Supporting Information

Taking Advantage of Lithium Monohalocarbenoids Intrinsic α-Elimination in 2-MeTHF: Controlled Epoxide Ring-Opening *en route* to Halohydrins

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Electronic Supplementary Information (ESI) available: [details of any supplementary information available should be included here]. See DOI: 10.1039/x0xx00000x

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1. General Methods

Melting points were determined on a Reichert–Kofler hot-stage microscope and are uncorrected. Mass spectra were obtained on a Shimadzu QP 1000 instrument (EI, 70 eV) and on a Bruker maXis 4G instrument (ESI-TOF, HRMS). ^{1}H, ^{13}C, and ^{19}F NMR spectra were recorded with a Bruker Avance III 400 spectrometer (400 MHz for ^{1}H, 100 MHz for ^{13}C, 376 MHz for ^{19}F) at 298 K using a directly detecting broadband observe (BBFO) probe. The center of the (residual) solvent signal was used as an internal standard which was related to TMS with δ 7.26 ppm (^{1}H in $CDCl_3$) and δ 77.0 ppm (^{13}C in $CDCl_3$). ^{19}F NMR spectra were referenced via the Ξ ratio (absolute referencing). Spin-spin coupling constants (*J*) are given in Hz. In nearly all cases, full and unambiguous assignment of all resonances was performed by combined application of standard NMR techniques, such as APT, HSQC, HMBC, HSQCTOCSY, COSY and NOESY experiments.

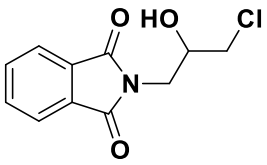
THF was distilled over Na/benzophenone. Chemicals were purchased from Sigma-Aldrich, Acros, Alfa Aesar, Fluorochem and TCI Europe, otherwise specified. Organolithium reagents were provided by Albemarle Corporation. Organolithium reagents were titrated immediately before the use according to established literature procedure.[1] The starting epoxides were commercially available or simply synthesized according to Corey Chaykosky procedure.[2] Solutions were evaporated under reduced pressure with a rotary evaporator. TLC was carried out on aluminium sheets precoated with silica gel 60F254 (Macherey-Nagel, Merck); the spots were visualized under UV light (λ = 254 nm) and/or $KMnO_4$ (aq.) was used as revealing system. Neutral Aluminium Oxide – Brockmann grade 2 (Alox-BG2) for chromatographic purifications was prepared as we previously reported.[3]

2. General procedure

To a cooled (-78 °C) solution of the suitable epoxide (1.0 equiv) in dry 2-MeTHF was added iodochloromethane (2.0 equiv). After 2 min, an ethereal solution of MeLi (1.8 equiv, 1.6 M) was added dropwise, using a syringe pump (flow: 0.200 mL/min). The resulting solution was stirred for one hour at -78 °C. A satured solution of NH_4Cl was added (2 mL/mmol substrate), then was extracted with Et_2O (2 x 5 mL) and washed with water (5 mL) and brine (10 mL). The organic phase was dried over anhydrous Na_2SO_4, filtered and, after removal of the solvent under reduced pressure, the so-obtained crude mixture was subjected to chromatography silica gel to afford pure compounds.

3. Spectral and Characterization Data

2-(3-Chloro-2-hydroxypropyl)-1*H*-isoindole-1,3(2*H*)-dione (*rac*-2)[4]



By following the General Procedure **1**, starting from 2-[(oxiran-2-yl)methyl]-1*H*-isoindole-1,3(2*H*)-dione (203 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 91% yield (218 mg) as white solid (m.p.: 95 °C) after chromatography on silica gel (50:50 *v/v*, *n*-hexane/diethyl ether).

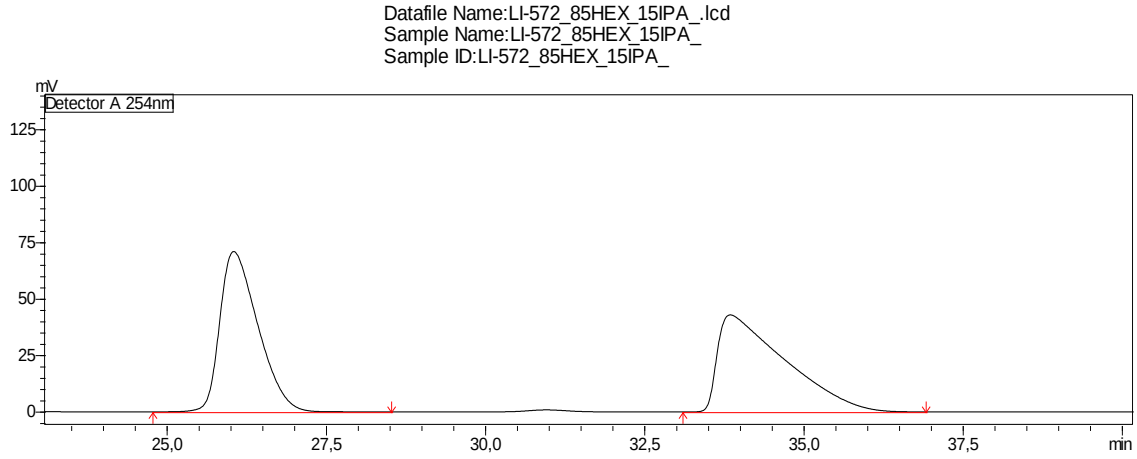
^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.81 (m, 2H, Phthal H-4,7), 7.70 (m, 2H, Phthal H-5,6), 4.16 (brs, 1H, C<u>H</u>OH), 3.91 (dd, *J* = 14.3, 7.4 Hz, 1H, NCH_2), 3.83 (dd, *J* = 14.3, 4.4 Hz, 1H, NCH_2), 3.64 (dd, *J* = 11.5, 4.7 Hz, 1H, CH_2Cl), 3.59 (dd, *J* = 11.5, 5.5 Hz, 1H, CH_2Cl), 3.18 (brs, 1H, OH).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 168.6 (Phthal C-1,3), 134.2 (Phthal C-5,6), 131.7 (Phthal C-3a,7a), 123.4 (Phthal C-4,7), 69.5 (CHOH), 47.2 (CH_2Cl) 41.5 (NCH_2).

HRMS (ESI), *m/z*: calcd. for $C_{11}H_{11}ClNO_3^+$: 240.0422 $[M+H]^+$; found: 240.0426.

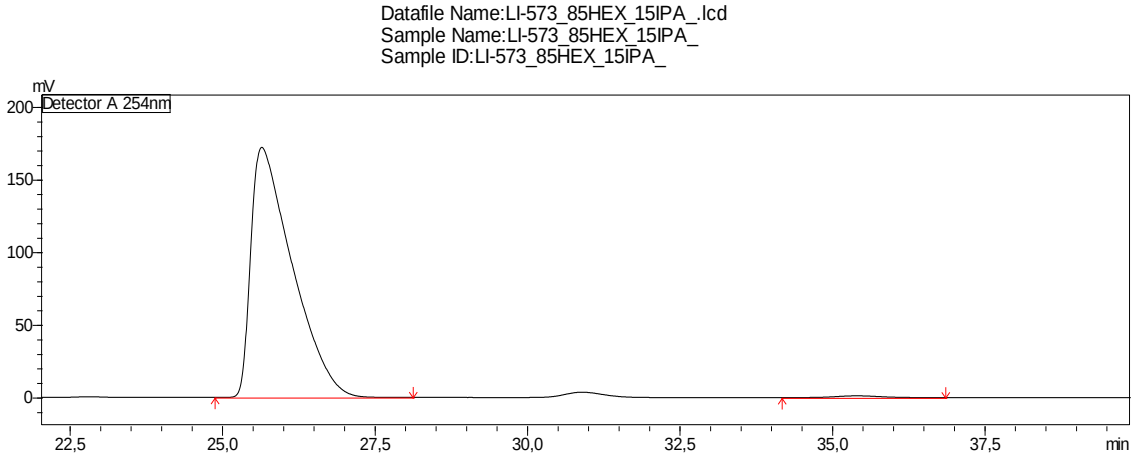
Racemate:

Chiralpak IG, HEX:IPA 85:15, 254 nm, 23 °C, 1 ml/min



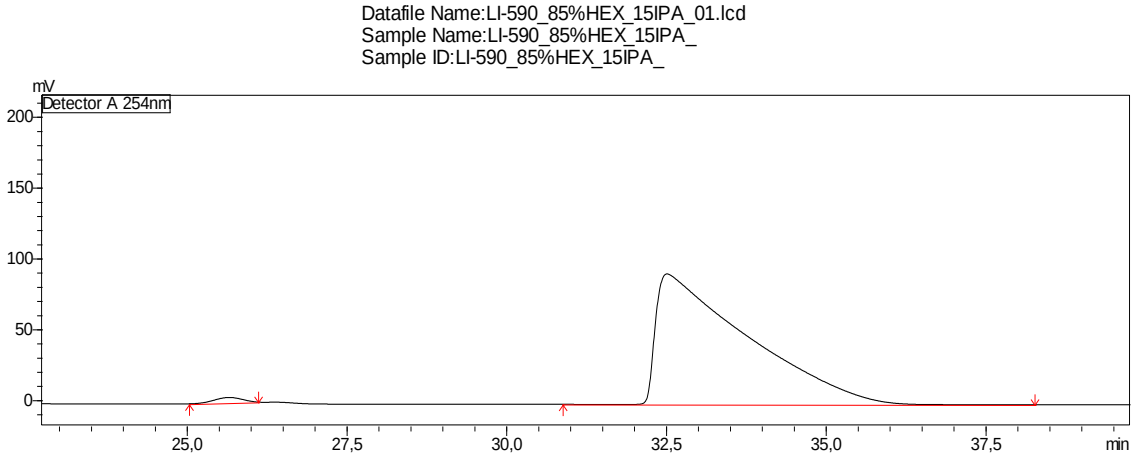
Peak#	Ret. Time	Area	Area%
1	26,055	2948178	48,287
2	33,854	3157389	51,713
Total		6105567	100,000

Enantioenriched (S):



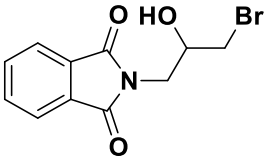
Peak#	Ret. Time	Area	Area%
1	25,653	8133080	99,274
2	35,413	59482	0,726
Total		8192562	100,000

Enantioenriched (R):



Peak#	Ret. Time	Area	Area%
1	25,668	113574	1,228
2	32,520	9135815	98,772
Total		9249389	100,000

2-(3-Bromo-2-hydroxypropyl)-1*H*-isoindole-1,3(2*H*)-dione (*rac*-3)[5]



By following the General Procedure **1**, starting from 2-[(oxiran-2-yl)methyl]-1*H*-isoindole-1,3(2*H*)-dione (203 mg, 1.0 mmol, 1.0 equiv), ICH_2Br (442 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 89% yield (253 mg) as white solid (m.p.: 85 °C) after chromatography on silica gel (50:50 *v/v*, *n*-hexane/diethyl ether).

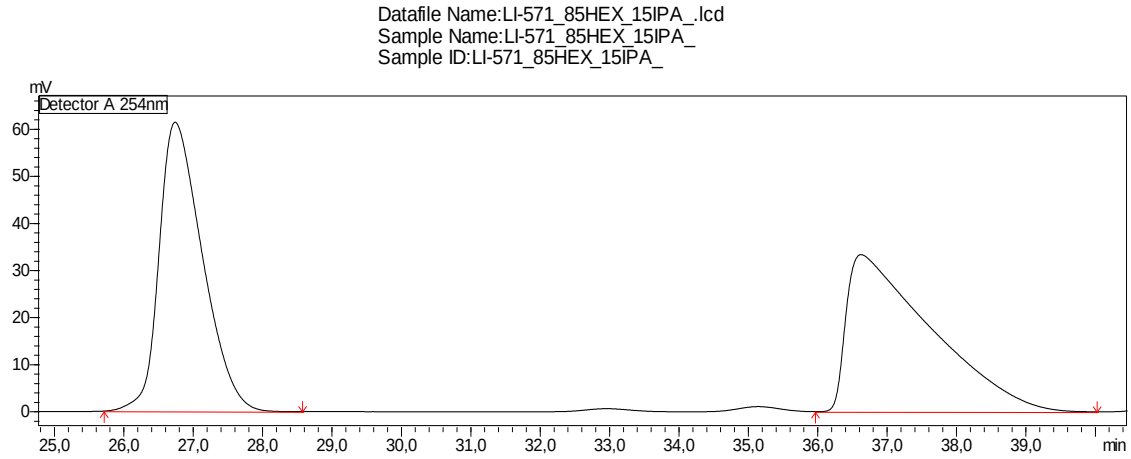
^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.82 (m, 2H, Phthal H-4,7), 7.71 (m, 2H, Phthal H-5,6), 4.14 (m, 1H, CHOH), 3.92 (dd, *J* = 14.3, 7.4 Hz, 1H, NCH_2), 3.84 (dd, *J* = 14.3, 4.4 Hz, 1H, NCH_2), 3.52 (dd, *J* = 10.7, 4.6 Hz, 1H, CH_2Br), 3.46 (dd, *J* = 10.7, 5.6 Hz, 1H, CH_2Br), 3.09 (brs, 1H, OH).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 168.5 (Phthal C-1,3), 134.2 (Phthal C-5,6), 131.7 (Phthal C-3a,7a), 123.4 (Phthal C-4,7), 69.1 (CHOH), 42.3 (NCH_2) 36.2 (CH_2Br).

HRMS (ESI), *m/z*: calcd. for $C_{11}H_{11}BrNO_3^+$: 283.9917 $[M+H]^+$; found: 283.9922.

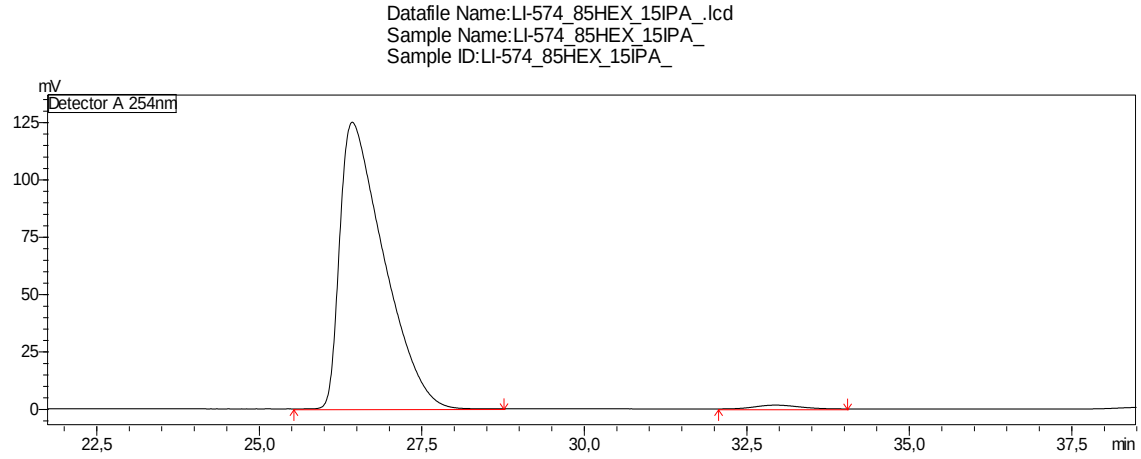
Racemate:

Chiralpak IG, HEX:IPA 85:15, 254 nm, 23 °C, 1 ml/min



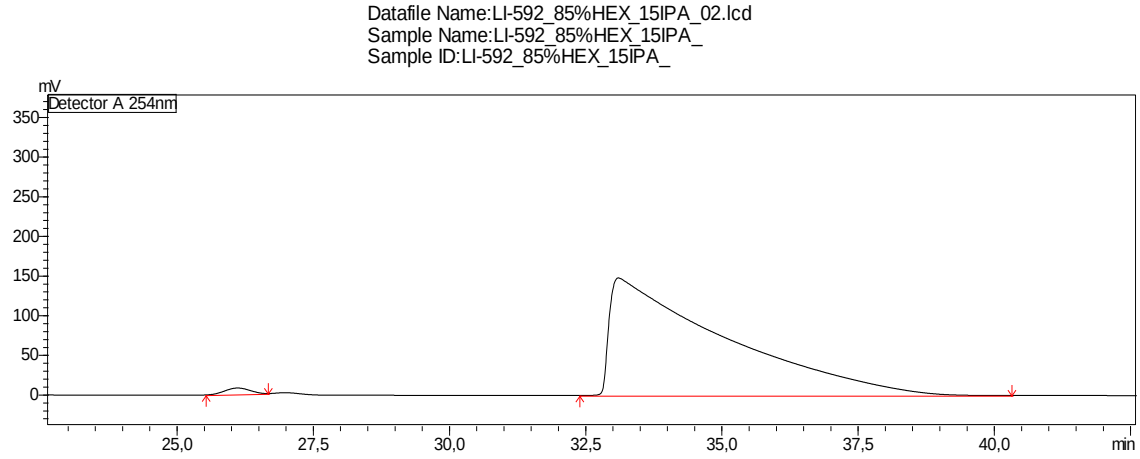
Peak#	Ret. Time	Area	Area%
1	26,750	2667606	48,632
2	36,635	2817712	51,368
Total		5485318	100,000

Enantioenriched (S):



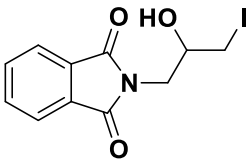
Peak#	Ret. Time	Area	Area%
1	26,442	5876187	98,704
2	32,945	77167	1,296
Total		5953354	100,000

Enantioenriched (R):



Peak#	Ret. Time	Area	Area%
1	26,125	247488	1,139
2	33,112	21479488	98,861
Total		21726975	100,000

2-(2-Hydroxy-3-iodopropyl)-1*H*-isoindole-1,3(2*H*)-dione (*rac*-4)[5]



By following the General Procedure **1**, starting from 2-[(oxiran-2-yl)methyl]-1*H*-isoindole-1,3(2*H*)-dione (203 mg, 1.0 mmol, 1.0 equiv), ICH_2I (536 mg, 0.16 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 91% yield (301 mg) as white solid (m.p.: 112 °C) after chromatography on silica gel (50:50 *v/v*, *n*-hexane/diethyl ether).

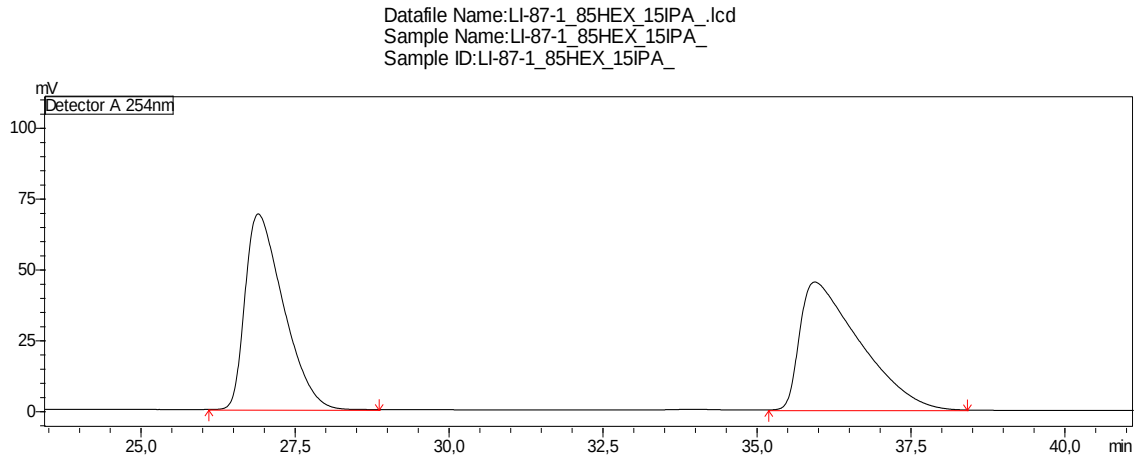
^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.87 (m, 2H, Phthal H-4,7), 7.75 (m, 2H, Phthal H-5,6), 3.90 (m, 2H, NCH_2), 3.90 (m, 1H, CHOH), 3.37 (m, 1H, CH_2I), 3.30 (m, 1H, CH_2I), 2.77 (brs, 1H, OH).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 168.6 (Phthal C-1,3), 134.3 (Phthal C-5,6), 131.8 (Phthal C-3a,7a), 123.6 (Phthal C-4,7), 69.4 (CHOH), 43.5 (NCH_2), 10.8 (CH_2I).

HRMS (ESI), *m/z*: calcd. for $C_{11}H_{11}INO_3^+$: 331.9779 $[M+H]^+$; found: 331.9775.

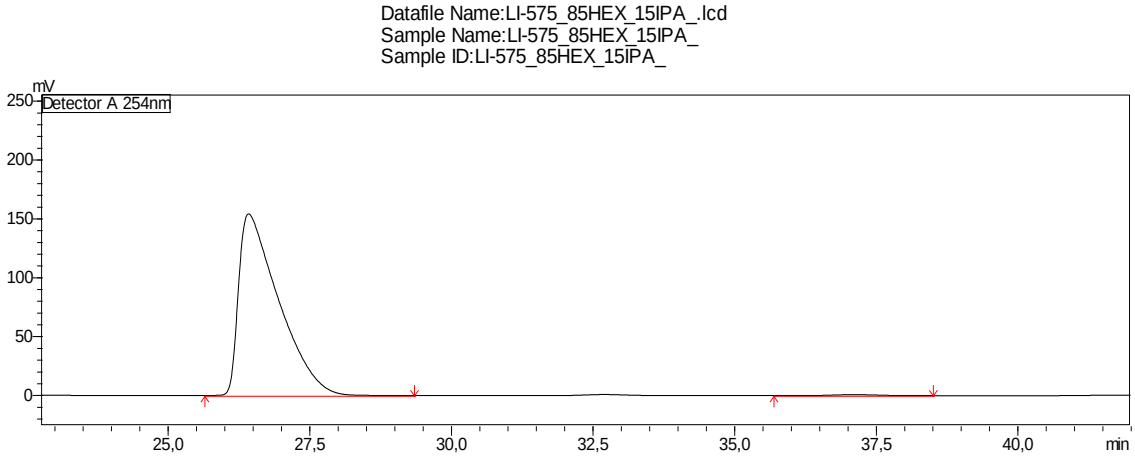
Racemate:

Chiralpak IG, HEX:IPA 85:15, 254 nm, 23 °C, 1ml/min



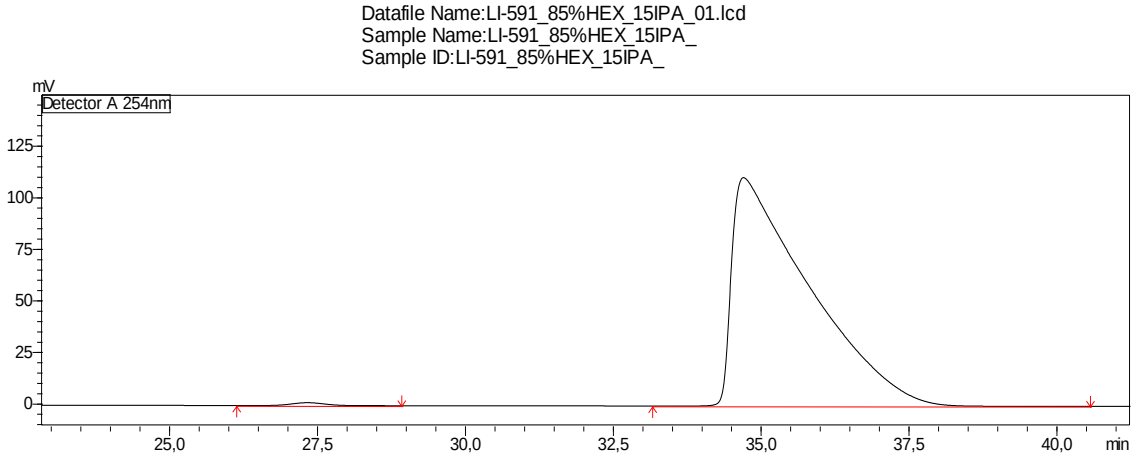
Peak#	Ret. Time	Area	Area%
1	26,913	2988437	49,430
2	35,952	3057400	50,570
Total		6045838	100,000

Enantioenriched (S):



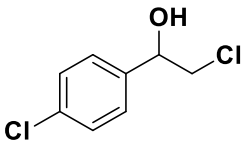
Peak#	Ret. Time	Area	Area%
1	26,434	7576138	99,432
2	37,122	43273	0,568
Total		7619411	100,000

Enantioenriched (R):



Peak#	Ret. Time	Area	Area%
1	27,344	55238	0,545
2	34,715	10078726	99,455
Total		10133963	100,000

2-Chloro-1-(4-chlorophenyl)ethanol (5)[6]



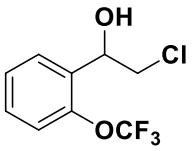
By following the General Procedure **1**, starting from 2-(4-chlorophenyl)oxirane (155 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 90% yield (172 mg) as yellow oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.34 (m, 2H, Ph H-3,5), 7.29 (m, 2H, Ph H-2,6), 4.84 (m, 1H, C<u>H</u>OH), 3.69 (dd, *J* = 11.3, 3.5 Hz, 1H, CH_2Cl), 3.59 (dd, *J* = 11.3, 8.5 Hz, 1H, CH_2Cl), 2.97 (m, OH).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 138.3 (Ph C-1), 134.1 (Ph C-4), 128.7 (Ph C-3,5), 127.4 (Ph C-2,6), 73.2 (CHOH), 50.4 (CH_2Cl).

HRMS (ESI), m/z: calcd. for $C_8H_9Cl_2O^+$: 191.0025 $[M+H]^+$; found: 191.0029.

2-Chloro-1-[2-(trifluoromethoxy)phenyl]ethanol (6)



By following the General Procedure **1**, starting from 2-[2-(trifluoromethoxy)phenyl]oxirane (204 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 85% yield (205 mg) as yellow oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

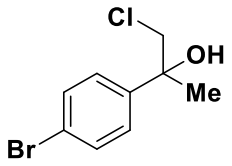
^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.66 (m, 1H, Ph H-6), 7.37 (m, 1H, Ph H-4), 7.35 (m, 1H, Ph H-5), 7.26 (m, 1H, Ph H-3), 5.25 (dt, J_d = 8.6 Hz, J_t = 3.3 Hz, 1H, C<u>H</u>OH), 3.81 (dd, *J* = 11.2, 3.1 Hz, 1H, CH_2Cl), 3.60 (dd, *J*= 11.2, 8.6 Hz, 1H, CH_2Cl), 2.71 (d, *J* = 3.6 Hz, 1H, OH).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 146.1 (q, *J* = 1.6 Hz, Ph C-2), 132.0 (Ph C-1), 129.6 (Ph C-4), 127.8 (Ph C-6), 127.0 (Ph C-5), 120.4 (q, *J* = 258.5 Hz, OCF_3), 119.9 (q, *J* = 1.7 Hz, Ph C-3), 68.2 (CHOH), 49.6 (CH_2Cl).

^{19}F NMR (470 MHz, $CDCl_3$) δ: -56.9 (s, CF_3).

HRMS (ESI), m/z: calcd. for $C_9H_9ClF_3O_2^+$: 241.0238 $[M+H]^+$; found: 241.0242.

2-(4-Bromophenyl)-1-chloro-2-propan-2-ol (7)



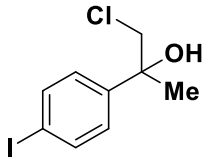
By following the General Procedure **1**, starting from 2-(4-bromophenyl)-2-methyloxirane (213 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 82% yield (205 mg) as colourless oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.50 (m, 2H, Ph H-3,5), 7.34 (m, 2H, Ph H-2,6), 3.79 (A-part of an AB-system, $^2J_{AB}$ = 11.2 Hz, 1H, CH_2Cl), 3.73 (B-part of an AB-system, $^2J_{AB}$ = 11.2 Hz, 1H, CH_2Cl), 2.60 (brs, 1H, OH), 1.61 (s, 3H, CH_3).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 143.2 (Ph C-1), 131.5 (Ph C-3,5), 126.8 (Ph C-2,6), 121.6 (Ph C-4), 73.6 (COH), 55.0 (CH_2Cl), 27.3 (CH_3).

HRMS (ESI), *m/z*: calcd. for $C_9H_{11}BrClO^+$: 248.9676 $[M+H]^+$; found: 248.9680.

1-Chloro-2-(4-iodophenyl)-2-propanol (8)



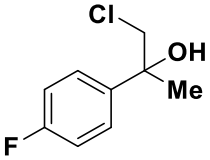
By following the General Procedure **1**, starting from 2-(4-iodophenyl)-2-methyloxirane (260 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 83% yield (246 mg) as colourless oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.70 (m, 2H, Ph H-3,5), 7.21 (m, 2H, Ph H-2,6), 3.79 (A-part of an AB-system, $^2J_{AB}$ = 11.2 Hz, 1H, CH_2Cl), 3.73 (B-part of an AB-system, $^2J_{AB}$ = 11.2 Hz, 1H, CH_2Cl), 2.60 (brs, 1H, OH), 1.60 (s, 3H, CH_3).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 144.0 (Ph C-1), 137.5 (Ph C-3,5), 127.1 (Ph C-2,6), 93.2 (Ph C-4), 73.7 (COH), 55.0 (CH_2Cl), 27.3 (CH_3).

HRMS (ESI), *m/z*: calcd. for $C_9H_{11}ClIO^+$: 296.9538 $[M+H]^+$; found: 296.9542.

1-Chloro-2-(4-fluorophenyl)-2-propanol (9)



By following the General Procedure **1**, starting from 2-(4-fluorophenyl)-2-methyloxirane (152 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 90% yield (170 mg) as colourless oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

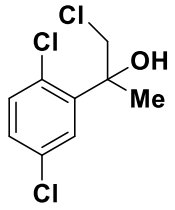
^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.44 (m, 2H, Ph H-2,6), 7.05 (m, 2H, Ph H-3,5), 3.79 (A-part of an AB-system, $^2J_{AB}$ = 11.2 Hz, 1H, CH_2Cl), 3.73 (B-part of an AB-system, $^2J_{AB}$ = 11.2 Hz, 1H, CH_2Cl), 2.59 (brs, 1H, OH), 1.63 (s, 3H, CH_3).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 162.1 (d, *J* = 246.2 Hz, Ph C-4), 139.9 (d, *J* = 3.1 Hz, Ph C-1), 126.8 (d, *J* = 8.1 Hz, Ph C-2,6), 115.2 (d, *J* = 21.4 Hz, Ph C-3,5), 73.5 (COH), 55.3 (CH_2Cl), 27.3 (CH_3).

^{19}F NMR (376 MHz, $CDCl_3$) δ: -115.2 (m, F).

HRMS (ESI), *m/z*: calcd. for $C_9H_{11}ClFO^+$: 189.0477 $[M+H]^+$; found: 189.0481.

1-Chloro-2-(2,5-dichlorophenyl)propan-2-ol (10)



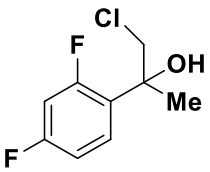
By following the General Procedure **1**, starting from 2-(2,5-dichlorophenyl)-2-methyloxirane (203 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 92% yield (220 mg) as colourless oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

^{1}H NMR (200 MHz, $CDCl_3$) δ: 7.76 (d, *J* = 8.6 Hz, 1H, Ph H), 7.37 (d, *J* = 2.2 Hz, 1H, Ph H), 7.29 (dd, *J* = 8.6, 2.2 Hz, 1H, Ph H), 4.33 (d, *J* = 11.2 Hz, 1H, CH_2Cl), 4.01 (d, *J* = 11.2 Hz, 1H, CH_2Cl), 2.96 (brs, 1H, OH), 1.74 (s, 3H, CH_3).

^{13}C NMR (50 MHz, $CDCl_3$) δ: 139.5 (Ph C), 134.1 (Ph C), 131.1 (Ph C), 130.9 (Ph C), 129.6 (Ph C), 127.3 (Ph C), 74.4 (COH), 52.6 (CH_2Cl), 24.9 (CH_3).

HRMS (ESI), *m/z*: calcd. for $C_9H_9Cl_3O^+$: 238.9792 $[M+H]^+$; found: 238.9788.

1-Chloro-2-(2,4-difluorophenyl)-2-propanol (11)



By following the General Procedure **1**, starting from 2-(2,4-difluorophenyl)-2-methyloxirane (170 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M,

1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 87% yield (180 mg) as colourless oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

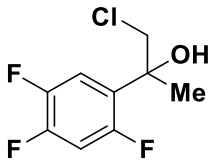
^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.64 (m, 1H, Ph H-6), 6.91 (m, 1H, Ph H-5), 6.80 (m, 1H, Ph H-3), 4.02 (d, *J* = 11.1 Hz, 1H, CH_2Cl), 3.88 (dd, *J* = 11.1, 1.1 Hz, 1H, CH_2Cl), 2.77 (brs, 1H, OH), 1.65 (d, *J* = 1.2 Hz, 3H, CH_3).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 162.5 (dd, *J* = 249.0, 12.4 Hz, Ph C-4), 159.1 (dd, *J* = 247.8, 11.7 Hz, Ph C-2), 128.9 (dd, *J* = 9.5, 5.8 Hz, Ph C-6), 127.0 (dd, *J* = 12.6, 3.8 Hz, Ph C-1), 111.2 (dd, *J* = 20.6, 3.5 Hz, Ph C-5), 104.3 (dd, *J* = 27.6, 25.5 Hz, Ph C-3), 72.8 (d, *J* = 4.3 Hz, COH), 53.8 (d, *J* = 6.4 Hz, CH_2Cl), 25.9 (d, *J* = 3.6 Hz, CH_3).

^{19}F NMR (376 MHz, $CDCl_3$) δ: -111.4 (m, Ph F), -109.7 (m, Ph F).

HRMS (ESI), *m/z*: calcd. for $C_9H_{10}ClF_2O^+$: 207.0383 $[M+H]^+$; found: 207.0388.

1-Chloro-2-(2,4,5-trifluorophenyl)-2-propanol (12)



By following the General Procedure **1**, starting from 2-methyl-2-(2,4,5-trifluorophenyl)oxirane (188 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 91% yield (204 mg) as colourless oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

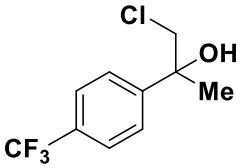
^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.52 (ddd, *J* = 11.5, 9.0, 7.3 Hz, 1H, Ph H-6), 6.91 (m, 1H, Ph H-3), 4.01 (d, *J* = 11.2 Hz, 1H, CH_2Cl), 3.86 (dd, *J* = 11.2, 1.1 Hz, 1H, CH_2Cl), 2.79 (brs, 1H, OH), 1.64 (d, *J* = 1.2 Hz, 3H, CH_3).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 153.8 (ddd, *J* = 244.1, 9.3, 2.9 Hz, Ph C), 149.3 (ddd, *J* = 251.5, 14.6, 12.8 Hz, Ph C), 146.8 (ddd, *J* = 244.6, 12.0, 3.4 Hz, Ph C), 127.9 (dt, J_d = 15.0 Hz, J_t = 4.4 Hz, Ph C-1), 116.4 (ddd, *J* = 21.4, 5.9, 1.3 Hz, Ph C-6), 106.4 (dd, *J* = 29.9, 21.0 Hz, Ph C-3), 72.6 (d, *J* = 4.7 Hz, COH), 53.4 (d, *J* = 6.5 Hz, CH_2Cl), 25.8 (d, *J* = 3.5 Hz, CH_3).

^{19}F NMR (376 MHz, $CDCl_3$) δ: -141.9 (m, F), -134.7 (m, F), -115.7 (m, F).

HRMS (ESI), *m/z*: calcd. for $C_9H_9ClF_3O^+$: 225.0289 $[M+H]^+$; found: 225.0286.

1-Chloro-2-[4-(trifluoromethyl)phenyl]-2-propanol (13)



By following the General Procedure **1**, starting from 2-methyl-2-[4-(trifluoromethyl)phenyl]oxirane (202 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 91% yield (203 mg) as colourless oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

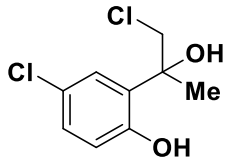
^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.63 (m, 2H, Ph H-3,5), 7.60 (m, 2H, Ph H-2,6), 3.84 (A-part of an AB-system, $^2J_{AB}$ = 11.2 Hz, 1H, CH_2Cl), 3.78 (B-part of an AB-system, $^2J_{AB}$ = 11.2 Hz, 1H, CH_2Cl), 2.68 (brs, 1H, OH), 1.64 (s, 3H, CH_3).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 148.2 (Ph C-1), 129.8 (q, *J* = 32.5 Hz, Ph C-4), 125.5 (Ph C-2,6), 125.4 (q, *J* = 3.8 Hz, Ph C-3,5), 124.0 (q, *J* = 272.0 Hz, CF_3), 73.8 (COH), 54.9 (CH_2Cl), 27.4 (CH_3).

^{19}F NMR (376 MHz, $CDCl_3$) δ: -62.6 (s, CF_3).

HRMS (ESI), *m/z*: calcd. for $C_{10}H_{11}ClF_3O^+$: 239.0445 $[M+H]^+$; found: 239.0440.

4-Chloro-2-(1-chloro-2-hydroxy-2-propanyl)phenol (14)



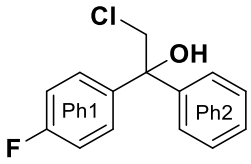
By following the General Procedure **1**, starting from 4-chloro-2-(2-methyloxiran-2-yl)phenol [185 mg, 1.0 mmol, 1.0 equiv – previously deprotonated at -78 °C in 2-MeTHF with MeLi (1.6 M, 0.6 mL, 0.95 mmol, 0.95 equiv)], ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 82% yield (181 mg) as white solid (m.p.: 105 °C) after chromatography on silica gel (80:20 *v/v*, *n*-hexane/diethyl ether).

^{1}H NMR (400 MHz, $CDCl_3$) δ: 8.67 (s, 1H, OH), 7.16 (dd, *J* = 8.7, 2.5 Hz, 1H, Ph H-5), 7.03 (d, *J* = 2.5 Hz, 1H, Ph H-3), 6.83 (d, *J* = 8.7 Hz, 1H, Ph C-6), 3.98 (d, *J* = 11.5 Hz, 1H, CH_2Cl), 3.69 (d, *J* = 11.5 Hz, 1H, CH_2Cl), 3.24 (s, 1H, OH), 1.73 (s, 3H, CH_3).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 154.7 (Ph C-1), 129.7 (Ph C-5), 127.2 (Ph C-2), 126.1 (Ph C-3), 124.6 (Ph C-4), 119.5 (Ph C-6), 76.9 (COH), 53.2 (CH_2Cl), 25.9 (CH_3).

HRMS (ESI), *m/z*: calcd. for $C_9H_{11}Cl_2O_2^+$: 221.0131 $[M+H]^+$; found: 221.0135.

2-Chloro-1-(4-fluorophenyl)-1-phenylethanol (15)



By following the General Procedure **1**, starting from 2-(4-fluorophenyl)-2-phenyloxirane (214 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 90% yield (225 mg) as colourless oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

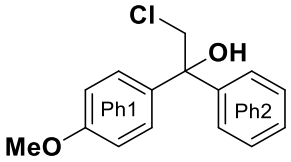
^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.43 (m, 2H, Ph2 H-2,6), 7.42 (m, 2H, Ph1 H-2,6), 7.36 (m, 2H, Ph2 H-3,5), 7.30 (m, 1H, Ph2 H-4), 7.03 (m, 2H, Ph1 H-3,5), 4.18 (A-part of an AB-system, $^2J_{AB}$ = 11.7 Hz, 1H, CH_2Cl), 4.16 (B-part of an AB-system, $^2J_{AB}$ = 11.7 Hz, 1H, CH_2Cl), 3.17 (brs, 1H, OH).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 162.2 (d, *J* = 246.9 Hz, Ph1 C-4), 143.0 (Ph2 C-1), 139.1 (d, *J* = 3.2 Hz, Ph1 C-1), 128.4 (Ph2 C-3,5), 128.3 (d, *J* = 8.2 Hz, Ph1 C-2,6), 127.9 (Ph2 C-4), 126.3 (Ph2 C-2,6), 115.2 (d, *J* = 21.4 Hz, Ph1 C-3,5), 77.5 (COH), 53.1 (CH_2Cl).

^{19}F NMR (376 MHz, $CDCl_3$) δ: -114.7 (m, F).

HRMS (ESI), *m/z*: calcd. for $C_{14}H_{13}ClFO^+$: 251.0633 $[M+H]^+$; found: 251.0659.

2-Chloro-1-(4-methoxyphenyl)-1-phenylethan-1-ol (16)



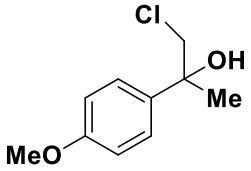
By following the General Procedure **1**, starting from 2-(4-methoxyphenyl)-2-phenyloxirane (226 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 92% yield (229 mg) as colourless oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

^{1}H NMR (200 MHz, $CDCl_3$) δ: 7.50-7.34 (m, 7H, Ph1 H-2,6, Ph2 H-2,3,4,5,6), 6.91 (m, 2H, Ph1 H-3,5), 4.19 (s, 2H, CH_2Cl), 3.80 (s, 3H, OCH_3), 3.22 (s, 1H, OH).

^{13}C NMR (50 MHz, $CDCl_3$) δ: 158.9 (Ph1 C-4), 143.4 (Ph2 C-1), 135.4 (Ph1 C-1), 128.2 (Ph2 C-3,5), 127.6 (Ph1 C-2,6), 127.5 (Ph2 C-4), 126.3 (Ph2 C-2,6), 113.6 (Ph1 C-3,5), 77.6 (COH), 55.1 (OCH_3), 53.3 (CH_2Cl).

HRMS (ESI), *m/z*: calcd. for $C_{15}H_{16}ClO_2^+$: 263.0833 $[M+H]^+$; found: 263.0838.

1-Chloro-2-(4-methoxyphenyl)propan-2-ol (17)[7]



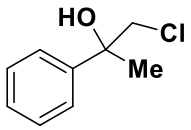
By following the General Procedure **1**, starting from 2-(4-methoxyphenyl)-2-methyloxirane (164 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 92% yield (229 mg) as colourless oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

^{1}H NMR (200 MHz, $CDCl_3$) δ: 7.39 (d, *J* = 8.8 Hz, 2H, Ph H-2,6), 6.90 (d, *J* = 8.8 Hz, 2H, Ph H-3,5), 3.87-3.68 (m, 2H, CH_2Cl), 2.83 (s, 3H, OCH_3), 2.41 (brs, 1H, OH), 1.63 (s, 3H, CH_3).

^{13}C NMR (50 MHz, $CDCl_3$) δ: 158.8 (Ph C-4), 136.2 (Ph C-1), 126.2 (Ph C-2,6), 113.7 (Ph C-3,5), 73.5 (COH), 55.4 (CH_2Cl), 55.2 (OCH_3), 27.2 (CH_3).

HRMS (ESI), *m/z*: calcd. for $C_{10}H_{13}ClO_2^+$: $[M+H]^+$; found: .

1-Chloro-2-phenyl-2-propanol (18)[8]



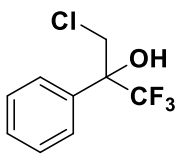
By following the General Procedure **1**, starting from 2-methyl-2-phenyloxirane (134 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 89% yield (152 mg) as yellow oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.47 (m, 2H, Ph H-2,6), 7.38 (m, 2H, Ph H-3,5), 7.30 (m, 1H, Ph H-4), 3.84 (A-part of an AB-system, $^2J_{AB}$ = 11.2 Hz, 1H, CH_2Cl), 3.76 (B-part of an AB-system, $^2J_{AB}$ = 11.2 Hz, 1H, CH_2Cl), 2.59 (brs, 1H, OH), 1.64 (s, 3H, CH_3).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 144.1 (Ph C-1), 128.4 (Ph C-3,5), 127.5 (Ph C-4), 124.9 (Ph C-2,6), 73.8 (COH), 55.4 (CH_2Cl), 27.3 (CH_3).

HRMS (ESI), m/z: calcd. for $C_9H_{12}ClO^+$: 171.0571 $[M+H]^+$; found: 171.0575.

3-Chloro-1,1,1-trifluoro-2-phenyl-2-propanol (19)



By following the General Procedure **1**, starting from 2-phenyl-2-(trifluoromethyl)oxirane (188 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 85% yield (191 mg) as yellow oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.59 (m, 2H, Ph H-2,6), 7.45 (m, 3H, Ph H-3,4,5), 4.18 (d, *J* = 12.0

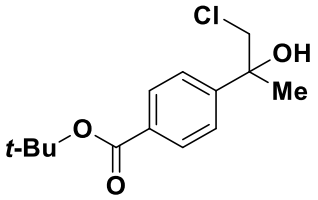
Hz, 1H, CH_2Cl), 4.06 (d, *J* = 12.0 Hz, 1H, CH_2Cl), 3.29 (brs, 1H, OH).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 134.7 (Ph C-1), 129.3 (Ph C-4), 128.6 (Ph C-3,5), 126.2 (Ph C-2,6), 124.3 (q, *J* = 286.5 Hz, CF_3), 76.4 (q, *J* = 28.6 Hz, COH), 47.7 (CH_2Cl).

^{19}F NMR (376 MHz, $CDCl_3$) δ: -76.9 (s, CF_3).

HRMS (ESI), *m/z*: calcd. for $C_9H_9ClF_3O^+$: 225.0289 $[M+H]^+$; found: 225.0285.

2-Methyl-2-propanyl 4-(1-chloro-2-hydroxy-2-propanyl)benzoate (20)



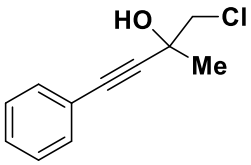
By following the General Procedure **1**, starting from *tert*-butyl 4-(2-methyloxiran-2-yl)benzoate (234 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 87% yield (236 mg) as yellow oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether).

^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.99 (m, 2H, Ph H-2,6), 7.51 (m, 2H, Ph H-3,5), 3.84 (A-part of an AB-system, $^2J_{AB}$ = 11.2 Hz, 1H, CH_2Cl), 3.77 (B-part of an AB-system, $^2J_{AB}$ = 11.2 Hz, 1H, CH_2Cl), 2.64 (s, 1H, OH), 1.63 (s, 3H, CH_3), 1.59 (s, 9H, $C(CH_3)_3$).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 165.4 (C=O), 148.6 (Ph C-4), 131.3 (Ph C-1), 129.6 (Ph C-2,6), 124.9 (Ph C-3,5), 81.1 ($\underline{C}(CH_3)_3$), 73.9 (COH), 55.0 (CH_2Cl), 28.2 ($C(\underline{C}H_3)_3$), 27.4 (CH_3).

HRMS (ESI), *m/z*: calcd. for $C_{14}H_{20}ClO_3^+$: 271.1095 $[M+H]^+$; found: 271.1091.

1-Chloro-2-methyl-4-phenyl-3-butyn-2-ol (21)[9]



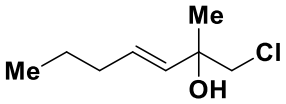
By following the General Procedure **1**, starting from 2-methyl-2-(phenylethynyl)oxirane (158 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 85% yield (165 mg) as colourless oil after chromatography on silica gel (80:20 *v/v*, *n*-hexane/ethyl acetate).

^{1}H NMR (400 MHz, $CDCl_3$) δ: 7.45 (m, 2H, Ph H-2,6), 7.32 (m, 3H, Ph H-3,4,5), 3.78 (A-part of an AB-system, $^2J_{AB}$ = 10.9 Hz, 1H, CH_2Cl), 3.69 (B-part of an AB-system, $^2J_{AB}$ = 10.9 Hz, 1H, CH_2Cl), 2.86 (s, 1H, OH), 1.68 (s, 3H, Me).

^{13}C NMR (100 MHz, $CDCl_3$) δ: 131.8 (Ph C-2,6), 128.6 (Ph C-4), 128.2 (Ph C-3,5), 122.0 (Ph C-1), 89.5 (PhC≡C), 84.5 (PhC≡C), 68.0 (CHOH), 54.1 (CH_2Cl), 26.9 (CH_3).

HRMS (ESI), m/z: calcd. for $C_{11}H_{11}ClO^+$: 195.0571 $[M+H]^+$; found: 195.0571.

(3*E*)-1-Chloro-2-methyl-3-hepten-2-ol (22)



By following the General Procedure **1**, starting from 2-methyl-2-[(1*E*)-pent-1-en-1-yl]oxirane (126 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (3 mL), the desired product was obtained in 92% yield (150 mg) as colourless oil after chromatography on silica gel (80:20 *v/v*, *n*-hexane/ethyl acetate).

^{1}H NMR (400 MHz, C_6D_6) δ: 5.64 (td, J_d = 15.5 Hz, J_t = 6.9 Hz, 1H, Hepten H-4), 5.30 (dt, J_d= 15.5 Hz, J_t= 1.5 Hz, 1H, Hepten H-3), 3.18 (A-part of an AB-system, $^2J_{AB}$ = 10.8 Hz, 1H, Hepten H-1), 3.14 (B-part of an AB-system, $^2J_{AB}$ = 10.8 Hz, 1H, Hepten H-1), 1.88 (s, 1H, OH), 1.87 (m, 2H, Hepten H-5), 1.28 (m, 2H, Hepten H-6), 1.13 (s, 3H, CH_3), 0.82 (t, J = 7.3 Hz, 3H, Hepten H-7).

^{13}C NMR (100 MHz, C_6D_6) δ: 133.9 (Hepten C-3), 130.4 (Hepten C-4), 71.9 (Hepten C-2), 54.7 (Hepten C-1), 34.5 (Hepten C-5), 25.7 (CH_3), 22.6 (Hepten C-6), 13.7 (Hepten C-7).

HRMS (ESI), m/z: calcd. for $C_8H_{16}ClO^+$: 163.0884 $[M+H]^+$; found: 163.0880.

4. Experimental procedures Scheme 3

General Procedure scheme 3a with 1.8 equiv of $LiCH_2Cl$ in 2-MeTHF

By following the General Procedure **1**, starting from 2-{[(2*S*)-oxiran-2-yl]methyl}-1*H*-isoindole-1,3(2*H*)-dione (203 mg, 1.0 mmol, 1.0 equiv), 4-chlorobenzaldehyde (141 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (353 mg, 0.15 mL, 2.0 mmol, 2.0 equiv), MeLi (1.6 M, 1.1 mL, 1.8 mmol, 1.8 equiv) and 2-MeTHF (5 mL), ***rac*-2** was obtained in 21% yield (50 mg) as white solid (m.p.: 95 °C) and compound **5** in 57% yield (109 mg) as yellow oil after chromatography on silica gel (80:20 *v/v*, *n*-hexane/diethyl ether). The experimental spectra match with those reported above.

General Procedure scheme 3a with 1.0 equiv of $LiCH_2Cl$ in 2-MeTHF

By following the General Procedure **1**, starting from 2-{[(2*S*)-oxiran-2-yl]methyl}-1*H*-isoindole-1,3(2*H*)-dione (203 mg, 1.0 mmol, 1.0 equiv), 4-chlorobenzaldehyde (141 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (212 mg, 0.09 mL, 1.2 mmol, 1.2 equiv), MeLi (1.6 M, 0.6 mL, 1.0 mmol, 1.0 equiv) and 2-MeTHF (5 mL), ***rac*-2** was obtained in 10% yield (24 mg) as white solid (m.p.: 95 °C) and compound **5** in 25% yield (48 mg) as yellow oil after chromatography on silica gel (80:20 *v/v*, *n*-hexane/diethyl ether). The experimental spectra match with those reported above.

General Procedure scheme 3a with 1.0 equiv of $LiCH_2Cl$ in THF

By following the General Procedure **1**, starting from 2-{[(2*S*)-oxiran-2-yl]methyl}-1*H*-isoindole-1,3(2*H*)-dione (203 mg, 1.0 mmol, 1.0 equiv), 4-chlorobenzaldehyde (141 mg, 1.0 mmol, 1.0 equiv), ICH_2Cl (212 mg, 0.09 mL, 1.2 mmol, 1.2 equiv), MeLi (1.6 M, 0.6 mL, 1.0 mmol, 1.0 equiv) and THF (5 mL), compound **5** was formed in 77% yield (147 mg) as yellow oil after chromatography on silica gel (90:10 *v/v*, *n*-hexane/diethyl ether). The experimental spectra match with those reported above.

General Procedure scheme 3b with 1.8 equiv of $LiCD_2Cl$ in 2-MeTHF

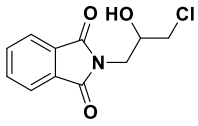
By following the General Procedure **1**, starting from 2-{[(2*S*)-oxiran-2-yl]methyl}-1*H*-isoindole-1,3(2*H*)-dione (203 mg, 1.0 mmol, 1.0 equiv), CD_2I_2 (324 mg, 0.1 mL, 1.2 mmol, 1.2 equiv), MeLi (1.6 M, 0.6 mL, 1.0 mmol, 1.0 equiv) and 2-MeTHF (3 mL), ***rac*-4** was formed in 84% yield (278 mg) as white solid (m.p.: 112 °C) after chromatography on silica gel (50:50 *v/v*, *n*-hexane/diethyl ether). The experimental spectra match with those reported above.

5. References

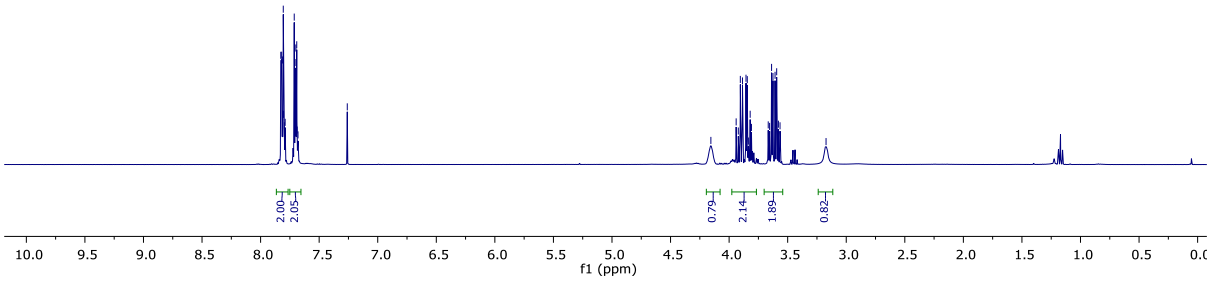
(1) Suffert, J. *J Org Chem* **1989**, *54*, 509-510.
(2) Hajra, S.; Maity, S.; Maity, R. *Org Lett* **2015**, *17*, 3430-3433.
(3) Castoldi, L.; Holzer, W.; Langer, T.; Pace, V. *Chem Commun (Camb)* **2017**, *53*, 9498-9501.
(4) Toda, Y.; Tanaka, K.; Matsuda, R.; Suga, H. *Chem Lett* **2019**, *48*, 1469-1471.
(5) Pace, V.; Holzer, W. *Tetrahedron Lett* **2012**, *53*, 5106-5109.
(6) von Keutz, T.; Cantillo, D.; Kappe, C. O. *Org Lett* **2020**, *22*, 7537-7541.
(7) Egami, H.; Yoneda, T.; Uku, M.; Ide, T.; Kawato, Y.; Hamashima, Y. *J Org Chem* **2016**, *81*, 4020-4030.
(8) Degennaro, L.; Fanelli, F.; Giovine, A.; Luisi, R. *Adv Synth Catal* **2015**, *357*, 21-27.
(9) Minami, I.; Yuhara, M.; Watanabe, H.; Tsuji, J. *J Organomet Chem* **1987**, *334*, 225-242.

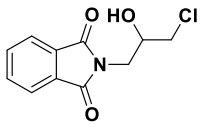
6. Copies of ^{1}H- and ^{13}C-NMR Spectra for all the compounds

2-(3-Chloro-2-hydroxypropyl)-1*H*-isoindole-1,3(2*H*)-dione (2)

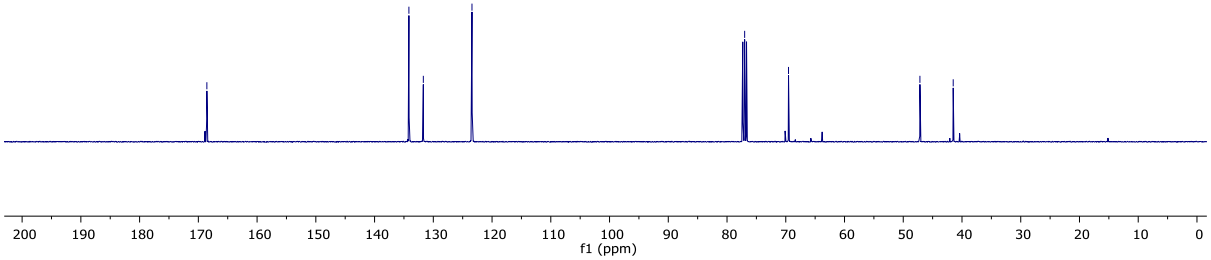


(^{1}H NMR, $CDCl_3$, 400 MHz)

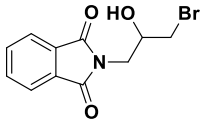




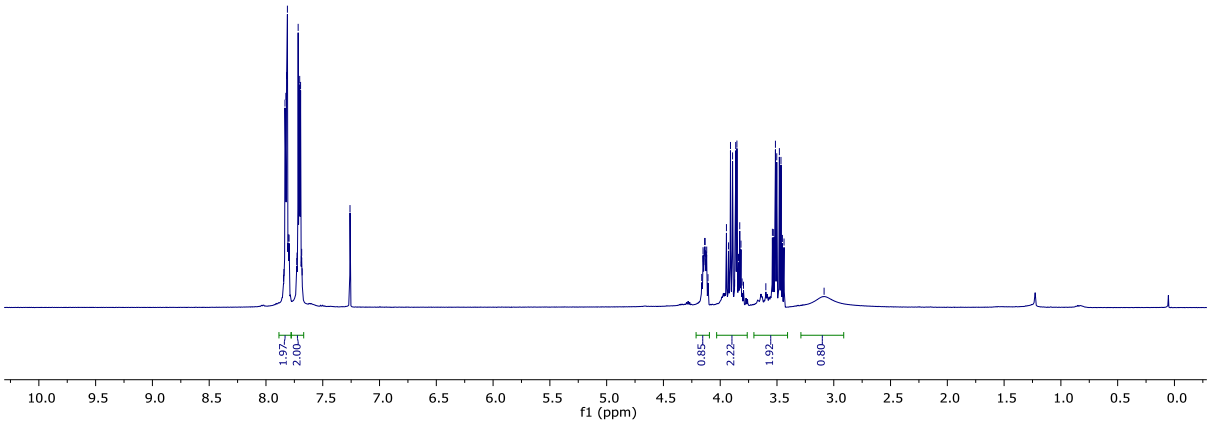
(^{13}C NMR, $CDCl_3$, 100 MHz)

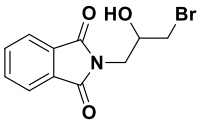


2-(3-Bromo-2-hydroxypropyl)-1*H*-isoindole-1,3(2*H*)-dione (3)

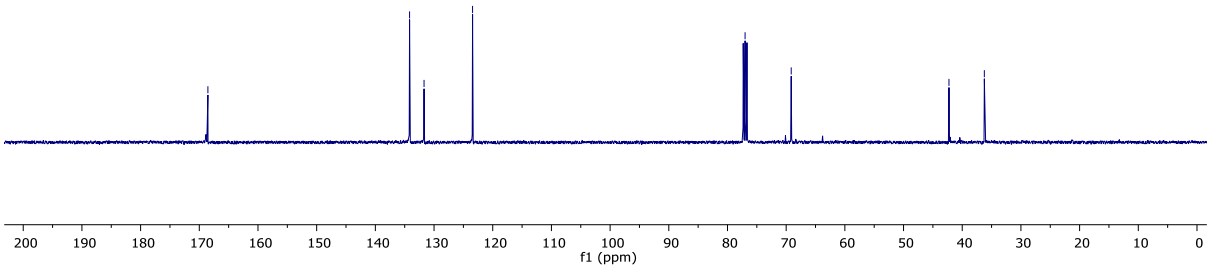


(^{1}H NMR, $CDCl_3$, 400 MHz)

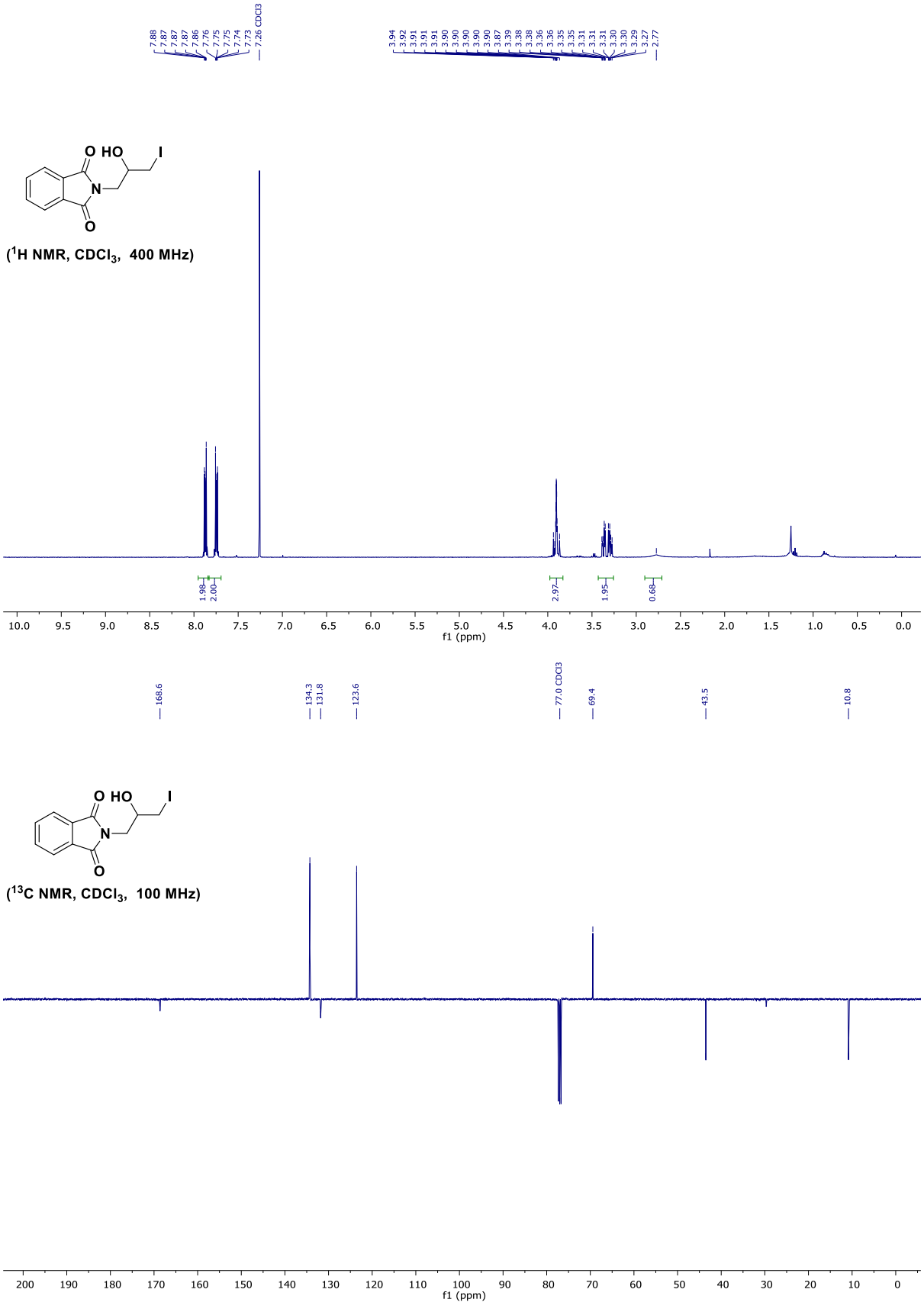




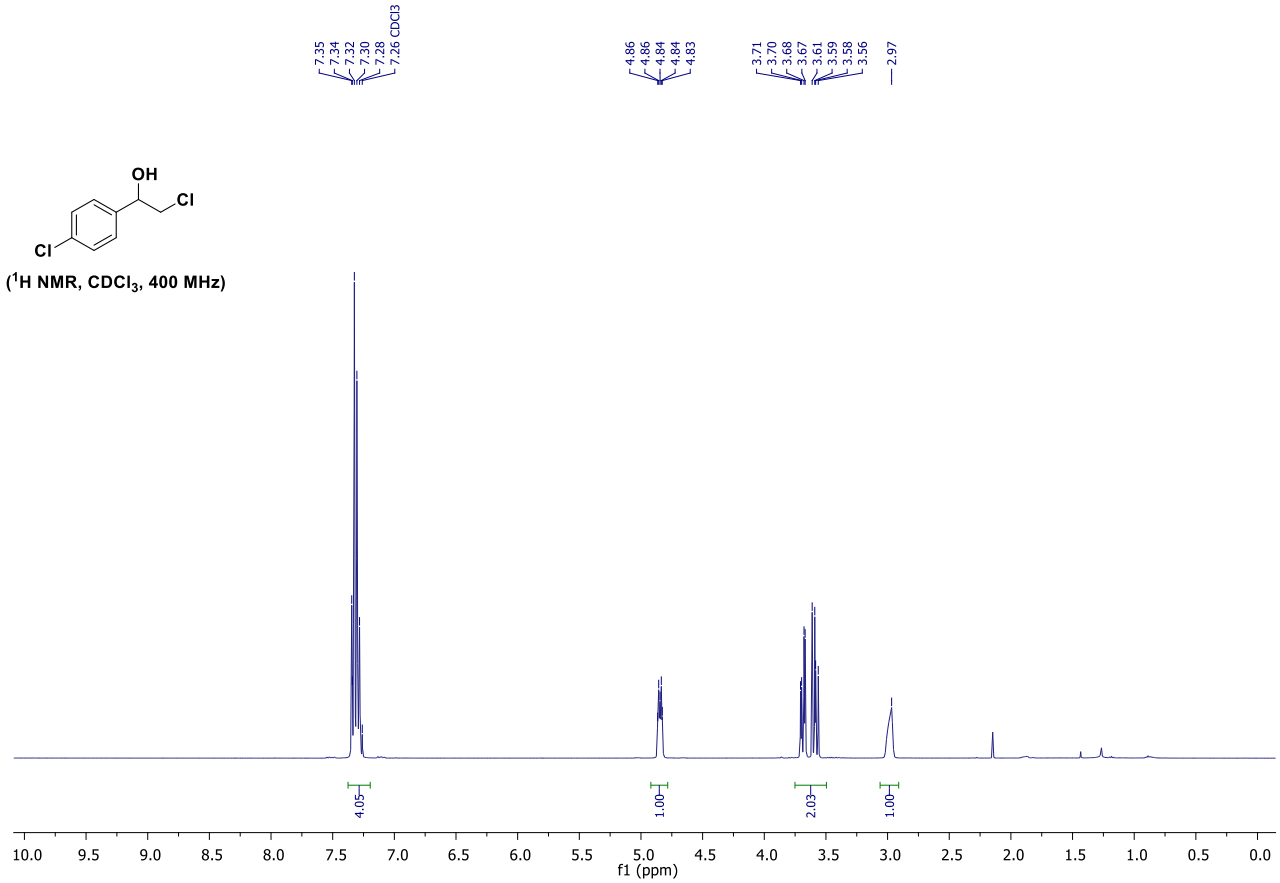
(^{13}C NMR, $CDCl_3$, 100 MHz)



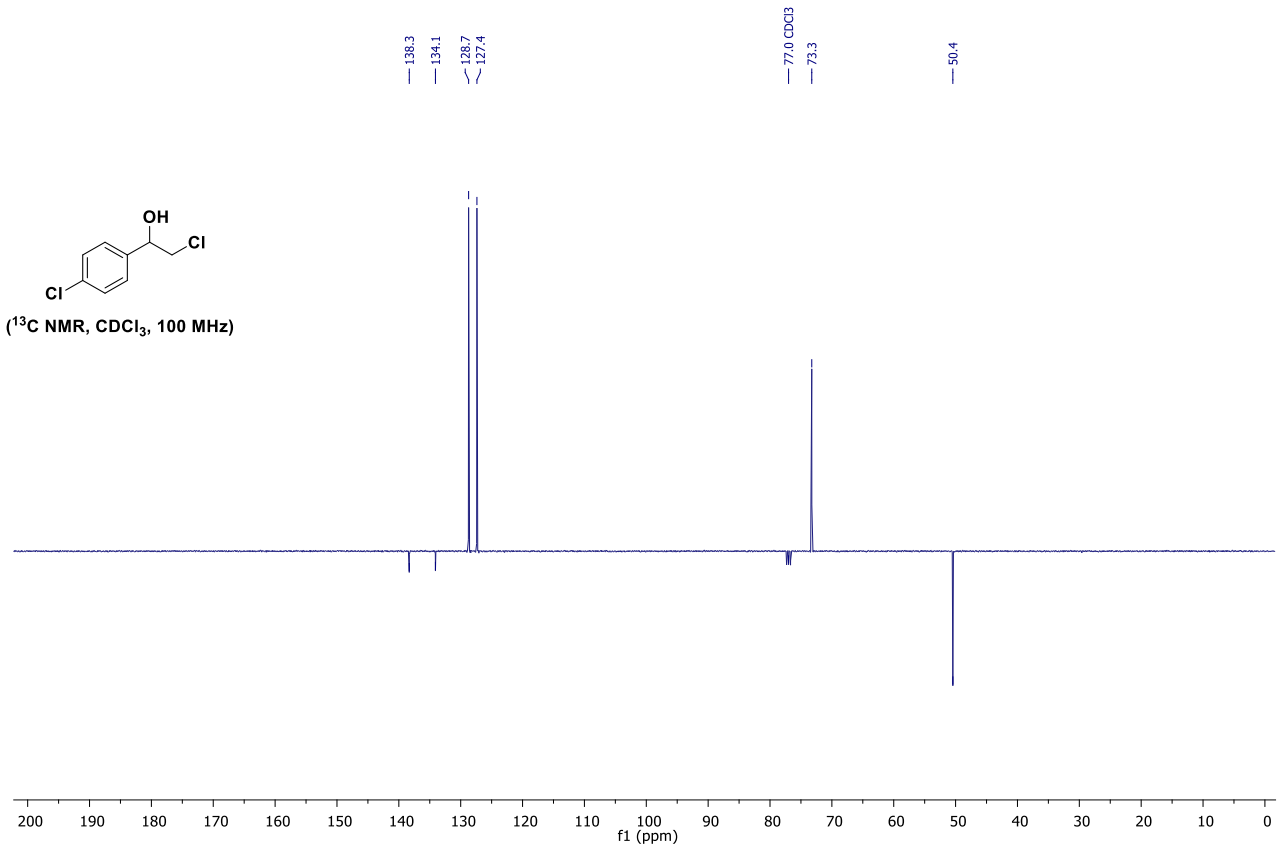
2-(2-Hydroxy-3-iodopropyl)-1*H*-isoindole-1,3(2*H*)-dione (4)



2-Chloro-1-(4-chlorophenyl)ethanol (5)

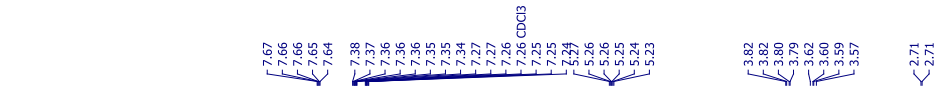


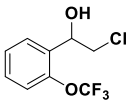
(^{1}H NMR, $CDCl_3$, 400 MHz)



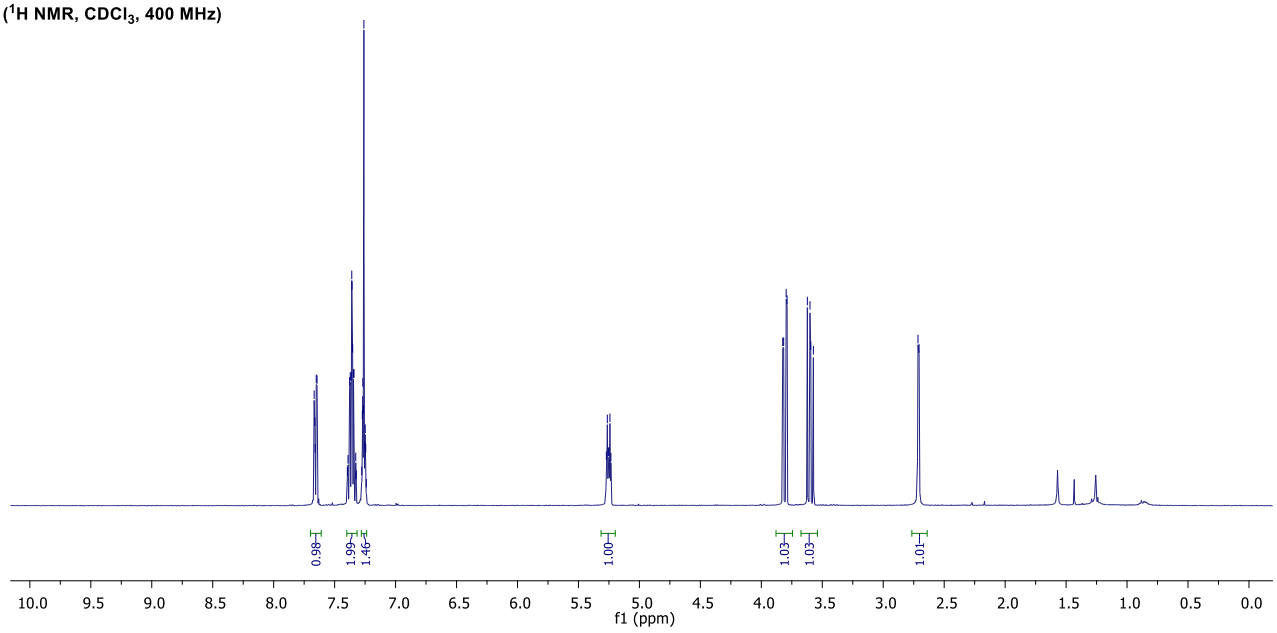
(^{13}C NMR, $CDCl_3$, 100 MHz)

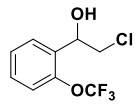
2-Chloro-1-[2-(trifluoromethoxy)phenyl]ethanol (6)



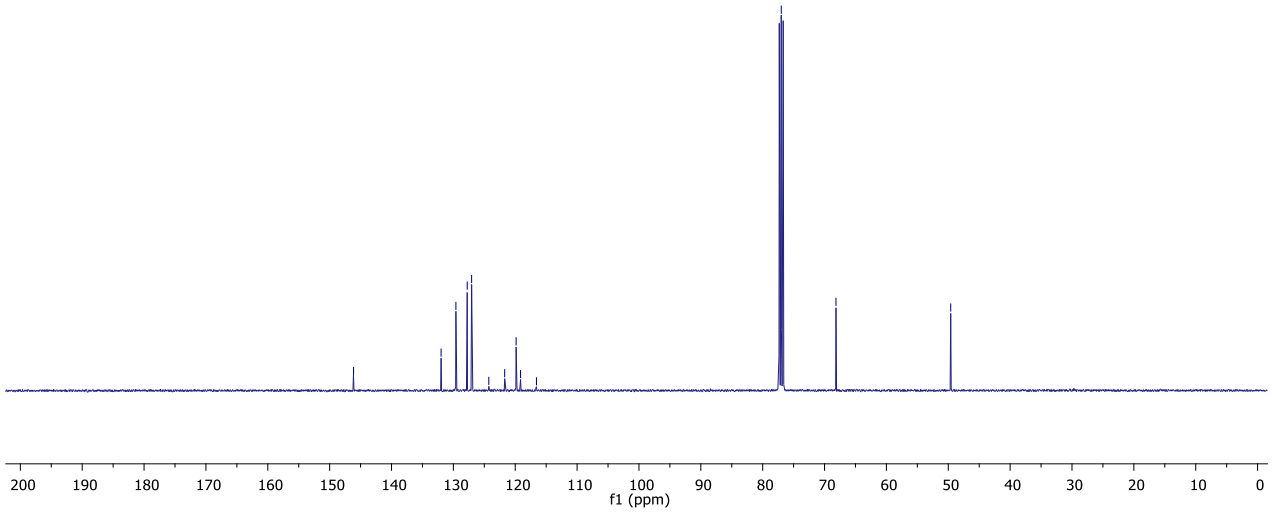


(^{1}H NMR, $CDCl_3$, 400 MHz)

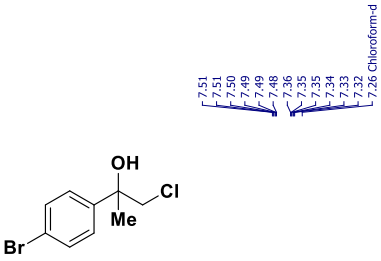




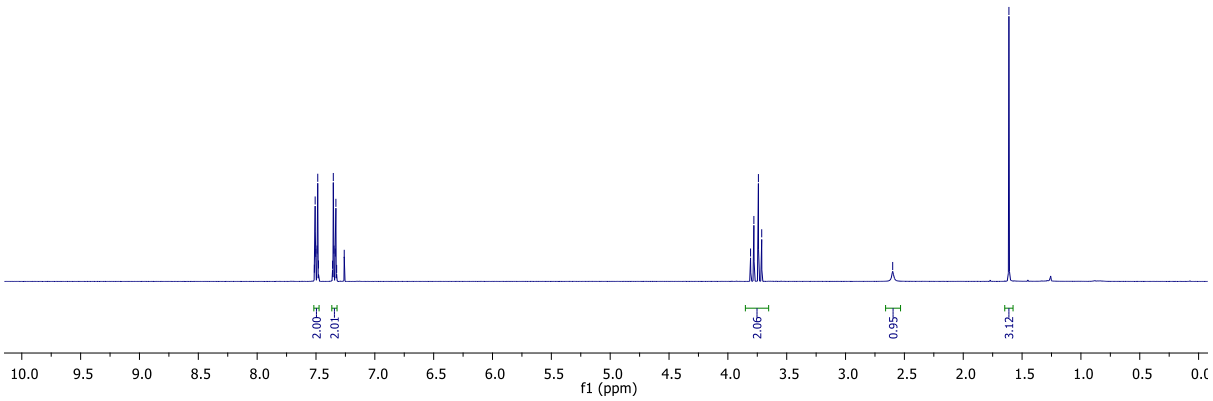
(^{13}C NMR, $CDCl_3$, 100 MHz)



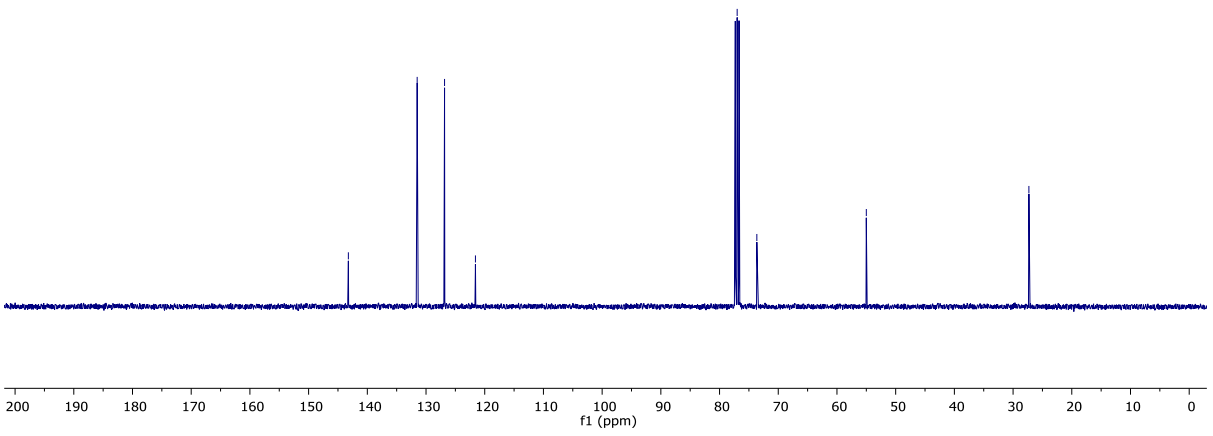
2-(4-Bromophenyl)-1-chloro-2-propan-2-ol (7)



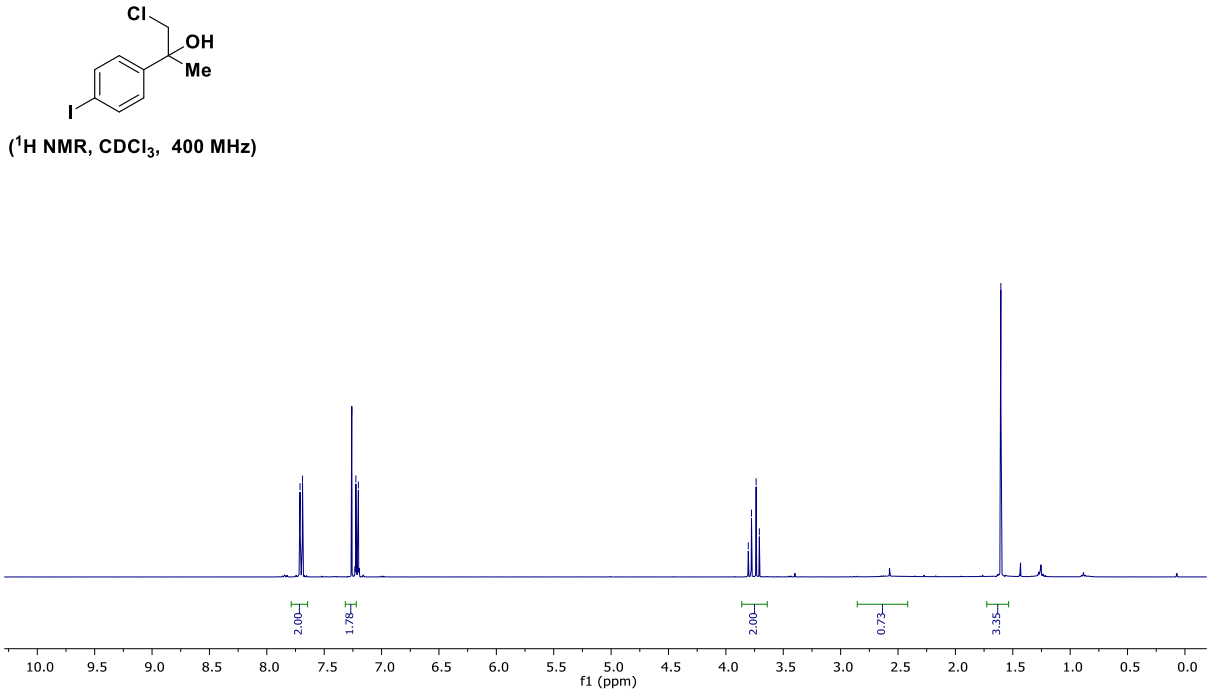
(^{1}H NMR, $CDCl_3$, 400 MHz)



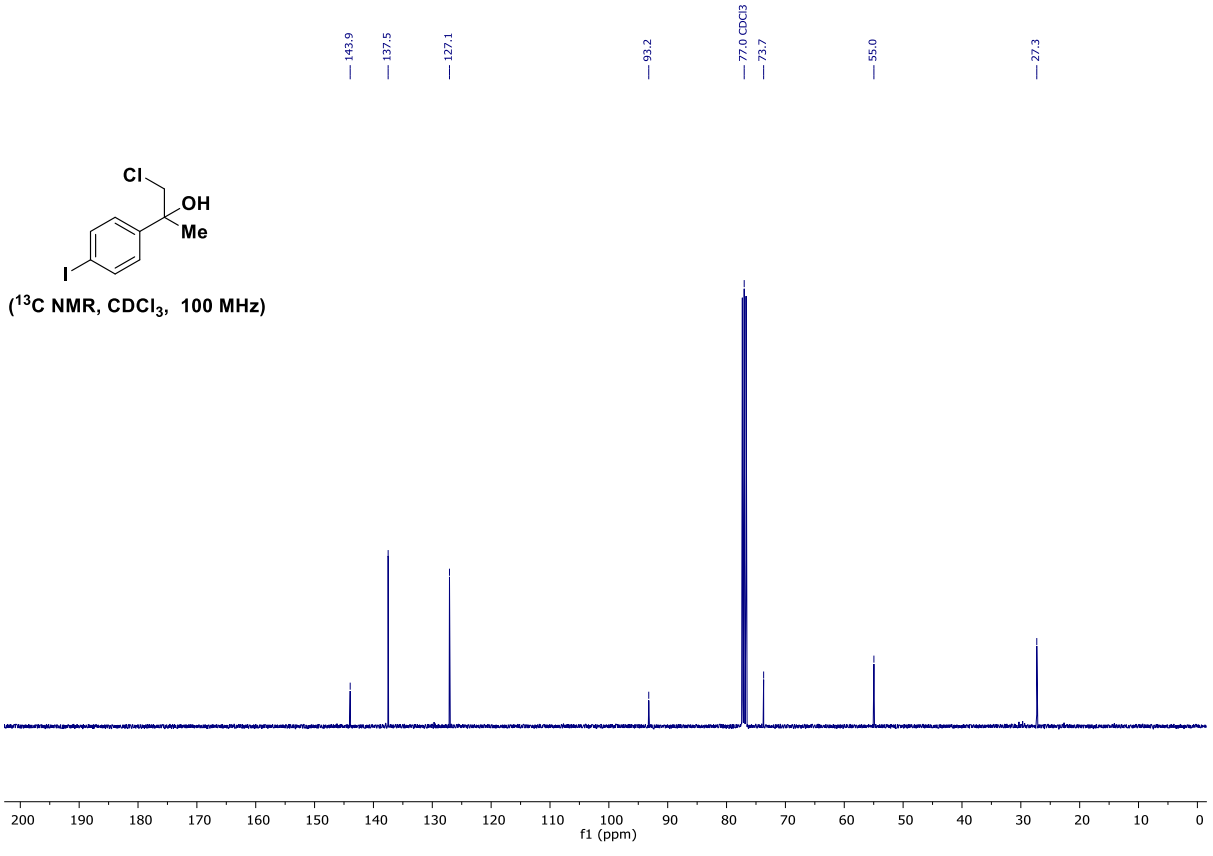
(^{13}C NMR, $CDCl_3$, 100 MHz)



1-Chloro-2-(4-iodophenyl)-2-propanol (8)

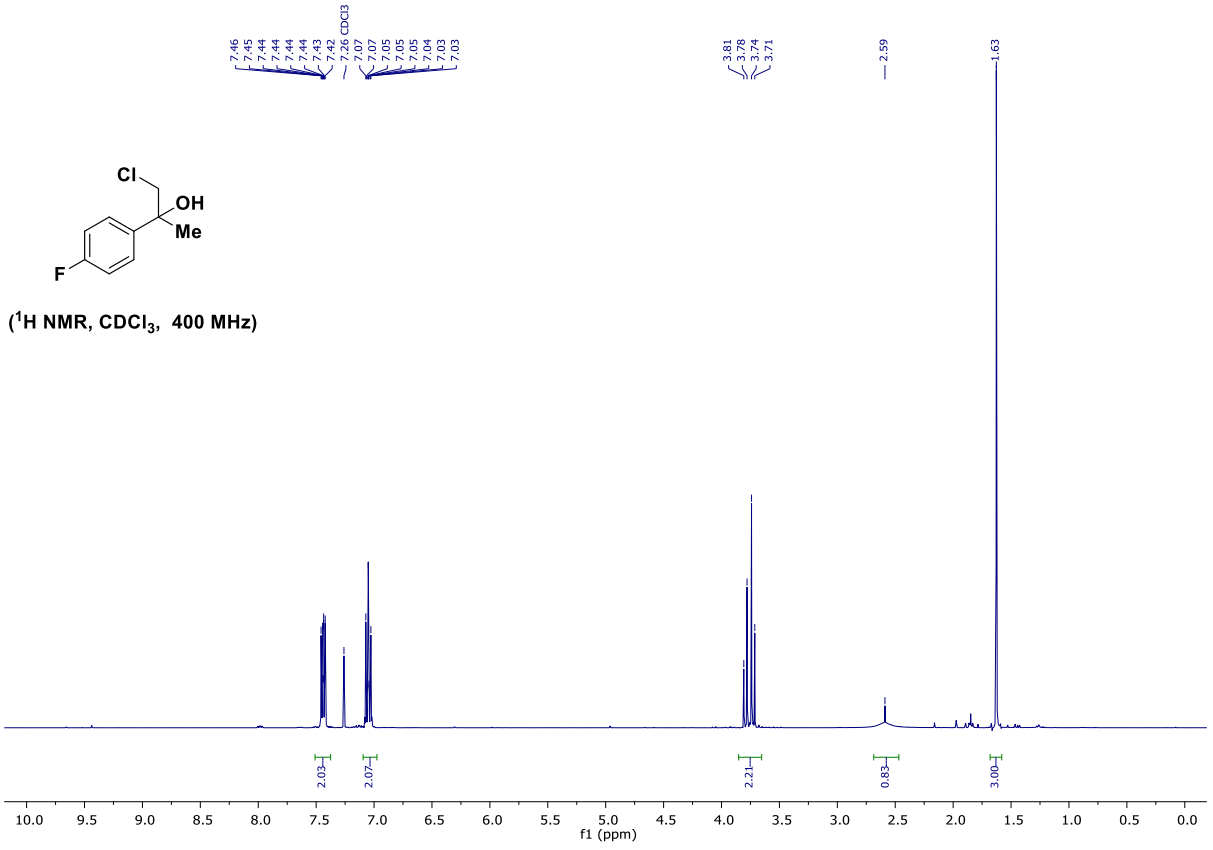


(^{1}H NMR, $CDCl_3$, 400 MHz)

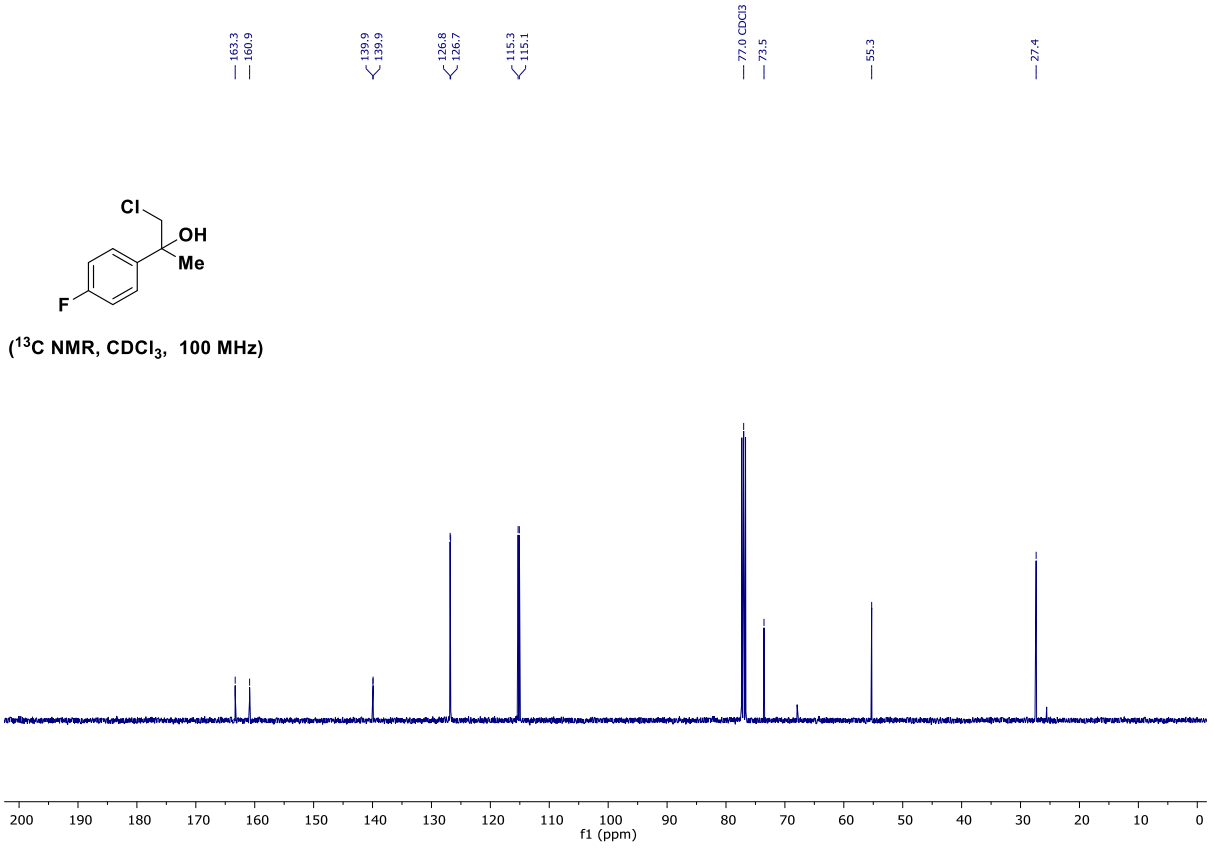


(^{13}C NMR, $CDCl_3$, 100 MHz)

1-Chloro-2-(4-fluorophenyl)-2-propanol (9)

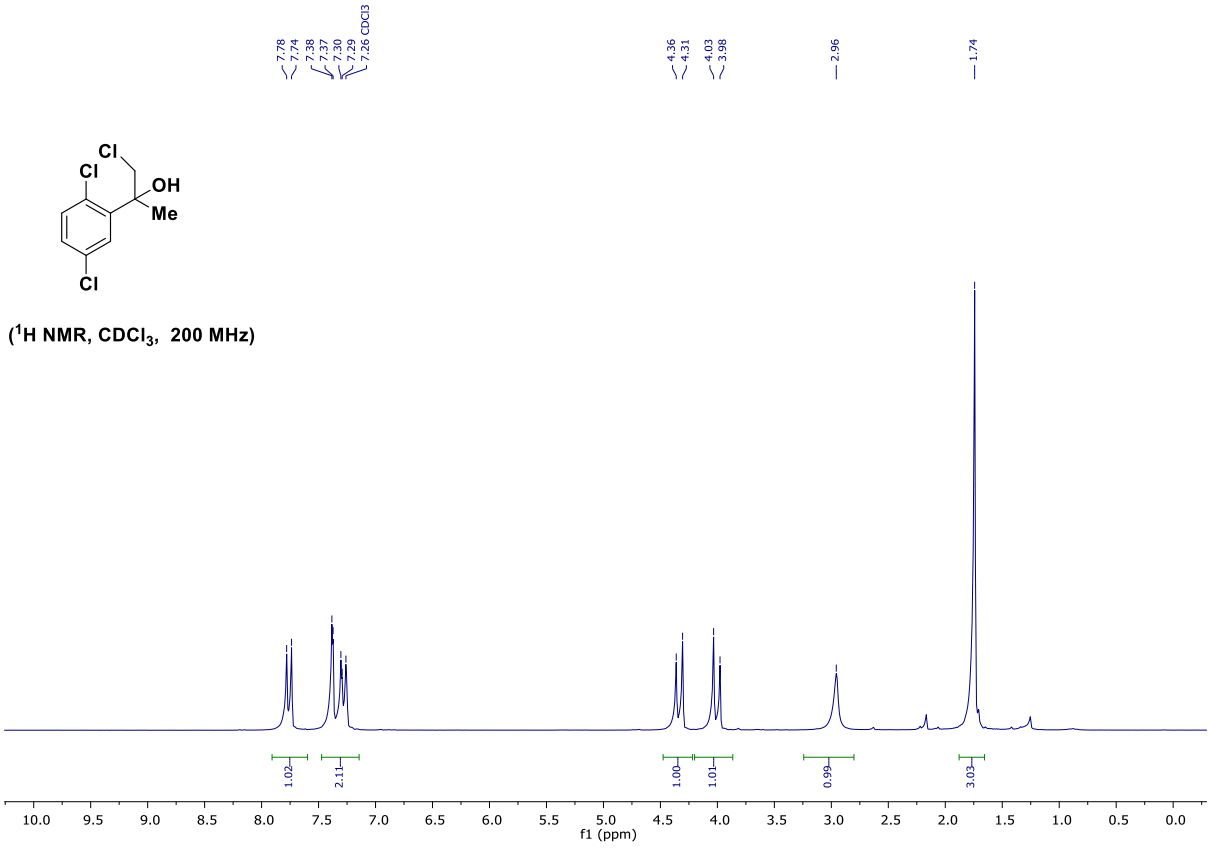


(^{1}H NMR, $CDCl_3$, 400 MHz)

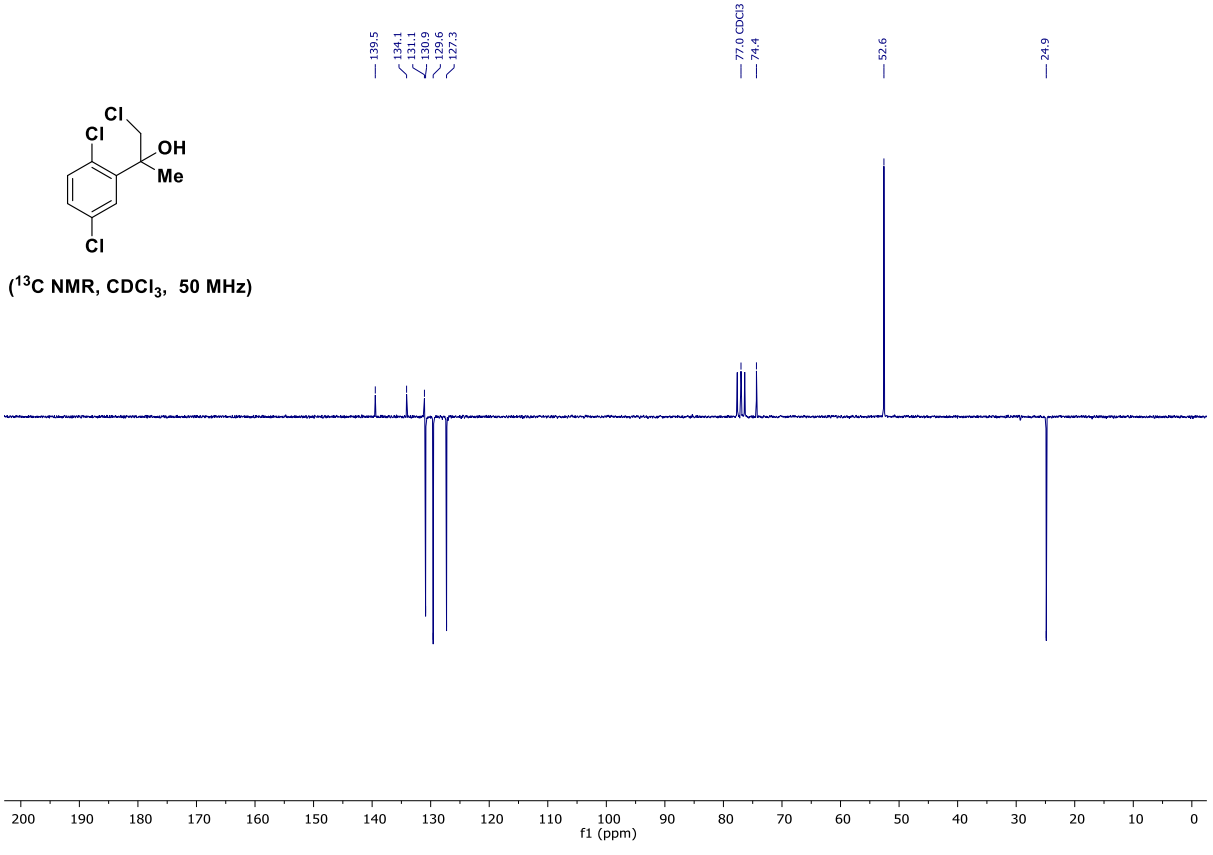


(^{13}C NMR, $CDCl_3$, 100 MHz)

1-Chloro-2-(2,5-dichlorophenyl)propan-2-ol (10)

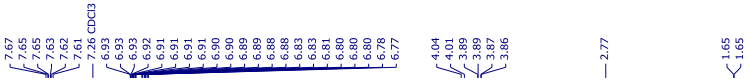


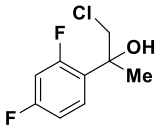
(^{1}H NMR, $CDCl_3$, 200 MHz)



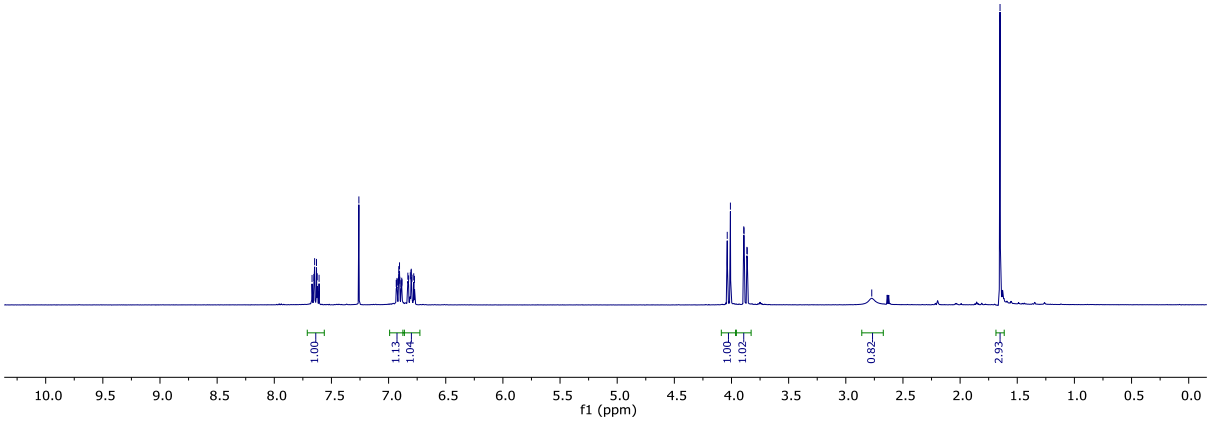
(^{13}C NMR, $CDCl_3$, 50 MHz)

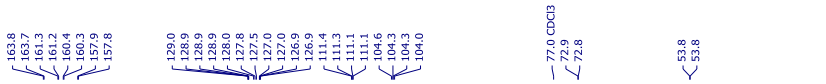
1-Chloro-2-(2,4-difluorophenyl)-2-propanol (11)

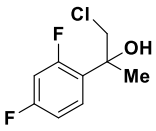




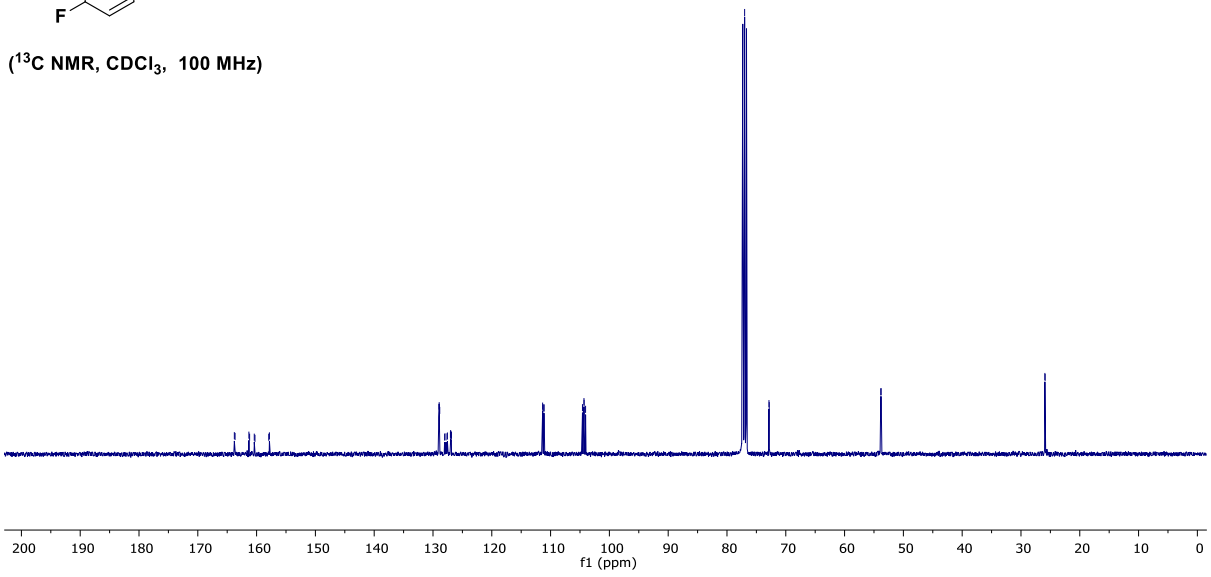
(^{1}H NMR, $CDCl_3$, 400 MHz)



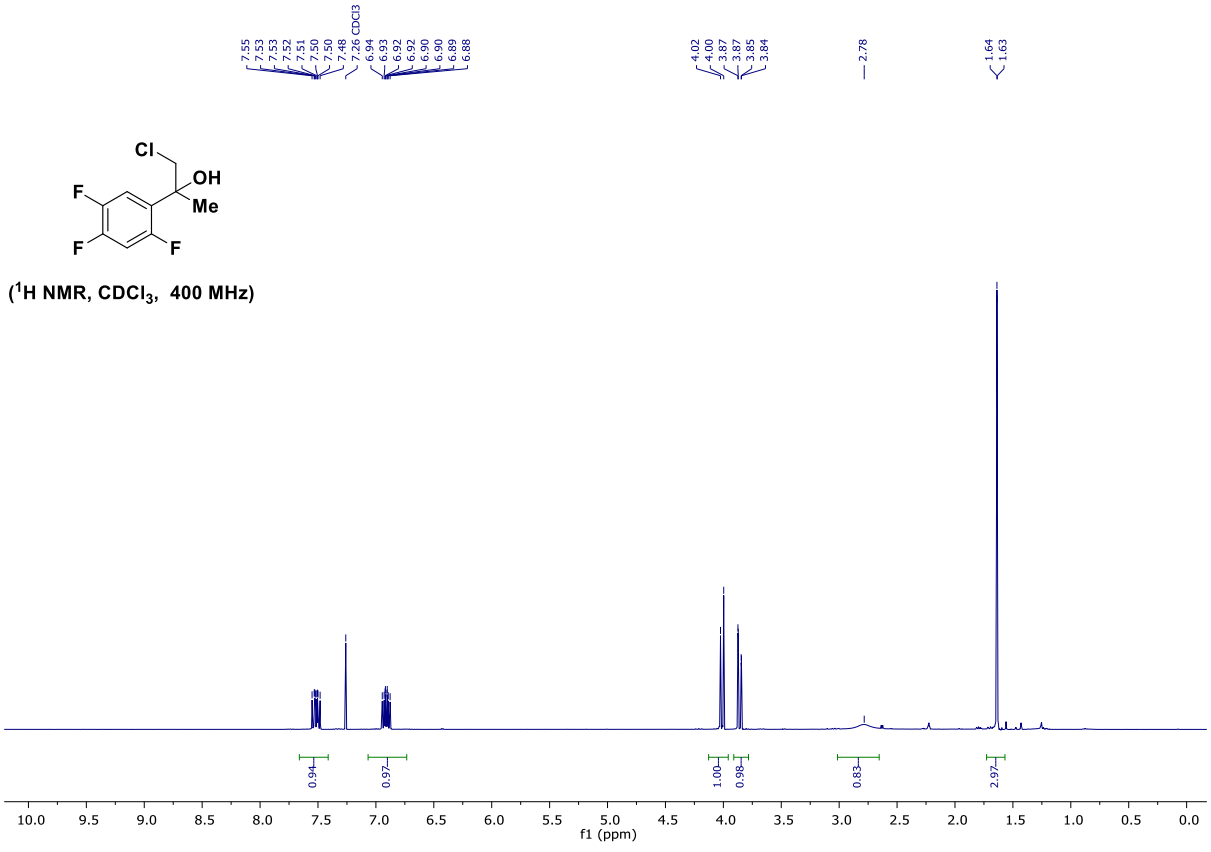


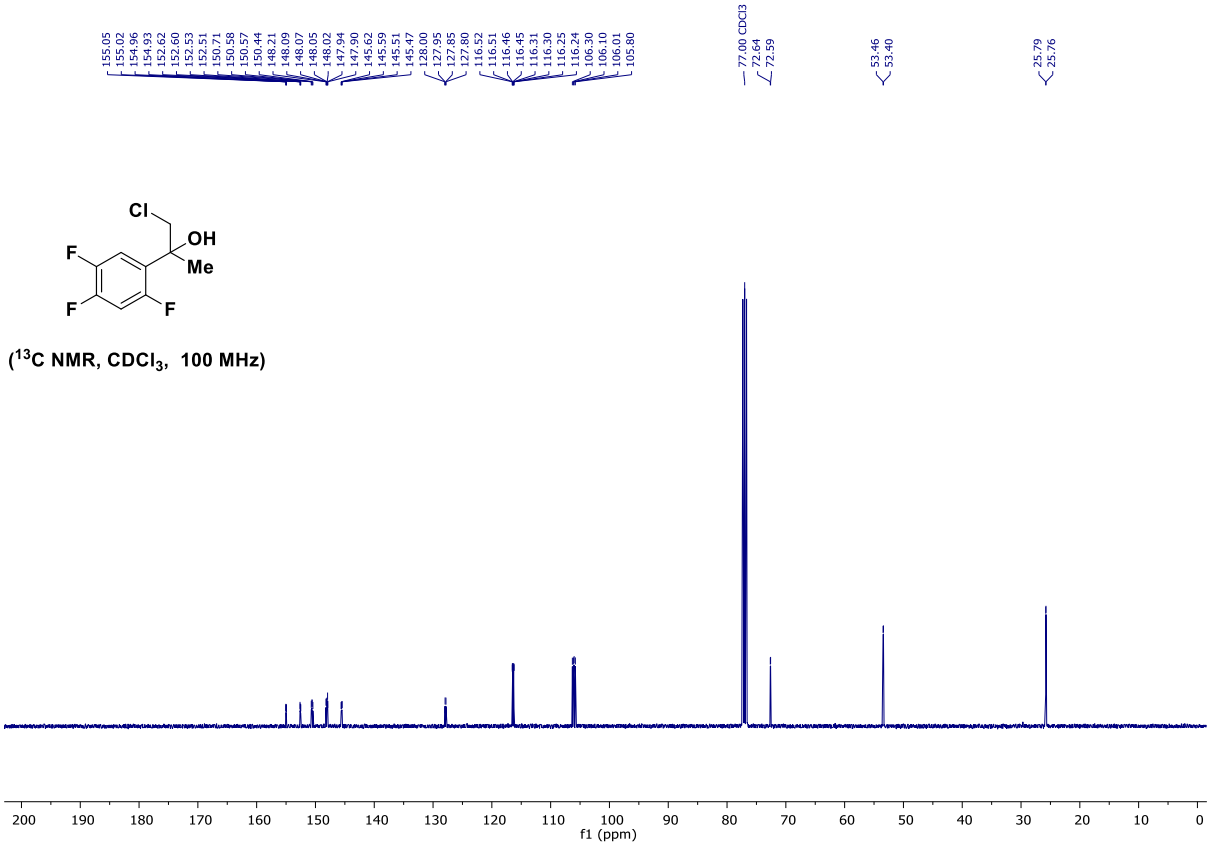


(^{13}C NMR, $CDCl_3$, 100 MHz)

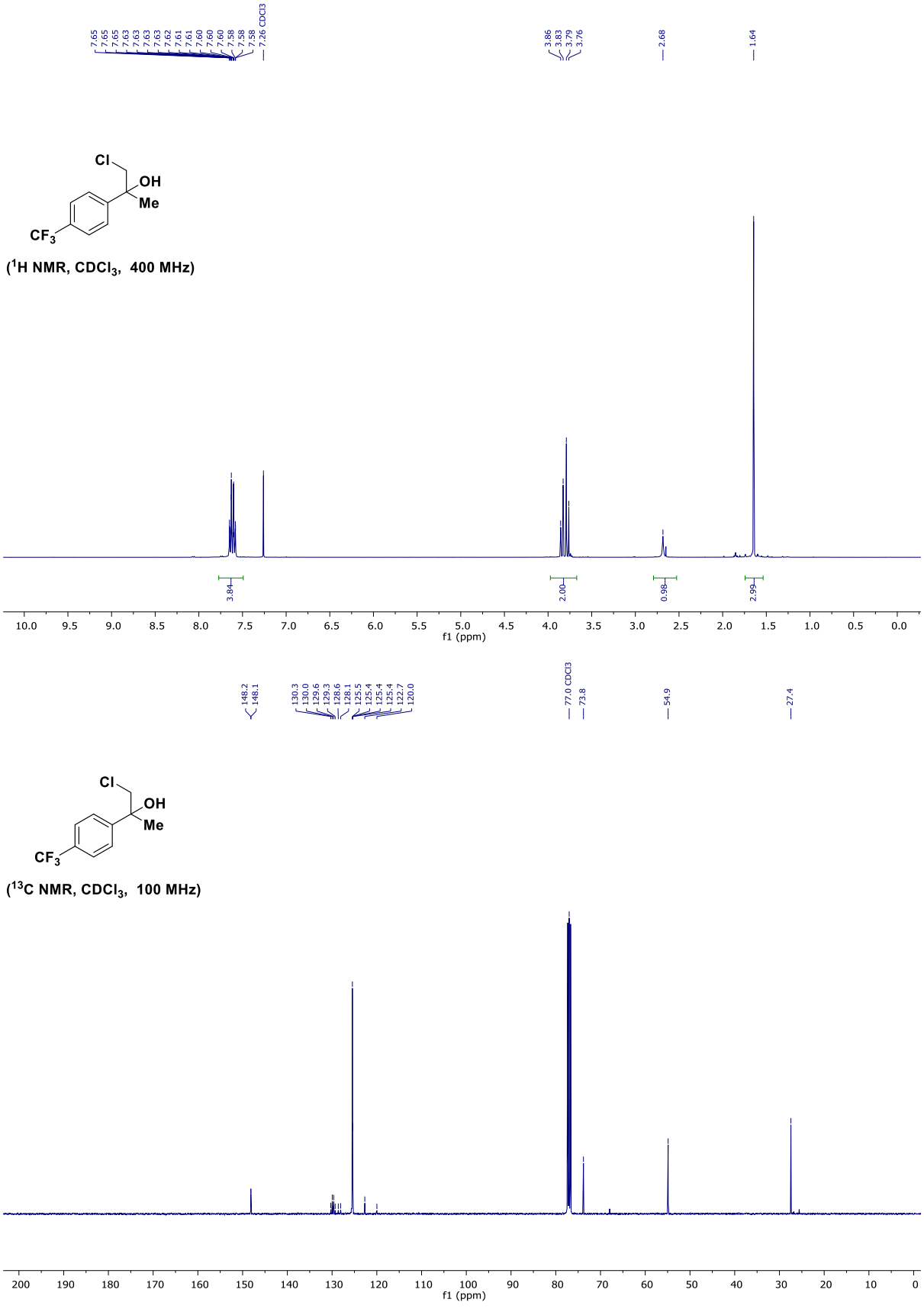


1-Chloro-2-(2,4,5-trifluorophenyl)-2-propanol (12)

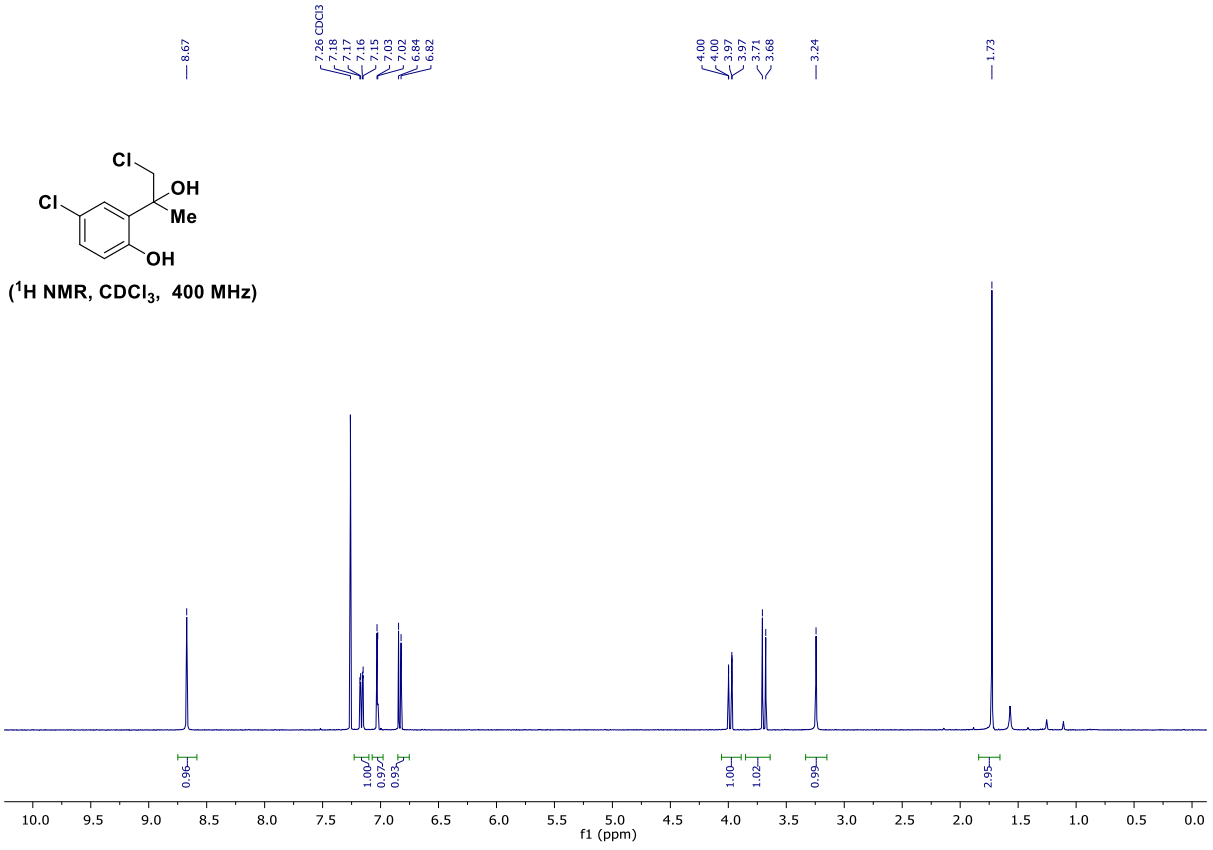




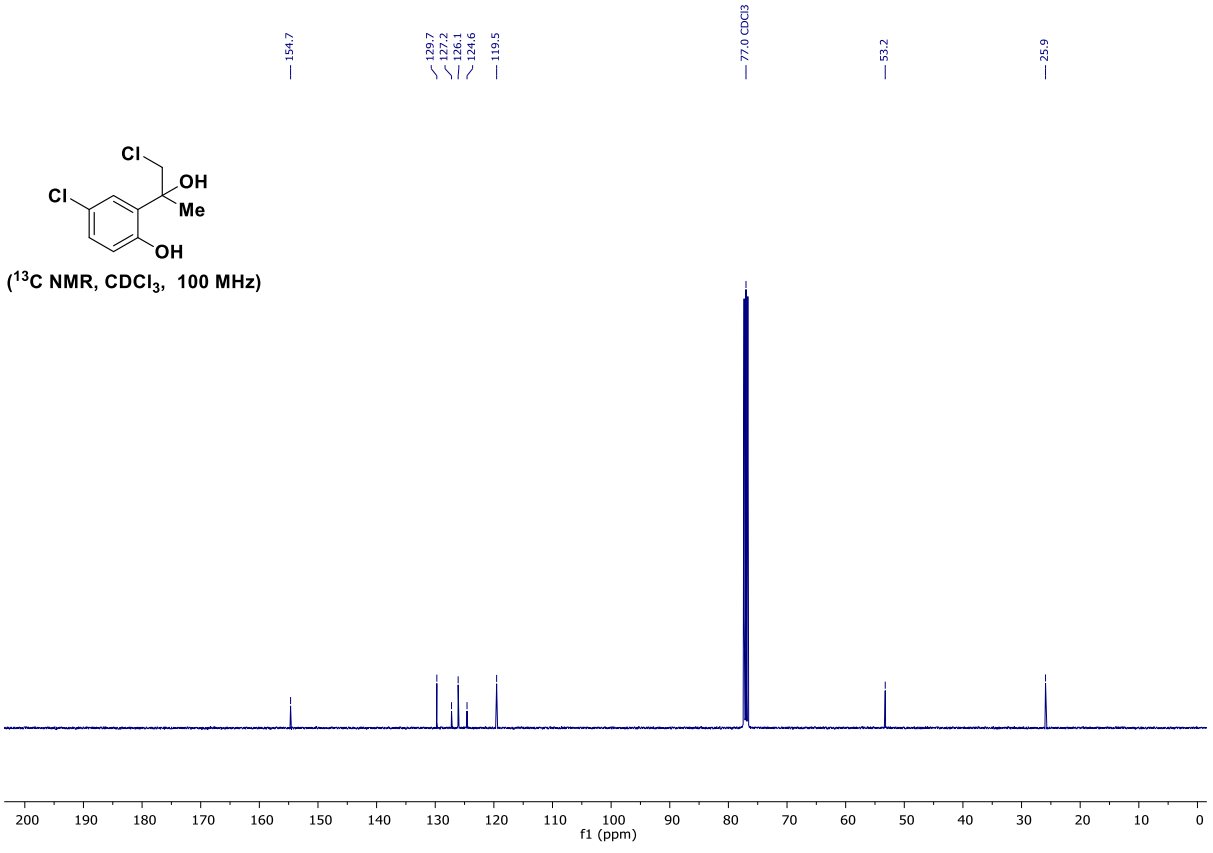
1-Chloro-2-[4-(trifluoromethyl)phenyl]-2-propanol (13)



4-Chloro-2-(1-chloro-2-hydroxy-2-propanyl)phenol (14)

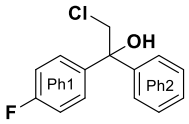


(^{1}H NMR, $CDCl_3$, 400 MHz)

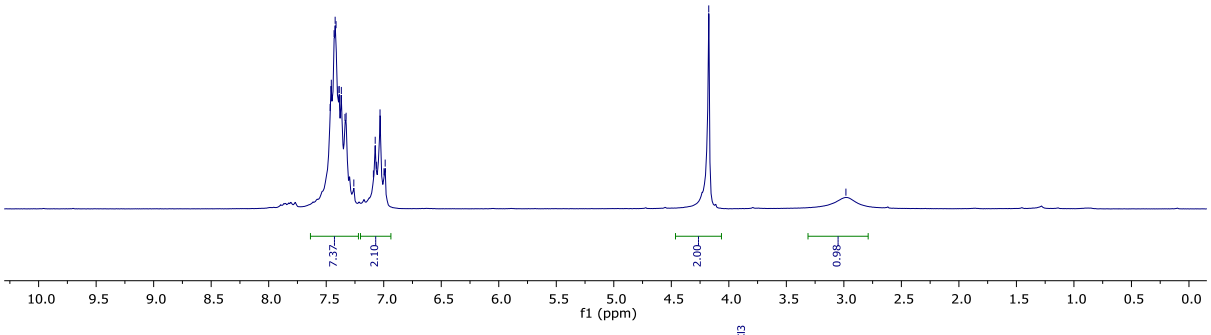


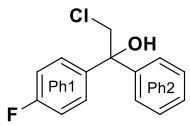
(^{13}C NMR, $CDCl_3$, 100 MHz)

2-Chloro-1-(4-fluorophenyl)-1-phenylethanol (15)



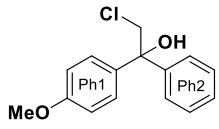
(^{1}H NMR, $CDCl_3$, 200 MHz)



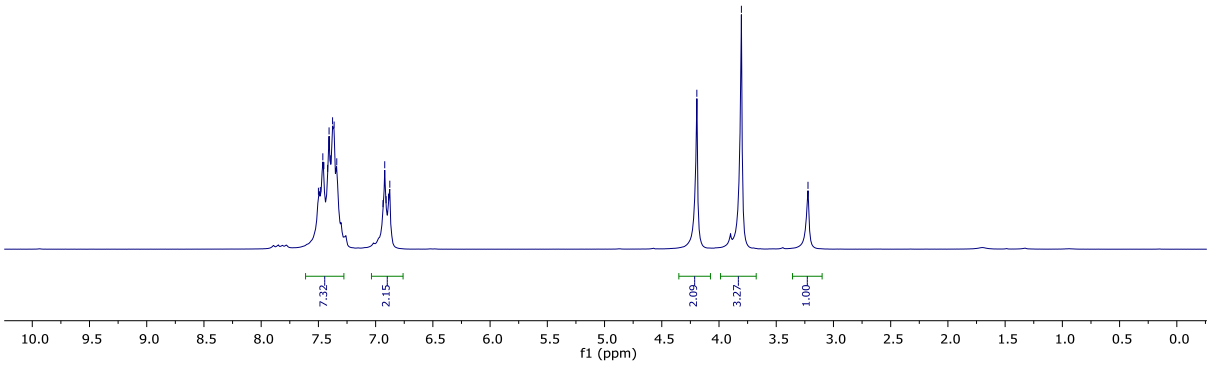


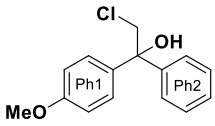
(^{13}C NMR, $CDCl_3$, 50 MHz)

2-Chloro-1-(4-methoxyphenyl)-1-phenylethan-1-ol (16)

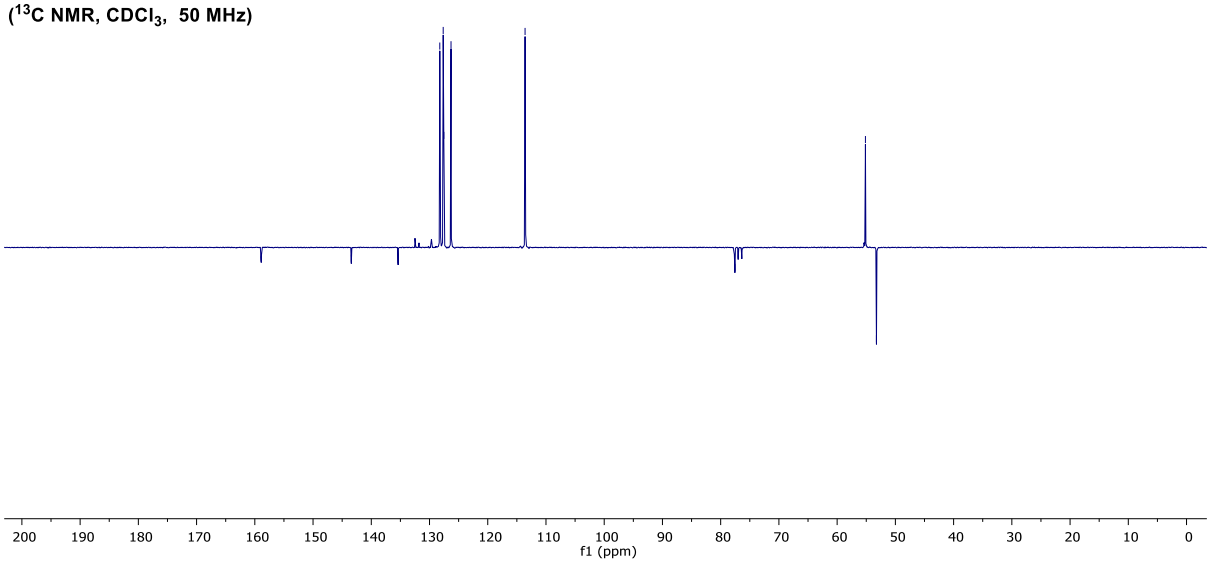


(^{1}H NMR, $CDCl_3$, 200 MHz)

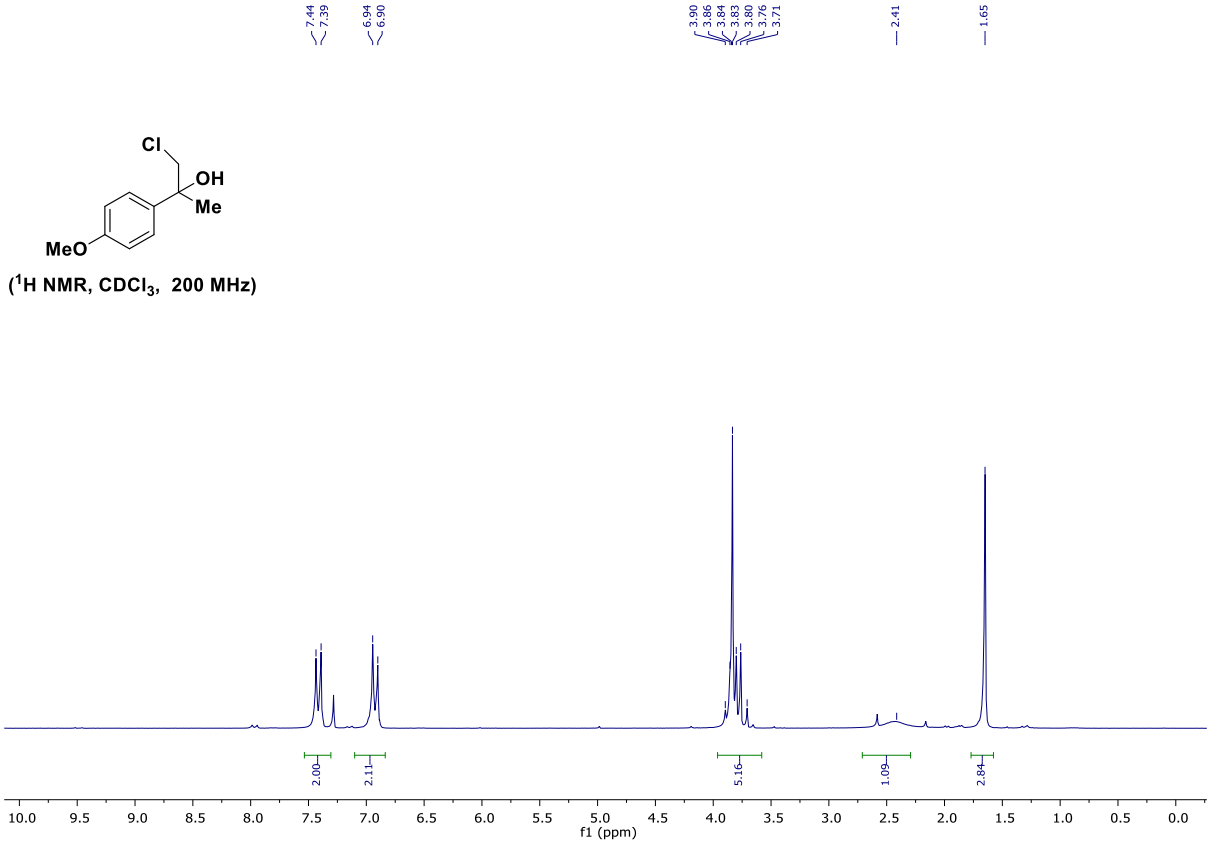




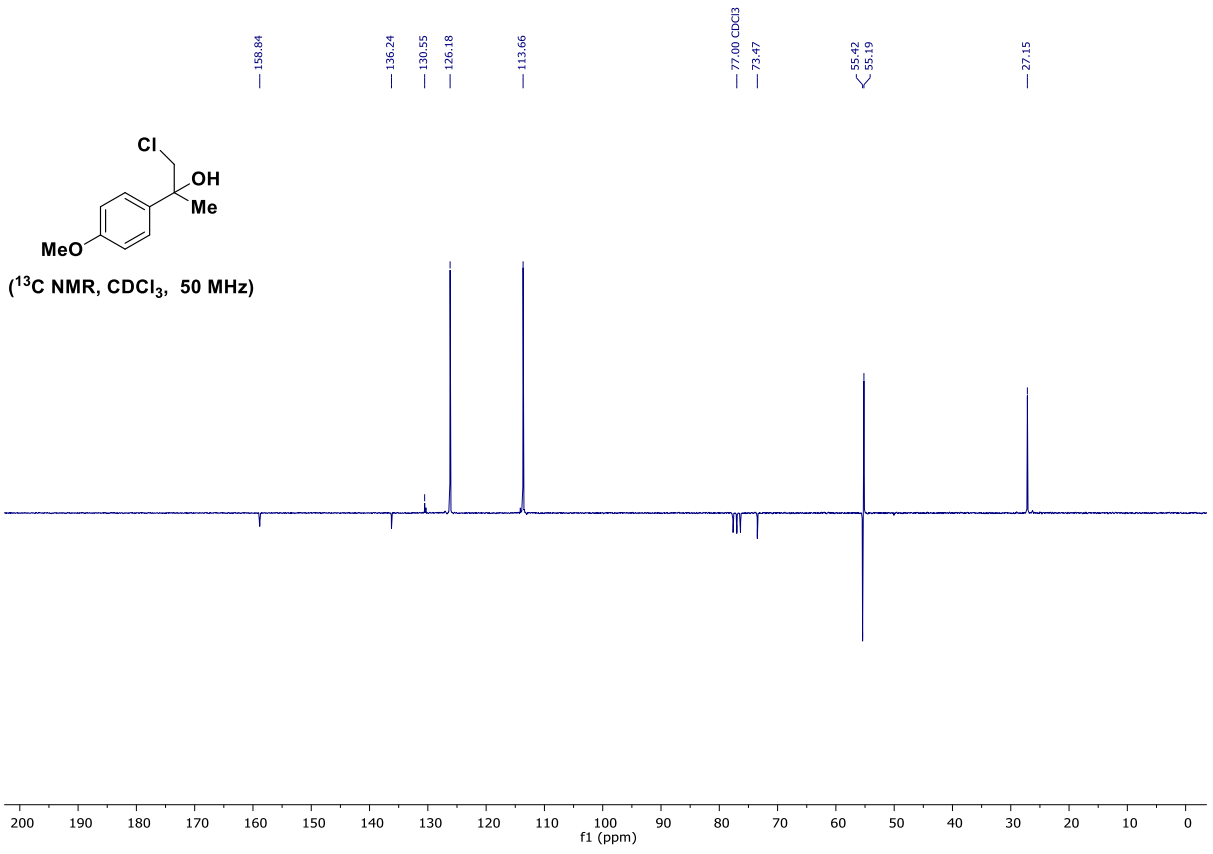
(^{13}C NMR, $CDCl_3$, 50 MHz)



1-Chloro-2-(4-methoxyphenyl)propan-2-ol (17)

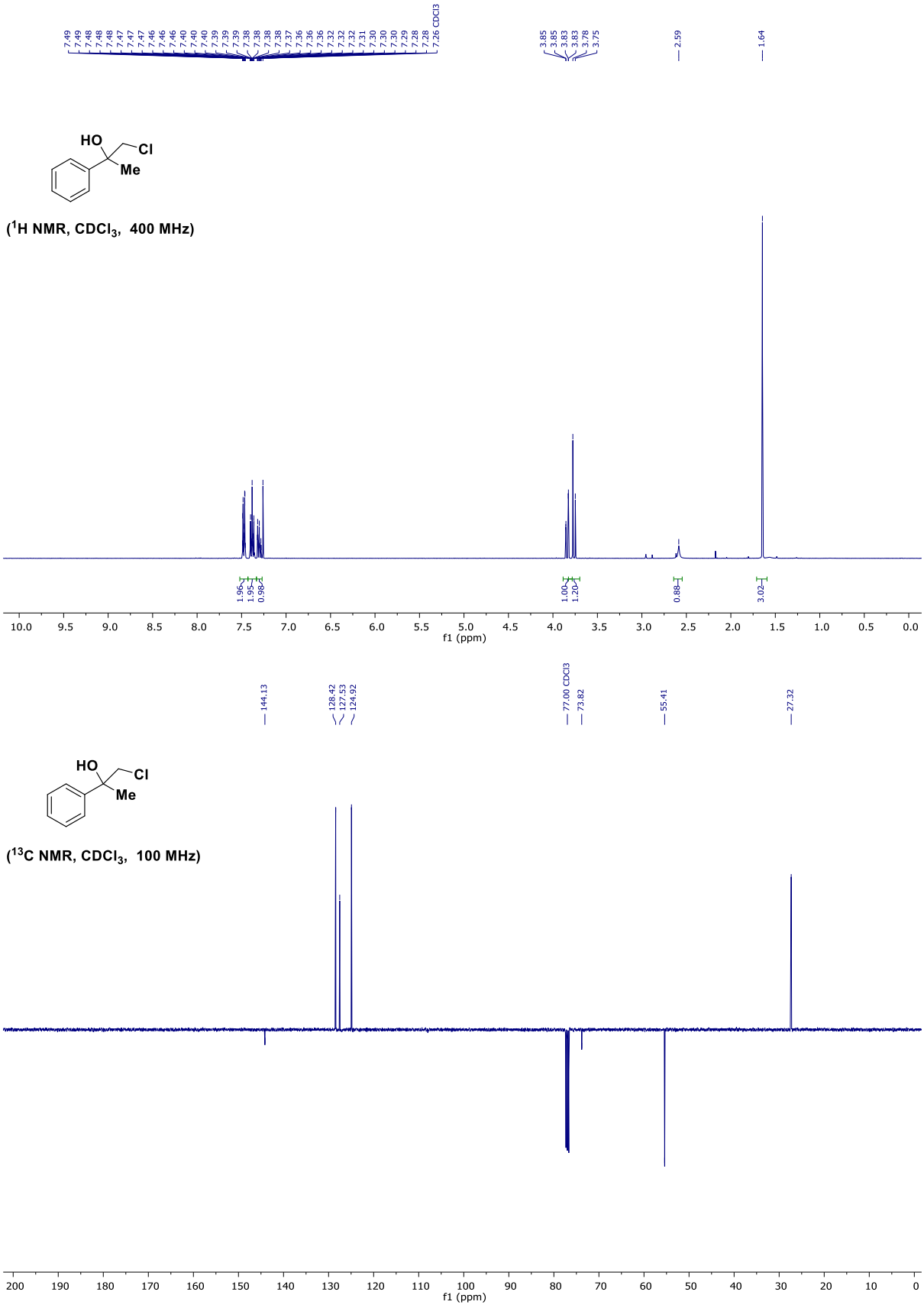


(^{1}H NMR, $CDCl_3$, 200 MHz)

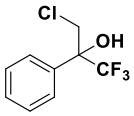


(^{13}C NMR, $CDCl_3$, 50 MHz)

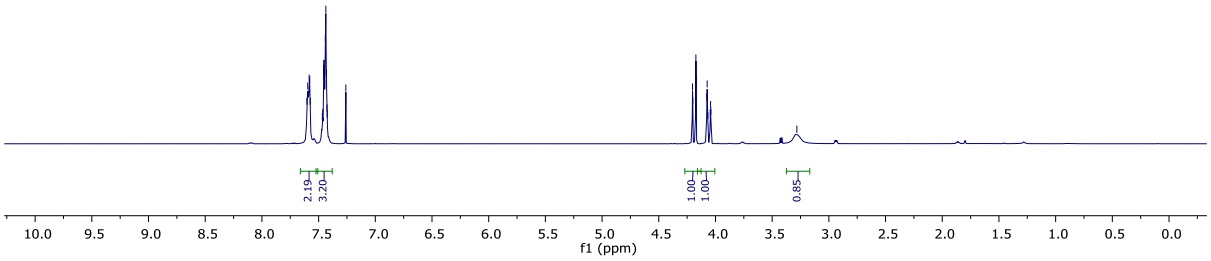
1-Chloro-2-phenyl-2-propanol (18)

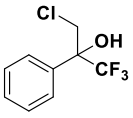


3-Chloro-1,1,1-trifluoro-2-phenyl-2-propanol (19)

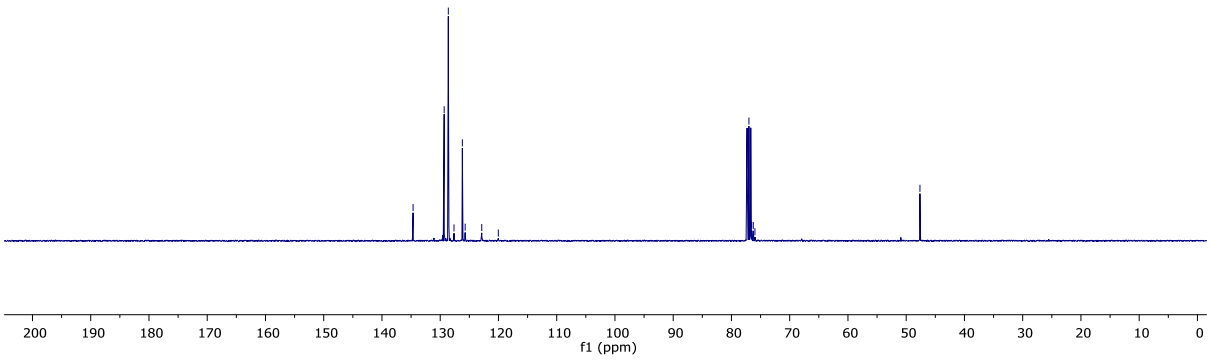


(¹H NMR, $CDCl_3$, 400 MHz)

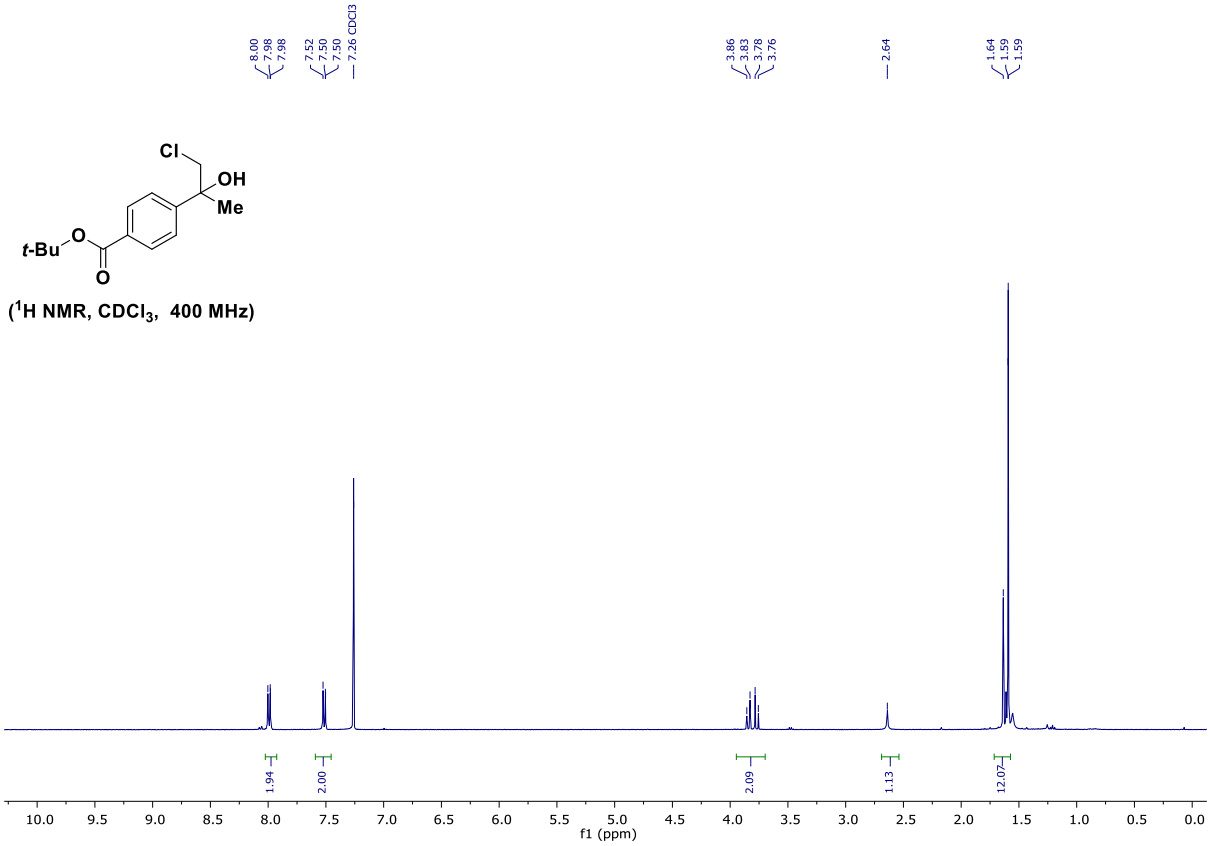




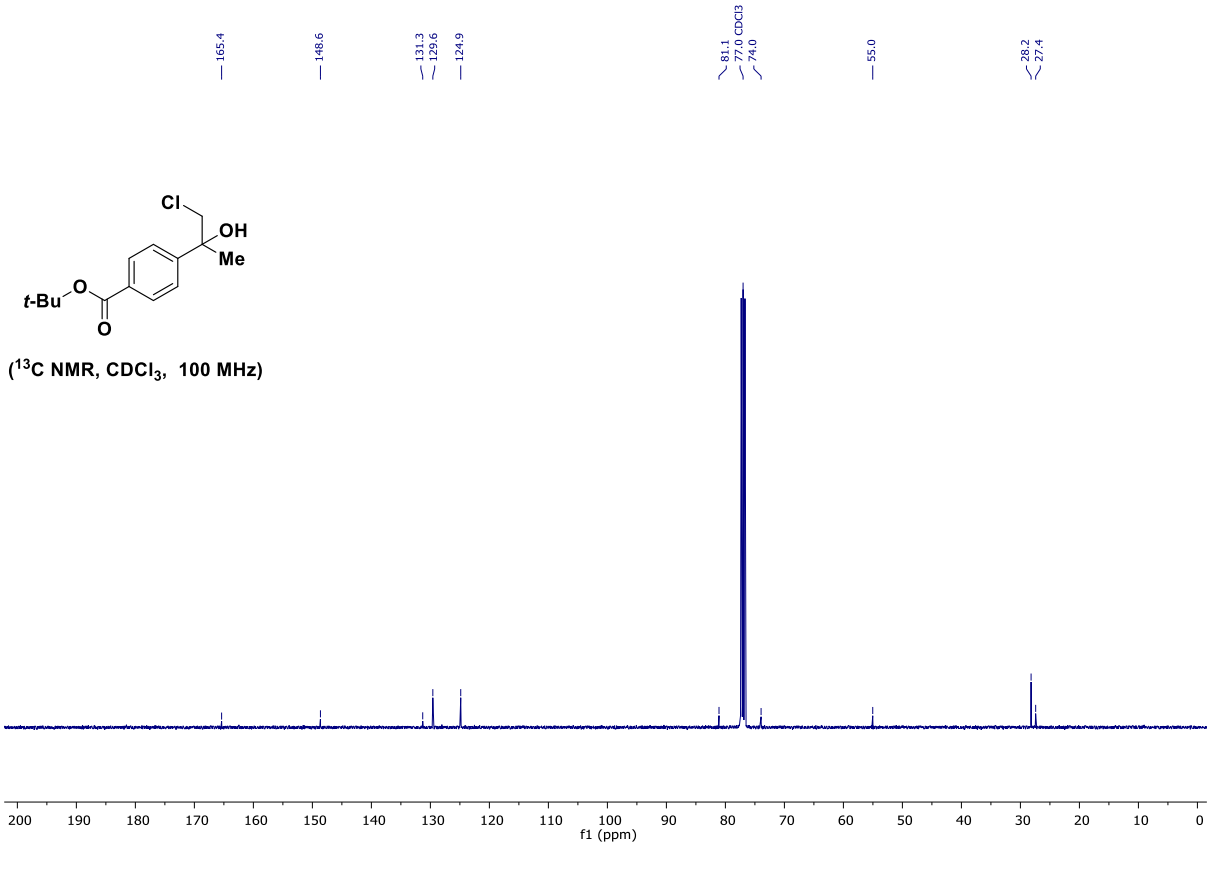
(¹³C NMR, $CDCl_3$, 100 MHz)



2-Methyl-2-propanyl 4-(1-chloro-2-hydroxy-2-propanyl)benzoate (20)

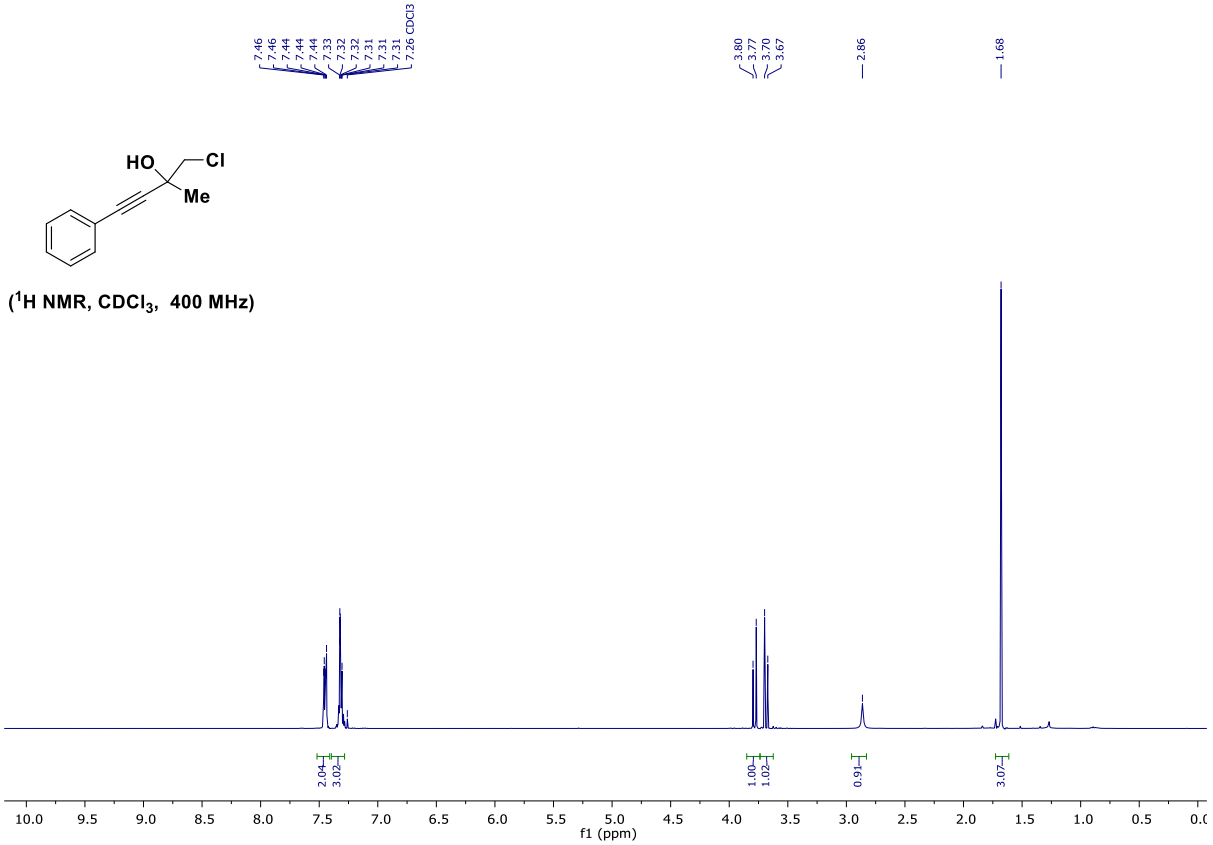


(^{1}H NMR, $CDCl_3$, 400 MHz)

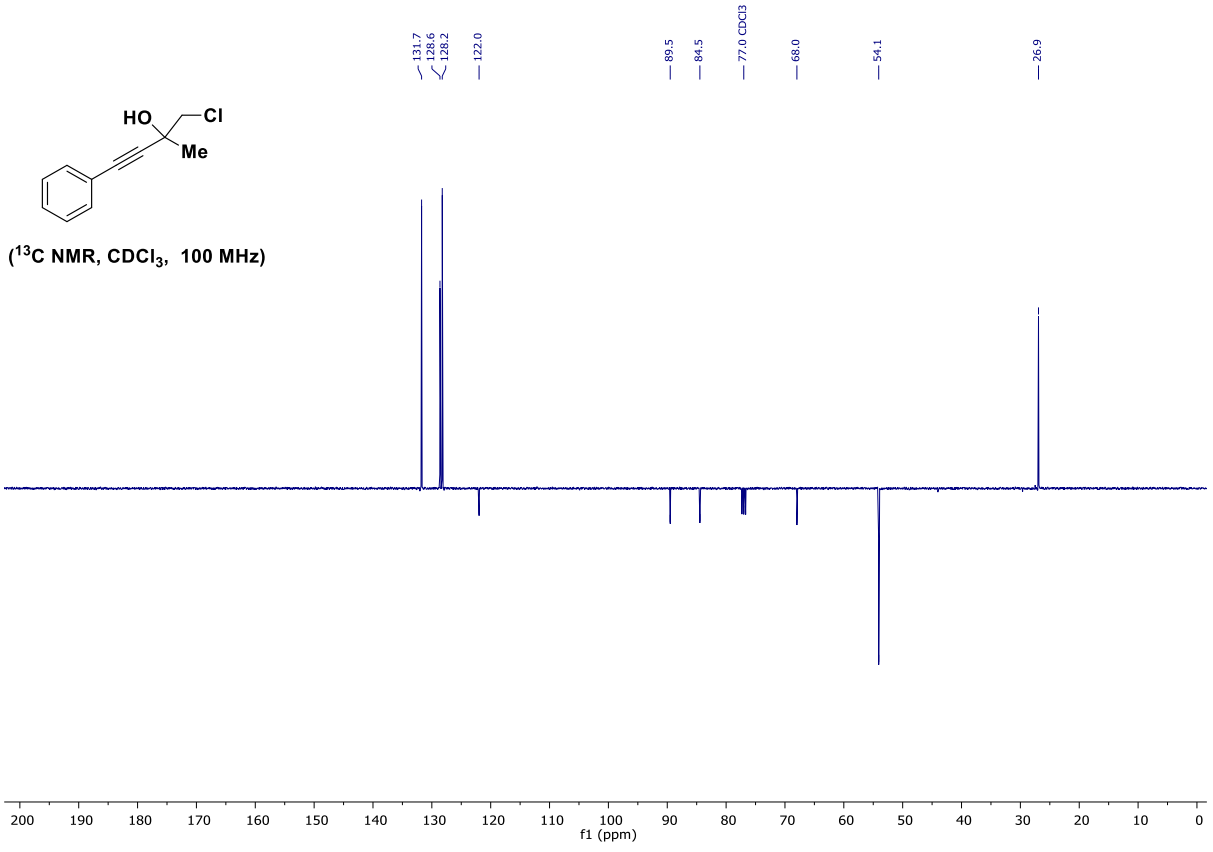


(^{13}C NMR, $CDCl_3$, 100 MHz)

1-Chloro-2-methyl-4-phenyl-3-butyn-2-ol (21)

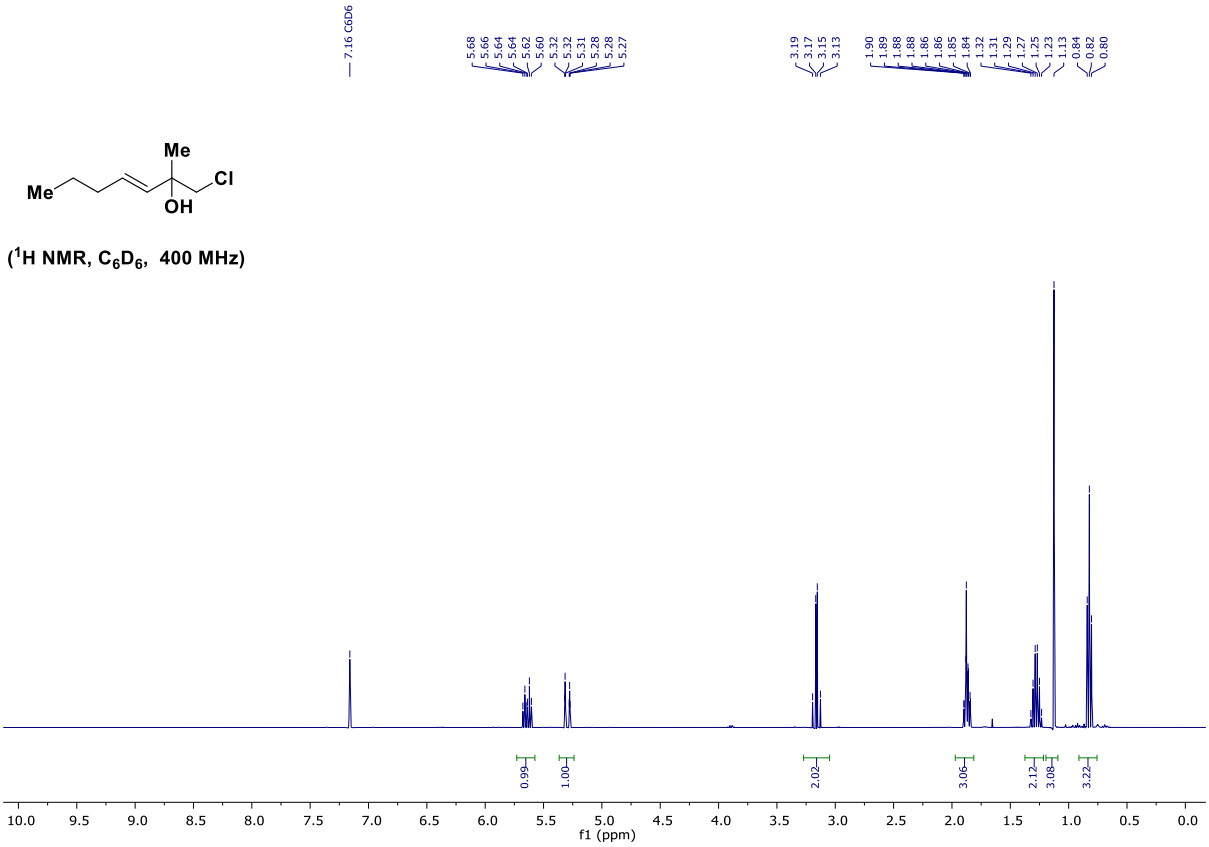


(^{1}H NMR, $CDCl_3$, 400 MHz)

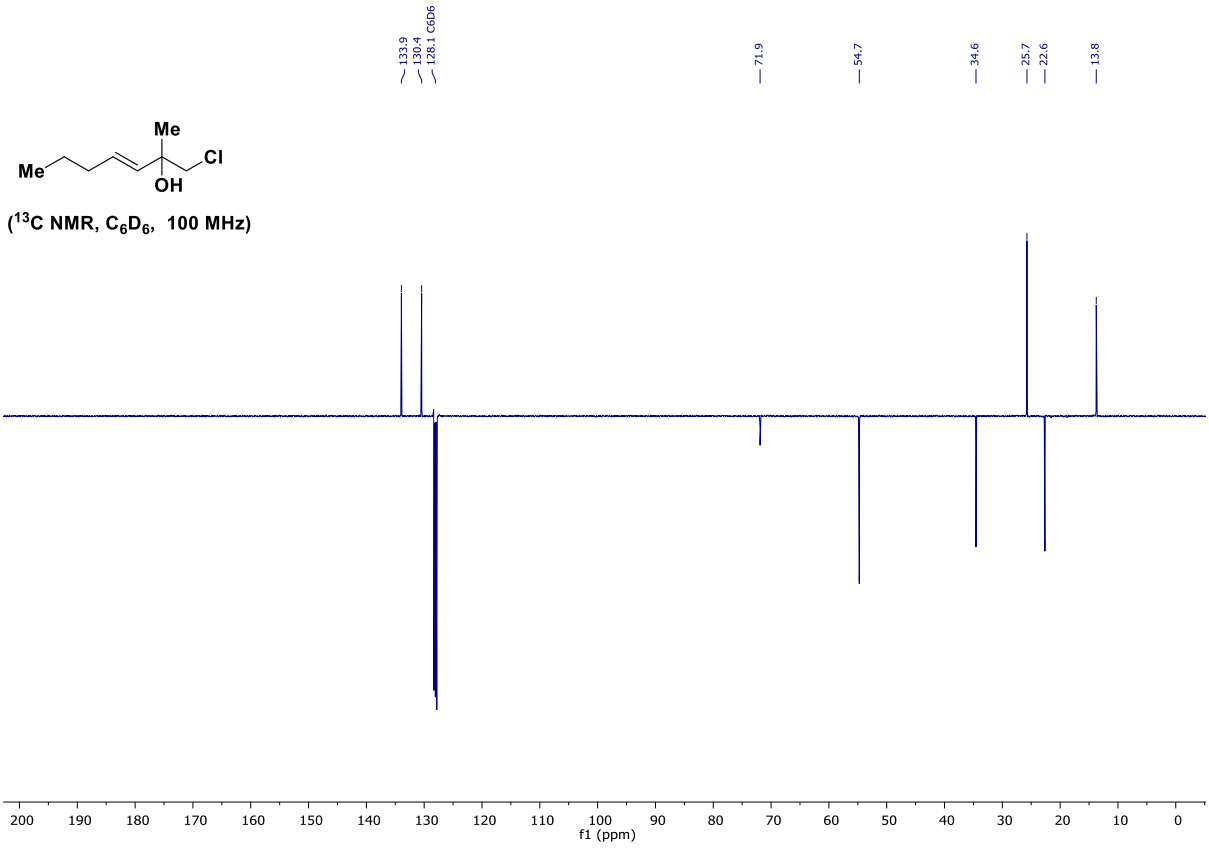


(^{13}C NMR, $CDCl_3$, 100 MHz)

(3*E*)-1-Chloro-2-methyl-3-hepten-2-ol (22)



(^{1}H NMR, C_6D_6, 400 MHz)



(^{13}C NMR, C_6D_6, 100 MHz)