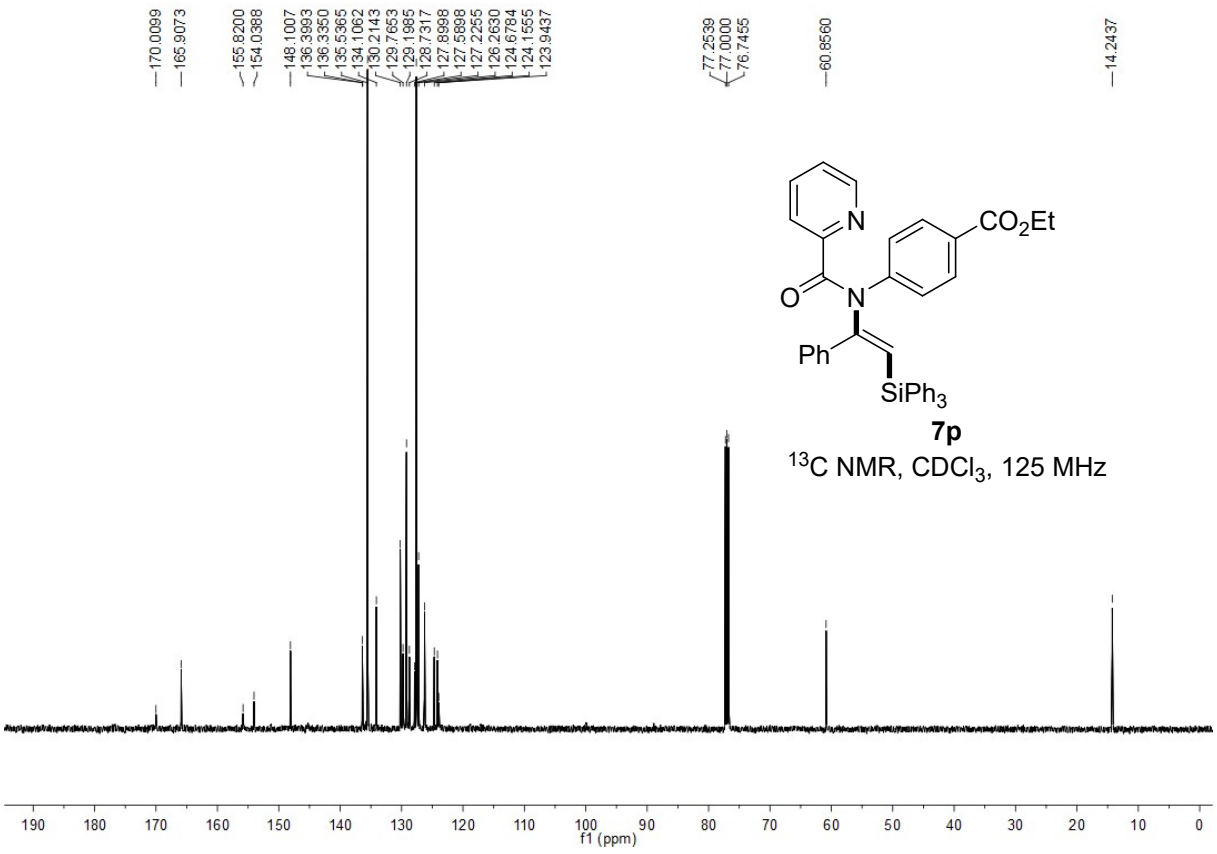
7o

^{13}C NMR, $CDCl_3$, 125 MHz



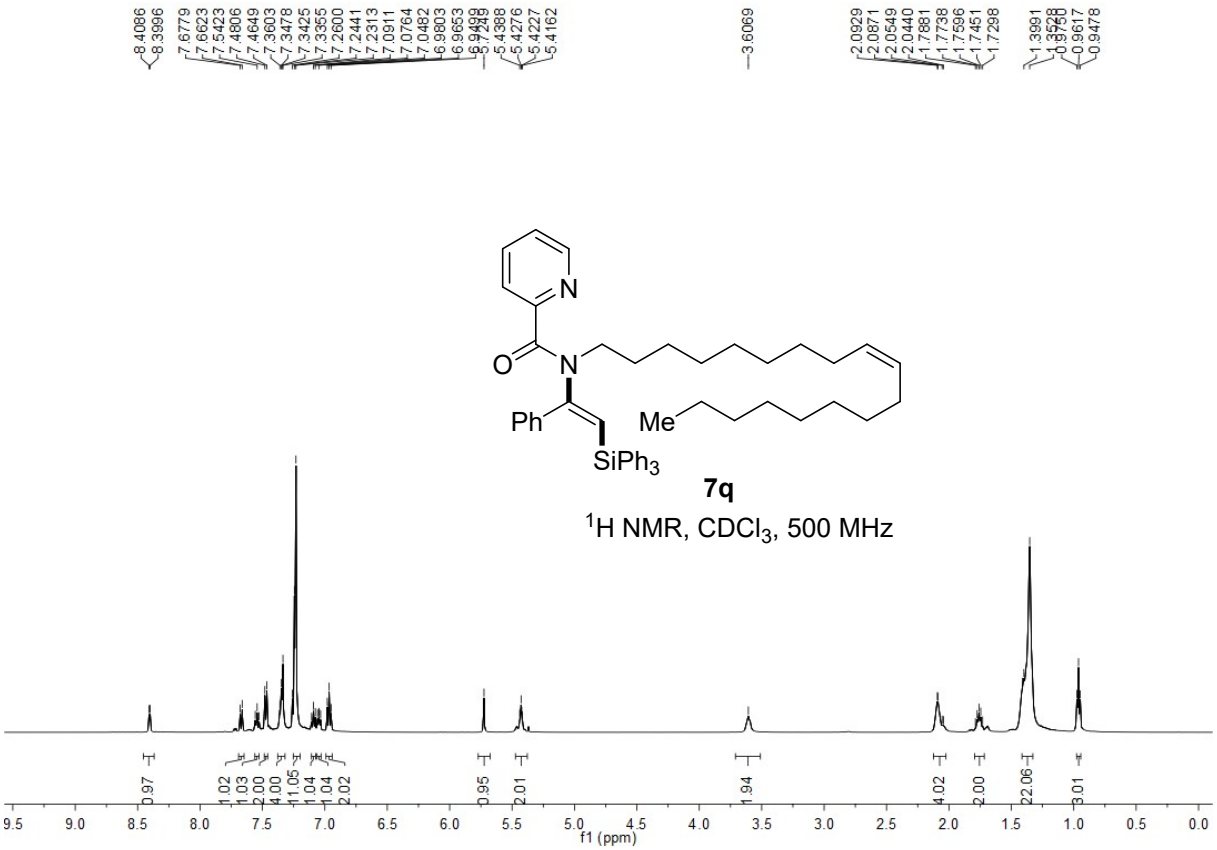
7p

^{1}H NMR, $CDCl_3$, 500 MHz



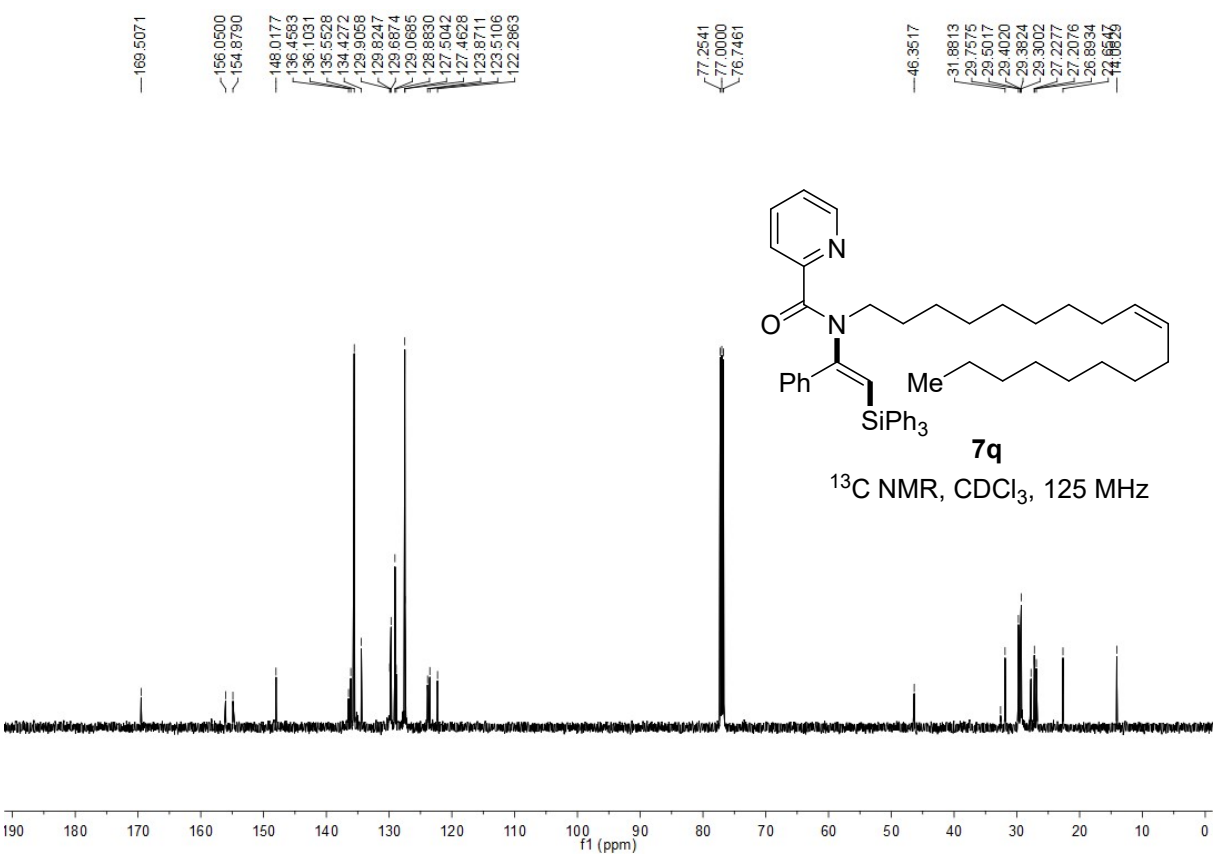
7p

^{13}C NMR, $CDCl_3$, 125 MHz



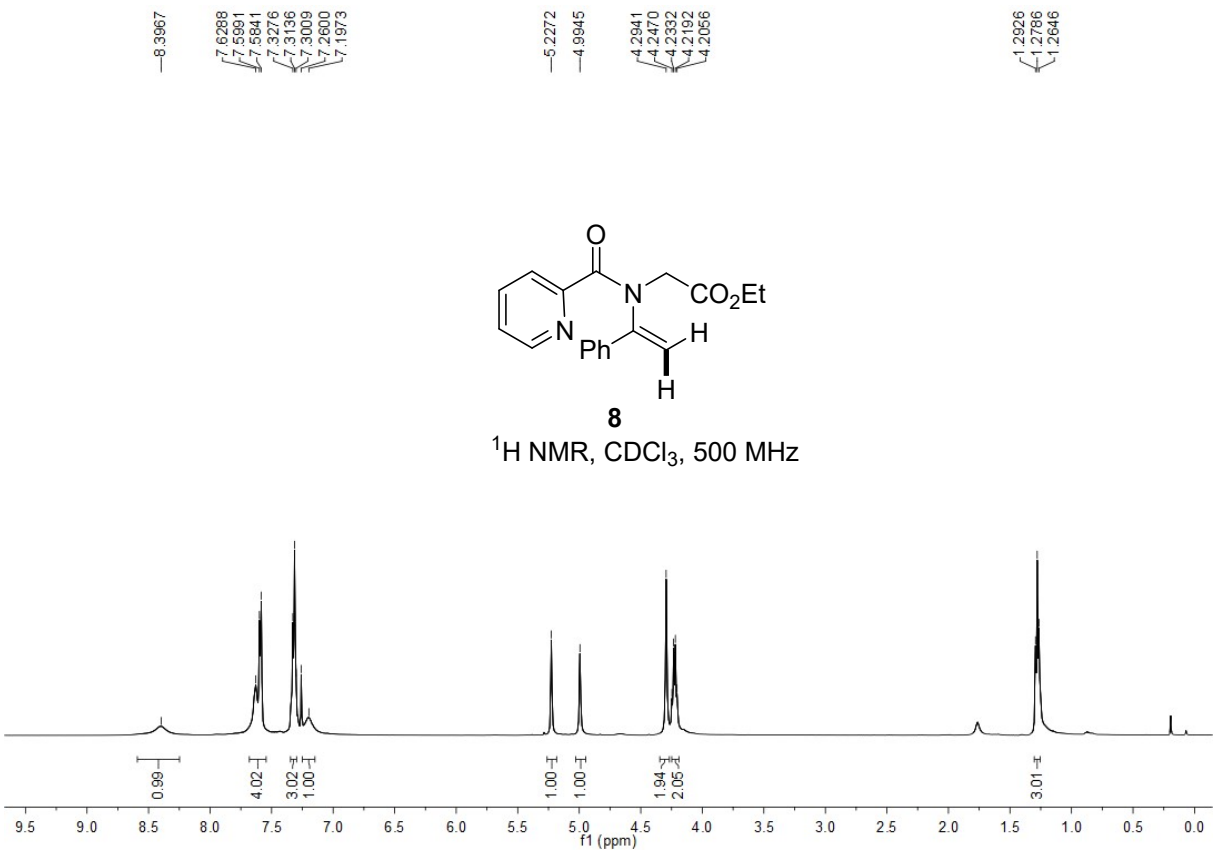
7q

^{1}H NMR, $CDCl_3$, 500 MHz



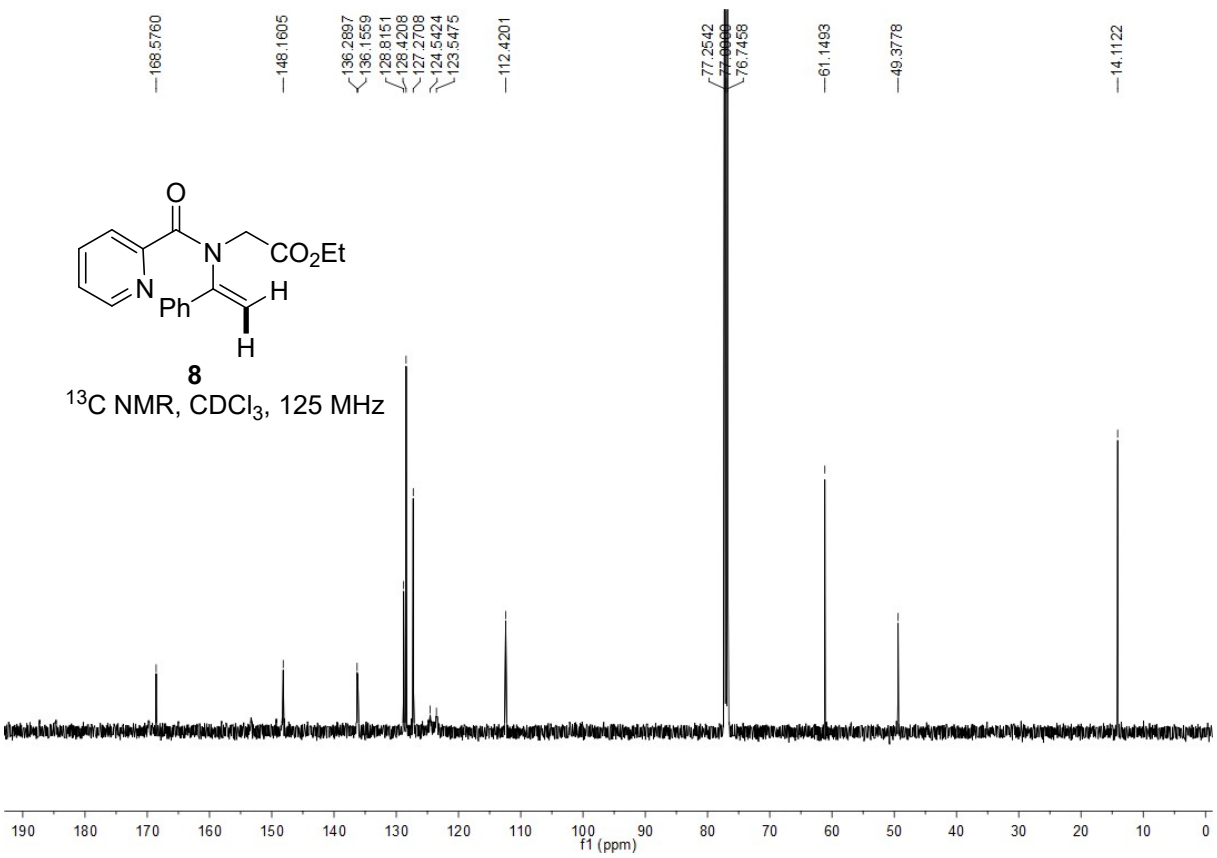
7q

^{13}C NMR, $CDCl_3$, 125 MHz



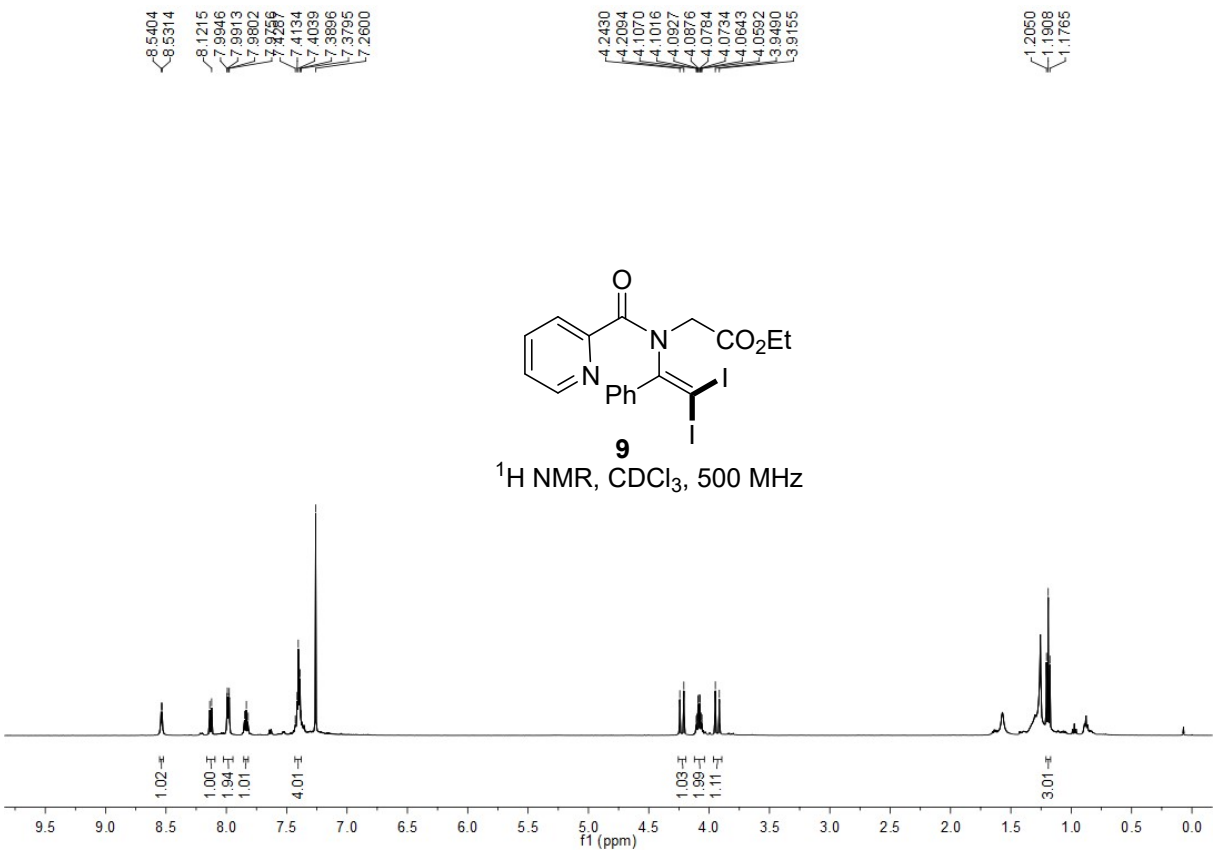
8

^{1}H NMR, $CDCl_3$, 500 MHz



8

^{13}C NMR, $CDCl_3$, 125 MHz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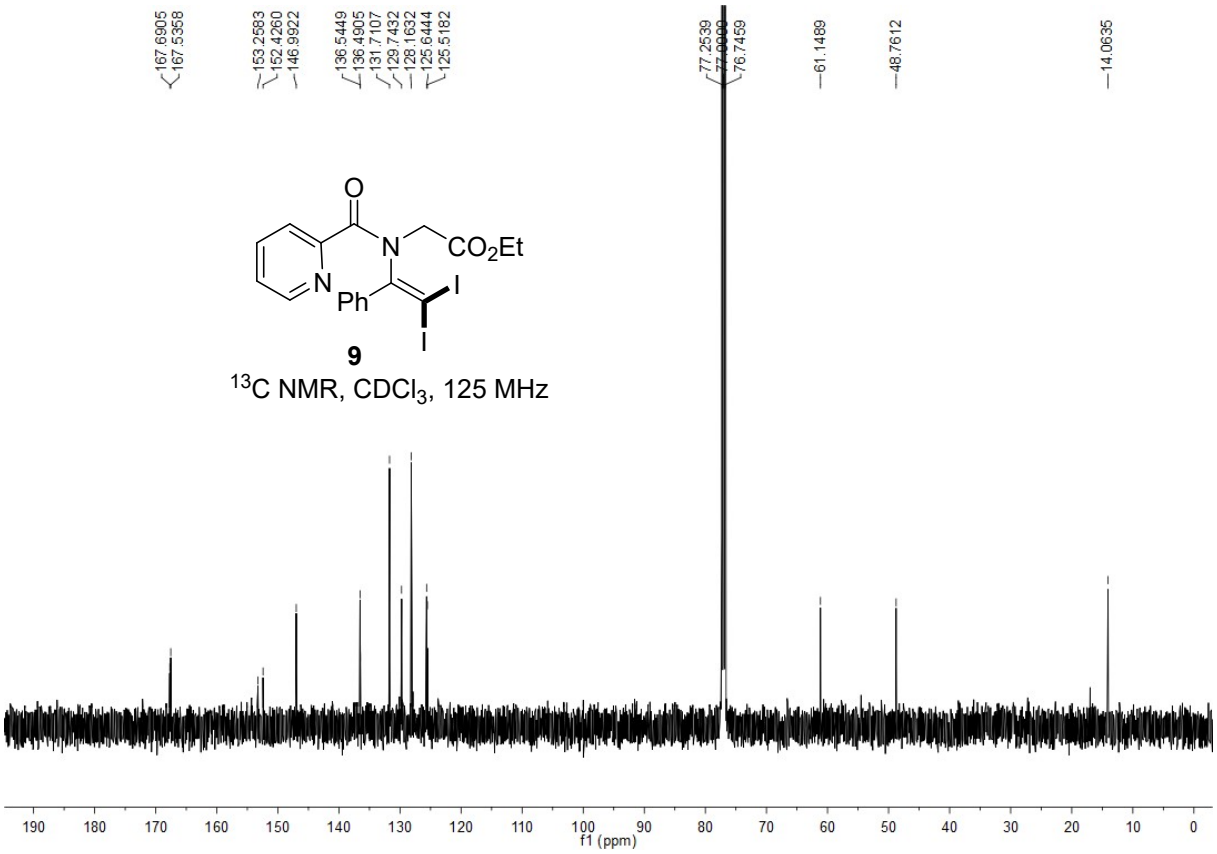
8.1215
7.9946
7.9913
7.9802
7.4287
7.4134
7.4039
7.3896
7.3795
7.2600
4.2430
4.2094
4.1070
4.1016
4.0927
4.0876
4.0784
4.0734
4.0643
4.0592
3.9490
3.9155
1.2050
1.1908
1.1765
O
N
CO2Et
N
Ph
I
I
9
1H NMR, CDCl3, 500 MHz
1.02
1.00
1.94
1.01
4.01
1.03
1.99
1.11
3.01
f1 (ppm)


167.6905
167.5358
153.2583
152.4260
146.9922
136.5449
136.4905
131.7107
129.7432
128.1632
125.6444
125.5182
77.2539
77.0000
76.7459
61.1489
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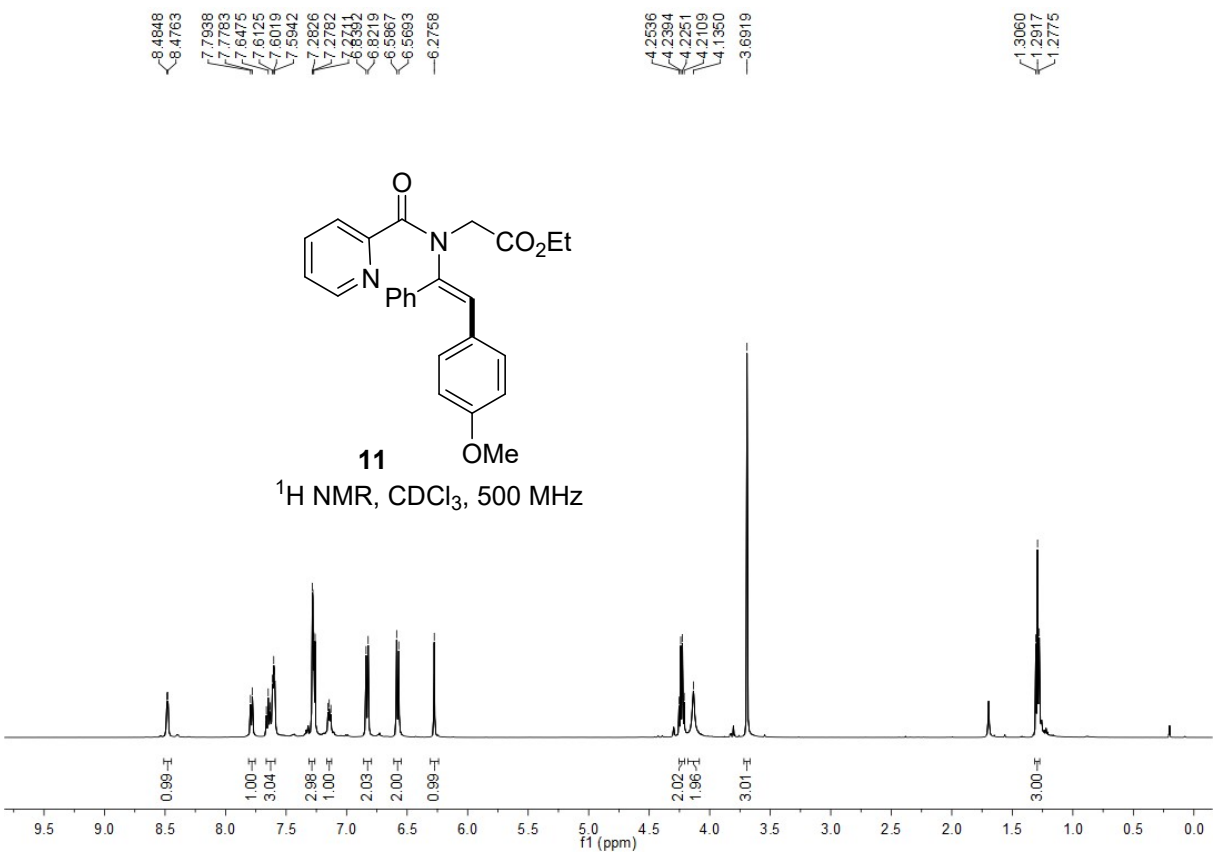
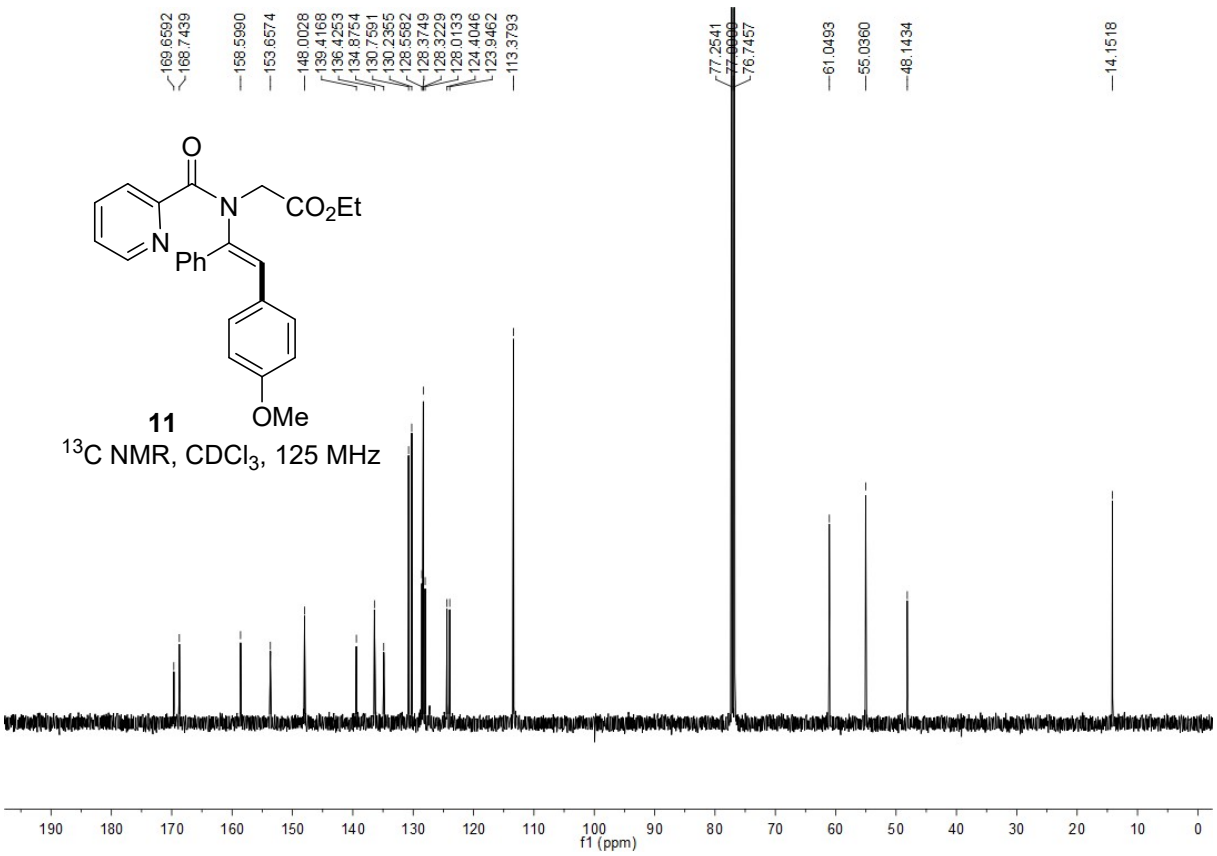
CO2Et
N
Ph
I
I
9
13C NMR, CDCl3, 125 MHz
f1 (ppm)



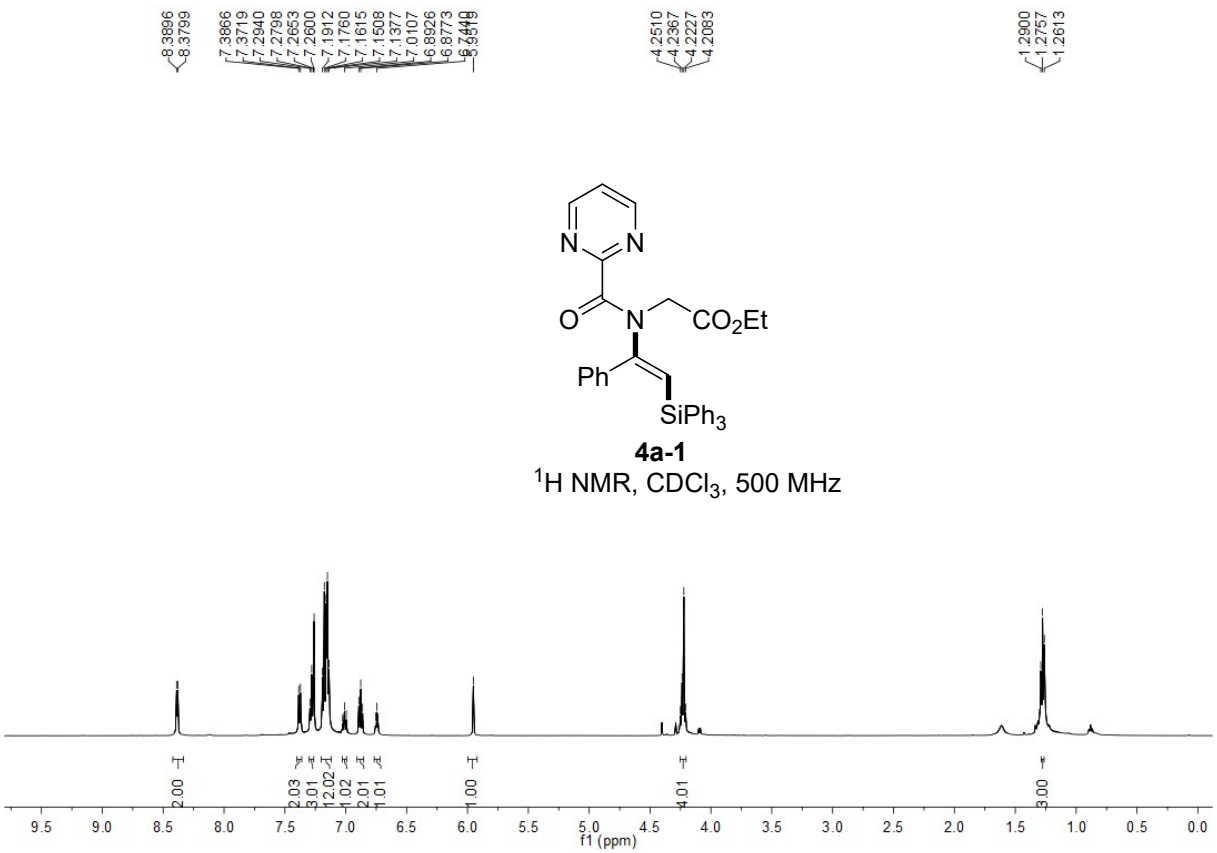
11

^{1}H NMR, $CDCl_3$, 500 MHz



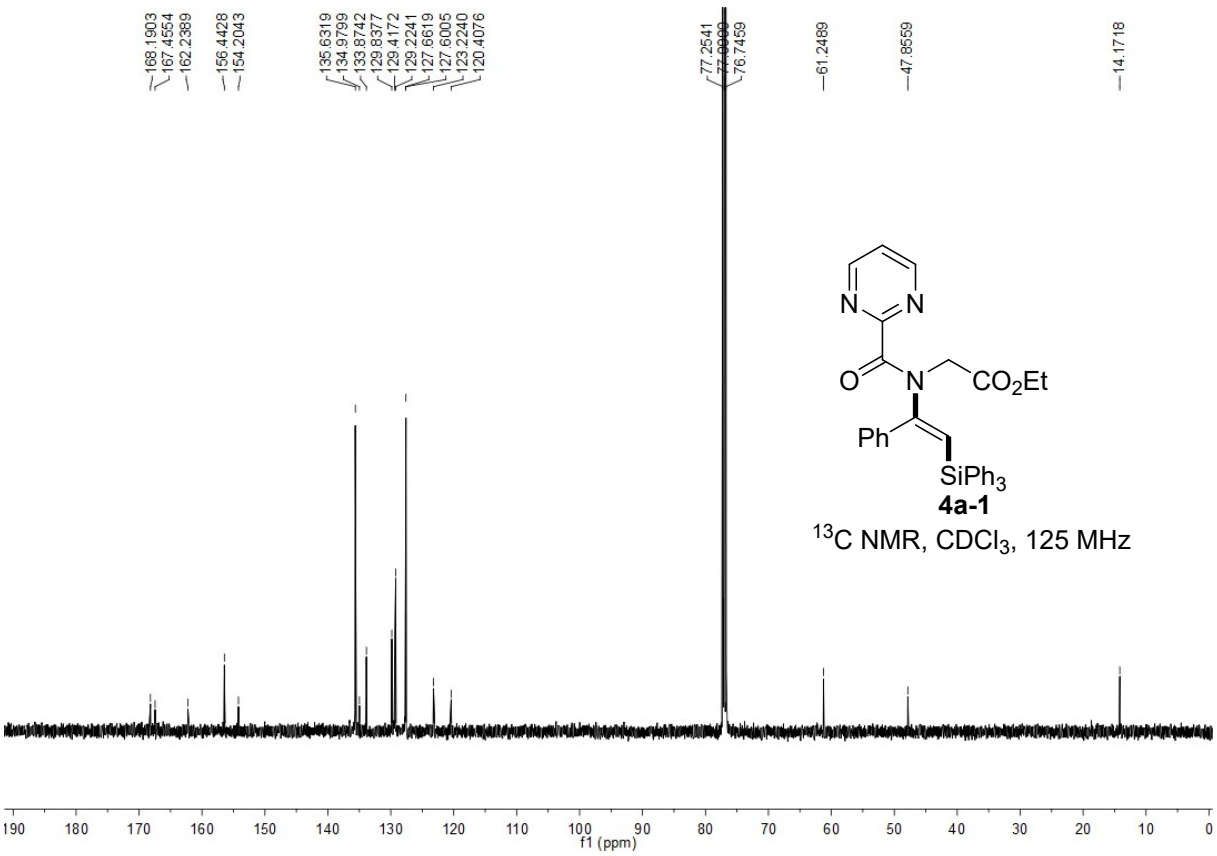
11

^{13}C NMR, $CDCl_3$, 125 MHz



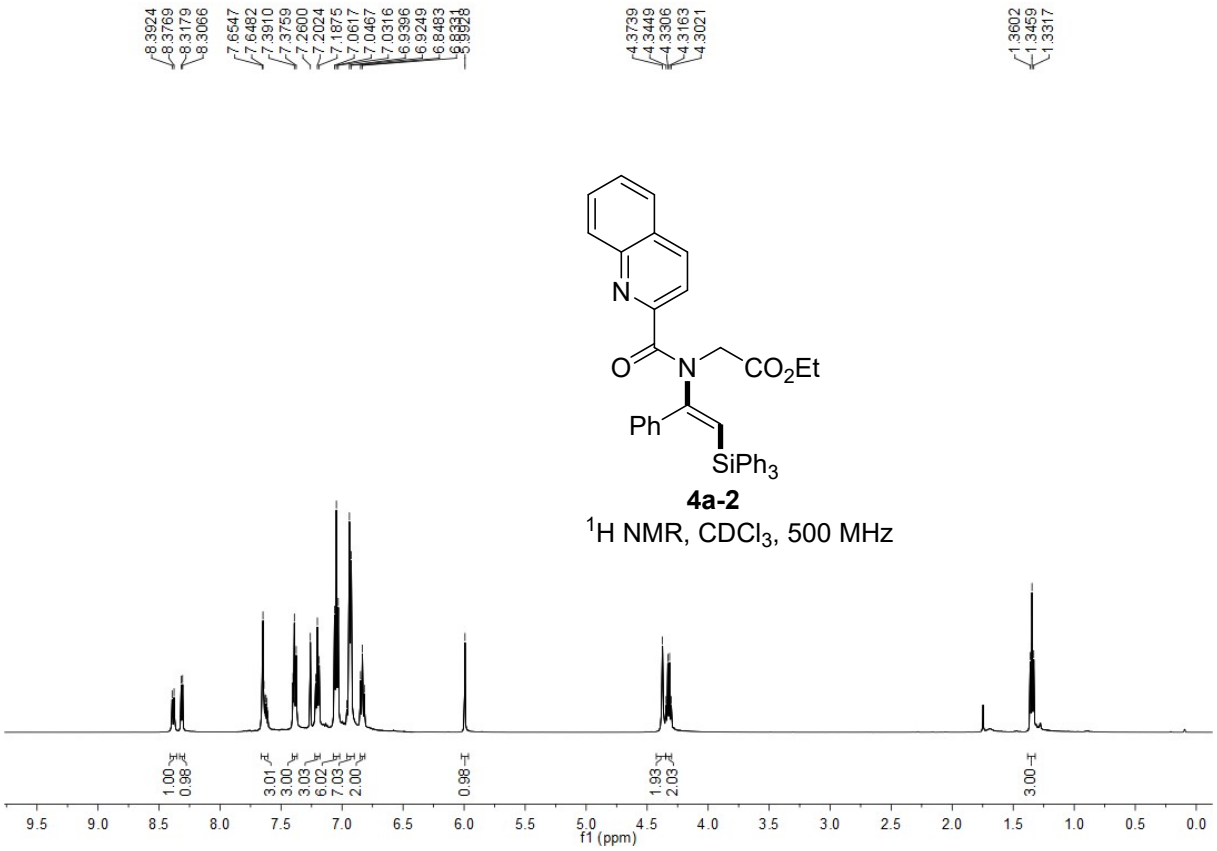
4a-1

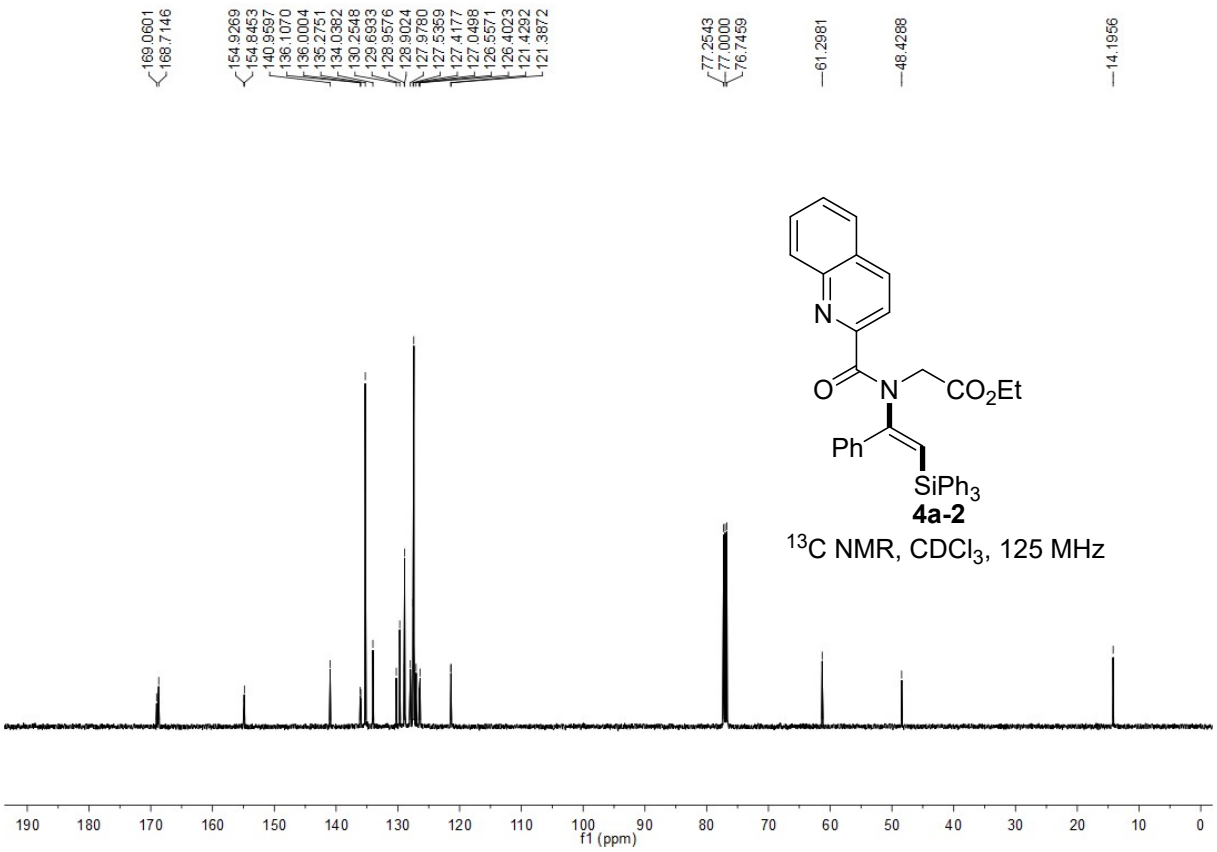
^{1}H NMR, $CDCl_3$, 500 MHz

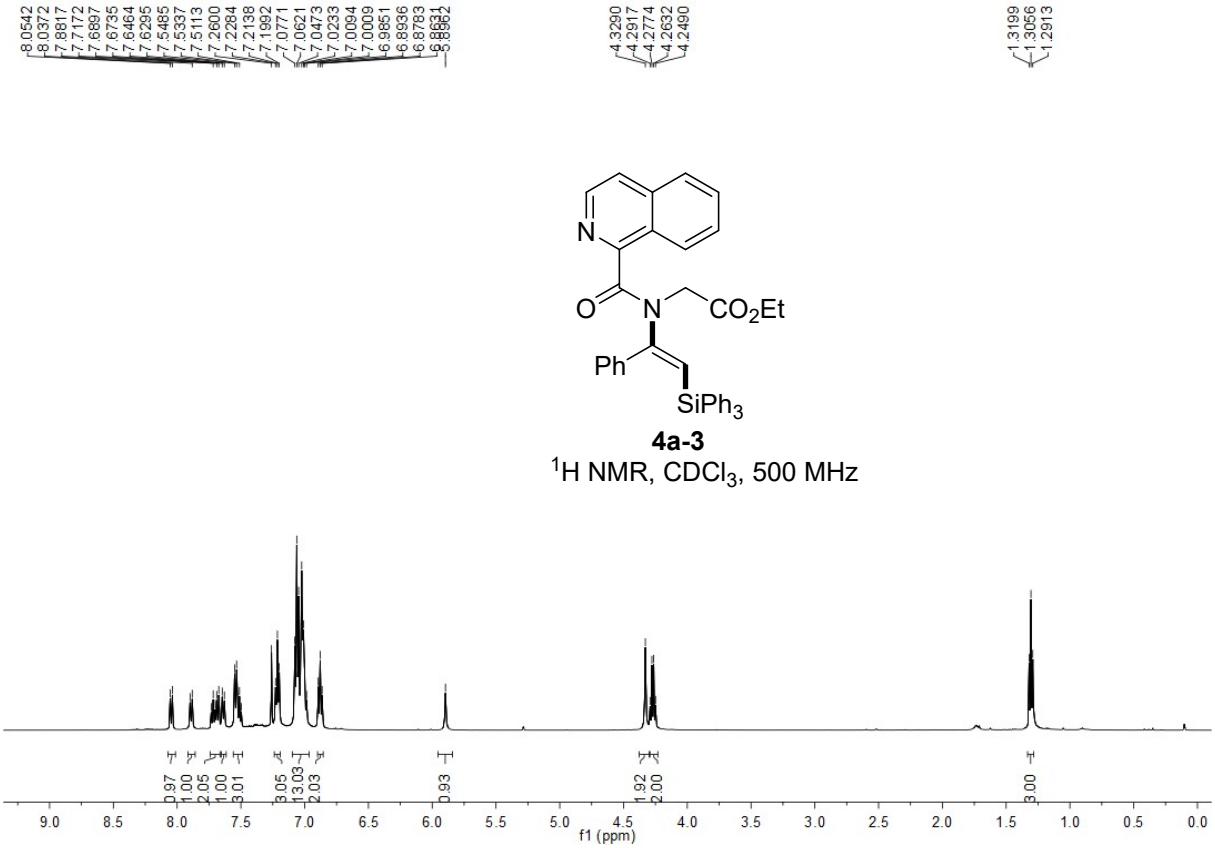


4a-1

^{13}C NMR, $CDCl_3$, 125 MHz


8.3924
8.3769
8.3179
8.3066
7.6547
7.6482
7.3910
7.3759
7.2600
7.2024
7.1875
7.0617
7.0467
7.0316
6.9396
6.9249
6.8483
6.8331
5.9928
4.3739
4.3449
4.3306
4.3163
4.3021
1.3602
1.3459
1.3317
N
O
N
CO2Et
Ph
SiPh3
4a-2
1H NMR, CDCl3, 500 MHz
1.00
0.98
3.01
3.00
3.03
6.02
7.03
2.00
0.98
1.93
2.03
3.00
f1 (ppm)


169.0601
168.7146
154.9269
154.8453
140.9597
136.1070
136.0004
135.2751
134.0382
130.2548
129.6933
128.9576
128.9024
127.9780
127.5359
127.4177
127.0498
126.5571
126.4023
121.4292
121.3872
77.2543
77.0000
76.7459
61.2981
48.4288
14.1956
N
O
N
CO2Et
Ph
SiPh3
4a-2
13C NMR, CDCl3, 125 MHz
f1 (ppm)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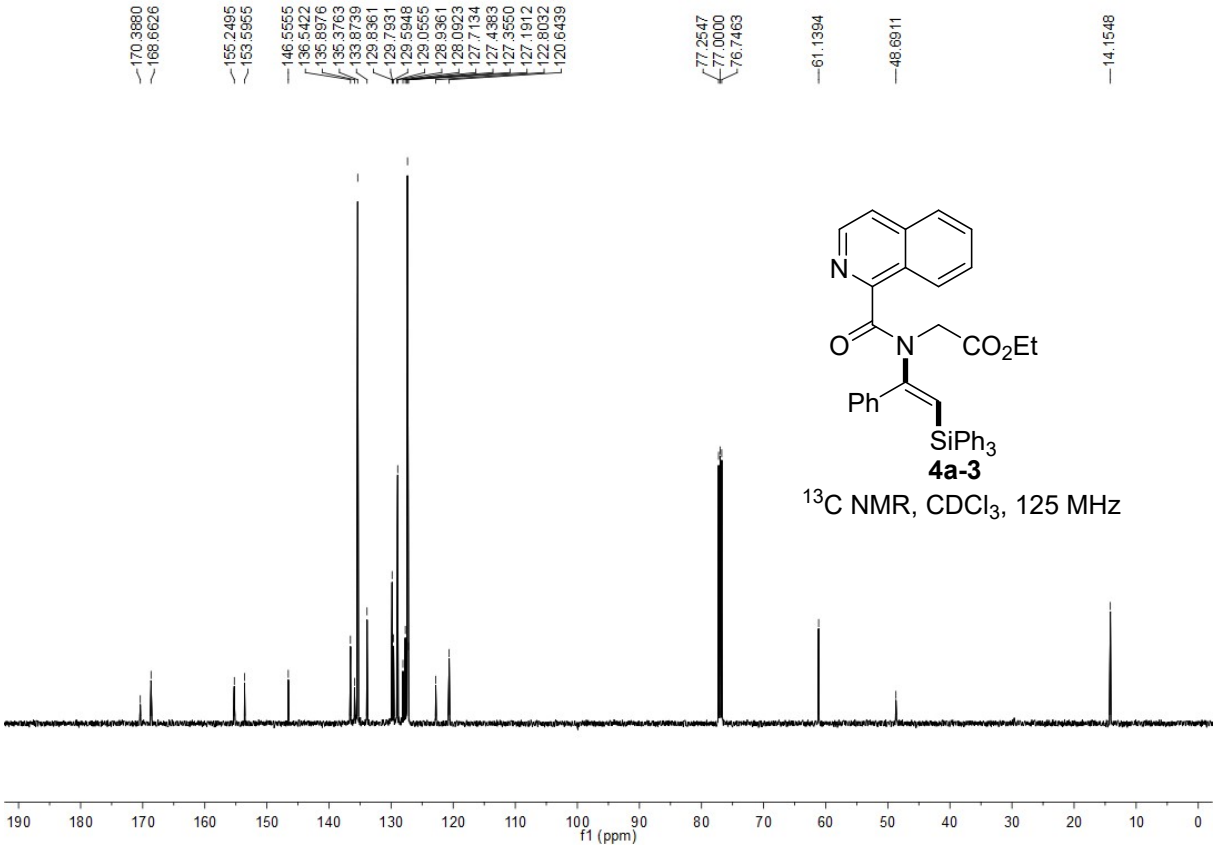
8.0372
7.8817
7.7172
7.6897
7.6735
7.6464
7.6295
7.5485
7.5337
7.5113
7.2600
7.2284
7.2138
7.1992
7.0771
7.0621
7.0473
7.0233
7.0094
7.0009
6.9851
6.8936
6.8783
5.8862
4.3290
4.2917
4.2774
4.2632
4.2490
1.3199
1.3056
1.2913
N
O
N
CO2Et
Ph
SiPh3
4a-3
1H NMR, CDCl3, 500 MHz
0.97
1.00
2.05
1.00
3.01
3.05
13.03
2.03
0.93
1.92
2.00
3.00
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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168.6626
155.2495
153.5955
146.5555
136.5422
135.8976
135.3763
133.8739
129.8361
129.7931
129.5948
129.0555
128.9361
128.0923
127.7134
127.4383
127.3550
127.1912
122.8032
120.6439
77.2547
77.0000
76.7463
61.1394
48.6911
14.1548
N
O
N
CO2Et
Ph
SiPh3
4a-3
13C NMR, CDCl3, 125 MHz
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)