

Supplementary Information

Enantioselective Copper-Catalyzed Cascade Hydroboration and Hydroallylation of Alkynes to Access Chiral Homoallylic Boronates

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1. Supplementary Methods

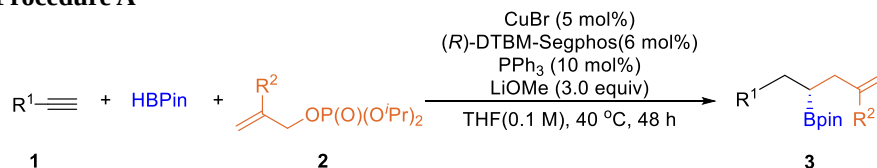
1.1 General Information

All reactions were carried out under nitrogen atmosphere in a glovebox. Reagents were purchased from commercial sources and used without further purification, unless otherwise noted. All of the solvents were anhydrous according distillation. The reactions were monitored with the aid of thin-layer chromatography (TLC) on 0.25 mm precoated silica gel plates. Visualization was carried out with UV light and aqueous potassium permanganate stain. Melting points were measured on Büchi B-540 apparatus. ^1H NMR spectra were recorded at 25 °C on a Bruker 600 HMz or 500 HMz, Varian 500 MHz, ^{13}C NMR spectra were recorded at 25 °C on a Bruker 151 HMz, Varian 126 MHz, respectively in CDCl_3 by using TMS as internal standard. Chemical shifts (δ) are given in ppm relative to the residual solvent signals (chloroform, 7.26 ppm for ^1H -NMR and 77.00 ppm for ^{13}C -NMR). ^{11}B NMR spectra were recorded at 25 °C on a Bruker 193 MHz or 160 MHz. Coupling constants (J) are given in Hertz (Hz). Letters s, d, t, m, q stand for singlet, doublet, triplet, multiplet, and quartet, respectively. High resolution mass spectra (HRMS) were recorded on Bruck microtof. High-pressure liquid chromatography (HPLC) was performed on Agilent 1260 Series chromatographs using a chiral column (25 cm) as noted for each compound. Enantiomeric excess was determined by HPLC analysis employing Darcel Chiracel column. Optical rotation was measured on a Perkin–Elmer 341 polarimeter using a sodium lamp (589 nm) as the light source over a path length of 10 cm.

2. Supplementary Discussion

2.1 General Procedure for the Synthesis Homoallylic Boronates

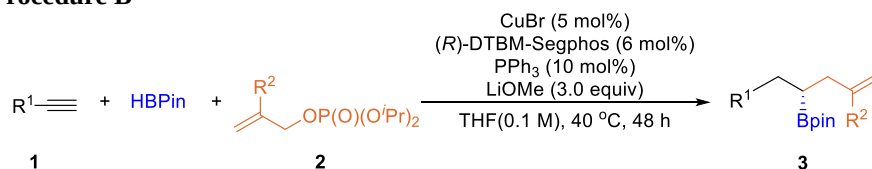
General Procedure A



Supplementary Figure 1. Synthetic methods for Homoallylic Boronates

In a nitrogen-filled glovebox, a seal the tube (25.0 mL) was charged with CuBr (0.7 mg, 5 mol%), (R)-DTBM-Segphos (7.1 mg, 6 mol%), PPh₃ (26 mg, 10 mol%), LiOMe (11.4 mg, 3.0 equiv), and then THF (1.0 mL) was added. The mixtures were stirred at room temperature for 10 minutes, then the HBPIn (51.2 mg, 0.4 mmol, 4.0 equiv) was added successively, and the resultant mixture was stirred at room temperature for an additional 10 minutes. To the solution were added **1** (0.1 mmol) and **2** (0.15 mmol, 1.5 equiv). The vial was removed from the glovebox and stirred at 40 °C for 48 h. After the reaction finished that monitored by TLC, the solution was pass through a short pad of silica gel and washed with DCM (2 x 10.0 mL). The filtrate was concentrated in vacuo and then purified by silica gel column chromatography to give the product **3**.

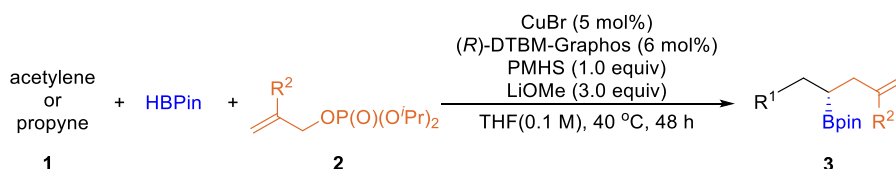
General Procedure B



Supplementary Figure 2. Synthetic methods for Homoallylic Boronates

In a nitrogen-filled glovebox, a seal the tube (25.0 mL) was charged with CuBr (0.7 mg, 5 mol%), (R)-DTBM-Segphos (7.1 mg, 6 mol%), PPh₃ (26 mg, 10 mol%), LiOMe (11.4 mg, 3.0 equiv), and then THF (1.0 mL) was added. The mixtures were stirred at room temperature for 10 minutes, then the HBPIn (51.2 mg, 0.4 mmol, 4.0 equiv) was added successively, and the resultant mixtures were stirred at room temperature for an additional 10 minutes. To the solution was added **1** (0.3 mmol, 3.0 equiv) and **2** (0.1 mmol, 1.0 equiv). The vial was removed from the glovebox and stirred at 40 °C for 48 h. After the reaction finished that monitored by TLC, the solution was pass through a short pad of silica gel and washed with DCM (2 x 10.0 mL). The filtrate was concentrated in vacuo and then purified by silica gel column chromatography to give the product **3**.

General Procedure C



Supplementary Figure 3. Synthetic methods for Homoallylic Boronates

In a nitrogen-filled glovebox, a Schlenk flask (25.0 mL) was charged with CuBr (0.7 mg, 5 mol%), (R)-DTBM-Graphos (7.3 mg, 6 mol%), LiOMe (11.4 mg, 3.0 equiv), and then THF (4.0 mL) was added. The mixtures were stirred at 40 °C for 10 minutes, then the HBPIn (51.2 mg, 0.4 mmol, 4.0 equiv) and the PMHS (2.3 mg, 0.1 mmol, 1.0 equiv) were added successively, and the resultant mixtures were stirred at room temperature for an additional 10 minutes. The Schlenk flask was removed from the glovebox, and evacuated with oil pump, then acetylene or propyne gas in a balloon

was introduced into the flask via the side arm with a stopcock. Finally, the flask followed by the addition of a solution of **2** (0.1 mmol, 1 mL THF) via syringe and stirred at 40 °C for 48 h. After the reaction finished that monitored by TLC, the solution was pass through a short pad of silica gel and washed with DCM (2 x 10.0 mL). The filtrate was concentrated in vacuo and then purified by silica gel column chromatography to give the product **3**.

2.2 Detailed Optimization Studies

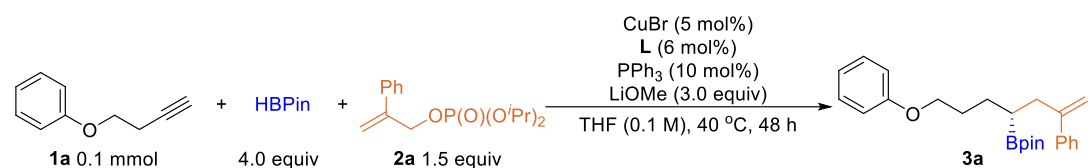
Supplementary Table 1 Copper Catalysis Screening. Changing the catalysis with other parameters as the same.

entry	Cu cat.	yield of 3a (%)	ee of 3a (%)
1	CuBr	80	95
2	CuCl	61	90
3	CuI	66	95
4	Cu(OAc) ₂	37	72
5	Cu(CH ₃ CN) ₄ PF ₆	30	54

Supplementary Table 2 Base Screening. Changing the base with other parameters as the same.

entry	base (equiv)	yield of 3a (%)	ee of 3a (%)
1	LiOMe (3.0)	80	95
2	NaOMe (3.0)	trace	59
3	KOMe (3.0)	trace	75
4	LiO ^t Bu (3.0)	30	90
5	Cs ₂ CO ₃ (3.0)	11	47
6	LiOMe (0.2)	34	89
7	LiOMe (1.0)	50	91

Supplementary Table 3 Chiral Ligand Screening. Changing the chiral ligand with other parameters as the same.



entry	L	yield of 3a (%)	ee of 3a (%)
1	L1	NR	
2	L2	NR	
3	L3	10	67
4	L4	20	80
5	L5	80	95
6	L6	10	37
7	L7	85	93
8	L8	72	86
9	L9	13	64

L1

L2

L3, Ar: Ph, (*R,R*)-Segphos
L4, Ar: 3,5-(CH₃)₂C₆H₃
(*R*)-DM-Segphos
L5, Ar: 3,5-*t*Bu-4-OMe-C₆H₂
(*R*)-DTBM-Segphos

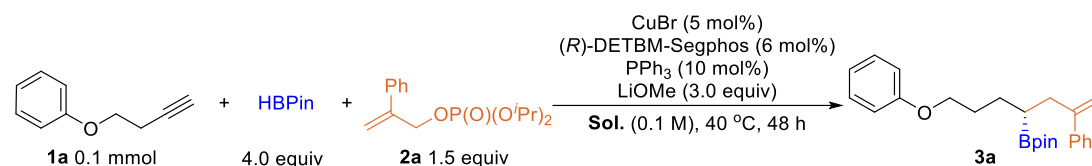
L6

L7, Ar: 3,5-*t*Bu-4-OMe-C₆H₂
(*R*)-DTBM-Graphos

L8, Ar: 3,5-Si(CH₃)₃

L9

Supplementary Table 4 Solvent Screening. Changing the solvent with other parameters as the same.



entry	Sol.	yield of 3a (%)	ee of 3a (%)
1	THF	80	95
2	Dioxane	46	91
3	MTBE	70	86
4	Tol.	69	69
5	DCM	45	94

Supplementary Table 5 Leaving Group of Allyl Phosphate Screening. Changing the leaving group of allyl phosphate with other parameters as the same.

entry	R	yield of 3a (%)	ee of 3a (%)
1	OPO(O ⁱ Pr) ₂	80	95
2	OPO(OPh) ₂	43	96
3	OPO(O ^t Bu) ₂	17	91
4	Cl	21	90

Supplementary Table 6 Optimization for Asymmetric Acetylene Cascade Hydroboration and Hydroallylation.

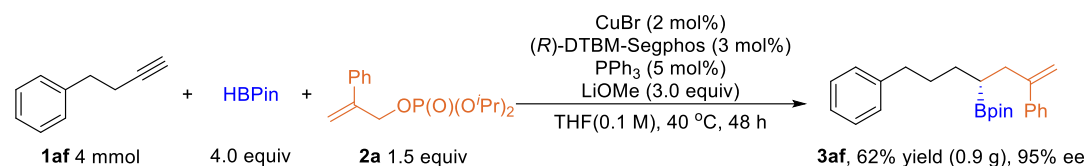
entry	L	yield of 3cm (%)	ee of 3cm (%)
1	L5	50	30
2 ^a	L5	30	70
3 ^{abc}	L5	84	76
4 ^{abc}	L4	80	52
5 ^{abc}	L6	85	80
6 ^{abc}	L7	90	74
7 ^{abc}	L8	Trace	70

^aWithout PPh₃; ^bWith PMHS (0.1 mmol); ^cWith THF (0.025 M)

3. Supplementary Notes.

3.1 Further Transformations of Chiral Product.

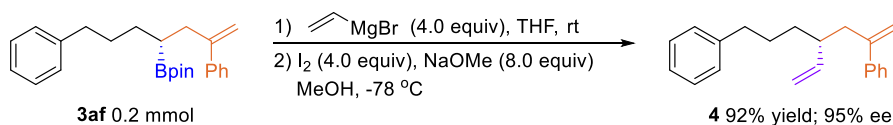
Gram-scale reaction



Supplementary Figure 4. Gram-scale reaction

In a nitrogen-filled glovebox, a seal the tube (100.0 mL) was charged with CuBr (11.5 mg, 2 mol%), (*R*)-DTBM-Segphos (142.0 mg, 3 mol%), PPh₃ (52.5 mg, 5 mol%), LiOMe (0.46 g, 3.0 equiv), and then THF (40.0 mL) was added. The mixtures were stirred at room temperature for 10 minutes, then the HBPIn (2.0 g, 16 mmol, 4.0 equiv) was added successively, and the resultant mixtures were stirred at room temperature for an additional 10 minutes. To the solution were added **1af** (4 mmol, 1.0 equiv) and **2a** (0.2 mmol, 1.5 equiv). The vial was removed from the glovebox and stirred at 40 °C for 48 h. After the reaction finished that monitored by TLC, the solution was pass through a short pad of silica gel and washed with DCM (3 x 30.0 mL). The filtrate was concentrated in vacuo and then purified by silica gel column chromatography to give the product **3af** (62% yield, 0.9 g, 95% ee).

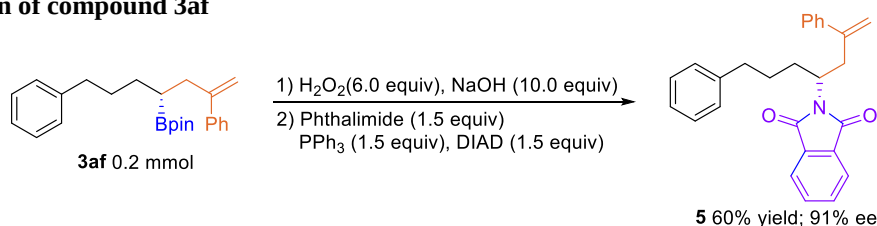
Vinylation of compound 3af



Supplementary Figure 5. Vinylation of compound 3af

To an oven-dried 10 mL reaction tube containing a stirring bar, a solution of compound **3af** (75.3 mg, 0.2 mmol, 1.0 equiv) in THF (2.0 mL) was added as subsequently vinylmagnesium bromide (0.8 mL, 1.0 M, 0.8 mmol, 4.0 equiv) was added dropwise and stirred at room temperature for 30 minutes. To the above solution at -78 °C, I₂ (203.0 mg, 0.8 mmol, 4.0 equiv) in methanol (3.0 mL) was added dropwise. The reaction mixture was allowed to stir 30 minutes at the same temperature followed by dropwise addition of a solution of NaOMe (87.0 mg, 1.6 mmol, 8.0 equiv) in methanol (3.0 mL). After warming to room temperature, the mixture was stirred for another 1.5 h, diluted with pentane (20 mL) and washed sequentially with saturated aqueous solution of Na₂S₂O₃ (5.0 mL). The mixtures were extracted with EtOAc (3 x 10 mL), dried over Na₂SO₄, filtered and concentrated under reduced pressure. The mixtures were purified by flash column chromatography to provide the title compound **4** (50.9 mg, 92% yield, 95% ee)¹.

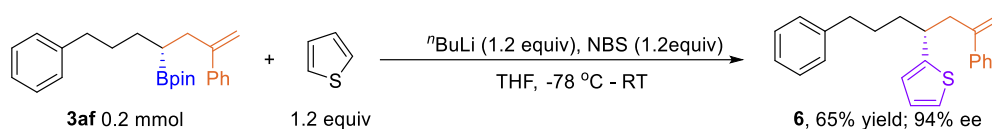
Amination of compound 3af



Supplementary Figure 6. Vinylation of compound 3af

To an oven-dried 10 mL reaction tube containing a stirring bar, a solution of compound **3af** (75.3 mg, 0.2 mmol) was dissolved in THF (2.0 mL). The reaction flask was placed in an ice bath and cooled to 0 °C, then NaOH (1.2 mL, 2 M, aqueous solution, 2 mmol, 10.0 equiv) and H₂O₂ (1.2 mL, 30% aqueous solution, 1.1 mmol, 6.0 equiv) were added. The aqueous layer was extracted with EtOAc (3 × 5 mL). The combined organic phases were dried over anhydrous Na₂SO₄ and the solvent was removed under reduced pressure. The crude material, phthalimide (44.0 mg, 0.3 mmol, 1.5 equiv), and PPh₃ (78.7 mg, 0.3 mmol, 1.5 equiv) were dissolved in anhydrous THF (2.0 mL) at 0 °C. To this mixture was added dropwise DIAD (61.0 mg, 0.3 mmol, 1.5 equiv) over a period of 5 min, the reaction was warmed to rt and stirred 2 h. Then the reaction was quenched with saturated aqueous solution of NaCl (5 mL) and extracted with EtOAc (3 × 5 mL), dried over Na₂SO₄, filtered and concentrated under reduced pressure. The mixture was purified by flash column chromatography to provide the title compound **5** (47.5 mg, 60% yield, 91% ee)¹.

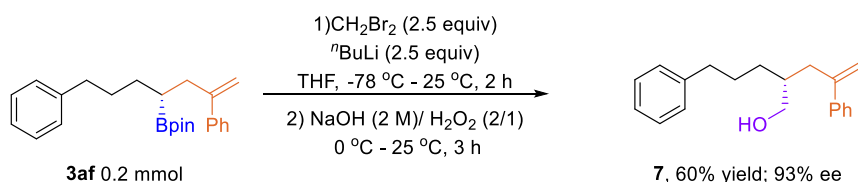
Thienylation of compound **3af**



Supplementary Figure 7. Thienylation of compound **3af**

A solution of thiophene (19.2 μL, 1.2 equiv) in THF (1.0 mL) was cooled to –78 °C and treated with ⁿBuLi (150 μL, 1.2 equiv, 1.6 M in hexanes) under N₂. The mixture was warmed to 0 °C and stirred for 30 minutes. The mixture was cooled to –78 °C and the **3af** (75.3 mg, 0.2 mmol) was added dropwise as a solution in THF (1.0 mL). The mixture was stirred at –78 °C for 1 h. Then a solution of NBS (42.8 mg, 1.2 equiv) in THF (1.0 mL) was added dropwise. After 1 h saturated aqueous solution of Na₂S₂O₃ (2.0 mL) was added and the reaction mixture was allowed to warm to room temperature. The reaction mixture was diluted with Et₂O (10.0 mL) and water (5.0 mL). The layers were separated and the aqueous layer was extracted with Et₂O (2 × 5.0 mL). The combined organic layers were dried over Na₂SO₄, filtered and concentrated under vacuum. The crude material was adsorbed on silica and purified by flash column chromatography on silica gel eluting with petroleum ether to give **6** (30.3 mg, 65 % yield; 94% ee)².

Compound **3af** reaction with CH₂Br₂

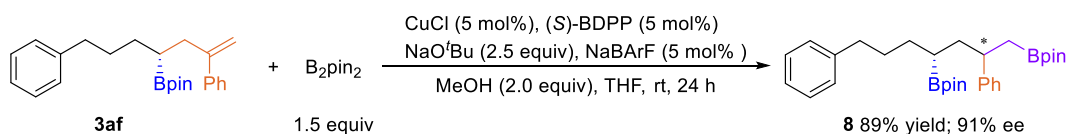


Supplementary Figure 8. Compound **3af reaction with CH₂Br₂**

In a nitrogen-filled glovebox, a Schlenk tube was charged with **3af** (75.3 mg, 0.2 mmol), dibromomethane (CH₂Br₂, 35.0 μL, 2.5 equiv) and THF (2.0 mL). The tube was capped, removed from the glovebox, and cooled to –78 °C. A solution of ⁿBuLi (176 μL, 2.5 M in hexanes, 2.2 equiv) was added dropwise. The resulting mixture was allowed to stir for 10 minutes, warmed to 25 °C and stirred

for an additional 2 h. The reaction mixture was cooled to 0 °C, and a premixed solution of NaOH (2 M, aq.)/30% H₂O₂ (2:1, 3.0 mL) was added dropwise. The resulting solution was warmed to 25 °C and allowed to stir for 3 h before being quenched with water (10.0 mL). The mixture was extracted with ethyl acetate (2 x 10.0 mL). The organic layers were combined, dried over Na₂SO₄, and concentrated in vacuo. The crude material was purified by flash column chromatography to give the corresponding product **7** (33.6 mg, 60% yield; 93% ee)³.

Hydroboration of compound **3af**

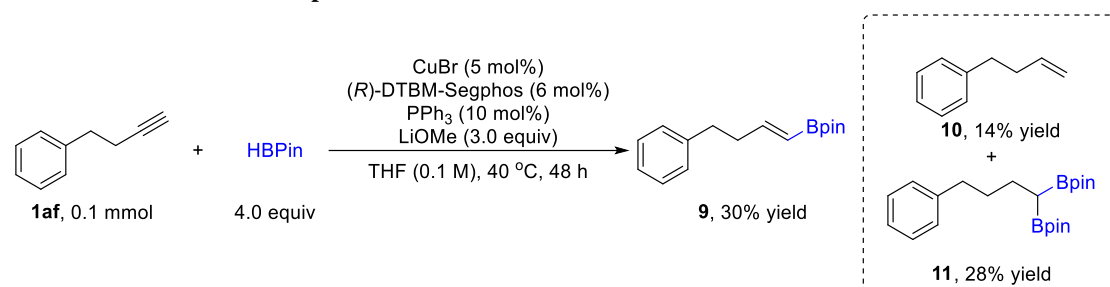


Supplementary Figure 9. Hydroboration of compound **3af**

In a nitrogen-filled glovebox, a flame-dried screw-cap reaction tube equipped with a magnetic stir bar was charged with CuCl (5 mol%), (S)-BDPP (5 mol%), NaO^tBu (1.0 equiv), NaBArF (5 mol%) and anhydrous THF (2 mL) was added. Then, the reaction mixture was stirred for 10 minutes, until a yellow homogeneous solution was obtained. B₂Pin₂ (1.5 equiv) was added and stirring was continued for another 10 min at room temperature. After stirring, the alkene **3af** (0.2 mmol) and MeOH (2.0 equiv) was added. And then removed from the glovebox. The reaction mixture was stirred at room temperature for 24 h. The reaction mixture was then quenched with water, extracted with CH₂Cl₂. The resulting solution was concentrated in vacuum and the crude material was purified by flash column chromatography to give the corresponding product **8** (89.9 mg, 89% yield; 91% ee)⁴.

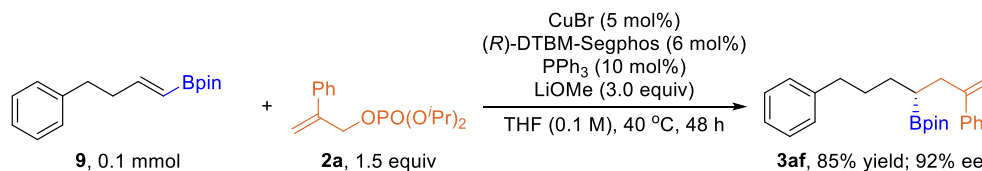
3.2 Mechanistic experiments.

A. Intermeidate control experiments



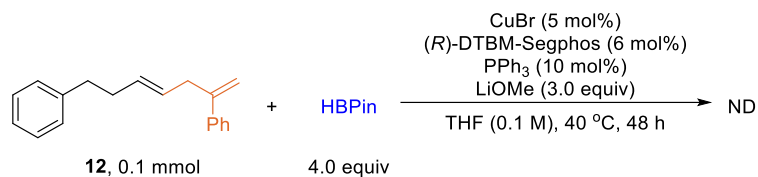
Supplementary Figure 10. Intermeidate control experiments. **1af** was exposed to HBPin in the absence of **2a**, under the standard reaction conditions.

In a nitrogen-filled glovebox, a seal the tube (25.0 mL) was charged with CuBr (0.7 mg, 5 mol%), (R)-DTBM-Segphos (7.1 mg, 6 mol%), PPh₃ (26 mg, 10 mol%), LiOMe (11.4 mg, 3.0 equiv), and then THF (1.0 mL) was added. The mixtures were stirred at room temperature for 10 minutes, then the HBPin (51.2 mg, 0.4 mmol, 4.0 equiv) was added successively, and the resultant mixture was stirred at room temperature for an additional 10 minutes. To the solution were added 4-Phenyl-1-butyne (0.1 mmol). The vial was removed from the glovebox and stirred at 40 °C for 48 h. After the reaction finished, the solution was pass through a short pad of silica gel and washed with DCM (2 x 10.0 mL). The yields were determined by crude NMR using dibromomethane (CH₂Br₂) as an internal standard.



Supplementary Figure 11. Intermeidate control experiments. Alkenyl-Bpin **9** and **2a** was exposed under the standard reaction conditions.

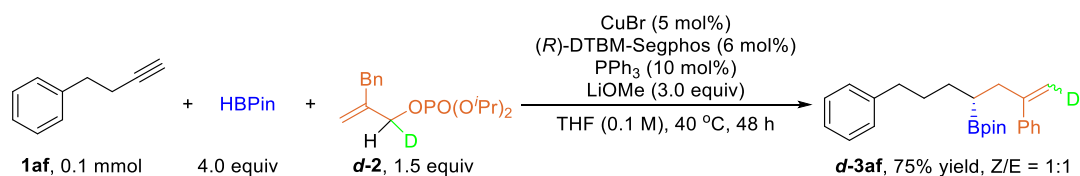
In a nitrogen-filled glovebox, a seal the tube (25.0 mL) was charged with CuBr (0.7 mg, 5 mol%), (R)-DTBM-Segphos (71 mg, 6 mol%), PPh₃ (26 mg, 10 mol%), LiOMe (11.4 mg, 3.0 equiv), and then THF (1.0 mL) was added. The mixtures were stirred at room temperature for 10 minutes. Then, to the solution were added 4,4,5,5-tetramethyl-2-(4-phenylbut-1-en-1-yl)-1,3,2-dioxaborolane (25.8 mg, 0.1 mmol) and diisopropyl (2-phenylallyl) phosphate (44.7 mg, 1.5 equiv). The vial was removed from the glovebox and stirred at 40 °C for 48 h. After the reaction finished, the solution was pass through a short pad of silica gel and washed with DCM (2 x 10.0 mL). The yield was determined by crude NMR using dibromomethane (CH₂Br₂) as an internal standard. The ee was determined by HPLC analysis using chiral stationary phases.



Supplementary Figure 12. Intermeidate control experiments. **12** and **HBPIn** was exposed under the standard reaction conditions.

In a nitrogen-filled glovebox, a seal the tube (25.0 mL) was charged with CuBr (0.7 mg, 5 mol%), (R)-DTBM-Segphos (7.1 mg, 6 mol%), PPh₃ (26 mg, 10 mol%), LiOMe (11.4 mg, 3.0 equiv), and then THF (1.0 mL) was added. The mixtures were stirred at room temperature for 10 minutes, then the HBPIn (51.2 mg, 0.4 mmol, 4.0 equiv) was added successively, and the resultant mixtures were stirred at room temperature for an additional 10 minutes. To the solution were added hepta-3,6-diene-1,6-diylidibenzene (24.8 mg, 0.1 mmol). The vial was removed from the glovebox and stirred at 40 °C for 48 h. After the reaction finished, the solution was pass through a short pad of silica gel and washed with DCM (2 x 10.0 mL).The yield was determined by crude NMR using dibromomethane (CH₂Br₂) as an internal standard.

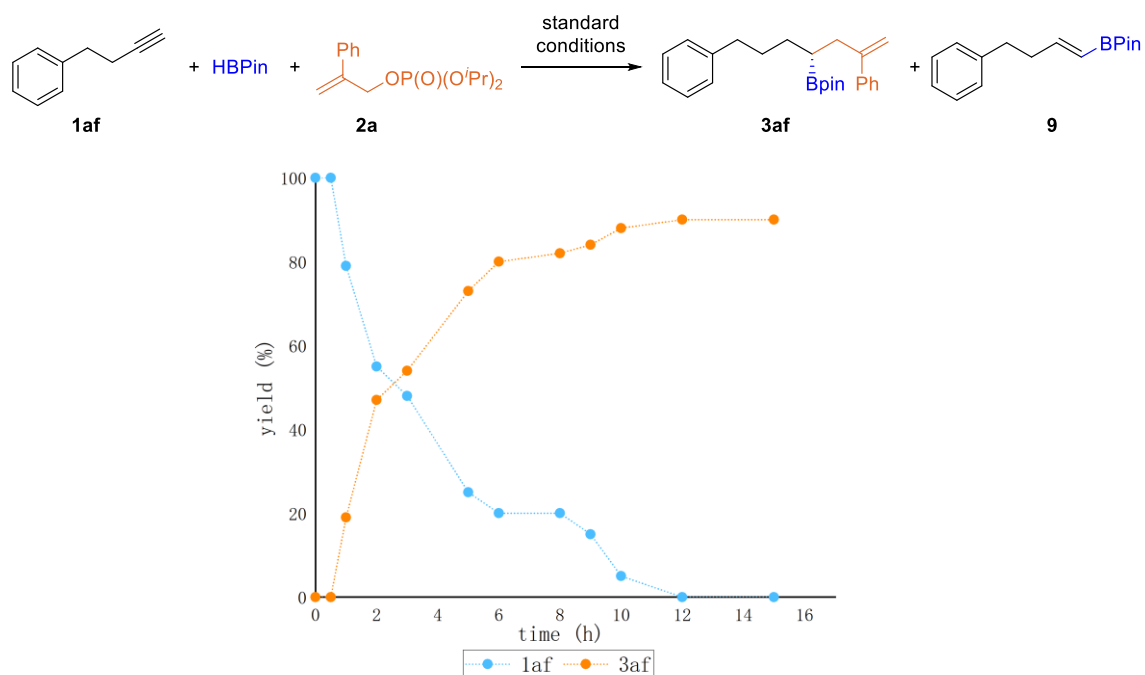
B. Isotopic labeling experiment



Supplementary Figure 13. Isotopic labeling experiment. **12**, **HBPIn** and **d-2** was exposed under the standard reaction conditions.

In a nitrogen-filled glovebox, a seal the tube (25.0 mL) was charged with CuBr (0.7 mg, 5 mol%), (R)-DTBM-Segphos (7.1 mg, 6 mol%), PPh₃ (26 mg, 10 mol%), LiOMe (11.4 mg, 3.0 equiv), and then THF (1.0 mL) was added. The mixtures were stirred at room temperature for 10 minutes, then the HBPIn (51.2 mg, 0.4 mmol, 4.0 equiv) was added successively, and the resultant mixture was stirred at room temperature for an additional 10 minutes. To the solution was added hepta-3,6-diene-1,6-diylidibenzene (24.8 mg, 0.1 mmol). The vial was removed from the glovebox and stirred at 40 °C for 48 h. After the reaction finished, the solution was pass through a short pad of silica gel and washed with DCM (2 x 10.0 mL).The yield was determined by crude NMR using dibromomethane (CH₂Br₂) as an internal standard.

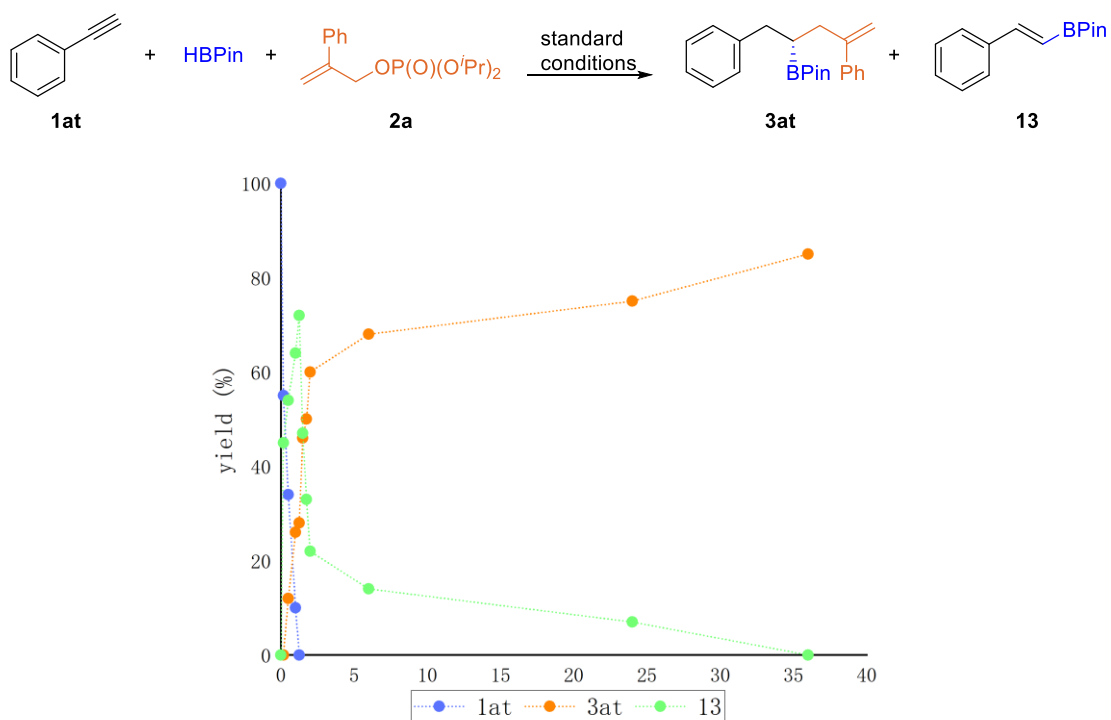
C. The time course study of aliphatic alkynes



Supplementary Figure 14. The time course study of aliphatic alkynes

time (h)	yield of 1af (%)	yield of 3af (%)
0	100	0
0.5	100	0
1	79	19
2	55	47
3	48	54
5	25	73
6	20	80
8	20	82
9	15	84
10	5	88
12	0	90
15	0	90

D. The time course study of aromatic acetylenes



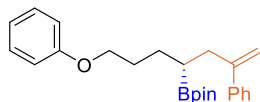
Supplementary Figure 15. The time course study of aromatic acetylenes

time (h)	yield of 1at (%)	yield of 13 (%)	yield of 3at (%)
0	100	0	0
0.17	55	45	0
0.5	34	54	12
1	10	64	26
1.25	0	72	28
1.5	0	47	46
1.75	0	33	50
2	0	22	60
6	0	14	68
24	0	7	75
36	0	0	85

3.3 Characterization of the Products

Analysis of Stereochemistry

The absolute stereochemistry was assigned by comparing the Spectra of high performance liquid chromatography of **3at** with the previous literature reports⁵.



(R)-2-(2,7-diphenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3a** as a colorless oil with 80% yield (31.4 mg).

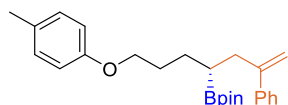
¹H NMR (500 MHz, CDCl₃) δ 7.43 – 7.37 (m, 2H), 7.31 (t, J = 7.5 Hz, 2H), 7.30 – 7.23 (m, 3H), 6.92 (t, J = 7.4 Hz, 1H), 6.90 – 6.85 (m, 2H), 5.25 (d, J = 1.5 Hz, 1H), 5.11 (d, J = 1.6 Hz, 1H), 3.92 – 3.89 (m, 2H), 2.71 (dd, J = 14.7, 8.7 Hz, 1H), 2.54 (dd, J = 14.8, 7.1 Hz, 1H), 1.82 – 1.74 (m, J = 21.8, 7.3 Hz, 2H), 1.57 (q, J = 7.6 Hz, 2H), 1.28 – 1.24 (m, 1H), 1.22 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 159.1, 148.4, 141.6, 129.3, 128.2, 127.2, 126.3, 120.4, 114.6, 112.9, 83.1, 68.0, 36.9, 28.6, 27.3, 24.9, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.28.

HRMS (ESI-TOF): calcd for C₂₅H₃₃BNaO₃⁺ ([M + Na]⁺), 415.2525; found, 415.2528.

Specific rotation [α]_D²⁵ = 28.2, (c = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 95% ee: t_R (minor) = 9.9 min, t_R (major) = 11.1 min.



(R)-4,4,5,5-tetramethyl-2-(2-phenyl-7-(p-tolyloxy)hept-1-en-4-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3b** as a colorless oil with 56% yield (22.8 mg).

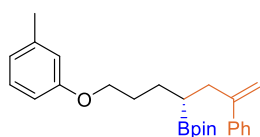
¹H NMR (500 MHz, CDCl₃) δ 7.43 – 7.35 (m, 2H), 7.29 (t, J = 7.5 Hz, 2H), 7.24 – 7.22 (m, 1H), 7.05 (d, J = 8.2 Hz, 2H), 6.76 (d, J = 8.5 Hz, 2H), 5.23 (d, J = 1.5 Hz, 1H), 5.09 (d, J = 1.5 Hz, 1H), 3.87 – 73.84 (m, 2H), 2.69 (dd, J = 14.8, 8.7 Hz, 1H), 2.53 (dd, J = 14.8, 7.1 Hz, 1H), 2.27 (s, 3H), 1.82 – 1.69 (m, 2H), 1.55 (q, J = 7.7 Hz, 2H), 1.26 – 1.23 (m, 1H), 1.21 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 156.9, 148.3, 141.5, 129.8, 129.5, 128.2, 127.2, 126.3, 114.4, 112.9, 83.0, 68.1, 36.8, 28.6, 27.3, 24.8, 24.8, 20.4.

¹¹B NMR (193 MHz, CDCl₃) δ 34.36.

HRMS (ESI-TOF): calcd for C₂₆H₃₅BNaO₃⁺ ([M + Na]⁺), 429.2679; found, 429.2680.

Specific rotation [α]_D²⁵ = 10.9, (c = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AS-H, Hexane/IPA = 95/5, 1 mL/min, 254 nm) indicated 94% ee: t_R (major) = 7.7 min, t_R (minor) = 12.0 min.



(R)-4,4,5,5-tetramethyl-2-(2-phenyl-7-(m-tolyloxy)hept-1-en-4-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3c** as a colorless oil with 57% yield (23.2 mg).

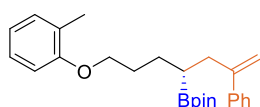
¹H NMR (500 MHz, CDCl₃) δ 7.41 – 7.37 (m, 2H), 7.30 (t, *J* = 7.4 Hz, 2H), 7.25 – 7.22 (d, *J* = 6.9 Hz, 1H), 7.14 (t, *J* = 7.7 Hz, 1H), 6.73 (d, *J* = 7.6 Hz, 1H), 6.71 – 6.64 (m, 2H), 5.24 (d, *J* = 1.5 Hz, 1H), 5.10 (d, *J* = 1.0 Hz, 1H), 3.89 – 3.86 (m, 2H), 2.70 (dd, *J* = 14.7, 8.6 Hz, 1H), 2.53 (dd, *J* = 14.7, 7.1 Hz, 1H), 2.32 (s, 3H), 1.83 – 1.69 (m, 2H), 1.62 – 1.49 (m, 2H), 1.27 – 1.23 (m, 1H), 1.21 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 159.1, 148.4, 141.6, 139.3, 129.1, 128.2, 127.2, 126.3, 121.2, 115.4, 112.9, 111.4, 83.1, 67.9, 36.8, 28.6, 27.3, 24.8, 24.8, 21.5.

¹¹B NMR (193 MHz, CDCl₃) δ 34.31.

HRMS (ESI-TOF): calcd for C₂₆H₃₅BNaO₃⁺ ([M + Na]⁺), 429.2679; found, 429.2681.

Specific rotation [α]_D²⁵ = 45., (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AS-H, Hexane/IPA = 95/5, 1 mL/min, 254 nm) indicated 96% ee: *t*_R (major) = 7.7 min, *t*_R (minor) = 8.7 min.



(R)-4,4,5,5-tetramethyl-2-(2-phenyl-7-(o-tolyloxy)hept-1-en-4-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3d** as a colorless oil with 64% yield (26.0 mg).

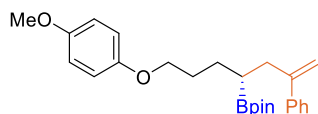
¹H NMR (500 MHz, CDCl₃) δ 7.42 – 7.36 (m, 2H), 7.33 – 7.27 (m, 2H), 7.23 (d, *J* = 7.4 Hz, 1H), 7.16 – 7.07 (m, 2H), 6.84 – 6.81 (m, 1H), 6.78 – 6.74 (m, 1H), 5.24 (d, *J* = 1.5 Hz, 1H), 5.09 (d, *J* = 1.4 Hz, 1H), 3.92 – 3.89 (m, 2H), 2.71 (dd, *J* = 14.6, 8.8 Hz, 1H), 2.53 (dd, *J* = 14.8, 7.2 Hz, 1H), 2.21 (s, 3H), 1.90 – 1.67 (m, 2H), 1.65 – 1.52 (m, 2H), 1.25 (d, *J* = 2.0 Hz, 1H), 1.21 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 157.2, 148.4, 141.6, 130.5, 128.2, 127.2, 126.8, 126.6, 126.3, 120.0, 112.8, 110.9, 83.0, 67.9, 36.8, 28.8, 27.4, 24.8, 24.8, 16.2.

¹¹B NMR (193 MHz, CDCl₃) δ 34.33.

HRMS (ESI-TOF): calcd for C₂₆H₃₅BNaO₃⁺ ([M + Na]⁺), 429.2679; found, 429.2680.

Specific rotation [α]_D²⁵ = 55.3, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 95/5, 1 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 28.7 min, *t*_R (major) = 43.7 min.



(R)-2-(7-(4-methoxyphenoxy)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3e** as a colorless oil with 90% yield (38.0 mg).

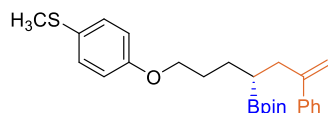
¹H NMR (500 MHz, CDCl₃) δ 7.39 – 7.37 (m, 2H), 7.32 – 7.27 (m, 2H), 7.25 – 7.22 (m, 1H), 6.84 – 6.80 (m, 4H), 5.24 (s, 1H), 5.09 (s, 1H), 3.86 – 3.83 (m, 2H), 3.76 (s, 3H), 2.69 (dd, *J* = 14.7, 8.7 Hz, 1H), 2.52 (dd, *J* = 14.7, 7.1 Hz, 1H), 1.82 – 1.67 (m, 2H), 1.54 (q, *J* = 7.7 Hz, 2H), 1.29 – 1.24 (m, 1H), 1.21 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 153.6, 153.2, 148.4, 141.6, 128.2, 127.2, 126.3, 115.5, 114.6, 112.9, 83.1, 68.7, 55.8, 36.9, 28.7, 27.3, 24.8 (d, *J* = 10.5 Hz).

¹¹B NMR (193 MHz, CDCl₃) δ 34.04.

HRMS (ESI-TOF): calcd for $C_{26}H_{35}BNaO_4^+$ ($[M + Na]^+$), 445.2628; found, 445.2629.

Specific rotation $[\alpha]_D^{25} = 24.1$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 92% ee: t_R (minor) = 17.2 min, t_R (major) = 18.5 min.



(R)-4,4,5,5-tetramethyl-2-(7-(4-(methylthio)phenoxy)-2-phenylhept-1-en-4-yl)1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3f** as a colorless oil with 91% yield (39.9 mg).

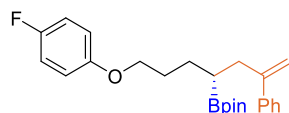
1H NMR (500 MHz, $CDCl_3$) δ 7.41 – 7.36 (m, 2H), 7.29 (t, $J = 7.4$ Hz, 2H), 7.26 – 7.23 (m, 3H), 6.83 – 6.77 (m, 2H), 5.24 (d, $J = 1.5$ Hz, 1H), 5.09 (d, $J = 1.5$ Hz, 1H), 3.88 – 3.85 (m, 2H), 2.69 (dd, $J = 14.7$, 8.6 Hz, 1H), 2.52 (dd, $J = 14.7$, 7.2 Hz, 1H), 2.43 (s, 3H), 1.89 – 1.65 (m, 2H), 1.54 (q, $J = 7.7$ Hz, 2H), 1.25 – 1.23 (m, 1H), 1.21 (s, 12H).

^{13}C NMR (151 MHz, $CDCl_3$) δ 157.7, 148.3, 141.5, 130.2, 128.3, 128.2, 127.2, 126.3, 115.2, 112.9, 83.1, 68.2, 36.8, 28.5, 27.2, 24.8, 24.8, 18.2.

^{11}B NMR (193 MHz, $CDCl_3$) δ 34.32.

HRMS (ESI-TOF): calcd for $C_{26}H_{35}BNaO_3S^+$ ($[M + Na]^+$), 461.2400; found, 461.2403.

Specific rotation $[\alpha]_D^{25} = -10.0$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1 mL/min, 254 nm) indicated 95% ee: t_R (minor) = 14.2 min, t_R (major) = 15.2 min.



(R)-2-(7-(4-fluorophenoxy)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3g** as a colorless oil with 70% yield (36.9 mg).

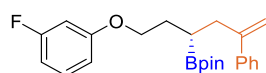
1H NMR (600 MHz, $CDCl_3$) δ 7.42 – 7.35 (m, 2H), 7.29 (t, $J = 7.5$ Hz, 2H), 7.24 (t, $J = 7.3$ Hz, 1H), 6.94 (t, $J = 8.7$ Hz, 2H), 6.79 – 6.77 (m, 2H), 5.24 (s, 1H), 5.09 (s, 1H), 3.86 – 3.83 (m, 2H), 2.70 (dd, $J = 14.7$, 8.6 Hz, 1H), 2.52 (dd, $J = 14.7$, 7.2 Hz, 1H), 1.86 – 1.66 (m, 2H), 1.60 – 1.50 (m, 2H), 1.27 – 1.22 (m, 1H), 1.21 (s, 12H).

^{13}C NMR (151 MHz, $CDCl_3$) δ 157.8, 156.3, 155.1, 148.3, 141.5, 128.2, 127.2, 126.3, 115.7, 115.5, 115.4 (d, $J = 7.8$ Hz), 112.9, 83.1, 68.6, 36.8, 28.5, 27.2, 24.9, 24.8.

^{11}B NMR (193 MHz, $CDCl_3$) δ 34.27.

HRMS (ESI-TOF): calcd for $C_{25}H_{32}BFNaO_3^+$ ($[M + Na]^+$), 433.2429; found, 433.2431.

Specific rotation $[\alpha]_D^{25} = -16.9$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 91% ee: t_R (minor) = 18.1 min, t_R (major) = 19.8 min.



(R)-2-(7-(3-fluorophenoxy)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3h** as

a colorless oil with 80% yield (31.7 mg).

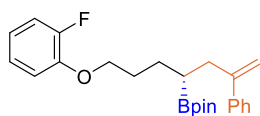
¹H NMR (500 MHz, CDCl₃) δ 7.38 (d, *J* = 7.2 Hz, 2H), 7.29 (t, *J* = 7.4 Hz, 2H), 7.25 (d, *J* = 8.4 Hz, 1H), 7.18 (q, *J* = 8.2 Hz, 1H), 6.64 – 6.60 (m, 2H), 6.58 – 6.55 (m, 1H), 5.24 (s, 1H), 5.09 (s, 1H), 3.90 – 3.83 (m, 2H), 2.70 (dd, *J* = 14.6, 8.5 Hz, 1H), 2.52 (dd, *J* = 14.7, 7.3 Hz, 1H), 1.84 – 1.68 (m, 2H), 1.54 (q, *J* = 7.8 Hz, 2H), 1.27 – 1.21 (m, 13H).

¹³C NMR (151 MHz, CDCl₃) δ 164.4, 162.8, 160.5 (d, *J* = 10.9 Hz), 148.3, 141.5, 130.0 (d, *J* = 9.9 Hz), 128.2, 127.2, 126.3, 112.9, 110.4 (d, *J* = 2.8 Hz), 107.1 (d, *J* = 21.4 Hz), 102.1 (d, *J* = 24.8 Hz), 83.1, 68.3, 36.8, 28.4, 27.1, 24.9, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.03.

HRMS (ESI-TOF): calcd for C₂₅H₃₂BFNaO₃⁺ ([M + Na]⁺), 433.2429; found, 433.2430.

Specific rotation [α]_D²⁵ = 37.3, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 9.9 min, *t*_R (major) = 11.3 min.



(R)-2-(1-(2-fluorophenoxy)-5-phenylhex-5-en-3-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3i** as a colorless oil with 74% yield (29.3 mg).

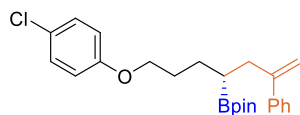
¹H NMR (600 MHz, CDCl₃) δ 7.40 – 7.37 (m, 2H), 7.31 – 7.28 (m, 2H), 7.26 – 7.22 (m, 1H), 7.07 – 7.03 (m, 1H), 7.02 – 7.00 (m, 1H), 6.92 – 6.89 (m, 1H), 6.87 – 6.84 (m, 1H), 5.23 (d, *J* = 1.3 Hz, 1H), 5.09 (d, *J* = 1.3 Hz, 1H), 3.99 – 3.93 (m, 1H), 2.70 (dd, *J* = 14.6, 8.5 Hz, 1H), 2.52 (dd, *J* = 14.7, 7.2 Hz, 1H), 1.91 – 1.71 (m, 2H), 1.61 – 1.52 (m, 2H), 1.26 – 1.20 (m, 13H).

¹³C NMR (151 MHz, CDCl₃) δ 153.6, 152.0, 148.3, 147.1 (d, *J* = 10.4 Hz), 141.5, 128.2, 127.2, 126.3, 124.1 (d, *J* = 3.9 Hz), 120.7 (d, *J* = 6.9 Hz), 116.1, 116.0, 115.0, 112.9, 83.1, 69.4, 36.8, 28.5, 27.0, 24.8 (d, *J* = 10.6 Hz).

¹¹B NMR (193 MHz, CDCl₃) δ 33.80.

HRMS (ESI-TOF): calcd for C₂₅H₃₂BFNaO₃⁺ ([M + Na]⁺), 433.2429; found, 433.2432.

Specific rotation [α]_D²⁵ = 13.6, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 92/8, 1.0 mL/min, 254 nm) indicated 95% ee: *t*_R (minor) = 13.3 min, *t*_R (major) = 15.3 min.



(R)-2-(7-(4-chlorophenoxy)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3j** as a colorless oil with 58% yield (24.8 mg).

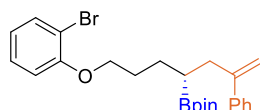
¹H NMR (500 MHz, CDCl₃) δ 7.42 – 7.35 (m, 2H), 7.31 – 7.28 (m, 2H), 7.23 (d, *J* = 7.3 Hz, 1H), 7.22 – 7.17 (m, 2H), 6.82 – 6.74 (m, 2H), 5.24 (d, *J* = 1.5 Hz, 1H), 5.09 (d, *J* = 1.5 Hz, 1H), 3.86 – 3.83 (m, 2H), 2.70 (dd, *J* = 14.8, 8.6 Hz, 1H), 2.52 (dd, *J* = 14.7, 7.2 Hz, 1H), 1.80 – 1.68 (m, 2H), 1.54 (q, *J* = 7.7 Hz, 2H), 1.24 – 1.23 (m, 1H), 1.21 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 157.6, 148.3, 141.5, 129.2, 128.2, 127.2, 126.3, 125.2, 115.8, 112.9, 83.1, 68.3, 36.8, 28.4, 27.1, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.37.

HRMS (ESI-TOF): calcd for C₂₅H₃₂BClNaO₃⁺ ([M + Na]⁺), 449.2133; found, 449.2135.

Specific rotation [α]_D²⁵ = 23.9, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 92/8, 1 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 12.3 min, *t*_R (major) = 13.1 min.



(R)-2-(7-(2-bromophenoxy)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3k** as a colorless oil with 56% yield (26.4 mg).

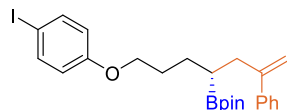
¹H NMR (600 MHz, CDCl₃) δ 7.51 (dd, *J* = 7.8, 1.6 Hz, 1H), 7.41 – 7.37 (m, 2H), 7.31 – 7.27 (m, 2H), 7.25 – 7.19 (m, 2H), 6.85 – 6.77 (m, 2H), 5.24 (d, *J* = 1.5 Hz, 1H), 5.09 (d, *J* = 1.2 Hz, 1H), 3.98 – 3.94 (m, 1H), 2.71 (dd, *J* = 14.9, 8.7 Hz, 1H), 2.53 (dd, *J* = 14.7, 7.2 Hz, 1H), 1.93 – 1.72 (m, 2H), 1.66 – 1.52 (m, 2H), 1.26 – 1.23 (m, 1H), 1.21 (d, *J* = 1.8 Hz, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 155.4, 148.3, 141.5, 133.2, 128.3, 128.2, 127.2, 126.3, 121.5, 113.2, 112.9, 112.3, 83.1, 69.1, 36.8, 28.4, 27.2, 24.8, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.22.

HRMS (ESI-TOF): calcd for C₂₅H₃₂BBrNaO₃⁺ ([M + Na]⁺), 493.1628; found, 493.1629.

Specific rotation [α]_D²⁵ = -9.4, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 95/5, 1 mL/min, 254 nm) indicated 93% ee: *t*_R (minor) = 38.7 min, *t*_R (major) = 56.9 min



(R)-2-(7-(4-iodophenoxy)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3l** as a colorless oil with 58% yield (30.1 mg).

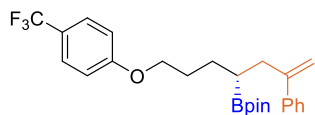
¹H NMR (600 MHz, CDCl₃) δ 7.54 – 7.49 (m, 2H), 7.40 – 7.35 (m, 2H), 7.32 – 7.27 (m, 2H), 7.25 – 7.22 (m, 1H), 6.65 – 6.60 (m, 2H), 5.23 (d, *J* = 1.5 Hz, 1H), 5.08 (d, *J* = 1.5 Hz, 1H), 3.85 – 3.82 (m, 2H), 2.70 (dd, *J* = 14.7, 8.5 Hz, 1H), 2.51 (dd, *J* = 14.7, 7.2 Hz, 1H), 1.84 – 1.67 (m, 2H), 1.55 – 1.50 (m, 2H), 1.25 – 1.23 (m, 1H), 1.21 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 158.9, 148.3, 141.5, 138.1, 128.2, 127.2, 126.3, 117.0, 112.9, 83.1, 82.3, 68.1, 36.8, 28.4, 27.1, 24.9, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.19.

HRMS (ESI-TOF): calcd for C₂₅H₃₂BIaNaO₃⁺ ([M + Na]⁺), 541.1489; found, 541.1487.

Specific rotation [α]_D²⁵ = 8.4, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 11.2 min, *t*_R (major) = 11.9 min



(R)-4,4,5,5-tetramethyl-2-(2-phenyl-7-(4-(trifluoromethyl)phenoxy)hept-1-en-4-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3m** as a colorless oil with 77% yield (35.4 mg).

¹H NMR (500 MHz, CDCl₃) δ 7.51 (d, *J* = 8.6 Hz, 2H), 7.41 – 7.36 (m, 2H), 7.32 – 7.27 (m, 2H), 7.25 – 7.22 (m, 1H), 6.90 (d, *J* = 8.5 Hz, 2H), 5.24 (d, *J* = 1.3 Hz, 1H), 5.09 (d, *J* = 1.0 Hz, 1H), 3.96 – 3.89 (m, 2H), 2.71 (dd, *J* = 14.7, 8.4 Hz, 1H), 2.51 (dd, *J* = 14.7, 7.3 Hz, 1H), 1.94 – 1.65 (m, 2H), 1.58 – 1.53 (m, 2H), 1.25 – 1.24 (m, 1H), 1.21 (s, 12H).

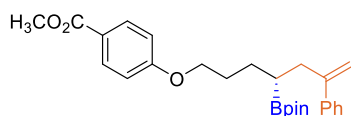
¹³C NMR (151 MHz, CDCl₃) δ 161.5, 148.3, 141.5, 128.2, 127.2, 126.8 (q, *J* = 3.6 Hz), 126.3, 114.5, 113.0, 83.1, 68.2, 36.8, 28.3, 27.1, 24.8, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.38.

¹⁹F NMR (565 MHz, CDCl₃) δ -61.42.

HRMS (ESI-TOF): calcd for C₂₆H₃₂BF₃NaO₃⁺ ([M + Na]⁺), 483.2397; found, 483.2399.

Specific rotation [α]_D²⁵ = -6.6, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 95/5, 1 mL/min, 254 nm) indicated 97% ee: *t*_R (minor) = 11.2 min, *t*_R (major) = 11.7 min



(R)-4-((6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl)oxy)benzoate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3n** as a colorless oil with 90% yield (40.5 mg).

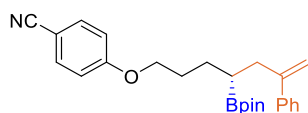
¹H NMR (500 MHz, CDCl₃) δ 7.96 (d, *J* = 8.8 Hz, 2H), 7.41 – 7.35 (m, 2H), 7.32 – 7.27 (m, 2H), 7.26 – 7.21 (m, 1H), 6.89 – 6.84 (m, 2H), 5.24 (d, *J* = 1.5 Hz, 1H), 5.09 (d, *J* = 1.6 Hz, 1H), 3.96 – 3.92 (m, 2H), 3.88 (s, 3H), 2.71 (dd, *J* = 14.7, 8.4 Hz, 1H), 2.52 (dd, *J* = 14.8, 7.3 Hz, 1H), 1.91 – 1.68 (m, 2H), 1.59 – 1.53 (m, 2H), 1.26 – 1.24 (m, 1H), 1.21 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 166.9, 162.9, 148.3, 141.5, 131.5, 128.2, 127.2, 126.3, 122.2, 114.1, 113.0, 83.1, 68.2, 51.8, 36.8, 28.4, 27.1, 24.9, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.42.

HRMS (ESI-TOF): calcd for C₂₇H₃₅BNaO₅⁺ ([M + Na]⁺), 473.2578; found, 473.2579.

Specific rotation [α]_D²⁵ = 9.4, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1 mL/min, 254 nm) indicated 95% ee: *t*_R (minor) = 26.6 min, *t*_R (major) = 30.9 min



(R)-4-((6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl)oxy)benzonitrile

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3o** as a colorless oil with 56% yield (23.4 mg).

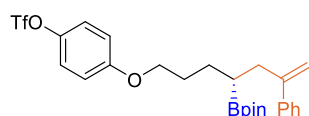
¹H NMR (500 MHz, CDCl₃) δ 7.60 – 7.53 (m, 2H), 7.41 – 7.35 (m, 2H), 7.33 – 7.27 (m, 2H), 7.26 – 7.21 (m, 1H), 6.93 – 6.85 (m, 2H), 5.24 (d, *J* = 1.3 Hz, 1H), 5.08 (d, *J* = 1.5 Hz, 1H), 3.96 – 3.89 (m, 2H), 2.71 (dd, *J* = 14.7, 8.3 Hz, 1H), 2.51 (dd, *J* = 14.7, 7.4 Hz, 1H), 1.91 – 1.67 (m, 2H), 1.57 – 1.52 (m, 2H), 1.27 – 1.20 (m, 13H).

¹³C NMR (151 MHz, CDCl₃) δ 162.4, 148.2, 141.4, 133.9, 128.2, 127.2, 126.3, 119.3, 115.2, 113.0, 103.5, 83.1, 68.4, 36.8, 28.2, 27.0, 24.8, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.30.

HRMS (ESI-TOF): calcd for C₂₆H₃₂BNaO₃⁺ ([M + Na]⁺), 440.2475; found, 440.2477.

Specific rotation [α]_D²⁵ = -59.8 (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IF, Hexane/IPA = 97/3, 1 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 31.1 min, *t*_R (major) = 33.8 min



(R)-4-((6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl)oxy)phenyl trifluoromethanesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3p** as a colorless oil with 80% yield (43.2 mg).

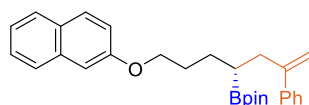
¹H NMR (500 MHz, CDCl₃) δ 7.40 – 7.35 (m, 2H), 7.32 – 7.26 (m, 2H), 7.26 – 7.21 (m, 1H), 7.18 – 7.12 (m, 2H), 6.90 – 6.82 (m, 2H), 5.24 (d, *J* = 1.5 Hz, 1H), 5.08 (d, *J* = 1.0 Hz, 1H), 3.91 – 3.84 (m, 2H), 2.71 (d, *J* = 14.7, 8.5 Hz, 1H), 2.51 (dd, *J* = 14.7, 7.3 Hz, 1H), 1.91 – 1.64 (m, 2H), 1.57 – 1.52 (m, 2H), 1.27 – 1.23 (m, 1H), 1.21 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 158.6, 148.3, 142.8, 141.5, 128.2, 127.2, 126.3, 122.20, 115.6, 113.0, 83.1, 68.6, 36.8, 28.4, 27.1, 24.8 (d, *J* = 12.2 Hz).

¹¹B NMR (193 MHz, CDCl₃) δ 34.40.

HRMS (ESI-TOF): calcd for C₂₆H₃₂BF₃NaO₆S⁺ ([M + Na]⁺), 563.1965; found, 563.1967.

Specific rotation [α]_D²⁵ = -27.1, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1 mL/min, 254 nm) indicated 95% ee: *t*_R (minor) = 31.1 min, *t*_R (major) = 33.8 min



(R)-4,4,5,5-tetramethyl-2-(7-(naphthalen-2-yloxy)-2-phenylhept-1-en-4-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3q** as a colorless oil with 60% yield (26.5 mg).

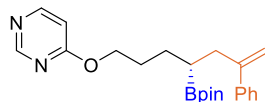
¹H NMR (500 MHz, CDCl₃) δ 7.76 – 7.69 (m, 3H), 7.43 – 7.38 (m, 3H), 7.33 – 7.27 (m, 3H), 7.25 – 7.22 (m, 1H), 7.12 (dd, *J* = 8.9, 2.5 Hz, 1H), 7.08 (d, *J* = 2.5 Hz, 1H), 5.24 (d, *J* = 1.5 Hz, 1H), 5.10 (d, *J* = 1.5 Hz, 1H), 4.03 – 3.99 (m, 2H), 2.72 (dd, *J* = 14.7, 8.6 Hz, 1H), 2.55 (dd, *J* = 14.7, 7.2 Hz, 1H), 2.00 – 1.72 (m, 2H), 1.61 (q, *J* = 7.7 Hz, 2H), 1.28 – 1.24 (m, 1H), 1.21 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 157.0, 148.3, 141.5, 134.6, 129.2, 128.8, 128.2, 127.6, 127.2, 126.7, 126.3, 126.2, 123.4, 119.1, 112.9, 106.5, 83.1, 68.0, 36.8, 28.5, 27.3, 24.9, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.34.

HRMS (ESI-TOF): calcd for C₂₉H₃₅BNaO₃⁺ ([M + Na]⁺), 465.2679; found, 465.2680.

Specific rotation $[\alpha]_{\text{D}}^{25} = 18.6$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (AS-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 94% ee: t_{R} (minor) = 11.9 min, t_{R} (major) = 15.2 min



(R)-4-((6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl)oxy)pyrimidine

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3r** as a colorless oil with 83% yield (32.7 mg).

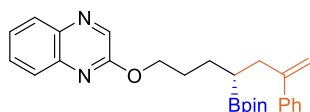
^1H NMR (500 MHz, CDCl_3) δ 8.73 (s, 1H), 8.39 (d, $J = 5.7$ Hz, 1H), 7.38 (d, $J = 7.4$ Hz, 2H), 7.29 (t, $J = 7.4$ Hz, 2H), 7.23 (t, $J = 7.3$ Hz, 1H), 6.71 – 6.65 (m, 1H), 5.23 (s, 1H), 5.08 (s, 1H), 4.32 – 4.28 (m, 2H), 2.69 (dd, $J = 14.6$, 8.6 Hz, 1H), 2.51 (dd, $J = 14.6$, 7.1 Hz, 1H), 1.85 – 1.51 (m, 2H), 1.56 – 1.51 (m, 2H), 1.27 – 1.21 (m, 13H).

^{13}C NMR (151 MHz, CDCl_3) δ 169.0, 158.4, 156.8, 148.3, 141.5, 128.2, 127.2, 126.3, 112.9, 108.7, 83.1, 66.8, 36.8, 28.0, 27.2, 24.8, 24.8.

^{11}B NMR (193 MHz, CDCl_3) δ 34.30.

HRMS (ESI-TOF): calcd for $\text{C}_{23}\text{H}_{31}\text{BN}_2\text{O}_3^+$ ($[\text{M} + \text{Na}]^+$), 417.2428; found, 417.2429.

Specific rotation $[\alpha]_{\text{D}}^{25} = 25.4$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 85/15, 1 mL/min, 254 nm) indicated 94% ee: t_{R} (minor) = 15.8 min, t_{R} (major) = 17.2 min



(R)-2-((6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl)oxy)quinoxaline

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3s** as a colorless oil with 62% yield (27.5 mg).

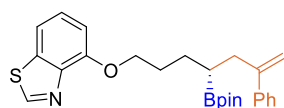
^1H NMR (500 MHz, CDCl_3) δ 8.33 (s, 1H), 7.90 (d, $J = 8.2$ Hz, 1H), 7.70 (d, $J = 8.3$ Hz, 1H), 7.55 (t, $J = 7.6$ Hz, 1H), 7.44 (t, $J = 7.6$ Hz, 1H), 7.29 (d, $J = 7.5$ Hz, 2H), 7.21 – 7.15 (m, 2H), 7.12 (t, $J = 7.3$ Hz, 1H), 5.15 (s, 1H), 5.00 (s, 1H), 4.32 (t, $J = 6.6$ Hz, 2H), 2.62 (dd, $J = 14.7$, 8.5 Hz, 1H), 2.45 (dd, $J = 14.8$, 7.1 Hz, 1H), 1.84 – 1.67 (m, 2H), 1.51 (q, $J = 7.7$ Hz, 2H), 1.22 – 1.45 (m, 1H), 1.11 (s, 12H).

^{13}C NMR (151 MHz, CDCl_3) δ 157.5, 148.3, 141.5, 140.5, 139.9, 138.7, 129.9, 128.9, 128.2, 127.2, 127.1, 126.3, 112.9, 83.1, 66.7, 36.8, 28.0, 27.3, 24.8, 24.8.

^{11}B NMR (193 MHz, CDCl_3) δ 34.28.

HRMS (ESI-TOF): calcd for $\text{C}_{27}\text{H}_{33}\text{BN}_2\text{O}_3^+$ ($[\text{M} + \text{Na}]^+$), 467.2584; found, 467.2586.

Specific rotation $[\alpha]_{\text{D}}^{25} = 8.2$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 85/15, 1 mL/min, 254 nm) indicated 94% ee: t_{R} (minor) = 21.3 min, t_{R} (major) = 23.5 min



(R)-7-((6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl)oxy)benzo[d]thiazole

ole

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3t** as a colorless oil with 70% yield (31.5 mg).

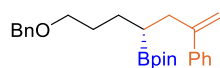
¹H NMR (500 MHz, CDCl₃) δ 8.89 (s, 1H), 7.49 (d, *J* = 8.0 Hz, 1H), 7.38 (d, *J* = 7.5 Hz, 2H), 7.33 (t, *J* = 8.0 Hz, 1H), 7.28 (t, *J* = 7.5 Hz, 2H), 7.22 (t, *J* = 7.2 Hz, 1H), 6.88 (d, *J* = 7.9 Hz, 1H), 5.23 (s, 1H), 5.09 (s, 1H), 4.18 – 4.14 (m, 2H), 2.70 (dd, *J* = 14.7, 8.7 Hz, 1H), 2.55 (dd, *J* = 14.7, 7.2 Hz, 1H), 2.05 – 1.90 (m, 2H), 1.68 – 1.54 (m, 2H), 1.30 – 1.24 (m, 1H), 1.20 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 153.4, 152.0, 148.3, 143.7, 141.5, 135.5, 128.1, 127.1, 126.5, 126.3, 113.4, 112.9, 107.7, 83.0, 69.1, 36.8, 28.3, 27.0, 24.8, 24.7.

¹¹B NMR (193 MHz, CDCl₃) δ 34.20.

HRMS (ESI-TOF): calcd for C₂₆H₃₂BNO₃S⁺ ([M + Na]⁺), 472.2196; found, 472.2197.

Specific rotation [α]_D²⁵ = 10.3, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 85/15, 1 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 14.7 min, *t*_R (major) = 17.1 min



(R)-2-(7-(benzyloxy)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3u** as a colorless oil with 60% yield (24.4 mg).

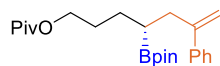
¹H NMR (500 MHz, CDCl₃) δ 7.41 – 7.36 (m, 2H), 7.35 – 7.30 (m, 4H), 7.30 – 7.27 (m, 3H), 7.23 (t, *J* = 7.2 Hz, 1H), 5.23 (d, *J* = 1.5 Hz, 1H), 5.08 (d, *J* = 1.0 Hz, 2H), 4.46 (s, 2H), 3.42 (t, *J* = 6.7 Hz, 2H), 2.66 (dd, *J* = 14.7, 8.9 Hz, 1H), 2.51 (dd, *J* = 14.8, 6.9 Hz, 1H), 1.73 – 1.57 (m, 2H), 1.53 – 1.39 (m, 3H), 1.20 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 166.6, 148.4, 141.6, 132.7, 130.5, 129.5, 128.2, 128.2, 127.2, 126.3, 112.8, 83.0, 65.0, 36.9, 30.7, 29.0, 25.5, 24.8, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.37.

HRMS (ESI-TOF): calcd for C₂₆H₃₅BO₃⁺ ([M + Na]⁺), 429.2679; found, 429.2680.

Specific rotation [α]_D²⁵ = -14.9, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1 mL/min, 254 nm) indicated 93% ee: *t*_R (minor) = 23.8 min, *t*_R (major) = 27.3 min



(R)-5-phenyl-3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hex-5-en-1-yl pivalate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3v** as a colorless oil with 60% yield (23.2 mg).

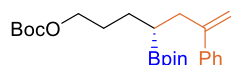
¹H NMR (500 MHz, CDCl₃) δ 7.41 – 7.35 (m, 2H), 7.34 – 7.28 (m, 2H), 7.26 – 7.21 (m, 1H), 5.24 (d, *J* = 1.5 Hz, 1H), 5.08 (d, *J* = 1.6 Hz, 1H), 4.01 – 3.98 (m, 2H), 2.68 (dd, *J* = 14.7, 8.5 Hz, 1H), 2.49 (dd, *J* = 14.7, 7.2 Hz, 1H), 1.73 – 1.51 (m, 2H), 1.46 (q, *J* = 7.6 Hz, 2H), 1.26 – 1.23 (m, 1H), 1.21 (s, 12H), 1.18 (s, 9H).

¹³C NMR (151 MHz, CDCl₃) δ 178.5, 148.3, 141.5, 128.2, 127.2, 126.3, 112.8, 83.0, 64.5, 38.7, 36.8, 28.1, 27.3, 27.2, 24.8, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.35.

HRMS (ESI-TOF): calcd for $C_{24}H_{37}BO_4^+$ ($[M + Na]^+$), 423.2785; found, 423.2788.

Specific rotation $[\alpha]_D^{25} = -12.4$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 95/5, 1 mL/min, 254 nm) indicated 92% ee: t_R (minor) = 13.9 min, t_R (major) = 14.9 min



(R)-tert-butyl-(7-phenyl-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oct-7-en-1-yl) carbonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3w** as a colorless oil with 66% yield (28.4 mg).

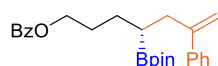
1H NMR (500 MHz, $CDCl_3$) δ 7.40 – 7.35 (m, 2H), 7.30 (t, $J = 7.5$ Hz, 3H), 7.26 – 7.22 (m, 1H), 5.23 (d, $J = 1.5$ Hz, 1H), 5.07 (d, $J = 1.6$ Hz, 1H), 4.02 – 3.98 (m, 2H), 2.66 (dd, $J = 14.7, 8.8$ Hz, 1H), 2.50 (dd, $J = 14.7, 6.9$ Hz, 1H), 1.77 – 1.54 (m, 2H), 1.50 – 1.43 (m, 11H), 1.24 – 1.20 (13H).

^{13}C NMR (151 MHz, $CDCl_3$) δ 153.6, 148.3, 141.5, 128.2, 127.2, 126.3, 112.9, 83.1, 81.7, 67.3, 36.8, 28.1, 27.8, 27.1, 24.8, 24.8.

^{11}B NMR (193 MHz, $CDCl_3$) δ 36.98.

HRMS (ESI-TOF): calcd for $C_{24}H_{37}BO_5^+$ ($[M + Na]^+$), 439.2734; found, 439.2736.

Specific rotation $[\alpha]_D^{25} = -9.7$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 95/5, 1 mL/min, 254 nm) indicated 94% ee: t_R (minor) = 11.9 min, t_R (major) = 12.6 min



(R)-5-phenyl-3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hex-5-en-1-yl benzoate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3x** as a colorless oil with 75% yield (30.5 mg).

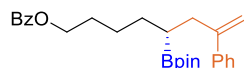
1H NMR (500 MHz, $CDCl_3$) δ 8.08 – 7.96 (m, 2H), 7.60 – 7.49 (m, 1H), 7.43 (t, $J = 7.8$ Hz, 2H), 7.39 – 7.37 (m, 2H), 7.32 – 7.27 (m, 2H), 7.25 – 7.21 (m, 1H), 5.23 (d, $J = 1.5$ Hz, 1H), 5.09 (d, $J = 1.0$ Hz, 2H), 4.26 (t, $J = 6.5$ Hz, 2H), 2.71 (dd, $J = 14.8, 8.4$ Hz, 1H), 2.52 (dd, $J = 14.7, 7.4$ Hz, 1H), 1.89 – 1.65 (m, 2H), 1.56 (q, $J = 8.0$ Hz, 2H), 1.27 – 1.23 (m, 1H), 1.21 (s, 12H).

^{13}C NMR (151 MHz, $CDCl_3$) δ 166.6, 148.3, 141.5, 132.7, 130.6, 129.6, 128.3, 128.2, 127.2, 126.3, 112.9, 83.1, 65.2, 36.8, 28.1, 27.3, 24.9, 24.8.

^{11}B NMR (193 MHz, $CDCl_3$) δ 33.24.

HRMS (ESI-TOF): calcd for $C_{26}H_{33}BO_4^+$ ($[M + Na]^+$), 443.2472; found, 443.2474

Specific rotation $[\alpha]_D^{25} = 3.6$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1 mL/min, 254 nm) indicated 92% ee: t_R (minor) = 30.6 min, t_R (major) = 37.6 min



(R)-7-phenyl-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oct-7-en-1-yl benzoate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3y** as a colorless oil with 77% yield (33.4 mg).

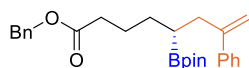
1H NMR (500 MHz, $CDCl_3$) δ 8.03 – 8.01 (m, 2H), 7.56 – 7.52 (m, 1H), 7.42 (t, $J = 7.8$ Hz, 2H), 7.40 – 7.36 (m, 2H), 7.32 – 7.27 (m, 2H), 7.25 – 7.21 (m, 1H), 5.23 (d, $J = 1.6$ Hz, 1H), 5.08 (d, $J = 1.6$ Hz, 1H), 4.28 (t, $J = 6.6$ Hz, 2H), 2.67 (dd, $J = 14.7, 8.7$ Hz, 1H), 2.51 (dd, $J = 14.8, 7.0$ Hz, 1H), 1.81 – 1.65 (m, 2H), 1.53 – 1.35 (m, 4H), 1.31 – 1.23 (m, 1H), 1.19 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 166.6, 148.4, 141.6, 132.7, 130.5, 129., 128.24, 128.2, 127.2, 126.3, 112.8, 83.0, 65.0, 36.9, 30.7, 29.0, 25.5, 24.8, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.29.

HRMS (ESI-TOF): calcd for C₂₇H₃₅BO₄⁺ ([M + Na]⁺), 457.2628; found, 457.2629.

Specific rotation [α]_D²⁵ = 13.6, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1 mL/min, 254 nm) indicated 93% ee: *t*_R (minor) = 20.0 min, *t*_R (major) = 21.4 min



(R)-benzyl-7-phenyl-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oct-7-enoate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3z** as a colorless oil with 80% yield (34.7 mg).

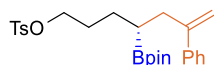
¹H NMR (500 MHz, CDCl₃) δ 7.38 – 7.35 (m, 2H), 7.34 – 7.32 (m, 2H), 7.31 – 7.28 (m, 2H), 7.25 – 7.22 (m, 1H), 5.23 – 5.21 (m, 1H), 5.09 (s, 1H), 5.07 – 5.05 (m, 2H), 2.65 (dd, *J* = 14.6, 8.7 Hz, 1H), 2.48 (dd, *J* = 14.8, 7.0 Hz, 1H), 2.33 – 2.29 (m, 2H), 1.70 – 1.57 (m, 2H), 1.46 – 1.38 (m, 2H), 1.20 – 1.18 (m, 13H).

¹³C NMR (126 MHz, CDCl₃) δ 173.4, 148.3, 141.5, 136.1, 128.5, 128.1, 128.1, 127.2, 126.2, 112.8, 83.0, 66.0, 36.8, 34.6, 30.6, 24.8, 24.8, 24.4.

¹¹B NMR (160 MHz, CDCl₃) δ 36.14.

HRMS (ESI-TOF): calcd for C₂₇H₃₅BO₄⁺ ([M + Na]⁺), 457.2628; found, 457.2626.

Specific rotation [α]_D²⁵ = -15.5, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 16.9 min, *t*_R (major) = 19.8 min.



(R)-6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3aa** as a colorless oil with 74% yield (34.8 mg).

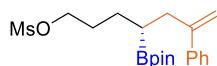
¹H NMR (600 MHz, CDCl₃) δ 7.79 – 7.74 (m, 2H), 7.36 – 7.33 (m, 2H), 7.33 – 7.27 (m, 4H), 7.26 – 7.22 (m, 1H), 5.21 (d, *J* = 1.1 Hz, 1H), 5.03 – 5.01 (m, 1H), 3.96 (t, *J* = 6.7 Hz, 2H), 2.63 (dd, *J* = 14.7, 8.5 Hz, 1H), 2.50 – 2.33 (m, 4H), 1.70 – 1.63 (m, 1H), 1.60 – 1.53 (m, 1H), 1.39 – 1.35 (m, 2H), 1.18 (d, *J* = 2.0 Hz, 12H), 1.13 – 1.07 (m, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 148.1, 144.5, 141.4, 133.3, 129.7, 128.2, 127.9, 127.2, 126.2, 113.0, 83.1, 70.8, 36.6, 28.2, 26.6, 24.8 (d, *J* = 9.3 Hz), 21.6.

¹¹B NMR (193 MHz, CDCl₃) δ 34.06.

HRMS (ESI-TOF): calcd for C₂₆H₃₅BO₅S⁺ ([M + Na]⁺), 493.2298; found, 493.2300.

Specific rotation [α]_D²⁵ = -25.8, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 97/3, 1 mL/min, 254 nm) indicated 93% ee: *t*_R (minor) = 5.4 min, *t*_R (major) = 5.9 min



(R)-6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl methanesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ab** as a colorless oil with 88% yield (34.7 mg).

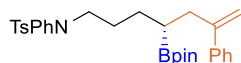
¹H NMR (500 MHz, CDCl₃) δ 7.38 (d, *J* = 7.6 Hz, 2H), 7.31 (t, *J* = 7.5 Hz, 2H), 7.25 (d, *J* = 6.8 Hz, 1H), 5.24 (s, 1H), 5.07 (s, 1H), 4.17 – 4.13 (m, 2H), 2.94 (s, 3H), 2.71 (dd, *J* = 14.6, 8.1 Hz, 1H), 2.48 (dd, *J* = 14.7, 7.5 Hz, 1H), 1.82 – 1.64 (m, 2H), 1.48 (q, *J* = 7.7 Hz, 2H), 1.26 – 1.16 (m, 13H).

¹³C NMR (151 MHz, CDCl₃) δ 148.1, 141.3, 128.2, 127.3, 126.3, 113.1, 83.2, 70.3, 37.3, 36.7, 28.4, 26.6, 24.8 (d, *J* = 10.3 Hz).

¹¹B NMR (193 MHz, CDCl₃) δ 33.36.

HRMS (ESI-TOF): calcd for C₂₀H₃₁BO₅S⁺ ([M + Na]⁺), 417.1985; found, 417.1987.

Specific rotation [α]_D²⁵ = -5.1, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 95/5, 1 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 22.5 min, *t*_R (major) = 26.1 min.



(R)-4-methyl-N-phenyl-N-(6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl)benzenesulfonamide

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ac** as a colorless oil with 80% yield (43.6 mg).

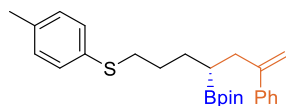
¹H NMR (500 MHz, CDCl₃) δ 7.45 (d, *J* = 8.1 Hz, 2H), 7.34 – 7.32 (m, 2H), 7.29 (d, *J* = 7.1 Hz, 3H), 7.26 – 7.24 (m, 2H), 7.22 (d, *J* = 7.9 Hz, 3H), 7.04 – 6.95 (m, 2H), 5.19 (d, *J* = 1.5 Hz, 1H), 5.00 (d, *J* = 1.5 Hz, 1H), 3.47 – 3.44 (m, 2H), 2.60 (dd, *J* = 14.7, 8.5 Hz, 1H), 2.41 – 2.37 (m, 4H), 1.47 – 1.28 (m, 4H), 1.27 – 1.23 (m, 1H), 1.09 (d, *J* = 2.3 Hz, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 148.2, 143.1, 141.4, 139.1, 135.4, 129.3, 128.9, 128.8, 128.2, 127.7, 127.7, 127.2, 126.3, 112.8, 83.0, 50.7, 36.8, 28.0, 27.7, 24.7, 24.7, 21.5.

¹¹B NMR (193 MHz, CDCl₃) δ 34.37.

HRMS (ESI-TOF): calcd for C₃₂H₄₀BNO₄S⁺ ([M + Na]⁺), 568.2771; found, 568.2773.

Specific rotation [α]_D²⁵ = 5.1, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IA, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 86% ee: *t*_R (minor) = 24.7 min, *t*_R (major) = 28.4 min.



(R)-4,4,5,5-tetramethyl-2-(2-phenyl-7-(p-tolylthio)hept-1-en-4-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ad** as a colorless oil with 76% yield (32.1 mg).

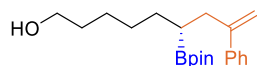
¹H NMR (500 MHz, CDCl₃) δ 7.37 (d, *J* = 7.6 Hz, 2H), 7.29 (t, *J* = 7.5 Hz, 2H), 7.25 – 7.18 (m, 3H), 7.06 (d, *J* = 7.8 Hz, 2H), 5.22 (s, 1H), 5.05 (s, 1H), 2.86 – 2.75 (m, 2H), 2.65 (dd, *J* = 14.8, 8.6 Hz, 1H), 2.47 (dd, *J* = 14.8, 7.2 Hz, 1H), 2.30 (s, 3H), 1.64 – 1.57 (m, 1H), 1.54 – 1.48 (m, 3H), 1.21 – 1.16 (m, 13H).

¹³C NMR (151 MHz, CDCl₃) δ 148.3, 141.5, 135.8, 133.0, 129.9, 129.5, 128.2, 127.2, 126.3, 112.8, 83.0, 36.8, 34.5, 30.3, 28.7, 24.8 (d, *J* = 6.8 Hz), 21.0.

¹¹B NMR (193 MHz, CDCl₃) δ 34.39.

HRMS (ESI-TOF): calcd for C₂₆H₃₅BO₂S⁺ ([M + Na]⁺), 445.2451; found, 445.2453.

Specific rotation [α]_D²⁵ = 26.7, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 18.1 min, *t*_R (major) = 19.6 min



(R)-8-phenyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)non-8-en-1-ol

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ae** as a colorless oil with 82% yield (28.2 mg).

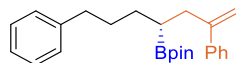
¹H NMR (600 MHz, CDCl₃) δ 7.41 – 7.37 (m, 2H), 7.30 (dd, *J* = 8.4, 6.8 Hz, 2H), 7.26 – 7.22 (m, 1H), 5.23 (d, *J* = 1.3 Hz, 1H), 5.08 (d, *J* = 1.3 Hz, 1H), 3.61 – 3.58 (m, 2H), 2.65 (dd, *J* = 14.6, 8.8 Hz, 1H), 2.49 (d, *J* = 21.6 Hz, 1H), 1.57 – 1.48 (m, 2H), 1.46 – 1.36 (m, 2H), 1.36 – 1.23 (m, 5H), 1.21 (d, *J* = 1.3 Hz, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 148.5, 141.7, 128.1, 127.2, 126.3, 112.7, 83.0, 63.0, 37.0, 32.6, 31.6, 31.0, 28.7, 25.8, 24.8, 24.8, 22.6, 14.1.

¹¹B NMR (193 MHz, CDCl₃) δ 34.67.

HRMS (ESI-TOF): calcd for C₂₁H₃₃BO₃⁺ ([M + Na]⁺), 367.2523; found, 367.2524.

Specific rotation [α]_D²⁵ = -16.0, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 18.1 min, *t*_R (major) = 19.6 min.



(R)-2-(2,7-diphenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3af** as a colorless oil with 91% yield (34.2 mg).

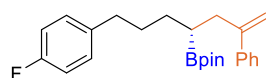
¹H NMR (500 MHz, CDCl₃) δ 7.39 – 7.33 (m, 2H), 7.30 (t, *J* = 7.4 Hz, 2H), 7.24 (dd, *J* = 7.9, 1.7 Hz, 3H), 7.18 – 7.11 (m, 3H), 5.22 (d, *J* = 1.5 Hz, 1H), 5.07 (d, *J* = 1.6 Hz, 1H), 2.64 (dd, *J* = 14.7, 9.0 Hz, 1H), 2.58 – 2.53 (m, 2H), 2.50 (dd, *J* = 14.8, 6.9 Hz, 1H), 1.68 – 1.53 (m, 2H), 1.51 – 1.40 (m, 2H), 1.26 – 1.22 (m, 1H), 1.20 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 148.5, 142.8, 141.7, 128.4, 128.2, 128.1, 127.1, 126.3, 125.5, 112.7, 83.0, 36.9, 36.1, 30.8, 30.8, 24.9 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.55.

HRMS (ESI-TOF): calcd for C₂₅H₃₃BO₂⁺ ([M + Na]⁺), 399.2574; found, 399.2574

Specific rotation [α]_D²⁵ = -22.2, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 95% ee: *t*_R (minor) = 25.1 min, *t*_R (major) = 34.2 min.



(R)-2-(7-(4-fluorophenyl)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ag** as a colorless oil with 62% yield (24.4 mg).

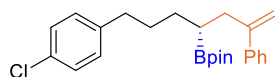
¹H NMR (500 MHz, CDCl₃) δ 7.39 – 7.33 (m, 2H), 7.33 – 7.26 (m, 2H), 7.24 – 7.20 (m, 3H), 7.04 (d, *J* = 7.9 Hz, 2H), 5.21 (s, 1H), 5.06 (s, 1H), 2.64 (dd, *J* = 14.7, 8.8 Hz, 1H), 2.57 – 2.46 (m, 3H), 1.57 – 1.51 (m, 2H), 1.48 – 1.35 (m, 2H), 1.28 – 1.07 (m, 13H).

¹³C NMR (151 MHz, CDCl₃) δ 161.9, 160.3, 148.5, 141.7, 138.3, 129.6 (d, *J* = 8.5 Hz), 128.2, 127.2, 126.3, 114.8 (d, *J* = 20.6 Hz), 112.7, 83.0, 36.9, 35.2, 30.9, 30.6, 24.9, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.45.

HRMS (ESI-TOF): calcd for C₂₅H₃₂BFO₂⁺ ([M + Na]⁺), 417.2479; found, 417.2480.

Specific rotation [α]_D²⁵ = -65., (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 95% ee: *t*_R (minor) = 18.7 min, *t*_R (major) = 22.1 min.



(R)-2-(7-(4-chlorophenyl)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ah** as a colorless oil with 65% yield (26.7 mg).

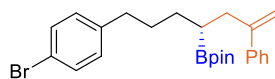
¹H NMR (500 MHz, CDCl₃) δ 7.50 (d, *J* = 8.1 Hz, 2H), 7.41 – 7.34 (m, 2H), 7.30 (t, *J* = 7.5 Hz, 2H), 7.23 (t, *J* = 7.2 Hz, 3H), 5.21 (d, *J* = Hz, 1H), 5.06 (s, 1H), 2.69 – 2.54 (m, 2H), 2.48 (dd, *J* = 14.8, 7.0 Hz, 1H), 1.73 – 1.57 (m, 0H), 1.52 – 1.35 (m, 1H), 1.20 (s, 6H).

¹³C NMR (151 MHz, CDCl₃) δ 148.4, 141.6, 141.1, 131.2, 129.7, 128.2, 128.2, 127.2, 126.3, 112.8, 83.0, 36.9, 35.4, 30.6, 30.5, 24.8, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.64.

HRMS (ESI-TOF): calcd for C₂₅H₃₂BClO₂⁺ ([M + Na]⁺), 433.2184; found, 433.2186.

Specific rotation [α]_D²⁵ = 29.0, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 93% ee: *t*_R (minor) = 18.0 min, *t*_R (major) = 20.4 min.



(R)-2-(7-(4-bromophenyl)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ai** as a colorless oil with 79% yield (36.0 mg).

¹H NMR (500 MHz, CDCl₃) δ 7.37 – 7.35 (m, 2H), 7.33 – 7.27 (m, 2H), 7.25 – 7.23 (m, 1H), 6.99 (d, *J* = 8.4 Hz, 2H), 5.21 (d, *J* = 1.5 Hz, 1H), 5.06 (d, *J* = 1.0 Hz, 1H), 2.64 (dd, *J* = 14.7, 8.8 Hz, 1H), 2.58 – 2.39 (m, 3H), 1.57 – 1.49 (m, 2H), 1.48 – 1.35 (m, 2H), 1.27 – 1.20 (m, 13H).

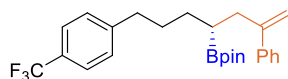
¹³C NMR (151 MHz, CDCl₃) δ 148.4, 141.6, 141.6, 131.2, 130.1, 128.2, 127.2, 126.3, 119.2, 112.8, 83.0, 36.9, 35.4, 30.6, 30.5, 24.8, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.49.

HRMS (ESI-TOF): calcd for C₂₅H₃₂BBro₂⁺ ([M + Na]⁺), 477.1679; found, 477.1680.

Specific rotation [α]_D²⁵ = 22.8, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 95% ee: *t*_R (minor) = 21.8 min, *t*_R (major) = 24.5 min.

min.



(R)-4,4,5,5-tetramethyl-2-(2-phenyl-7-(4-(trifluoromethyl)phenyl)hept-1-en-4-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3aj** as a colorless oil with 68% yield (30.2 mg).

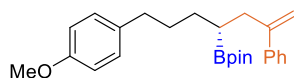
¹H NMR (600 MHz, CDCl₃) δ 7.49 (d, *J* = 8.0 Hz, 2H), 7.38 – 7.34 (m, 2H), 7.32 – 7.27 (m, 2H), 7.25 – 7.23 (m, 1H), 7.23 – 7.20 (m, 2H), 5.21 (d, *J* = 1.3 Hz, 1H), 5.06 (d, *J* = 1.3 Hz, 1H), 2.69 – 2.54 (m, 3H), 2.48 (dd, *J* = 14.7, 7.1 Hz, 1H), 1.71 – 1.56 (m, 2H), 1.50 – 1.37 (m, 2H), 1.24 – 1.19 (s, 13H).

¹³C NMR (151 MHz, CDCl₃) δ 148.4, 146.8, 141.6, 128.7, 128.2, 127.2, 126.3, 125.1 (q, *J* = 3.7 Hz), 112.8, 83.0436.9, 35.8, 30.5 (d, *J* = 11.0 Hz), 24.8 (d, *J* = 10.2 Hz).

¹¹B NMR (193 MHz, CDCl₃) δ 34.16.

HRMS (ESI-TOF): calcd for C₂₆H₃₂BF₃O₂⁺ ([M + Na]⁺), 467.2447; found, 467.2448.

Specific rotation [α]_D²⁵ = 65.5, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 11.4 min, *t*_R (major) = 13.5 min.



(R)-2-(7-(4-methoxyphenyl)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ak** as a colorless oil with 92% yield (37.4 mg).

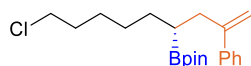
¹H NMR (500 MHz, CDCl₃) δ 7.40 – 7.34 (m, 2H), 7.32 – 7.26 (m, 2H), 7.26 – 7.21 (m, 1H), 7.04 (d, *J* = 8.3 Hz, 2H), 6.83 – 6.77 (m, 2H), 5.21 (s, 1H), 5.07 (s, 1H), 3.77 (s, 3H), 2.64 (dd, *J* = 14.8, 9.0 Hz, 1H), 2.56 – 2.46 (m, 3H), 1.62 – 1.52 (m, 2H), 1.447 – 1.41 (m, 2H), 1.24 – 1.22 (m, 1H), 1.20 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 157.5, 148.5, 141.7, 134.8, 129.2, 128.1, 127.1, 126.3, 113.6, 112.7, 83.0, 55.2, 36.9, 35.1, 31.0, 30.7, 24.8 (d, *J* = 9.8 Hz).

¹¹B NMR (193 MHz, CDCl₃) δ 35.02.

HRMS (ESI-TOF): calcd for C₂₆H₃₅BO₃⁺ ([M + Na]⁺), 429.2679; found, 429.2681.

Specific rotation [α]_D²⁵ = 7.6, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 11.4 min, *t*_R (major) = 13.5 min.



(R)-2-(9-chloro-2-phenylnon-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure B at a 0.1 mmol scale with alkene to afford the title compound **3al** as a colorless oil with 74% yield (26.8 mg).

¹H NMR (500 MHz, CDCl₃) δ 7.38 (d, *J* = 7.4 Hz, 2H), 7.30 (t, *J* = 7.5 Hz, 2H), 7.23 (d, *J* = 7.3 Hz, 1H), 5.23 (s, 1H), 5.07 (s, 1H), 3.49 (t, *J* = 6.8 Hz, 2H), 2.65 (dd, *J* = 14.7, 8.9 Hz, 1H), 2.49 (dd, *J* =

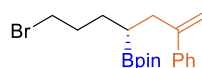
14.7, 7.0 Hz, 1H), 1.73 (p, $J = 7.1$ Hz, 2H), 1.42 - 1.33 (m, 4H), 1.32 - 1.24 (m, 4H), 1.21 (d, $J = 1.7$ Hz, 12H).

^{13}C NMR (151 MHz, CDCl_3) δ 148.5, 141.7, 128.2, 127.2, 126.3, 112.7, 83.0, 45.0, 36.9, 32.5, 30.8, 28.2, 27.1, 24.8 (d, $J = 7.0$ Hz).

^{11}B NMR (193 MHz, CDCl_3) δ 34.44.

HRMS (ESI-TOF): calcd for $\text{C}_{21}\text{H}_{32}\text{BClO}_2^+$ ($[\text{M} + \text{Na}]^+$), 385.2184; found, 385.2186.

Specific rotation $[\alpha]_{\text{D}}^{25} = 24.7$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 92% ee: t_{R} (minor) = 11.8 min, t_{R} (major) = 13.1 min



(R)-2-(7-bromo-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure B at a 0.1 mmol scale with alkene to afford the title compound **3am** as a colorless oil with 68% yield (25.8 mg).

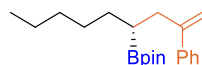
^1H NMR (600 MHz, CDCl_3) δ 7.40 – 7.36 (m, 2H), 7.31 (t, $J = 7.6$ Hz, 2H), 7.24 (d, $J = 7.3$ Hz, 1H), 5.24 (d, $J = 1.2$ Hz, 1H), 5.08 (d, $J = 1.2$ Hz, 1H), 3.41 – 3.29 (m, 2H), 2.69 (dd, $J = 14.7$, 8.6 Hz, 1H), 2.49 (dd, $J = 14.8$, 7.2 Hz, 1H), 1.96 – 1.75 (m, 2H), 1.52 (q, $J = 7.7$ Hz, 2H), 1.27 – 1.16 (m, 13H).

^{13}C NMR (151 MHz, CDCl_3) δ 148.2, 141.4, 128.2, 127.3, 126.3, 113.0, 83.1, 36.8, 34.0, 32.3, 29.6, 24.8 (d, $J = 7.6$ Hz).

^{11}B NMR (193 MHz, CDCl_3) δ 34.15.

HRMS (ESI-TOF): calcd for $\text{C}_{19}\text{H}_{28}\text{BBro}_2^+$ ($[\text{M} + \text{Na}]^+$), 401.1366; found, 401.1368.

Specific rotation $[\alpha]_{\text{D}}^{25} = 8.6$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 95% ee: t_{R} (minor) = 4.6 min, t_{R} (major) = 5.0 min



(R)-4,4,5,5-tetramethyl-2-(2-phenylnon-1-en-4-yl)-1,3,2-dioxaborolane

Following the General Procedure B at a 0.1 mmol scale with alkene to afford the title compound **3an** as a colorless oil with 74% yield (24.3 mg).

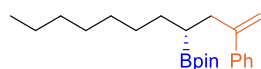
^1H NMR (500 MHz, CDCl_3) δ 7.43 – 7.36 (m, 2H), 7.30 (dd, $J = 8.4$, 6.7 Hz, 2H), 7.25 – 7.20 (m, 1H), 5.22 (d, $J = 1.5$ Hz, 1H), 5.08 (d, $J = 1.0$ Hz, 1H), 2.63 (dd, $J = 14.7$, 9.2 Hz, 1H), 2.50 (dd, $J = 14.8$, 6.7 Hz, 1H), 1.43 – 1.34 (m, 2H), 1.31 – 1.22 (m, 6H), 1.21 – 1.17 (m, 13H), 0.85 (t, $J = 6.8$ Hz, 2H).

^{13}C NMR (151 MHz, CDCl_3) δ 148.6, 141.7, 128.1, 127.1, 126.3, 112.5, 82.9, 37.0, 32.1, 31.2, 28.7, 24.8 (d, $J = 5.8$ Hz), 22.5, 14.0.

^{11}B NMR (193 MHz, CDCl_3) δ 33.80.

HRMS (ESI-TOF): calcd for $\text{C}_{21}\text{H}_{33}\text{BO}_2^+$ ($[\text{M} + \text{Na}]^+$), 351.2574; found, 351.2576.

Specific rotation $[\alpha]_{\text{D}}^{25} = 7.5$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 97/3, 1.0 mL/min, 254 nm) indicated 93% ee: t_{R} (minor) = 7.9 min, t_{R} (major) = 8.6 min



(R)-4,4,5,5-tetramethyl-2-(2-phenylundec-1-en-4-yl)-1,3,2-dioxaborolane

Following the General Procedure B at a 0.1 mmol scale with alkene to afford the title compound **3ao** as a colorless oil with 64% yield (22.8 mg).

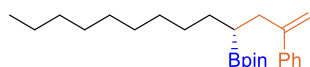
¹H NMR (500 MHz, CDCl₃) δ 7.42 – 7.35 (m, 2H), 7.30 (t, *J* = 7.6 Hz, 2H), 7.25 – 7.21 (m, 1H), 5.22 (d, *J* = 1.5 Hz, 1H), 5.08 (d, *J* = 1.0 Hz, 1H), 2.63 (dd, *J* = 14.7, 9.1 Hz, 1H), 2.50 (dd, *J* = 14.7, 6.7 Hz, 1H), 1.43 – 1.37 (m, 1H), 1.28 – 1.21 (m, 23H), 0.86 (t, *J* = 7.0 Hz, 3H).

¹³C NMR (126 MHz, CDCl₃) δ 148.6, 141.7, 128.1, 127.1, 126.3, 112.6, 82.9, 37.0, 31.8, 31.2, 29.8, 29.2, 29.0, 24.8 (d, *J* = 5.0 Hz), 22.6, 14.1.

¹¹B NMR (160 MHz, CDCl₃) δ 34.07.

HRMS (ESI-TOF): calcd for C₂₃H₃₇BO₂⁺ ([M + Na]⁺), 379.2887; found, 379.2889.

Specific rotation [α]_D²⁵ = -26.6, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 97/3, 1.0 mL/min, 254 nm) indicated 91% ee: *t*_R (minor) = 8.9min, *t*_R (major) = 9.1 min



(R)-4,4,5,5-tetramethyl-2-(2-phenyltridec-1-en-4-yl)-1,3,2-dioxaborolane

Following the General Procedure B at a 0.1 mmol scale with alkene to afford the title compound **3ap** as a colorless oil with 61% yield (23.4 mg).

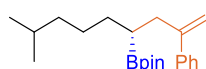
¹H NMR (500 MHz, CDCl₃) δ 7.42 – 7.36 (m, 2H), 7.30 (t, *J* = 7.5 Hz, 2H), 7.25 – 7.22 (m, 1H), 5.23 (d, *J* = 0.5 Hz, 1H), 5.08 (d, *J* = 1.0 Hz, 1H), 2.63 (dd, *J* = 14.8, 9.1 Hz, 1H), 2.51 (dd, *J* = 14.8, 6.7 Hz, 1H), 1.42 – 1.37 (m, 2H), 1.29 – 1.23 (m, 14H), 1.21 – 1.20 (m, 13H), 0.88 (t, *J* = 7.0 Hz, 3H).

¹³C NMR (126 MHz, CDCl₃) δ 148.6, 141.7, 128.1, 127.1, 126.3, 112.6, 82.9, 37.0, 31.9, 31.2, 29.8, 29.5, 29.5, 29.3, 29.0, 24.8 (d, *J* = 4.9 Hz), 22.7, 14.1.

¹¹B NMR (160 MHz, CDCl₃) δ 34.74.

HRMS (ESI-TOF): calcd for C₂₅H₄₁BO₂⁺ ([M + Na]⁺), 407.3200; found, 407.3202.

Specific rotation [α]_D²⁵ = -13.3, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 97/3, 0.7 mL/min, 254 nm) indicated 89% ee: *t*_R (minor) = 10.4 min, *t*_R (major) = 11.3 min



(R)-4,4,5,5-tetramethyl-2-(8-methyl-2-phenylnon-1-en-4-yl)-1,3,2-dioxaborolane

Following the General Procedure B at a 0.1 mmol scale with alkene to afford the title compound **3aq** as a colorless oil with 81% yield (27.7 mg).

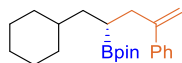
¹H NMR (500 MHz, CDCl₃) δ 7.43 – 7.36 (m, 2H), 7.30 (dd, *J* = 8.3, 6.6 Hz, 2H), 7.25 – 7.20 (m, 1H), 5.22 (d, *J* = 1.0 Hz, 1H), 5.08 (d, *J* = 1.0 Hz, 1H), 2.64 (dd, *J* = 9.5 Hz, *J* = 9.0 Hz, 1H), 2.50 (dd, *J* = 14.6, 6.7 Hz, 1H), 1.53 – 1.45 (m, 1H), 1.43 – 1.33 (m, 2H), 1.32 – 1.23 (m, 2H), 1.21 (d, *J* = 1.8 Hz, 12H), 1.17 – 1.05 (m, 2H), 0.93 – 0.84 (m, 1H), 0.83 (d, *J* = 6.6 Hz, 6H).

¹³C NMR (126 MHz, CDCl₃) δ 148.6, 141.7, 128.1, 127.1, 126.3, 112.6, 82.9, 39.2, 37.1, 31.5, 27.8, 26.8, 24.8 (d, *J* = 4.3 Hz), 22.6 (d, *J* = 14.5 Hz), 1.0.

¹¹B NMR (160 MHz, CDCl₃) δ 34.28.

HRMS (ESI-TOF): calcd for C₂₃H₃₇BO₂⁺ ([M + Na]⁺), 379.2887; found, 379.2889.

Specific rotation [α]_D²⁵ = 5.1, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 91% ee: *t*_R (minor) = 7.9min, *t*_R (major) = 8.4 min



(R)-2-(1-cyclohexyl-4-phenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure B at a 0.1 mmol scale with alkene to afford the title compound **3ar** as a colorless oil with 77% yield (27.3 mg).

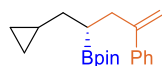
¹H NMR (500 MHz, CDCl₃) δ 7.41 – 7.35 (m, 2H), 7.29 (t, *J* = 7.6 Hz, 2H), 7.25 – 7.21 (m, 1H), 5.22 (d, *J* = 1.5 Hz, 1H), 5.09 (d, *J* = 1.0 Hz, 2H), 2.59 (dd, *J* = 14.7, 8.2 Hz, 1H), 2.48 (dd, *J* = 14.7, 5.6 Hz, 1H), 1.77 – 1.57 (m, 6H), 1.38 – 1.27 (m, 2H), 1.25 – 1.23 (m, 1H), 1.21 – 1.20 (m, 13H), 1.16 – 1.09 (m, 3H), 0.93 – 0.68 (m, 2H).

¹³C NMR (151 MHz, CDCl₃) δ 148.7, 141.9, 128.1, 127.1, 126.3, 112.6, 82.9, 39.1, 37.5, 37.2, 34.0, 33.1, 26.7, 26.5, 26.4, 24.8, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.28.

HRMS (ESI-TOF): calcd for C₂₃H₃₅BO₂⁺ ([M + Na]⁺), 377.2730; found, 377.2732.

Specific rotation [α]_D²⁵ = -10.9, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 95% ee: *t*_R (minor) = 7.8 min, *t*_R (major) = 8.6 min



(R)-2-(1-cyclopropyl-4-phenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure B at a 0.1 mmol scale with alkene to afford the title compound **3as** as a colorless oil with 92% yield (28.7 mg).

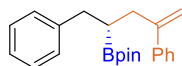
¹H NMR (500 MHz, CDCl₃) δ 7.42 – 7.36 (m, 2H), 7.33 – 7.27 (m, 2H), 7.25 – 7.21 (m, 1H), 5.23 (s, 1H), 5.09 (d, *J* = 1.0 Hz, 1H), 2.66 (dd, *J* = 14.8, 7.9 Hz, 1H), 2.55 (dd, *J* = 14.8, 5.9 Hz, 1H), 1.38 – 1.32 (m, 2H), 1.39 – 1.26 (m, 1H), 1.22 (d, *J* = 4.9 Hz, 12H), 0.70 – 0.63 (m, 1H), 0.40 – 0.34 (m, 2H), 0.07 – 0.02 (m, 1H), -0.04 – -0.07 (m, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 148.5, 141.7, 128.1, 127.1, 126.3, 112.6, 82.9, 36.9, 36.3, 24.9, 24.9, 10.5, 5.1, 4.8.

¹¹B NMR (193 MHz, CDCl₃) δ 33.87.

HRMS (ESI-TOF): calcd for C₂₀H₂₉BO₂⁺ ([M + Na]⁺), 335.2261; found, 335.2264.

Specific rotation [α]_D²⁵ = 33.5, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 97/3, 1.0 mL/min, 254 nm) indicated 96% ee: *t*_R (minor) = 13.3 min, *t*_R (major) = 13.9 min



(R)-2-(1,4-diphenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3at** as a colorless oil with 84% yield (29.3 mg).

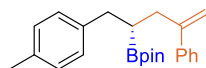
¹H NMR (500 MHz, CDCl₃) δ 7.35 – 7.33 (m, 2H), 7.31 – 7.26 (m, 2H), 7.26 – 7.18 (m, 3H), 7.17 – 7.08 (m, 3H), 5.25 (s, 1H), 5.12 (d, *J* = 1.0 Hz, 1H), 2.74 – 2.61 (m, 3H), 2.56 (dd, *J* = 14.7, 6.6 Hz, 1H), 1.59 (d, *J* = 8.2 Hz, 1H), 1.12 (s, 6H), 1.08 (s, 6H).

¹³C NMR (151 MHz, CDCl₃) δ 148.1, 141.8, 141.4, 128.9, 128.2, 128.0, 127.2, 126.3, 125.7, 113.0, 83.1, 37.1, 36.7, 24.7 (d, *J* = 5.3 Hz).

¹¹B NMR (193 MHz, CDCl₃) δ 34.49.

HRMS (ESI-TOF): calcd for C₂₃H₂₉BO₂⁺ ([M + Na]⁺), 371.2261; found, 371.2265.

Specific rotation [α]_D²⁵ = 16.7, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 95% ee: *t*_R (minor) = 16.4 min, *t*_R (major) = 17.2 min



(R)-4,4,5,5-tetramethyl-2-(4-phenyl-1-(p-tolyl)pent-4-en-2-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3au** as a colorless oil with 86% yield (31.2 mg).

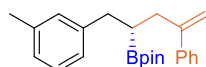
¹H NMR (500 MHz, CDCl₃) δ 7.34 – 7.33 (m, 2H), 7.31 – 7.27 (m, 2H), 7.25 – 7.22 (m, 1H), 7.04 – 7.01 (m, 4H), 5.24 (s, 1H), 5.11 (s, 1H), 2.71 – 2.59 (m, 3H), 2.54 (dd, *J* = 14.8, 6.4 Hz, 1H), 2.28 (s, 3H), 1.35 – 1.19 (m, 1H), 1.14 (s, 6H), 1.09 (s, 6H).

¹³C NMR (151 MHz, CDCl₃) δ 148.3, 141.5, 138.7, 135.0, 128.7 (d, *J* = 5.3 Hz), 128.1, 127.2, 126.3, 112.8, 83.0, 36.6 (d, *J* = 2.7 Hz), 24.8 (d, *J* = 3.2 Hz), 21.0

¹¹B NMR (193 MHz, CDCl₃) δ 34.17.

HRMS (ESI-TOF): calcd for C₂₄H₃₁BO₂⁺ ([M + Na]⁺), 385.2417; found, 385.2419.

Specific rotation [α]_D²⁵ = 38., (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 97/3, 1.0 mL/min, 254 nm) indicated 95% ee: *t*_R (minor) = 16.8min, *t*_R (major) = 23.4 min.



(R)-4,4,5,5-tetramethyl-2-(4-phenyl-1-(m-tolyl)pent-4-en-2-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3av** as a colorless oil with 80% yield (29.0 mg).

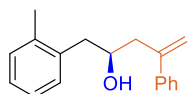
¹H NMR (600 MHz, CDCl₃) δ 7.35 – 7.33 (m, 2H), 7.30 – 7.27 (m, 2H), 7.25 – 7.22 (m, 1H), 7.10 (t, *J* = 7.5 Hz, 1H), 7.01 – 6.90 (m, 3H), 5.25 (s, 1H), 5.12 (s, 1H), 2.67 – 2.62 (m, 3H), 2.55 (dd, *J* = 14.7, 6.5 Hz, 1H), 2.27 (s, 3H), 1.60 – 1.55 (m, 1H), 1.13 (s, 6H), 1.09 (s, 6H).

¹³C NMR (151 MHz, CDCl₃) δ 148.3, 141.7, 141.4, 137.4, 129.7, 128.2, 127.9, 127.2, 126.4, 126.3, 125.9, 112.9, 83.0, 37.0, 36.7, 24.8, 24.7, 21.4.

¹¹B NMR (193 MHz, CDCl₃) δ 34.02.

HRMS (ESI-TOF): calcd for C₂₄H₃₁BO₂⁺ ([M + Na]⁺), 385.2417; found, 385.2420.

Specific rotation [α]_D²⁵ = -28.9 (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 97/3, 1.0 mL/min, 254 nm) indicated 93% ee: *t*_R (minor) = 8.7min, *t*_R (major) = 9.4 min



(R)-4-phenyl-1-(o-tolyl)pent-4-en-2-ol

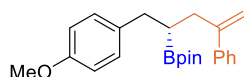
Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3aw** as a colorless oil with 80% yield (20.2 mg).

¹H NMR (500 MHz, CDCl₃) δ 7.37 – 7.35 (m, 2H), 7.31 (t, *J* = 7.3 Hz, 2H), 7.28 – 7.24 (m, 1H), 7.12 (s, 4H), 5.42 (s, 1H), 5.21 (s, 1H), 3.90 – 3.85 (m, 1H), 2.91 – 2.78 (m, 2H), 2.75 – 2.70 (m, 2H), 2.20 (s, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 145.3, 140.3, 136.7, 136.6, 130.4, 130.1, 128.4, 127.7, 126.6, 126.2, 125.9, 115.3, 69.6, 43.3, 40.6, 19.5.

HRMS (ESI-TOF): calcd for C₁₈H₂₀O⁺ ([M + Na]⁺), 275.1514; found, 275.1516.

Specific rotation [α]_D²⁵ = -48.5, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 97/3, 1.0 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 9.4min, *t*_R (major) = 11.2 min



(R)-2-(1-(4-methoxyphenyl)-4-phenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ax** as a colorless oil with 95% yield (35.9 mg).

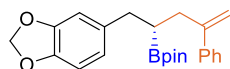
¹H NMR (600 MHz, CDCl₃) δ 7.35 – 7.33 (m, 2H), 7.31 – 7.27 (m, 2H), 7.25 – 7.22 (m, 1H), 7.06 (d, *J* = 8.6 Hz, 1H), 6.77 (d, *J* = 8.6 Hz, 1H), 5.25 (d, *J* = 1.2 Hz, 1H), 5.11 (d, *J* = 1.2 Hz, 1H), 3.76 (s, 3H), 2.66 – 2.61 (m, 3H), 2.55 (dd, *J* = 14.6, 6.4 Hz, 1H), 1.57 – 1.49 (m, 1H), 1.13 (s, 6H), 1.09 (s, 6H).

¹³C NMR (151 MHz, CDCl₃) δ 157.7, 148.3, 141.5, 133.9, 129.8, 128.2, 127.2, 126.3, 113.5, 112.9, 83.0, 55.3, 36.6, 36.2, 24.8, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.07.

HRMS (ESI-TOF): calcd for C₂₄H₃₁BO₃⁺ ([M + Na]⁺), 401.2366; found, 401.2369.

Specific rotation [α]_D²⁵ = -23.3, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 97% ee: *t*_R (minor) = 18.4min, *t*_R (major) = 20.1 min



(R)-2-(1-(benzo[d][1,3]dioxol-5-yl)-4-phenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ay** as a colorless oil with 68% yield (23.5 mg).

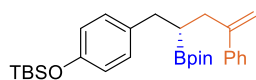
¹H NMR (500 MHz, CDCl₃) δ 7.36 – 7.34 (m, 2H), 7.31 – 7.28 (m, 2H), 7.25 – 7.23 (m, 1H), 6.67 (d, *J* = 7.9 Hz, 1H), 6.63 (d, *J* = 1.6 Hz, 1H), 6.59 (dd, *J* = 7.9, 1.7 Hz, 1H), 5.89 – 5.87 (m, 2H), 5.25 (s, 1H), 5.11 (s, 1H), 2.66 – 2.61 (m, 3H), 2.54 (dd, *J* = 14.8, 6.6 Hz, 1H), 1.54 – 1.46 (m, 1H), 1.15 (s, 6H), 1.11 (s, 6H).

¹³C NMR (126 MHz, CDCl₃) δ 148.2, 147.3, 145.4, 141.4, 135.7, 128.2, 127.3, 126.3, 121.6, 113.0, 109.4, 107.8, 100.6, 83.1, 36.8, 36.6, 24.8 (d, *J* = 3.6 Hz).

¹¹B NMR (160 MHz, CDCl₃) δ 33.93.

HRMS (ESI-TOF): calcd for C₂₄H₂₉BO₄⁺ ([M + Na]⁺), 415.2159; found, 415.2163.

Specific rotation [α]_D²⁵ = -7.5, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 95% ee: *t*_R (minor) = 18.2 min, *t*_R (major) = 19.4 min



(R)-tert-butyldimethyl(4-(4-phenyl-2-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pent-4-en-1-yl)phenoxy)silane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3az** as a colorless oil with 92% yield (44.0 mg).

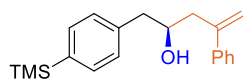
¹H NMR (500 MHz, CDCl₃) δ 7.36 – 7.32 (m, 2H), 7.31 – 7.26 (m, 2H), 7.25 – 7.21 (m, 1H), 7.02 – 6.96 (m, 2H), 6.73 – 6.66 (m, 2H), 5.24 (d, *J* = 1.0 Hz, 1H), 5.12 (d, *J* = 0.5 Hz, 1H), 2.69 – 2.60 (m, 2H), 2.56 (dd, *J* = 14.6, 6.5 Hz, 1H), 1.55 – 1.49 (m, 1H), 1.11 (s, 6H), 1.07 (s, 6H), 0.96 (s, 9H), 0.15 (s, 6H).

¹³C NMR (151 MHz, CDCl₃) δ 153.6, 148.3, 141.4, 134.5, 129.7, 128.2, 127.2, 126.3, 119.7, 112.9, 83.0, 36.8, 36.4, 25.7, 24.8, 24.7, 18.2, -4.5.

¹¹B NMR (193 MHz, CDCl₃) δ 34.08.

HRMS (ESI-TOF): calcd for C₂₉H₄₃BO₃Si⁺ ([M + Na]⁺), 501.3075; found, 501.3078.

Specific rotation [α]_D²⁵ = -9.7, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 97% ee: *t*_R (minor) = 7.1 min, *t*_R (major) = 9.2 min.



(R)-4-phenyl-1-(4-(trimethylsilyl)phenyl)pent-4-en-2-ol

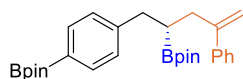
Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ba** as a colorless oil with 69% yield (21.4 mg).

¹H NMR (500 MHz, CDCl₃) δ 7.47 – 7.42 (m, 2H), 7.37 – 7.35 (m, 2H), 7.34 – 7.30 (m, 2H), 7.30 – 7.27 (m, 1H), 7.17 (d, *J* = 7.8 Hz, 2H), 5.41 (d, *J* = 1.2 Hz, 1H), 5.20 (s, 1H), 3.92 – 3.87 (m, 1H), 2.87 – 2.79 (m, 2H), 2.73 (dd, *J* = 13.6, 8.1 Hz, 1H), 2.64 (dd, *J* = 14.2, 8.4 Hz, 1H), 1.71 (d, *J* = 3.0 Hz, 1H), 0.25 (s, 9H).

¹³C NMR (151 MHz, CDCl₃) δ 145.3, 140.5, 139.0, 138.2, 133.5, 128.8, 128.4, 127.7, 126.2, 115.3, 70.5, 43.4, 43.2, -1.1.

HRMS (ESI-TOF): calcd for C₂₀H₂₆OSi⁺ ([M + Na]⁺), 333.1753; found, 333.1756.

Specific rotation [α]_D²⁵ = 5.5, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 98% ee: *t*_R (minor) = 12.6min, *t*_R (major) = 13.4 min



(R)-4,4,5,5-tetramethyl-2-(4-phenyl-1-(4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)pent-4-en-2-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bb** as a colorless oil with 66% yield (31.3 mg).

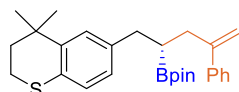
¹H NMR (500 MHz, CDCl₃) δ 7.67 (d, *J* = 7.6 Hz, 2H), 7.35 – 7.31 (m, 2H), 7.30 – 7.26 (m, 2H), 7.23 (t, *J* = 7.0 Hz, 1H), 7.15 (d, *J* = 7.5 Hz, 2H), 5.25 (s, 1H), 5.10 (s, 1H), 2.79 – 2.59 (m, 3H), 2.52 (dd, *J* = 14.7, 6.6 Hz, 1H), 1.56 (q, *J* = 8.0 Hz, 1H), 1.33 (s, 12H), 1.14 (s, 6H), 1.10 (s, 6H).

¹³C NMR (151 MHz, CDCl₃) δ 148.2, 145.3, 141.4, 134.6, 128.3, 128.2, 127.2, 126.3, 113.0, 83.5, 83.1, 37.1, 36.5, 24.9, 24.8, 24.7.

¹¹B NMR (193 MHz, CDCl₃) δ 35.37.

HRMS (ESI-TOF): calcd for C₂₉H₄₀B₂O₄⁺ ([M + Na]⁺), 497.3113; found, 497.3115.

Specific rotation [α]_D²⁵ = 64.2, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 91% ee: *t*_R (minor) = 18.4 min, *t*_R (major) = 21.7 min



(R)-2-(1-(4,4-dimethylthiochroman-6-yl)-4-phenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bc** as a colorless oil with 70% yield (31.4 mg).

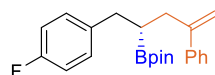
¹H NMR (600 MHz, CDCl₃) δ 7.33 – 7.31 (m, 2H), 7.29 – 7.27 (m, 2H), 7.24 – 7.22 (m, 1H), 7.11 – 7.10 (m, 1H), 6.94 (d, *J* = 8.0 Hz, 1H), 6.83 – 6.82 (m, 1H), 5.25 (s, 1H), 5.11 (s, 1H), 3.00 – 2.98 (m, 2H), 2.66 – 2.58 (m, 3H), 2.53 (dd, *J* = 14.7, 6.5 Hz, 1H), 1.97 – 1.86 (m, 2H), 1.55 – 1.49 (m, 1H), 1.27 (s, 6H), 1.14 (s, 6H), 1.11 (s, 6H).

¹³C NMR (151 MHz, CDCl₃) δ 148.3, 141.5, 141.4, 137.5, 128.2, 128.2, 127.2, 127.0, 126.7, 126.3, 126.2, 113.0, 83.0, 38.0, 36.5, 36.4, 32.9, 30.3, 30.2, 24.7, 23.1.

¹¹B NMR (193 MHz, CDCl₃) δ 34.15.

HRMS (ESI-TOF): calcd for C₂₈H₃₇BO₂S⁺ ([M + Na]⁺), 471.2607; found, 471.2609.

Specific rotation [α]_D²⁵ = -21.7, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 96% ee: *t*_R (minor) = 13.8 min, *t*_R (major) = 14.5 min



(R)-2-(1-(4-fluorophenyl)-4-phenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bd** as a colorless oil with 73% yield (26.7 mg).

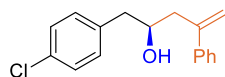
¹H NMR (500 MHz, CDCl₃) δ 7.35 – 7.34 (m, 2H), 7.32 – 7.27 (m, 2H), 7.24 (d, *J* = 7.1 Hz, 1H), 7.12 – 7.05 (m, 2H), 6.89 (t, *J* = 8.7 Hz, 2H), 5.25 (s, 1H), 5.12 (s, 1H), 2.72 – 2.62 (m, 3H), 2.54 (dd, *J* = 14.6, 6.7 Hz, 1H), 1.55 – 1.49 (m, 1H), 1.12 (s, 6H), 1.08 (s, 6H).

¹³C NMR (126 MHz, CDCl₃) δ 162.2, 160.2, 148.1, 141.3, 137.4 (d, *J* = 3.2 Hz), 130.2 (d, *J* = 7.6 Hz), 128.2, 127.3, 126.3, 114.8, 114.6, 113.1, 83.1, 36.7, 36.2, 24.7.

¹¹B NMR (160 MHz, CDCl₃) δ 34.09.

HRMS (ESI-TOF): calcd for C₂₃H₂₈BFO₂⁺ ([M + Na]⁺), 389.2166; found, 389.2168.

Specific rotation [α]_D²⁵ = 10.8, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 90% ee: *t*_R (minor) = 12.4 min, *t*_R (major) = 13.1 min



(R)-1-(4-chlorophenyl)-4-phenylpent-4-en-2-ol

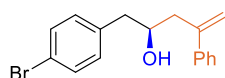
Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3be** as a colorless oil with 67% yield (18.2 mg).

¹H NMR (500 MHz, CDCl₃) δ 7.37 – 7.30 (m, 2H), 7.30 – 7.27 (m, 1H), 7.24 (s, 1H), 7.11 (d, *J* = 8.2 Hz, 2H), 5.42 (d, *J* = 1.0 Hz, 1H), 5.19 (s, 1H), 3.93 – 3.76 (m, 1H), 2.84 – 2.76 (m, 2H), 2.72 (dd, *J* = 13.7, 7.8 Hz, 1H), 2.60 (dd, *J* = 14.2, 8.6 Hz, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 145.2, 140.3, 136.9, 132.3, 130.7, 128.5 (d, *J* = 5.1 Hz), 127.8, 115.6, 70.3, 43.2, 42.6.

HRMS (ESI-TOF): calcd for C₁₇H₁₇ClO⁺ ([M + Na]⁺), 295.0968; found, 295.0969.

Specific rotation [α]_D²⁵ = -42.9, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 95/5, 0.5 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 20.0 min, *t*_R (major) = 23.6 min



(R)-1-(4-bromophenyl)-4-phenylpent-4-en-2-ol

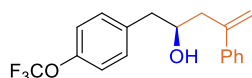
Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bf** as a colorless oil with 50% yield (15.8 mg).

¹H NMR (500 MHz, CDCl₃) δ 7.44 – 7.37 (m, 2H), 7.32 (tt, *J* = 13.7, 6.6 Hz, 4H), 7.05 (d, *J* = 7.9 Hz, 2H), 5.41 (s, 1H), 5.18 (s, 1H), 4.71 (s, 1H), 3.86 – 3.84 (m, 1H), 2.81 – 2.75 (m, 2H), 2.70 (dd, *J* = 13.7, 7.9 Hz, 1H), 2.59 (dd, *J* = 14.1, 8.6 Hz, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 145.2, 140.3, 137.5, 131.5, 131.1, 128.5, 127.8, 126.2, 120.3, 115.5, 70.3, 43.2, 42.7.

HRMS (ESI-TOF): calcd for C₁₇H₁₇BrO⁺ ([M + Na]⁺), 339.0463; found, 339.0467.

Specific rotation [α]_D²⁵ = -10.2, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 95/5, 0.5 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 17.8 min, *t*_R (major) = 19.0 min



(R)-4-phenyl-1-(4-(trifluoromethoxy)phenyl)pent-4-en-2-ol

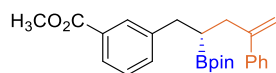
Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bg** as a colorless oil with 56% yield (24.2 mg).

¹H NMR (500 MHz, CDCl₃) δ 7.39 – 7.26 (m, 5H), 7.19 (d, *J* = 8.2 Hz, 2H), 7.13 (d, *J* = 8.2 Hz, 2H), 5.42 (s, 1H), 5.19 (s, 1H), 3.89 – 3.84 (m, 1H), 2.84 – 2.79 (m, 2H), 2.75 (dd, *J* = 13.8, 7.9 Hz, 1H), 2.61 (dd, *J* = 14.1, 8.6 Hz, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 147.9, 145.1, 140.3, 137.3, 130.7, 128.5, 127.8, 126.2, 120.9, 115.6, 70.3, 43.2, 42.6.

HRMS (ESI-TOF): calcd for C₁₈H₁₇F₃O₂⁺ ([M + Na]⁺), 345.1181; found, 345.1184.

Specific rotation [α]_D²⁵ = -8.9, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 96% ee: *t*_R (minor) = 10.3 min, *t*_R (major) = 11.0 min



(R)-methyl-4-(4-phenyl-2-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pent-4-en-1-yl)benzoate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bh** as a colorless oil with 68% yield (27.6 mg).

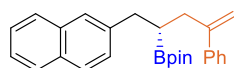
¹H NMR (500 MHz, CDCl₃) δ 7.85 – 7.81 (m, 2H), 7.35 – 7.32 (m, 2H), 7.31 – 7.28 (m, 4H), 7.25 – 7.23 (m, 1H), 5.26 (d, *J* = 1.0 Hz, 1H), 5.12 (d, *J* = 1.0 Hz, 1H), 2.75 (d, *J* = 8.1 Hz, 1H), 2.69 (dd, *J* = 14.5, 8.7 Hz, 1H), 2.54 (dd, *J* = 14.7, 6.9 Hz, 1H), 1.56 – 1.53 (m, 1H), 1.13 (s, 6H), 1.09 (s, 6H).

¹³C NMR (151 MHz, CDCl₃) δ 167.3, 148.1, 142.3, 141.3, 133.6, 130.1, 129.9, 128.2, 128.1, 127.3, 127.1, 126.3, 113.2, 83.2, 51.9, 36.8, 36.7, 24.8 (d, *J* = 4.1 Hz).

¹¹B NMR (193 MHz, CDCl₃) δ 33.83.

HRMS (ESI-TOF): calcd for C₂₅H₃₁BO₄⁺ ([M + Na]⁺), 429.2315; found, 429.2317.

Specific rotation [α]_D²⁵ = 33.3, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 22.5 min, *t*_R (major) = 26.1 min



(R)-4,4,5,5-tetramethyl-2-(1-(naphthalen-2-yl)-4-phenylpent-4-en-2-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bi** as a colorless oil with 75% yield (29.9 mg).

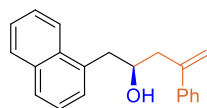
¹H NMR (500 MHz, CDCl₃) δ 7.77 (dd, *J* = 7.6, 1.6 Hz, 1H), 7.73 – 7.68 (m, 2H), 7.59 (s, 1H), 7.43 – 7.38 (m, 2H), 7.37 – 7.33 (m, 2H), 7.30 – 7.27 (m, 3H), 7.25 – 7.23 (m, 1H), 5.27 (d, *J* = 1.0 Hz, 1H), 5.14 (d, *J* = 1.0 Hz, 1H), 2.87 (d, *J* = 8.2 Hz, 2H), 2.71 (dd, *J* = 14.6, 9.1 Hz, 1H), 2.59 (dd, *J* = 14.7, 6.7 Hz, 1H), 1.74 – 1.63 (m, 1H), 1.11 (s, 6H), 1.05 (s, 6H).

¹³C NMR (151 MHz, CDCl₃) δ 148.2, 141.4, 139.4, 133.4, 132.0, 128.2, 127.7, 127.6, 127.5, 127.4, 127.2, 126.9, 126.3, 125.7, 124.9, 113.1, 83.1, 37.1, 36.7, 24.8, 24.7.

¹¹B NMR (193 MHz, CDCl₃) δ 34.20.

HRMS (ESI-TOF): calcd for C₂₇H₃₁BO₂⁺ ([M + Na]⁺), 421.2417; found, 421.2420.

Specific rotation [α]_D²⁵ = -64.9, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AS-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 11.9min, *t*_R (major) = 15.2 min



(R)-1-(naphthalen-1-yl)-4-phenylpent-4-en-2-ol

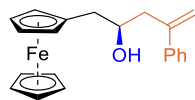
Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bj** as a colorless oil with 40% yield (15.9 mg).

¹H NMR (500 MHz, CDCl₃) δ 7.83 (d, *J* = 8.1 Hz, 1H), 7.76- 7.73 (m, 2H), 7.44 (t, *J* = 7.0 Hz, 1H), 7.41 – 7.34 (m, 5H), 7.32 – 7.28 (m, 3H), 5.45 (s, 1H), 5.25 (s, 1H), 4.15 – 4.00 (m, 1H), 3.39 (dd, *J* = 13.9, 4.1 Hz, 1H), 3.07 (dd, *J* = 13.9, 8.6 Hz, 1H), 2.94 – 2.79 (m, 2H).

¹³C NMR (151 MHz, CDCl₃) δ 145.3, 140.4, 134.6, 134.0, 132.1, 128.7, 128.5, 127.7, 127.6, 127.4, 126.3, 125.9, 125.6, 125.4, 123.8, 115.4, 69.9, 43.5, 40.4.

HRMS (ESI-TOF): calcd for C₂₁H₂₀O⁺ ([M + Na]⁺), 311.1514; found, 311.1518.

Specific rotation [α]_D²⁵ = -20.3, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 95% ee: *t*_R (minor) = 16.9min, *t*_R (major) = 19.8 min



(R)-1-Ferrocene-4-phenylpent-4-en-2-ol

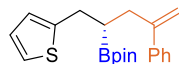
Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bk** as a colorless oil with 44% yield (15.3 mg).

¹H NMR (500 MHz, CDCl₃) δ 7.38 – 7.36 (m, 2H), 7.34 – 7.30 (m, 2H), 7.29 – 7.27 (m, 1H), 5.40 (s, 1H), 5.17 (s, 1H), 4.12 – 4.08 (m, 9H), 3.71 – 3.65 (m, 1H), 2.76 (dd, *J* = 14.2, 4.4 Hz, 1H), 2.58 – 2.49 (m, 3H), 1.88 (d, *J* = 3.0 Hz, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 145.4, 140.5, 128.4, 127.6, 126.2, 115.1, 84.4, 70.3, 68.6, 67.8, 67.7, 43.1, 37.3.

HRMS (ESI-TOF): calcd for C₂₁H₂₃FeO⁺ ([M + Na]⁺), 347.1870; found, 347.1873.

Specific rotation [α]_D²⁵ = 9.5, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 88% ee: *t*_R (minor) = 26.4 min, *t*_R (major) = 32.9 min



(R)-4,4,5,5-tetramethyl-2-(4-phenyl-1-(thiophen-2-yl)pent-4-en-2-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bl** as a colorless oil with 59% yield (20.9 mg).

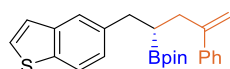
¹H NMR (500 MHz, CDCl₃) δ 7.37 (d, *J* = 8.6 Hz, 2H), 7.30 (t, *J* = 7.2 Hz, 2H), 7.23 (d, *J* = 7.4 Hz, 1H), 7.06 (dd, *J* = 5.1, 1.3 Hz, 1H), 6.86 (dd, *J* = 5.1, 3.4 Hz, 1H), 6.76 (d, *J* = 3.3 Hz, 1H), 5.26 (s, 1H), 5.12 (s, 1H), 2.98 – 2.86 (m, 2H), 2.68 (dd, *J* = 14.7, 8.8 Hz, 1H), 2.60 (dd, *J* = 14.6, 7.0 Hz, 1H), 1.63 – 1.59 (m, 1H), 1.13 (d, *J* = 9.9 Hz, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 148.0, 144.7, 141.4, 128.2, 127.3, 126.4, 126.3, 124.8, 123.0, 113.2, 83.2, 36.4, 30.9, 24.8 (d, *J* = 3.4 Hz).

¹¹B NMR (193 MHz, CDCl₃) δ 33.88.

HRMS (ESI-TOF): calcd for C₂₁H₂₇BO₂S⁺ ([M + Na]⁺), 377.1825; found, 377.1827.

Specific rotation [α]_D²⁵ = -28.8, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 97/3, 1.0 mL/min, 254 nm) indicated 98% ee: *t*_R (minor) = 14.3 min, *t*_R (major) = 15.4 min



(R)-2-(1-(benzo[b]thiophen-5-yl)-4-phenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bm**

as a colorless oil with 72% yield (29.1 mg).

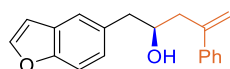
¹H NMR (500 MHz, CDCl₃) δ 7.72 (d, *J* = 8.2 Hz, 1H), 7.59 (d, *J* = 1.5 Hz, 1H), 7.37 (d, *J* = 5.4 Hz, 1H), 7.35 – 7.33 (m, 2H), 7.30 – 7.27 (m, 2H), 7.24 – 7.23 (m, 1H), 7.14 (dd, *J* = 8.3, 1.6 Hz, 1H), 5.26 (s, 1H), 5.13 (d, *J* = 0.5 Hz, 1H), 2.83 (d, *J* = 8.2 Hz, 2H), 2.68 (dd, *J* = 14.6, 9.2 Hz, 1H), 2.58 (dd, *J* = 14.7, 6.6 Hz, 1H), 1.67 – 1.60 (m, 1H), 1.12 (s, 6H), 1.06 (s, 6H).

¹³C NMR (151 MHz, CDCl₃) δ 148.3, 141.4, 139.7, 137.9, 137.2, 128.2, 127.2, 126.3, 126.1, 125.8, 123.6, 123.5, 121.9, 113.0, 83.1, 36.9, 36.7, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.17.

HRMS (ESI-TOF): calcd for C₂₅H₂₉BO₂S⁺ ([M + Na]⁺), 427.1981; found, 427.1985.

Specific rotation [α]_D²⁵ = 6.8, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 95/5, 0.5 mL/min, 254 nm) indicated 95% ee: *t*_R (minor) = 39.6 min, *t*_R (major) = 41.7 min



(R)-1-(benzofuran-5-yl)-4-phenylpent-4-en-2-ol

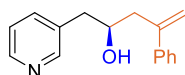
Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bn** as a colorless oil with 70% yield (19.5 mg).

¹H NMR (500 MHz, CDCl₃) δ 7.60 (d, *J* = 2.1 Hz, 1H), 7.43 – 7.40 (m, 2H), 7.37 – 7.35 (m, 2H), 7.33 – 7.27 (m, 3H), 7.10 – 7.08 (m, 1H), 6.72 – 6.68 (m, 1H), 5.42 (d, *J* = 1.0 Hz, 1H), 5.20 (s, 1H), 3.94 – 3.88 (m, 1H), 2.92 (dd, *J* = 13.7, 4.9 Hz, 1H), 2.85 – 2.81 (m, 2H), 2.64 (dd, *J* = 14.2, 8.4 Hz, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 153.9, 145.2, 140.4, 132.7, 128.4, 127.7, 127.6, 126.2, 125.6, 121.6, 115.3, 111.2, 106.4, 70.8, 43.2, 43.0.

HRMS (ESI-TOF): calcd for C₁₉H₁₈BO₂⁺ ([M + Na]⁺), 301.1307; found, 301.1310.

Specific rotation [α]_D²⁵ = 16.4, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 0.8 mL/min, 254 nm) indicated 96% ee: *t*_R (minor) = 26.3 min, *t*_R (major) = 30.2 min



(R)-4-phenyl-1-(pyridin-3-yl)pent-4-en-2-ol

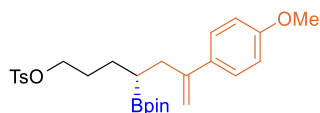
Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bo** as a colorless oil with 55% yield (19.2 mg).

¹H NMR (500 MHz, CDCl₃) δ 8.42 (d, *J* = 7.2 Hz, 2H), 7.51 (dd, *J* = 7.9, 1.9 Hz, 1H), 7.38 – 7.30 (m, 4H), 7.30 – 7.25 (m, 1H), 7.19 (dd, *J* = 7.8, 4.8 Hz, 1H), 5.42 (s, 1H), 5.19 (s, 1H), 3.90 – 3.85 (m, 1H), 2.84 – 2.79 (m, 2H), 2.73 (dd, *J* = 13.9, 7.9 Hz, 1H), 2.63 (dd, *J* = 14.1, 8.5 Hz, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 150.6, 147.7, 145.1, 140.3, 137.0, 128.5, 127.8, 126.2, 115.7, 67.0, 43.4, 40.3.

HRMS (ESI-TOF): calcd for C₁₆H₁₇NO⁺ ([M + Na]⁺), 262.1310; found, 262.1313.

Specific rotation [α]_D²⁵ = -16.9, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 18.4 min, *t*_R (major) = 23.0 min.



(R)-6-(4-methoxyphenyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bq** as a colorless oil with 63% yield (31.5 mg).

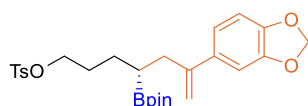
¹H NMR (500 MHz, CDCl₃) δ 7.82 – 7.68 (m, 2H), 7.42 – 7.22 (m, 4H), 6.87 – 6.78 (m, 2H), 5.14 (s, 1H), 4.94 (s, 1H), 3.96 (t, *J* = 6.6 Hz, 2H), 3.80 (s, 3H), 2.60 (dd, *J* = 14.6, 8.4 Hz, 1H), 2.43 (s, 3H), 2.38 (dd, *J* = 14.6, 7.4 Hz, 1H), 1.71 – 1.53 (m, 2H), 1.36 (q, *J* = 7.6 Hz, 2H), 1.18 (s, 12H), 1.13 – 1.05 (m, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 158.9, 147.2, 144.5, 133.7, 133.3, 129.7, 127.8, 127.3, 113.6, 111.5, 83.1, 70.8, 55.2, 36.7, 28.2, 26.5, 24.8 (d, *J* = 11.7 Hz), 21.6.

¹¹B NMR (193 MHz, CDCl₃) δ 34.04.

HRMS (ESI-TOF): calcd for C₂₇H₃₇BO₆S⁺ ([M + Na]⁺), 523.2404; found, 523.2407.

Specific rotation [α]_D²⁵ = 10.2, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 5.9 min, *t*_R (major) = 6.5 min



(R)-6-(benzo[d][1,3]dioxol-5-yl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bp** as a colorless oil with 76% yield (39.1 mg).

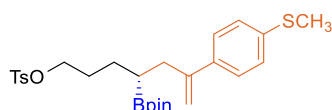
¹H NMR (500 MHz, CDCl₃) δ 7.78 – 7.76 (m, 2H), 7.32 (d, *J* = 8.0 Hz, 2H), 6.85 – 6.82 (m, 2H), 6.74 (d, *J* = 8.0 Hz, 1H), 5.94 (s, 2H), 5.12 (d, *J* = 1.2 Hz, 1H), 4.94 (d, *J* = 1.0 Hz, 1H), 3.96 (t, *J* = 6.7 Hz, 2H), 2.57 (dd, *J* = 14.6, 8.5 Hz, 1H), 2.44 (s, 3H), 2.36 (dd, *J* = 14.7, 7.3 Hz, 1H), 1.69 – 1.53 (m, 2H), 1.35 (q, *J* = 7.7 Hz, 2H), 1.18 (s, 12H), 1.12 – 1.06 (p, *J* = 7.7 Hz, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 147.5, 147.5, 146.8, 144.5, 135.5, 133.2, 129.7, 127.8, 119.7, 112.1, 107.9, 106.9, 100.9, 83.1, 70.8, 36.9, 28.2, 26.5, 24.8, 24.7, 21.6.

¹¹B NMR (193 MHz, CDCl₃) δ 34.04.

HRMS (ESI-TOF): calcd for C₂₇H₃₅BO₇S⁺ ([M + Na]⁺), 537.2197; found, 537.2197.

Specific rotation [α]_D²⁵ = -7.1 (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 91% ee: *t*_R (minor) = 6.3 min, *t*_R (major) = 6.9 min



(R)-6-(4-(methylthio)phenyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate

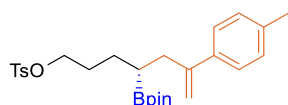
Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bq** as a colorless oil with 76% yield (39.1 mg).

¹H NMR (600 MHz, CDCl₃) δ 7.76 (d, *J* = 8.3 Hz, 2H), 7.32 (d, *J* = 8.0 Hz, 2H), 7.29 – 7.26 (m, 2H), 7.22 – 7.17 (m, 2H), 5.20 (d, *J* = 1.4 Hz, 1H), 5.00 (d, *J* = 1.5 Hz, 1H), 3.96 (t, *J* = 6.6 Hz, 2H), 2.60 (dd, *J* = 14.7, 8.4 Hz, 1H), 2.48 (s, 3H), 2.43 (s, 3H), 2.39 (dd, *J* = 14.7, 7.3 Hz, 1H), 1.70 – 1.64 (m, 1H), 1.61 – 1.52 (m, 1H), 1.36 (q, *J* = 7.6 Hz, 2H), 1.18 (d, *J* = 1.2 Hz, 12H), 1.09 (p, *J* = 7.5 Hz, 1H).
¹³C NMR (151 MHz, CDCl₃) δ 147.3, 144.5, 138.1, 137.3, 133.3, 129.8, 127.9, 126.7, 126.5, 112.6, 83.1, 70.8, 36.5, 28.2, 26.6, 24.8 (d, *J* = 10.7 Hz), 21.6, 15.9.

¹¹B NMR (193 MHz, CDCl₃) δ 33.90.

HRMS (ESI-TOF): calcd for C₂₇H₃₇BO₅S₂⁺ ([M + Na]⁺), 539.2175; found, 539.2177.

Specific rotation [α]_D²⁵ = -57.4, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (1G, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 6.5 min, *t*_R (major) = 7.0 min.



(R)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-6-(p-tolyl)hept-6-en-1-yl

4-methylbenzenesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bs** as a colorless oil with 72% yield (34.9 mg).

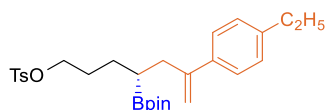
¹H NMR (500 MHz, CDCl₃) δ 7.76 (d, *J* = 8.3 Hz, 2H), 7.32 (d, *J* = 8.0 Hz, 2H), 7.24 (d, *J* = 8.1 Hz, 2H), 7.10 (d, *J* = 7.9 Hz, 2H), 5.18 (s, 1H), 4.97 (s, 1H), 3.96 (t, *J* = 6.7 Hz, 2H), 2.61 (dd, *J* = 14.7, 8.5 Hz, 1H), 2.44 (s, 3H), 2.39 (dd, *J* = 14.8, 7.4 Hz, 1H), 2.33 (s, 3H), 1.70 – 1.60 (m, 1H), 1.56 (s, 3H), 1.38 – 1.33 (m, 2H), 1.18 (d, *J* = 1.3 Hz, 12H), 1.13 – 1.07 (m, 1H), 0.90 – 0.84 (m, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 147.8, 144.5, 138.4, 1367.0, 133.4, 129.7, 128.9, 127.9, 126.1, 112.2, 83.1, 70.9, 36.7, 28.2, 26.6, 24.8 (d, *J* = 9.6 Hz), 21.6, 21.1.

¹¹B NMR (193 MHz, CDCl₃) δ 34.27.

HRMS (ESI-TOF): calcd for C₂₇H₃₇BO₅S⁺ ([M + Na]⁺), 507.2455; found, 507.2455.

Specific rotation [α]_D²⁵ = -13.8, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (1G, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 4.6 min, *t*_R (major) = 4.9 min.



(R)-6-(4-ethylphenyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl 4-methylbenzenesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bt** as a colorless oil with 65% yield (34.2 mg).

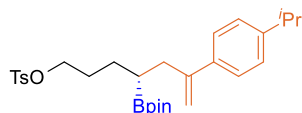
¹H NMR (500 MHz, CDCl₃) δ 7.76 (d, *J* = 8.2 Hz, 2H), 7.32 (d, *J* = 8.0 Hz, 2H), 7.29 – 7.23 (m, 2H), 7.13 (d, *J* = 8.0 Hz, 2H), 5.19 (s, 1H), 4.98 (s, 1H), 3.96 (t, *J* = 6.7 Hz, 2H), 2.62 (p, *J* = 6.9, 6.5 Hz, 3H), 2.48 – 2.34 (m, 3H), 1.73 – 1.62 (m, 1H), 1.59 – 1.52 (m, 0H), 1.36 (q, *J* = 7.7 Hz, 2H), 1.23 (t, *J* = 7.6 Hz, 3H), 1.18 (s, 9H), 1.11 (p, *J* = 7.5 Hz, 1H).

¹³C NMR (126 MHz, CDCl₃) δ 147.80, 144.50, 143.33, 138.63, 133.29, 129.74, 127.86, 127.69, 126.15, 112.24, 83.11, 70.87, 36.65, 28.48, 28.20, 26.59, 24.81, 24.74, 21.60, 15.51.

¹¹B NMR (160 MHz, CDCl₃) δ 34.73.

HRMS (ESI-TOF): calcd for C₂₈H₃₉BO₅S⁺ ([M + Na]⁺), 521.2611; found, 521.2614.

Specific rotation [α]_D²⁵ = -11.9, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 91% ee: *t*_R (minor) = 4.1 min, *t*_R (major) = 4.3 min.



(R)-6-(4-isopropylphenyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bu** as a colorless oil with 63% yield (32.3 mg).

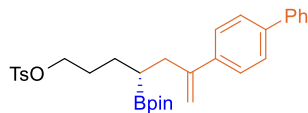
¹H NMR (500 MHz, CDCl₃) δ 7.77 (d, *J* = 8.0 Hz, 2H), 7.32 (d, *J* = 7.9 Hz, 2H), 7.29 – 7.24 (m, 2H), 7.15 (d, *J* = 8.0 Hz, 2H), 5.19 (s, 1H), 4.98 (s, 1H), 3.97 (t, *J* = 6.7 Hz, 2H), 2.91 – 2.86 (m, 1H), 2.62 (dd, *J* = 14.7, 8.6 Hz, 1H), 2.47 – 2.33 (m, 4H), 1.69 – 1.56 (m, 2H), 1.37 (q, *J* = 7.8 Hz, 2H), 1.24 (d, *J* = 6.9 Hz, 6H), 1.17 (s, 12H), 1.10 (q, *J* = 7.5 Hz, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 147.9, 147.8, 144.5, 138.7, 133.3, 129.8, 127.9, 126.3, 126.1, 112.3, 83.1, 70.9, 36.6, 33.8, 28.2, 26.6, 24.8, 24.7, 24.0 (d, *J* = 2.9 Hz), 21.6.

¹¹B NMR (193 MHz, CDCl₃) δ 33.50.

HRMS (ESI-TOF): calcd for C₂₉H₄₁BO₅S⁺ ([M + Na]⁺), 535.2768; found, 535.2769.

Specific rotation [α]_D²⁵ = 7.1, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 11.8 min, *t*_R (major) = 12.8 min.



(R)-6-([1,1'-biphenyl]-4-yl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bv** as a colorless oil with 69% yield (37.7 mg).

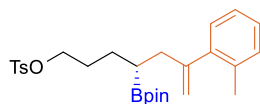
¹H NMR (500 MHz, CDCl₃) δ 7.77 – 7.75 (m, 2H), 7.60 – 7.58 (m, 2H), 7.54 – 7.53 (m, 2H), 7.44 (t, *J* = 7.4 Hz, 4H), 7.36 – 7.32 (m, 1H), 7.31 – 7.29 (m, 2H), 5.28 (s, 1H), 5.06 (s, 1H), 3.97 (t, *J* = 6.6 Hz, 2H), 2.67 (dd, *J* = 14.7, 8.5 Hz, 1H), 2.48 – 2.42 (m, 4H), 1.73 – 1.59 (m, 2H), 1.42 – 1.37 (m, 2H), 1.19 (d, *J* = 1.5 Hz, 12H), 1.16 – 1.14 (m, 1H).

¹³C NMR (126 MHz, CDCl₃) δ 147.5, 144.5, 140.8, 140.2, 140.1, 133.2, 129.8, 128.7, 127.9, 127.2, 127.0 (d, *J* = 2.3 Hz), 126.6, 113.0, 83.2, 70.8, 36.6, 28.2, 26.6, 24.8, 24.8, 21.6.

¹¹B NMR (160 MHz, CDCl₃) δ 34.30.

HRMS (ESI-TOF): calcd for C₃₂H₃₉BO₅S⁺ ([M + Na]⁺), 569.2611; found, 569.2614.

Specific rotation [α]_D²⁵ = -5.7, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 97/3, 1.0 mL/min, 254 nm) indicated 90% ee: *t*_R (minor) = 16.9 min, *t*_R (major) = 10.1 min.



(R)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl 4-methylbenzenesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bw** as a colorless oil with 56% yield (27.1 mg).

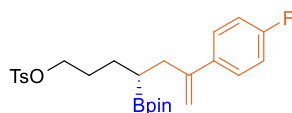
¹H NMR (600 MHz, CDCl₃) δ 7.80 – 7.73 (m, 2H), 7.32 (d, *J* = 8.0 Hz, 2H), 7.17 – 7.08 (m, 3H), 7.07 – 7.01 (m, 1H), 5.15 – 5.11 (m, 1H), 4.85 – 4.81 (m, 1H), 3.97 (t, *J* = 6.6 Hz, 2H), 2.50 – 2.40 (m, 4H), 2.27 (s, 3H), 2.24 (dd, *J* = 15.2, 6.4 Hz, 1H), 1.73 – 1.57 (m, 2H), 1.38 (q, *J* = 7.7 Hz, 2H), 1.19 (s, 12H), 1.11 – 1.03 (m, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 149.4, 144.5, 143.0, 134.8, 133.3, 130.0, 129.7, 128.4, 127.9, 126.7, 125.3, 114.0, 83.1, 70.8, 38.9, 28.2, 26.8, 24.8 (d, *J* = 13.9 Hz), 21.6, 19.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.20.

HRMS (ESI-TOF): calcd for C₂₇H₃₇BO₅S⁺ ([M + Na]⁺), 507.2455; found, 507.2457.

Specific rotation [α]_D²⁵ = -30.5, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 82% ee: *t*_R (minor) = 3.8 min, *t*_R (major) = 3.9 min.



(R)-6-(4-fluorophenyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl 4-methylbenzenesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bx** as a colorless oil with 72% yield (35.2 mg).

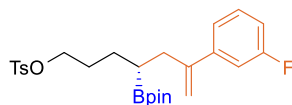
¹H NMR (500 MHz, CDCl₃) δ 7.77 – 7.75 (m, 2H), 7.33 – 7.29 (m, 4H), 6.98 (t, *J* = 8.7 Hz, 2H), 5.16 (s, 1H), 5.01 (s, 1H), 3.96 (t, *J* = 6.6 Hz, 2H), 2.60 (dd, *J* = 14.7, 8.5 Hz, 1H), 2.44 (s, 3H), 2.39 (dd, *J* = 14.7, 7.2 Hz, 1H), 1.71 – 1.61 (m, 1H), 1.58 – 1.54 (m, 1H), 1.37 (q, *J* = 7.7 Hz, 2H), 1.18 (d, *J* = 1.6 Hz, 12H), 1.10 – 1.04 (m, 1H).

¹³C NMR (126 MHz, CDCl₃) δ 163.2, 161.3, 147.1, 144.6, 137.4, 133.3, 129.8, 127.9, 127.8, 115.1, 114.9, 113.0, 83.2, 70.8, 36.8, 28.2, 26.6, 24.8 (d, *J* = 8.3 Hz), 21.6.

¹¹B NMR (160 MHz, CDCl₃) δ 34.03.

HRMS (ESI-TOF): calcd for C₂₆H₃₄BFO₅S⁺ ([M + Na]⁺), 511.2204; found, 511.2206.

Specific rotation [α]_D²⁵ = -20.6, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 98/2, 0.5 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 12.3 min, *t*_R (major) = 13.0 min.



(R)-6-(3-fluorophenyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl 4-methylbenzenesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3by**

as a colorless oil with 51% yield (24.9 mg).

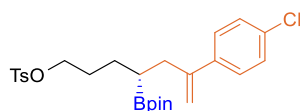
¹H NMR (500 MHz, CDCl₃) δ 7.78 – 7.76 (m, 2H), 7.32 (d, *J* = 8.1 Hz, 2H), 7.28 – 7.23 (m, 1H), 7.13 – 7.11 (m, 1H), 7.05 – 7.02 (m, 1H), 6.96 – 6.92 (m, 1H), 5.24 (d, *J* = 1.2 Hz, 1H), 5.06 (d, *J* = 1.4 Hz, 1H), 3.97 (t, *J* = 6.6 Hz, 2H), 2.60 (dd, *J* = 14.8, 8.6 Hz, 1H), 2.44 (s, 3H), 2.39 (dd, *J* = 14.8, 7.2 Hz, 1H), 1.70 – 1.63 (m, 1H), 1.59 – 1.54 (m, 1H), 1.37 (q, *J* = 7.8 Hz, 2H), 1.18 (d, *J* = 1.6 Hz, 12H), 1.13 – 1.05 (m, 1H).

¹³C NMR (126 MHz, CDCl₃) δ 163.8, 161.8, 147.0 (d, *J* = 2.2 Hz), 144.6, 143.7 (d, *J* = 7.6 Hz), 133.2, 129.8, 129.6 (d, *J* = 7.6 Hz), 127.8, 121.9 (d, *J* = 2.6 Hz), 114.1, 113.9 (d, *J* = 4.5 Hz), 113.3, 113.1, 83.2, 70.7, 36.5, 28.2, 26.6, 24.8, 24.7, 21.6.

¹¹B NMR (160 MHz, CDCl₃) δ 34.02.

HRMS (ESI-TOF): calcd for C₂₆H₃₄BFO₅S⁺ ([M + Na]⁺), 511.2204; found, 511.2205.

Specific rotation [α]_D²⁵ = 66.7, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 91% ee: *t*_R (minor) = 4.5 min, *t*_R (major) = 4.7 min



(R)-6-(4-chlorophenyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3bz** as a colorless oil with 72% yield (36.4 mg).

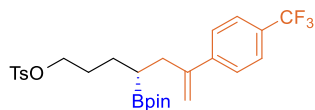
¹H NMR (500 MHz, CDCl₃) δ 7.77 – 7.75 (m, 2H), 7.32 (d, *J* = 8.0 Hz, 2H), 7.29 – 7.25 (m, 4H), 5.20 (d, *J* = 1.3 Hz, 1H), 5.04 (d, *J* = 1.4 Hz, 1H), 3.96 (t, *J* = 6.6 Hz, 2H), 2.59 (dd, *J* = 14.7, 8.6 Hz, 1H), 2.44 (s, 3H), 2.39 (dd, *J* = 14.7, 7.2 Hz, 1H), 1.69 – 1.53 (m, 2H), 1.37 (q, *J* = 7.7 Hz, 2H), 1.18 (d, *J* = 1.7 Hz, 12H), 1.10 – 1.04 (m, 1H).

¹³C NMR (126 MHz, CDCl₃) δ 146.9, 144.5, 139.7, 133.2, 133.0, 129.7, 128.3, 127.8, 127.6, 113.5, 83.2, 70.7, 36.6, 28.2, 26.5, 24.7 (d, *J* = 7.7 Hz), 21.6.

¹¹B NMR (160 MHz, CDCl₃) δ 36.78.

HRMS (ESI-TOF): calcd for C₂₆H₃₄BClO₅S⁺ ([M + Na]⁺), 527.1909; found, 527.1911.

Specific rotation [α]_D²⁵ = -31.0, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 97/3, 1.0 mL/min, 254 nm) indicated 91% ee: *t*_R (minor) = 5.2 min, *t*_R (major) = 5.4 min



(R)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-6-(4-(trifluoromethyl)phenyl)hept-6-en-1-yl-4-methylbenzenesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ca** as a colorless oil with 63% yield (33.9 mg).

¹H NMR (500 MHz, CDCl₃) δ 7.78 – 7.76 (m, 2H), 7.55 (d, *J* = 8.1 Hz, 2H), 7.45 (d, *J* = 8.1 Hz, 2H), 7.32 (d, *J* = 8.0 Hz, 2H), 5.27 (s, 1H), 5.13 (s, 1H), 3.97 (t, *J* = 6.6 Hz, 2H), 2.63 (dd, *J* = 14.8, 8.6 Hz,

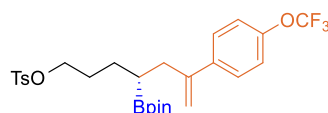
1H), 2.44 (s, 4H), 1.77 – 1.52 (m, 2H), 1.42 – 1.36 (m, 2H), 1.18 (d, $J = 2.1$ Hz, 12H), 1.10 – 1.04 (m, 1H).

^{13}C NMR (126 MHz, CDCl_3) δ 147.1, 145.0, 144.6, 133.2, 129.8, 127.9, 126.6, 125.2 (q, $J = 3.5$ Hz), 114.9, 83.2, 70.7, 36.6, 28.2, 26.6, 24.8, 24.7, 21.6.

^{11}B NMR (160 MHz, CDCl_3) δ 33.84.

HRMS (ESI-TOF): calcd for $\text{C}_{27}\text{H}_{34}\text{BF}_3\text{O}_5\text{S}^+$ ($[\text{M} + \text{Na}]^+$), 561.2172; found, 561.2175.

Specific rotation $[\alpha]_{\text{D}}^{25} = -6.8$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 97/3, 1.0 mL/min, 254 nm) indicated 92% ee: t_{R} (minor) = 4.8 min, t_{R} (major) = 5.1 min



(R)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-6-(4-(trifluoromethoxy)phenyl)hept-6-en-1-yl-4-methylbenzenesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3cb** as a colorless oil with 77% yield (42.7 mg).

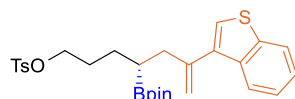
^1H NMR (600 MHz, CDCl_3) δ 7.77 (d, $J = 8.3$ Hz, 2H), 7.37 – 7.35 (m, 2H), 7.33 – 7.32 (m, 2H), 7.15 – 7.13 (m, 2H), 5.21 (d, $J = 1.3$ Hz, 1H), 5.06 (d, $J = 1.4$ Hz, 1H), 3.97 (t, $J = 6.6$ Hz, 2H), 2.61 (dd, $J = 14.7$, 8.6 Hz, 1H), 2.44 (s, 3H), 2.41 (dd, $J = 14.7$, 7.0 Hz, 1H), 1.71 – 1.59 (m, 2H), 1.40 – 1.36 (m, 2H), 1.18 (d, $J = 2.0$ Hz, 12H), 1.12 – 1.05 (m, 1H).

^{13}C NMR (151 MHz, CDCl_3) δ 148.4 (d, $J = 4.5$ Hz), 146.8, 144.6, 140.1, 133.2, 129.8, 127.9, 127.6, 120.7, 113.9, 83.2, 70.7, 36.7, 28.2, 26.6, 24.8, 24.7, 21.6.

^{11}B NMR (193 MHz, CDCl_3) δ 33.76.

HRMS (ESI-TOF): calcd for $\text{C}_{27}\text{H}_{34}\text{BF}_3\text{O}_6\text{S}^+$ ($[\text{M} + \text{Na}]^+$), 577.2121; found, 577.2124.

Specific rotation $[\alpha]_{\text{D}}^{25} = -3.4$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 97/3, 1.0 mL/min, 254 nm) indicated 92% ee: t_{R} (minor) = 4.4 min, t_{R} (major) = 4.6 min



6-(benzo[b]thiophen-3-yl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3cc** as a colorless oil with 82% yield (43.2 mg).

^1H NMR (600 MHz, CDCl_3) δ 7.89 (d, $J = 7.4$ Hz, 1H), 7.84 (d, $J = 8.1$ Hz, 1H), 7.74 (d, $J = 8.2$ Hz, 2H), 7.37 – 7.32 (m, 2H), 7.29 (d, $J = 8.0$ Hz, 2H), 7.22 (s, 1H), 5.30 – 5.27 (m, 1H), 5.24 (s, 1H), 3.95 (t, $J = 6.6$ Hz, 2H), 2.66 (dd, $J = 14.7$, 8.6 Hz, 1H), 2.50 – 2.38 (m, 4H), 1.70 – 1.63 (m, 1H), 1.59 – 1.51 (m, 1H), 1.39 (q, $J = 7.7$ Hz, 1H), 1.18 (s, 12H), 1.15 – 1.09 (m, 1H).

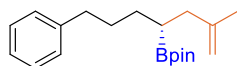
^{13}C NMR (151 MHz, CDCl_3) δ 144.5, 143.2, 140.5, 138.3, 138.1, 133.3, 129.7, 127.8, 124.2, 124.0, 123.3, 122.7, 122.5, 115.1, 83.2, 70.8, 38.6, 28.2, 26.6, 24.8 (d, $J = 4.7$ Hz), 21.6.

^{11}B NMR (193 MHz, CDCl_3) δ 34.16.

HRMS (ESI-TOF): calcd for $\text{C}_{28}\text{H}_{35}\text{BO}_5\text{S}_2^+$ ($[\text{M} + \text{Na}]^+$), 549.2019; found, 549.2015.

Specific rotation $[\alpha]_{\text{D}}^{25} = -18.6$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 254 nm) indicated 92% ee: t_{R} (minor) = 4.3 min, t_{R} (major) = 4.7

min



(R)-4,4,5,5-tetramethyl-2-(2-methyl-7-phenylhept-1-en-4-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3cd** as a colorless oil with 78% yield (24.5 mg).

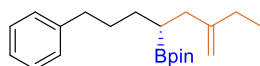
¹H NMR (500 MHz, CDCl₃) δ 7.30 – 7.21 (m, 2H), 7.17 – 7.14 (m, 3H), 4.68 (s, 2H), 2.65 – 2.55 (m, 2H), 2.14 (dd, *J* = 14.3, 9.0 Hz, 1H), 2.03 (dd, *J* = 14.3, 7.0 Hz, 1H), 1.69 (s, 3H), 1.67 – 1.56 (m, 2H), 1.48 – 1.41 (m, 2H), 1.28 – 1.23 (m, 1H), 1.21 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 145.6, 142.8, 128.3, 128.2, 125.5, 110.3, 82.9, 39.5, 36.2, 31.0, 30.9, 24.8, 24.8, 22.4.

¹¹B NMR (193 MHz, CDCl₃) δ 33.67.

HRMS (ESI-TOF): calcd for C₂₀H₃₁BO₂⁺ ([M + Na]⁺), 337.2417; found, 337.2418.

Specific rotation [α]_D²⁵ = -66.0, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 97/3, 0.7 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 13.4 min, *t*_R (major) = 14.1 min.



(R)-4,4,5,5-tetramethyl-2-(6-methylene-1-phenyloctan-4-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ce** as a colorless oil with 86% yield (28.2 mg).

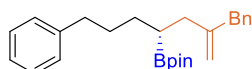
¹H NMR (500 MHz, CDCl₃) δ 7.28 – 7.22 (m, 2H), 7.16 (d, *J* = 7.3 Hz, 3H), 4.70 (d, *J* = 13.1 Hz, 2H), 2.65 – 2.54 (m, 2H), 2.15 (dd, *J* = 14.5, 9.3 Hz, 1H), 2.08 – 1.98 (m, 3H), 1.68 – 1.57 (m, 2H), 1.49 – 1.37 (m, 2H), 1.28 – 1.24 (m, 1H), 1.21 (s, 12H), 1.00 (t, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 151.1, 142.8, 128.3, 128.2, 125.5, 108.0, 82.9, 38.0, 36.2, 31.0, 28.7, 24.8 (d, *J* = 12.5 Hz), 12.3.

¹¹B NMR (193 MHz, CDCl₃) δ 33.81.

HRMS (ESI-TOF): calcd for C₂₁H₃₃BO₂⁺ ([M + Na]⁺), 351.2574; found, 351.2578.

Specific rotation [α]_D²⁵ = -45.9, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OJ-H, Hexane/IPA = 97/3, 0.7 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 12.4 min, *t*_R (major) = 18.1 min.



(R)-2-(2-benzyl-7-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3cf** as a colorless oil with 75% yield (29.3 mg).

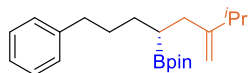
¹H NMR (500 MHz, CDCl₃) δ 7.28 – 7.22 (m, 4H), 7.19 – 7.16 (m, 3H), 7.16 – 7.13 (m, 3H), 4.84 (s, 1H), 4.66 (s, 1H), 3.31 (s, 2H), 2.63 – 2.52 (m, 2H), 2.12 (dd, *J* = 14.8, 9.5 Hz, 1H), 2.01 (dd, *J* = 14.8, 6.5 Hz, 1H), 1.64 – 1.57 (m, 2H), 1.48 – 1.36 (m, 2H), 1.34 – 1.29 (m, 1H), 1.21 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 148.8, 142.7, 139.9, 129.1, 128.4, 128.2 (d, *J* = 1.8 Hz), 125.9, 125.5, 111.6, 83.0, 42.8, 37.4, 36.1, 31.0, 30.9, 24.9, 24.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.01.

HRMS (ESI-TOF): calcd for C₂₆H₃₅BO₂⁺ ([M + Na]⁺), 413.2730; found, 413.2733.

Specific rotation [α]_D²⁵ = 38.5, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 22.0 min, *t*_R (major) = 36.9 min.



(R)-4,4,5,5-tetramethyl-2-(7-methyl-6-methylene-1-phenyloctan-4-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3cg** as a colorless oil with 50% yield (17.1 mg).

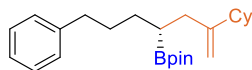
¹H NMR (500 MHz, CDCl₃) δ 7.30 – 7.21 (m, 2H), 7.16 (d, *J* = 7.4 Hz, 3H), 4.71 (d, *J* = 3.7 Hz, 2H), 2.65 – 2.55 (m, 2H), 2.24 – 2.19 (m, 1H), 2.15 (dd, *J* = 15.1, 9.9 Hz, 1H), 2.07 (dd, *J* = 15.1, 6.4 Hz, 1H), 1.67 – 1.61 (m, 2H), 1.38 – 1.50 (m, 2H), 1.31 – 1.26 (m, 1H), 1.20 (d, *J* = 1.2 Hz, 12H), 1.01 (t, *J* = 6.4 Hz, 6H).

¹³C NMR (151 MHz, CDCl₃) δ 155.7, 142.8, 128.4, 128.2, 125.5, 106.6, 82.9, 36.4, 36.2, 33.5, 31.2, 31.1, 24.8 (d, *J* = 8.0 Hz), 21.9 (d, *J* = 6.1 Hz).

¹¹B NMR (193 MHz, CDCl₃) δ 34.33.

HRMS (ESI-TOF): calcd for C₂₂H₃₅BO₂⁺ ([M + Na]⁺), 365.2730; found, 365.2732.

Specific rotation [α]_D²⁵ = -40.3, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 97/3, 0.7 mL/min, 220 nm) indicated 95% ee: *t*_R (minor) = 9.9 min, *t*_R (major) = 10.2 min



(R)-2-(2-cyclohexyl-7-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ch** as a colorless oil with 62% yield (23.7 mg).

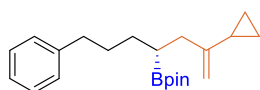
¹H NMR (600 MHz, CDCl₃) δ 7.25 (t, *J* = 7.6 Hz, 2H), 7.16 (d, *J* = 7.4 Hz, 3H), 4.70 (d, *J* = 13.0 Hz, 2H), 2.67 – 2.52 (m, 2H), 2.14 (dd, *J* = 14.9, 9.7 Hz, 1H), 2.06 (dd, *J* = 14.9, 6.4 Hz, 1H), 1.84 – 1.79 (m, 1H), 1.77 – 1.70 (m, 4H), 1.66 – 1.61 (m, 3H), 1.47 – 1.39 (m, 2H), 1.29 – 1.22 (m, 2H), 1.20 (s, 12H), 1.17 – 1.04 (m, 4H).

¹³C NMR (151 MHz, CDCl₃) δ 155.0, 142.8, 128.4, 128.2, 125.5, 107.1, 82.9, 43.9, 36.9, 36.2, 32.6, 32.5, 31.2, 31.0, 26.9 (d, *J* = 4.8 Hz), 26.5, 24.8 (d, *J* = 11.0 Hz).

¹¹B NMR (193 MHz, CDCl₃) δ 34.28.

HRMS (ESI-TOF): calcd for C₂₅H₃₉BO₂⁺ ([M + Na]⁺), 405.3043; found, 405.3045.

Specific rotation [α]_D²⁵ = 14.8, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 98.5/0.5, 1.0 mL/min, 220 nm) indicated 93% ee: *t*_R (minor) = 23.4 min, *t*_R (major) = 24.4 min



(R)-2-(2-cyclopropyl-7-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ci** as a colorless oil with 62% yield (21.1 mg).

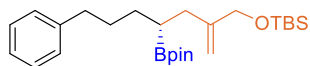
¹H NMR (500 MHz, CDCl₃) δ 7.30 – 7.22 (m, 2H), 7.16 (d, *J* = 7.5 Hz, 3H), 4.63 (s, 1H), 4.57 (s, 1H), 2.65 – 2.55 (m, 2H), 2.18 (dd, *J* = 14.5, 9.1 Hz, 1H), 2.06 (dd, *J* = 14.4, 6.7 Hz, 1H), 1.72 – 1.58 (m, 2H), 1.51 – 1.40 (m, 2H), 1.39 – 1.34 (m, 1H), 1.29 – 1.24 (m, 1H), 1.21 (s, 12H), 0.61 – 0.56 (m, 2H), 0.49 – 0.35 (m, 2H).

¹³C NMR (151 MHz, CDCl₃) δ 150.7, 142.8, 128.4, 128.2, 125.5, 106.3, 82.9, 38.0, 36.2, 31.0, 24.9, 24.8, 16.0, 6.1, 6.0.

¹¹B NMR (193 MHz, CDCl₃) δ 34.24.

HRMS (ESI-TOF): calcd for C₂₂H₃₃BO₂⁺ ([M + Na]⁺), 363.2574; found, 363.2577.

Specific rotation [α]_D²⁵ = 17.8, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 97/3, 0.7 mL/min, 220 nm) indicated 93% ee: *t*_R (minor) = 15.0 min, *t*_R (major) = 16.1 min



(R)-tert-butyl dimethyl((2-methylene-7-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)heptyl)oxy)silane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3cj** as a colorless oil with 69% yield (30.7 mg).

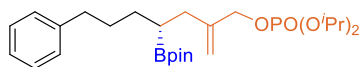
¹H NMR (500 MHz, CDCl₃) δ 7.32 (t, *J* = 7.6 Hz, 2H), 7.26 – 7.18 (m, 3H), 5.09 (s, 1H), 4.89 (s, 1H), 4.11 (s, 2H), 2.65 (hept, *J* = 7.1 Hz, 2H), 2.18 (dd, *J* = 14.8, 9.3 Hz, 1H), 2.10 (dd, *J* = 14.7, 6.7 Hz, 1H), 1.57 – 1.44 (m, 2H), 1.35 – 1.29 (m, 1H), 1.27 (s, 9H), 0.97 (s, 8H), 0.12 (s, 5H).

¹³C NMR (151 MHz, CDCl₃) δ 148.22, 142.75, 128.34, 128.17, 125.51, 108.51, 82.96, 65.72, 36.18, 34.37, 31.05, 30.96, 25.94, 24.84, 24.78, 18.39, -5.36 (d, *J* = 2.3 Hz).

¹¹B NMR (193 MHz, CDCl₃) δ 34.03.

HRMS (ESI-TOF): calcd for C₂₆H₄₅BO₃Si⁺ ([M + Na]⁺), 467.3231; found, 467.3234.

Specific rotation [α]_D²⁵ = 26.3, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 97/3, 0.7 mL/min, 210 nm) indicated 83% ee: *t*_R (minor) = 9.3 min, *t*_R (major) = 9.9 min.



(R)-diisopropyl (2-methylene-7-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)heptyl)phosphate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3ck** as a colorless oil with 90% yield (44.5 mg).

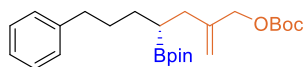
¹H NMR (500 MHz, CDCl₃) δ 7.27 – 7.24 (m, 2H), 7.15 (d, *J* = 7.6 Hz, 3H), 5.08 (s, 1H), 4.94 (s, 1H), 4.66 – 4.60 (m, 2H), 4.42 – 4.40 (m, 2H), 2.61 – 2.57 (m, 2H), 2.18 (dd, *J* = 15.4, 9.0 Hz, 1H), 2.11 (dd, *J* = 13.7, 7.0 Hz, 1H), 1.68 – 1.60 (m, 2H), 1.48 – 1.41 (m, 2H), 1.34 – 1.31 (m, 12H), 1.20 (s, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 144.0 (d, *J* = 7.8 Hz), 142.7, 128.3, 128.2, 125.5, 112.0, 83.0, 72.3 (d, *J* = 6.1 Hz), 69.3 (d, *J* = 5.7 Hz), 36.1, 34.2, 30.9 (d, *J* = 10.3 Hz), 24.9 – 24.8 (m), 23.6 (d, *J* = 5.0 Hz).

¹¹B NMR (193 MHz, CDCl₃) δ 34.30.

HRMS (ESI-TOF): calcd for C₂₆H₄₄BO₆P⁺ ([M + Na]⁺), 517.2969; found, 517.2971.

Specific rotation $[\alpha]_{\text{D}}^{25} = 13.3$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 85/15, 1.0 mL/min, 210 nm) indicated 93% ee: t_{R} (minor) = 5.6 min, t_{R} (major) = 6.2 min.



(R)-tert-butyl-(2-methylene-7-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)heptyl) carbonate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3cl** as a colorless oil with 65% yield (27.9 mg).

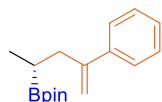
^1H NMR (600 MHz, CDCl_3) δ 7.25 (d, $J = 8.2$ Hz, 2H), 7.16 (d, $J = 7.3$ Hz, 3H), 5.03 (s, 1H), 4.96 (s, 1H), 4.49 (s, 2H), 2.64 – 2.55 (m, 2H), 2.18 (dd, $J = 14.9, 9.5$ Hz, 1H), 2.10 (dd, $J = 15.0, 6.5$ Hz, 1H), 1.64 (q, $J = 7.2$ Hz, 2H), 1.48 (s, 9H), 1.23 – 1.20 (m, 13H).

^{13}C NMR (151 MHz, CDCl_3) δ 153.4, 143.5, 142.7, 128.4, 128.2, 125.5, 112.5, 83.1, 81.9, 69.2, 36.1, 34.6, 30.9 (d, $J = 6.6$ Hz), 27.8, 24.8 (d, $J = 2.9$ Hz).

^{11}B NMR (193 MHz, CDCl_3) δ 33.81.

HRMS (ESI-TOF): calcd for $\text{C}_{25}\text{H}_{39}\text{BO}_5^+$ ($[\text{M} + \text{Na}]^+$), 453.2891; found, 453.2894.

Specific rotation $[\alpha]_{\text{D}}^{25} = -22.0$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 95/5, 1.0 mL/min, 220 nm) indicated 88% ee: t_{R} (minor) = 11.7 min, t_{R} (major) = 20.2 min.



(R)-4,4,5,5-tetramethyl-2-(4-phenylpent-4-en-2-yl)-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3cm** as a colorless oil with 85% yield (23.1 mg).

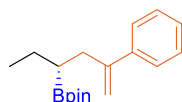
^1H NMR (500 MHz, CDCl_3) δ 7.40 (d, $J = 7.6$ Hz, 2H), 7.30 (t, $J = 7.5$ Hz, 2H), 7.24 (t, $J = 7.1$ Hz, 1H), 5.24 (s, 1H), 5.06 (s, 1H), 2.75 (dd, $J = 14.7, 7.4$ Hz, 1H), 2.36 (dd, $J = 14.5, 8.4$ Hz, 1H), 1.28–1.24 (m, 1H), 1.21 (s, 12H), 0.95 (d, $J = 7.4$ Hz, 3H).

^{13}C NMR (151 MHz, CDCl_3) δ 148.4, 141.6, 128.1, 127.1, 126.3, 112.7, 82.9, 38.5, 24.7, 15.1.

^{11}B NMR (193 MHz, CDCl_3) δ 34.41.

HRMS (ESI-TOF): calcd for $\text{C}_{17}\text{H}_{25}\text{BO}_2^+$ ($[\text{M} + \text{Na}]^+$), 295.1948; found, 295.1949.

Specific rotation $[\alpha]_{\text{D}}^{25} = -7.6$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 81% ee: t_{R} (minor) = 9.7 min, t_{R} (major) = 10.7 min.



(R)-4,4,5,5-tetramethyl-2-(5-phenylhex-5-en-3-yl)-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3cn** as a colorless oil with 80% yield (22.9 mg).

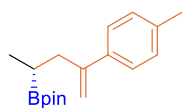
¹H NMR (500 MHz, CDCl₃) δ 7.39 (d, *J* = 7.3 Hz, 2H), 7.30 (t, *J* = 7.5 Hz, 2H), 7.25 – 7.22 (m, 2H), 5.23 (s, 1H), 5.08 (s, 1H), 2.65 (dd, *J* = 14.7, 9.1 Hz, 1H), 2.51 (dd, *J* = 14.7, 7.0 Hz, 1H), 1.47 – 1.41 (m, 2H), 1.21 (s, 12H), 1.12 (d, *J* = 7.4 Hz, 1H), 0.90 (t, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 148.6, 141.8, 128.1, 127.1, 126.3, 112.6, 82.9, 36.7, 24.8, 24.8, 24.1, 13.5.

¹¹B NMR (193 MHz, CDCl₃) δ 34.19.

HRMS (ESI-TOF): calcd for C₁₈H₂₇BO₂⁺ ([M + Na]⁺), 309.2104; found, 309.2107.

Specific rotation [α]_D²⁵ = -23.7, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 8.0 min, *t*_R (major) = 8.9 min.



(R)-4,4,5,5-tetramethyl-2-(4-(p-tolyl)pent-4-en-2-yl)-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3co** as a colorless oil with 85% yield (24.3 mg).

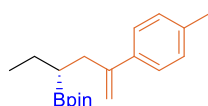
¹H NMR (500 MHz, CDCl₃) δ 7.29 (d, *J* = 7.6 Hz, 2H), 7.11 (d, *J* = 7.8 Hz, 2H), 5.21 (s, 1H), 5.01 (s, 1H), 2.74 (dd, *J* = 14.7, 7.6 Hz, 1H), 2.38 – 2.26 (m, 4H), 1.28 – 1.24 (m, 1H), 1.21 (s, 12H), 0.94 (d, *J* = 7.3 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 148.1, 138.7, 136.8, 128.8, 126.2, 112.0, 82.9, 38.6, 24.7, 22.4, 21.1, 15.1.

¹¹B NMR (193 MHz, CDCl₃) δ 34.38.

HRMS (ESI-TOF): calcd for C₁₈H₂₇BO₂⁺ ([M + Na]⁺), 309.2104; found, 309.2106.

Specific rotation [α]_D²⁵ = 29.4, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 80% ee: *t*_R (minor) = 7.9 min, *t*_R (major) = 8.8 min.



(R)-4,4,5,5-tetramethyl-2-(5-(p-tolyl)hex-5-en-3-yl)-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3cp** as a colorless oil with 60% yield (18.0 mg).

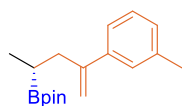
¹H NMR (500 MHz, CDCl₃) δ 7.31 – 7.27 (m, 2H), 7.11 (d, *J* = 8.0 Hz, 2H), 5.20 (d, *J* = 1.5 Hz, 1H), 5.03 (d, *J* = 1.4 Hz, 1H), 2.63 (dd, *J* = 14.8, 8.9 Hz, 1H), 2.49 (dd, *J* = 14.7, 6.9 Hz, 1H), 2.33 (s, 3H), 1.47 – 1.40 (m, 2H), 1.21 (s, 12H), 1.17 – 1.11 (m, 1H), 0.89 (t, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 148.4, 138.8, 136.8, 128.8, 126.2, 111.8, 82.9, 36.7, 24.8 (d, *J* = 6.9 Hz), 24.1, 21.1, 13.5, 1.0.

¹¹B NMR (193 MHz, CDCl₃) δ 34.33.

HRMS (ESI-TOF): calcd for C₁₉H₂₉BO₂⁺ ([M + Na]⁺), 323.2261; found, 323.2264.

Specific rotation [α]_D²⁵ = -42.4, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 6.9 min, *t*_R (major) = 7.9 min.



(R)-4,4,5,5-tetramethyl-2-(4-(m-tolyl)pent-4-en-2-yl)-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3cq** as a colorless oil with 50% yield (14.3 mg).

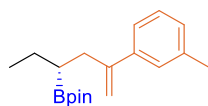
¹H NMR (500 MHz, CDCl₃) δ 7.22 – 7.15 (m, 3H), 7.06 (d, *J* = 4.7 Hz, 1H), 5.21 (s, 1H), 5.04 (s, 1H), 2.73 (dd, *J* = 14.6, 7.4 Hz, 1H), 2.37 – 2.33 (m, 4H), 1.29 – 1.22 (m, 1H), 1.21 (s, 12H), 0.95 (d, *J* = 7.3 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 148.5, 141.7, 137.5, 128.0, 127.9, 127.1, 123.5, 112.5, 82.9, 38.6, 24.7, 21.5, 15.1.

¹¹B NMR (193 MHz, CDCl₃) δ 34.25.

HRMS (ESI-TOF): calcd for C₁₈H₂₇BO₂⁺ ([M + Na]⁺), 309.2104; found, 309.2106.

Specific rotation [α]_D²⁵ = -36.4, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 97/3, 1.0 mL/min, 254 nm) indicated 80% ee: *t*_R (minor) = 9.0 min, *t*_R (major) = 10.3 min.



(R)-4,4,5,5-tetramethyl-2-(5-(m-tolyl)hex-5-en-3-yl)-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3cr** as a colorless oil with 63% yield (18.9 mg).

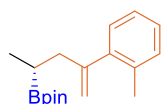
¹H NMR (500 MHz, CDCl₃) δ 7.22 – 7.15 (m, 3H), 7.08 – 7.02 (m, 2H), 5.20 (s, 1H), 5.06 (s, 1H), 2.63 (dd, *J* = 15.1, 9.0 Hz, 1H), 2.49 (dd, *J* = 15.1, 9.0 Hz, 1H), 2.34 (s, 3H), 1.47 – 1.41 (m, 2H), 1.21 (s, 12H), 1.17 – 1.11 (m, 1H), 0.90 (t, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 148.7, 141.8, 137.6, 128.0, 127.9, 127.1, 123.4, 112.3, 82.9, 36.7, 24.8, 24.8, 24.1, 21.5, 13.5.

¹¹B NMR (193 MHz, CDCl₃) δ 34.20.

HRMS (ESI-TOF): calcd for C₁₉H₂₉BO₂⁺ ([M + Na]⁺), 323.2261; found, 323.2265.

Specific rotation [α]_D²⁵ = 10.5, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 6.0 min, *t*_R (major) = 6.6 min.



(R)-4,4,5,5-tetramethyl-2-(4-(o-tolyl)pent-4-en-2-yl)-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3cs** as a colorless oil with 56% yield (16.0 mg).

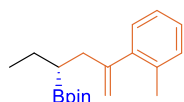
¹H NMR (500 MHz, CDCl₃) δ 7.15 – 7.10 (m, 2H), 7.08 (d, *J* = 5.9 Hz, 1H), 5.17 (s, 1H), 4.85 (s, 1H), 2.54 (dd, *J* = 15.1, 7.9 Hz, 1H), 2.30 (s, 3H), 2.22 (dd, *J* = 15.0, 7.3 Hz, 1H), 1.21 (s, 12H), 1.18 – 1.15 (m, 1H), 0.99 (d, *J* = 7.3 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 149.8, 143.3, 134.9, 123.0, 128.5, 126.6, 125.2, 113.8, 82.9, 41.0, 24.7 (d, *J* = 3.0 Hz), 19.8, 15.4.

¹¹B NMR (193 MHz, CDCl₃) δ 34.47.

HRMS (ESI-TOF): calcd for C₁₈H₂₇BO₂⁺ ([M + Na]⁺), 309.2104; found, 309.2106.

Specific rotation [α]_D²⁵ = -47.3, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 97/3, 0.7 mL/min, 254 nm) indicated 68% ee: *t*_R (minor) = 7.0 min, *t*_R (major) = 7.8 min.



(R)-4,4,5,5-tetramethyl-2-(5-(o-tolyl)hex-5-en-3-yl)-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3ct** as a colorless oil with 71% yield (21.3 mg).

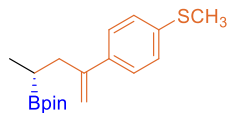
¹H NMR (500 MHz, CDCl₃) δ 7.15 – 7.13 (m, 1H), 7.12 – 7.10 (m, 1H), 7.10 – 7.08 (m, 1H), 5.18 (d, *J* = 1.5 Hz, 1H), 4.84 (d, *J* = 0.5 Hz, 1H), 2.47 (dd, *J* = 15.2, 9.3 Hz, 1H), 2.33 – 2.29 (m, 4H), 1.48 – 1.42 (m, 2H), 1.23 (s, 12H), 1.14 – 1.08 (m, 1H), 0.90 (t, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 150.1, 143.5, 134.8, 130.0, 128.5, 126.6, 125.3, 113.6, 83.0, 39.1, 24.9, 24.8, 24.3, 19.8, 13.5.

¹¹B NMR (193 MHz, CDCl₃) δ 34.41.

HRMS (ESI-TOF): calcd for C₁₉H₂₉BO₂⁺ ([M + Na]⁺), 323.2261; found, 323.2263.

Specific rotation [α]_D²⁵ = -33.9, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 86% ee: *t*_R (minor) = 8.8 min, *t*_R (major) = 9.3 min.



(R)-4,4,5,5-tetramethyl-2-(4-(4-(methylthio)phenyl)pent-4-en-2-yl)-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3cu** as a colorless oil with 80% yield (25.5 mg).

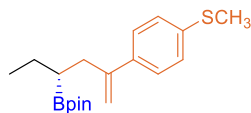
¹H NMR (500 MHz, CDCl₃) δ 7.37 – 7.30 (m, 2H), 7.22 – 7.17 (m, 2H), 5.23 (s, 1H), 5.03 (s, 1H), 2.72 (dd, *J* = 14.2, 7.8 Hz, 1H), 2.47 (s, 3H), 2.34 (dd, *J* = 14.6, 8.3 Hz, 1H), 1.50 – 1.24 (m, 13H), 0.94 (d, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 147.6, 138.5, 137.1, 126.7, 126.6, 112.4, 82.9, 38.4, 24.7, 16.0, 15.1.

¹¹B NMR (193 MHz, CDCl₃) δ 34.44.

HRMS (ESI-TOF): calcd for C₁₈H₂₇BO₂S⁺ ([M + Na]⁺), 341.1825; found, 341.1827.

Specific rotation [α]_D²⁵ = 13.5, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 98/2, 1.0 mL/min, 254 nm) indicated 86% ee: *t*_R (minor) = 19.0 min, *t*_R (major) = 20.6 min.



(R)-4,4,5,5-tetramethyl-2-(5-(4-(methylthio)phenyl)hex-5-en-3-yl)-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3cv** as a colorless oil with 62% yield (20.6 mg).

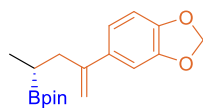
¹H NMR (600 MHz, CDCl₃) δ 7.34 – 7.30 (m, 2H), 7.22 – 7.18 (m, 2H), 5.22 (d, *J* = 1.2 Hz, 1H), 5.05 (d, *J* = 1.2 Hz, 1H), 2.62 (dd, *J* = 14.7, 8.9 Hz, 1H), 2.50 – 2.46 (m, 4H), 1.48 – 1.38 (m, 2H), 1.21 (s, 12H), 1.15 – 1.10 (m, 1H), 0.89 (t, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 147.8, 138.6, 137.1, 126.7, 126.6, 112.2, 83.0, 36.6, 24.8 (d, *J* = 7.5 Hz), 24.1, 16.0, 13.5.

¹¹B NMR (193 MHz, CDCl₃) δ 34.37.

HRMS (ESI-TOF): calcd for C₁₉H₂₉BO₂S⁺ ([M + Na]⁺), 355.1981; found, 355.1983.

Specific rotation [α]_D²⁵ = 8.5, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 92% ee: *t*_R (minor) = 9.9 min, *t*_R (major) = 10.9 min.



(R)-2-(4-(benzo[d][1,3]dioxol-5-yl)pent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3cw** as a colorless oil with 80% yield (25.3 mg).

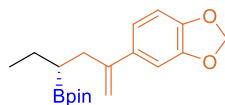
¹H NMR (500 MHz, CDCl₃) δ 6.93 – 6.85 (m, 2H), 6.75 (d, *J* = 8.0 Hz, 1H), 5.93 (s, 2H), 5.15 (s, 1H), 4.98 (s, 1H), 2.68 (dd, *J* = 14.6, 7.6 Hz, 1H), 2.31 (dd, *J* = 14.6, 8.2 Hz, 1H), 1.24 – 1.14 (m, 13H), 0.94 (d, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 147.8, 147.5, 146.8, 135.9, 119.8, 111.9, 107.9, 107.0, 100.9, 82.9, 38.8, 24.7, 15.1.

¹¹B NMR (193 MHz, CDCl₃) δ 34.31.

HRMS (ESI-TOF): calcd for C₁₈H₂₅BO₄⁺ ([M + Na]⁺), 339.1846; found, 339.1847.

Specific rotation [α]_D²⁵ = -20.3, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 84% ee: *t*_R (minor) = 15.4 min, *t*_R (major) = 17.3 min.



(R)-2-(5-(benzo[d][1,3]dioxol-5-yl)hex-5-en-3-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3cx** as a colorless oil with 90% yield (29.7 mg).

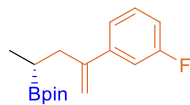
¹H NMR (500 MHz, CDCl₃) δ 6.92 – 6.84 (m, 2H), 6.75 (d, *J* = 8.0 Hz, 1H), 5.94 (s, 2H), 5.13 (s, 1H), 5.00 (s, 1H), 2.58 (dd, *J* = 14.6, 9.0 Hz, 1H), 2.45 (dd, *J* = 14.7, 7.0 Hz, 1H), 1.45 – 1.40 (m, 2H), 1.22 (s, 12H), 1.17 – 1.07 (m, 1H), 0.89 (t, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 148.0, 147.5, 146.8, 136.0, 119.7, 111.8, 107.9, 107.0, 100.9, 82.9, 37.0, 24.9, 24.8, 24.1, 13.5.

¹¹B NMR (193 MHz, CDCl₃) δ 34.37.

HRMS (ESI-TOF): calcd for C₁₉H₂₇BO₄⁺ ([M + Na]⁺), 353.2002; found, 353.2002.

Specific rotation $[\alpha]_{\text{D}}^{25} = -16.4$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 91% ee: t_{R} (minor) = 13.1 min, t_{R} (major) = 14.8 min.



(R)-2-(4-(3-fluorophenyl)pent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3cy** as a colorless oil with 60% yield (17.4 mg).

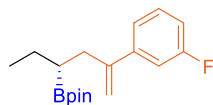
^1H NMR (500 MHz, CDCl_3) δ 7.30 – 7.22 (m, 1H), 7.17 (d, $J = 7.8$ Hz, 1H), 7.10 – 7.08 (m, 1H), 6.95 – 6.91 (m, 1H), 5.26 (s, 1H), 5.09 (s, 1H), 2.71 (dd, $J = 14.7$, 7.6 Hz, 1H), 2.35 (dd, $J = 14.7$, 8.1 Hz, 1H), 1.21 – 1.16 (m, 13H), 0.95 (d, $J = 7.4$ Hz, 3H).

^{13}C NMR (151 MHz, CDCl_3) δ 163.6, 162.0, 147.4 (d, $J = 2.1$ Hz), 144.0 (d, $J = 7.4$ Hz), 129.5 (d, $J = 8.5$ Hz), 122.0 (d, $J = 2.8$ Hz), 114.1 – 113.6 (m), 113.3 (d, $J = 21.8$ Hz), 83.0, 38.4, 24.7 (d, $J = 2.4$ Hz), 15.1.

^{11}B NMR (193 MHz, CDCl_3) δ 34.09.

HRMS (ESI-TOF): calcd for $\text{C}_{17}\text{H}_{24}\text{BFO}_2^+$ ($[\text{M} + \text{Na}]^+$), 313.1853; found, 313.1855.

Specific rotation $[\alpha]_{\text{D}}^{25} = -36.8$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 98/2, 0.7 mL/min, 254 nm) indicated 81% ee: t_{R} (minor) = 25.6 min, t_{R} (major) = 28.0 min



(R)-2-(5-(3-fluorophenyl)hex-5-en-3-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3cz** as a colorless oil with 64% yield (19.5 mg).

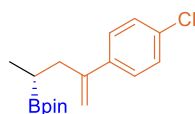
^1H NMR (600 MHz, CDCl_3) δ 7.28 – 7.23 (m, 1H), 7.17 – 7.16 (m, 1H), 7.10 – 7.07 (m, 1H), 6.95 – 6.91 (m, 1H), 5.25 (s, 1H), 5.12 (d, $J = 1.2$ Hz, 1H), 2.61 (dd, $J = 14.8$, 9.0 Hz, 1H), 2.48 (dd, $J = 14.8$, 6.8 Hz, 1H), 1.49 – 1.40 (m, 2H), 1.24 – 1.21 (m, 13H), 1.15 – 1.00 (m, 1H), 0.90 (t, $J = 7.4$ Hz, 3H).

^{13}C NMR (151 MHz, CDCl_3) δ 163.63, 162.01, 147.56, 144.10 (d, $J = 7.4$ Hz), 129.52 (d, $J = 8.2$ Hz), 121.93 (d, $J = 2.8$ Hz), 114.03 – 113.42 (m), 113.23 (d, $J = 21.9$ Hz), 83.00, 36.58, 24.81 (d, $J = 5.8$ Hz), 24.07, 13.43.

^{11}B NMR (193 MHz, CDCl_3) δ 34.36.

HRMS (ESI-TOF): calcd for $\text{C}_{18}\text{H}_{26}\text{BFO}_2^+$ ($[\text{M} + \text{Na}]^+$), 327.2010; found, 327.2011.

Specific rotation $[\alpha]_{\text{D}}^{25} = -6.8$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 97/3, 1.0 mL/min, 254 nm) indicated 90% ee: t_{R} (minor) = 6.7 min, t_{R} (major) = 7.2 min.



(R)-2-(4-(4-chlorophenyl)pent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3da** as a colorless oil with 80% yield (24.5 mg).

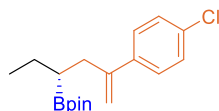
¹H NMR (500 MHz, CDCl₃) δ 7.32 (d, *J* = 8.8 Hz, 2H), 7.28 – 7.24 (m, 2H), 5.22 (s, 1H), 5.07 (s, 1H), 2.71 (dd, *J* = 14.7, 7.5 Hz, 1H), 2.34 (dd, *J* = 14.7, 8.1 Hz, 1H), 1.21 (s, 12H), 1.17 – 1.13 (m, 1H), 0.94 (d, *J* = 7.3 Hz, 2H).

¹³C NMR (151 MHz, CDCl₃) δ 147.3, 140.0, 132.9, 128.3, 127.7, 113.2, 82.0, 38.5, 24.7, 15.1.

¹¹B NMR (193 MHz, CDCl₃) δ 34.37.

HRMS (ESI-TOF): calcd for C₁₇H₂₄BClO₂⁺ ([M + Na]⁺), 329.1558; found, 329.1561.

Specific rotation [α]_D²⁵ = 14.6, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 81% ee: *t*_R (minor) = 9.3 min, *t*_R (major) = 10.4 min.



(R)-2-(5-(4-chlorophenyl)hex-5-en-3-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3db** as a colorless oil with 70% yield (22.4 mg).

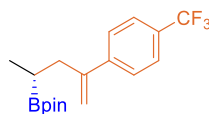
¹H NMR (600 MHz, CDCl₃) δ 7.33 - 7.32 (m, 1H), 7.31 (d, *J* = 2.1 Hz, 1H), 7.27 (d, *J* = 2.1 Hz, 1H), 7.26 (d, *J* = 1.6 Hz, 1H), 5.21 (d, *J* = 1.2 Hz, 1H), 5.09 (d, *J* = 1.3 Hz, 1H), 2.61 (dd, *J* = 14.8, 9.0 Hz, 1H), 2.47 (dd, *J* = 14.7, 6.9 Hz, 1H), 1.45 – 1.40 (m, 2H), 1.21 (d, *J* = 1.9 Hz, 12H), 1.13 – 1.08 (m, 1H), 0.89 (t, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 147.5, 140.1, 132.9, 128.3, 127.6, 113.1, 83.0, 36.6, 24.8 (d, *J* = 5.8 Hz), 24.0, 13.4.

¹¹B NMR (193 MHz, CDCl₃) δ 34.63.

HRMS (ESI-TOF): calcd for C₁₈H₂₆BClO₂⁺ ([M + Na]⁺), 343.1714; found, 343.1717.

Specific rotation [α]_D²⁵ = -23.7, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 88% ee: *t*_R (minor) = 7.1 min, *t*_R (major) = 8.1 min.



(R)-4,4,5,5-tetramethyl-2-(4-(4-(trifluoromethyl)phenyl)pent-4-en-2-yl)-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3dc** as a colorless oil with 80% yield (27.2 mg).

¹H NMR (500 MHz, CDCl₃) δ 7.56 (d, *J* = 8.3 Hz, 2H), 7.49 (d, *J* = 8.0 Hz, 2H), 5.30 (s, 1H), 5.16 (s, 1H), 2.75 (dd, *J* = 15.3, 7.9 Hz, 1H), 2.44 – 2.32 (m, 1H), 1.25 – 1.14 (m, 13H), 0.95 (d, *J* = 7.3 Hz, 3H).

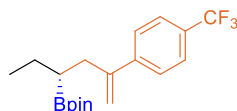
¹³C NMR (151 MHz, CDCl₃) δ 147.4, 145.3, 137.0, 129.2 (q, *J* = 32.3 Hz), 126.7, 125.1 (d, *J* = 3.8 Hz), 123.4, 114.6, 83.0, 38.5, 24.7 (d, *J* = 2.1 Hz), 15.1.

¹¹B NMR (193 MHz, CDCl₃) δ 34.23.

HRMS (ESI-TOF): calcd for C₁₈H₂₄BF₃O₂ ([M + Na]⁺), 363.1821; found, 363.1823

Specific rotation [α]_D²⁵ = -18.6, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol

(AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 80% ee: t_R (minor) = 6.7 min, t_R (major) = 7.6 min.



(R)-4,4,5,5-tetramethyl-2-(5-(4-(trifluoromethyl)phenyl)hex-5-en-3-yl)-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3dd** as a colorless oil with 75% yield (25.5 mg).

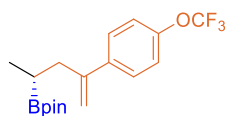
^1H NMR (500 MHz, CDCl_3) δ 7.56 (d, J = 8.1 Hz, 2H), 7.48 (d, J = 8.1 Hz, 2H), 5.28 (s, 1H), 5.18 (s, 1H), 2.69 – 2.60 (m, 1H), 2.52 (dd, J = 14.7, 6.8 Hz, 1H), 1.49 – 1.38 (m, 2H), 1.21 (d, J = 1.8 Hz, 12H), 1.10 (dt, J = 15.1, 7.5 Hz, 1H), 0.90 (t, J = 7.4 Hz, 3H).

^{13}C NMR (151 MHz, CDCl_3) δ 147.7, 145.4, 129.2 (q, J = 32.5 Hz), 126.6, 125.1 (d, J = 3.9 Hz), 114.5, 83.0, 36.6, 24.8 (d, J = 5.3 Hz), 24.1, 13.4.

^{11}B NMR (193 MHz, CDCl_3) δ 34.61.

HRMS (ESI-TOF): calcd for $\text{C}_{19}\text{H}_{26}\text{BF}_3\text{O}_2$ ($[\text{M} + \text{Na}]^+$), 377.1978; found, 377.1979.

Specific rotation $[\alpha]_{\text{D}}^{25} = -15.3$, (c = 1.00, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 93% ee: t_R (minor) = 6.4 min, t_R (major) = 7.5 min.



(R)-4,4,5,5-tetramethyl-2-(4-(4-(trifluoromethoxy)phenyl)pent-4-en-2-yl)-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3de** as a colorless oil with 80% yield (28.5 mg).

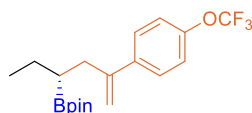
^1H NMR (600 MHz, CDCl_3) δ 7.43 – 7.39 (m, 2H), 7.17 – 7.12 (m, 2H), 5.24 – 5.22 (m, 1H), 5.10 – 5.08 (m, 1H), 2.72 (dd, J = 14.7, 7.6 Hz, 1H), 2.36 (dd, J = 14.7, 8.0 Hz, 1H), 1.21 (d, J = 2.5 Hz, 12H), 1.19 – 1.13 (m, 1H), 0.95 (d, J = 7.4 Hz, 3H).

^{13}C NMR (151 MHz, CDCl_3) δ 148.4, 147.2, 140.3, 127.7, 120.6, 113.6, 83.0, 38.6, 24.7, 15.1.

^{11}B NMR (193 MHz, CDCl_3) δ 34.29.

HRMS (ESI-TOF): calcd for $\text{C}_{18}\text{H}_{24}\text{BF}_3\text{O}_3^+$ ($[\text{M} + \text{Na}]^+$), 379.1771; found, 379.1773.

Specific rotation $[\alpha]_{\text{D}}^{25} = -11.1$, (c = 1.00, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 92% ee: t_R (minor) = 7.0 min, t_R (major) = 7.9 min.



(R)-4,4,5,5-tetramethyl-2-(5-(4-(trifluoromethoxy)phenyl)hex-5-en-3-yl)-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3df** as a colorless oil with 68% yield (25.2 mg).

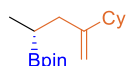
¹H NMR (600 MHz, CDCl₃) δ 7.40 (d, *J* = 8.8 Hz, 2H), 7.14 (d, *J* = 8.1 Hz, 2H), 5.23 – 5.20 (m, 1H), 5.11 (d, *J* = 1.2 Hz, 1H), 2.62 (dd, *J* = 15.0, 9.1 Hz, 1H), 2.49 (dd, *J* = 14.6, 6.9 Hz, 1H), 1.44 (p, *J* = 7.4 Hz, 2H), 1.21 (d, *J* = 1.2 Hz, 12H), 1.12 (dt, *J* = 9.0, 7.0 Hz, 1H), 0.90 (t, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 148.4, 147.4, 140.4, 127.6, 120.6, 113.5, 83.0, 36.7, 29.7, 24.8 (d, *J* = 7.5 Hz), 24.1, 13.4.

¹¹B NMR (193 MHz, CDCl₃) δ 34.29.

HRMS (ESI-TOF): calcd for C₁₉H₂₆BF₃O₃⁺ ([M + Na]⁺), 393.1927; found, 393.1928.

Specific rotation [α]_D²⁵ = -31.6, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 83% ee: *t*_R (minor) = 5.7 min, *t*_R (major) = 6.5 min.



(R)-2-(4-cyclohexylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3dg** as a colorless oil with 68% yield (18.9 mg).

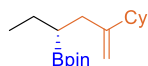
¹H NMR (500 MHz, CDCl₃) δ 4.70 (d, *J* = 5.7 Hz, 2H), 2.22 (dd, *J* = 14.9, 8.4 Hz, 1H), 1.95 (dd, *J* = 14.9, 7.6 Hz, 1H), 1.86 – 1.80 (m, 1H), 1.80 – 1.71 (m, 4H), 1.69 – 1.63 (m, 1H), 1.30 – 1.23 (m, 3H), 1.22 (d, *J* = 1.8 Hz, 12H), 1.19 – 1.05 (m, 3H), 0.95 (d, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 154.9, 107.1, 82.8, 43.9, 38.6, 32.7, 32.5, 26.9 (d, *J* = 3.7 Hz), 26.5, 24.7 (d, *J* = 2.5 Hz), 15.4.

¹¹B NMR (193 MHz, CDCl₃) δ 34.42.

HRMS (ESI-TOF): calcd for C₁₇H₃₁BO₂⁺ ([M + Na]⁺), 301.2417; found, 301.2419.

Specific rotation [α]_D²⁵ = -23.5, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 97/3, 1.0 mL/min, 210 nm) indicated 65% ee: *t*_R (minor) = 8.9 min, *t*_R (major) = 9.3 min.



(R)-2-(5-cyclohexylhex-5-en-3-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3dh** as a colorless oil with 69% yield (20.2 mg).

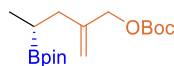
¹H NMR (500 MHz, CDCl₃) δ 4.73 – 4.71 (m, 1H), 4.69 (s, 1H), 2.15 (dd, *J* = 14.9, 9.6 Hz, 1H), 2.07 (dd, *J* = 15.0, 6.6 Hz, 1H), 1.87 – 1.79 (m, 1H), 1.78 – 1.70 (m, 4H), 1.70 – 1.63 (m, 1H), 1.41 (p, *J* = 7.4 Hz, 2H), 1.29 – 1.22 (m, 2H), 1.22 (s, 12H), 1.21 – 1.05 (m, 4H), 0.92 (t, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 155.1, 107.0, 82.8, 43.9, 36.8, 32.6, 32.5, 26.9 (d, *J* = 4.0 Hz), 26.5, 24.8 (d, *J* = 6.9 Hz), 24.4, 13.7.

¹¹B NMR (193 MHz, CDCl₃) δ 34.29.

HRMS (ESI-TOF): calcd for C₁₈H₃₃BO₂⁺ ([M + Na]⁺), 315.2574; found, 315.2577.

Specific rotation [α]_D²⁵ = -12.9, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 97/3, 0.5 mL/min, 210 nm) indicated 86% ee: *t*_R (minor) = 12.9 min, *t*_R (major) = 13.3 min.



(R)-tert-butyl-(2-methylene-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pentyl) carbonate

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3di** as a colorless oil with 78% yield (20.2 mg).

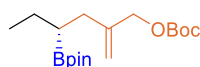
¹H NMR (500 MHz, CDCl₃) δ 5.05 (s, 1H), 4.95 (s, 1H), 4.49 (s, 2H), 2.26 (dd, *J* = 14.9, 7.9 Hz, 1H), 2.01 (dd, *J* = 15.0, 7.9 Hz, 1H), 1.49 (s, 9H), 1.27 - 1.22 (m, 13H), 0.97 (d, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 153.4, 143.3, 112.5, 83.0, 81.9, 69.2, 36.2, 27.8, 24.7 (d, *J* = 6.3 Hz), 15.2.

¹¹B NMR (193 MHz, CDCl₃) δ 34.34.

HRMS (ESI-TOF): calcd for C₁₇H₃₁BO₅⁺ ([M + Na]⁺), 349.2265; found, 349.2266.

Specific rotation [α]_D²⁵ = -5.0, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 97/3, 1.0 mL/min, 210 nm) indicated 64% ee: *t*_R (minor) = 22.6 min, *t*_R (major) = 25.5 min.



(R)-tert-butyl-(2-methylene-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hexyl) carbonate

Following the General Procedure C at a 0.1 mmol scale with alkene to afford the title compound **3dj** as a colorless oil with 75% yield (20.2 mg).

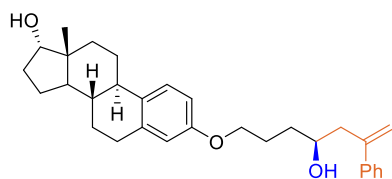
¹H NMR (600 MHz, CDCl₃) δ 5.04 (s, 1H), 4.96 (s, 1H), 4.50 (s, 2H), 2.19 (dd, *J* = 15.0, 9.2 Hz, 1H), 2.11 (dd, *J* = 15.0, 6.9 Hz, 1H), 1.49 (s, 9H), 1.46 – 1.39 (m, 2H), 1.27 – 1.25 (m, 1H), 1.22 (s, 12H), 0.92 (t, *J* = 7.4 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 153.4, 143.6, 112.3, 83.0, 81.9, 69.2, 34.3, 27.8, 24.8, 24.1, 13.5.

¹¹B NMR (193 MHz, CDCl₃) δ 34.30.

HRMS (ESI-TOF): calcd for C₁₈H₃₃BO₅⁺ ([M + Na]⁺), 363.2421; found, 363.2422.

Specific rotation [α]_D²⁵ = -27.4, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (OD-H, Hexane/IPA = 98/2, 0.5 mL/min, 210 nm) indicated 84% ee: *t*_R (minor) = 22.6 min, *t*_R (major) = 25.5 min.



(8S,9R,13R,17S)-3-(((S)-4-hydroxy-6-phenylhept-6-en-1-yl)oxy)-13-methyl-7,8,9,11,12,13,14,15,16,17-decahydro-6H-cyclopenta[a]phenanthren-17-ol

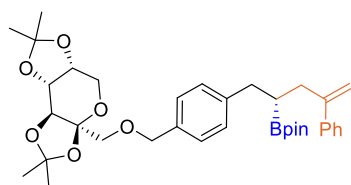
Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3dk** as a colorless oil with 80% yield (36.9 mg).

¹H NMR (500 MHz, CDCl₃) δ 7.42 – 7.40 (m, 2H), 7.34 (t, *J* = 7.5 Hz, 2H), 7.29 (d, *J* = 7.2 Hz, 1H), 7.19 – 7.18 (m, 1H), 6.68 (dd, *J* = 8.7, 2.8 Hz, 1H), 6.63 – 6.59 (m, 1H), 5.42 (d, *J* = 1.0 Hz, 1H), 5.17 (d, *J* = 1.0 Hz, 1H), 3.91 (t, *J* = 6.4 Hz, 2H), 3.73 – 3.71 (m, 1H), 3.69 – 3.65 (m, 1H), 2.83 – 2.80 (m, 2H), 2.52 (dd, *J* = 14.1, 9.0 Hz, 1H), 2.36 – 2.26 (m, 1H), 2.21 – 2.08 (m, 2H), 1.96 – 1.92 (m, 1H), 1.89 – 1.84 (m, 1H), 1.79 – 1.74 (m, 2H), 1.69 – 1.66 (m, 1H), 1.50 – 1.16 (m, 10H), 0.77 (s, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 156.9, 145.4, 140.5, 137.9, 132.5, 128.5, 127.7, 126.3, 126.2, 115.3, 114.5, 112.0, 81.9, 69.3, 67.7, 50.0, 44.0, 43.8, 43.3, 38.9, 36.7, 36.6, 30.6, 29.8, 29.3, 27.3, 26.3, 23.1, 22.3, 11.1.

HRMS (ESI-TOF): calcd for C₃₁H₄₀O₃⁺ ([M + Na]⁺), 483.2977; found, 483.2978.

Specific rotation [α]_D²⁵ = 23.4, (c = 1.00, CH₂Cl₂). dr > 25:1.



4,4,5,5-tetramethyl-2-(4-phenyl-1-(4-(((3aS,5aR,8aR,8bS)-2,2,7,7-tetramethyltetrahydro-3aH-bis([1,3]dioxolo)[4,5-b:4',5'-d]pyran-3a-yl)methoxy)methyl)phenyl)pent-4-en-2-yl)-1,3,2-dioxaborolane compound with methane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3dl** as a colorless oil with 82% yield (52.2 mg).

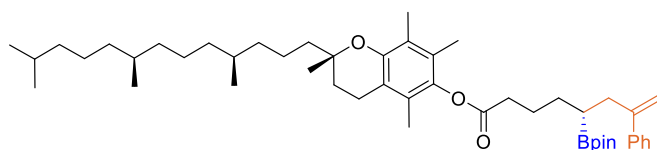
¹H NMR (600 MHz, CDCl₃) δ 7.34 – 7.33 (m, 2H), 7.28 (t, *J* = 7.6 Hz, 2H), 7.25 – 7.22 (m, 1H), 7.19 (d, *J* = 7.9 Hz, 2H), 7.10 (d, *J* = 7.8 Hz, 2H), 5.25 (s, 1H), 5.11 (s, 1H), 4.63 – 4.57 (m, 2H), 4.52 (d, *J* = 12.0 Hz, 1H), 4.43 (d, *J* = 2.6 Hz, 1H), 4.21 (dd, *J* = 7.9, 1.7 Hz, 1H), 3.90 (dd, *J* = 13.0, 1.9 Hz, 1H), 3.72 (d, *J* = 13.0 Hz, 1H), 3.63 – 3.53 (m, 2H), 2.61 – 3.55 (m, 3H), 2.54 (dd, *J* = 14.7, 6.6 Hz, 1H), 1.62 – 1.50 (m, 4H), 1.41 (s, 3H), 1.39 (s, 3H), 1.32 (s, 3H), 1.12 (s, 6H), 1.07 (s, 6H).

¹³C NMR (151 MHz, CDCl₃) δ 148.2, 141.4, 141.0, 135.4, 128.7, 128.1, 127.3, 127.2, 126.2, 112.9, 108.8, 108.4, 102.7, 83.0, 73.6, 71.4, 71.0, 70.2, 70.1, 61.0, 36.7 (d, *J* = 8.8 Hz), 26.5, 25.8, 25.4, 24.7 (d, *J* = 4.7 Hz), 24.0.

¹¹B NMR (193 MHz, CDCl₃) δ 33.74.

HRMS (ESI-TOF): calcd for C₃₇H₅₃BO₈⁺ ([M + Na]⁺), 659.3833; found, 659.3835.

Specific rotation [α]_D²⁵ = -14.9, (c = 1.00, CH₂Cl₂). dr > 25:1.



(S)-2,5,7,8-tetramethyl-2-((4S,8S)-4,8,12-trimethyltridecyl)chroman-6-yl-(R)-7-phenyl-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oct-7-enoate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3dm** as a colorless oil with 60% yield (45.4 mg).

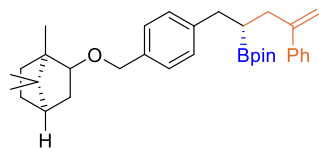
¹H NMR (500 MHz, CDCl₃) δ 7.43 – 7.35 (m, 2H), 7.30 (t, *J* = 7.5 Hz, 2H), 7.27 – 7.20 (m, 1H), 5.24 (s, 1H), 5.10 (s, 1H), 2.69 (dd, *J* = 14.7, 8.7 Hz, 1H), 2.61 – 2.50 (m, 5H), 2.08 (s, 3H), 1.98 (s, 3H), 1.94 (s, 3H), 1.86 – 1.71 (m, 4H), 1.58 – 1.50 (m, 6H), 1.46 – 1.34 (m, 5H), 1.32 – 1.21 (m, 23H), 1.17 – 1.11 (m, 2H), 1.10 – 1.02 (m, 3H), 0.87 – 0.84 (m, 12H).

¹³C NMR (151 MHz, CDCl₃) δ 172.2, 149.3, 148.3, 141.5, 140.5, 128.2, 127.2, 126.7, 126.3, 124.9, 122.9, 117.3, 112.9, 83.1, 75.0, 39.4, 37.5, 37.3, 36.9, 34.5, 32.8, 32.7, 31.2, 30.9, 28.0, 24.8, 24.7, 24.4, 22.7, 22.6, 21.0, 20.6, 19.7, 19.7, 13.0, 12.1, 11.8.

¹¹B NMR (193 MHz, CDCl₃) δ 34.37.

HRMS (ESI-TOF): calcd for $C_{49}H_{77}BO_5^+$ ($[M + Na]^+$), 779.5864; found, 779.5862.

Specific rotation $[\alpha]_D^{25} = 15.2$, ($c = 1.00$, CH_2Cl_2). $dr > 25:1$.



4,4,5,5-tetramethyl-2-(4-phenyl-1-(4-(((1S,4S)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-yl)oxy)methyl)phenyl)pent-4-en-2-yl)-1,3,2-dioxaborolane

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3dn** as a colorless oil with 60% yield (31.9 mg).

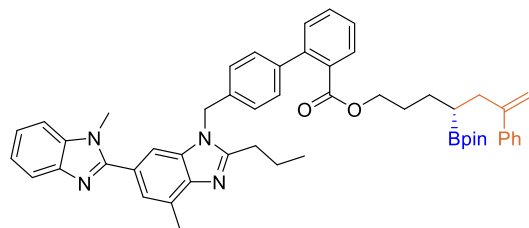
1H NMR (500 MHz, $CDCl_3$) δ 7.35 – 7.33 (m, 2H), 7.30 – 7.27 (m, 2H), 7.25 – 7.22 (dm, 1H), 7.19 (d, $J = 7.8$ Hz, 2H), 7.11 (d, $J = 7.8$ Hz, 2H), 5.25 (s, 1H), 5.11 (s, 1H), 4.51 (d, $J = 12.1$ Hz, 1H), 4.38 (d, $J = 12.1$ Hz, 1H), 3.67 – 3.64 (m, 1H), 2.70 – 2.62 (m, 3H), 2.55 (dd, $J = 14.7$, 6.5 Hz, 1H), 2.11 – 2.04 (m, 2H), 1.72 – 1.66 (m, 1H), 1.62 (t, $J = 4.7$ Hz, 1H), 1.59 – 1.54 (m, 1H), 1.26 – 1.19 (m, 2H), 1.13 (s, 6H), 1.09 (s, 6H), 0.87 (s, 3H), 0.83 (s, 3H), 0.80 (s, 3H).

^{13}C NMR (151 MHz, $CDCl_3$) δ 148.3, 141.4, 140.7, 136.8, 128.7, 128.2, 127.2, 127.1, 126.3, 112.9, 83.9, 83.0, 71.4, 49.2, 47.8, 45.0, 36.7, 36.6, 36.1, 28.3, 26.8, 24.8, 19.8, 18.9, 14.0.

^{11}B NMR (193 MHz, $CDCl_3$) δ 33.87.

HRMS (ESI-TOF): calcd for $C_{34}H_{47}BO_3^+$ ($[M + Na]^+$), 537.3618; found, 537.3619.

Specific rotation $[\alpha]_D^{25} = -29.9$, ($c = 1.00$, CH_2Cl_2). $dr > 25:1$.



(R)-6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl 4'-((1,7'-dimethyl-2'-propyl-1H,3'H-[2,5'-bibenzo[d]imidazol]-3'-yl)methyl)-[1,1'-biphenyl]-2-carboxylate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3do** as a colorless oil with 67% yield (54.4 mg).

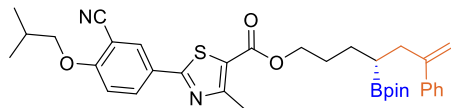
1H NMR (600 MHz, $CDCl_3$) δ 7.82 – 7.79 (m, 2H), 7.50 – 7.47 (m, 1H), 7.44 (s, 2H), 7.40 – 7.37 (m, 1H), 7.36 – 7.33 (m, 3H), 7.29 – 7.25 (m, 5H), 7.24 – 7.19 (m, 3H), 7.07 (d, $J = 8.0$ Hz, 2H), 5.38 (s, 2H), 5.21 (d, $J = 1.4$ Hz, 1H), 5.05 (d, $J = 1.6$ Hz, 1H), 4.01 (t, $J = 6.5$ Hz, 2H), 3.75 (s, 3H), 2.95 – 2.88 (m, 2H), 2.76 (s, 3H), 2.63 (dd, $J = 14.8$, 8.8 Hz, 1H), 2.44 (dd, $J = 14.8$, 6.9 Hz, 1H), 1.91 – 1.84 (m, 2H), 1.59 – 1.41 (m, 2H), 1.39 – 1.32 (m, 2H), 1.25 (t, $J = 7.1$ Hz, 1H), 1.23 – 1.19 (m, 1H), 1.17 (s, 12H), 1.16 – 1.10 (m, 1H), 1.05 (t, $J = 7.4$ Hz, 3H).

^{13}C NMR (151 MHz, $CDCl_3$) δ 168.0, 156.4, 154.7, 148.2, 143.2, 143.0, 141.9, 141.5, 141.3, 136.7, 135.0, 134.7, 131.2, 130.9, 130.8, 129.9, 129.5, 129.1, 128.2, 127.3 (d, $J = 6.7$ Hz), 126.3, 126.0, 123.9, 122.5, 122.3, 119.6, 112.9, 109.5, 109.0, 83.1, 65.2, 60.4, 47.1, 36.8, 31.8, 29.8, 27.9, 27.3, 24.8 (d, $J = 8.6$ Hz), 21.9, 16.9, 14.1.

^{11}B NMR (193 MHz, $CDCl_3$) δ 34.45.

HRMS (ESI-TOF): calcd for $C_{52}H_{57}BN_4O_4^+$ ($[M + Na]^+$), 853.4473; found, 853.4475.

Specific rotation $[\alpha]_D^{25} = 11.1$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 75/25, 1.0 mL/min, 254 nm) indicated 94% ee: t_R (minor) = 13.2 min, t_R (major) = 18.1 min.



(R)-6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-2-(3-cyano-4-isobutoxyphenyl)-4-methylthiazole-5-carboxylate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3dp** as a colorless oil with 65% yield (39.9 mg).

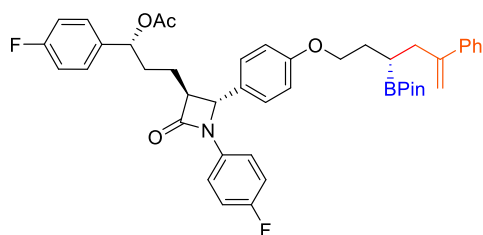
1H NMR (500 MHz, $CDCl_3$) δ 8.17 (d, $J = 2.2$ Hz, 1H), 8.09 (dd, $J = 8.9$, 2.3 Hz, 1H), 7.39 – 7.38 (m, 2H), 7.29 (t, $J = 7.5$ Hz, 2H), 7.24 (t, $J = 7.2$ Hz, 1H), 7.01 (d, $J = 8.9$ Hz, 1H), 5.24 (s, 1H), 5.09 (s, 1H), 4.24 (t, $J = 6.5$ Hz, 2H), 3.90 (d, $J = 6.5$ Hz, 2H), 2.75 (s, 4H), 2.51 (dd, $J = 14.8$, 7.4 Hz, 1H), 2.24 – 2.18 (m, 1H), 1.80 – 1.66 (m, 2H), 1.55 – 1.48 (m, 1H), 1.22 (s, 12H), 1.09 (d, $J = 6.7$ Hz, 6H), 0.88 (t, $J = 6.8$ Hz, 2H).

^{13}C NMR (151 MHz, $CDCl_3$) δ 167.1, 162.5, 162.0, 160.9, 148.2, 141.4, 132.5, 132.1, 128.2, 127.3, 126.3, 126.1, 122.1, 115.4, 112.9, 112.6, 103.0, 83.1, 75.7, 65.6, 36.8, 28.2, 28.0, 27.2, 24.8 (d, $J = 9.0$ Hz), 19.1, 17.5.

^{11}B NMR (193 MHz, $CDCl_3$) δ 34.64.

HRMS (ESI-TOF): calcd for $C_{35}H_{43}BN_2O_5S^+$ ($[M + Na]^+$), 637.2986; found, 637.2987.

Specific rotation $[\alpha]_D^{25} = 9.5$, ($c = 1.00$, CH_2Cl_2). **HPLC** analysis of the corresponding alcohol (AD-H, Hexane/IPA = 80/20, 1.0 mL/min, 254 nm) indicated 81% ee: t_R (minor) = 11.8 min, t_R (major) = 17.3 min.



(R)-1-(4-fluorophenyl)-3-((3S,4R)-1-(4-fluorophenyl)-2-oxo-4-(4-(((S)-5-phenyl-3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hex-5-en-1-yl)oxy)phenyl)azetidin-3-yl)propyl acetate

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3dq** as a colorless oil with 76% yield (45.8 mg).

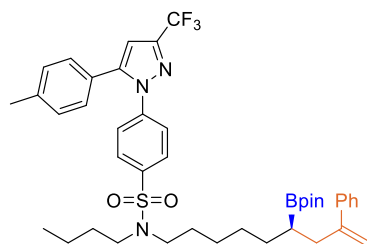
1H NMR (500 MHz, $CDCl_3$) δ 7.39 – 7.36 (m, 2H), 7.32 – 7.27 (m, 4H), 7.24 (s, 1H), 7.22 – 7.18 (m, 4H), 7.01 (t, $J = 8.6$ Hz, 2H), 6.91 (t, $J = 8.6$ Hz, 2H), 6.85 – 6.83 (m, 2H), 5.69 (t, $J = 6.8$ Hz, 1H), 5.26 (s, 1H), 5.10 (s, 1H), 4.52 (d, $J = 1.5$ Hz, 1H), 3.97 – 3.86 (m, 2H), 3.06 – 3.03 (m, 1H), 2.76 (dd, $J = 14.8$, 7.8 Hz, 1H), 2.53 (dd, $J = 14.8$, 7.9 Hz, 1H), 2.01 – 1.99 (m, 2H), 1.90 – 1.81 (m, 4H), 1.33 (q, $J = 7.6$ Hz, 1H), 1.27 – 1.23 (m, 4H), 1.21 – 1.18 (m, 13H).

^{13}C NMR (151 MHz, $CDCl_3$) δ 170.1, 167.1, 159.4, 148.0, 141.3, 135.8 (d, $J = 3.2$ Hz), 133.9 (d, $J = 2.2$ Hz), 128.9, 128.6 – 127.9 (m), 127.3, 127.0, 126.3, 118.4 (d, $J = 7.7$ Hz), 115.8, 115.7, 115.6, 115.4, 115.3, 113.2, 83.2, 74.8, 67.7, 61.0, 60.1, 36.7, 33.6, 30.0, 29.7, 24.9, 24.8, 21.2, 14.2.

¹¹B NMR (193 MHz, CDCl₃) δ 34.37.

HRMS (ESI-TOF): calcd for C₄₄H₄₈BF₂NO₆⁺ ([M + Na]⁺), 758.3543; found, 758.3546.

Specific rotation [α]_D²⁵ = -37.2, (c = 1.00, CH₂Cl₂). dr > 25:1.



(R)-N-butyl-N-(8-phenyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)non-8-en-1-yl)-4-(5-(p-tolyl)-3-(trifluoromethyl)-1H-pyrazol-1-yl)benzenesulfonamide

Following the General Procedure A at a 0.1 mmol scale with alkene to afford the title compound **3dr** as a colorless oil with 60% yield (45.8 mg).

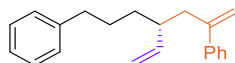
¹H NMR (500 MHz, CDCl₃) δ 7.82 – 7.72 (m, 2H), 7.47 – 7.41 (m, 2H), 7.39 – 7.34 (m, 2H), 7.29 (t, *J* = 7.5 Hz, 2H), 7.25 – 7.20 (m, 1H), 7.16 (d, *J* = 7.8 Hz, 2H), 7.09 (d, *J* = 7.8 Hz, 2H), 6.74 (s, 1H), 5.22 (s, 1H), 5.06 (s, 1H), 3.12 – 3.04 (m, 4H), 2.63 (dd, *J* = 14.8, 8.8 Hz, 1H), 2.47 (dd, *J* = 14.9, 6.9 Hz, 1H), 2.37 (s, 3H), 1.47 (p, *J* = 7.4 Hz, 4H), 1.41 – 1.32 (m, 3H), 1.21 – 1.25 (m, 6H), 1.20 (d, *J* = 2.0 Hz, 12H), 0.89 (t, *J* = 7.3 Hz, 3H).

¹³C NMR (151 MHz, CDCl₃) δ 148.5, 145.2, 142.1, 141.7, 139.8 (d, *J* = 11.1 Hz), 129.7, 128.7, 128.2, 128.0, 127.2, 126.3, 125.7, 125.5, 112.7, 106.2, 83.0, 48.2, 47.9, 36.9, 31.0, 30.6, 28.6, 28.5, 27.0, 24.8 (d, *J* = 5.7 Hz), 21.3, 19.9, 13.7.

¹¹B NMR (193 MHz, CDCl₃) δ 34.37.

HRMS (ESI-TOF): calcd for C₄₂H₅₃BF₃N₃O₄S⁺ ([M + Na]⁺), 786.3802; found, 786.304.

Specific rotation [α]_D²⁵ = 60.0, (c = 1.00, CH₂Cl₂). **HPLC** analysis (IG, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 91% ee: *t*_R (minor) = 13.7 min, *t*_R (major) = 14.8 min.



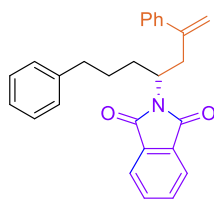
(R)-(4-vinylhept-6-ene-1,6-diyl)dibenzene (4)

¹H NMR (600 MHz, CDCl₃) δ 7.34 (d, *J* = 7.2 Hz, 2H), 7.31 (t, *J* = 7.5 Hz, 2H), 7.27 – 7.26 (m, 1H), 7.24 – 7.22 (m, 2H), 7.15 (t, *J* = 7.4 Hz, 1H), 7.11 (d, *J* = 7.5 Hz, 2H), 5.53 (dt, *J* = 17.7, 9.4 Hz, 1H), 5.23 (s, 1H), 5.00 (s, 1H), 4.92 (d, *J* = 10.2 Hz, 1H), 4.80 (d, *J* = 17.1 Hz, 1H), 2.58 – 2.53 (m, 2H), 2.51 – 2.44 (m, 2H), 2.14 – 2.08 (m, 1H), 1.66 – 1.58 (m, 1H), 1.53 – 1.43 (m, 2H), 1.30 – 1.23 (m, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 146.9, 142.6, 142.2, 141.3, 128.4, 128.2 (d, *J* = 3.6 Hz), 127.2, 126.3, 125.6, 114.4, 114.0, 41.8, 41.4, 35.9, 33.8, 28.8.

HRMS (ESI-TOF): calcd for C₂₁H₂₄⁺ ([M + Na]⁺), 299.1878; found, 299.1879.

Specific rotation [α]_D²⁵ = 18.8, (c = 1.00, CH₂Cl₂). **HPLC** analysis (OD-H, Hexane/IPA = 98/2, 1.0 mL/min, 254 nm) indicated 95% ee: *t*_R (minor) = 5.6 min, *t*_R (major) = 6.1 min.



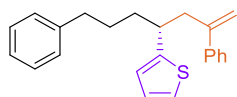
(R)-2-(2,7-diphenylhept-1-en-4-yl)isoindoline-1,3-dione (5)

¹H NMR (500 MHz, CDCl₃) δ 7.73 – 7.69 (m, 2H), 7.66 – 7.62 (m, 2H), 7.25 – 7.19 (m, 6H), 7.15 – 7.11 (m, 2H), 7.09 (d, *J* = 7.3 Hz, 2H), 5.16 (d, *J* = 1.0 Hz, 1H), 5.05 (s, 1H), 4.37 – 4.31 (m, 1H), 3.30 (dd, *J* = 14.2, 10.4 Hz, 1H), 2.90 (dd, *J* = 14.3, 4.8 Hz, 1H), 2.62 – 2.51 (m, 2H), 2.23 – 2.16 (m, 1H), 1.82 – 1.75 (m, 1H), 1.58 – 1.51 (m, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 146.9, 142.6, 142.2, 141.3, 128.4, 128.2 (d, *J* = 3.6 Hz), 127.2, 126.3, 125.6, 114.4, 114.0, 41.8, 41.4, 35.9, 33.8, 28.8.

HRMS (ESI-TOF): calcd for C₂₇H₂₅NO₂⁺ ([M + Na]⁺), 418.1885; found, 418.1887.

Specific rotation [α]_D²⁵ = 20.7, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis (IG, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 91% ee: *t*_R (minor) = 8.7 min, *t*_R (major) = 9.6 min.



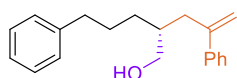
(R)-2-(2,7-diphenylhept-1-en-4-yl)thiophene (6)

¹H NMR (500 MHz, CDCl₃) δ 7.33 – 7.31 (m, 4H), 7.30 – 7.26 (m, 1H), 7.26 – 7.23 (m, 2H), 7.17 – 7.10 (m, 2H), 7.06 (d, *J* = 7.2 Hz, 2H), 6.89 – 6.86 (m, 1H), 6.63 (d, *J* = 2.9 Hz, 1H), 5.18 (s, 1H), 4.94 (s, 1H), 3.02 – 2.96 (m, 1H), 2.86 – 2.76 (m, 2H), 2.56 – 2.44 (m, 2H), 1.79 – 1.72 (m, 1H), 1.62 – 1.57 (m, 1H), 1.51 – 1.42 (m, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 149.2, 146.4, 142.3, 140.9, 128.4, 128.3, 128.2, 127.4, 126.4, 126.3, 125.6, 123.8, 122.7, 114.7, 44.3, 39.3, 36.5, 35.7, 28.9.

HRMS (ESI-TOF): calcd for C₂₃H₂₄S⁺ ([M + Na]⁺), 355.1599; found, 355.1561.

Specific rotation [α]_D²⁵ = 37.3, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis (OD-H, Hexane, 1.0 mL/min, 254 nm) indicated 94% ee: *t*_R (minor) = 29.2 min, *t*_R (major) = 46.9 min.



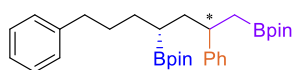
(R)-4-phenyl-2-(3-phenylpropyl)pent-4-en-1-ol (7)

¹H NMR (500 MHz, CDCl₃) δ 7.40 – 7.36 (m, 2H), 7.34 – 7.30 (m, 2H), 7.29 – 7.24 (m, 3H), 7.20 – 7.15 (m, 1H), 7.15 – 7.11 (m, 2H), 5.29 (d, *J* = 1.5 Hz, 1H), 5.08 (d, *J* = 1.0 Hz, 2H), 3.56 – 3.45 (m, 2H), 2.63 – 2.48 (m, 4H), 1.70 – 1.58 (m, 3H), 1.45 – 1.32 (m, 2H).

¹³C NMR (151 MHz, CDCl₃) δ 147.3, 142.5, 140.9, 128.4, 128.3, 127.5, 126.3, 125.7, 114.2, 65.0, 38.6, 37.5, 36.2, 30.5, 28.7.

HRMS (ESI-TOF): calcd for C₂₀H₂₄O⁺ ([M + Na]⁺), 303.1827; found, 303.1829.

Specific rotation [α]_D²⁵ = 4.7, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis (OJ-H, Hexane/IPA = 95/5, 1.0 mL/min, 254 nm) indicated 93% ee: *t*_R (minor) = 22.5 min, *t*_R (major) = 26.1 min.



2,2'-((4R)-2,7-diphenylheptane-1,4-diyl)bis(4,4,5,5-tetramethyl-1,3,2-dioxaborolane) (8)

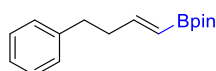
¹H NMR (500 MHz, CDCl₃) δ 7.25 – 7.21 (m, 4H), 7.18 – 7.15 (m, 3H), 7.13 – 7.09 (m, 3H), 2.82 (p, *J* = 7.8 Hz, 1H), 2.53 – 2.43 (m, 2H), 1.76 – 1.70 (m, 1H), 1.58 – 1.48 (m, 3H), 1.42 – 1.37 (m, 1H), 1.34 – 1.28 (m, 1H), 1.25 (s, 12H), 1.16 (dd, *J* = 16.8, 6.2 Hz, 1H), 1.08 (d, *J* = 4.8 Hz, 12H), 0.88 – 0.80 (m, 1H).

¹³C NMR (151 MHz, CDCl₃) δ 147.6, 142.9, 128.3, 128.1, 128.0, 127.5, 125.6, 125.4, 82.8, 41.3, 41.0, 36.1, 31.4, 30.7, 24.9, 24.8, 24.7, 24.7.

¹¹B NMR (193 MHz, CDCl₃) δ 32.67.

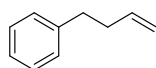
HRMS (ESI-TOF): calcd for C₃₁H₄₆B₂O₄⁺ ([M + Na]⁺), 527.3582; found, 527.3583.

Specific rotation [α]_D²⁵ = -55.8, (*c* = 1.00, CH₂Cl₂). **HPLC** analysis of the corresponding alcohol (IG, Hexane/IPA = 90/10, 1.0 mL/min, 210 nm) indicated 91% ee: *t*_R (minor) = 16.0 min, *t*_R (major) = 17.8 min.



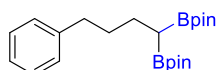
(E)-4,4,5,5-tetramethyl-2-(4-phenylbut-1-en-1-yl)-1,3,2-dioxaborolane (9)

¹H NMR (500 MHz, CDCl₃) δ 7.30 – 7.25 (m, 2H), 7.19 – 7.16 (m, 3H), 6.73 – 6.67 (dm, 1H), 5.52 – 5.48 (m, 1H), 2.75 – 2.72 (m, 2H), 2.50 – 2.45 (m, 2H), 1.27 (s, 12H).



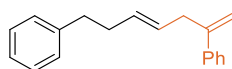
but-3-en-1-ylbenzene (10)

¹H NMR (500 MHz, CDCl₃) δ 7.27 – 7.18 (m, 2H), 7.14 (dd, *J* = 7.2, 1.9 Hz, 3H), 5.85 – 5.77 (m, 1H), 4.99 (d, *J* = 17.1 Hz, 1H), 4.93 (d, *J* = 10.2 Hz, 1H), 2.66 (t, *J* = 7.8 Hz, 2H), 2.32 (q, *J* = 7.7, 7.2 Hz, 2H).



2,2'-((4-phenylbutane-1,1-diyl)bis(4,4,5,5-tetramethyl-1,3,2-dioxaborolane) (11)

¹H NMR (500 MHz, CDCl₃) δ 7.25 (t, *J* = 7.5 Hz, 2H), 7.17 – 7.13 (m, 3H), 2.26 (t, *J* = 7.0 Hz, 2H), 1.64 – 1.60 (m, 4H), 1.23 (s, 12H), 1.22 (s, 12H), 0.78 (t, *J* = 6.0 Hz, 1H).

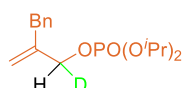


(E)-hepta-3,6-diene-1,6-diyl dibenzene (12)

¹H NMR (500 MHz, CDCl₃) δ 7.44 – 7.39 (m, 2H), 7.35 – 7.29 (m, 2H), 7.28 – 7.26 (m, 2H), 7.24 (d, *J* = 2.1 Hz, 1H), 7.20 – 7.12 (m, 3H), 5.54 (q, *J* = 5.3 Hz, 2H), 5.34 (s, 1H), 5.02 (d, *J* = 1.3 Hz, 1H), 3.17 (d, *J* = 4.7 Hz, 2H), 2.69 – 2.62 (m, 2H), 2.36 – 2.30 (m, 2H).

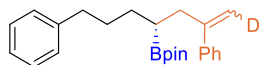
¹³C NMR (151 MHz, CDCl₃) δ 147.0, 142.0, 141.1, 131.6, 128.5, 128.2, 128.2, 128.2, 127.3, 126.0, 125.7, 112.7, 38.3, 35.9, 34.3.

HRMS (ESI-TOF): calcd for C₁₉H₂₀⁺ ([M + Na]⁺), 271.1565; found, 271.1566.



2-benzylallyl-1-d-diisopropyl phosphate (*d*-2)

¹H NMR (500 MHz, CDCl₃) δ 7.33 – 7.25 (m, 2H), 7.25 – 7.16 (m, 3H), 5.18 (s, 1H), 4.95 (s, 1H), 4.68 – 4.57 (m, *J* = 6.3 Hz, 2H), 4.37 (d, *J* = 6.8 Hz, 1H), 3.42 (s, 2H), 1.31 (dd, *J* = 8.7, 6.2 Hz, 12H).

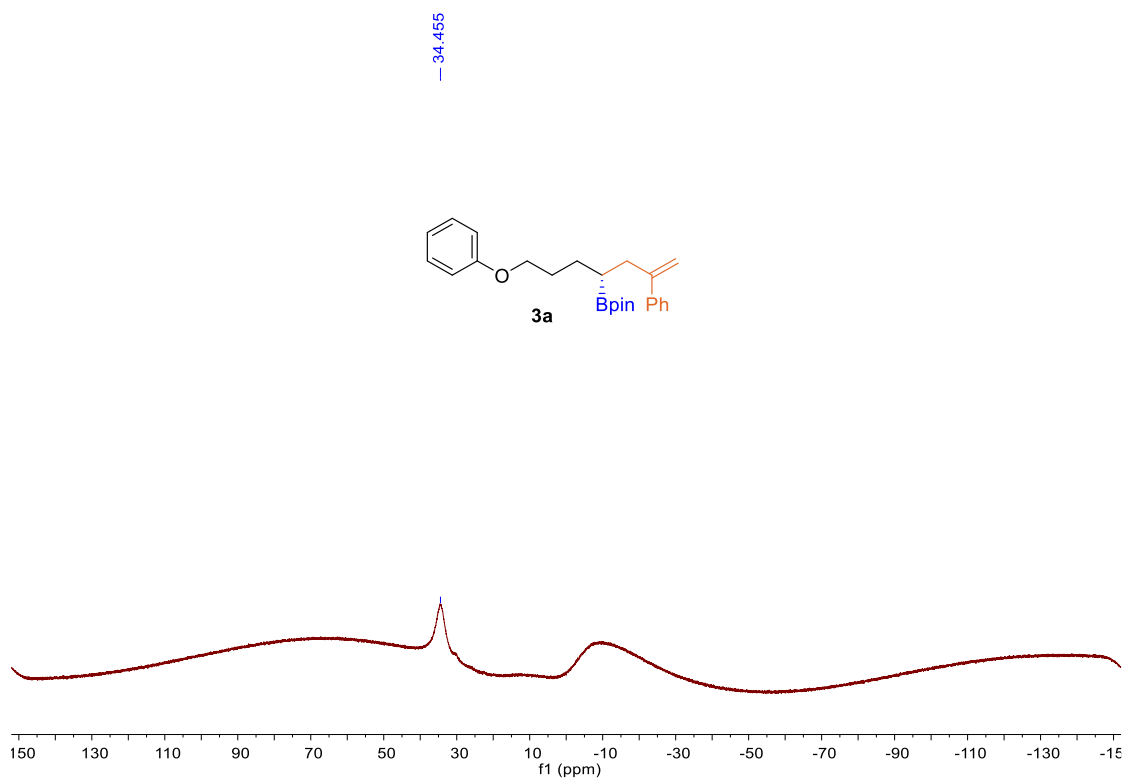


(*R*)-2-(2,7-diphenylhept-1-en-4-yl-1-d)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (*d*-3af)

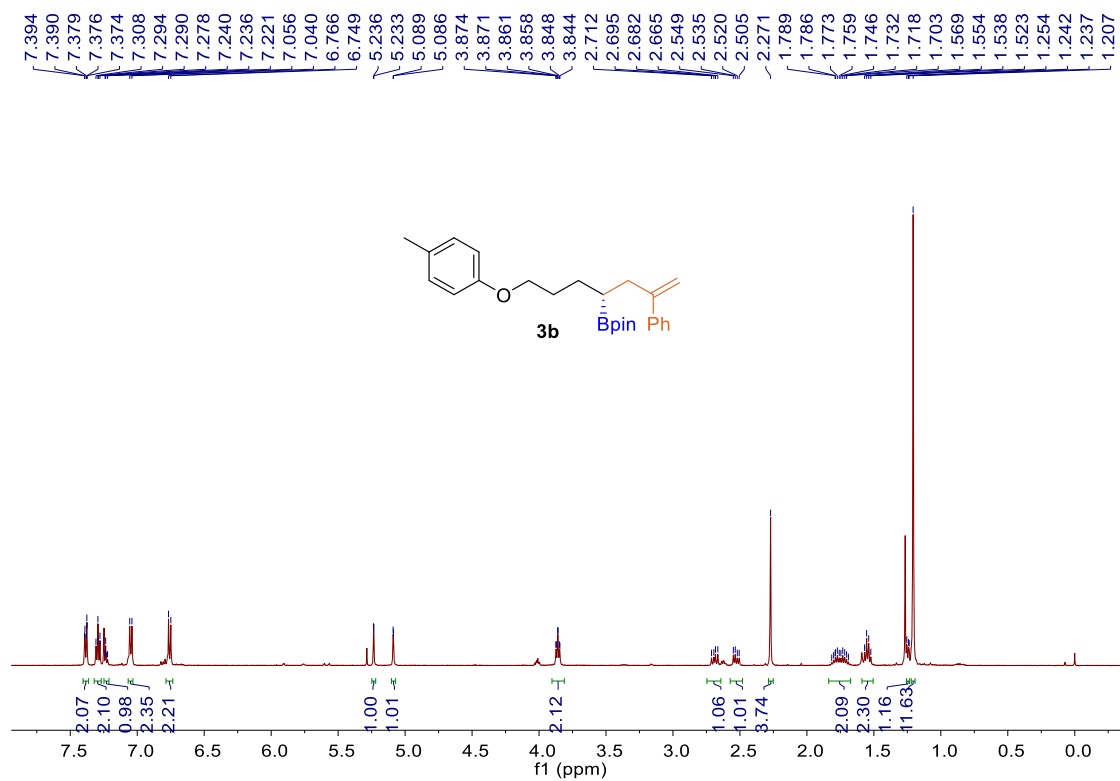
¹H NMR (500 MHz, CDCl₃) δ 7.31 – 7.22 (m, 4H), 7.19 – 7.10 (m, 6H), 4.83 (s, 0.5H), 4.65 (s, 0.5H), 3.31 (s, 2H), 2.63 – 2.52 (m, 2H), 2.12 (dd, *J* = 14.9, 9.5 Hz, 1H), 2.01 (dd, *J* = 14.9, 6.5 Hz, 1H), 1.68 – 1.57 (m, 2H), 1.48 – 1.36 (m, 2H), 1.35 – 1.27 (m, 1H), 1.21 (s, 12H).

4.1 NMR Spectroscopic Data

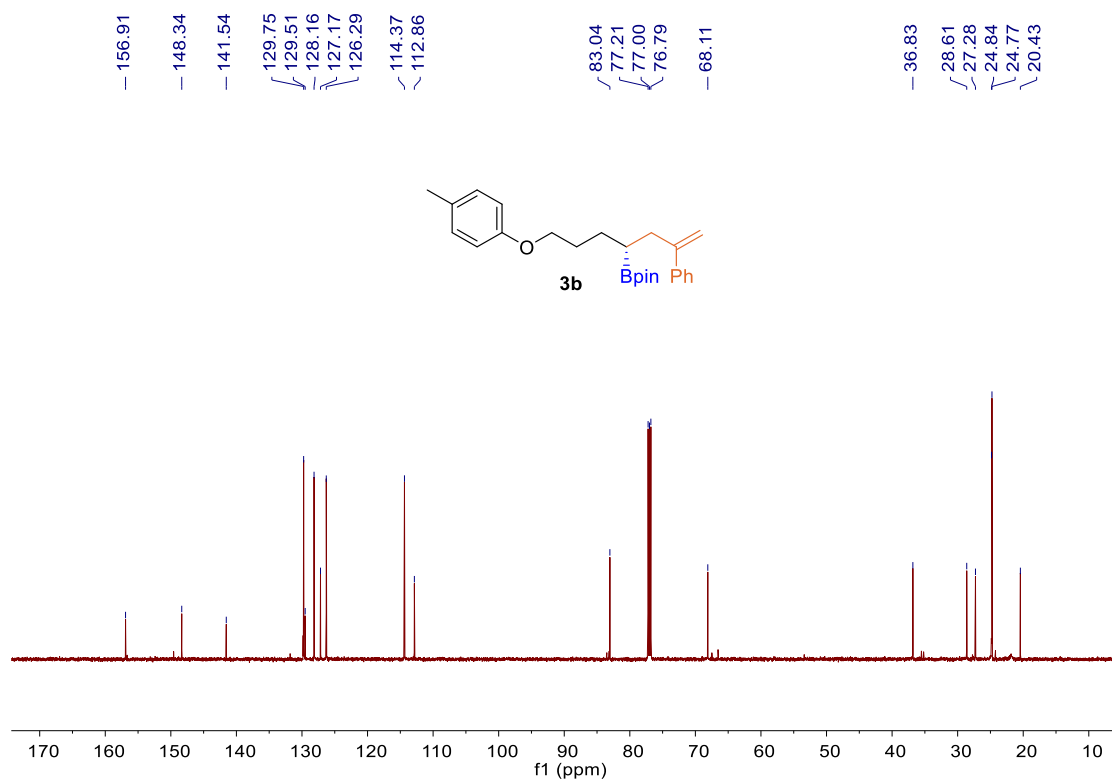




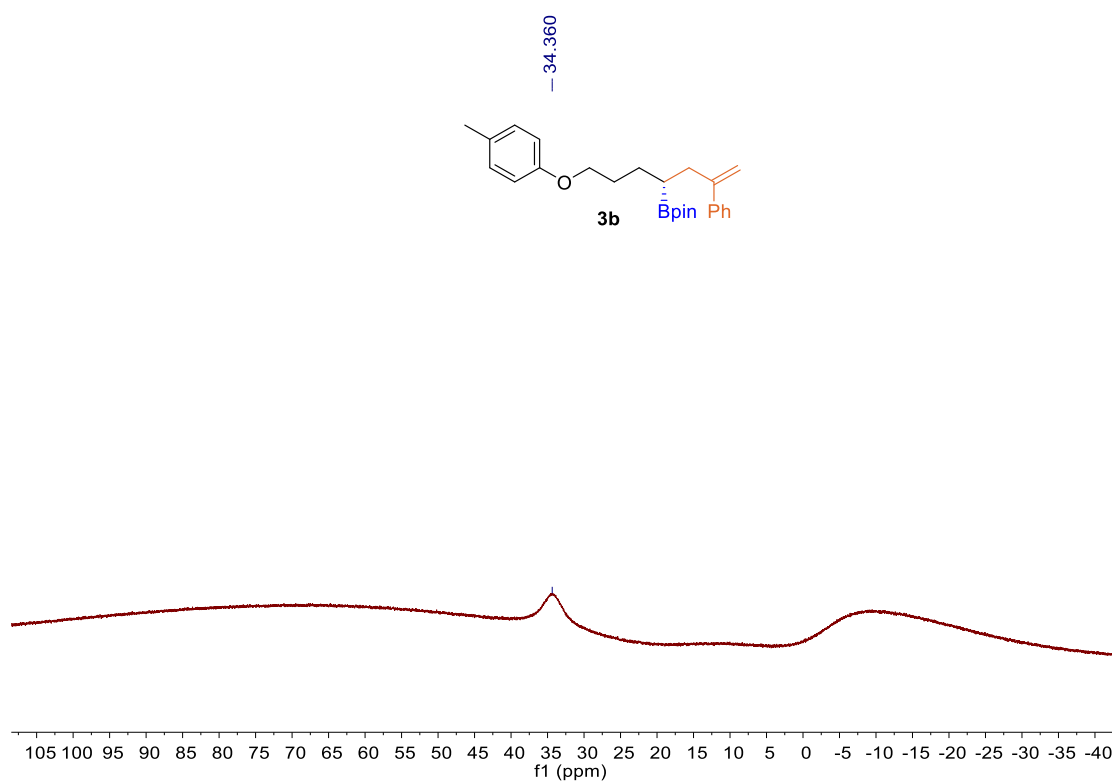
Supplementary Figure 18. ^{11}B NMR spectrum of compound **3a**



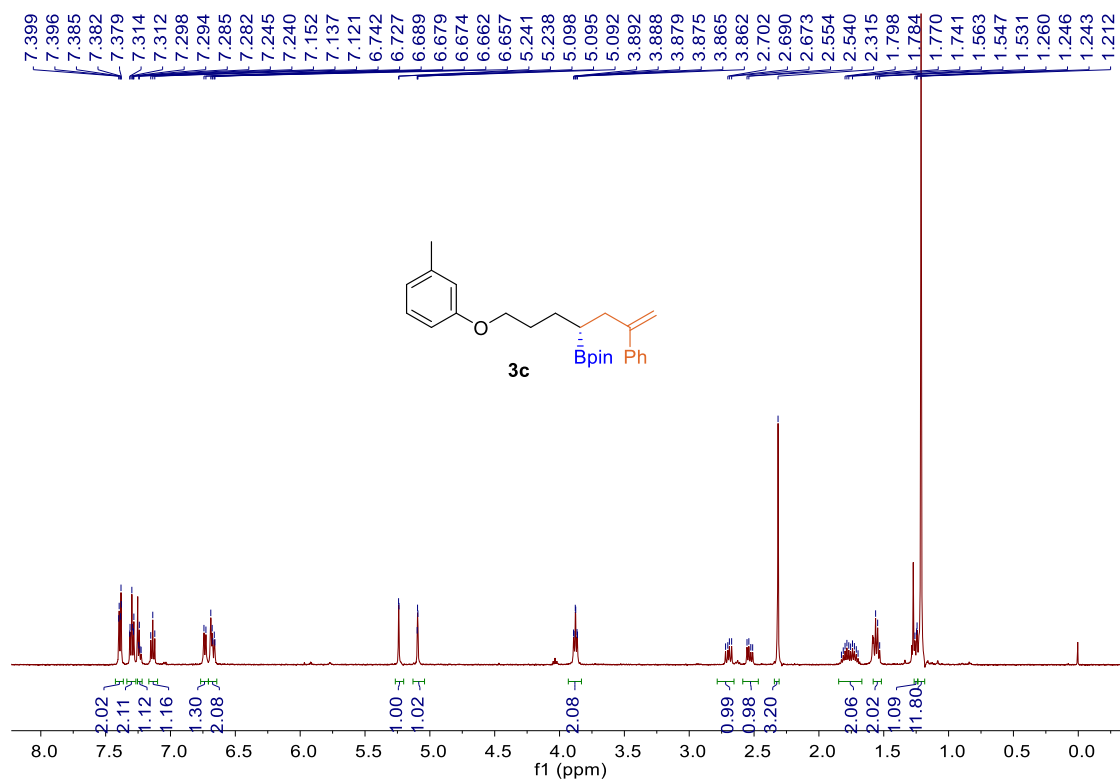
Supplementary Figure 19. ^1H NMR spectrum of compound **3b**



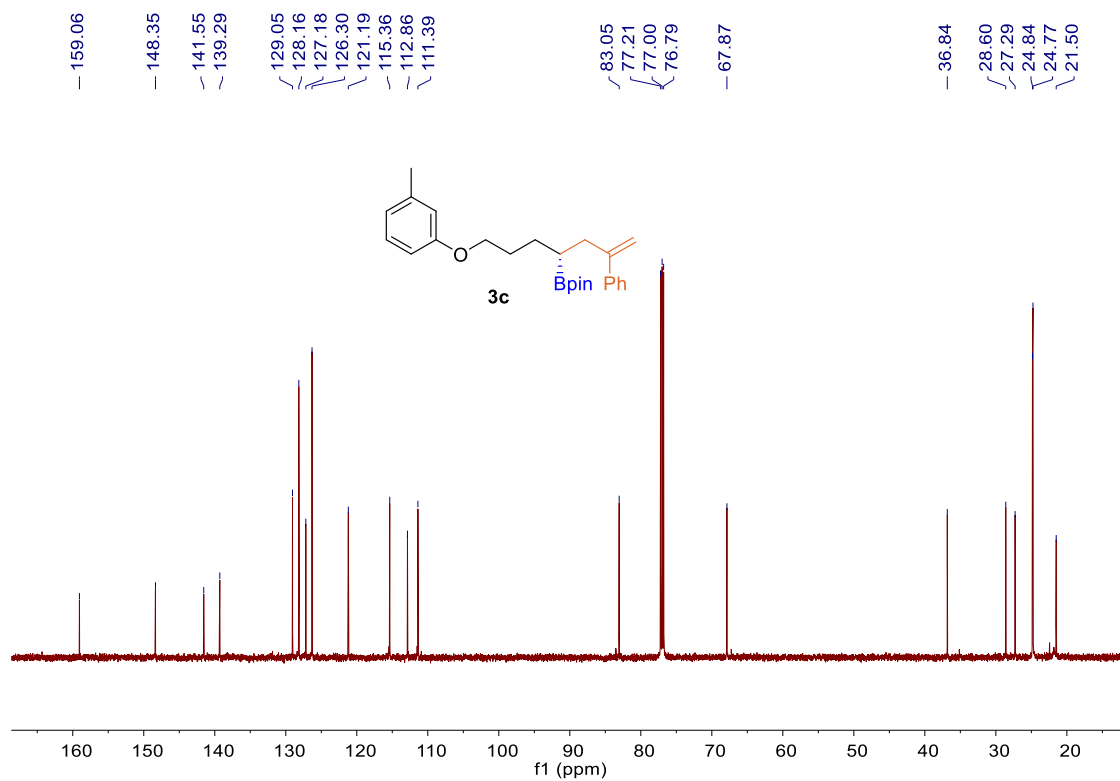
Supplementary Figure 20. ¹³C NMR spectrum of compound 3b



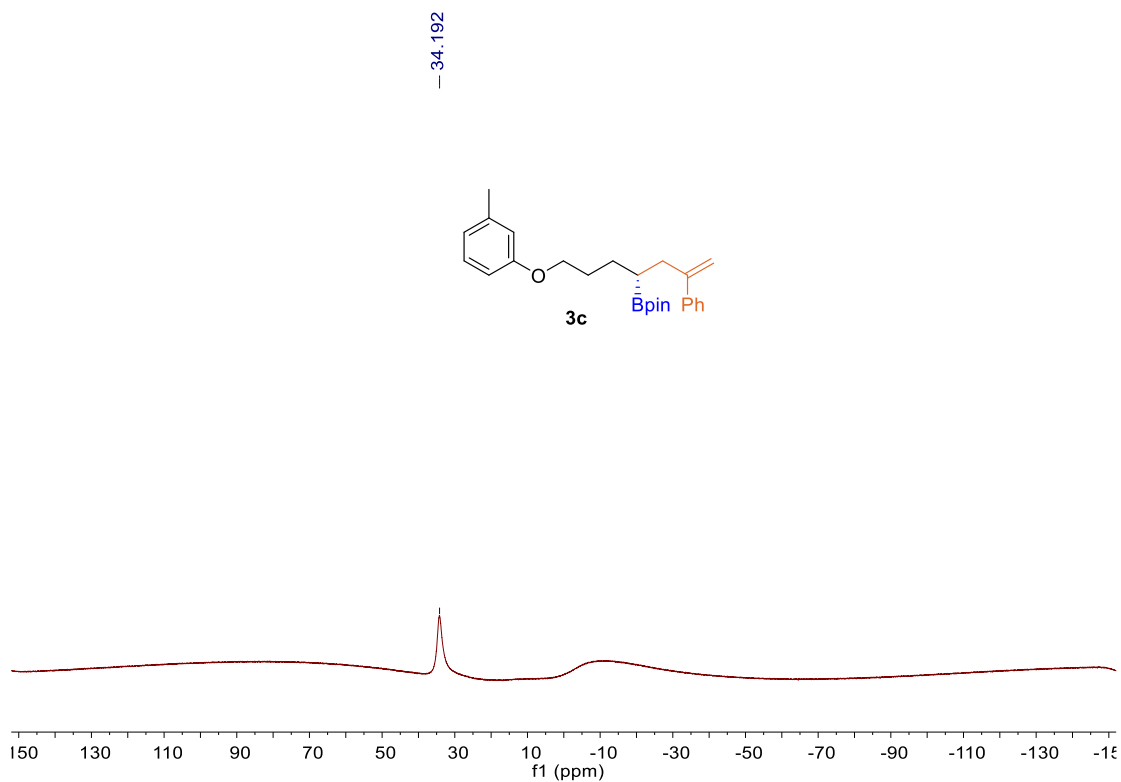
Supplementary Figure 21. ¹¹B NMR spectrum of compound 3b



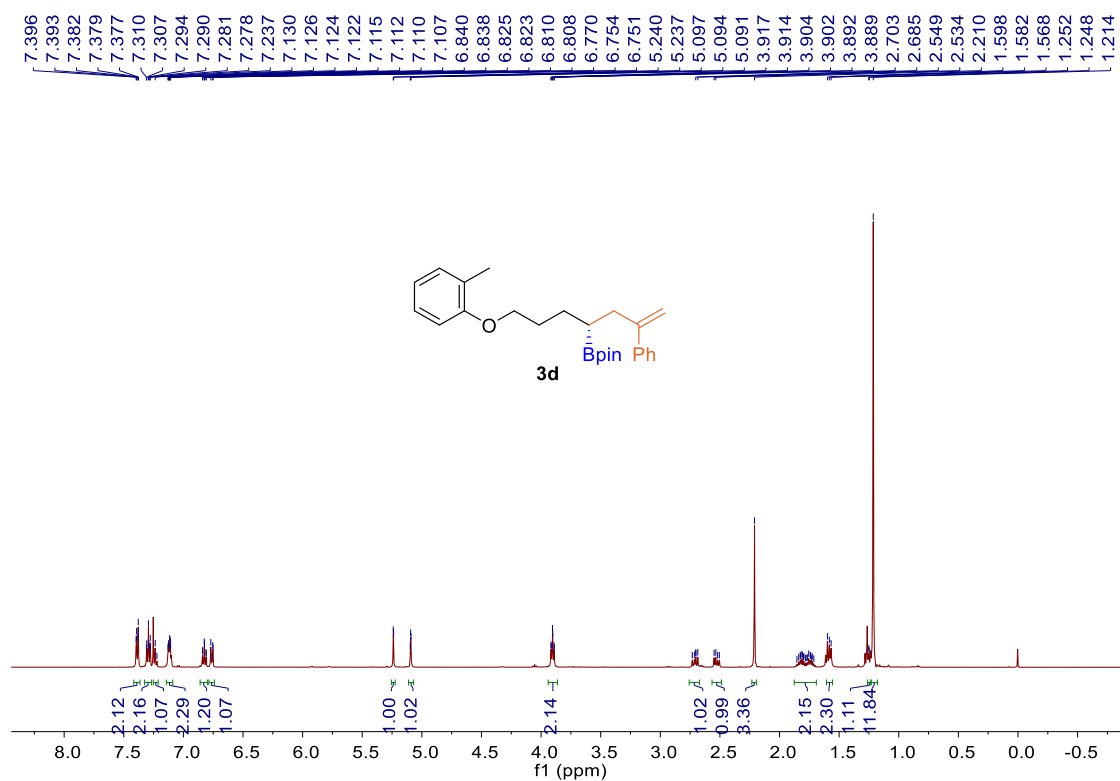
Supplementary Figure 22. ¹H NMR spectrum of compound 3c



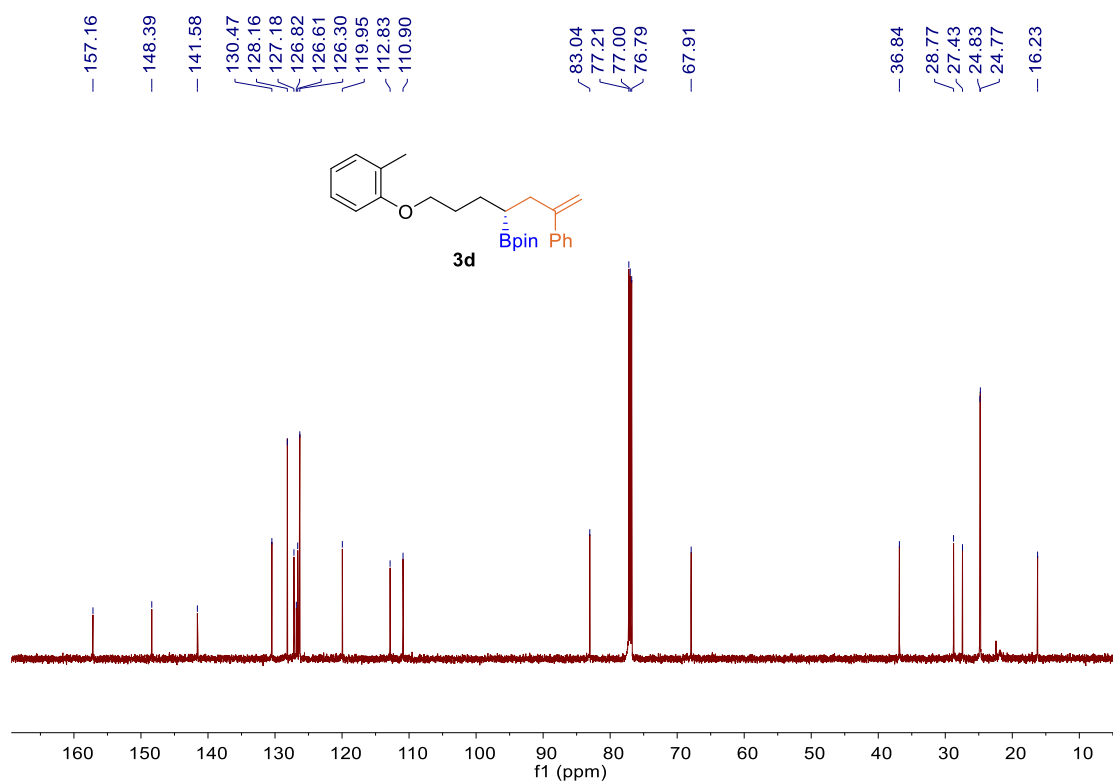
Supplementary Figure 23. ¹³C NMR spectrum of compound 3c



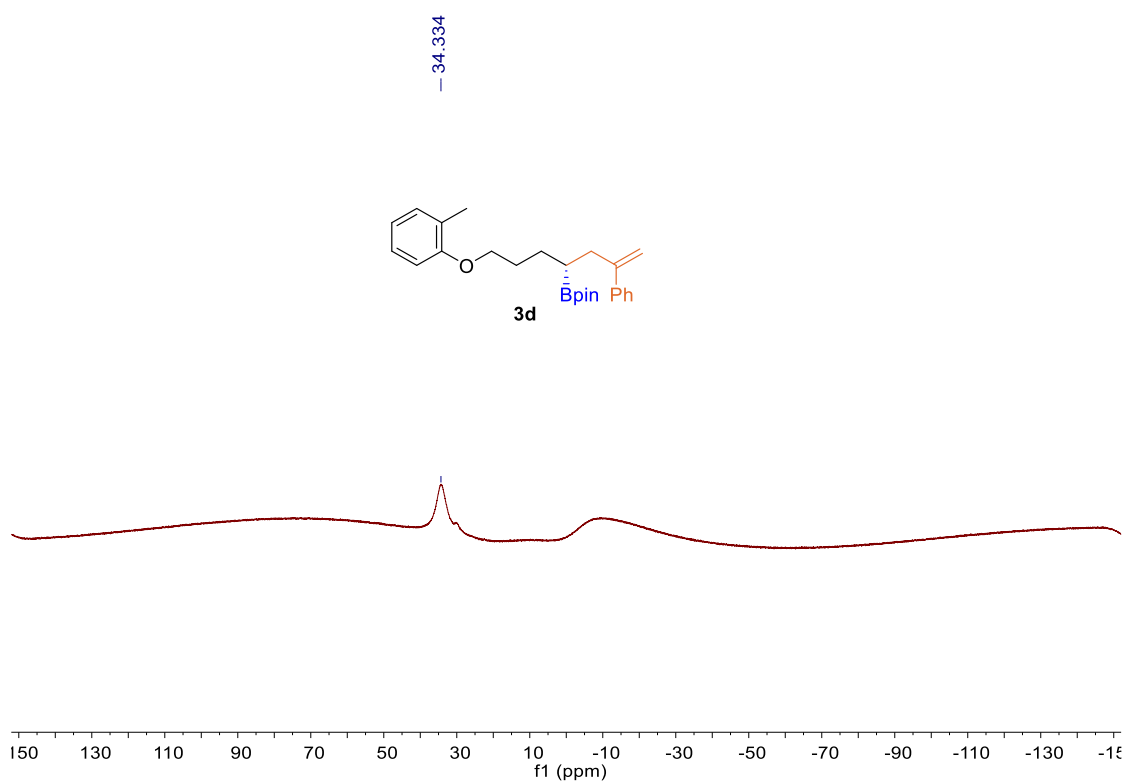
Supplementary Figure 24. ^{11}B NMR spectrum of compound 3c



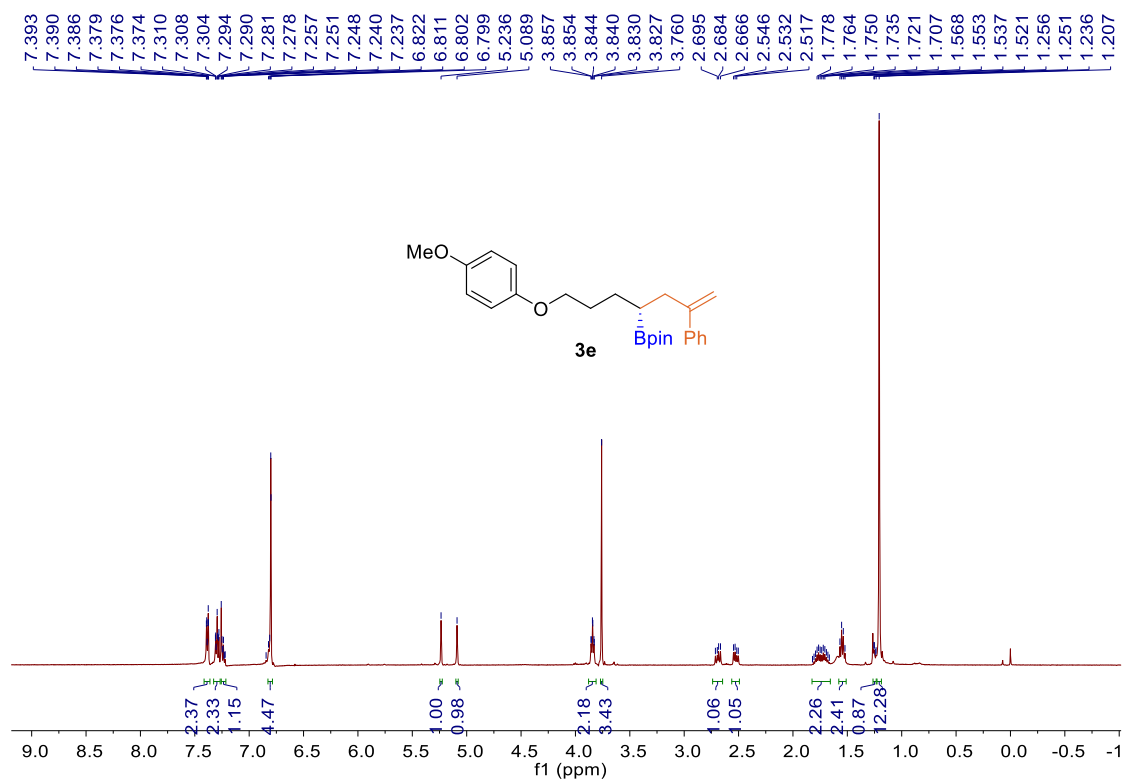
Supplementary Figure 25. ^1H NMR spectrum of compound 3d



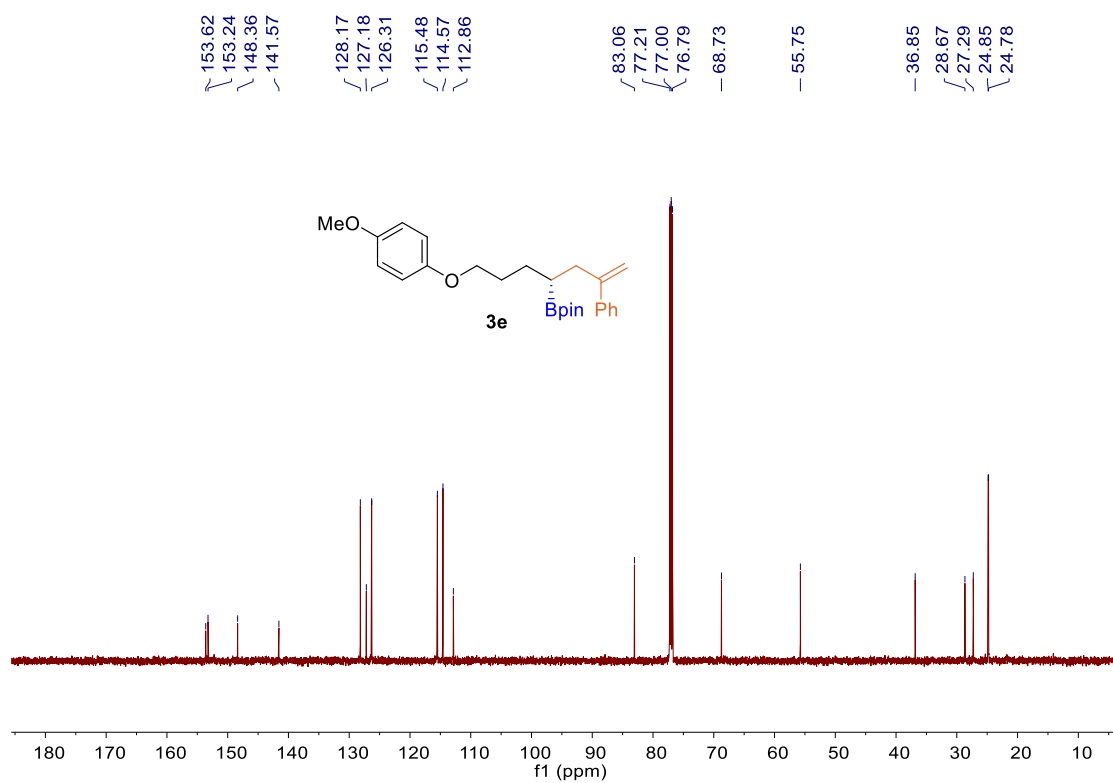
Supplementary Figure 26. ¹³C NMR spectrum of compound 3d



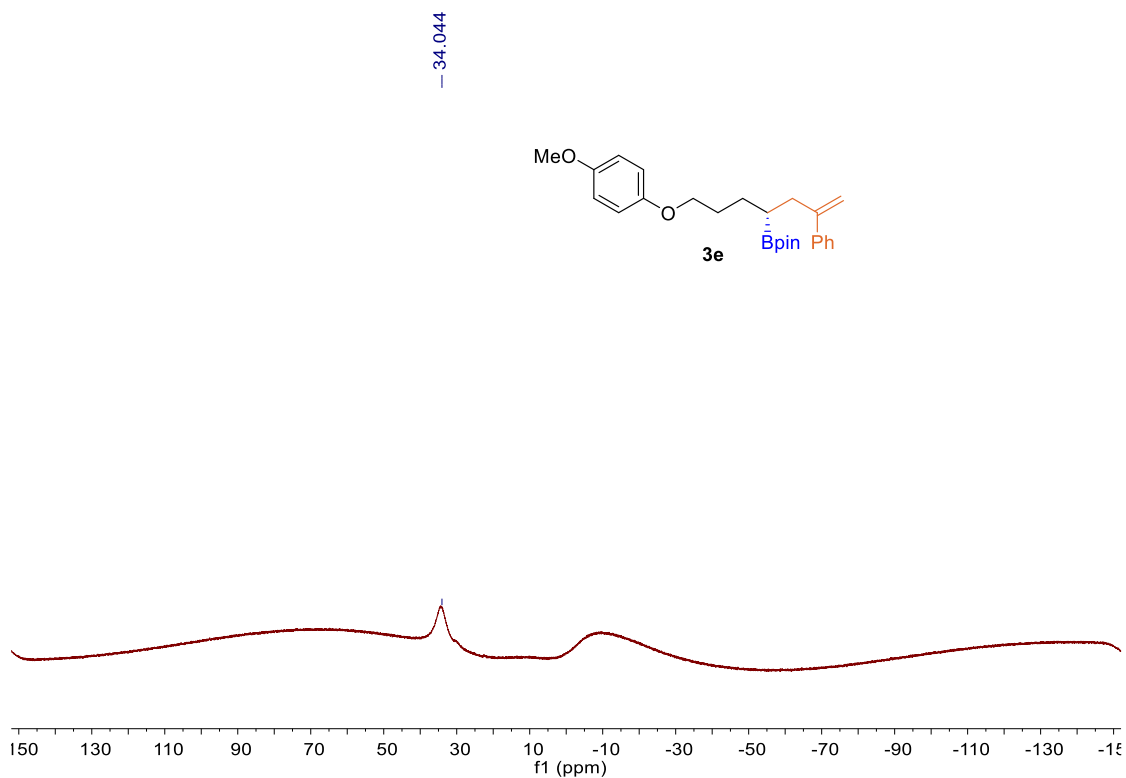
Supplementary Figure 27. ¹¹B NMR spectrum of compound 3d



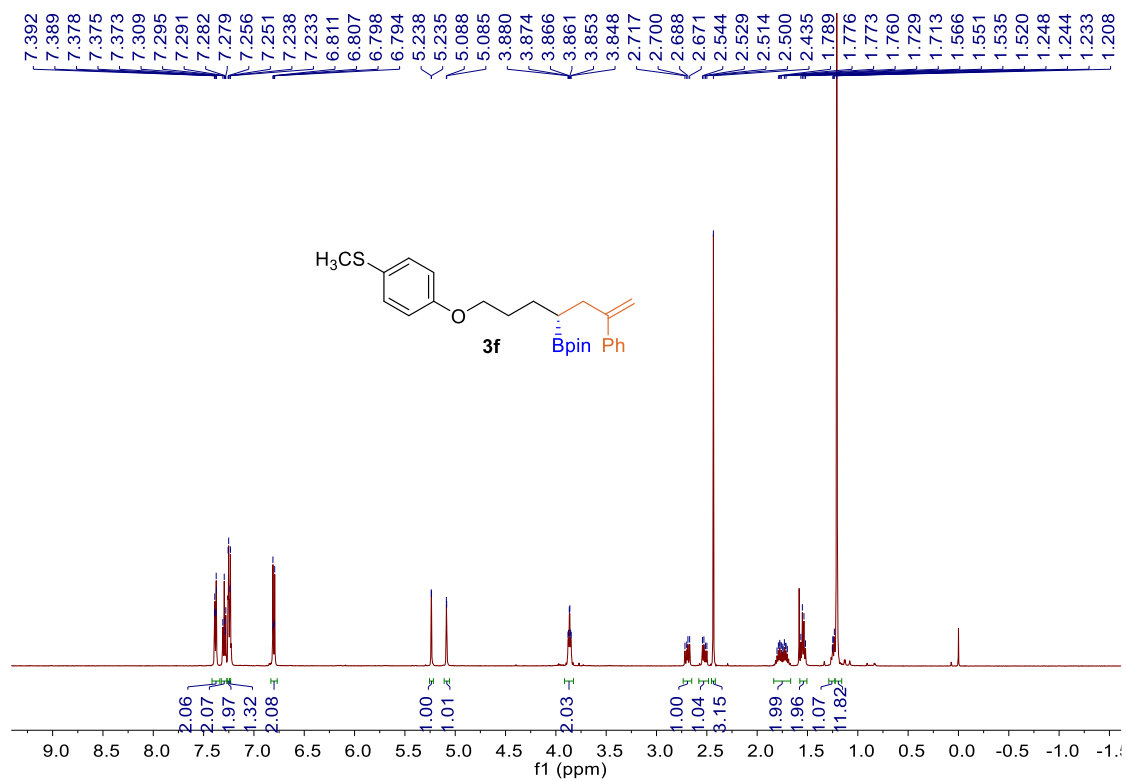
Supplementary Figure 28. ¹H NMR spectrum of compound 3e



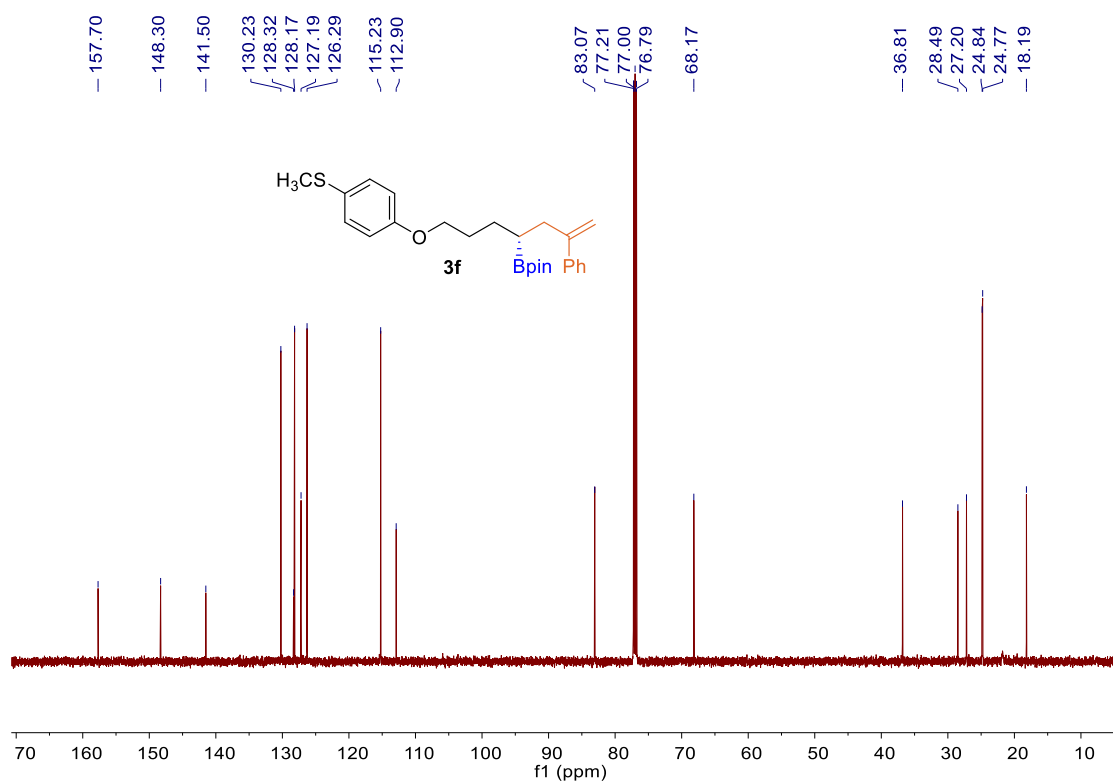
Supplementary Figure 29. ¹³C NMR spectrum of compound 3e



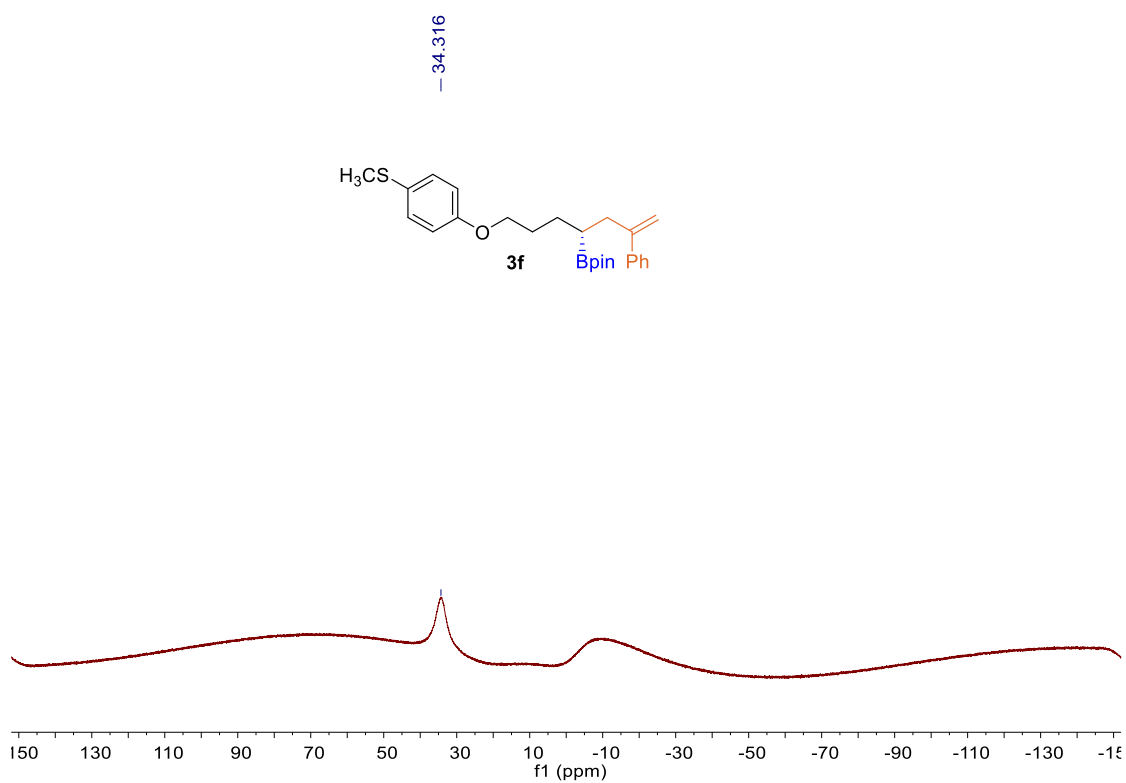
Supplementary Figure 30. ^{11}B NMR spectrum of compound **3e**



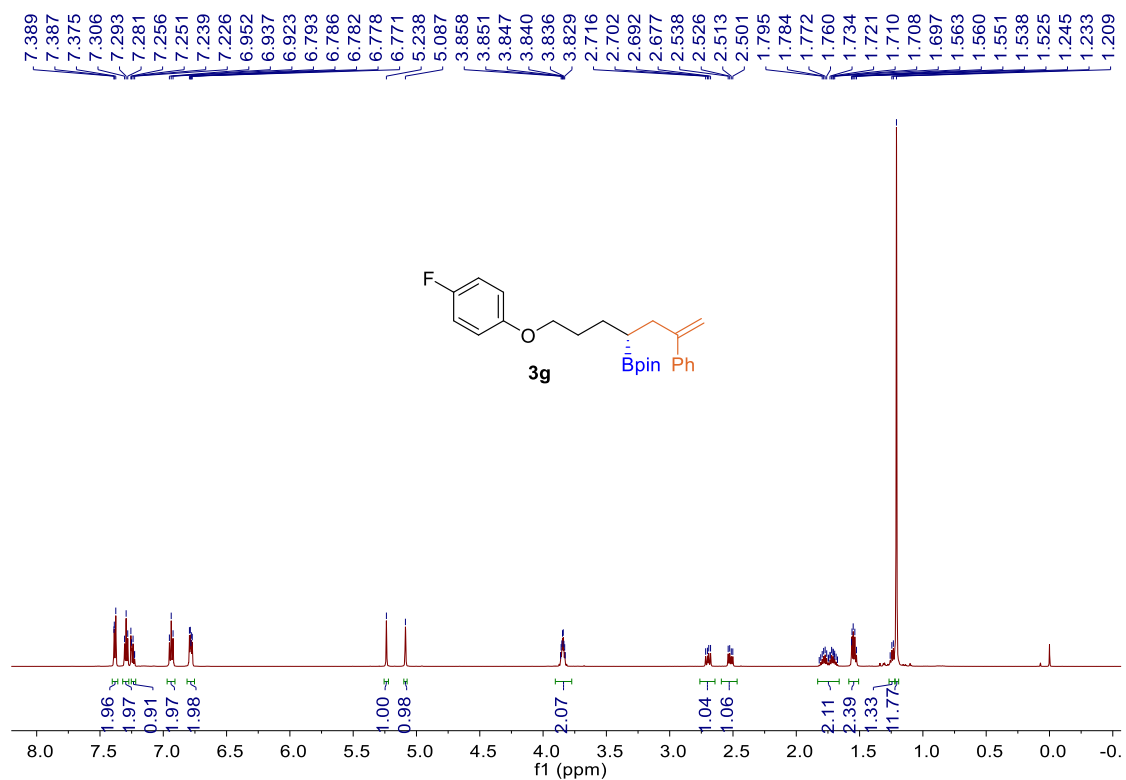
Supplementary Figure 31. ^1H NMR spectrum of compound **3f**



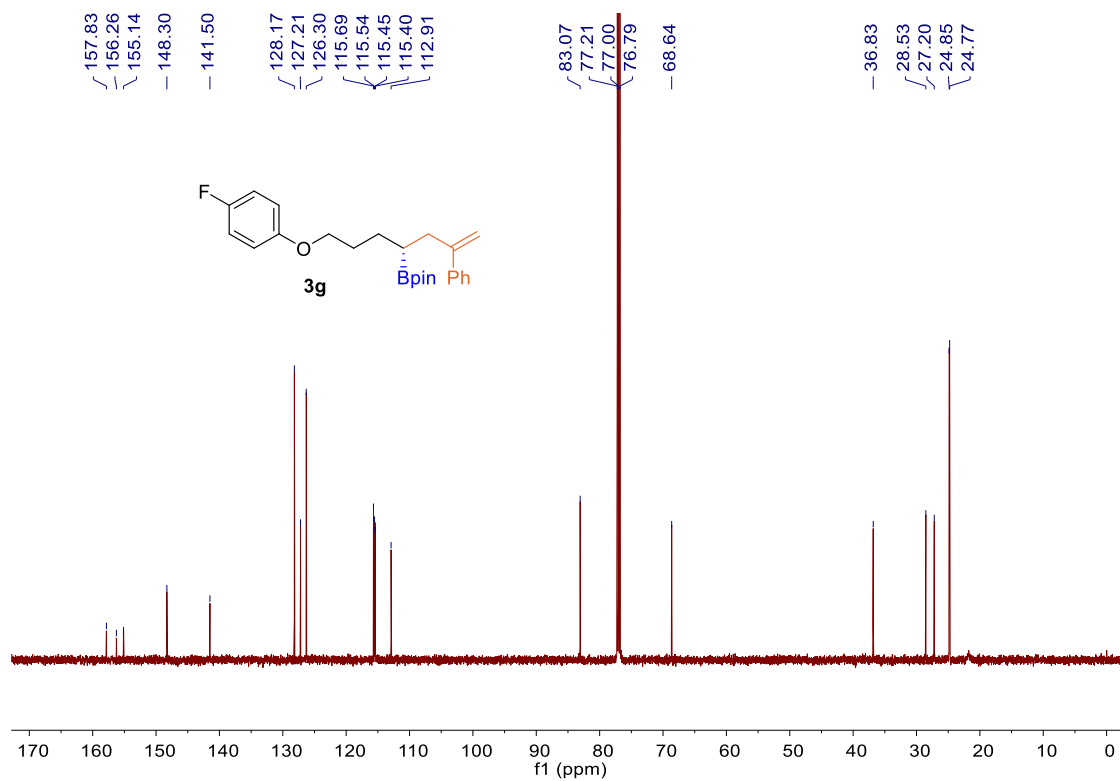
Supplementary Figure 32. ¹³C NMR spectrum of compound 3f



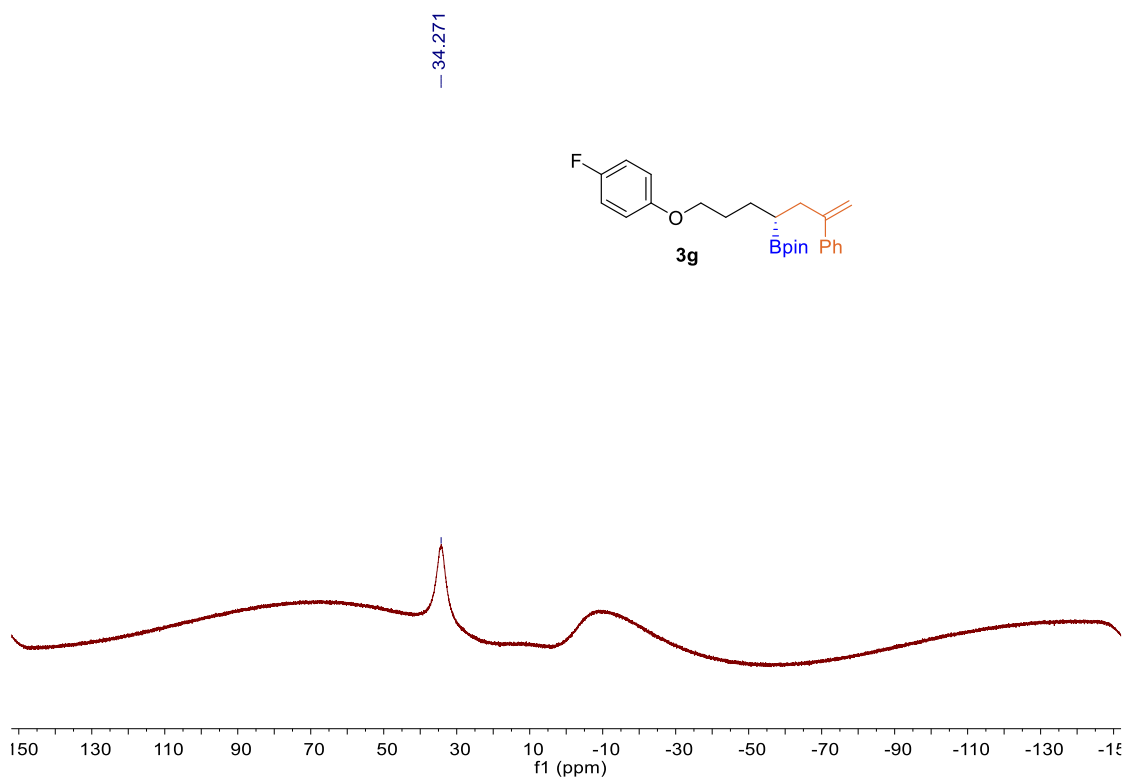
Supplementary Figure 33. ¹¹B NMR spectrum of compound 3f



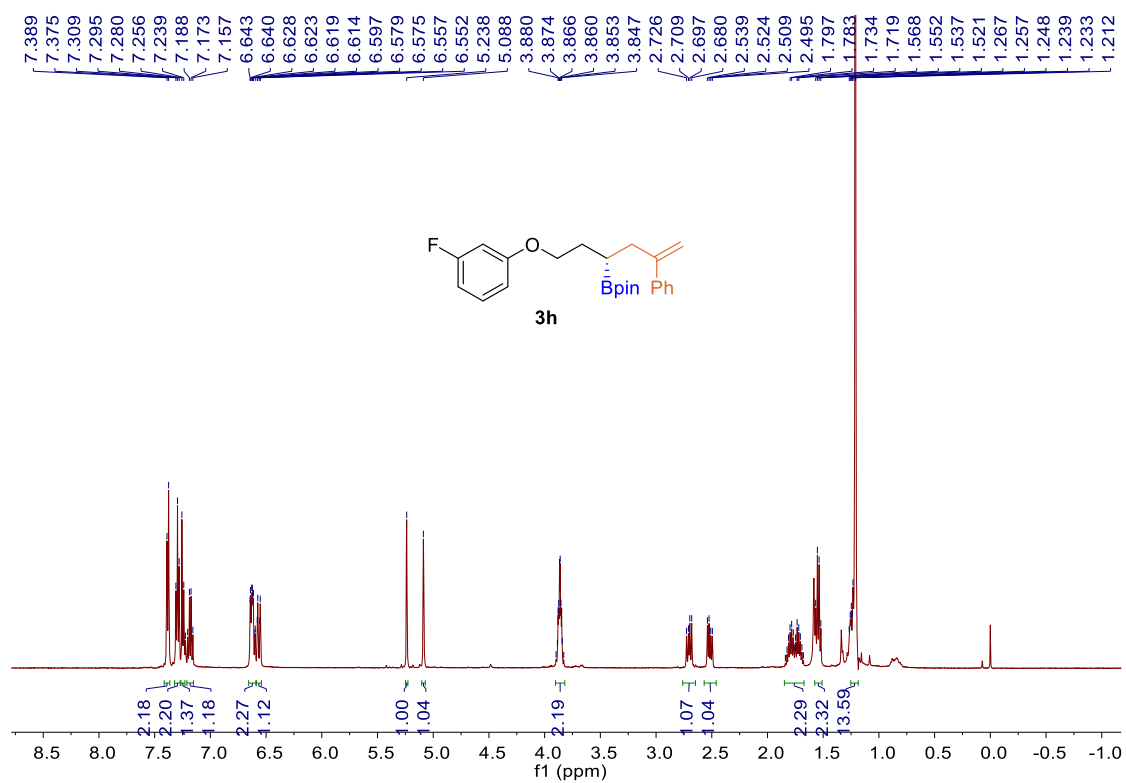
Supplementary Figure 34. ¹H NMR spectrum of compound 3g



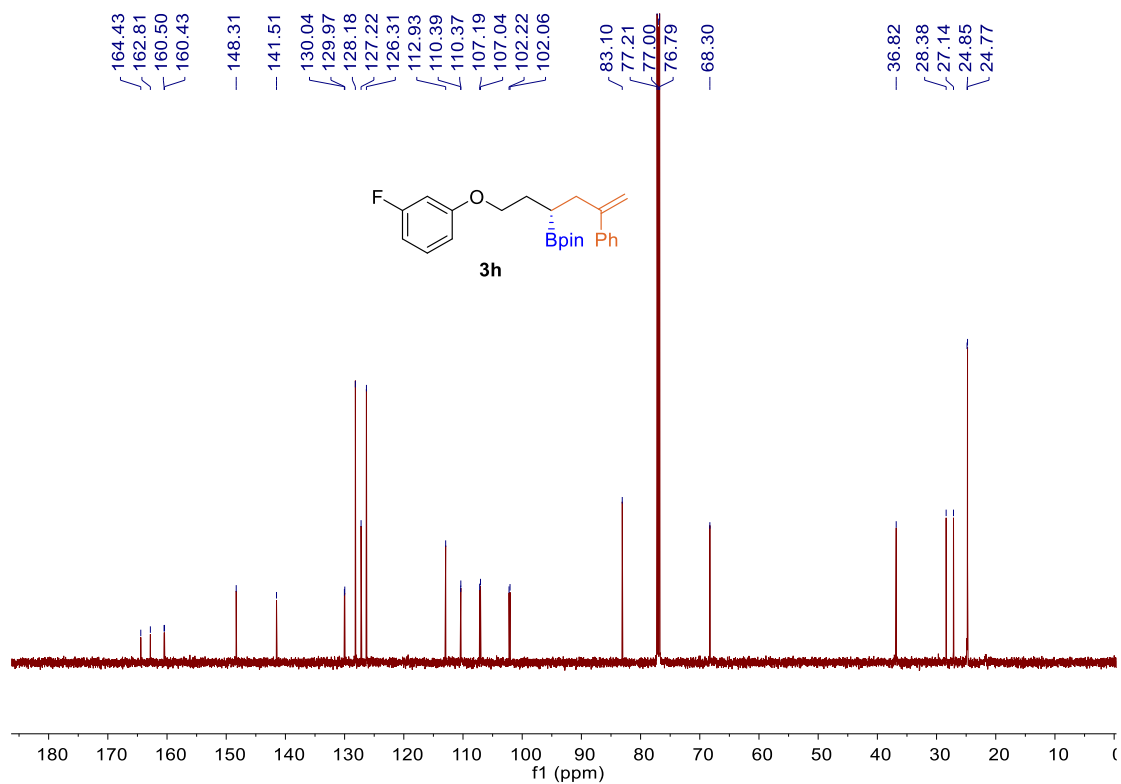
Supplementary Figure 35. ¹³C NMR spectrum of compound 3g



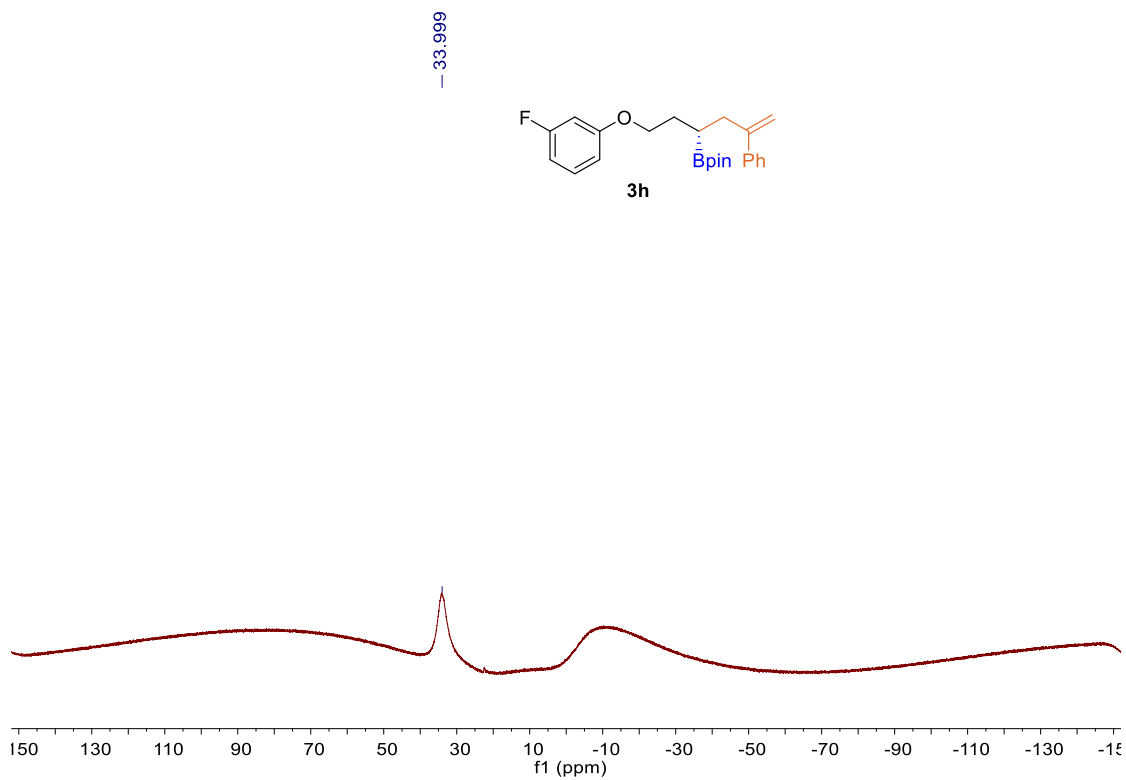
Supplementary Figure 36. ^{11}B NMR spectrum of compound 3g



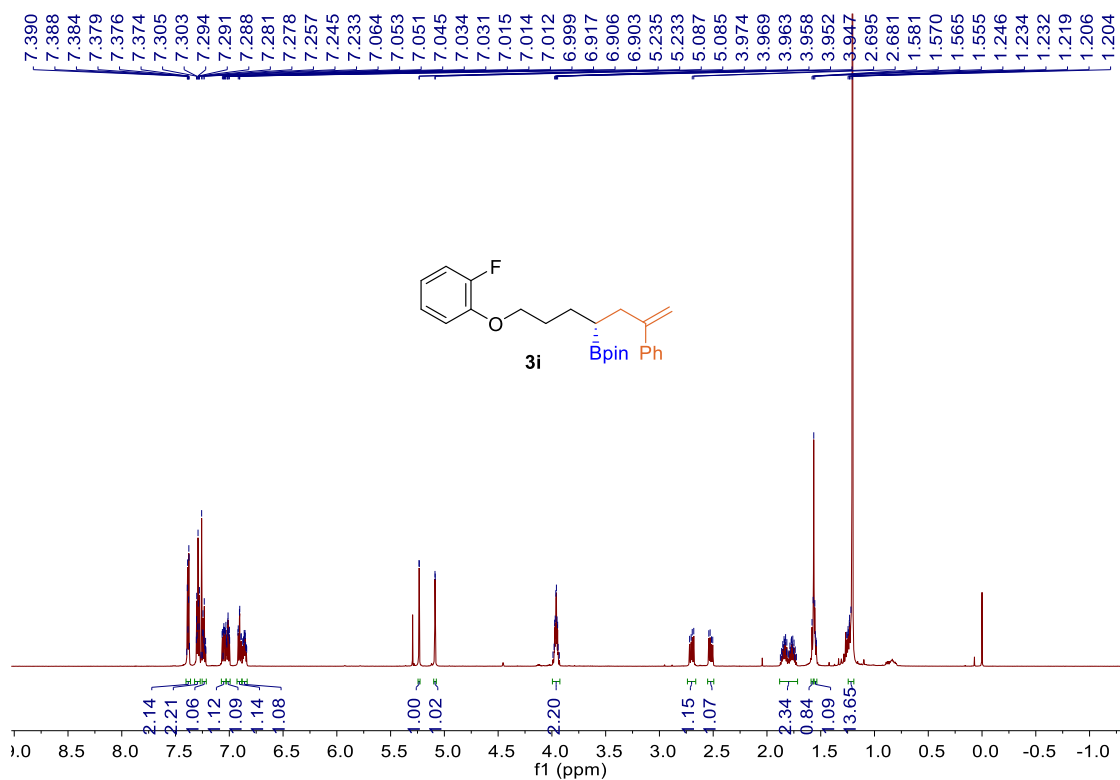
Supplementary Figure 37. ^1H NMR spectrum of compound 3h



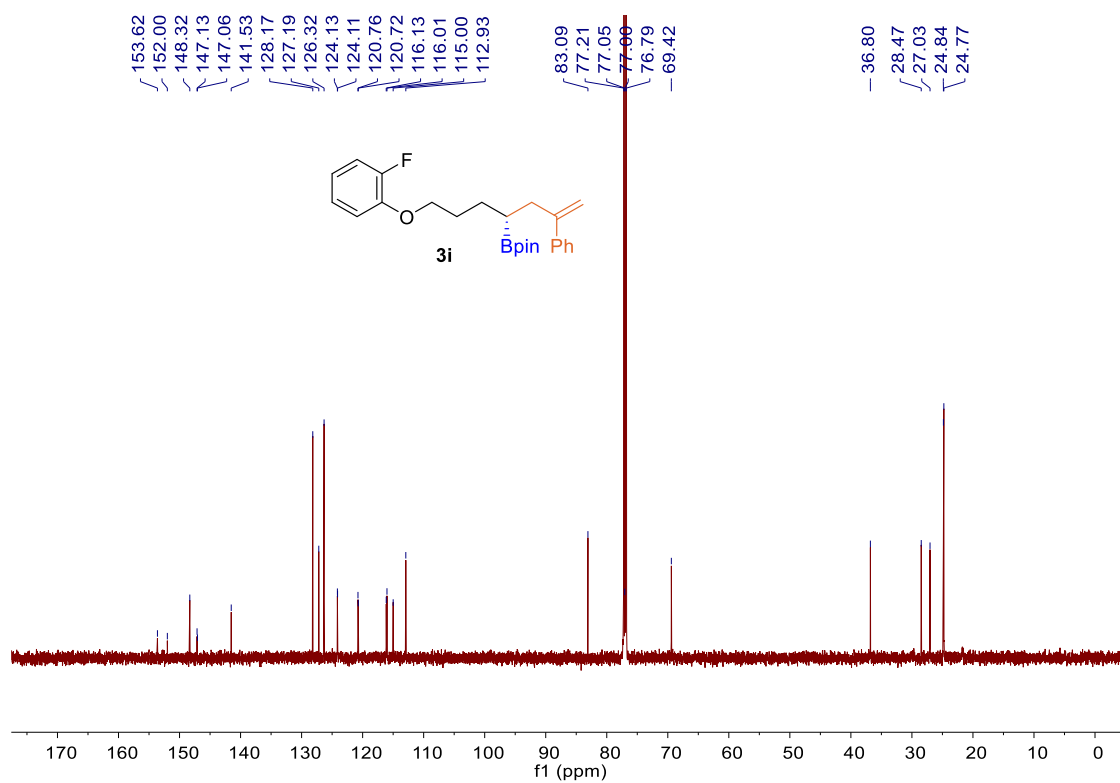
Supplementary Figure 38. ¹³C NMR spectrum of compound 3h



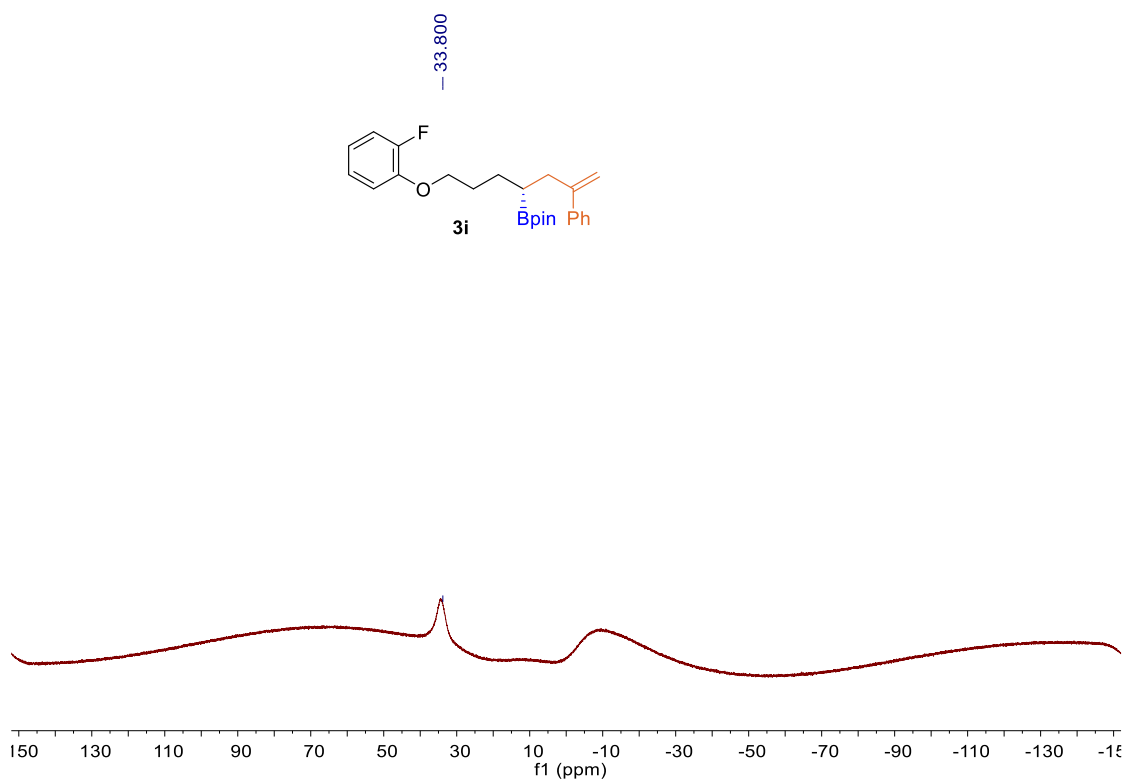
Supplementary Figure 39. ¹¹B NMR spectrum of compound 3h



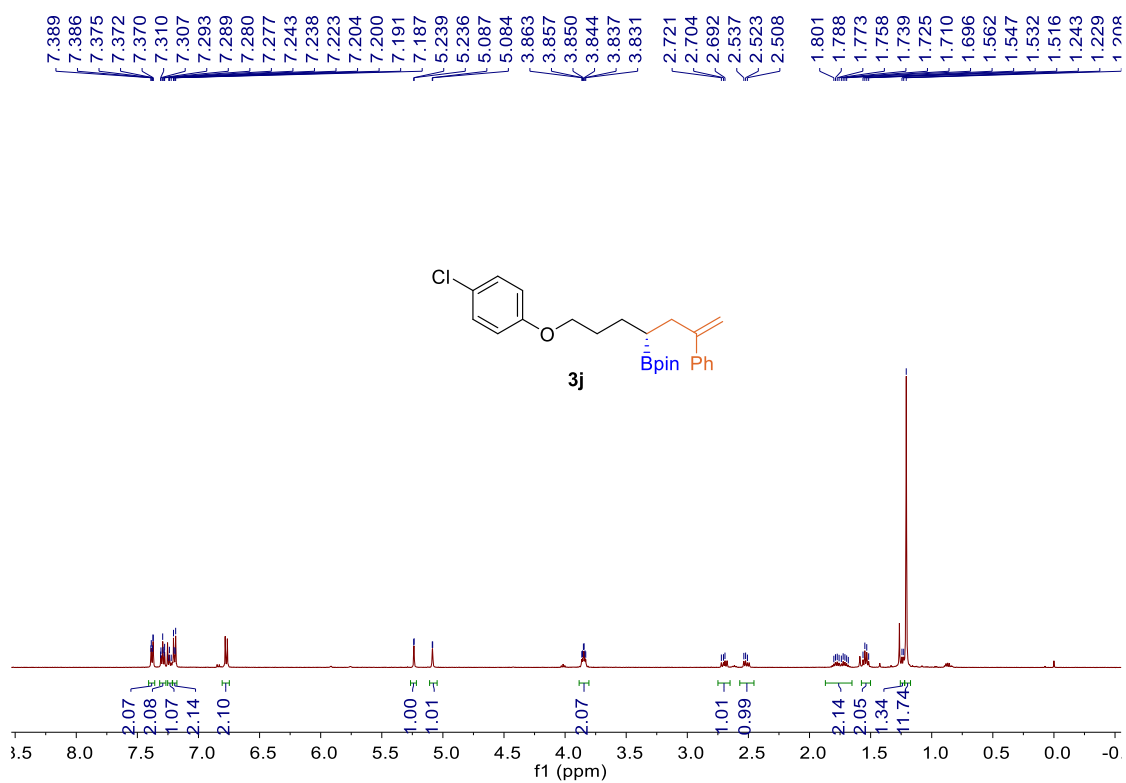
Supplementary Figure 40. ¹H NMR spectrum of compound 3i



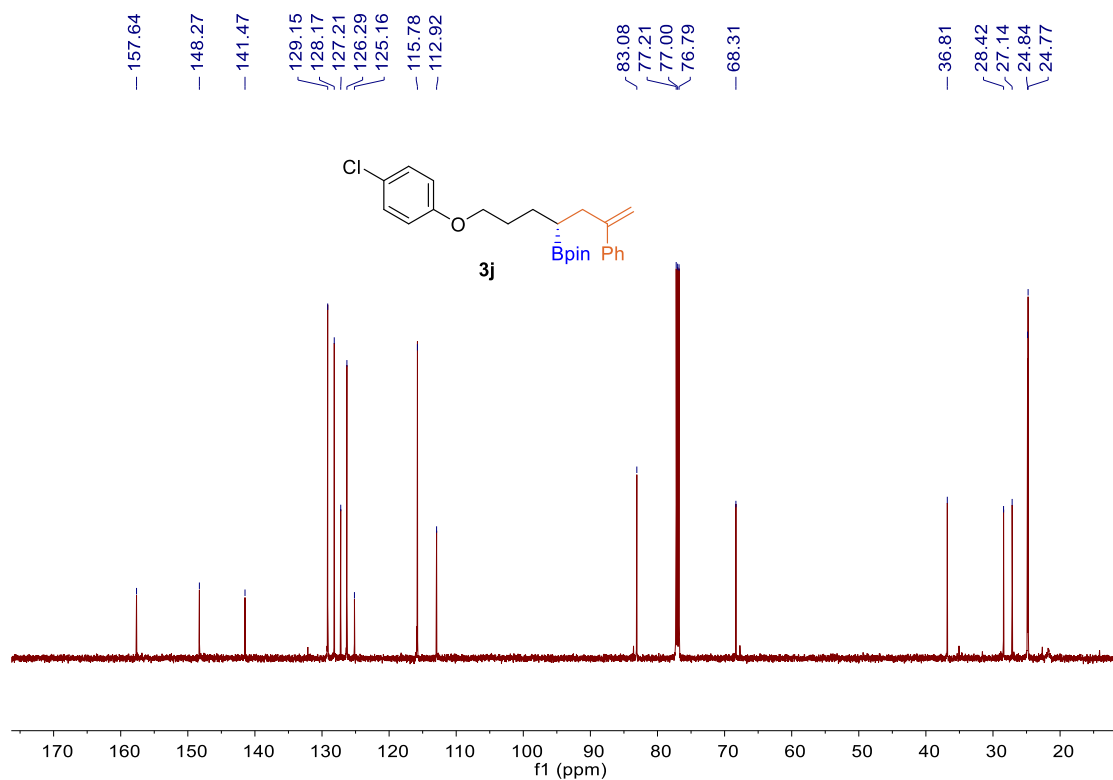
Supplementary Figure 41. ¹³C NMR spectrum of compound 3i



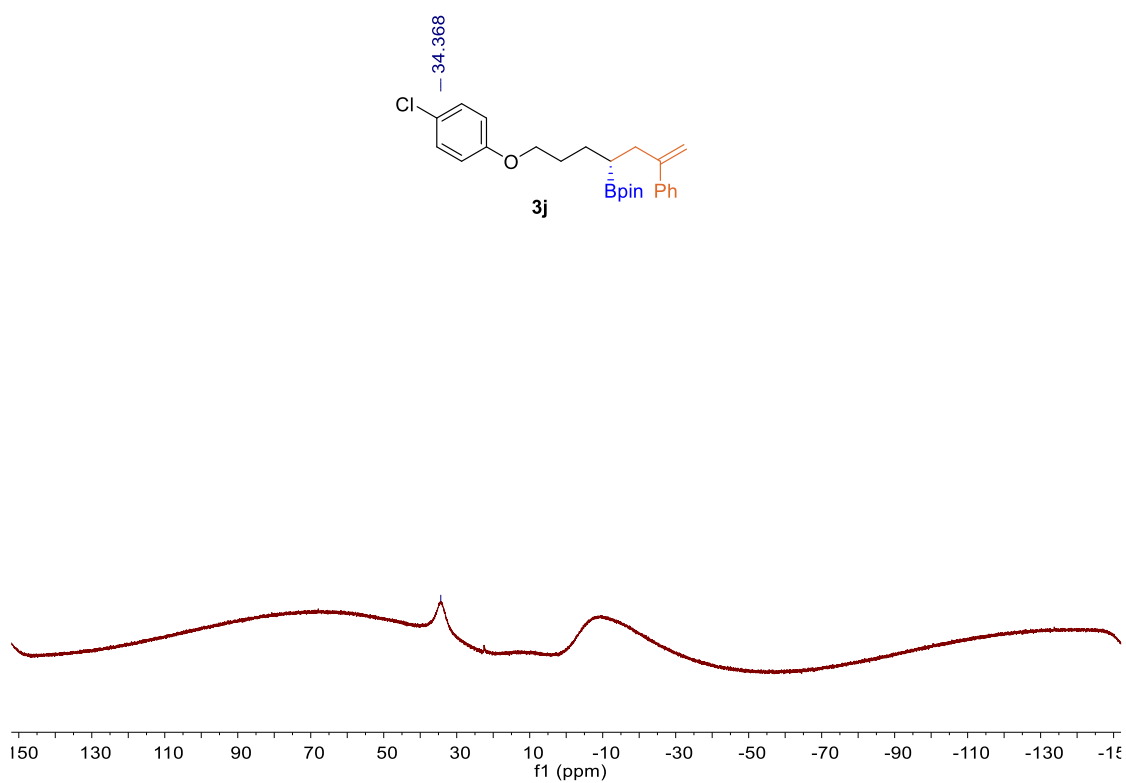
Supplementary Figure 42. ^{11}B NMR spectrum of compound **3i**



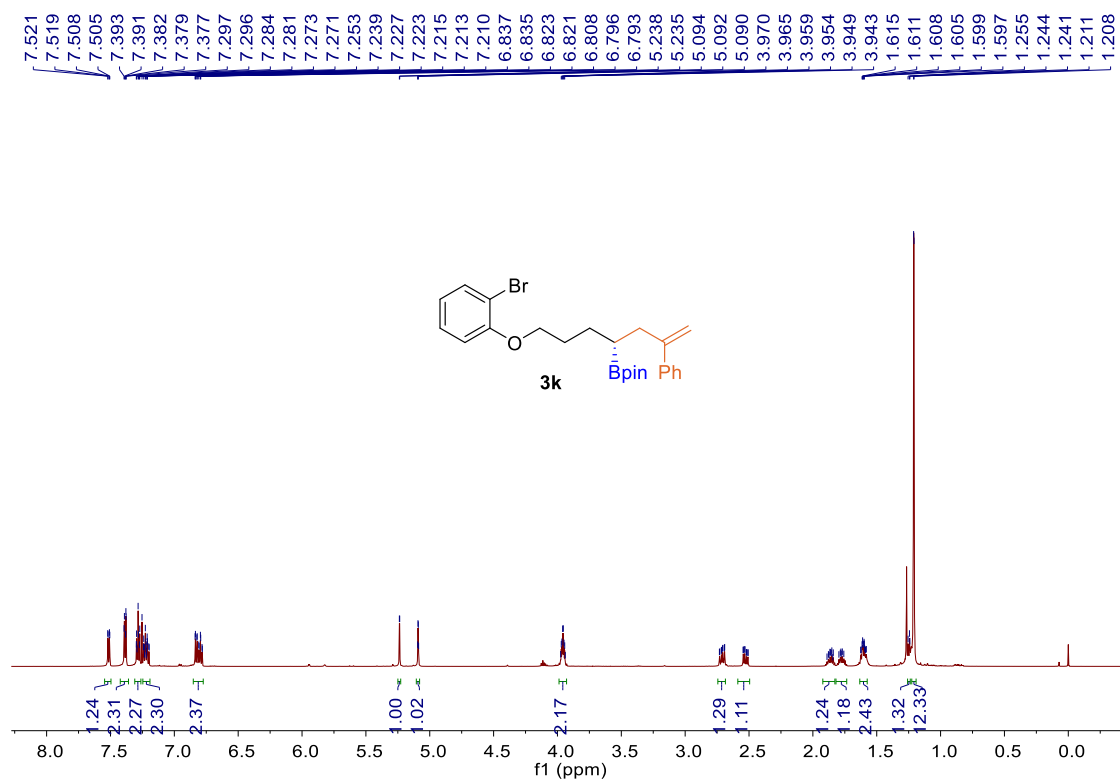
Supplementary Figure 43. ^1H NMR spectrum of compound **3j**



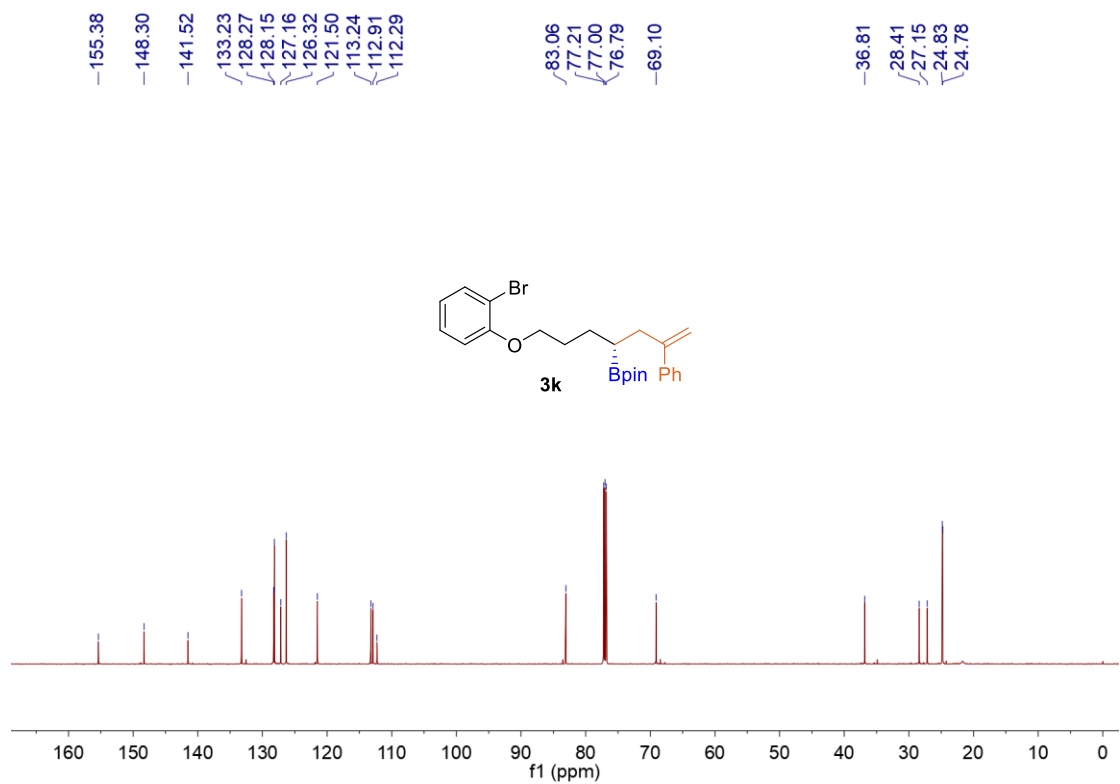
Supplementary Figure 44. ¹³C NMR spectrum of compound 3j



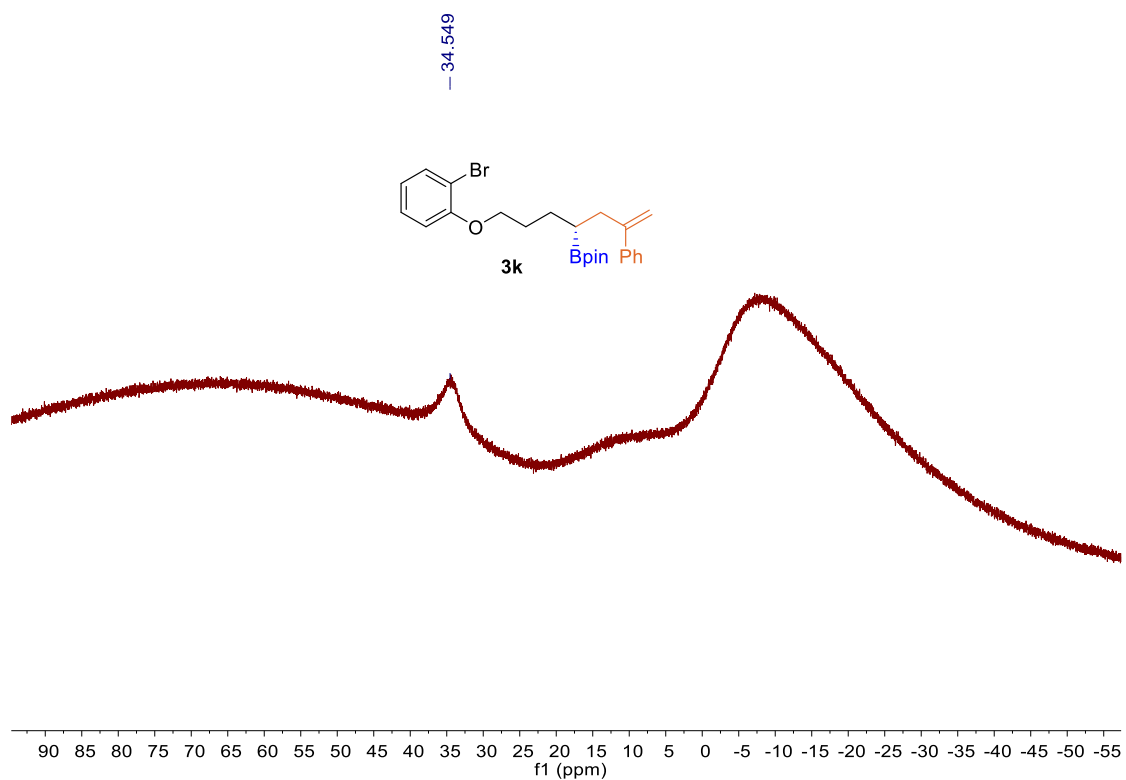
Supplementary Figure 45. ¹¹B NMR spectrum of compound 3j



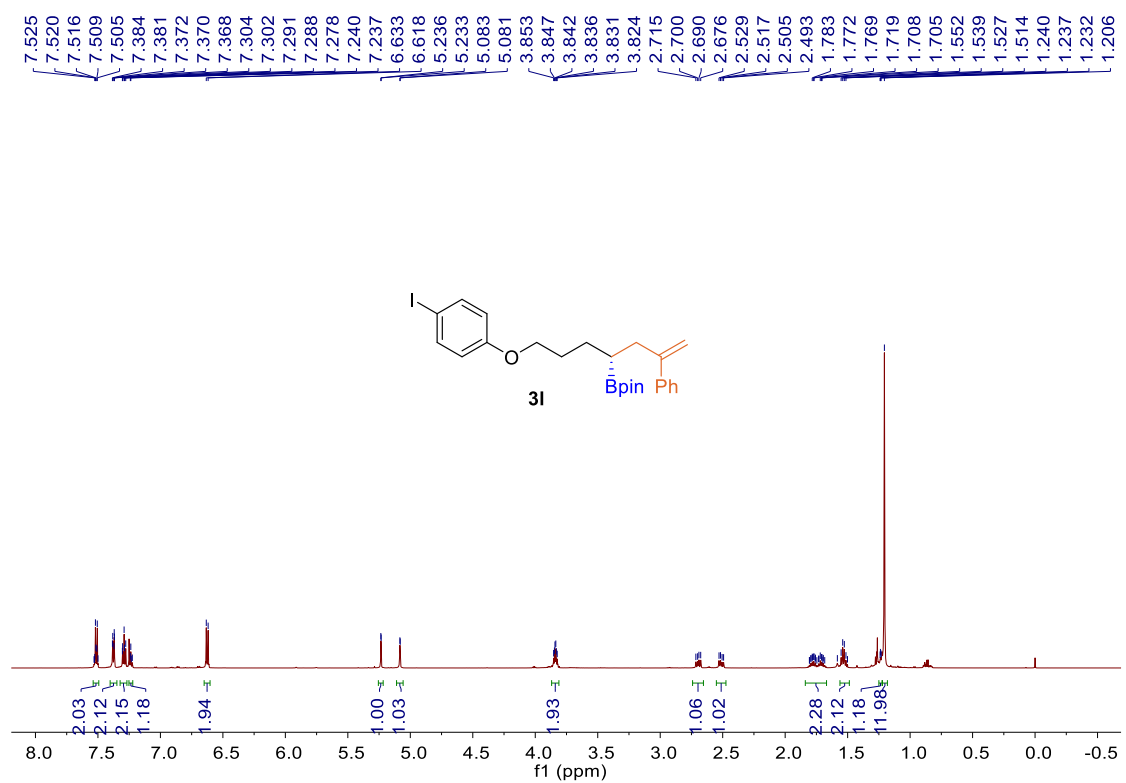
Supplementary Figure 46. ¹H NMR spectrum of compound 3k



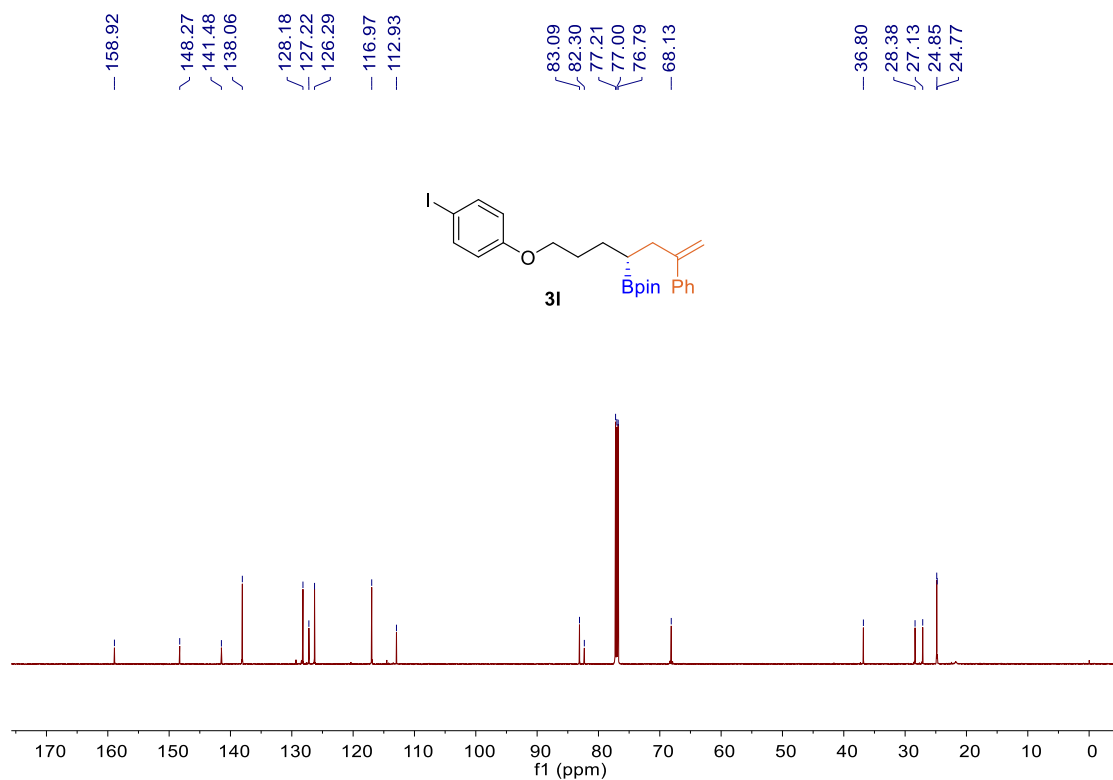
Supplementary Figure 47. ¹³C NMR spectrum of compound 3k



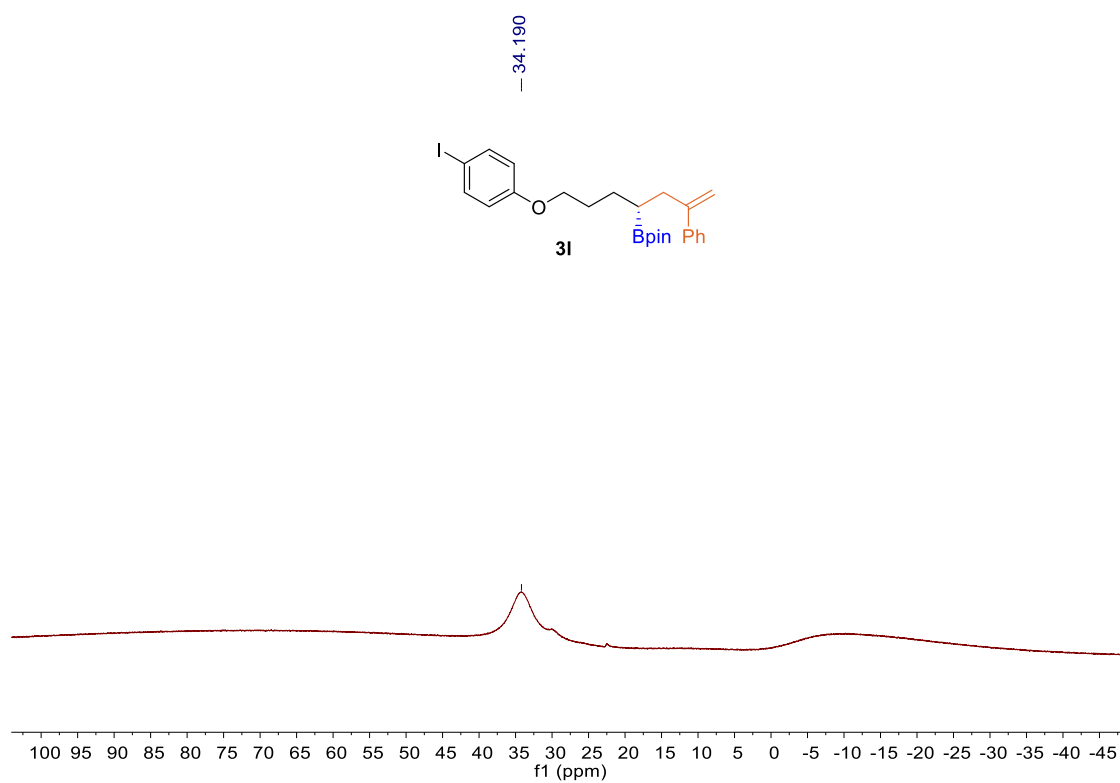
Supplementary Figure 48. ^{11}B NMR spectrum of compound **3k**



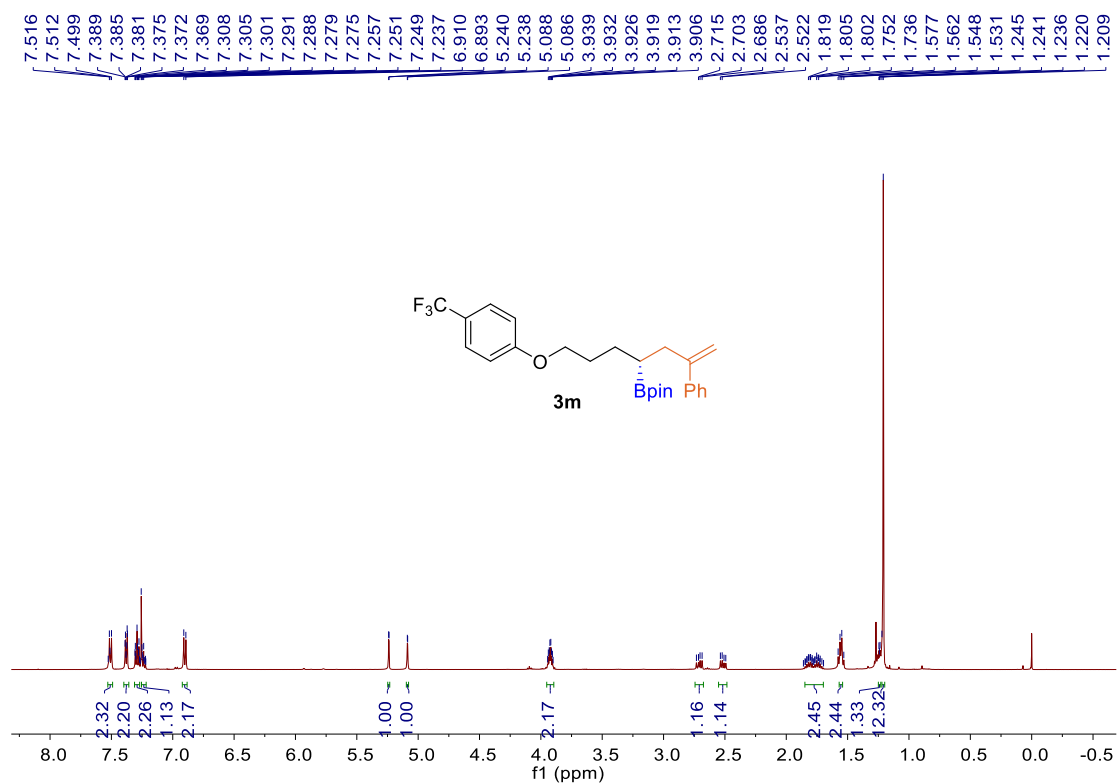
Supplementary Figure 49. ^1H NMR spectrum of compound **3l**



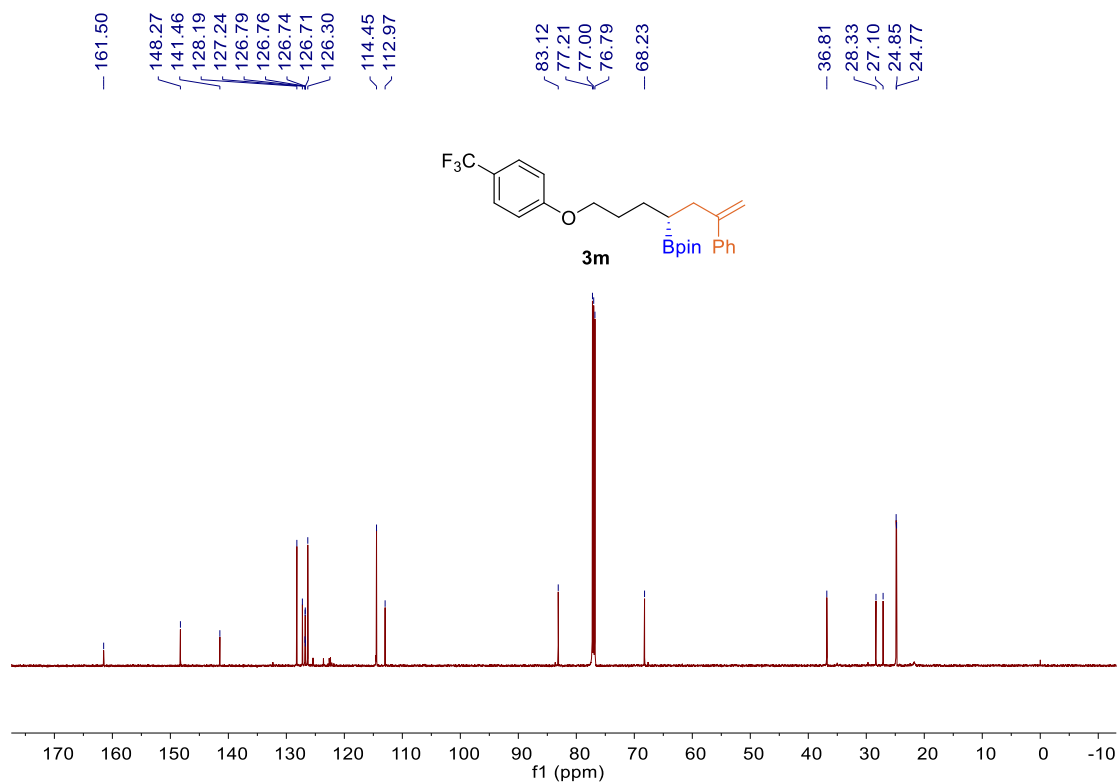
Supplementary Figure 50. ¹³C NMR spectrum of compound 3l



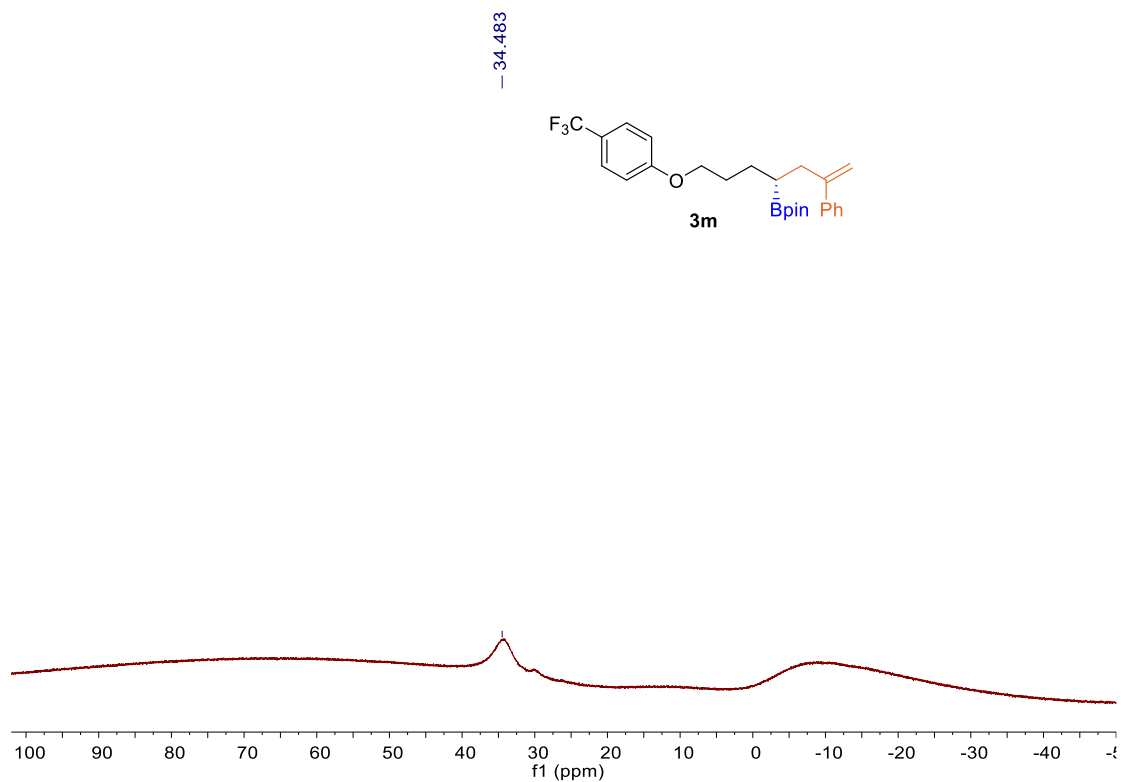
Supplementary Figure 51. ¹¹B NMR spectrum of compound 3l



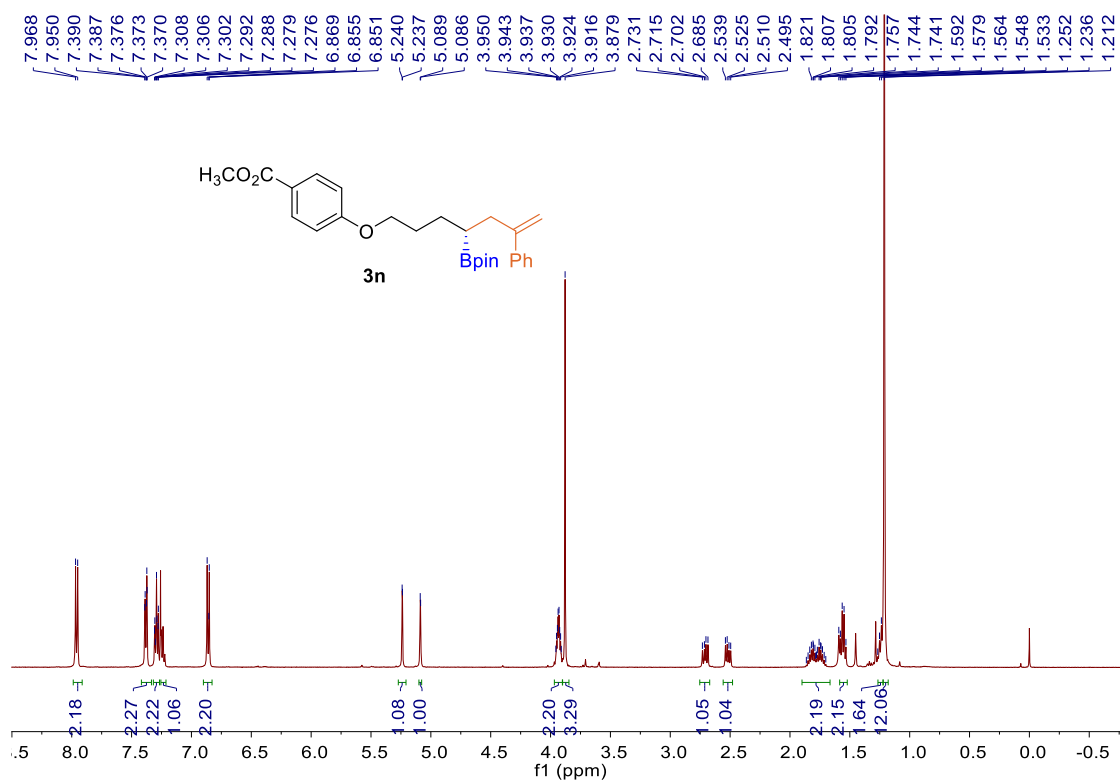
Supplementary Figure 52. ¹H NMR spectrum of compound 3m



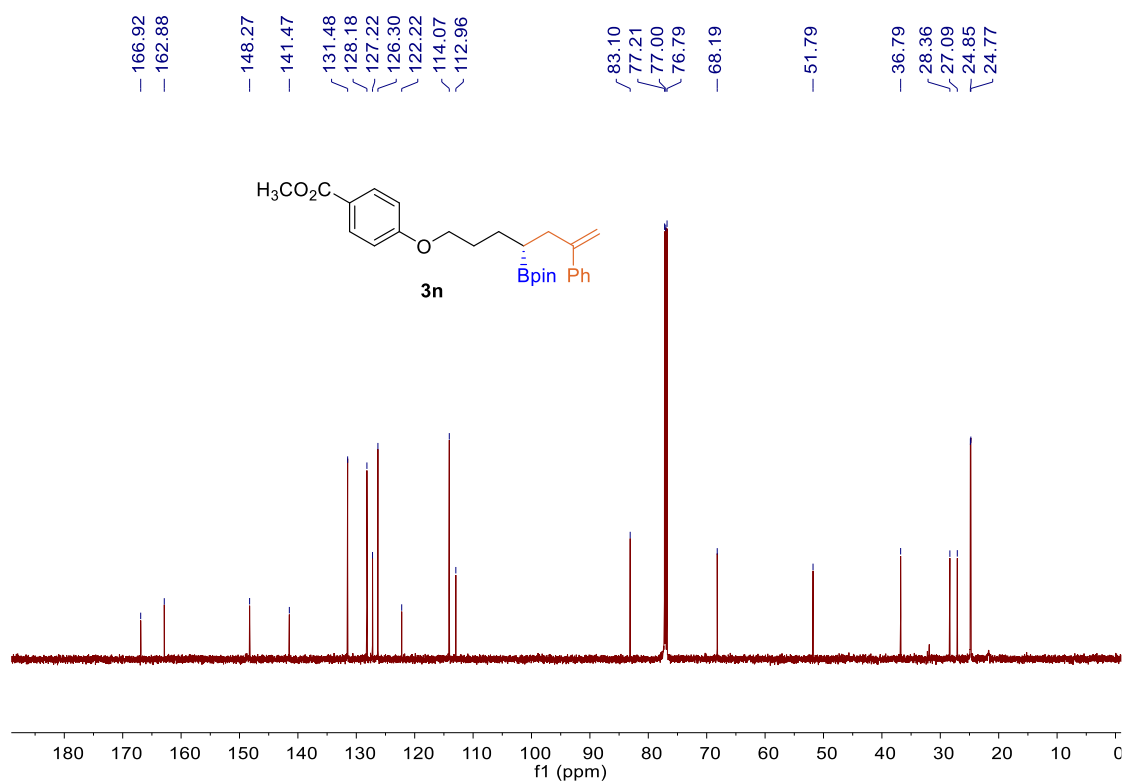
Supplementary Figure 53. ¹³C NMR spectrum of compound 3m



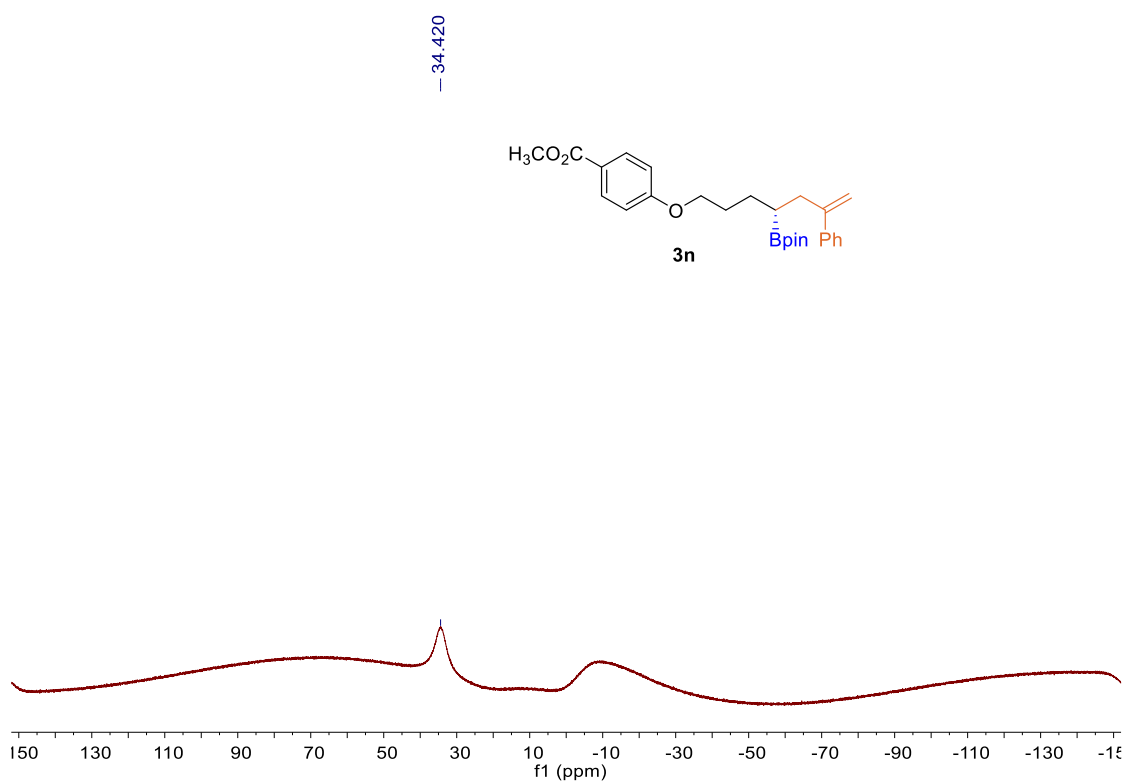
Supplementary Figure 54. ^{11}B NMR spectrum of compound 3m



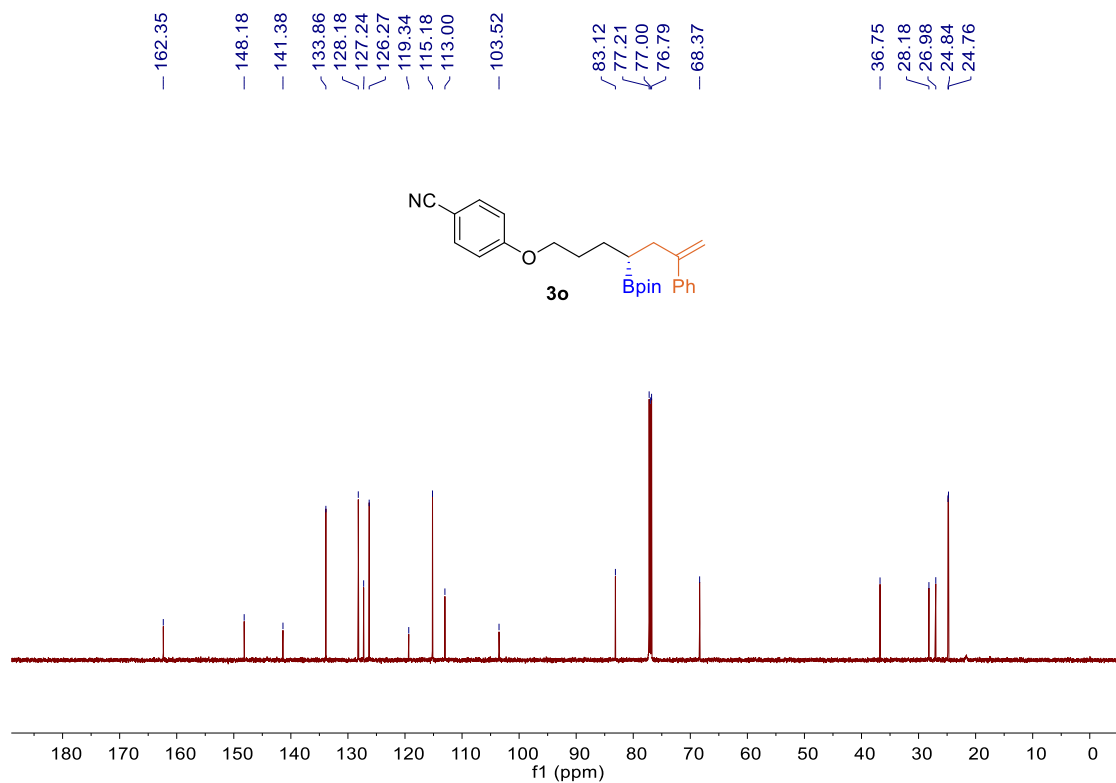
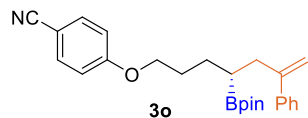
Supplementary Figure 55. ^1H NMR spectrum of compound 3n

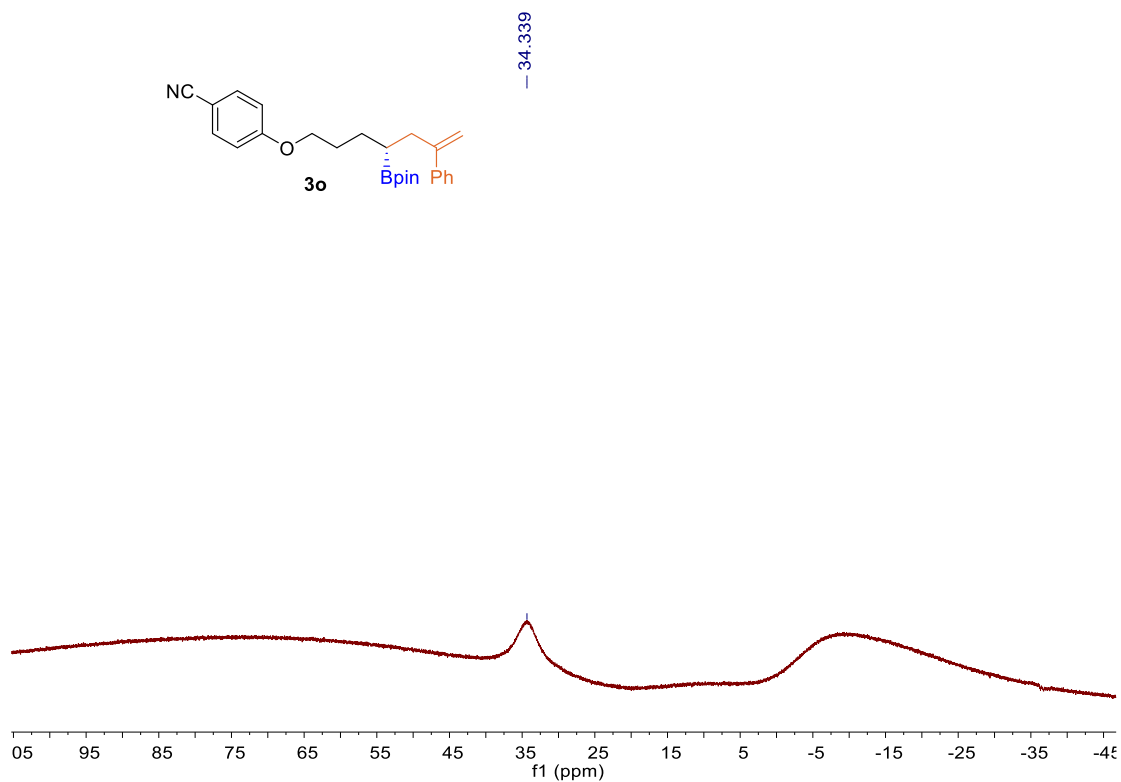


Supplementary Figure 56. ¹³C NMR spectrum of compound 3n

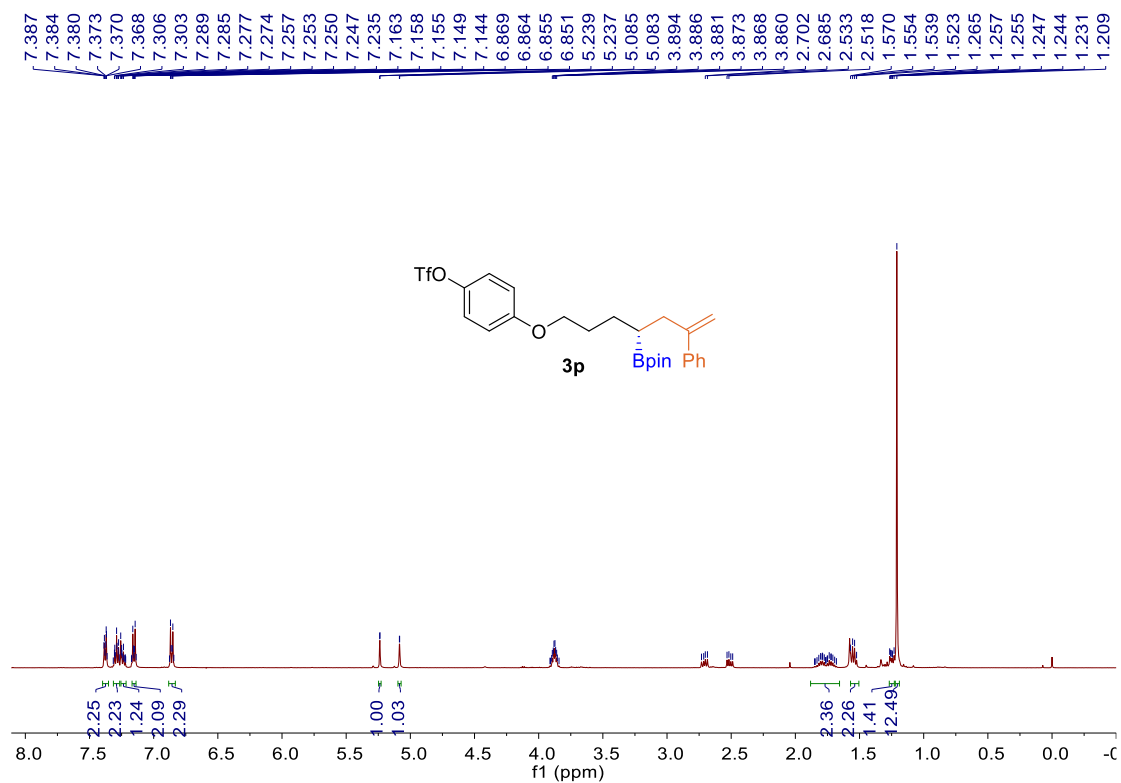


Supplementary Figure 57. ¹¹B NMR spectrum of compound 3n

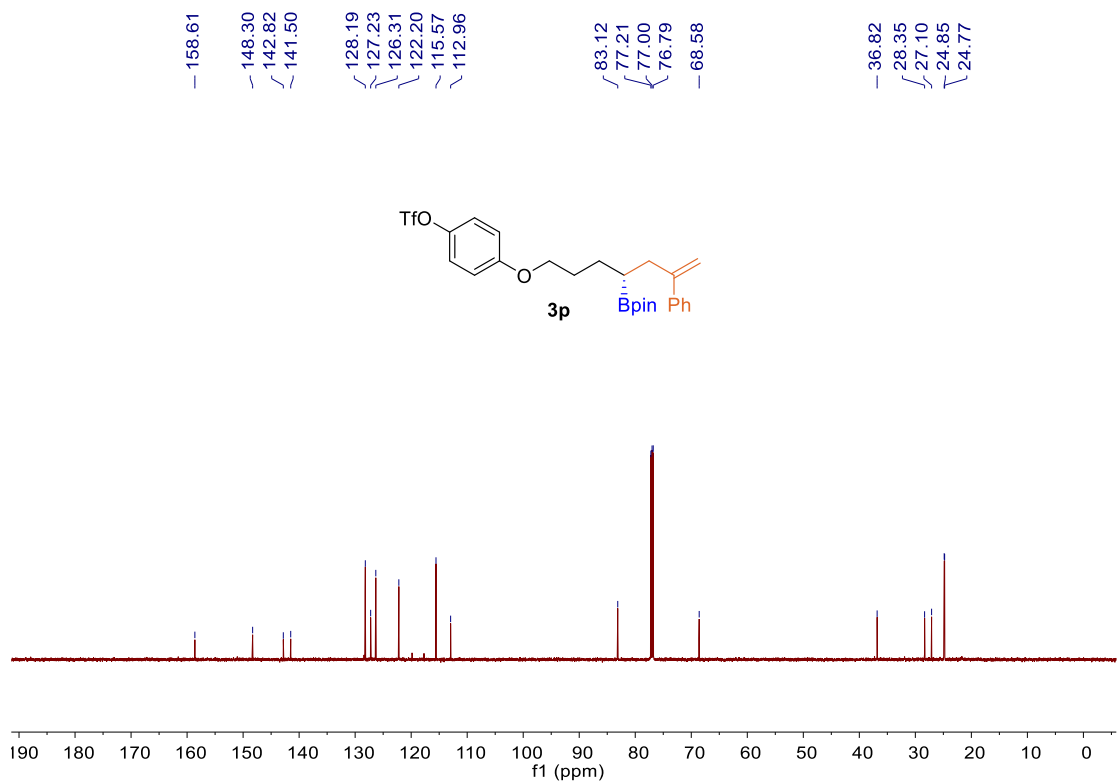




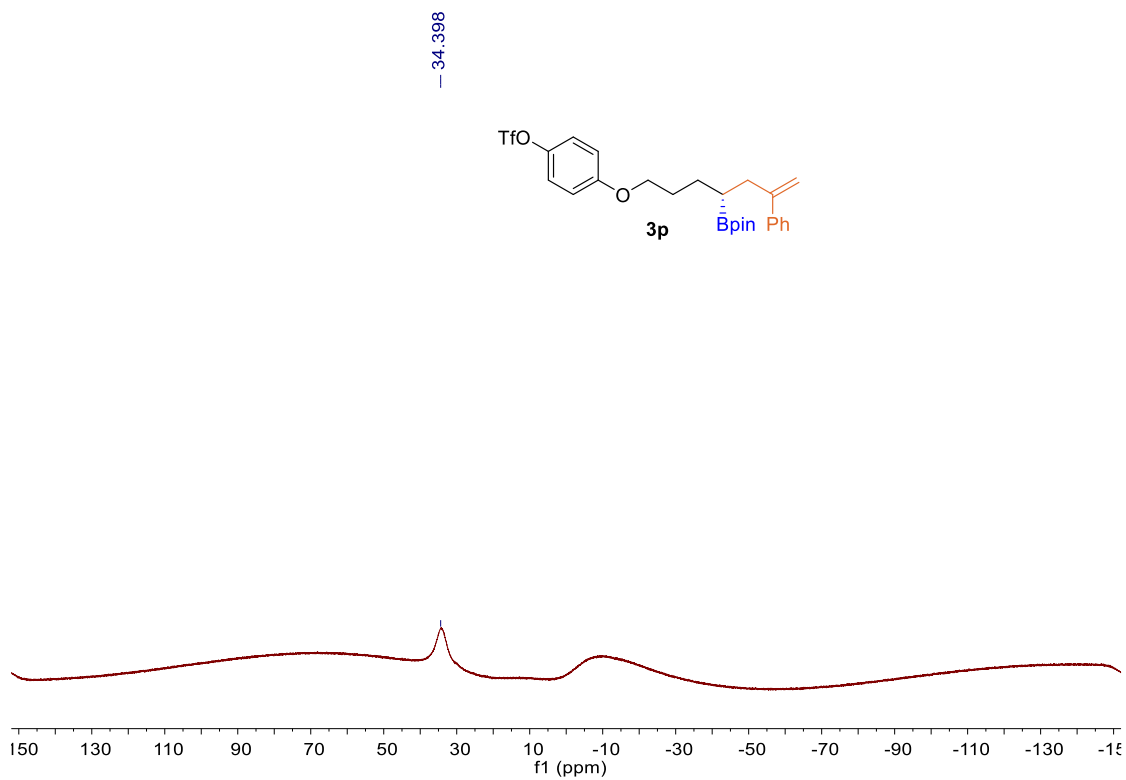
Supplementary Figure 60. ^{11}B NMR spectrum of compound **3o**



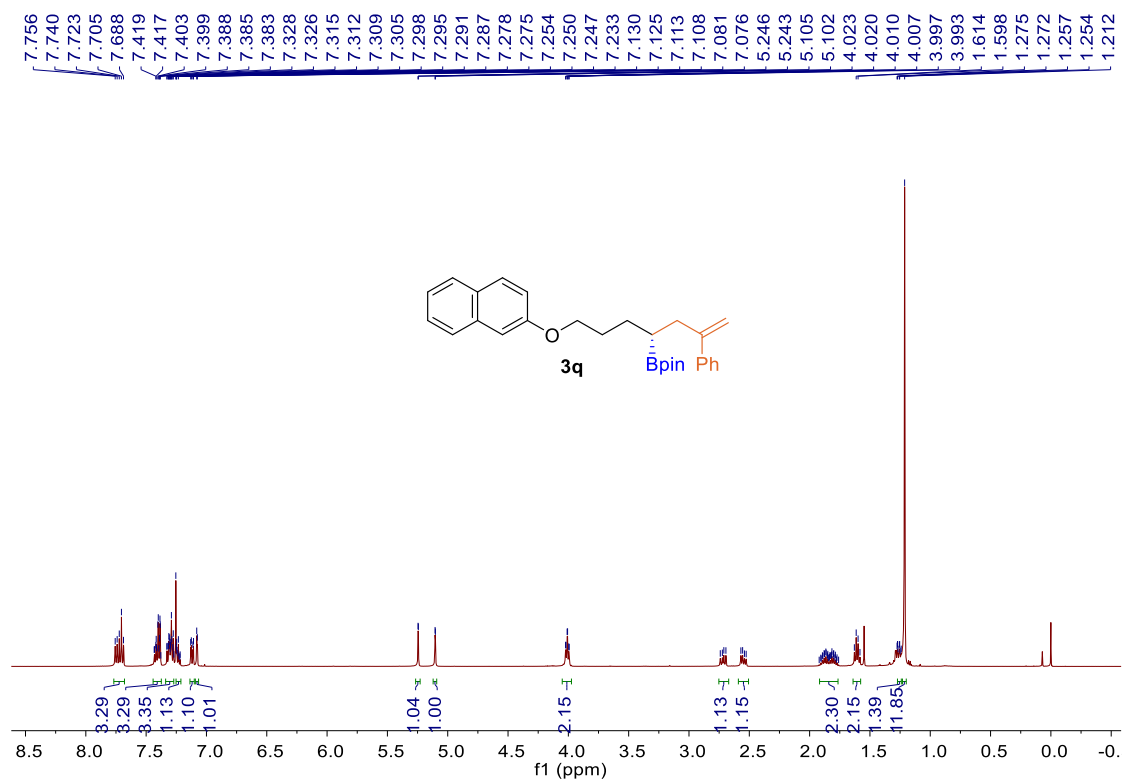
Supplementary Figure 61. ^1H NMR spectrum of compound **3p**



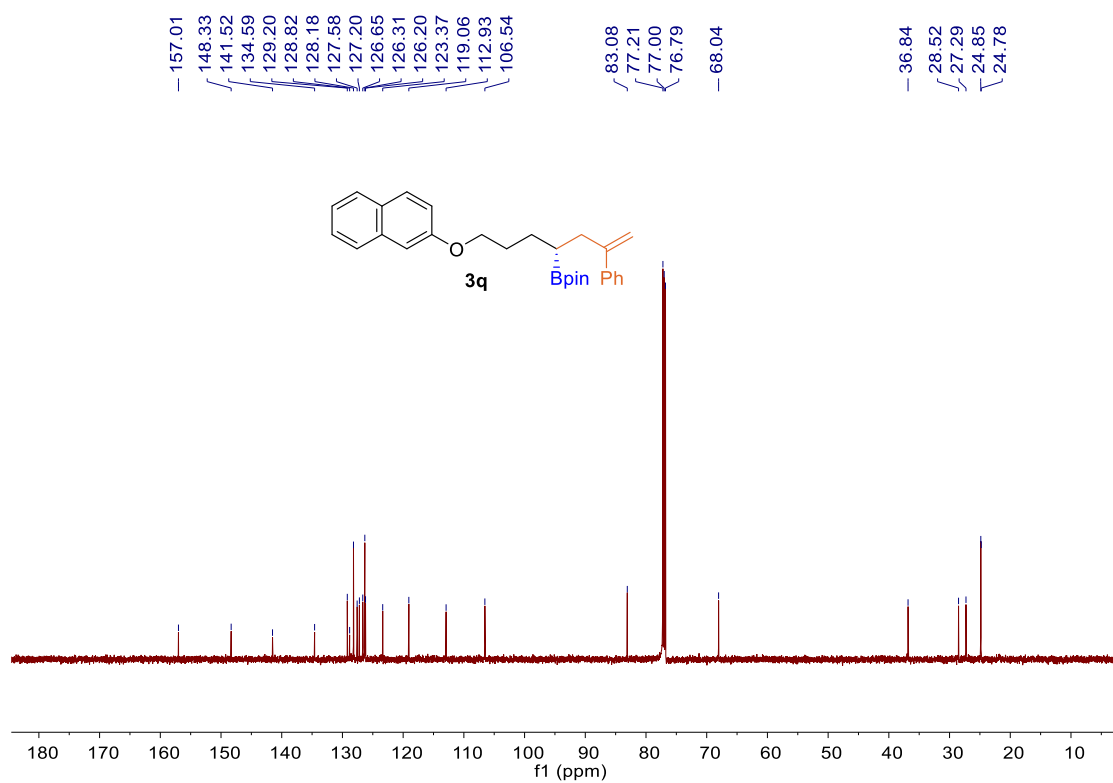
Supplementary Figure 62. ¹³C NMR spectrum of compound 3p



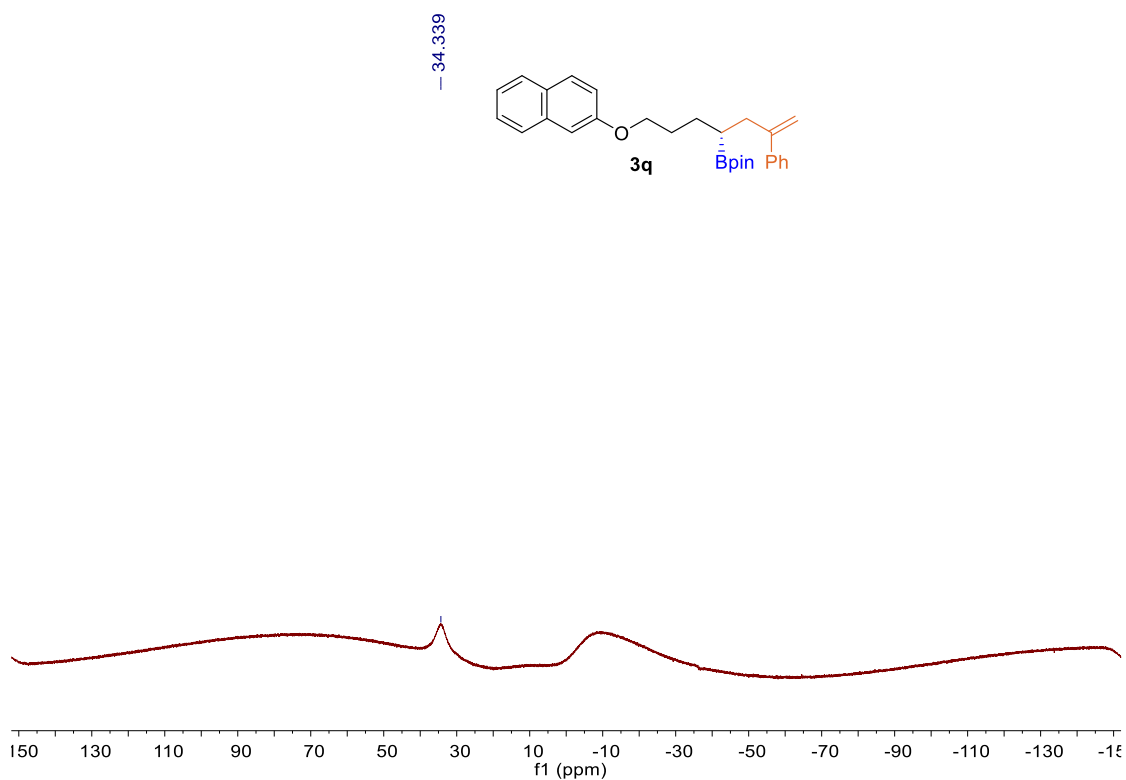
Supplementary Figure 63. ¹¹B NMR spectrum of compound 3p



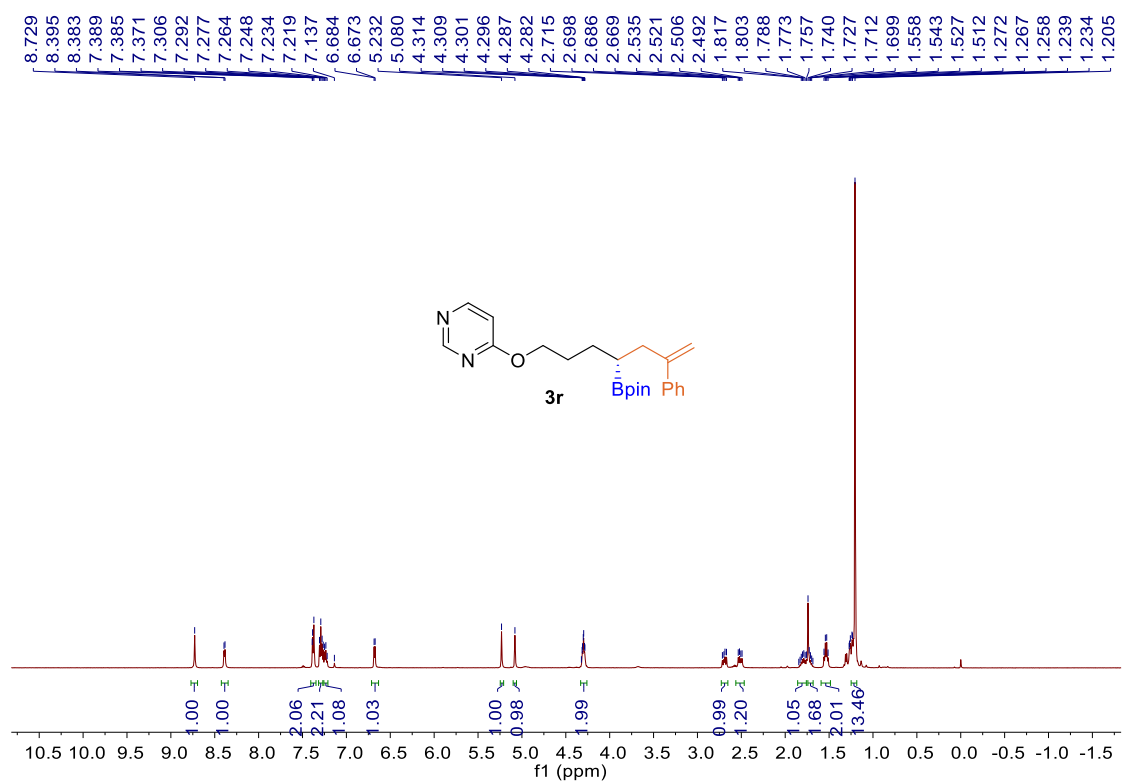
Supplementary Figure 64. ¹H NMR spectrum of compound 3q



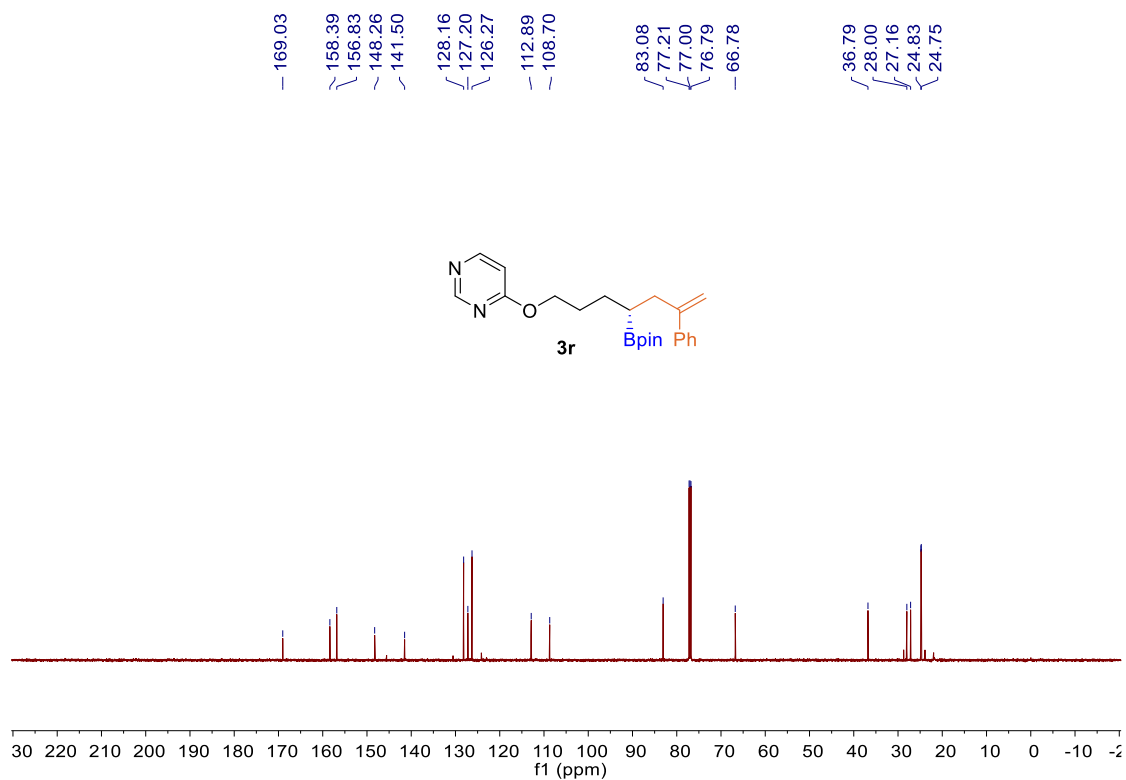
Supplementary Figure 65. ¹³C NMR spectrum of compound 3q



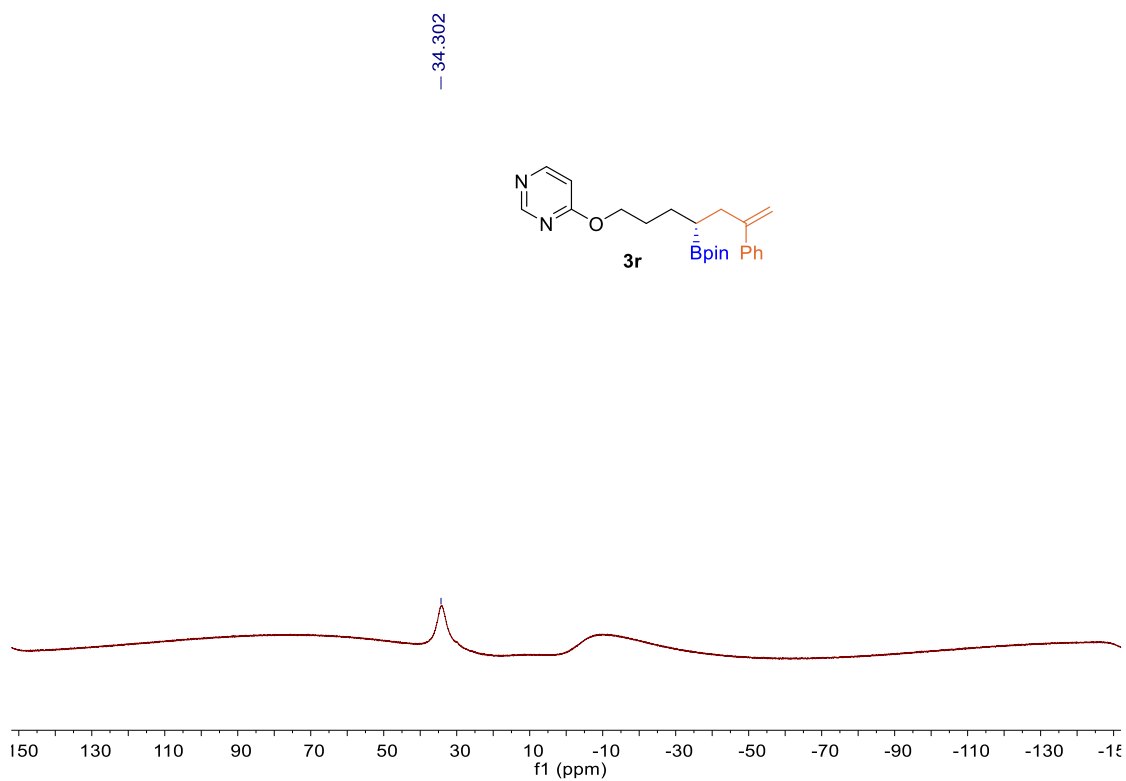
Supplementary Figure 66. ^{11}B NMR spectrum of compound **3q**



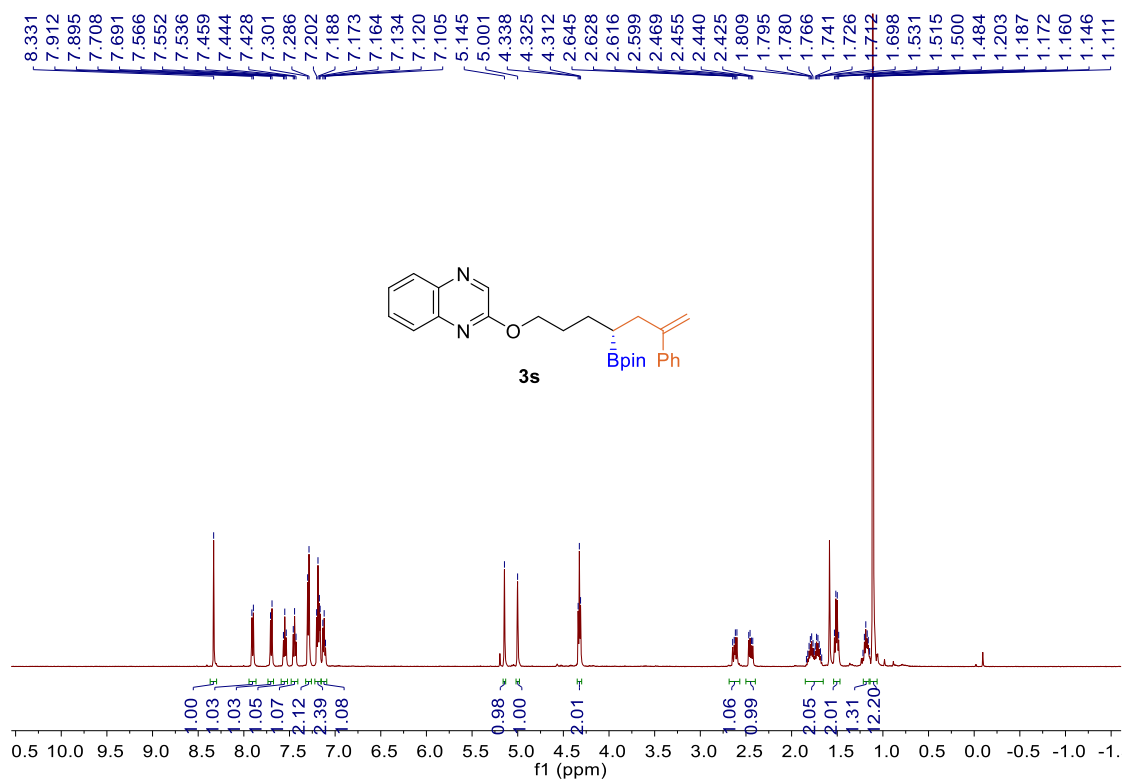
Supplementary Figure 67. ^1H NMR spectrum of compound **3r**



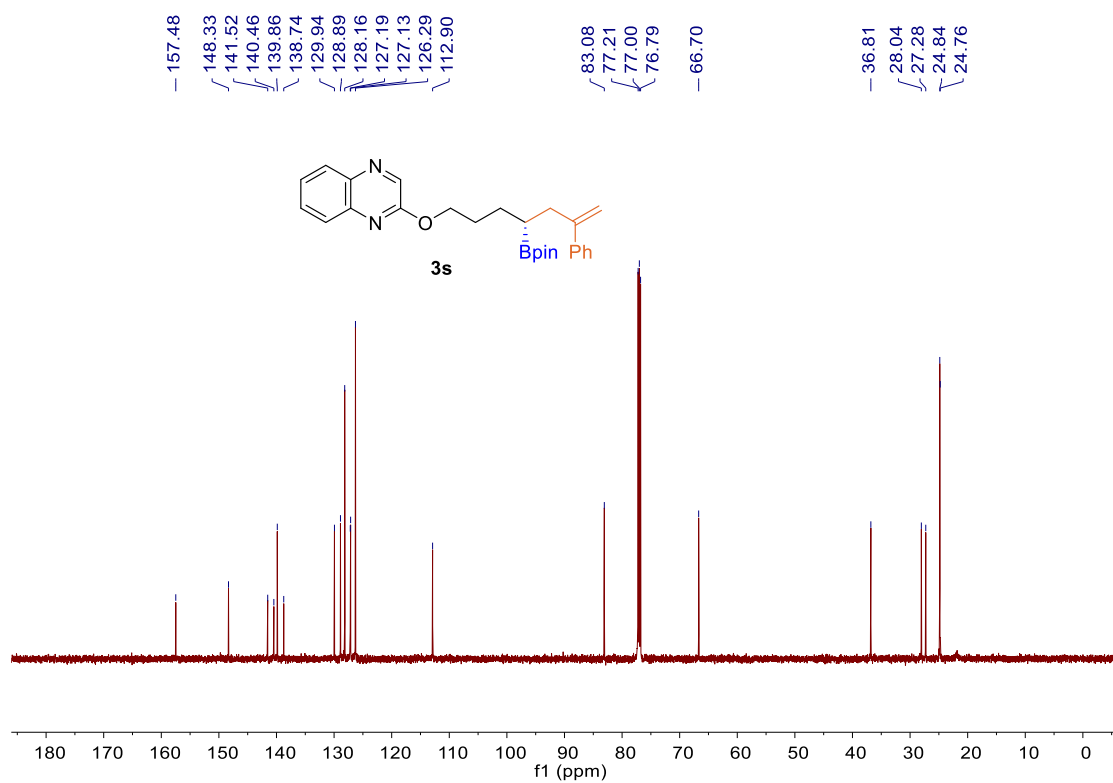
Supplementary Figure 68. ¹³C NMR spectrum of compound 3r



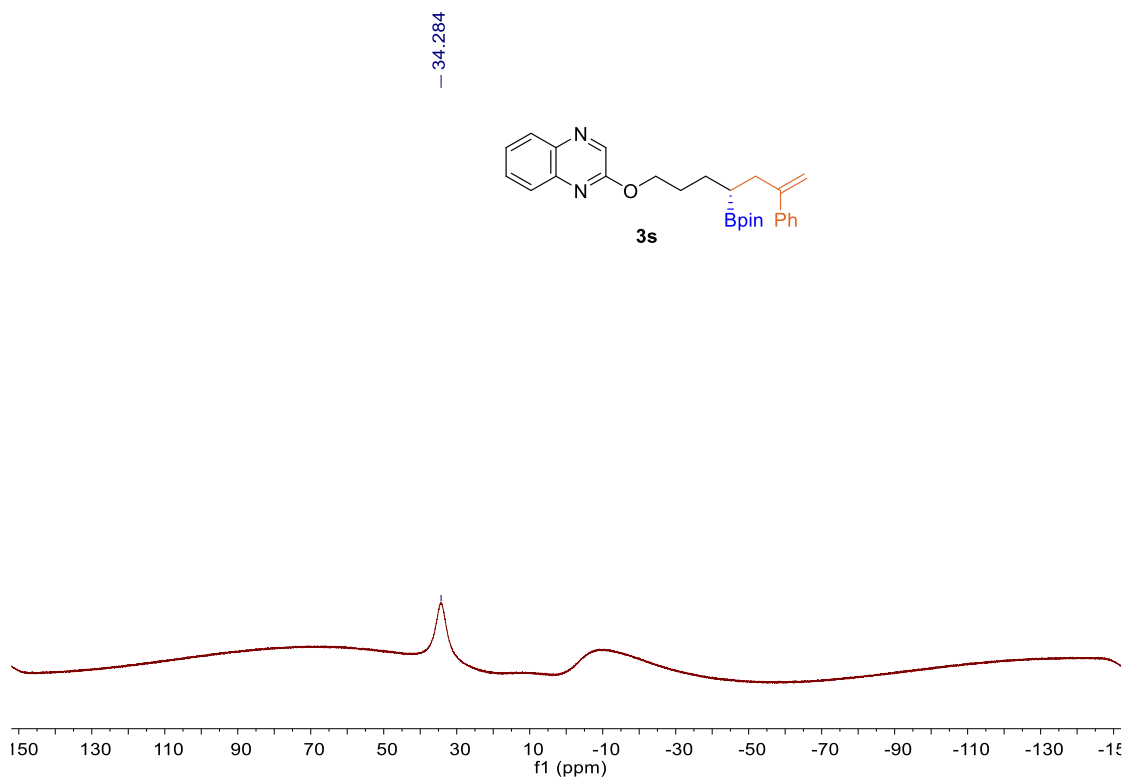
Supplementary Figure 69. ¹¹B NMR spectrum of compound 3r



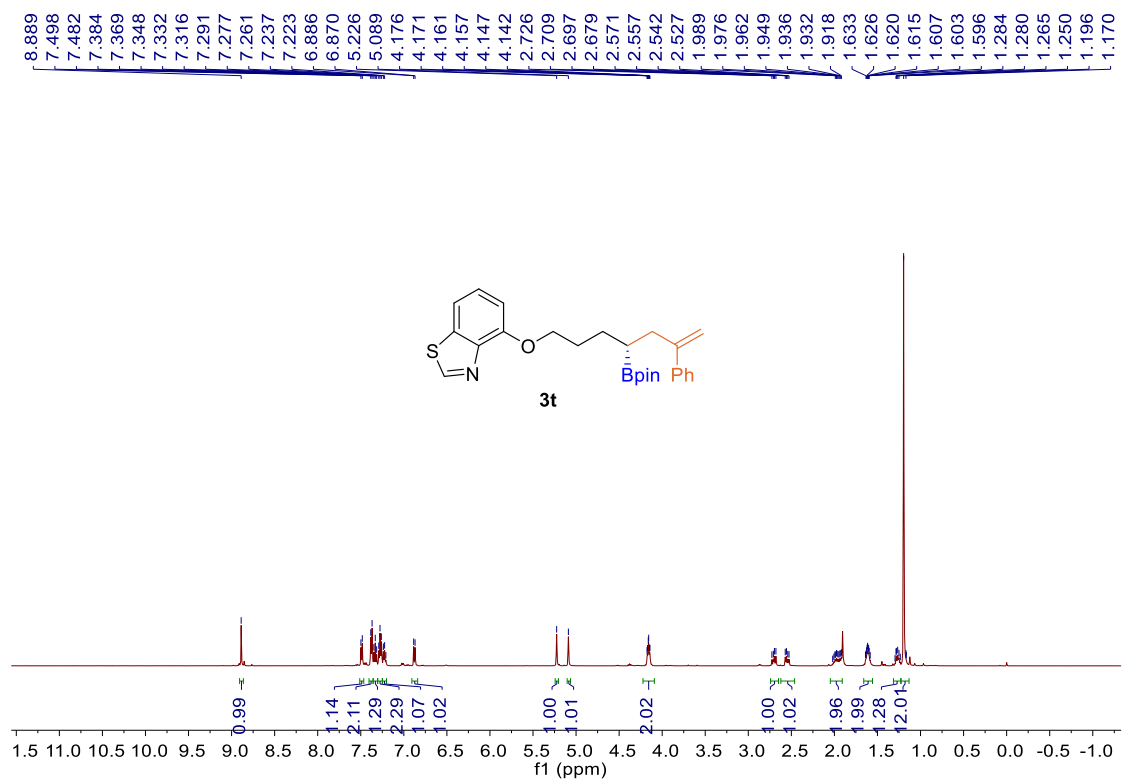
Supplementary Figure 70. ¹H NMR spectrum of compound 3s



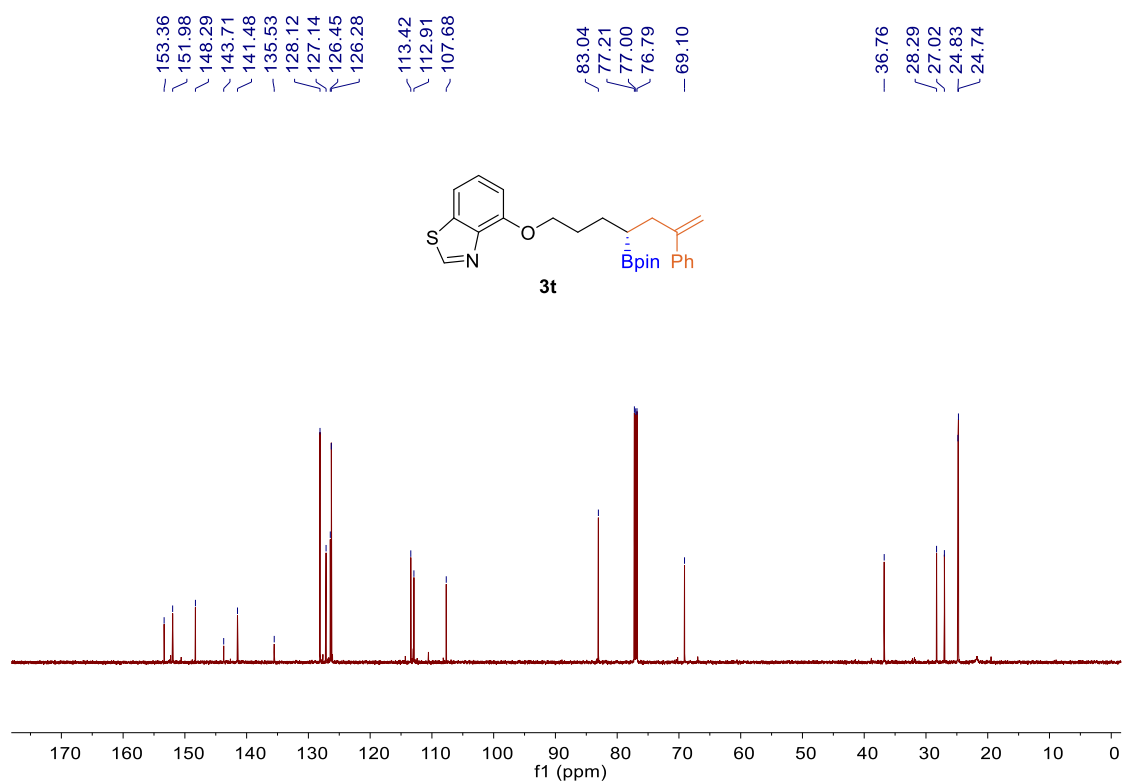
Supplementary Figure 71. ¹³C NMR spectrum of compound 3s



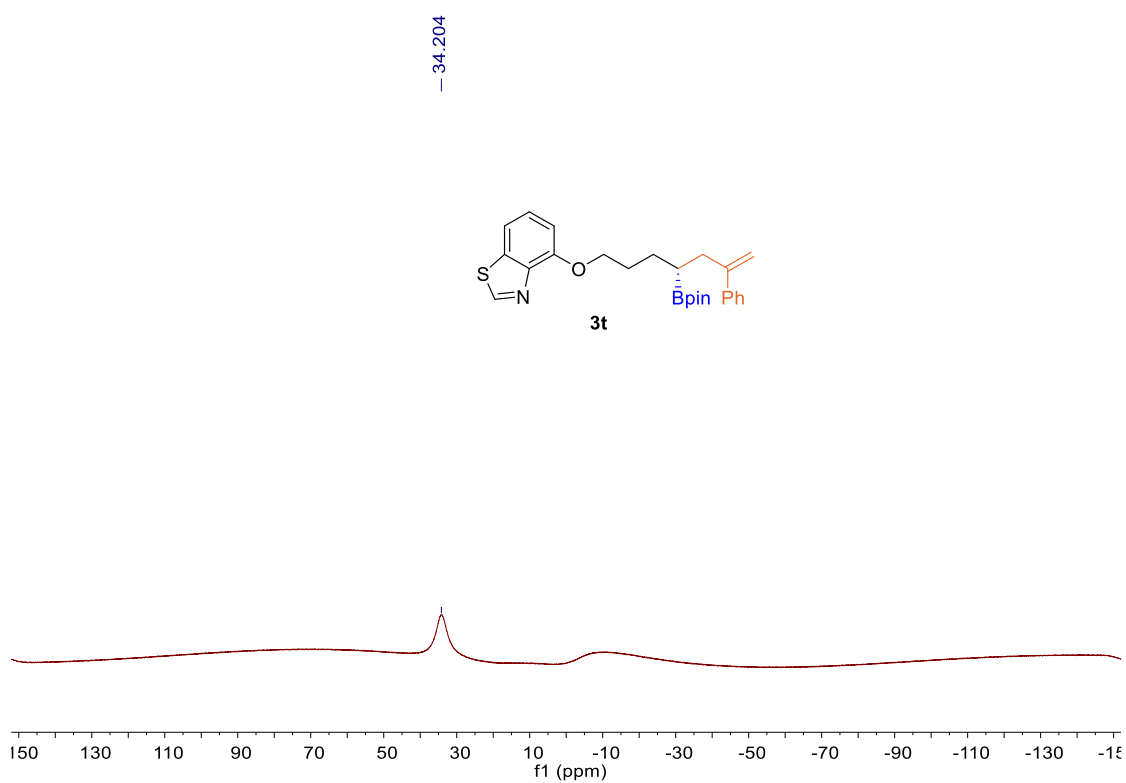
Supplementary Figure 72. ^{11}B NMR spectrum of compound **3s**



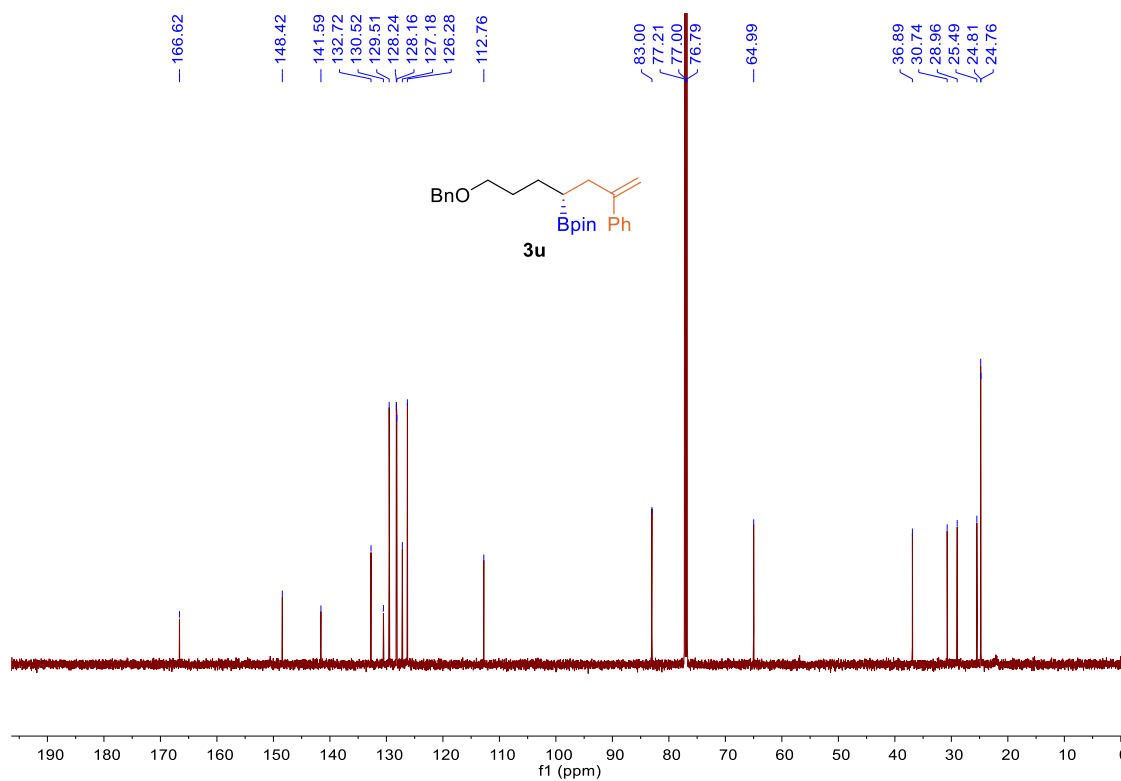
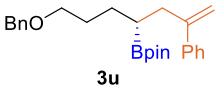
Supplementary Figure 73. ^1H NMR spectrum of compound **3t**

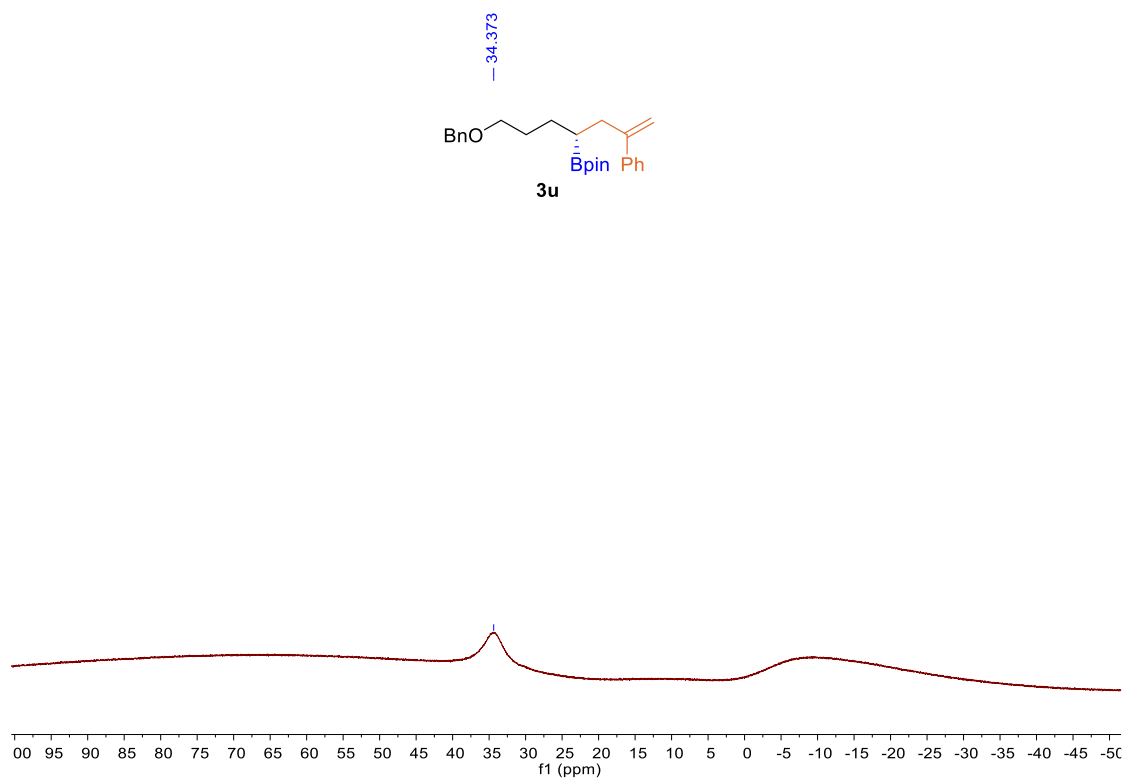


Supplementary Figure 74. ¹³C NMR spectrum of compound 3t

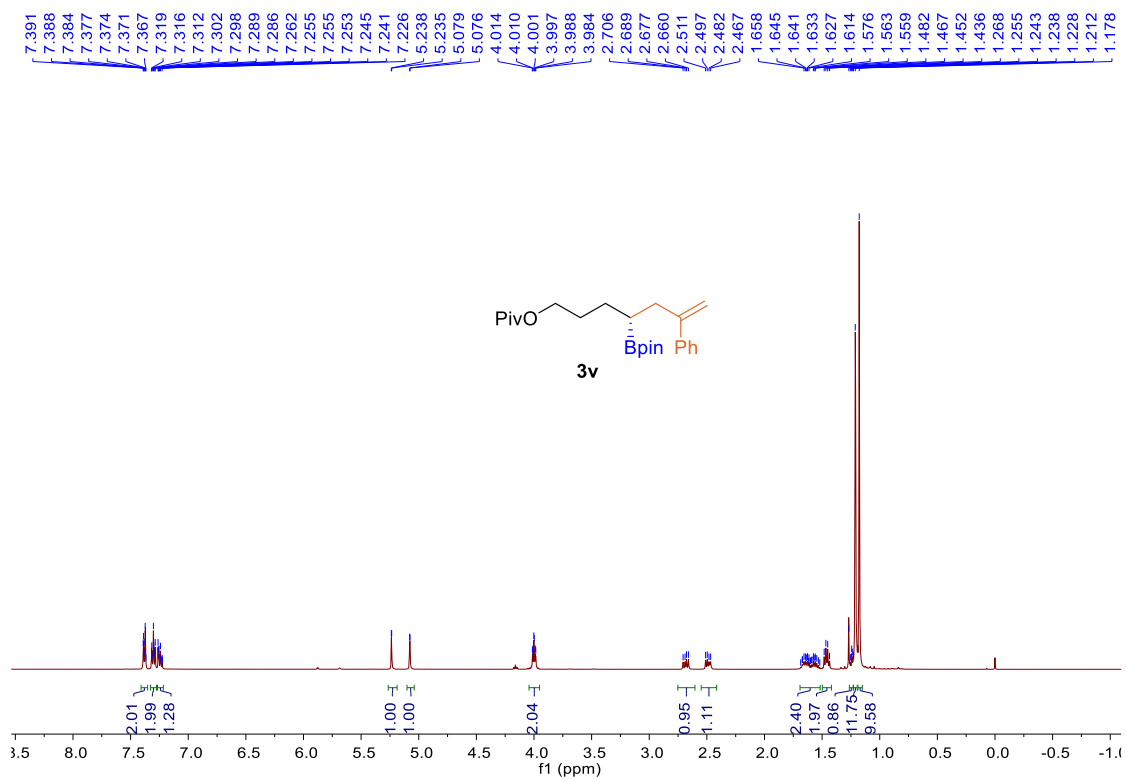


Supplementary Figure 75. ¹¹B NMR spectrum of compound 3t

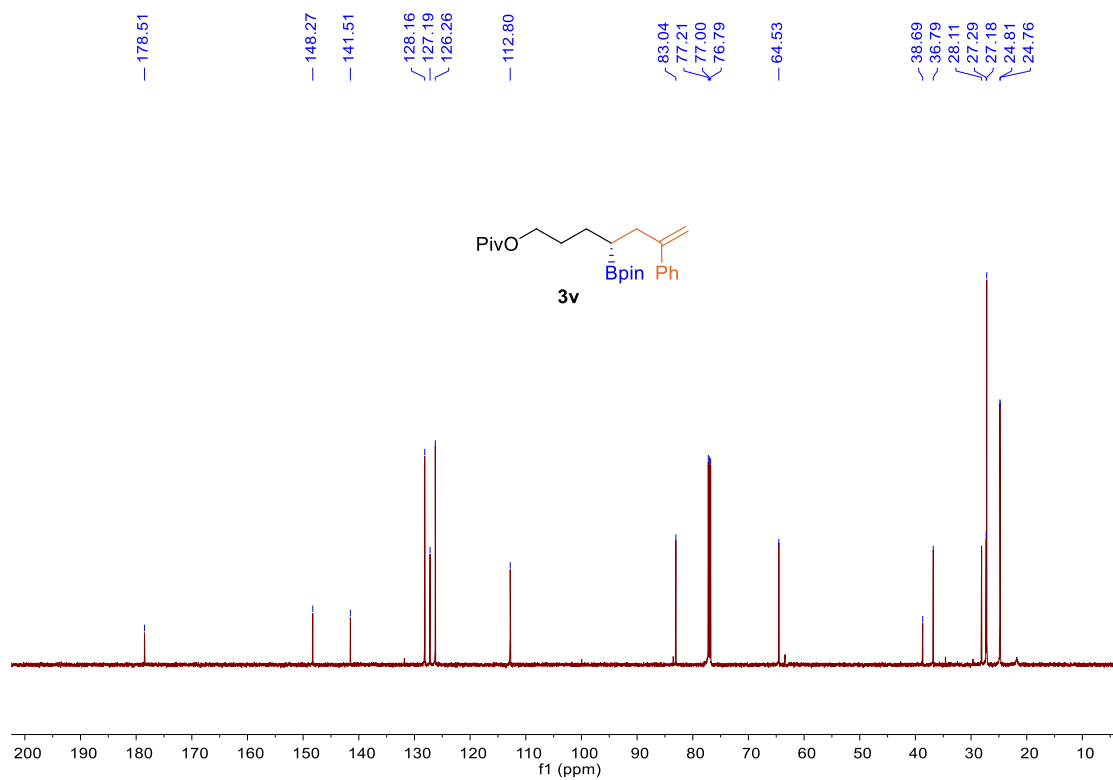




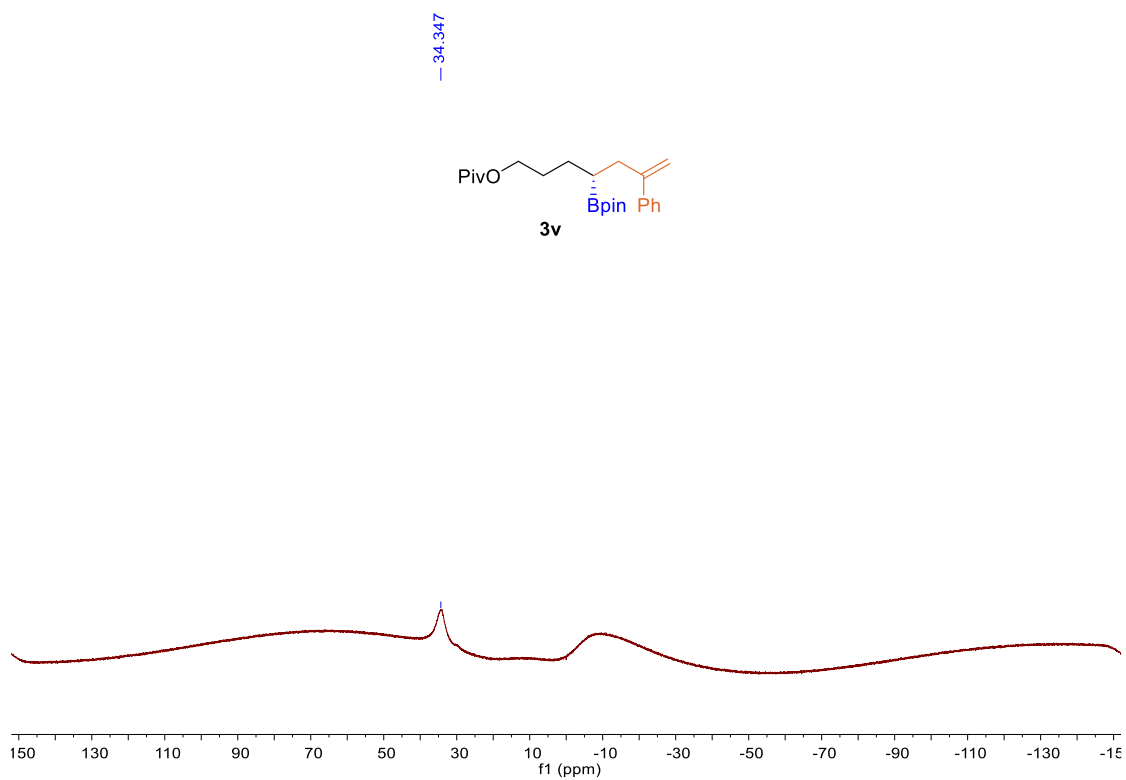
Supplementary Figure 78. ^{11}B NMR spectrum of compound **3u**



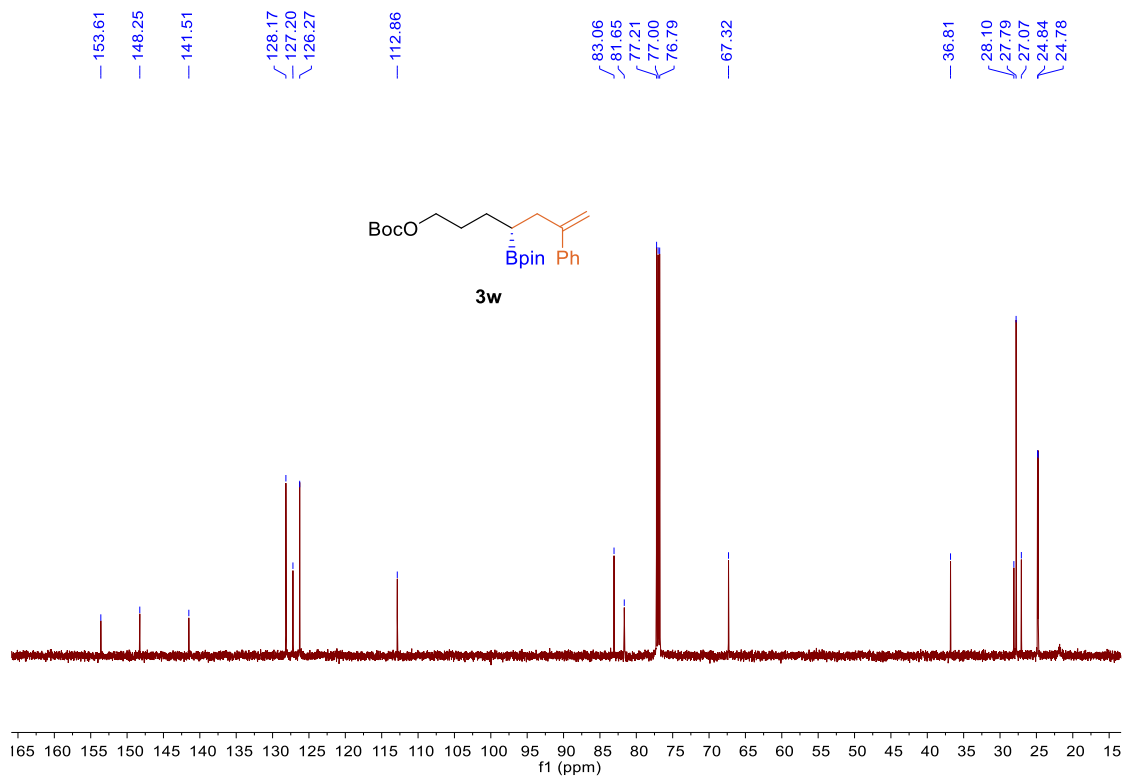
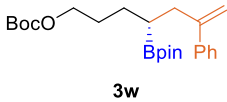
Supplementary Figure 79. ^1H NMR spectrum of compound **3v**

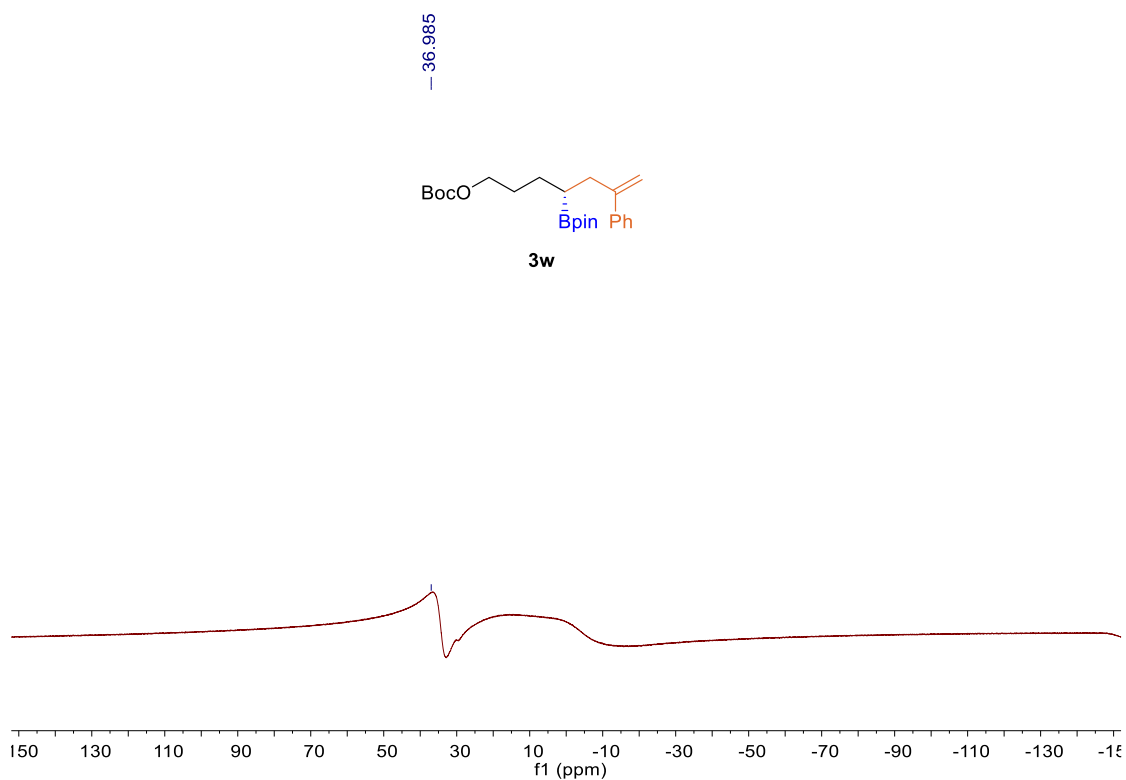


Supplementary Figure 80 ¹³C NMR spectrum of compound 3v

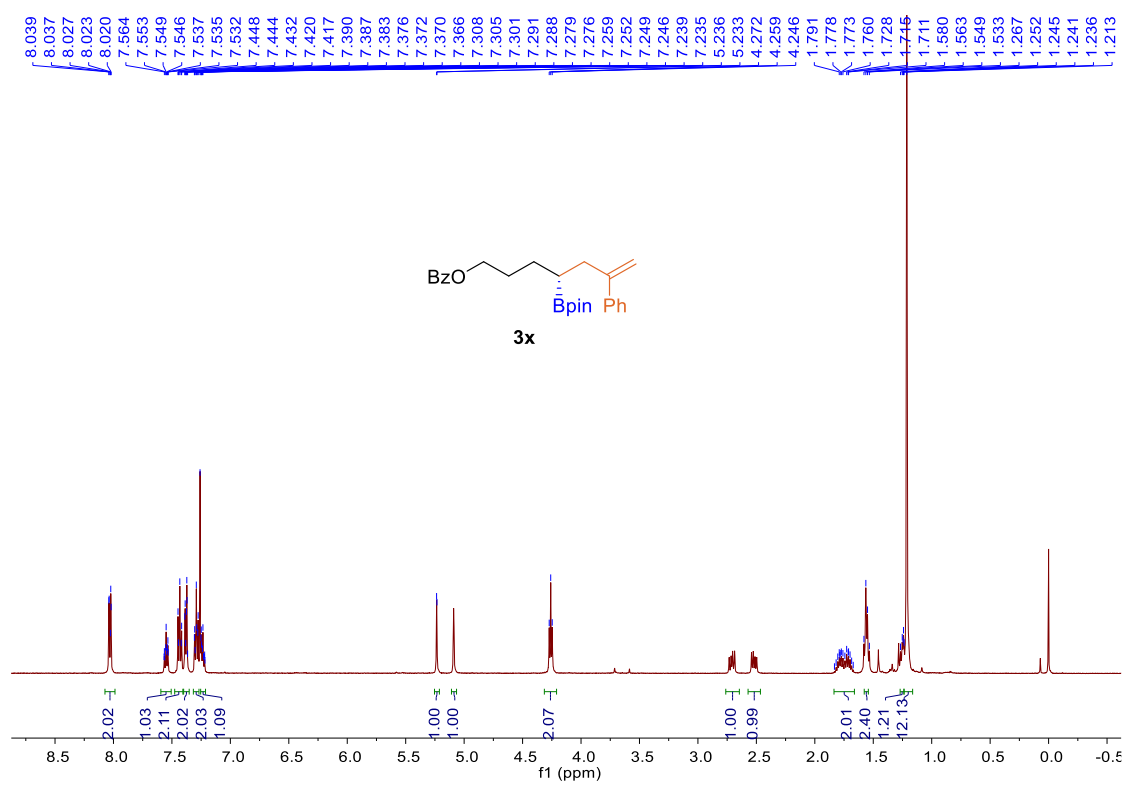


Supplementary Figure 81. ¹¹B NMR spectrum of compound 3v

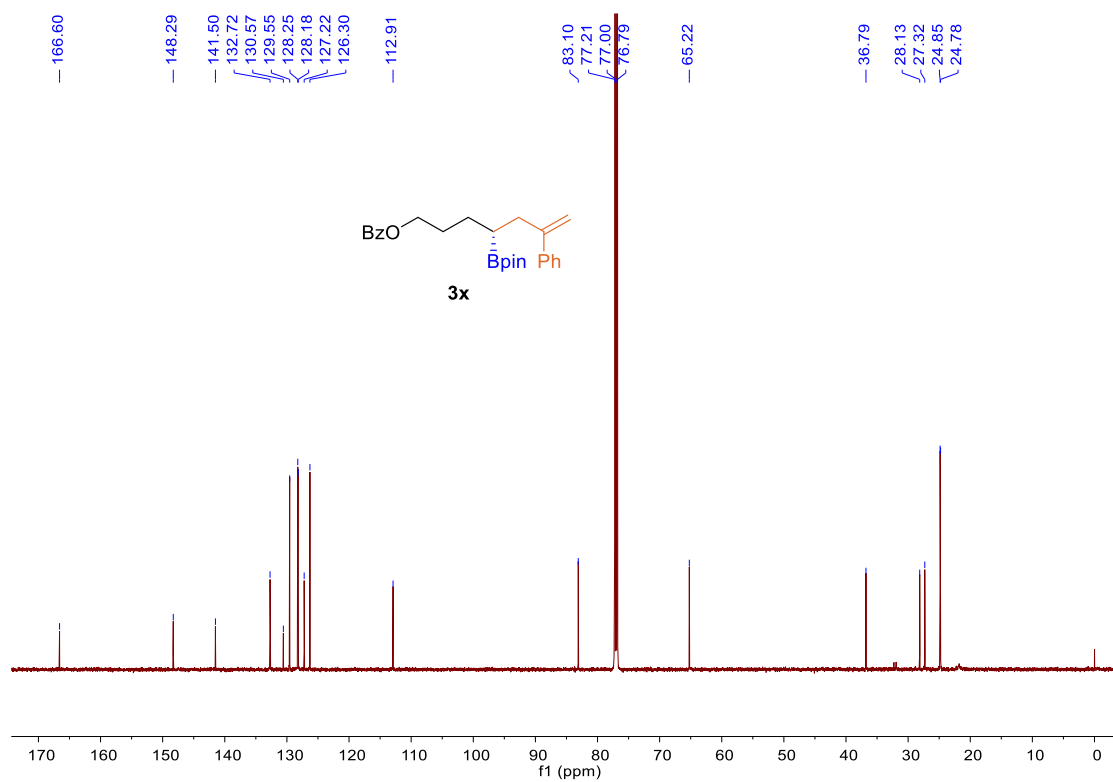




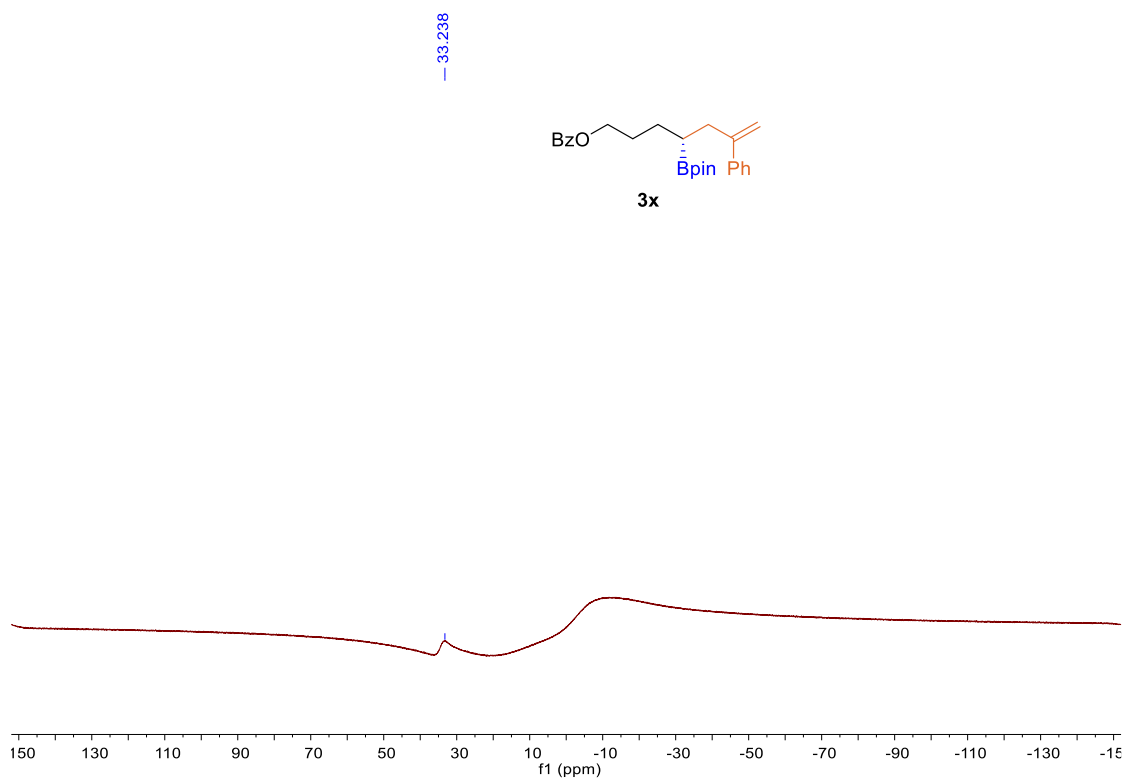
Supplementary Figure 84. ^{11}B NMR spectrum of compound **3w**



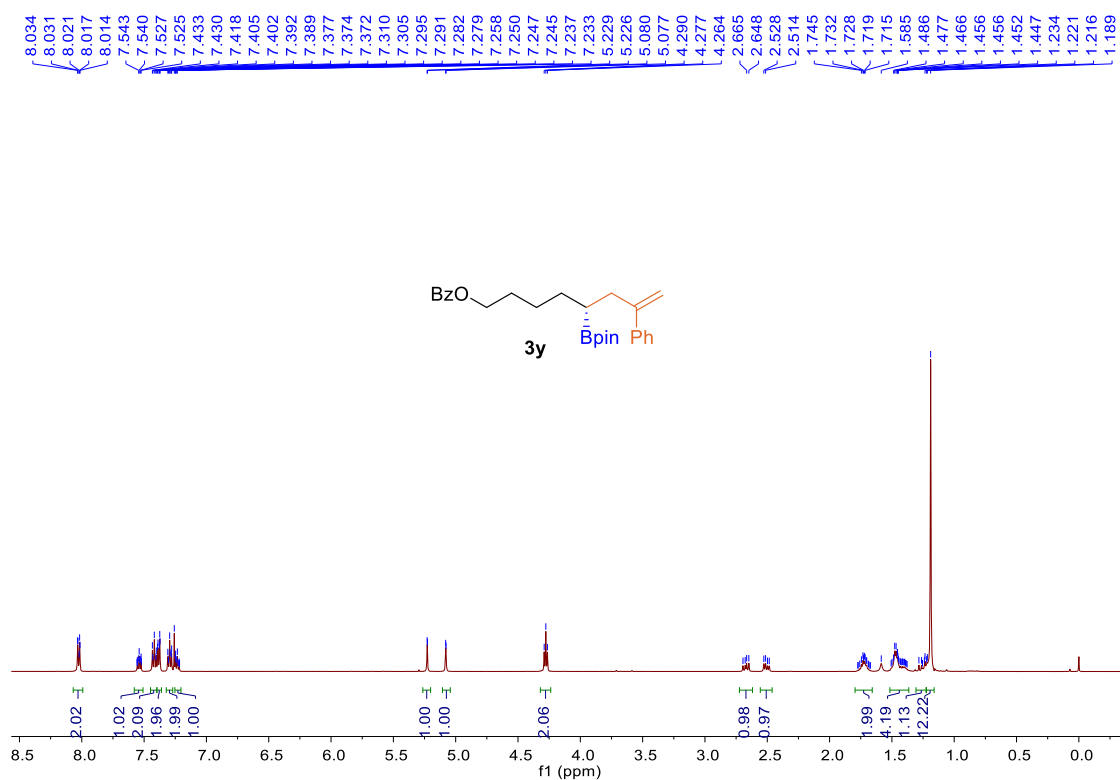
Supplementary Figure 85. ^1H NMR spectrum of compound **3x**



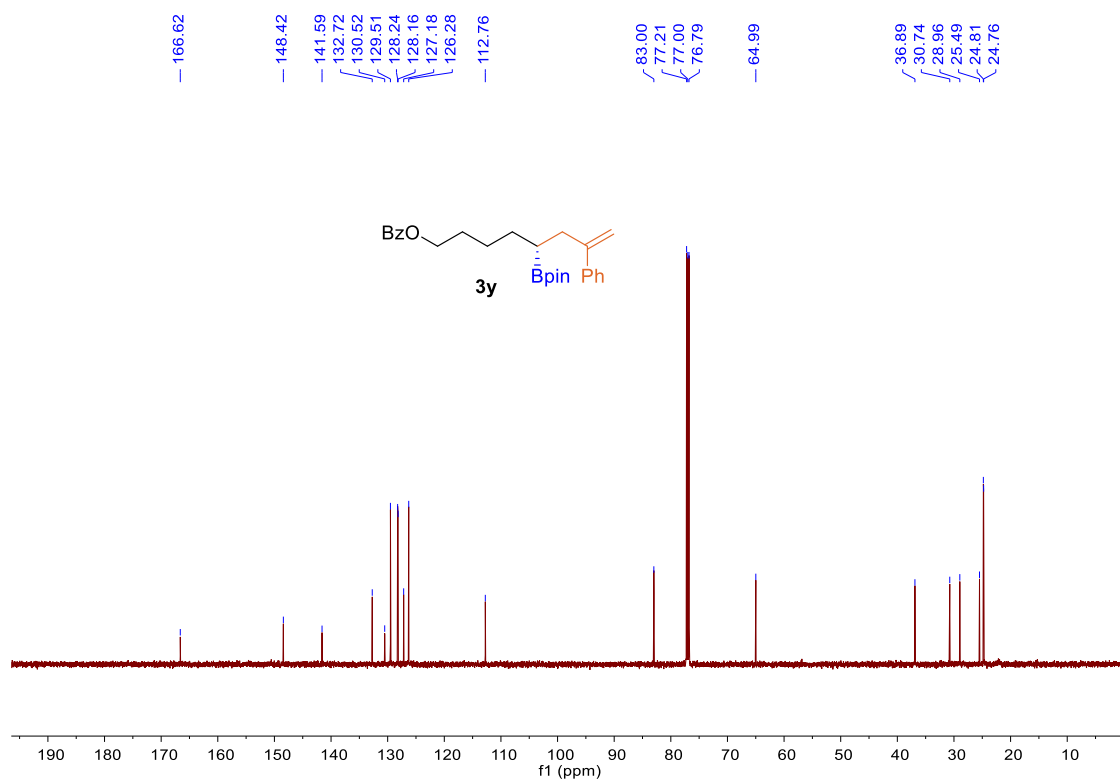
Supplementary Figure 86. ¹³C NMR spectrum of compound 3x



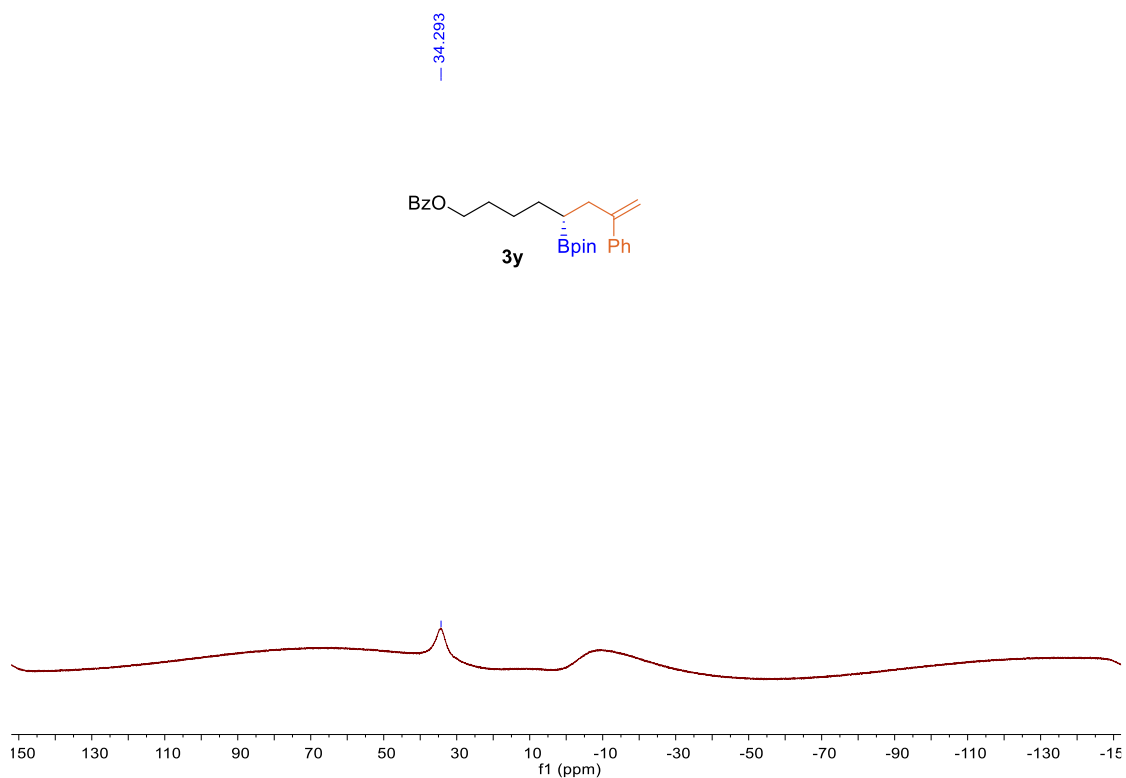
Supplementary Figure 87. ¹¹B NMR spectrum of compound 3x



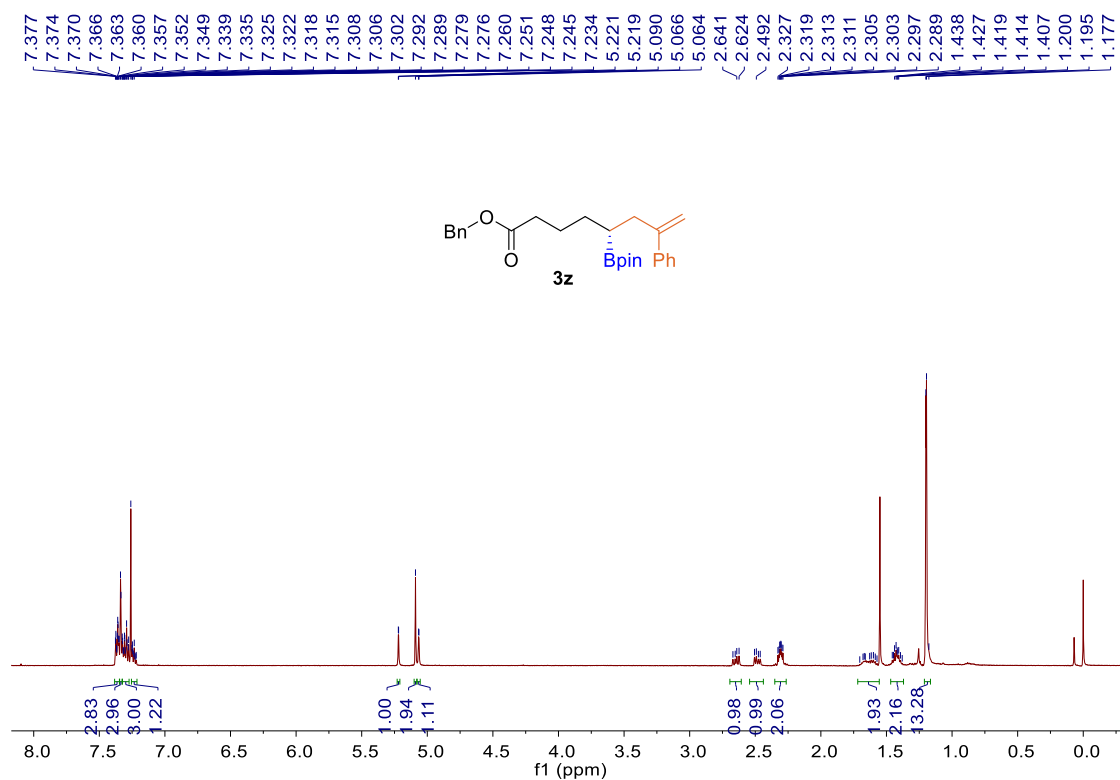
Supplementary Figure 88. ¹H NMR spectrum of compound 3y



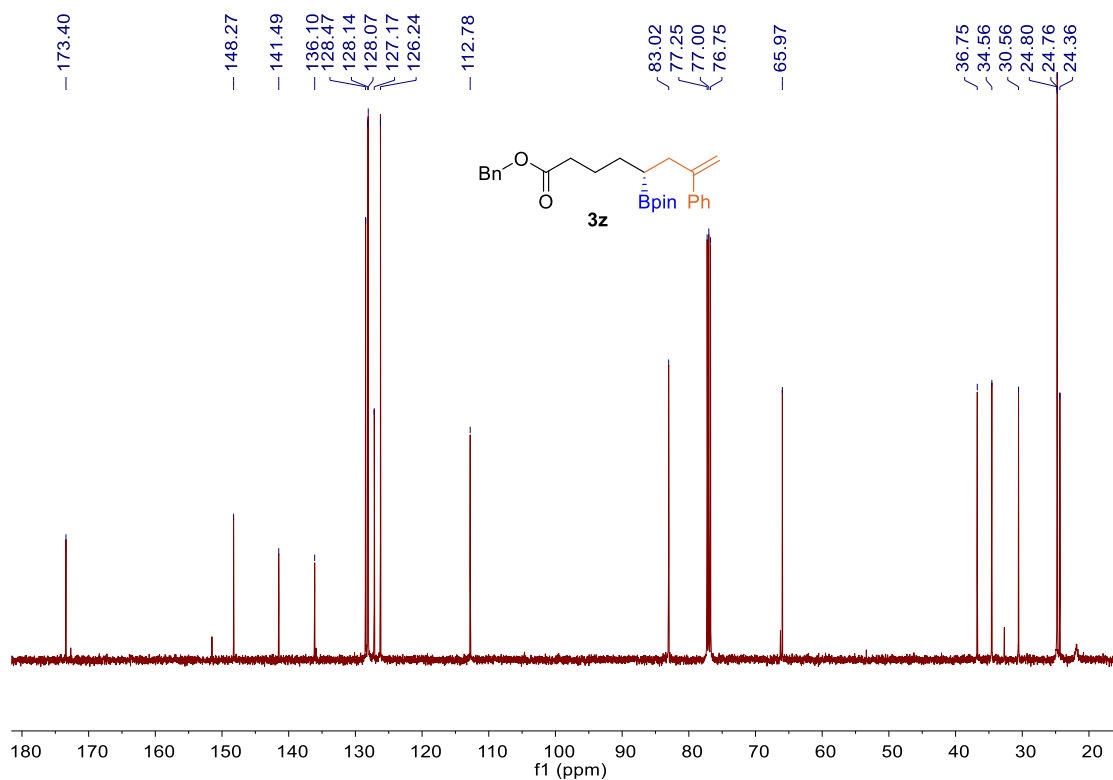
Supplementary Figure 89. ¹³C NMR spectrum of compound 3y



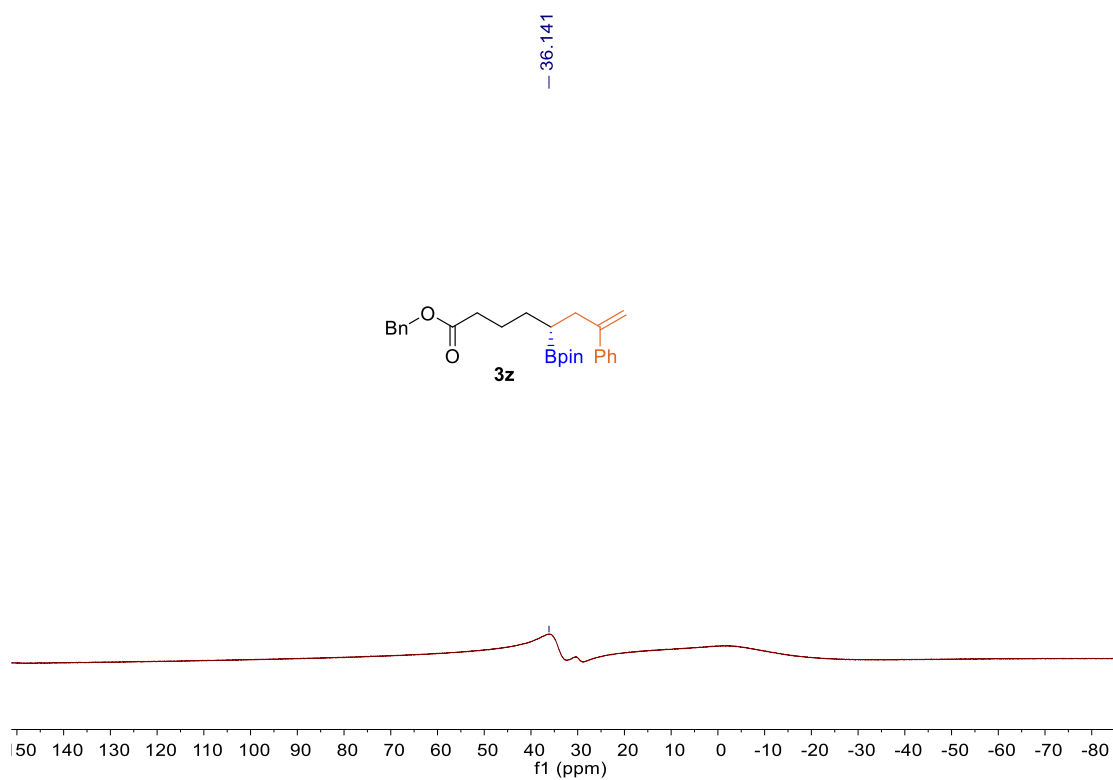
Supplementary Figure 90. ^{11}B NMR spectrum of compound **3y**



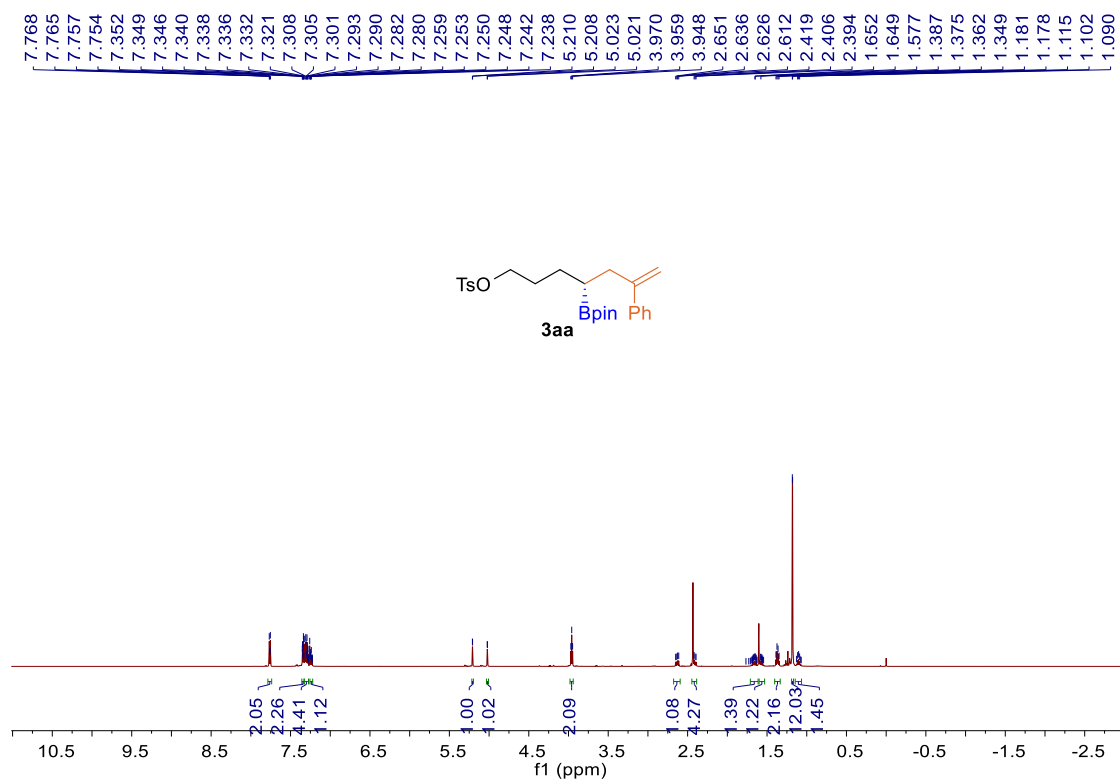
Supplementary Figure 91. ^1H NMR spectrum of compound **3z**



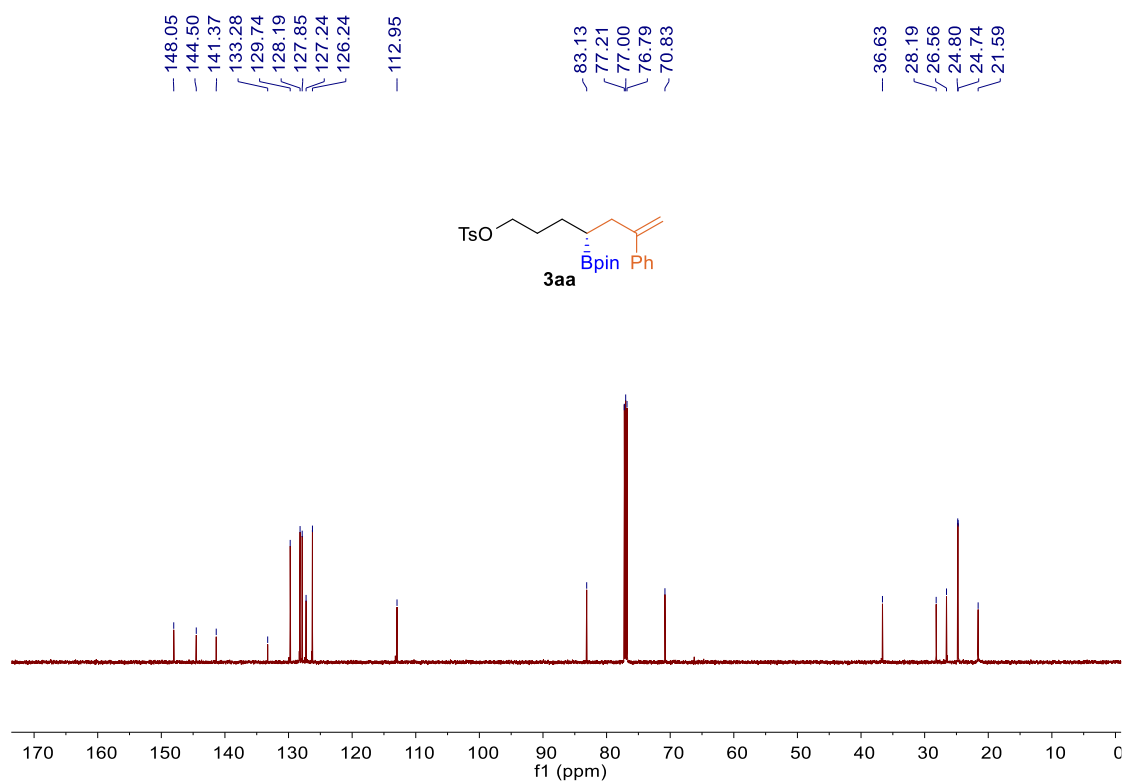
Supplementary Figure 92. ¹³C NMR spectrum of compound 3z



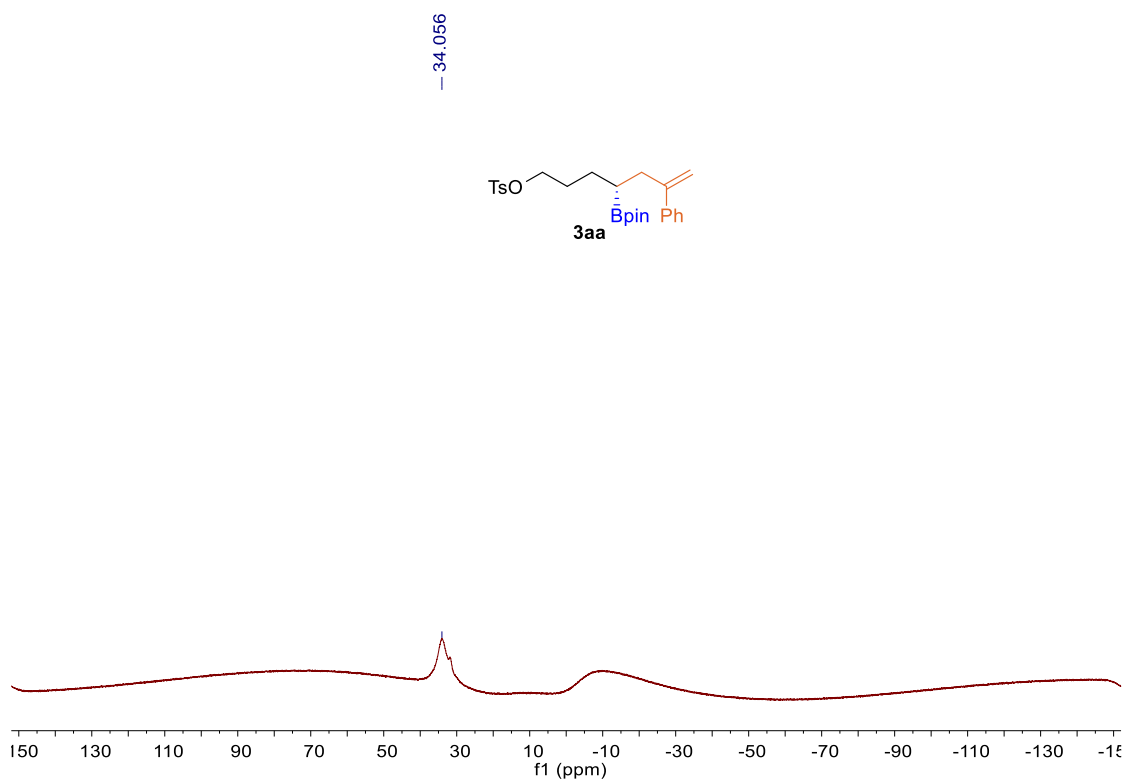
Supplementary Figure 93. ¹¹B NMR spectrum of compound 3z



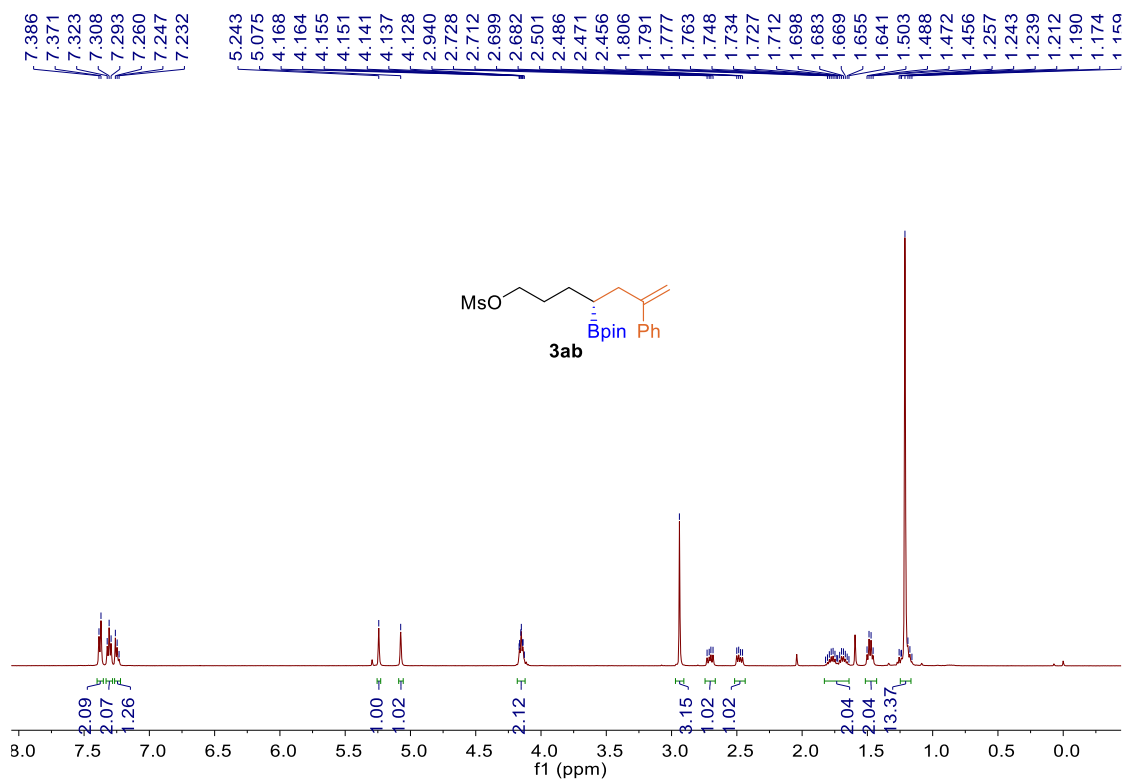
Supplementary Figure 94. ^1H NMR spectrum of compound 3aa



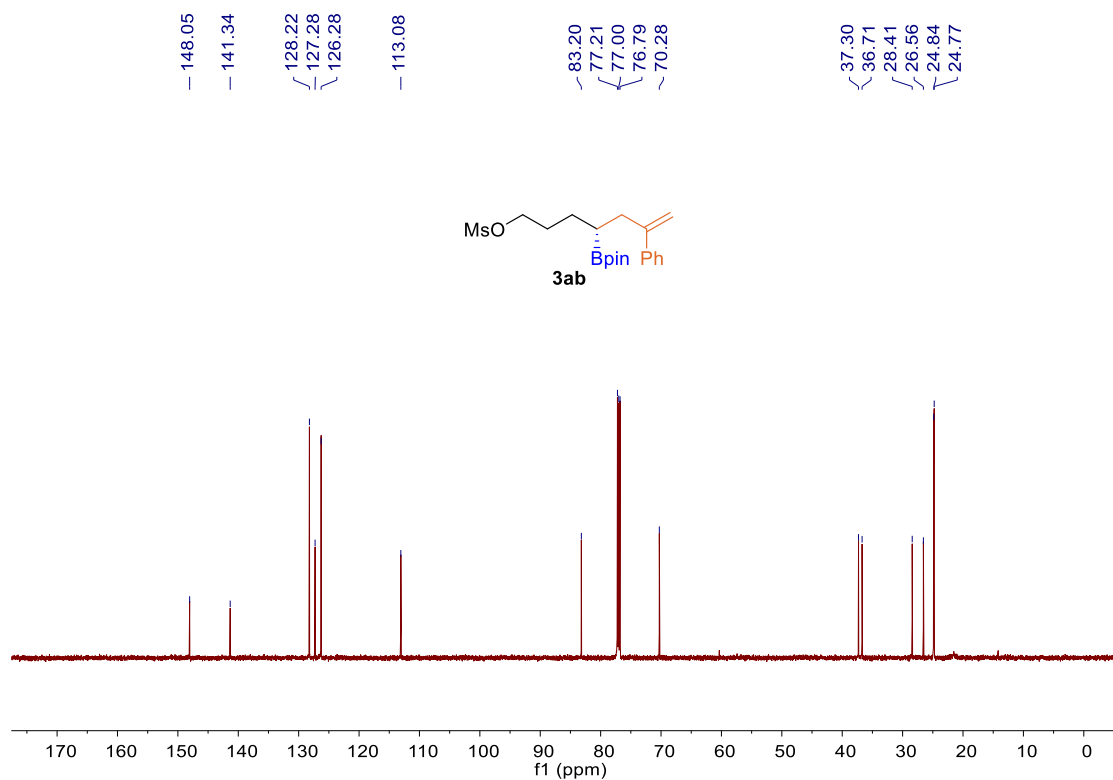
Supplementary Figure 95. ^{13}C NMR spectrum of compound 3aa



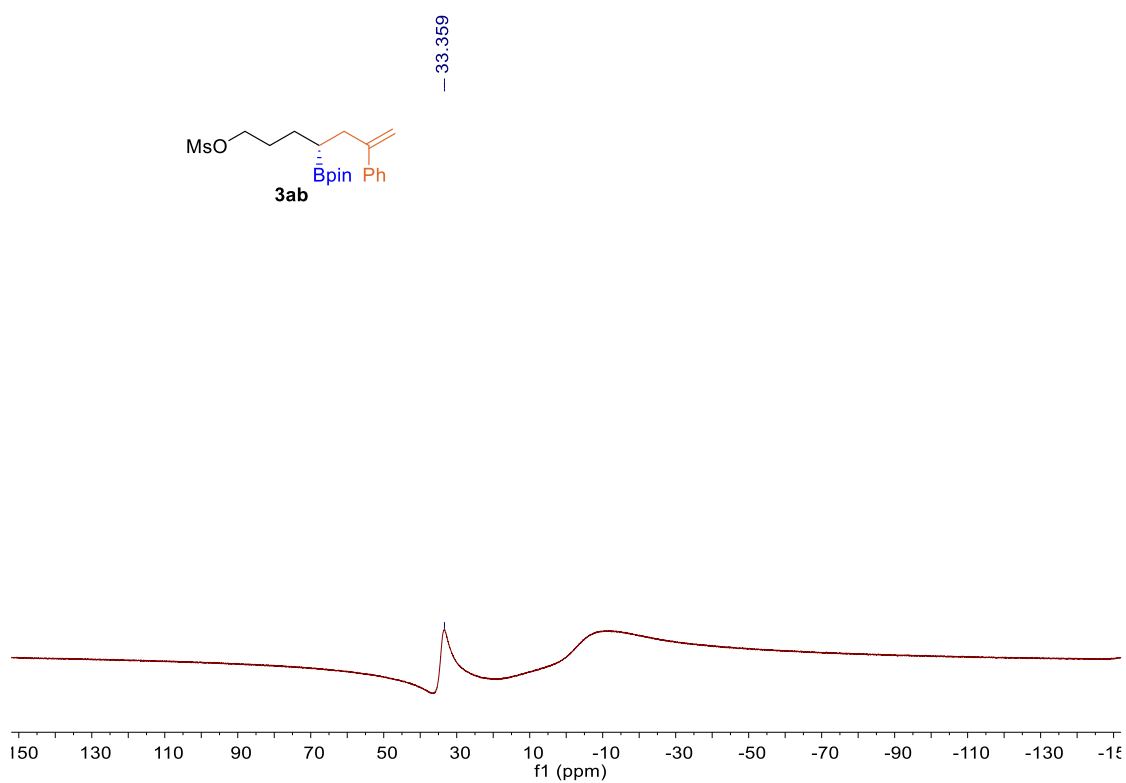
Supplementary Figure 96. ^{11}B NMR spectrum of compound 3aa



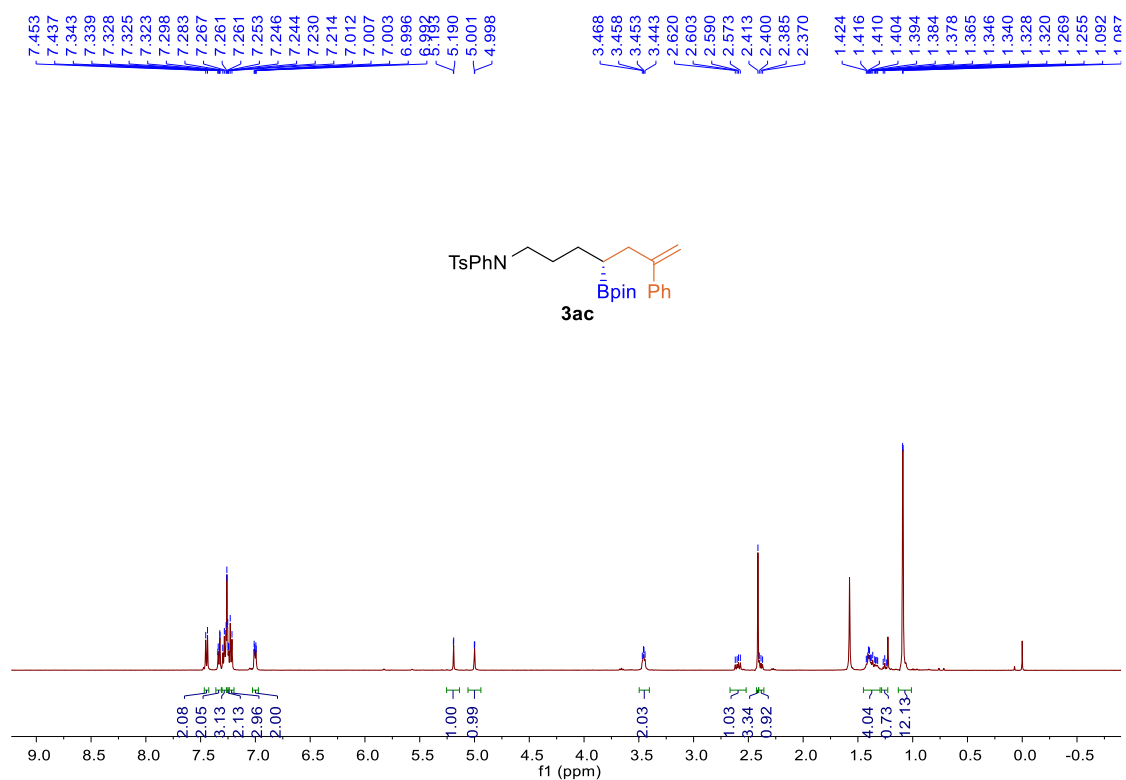
Supplementary Figure 97. ^1H NMR spectrum of compound 3ab



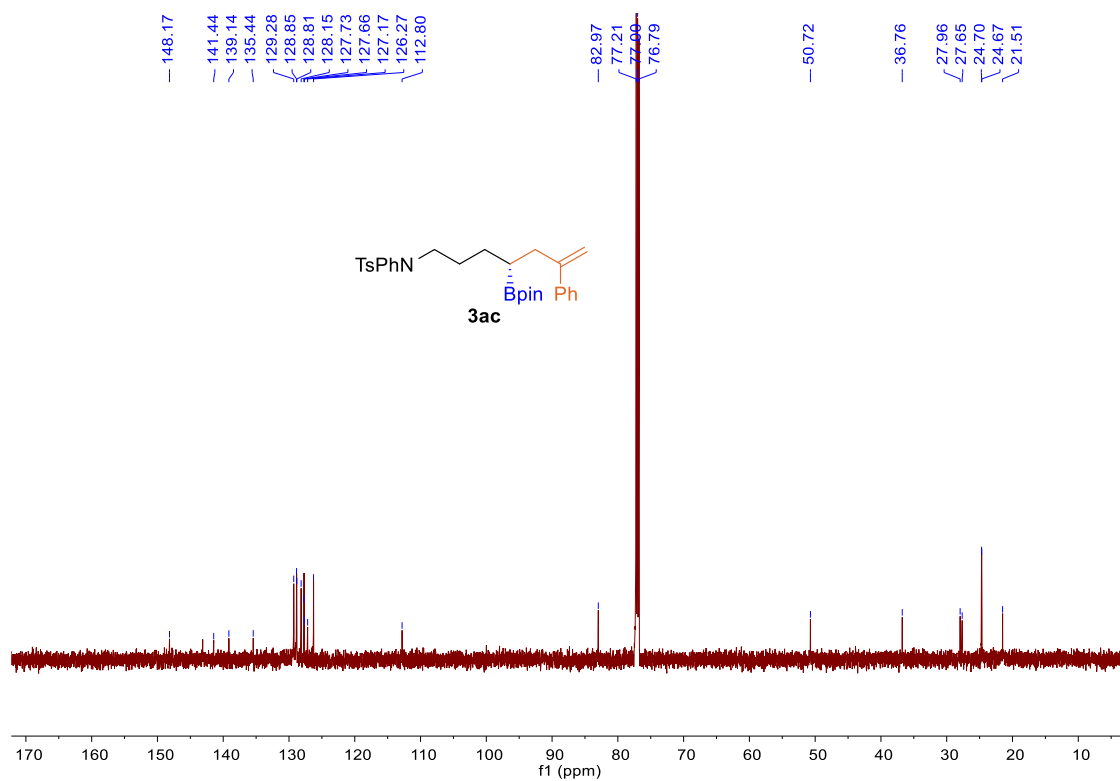
Supplementary Figure 98. ^{13}C NMR spectrum of compound **3ab**



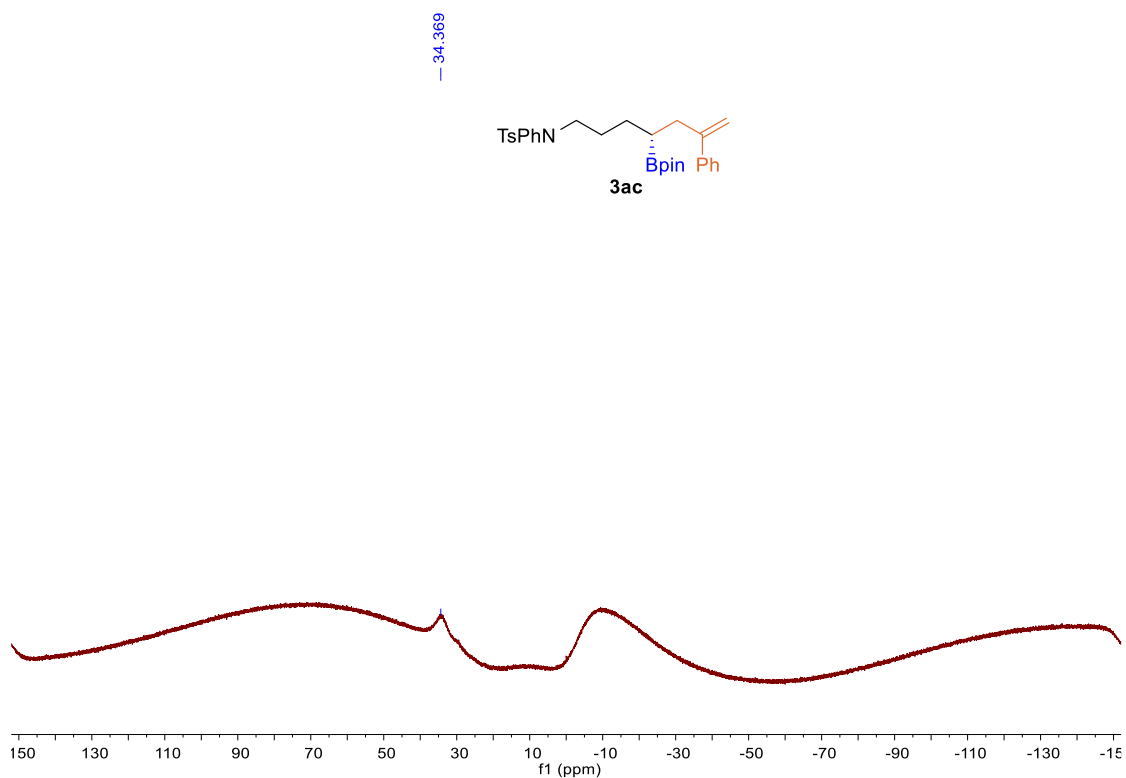
Supplementary Figure 99. ^{11}B NMR spectrum of compound **3ab**



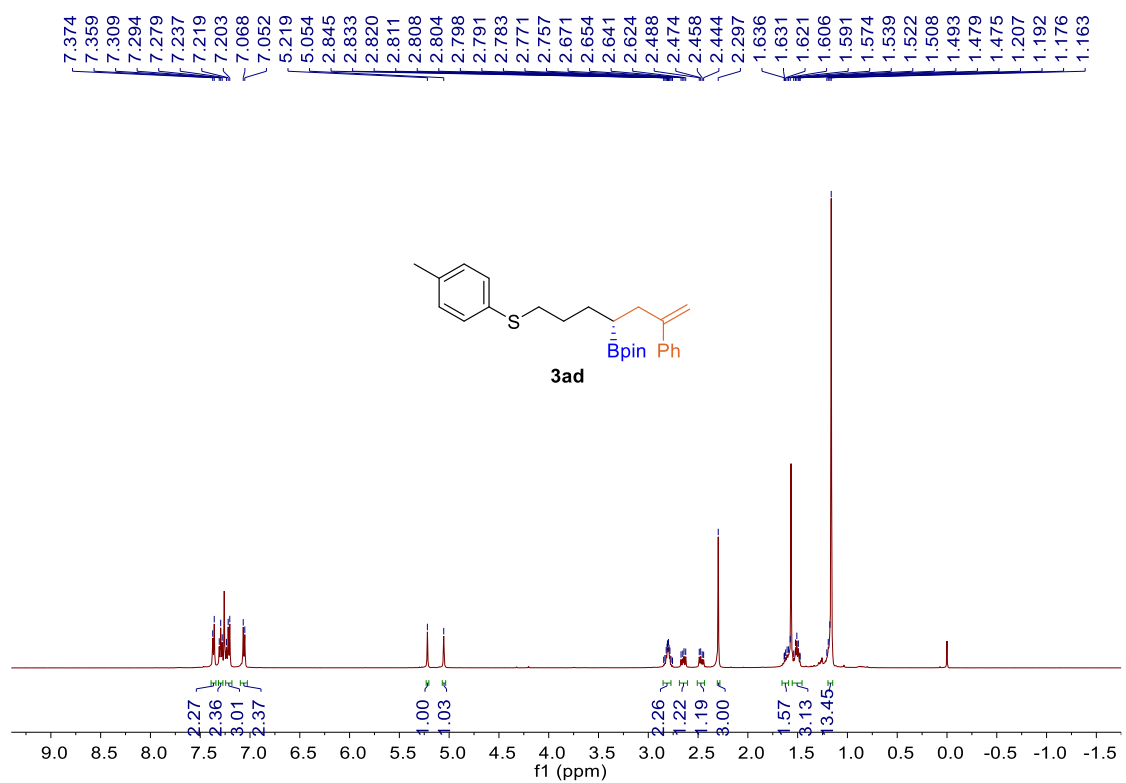
Supplementary Figure 100. ¹H NMR spectrum of compound 3ac



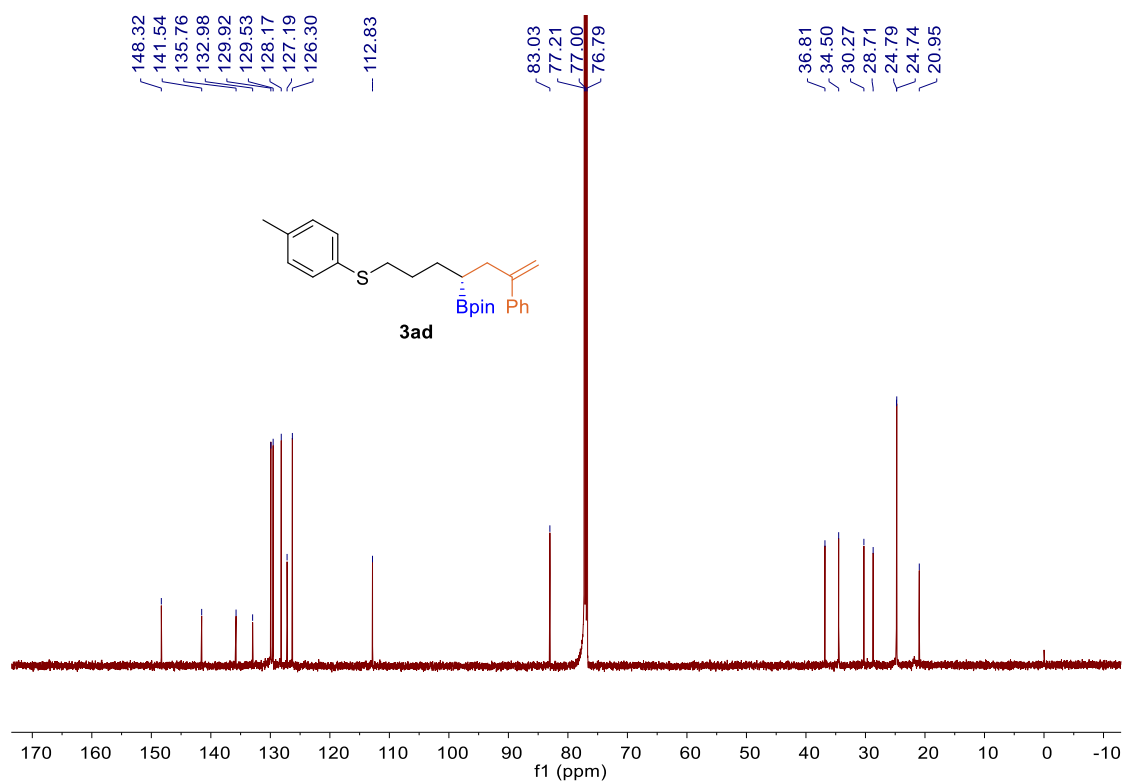
Supplementary Figure 101. ¹³C NMR spectrum of compound 3ac



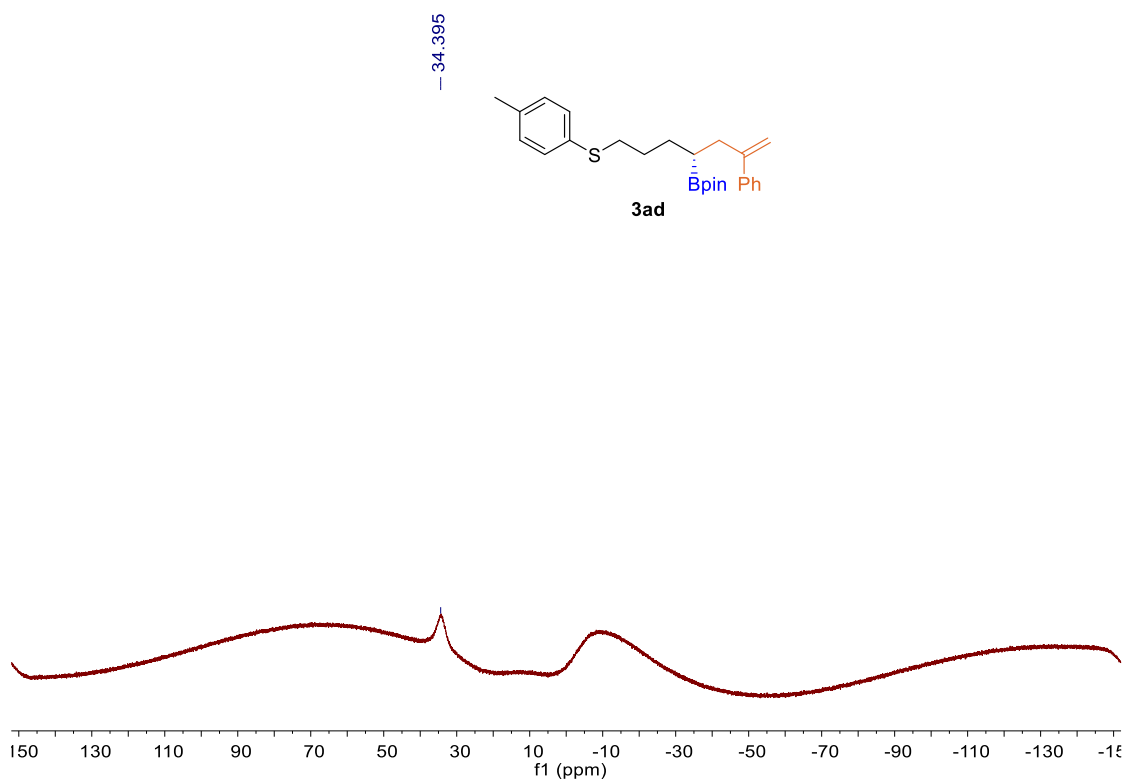
Supplementary Figure 102. ^{11}B NMR spectrum of compound **3ac**



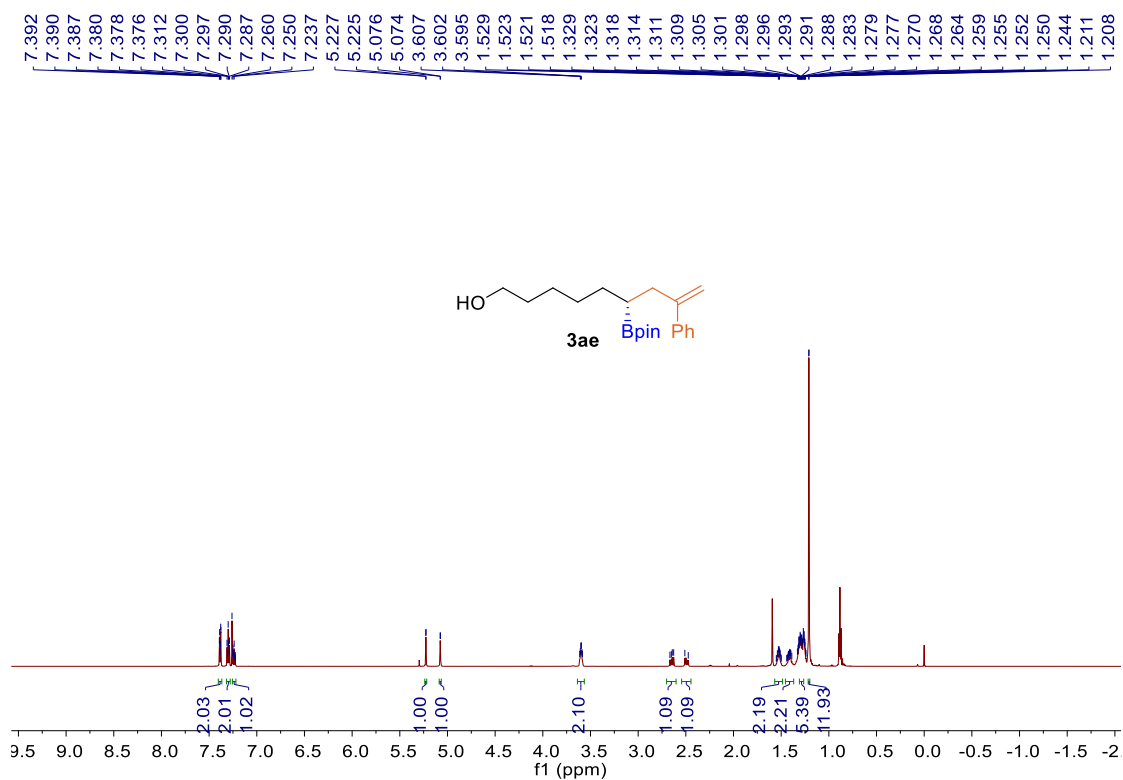
Supplementary Figure 103. ^1H NMR spectrum of compound **3ad**



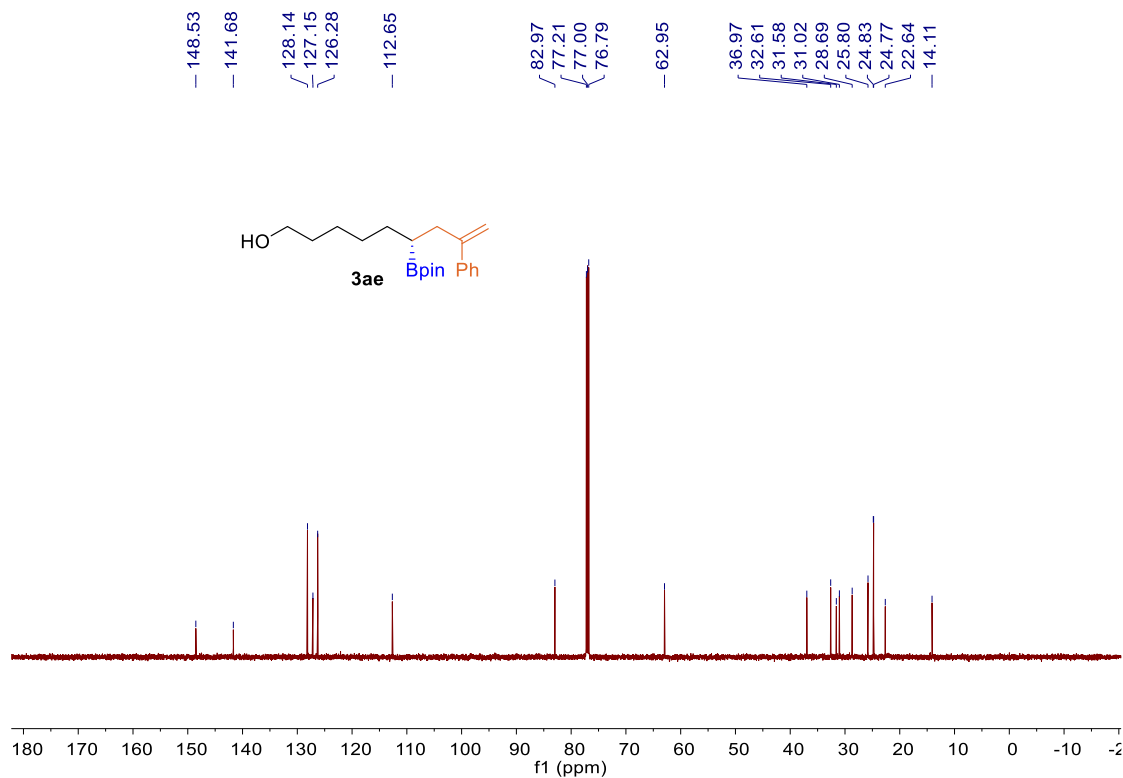
Supplementary Figure 104. ¹³C NMR spectrum of compound 3ad



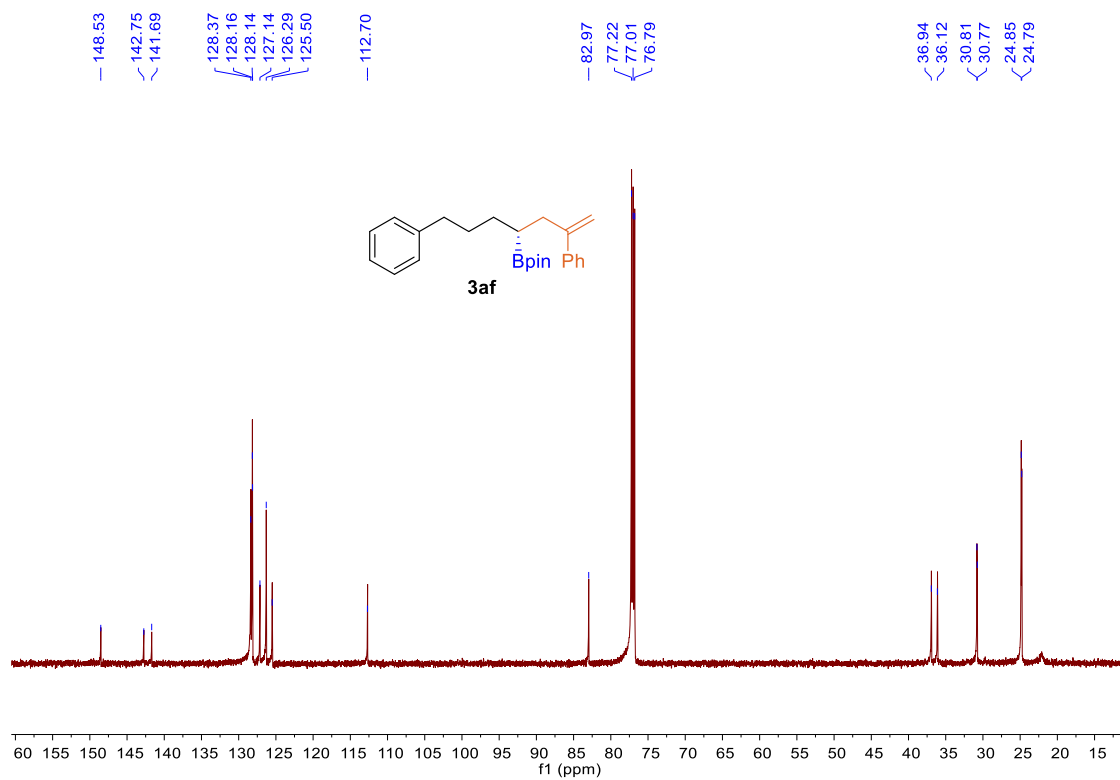
Supplementary Figure 105. ¹¹B NMR spectrum of compound 3ad



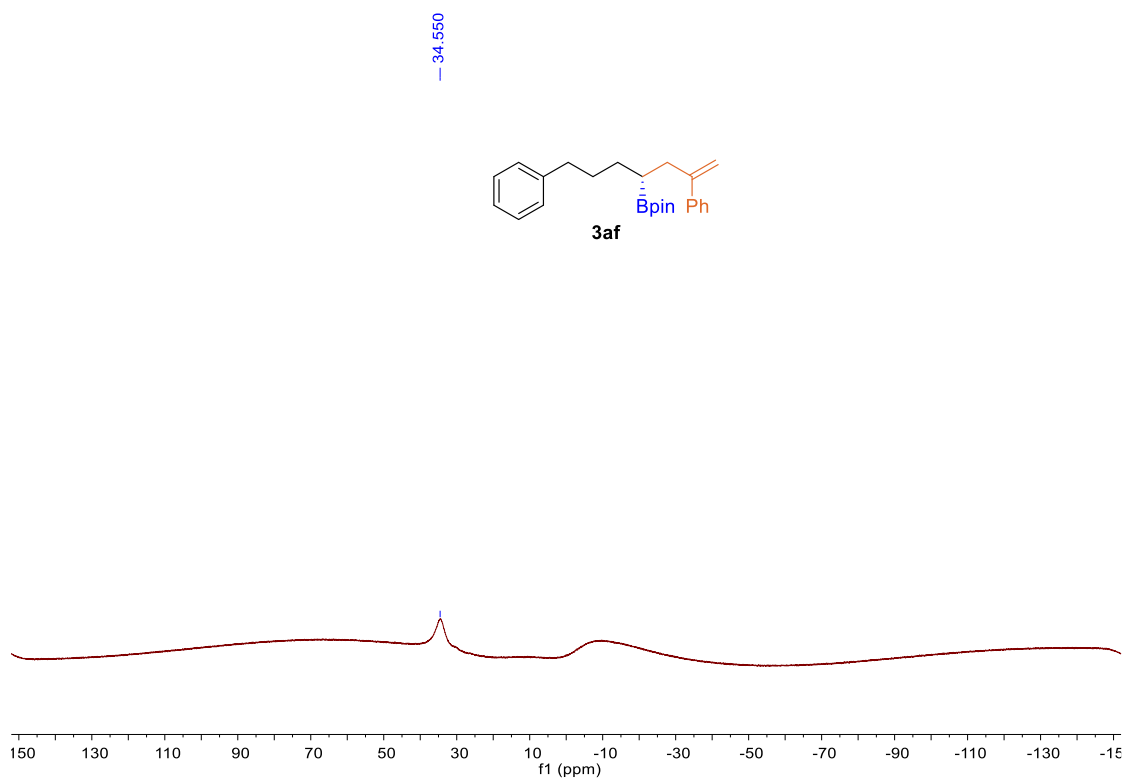
Supplementary Figure 106. ¹H NMR spectrum of compound 3ae



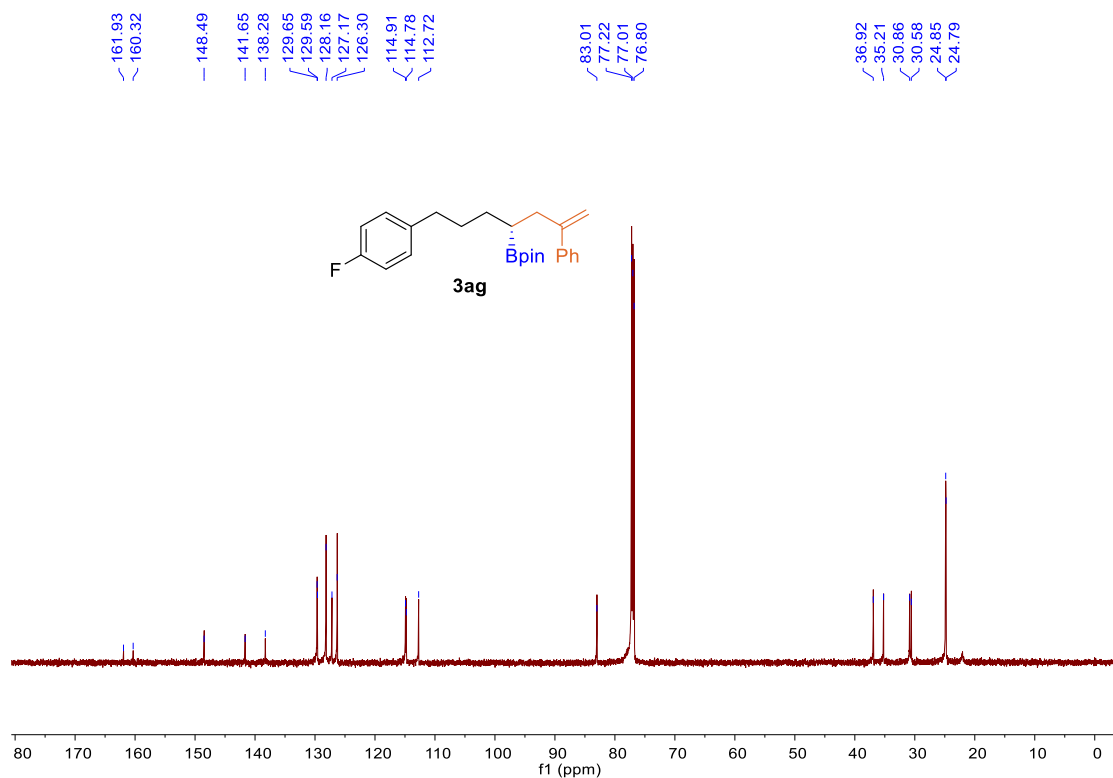
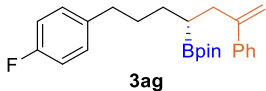
Supplementary Figure 107. ¹³C NMR spectrum of compound 3ae

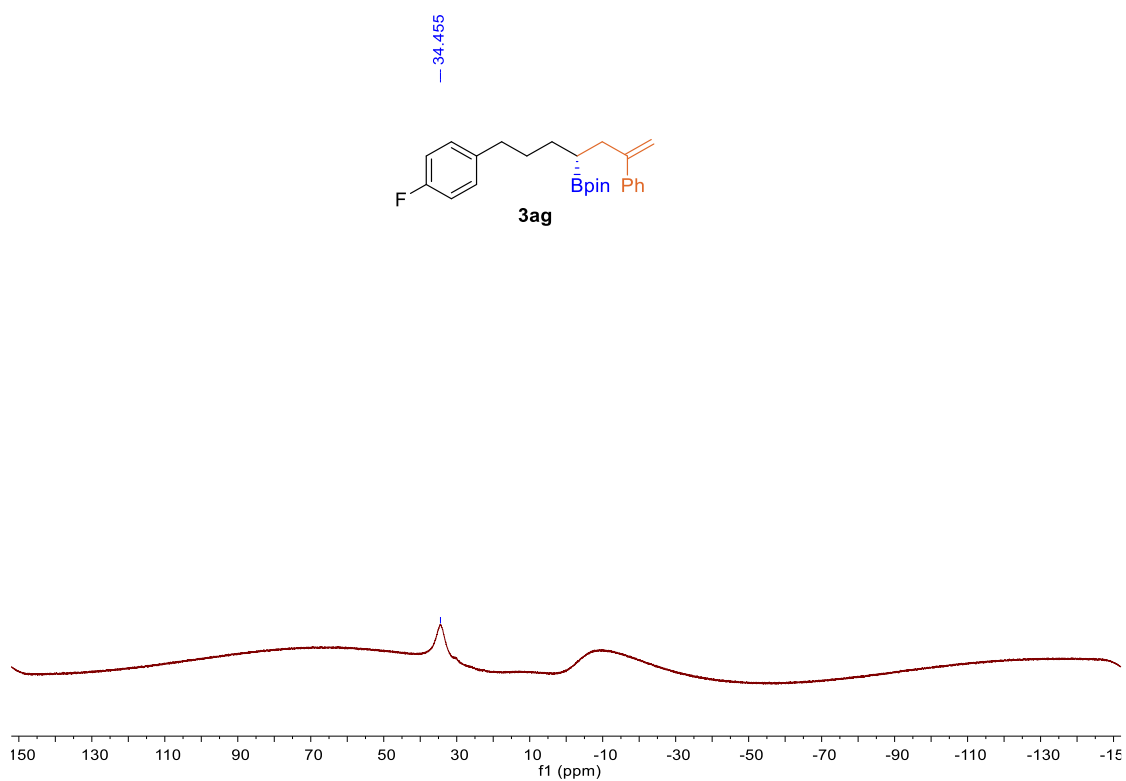


Supplementary Figure 110. ¹³C NMR spectrum of compound 3af

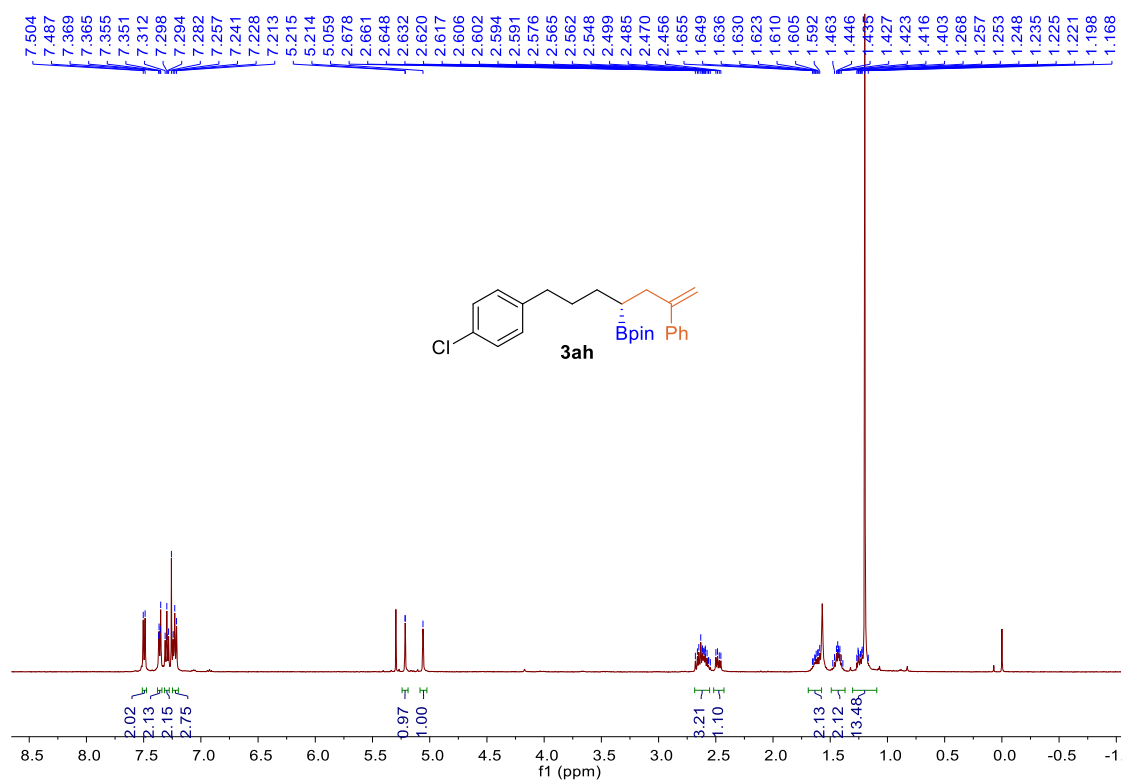


Supplementary Figure 111. ¹¹B NMR spectrum of compound 3af

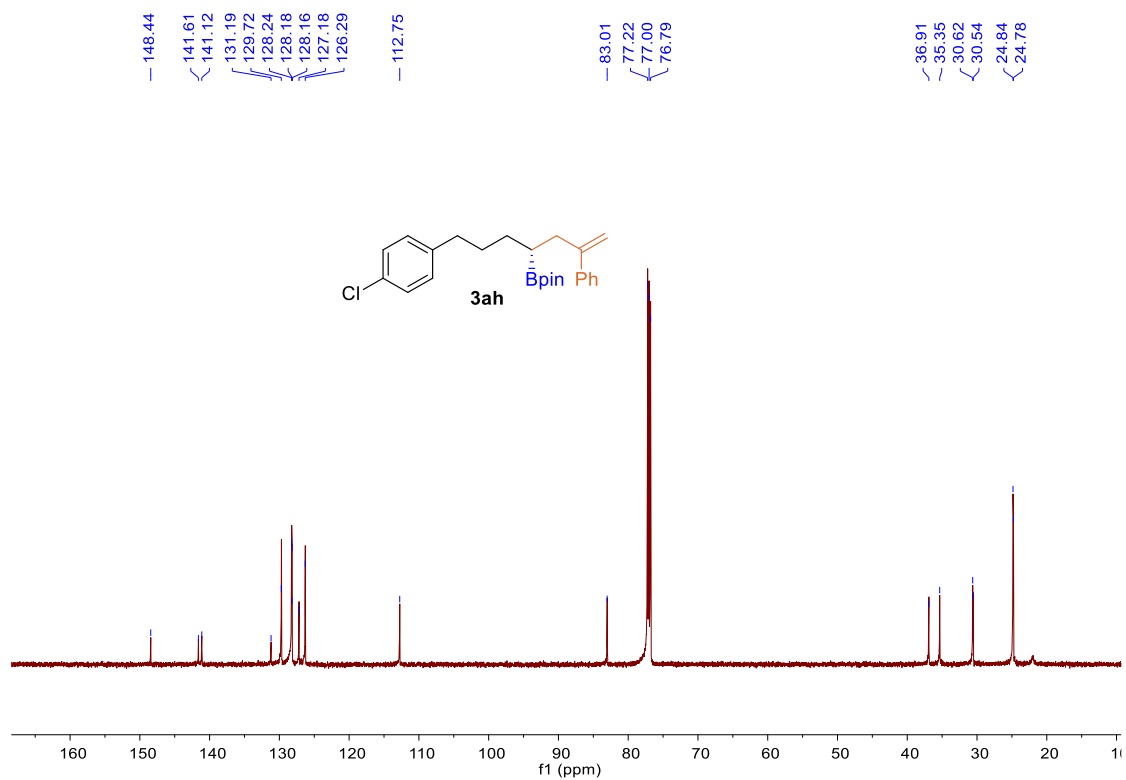




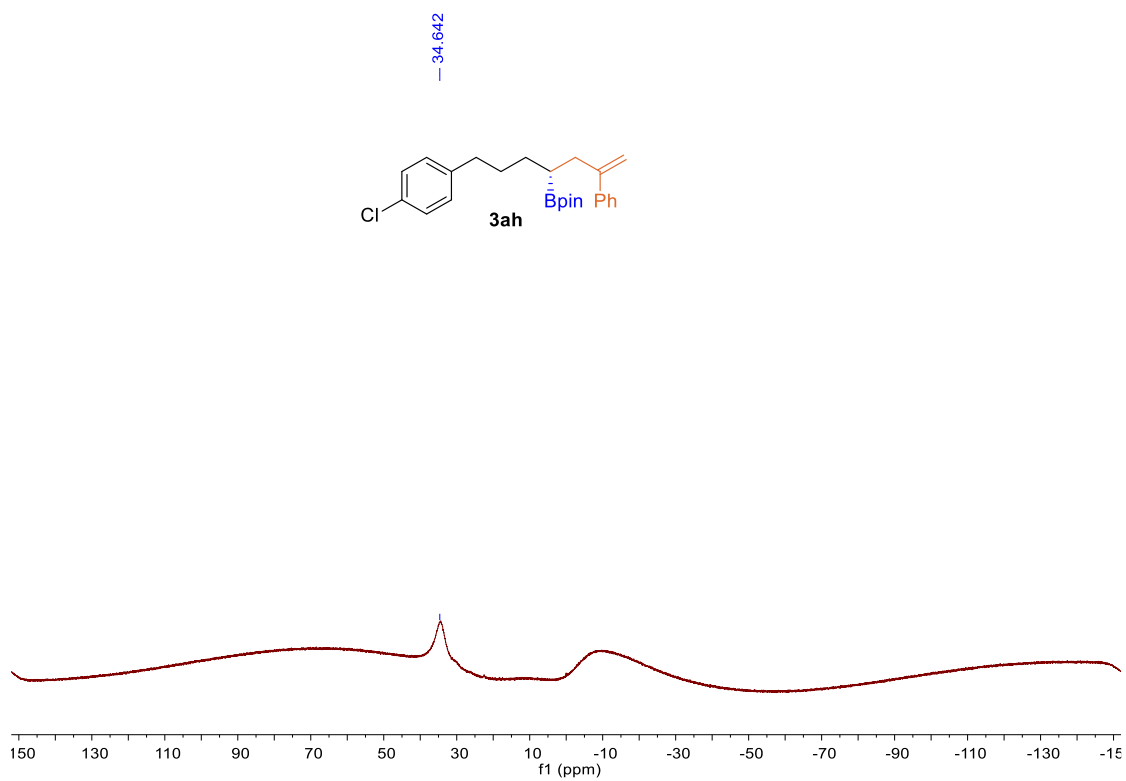
Supplementary Figure 114. ^{11}B NMR spectrum of compound 3ag



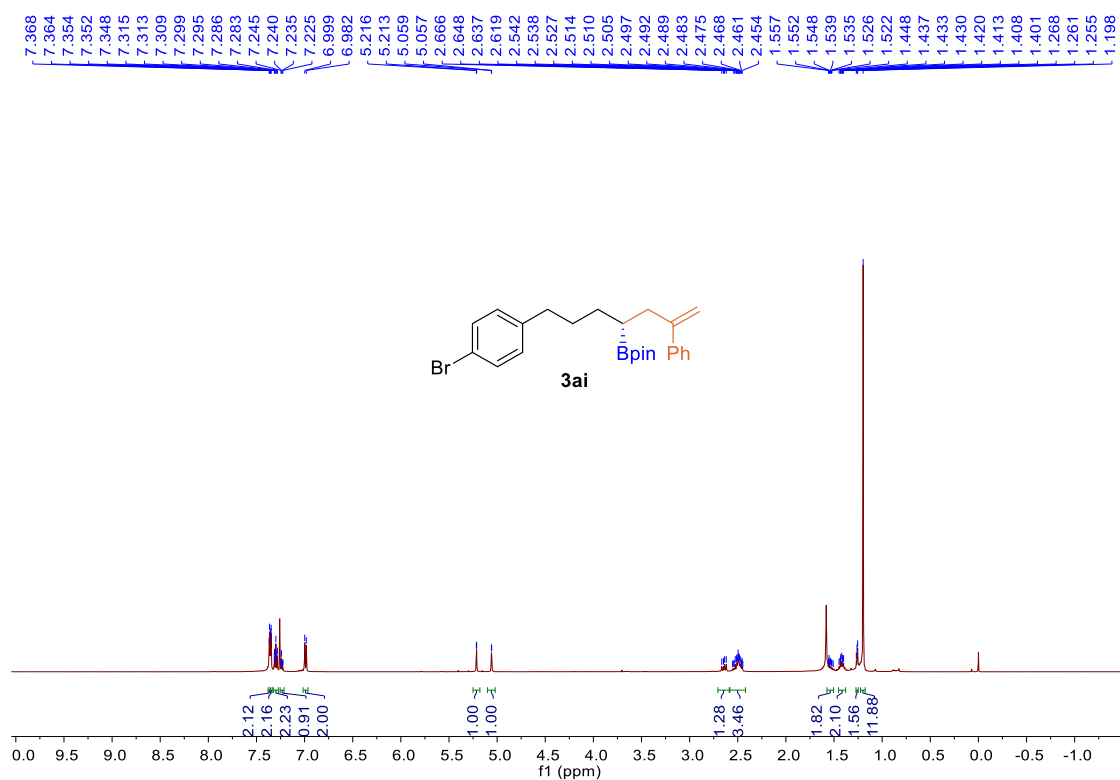
Supplementary Figure 115. ^1H NMR spectrum of compound 3ah



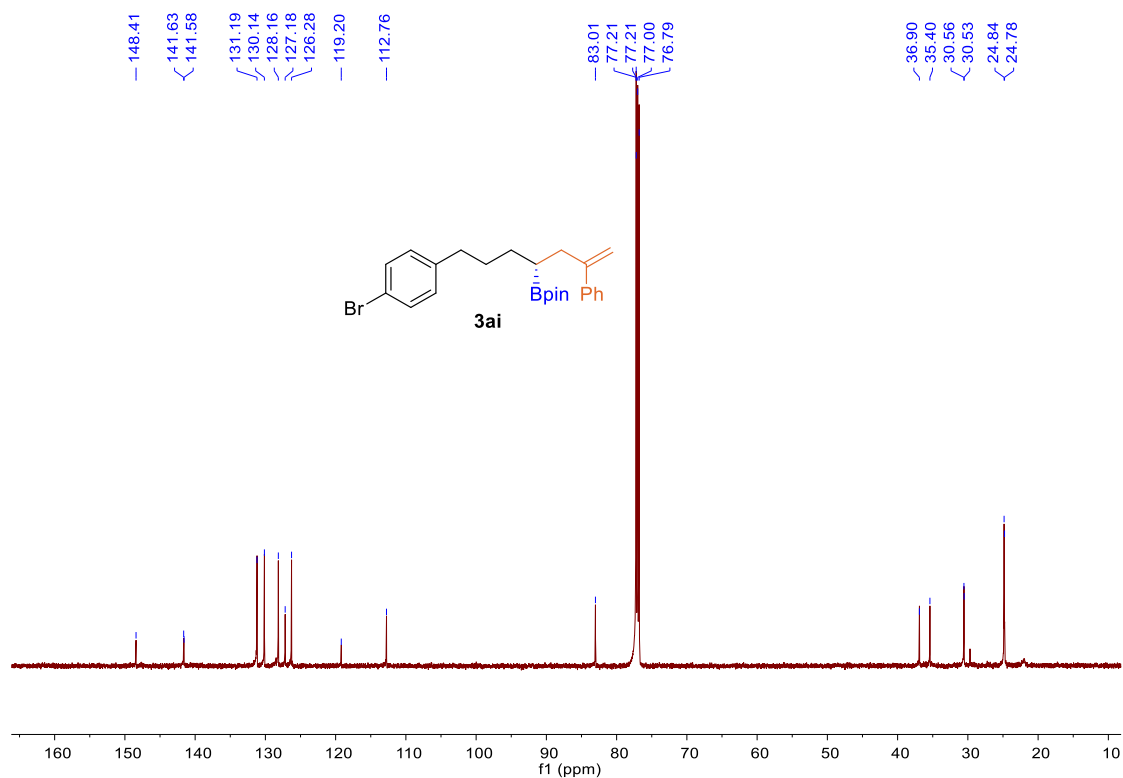
Supplementary Figure 116. ¹³C NMR spectrum of compound 3ah



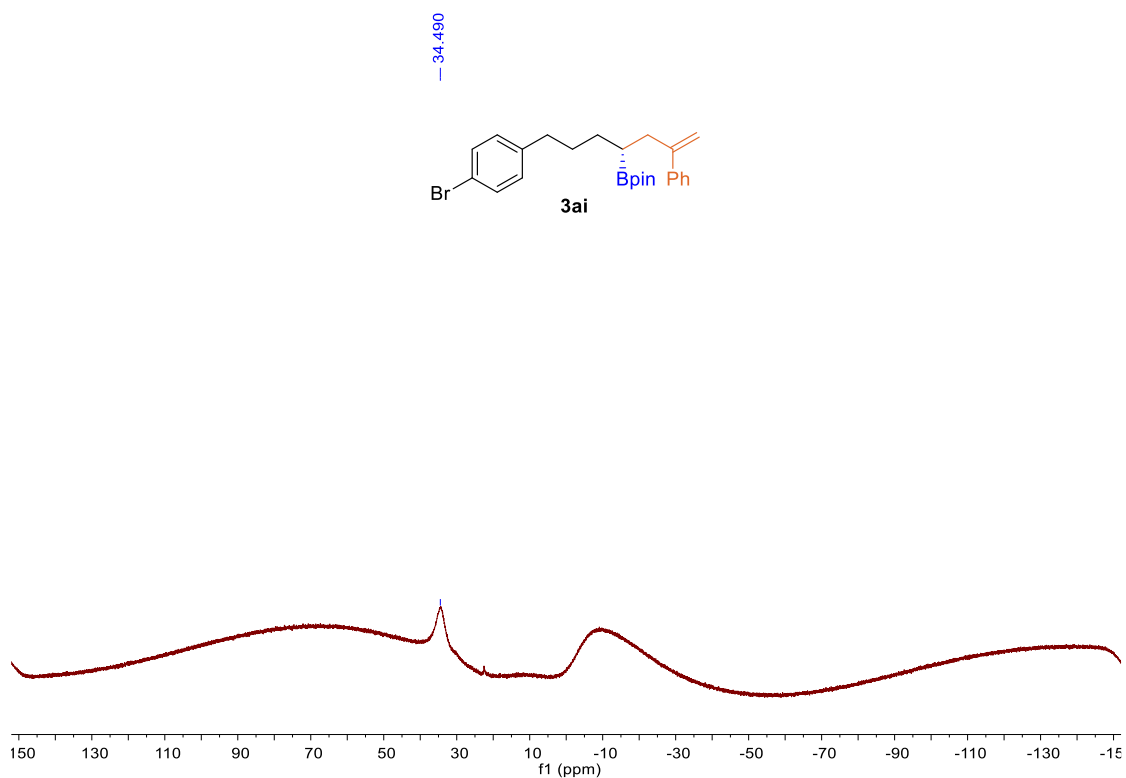
Supplementary Figure 117. ¹¹B NMR spectrum of compound 3ah



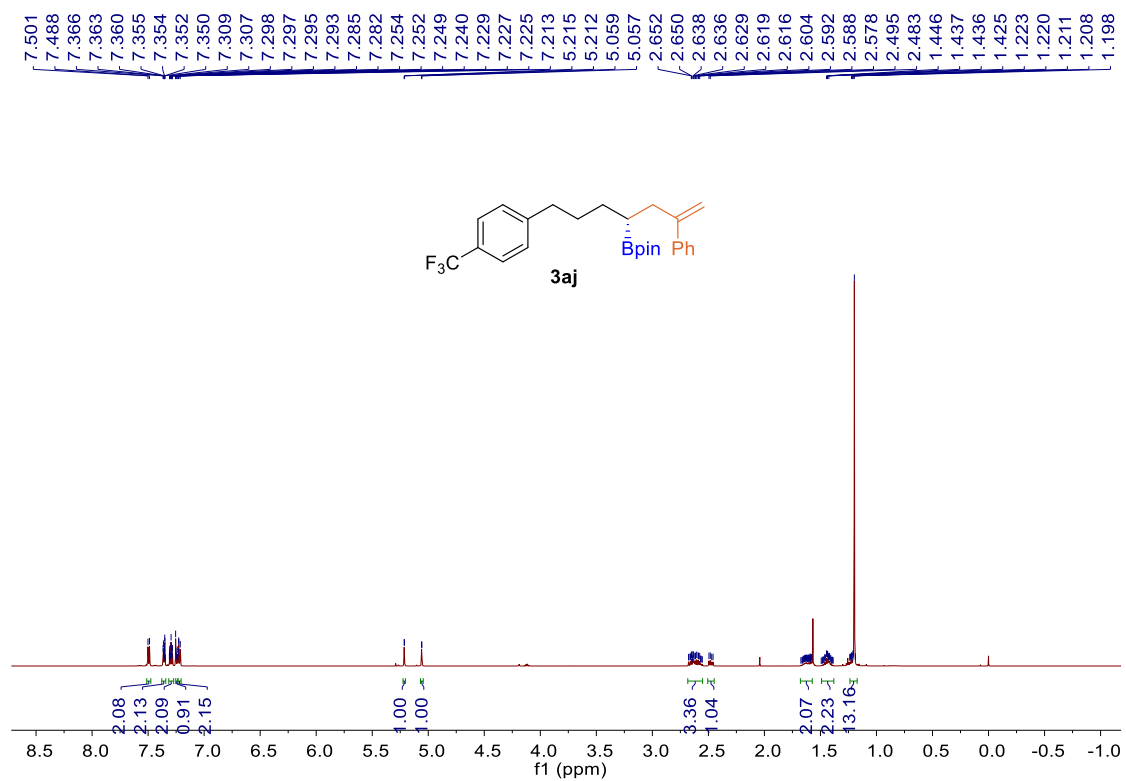
Supplementary Figure 118. ¹H NMR spectrum of compound 3ai



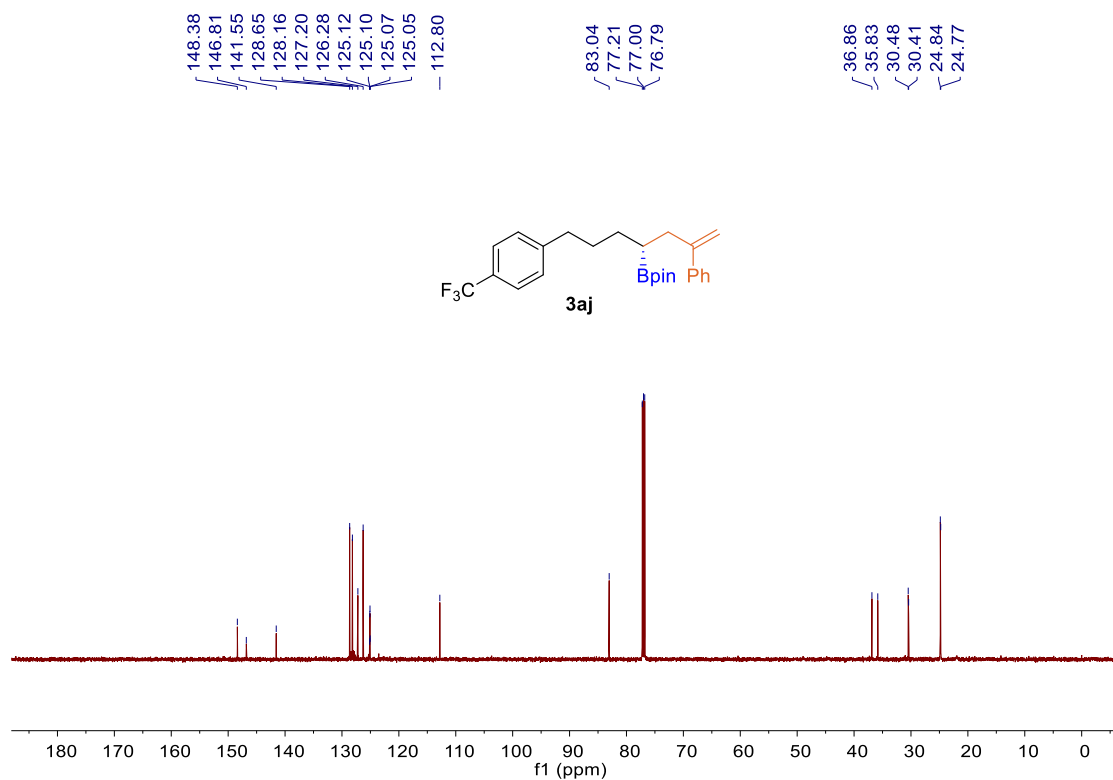
Supplementary Figure 119. ¹³C NMR spectrum of compound 3ai



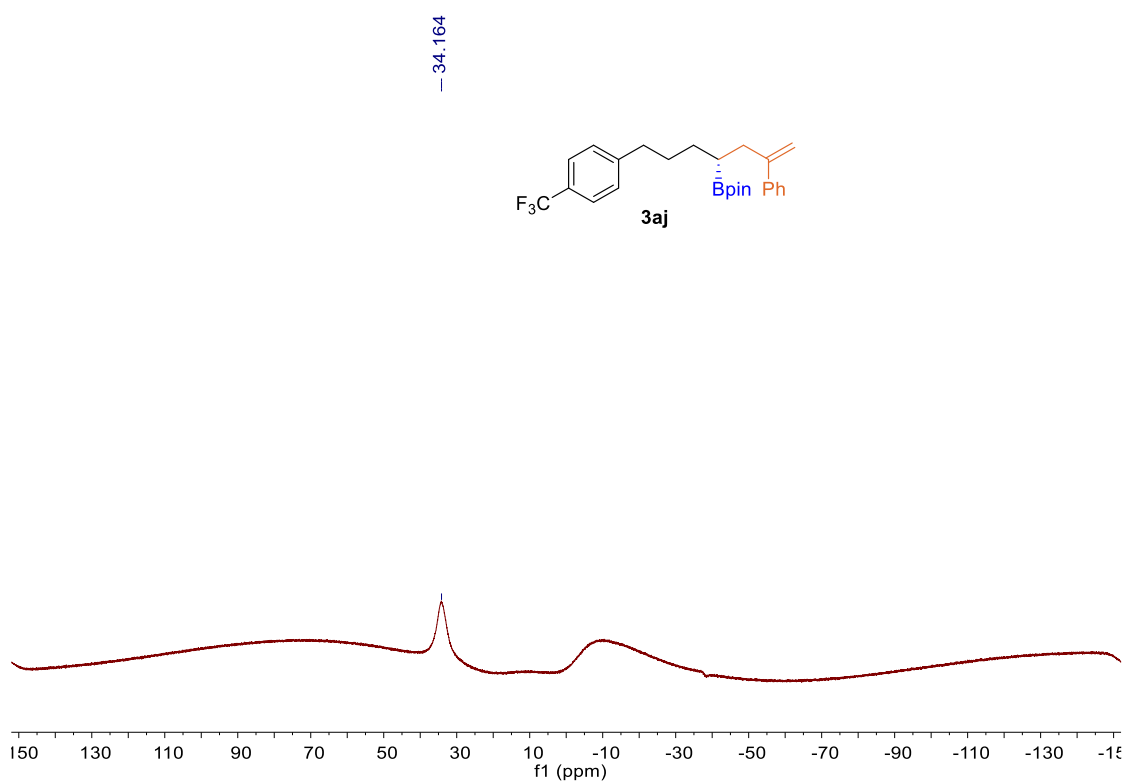
Supplementary Figure 120. ^{11}B NMR spectrum of compound 3ai



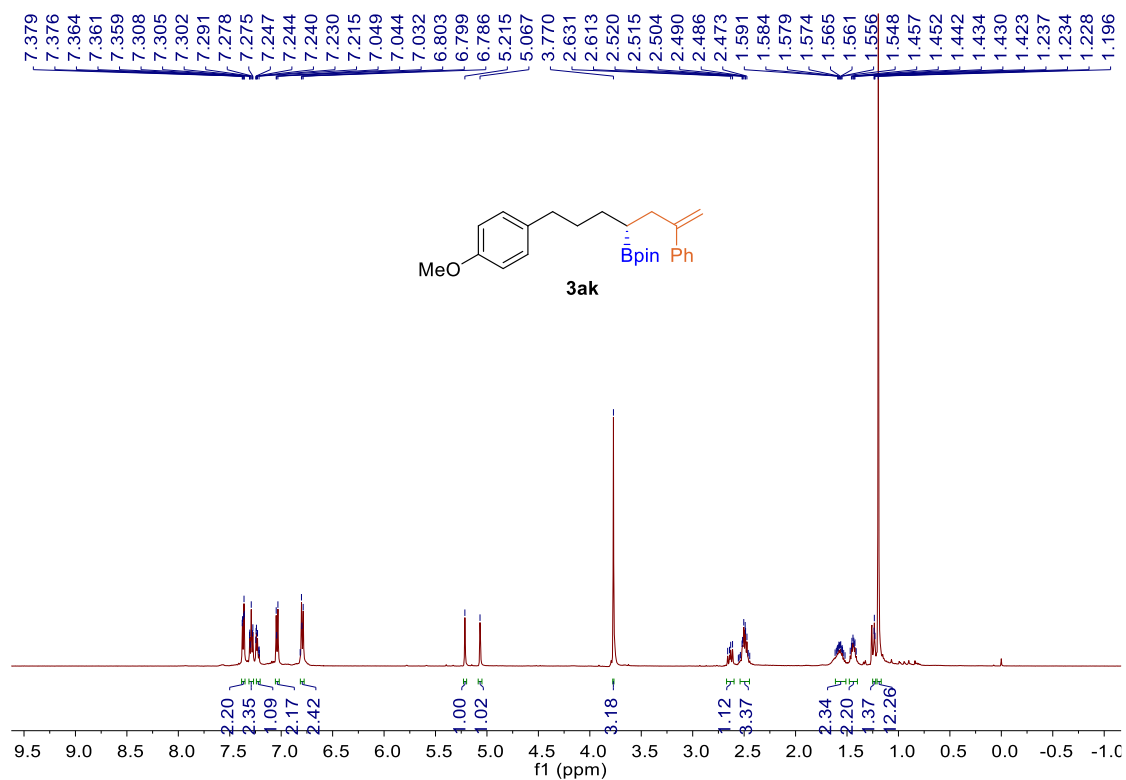
Supplementary Figure 121. ^1H NMR spectrum of compound 3aj



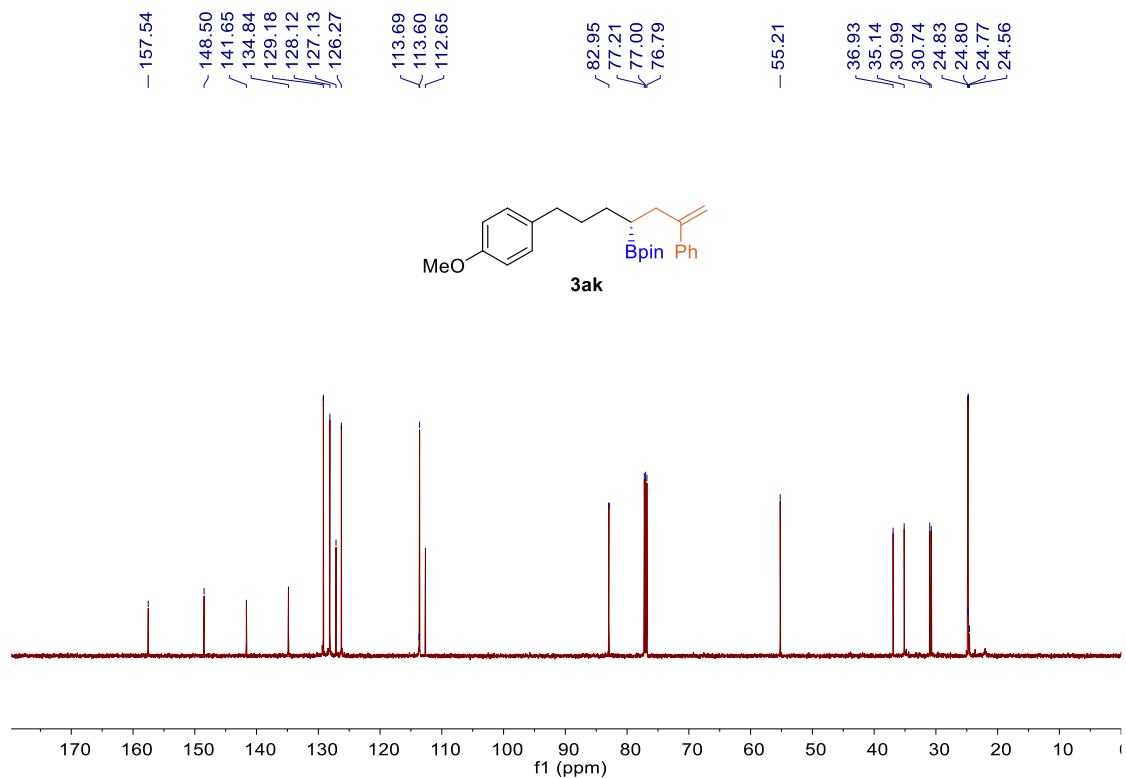
Supplementary Figure 122. ¹³C NMR spectrum of compound 3aj



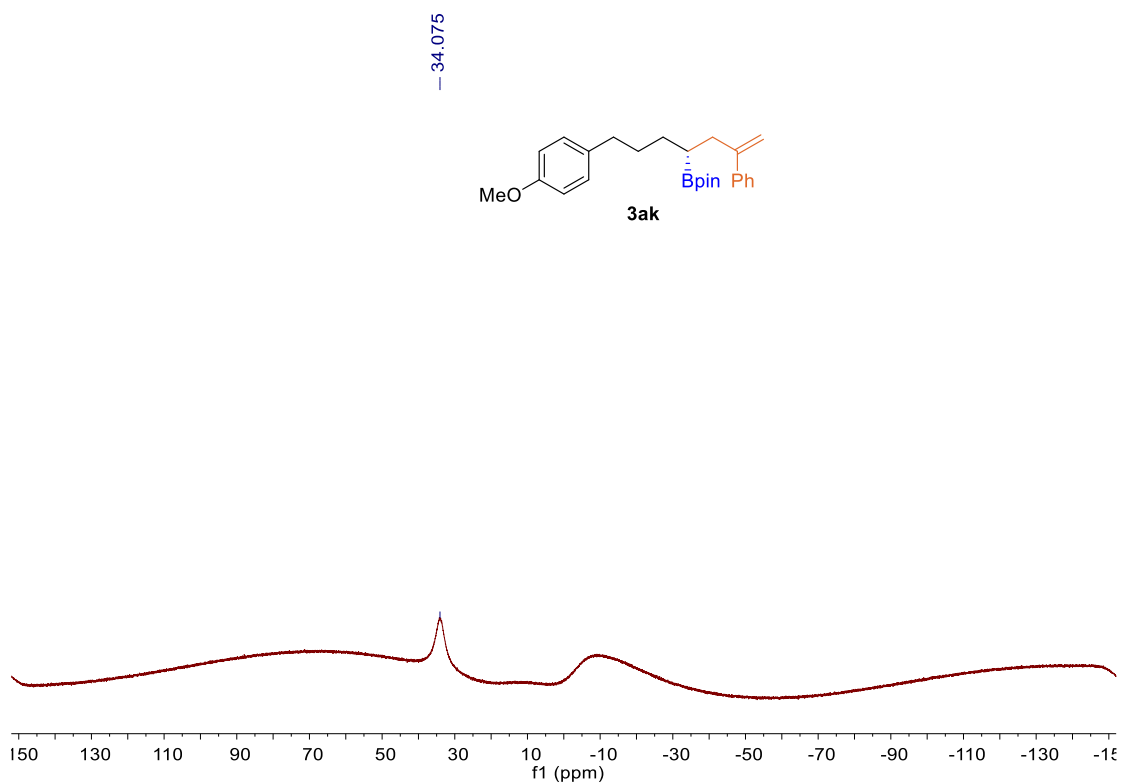
Supplementary Figure 123. ¹¹B NMR spectrum of compound 3aj



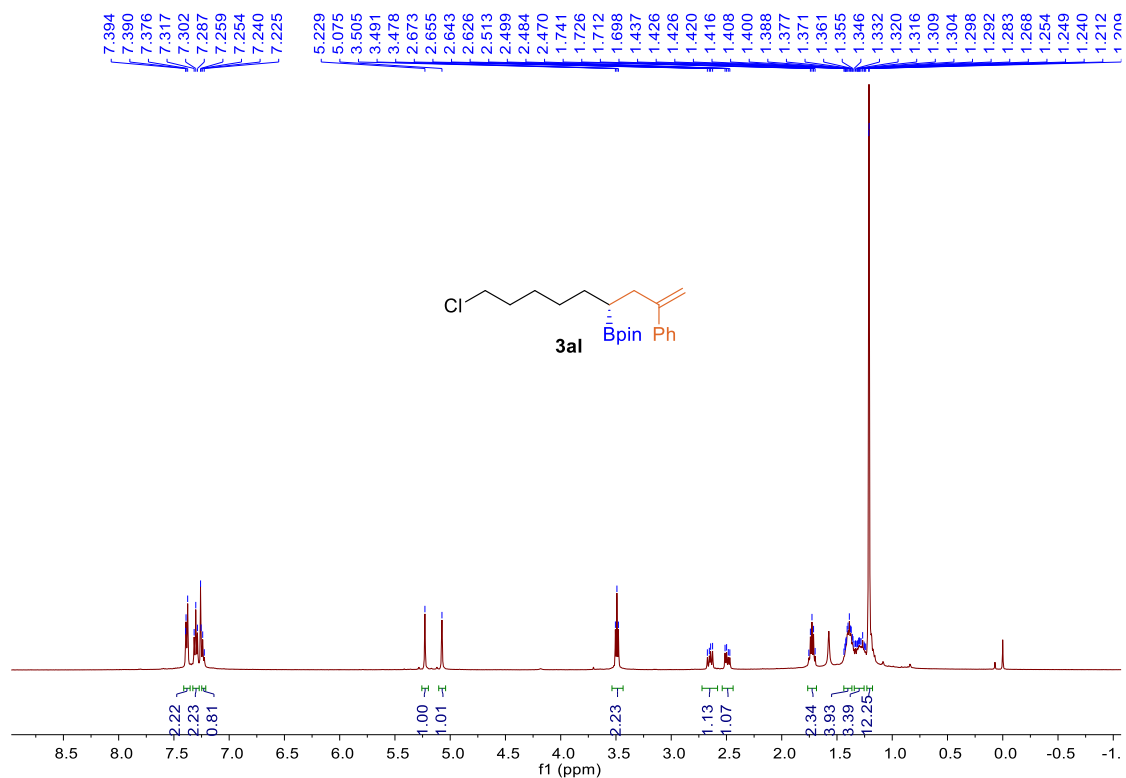
Supplementary Figure 124. ¹H NMR spectrum of compound 3ak



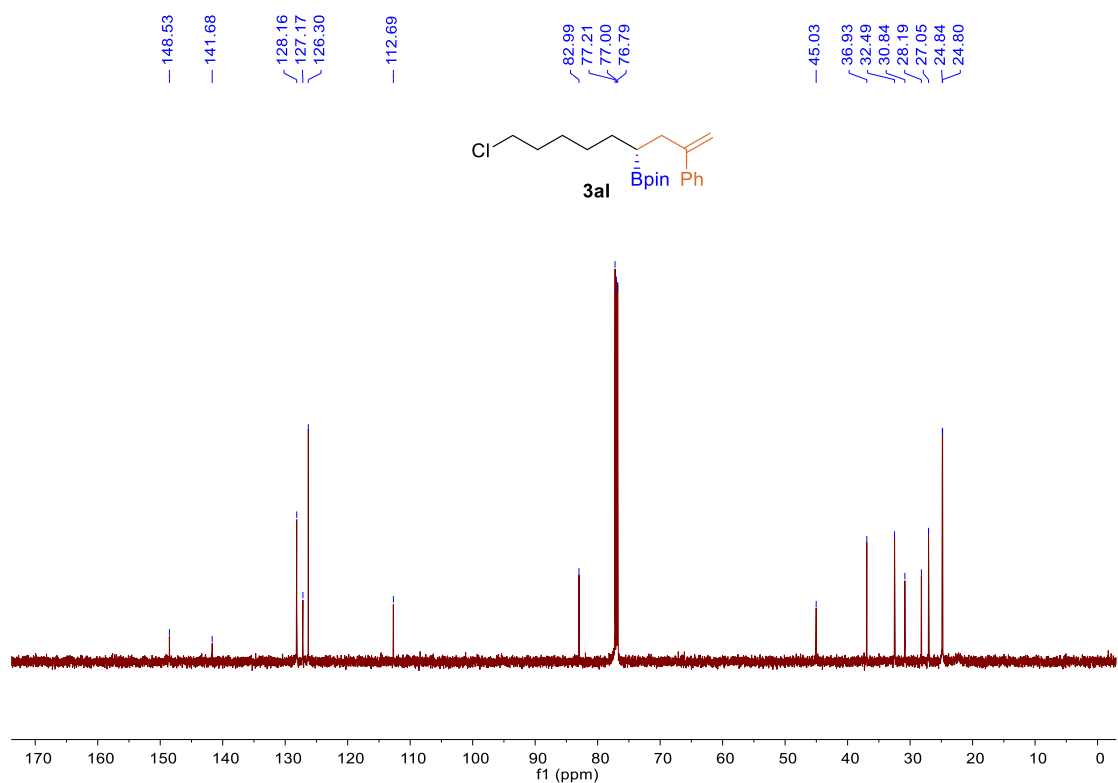
Supplementary Figure 125. ¹³C NMR spectrum of compound 3ak



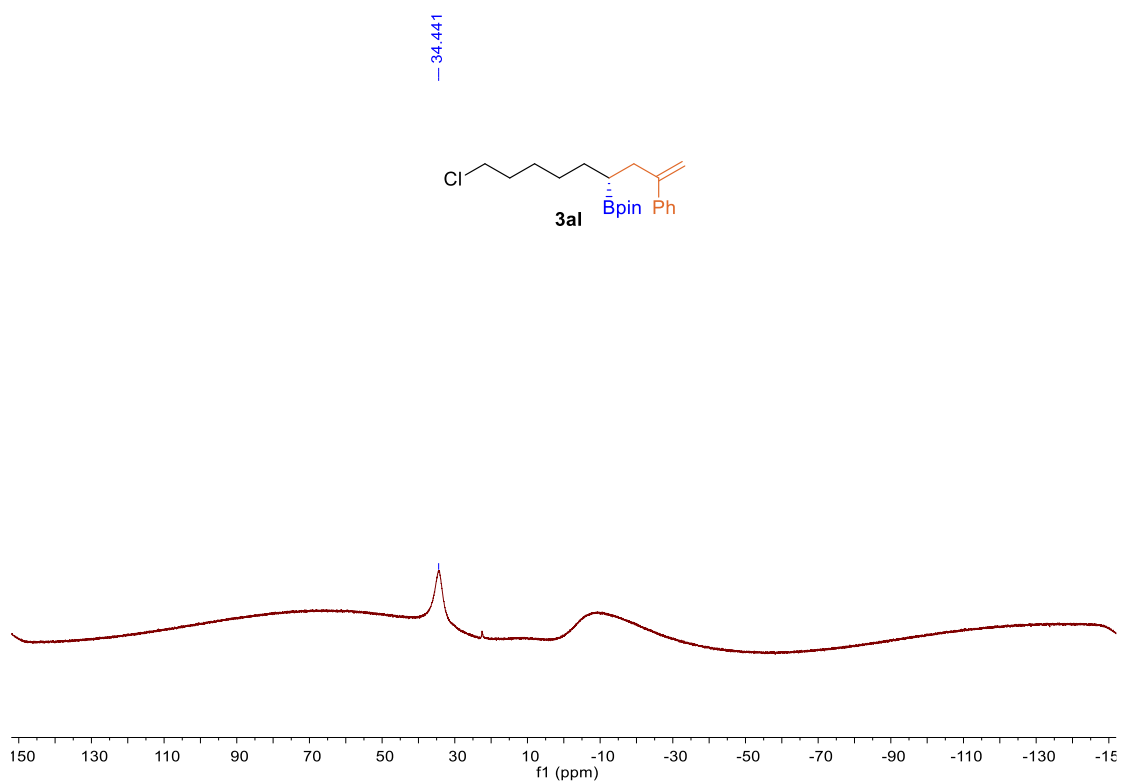
Supplementary Figure 126. ^{11}B NMR spectrum of compound **3ak**



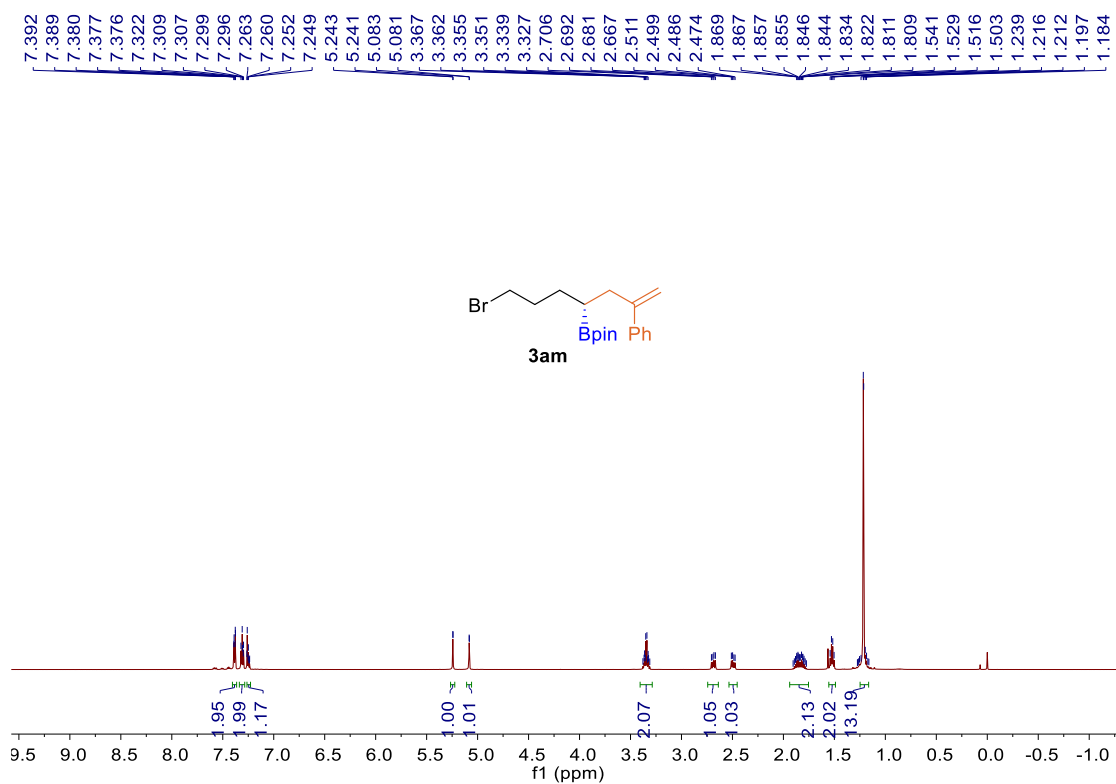
Supplementary Figure 127. ^1H NMR spectrum of compound **3al**



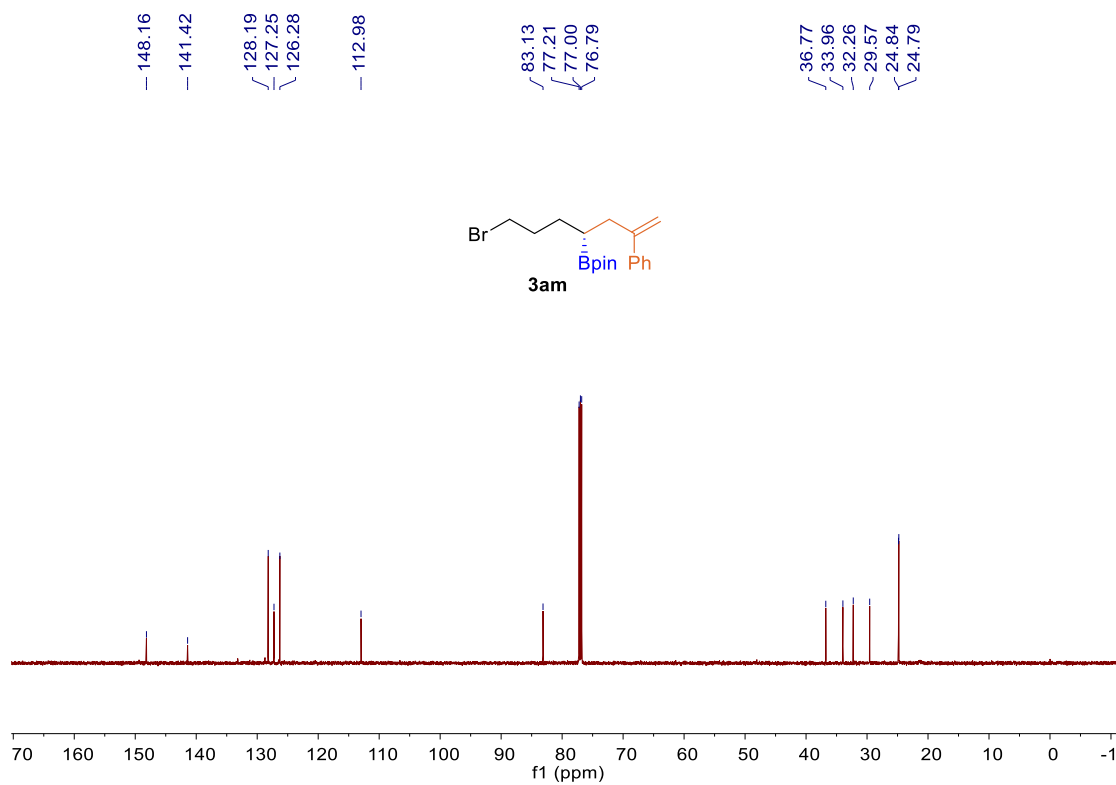
Supplementary Figure 128. ^{13}C NMR spectrum of compound 3al



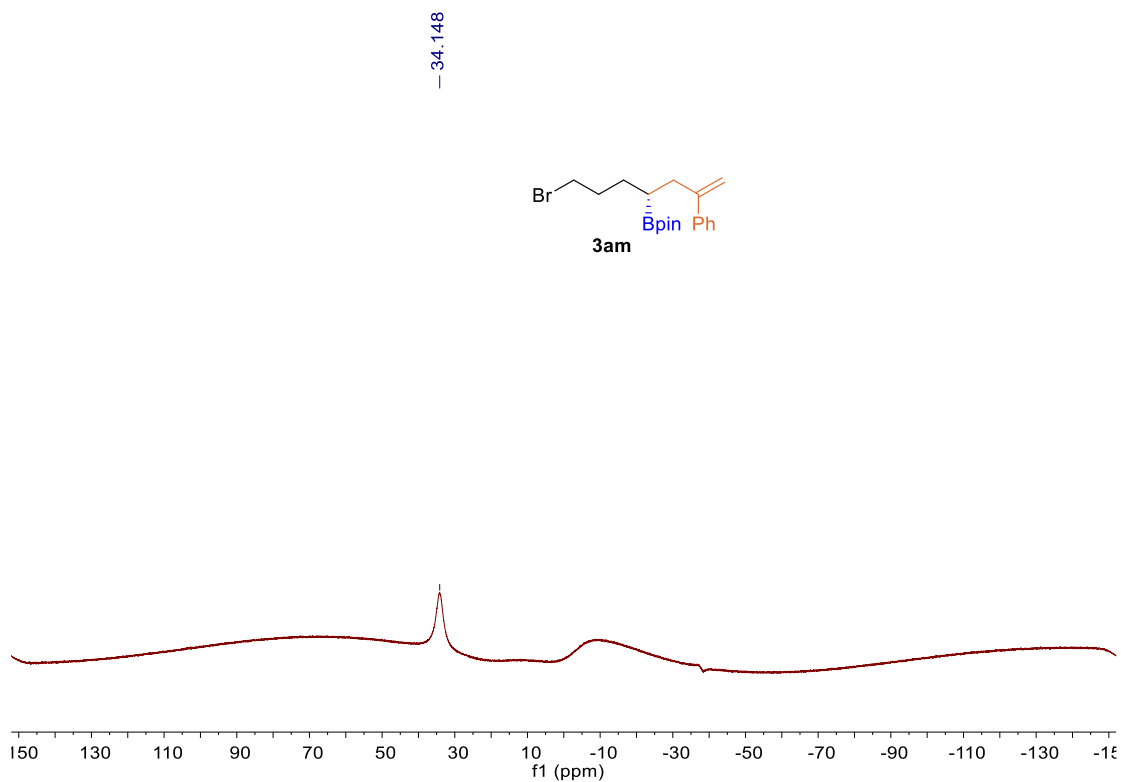
Supplementary Figure 129. ^{11}B NMR spectrum of compound 3al



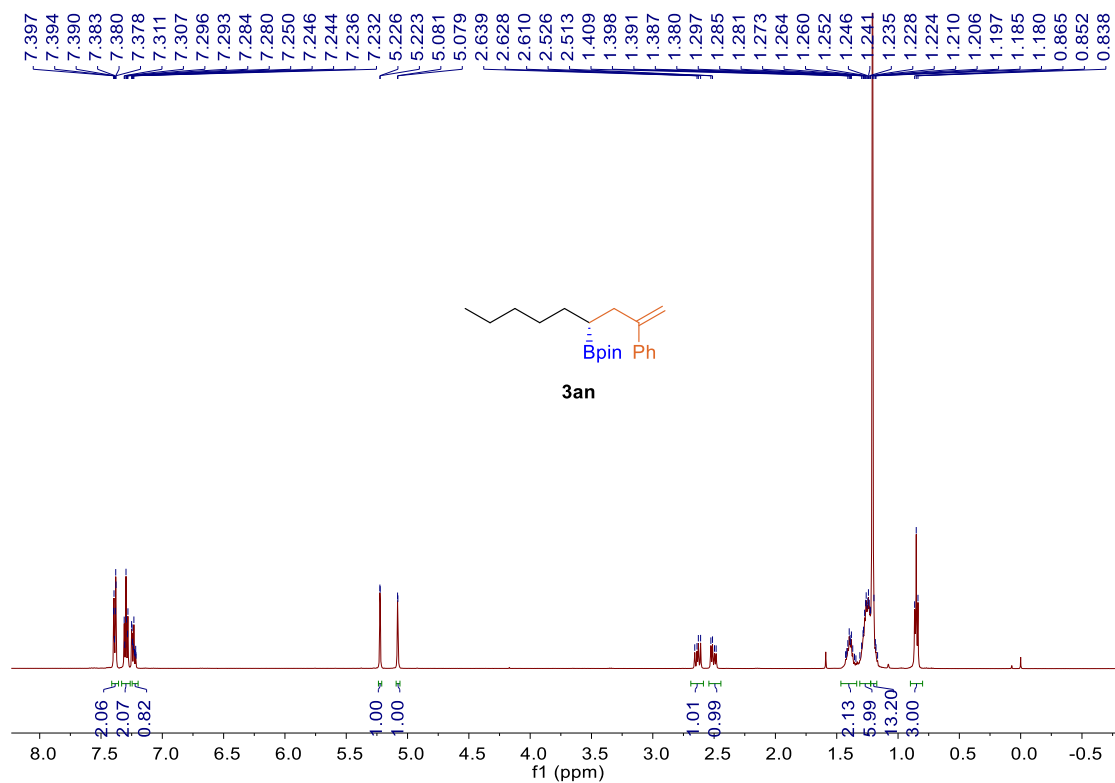
Supplementary Figure 130. ¹H NMR spectrum of compound 3am



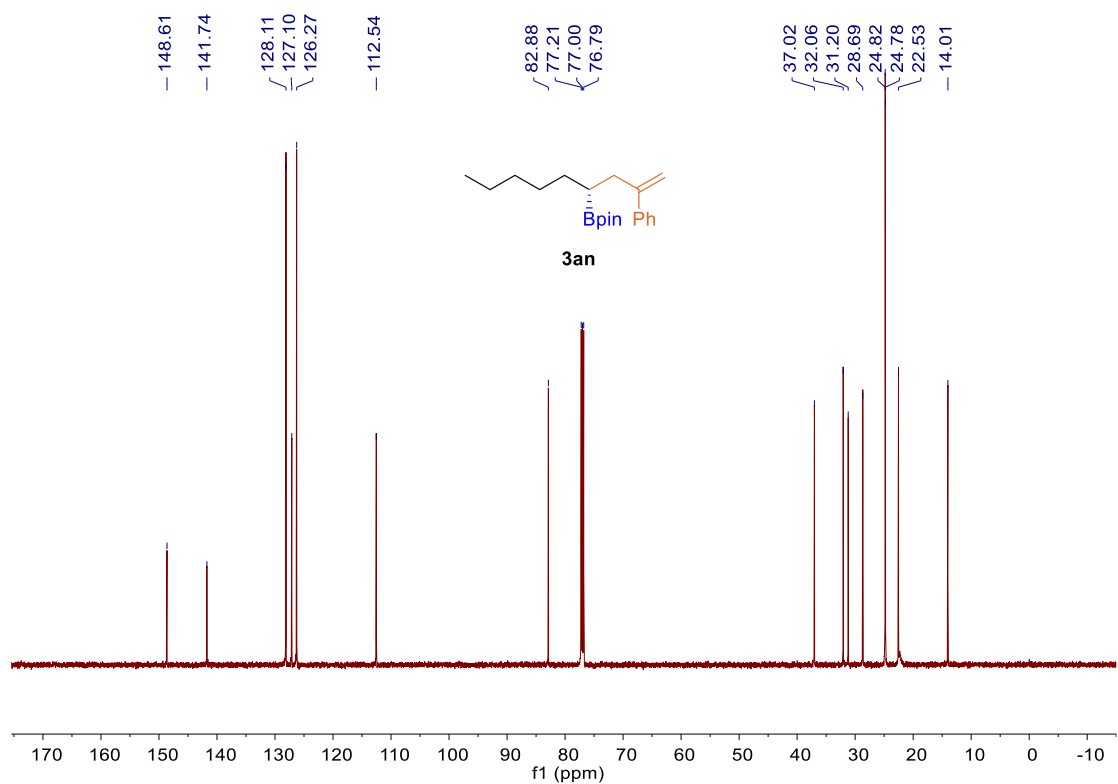
Supplementary Figure 131. ¹³C NMR spectrum of compound 3am



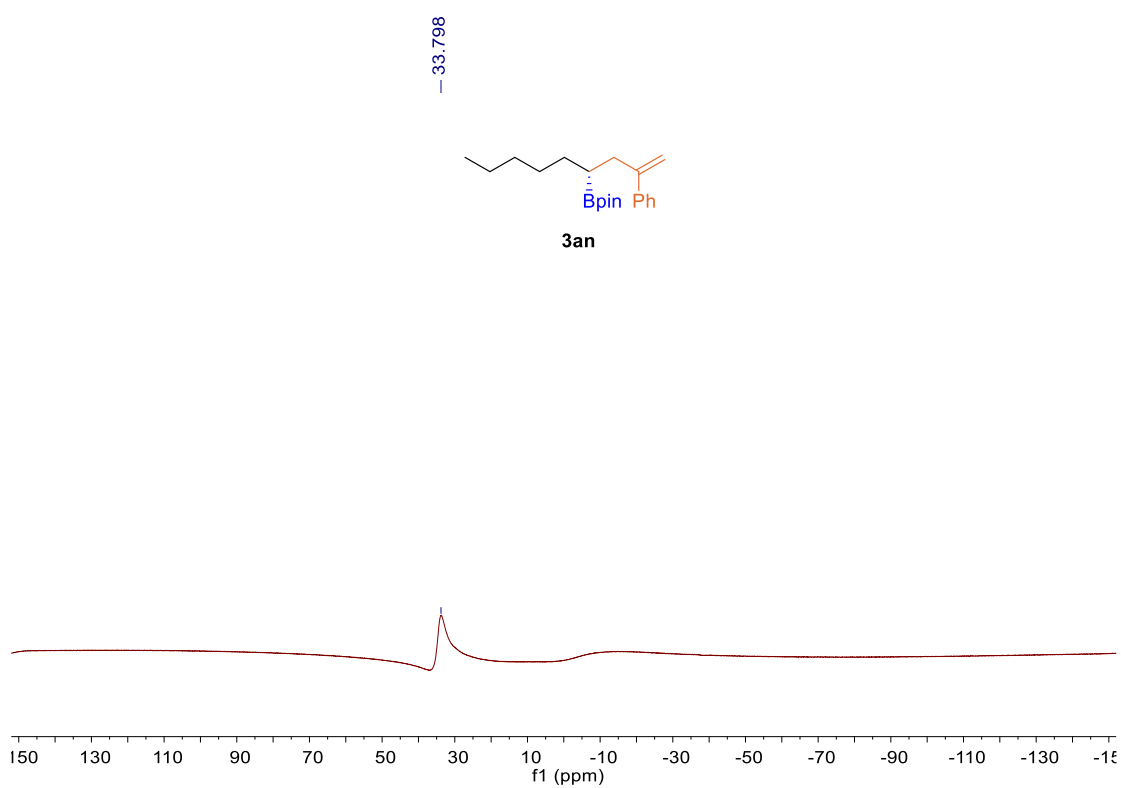
Supplementary Figure 132. ^{11}B NMR spectrum of compound 3am



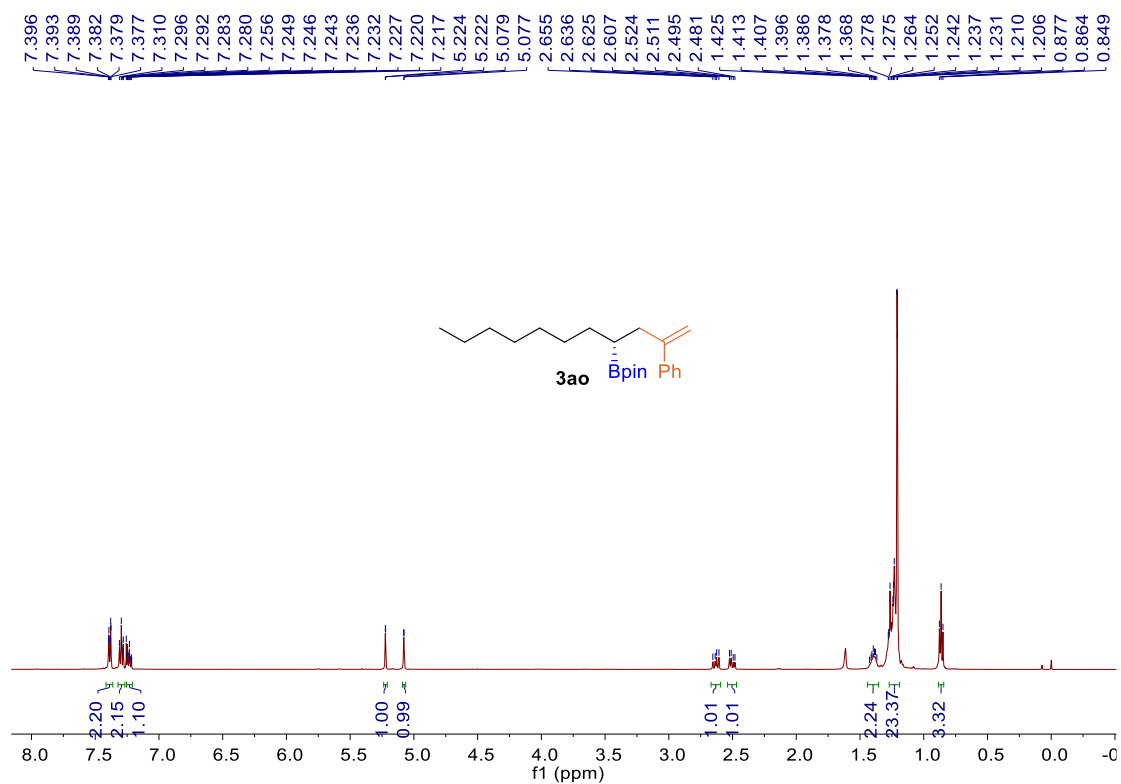
Supplementary Figure 133. ^1H NMR spectrum of compound 3an



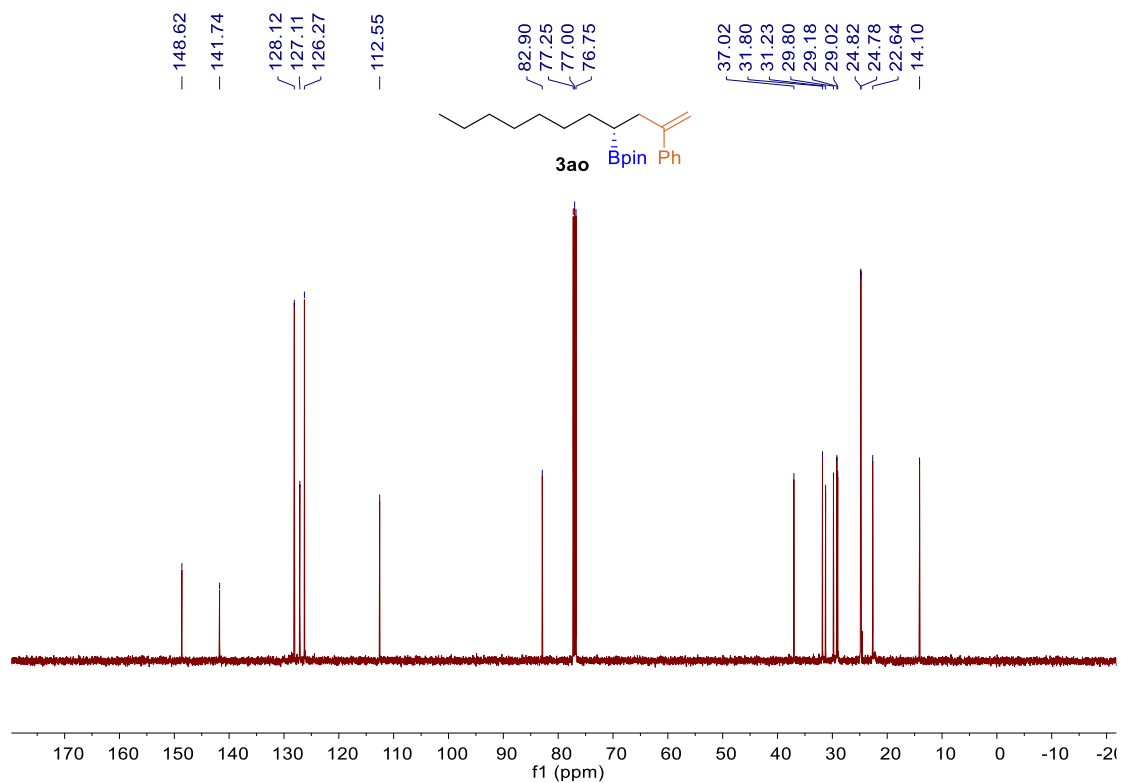
Supplementary Figure 134. ¹³C NMR spectrum of compound 3an



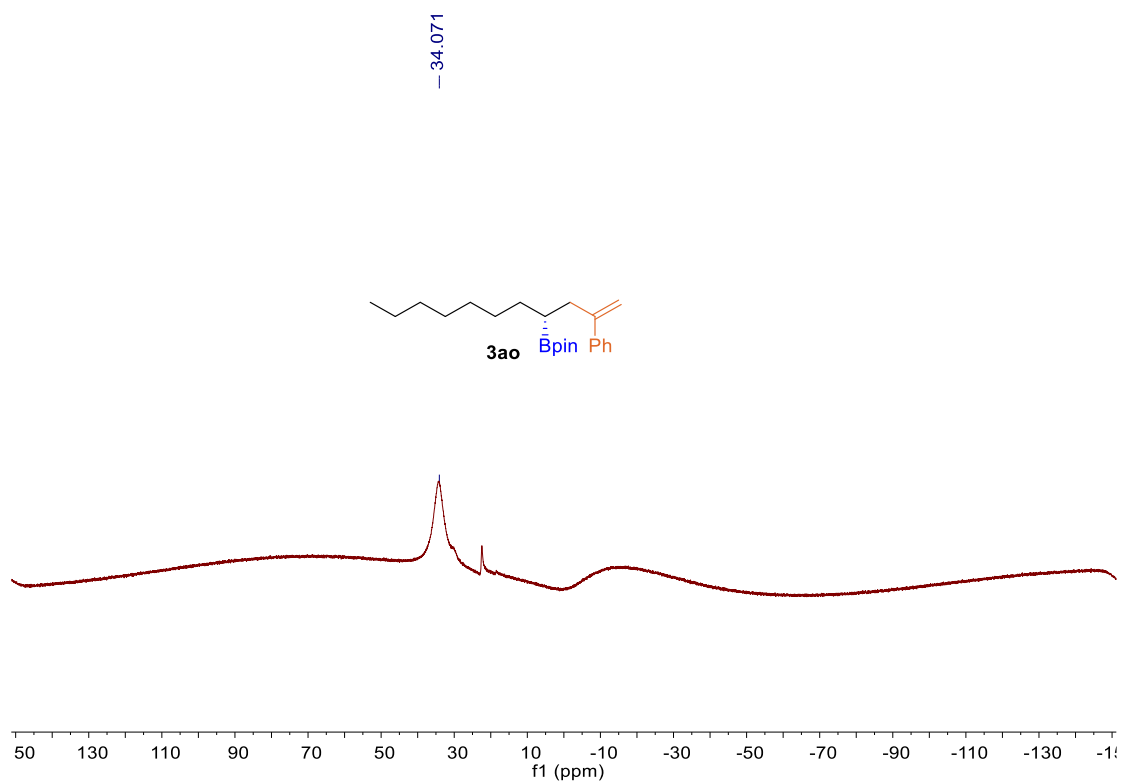
Supplementary Figure 135. ¹¹B NMR spectrum of compound 3an



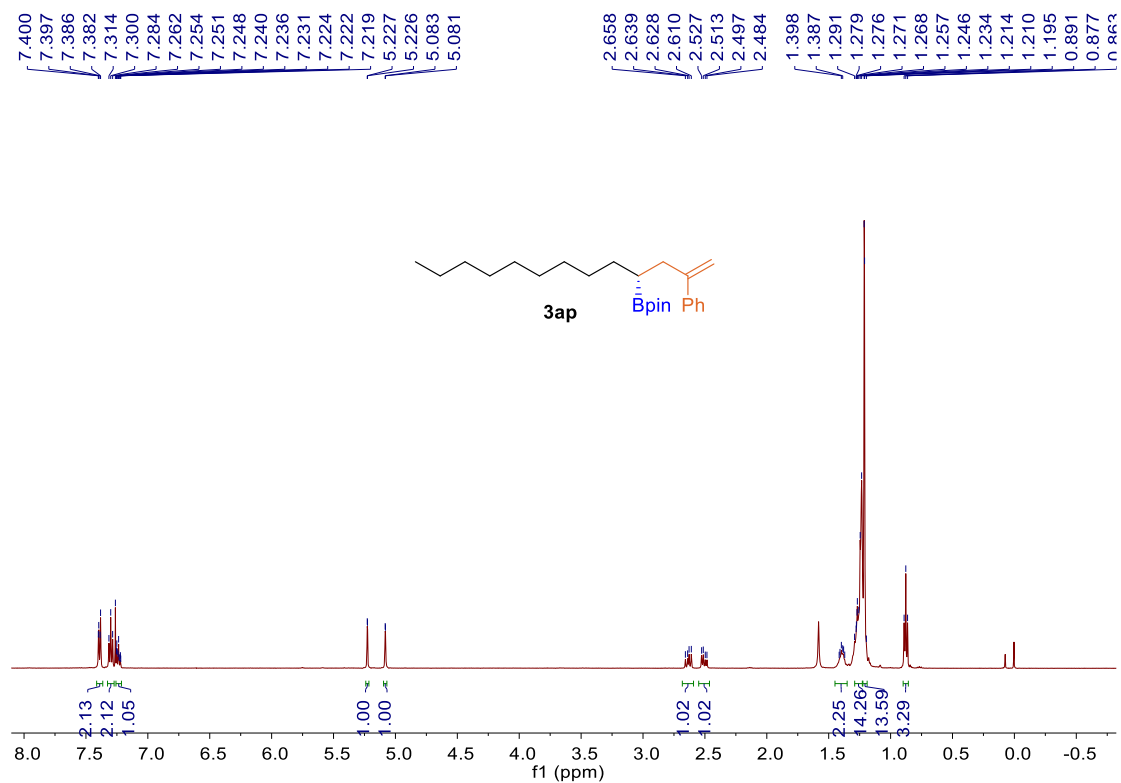
Supplementary Figure 136. ¹H NMR spectrum of compound 3ao



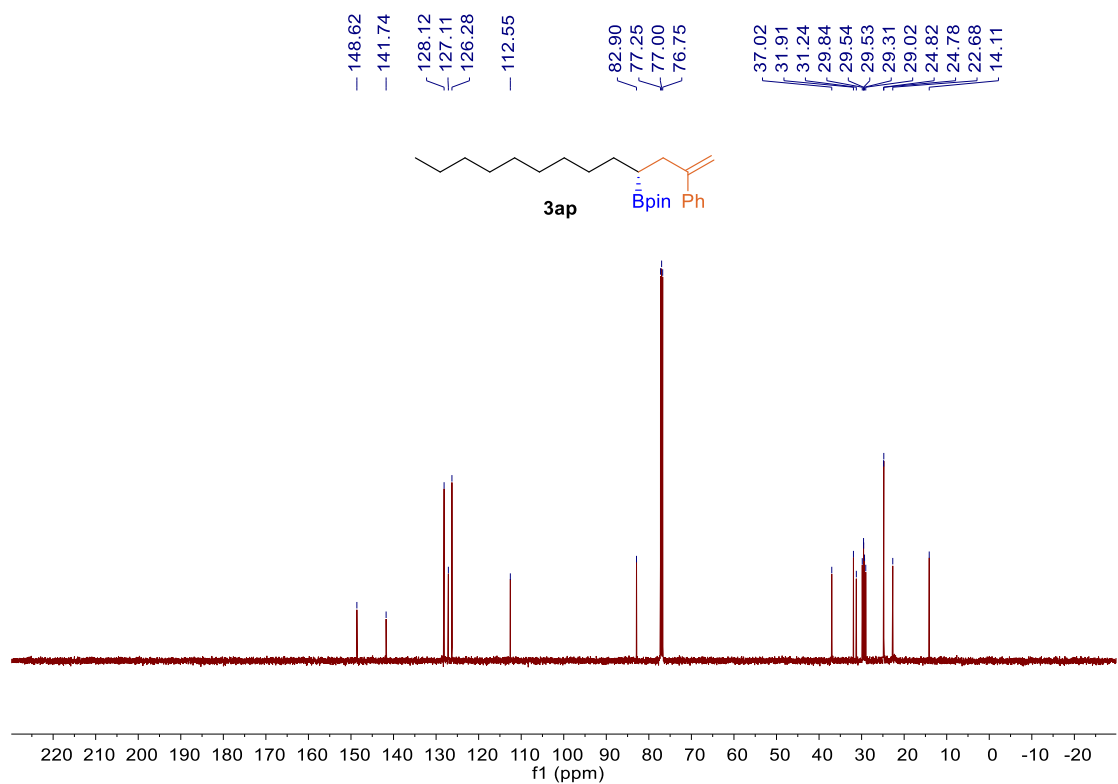
Supplementary Figure 137. ¹³C NMR spectrum of compound 3ao



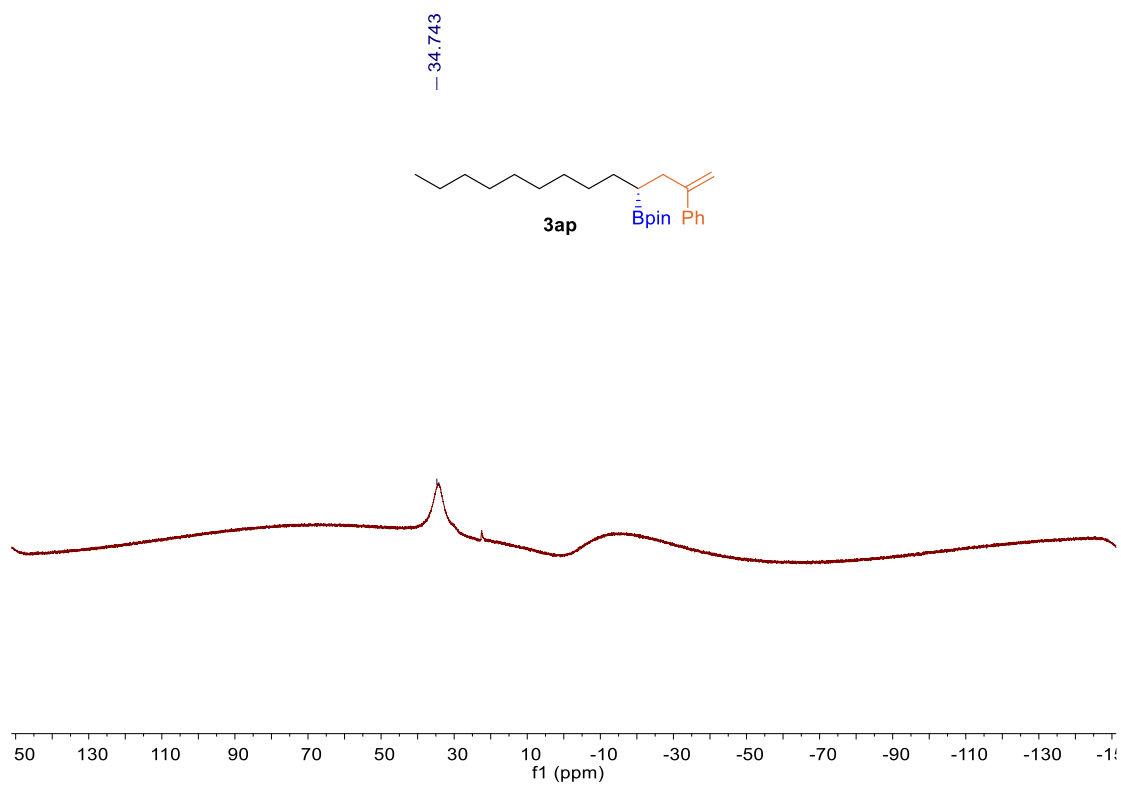
Supplementary Figure 138. ^{11}B NMR spectrum of compound 3ao



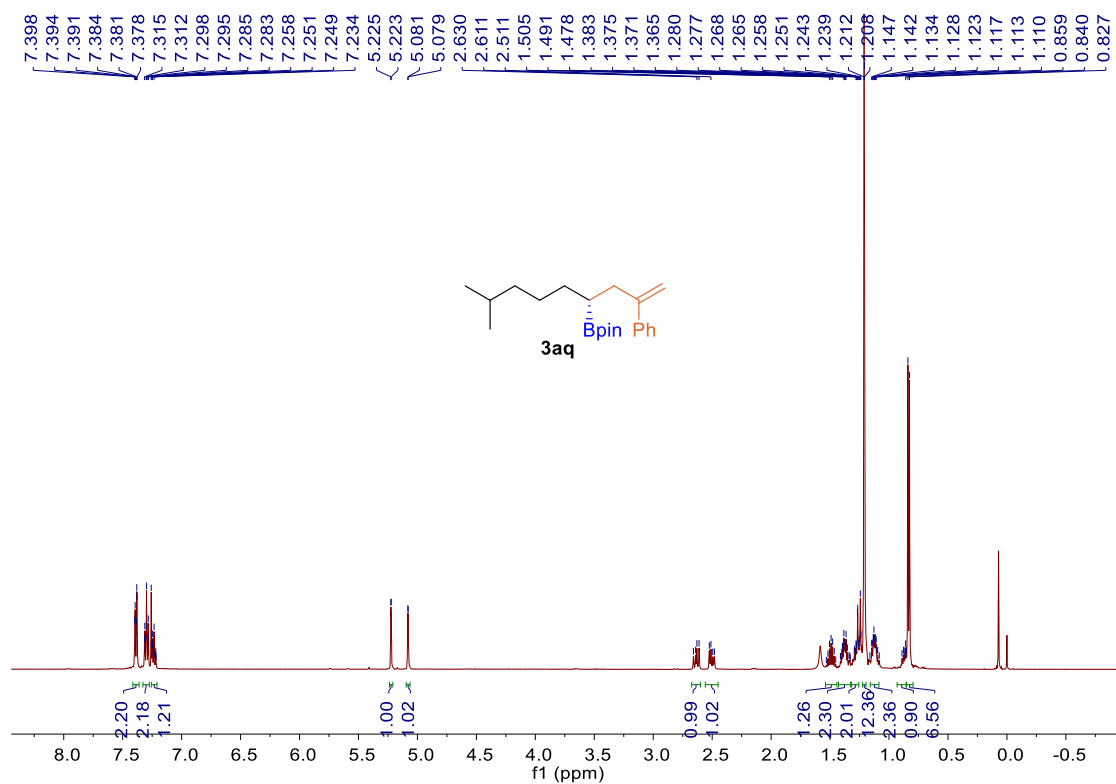
Supplementary Figure 139. ^1H NMR spectrum of compound 3ap



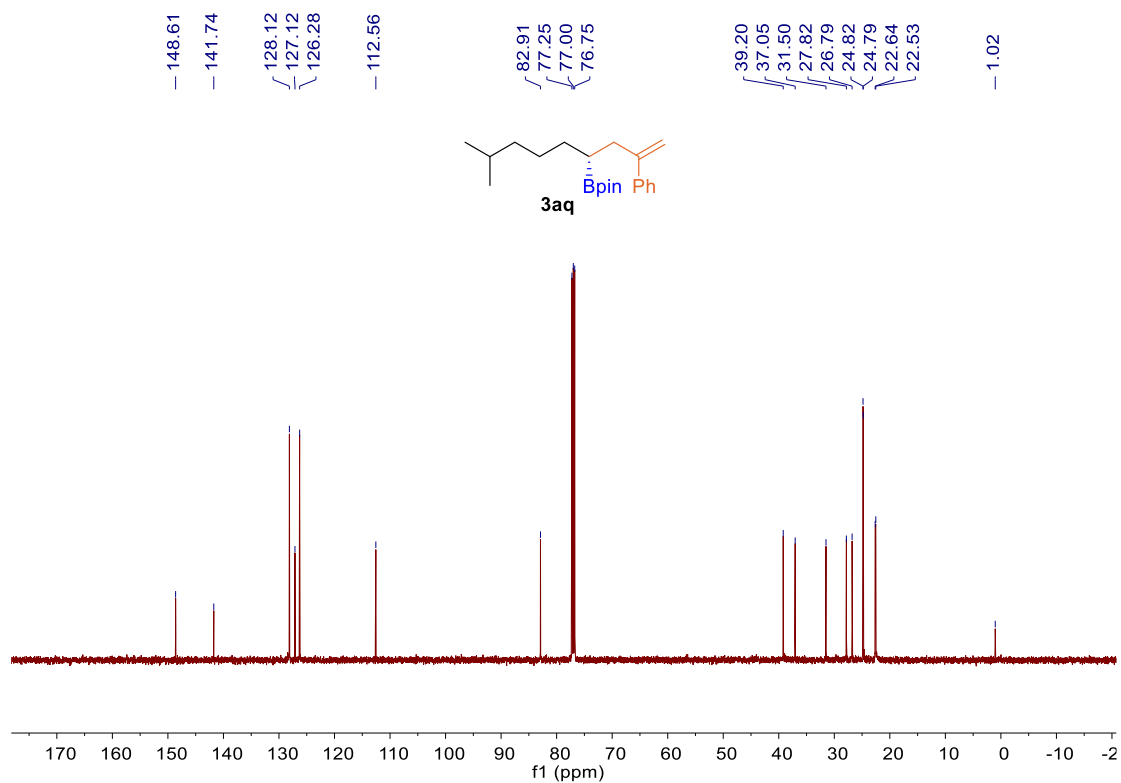
Supplementary Figure 140. ¹³C NMR spectrum of compound 3ap



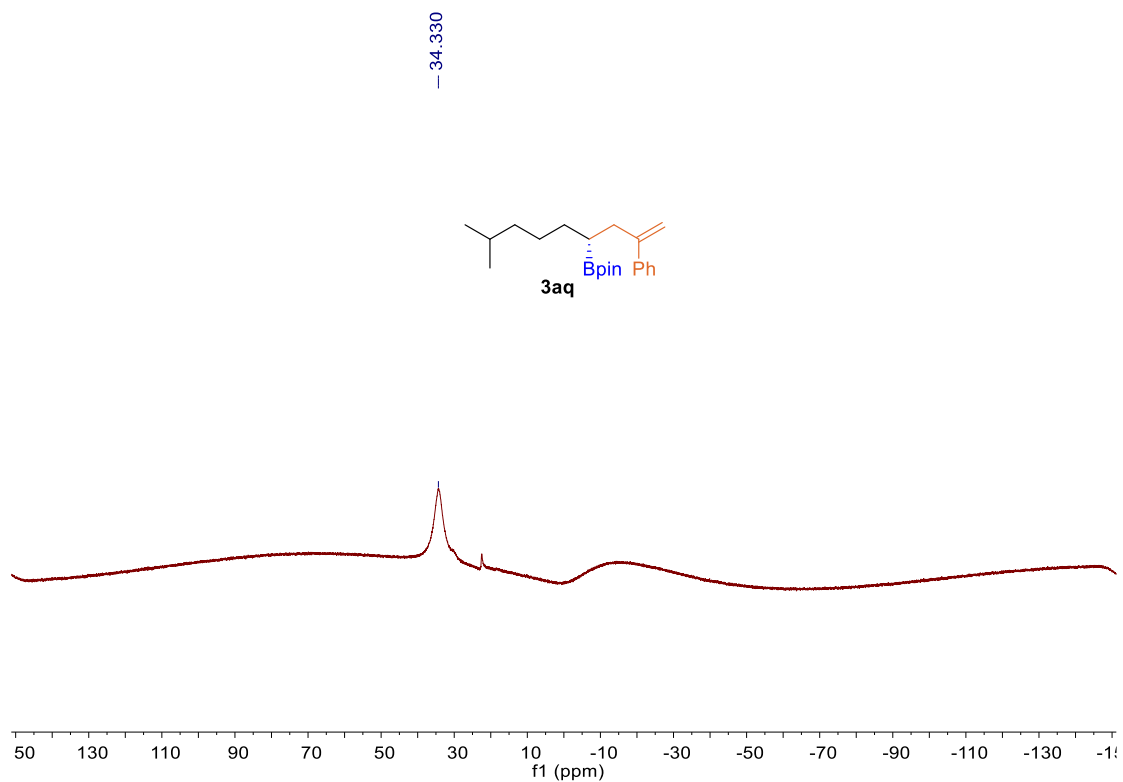
Supplementary Figure 141. ¹¹B NMR spectrum of compound 3ap



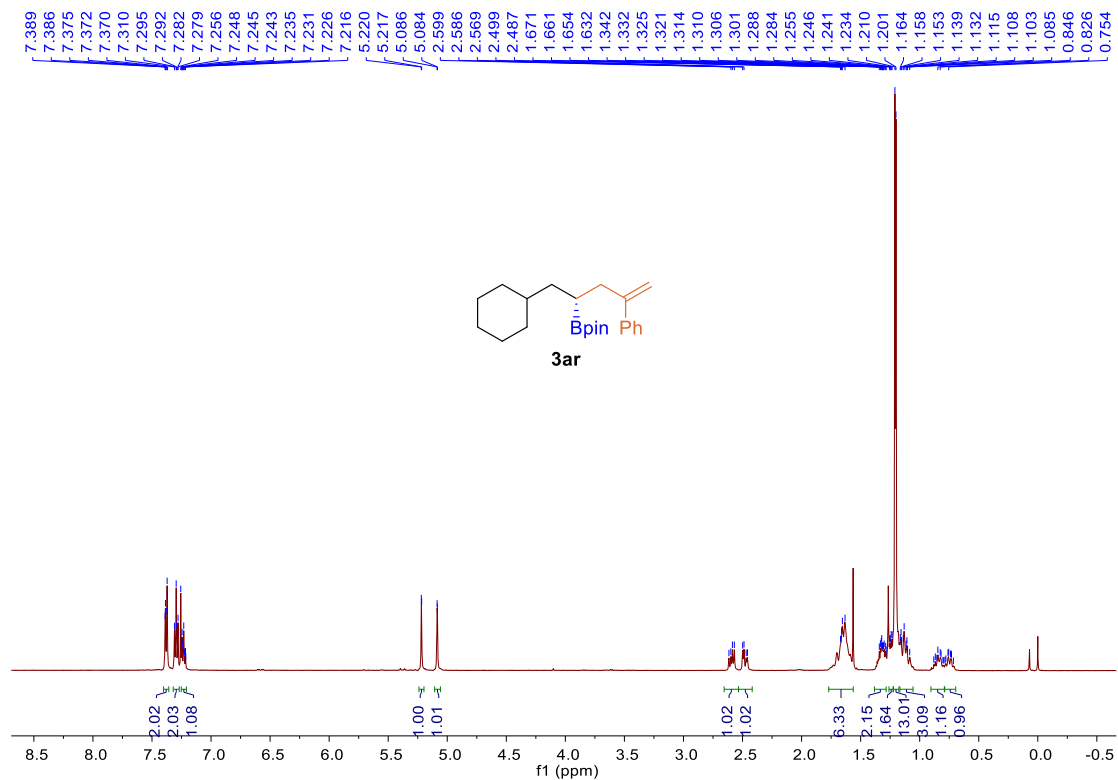
Supplementary Figure 142. ¹H NMR spectrum of compound 3aq



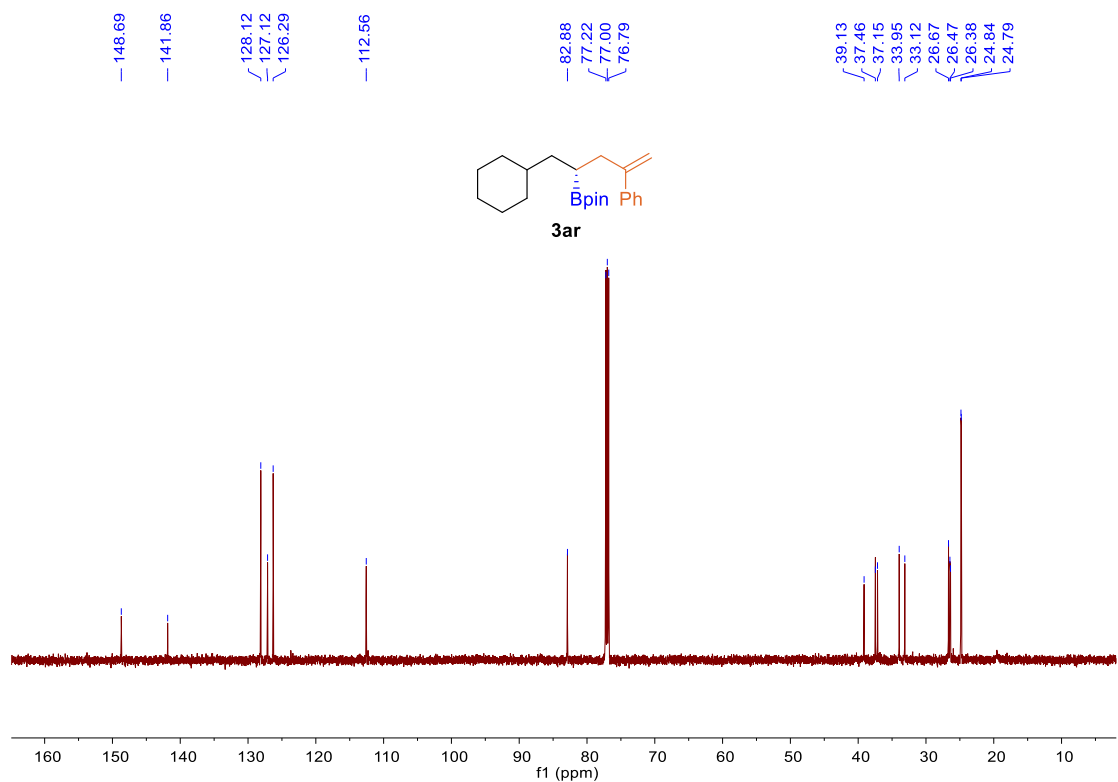
Supplementary Figure 143. ¹³C NMR spectrum of compound 3aq



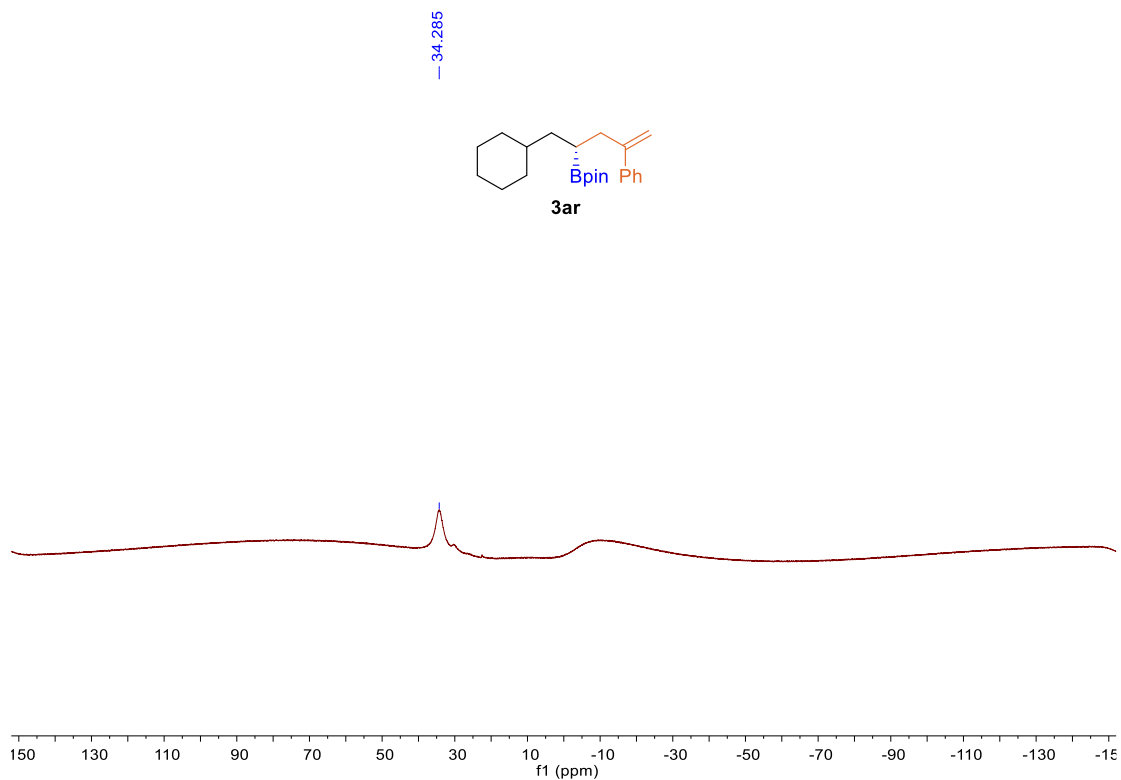
Supplementary Figure 144. ^{11}B NMR spectrum of compound 3aq



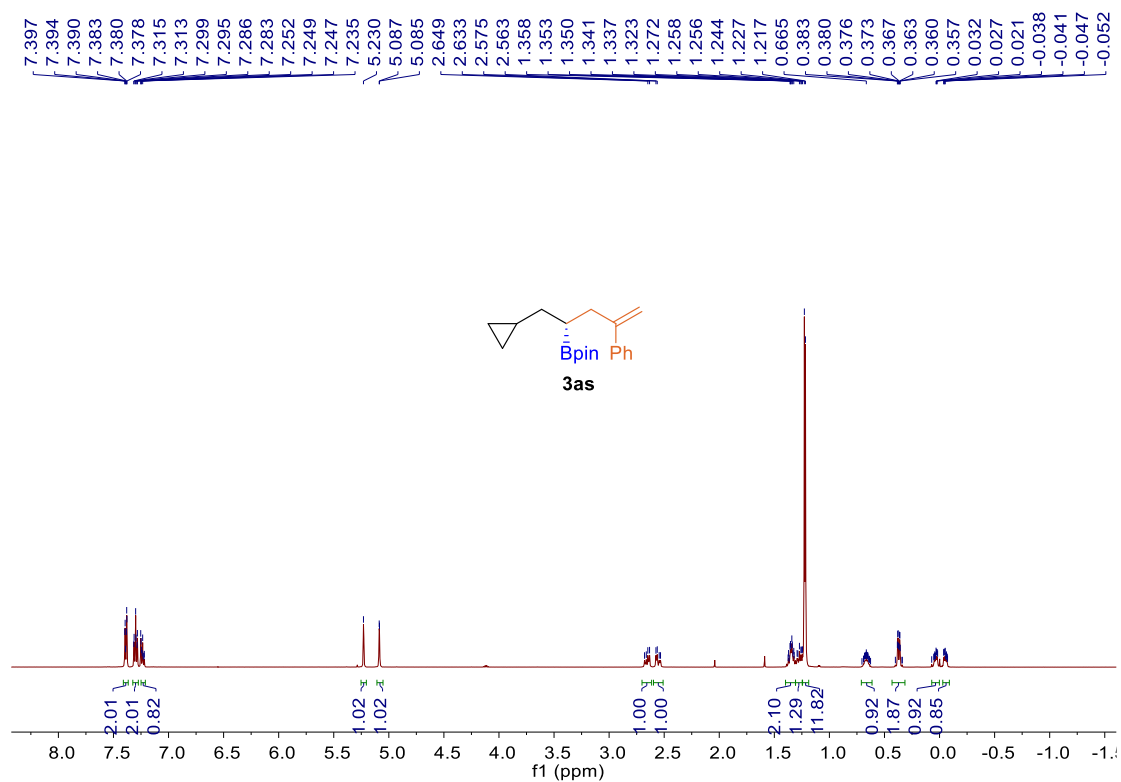
Supplementary Figure 145. ^1H NMR spectrum of compound 3ar



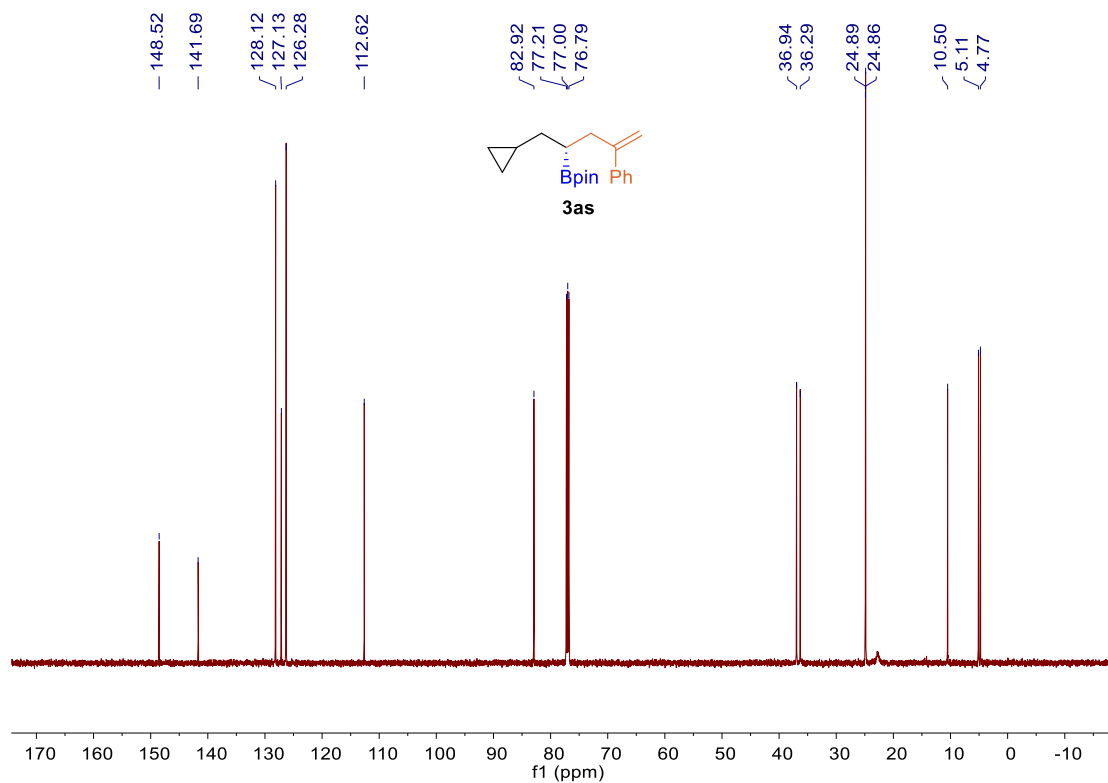
Supplementary Figure 146. ¹³C NMR spectrum of compound **3ar**



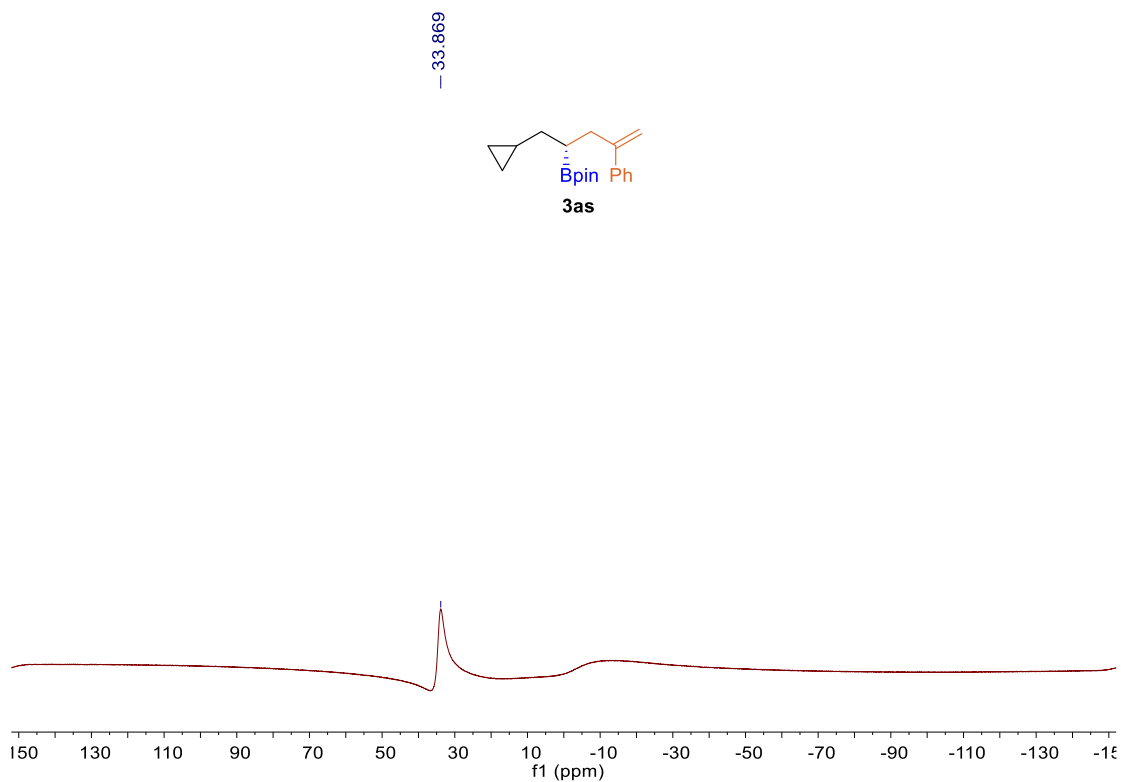
Supplementary Figure 147. ¹¹B NMR spectrum of compound **3ar**



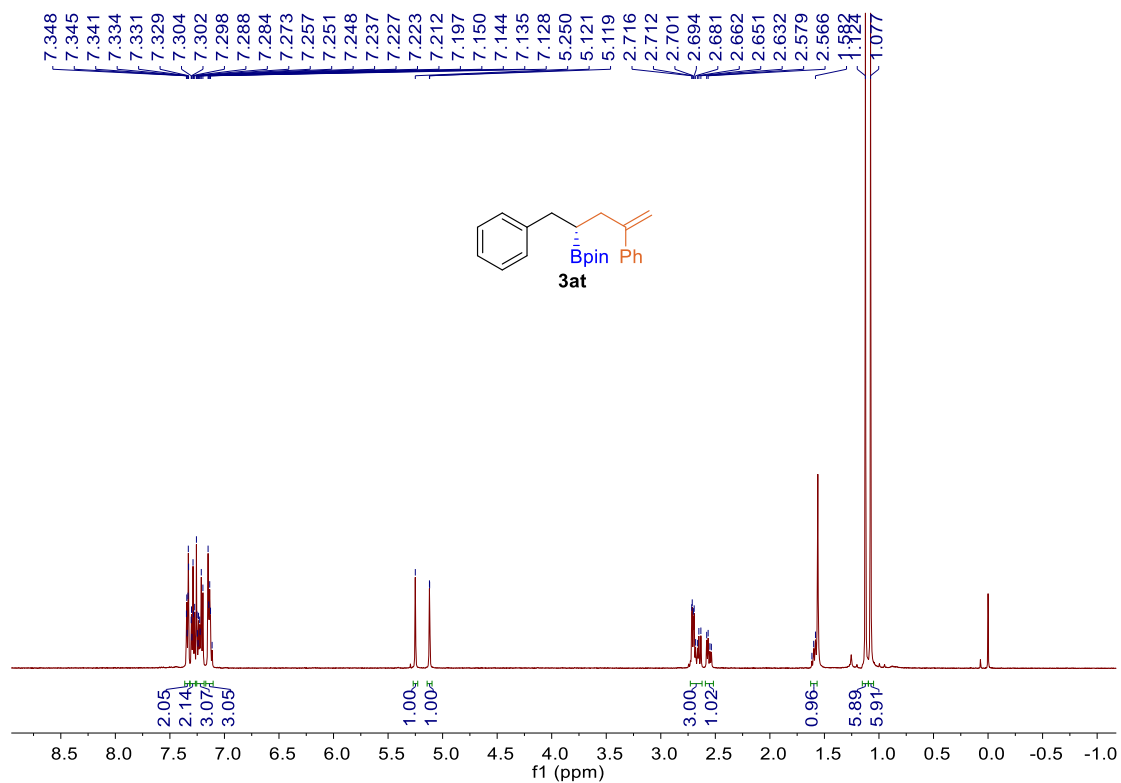
Supplementary Figure 148. ¹H NMR spectrum of compound 3as



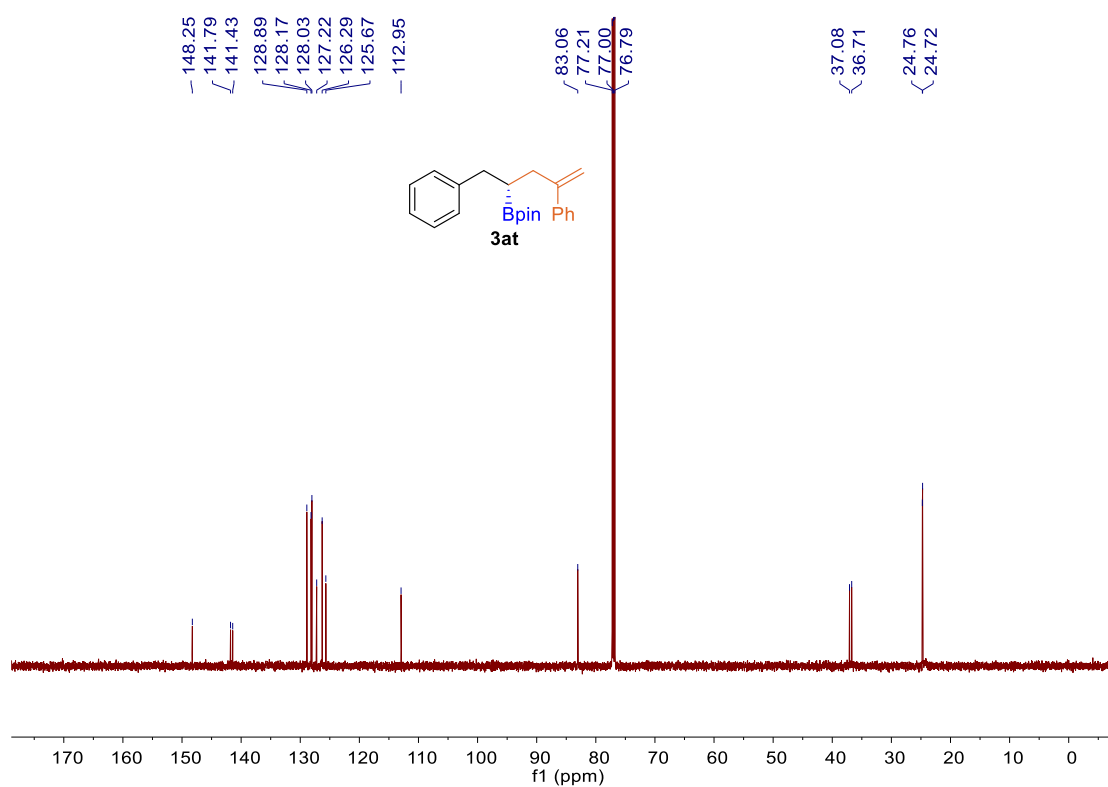
Supplementary Figure 149. ¹³C NMR spectrum of compound 3as



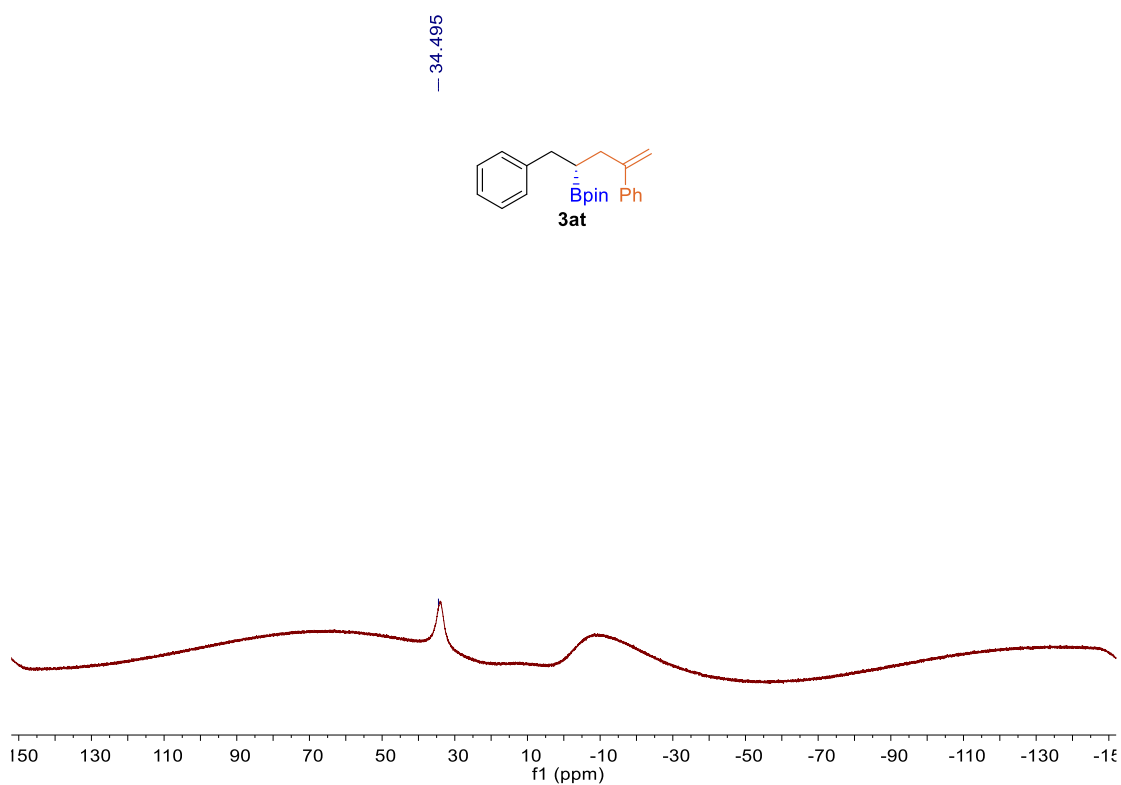
Supplementary Figure 150. ^{11}B NMR spectrum of compound 3as



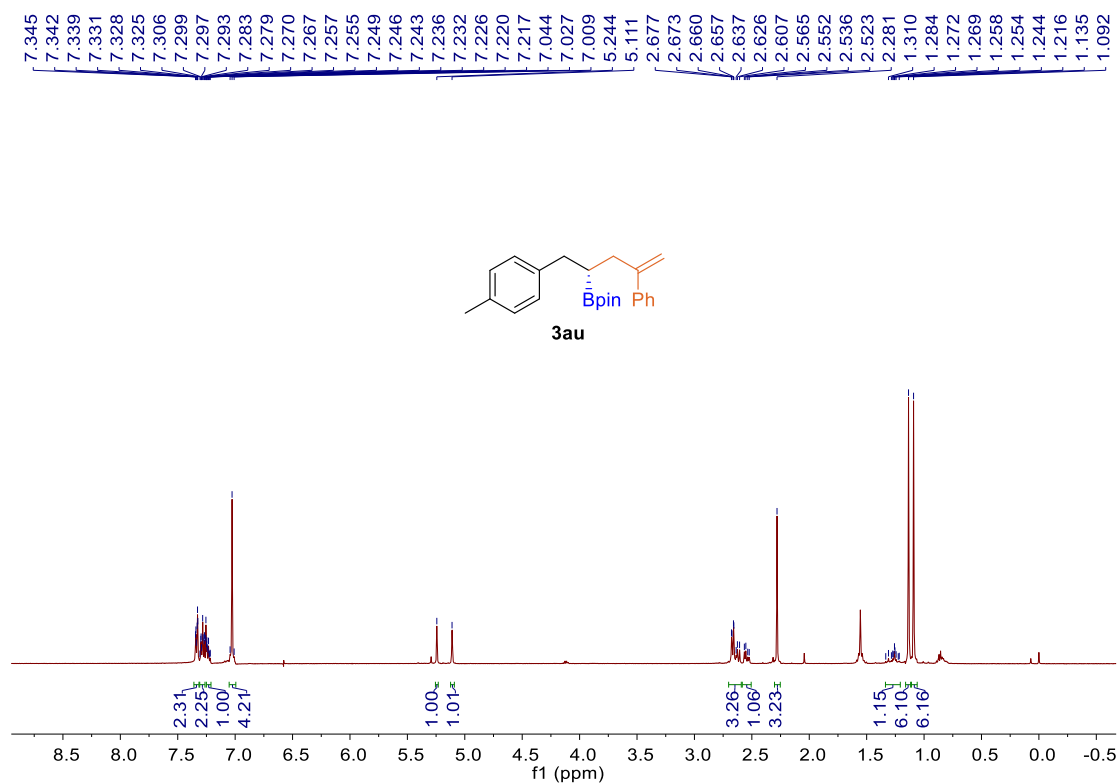
Supplementary Figure 151. ^1H NMR spectrum of compound 3at



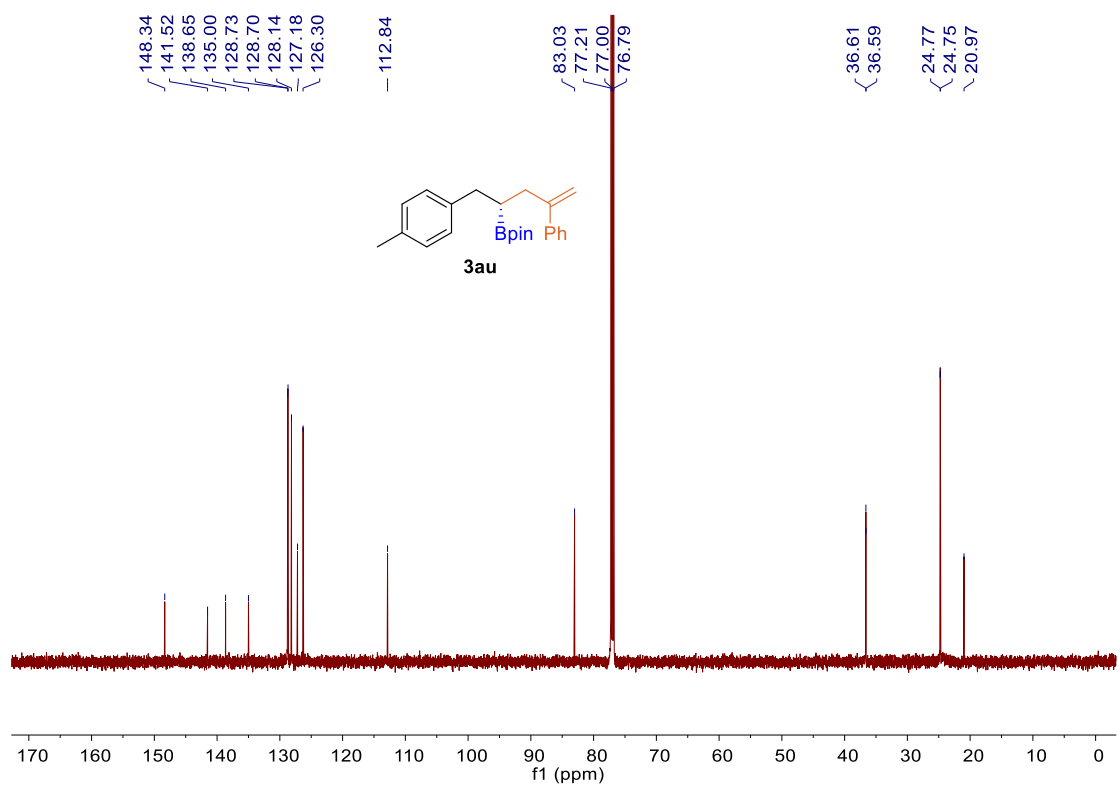
Supplementary Figure 152. ¹³C NMR spectrum of compound 3at



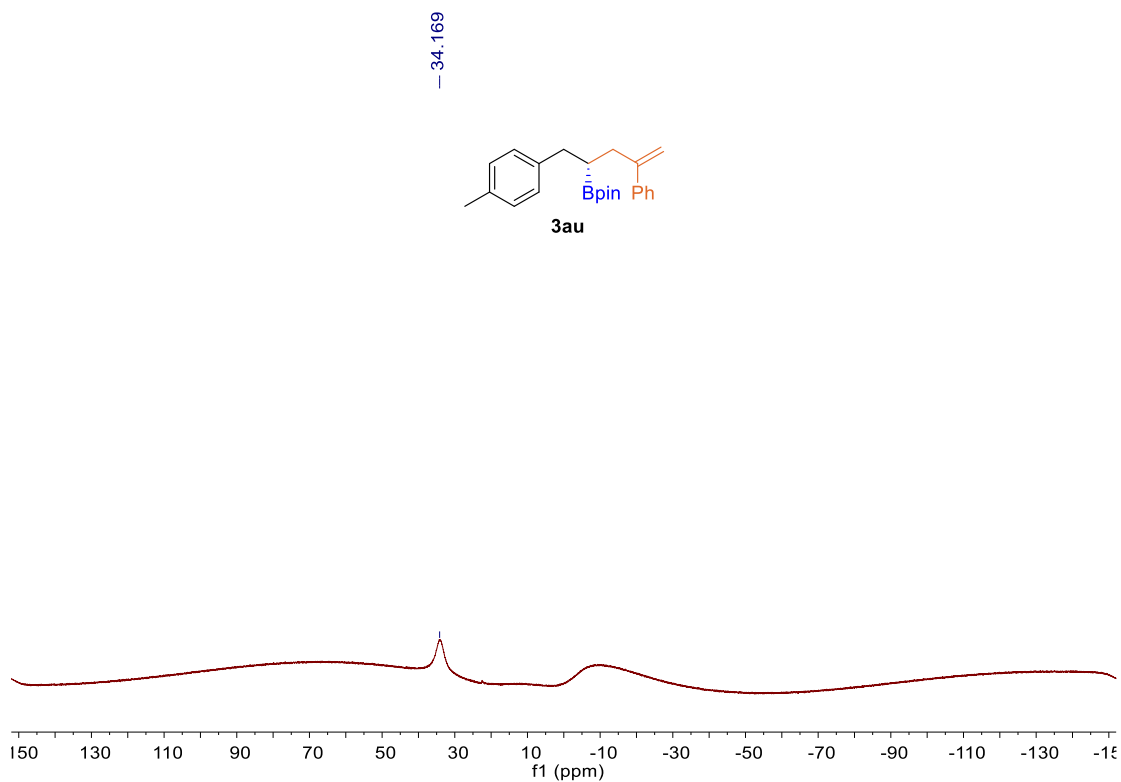
Supplementary Figure 153. ¹¹B NMR spectrum of compound 3at



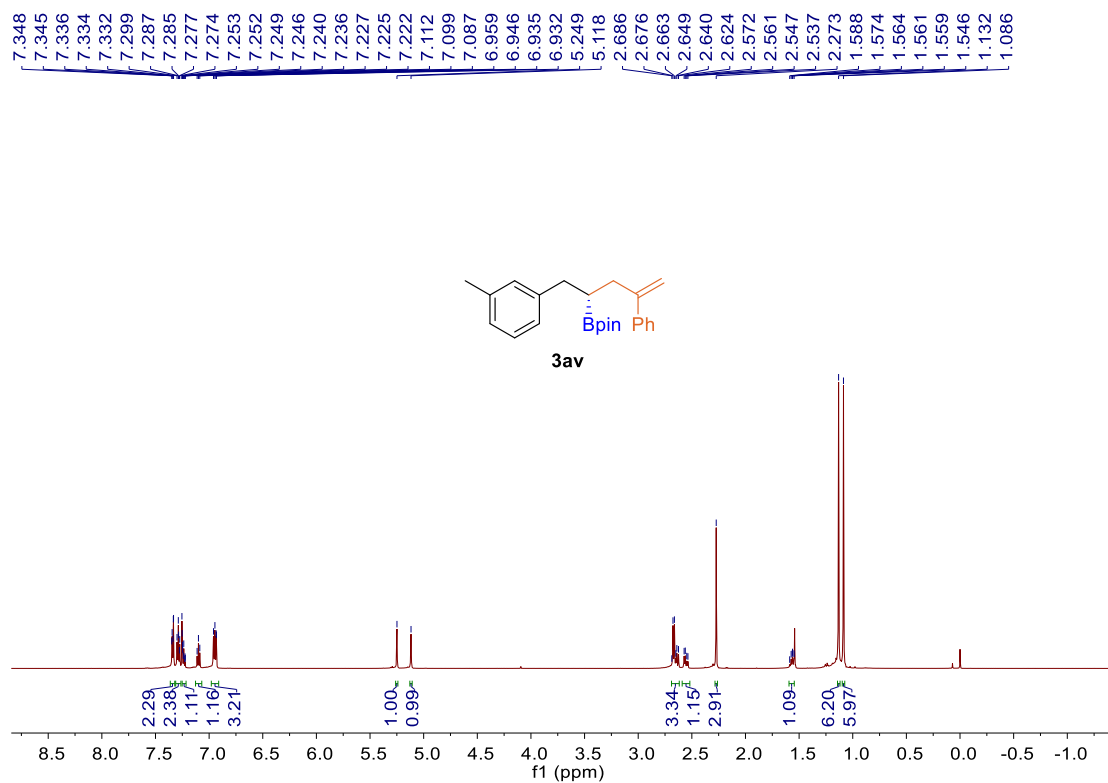
Supplementary Figure 154. ¹H NMR spectrum of compound 3au



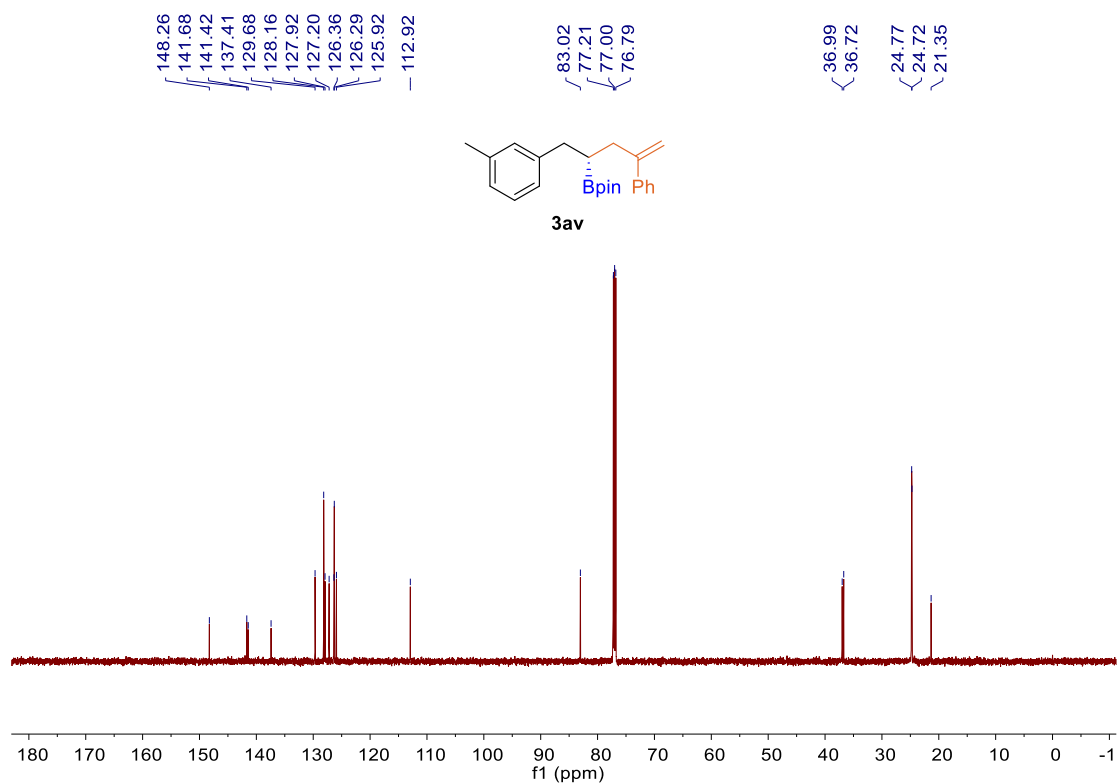
Supplementary Figure 155. ¹³C NMR spectrum of compound 3au



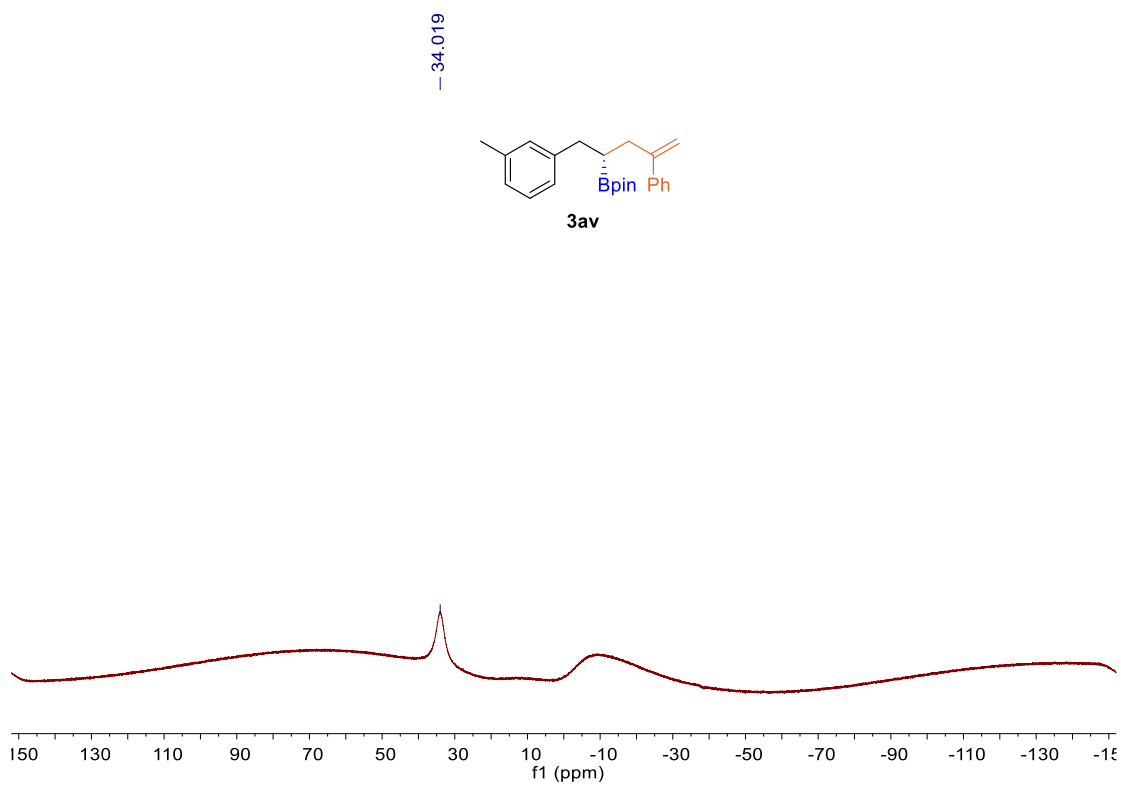
Supplementary Figure 156. ^{11}B NMR spectrum of compound 3au



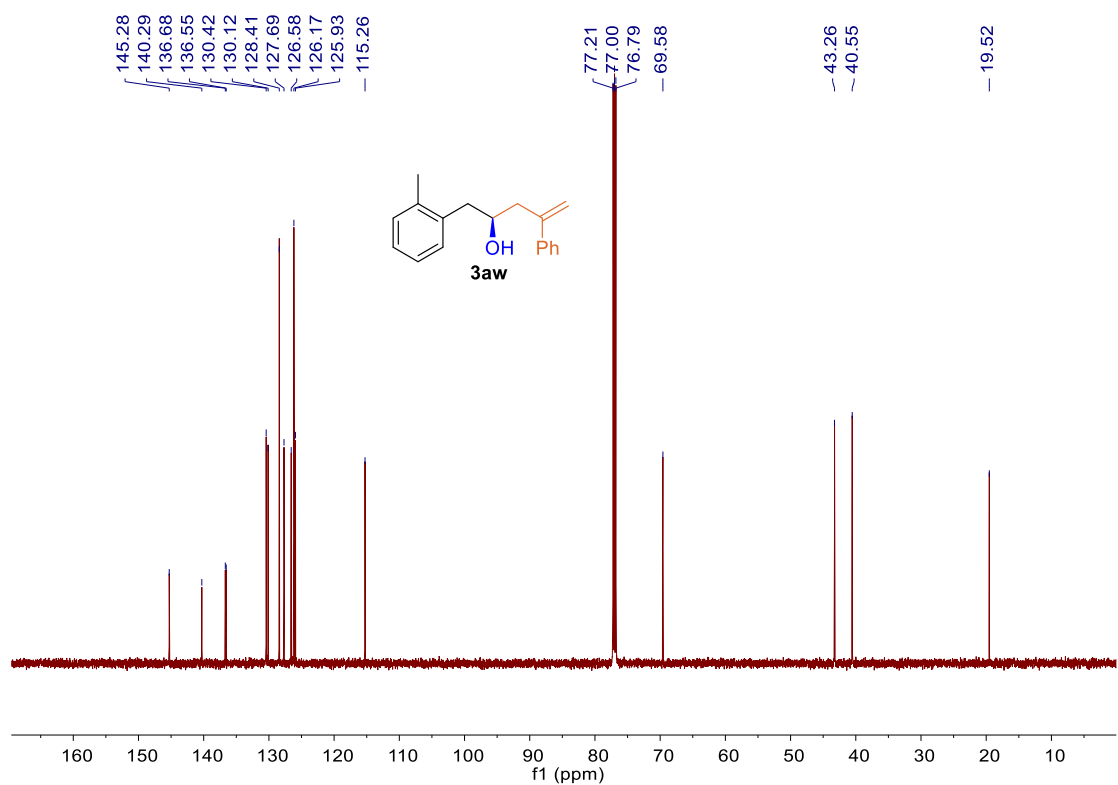
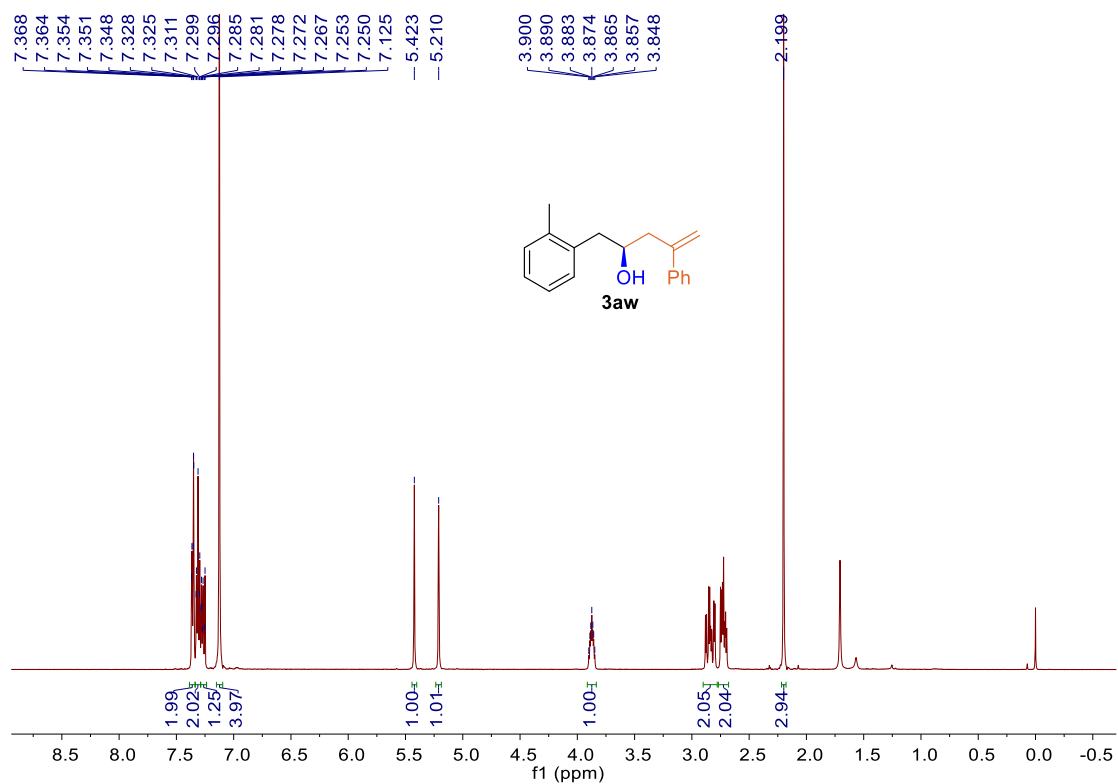
Supplementary Figure 157. ^1H NMR spectrum of compound 3av

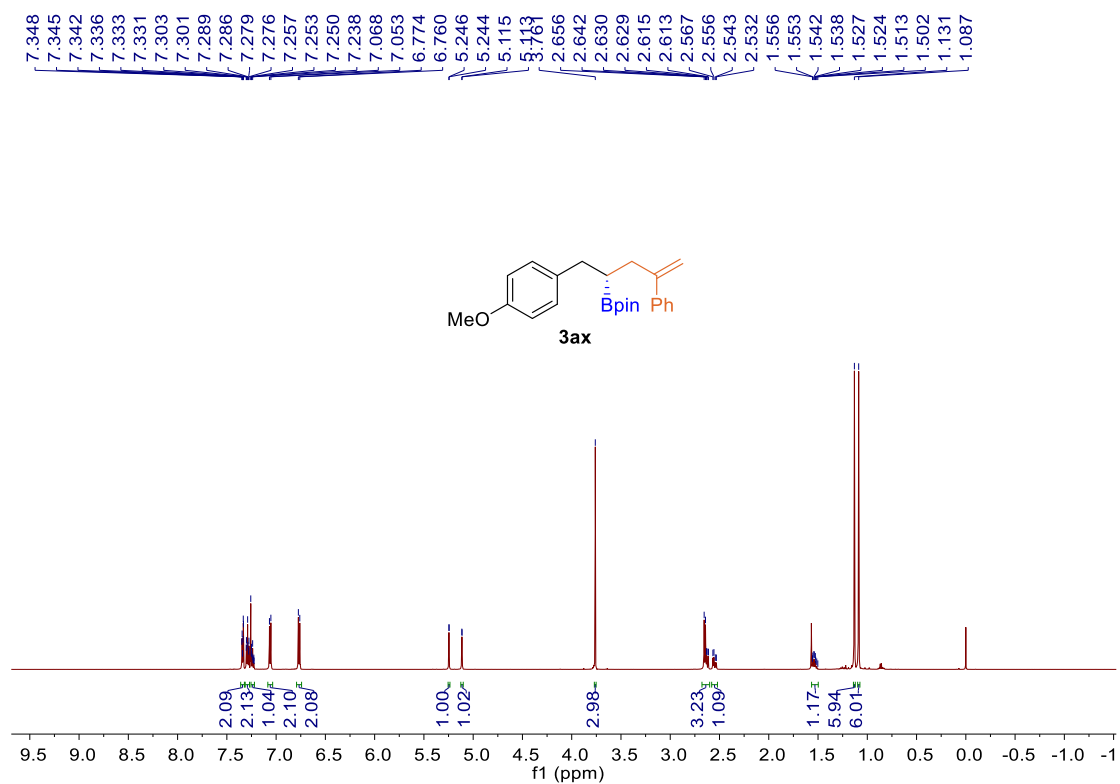


Supplementary Figure 158. ^{13}C NMR spectrum of compound 3av

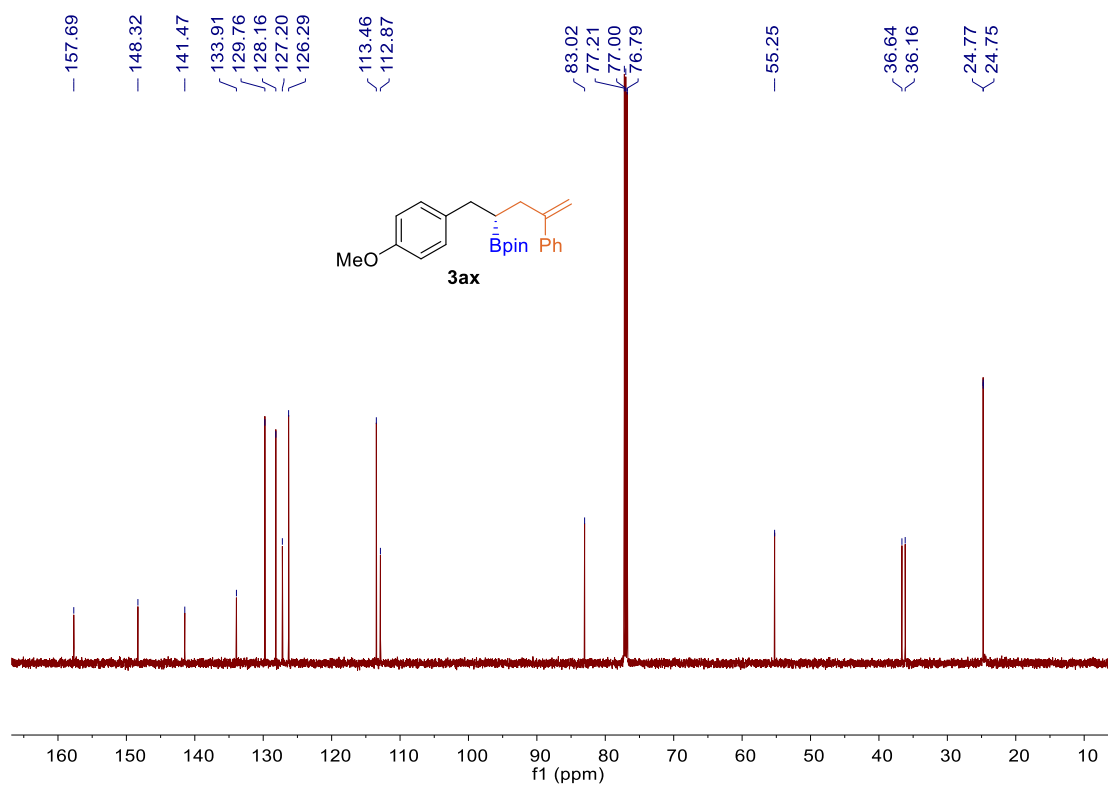


Supplementary Figure 159. ^{11}B NMR spectrum of compound 3av

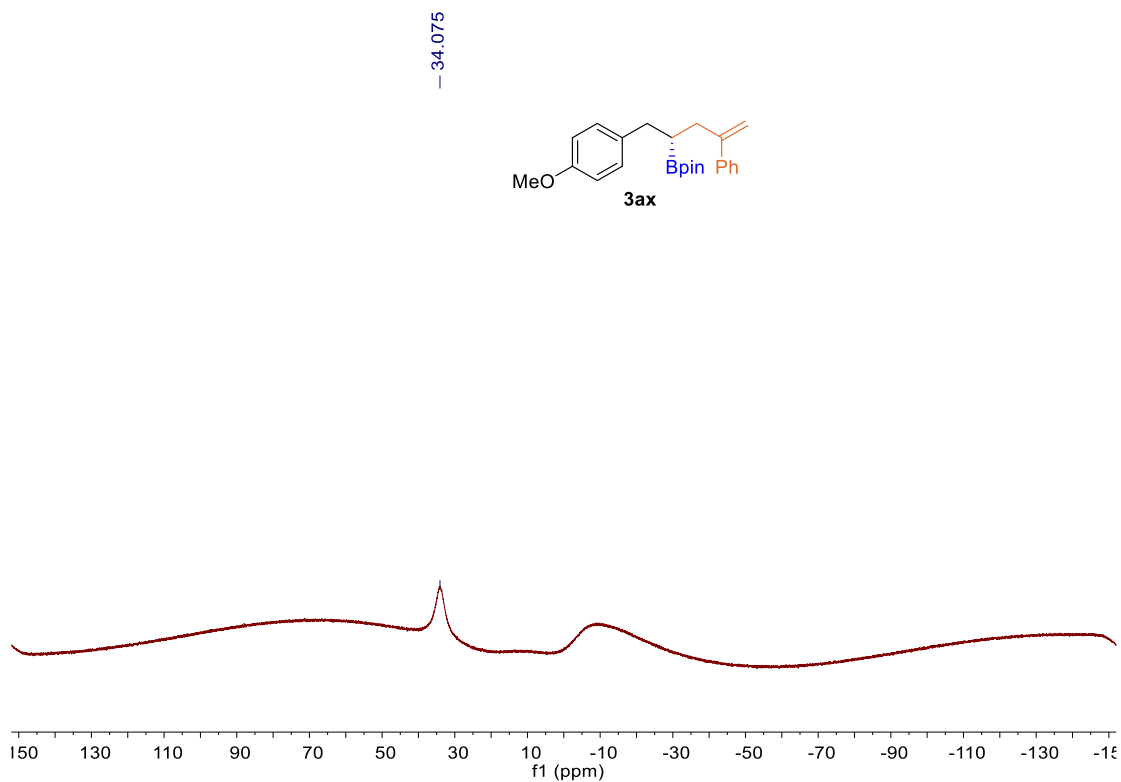




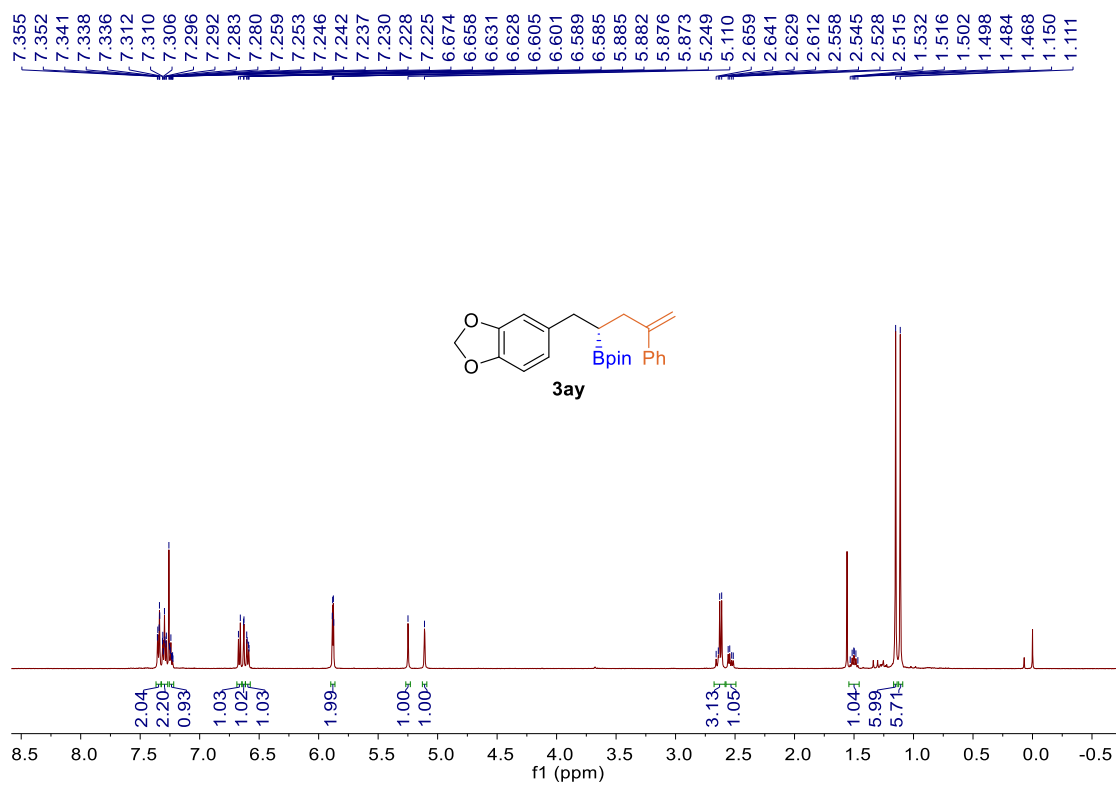
Supplementary Figure 162. ¹H NMR spectrum of compound **3ax**



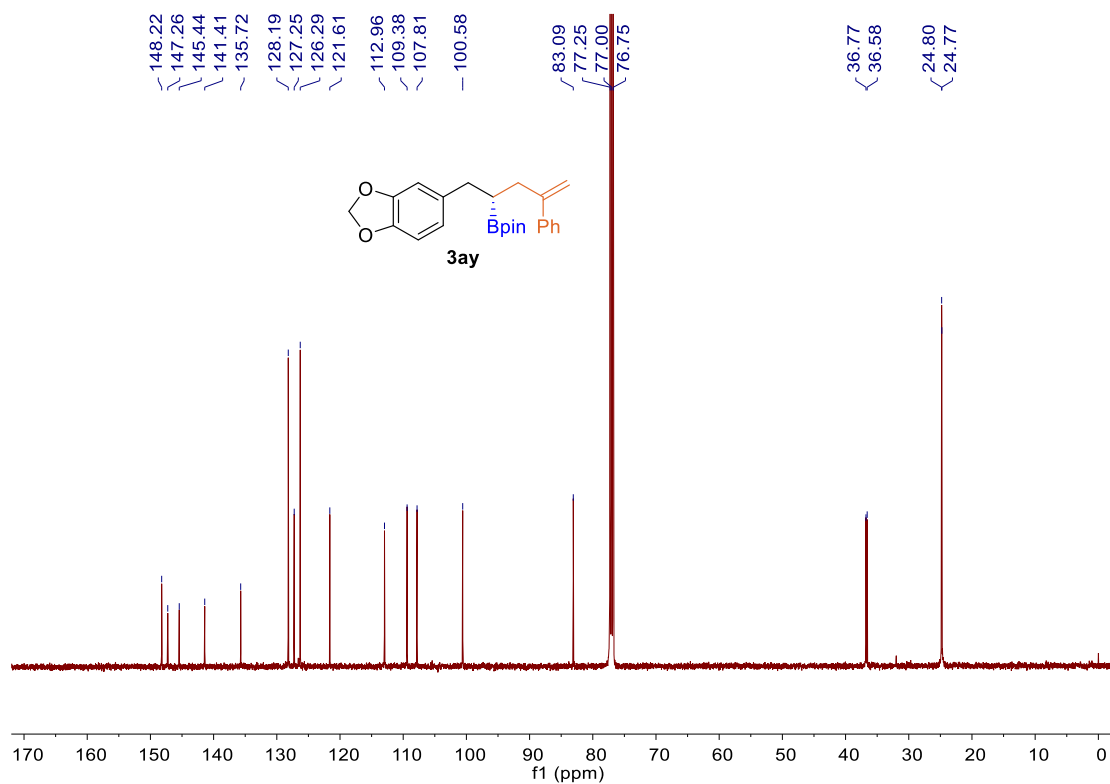
Supplementary Figure 163. ¹³C NMR spectrum of compound **3ax**



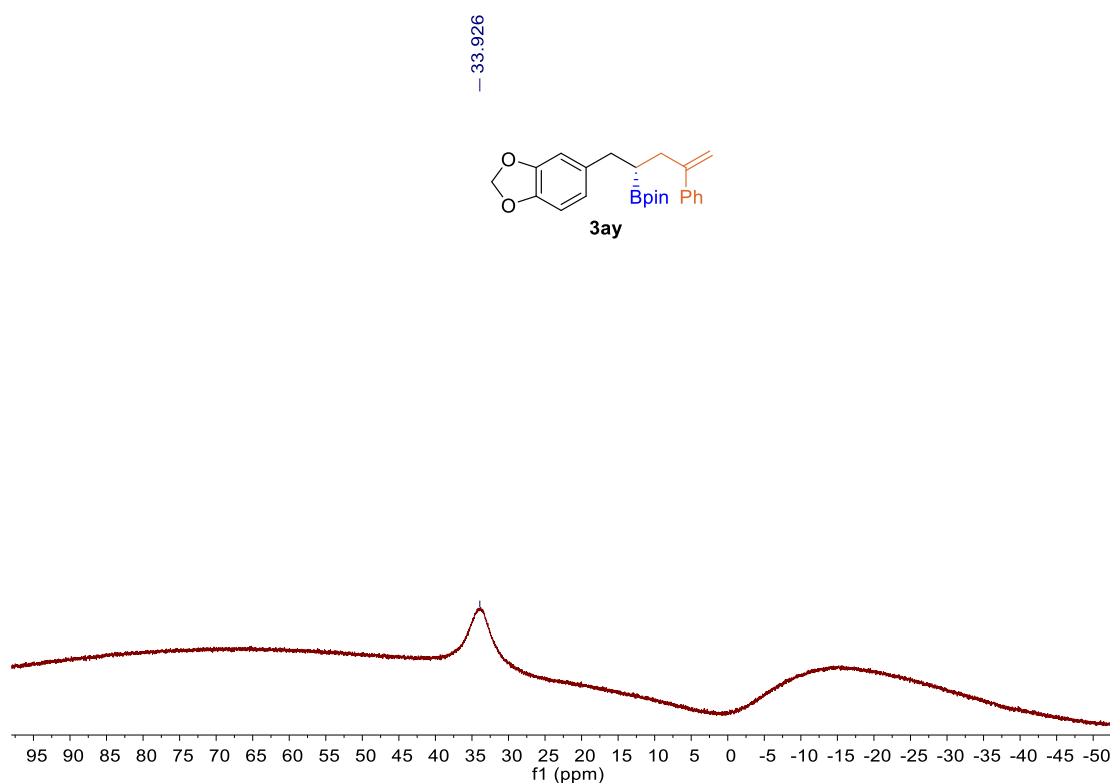
Supplementary Figure 164. ^{11}B NMR spectrum of compound 3ax



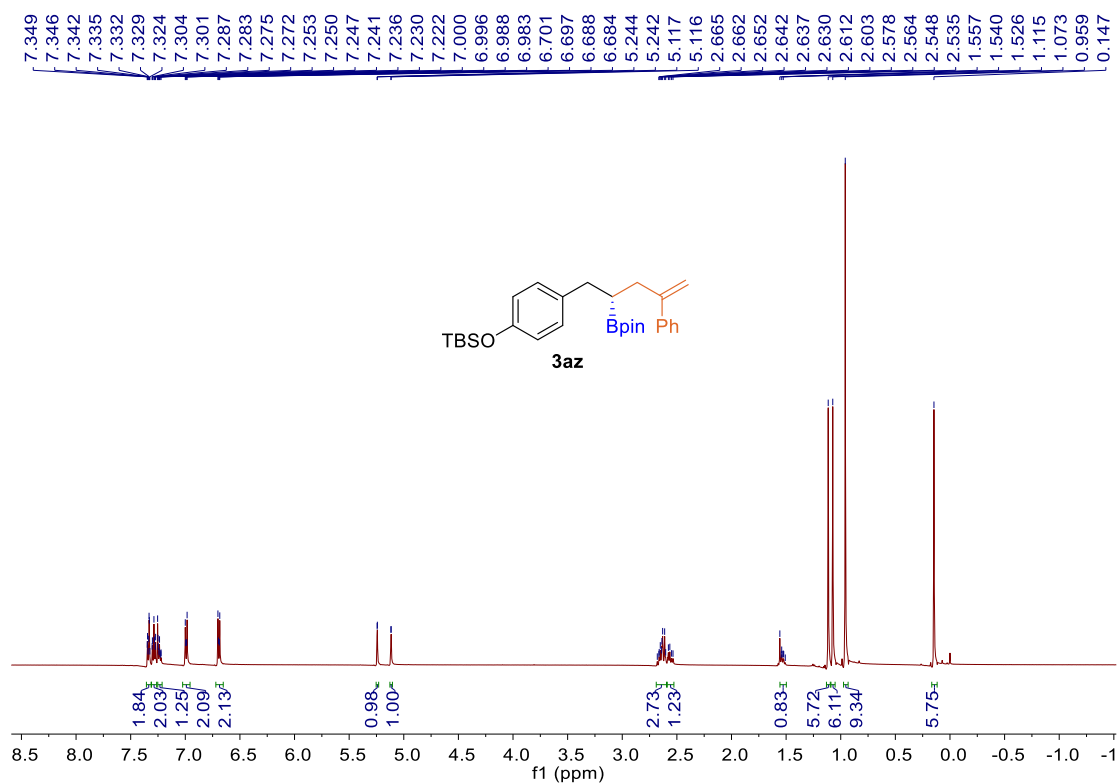
Supplementary Figure 165. ^1H NMR spectrum of compound 3ay



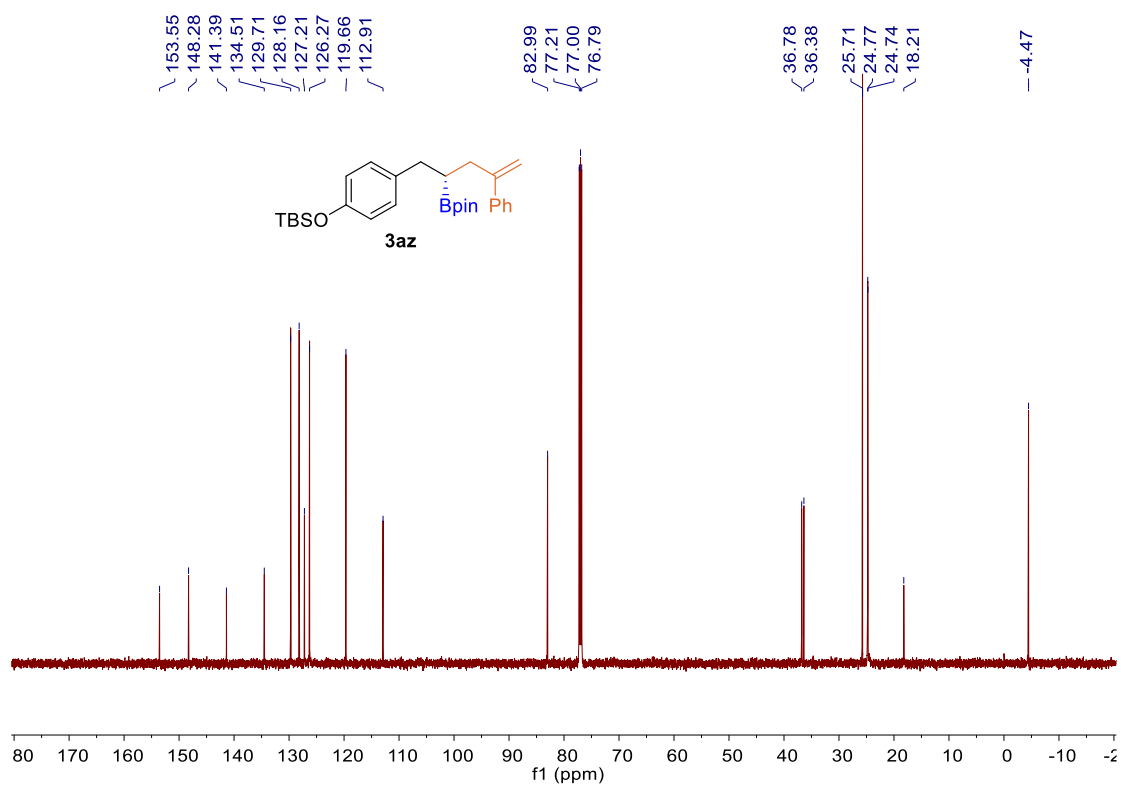
Supplementary Figure 166. ¹³C NMR spectrum of compound 3ay



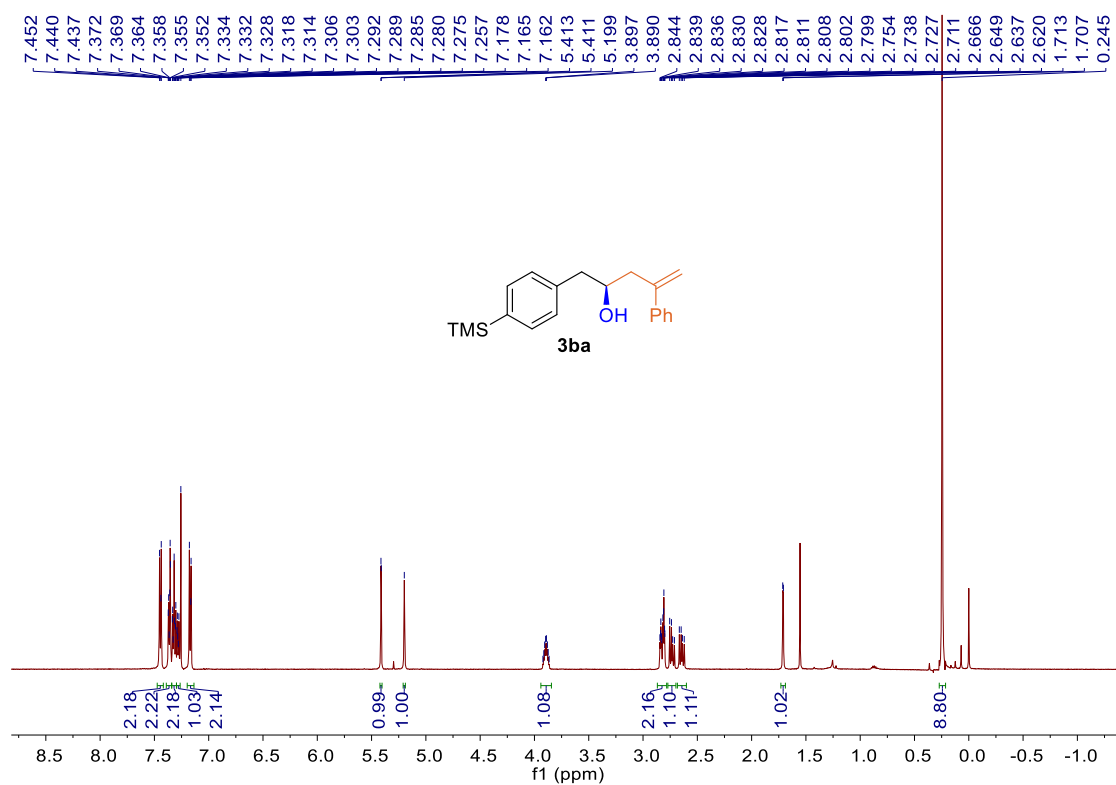
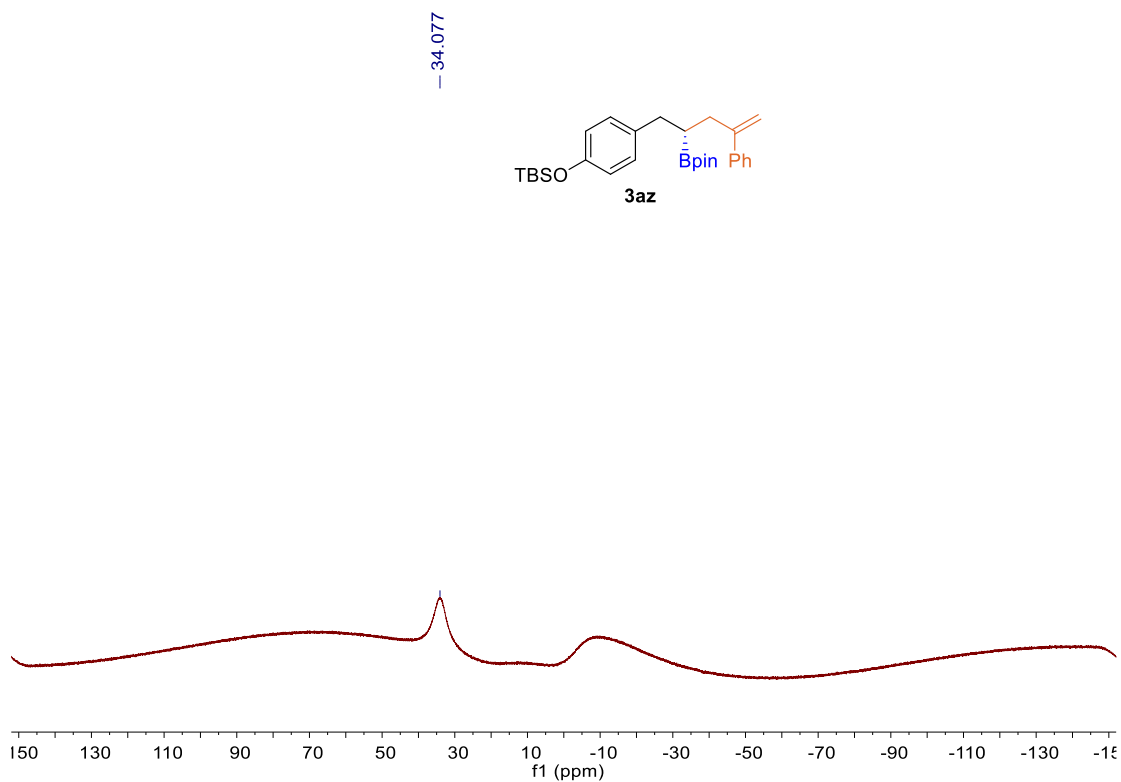
Supplementary Figure 167. ¹¹B NMR spectrum of compound 3ay

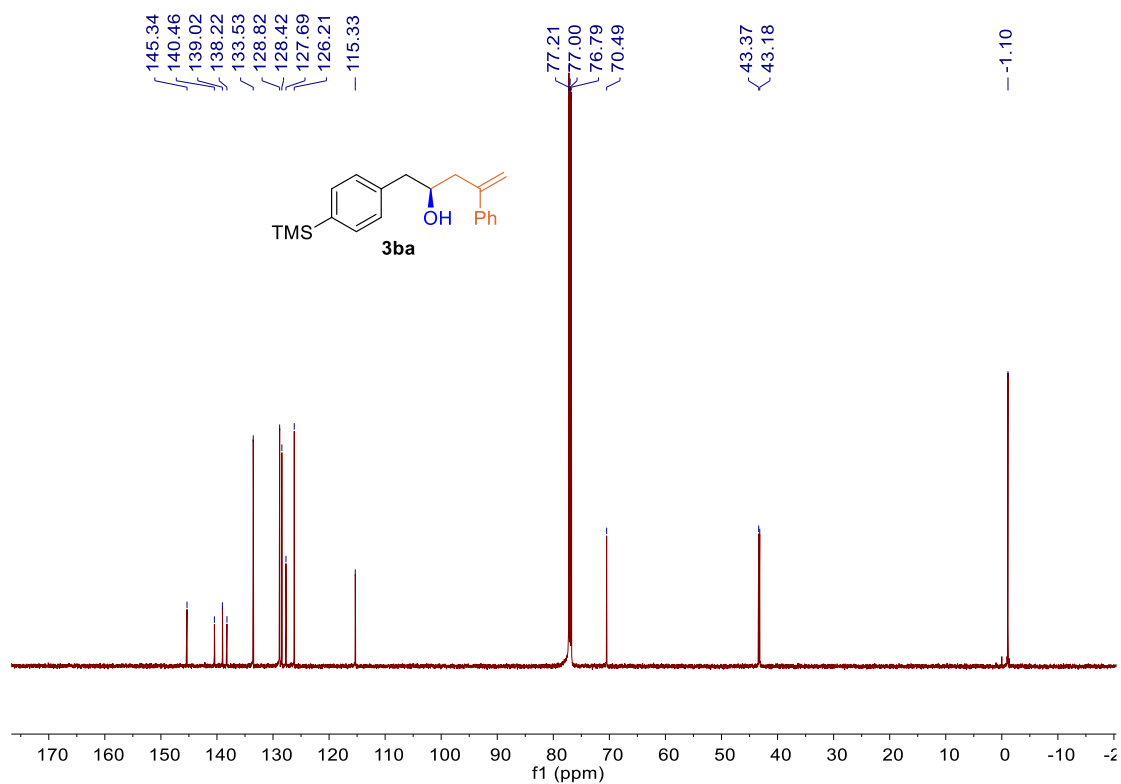


Supplementary Figure 168. ¹H NMR spectrum of compound 3az

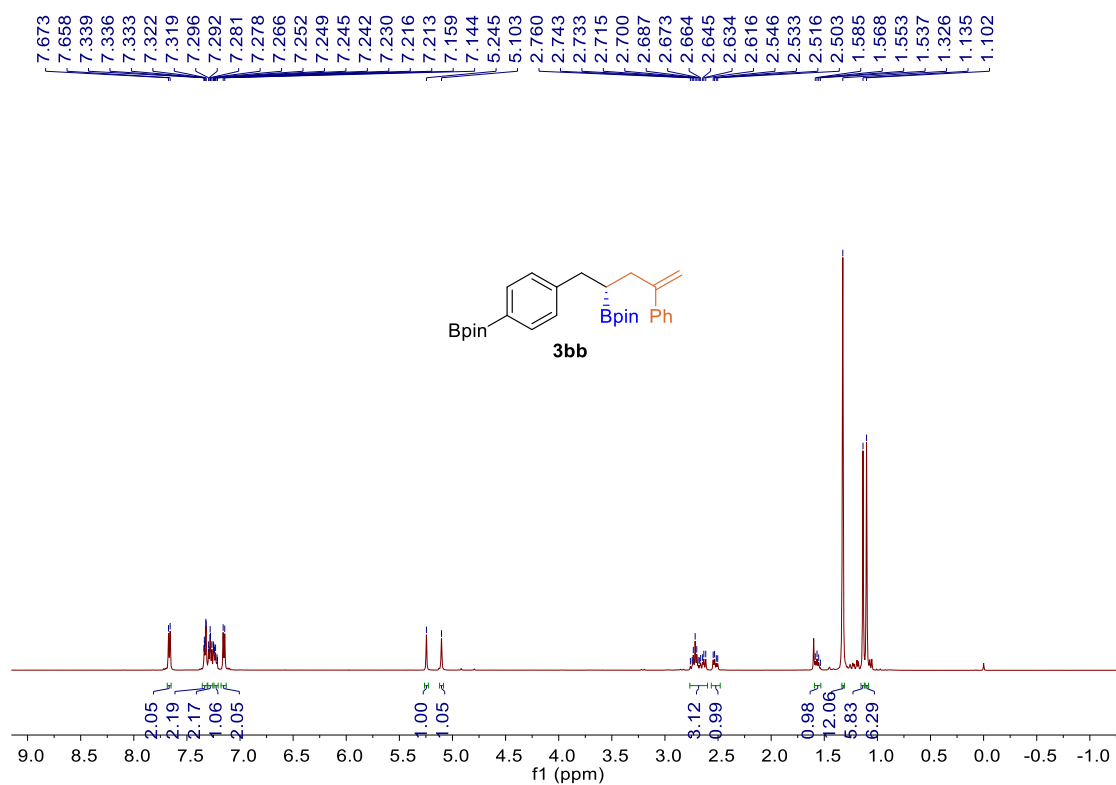


Supplementary Figure 169. ¹³C NMR spectrum of compound 3az

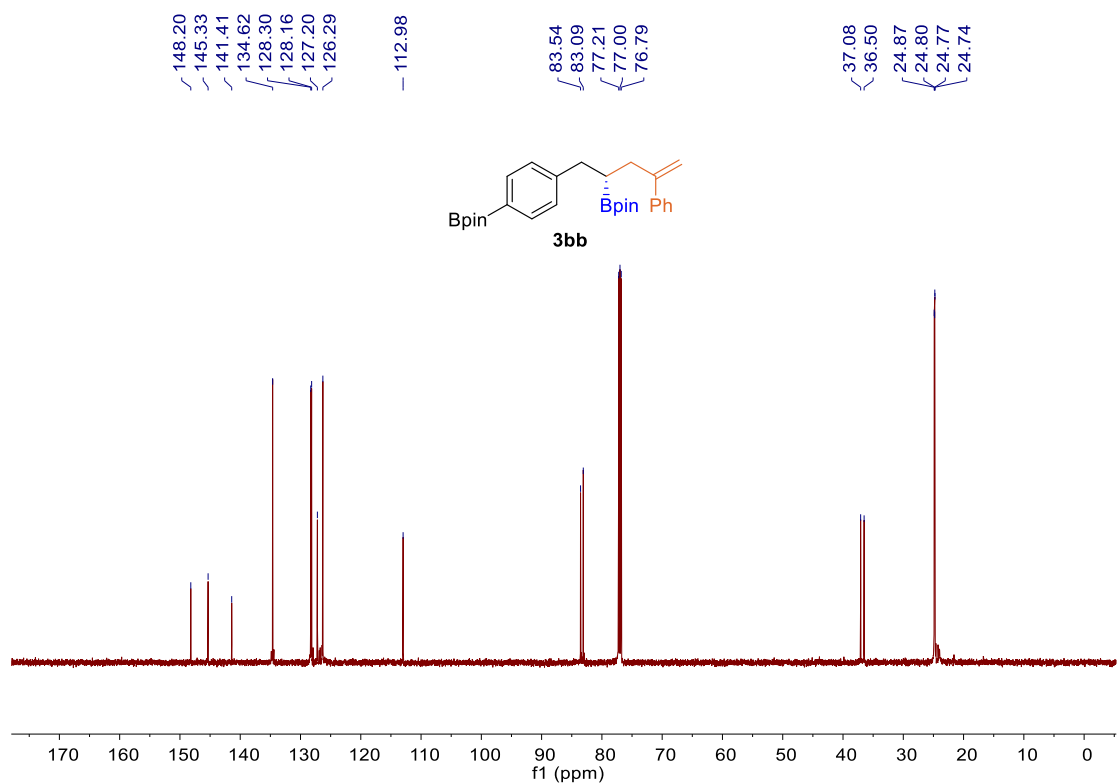




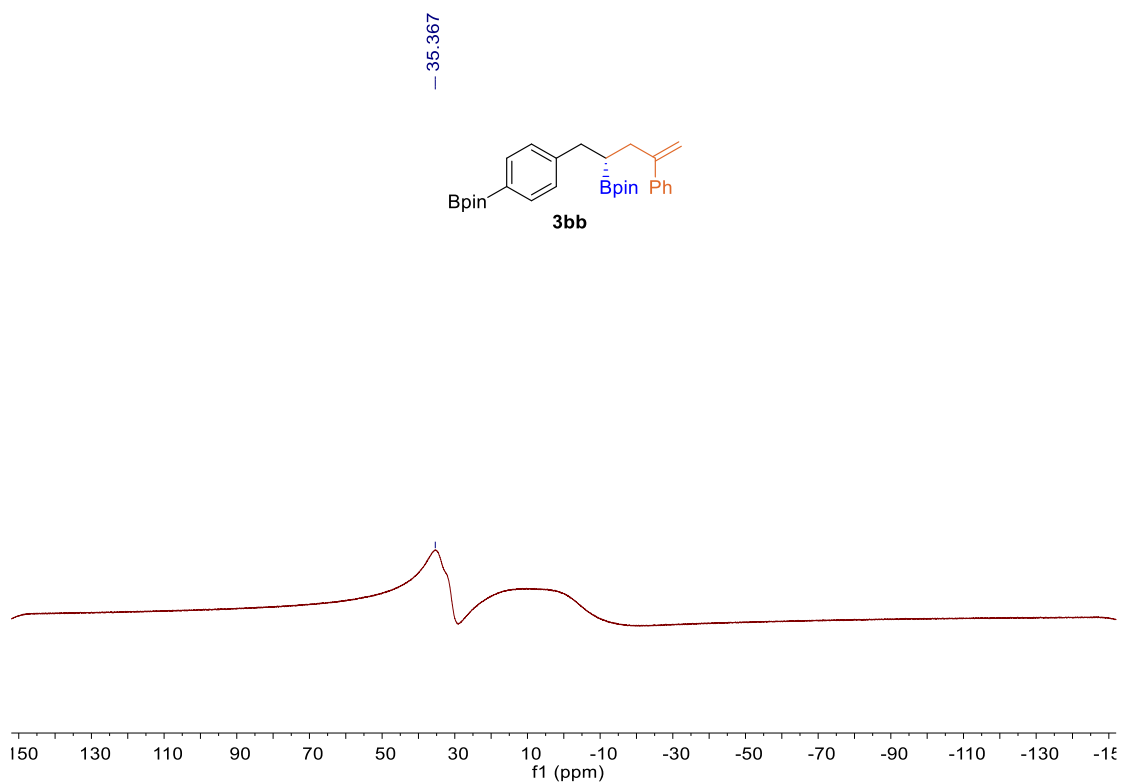
Supplementary Figure 172. ¹³C NMR spectrum of compound 3ba



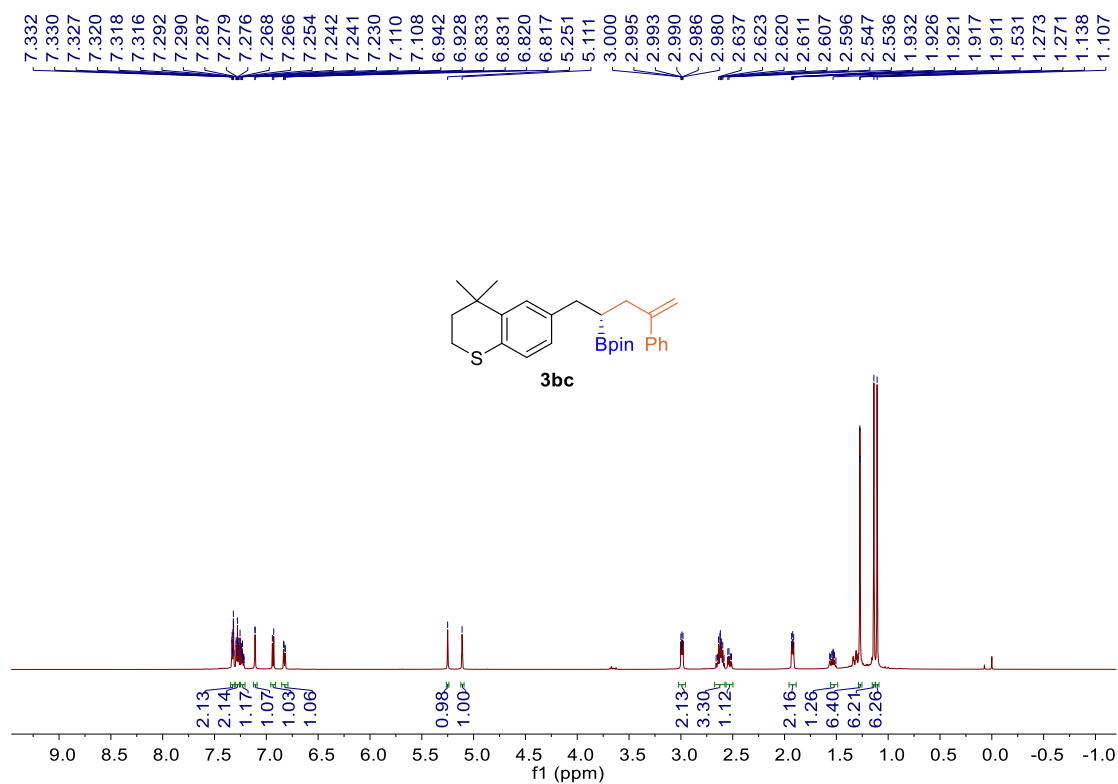
Supplementary Figure 173. ¹H NMR spectrum of compound 3bb



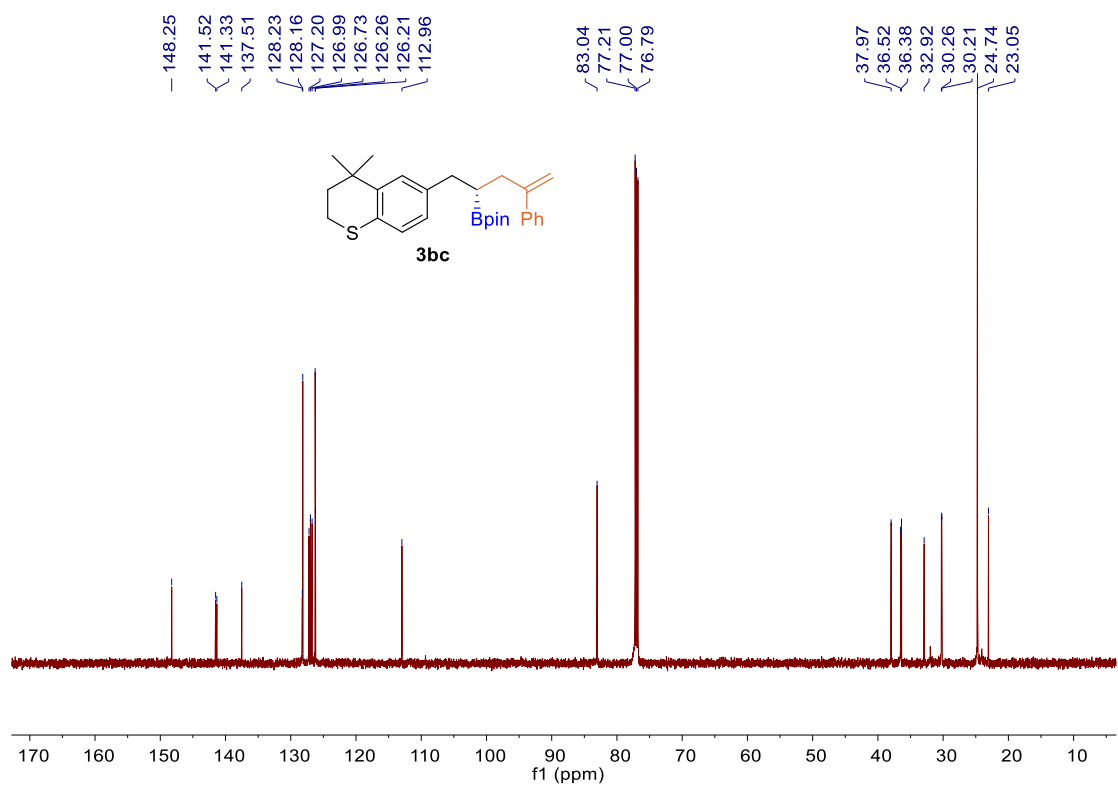
Supplementary Figure 174. ¹³C NMR spectrum of compound 3bb



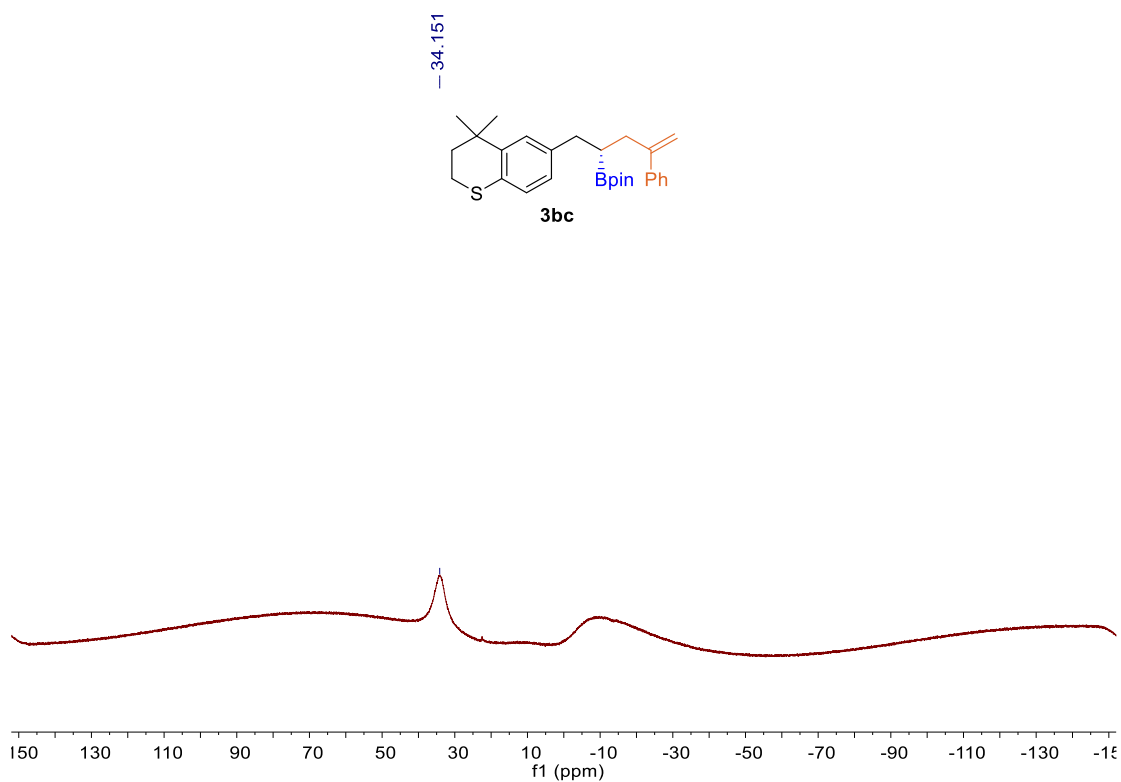
Supplementary Figure 175. ¹¹B NMR spectrum of compound 3bb



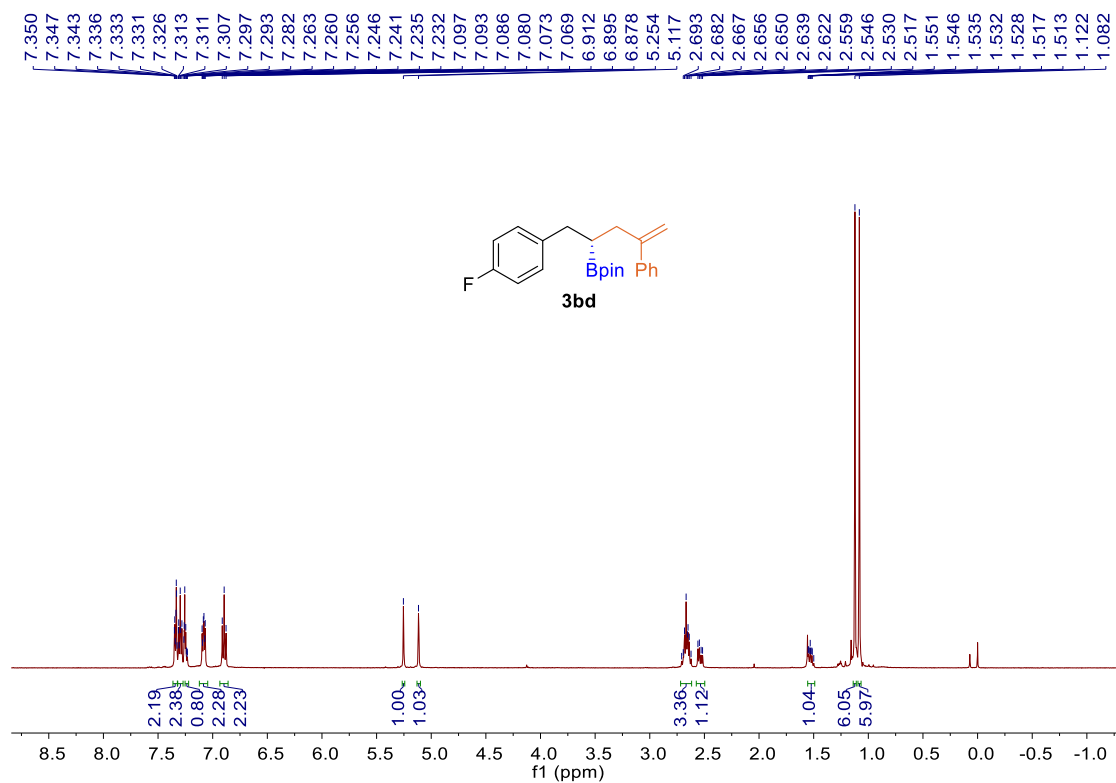
Supplementary Figure 176. ¹H NMR spectrum of compound 3bc



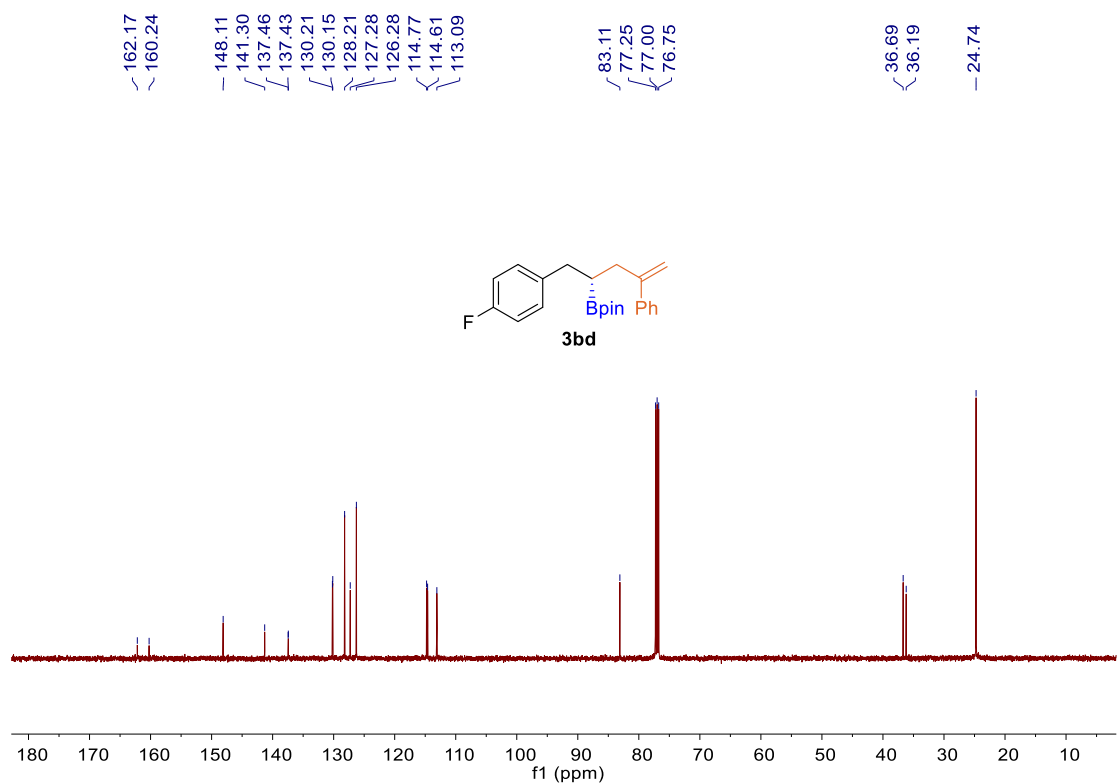
Supplementary Figure 177. ¹³C NMR spectrum of compound 3bc



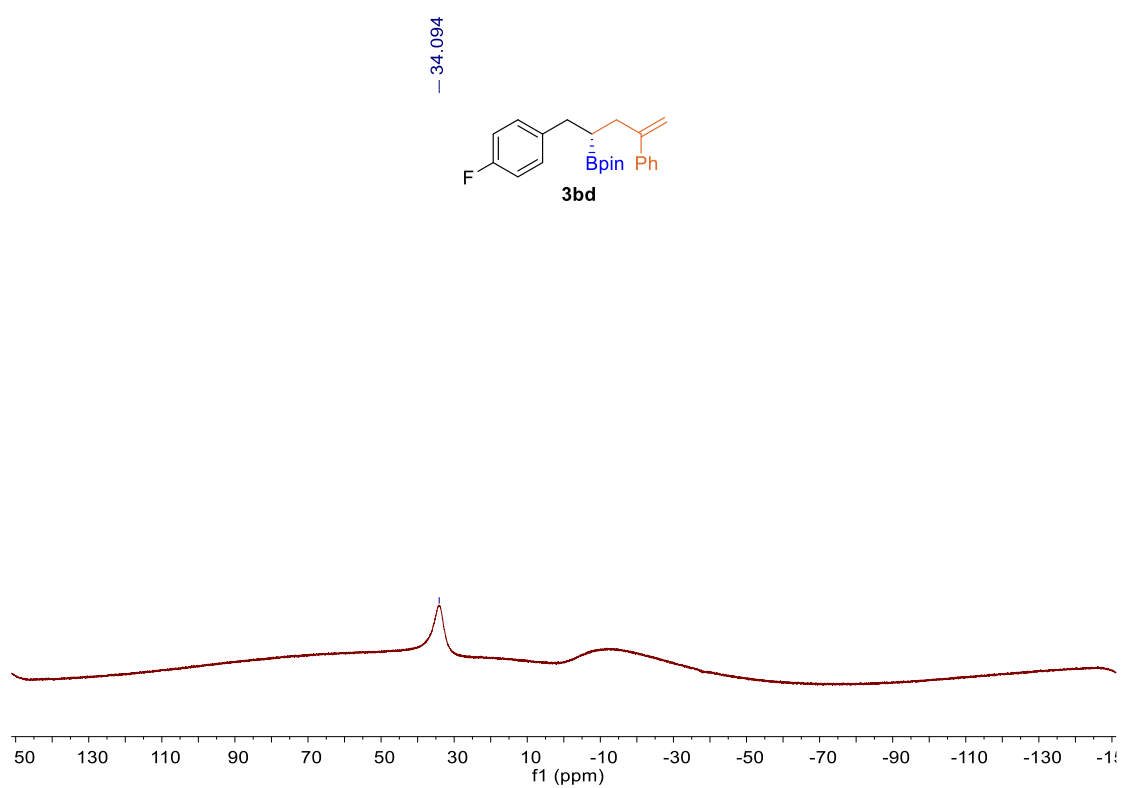
Supplementary Figure 178. ^{11}B NMR spectrum of compound 3bc



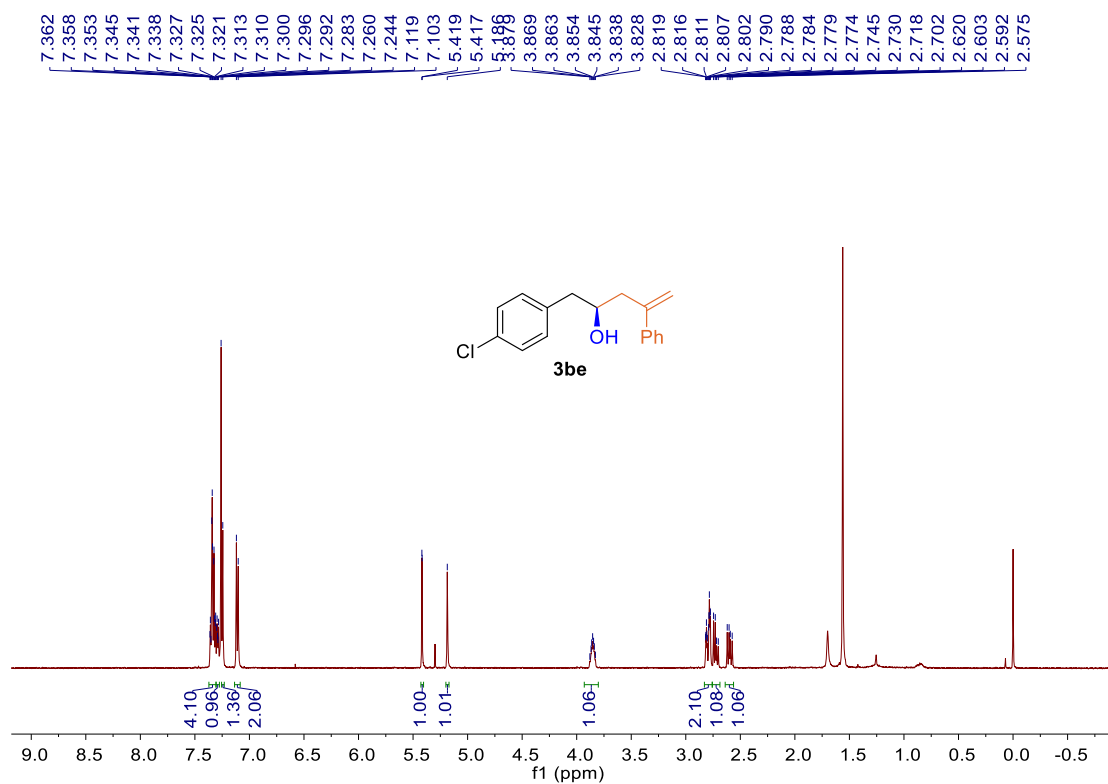
Supplementary Figure 179. ^1H NMR spectrum of compound 3bd



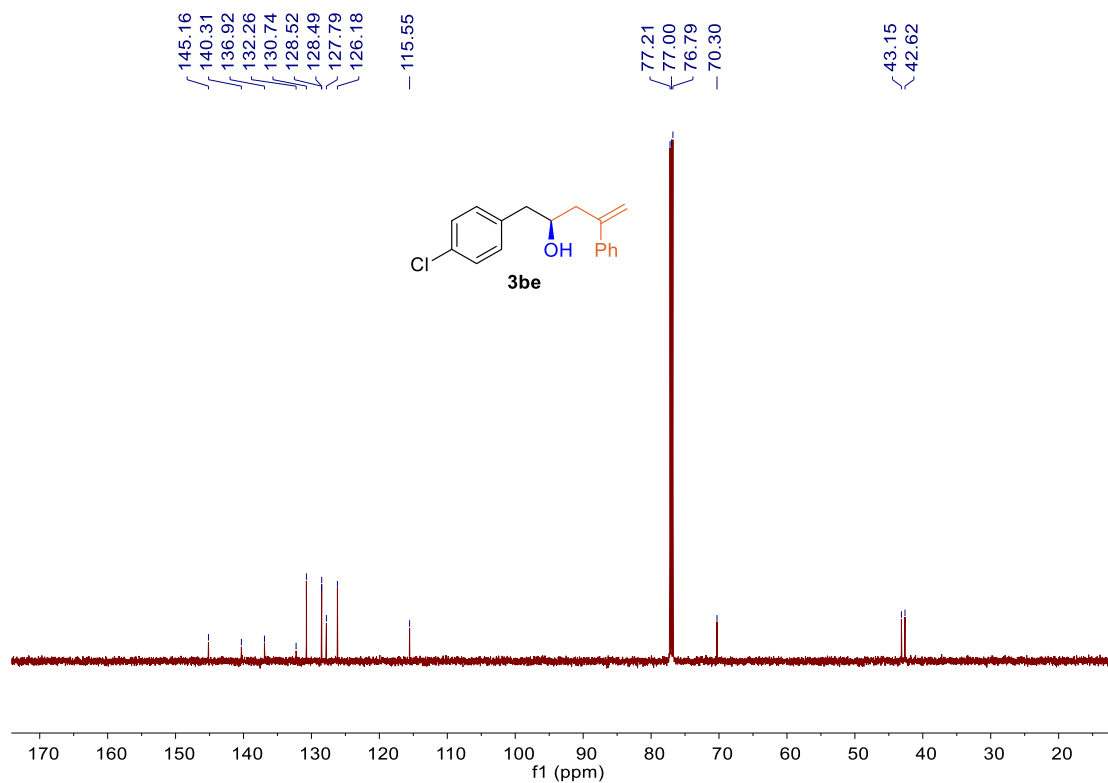
Supplementary Figure 180. ¹³C NMR spectrum of compound 3bd



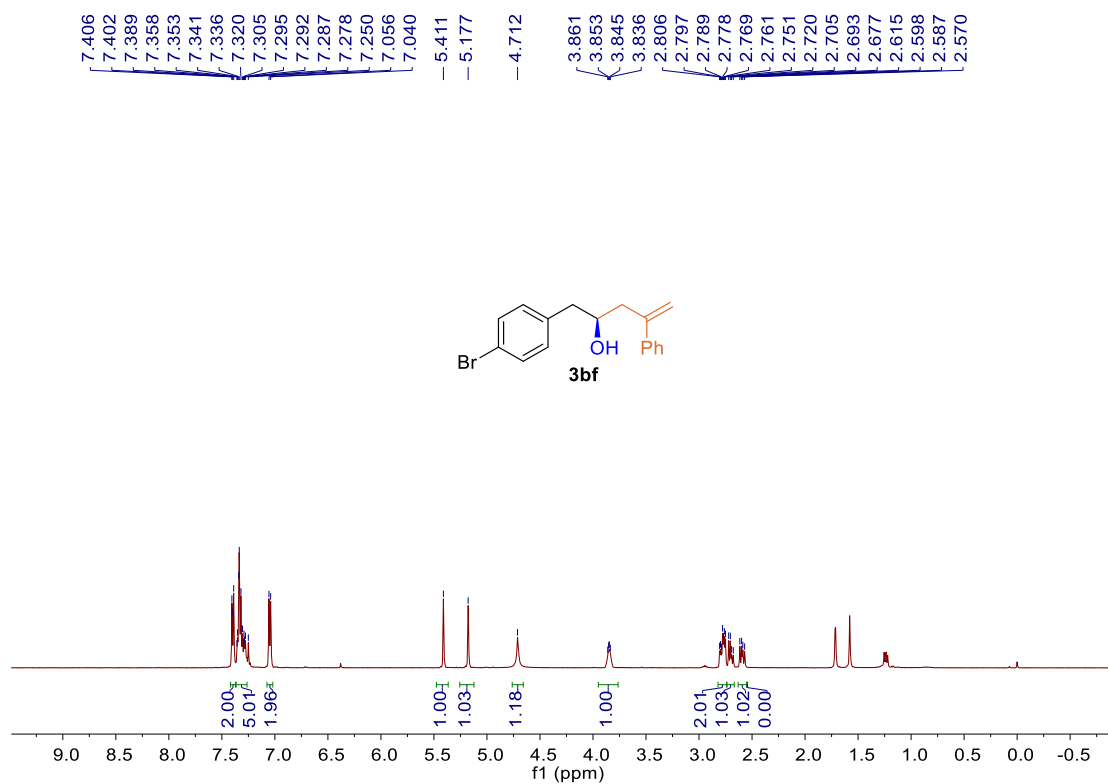
Supplementary Figure 181. ¹¹B NMR spectrum of compound 3bd



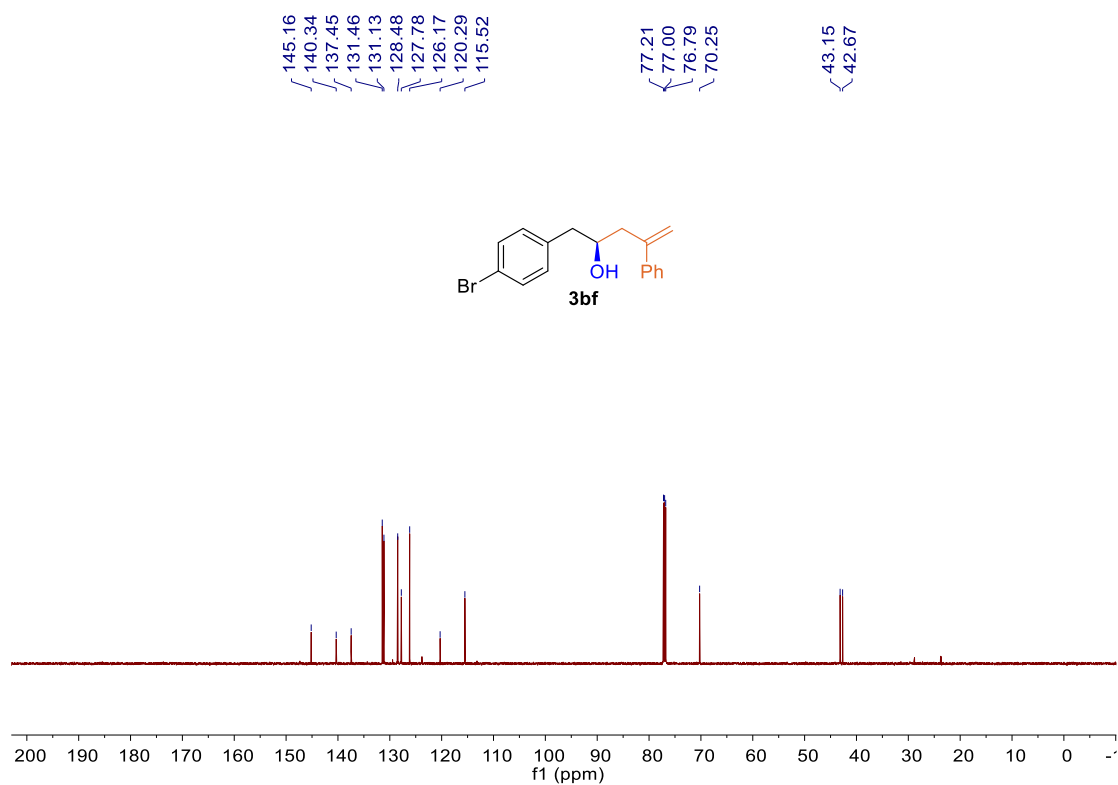
Supplementary Figure 182. ¹H NMR spectrum of compound 3be



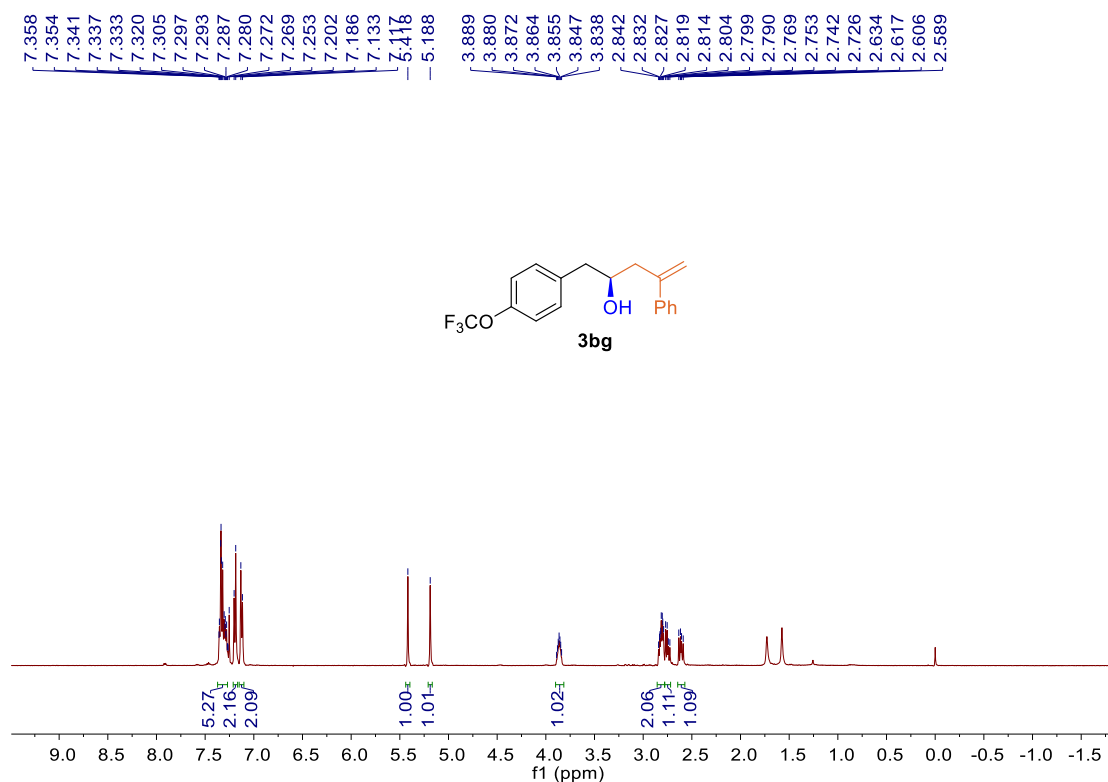
Supplementary Figure 183. ¹³C NMR spectrum of compound 3be



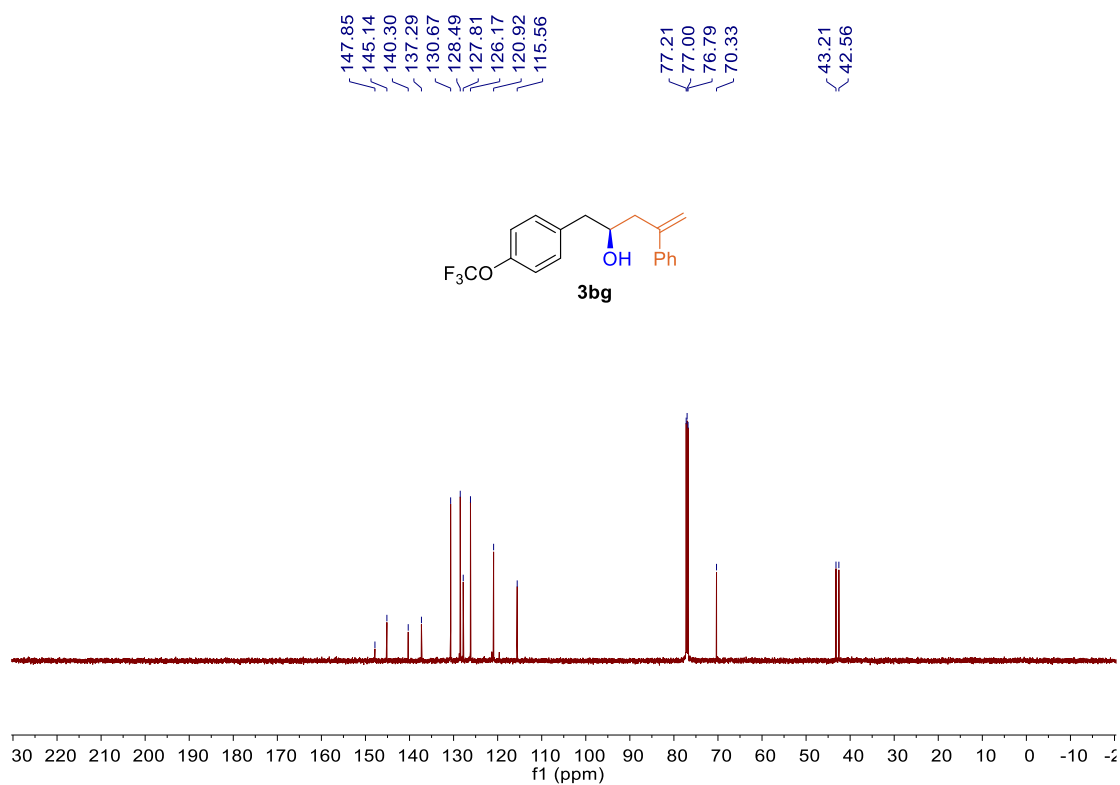
Supplementary Figure 184. ¹H NMR spectrum of compound **3bf**



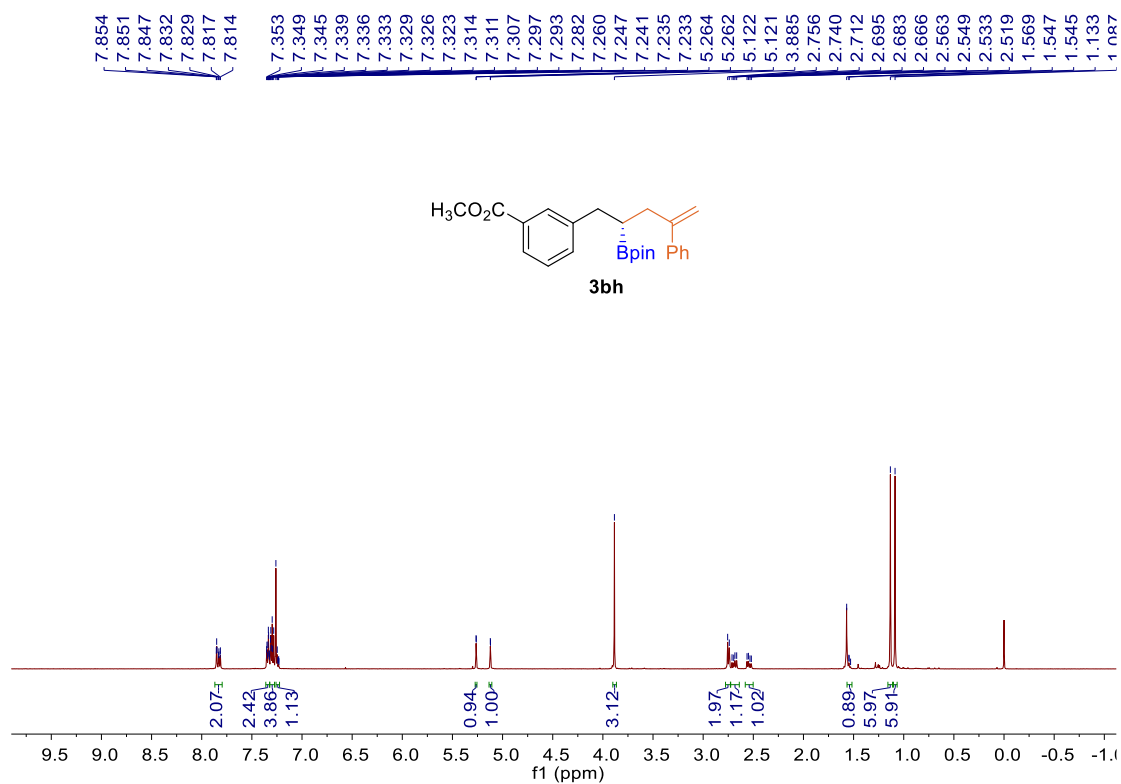
Supplementary Figure 185. ¹³C NMR spectrum of compound **3bf**



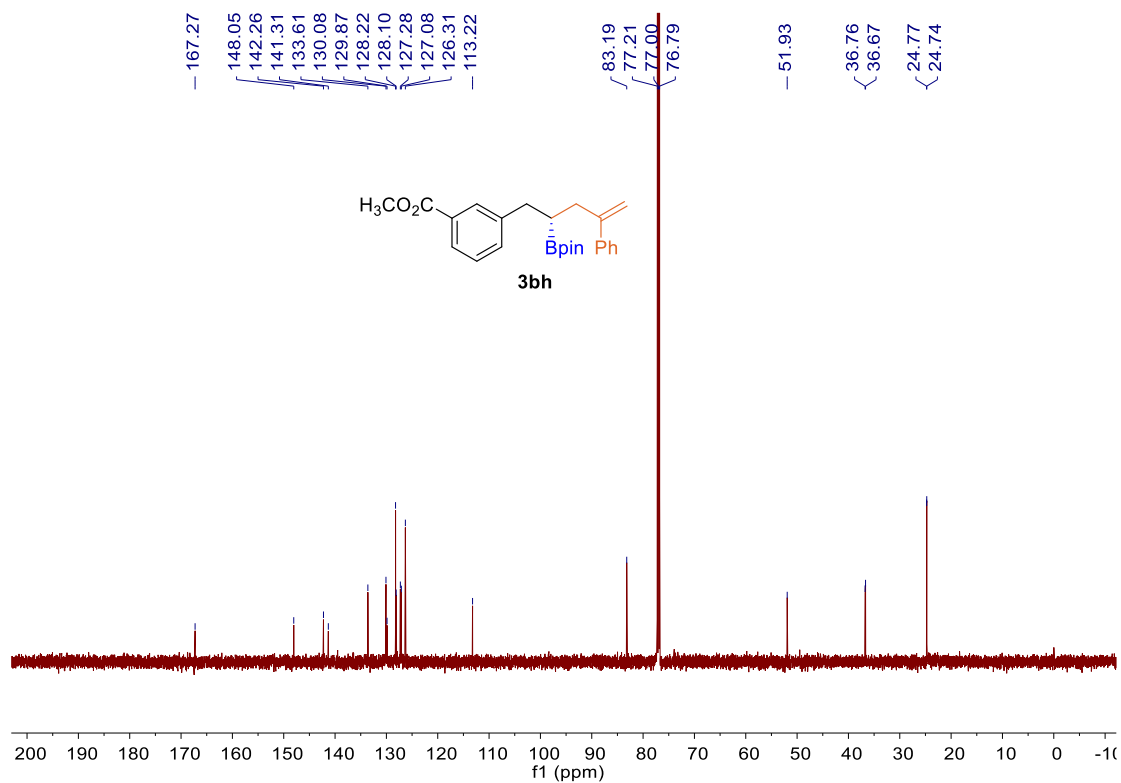
Supplementary Figure 186. ¹H NMR spectrum of compound 3bg



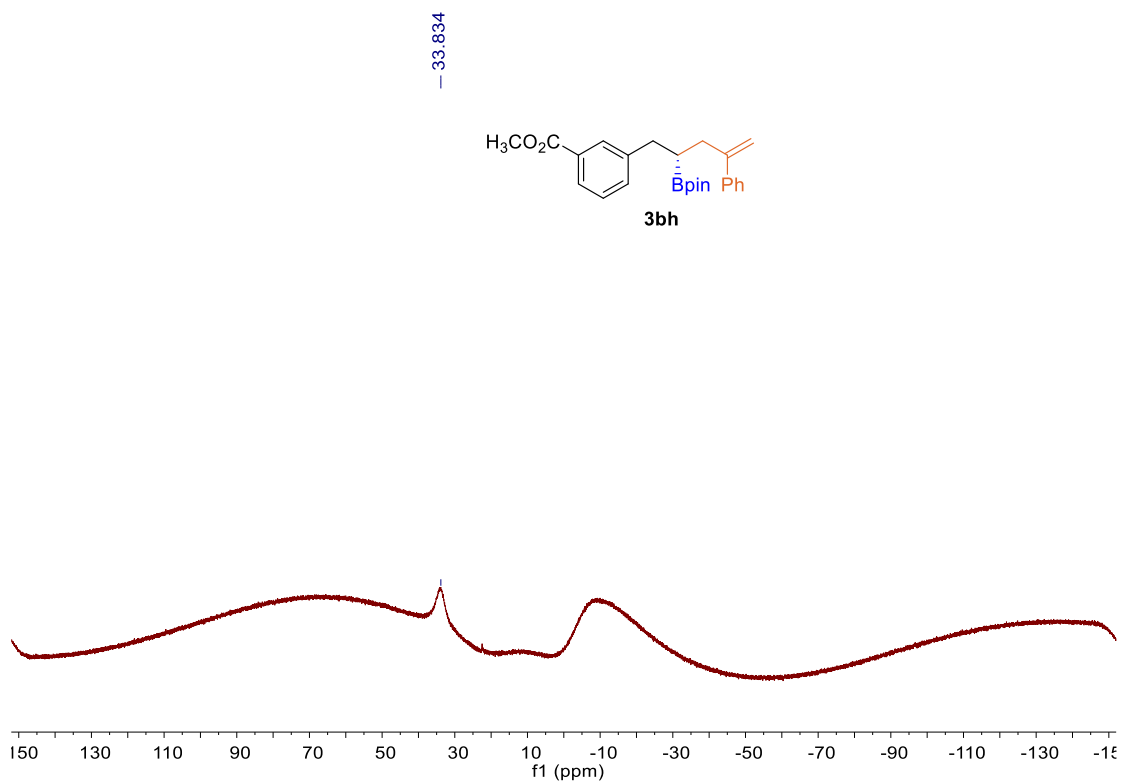
Supplementary Figure 187. ¹³C NMR spectrum of compound 3bg



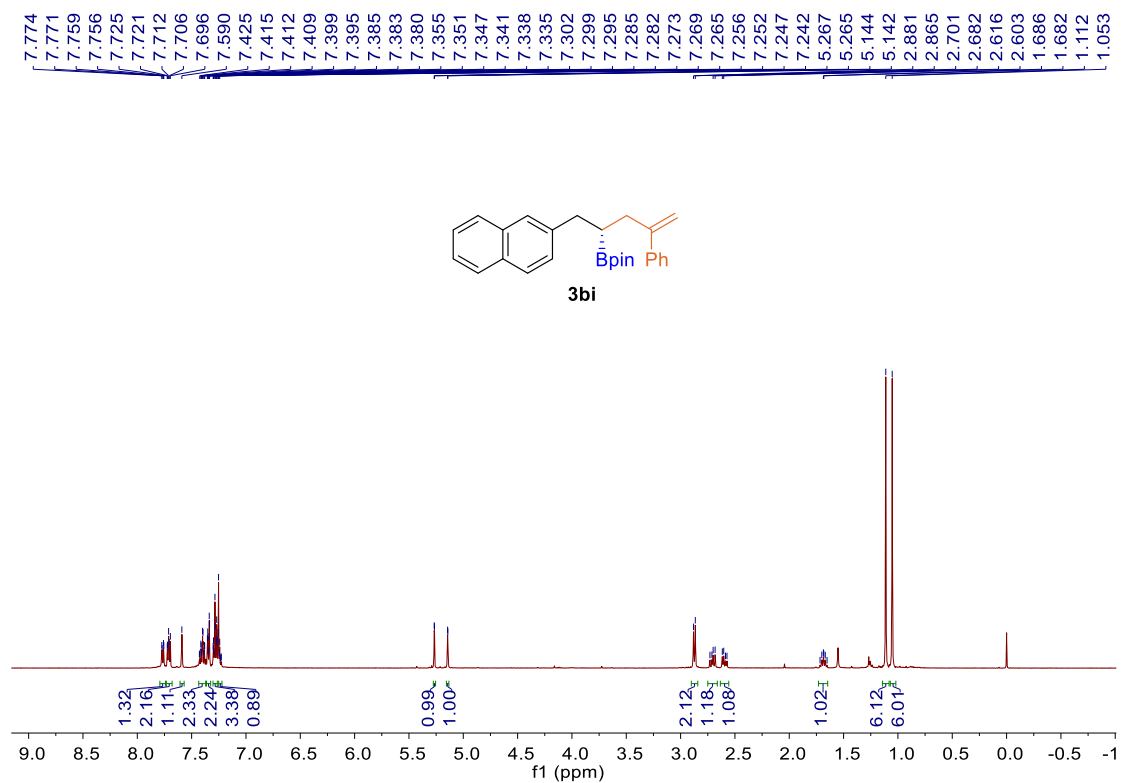
Supplementary Figure 188. ¹H NMR spectrum of compound 3bh



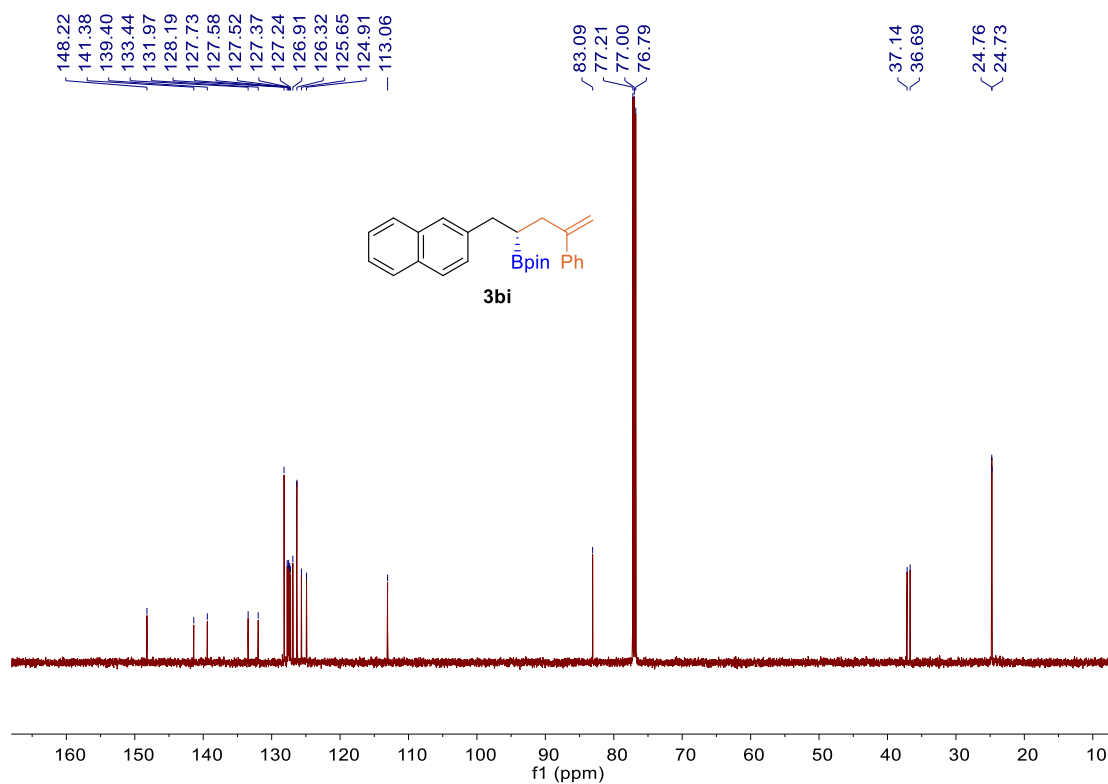
Supplementary Figure 189. ¹³C NMR spectrum of compound 3bh



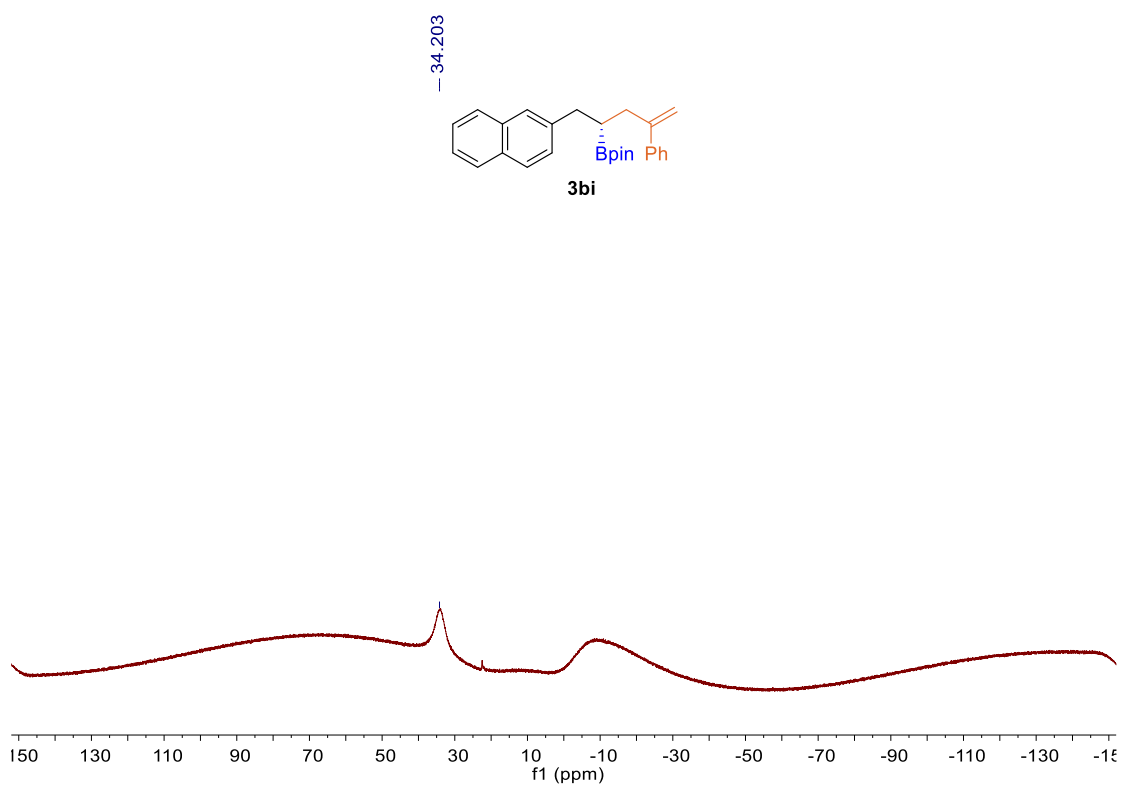
Supplementary Figure 190. ^{11}B NMR spectrum of compound 3bh



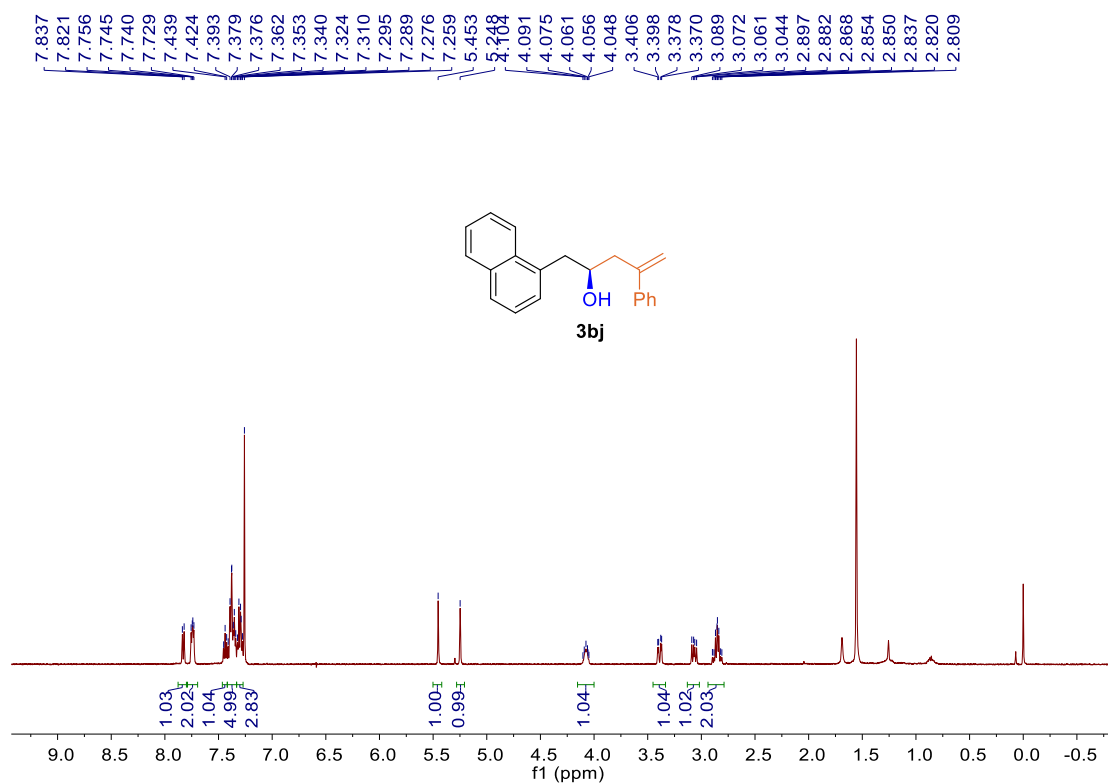
Supplementary Figure 191. ^1H NMR spectrum of compound 3bi



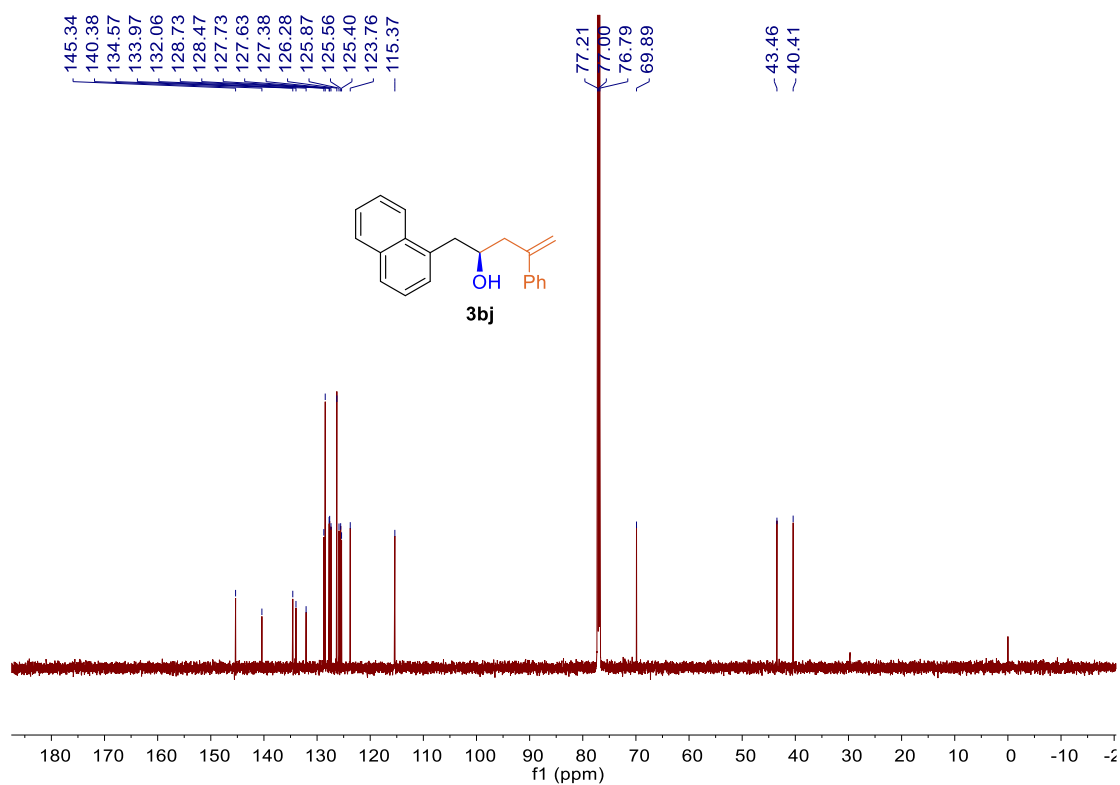
Supplementary Figure 192. ¹³C NMR spectrum of compound 3bi



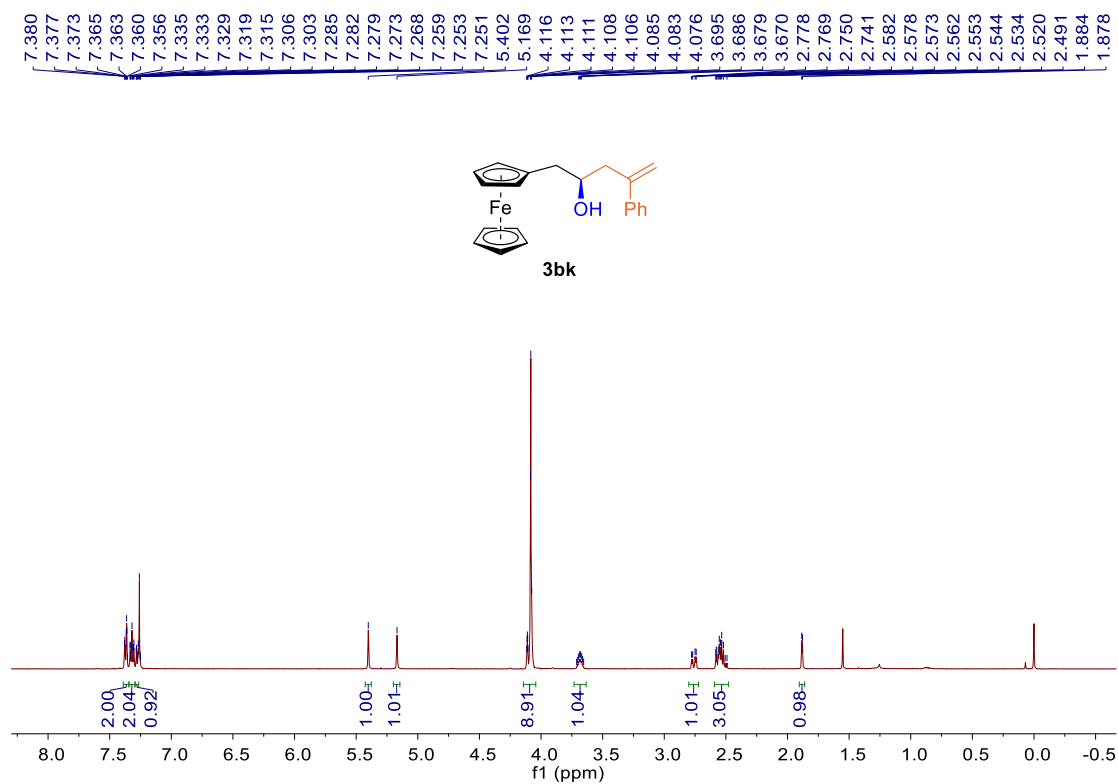
Supplementary Figure 193. ¹¹B NMR spectrum of compound 3bi



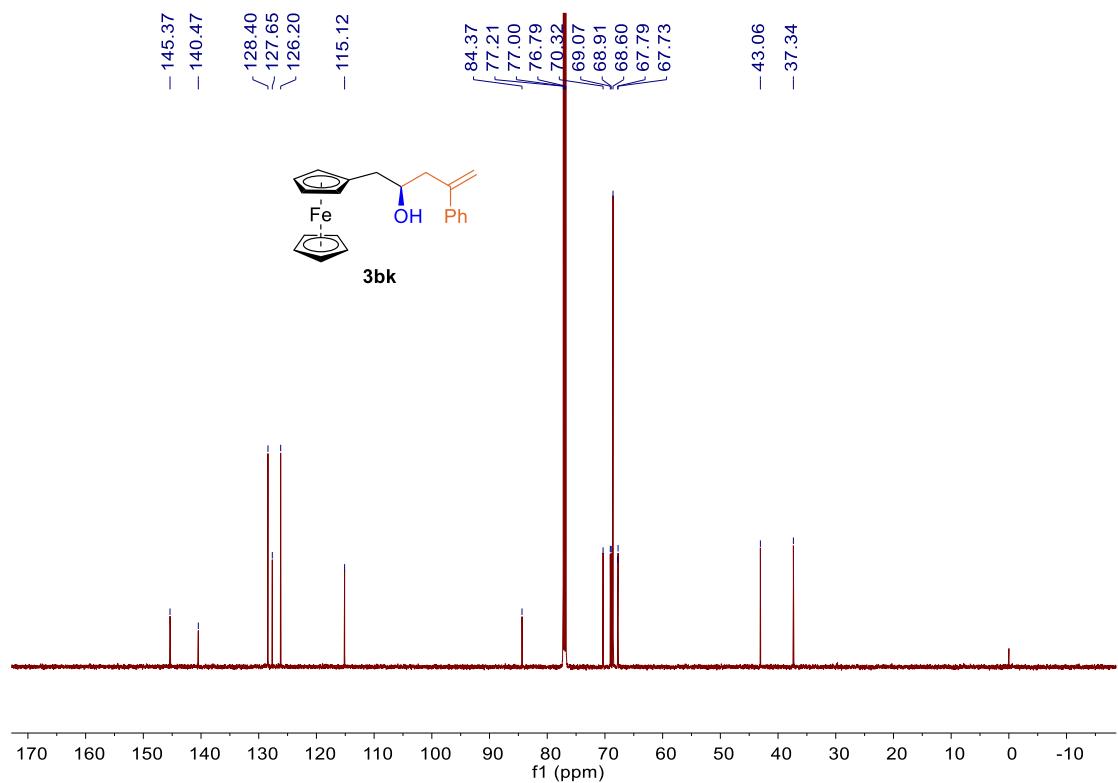
Supplementary Figure 194. ¹H NMR spectrum of compound 3bj



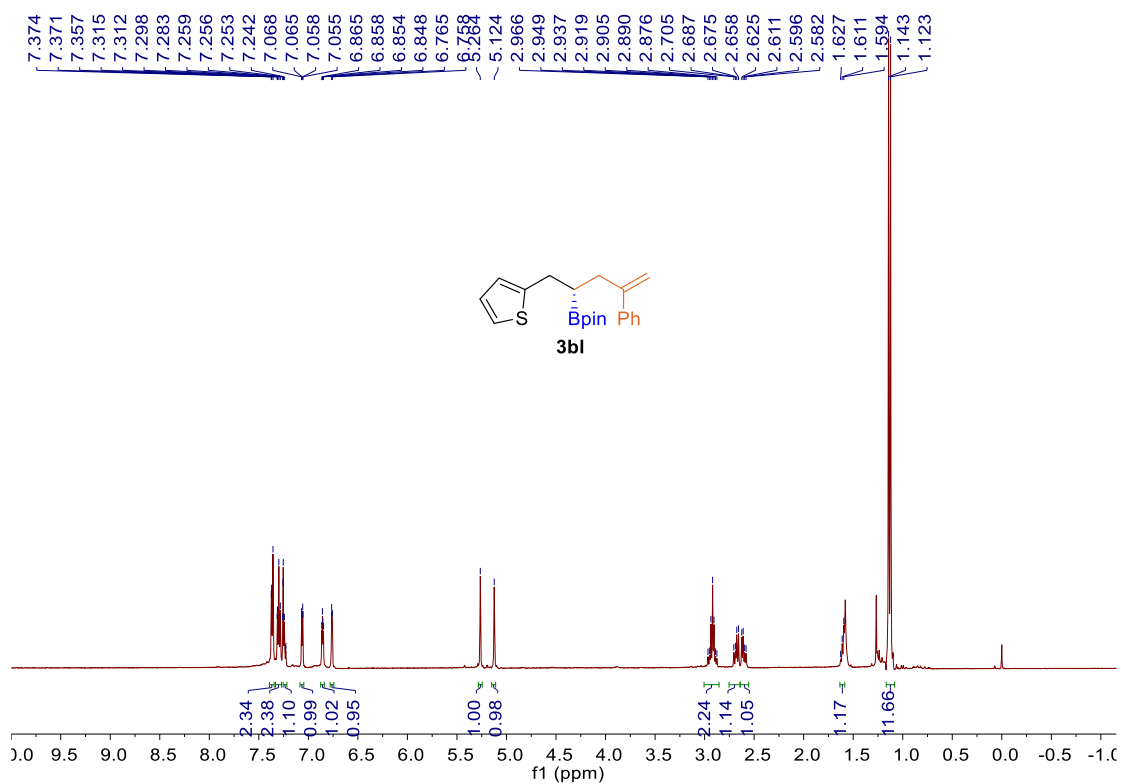
Supplementary Figure 195. ¹³C NMR spectrum of compound 3bj



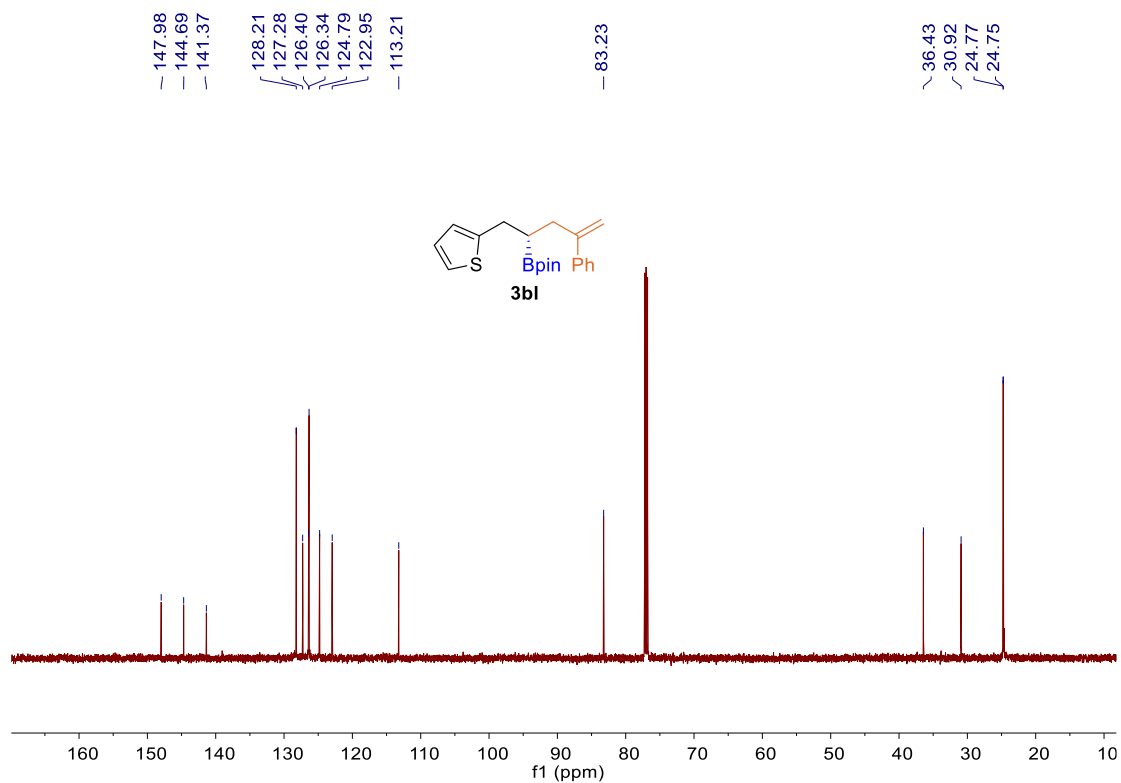
Supplementary Figure 196. ¹H NMR spectrum of compound 3bk



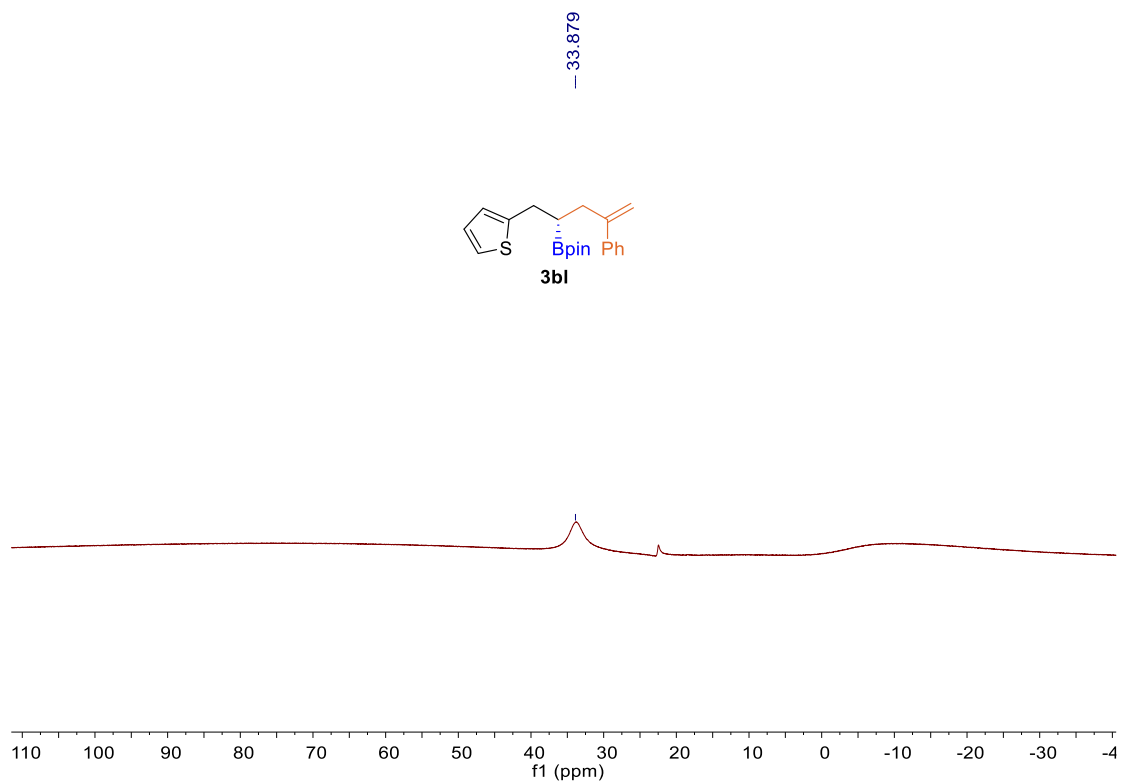
Supplementary Figure 197. ¹³C NMR spectrum of compound 3bk



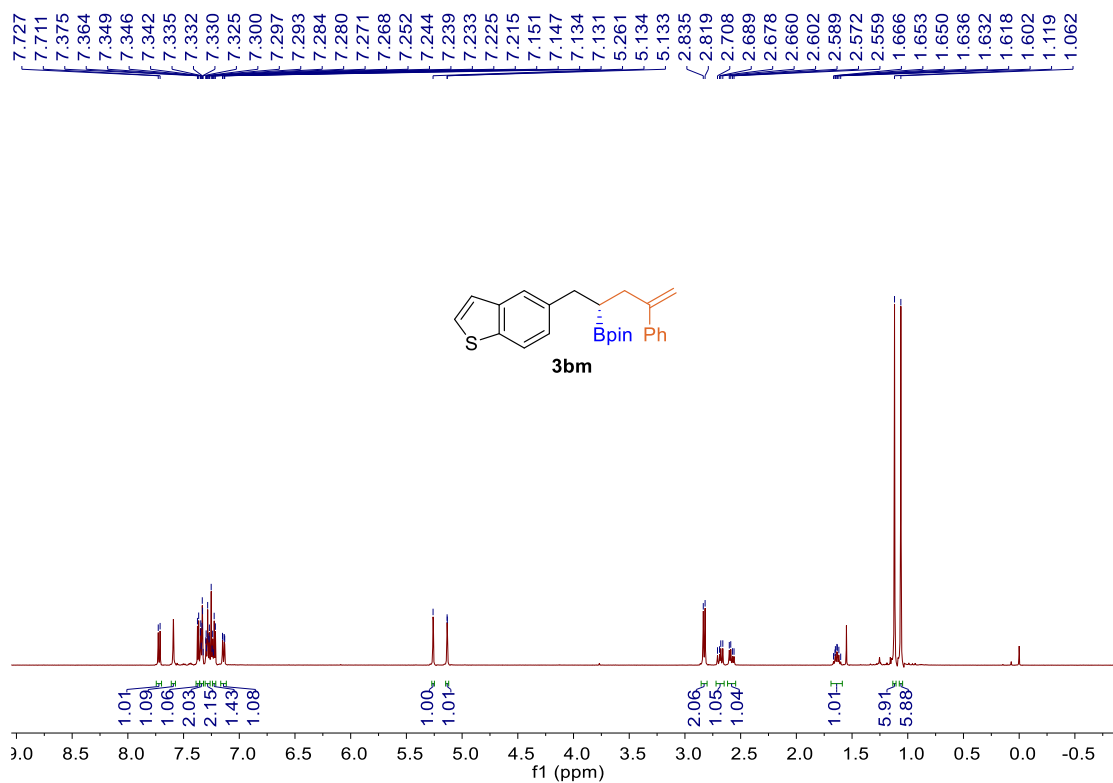
Supplementary Figure 198. ¹H NMR spectrum of compound 3bl



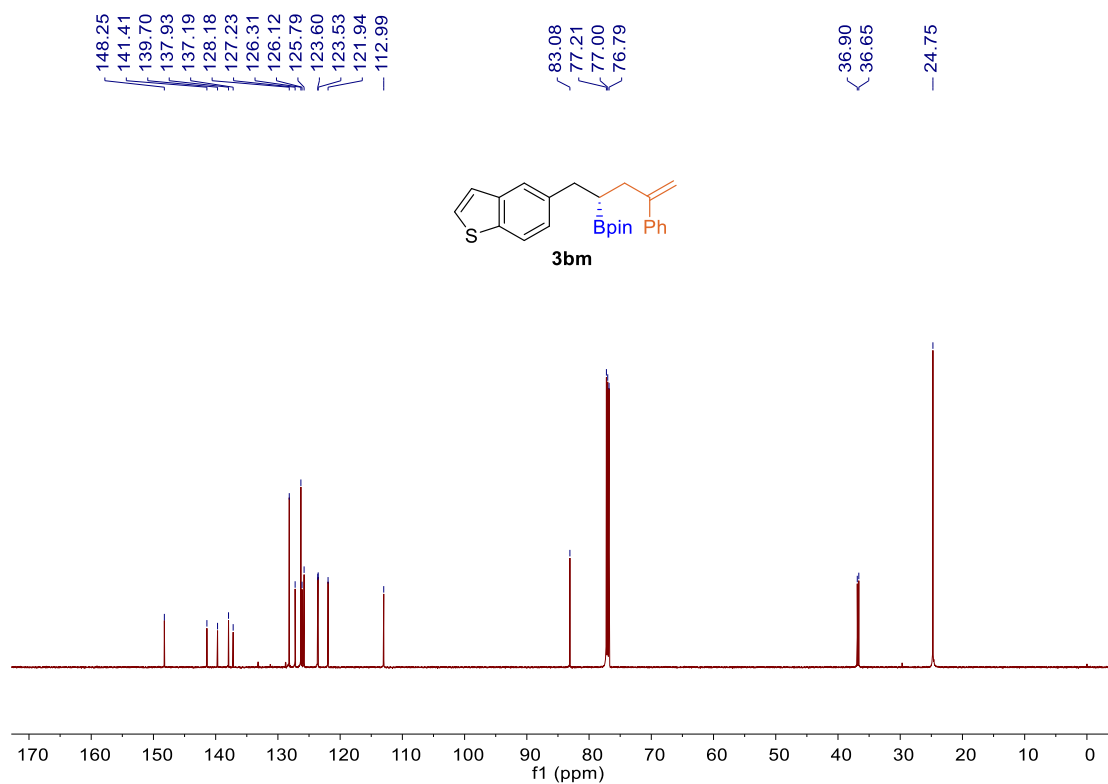
Supplementary Figure 199. ¹³C NMR spectrum of compound 3bl



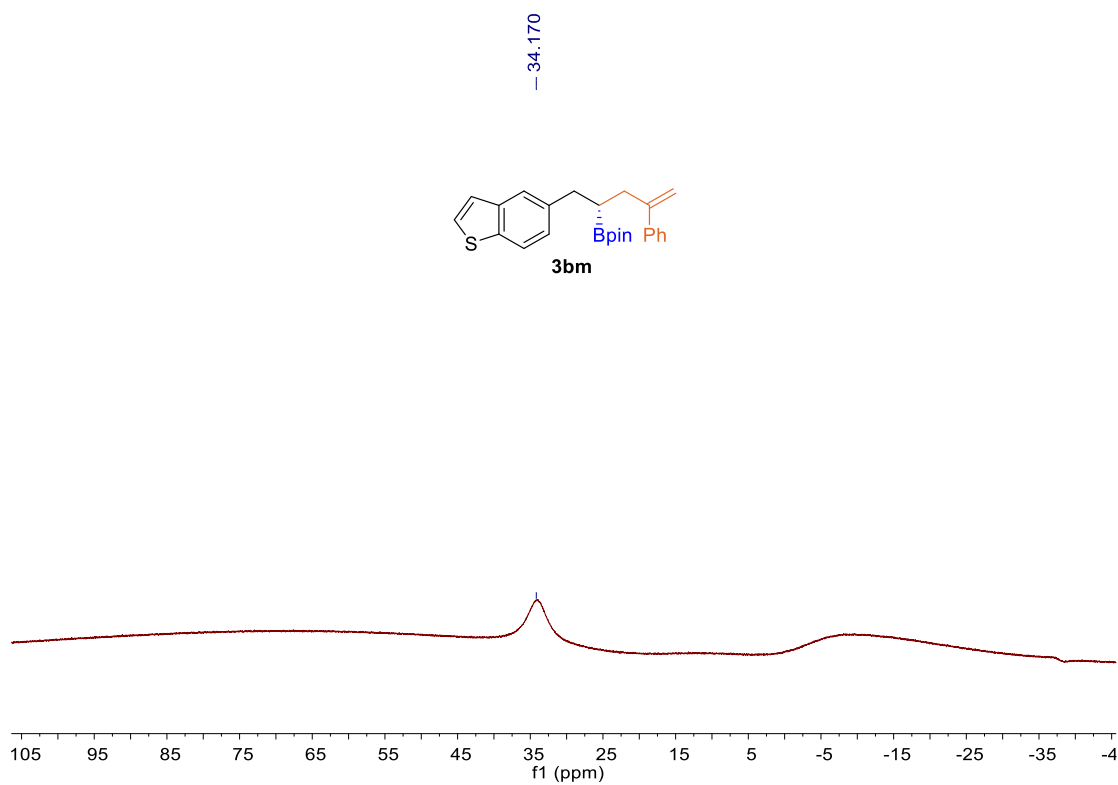
Supplementary Figure 200. ^{11}B NMR spectrum of compound 3bl



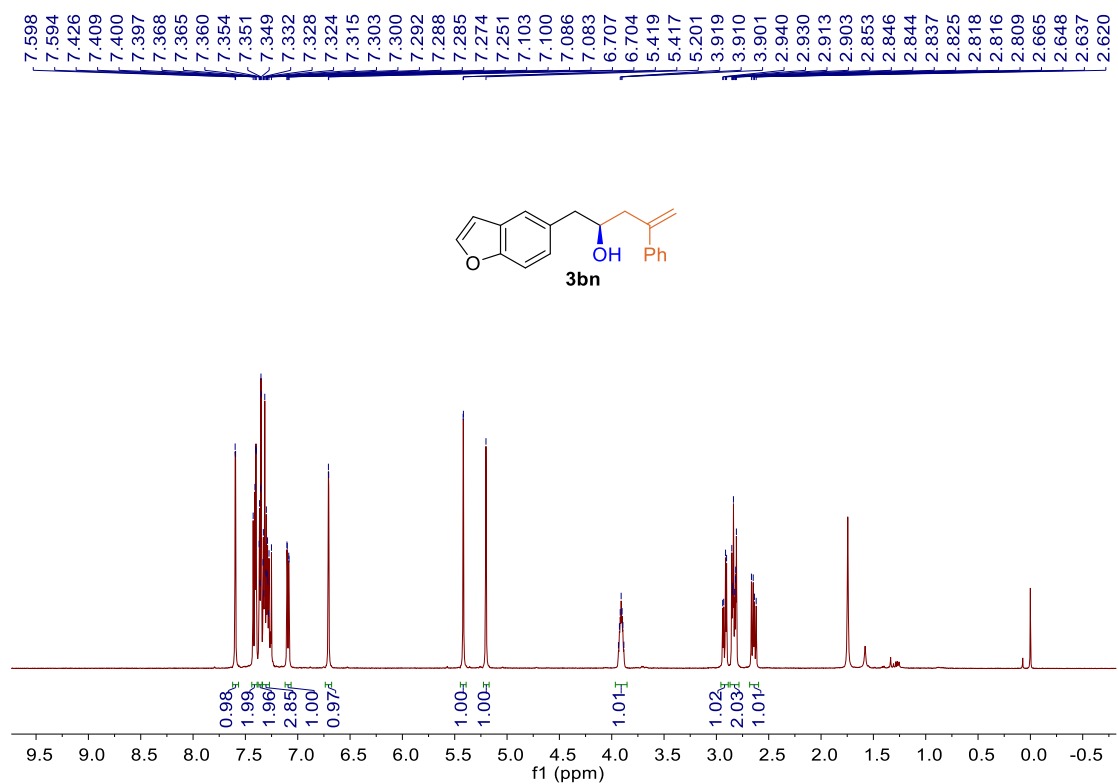
Supplementary Figure 201. ^1H NMR spectrum of compound 3bm



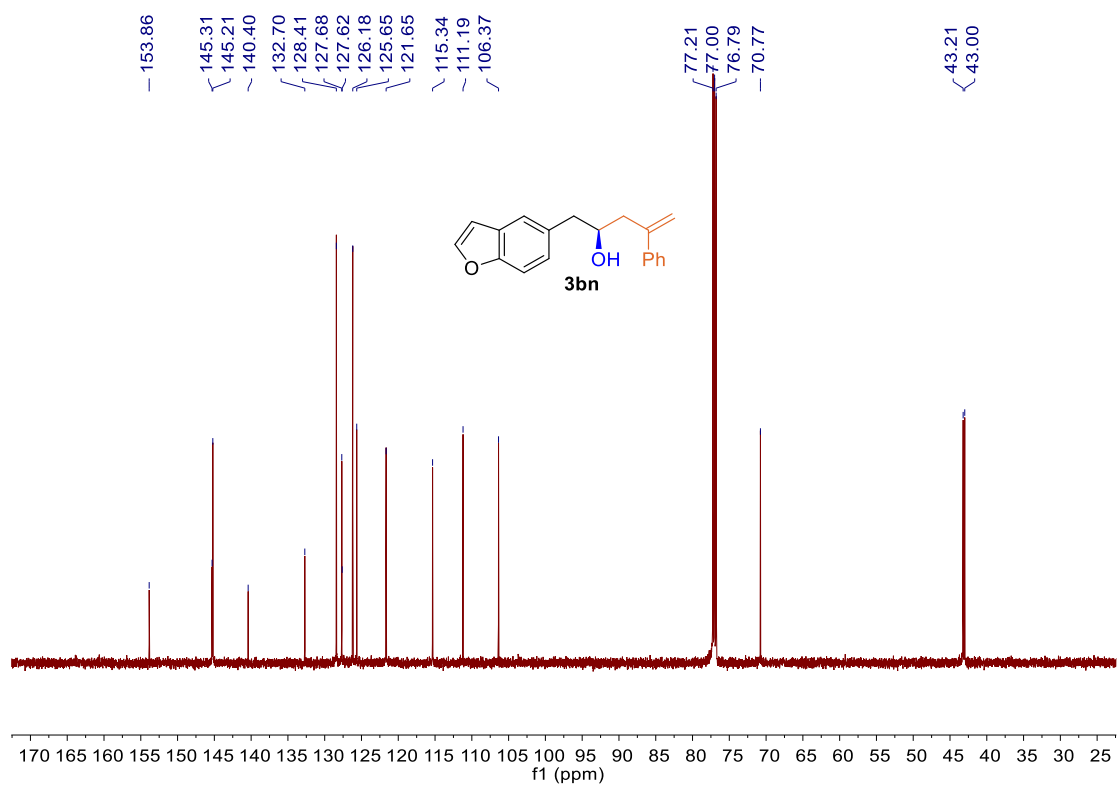
Supplementary Figure 202. ¹³C NMR spectrum of compound 3bm



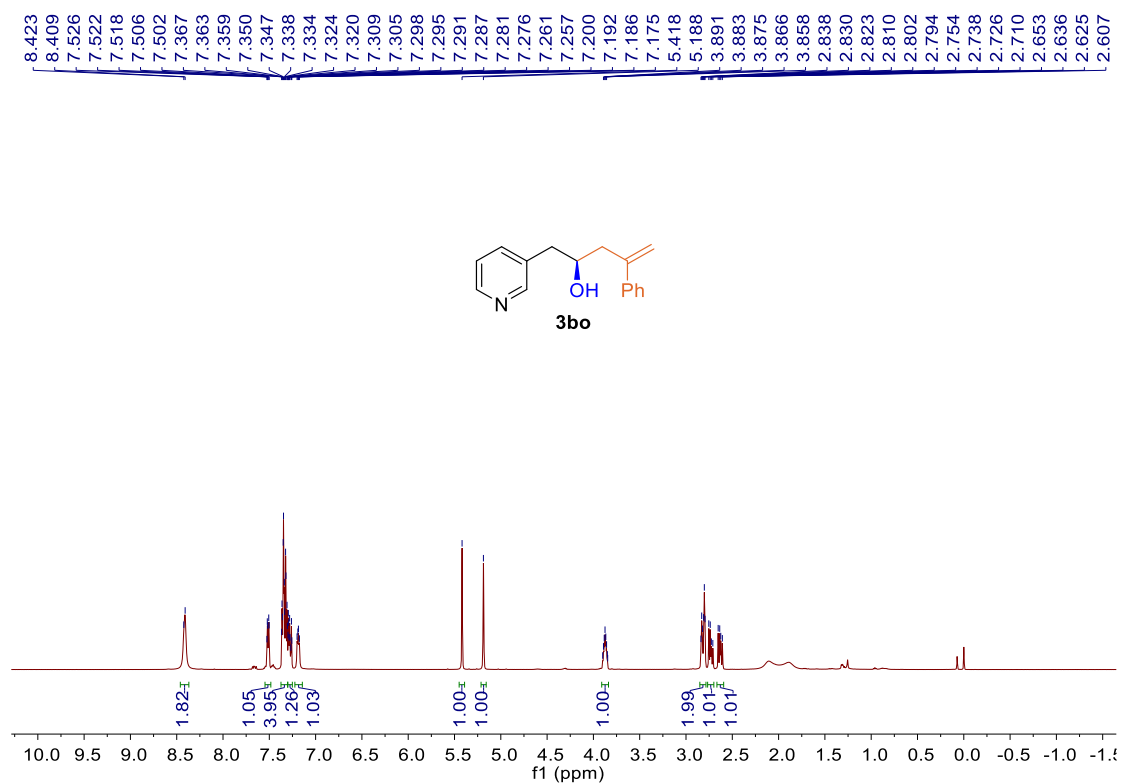
Supplementary Figure 203. ¹¹B NMR spectrum of compound 3bm



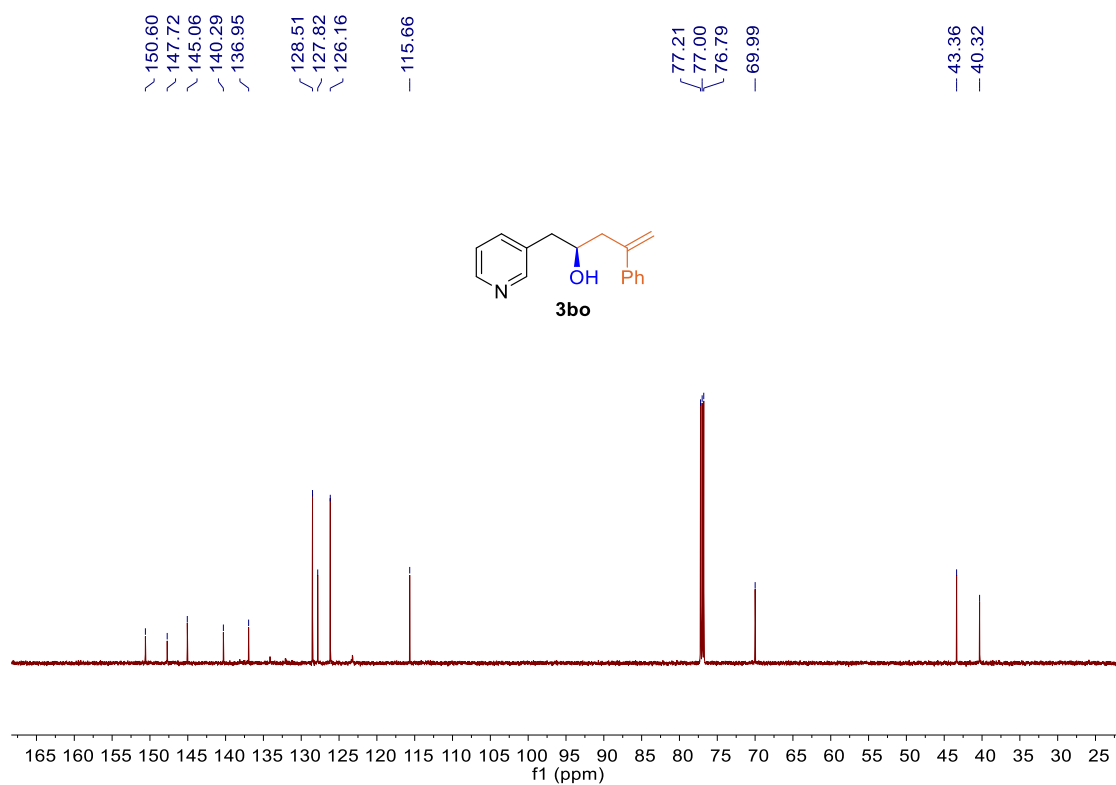
Supplementary Figure 204. ¹H NMR spectrum of compound 3bn



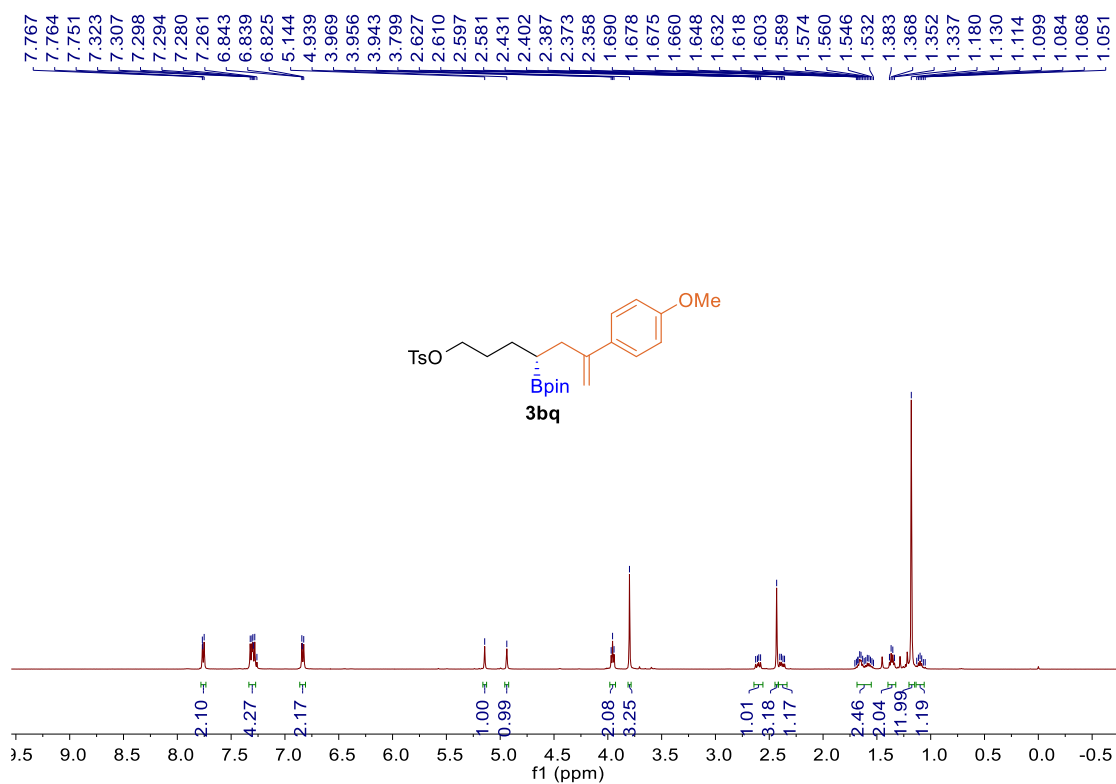
Supplementary Figure 205. ¹³C NMR spectrum of compound 3bn



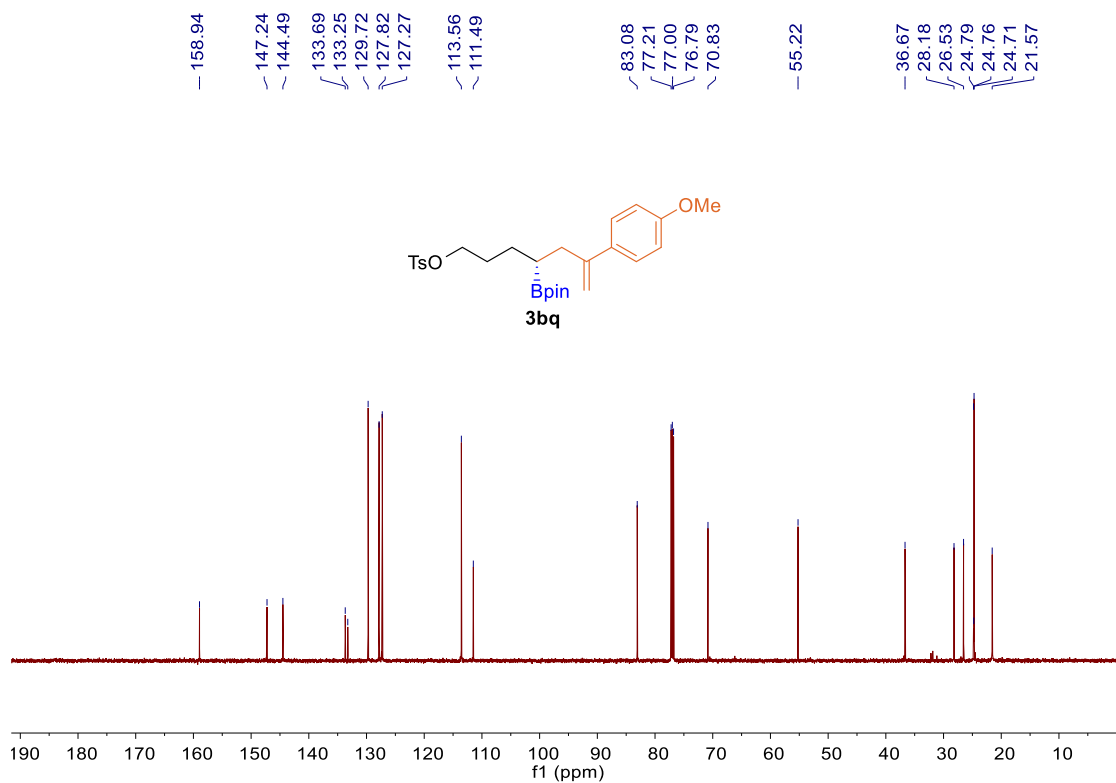
Supplementary Figure 206. ¹H NMR spectrum of compound 3bo



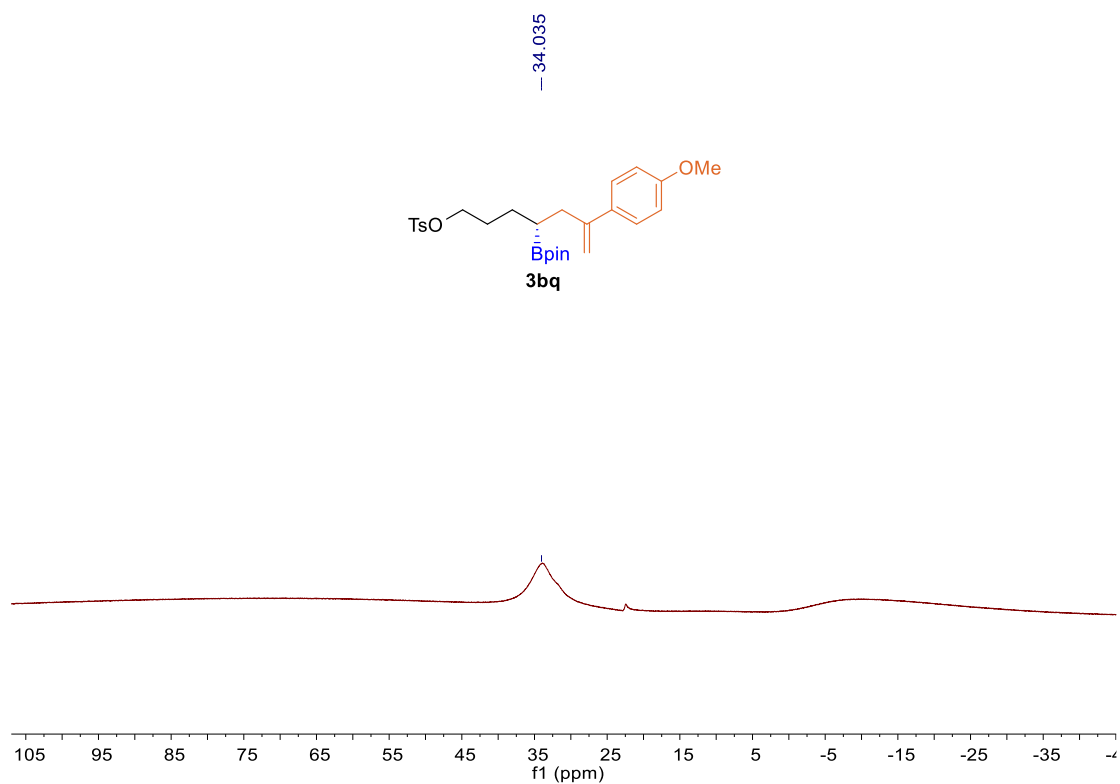
Supplementary Figure 207. ¹³C NMR spectrum of compound 3bo



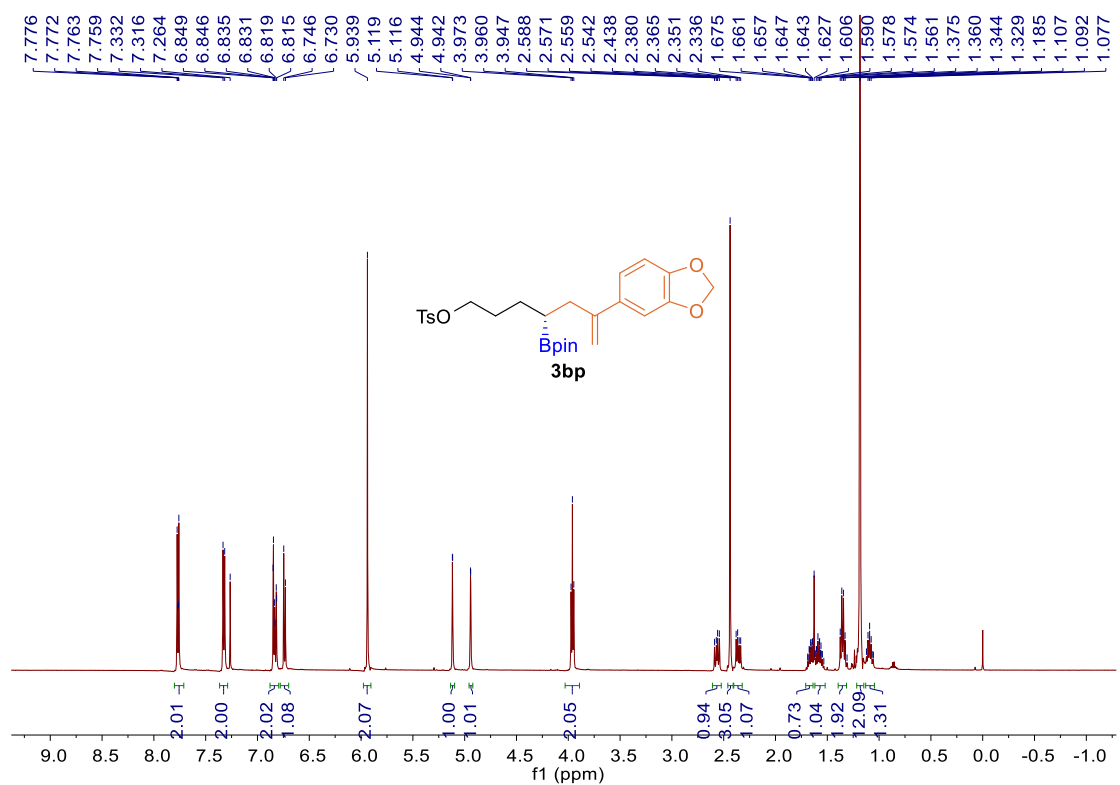
Supplementary Figure 208. ¹H NMR spectrum of compound 3bq



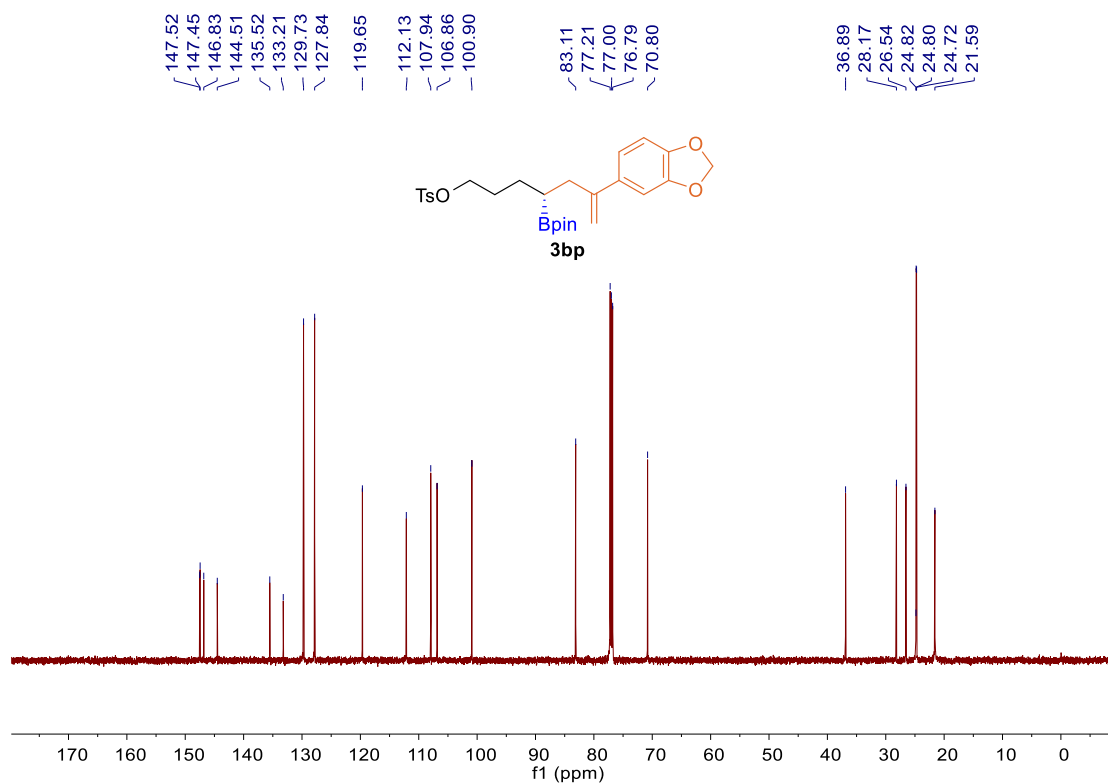
Supplementary Figure 209. ¹³C NMR spectrum of compound 3bq



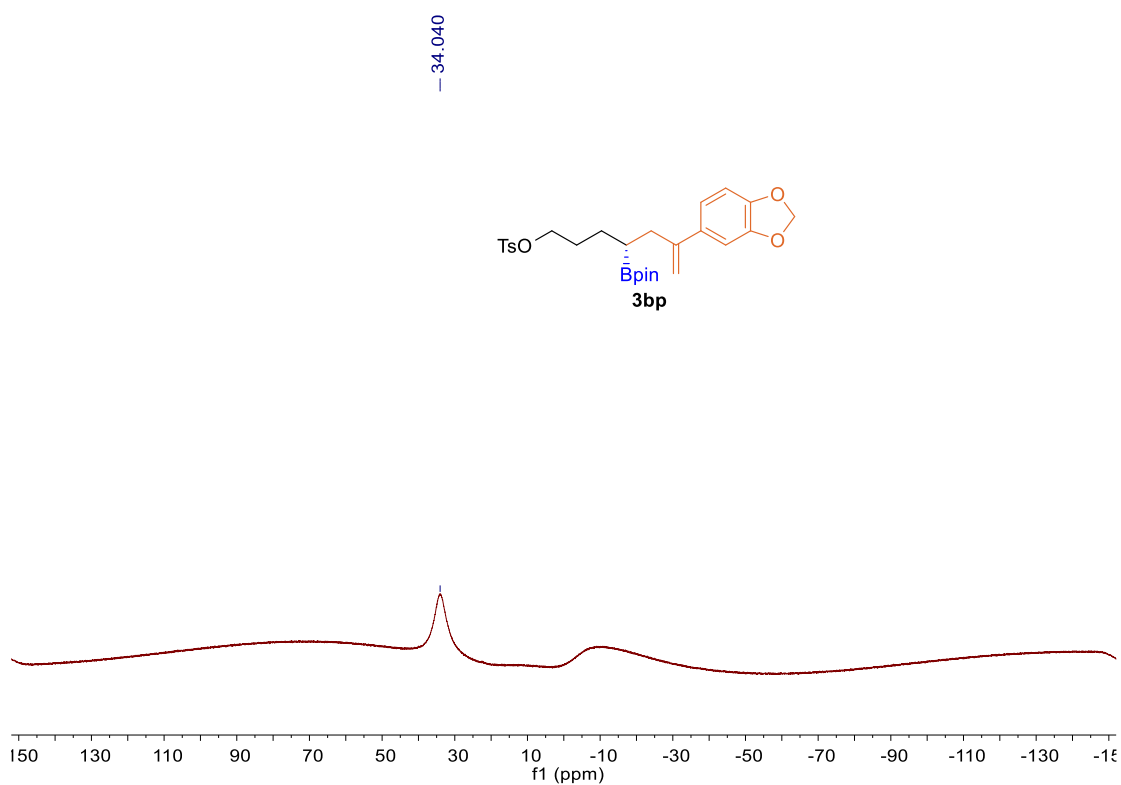
Supplementary Figure 210. ^{11}B NMR spectrum of compound **3bq**



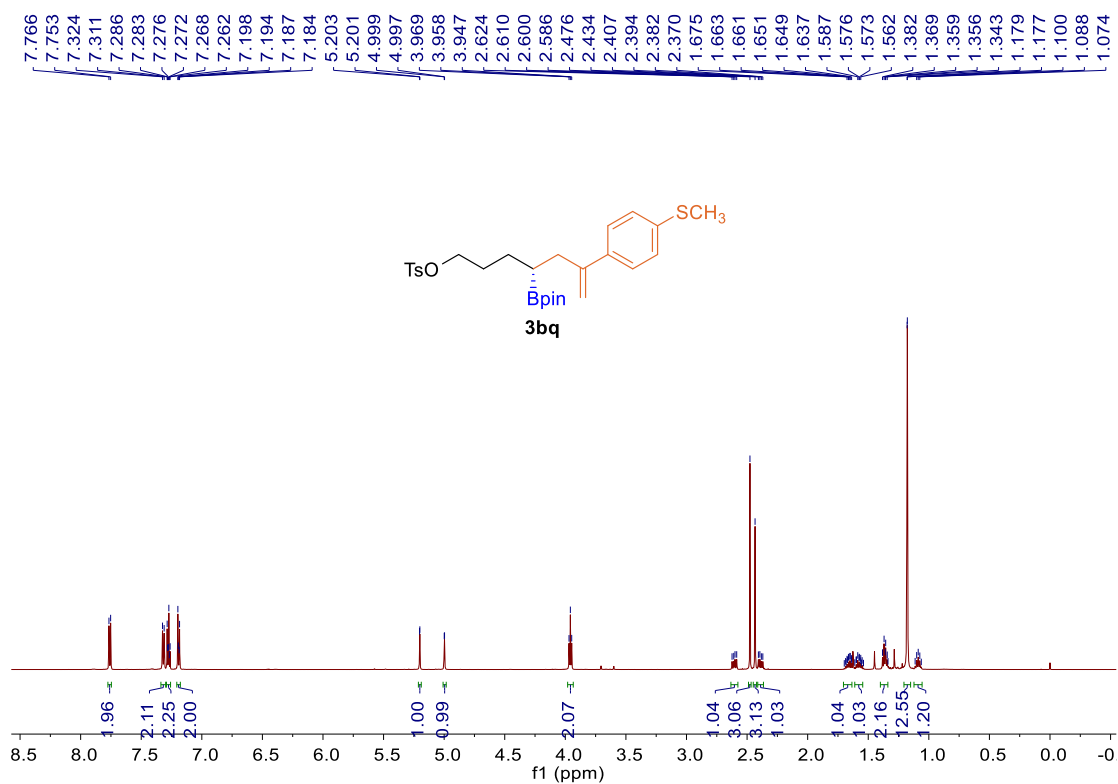
Supplementary Figure 211. ^1H NMR spectrum of compound **3bp**



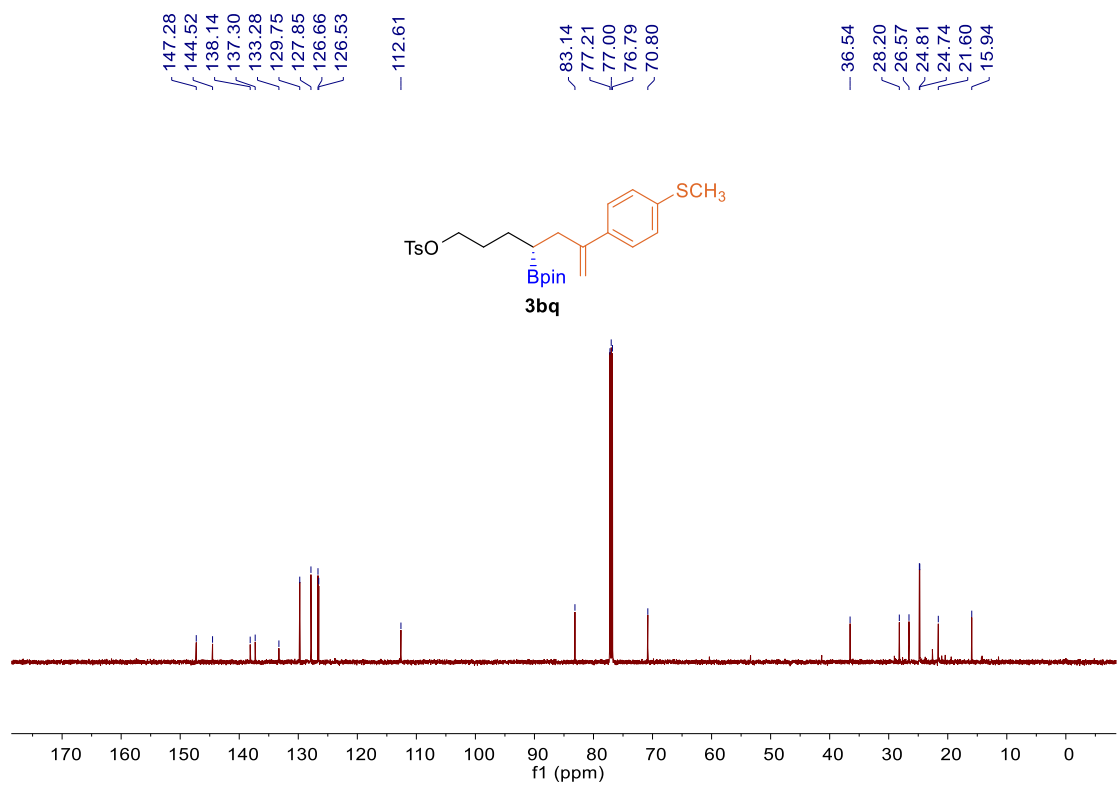
Supplementary Figure 212. ¹³C NMR spectrum of compound 3bp



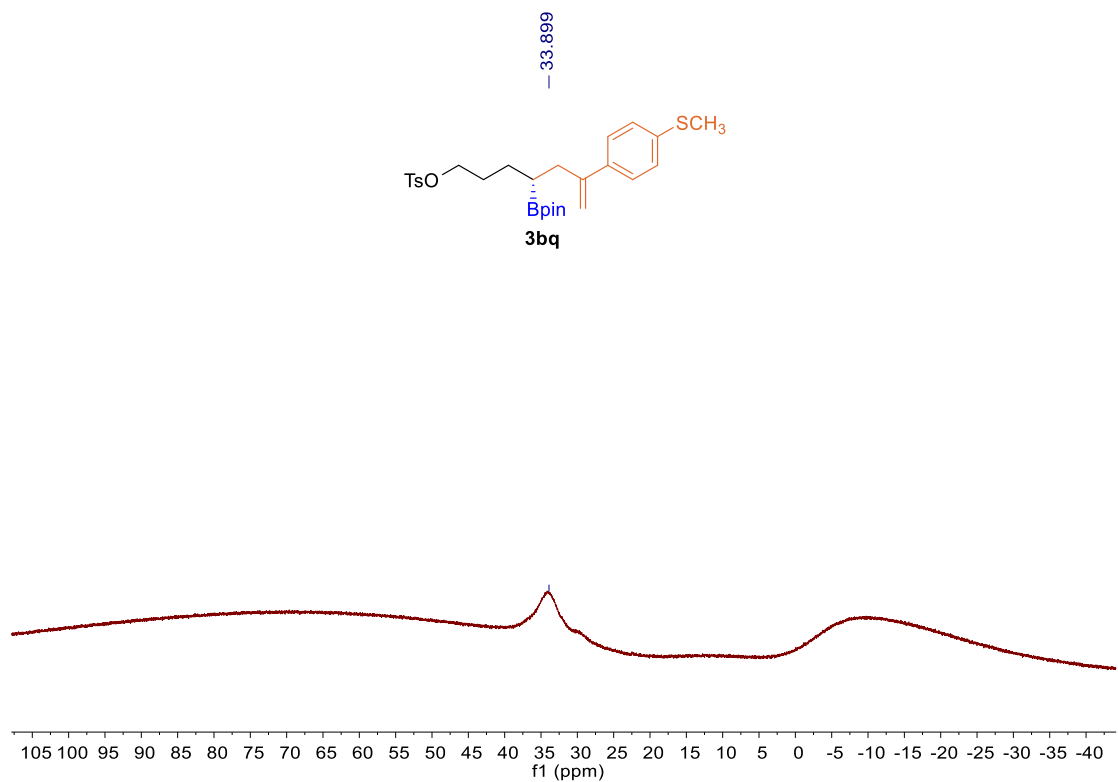
Supplementary Figure 213. ¹¹B NMR spectrum of compound 3bp



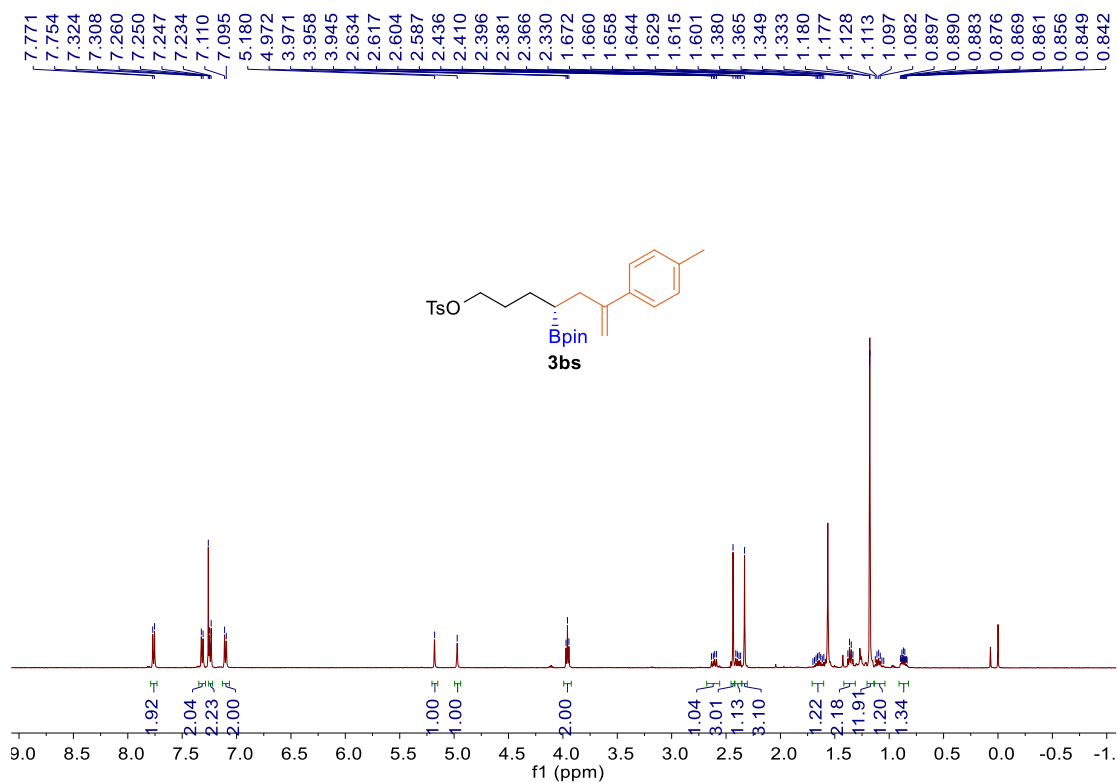
Supplementary Figure 214. ¹H NMR spectrum of compound 3bq



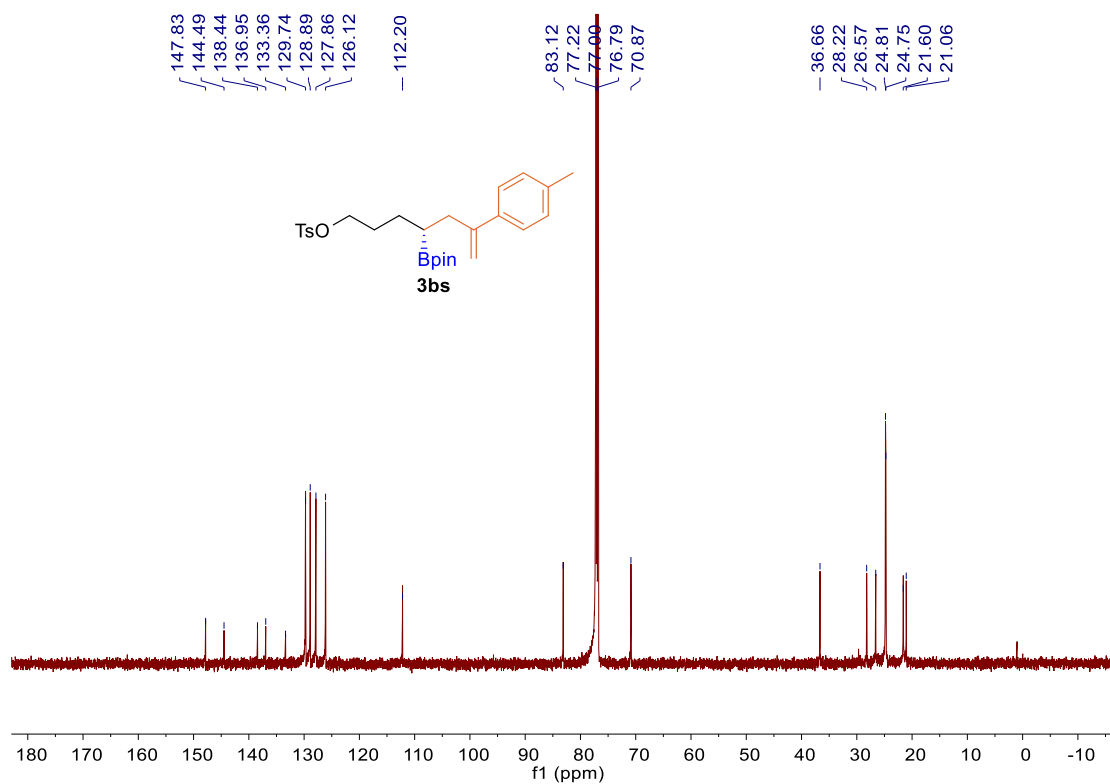
Supplementary Figure 215. ¹³C NMR spectrum of compound 3bq



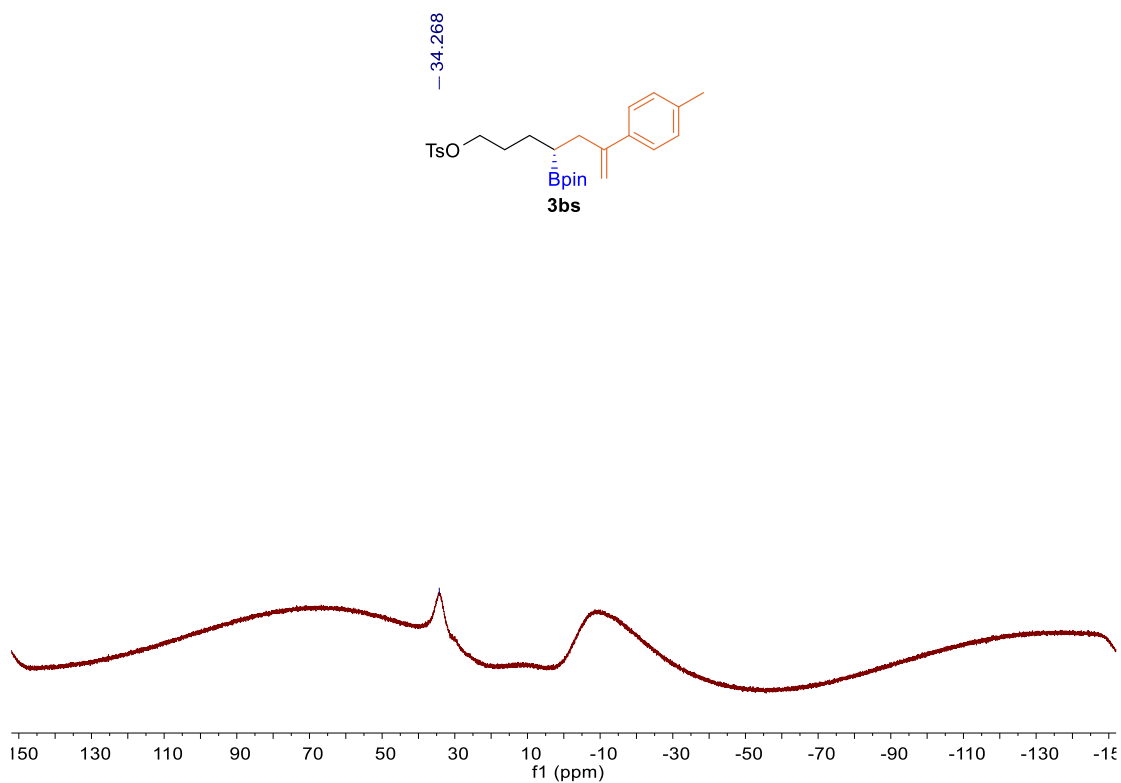
Supplementary Figure 216. ^{11}B NMR spectrum of compound **3bq**



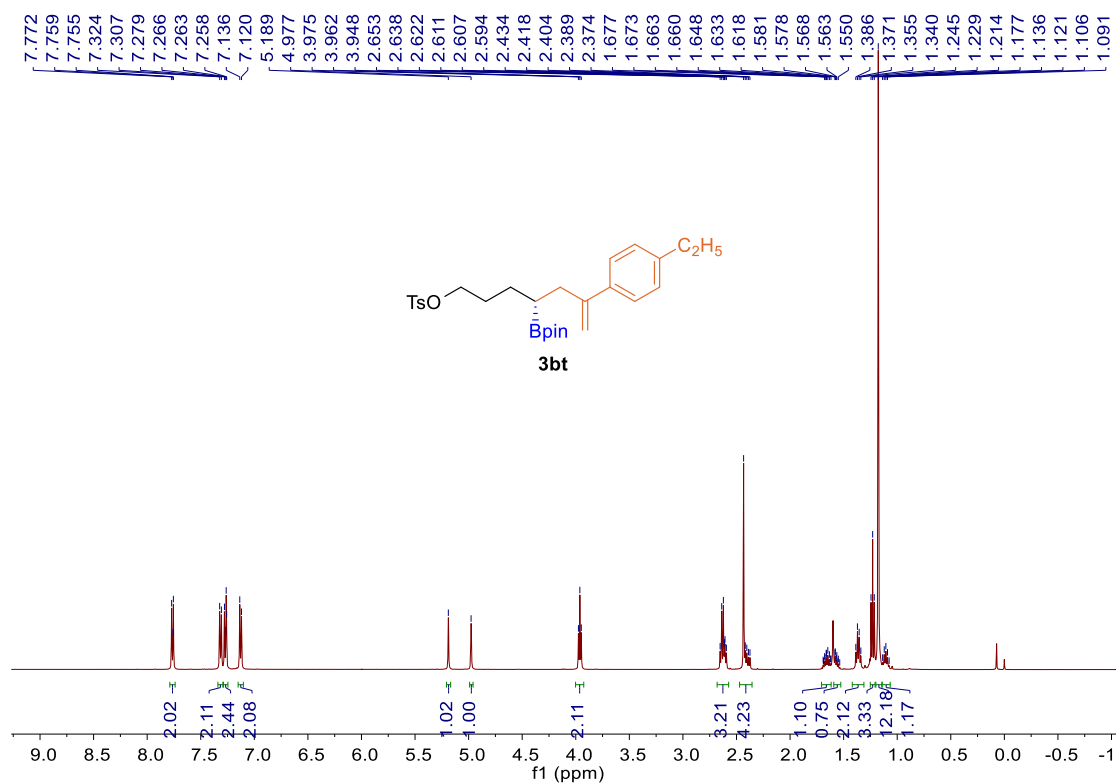
Supplementary Figure 217. ^1H NMR spectrum of compound **3bs**



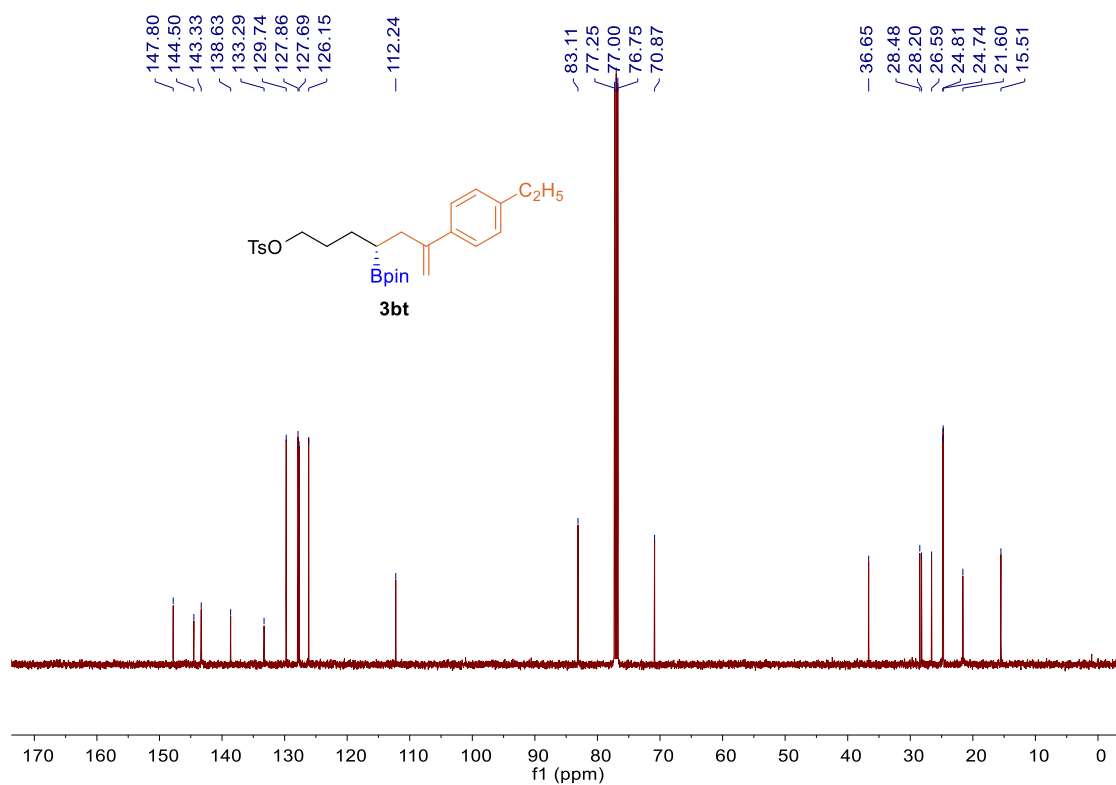
Supplementary Figure 218. ¹³C NMR spectrum of compound 3bs



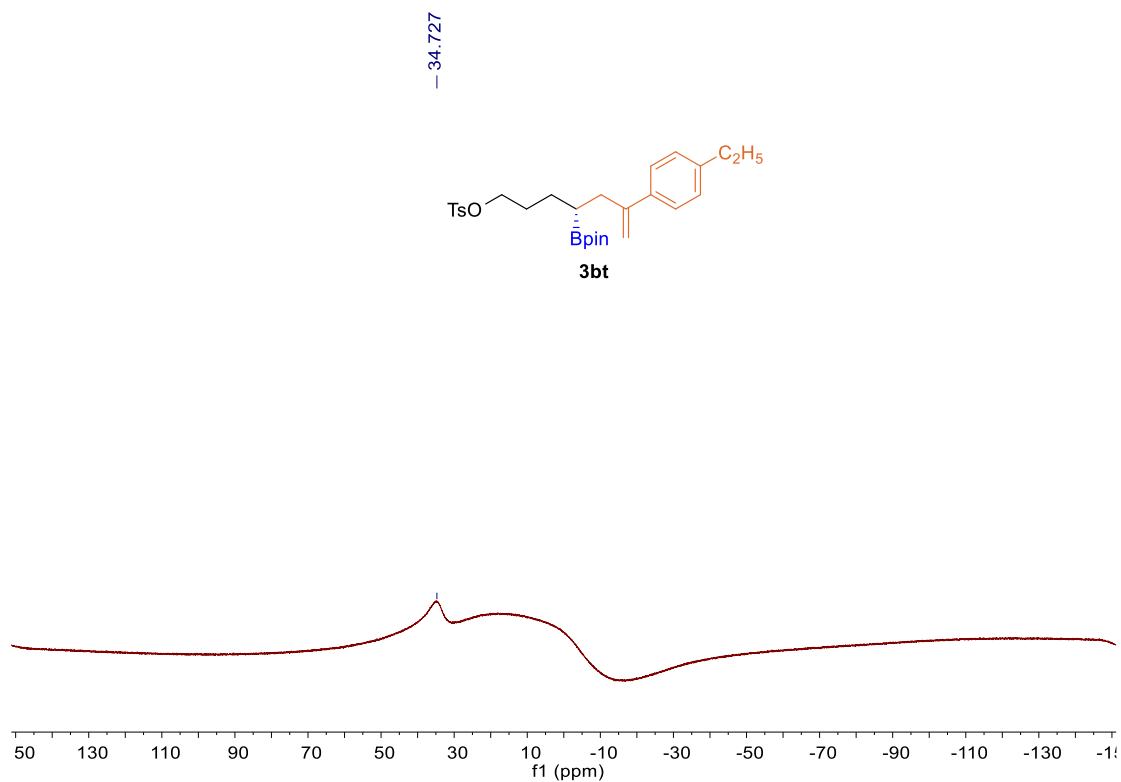
Supplementary Figure 219. ¹¹B NMR spectrum of compound 3bs



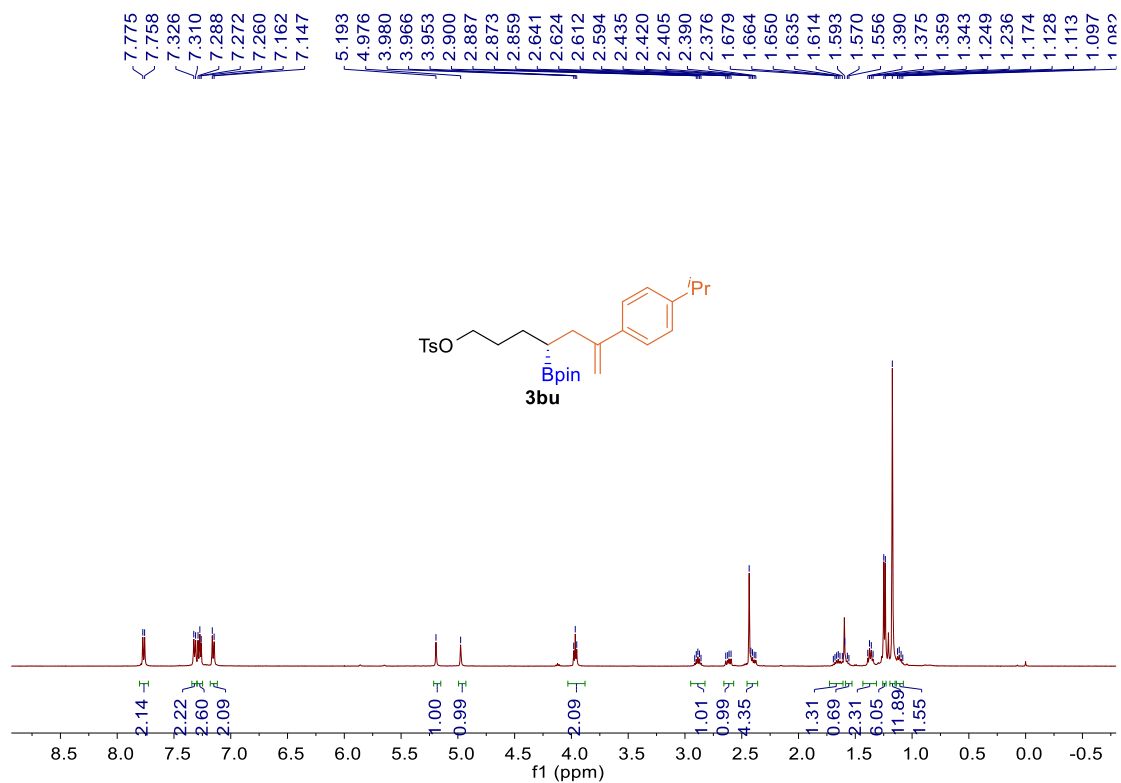
Supplementary Figure 220. ¹H NMR spectrum of compound 3bt



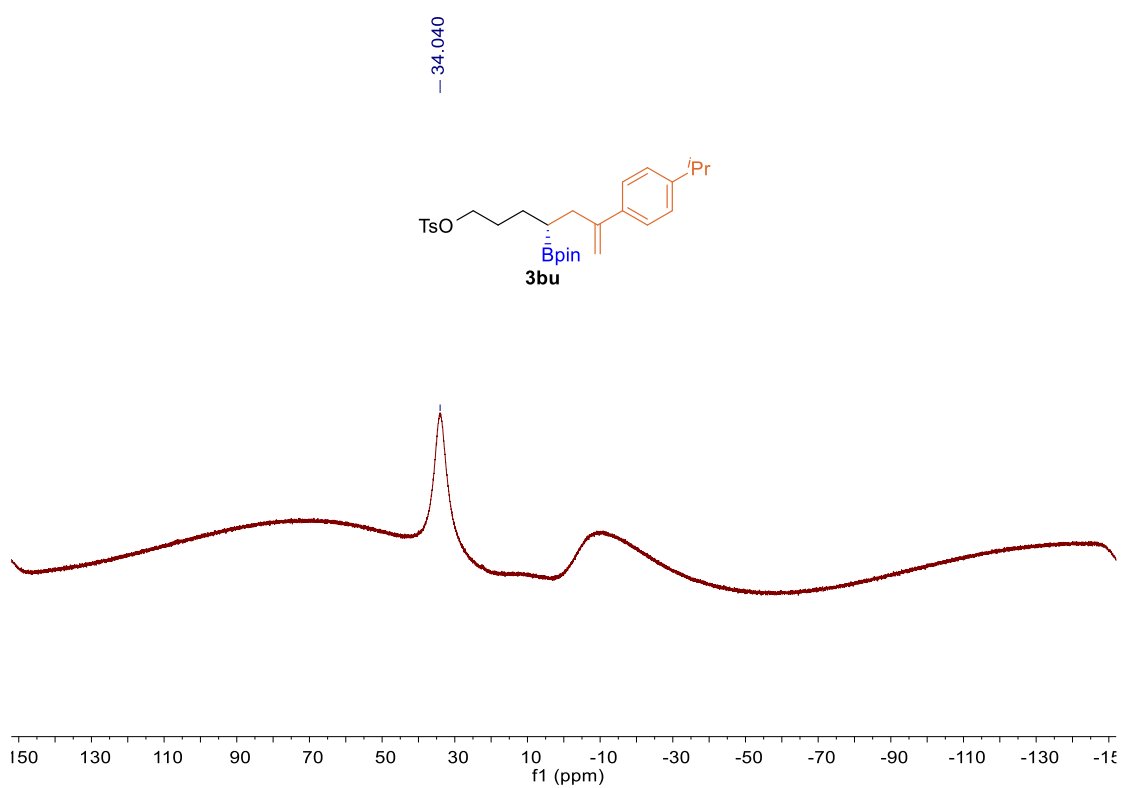
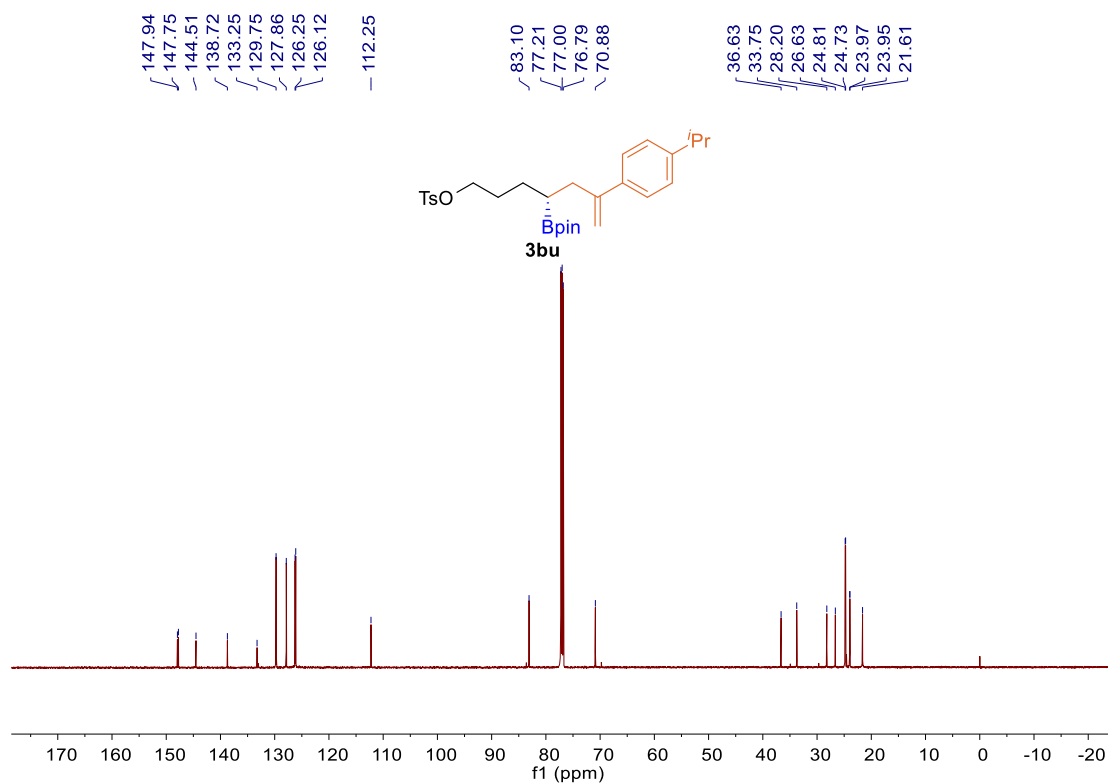
Supplementary Figure 221. ¹³C NMR spectrum of compound 3bt

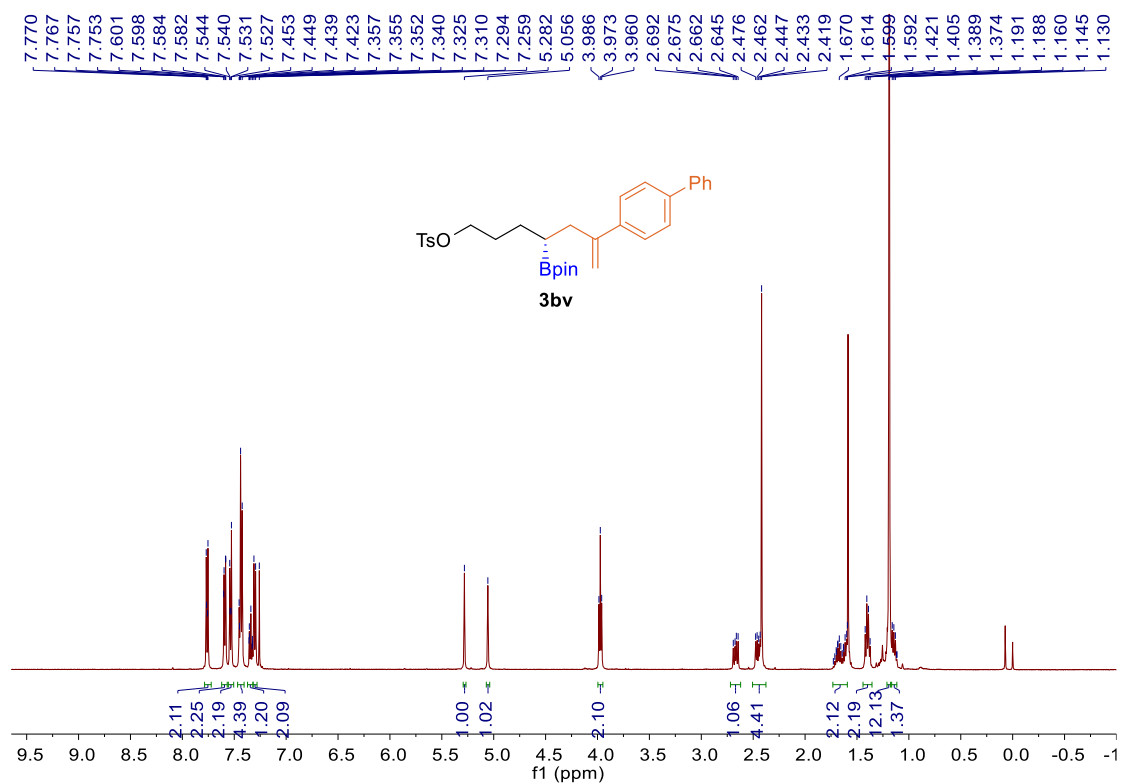


Supplementary Figure 222. ^{11}B NMR spectrum of compound 3bt

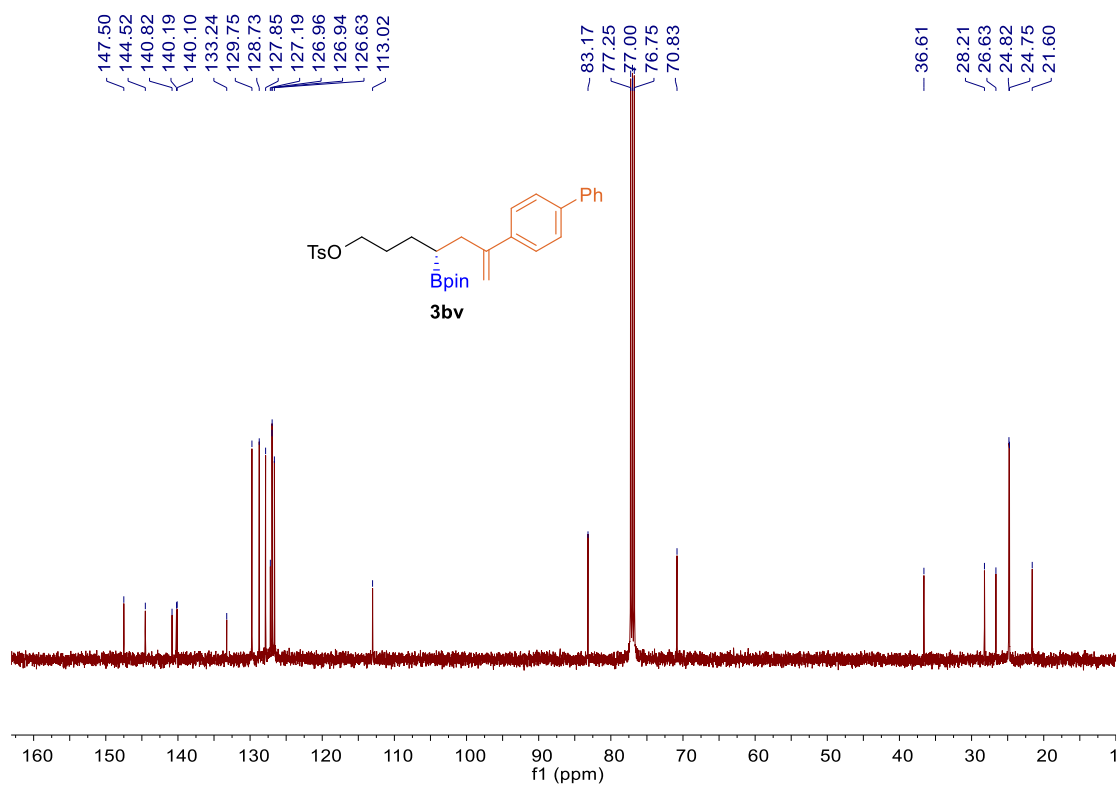


Supplementary Figure 223. ^1H NMR spectrum of compound 3bu

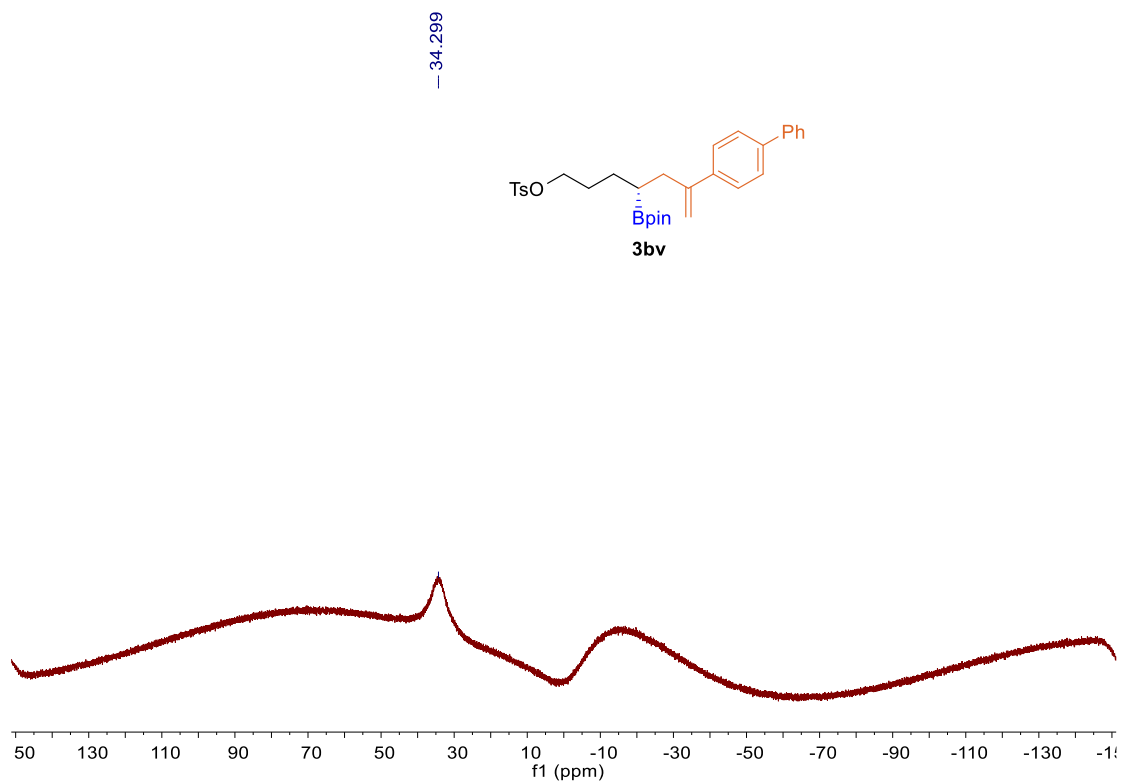




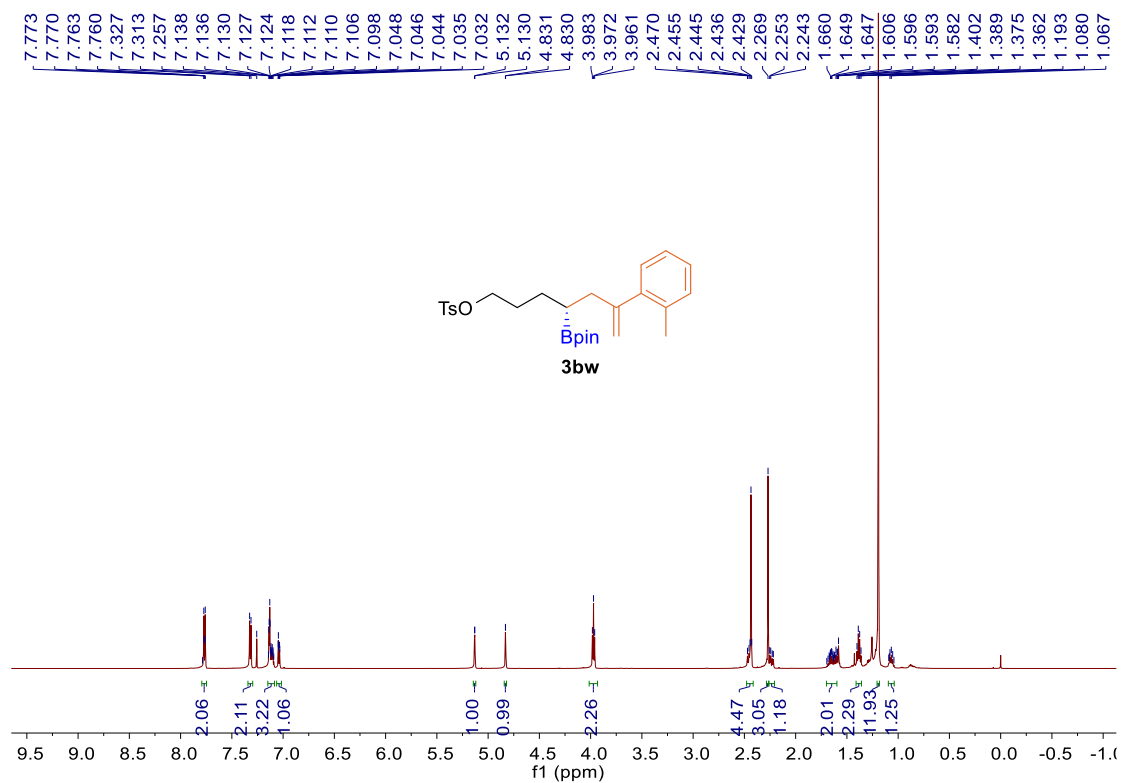
Supplementary Figure 226. ¹H NMR spectrum of compound 3bv



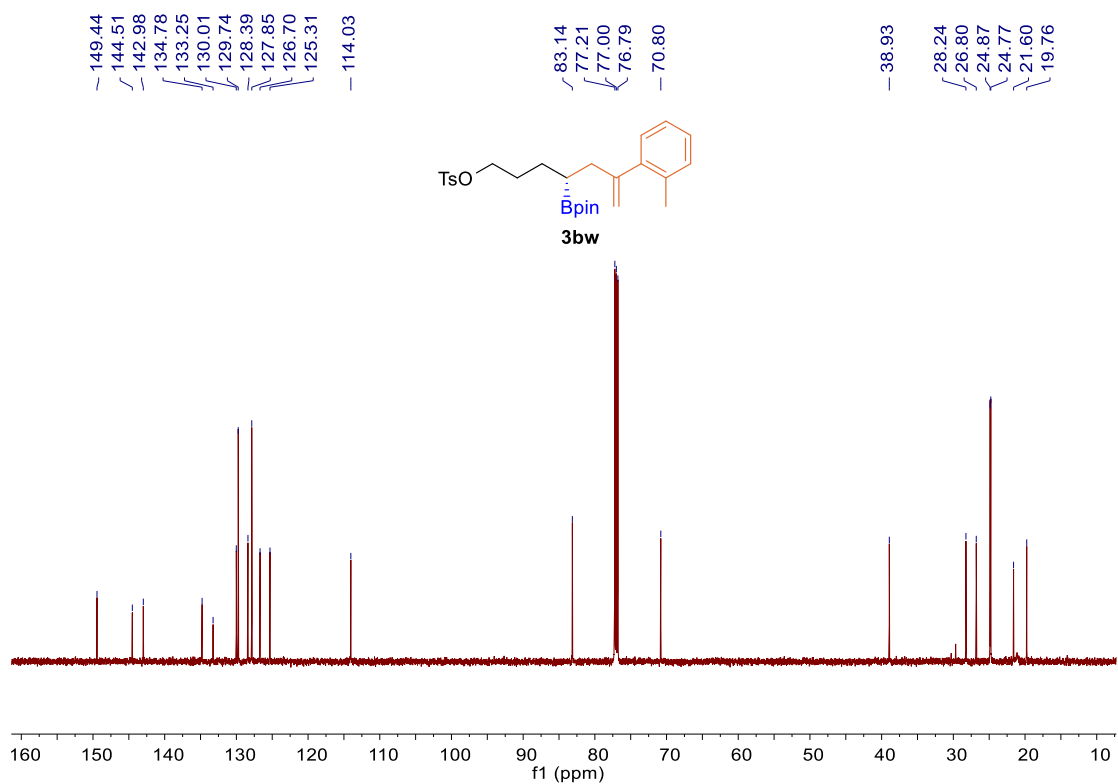
Supplementary Figure 227. ¹³C NMR spectrum of compound 3bv



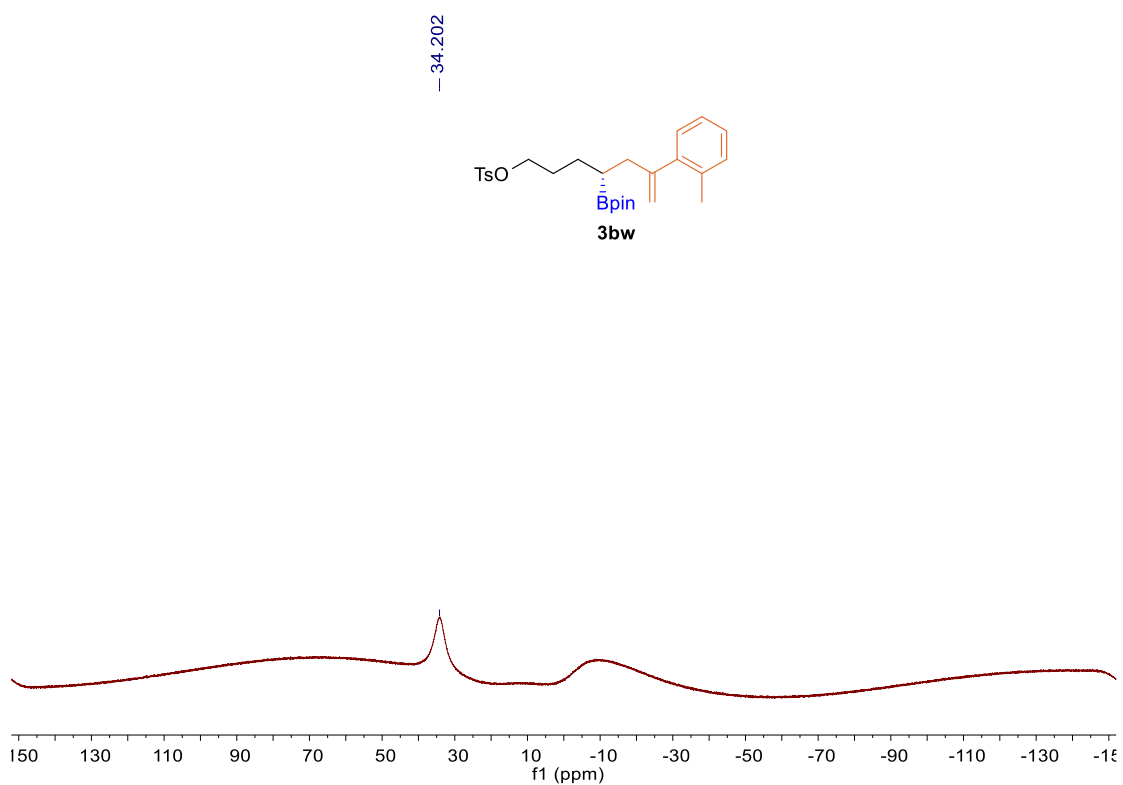
Supplementary Figure 228. ^{11}B NMR spectrum of compound 3bv



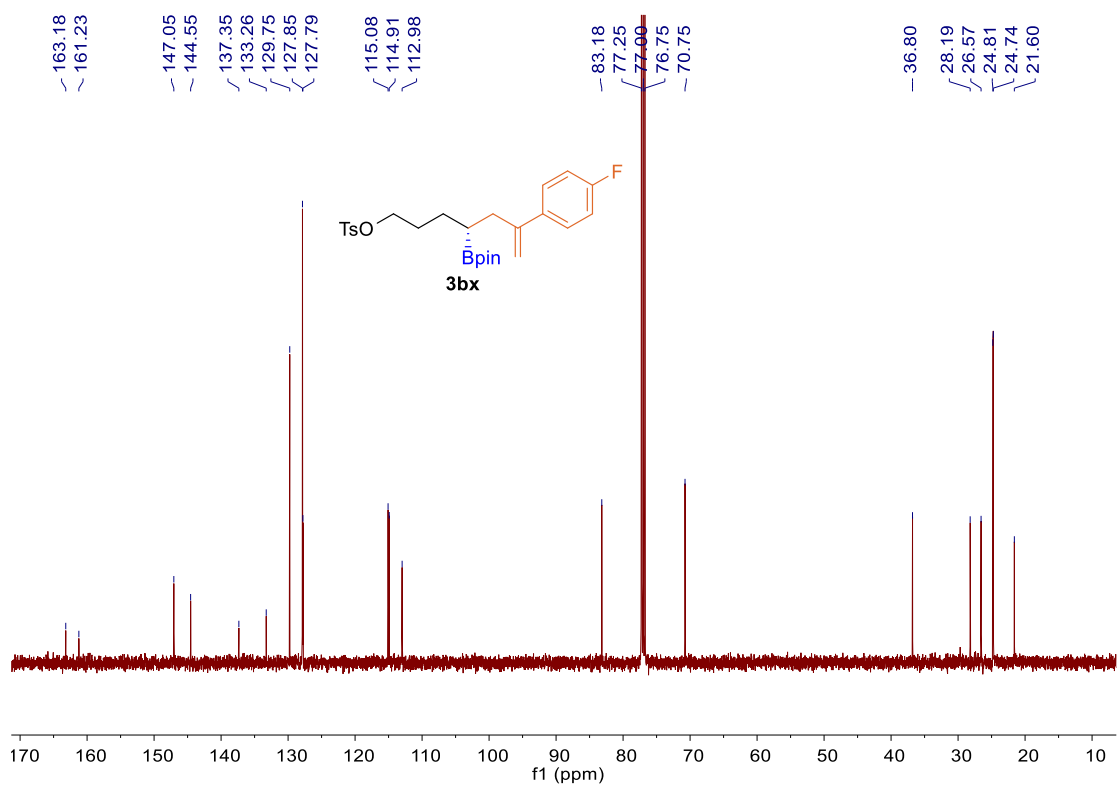
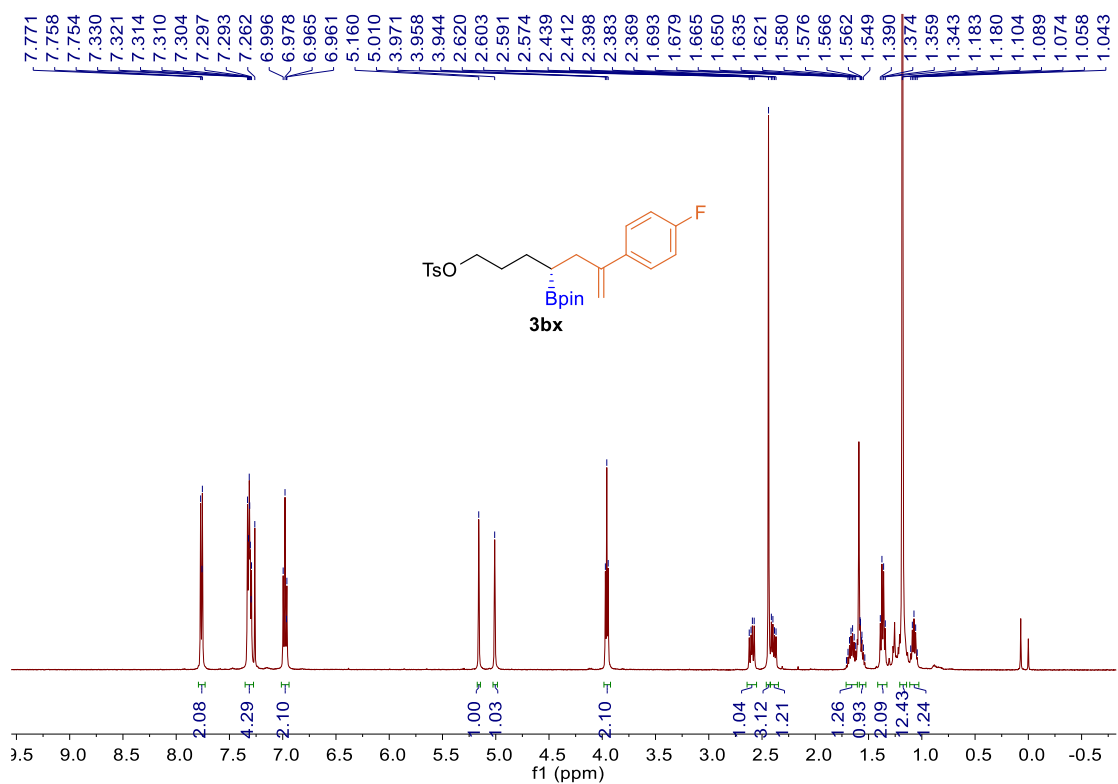
Supplementary Figure 229. ^1H NMR spectrum of compound 3bw

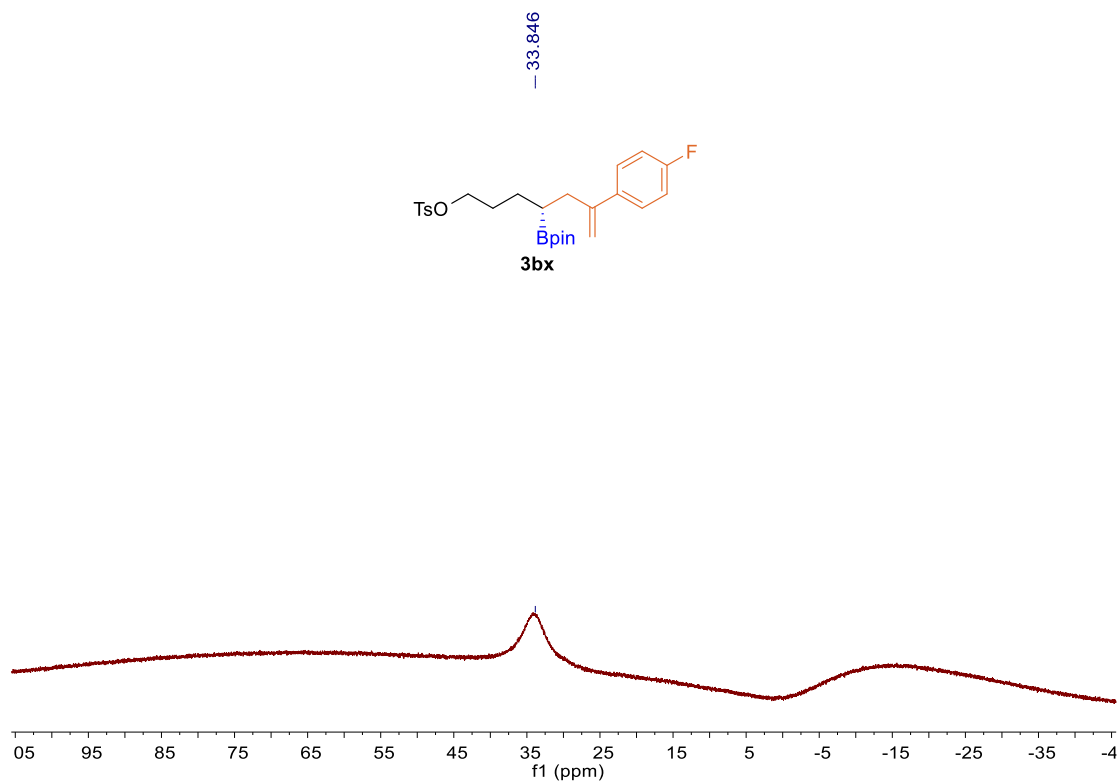


Supplementary Figure 230. ¹³C NMR spectrum of compound 3bw

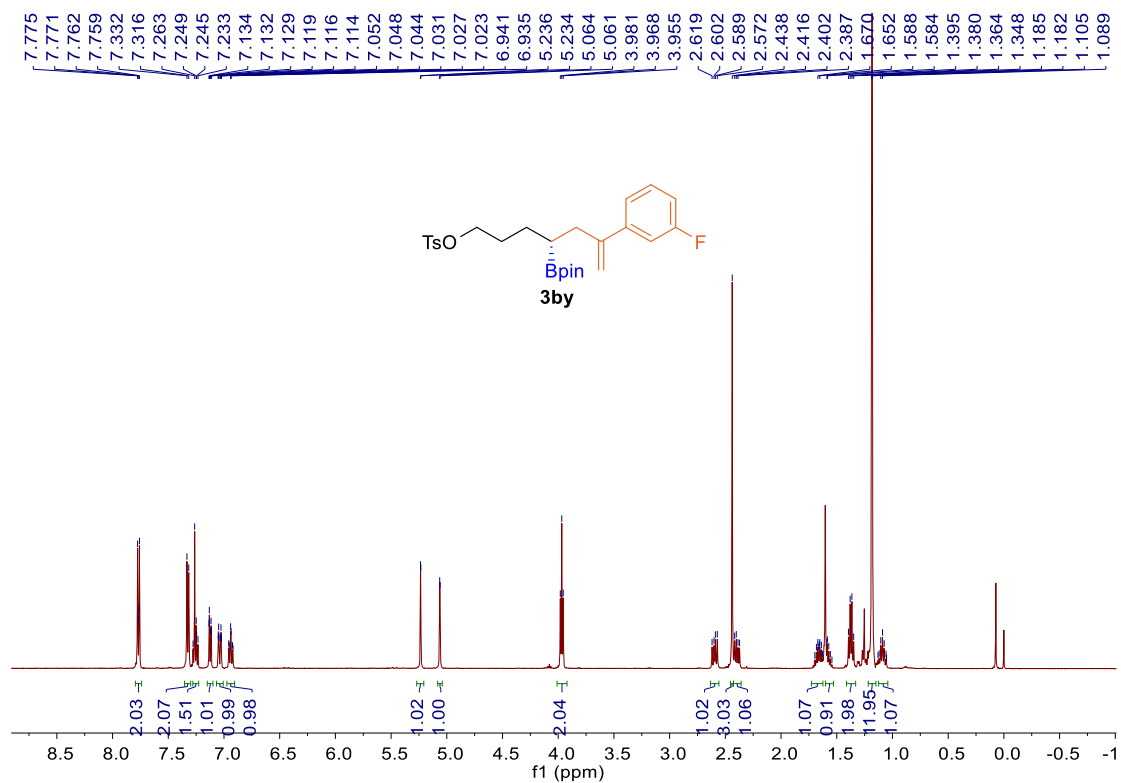


Supplementary Figure 231. ¹¹B NMR spectrum of compound 3bw

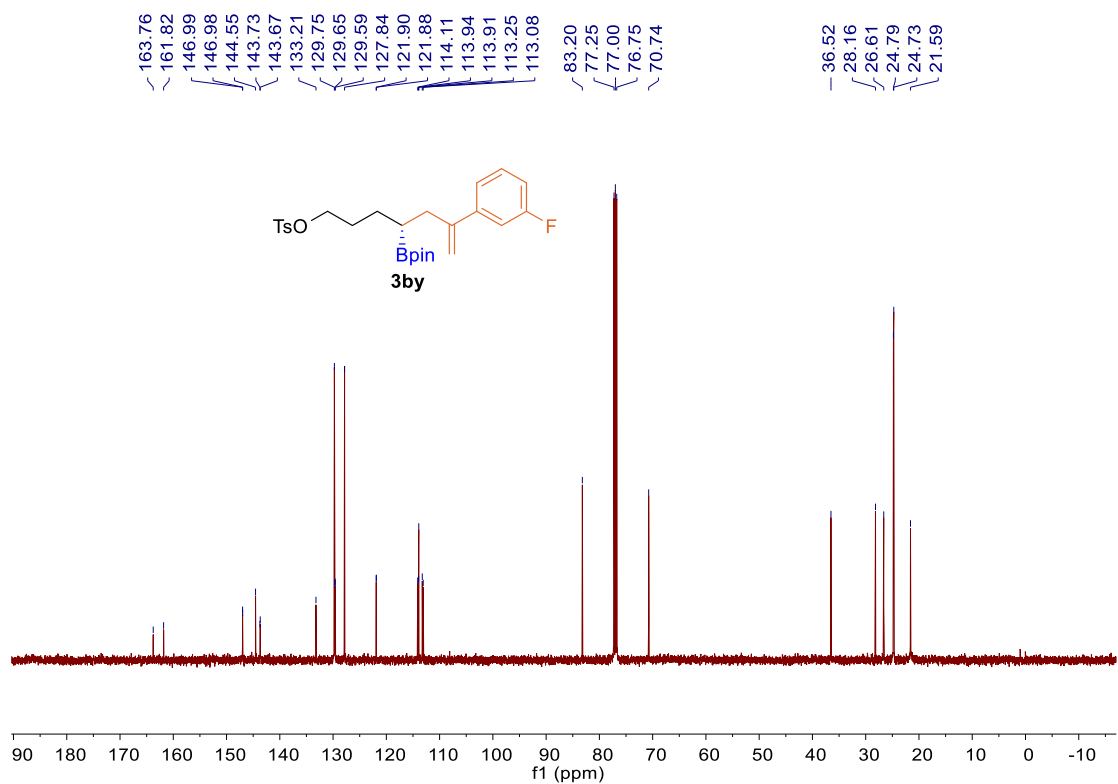




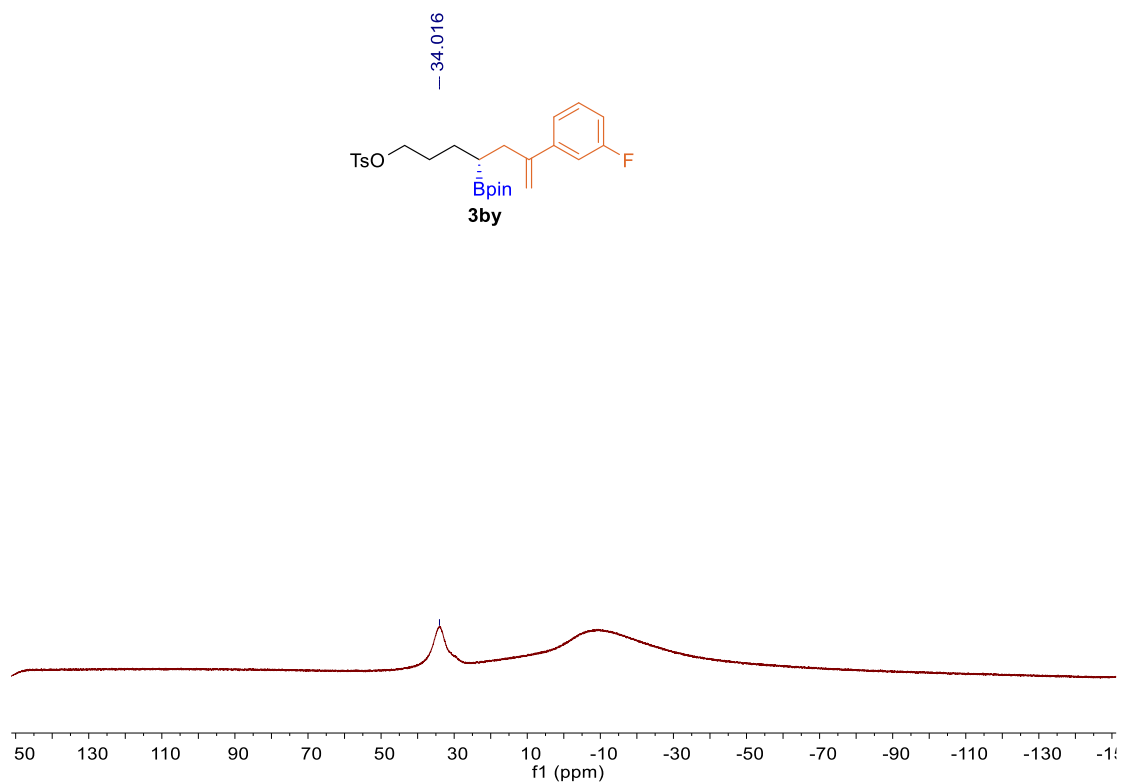
Supplementary Figure 234. ^{11}B NMR spectrum of compound 3bx



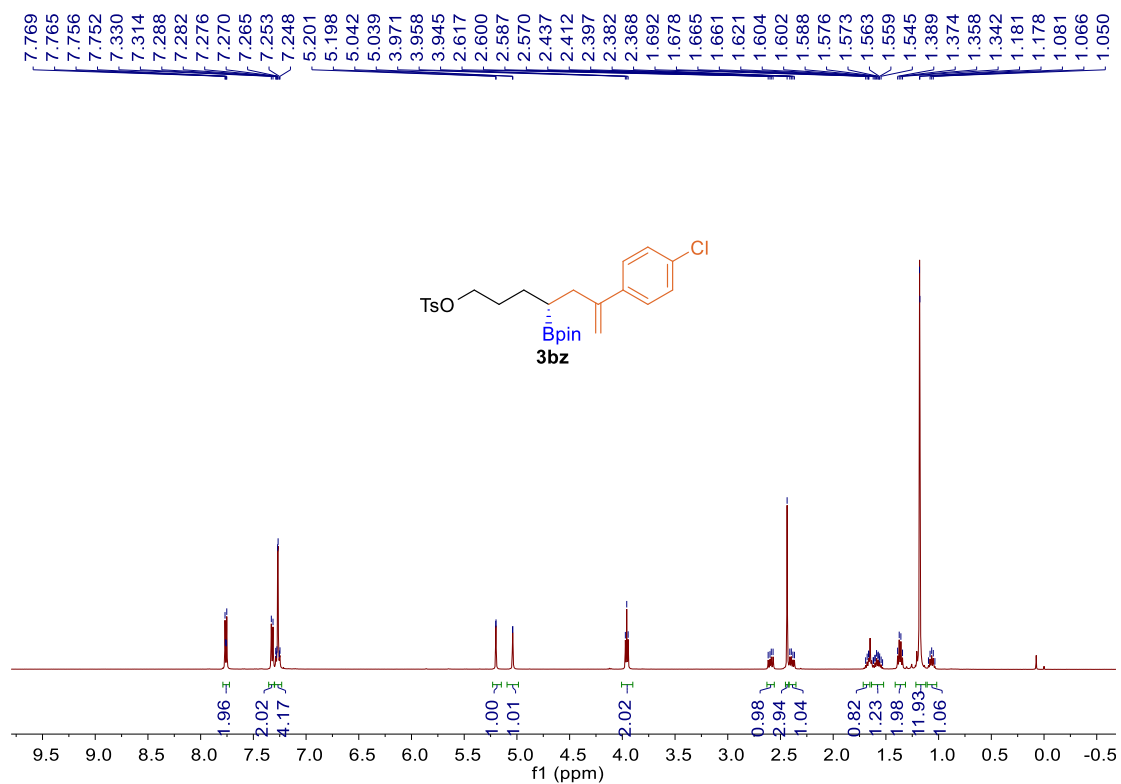
Supplementary Figure 235. ^1H NMR spectrum of compound 3by



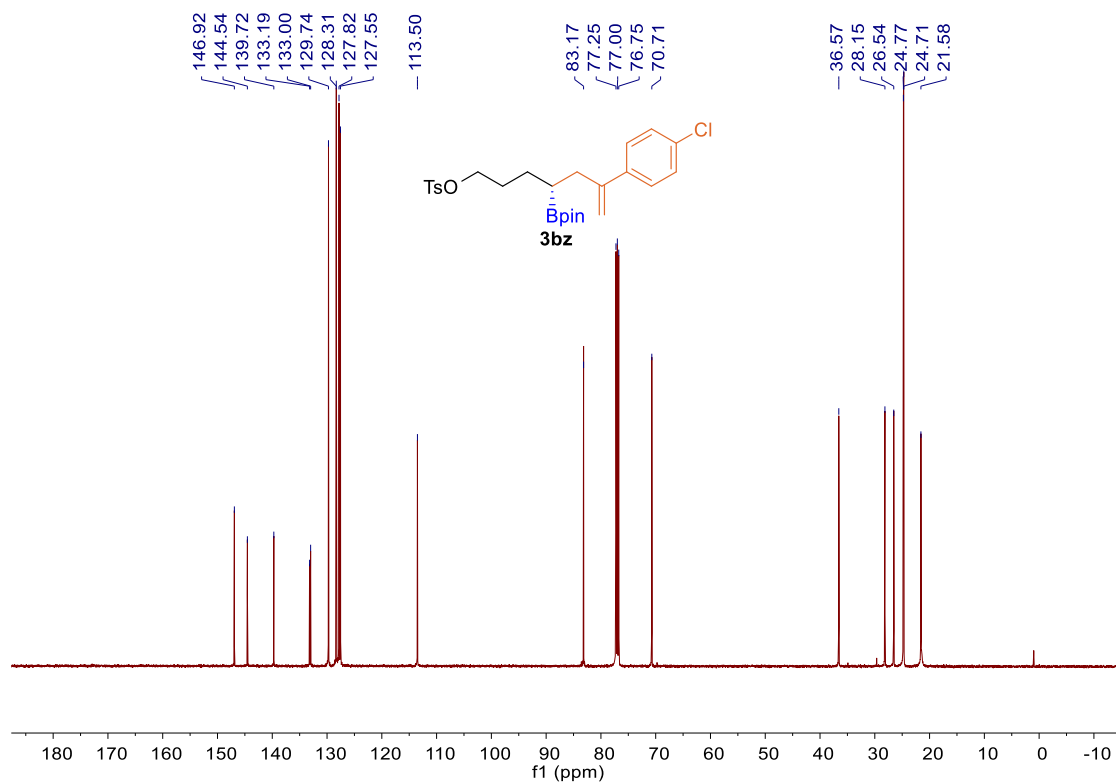
Supplementary Figure 236. ¹³C NMR spectrum of compound 3by



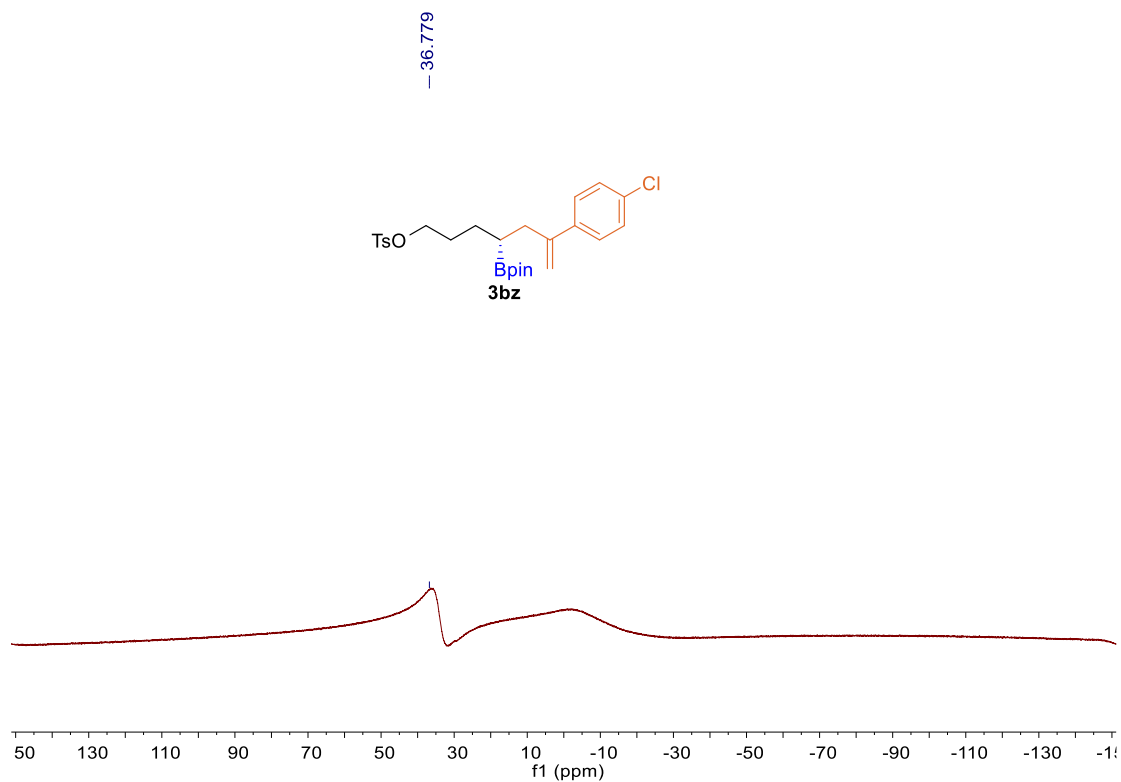
Supplementary Figure 237. ¹¹B NMR spectrum of compound 3by



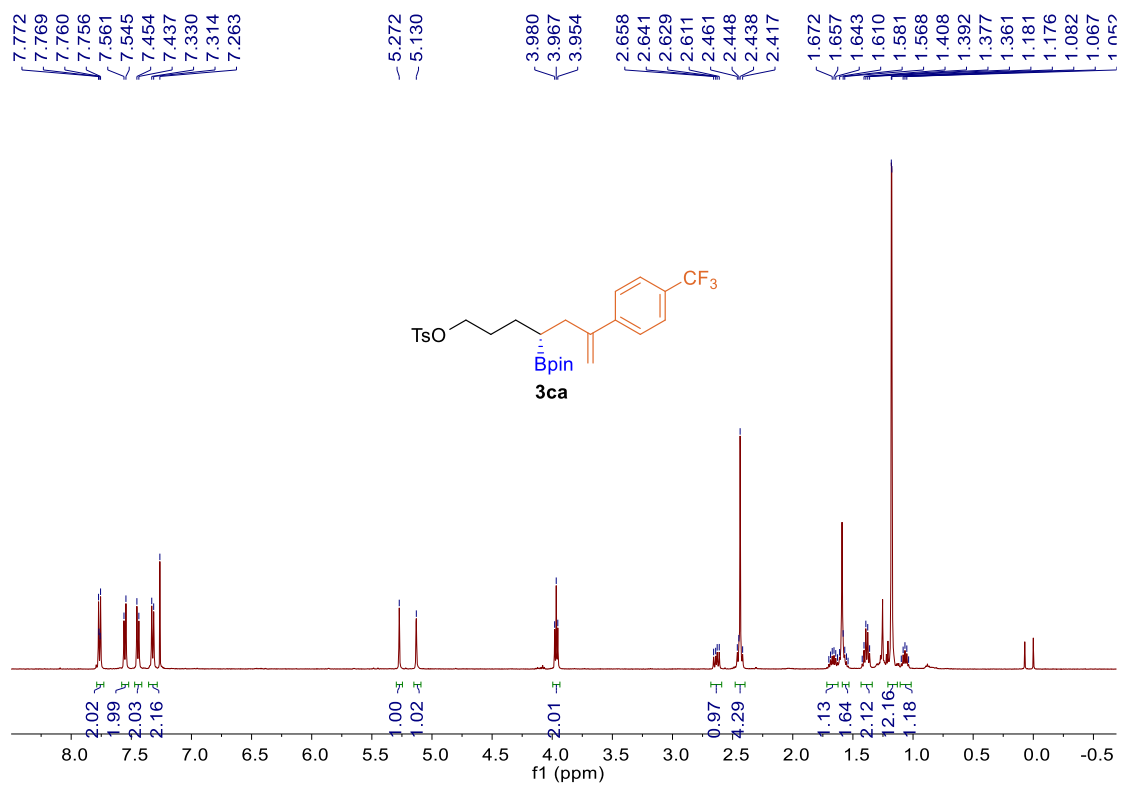
Supplementary Figure 238. ¹H NMR spectrum of compound 3bz



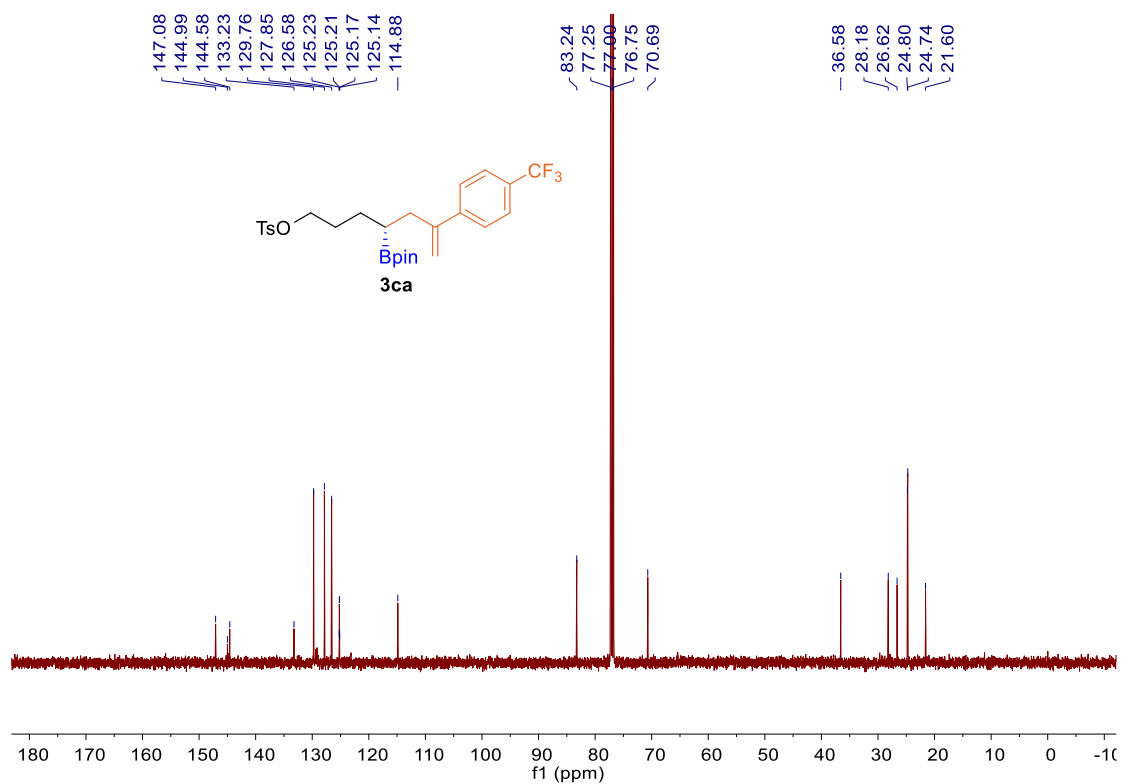
Supplementary Figure 239. ¹³C NMR spectrum of compound 3bz



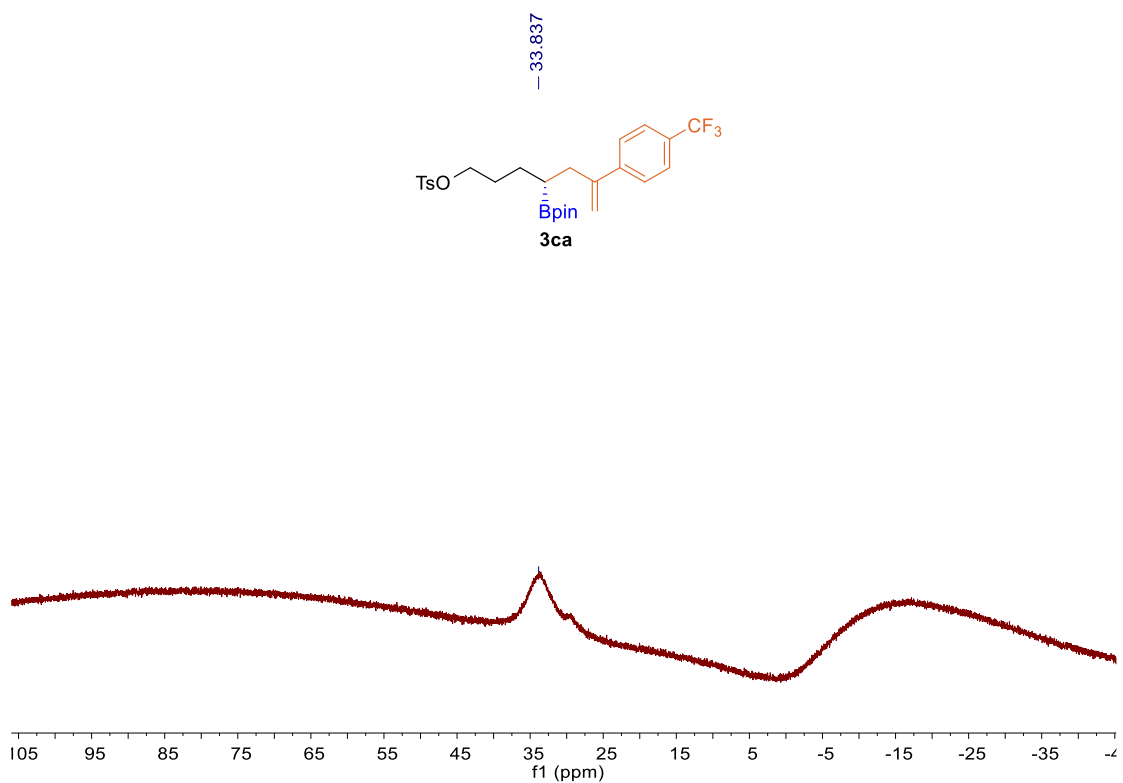
Supplementary Figure 240. ^{11}B NMR spectrum of compound 3bz



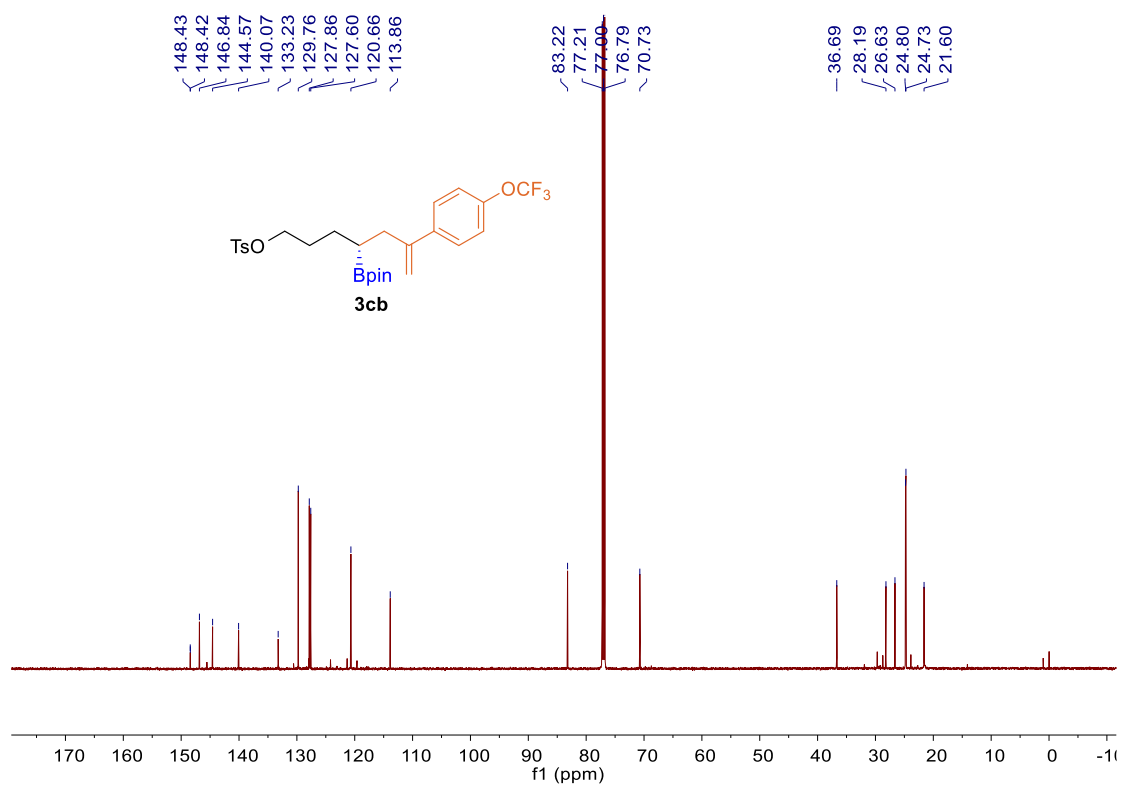
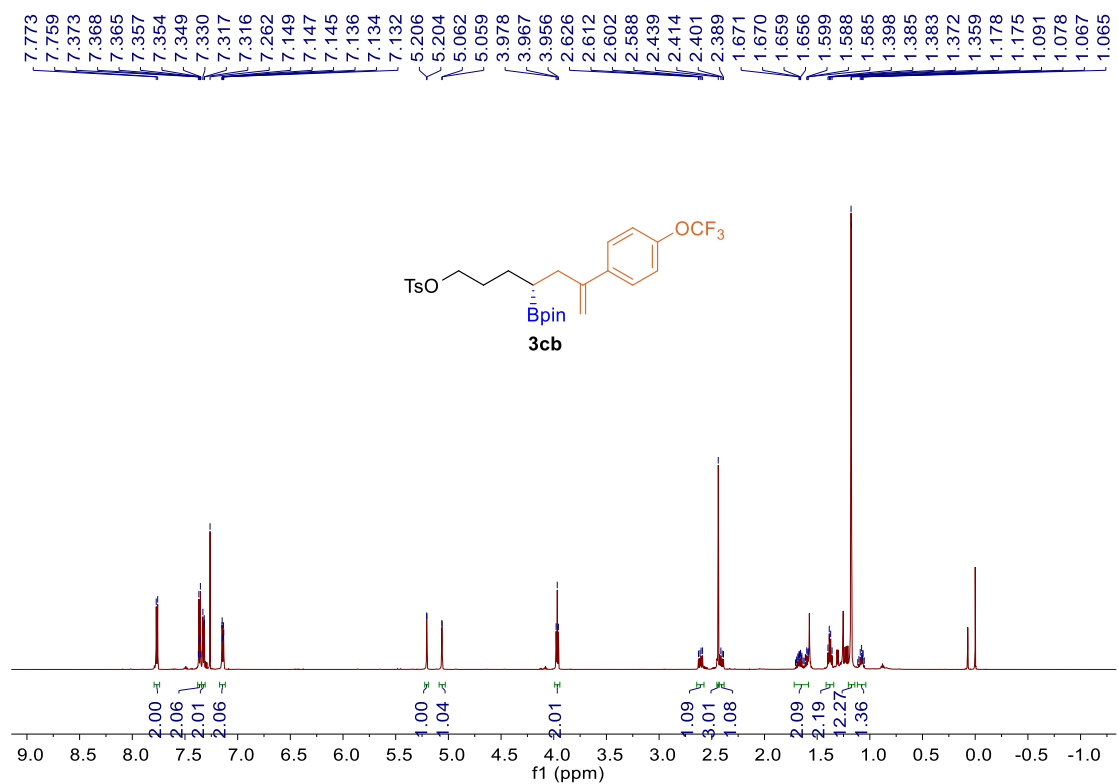
Supplementary Figure 241. ^1H NMR spectrum of compound 3ca

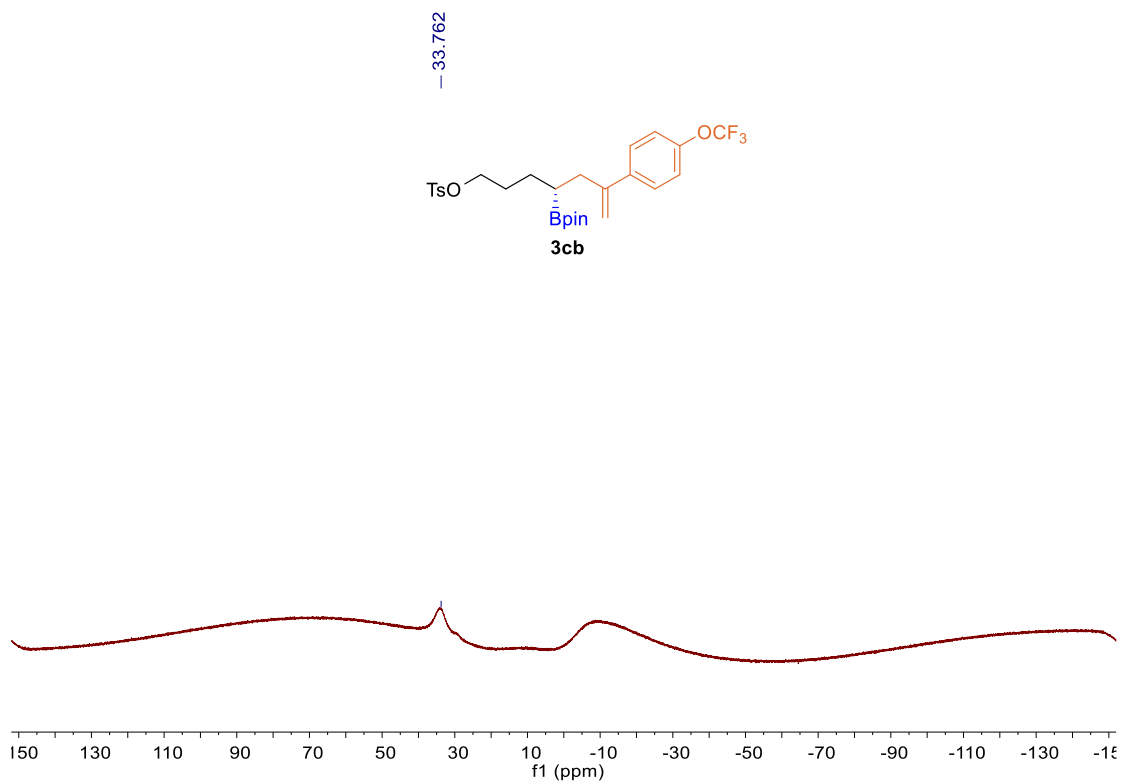


Supplementary Figure 242. ¹³C NMR spectrum of compound 3ca

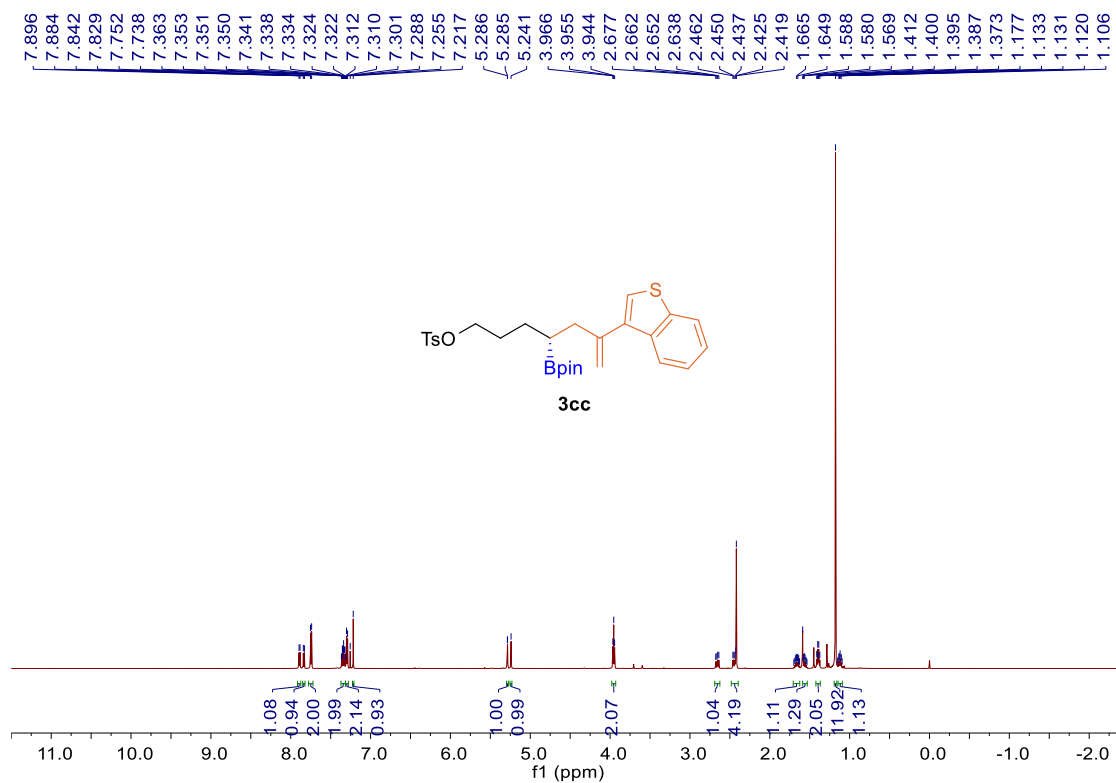


Supplementary Figure 243. ¹¹B NMR spectrum of compound 3ca

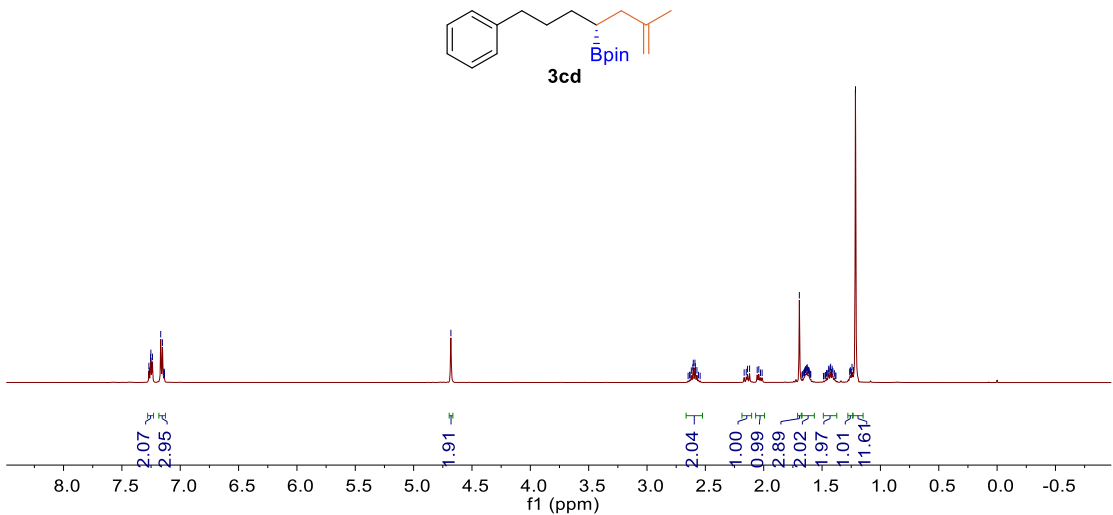




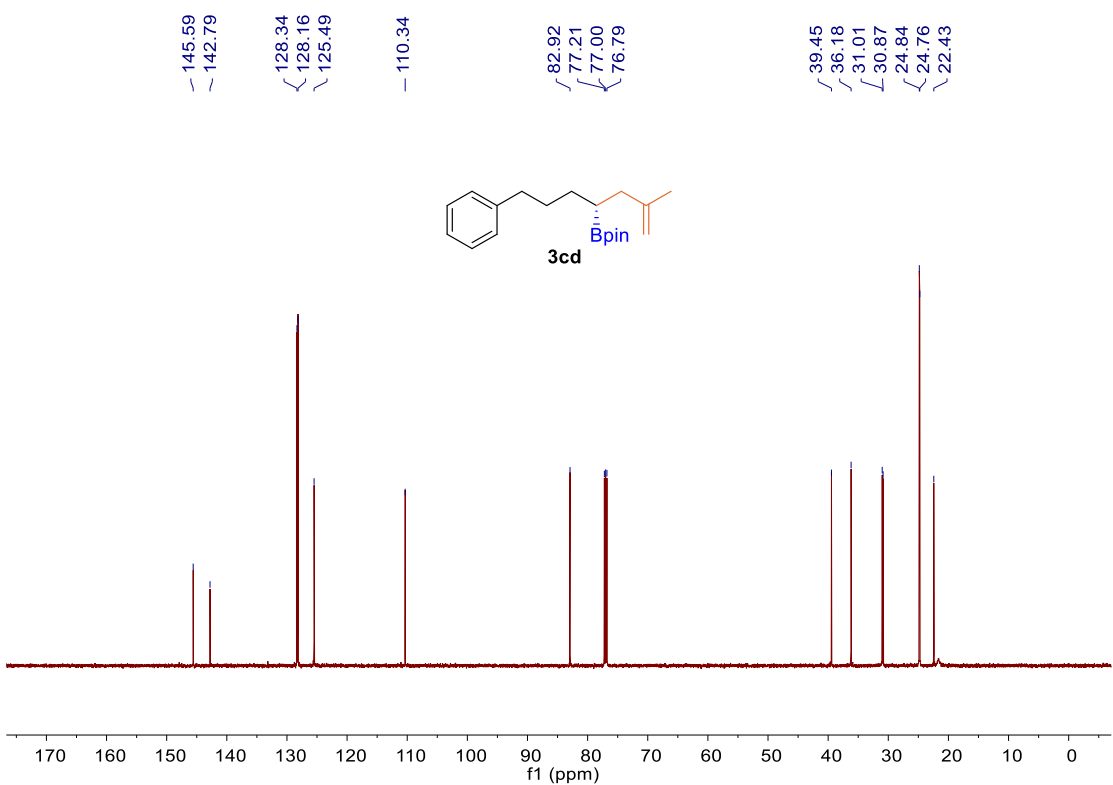
Supplementary Figure 246. ^{11}B NMR spectrum of compound 3cb



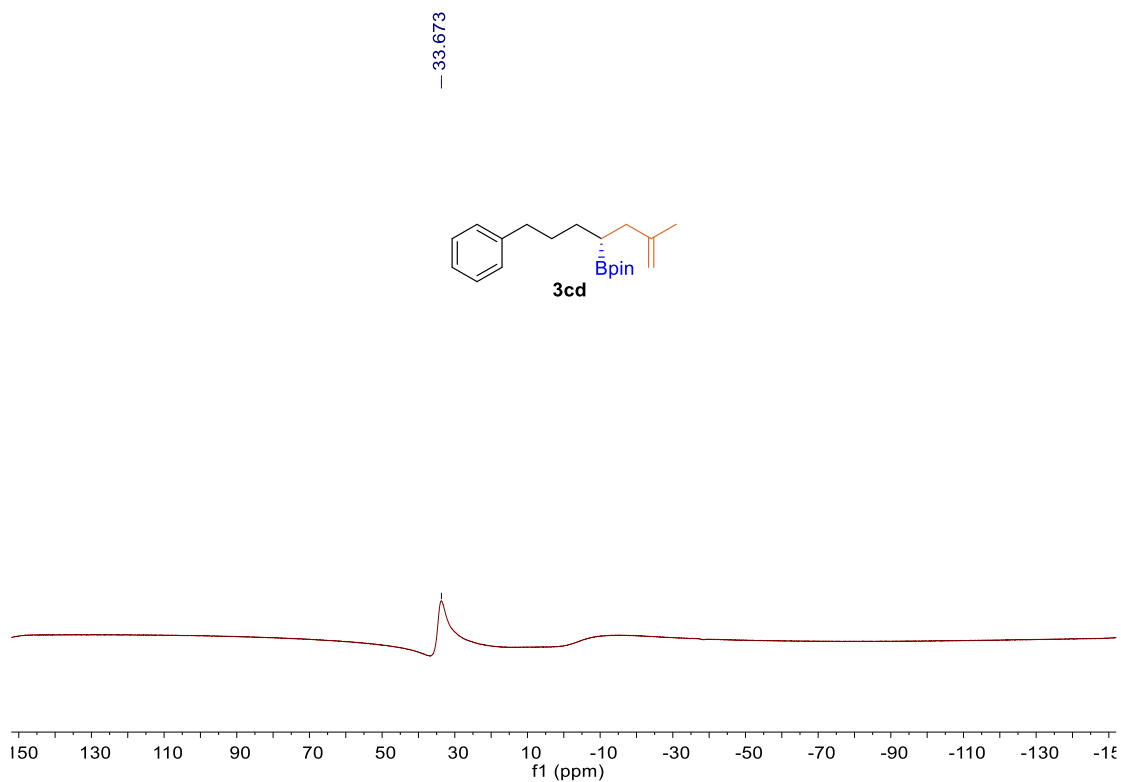
Supplementary Figure 247. ^1H NMR spectrum of compound 3cc



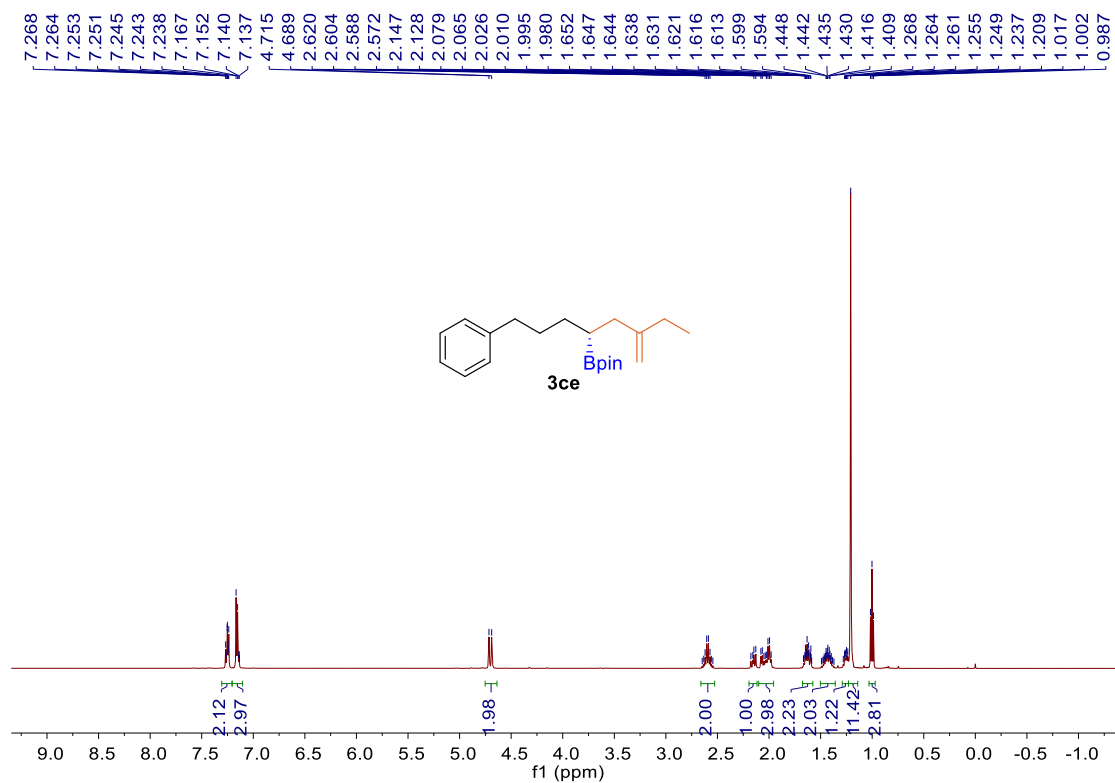
Supplementary Figure 250. ¹H NMR spectrum of compound 3cd



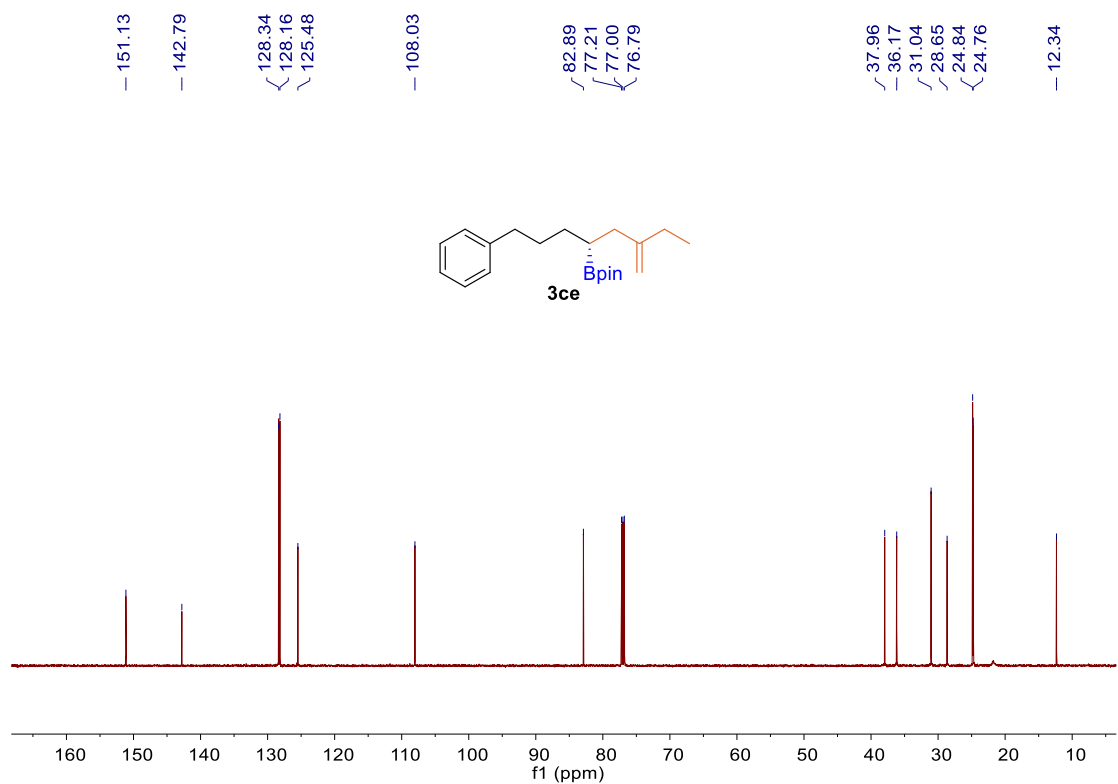
Supplementary Figure 251. ^{13}C NMR spectrum of compound 3cd



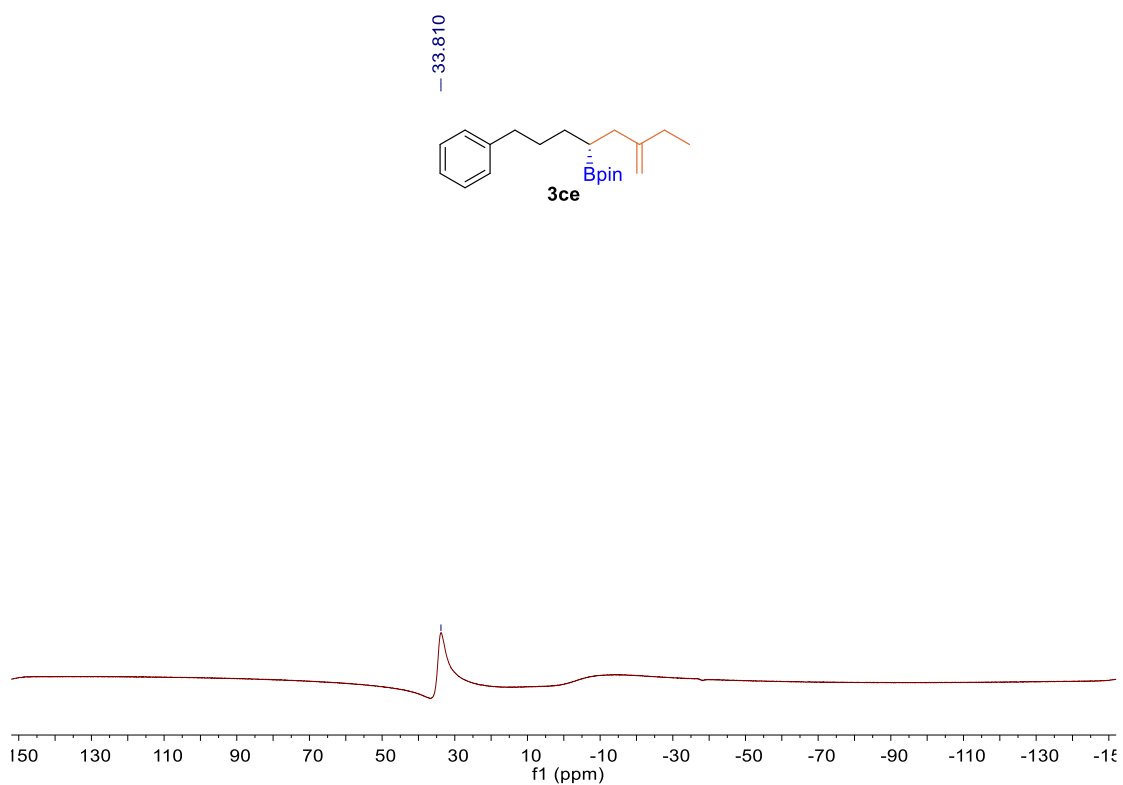
Supplementary Figure 252. ^{11}B NMR spectrum of compound **3cd**



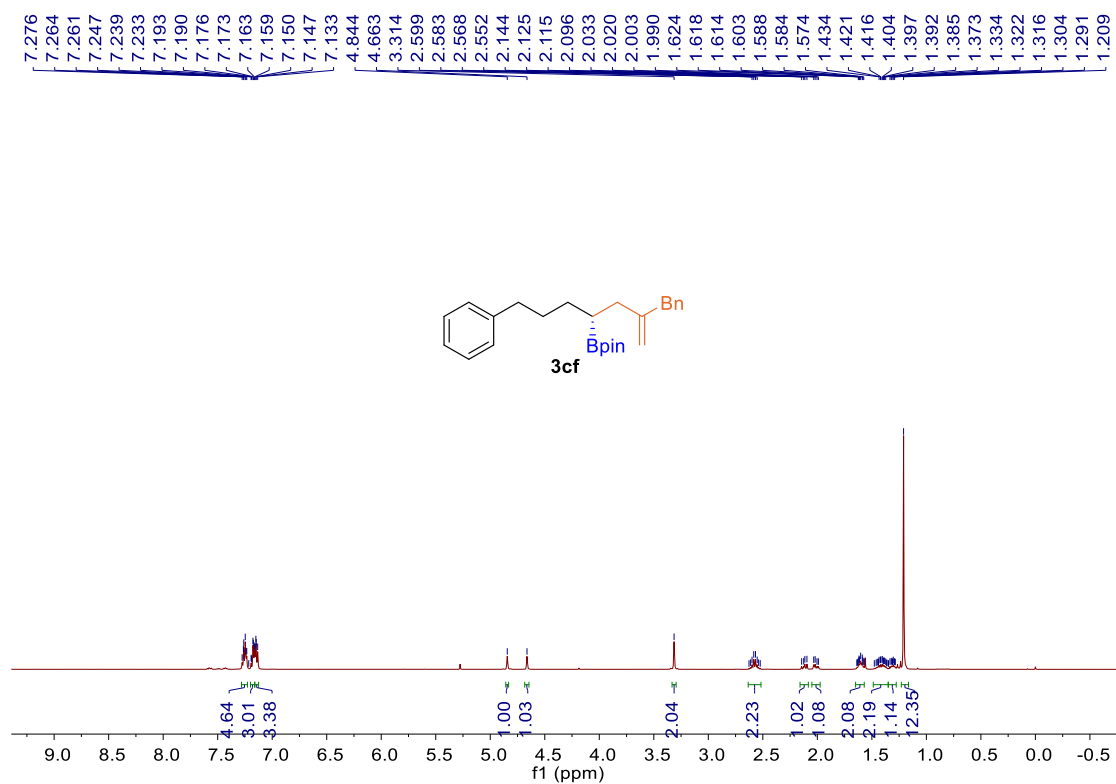
Supplementary Figure 253. ^1H NMR spectrum of compound **3ce**



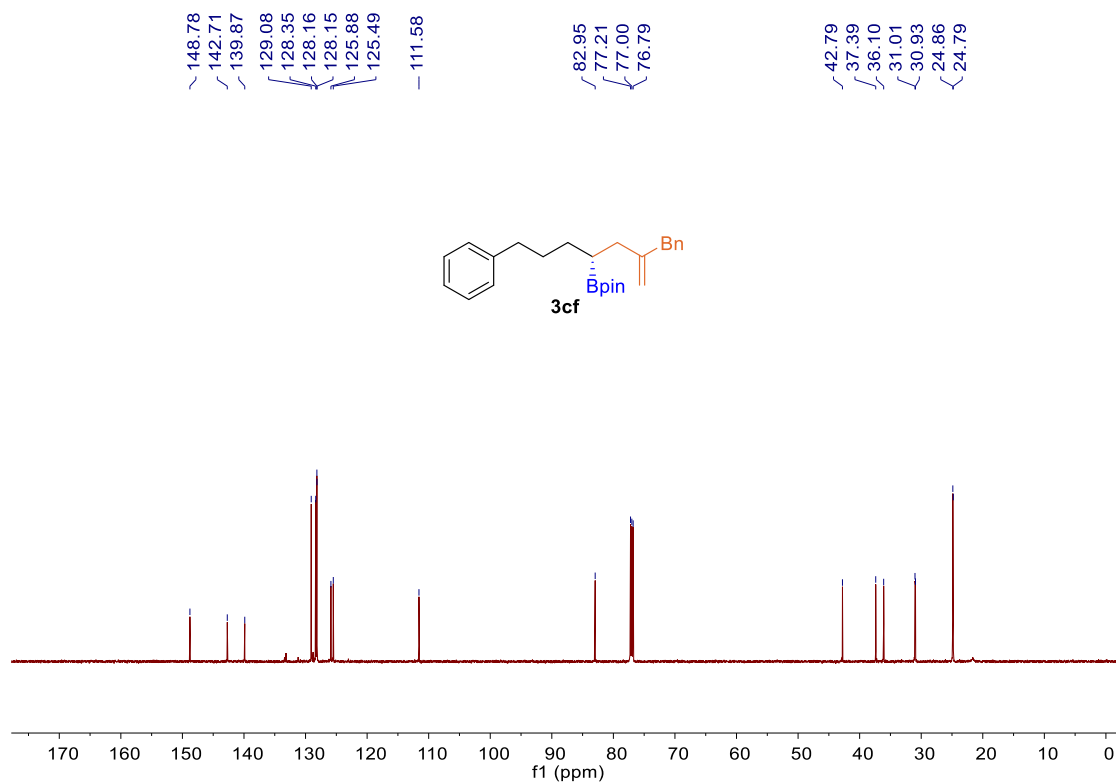
Supplementary Figure 254. ¹³C NMR spectrum of compound 3ce



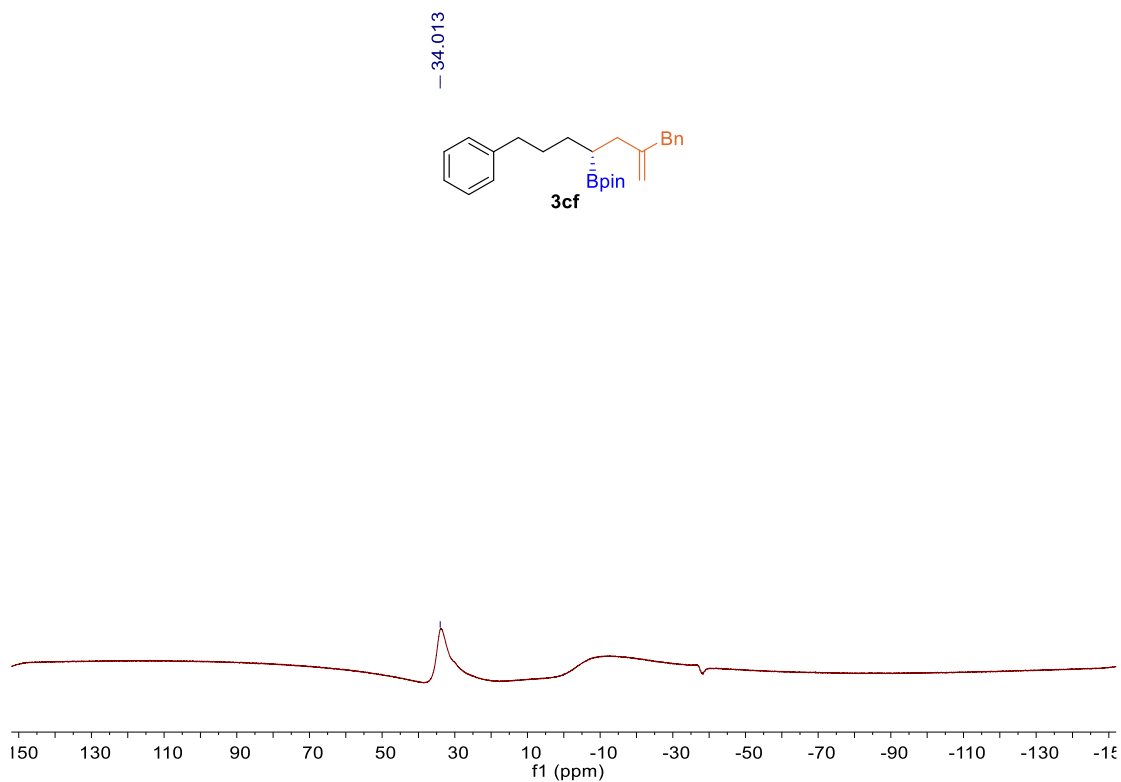
Supplementary Figure 255. ¹¹B NMR spectrum of compound 3ce



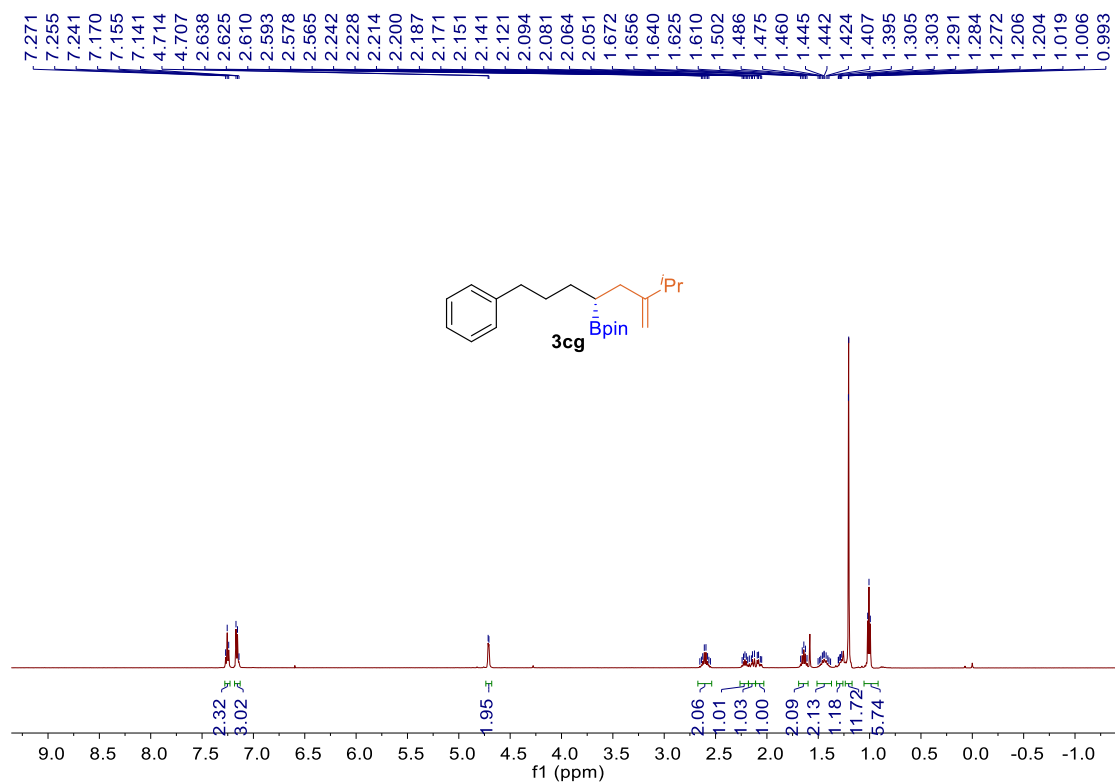
Supplementary Figure 256. ¹H NMR spectrum of compound 3cf



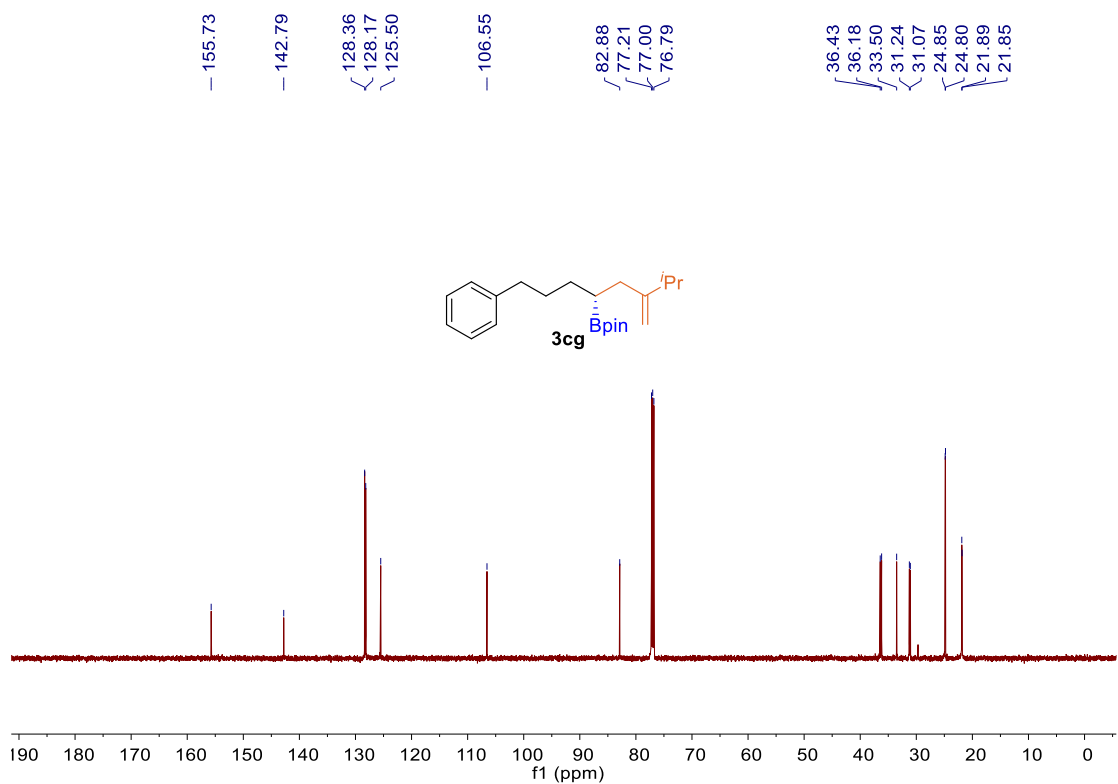
Supplementary Figure 257. ¹³C NMR spectrum of compound 3cf



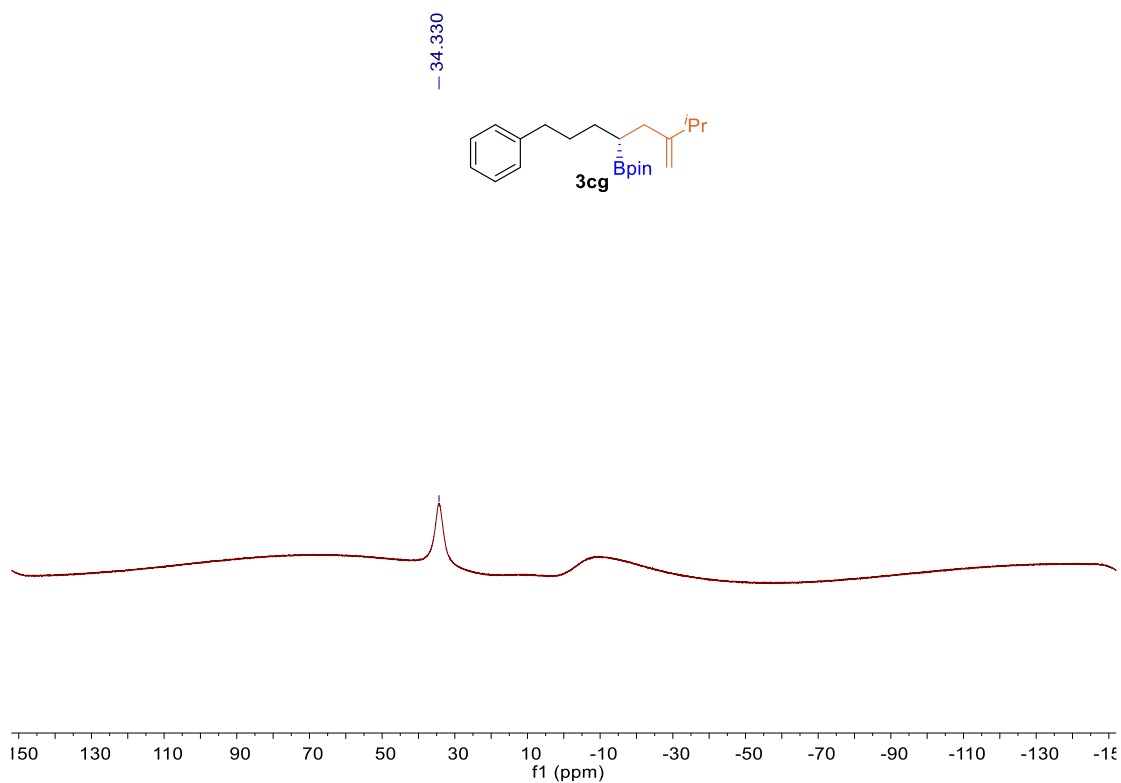
Supplementary Figure 258. ^{11}B NMR spectrum of compound **3cf**



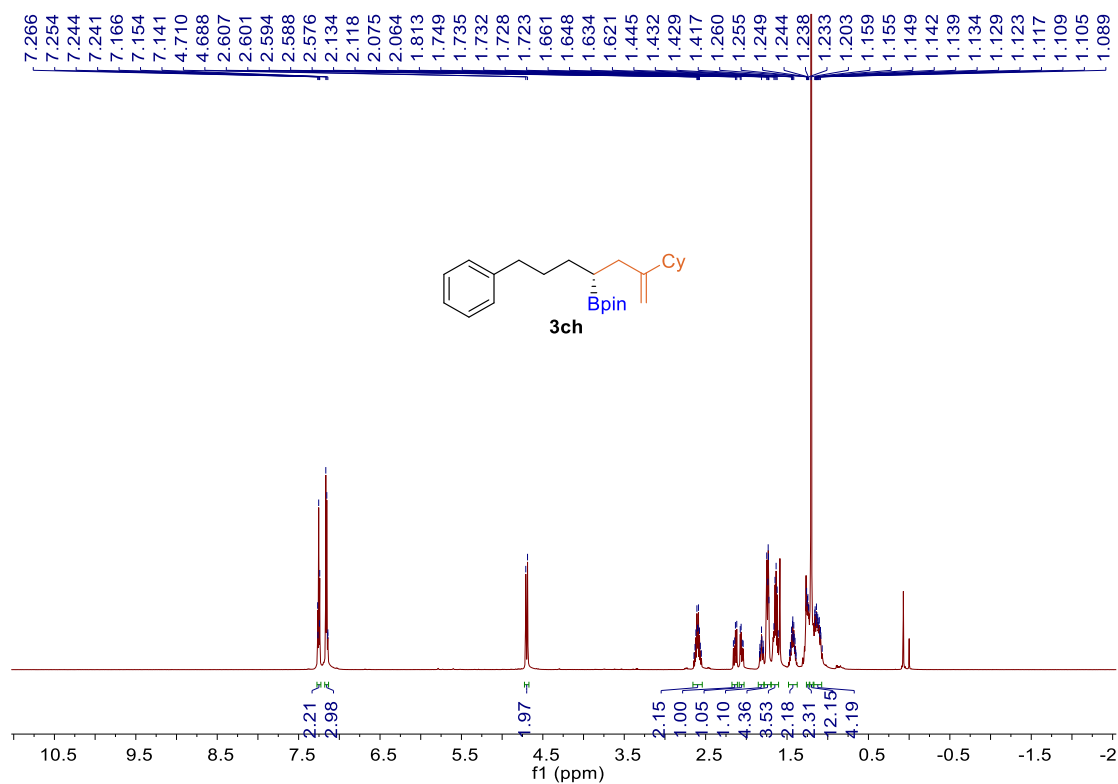
Supplementary Figure 259. ^1H NMR spectrum of compound **3cg**



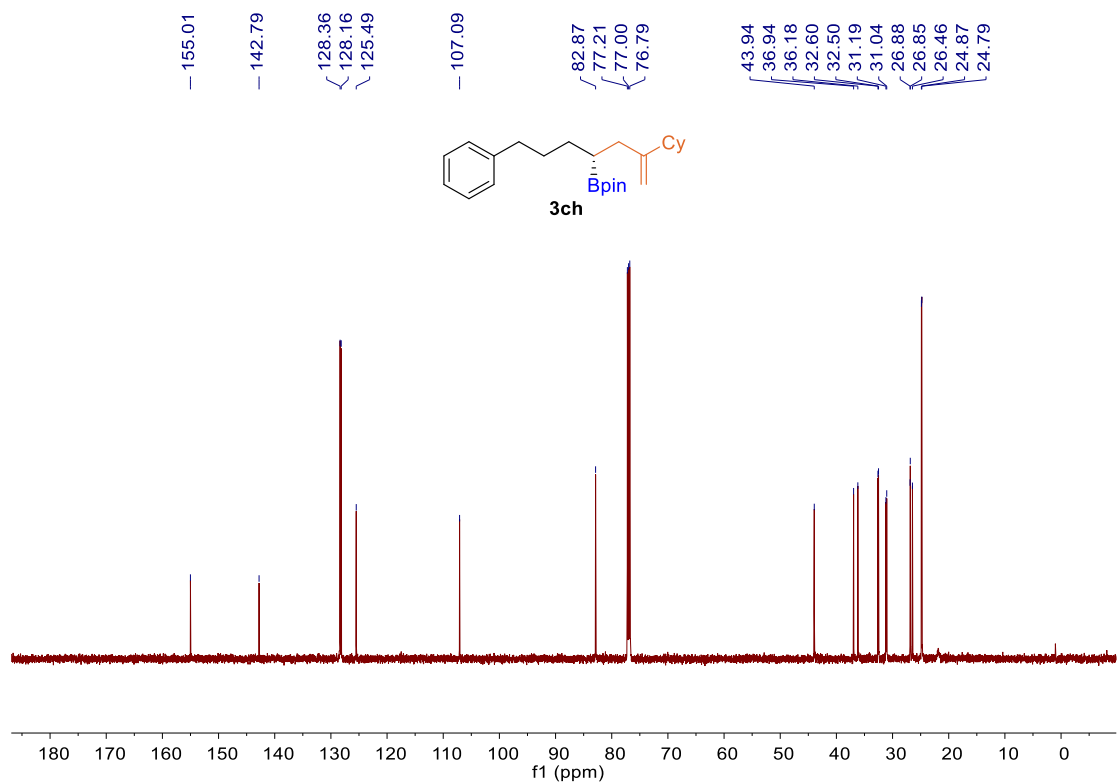
Supplementary Figure 260. ¹³C NMR spectrum of compound 3cg



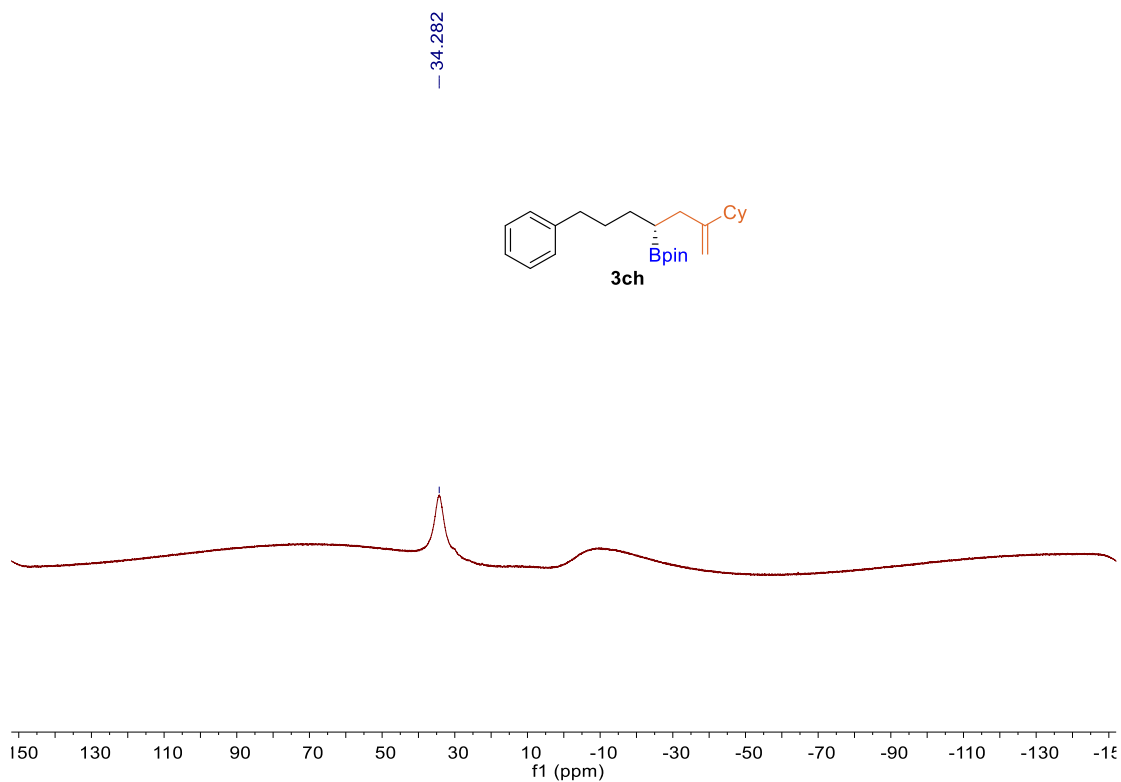
Supplementary Figure 261. ¹¹B NMR spectrum of compound 3cg



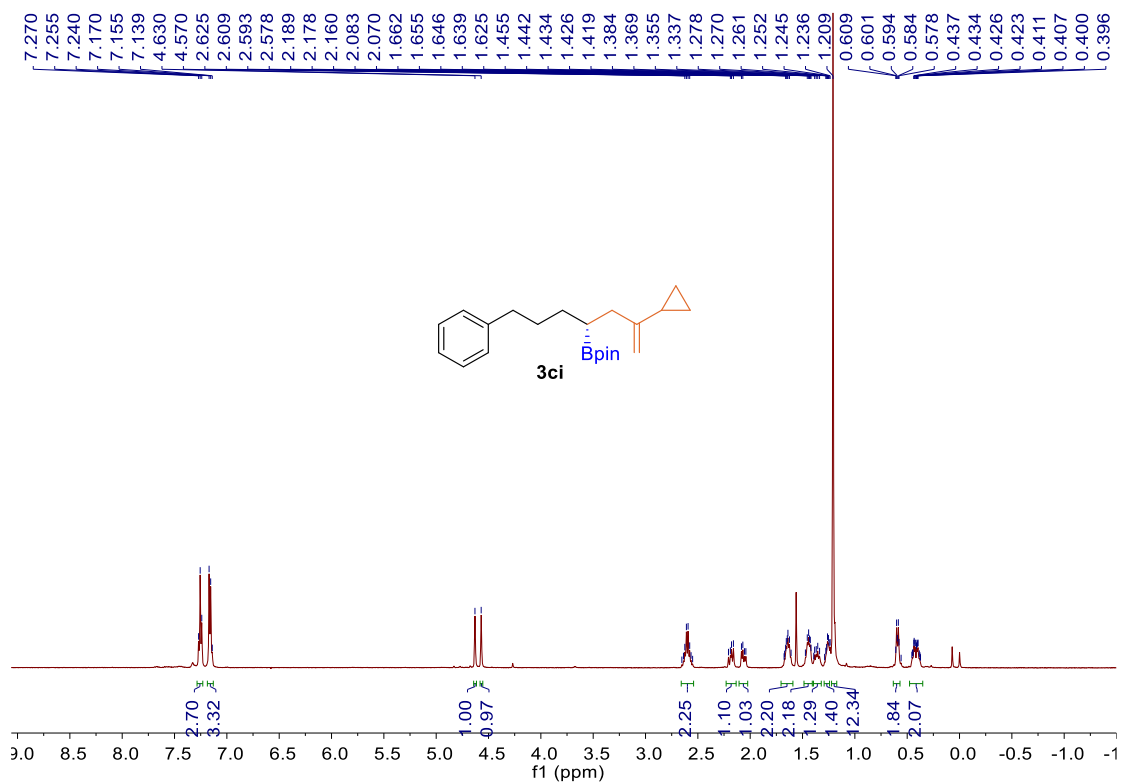
Supplementary Figure 262. ¹H NMR spectrum of compound 3ch



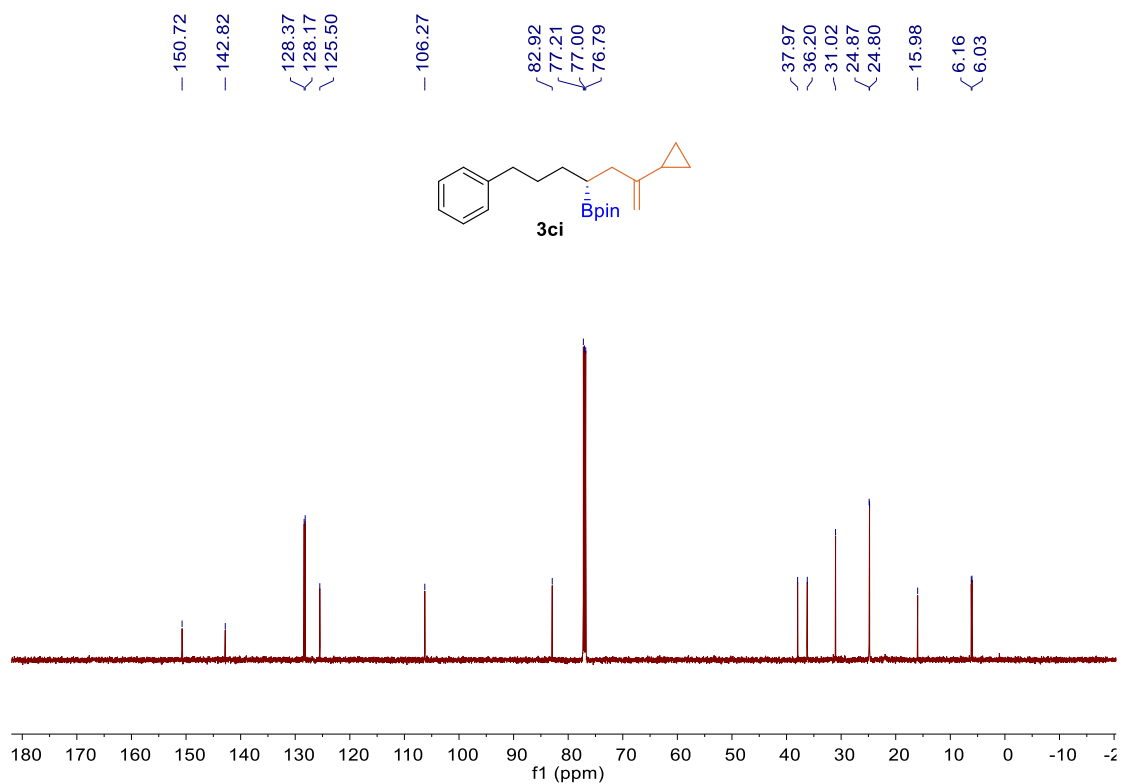
Supplementary Figure 263. ¹³C NMR spectrum of compound 3ch



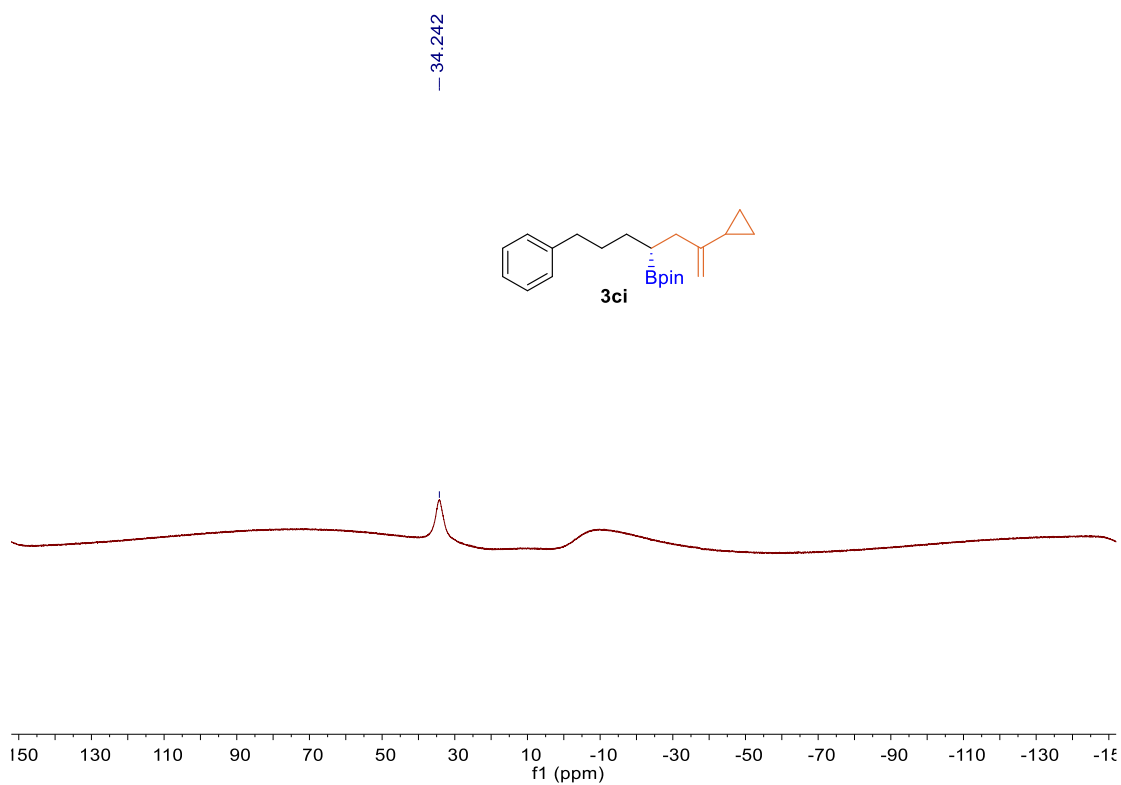
Supplementary Figure 264. ^{11}B NMR spectrum of compound 3ch



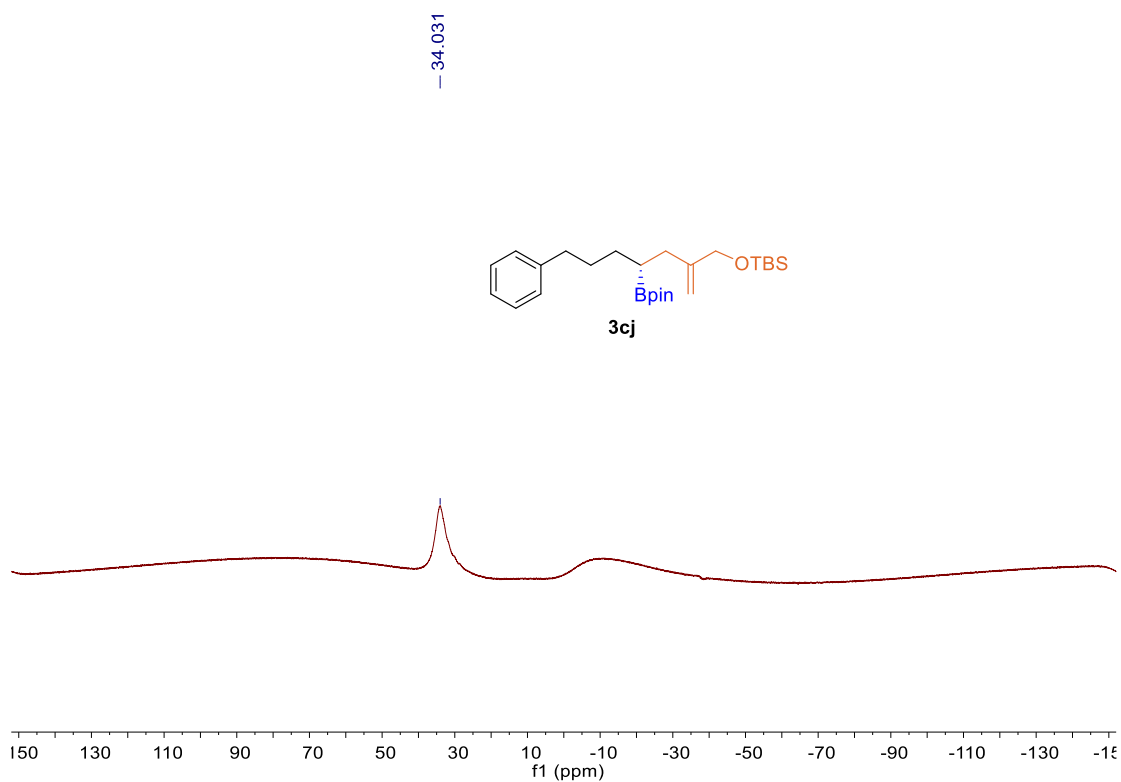
Supplementary Figure 265. ^1H NMR spectrum of compound 3ci



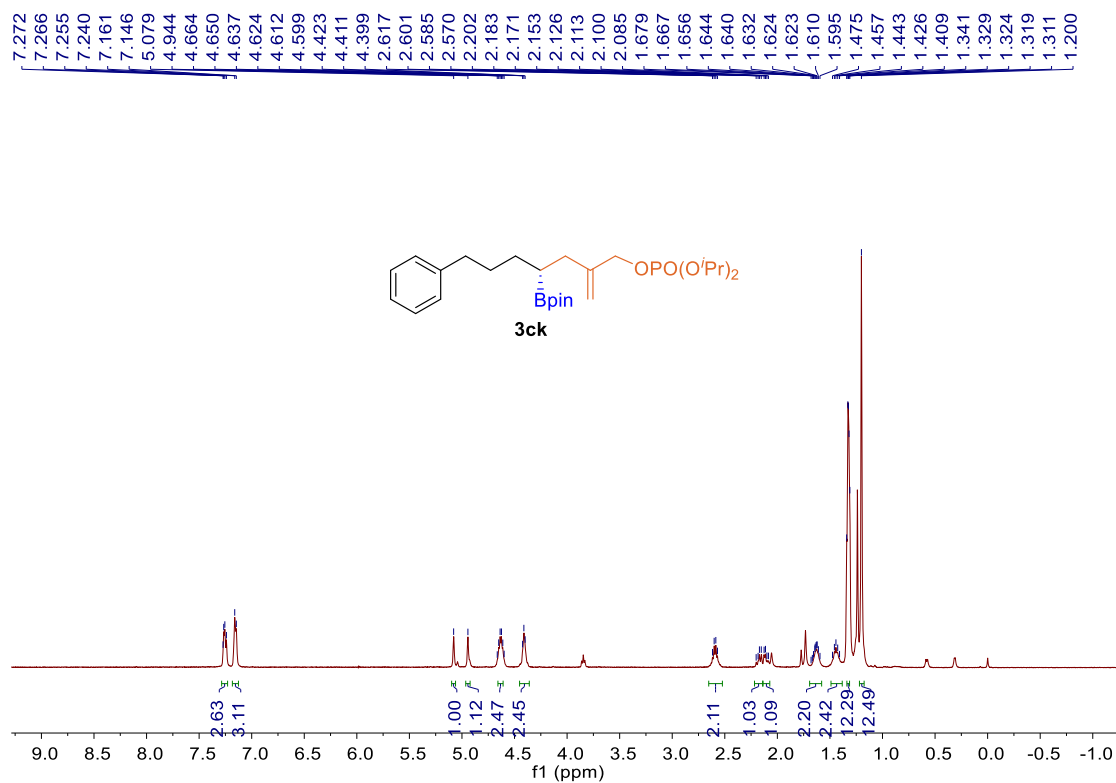
Supplementary Figure 266. ¹³C NMR spectrum of compound 3ci



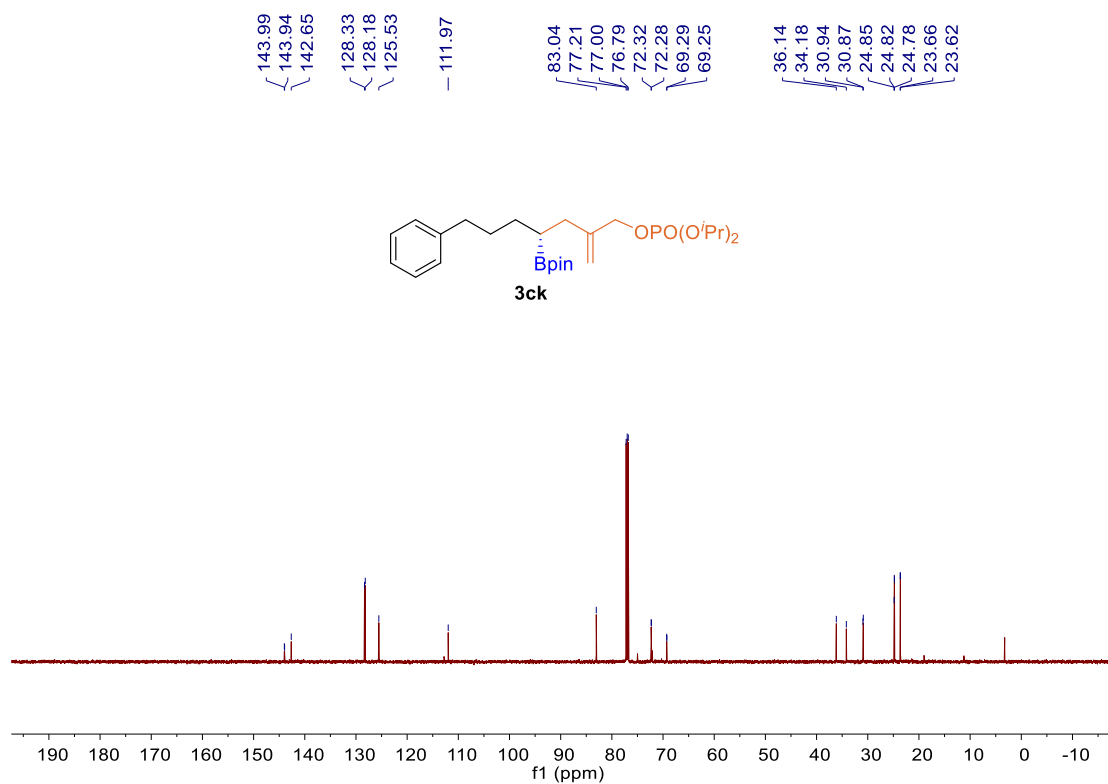
Supplementary Figure 267. ¹¹B NMR spectrum of compound 3ci



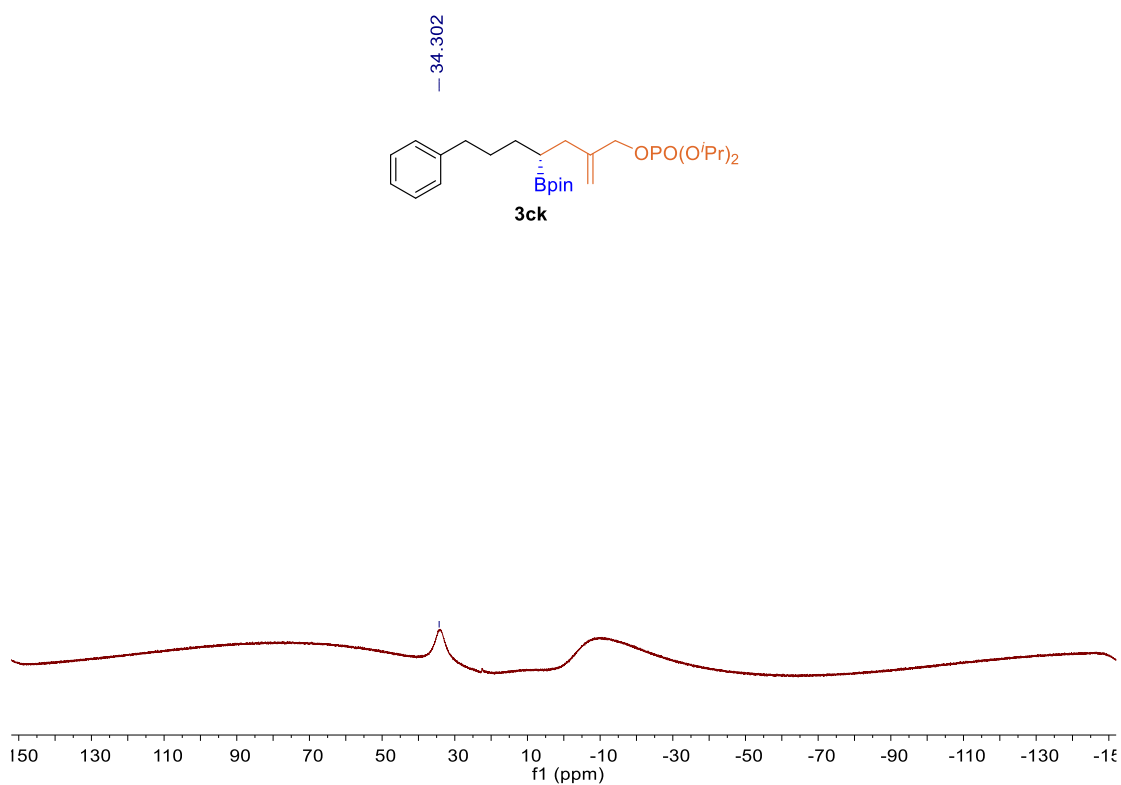
Supplementary Figure 270. ^{11}B NMR spectrum of compound **3cj**



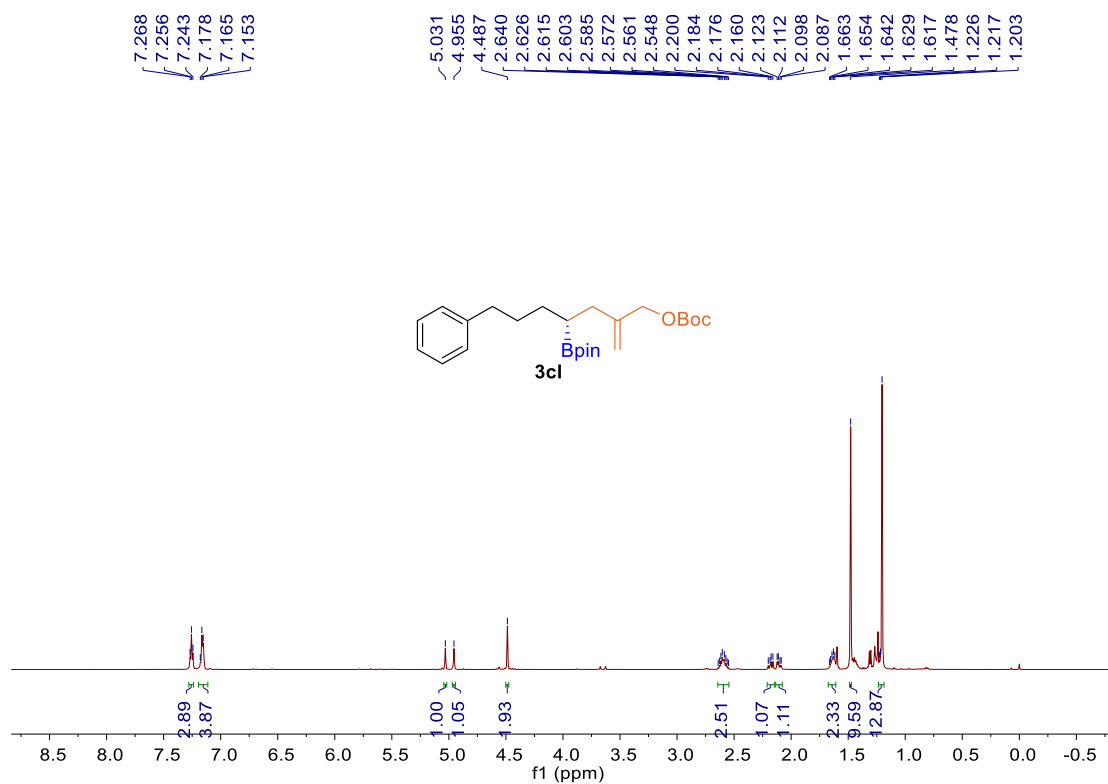
Supplementary Figure 271. ^1H NMR spectrum of compound **3ck**



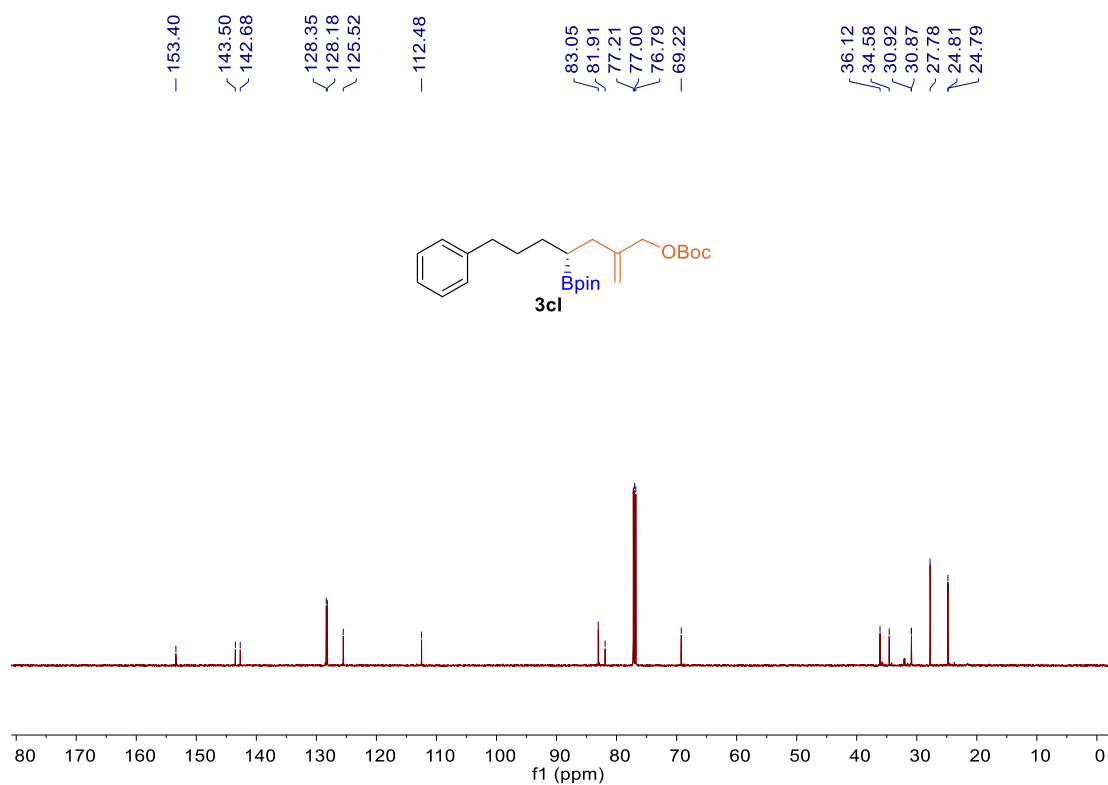
Supplementary Figure 272. ¹³C NMR spectrum of compound **3ck**



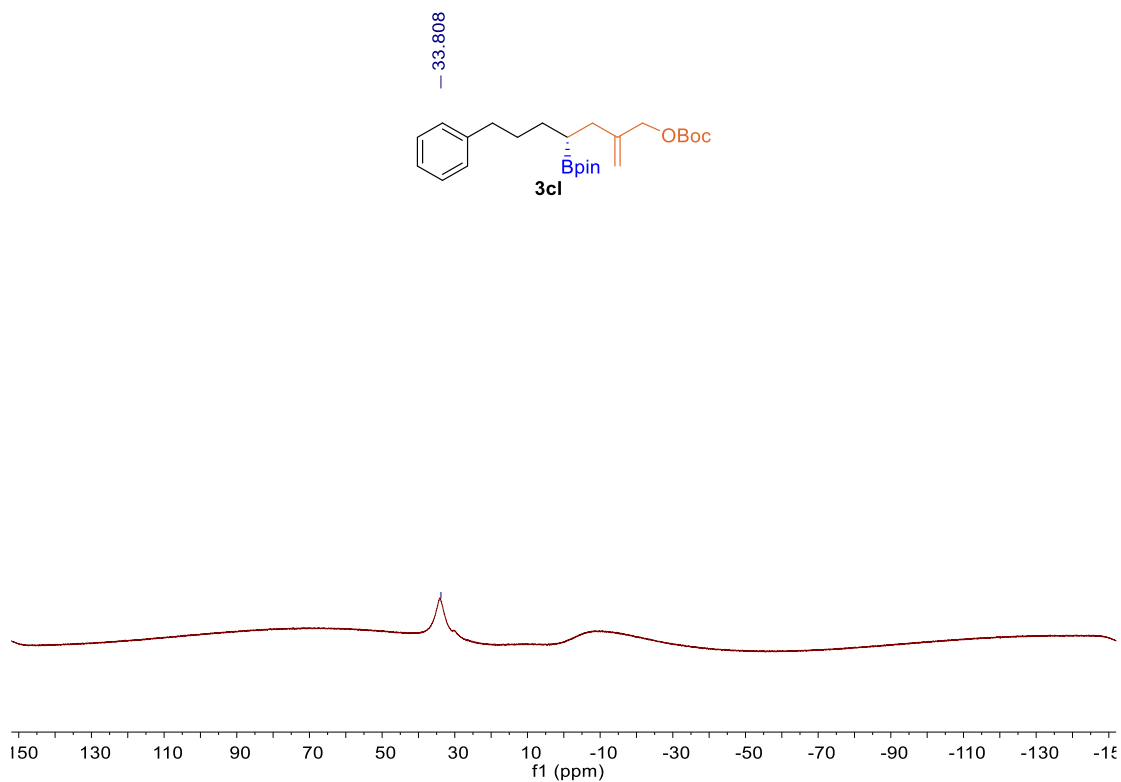
Supplementary Figure 273. ¹¹B NMR spectrum of compound **3ck**



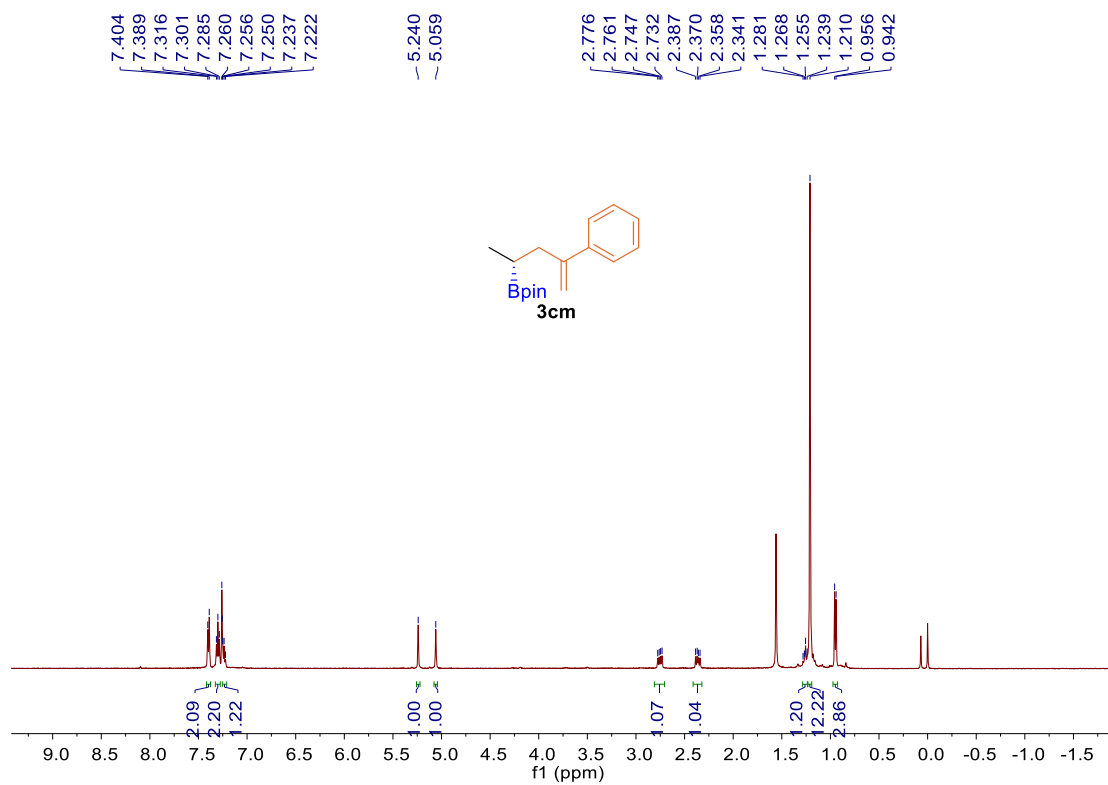
Supplementary Figure 274. ¹H NMR spectrum of compound 3cl



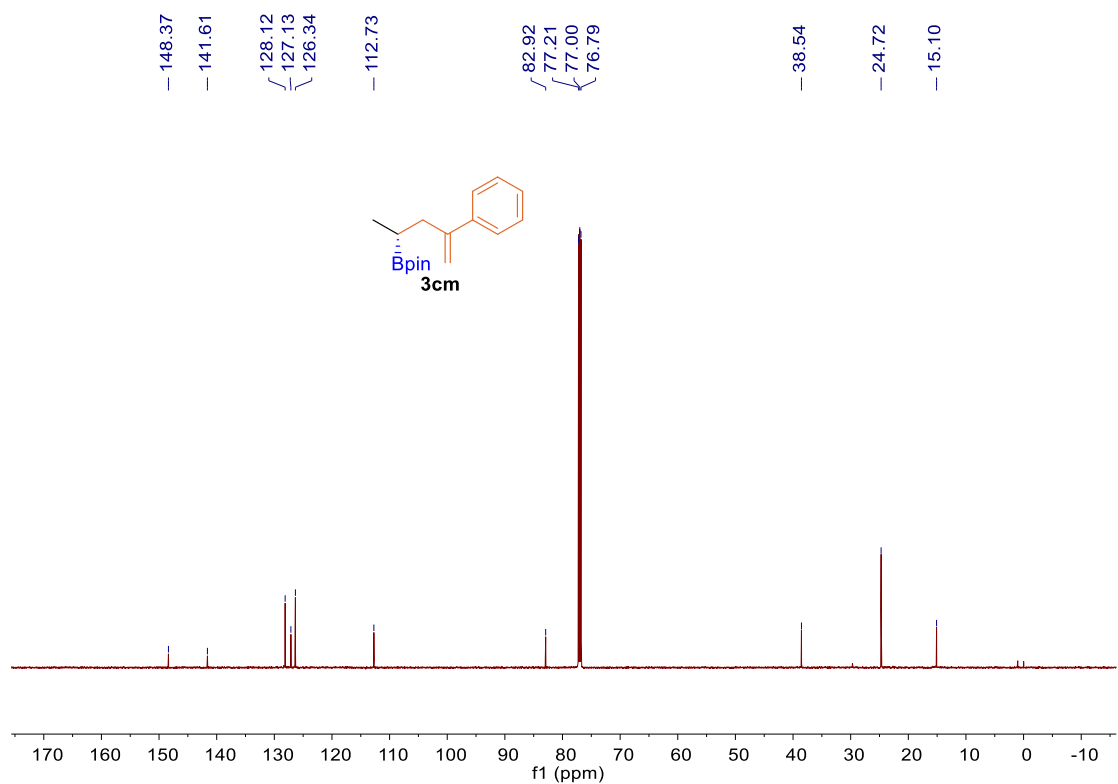
Supplementary Figure 275. ¹³C NMR spectrum of compound 3cl



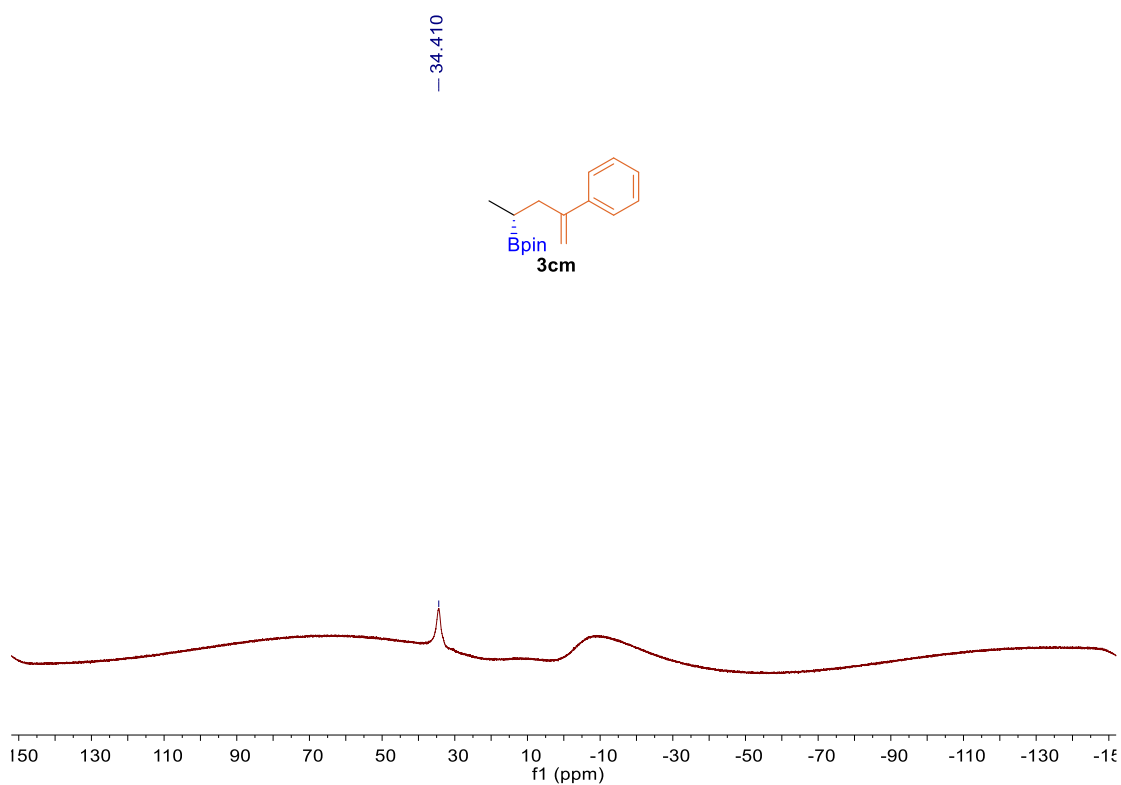
Supplementary Figure 276. ^{11}B NMR spectrum of compound **3cl**



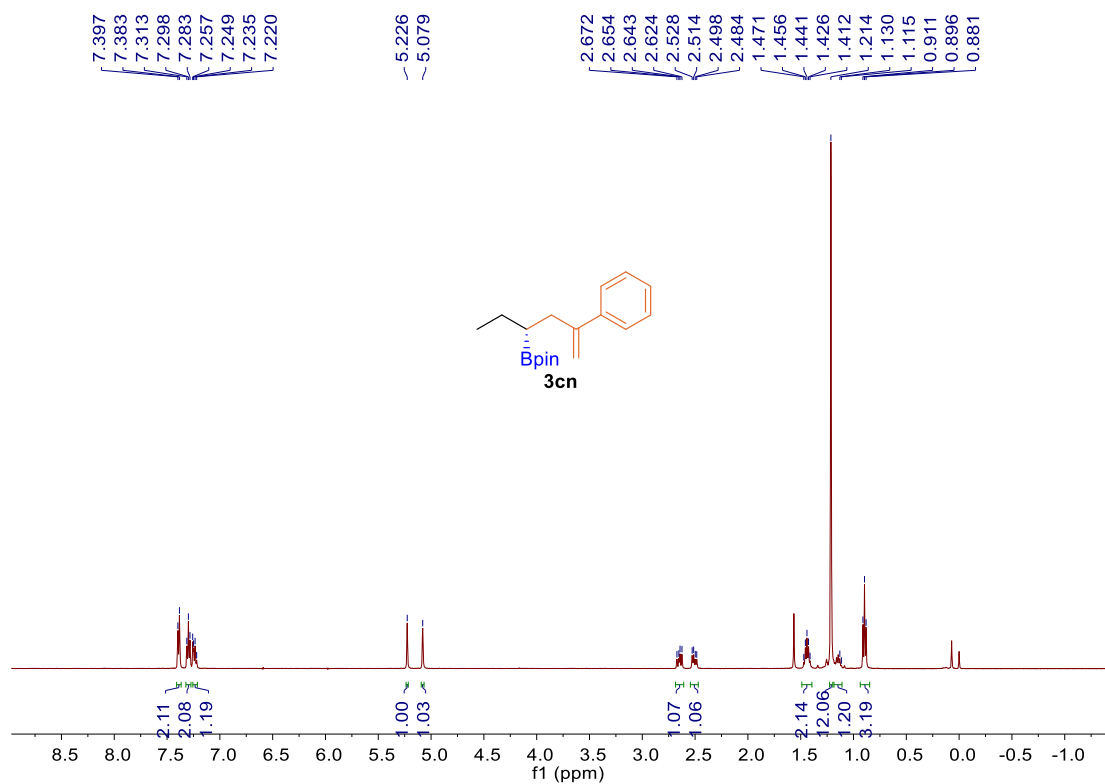
Supplementary Figure 277. ^1H NMR spectrum of compound **3cm**



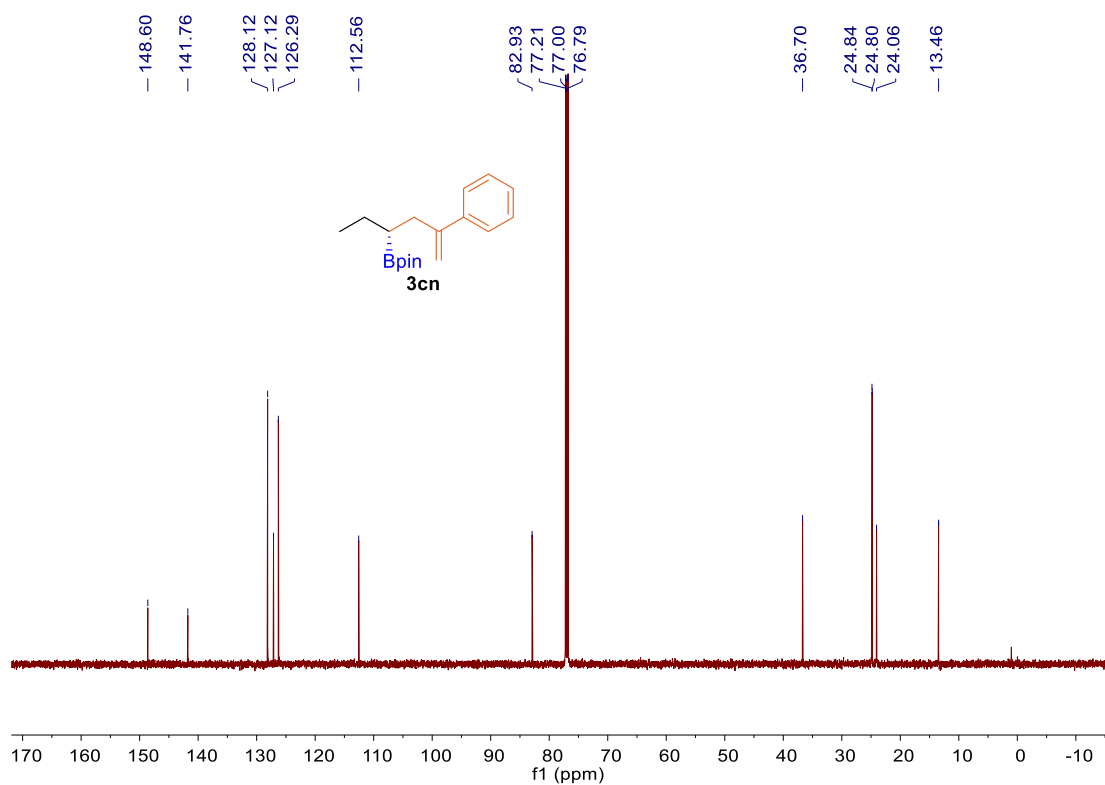
Supplementary Figure 278. ¹³C NMR spectrum of compound 3cm



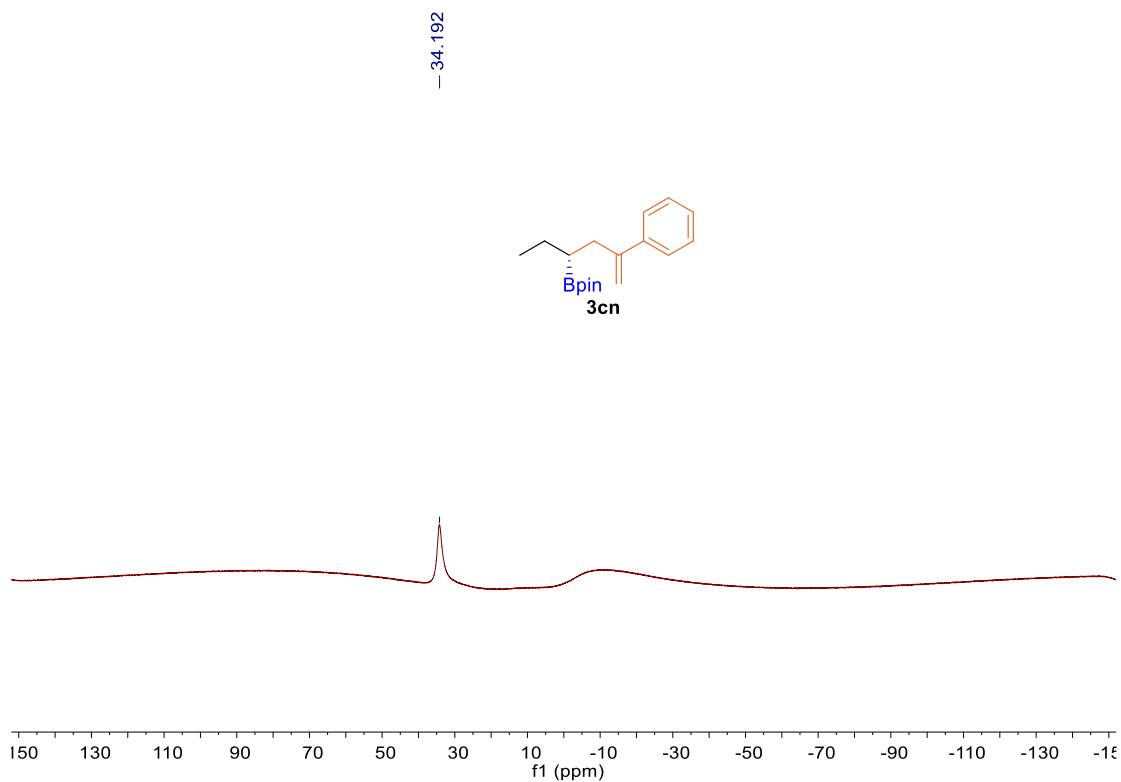
Supplementary Figure 279. ¹¹B NMR spectrum of compound 3cm



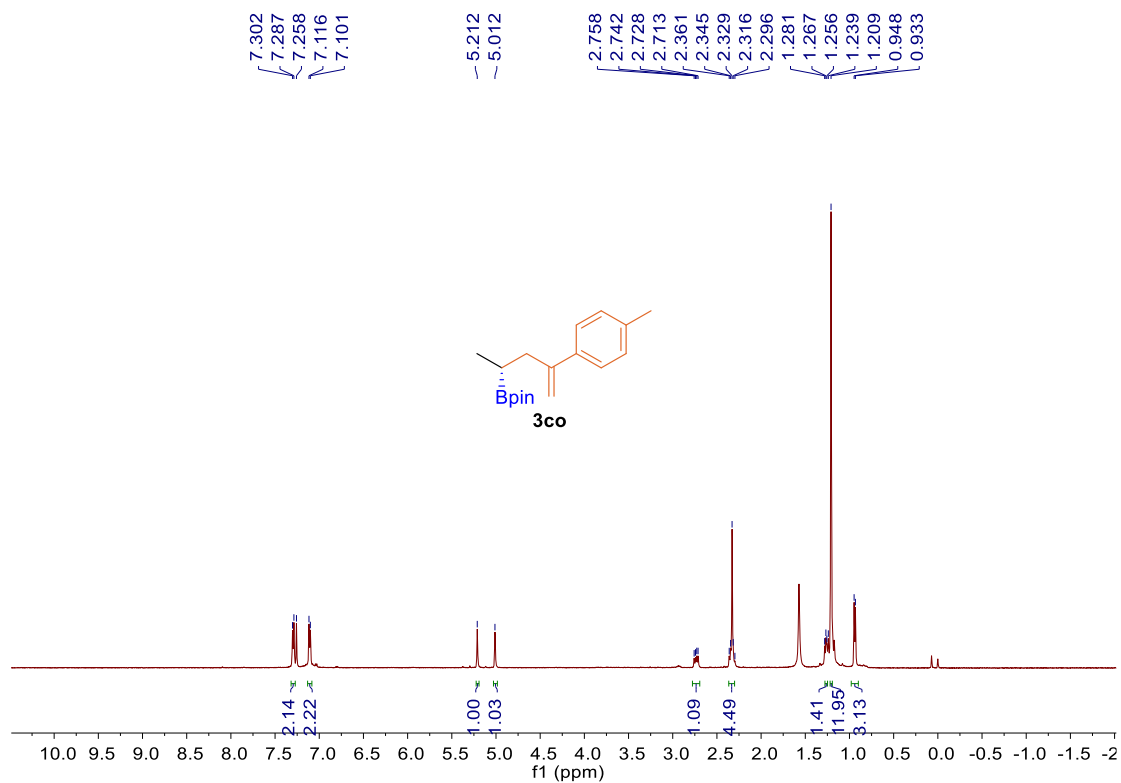
Supplementary Figure 280. ¹H NMR spectrum of compound 3cn



Supplementary Figure 281. ¹³C NMR spectrum of compound 3cn

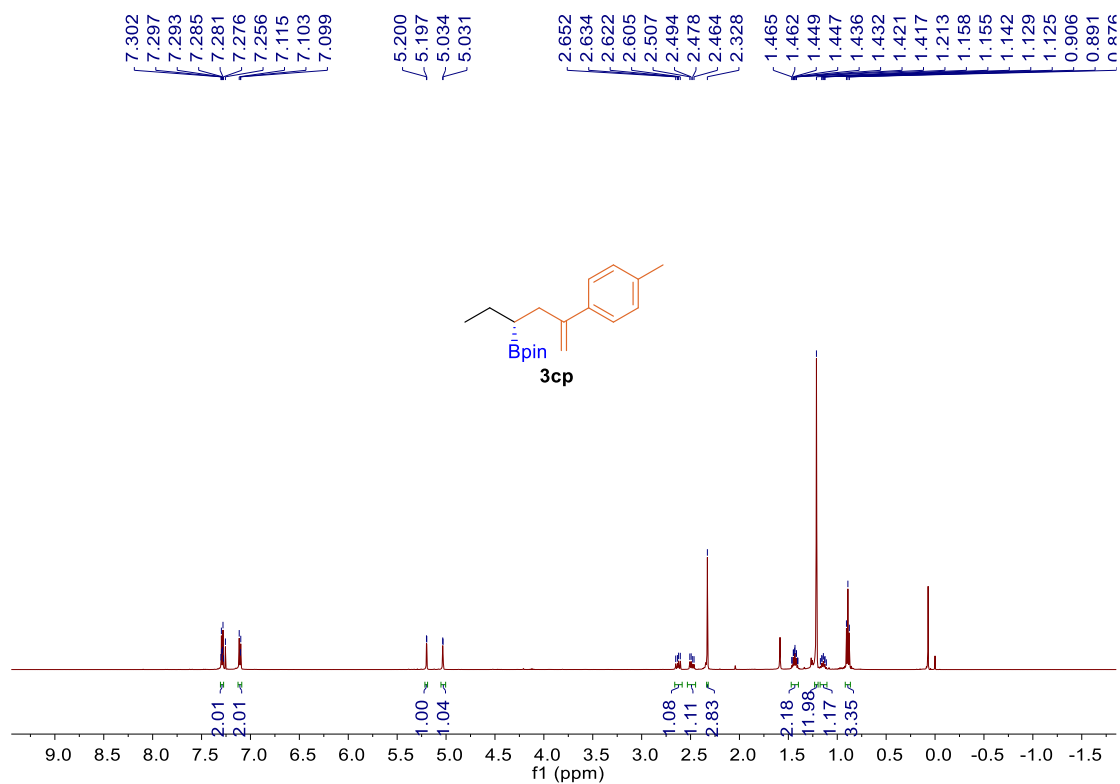


Supplementary Figure 282. ^{11}B NMR spectrum of compound 3cn

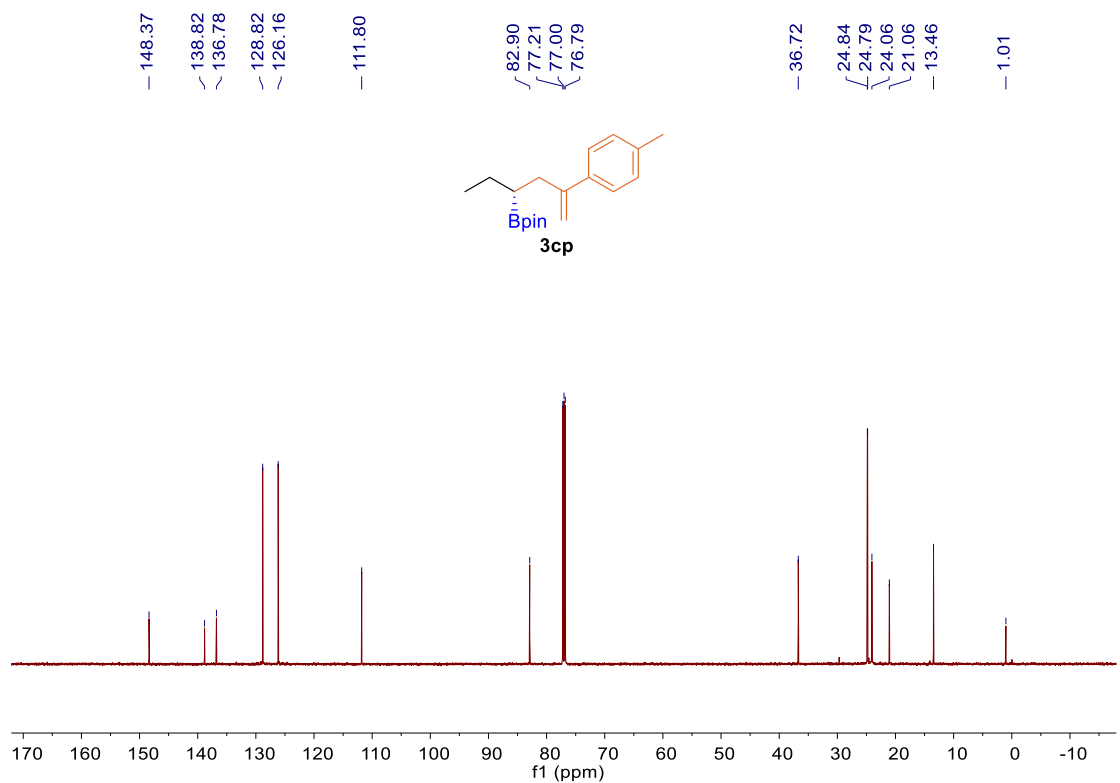


Supplementary Figure 283. ^1H NMR spectrum of compound 3co

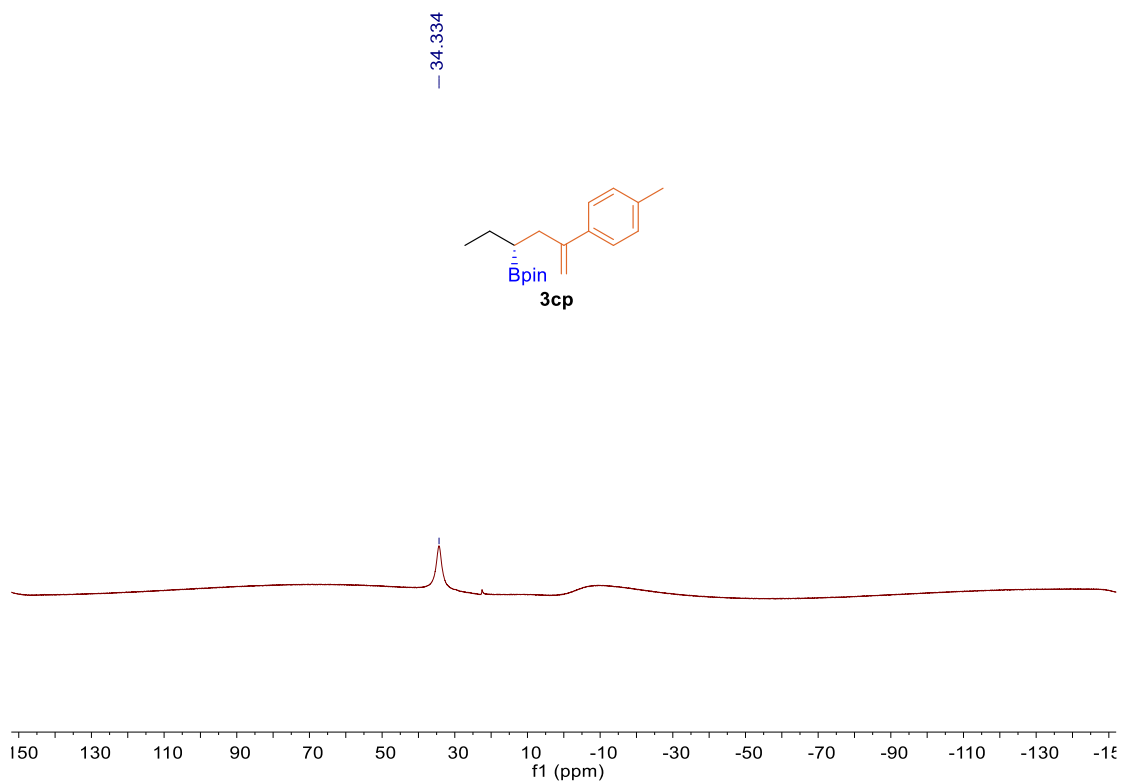




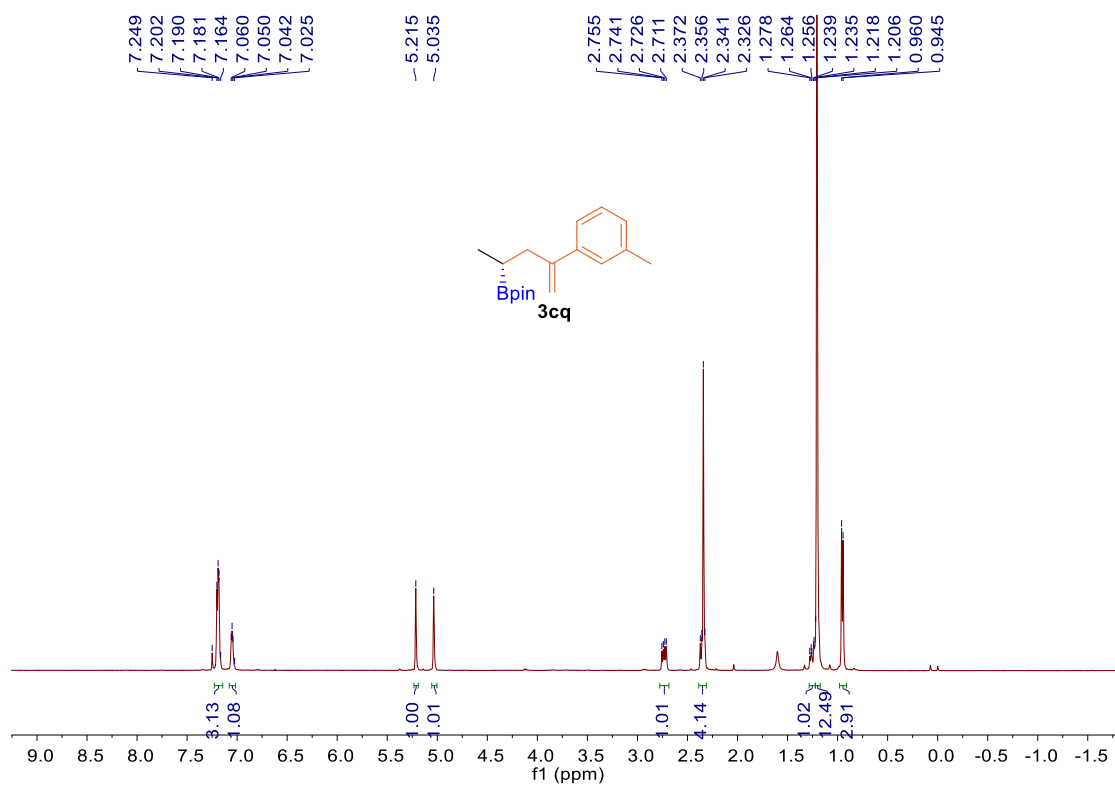
Supplementary Figure 286. ¹H NMR spectrum of compound 3cp



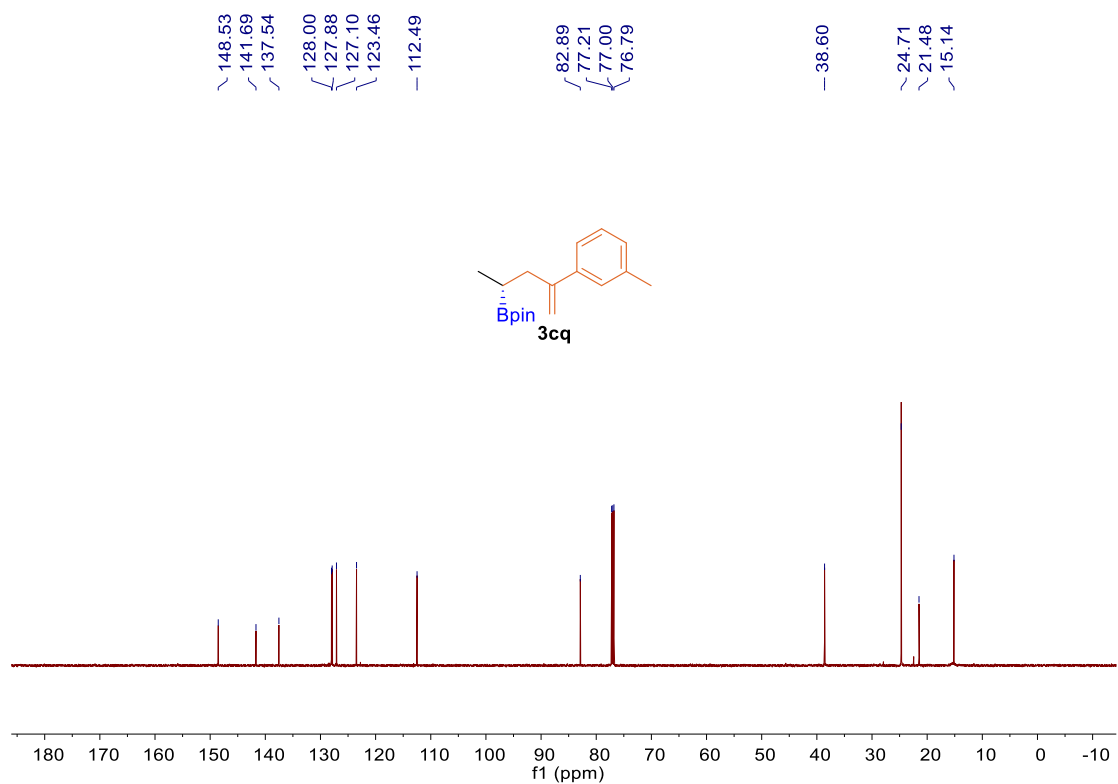
Supplementary Figure 287. ¹³C NMR spectrum of compound 3cp



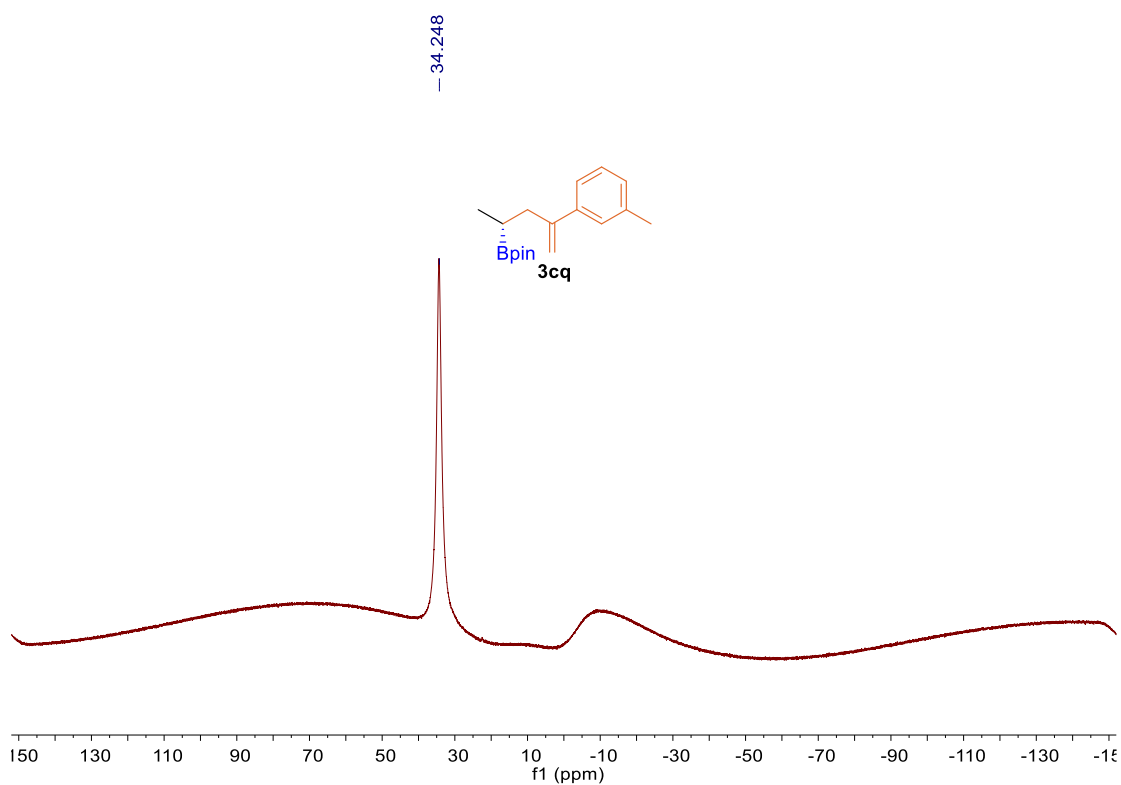
Supplementary Figure 288. ^{11}B NMR spectrum of compound 3cp



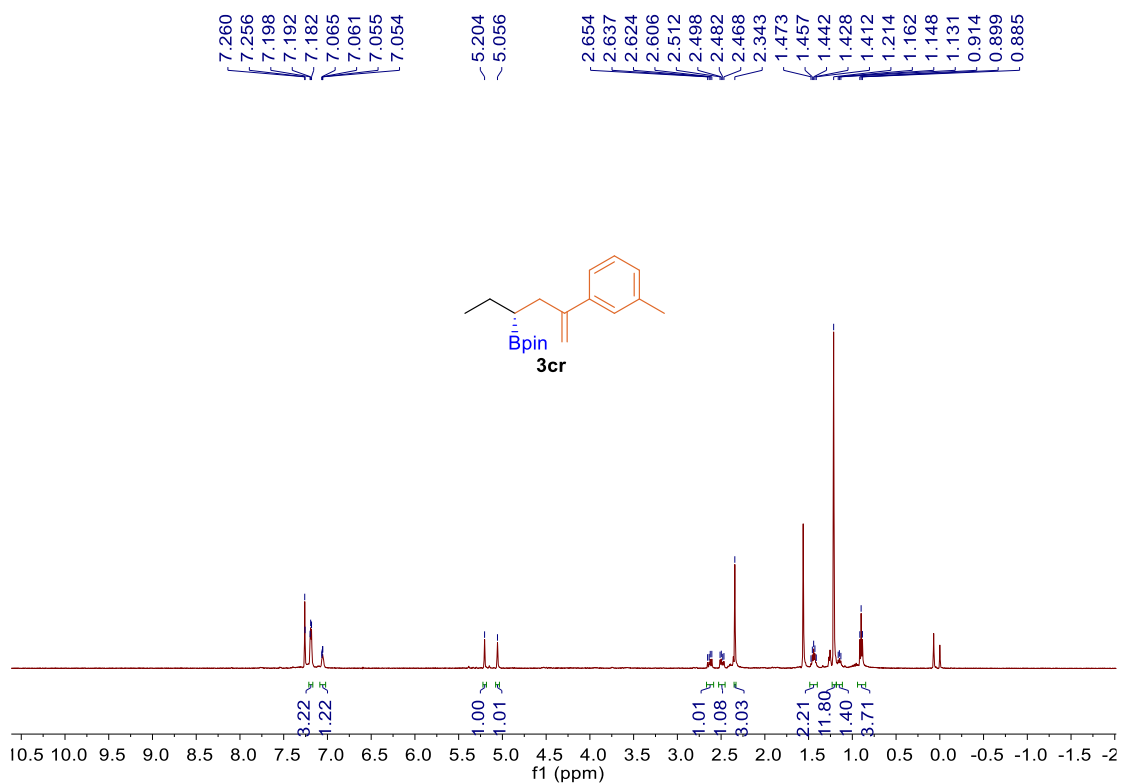
Supplementary Figure 289. ^1H NMR spectrum of compound 3cq



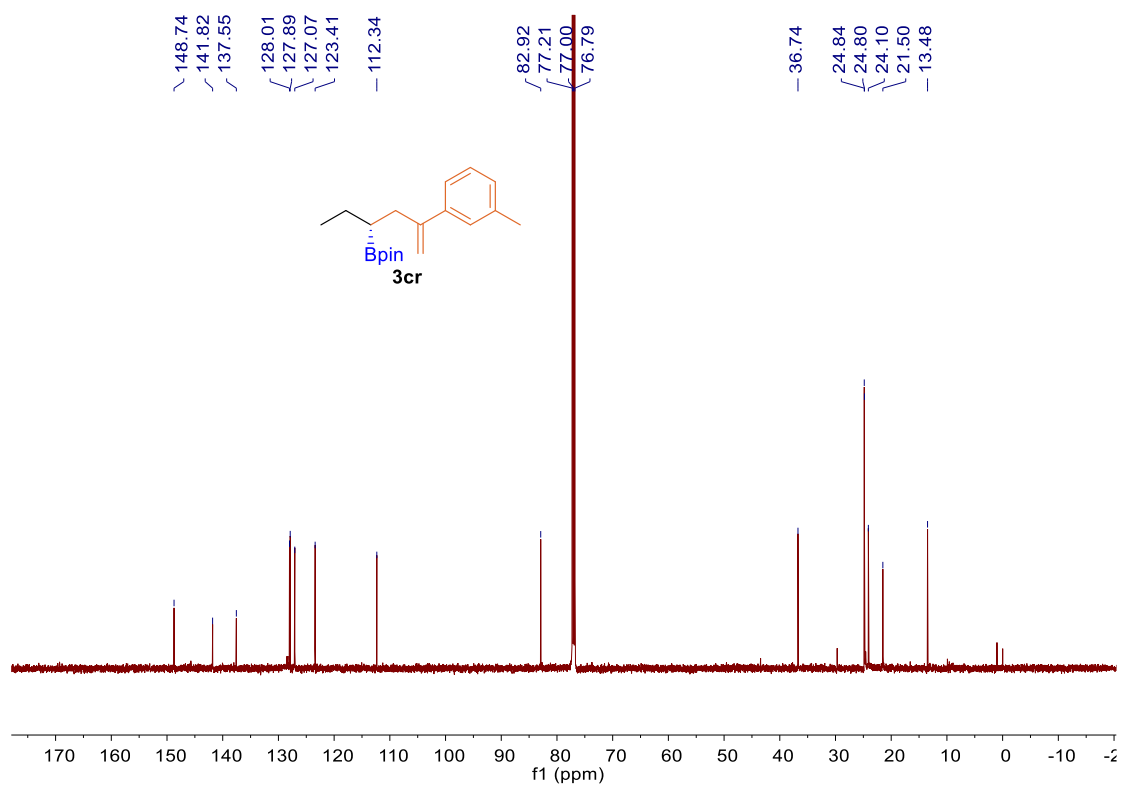
Supplementary Figure 290. ¹³C NMR spectrum of compound 3cq



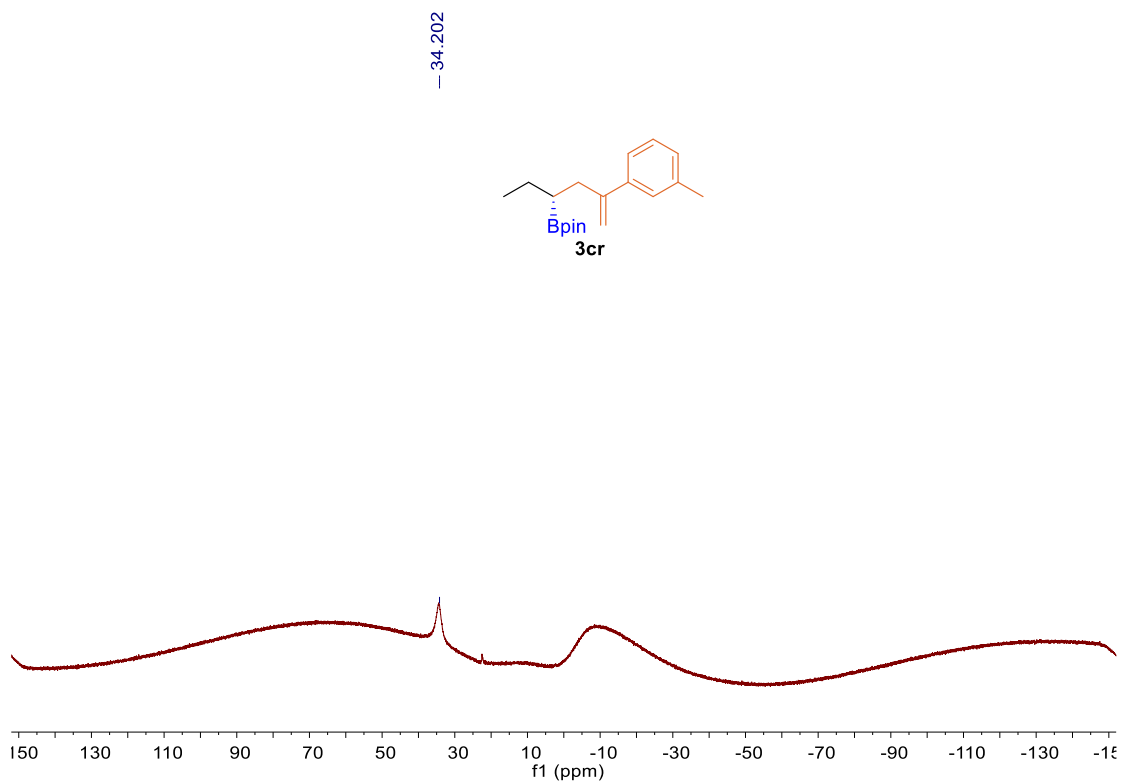
Supplementary Figure 291. ¹¹B NMR spectrum of compound 3cq



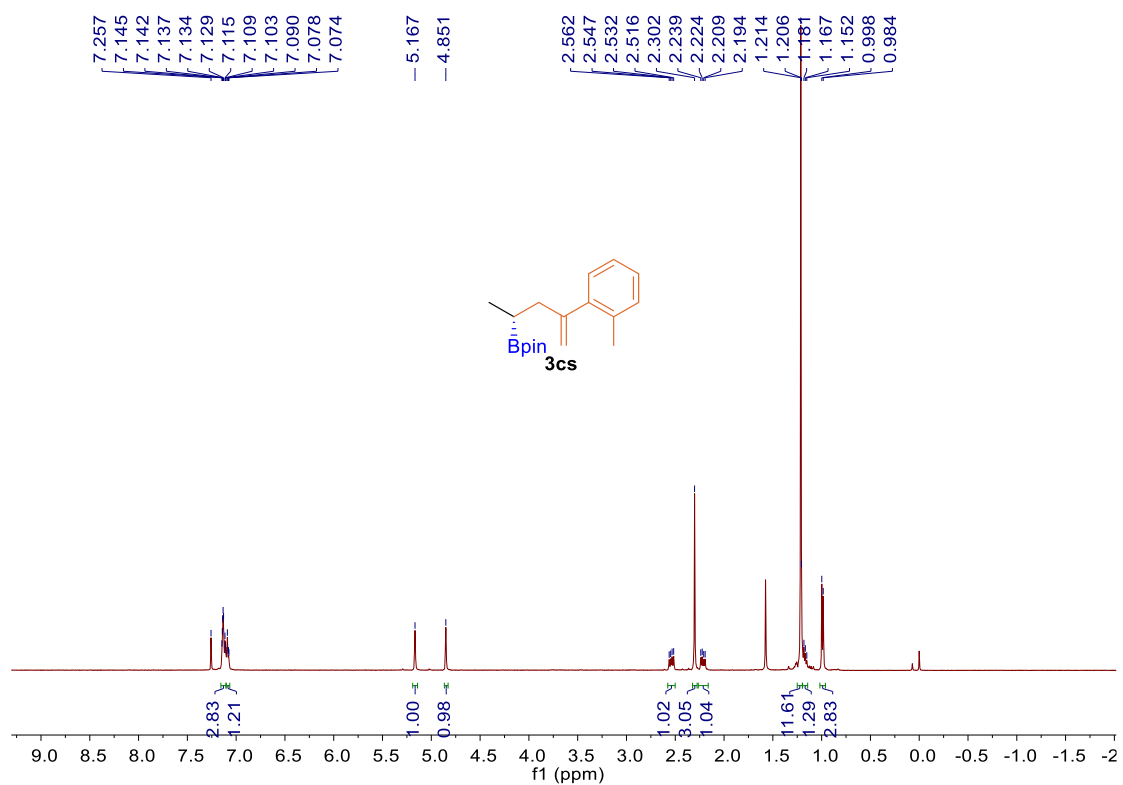
Supplementary Figure 292. ¹H NMR spectrum of compound 3cr



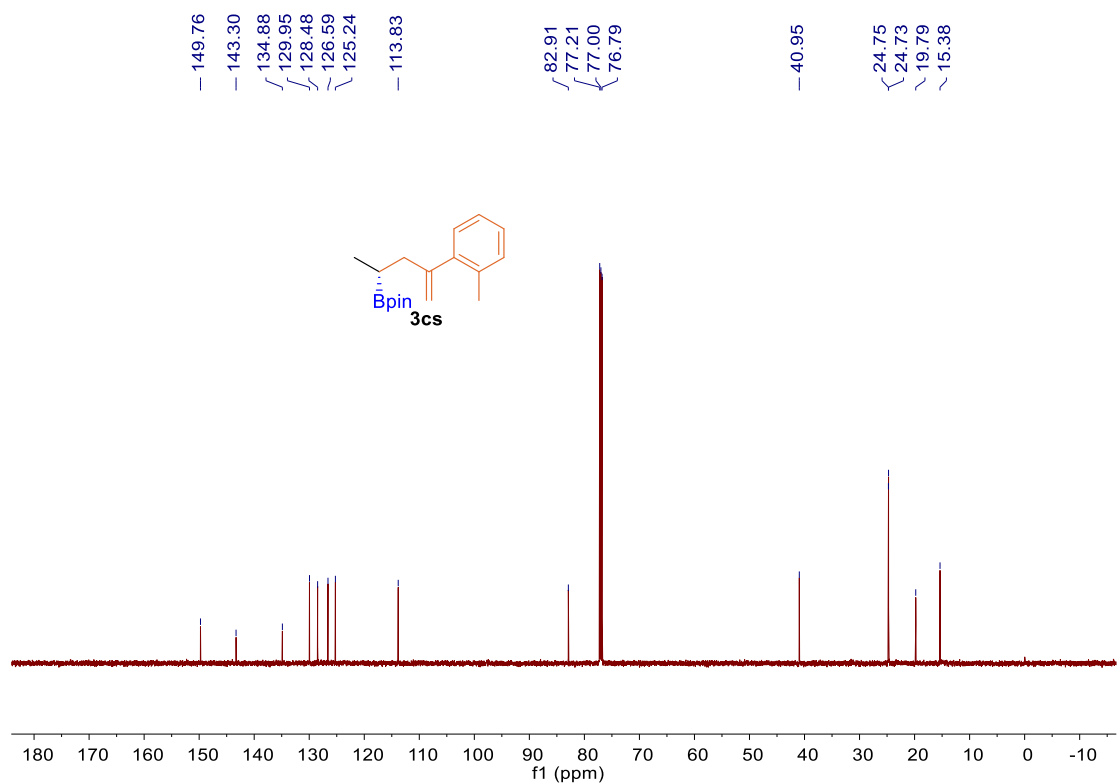
Supplementary Figure 293. ¹³C NMR spectrum of compound 3cr



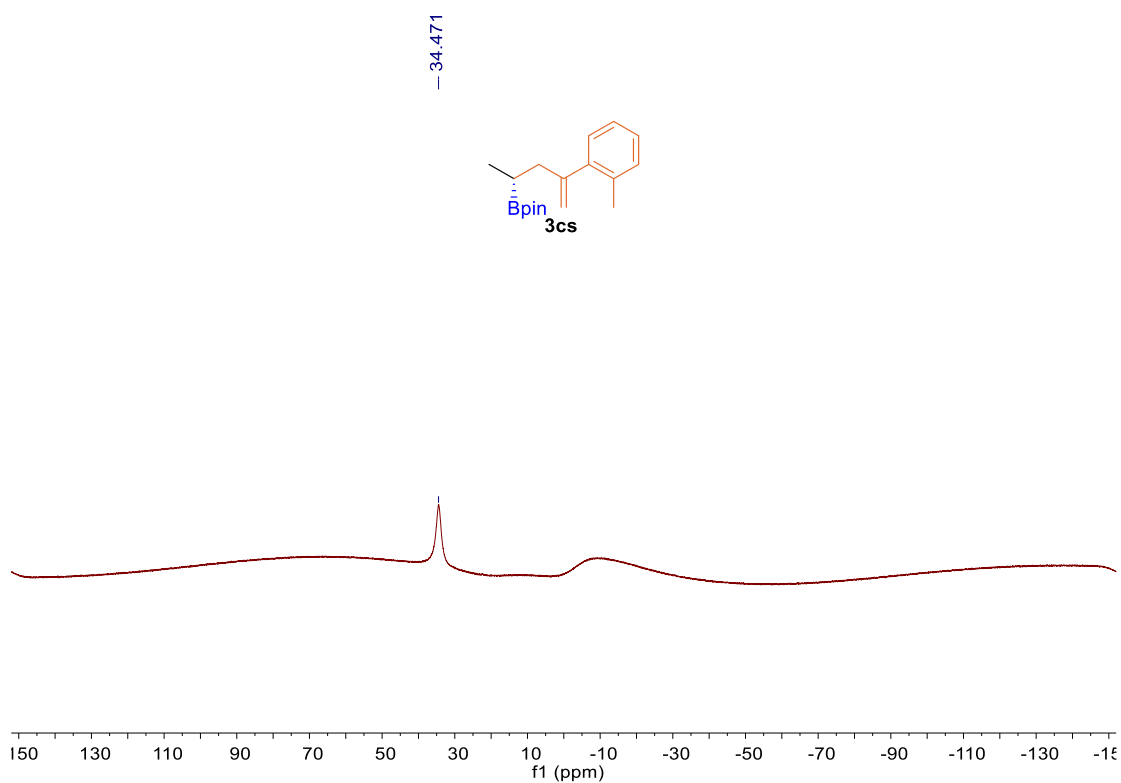
Supplementary Figure 294. ^{11}B NMR spectrum of compound 3cr



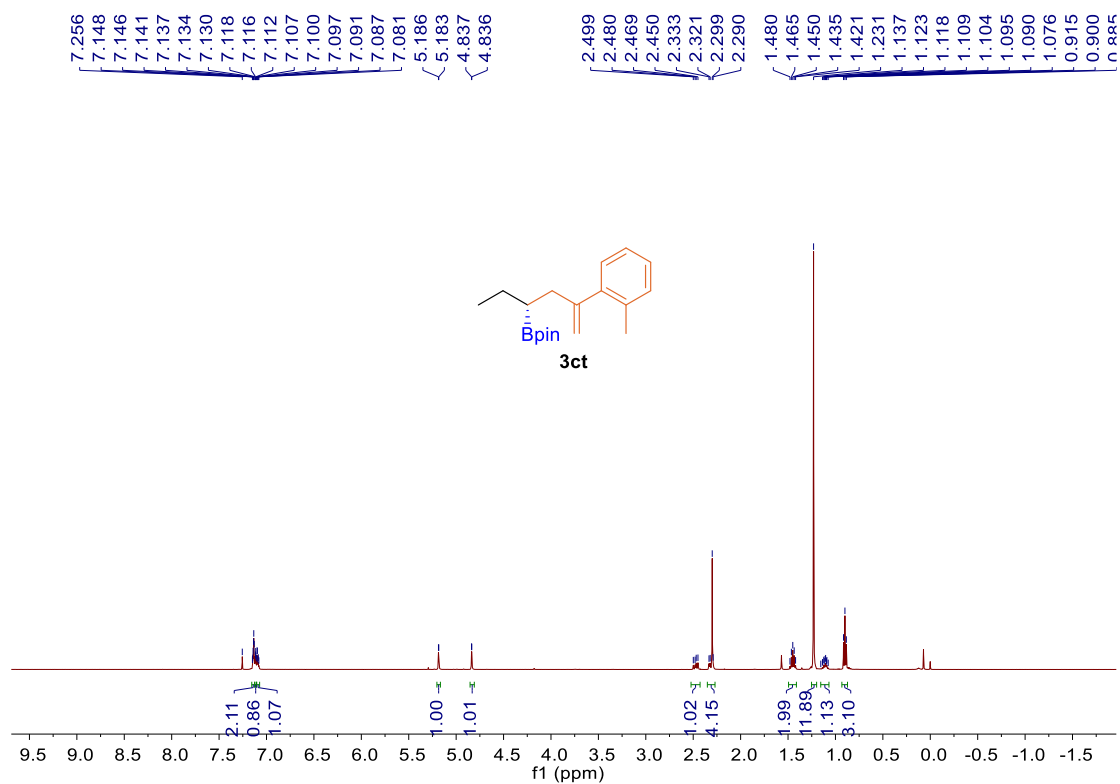
Supplementary Figure 295. ^1H NMR spectrum of compound 3cs



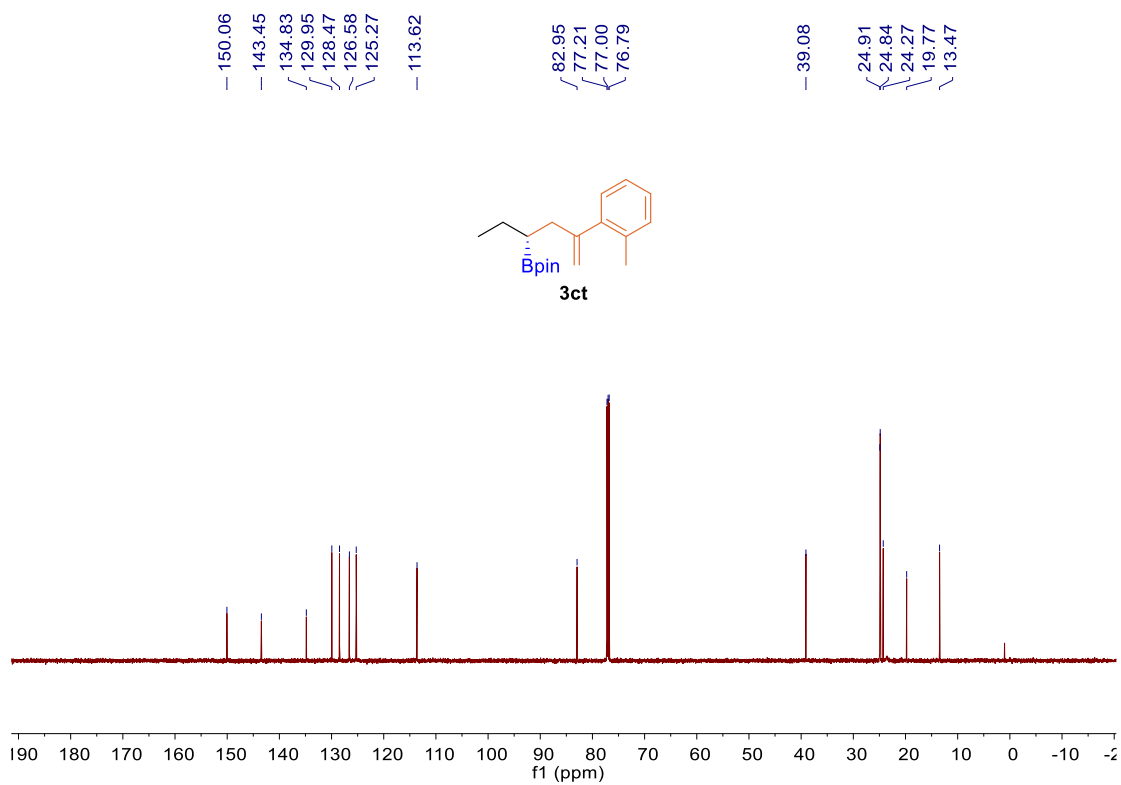
Supplementary Figure 296. ¹³C NMR spectrum of compound 3cs



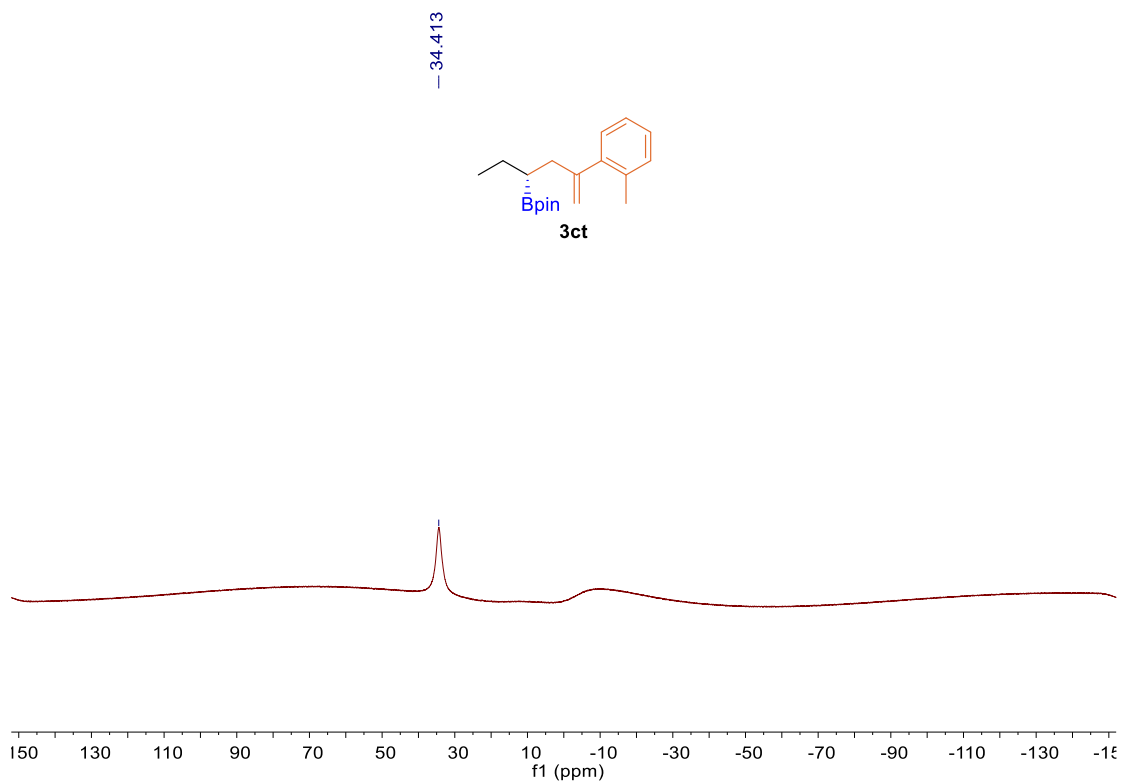
Supplementary Figure 297. ¹¹B NMR spectrum of compound 3cs



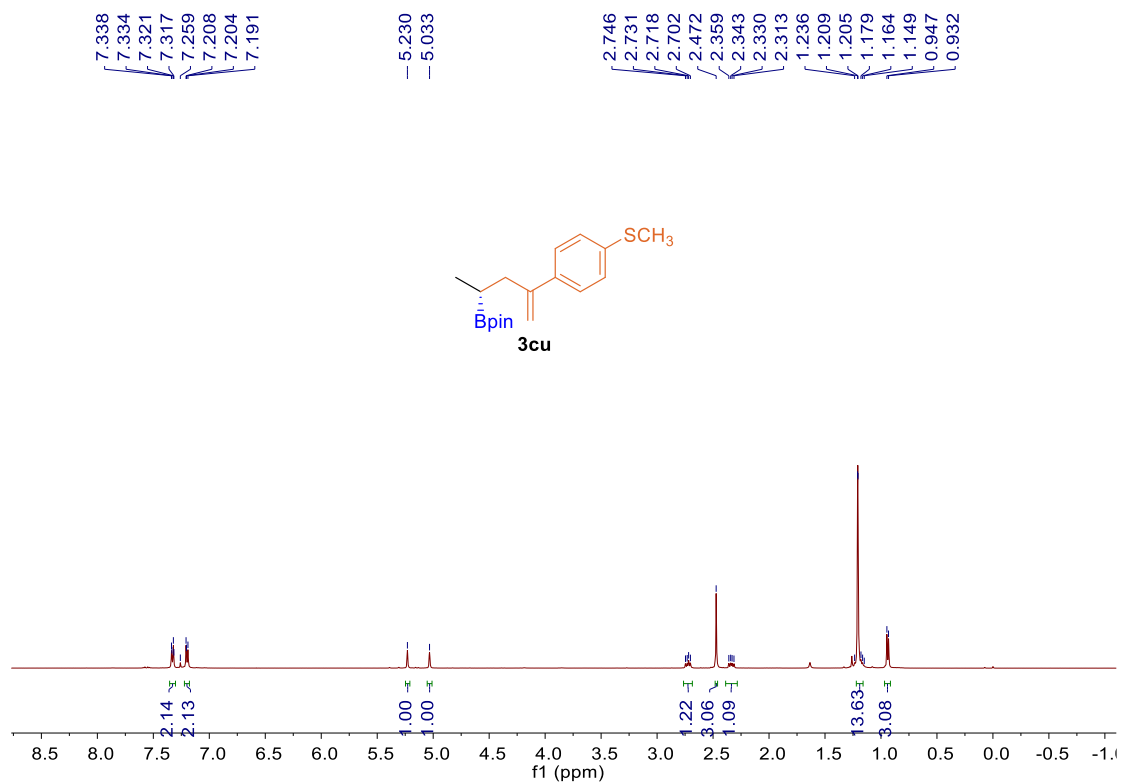
Supplementary Figure 298. ¹H NMR spectrum of compound 3ct



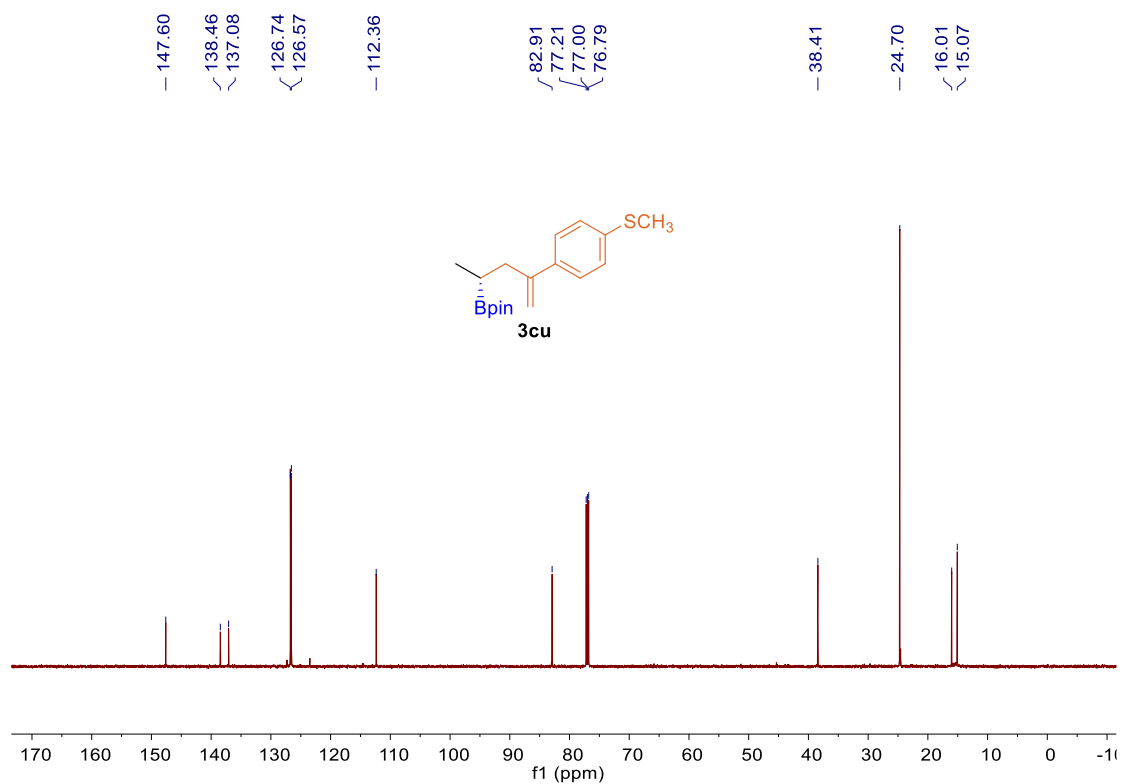
Supplementary Figure 299. ¹³C NMR spectrum of compound 3ct



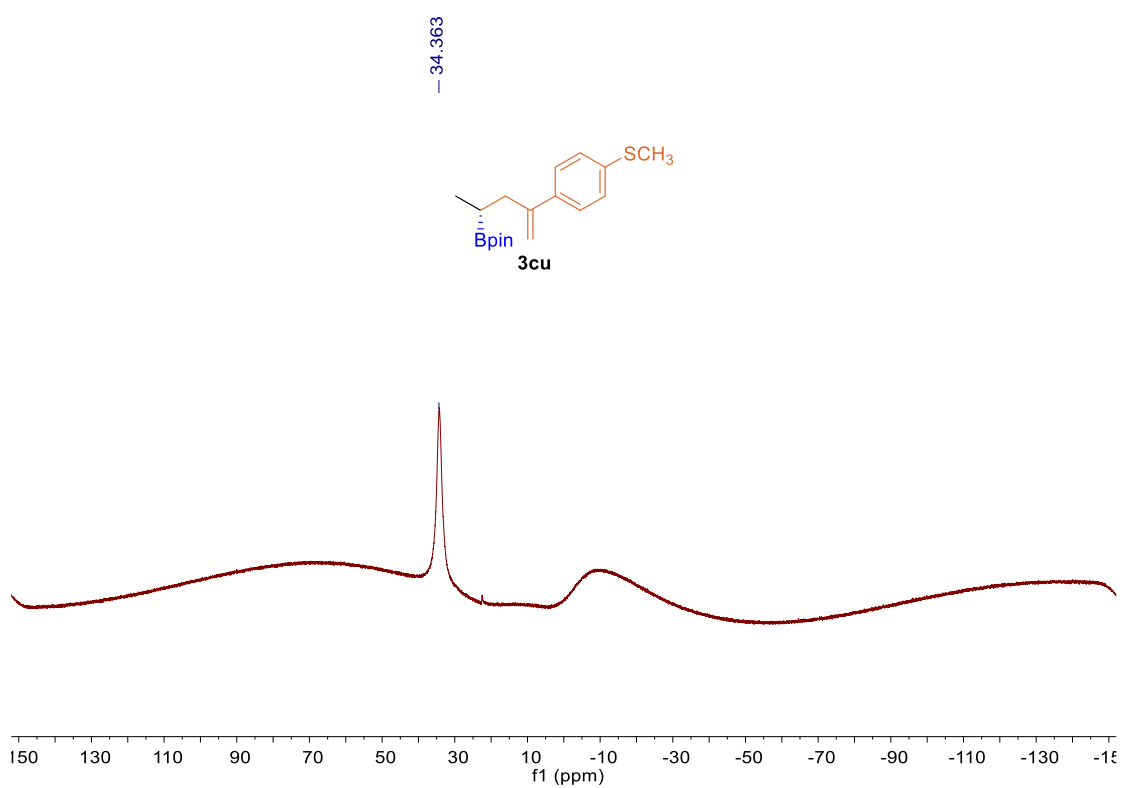
Supplementary Figure 300. ^{11}B NMR spectrum of compound 3ct



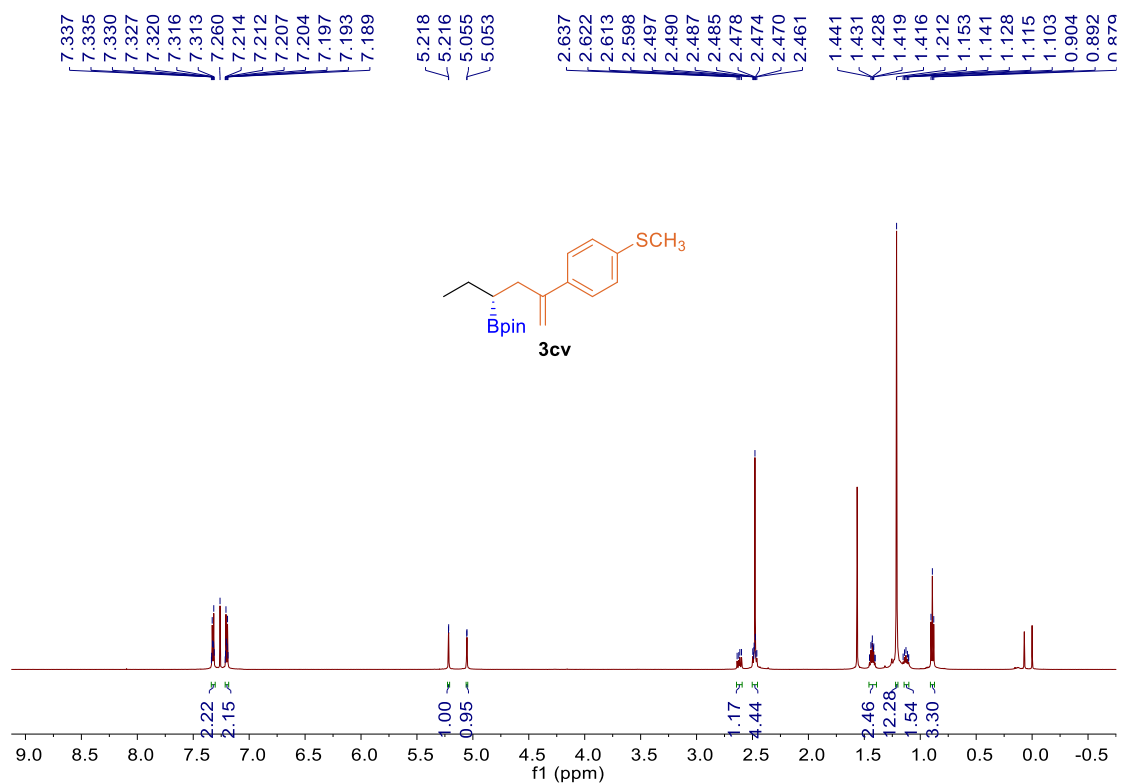
Supplementary Figure 301. ^1H NMR spectrum of compound 3cu



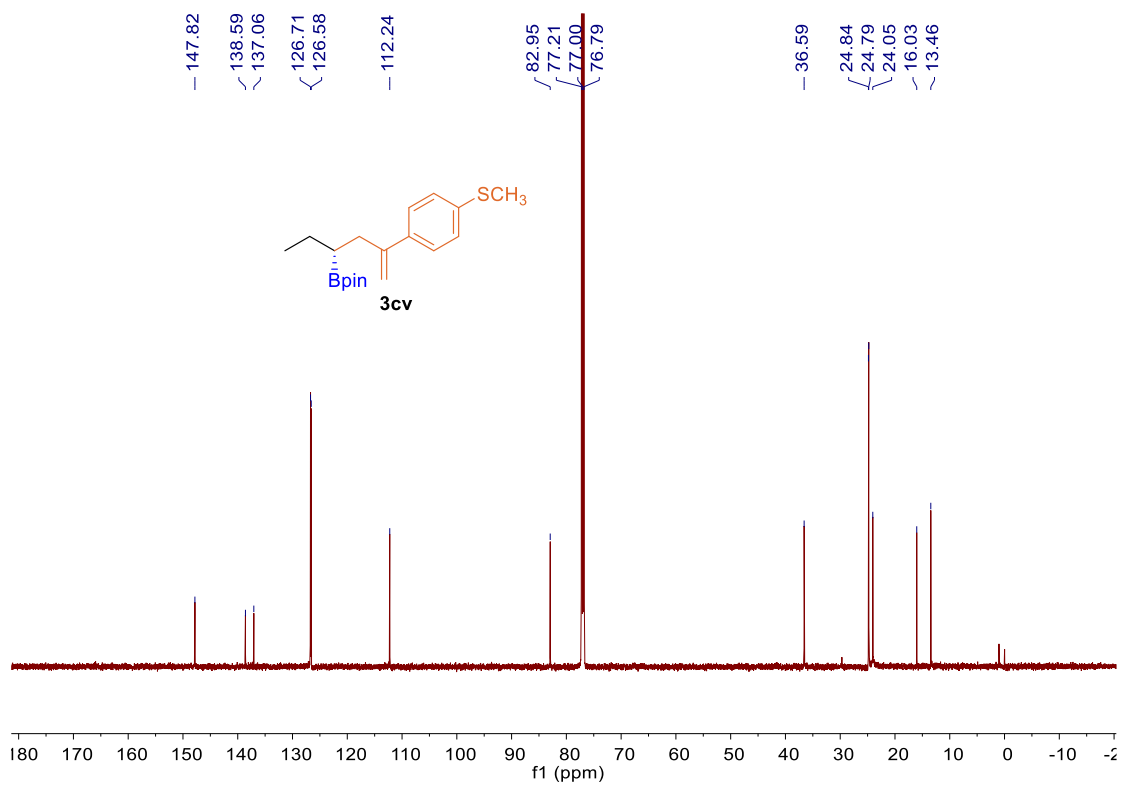
Supplementary Figure 302. ¹³C NMR spectrum of compound 3cu



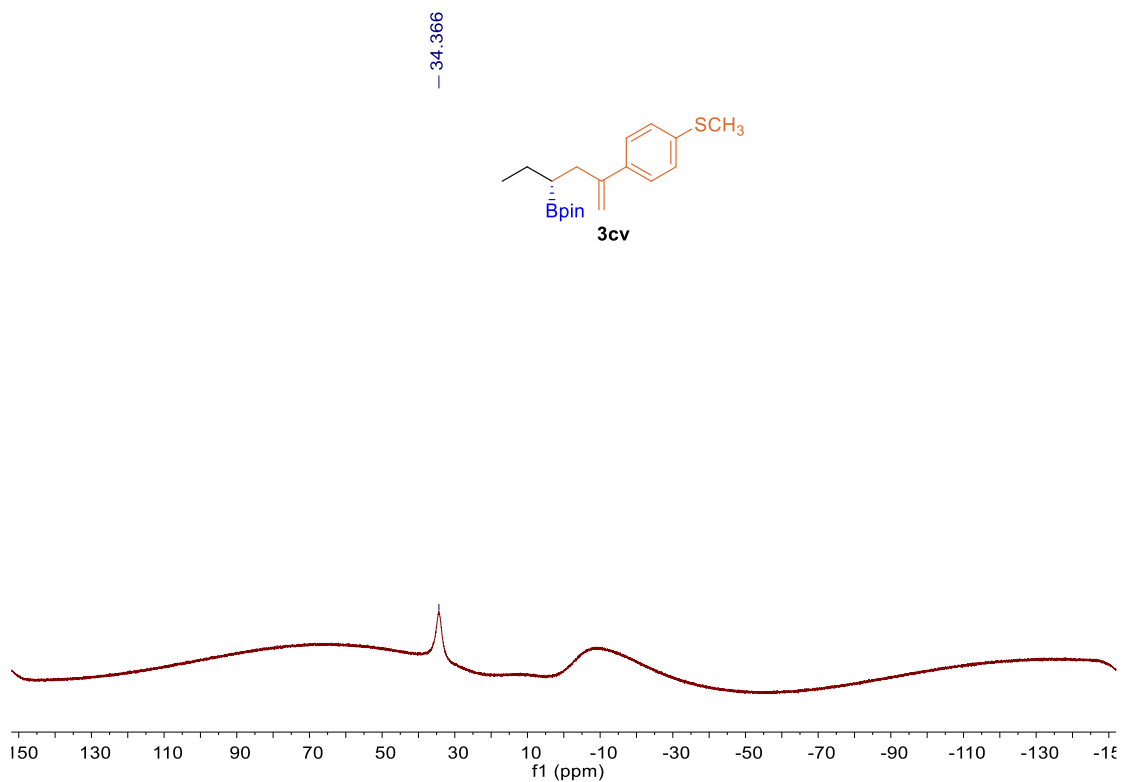
Supplementary Figure 303. ¹¹B NMR spectrum of compound 3cu



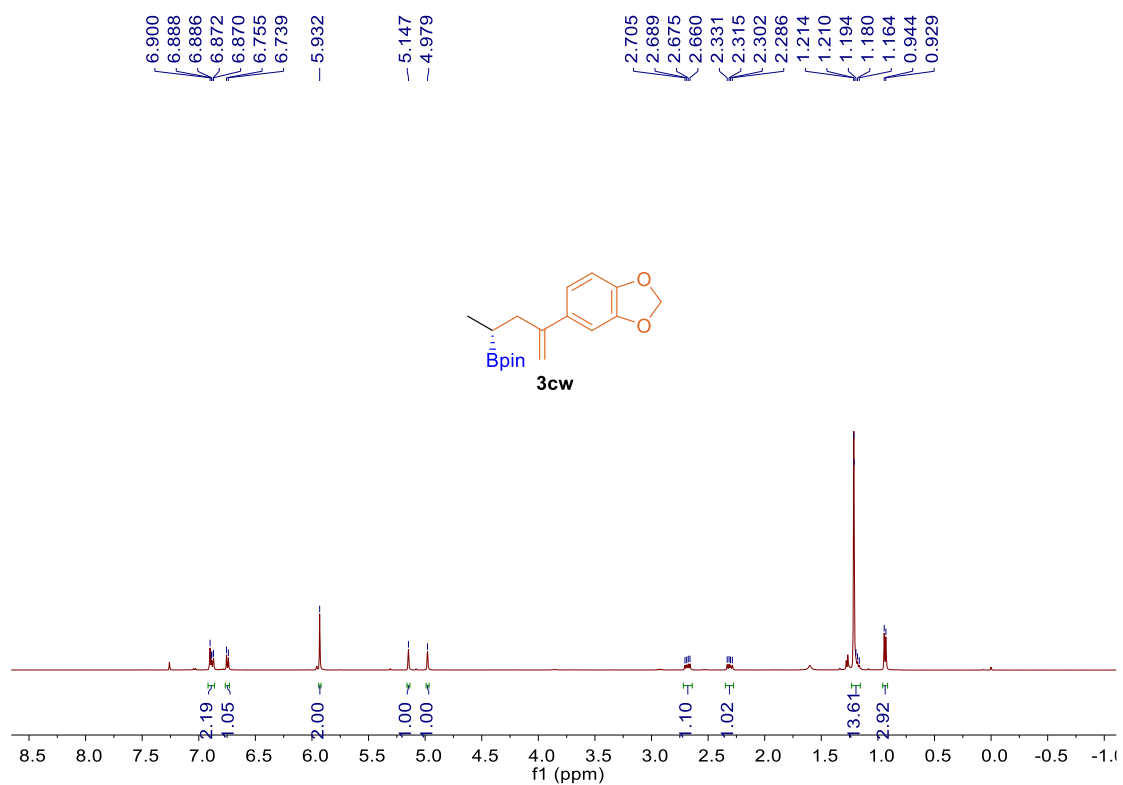
Supplementary Figure 304. ¹H NMR spectrum of compound 3cv



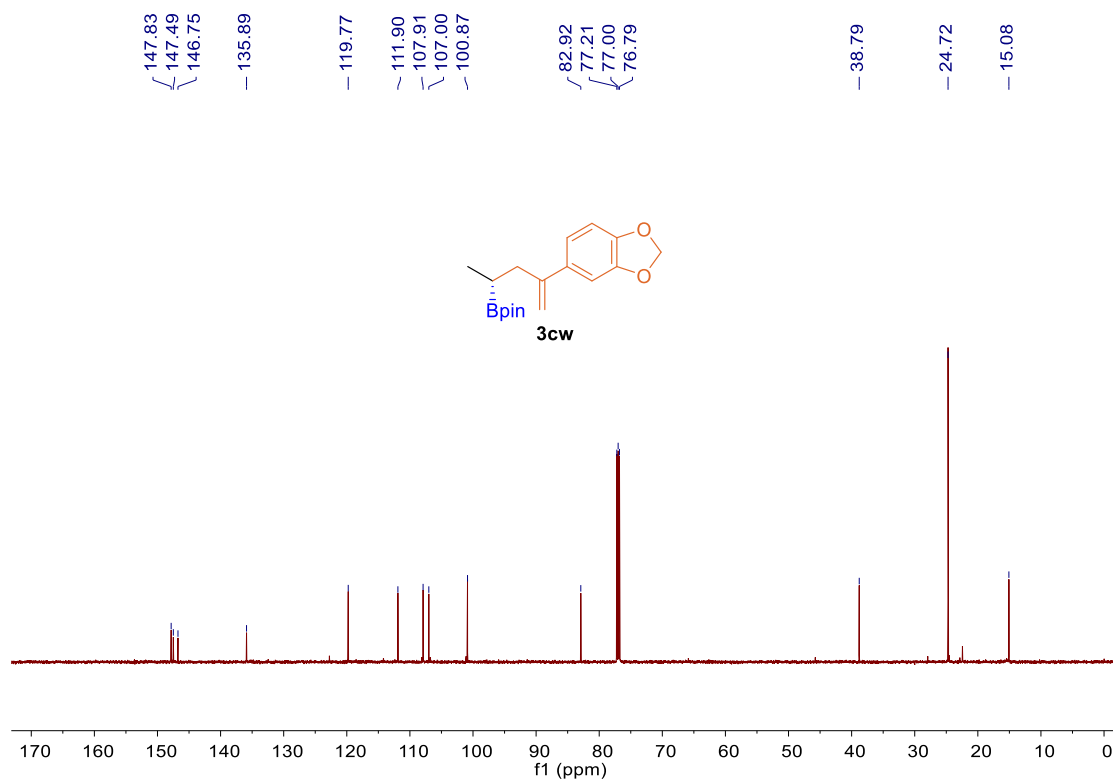
Supplementary Figure 305. ¹³C NMR spectrum of compound 3cv



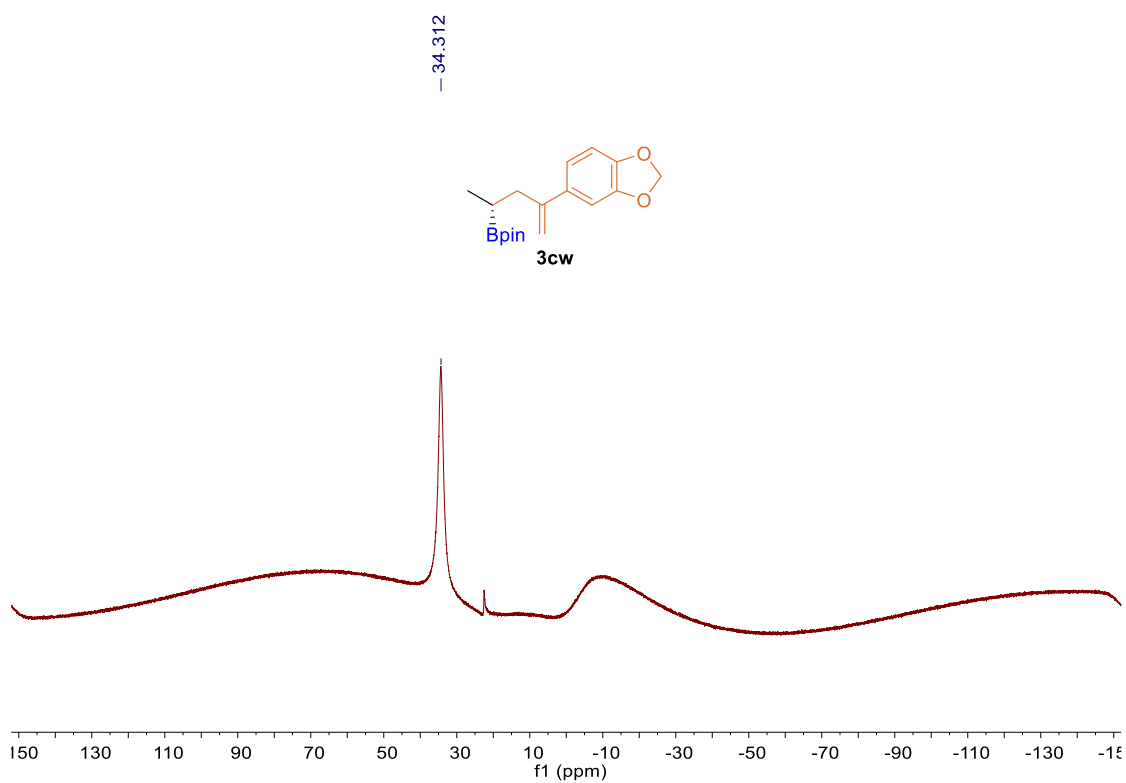
Supplementary Figure 306. ^{11}B NMR spectrum of compound 3cv



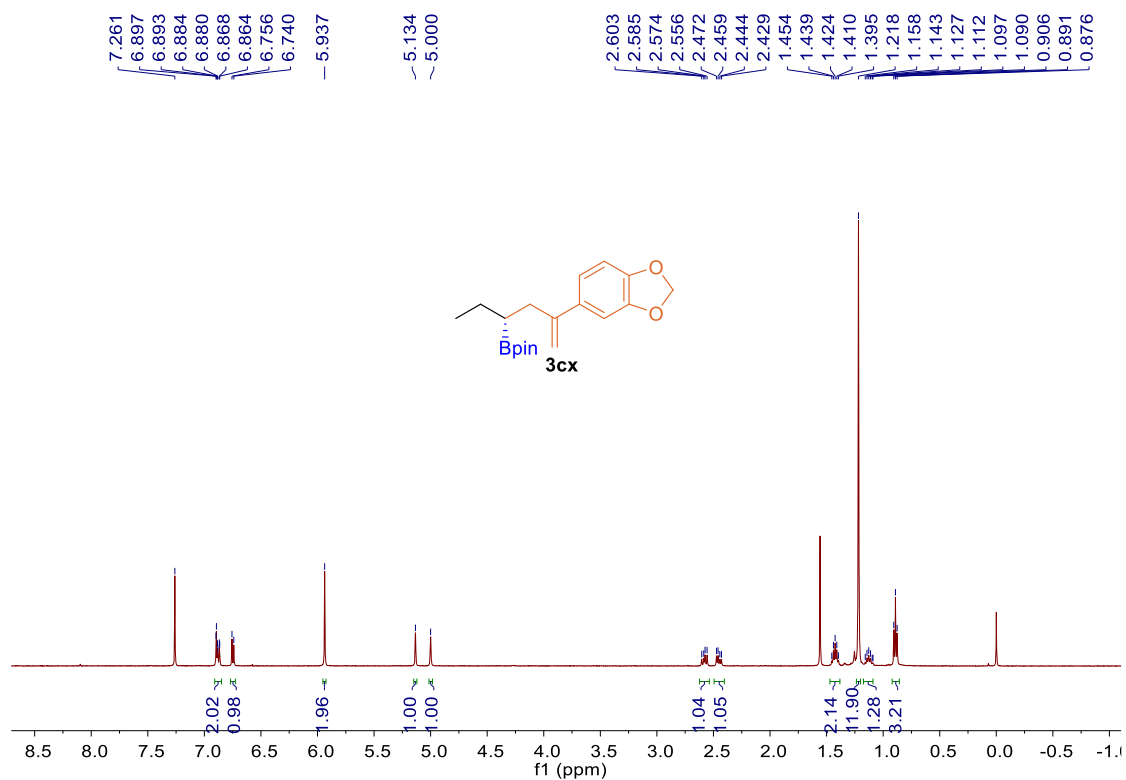
Supplementary Figure 307. ^1H NMR spectrum of compound 3cw



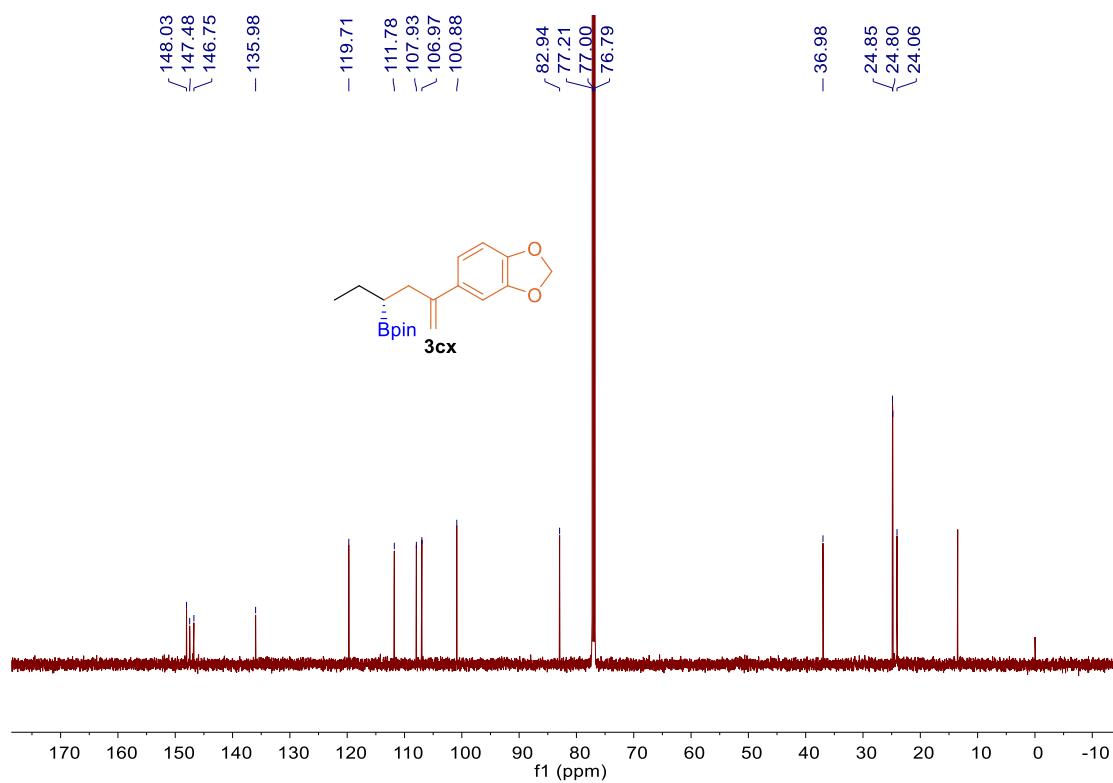
Supplementary Figure 308. ¹³C NMR spectrum of compound 3cw



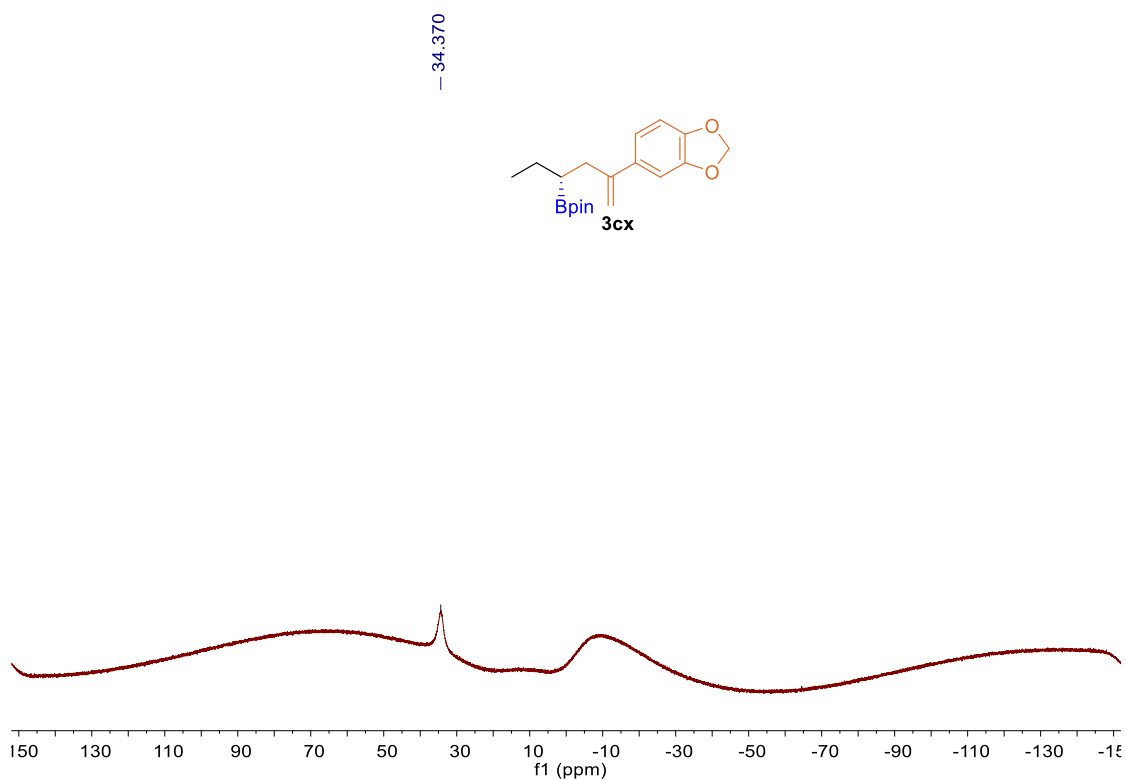
Supplementary Figure 309. ¹¹B NMR spectrum of compound 3cw



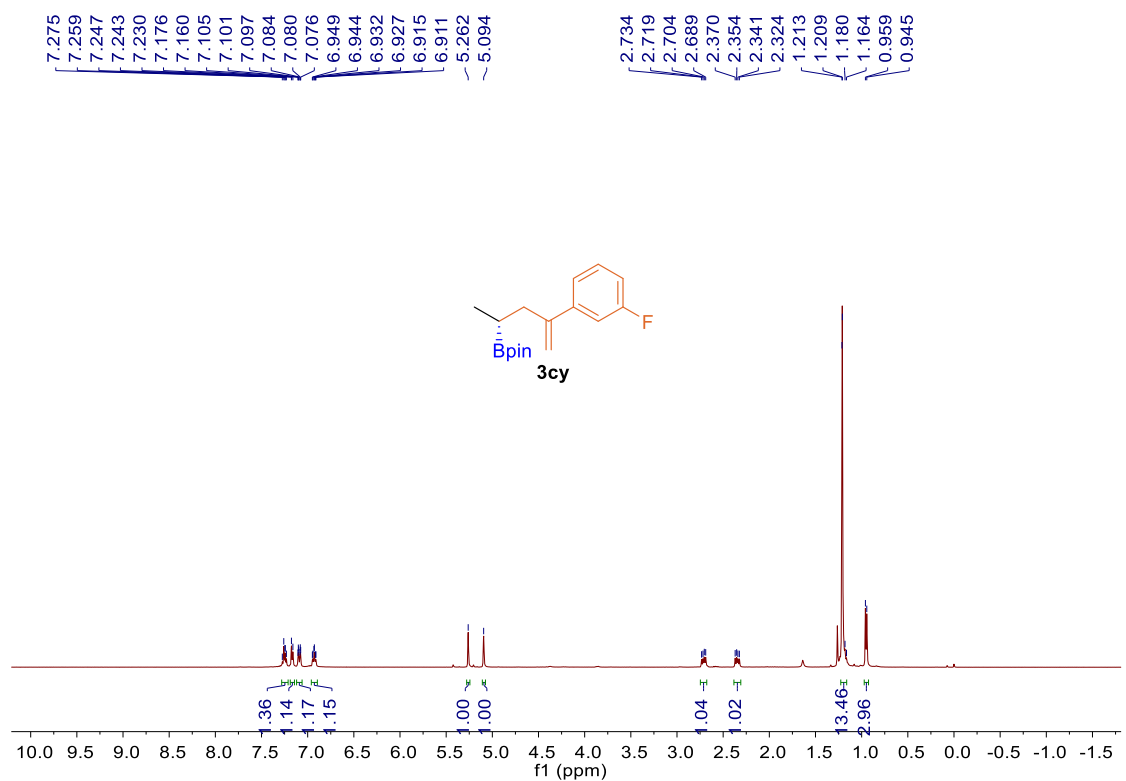
Supplementary Figure 310. ¹H NMR spectrum of compound 3cx



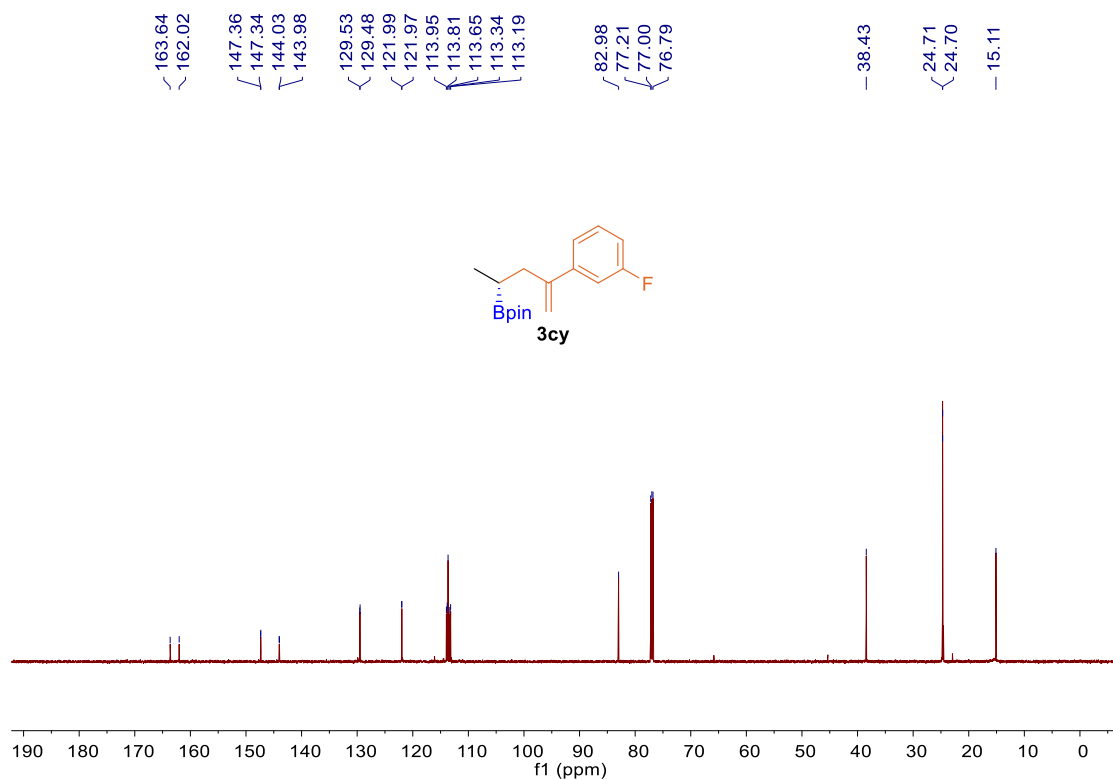
Supplementary Figure 311. ¹³C NMR spectrum of compound 3cx



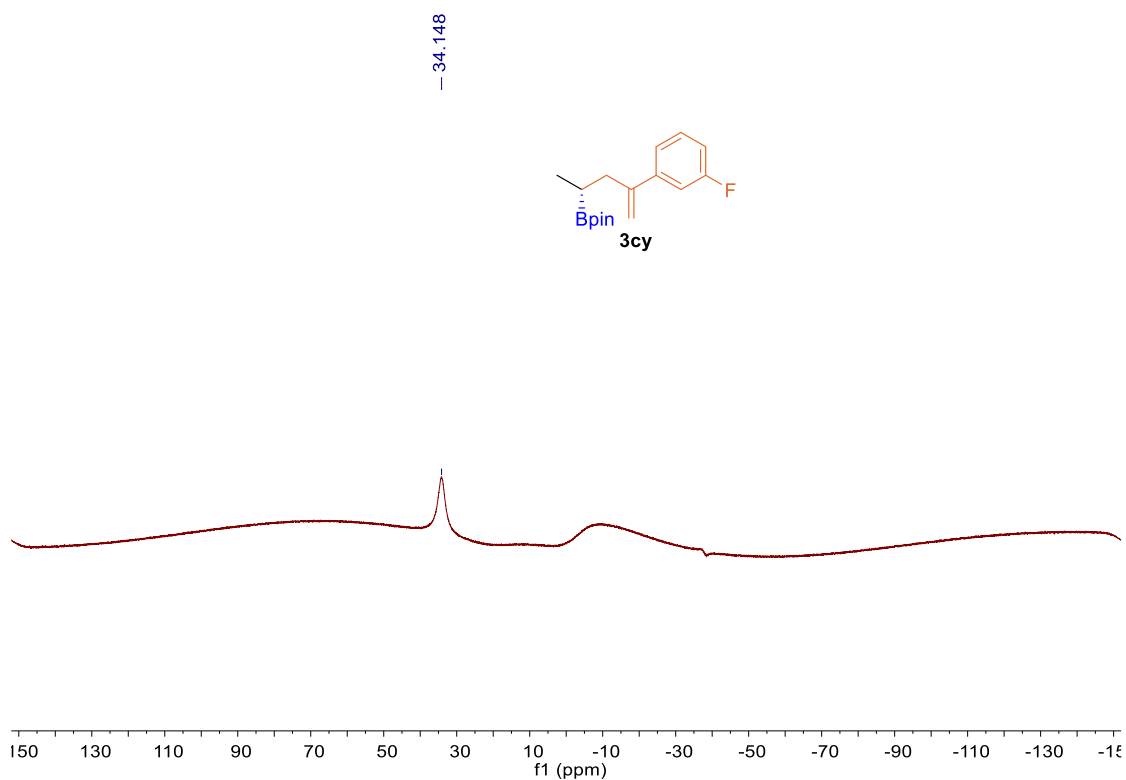
Supplementary Figure 312. ^{11}B NMR spectrum of compound **3cx**



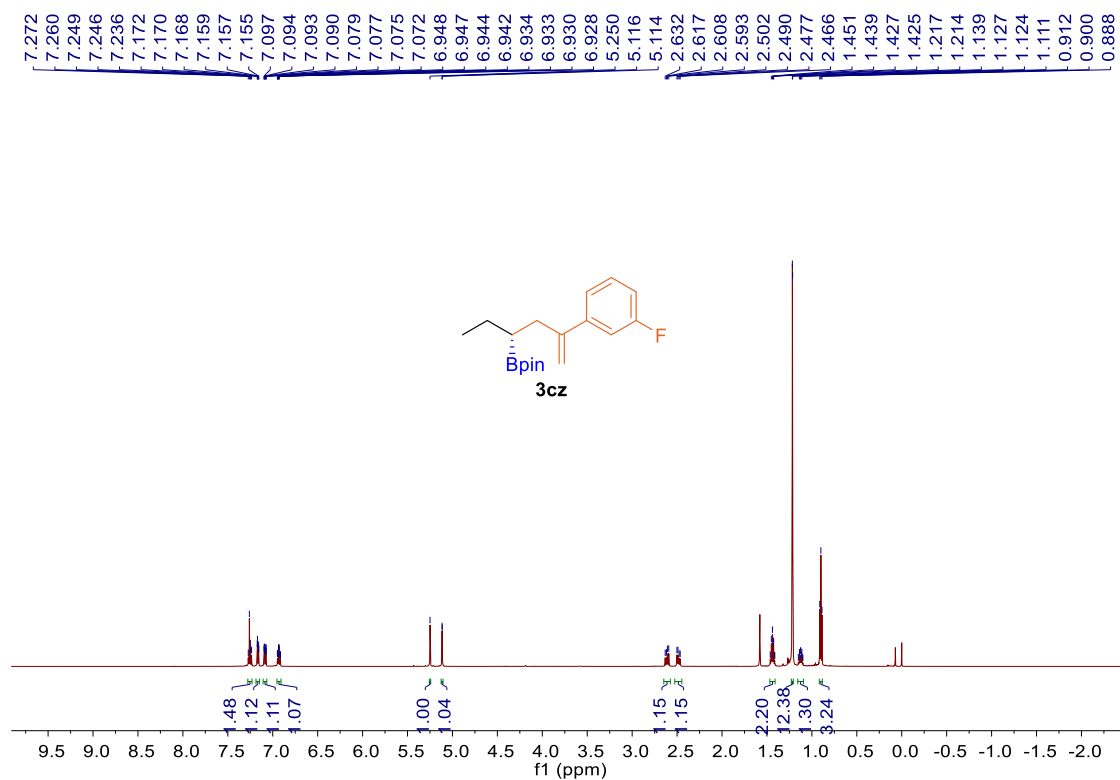
Supplementary Figure 313. ^1H NMR spectrum of compound **3cy**



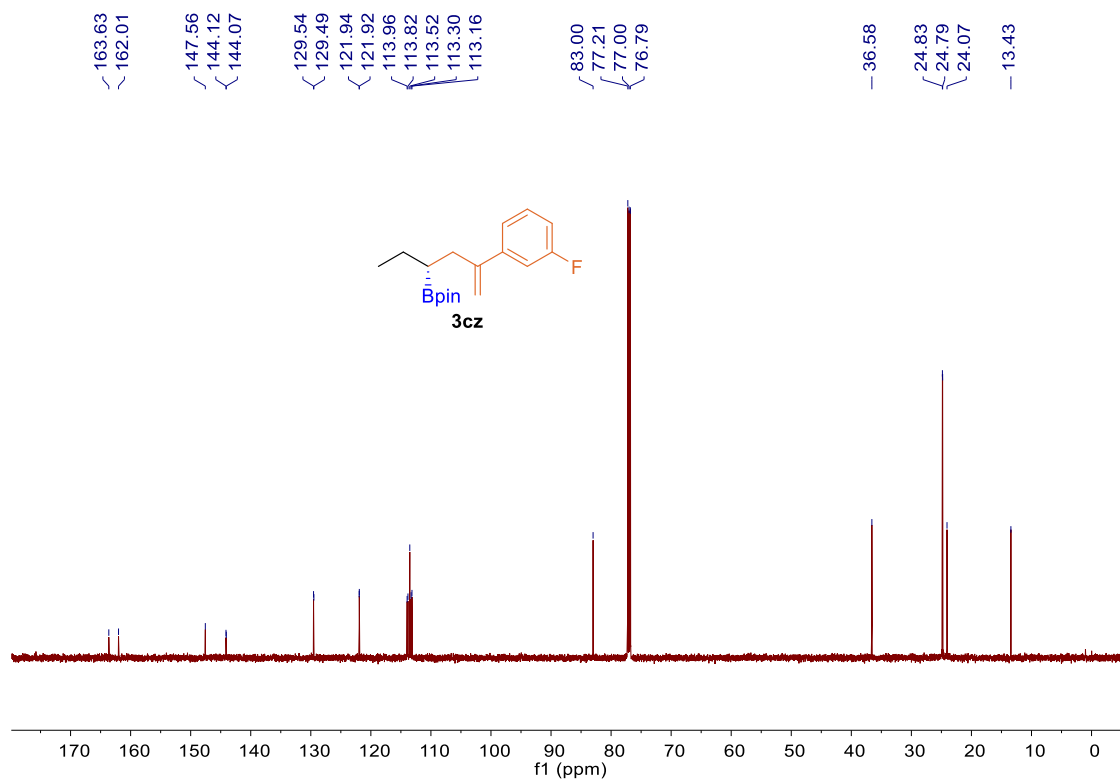
Supplementary Figure 314. ¹³C NMR spectrum of compound 3cy



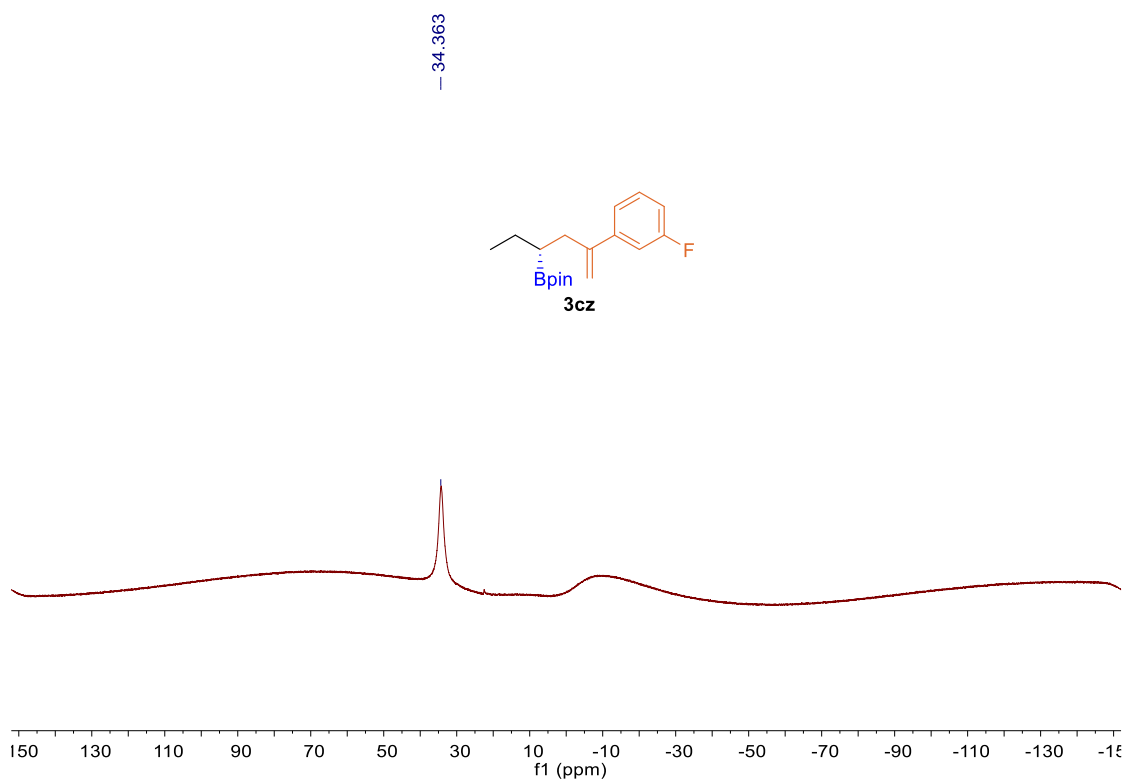
Supplementary Figure 315. ¹¹B NMR spectrum of compound 3cy



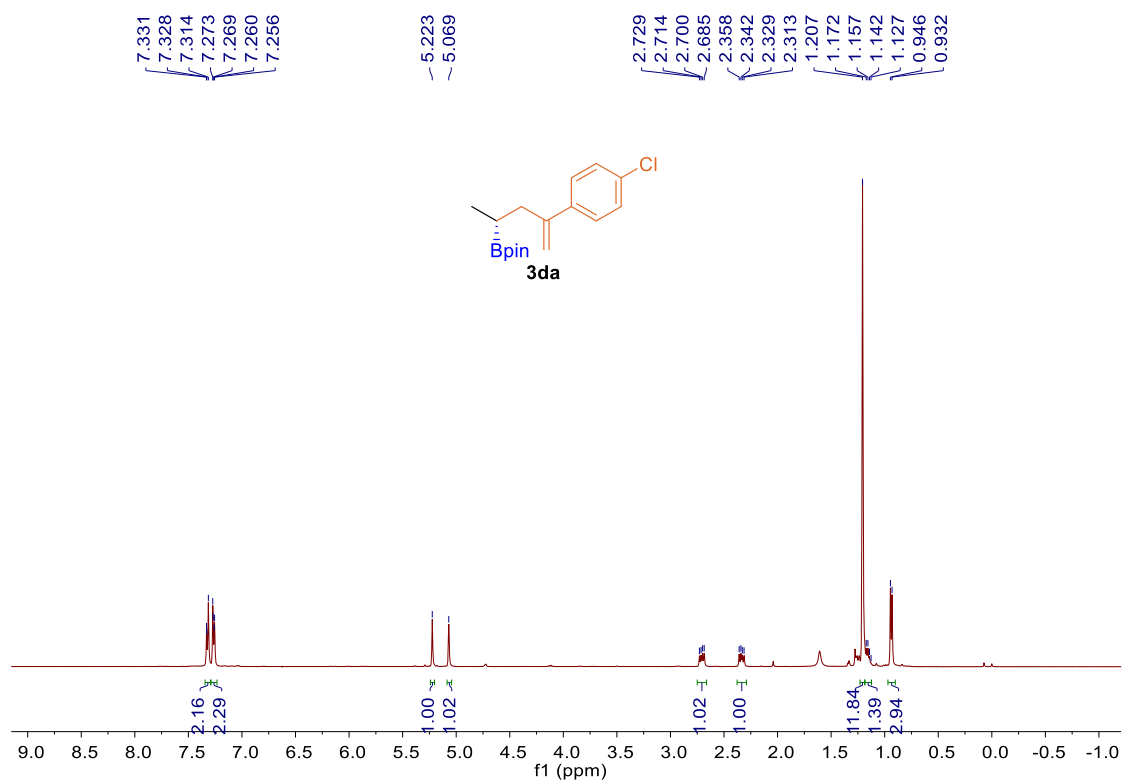
Supplementary Figure 316. ¹H NMR spectrum of compound **3cz**



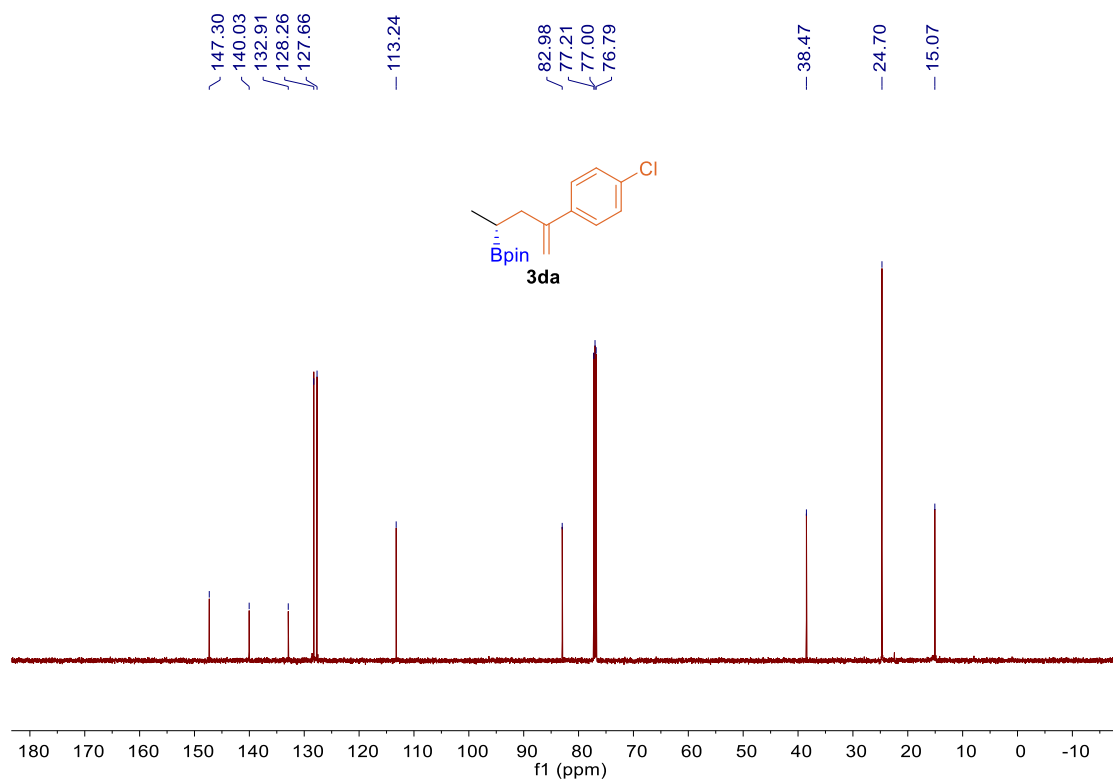
Supplementary Figure 317. ¹³C NMR spectrum of compound **3cz**



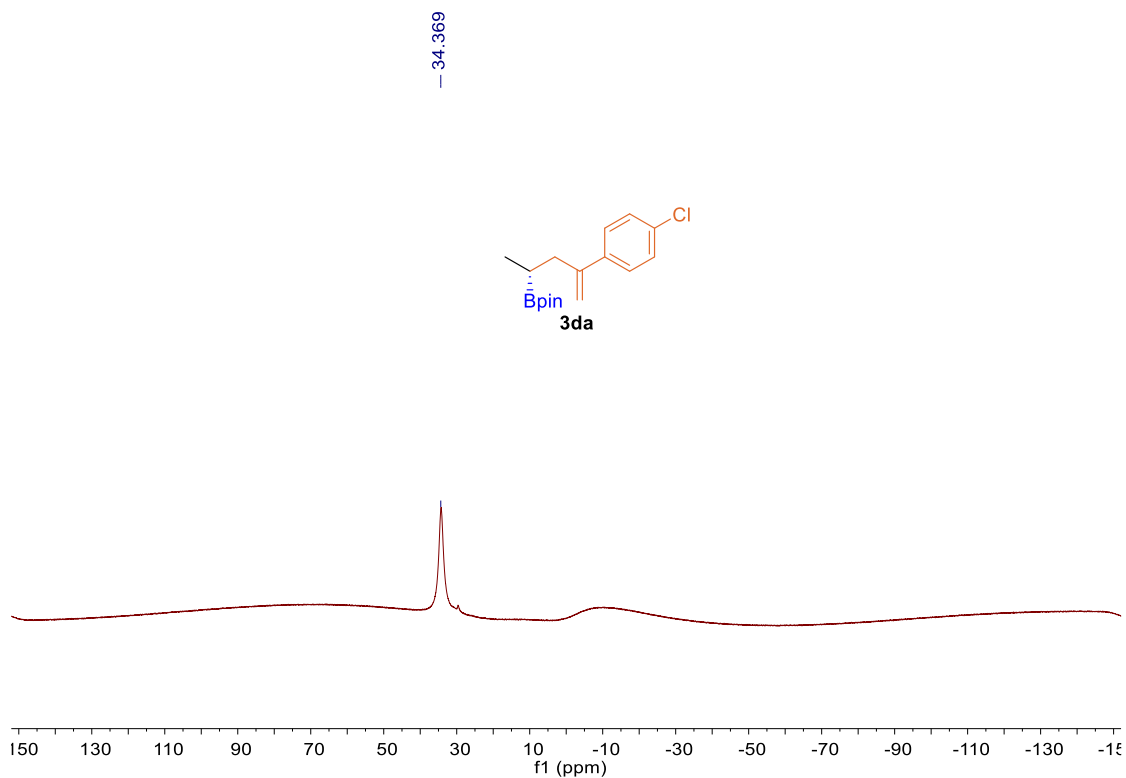
Supplementary Figure 318. ^{11}B NMR spectrum of compound **3cz**



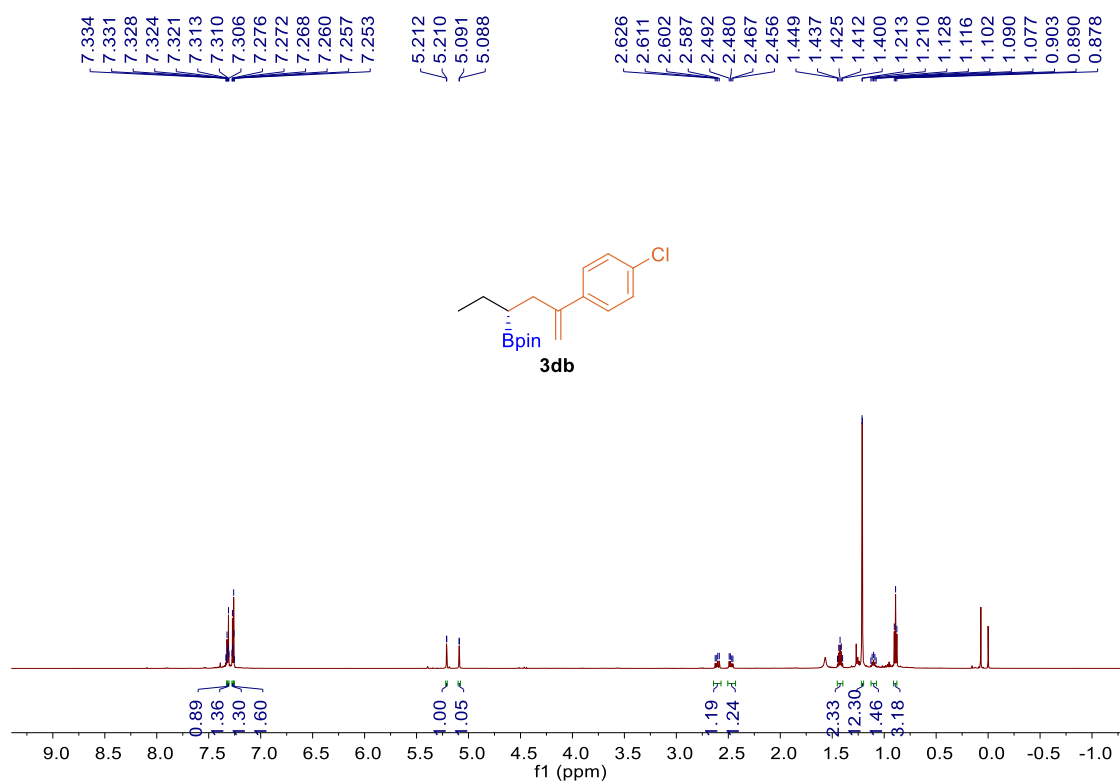
Supplementary Figure 319. ^1H NMR spectrum of compound **3da**



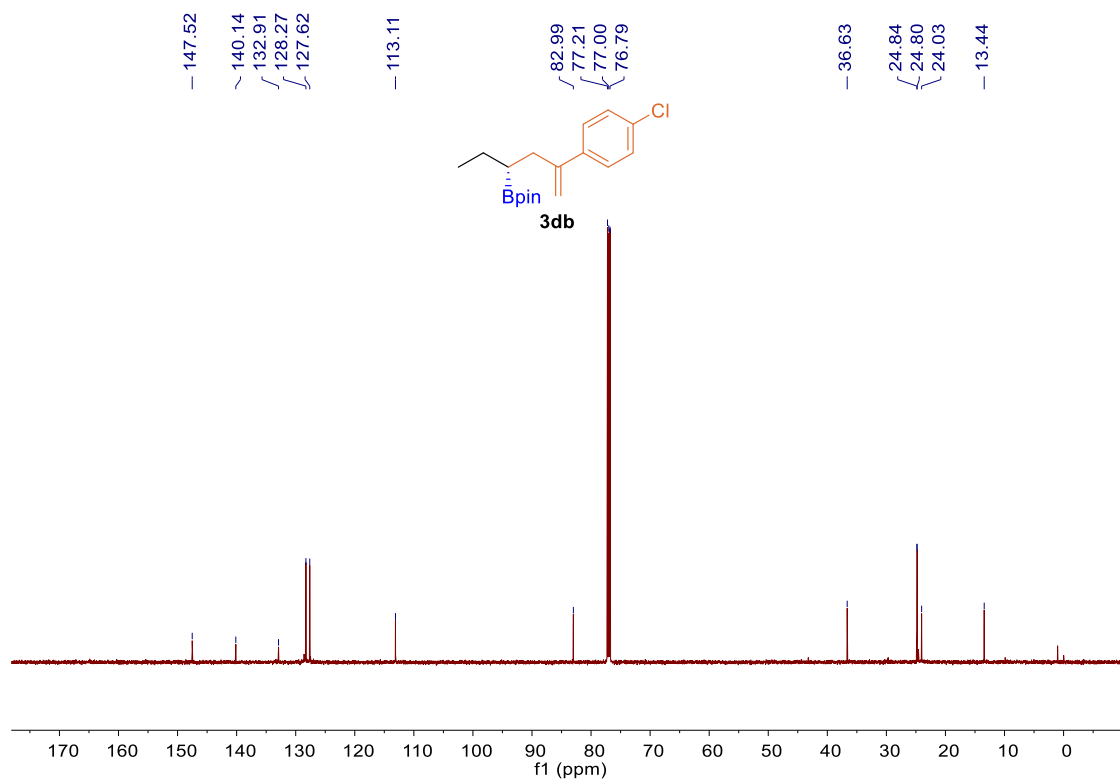
Supplementary Figure 320. ¹³C NMR spectrum of compound 3da



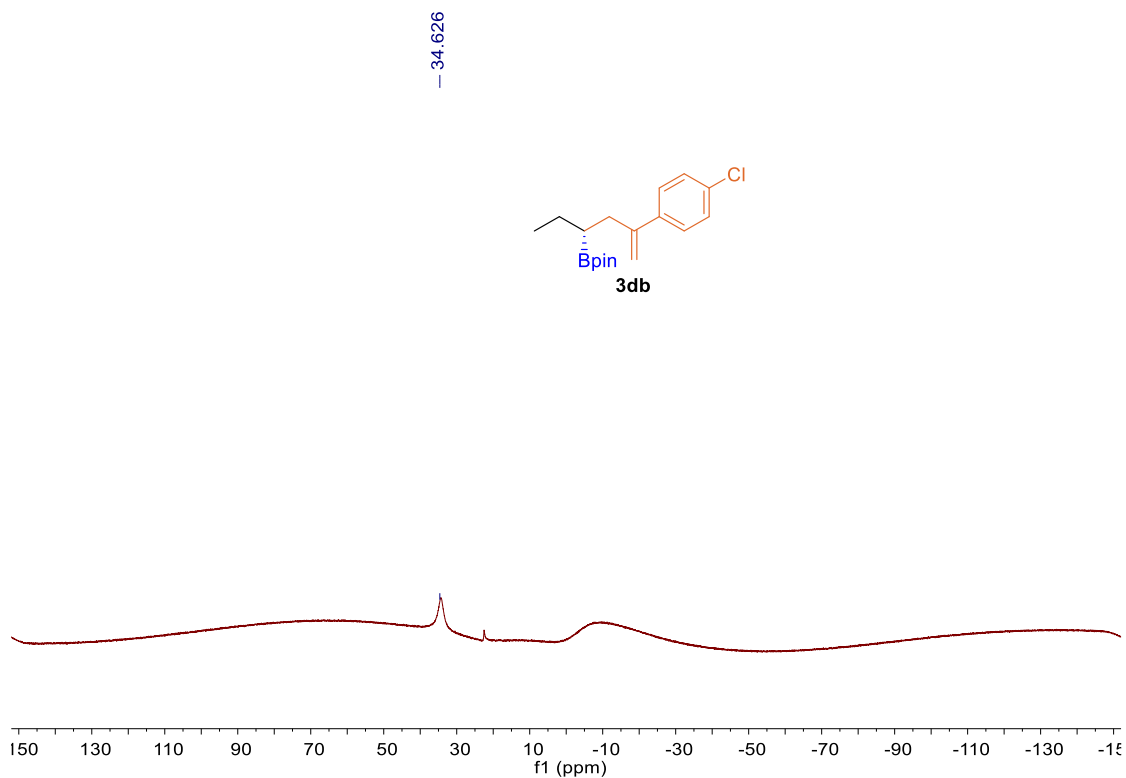
Supplementary Figure 321. ¹¹B NMR spectrum of compound 3da



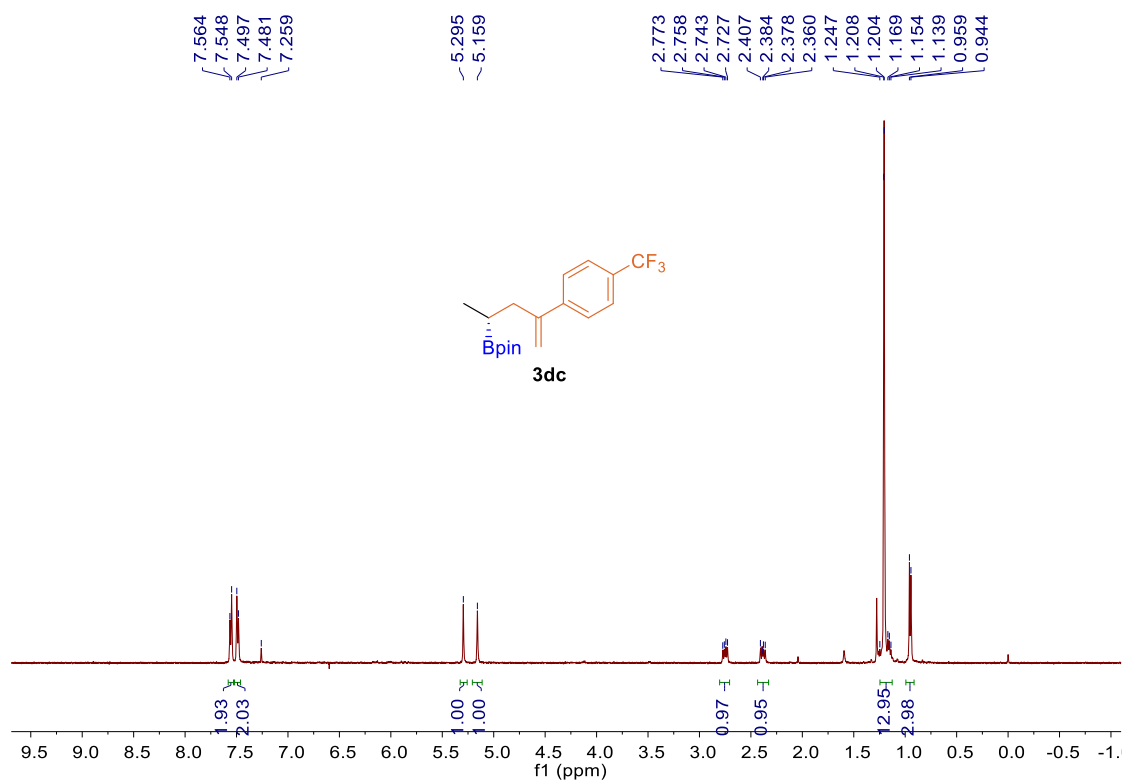
Supplementary Figure 322. ¹H NMR spectrum of compound 3db



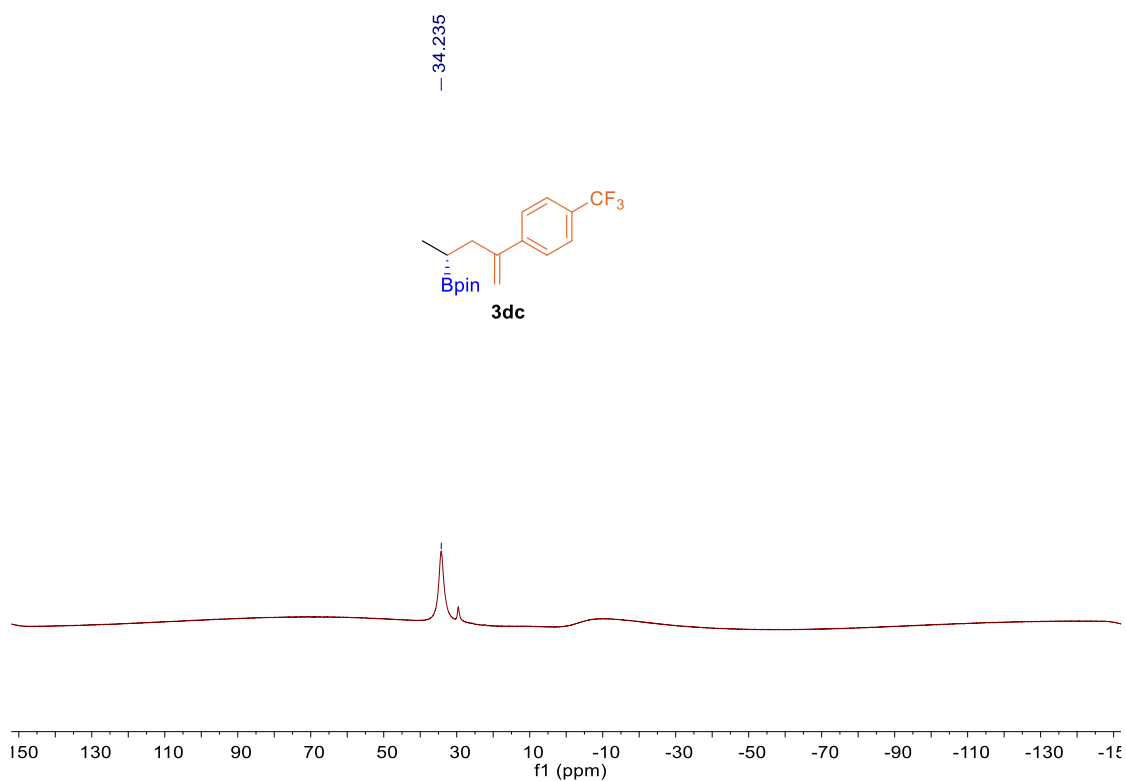
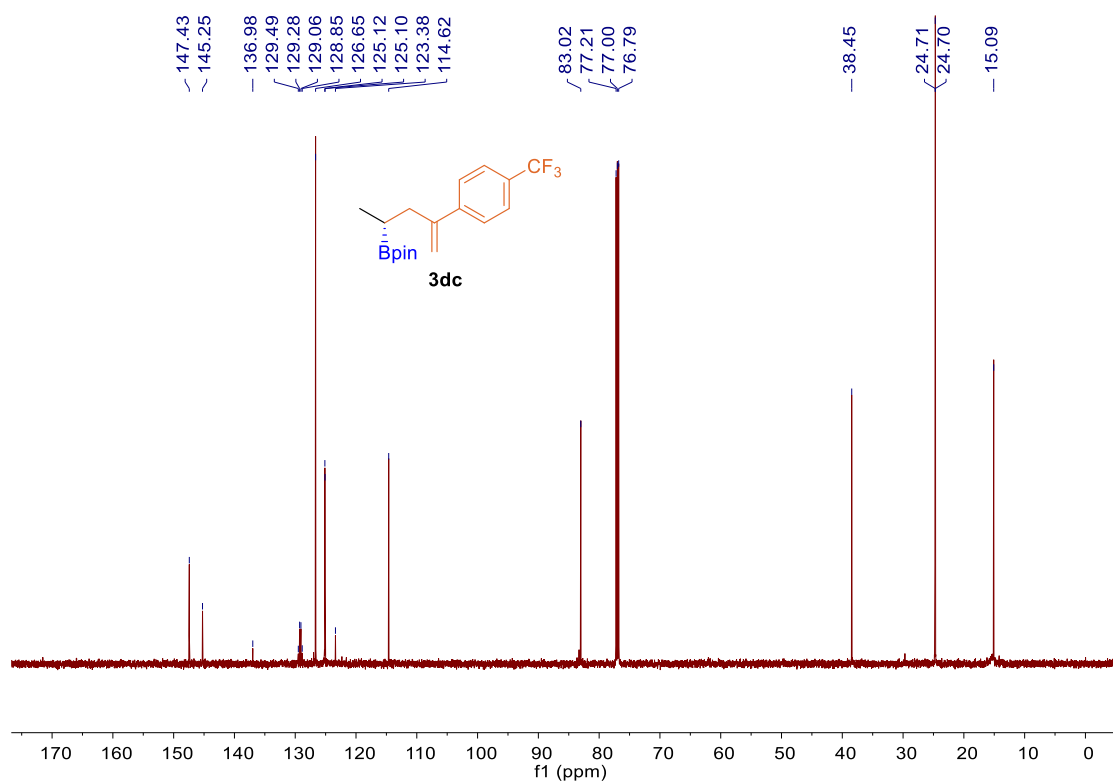
Supplementary Figure 323. ¹³C NMR spectrum of compound 3db

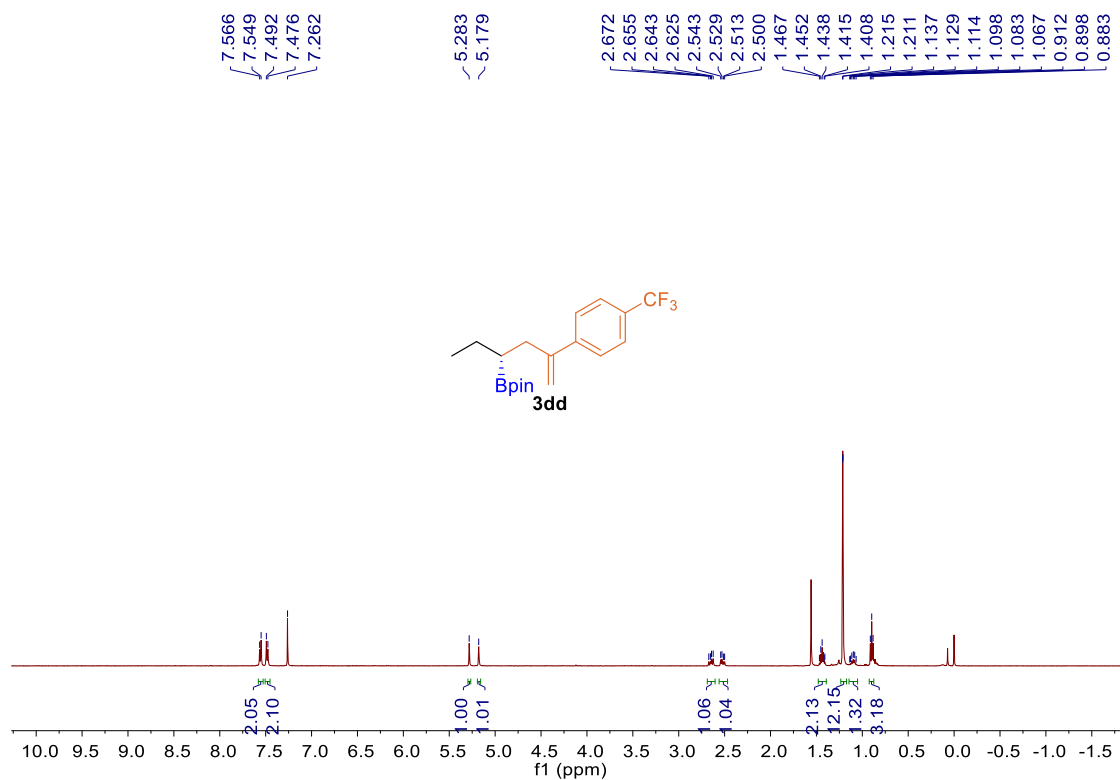


Supplementary Figure 324. ^{11}B NMR spectrum of compound **3db**

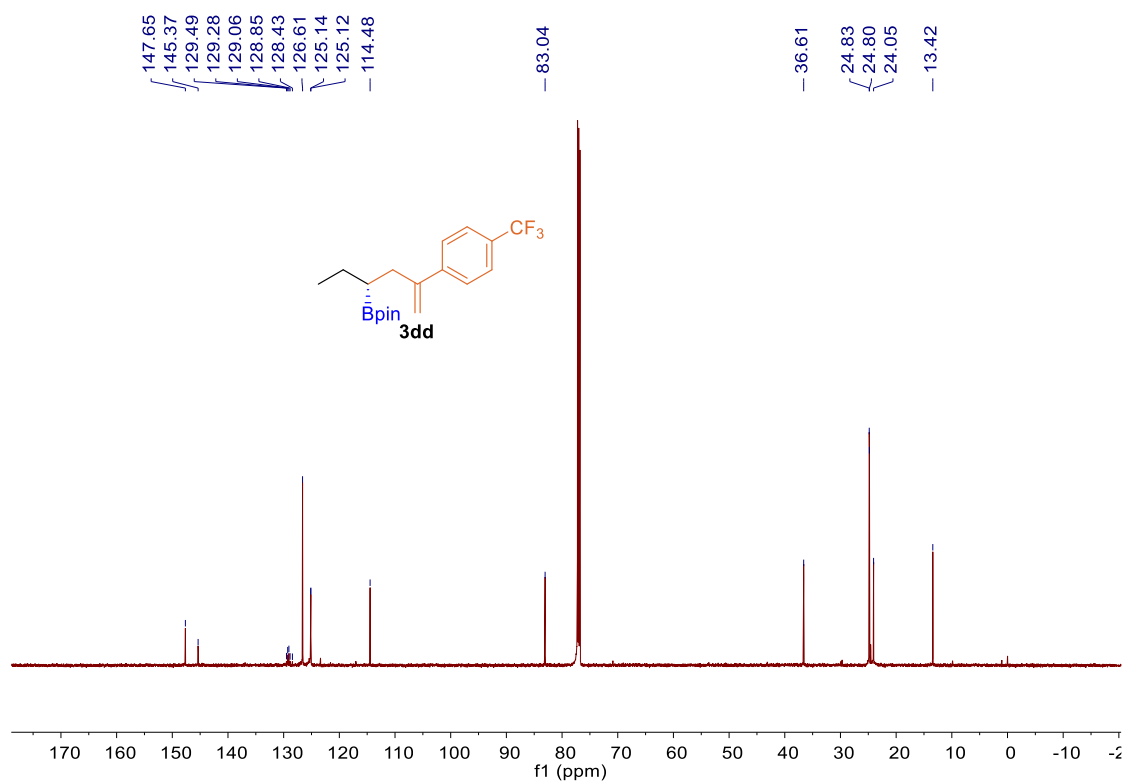


Supplementary Figure 325. ^1H NMR spectrum of compound **3dc**

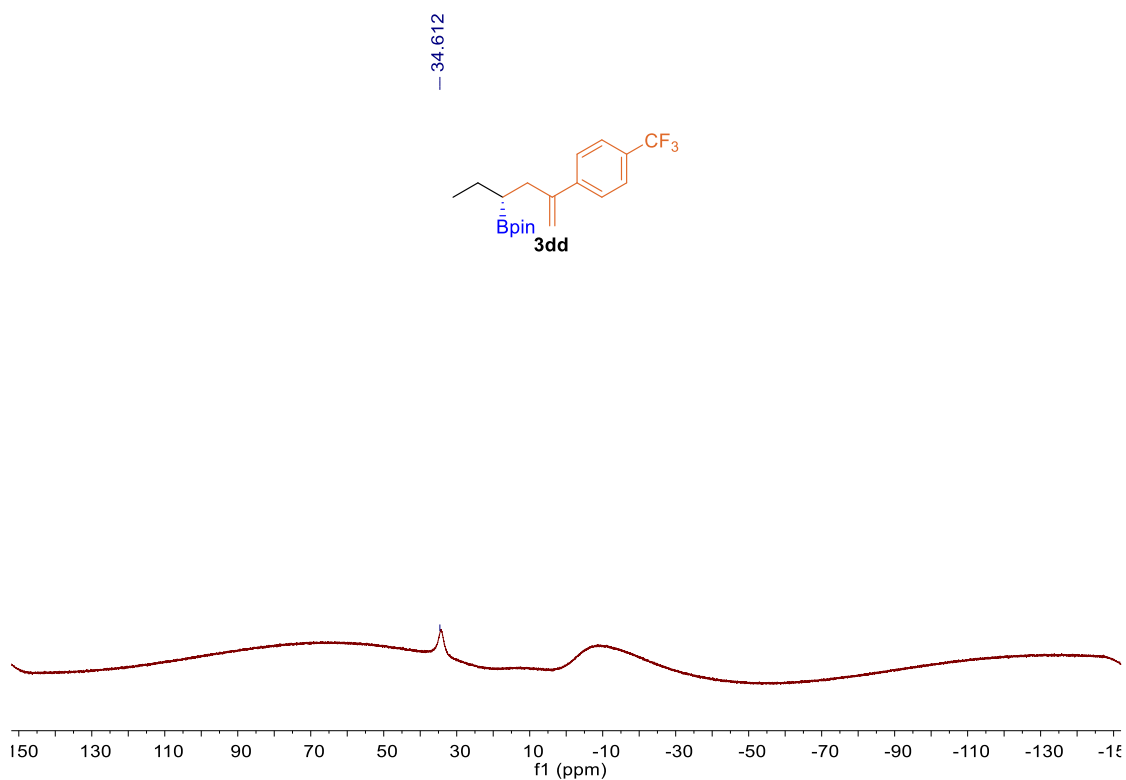




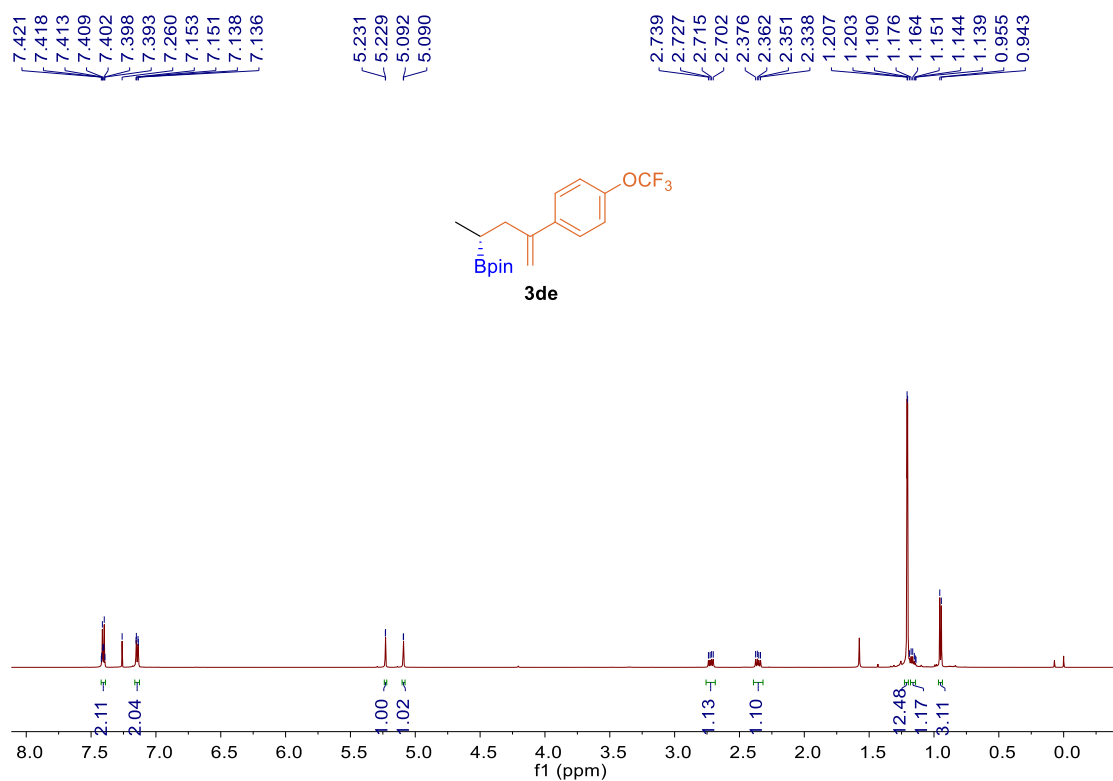
Supplementary Figure 328. ¹H NMR spectrum of compound 3dd



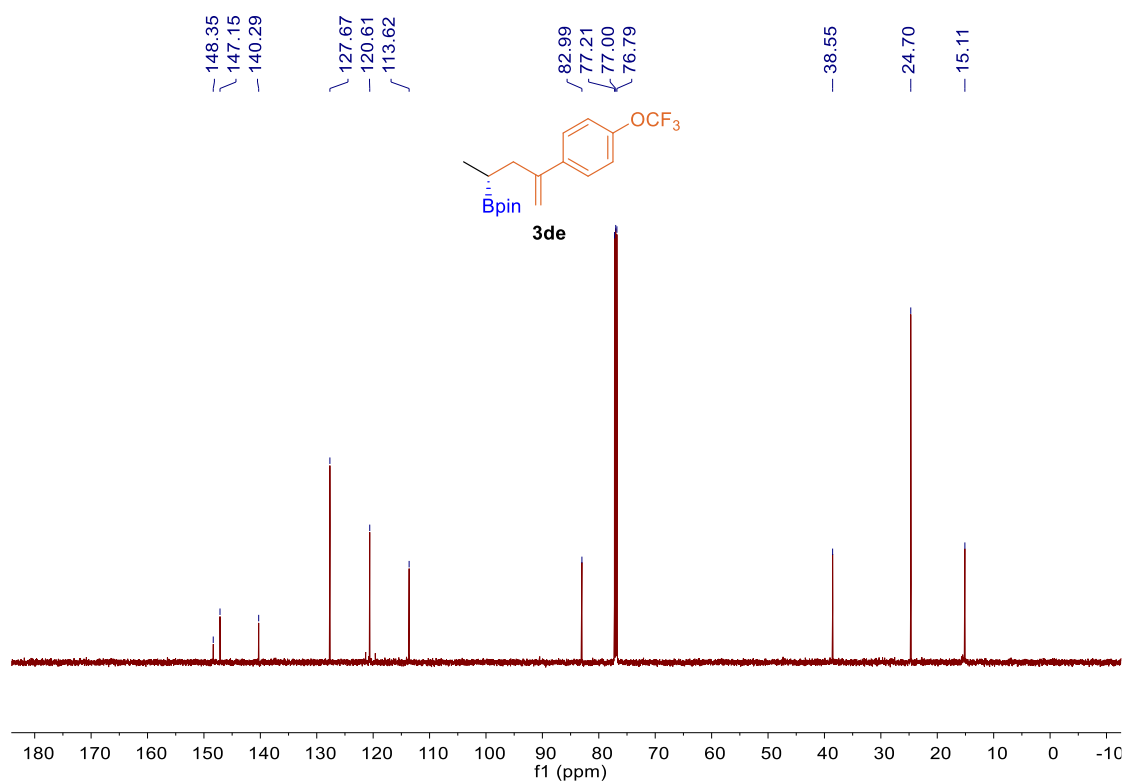
Supplementary Figure 329. ¹³C NMR spectrum of compound 3dd



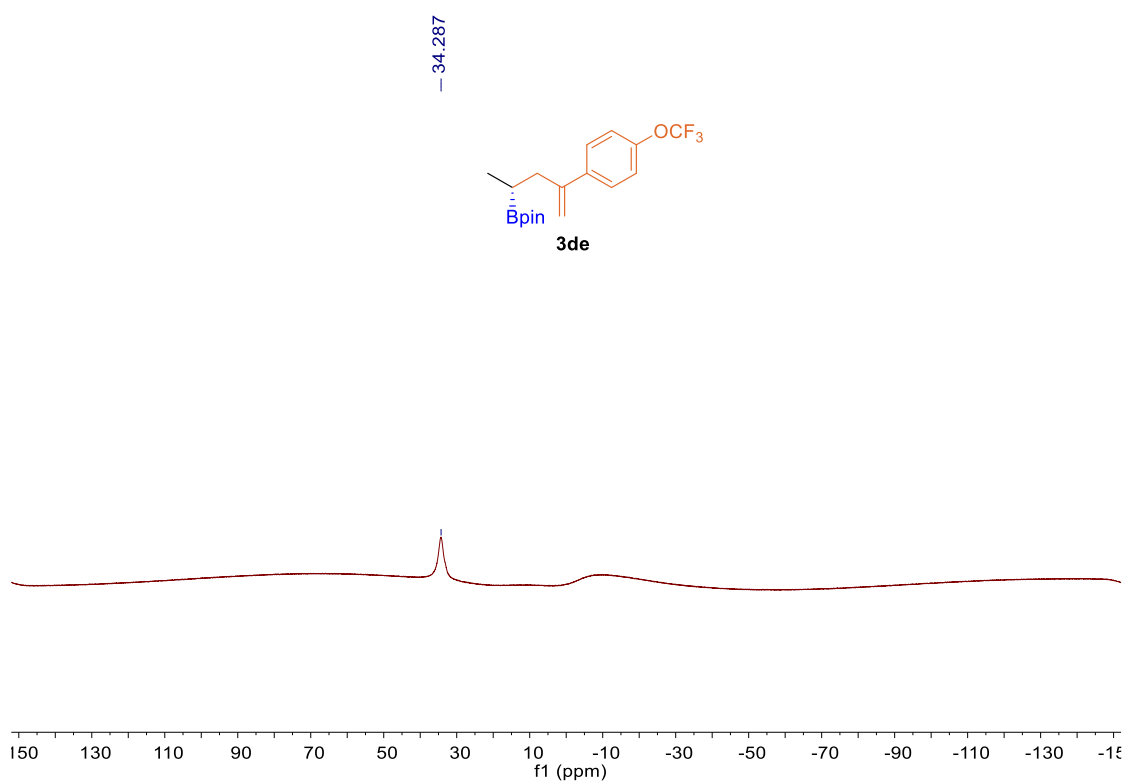
Supplementary Figure 330. ^{11}B NMR spectrum of compound **3dd**



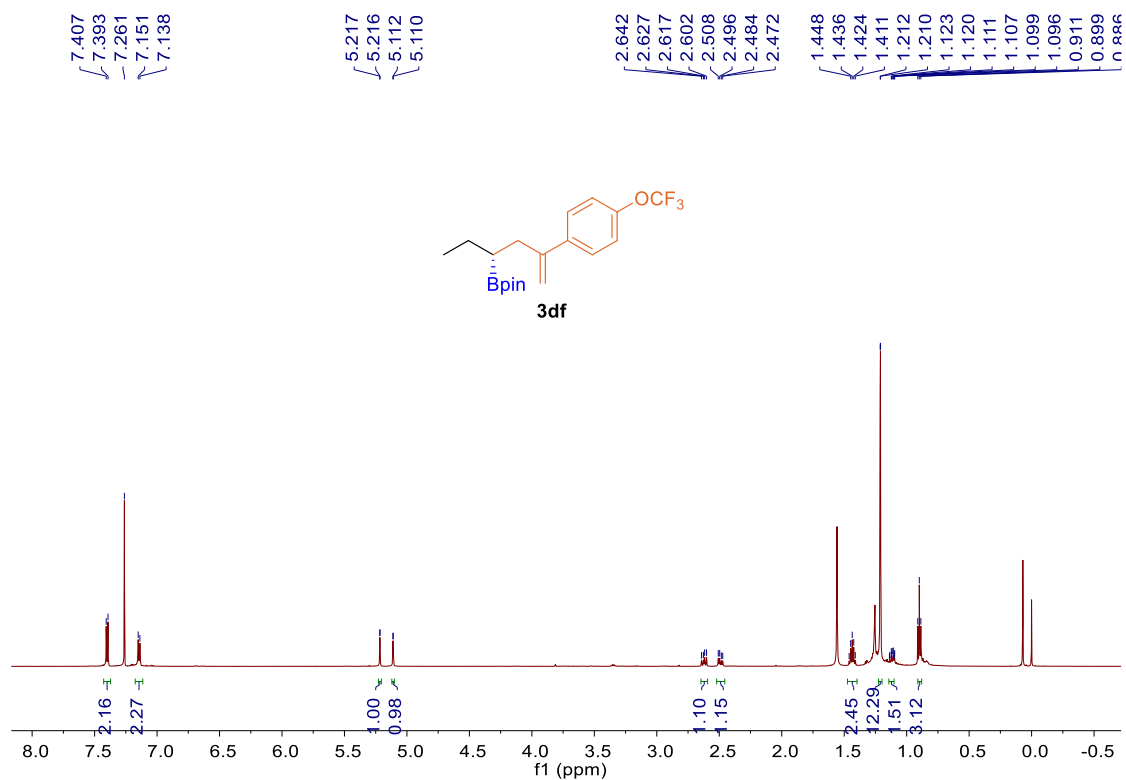
Supplementary Figure 331. ^1H NMR spectrum of compound **3de**



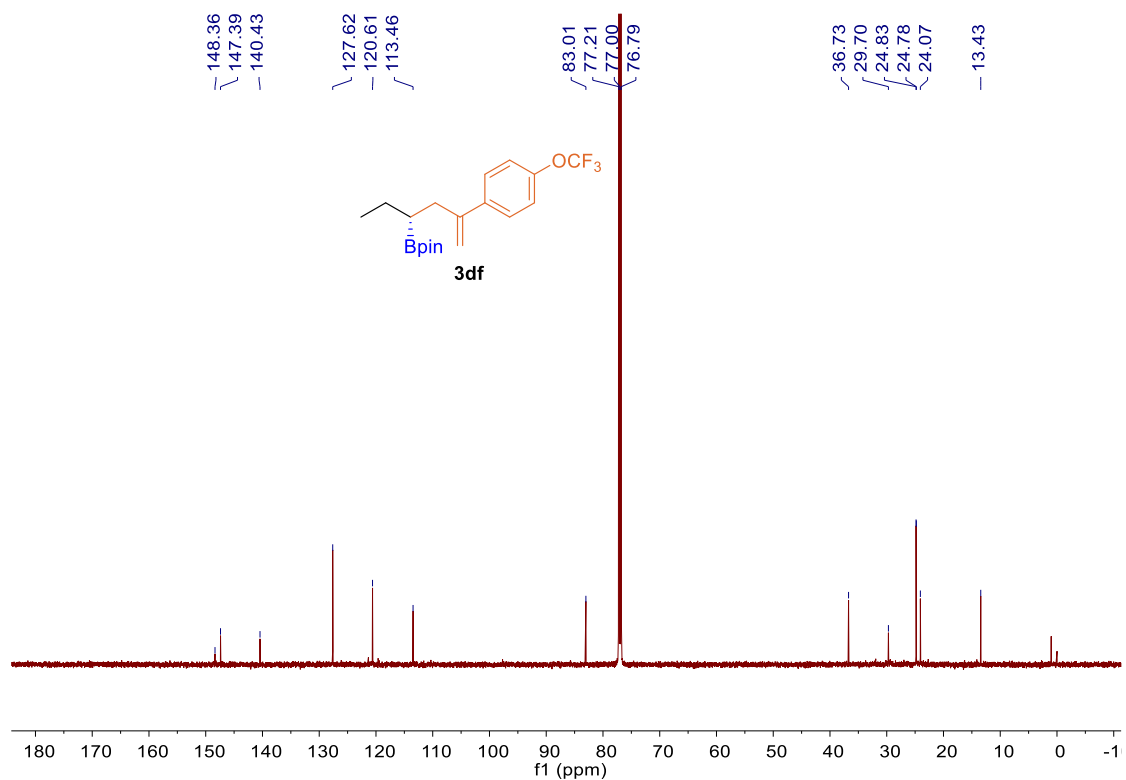
Supplementary Figure 332. ¹³C NMR spectrum of compound 3de



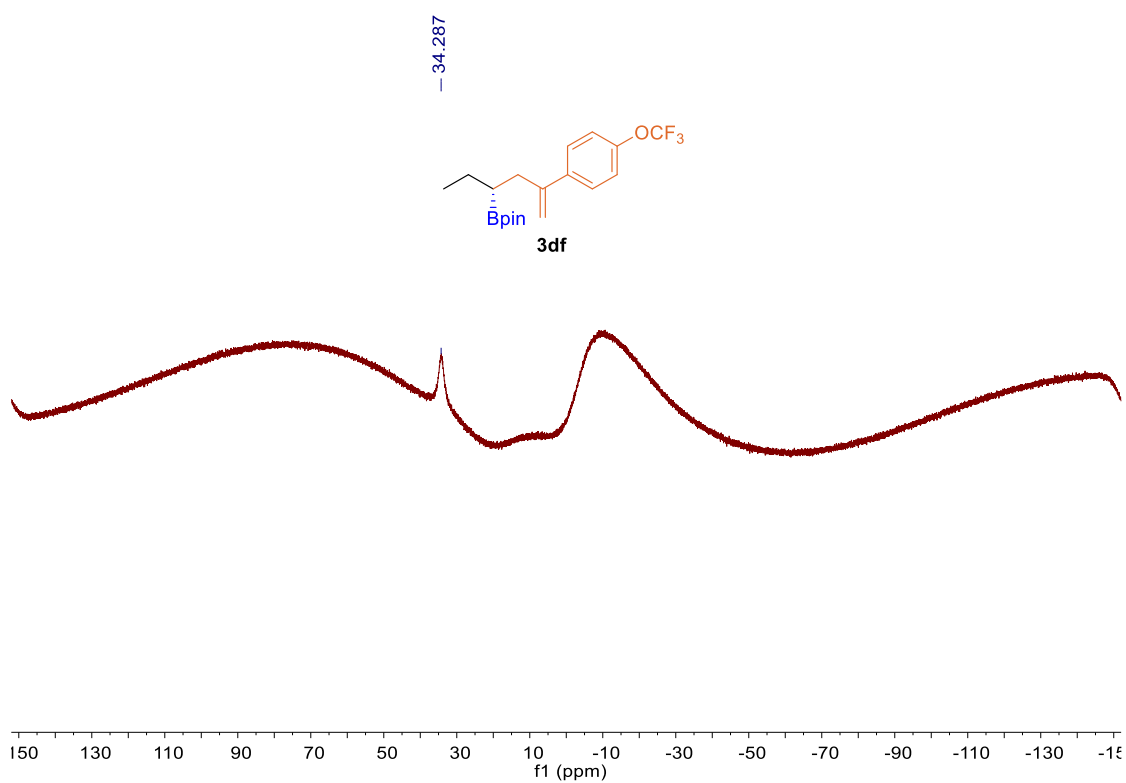
Supplementary Figure 333. ¹¹B NMR spectrum of compound 3de



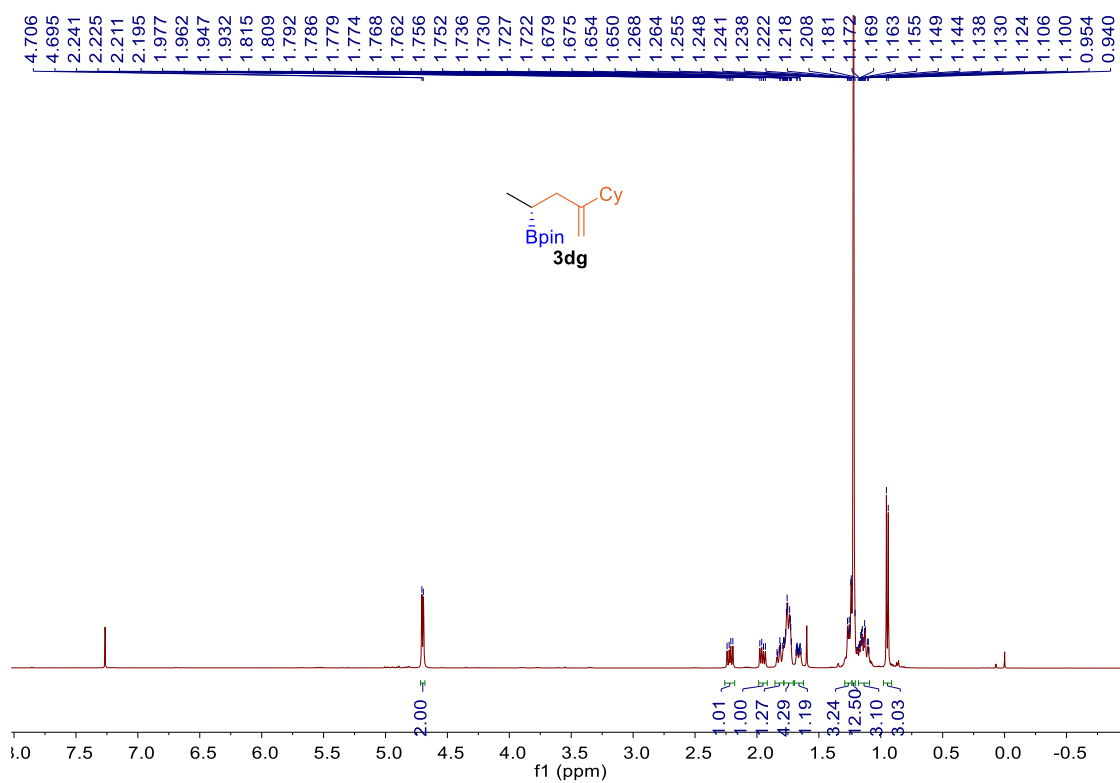
Supplementary Figure 334. ^1H NMR spectrum of compound **3df**



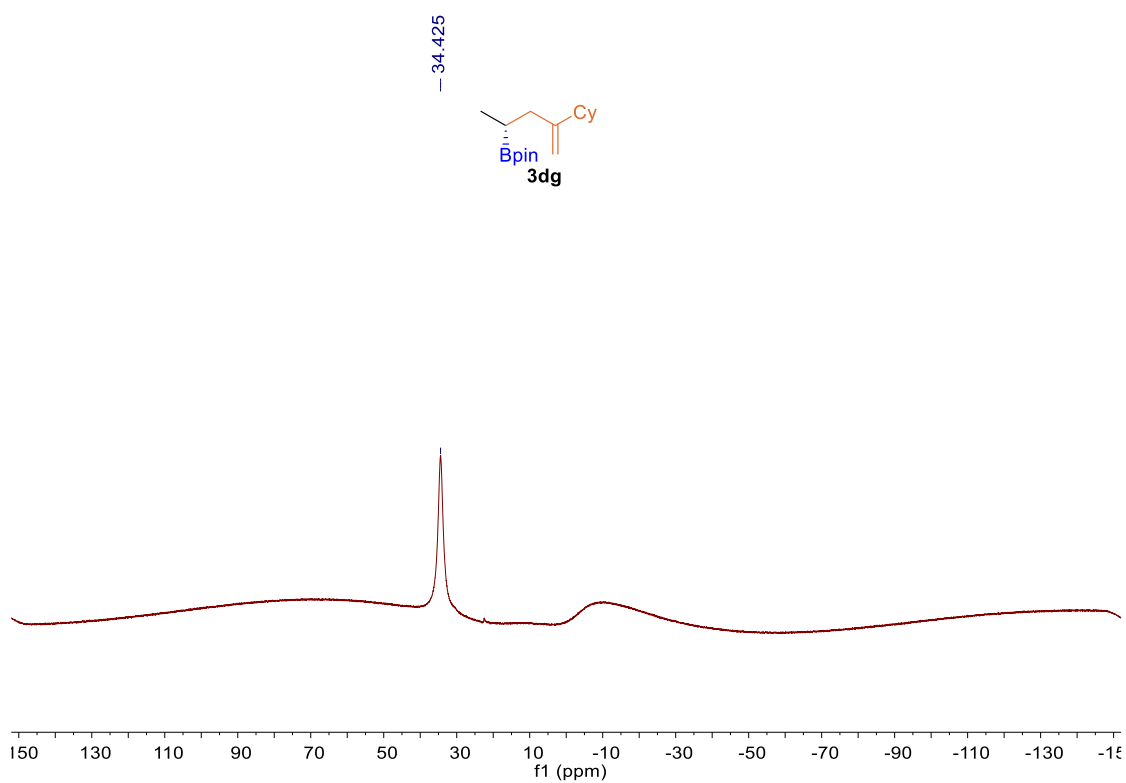
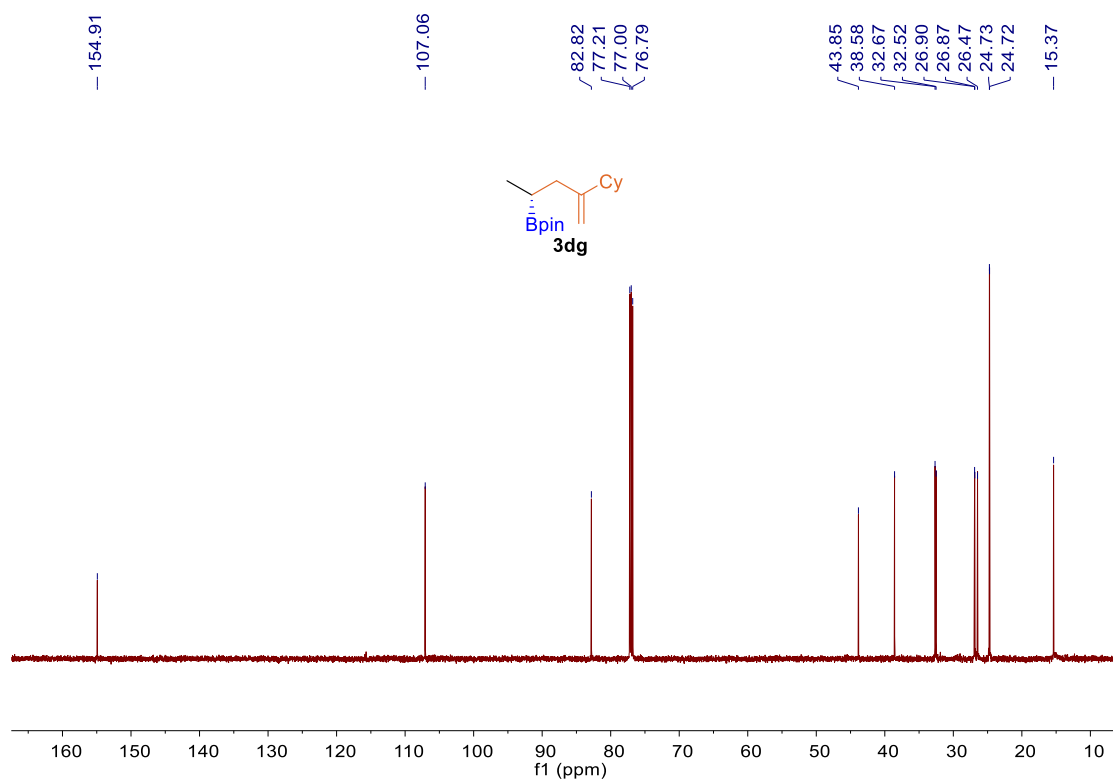
Supplementary Figure 335. ^{13}C NMR spectrum of compound **3df**

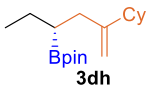


Supplementary Figure 336. ¹¹B NMR spectrum of compound 3df

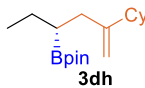


Supplementary Figure 337. ¹H NMR spectrum of compound 3dg

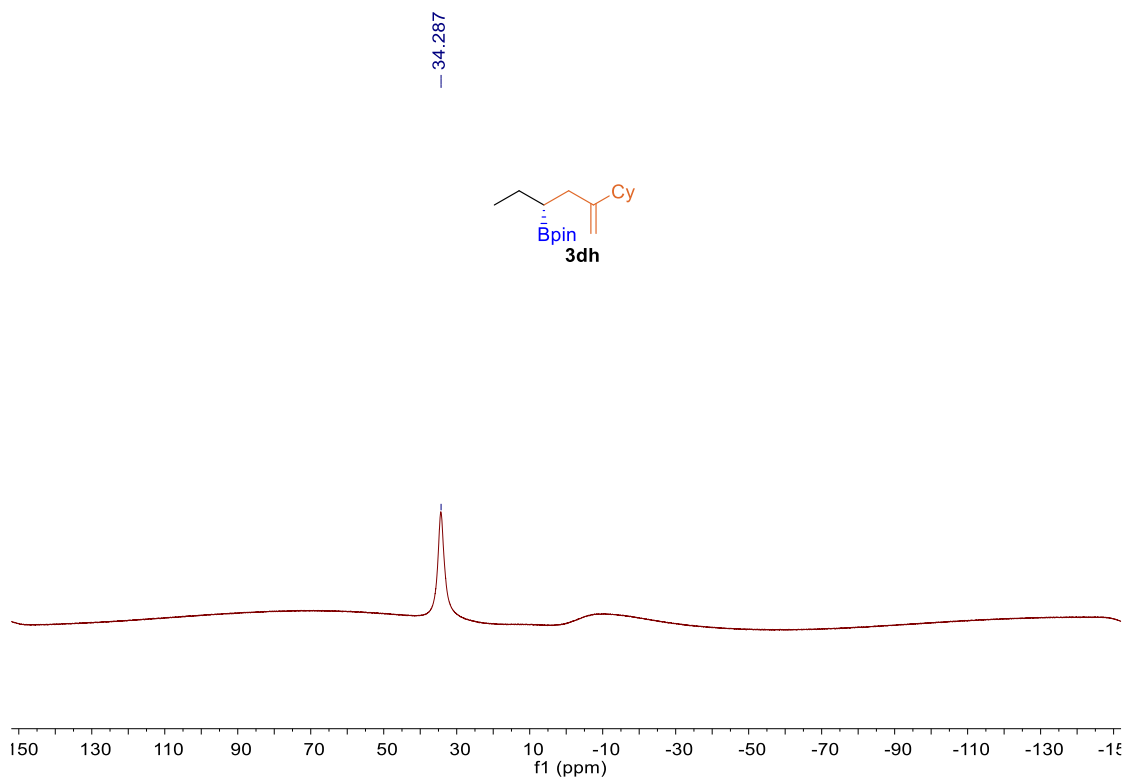




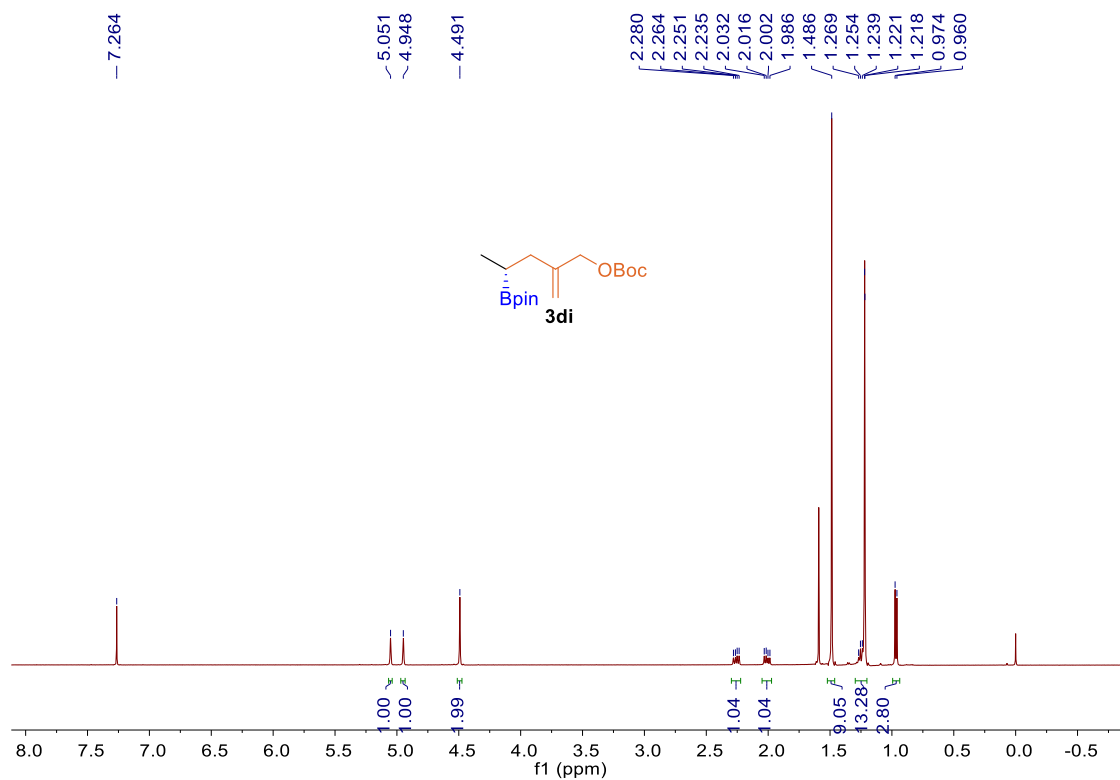
Supplementary Figure 340. ¹H NMR spectrum of compound 3dh



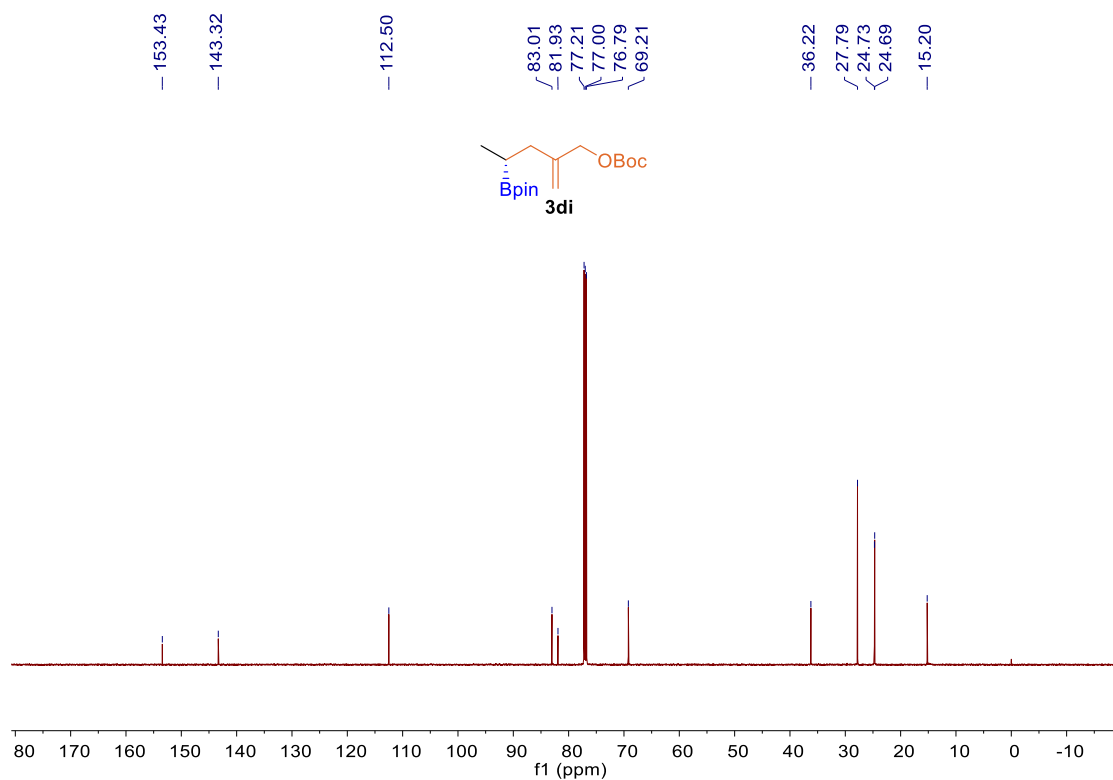
Supplementary Figure 341. ^{13}C NMR spectrum of compound 3dh



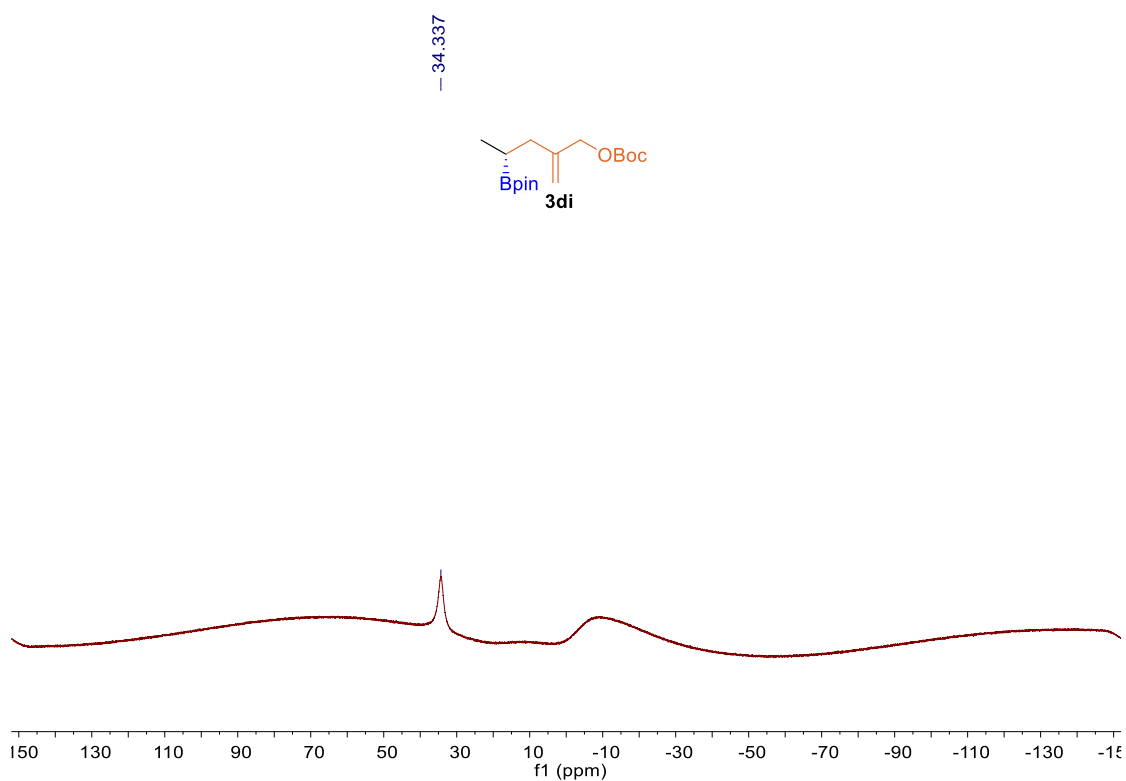
Supplementary Figure 342. ^{11}B NMR spectrum of compound 3dh



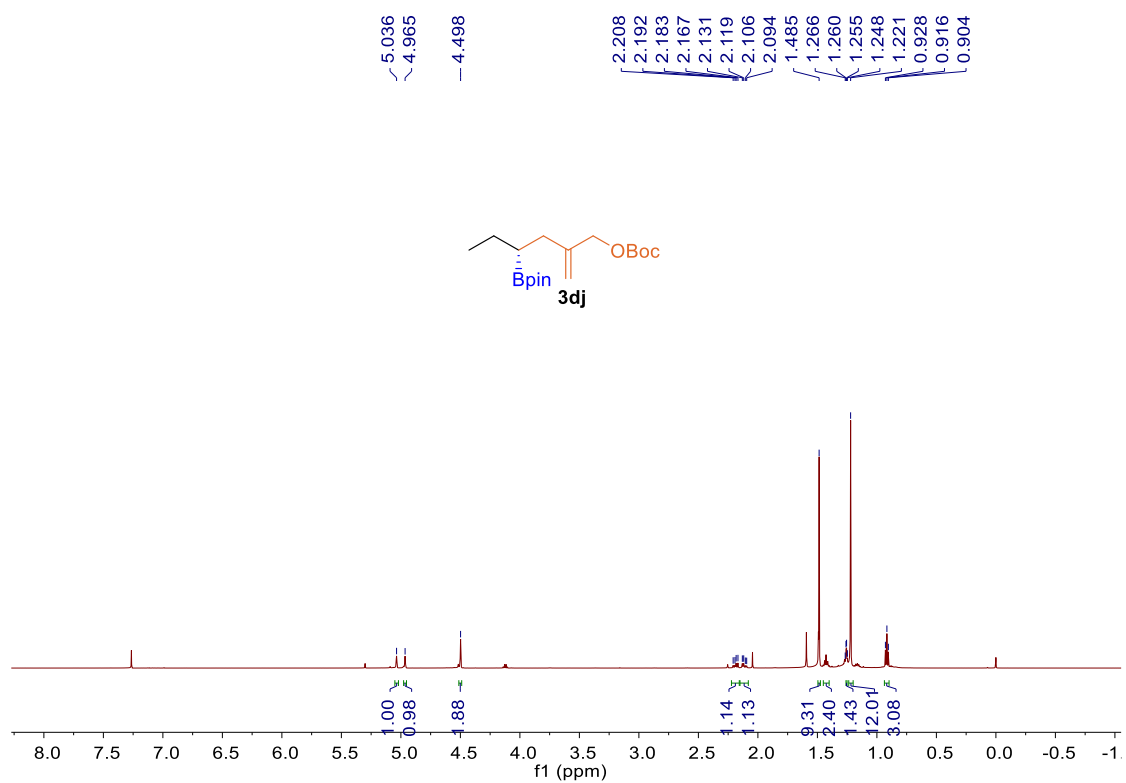
Supplementary Figure 343. ^1H NMR spectrum of compound 3di



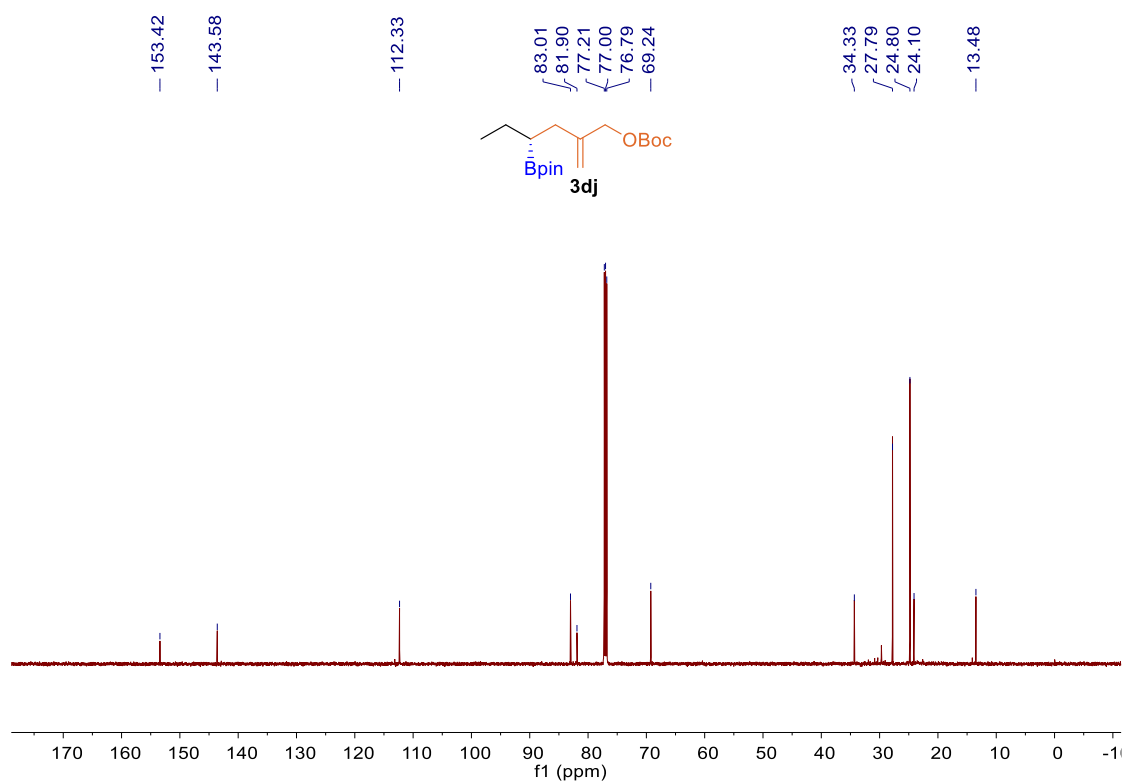
Supplementary Figure 344 ^{13}C . NMR spectrum of compound 3di



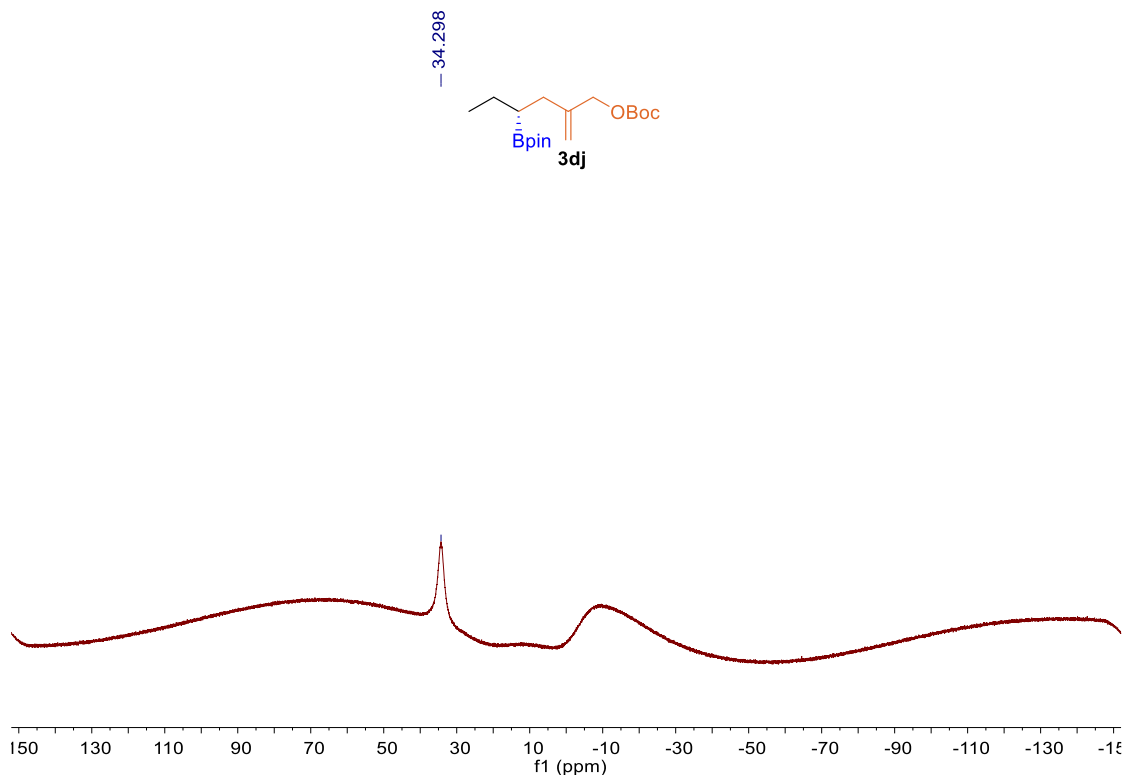
Supplementary Figure 345. ^{11}B NMR spectrum of compound 3di



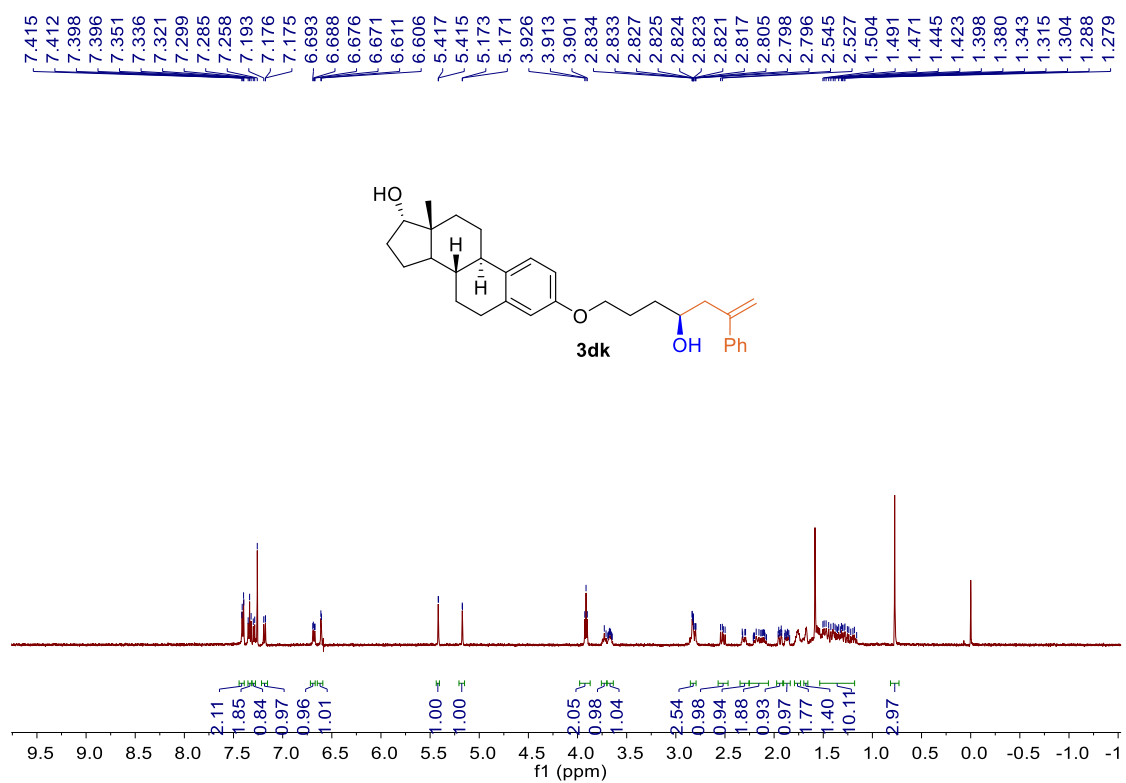
Supplementary Figure 346. ¹H NMR spectrum of compound 3dj



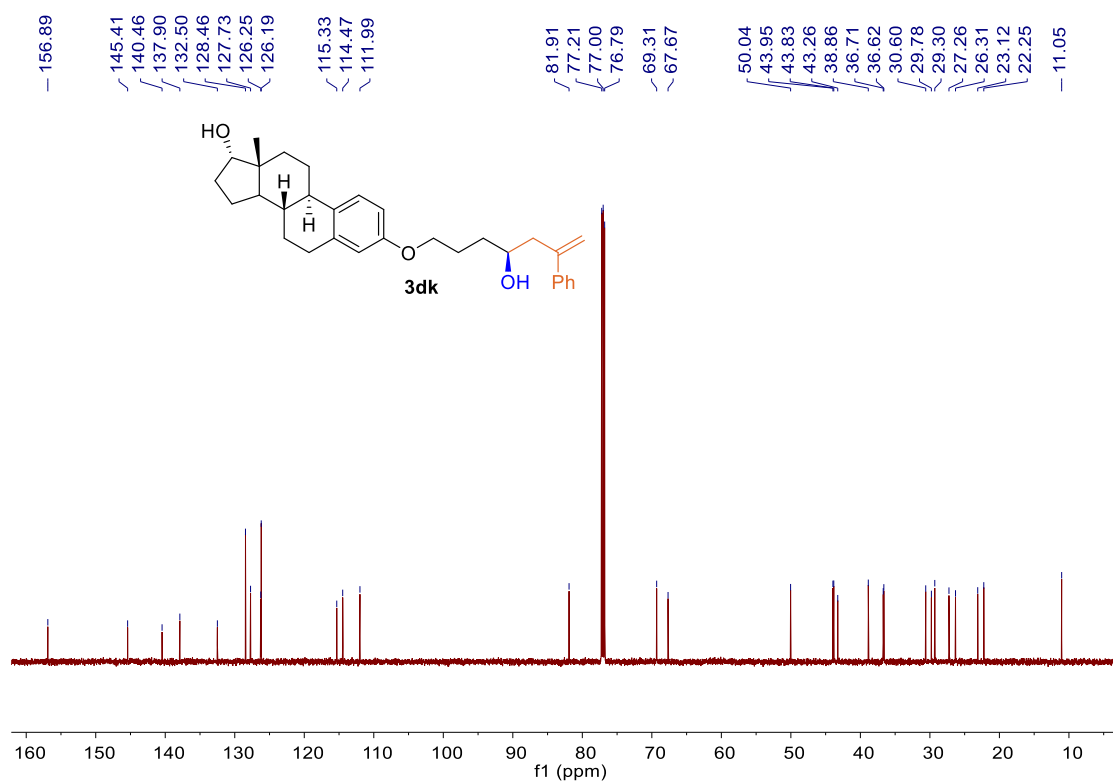
Supplementary Figure 347. ¹³C NMR spectrum of compound 3dj



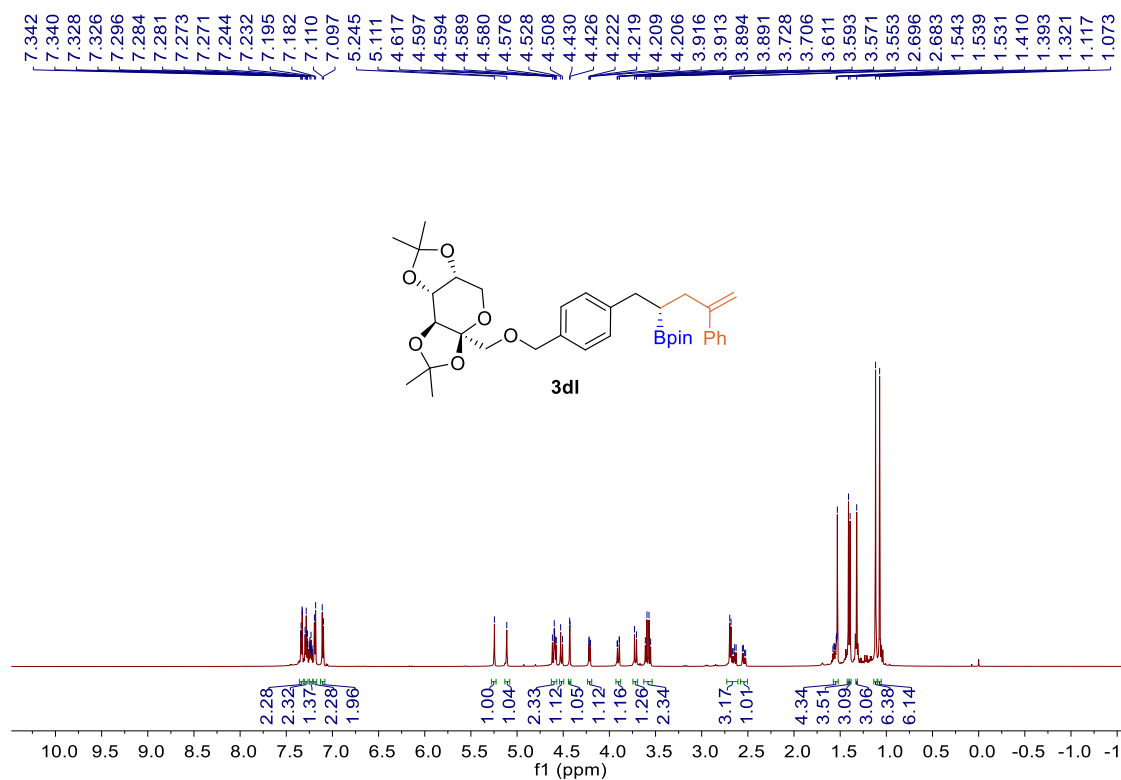
Supplementary Figure 348. ^{13}B NMR spectrum of compound **3dj**



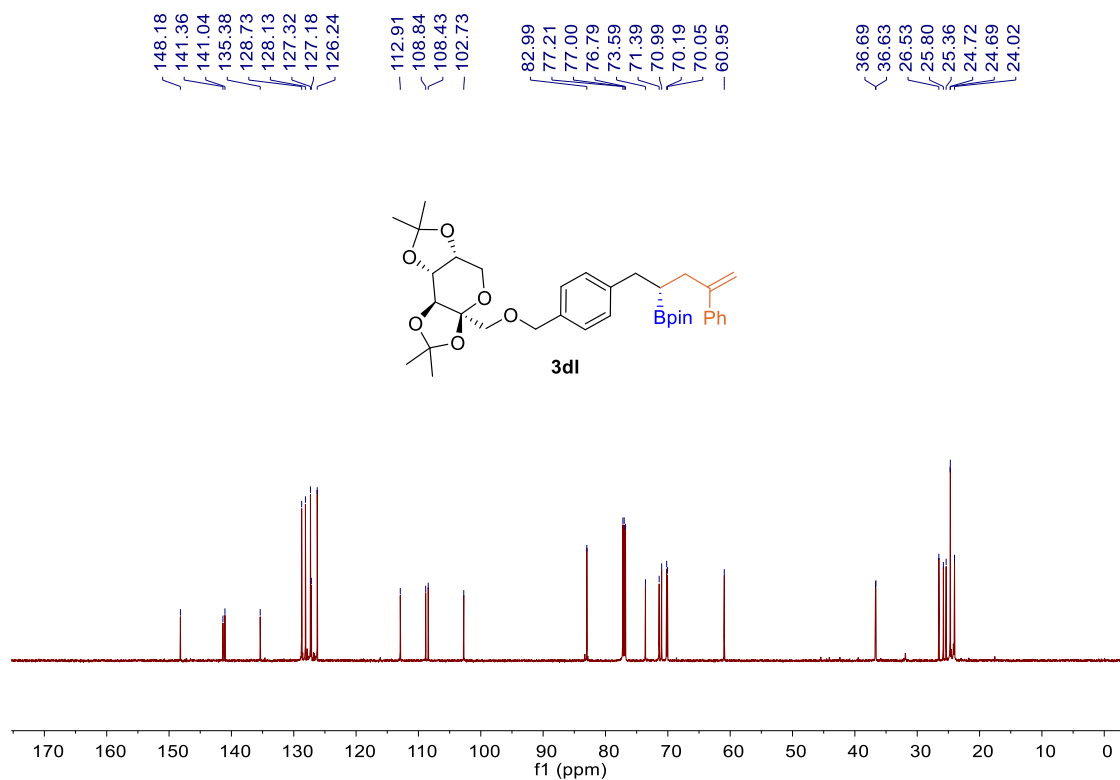
Supplementary Figure 349. ^1H NMR spectrum of compound **3dk**



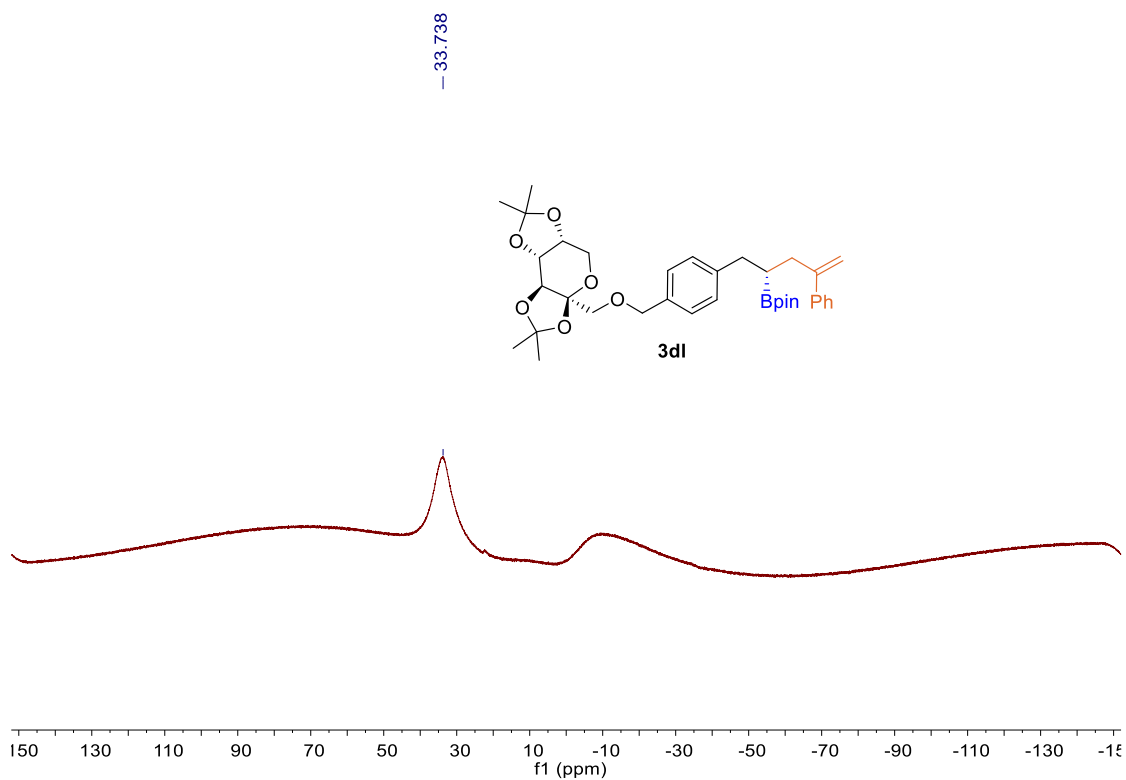
Supplementary Figure 350. ¹³C NMR spectrum of compound 3dk



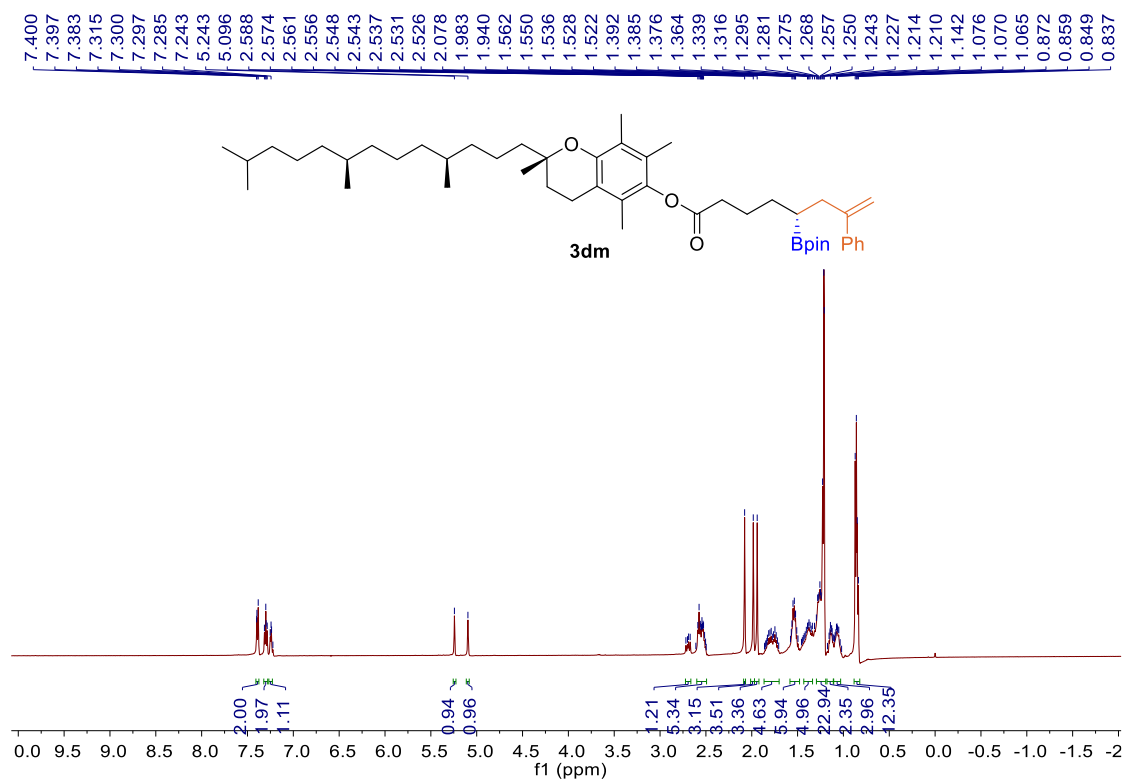
Supplementary Figure 351. ¹H NMR spectrum of compound 3dl



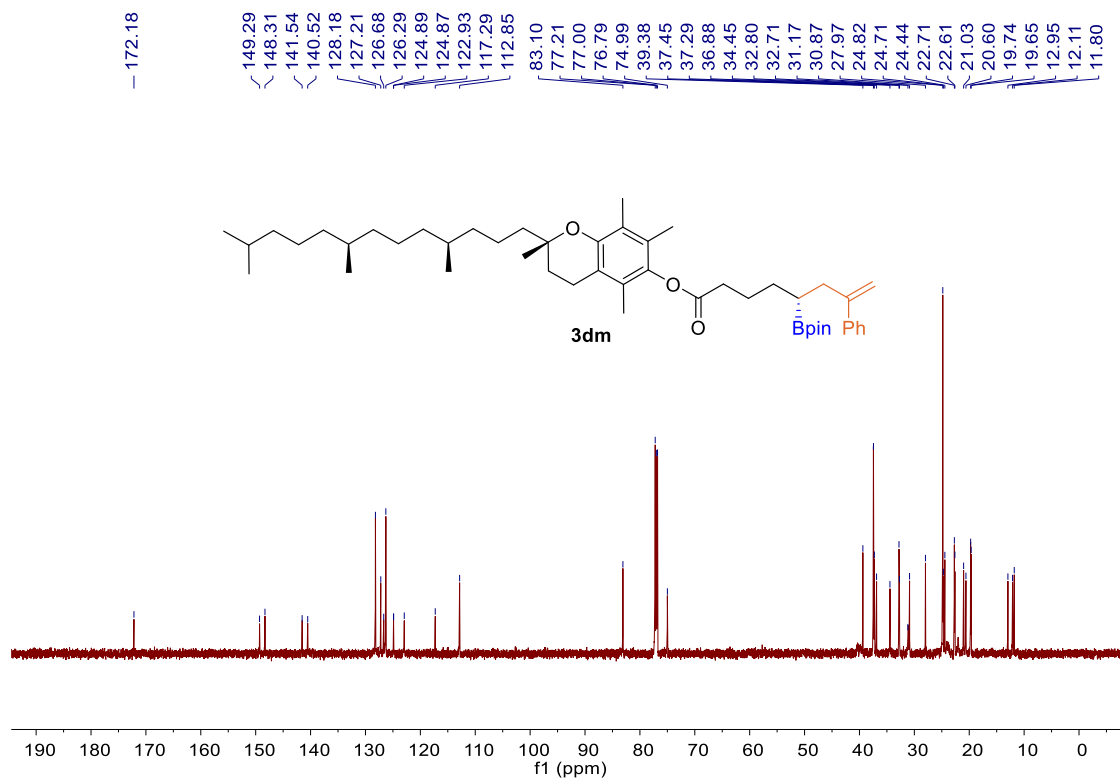
Supplementary Figure 352. ¹³C NMR spectrum of compound 3dl



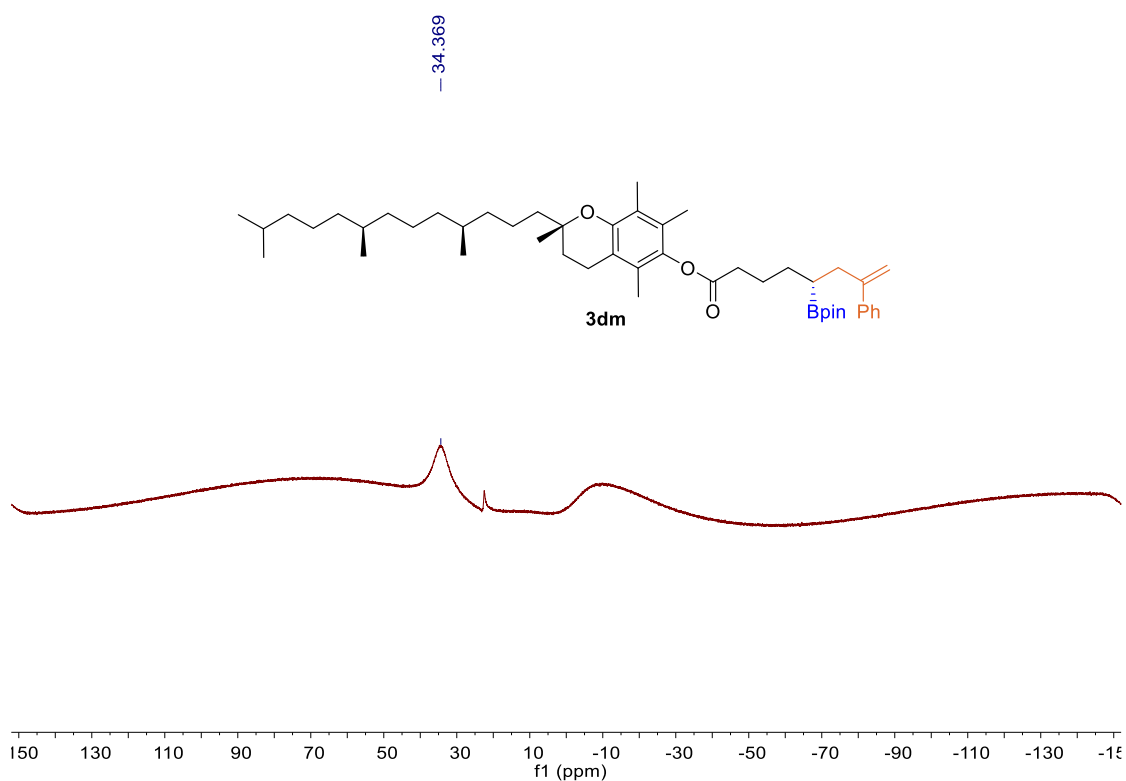
Supplementary Figure 353. ¹¹B NMR spectrum of compound 3dl



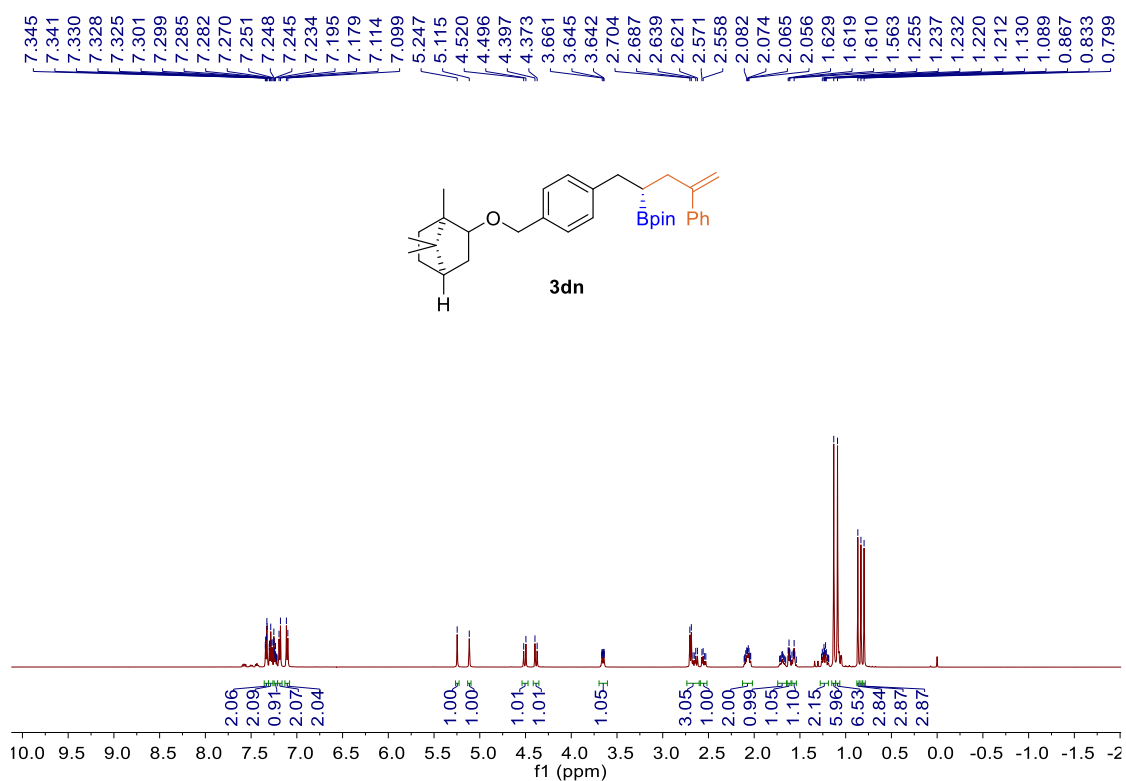
Supplementary Figure 354. ^1H NMR spectrum of compound 3dm



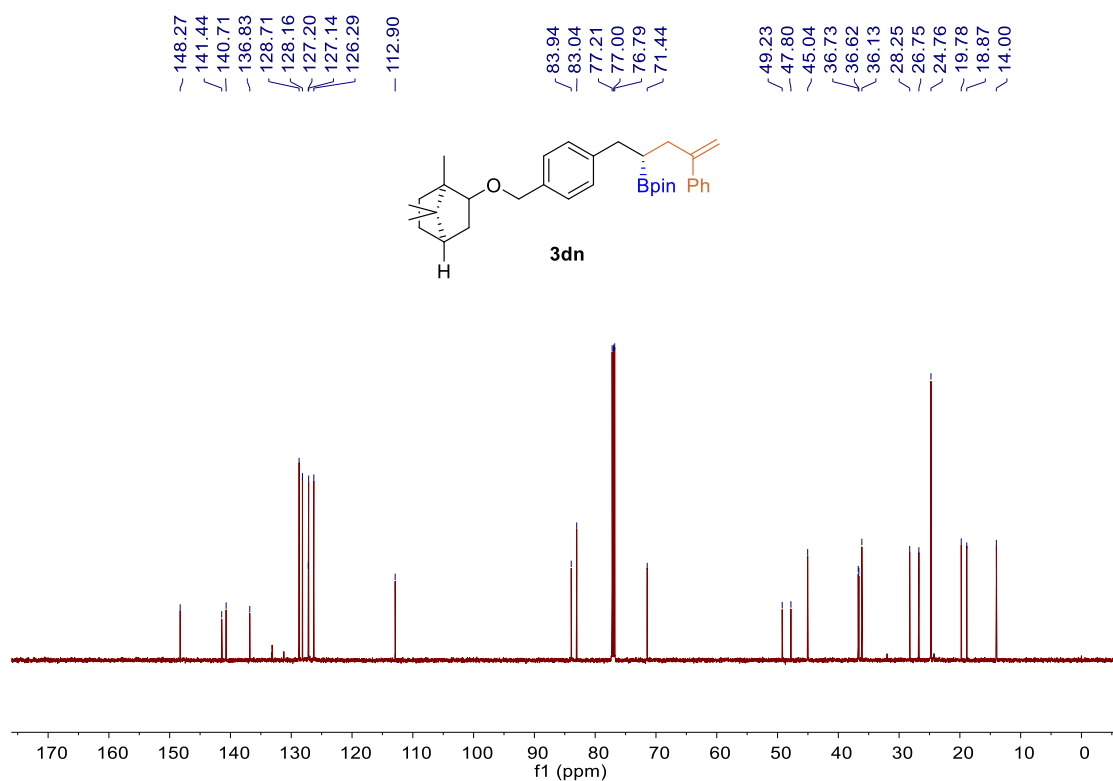
Supplementary Figure 355. ^{13}C NMR spectrum of compound 3dm



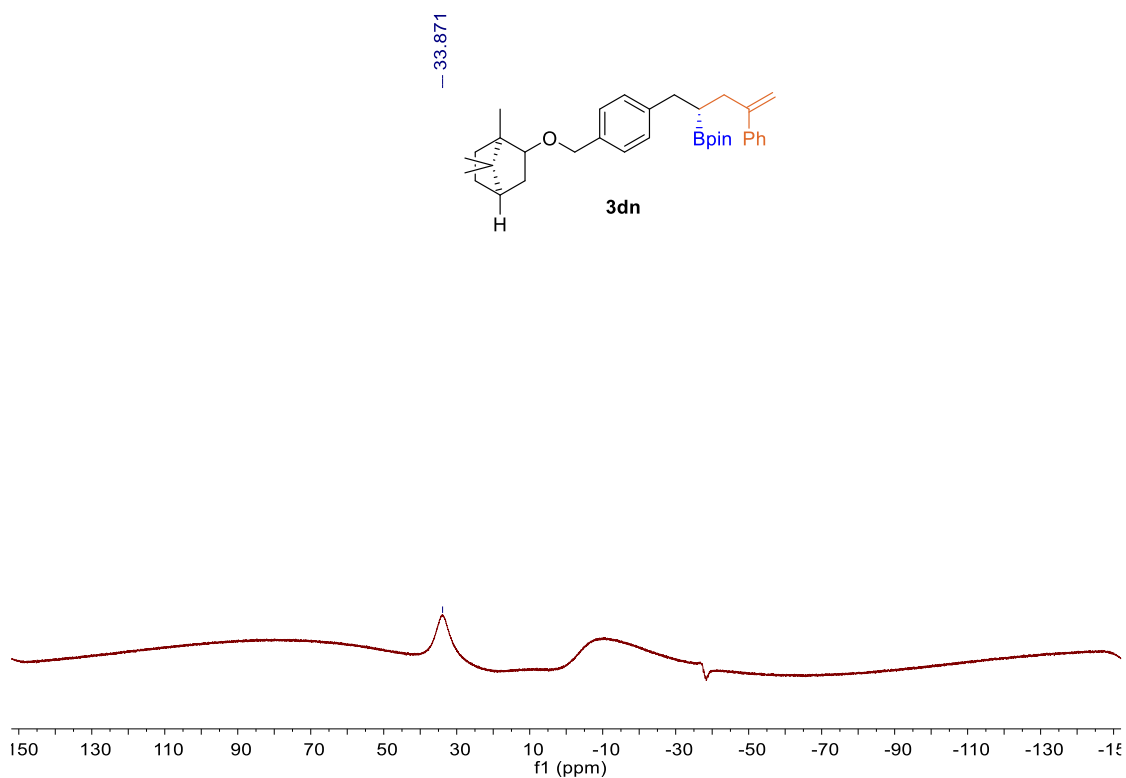
Supplementary Figure 356. ^{11}B NMR spectrum of compound **3dm**



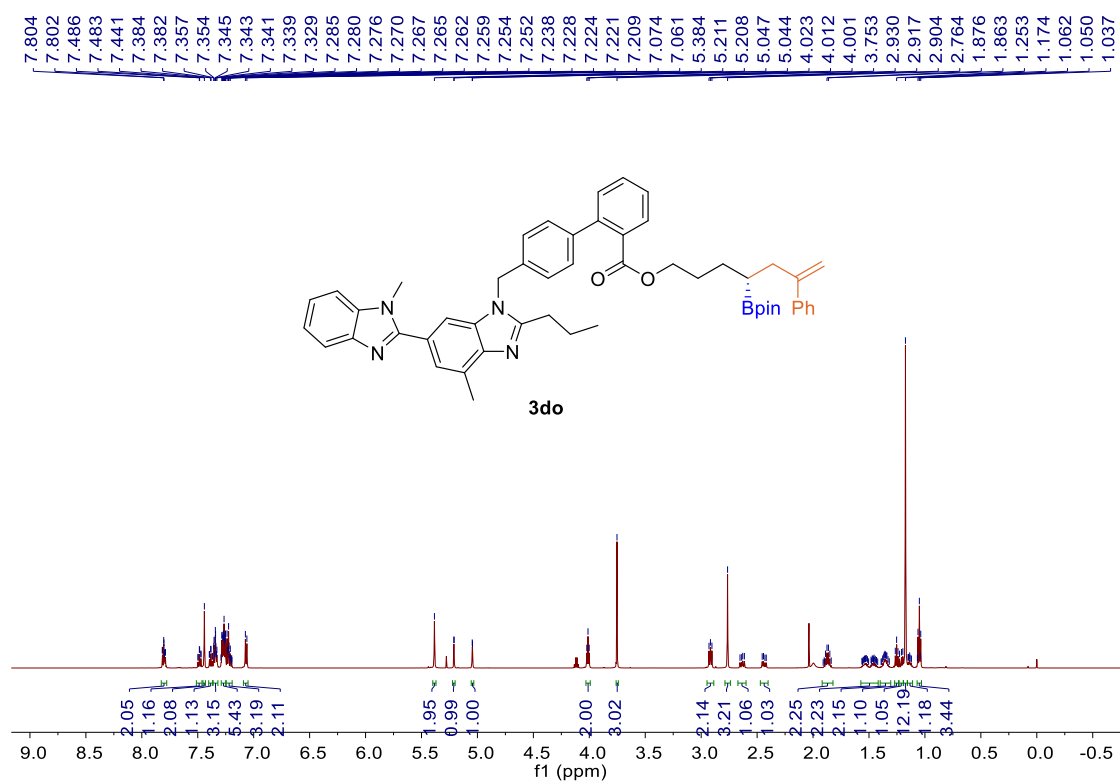
Supplementary Figure 357. ^1H NMR spectrum of compound **3dn**



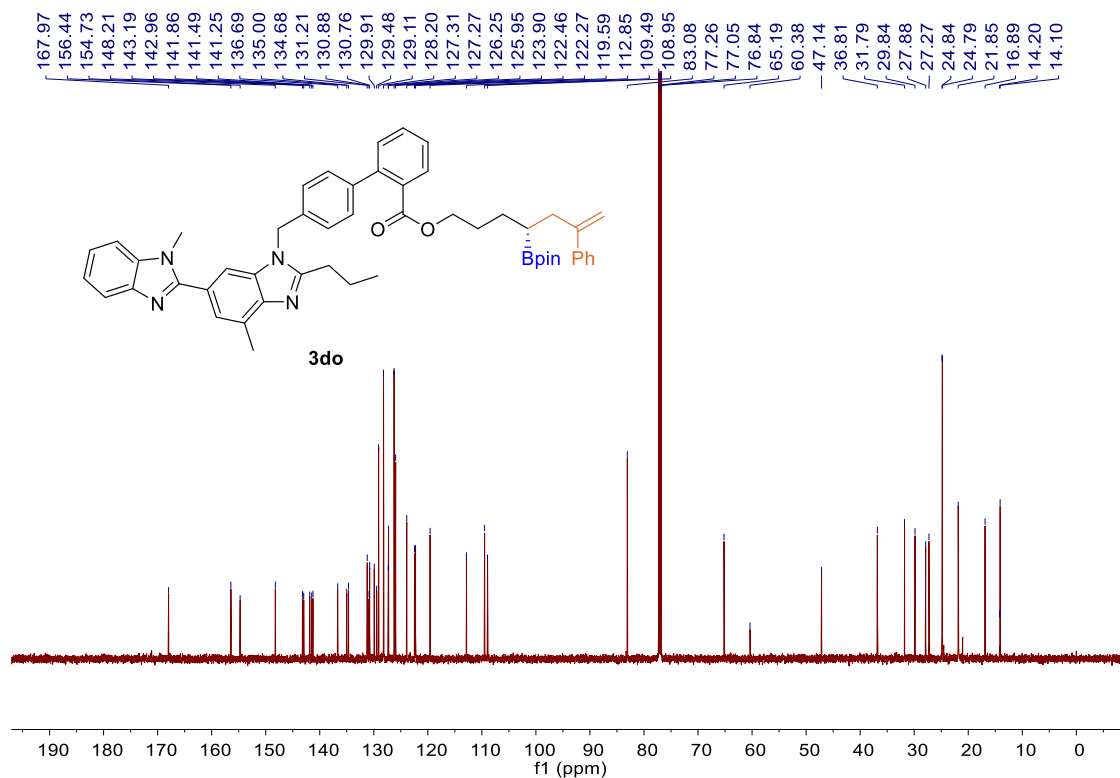
Supplementary Figure 358. ¹³C NMR spectrum of compound 3dn



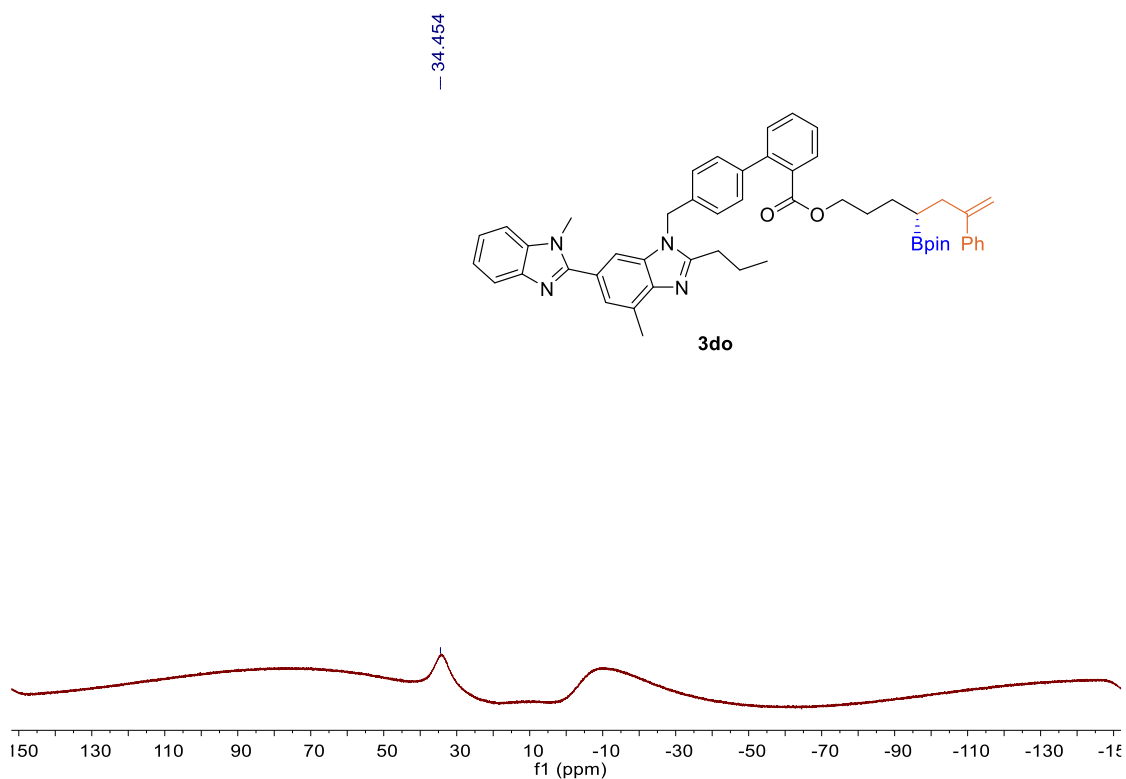
Supplementary Figure 359. ¹¹B NMR spectrum of compound 3dn



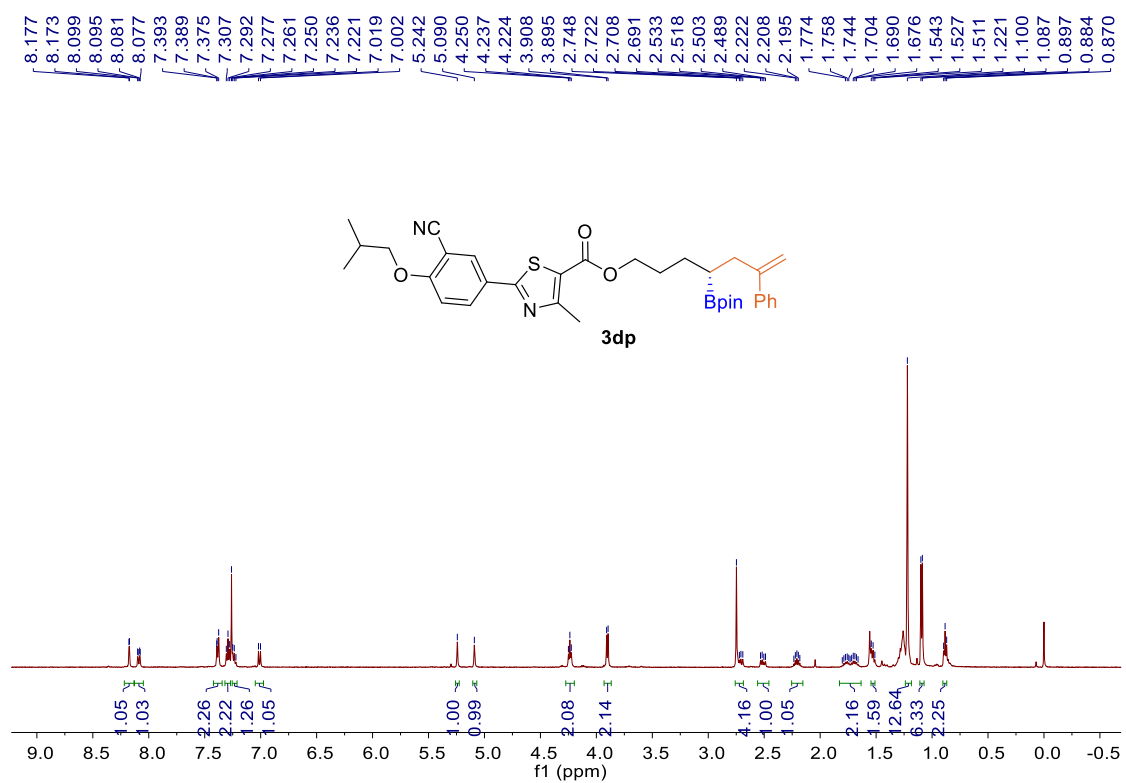
Supplementary Figure 360. ¹H NMR spectrum of compound 3do



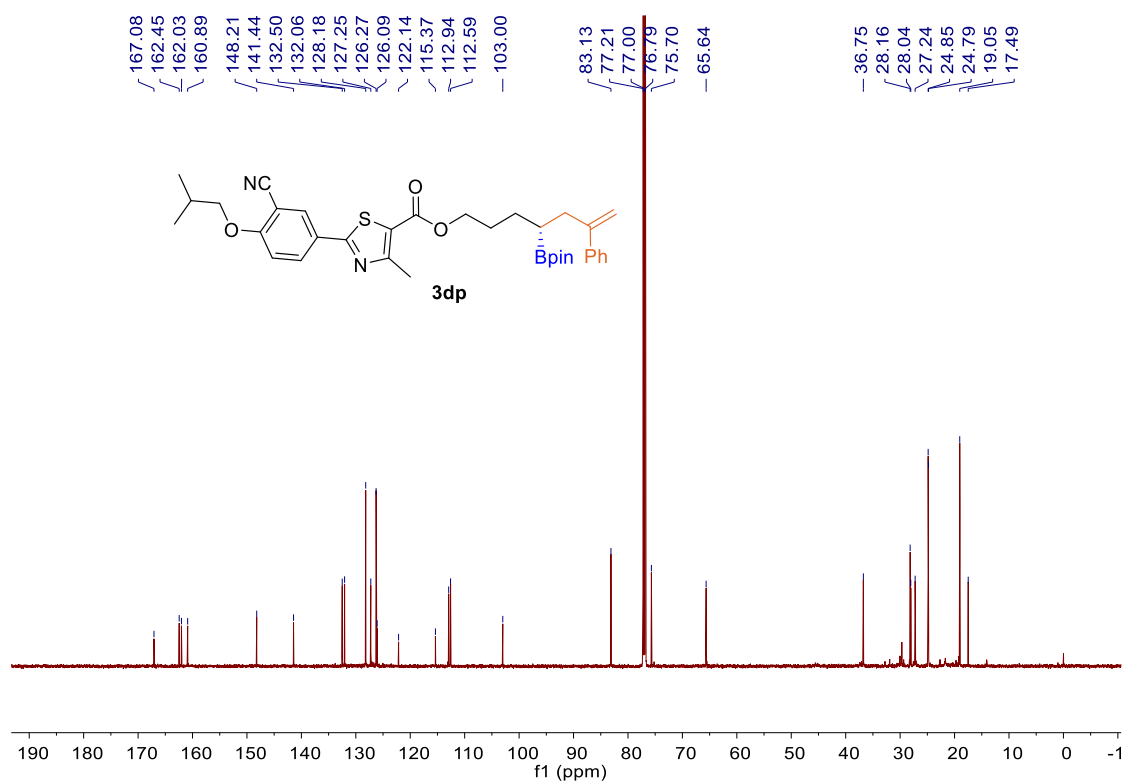
Supplementary Figure 361. ¹³C NMR spectrum of compound 3do



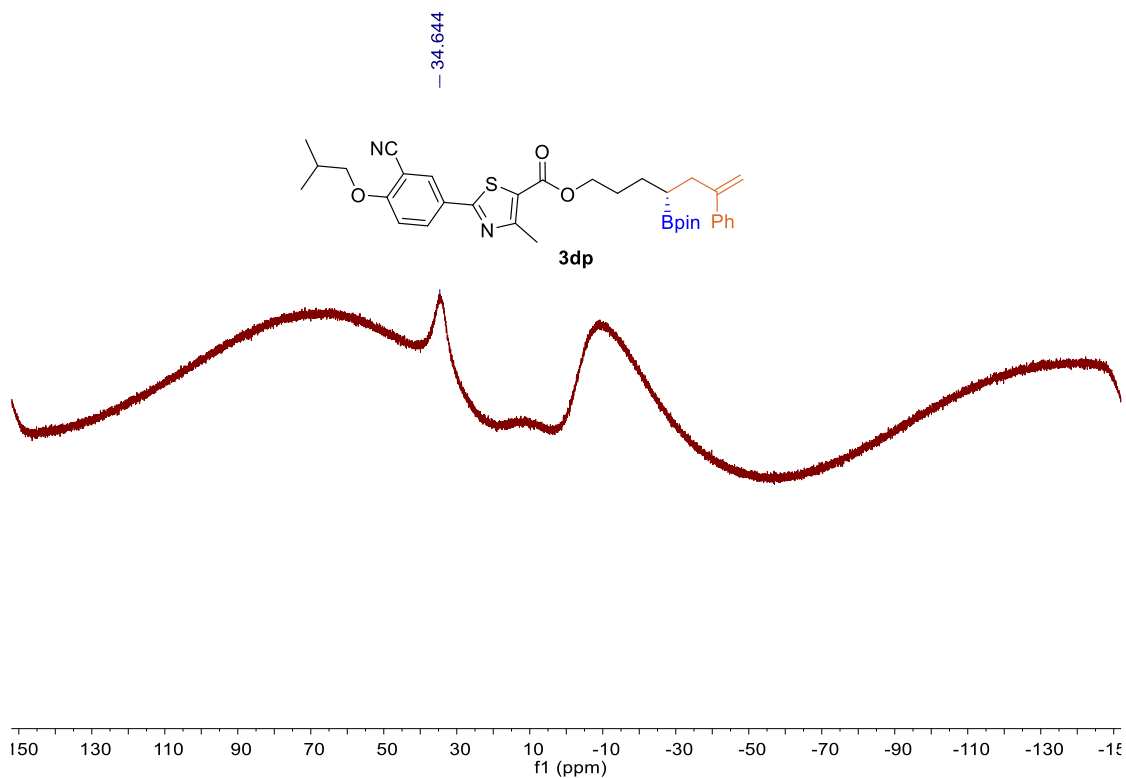
Supplementary Figure 362. ^{11}B NMR spectrum of compound 3do



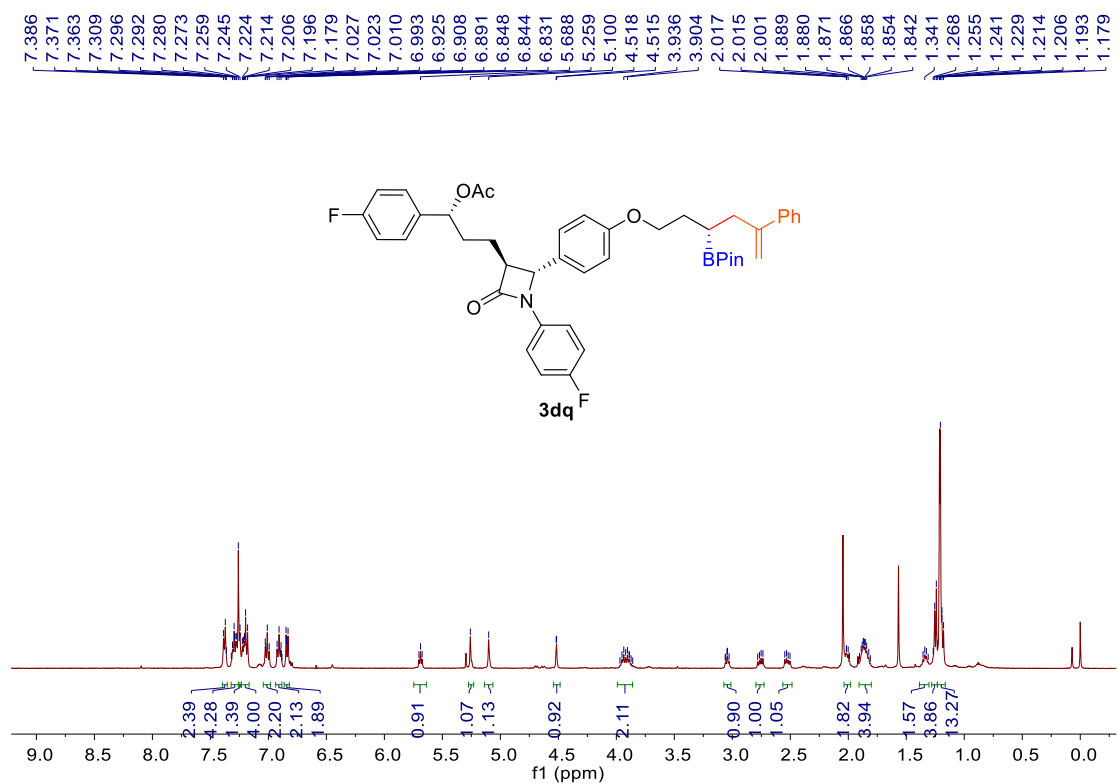
Supplementary Figure 363. ^1H NMR spectrum of compound 3dp



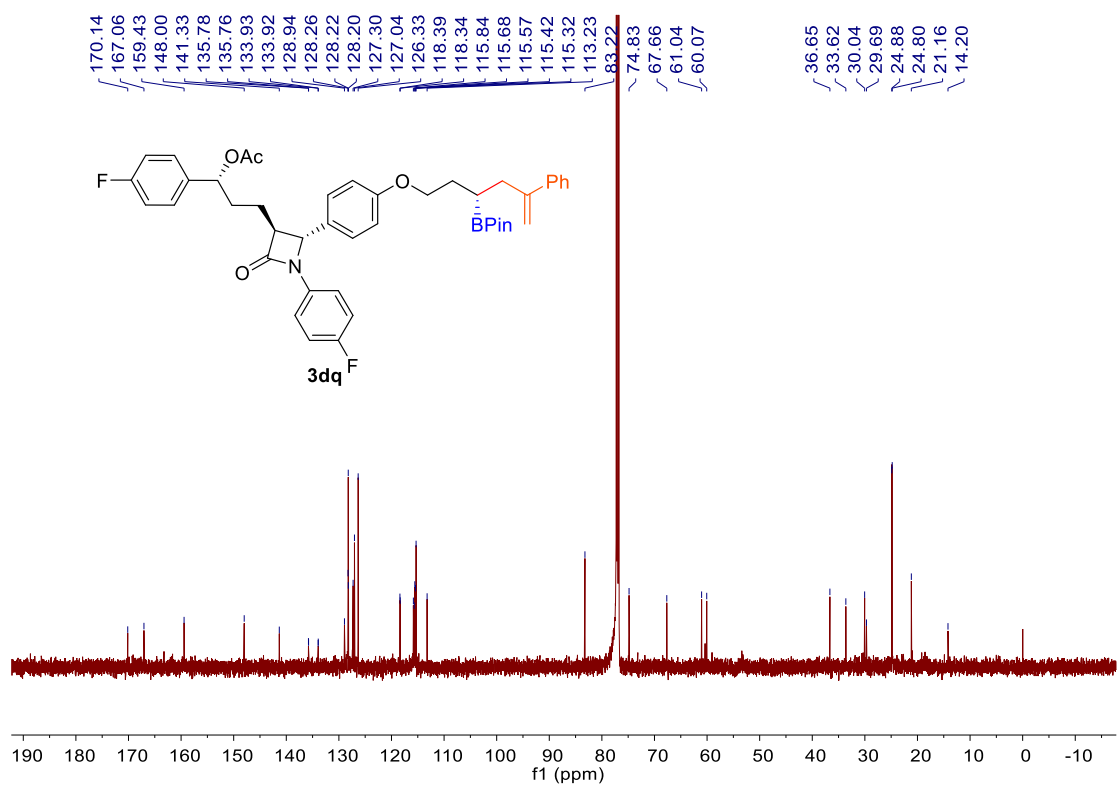
Supplementary Figure 364. ¹³C NMR spectrum of compound 3dp



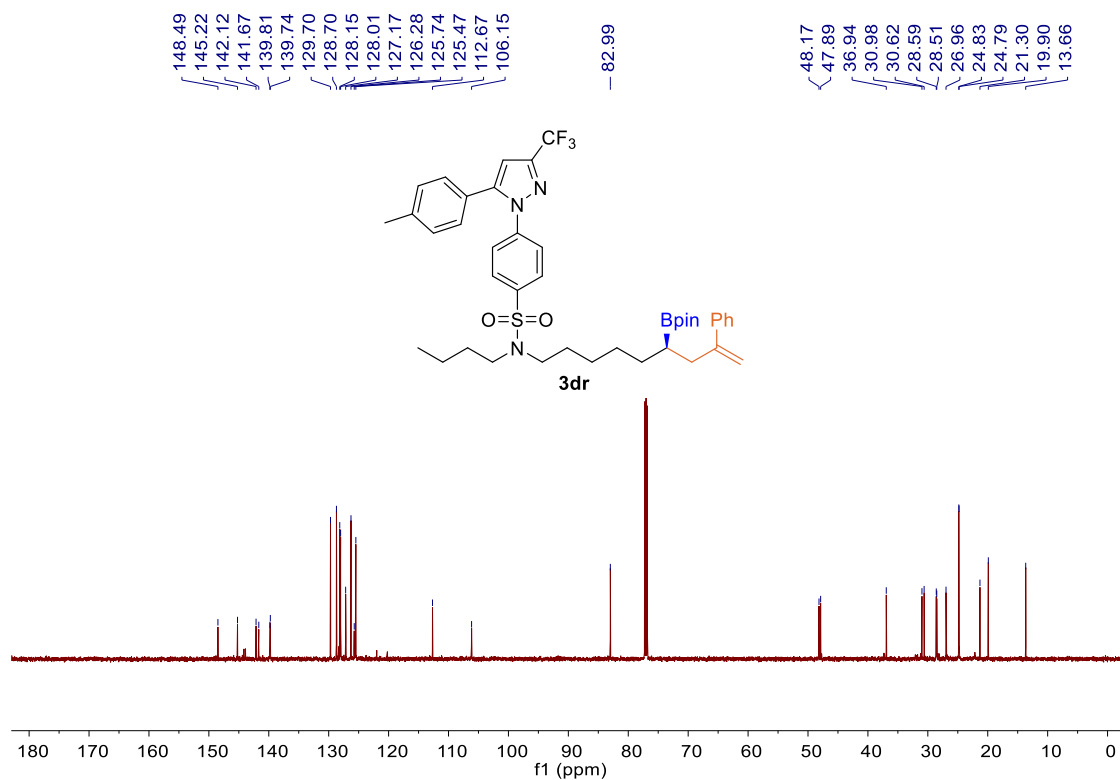
Supplementary Figure 365. ¹¹B NMR spectrum of compound 3dp



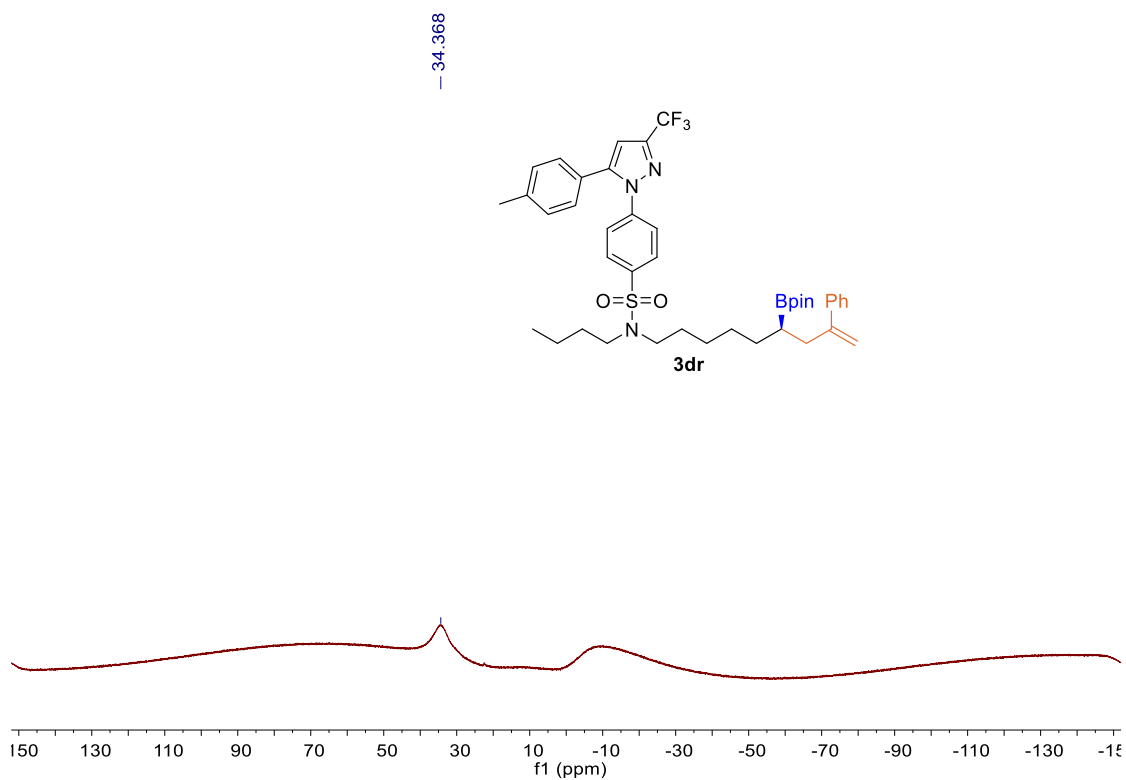
Supplementary Figure 366. ¹H NMR spectrum of compound 3dp



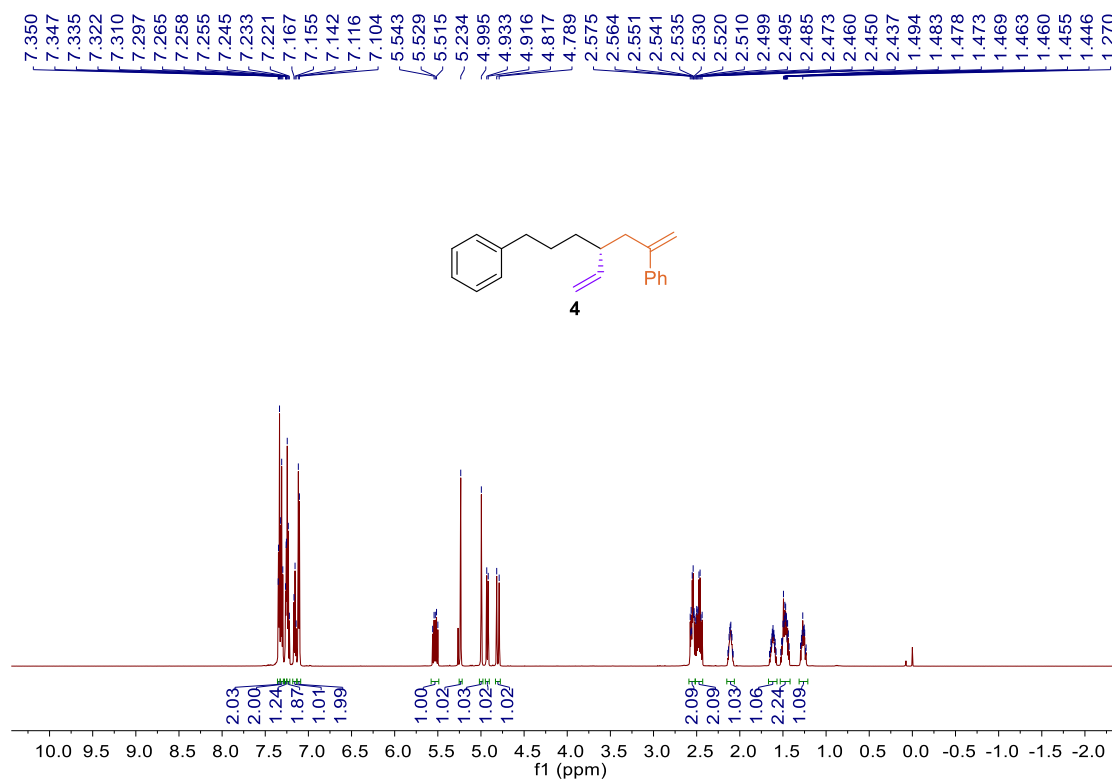
Supplementary Figure 367. ¹³C NMR spectrum of compound 3dp



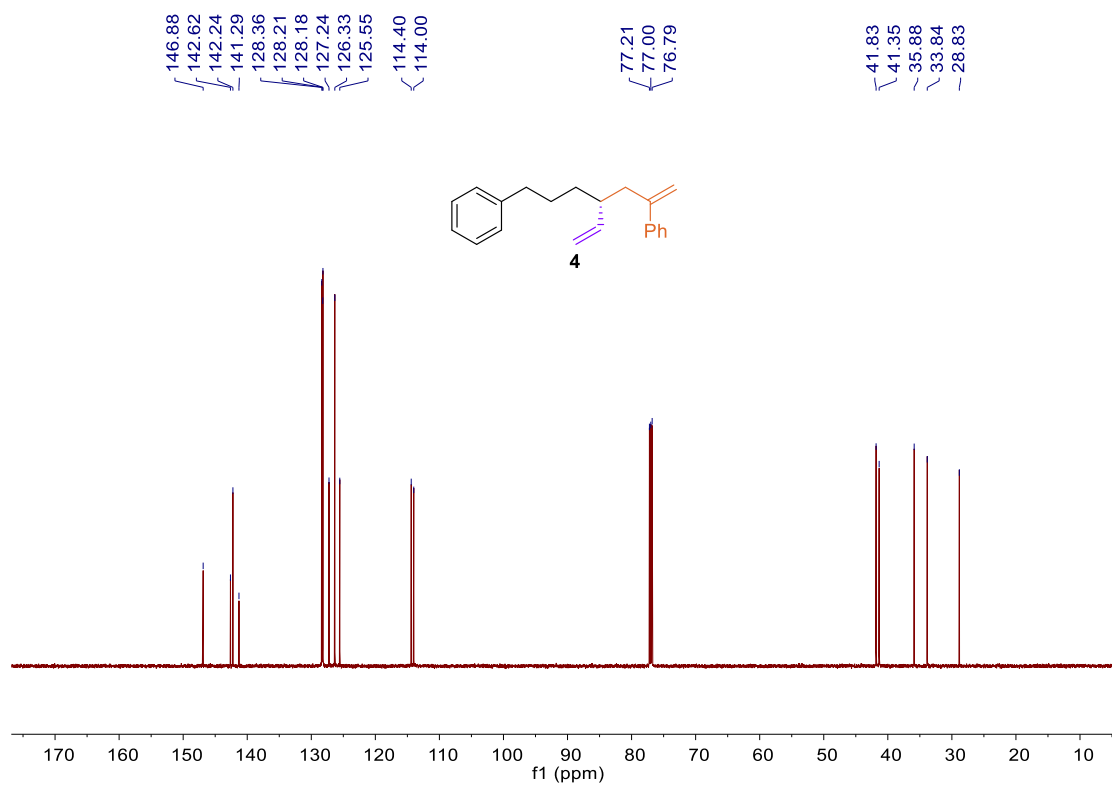
Supplementary Figure 370. ¹³C NMR spectrum of compound 3dr



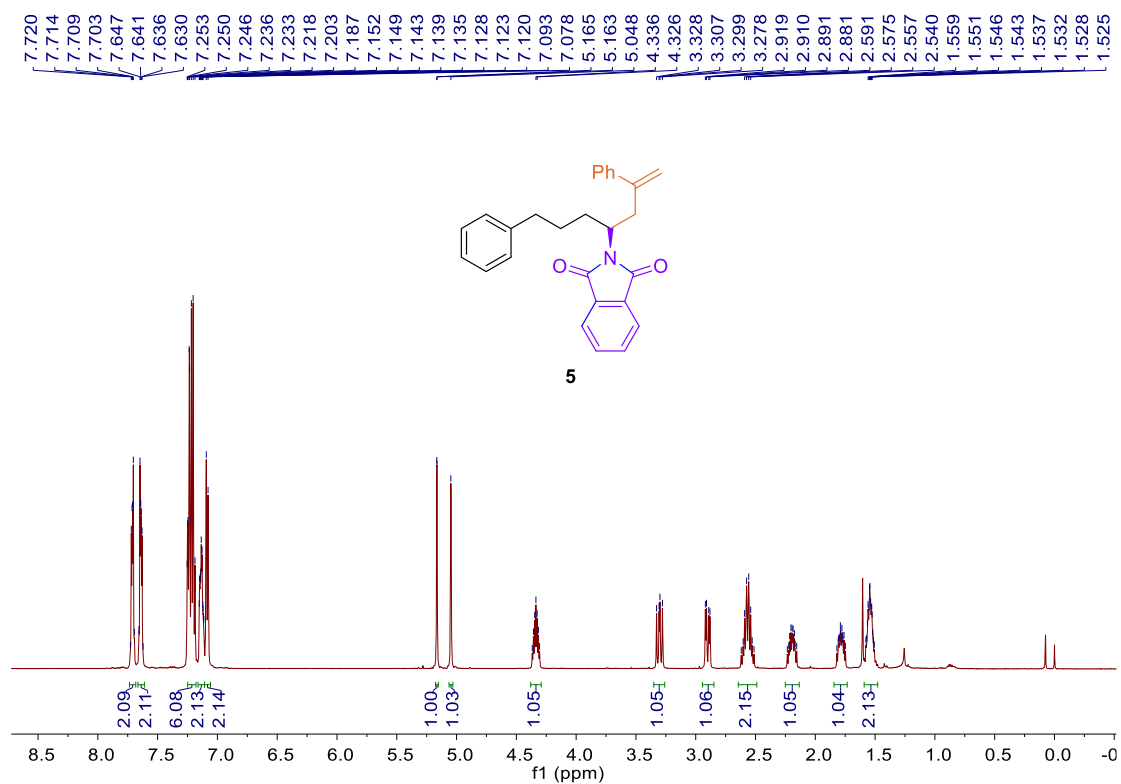
Supplementary Figure 370. ¹¹B NMR spectrum of compound 3dr



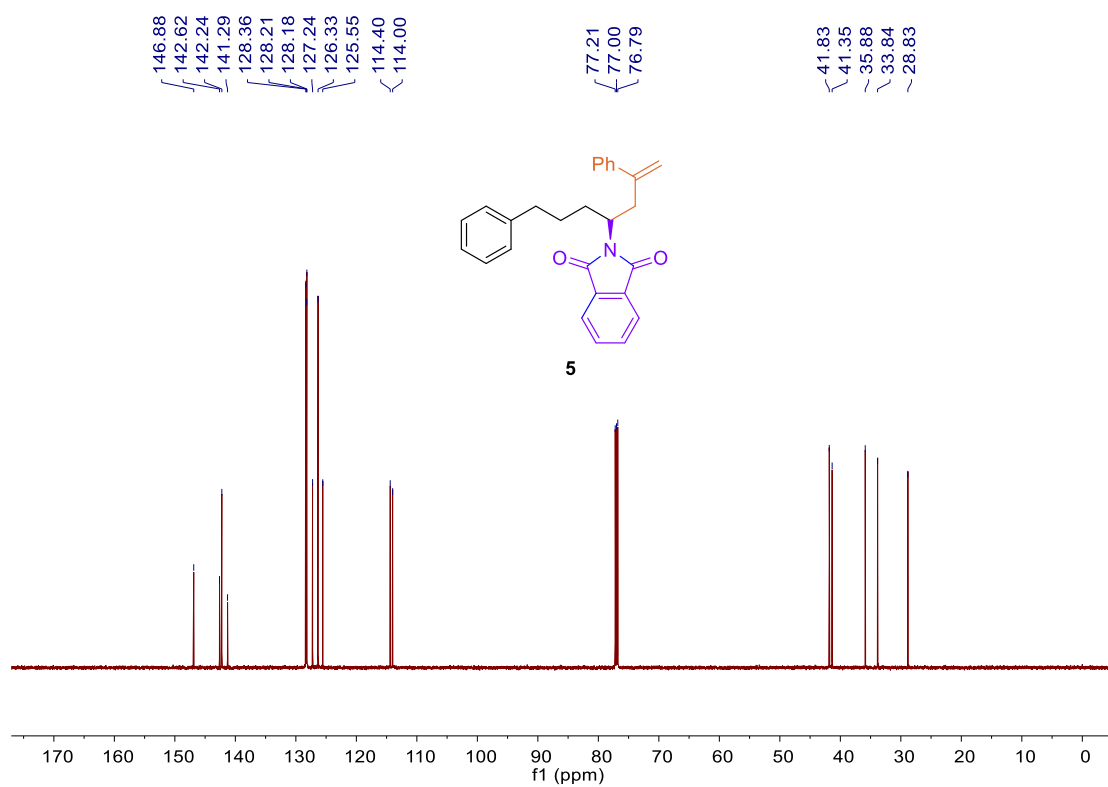
Supplementary Figure 371. ¹H NMR spectrum of compound 4



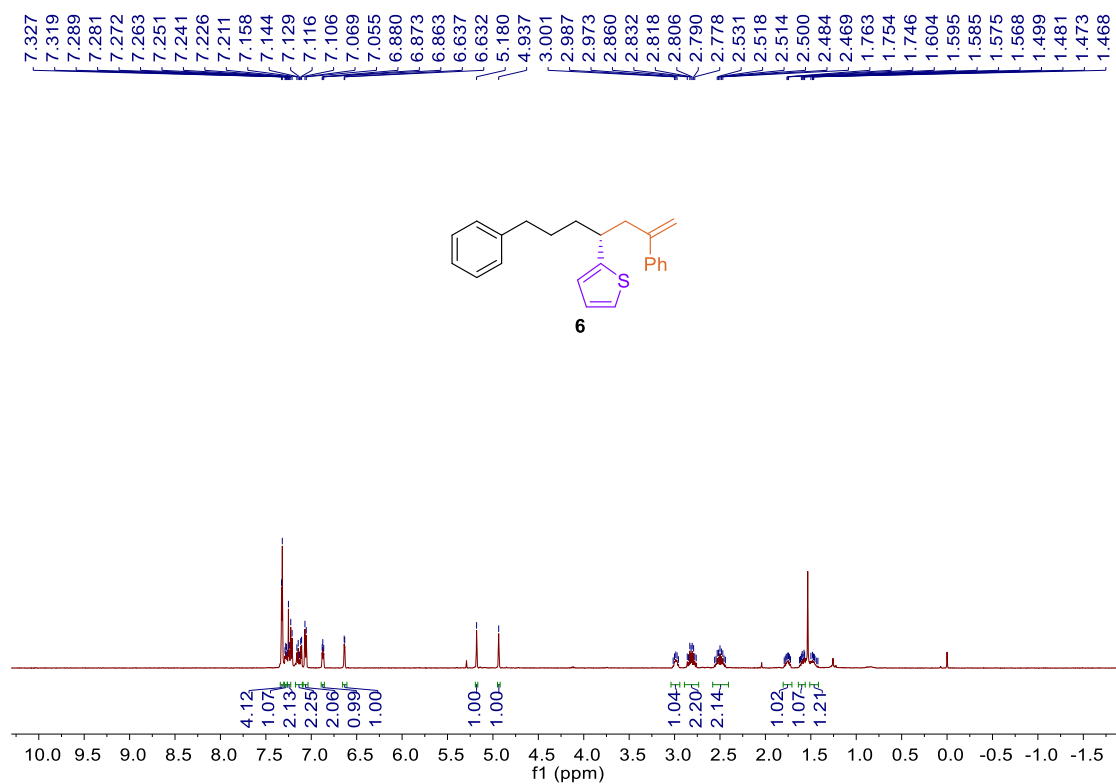
Supplementary Figure 372. ¹³C NMR spectrum of compound 4



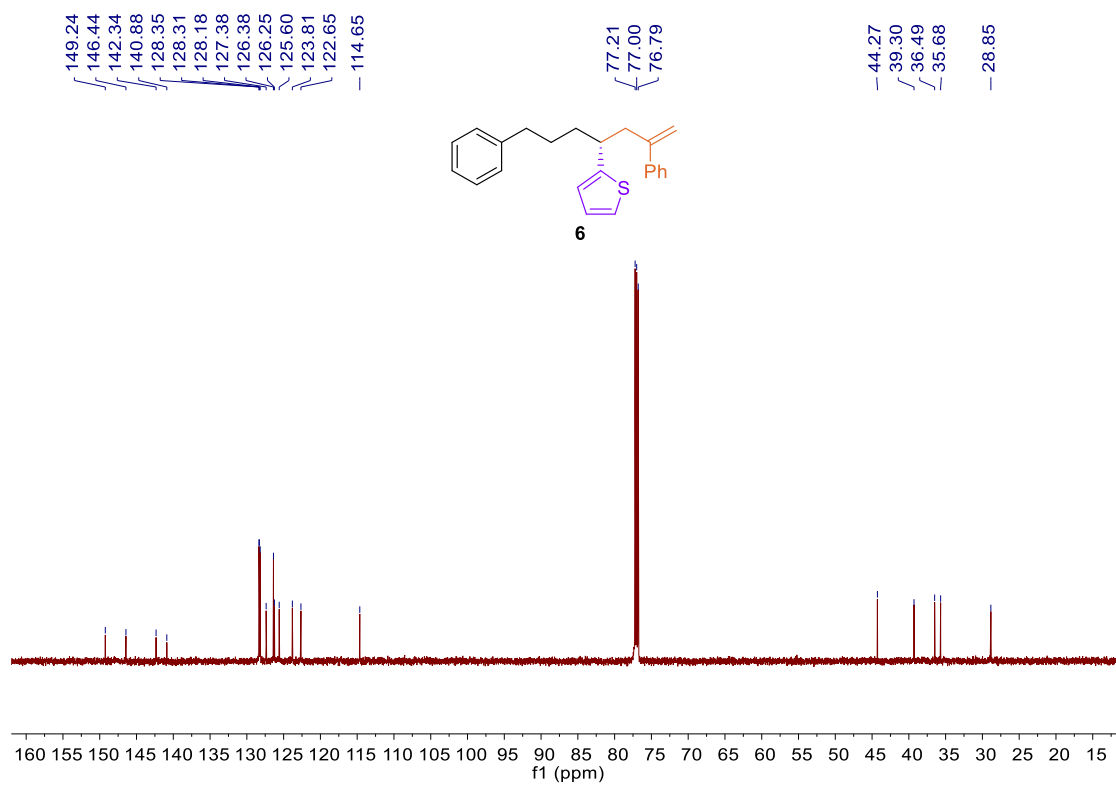
Supplementary Figure 373. ¹H NMR spectrum of compound 5



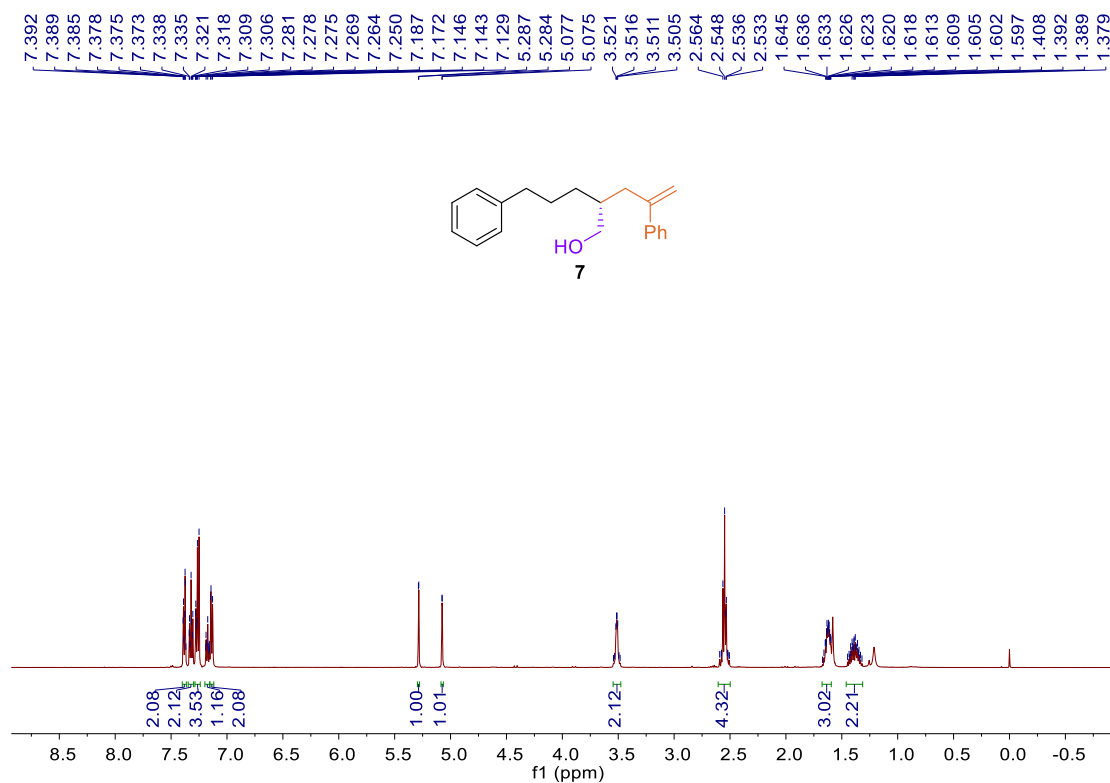
Supplementary Figure 374. ¹³C NMR spectrum of compound 5



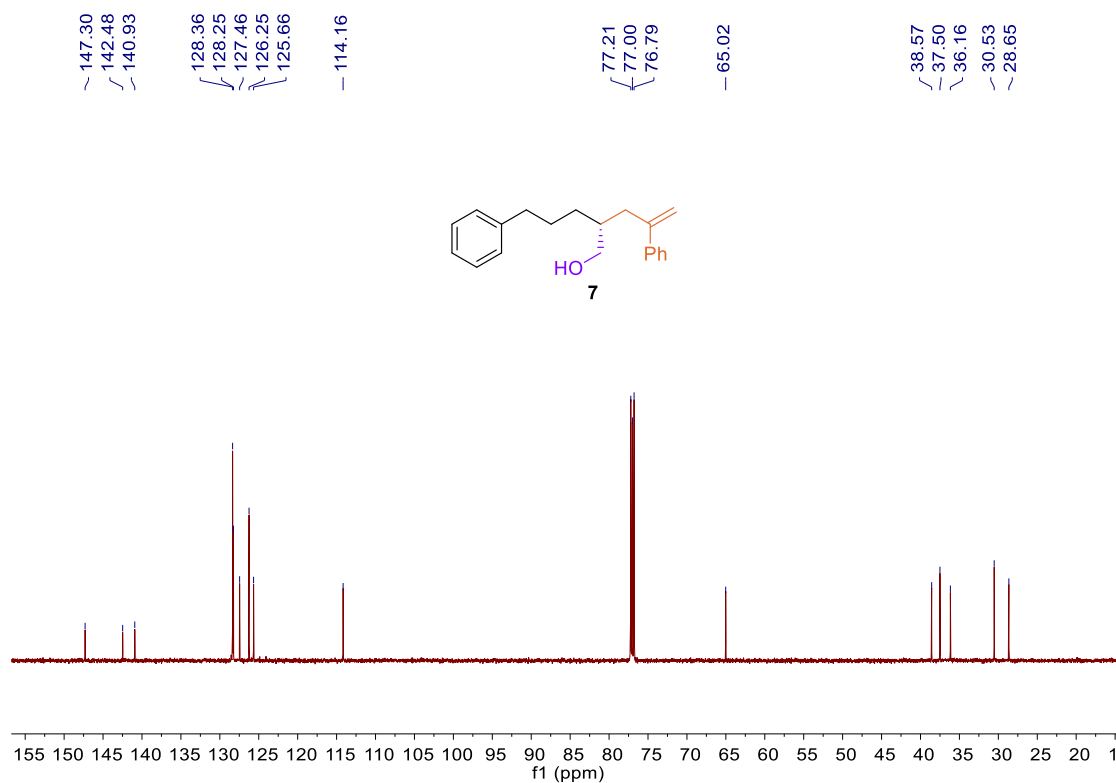
Supplementary Figure 375. ¹H NMR spectrum of compound 6



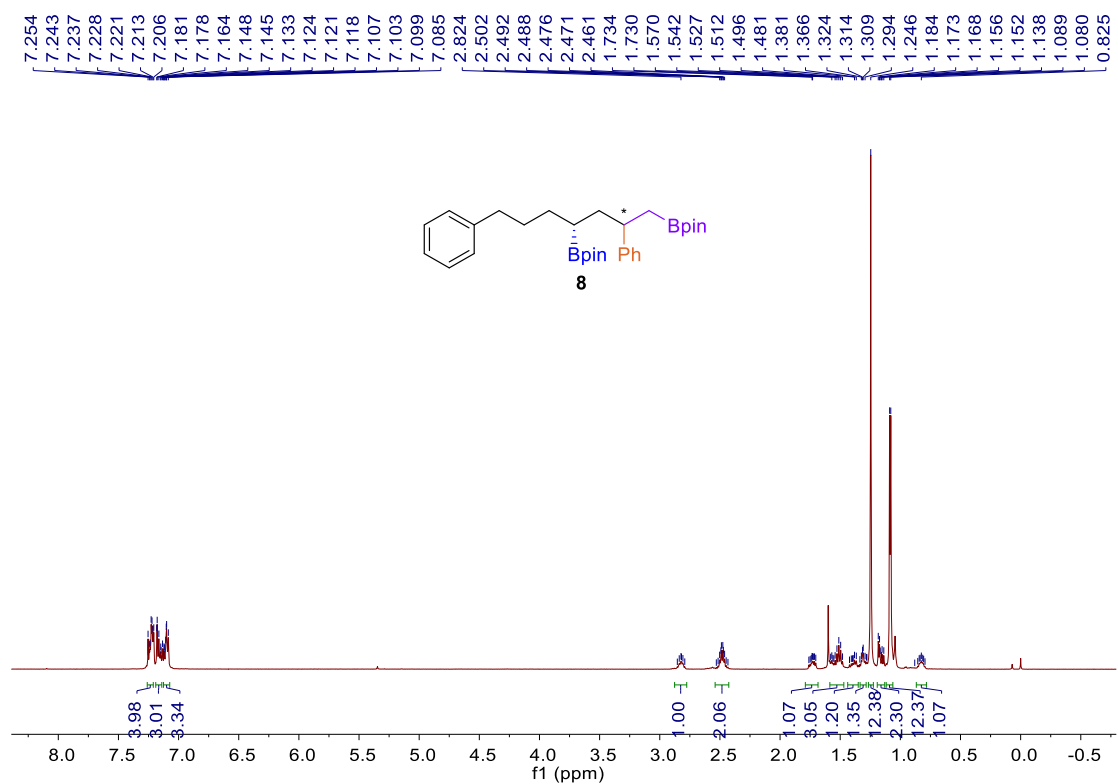
Supplementary Figure 376. ¹³C NMR spectrum of compound 6



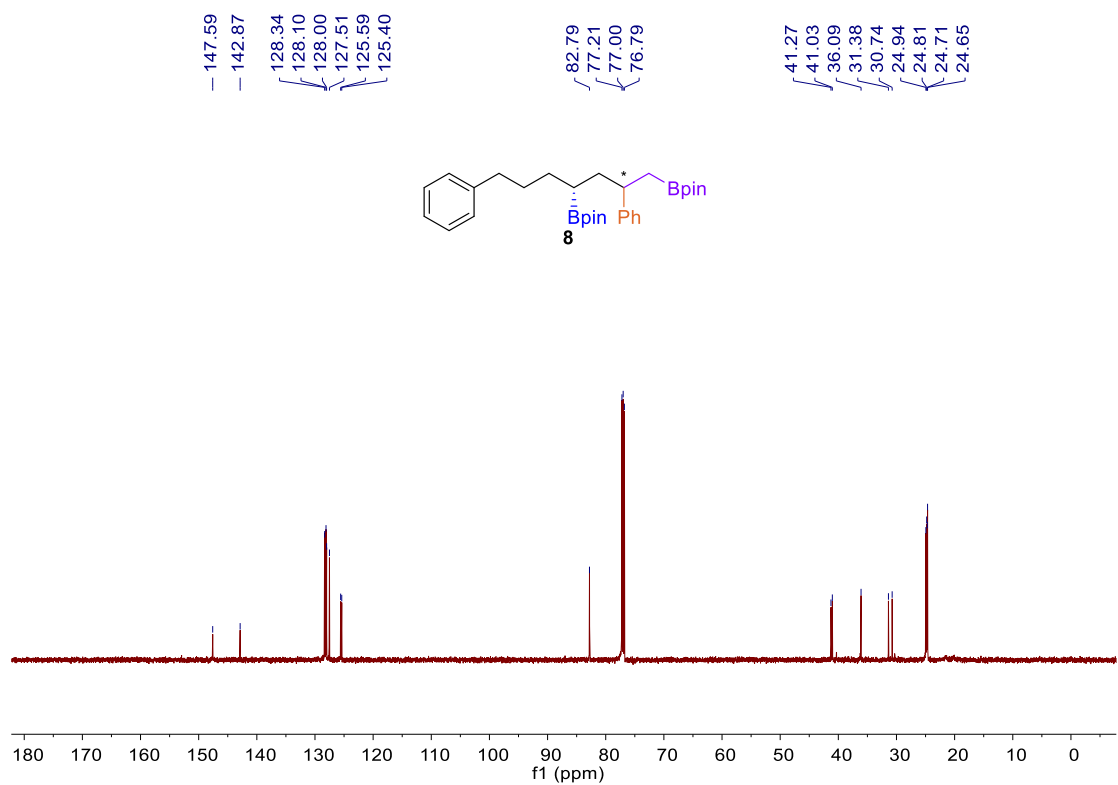
Supplementary Figure 377. ¹H NMR spectrum of compound 7



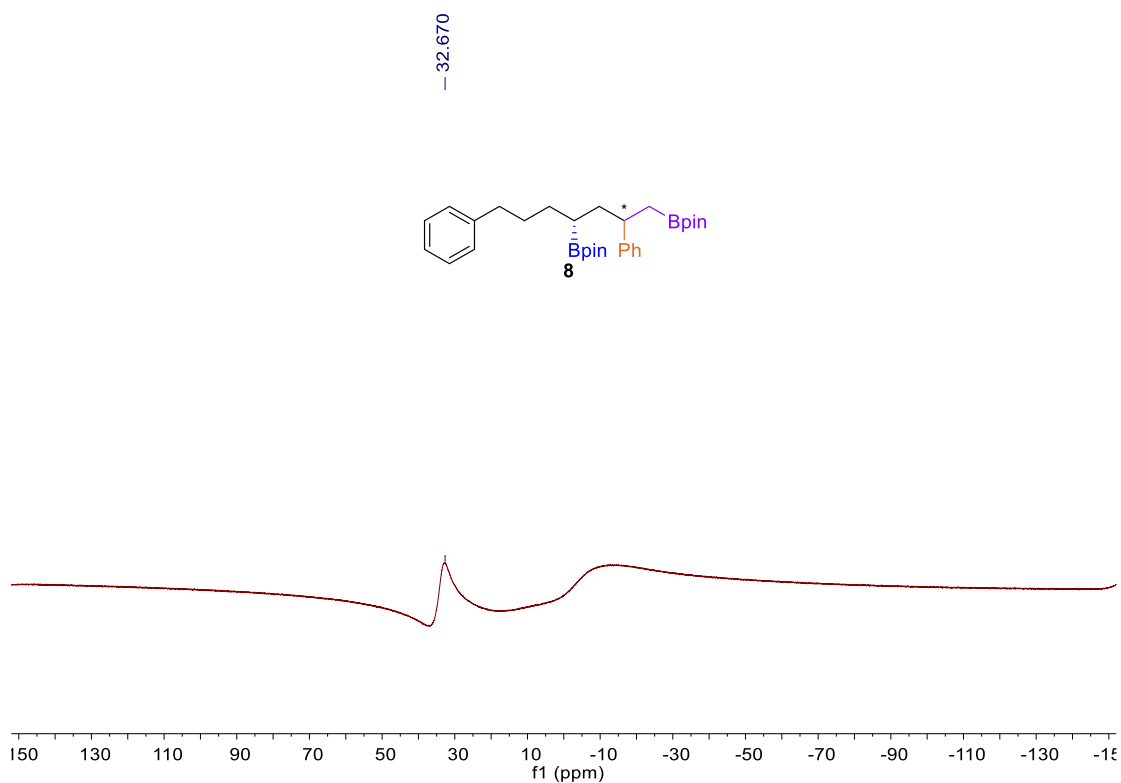
Supplementary Figure 378. ¹³C NMR spectrum of compound 7



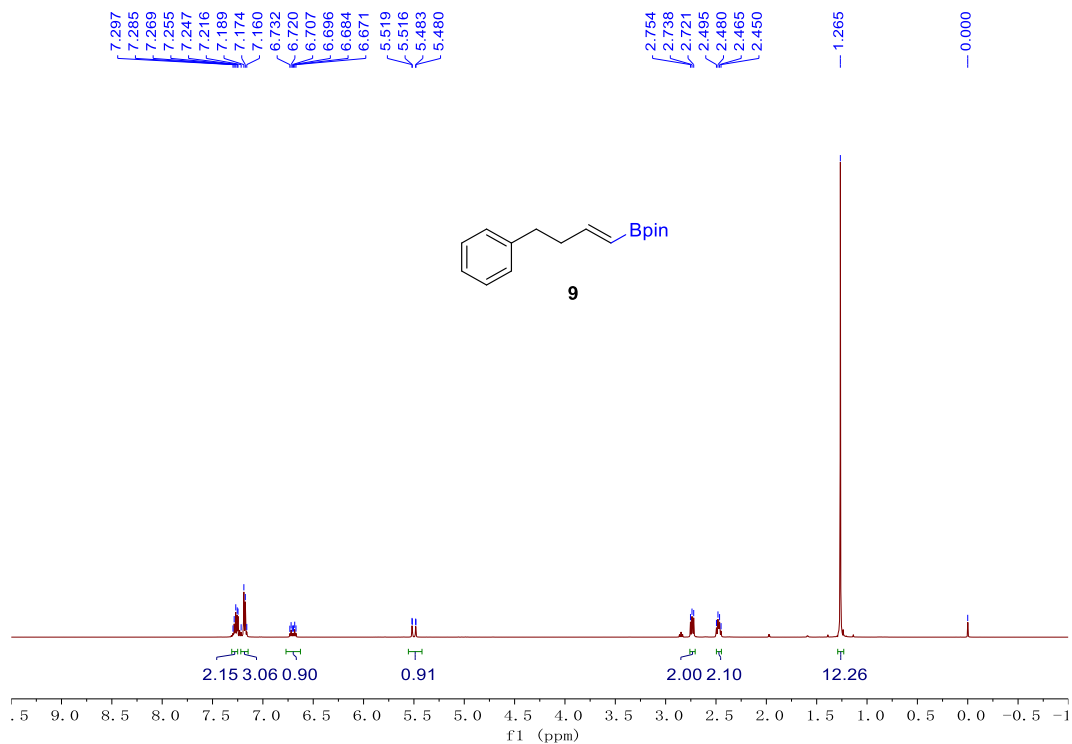
Supplementary Figure 379. ¹H NMR spectrum of compound 8



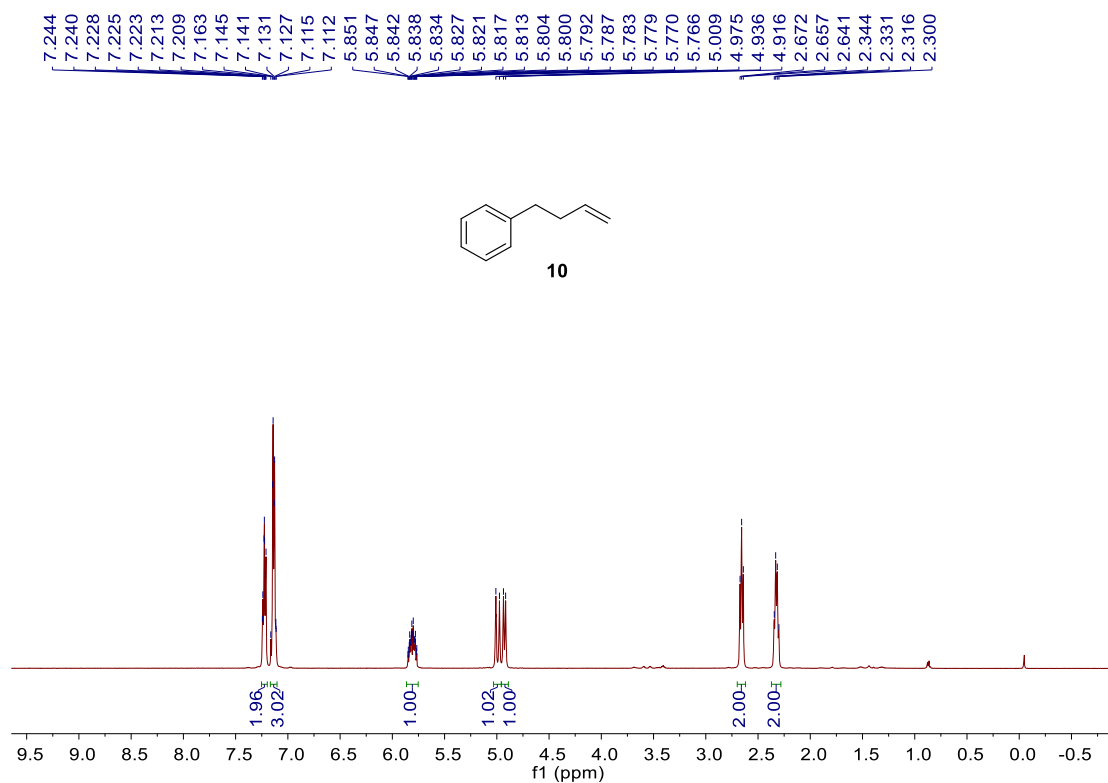
Supplementary Figure 380. ¹³C NMR spectrum of compound 8



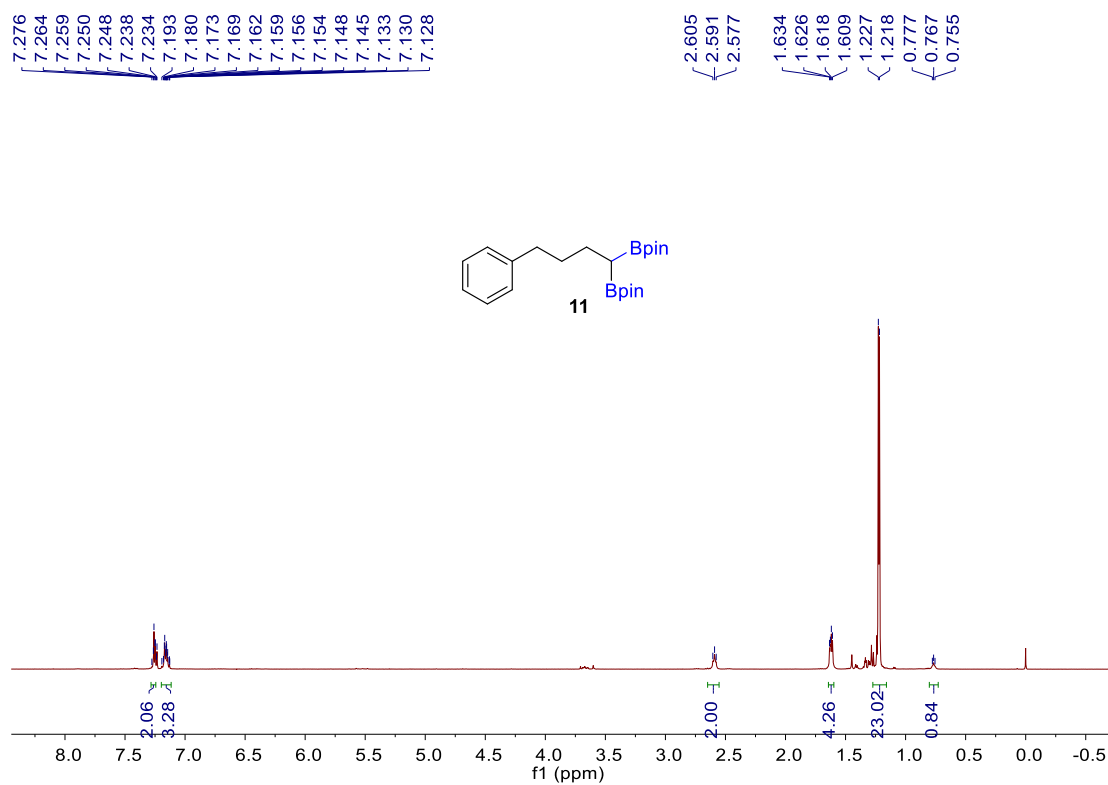
Supplementary Figure 381. ^{11}B NMR spectrum of compound **8**



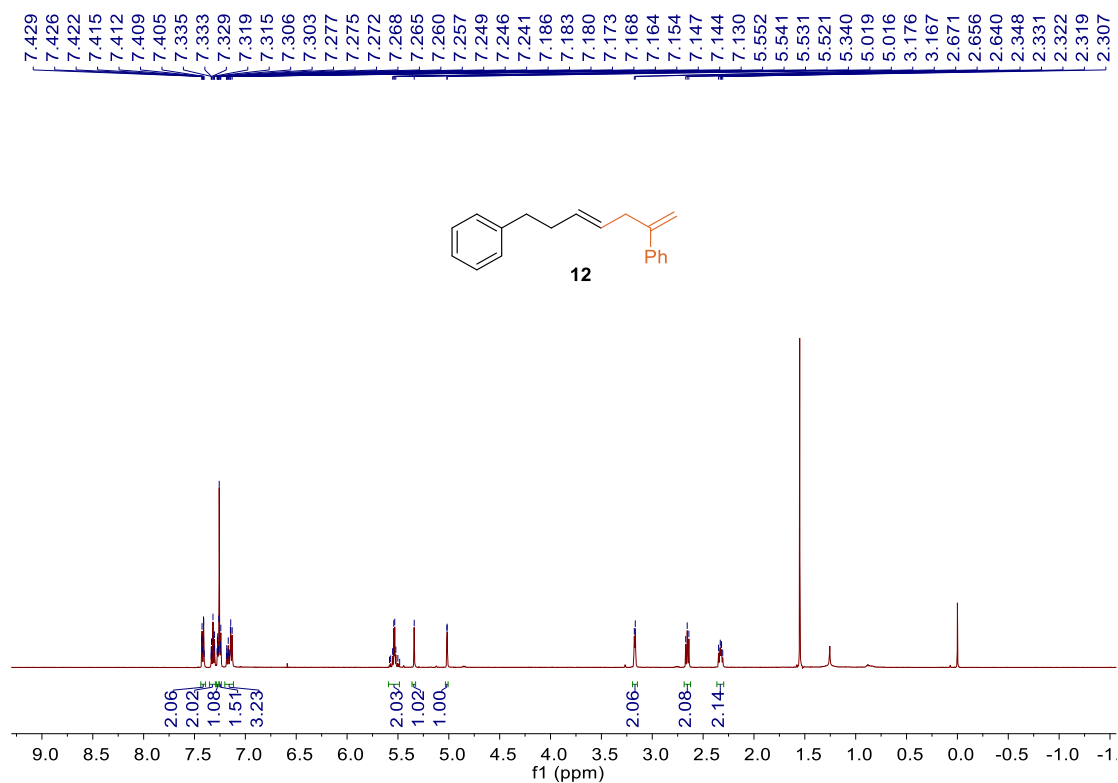
Supplementary Figure 382. ^1H NMR spectrum of compound **9**



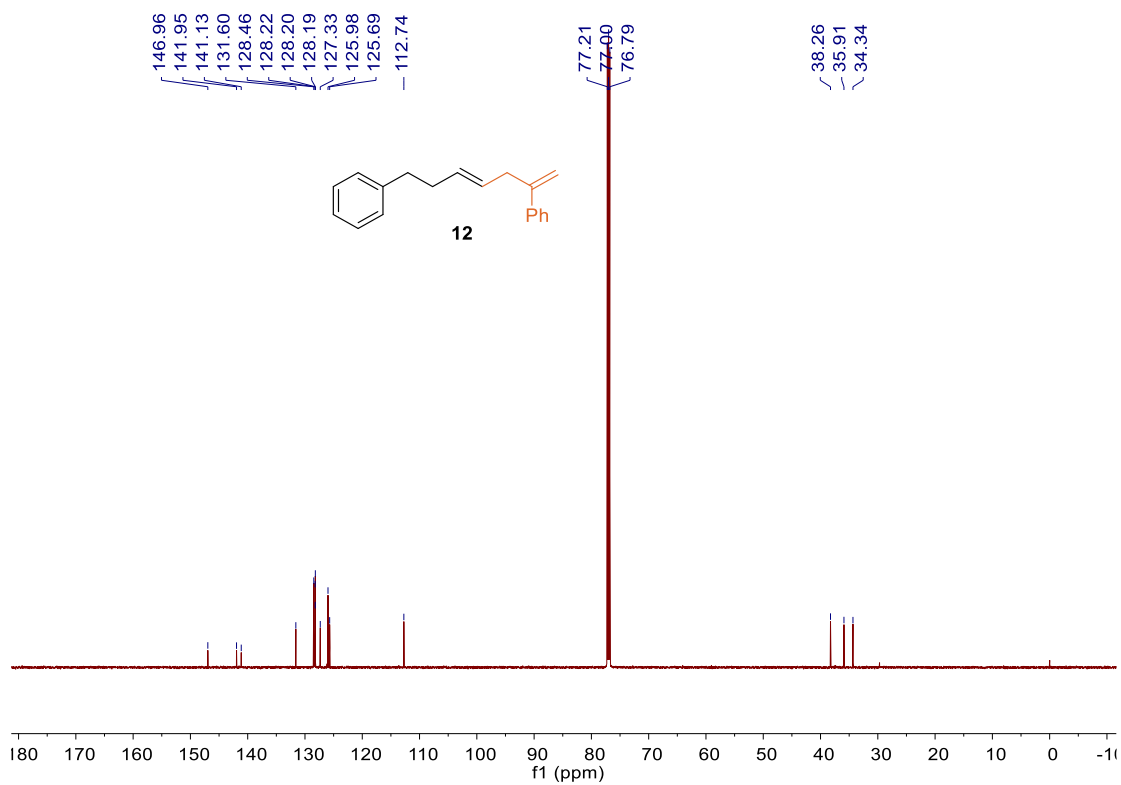
Supplementary Figure 383. ^1H NMR spectrum of compound 10



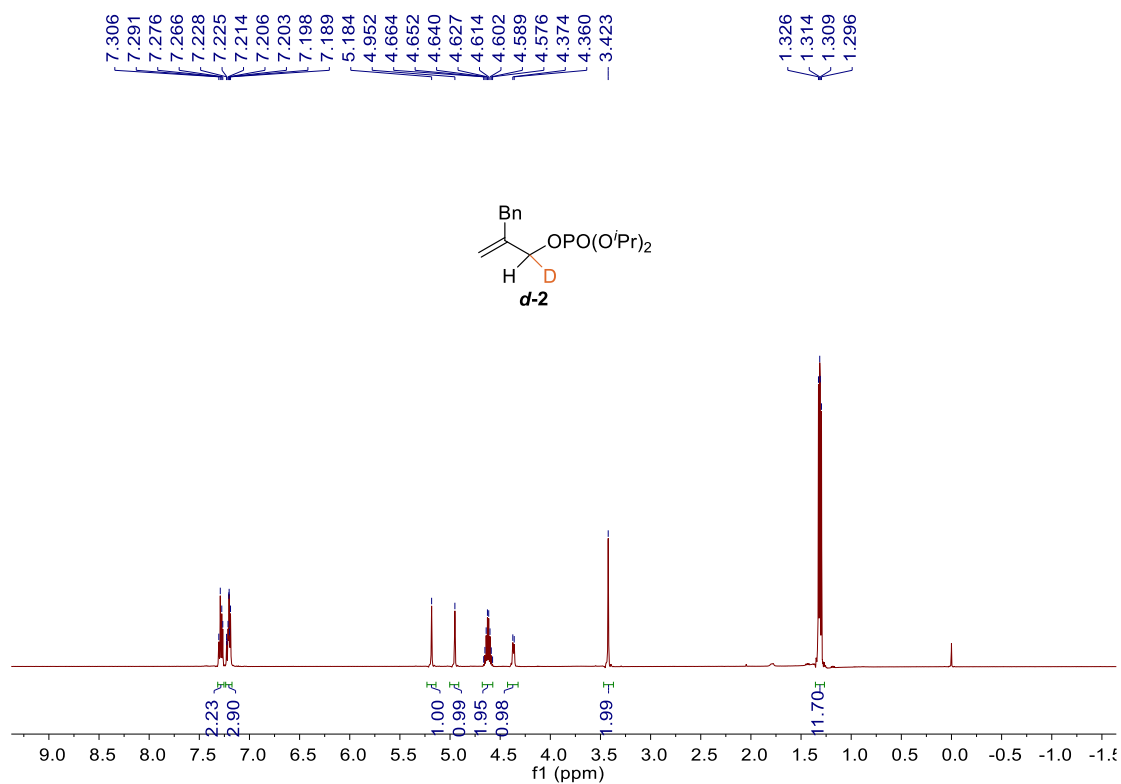
Supplementary Figure 384. ^1H NMR spectrum of compound 11



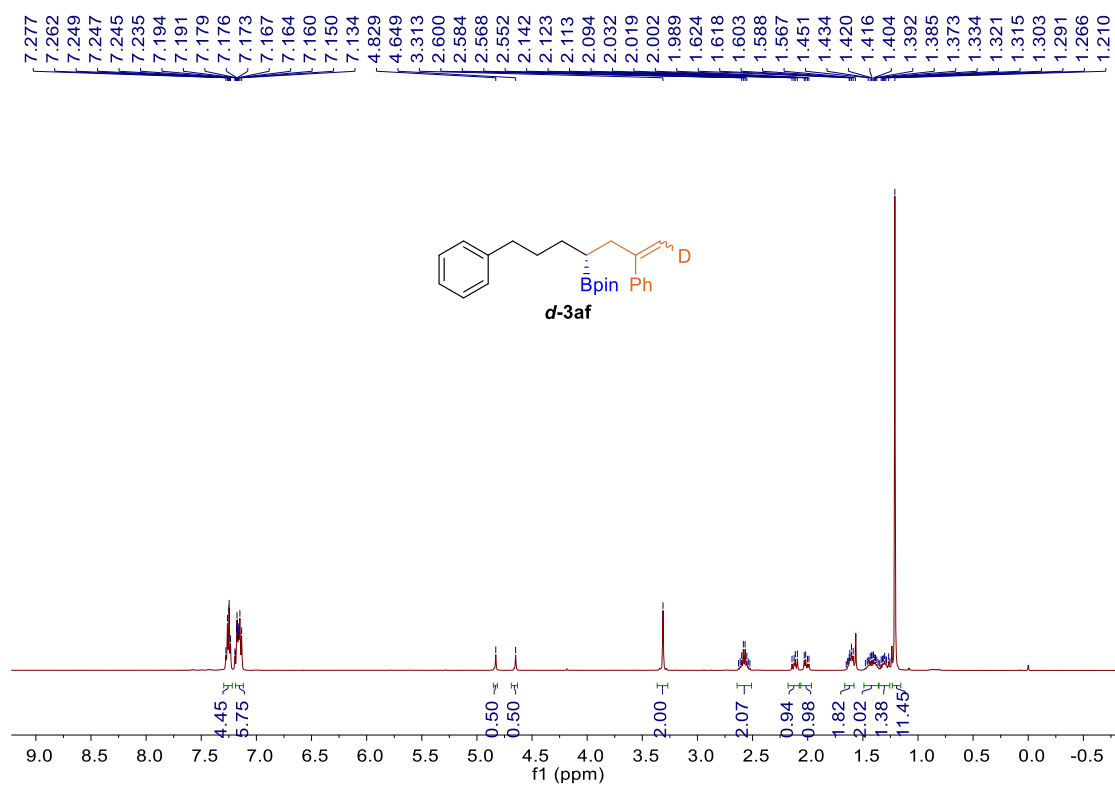
Supplementary Figure 385. ¹H NMR spectrum of compound 12



Supplementary Figure 386. ¹³C NMR spectrum of compound 12



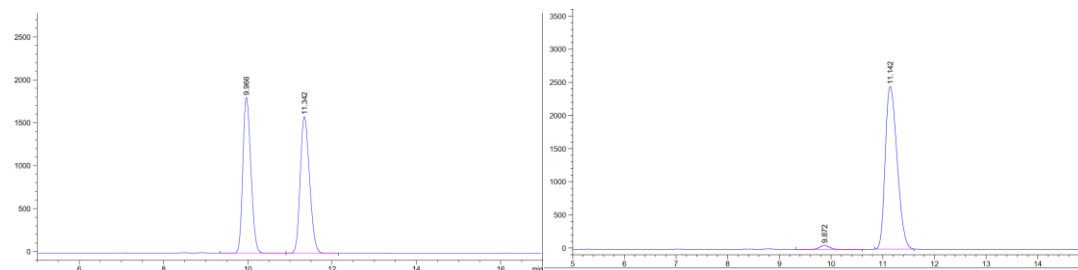
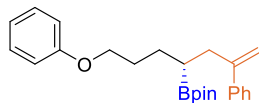
Supplementary Figure 387. ¹H NMR spectrum of compound **d-2**



Supplementary Figure 388. ¹H NMR spectrum of compound **d-3af**

4.2 Chiral HPLC charts.

(R)-2-(2,7-diphenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3a)

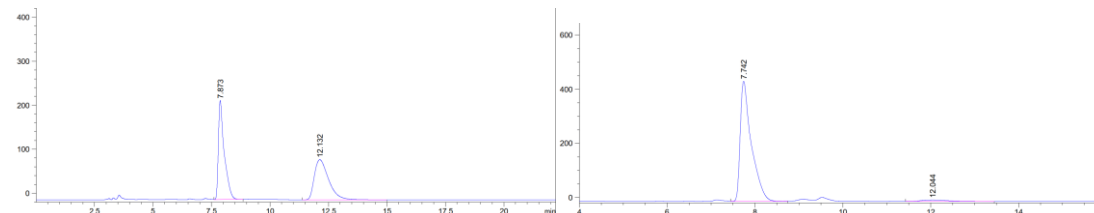
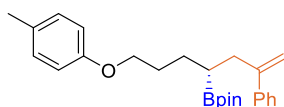


peak	Ret. Time/min	Area/mAU*s	Area %
1	9.966	2.40906e4	49.6858
2	11.342	2.43953e4	50.3142

peak	Ret. Time/min	Area/mAU*s	Area %
1	9.872	962.42206	2.3981
2	11.142	3.91706e4	97.6019

Supplementary Figure 389. HPLC of compound 3a corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(2-phenyl-7-(p-tolyloxy)hept-1-en-4-yl)-1,3,2-dioxaborolane (3b)

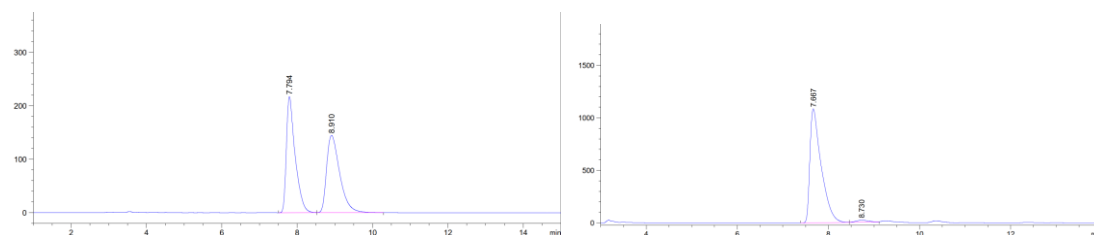
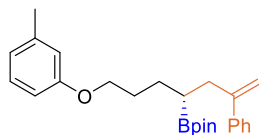


peak	Ret. Time/min	Area/mAU*s	Area %
1	7.873	3888.53418	50.2406
2	12.132	3851.29272	49.7594

peak	Ret. Time/min	Area/mAU*s	Area %
1	7.742	7804.68604	97.1510
2	12.044	228.87326	2.8490

Supplementary Figure 390. HPLC of compound 3b corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(2-phenyl-7-(m-tolyloxy)hept-1-en-4-yl)-1,3,2-dioxaborolane (3c)

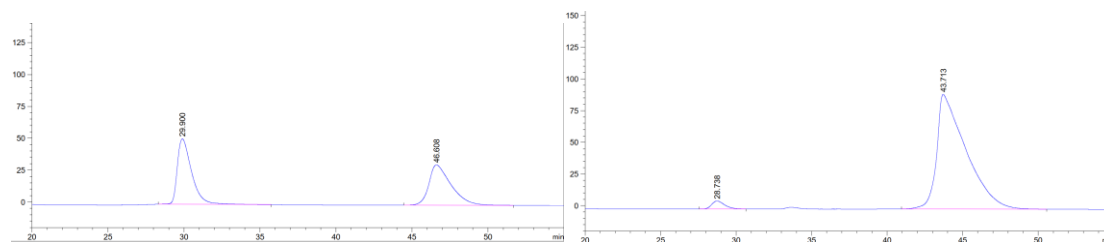
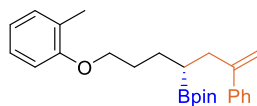


peak	Ret. Time/min	Area/mAU*s	Area %
1	7.794	3501.09814	50.0311
2	8.910	3496.74194	49.9689

peak	Ret. Time/min	Area/mAU*s	Area %
1	7.667	1.86230e4	97.9120
2	8.730	397.13303	2.0880

Supplementary Figure 391. HPLC of compound 3c corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(2-phenyl-7-(o-tolyloxy)hept-1-en-4-yl)-1,3,2-dioxaborolane (3d)

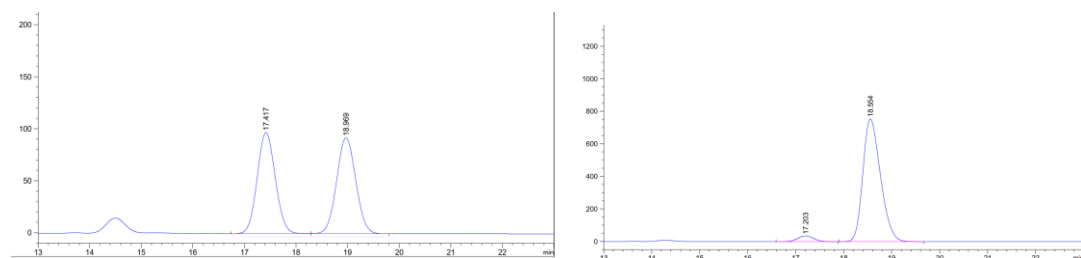
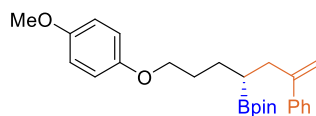


peak	Ret. Time/min	Area/mAU*s	Area %
1	29.900	3359.35767	51.2607
2	46.608	3194.11475	48.7393

peak	Ret. Time/min	Area/mAU*s	Area %
1	28.738	376.84564	2.9932
2	43.713	1.22133e4	97.0068

Supplementary Figure 392. HPLC of compound 3d corresponding alcohol

(R)-2-(7-(4-methoxyphenoxy)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3e)

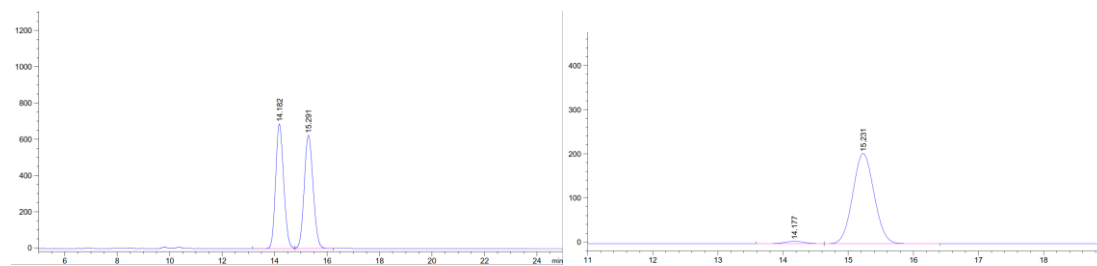
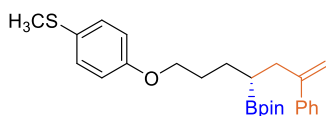


peak	Ret. Time/min	Area/mAU*s	Area %
1	17.417	2368.83716	49.9416
2	18.969	2374.38159	50.0584

peak	Ret. Time/min	Area/mAU*s	Area %
1	17.203	810.33545	4.0507
2	18.554	1.91943e4	95.9493

Supplementary Figure 393. HPLC of compound 3e corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(7-(4-(methylthio)phenoxy)-2-phenylhept-1-en-4-yl)1,3,2-dioxaborolane (3f)

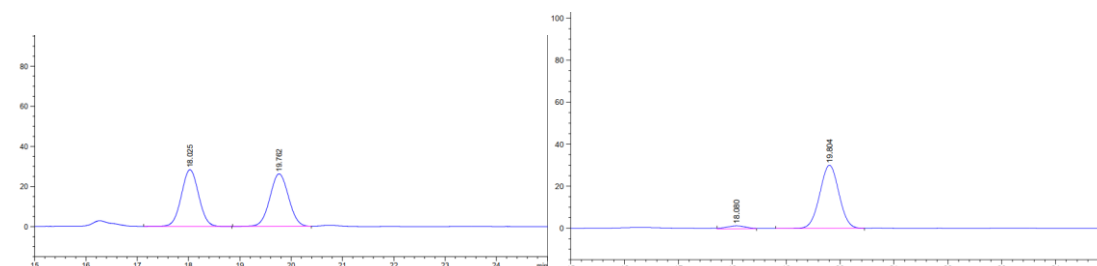
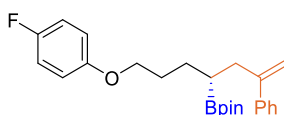


peak	Ret. Time/min	Area/mAU*s	Area %
1	14.182	1.46710e4	49.9387
2	15.291	1.47070e4	50.0613

peak	Ret. Time/min	Area/mAU*s	Area %
1	14.177	113.77962	2.3831
2	15.231	4660.73828	97.6169

Supplementary Figure 394. HPLC of compound 3f corresponding alcohol

(R)-2-(7-(4-fluorophenoxy)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3g)

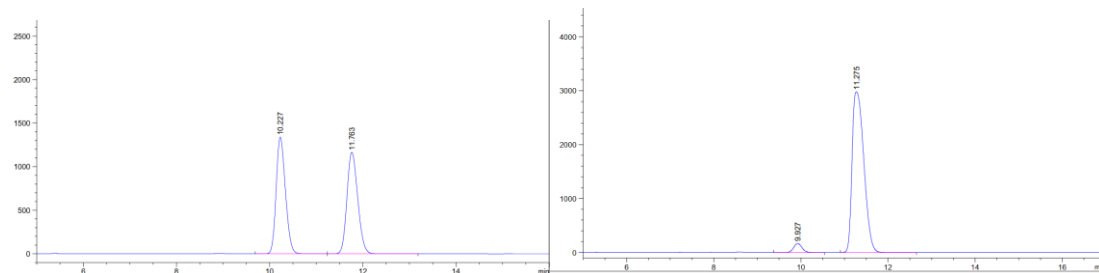
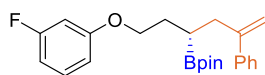


peak	Ret. Time/min	Area/mAU*s	Area %
1	18.025	661.21790	49.9701
2	19.762	662.00970	50.0299

peak	Ret. Time/min	Area/mAU*s	Area %
1	18.080	35.11736	4.5227
2	19.804	741.34601	95.4773

Supplementary Figure 395. HPLC of compound 3g corresponding alcohol

(R)-2-(7-(3-fluorophenoxy)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3h)

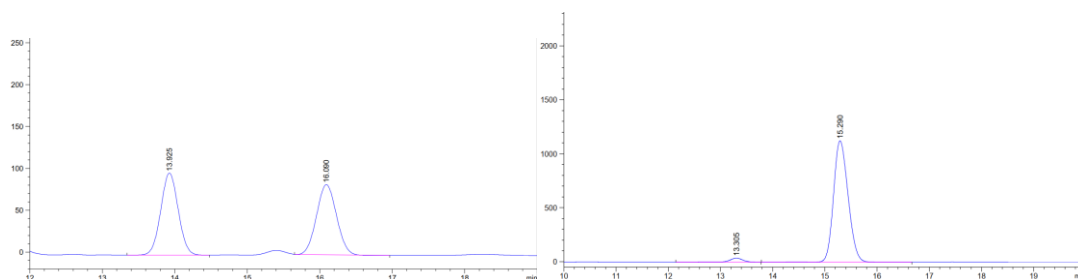
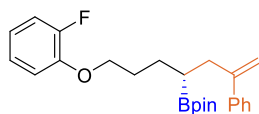


peak	Ret. Time/min	Area/mAU*s	Area %
1	10.227	1.85686e4	49.6805
2	11.763	1.88074e4	50.3195

peak	Ret. Time/min	Area/mAU*s	Area %
1	9.927	2213.53247	3.8265
2	11.275	5.56335e4	96.1735

Supplementary Figure 396. HPLC of compound 3h corresponding alcohol

(R)-2-(1-(2-fluorophenoxy)-5-phenylhex-5-en-3-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3i)

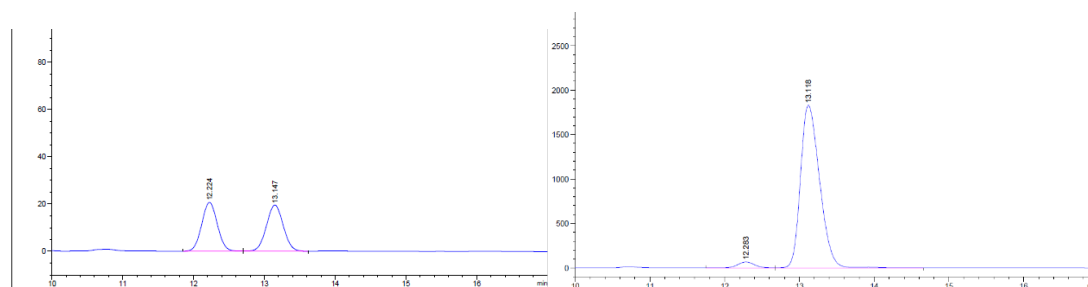
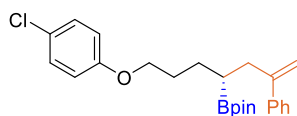


peak	Ret. Time/min	Area/mAU*s	Area %
1	13.925	1649.55078	50.7283
2	16.090	1602.18311	49.2717

peak	Ret. Time/min	Area/mAU*s	Area %
1	13.305	611.01312	2.7387
2	15.290	2.16996e4	97.2613

Supplementary Figure 397. HPLC of compound 3i corresponding alcohol

(R)-2-(7-(4-chlorophenoxy)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3j)

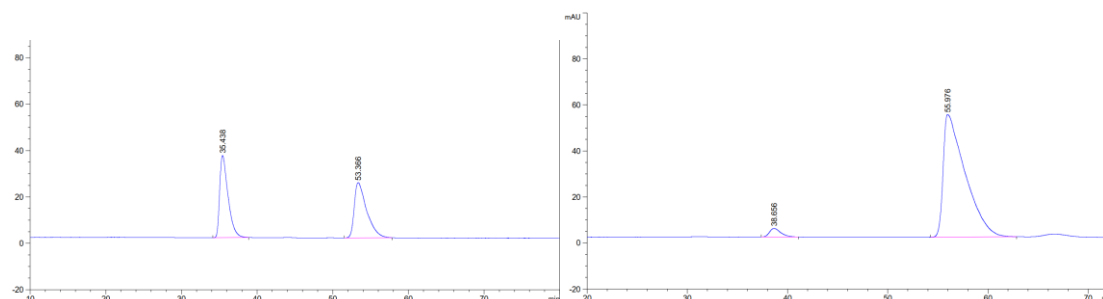
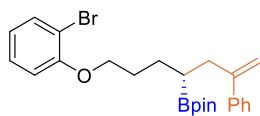


peak	Ret. Time/min	Area/mAU*s	Area %
1	12.224	315.05731	49.4726
2	13.147	321.77466	50.5274

peak	Ret. Time/min	Area/mAU*s	Area %
1	12.283	1021.61688	3.0639
2	13.118	3.23223e4	96.9361

Supplementary Figure 398. HPLC of compound 3j corresponding alcohol

(R)-2-(7-(2-bromophenoxy)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3k)

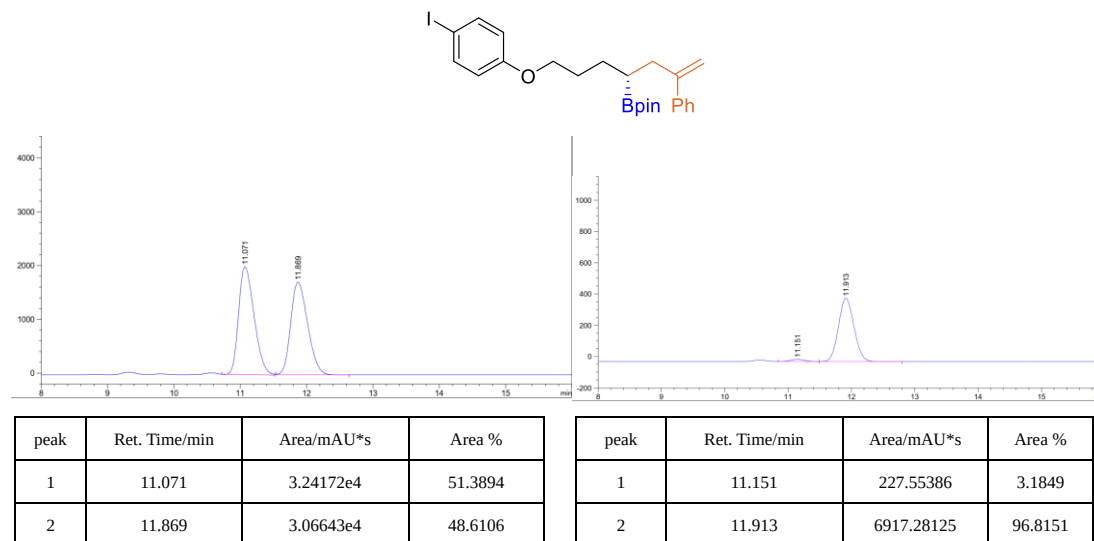


peak	Ret. Time/min	Area/mAU*s	Area %
1	35.438	2718.16626	50.1404
2	53.366	2702.93896	49.8596

peak	Ret. Time/min	Area/mAU*s	Area %
1	38.656	285.45053	3.3893
2	55.976	8136.75732	96.6107

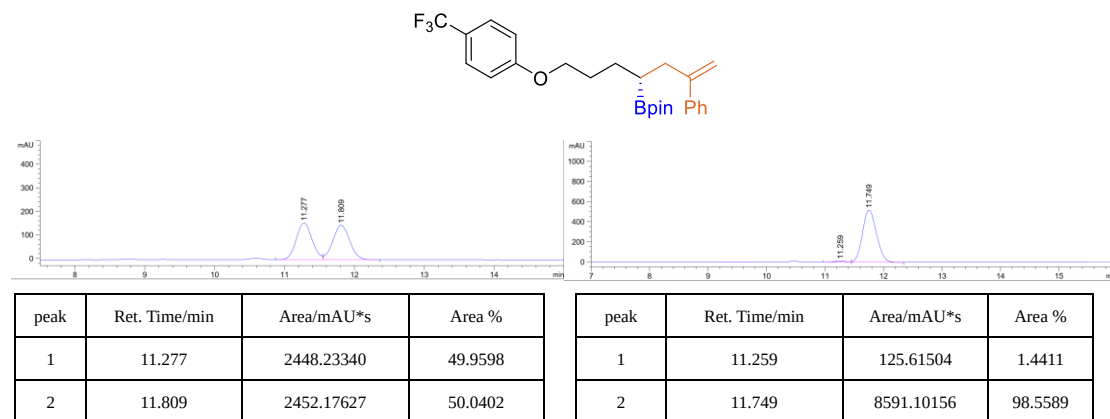
Supplementary Figure 399. HPLC of compound 3k corresponding alcohol

(R)-2-(7-(4-iodophenoxy)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3l)



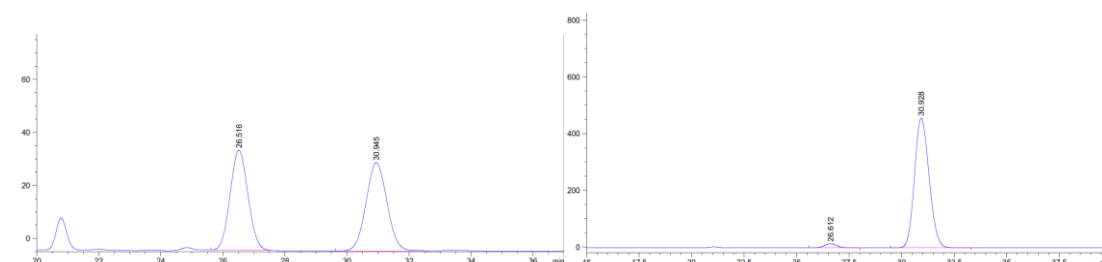
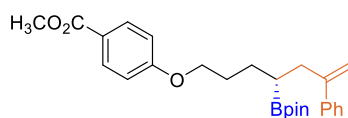
Supplementary Figure 400. HPLC of compound 3l corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(2-phenyl-7-(4-(trifluoromethyl)phenoxy)hept-1-en-4-yl)-1,3,2-dioxaborolane (3m)



Supplementary Figure 401. HPLC of compound 3m corresponding alcohol

(R)-4-((6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl)oxy)benzoate (3n)

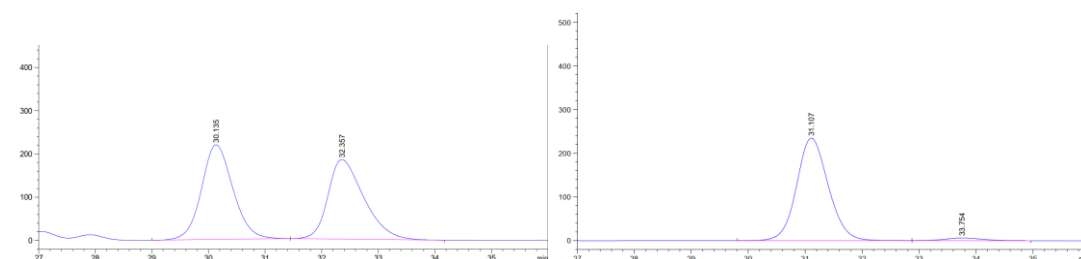
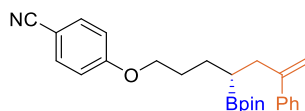


Peak	Ret. Time/min	Area/mAU*s	Area %
1	26.516	1509.77380	49.2064
2	30.945	1558.47595	50.7936

peak	Ret. Time/min	Area/mAU*s	Area %
1	26.612	575.52313	2.5437
2	30.928	2.20495e4	97.4563

Supplementary Figure 402. HPLC of compound 3n corresponding alcohol

(R)-4-((6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl)oxy)benzonitrile (3o)

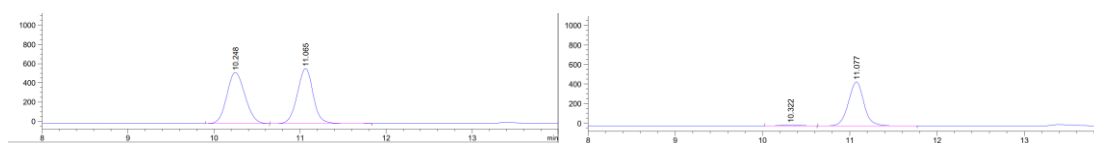
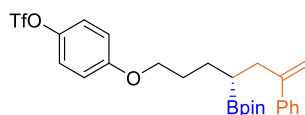


Peak	Ret. Time/min	Area/mAU*s	Area %
1	30.135	8482.22461	51.1452
2	32.357	8102.36572	48.8548

peak	Ret. Time/min	Area/mAU*s	Area %
1	31.107	9056.7	97.239
2	33.754	257.2	2.761

Supplementary Figure 403. HPLC of compound 3o corresponding alcohol

(R)-4-((6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl)oxy)phenyl trifluoromethanesulfonate (3p)

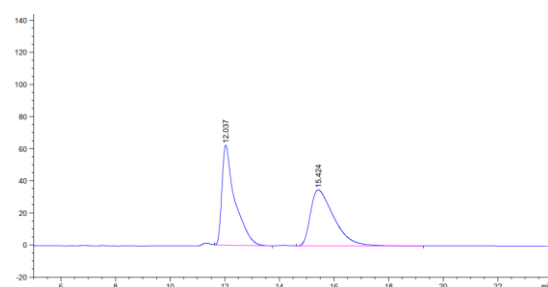
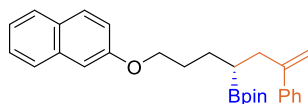


Peak	Ret. Time/min	Area/mAU*s	Area %
1	10.248	7812.10596	51.5404
2	11.065	7345.13184	48.4596

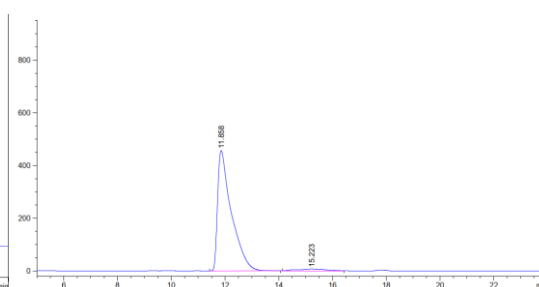
peak	Ret. Time/min	Area/mAU*s	Area %
1	10.322	151.08289	2.6679
2	11.077	5511.88818	97.3321

Supplementary Figure 404. HPLC of compound 3p corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(7-(naphthalen-2-yloxy)-2-phenylhept-1-en-4-yl)-1,3,2-dioxaborolane (3q)



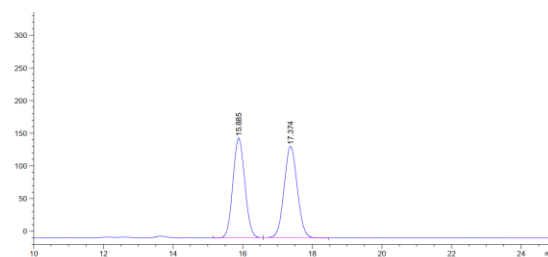
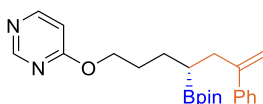
peak	Ret. Time/min	Area/mAU*s	Area %
1	12.037	2045.79504	49.7343
2	15.424	2067.65430	50.2657



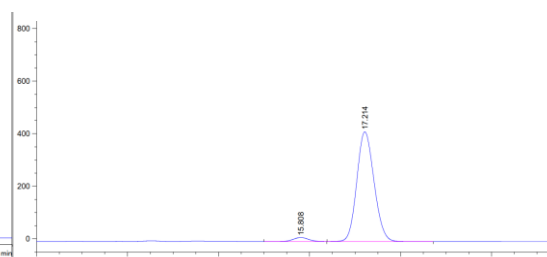
peak	Ret. Time/min	Area/mAU*s	Area %
1	11.858	1.62913e4	96.8003
2	15.223	1.2218 538	3.1997

Supplementary Figure 405. HPLC of compound 3q corresponding alcohol

(R)-4-((6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl)oxy)pyrimidine (3r)



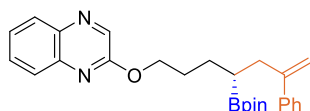
peak	Ret. Time/min	Area/mAU*s	Area %
1	15.885	3622.18066	49.5996
2	17.374	3680.66626	50.4004

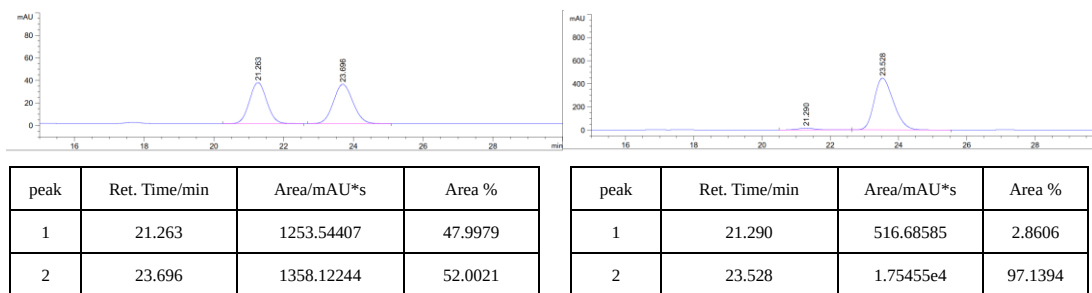


peak	Ret. Time/min	Area/mAU*s	Area %
1	15.808	357.06445	3.1486
2	17.214	1.09833e4	96.8514

Supplementary Figure 406. HPLC of compound 3r corresponding alcohol

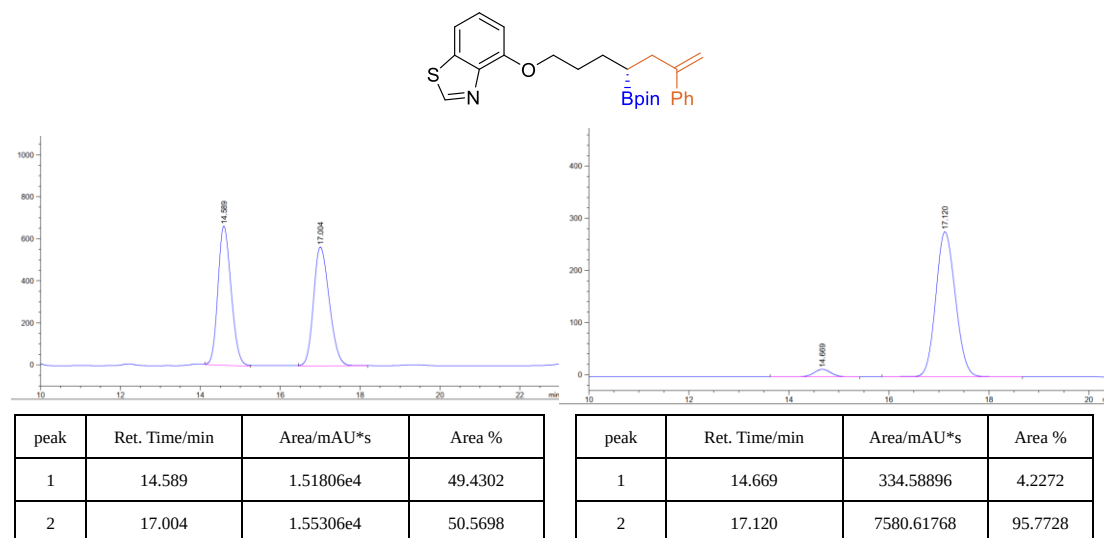
(R)-2-((6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl)oxy)quinoxaline (3s)





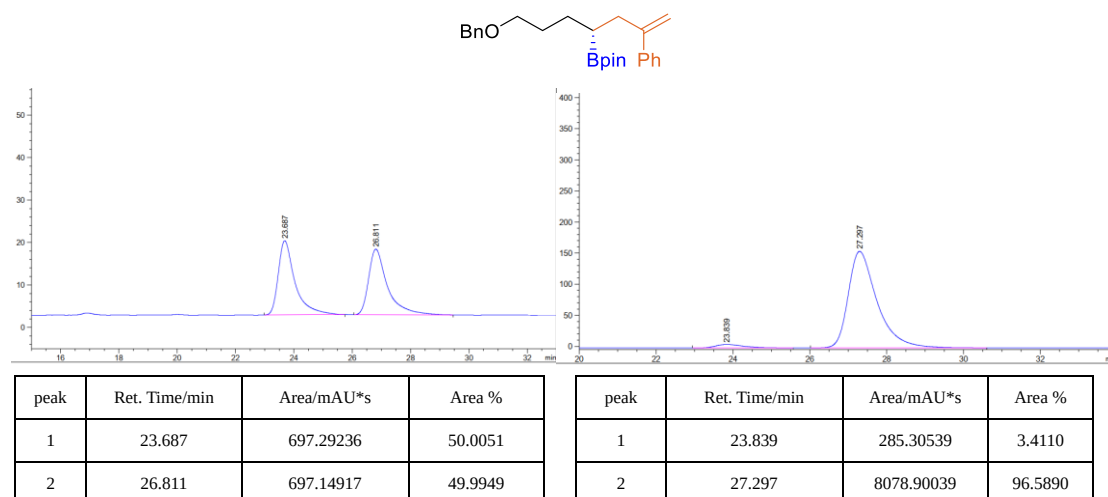
Supplementary Figure 407. HPLC of compound 3s corresponding alcohol

(R)-7-((6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl)oxy)benzo[d]thiazole (3t)



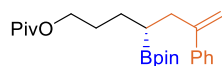
Supplementary Figure 408. HPLC of compound 3t corresponding alcohol

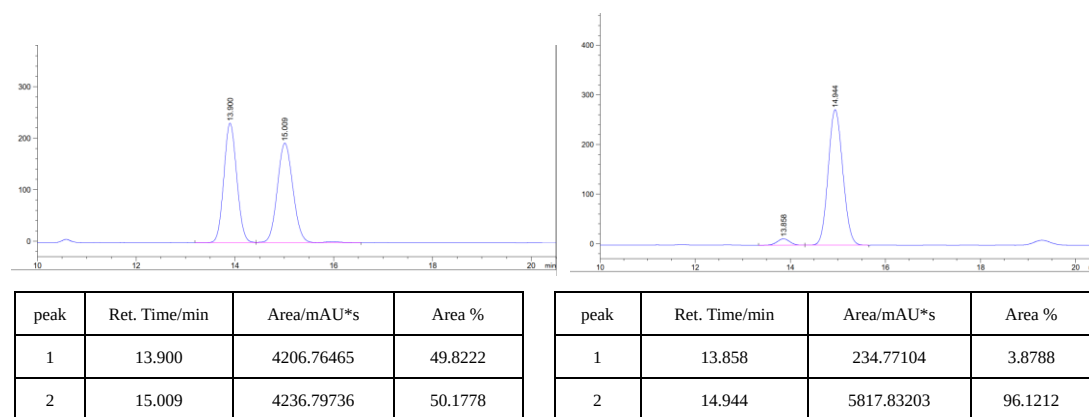
(R)-2-(7-(benzyloxy)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3u)



Supplementary Figure 409. HPLC of compound 3u corresponding alcohol

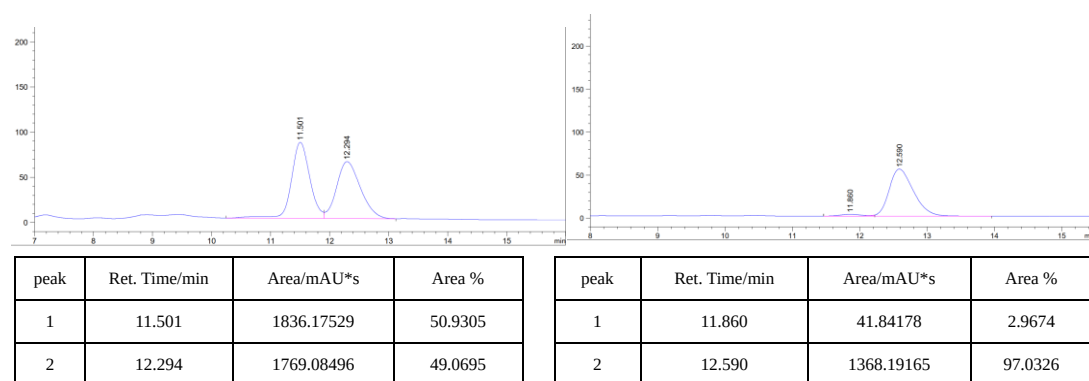
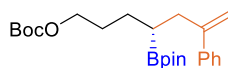
(R)-5-phenyl-3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hex-5-en-1-yl pivalate (3v)





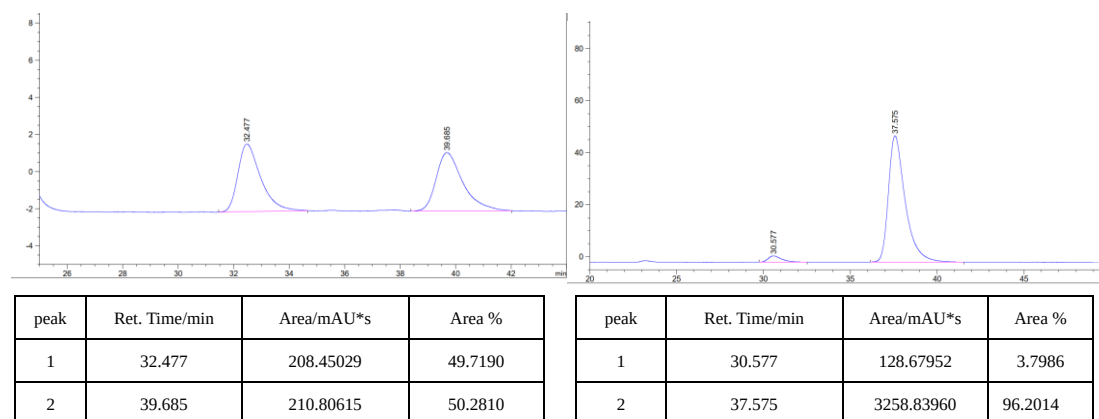
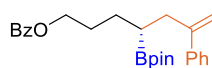
Supplementary Figure 410. HPLC of compound 3v corresponding alcohol

(R)-tert-butyl-(7-phenyl-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oct-7-en-1-yl) carbonate (3w)



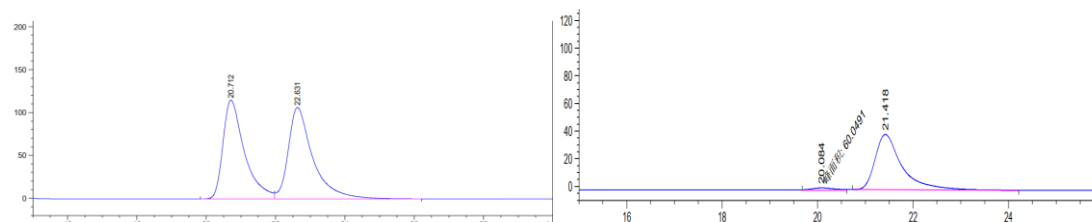
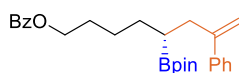
Supplementary Figure 411. HPLC of compound 3w corresponding alcohol

(R)-5-phenyl-3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hex-5-en-1-yl benzoate (3x)



Supplementary Figure 412. HPLC of compound 3x corresponding alcohol

(R)-7-phenyl-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oct-7-en-1-yl benzoate (3y)

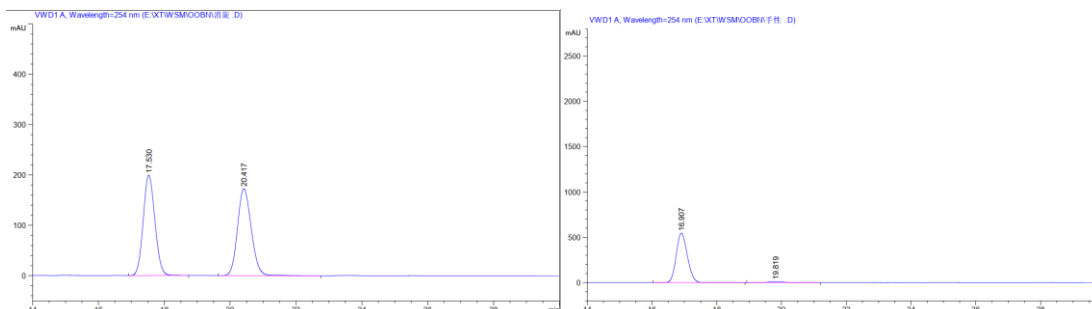
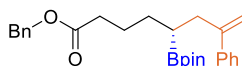


peak	Ret. Time/min	Area/mAU*s	Area %
1	20.712	4964.09961	48.5526
2	22.631	5260.06152	51.4474

peak	Ret. Time/min	Area/mAU*s	Area %
1	20.084	60.04914	3.7030
2	21.418	1561.57227	96.2970

Supplementary Figure 413. HPLC of compound 3y corresponding alcohol

(R)-benzyl-7-phenyl-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)oct-7-enoate (3z)

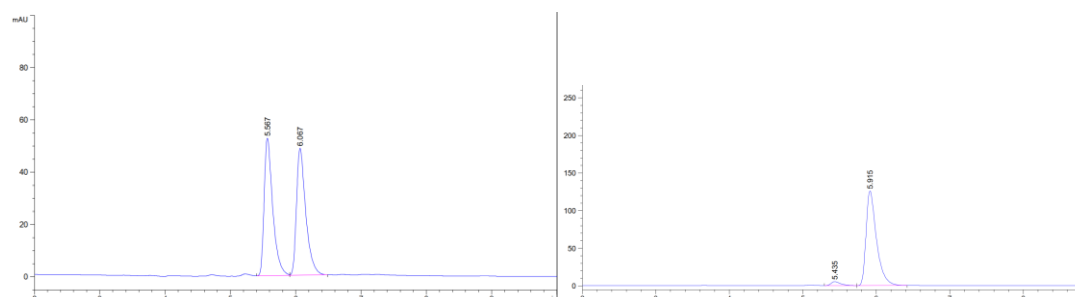
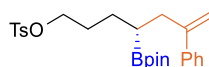


peak	Ret. Time/min	Area/mAU*s	Area %
1	17.530	4921.10986	49.5280
2	20.417	5037.20850	50.4720

peak	Ret. Time/min	Area/mAU*s	Area %
1	16.907	1.30459e4	96.9219
2	19.819	377.69843	3.0781

Supplementary Figure 414. HPLC of compound 3z corresponding alcohol

(R)-6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate (3aa)

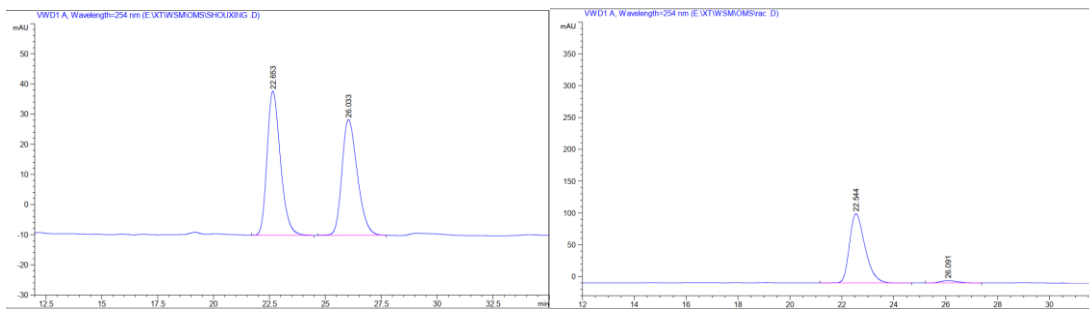
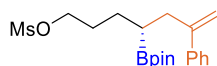


peak	Ret. Time/min	Area/mAU*s	Area %
1	5.567	482.51340	50.1872
2	6.067	478.91476	49.8128

peak	Ret. Time/min	Area/mAU*s	Area %
1	5.435	46.62428	3.6280
2	5.915	1238.51440	96.3720

Supplementary Figure 415. HPLC of compound 3aa corresponding alcohol

(R)-6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl methanesulfonate (3ab)

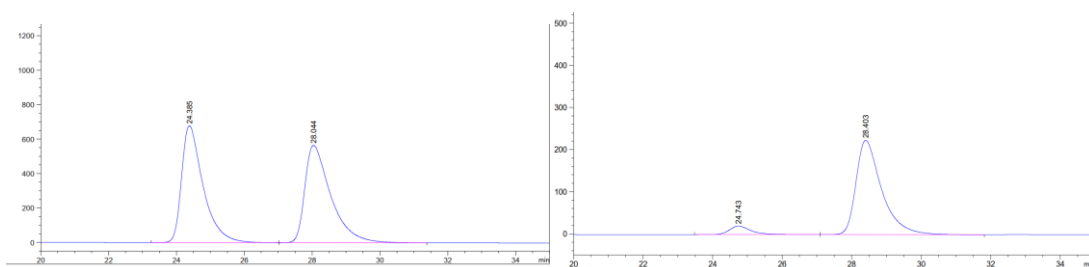
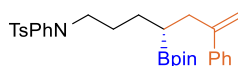


peak	Ret. Time/min	Area/mAU*s	Area %
1	22.653	1978.17383	51.9246
2	26.033	1838.87915	48.0754

peak	Ret. Time/min	Area/mAU*s	Area %
1	22.544	4528.84912	96.3444
2	26.091	176.72061	3.6556

Supplementary Figure 416. HPLC of compound 3ab corresponding alcohol

(R)-4-methyl-N-phenyl-N-(6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl)benzenesulfonamide (3ac)

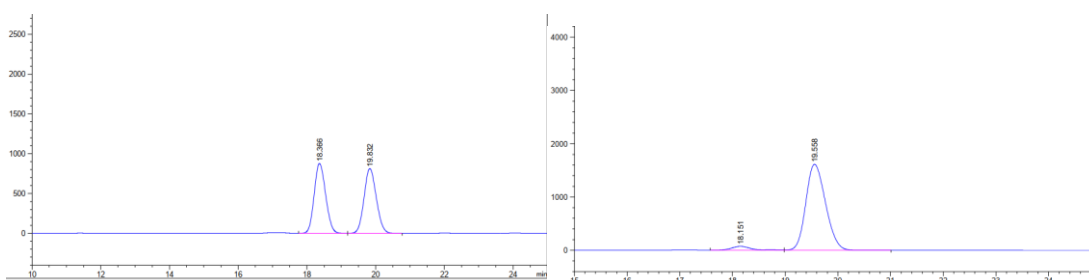
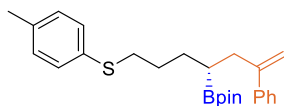


peak	Ret. Time/min	Area/mAU*s	Area %
1	24.385	3.00009e4	49.9507
2	28.044	3.00601e4	50.0493

peak	Ret. Time/min	Area/mAU*s	Area %
1	24.743	874.18555	7.0898
2	28.403	1.14559e4	92.9102

Supplementary Figure 417. HPLC of compound 3ac corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(2-phenyl-7-(p-tolylthio)hept-1-en-4-yl)-1,3,2-dioxaborolane (3ad)

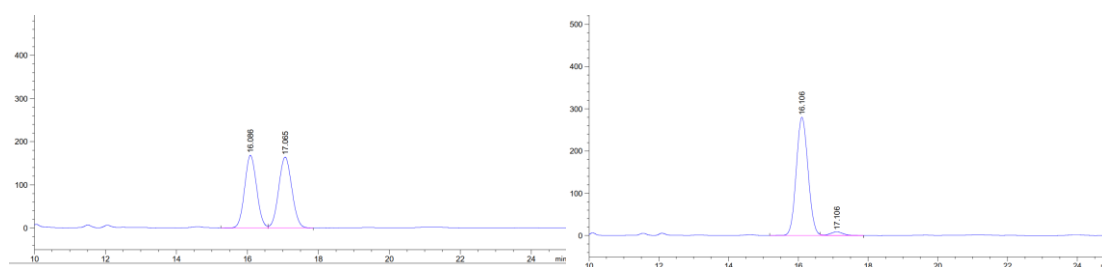
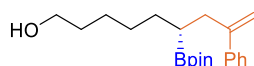


peak	Ret. Time/min	Area/mAU*s	Area %
1	18.366	2.03441e4	50.2310
2	19.832	2.01569e4	49.7690

peak	Ret. Time/min	Area/mAU*s	Area %
1	18.151	1864.71289	4.2629
2	19.558	4.18779e4	95.7371

Supplementary Figure 418. HPLC of compound 3ad corresponding alcohol

(R)-8-phenyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)non-8-en-1-ol (3ae)

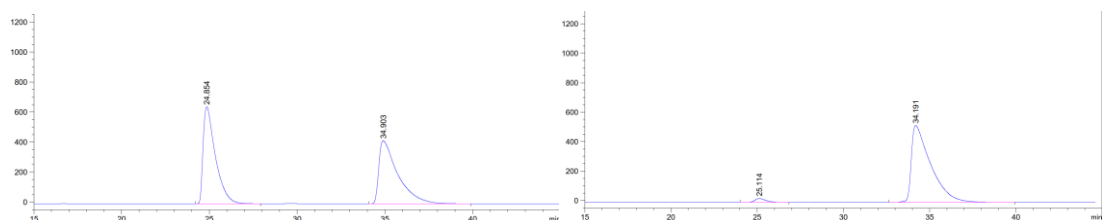
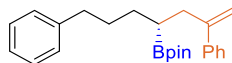


peak	Ret. Time/min	Area/mAU*s	Area %
1	16.086	3939.12817	48.2363
2	17.065	4227.18945	51.7637

peak	Ret. Time/min	Area/mAU*s	Area %
1	16.106	6576.17920	96.7071
2	17.106	223.92265	3.2929

Supplementary Figure 419. HPLC of compound 3ae corresponding alcohol

(R)-2-(2,7-diphenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3af)

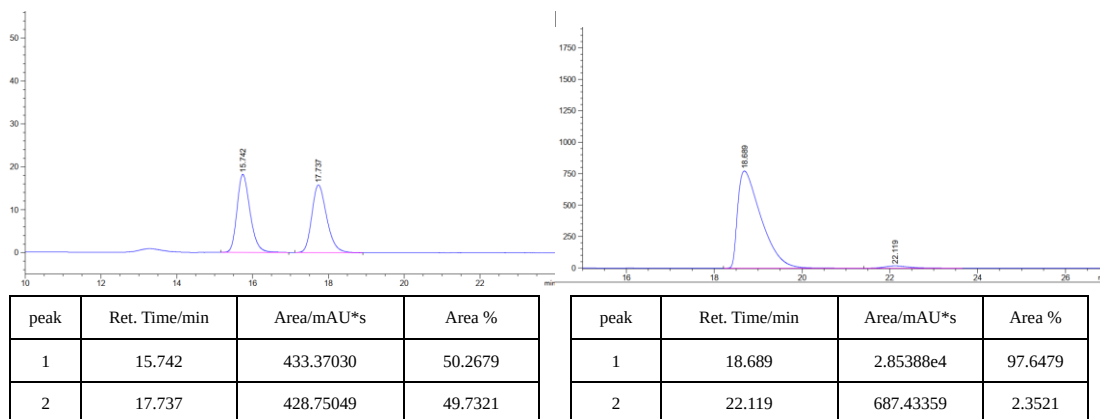
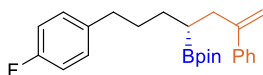


peak	Ret. Time/min	Area/mAU*s	Area %
1	24.854	3.13699e4	50.0196
2	34.903	3.13454e4	49.9804

peak	Ret. Time/min	Area/mAU*s	Area %
1	25.114	1067.03235	2.5763
2	34.191	4.03503e4	97.4237

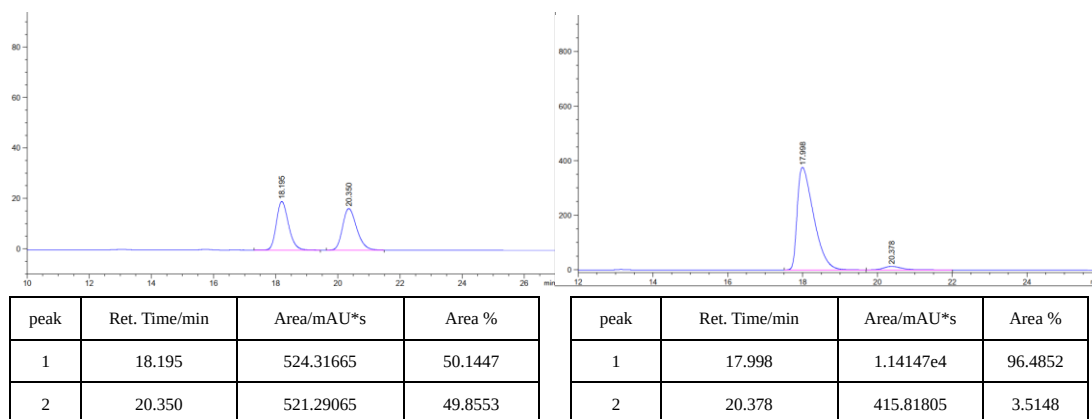
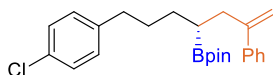
Supplementary Figure 420. HPLC of compound 3af corresponding alcohol

(R)-2-(7-(4-fluorophenyl)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3ag)



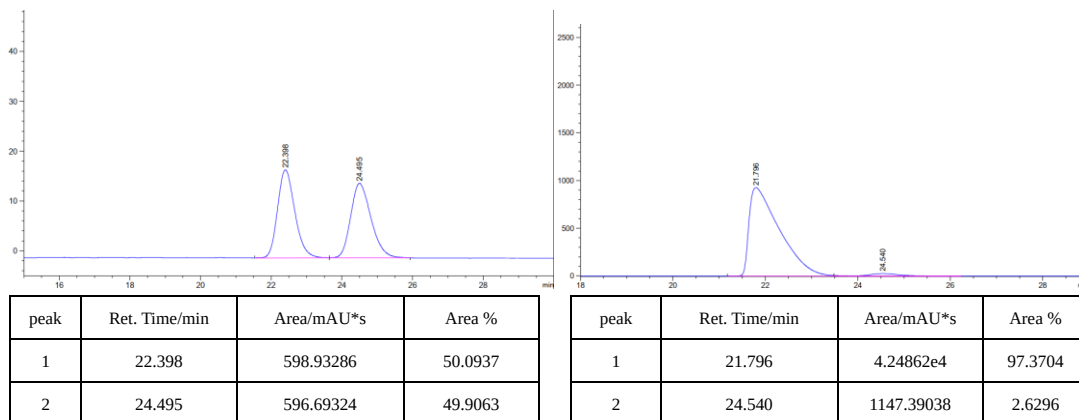
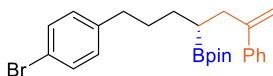
Supplementary Figure 421. HPLC of compound 3ag corresponding alcohol

(R)-2-(7-(4-chlorophenyl)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3ah)



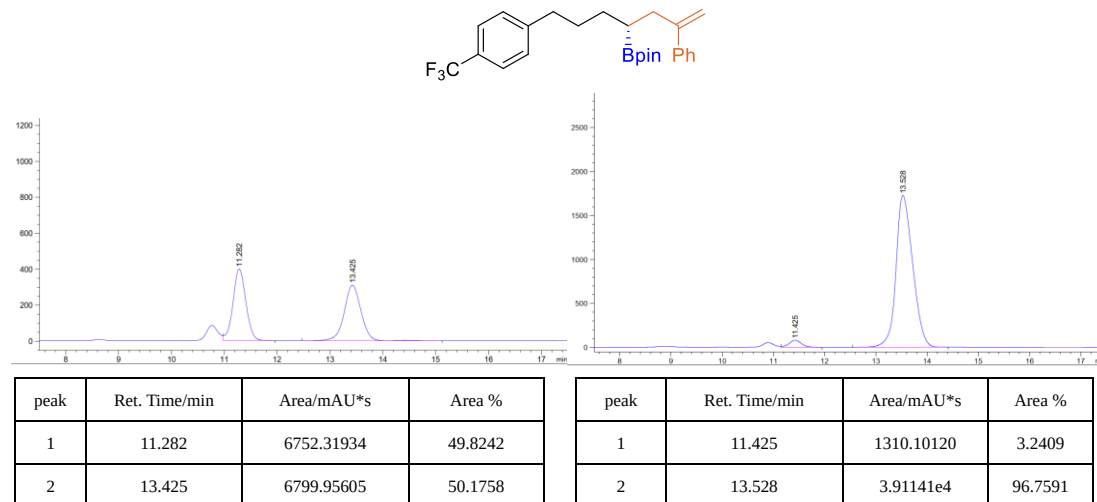
Supplementary Figure 422. HPLC of compound 3ah corresponding alcohol

(R)-2-(7-(4-bromophenyl)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3ai)



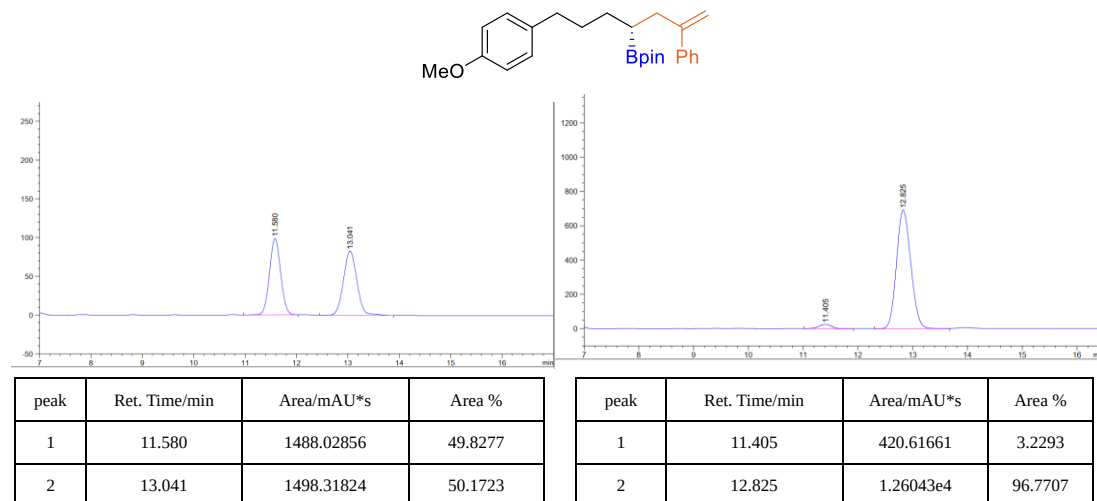
Supplementary Figure 423. HPLC of compound 3ai corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(2-phenyl-7-(4-(trifluoromethyl)phenyl)hept-1-en-4-yl)-1,3,2-dioxaborolane (3j)



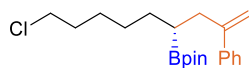
Supplementary Figure 424. HPLC of compound 3aj corresponding alcohol

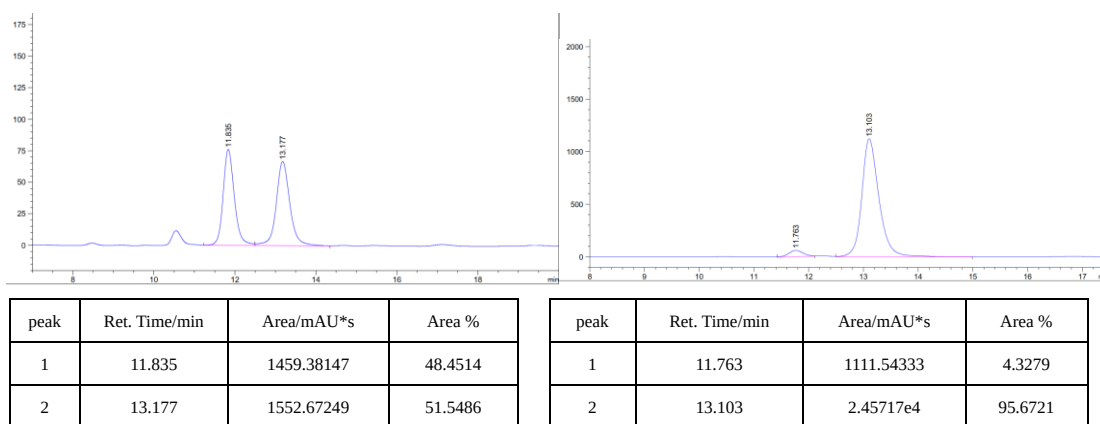
(R)-2-(7-(4-methoxyphenyl)-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3ak)



Supplementary Figure 425. HPLC of compound 3ak corresponding alcohol

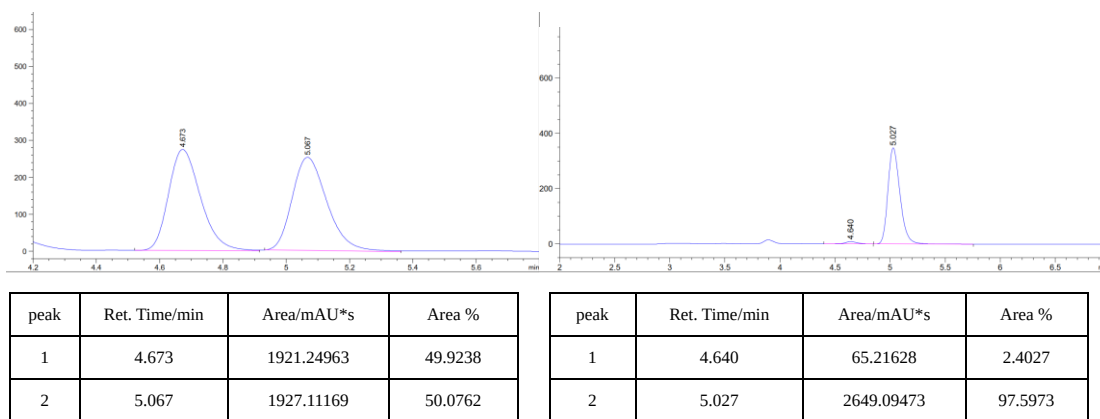
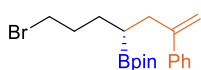
(R)-2-(9-chloro-2-phenylnon-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3al)





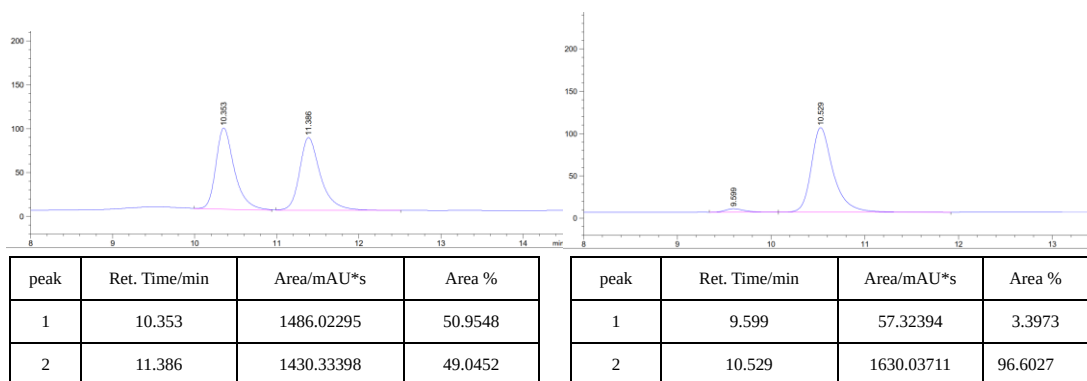
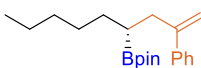
Supplementary Figure 426. HPLC of compound 3al corresponding alcohol

(R)-2-(7-bromo-2-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3am)



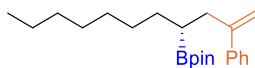
Supplementary Figure 427. HPLC of compound 3am corresponding alcohol

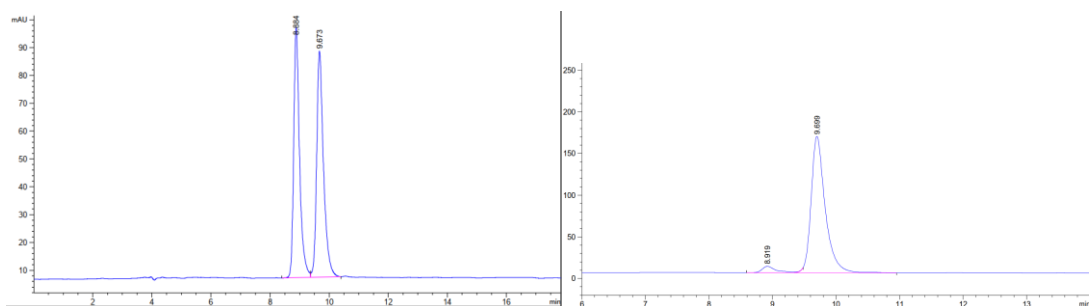
(R)-4,4,5,5-tetramethyl-2-(2-phenylnon-1-en-4-yl)-1,3,2-dioxaborolane (3an)



Supplementary Figure 428. HPLC of compound 3an corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(2-phenylundec-1-en-4-yl)-1,3,2-dioxaborolane (3ao)



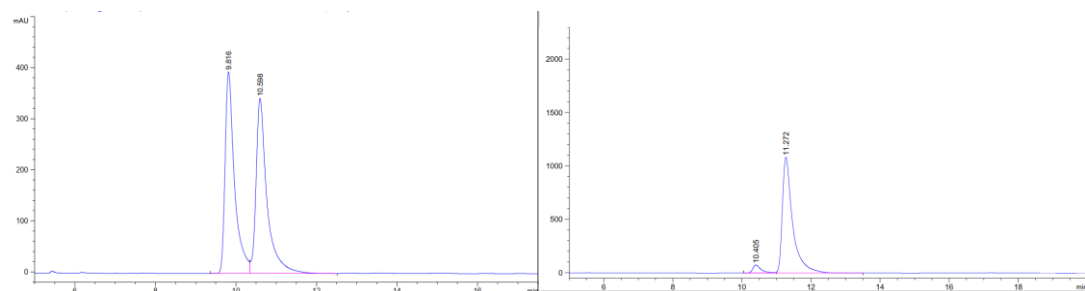
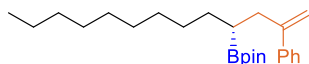


peak	Ret. Time/min	Area/mAU*s	Area %
1	8.884	1236.24084	48.6343
2	9.673	1305.67188	51.3657

peak	Ret. Time/min	Area/mAU*s	Area %
1	8.919	112.98401	4.3259
2	9.699	2498.80640	95.6741

Supplementary Figure 429. HPLC of compound 3ao corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(2-phenyltridec-1-en-4-yl)-1,3,2-dioxaborolane (3ap)

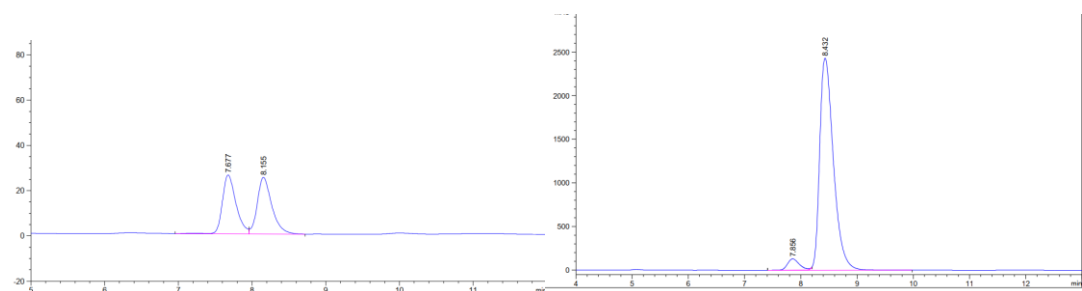
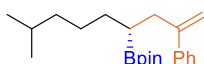


peak	Ret. Time/min	Area/mAU*s	Area %
1	9.816	6399.14404	49.7078
2	10.598	6474.36816	50.2922

peak	Ret. Time/min	Area/mAU*s	Area %
1	10.405	1280.42834	5.3790
2	11.272	2.25237e4	94.6210

Supplementary Figure 430. HPLC of compound 3ap corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(8-methyl-2-phenylnon-1-en-4-yl)-1,3,2-dioxaborolane (3aq)

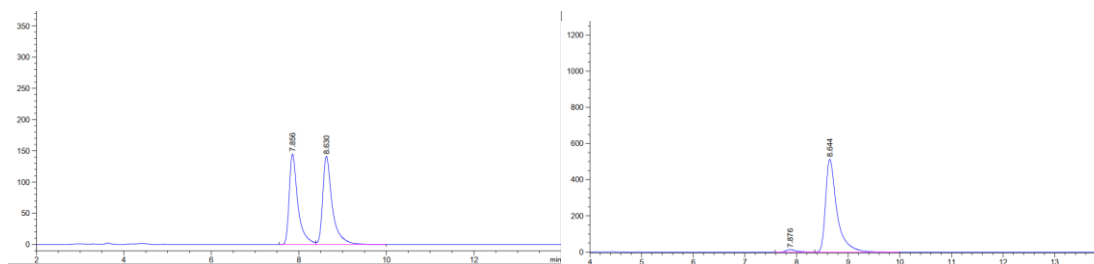
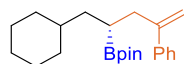


peak	Ret. Time/min	Area/mAU*s	Area %
1	7.677	334.35916	49.4025
2	8.155	342.44711	50.5975

peak	Ret. Time/min	Area/mAU*s	Area %
1	7.856	1894.81750	4.4033
2	8.432	4.11373e4	95.5967

Supplementary Figure 431. HPLC of compound 3aq corresponding alcohol

(R)-2-(1-cyclohexyl-4-phenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3ar)

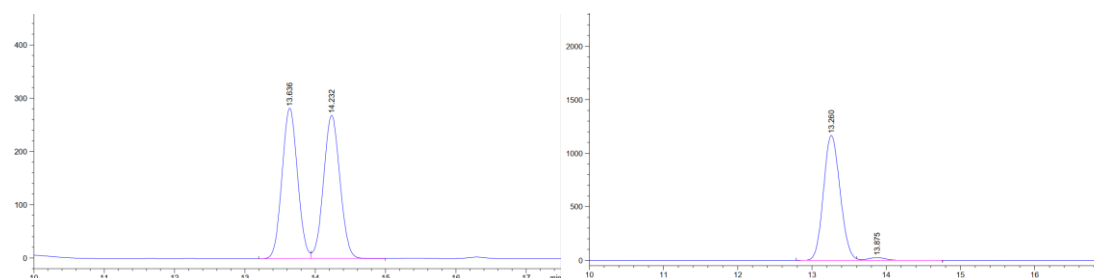
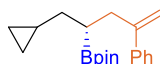


peak	Ret. Time/min	Area/mAU*s	Area %
1	7.856	1990.41064	48.1032
2	8.630	2147.37988	51.8968

peak	Ret. Time/min	Area/mAU*s	Area %
1	7.876	180.48715	2.2588
2	8.644	7810.06055	97.7412

Supplementary Figure 432. HPLC of compound 3ar corresponding alcohol

(R)-2-(1-cyclopropyl-4-phenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3as)

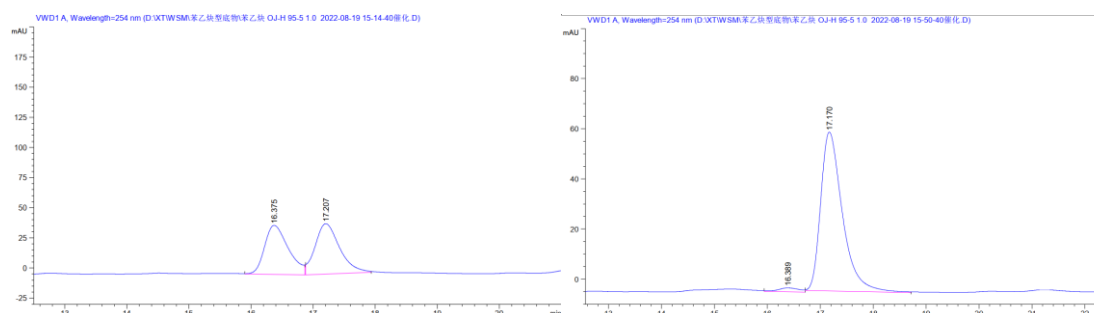
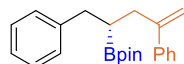


peak	Ret. Time/min	Area/mAU*s	Area %
1	13.636	4332.62549	49.9008
2	14.232	4349.85791	50.0992

peak	Ret. Time/min	Area/mAU*s	Area %
1	13.260	1.82331e4	97.7886
2	13.875	412.32767	2.2114

Supplementary Figure 433. HPLC of compound 3as corresponding alcohol

(R)-2-(1,4-diphenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3at)

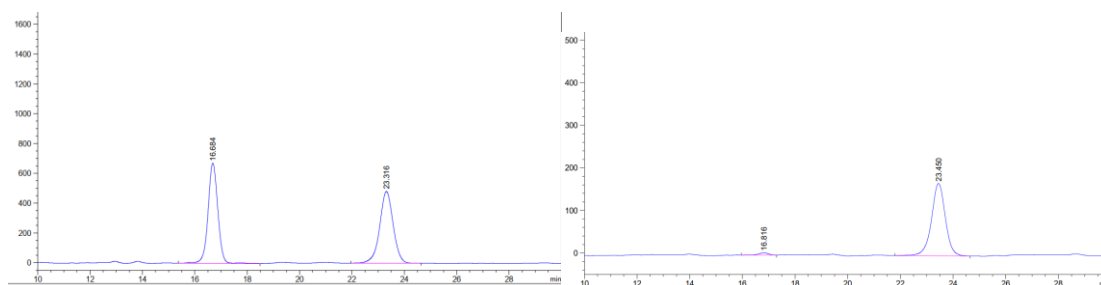
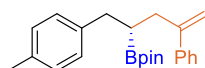


peak	Ret. Time/min	Area/mAU*s	Area %
1	16.375	1084.51868	48.5643
2	17.207	1148.64111	51.4357

peak	Ret. Time/min	Area/mAU*s	Area %
1	16.389	44.62174	2.4107
2	17.170	1806.32800	97.5893

Supplementary Figure 434. HPLC of compound 3at corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(4-phenyl-1-(p-tolyl)pent-4-en-2-yl)-1,3,2-dioxaborolane (3au)

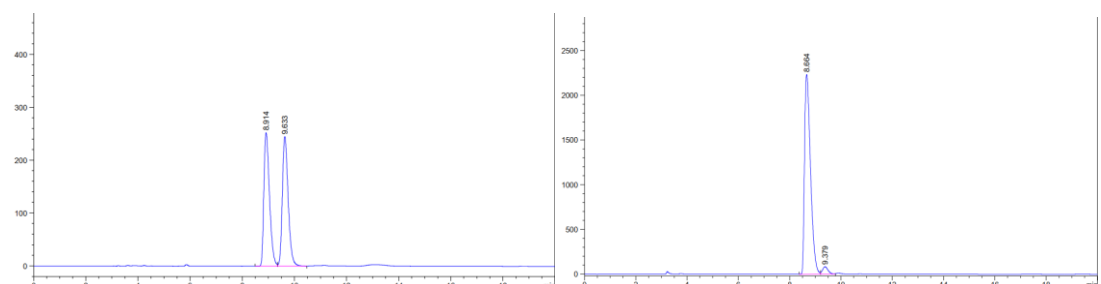
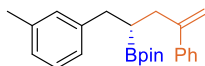


peak	Ret. Time/min	Area/mAU*s	Area %
1	16.684	1.74030e4	50.1980
2	23.316	1.72657e4	49.8020

peak	Ret. Time/min	Area/mAU*s	Area %
1	16.816	133.68130	2.1005
2	23.450	6230.64160	97.8995

Supplementary Figure 435. HPLC of compound 3au corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(4-phenyl-1-(m-tolyl)pent-4-en-2-yl)-1,3,2-dioxaborolane (3av)

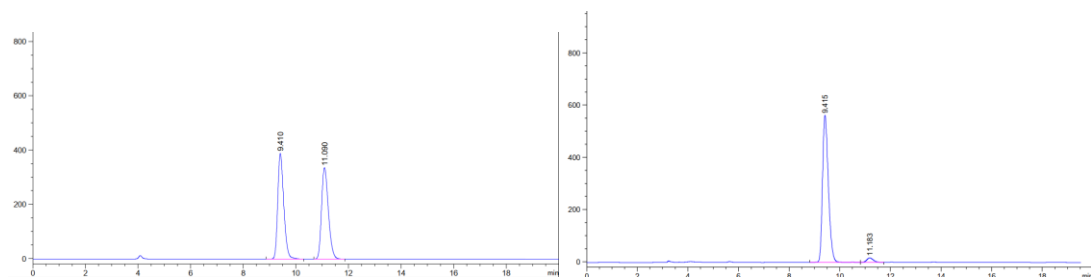
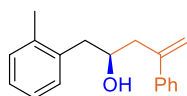


peak	Ret. Time/min	Area/mAU*s	Area %
1	8.914	3777.68335	49.7610
2	9.633	3813.96973	50.2390

peak	Ret. Time/min	Area/mAU*s	Area %
1	8.664	3.61376e4	96.6465
2	9.379	1253.90955	3.3535

Supplementary Figure 436. HPLC of compound 3av corresponding alcohol

(R)-4-phenyl-1-(o-tolyl)pent-4-en-2-ol (3aw)

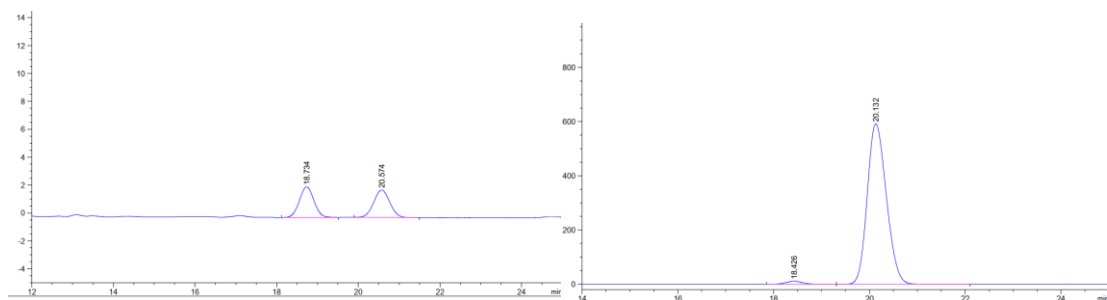
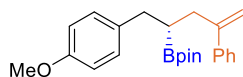


peak	Ret. Time/min	Area/mAU*s	Area %
1	9.410	6191.76367	50.4885
2	11.090	6071.93848	49.5115

peak	Ret. Time/min	Area/mAU*s	Area %
1	9.415	9066.21680	96.7630
2	11.183	303.28647	3.2370

Supplementary Figure 437. HPLC of compound 3aw

(R)-2-(1-(4-methoxyphenyl)-4-phenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3ax)

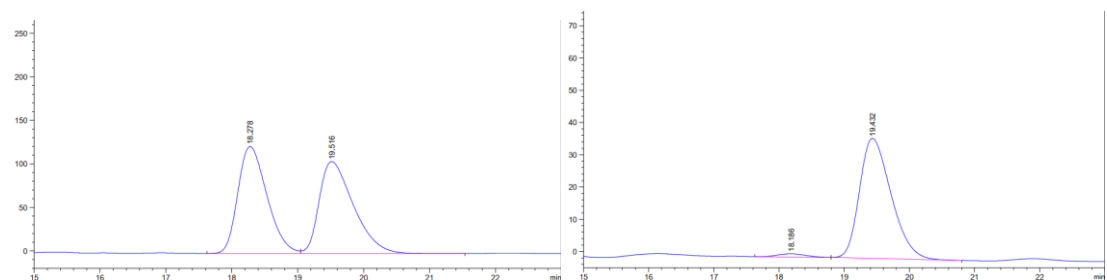
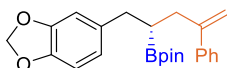


peak	Ret. Time/min	Area/mAU*s	Area %
1	18.734	54.12457	50.1851
2	20.574	53.72527	49.8149

peak	Ret. Time/min	Area/mAU*s	Area %
1	18.426	263.55960	1.5850
2	20.132	1.63653e4	98.4150

Supplementary Figure 438. HPLC of compound 3ax corresponding alcohol

(R)-2-(1-(benzo[d][1,3]dioxol-5-yl)-4-phenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3ay)

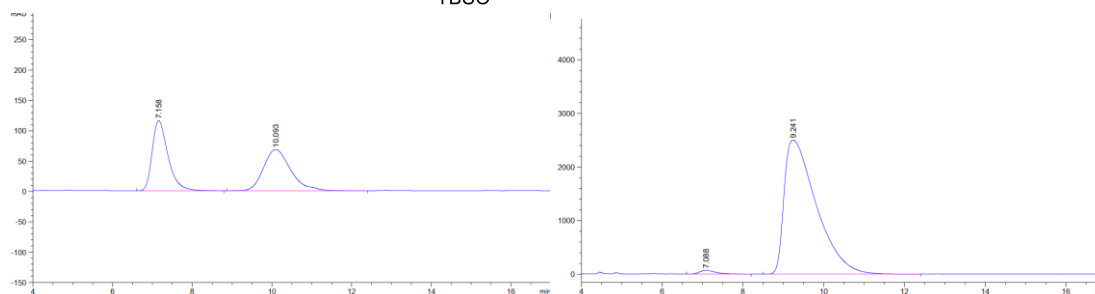
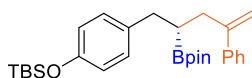


peak	Ret. Time/min	Area/mAU*s	Area %
1	18.278	3774.48169	49.7382
2	19.516	3814.21118	50.2618

peak	Ret. Time/min	Area/mAU*s	Area %
1	18.186	30.31198	2.3716
2	19.432	1247.80359	97.6284

Supplementary Figure 439. HPLC of compound 3ay corresponding alcohol

(*R*)-tert-butyl dimethyl(4-(4-phenyl-2-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pent-4-en-1-yl)phenoxy)silane (3az)

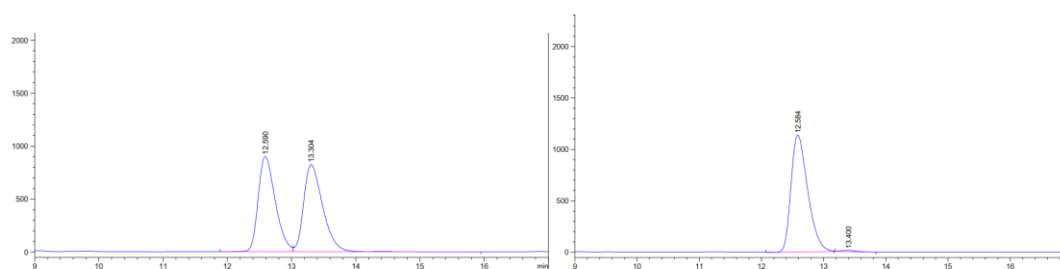
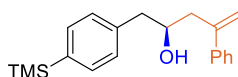


peak	Ret. Time/min	Area/mAU*s	Area %
1	7.158	3177.17896	49.7783
2	10.093	3205.48584	50.2217

peak	Ret. Time/min	Area/mAU*s	Area %
1	7.088	1943.49231	1.3870
2	9.241	1.38175e5	98.6130

Supplementary Figure 440. HPLC of compound 3az corresponding alcohol

(*R*)-4-phenyl-1-(4-(trimethylsilyl)phenyl)pent-4-en-2-ol (3ba)

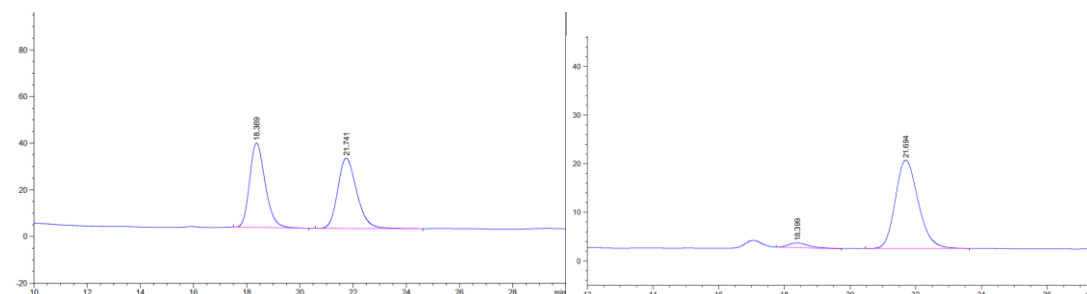
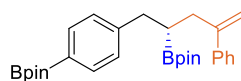


peak	Ret. Time/min	Area/mAU*s	Area %
1	12.590	1.66720e4	49.4119
2	13.304	1.70688e4	50.5881

peak	Ret. Time/min	Area/mAU*s	Area %
1	12.584	2.13561e4	98.9817
2	13.400	219.70143	1.0183

Supplementary Figure 441. HPLC of compound 3ba

(R)-4,4,5,5-tetramethyl-2-(4-phenyl-1-(4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)pent-4-en-2-yl)-1,3,2-dioxaborolane (3bb)

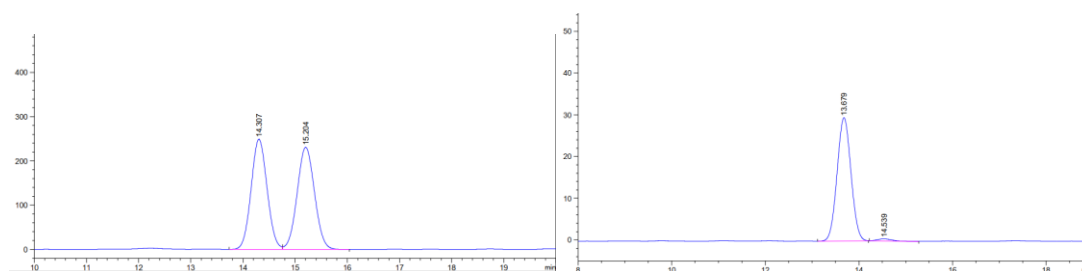
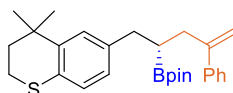


peak	Ret. Time/min	Area/mAU*s	Area %
1	18.369	1469.57971	49.6223
2	21.741	1491.95215	50.3777

peak	Ret. Time/min	Area/mAU*s	Area %
1	18.399	42.15122	4.5665
2	21.694	880.89978	95.4335

Supplementary Figure 442. HPLC of compound 3bb corresponding alcohol

(R)-2-(1-(4,4-dimethylthiochroman-6-yl)-4-phenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3bc)

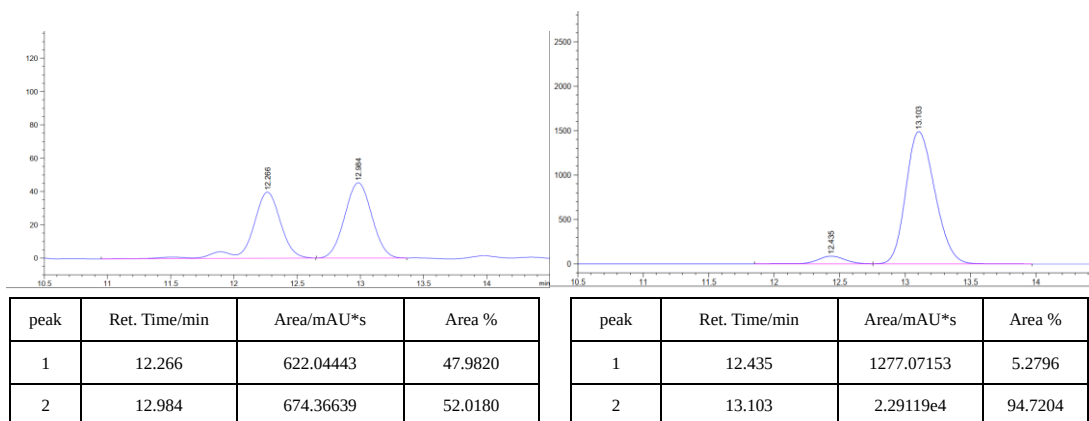
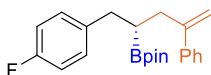


peak	Ret. Time/min	Area/mAU*s	Area %
1	14.307	5291.14160	49.7532
2	15.204	5343.63379	50.2468

peak	Ret. Time/min	Area/mAU*s	Area %
1	13.679	608.27014	98.2147
2	14.539	11.05686	1.7853

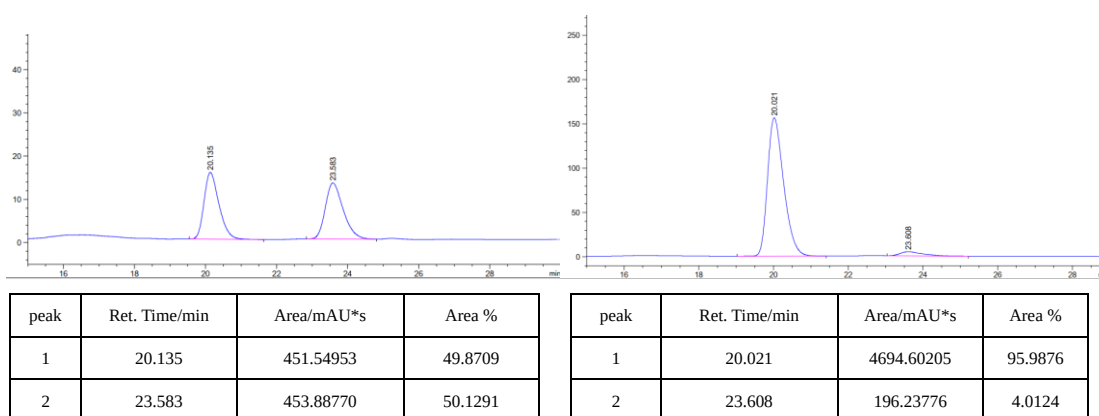
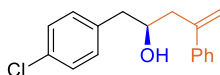
Supplementary Figure 443. HPLC of compound 3bc corresponding alcohol

(R)-2-(1-(4-fluorophenyl)-4-phenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3bd)



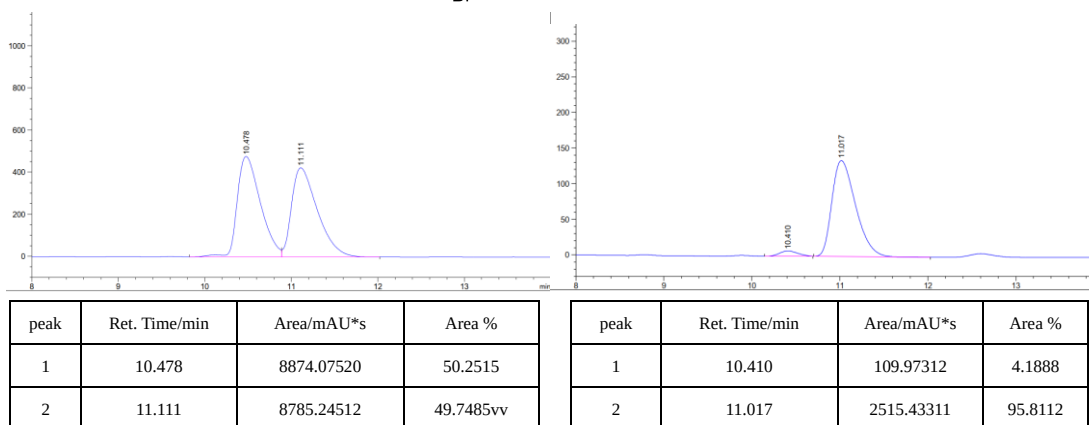
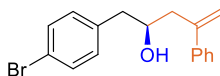
Supplementary Figure 444. HPLC of compound 3bd corresponding alcohol

(R)-1-(4-chlorophenyl)-4-phenylpent-4-en-2-ol (3be)



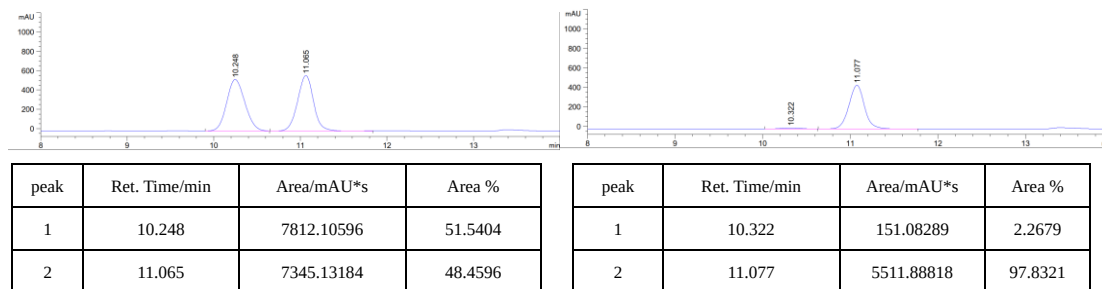
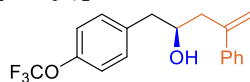
Supplementary Figure 445. HPLC of compound 3be

(R)-1-(4-bromophenyl)-4-phenylpent-4-en-2-ol (3bf)



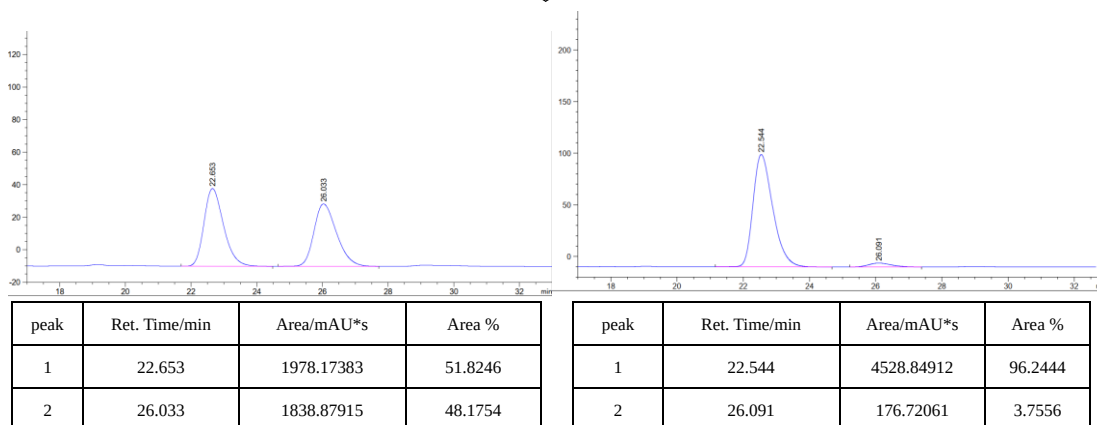
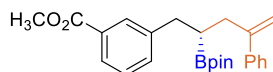
Supplementary Figure 446. HPLC of compound 3bf

(R)-4-phenyl-1-(4-(trifluoromethoxy)phenyl)pent-4-en-2-ol (3bg)



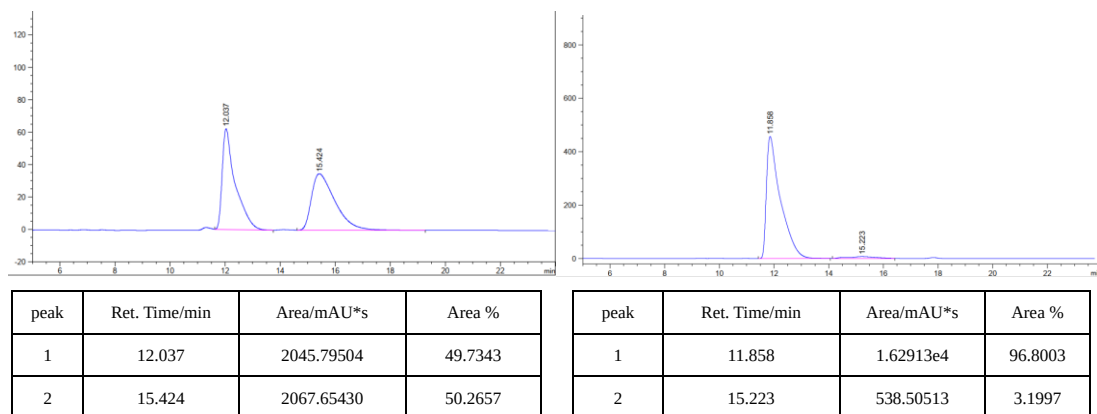
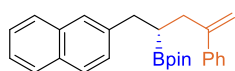
Supplementary Figure 447. HPLC of compound 3bg

(R)-methyl 4-(4-phenyl-2-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pent-4-en-1-yl)benzoate (3bh)



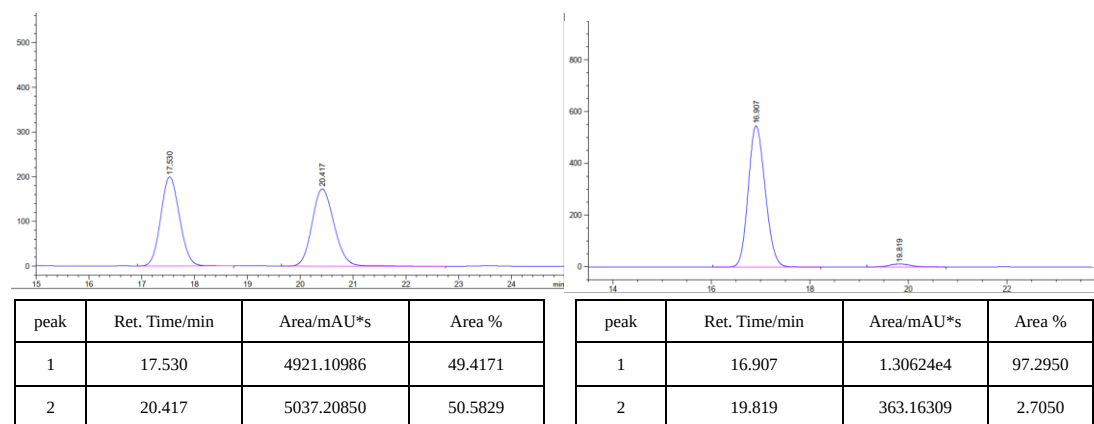
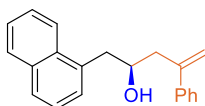
Supplementary Figure 448. HPLC of compound 3bh corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(1-(naphthalen-2-yl)-4-phenylpent-4-en-2-yl)-1,3,2-dioxaborolane (3bi)



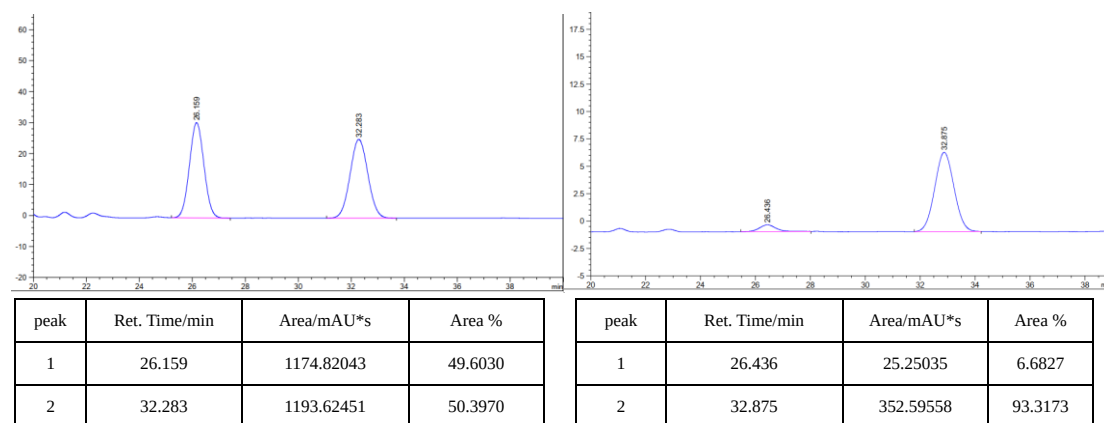
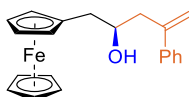
Supplementary Figure 449. HPLC of compound 3bi corresponding alcohol

(R)-1-(naphthalen-1-yl)-4-phenylpent-4-en-2-ol (3bj)



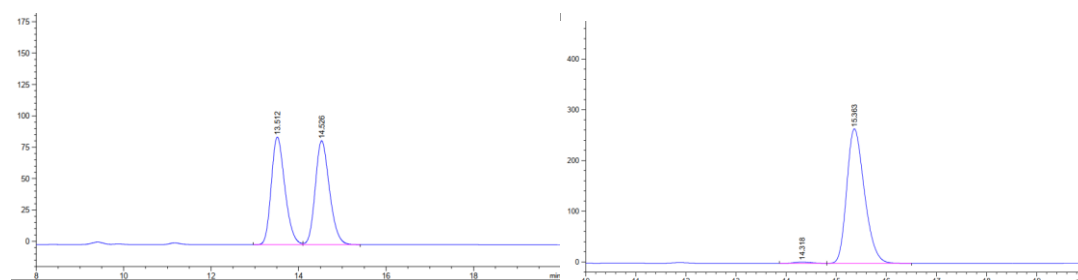
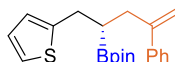
Supplementary Figure 450. HPLC of compound 3bj

(R)-1-Ferrocene-4-phenylpent-4-en-2-ol (3bk)



Supplementary Figure 451. HPLC of compound 3bk

(R)-4,4,5,5-tetramethyl-2-(4-phenyl-1-(thiophen-2-yl)pent-4-en-2-yl)-1,3,2-dioxaborolane (3bl)

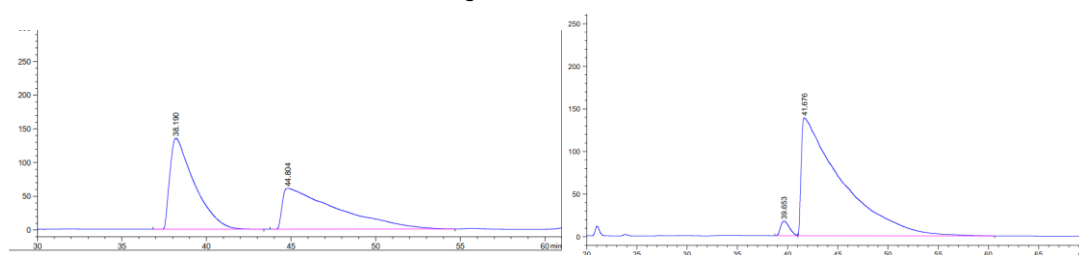
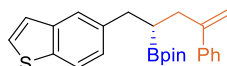


peak	Ret. Time/min	Area/mAU*s	Area %
1	13.512	1856.03955	49.8505
2	14.526	1867.17322	50.1495

peak	Ret. Time/min	Area/mAU*s	Area %
1	14.318	62.70996	0.9565
2	15.363	6493.46533	99.0435

Supplementary Figure 452. HPLC of compound 3bl corresponding alcohol

(R)-2-(1-(benzo[b]thiophen-5-yl)-4-phenylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3bm)

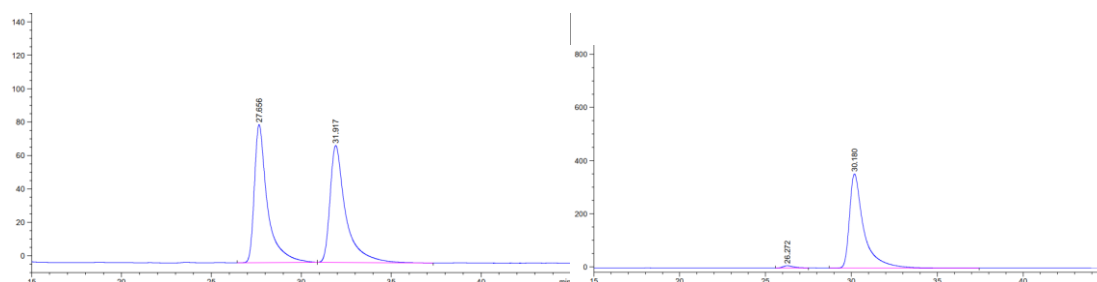
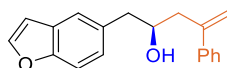


peak	Ret. Time/min	Area/mAU*s	Area %
1	38.190	1.35489e4	49.8938
2	44.804	1.36065e4	50.1062

peak	Ret. Time/min	Area/mAU*s	Area %
1	39.653	1045.28833	2.6401
2	41.676	3.85476e4	97.3599

Supplementary Figure 453. HPLC of compound 3bm corresponding alcohol

(R)-1-(benzofuran-5-yl)-4-phenylpent-4-en-2-ol (3bn)

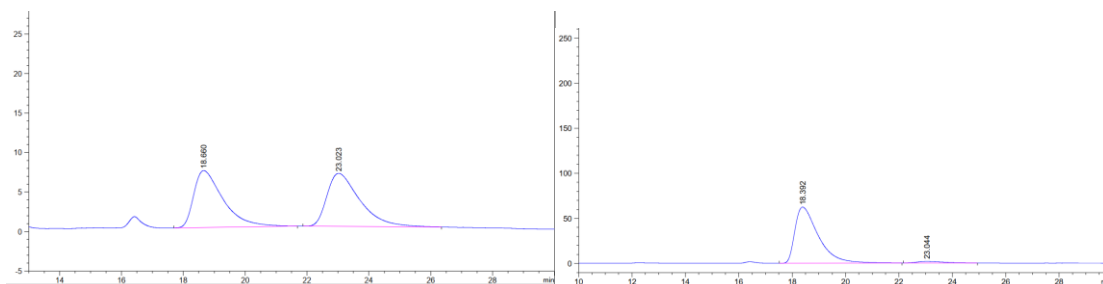
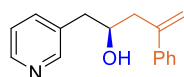


peak	Ret. Time/min	Area/mAU*s	Area %
1	27.656	4187.69336	49.6009
2	31.917	4255.09033	50.3991

peak	Ret. Time/min	Area/mAU*s	Area %
1	26.272	453.77570	2.1184
2	30.180	2.09674e4	97.8816

Supplementary Figure 454. HPLC of compound 3bn

(R)-4-phenyl-1-(pyridin-3-yl)pent-4-en-2-ol (3bo)

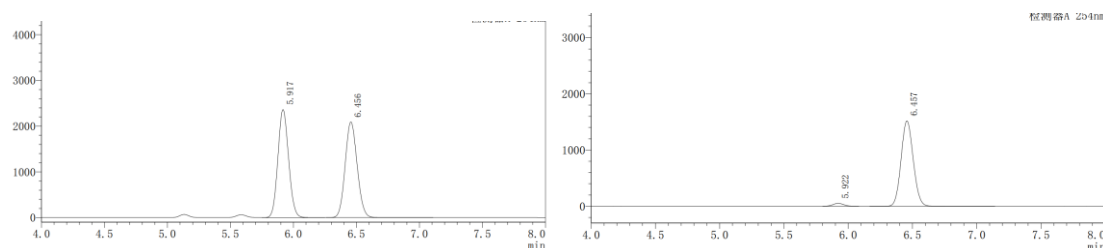
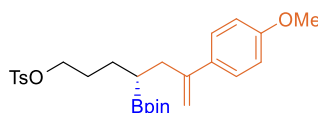


peak	Ret. Time/min	Area/mAU*s	Area %
1	18.660	476.67300	48.9403
2	23.023	497.31570	51.0597

peak	Ret. Time/min	Area/mAU*s	Area %
1	18.392	3795.36108	97.0017
2	23.044	117.31461	2.9983

Supplementary Figure 455. HPLC of compound 3bo

(R)-6-(4-methoxyphenyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate (3bq)

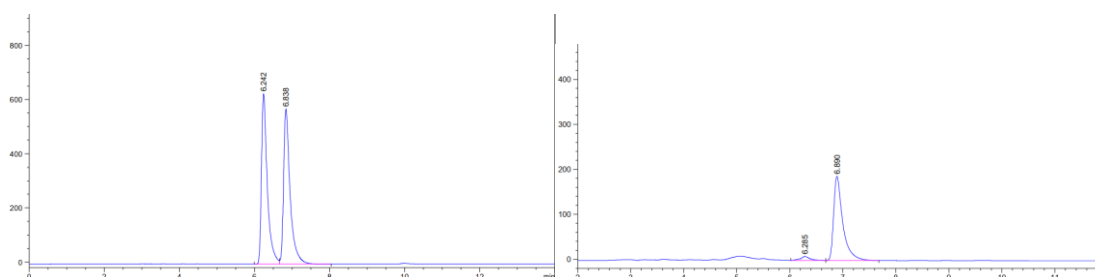
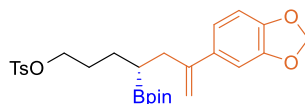


peak	Ret. Time/min	Area/mAU*s	Area %
1	5.917	13991565	50.260
2	6.456	13846626	49.740

peak	Ret. Time/min	Area/mAU*s	Area %
1	5.922	298800	2.901
2	6.457	9999756	97.099

Supplementary Figure 456. HPLC of compound 3bp corresponding alcohol

(R)-6-(benzo[d][1,3]dioxol-5-yl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate (3bq)

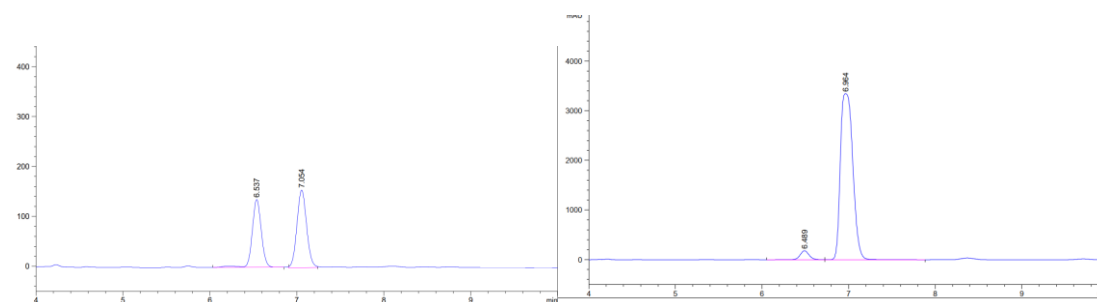
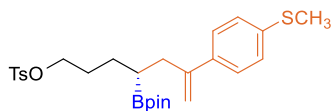


peak	Ret. Time/min	Area/mAU*s	Area %
1	6.242	6778.40820	49.5147
2	6.838	6911.26904	50.4853

peak	Ret. Time/min	Area/mAU*s	Area %
1	6.285	105.36386	4.4990
2	6.890	2236.55737	95.5010

Supplementary Figure 457. HPLC of compound 3bq corresponding alcohol

(R)-6-(4-(methylthio)phenyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl 4-methylbenzenesulfonate (3br)

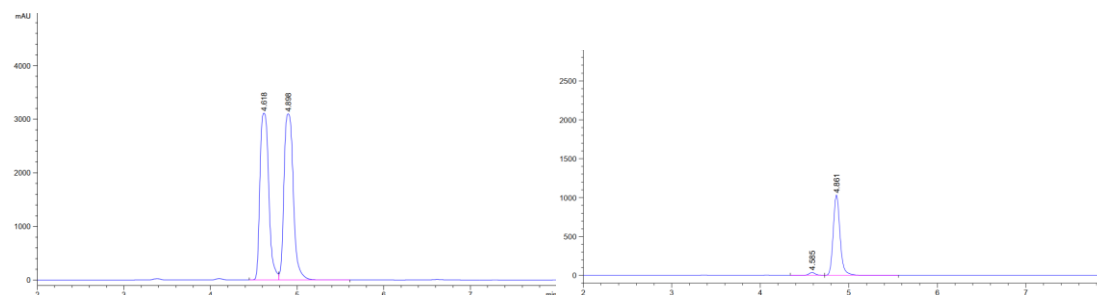
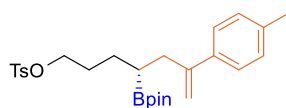


peak	Ret. Time/min	Area/mAU*s	Area %
1	6.537	994.74402	45.3587
2	7.054	1198.31702	54.6413

peak	Ret. Time/min	Area/mAU*s	Area %
1	6.489	1335.05090	3.8487
2	6.964	3.33532e4	96.1513

Supplementary Figure 458. HPLC of compound 3br corresponding alcohol

(R)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-6-(p-tolyl)hept-6-en-1-yl 4-methylbenzenesulfonate (3bs)

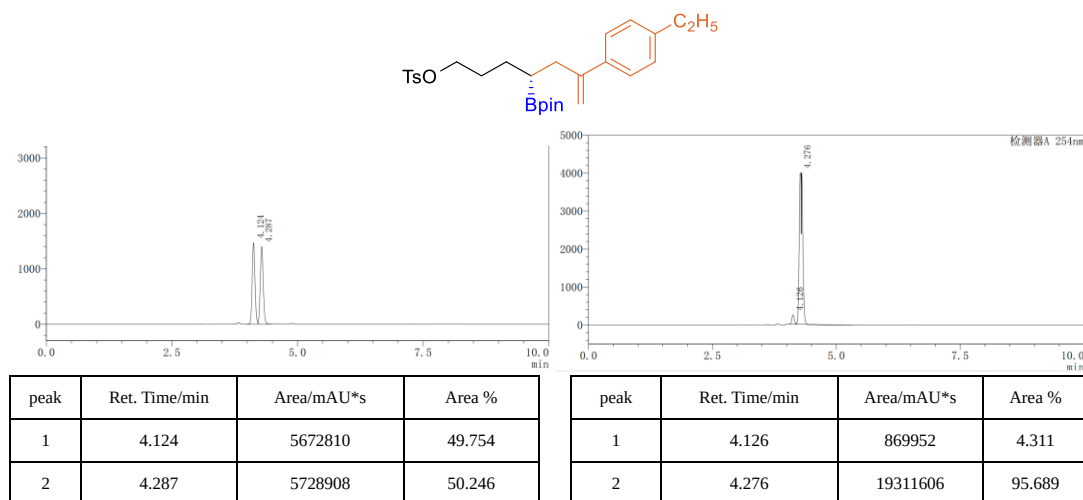


peak	Ret. Time/min	Area/mAU*s	Area %
1	4.618	2.19365e4	48.5959
2	4.898	2.32042e4	51.4041

peak	Ret. Time/min	Area/mAU*s	Area %
1	4.585	182.30049	3.1991
2	4.861	5516.26465	96.8009

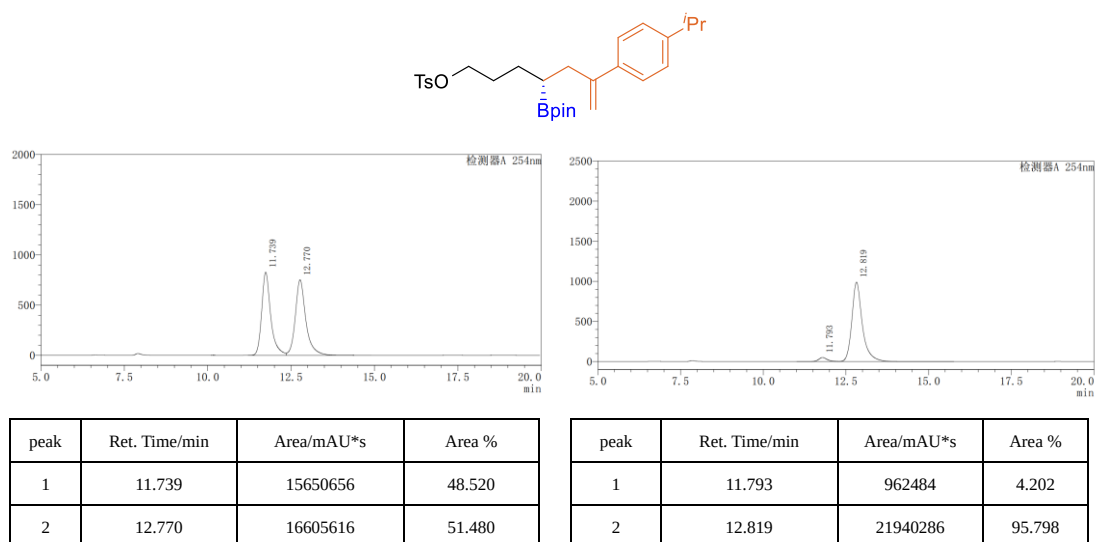
Supplementary Figure 459. HPLC of compound 3bs corresponding alcohol

(R)-6-(4-ethylphenyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate (3bt)



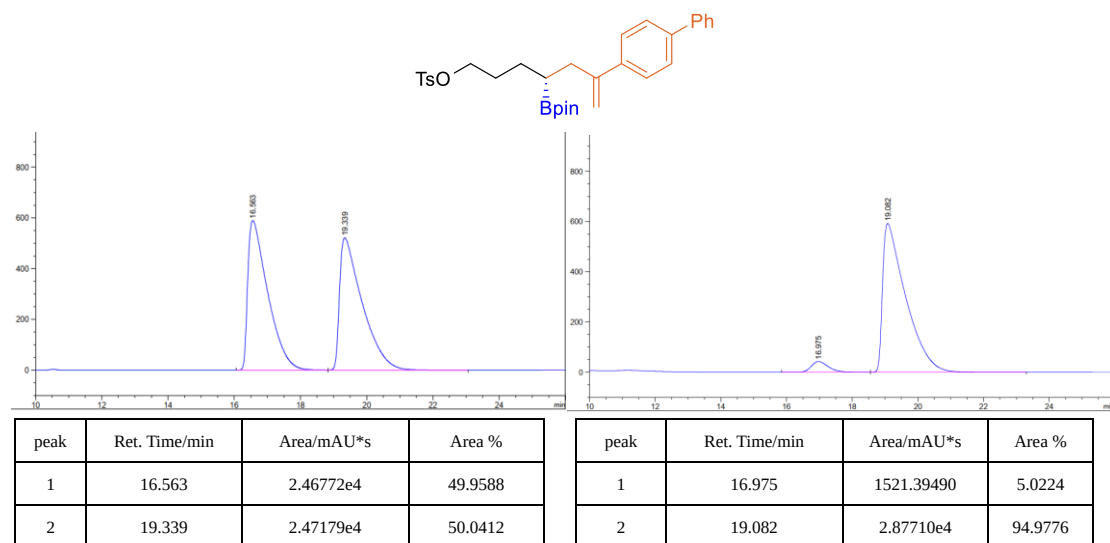
Supplementary Figure 460. HPLC of compound 3bt corresponding alcohol

(R)-6-(4-isopropylphenyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate (3bu)



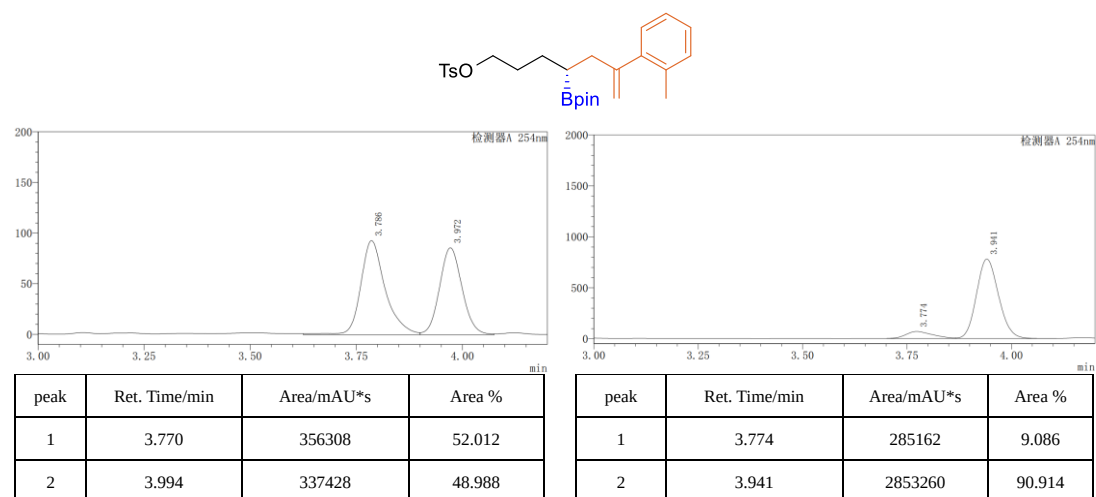
Supplementary Figure 461. HPLC of compound 3bu corresponding alcohol

(R)-6-([1,1'-biphenyl]-4-yl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate (3bv)



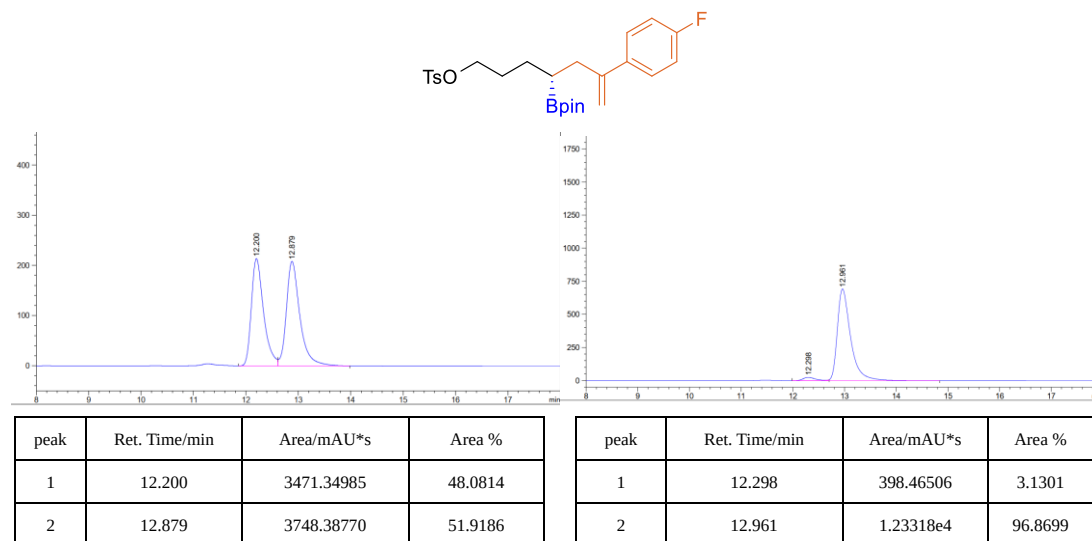
Supplementary Figure 462. HPLC of compound 3bv corresponding alcohol

(R)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-6-(o-tolyl)hept-6-en-1-yl-4-methylbenzenesulfonate (3bw)



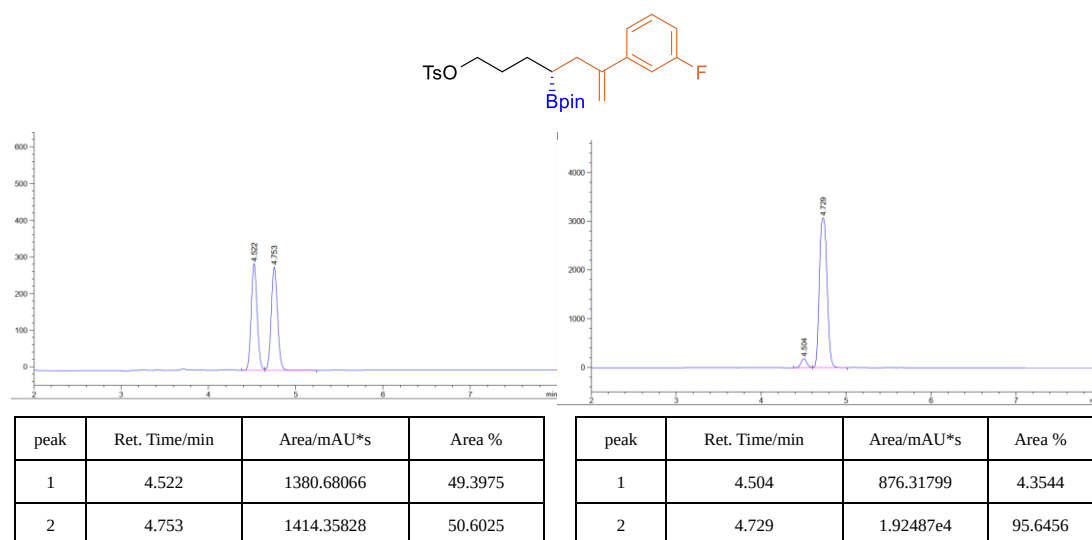
Supplementary Figure 463. HPLC of compound 3bw corresponding alcohol

(R)-6-(4-fluorophenyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate (3bx)



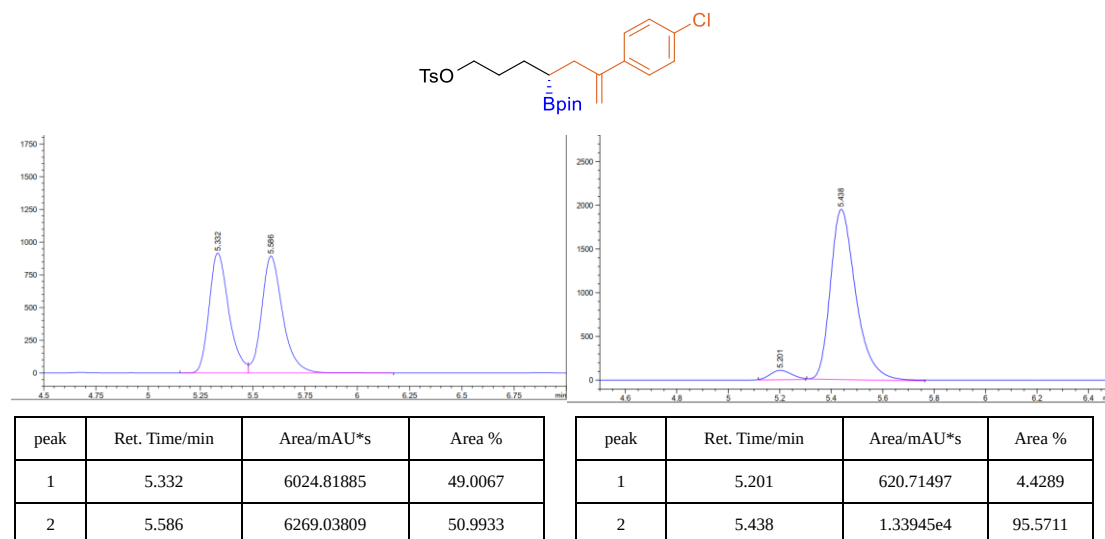
Supplementary Figure 464. HPLC of compound 3bx corresponding alcohol

(R)-6-(3-fluorophenyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate (3by)



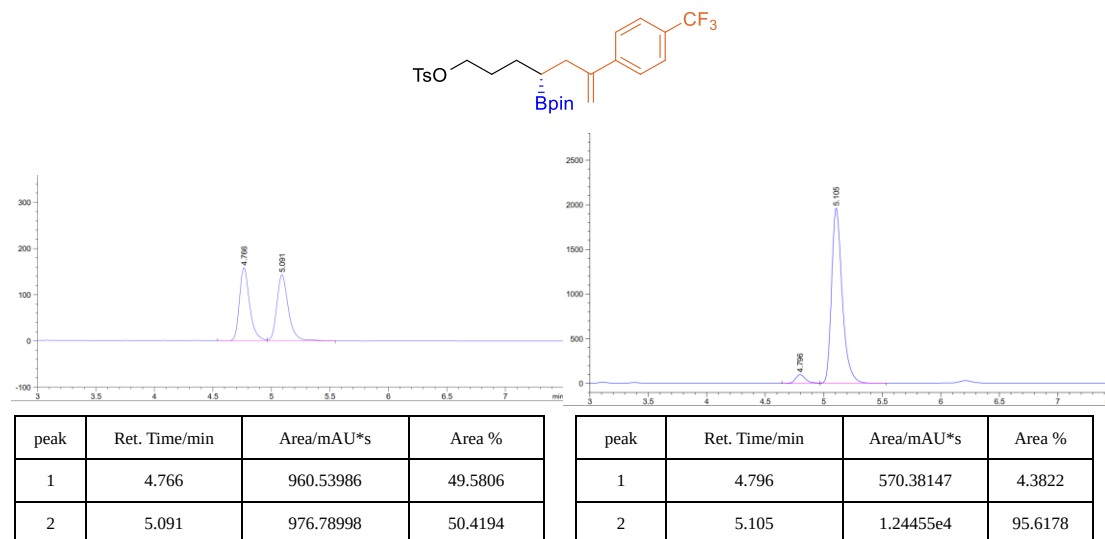
Supplementary Figure 465. HPLC of compound 3by corresponding alcohol

(R)-6-(4-chlorophenyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate (3bz)



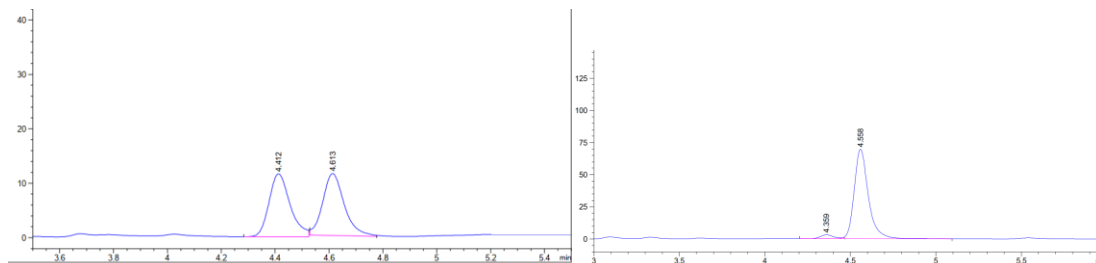
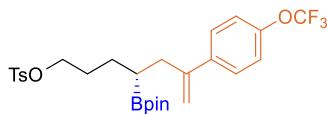
Supplementary Figure 466. HPLC of compound 3bz corresponding alcohol

(R)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-6-(4-(trifluoromethyl)phenyl)hept-6-en-1-yl-4-methylbenzenesulfonate (3ca)



Supplementary Figure 467. HPLC of compound 3ca corresponding alcohol

(R)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)-6-(4-(trifluoromethoxy)phenyl)hept-6-en-1-yl-4-methylbenzenesulfonate (3cb)

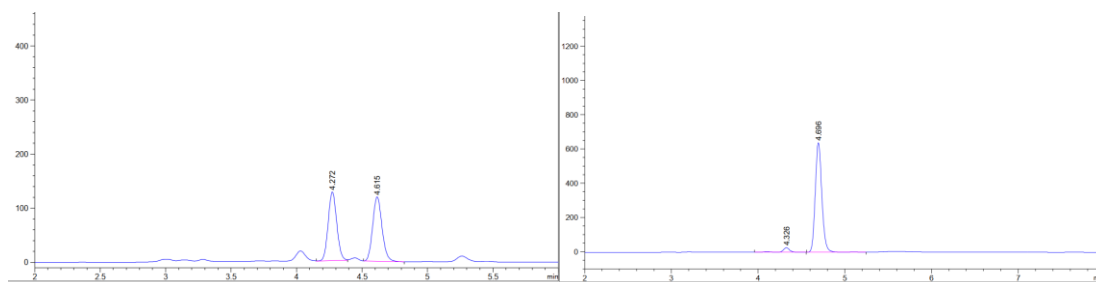
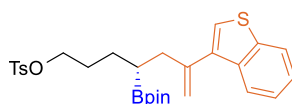


peak	Ret. Time/min	Area/mAU*s	Area %
1	4.412	62.90769	49.8765
2	4.613	63.21931	50.1235

peak	Ret. Time/min	Area/mAU*s	Area %
1	4.359	15.57547	3.7553
2	4.558	399.18817	96.2447

Supplementary Figure 468. HPLC of compound 3cb corresponding alcohol

(R)-6-(benzo[b]thiophen-3-yl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-4-methylbenzenesulfonate (3cc)

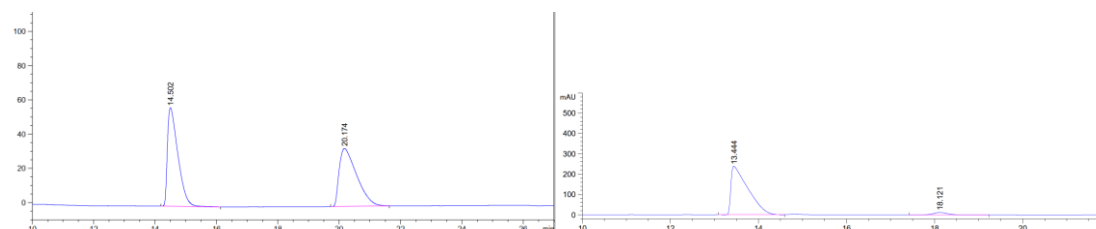
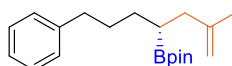


peak	Ret. Time/min	Area/mAU*s	Area %
1	4.272	580.22375	49.4243
2	4.615	593.74048	50.5757

peak	Ret. Time/min	Area/mAU*s	Area %
1	4.326	148.01485	4.1842
2	4.696	3389.42798	95.8158

Supplementary Figure 469. HPLC of compound 3cc corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(2-methyl-7-phenylhept-1-en-4-yl)-1,3,2-dioxaborolane (3cd)

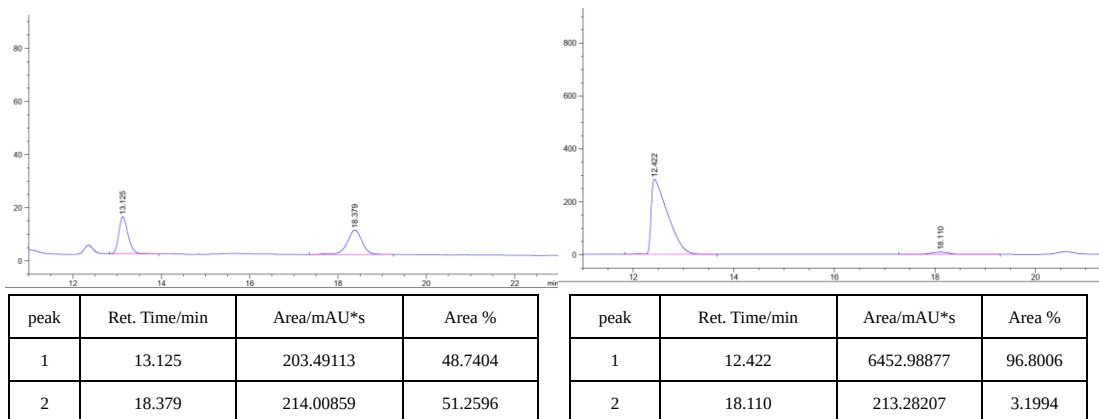
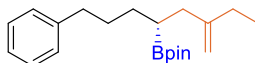


peak	Ret. Time/min	Area/mAU*s	Area %
1	14.502	1366.59692	50.5507
2	20.174	1336.81934	49.4493

peak	Ret. Time/min	Area/mAU*s	Area %
1	13.444	6372.53027	96.0059
2	18.121	265.11444	3.9941

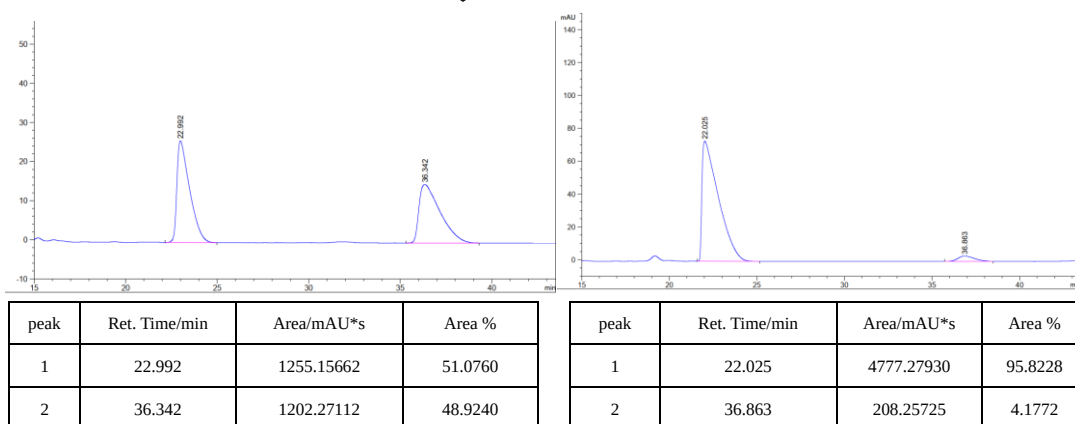
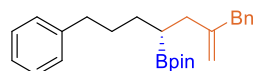
Supplementary Figure 470. HPLC of compound 3cd corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(6-methylene-1-phenyloctan-4-yl)-1,3,2-dioxaborolane (3ce)



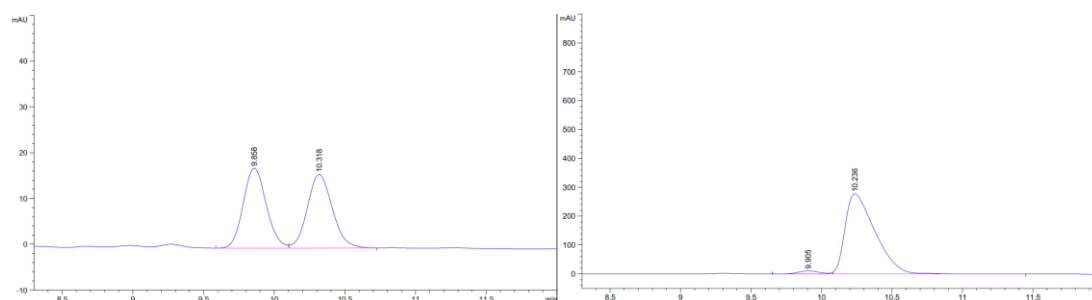
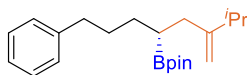
Supplementary Figure 471. HPLC of compound 3ce corresponding alcohol

(R)-2-(2-benzyl-7-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3cf)



Supplementary Figure 472. HPLC of compound 3cf corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(7-methyl-6-methylene-1-phenyloctan-4-yl)-1,3,2-dioxaborolane (3cg)

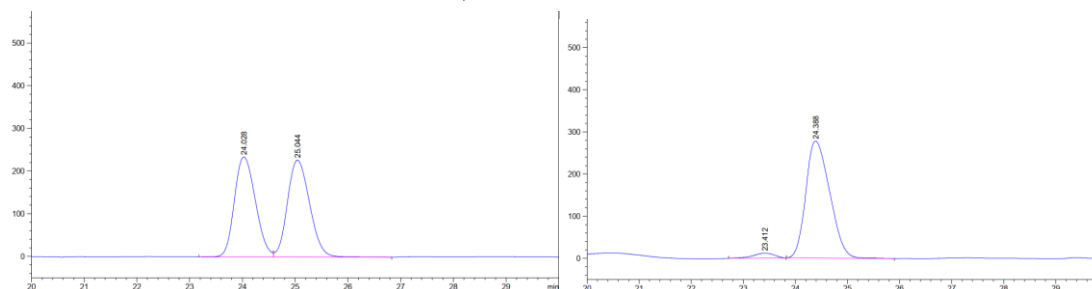
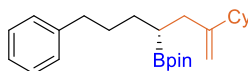


peak	Ret. Time/min	Area/mAU*s	Area %
1	9.858	198.64729	50.1737
2	10.318	197.27165	49.8263

peak	Ret. Time/min	Area/mAU*s	Area %
1	9.905	115.10593	2.7311
2	10.236	4099.58740	97.2689

Supplementary Figure 473. HPLC of compound 3cg corresponding alcohol

(R)-2-(2-cyclohexyl-7-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3ch)

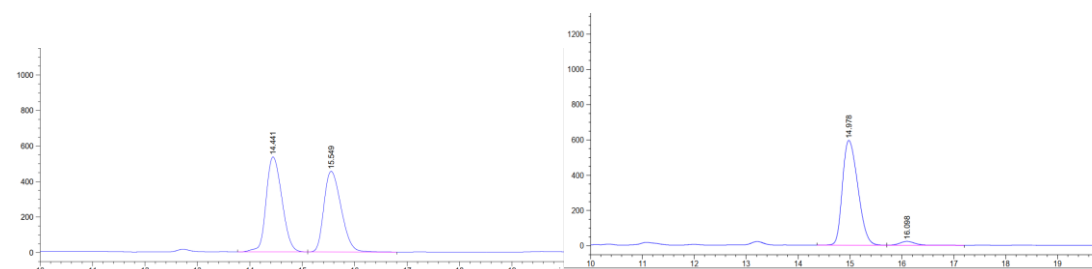
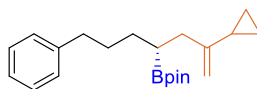


peak	Ret. Time/min	Area/mAU*s	Area %
1	24.028	6475.69873	49.4240
2	25.044	6626.64160	50.5760

peak	Ret. Time/min	Area/mAU*s	Area %
1	23.412	324.35294	3.5334
2	24.388	8855.37891	96.4666

Supplementary Figure 474. HPLC of compound 3ch corresponding alcohol

(R)-2-(2-cyclopropyl-7-phenylhept-1-en-4-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3ci)

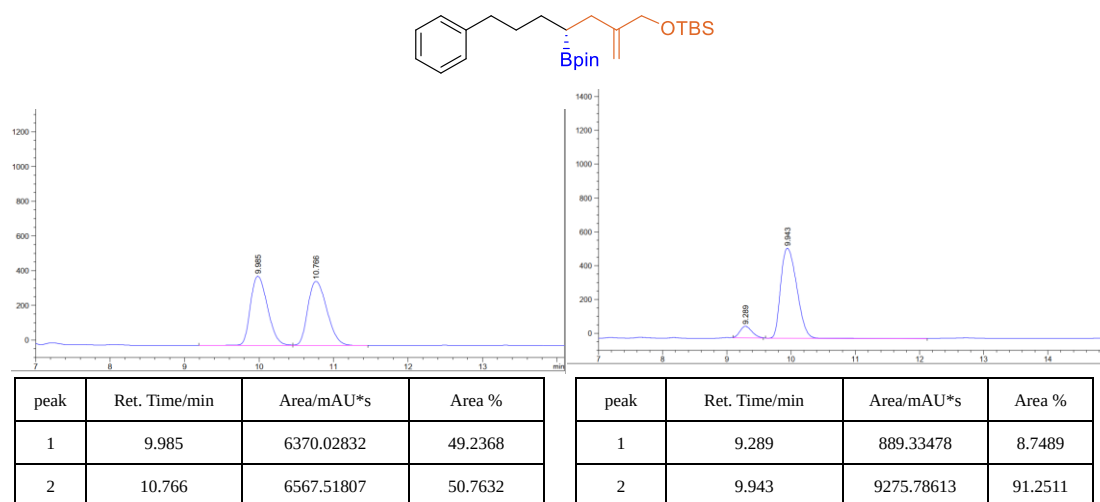


peak	Ret. Time/min	Area/mAU*s	Area %
1	14.441	1.12324e4	51.9900
2	15.549	1.03725e4	48.0100

peak	Ret. Time/min	Area/mAU*s	Area %
1	14.978	1.22402e4	96.3872
2	16.098	458.78613	3.6128

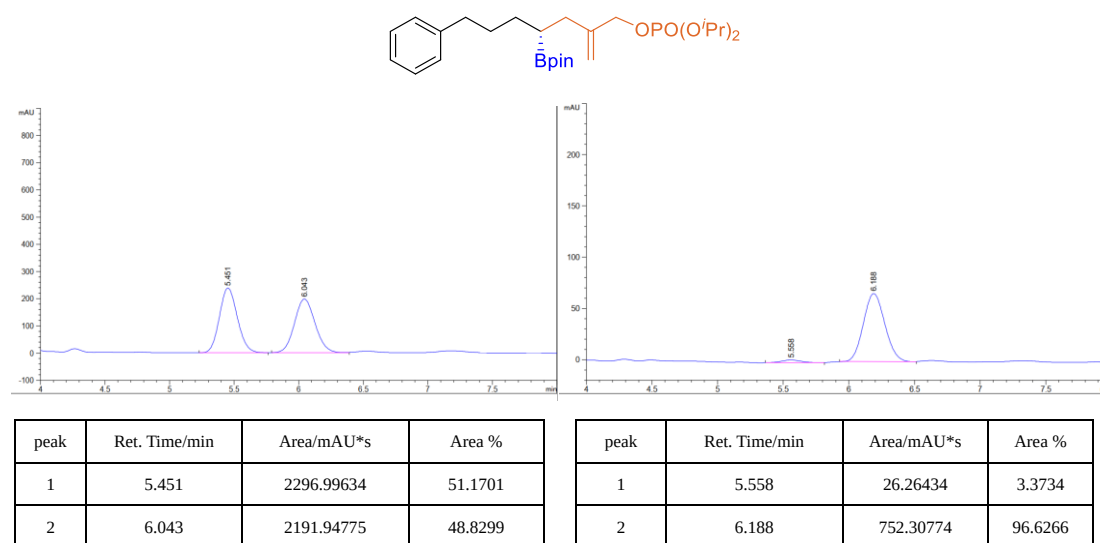
Supplementary Figure 475. HPLC of compound 3ci corresponding alcohol

(R)-tert-butyl dimethyl((2-methylene-7-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)heptyl)oxy)silane (3cj)



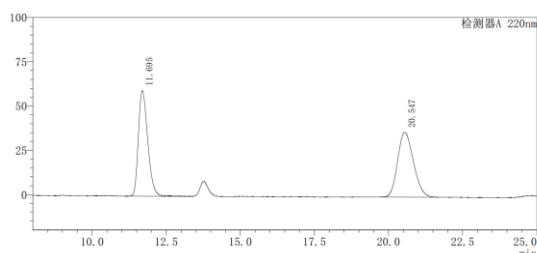
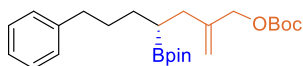
Supplementary Figure 476. HPLC of compound 3cj corresponding alcohol

(R)-diisopropyl (2-methylene-7-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)heptyl) phosphate (3ck)

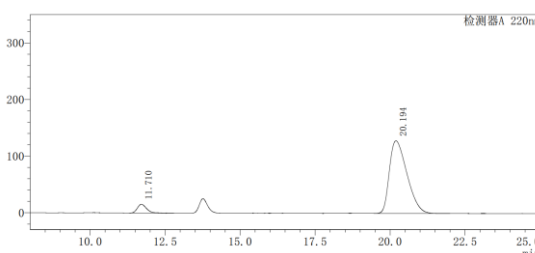


Supplementary Figure 477. HPLC of compound 3ck corresponding alcohol

(R)-tert-butyl-(2-methylene-7-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)heptyl) carbonate (3cl)



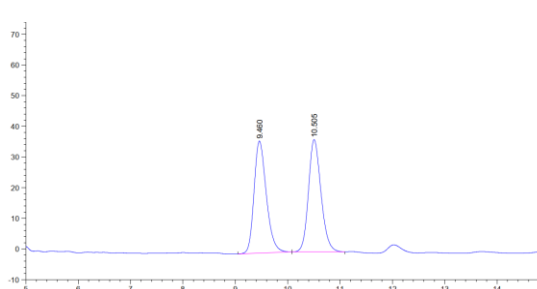
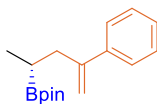
peak	Ret. Time/min	Area/mAU*s	Area %
1	11.695	1312881	49.238
2	20.547	1353522	50.762



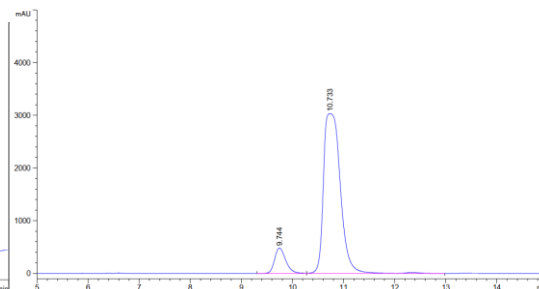
peak	Ret. Time/min	Area/mAU*s	Area %
1	11.710	334742	6.017
2	20.194	5228081	93.983

Supplementary Figure 478. HPLC of compound 3cl corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(4-phenylpent-4-en-2-yl)-1,3,2-dioxaborolane (3cm)



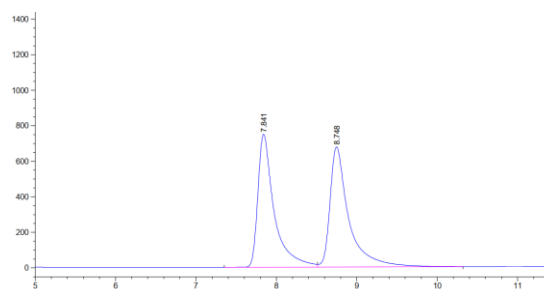
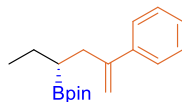
peak	Ret. Time/min	Area/mAU*s	Area %
1	9.460	596.25616	49.4665
2	10.505	609.11682	50.5335



peak	Ret. Time/min	Area/mAU*s	Area %
1	9.744	7352.54150	9.5542
2	10.733	6.96039e4	90.4458

Supplementary Figure 479. HPLC of compound 3cm corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(5-phenylhex-5-en-3-yl)-1,3,2-dioxaborolane (3cn)

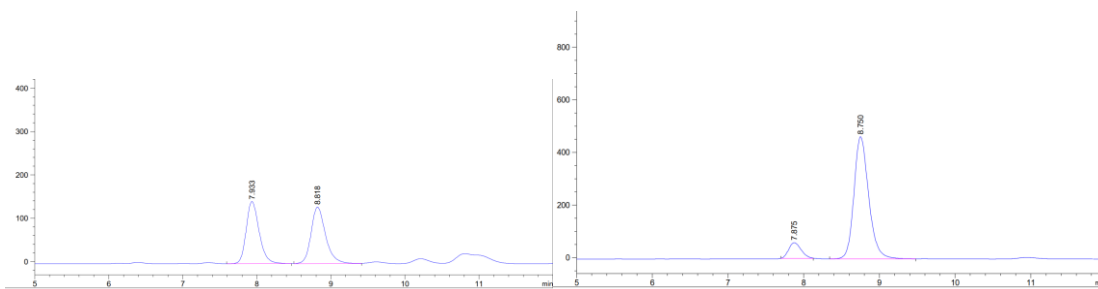
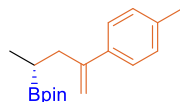


peak	Ret. Time/min	Area/mAU*s	Area %
1	7.841	1.05283e4	49.0273
2	8.748	1.09461e4	50.9727

peak	Ret. Time/min	Area/mAU*s	Area %
1	8.041	1006.08093	4.0171
2	8.931	2.40390e4	95.9829

Supplementary Figure 480. HPLC of compound 3cn corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(4-(p-tolyl)pent-4-en-2-yl)-1,3,2-dioxaborolane (3co)

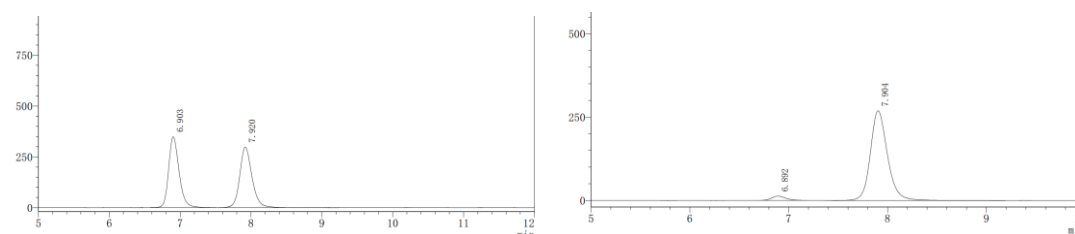
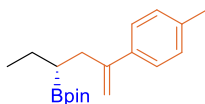


peak	Ret. Time/min	Area/mAU*s	Area %
1	7.933	1742.55774	49.4876
2	8.818	1778.64124	50.5124

peak	Ret. Time/min	Area/mAU*s	Area %
1	7.875	693.49591	9.9368
2	8.750	6285.55420	90.0632

Supplementary Figure 481. HPLC of compound 3co corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(5-(p-tolyl)hex-5-en-3-yl)-1,3,2-dioxaborolane (3cp)

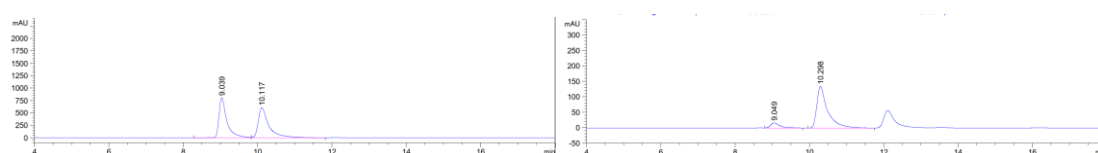
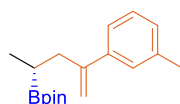


peak	Ret. Time/min	Area/mAU*s	Area %
1	6.903	3561463	49.960
2	7.920	3567212	50.040

peak	Ret. Time/min	Area/mAU*s	Area %
1	6.892	122320	3.653
2	7.904	3225828	96.347

Supplementary Figure 482. HPLC of compound 3cp corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(4-(m-tolyl)pent-4-en-2-yl)-1,3,2-dioxaborolane (3cq)

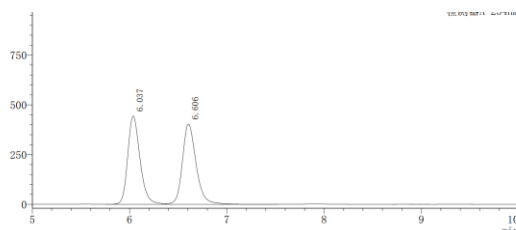
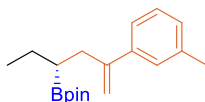


peak	Ret. Time/min	Area/mAU*s	Area %
1	9.039	1.18645e4	49.7822
2	10.117	1.19683e4	50.2178

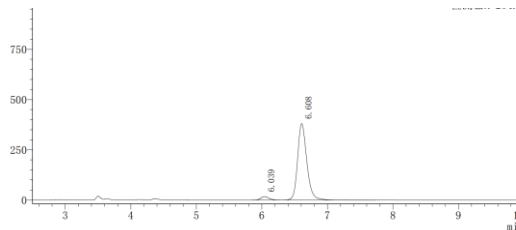
peak	Ret. Time/min	Area/mAU*s	Area %
1	9.049	297.04074	9.8749
2	10.298	2710.99438	90.1251

Supplementary Figure 483. HPLC of compound 3cq corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(5-(m-tolyl)hex-5-en-3-yl)-1,3,2-dioxaborolane (3cr)



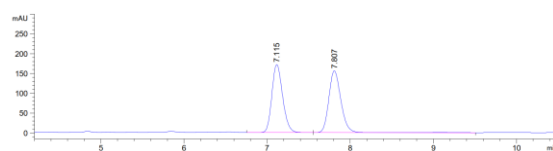
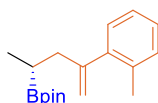
peak	Ret. Time/min	Area/mAU*s	Area %
1	6.037	3898531	49.612
2	6.606	3959552	50.388



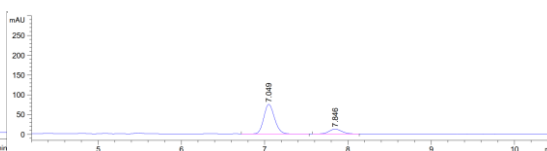
peak	Ret. Time/min	Area/mAU*s	Area %
1	6.039	140717	3.674
2	6.608	3688903	96.326

Supplementary Figure 484. HPLC of compound 3cr corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(4-(o-tolyl)pent-4-en-2-yl)-1,3,2-dioxaborolane (3cs)



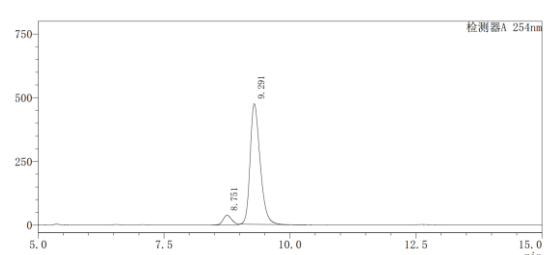
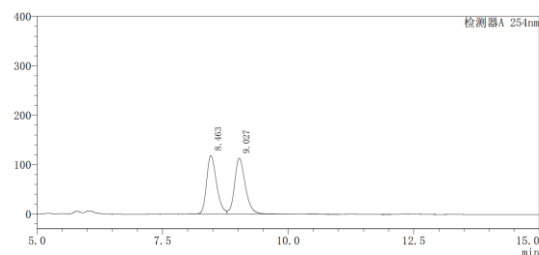
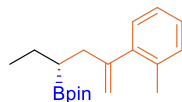
peak	Ret. Time/min	Area/mAU*s	Area %
1	7.115	1542.72461	49.4931
2	7.807	1574.32410	50.5069



peak	Ret. Time/min	Area/mAU*s	Area %
1	7.049	676.19171	84.0652
2	7.846	128.17419	15.9348

Supplementary Figure 485. HPLC of compound 3cs corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(5-(o-tolyl)hex-5-en-3-yl)-1,3,2-dioxaborolane (3ct)

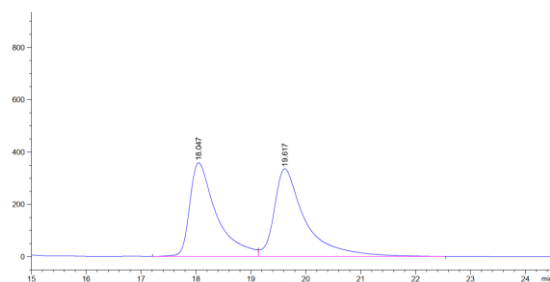
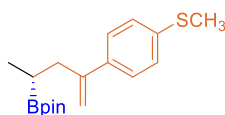


peak	Ret. Time/min	Area/mAU*s	Area %
1	8.463	1623269	49.158
2	9.027	1678893	50.842

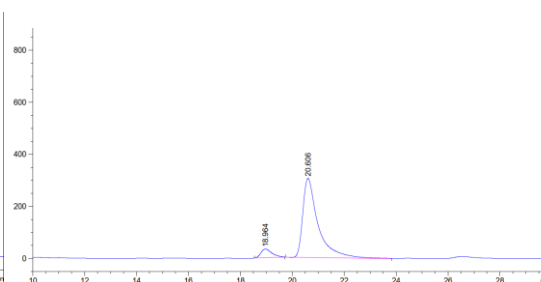
peak	Ret. Time/min	Area/mAU*s	Area %
1	8.751	478246	6.813
2	9.291	6540964	93.187

Supplementary Figure 486. HPLC of compound 3ct corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(4-(4-(methylthio)phenyl)pent-4-en-2-yl)-1,3,2-dioxaborolane (3cu)



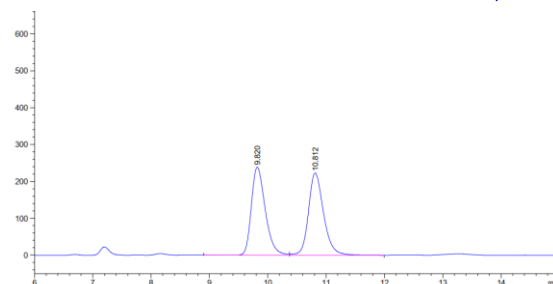
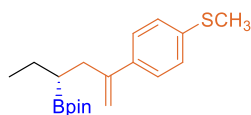
peak	Ret. Time/min	Area/mAU*s	Area %
1	18.047	1.20883e4	47.9651
2	19.617	1.31140e4	52.0349



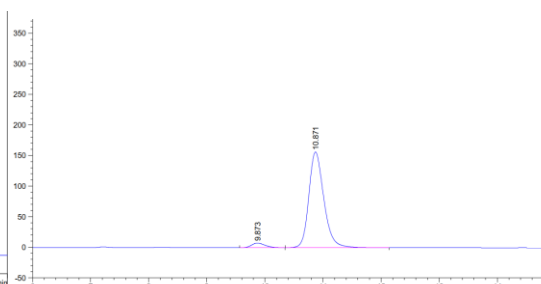
peak	Ret. Time/min	Area/mAU*s	Area %
1	18.964	982.23602	7.2847
2	20.606	1.25013e4	92.7153

Supplementary Figure 487. HPLC of compound 3cu corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(5-(4-(methylthio)phenyl)hex-5-en-3-yl)-1,3,2-dioxaborolane (3cv)



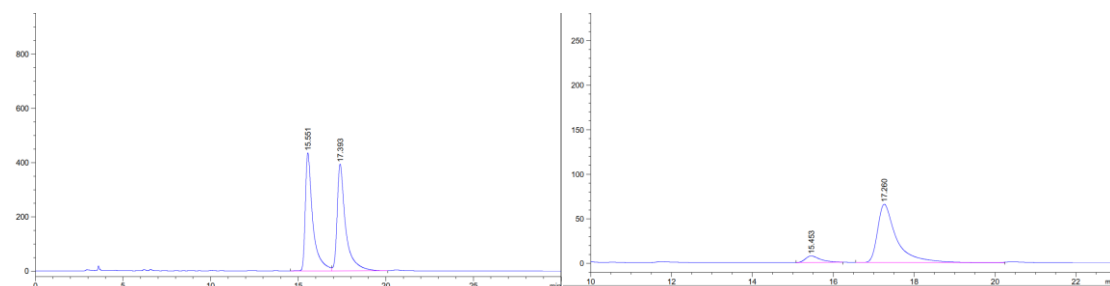
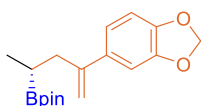
peak	Ret. Time/min	Area/mAU*s	Area %
1	9.820	3965.53857	49.6058
2	10.812	4028.56958	50.3942



peak	Ret. Time/min	Area/mAU*s	Area %
1	9.873	95299.7	4.1578
2	10.871	2811.18042	95.8422

Supplementary Figure 488. HPLC of compound 3cv corresponding alcohol

(R)-2-(4-(benzo[d][1,3]dioxol-5-yl)pent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3cw)

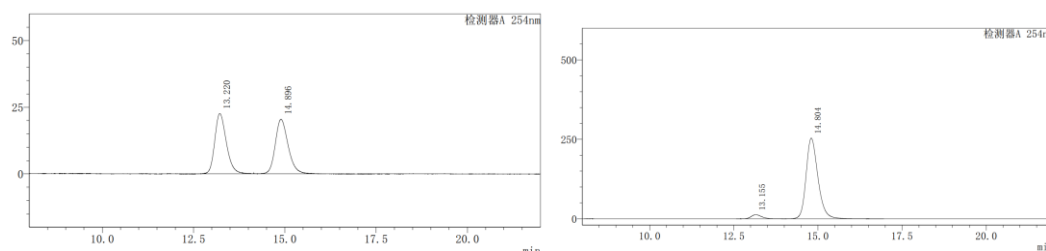
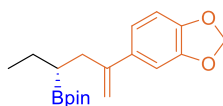


peak	Ret. Time/min	Area/mAU*s	Area %
1	15.551	1.29305e4	49.4822
2	17.393	1.32011e4	50.5178

peak	Ret. Time/min	Area/mAU*s	Area %
1	15.453	185.42775	8.0397
2	17.260	2120.96436	91.9603

Supplementary Figure 489. HPLC of compound 3cw corresponding alcohol

(R)-2-(5-(benzo[d][1,3]dioxol-5-yl)hex-5-en-3-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3cx)

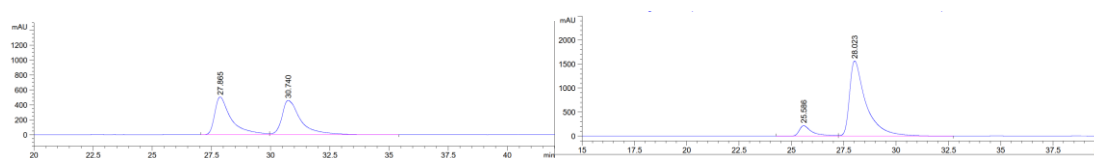
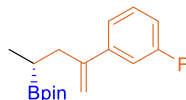


peak	Ret. Time/min	Area/mAU*s	Area %
1	13.220	504251	49.974
2	14.896	504772	50.026

peak	Ret. Time/min	Area/mAU*s	Area %
1	13.155	283236	4.346
2	14.804	6234319	95.654

Supplementary Figure 490. HPLC of compound 3cx corresponding alcohol

(R)-2-(4-(3-fluorophenyl)pent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3cy)

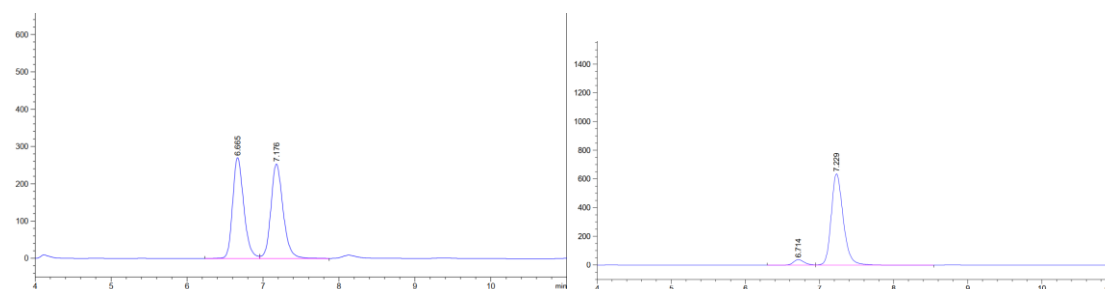
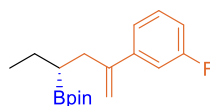


peak	Ret. Time/min	Area/mAU*s	Area %
1	27.865	2.43753e4	49.1151
2	30.740	2.52536e4	50.8849

peak	Ret. Time/min	Area/mAU*s	Area %
1	25.586	9264.89844	9.7845
2	28.023	8.54249e4	90.2155

Supplementary Figure 491. HPLC of compound 3cy corresponding alcohol

(R)-2-(5-(3-fluorophenyl)hex-5-en-3-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3cz)

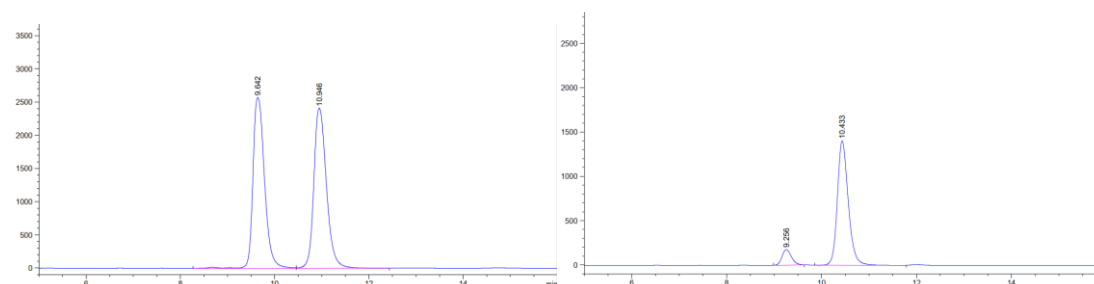
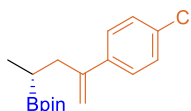


peak	Ret. Time/min	Area/mAU*s	Area %
1	6.665	2767.05444	49.3519
2	7.176	2839.72559	50.6481

peak	Ret. Time/min	Area/mAU*s	Area %
1	6.714	395.56757	5.2214
2	7.229	7180.29150	94.7786

Supplementary Figure 492. HPLC of compound 3cz corresponding alcohol

(R)-2-(4-(4-chlorophenyl)pent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3da)

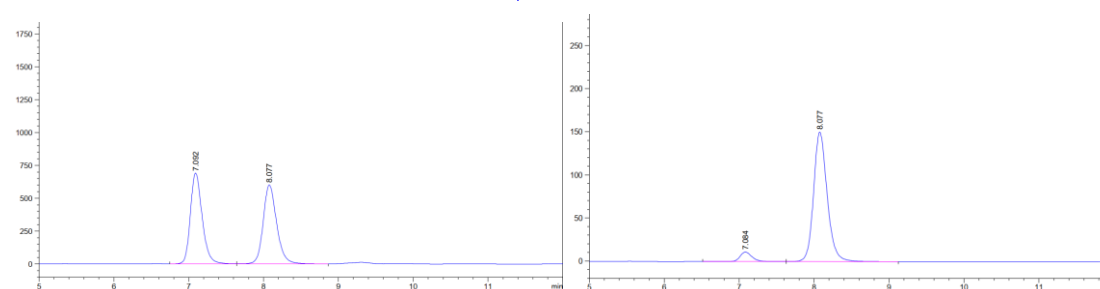
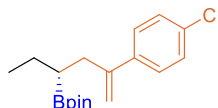


peak	Ret. Time/min	Area/mAU*s	Area %
1	9.642	4.39521e4	49.5458
2	10.946	4.47580e4	50.4542

peak	Ret. Time/min	Area/mAU*s	Area %
1	9.256	2408.59082	9.6964
2	10.433	2.24314e4	90.3036

Supplementary Figure 493. HPLC of compound 3da corresponding alcohol

(R)-2-(5-(4-chlorophenyl)hex-5-en-3-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3db)

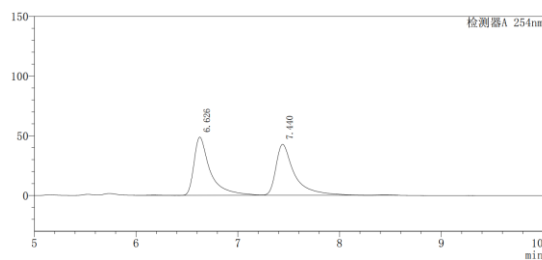
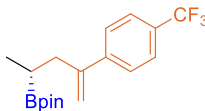


peak	Ret. Time/min	Area/mAU*s	Area %
1	7.092	7613.48193	50.1723
2	8.077	7561.19434	49.8277

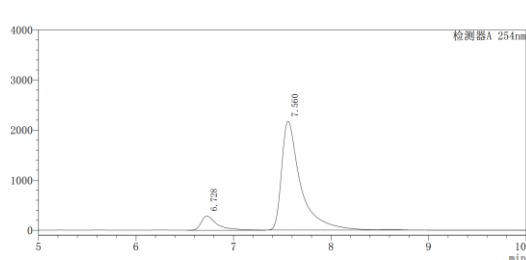
peak	Ret. Time/min	Area/mAU*s	Area %
1	7.084	122.62425	6.0759
2	8.077	1895.59888	93.9241

Supplementary Figure 494. HPLC of compound 3db corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(4-(4-(trifluoromethyl)phenyl)pent-4-en-2-yl)-1,3,2-dioxaborolane (3dc)



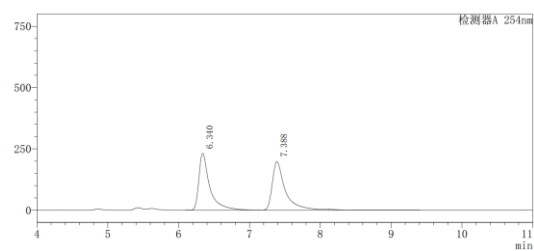
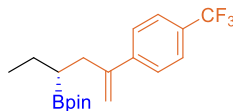
peak	Ret. Time/min	Area/mAU*s	Area %
1	6.626	538550	49.803
2	7.440	542809	50.197



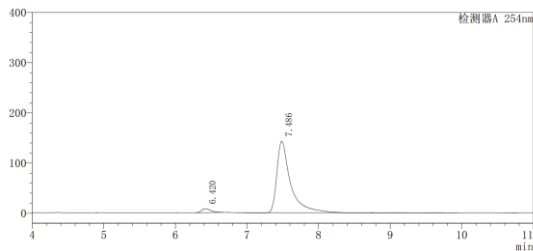
peak	Ret. Time/min	Area/mAU*s	Area %
1	6.728	3302354	10.039
2	7.560	29593168	89.961

Supplementary Figure 495. HPLC of compound 3dc corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(5-(4-(trifluoromethyl)phenyl)hex-5-en-3-yl)-1,3,2-dioxaborolane (3dd)



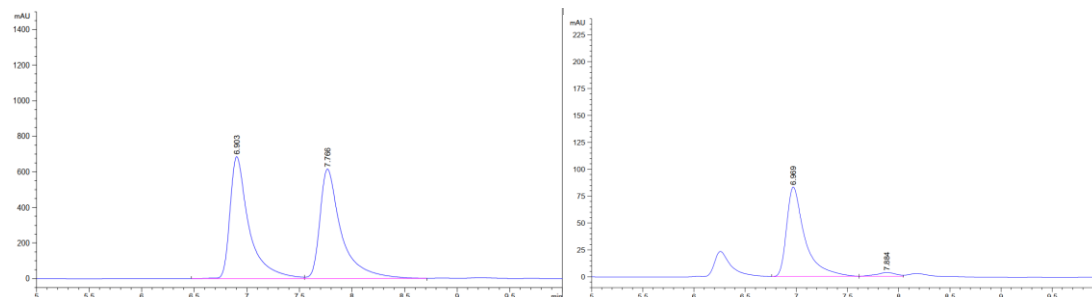
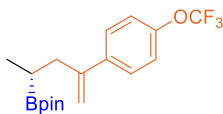
peak	Ret. Time/min	Area/mAU*s	Area %
1	6.340	5291.14160	49.7532
2	7.388	5343.63379	50.2468



peak	Ret. Time/min	Area/mAU*s	Area %
1	6.420	69048	3.526
2	7.486	1889194	96.474

Supplementary Figure 496. HPLC of compound 3dd corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(4-(4-(trifluoromethoxy)phenyl)pent-4-en-2-yl)-1,3,2-dioxaborolane (3de)

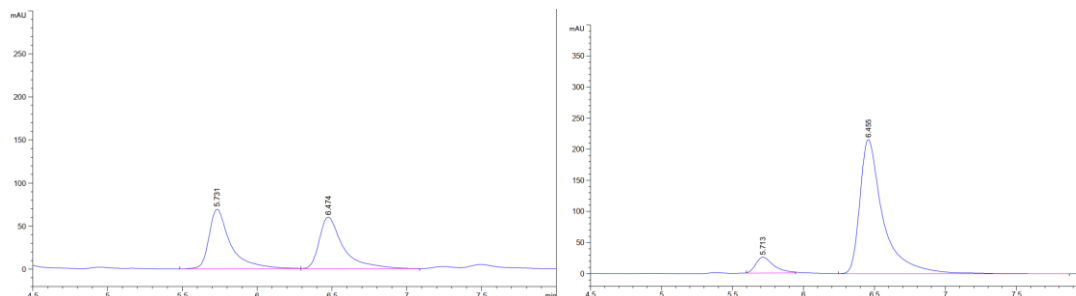
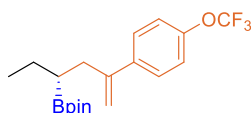


peak	Ret. Time/min	Area/mAU*s	Area %
1	6.903	8613.36133	49.8500
2	7.766	8665.19727	50.1500

peak	Ret. Time/min	Area/mAU*s	Area %
1	6.969	1026.68274	95.7112
2	7.884	46.00568	4.2888

Supplementary Figure 497. HPLC of compound 3de corresponding alcohol

(R)-4,4,5,5-tetramethyl-2-(5-(4-(trifluoromethoxy)phenyl)hex-5-en-3-yl)-1,3,2-dioxaborolane (3df)

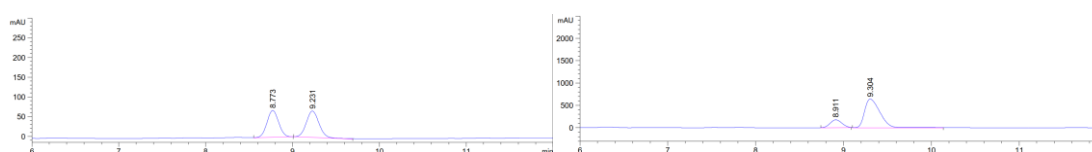
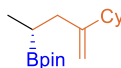


peak	Ret. Time/min	Area/mAU*s	Area %
1	5.731	697.34387	51.1674
2	6.474	665.52478	48.8326

peak	Ret. Time/min	Area/mAU*s	Area %
1	5.713	223.88422	8.3457
2	6.455	2458.76050	91.6543

Supplementary Figure 498. HPLC of compound 3df corresponding alcohol

(R)-2-(4-cyclohexylpent-4-en-2-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3dg)

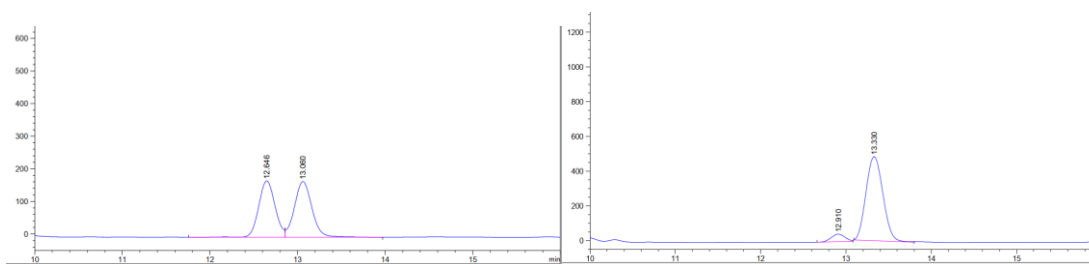
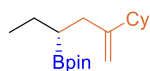


peak	Ret. Time/min	Area/mAU*s	Area %
1	8.773	635.23035	48.1335
2	9.231	684.49579	51.8665

peak	Ret. Time/min	Area/mAU*s	Area %
1	8.911	1683.59692	17.3244
2	9.304	8034.46143	82.6756

Supplementary Figure 499. HPLC of compound 3dg corresponding alcohol

(R)-2-(5-cyclohexylhex-5-en-3-yl)-4,4,5,5-tetramethyl-1,3,2-dioxaborolane (3dh)

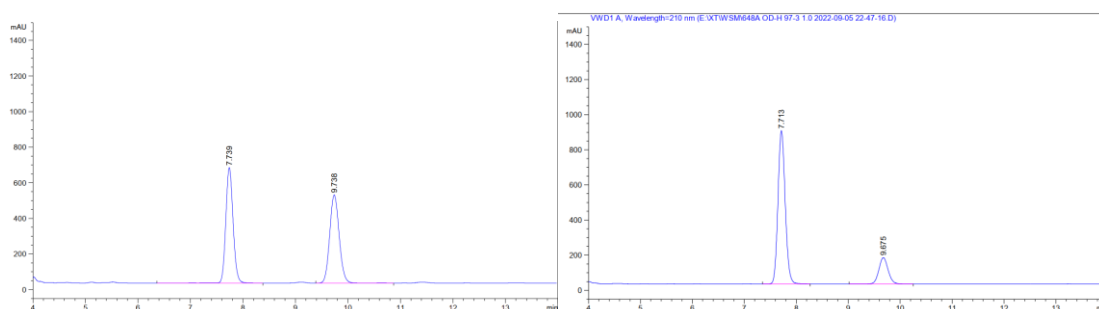
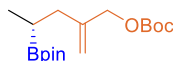


peak	Ret. Time/min	Area/mAU*s	Area %
1	12.646	2242.46313	48.5314
2	13.060	2378.18188	51.4686

peak	Ret. Time/min	Area/mAU*s	Area %
1	12.910	487.03137	6.8076
2	13.330	6667.15674	93.1924

Supplementary Figure 500. HPLC of compound 3dh corresponding alcohol

(R)-tert-butyl-(2-methylene-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)pentyl) carbonate (3di)

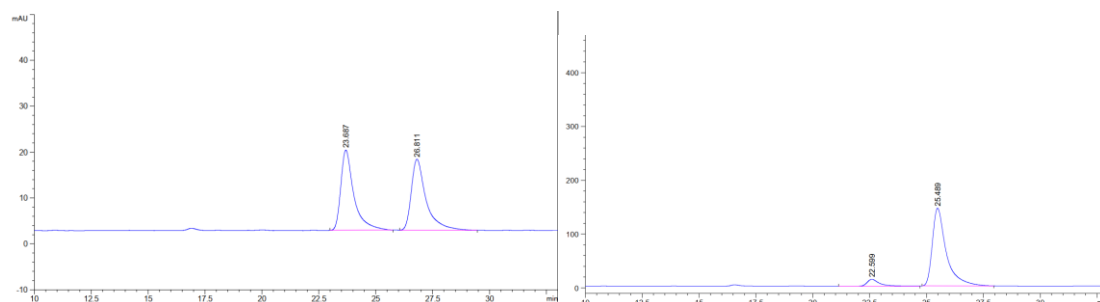
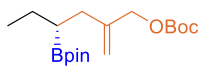


peak	Ret. Time/min	Area/mAU*s	Area %
1	7.739	6273.51904	50.1735
2	9.738	6230.13965	49.8265

peak	Ret. Time/min	Area/mAU*s	Area %
1	7.713	8428.83105	81.9132
2	9.675	1861.11951	18.0868

Supplementary Figure 501. HPLC of compound 3di corresponding alcohol

(R)-tert-butyl-(2-methylene-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hexyl) carbonate (3dj)



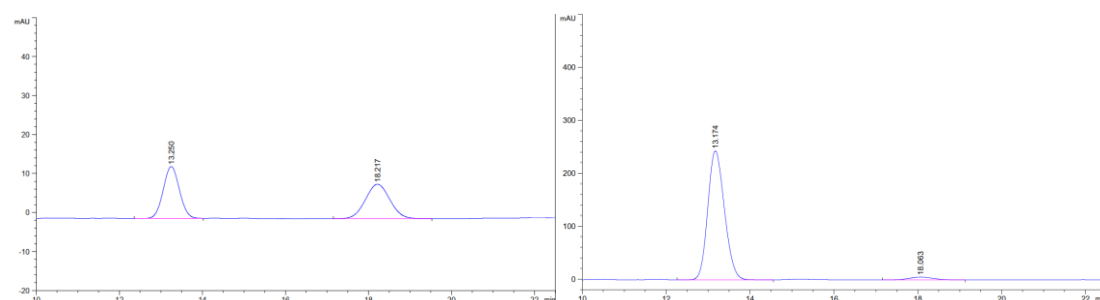
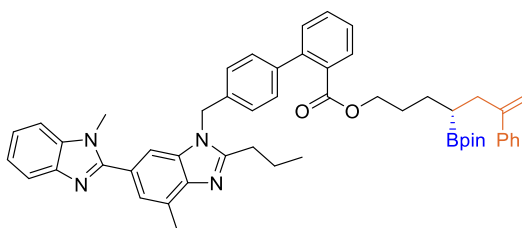
peak	Ret. Time/min	Area/mAU*s	Area %
1	23.687	697.29236	50.0051
2	26.811	697.14917	49.9949

peak	Ret. Time/min	Area/mAU*s	Area %
1	22.599	520.65021	7.7750
2	25.489	6175.78076	92.2250

Supplementary Figure 502. HPLC of compound 3dj corresponding alcohol

(R)-6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl

4'-((1,7'-dimethyl-2'-propyl-1H,3'H-[2,5'-bibenzo[d]imidazol]-3'-yl)methyl)-[1,1'-biphenyl]-2-carboxylate (3do)

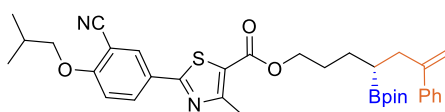


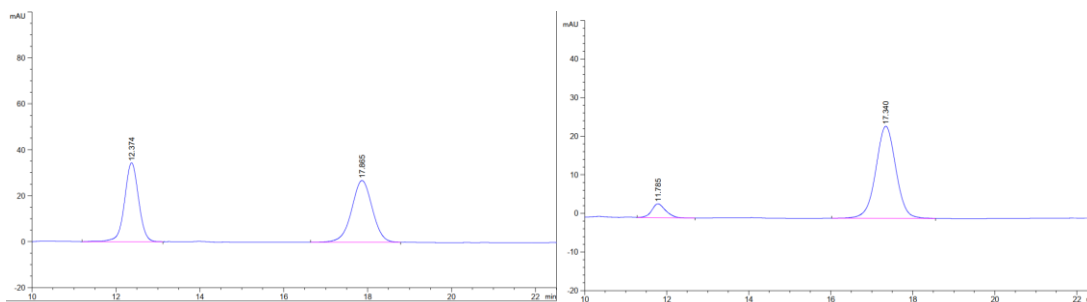
peak	Ret. Time/min	Area/mAU*s	Area %
1	13.250	359.58011	49.9452
2	18.217	360.36966	50.0548

peak	Ret. Time/min	Area/mAU*s	Area %
1	13.174	6690.40576	96.9731
2	18.063	208.83165	3.0269

Supplementary Figure 503. HPLC of compound 3do corresponding alcohol

(R)-6-phenyl-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)hept-6-en-1-yl-2-(3-cyano-4-isobutoxyphenyl)-4-methylthiazole-5-carboxylate (3dp)



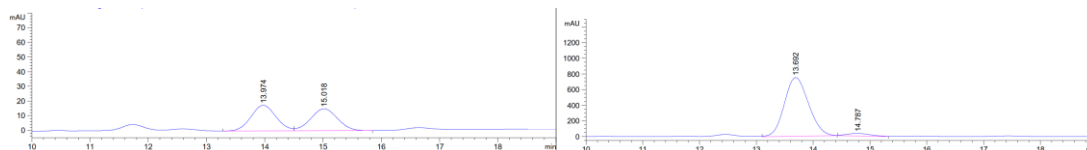
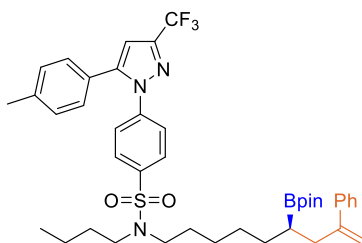


peak	Ret. Time/min	Area/mAU*s	Area %
1	12.374	799.58832	46.4855
2	17.865	920.49225	53.5145

peak	Ret. Time/min	Area/mAU*s	Area %
1	11.785	83.93954	9.3599
2	17.340	812.86053	90.6401

Supplementary Figure 504. HPLC of compound 3dp corresponding alcohol

(*R*)-*N*-butyl-*N*-(8-phenyl-6-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)non-8-en-1-yl)-4-(5-(*p*-tolyl)-3-(trifluoromethyl)-1H-pyrazol-1-yl)benzenesulfonamide (3dr)

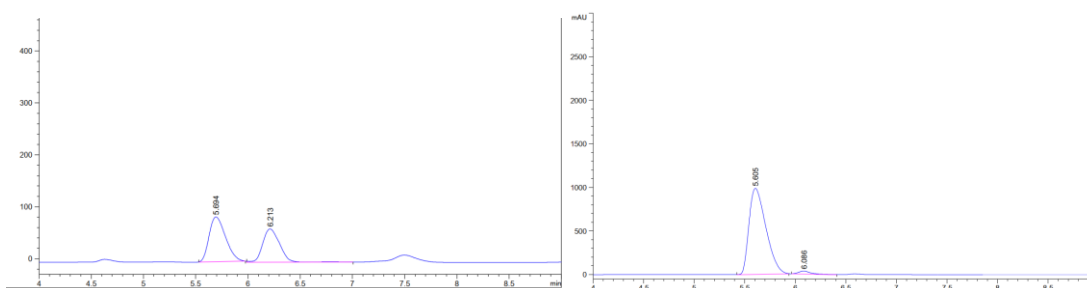
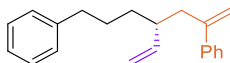


peak	Ret. Time/min	Area/mAU*s	Area %
1	13.974	521.65094	52.0148
2	15.018	481.23920	47.9852

peak	Ret. Time/min	Area/mAU*s	Area %
1	13.692	2.21806e4	95.5651
2	14.787	956.69476	4.5349

Supplementary Figure 505. HPLC of compound 3dr

(*R*)-(4-vinylhept-6-ene-1,6-diyl)dibenzene (4)

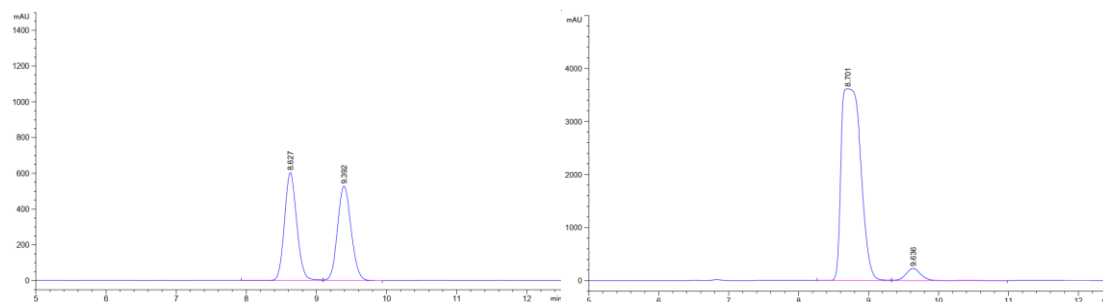
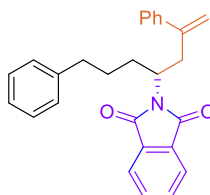


peak	Ret. Time/min	Area/mAU*s	Area %
1	5.694	1821 942	52.5521
2	6.213	1883 724	48.4479

peak	Ret. Time/min	Area/mAU*s	Area %
1	5.605	1.14624e4	97.3098
2	6.086	316.88925	2.6902

Supplementary Figure 506. HPLC of compound 4

(R)-2-(2,7-diphenylhept-1-en-4-yl)isoindoline-1,3-dione (5)

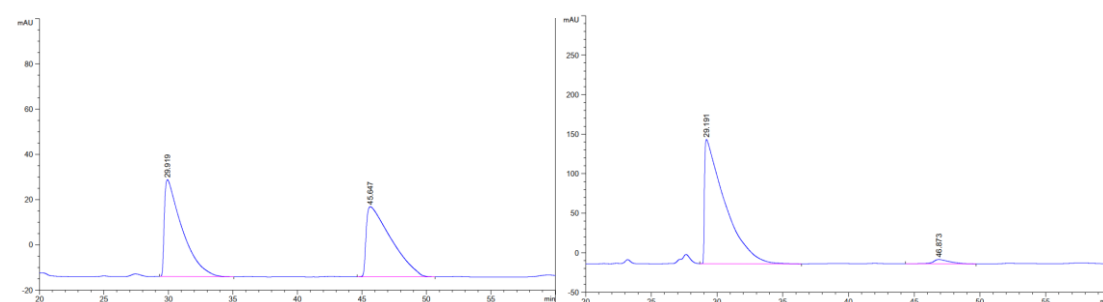
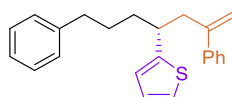


peak	Ret. Time/min	Area/mAU*s	Area %
1	8.627	7362.72363	50.9154
2	9.392	7097.98828	49.0846

peak	Ret. Time/min	Area/mAU*s	Area %
1	8.701	7.04981e4	95.4551
2	9.636	3356.62549	4.5449

Supplementary Figure 507. HPLC of compound 5

(R)-2-(2,7-diphenylhept-1-en-4-yl)thiophene (6)

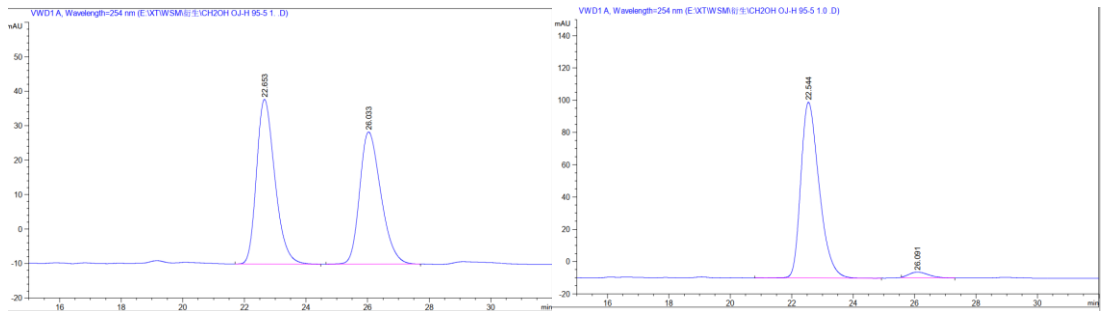
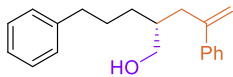


peak	Ret. Time/min	Area/mAU*s	Area %
1	29.919	4082.30103	49.6579
2	45.647	4138.55566	50.3421

peak	Ret. Time/min	Area/mAU*s	Area %
1	29.191	1.68628e4	97.2244
2	46.873	481.40372	2.7756

Supplementary Figure 508. HPLC of compound 6

(R)-4-phenyl-2-(3-phenylpropyl)pent-4-en-1-ol (7)

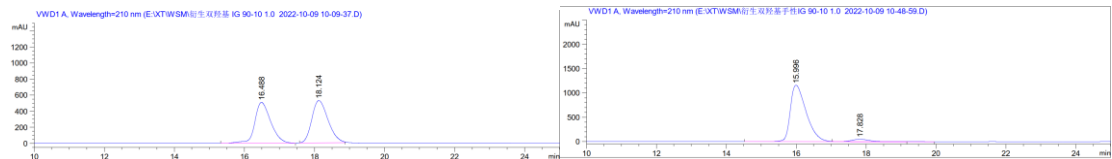
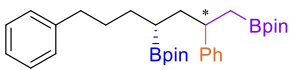


peak	Ret. Time/min	Area/mAU*s	Area %
1	22.653	1978.17383	51.8246
2	26.033	1838.87915	48.1754

peak	Ret. Time/min	Area/mAU*s	Area %
1	22.544	4516.87939	96.5197
2	26.091	153.19217	3.5803

Supplementary Figure 509. HPLC of compound 7

2,2'-((4R)-2,7-diphenylheptane-1,4-diyl)bis(4,4,5,5-tetramethyl-1,3,2-dioxaborolane) (8)



peak	Ret. Time/min	Area/mAU*s	Area %
1	16.488	1.60534e4	48.6912
2	18.124	1.69164e4	51.3088

peak	Ret. Time/min	Area/mAU*s	Area %
1	15.996	3.66177e4	95.3074
2	17.828	1802.92456	4.6926

Supplementary Figure 510. HPLC of compound 8 corresponding alcohol

5. Supplementary References.

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