Supporting Information

Transition metal-free iterative two-fold reductive coupling and 1,3 borotropic shift to form 1,4-skipped dienes

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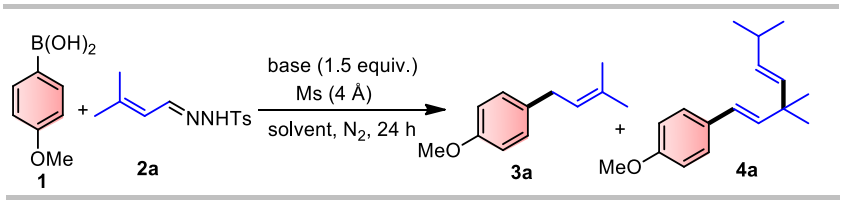
Table -1: Optimization of reaction condition for skipped diene[a,b]



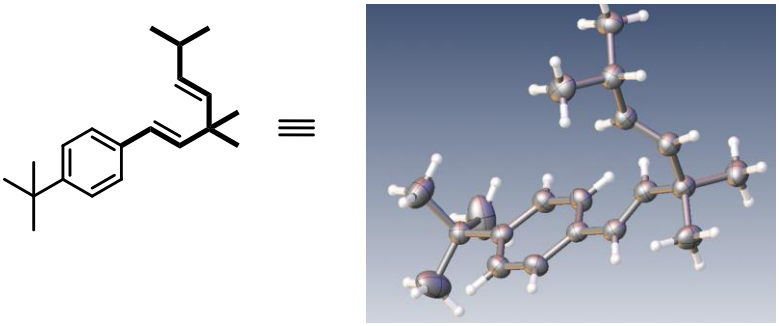
Entry	Base	Solvent	Temp.(°C)	Yield **3a**/**4a**
1	Li_2CO_3	1,4 dioxane	120	0/23
2	KF	1,4 dioxane	120	0/38
3	CsF	1,4 dioxane	120	16/3
4[c]	K_2CO_3	MeCN	90	11/6
5[c]	K_2CO_3	THF	90	15/8
6[c]	K_2CO_3	DCE	90	-
7[d]	Na_2CO_3	1,4 dioxane	120	0/68
8	Na_2CO_3	1,4 dioxane	90	0/56
9	Na_2CO_3	1,4 dioxane	110	0/78

[a]All reactions were carried out in 0.5 mmol scale in presence of 4 Å [b]Yields refer to here are overall isolated yields. [a]All reactions were carried out in 0.5 mmol scale in presence of 4 Å [b]Yields referred to here are overall isolated yields. [c]Reaction was performed in absence of molecular sieves (MS). [d]Reaction was performed in a sealed tube.

Crystal data for compound 4c

Identification code	kvl_0m_a
Empirical formula	$C_{20}H_{30}$
Formula weight	270.461
Temperature/K	115.0
Crystal system	monoclinic
Space group	$P2_1/n$
a/Å	6.2632(6)
b/Å	24.832(3)
c/Å	11.5592(12)
α/°	90
β/°	97.293(4)
γ/°	90
Volume/Å^3	1783.2(3)
Z	4
ρ_{calc}g/cm^3	1.007
μ/mm^{-1}	0.408
F(000)	601.5
Crystal size/mm^3	0.2 × 0.2 × 0.2
Radiation	Cu Kα (λ = 1.54178)
2Θ range for data collection/°	7.12 to 129.94
Index ranges	$-7 \le h \le 5$, $-29 \le k \le 29$, $-13 \le l \le 13$

Reflections collected	23023
Independent reflections	3022 [R_{int} = 0.1617, R_{sigma} = 0.0708]
Data/restraints/parameters	3022/0/188
Goodness-of-fit on F^2	1.038
Final R indexes [I>=2σ (I)]	R_1 = 0.0757, wR_2 = 0.2079
Final R indexes [all data]	R_1 = 0.0819, wR_2 = 0.2146
Largest diff. peak/hole / e $Å^{-3}$	0.44/-0.36



Structural elucidation of cinnamaldehyde skipped diene

((2E,5E)-6-(o-tolyl)hexa-2,5-diene-1,4-diyl)dibenzene (5r):

The assignments and position of the aromatic rings were ascertained by the combined use of HSQC/HMBC and DQF-COSY (⟷) correlations starting from the δc 39.42/ δ_H 3.47 (-*C*H_2) displaying a cross peak with δ_H 5.82 / δc 130.28 in COSY. Subsequent cross-peaks between δ_H 5.82/δc 130.28 - δ_H 5.86/δc 133.62 - δ_H 4.36/δc 51.73 - δ_H 6.37/δc 133.87 - δ_H 6.72/δc 128.34 in COSY confirmed the positions and assignments as displayed in Fig. 1. The position of aromatic ring bearing an ortho-substituted methyl was ascertained by the HMBC correlations between δ_H 6.72 - δc 135.34 - δc 136.69 - δ_H 2.38/ δc 19.68.

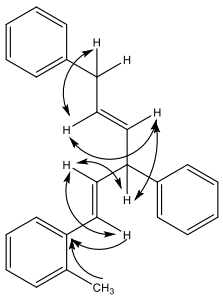
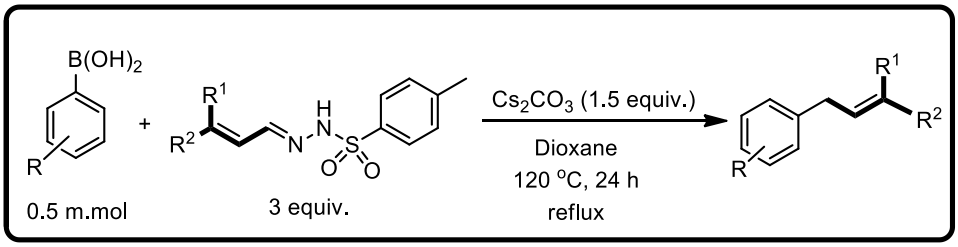


Figure 1

COSY ⟷

HMBC ⟶

Representative procedure for monoprenylation:

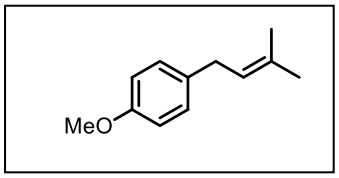


To an oven dried round bottom flask containing a stir bar added with corresponding boronic acid (0.5 mmol) and corresponding tosyl hydrazone (1.5 equivalent). Dry 1,4 Dioxane (2mL) was then added followed by Cs_2CO_3 (1.5 equivalent, measured in glove box). Then the reaction mixture was purged with N_2 gas for 2 minutes. The mixture allowed to reflux for 120 ^oC for 24 hours. After allotted time the reaction mixture was cooled to room temperature. The mixture was diluted with EtOAc (15 mL) and washed with water (25 mL) followed by brine solution (25 mL) and dried over Na_2SO_4 and evaporated in *vacuo*. The crude mixture was loaded on a silica gel column chromatography and purified using (Hexane/EtOAc) to give the desired monoprenylation product.

Spectral data for monoprenylation:

1-methoxy-4-(3-methylbut-2-en-1-yl)benzene (3a)

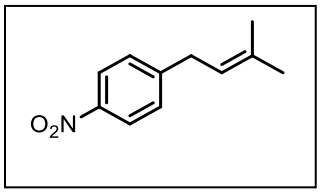
The same general procedure was followed. Column chromatography (Silica gel, eluting with 98:2 hexane/EtOAc) afforded the desired product as a pale-yellow solid (69.1 mg, 78% yield).



^1H NMR (600 MHz, $CDCl_3$): δ 1.73 (s, 3H), δ 1.76 (s, 3H), 3.30 (d, 2H, J = 7.3 Hz), 3.80 (s, 3H), 5.31-5.34 (m, 1H), 6.84 (d, 2H, J = 8.5 Hz), 7.11 (d, 2H, J = 8.5 Hz); ^{13}C NMR (150 MHz, $CDCl_3$): 17.3, 25.3, 32.9, 54.8, 113.3, 123.1, 128.7, 131.7, 133.4, 157.2; HRMS (EI, m/z) calcd. For $C_{12}H_{16}O$ $[M]^+$:176.1201; found: 176.1206.

1-(3-methylbut-2-en-1-yl)-4-nitrobenzene (3b)

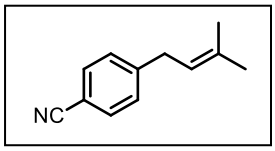
The same general procedure was followed. Column chromatography (Silica gel, eluting with 98:2 hexane/EtOAc) afforded the desired product as a white solid (75.5 mg, 79% yield).



^{1}H NMR (600 MHz, $CDCl_3$): δ 1.73 (s, 3H), 1.78 (s, 3H), 3.44 (d, 2H, *J* = 7.3 Hz), 5.28-5.31 (m, 1H), 7.32 (d, 2H, *J* = 8.7 Hz), 8.13 (d, 2H, *J* = 8.7 Hz); ^{13}C NMR (150 MHz, $CDCl_3$): δ 17.8, 25.6, 34.1, 121.1, 123.5, 129.0, 134.4, 146.2, 149.6; HRMS (EI, m/z) calcd. For $C_{11}H_{13}NO_2$ $[M]^+$: 191.0946; found: 191.0926.

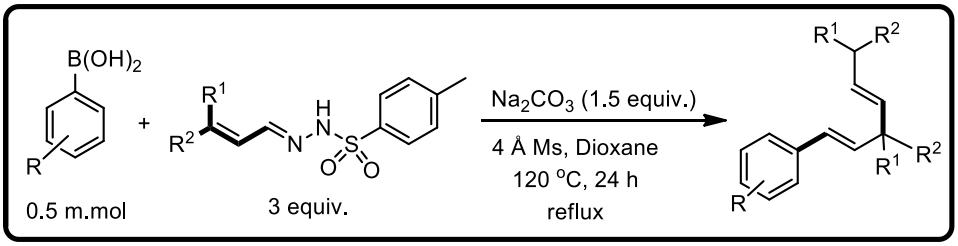
4-(3-methylbut-2-en-1-yl)benzonitrile (3c)

The same general procedure was followed. Column chromatography (Silica gel, eluting with 98:2 hexane/EtOAc) afforded the desired product as a white solid (36.0 mg, 42% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 1.69 (s, 3H), δ 1.74 (s, 3H), 3.37 (d, 2H, *J* = 7.3 Hz), 5.23-5.28 (m, 1H), 7.25 (d, 2H, *J* = 8.2 Hz), 7.53 (dd, 2H, J_1 = 6.4 Hz, J_2 = 1.5 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 17.9, 25.7, 34.5, 109.6, 119.2, 121.3, 129.1, 132.2, 134.3, 147.5; HRMS (EI, m/z) calcd. For $C_{12}H_{13}N$ $[M]^+$: 171.1048; found: 171.1039.

<u>Representative procedure for diprenylation</u>:

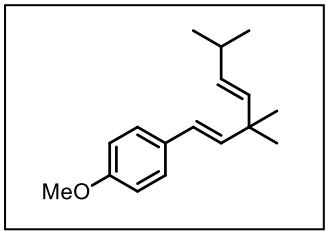


To an oven dried round bottom flask containing a stir bar added with corresponding boronic acid (0.5 mmol) and corresponding tosyl hydrazone (1.5 equivalent). Dry 1,4 Dioxane (2mL) was then added followed by Na_2CO_3(1.5 equivalent) and molecular sieves. Then the reaction mixture was purged with N_2 gas for 2 minutes. The mixture allowed to reflux for 120 ^oC for 24 hours. After allotted time the reaction mixture was cooled to room temperature. The mixture was diluted with EtOAc (15 mL) and washed with water (25 mL) followed by brine solution (25 mL) and dried over Na_2SO_4 and evaporated in *vacuo*. The crude mixture was loaded on a silica gel column chromatography and purified using (Hexane/EtOAc) to give the desired diprenylation product.

Spectral data for 1,4-Skipped dienes:

1-methoxy-4-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)benzene (4a)

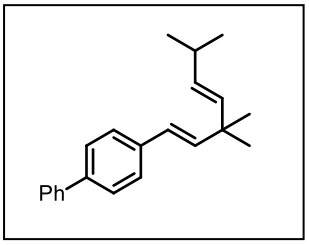
The same general procedure was followed. Column chromatography (Silica gel, eluting with 98:2 hexane/EtOAc) afforded the desired product as a pale brown liquid (104 mg, 85% yield).



^1H NMR (400 MHz, $CDCl_3$): δ 0.97 (d, 6H, *J* = 6.7 Hz), 1.16 (s, 6H), 2.20-2.32 (m, 1H), 3.79 (s, 3H), 5.34 (dd, 1H, J_1 = 15.7 Hz, J_2 = 6.2 Hz), 5.42 (d, 1H, *J* = 16.0 Hz), 6.06 (d, 1H, *J* = 16.1 Hz), 6.23 (d, 1H, *J* = 16.2 Hz), 6.83 (dd, 1H, J_1 = 6.7 Hz, J_2 = 2.0 Hz), 7.29 (dd, 1H, J_1 = 6.7 Hz, J_2 = 1.9 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.9, 27.8, 31.2, 38.3, 55.3, 114.0, 125.1, 127.2, 130.9, 134.0, 135.9, 138.0, 158.7; HRMS (EI, m/z) calcd. For $C_{17}H_{24}O$ $[M]^+$: 244.1827; found: 244.1823.

4-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)-1,1'-biphenyl (4b)

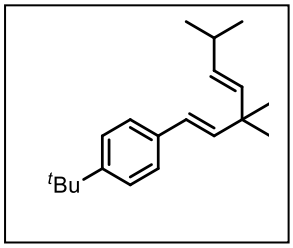
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a white solid (142.6 mg, 98% yield).



^{1}H NMR (400 MHz, DMSO-d_6): δ 0.92 (d, 6H, *J* = 6.7 Hz), 1.13 (s, 6H), 2.18-2.27 (m, 1H), 5.33 (dd, 1H, J_1 = 15.7 Hz, J_2 = 6.3 Hz), 5.43 (dd, 1H, J_1 = 1.0 Hz, J_2 = 6.3 Hz), 6.29 (s, 1H), 7.30 (tt, 1H, J_1 = 7.3 Hz, J_2 = 1.2 Hz), 7.39-7.43 (m, 2H), 7.45 (dd, 2H, J_1 = 6.6 Hz, J_2 = 2.0 Hz), 7.57 (dd, 2H, J_1 = 6.5 Hz, J_2 = 1.8 Hz), 7.60-7.63 (m, 2H); ^{13}C NMR (100 MHz, DMSO-d_6): δ 23.1, 27.9, 31.0, 38.6, 125.4, 126.9, 127.1, 127.2, 127.8, 129.4, 134.0, 135.9, 137.0, 139.0, 140.1, 140.2; HRMS (EI, m/z) calcd. For $C_{22}H_{26}$ $[M]^+$: 290.2035; found: 290.2029.

1-(tert-butyl)-4-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)benzene (4c)

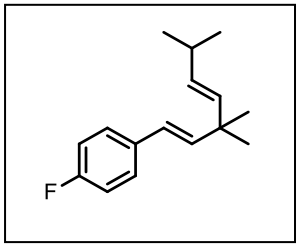
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as brownish yellow liquid (95.8 mg, 70% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 1.04 (d, 6H, *J* = 6.7 Hz), 1.23 (s, 6H), 1.36 (s, 9H), 2.26-2.38 (m, 1H), 5.38-5.51 (m, 2H), 6.29 (q, 2H, *J* = 26.7 Hz), 7.37 (s, 4H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.9, 27.8, 31.2, 31.4, 34.6, 38.4, 125.5, 125.9, 134.1, 135.3, 135.9, 139.3, 149.9; HRMS (EI, m/z) calcd. For $C_{20}H_{30}$ $[M]^+$: 270.2348; found: 270.2355.

1-fluoro-4-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)benzene (4d)

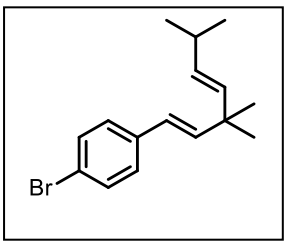
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as white liquid (75.6 mg, 65% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.99 (d, 6H, *J* = 6.7 Hz), 1.18 (s, 6H), 2.22-2.33 (m, 1H), 5.33-5.44 (m, 2H), 6.19 (q, 2H, *J* = 38.4 Hz), 6.97 (t, 2H, *J* = 8.7 Hz), 7.30-7.33 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.8, 27.6, 31.1, 38.3, 115.3 (d, *J* = 21.3 Hz), 124.6, 127.5(d, *J* = 7.8 Hz), 134.1(d, *J* = 2.7 Hz), 134.3, 135.5, 139.8, 161.9 (d, *J* = 244.2 Hz); HRMS (EI, m/z) calcd. For $C_{16}H_{21}F$ $[M]^+$: 232.1627; found: 232.1621.

1-bromo-4-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)benzene (4e)

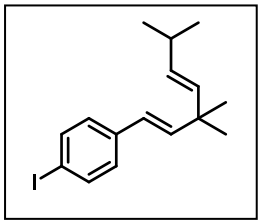
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as yellowish liquid (118 mg, 80% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.98 (d, 6H, *J* = 6.7 Hz), 1.17 (s, 6H), 2.21-2.32 (m, 1H), 5.32-5.43 (m, 2H), 6.21 (q, 2H, *J* = 3.2 Hz), 7.21 (dd, 2H, J_1 = 6.6 Hz, J_2 = 1.4 Hz), 7.40 (dd, 2H, J_1 = 6.6 Hz, J_2 = 1.9 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.8, 27.6, 31.2, 38.4, 120.4, 124.6, 127.7, 131.5, 134.4, 135.3, 137.0, 140.9; HRMS (EI, m/z) calcd. For $C_{16}H_{21}Br$ $[M]^+$: 292.0827; found: 292.0826.

1-iodo-4-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)benzene (4f)

The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as yellowish white liquid (100.2 mg, 58% yield).

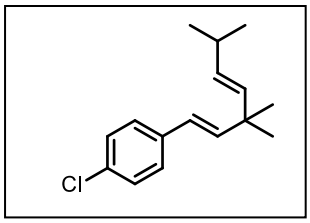


^{1}H NMR (400 MHz, $CDCl_3$): δ 0.98 (d, 6H, *J* = 6.7 Hz), 1.17 (s, 6H), 2.21-2.32 (m, 1H), 5.31-5.43 (m, 2H), 6.20 (s, 2H), 7.09 (dd, 2H, J_1 = 6.5 Hz, J_2 = 1.8 Hz), 7.59 (dd, 2H, J_1 = 6.5 Hz, J_2 = 1.8 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.9, 27.6, 31.2, 38.4, 91.8, 124.8, 128.0, 134.4,

135.3, 137.5, 137.6, 141.0; HRMS (EI, m/z) calcd. For $C_{16}H_{21}I$ $[M]^+$: 340.0688; found: 340.0689.

1-chloro-4-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)benzene (4g)

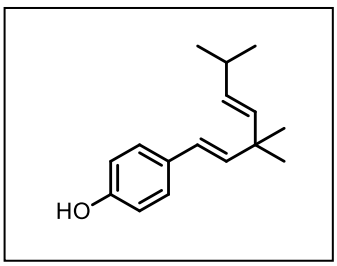
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as white liquid (93.3 mg, 75% yield).



^{1}H NMR (300 MHz, $CDCl_3$): δ 1.01 (d, 6H, *J* = 6.6 Hz), 1.20 (s, 6H), 2.22-2.37 (m, 1H), 5.34-5.48 (m, 2H), 6.24 (q, 2H, *J* = 7.1 Hz), 7.29 (q, 4H, *J* = 2.7 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.8, 27.6, 31.2, 38.4, 124.6, 127.4, 128.6, 132.4, 134.4, 135.4, 136.5, and 140.7; HRMS (EI, m/z) calcd. For $C_{16}H_{21}Cl$ $[M]^+$: 248.1332; found: 248.1345.

4-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)phenol (4h)

The same general procedure was followed. Column chromatography (Silica gel, eluting with 95:5 hexane/EtOAc) afforded the desired product as a pale-yellow liquid (113 mg, 98% yield).

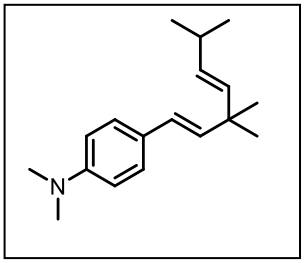


^{1}H NMR (400 MHz, $CDCl_3$): δ 0.98 (d, 6H, *J* = 6.7 Hz), 1.16 (s, 6H), 2.21-2.32 (m, 1H), 5.30 (s, 1H), 5.35 (dd, 1H, J_1 = 15.7 Hz, J_2 = 6.1 Hz), 5.42 (d, 1H, *J* = 15.8 Hz), 6.06 (d, 1H, *J* = 16.2 Hz), 6.22 (d, 1H, *J* = 16.1 Hz), 6.77 (dd, 2H, J_1 = 6.6 Hz, J_2 = 2.1 Hz), 7.24 (dd, 2H, J_1 = 6.5 Hz, J_2 = 2.0 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.8, 27.7, 31.1, 38.2, 115.4, 125.0,

127.4, 131.0, 134.0, 135.8, 138.0, 154.6; HRMS (EI, m/z) calcd. For $C_{16}H_{22}O$ $[M]^+$: 230.1671; found: 230.1669.

_N,N_-dimethyl-4-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)aniline (4i)

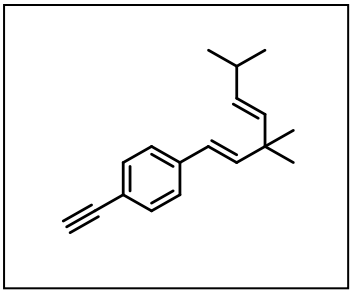
The same general procedure was followed. Column chromatography (Silica gel, eluting with 95:5 hexane/EtOAc) afforded the desired product as a pale-yellow liquid (113.2 mg, 88% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.98 (d, 6H, J = 6.7 Hz), 1.16 (s, 6H), 2.22-2.30 (m, 1H), 2.93 (s, 6H), 5.34 (dd, 1H, J_1 = 15.7 Hz, J_2 = 6.2 Hz), 5.43 (d, 1H, J = 15.6 Hz), 6.01 (d, 1H, J = 16.1 Hz), 6.21 (d, 1H, J = 16.1 Hz), 6.68 (dd, 2H, J_1 = 6.7 Hz, J_2 = 2.0 Hz), 7.26 (dd, 2H, J_1 = 6.7 Hz, J_2 = 2.0 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.9, 27.9, 31.1, 38.2, 40.7, 112.8, 122.4, 125.3, 126.9, 133.7, 136.1, 136.2, 149.8; HRMS (EI, m/z) calcd. For $C_{18}H_{27}N$ $[M]^+$:257.2143; found: 257.2145.

1-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)-4-vinylbenzene (4j)

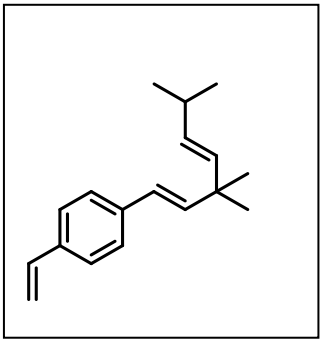
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a pale-yellow liquid (102.4 mg, 86% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.99 (d, 6H, J = 6.7 Hz), 1.18 (s, 6H), 2.22-2.34 (m, 1H), 3.08 (s, 1H), 5.36 (dd, 1H, J_1 = 15.6 Hz, J_2 = 5.8 Hz), 5.43 (d, 1H, J = 15.8 Hz), 6.21-6.30 (m, 2H), 7.31 (dd, 2H, J_1 = 6.5 Hz, J_2 = 1.8 Hz), 7.42 (dd, 2H, J_1 = 6.4 Hz, J_2 = 1.7 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.8, 27.6, 31.2, 38.5, 77.4, 83.9, 120.3, 125.1, 126.0, 132.3, 134.4, 135.3, 138.6, 141.4; HRMS (EI, m/z) calcd. For $C_{18}H_{22}$ $[M]^+$:238.1722; found: 238.1720.

1-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)-4-vinylbenzene (4k)

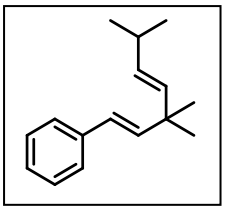
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a pale-yellow liquid (93.7 mg, 78% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.98 (d, 6H, J = 6.7 Hz), 1.18 (s, 6H), 2.21-2.32 (m, 1H), 5.20 (dd, 1H, J_1 = 10.9 Hz, J_2 = 0.9 Hz), 5.35 (dd, 1H, J_1 = 9.6 Hz, J_2 = 6.0 Hz), 5.43 (d, 1H, J = 16.2 Hz), 5.71 (dd, 1H, J_1 = 17.6 Hz, J_2 = 0.9 Hz), 6.21 (d, 1H, J = 16.1 Hz), 6.28 (d, 1H, J = 16.2 Hz), 6.68 (dd, 1H, J_1 = 17.6 Hz, J_1 = 10.9Hz), 7.33 (d, 3H, J_1 = 1.9 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.8, 27.6, 31.2, 38.4, 113.2, 125.3, 126.3, 126.4, 134.2, 135.6, 136.2, 136.6, 137.6, 140.1; HRMS (EI, m/z) calcd. For $C_{18}H_{24}$ $[M]^+$:240.1878; found: 240.1800.

((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)benzene (4l)

The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as colourless liquid (81 mg, 75% yield).

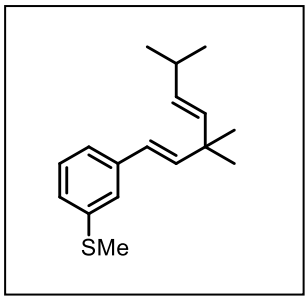


^{1}H NMR (400 MHz, $CDCl_3$): δ 1.02 (d, 6H, J = 6.8 Hz), 1.22 (s, 6H), 2.24-2.36 (m, 1H), 5.39 (dd, 2H, J_1 = 15.7 Hz, J_2 = 9.6 Hz), 5.47 (d, 1H, J = 16.2 Hz), 6.29 (dd, 2H, J_1 = 36.2 Hz, J_2 =

16.2 Hz), 7.21 (tt, 1H, J_1 = 7.2 Hz, J_2 = 1.2 Hz), 7.29-7.33 (m, 2H), 7.39 (dd, 2H, J_1 = 8.6 Hz, J_2 = 1.4 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.9, 27.7, 31.2, 38.4, 125.7, 126.2, 126.9, 128.5, 134.2, 135.7, 138.1, 140.0; HRMS (EI, m/z) calcd. For $C_{16}H_{22}$ $[M]^+$: 214.1722; found: 214.1711.

Methyl(3-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)phenyl)sulfane (4m)

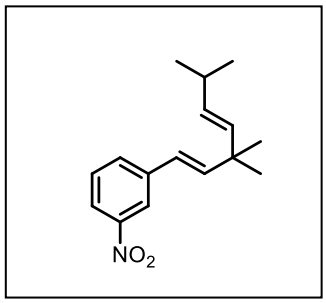
The same general procedure was followed. Column chromatography (Silica gel, eluting with 99:1 hexane/EtOAc) afforded the desired product as a pale-yellow liquid (119.7 mg, 92% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.99 (d, 6H, J = 6.7 Hz), 1.18 (s, 6H), 2.21-2.23 (m, 1H), 2.49 (s, 3H), 5.35 (dd, 1H, J_1 = 15.7 Hz, J_2 = 5.9 Hz), 5.42 (d, 1H, J = 15.9 Hz), 6.23 (q, 2H, J = 5.3 Hz), 7.08-7.10 (m, 1H), 7.14 (dt, 1H, J_1 = 7.7 Hz, J_2 = 1.3 Hz), 7.21 (t, 1H, J = 7.6 Hz), 7.26 (t, 1H, J = 1.7 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 16.0, 22.8, 27.6, 31.1, 38.4, 123.1, 124.5, 125.1, 125.2, 128.9, 134.3, 135.4, 138.5, 138.7, 140.7; HRMS (EI, m/z) calcd. For $C_{17}H_{24}S$ $[M]^+$: 260.1599; found: 260.1579.

1-nitro-3-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)benzene (4n)

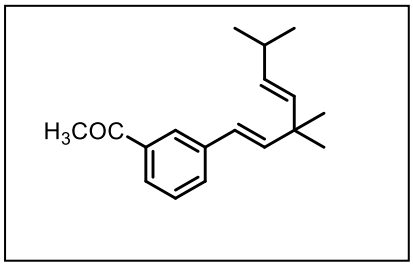
The same general procedure was followed. Column chromatography (Silica gel, eluting with 97:3 hexane/EtOAc) afforded the desired product as a pale-yellow liquid (97.2 mg, 75% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.98 (d, 6H, *J* = 6.7 Hz), 1.19 (s, 6H), 2.23-2.31 (m, 1H), 5.36 (dd, 1H, J_1 = 15.7 Hz, J_2 = 5.3 Hz), 5.41 (d, 1H, *J* = 15.7 Hz), 6.33 (q, 2H, *J* = 1.2 Hz), 7.43 (t, 1H, *J* = 7.9 Hz), 7.63 (dt, 1H, J_1 = 7.7 Hz, J_2 = 1.3 Hz), 8.00-8.03 (m, 1H), 8.20 (t, 1H, *J* = 2.0 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.8, 27.5, 31.2, 38.6, 120.6, 121.4, 123.8, 129.3, 132.1, 134.8, 139.9, 143.4, 148.6; HRMS (EI, m/z) calcd. For $C_{16}H_{21}NO_2$ $[M]^+$:259.1572; found: 259.1573.

1-(3-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)phenyl)ethan-1-one (4o)

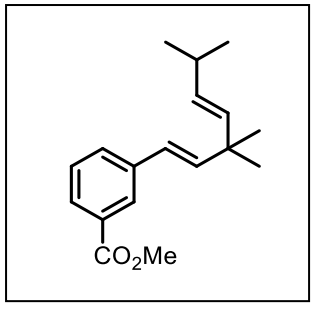
The same general procedure was followed. Column chromatography (Silica gel, eluting with 98:2 hexane/EtOAc) afforded the desired product as colourless liquid (90 mg, 70% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.97 (d, 6H, *J* = 6.7 Hz), 1.18 (s, 6H), 2.20-2.32 (m, 1H), 2.59 (s, 3H), 5.32-5.43 (m, 2H), 6.30 (q, 2H, *J* = 5.2 Hz), 7.36 (t, 1H, *J* = 7.7 Hz), 7.52-7.55 (m, 1H), 7.73-7.76 (m, 1H), 7.92-7.93 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.8, 26.7, 27.6, 31.1, 38.5, 124.9, 125.8, 126.8, 128.7, 130.7, 134.5, 135.2, 137.4, 138.5, 141.5, 198.4; HRMS (EI, m/z) calcd. For $C_{18}H_{24}O$ $[M]^+$: 256.1827; found: 256.1832.

Methyl 3-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)benzoate (4p)

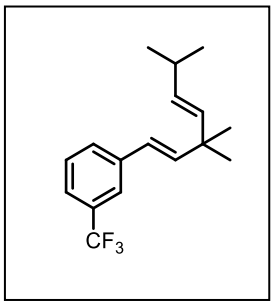
The same general procedure was followed. Column chromatography (Silica gel, eluting with 99:1 hexane/EtOAc) afforded the desired product as a pale-yellow liquid (107 mg, 78% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.98 (d, 6H, J = 6.7 Hz), 1.18 (s, 6H), 2.21-2.32 (m, 1H), 3.91 (s, 3H), 5.35 (dd, 1H, J_1 = 15.7 Hz, J_2 = 5.9 Hz), 5.42 (d, 1H, J = 15.9 Hz), 6.30 (q, 2H, J = 3.1 Hz), 7.34 (t, 1H, J = 7.7 Hz), 7.52 (dt, 1H, J_1 = 7.7 Hz, J_2 = 1.4 Hz), 7.84 (dt, 1H, J_1 = 8.0 Hz, J_2 = 1.3 Hz), 8.03 (t, 1H, J = 1.7 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.8, 27.6, 31.9, 38.4, 52.1, 124.8, 127.1, 127.8, 128.5, 130.4, 130.6, 134.4, 135.3, 138.4, 141.3, 167.2; HRMS (EI, m/z) calcd. For $C_{18}H_{24}O_2$ $[M]^+$:272.1776; found: 272.1775.

1-(trifluoromethyl)-3-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)benzene (4q)

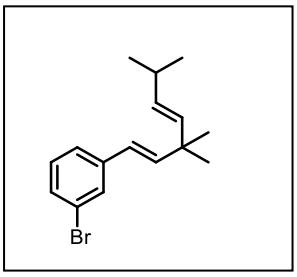
The same general procedure was followed. Column chromatography (Silica gel, eluting with 98:2 hexane/EtOAc) afforded the desired product as colourless liquid (82.0 mg, 58% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 1.01 (d, 6H, J = 6.7 Hz), 1.21 (s, 6H), 2.23-2.35 (m, 1H), 5.36-5.46 (m, 2H), 6.31 (q, 2H, J = 5.3 Hz), 7.37-7.45 (m, 2H), 7.52 (d, 1H, J = 7.5 Hz), 7.61 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.8, 27.5, 31.1, 38.5, 122.8 (q, J = 3.6 Hz), 123.4 (q, J = 3.2 Hz), 124.3 (q, J = 270.6 Hz), 124.6, 128.9, 129.3, 130.9 (q, J = 31.8 Hz), 134.6, 135.1, 138.8, 142.0; HRMS (EI, m/z) calcd. For $C_{17}H_{21}F_3$ $[M]^+$: 282.1595; found: 282.1599.

1-bromo-3-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)benzene (4r)

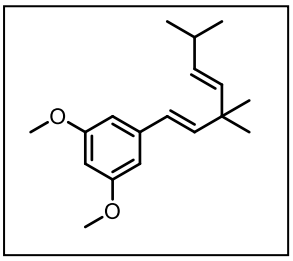
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as pale yellowish liquid (102.6 mg, 70% yield).



^{1}H NMR (300 MHz, $CDCl_3$): δ 1.01(d, 6H, *J* = 6.9 Hz), 1.20 (s, 6H), 2.24-2.35 (m, 1H), 5.34-5.47 (m, 2H), 6.24 (s, 2H), 7.16 (t, 1H, *J* = 7.7 Hz), 7.26-7.34 (m, 2H), 7.54 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.8, 27.6, 31.2, 38.5, 122.8, 124.5, 124.9, 129.0, 129.7, 130.0, 134.5, 135.2, 140.3, 141.6; HRMS (EI, m/z) calcd. For $C_{16}H_{21}Br$ $[M]^+$: 292.0827; found: 292.0828.

1,3-dimethoxy-5-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)benzene (4s)

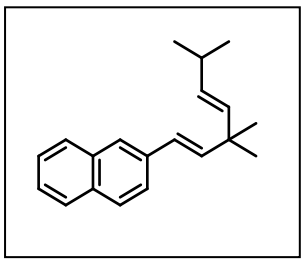
The same general procedure was followed. Column chromatography (Silica gel, eluting with 98:2 hexane/ethyl acetate)) afforded the desired product as a colourless liquid (107 mg, 78% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.98 (d, 6H, *J* = 6.7 Hz), 1.18 (s, 6H), 2.21-2.33 (m, 1H), 3.79 (s, 6H), 5.33-5.44 (m, 2H), 6.21 (q, 2H, *J* = 3.8 Hz), 6.33 (1H, t, *J* = 2.2 Hz), 6.53 (d, 2H, *J* = 2.3 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.8, 27.6, 31.1, 38.3, 55.3, 99.3, 104.2, 125.7, 134.3, 135.5, 140.1, 140.5, 160.9. HRMS (ESI, m/z) calcd. For $C_{18}H_{26}O_2$ $[M]^+$: 274.1933; found: 274.1938.

2-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)naphthalene (4t)

The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as white liquid (67.2 mg, 50% yield).

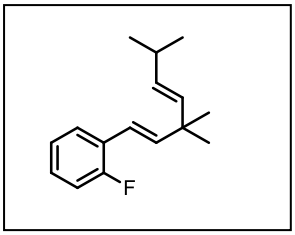


^{1}H NMR (300 MHz, $CDCl_3$): δ 1.08 (d, 6H, *J* = 6.7 Hz), 1.30 (s, 6H), 2.29-2.44 (m, 1H), 5.43-5.57 (m, 2H), 6.47 (q, 2H, *J* = 22.4 Hz), 7.47 (quin, 2H, *J* = 7.2 Hz), 7.66 (d, 1H, *J* = 8.5 Hz), 7.76 (s, 1H), 7.82 (q, 3H, *J* = 2.1 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.9, 27.8, 31.3, 38.5,

123.8, 125.5, 125.7, 125.9, 126.2, 127.7, 127.9, 128.1, 132.8, 133.9, 134.3, 135.6, 135.7, 140.5; HRMS (EI, m/z) calcd. For $C_{20}H_{24}$ $[M]^+$: 264.1878; found: 264.1871.

1-fluoro-2-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)benzene (4u)

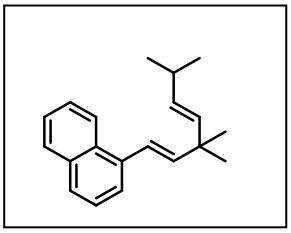
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as pale yellowish liquid (101.0 mg, 87% yield).



^{1}H NMR (300 MHz, $CDCl_3$): δ 0.97 (d, 6H, *J* = 6.7 Hz), 1.18 (s, 6H), 2.20-2.32 (m, 1H), 5.35 (dd, 1H, J_1 = 15.7 Hz, J_2 = 6.0 Hz), 5.42 (d, 1H, *J* = 16 Hz), 6.27 (d, 1H, *J* = 16.3 Hz), 6.46 (d, 1H, *J* = 16.3 H,), 6.97-7.02 (m, 1H), 7.05 (td, 1H, J_1 = 7.4 Hz, J_2 = 1.2 Hz), 7.11-7.17 (m, 1H), 7.45 (td, 1H, J_1 = 7.6 Hz, J_2 = 1.7 Hz); ^{13}C NMR (150 MHz, $CDCl_3$): δ 22.3, 27.0, 30.6, 38.2, 115.1 (d, *J* = 22.2 Hz), 117.46, 117.49, 123.4 (d, *J* = 3.4 Hz), 125.1, 125.2, 126.43, 126.45, 127.5 (d, *J* = 8.2 Hz), 133.9, 134.8, 141.8, 141.9, 159.5 (d, *J* = 246.4 Hz); HRMS (EI, m/z) calcd. For $C_{16}H_{21}F$ $[M]^+$: 232.1627; found: 232.1625.

1-((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)naphthalene(4v)

The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as white liquid (67.8 mg, 50% yield yield).

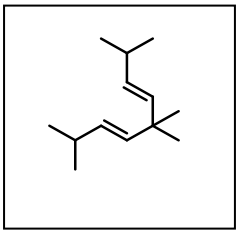


^{1}H NMR (400 MHz, $CDCl_3$): δ 1.05 (d, 6H, *J* = 6.7 Hz), 1.30 (s, 6H), 2.28-2.40 (m, 1H), 5.44-5.58 (m, 2H), 6.26 (d, 2H, *J* = 15.8 Hz), 7.07 (d, 2H, *J* = 15.8 Hz), 7.43-7.55 (m, 4H), 7.59 (d, 1H, *J* = 7.1 Hz), 7.76 (d, 1H, *J* = 8.2 Hz), 7.85 (dd, 1H, J_1 = 5.3 Hz, J_2 = 1.8 Hz), 8.13 (dd, 1H, J_1 = 6.9 Hz, J_2 = 1.3 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.9, 27.9, 31.2, 38.9, 123.0, 123.6,

124.0, 125.72, 125.76, 125.8, 127.3, 128.5, 131.4, 133.7, 134.5, 135.7, 136.0, 143.5; HRMS (EI, m/z) calcd. For $C_{20}H_{24}$ $[M]^+$: 264.1878; found: 264.1880.

(3E,6E)-2,5,5,8-tetramethylnona-3,6-diene (4w)

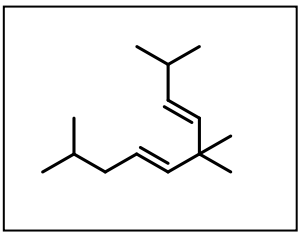
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as white liquid (40.8 mg, 45% yield yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.95 (d, 12H, J = 6.7 Hz), 0.96 (s, 6H), 1.02 (s, 6H), 2.16-2.28 (m, 2H), 5.25 (dd, 2H, J_1 = 15.7 Hz, J_2 = 6.2 Hz), 5.33 (dd, 2H, J_1 = 15.7 Hz, J_2 = 0.6 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.9, 27.9, 31.0, 37.5, 133.2, 136.5; HRMS (EI, m/z) calcd. For $C_{13}H_{24}$ $[M]^+$: 180.1878; found: 180.1876.

(3E,6E)-2,5,5,9-tetramethyldeca-3,6-diene (4x)

The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a pale-yellow liquid (74.2 mg, 76% yield).

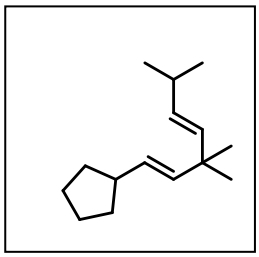


^{1}H NMR (400 MHz, $CDCl_3$): δ 0.86 (d, 6H, J = 6.4 Hz), 0.95 (d, 6H, J = 6.8 Hz), 1.04 (s, 6H), 1.53-1.63 (m, 1H), 1.87 (td, 2H, J_1 = 6.8 Hz, J_2 = 0.8 Hz), 2.17-2.28 (m, 1H), 5.24-5.30 (m, 1H), 5.32-5.33 (m, 1H), 5.36-5.40 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.3, 22.9, 27.9,

28.6, 31.1, 37.9, 42.1, 124.7, 133.3, 136.4, 140.8; HRMS (EI, m/z) calcd. For $C_{14}H_{26}$ $[M]^+$:194.2035; found: 194.2031.

((1E,4E)-3,3,6-trimethylhepta-1,4-dien-1-yl)cyclopentane (4y)

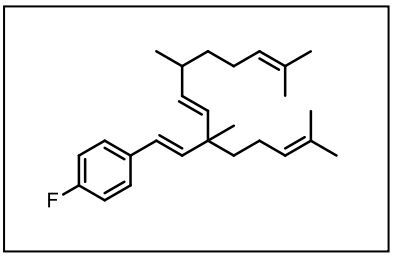
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a pale-yellow liquid (67.8 mg, 65% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.95 (d, 6H, *J* = 6.7 Hz), 1.03 (s, 6H), 1.23-1.27 (m, 2H), 1.49-1.57 (m, 2H), 1.58-1.65 (m, 2H), 1.69-1.77 (m, 2H), 2.18-2.26 (m, 1H), 2.31-2.41 (m, 1H), 5.22-5.29 (m, 2H), 5.31-5.38 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.9, 25.2, 27.9, 31.1, 33.4, 37.6, 43.4, 130.7, 133.2, 136.5, 137.6; HRMS (EI, m/z) calcd. For $C_{15}H_{26}$ $[M]^+$:206.2035; found: 206.2034.

1-fluoro-4-((1E,4E)-3,6,10-trimethyl-3-(4-methylpent-3-en-1-yl)undeca-1,4,9-trien-1-yl)benzene (4ya)

The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as yellowish brown (138.2 mg, 75% yield yield).

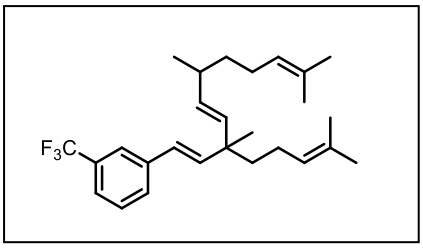


^{1}H NMR (600 MHz, $CDCl_3$): δ 1.03 (dd, 3H, J_1 = 6.7 Hz, J_2 = 2.7 Hz), 1.25 (s, 3H), 1.35 (quin, 2H, *J* = 6.2 Hz), 1.52 (t, 2H, *J* = 8.2 Hz), 1.62 (s, 6H), 1.75 (s, 3H), 2.00 (q, 4H, *J* = 7.0 Hz), 2.17 (quin, 1H, *J* = 6.9 Hz), 5.16 (t, 2H, *J* = 5.7 Hz), 5.27-5.31 (m, 1H), 5.46 (d, 1H, *J* = 15.7 Hz), 6.16 (d, 1H, *J* = 16.2 Hz), 6.30 (dd, 1H, J_1 = 16.2 Hz, J_2 = 2.5 Hz), 7.01 (t, 2H, *J* = 8.6 Hz), 7.33-7.36 (m, 2H); ^{13}C NMR (150 MHz, $CDCl_3$): δ 17.1, 17.24, 17.25, 20.6, 20.7, 22.8,

22.9, 23.66, 23.67, 25.27, 114.8 (d, *J* = 21.3 Hz), 124.3, 124.4, 125.0, 126.9 (d, *J* = 7.8 Hz), 130.68, 130.69, 130.7, 133.5, 133.6, 133.7 (d, *J* = 3.3 Hz), 135.35, 135.37, 138.30, 138.31, 138.32, 161.4 (d, *J* = 244.0 Hz) ; HRMS (EI, m/z) calcd. For $C_{26}H_{37}F$ $[M]^+$: 368.2879; found: 368.2880.

1-(trifluoromethyl)-3-((1E,4E)-3,6,10-trimethyl-3-(4-methylpent-3-en-1-yl)undeca-1,4,9-trien-1-yl)benzene (4yb)

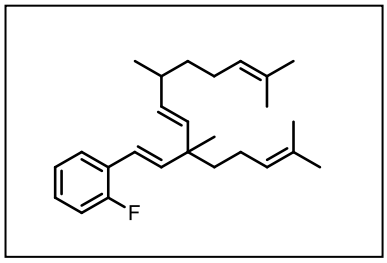
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as pale brown (132 mg, 63% yield yield).



^{1}H NMR (600 MHz, $CDCl_3$): δ 1.02 (dd, 3H, J_1 = 6.7 Hz, J_2 = 2.5 Hz), 1.25 (s, 3H), 1.34 (quin, 2H, *J* = 6.5 Hz), 1.53 (t, 2H, *J* = 8.3 Hz), 1.61 (s, 6H), 1.70 (s, 3H), 1.99 (q, 4H, *J* = 7.8 Hz), 2.16 (quin, 1H, *J* = 6.9 Hz), 5.14 (t, 2H, *J* = 7.2 Hz), 5.27-5.31 (m, 1H), 5.45 (d, 1H, *J* = 15.7 Hz), 6.30 (d, 1H, *J* = 16.2 Hz), 6.36 (dd, 1H, J_1 = 16.2 Hz, J_2 = 2.2 Hz), 7.42 (t, 1H, *J* = 7.6 Hz), 7.46 (d, 1H, *J* = 7.7 Hz), 7.54 (d, 1H, *J* = 7.5 Hz), 7.61 (s, 1H),; ^{13}C NMR (150 MHz, $CDCl_3$): δ 17.1, 17.2, 20.61, 20.67, 22.84, 22.87, 23.51, 23.53, 25.23, 25.23, 25.25, 25.50, 25.52, 36.29, 36.35, 36.8, 36.9, 41.1, 41.2, 41.36, 41.37, 122.28 (q, *J* = 3.7 Hz), 122.86 (q, *J* = 3.7 Hz), 124.28, 124.29, 124.3, 128.3, 127.7 (q, *J* = 275.8 Hz), 130.2, 130.51(q, *J* = 34.9 Hz), 130.506, 130.73, 130.75, 133.8, 133.9, 134.93, 134.96, 138.3, 140.57, 140.59. HRMS (EI, m/z) calcd. For $C_{27}H_{37}F_3$ $[M]^+$: 418.2847; found: 418.2843.

Methyl(3-((1E,4E)-3,6,10-trimethyl-3-(4-methylpent-3-en-1-yl)undeca-1,4,9-trien-1-yl)phenyl)sulfane(4yc)

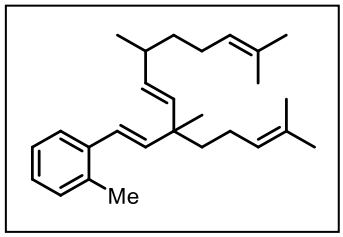
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a pale-yellow liquid (139.2 mg, 75% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.98 (dd, 3H, J_1 = 6.7 Hz, J_2 = 1.8 Hz), 1.19 (s, 3H), 1.29-1.33 (m, 2H), 1.46-1.50 (m, 2H), 1.57 (s, 6H), 1.67 (, 6H), 1.92-1.98 (m, 4H), 2.08-2.15 (m, 1H), 5.08-5.12 (m, 2H), 5.25 (ddd, 1H, J_1 = 15.7 Hz, J_2 = 7.8 Hz, J_3 = 2.1 Hz), 5.42 (d, 1H, J = 15.7 Hz), 6.26 (d, 1H, J = 16.4 Hz), 6.46 (d, 1H, J = 16.3 Hz), 6.99 (ddd, 1H, J_1 = 10.7 Hz, J_2 = 8.1 Hz, J_3 = 1.1 Hz), 7.05 (dt, 1H, J_1 = 7.6 Hz, J_2 = 1.2 Hz), 7.12-7.17 (m, 1H), 7.44 (tt, 1H, J_1 = 7.7 Hz, J_2 = 1.6 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 17.6, 17.7, 21.1, 21.2, 23.40, 23.42, 25.7, 26.02, 26.04, 29.7, 36.81, 36.86, 37.4, 41.71, 41.76, 42.0, 115.6 (d, J = 22.1 Hz), 119.0, 119.04, 124.0 (d, J = 3.1 Hz), 124.8, 124.9, 125.8, 125.9, 126.9, 127.0, 127.9, 128.0 (d, J = 8.2 Hz), 141.5,160.0 (d, 1H, J = 246.4 Hz); HRMS (EI, m/z) calcd. For $C_{26}H_{37}F$ $[M]^+$:368.2879; found: 368.2872.

1-methyl-2-((1E,4E)-3,6,10-trimethyl-3-(4-methylpent-3-en-1-yl)undeca-1,4,9-trien-1-yl)benzene (4yd)

The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a pale-yellow liquid (115.6 mg, 63% yield).

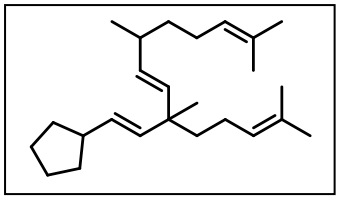


^{1}H NMR (400 MHz, $CDCl_3$): δ 1.03 (dd, 3H, J_1 = 6.7 Hz, J_2 = 1.3 Hz), 1.23 (s, 3H), 1.33-1.37 (m, 2H), 1.51-1.55 (m, 2H), 1.62 (s, 6H), 1.71 (s, 6H), 1.98-2.04 (m, 4H), 2.14-2.21 (m, 1H), 2.35 (s, 3H), 5.13-5.18 (m, 2H), 5.30 (dd, 1H, J_1 = 15.6 Hz, J_2 = 7.8 Hz), 5.48 (d, 1H, J = 15.8 Hz), 6.10 (dd, 1H, J_1 = 16.0 Hz, J_2 = 1.2 Hz), 6.54 (d, 1H, J = 16.0 Hz), 7.14-7.20 (m, 3H), 7.44 (d, 1H, J = 7.0 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 17.73, 17.78, 19.9, 21.30, 21.33, 23.50, 23.53, 24.4, 24.5, 25.8, 26.1, 36.9, 37.5, 41.8, 42.0, 124.8, 124.9, 125.1, 125.6, 126.1,

126.8, 130.1, 131.2, 136.16, 136.18, 137.4, 140.5, 140.6; HRMS (EI, m/z) calcd. For $C_{27}H_{40}$ $[M]^+$:364.3130; found: 364.3136.

((1E,4E)-3,6,10-trimethyl-3-(4-methylpent-3-en-1-yl)undeca-1,4,9-trien-1yl) cyclopentane (4ye)

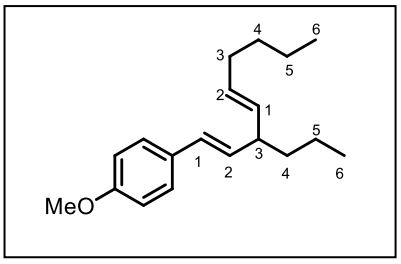
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a colourless liquid (101.8 mg, 59% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.96 (dd, 3H, J_1 = 6.7 Hz, J_2 = 0.6 Hz), 1.03 (s, 3H), 1.19-1.24 (m, 2H), 1.29-1.34 (m, 2H), 1.50-1.54 (m, 2H), 1.57 (d, 6H, J = 4.3 Hz), 1.60-1.64 (m, 2H), 1.67 (d, 6H, J = 3.4 Hz), 1.71-1.77 (m, 2H), 1.85-1.97 (m, 4H), 2.04-2.13 (m, 1H), 2.34-2.43 (m, 1H), 5.07-5.11 (m, 2H), 5.15 (t, 1H, J = 7.8 Hz), 5.27 (td, 1H, J_1 = 9.0 Hz, J_2 = 1.4 Hz), 5.34 (dd, 3H, J_1 = 15.7 Hz, J_2 = 10.2 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 17.6, 17.74, 17.76, 21.2, 23.35, 23.37, 24.3, 24.4, 25.1, 25.77, 25.79, 26.0, 33.4, 36.74, 36.77, 37.5, 40.9, 41.9, 43.5, 125.0, 125.3, 130.8, 131.0, 131.8, 133.04, 133.07, 136.4, 136.5, 136.8; HRMS (EI, m/z) calcd. For $C_{25}H_{42}$ $[M]^+$:342.3287; found: 342.3282.

1-methoxy-4-((1E,4E)-3-propylnona-1,4-dien-1-yl)benzene (4yf)

The same general procedure was followed. Column chromatography (Silica gel, eluting with 98:2 hexane/EtOAc) afforded the desired product as a colourless liquid (92.6 mg, 68% yield).

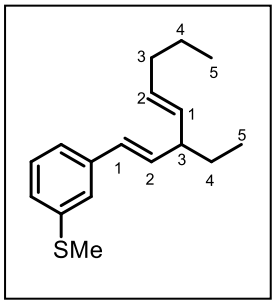


^{1}H NMR (600 MHz, $CDCl_3$): δ 0.93 (q, 6H, J = 5.3 Hz), 1.37 (q, 6H, J = 6.7 Hz), 1.46 (q, 2H, J = 8.3 Hz), 2.05 (q, 2H, J = 6.8 Hz), 2.82 (quin, 1H, J = 7.2 Hz), 3.82 (s, 3H), 5.39 (dd, 1H, J_1 = 15.3 Hz, J_2 = 7.3 Hz), 5.47 (dt, 1H, J_1 = 15.3 Hz, J_2 = 6.6 Hz), 6.00 (dd, 1H, J_1 = 15.9 Hz, J_2 = 7.6 Hz), 6.32 (d, 1H, , J = 15.9 Hz), 6.86 (d, 2H, J = 8.6 Hz), 7.31 (d, 2H, J = 8.5 Hz); ^{13}C NMR (150 MHz, $CDCl_3$): δ 13.5, 13.6, 19.9, 21.7, 31.3, 31.9, 37.1, 40.9, 45.3, 54.8, 113.4,

126.6, 127.6, 129.8, 130.2, 131.7, 132.5, 158.2; HRMS (EI, m/z) calcd. For $C_{19}H_{28}O$ $[M]^+$:272.2140; found: 272.2146.

(3-((1E,4E)-3-ethylocta-1,4-dien-1-yl)phenyl)(methyl)sulfane (4yg)

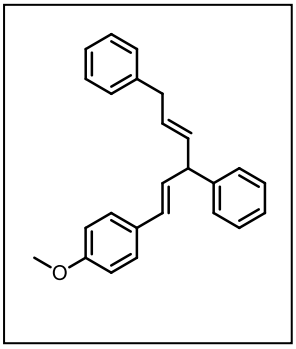
The same general procedure was followed. Column chromatography (Silica gel, eluting with 99:1 hexane/EtOAc) afforded the desired product as a colourless liquid (94.2 mg, 72% yield)



^{1}H NMR (600 MHz, $CDCl_3$): δ 0.92 (td, 6H, J_1 = 7.3 Hz, J_2 = 2.7 Hz), 1.38-1.44 (m, 2H), 1.49-1.52 (m, 2H), 2.02 (q, 2H, , J = 7.14 Hz), 2.50 (s, 3H), 2.72 (quin, 1H, J = 7.2Hz), 5.38 (dd, 1H, J_1 = 15.3 Hz, J_2 = 7.3 Hz), 5.47 (dt, 1H, J_1 = 15.3 Hz, J_2 = 6.6 Hz), 6.14 (dd, 1H, J_1 = 15.8 Hz, J_2 = 7.5 Hz), 6.32 (d, 1H, , J = 15.8 Hz), 7.11 (d, 1H, J = 7.5 Hz), 7.15 (d, 1H, J = 7.6 Hz), 7.23 (t, 1H, J = 7.7 Hz), 7.27 (d, 1H, J = 3.4 Hz); ^{13}C NMR (150 MHz, $CDCl_3$): δ 11.3, 13.2, 15.4, 22.2, 27.7, 34.3, 47.3, 122.5, 123.8, 124.6, 128.0, 128.4, 130.2, 132.1, 134.4, 138.00, 138.04; HRMS (EI, m/z) calcd. For $C_{17}H_{24}S$ $[M]^+$:260.1599; found: 260.1601.

((1E,4E)-3-(4-methoxyphenyl)hexa-1,4-diene-1,6-diyl)dibenzene (5a)

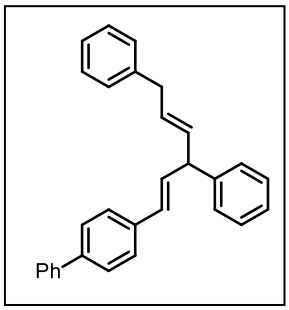
The same general procedure was followed. Column chromatography (Silica gel, eluting with 98:2 hexane/EtOAc) afforded the desired product as a light brown liquid (140.0 mg, 82% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 3.43 (d, 2H, *J* = 6.4 Hz), 3.80 (s, 3H), 4.21 (t, 1H, *J* = 6.7 Hz), 5.68-5.75 (m, 1H), 5.79-5.85 (m, 1H), 6.26 (dd, 1H, J_1 = 15.8 Hz, J_2 = 6.8 Hz), 6.37 (d, 1H, *J* = 15.9 Hz), 6.84 (dd, 2H, J_1 = 6.7 Hz, J_2 = 2.1 Hz), 7.20-7.23 (m, 3H), 7.24 (t, 1H, J_2 = 2.0 Hz), 7.27 (t, 1H, J_2 = 1.4 Hz), 7.29 (s, 3H), 7.30-7.32 (m, 3H), 7.33-7.35 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 37.9, 50.2, 54.1, 112.7, 124.8, 125.2, 126.2, 126.8, 127.2, 127.3, 127.4, 128.5, 128.9, 129.10, 129.13, 132.4, 139.4, 142.3, 157.8; HRMS (EI, m/z) calcd. For $C_{25}H_{24}O$ $[M]^+$: 340.1827; found: 340.1823.

4-((1E,4E)-1,6-diphenylhexa-1,4-dien-3-yl)-1,1'-biphenyl (5b)

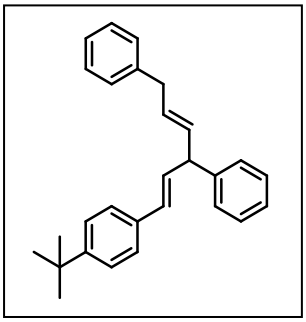
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a colourless liquid (155.4 mg, 80% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 3.55 (d, 2H, *J* = 6.5 Hz), 4.36 (t, 1H, *J* = 3.1 Hz), 5.82-5.89 (m, 1H), 5.92-5.98 (m, 1H), 6.57-6.58 (m, 2H), 7.31-7.32 (m, 1H), 7.33-7.37 (m, 3H), 7.40-7.41 (m, 1H), 7.41-7.43 (m, 4H), 7.44-7.47 (m, 2H), 7.50-7.55 (m, 5H), 7.65 (dd, 2H, J_1 = 6.4 Hz, J_2 = 1.9 Hz), 7.68-7.69 (m, 1H), 7.70-7.71 (m, 1H); ^{13}C NMR (150 MHz, $CDCl_3$): δ 39.0, 51.3, 126.0, 126.4, 126.6, 126.8, 127.1, 127.2, 128.0, 128.4, 128.54, 128.55, 128.7, 129.8, 130.3, 132.5, 133.2, 136.4, 139.9, 140.4, 140.7, 143.1; HRMS (EI, m/z) calcd. For $C_{30}H_{26}$ $[M]^+$: 340.2035; found: 340.2041.

((1E,4E)-3-(4-(tert-butyl)phenyl)hexa-1,4-diene-1,6-diyl)dibenzene (5c)

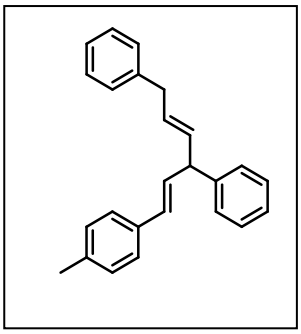
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a colourless liquid (150.2 mg, 82% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 1.19 (s, 9H), 3.30 (d, 2H, *J* = 6.4 Hz), 4.10 (t, 1H, *J* = 6.2 Hz), 5.56-5.64 (m, 1H), 5.67-5.72 (m, 1H), 6.22-6.32 (m, 2H), 7.04-7.09 (m, 4H), 7.11 (t, 1H, *J* = 1.7 Hz) 7.14-7.18 (m, 6H), 7.19 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 31.5, 34.7, 39.2, 51.5, 125.6, 126.1, 126.2, 126.5, 128.2, 128.6, 128.71, 128.77, 130.2, 130.4, 131.8, 133.6, 134.8, 140.7, 143.5, 150.4; HRMS (EI, m/z) calcd. For $C_{28}H_{30}$ $[M]^+$: 366.2348; found: 366.2354.

((2E,5E)-6-(p-tolyl)hexa-2,5-diene-1,4-diyl)dibenzene (5d)

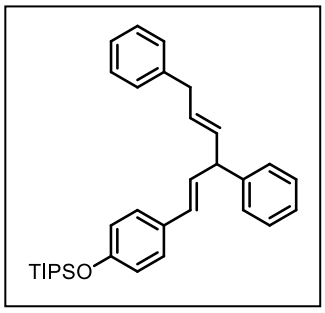
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a colorless liquid (117.2 mg, 72% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 2.38 (s, 3H), 3.48 (d, 2H, *J* = 6.4 Hz), 4.27 (t, 1H, *J* = 6.2 Hz), 5.74-5.81 (m, 1H), 5.85-5.90 (m, 1H), 6.38-6.48 (m, 2H), 7.16 (d, 2H, *J* = 7.8 Hz), 7.24-7.28 (m, 4H), 7.29-7.31 (m, 1H), 7.33-7.40 (m, 7H); ^{13}C NMR (100 MHz, $CDCl_3$): 21.3, 39.2, 51.5, 126.1, 126.3, 126.5, 128.2, 128.5, 128.6, 128.7, 129.3,130.3, 131.5, 133.6, 134.7, 137.0, 140.7, 143.5; HRMS (EI, m/z) calcd. For $C_{25}H_{24}$ $[M]^+$: 324.1878; found: 324.1874.

(4-((1E,4E)-3,6-diphenylhexa-1,4-dien-1-yl)phenoxy)triisopropylsilane (5e)

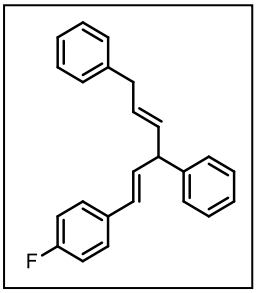
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a pale white liquid (136.4 mg, 56% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 1.20-1.23 (m, 18H), 1.32-1.41(m, 3H), 3.53 (d, 2H, *J* = 5.9 Hz), 4.31 (t, 1H, *J* = 6.3 Hz), 5.79-5.86 (m, 1H), 5.88-5.95 (m, 1H), 6.32-6.39 (m, 1H), 6.46 (dd, 1H, J_1 = 15.9 Hz, J_2 = 4.1 Hz), 6.92-6.94 (m, 2H), 7.30-7.35 (m, 6H), 7.38-7.45 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): 12.9, 18.1, 39.2, 51.6, 120.1, 126.2, 126.5, 127.5, 128.2, 128.6, 128.7, 128.8, 130.0, 130.3, 130.4, 130.6, 133.7, 140.7, 143.6, 155.6; HRMS (EI, m/z) calcd. For $C_{33}H_{42}OSi$ $[M]^+$: 482.3005; found: 482.2998.

((1E,4E)-3-(4-fluorophenyl)hexa-1,4-diene-1,6-diyl)dibenzene (5f)

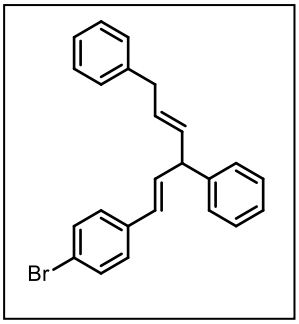
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a colourless liquid (159.4 mg, 97% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 3.52 (d, 2H, *J* = 6.4 Hz), 4.30 (t, 1H, *J* = 6.4 Hz), 5.77-5.85 (m, 1H), 5.88-5.93 (m, 1H), 6.40 (dd, 1H, J_1 = 15.8, Hz, , J_2 = 6.3 Hz), 6.47 (d, 1H, *J* = 15.9 Hz), 7.04 (dd, 1H, J_1 = 6.6 Hz, J_1 = 2.1 Hz), 7.07 (dd, 1H, J_1 = 6.8 Hz, J_1 = 1.8 Hz), 7.27-7.30 (m, 3H), 7.32-7.34 (m, 1H),7.35-7.39 (m, 5H), 7.40-7.44 (m,3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 39.1, 51.3, 115.4 (d, *J* = 21.3 Hz), 126.1, 126.5, 127.7 (d, *J* = 7.9 Hz), 128.0, 128.5, 128.6, 129.2, 130.4, 132.2, 133.2 133.6 (d, *J* = 2.8 Hz), 140.5, 143.2, 162.1 (d, *J* = 245.1 Hz); HRMS (EI, m/z) calcd. For $C_{24}H_{21}F$ $[M]^+$: 328.1627; found: 328.1628.

((1E,4E)-3-(4-bromophenyl)hexa-1,4-diene-1,6-diyl)dibenzene (5g)

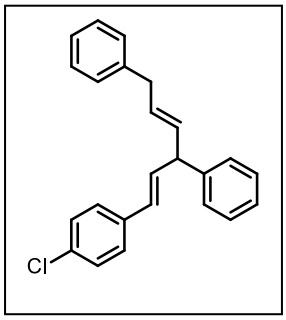
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a brown liquid (155.9 mg, 80% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 3.47 (d, 2H, *J* = 6.3 Hz), 4.25 (t, 1H, *J* = 6.3 Hz), 5.72-5.80 (m, 1H), 5.82-5.88 (m, 1H), 6.35-6.47 (m, 2H), 7.23-7.40 (m, 13H), 7.42-7.46 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 39.1, 51.4, 121.0, 126.2, 126.7, 127.9, 128.1, 128.5, 128.7, 128.8, 129.3, 130.6, 131.7, 133.1, 133.4, 136.4, 140.5, 143.0; HRMS (EI, m/z) calcd. For $C_{24}H_{21}Br$ $[M]^+$: 388.0827; found: 388.0827.

((1E,4E)-3-(4-chlorophenyl)hexa-1,4-diene-1,6-diyl)dibenzene(5h)

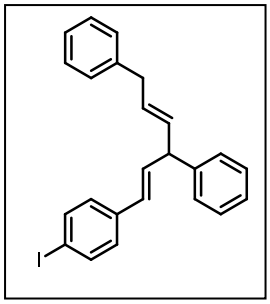
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a colourless liquid (124.2 mg, 72% yield).



^{1}H NMR (600 MHz, $CDCl_3$): δ 3.52 (d, 2H, *J* = 6.3 Hz), 4.30 (t, 1H, *J* = 5.5 Hz), 5.77-5.84 (m, 1H), 5.87-5.93 (m, 1H), 6.41-6.50 (m, 2H), 7.28-7.30 (m, 3H), 7.32-7.34 (m, 5H), 7.36 (m, 2H), 7.38-7.44 (m, 4H); ^{13}C NMR (150 MHz, $CDCl_3$): δ 39.2, 51.5, 126.2, 126.7, 127.6, 128.2, 128.6, 128.7, 128.8, 129.3, 130.7, 132.9, 133.2, 133.3, 136.0, 140.6, 143.1; HRMS (EI, m/z) calcd. For $C_{24}H_{21}Cl$ $[M]^+$: 344.1332; found: 344.1316.

((1E,4E)-3-(4-iodophenyl)hexa-1,4-diene-1,6-diyl)dibenzene (5i)

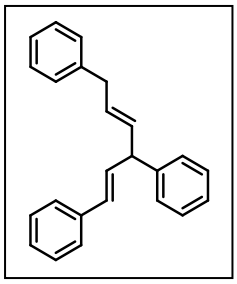
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a colourless liquid (179.6 mg, 82% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 3.46 (d, 2H, *J* = 6.3 Hz), 4.24 (t, 1H, *J* = 6.5 Hz), 5.71-5.78 (m, 1H), 5.81-5.86 (m, 1H), 6.35 (d, 1H, *J* = 16 Hz), 6.41-6.47 (m, 1H), 7.11 (d, 2H, *J* = 8.4 Hz), 7.22-7.25 (m, 3H), 7.27-7.39 (m, 8H), 7.63 (d, 2H, *J* = 8.0 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 39.1, 51.4, 92.4, 126.2, 126.7, 128.1, 128.2, 128.6, 128.7, 128.8, 129.4, 130.7, 133.1, 133.5, 137.0, 137.6, 140.5, 143.0; HRMS (EI, m/z) calcd. For $C_{24}H_{21}I$ $[M]^+$: 436.0688; found: 436.0682.

((1E,4E)-hexa-1,4-diene-1,3,6-triyl)tribenzene (5j)

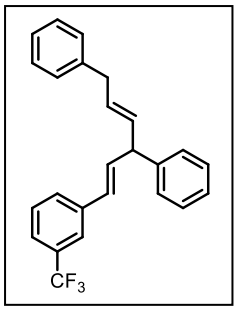
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a white liquid (123.0 mg, 79% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 3.49 (t, 2H, *J* = 6.0 Hz), 4.29-4.30 (m, 1H), 5.76-5.93 (m, 2H), 5.76-5.93 (m, 2H), 6.47-6.50 (m, 2H), 7.24-7.30 (m, 5H), 7.34-7.45 (m, 10H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 39.2, 51.6, 126.2, 126.4, 126.6, 127.4, 128.2, 128.6, 128.7, 128.8, 130.5, 132.6, 133.5, 137.6, 140.7, 143.4; HRMS (EI, m/z) calcd. For $C_{24}H_{22}$ $[M]^+$: 310.1722; found: 310.1728.

((1E,4E)-3-(3-(trifluoromethyl)phenyl)hexa-1,4-diene-1,6-diyl)dibenzene (5k)

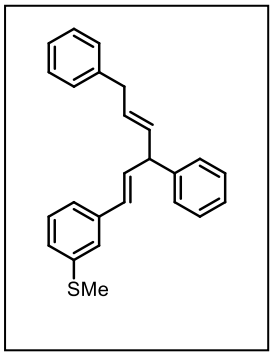
The same general procedure was followed. Column chromatography (Silica gel, eluting with 99:1 hexane/EtOAc) afforded the desired product as a colourless liquid (122.8 mg, 65% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 3.52 (d, 2H, *J* = 6.2 Hz), 4.32 (t, 1H, *J* = 6.3 Hz), 5.78-5.85 (m, 1H), 5.88-5.93 (m, 1H), 6.48-6.60 (m, 2H), 7.26-7.33 (m, 4H), 7.34-7.38 (m, 4H), 7.39-7.41 (m, 1H), 7.42-7.46 (m, 2H), 7.52 (d, 1H, *J* = 7.7 Hz), 7.57 (d, 1H, *J* = 7.6 Hz), 7.67 (s, 1H) ; ^{13}C NMR (100 MHz, $CDCl_3$): δ 39.2, 51.5, 123.0 (q, *J* = 3.2 Hz), 123.8 (q, *J* = 3.7 Hz), 126.2, 126.8, 127.0 (q, *J* = 271 Hz), 128.1, 128.6, 128.7, 128.8, 129.0, 129.2, 129.5, 130.9, 131.0 (q, *J* = 31.5 Hz), 133.0, 134.6, 138.3, 140.5, 142.9; HRMS (EI, m/z) calcd. For $C_{25}H_{21}F_3$ $[M]^+$: 378.1595; found: 378.1596

(3-((1E,4E)-3,6-diphenylhexa-1,4-dien-1-yl)phenyl)(methyl)sulfane (5l)

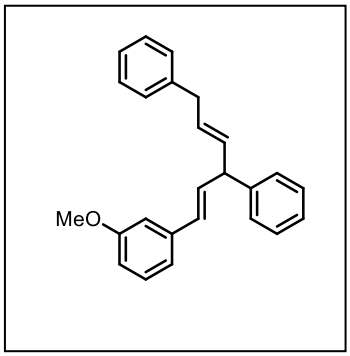
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a colourless liquid (122.8 mg, 65% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 2.47 (s, 3H), 3.43 (d, 2H, *J* = 6.4 Hz), 4.22 (t, 1H, *J* = 6.0 Hz), 5.68-5.75 (m, 1H), 5.78-5.84 (m, 1H), 6.34-6.44 (m, 2H), 7.09-7.14 (m, 2H), 7.19-7.23 (m, 4H), 7.25-7.28 (m, 4H), 7.29-7.35 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 16.0, 39.1, 51.4, 123.2, 124.6, 125.5, 126.1, 126.5, 128.1, 128.5, 128.6, 129.0, 129.9, 130.5, 133.2, 138.1, 138.7, 140.5, 143.1; HRMS (EI, m/z) calcd. For $C_{25}H_{24}S$ $[M]^+$: 356.1599; found: 356.1595.

((2E,5E)-6-(3-methoxyphenyl)hexa-2,5-diene-1,4-diyl)dibenzene (5m)

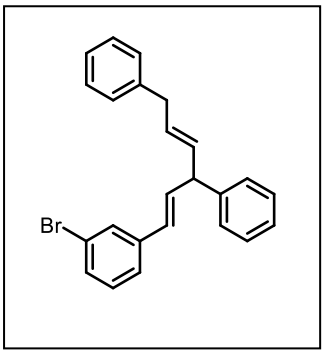
The same general procedure was followed. Column chromatography (Silica gel, eluting with 98:2 hexane/EtOAc) afforded the desired product as a yellowish-brown liquid (136.2 mg, 80% yield).



^{1}H NMR (400 MHz, $CDCl_3$ δ 3.45 (d, 2H, *J* = 6.3 Hz), 3.82 (s, 3H), 4.25 (t, 1H, *J* = 3.9 Hz), 5.70-5.78 (m, 1H), 5.81-5.87 (m, 1H), 6.41-6.43 (m, 2H), 6.78-6.80 (m, 1H), 6.93 (s, 1H), 6.97-6.99 (m, 1H), 7.21-7.25 (m, 5H), 7.28-7.32 (m, 4H), 7.34-7.38 (m, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): 39.1, 51.4, 55.3, 111.6, 113.0, 119.0, 126.1, 126.5, 128.1, 128.5, 128.67, 128.69, 129.5, 130.3, 130.5, 132.8, 133.3, 138.9, 140.6, 143.2, 159.9; HRMS (EI, m/z) calcd. For $C_{25}H_{24}O$ $[M]^+$: 340.1827; found: 340.1825.

((1E,4E)-3-(4-bromophenyl)hexa-1,4-diene-1,6-diyl)dibenzene (5n)

The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a light brown liquid (160.2 mg, 82% yield).

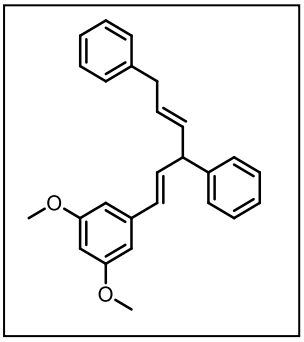


^{1}H NMR (400 MHz, $CDCl_3$): δ 3.48 (d, 2H, *J* = 6.2 Hz), 4.27 (t, 1H, *J* = 6.5 Hz), 5.73-5.80 (m, 1H), 5.85 (dd, 1H, J_1 = 15.3 Hz, J_2 = 6.5 Hz), 6.38 (d, 1H, *J* = 16.0 Hz), 6.43-6.49 (m, 1H), 7.16-7.20 (m, 1H), 7.25-7.29 (m, 4H), 7.30-7.33 (m, 3H), 7.35-7.41 (m, 5H), 7.56 (t, 1H, *J* = 1.7 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 39.2, 51.4, 122.8, 125.1, 126.2, 126.7, 128.1, 128.6,

128.7, 128.8, 129.1, 129.2, 130.1, 130.2, 130.7, 133.0, 134.2, 139.7, 140.5, 142.9; HRMS (EI, m/z) calcd. For $C_{24}H_{21}Br$ $[M]^+$: 388.0827; found: 388.0821.

((1E,4E)-3-(3,5-dimethoxyphenyl)hexa-1,4-diene-1,6-diyl)dibenzene (5o)

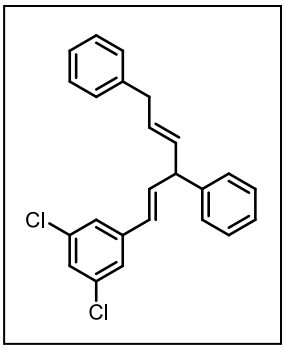
The same general procedure was followed. Column chromatography (Silica gel, eluting with 98:2 hexane/EtOAc) afforded the desired product as a colourless liquid (133.2 mg, 72% yield).



^{1}H NMR (600 MHz, $CDCl_3$): δ 3.30 (d, 2H, *J* = 5.9 Hz), 3.63 (t, 6H, *J* = 4.6 Hz), 4.09 (t, 1H, *J* = 6.2 Hz), 5.56-5.62 (m, 1H), 5.66-5.71 (m, 1H), 6.22-6.31 (m, 3H), 6.41 (q, 2H, *J* = 2.2 Hz), 7.07-7.11 (m, 4H), 7.14-7.21 (m, 6H); ^{13}C NMR (150 MHz, $CDCl_3$): δ 39.1, 51.3, 55.3, 99.6, 104.3, 126.1, 126.5, 128.1, 128.4, 128.6, 130.4, 130.5, 132.9, 133.2, 139.4, 140.5, 143.1, 160.9; HRMS (ESI, m/z) calcd. For $C_{26}H_{26}O_2$ $[M]^+$: 370.1933; found: 370.1939.

((1E,4E)-3-(4-chlorophenyl)hexa-1,4-diene-1,6-diyl)dibenzene (5p)

The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a pale-yellow liquid (120.8 mg, 63% yield).

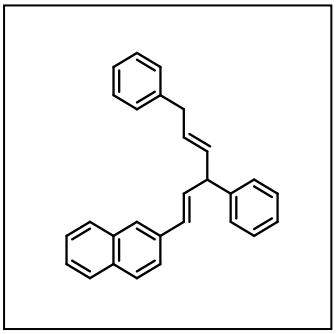


^{1}H NMR (600 MHz, $CDCl_3$): δ 3.50 (d, 2H, *J* = 6.4 Hz), 4.28 (t, 1H, *J* = 6.8 Hz), 5.77-5.81 (m, 1H), 5.86 (dd, 1H, J_1 = 15.4 Hz, J_2 = 6.4 Hz), 6.33 (d, 1H, *J* = 15.7 Hz), 6.49 (dd, 1H, J_1 = 15.8 Hz, J_2 = 7.0 Hz), 7.24-7.33 (m, 9H), 7.40 (dt, 4H, J_1 = 21.8 Hz, J_2 = 7.6 Hz), ^{13}C NMR (150 MHz, $CDCl_3$): δ 39.1, 51.3, 124.6, 126.1, 126.7, 126.9, 128.0, 128.05, 128.54, 128.55, 128.6,

128.7, 130.9, 132.6, 135.0, 135.6, 140.3, 140.4, 142.4; HRMS (EI, m/z) calcd. For $C_{24}H_{20}Cl_2$ $[M]^+$: 378.0942; found: 378.0936.

2-((1E,4E)-3,6-diphenylhexa-1,4-dien-1-yl)naphthalene (5q)

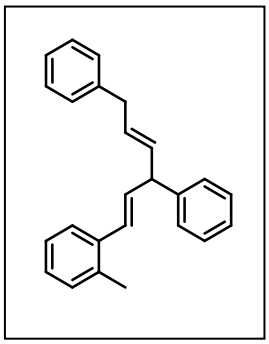
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a colourless liquid (135.2 mg, 75% yield).



1H NMR (400 MHz, $CDCl_3$): δ 3.52 (d, 2H, *J* = 6.4 Hz), 4.35 (t, 1H, *J* = 6.0 Hz), 5.79-5.87 (m, 1H), 5.90-5.96 (m, 1H), 6.60 (dd, 1H, J_1 = 16.0 Hz, J_2 = 6.0 Hz), 6.66 (d, 1H, *J* = 16.0 Hz), 7.26-7.34 (m, 4H), 7.36-7.42 (m, 6H), 7.47-7.52 (m, 2H), 7.65 (dd, 1H, J_1 = 8.8 Hz, J_2 = 1.6 Hz), 7.76 (s, 1H), 7.82 (t, 3H, *J* = 9.2 Hz); ^{13}C NMR (150 MHz, $CDCl_3$): 39.2, 51.6, 123.8, 125.8, 126.1, 126.2, 126.3, 126.6, 127.8, 128.0, 128.2, 128.6, 128.7, 130.5, 130.6, 133.01, 133.04, 133.4, 133.8, 135.0, 140.7, 143.3; HRMS (EI, m/z) calcd. For $C_{28}H_{24}$ $[M]^+$: 360.1878; found: 360.1885.

((2E,5E)-6-(o-tolyl)hexa-2,5-diene-1,4-diyl)dibenzene (5r)

The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a colorless liquid (117.2 mg, 72% yield).

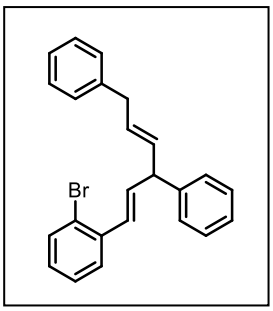


^{1}H NMR (400 MHz, $CDCl_3$): δ 2.37 (s, 3H), 3.49 (d, 2H, *J* = 6.2 Hz), 4.31 (t, 1H, *J* = 6.4 Hz), 5.75-5.83 (m, 1H), 5.85-5.91 (m, 1H), 6.31-6.38 (m, 1H), 6.70 (d, 1H, *J* = 15.7 Hz), 7.18-7.19 (m, 3H), 7.26-7.31 (m, 4H), 7.33-7.41 (m, 6H), 7.48-7.50 (m, 1H); ^{13}C NMR (100 MHz,

$CDCl_3$): 19.9, 39.2, 51.7, 125.7, 126.1, 126.5, 127.2, 128.1, 128.3, 128.5, 128.6, 128.7, 130.3, 130.4, 133.6, 133.8, 135.3, 136.6, 140.7, 143.4; HRMS (EI, m/z) calcd. For $C_{25}H_{24}$ $[M]^+$: 324.1878; found: 324.1872.

((1E,4E)-3-(2-bromophenyl)hexa-1,4-diene-1,6-diyl)dibenzene (5s)

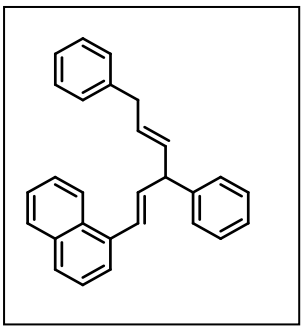
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a brown liquid (110.2 mg, 56% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 3.48 (d, 2H, *J* = 6.3 Hz), 4.32 (t, 1H, *J* = 6.7 Hz), 5.74-5.82 (m, 1H), 5.84-5.90 (m, 1H), 6.39 (ddd, 1H, J_1 = 15.8 Hz, J_2 = 6.9 Hz, J_3 = 1.2 Hz), 6.87 (d, 1H, *J* = 15.8 Hz), 7.07-7.11 (m, 1H), 7.22-7.30 (m, 6H), 7.32-7.34 (m, 3H), 7.36-7.41 (m, 3H), 7.54 (dd, 1H, J_1 = 7.7 Hz, J_2 = 1.4 Hz), 7.57 (dt, 1H, J_1 = 8.0 Hz, J_2 = 1.1 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 39.2, 51.5, 123.7, 126.2, 126.7, 127.1, 127.5, 128.1, 128.5, 128.6, 128.76, 128.78, 129.4, 130.8, 133.0, 133.1, 135.5, 137.4, 140.5, 143.0; HRMS (EI, m/z) calcd. For $C_{24}H_{21}Br$ $[M]^+$: 388.0827; found: 388.0820

1-((1E,4E)-3,6-diphenylhexa-1,4-dien-1-yl)naphthalene (KVL-5t)

The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a colourless liquid (117.0 mg, 65% yield).

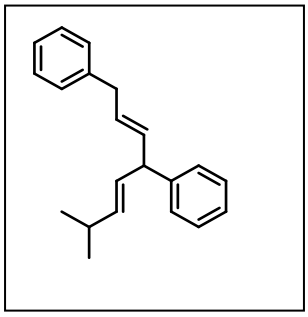


^{1}H NMR (400 MHz, $CDCl_3$): δ 3.51 (d, 2H, *J* = 6.4 Hz), 4.41 (t, 1H, *J* = 6.6 Hz), 5.81-5.88 (m, 1H), 5.94 (dd, 1H, J_1 = 15.6 Hz, J_2 = 6.6 Hz), 6.49 (dd, 1H, J_1 = 15.6 Hz, J_2 = 6.8 Hz), 7.20-7.31 (m, 5H), 7.35 (d, 1H, *J* = 7.2 Hz), 7.38-7.44 (m, 5H), 7.47 (d, 1H, *J* = 7.8 Hz), 7.53 (t, 2H,

J = 3.5 Hz), 7.63 (d, 1H, *J* = 7.1 Hz), 7.79 (d, 1H, *J* = 8.1 Hz), 7.88 (d, 1H, *J* = 8.2 Hz), 8.10 (d, 1H, *J* = 7.5 Hz) ; ^{13}C NMR (100 MHz, $CDCl_3$): δ 39.2, 51.8, 123.8, 124.0, 125.7, 125.8, 126.0, 126.2, 126.6, 127.7, 128.2, 128.6, 128.7, 130.6, 131.3, 133.5, 133.7, 135.3, 135.8, 140.7, 143.3; HRMS (EI, m/z) calcd. For $C_{28}H_{24}$ $[M]^+$: 360.1878; found: 360.1879.

((2E,5E)-7-methylocta-2,5-diene-1,4-diyl)dibenzene (5u)

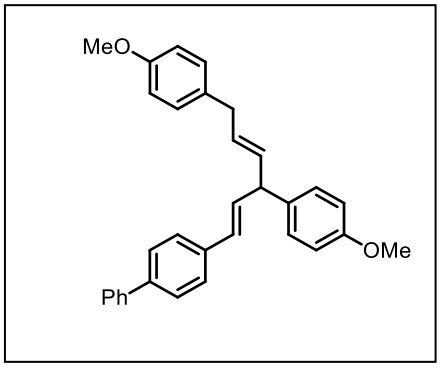
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a light brown liquid (69.2 mg, 50% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 1.00 (d, 3H, *J* = 3.5 Hz), 1.02 (d, 3H, *J* = 3.5 Hz), 2.26-2.38 (m, 1H), 3.41 (d, 2H, *J* = 6.5 Hz), 4.01 (t, 2H, *J* = 6.7 Hz), 5.45-5.51 (m, 1H), 5.56-5.60 (m, 1H), 5.61-5.67 (m, 1H), 5.71-5.77 (m, 1H), 7.19-7.23 (m, 5H), 7.24 (d, 1H, *J* = 1.6 Hz), 7.28-7.34 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.6, 31.1, 39.1, 51.0, 126.0, 126.2, 128.0, 128.4, 128.6, 129.2, 134.4, 138.5, 140.8, 144.1; HRMS (EI, m/z) calcd. For $C_{21}H_{24}$ $[M]^+$: 276.1878; found: 276.1875.

4-((1E,4E)-1,6-bis(4-methoxyphenyl)hexa-1,4-dien-3-yl)-1,1'-biphenyl (5v)

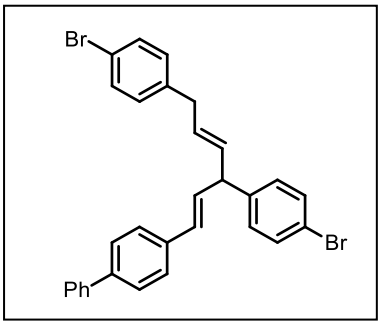
The same general procedure was followed. Column chromatography (Silica gel, eluting with 98:2 hexane/EtOAc) afforded the desired product as a pale brown liquid (198.8 mg, 89% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 3.45 (d, 2H, *J* = 6.3 Hz), 3.84 (s, 3H), 3.86 (s, 3H), 4.27 (t, 1H, *J* = 2.9 Hz), 5.74-5.79 (m, 1H), 5.86 (dd, 1H, J_1 = 15.3 Hz, J_2 = 6.6 Hz), 6.51 (t, 2H, *J* = 1.9 Hz), 6.93 (dd, 2H, J_1 = 8.6 Hz, J_2 = 1.7 Hz), 6.96 (dd, 2H, J_1 = 7.1 Hz, J_2 = 1.9 Hz), 7.20 (d, 2H, *J* = 8.2 Hz), 7.28 (d, 2H, *J* = 8.6 Hz), 7.37-7.42 (m, 1H), 7.49 (t, 4H, *J* = 7.2 Hz), 7.61 (d, 2H, *J* = 8.2 Hz), 7.66 (dd, 2H, J_1 = 7.0 Hz, J_2 = 1.7 Hz; ^{13}C NMR (100 MHz, $CDCl_3$): δ 38.3, 50.7, 55.4, 114.0, 114.1, 126.8, 127.0, 127.3, 127.4, 128.9, 129.1, 129.6, 129.7, 130.7, 132.7, 133.1, 133.3, 135.4, 136.7, 140.0, 140.9, 158.1, 158.4; HRMS (EI, m/z) calcd. For $C_{32}H_{30}O_2$ $[M]^+$: 446.2246; found: 446.2238.

4-((1E,4E)-3,6-bis(4-bromophenyl)hexa-1,4-dien-1-yl)-1,1'-biphenyl (5w)

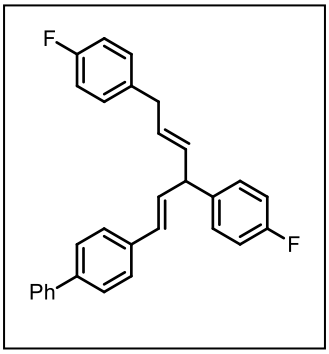
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a pale brown liquid (196.2 mg, 72% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 3.46 (d, 2H, *J* = 6.3 Hz), 4.24 (t, 1H, *J* = 6.3 Hz), 5.71-5.78 (m, 1H), 5.80-5.87 (m, 1H), 6.33-6.38 (m, 1H), 6.43 (dd, 1H, J_1 = 15.9 Hz, J_2 = 6.2 Hz), 7.22- 7.27 (m, 7H), 7.28 (q, 1H, *J* = 0.4 Hz), 7.29-7.31 (m, 2H), 7.33 (quin, 1H, *J* = 0.8 Hz), 7.34-7.35 (m, 1H), 7.36 (t, 1H, *J* = 0.8 Hz), 7.38-7.40 (m, 1H), 7.43 (dd, 2H, J_1 = 6.5 Hz, J_2 = 1.8 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): 39.1, 51.4, 121.0, 126.2, 126.6, 127.9, 128.1, 128.5, 128.6, 128.7, 129.3, 130.6, 131.6, 133.1, 133.4, 136.4, 140.5, 143.0; HRMS (EI, m/z) calcd. For $C_{30}H_{24}Br_2$ $[M]^+$: 542.0245; found: 542.0248.

4-((1E,4E)-1,6-bis(4-fluorophenyl)hexa-1,4-dien-3-yl)-1,1'-biphenyl (5x)

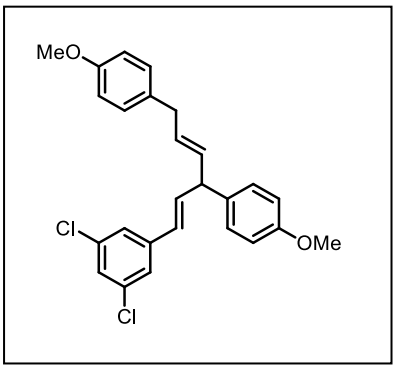
The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as a pale white liquid (194.8 mg, 92% yield).



^{1}H NMR (600 MHz, $CDCl_3$): δ 3.45 (d, 2H, *J* = 6.6 Hz), 4.28 (t, 1H, *J* = 6.2 Hz), 5.72-5.76 (m, 1H), 5.82 (dd, 1H, J_1 = 15.3 Hz, J_2 = 6.6 Hz), 6.44-6.51 (m, 2H), 7.06 (dt, 2H, J_1 = 15.2 Hz, J_2 = 11.4 Hz, J_3 = 5.7 Hz), 7.20 (q, 2H, *J* = 2.5 Hz), 7.28 (q, 2H, *J* = 2.4 Hz), 7.39 (t, 1H, *J* = 7.1 Hz), 7.47-7.49 (m, 4H), 7.60 (d, 2H, *J* = 8.1 Hz), 7.65 (d, 2H, *J* = 7.9 Hz); ^{13}C NMR (150 MHz, $CDCl_3$): δ 37.7, 50.1, 114.7 (d, *J* = 7.8 Hz), 114.9 (d, *J* = 7.8 Hz), 126.2, 126.5, 126.8, 126.9, 128.3, 129.0 (d, *J* = 7.8 Hz), 129.4 (d, *J* = 7.6 Hz), 130.0, 131.7, 132.8, 135.5 (d, *J* = 3 Hz), 135.8, 138.2 (d, *J* = 3 Hz), 139.7, 140.2, 161.0 (d, *J* = 242.4), 161.1 (d, *J* = 243.3 Hz); HRMS (EI, m/z) calcd. For $C_{30}H_{24}F_2$ $[M]^+$: 422.1846; found: 422.1851.

4,4'-((1E,4E)-3-(3,5-dichlorophenyl)hexa-1,4-diene-1,6-diyl)bis(methoxybenzene) (5y)

The same general procedure was followed. Column chromatography (Silica gel, eluting with 98:2 hexane/EtOAc) afforded the desired product as a brownish yellow liquid (167.2 mg, 76% yield).

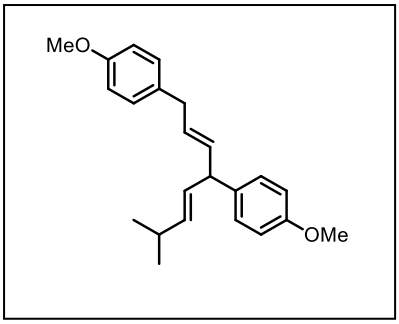


^{1}H NMR (400 MHz, $CDCl_3$): δ 3.37 (d, 2H, *J* = 6.0 Hz), 3.79 (s, 3H), 3.80 (s, 3H), 4.16 (t, 1H, *J* = 6.5 Hz), 5.63-5.70 (m, 1H), 5.74 (dd, 1H, J_1 = 15.3 Hz, J_2 = 6.2 Hz), 6.24 (dd, 1H, J_1 = 15.8 Hz, J_2 = 0.8 Hz), 6.41 (dd, 1H, J_1 = 15.8 Hz, J_2 = 6.9 Hz), 6.86 (dd, 2H, J_1 = 6.6 Hz, J_2 = 2.1 Hz), 6.88 (dd, 2H, J_1 = 6.6 Hz, J_2 = 2.1 Hz), 7.11 (dd, 2H, J_1 = 6.5 Hz, J_2 = 2.0 Hz), 7.15 (dd, 2H, J_1 = 6.5 Hz, J_2 = 2.0 Hz), 7.18 (t, 1H, *J* = 1.8 Hz), 7.21 (d, 2H, *J* = 1.8 Hz); ^{13}C NMR

(150 MHz, $CDCl_3$): 38.2. 50.4, 55.3, 113.9. 114.1. 124.6, 126.9, 127.7, 129.0, 129.5, 131.1, 132.5, 132.6, 134.6, 135.1, 136.0, 140.6, 158.1, 158.4; HRMS (EI, m/z) calcd. For $C_{26}H_{24}Cl_2O_2$ $[M]^+$: 438.1153; found: 438.1156.

4,4'-((2E,5E)-7-methylocta-2,5-diene-1,4-diyl)bis(methoxybenzene) (5z)

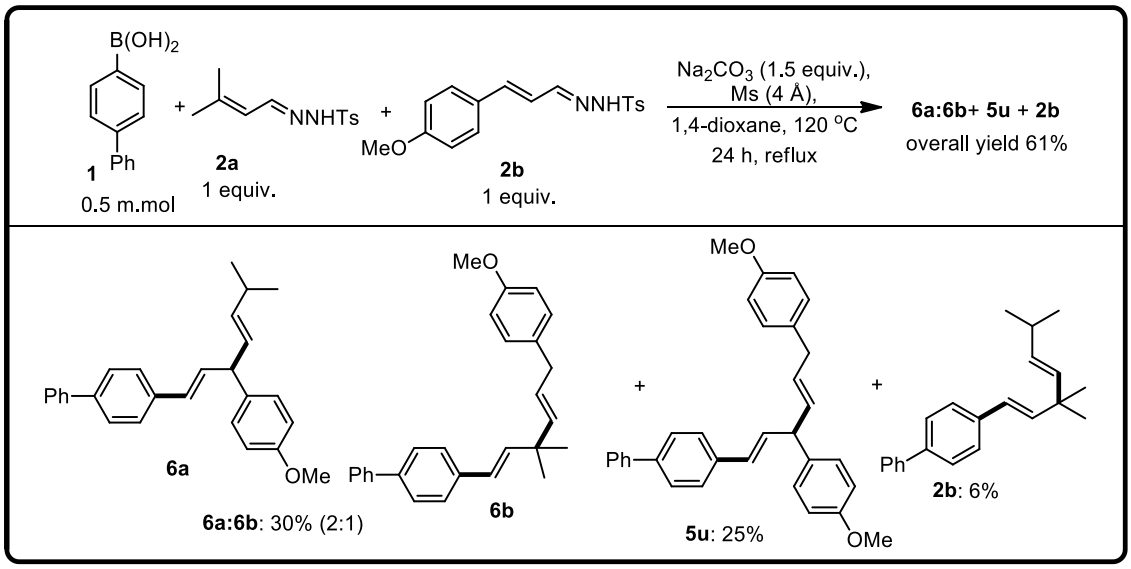
The same general procedure was followed. Column chromatography (Silica gel, eluting with 98:2 hexane/EtOAc) afforded the desired product as a yellow brown liquid (93.2 mg, 55% yield).



^{1}H NMR (400 MHz, $CDCl_3$): δ 0.99 (d, 3H, *J* = 2.9 Hz), 1.00 (d, 3H, *J* = 3.0 Hz), 2.24-2.36 (m, 1H), 3.36 (d, 2H, *J* = 6.5 Hz), 3.79 (s, 6H), 3.94 (t, 2H, *J* = 6.7 Hz), 5.41-5.47 (m, 1H), 5.52-5.56 (m, 1H), 5.57-5.61 (m, 1H), 5.65-5.71 (m, 1H), 6.84 (dd, 2H, J_1 = 4.6 Hz, J_2 = 1.9 Hz), 6.85 (dd, 2H, J_1 = 4.8 Hz, J_2 = 2.0 Hz), 7.06 (dd, 2H, J_1 = 7.0 Hz, J_2 = 2.5 Hz),), 7.13 (dd, 2H, J_1 = 6.6 Hz, J_2 = 2.0 Hz); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.6, 22.7, 31.1, 38.1, 50.1, 55.3, 113.85, 113.87, 128.9, 129.52, 129.55, 132.9, 134.3, 136.2, 138.2, 157.9; HRMS (EI, m/z) calcd. For $C_{23}H_{28}O_2$ $[M]^+$: 336.2089; found: 336.2078.

<u>Representative procedure for unsymmetrical skipped diene compounds</u>:

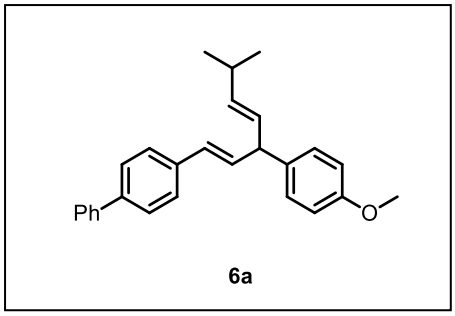
In an oven dried round bottom flask containing a stir bar, containing 4-biphenylboronic acid (0.5 mmol) and corresponding hydrazones of prenyl (1.0 equivalent) and 4-methoxy substituted cinnamaldehyde were added. Dry 1,4 Dioxane (2mL) was then added followed by Na_2CO_3 (1.5 equivalent) and molecular sieves. Then the reaction mixture was purged with N_2 gas for 2 minutes. The mixture was refluxed for 120 ^oC for 24 hours. After allotted time the reaction mixture was cooled to room temperature. The mixture was diluted with EtOAc (15 mL) and washed with water (25 mL), followed by brine solution (25 mL) and dried over Na_2SO_4, and evaporated in *vacuo*. The crude mixture was loaded on a silica gel column chromatography and purified using (Hexane) to isolate the desired skipped diene products.

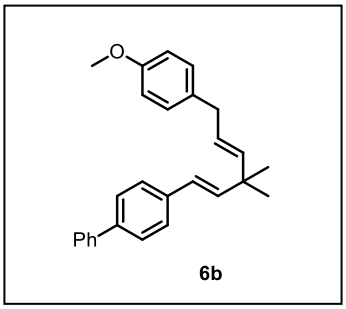


Spectral data for unsymmetrical skipped diene compounds:

4-((1E,4E)-3-(4-methoxyphenyl)-6-methylhepta-1,4-dien-1-yl)-1,1'-biphenyl(6a): 4-((1E,4E)-6-(4-methoxyphenyl)-3,3-dimethylhexa-1,4-dien-1-yl)-1,1'-biphenyl(6b) (2:1 inseparable mixture)

The same general procedure was followed. Column chromatography (Silica gel, eluting with hexane) afforded the desired product as colorless liquid (56.4 mg, 30% yield).

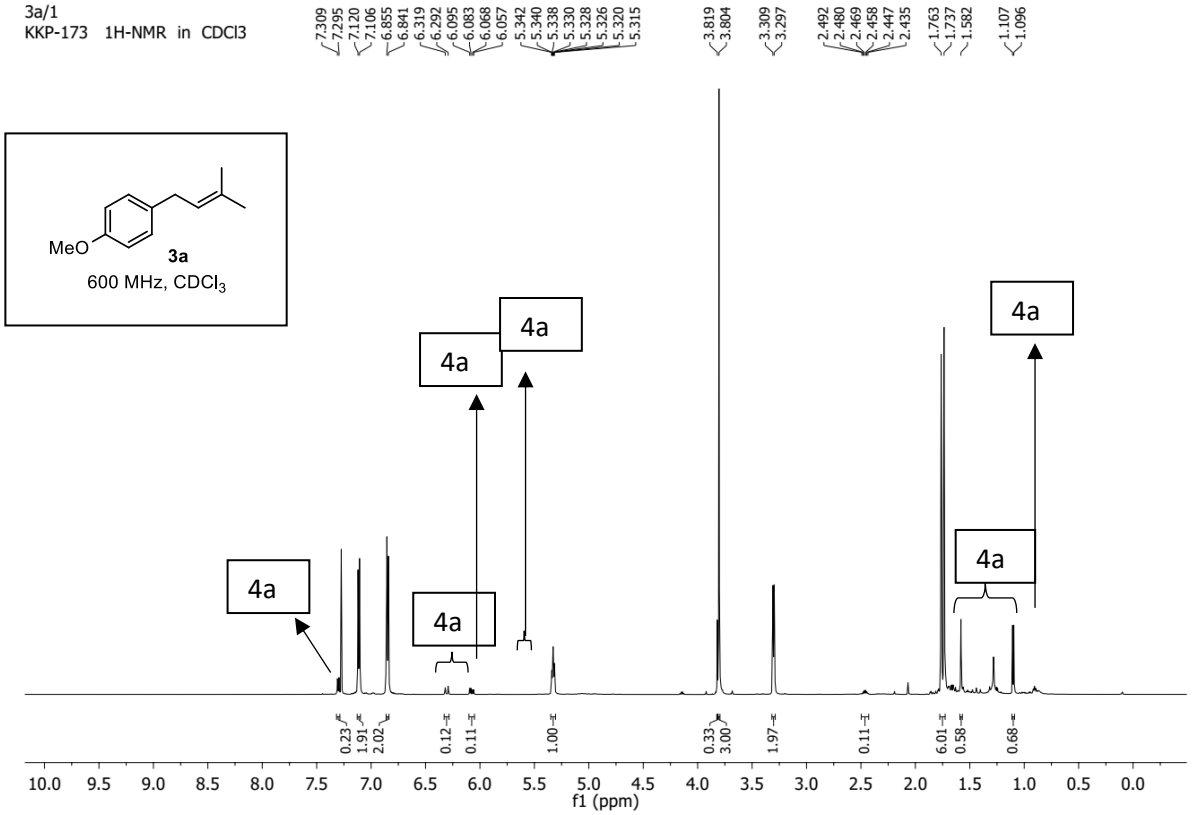


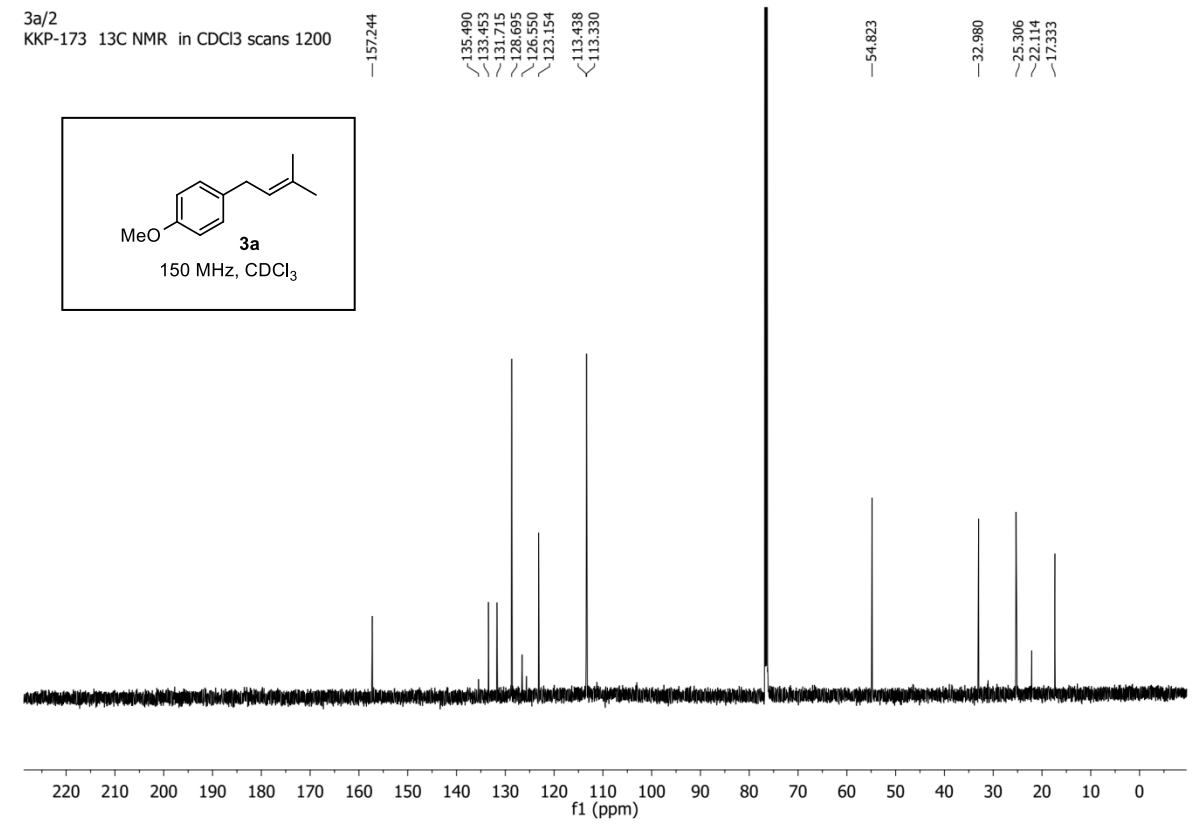


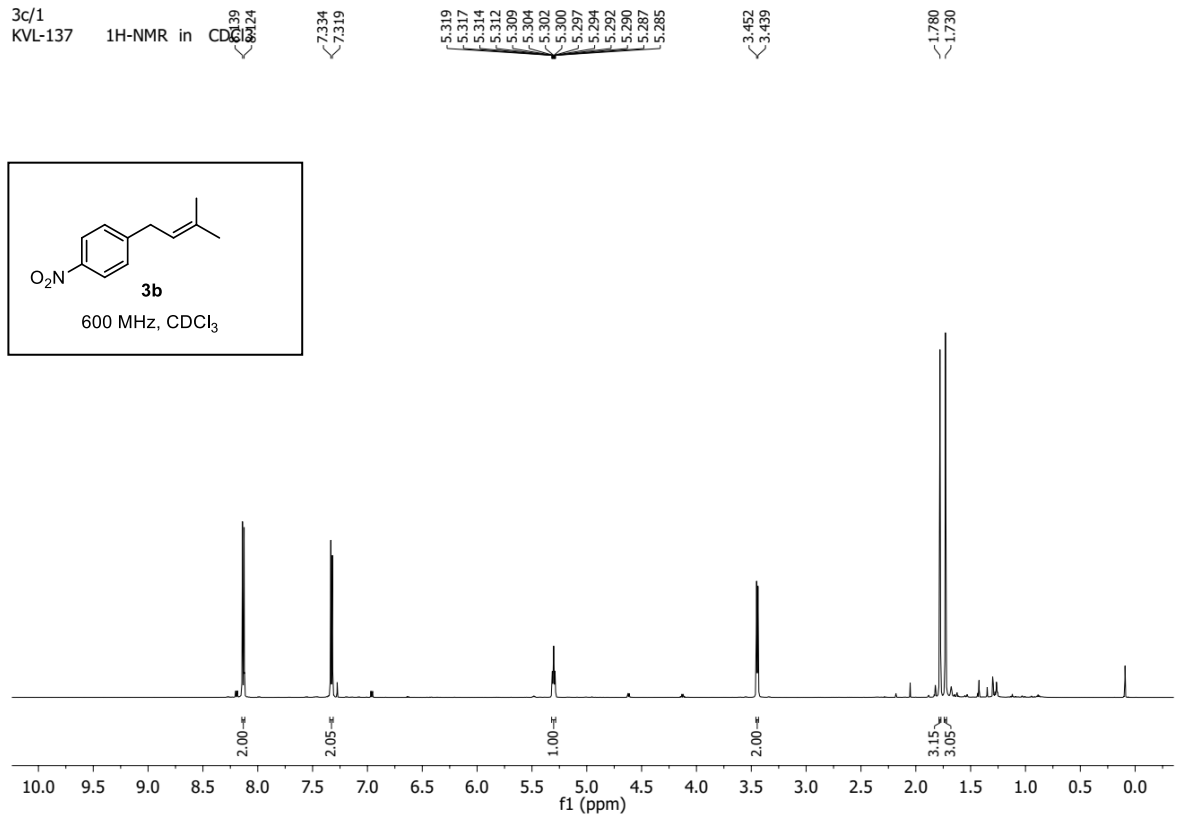
^{1}H NMR (400 MHz, $CDCl_3$): δ 1.01 (d, 3H, *J* = 3.2 Hz), 1.03 (d, 3H, *J* = 3.2 Hz), 1.23 (s, 3H), 2.29-2.40 (m, 1H), 3.32 (d, 1H, *J* = 5.2 Hz), 3.79 (s, 1H), 3.80 (s, 3H), 4.13 (t, 1H, *J* = 5.6 Hz), 5.49-5.59 (m, 2H), 5.61-5.67 (m, 1H), 6.21-6.34 (m, 1H), 6.36-6.49 (m, 3H), 6.83-6.86 (m, 1H), 6.87 (dd, 2H, J_1 = 6.6 Hz, J_2 = 2.1 Hz), 7.11 (dd, 1H, J_1 = 6.6 Hz, J_2 = 2.0 Hz), 7.19 (dd, 2H, J_1 = 6.8 Hz, J_2 = 2.0 Hz),), 7.30-7.35 (m, 3H), 7.41-7.45 (m, 7H), 7.54 (d, 4H, *J* = 8.4 Hz),

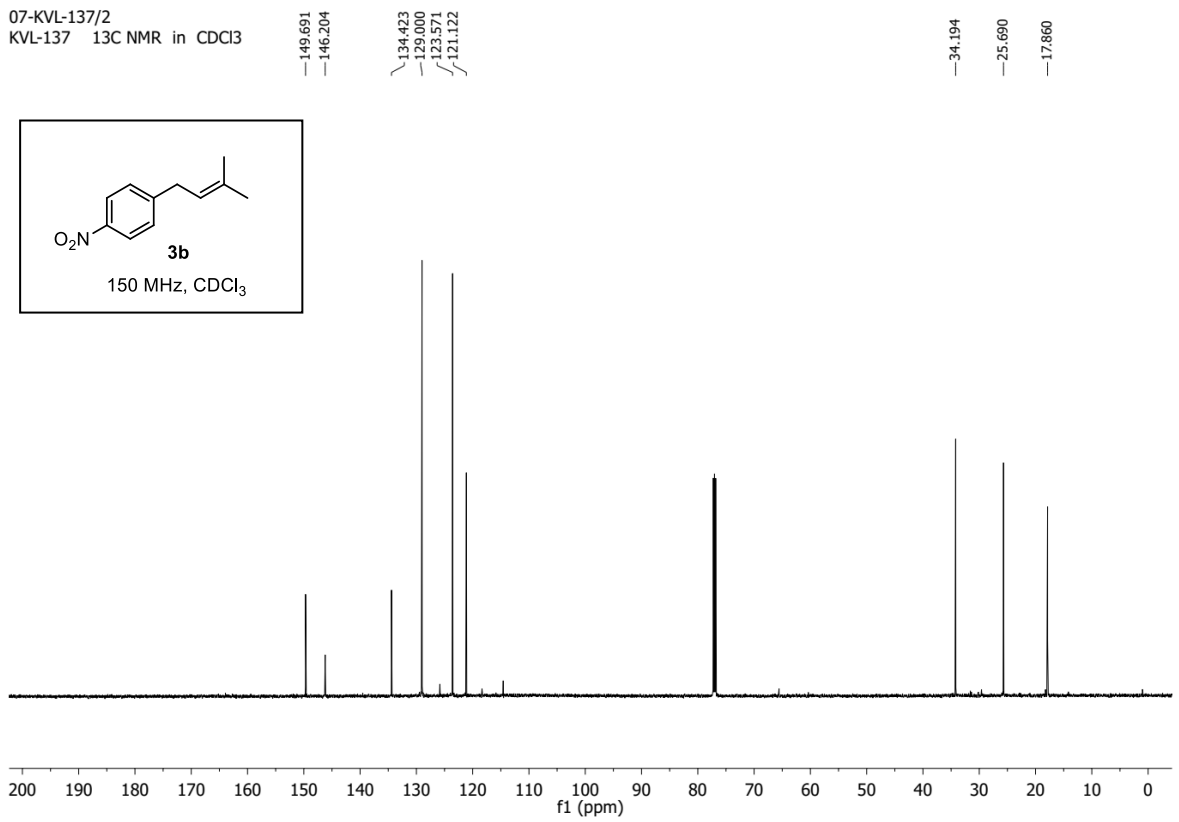
7.58-7.60 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 22.65, 22.69, 27.6, 31.2, 38.3, 38.8, 50.5, 55.3, 113.8, 113.9, 114.0, 125.5, 126.1, 126.6, 126.7, 126.9, 127.1, 127.2, 127.30, 127.34, 128.81, 128.83, 128.9, 129.0, 129.1, 129.3, 129.4, 129.5, 129.7, 130.6,133.0, 133.4, 135.7, 136.7, 138.8, 139.8, 139.92, 139.98, 140.8, 157.9, 158.2; HRMS (EI, m/z) calcd. For $C_{27}H_{28}O$ $[M]^+$: 368.2140; found: 368.2143.

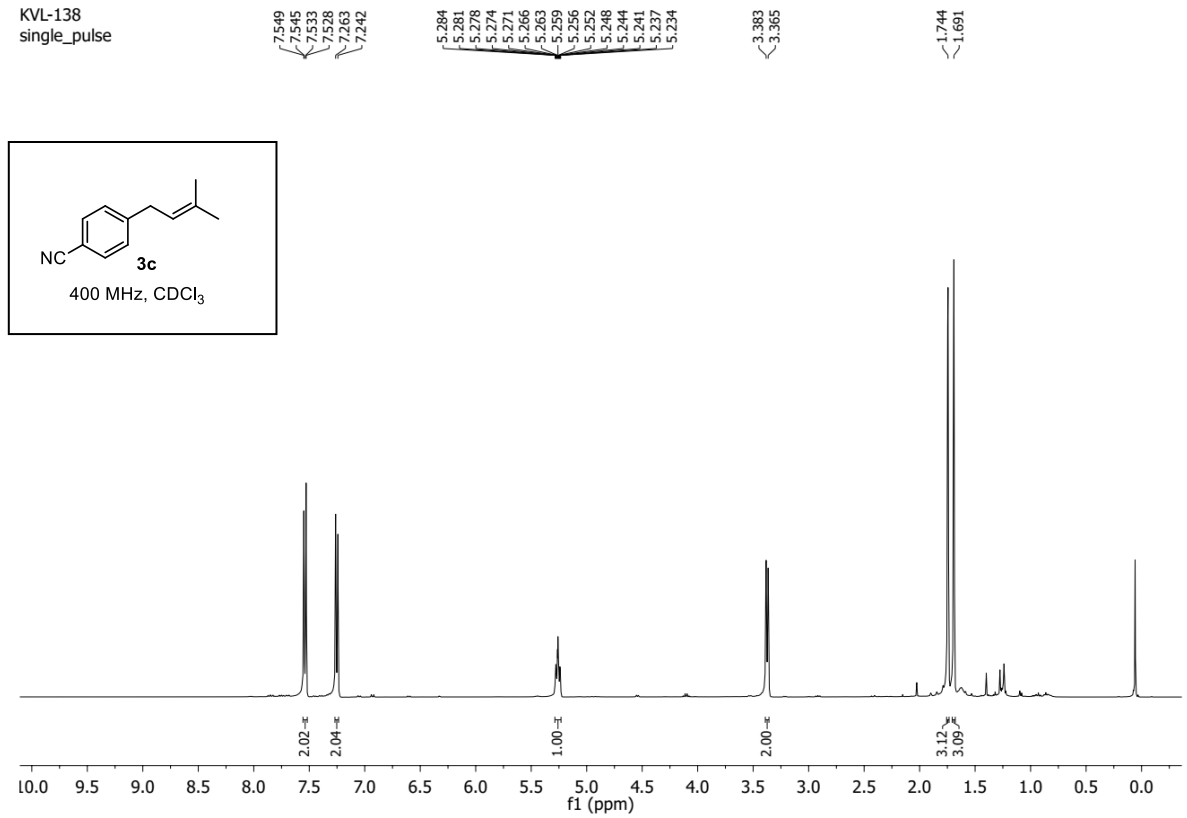
^{1}H and ^{13}C NMR spectra

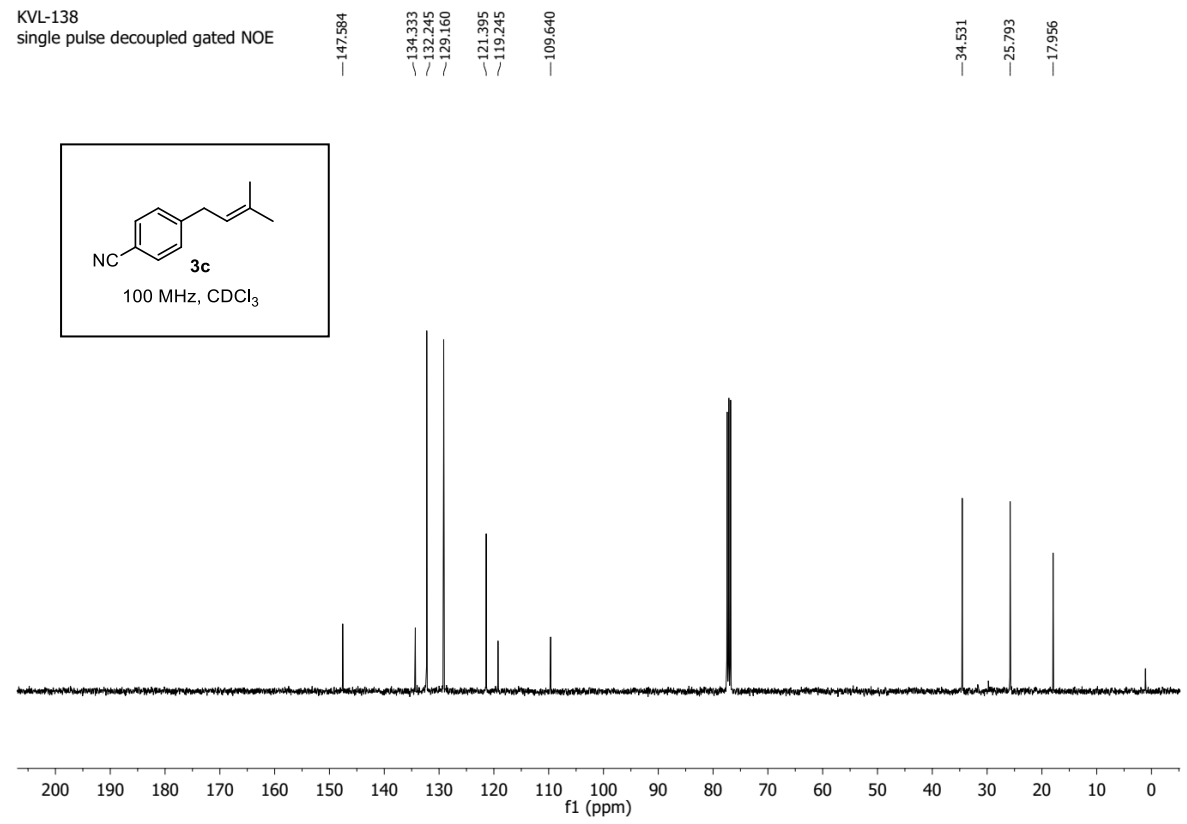

3a/1
KKP-173 1H-NMR in CDCl3
7.309
7.295
7.120
7.106
6.855
6.841
6.319
6.292
6.095
6.083
6.068
6.057
5.342
5.340
5.338
5.330
5.328
5.326
5.320
5.315
3.819
3.804
3.309
3.297
2.492
2.480
2.469
2.458
2.447
2.435
1.763
1.737
1.582
1.107
1.096
MeO
3a
600 MHz, CDCl3
4a
4a
4a
4a
4a
0.23
1.91
2.02
0.12
0.11
1.00
0.33
3.00
1.97
0.11
6.01
0.58
0.68
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)


3a/2
KKP-173 13C NMR in CDCl3 scans 1200
157.244
135.490
133.453
131.715
128.695
126.550
123.154
113.438
113.330
54.823
32.980
25.306
22.114
17.333
MeO
3a
150 MHz, CDCl3
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

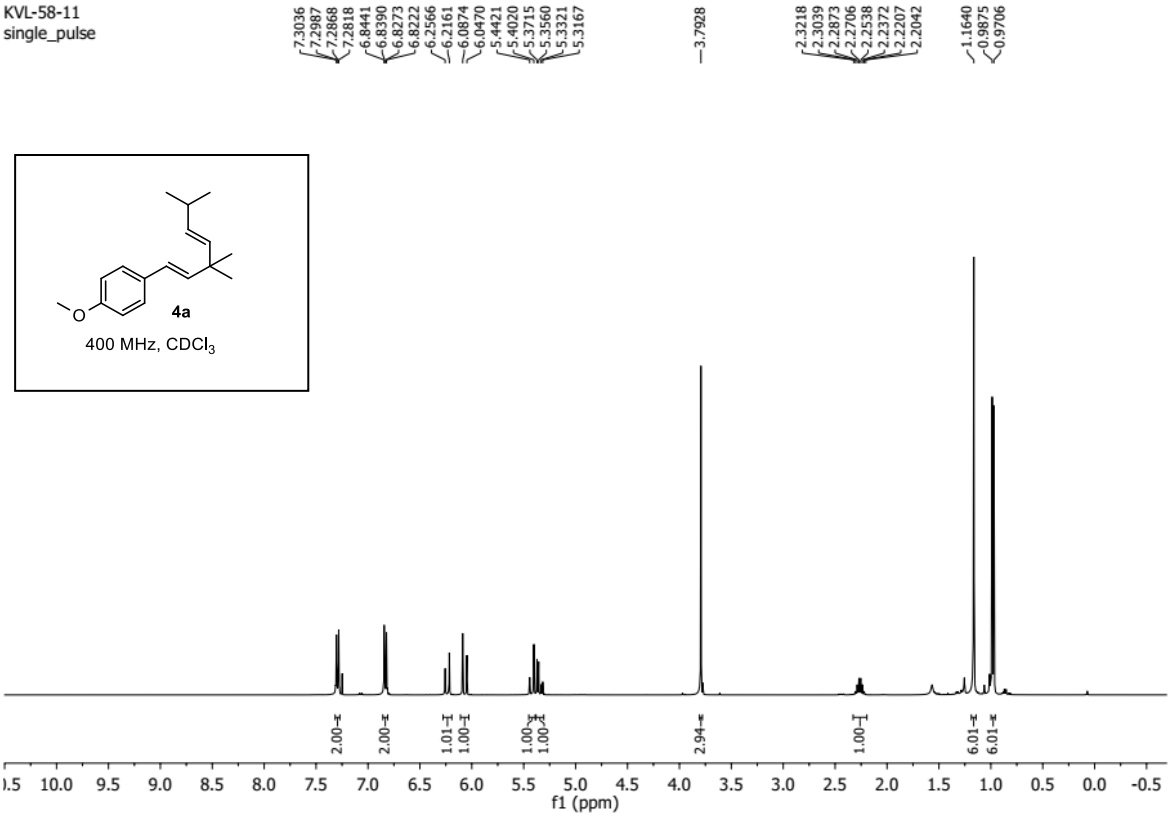

3c/1
KVL-137 1H-NMR in CDCl3
7.439
7.424
7.334
7.319
5.319
5.317
5.314
5.312
5.309
5.304
5.302
5.300
5.297
5.294
5.292
5.290
5.287
5.285
3.452
3.439
1.780
1.730
O2N
3b
600 MHz, CDCl3
2.00
2.05
1.00
2.00
3.15
3.05
f1 (ppm)


07-KVL-137/2
KVL-137 13C NMR in CDCl3
149.691
146.204
134.423
129.000
123.571
121.122
34.194
25.690
17.860
O2N
3b
150 MHz, CDCl3
f1 (ppm)

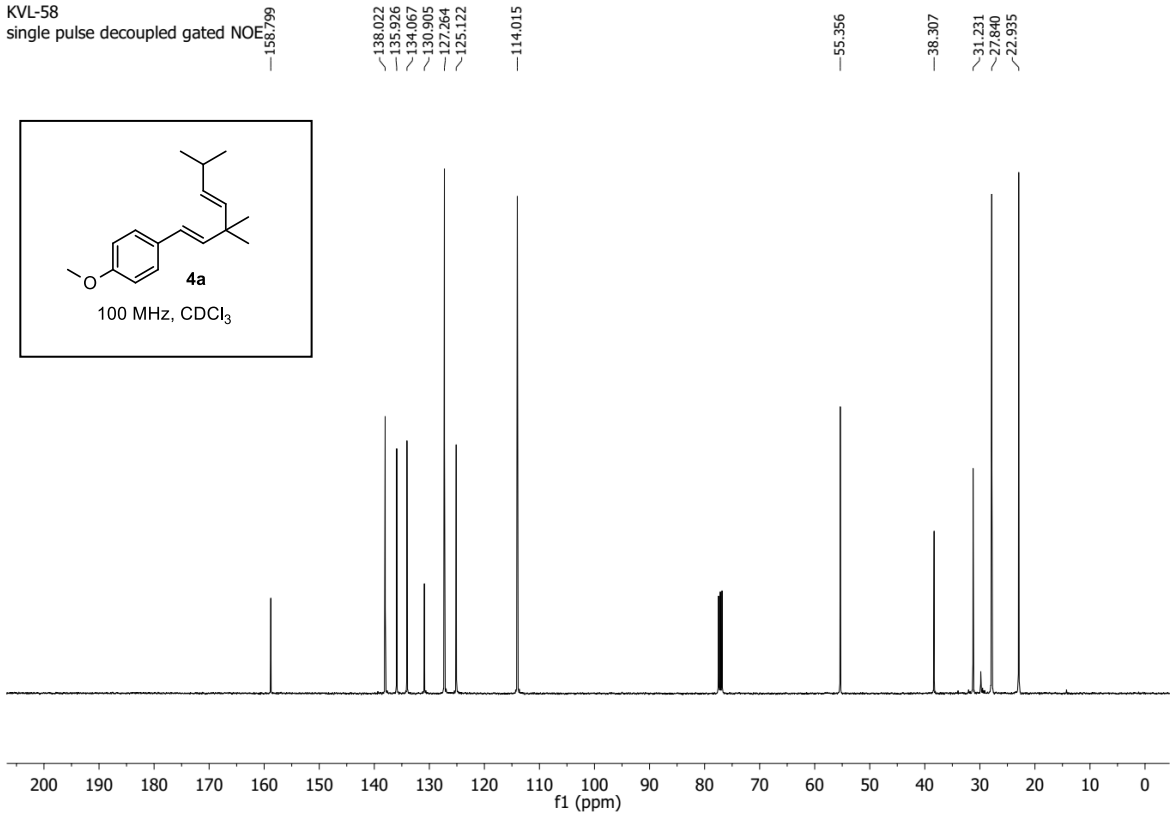

KVL-138
single_pulse
7.549
7.545
7.533
7.528
7.263
7.242
5.284
5.281
5.278
5.274
5.271
5.266
5.263
5.259
5.256
5.252
5.248
5.244
5.241
5.237
5.234
3.383
3.365
1.744
1.691
NC
3c
400 MHz, CDCl3
2.02
2.04
1.00
2.00
3.12
3.09
f1 (ppm)

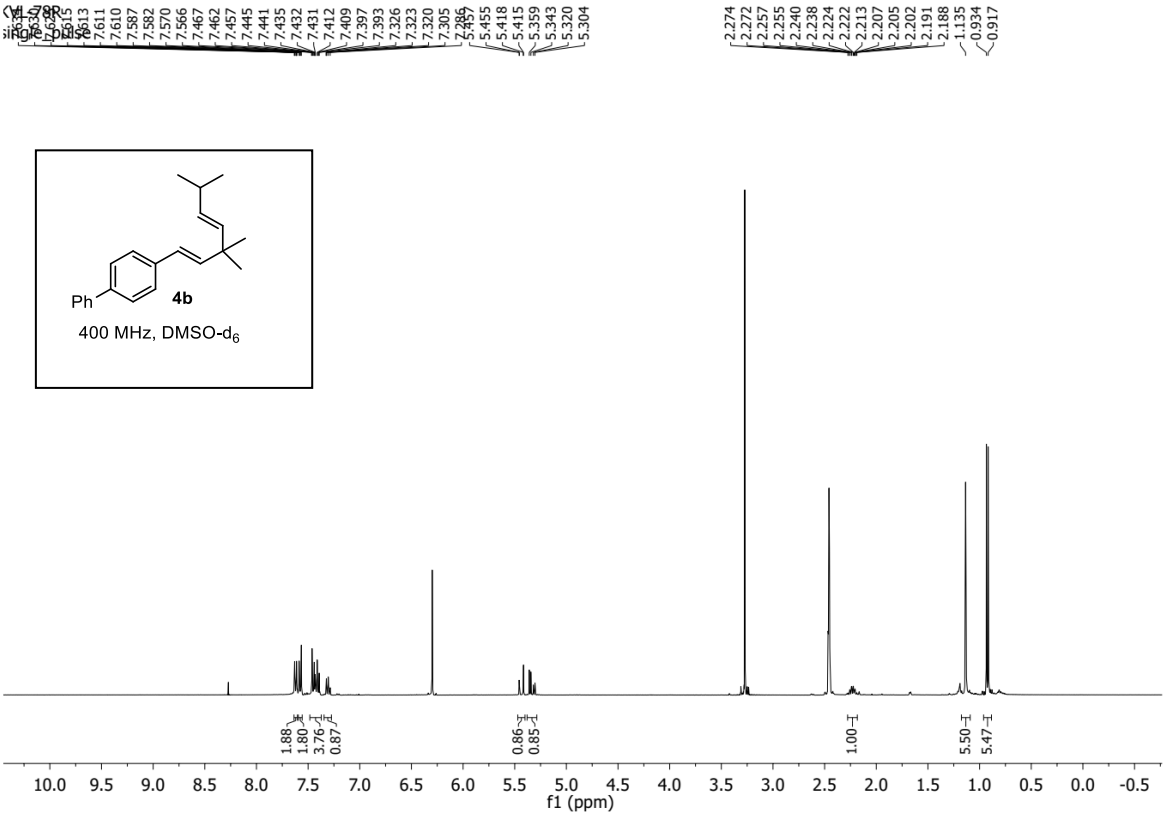

KVL-138
single pulse decoupled gated NOE
147.584
134.333
132.245
129.160
121.395
119.245
109.640
34.531
25.793
17.956
NC
3c
100 MHz, CDCl3
f1 (ppm)

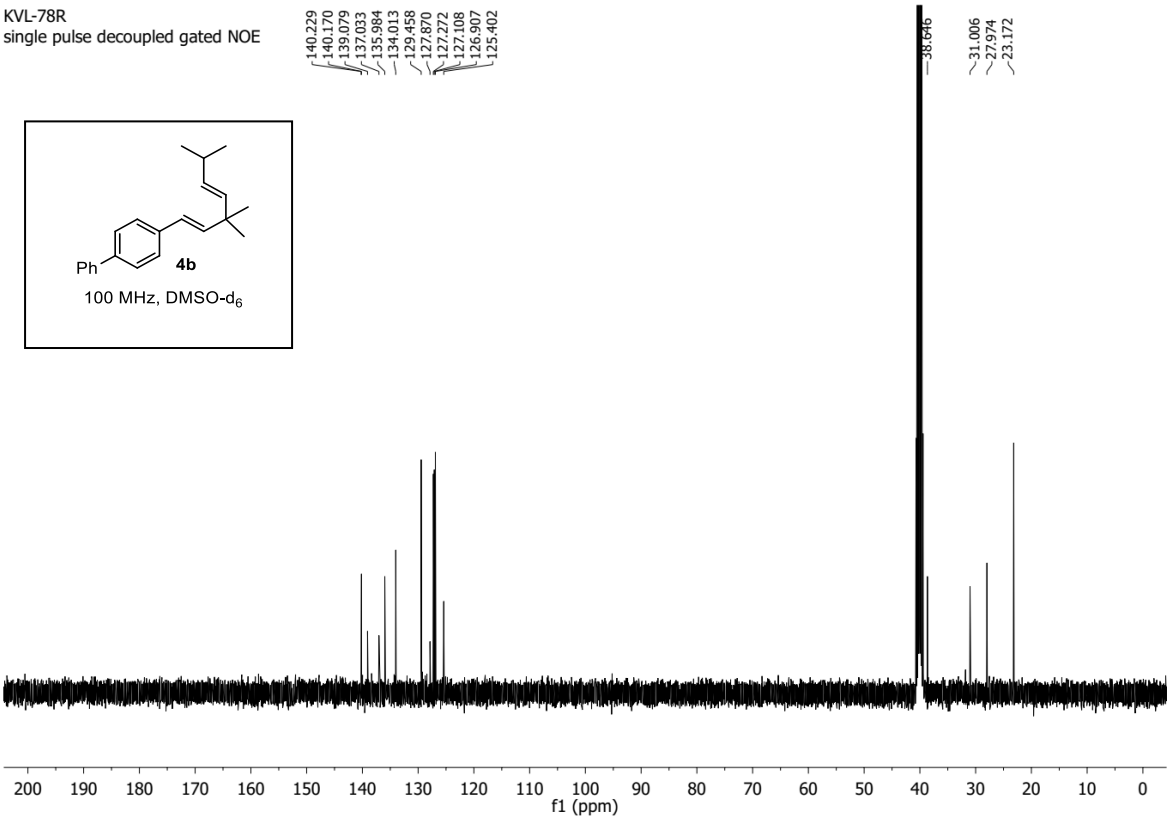
KVL-58-11
single_pulse



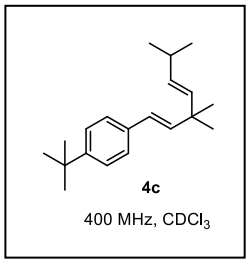
KVL-58
single pulse decoupled gated NOE



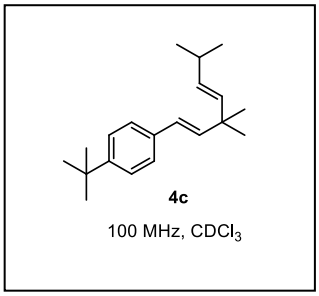

KVL-78R
single pulse
7.634
7.615
7.613
7.611
7.610
7.587
7.582
7.570
7.566
7.467
7.462
7.457
7.445
7.441
7.435
7.432
7.431
7.412
7.409
7.397
7.393
7.326
7.323
7.320
7.305
5.455
5.418
5.415
5.359
5.343
5.320
5.304
2.274
2.272
2.257
2.255
2.240
2.238
2.224
2.222
2.213
2.207
2.205
2.202
2.191
2.188
1.135
0.934
0.917
Ph
4b
400 MHz, DMSO-d6
1.88
1.80
3.76
0.87
0.86
0.85
1.00
5.50
5.47
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


KVL-78R
single pulse decoupled gated NOE
140.229
140.170
139.079
137.033
135.984
134.013
129.458
127.870
127.272
127.108
126.907
125.402
38.646
31.006
27.974
23.172
Ph
4b
100 MHz, DMSO-d6
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

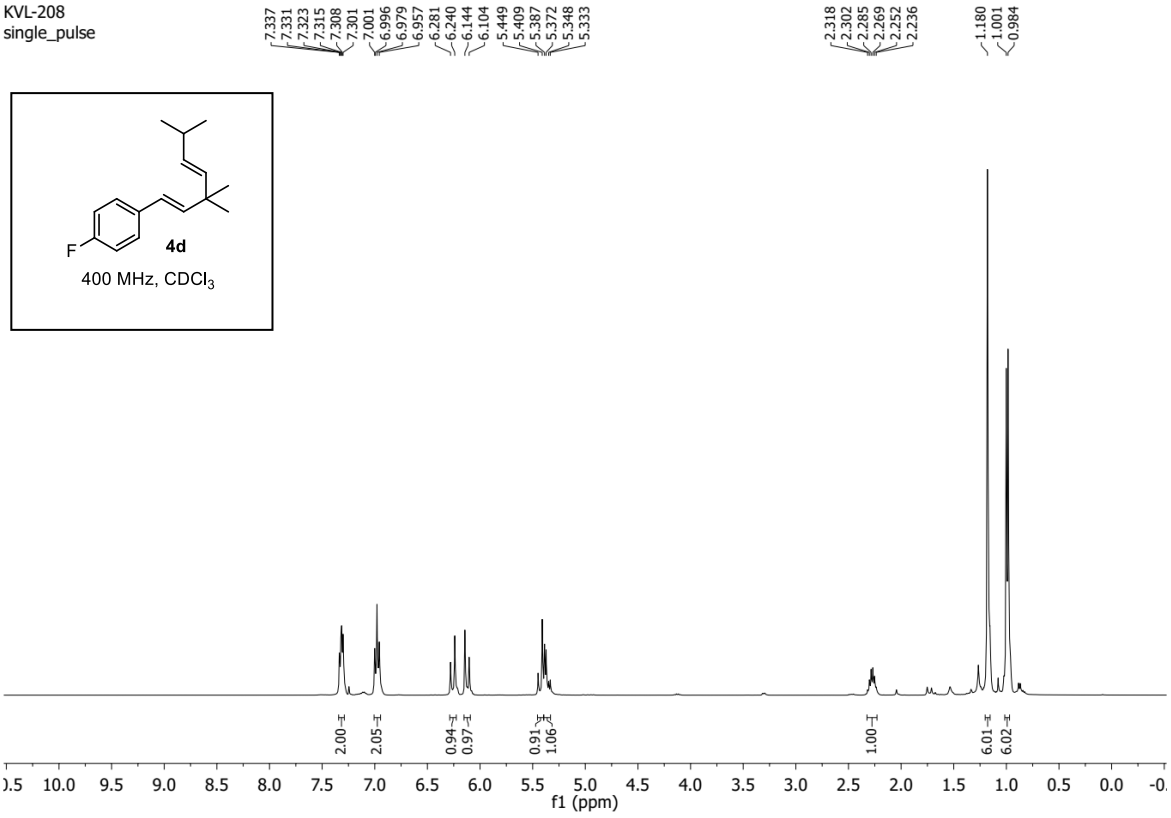
KVL-112
single_pulse



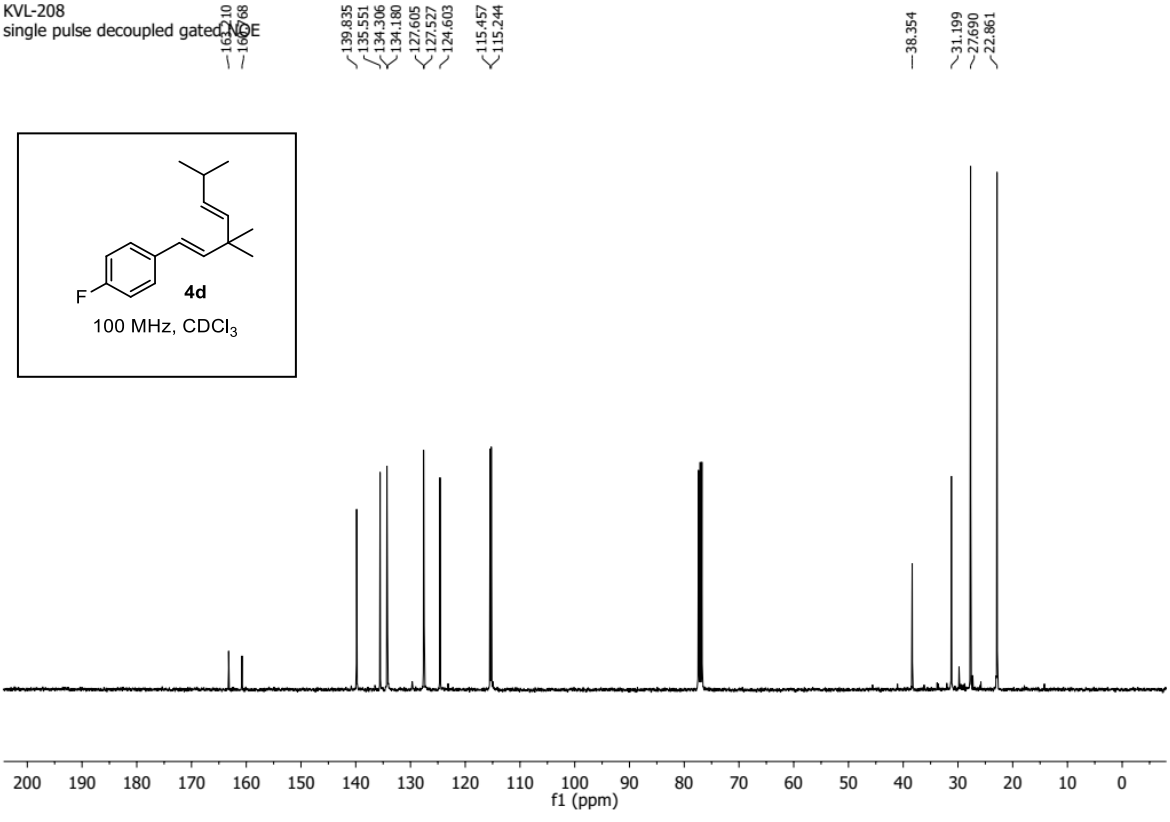
KVL-112
single pulse decoupled gated NOE



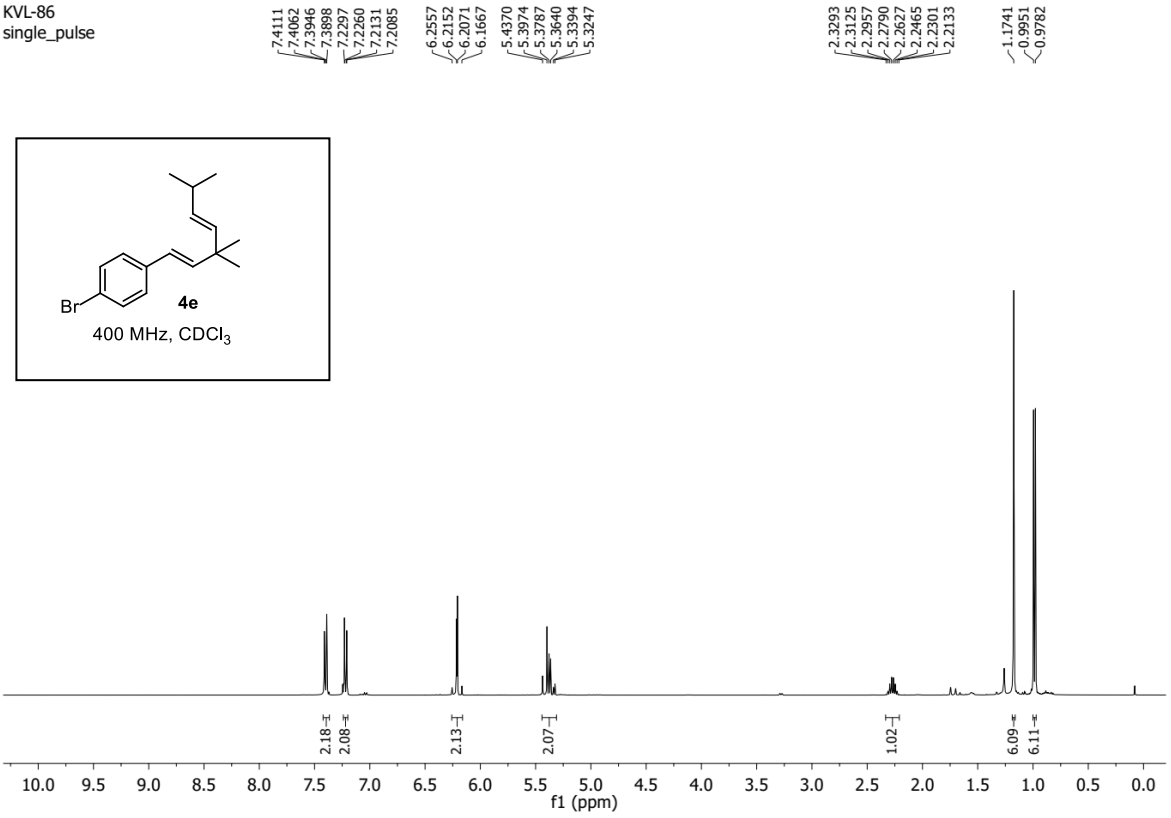
KVL-208
single_pulse



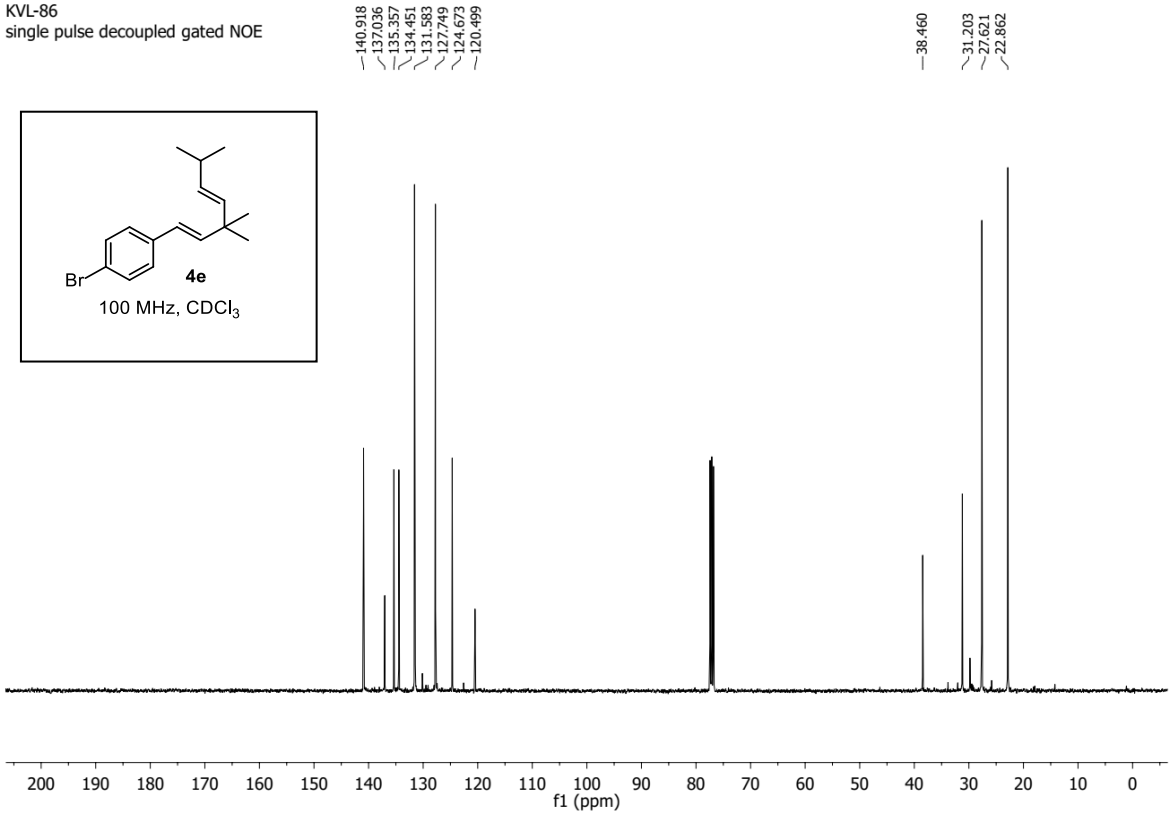
KVL-208
single pulse decoupled gated NOE



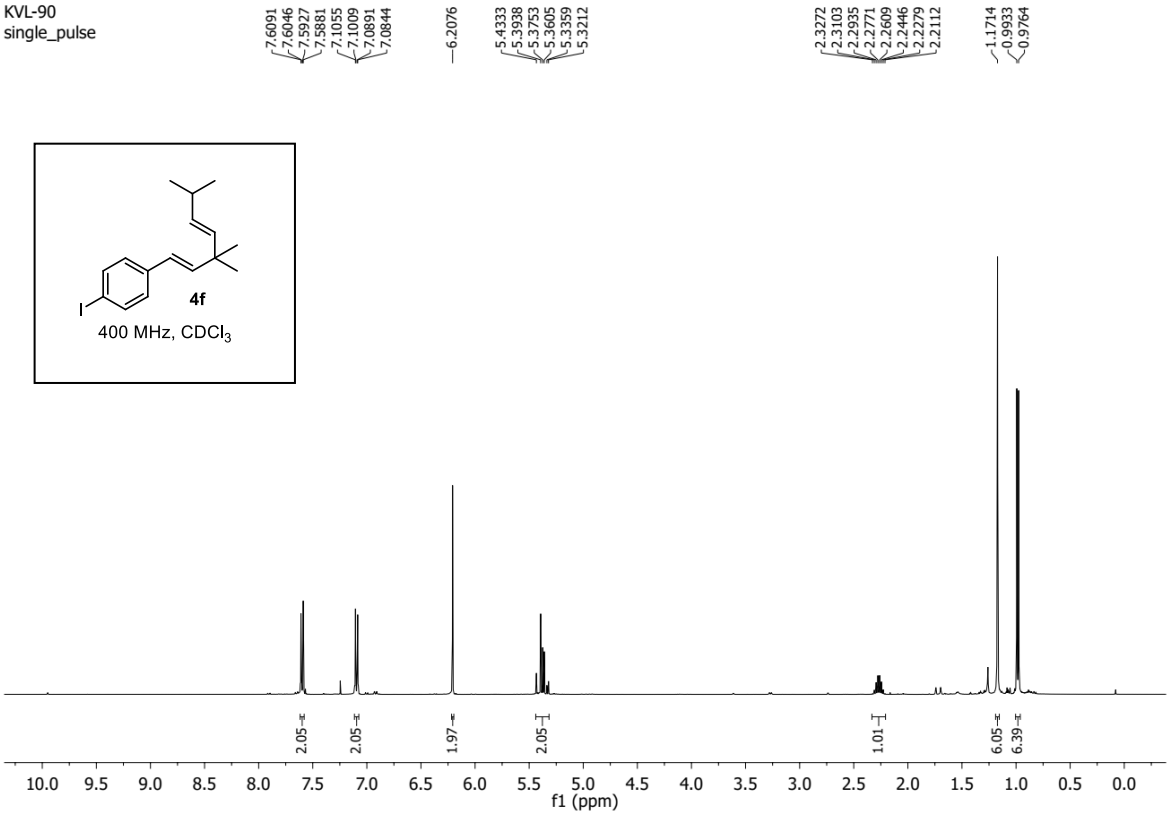
KVL-86
single_pulse



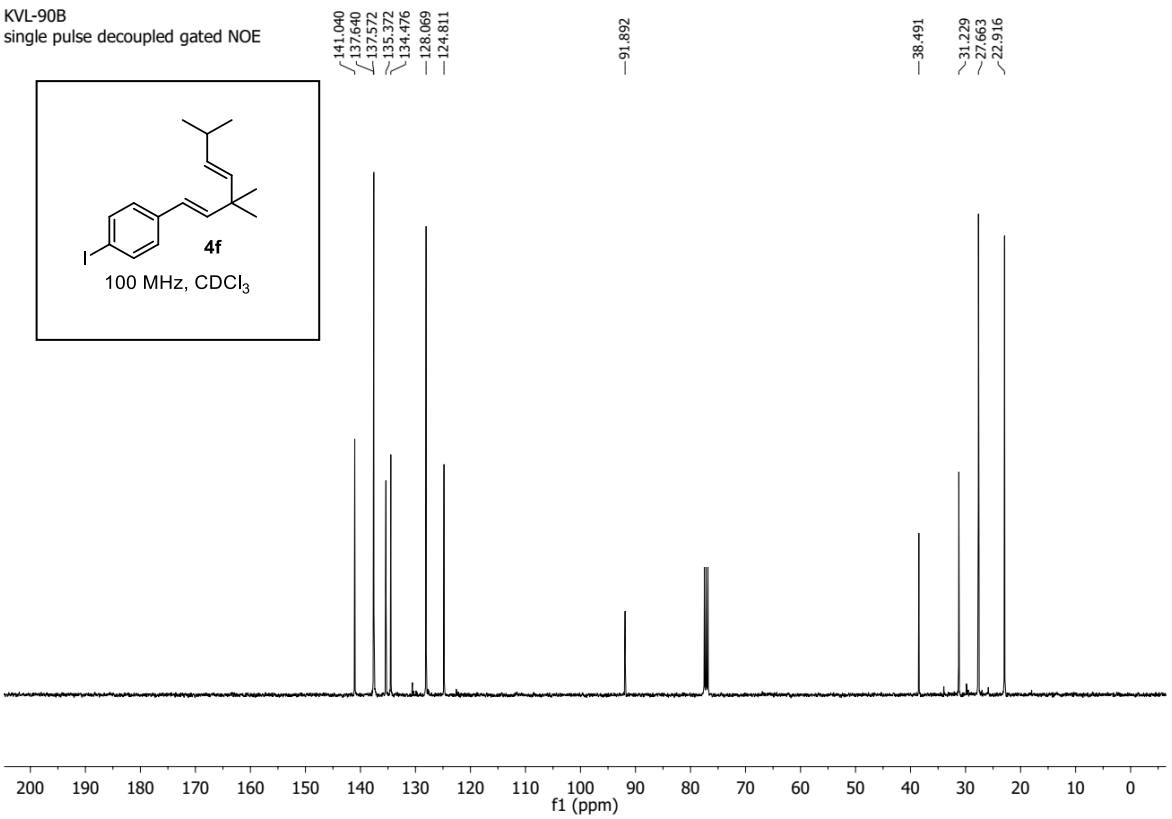
KVL-86
single pulse decoupled gated NOE



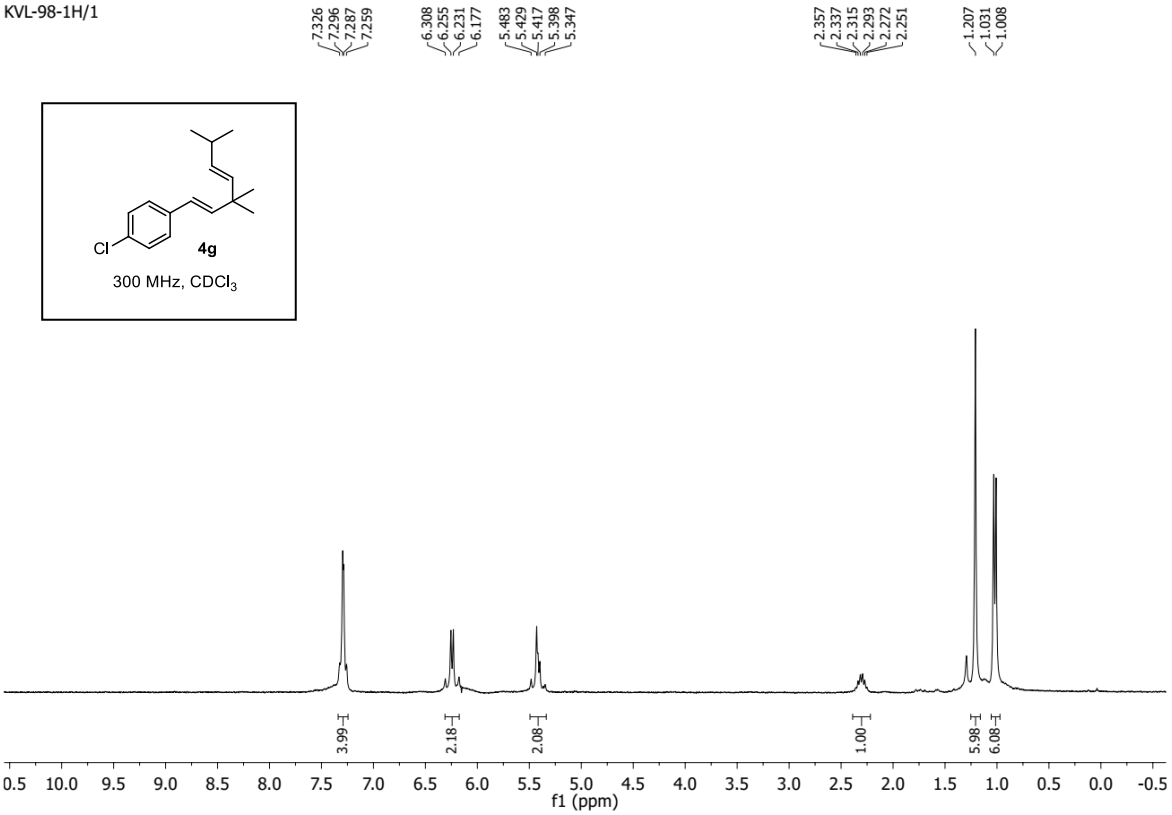
KVL-90
single_pulse



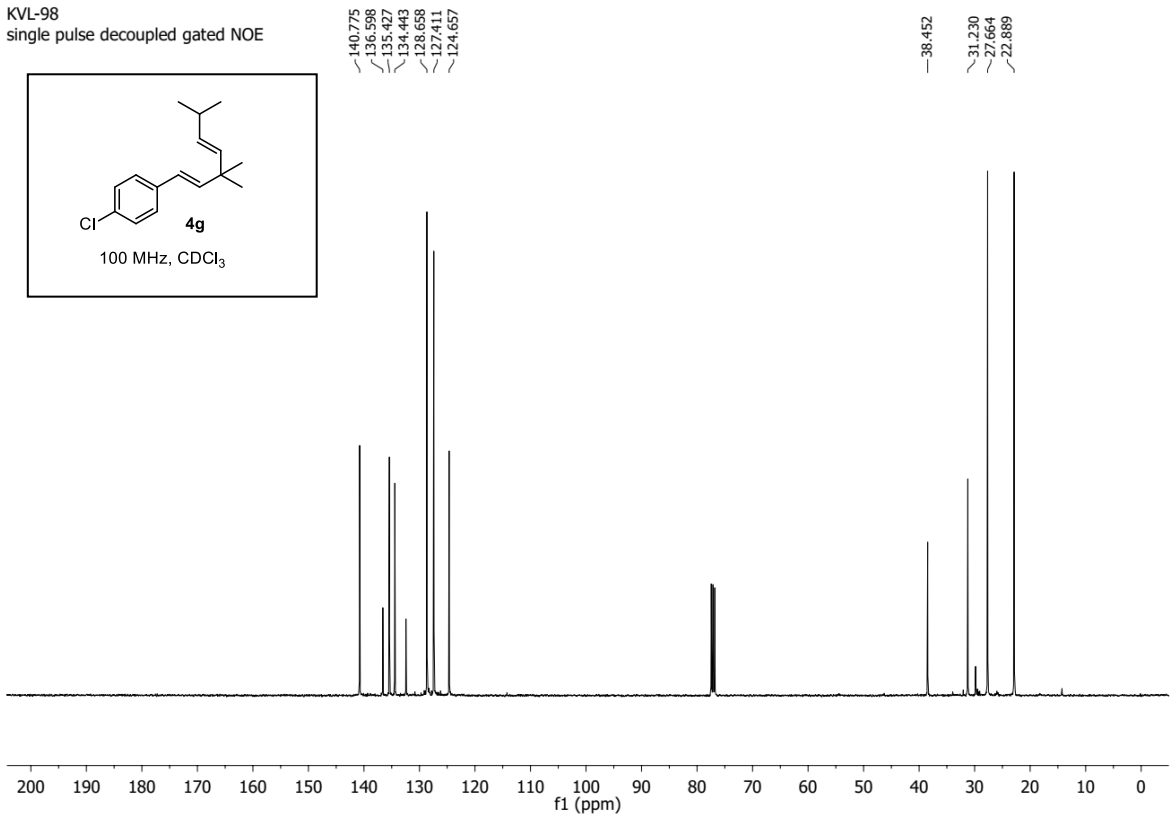
KVL-90B
single pulse decoupled gated NOE



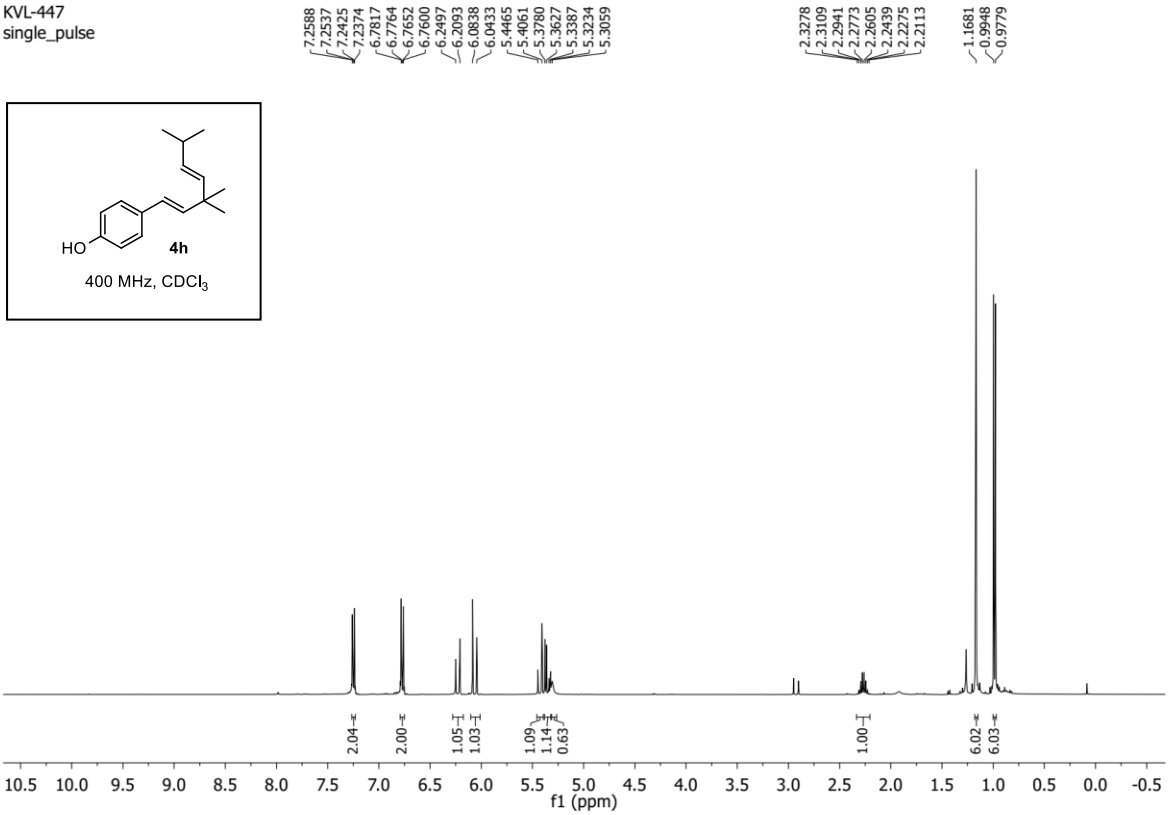
KVL-98-1H/1



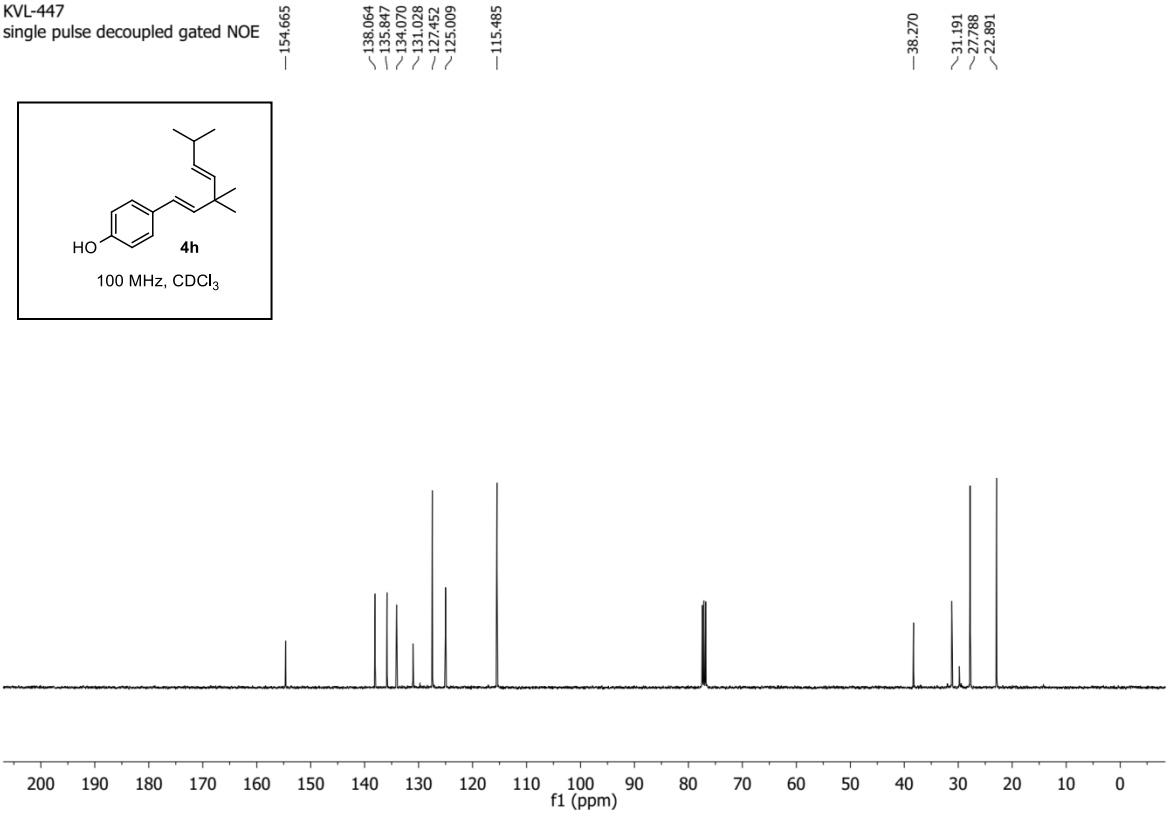
KVL-98
single pulse decoupled gated NOE



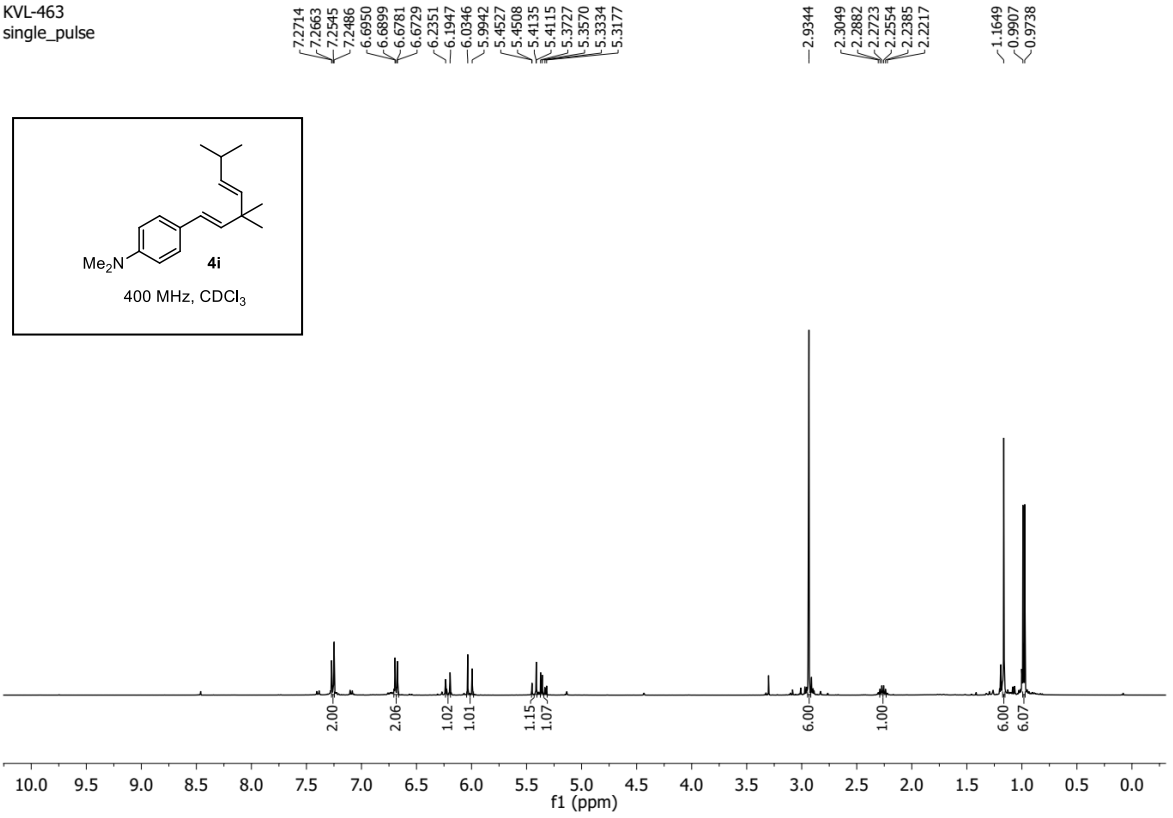
KVL-447
single_pulse



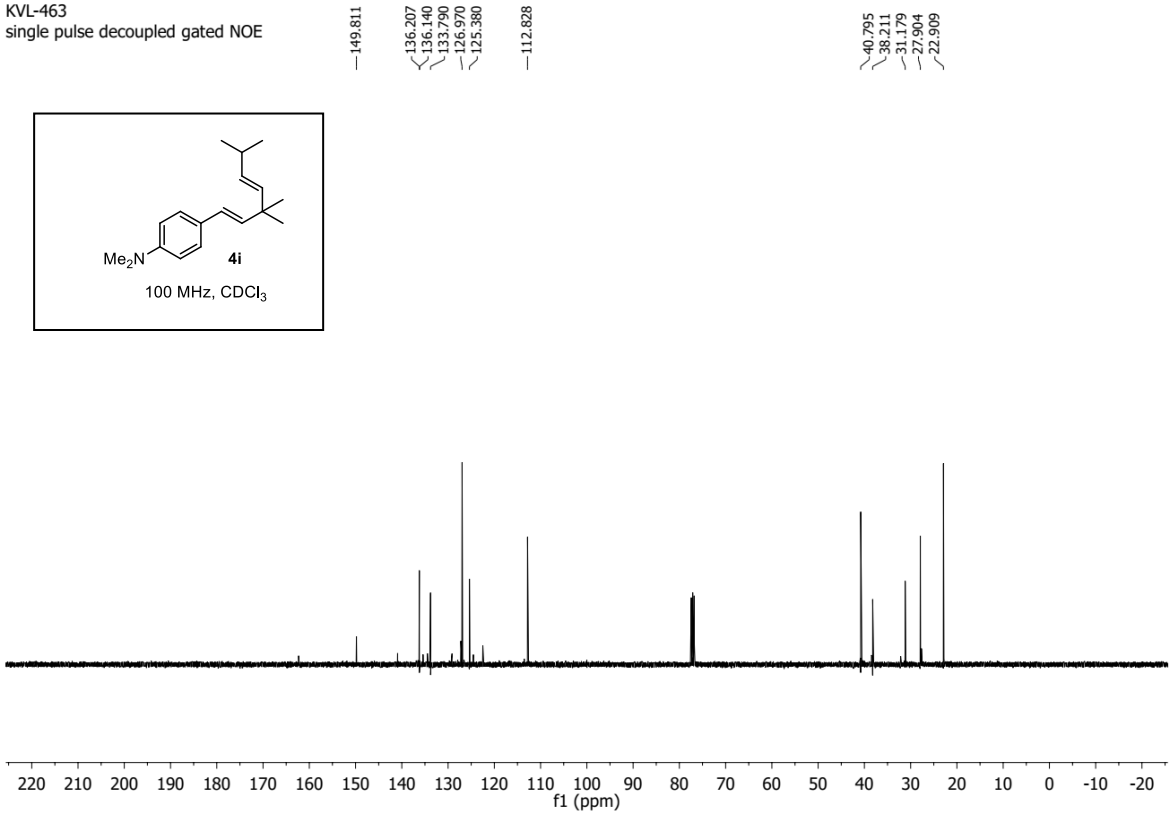
KVL-447
single pulse decoupled gated NOE

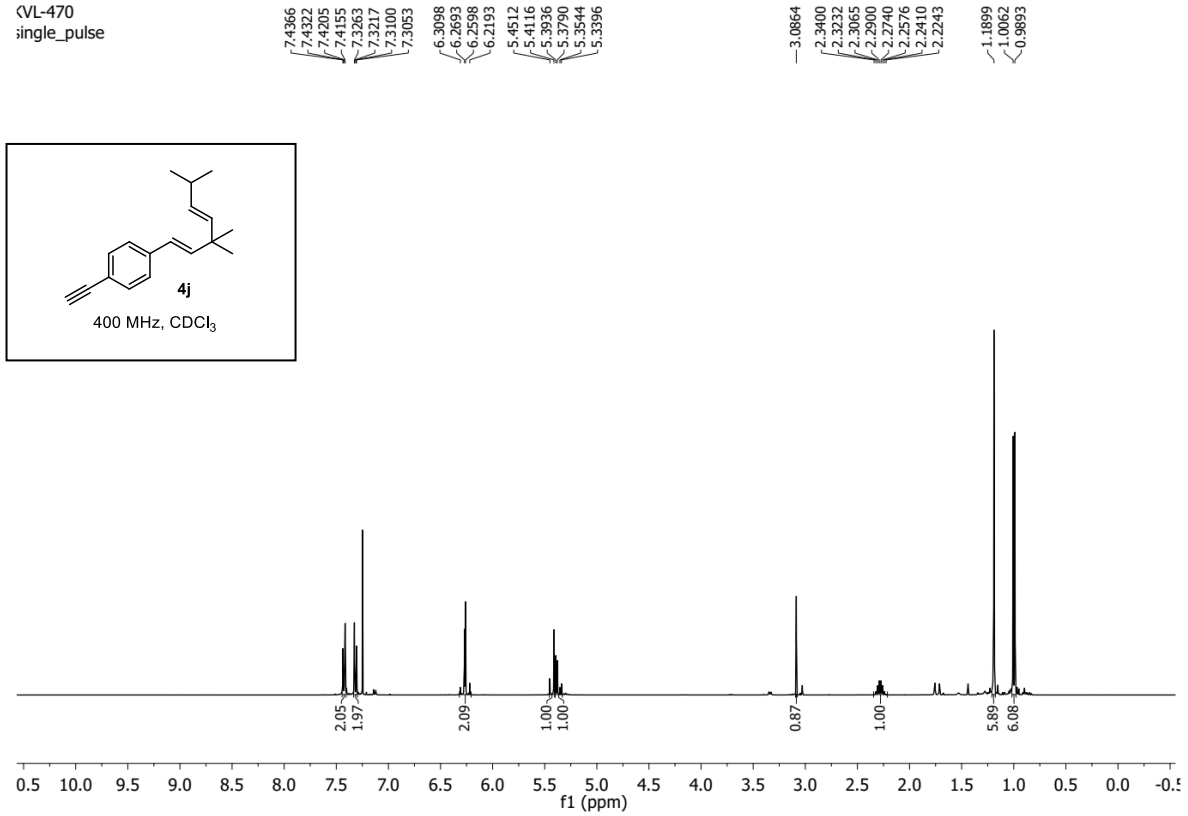


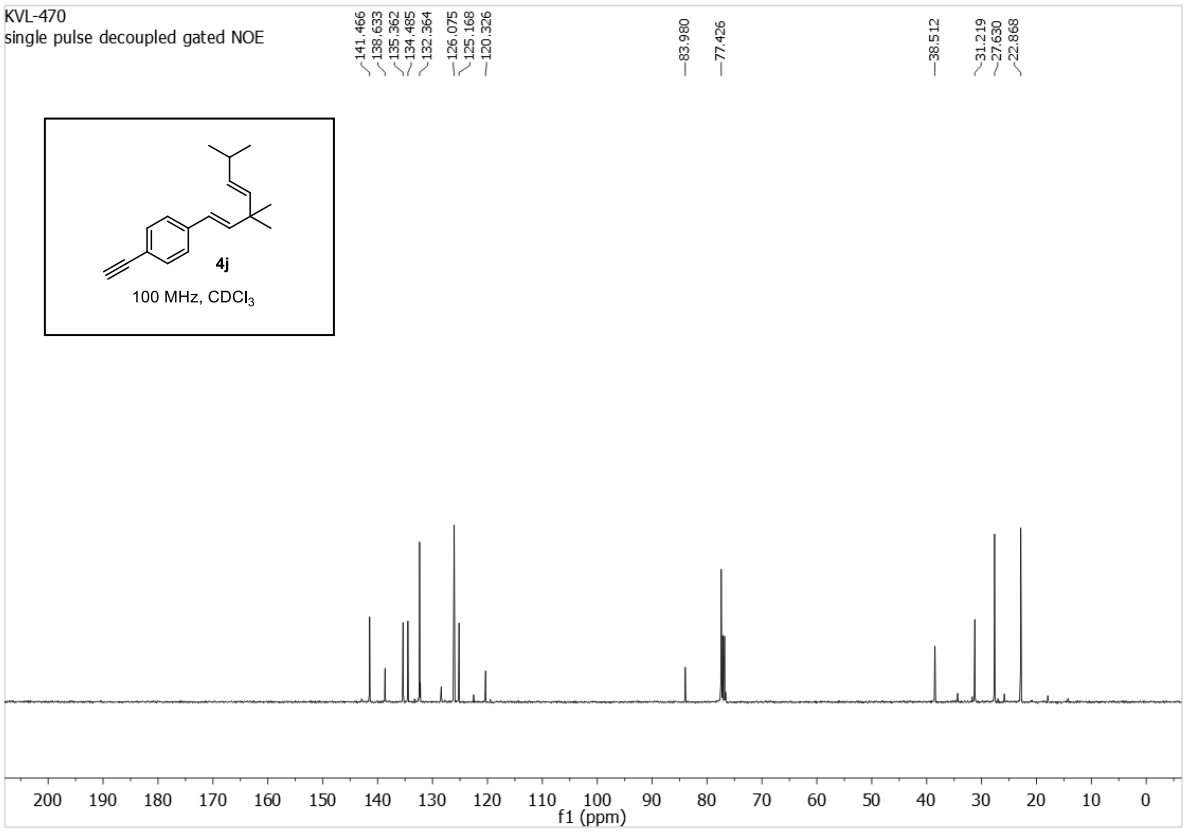
KVL-463
single_pulse



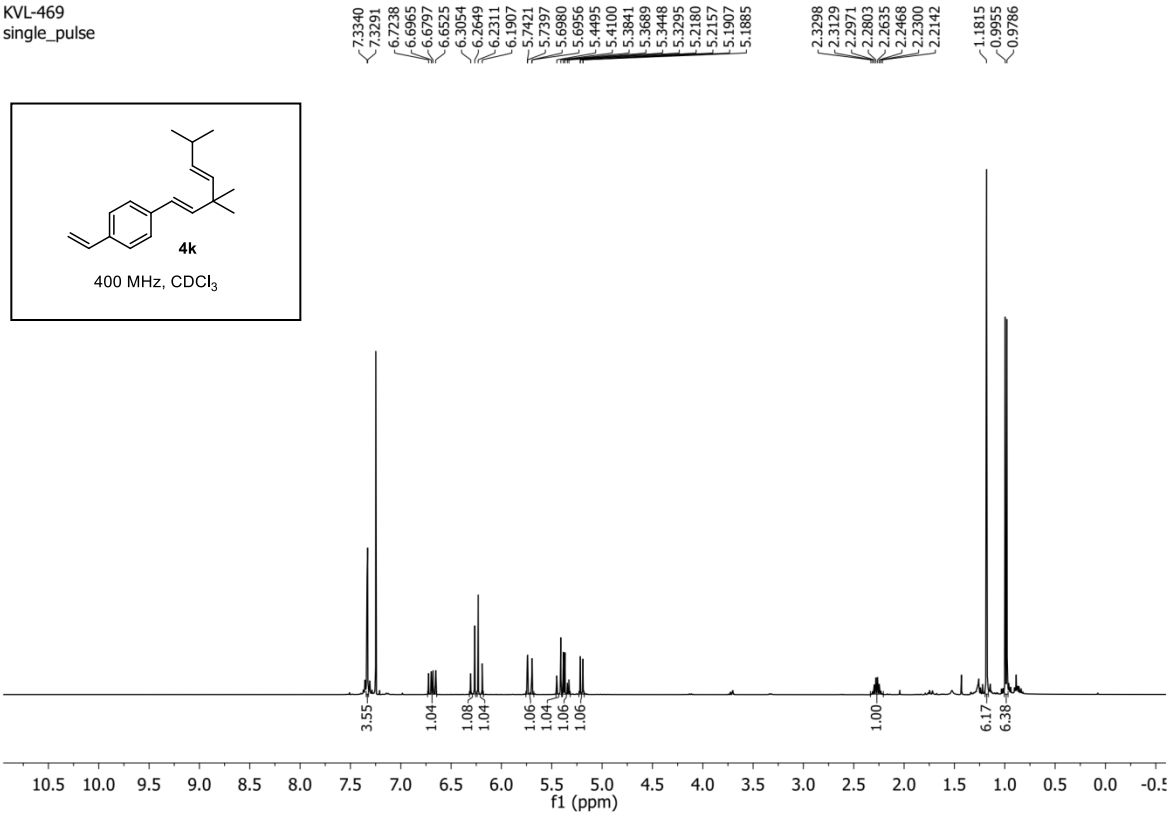
KVL-463
single pulse decoupled gated NOE



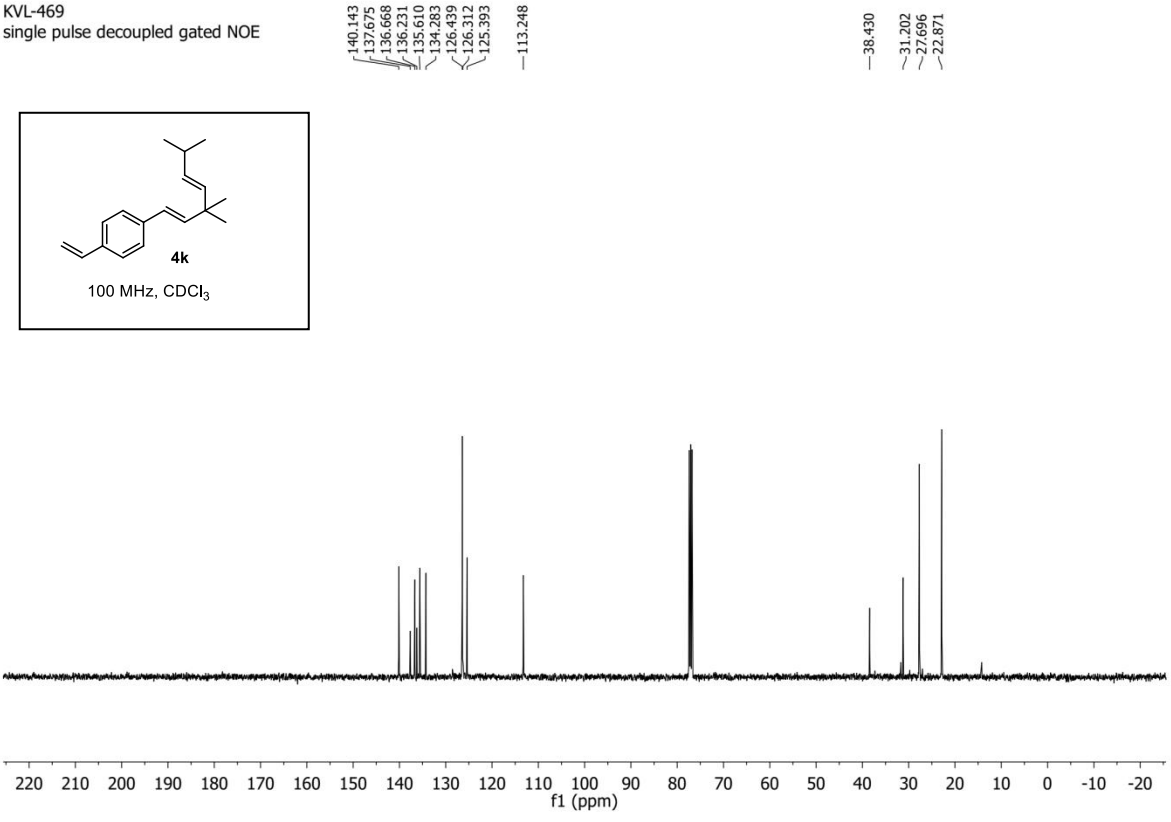

KVL-470
single_pulse
7.4366
7.4322
7.4205
7.4155
7.3263
7.3217
7.3100
7.3053
6.3098
6.2693
6.2598
6.2193
5.4512
5.4116
5.3936
5.3790
5.3544
5.3396
3.0864
2.3400
2.3232
2.3065
2.2900
2.2740
2.2576
2.2410
2.2243
1.1899
1.0062
0.9893
4j
400 MHz, CDCl3
2.05
1.97
2.09
1.00
1.00
0.87
1.00
5.89
6.08
f1 (ppm)


KVL-470
single pulse decoupled gated NOE
141.466
138.633
135.362
134.485
132.364
126.075
125.168
120.326
83.980
77.426
38.512
31.219
27.630
22.868
4j
100 MHz, CDCl3
f1 (ppm)

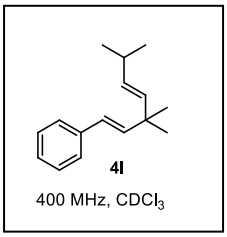
KVL-469
single_pulse



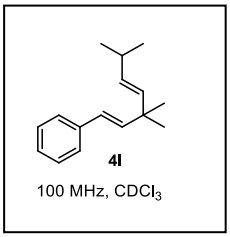
KVL-469
single pulse decoupled gated NOE

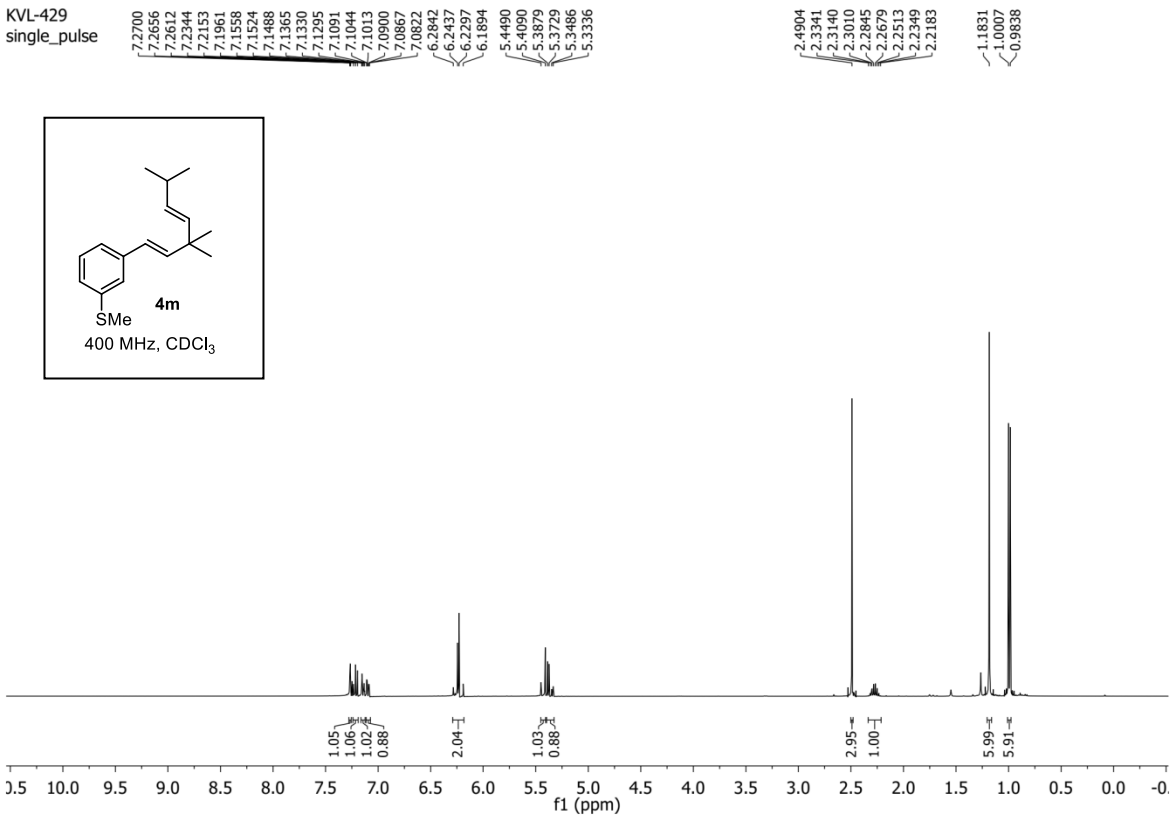


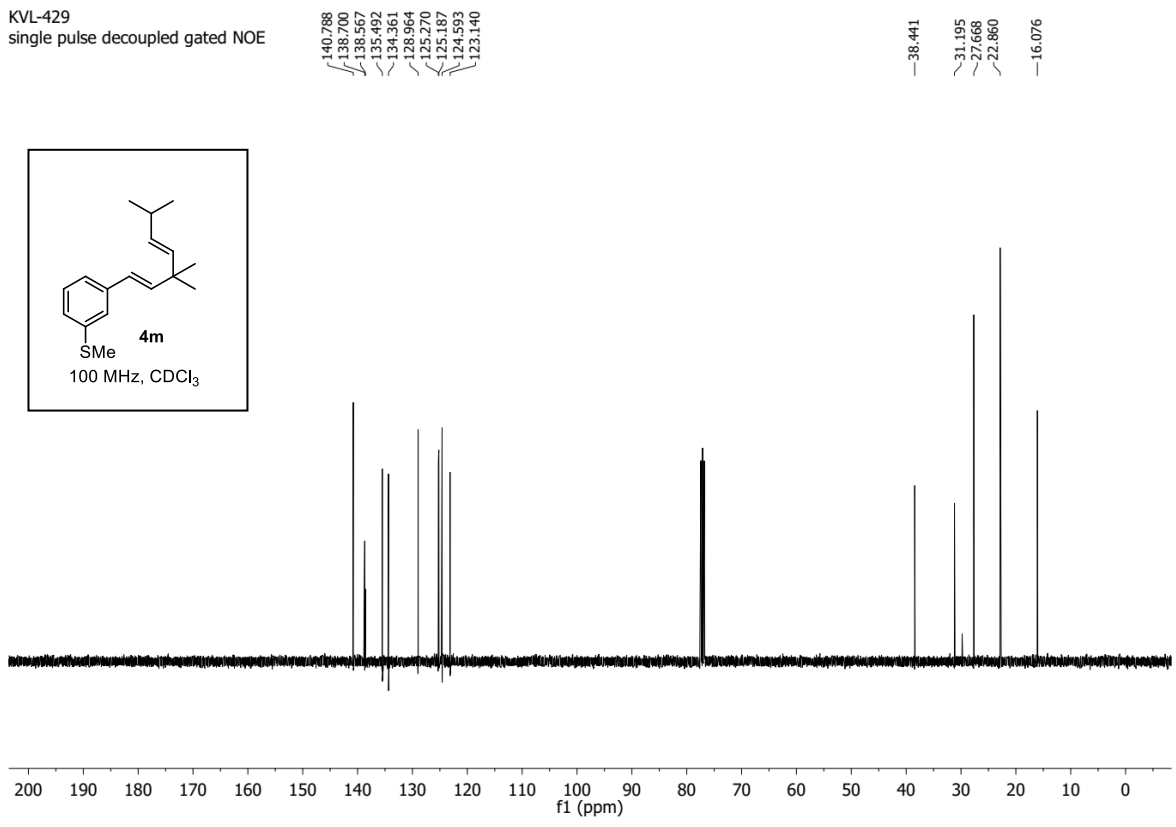
KVL-113B
single_pulse

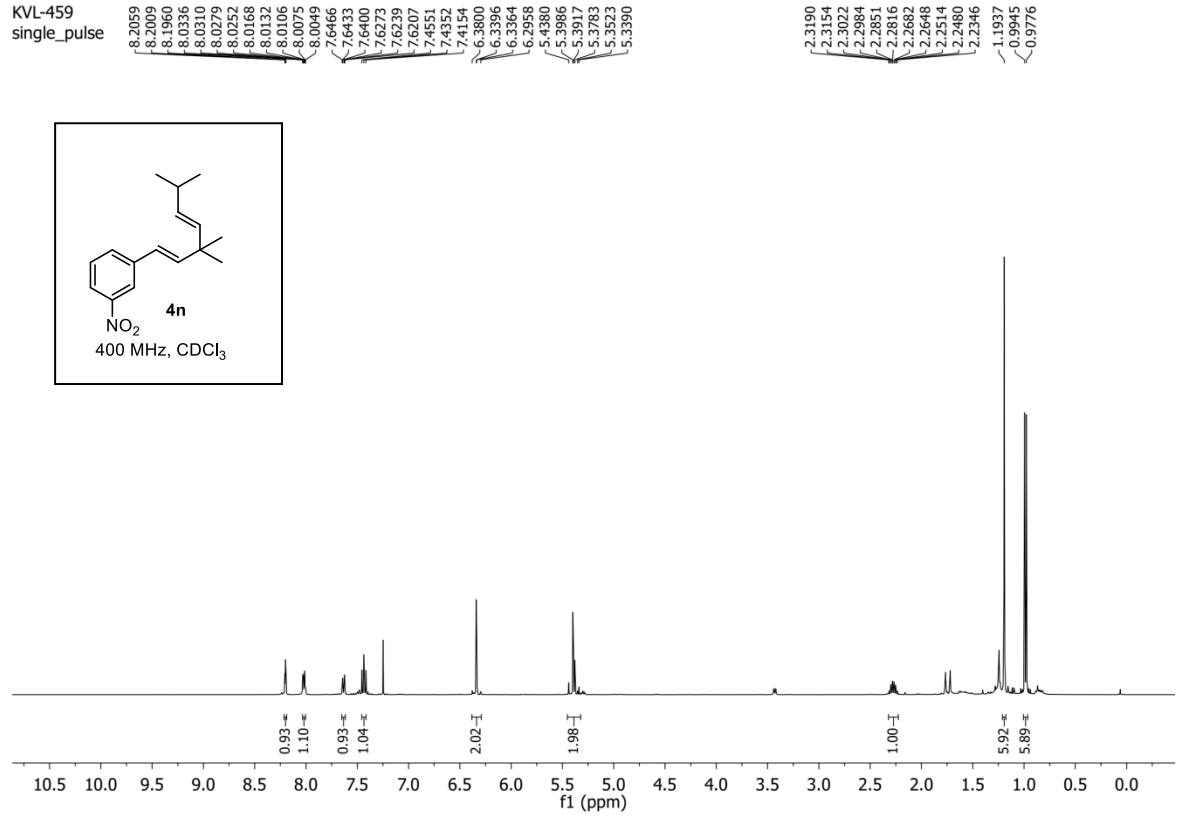


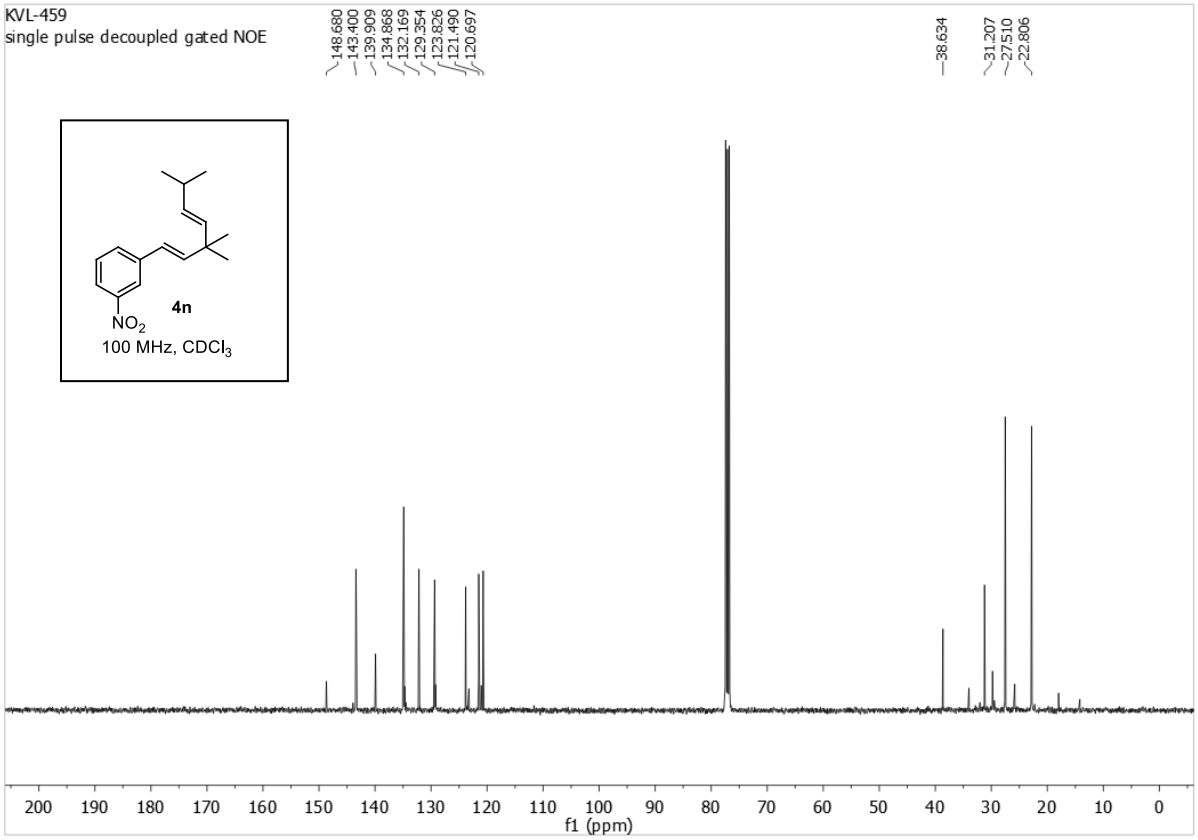
KVL-113B
single pulse decoupled gated NOE

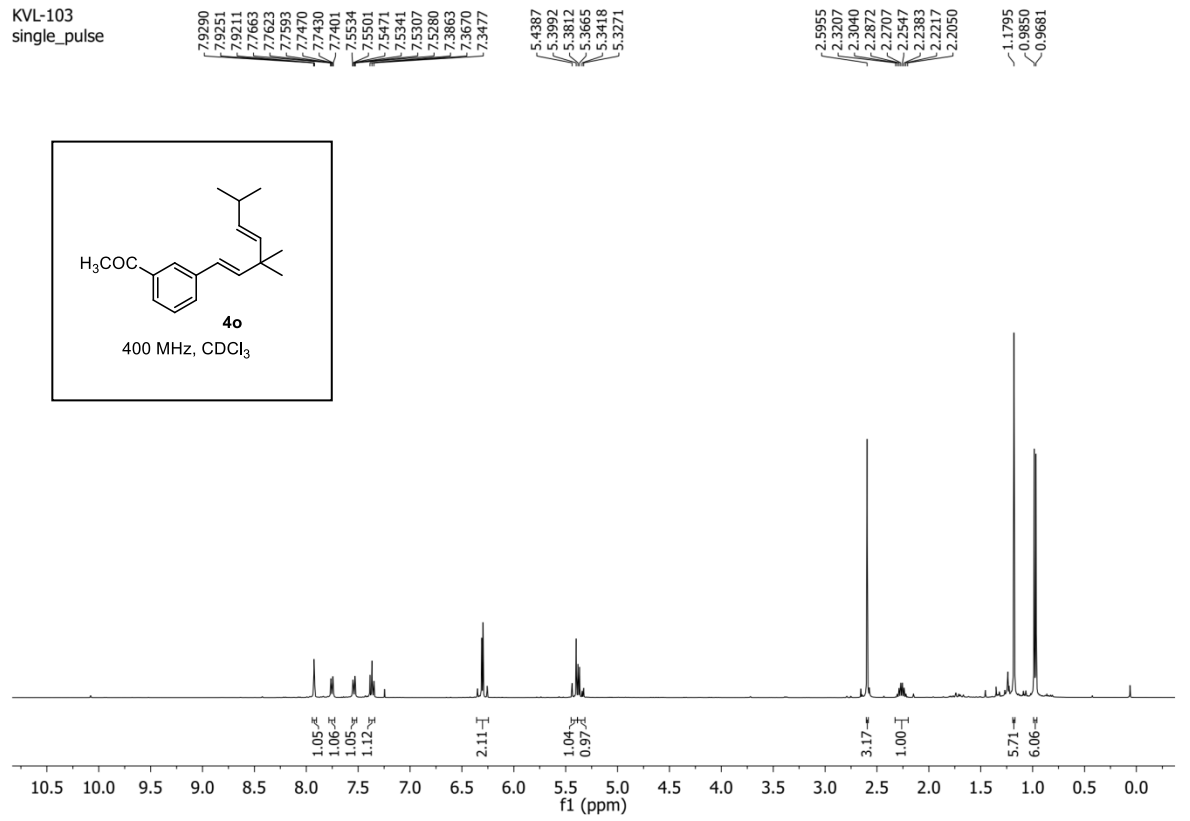


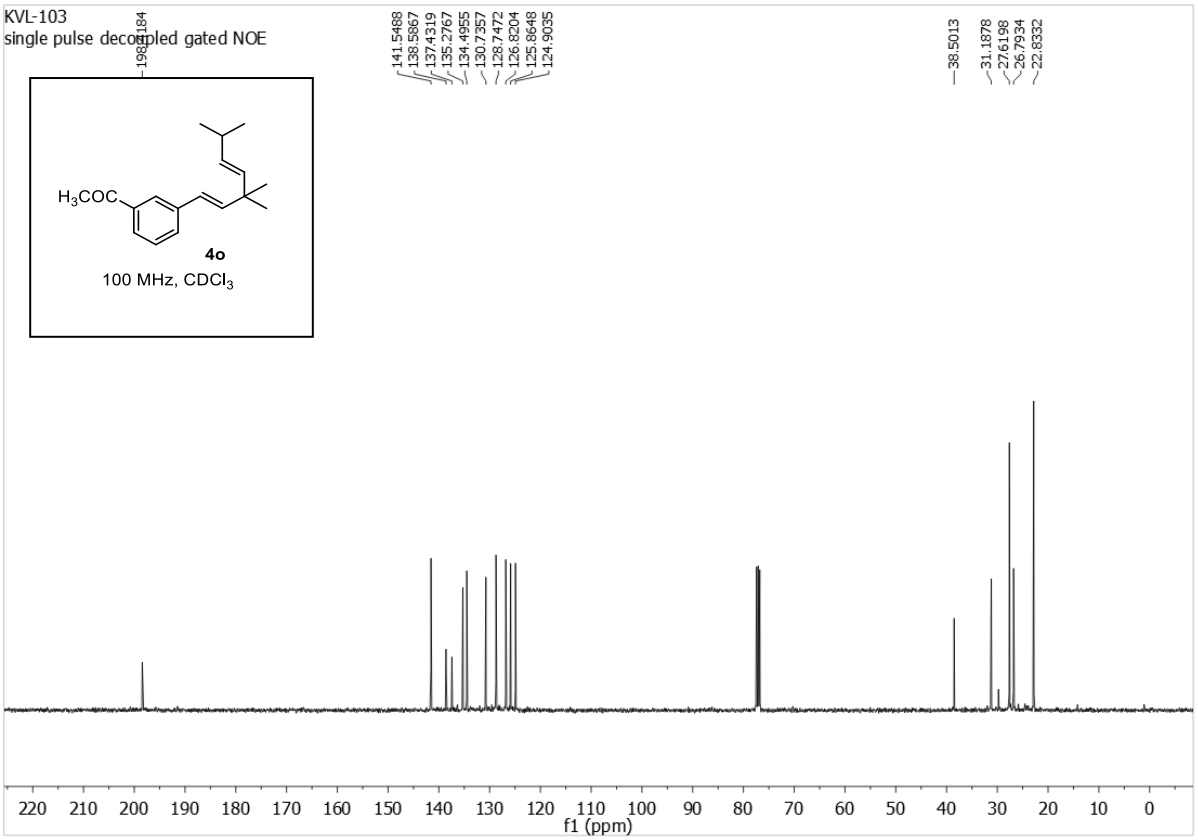

KVL-429
single_pulse
7.2700
7.2656
7.2612
7.2344
7.2153
7.1961
7.1558
7.1524
7.1488
7.1365
7.1330
7.1295
7.1091
7.1044
7.1013
7.0900
7.0867
7.0822
6.2842
6.2437
6.2297
6.1894
5.4490
5.4090
5.3879
5.3729
5.3486
5.3336
2.4904
2.3341
2.3140
2.3010
2.2845
2.2679
2.2513
2.2349
2.2183
1.1831
1.0007
0.9838
4m
SMe
400 MHz, CDCl3
1.05
1.06
1.02
0.88
2.04
1.03
0.88
2.95
1.00
5.99
5.91
f1 (ppm)

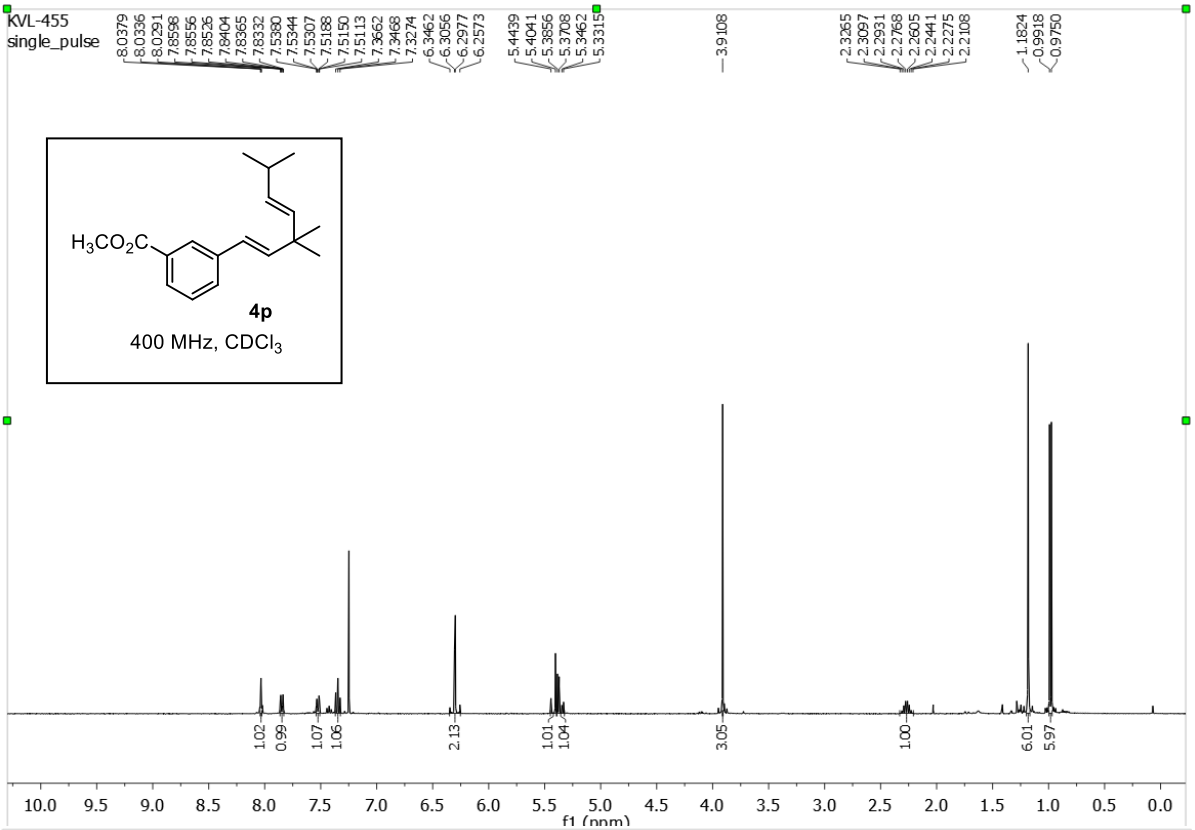

KVL-429
single pulse decoupled gated NOE
140.788
138.700
138.567
135.492
134.361
128.964
125.270
125.187
124.593
123.140
38.441
31.195
27.668
22.860
16.076
4m
SMe
100 MHz, CDCl3
f1 (ppm)

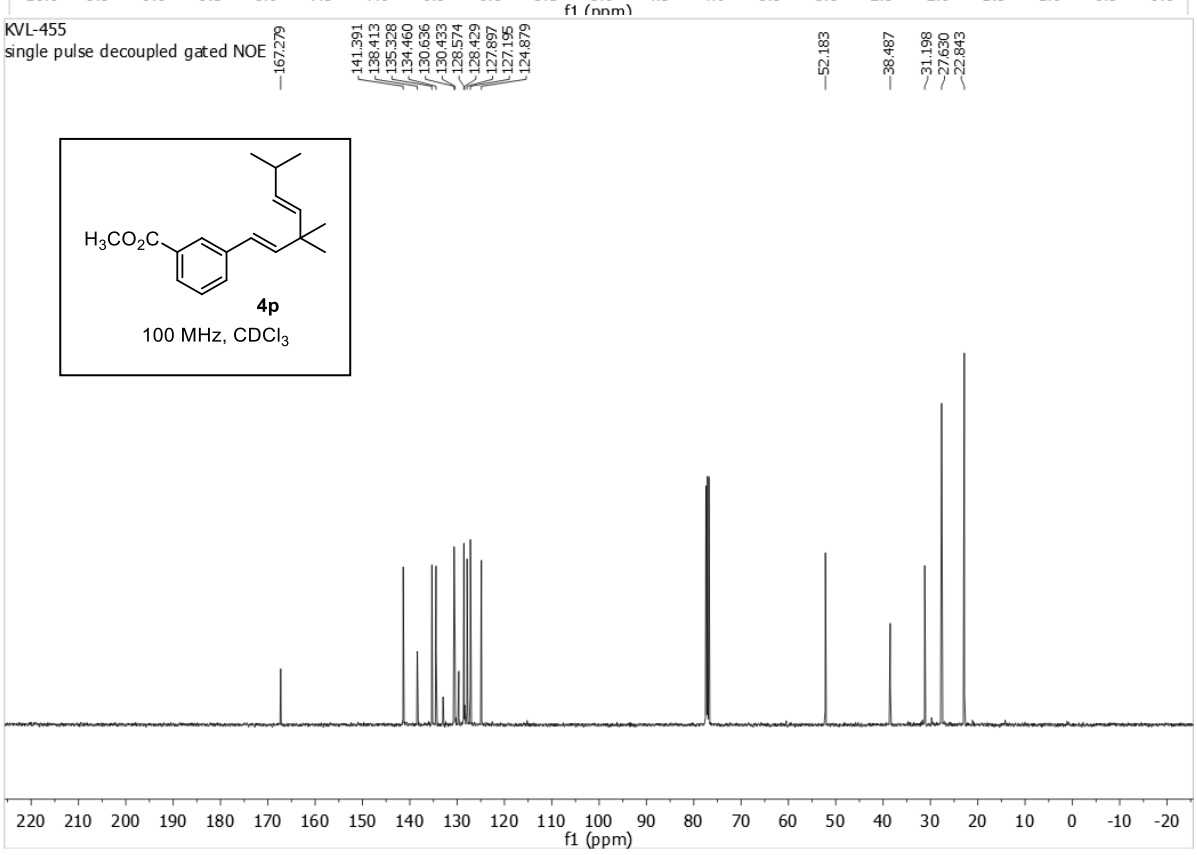

KVL-459
single_pulse
8.2059
8.2009
8.1960
8.0336
8.0310
8.0279
8.0252
8.0168
8.0132
8.0106
8.0075
8.0049
7.6466
7.6433
7.6400
7.6273
7.6239
7.6207
7.4551
7.4352
7.4154
6.3800
6.3396
6.3364
6.2958
5.4380
5.3986
5.3917
5.3783
5.3523
5.3390
2.3190
2.3154
2.3022
2.2984
2.2851
2.2816
2.2682
2.2648
2.2514
2.2480
2.2346
1.1937
0.9945
0.9776
4n
NO2
400 MHz, CDCl3
0.93
1.10
0.93
1.04
2.02
1.98
1.00
5.92
5.89
f1 (ppm)


KVL-459
single pulse decoupled gated NOE
148.680
143.400
139.909
134.868
132.169
129.354
123.826
121.490
120.697
38.634
31.207
27.510
22.806
4n
NO2
100 MHz, CDCl3
f1 (ppm)

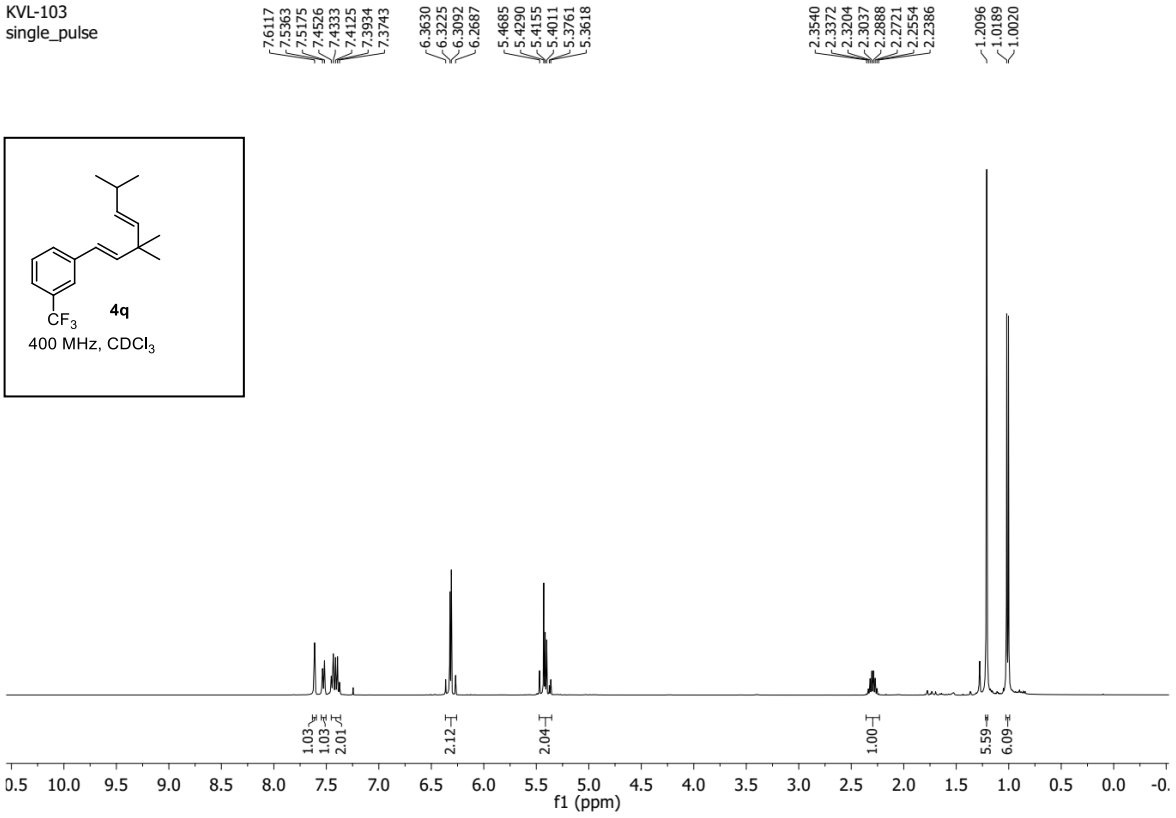

KVL-103
single_pulse
7.9290
7.9251
7.9211
7.7663
7.7623
7.7593
7.7470
7.7430
7.7401
7.5534
7.5501
7.5471
7.5341
7.5307
7.5280
7.3863
7.3670
7.3477
5.4387
5.3992
5.3812
5.3665
5.3418
5.3271
2.5955
2.3207
2.3040
2.2872
2.2707
2.2547
2.2383
2.2217
2.2050
1.1795
0.9850
0.9681
H3COC
4o
400 MHz, CDCl3
1.05
1.06
1.05
1.12
2.11
1.04
0.97
3.17
1.00
5.71
6.06
f1 (ppm)


KVL-103
single pulse decoupled gated NOE
198.0184
141.5488
138.5867
137.4319
135.2767
134.4955
130.7357
128.7472
126.8204
125.8648
124.9035
38.5013
31.1878
27.6198
26.7934
22.8332
H3COC
4o
100 MHz, CDCl3
f1 (ppm)

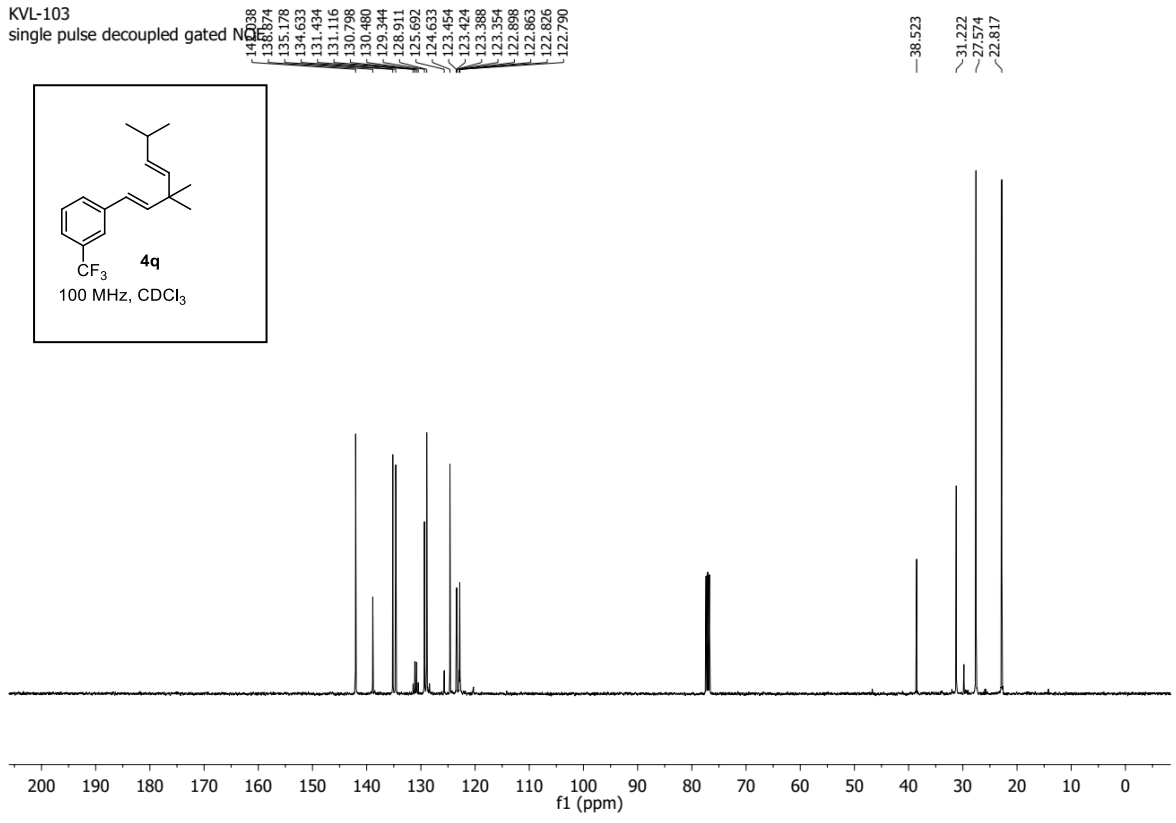

KVL-455
single_pulse
8.0379
8.0336
8.0291
7.8598
7.8556
7.8526
7.8404
7.8365
7.8332
7.5380
7.5344
7.5307
7.5188
7.5150
7.5113
7.3662
7.3468
7.3274
6.3462
6.3056
6.2977
6.2573
5.4439
5.4041
5.3856
5.3708
5.3462
5.3315
3.9108
2.3265
2.3097
2.2931
2.2768
2.2605
2.2441
2.2275
2.2108
1.1824
0.9918
0.9750
H3CO2C
4p
400 MHz, CDCl3
1.02
0.99
1.07
1.06
2.13
1.01
1.04
3.05
1.00
6.01
5.97
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)


KVL-455
single pulse decoupled gated NOE
167.279
141.391
138.413
135.328
134.460
130.636
130.433
128.574
128.429
127.897
127.195
124.879
52.183
38.487
31.198
27.630
22.843
H3CO2C
4p
100 MHz, CDCl3
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20
f1 (ppm)

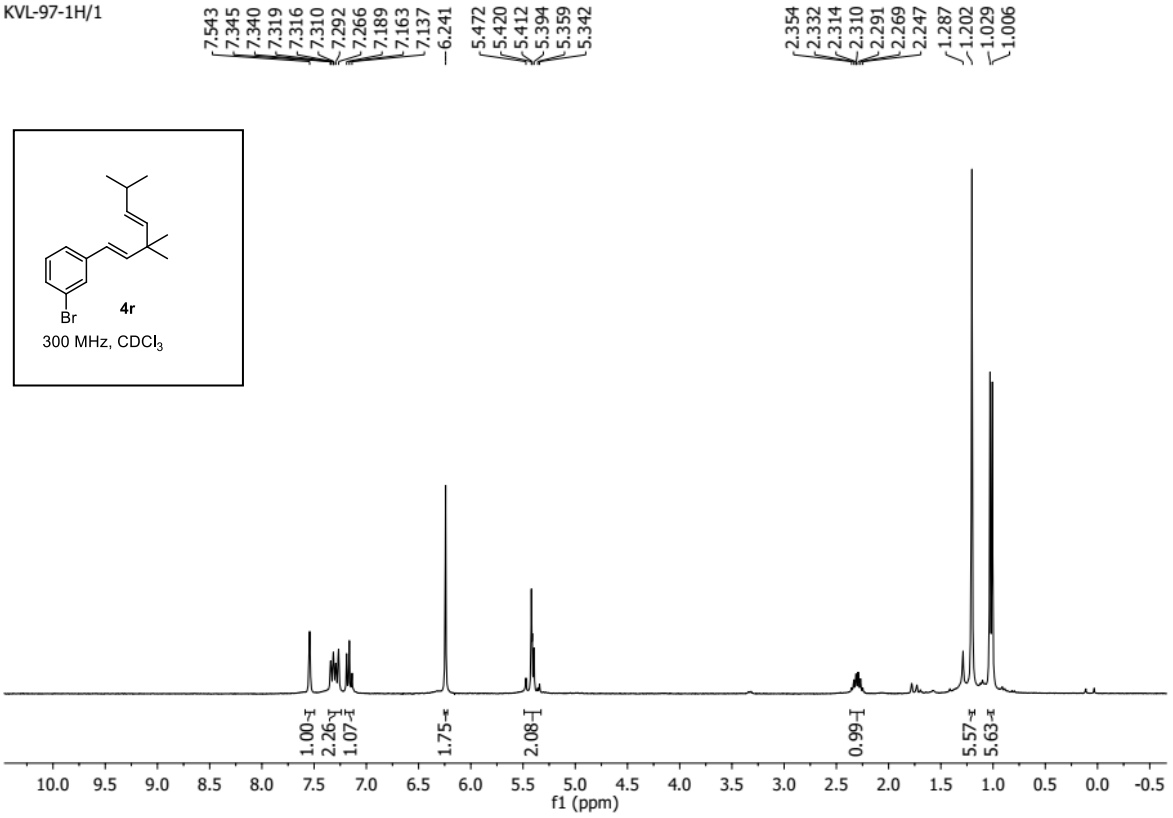
KVL-103
single_pulse



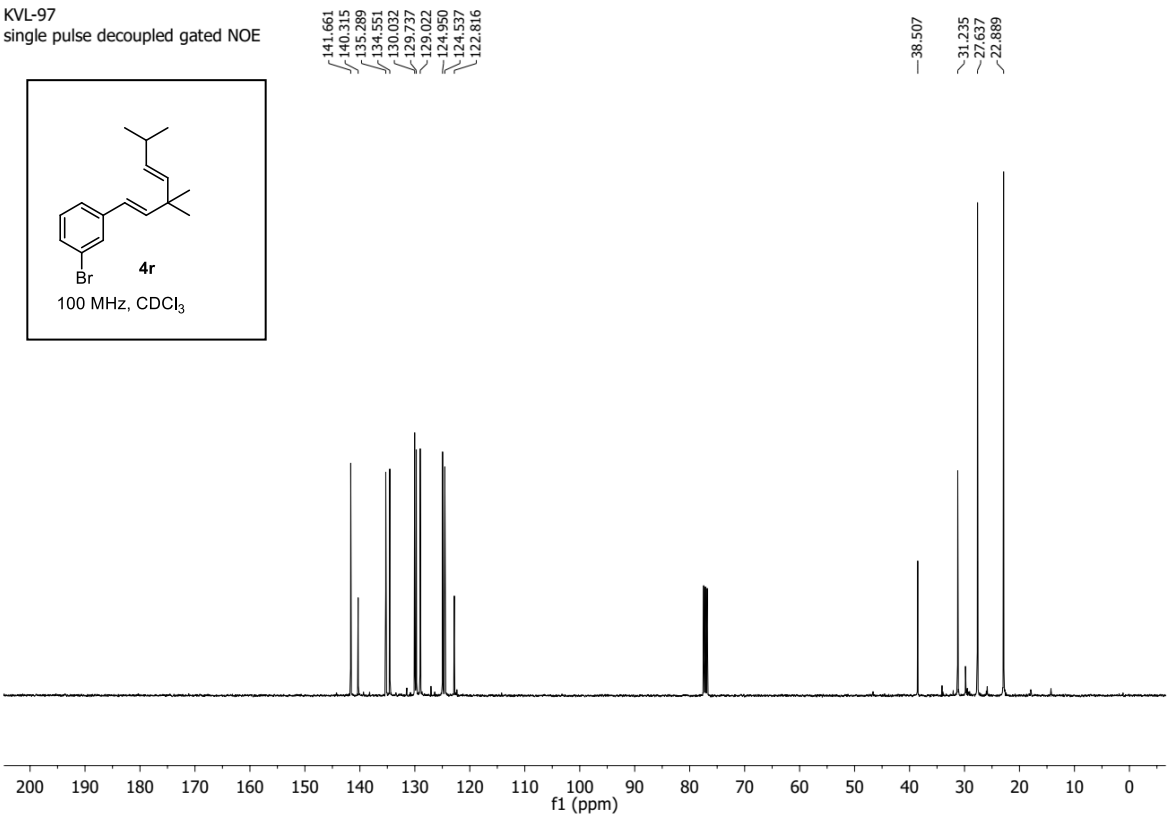
KVL-103
single pulse decoupled gated NOE

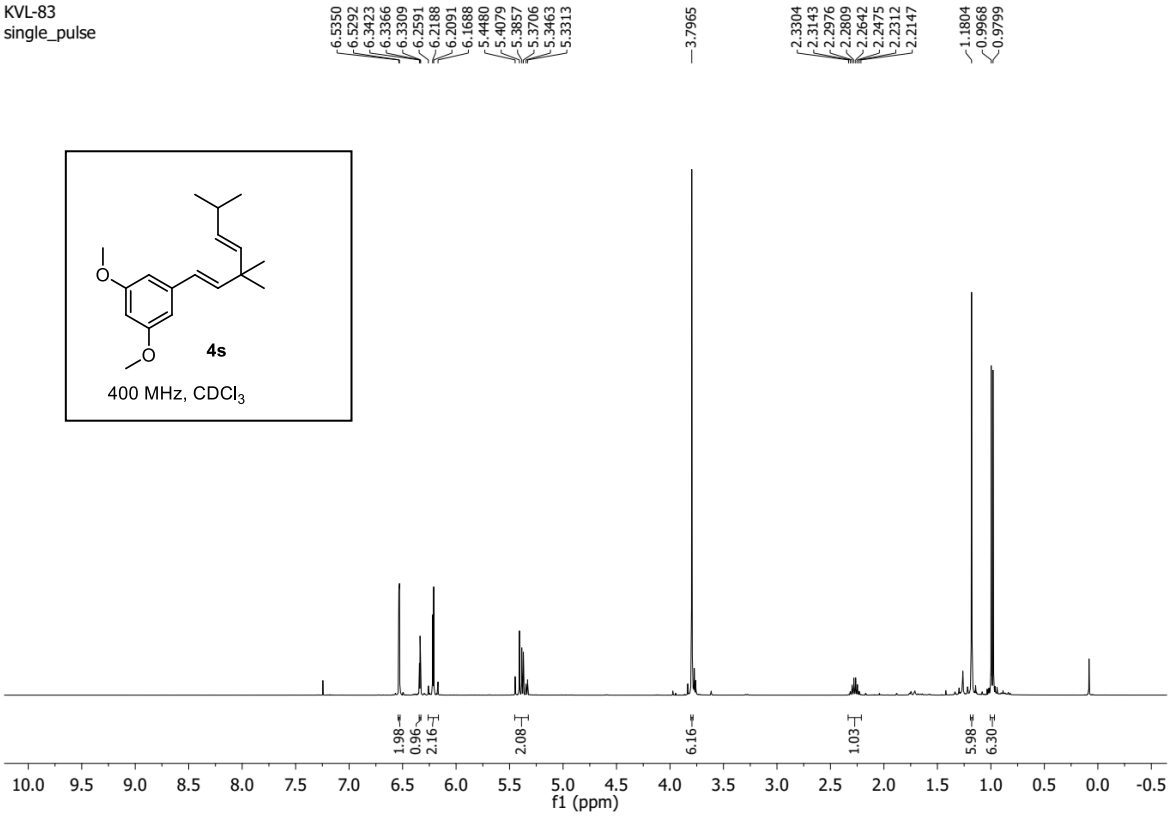


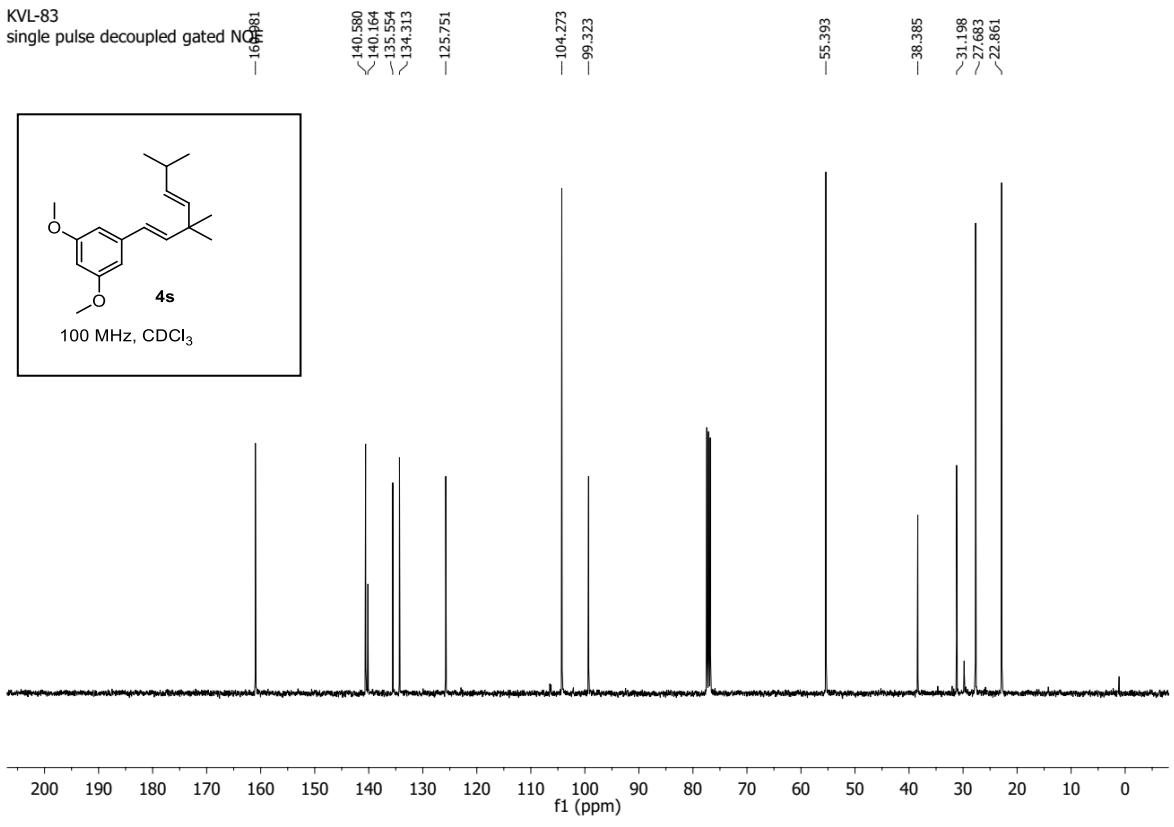
KVL-97-1H/1



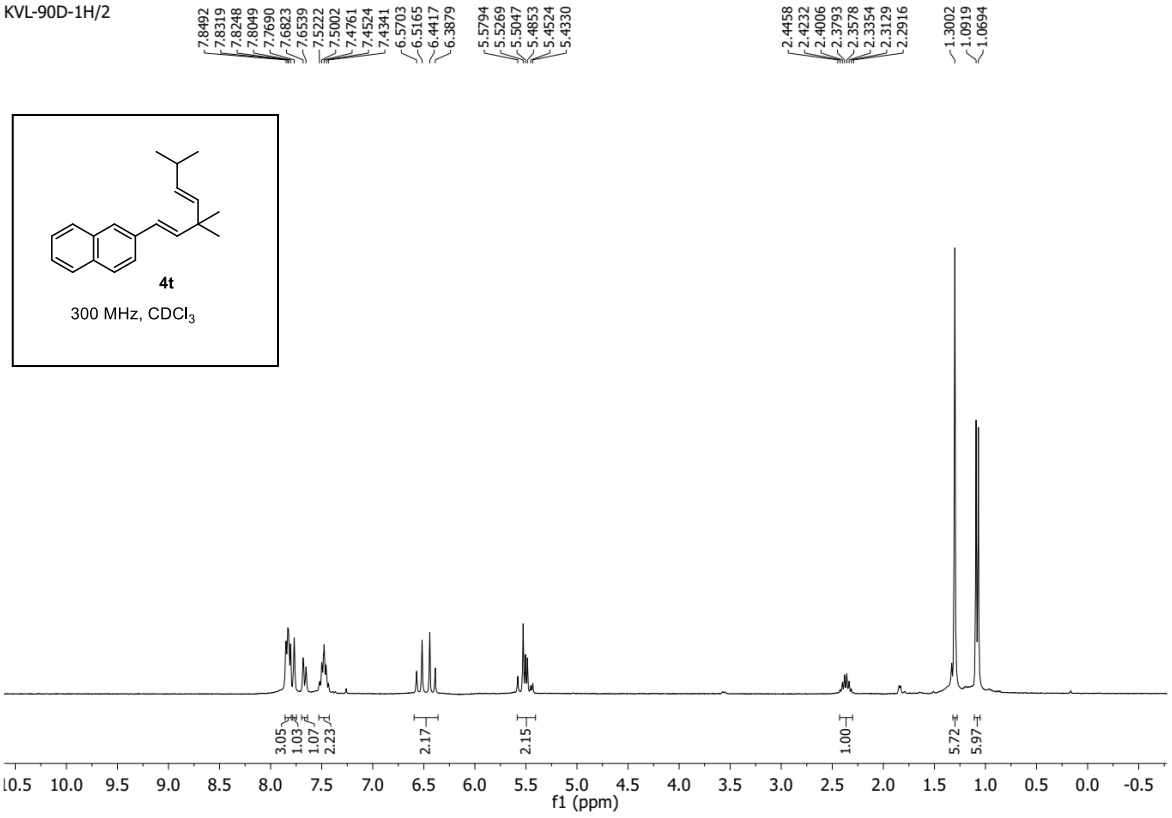
KVL-97
single pulse decoupled gated NOE



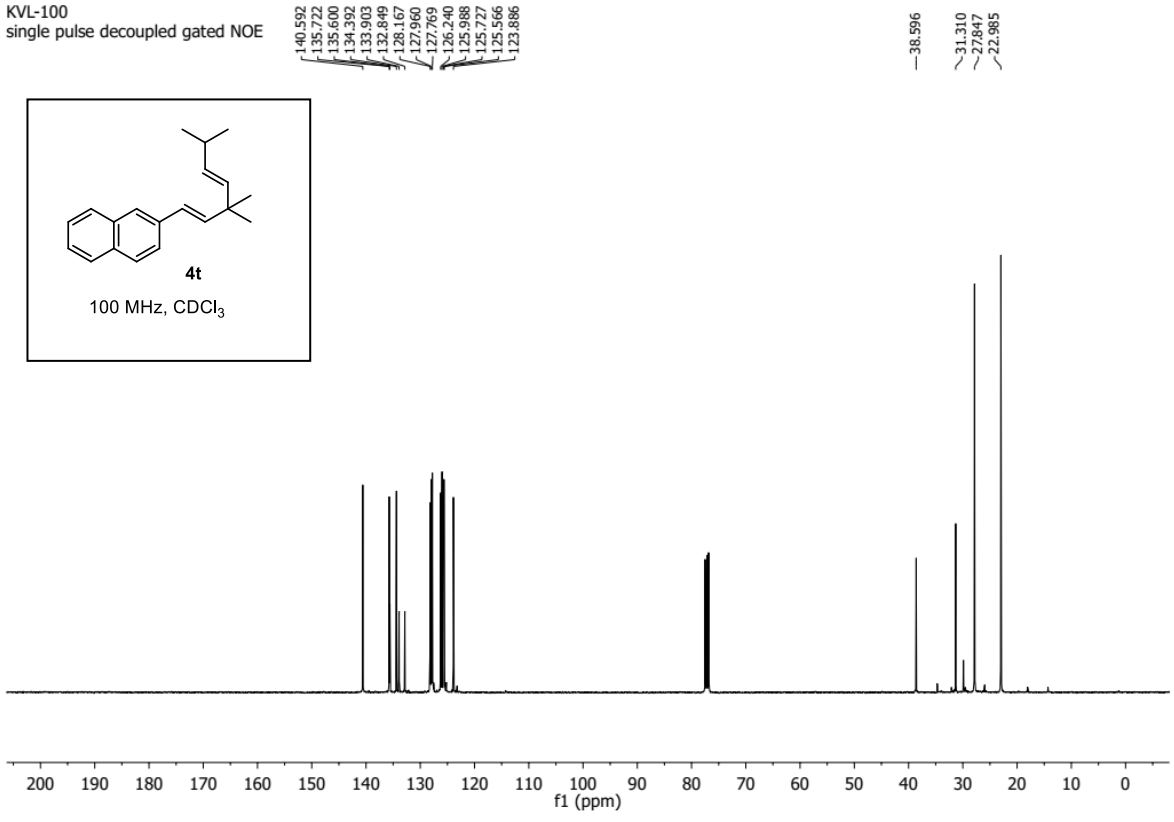

KVL-83
single_pulse
6.5350
6.5292
6.3423
6.3366
6.3309
6.2591
6.2188
6.2091
6.1688
5.4480
5.4079
5.3857
5.3706
5.3463
5.3313
3.7965
2.3304
2.3143
2.2976
2.2809
2.2642
2.2475
2.2312
2.2147
1.1804
0.9968
0.9799
4s
400 MHz, CDCl3
1.98
0.96
2.16
2.08
6.16
1.03
5.98
6.30
f1 (ppm)

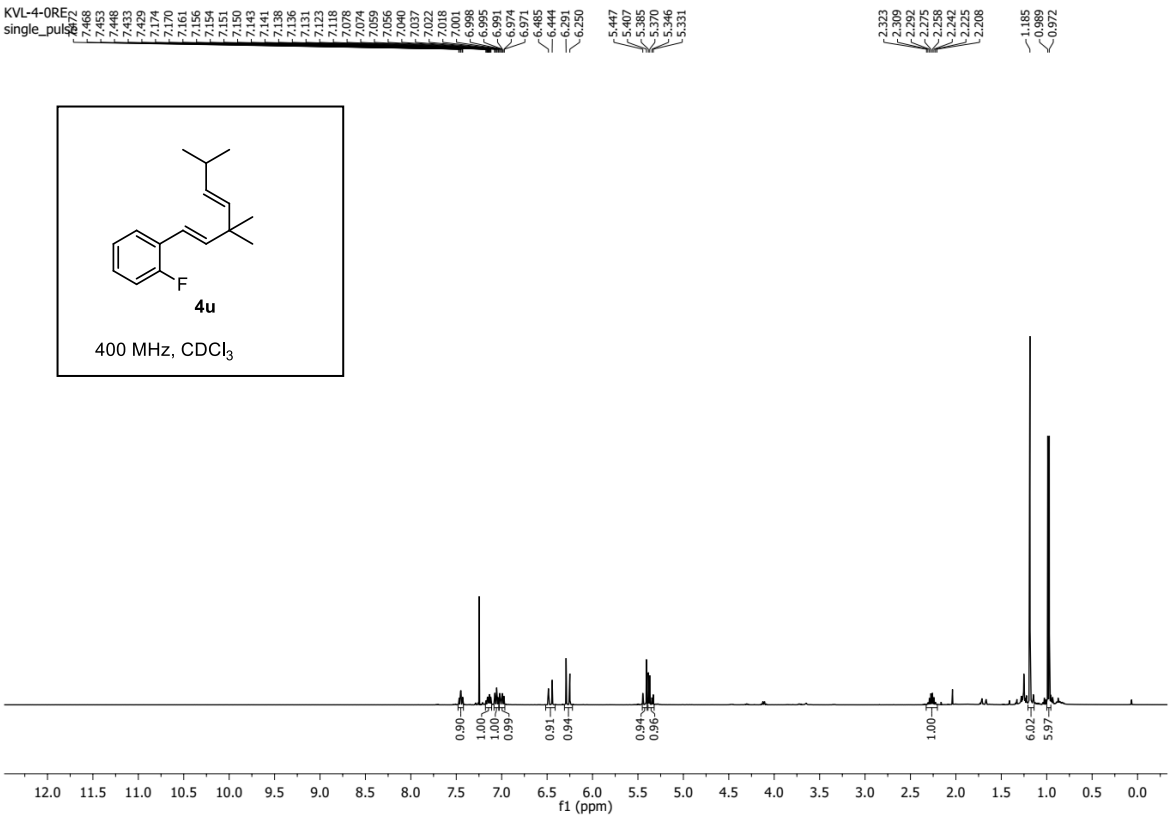

KVL-83
single pulse decoupled gated NOE
165.981
140.580
140.164
135.554
134.313
125.751
104.273
99.323
55.393
38.385
31.198
27.683
22.861
4s
100 MHz, CDCl3
f1 (ppm)

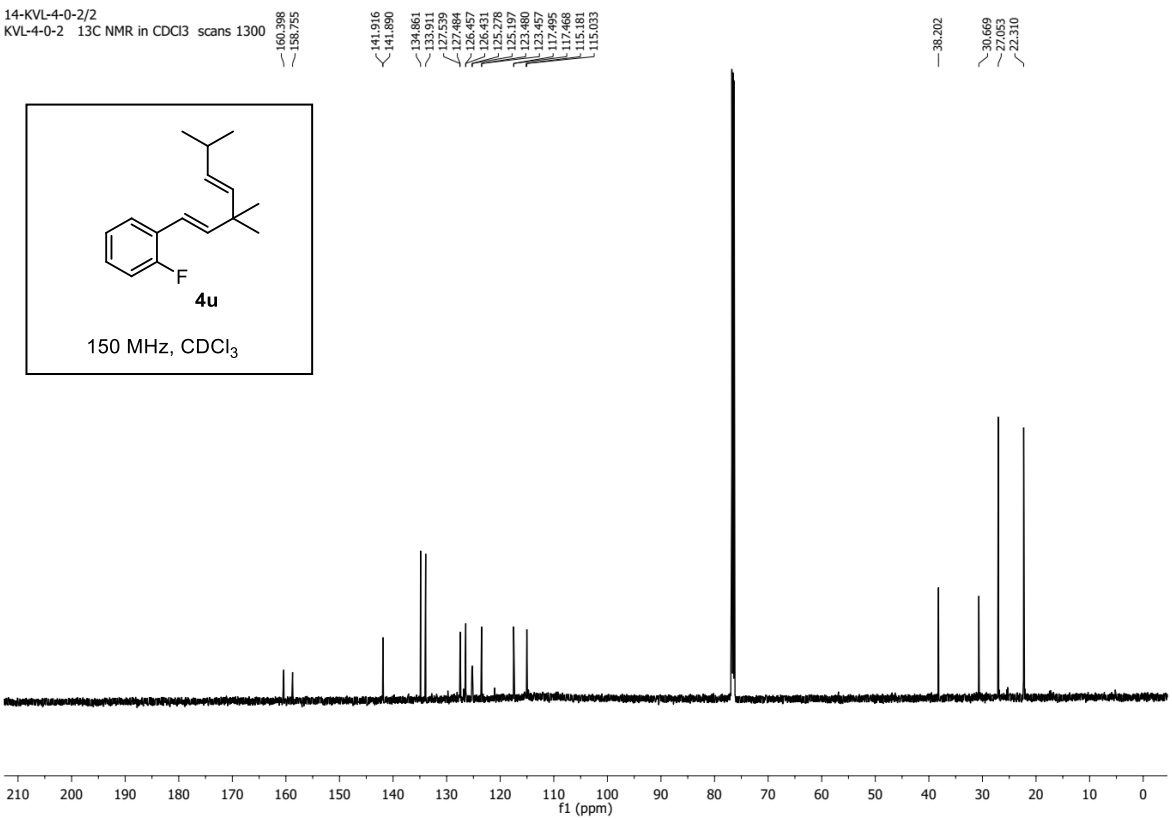
KVL-90D-1H/2

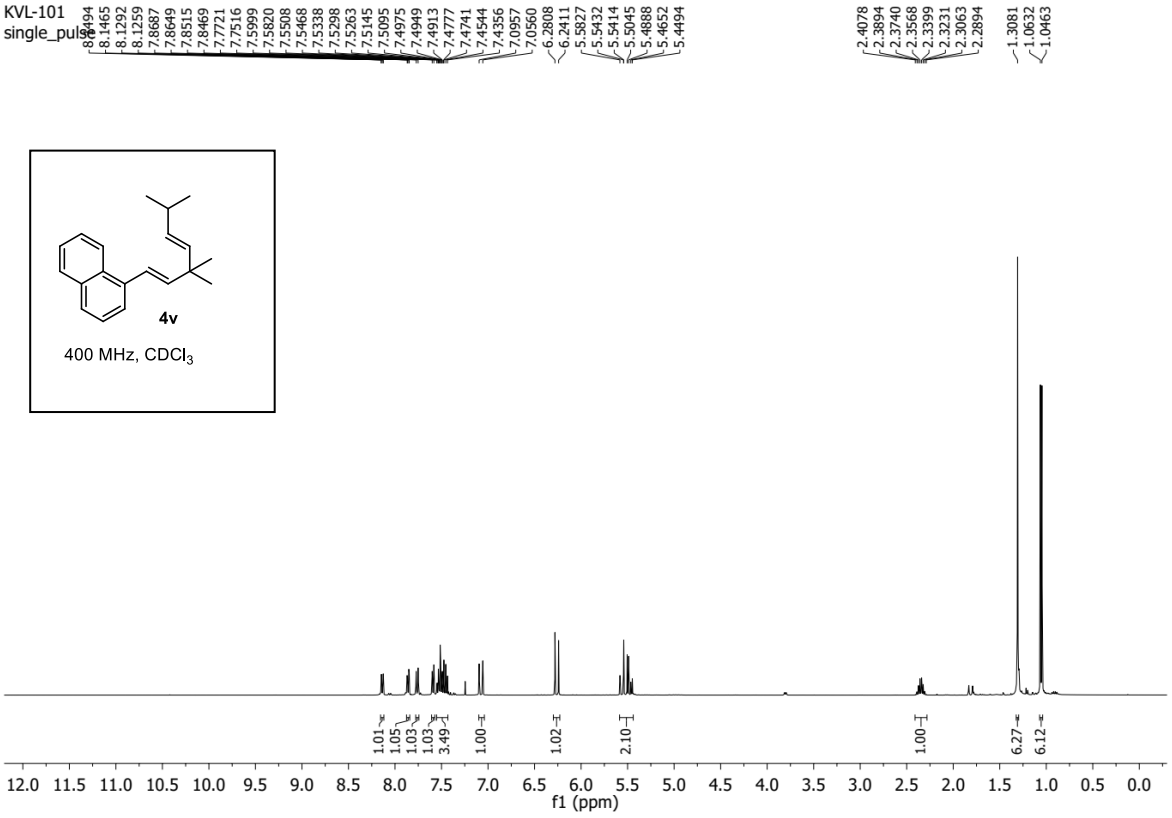


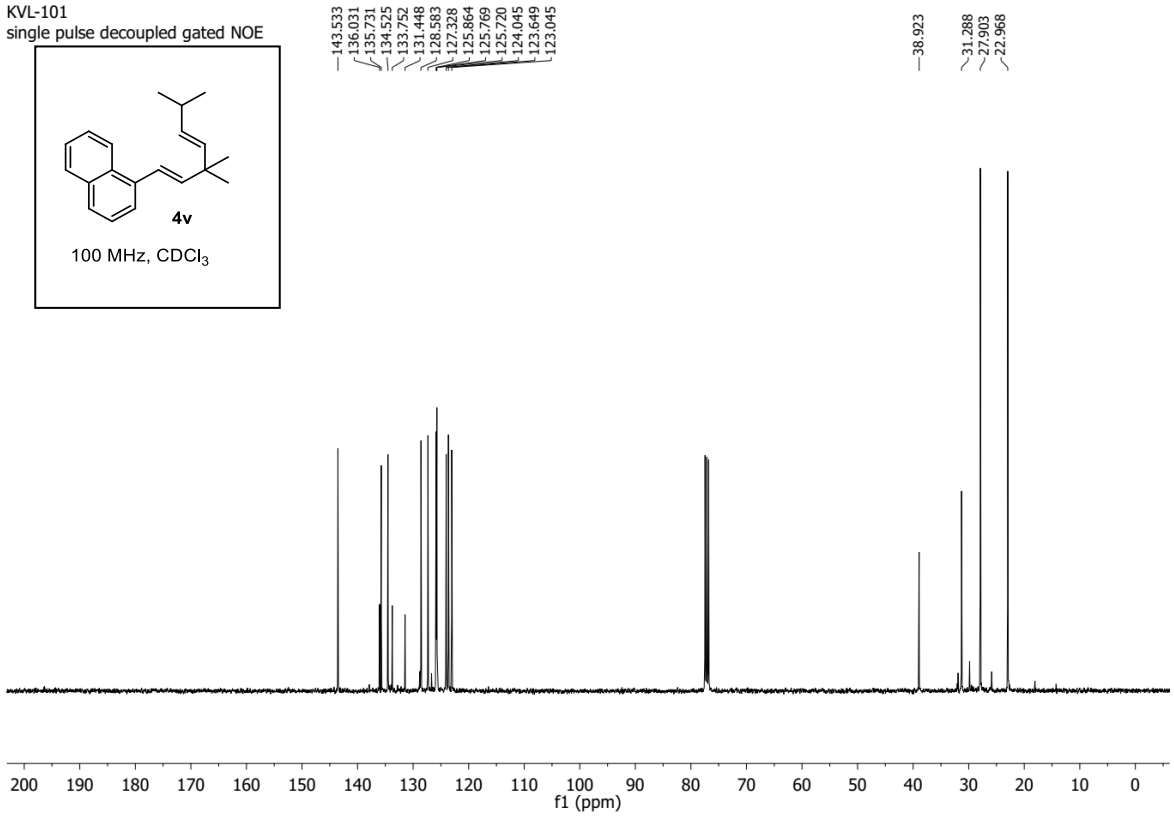
KVL-100
single pulse decoupled gated NOE

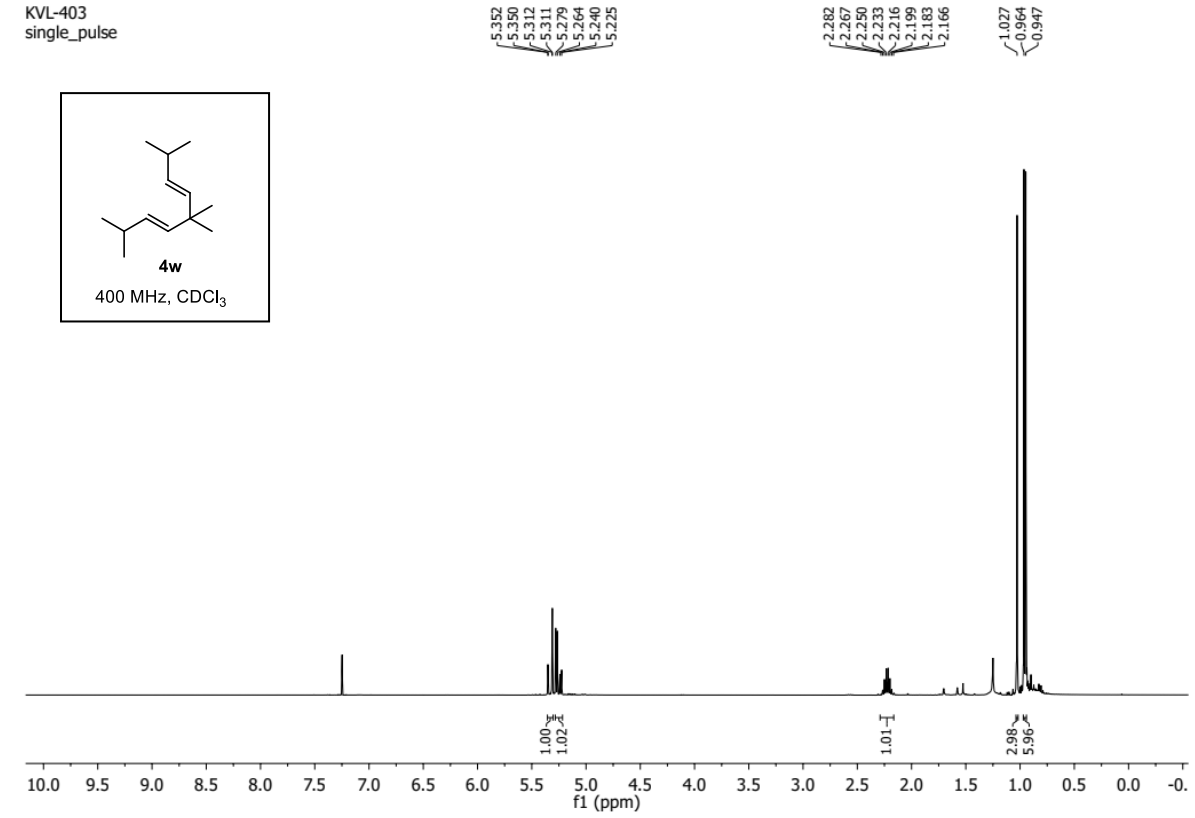


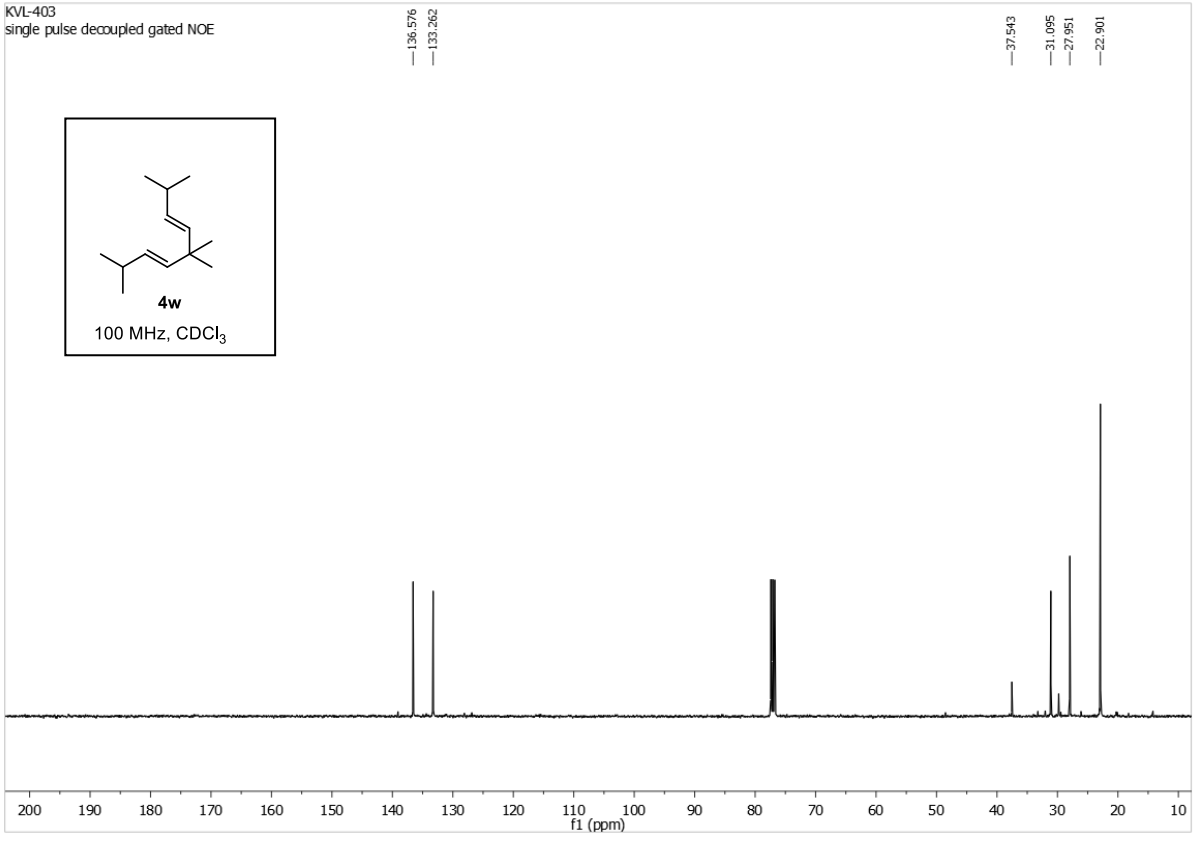

KVL-4-0RE
single_pulse
7.472
7.468
7.453
7.448
7.433
7.429
7.174
7.170
7.161
7.156
7.154
7.151
7.150
7.143
7.141
7.138
7.136
7.131
7.123
7.118
7.078
7.074
7.059
7.056
7.040
7.037
7.022
7.018
7.001
6.998
6.995
6.991
6.974
6.971
6.485
6.444
6.291
6.250
5.447
5.407
5.385
5.370
5.346
5.331
2.323
2.309
2.292
2.275
2.258
2.242
2.225
2.208
1.185
0.989
0.972
4u
400 MHz, CDCl3
0.90
1.00
1.00
0.99
0.91
0.94
0.94
0.96
1.00
6.02
5.97
12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)


14-KVL-4-0-2/2
KVL-4-0-2 13C NMR in CDCl3 scans 1300
160.398
158.755
141.916
141.890
134.861
133.911
127.539
127.484
126.457
126.431
125.278
125.197
123.480
123.457
117.495
117.468
115.181
115.033
38.202
30.669
27.053
22.310
4u
150 MHz, CDCl3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

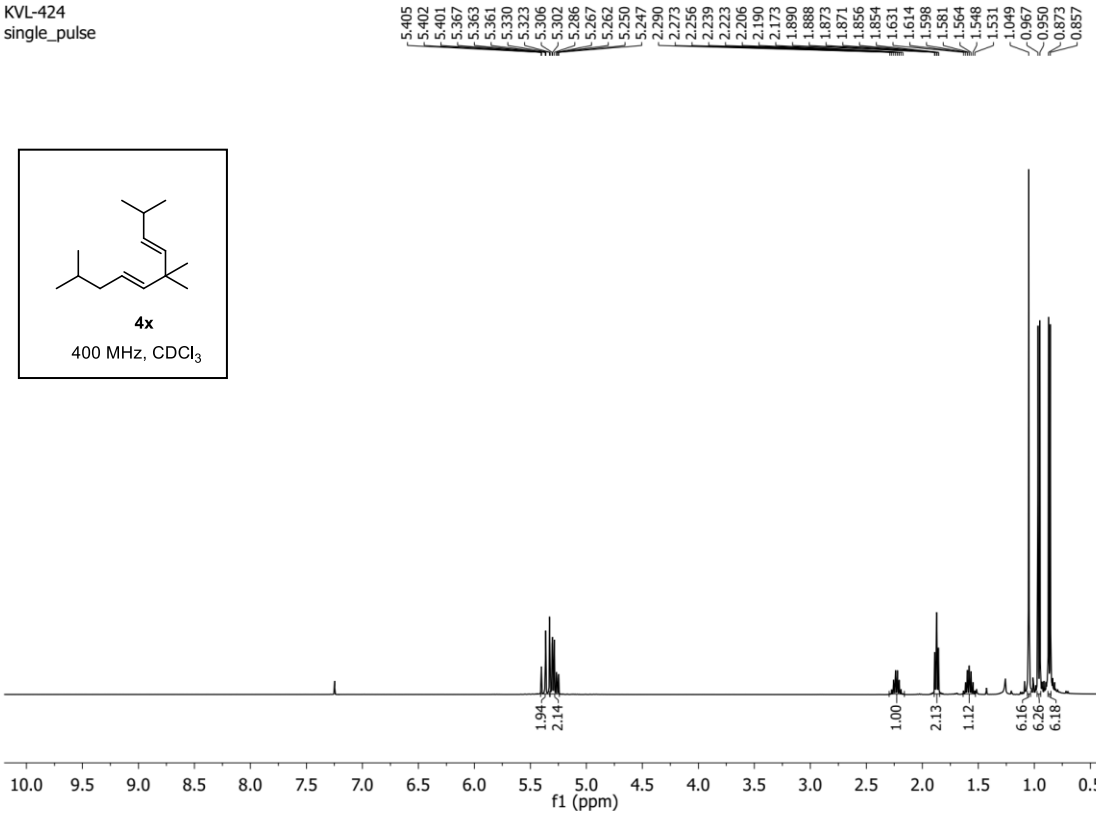

KVL-101
single_pulse
8.1494
8.1465
8.1292
8.1259
7.8687
7.8649
7.8515
7.8469
7.7721
7.7516
7.5999
7.5820
7.5508
7.5468
7.5338
7.5298
7.5263
7.5145
7.5095
7.4975
7.4949
7.4913
7.4777
7.4741
7.4544
7.4356
7.0957
7.0560
6.2808
6.2411
5.5827
5.5432
5.5414
5.5045
5.4888
5.4652
5.4494
2.4078
2.3894
2.3740
2.3568
2.3399
2.3231
2.3063
2.2894
1.3081
1.0632
1.0463
4v
400 MHz, CDCl3
1.01
1.05
1.03
1.03
3.49
1.00
1.02
2.10
1.00
6.27
6.12
12.0 11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)


KVL-101
single pulse decoupled gated NOE
143.533
136.031
135.731
134.525
133.752
131.448
128.583
127.328
125.864
125.769
125.720
124.045
123.649
123.045
38.923
31.288
27.903
22.968
4v
100 MHz, CDCl3
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

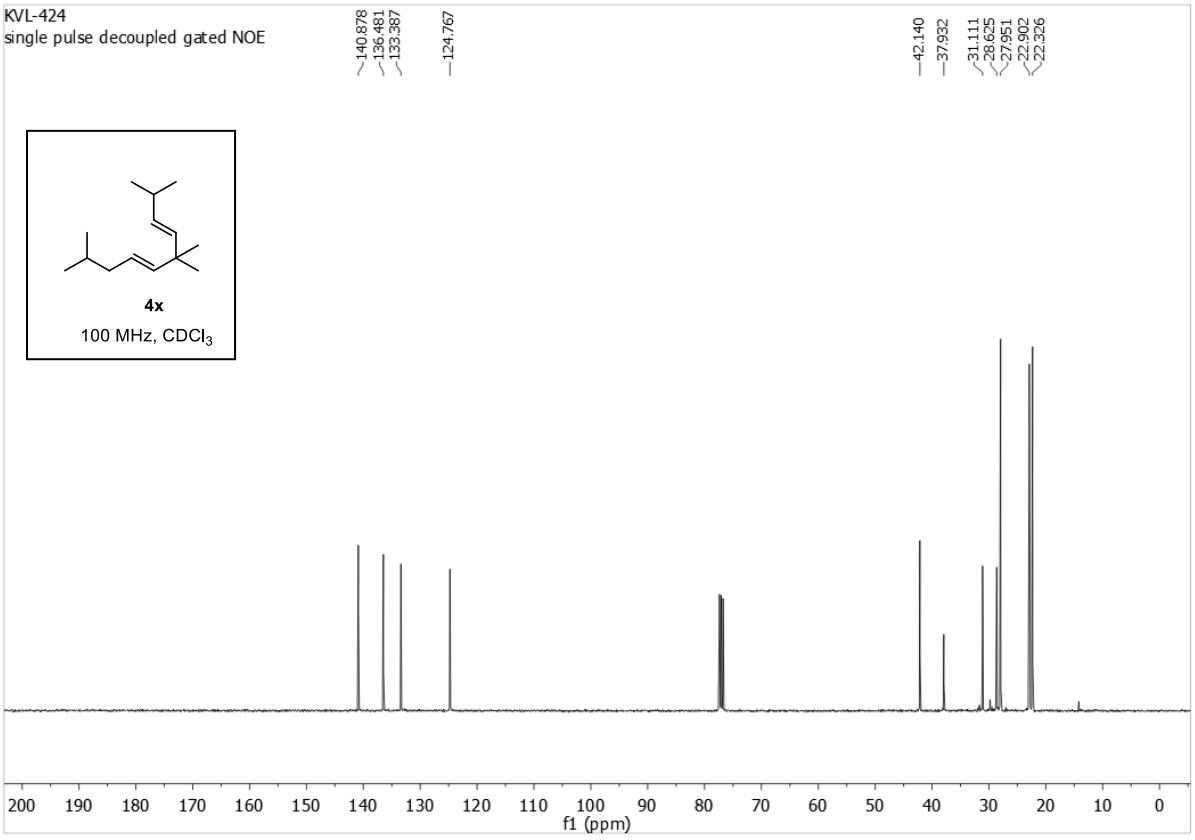

KVL-403
single_pulse
5.352
5.350
5.312
5.311
5.279
5.264
5.240
5.225
2.282
2.267
2.250
2.233
2.216
2.199
2.183
2.166
1.027
0.964
0.947
4w
400 MHz, CDCl3
1.00
1.02
1.01
2.98
5.96
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.
f1 (ppm)

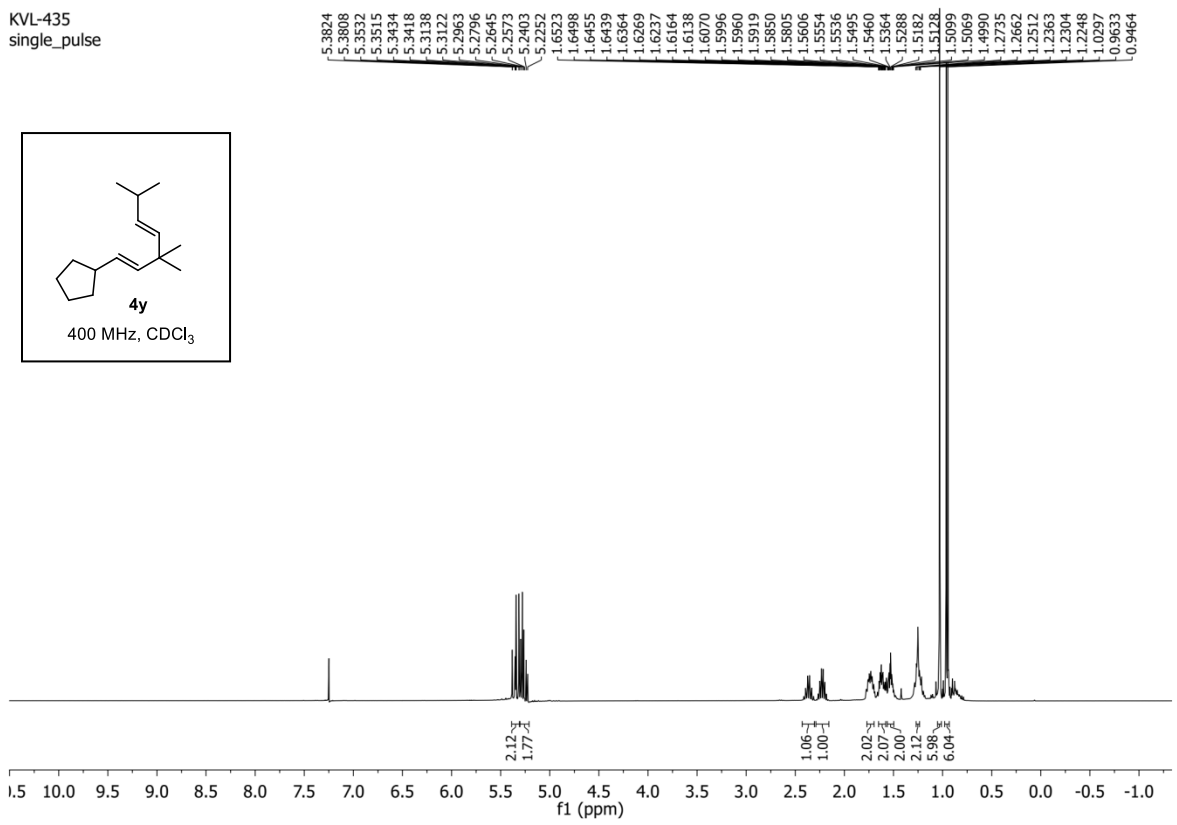

KVL-403
single pulse decoupled gated NOE
136.576
133.262
37.543
31.095
27.951
22.901
4w
100 MHz, CDCl3
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10
f1 (ppm)

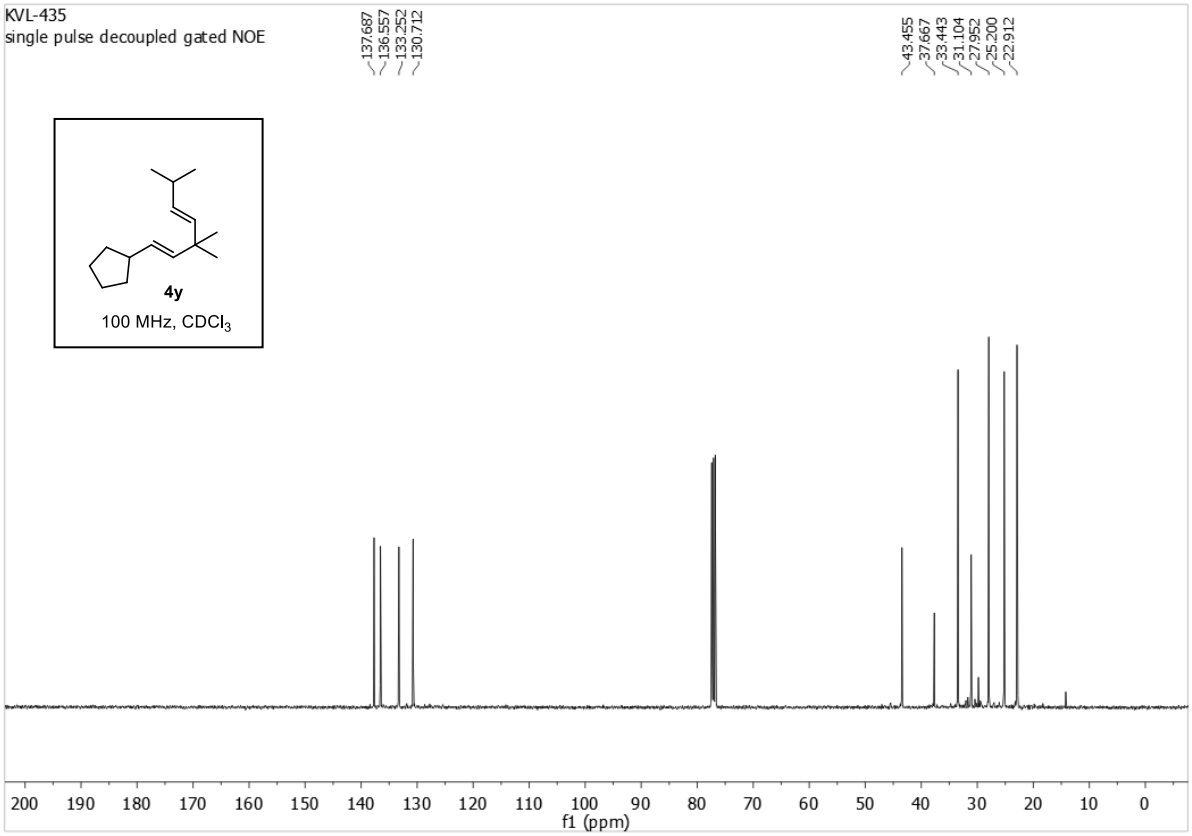
KVL-424
single_pulse



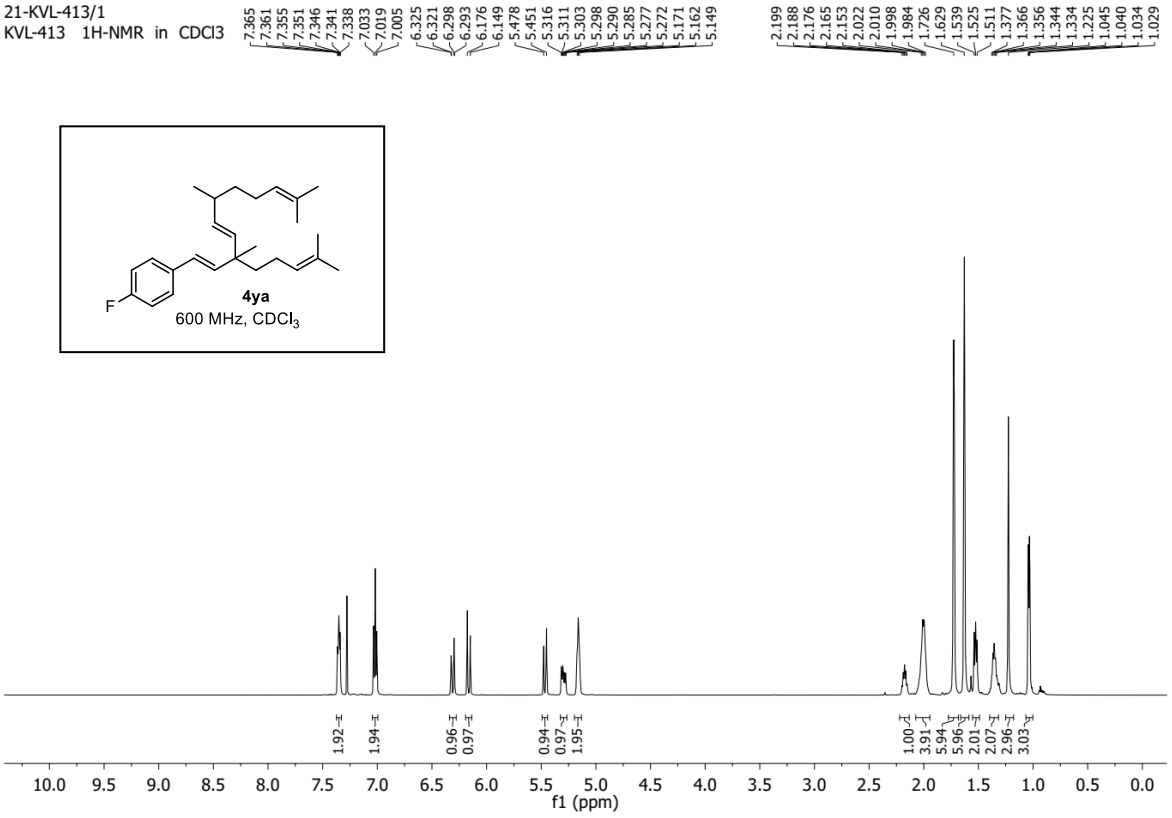
KVL-424
single pulse decoupled gated NOE



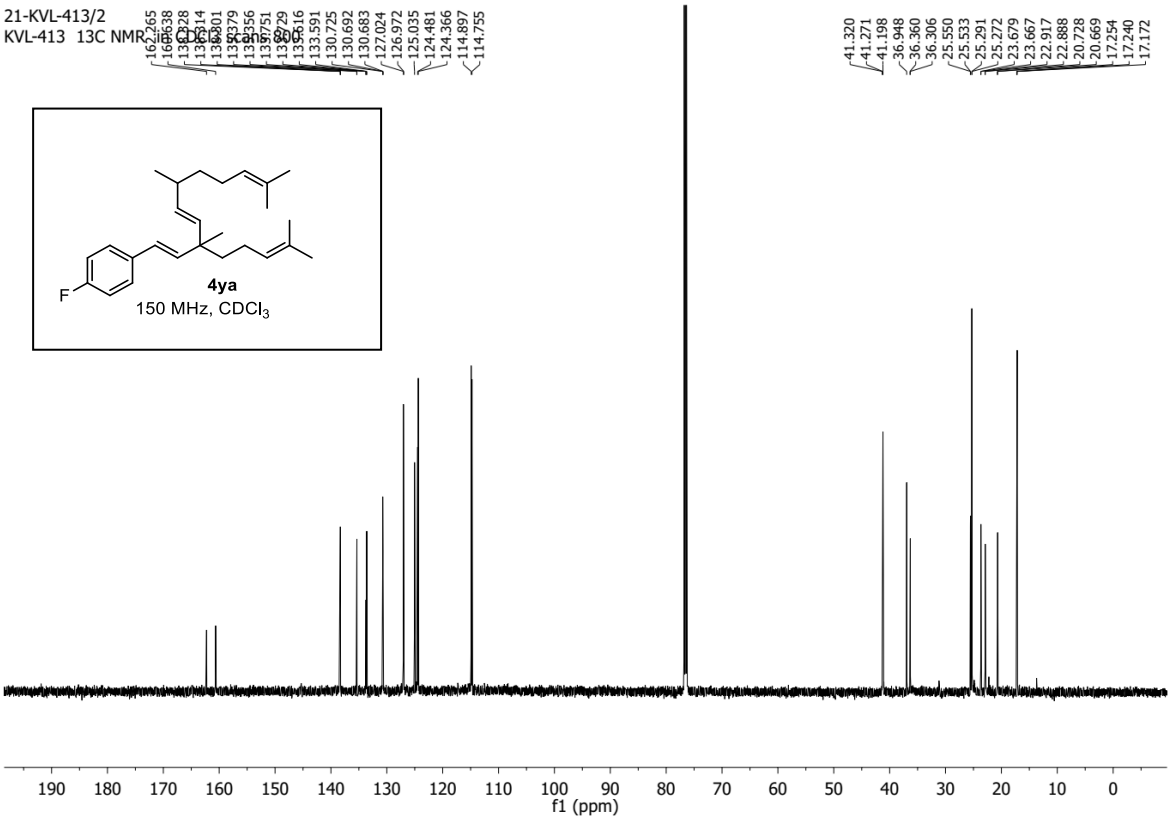

KVL-435
single_pulse
4y
400 MHz, CDCl3
f1 (ppm)


KVL-435
single pulse decoupled gated NOE
4y
100 MHz, CDCl3
f1 (ppm)

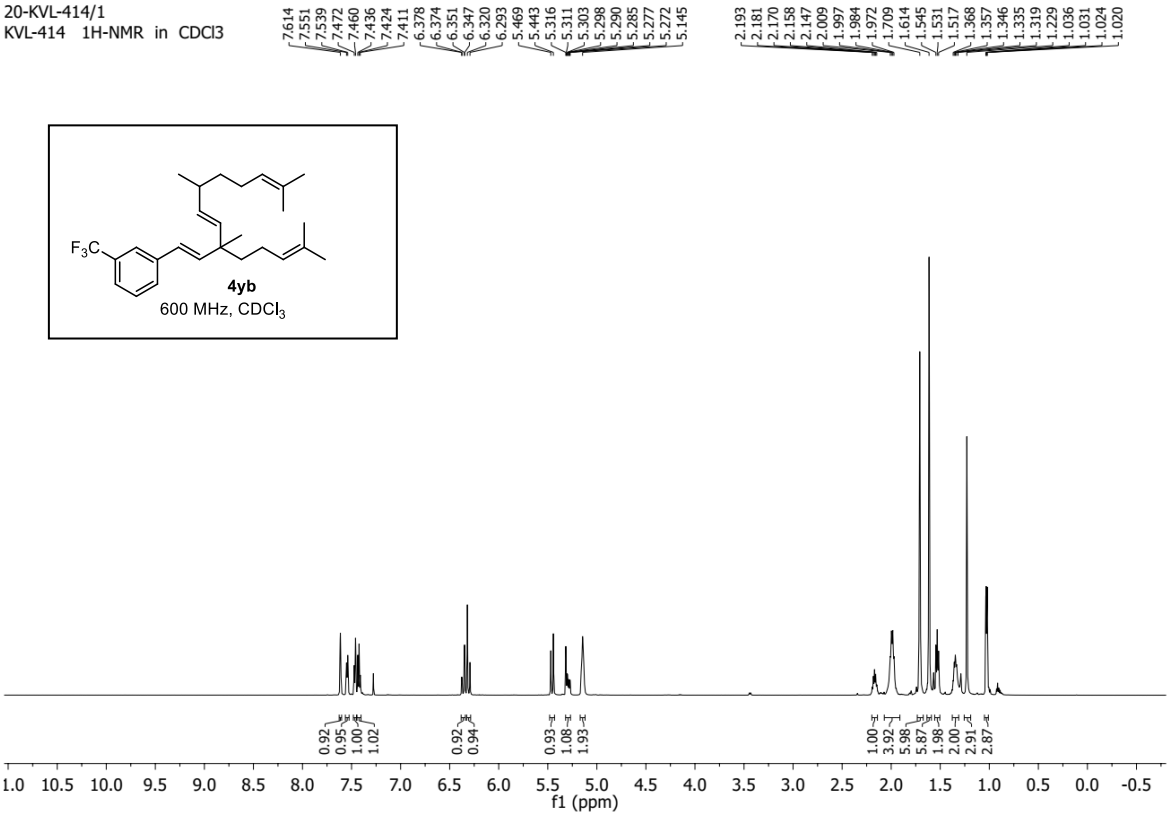
21-KVL-413/1
KVL-413 1H-NMR in CDCl3



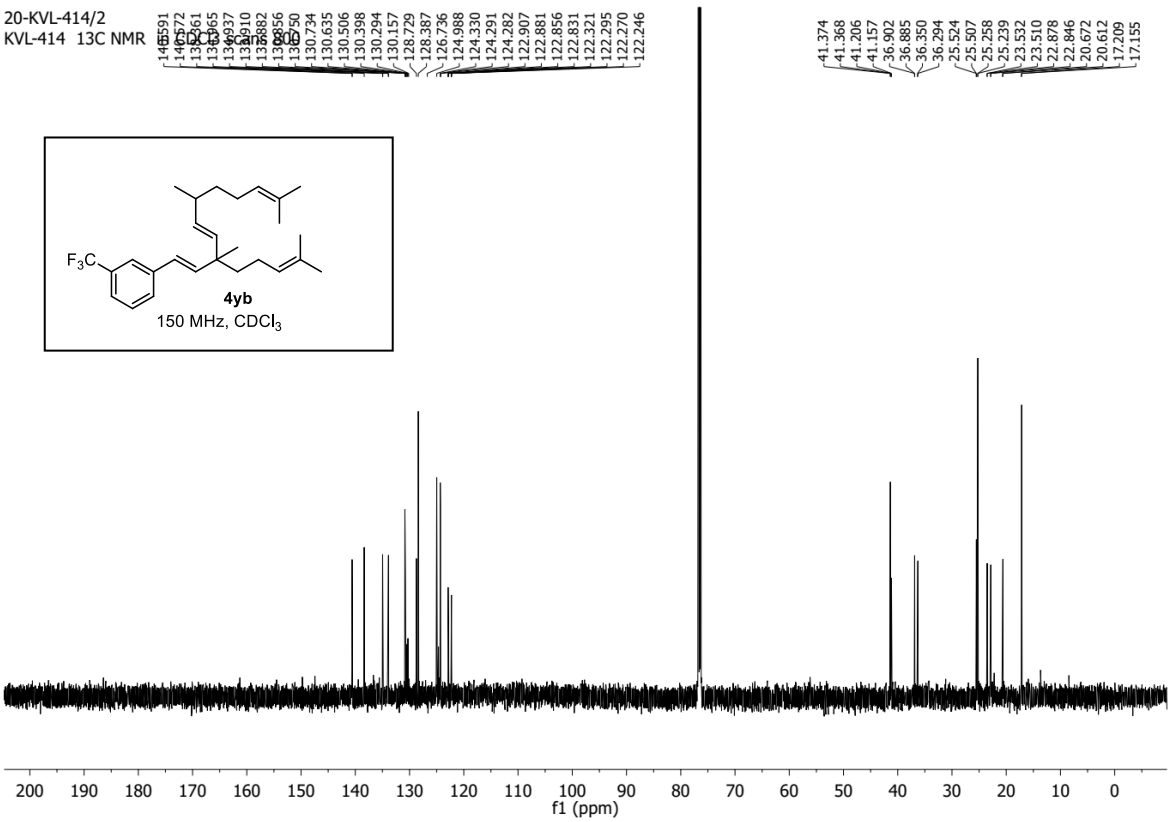
21-KVL-413/2
KVL-413 13C NMR in CDCl3

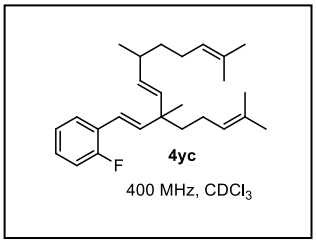


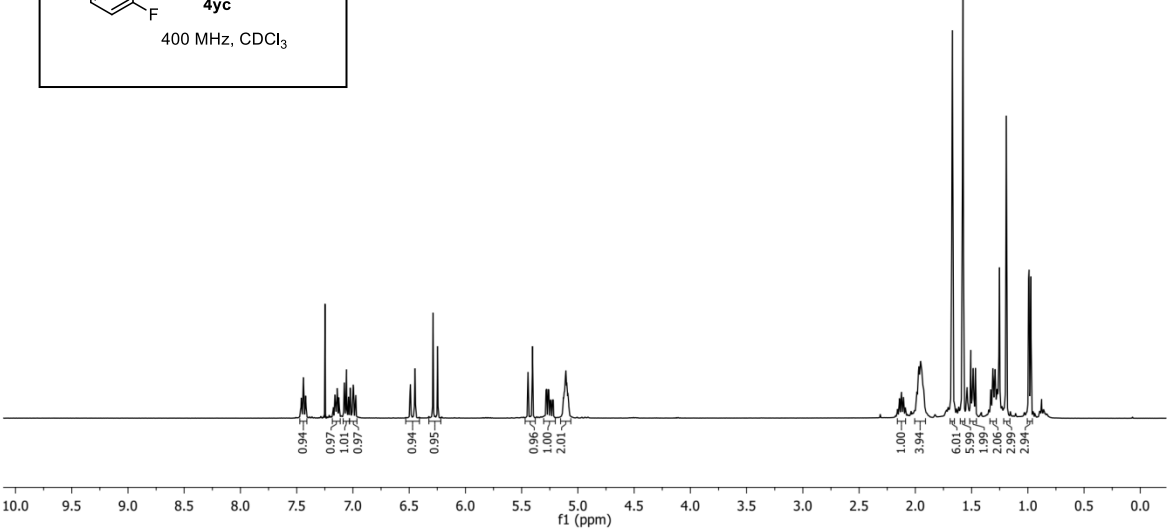
20-KVL-414/1
KVL-414 1H-NMR in CDCl3



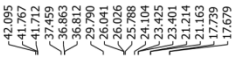
20-KVL-414/2
KVL-414 13C NMR

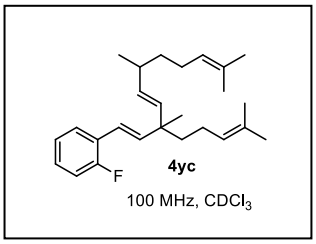


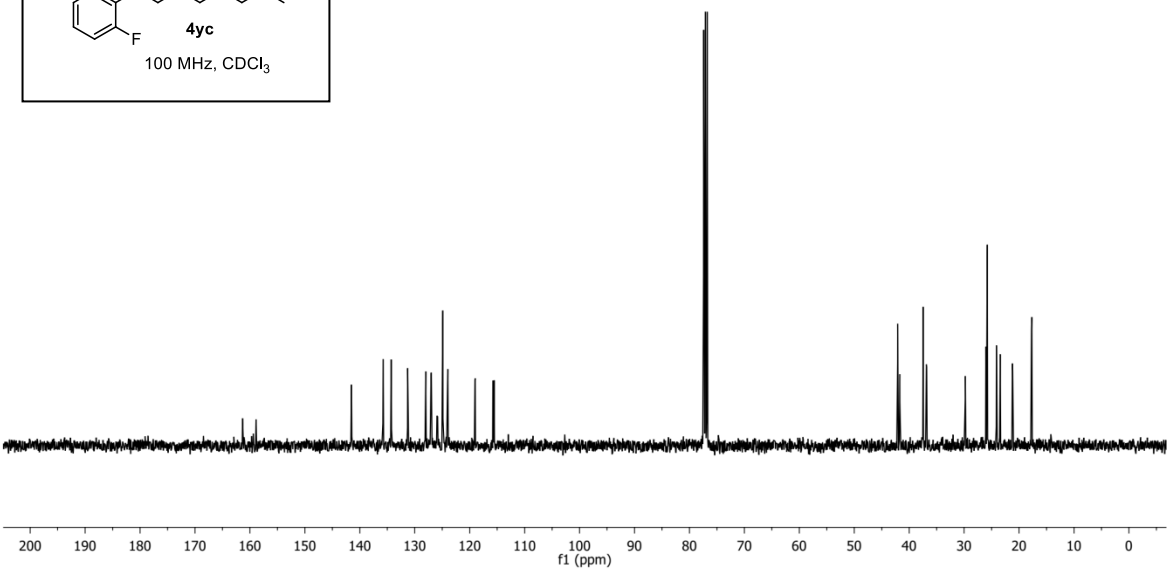




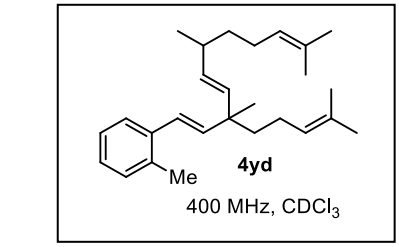
KVL-444
single pulse decoupled gated NOE

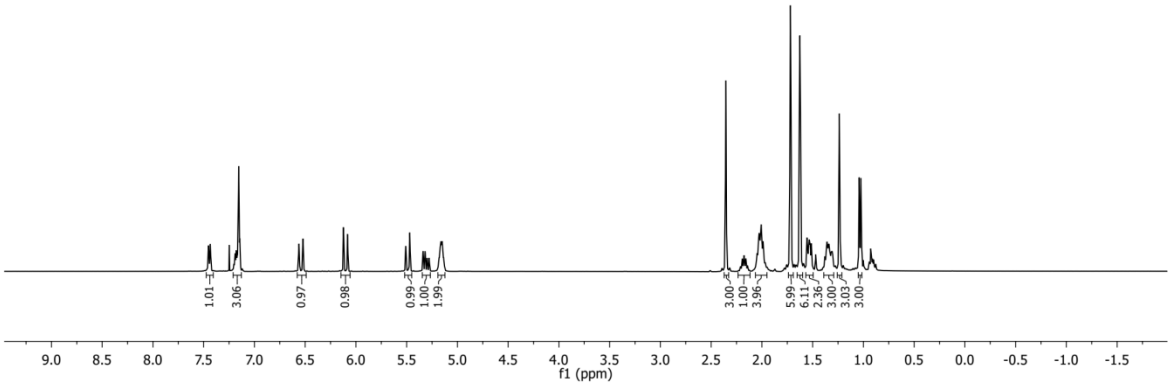




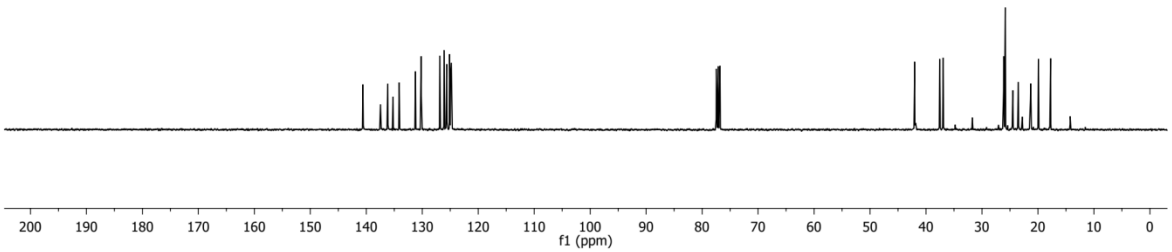


KVL-445
single_pulse

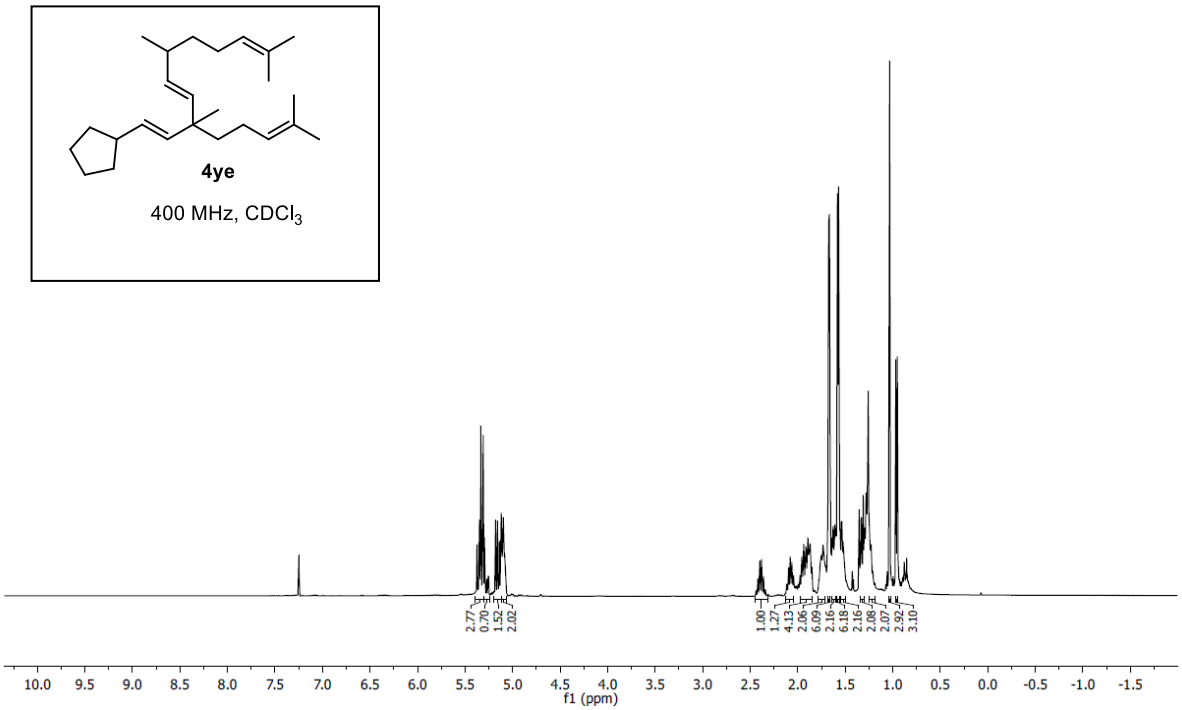




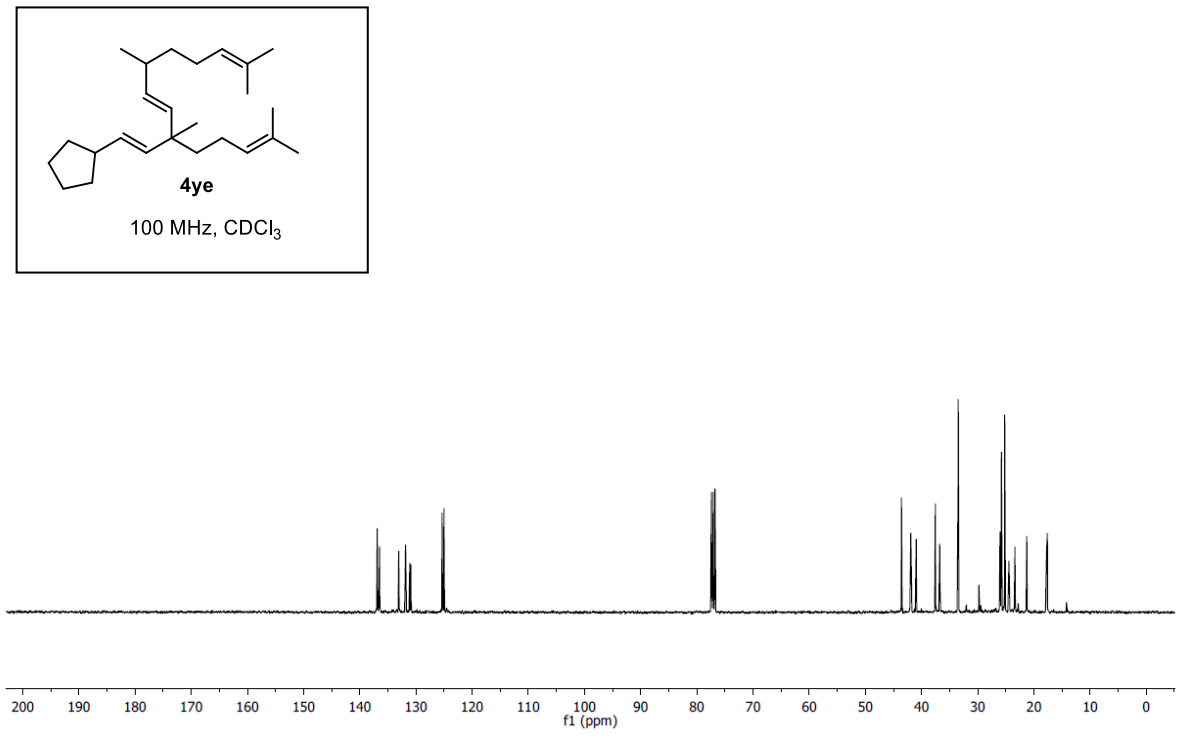
KVL-445
single pulse decoupled gated NOE

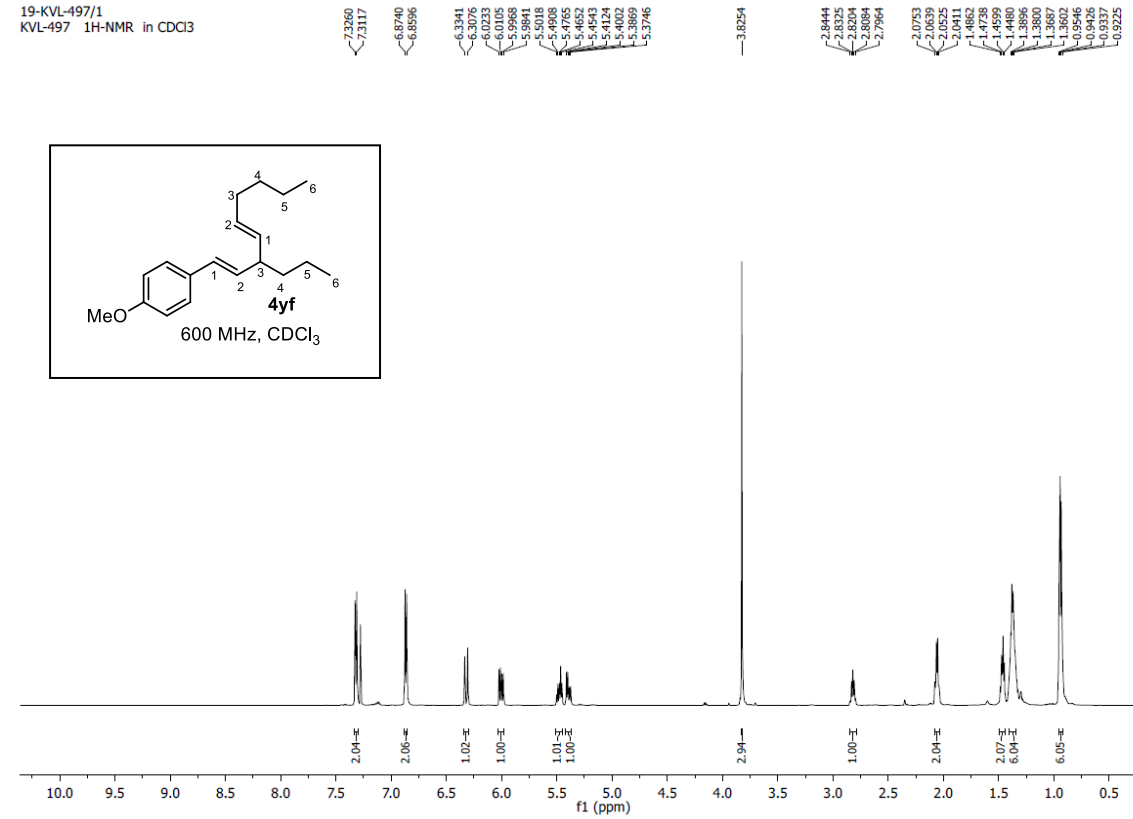


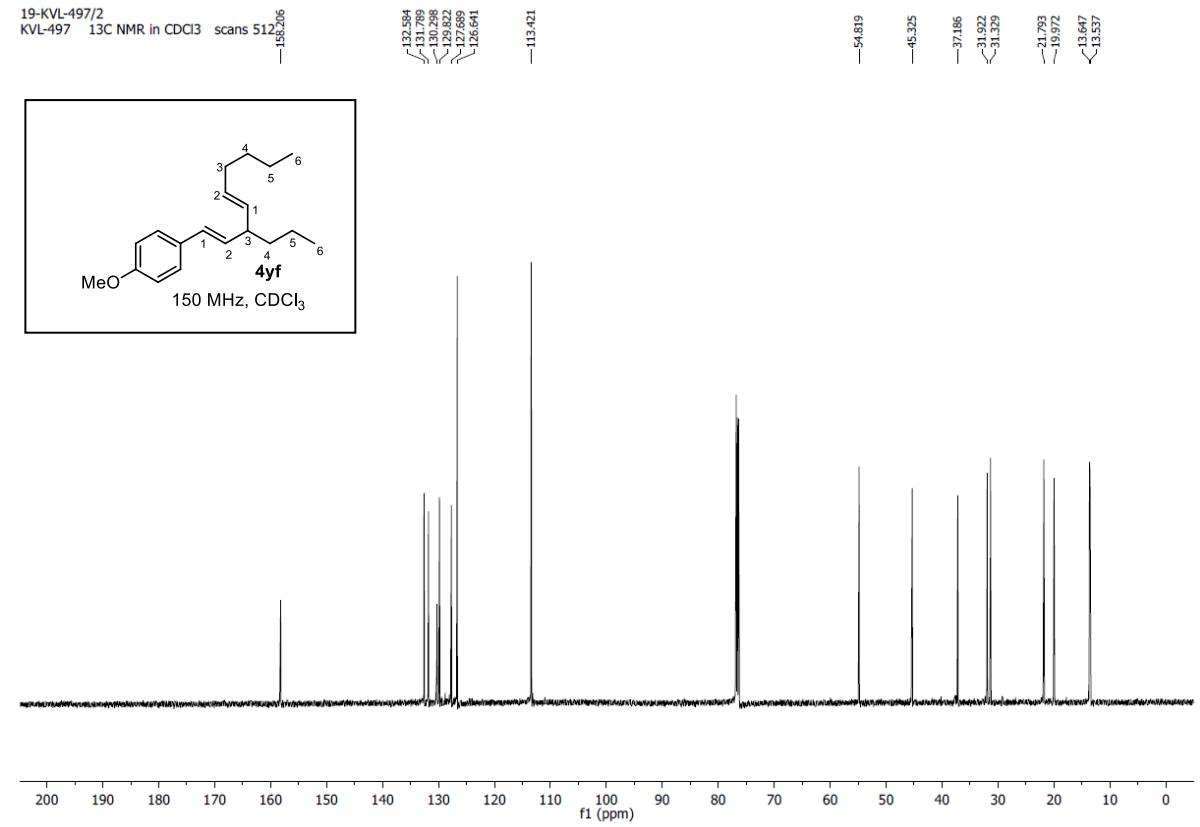
KVL-421
single_pulse



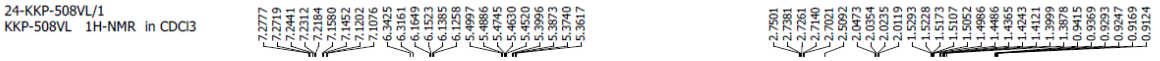
KVL-421
single pulse decoupled gated NOE

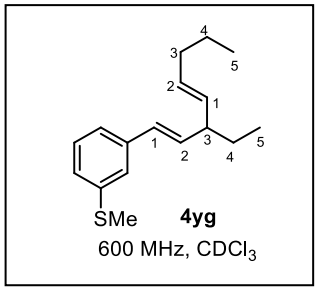


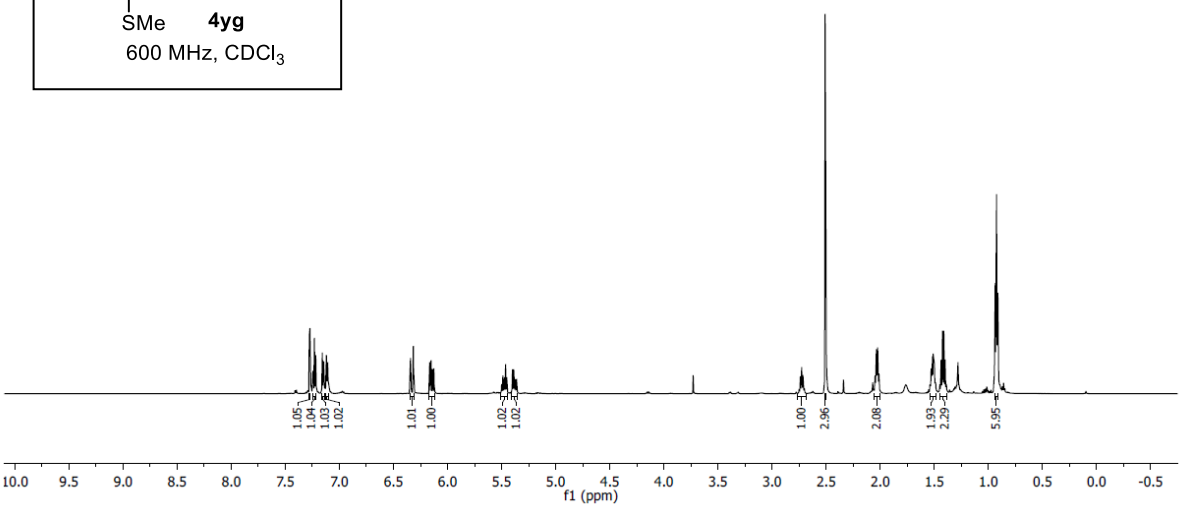

19-KVL-497/1
KVL-497 1H-NMR in CDCl3
7.3260
7.3117
6.8740
6.8596
6.3341
6.3076
6.0233
6.0105
5.9968
5.9841
5.5018
5.4908
5.4765
5.4653
5.4543
5.4124
5.4002
5.3869
5.3746
3.8254
2.8444
2.8325
2.8204
2.8084
2.7964
2.0753
2.0639
2.0525
2.0411
1.4862
1.4738
1.4599
1.4480
1.3896
1.3800
1.3687
1.3602
0.9546
0.9426
0.9337
0.9225
MeO
4yf
600 MHz, CDCl3
2.04
2.06
1.02
1.00
1.01
1.00
2.94
1.00
2.04
2.07
6.04
6.05
f1 (ppm)


19-KVL-497/2
KVL-497 13C NMR in CDCl3 scans 512
158.206
132.584
131.789
130.298
129.822
127.689
126.641
113.421
54.819
45.325
37.186
31.922
31.329
21.793
19.972
13.647
13.537
MeO
4yf
150 MHz, CDCl3
f1 (ppm)

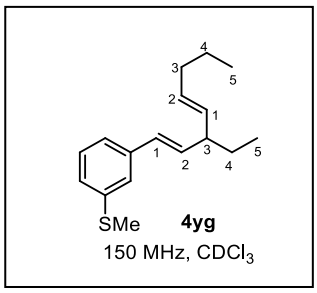
24-KKP-508VL/1
KKP-508VL 1H-NMR in CDCl3

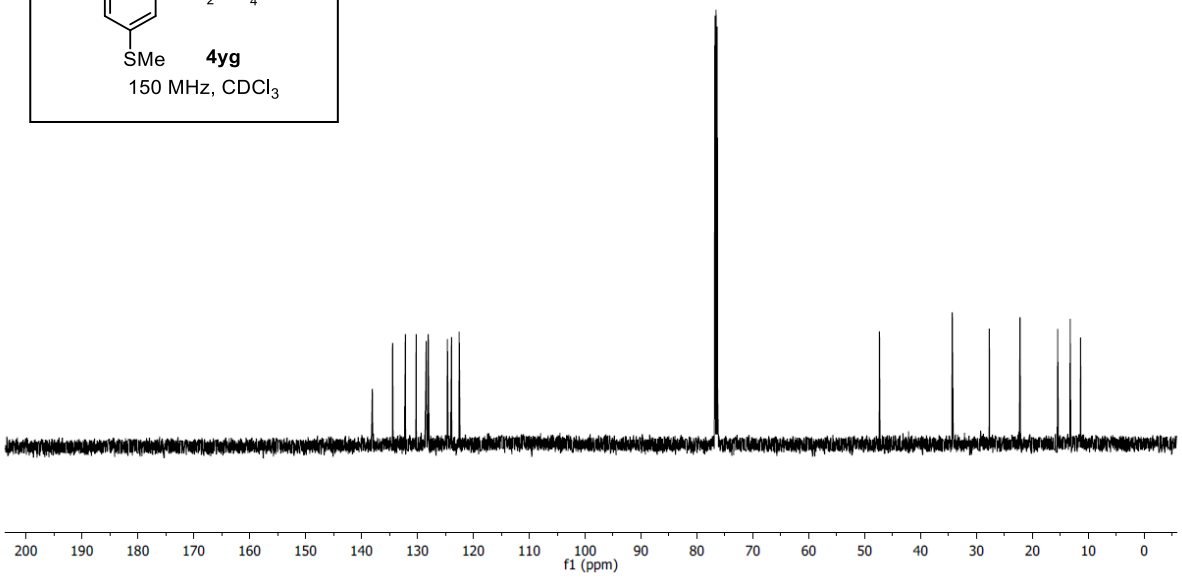




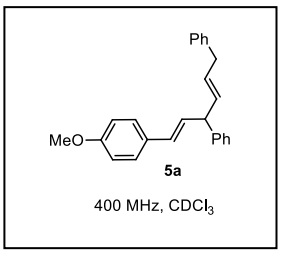


24-KKP-508VL/2
KKP-508VL 13C NMR in CDCl3 scans 300

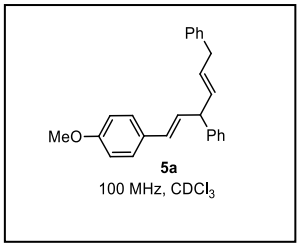


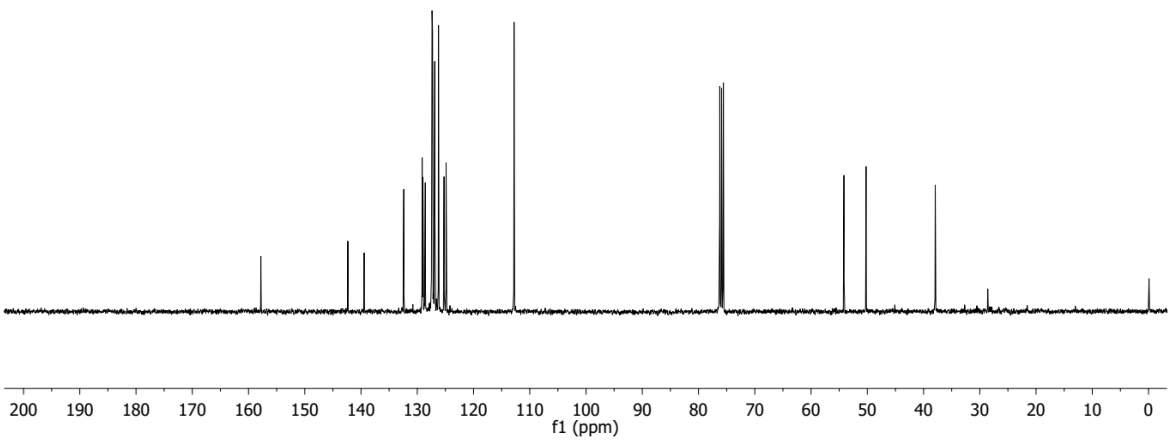


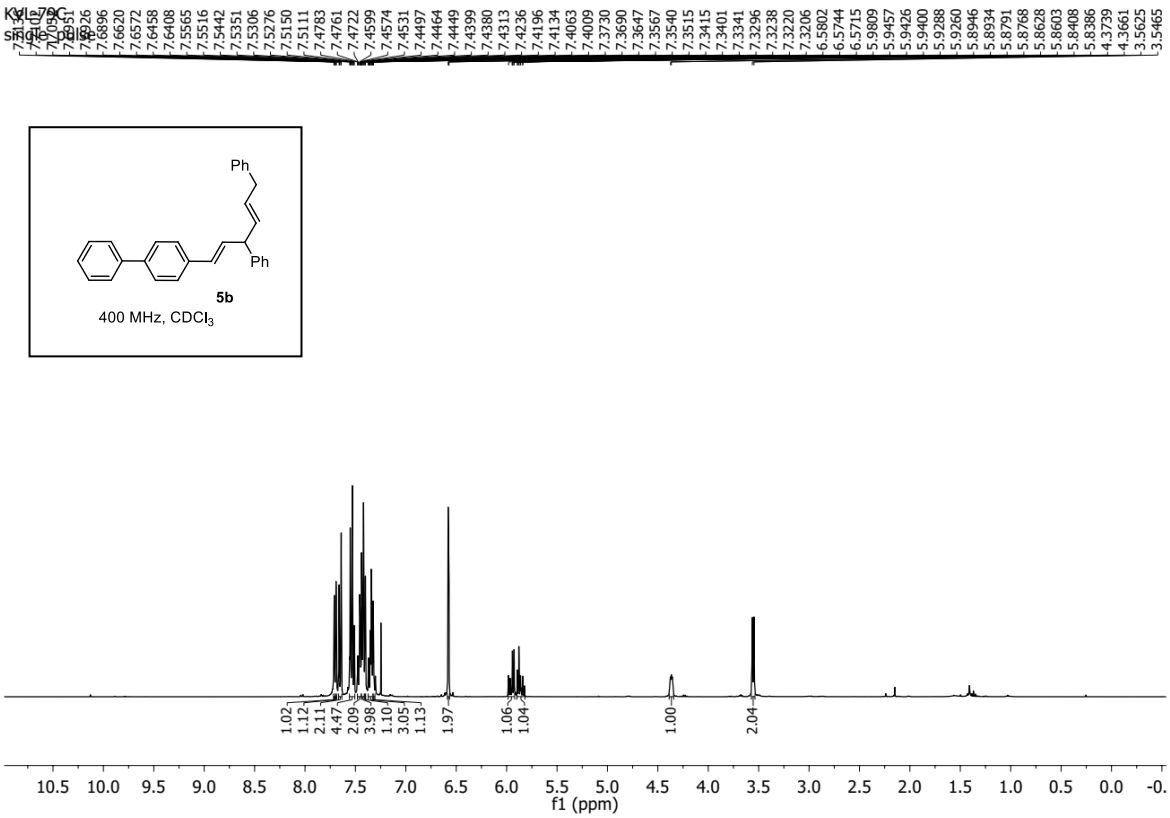
KVL-50
single pulse

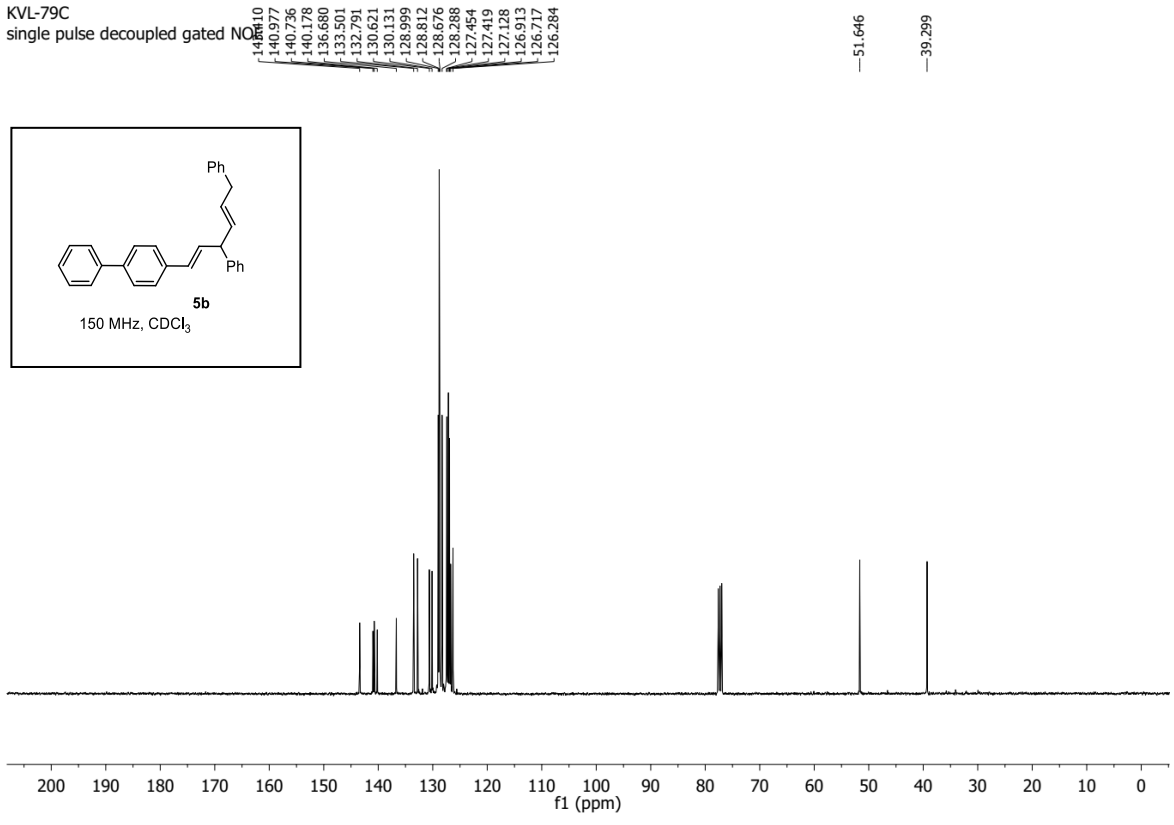


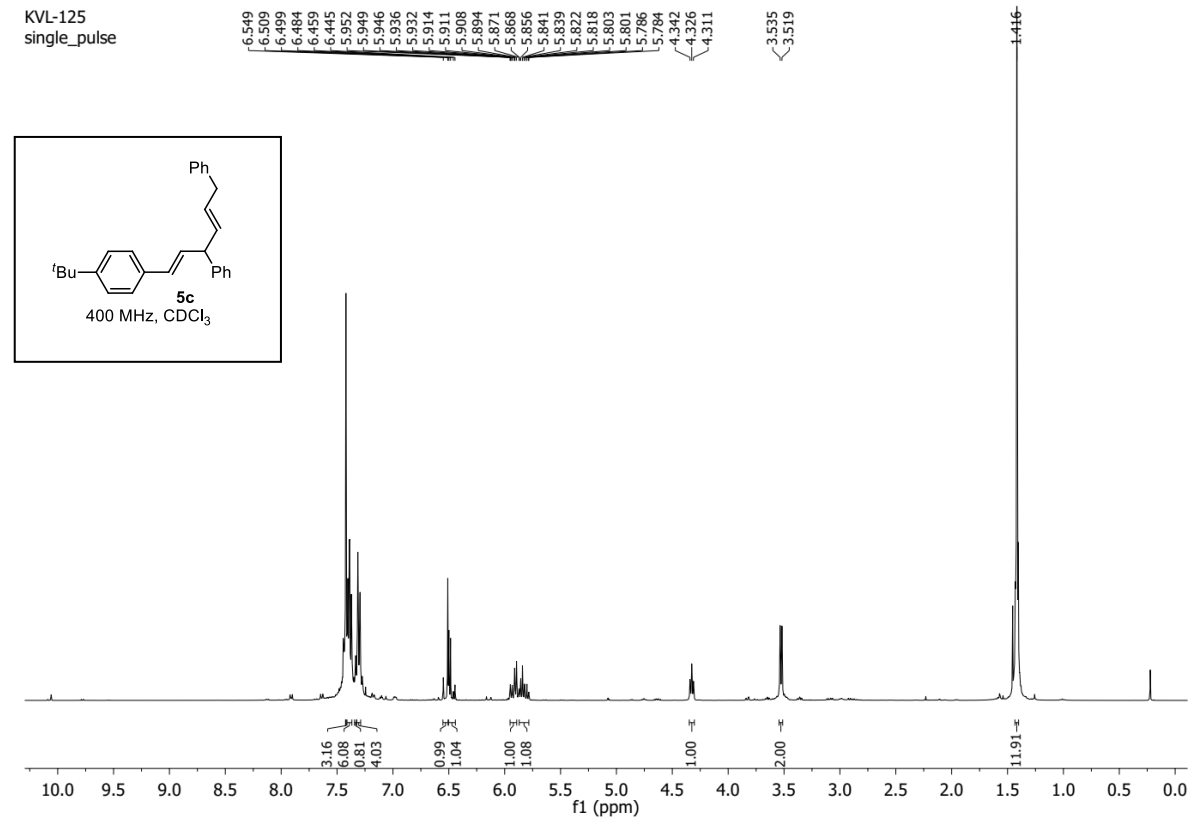
KVL-70AR
single pulse decoupled gated NOE

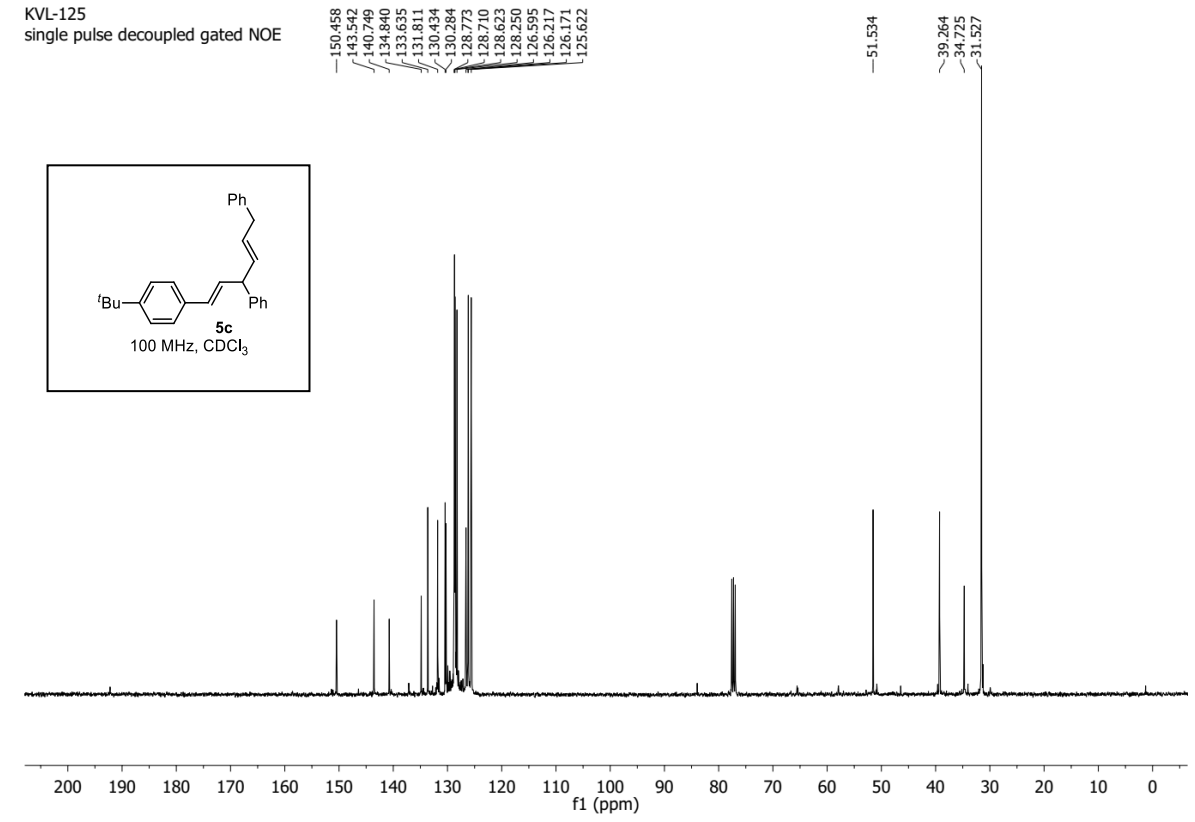




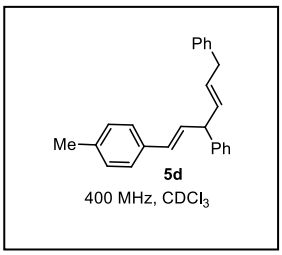

KVL-79C
single pulse
Ph
Ph
5b
400 MHz, CDCl3
1.02
1.12
2.11
4.47
2.09
3.98
1.10
3.05
1.13
1.97
1.06
1.04
1.00
2.04
f1 (ppm)

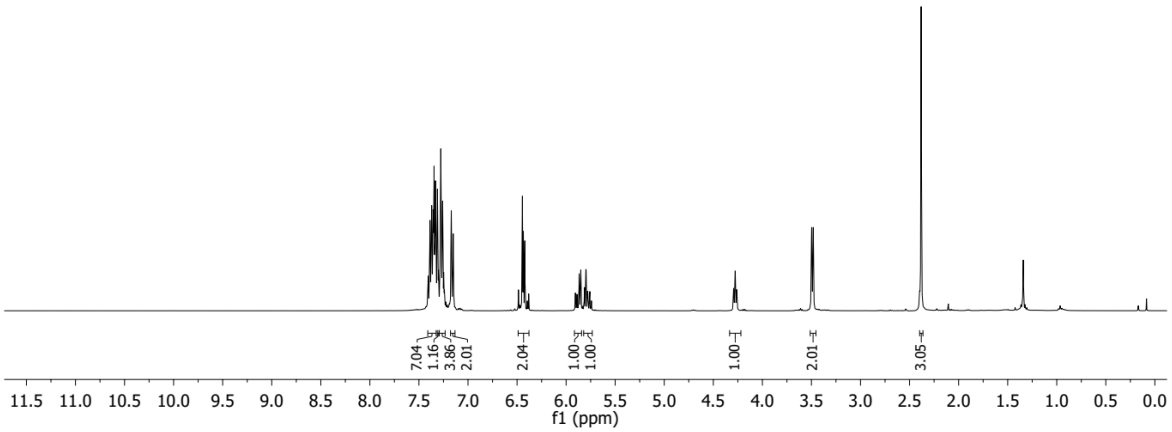

KVL-79C
single pulse decoupled gated NOE
140.977
140.736
140.178
136.680
133.501
132.791
130.621
130.131
128.999
128.812
128.676
128.288
127.454
127.419
127.128
126.913
126.717
126.284
51.646
39.299
Ph
Ph
5b
150 MHz, CDCl3
f1 (ppm)


KVL-125
single_pulse
6.549
6.509
6.499
6.484
6.459
6.445
5.952
5.949
5.946
5.936
5.932
5.914
5.911
5.908
5.894
5.871
5.868
5.856
5.841
5.839
5.822
5.818
5.803
5.801
5.786
5.784
4.342
4.326
4.311
3.535
3.519
1.416
Ph
tBu
Ph
5c
400 MHz, CDCl3
3.16
6.08
0.81
4.03
0.99
1.04
1.00
1.08
1.00
2.00
11.91
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

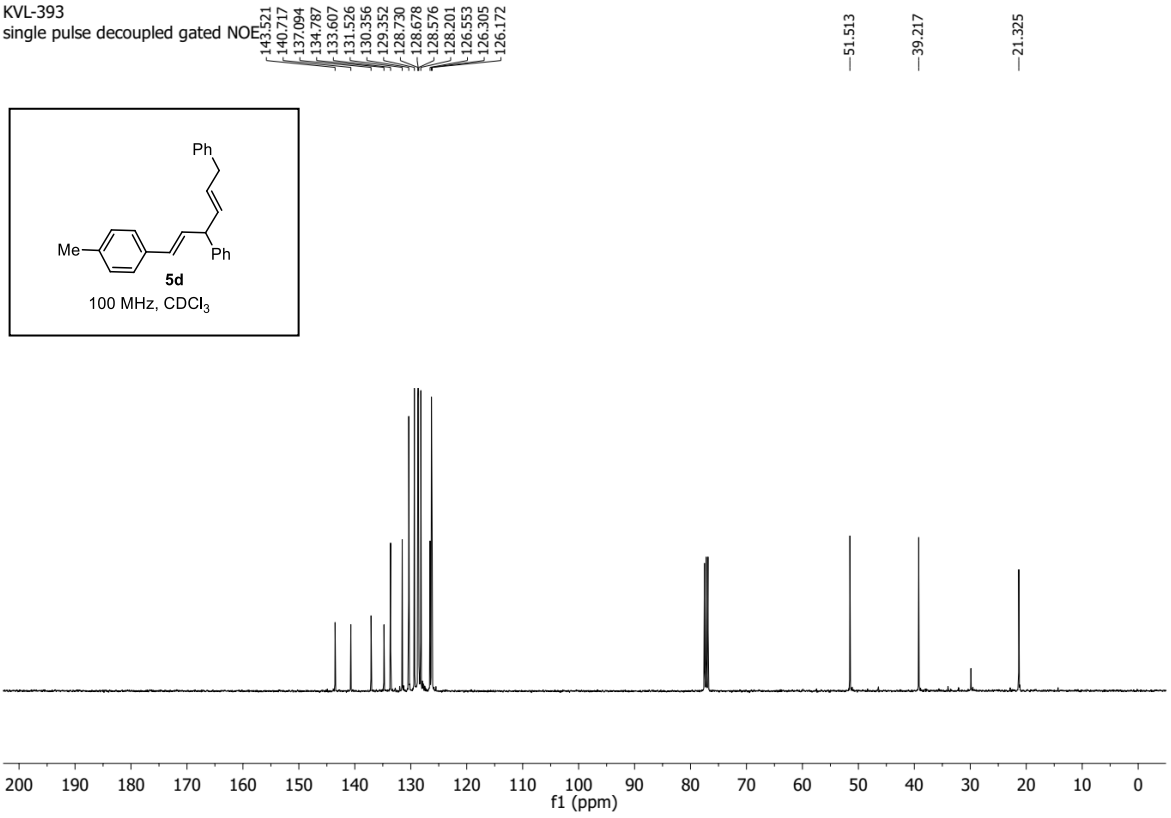

KVL-125
single pulse decoupled gated NOE
150.458
143.542
140.749
134.840
133.635
131.811
130.434
130.284
128.773
128.710
128.623
128.250
126.595
126.217
126.171
125.622
51.534
39.264
34.725
31.527
Ph
tBu
Ph
5c
100 MHz, CDCl3
200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

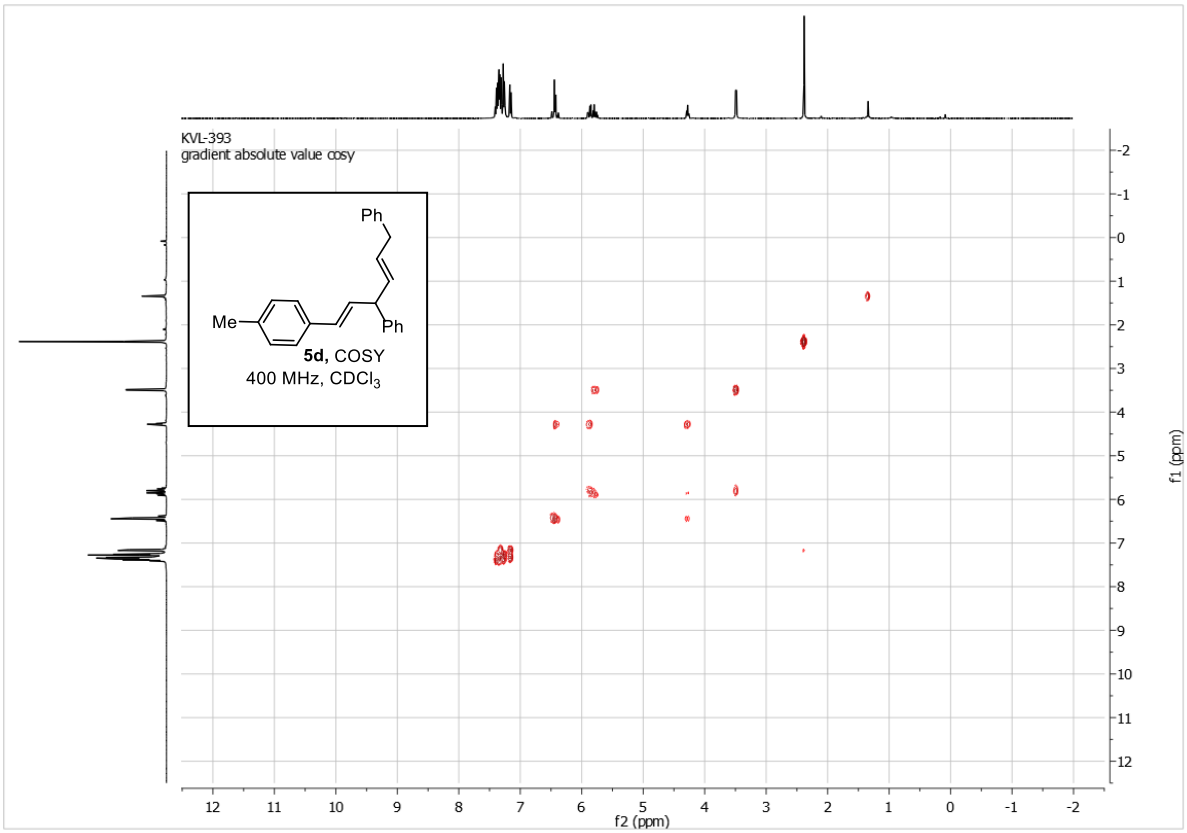
KVL-393
single_pulse

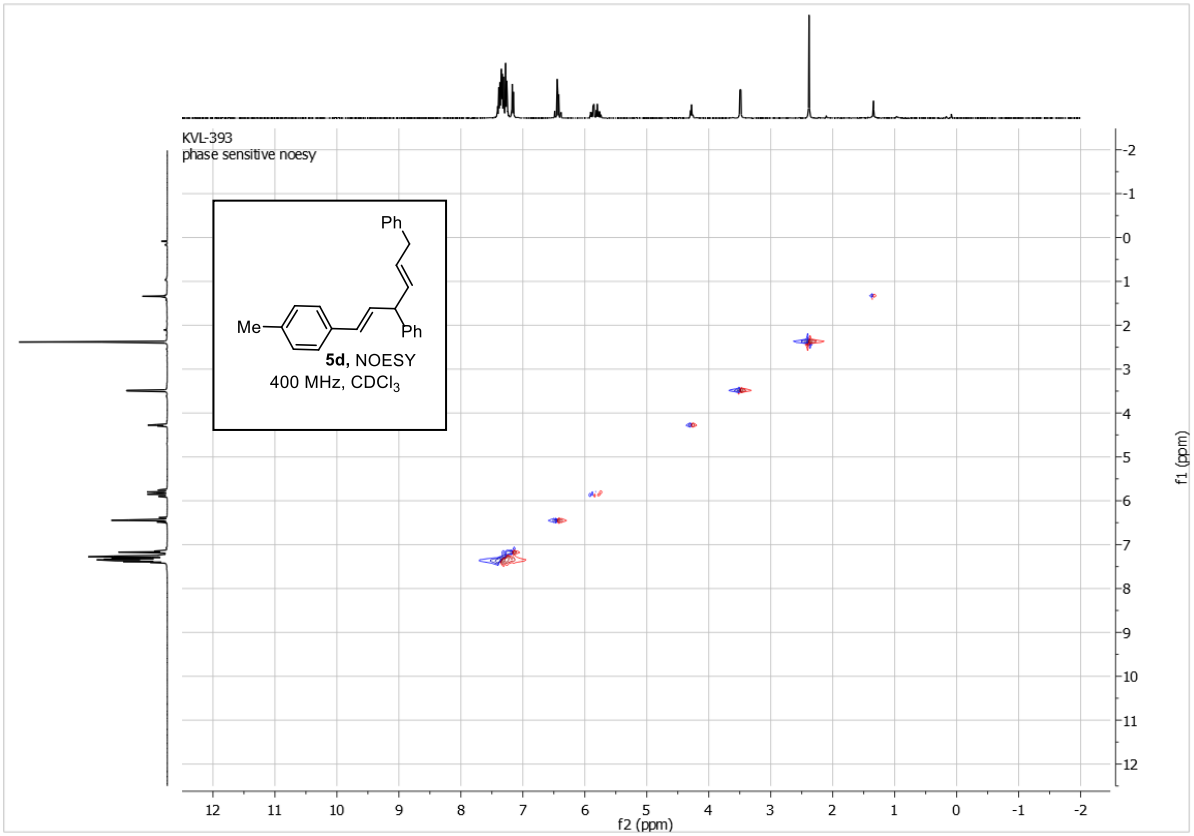


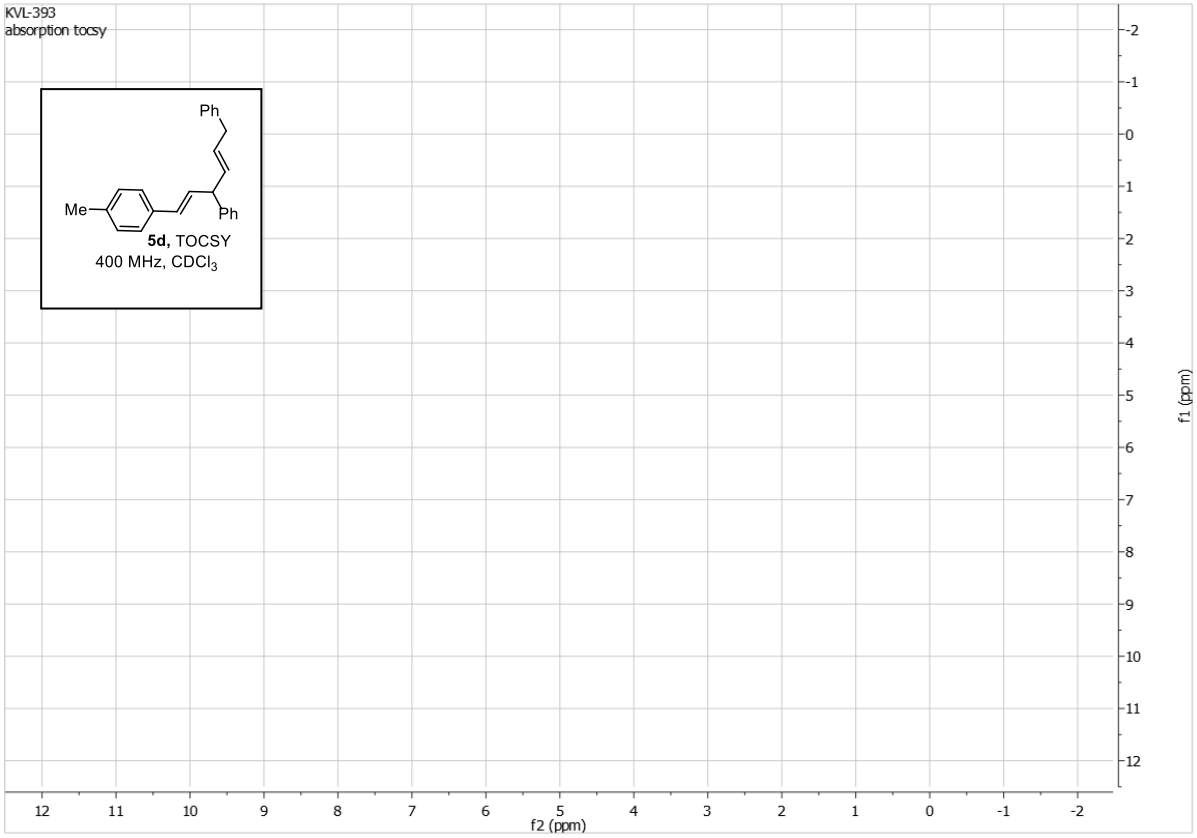


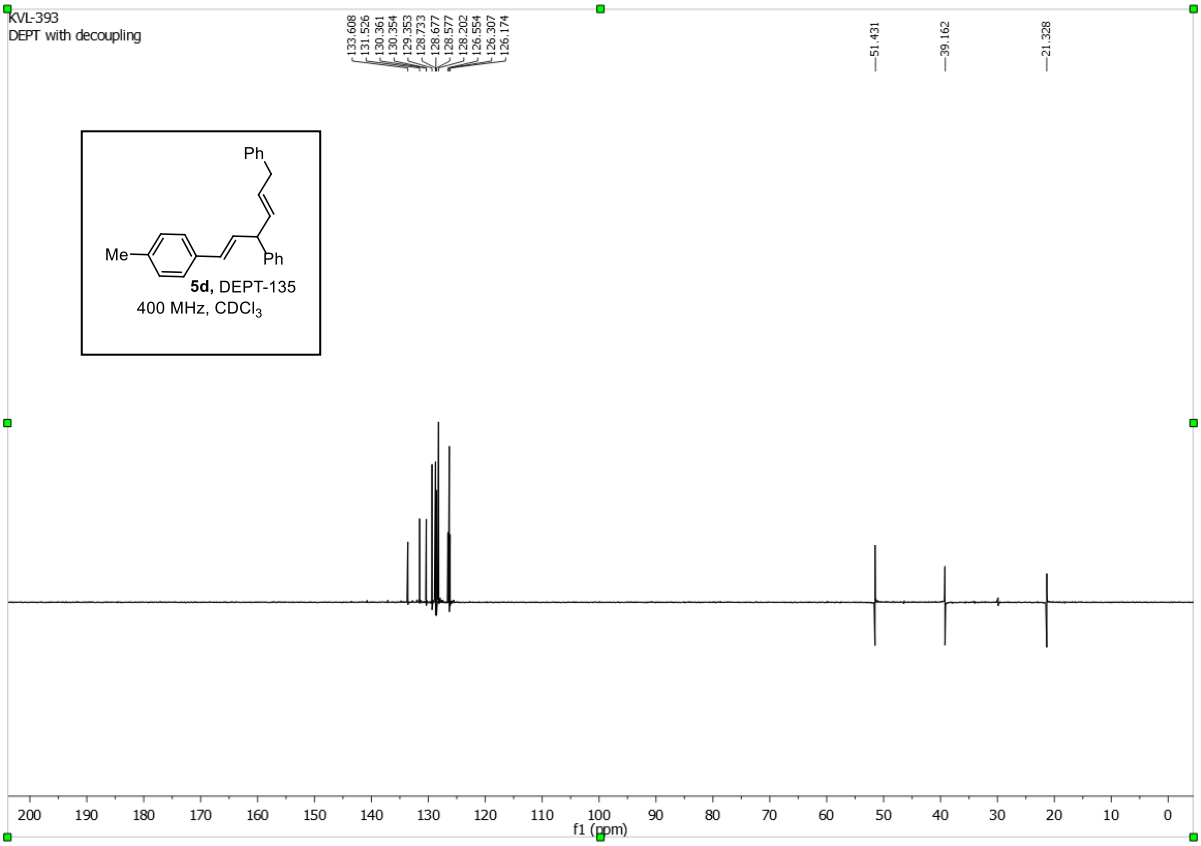
KVL-393
single pulse decoupled gated NOE

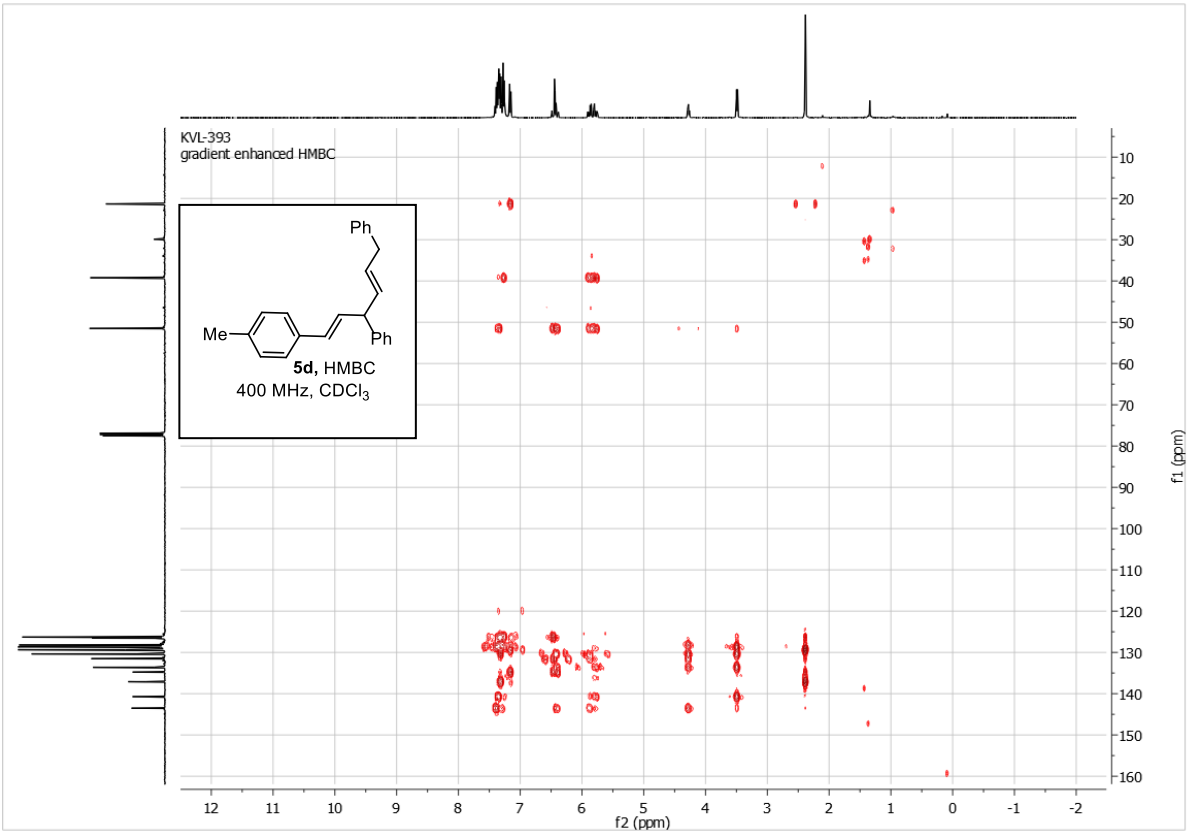


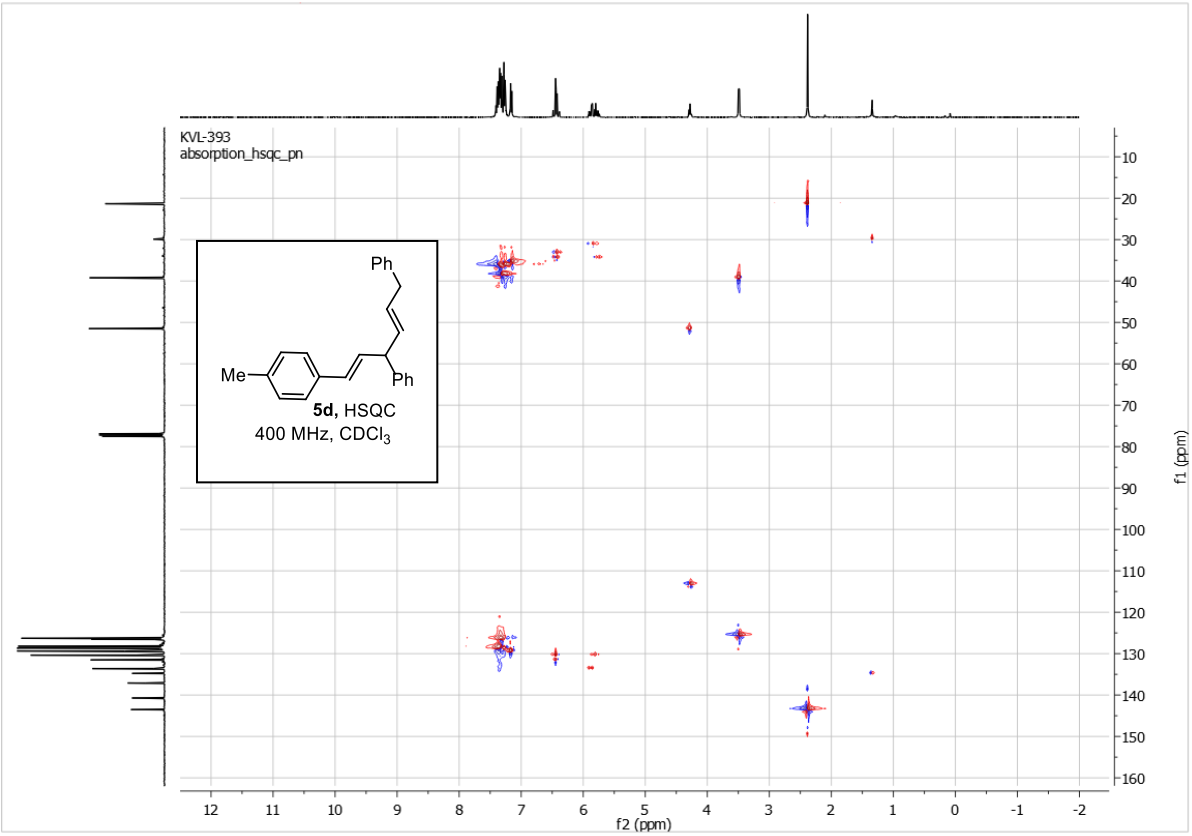

KVL-393
gradient absolute value cosy
Ph
Me
Ph
5d, COSY
400 MHz, CDCl3
f2 (ppm)
f1 (ppm)

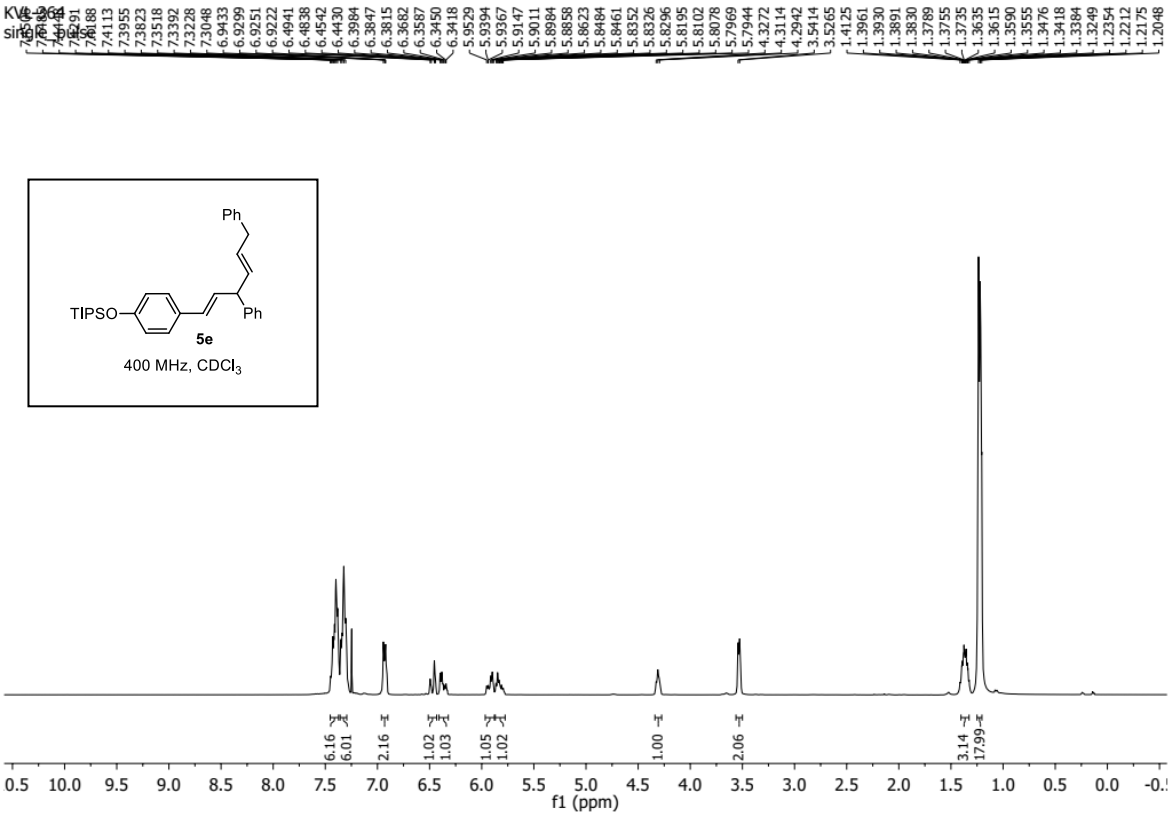

KVL-393
phase sensitive noesy
Ph
Me
Ph
5d, NOESY
400 MHz, CDCl3
f2 (ppm)
f1 (ppm)

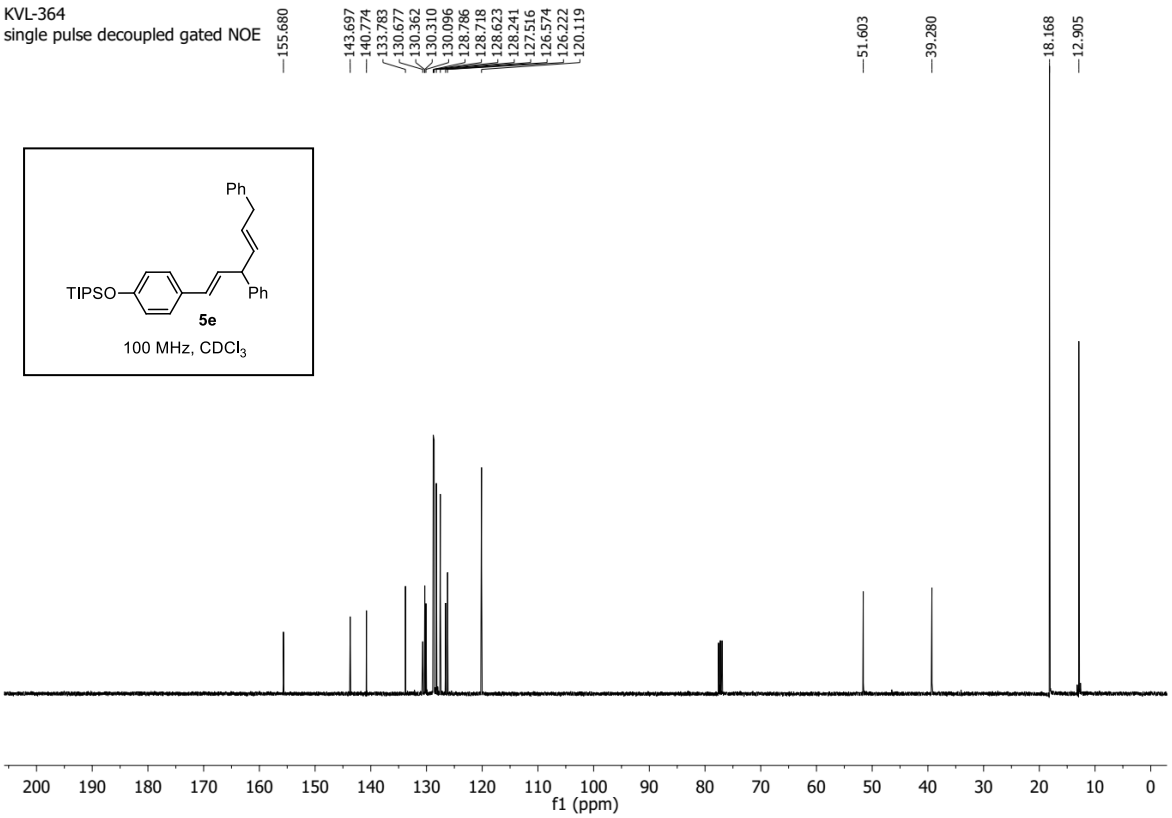

KVL-393
absorption tocsy
Ph
Me
Ph
5d, TOCSY
400 MHz, CDCl3
f2 (ppm)
f1 (ppm)


KVL-393
DEPT with decoupling
133.608
131.526
130.361
130.354
129.353
128.733
128.677
128.577
128.202
126.554
126.307
126.174
51.431
39.162
21.328
Ph
Me
Ph
5d, DEPT-135
400 MHz, CDCl3
f1 (ppm)

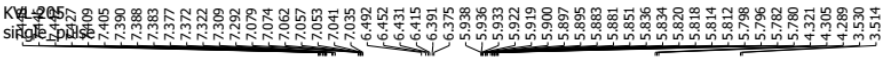

KVL-393
gradient enhanced HMBC
Ph
Me
Ph
5d, HMBC
400 MHz, CDCl3
f2 (ppm)
f1 (ppm)

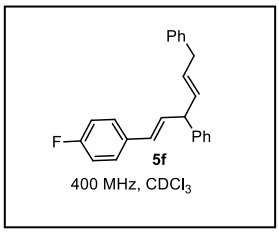

KVL-393
absorption_hsqc_pn
Ph
Me
Ph
5d, HSQC
400 MHz, CDCl3
f2 (ppm)
f1 (ppm)

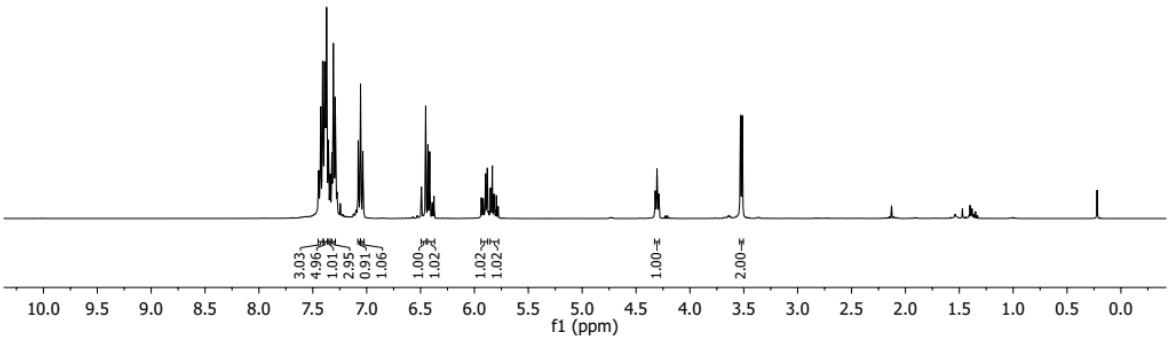

KVL-364
single pulse
Ph
TIPSO
Ph
5e
400 MHz, CDCl3
6.16
6.01
2.16
1.02
1.03
1.05
1.02
1.00
2.06
3.14
17.99
f1 (ppm)


KVL-364
single pulse decoupled gated NOE
155.680
143.697
140.774
133.783
130.677
130.362
130.310
130.096
128.786
128.718
128.623
128.241
127.516
126.574
126.222
120.119
51.603
39.280
18.168
12.905
Ph
TIPSO
Ph
5e
100 MHz, CDCl3
f1 (ppm)

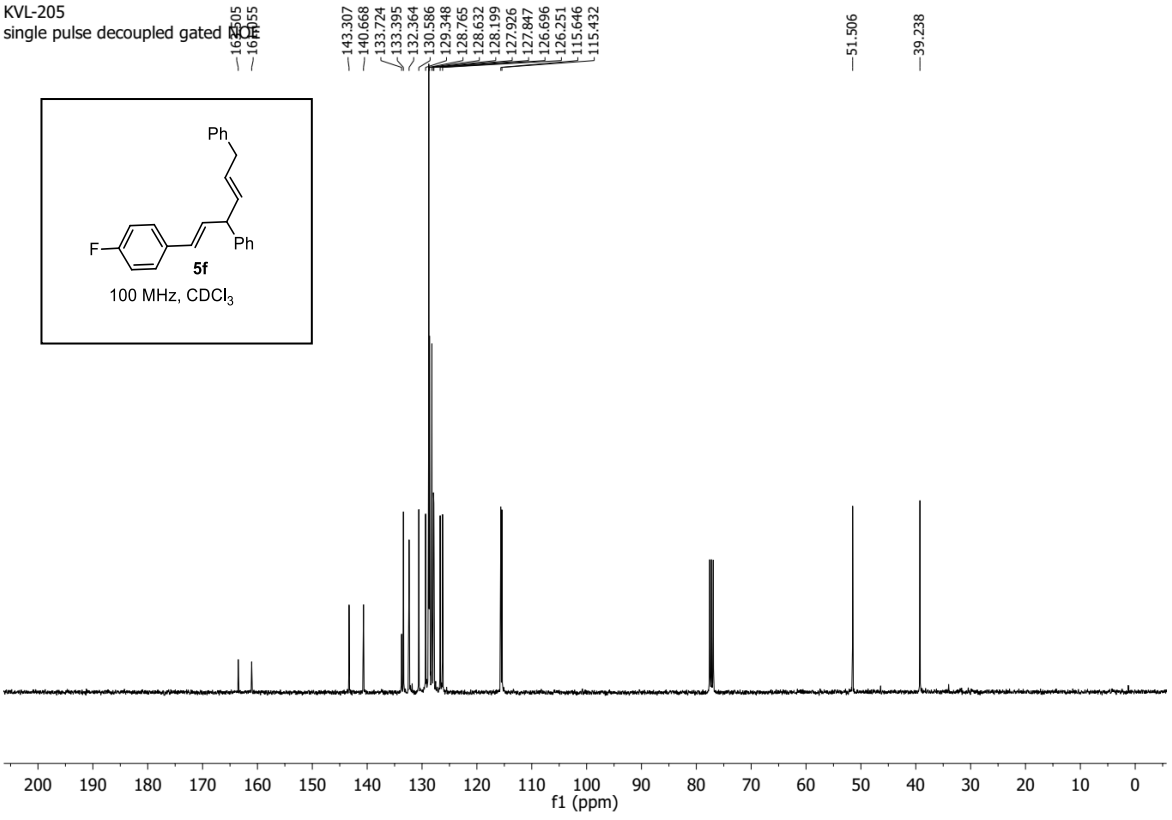
KVL-205
single pulse



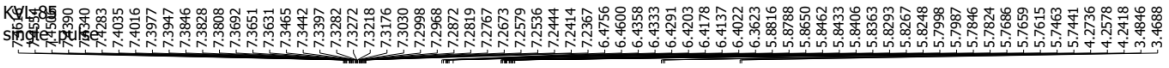


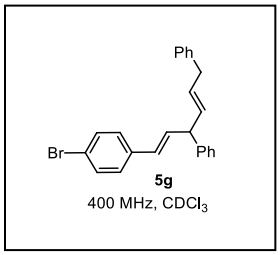


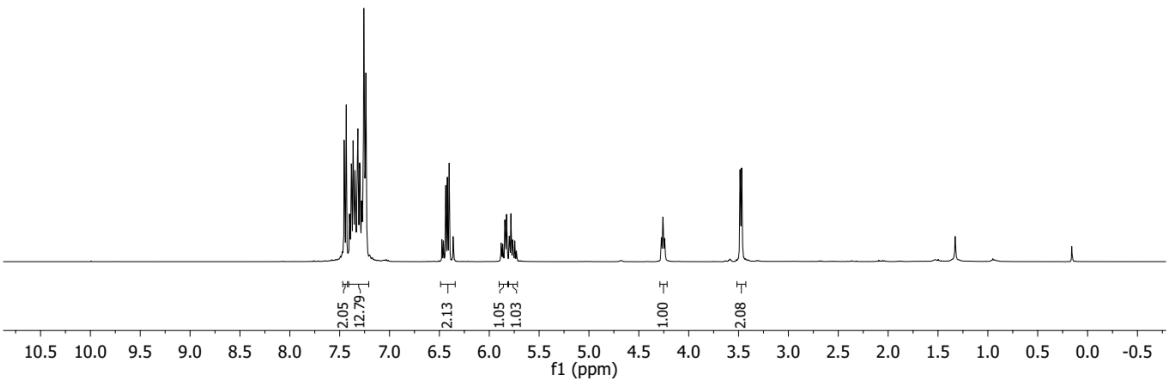
KVL-205
single pulse decoupled gated DEPT



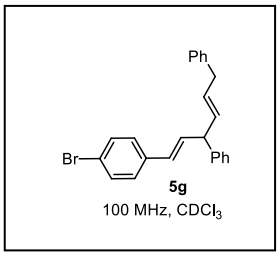
KVL-85
single pulse

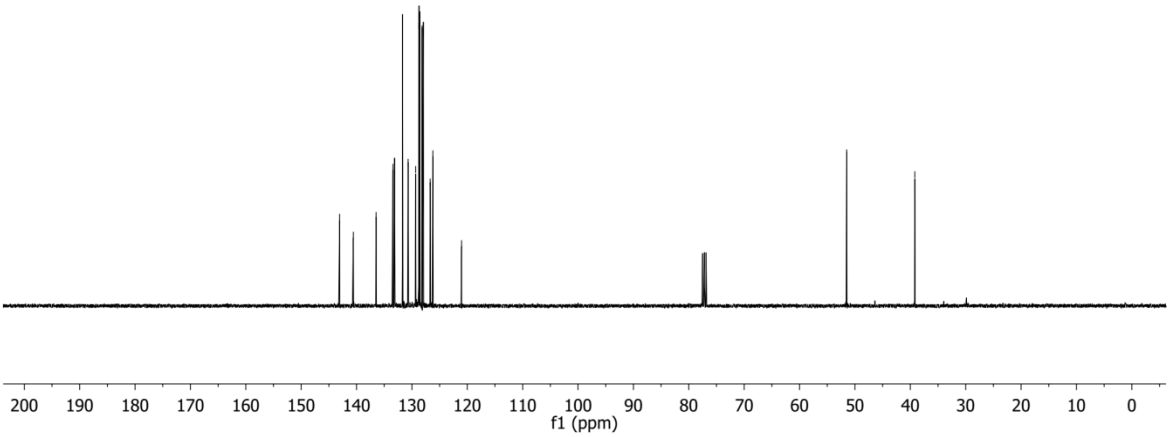




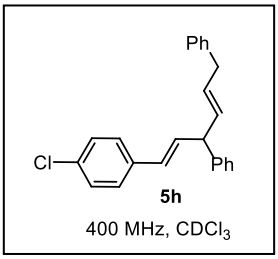


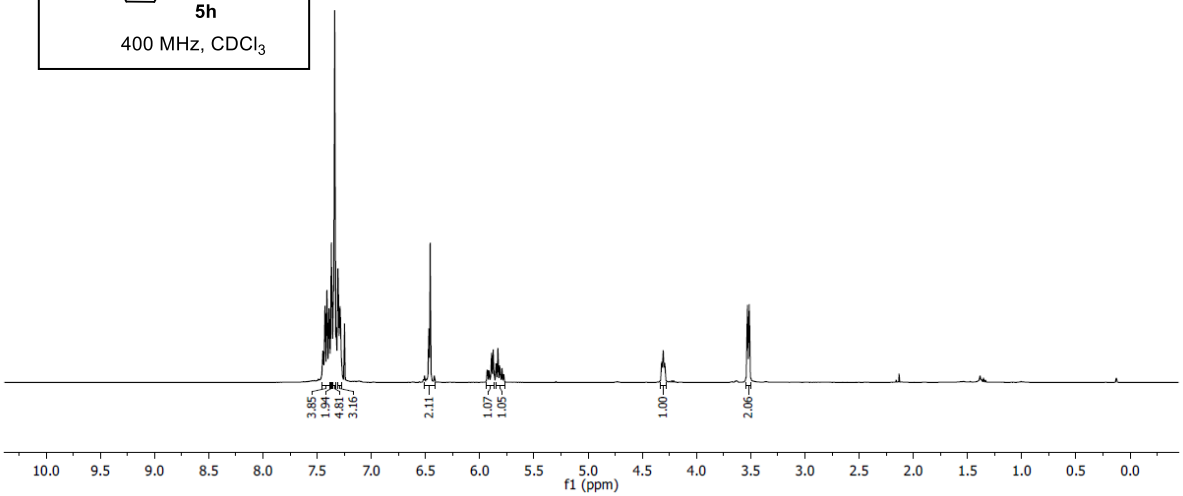
KVL-85
single pulse decoupled gated NOE



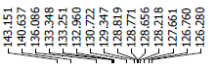


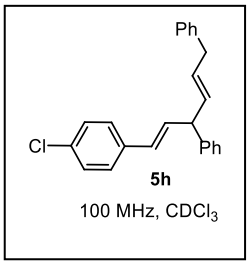
KVL-91B
single_pulse

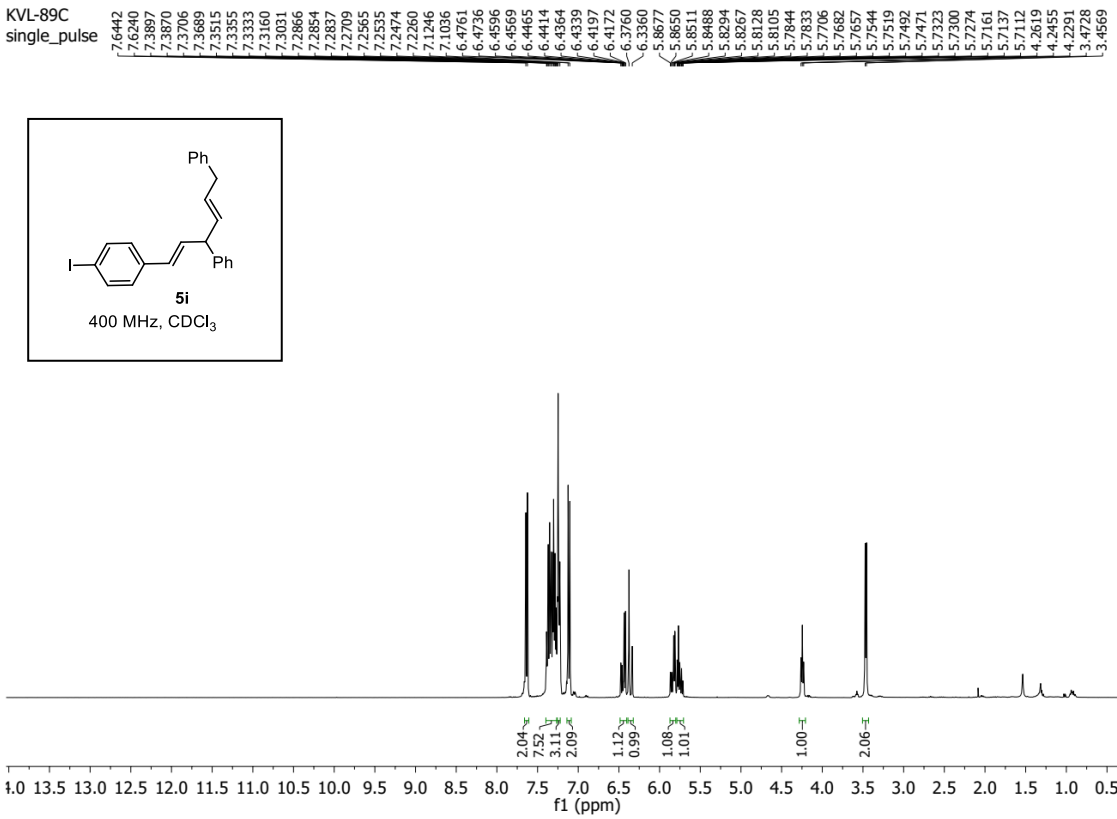


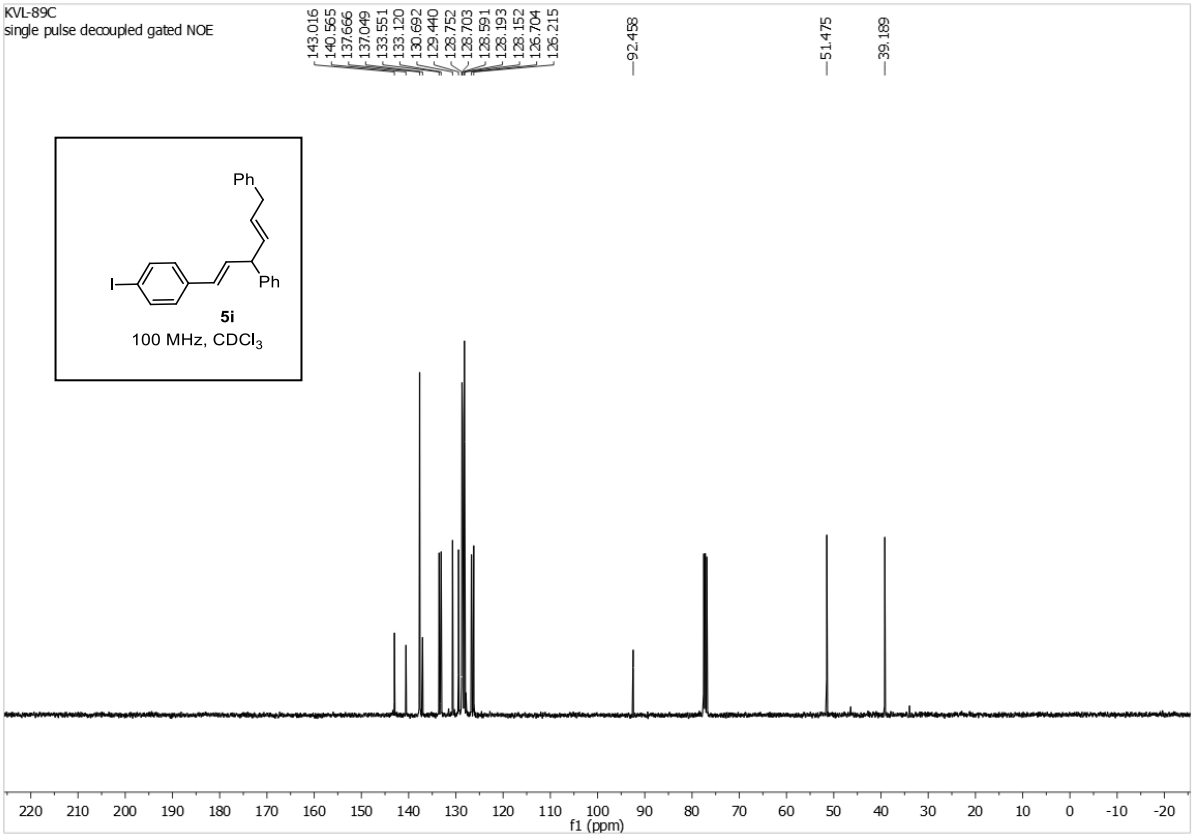


KVL-91B
single pulse decoupled gated NOE

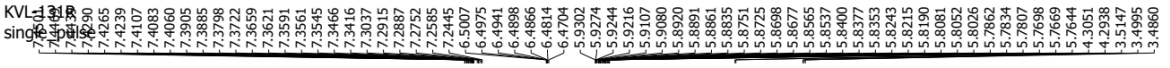


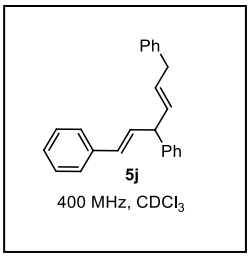


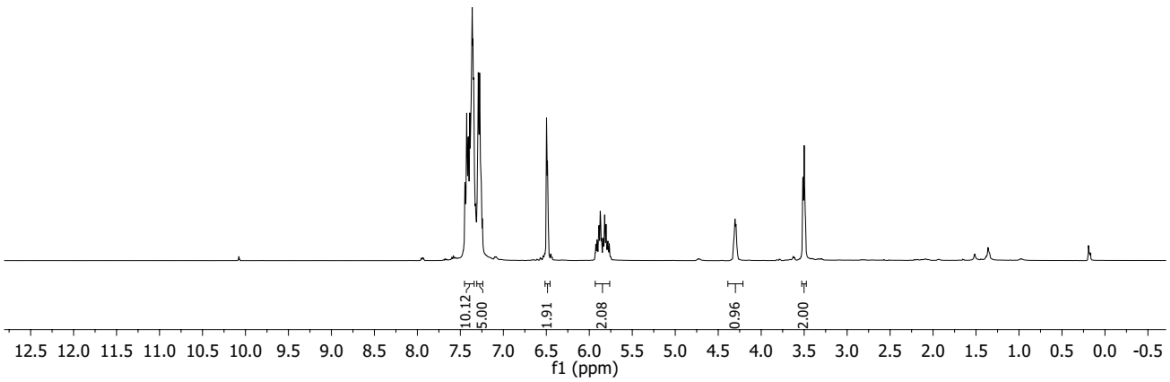

KVL-89C
single_pulse
7.6442
7.6240
7.3897
7.3870
7.3706
7.3689
7.3515
7.3355
7.3333
7.3160
7.3031
7.2866
7.2854
7.2837
7.2709
7.2565
7.2535
7.2474
7.2260
7.1246
7.1036
6.4761
6.4736
6.4596
6.4569
6.4465
6.4414
6.4364
6.4339
6.4197
6.4172
6.3760
6.3360
5.8677
5.8650
5.8511
5.8488
5.8294
5.8267
5.8128
5.8105
5.7844
5.7833
5.7706
5.7682
5.7657
5.7544
5.7519
5.7492
5.7471
5.7323
5.7300
5.7274
5.7161
5.7137
5.7112
4.2619
4.2455
4.2291
3.4728
3.4569
Ph
I
Ph
5i
400 MHz, CDCl3
2.04
7.52
3.11
2.09
1.12
0.99
1.08
1.01
1.00
2.06
f1 (ppm)


KVL-89C
single pulse decoupled gated NOE
143.016
140.565
137.666
137.049
133.551
133.120
130.692
129.440
128.752
128.703
128.591
128.193
128.152
126.704
126.215
92.458
51.475
39.189
Ph
I
Ph
5i
100 MHz, CDCl3
f1 (ppm)

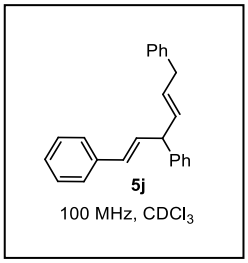
KVL-131B
single pulse

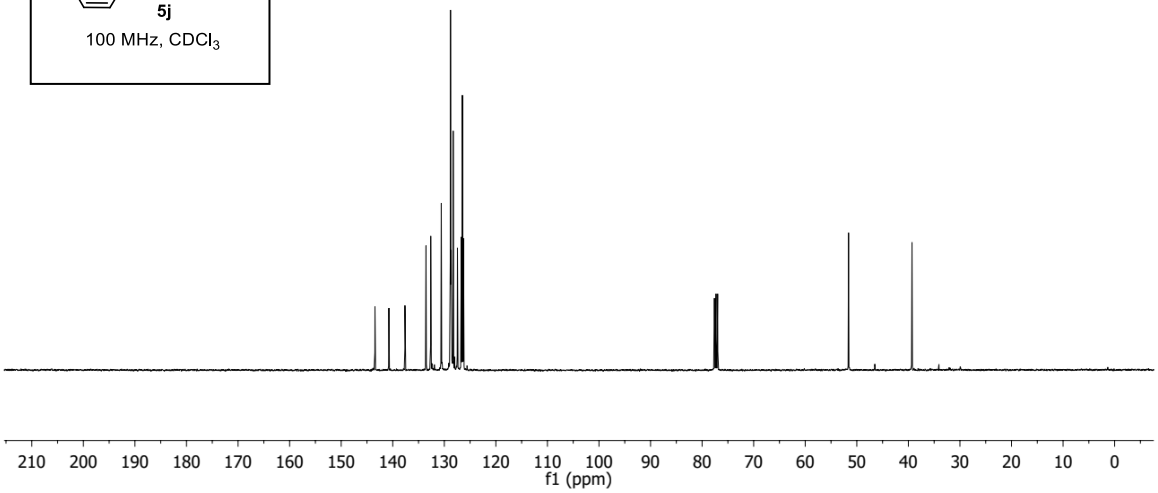


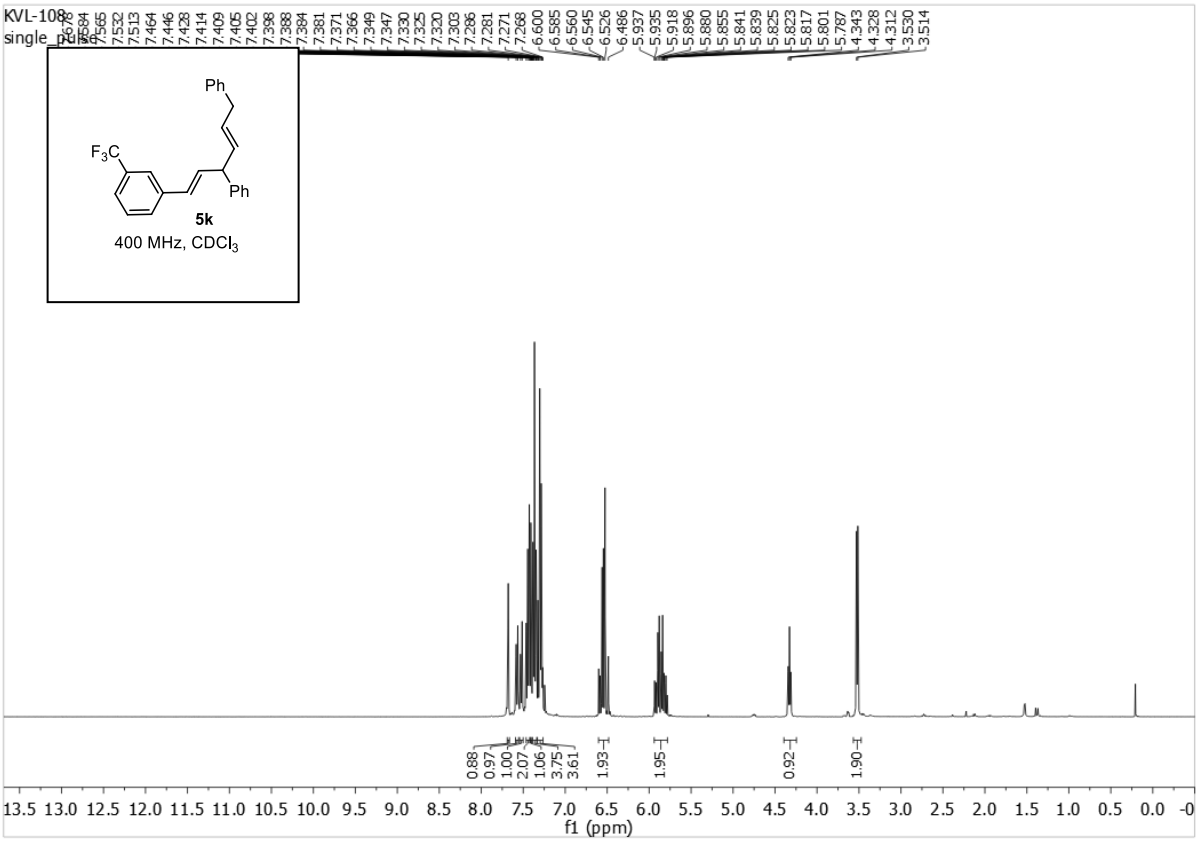


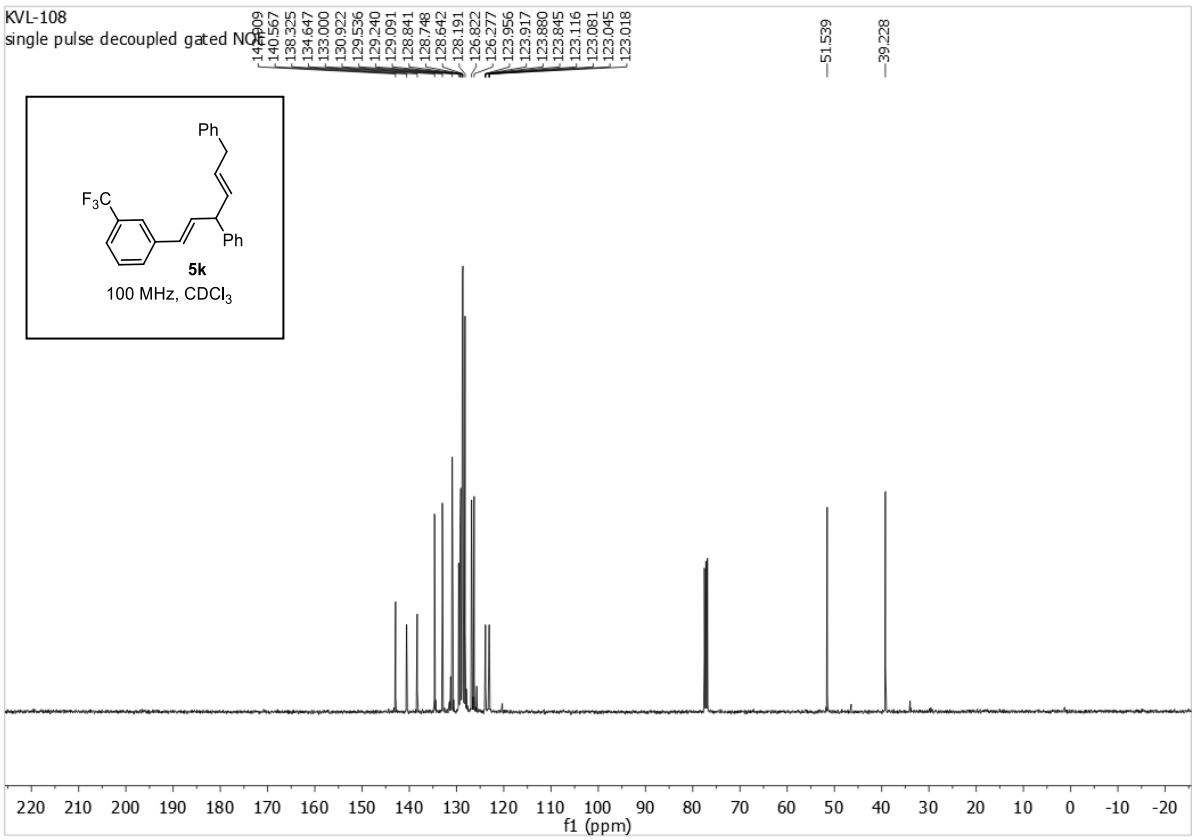


KVL-131
single pulse decoupled gated NOE

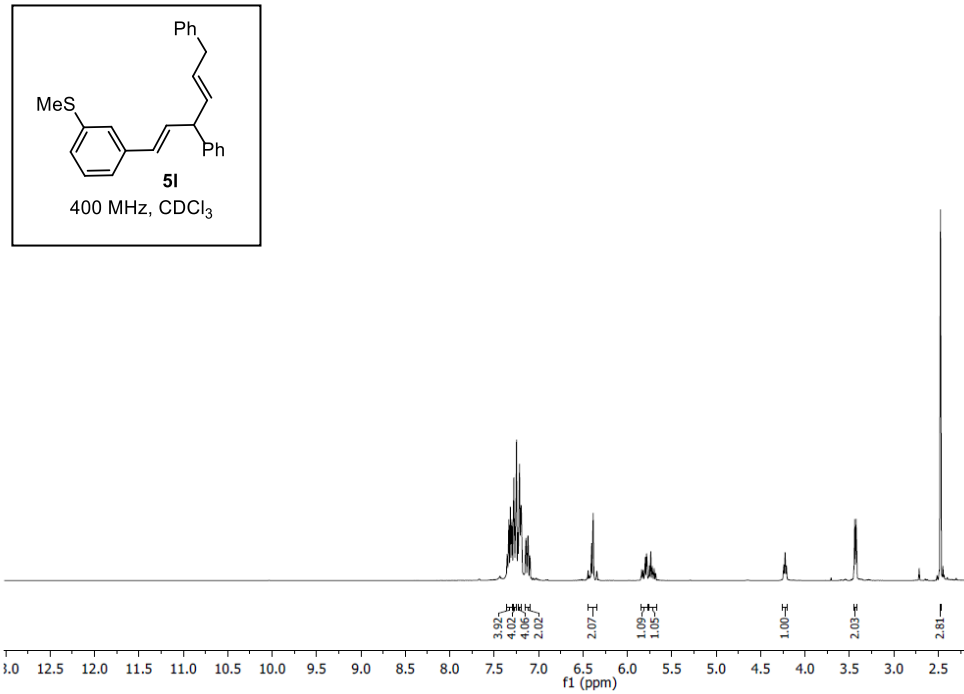




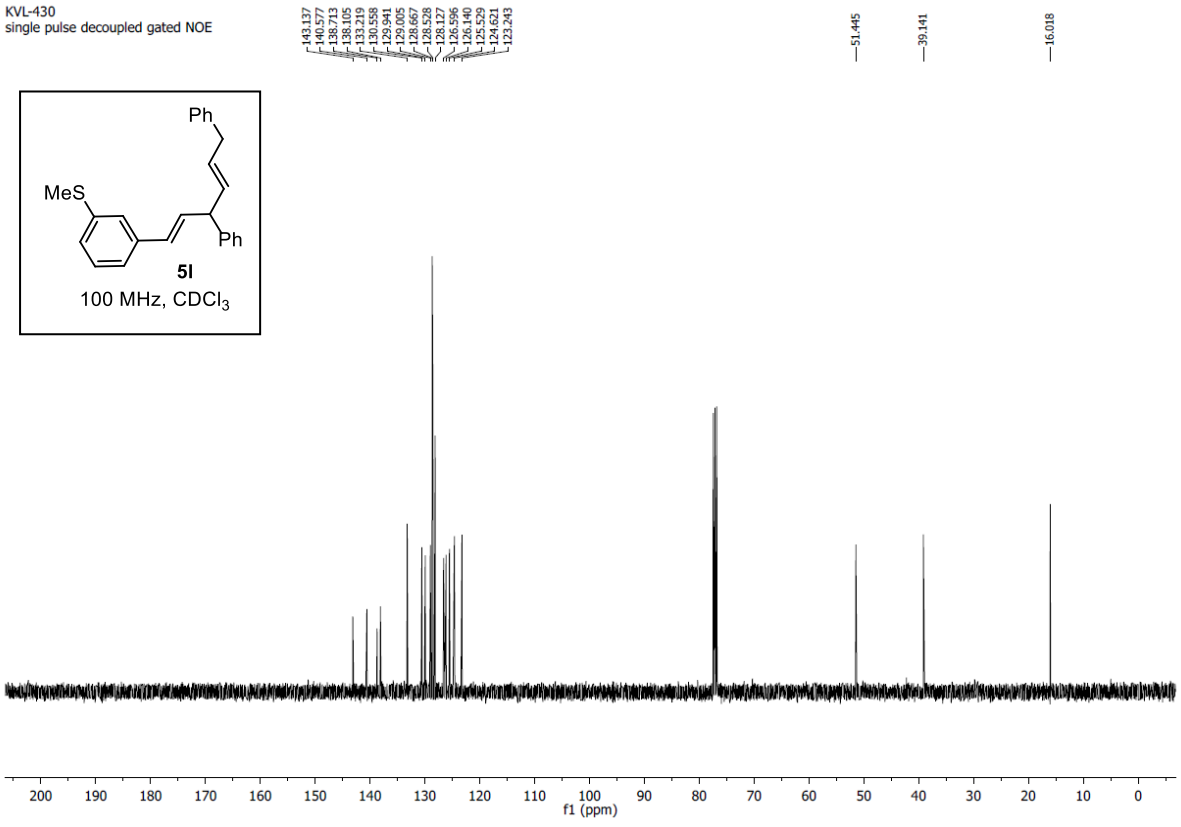

KVL-108
single_pulse
Ph
F3C
Ph
5k
400 MHz, CDCl3
0.88
0.97
1.00
2.07
1.06
3.75
3.61
1.93
1.95
0.92
1.90
f1 (ppm)

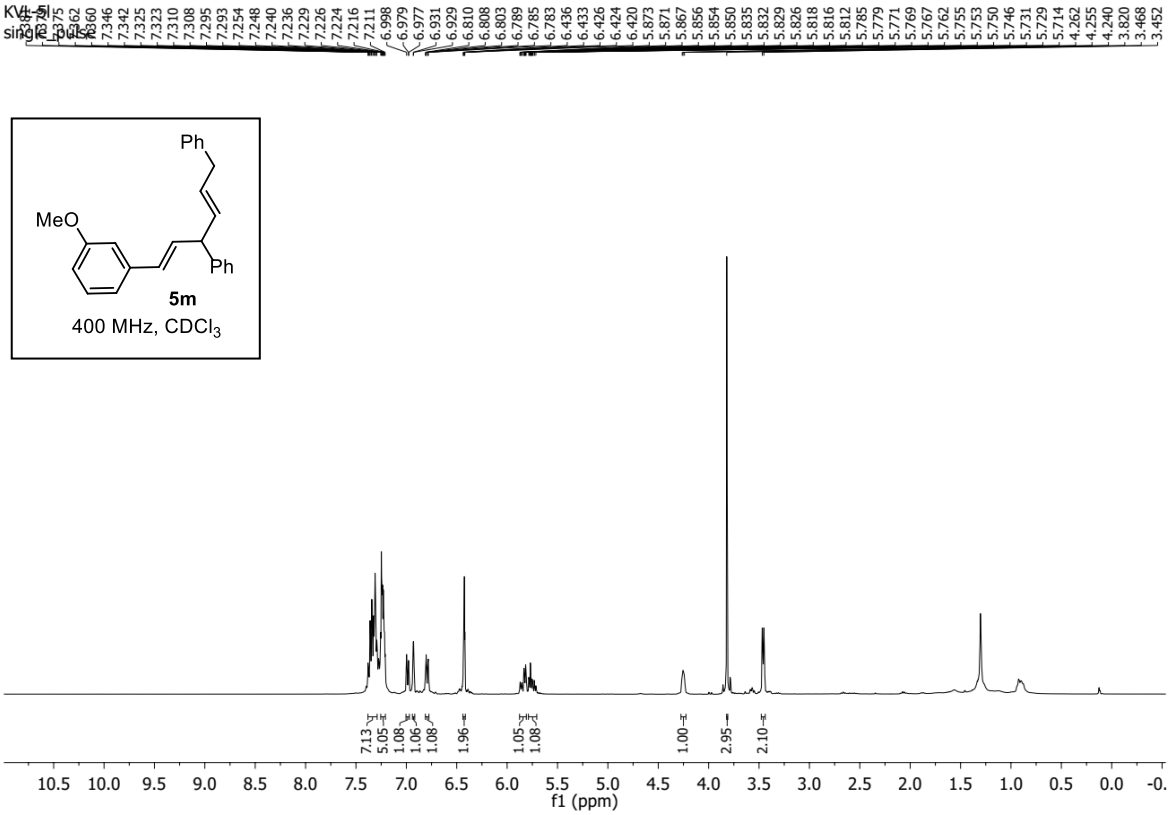

KVL-108
single pulse decoupled gated NOE
51.539
39.228
Ph
F3C
Ph
5k
100 MHz, CDCl3
f1 (ppm)

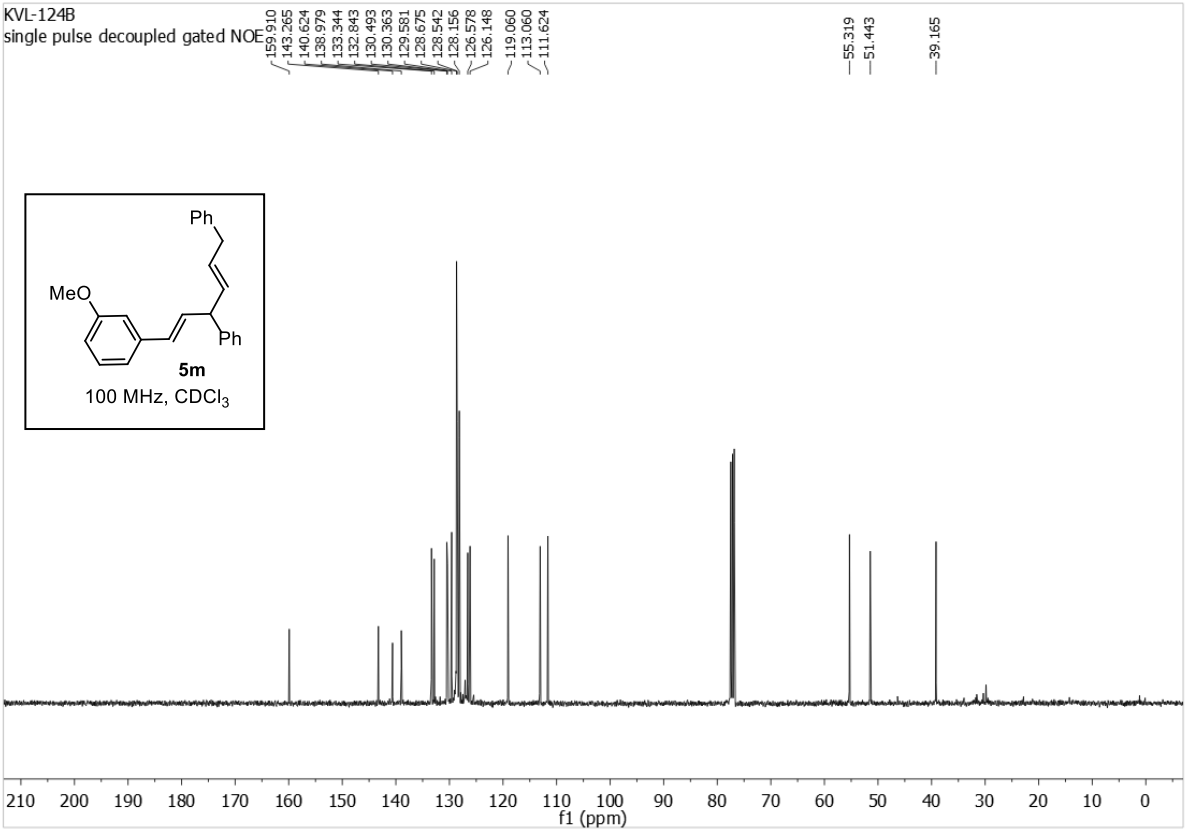
KVL-430
single_pulse

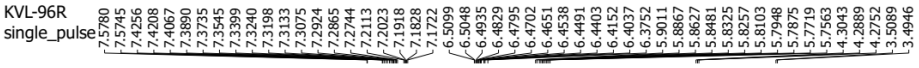


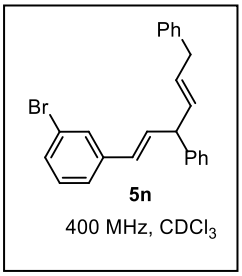
KVL-430
single pulse decoupled gated NOE

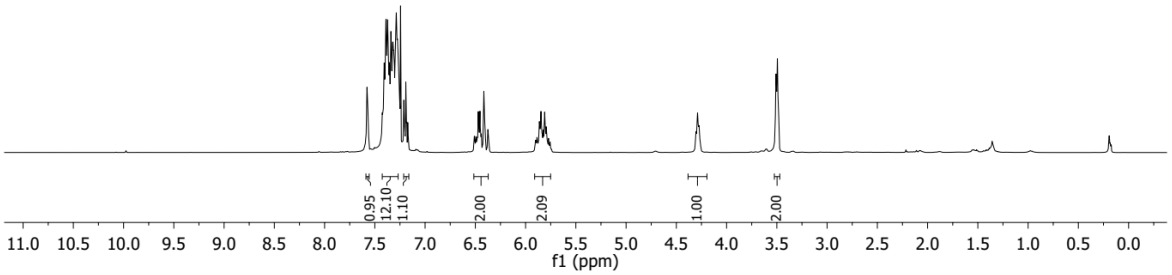


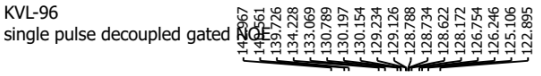

KVL-5I
single_pulse
MeO
Ph
Ph
5m
400 MHz, CDCl3
f1 (ppm)

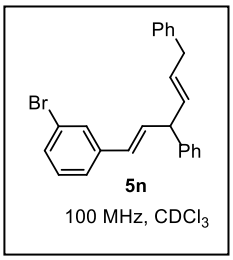

KVL-124B
single pulse decoupled gated NOE
MeO
Ph
Ph
5m
100 MHz, CDCl3
f1 (ppm)

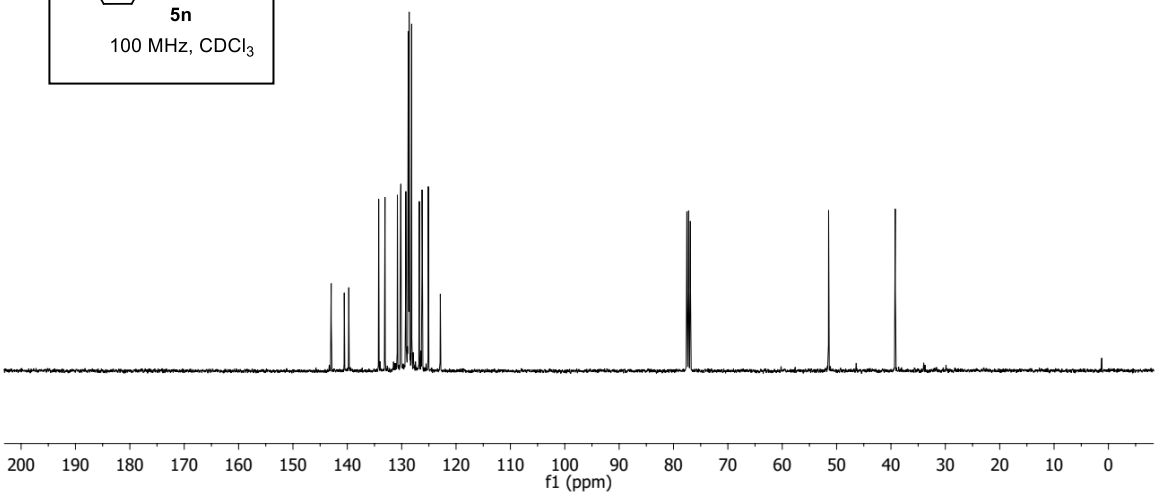

KVL-96R
single_pulse
7.5780
7.5745
7.4256
7.4208
7.4067
7.3890
7.3735
7.3545
7.3399
7.3240
7.3198
7.3133
7.3075
7.2924
7.2865
7.2744
7.2113
7.2023
7.1918
7.1828
7.1722
6.5099
6.5048
6.4935
6.4829
6.4795
6.4702
6.4651
6.4538
6.4491
6.4403
6.4152
6.4037
6.3752
5.9011
5.8867
5.8627
5.8481
5.8325
5.8257
5.8103
5.7948
5.7875
5.7719
5.7563
4.3043
4.2889
4.2752
3.5089
3.4946

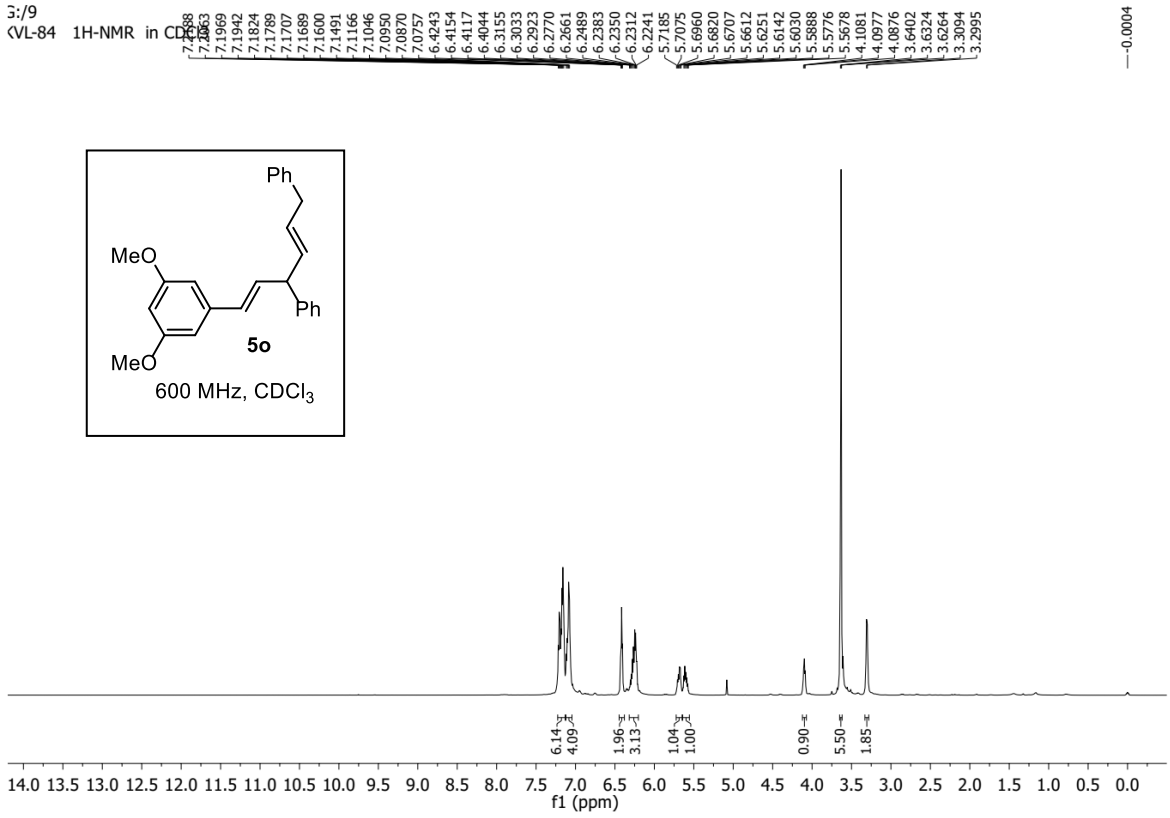

Ph
Br
Ph
5n
400 MHz, CDCl3

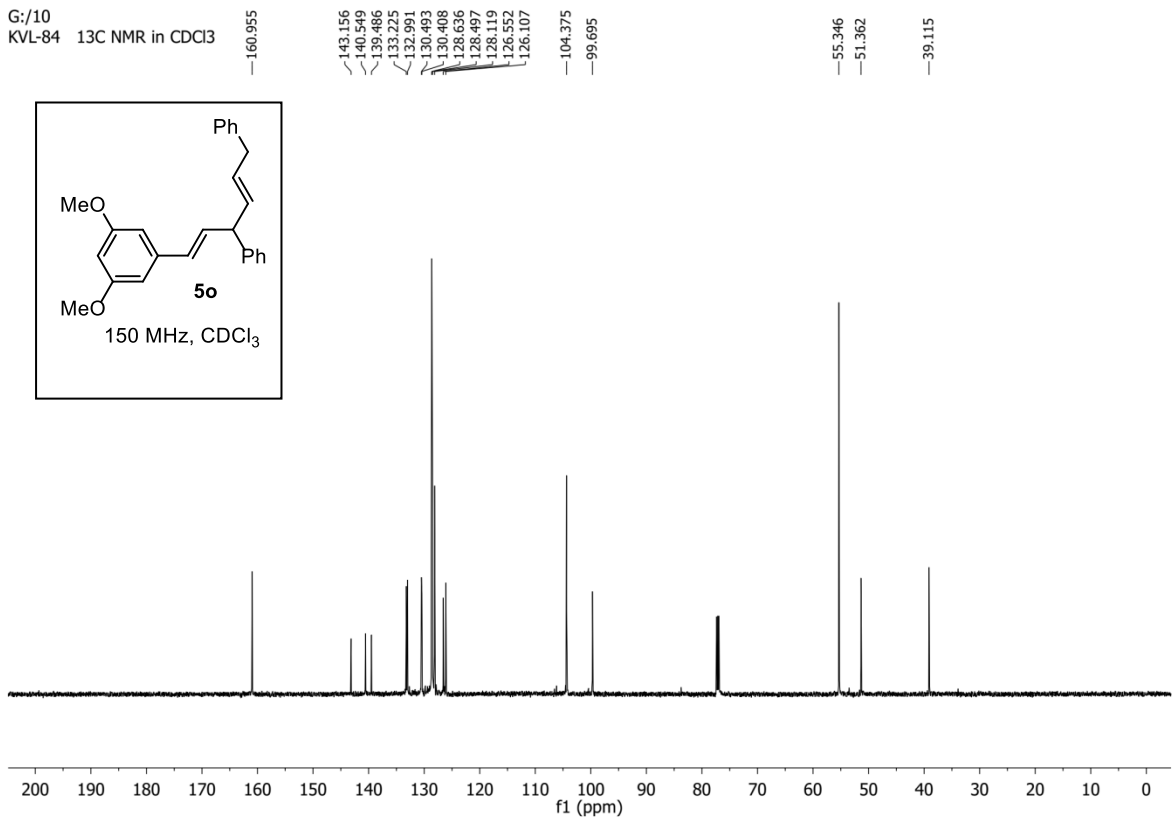

0.95
12.10
1.10
2.00
2.09
1.00
2.00
11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)


KVL-96
single pulse decoupled gated NOE
147.967
141.561
139.726
134.228
133.069
130.789
130.197
130.154
129.234
129.126
128.788
128.734
128.622
128.172
126.754
126.246
125.106
122.895
51.472
39.213

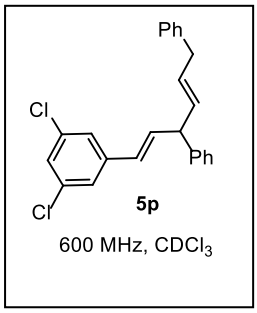

Ph
Br
Ph
5n
100 MHz, CDCl3

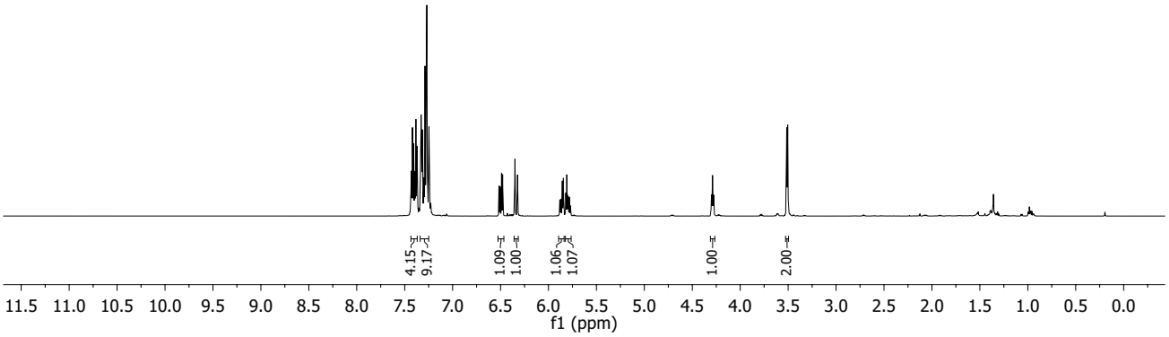

200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


G:/9
KVL-84 1H-NMR in CDCl3
Ph
MeO
Ph
5o
MeO
600 MHz, CDCl3
6.14
4.09
1.96
3.13
1.04
1.00
0.90
5.50
1.85
f1 (ppm)

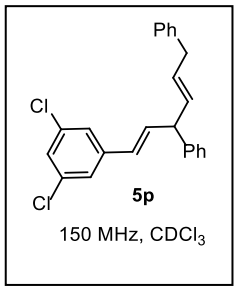

G:/10
KVL-84 13C NMR in CDCl3
160.955
143.156
140.549
139.486
133.225
132.991
130.493
130.408
128.636
128.497
128.119
126.552
126.107
104.375
99.695
55.346
51.362
39.115
Ph
MeO
Ph
5o
MeO
150 MHz, CDCl3
f1 (ppm)

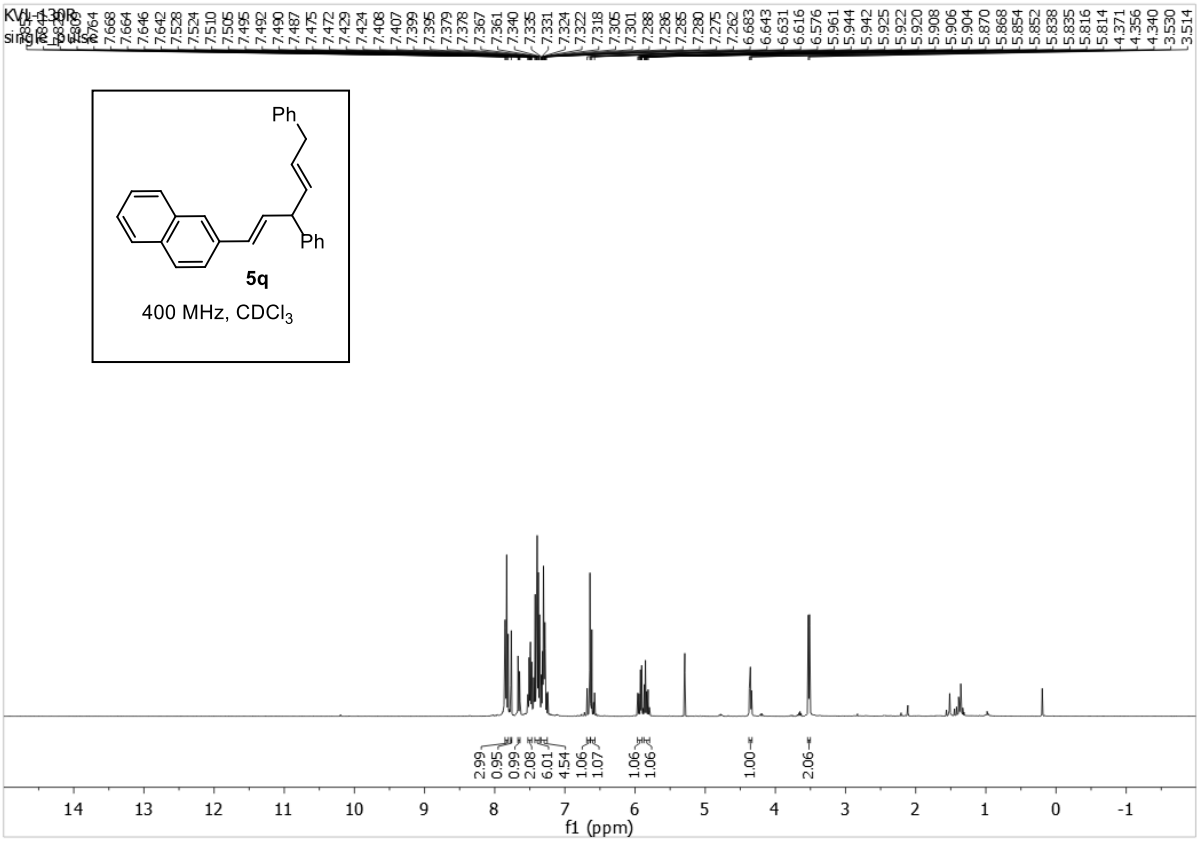
19-KVL-122/1
KVL-122 1H-NMR in CDCl3

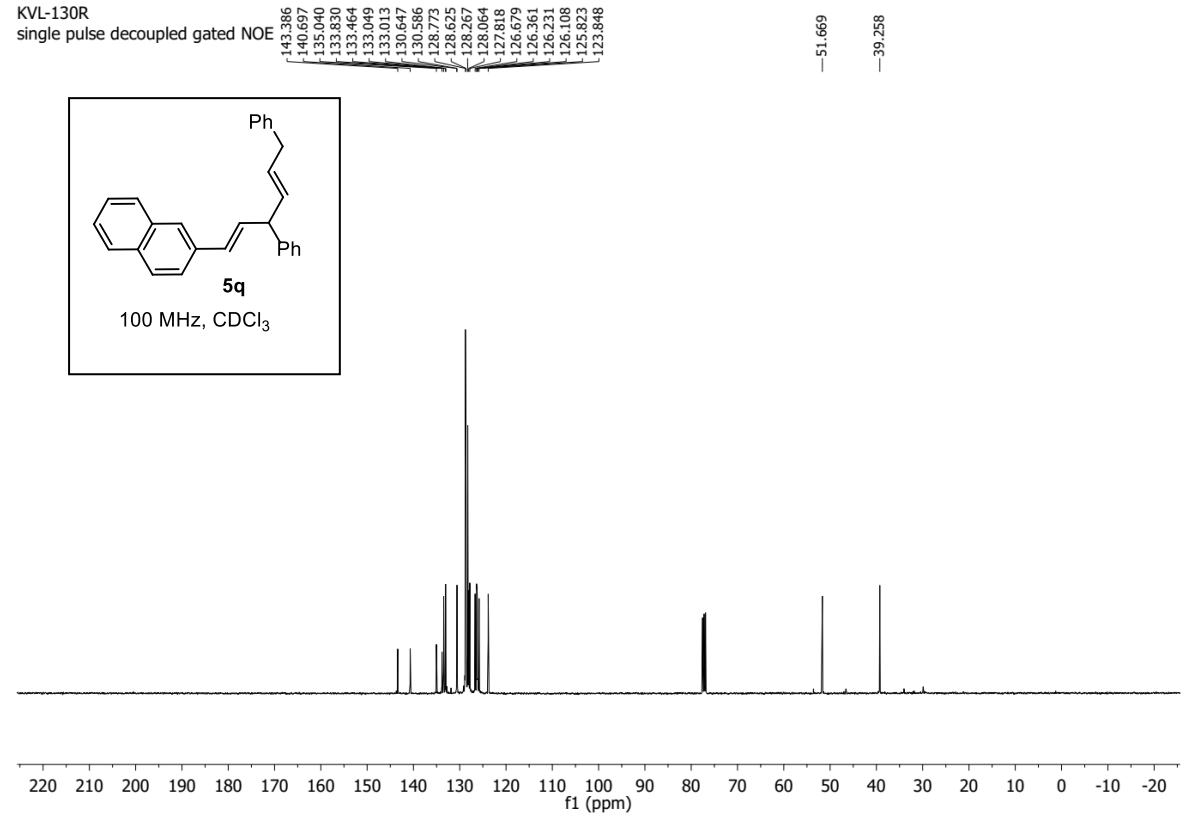


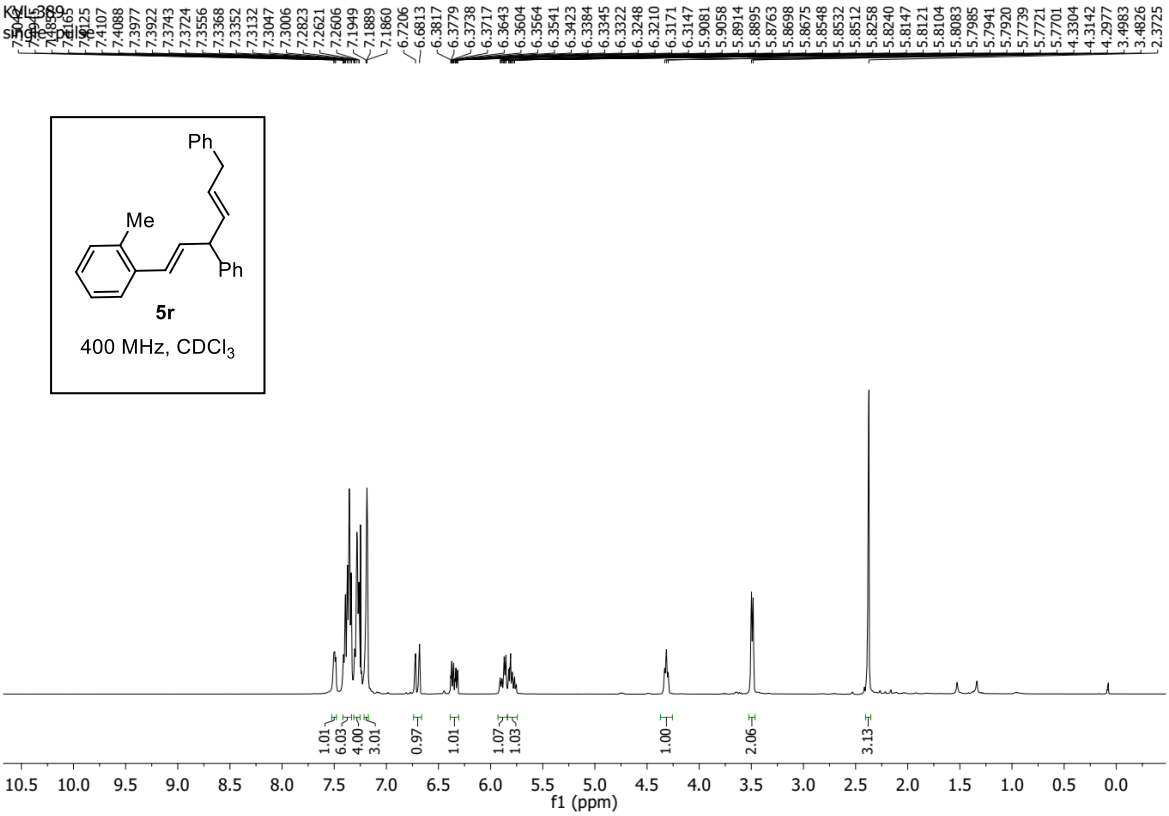


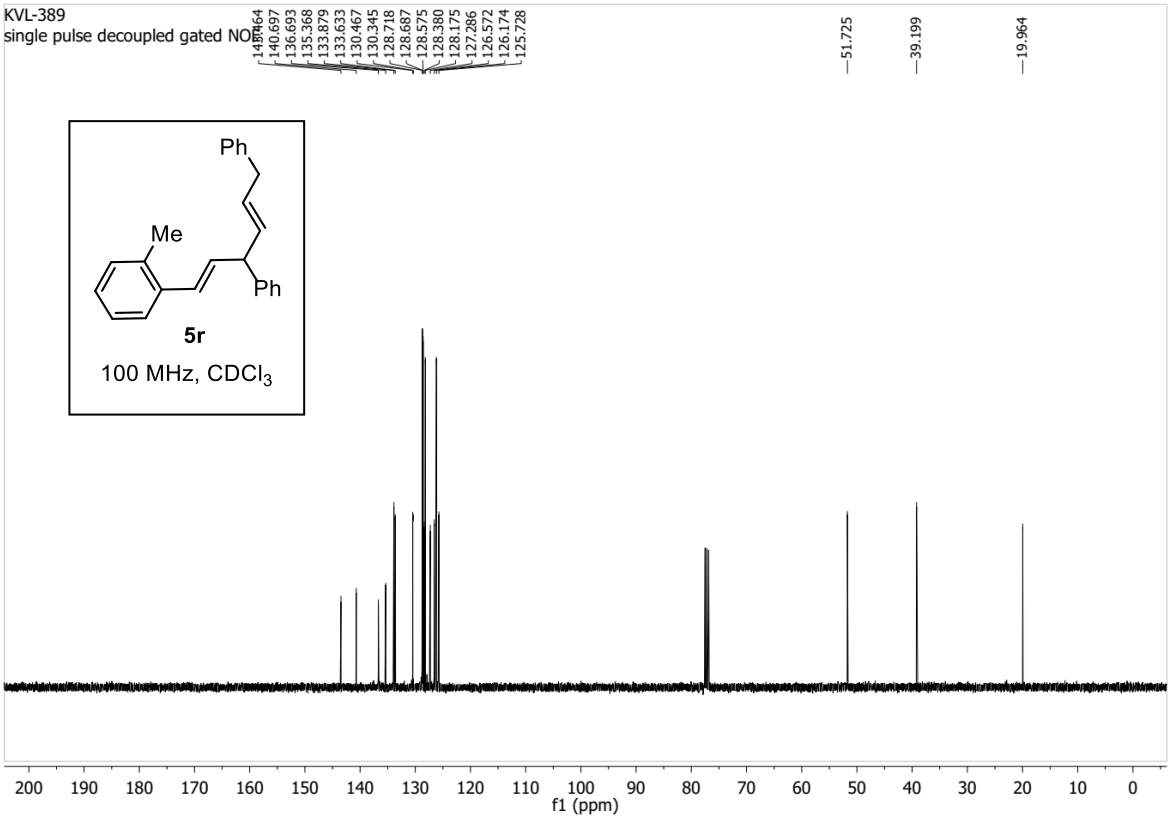
19-KVL-122/2
KVL-122 13C NMR in CDCl3

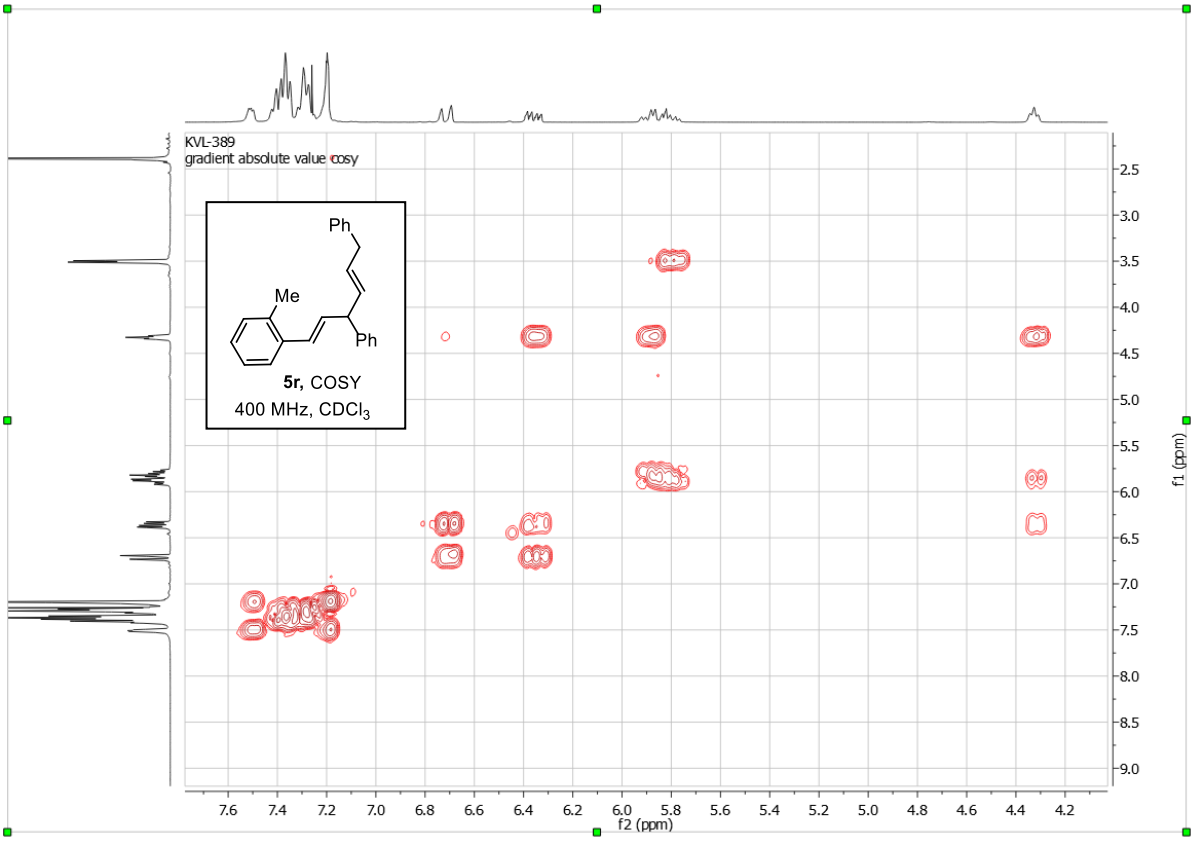


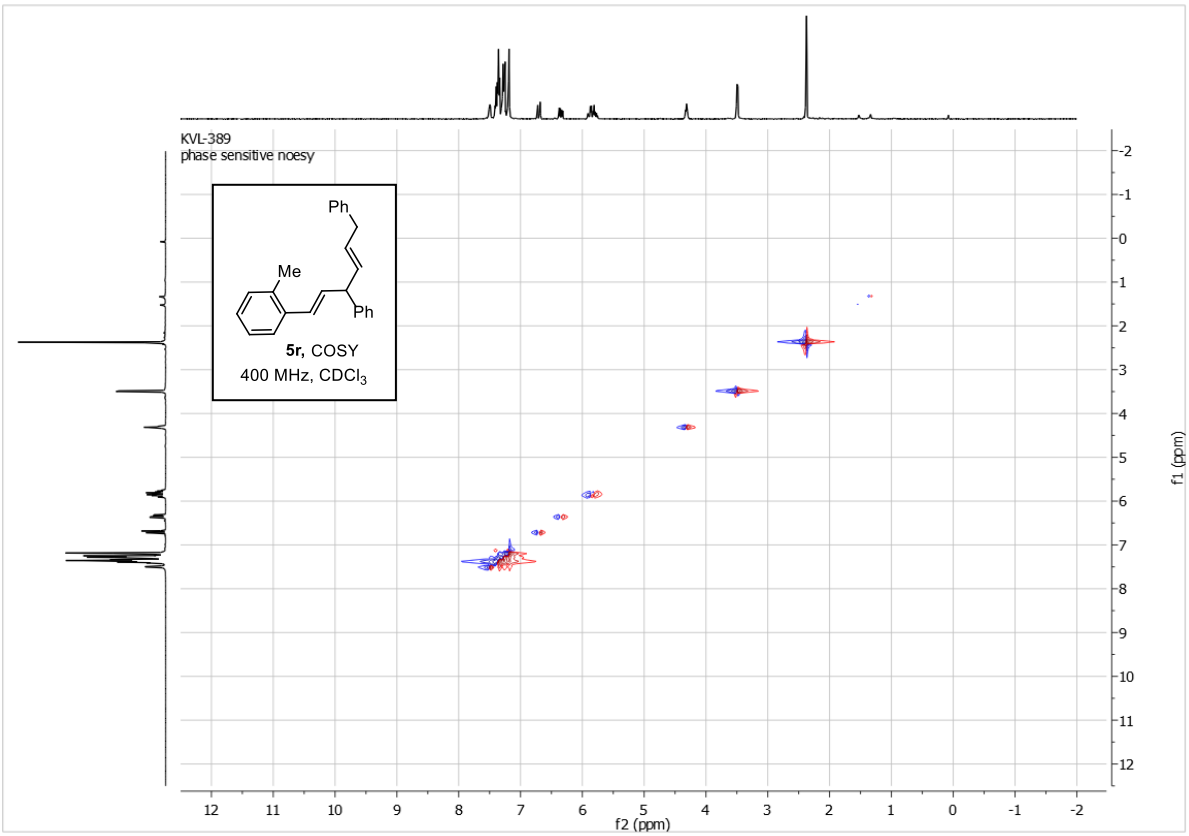

KVL-130R
single pulse
Ph
Ph
5q
400 MHz, CDCl3
2.99
0.95
0.99
2.08
6.01
4.54
1.06
1.07
1.06
1.06
1.00
2.06
14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 -1
f1 (ppm)

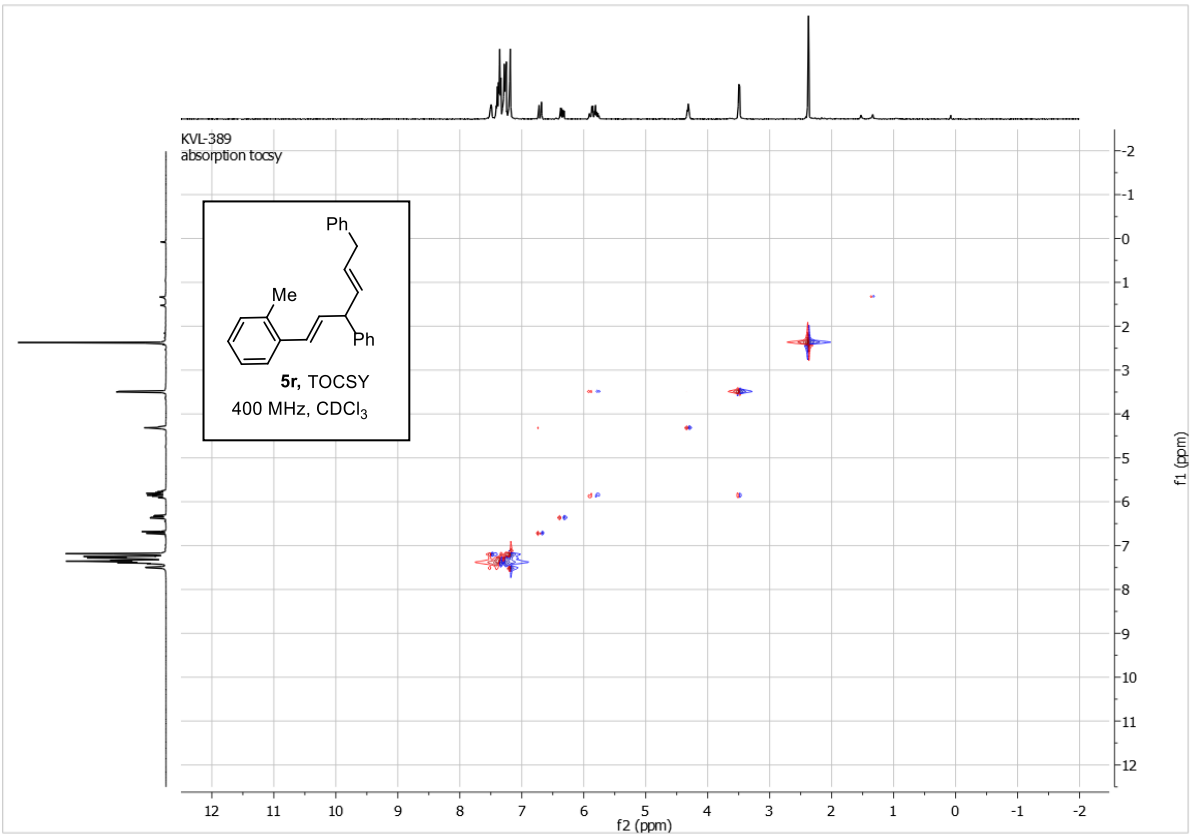

KVL-130R
single pulse decoupled gated NOE
143.386
140.697
135.040
133.830
133.464
133.049
133.013
130.647
130.586
128.773
128.625
128.267
128.064
127.818
126.679
126.361
126.231
126.108
125.823
123.848
51.669
39.258
Ph
Ph
5q
100 MHz, CDCl3
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20
f1 (ppm)

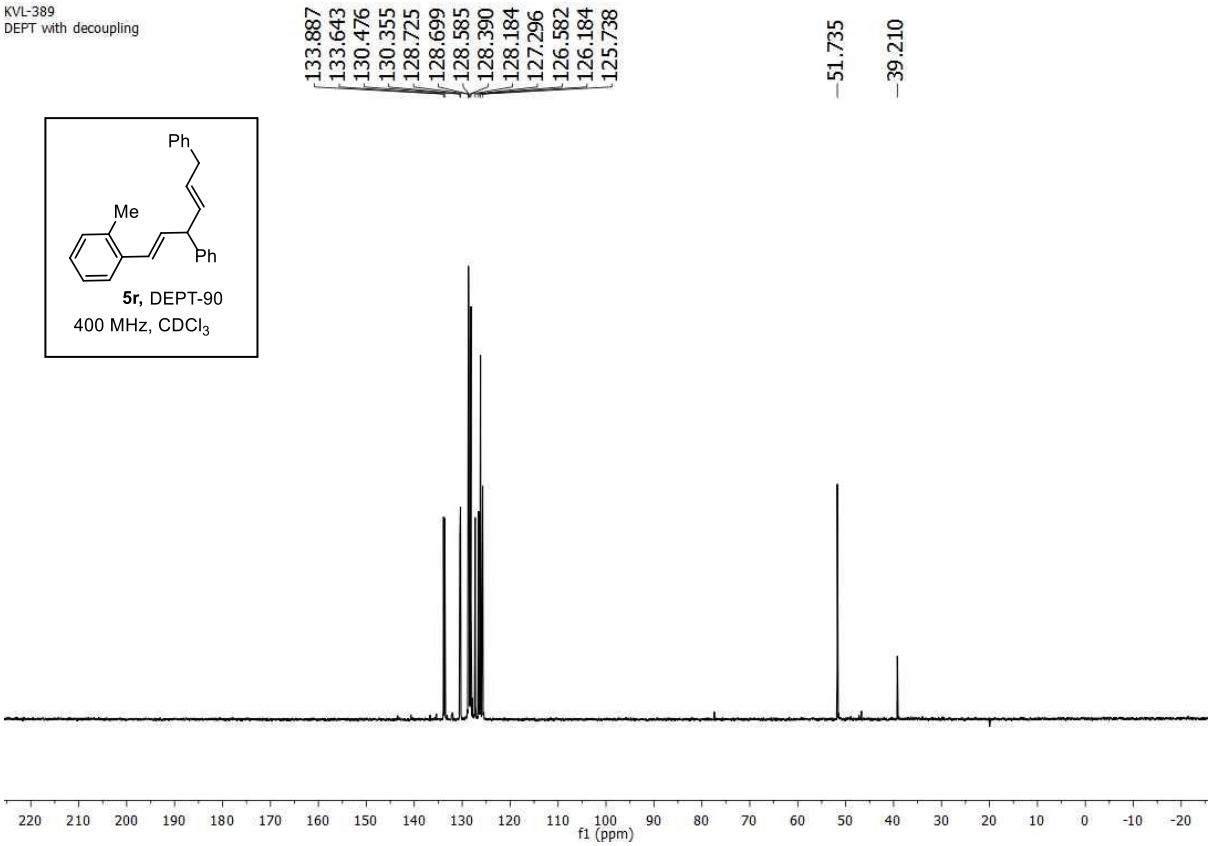

KVL-389
single pulse
Ph
Me
Ph
5r
400 MHz, CDCl3
1.01
6.03
4.00
3.01
0.97
1.01
1.07
1.03
1.00
2.06
3.13
f1 (ppm)

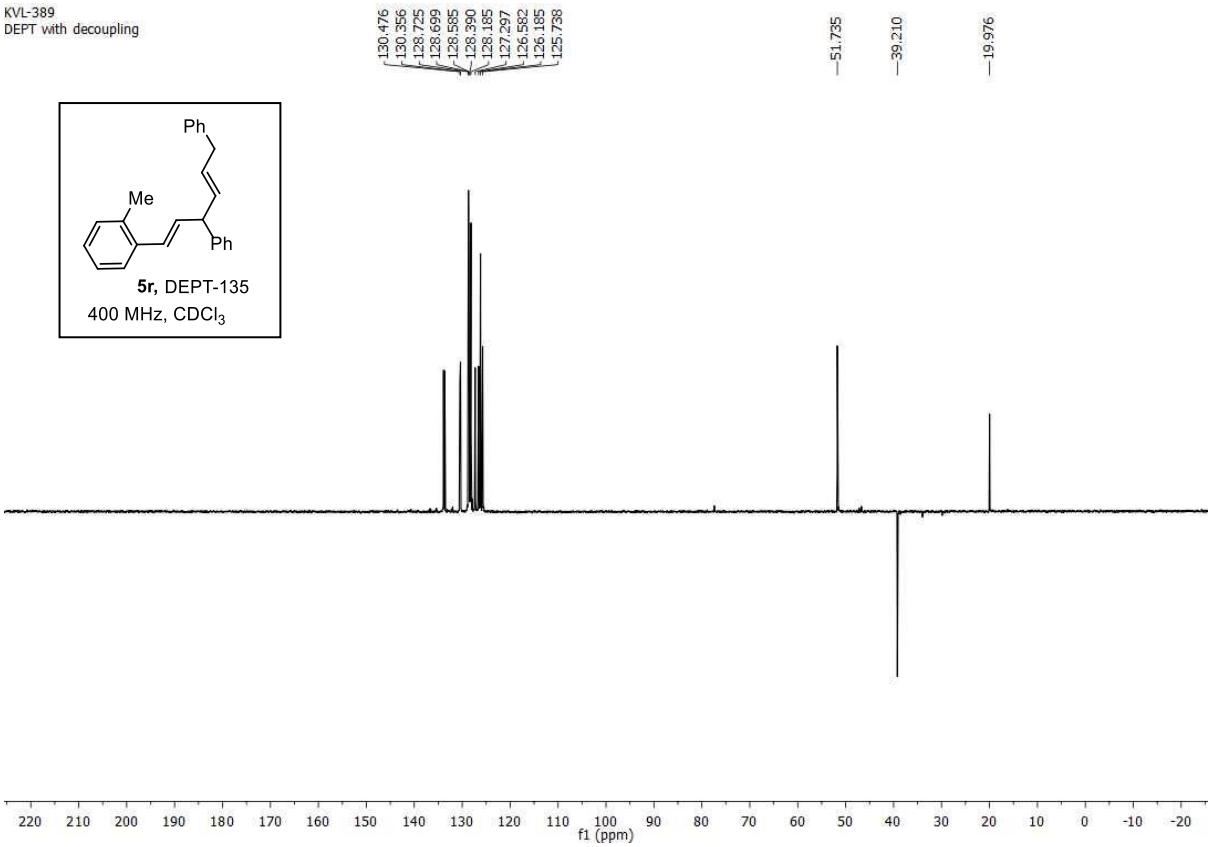

KVL-389
single pulse decoupled gated NOE
51.725
39.199
19.964
Ph
Me
Ph
5r
100 MHz, CDCl3
f1 (ppm)

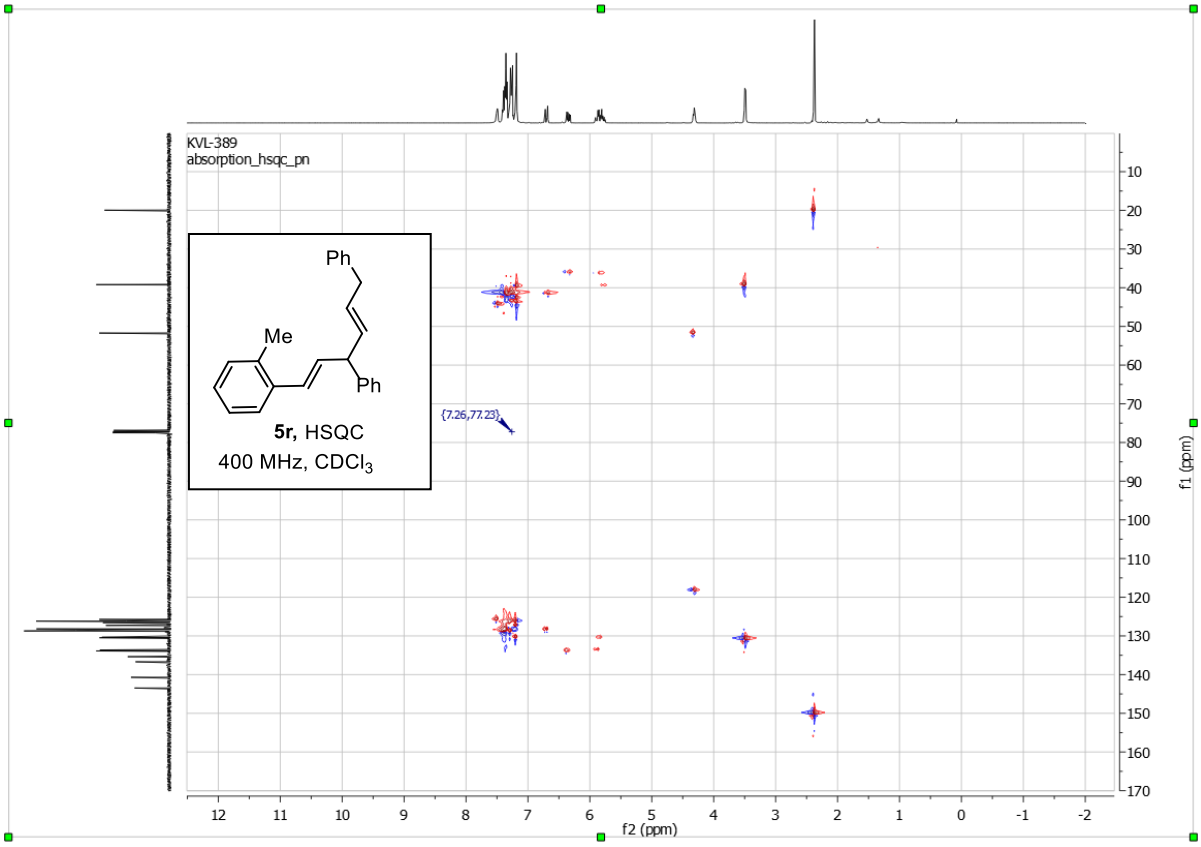

KVL-389
gradient absolute value cosy
Ph
Me
Ph
5r, COSY
400 MHz, CDCl3
f2 (ppm)
f1 (ppm)

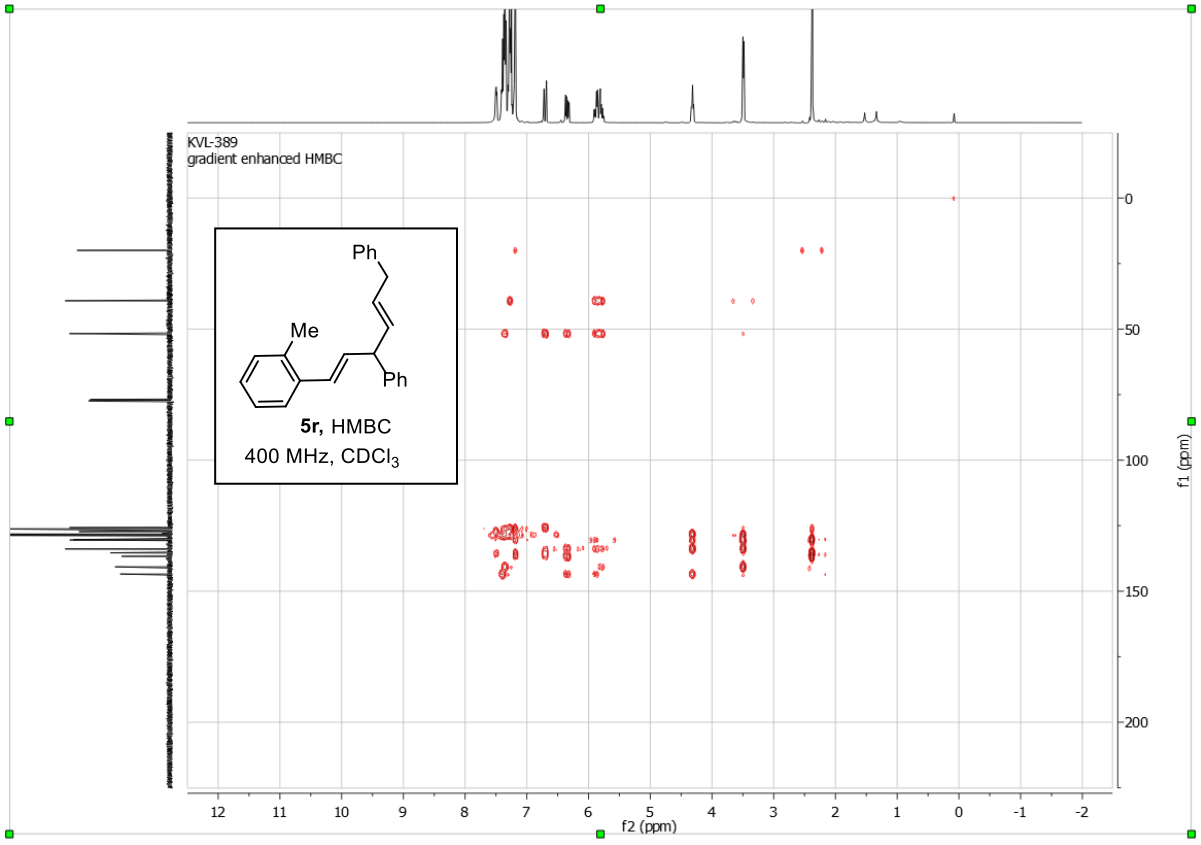

KVL-389
phase sensitive noesy
Ph
Me
Ph
5r, COSY
400 MHz, CDCl3
f2 (ppm)
f1 (ppm)

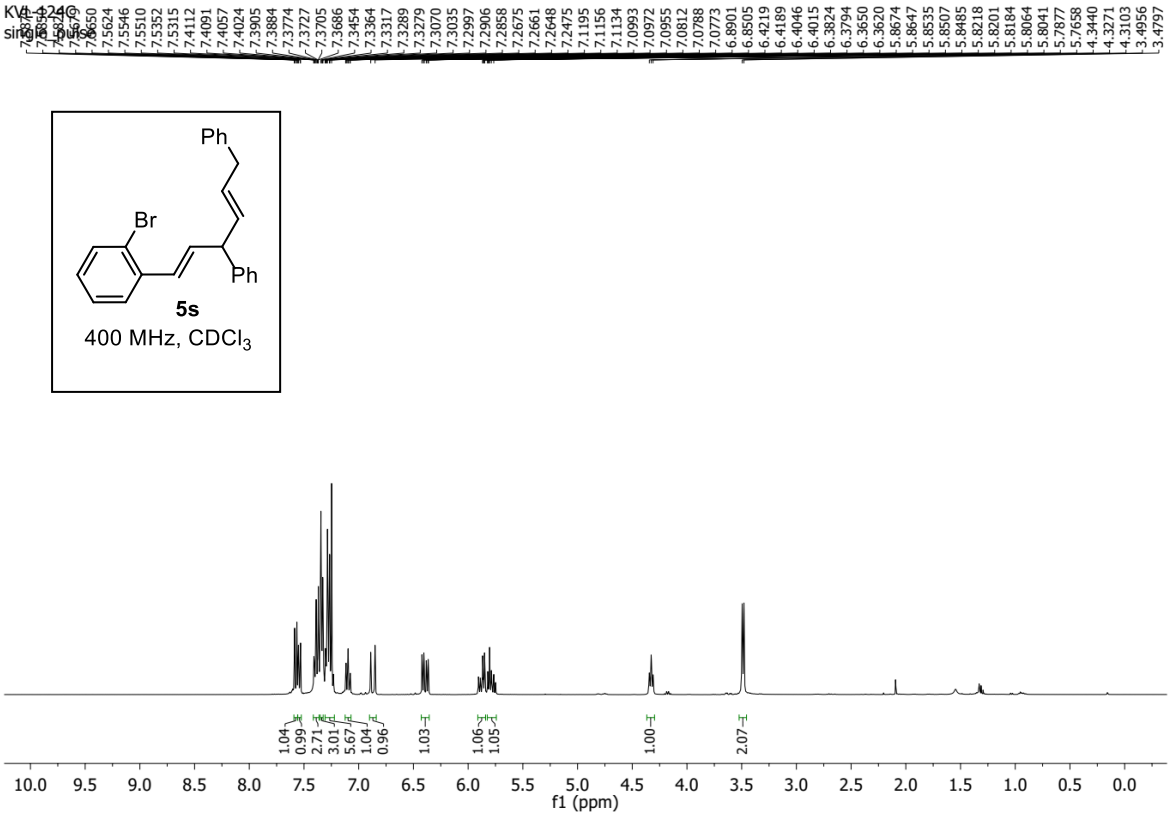

KVL-389
absorption tocsy
Ph
Me
Ph
5r, TOCSY
400 MHz, CDCl3
f2 (ppm)
f1 (ppm)

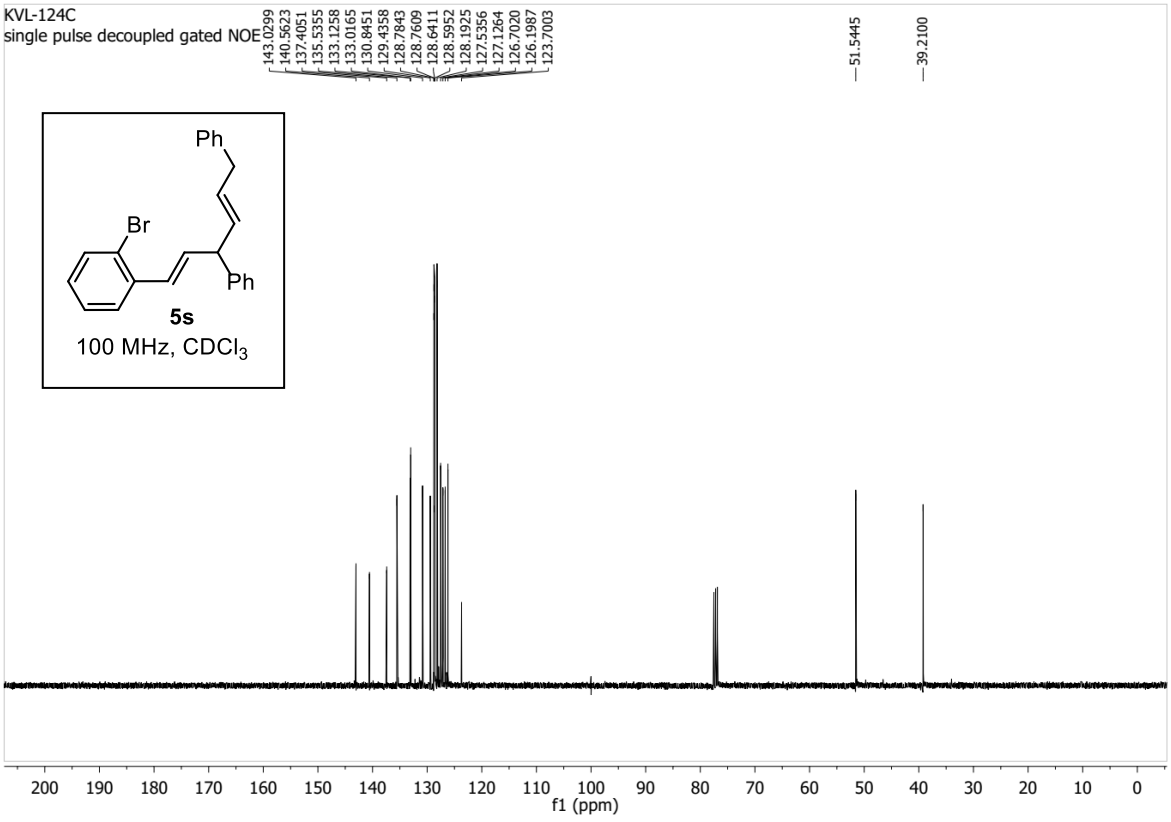

KVL-389
DEPT with decoupling
133.887
133.643
130.476
130.355
128.725
128.699
128.585
128.390
128.184
127.296
126.582
126.184
125.738
51.735
39.210
Ph
Me
Ph
5r, DEPT-90
400 MHz, CDCl3
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20
f1 (ppm)

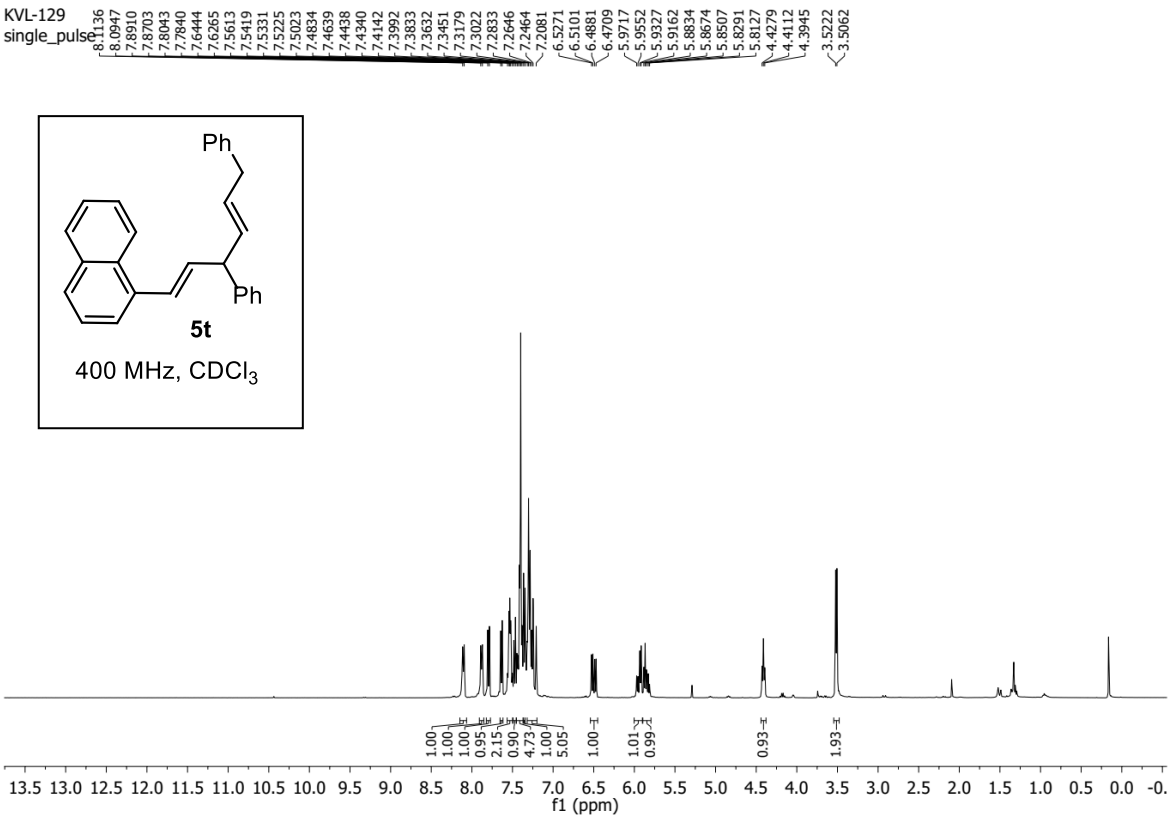

KVL-389
DEPT with decoupling
130.476
130.356
128.725
128.699
128.585
128.390
128.185
127.297
126.582
126.185
125.738
51.735
39.210
19.976
Ph
Me
Ph
5r, DEPT-135
400 MHz, CDCl3
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10 -20
f1 (ppm)

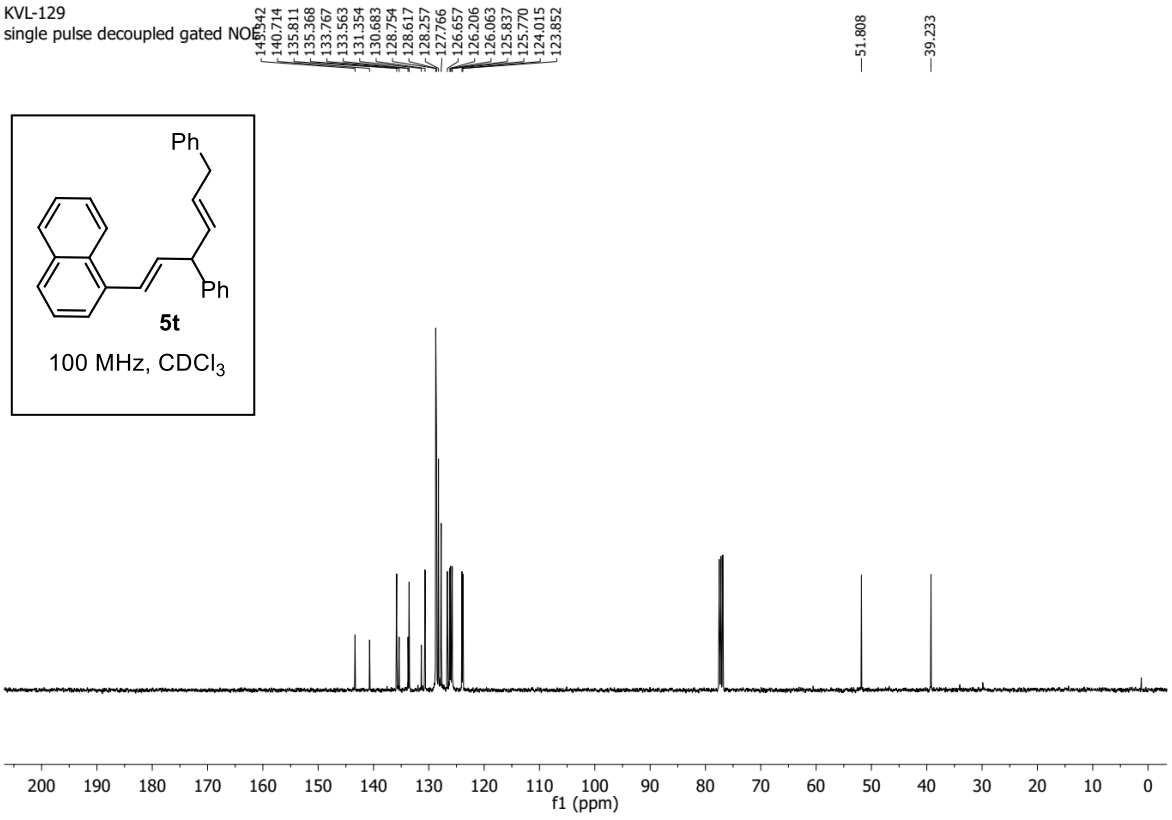

KVL-389
absorption_hsqc_pn
Ph
Me
Ph
5r, HSQC
400 MHz, CDCl3
{7.26,77.23}
f2 (ppm)
f1 (ppm)


KVL-389
gradient enhanced HMBC
Ph
Me
Ph
5r, HMBC
400 MHz, CDCl3
f2 (ppm)
f1 (ppm)

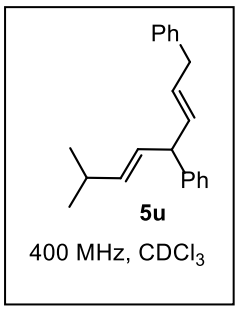

KVL-124C
single pulse
Ph
Br
Ph
5s
400 MHz, CDCl3
1.04
0.99
2.71
3.01
5.67
1.04
0.96
1.03
1.06
1.05
1.00
2.07
f1 (ppm)


KVL-124C
single pulse decoupled gated NOE
143.0299
140.5623
137.4051
135.5355
133.1258
133.0165
130.8451
129.4358
128.7843
128.7609
128.6411
128.5952
128.1925
127.5356
127.1264
126.7020
126.1987
123.7003
51.5445
39.2100
Ph
Br
Ph
5s
100 MHz, CDCl3
f1 (ppm)


KVL-129
single_pulse
Ph
Ph
5t
400 MHz, CDCl3
f1 (ppm)

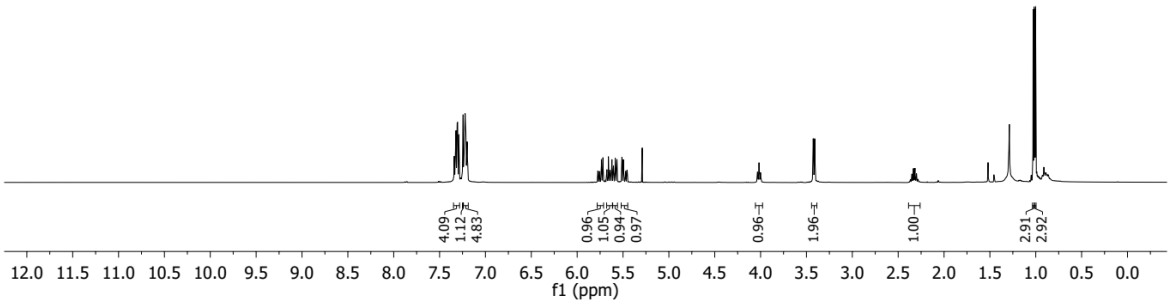

KVL-129
single pulse decoupled gated NOE
Ph
Ph
5t
100 MHz, CDCl3
f1 (ppm)

KKP-223
single_pulse

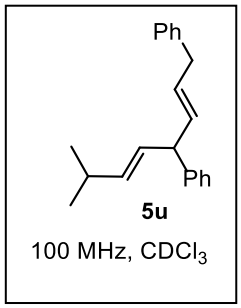


5u

400 MHz, $CDCl_3$

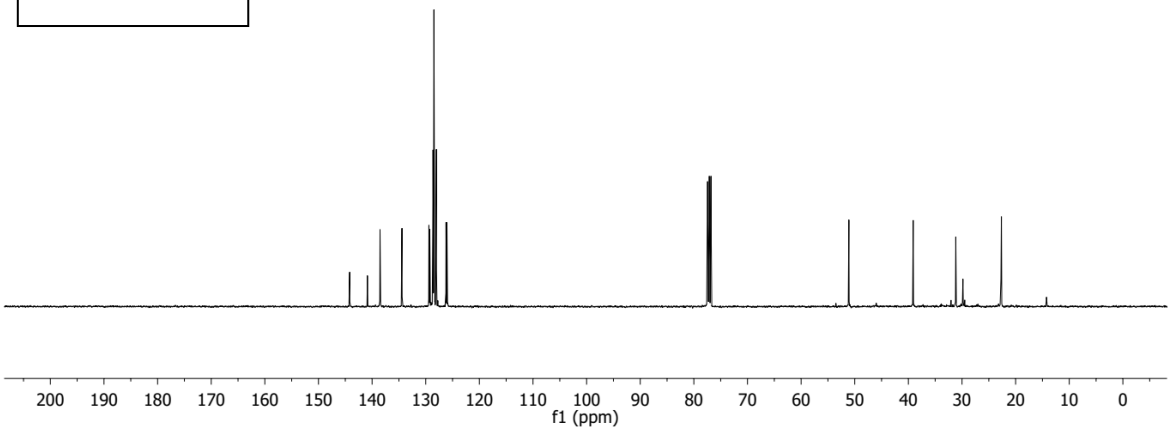


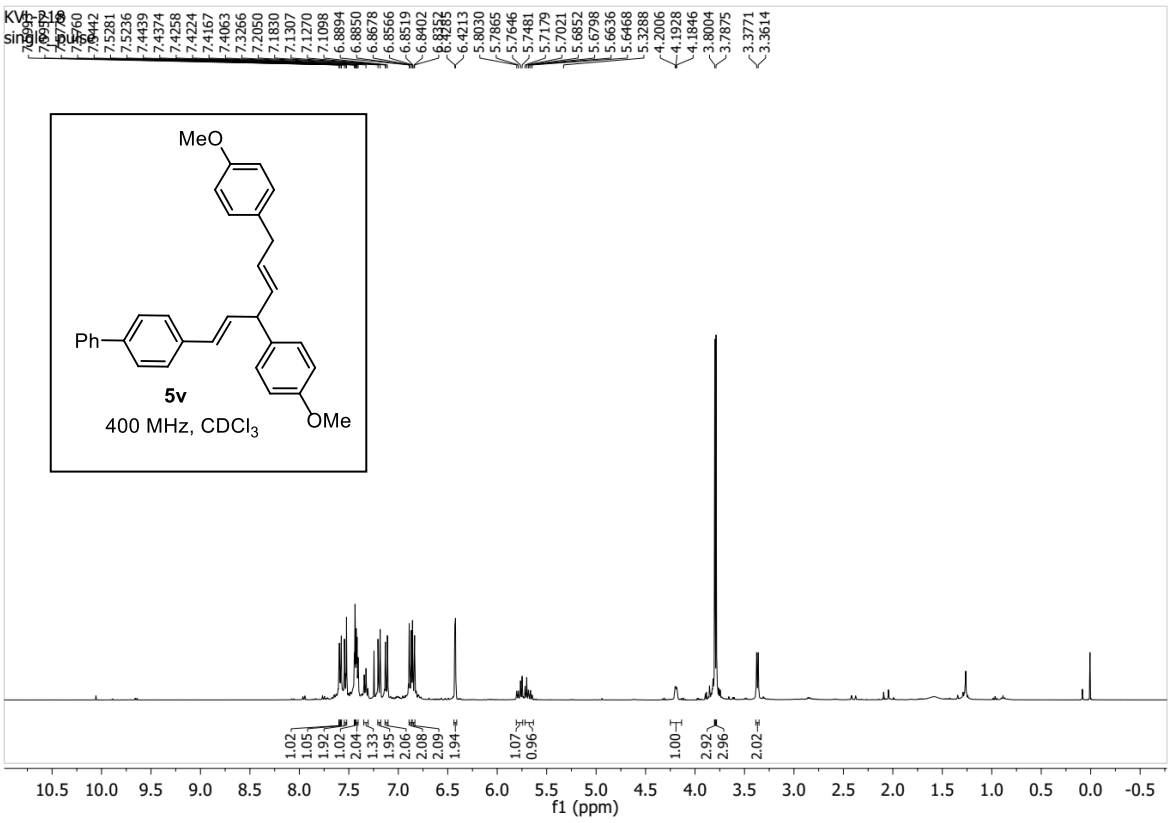
KKP-223
single pulse decoupled gated NOE

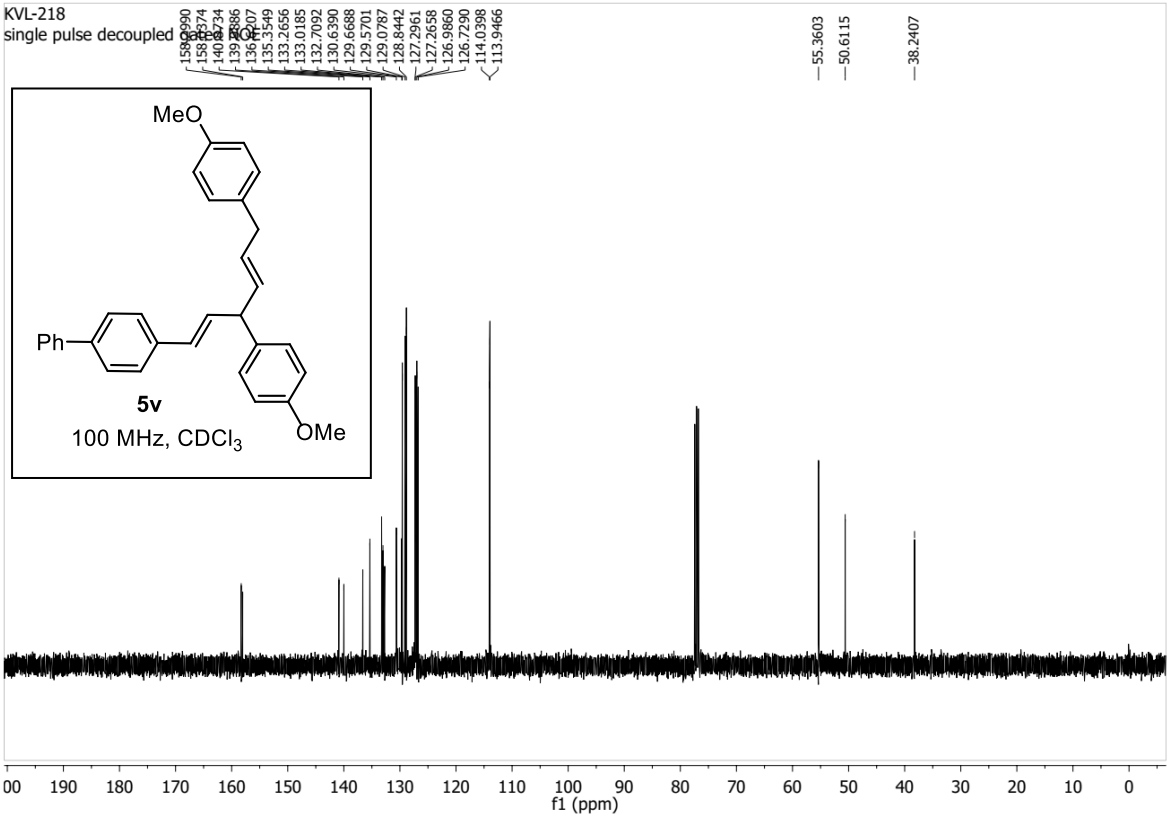


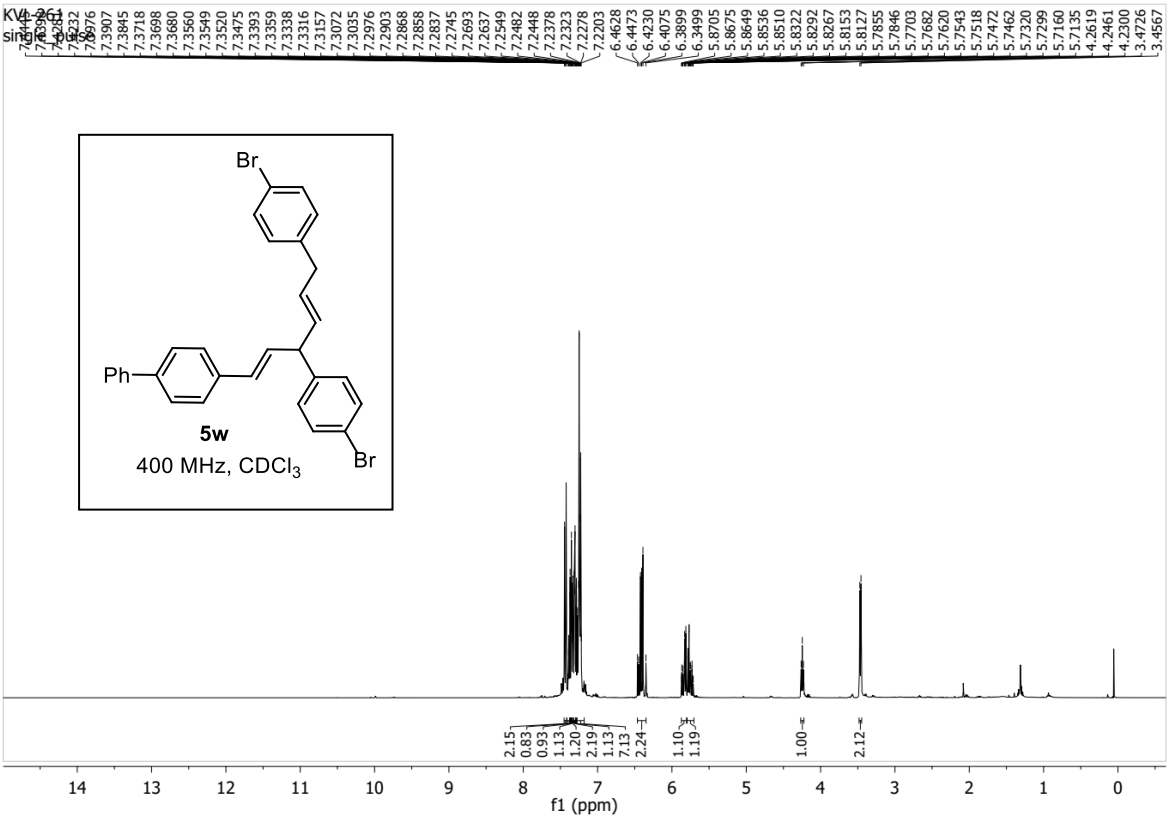
5u

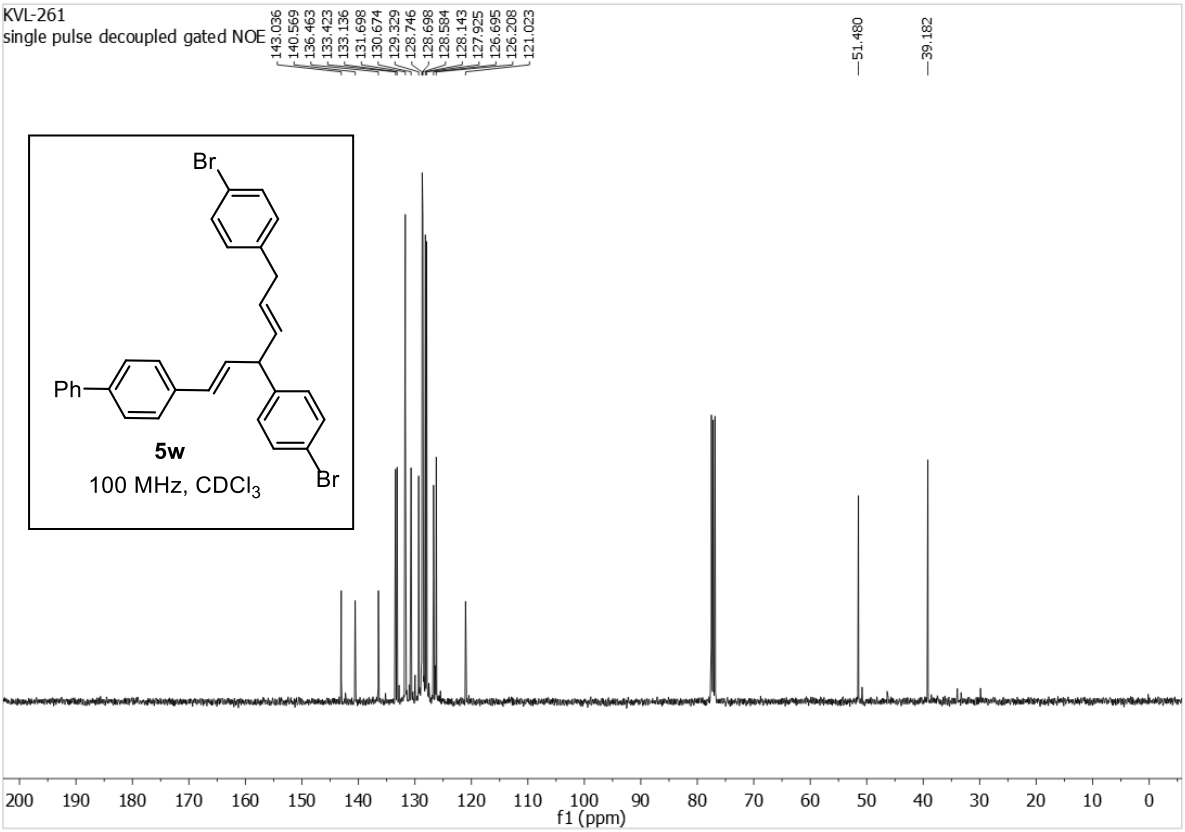
100 MHz, $CDCl_3$

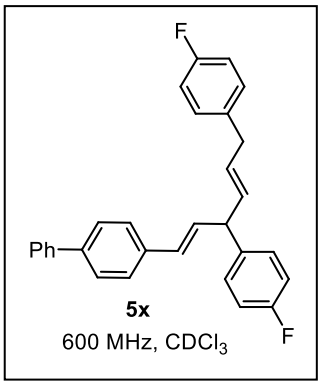


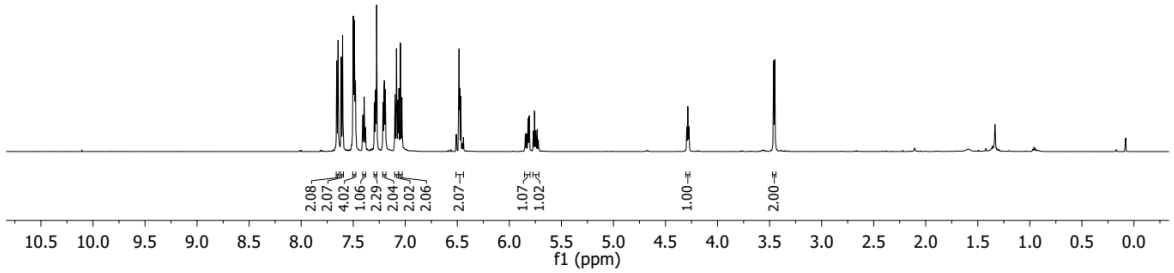

KVL-218
single pulse
MeO
Ph
OMe
5v
400 MHz, CDCl3
f1 (ppm)

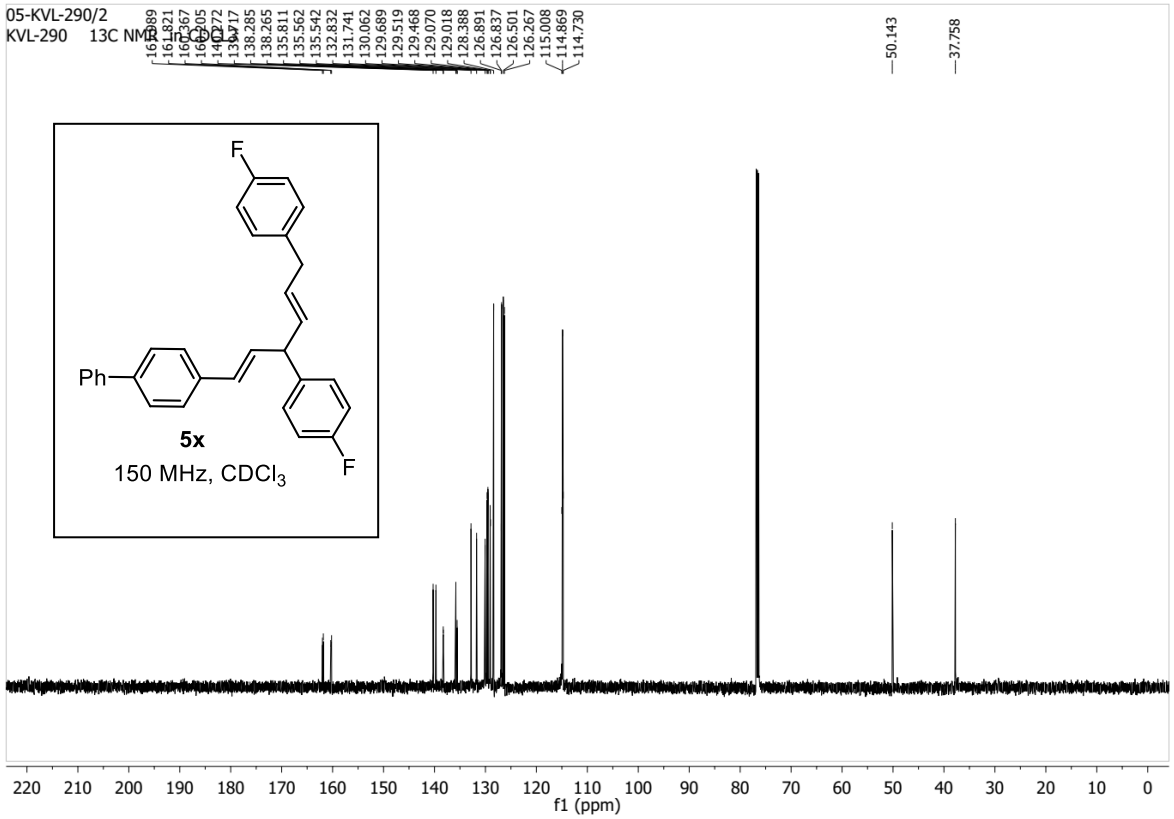

KVL-218
single pulse decoupled gated NOE
MeO
Ph
OMe
5v
100 MHz, CDCl3
55.3603
50.6115
38.2407
f1 (ppm)

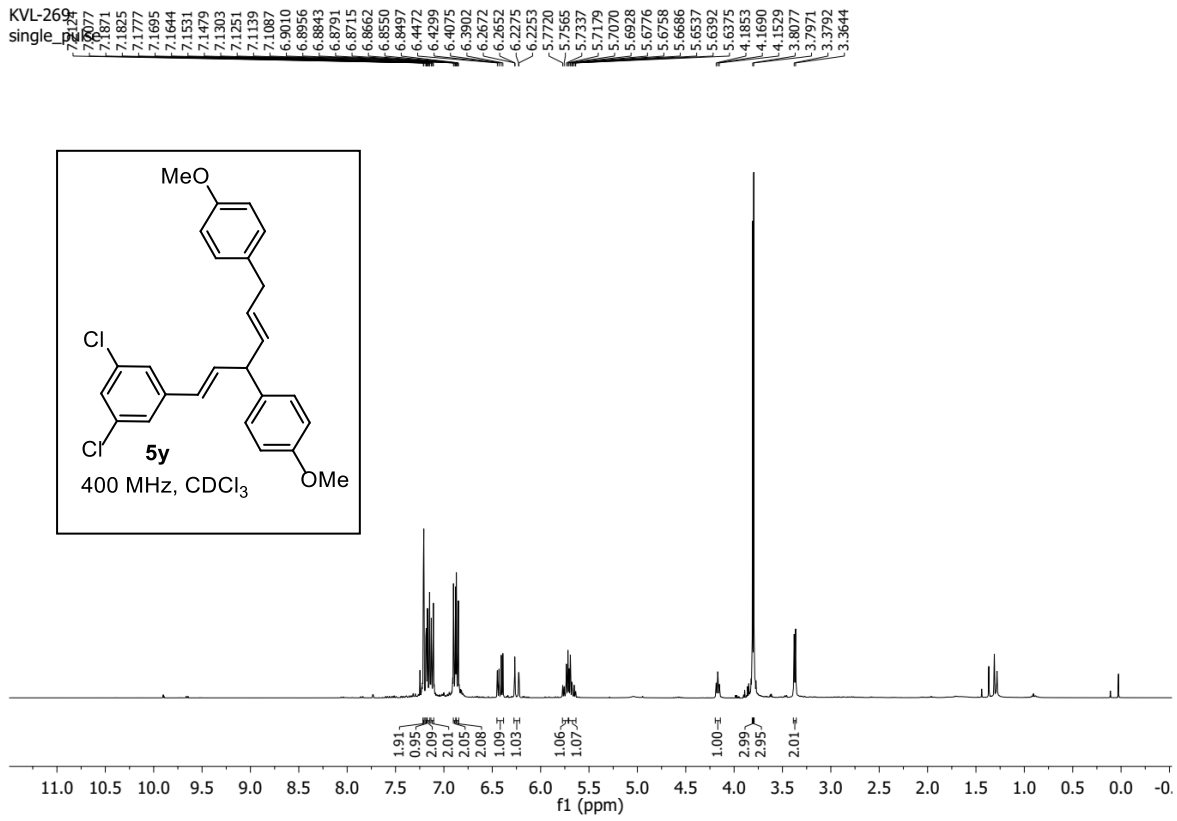

KVL-261
single pulse
Br
Ph
5w
400 MHz, CDCl3
Br
f1 (ppm)

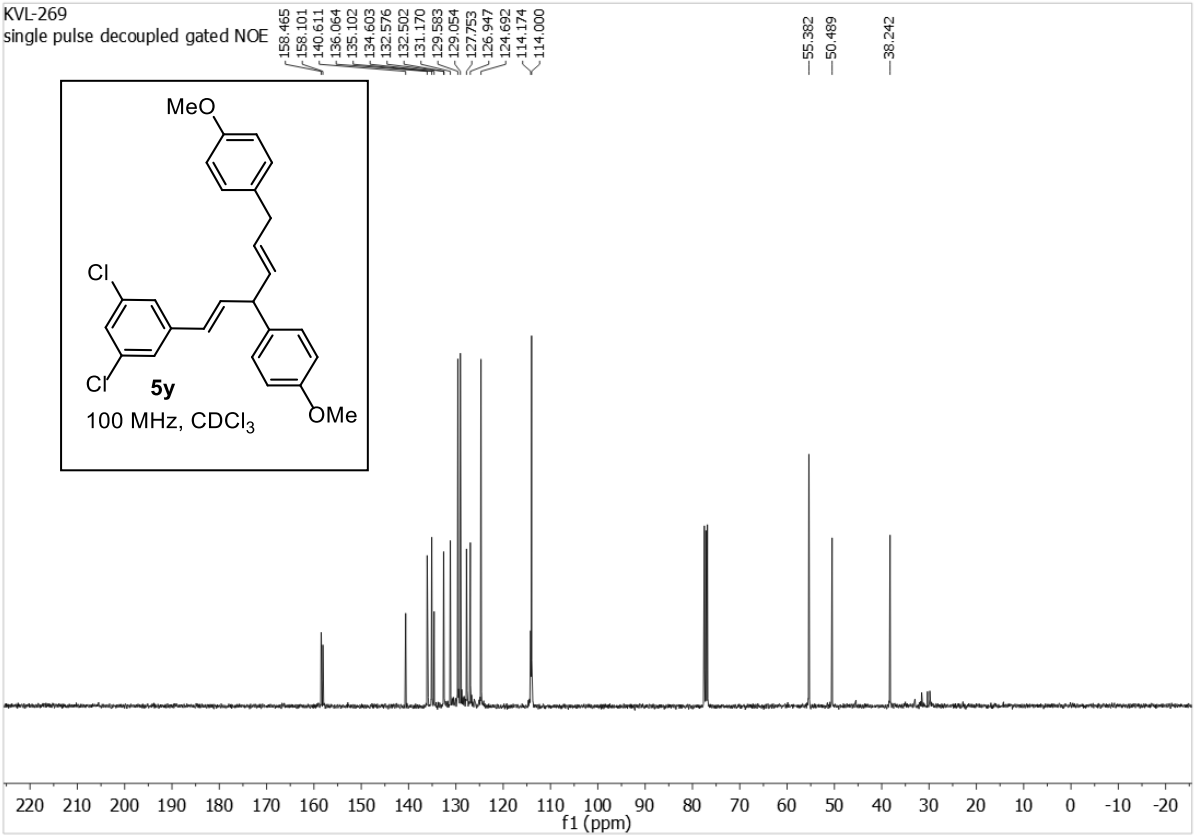

KVL-261
single pulse decoupled gated NOE
Br
Ph
5w
100 MHz, CDCl3
Br
f1 (ppm)

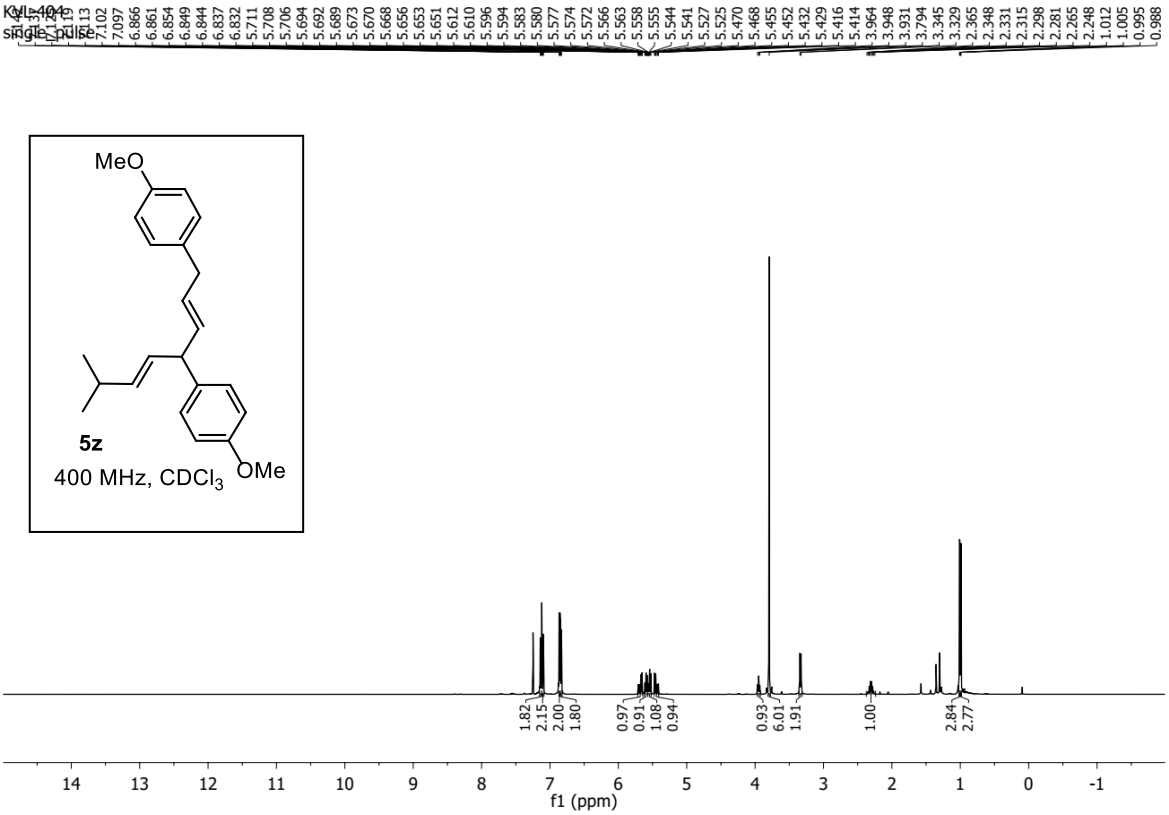

F
Ph
5x
600 MHz, CDCl3
F

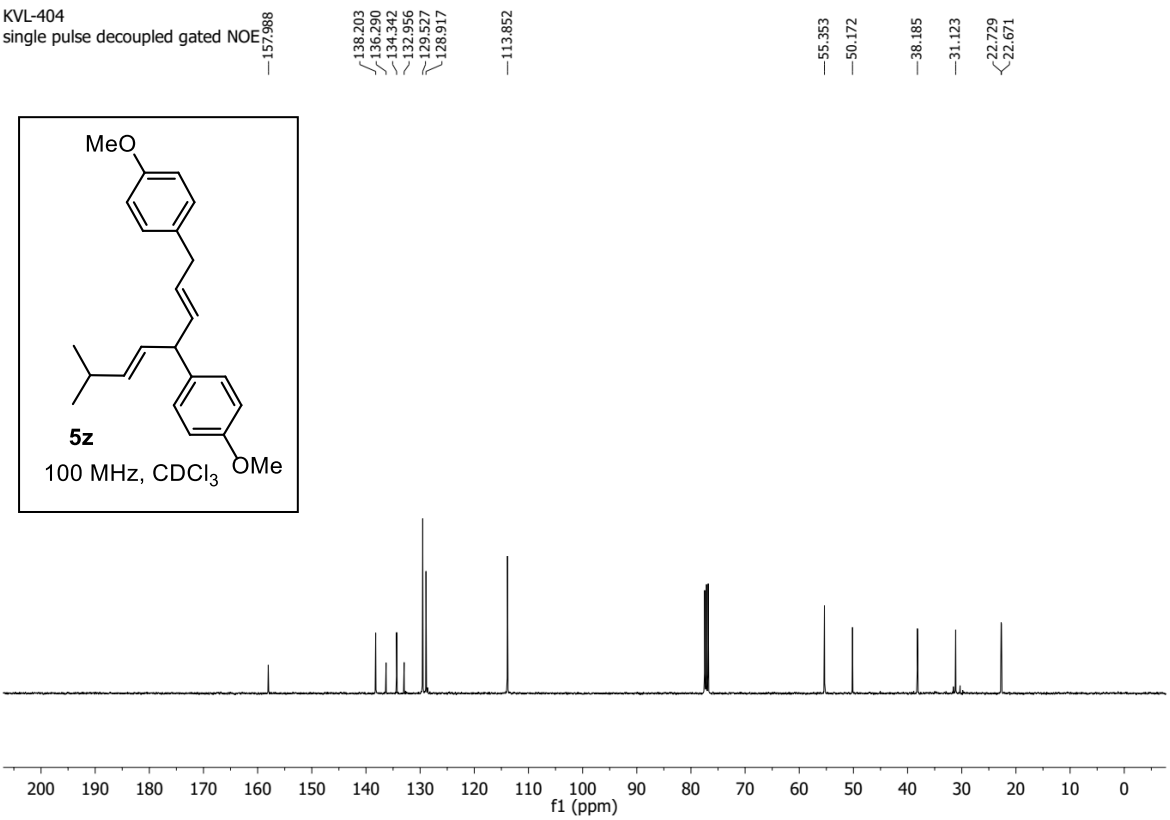

2.08
2.07
4.02
1.06
2.29
2.04
2.02
2.06
2.07
1.07
1.02
1.00
2.00
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)


05-KVL-290/2
KVL-290 13C NMR in CDCl3
50.143
37.758
F
Ph
5x
150 MHz, CDCl3
F
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

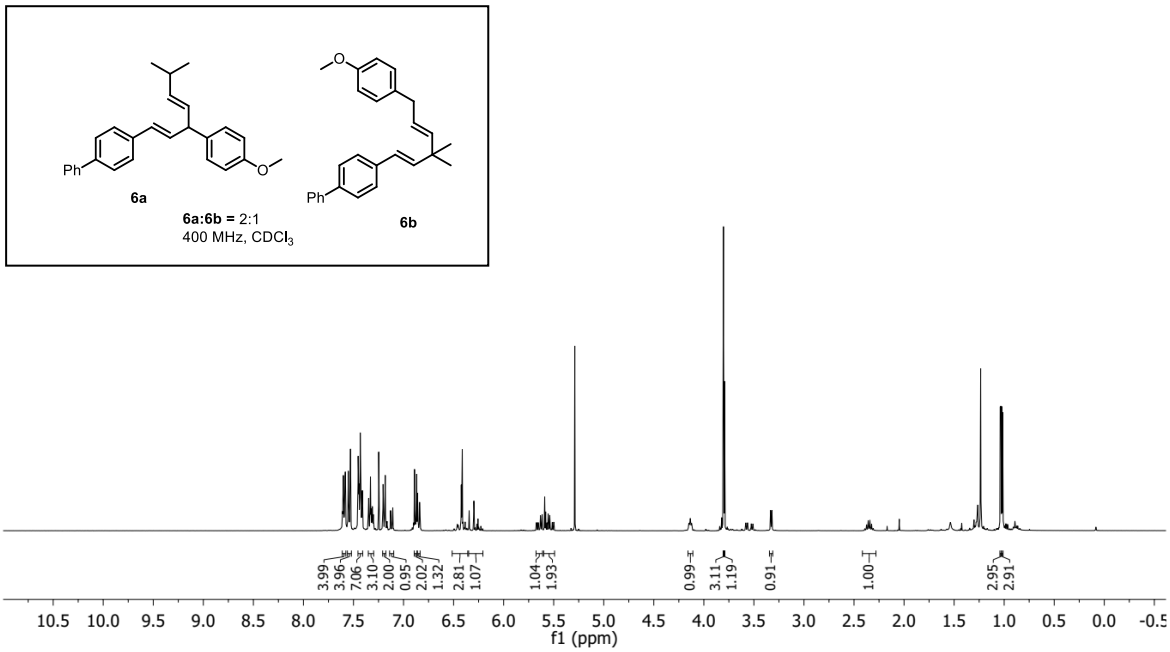

KVL-269
single_pulse
MeO
Cl
Cl
5y
400 MHz, CDCl3
OMe
f1 (ppm)


KVL-269
single pulse decoupled gated NOE
MeO
Cl
Cl
5y
100 MHz, CDCl3
OMe
f1 (ppm)

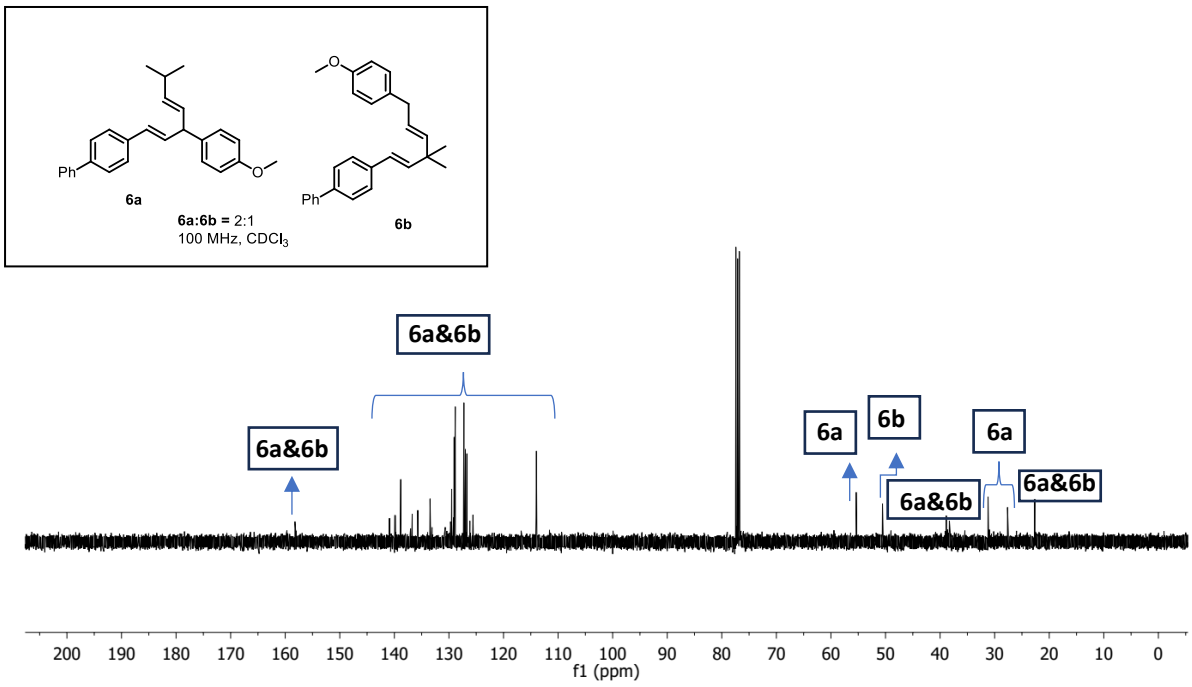

KVL-404
single pulse
MeO
5z
400 MHz, CDCl3
OMe
f1 (ppm)

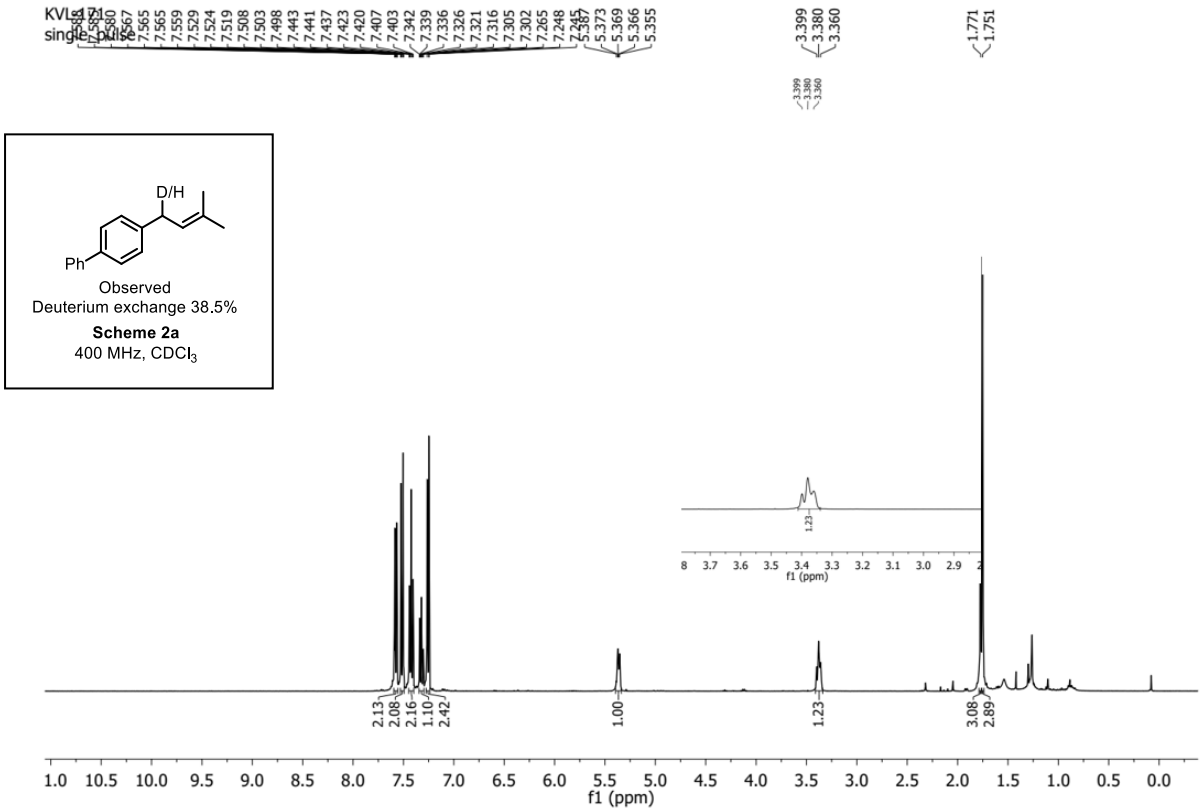

KVL-404
single pulse decoupled gated NOE
MeO
5z
100 MHz, CDCl3
OMe
f1 (ppm)

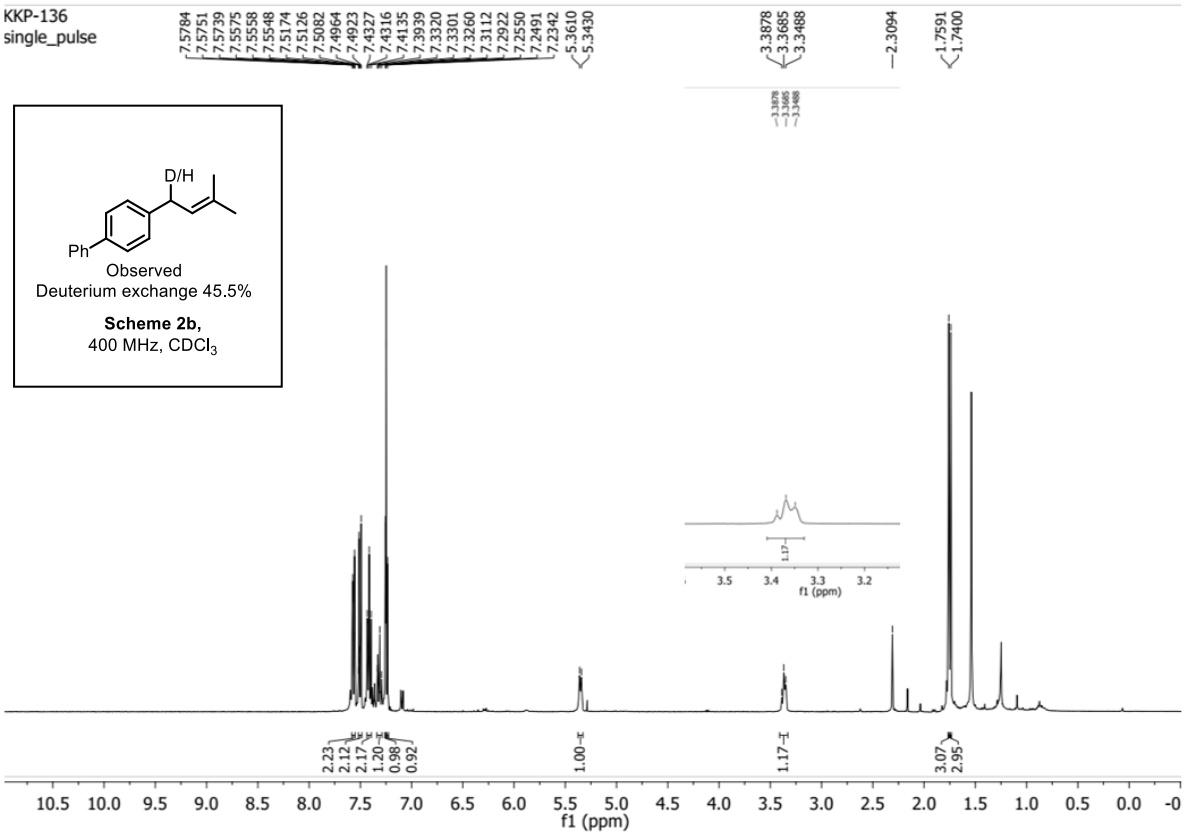
KVL-407B
single pulse



KVL-407B
single pulse decoupled gated NOE




D/H
Ph
Observed
Deuterium exchange 38.5%
Scheme 2a
400 MHz, CDCl3
f1 (ppm)


KKP-136
single_pulse
D/H
Ph
Observed
Deuterium exchange 45.5%
Scheme 2b,
400 MHz, CDCl3
f1 (ppm)