Electronic Supplementary Material (ESI) for Organic & Biomolecular Chemistry.

Electronic Supplementary Information

Enantioselective Synthesis of α-Phenyl- and α-(Dimethylphenylsilyl)-alkylboronic Esters by Ligand Mediated Stereoinductive Reagent-Controlled Homologation Using Configurationally Labile Carbenoids

2. ^{1}H & ^{13}C NMR Spectra

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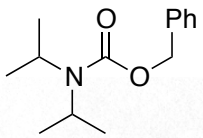
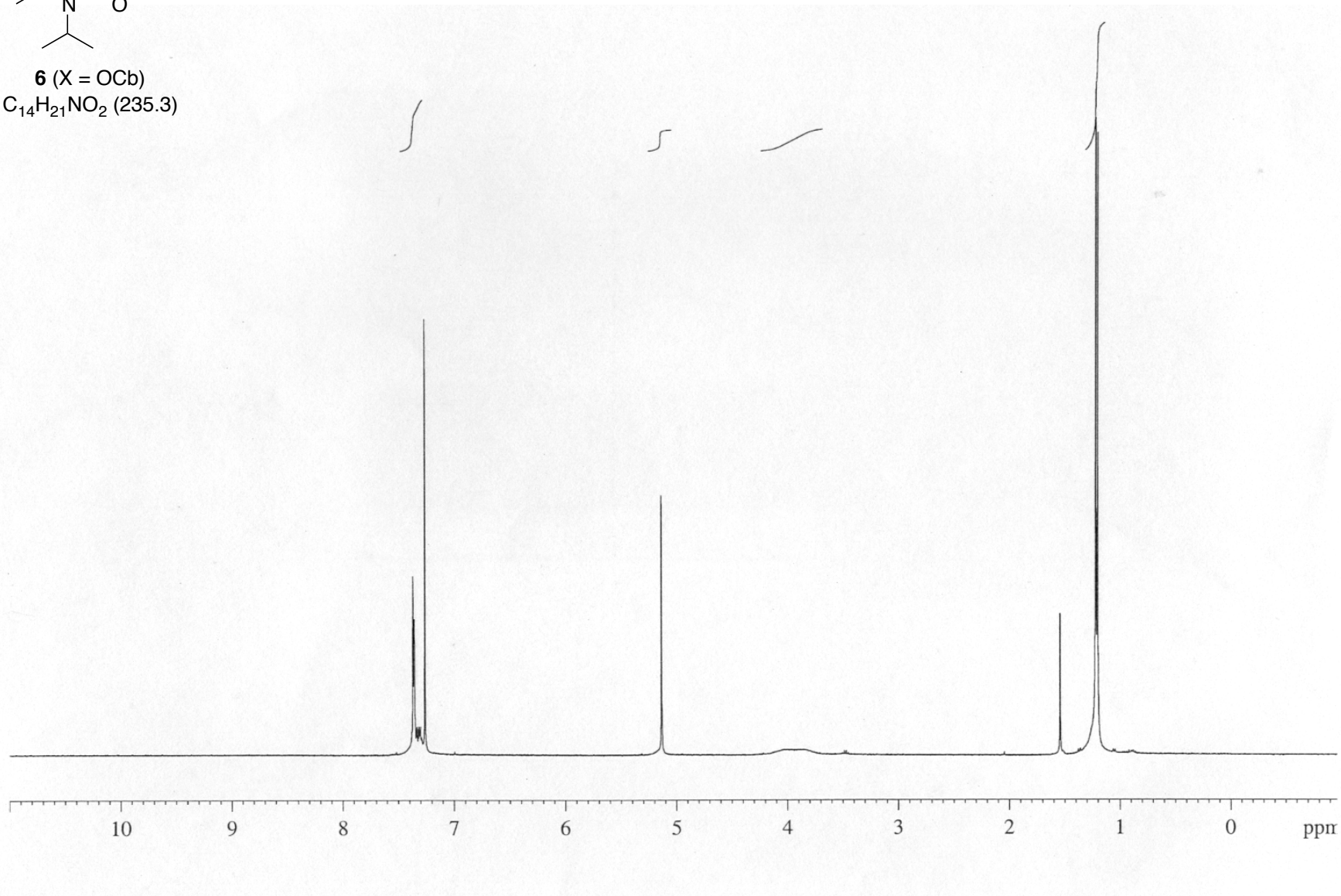
^{1}H and ^{13}C NMR spectra were recorded in Fourier transform mode at the field strength specified using standard 5 mm diameter tubes. Chemical shift in ppm is quoted relative to residual solvent signals calibrated as follows:

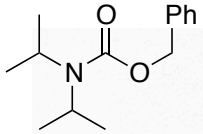
$CDCl_3$ δ_H ($CHCl_3$) = 7.26 ppm, δ_C ($CDCl_3$) = 77.2 ppm; d_6-DMSO δ_H (CHD_2SOCD_3) = 2.50 ppm, δ_C [$(CD_3)_2SO$] = 39.50 ppm



6 (X = OCb)
$C_{14}H_{21}NO_2$ (235.3)

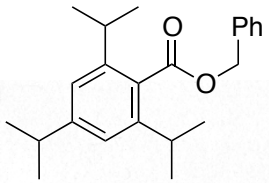
^{1}H NMR: 400 MHz, $CDCl_3$





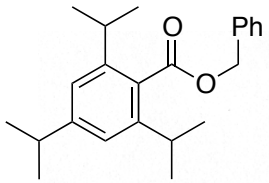
6 (X = OCb)
$C_{14}H_{21}NO_2$ (235.3)

^{13}C NMR: 100 MHz, $CDCl_3$



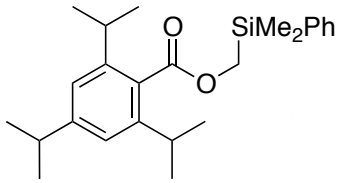
6 (X = OTIB)
$C_{23}H_{30}O_2$ (338.5)

^{1}H NMR: 400 MHz, $CDCl_3$



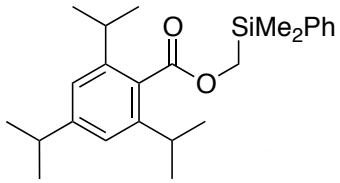
6 (X = OTIB)
$C_{23}H_{30}O_2$ (338.5)

^{13}C NMR: 100 MHz, $CDCl_3$



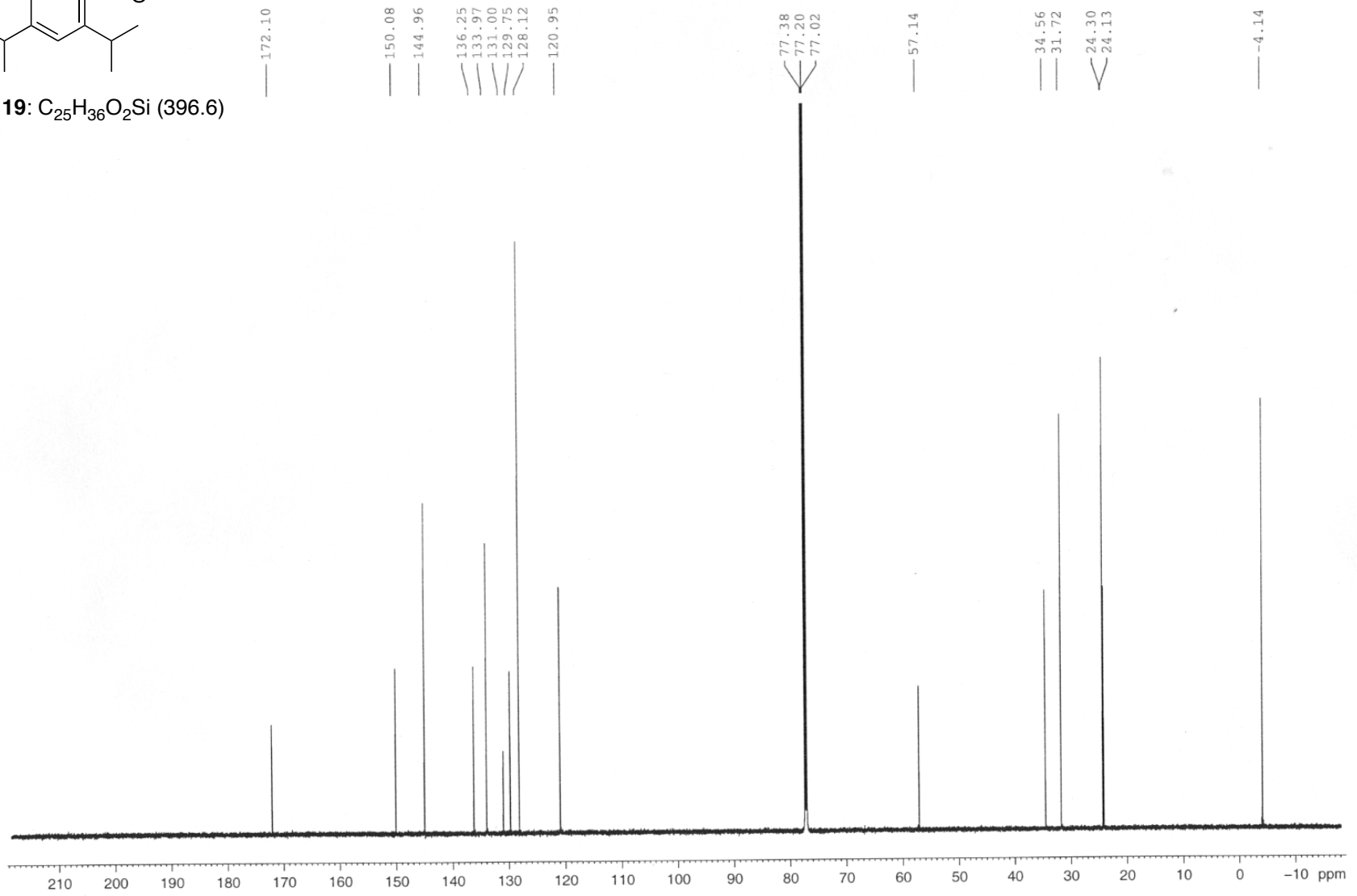
19: $C_{25}H_{36}O_2Si$ (396.6)

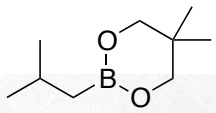
^1H NMR: 400 MHz, $CDCl_3$



19: $C_{25}H_{36}O_2Si$ (396.6)

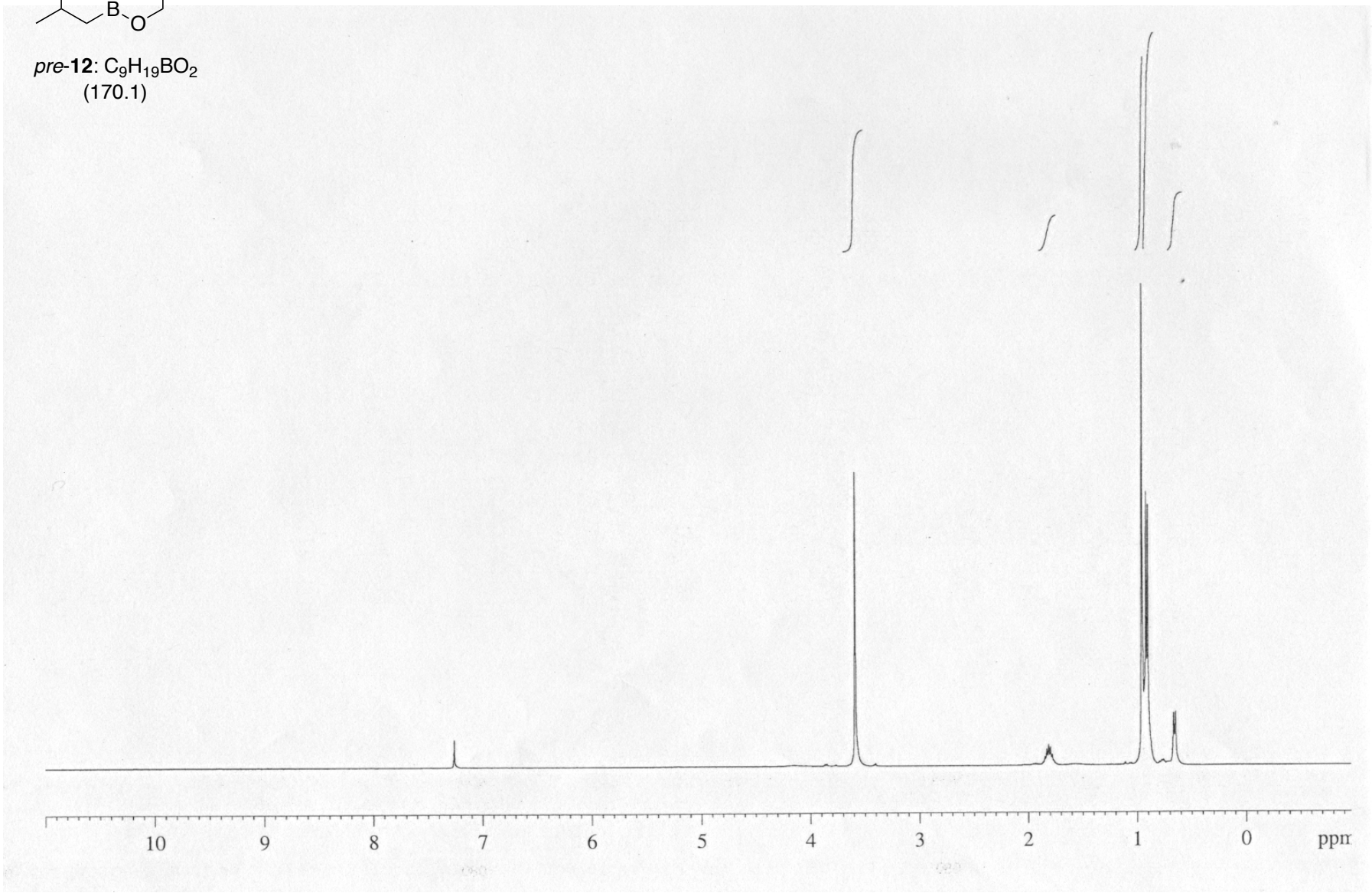
^{13}C NMR: 100 MHz, $CDCl_3$

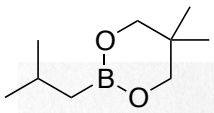




pre-**12**: $C_9H_{19}BO_2$
(170.1)

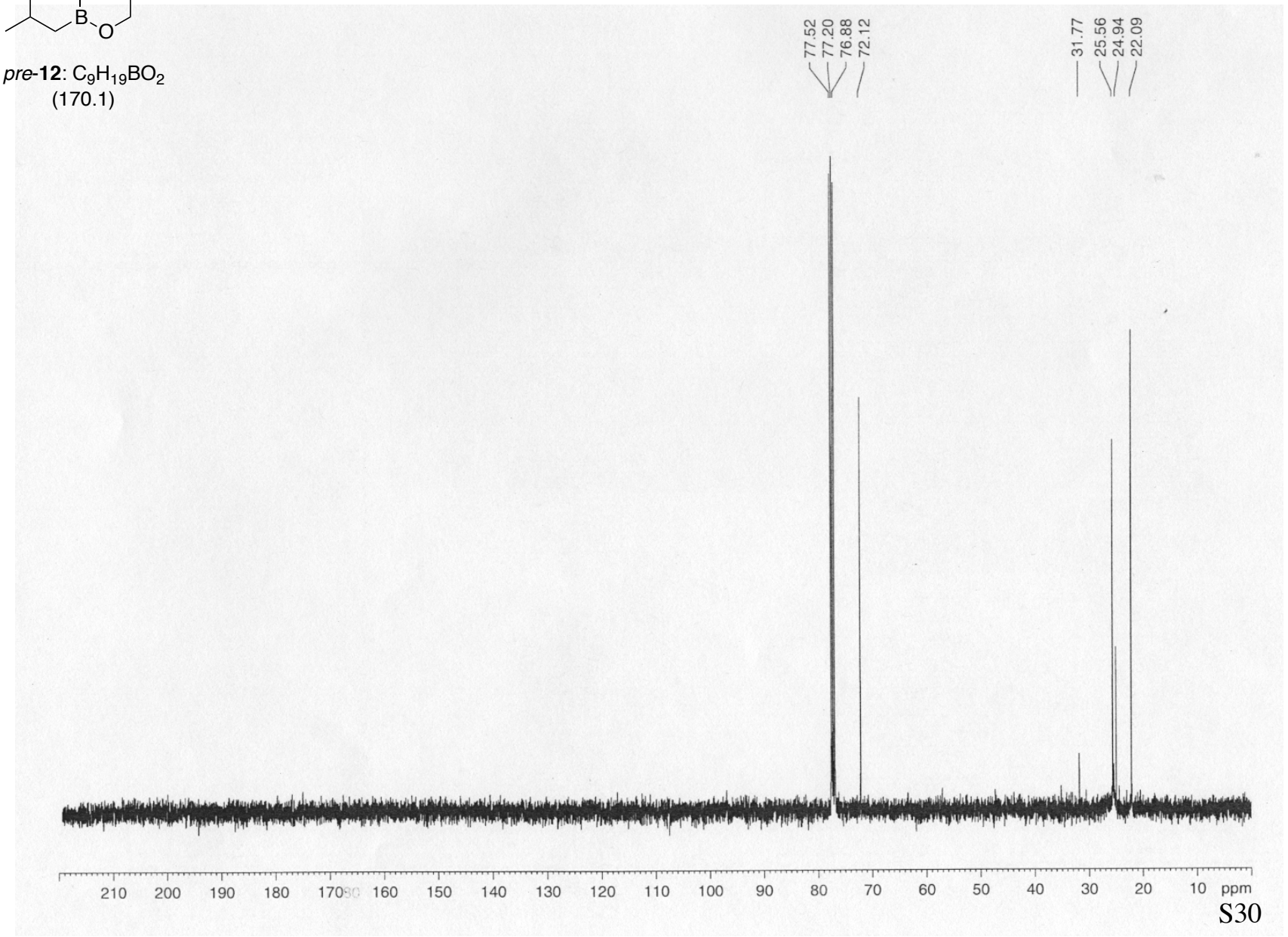
^{1}H NMR: 400 MHz, $CDCl_3$

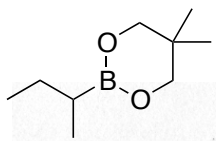




pre-**12**: $C_9H_{19}BO_2$
(170.1)

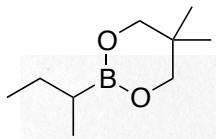
^{13}C NMR: 100 MHz, $CDCl_3$





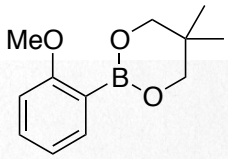
pre-**14**: $C_9H_{19}BO_2$
(170.1)

^{1}H NMR: 400 MHz, $CDCl_3$



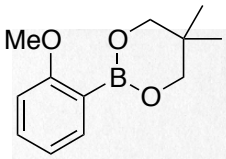
pre-**14**: $C_9H_{19}BO_2$
(170.1)

^{13}C NMR: 100 MHz, $CDCl_3$



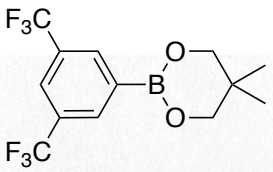
pre-**15**: $C_{12}H_{17}BO_3$
(220.1)

^{1}H NMR: 400 MHz, $CDCl_3$



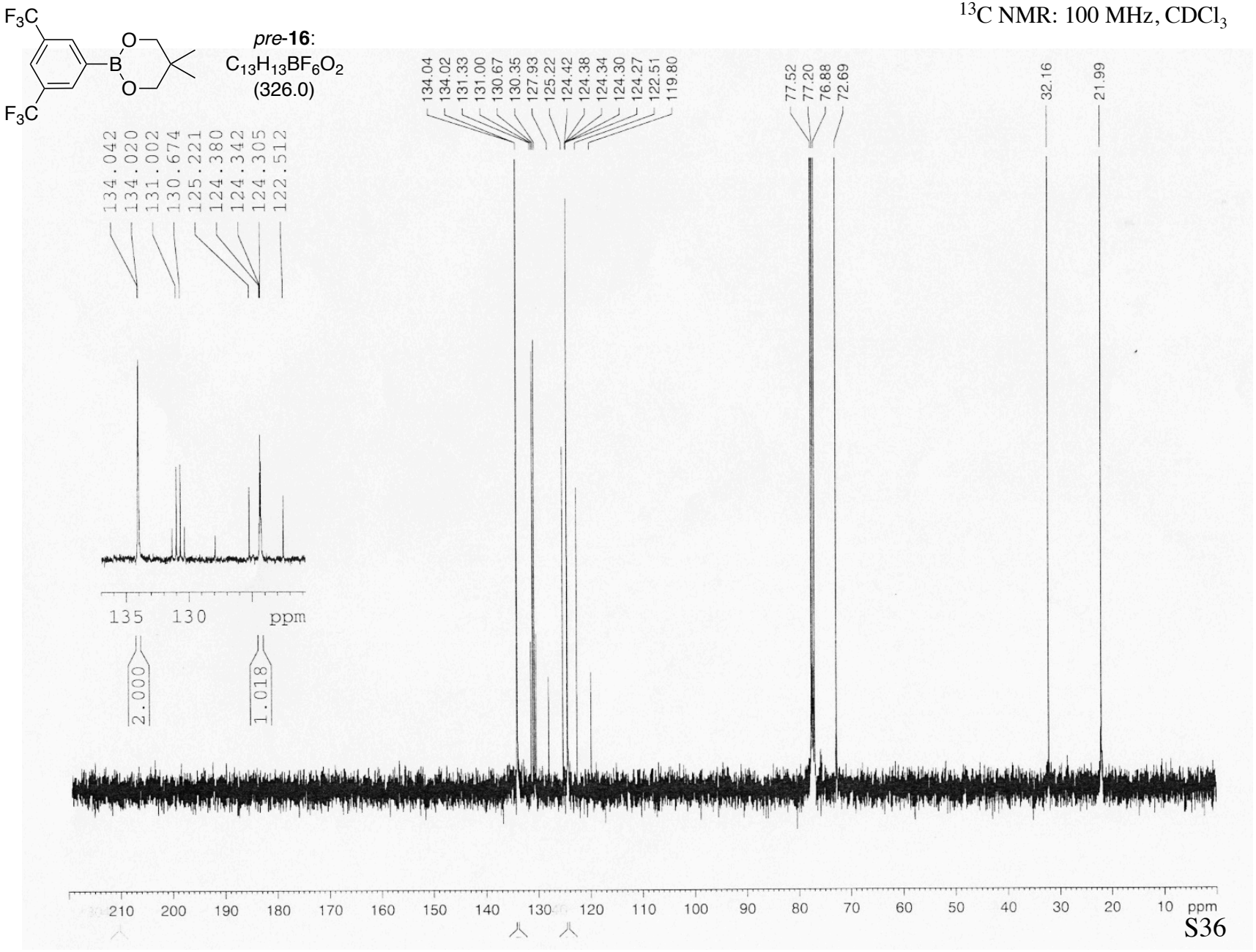
pre-**15**: $C_{12}H_{17}BO_3$
(220.1)

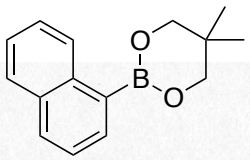
^{13}C NMR: 100 MHz, $CDCl_3$



pre-**16**: $C_{13}H_{13}BF_6O_2$
(326.0)

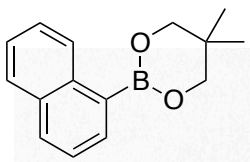
^{1}H NMR: 400 MHz, $CDCl_3$


F3C
F3C
O
B
O
pre-16:
C13H13BF6O2
(326.0)
13C NMR: 100 MHz, CDCl3
134.042
134.020
131.002
130.674
125.221
124.380
124.342
124.305
122.512
135
130
ppm
2.000
1.018
134.04
134.02
131.33
131.00
130.67
130.35
127.93
125.22
124.42
124.38
124.34
124.30
124.27
122.51
119.80
77.52
77.20
76.88
72.69
32.16
21.99
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm



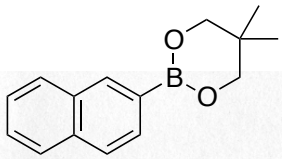
pre-**17**: $C_{15}H_{17}BO_2$
(240.1)

^{1}H NMR: 400 MHz, $CDCl_3$



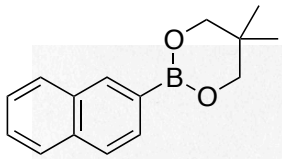
pre-**17**: $C_{15}H_{17}BO_2$
(240.1)

^{13}C NMR: 100 MHz, $CDCl_3$



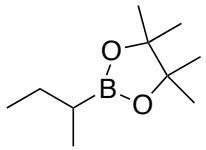
pre-**18**: $C_{15}H_{17}BO_2$
(240.1)

^{1}H NMR: 400 MHz, $CDCl_3$



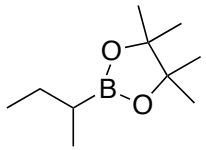
pre-**18**: $C_{15}H_{17}BO_2$
(240.1)

^{13}C NMR: 100 MHz, $CDCl_3$



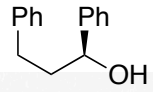
pre-**24**: $C_{10}H_{21}BO_2$
(184.1)

^{1}H NMR: 400 MHz, $CDCl_3$



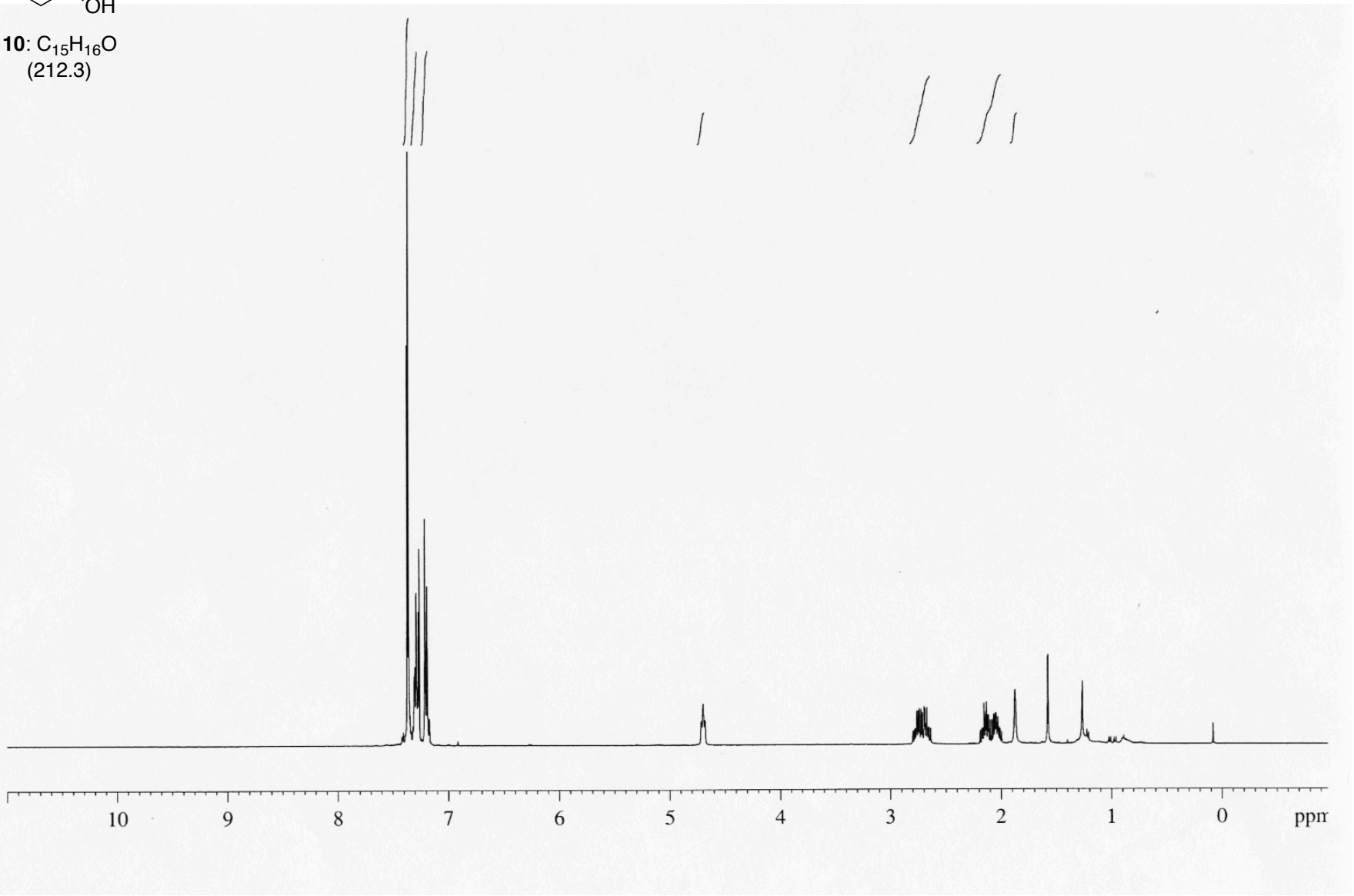
pre-**24**: $C_{10}H_{21}BO_2$
(184.1)

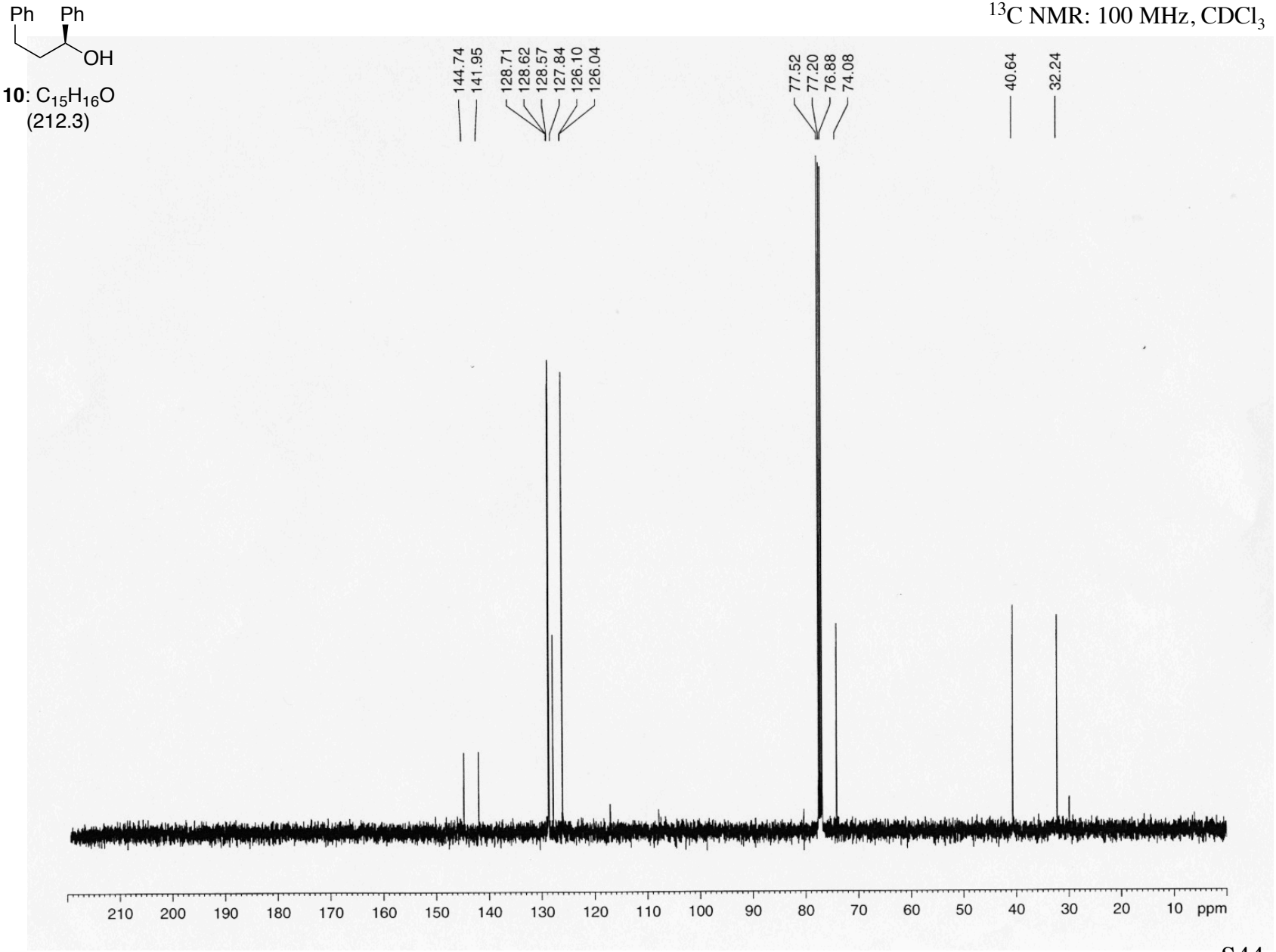
^{13}C NMR: 175 MHz, $CDCl_3$

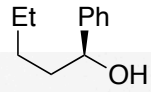


10: $C_{15}H_{16}O$
(212.3)

^{1}H NMR: 400 MHz, $CDCl_3$

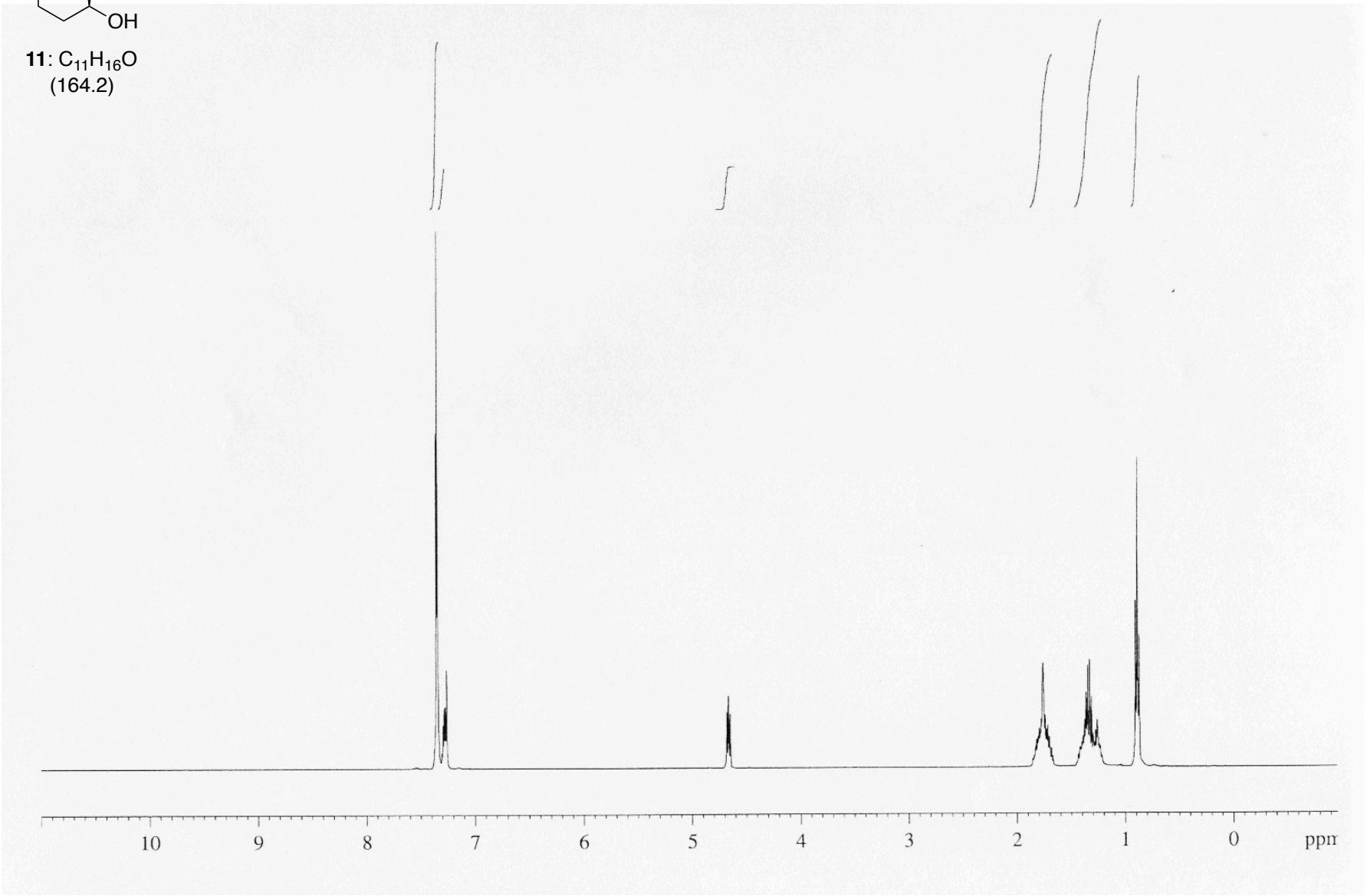


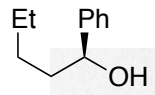

Ph
Ph
OH
10: C15H16O
(212.3)
13C NMR: 100 MHz, CDCl3
144.74
141.95
128.71
128.62
128.57
127.84
126.10
126.04
77.52
77.20
76.88
74.08
40.64
32.24
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm



11: $C_{11}H_{16}O$
(164.2)

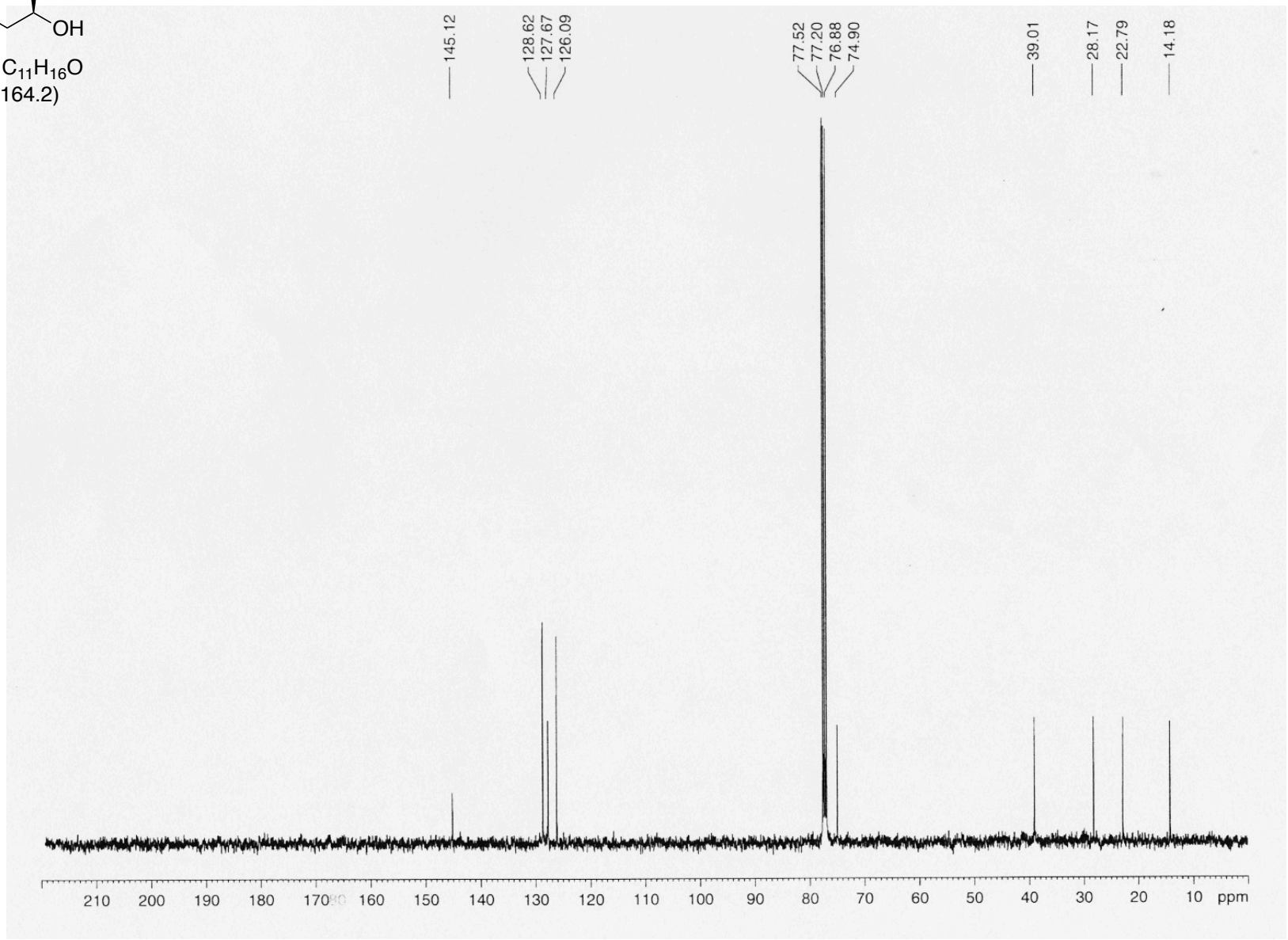
^{1}H NMR: 400 MHz, $CDCl_3$

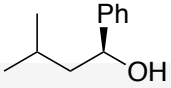




11: $C_{11}H_{16}O$
(164.2)

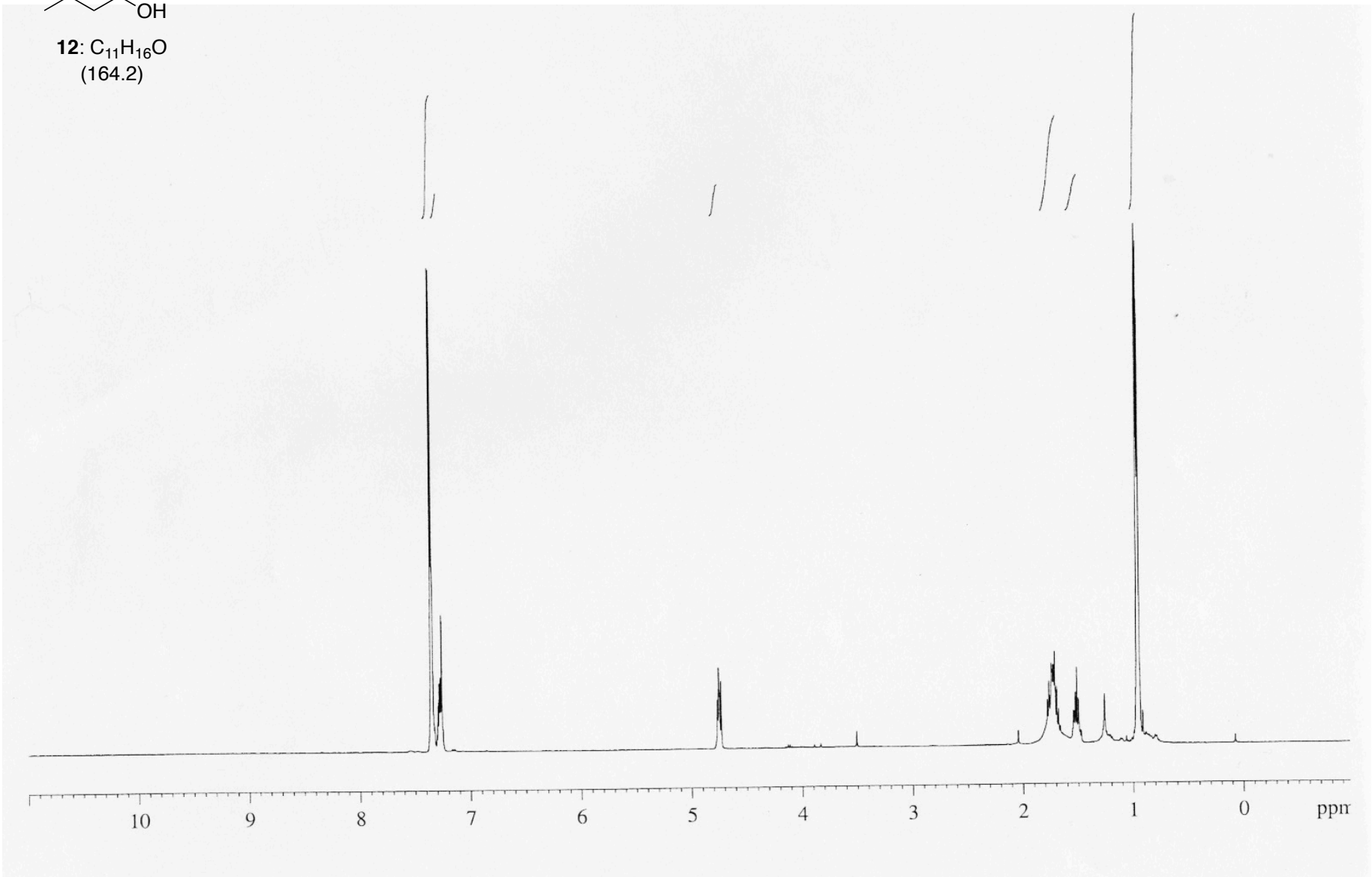
^{13}C NMR: 100 MHz, $CDCl_3$

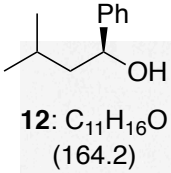




12: $C_{11}H_{16}O$
(164.2)

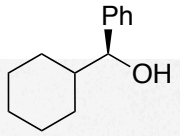
^{1}H NMR: 400 MHz, $CDCl_3$





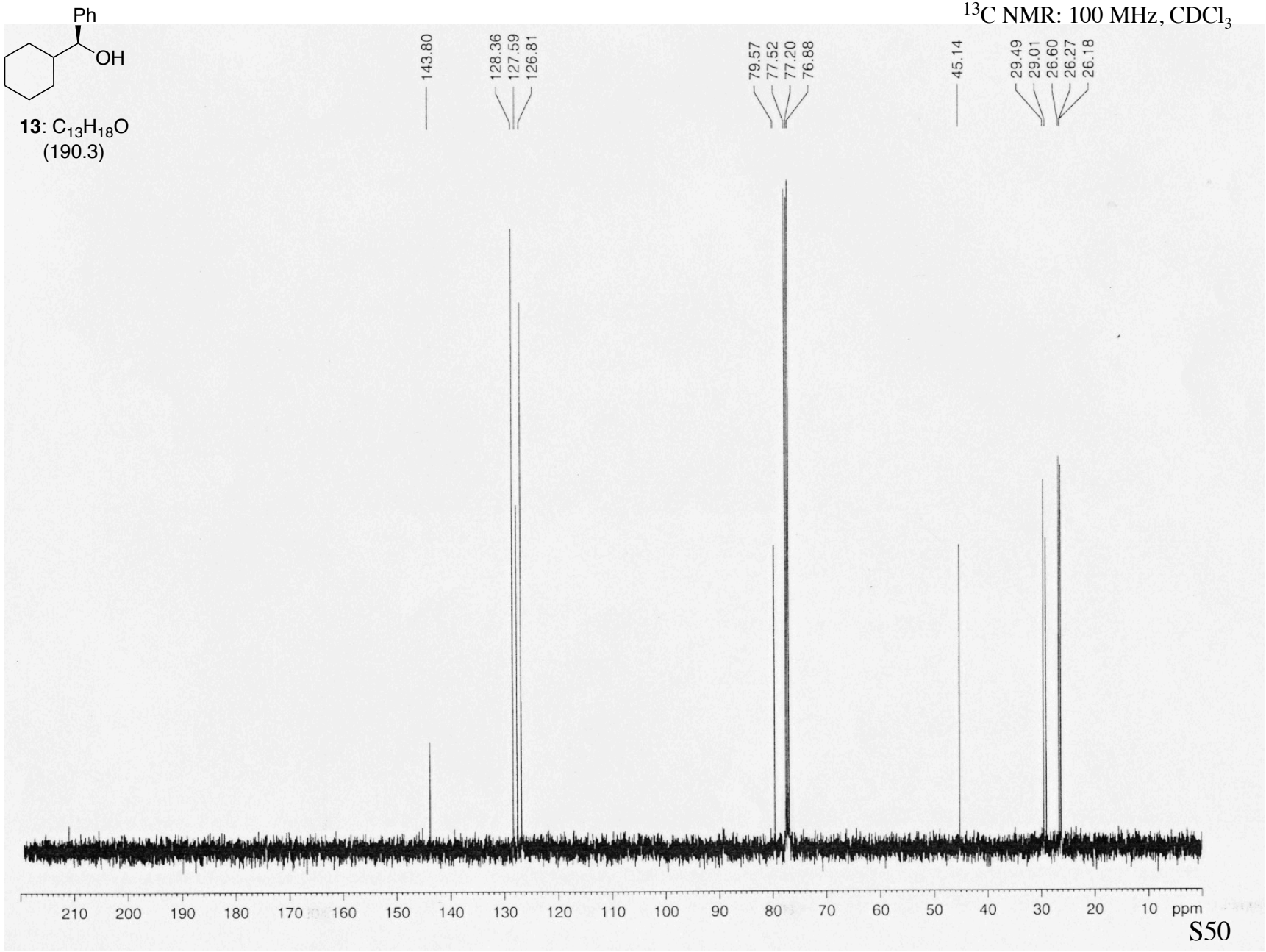
12: $C_{11}H_{16}O$
(164.2)

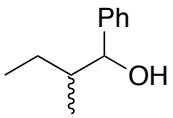
^{13}C NMR: 100 MHz, $CDCl_3$



13: $C_{13}H_{18}O$
(190.3)

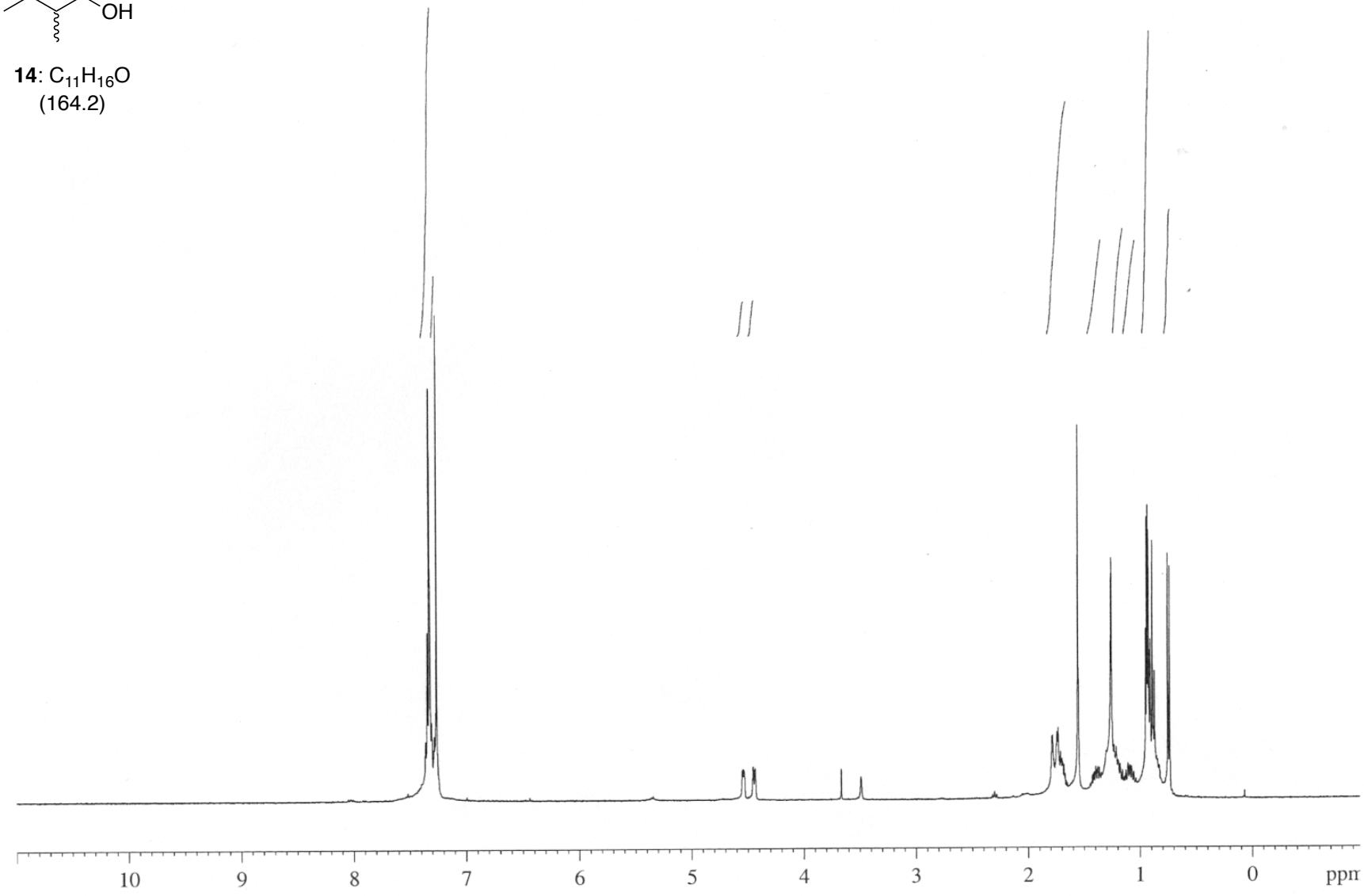
^{1}H NMR: 400 MHz, $CDCl_3$

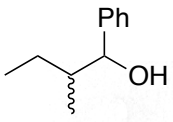

Ph
OH
13: C13H18O
(190.3)
13C NMR: 100 MHz, CDCl3
143.80
128.36
127.59
126.81
79.57
77.52
77.20
76.88
45.14
29.49
29.01
26.60
26.27
26.18
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm



14: $C_{11}H_{16}O$
(164.2)

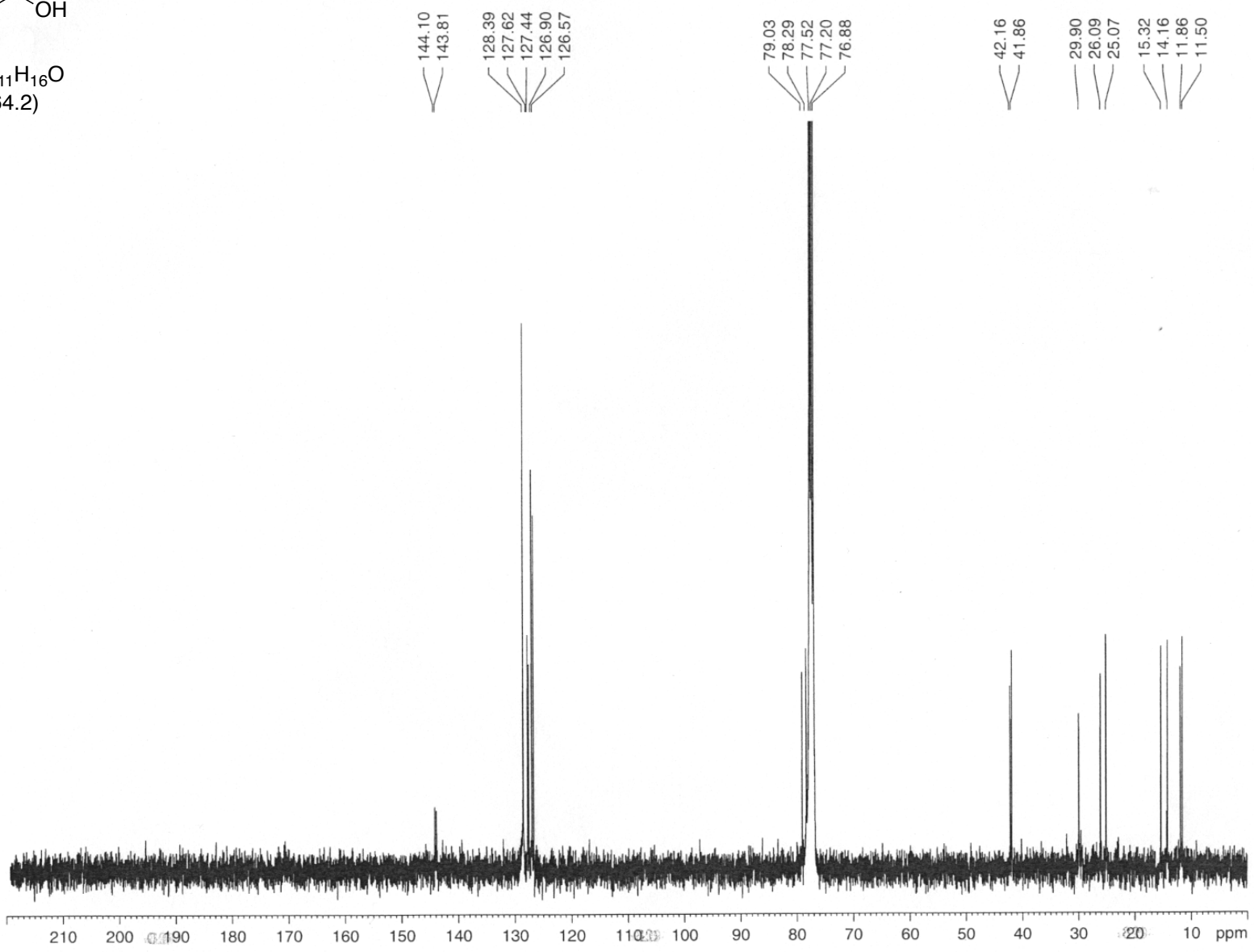
^{1}H NMR: 400 MHz, $CDCl_3$

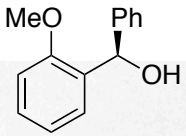




14: $C_{11}H_{16}O$
(164.2)

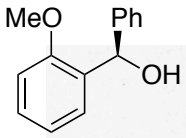
^{13}C NMR: 100 MHz, $CDCl_3$





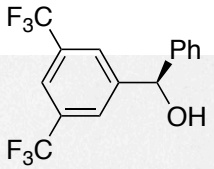
15: $C_{14}H_{14}O_2$
(214.3)

^{1}H NMR: 400 MHz, $CDCl_3$



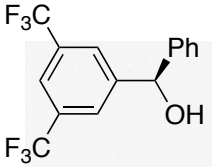
15: $C_{14}H_{14}O_2$
(214.3)

^{13}C NMR: 100 MHz, $CDCl_3$



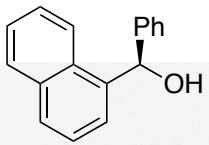
16: $C_{15}H_{10}F_6O$
(320.2)

^{1}H NMR: 400 MHz, $CDCl_3$



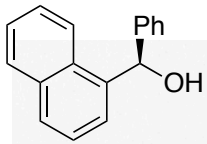
16: $C_{15}H_{10}F_6O$
(320.2)

^{13}C NMR: 100 MHz, $CDCl_3$



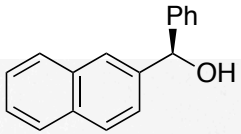
17: $C_{17}H_{14}O$ (234.3)

^{1}H NMR: 400 MHz, $CDCl_3$



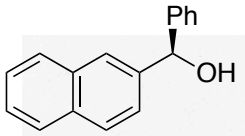
17: $C_{17}H_{14}O$ (234.3)

^{13}C NMR: 100 MHz, $CDCl_3$



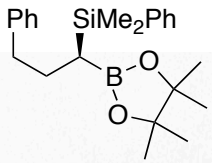
18: $C_{17}H_{14}O$ (234.3)

^1H NMR: 400 MHz, $CDCl_3$



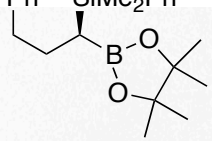
18: $C_{17}H_{14}O$ (234.3)

^{13}C NMR: 100 MHz, $CDCl_3$



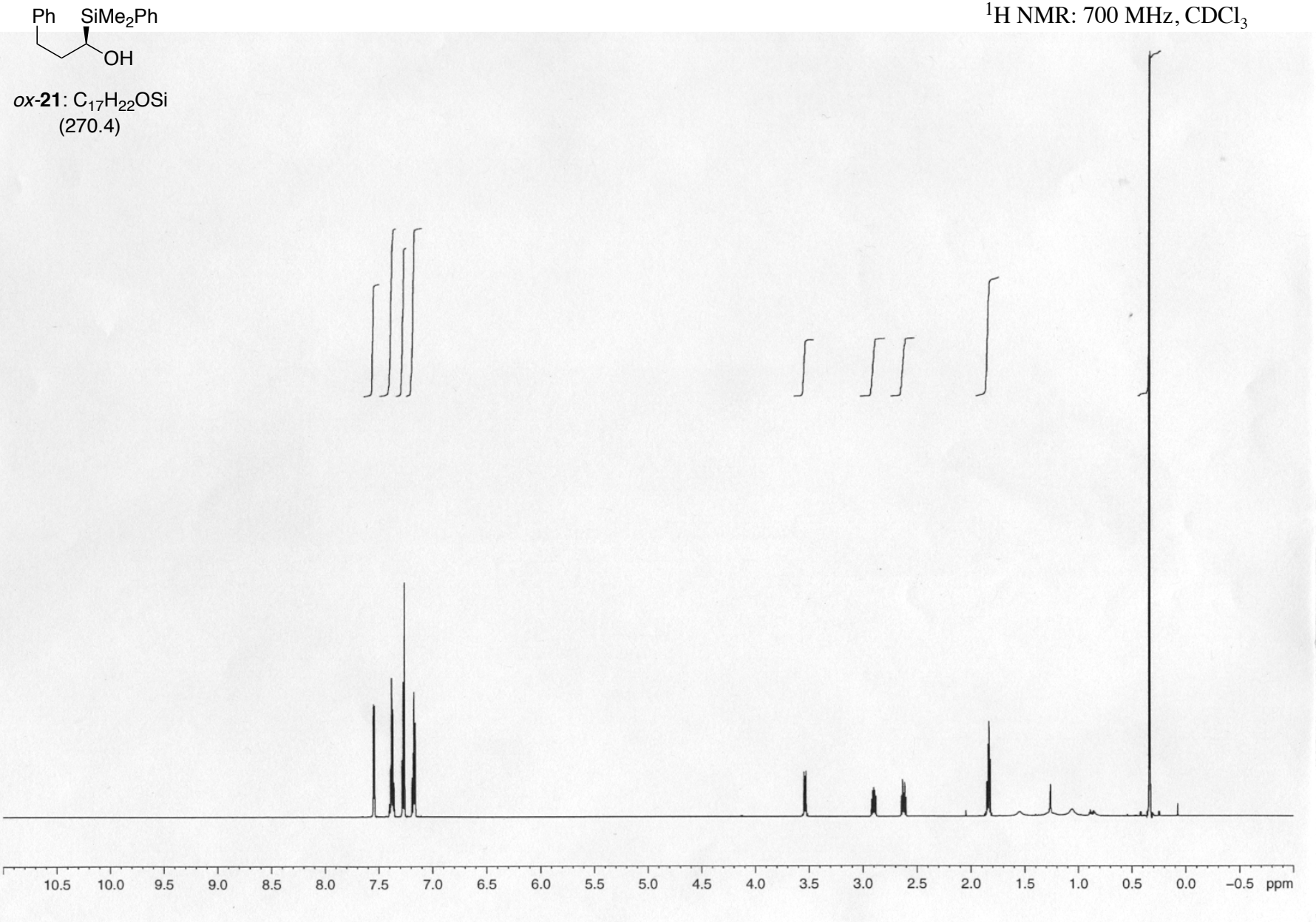
21: $C_{23}H_{33}BO_2Si$
(380.4)

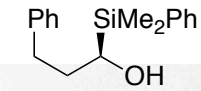
^{1}H NMR: 400 MHz, $CDCl_3$



21: $C_{23}H_{33}BO_2Si$
(380.4)

^{13}C NMR: 100 MHz, $CDCl_3$


Ph
SiMe2Ph
OH
ox-21: C17H22OSi
(270.4)
1H NMR: 700 MHz, CDCl3
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
−0.5
ppm

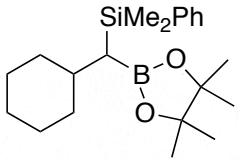


ox-**21**: $C_{17}H_{22}OSi$
(270.4)

^{13}C NMR: 175 MHz, $CDCl_3$

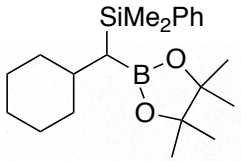
142.32
136.65
134.34
129.60
128.71
128.58
128.16
125.99
77.38
77.20
77.02
65.09
35.43
33.46
-5.24
-5.50

210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 −10 ppm



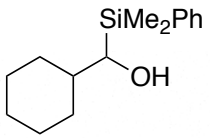
23: $C_{21}H_{35}BO_2Si$
(358.4)

^{1}H NMR: 400 MHz, $CDCl_3$



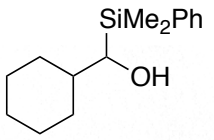
23: $C_{21}H_{35}BO_2Si$
(358.4)

^{13}C NMR: 100 MHz, $CDCl_3$



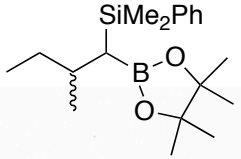
ox-**23**: $C_{15}H_{24}OSi$
(248.4)

^{1}H NMR: 700 MHz, $CDCl_3$



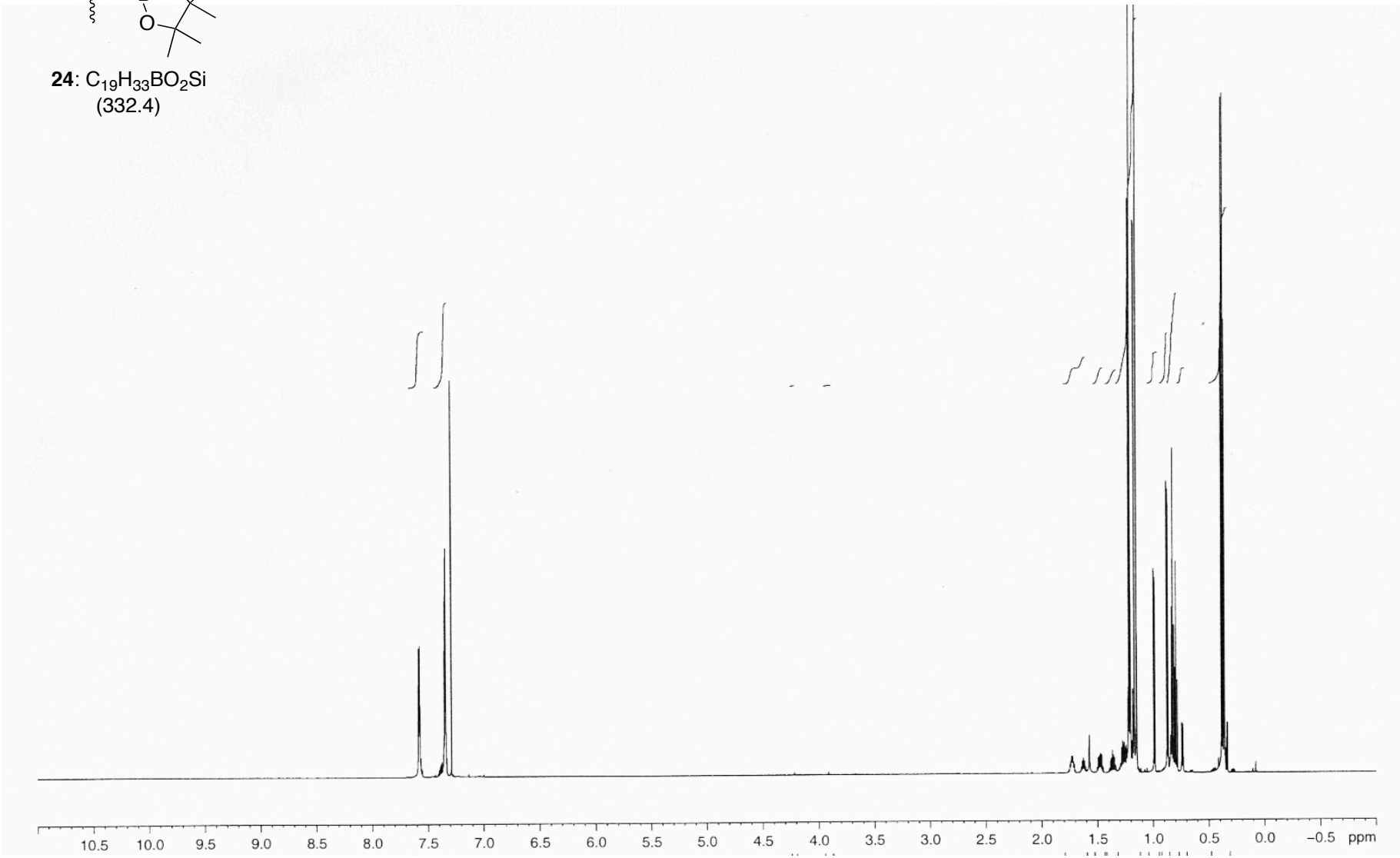
ox-**23**: $C_{15}H_{24}OSi$
(248.4)

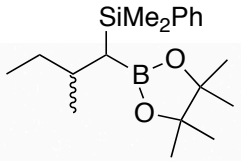
^{13}C NMR: 175 MHz, $CDCl_3$



24: $C_{19}H_{33}BO_2Si$
(332.4)

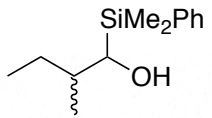
^{1}H NMR: 700 MHz, $CDCl_3$





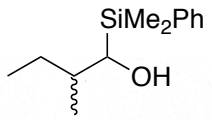
24: $C_{19}H_{33}BO_2Si$
(332.4)

^{13}C NMR: 175 MHz, $CDCl_3$



ox-**24**: $C_{13}H_{22}OSi$
(222.4)

^{1}H NMR: 700 MHz, $CDCl_3$



ox-**24**: $C_{13}H_{22}OSi$
(222.4)

^{13}C NMR: 175 MHz, $CDCl_3$