

Plate 1a: *trans*-Stilbene (**258**)

^1H NMR [600 MHz, CDCl_3]: δ 7.55 (4H, br d, $J = 8.2$ Hz, H-2,6), 7.39 (4H, t, $J = 7.7$ Hz, H-3,5), 7.29 (2H, m, H-4), 7.14 (2H, s, CH=CH).

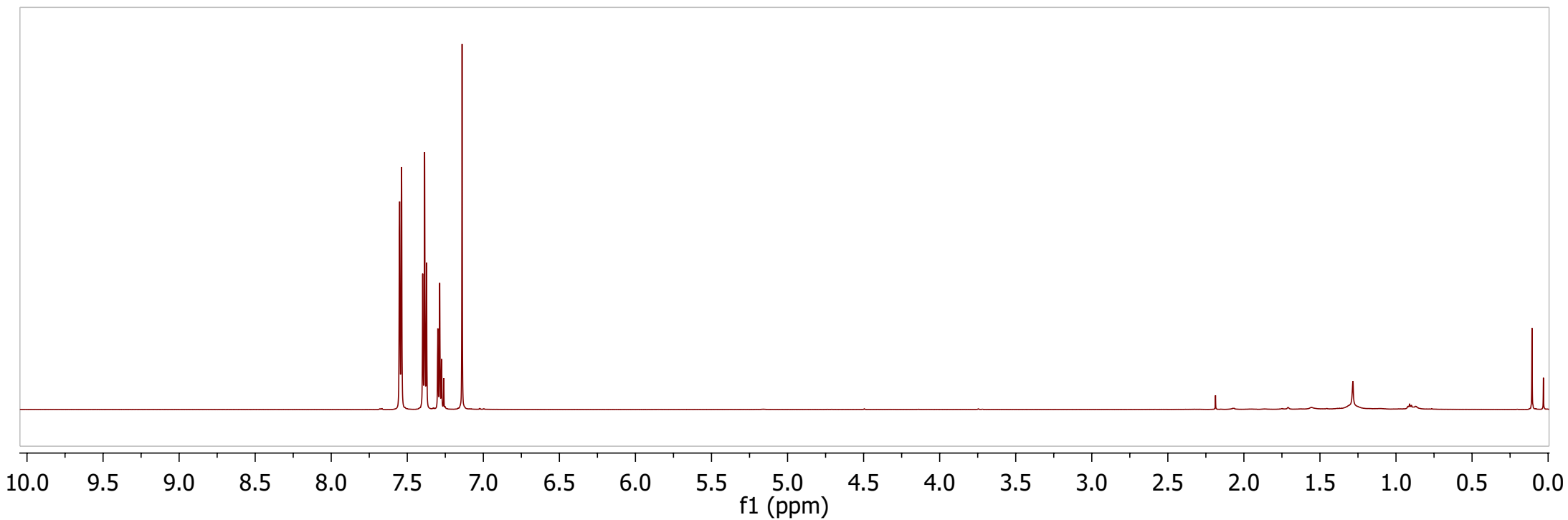
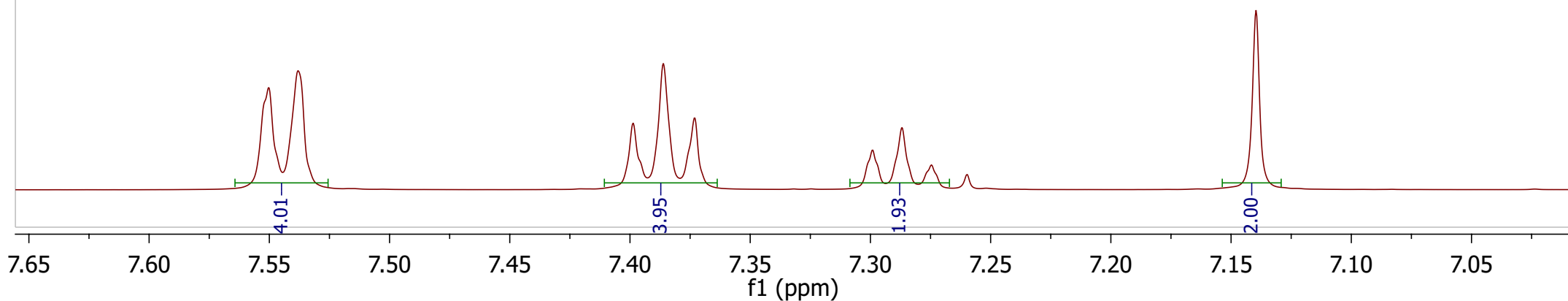
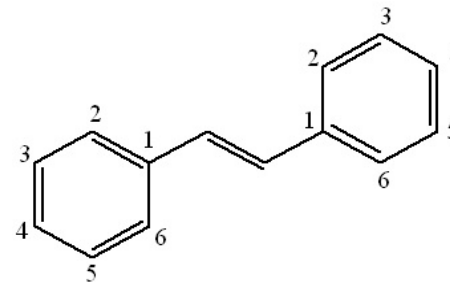


Plate 1b: *trans*-Stilbene (**258**)

^{13}C NMR [151 MHz, CDCl_3]: δ 137.5 (C-1), 128.8 (C-3,5 and $\text{CH}=\text{CH}$), 127.8 (C-4), 126.7 (C-2,6).

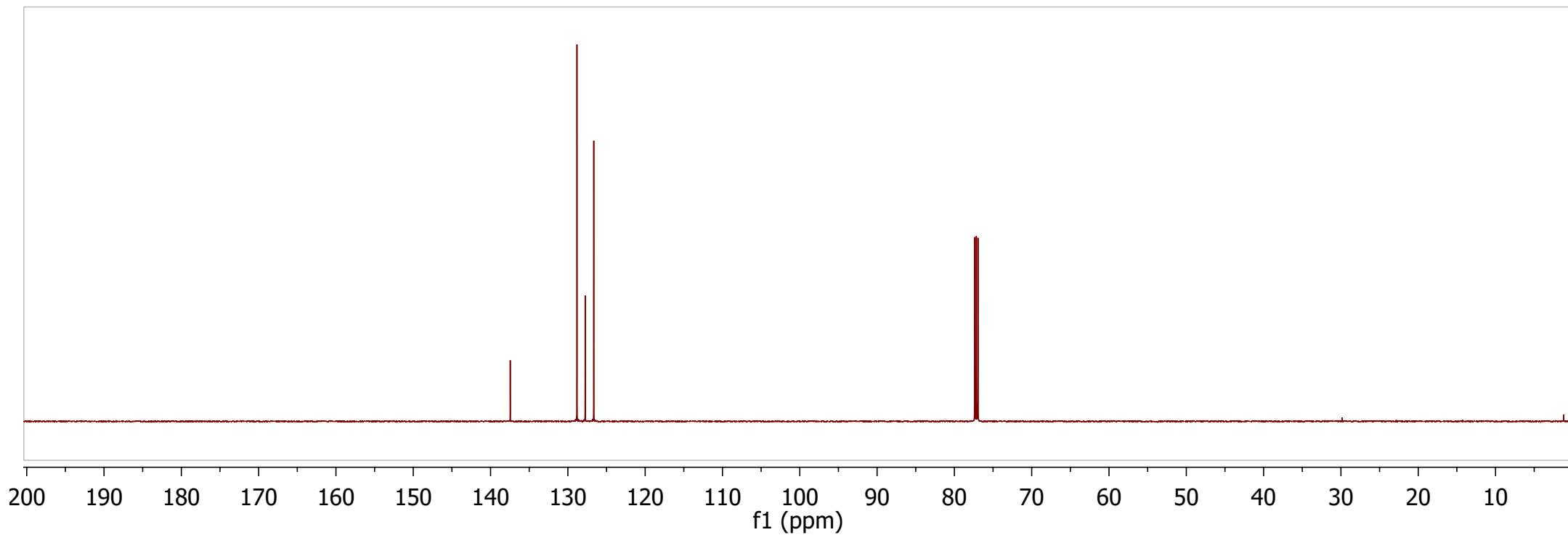
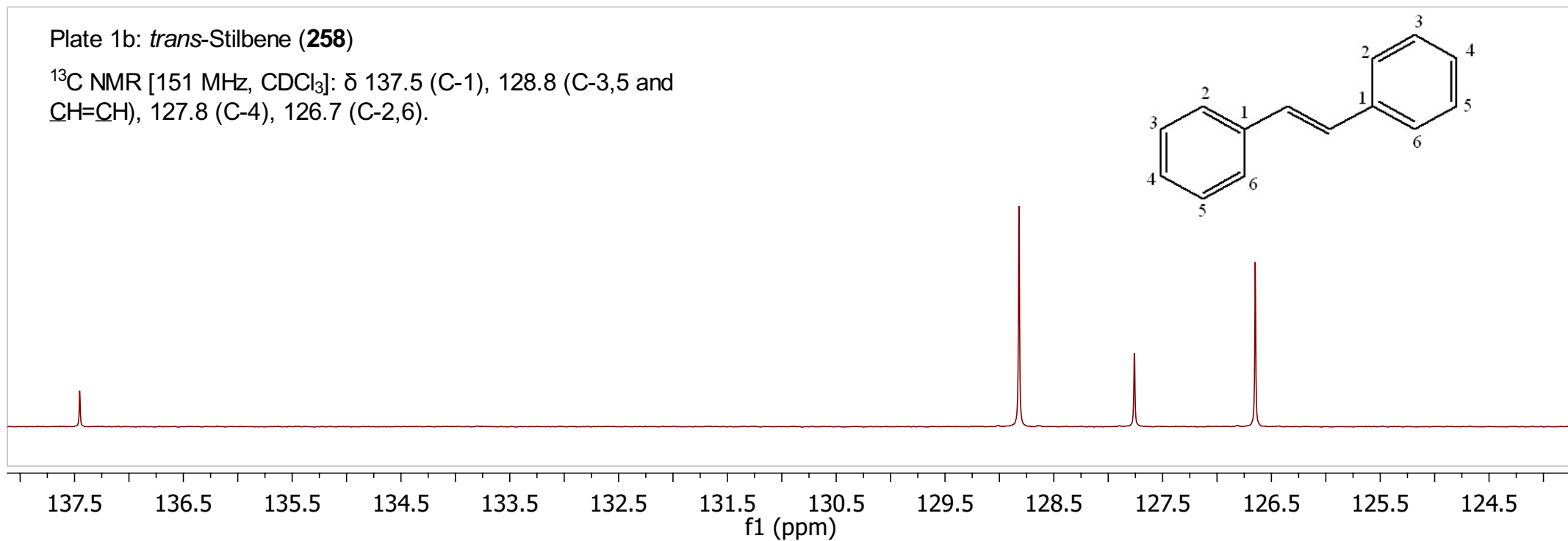
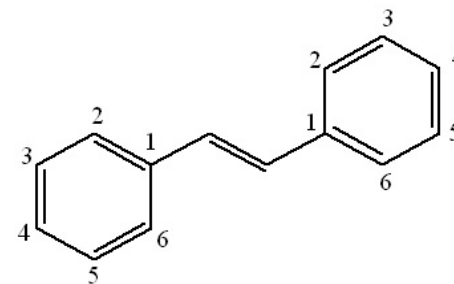


Plate 1c: *trans*-Stilbene (**258**)

HSQC NMR

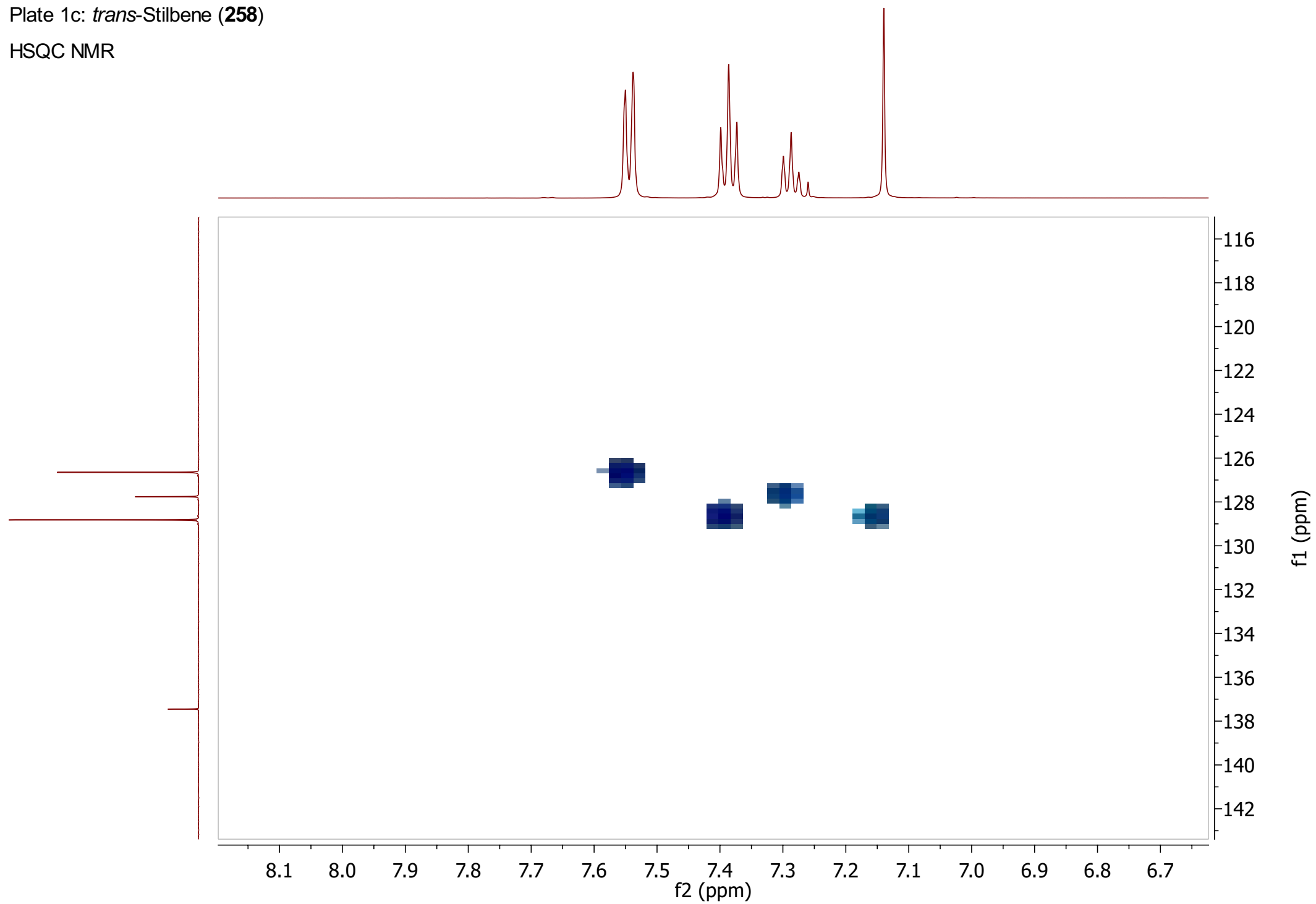


Plate 1d: *trans*-Stilbene (**258**)

HMBC NMR

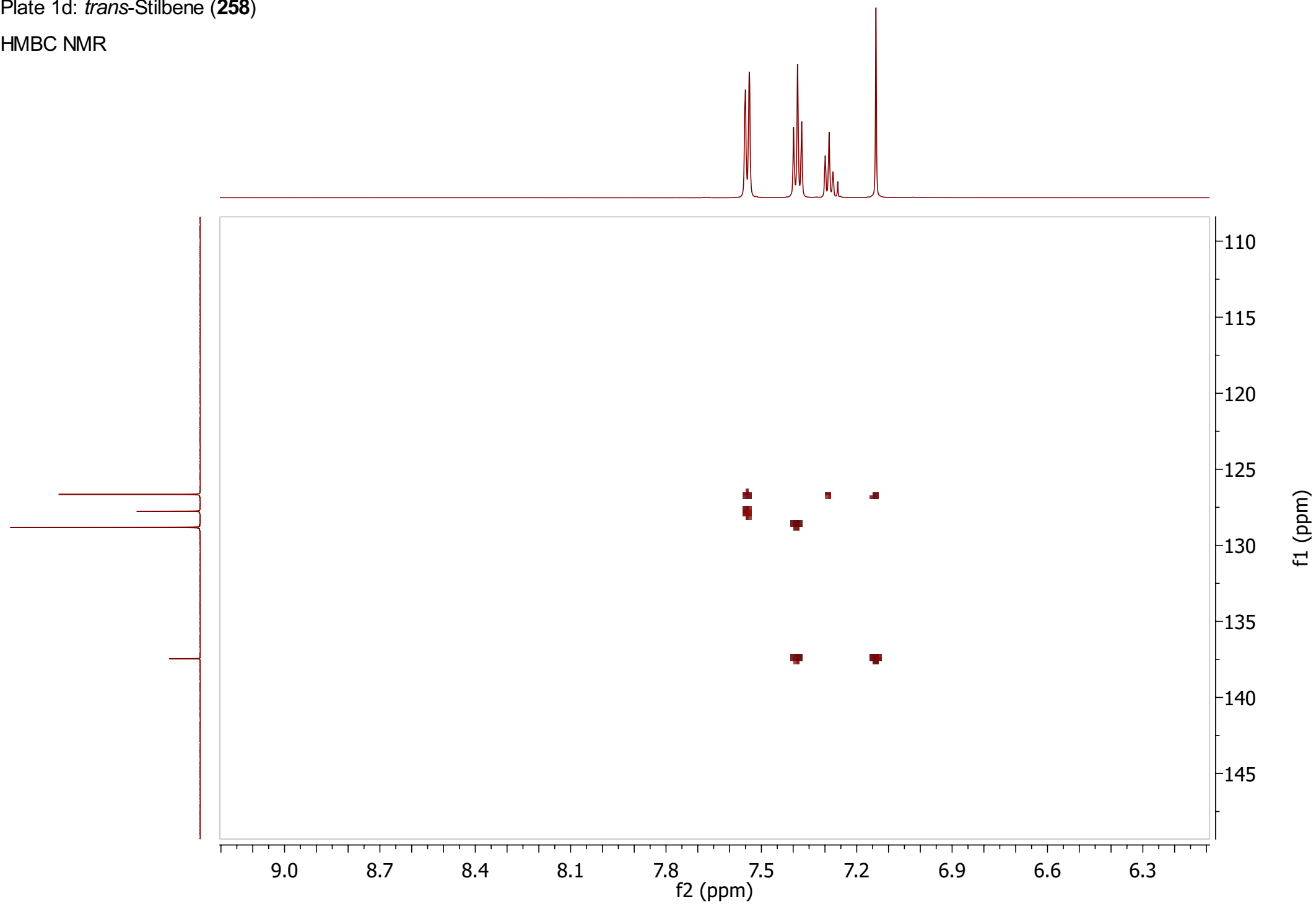


Plate 1e: *trans*-Stilbene (**258**)

^{13}C DEPT135 NMR

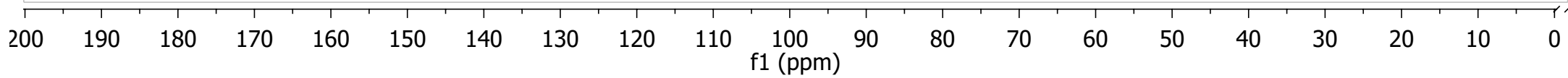


Plate 2a: *trans*-4,4-Dimethoxystilbene (**259**)

^1H NMR [600 MHz, CDCl_3]: δ 7.43 (4H, d, $J = 8.8$ Hz, H-2,6), 6.93 (2H, s, $\text{CH}=\text{CH}$), 6.89 (4H, d, $J = 8.8$ Hz, H-3,5), 3.83 (6H, s, $-\text{OCH}_3$).

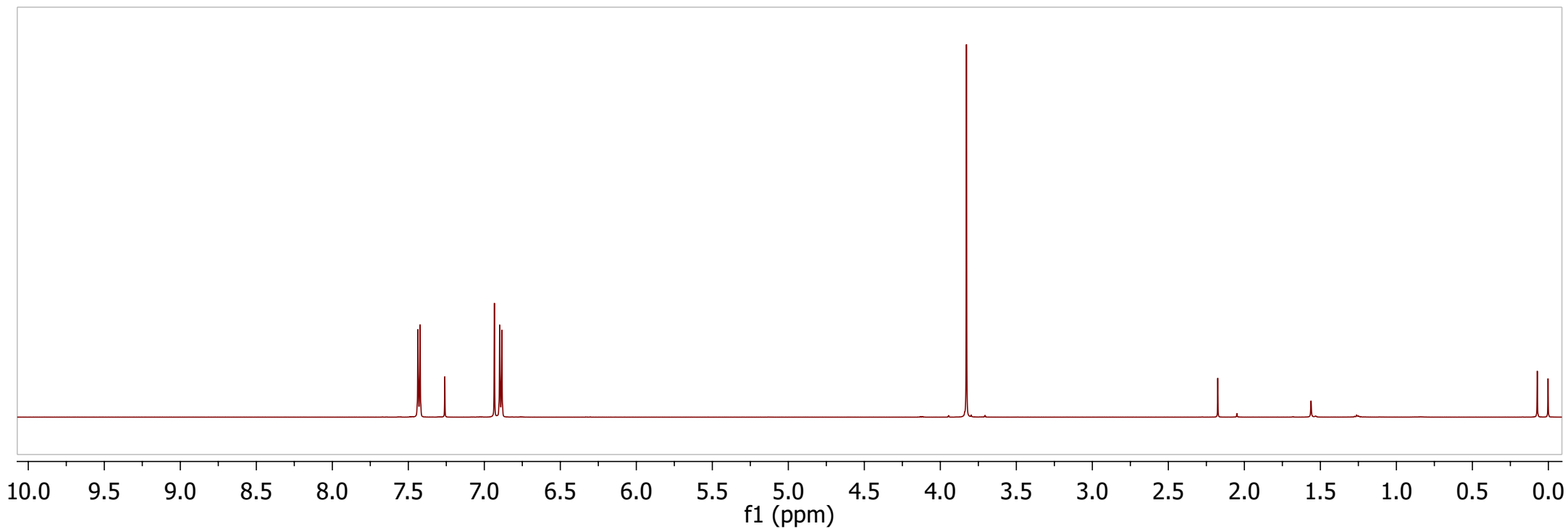
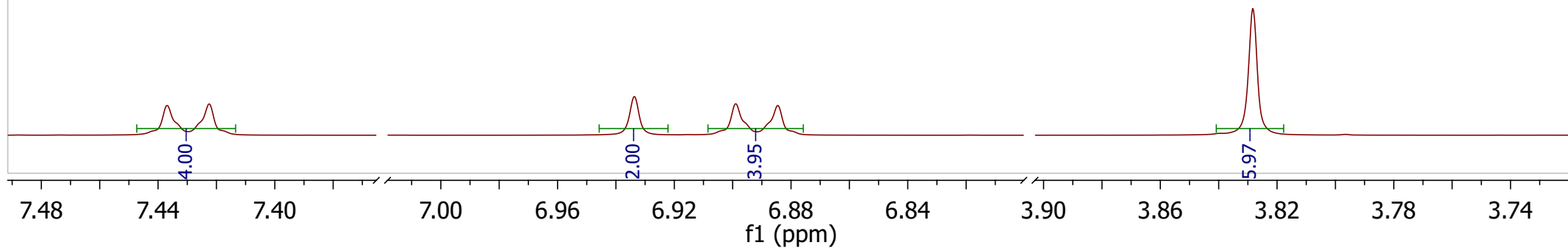
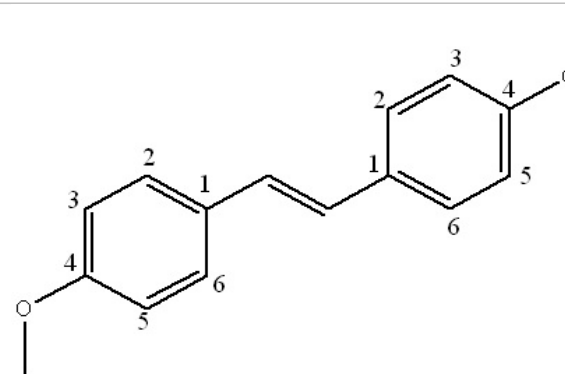


Plate 2b: *trans*-4,4-Dimethoxystilbene (**259**)

^{13}C NMR [151 MHz, CDCl_3]: δ 159.2 (C-4), 130.6 (C-1), 127.6 (C-2,6), 126.3 (CH=CH), 114.2 (C-3,5), 55.5 (OCH_3).

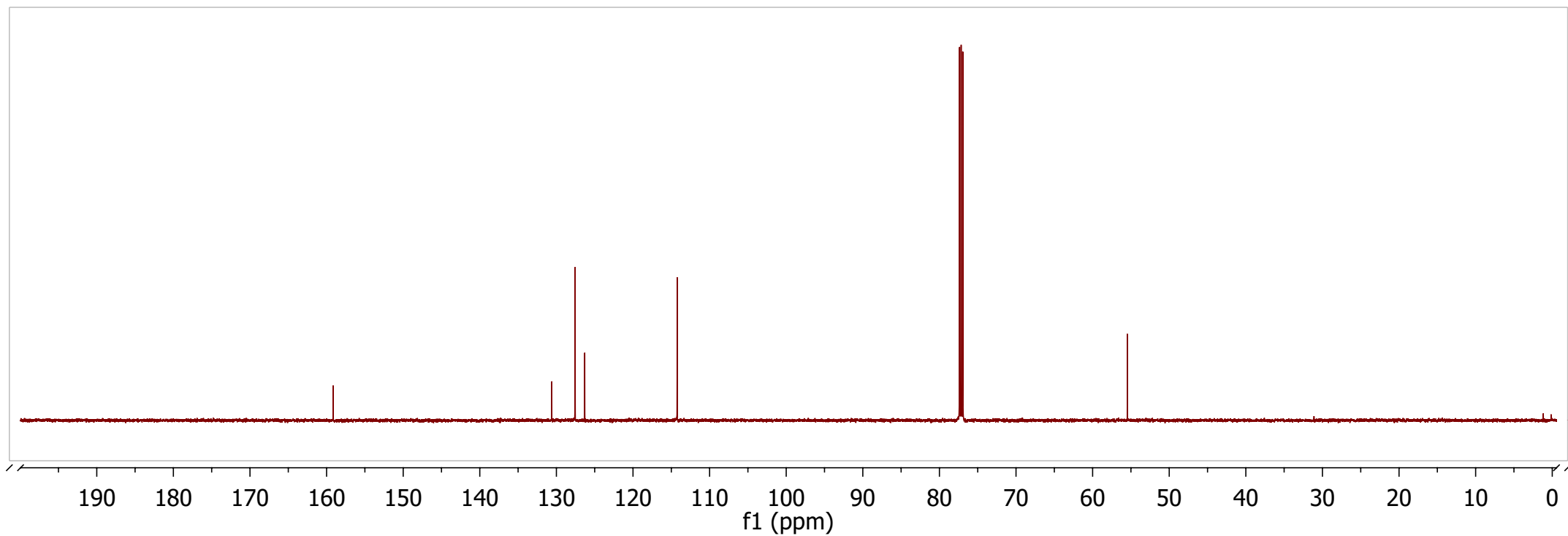
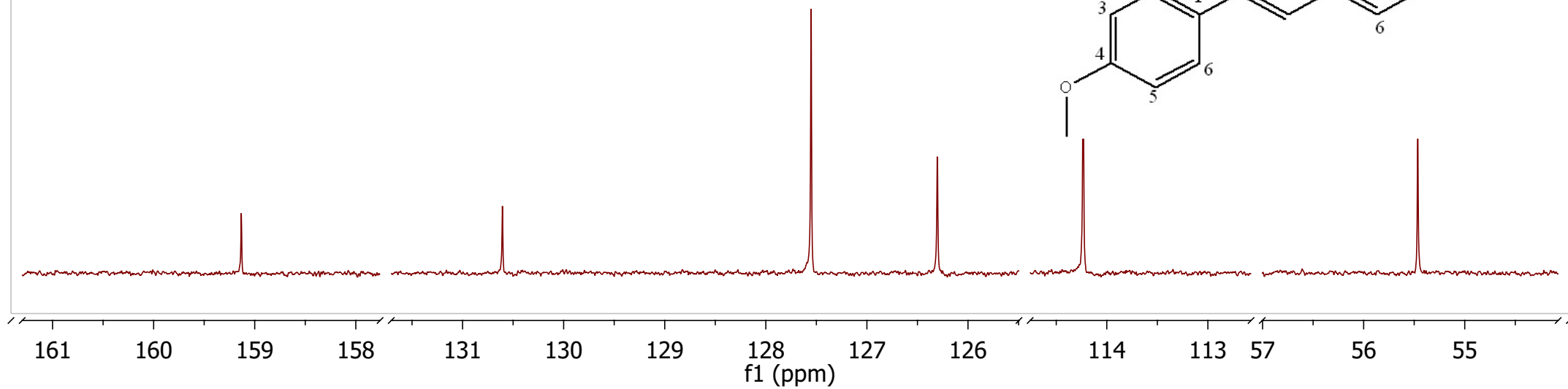
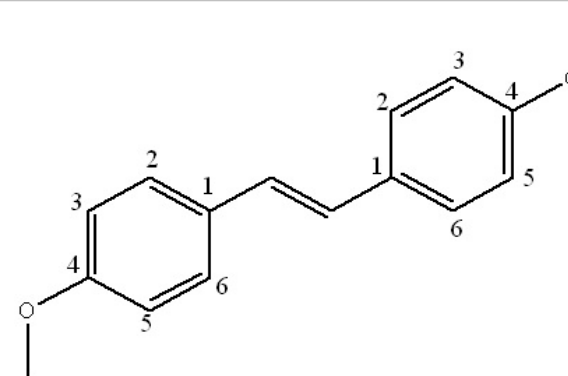


Plate 2c: *trans*-4,4-Dimethoxystilbene (**259**)

HSQC NMR

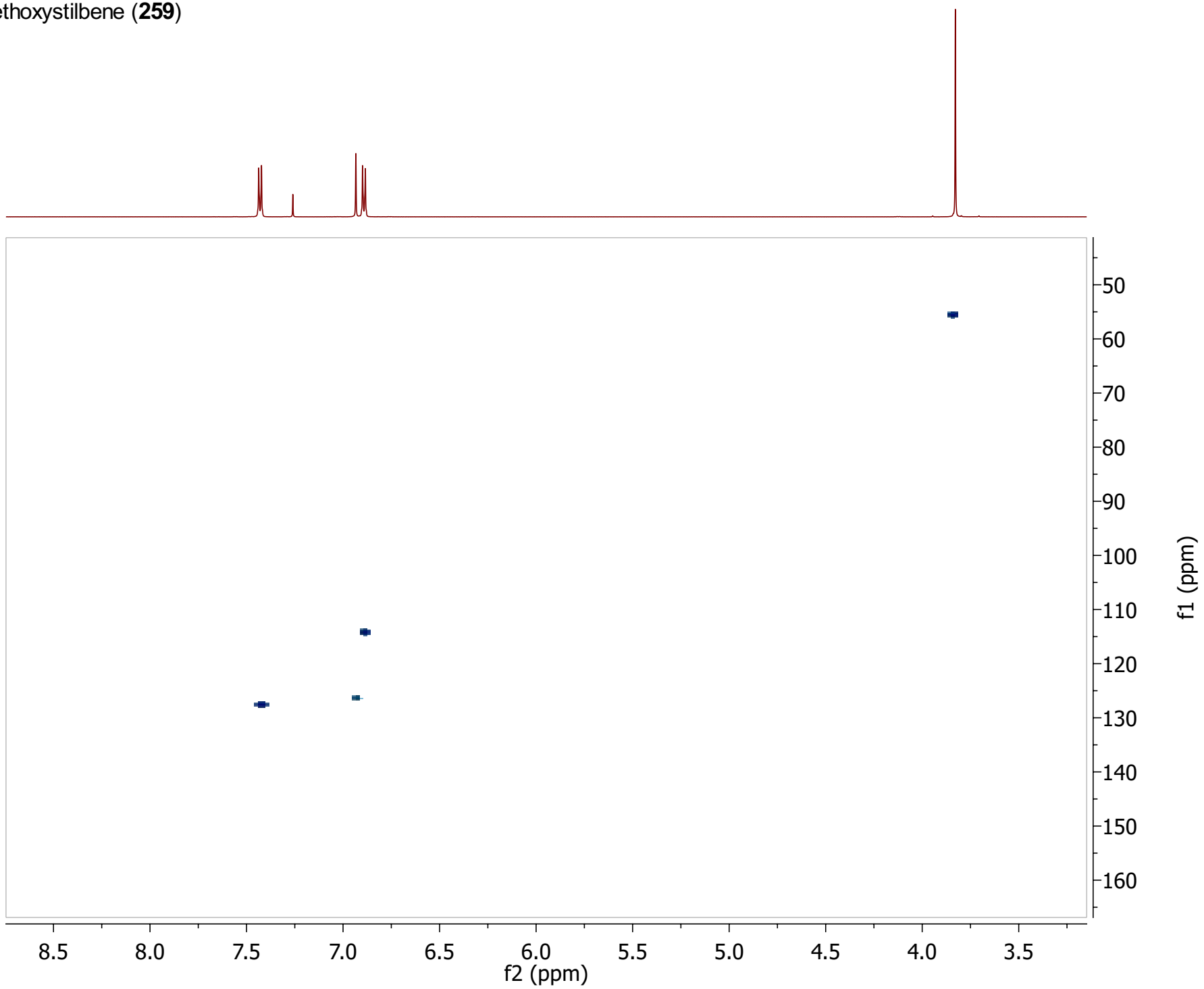
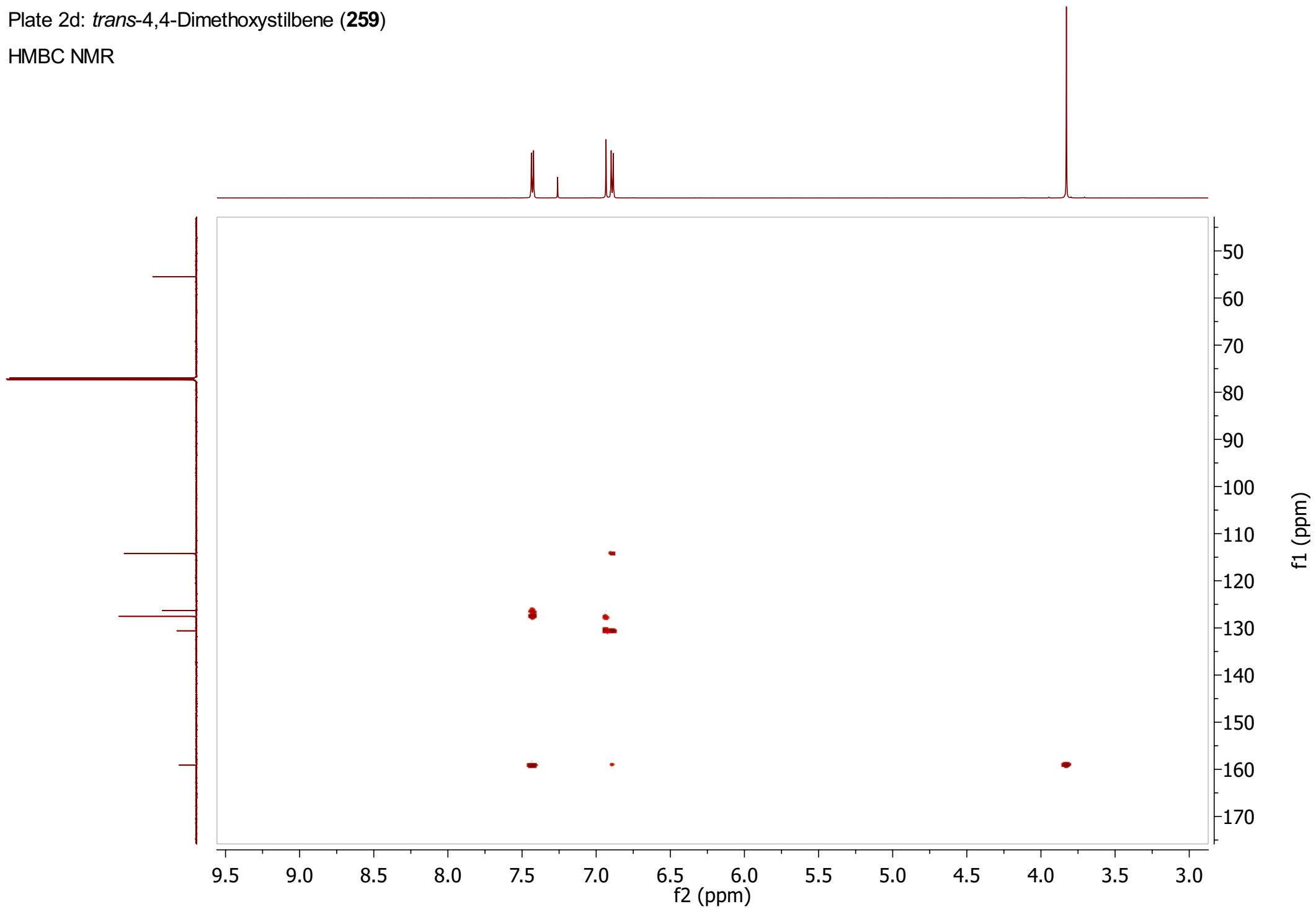


Plate 2d: *trans*-4,4-Dimethoxystilbene (**259**)

HMBC NMR



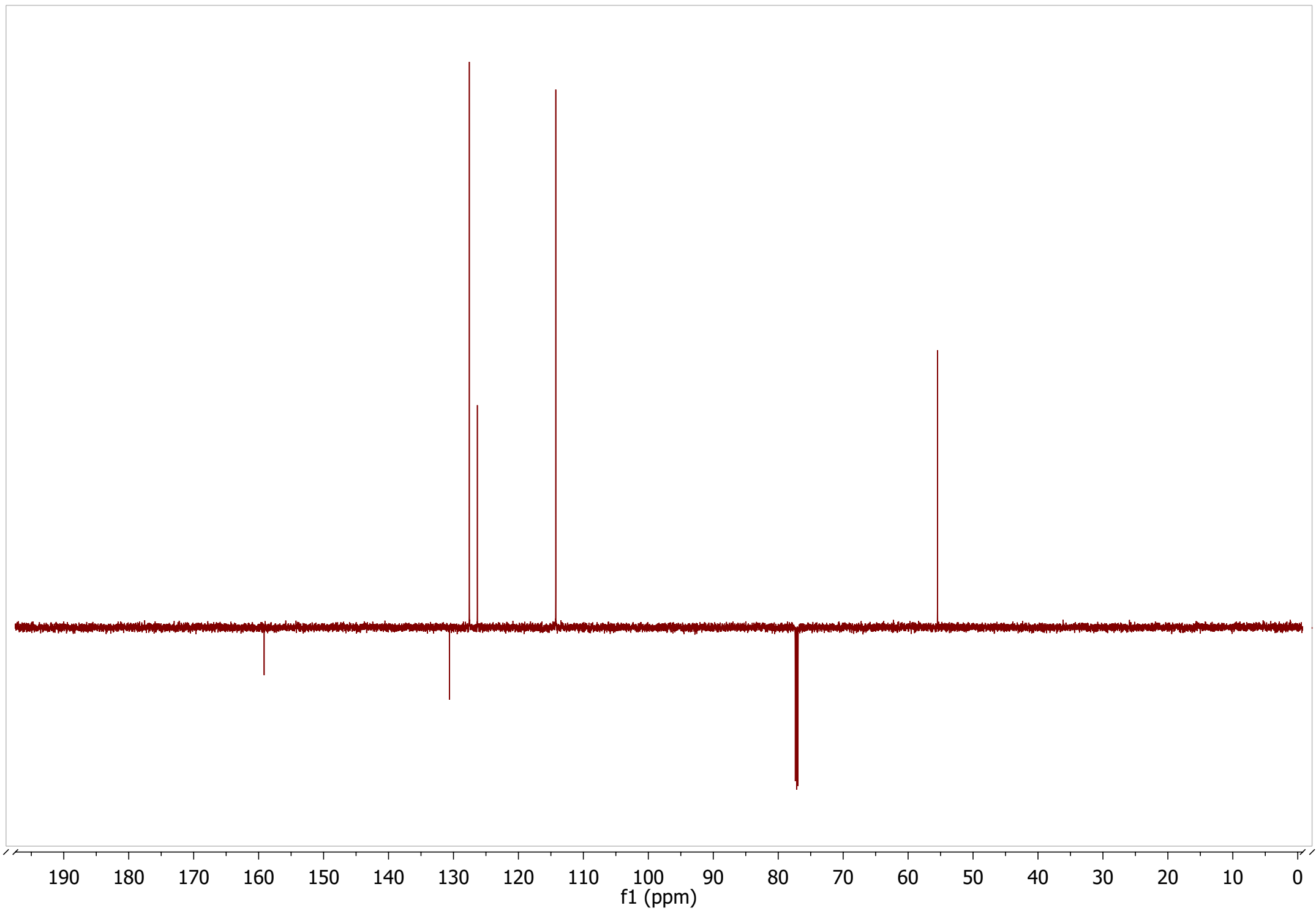


Plate 3a: Methyl cinnamate (**195**)

$^1\text{H NMR}$ [600 MHz, CDCl_3]: δ 7.70 (1H, d, $J = 16.0$ Hz, H-3), 7.52 – 7.50 (2H, m, H-2',6'), 7.37 – 7.36 (3H, m, H-3',4',5'), 6.44 (1H, d, $J = 16.0$ Hz, H-2), 3.79 (3H, s, H-1'').

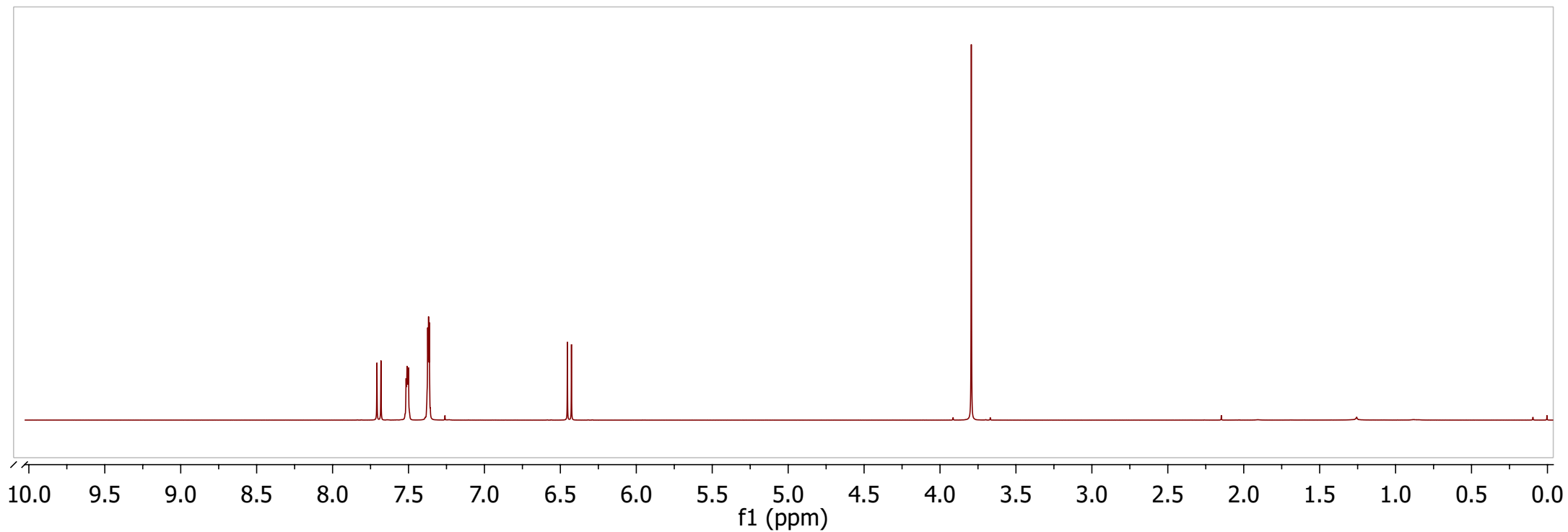
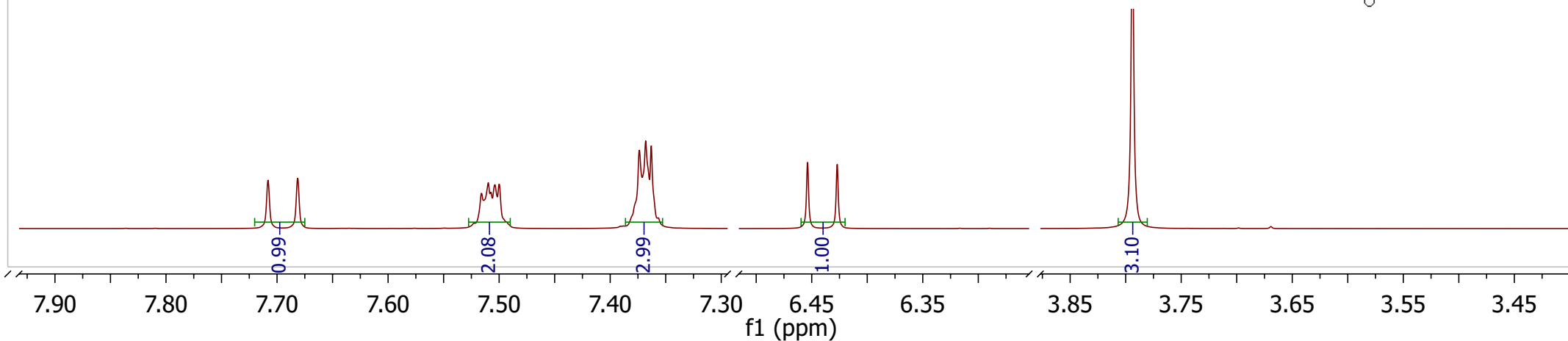
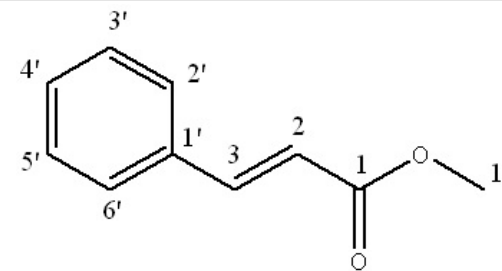


Plate 3b: Methyl cinnamate (**195**)

^{13}C NMR [151 MHz, CDCl_3]: δ 167.4 (C-1), 144.9 (C-3), 134.4 (C-1'), 130.3 (C-4'), 128.9 (C-3',5'), 128.1 (C-2',6'), 117.8 (C-3), 51.7 (C-1'').

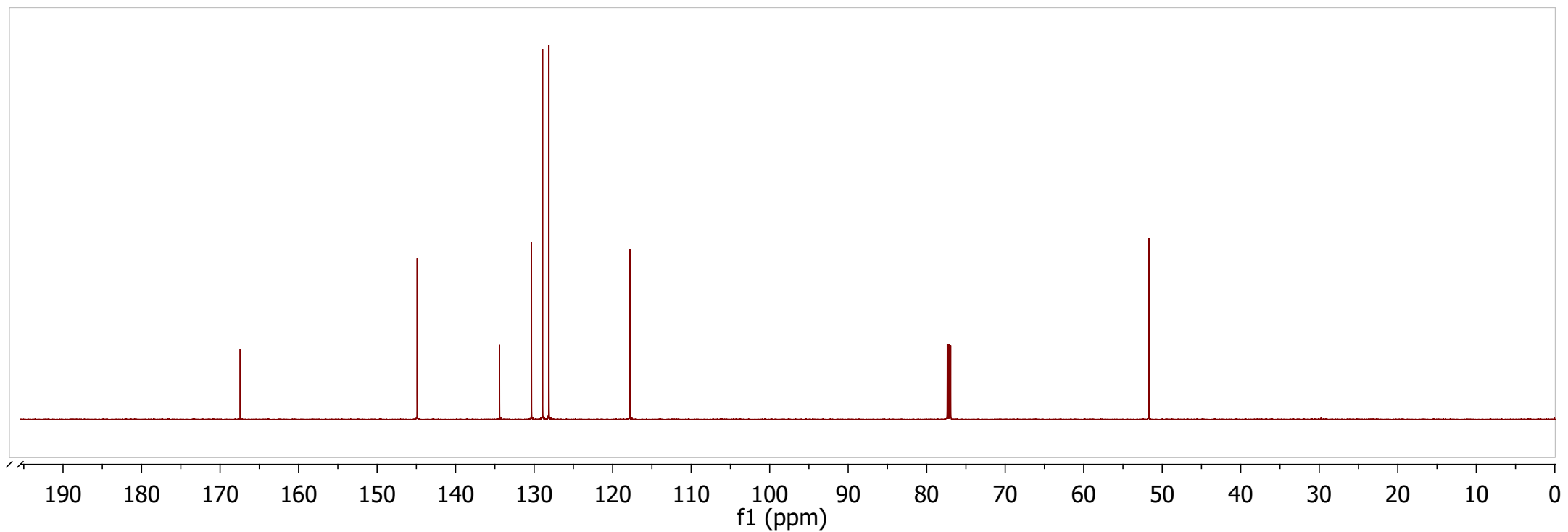
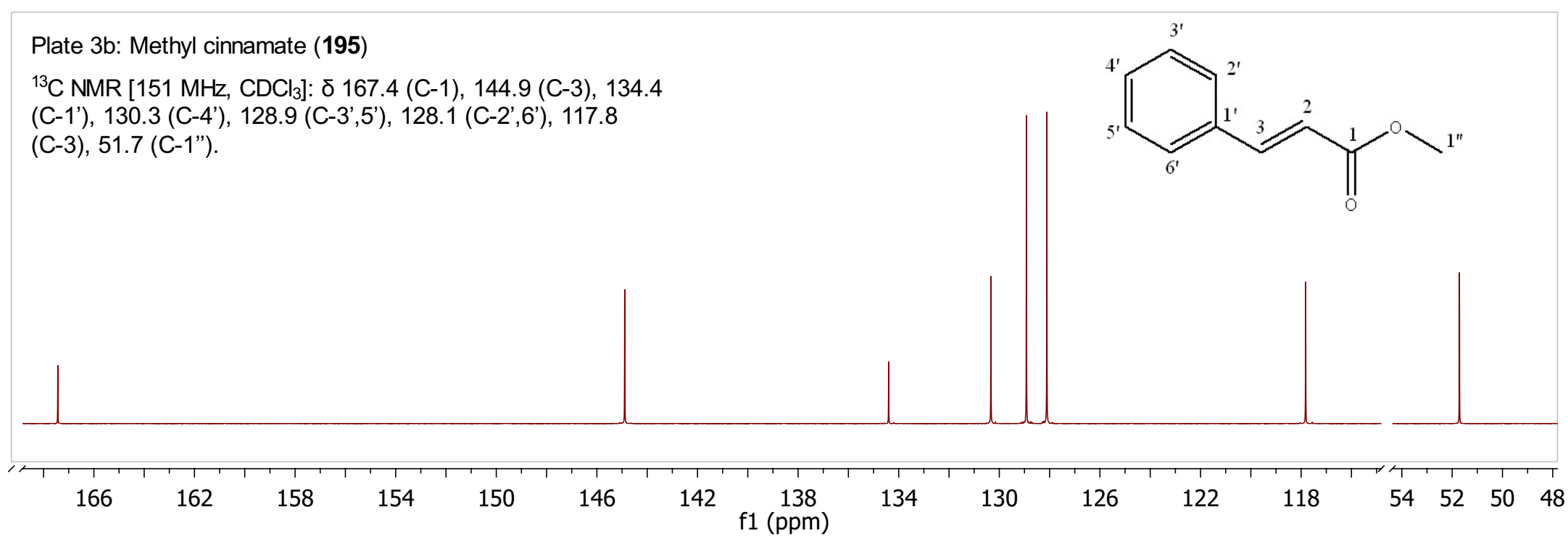
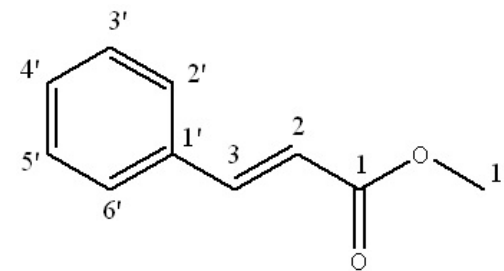


Plate 3c: Methyl cinnamate (**195**)

HSQC NMR

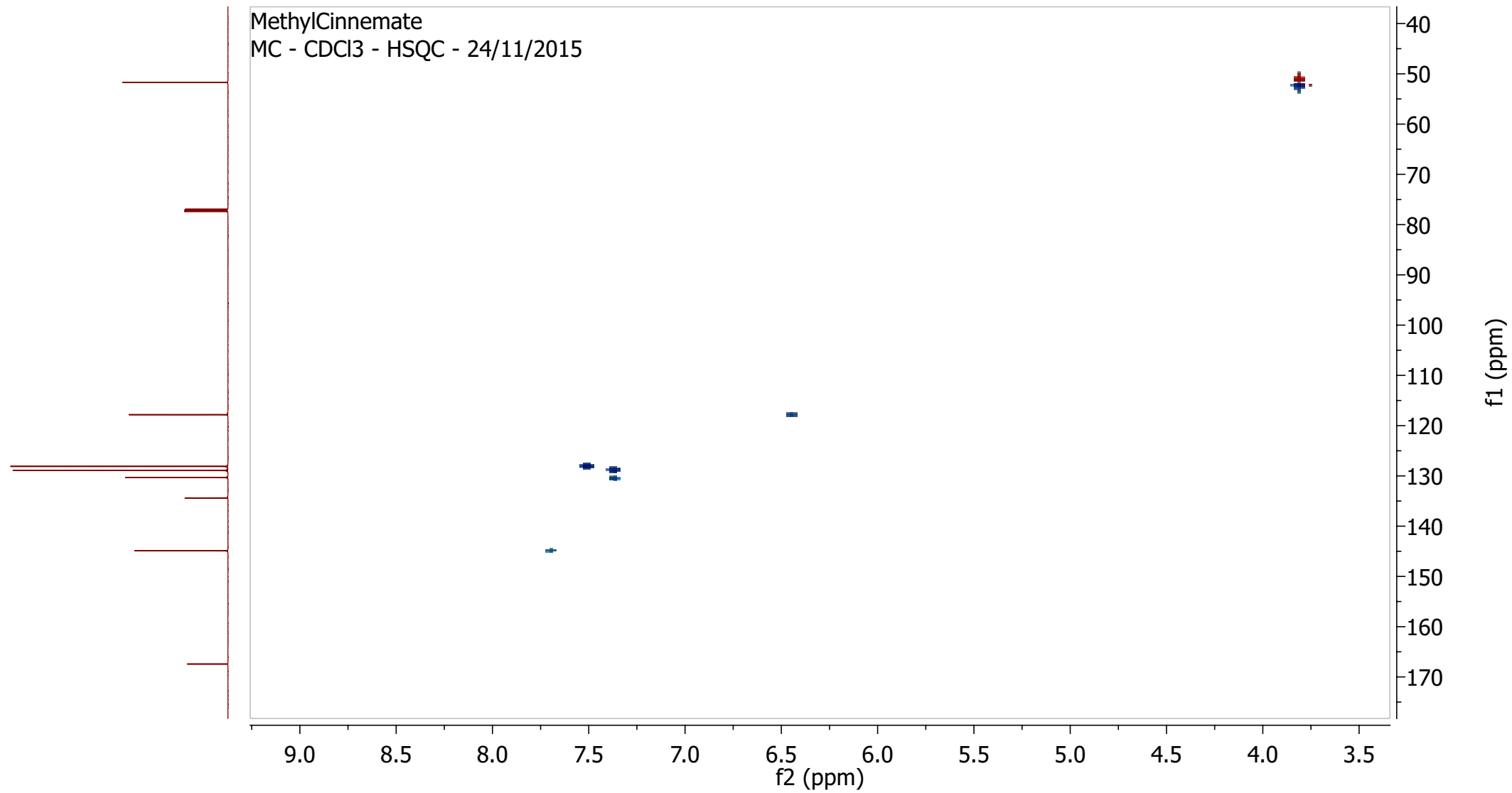
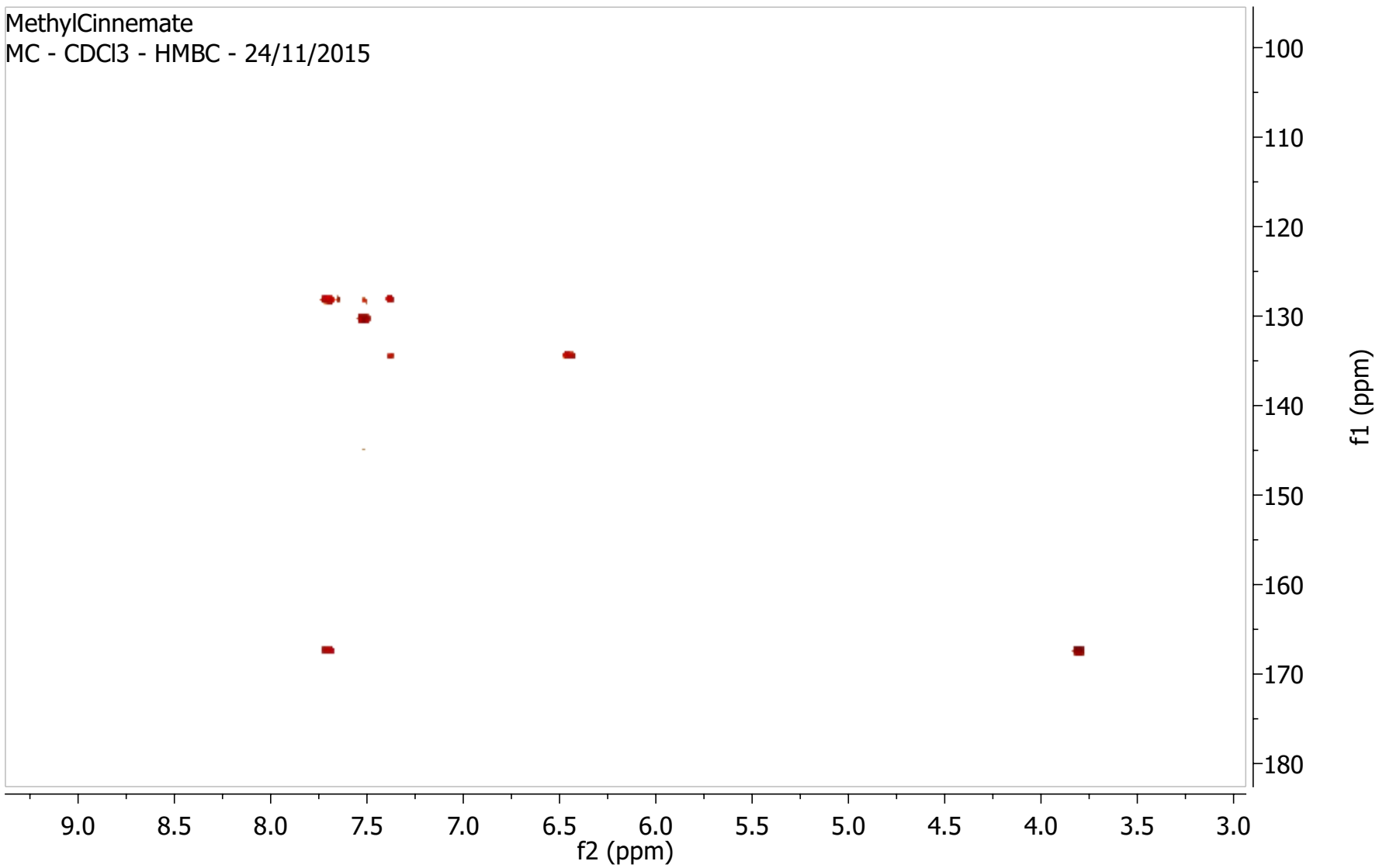


Plate 3d: Methyl cinnamate (**195**)

HMBC NMR



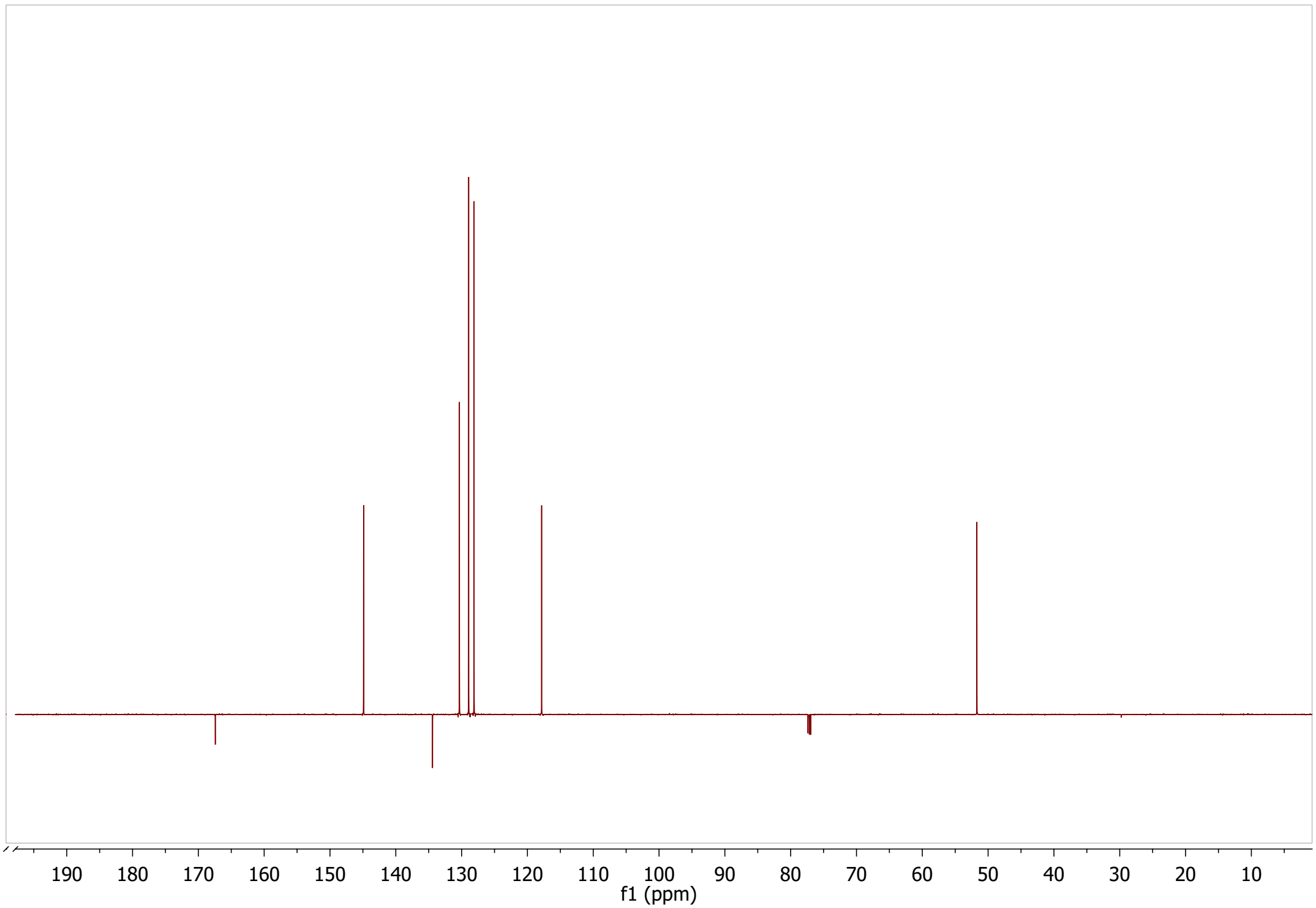
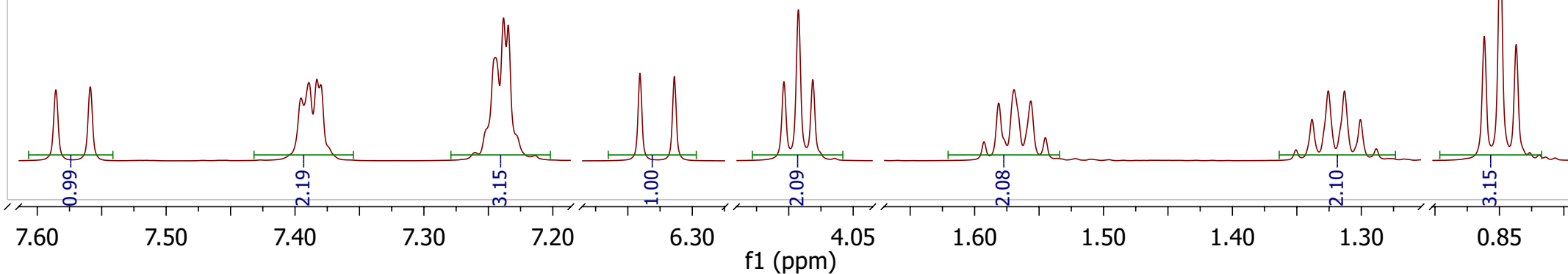
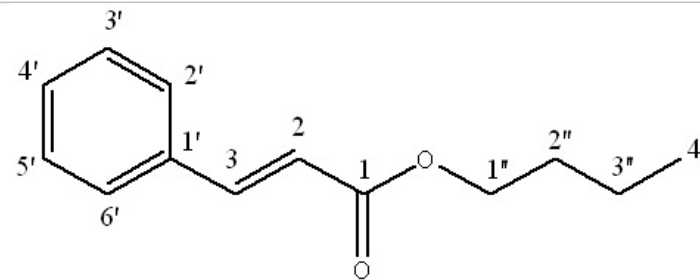


Plate 4a: Butyl cinnamate (**278**)

^1H NMR [600 MHz, CDCl_3]: δ 7.57 (1H, d, $J = 16.0$ Hz, H-3), 7.42-7.36 (2H, m, H-2',6'), 7.25-7.21 (3H, m, H-3',4',5'), 6.33 (1H, d, $J = 16.0$ Hz, H-2), 4.09 (2H, t, $J = 6.7$ Hz, H-1''), 1.59-1.55 (2H, m, H-2''), 1.35-1.29 (2H, m, H-3''), 0.85 (3H, t, $J = 7.4$ Hz, H-4'').



Butyl
Sty + BuAct - CDCl_3 - 1H - 25/11/2015

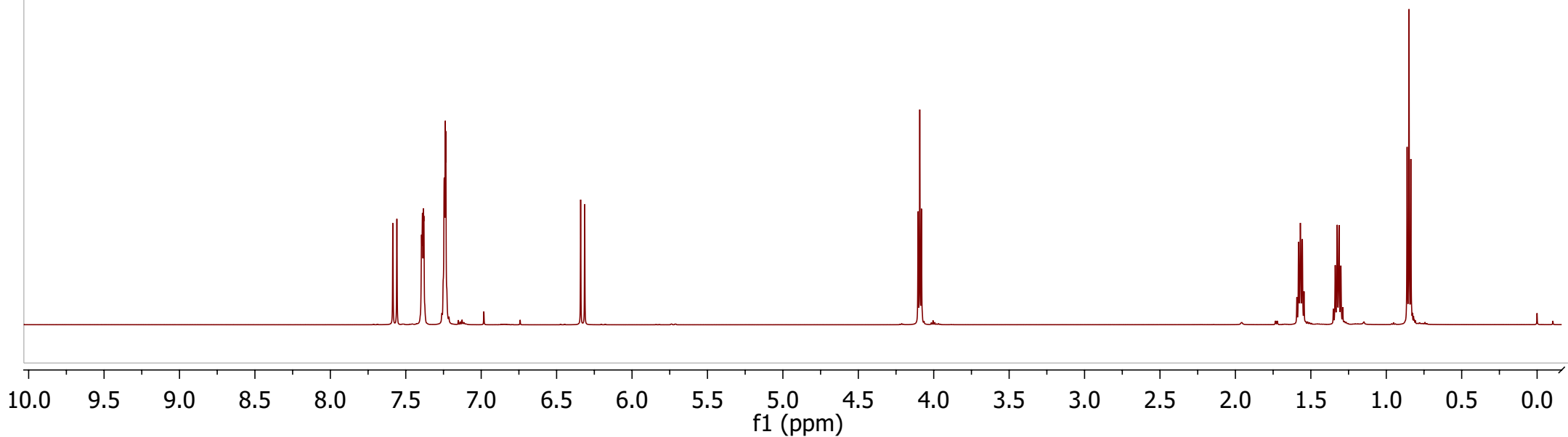
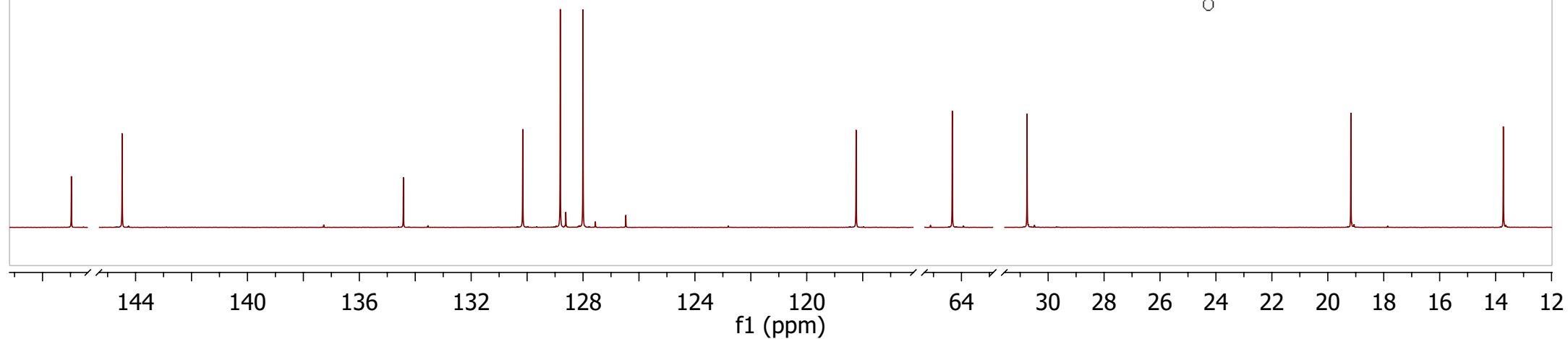
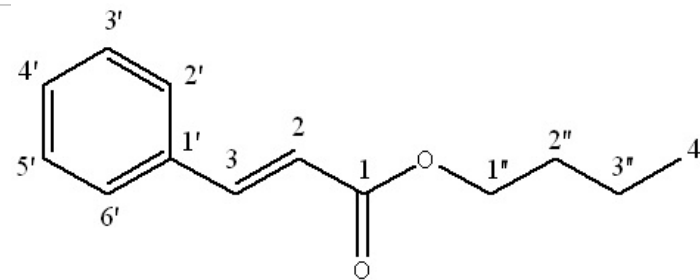


Plate 4b: Butyl cinnamate (**278**)

^{13}C NMR [151 MHz, CDCl_3]: δ 167.0 (C-1), 144.5 (C-3), 134.4 (C-1'), 130.2 (C-4'), 128.8 (C-2',6'), 128.0 (C-3',5'), 118.2 (C-2), 64.3 (C-1''), 30.8 (C-2''), 19.2 (C-3''), 13.7 (C-4'').



Butyl
Sty + BuAct - CDCl_3 - ^{13}C - 25/11/2015

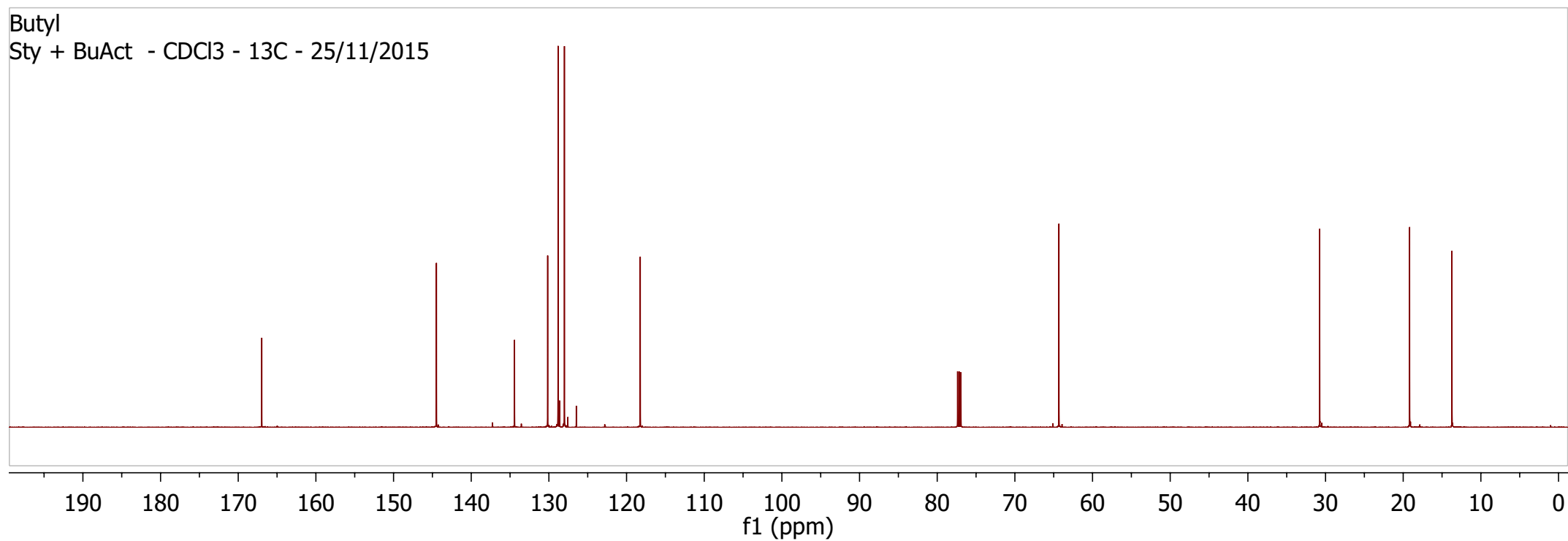


Plate 4c: Butyl cinnamate (278)

HSQC NMR

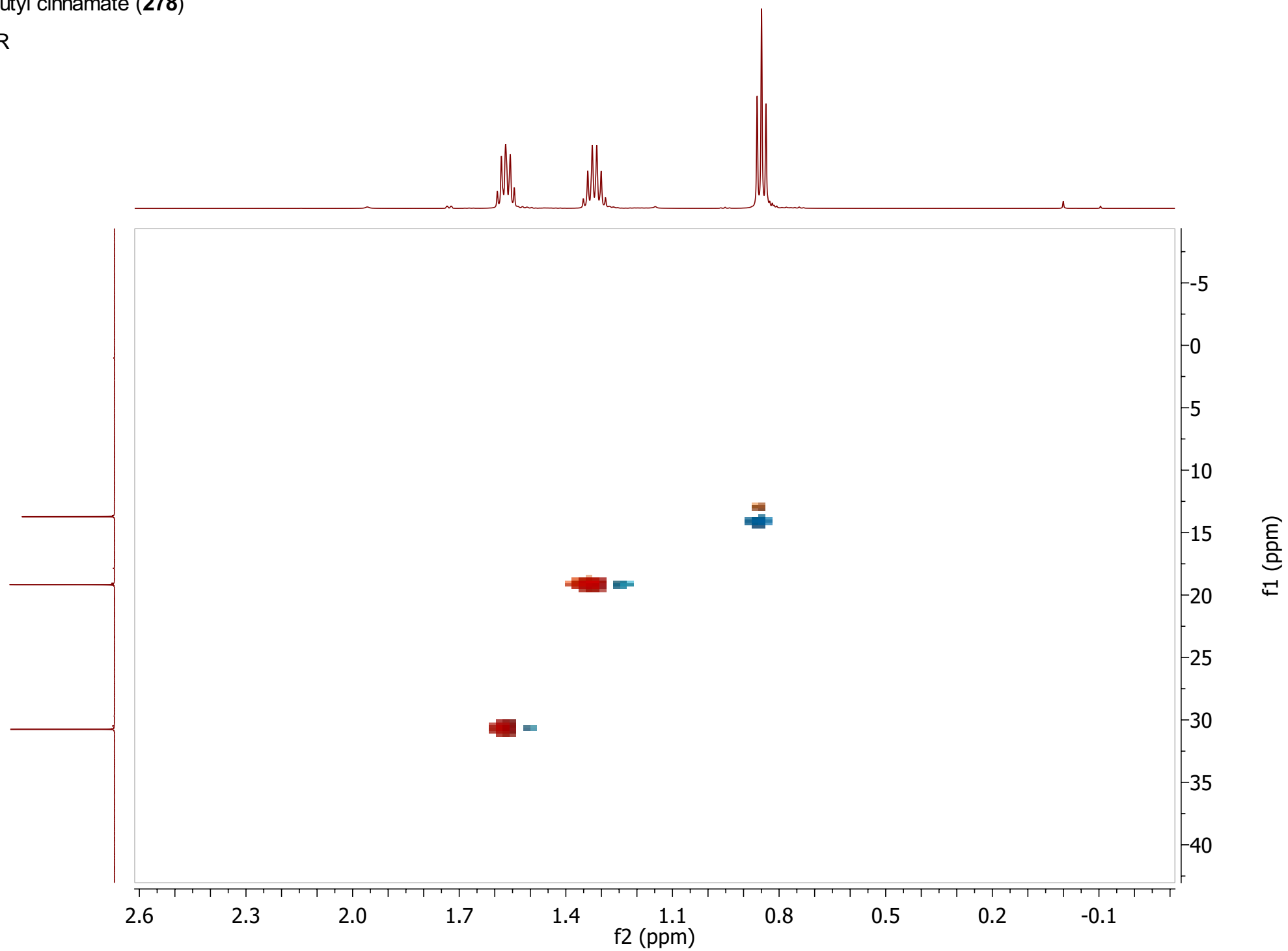


Plate 4d: Butyl cinnamate (278)

HMBC NMR

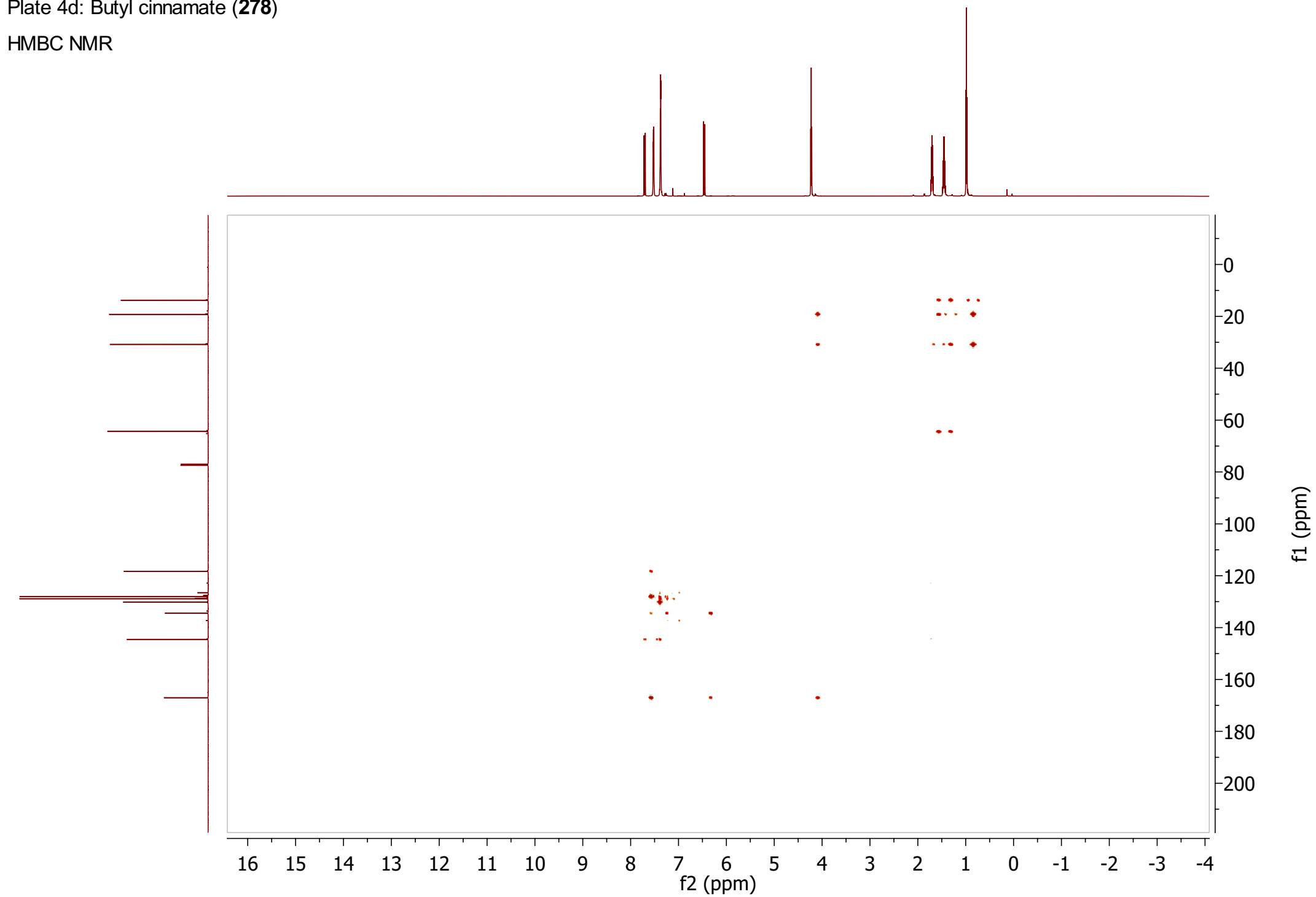


Plate 4e: Butyl cinnamate (278)

^{13}C DEPT135 NMR

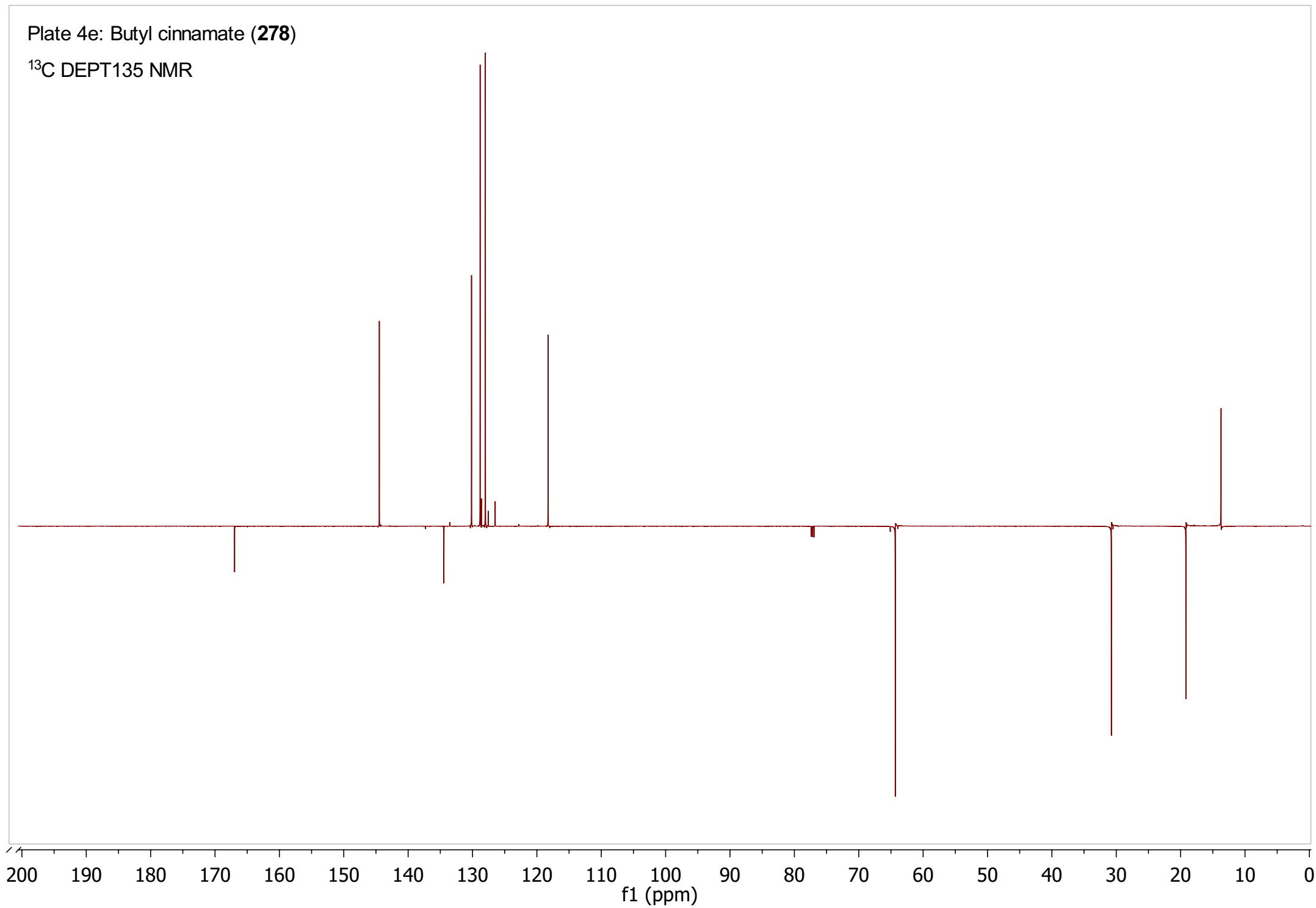


Plate 5a: 2-Ethylhexyl cinnamate (**282**)

$^1\text{H NMR}$ [600 MHz, CDCl_3]: δ 7.68 (1H, d, $J = 16.0$ Hz, H-3), 7.55-7.51 (2H, m, H-2',6'), 7.40-7.35 (3H, m, H-3',4',5'), 6.45 (1H, d, $J = 16.0$ Hz, H-2), 4.17-4.09 (2H, m, H-1''), 1.69-1.61 (1H, m, H-2''), 1.47-1.29 (8H, m, H-3'',4'',5'',1'''), 0.94-0.89 (6H, m, H-6'',2'').

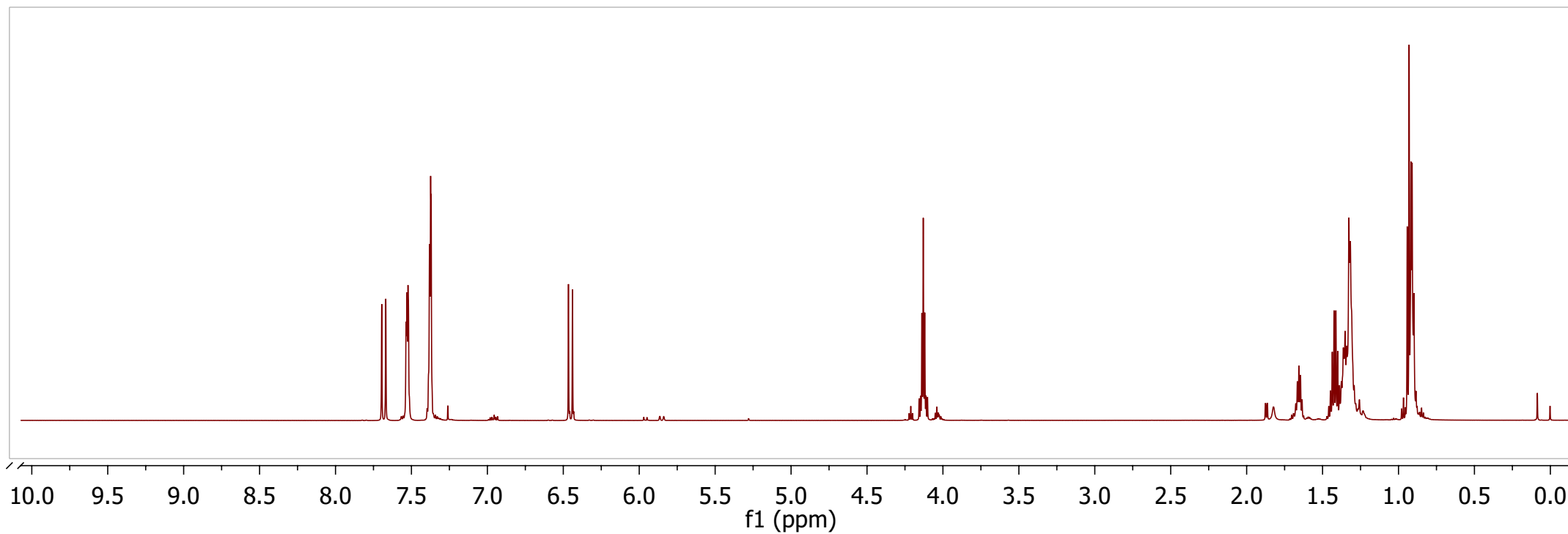
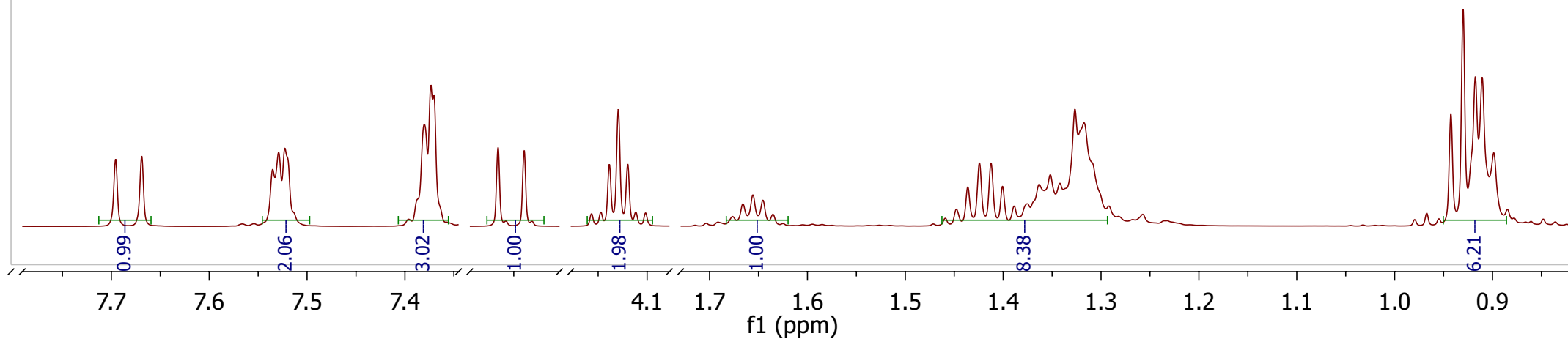
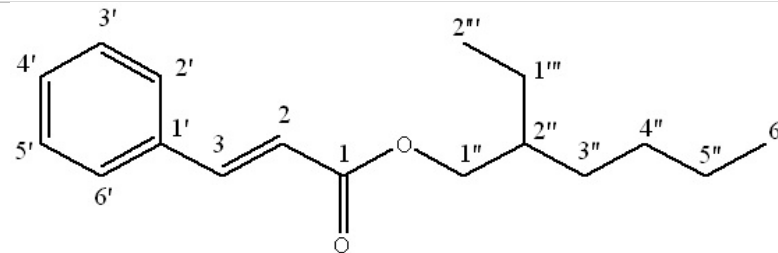


Plate 5b: 2-Ethylhexyl cinnamate (**282**)

^{13}C NMR [151 MHz, CDCl_3]: δ 167.3 (C-1), 144.6 (C-3), 134.6 (C-1'), 130.3 (C-4'), 128.9 (C-3',5'), 128.1 (C-2',6'), 118.4 (C-2), 67.1 (C-1'''), 38.9 (C-2''), 30.6, 29.1, 23.9, 23.1 (C-3'',4'',5'',1'''), 14.2, 11.1 (C-6'',2''').

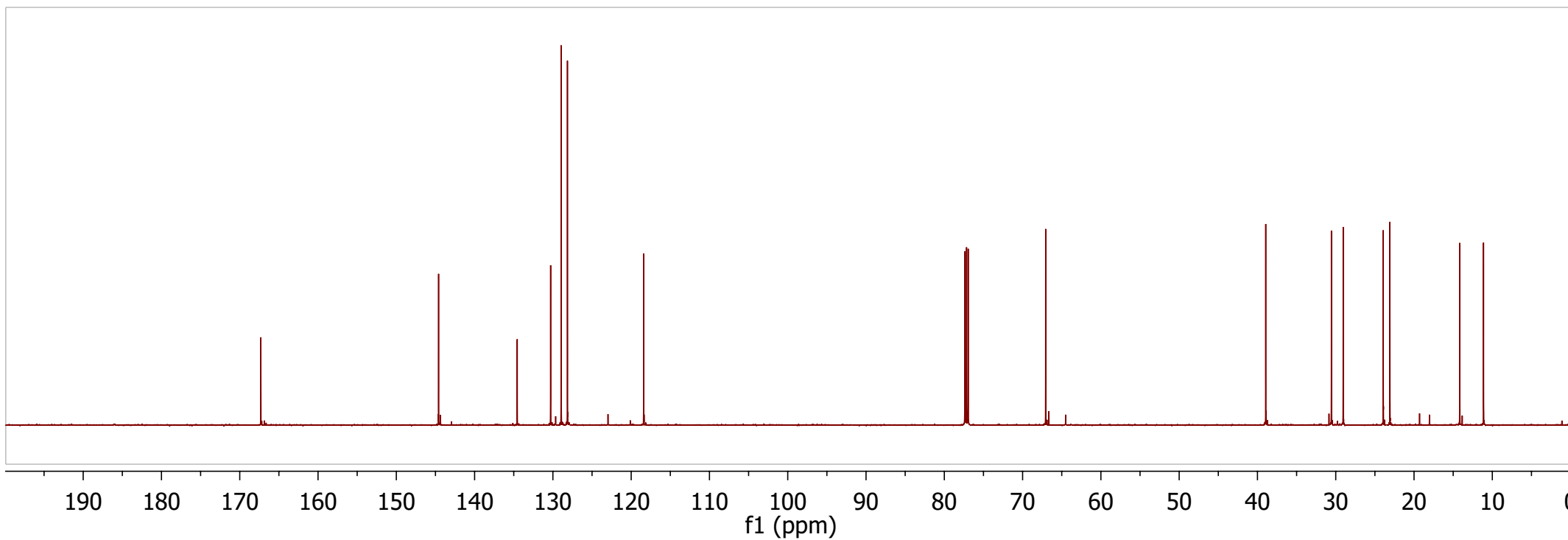
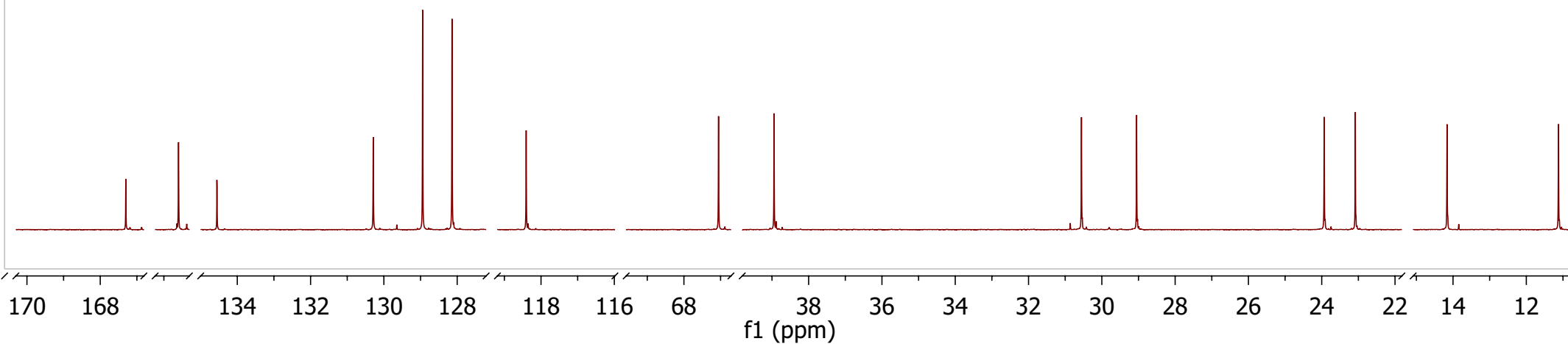
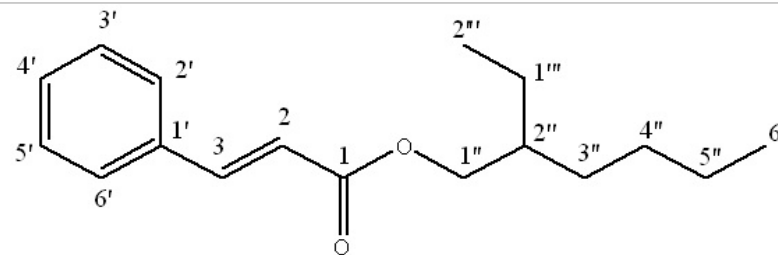


Plate 5c: 2-Ethylhexyl cinnamate (282)

HSQC NMR

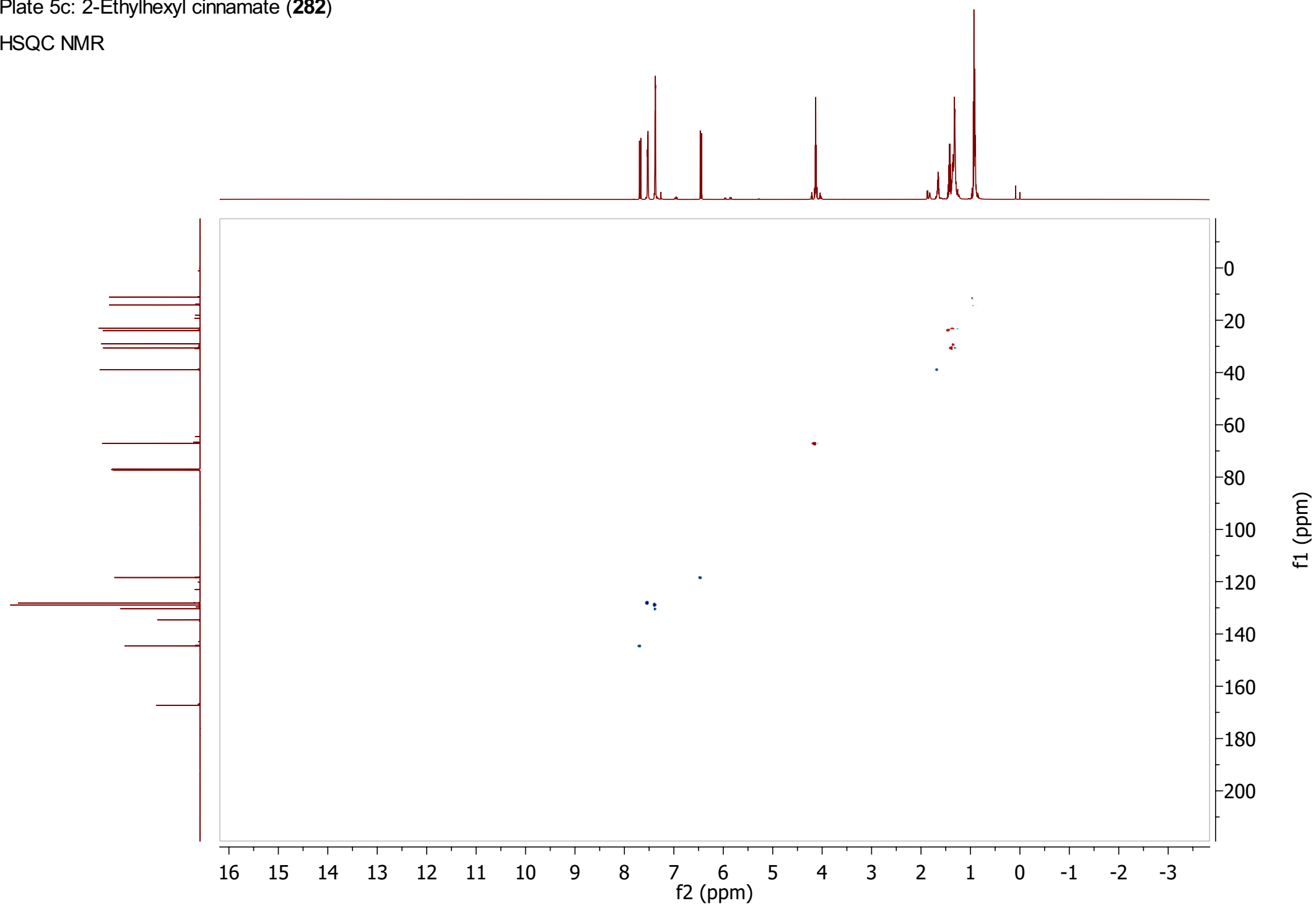


Plate 5d: 2-Ethylhexyl cinnamate (282)

HMBC NMR

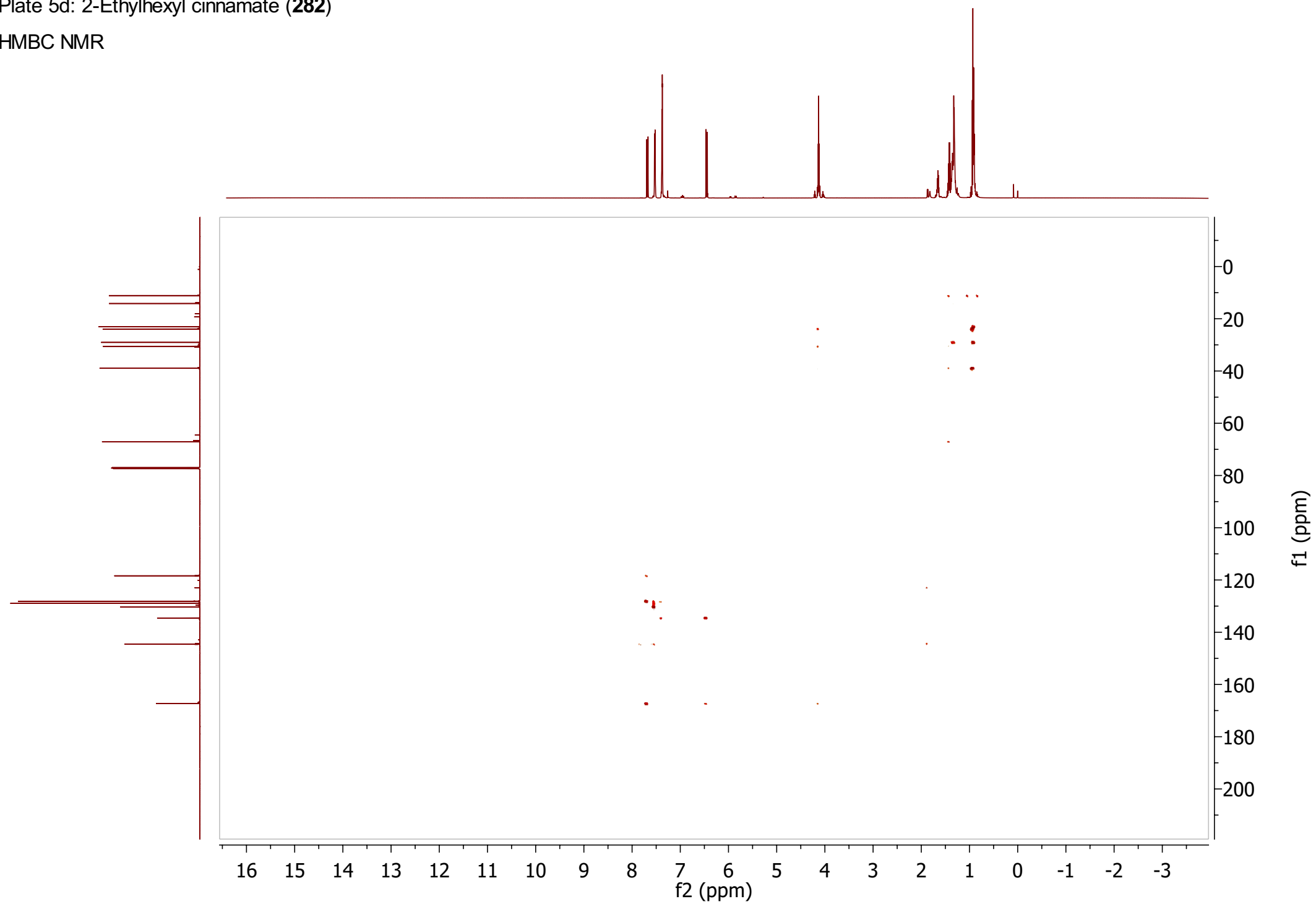


Plate 5e: 2-Ethylhexyl cinnamate (**282**)

^{13}C DEPT135 NMR

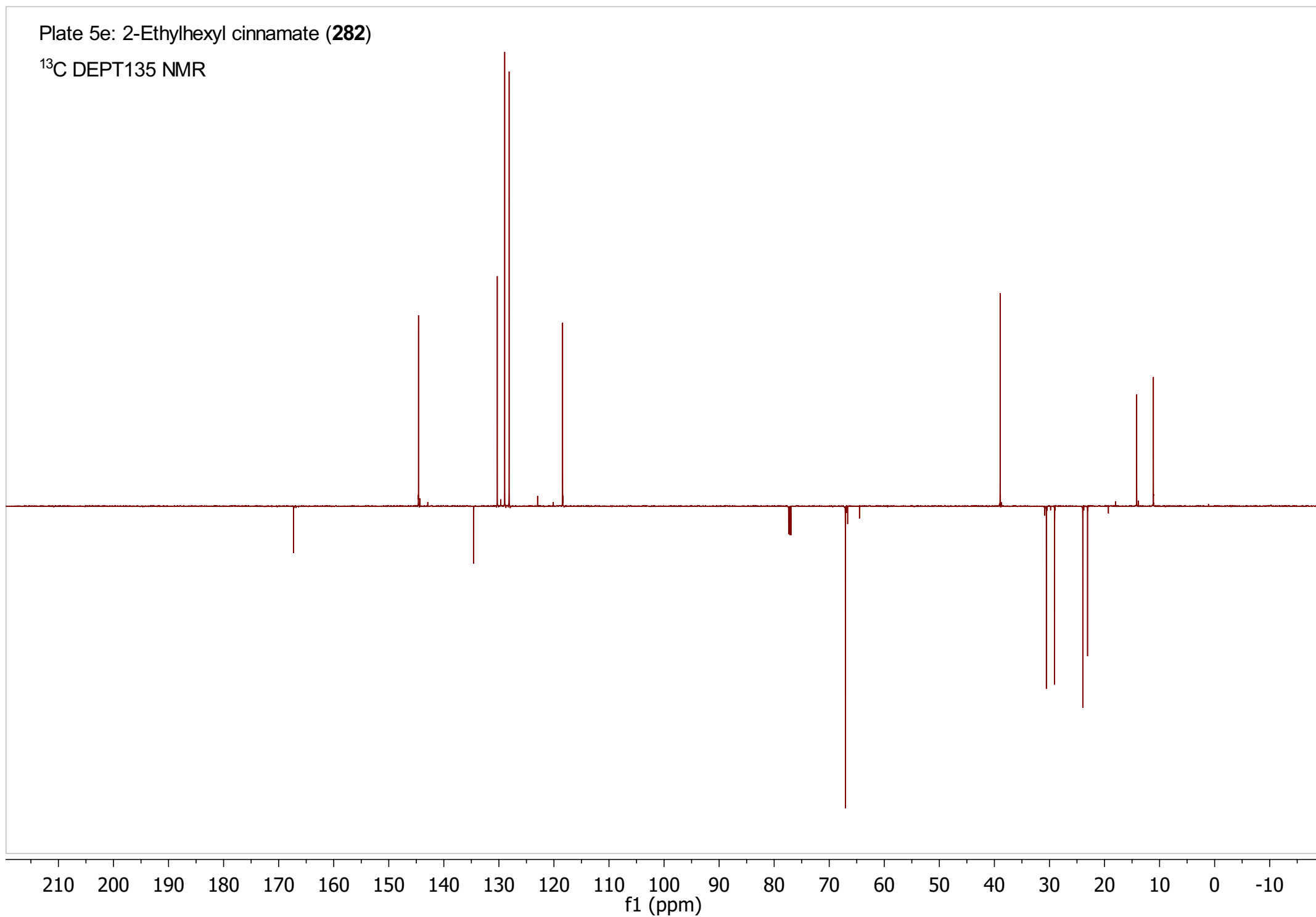


Plate 6a: (E)-4-Phenylbut-3-en-2-one (**277**)

^1H NMR [600 MHz, CDCl_3]: δ 7.51 (3H, m, H-4,2',6'),
7.39 (3H, m, H-3',4',5'), 6.71 (1H, d, $J = 16.3$ Hz,
H-3), 2.37 (3H, s, H-1).

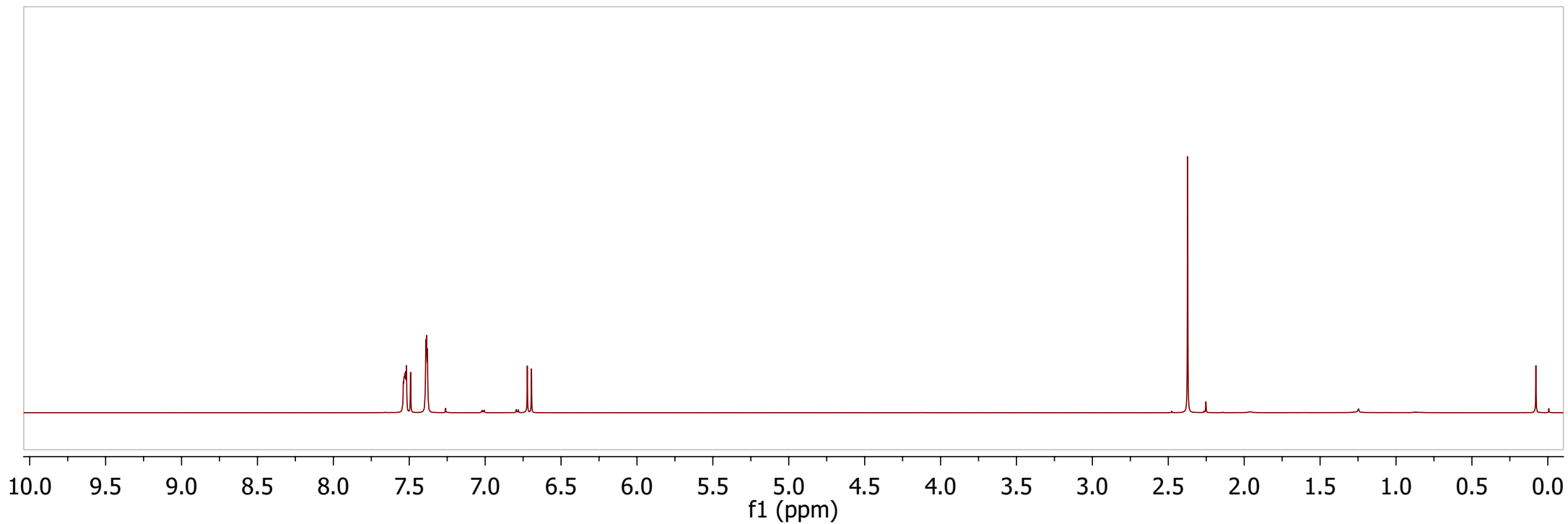
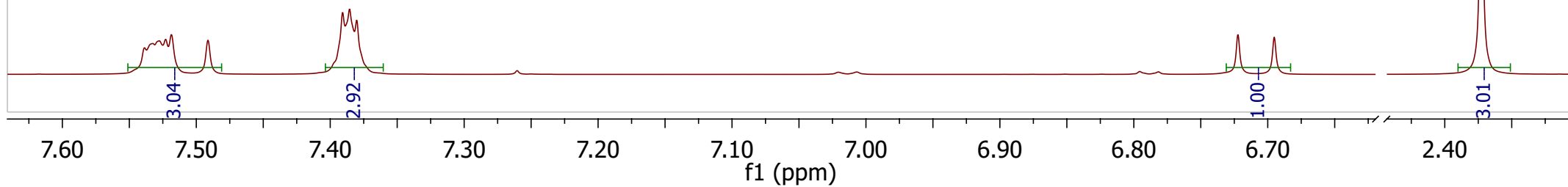
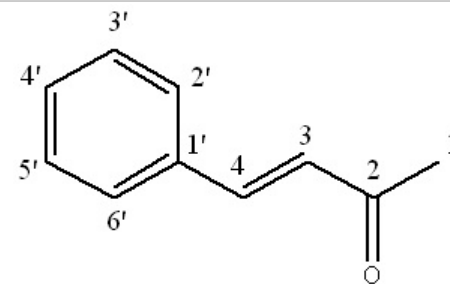


Plate 6b: (E)-4-Phenylbut-3-en-2-one (**277**)

^{13}C NMR [151 MHz, CDCl_3]: δ 198.55 (C-2), 143.56 (C-4), 134.45 (C-1'), 130.60 (C-4'), 129.04 (C-3',5'), 128.33 (C-2',6'), 127.18 (C-3), 27.56 (C-1).

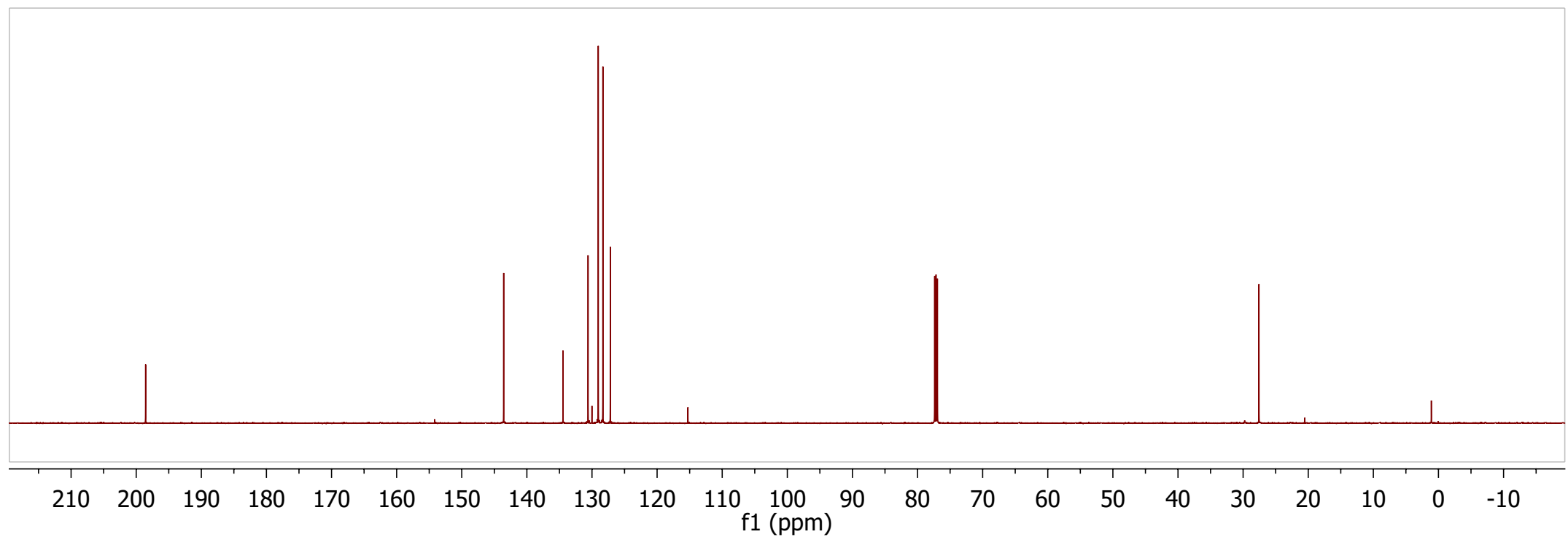
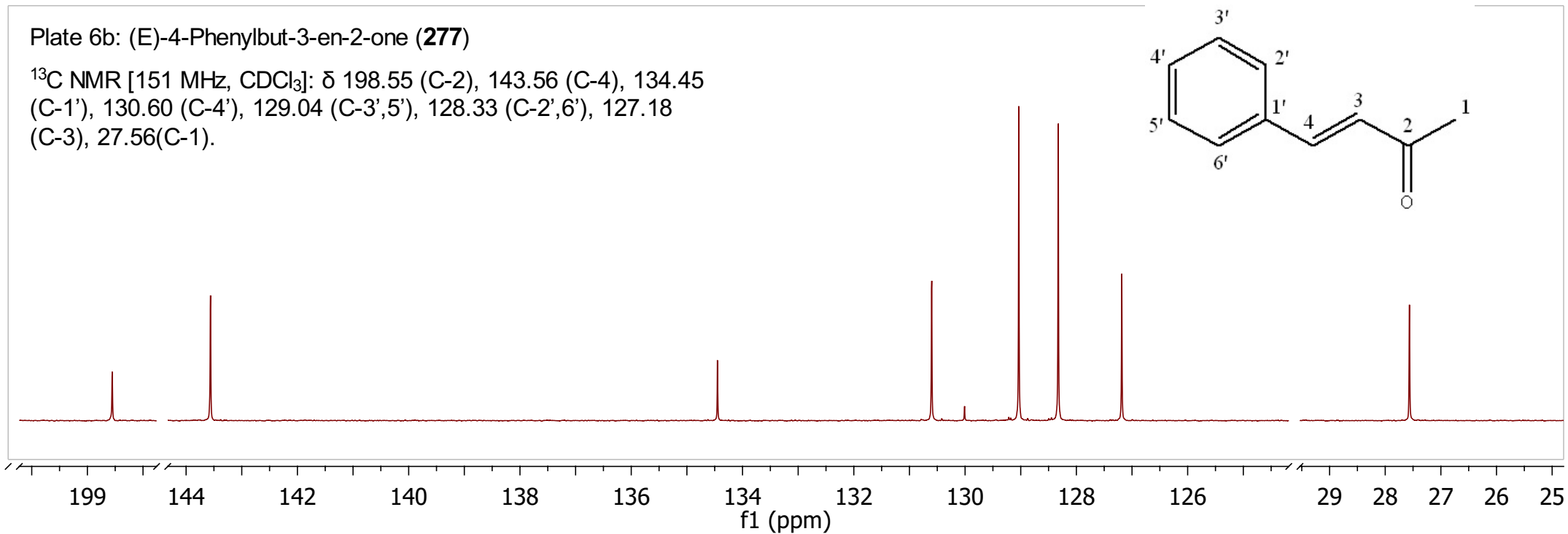
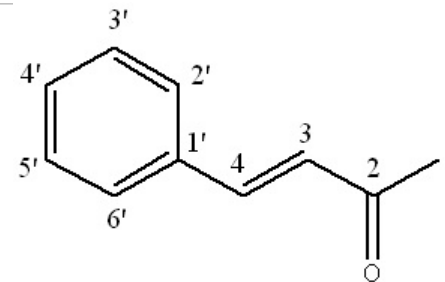


Plate 6c: (E)-4-Phenylbut-3-en-2-one (**277**)

HSQC NMR

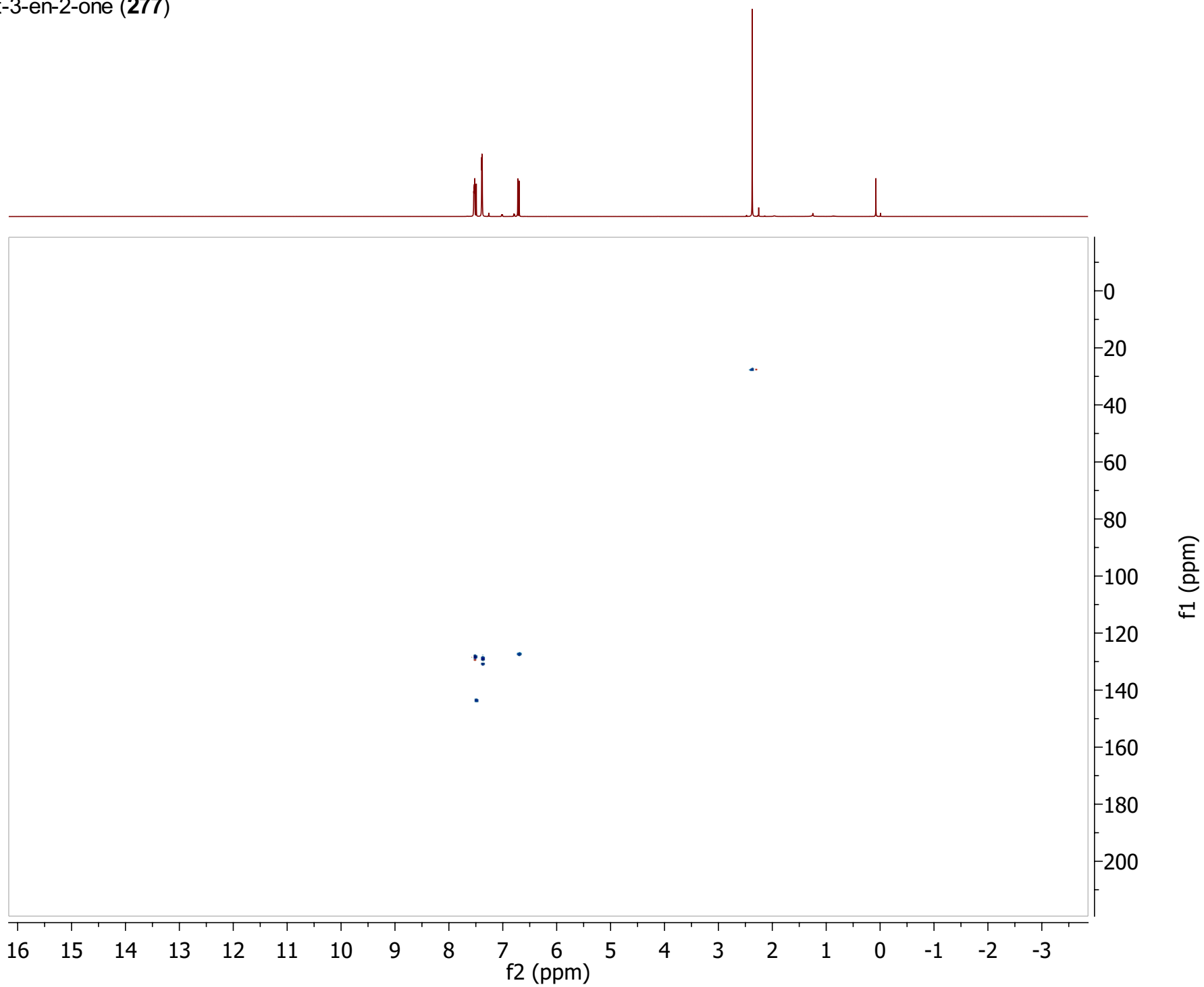


Plate 6d: (E)-4-Phenylbut-3-en-2-one (277)

HMBC NMR

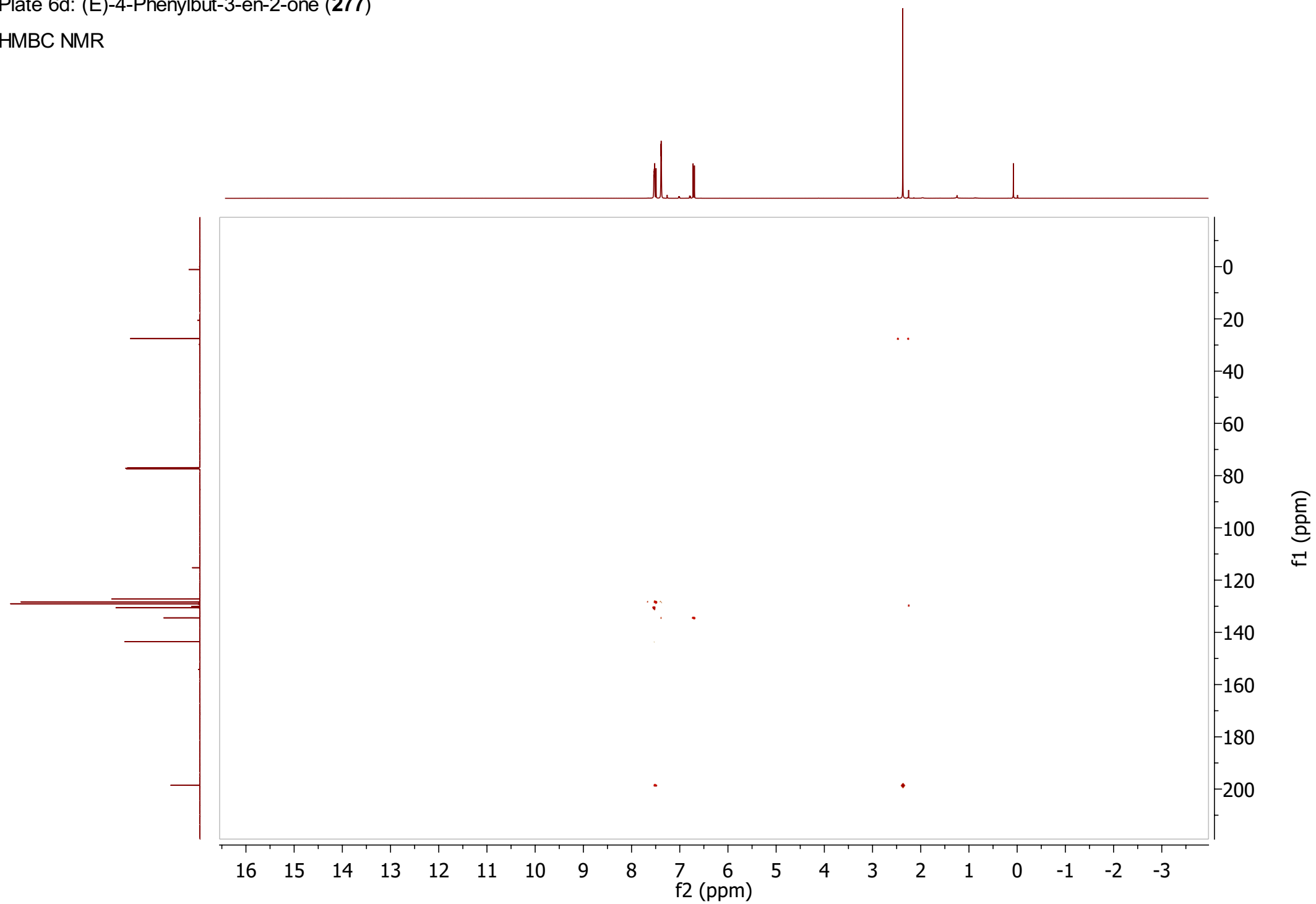


Plate 6e: (E)-4-Phenylbut-3-en-2-one (**277**)

^{13}C DEPT135 NMR

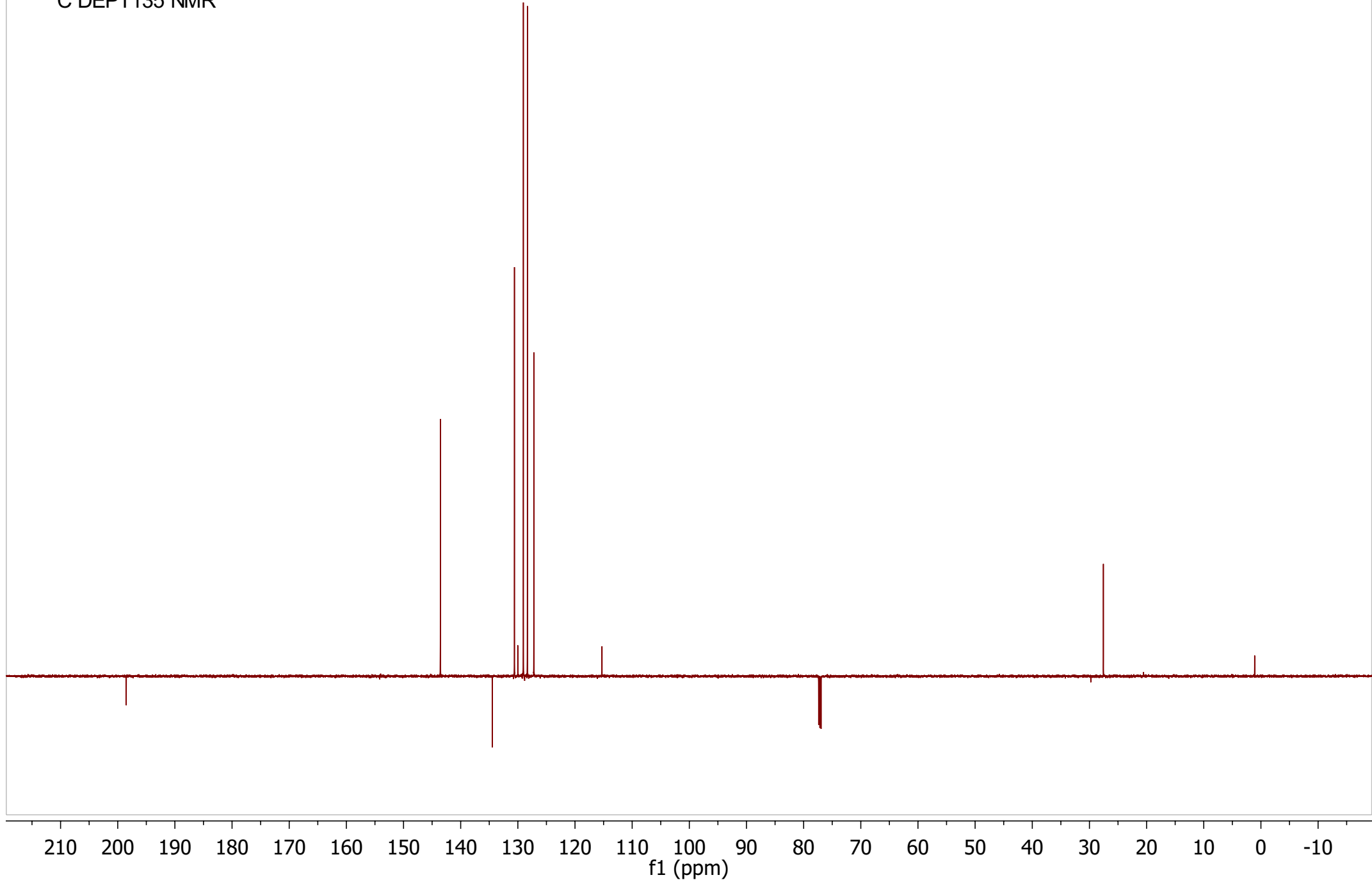


Plate 7a: (E)-methyl 4-methoxycinnamate (**35**)

$^1\text{H NMR}$ [600 MHz, CDCl_3]: δ 7.63 (1H, d, $J = 16.0$ Hz, H-3), 7.45 (2H, d, $J = 8.8$ Hz, H-2',6'), 6.88 (2H, d, $J = 8.8$ Hz, H-3',5'), 6.29 (1H, d, $J = 16.0$ Hz, H-2), 3.80 (3H, s, Ar-OMe), 3.77 (3H, s, H-1'').

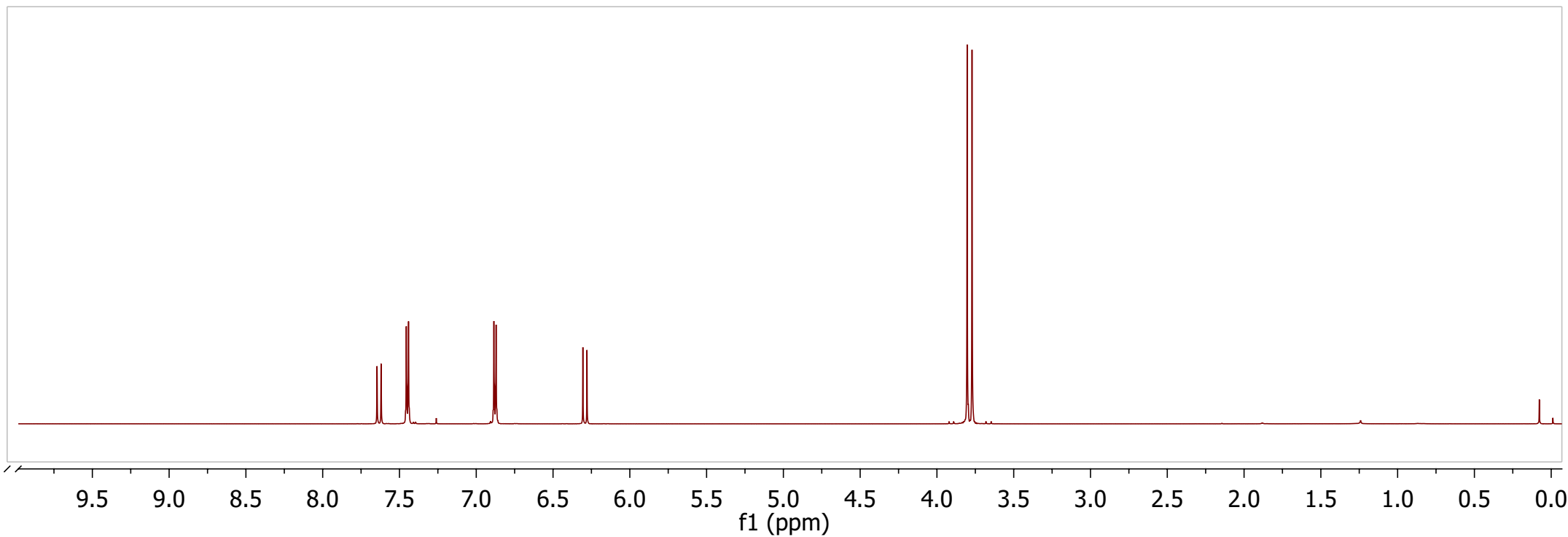
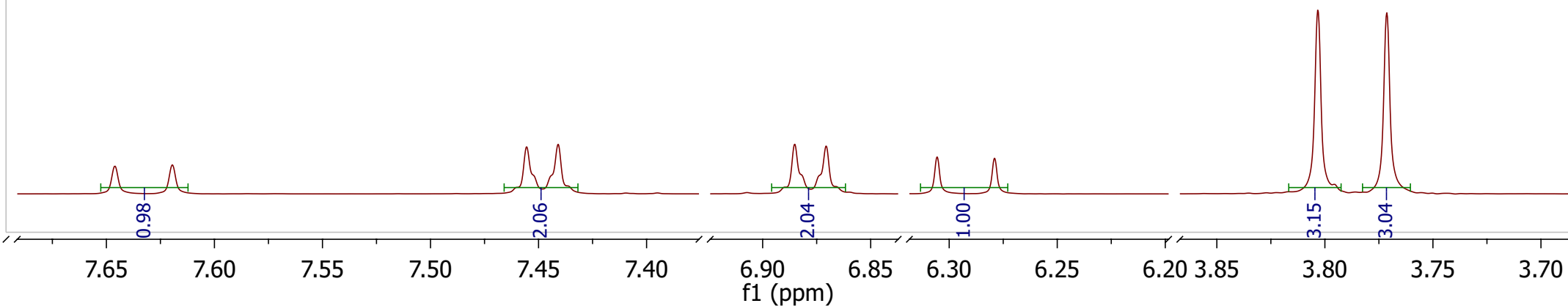
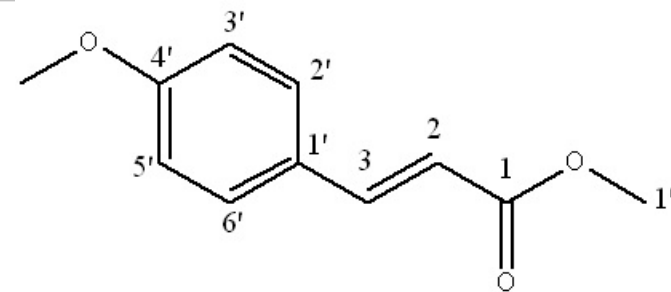


Plate 7b: (E)-methyl 4-methoxycinnamate (**35**)

^{13}C NMR [151 MHz, CDCl_3]: δ 167.8 (C-1), 161.4 (C-4'), 144.6 (C-3),
129.8 (C-2',6'), 127.1 (C-1'), 115.3 (C-2), 114.4 (C-3',5'), 55.4 (-OMe),
51.6 (C-1'').

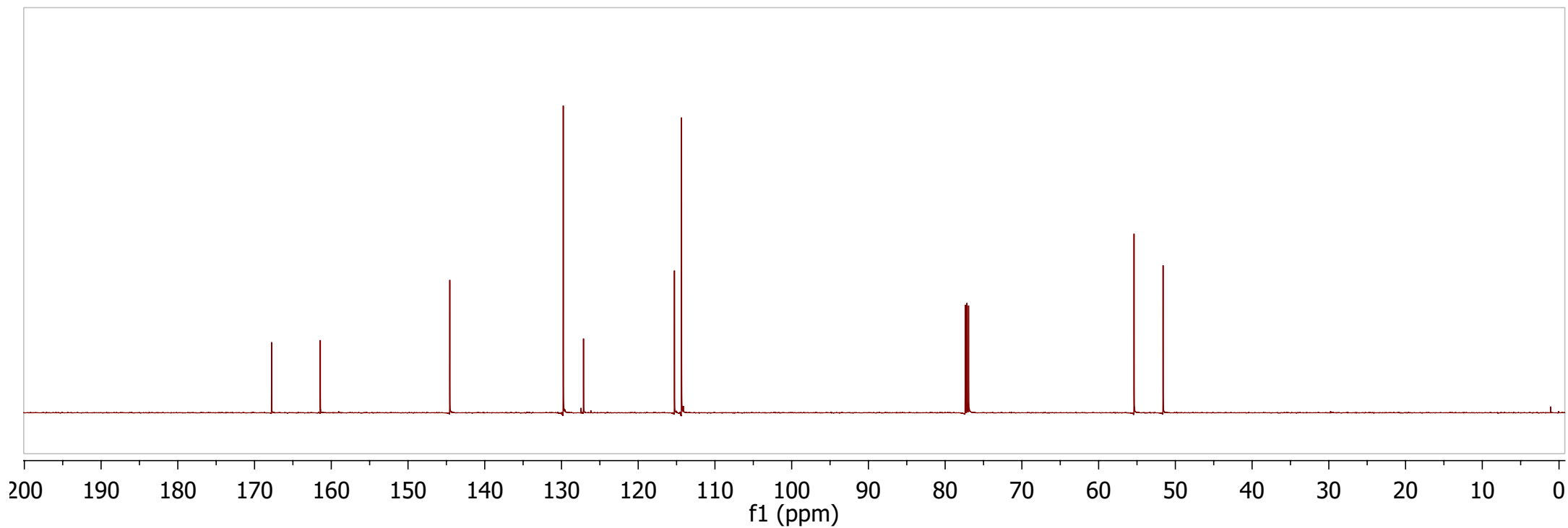
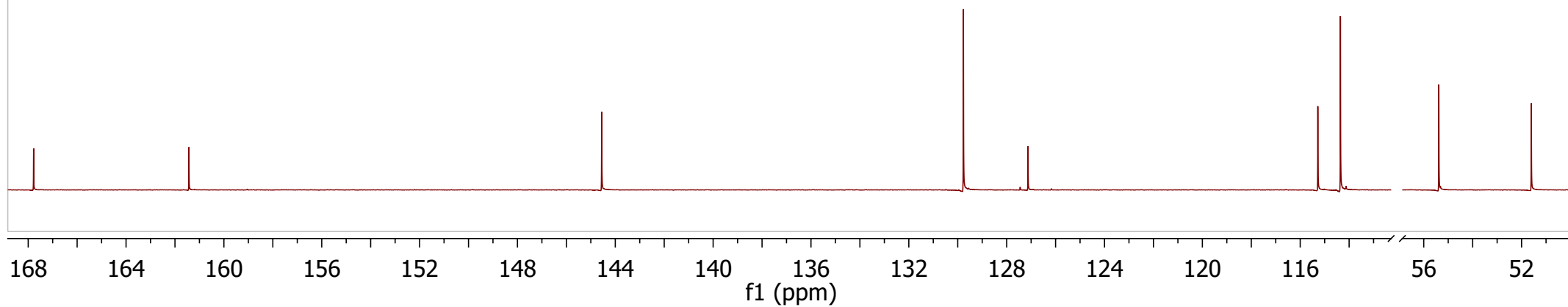
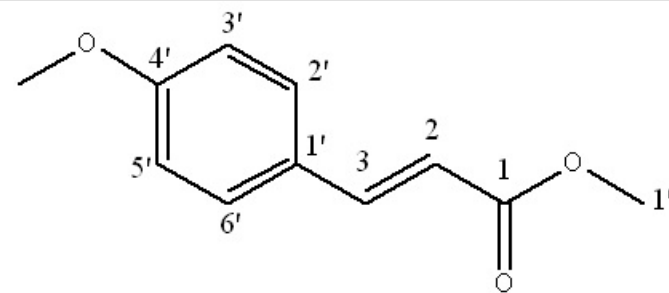


Plate 7c: (E)-methyl 3-(4-methoxyphenyl)acrylate (**35**)

HSQC NMR

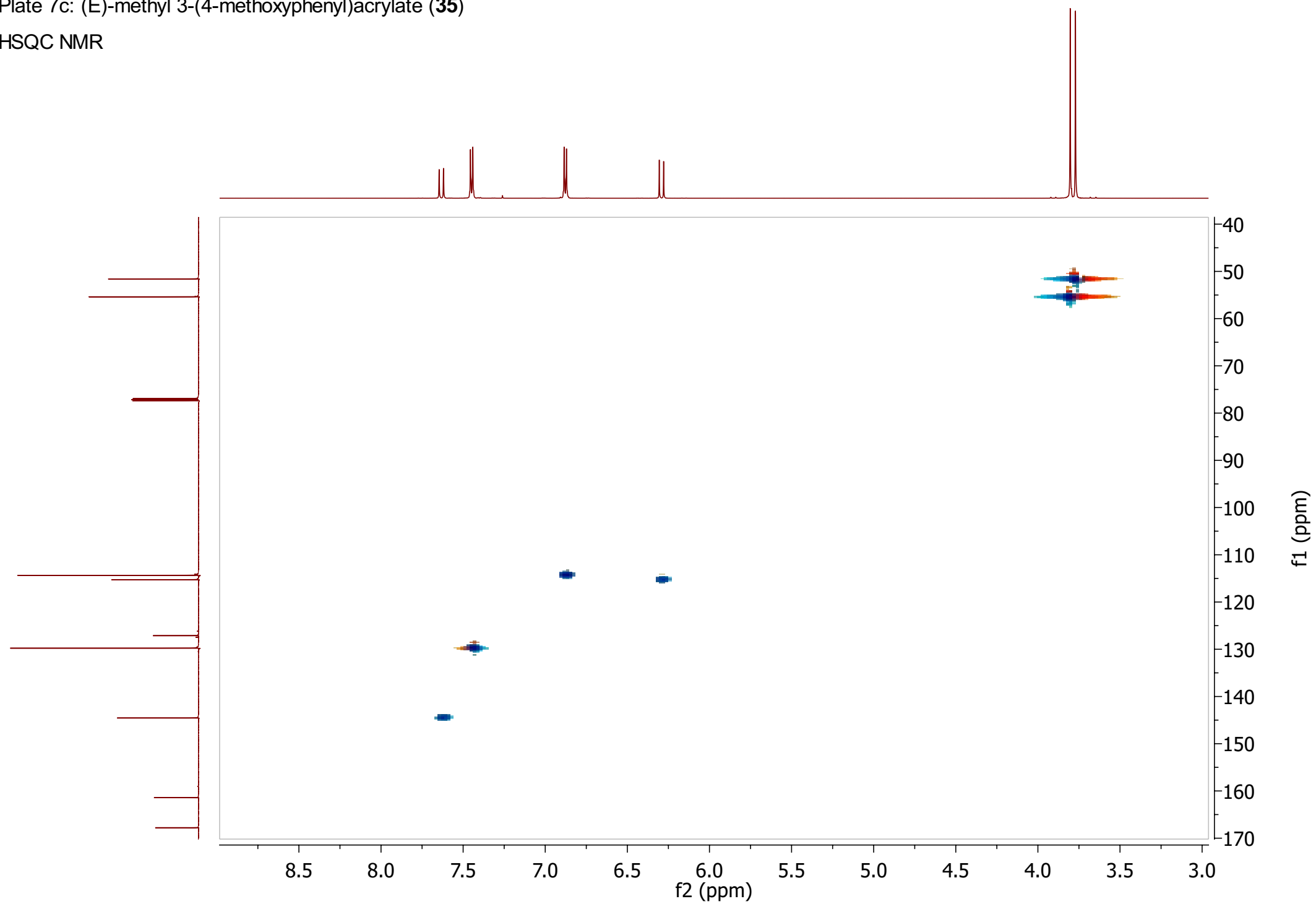


Plate 7d: (E)-methyl 3-(4-methoxyphenyl)acrylate (**35**)

HMBC NMR

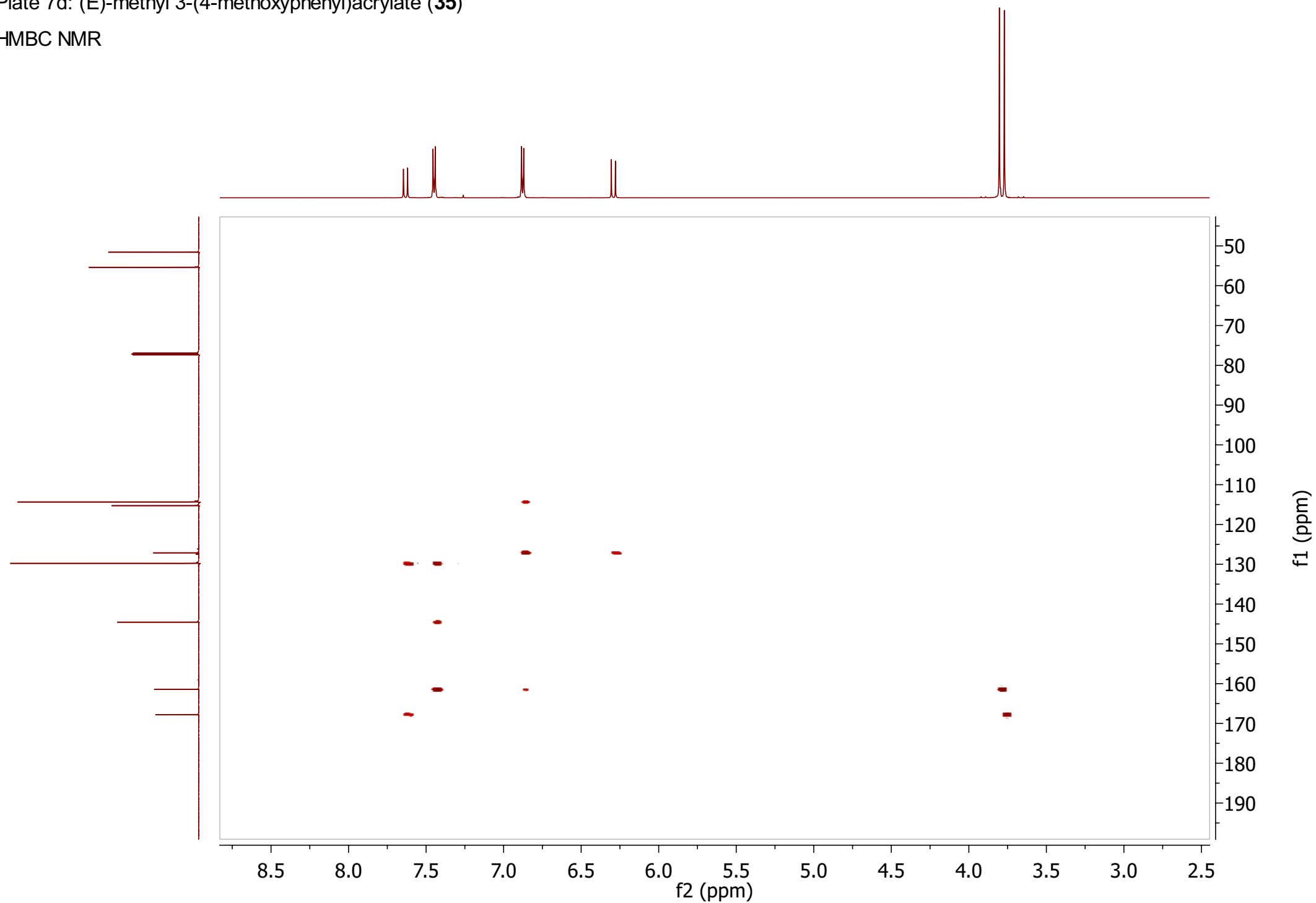


Plate 7e: (E)-methyl 3-(4-methoxyphenyl)acrylate (**35**)

^{13}C DEPT135 NMR

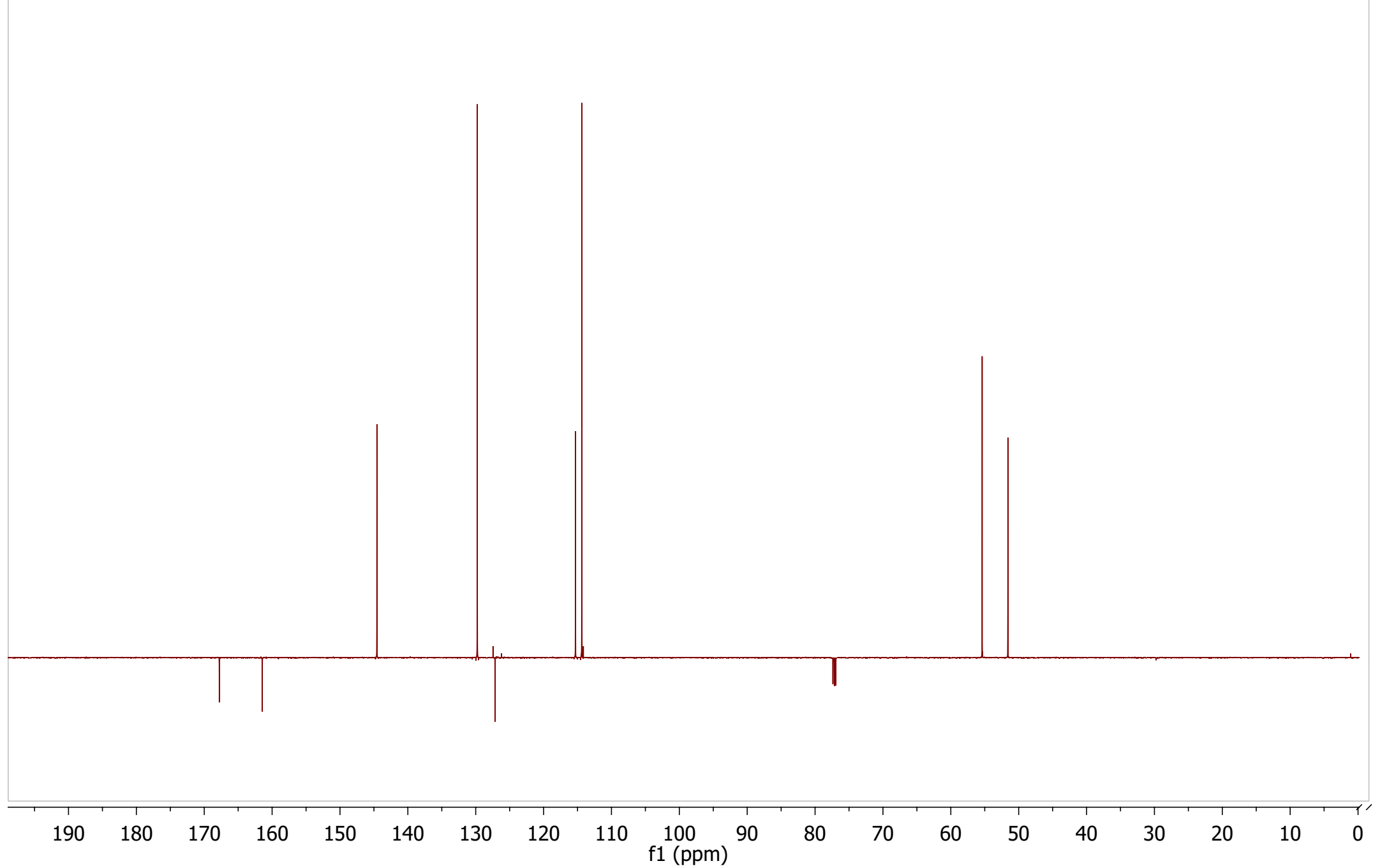


Plate 8a: (E)-butyl 4-methoxycinnamate (**281**)

^1H NMR [600 MHz, CDCl_3]: δ 7.62 (1H, d, $J = 16.0$ Hz, H-3), 7.45 (2H, d, $J = 8.7$ Hz, H-3',5'), 6.87 (2H, d, $J = 8.7$ Hz, H-2',6'), 6.29 (1H, d, $J = 16.0$ Hz, H-2), 4.18 (2H, t, $J = 6.7$ Hz, H-1''), 3.80 (3H, s, - OMe), 1.71 – 1.61 (2H, m, H-2''), 1.46 – 1.36 (2H, m, H-3''), 0.95 (3H, t, $J = 7.4$ Hz, H-4'').

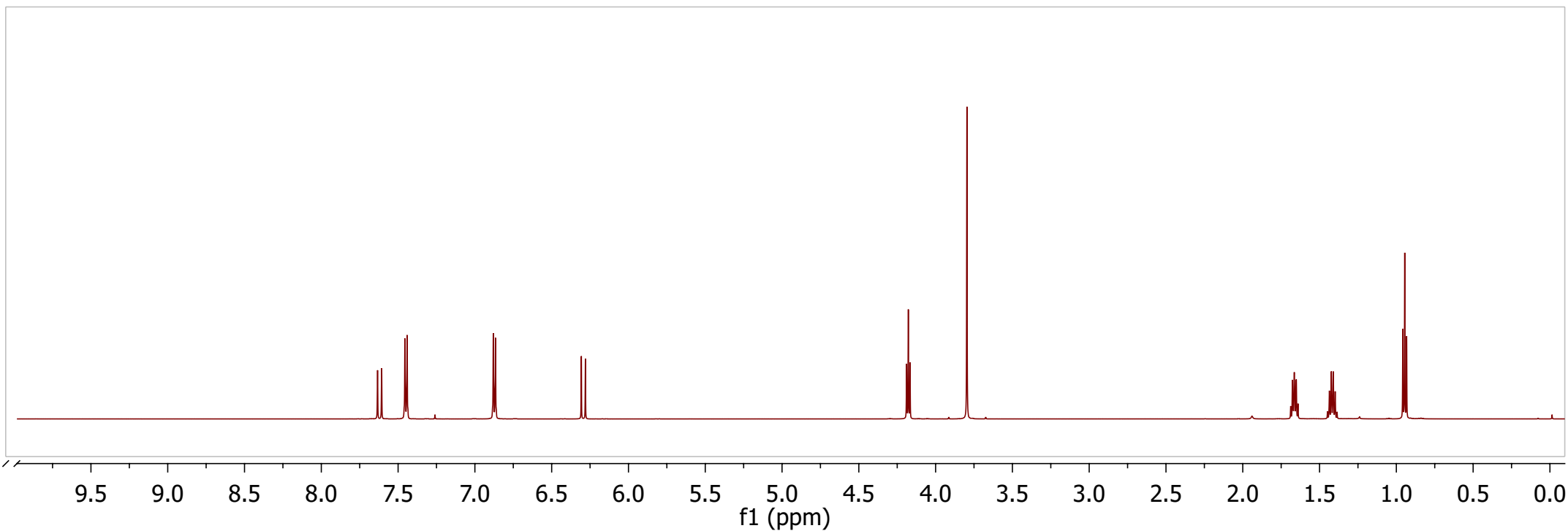
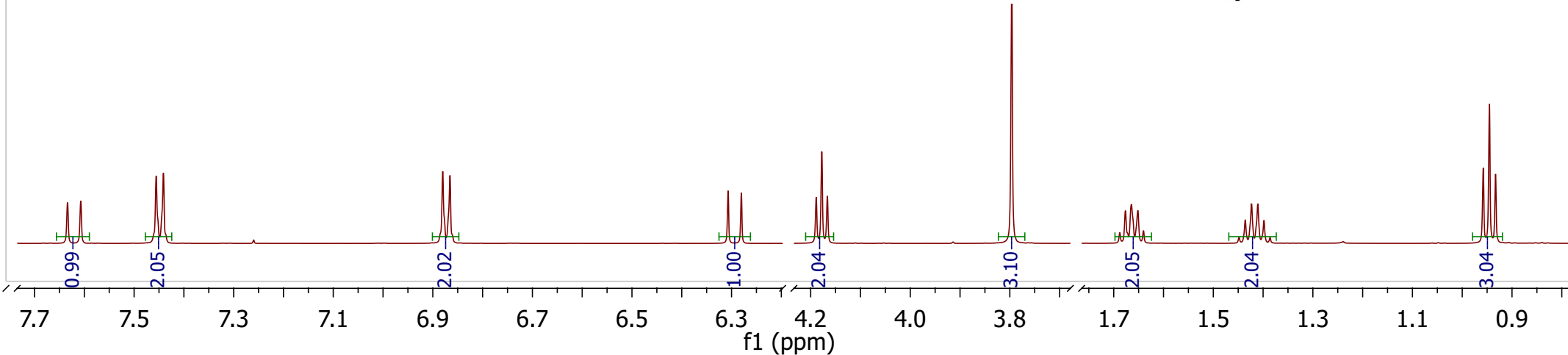
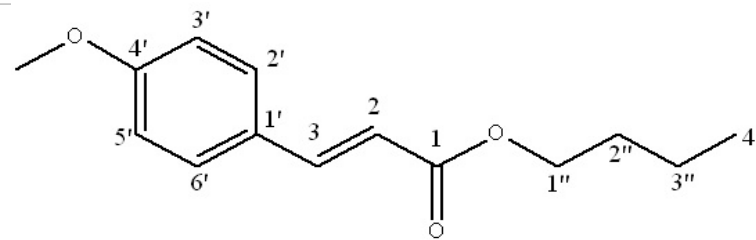


Plate 8b: (E)-butyl 4-methoxycinnamate (**281**)

^{13}C NMR [151 MHz, CDCl_3]: δ 167.4 (C-1), 161.4 (C-4'), 144.2 (C-3), 129.7 (C-2',6'), 127.2 (C-1'), 115.8 (C-2), 114.3 (C-3',5'), 64.3 (C-1''), 55.3 (-OMe), 30.9 (C-2''), 19.3 (C-3''), 13.8 (C-4'').

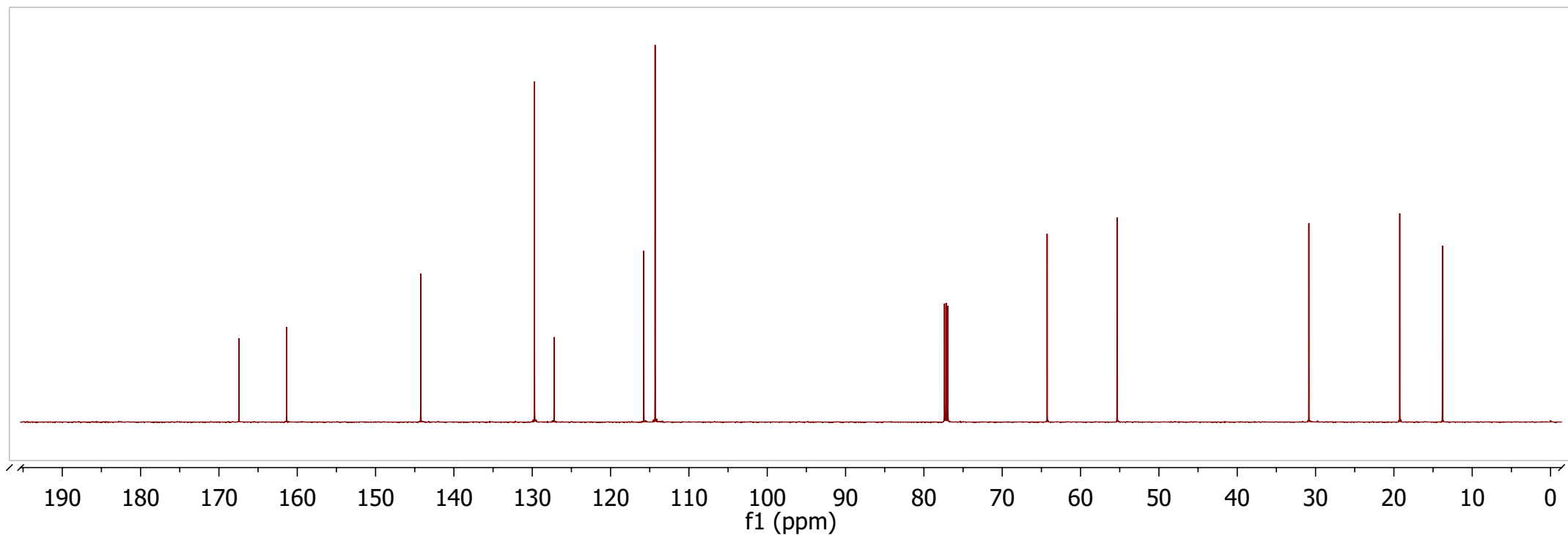
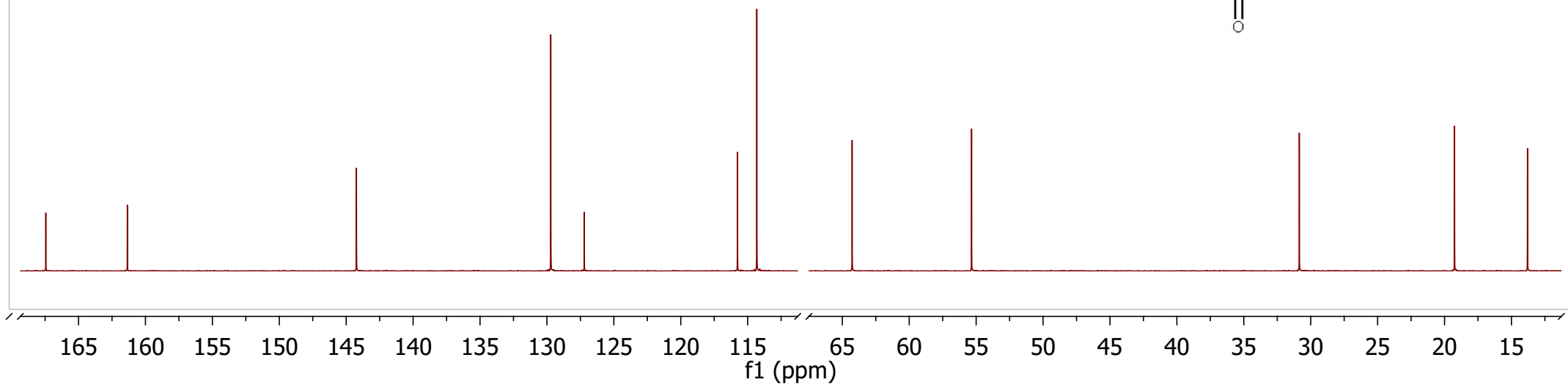
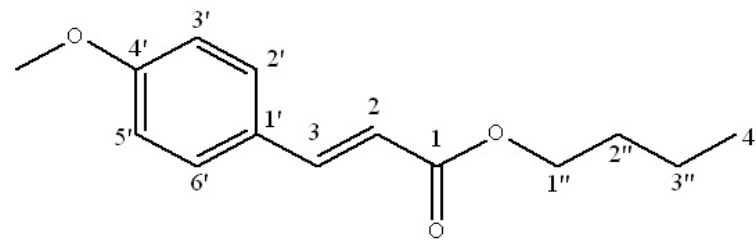


Plate 8c: (E)-butyl 4-methoxycinnamate (**281**)

HSQC NMR

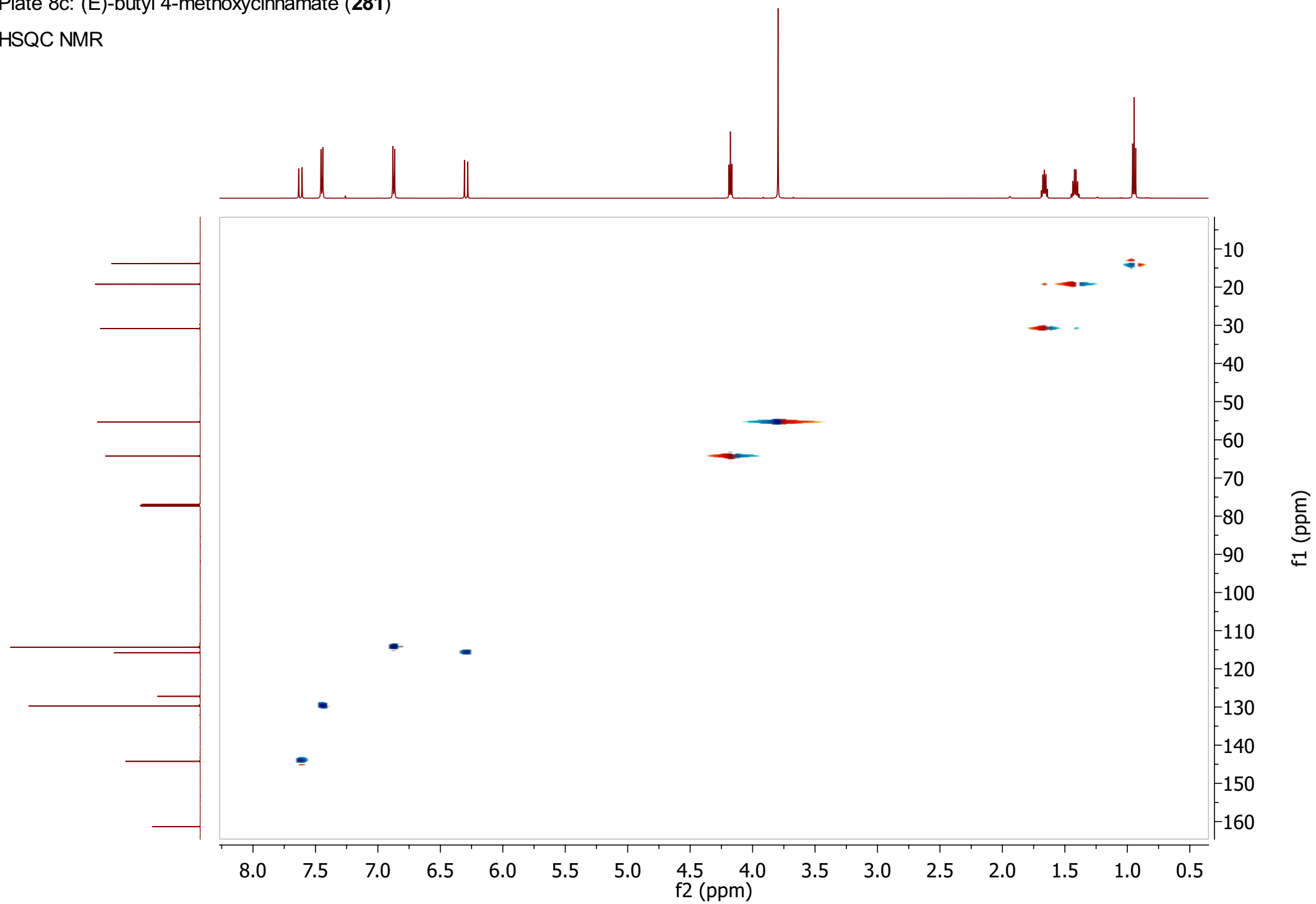


Plate 8d: (E)-butyl 4-methoxycinnamate (**281**)

HMBC NMR

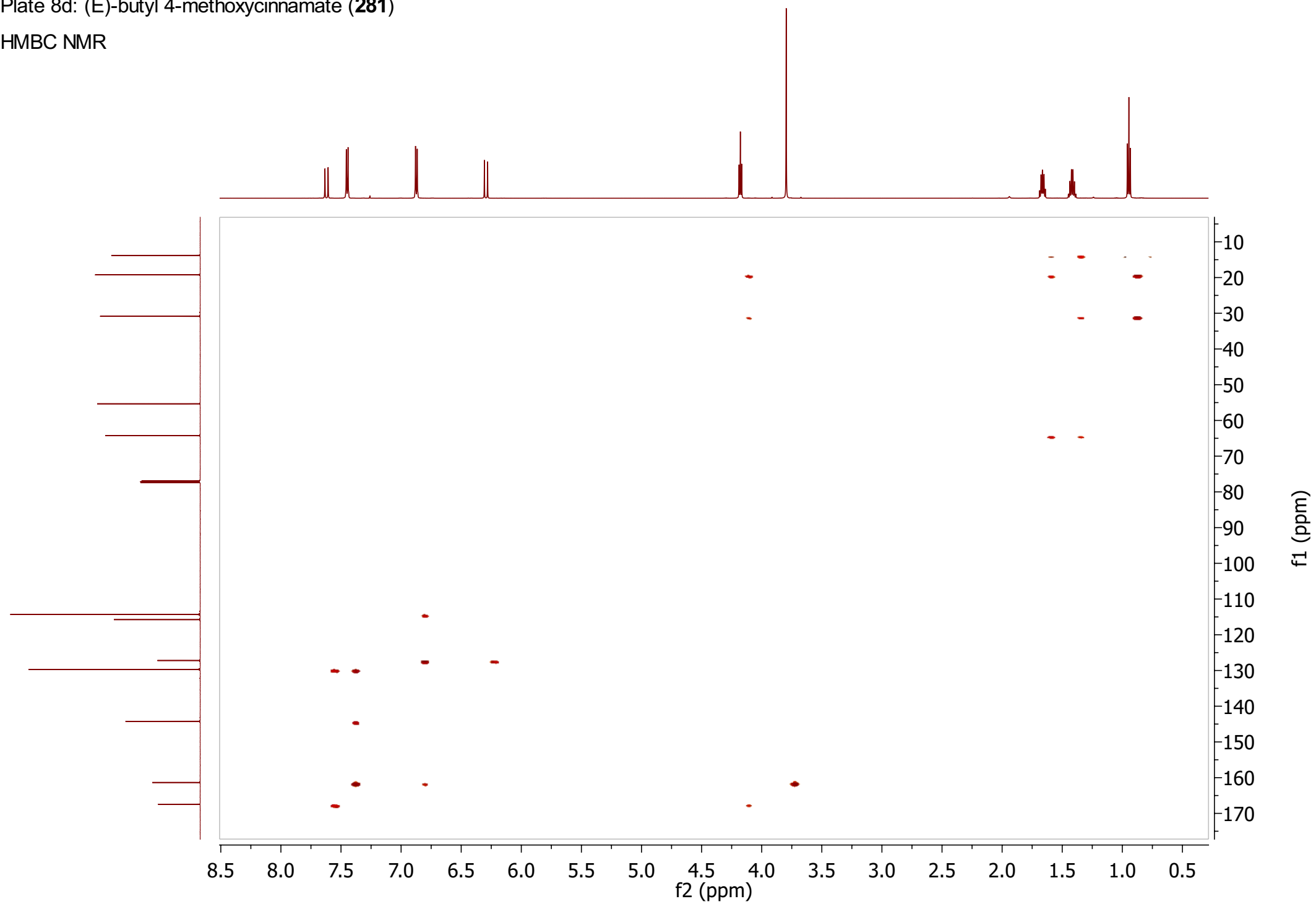


Plate 8e: (E)-butyl 4-methoxycinnamate (**281**)

^{13}C DEPT135 NMR

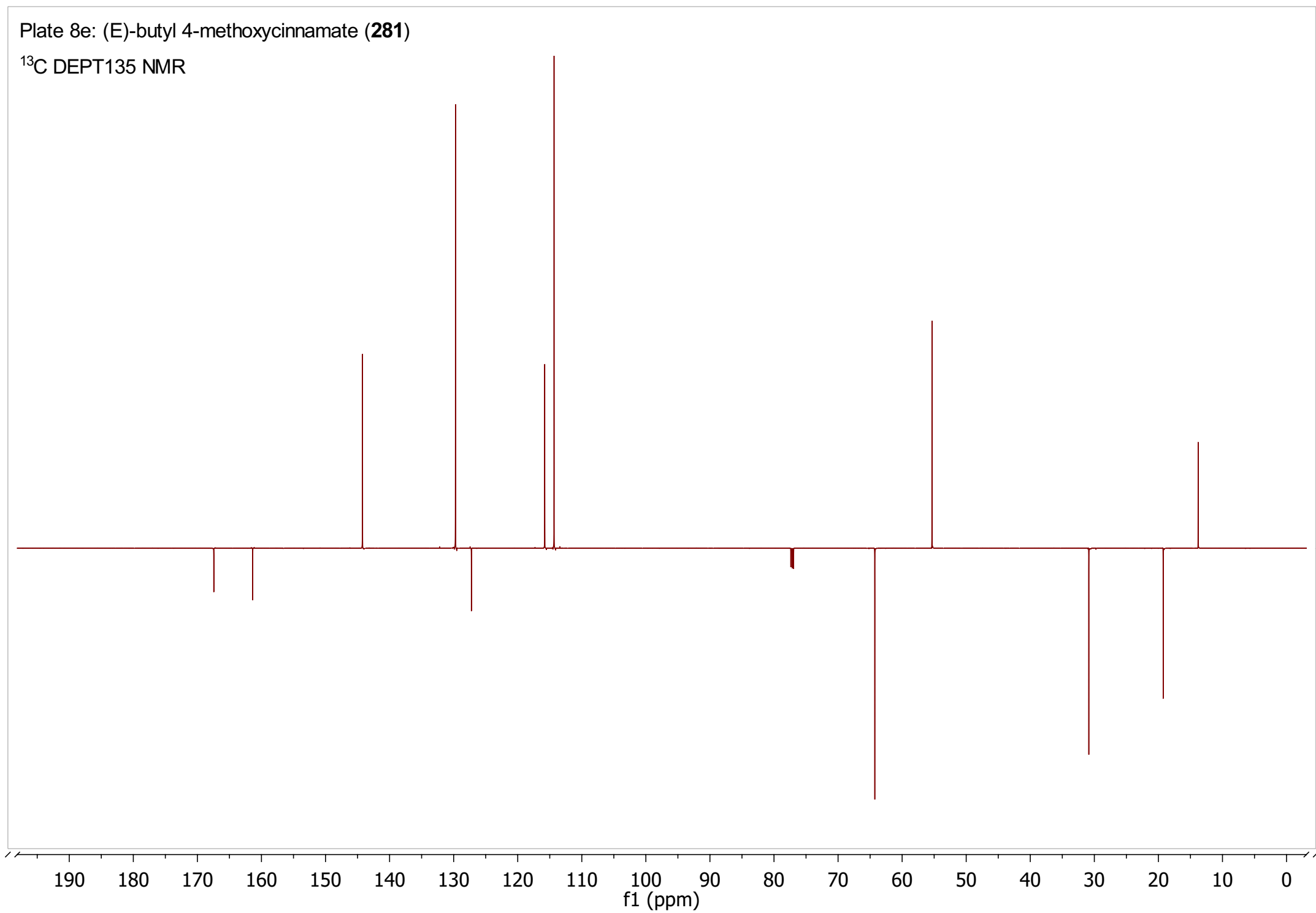


Plate 9a: (E)-2-ethylhexyl 4-methoxycinnamate (**7**)

$^1\text{H NMR}$ [600 MHz, CDCl_3]: δ 7.62 (1H, d, $J = 16.0$ Hz, H-3), 7.45 (2H, d, $J = 8.7$ Hz, H-2',6'), 6.87 (2H, d, $J = 8.7$ Hz, H3',5'), 6.30 (1H, d, $J = 16.0$ Hz, H-2), 4.09 (1H, m, H-1'''), 3.79 (3H, s, $-\text{OCH}_3$), 1.67 – 1.58 (1H, m, H-2''), 1.47 – 1.24 (8H, m, H-3'',4'',5'',1'''), 0.94 – 0.86 (6H, m, H-6'',2'').

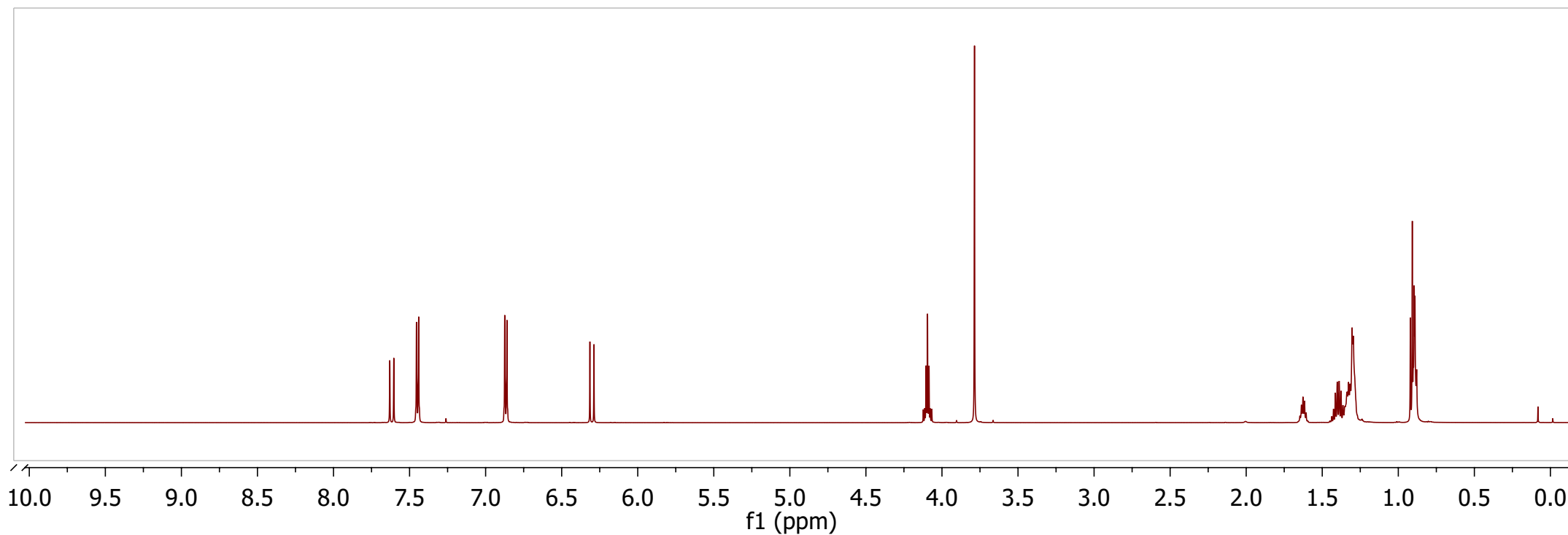
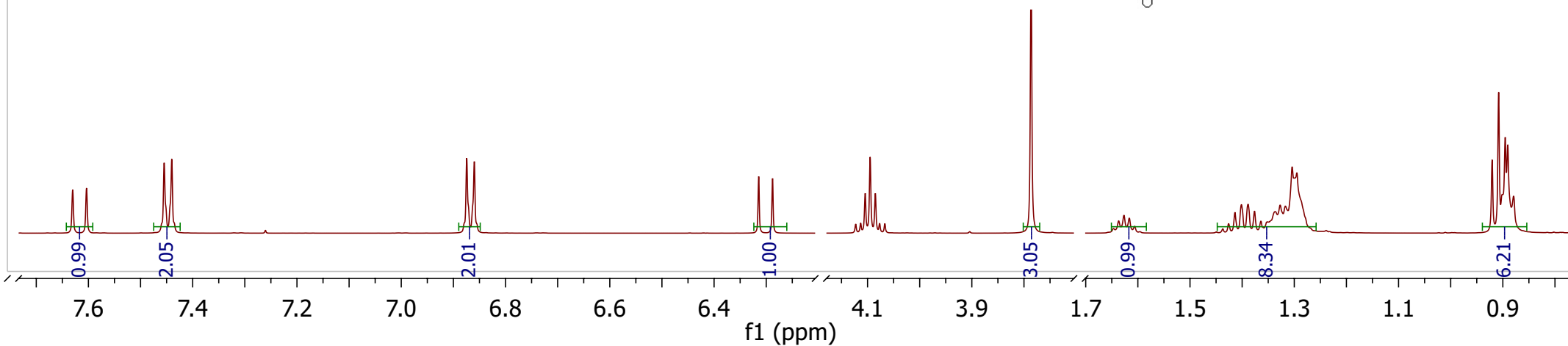
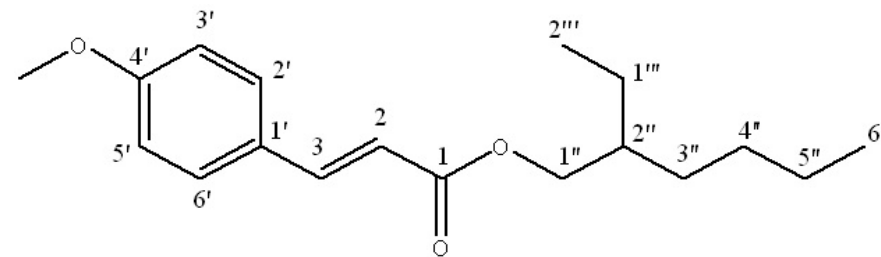


Plate 9b: (E)-2-ethylhexyl 4-methoxycinnamate (**7**)

^{13}C NMR [151 MHz, CDCl_3]: δ 167.5 (C-1), 161.3 (C-4'), 144.2 (C-3), 129.7 (C-2',6'), 127.2 (C-1'), 115.8 (C-2), 114.3 (C-3',5'), 66.8 (C-1''), 55.3 (-OMe), 38.9 (C-2''), 30.5, 29.0, 23.9, 23.0 (C-3'',4'',5'',1'''), 14.1, 11.0 (C-6'',2''').

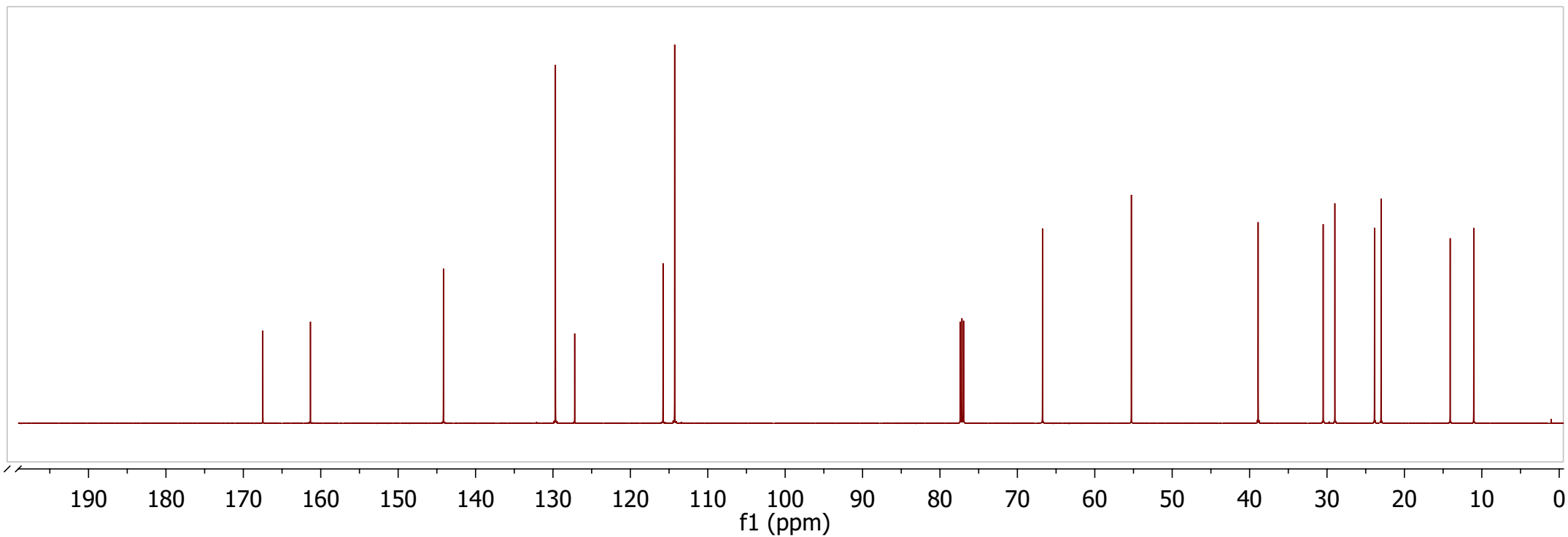
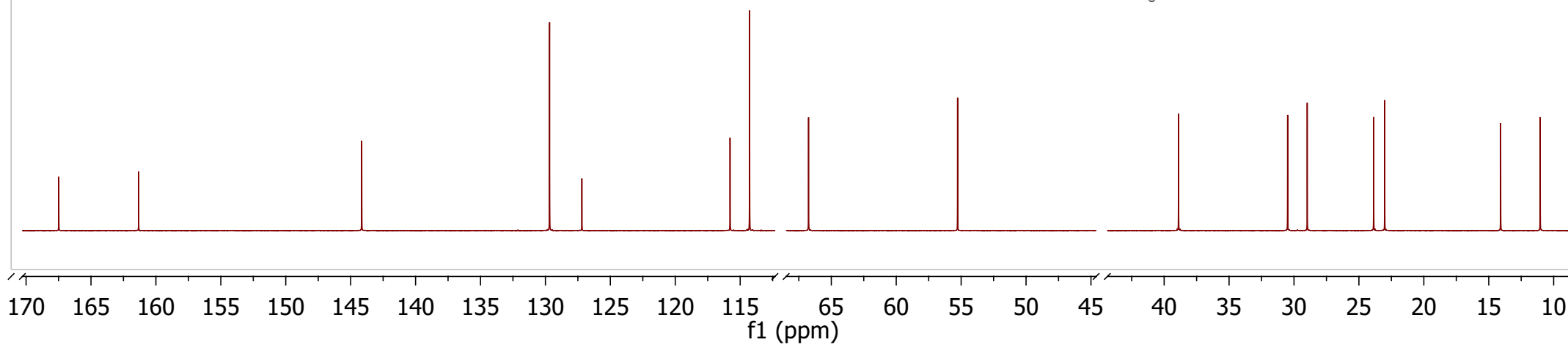
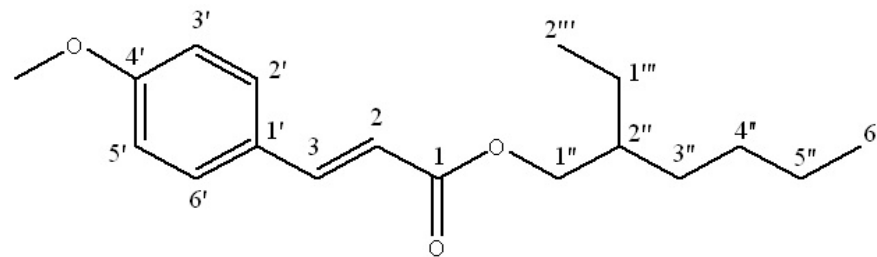


Plate 9c: (E)-2-ethylhexyl-3-(4methoxyphenyl)acrylate (7)

HSQC NMR

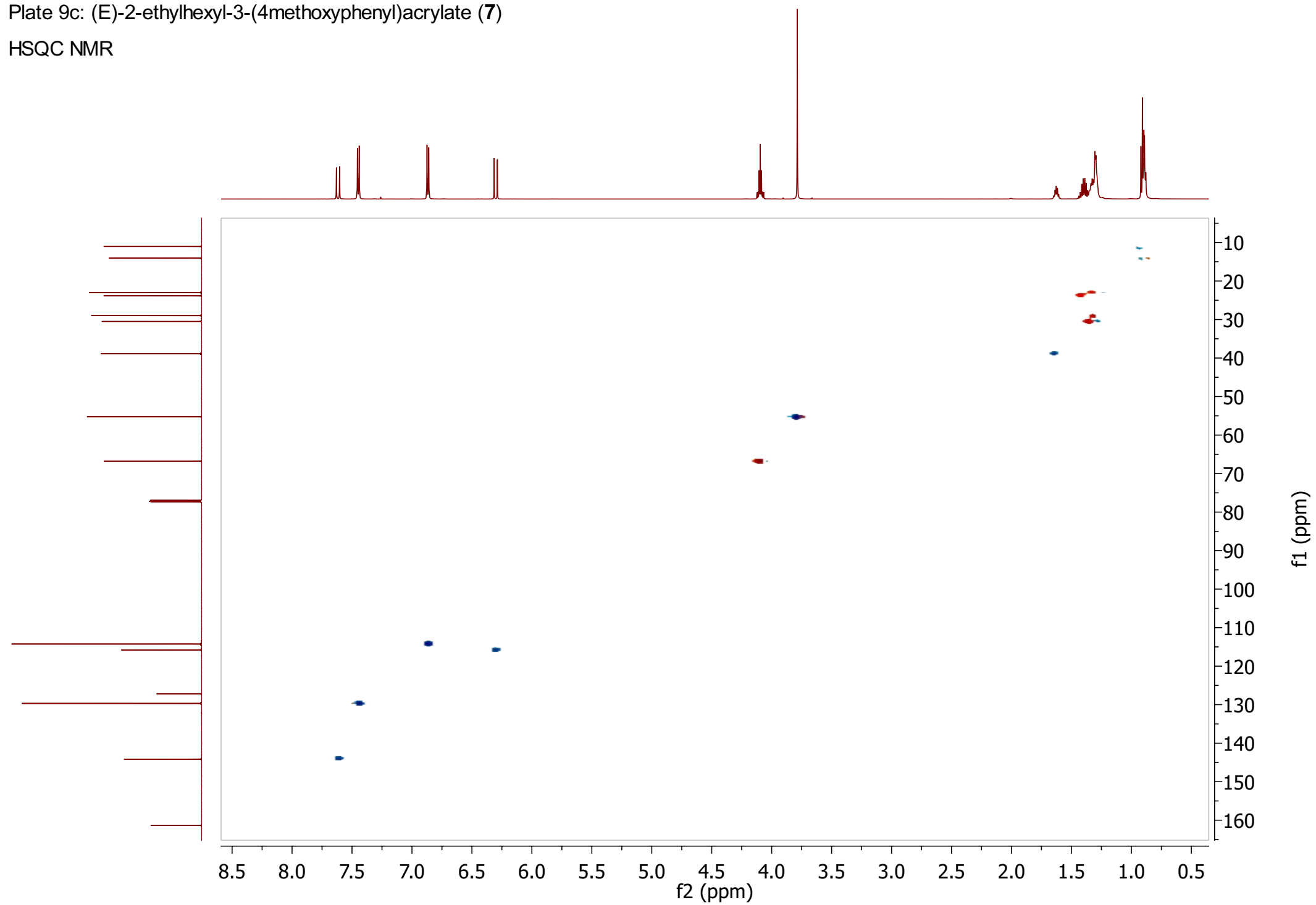


Plate 9d: (E)-2-ethylhexyl-3-(4methoxyphenyl)acrylate (7)

HMBC NMR

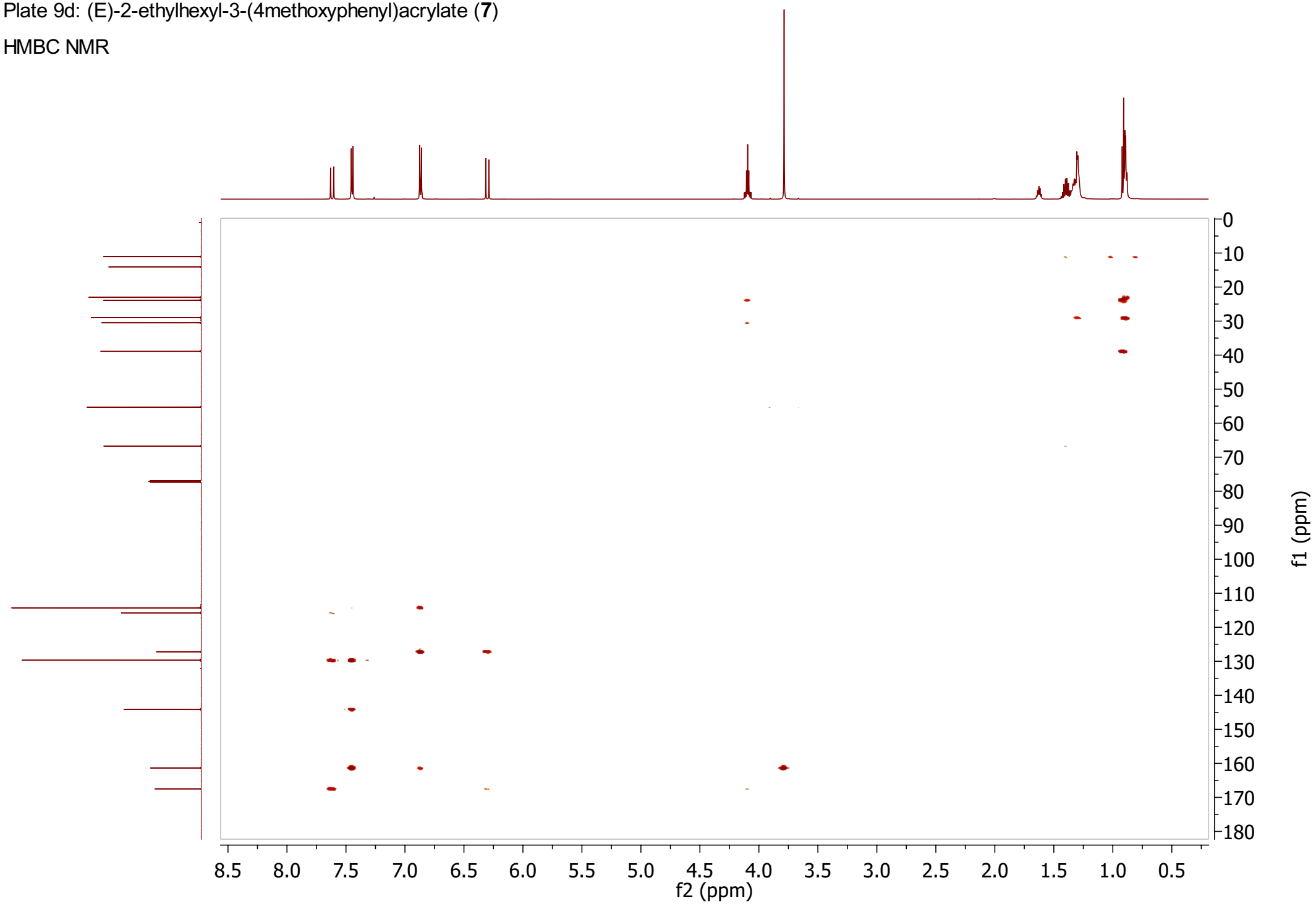


Plate 9e: (E)-2-ethylhexyl-3-(4methoxyphenyl)acrylate (**7**)

^{13}C DEPT135 NMR

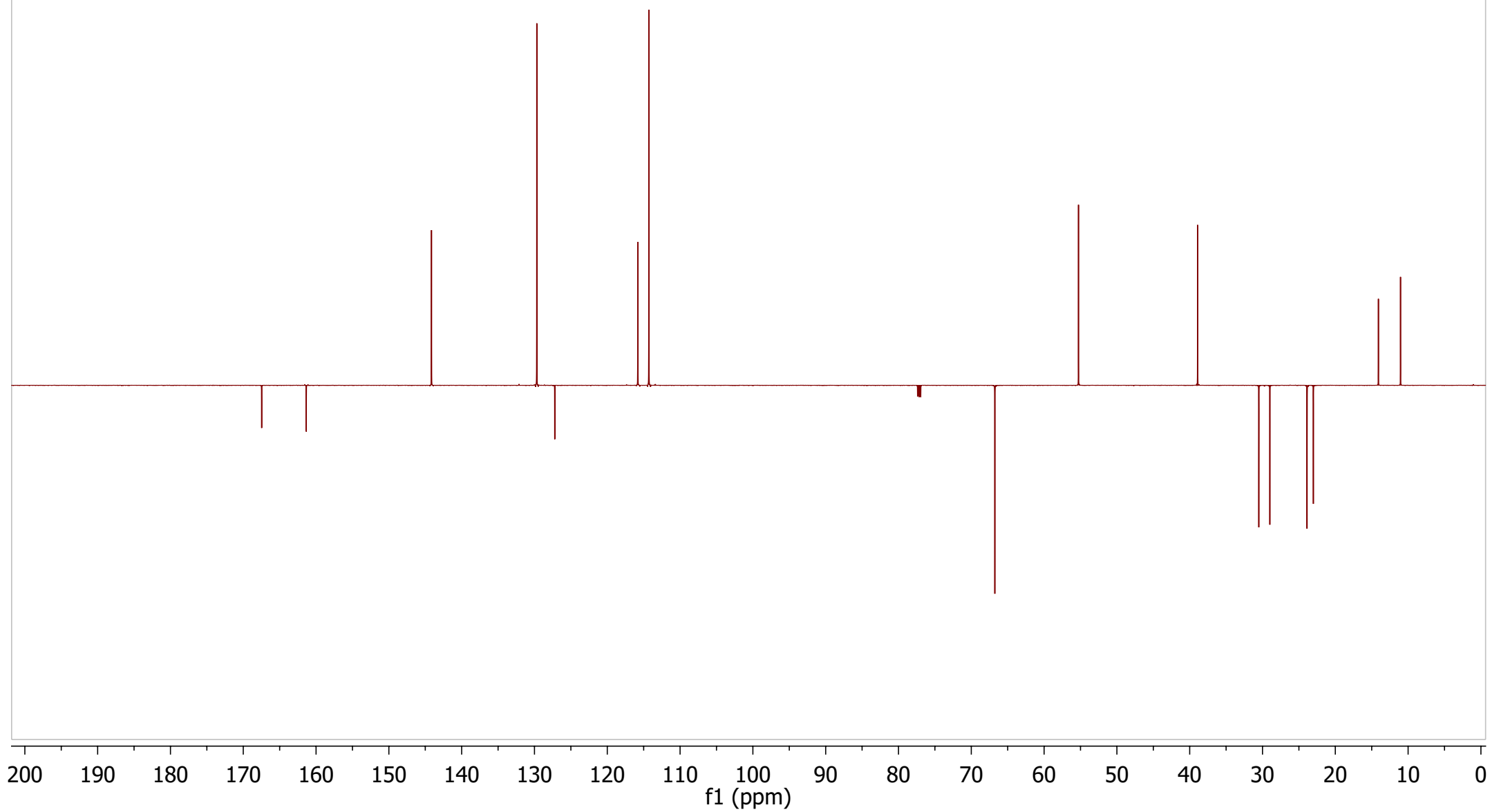


Plate 10a: (E)-4-(4-Methoxyphenyl)but-3-en-2-one (**280**)

^1H NMR [600 MHz, CDCl_3]: δ 7.37 (3H, m, H-4,2',6'), 6.89 (2H, d, $J = 8.7$ Hz, H-3',5'), 6.58 (1H, d, $J = 16.2$ Hz, H-3), 3.81 (3H, s, $-\text{OCH}_3$), 2.33 (3H, s, H-1).

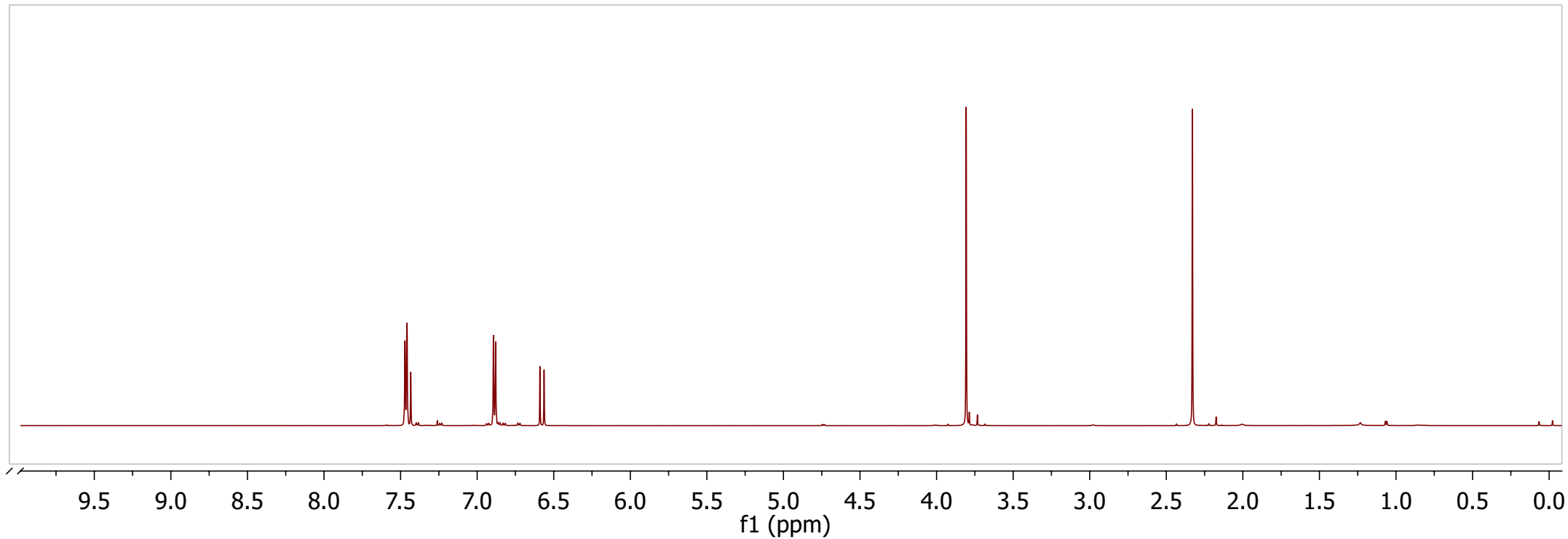
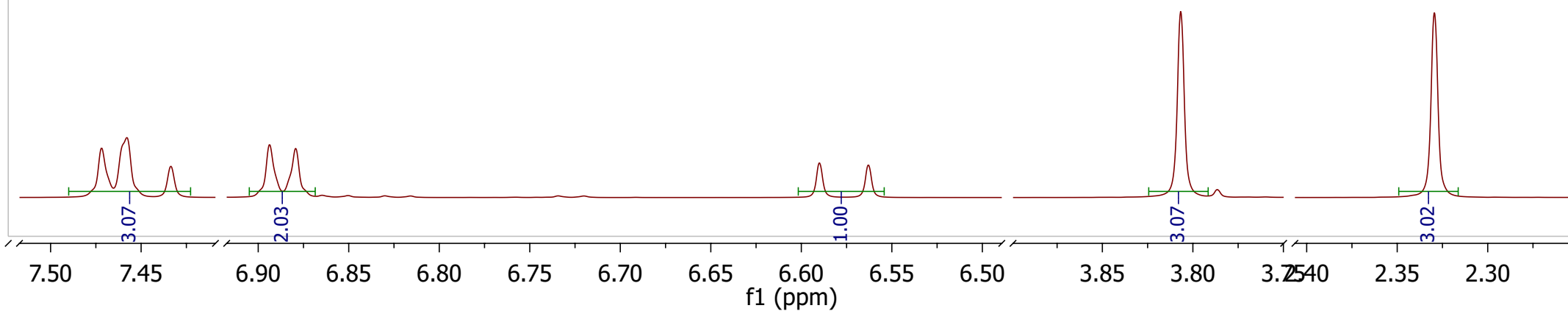
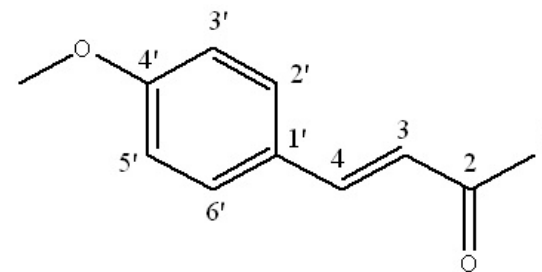


Plate 10b: (E)-4-(4-methoxyphenyl)but-3-en-2-one (**280**)

^{13}C NMR [151 MHz, CDCl_3]: δ 198.4 (C-2), 161.6 (C-4'), 143.3 (C-4), 130.0 (C-2',6'), 127.1 (C-1'), 125.0 (C-3), 114.5 (C-3',5'), 55.4 (-OMe), 27.4 (C-1).

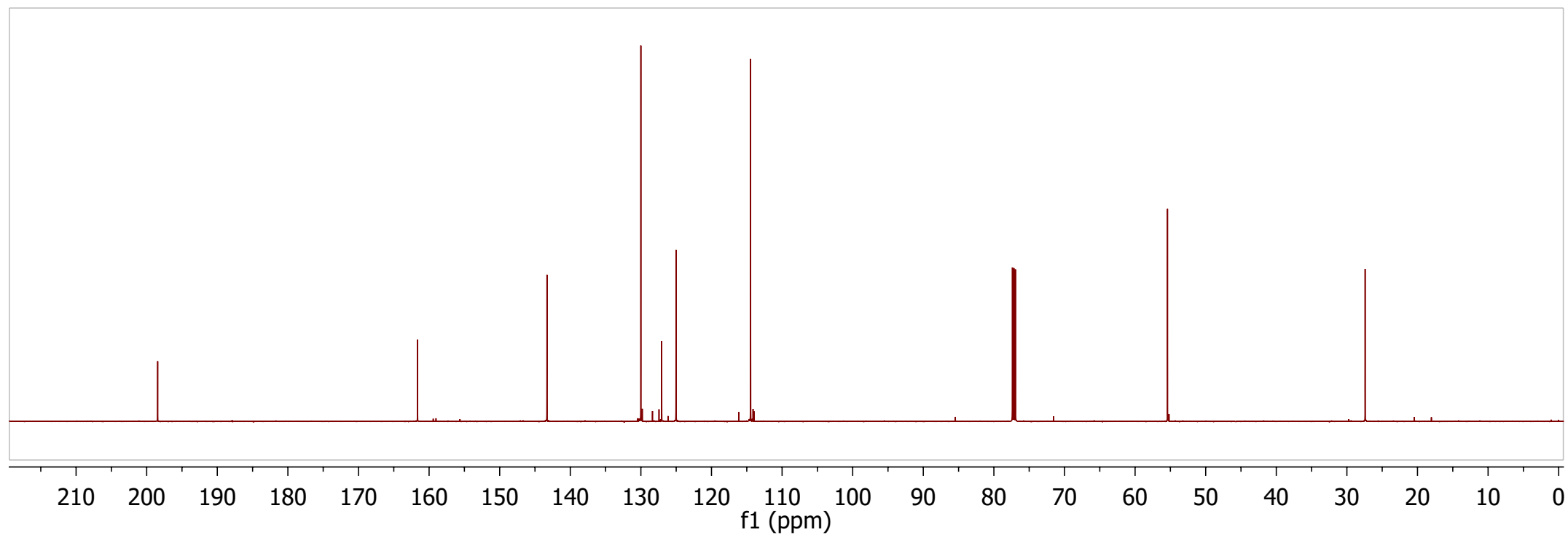
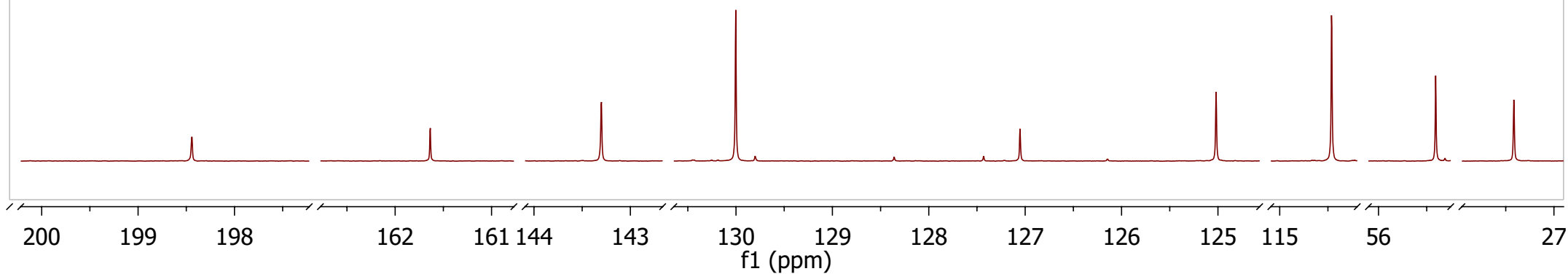
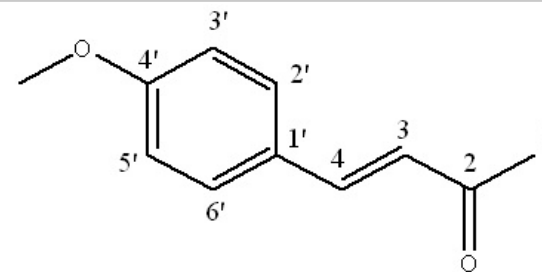


Plate 10c: (E)-4-(4-methoxyphenyl)but-3-en-2-one (**280**)

HSQC NMR

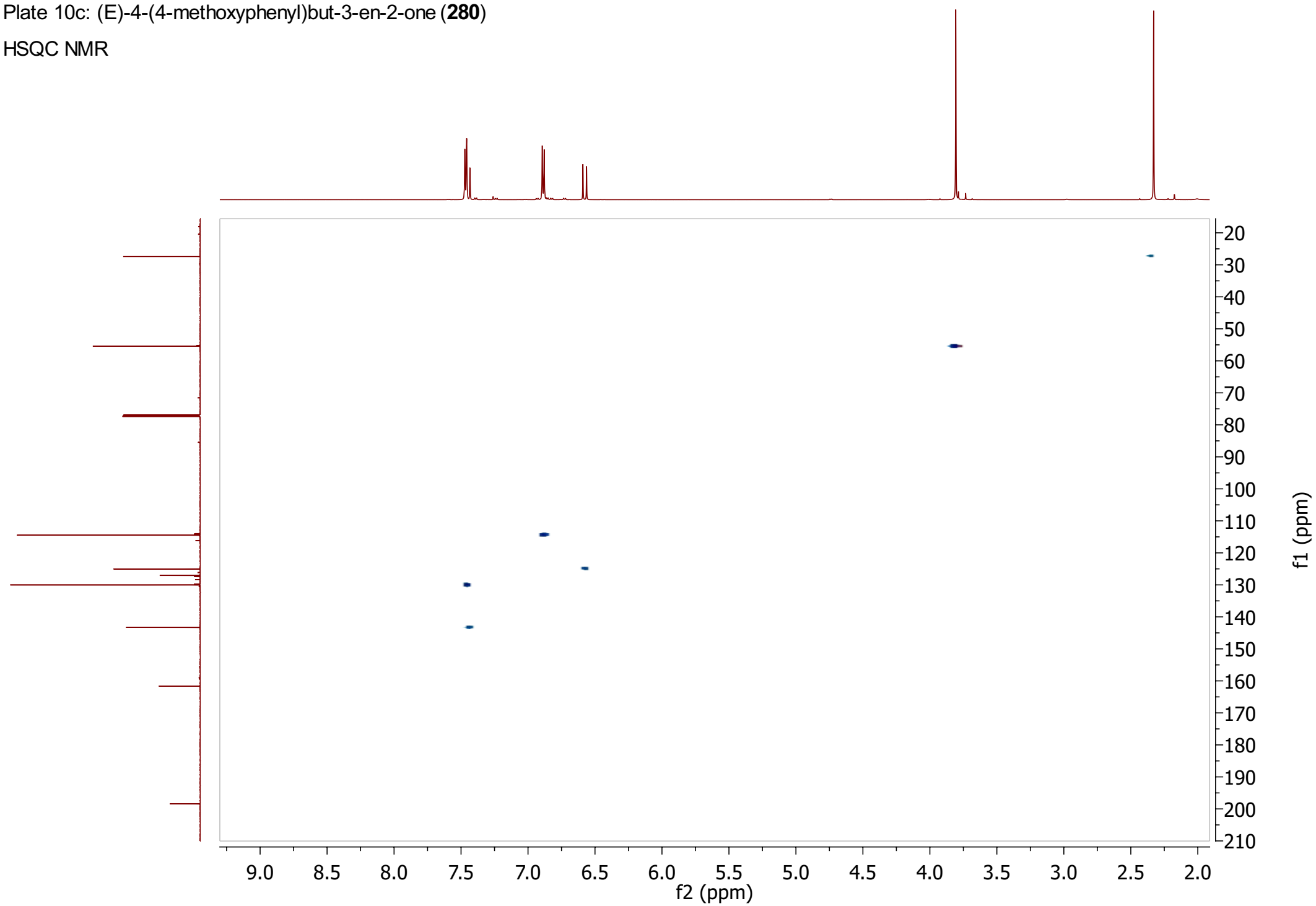


Plate 10d: (E)-4-(4-methoxyphenyl)but-3-en-2-one (**280**)

HMBC NMR

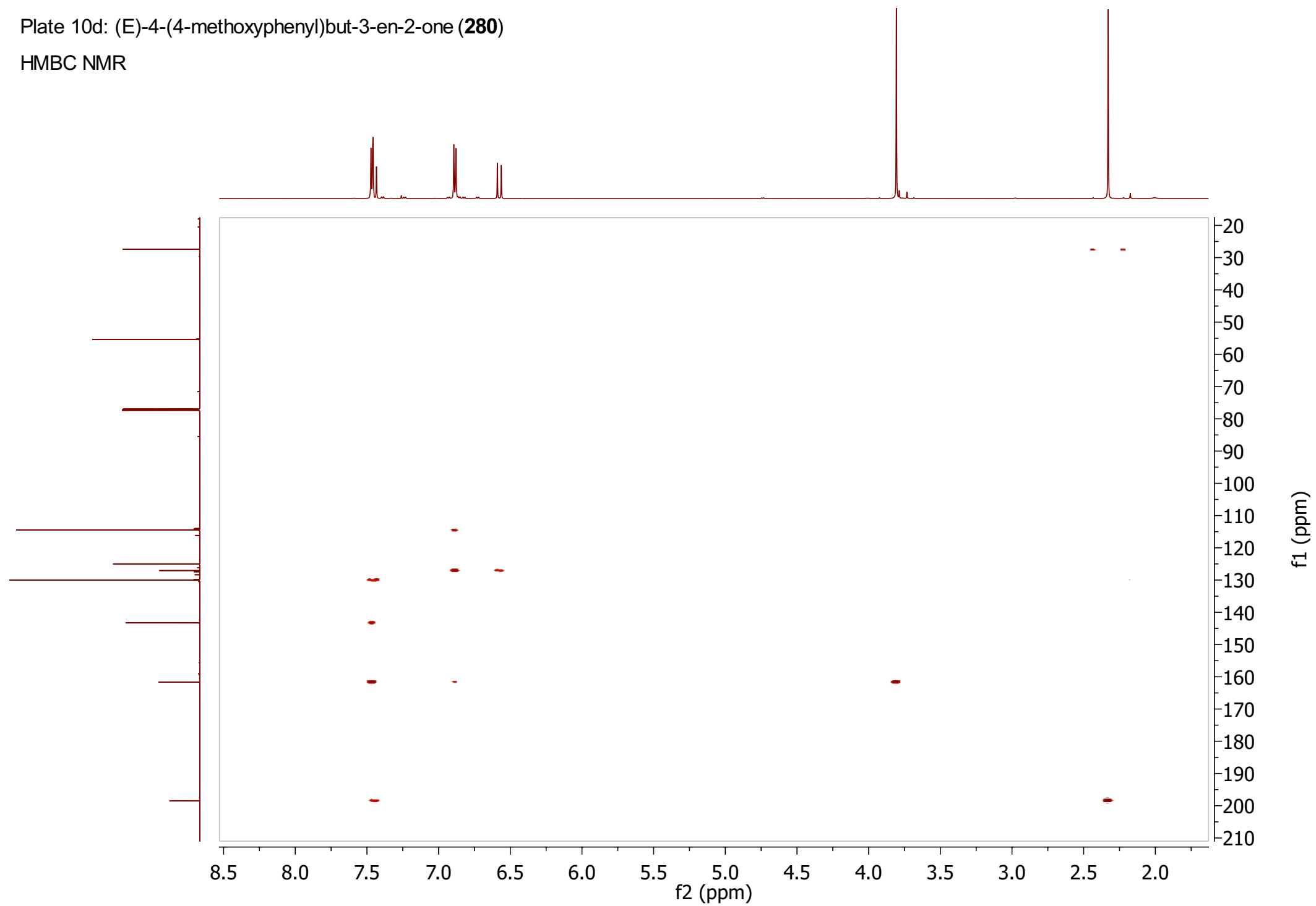


Plate 10e: (E)-4-(4-methoxyphenyl)but-3-en-2-one (**280**)

^{13}C DEPT135 NMR

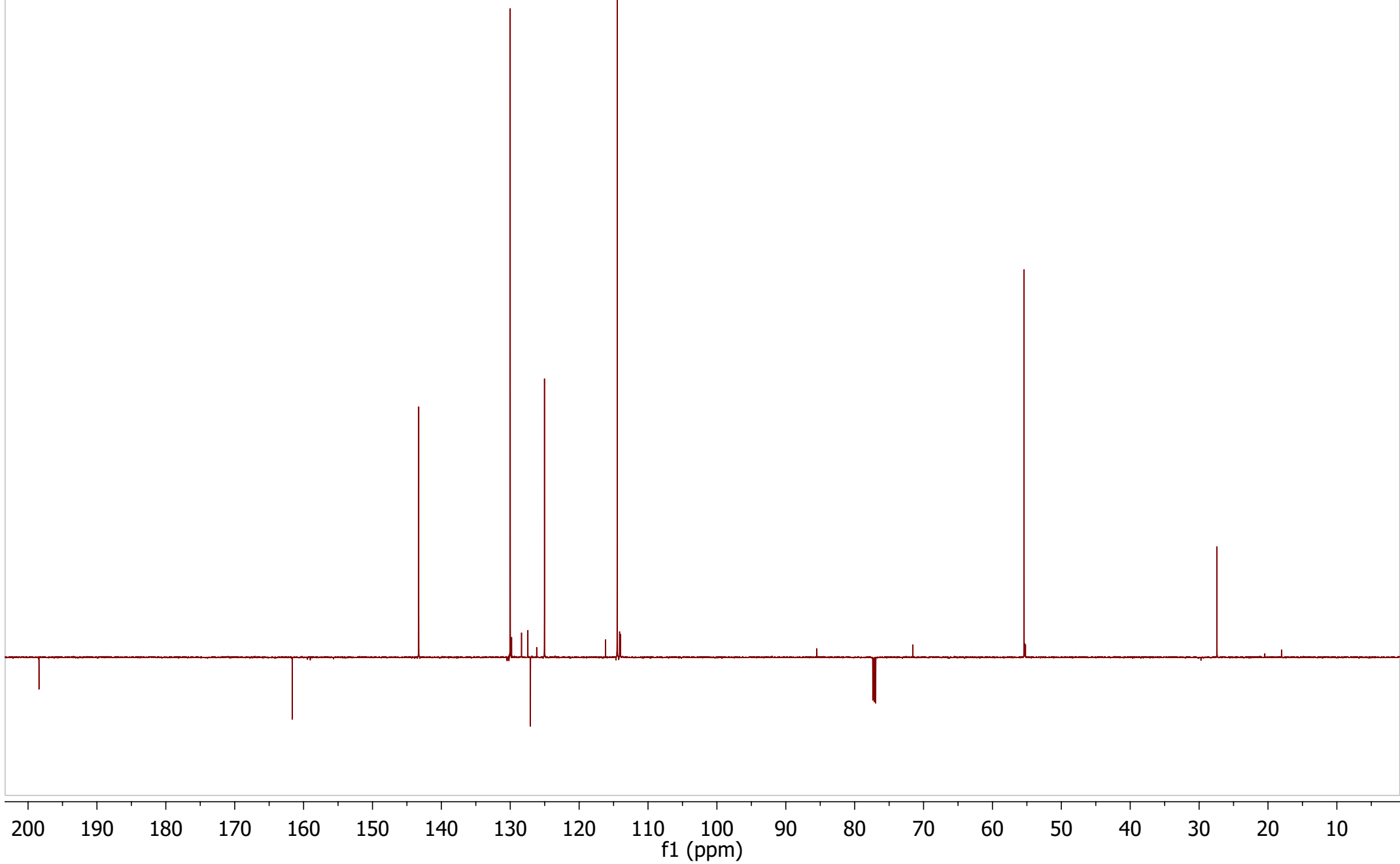


Plate11a: 4-propionylphenyl trifluoromethanesulfonate (**268**)

^1H NMR [600 MHz, CDCl_3]: δ 8.02 (2H, d, $J = 8.9$ Hz, H-3',5'), 7.33 (2H, d, $J = 8.9$ Hz, H-2',6'), 2.97 (2H, q, $J = 7.2$ Hz, H-2), 1.18 (3H, t, $J = 7.2$ Hz, H-3).

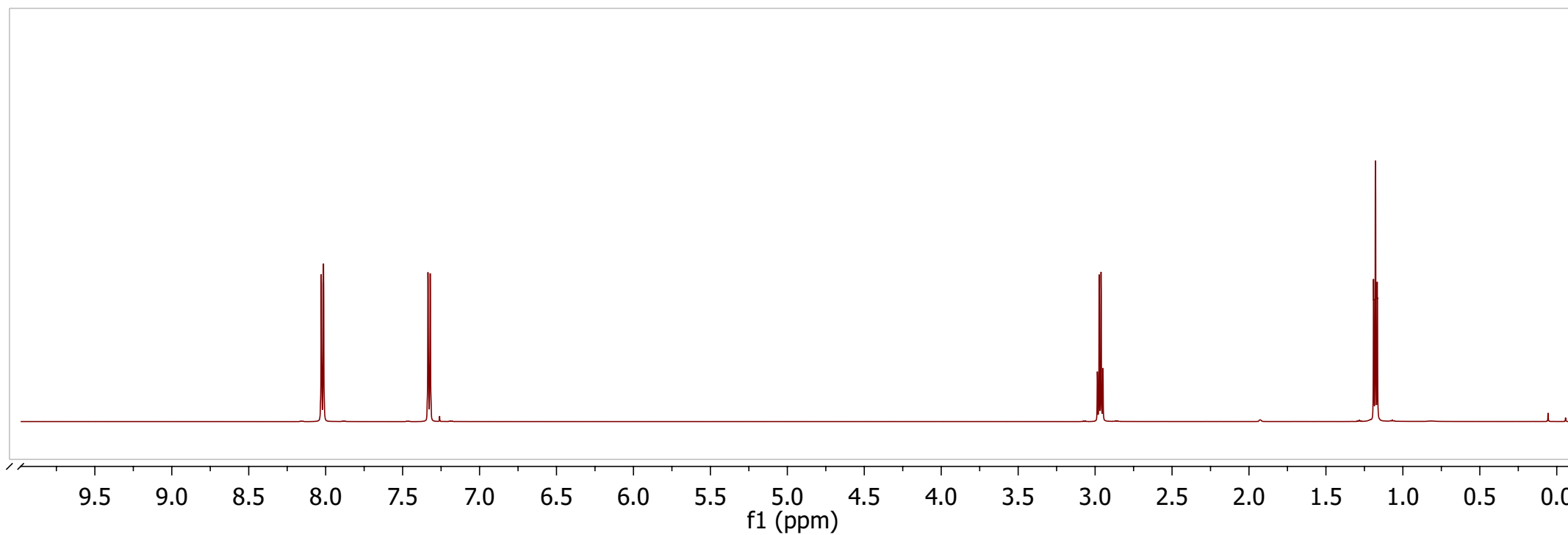
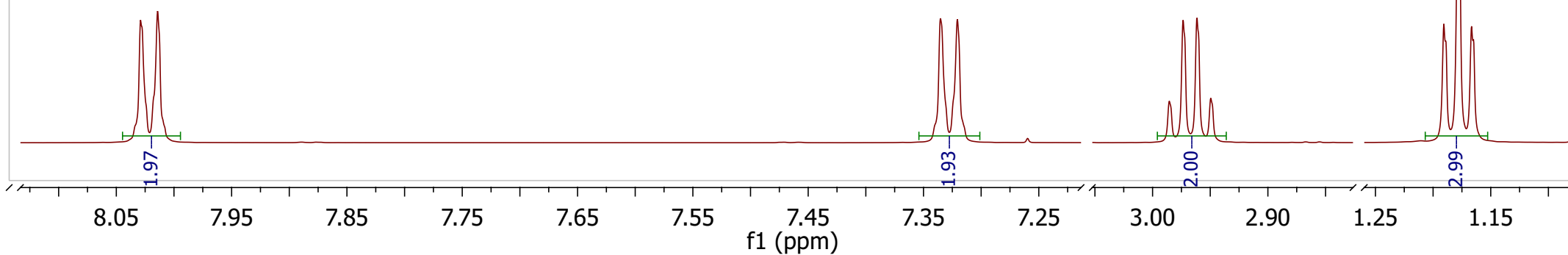
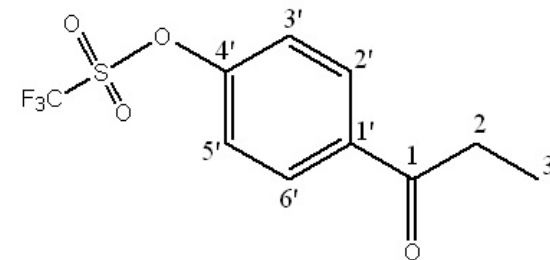


Plate 11b: 4-propionylphenyl trifluoromethanesulfonate (**268**)

^{13}C NMR [151 MHz, CDCl_3]: δ 198.9 (C-1), 152.4 (C-1'), 136.8 (C-4'), 130.3 (C-3',5'), 121.6 (C-2',6'), 118.7 (q, $J = 320.7$ Hz, CF_3), 32.0 (C-2), 7.9 (C-3).

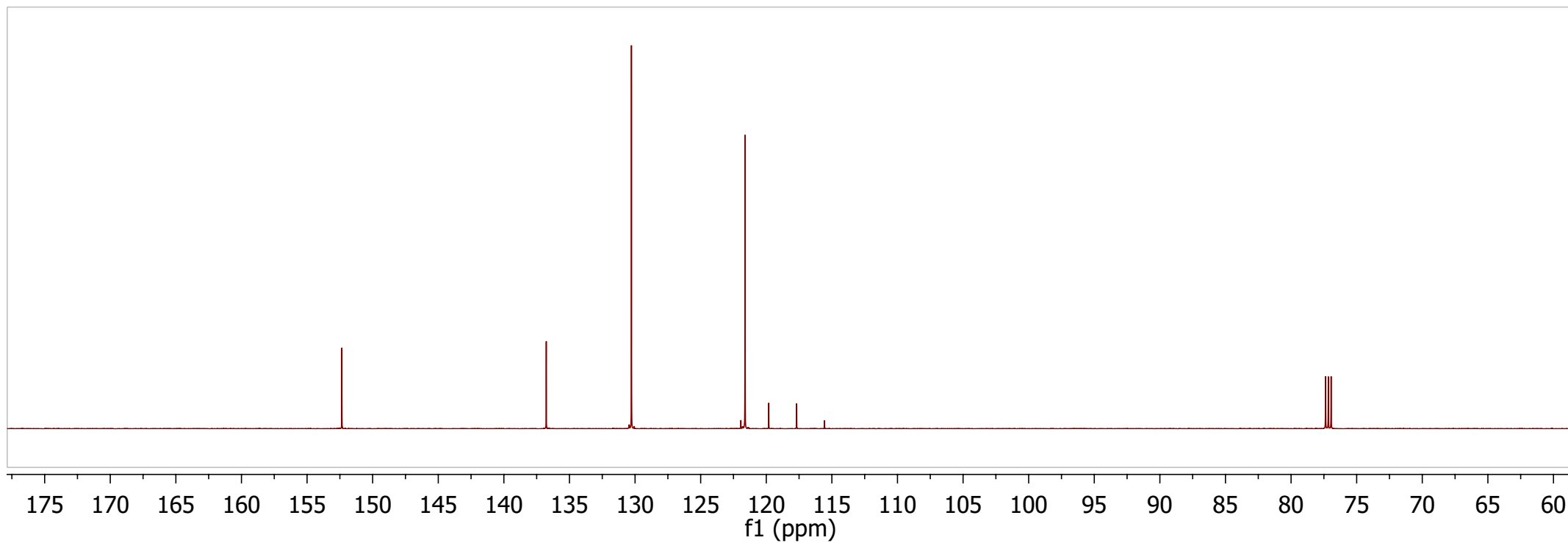
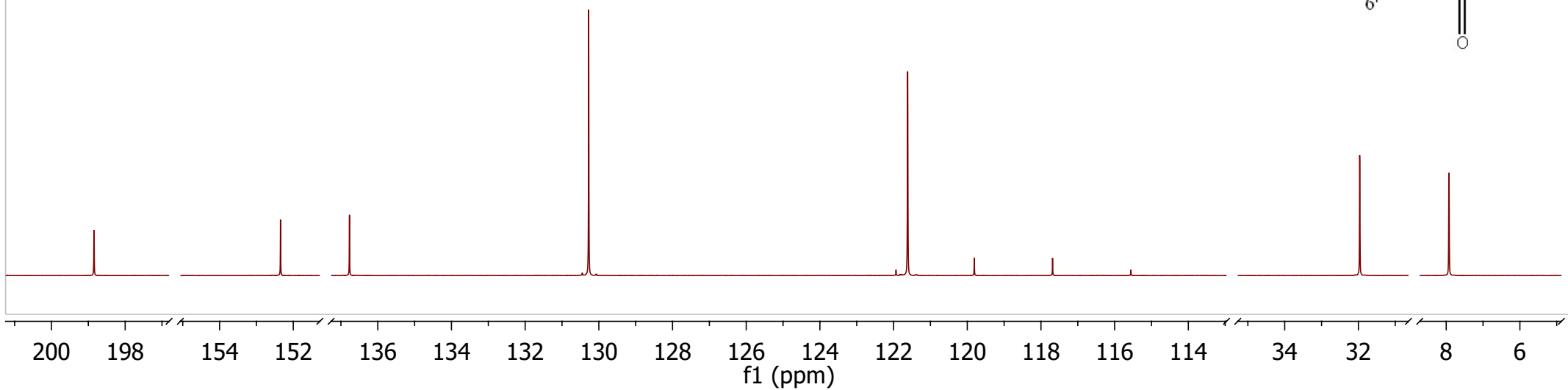
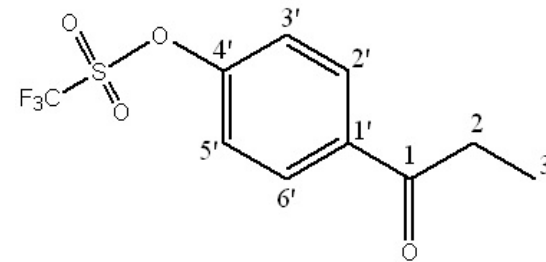


Plate 11c: 4-propionylphenyl trifluoromethanesulfonate (**268**)

HSQC NMR

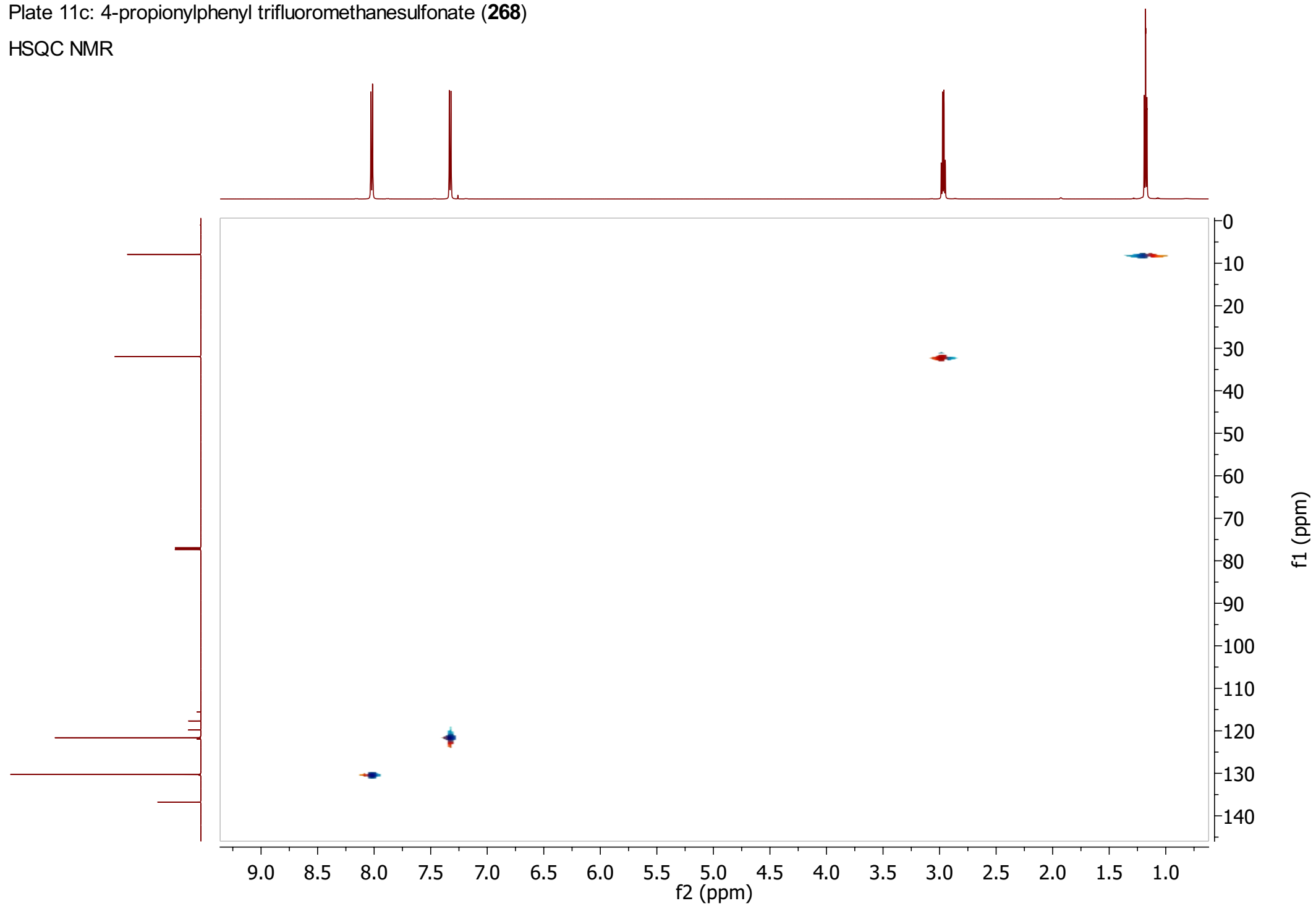


Plate 11d: 4-propionylphenyl trifluoromethanesulfonate (**268**)

HMBC NMR

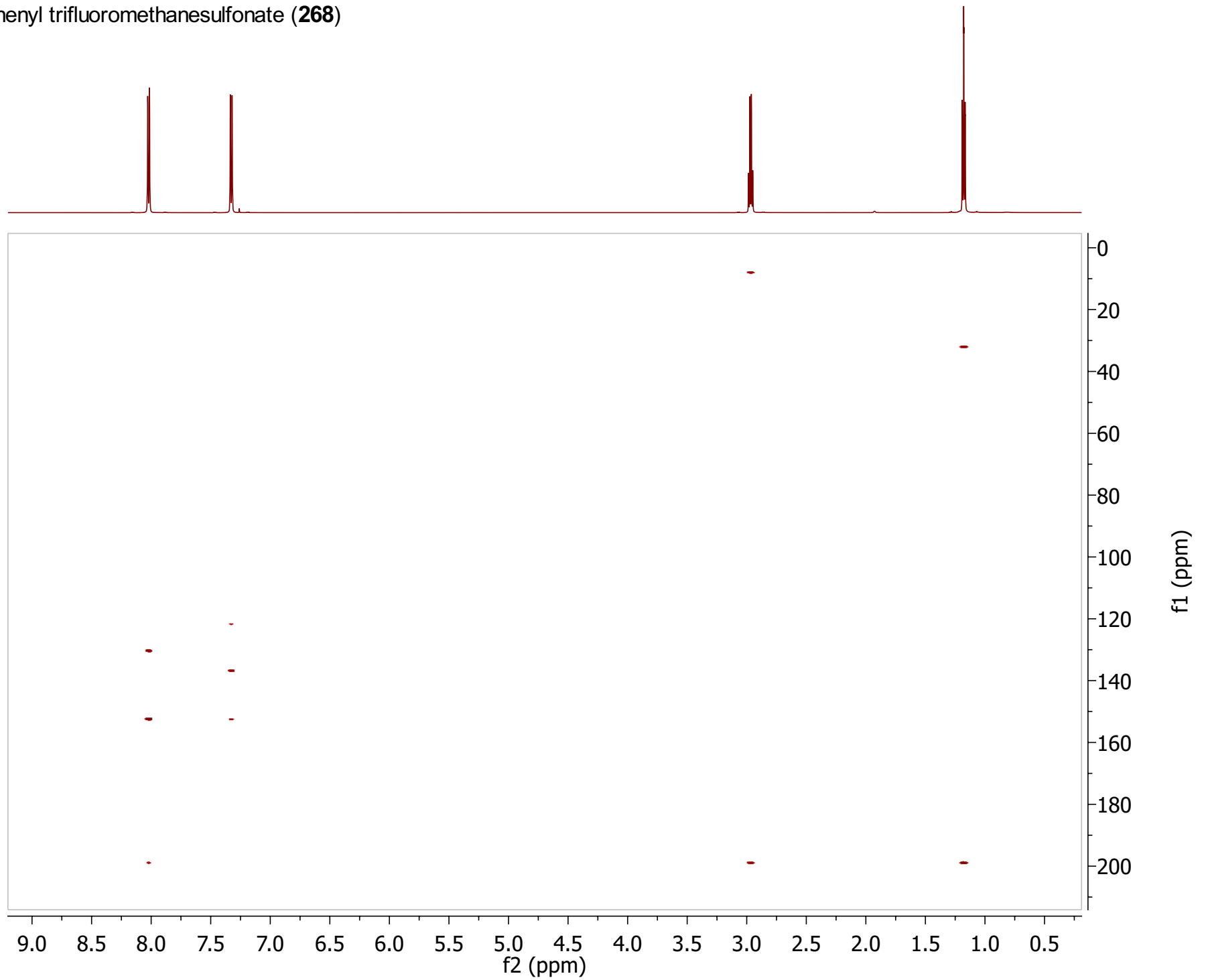


Plate 11e: 4-propionylphenyl trifluoromethanesulfonate (**268**)

^{13}C DEPT135 NMR

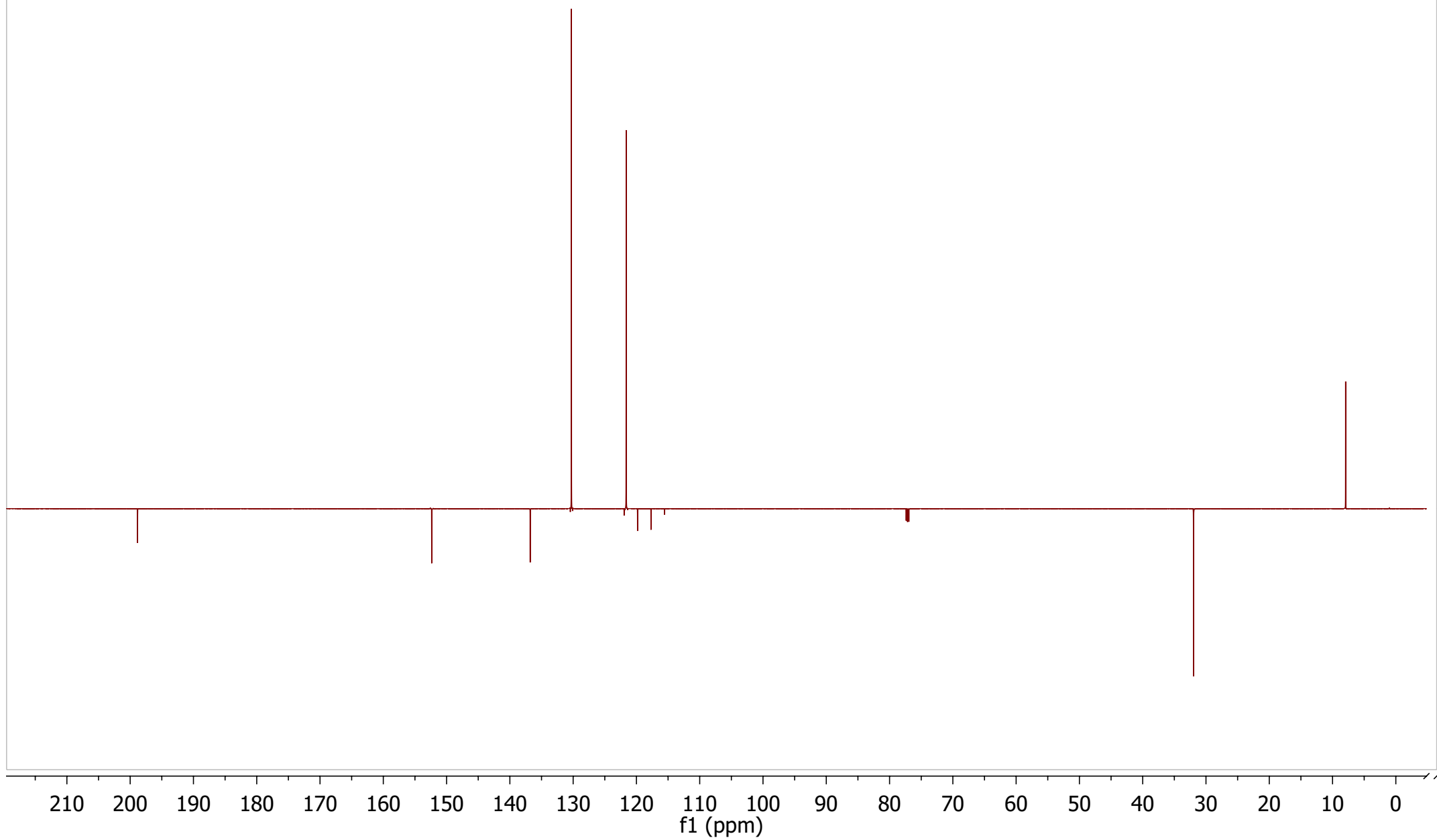


Plate 11f: 4-propionylphenyl trifluoromethanesulfonate (**268**)

^{19}F NMR [565 MHz, CDCl_3]: δ -75.83 (CF_3)

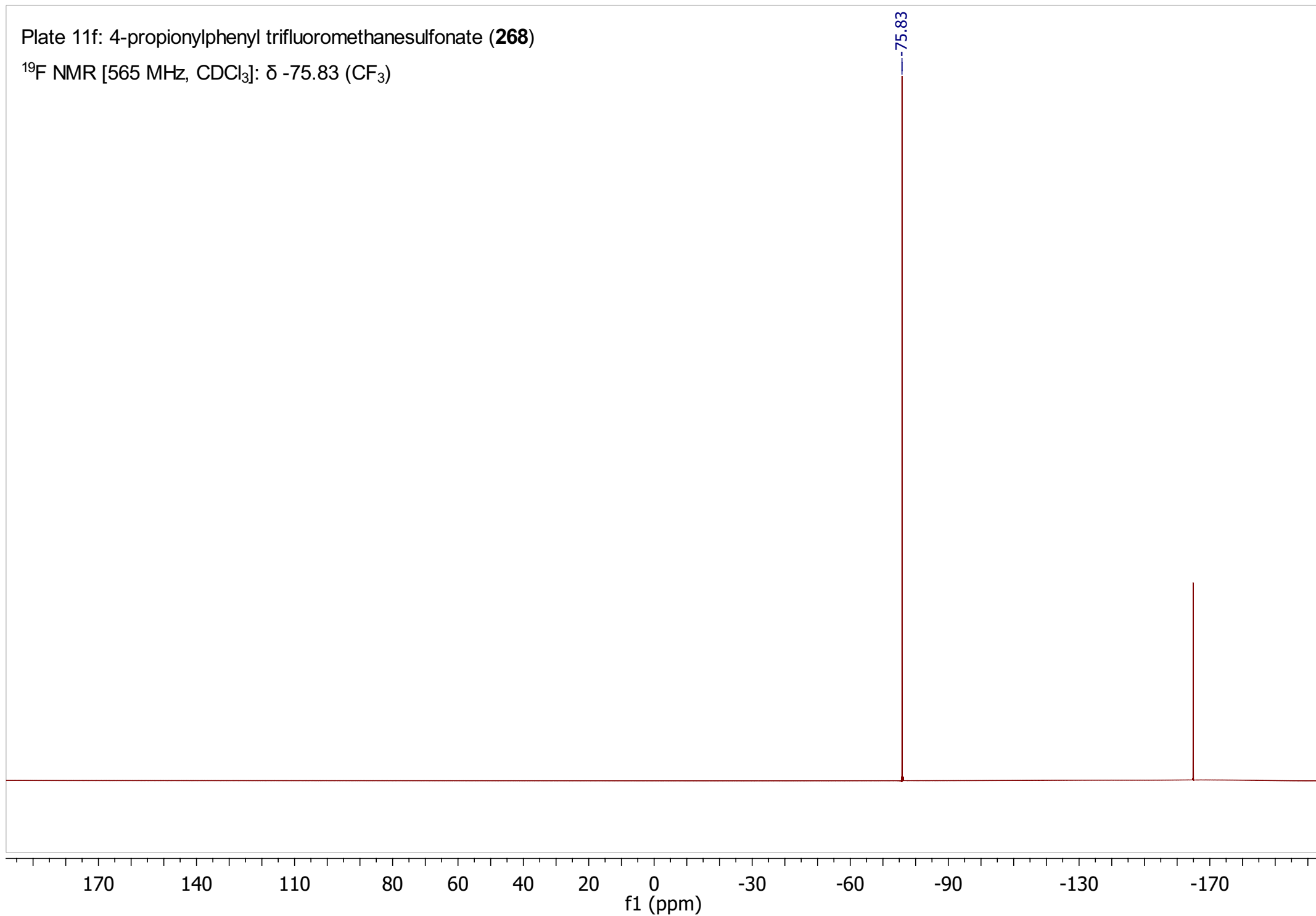


Plate 12a: 4-(1-hydroxypropyl)phenyl trifluoromethanesulfonate (**270**)

^1H NMR [600 MHz, CDCl_3]: δ 7.41 (2H, d, $J = 8.7$ Hz, H-2',6'), 7.24 (2H, d, $J = 8.7$ Hz, H-3',5'), 4.63 (1H, t, $J = 6.5$ Hz, H-1), 1.81-1.69 (2H, m, H-2), 1.16 (1H, d, $J = 6.2$ Hz, -OH), 0.91 (3H, t, $J = 7.4$ Hz, H-3).

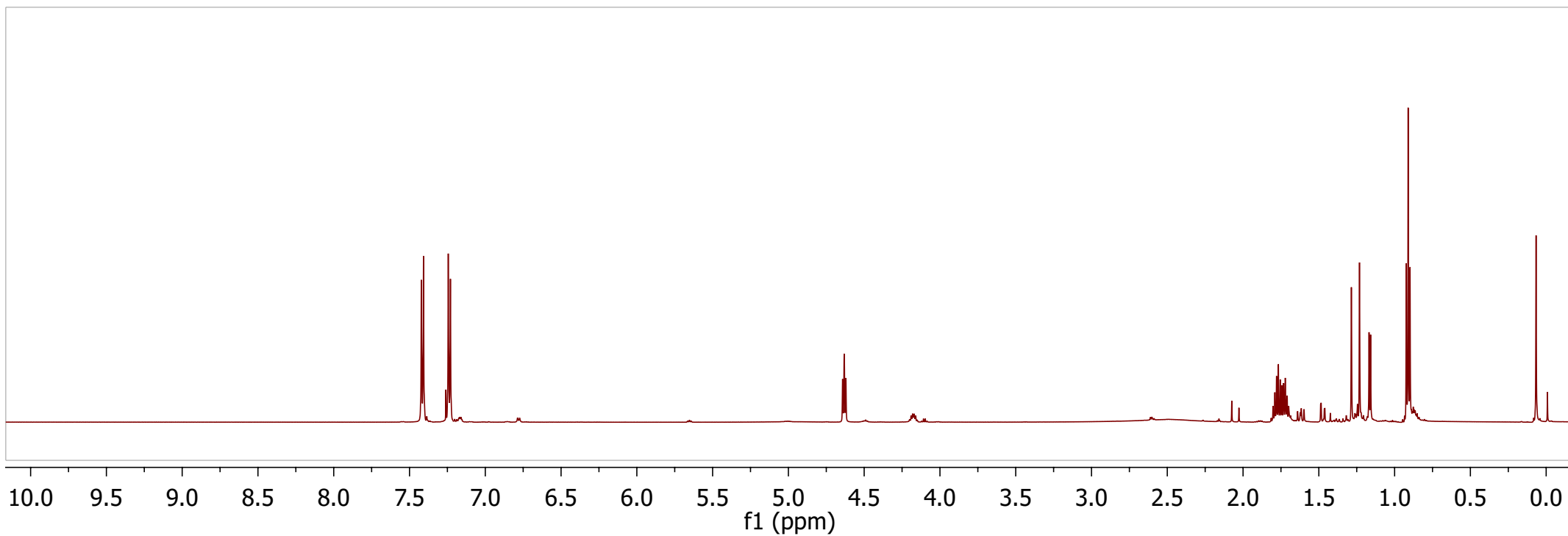
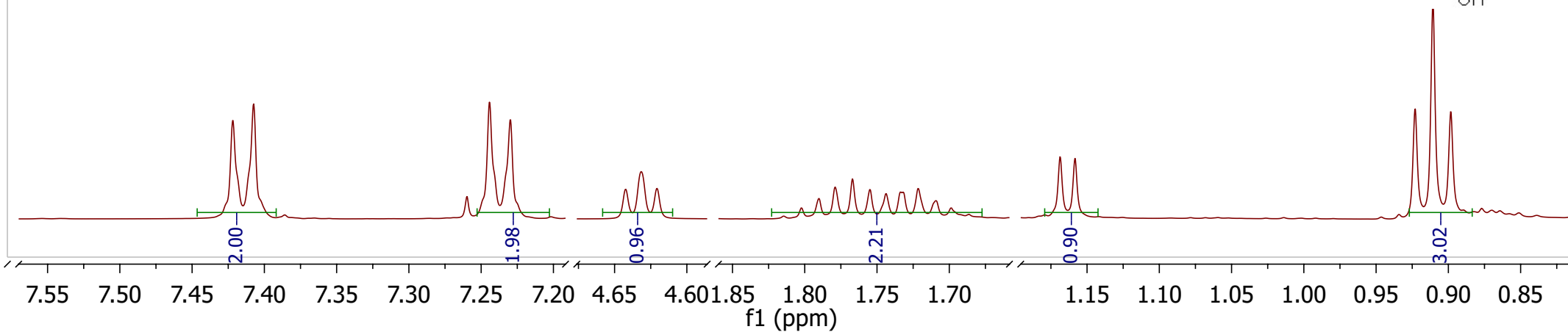
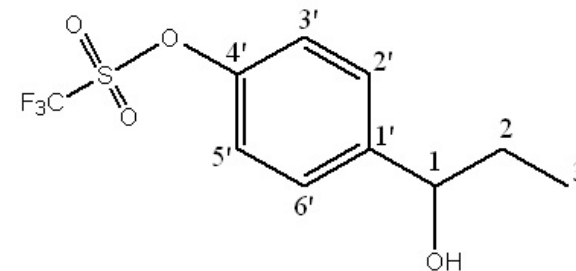


Plate 12b: 4-(1-hydroxypropyl)phenyl trifluoromethanesulfonate (**270**)

^{13}C NMR [151 MHz, CDCl_3]: δ 148.8 (C-4'), 145.3 (C-1'), 127.9 (C-2',6'), 121.3 (C-3',5'), 118.9 (q, $J = 320.8\text{Hz}$, CF_3), 75.0 (C-1), 32.2 (C-2), 10.1 (C-3).

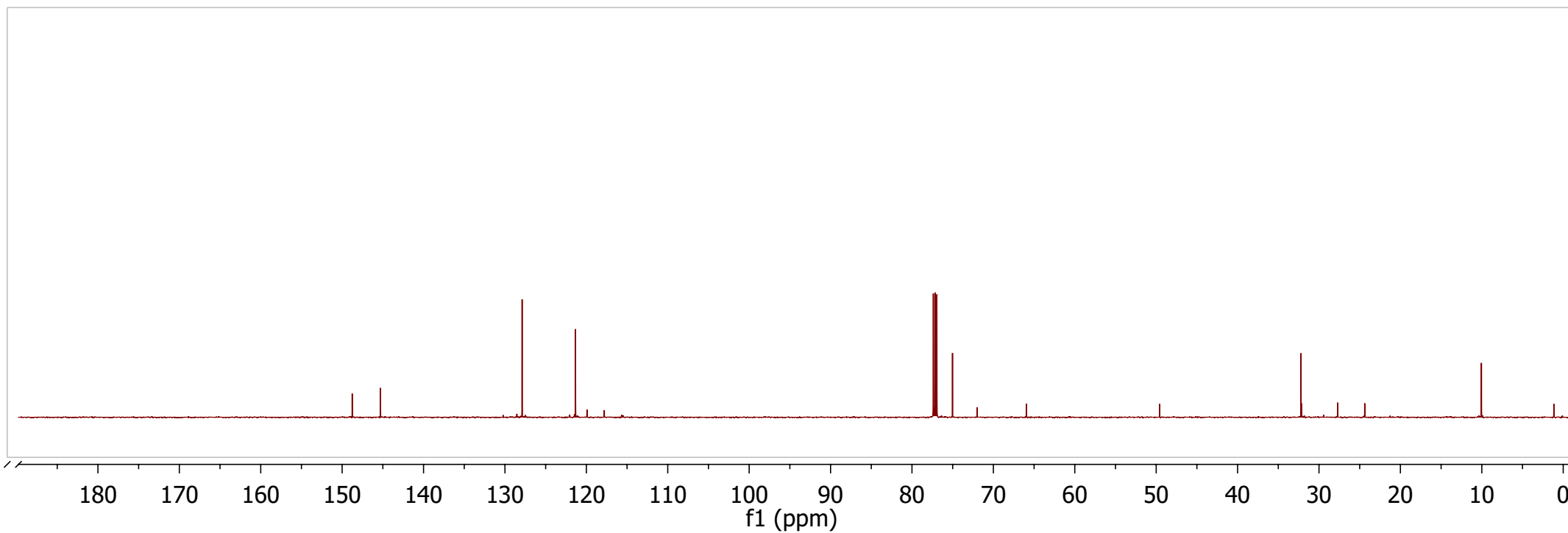
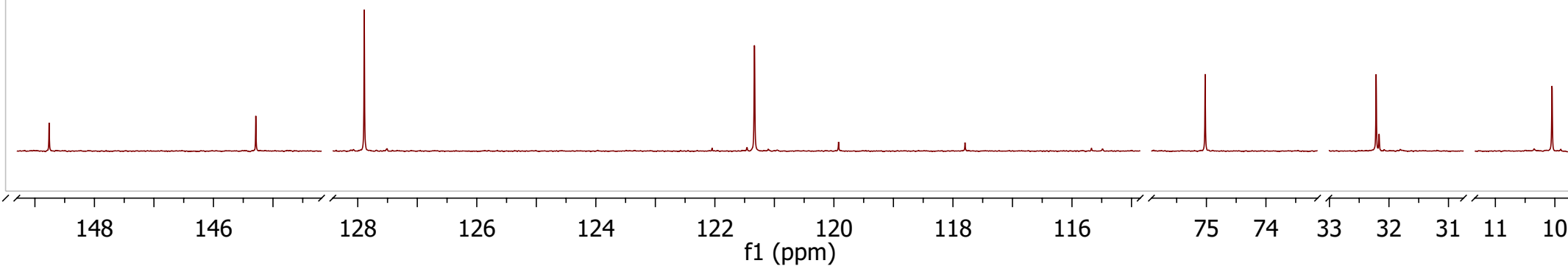
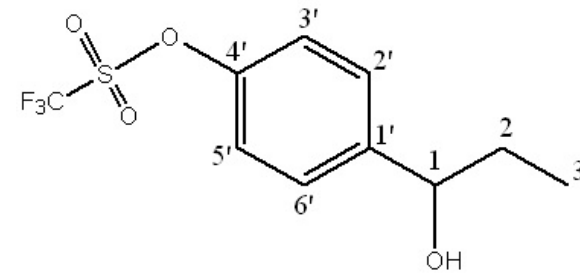


Plate 12c: 4-(1-hydroxypropyl)phenyl trifluoromethanesulfonate (**270**)

HSQC NMR

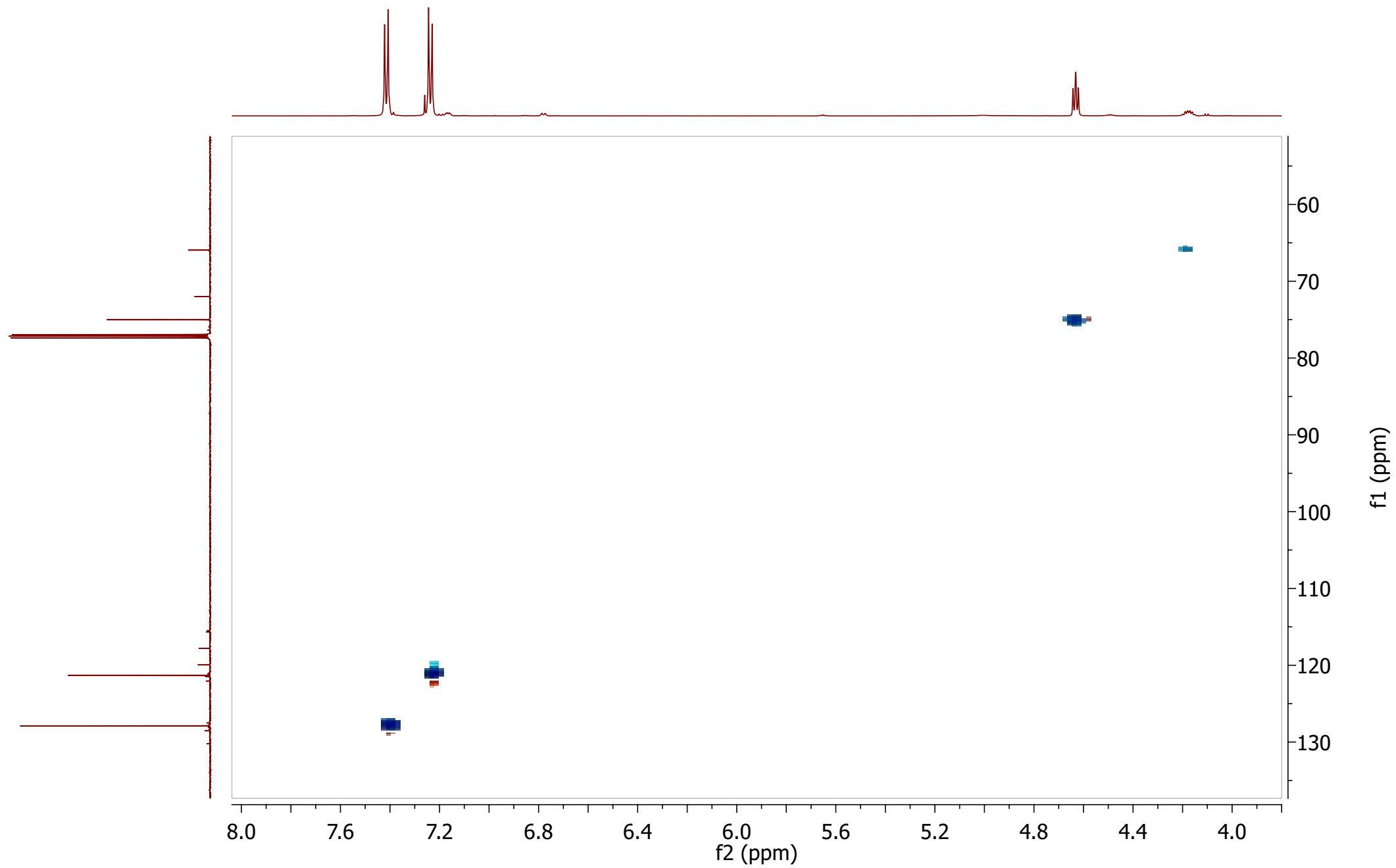


Plate 12d: 4-(1-hydroxypropyl)phenyl trifluoromethanesulfonate (**270**)

HMBC NMR

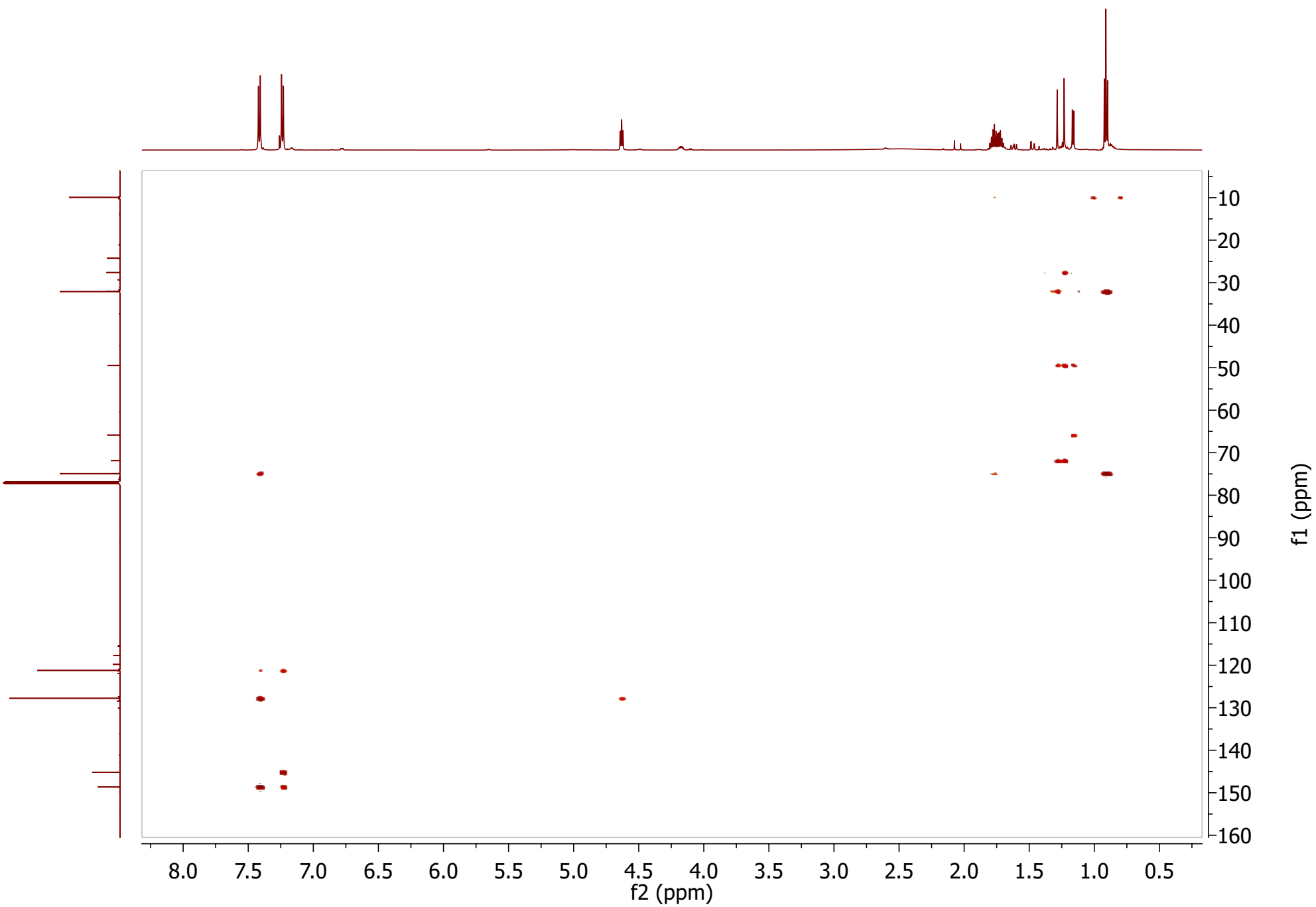


Plate 12e: 4-(1-hydroxypropyl)phenyl trifluoromethanesulfonate (**270**)

^{13}C DEPT135 NMR

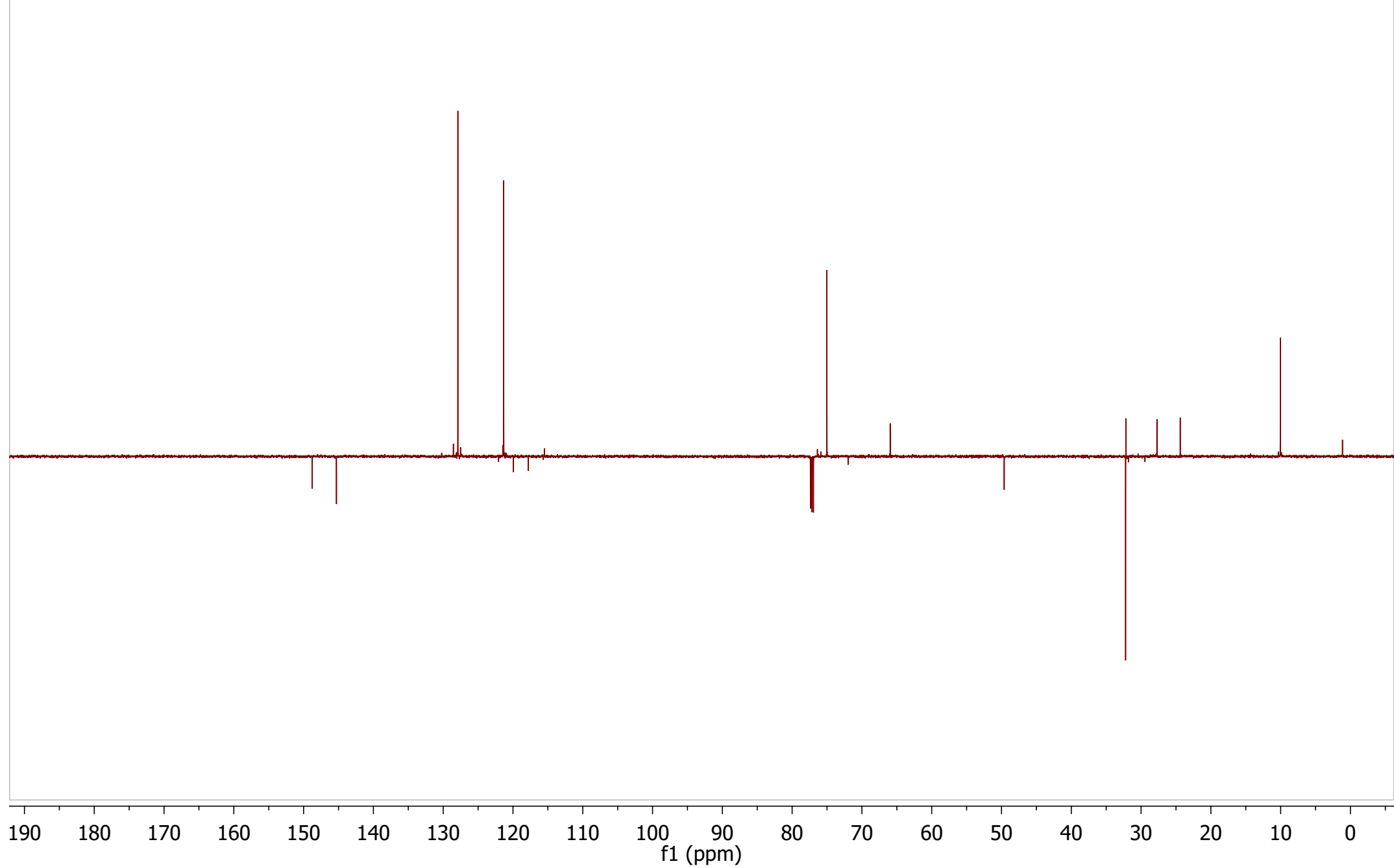


Plate 12f: 4-(1-hydroxypropyl)phenyl trifluoromethanesulfonate (**270**)

^{19}F NMR [565 MHz, CDCl_3]: δ -75.95 (CF_3)

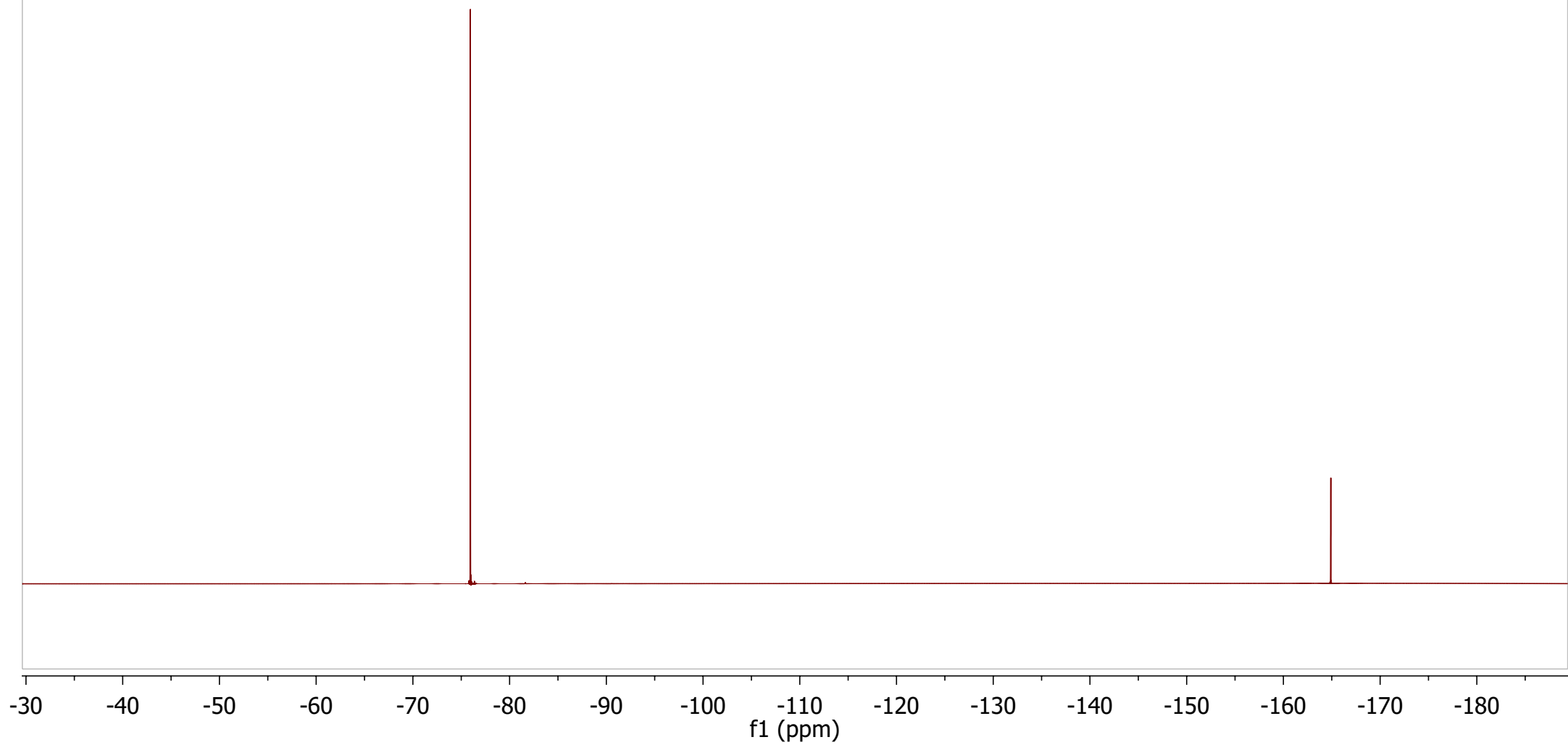


Plate 13a: (E)-4-(prop-1-enyl)phenyl trifluoromethanesulfonate (**271**)

^1H NMR [600 MHz, CDCl_3]: δ 7.37 (2H, d, $J = 8.6$ Hz, H-2',6'), 7.18 (2H, d, $J = 8.6$ Hz, H-3',5'), 6.39 (1H, br d, $J = 15.8$ Hz, H-1), 6.29-6.23 (1H, m, H-2), 1.90 (3H, m, H-3).

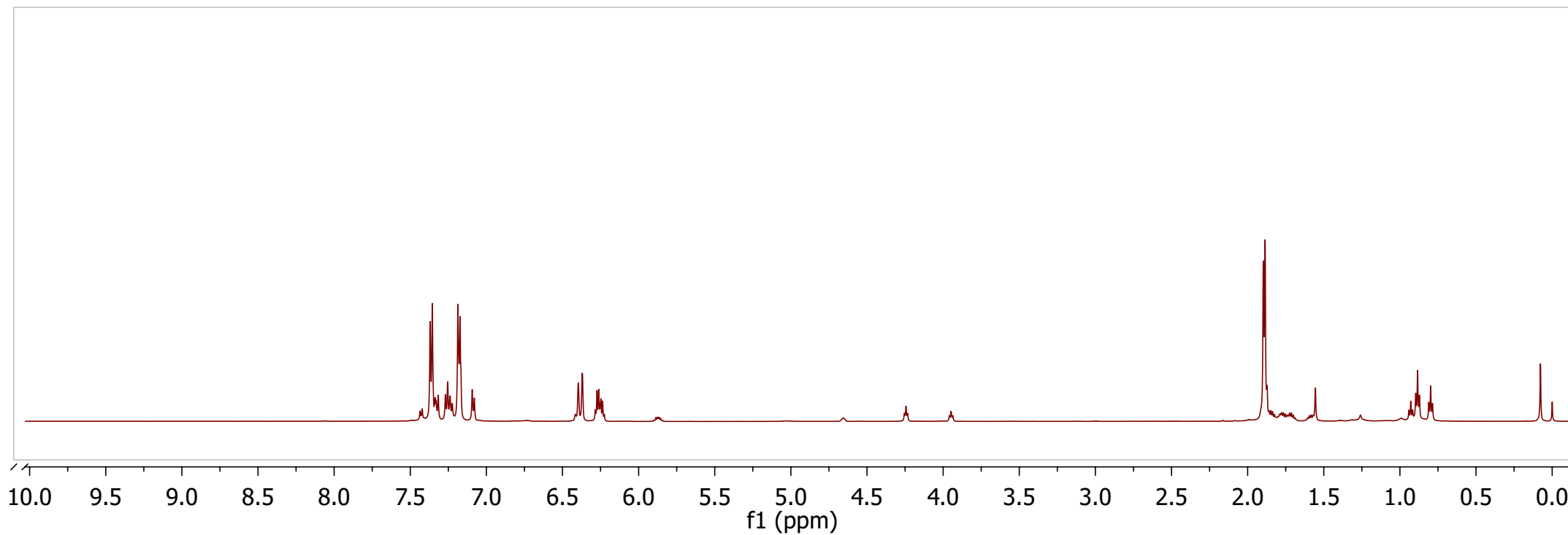
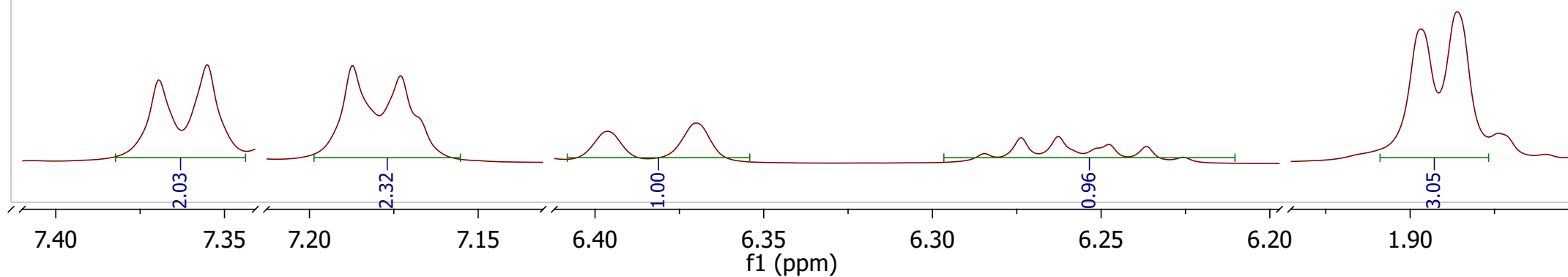
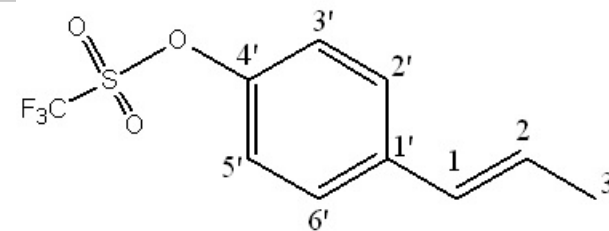


Plate 13b: (E)-4-(prop-1-enyl)phenyl trifluoromethanesulfonate (**271**)

^{13}C NMR [151 MHz, CDCl_3]: δ 148.3 (C-4'), 138.5 (C-1'), 129.4 (C-1), 128.3 (C-2), 127.5 (C-2',6'), 121.5 (C-3',5'), 118.9 (q, $J = 320.8\text{Hz}$, CF_3), 18.6 (C-3).

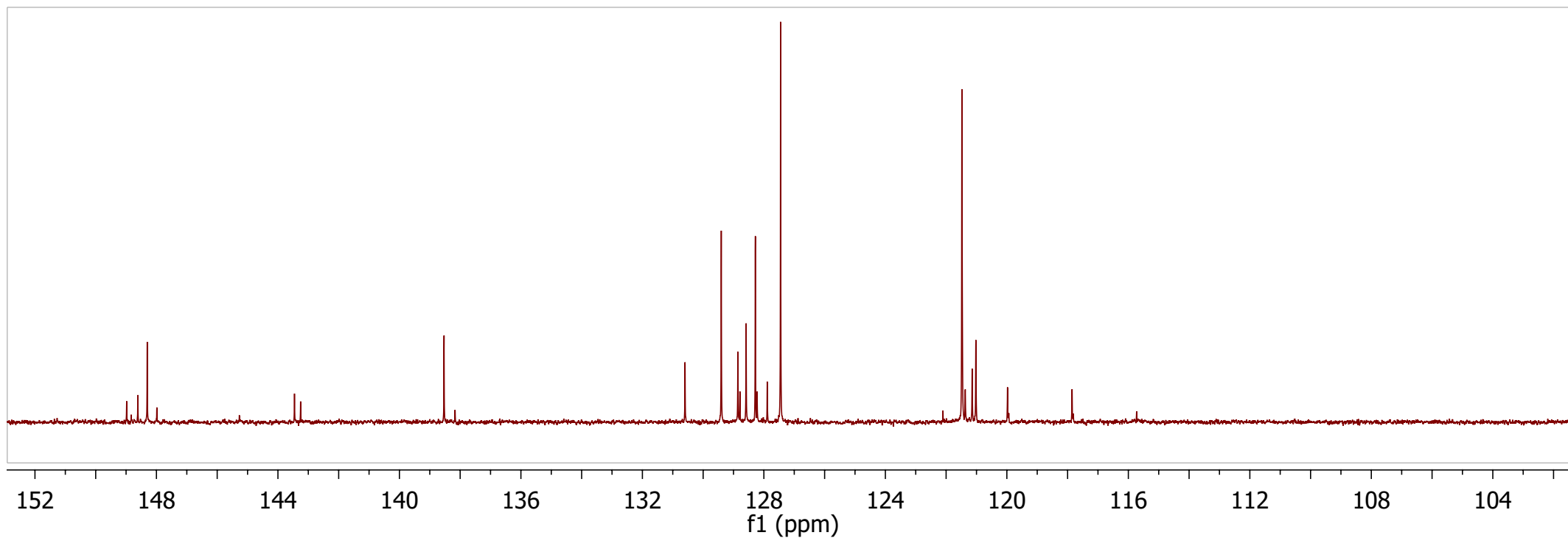
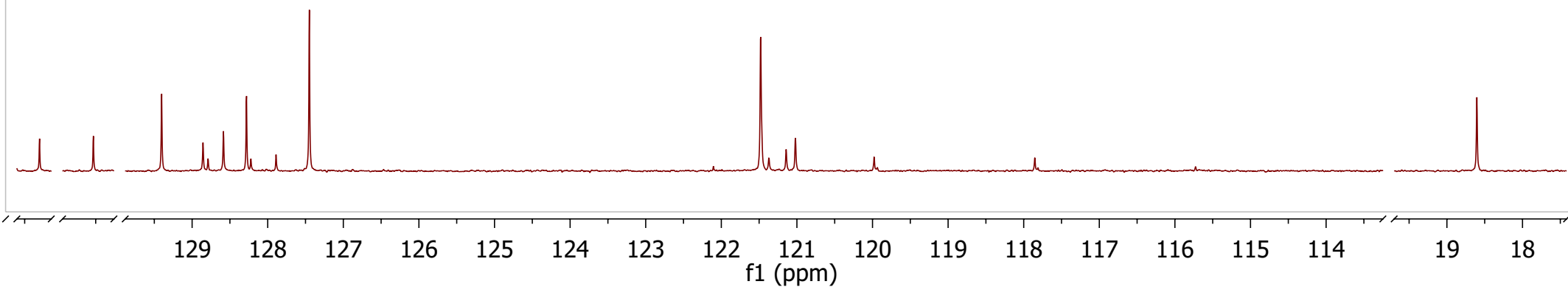
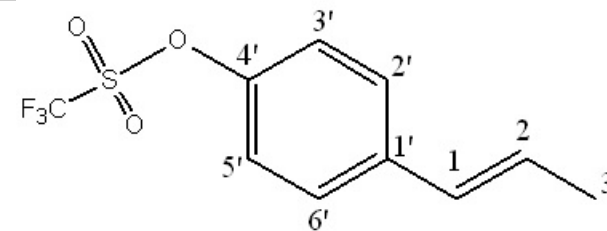


Plate 13c: (E)-4-(prop-1-enyl)phenyl trifluoromethanesulfonate (**271**)

HSQC NMR

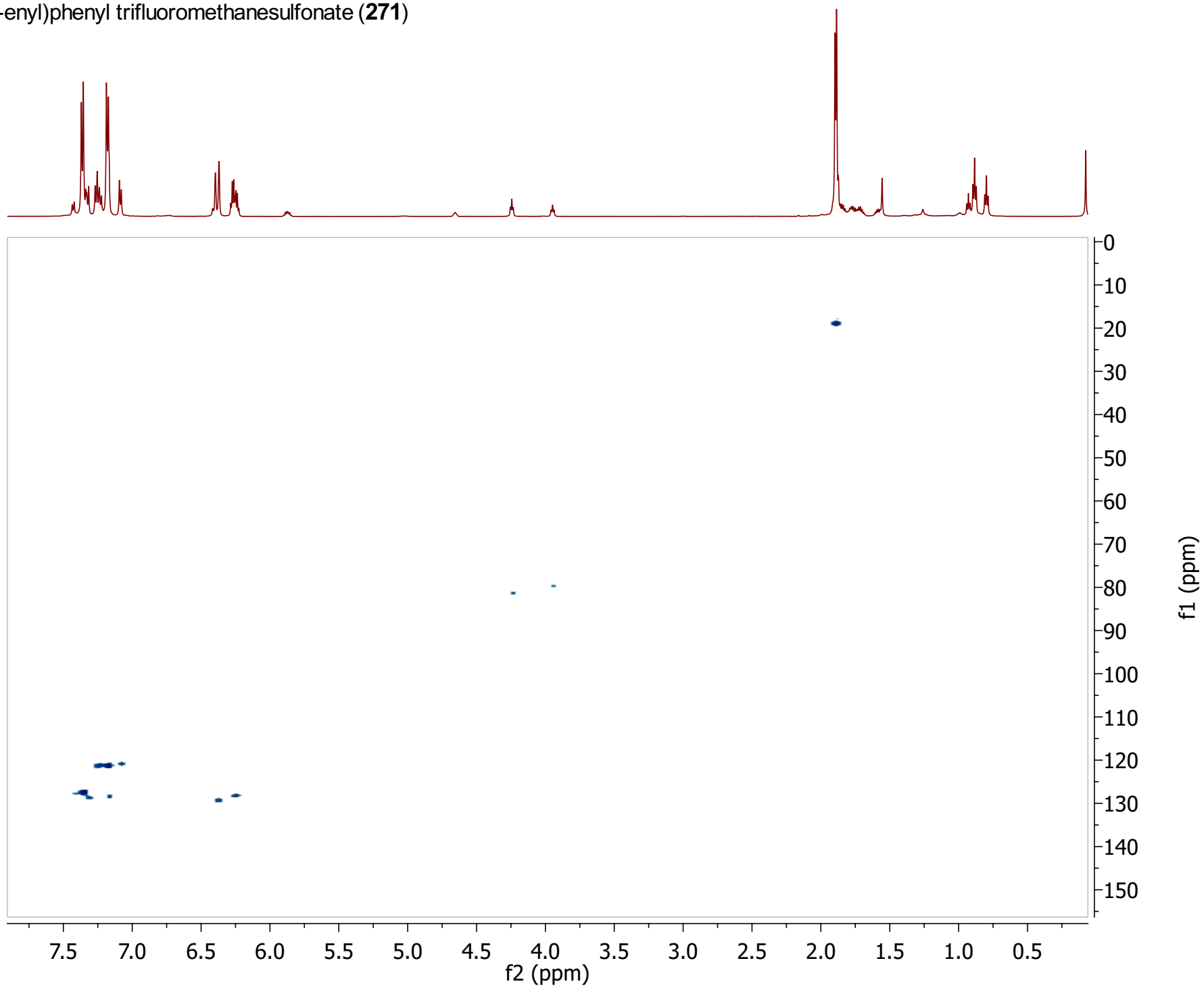


Plate 13d: (E)-4-(prop-1-enyl)phenyl trifluoromethanesulfonate (**271**)

HMBC NMR

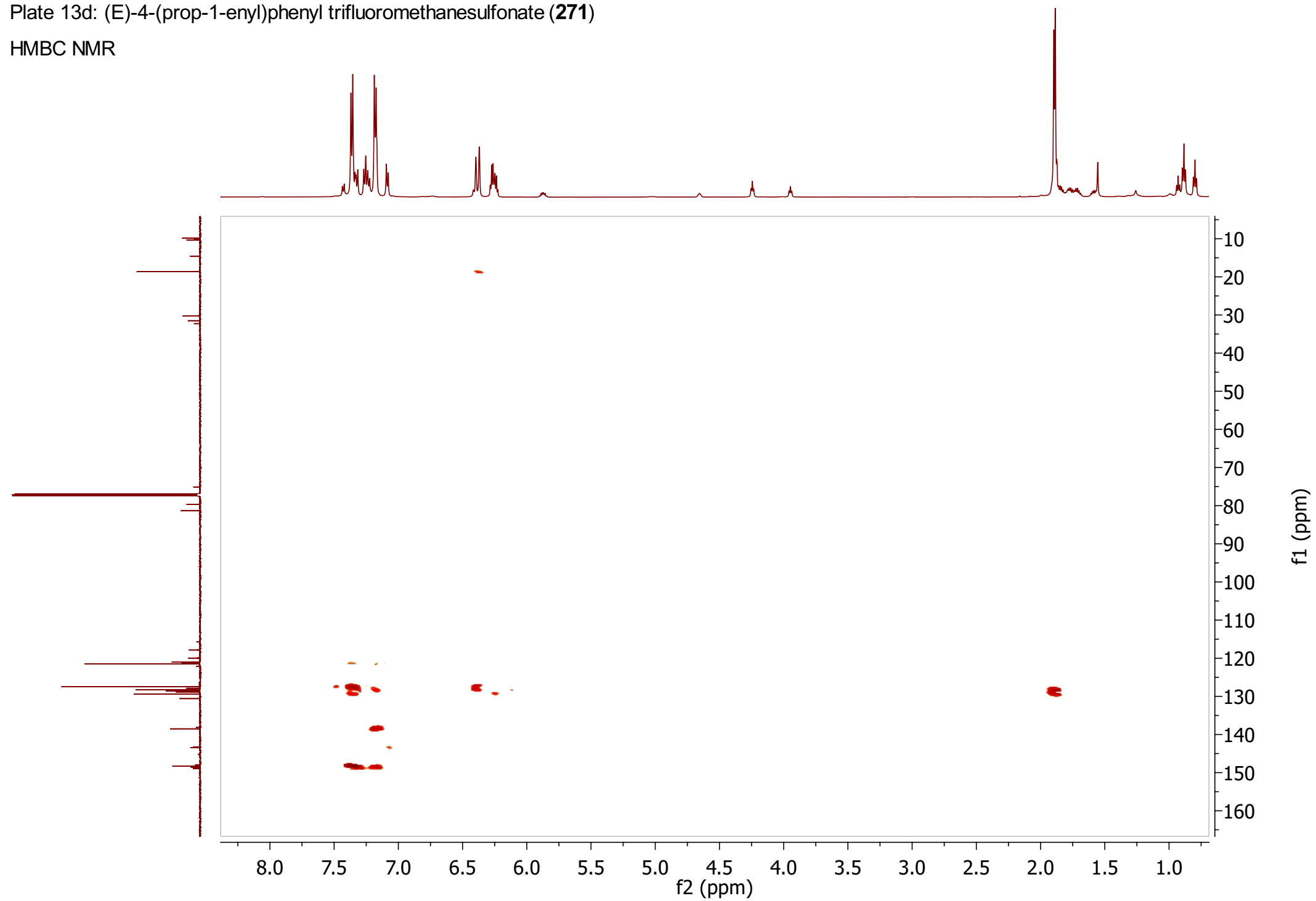


Plate 13e: (E)-4-(prop-1-enyl)phenyl trifluoromethanesulfonate (**271**)

^{13}C DEPT135 NMR

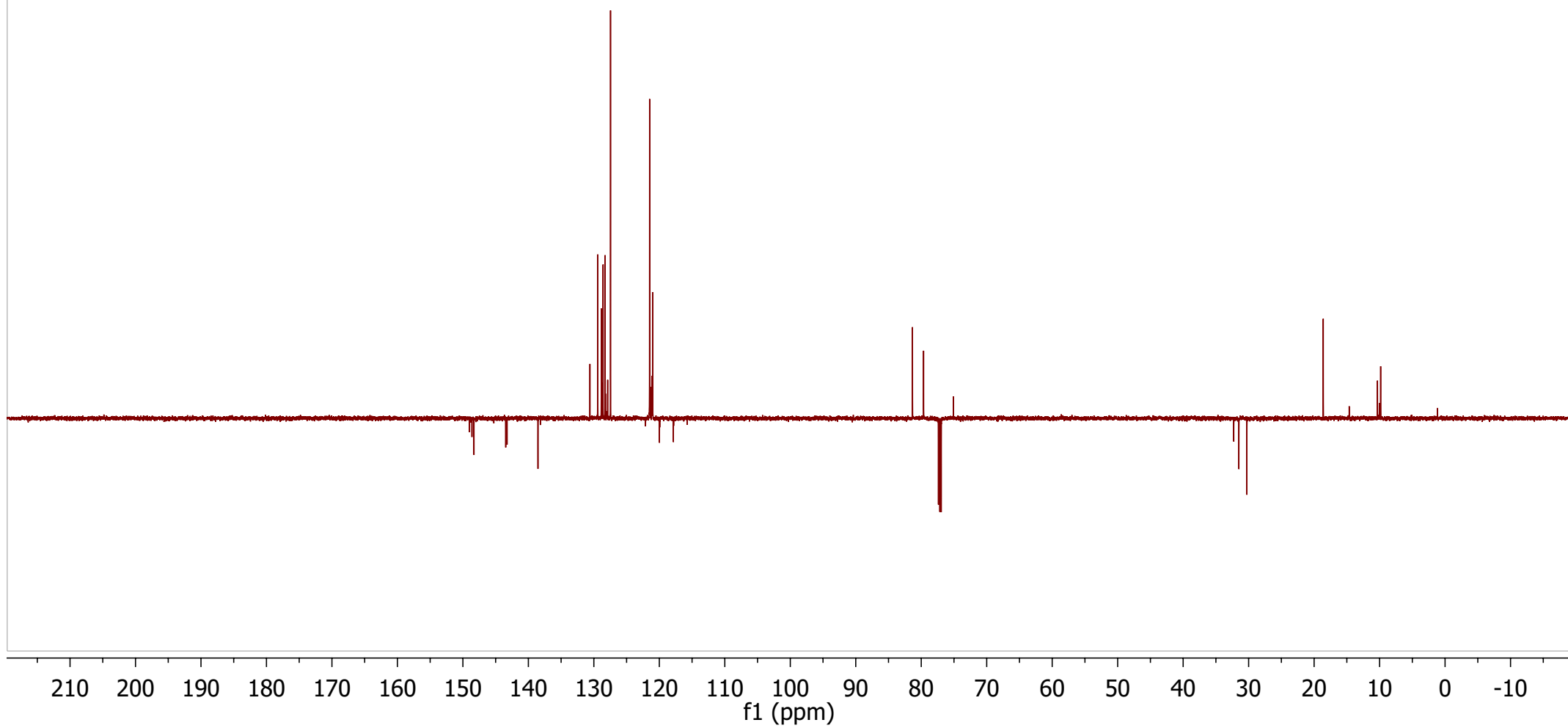


Plate 13f: (E)-4-(prop-1-enyl)phenyl trifluoromethanesulfonate (**271**)

^{19}F NMR [565 MHz, CDCl_3]: δ -75.85 (CF_3)

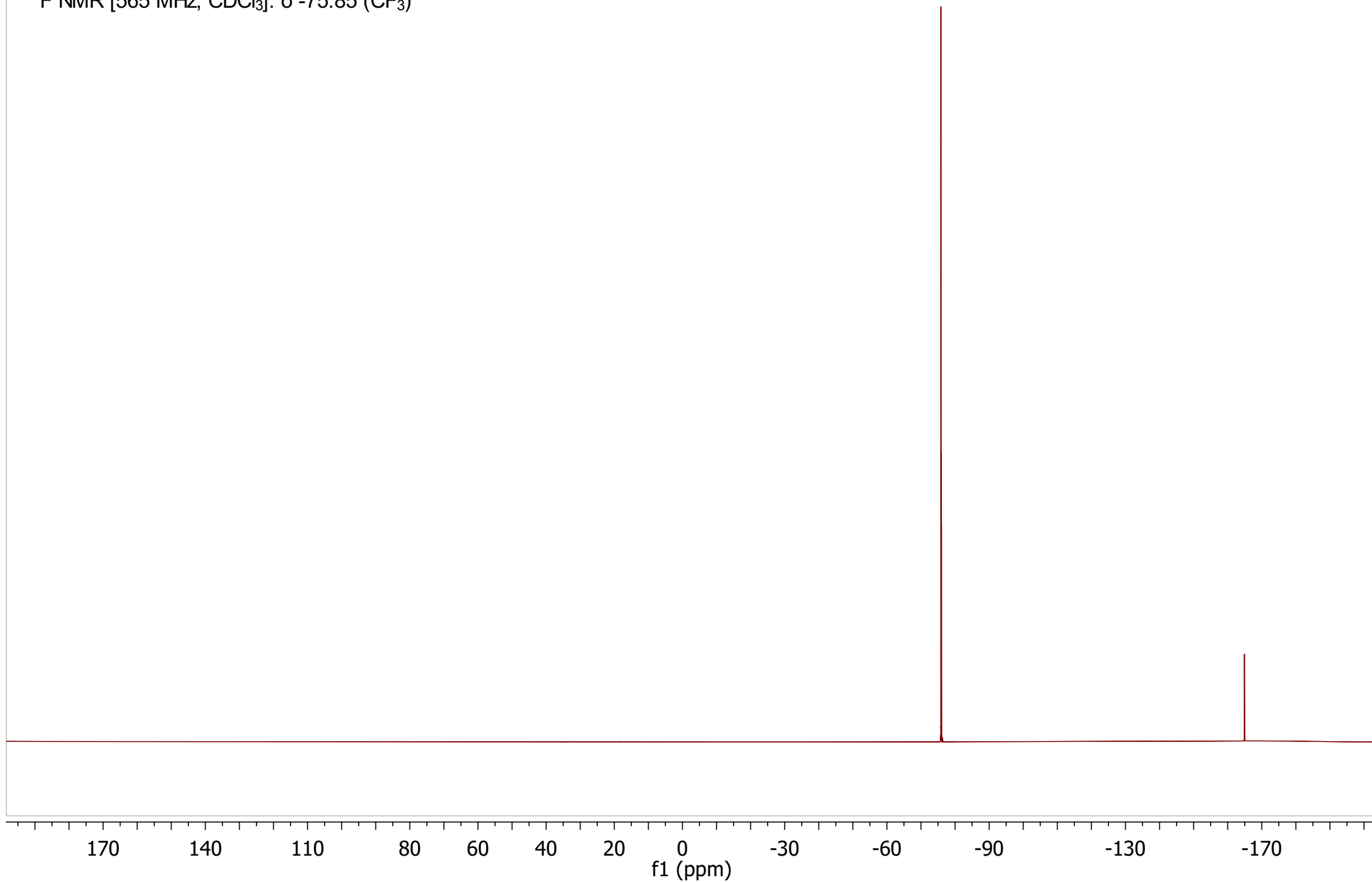


Plate 14a: (E)-4,4'-(ethene-1,2-diyl)bis(4,1-phenylene)
bis(trifluoromethanesulfonate) (**272**)

^1H NMR [600 MHz, CDCl_3]: δ 7.58 (4H, d, $J = 8.8$ Hz, H-2,6), 7.29 (4H, d, $J = 8.8$ Hz, H-3,5), 7.09 (2H, s, $\text{CH}=\text{CH}$).

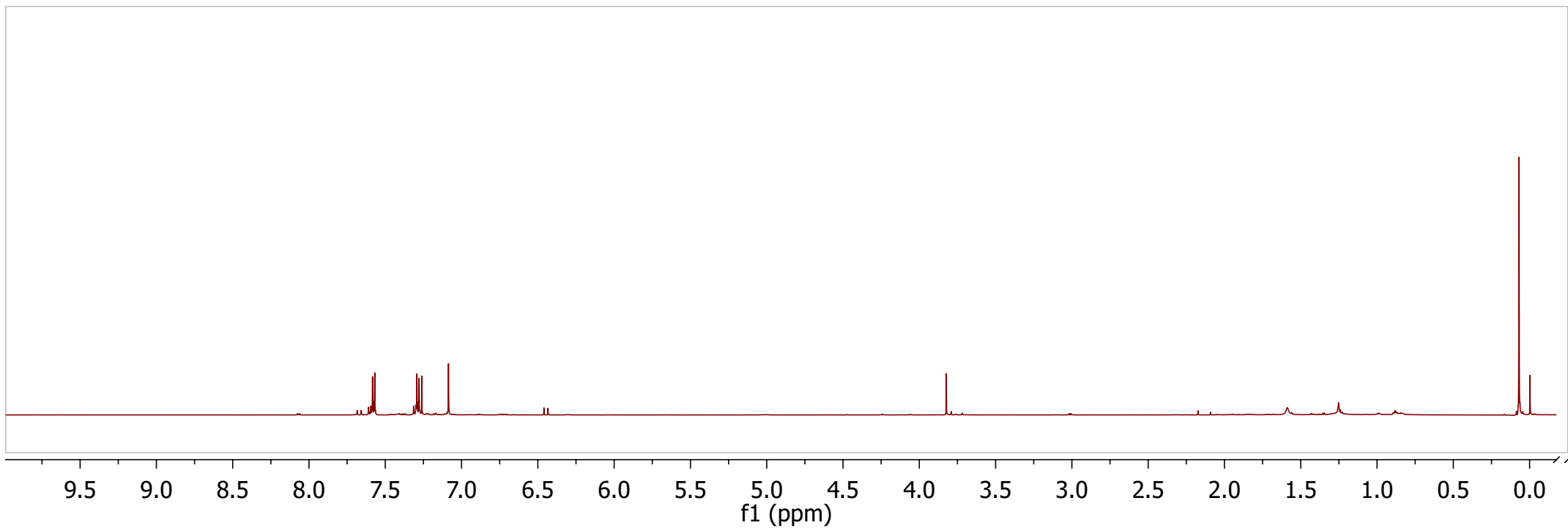
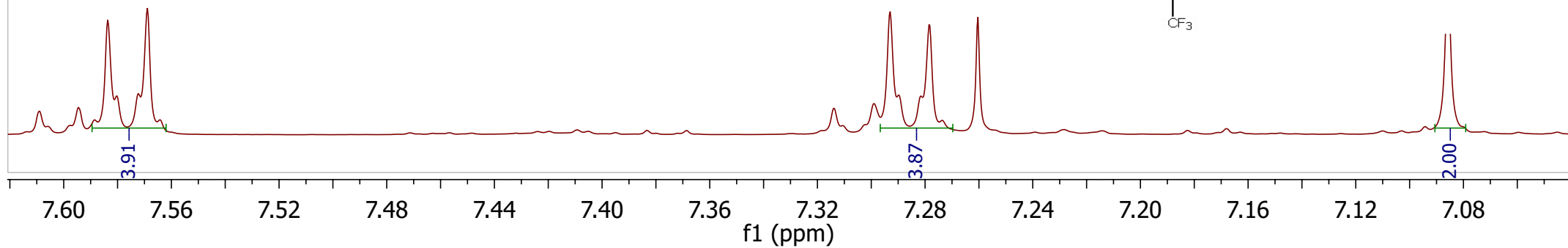
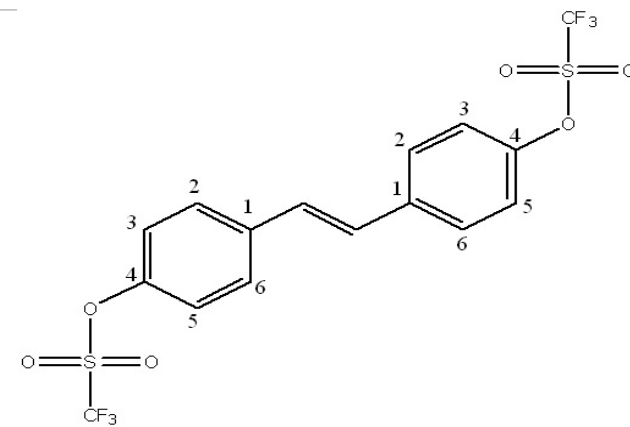


Plate 14b: (E)-4,4'-(ethene-1,2-diyl)bis(4,1-phenylene)
bis(trifluoromethanesulfonate) (**272**)

^{13}C NMR [151 MHz, CDCl_3]: δ 149.1 (C-4), 137.2 (C-1), 128.8
($\text{C}=\text{C}$), 128.1 (C-2,6), 121.9 (C-3,5), 118.9 (q, $J = 320.8\text{Hz}$, CF_3).

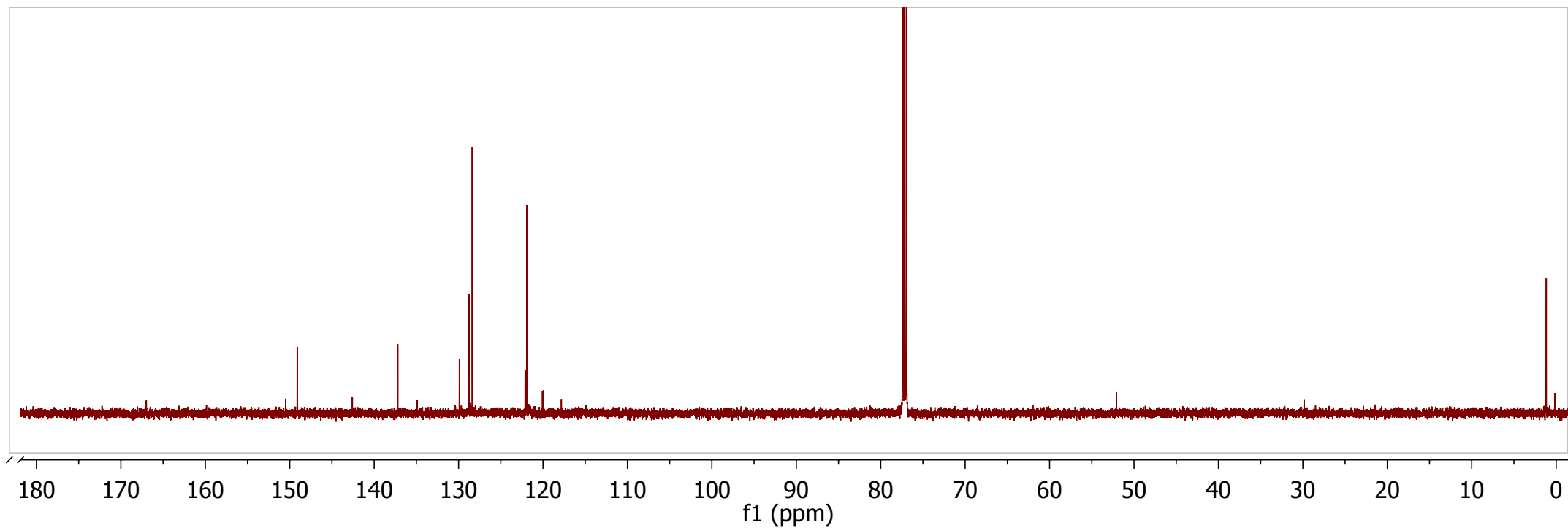
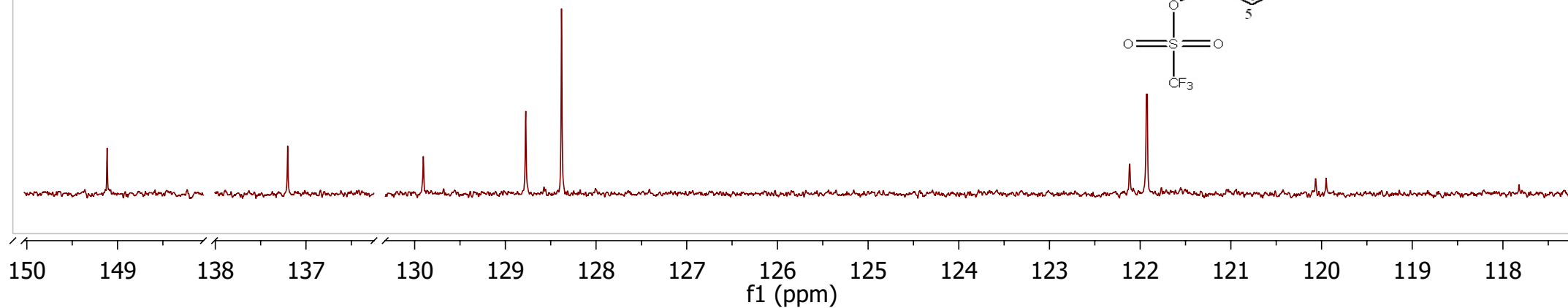
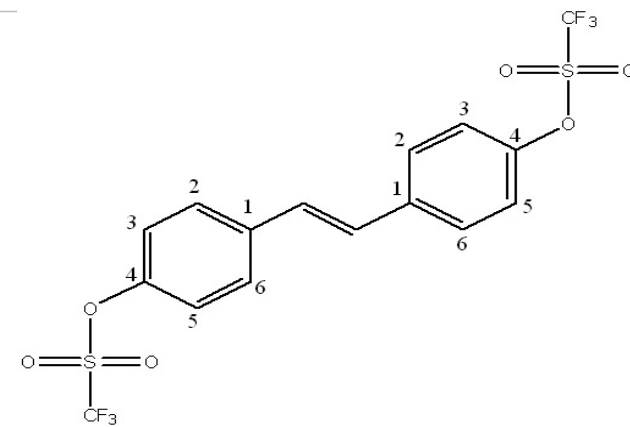


Plate 14c: (E)-4,4'-(ethene-1,2-diyl)bis(4,1-phenylene)
bis(trifluoromethanesulfonate) (**272**)

HSQC NMR

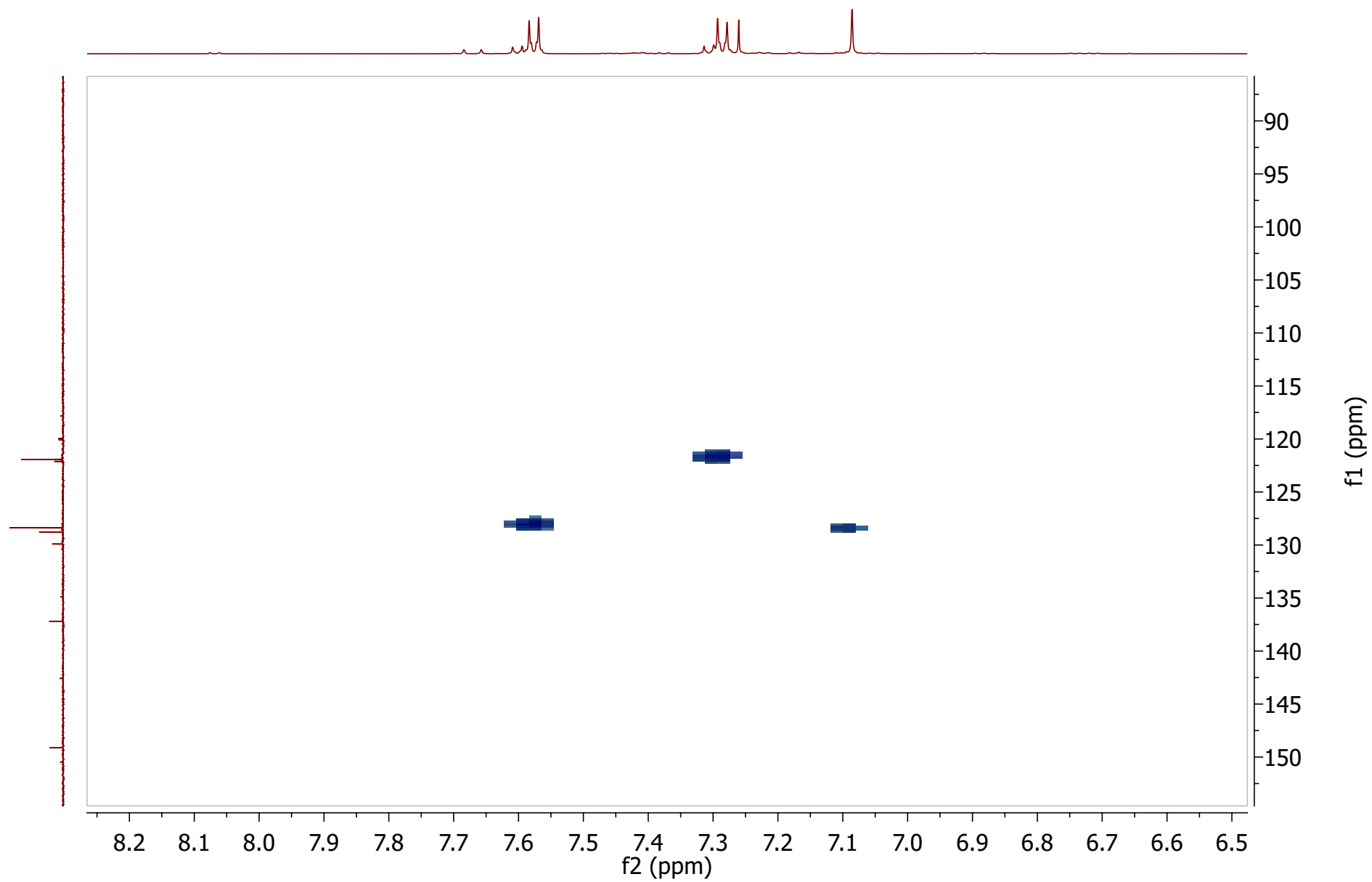


Plate 14d: (E)-4,4'-(ethene-1,2-diyl)bis(4,1-phenylene)
bis(trifluoromethanesulfonate) (**272**)

HMBC NMR

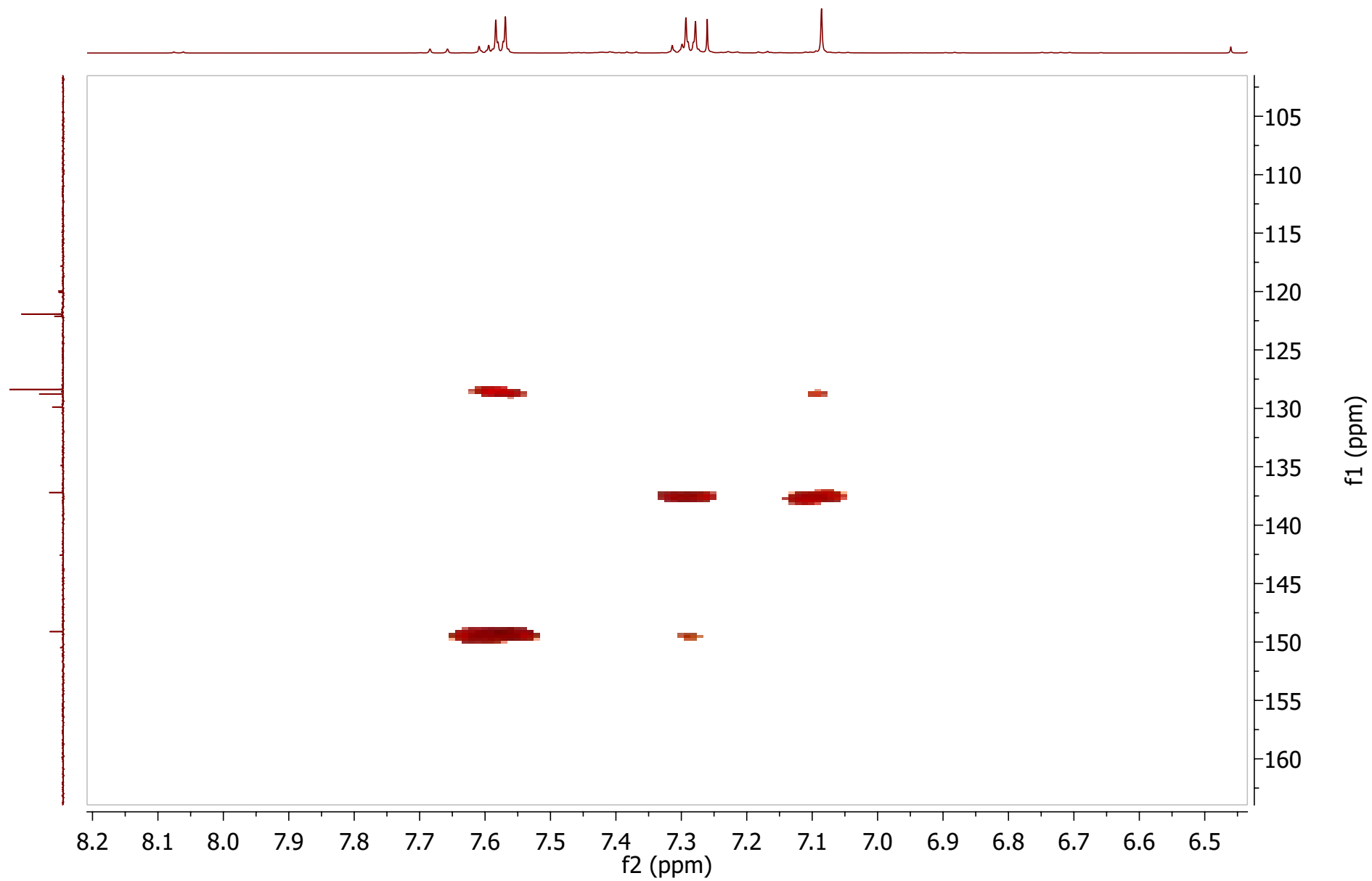


Plate 14e: (E)-4,4'-(ethene-1,2-diyl)bis(4,1-phenylene)
bis(trifluoromethanesulfonate) (**272**)

^{13}C DEPT135 NMR

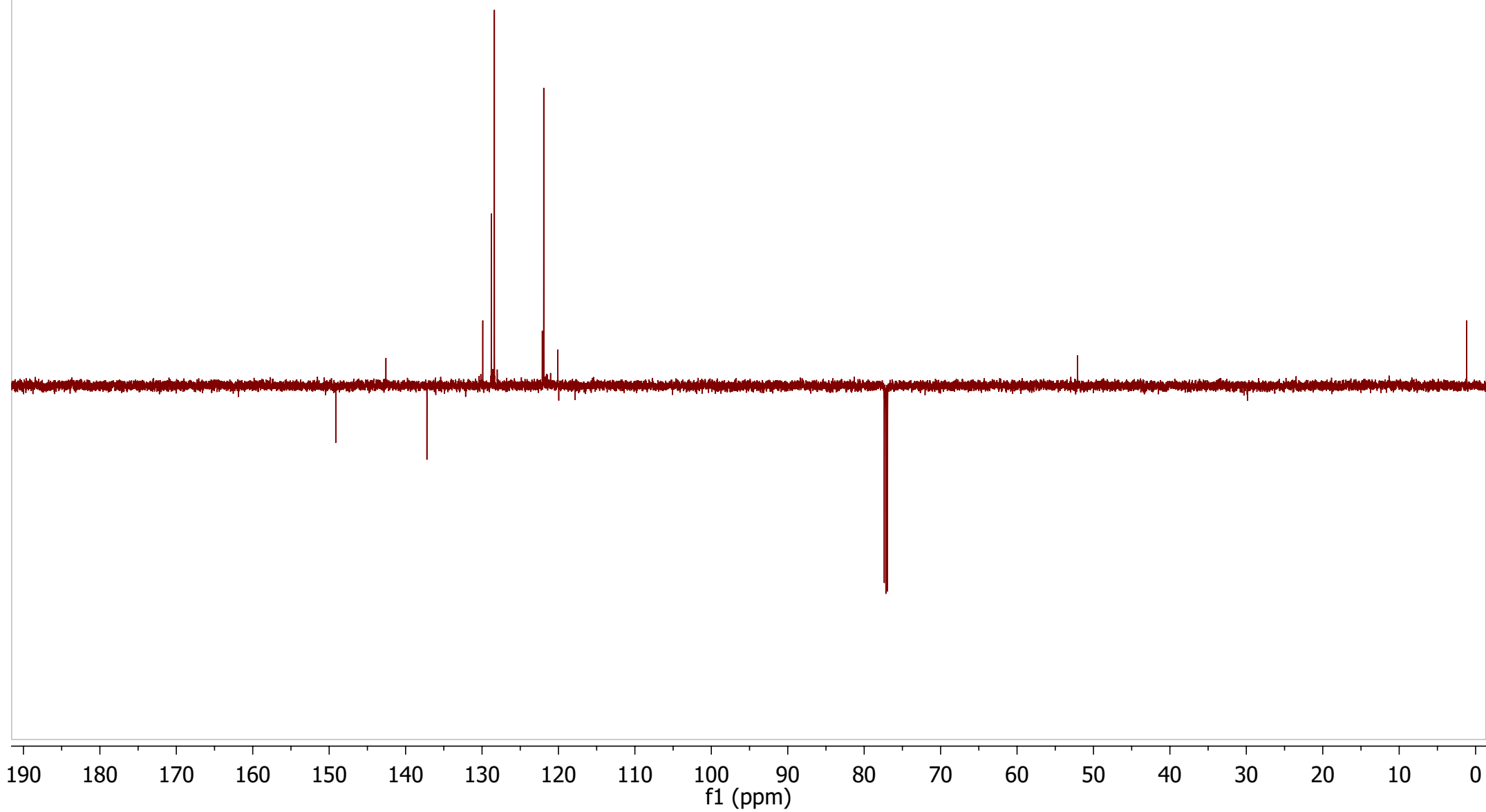


Plate 14f: (E)-4,4'-(ethene-1,2-diyl)bis(4,1-phenylene)
bis(trifluoromethanesulfonate) (**272**)

^{19}F NMR [565 MHz, CDCl_3]: δ -75.91 (CF_3)

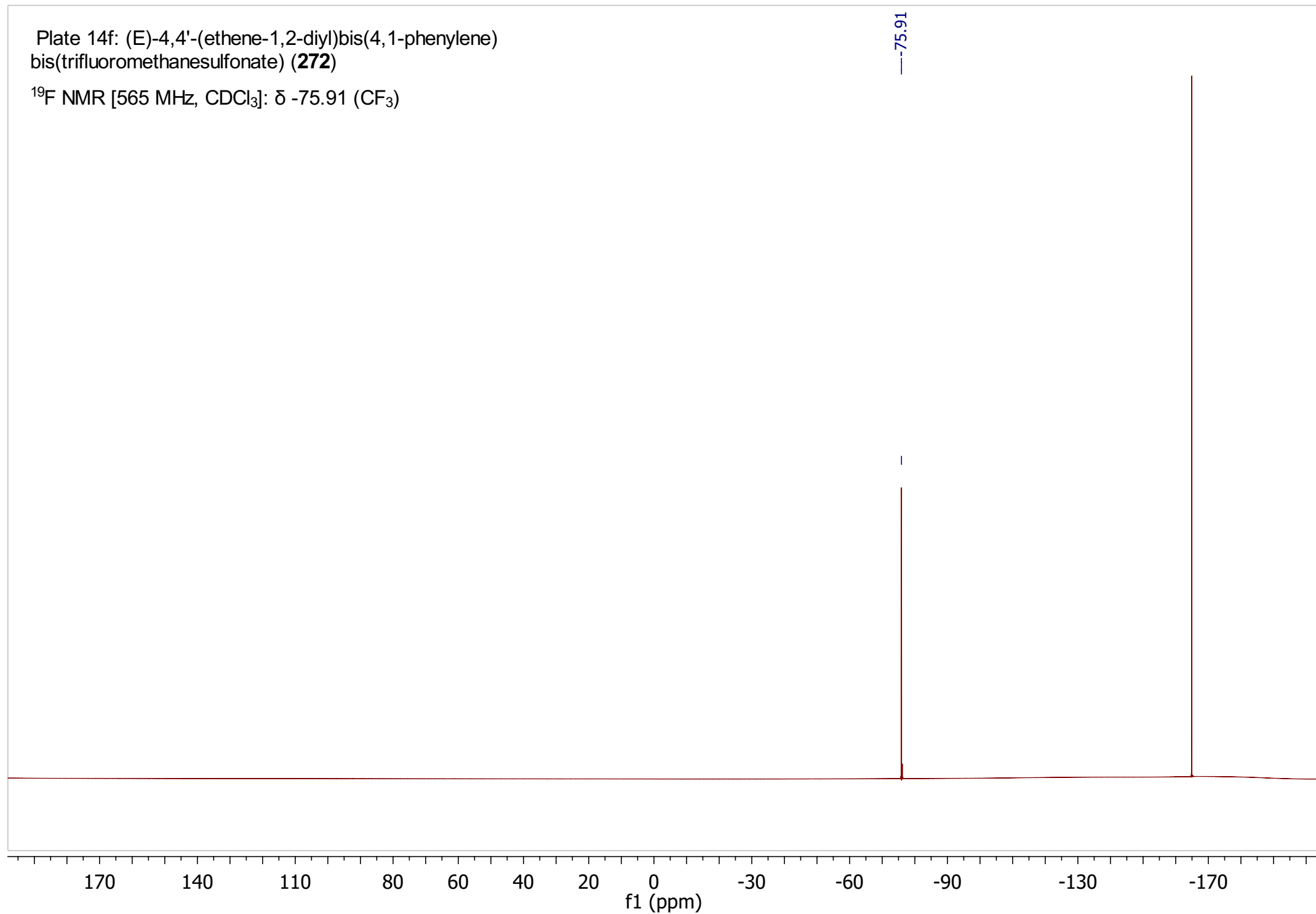


Plate 15a: (E)-methyl 3-(4-(trifluoromethylsulfonyloxy)phenyl)acrylate (**273**)

^1H NMR [600 MHz, CDCl_3]: δ 7.66 (1H, d, $J = 16.0$ Hz, H-3), 7.59 (2H, d, $J = 8.7$ Hz, H-2',6'), 7.29 (2H, d, $J = 8.7$ Hz, H-3',5'), 6.44 (1H, d, $J = 16.0$ Hz, H-2), 3.81 (3H, s, H-1").

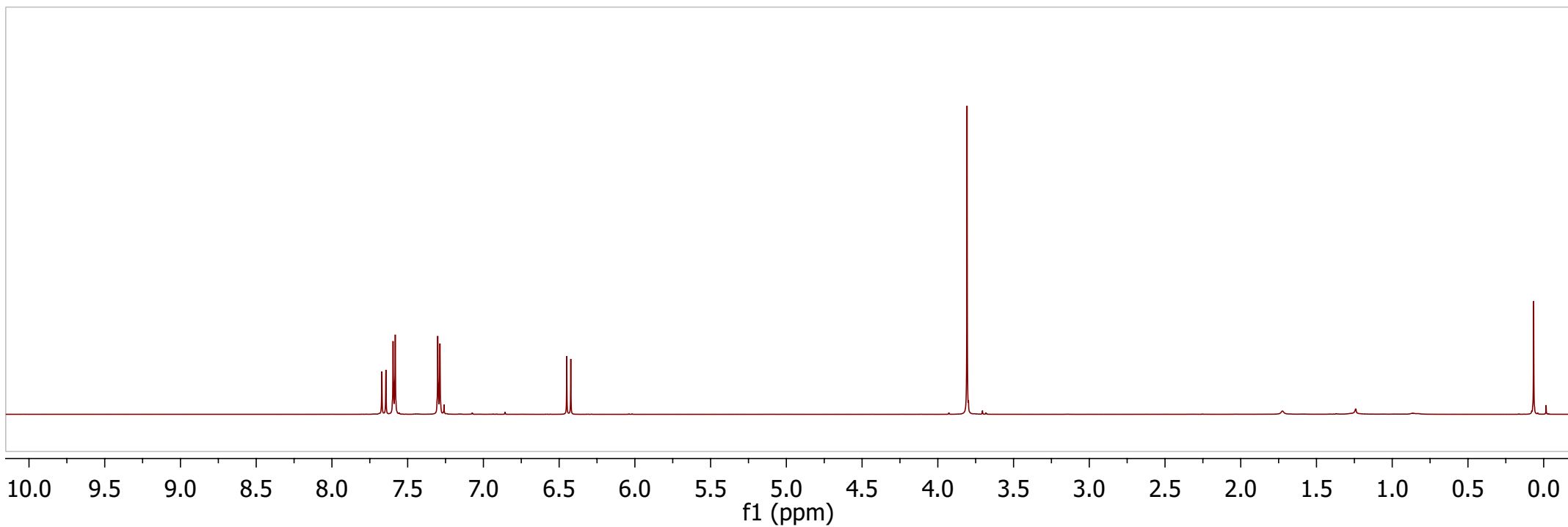
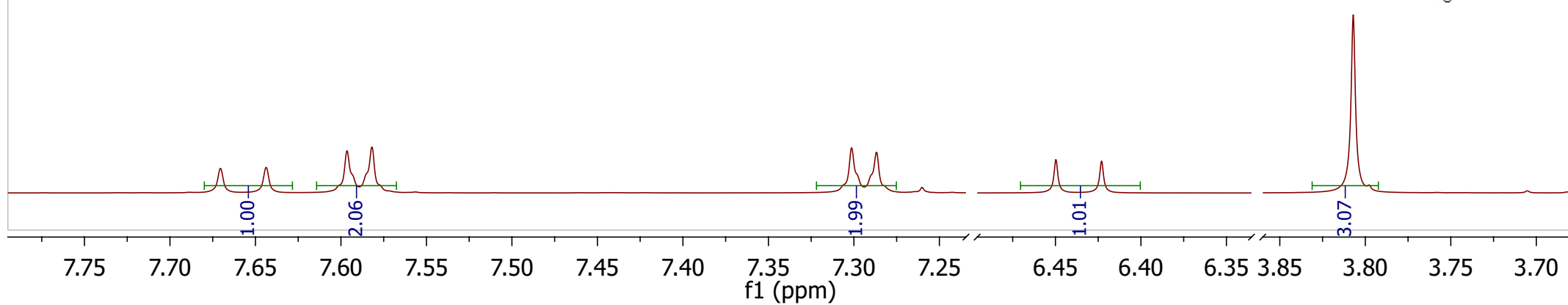
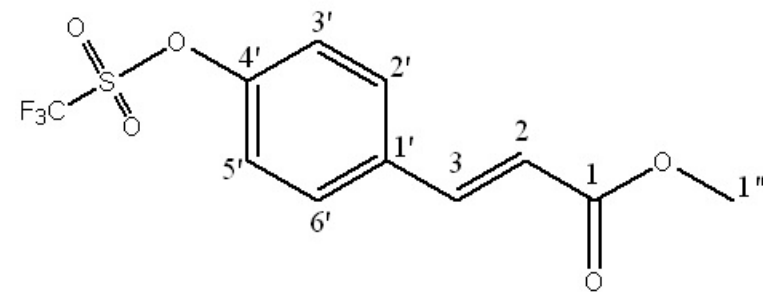


Plate 15b: (E)-methyl 3-(4-(trifluoromethylsulfonyloxy)phenyl)acrylate (**273**)

^{13}C NMR [151 MHz, CDCl_3]: δ 166.9 (C-1), 150.5 (C-4'), 142.5 (C-3), 134.9 (C-1'), 129.9 (C-2',6'), 122.1 (C-3',5'), 120.0 (C-2), 118.8 (q, $J = 320.9\text{Hz}$, CF_3), 52.0 (C-1'').

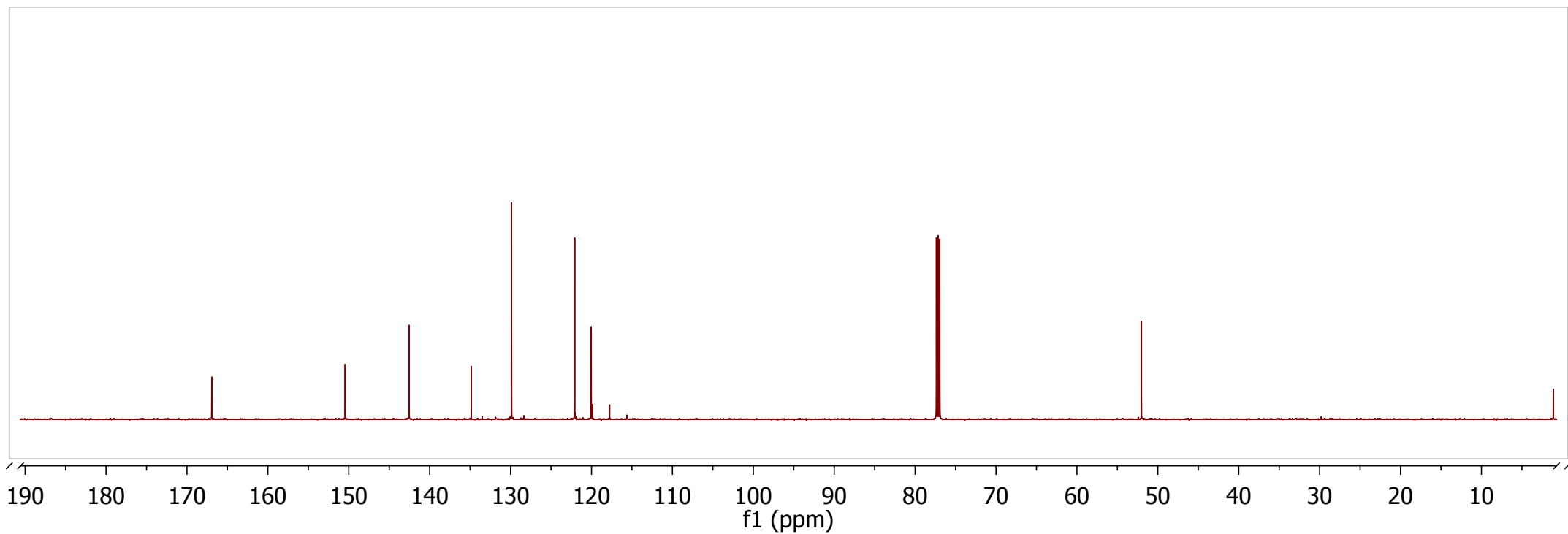
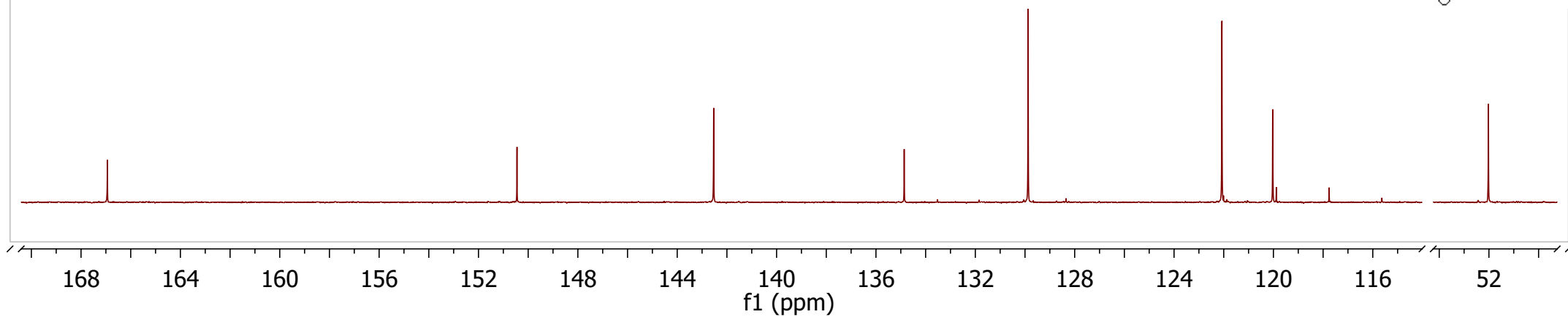
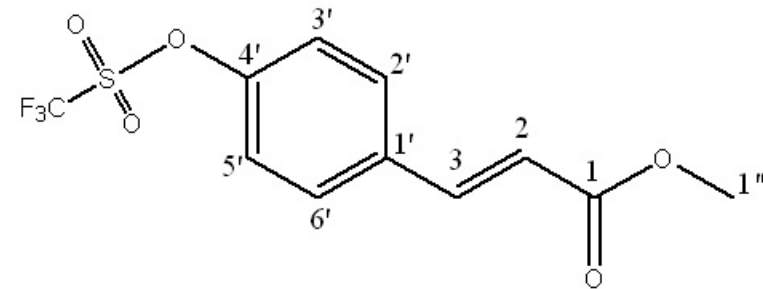


Plate 13c: (E)-methyl 3-(4-(trifluoromethylsulfonyloxy)phenyl)acrylate (**273**)

HSQC NMR

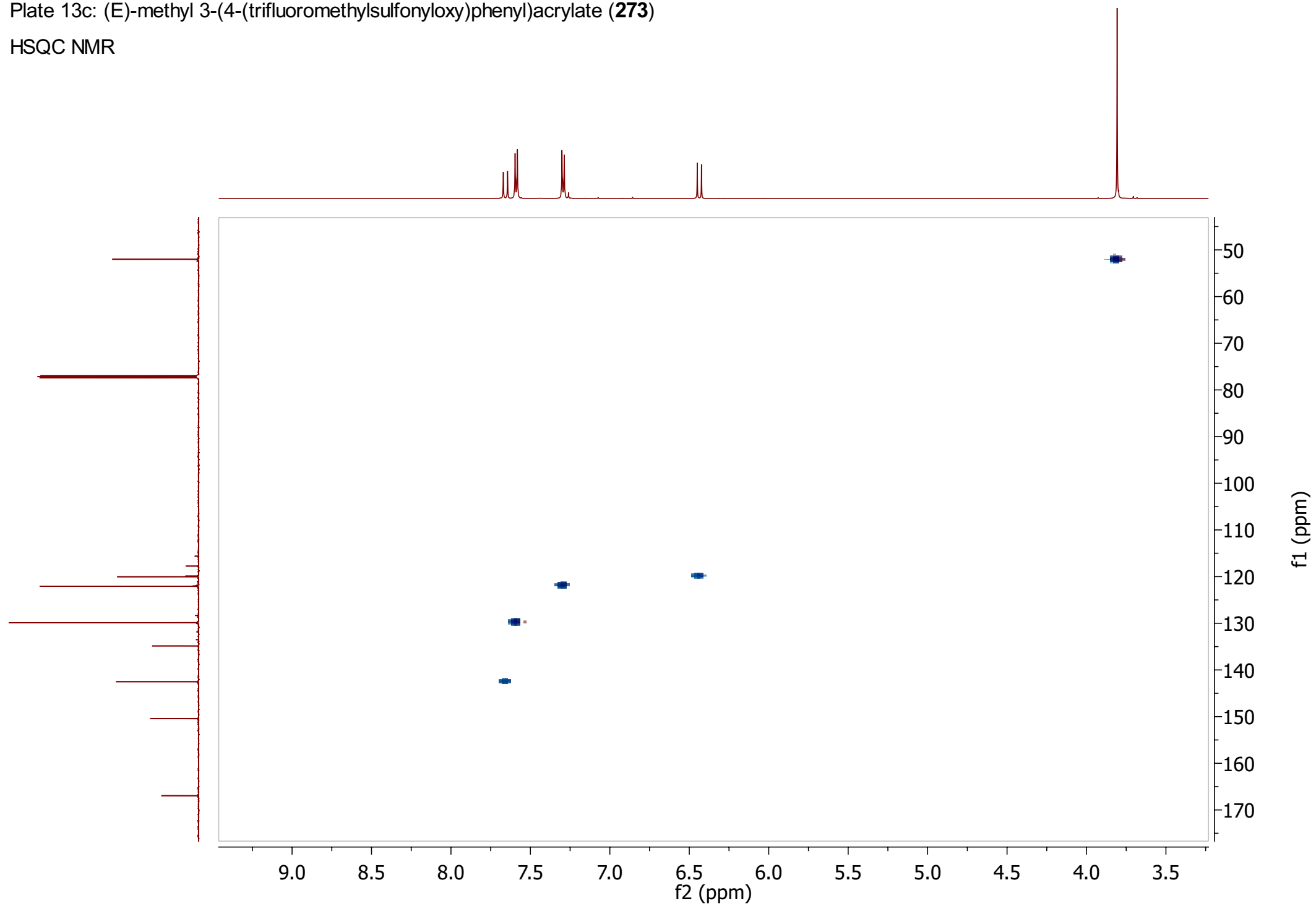


Plate 15d: (E)-methyl 3-(4-(trifluoromethylsulfonyloxy)phenyl)acrylate (**273**)

HMBC NMR

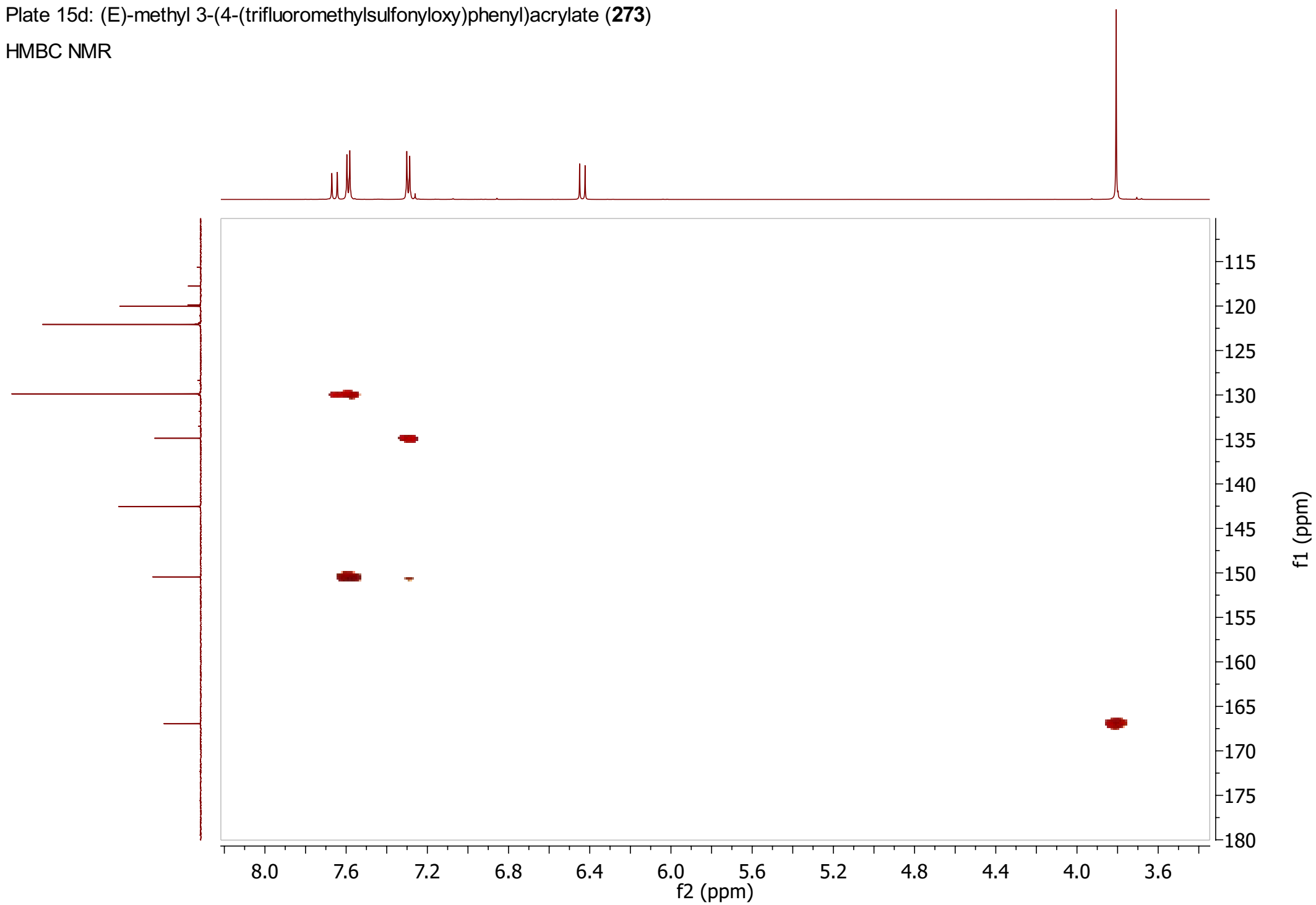


Plate 15e: (E)-methyl 3-(4-(trifluoromethylsulfonyloxy)phenyl)acrylate (**273**)

^{13}C DEPT135 NMR

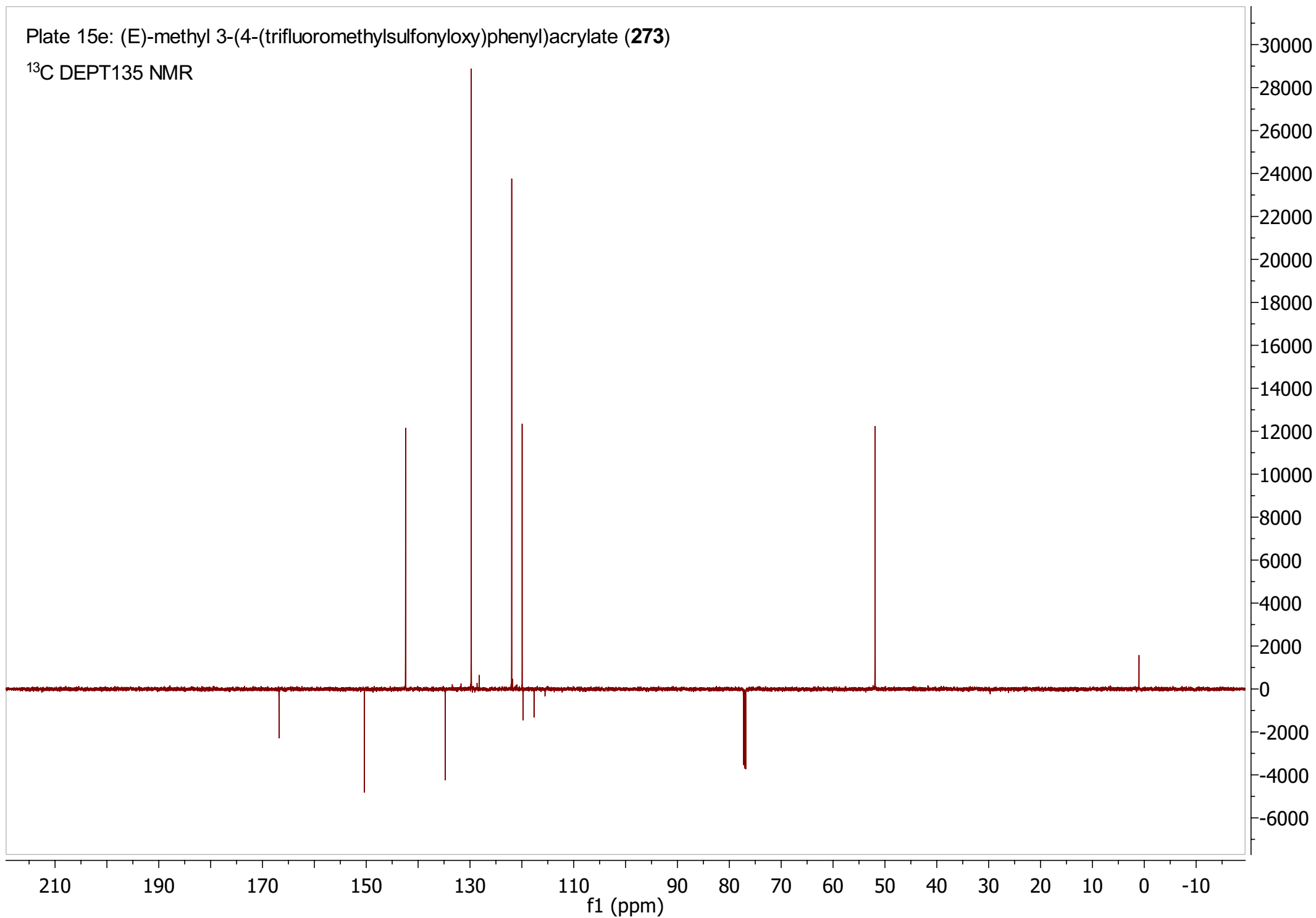


Plate 15f: (E)-methyl 3-(4-(trifluoromethylsulfonyloxy)phenyl)acrylate (**273**)

^{19}F NMR [565 MHz, CDCl_3]: δ -75.87 (CF_3)

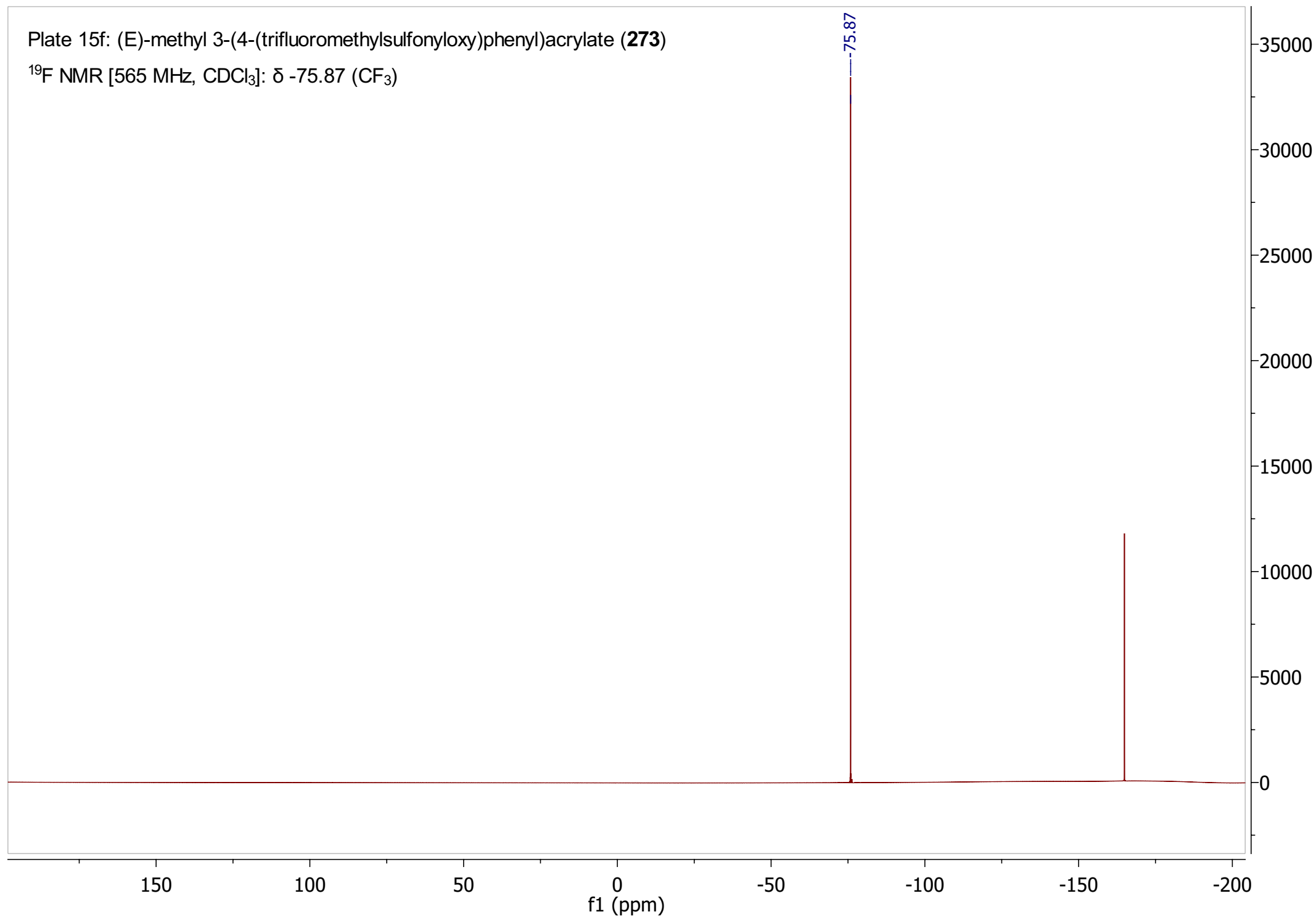


Plate 16a: Grubbs 2nd generation catalyst (**125**)

¹H NMR [600 MHz, CDCl₃]: δ 19.12 (1H, s, H-1'), 8.97 (1H, s, H-2(C)), 7.37 – 7.34 (1H, m, H-4(C)), 7.16 – 6.91 (3H, m, H-3(C), 5(C), 6(C)), 7.07 (1H, bs, H-3(B)), 7.02 (2H, bs, H-5(B)), 6.74 (1H, s, H-5(A)), 5.81 (1H, s, H-3(A)), 3.97 (3H, bs, H-4,5_b), 3.80 (1H, bs, H-5_a), 2.76 (3H, s, H-2-Me(B)), 2.57 (3H, s, H-6-Me(B)), 2.52 (3H, s, H-6-Me(A)), 2.31 (3H, s, H-4-Me(B)), 2.23 – 2.14 (3H, m, H-1(D)), 2.04 (3H, s, H-2-Me(A)), 1.90 (3H, s, H-4-Me(A)), 1.63 – 1.17 and 1.17 - 0.770 (30H, m, H2-6(D)).

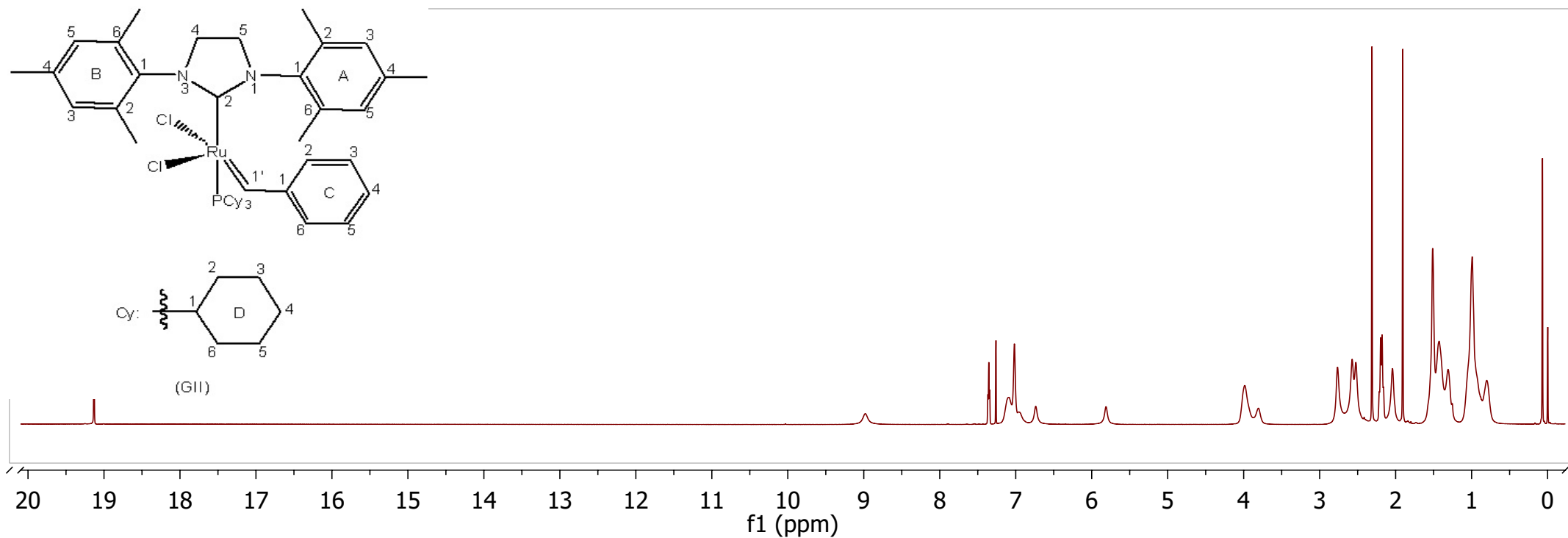
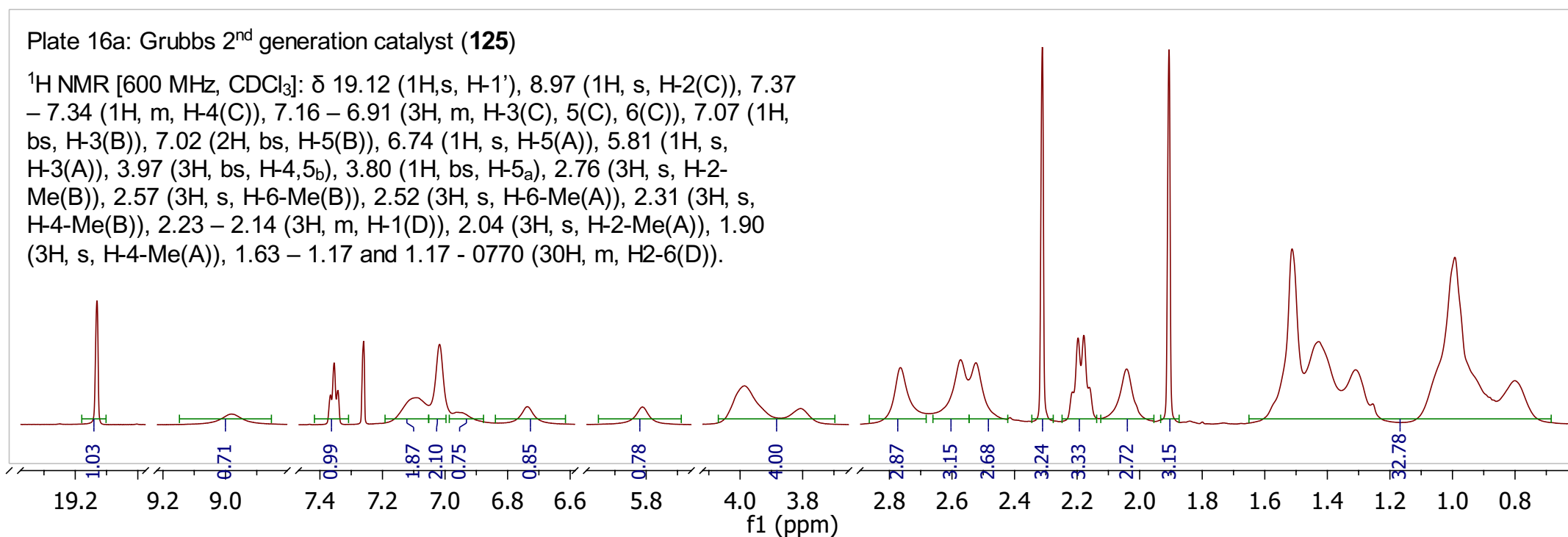


Plate 16b: Grubbs 2nd generation catalyst (**125**)

Int. ¹³C NMR [151 MHz, CDCl₃]: δ 294.4(C-1'), 220.5(d, J = 77.4 Hz, C-2), 151.3(C-1(C)), 139.2 and 139.0(C-2,6(A or B)), 138.4(C-4(B)), 137.7(C-4(A)), 137.3(C-1(A or B)), 137.2 and 136.9(C-2,6(B or A)), 135.3(C-1(B or A)), 132.0(C-2(C)), 130.0(C-3(B),5(C)), 129.8(C-6(C)), 129.3(C-3(A)), 128.9(C-5(A)), 128.2(C-3(C)), 128.0(C-4(C)), 127.2(C-5(B)), 52.3 (d, J = 3.4 Hz, C-4), 51.4 (d, J = 1.7 Hz, C-5), 31.5(d, J = 16.6 Hz, C-2,6(D)), 29.2(d, J = 141.0 Hz, C-1(D)), 27.9(d, J = 9.9 Hz, C-3,5(D)), 26.3(C-4(D)), 21.3(C-4-Me(B)), 21.0(C-4-Me(A)), 20.1(C-2-Me(B),6-Me(B)), 18.9(C-2-Me(A)), 18.6(C-6-Me(A)).

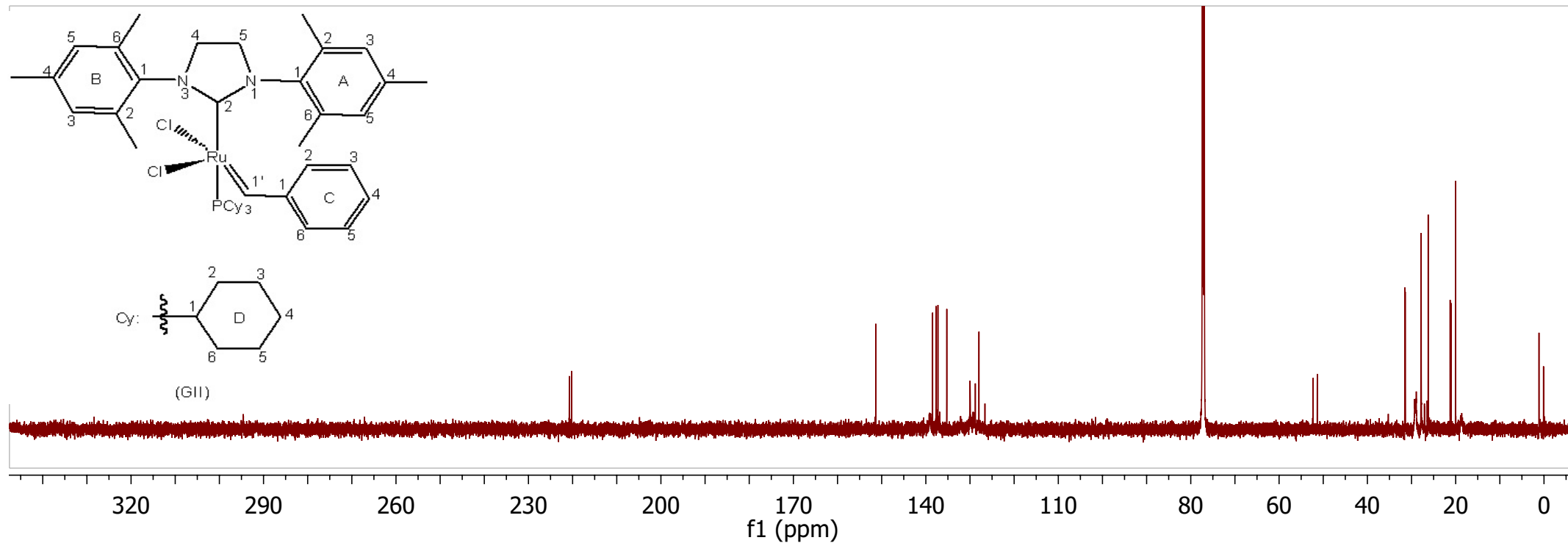
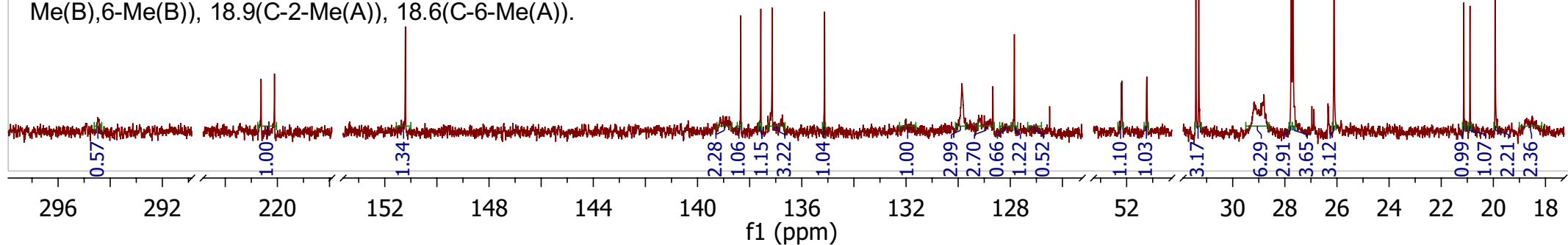


Plate 16c: Grubbs 2nd generation catalyst (**125**)

HSQC NMR

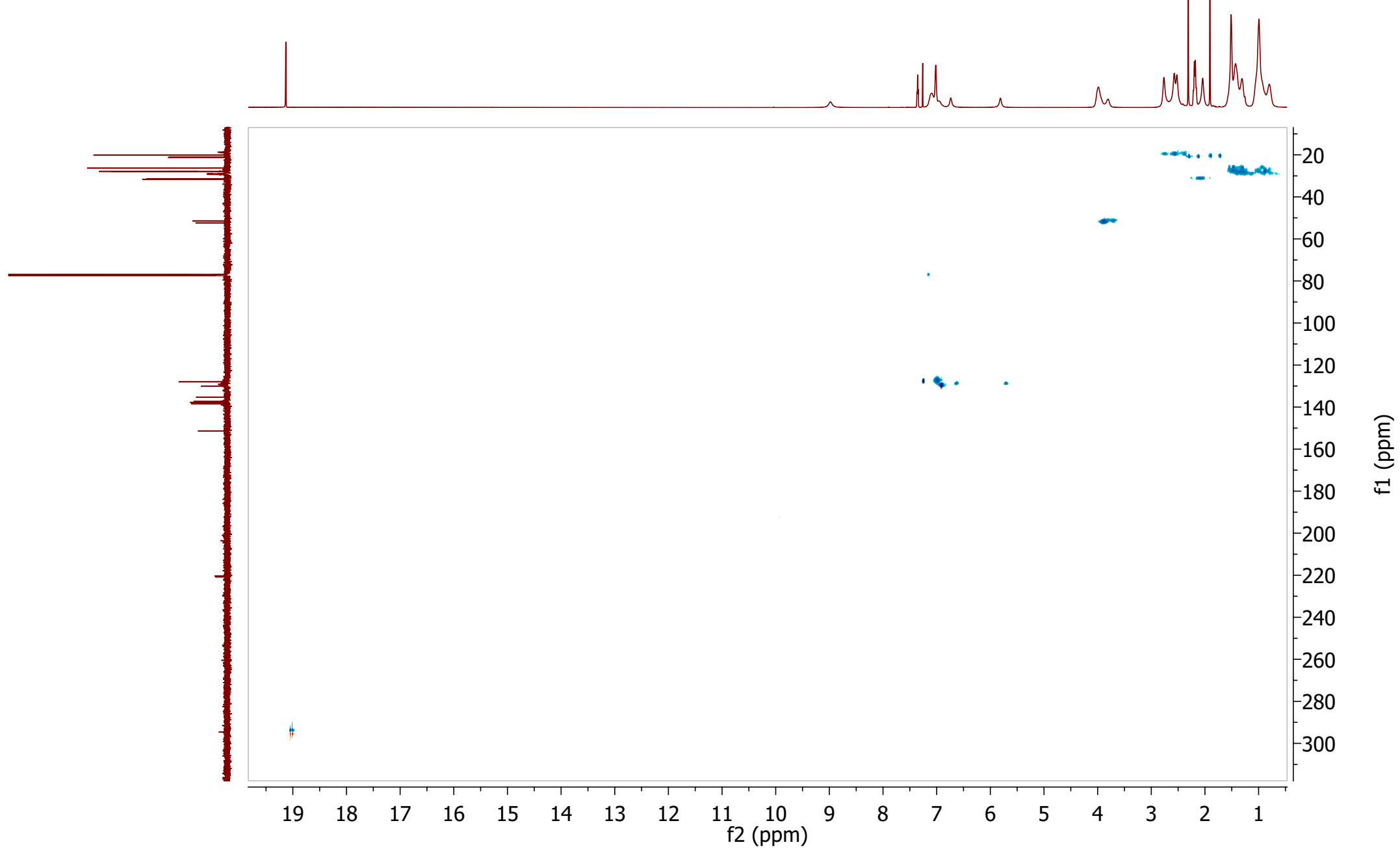


Plate 16d: Grubbs 2nd generation catalyst (**125**)

HMBC NMR

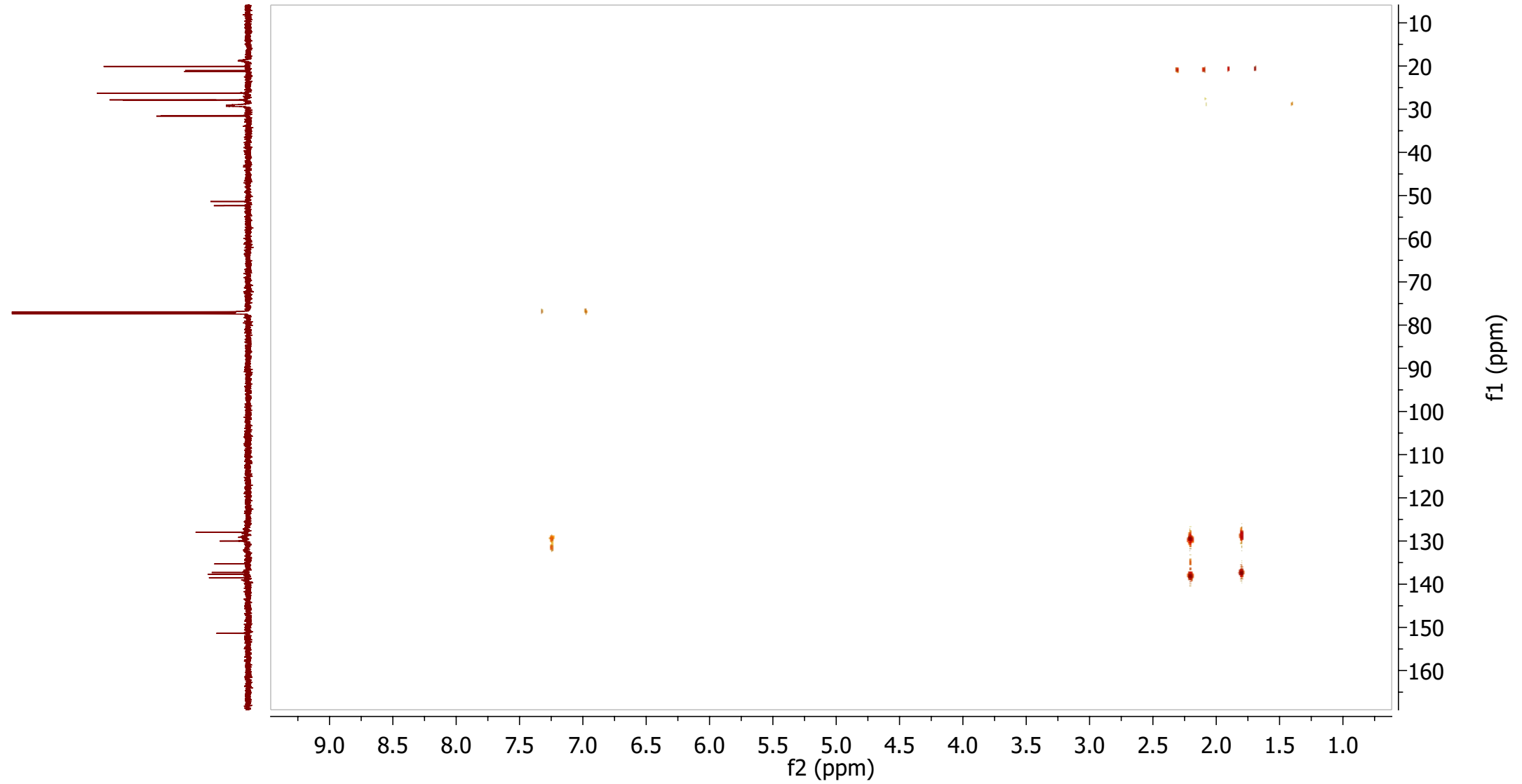


Plate 16e: Grubbs 2nd generation catalyst (**125**)

¹³C DEPT135 NMR

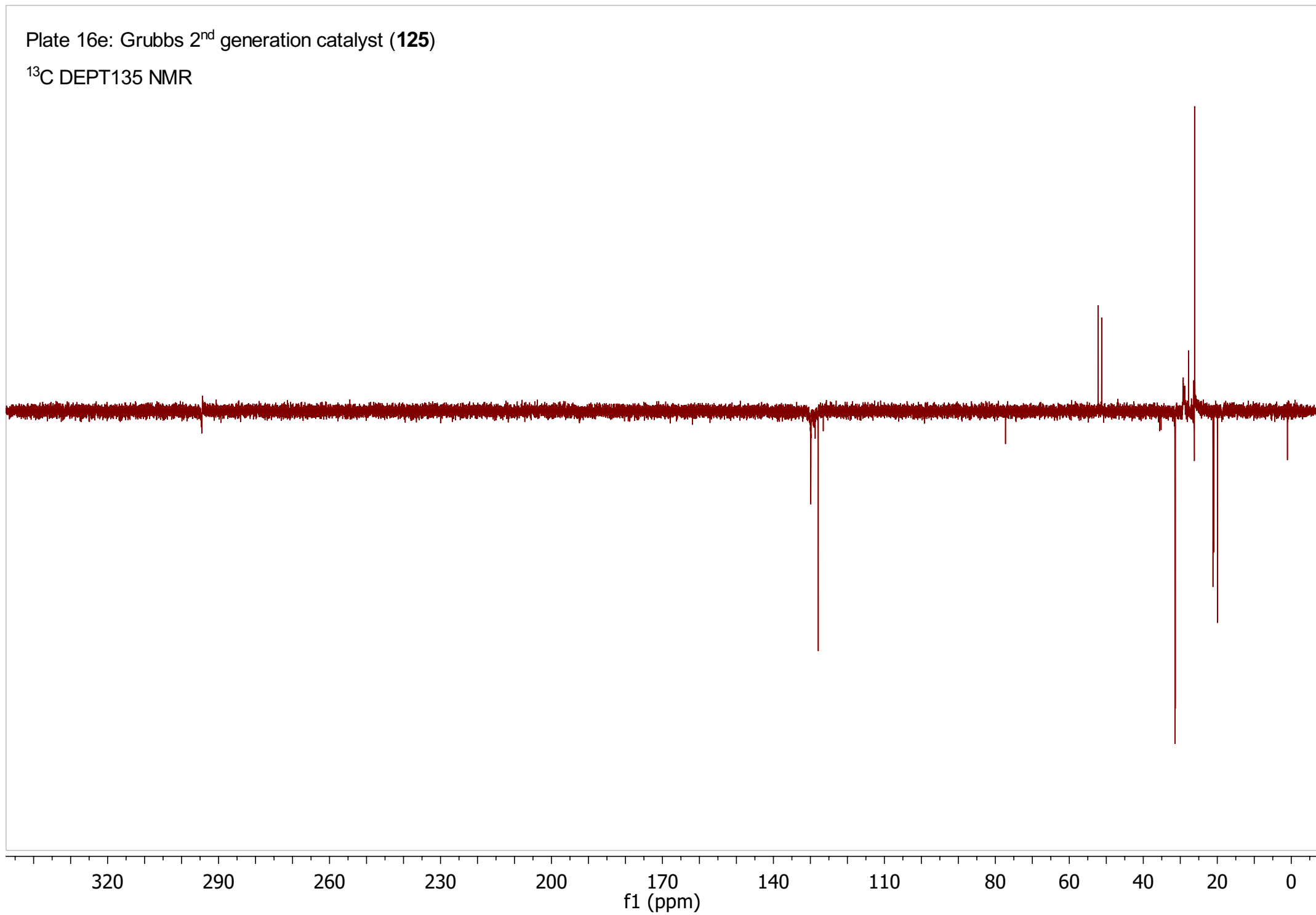


Plate 16g: Grubbs 2nd generation catalyst (**125**)

³¹P NMR [243 MHz, CDCl₃]: δ 28.9.

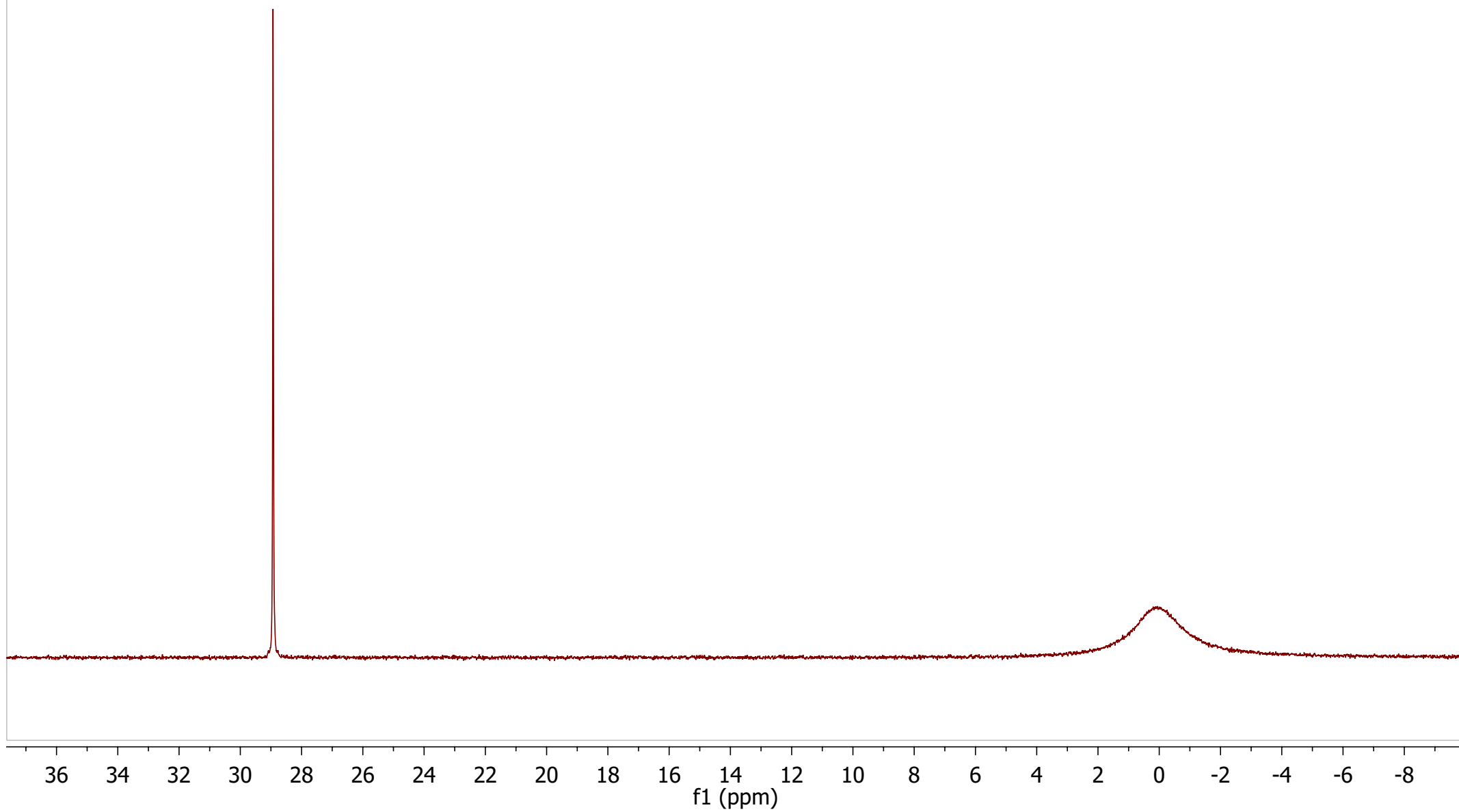


Plate 16h: Grubbs 2nd generation catalyst (**125**)

NOE NMR

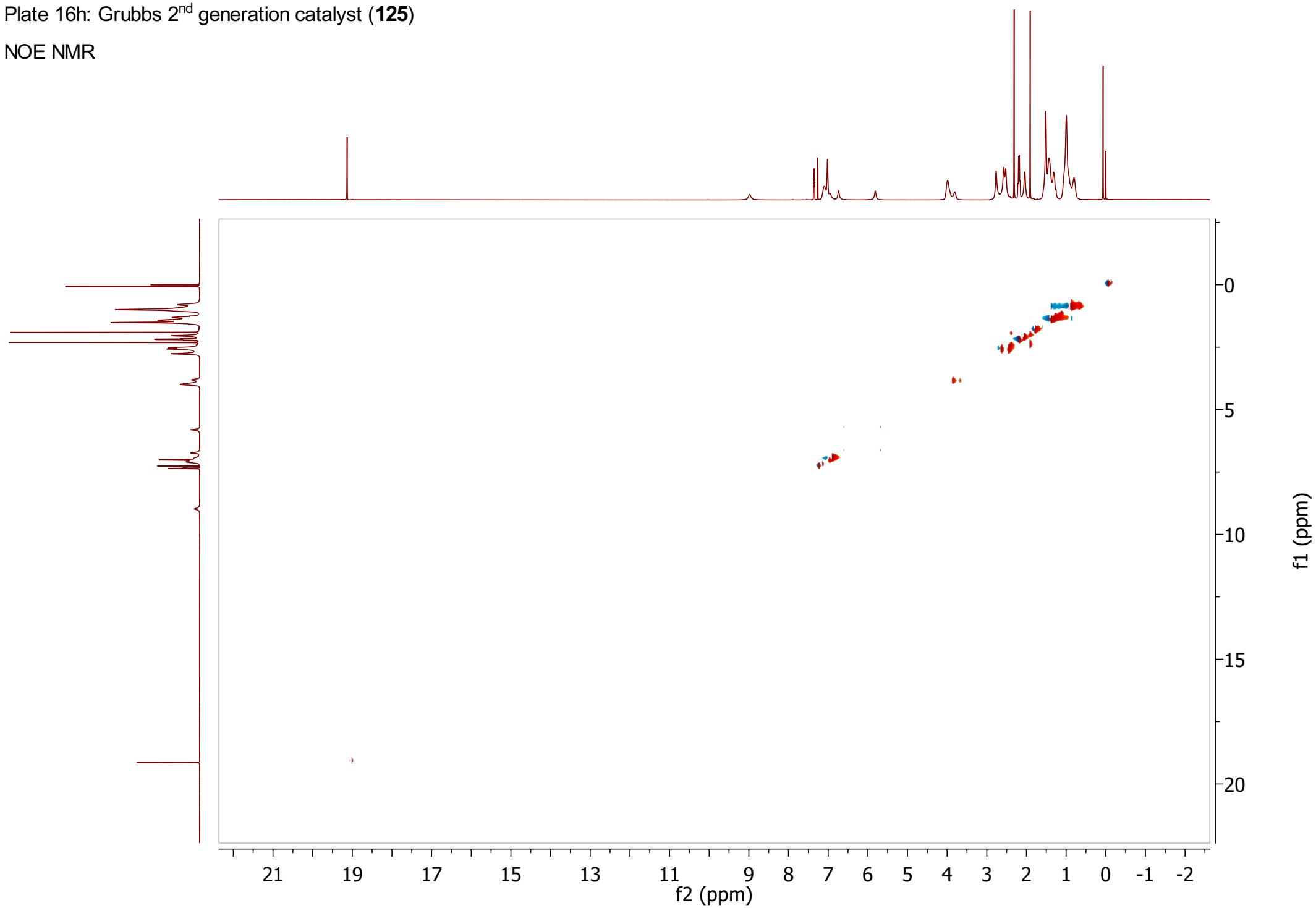


Plate 16i: Grubbs 2nd generation catalyst (**125**)

Cosy NMR

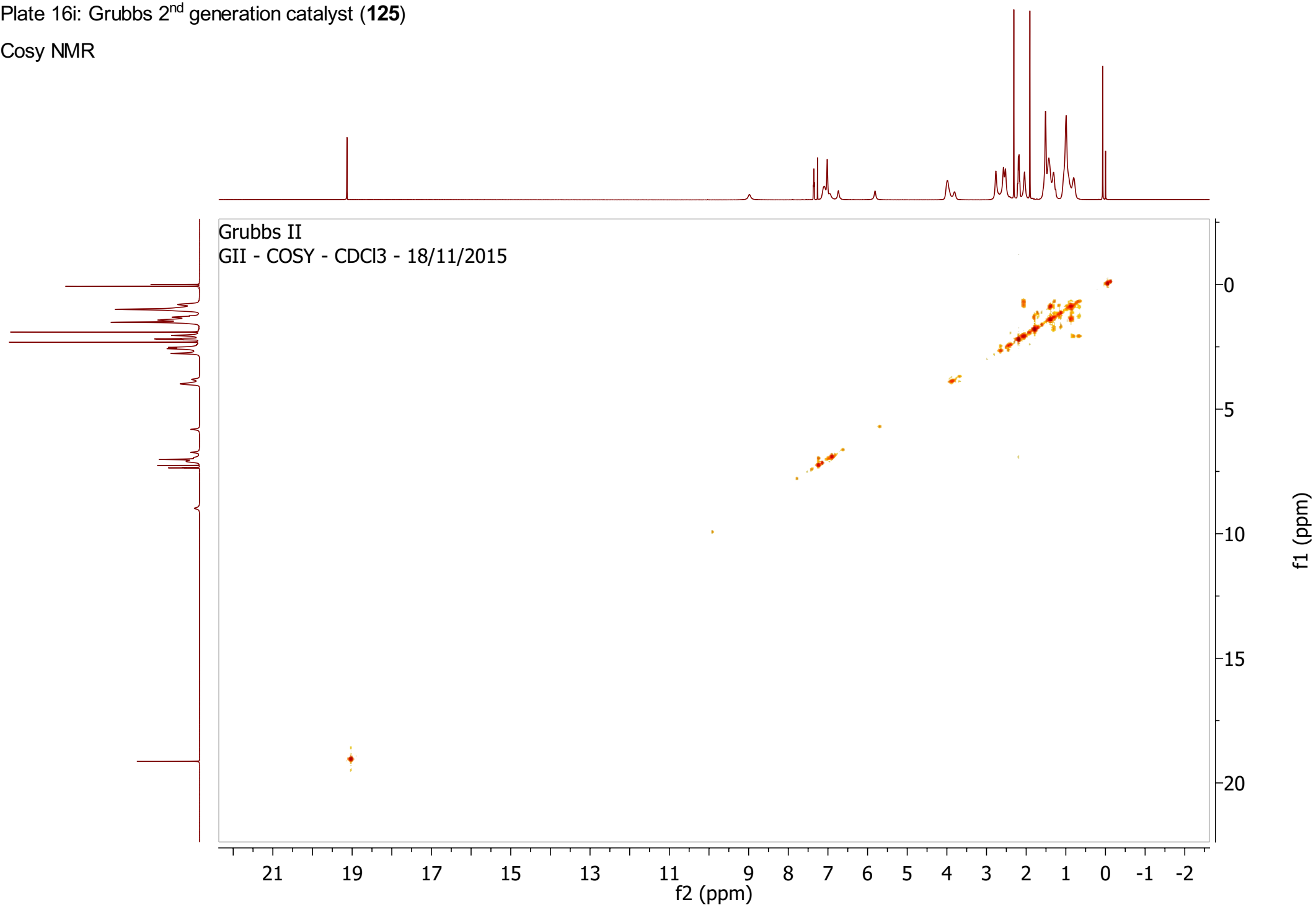


Plate 16a₂: Grubbs 2nd generation catalyst (**125**) @ 60°C

¹H NMR [600 MHz, CDCl₃]: δ 19.25 (1H, s, H-1'), 7.34 (1H, t, *J* = 7.3 Hz), 7.08 (2H, t, *J* = 7.8 Hz), 6.99 (2H, s), 6.28 (2H, s), 4.01 – 3.94 (2H, m, H-4), 3.89 – 3.81 (2H, m, H-5), 2.66 (6H, s), 2.30 (6H, s), 2.17 (4H, q, *J* = 12.0 Hz, C-1(D)), 1.90 (3H, s), 1.55 – 1.32 and 1.08 – 0.84 (30H, m, H-2-6(D)).

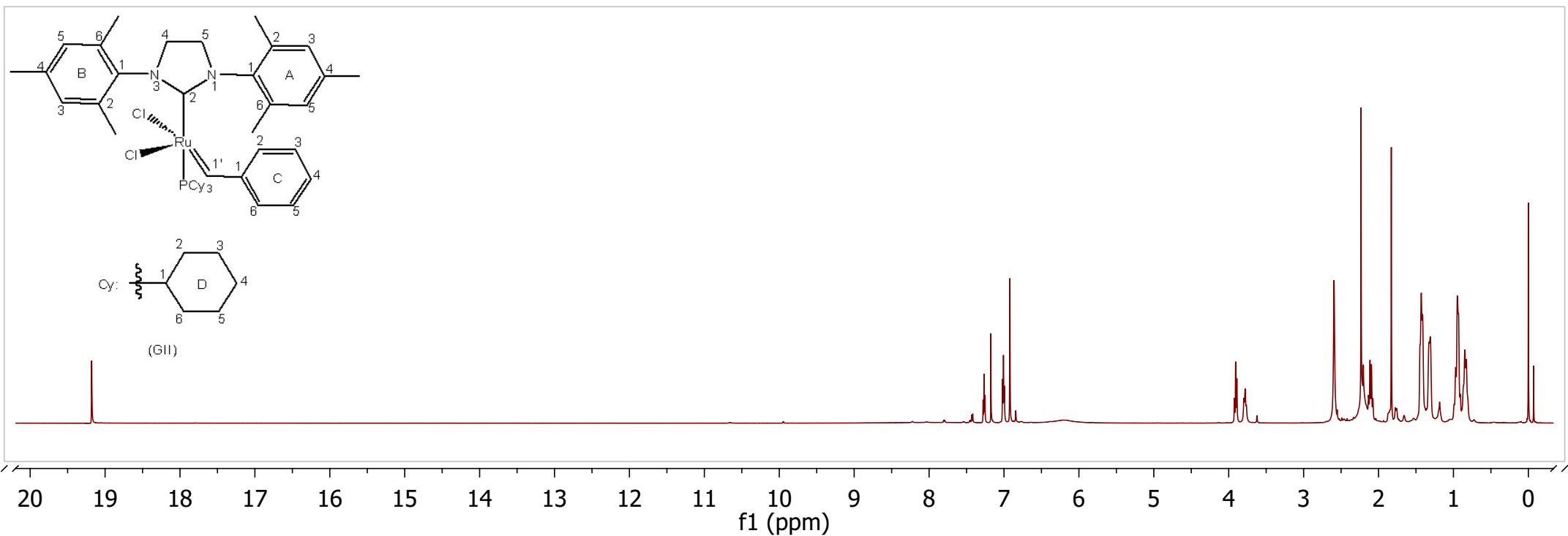
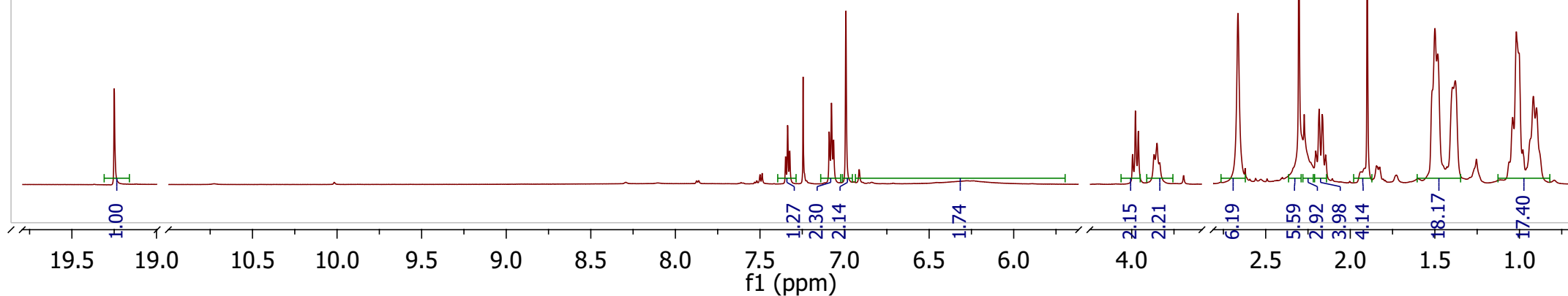


Plate 16b₂: Grubbs 2nd generation catalyst (**125**) @ 60°C

¹³C NMR [151 MHz, CDCl₃]: δ 219.8(*J* = 78.4 Hz), 150.6, 138.1, 137.4, 136.6, 136.4, 136.0, 134.4, 129.0, 128.2, 126.8, 126.6, 125.6, 51.4(*d*, *J* = 3.3 Hz, C-4), 50.5(*d*, *J* = 1.8 Hz, C-5), 30.9 (*d*, *J* = 16.2 Hz), 28.22, 26.8(*d*, *J* = 10.1 Hz), 25.28, 20.10, 19.86, 19.03, 17.63.

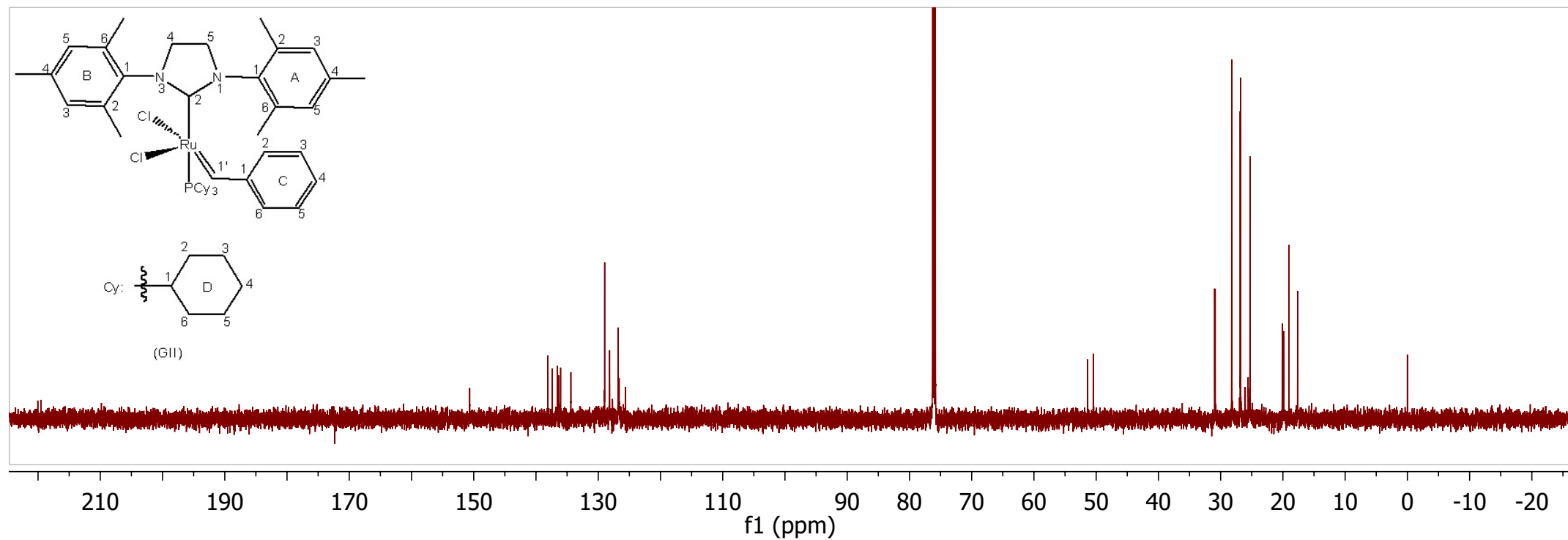
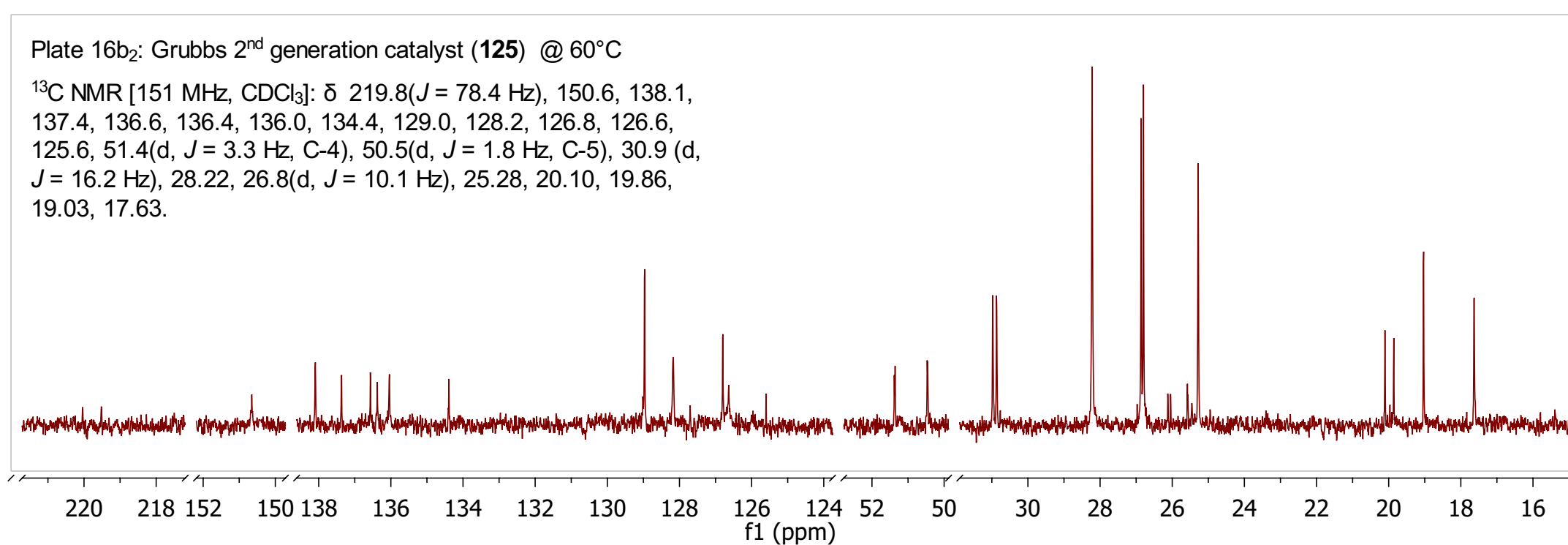


Plate 16c₂: Grubbs 2nd generation catalyst (**125**) @ 60°C

HSQC NMR

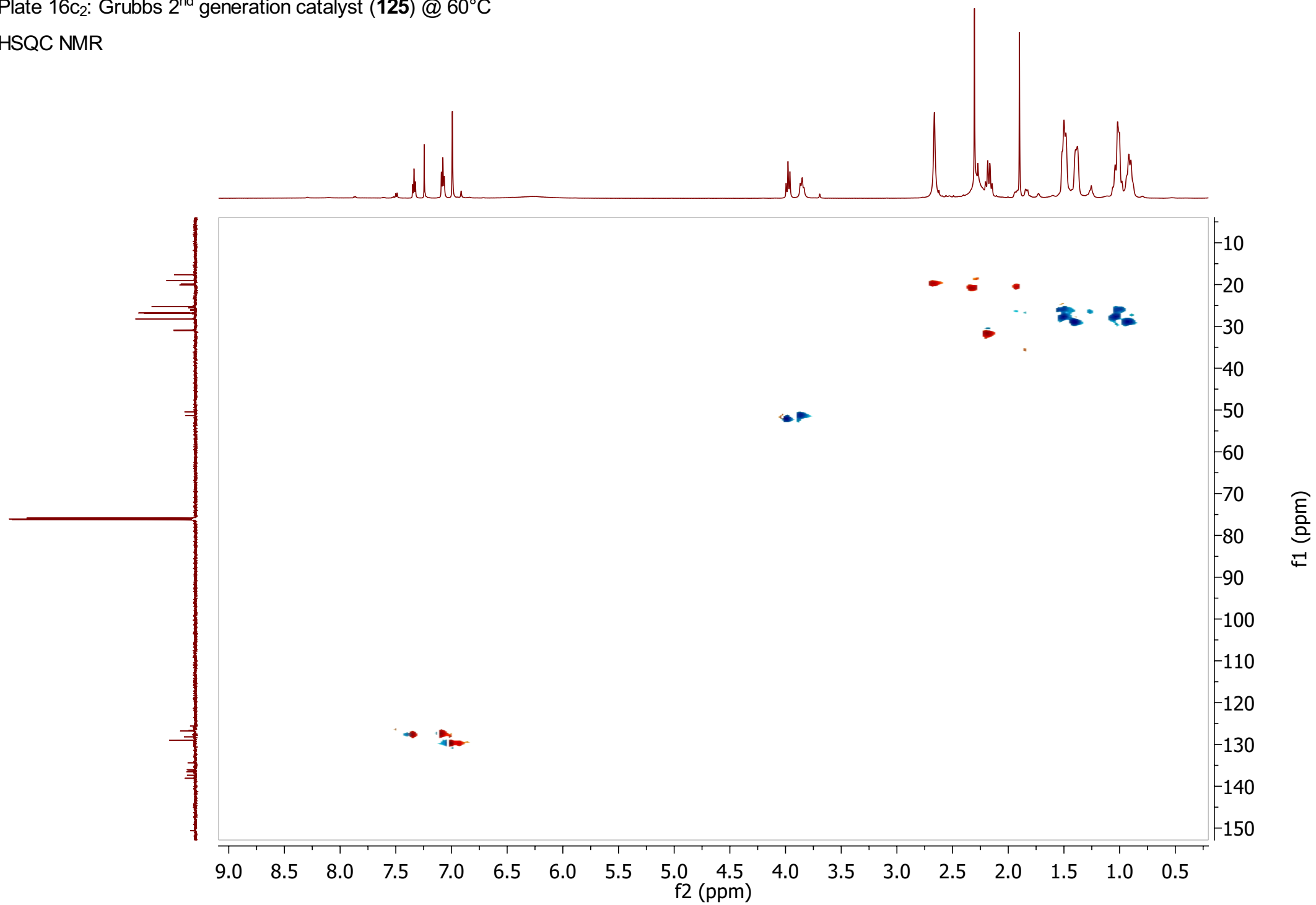


Plate 16a₃: Grubbs 2nd generation catalyst (**125**) @ -40°C

¹H NMR [600 MHz, CDCl₃]: δ 18.94 (1H, s, H-1'), 8.87 (1H, d, *J* = 7.84 Hz, H-2(C)), 7.39 – 3.35 (1H, m, H-4(C)), 7.18 – 7.14 (1H, m, H-3(C)), 7.08 (1H, s, H-3(B)), 7.03 (2H, s, H-5(B)), 7.09 – 7.04 (1H, m, 5(C)), 6.89 (1H, d, *J* = 7.57 Hz, H-6(C)), 6.75 (1H, s, H-5(A)), 5.77 (1H, s, H-3(A)), 4.08 – 3.91 (3H, bs, H-4,5_b), 3.82 (1H, ddd, *J* = 18.27, 17.27, 6.95 Hz, H-5_a), 2.77 (3H, s, H-2-Me(B)), 2.57 (3H, s, H-6-Me(B)), 2.52 (3H, s, H-6-Me(A)), 2.31 (3H, s, H-4-Me(B)), 2.25 – 2.07 (3H, m, H-1(D)), 2.03 (3H, s, H-2-Me(A)), 1.90 (3H, s, H-4-Me(A)), 1.67 – 1.11 and 1.11 – 0.51 (30H, m, H-2-6(D)).

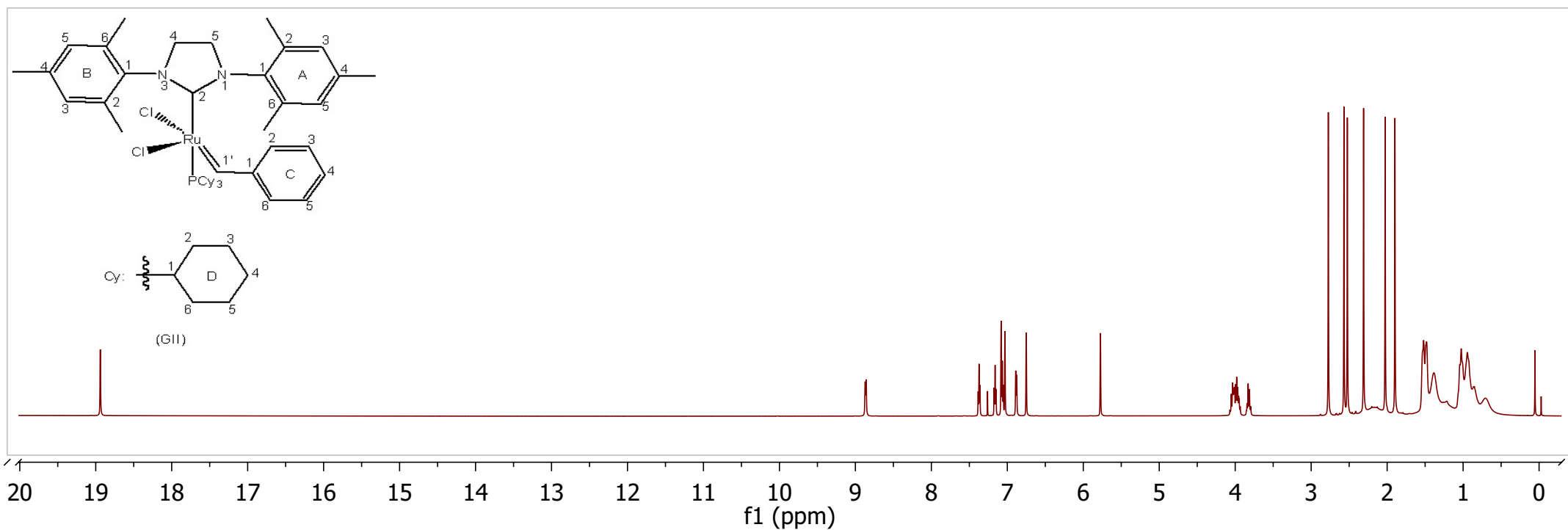
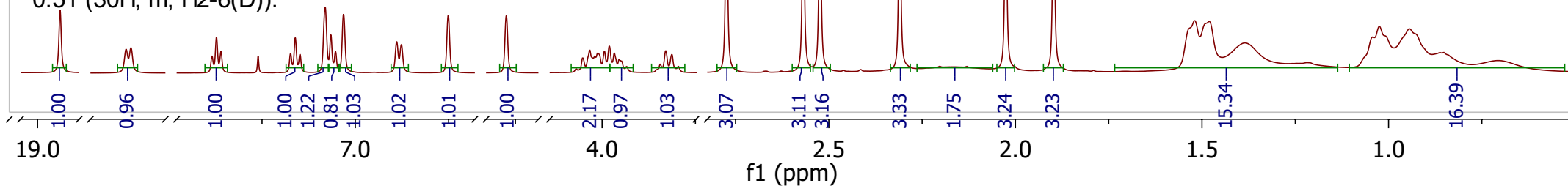


Plate 16b₃: Grubbs 2nd generation catalyst (**125**) @ -40°C

¹³C NMR [151 MHz, CDCl₃]: δ 294.4(C-1'), 219.6 (d, *J* = 177.3 Hz, C-2), 150.6(C-1(C)), 138.9 and 138.8 (C-2,6(A or B)), 138.5(C-4(B)), 137.8(C-4(A)), 137.3(C-1(A or B)), 136.9 and 136.7 (C-2,6(B or A)), 134.9(C-1(B or A)), 131.6(C-2(C)), 129.8(C-3(B)), 129.7 (C-5(C)), 129.3(C-6(C)), 128.9(C-3(A)), 128.5(C-5(A)), 128.2(C-3(C)), 128.1(C-4(C)), 127.0(C-5(B)), 52.0 (s, C-4), 50.9 (s, C-5), 30.6(C-1(D)), 28.8(d, *J* = 85.8 Hz, C-2(D),6(D)), 27.6(t, *J* = 9.2 Hz, C-3,5(D)), 25.9(C-4(D)), 21.3(C-4-Me(B)), 21.0(C-4-Me(A)), 19.8(C-2-Me(B),6-Me(B)), 19.0(C-2-Me(A)), 18.4(C-6-Me(A)).

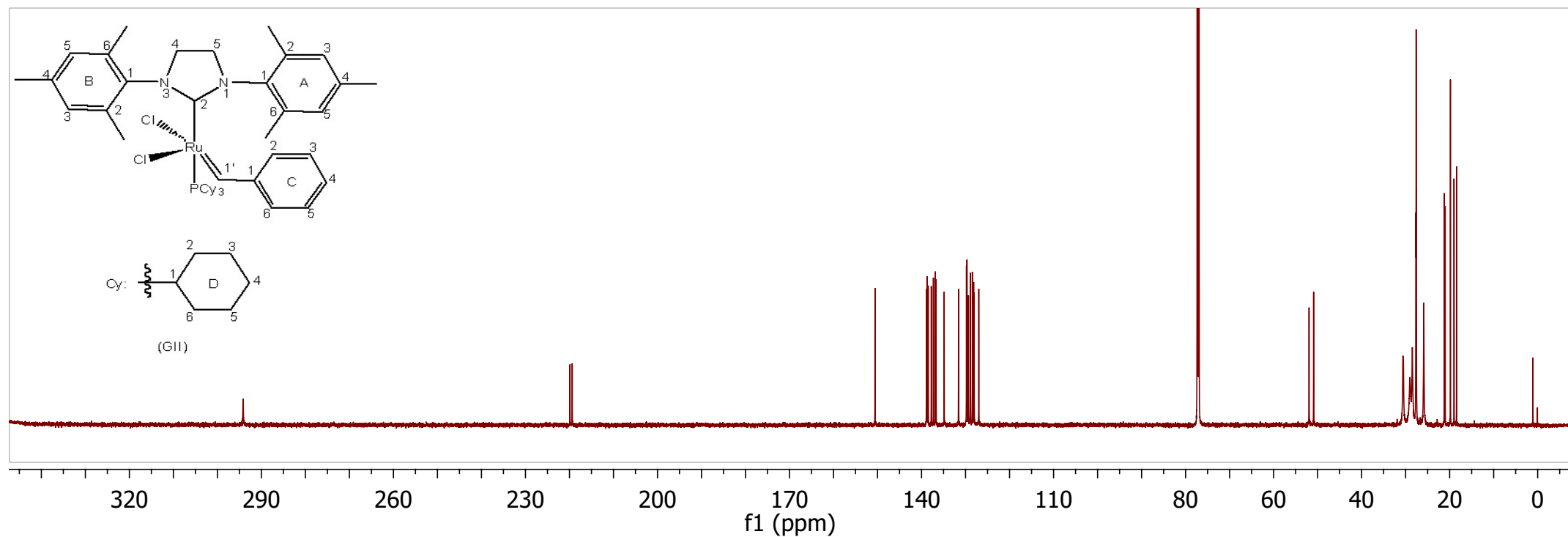
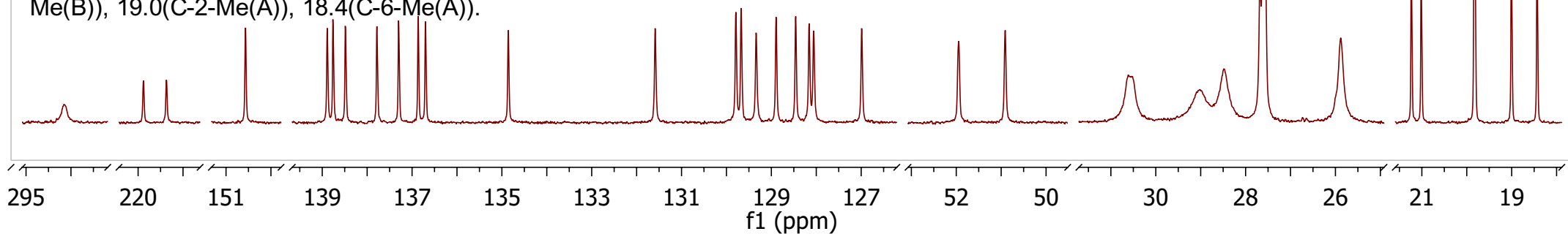


Plate 16c₃: Grubbs 2nd generation catalyst (**125**) @ -40°C

HSQC NMR

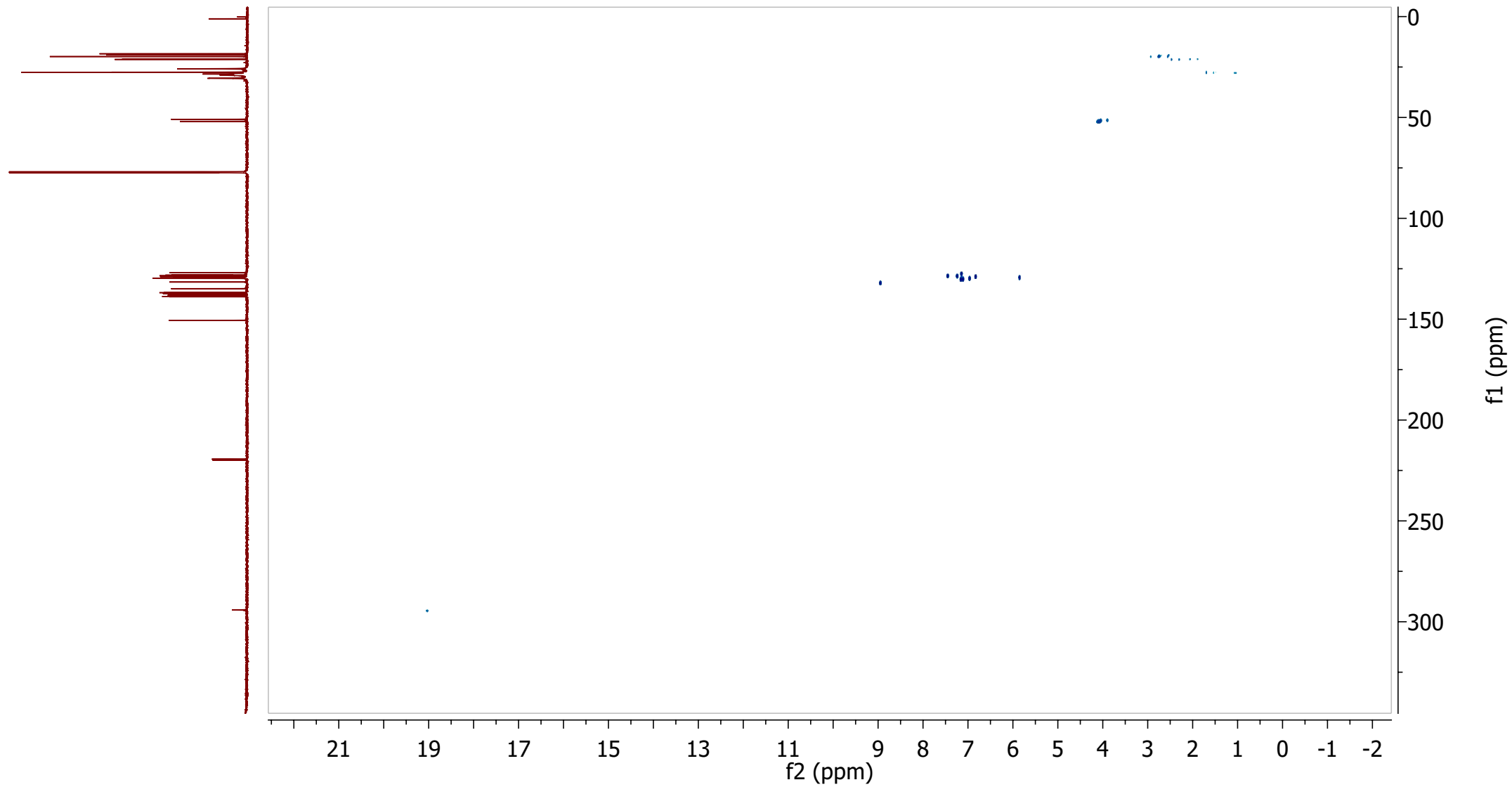


Plate 16e₃: Grubbs 2nd generation catalyst (**125**) @ -40°C

¹³C DEPT135 NMR

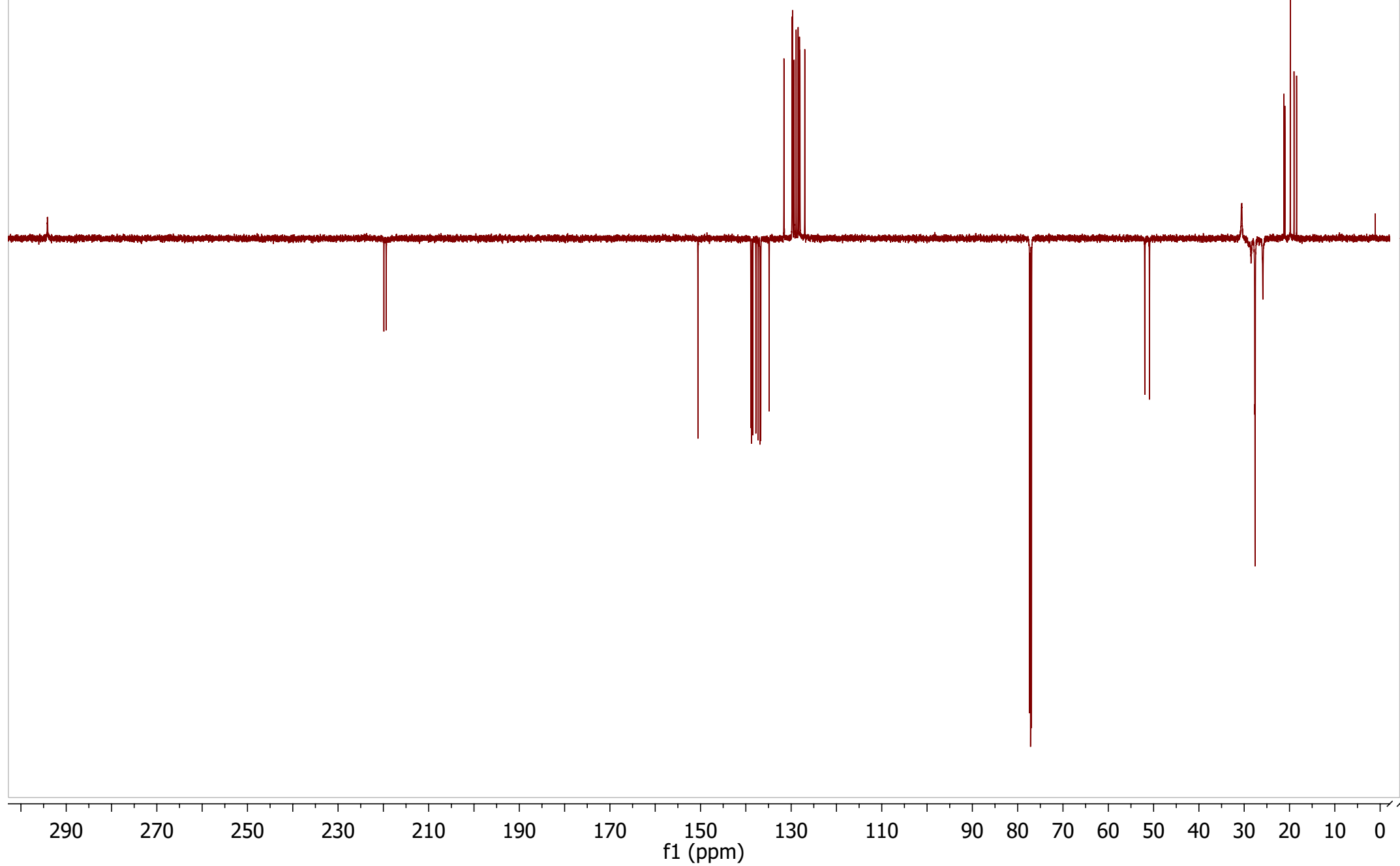


Plate 16h₃: Grubbs 2nd generation catalyst (**125**) @ -40°C

NOE NMR

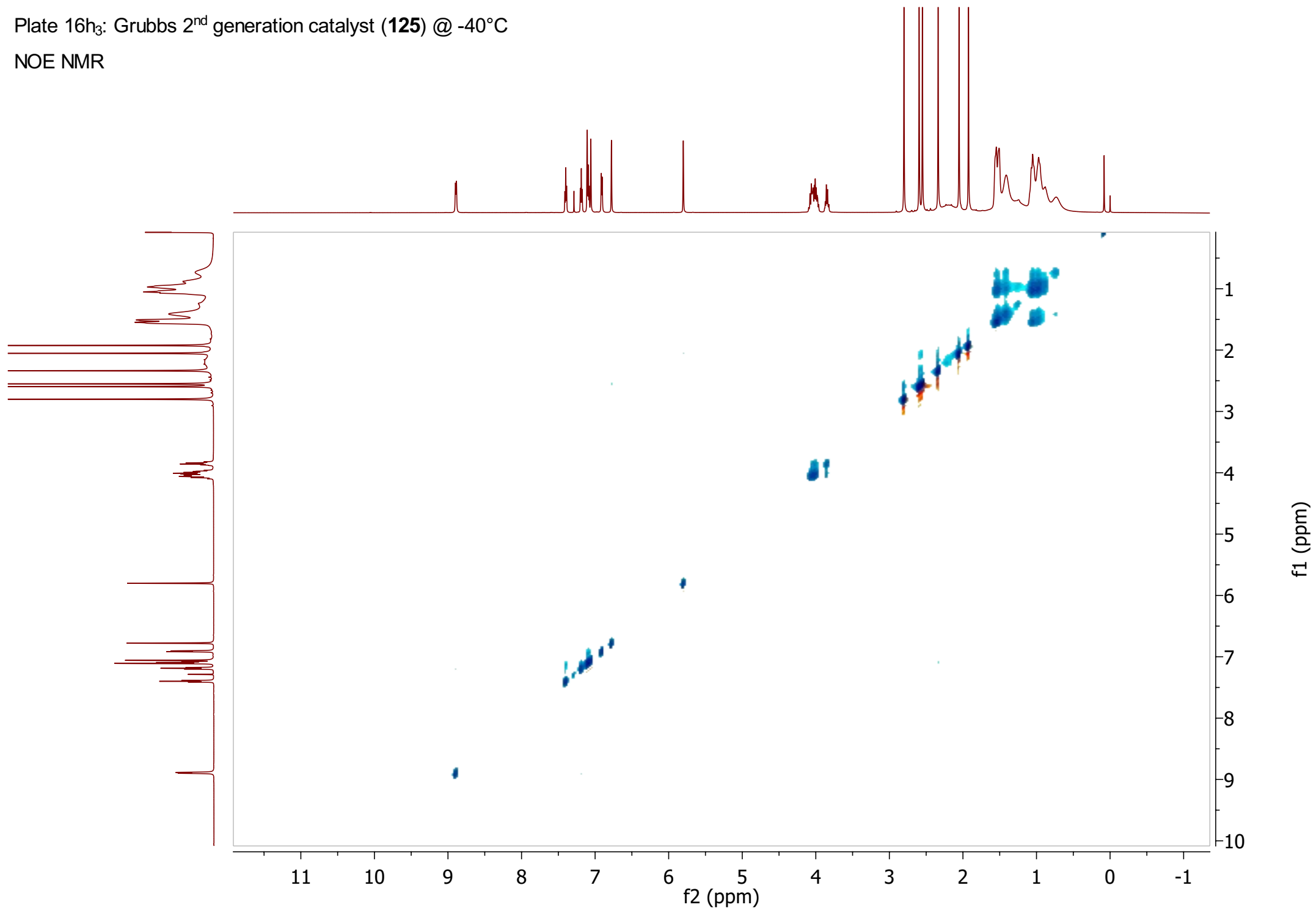


Plate 17a: *p*-Cresol (**266**)

^1H NMR [600 MHz, CDCl_3]: δ 7.05 (2H, d, $J = 8.3$ Hz, H-3,5), 6.76 (2H, d, $J = 8.3$ Hz, H-2,6), 5.11 (1H, s, -OH), 2.29 (3H, s, H-Me).

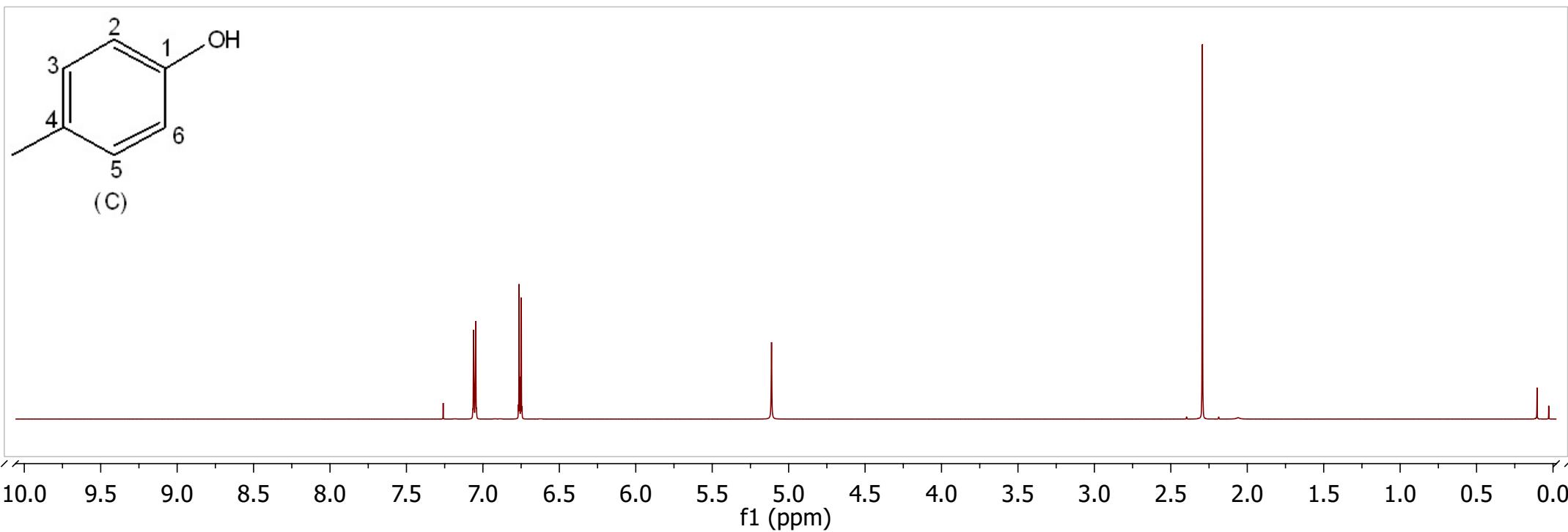
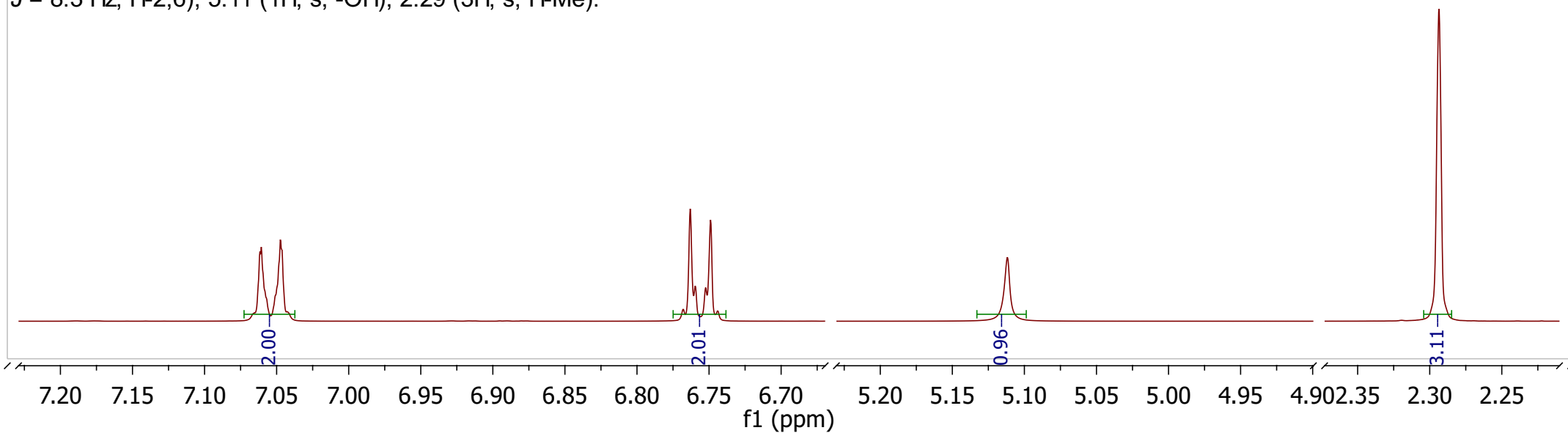


Plate 17b: *p*-Cresol (**266**)

^{13}C NMR [151 MHz, CDCl_3]: δ 153.2(C-1), 130.21(C-3,5), 130.17(C-4), 115.2(C-2,6), 20.6(Me).

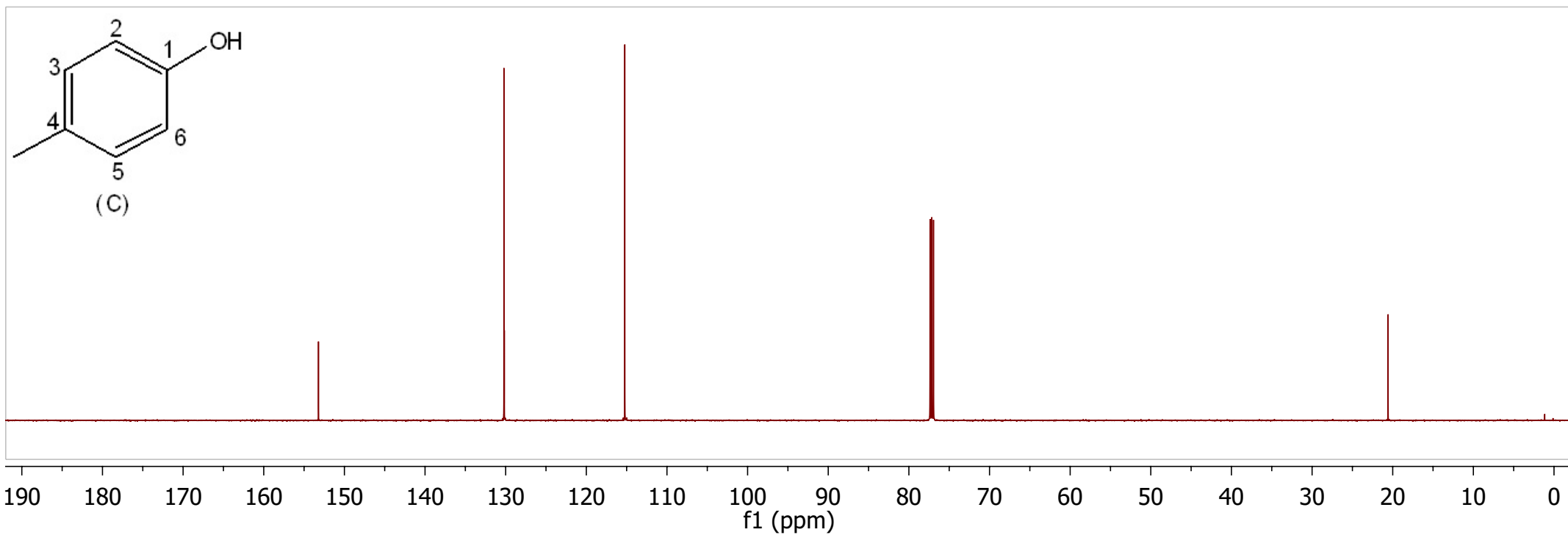
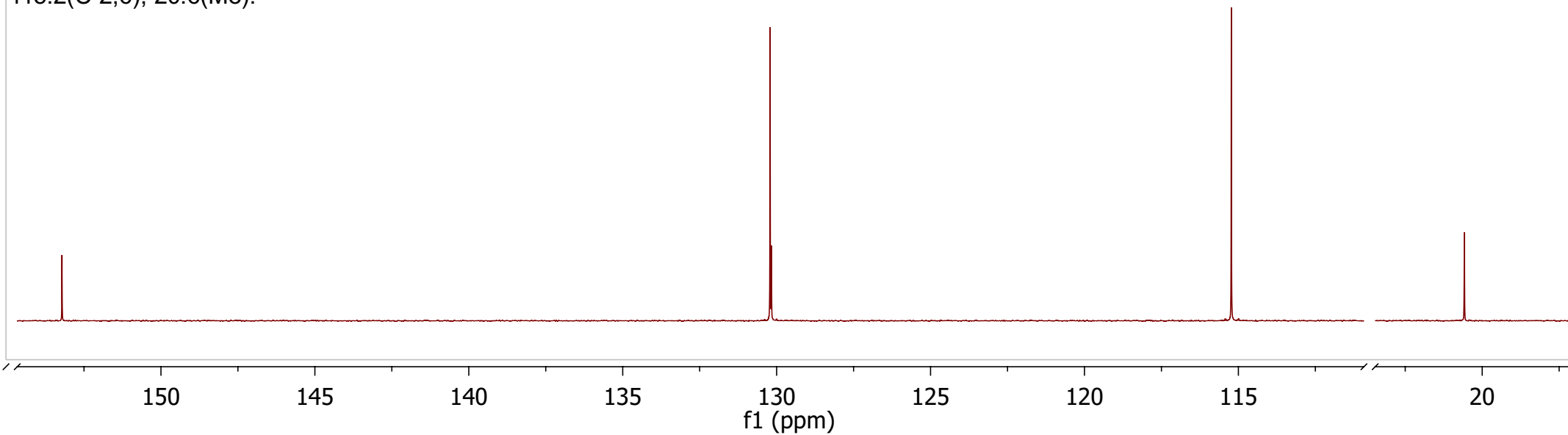


Plate 17c: *p*-Cresol (266)

HSQC NMR

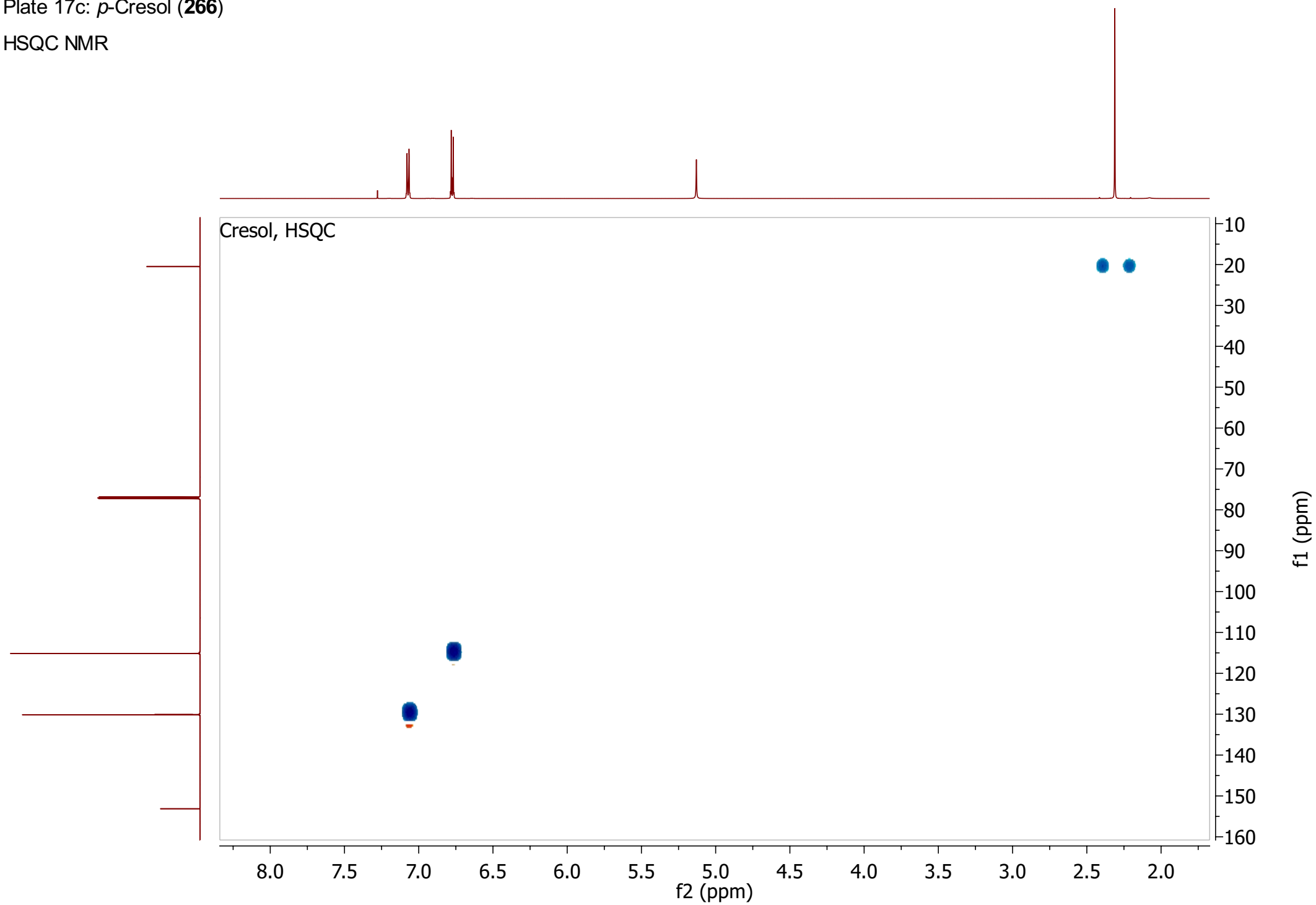


Plate 18a: Grubbs 2nd generation catalyst (**125**) + *p*-cresol (**266**)

¹H NMR [600 MHz, CDCl₃]: δ 19.12 (s, GII:H-1'), 17.84 (s), 10.00 (s), 9.01 (s, GII:H-2(C)), 7.42 – 7.39(m, GII:H-4(C)), 7.18 – 7.10 (m), 7.06 (d, *J* = 8.3 Hz, C: H-3,5), 6.86 (d, *J* = 8.3 Hz, C:H2,6), 6.79 – 6.72 (m), 6.43 (s, C:-OH), 5.85 (s, GII:H-3(A)), 4.12 – 3.76 (m, GII:H-4,5), 2.81 (s, GII:H-2-Me(B)), 2.67 (s), 2.62 (s, GII:H-6-Me(B)), 2.54 (s, GII:H-6-Me(A)), 2.48 – 2.41 (m), 2.37 (s, GII:H-4-Me(B)), 2.31 (s, GII:H-4-Me(A)), 2.30(s, C:Me), 2.29 – 2.19 (m), 2.09 (s, GII: H-2-Me(A)), 1.95 (s, GII:H-4-Me(A)), 1.87 – 1.65 (m), 1.62 – 1.30 (m, GII:H-2-6(D)), 1.28 – 1.21 (m), 1.17 – 0.79 (m, GII:H-2-6(D)).

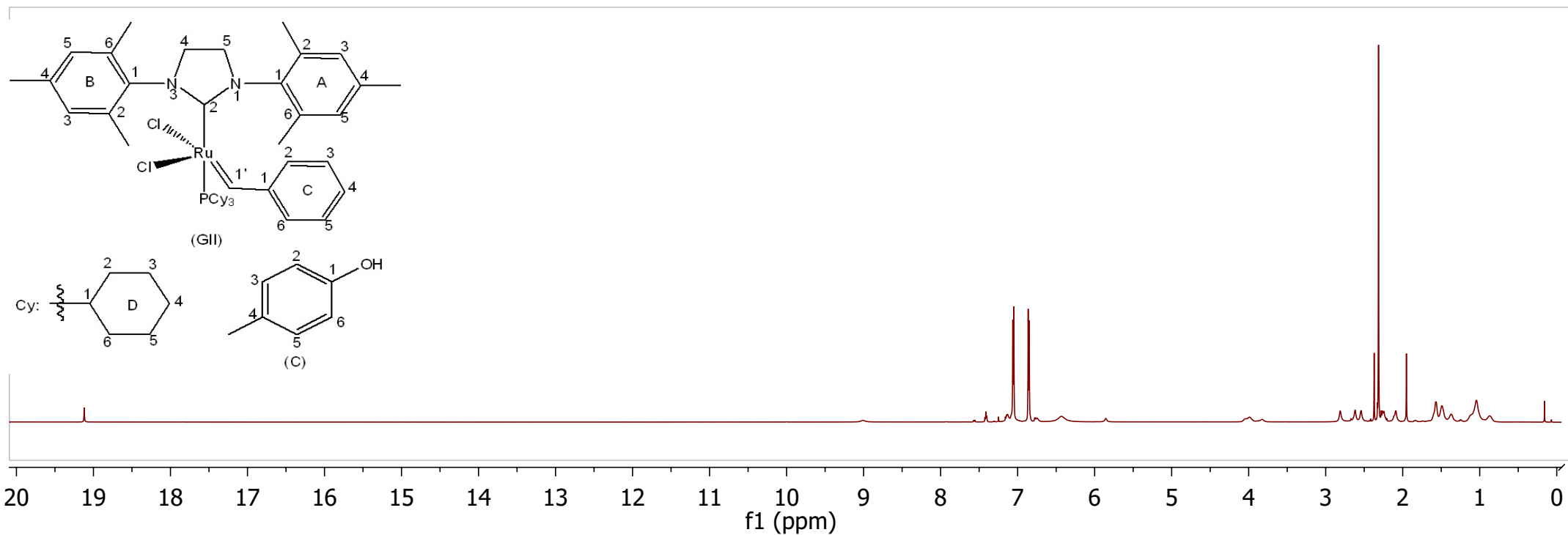
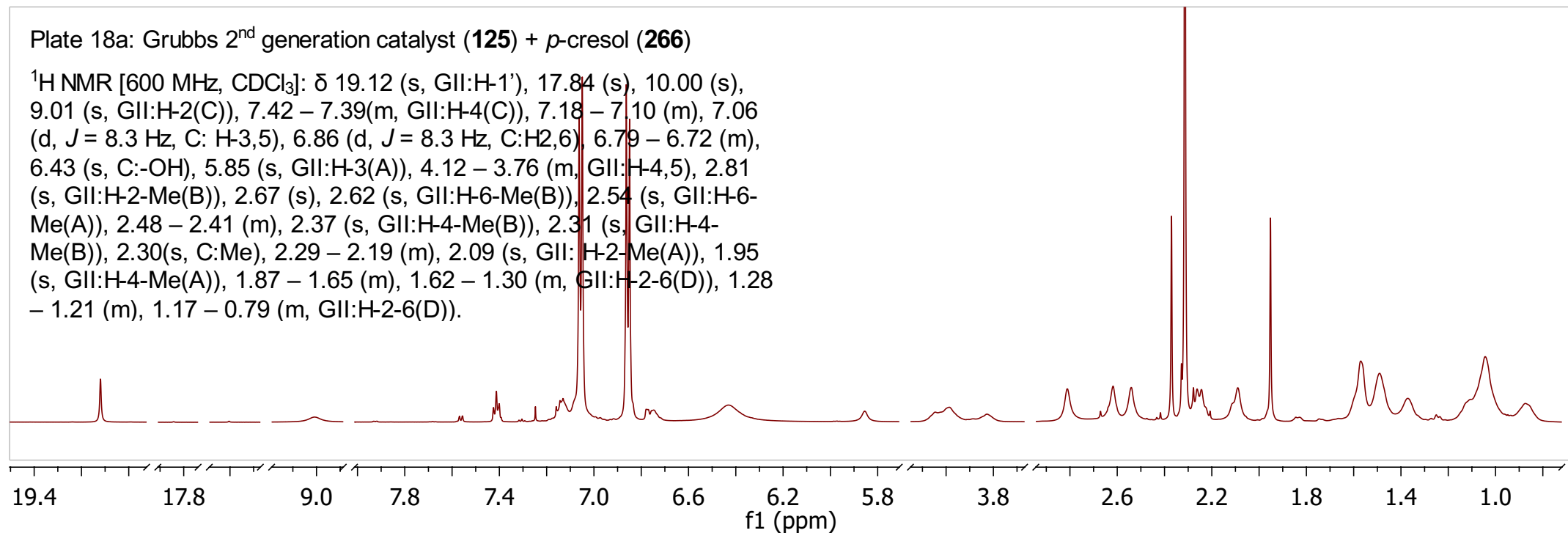


Plate 18b: Grubbs 2nd generation catalyst (**125**) + *p*-cresol (**266**)

¹³C NMR [151 MHz, CDCl₃]: δ 294.3(GII:C-1'), 219.9(d, J = 76.9Hz, GII:C-2), 155.7, 153.4(C:C-1), 153.2, 151.0(GII:C-1(C)), 139.6, 139.0 and 138.6(GII:C-2,6(A or B)), 138.4(GII:C-4(B)), 137.6(GII:C-4(A)), 137.3, 137.0, 136.6(GII:C-2,6(B or A)), 135.0(GII:C-1(B or A)), 134.8, 131.9, 130.2, 130.1, 129.9(C:C-3,5), 129.8, 129.7, 129.6, 129.5, 129.3, 129.2 128.8, 128.7, 128.6, 128.2, 127.6, 127.1, 126.5, 121.2, 116.3, 115.6, 115.4, 115.2, 112.6, 52.2(d, J = 3.2 Hz, GII:C-4), 51.3(d, J = 1.1 Hz, GII:C-5), 35.1, 34.7, 31.5(d, J = 16.6 Hz, GII:C-2,6(D)), 29.0(d, J = 54.6 Hz, GII:C-1(D)), 27.6(d, J = 9.9 Hz, GII:C-3,5(D)), 26.7, 26.6, 26.1, 25.9, 21.3, 21.1(GII:C-4-Me(B)), 21.0, 20.8(GII:C-4-Me(B)), 20.4(C:Me), 20.3, 19.9(GII:C-2-Me(B),6-Me(B)), 18.5.

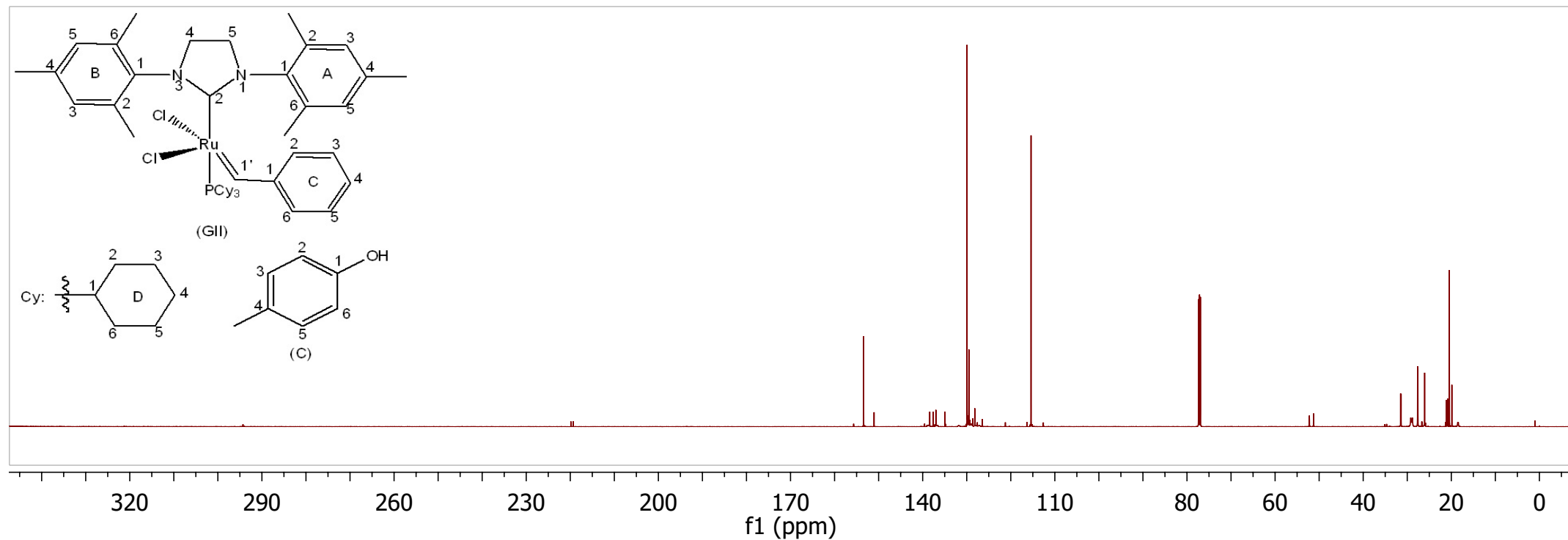
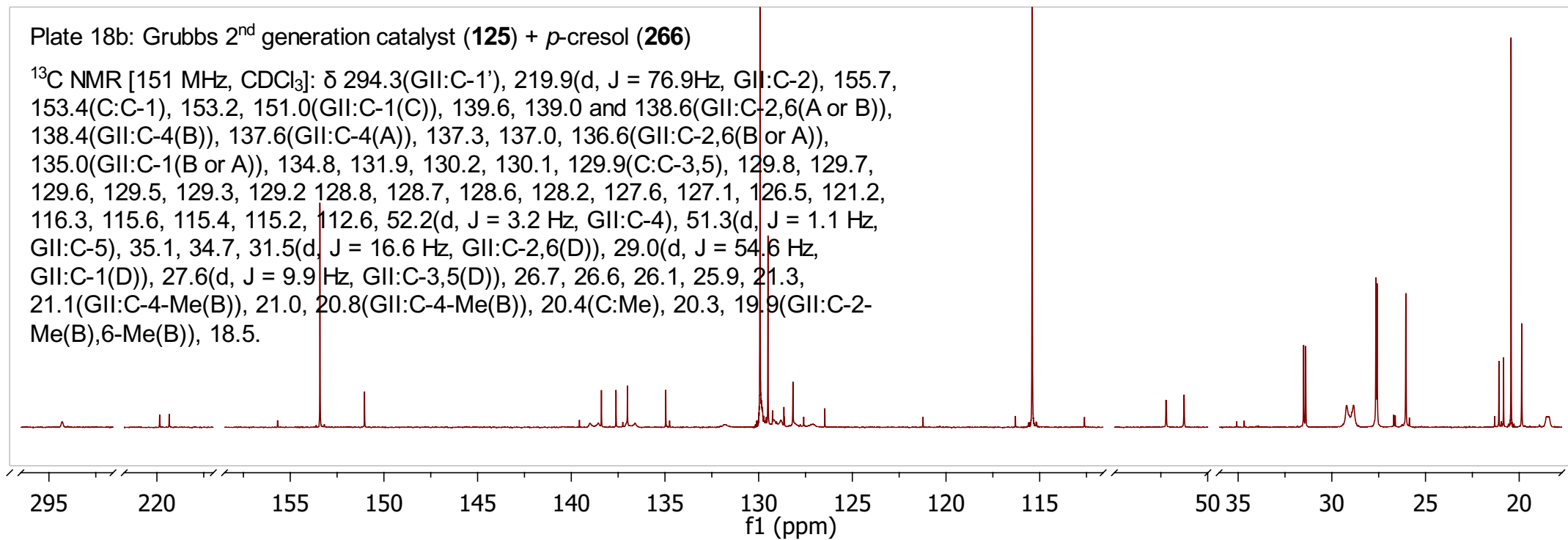


Plate 18c: Grubbs 2nd generation catalyst (**125**) + *p*-cresol (**266**)

HSQC NMR

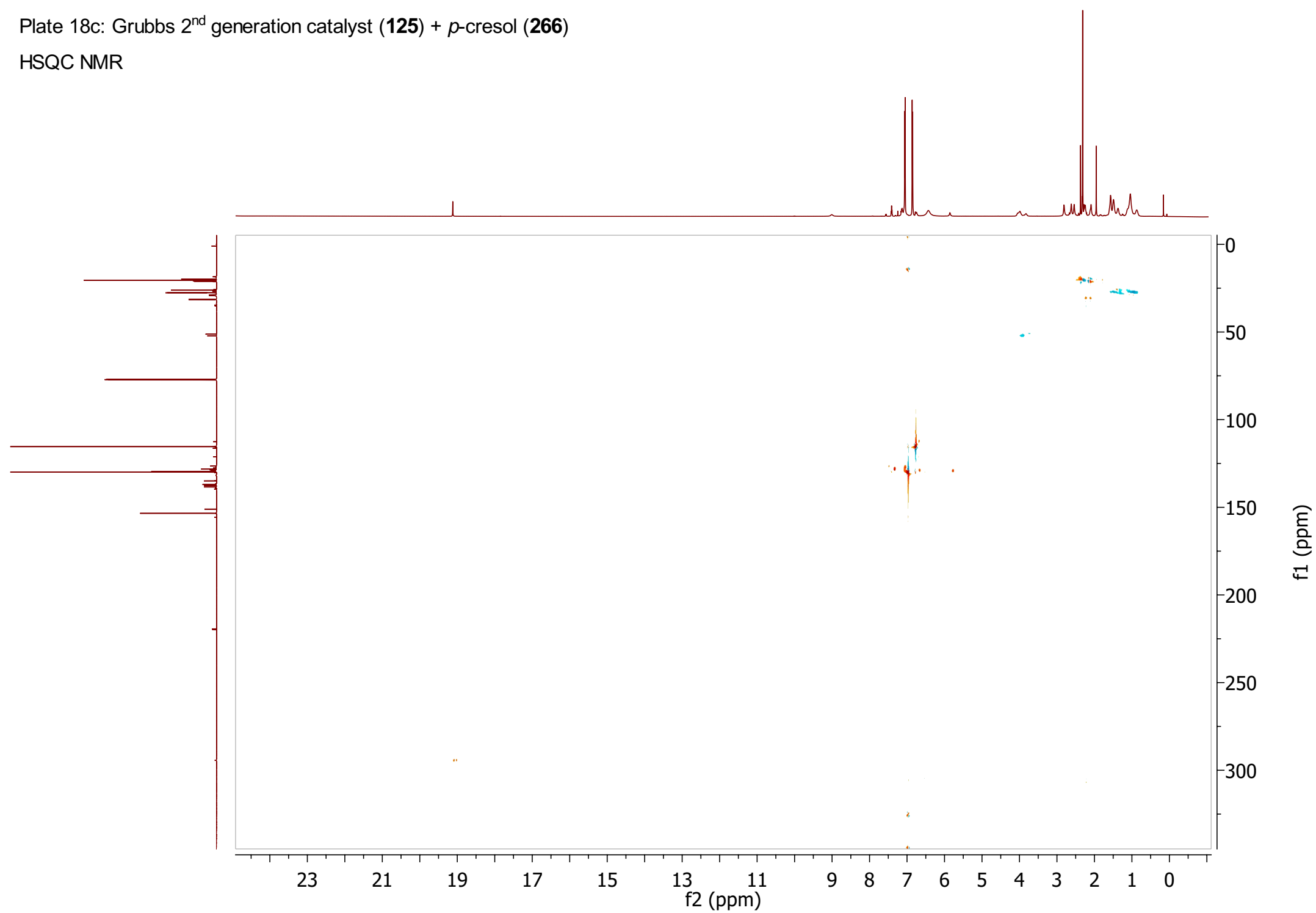


Plate 18d: Grubbs 2nd generation catalyst (**125**) + *p*-cresol (**266**)

HMBC NMR

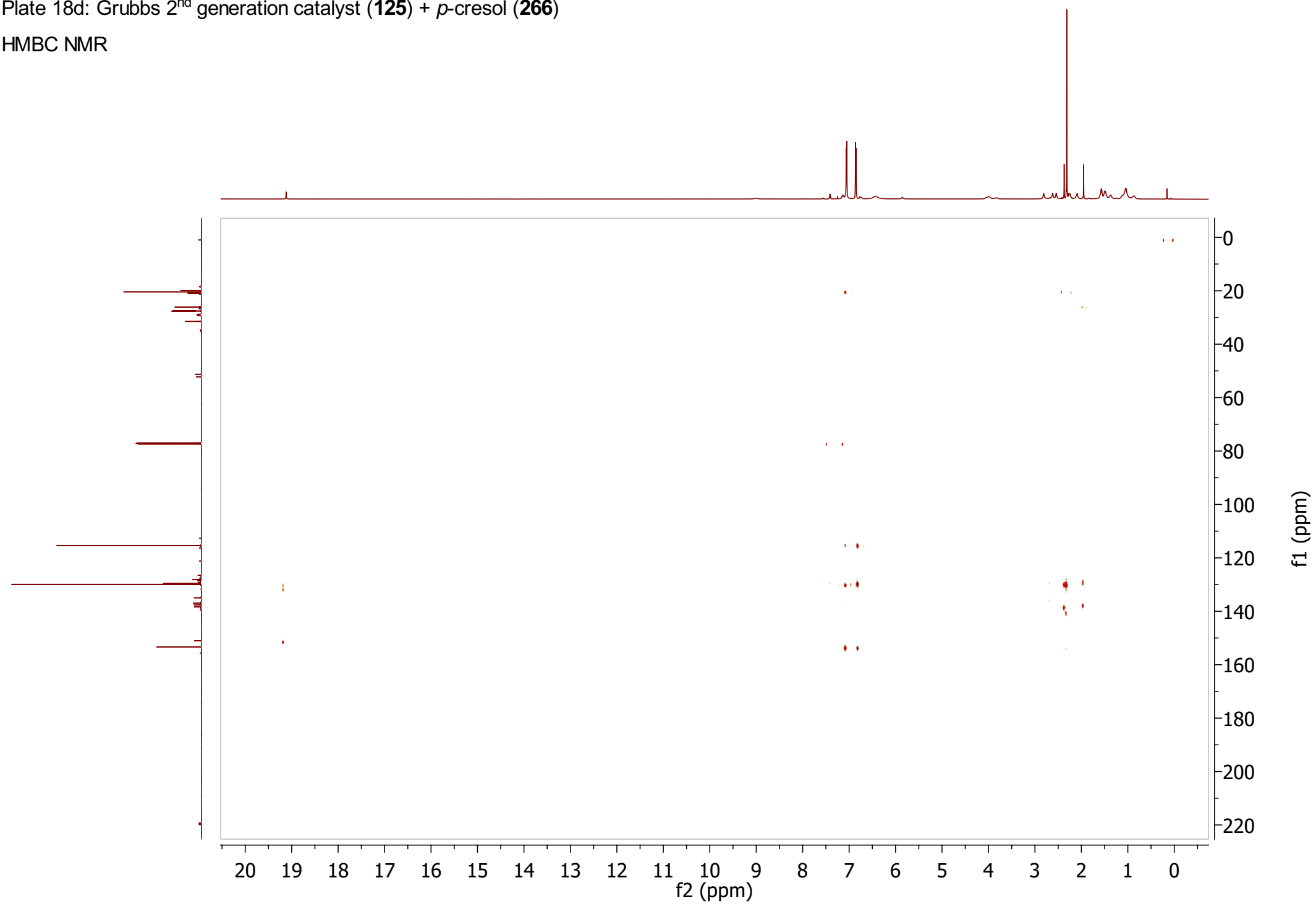


Plate 16g: Grubbs 2nd generation catalyst (**125**) + *p*-cresol (**266**)

³¹P NMR [243 MHz, CDCl₃]: δ 55.6, 40.7, 28.9(GII).

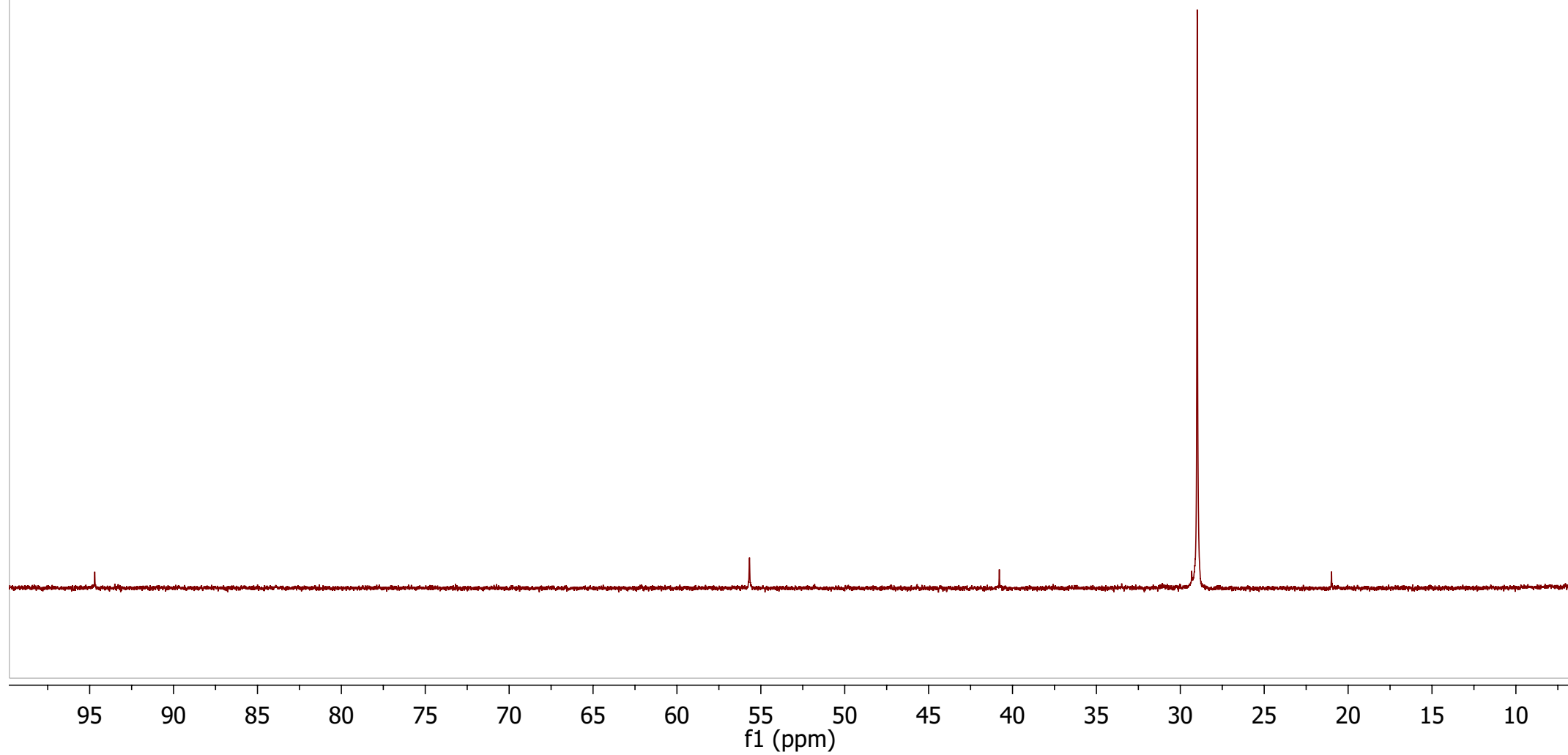


Plate 16h: Grubbs 2nd generation catalyst (**125**) + *p*-cresol (**266**)

NOE NMR

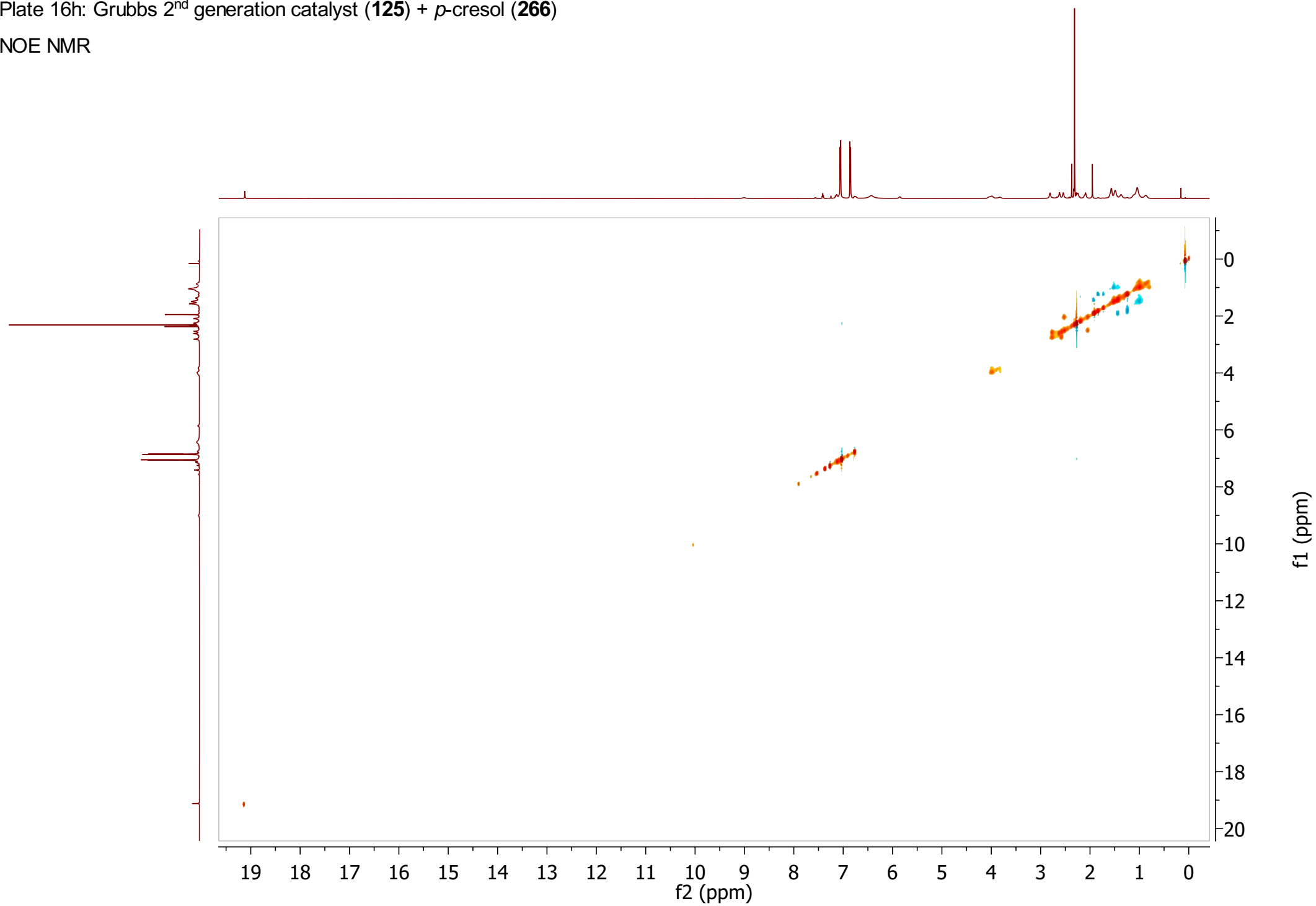


Plate 16i: Grubbs 2nd generation catalyst (**125**) + *p*-cresol (**266**)

Cosy NMR

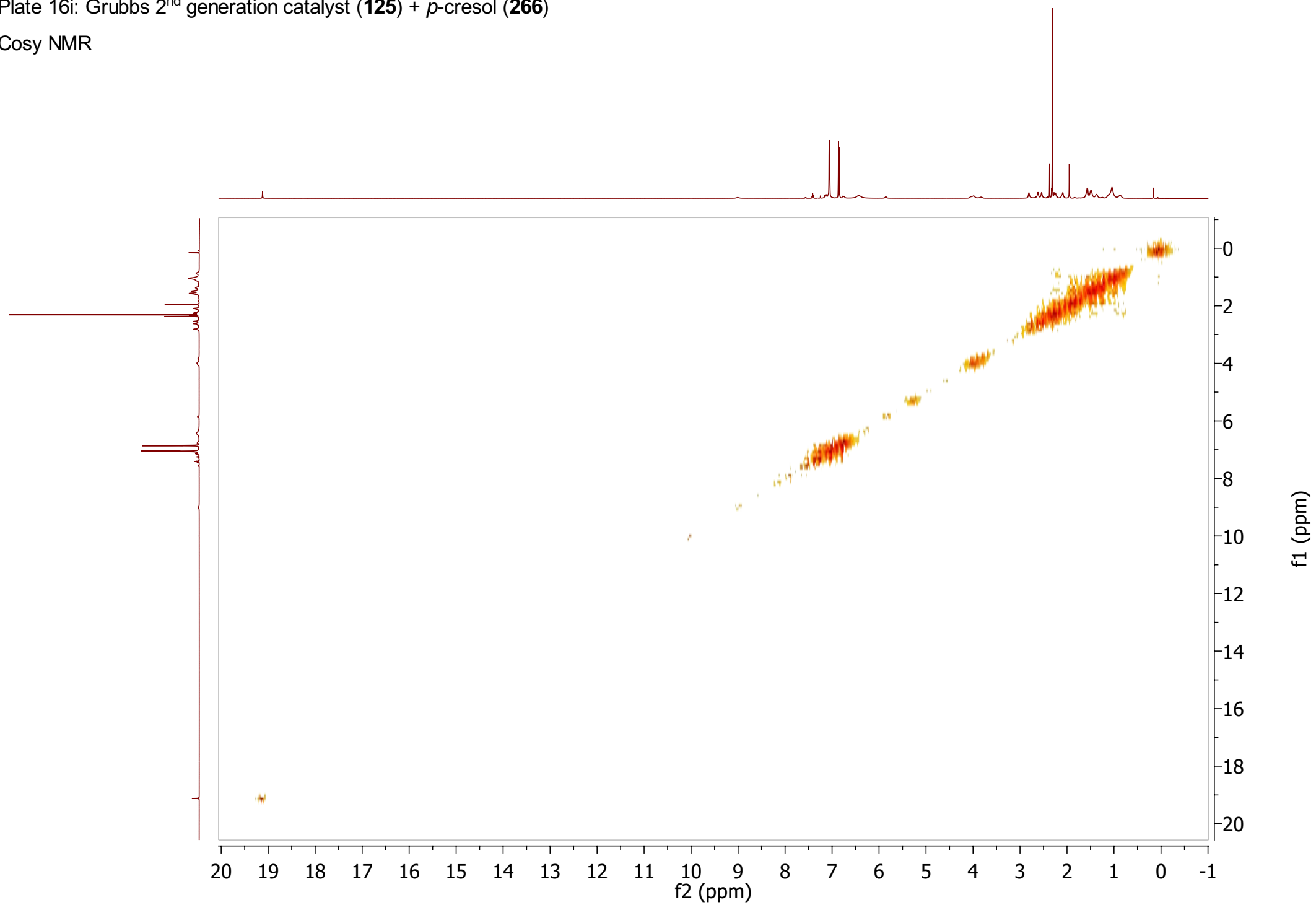


Plate 19a: Tricyclohexylphosphine (**289**)

$^1\text{H NMR}$ [600 MHz, CDCl_3]: δ 1.95 – 1.12 (33H, m, H-1-6).

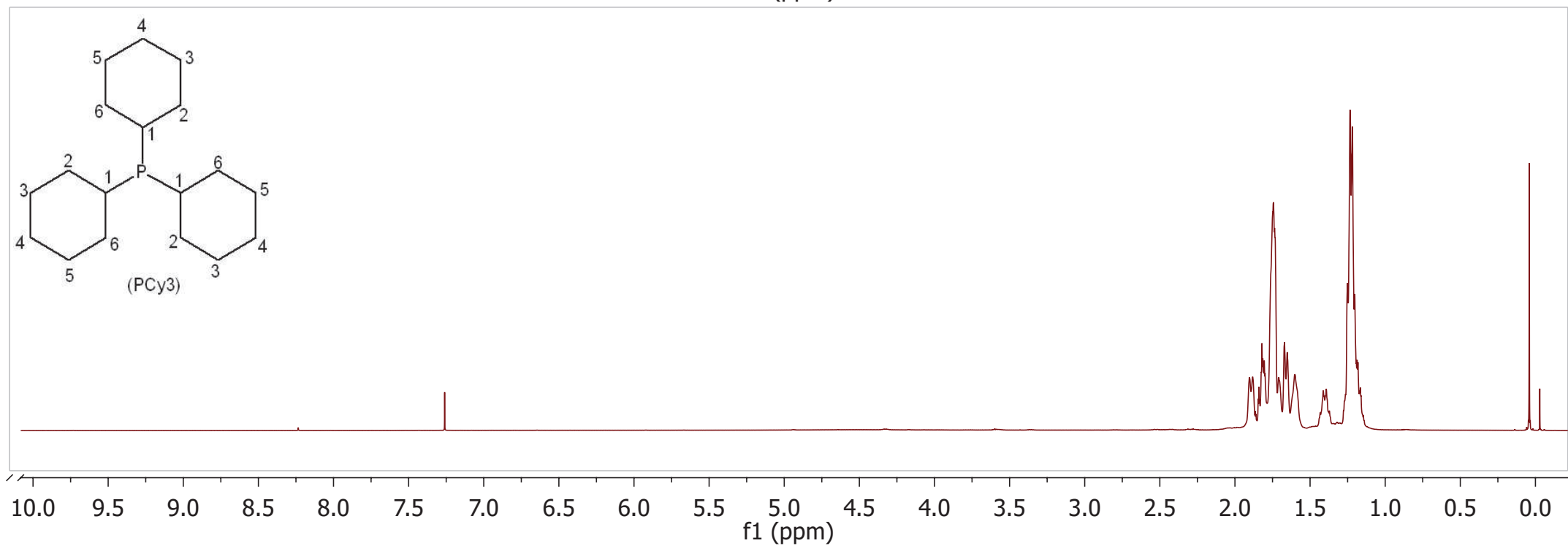
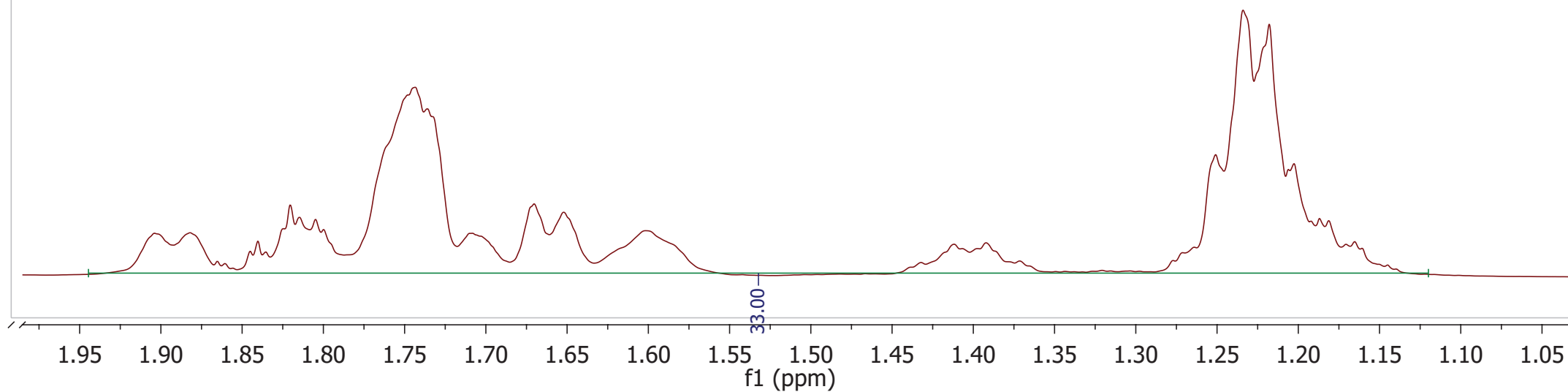


Plate 19g: Tricyclohexylphosphine (**289**)

^{31}P NMR [243 MHz, CDCl_3]: δ 57.7, 50.5(POCy₃), 11.2(PCy₃).

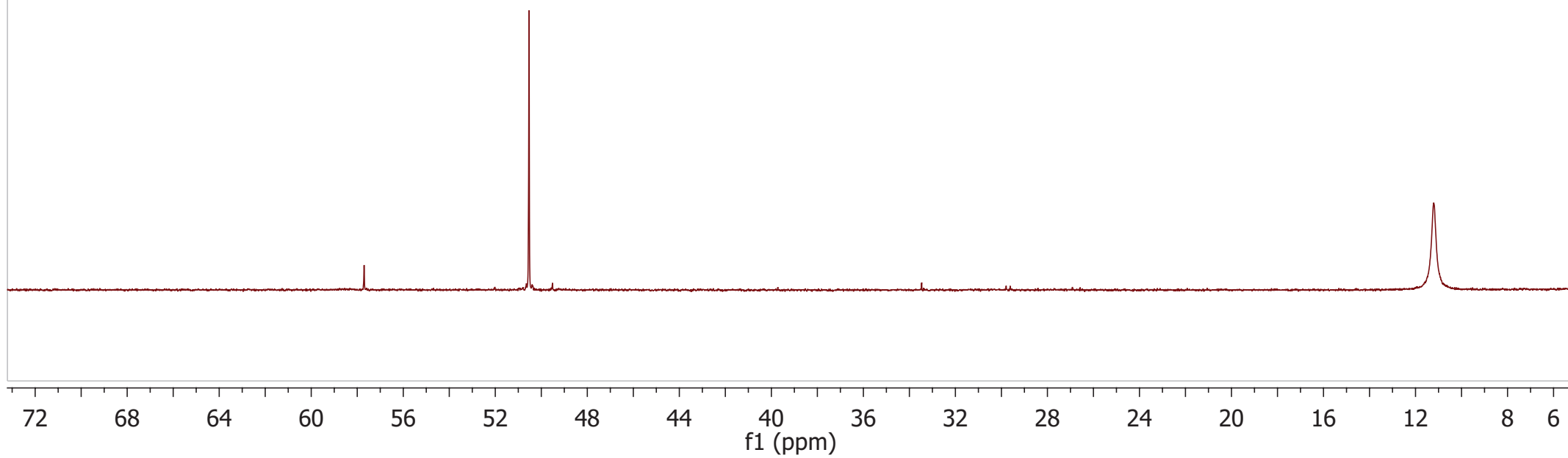


Plate 20a: Tricyclohexylphosphine (**289**) + 1 eq. *p*-cresol (**266**)

$^1\text{H NMR}$ [600 MHz, CDCl_3]: δ 7.60 (s), 6.95 (d, $J = 8.3$ Hz, C:H-3,5), 6.81 (d, $J = 8.3$ Hz, C:H-2,6), 2.35 – 2.27 (m), 2.23 (s, C:Me), 2.02 – 1.62 and 1.52 – 1.11 (m, PCy₃:H-1-6).

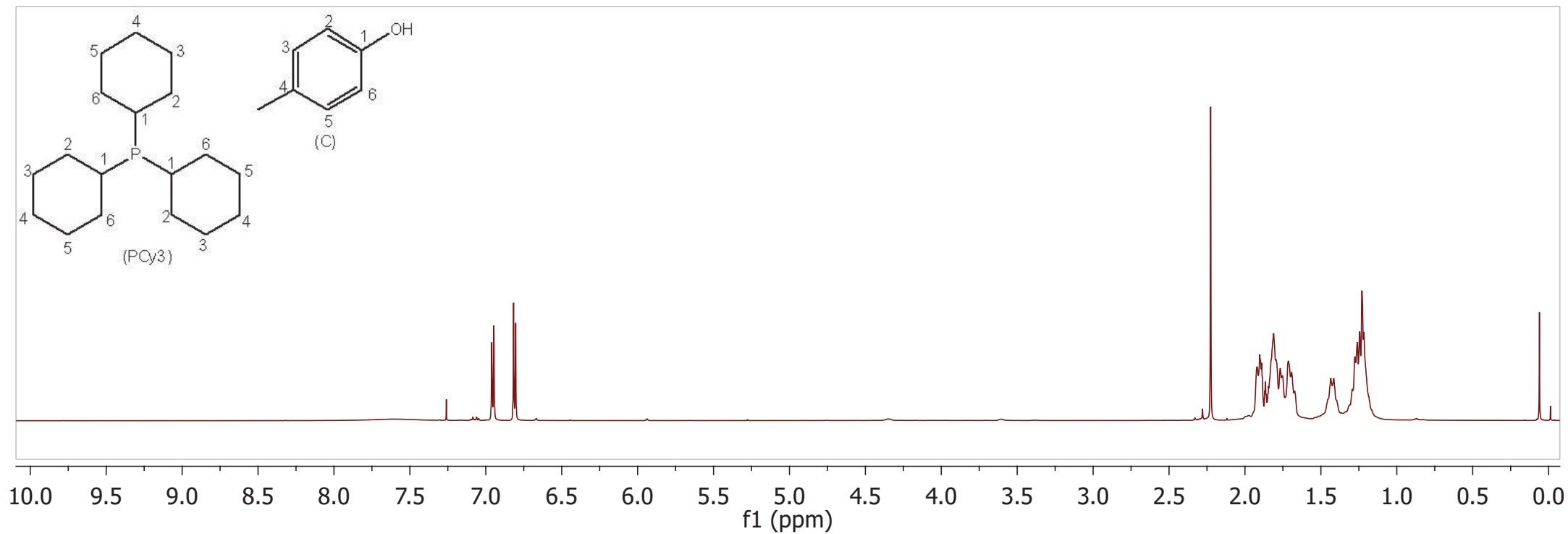
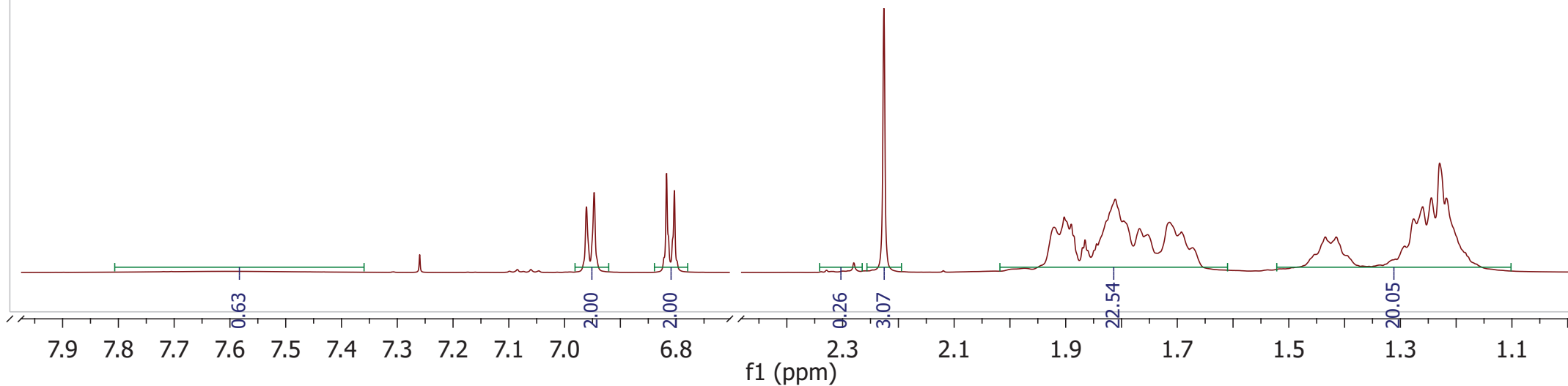


Plate 20g: Tricyclohexylphosphine (**289**) + 1 eq. *p*-cresol (**266**)

^{31}P NMR [243 MHz, CDCl_3]: δ 59.1, 58.8, 52.9, 50.7, 40.1, 33.3, 12.1.

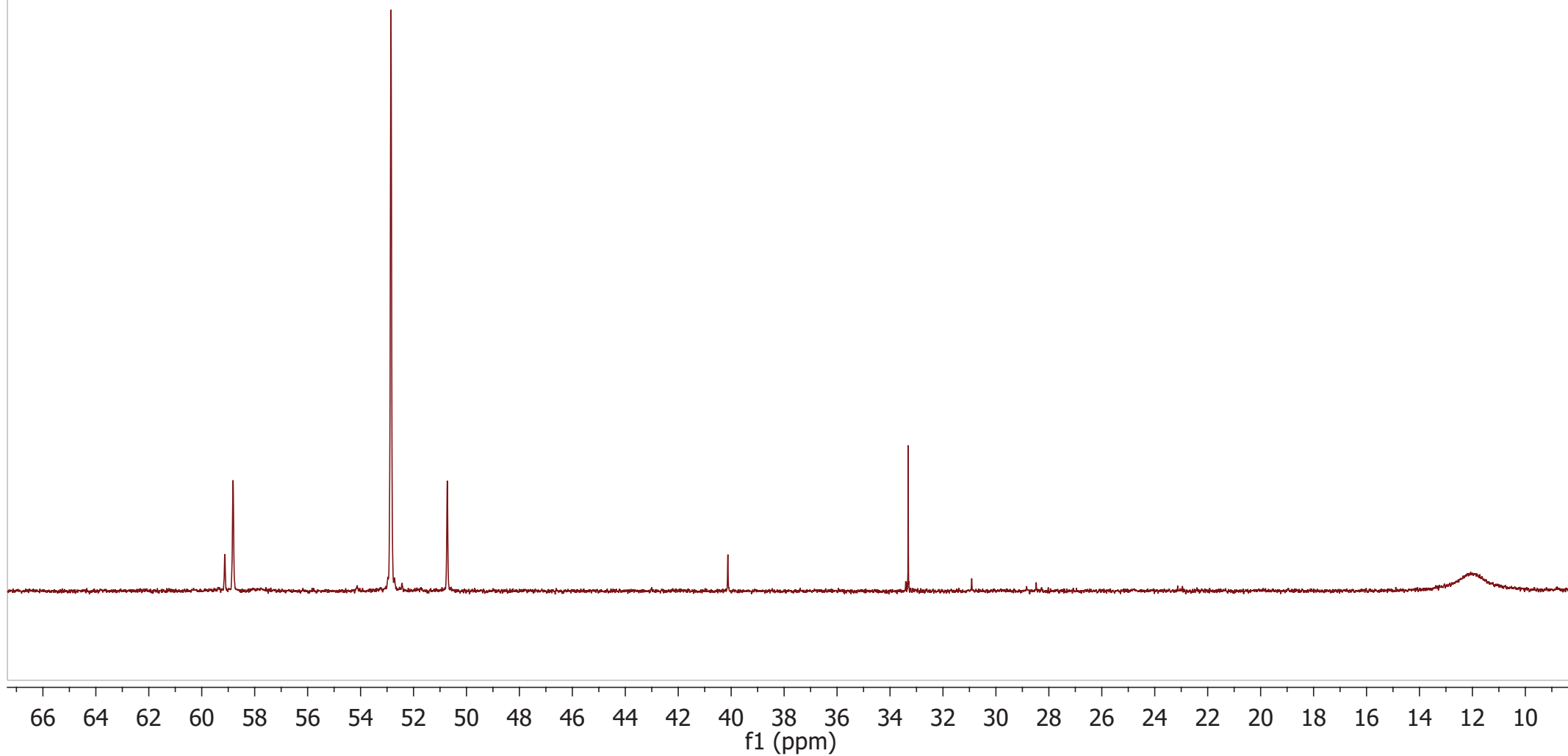


Plate 21a: Tricyclohexylphosphine (**289**) + 2 eq. *p*-cresol (**266**)

^1H NMR [600 MHz, CDCl_3]: δ 7.27 (s), 7.01 (d, $J = 8.3$ Hz, C:H-3,5),
6.85 (d, $J = 8.3$ Hz, C:H-2,6), 2.28 (s), 2.05 – 1.68 and 1.54 – 1.17 (m,
PCy₃:H1-6).

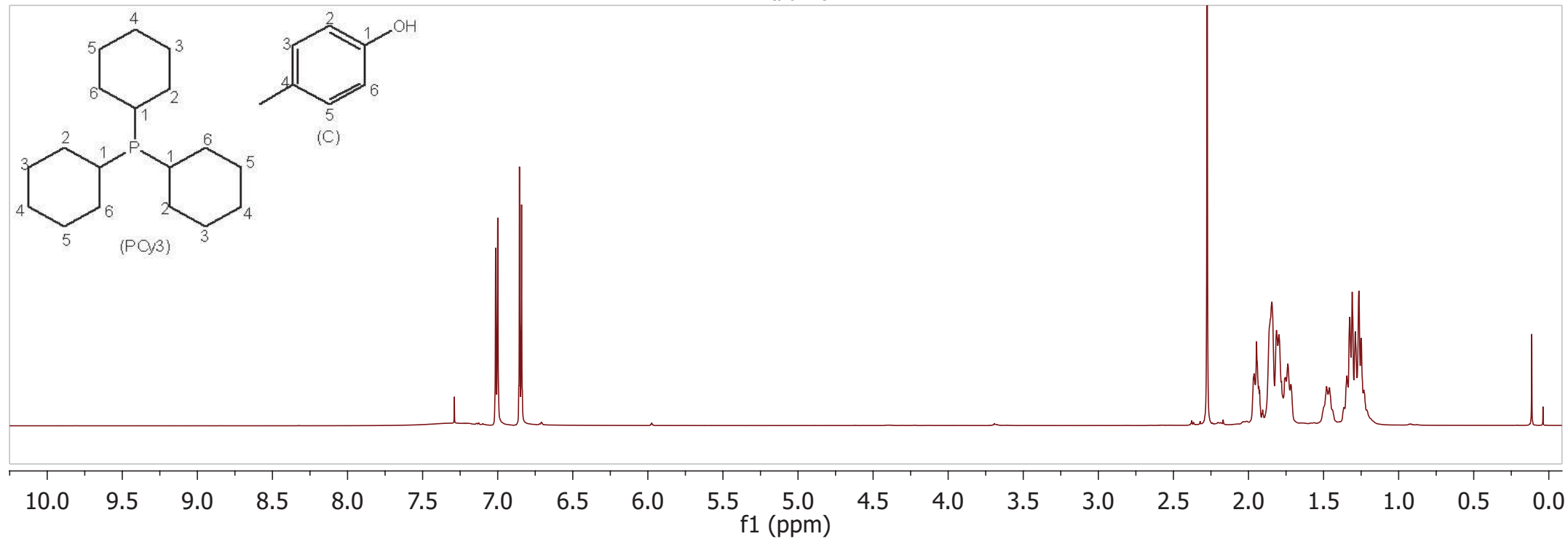
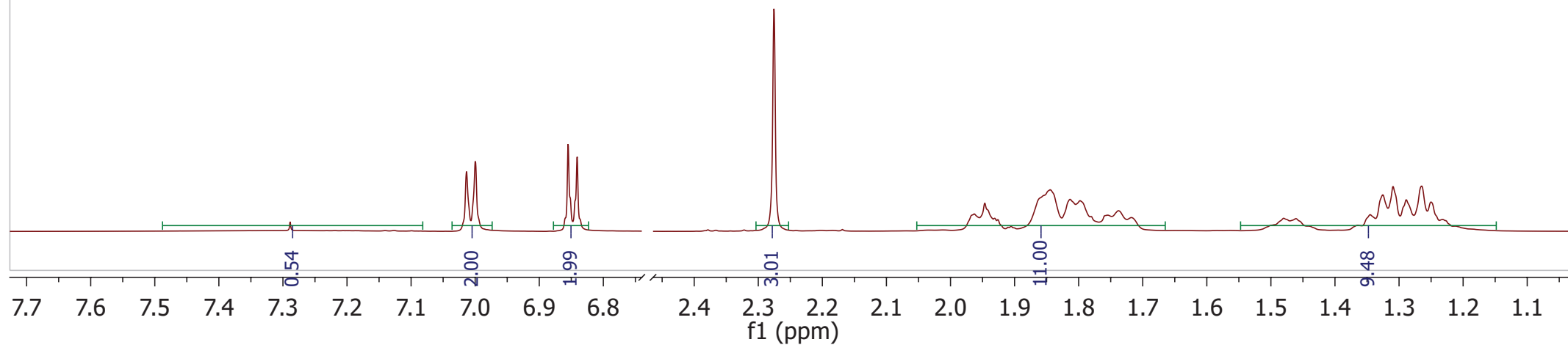


Plate 21g: Tricyclohexylphosphine (**289**) + 2 eq. *p*-cresol (**266**)

^{31}P NMR [243 MHz, CDCl_3]: δ 59.9, 59.8, 54.5, 52.0, 33.4, 12.4.

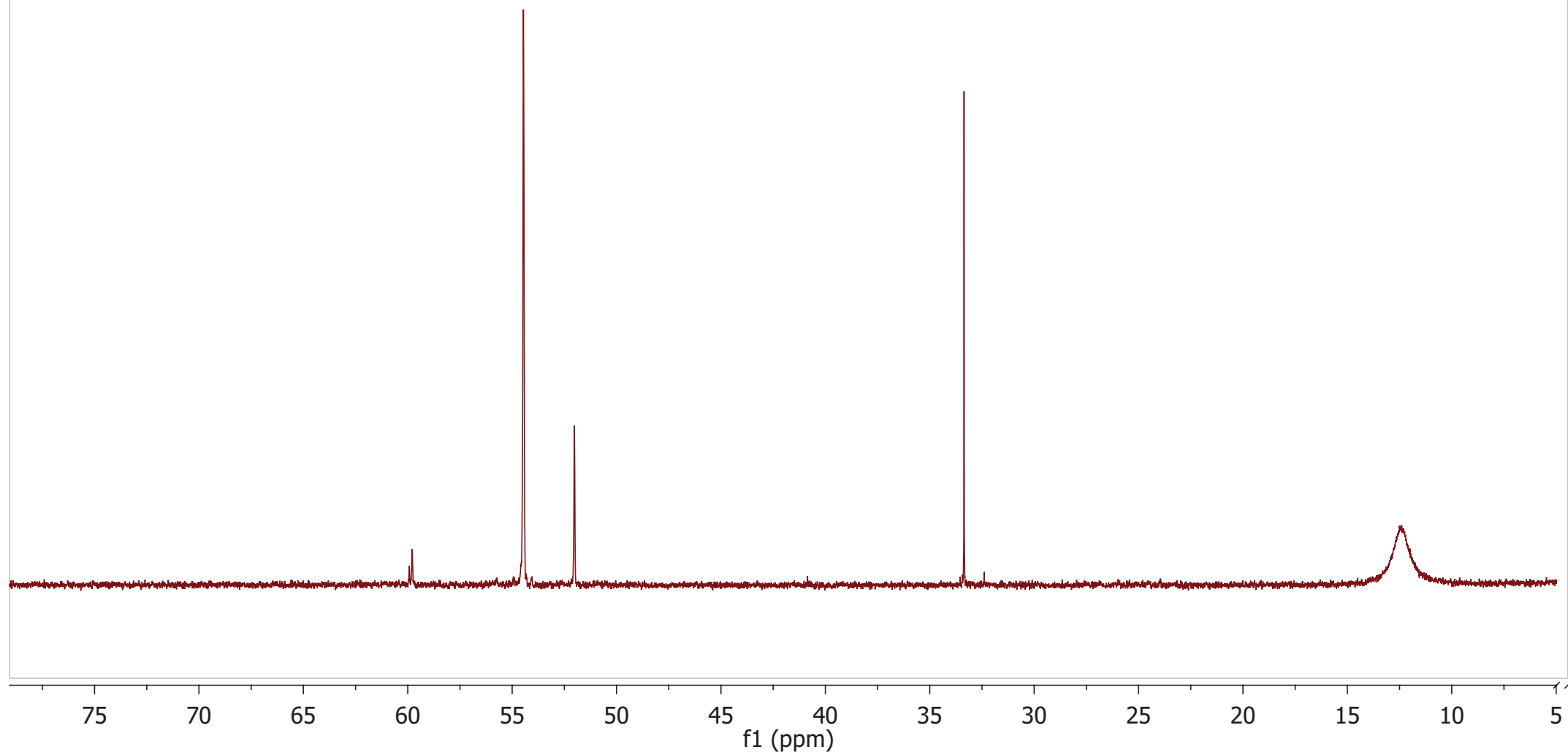


Plate 22a: Tricyclohexylphosphine (**289**) + trifluoromethanesulfonic acid (**312**) ^1H NMR [600 MHz, CDCl_3]: δ 11.53 – 11.04 (m) , 2.69 – 0.71 (m, POCy3:H-1-6).

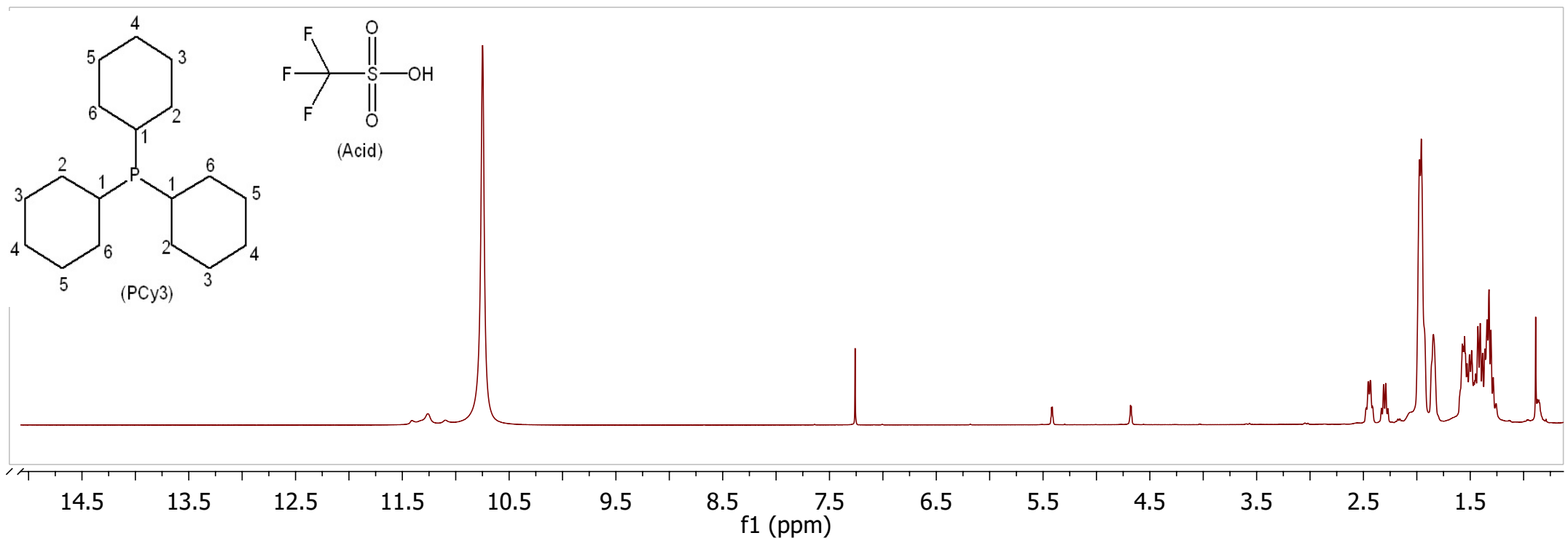
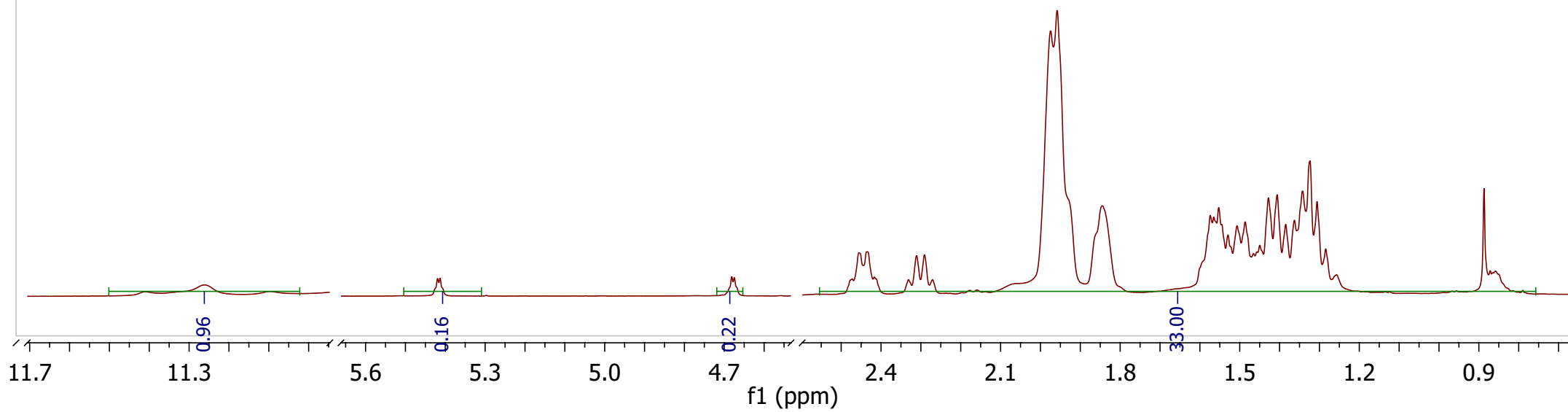


Plate 22g: Tricyclohexylphosphine (**289**) + trifluoromethanesulfonic acid (**312**)

^{31}P NMR [243 MHz, CDCl_3]: δ 86.4, 83.5, 33.4.

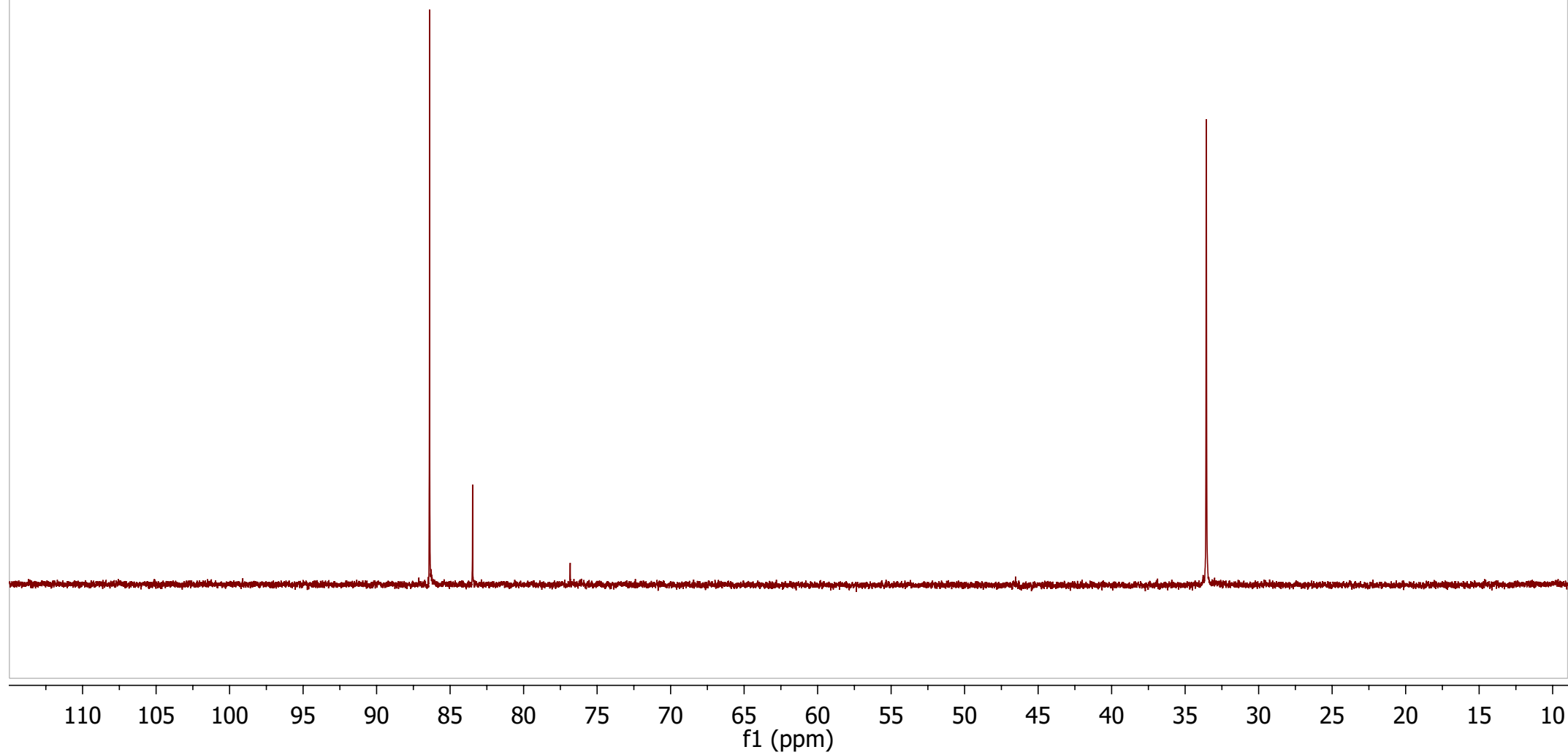


Plate 23a: Tricyclohexylphosphine oxide (**313**)

$^1\text{H NMR}$ [600 MHz, CDCl_3]: δ 4.46 – 4.30 (1H), 2.01 – 1.15 (33H, m, POCy₃:H-1-6).

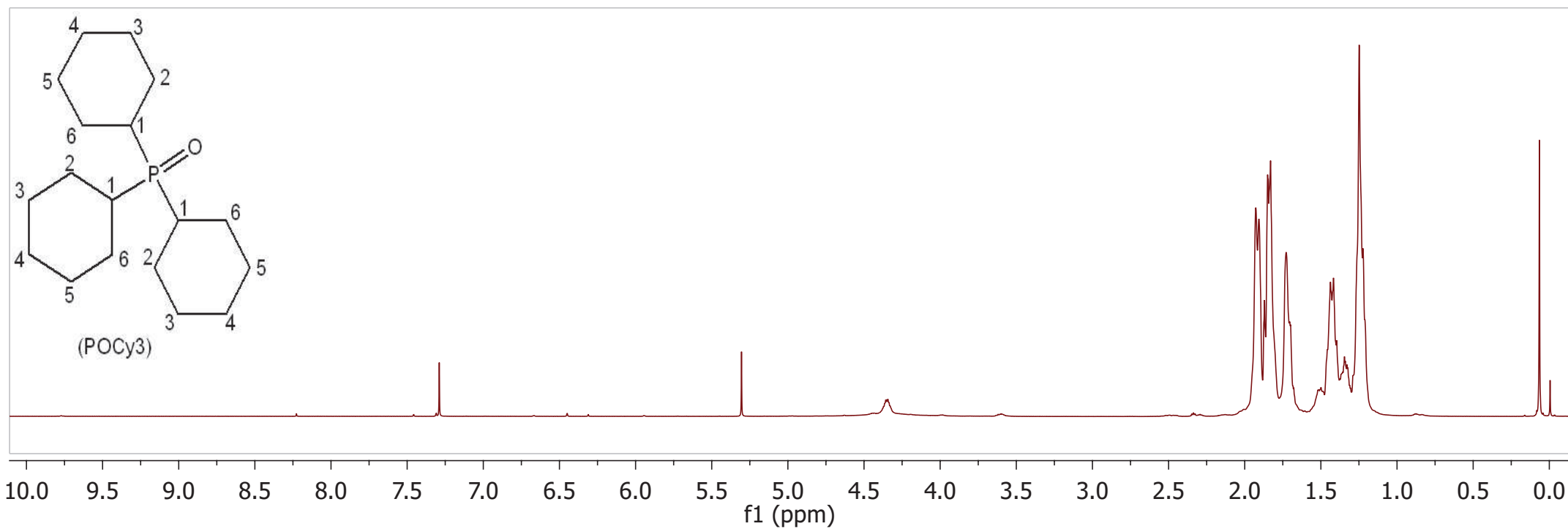
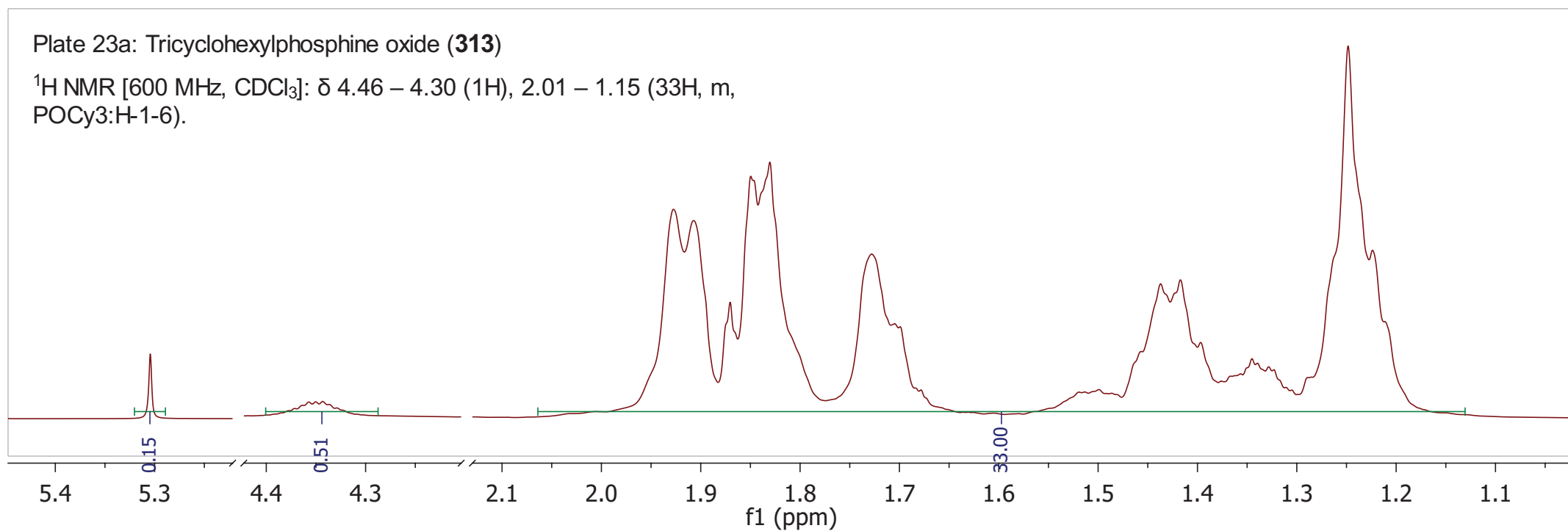


Plate 23g: Tricyclohexylphosphine oxide (**313**)

^{31}P NMR [243 MHz, CDCl_3]: δ 57.8, 51.1(POCy3), 49.7, 39.9, 31.0, 4.5, -3.1.

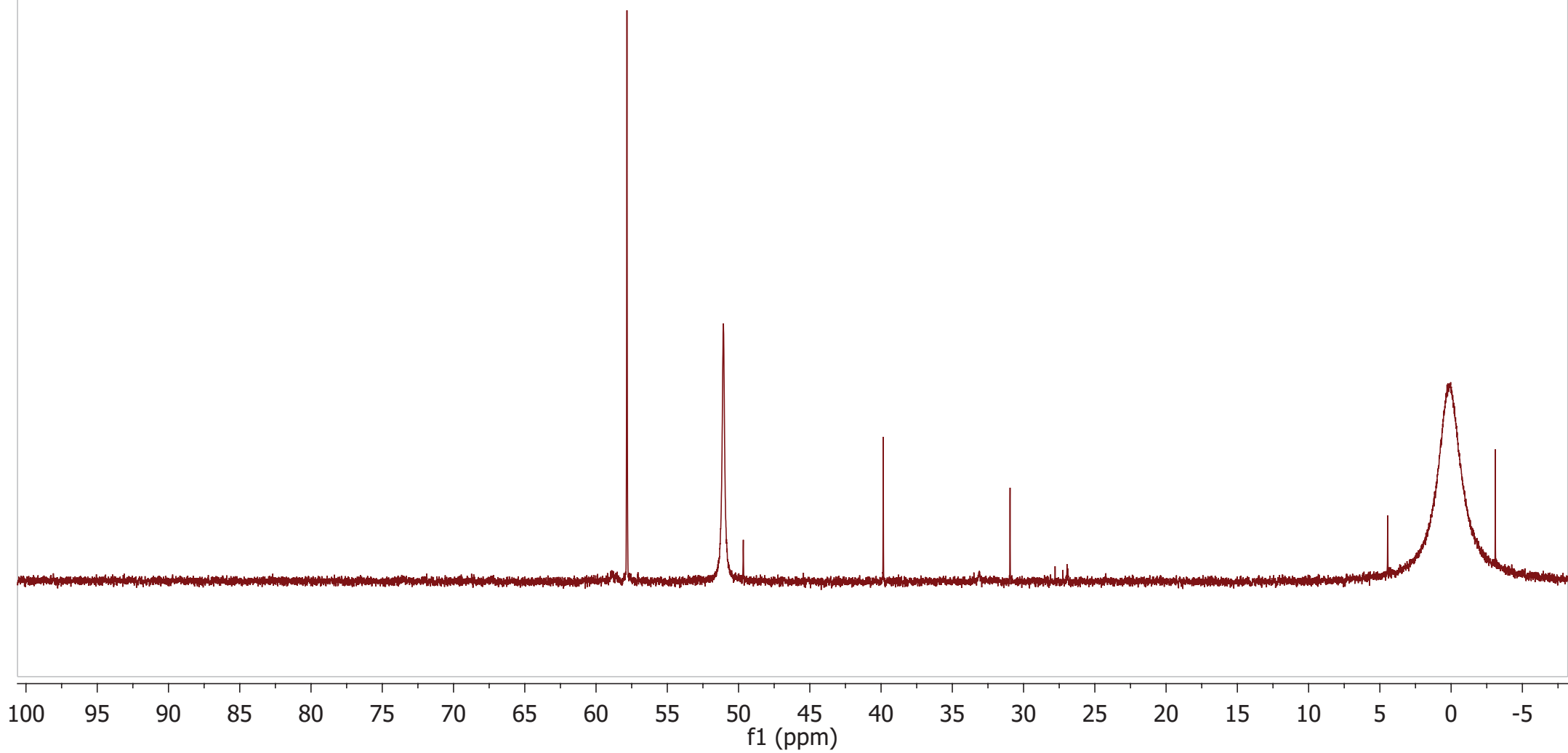


Plate 24a: Tricyclohexylphosphine oxide (**313**) + 1 eq. *p*-cresol (**266**)

^1H NMR [600 MHz, CDCl_3]: δ 7.45 (s), 7.00 (d, $J = 8.3$ Hz, C:H-3,5), 6.83 (d, $J = 8.3$ Hz, C:H-2,6), 2.27 (s, C:Me), 2.09 – 1.15 (m, POCy3:H-1-6).

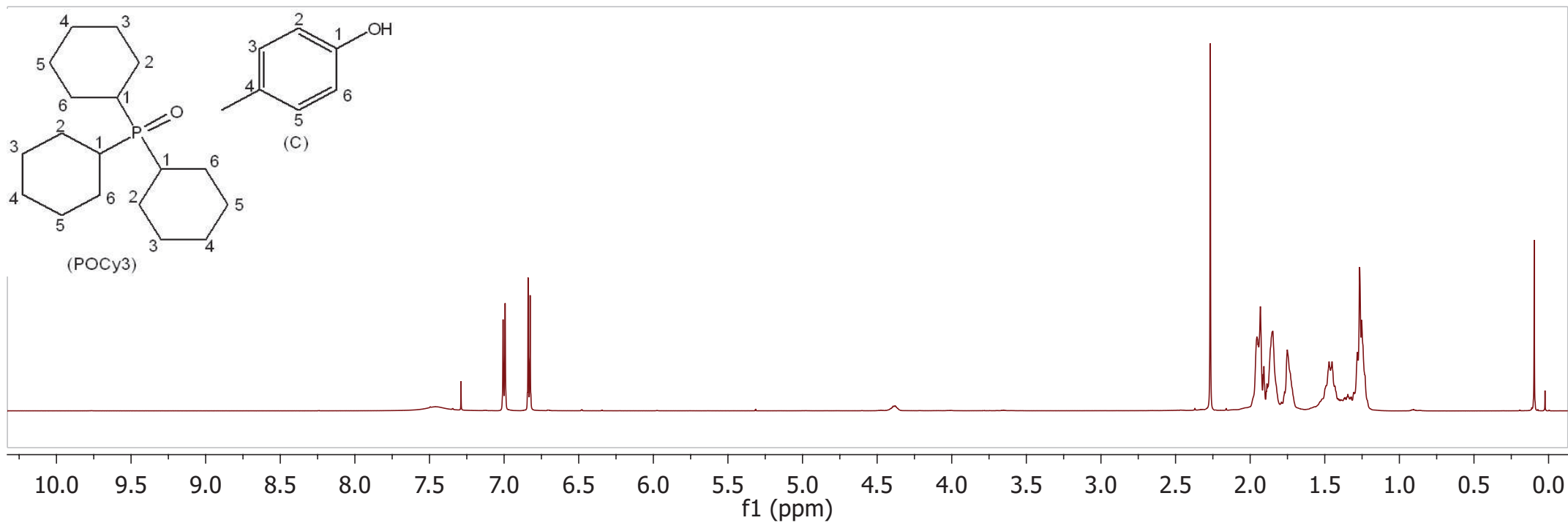
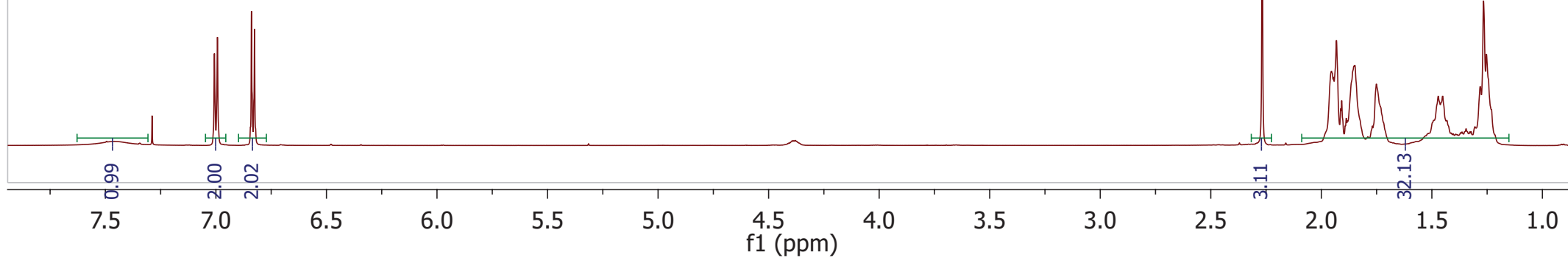


Plate 24g: Tricyclohexylphosphine oxide (**313**) + 1 eq. *p*-cresol (**266**)

^{31}P NMR [243 MHz, CDCl_3]: δ 59.1, 53.5, 51.0, 40.4, 31.1, 4.4, -3.4.

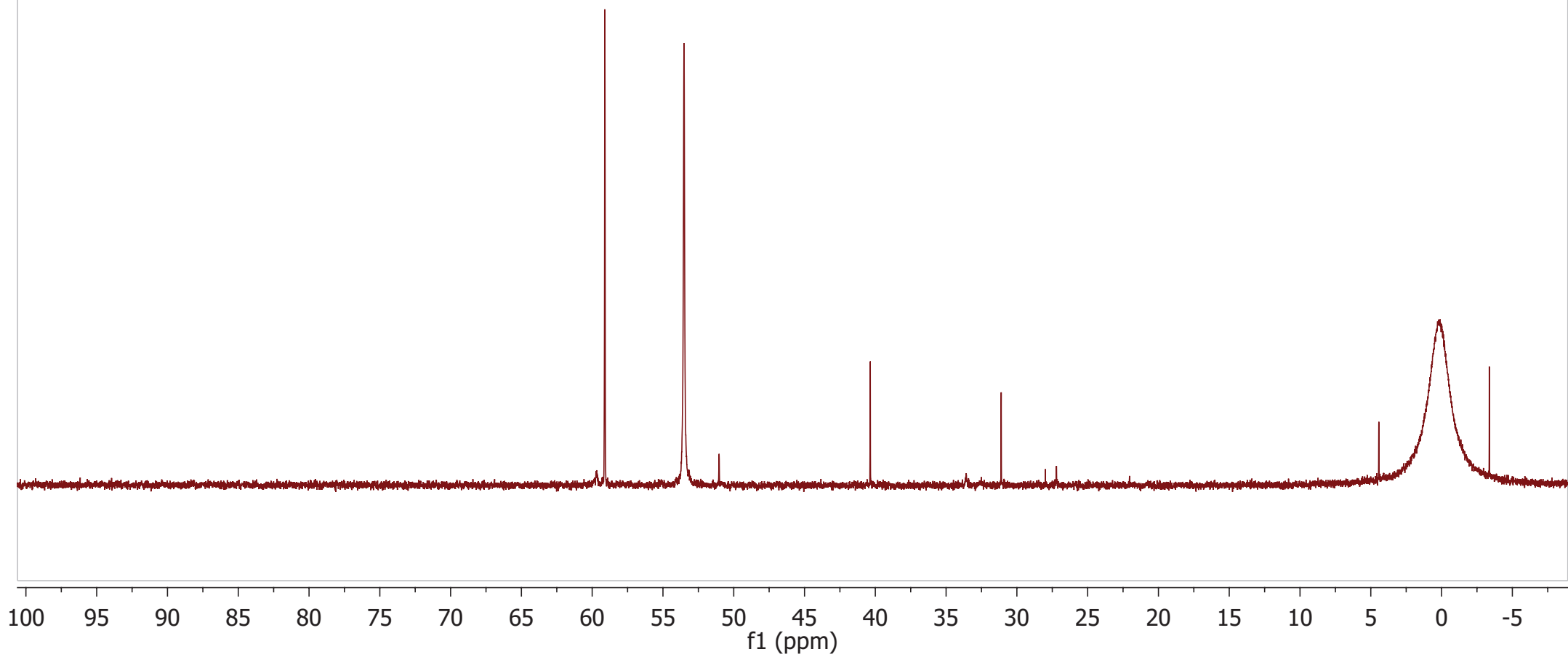


Plate 25a: Tricyclohexylphosphine oxide (**313**) + 2 eq. *p*-cresol (**266**)

$^1\text{H NMR}$ [600 MHz, CDCl_3]: δ 7.00 (d, $J = 8.3$ Hz, C:H-3,5), 6.78 (d, $J = 8.3$ Hz, C:H-2,6), 5.63 (s), 2.26 (s, C:Me), 2.01 – 1.17 (m, POCy3:H-1-6).

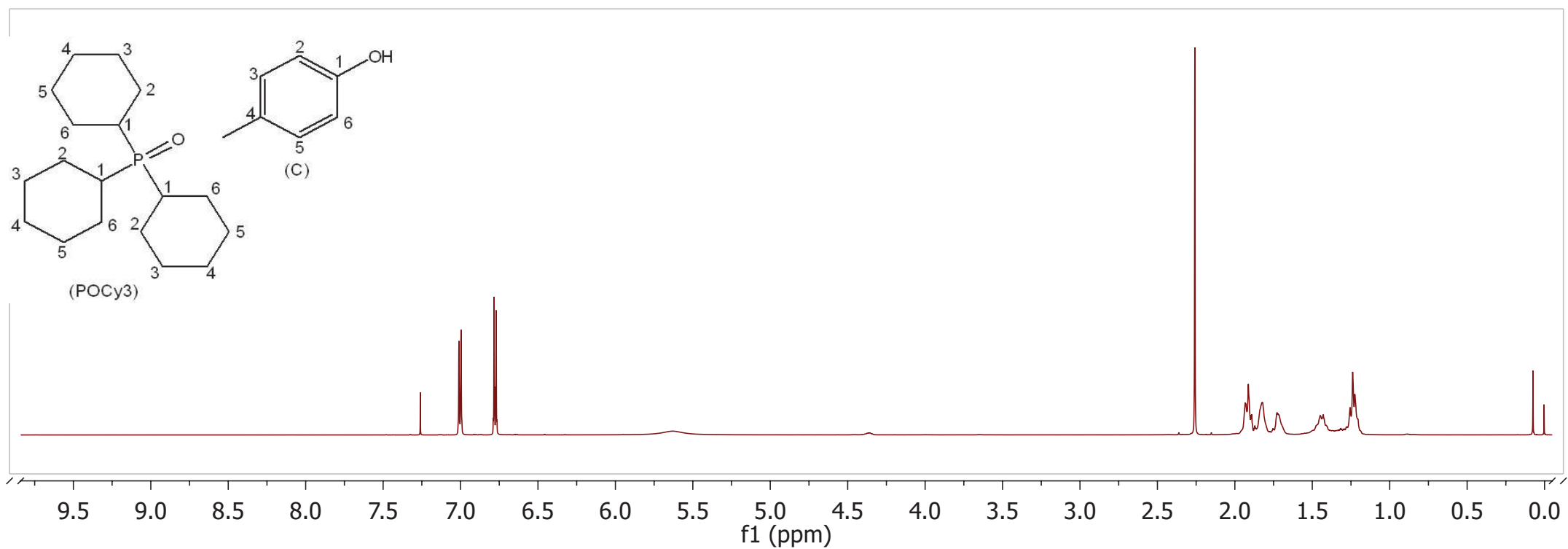
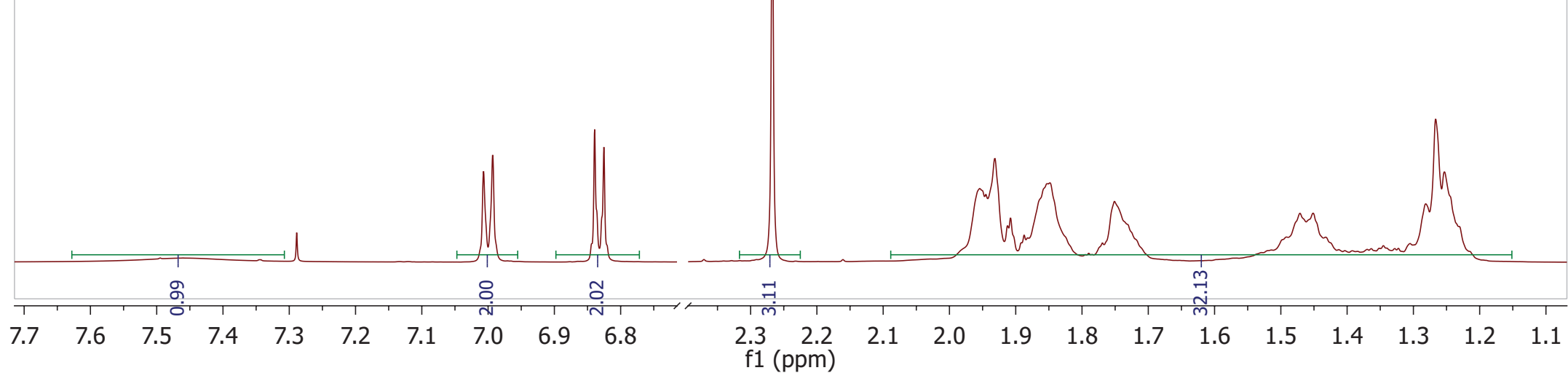


Plate 25g: Tricyclohexylphosphine oxide (**313**) + 2 eq. *p*-cresol (**266**)

^{31}P NMR [243 MHz, CDCl_3]: δ 59.5, 54.1, 51.6, 40.6, 31.2, 4.4, -3.5.

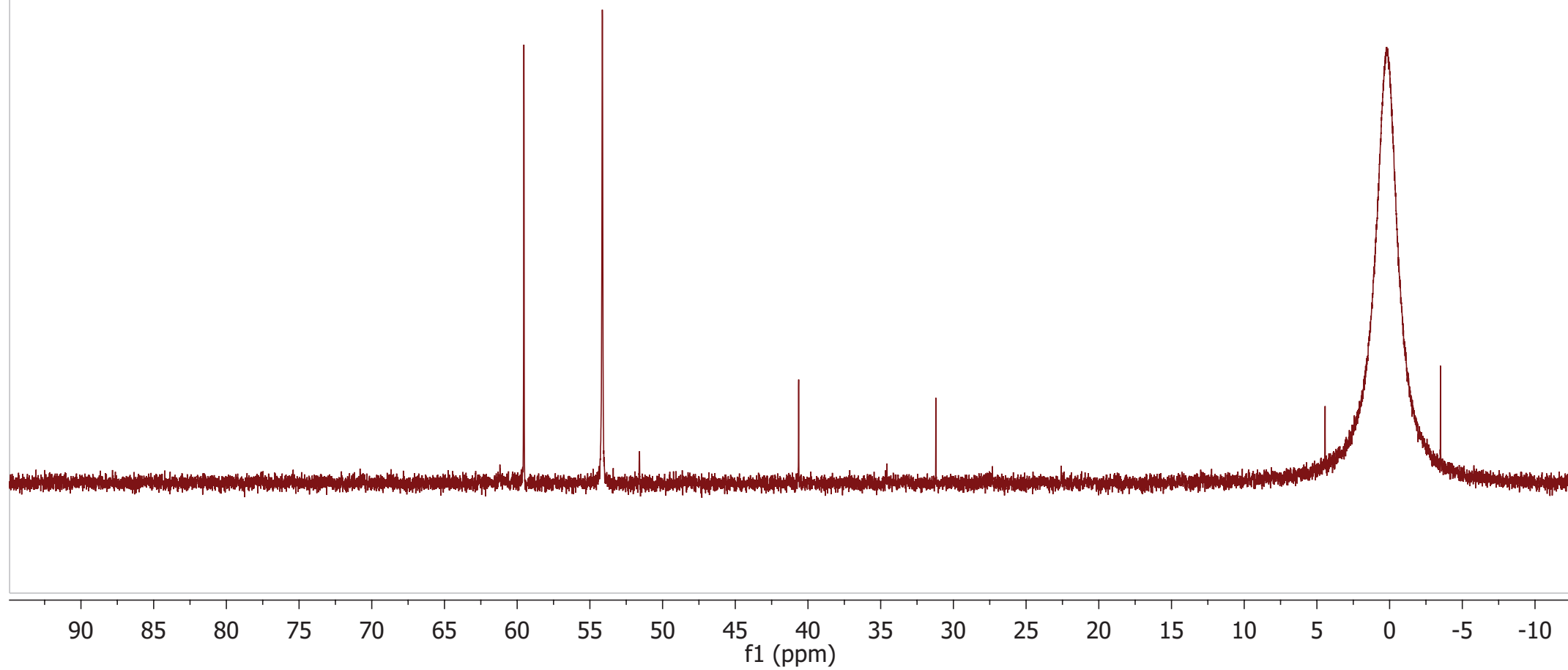


Plate 26a: Tricyclohexylphosphine oxide (**313**) +
trifluoromethanesulfonic acid (**312**)

$^1\text{H NMR}$ [600 MHz, CDCl_3]: δ 11.69 (s), 2.49 – 0.77
(m, POCy₃:H-1-6).

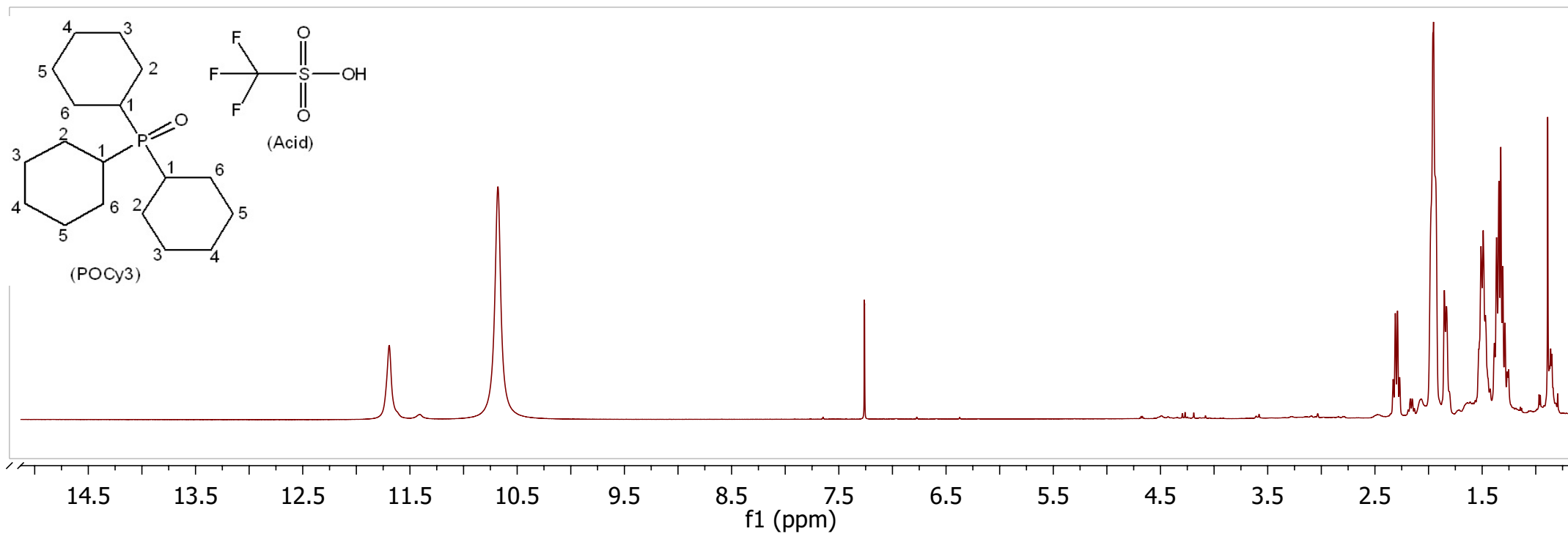
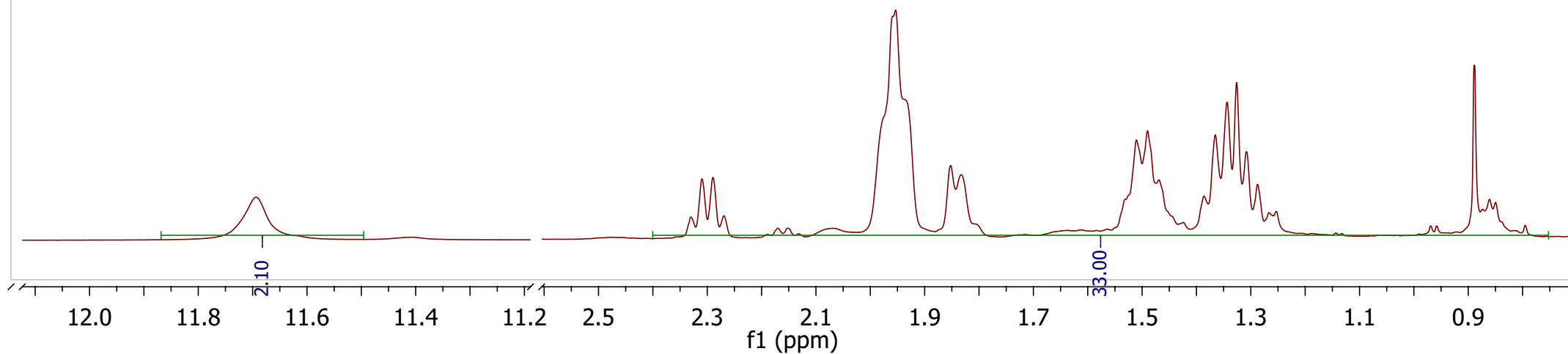


Plate 26g: Tricyclohexylphosphine oxide (**313**) +
trifluoromethanesulfonic acid (**312**)

^{31}P NMR [243 MHz, CDCl_3]: δ 86.0, 85.9, 83.1.

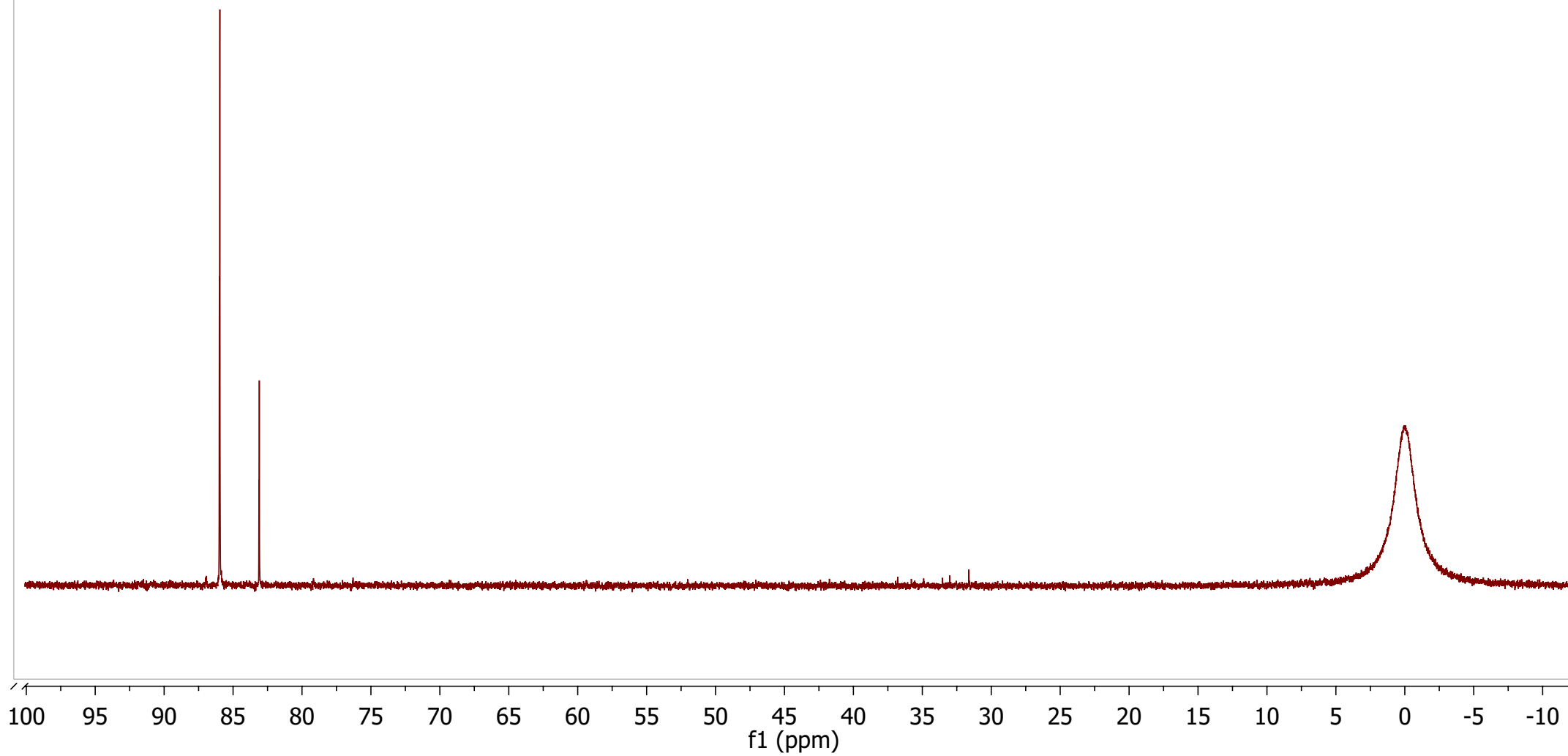


Plate 27a: Methyl acrylate (**59**)

^1H NMR [600 MHz, CDCl_3]: δ 6.28 (1H, dd, $J = 17.4, 1.5$ Hz, H-3a),
6.01 (1H, dd, $J = 17.4, 10.5$ Hz, H-2), 5.71 (1H, dd, $J = 10.5, 1.5$
Hz, H-3b), 3.64 (3H, s, $-\text{OCH}_3$).

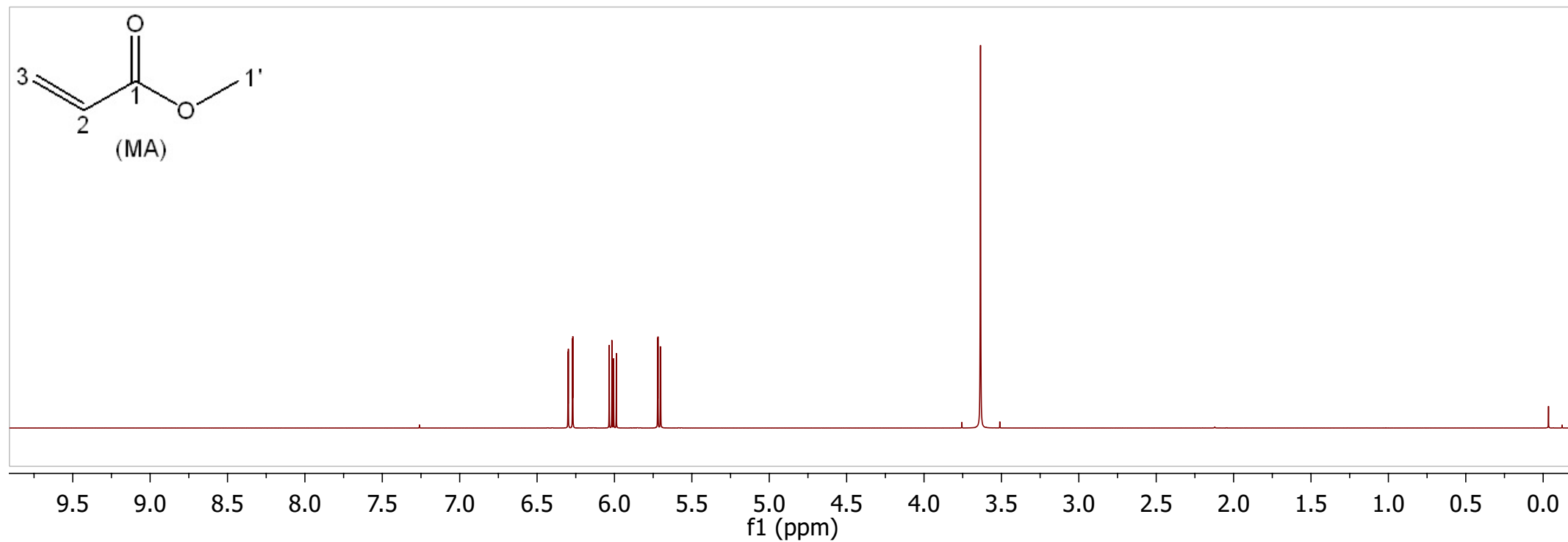
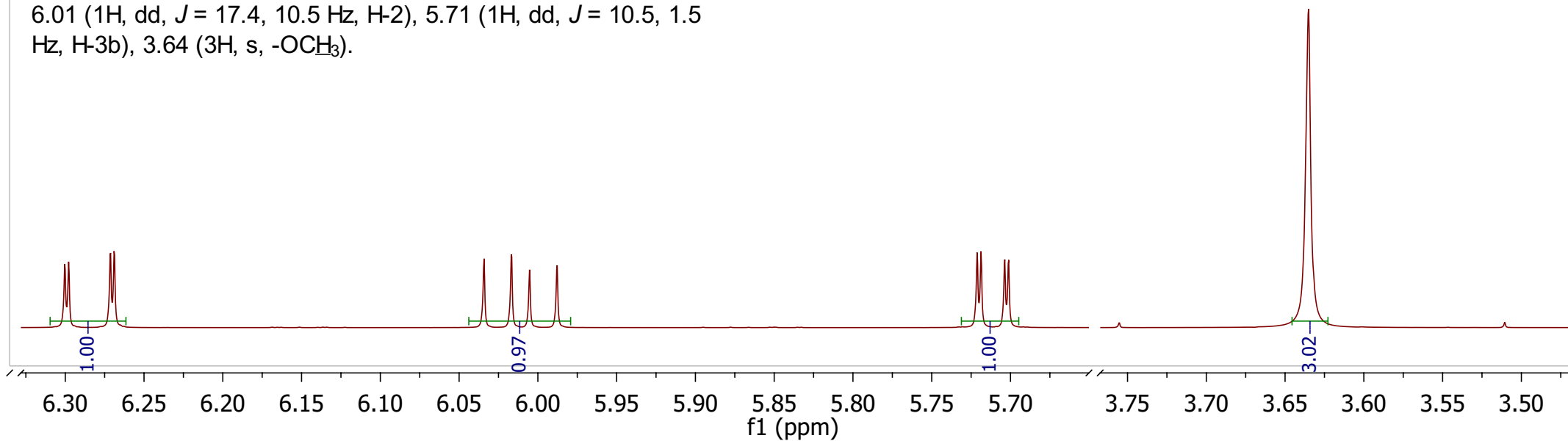


Plate 27b: Methyl acrylate (**59**)

^{13}C NMR [151 MHz, CDCl_3]: δ 166.5 (C-1), 130.5 (C-3), 128.2 (C-2), 51.4 (C-1').

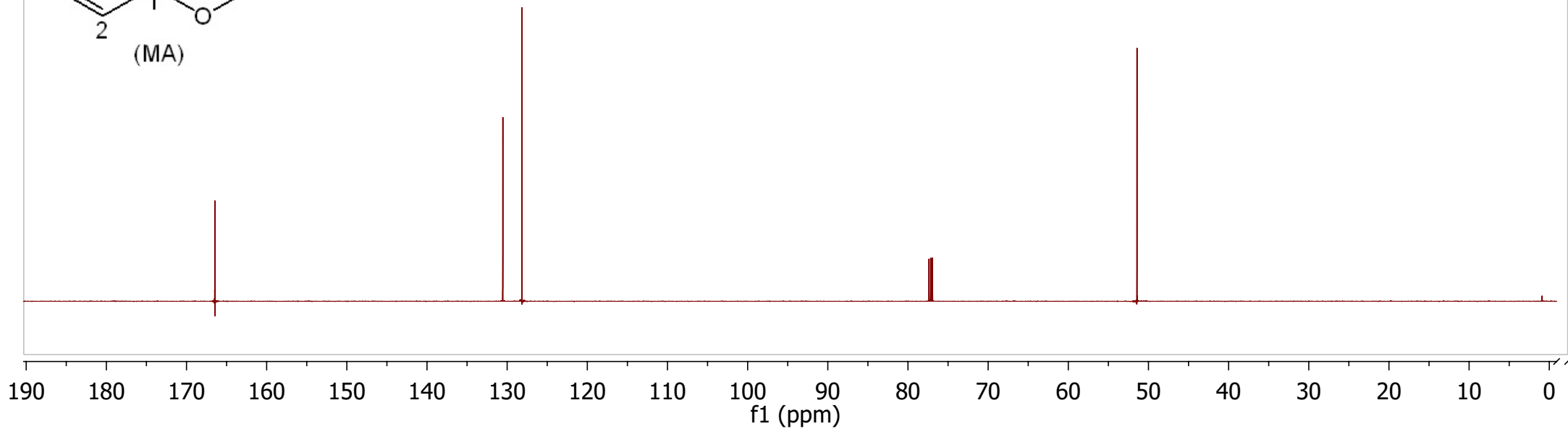
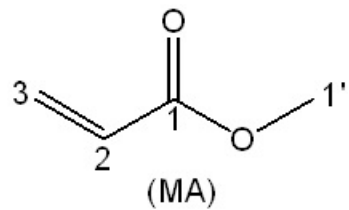
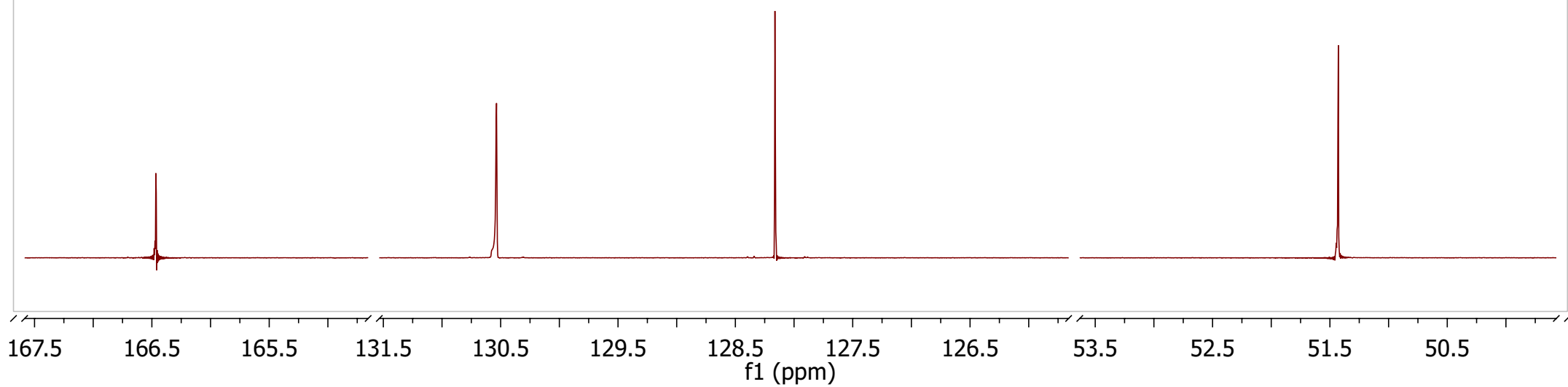


Plate 27c: Methyl acrylate (**59**)

HSQC NMR

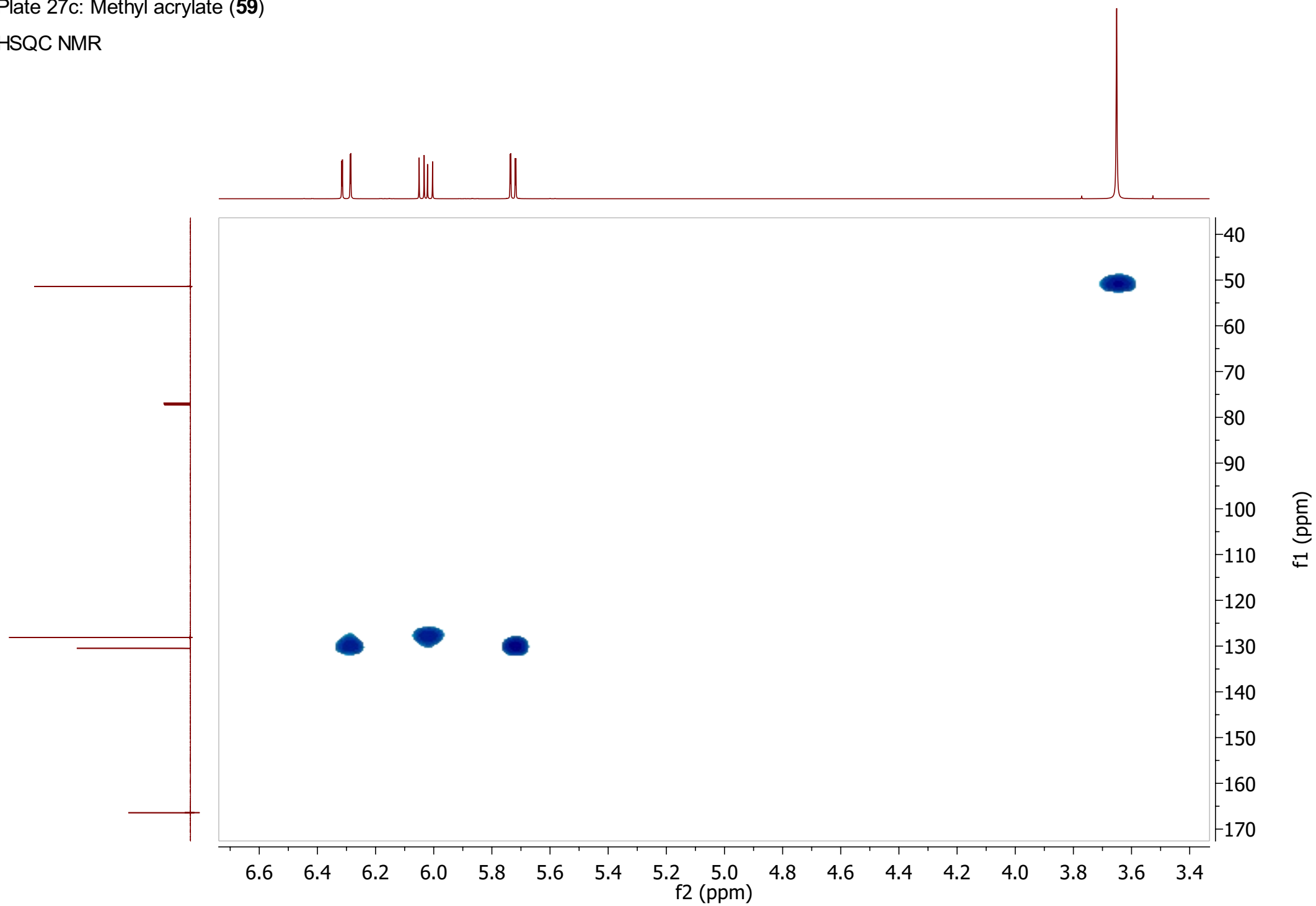


Plate 28a: Grubbs 2nd generation catalyst (**125**) + methyl acrylate (**59**)

¹H NMR [600 MHz, CDCl₃]: δ 19.13 (s, GII: H-1'), 12.04 – 12.01 (m), 10.03 (s), 8.24 – 7.98 (m), 7.89 (d, *J* = 6.3 Hz), 7.73 – 7.67 (m), 7.67 – 7.61 (m), 7.54 (dd, *J* = 16.8, 7.9 Hz), 7.42 – 7.32 (m), 7.27 (d, *J* = 8.2 Hz), 7.18 (d, *J* = 7.5 Hz), 7.11 (s), 7.09 – 6.79 (m), 6.45 (d, *J* = 16.0 Hz), 6.27 (d, *J* = 14.1, MA: H-3a), 5.93 – 5.78 (m), 4.57 (s), 3.99 (dd, *J* = 19.3, 7.1 Hz), 3.92 – 3.72 (m, GII: H-4,5), 2.99 (d, *J* = 53.3 Hz), 2.76 (s, GII: H-2-Me(B)), 2.63 (s), 2.56 (s, GII: H-6-Me(B)), 2.50 (s, GII: H-6-Me(A)), 2.41 – 2.01 (m), 1.97 – 1.34 and 1.32 – 0.82 (m, GII: H-2-6(D)).

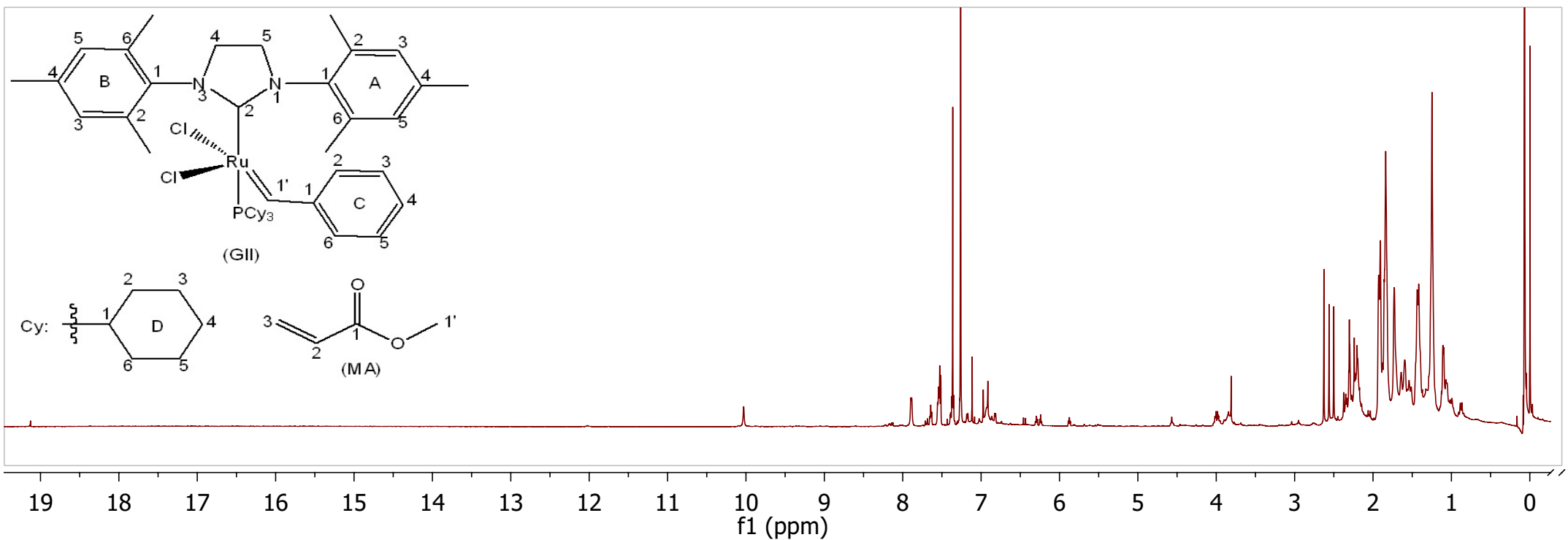
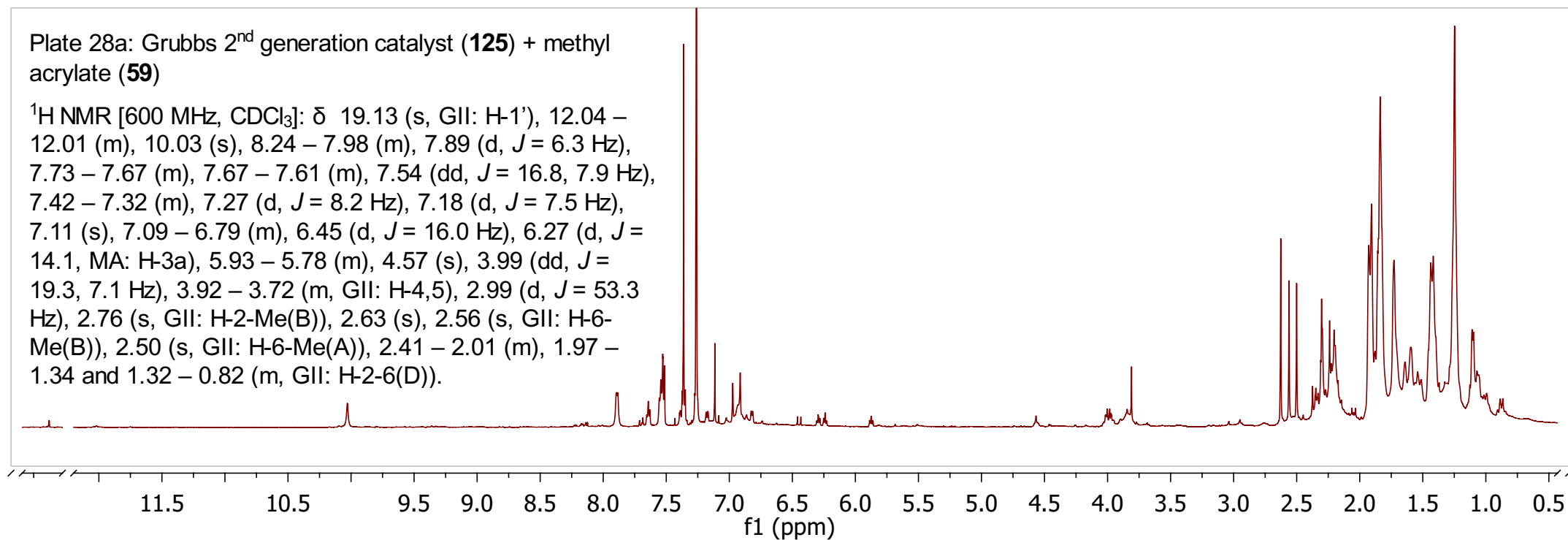


Plate 28b: Grubbs 2nd generation catalyst (**125**) + methyl acrylate (**59**)

¹³C NMR [151 MHz, CDCl₃]: δ 137.2, 130.0(GII: C-3(B),5(C)),
129.9(GII: C-6(C)), 129.1(GII: C-3(A)), 128.8(GII: C-5(A)), 128.0,
127.7, 126.6, 52.0, 35.6, 35.2, 31.5, 31.4, 29.1, 27.8, 27.1, 27.0,
26.5, 26.4, 26.2, 21.3(GII: C-4-Me(B)), 21.0(GII: C-4-Me(A)),
20.1(GII: C-2-Me(B),6-Me(B)).

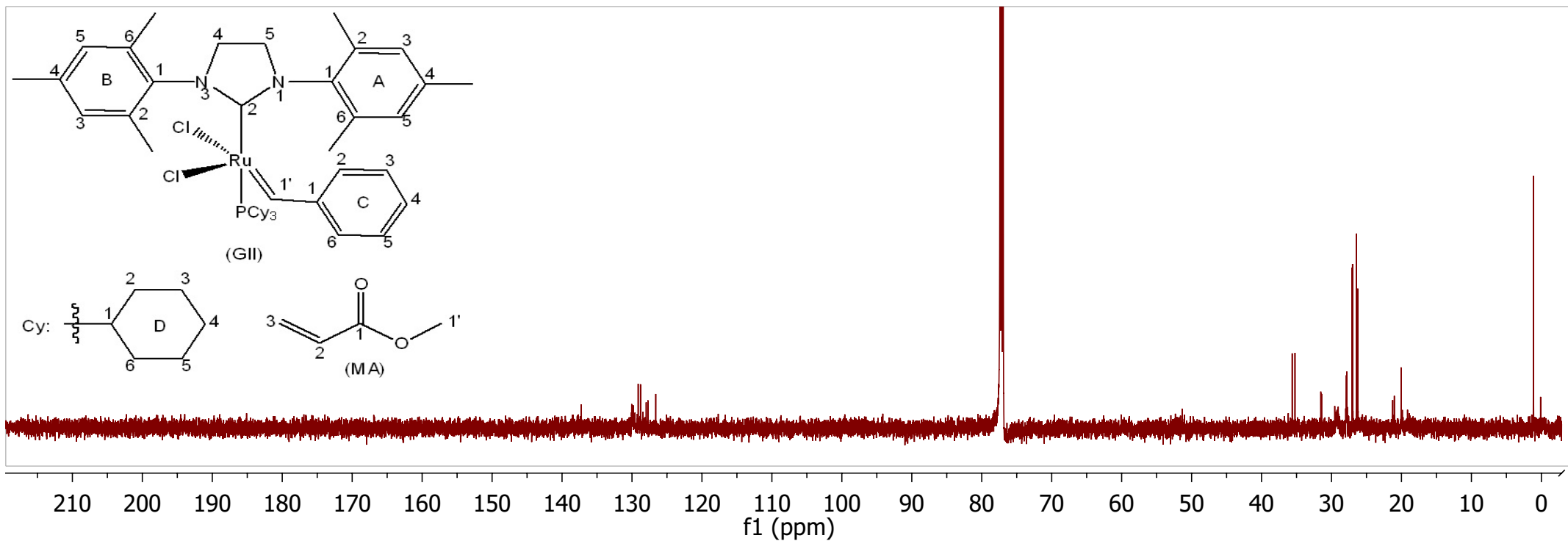
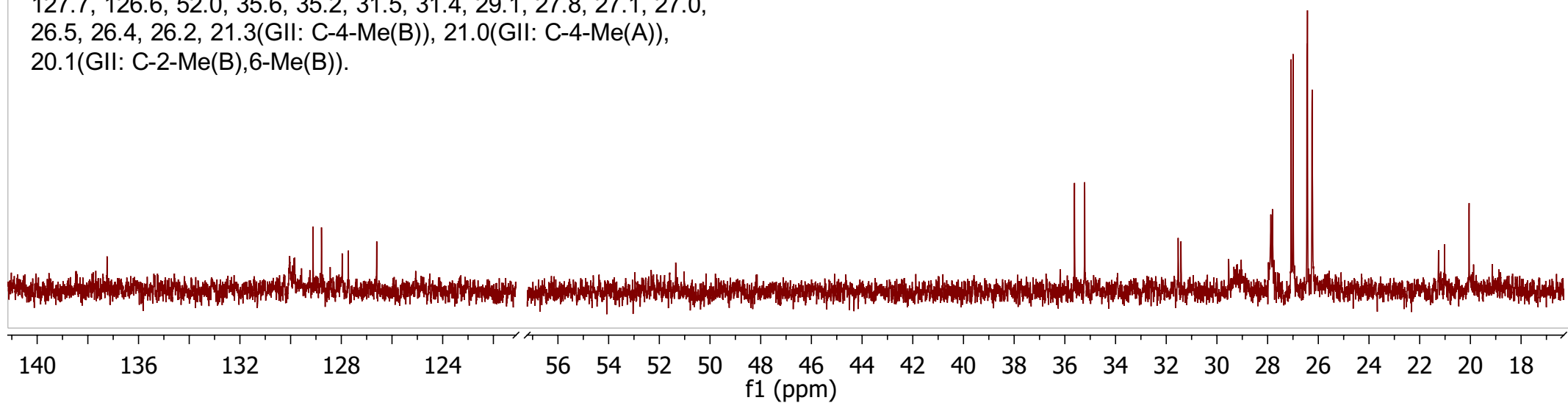


Plate 28c: Grubbs 2nd generation catalyst (**125**) +
methyl acrylate (**59**)

HSQC NMR

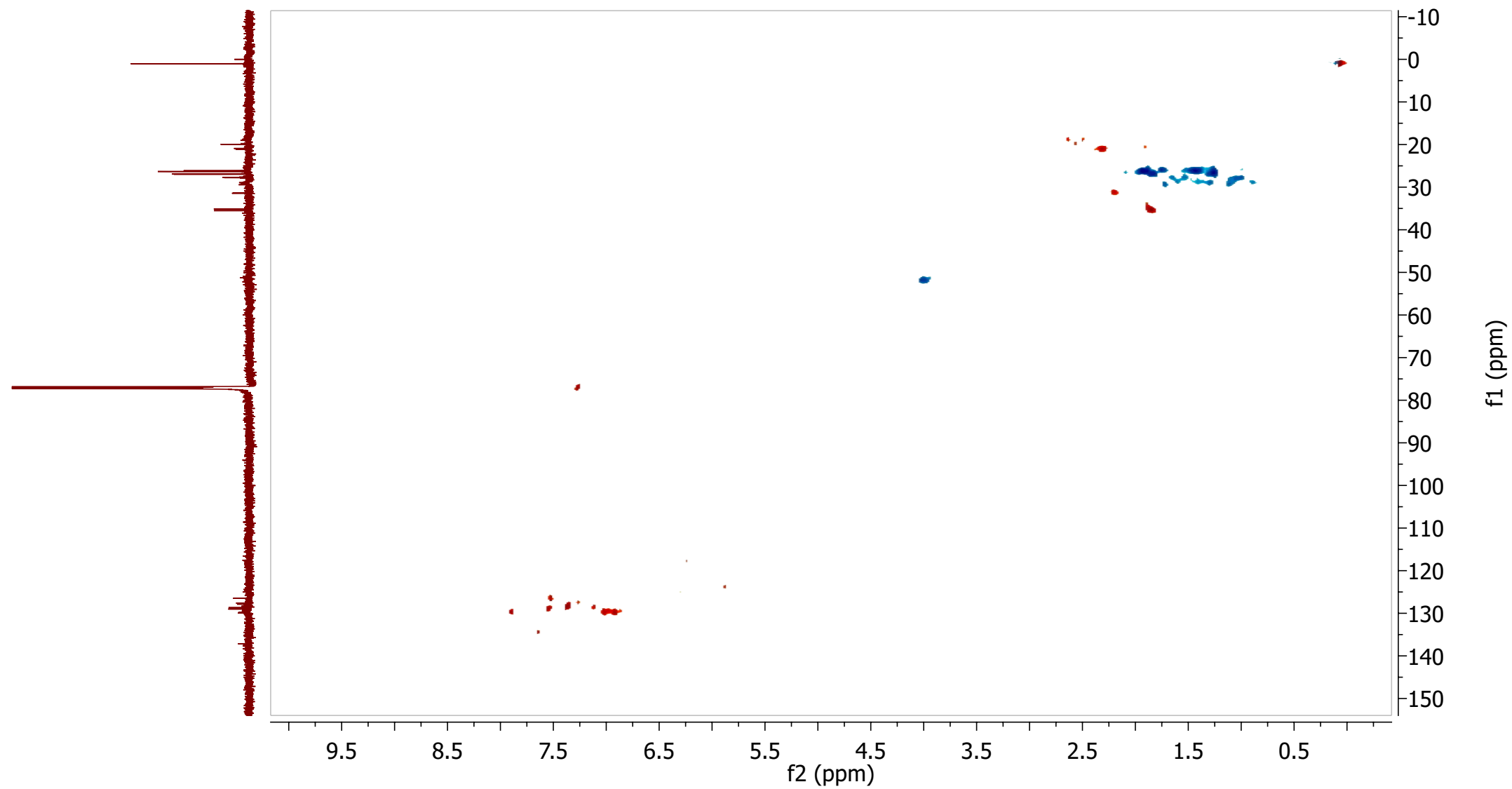


Plate 28d: Grubbs 2nd generation catalyst (**125**) +
methyl acrylate (**59**)

HMBC NMR

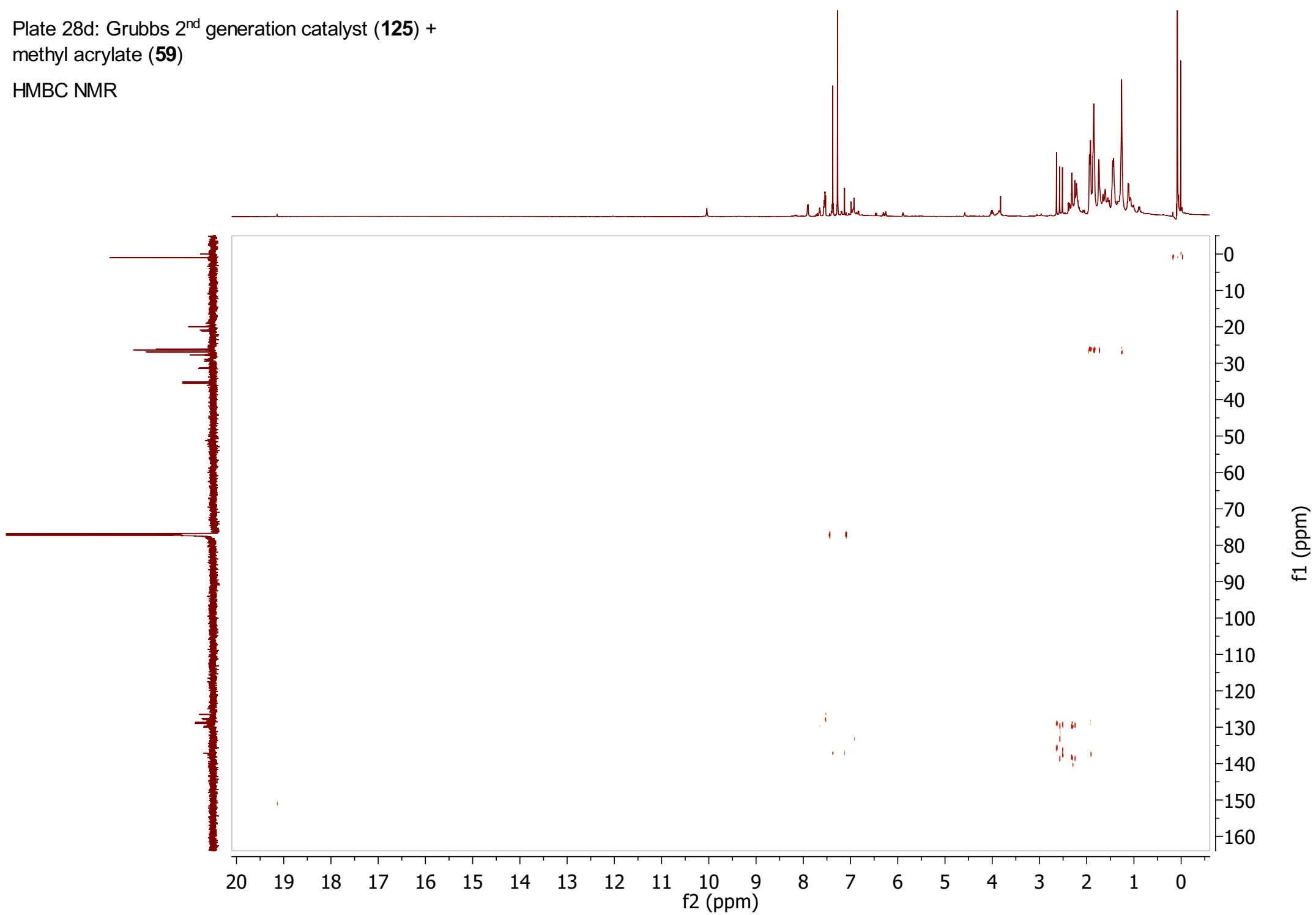


Plate 28g: Grubbs 2nd generation catalyst (**125**) + methyl acrylate (**59**)

³¹P NMR [243 MHz, CDCl₃]: δ 78.0, 50.0, 35.5, 31.5, 28.9(GII).

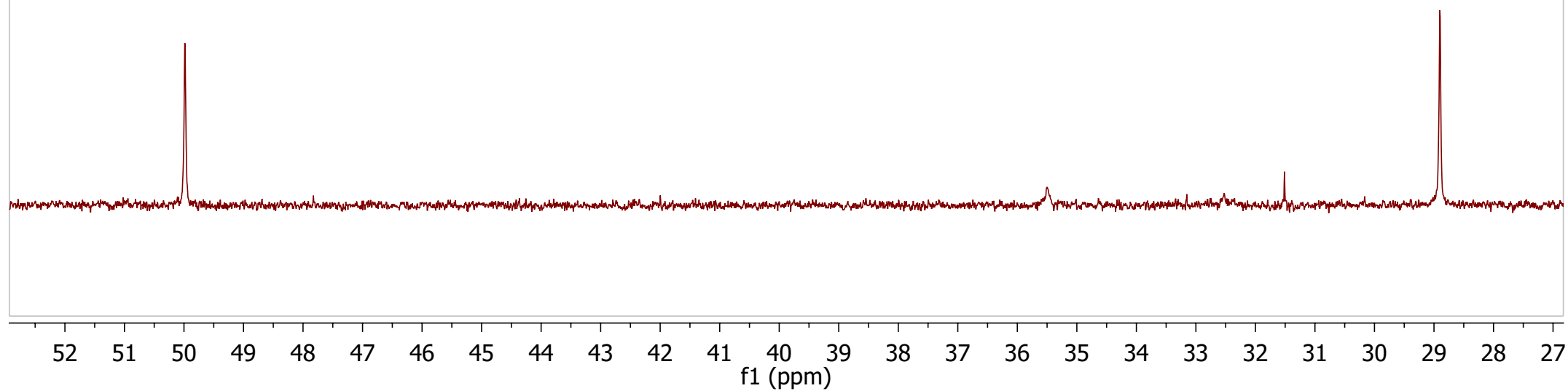


Plate 28h: Grubbs 2nd generation catalyst (**125**) +
methyl acrylate (**59**)

NOE NMR

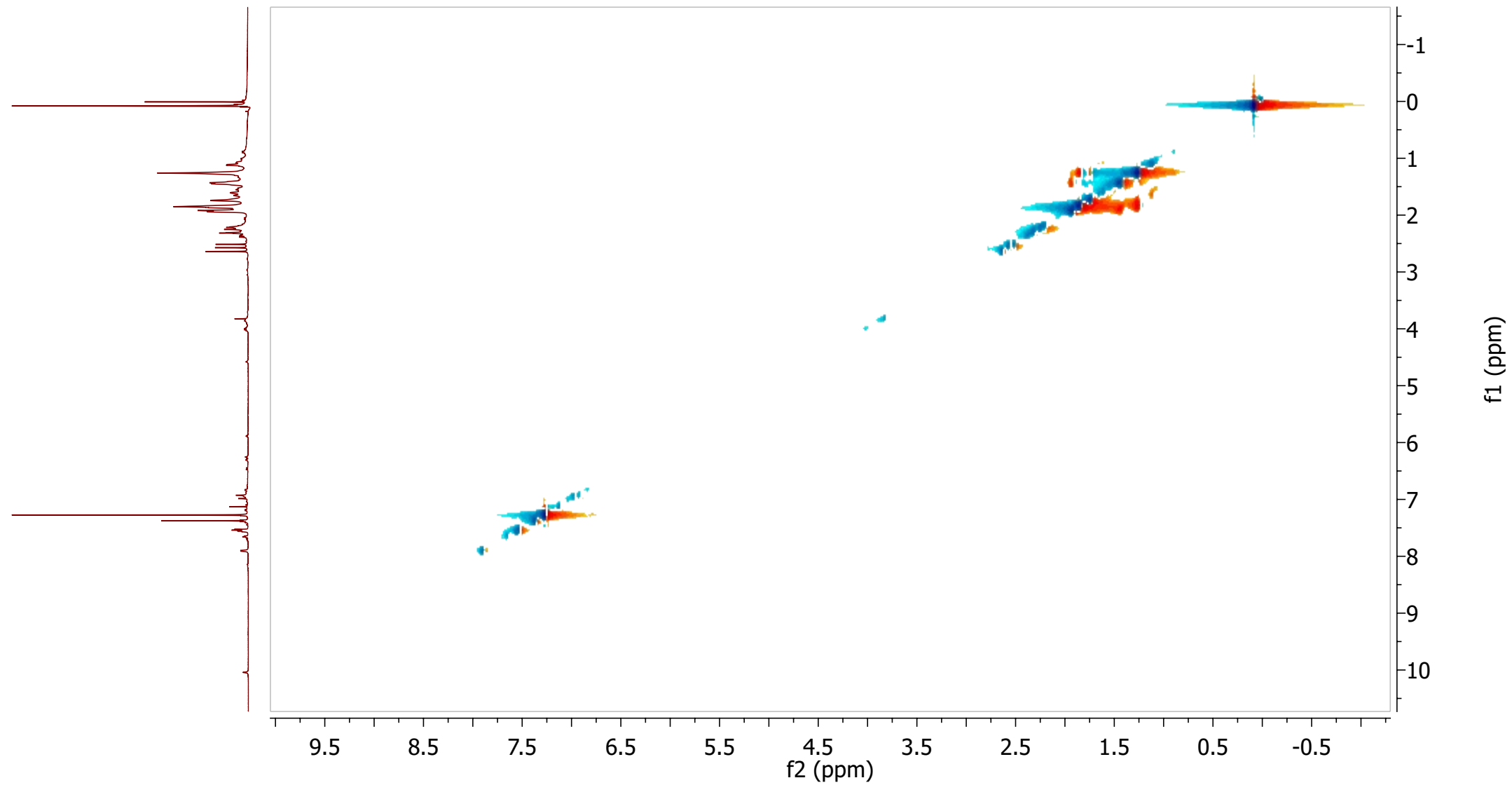


Plate 28i: Grubbs 2nd generation catalyst (**125**)
+ methyl acrylate (**59**)

Cosy NMR

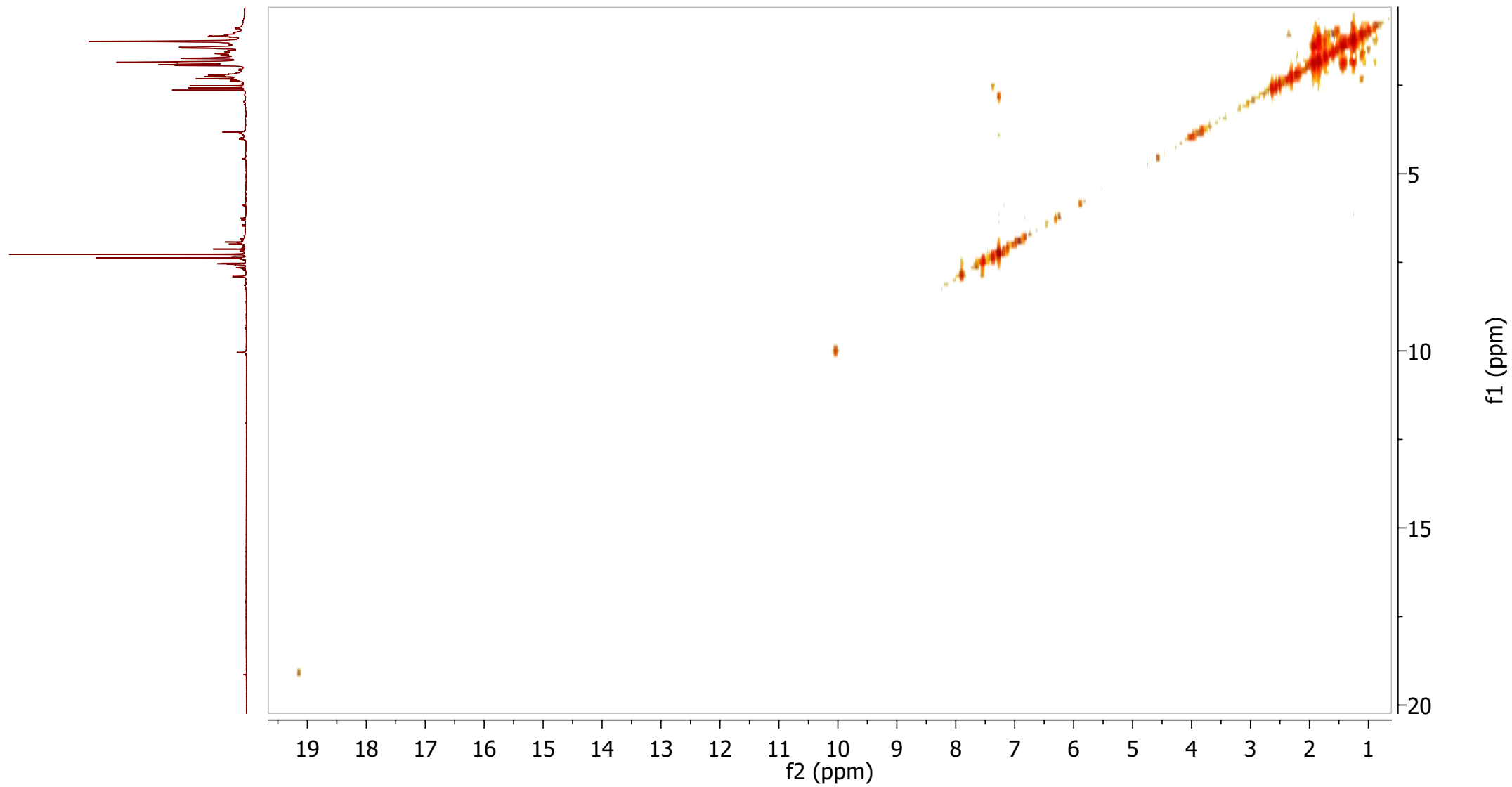


Plate 29a: Grubbs 2nd generation catalyst (**125**) + methyl acrylate (**59**) + *p*-cresol (**266**)

¹H NMR [600 MHz, CDCl₃]: δ 19.07 (s, GII: H-1'), 17.73 (s), 17.52 (s), 8.93 (s), 7.98 (s), 7.62 (d, *J* = 16.0 Hz), 7.48 – 7.38 (m), 7.35 – 7.26 (m), 7.25 – 7.12 (m), 7.25 – 7.12 (m), 7.08 – 6.91 (m), 6.90 – 6.85 (m), 6.84 – 6.75 (m), 6.75 – 6.43 (m), 6.42 – 6.25 (m), 6.13 – 5.97 (m), 5.97 – 5.83 (m), 5.85 – 5.68 (m), 5.69 – 5.55 (m), 5.31 (s), 4.79 – 4.20 (m), 3.97 – 3.78 (m), 3.76 – 3.71 (m), 3.70 – 3.65 (m), 3.65 – 3.62 (m), 3.61 – 3.58 (m), 3.57 – 3.43 (m), 3.41 – 3.23 (m), 3.23 – 2.92 (m), 2.82 – 2.48 (m), 2.47 – 2.37 (m), 2.36 – 2.32 (m), 2.31 – 2.26 (m), 2.27 – 2.20 (m), 2.18 – 2.11 (m), 2.09 – 0.67 (m).

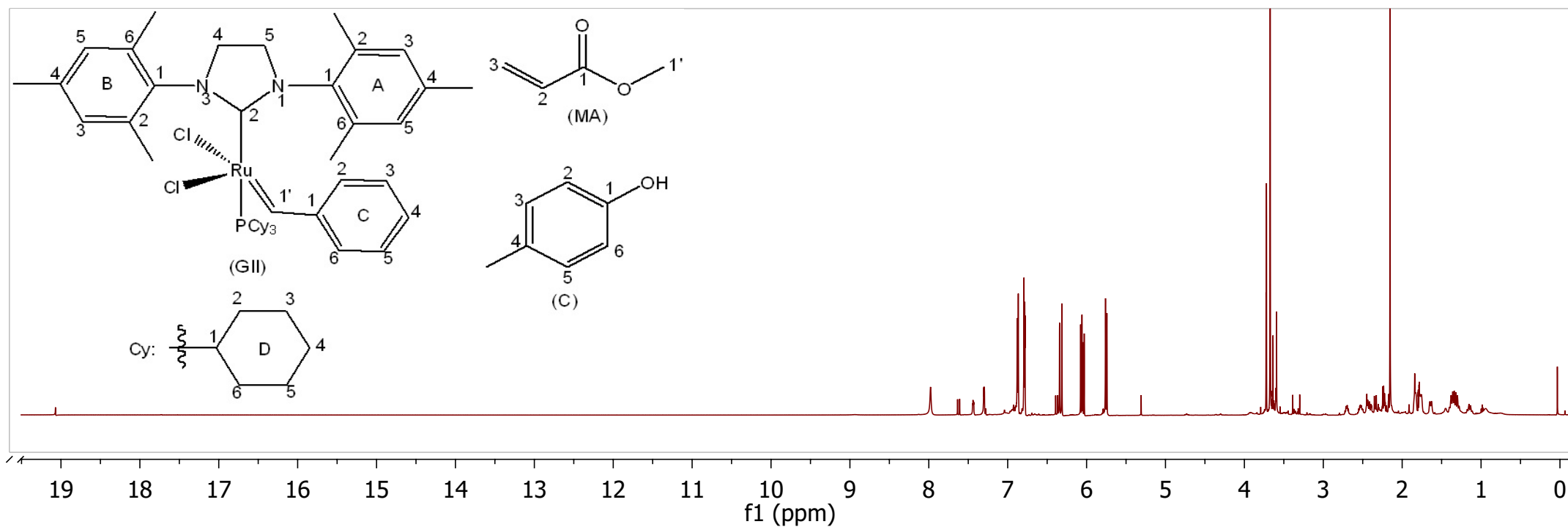
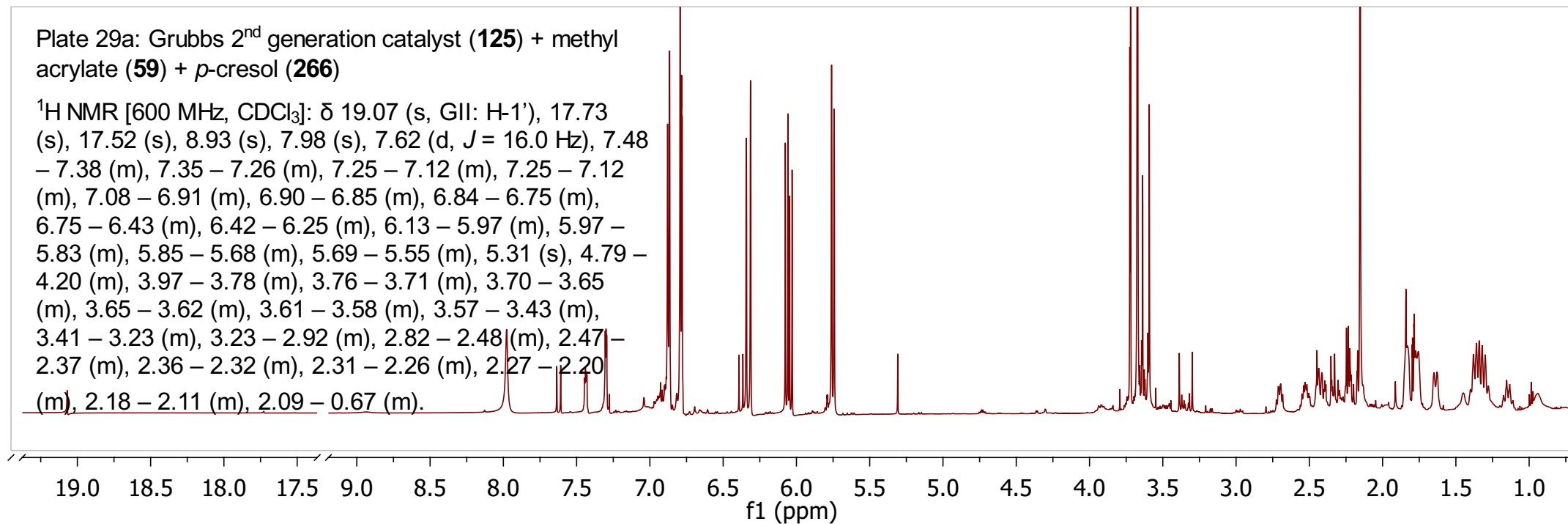


Plate 29b: Grubbs 2nd generation catalyst (**125**) + methyl acrylate (**59**) + *p*-cresol (**266**)

Int. ¹³C NMR [151 MHz, CDCl₃]: δ 294.1, 219.9(d, J = 77.2 Hz), 213.7, 174.8, 171.2 (d, J = 12.5 Hz), 167.3, 166.9, 166.5, 165.1, 154.5, 154.42, 154.36, 154.1, 151.0, 144.8, 138.6 (d, J = 63.3 Hz), 138.1, 137.5, 137.3, 136.9, 136.6 (d, J = 49.3 Hz), 136.1, 135.5, 134.9, 134.8, 134.3, 134.0, 133.1, 131.7, 130.7, 130.2, 129.6, 129.4, 129.2, 128.9, 128.7, 128.5, 128.1, 127.84, 127.77, 126.9, 125.9, 122.5 (d, J = 27.2 Hz), 122.1, 121.5, 119.7, 117.4, 115.2, 69.1, 53.0, 52.3, 52.1, 52.0, 51.4, 51.1, 51.0, 50.6, 50.0, 41.2, 31.2(d, J = 16.6 Hz), 29.8(d, J = 40.0 Hz), 28.8 (d, J = 48.0 Hz), 27.5, 27.4, 26.9, 26.7, 26.5, 26.2, 26.0, 25.9, 25.1, 20.9, 20.7, 20.6, 20.2, 19.7, 18.5, 18.4, 18.2, 18.0, 17.7, 17.4, 11.9, 11.0, 10.6.

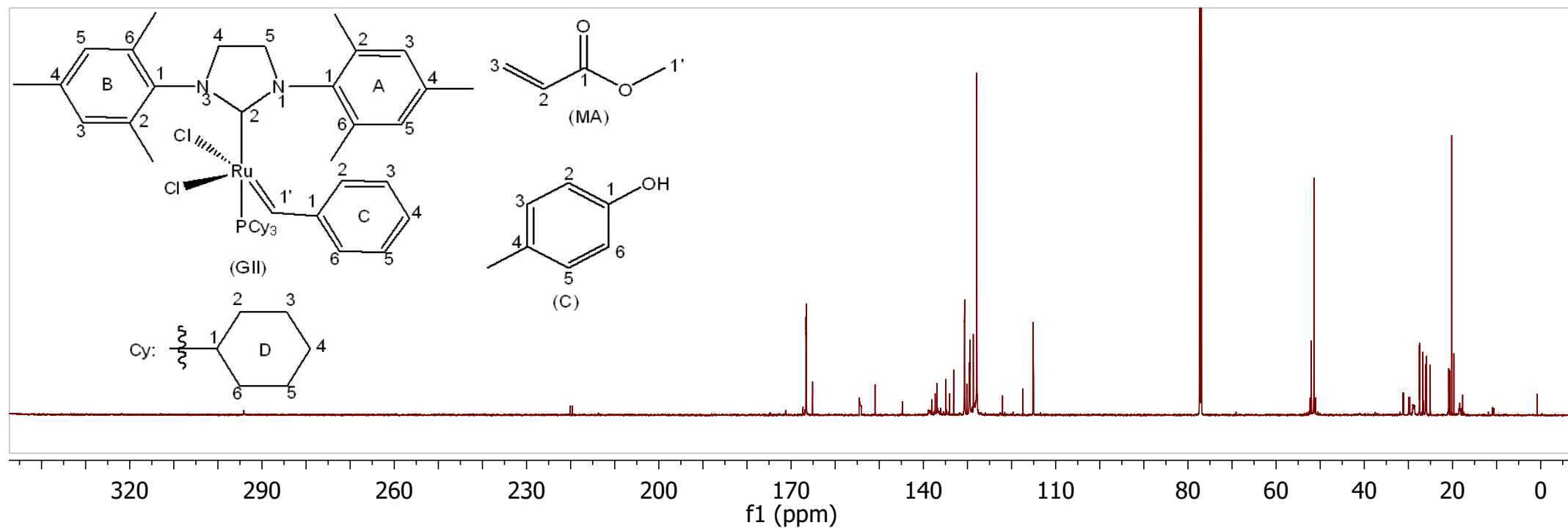
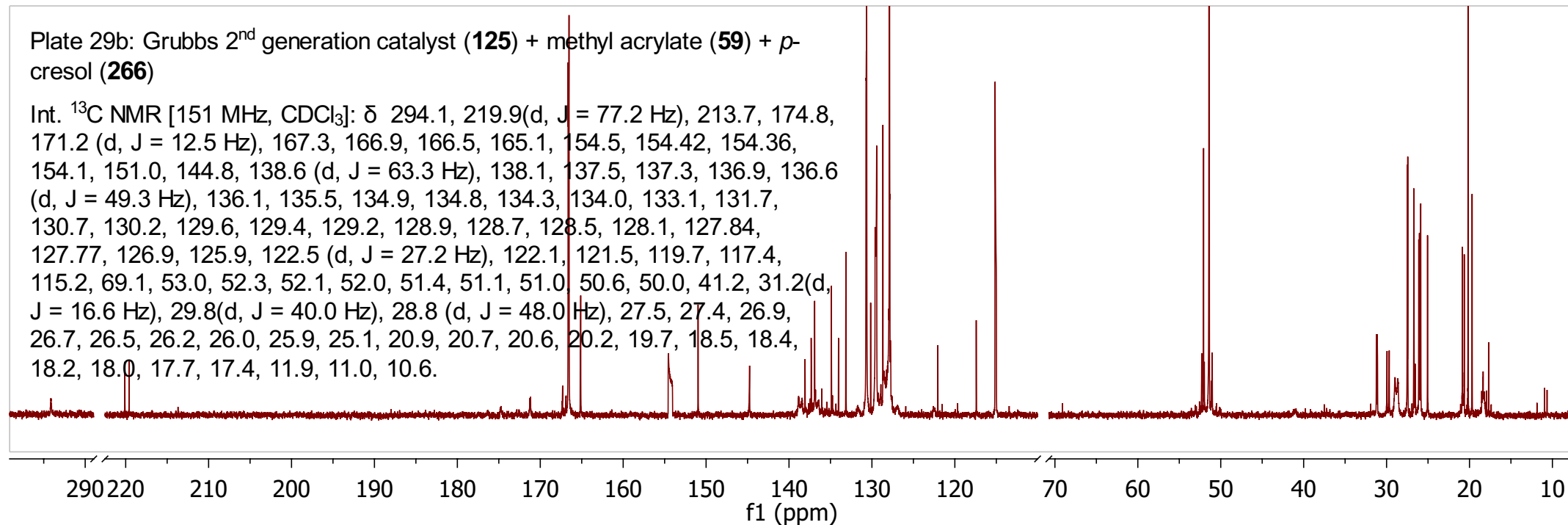
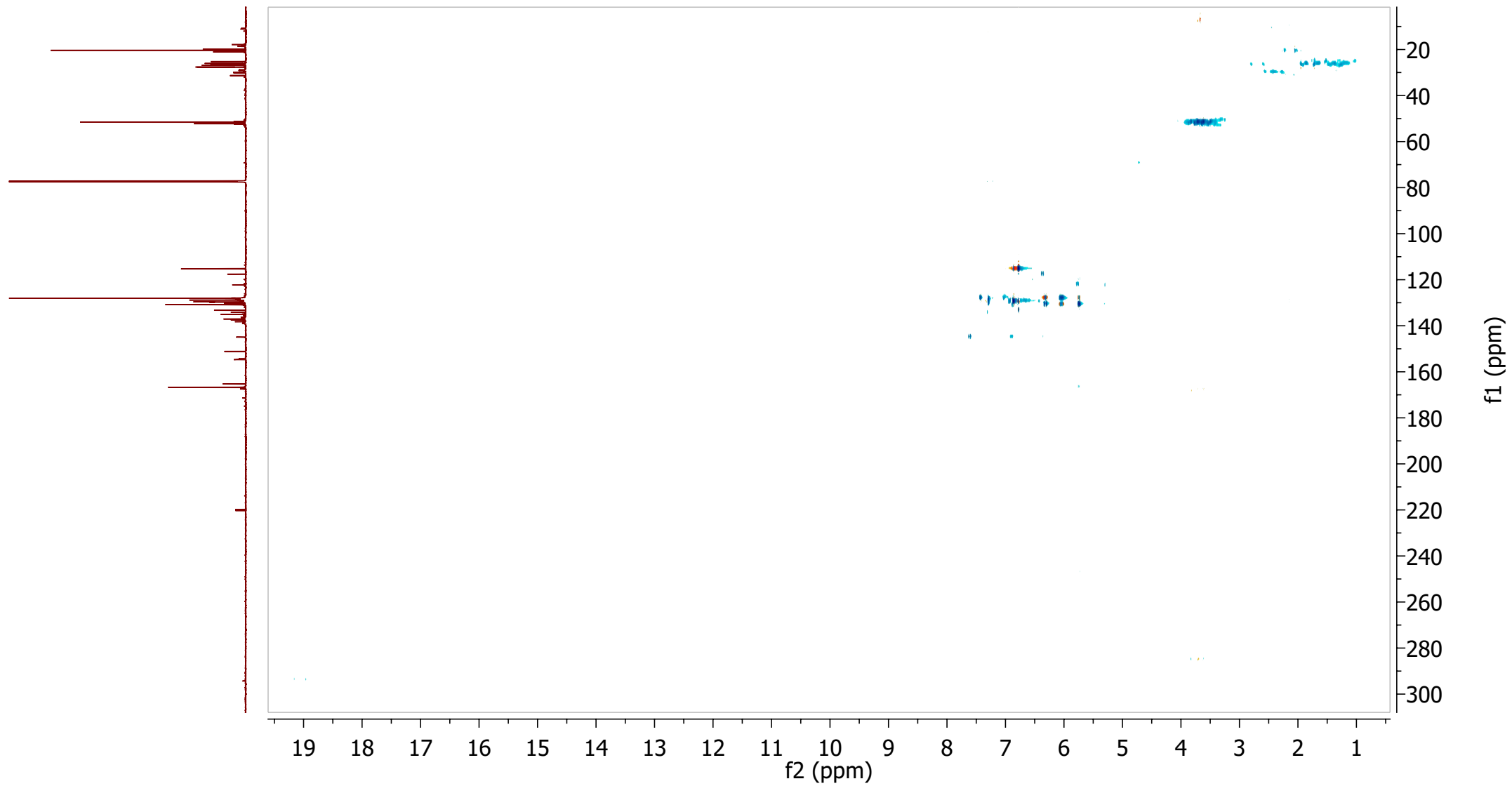


Plate 29c: Grubbs 2nd generation catalyst
(125) + methyl acrylate (59) + *p*-cresol (266)

HSQC NMR



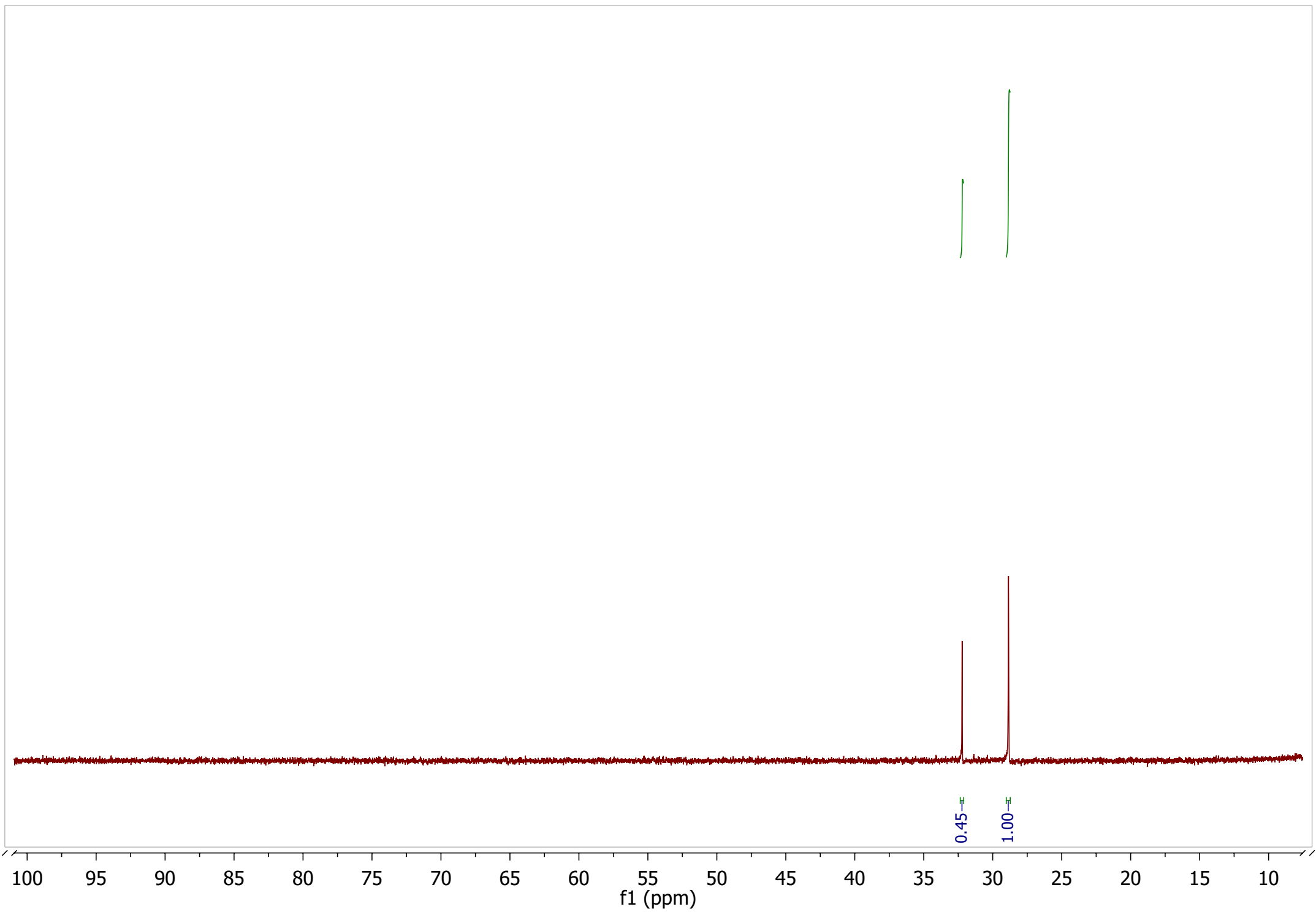
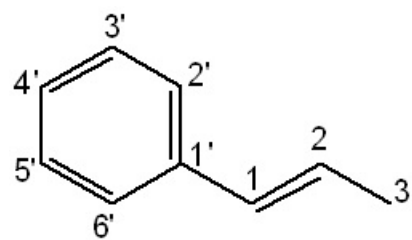
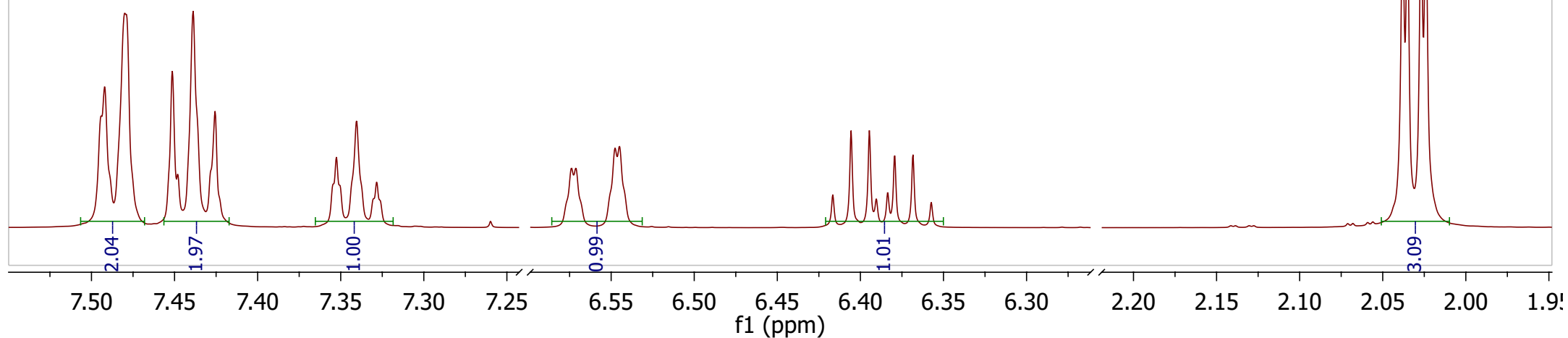


Plate 30a: Methylstyrene (**69**)

$^1\text{H NMR}$ [600 MHz, CDCl_3]: δ 7.49 (2H, dd, $J = 7.3, 1.0$ Hz, H-2',6'), 7.44 (2H, m, H-3',5'), 7.14 (1H, t t, $J = 6.7, 1.0$ Hz, H-4'), 6.56 (1H, qd, $J = 15.8, 1.7$ Hz, H-1), 6.39 (1H, dq, $J = 15.8, 6.7$ Hz, H-2), 2.03 (3H, dd, $J = 6.7, 1.7$ Hz, H-3).



(MS)

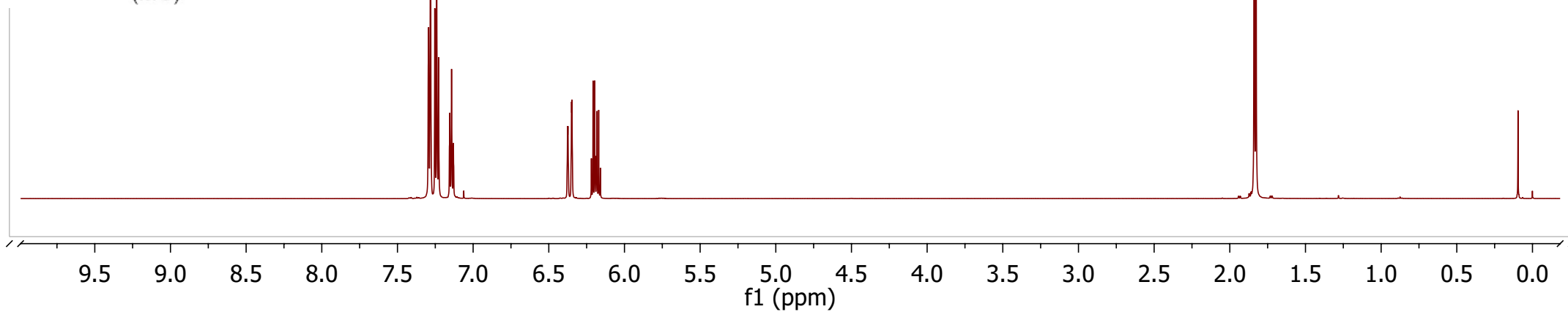


Plate 30b: Methylstyrene (**69**)

^{13}C NMR [151 MHz, CDCl_3]: δ 138.03 (C-1'), 131.18 (C-1), 128.56 (C-3',5'), 126.83 (C-4'), 125.93 (C-2',6'), 125.68 (C-2), 18.56 (C-3).

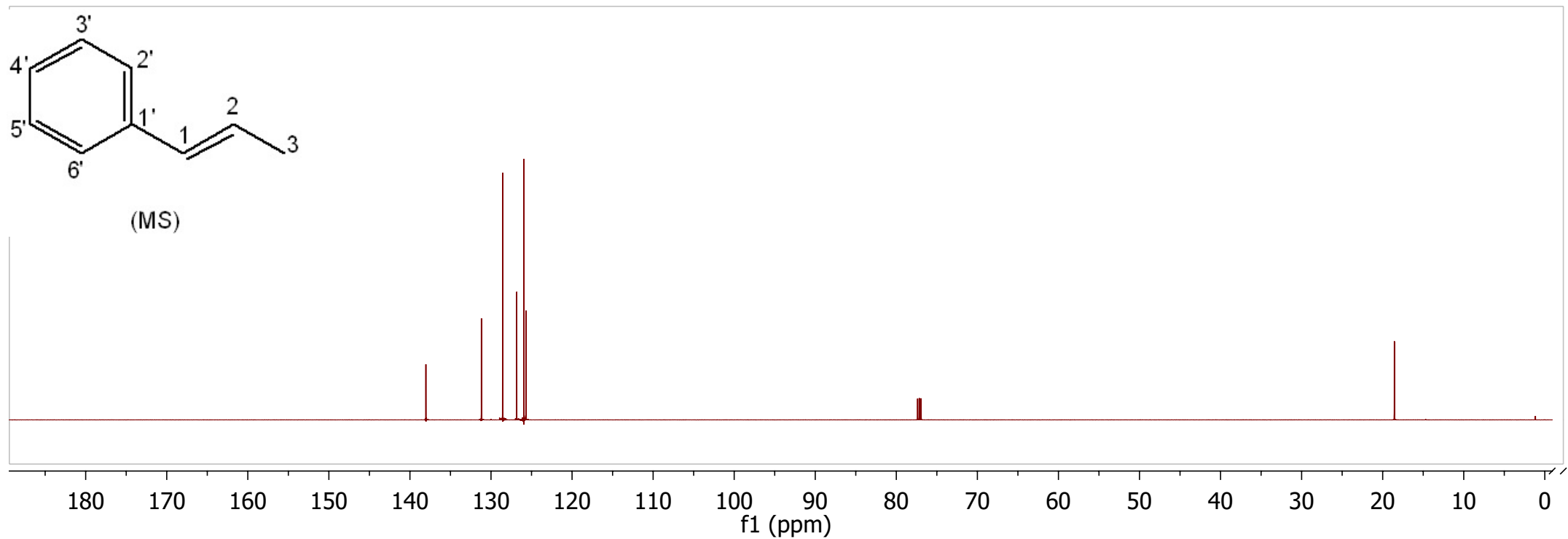
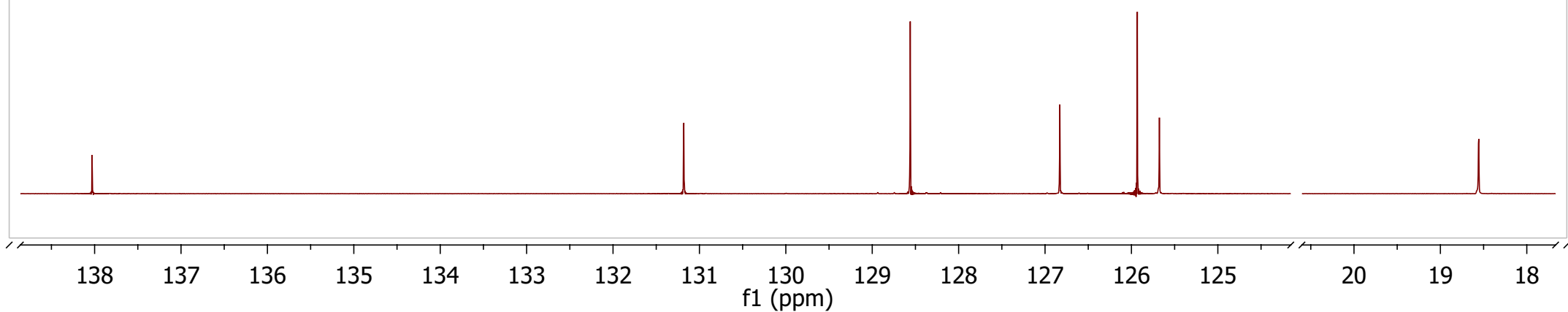


Plate 30c: Methylstyrene (69)

HSQC NMR

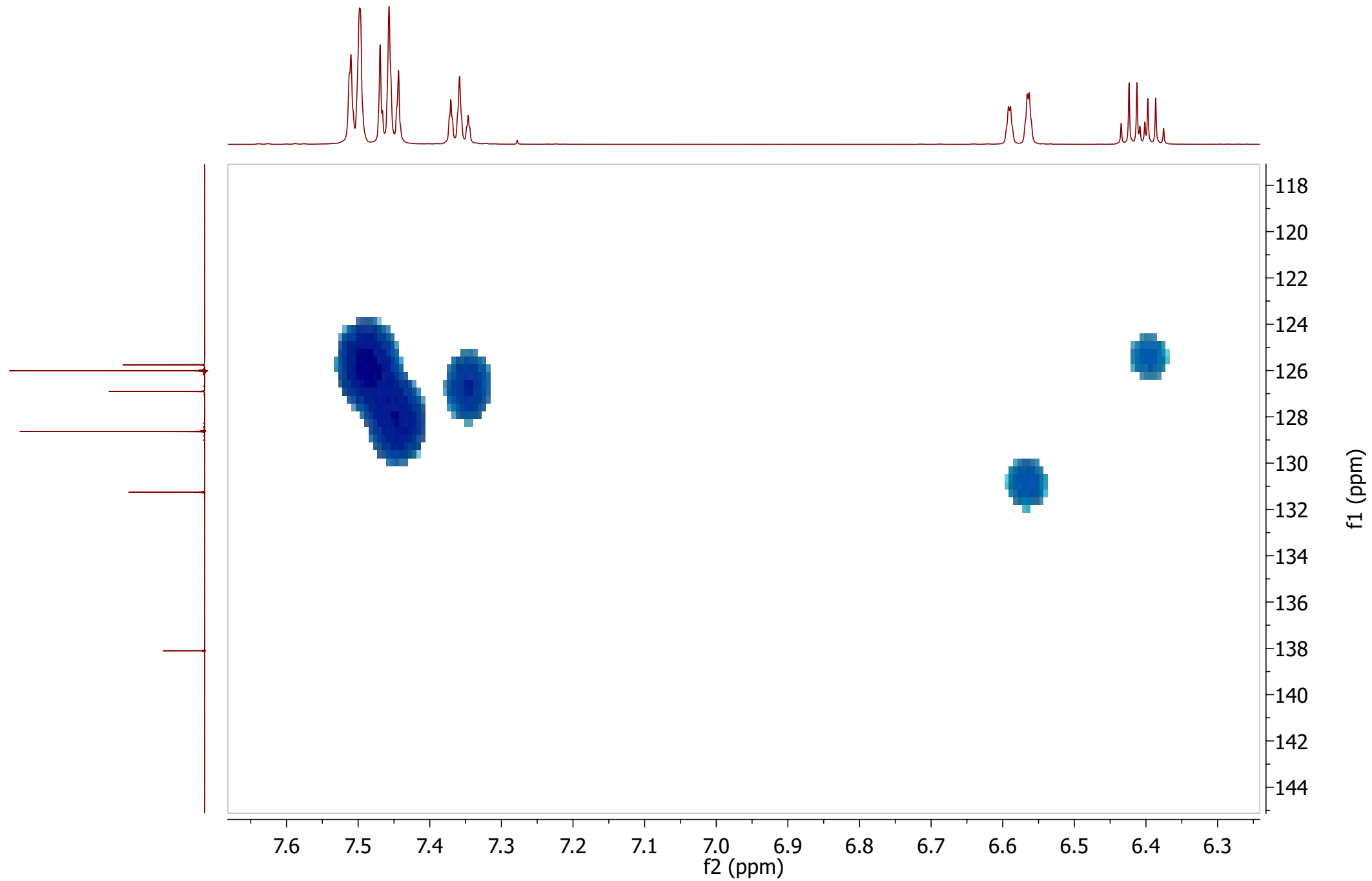


Plate 31a: Grubbs 2nd generation catalyst (**125**) + trans- β -methylstyrene (**69**)

¹H NMR [600 MHz, CDCl₃]: δ 19.12 (s, GII:H-1'), 18.52 (q, $J = 5.5$ Hz), 8.98 (s, GII:H-2(C)), 7.54 (d, $J = 8.1$ Hz), 7.41 (d, $J = 7.4$ Hz, MS:H-2',6'), 7.39 – 7.29 (m, MS:H-3',4',5'), 7.28 – 7.22 (m), 7.21 – 7.15 (m), 7.14 – 7.11 (m), 7.11 – 7.07 (m), 7.07 – 7.03 (m), 7.02 (s), 6.95 (s), 6.91 (s), 6.83 (s), 6.78 (s, GII:H-5(A)), 6.71 – 6.59 (m), 6.37 (dd, $J = 11.5, 6.0$ Hz), 6.31 (d, $J = 15.8$ Hz), 6.19 – 6.09 (m, $J = 15.7, 6.6$ Hz), 5.82 – 5.62 (m), 5.48 – 5.33 (m), 3.90 – 3.58 (m, GII:H-4,5), 2.79 – 2.43 (m), 2.38 (s), 2.24 (s), 2.15 (dd, $J = 19.5, 7.9$ Hz), 2.13 – 1.94 (m), 1.84 (s), 1.83 – 1.80 (m), 1.78 (dd, $J = 6.6, 1.5$ Hz), 1.70 – 1.63 (m), 1.70 – 1.14 (m), 1.13 – 0.69 (m).

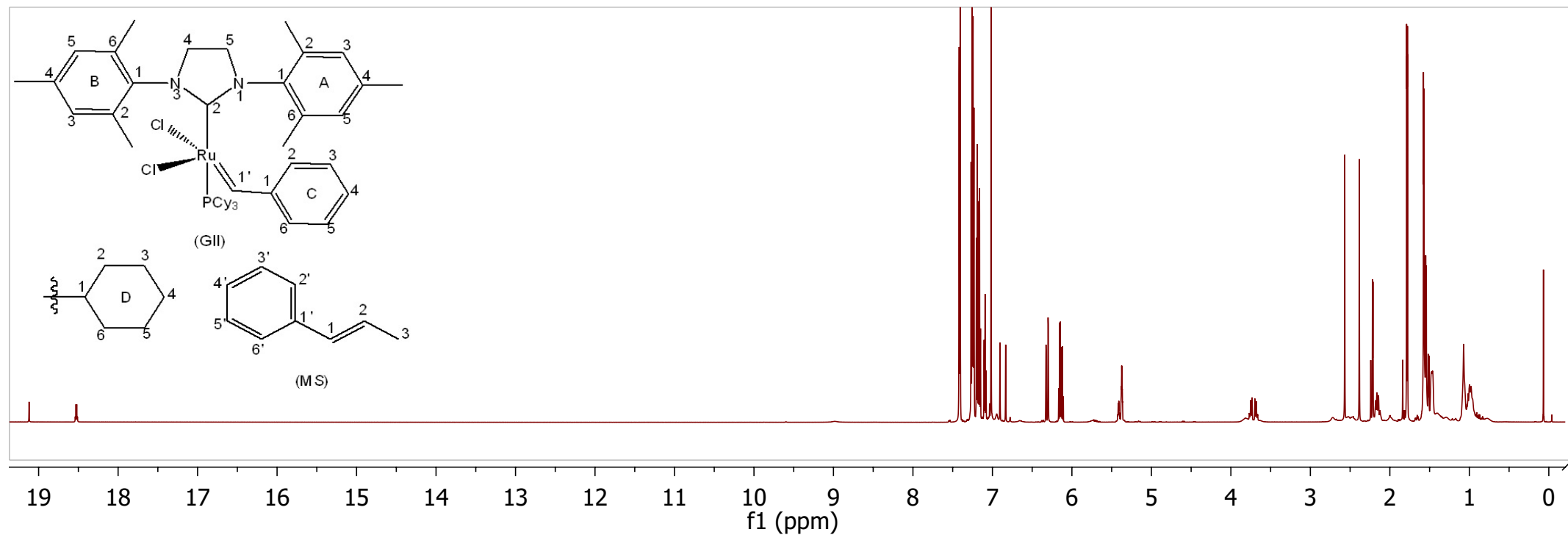
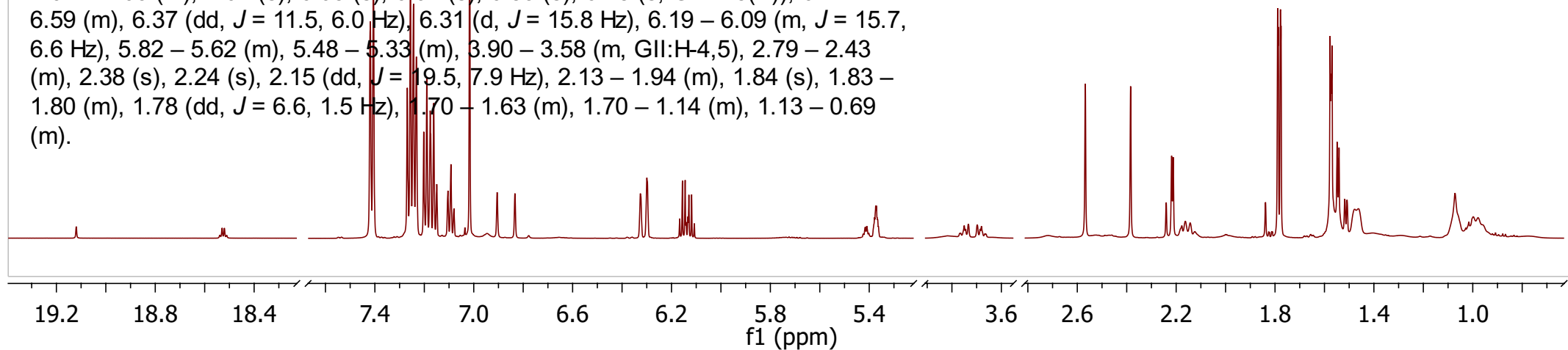


Plate 31b: Grubbs 2nd generation catalyst (**125**) + trans- β -methylstyrene (**69**)

Int. ¹³C NMR [151 MHz, CDCl₃]: δ 315.2, 294.3(GII:C-1'), 220.4 (d, J = 60.2 Hz, GII:C-2), 219.9(d, J = 57.4 Hz), 151.2(GII:C-1(C)), 140.1, 139.0, 138.9, 138.7, 138.4, 138.2, 138.1, 138.0, 137.9, 137.6, 137.53, 137.46, 137.4, 137.3, 137.1, 137.0, 136.9, 135.1, 134.8, 134.6, 133.6, 133.1, 132.4, 131.9, 131.2, 131.0, 129.8, 129.7, 129.4, 128.8, 128.6, 128.4, 128.2, 128.1, 127.8, 127.7, 127.6, 126.7, 126.5, 126.4, 126.3, 125.8, 125.5, 124.5, 51.9(d, J = 38.5 Hz, GII:C-4), 51.1(d, J = 8.2 Hz, GII:C-5), 46.2, 31.6, 31.5, 31.4, 31.3, 29.2, 28.9, 27.8, 27.7, 27.6, 26.3, 26.1, 21.1, 21.0, 20.9, 19.9, 19.7, 18.6, 18.4, 17.9, 14.6, 12.4.

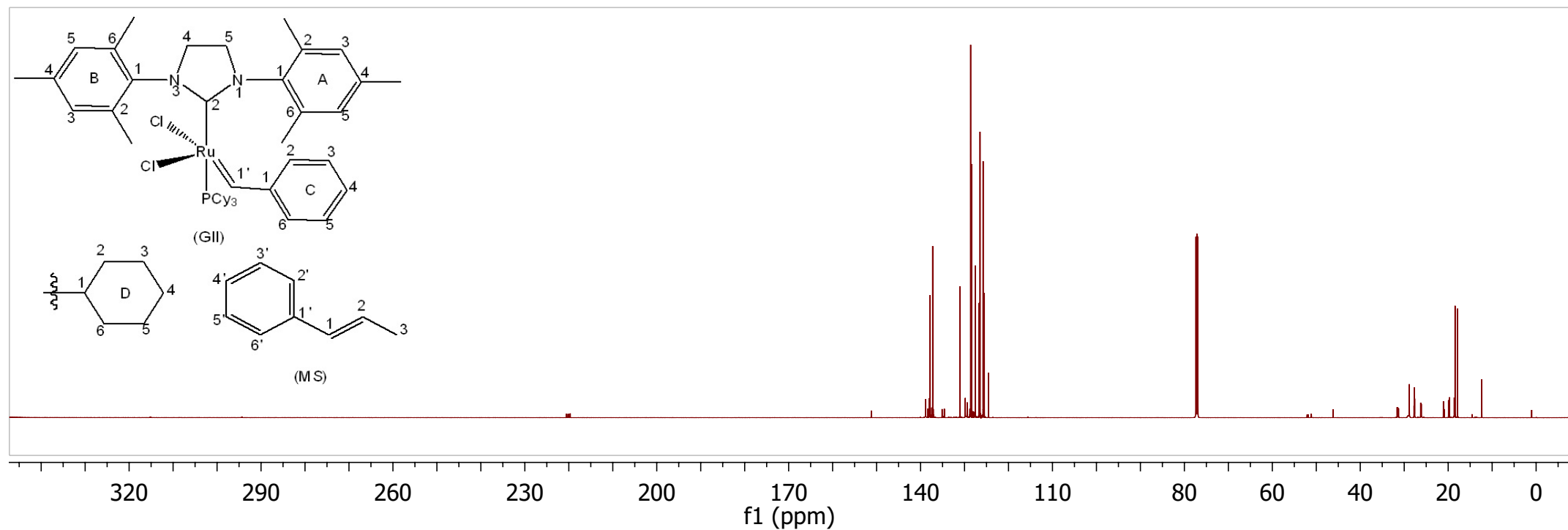
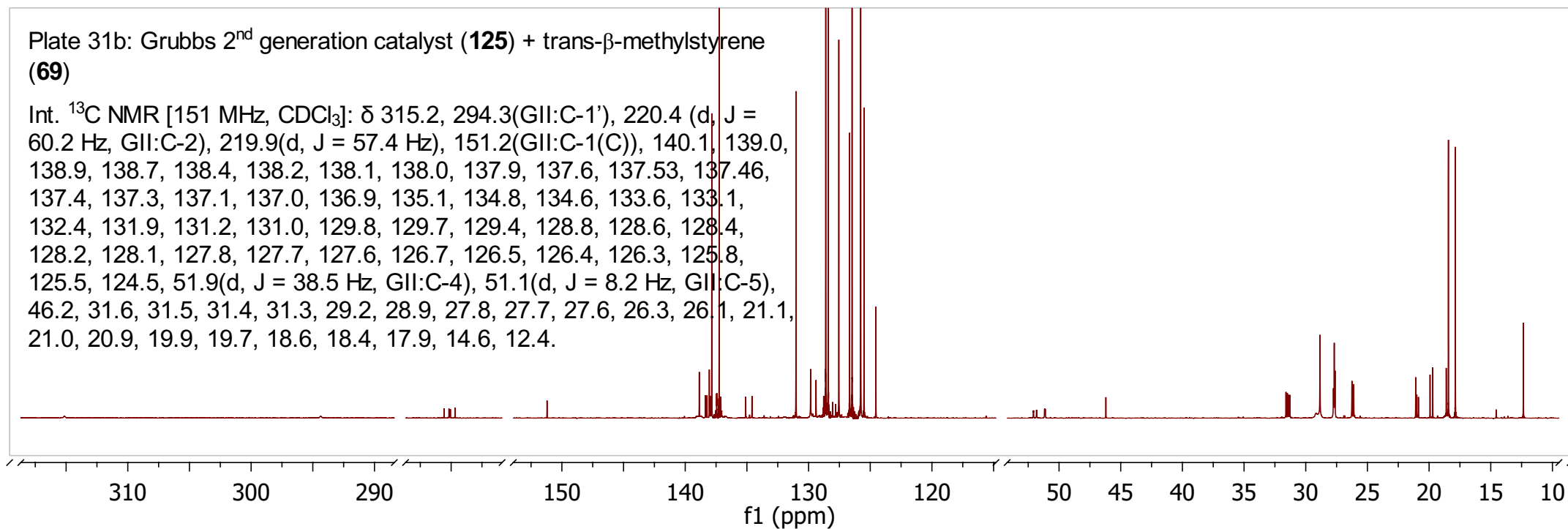


Plate 31c: Grubbs 2nd generation catalyst (**125**) +
trans- β -methylstyrene (**69**)

HSQC NMR

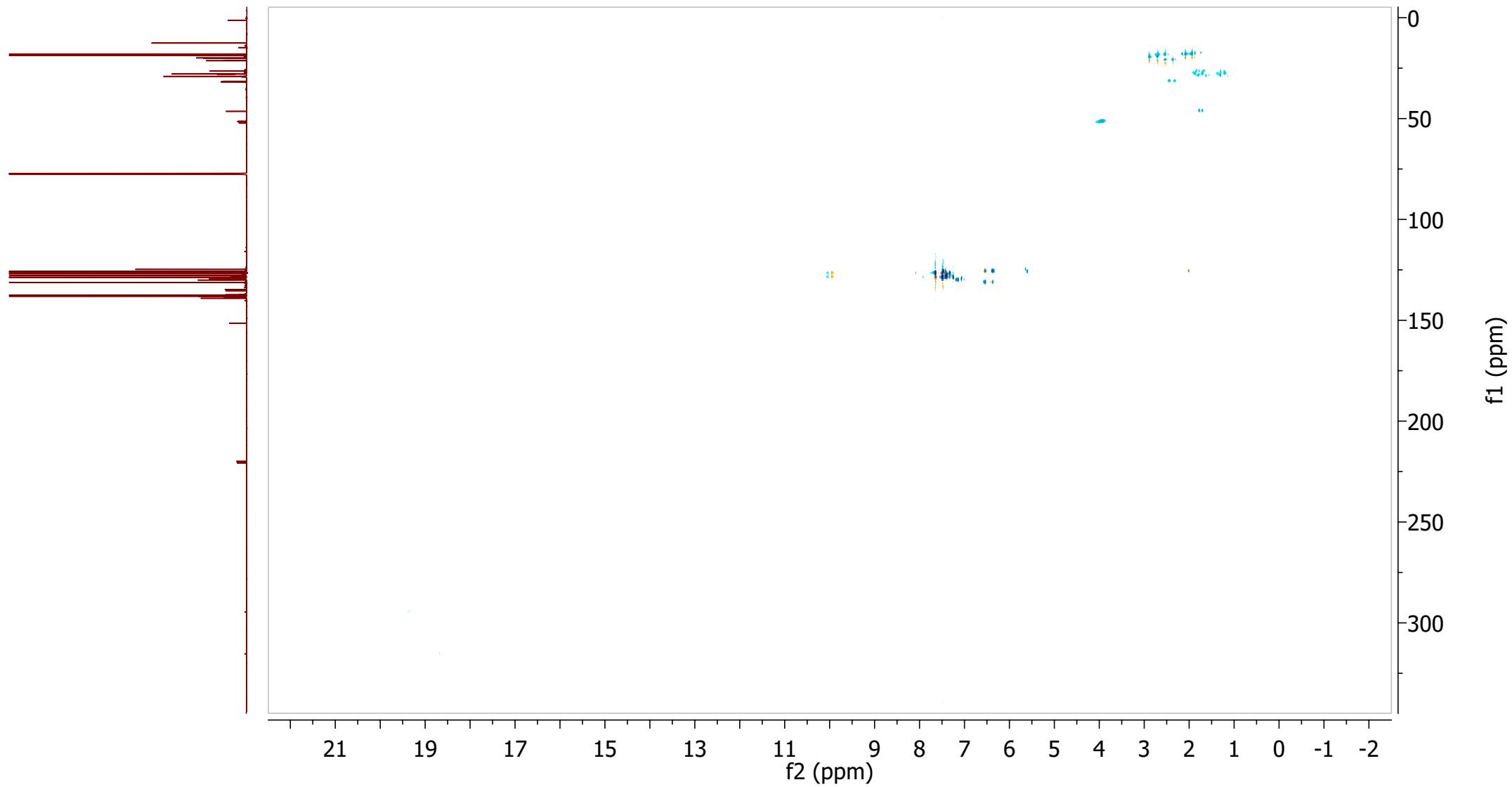


Plate 31g: Grubbs 2nd generation catalyst (**125**) + trans- β -methylstyrene (**69**)

³¹P NMR [243 MHz, CDCl₃]: δ 49.9, 28.9 (GII), 27.4.

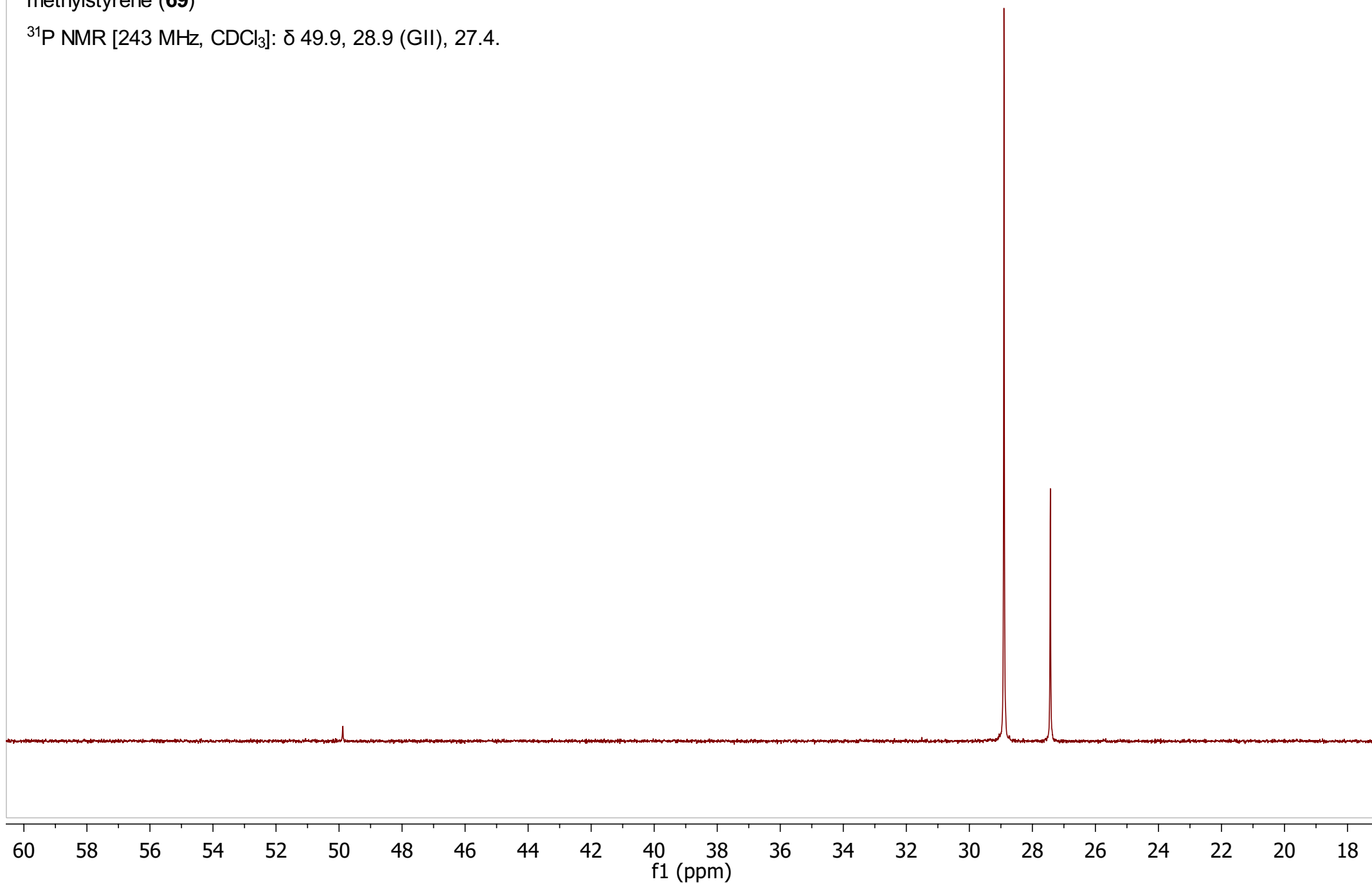


Plate 32a: Grubbs 2nd generation catalyst (**125**) + trans- β -methylstyrene (**69**) + *p*-cresol (**266**)

¹H NMR [600 MHz, CDCl₃]: δ 19.29 (s, GII: H-1'), 18.76 (q, $J = 5.5$ Hz), 9.18 (s), 7.66 (d, $J = 7.4$ Hz), 7.54 – 7.38 (m), 7.34 (t, $J = 7.3$ Hz, MS: H-4'), 7.32 – 7.24 (m), 7.16 (t, $J = 7.6$ Hz), 7.06 (s), 6.96 (d, $J = 8.4$ Hz), 6.91 – 6.59 (m), 6.55 (m, MS: H-1), 6.39 (dq, $J = 15.7, 6.6$ Hz, MS: H-2), 6.21 (s), 6.04 – 5.88 (m), 5.70 – 5.56 (m), 5.56 – 5.02 (m), 4.84 (dd, $J = 10.9, 6.0$ Hz), 4.17 – 3.78 (m, GII: H-4,5), 2.95 (s), 2.92 – 2.86 (m), 2.79 (s), 2.75 (s), 2.68 (s), 2.60 (s), 2.55 – 2.33 (m), 2.33 – 2.16 (m), 2.11 – 1.98 (m), 1.86 – 1.46 (m), 1.38 – 0.92 (m).

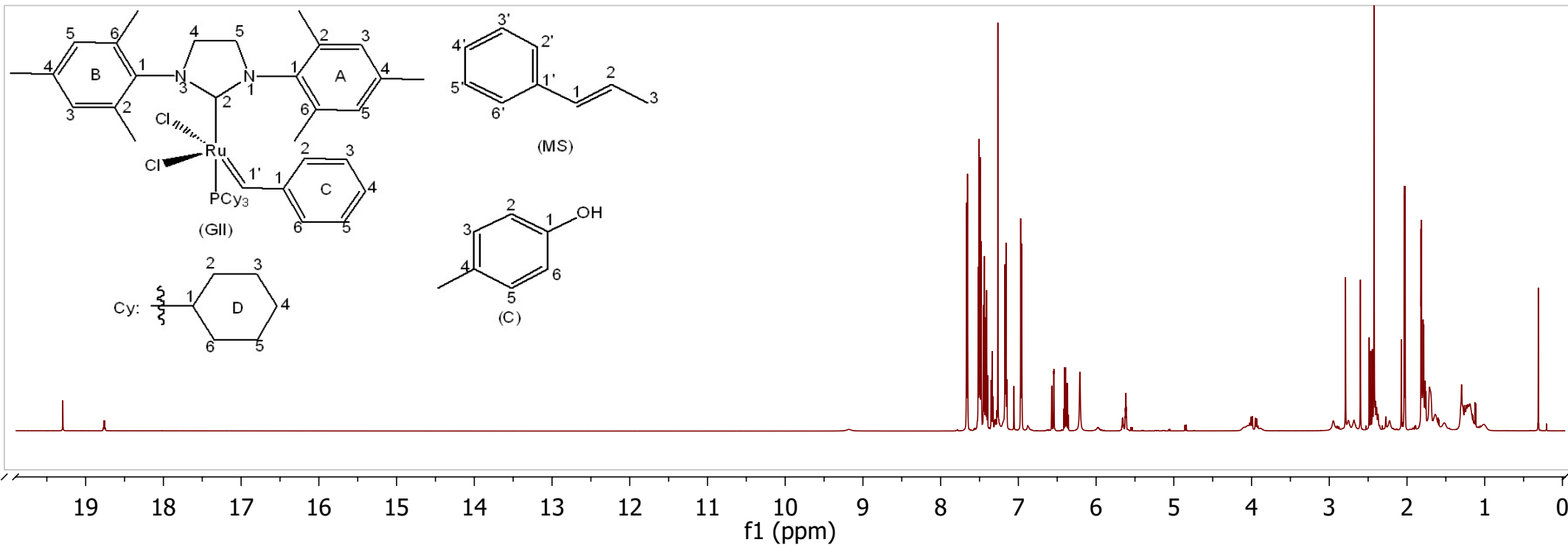
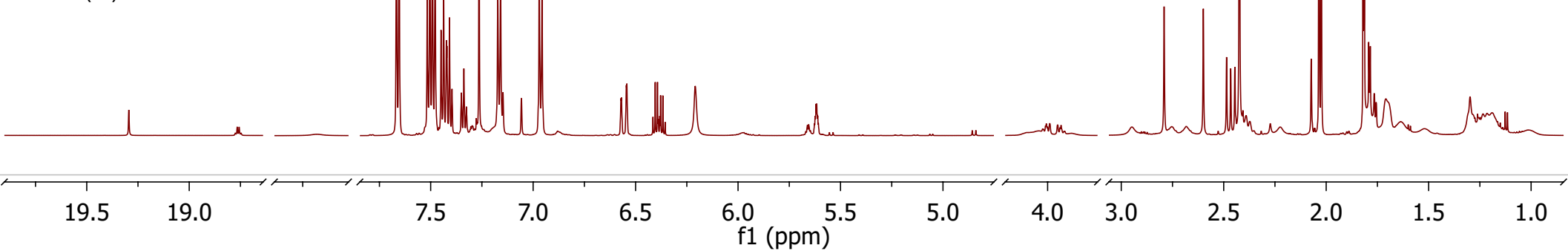


Plate 32b: Grubbs 2nd generation catalyst (**125**) + trans- β -methylstyrene (**69**) + *p*-cresol (**266**)

¹³C NMR [151 MHz, CDCl₃]: δ 315.4, 294.4 (GII: C-1'), 220.0(d, $J = 77.1$ Hz, GII: C-2), 219.3(d, $J = 74.1$ Hz), 153.6, 151.1(GII: C-1(C)), 139.0 (d, $J = 66.9$ Hz), 138.6, 138.5, 138.4, 138.1, 138.0, 137.9, 137.6, 137.31, 137.28, 137.1, 136.6, 135.0, 134.8, 134.4, 133.7, 133.5, 133.2, 132.5, 131.8, 131.0, 129.91, 129.85, 129.50, 129.4, 129.2, 128.9, 128.8, 128.7, 128.6, 128.5, 128.4, 128.3, 128.1, 127.8, 127.7, 127.59, 127.55, 127.1, 126.7, 126.5, 126.4, 126.3, 126.2, 126.0, 125.9, 125.84, 125.80, 125.76, 125.6, 124.6, 123.6, 115.3, 65.1, 63.6, 61.4, 52.2, 51.9, 51.3, 51.2, 50.7, 46.3, 31.7, 31.6, 31.5, 31.4, 29.3, 28.9, 27.7, 27.64, 27.56, 26.6, 26.1, 25.6, 21.1, 21.0, 20.9, 20.5(C: Me), 19.9, 19.7, 18.54(MS: C-3), 18.46, 17.9, 14.6, 13.9, 13.6, 12.4, 11.2.

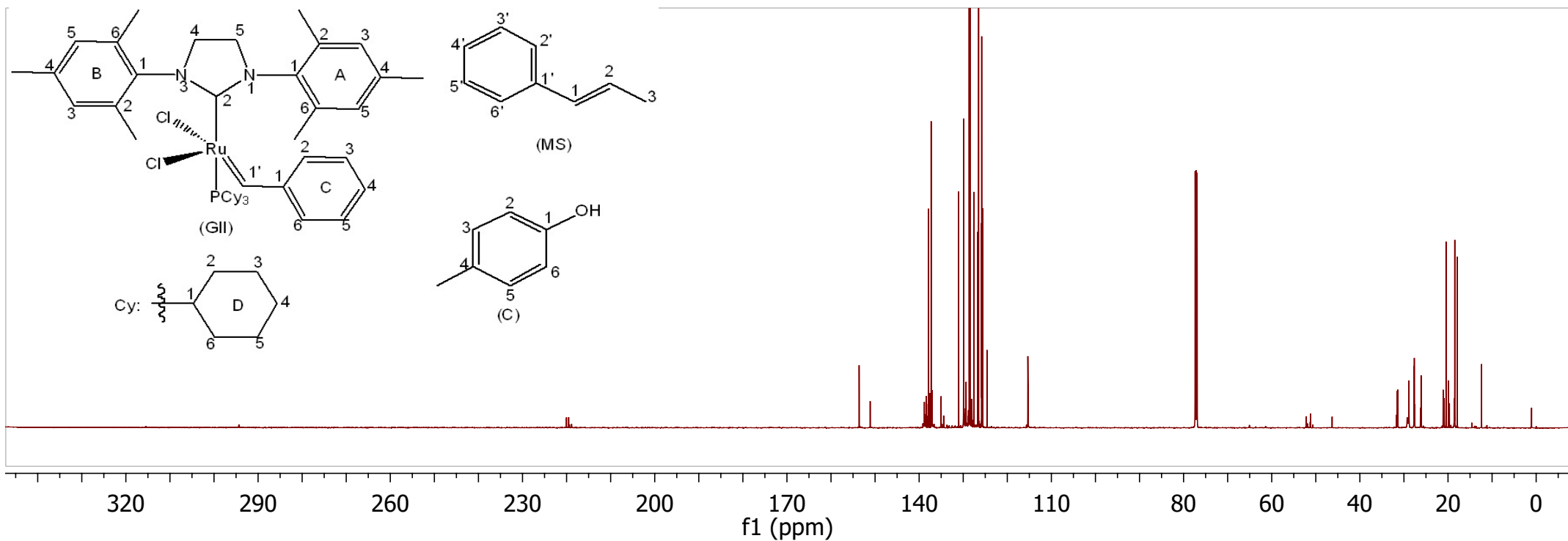
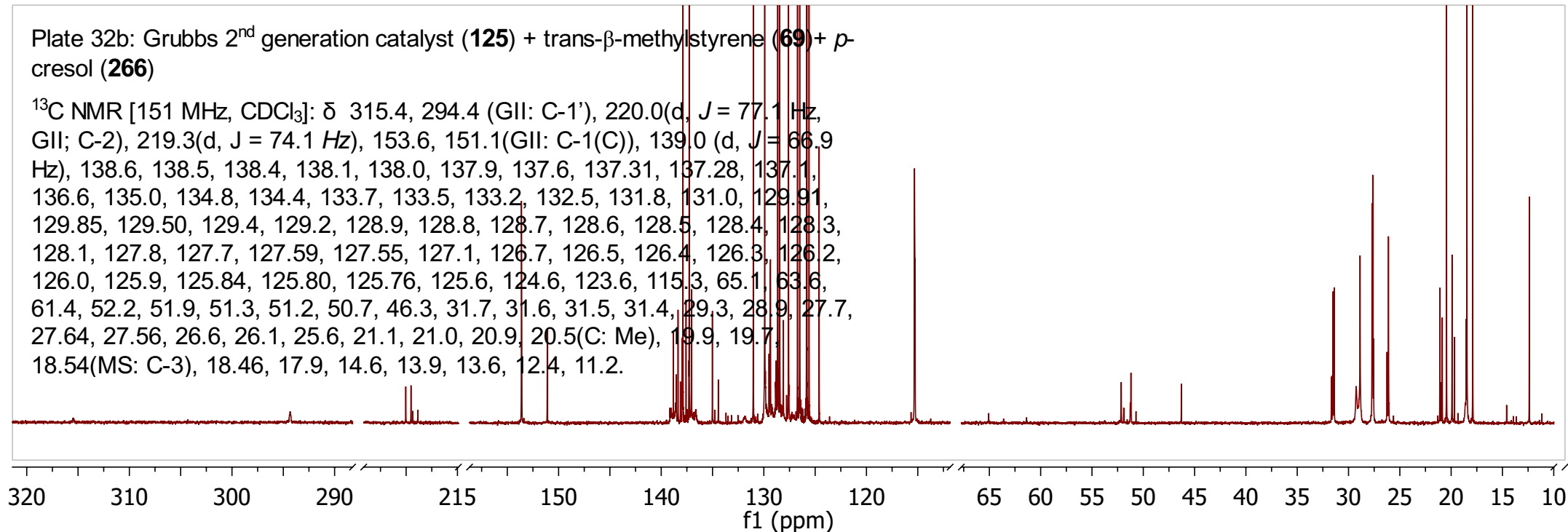


Plate 32c: Grubbs 2nd generation catalyst (**125**) +
trans- β -methylstyrene (**69**) + *p*-cresol (**266**)

HSQC NMR

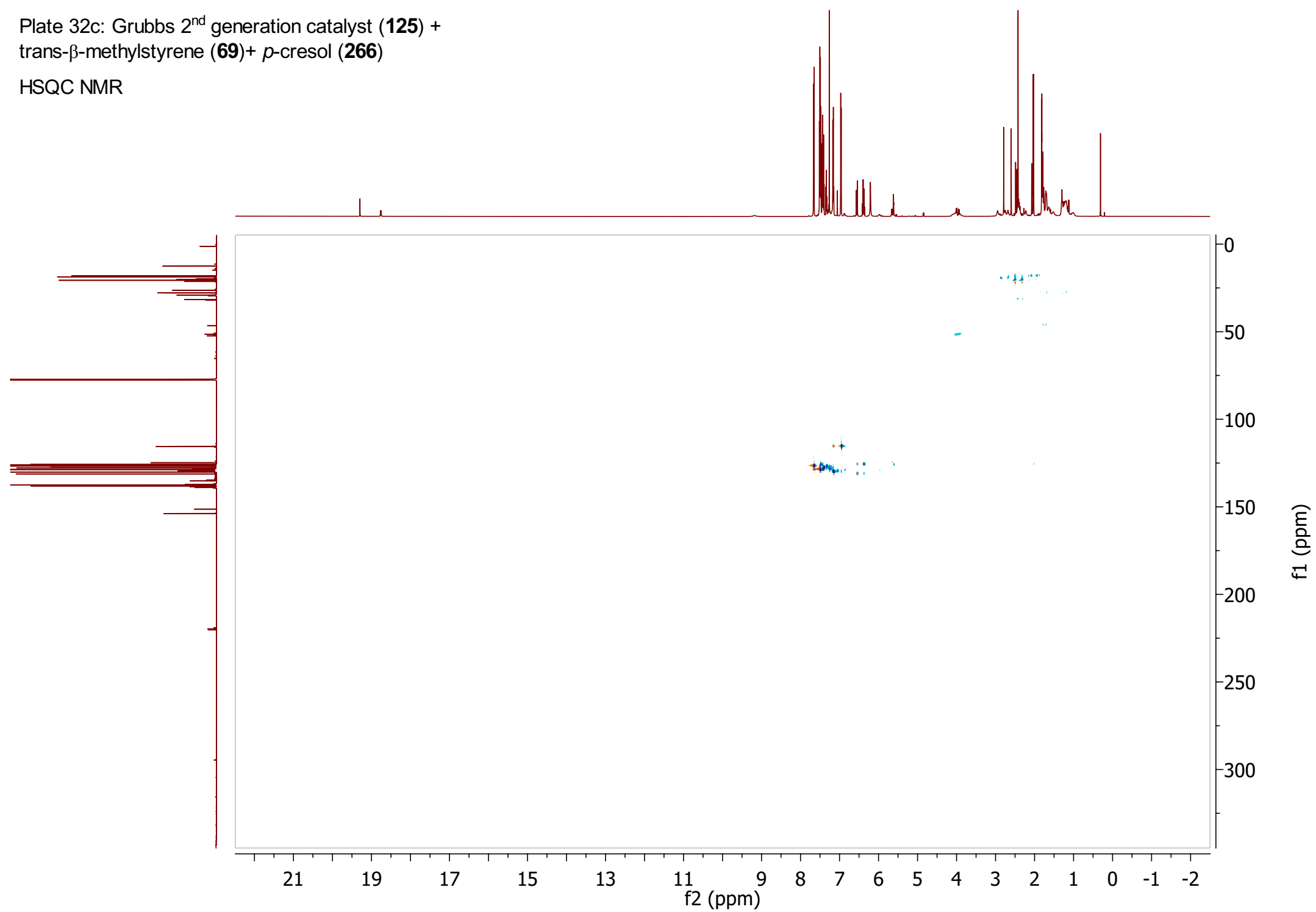


Plate 32g: Grubbs 2nd generation catalyst (**125**) + trans- β -methylstyrene (**69**) + *p*-cresol (**266**)

³¹P NMR [243 MHz, CDCl₃]: δ 28.9(GII), 27.3.

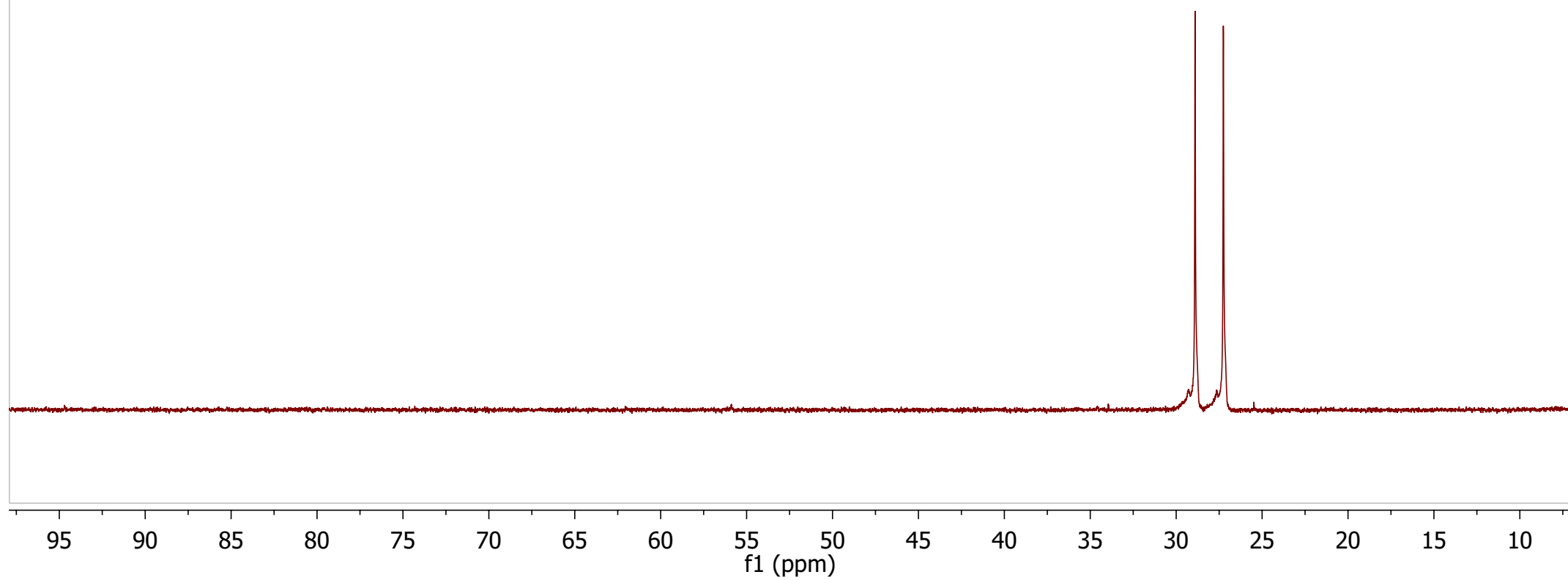


Plate 33b: Grubbs 2nd generation catalyst (**125**) + methyl acrylate (**59**) + trans- β -methylstyrene (**69**)

¹³C NMR [151 MHz, CDCl₃]: δ 167.3, 166.9, 166.6, 165.3, 145.2, 144.8, 144.7, 137.2, 134.3, 133.3, 131.0, 130.7, 130.3, 130.1, 129.8, 128.8, 128.62, 128.59, 128.5, 128.4, 128.1, 128.0, 127.8, 127.7, 127.6, 126.7, 126.5, 126.1, 125.7, 125.6, 122.3, 120.2, 117.7, 113.7, 53.5, 52.3, 51.62, 51.56, 51.3, 50.9, 35.5, 35.1, 31.4, 31.3, 28.8, 27.72, 27.66, 26.9, 26.8, 26.3, 26.1, 25.5, 21.1, 20.9, 19.9, 19.7, 18.6, 18.4, 17.9, 15.3.

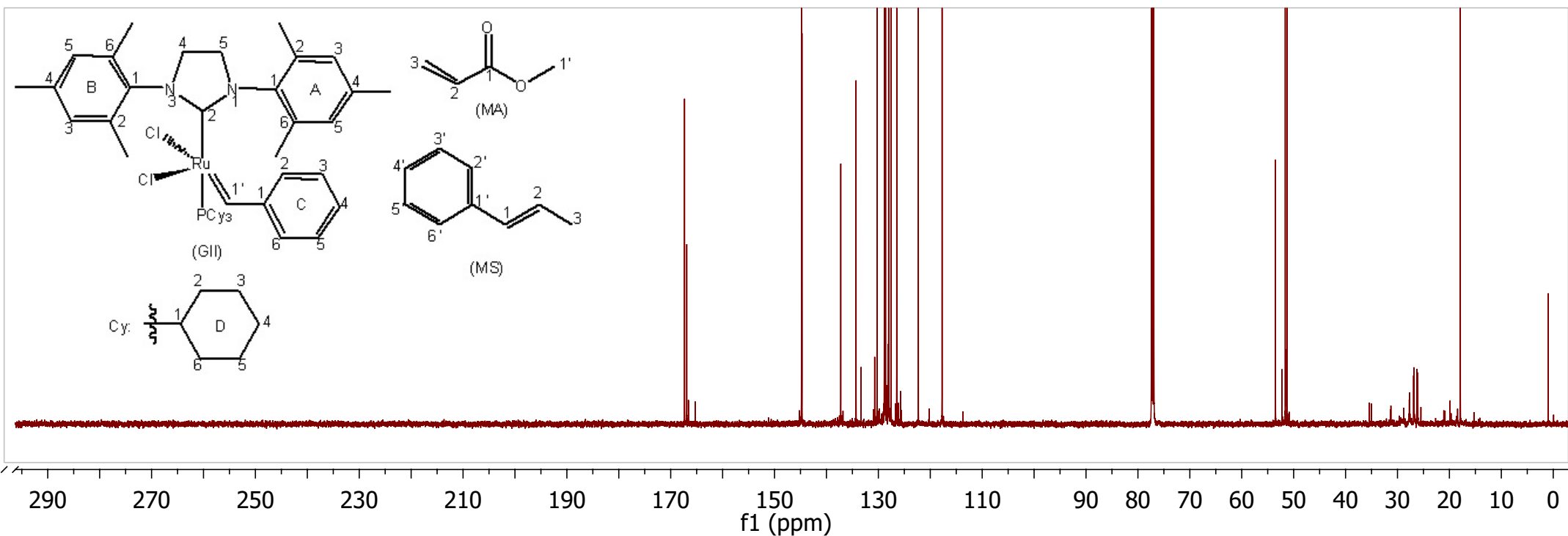
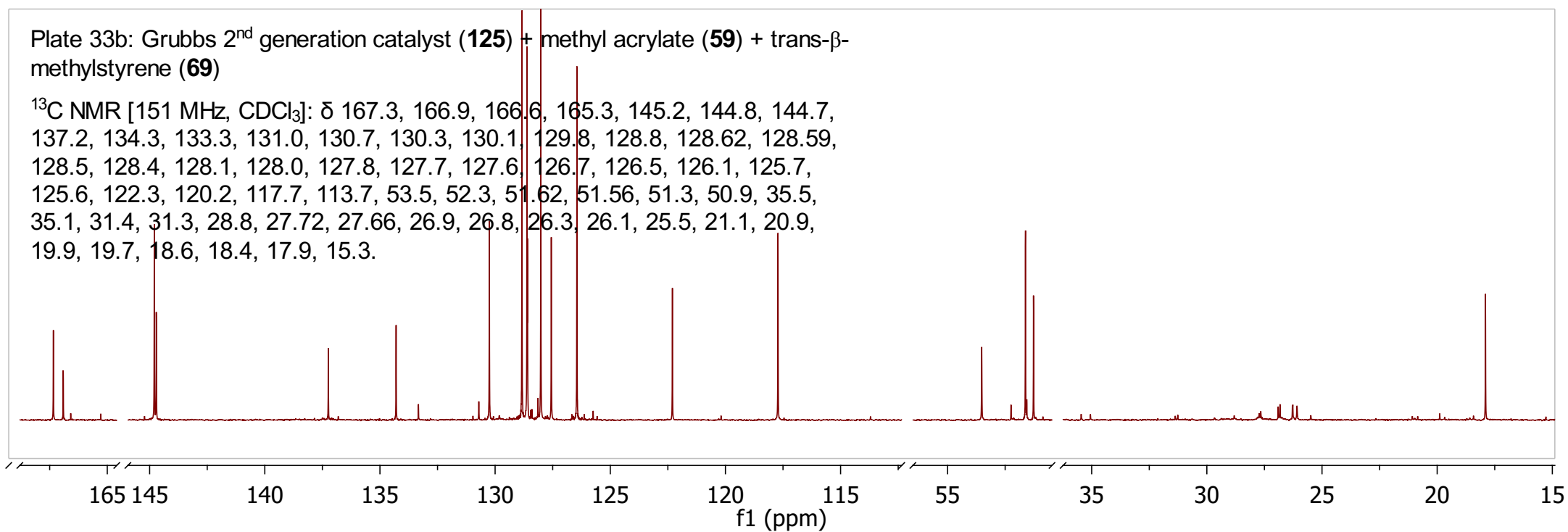


Plate 33c: Grubbs 2nd generation catalyst (**125**)
+ methyl acrylate (**59**) + trans- β -methylstyrene
(**69**)

HSQC NMR

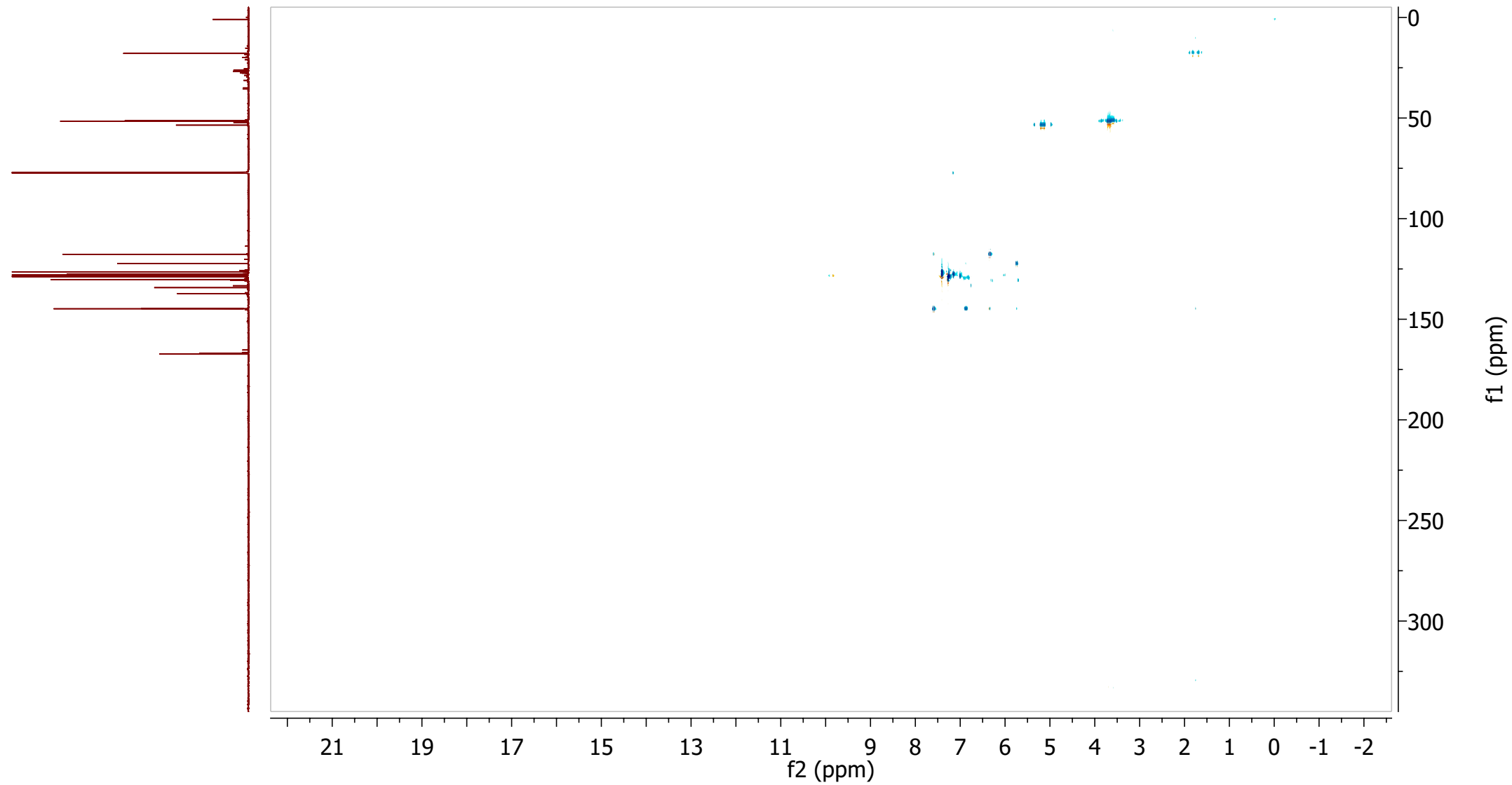


Plate 33d: Grubbs 2nd generation catalyst
(**125**) + methyl acrylate (**59**) + trans- β -
methylstyrene (**69**)

HMBC NMR

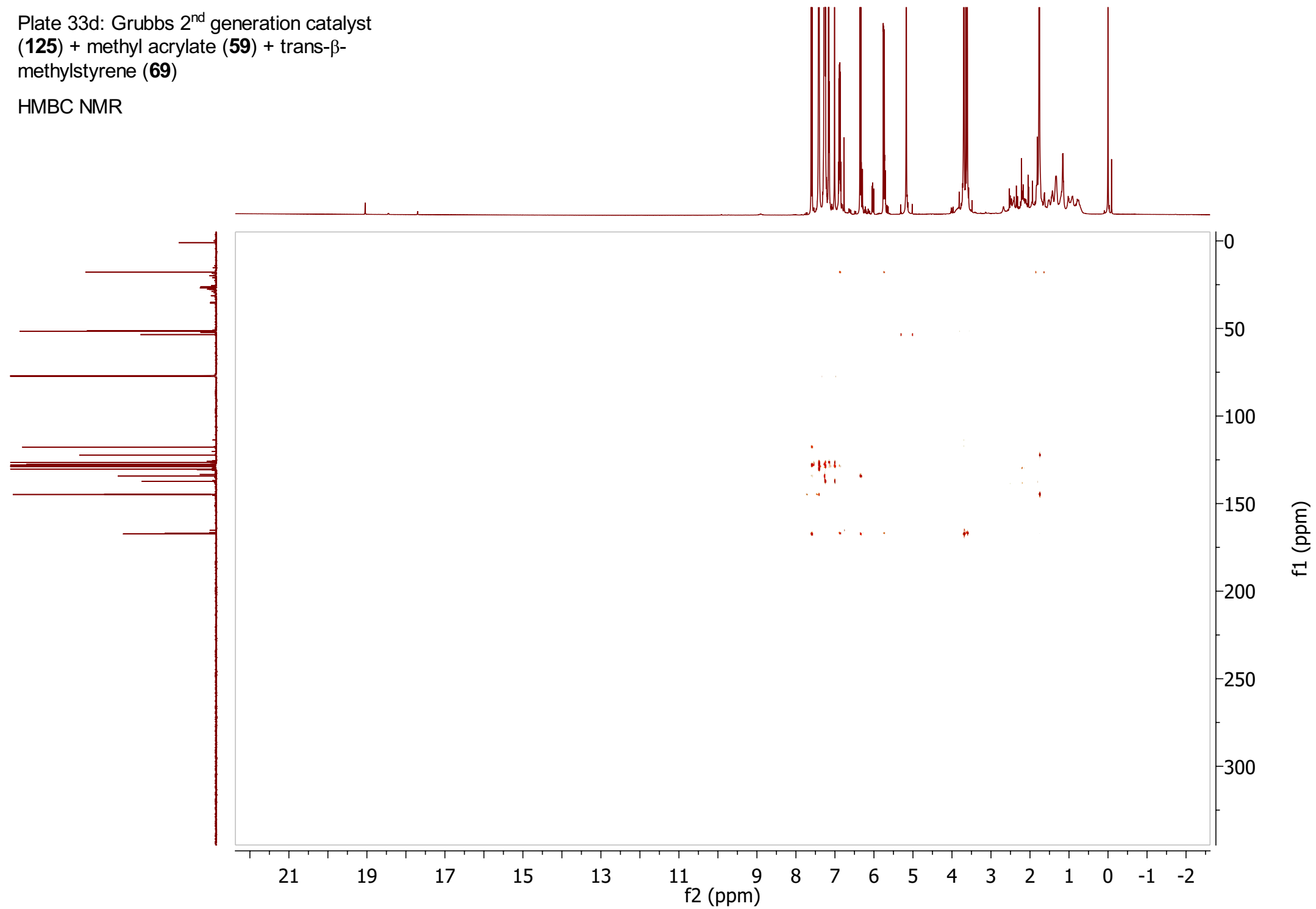


Plate 33g: Grubbs 2nd generation catalyst (**125**) +
methyl acrylate (**59**) + trans- β -methylstyrene (**69**)

³¹P NMR [243 MHz, CDCl₃]: δ 50.04, 32.54, 31.48,
28.90(GII), 27.38.

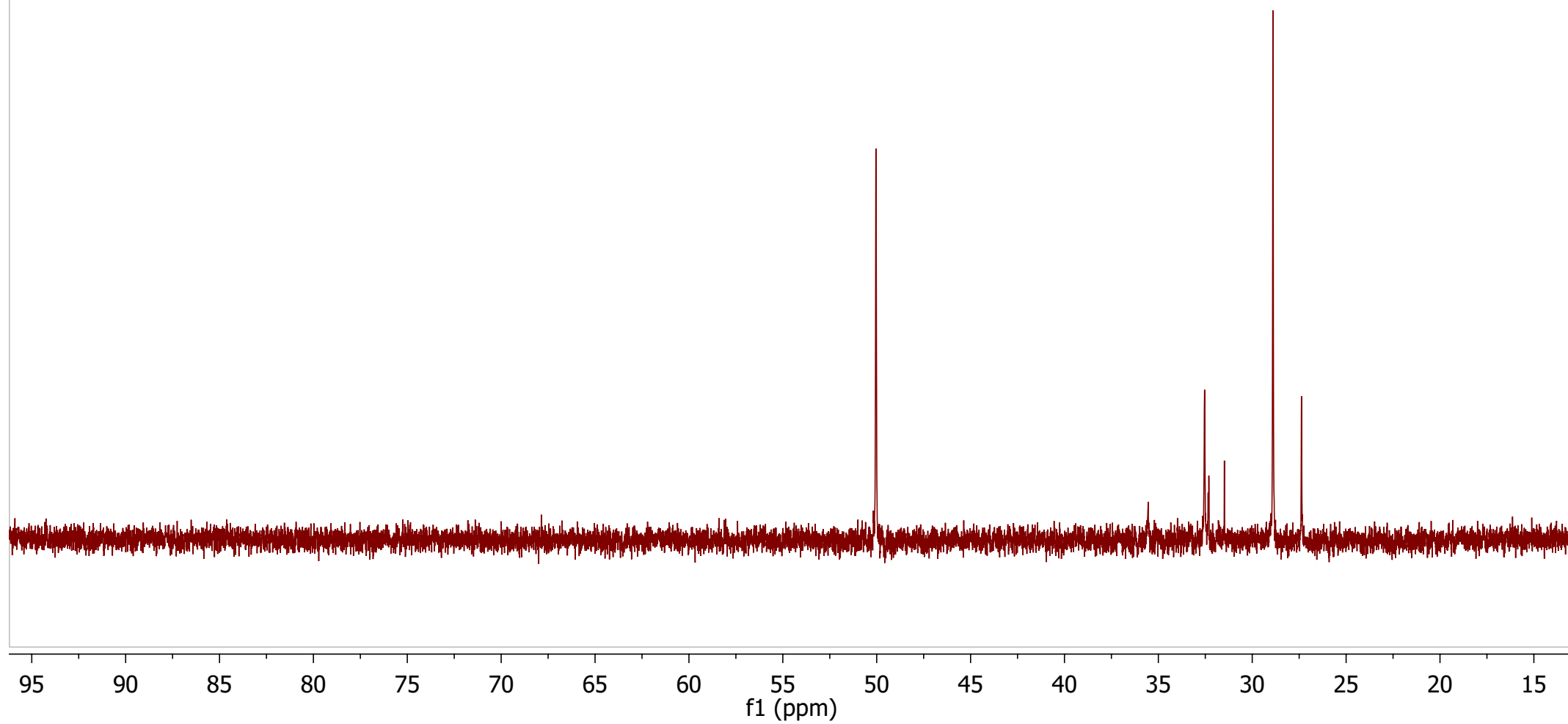


Plate 33j: Grubbs 2nd generation catalyst (**125**) + methyl acrylate (**59**) + trans- β -methylstyrene (**69**)

^1H - ^{31}P HMBC NMR

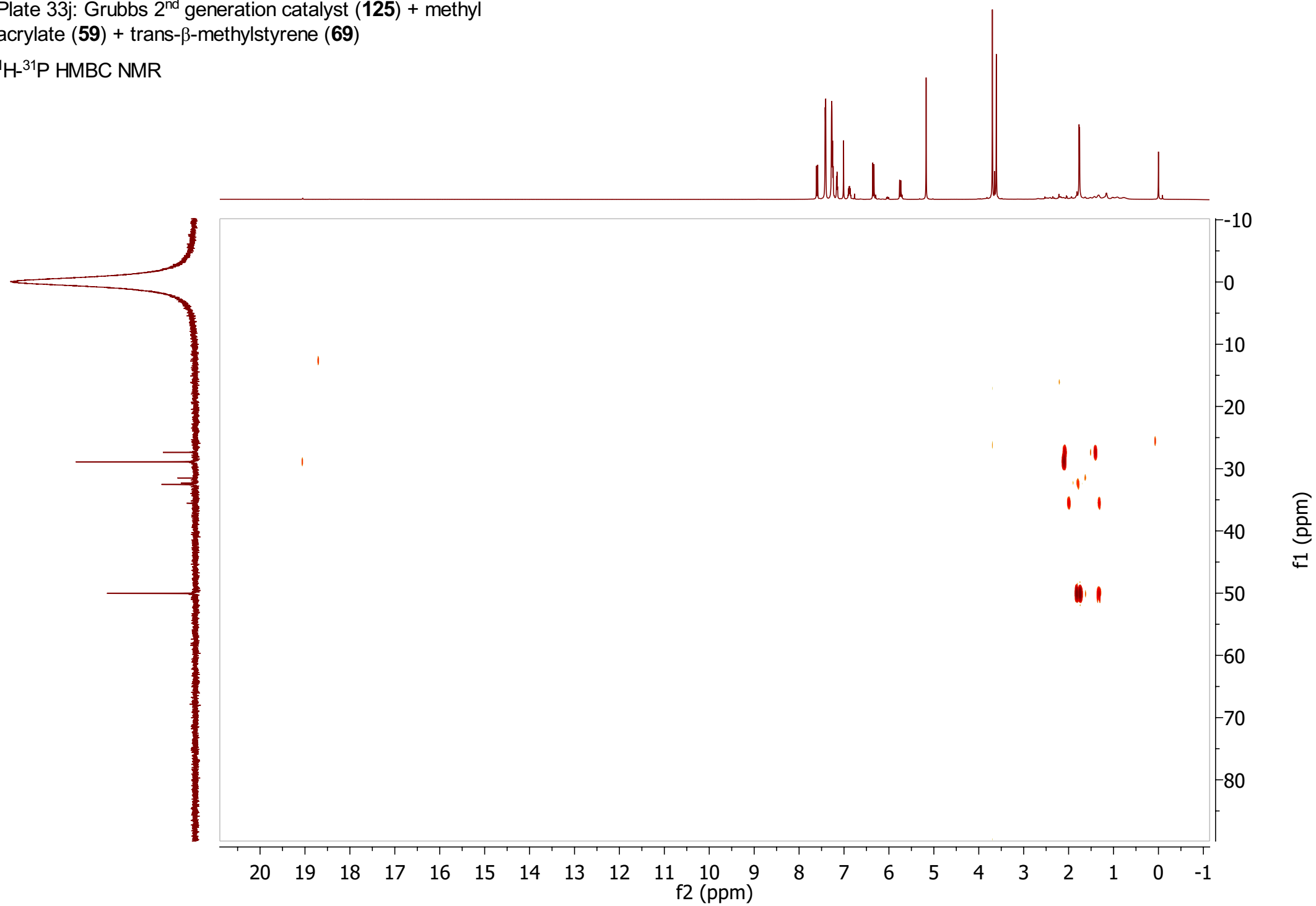


Plate 34a: Tricyclohexylphosphine (**289**) + methyl acrylate (**59**) + LiCl

$^1\text{H NMR}$ [600 MHz, CDCl_3]: δ 6.00 (s), 5.42 (s), 5.16 (s), 4.30 (s), 3.57 (s), 3.48 (s), 2.39 (dd, $J = 58.4, 6.9$ Hz), 2.19 – 0.96 (m).

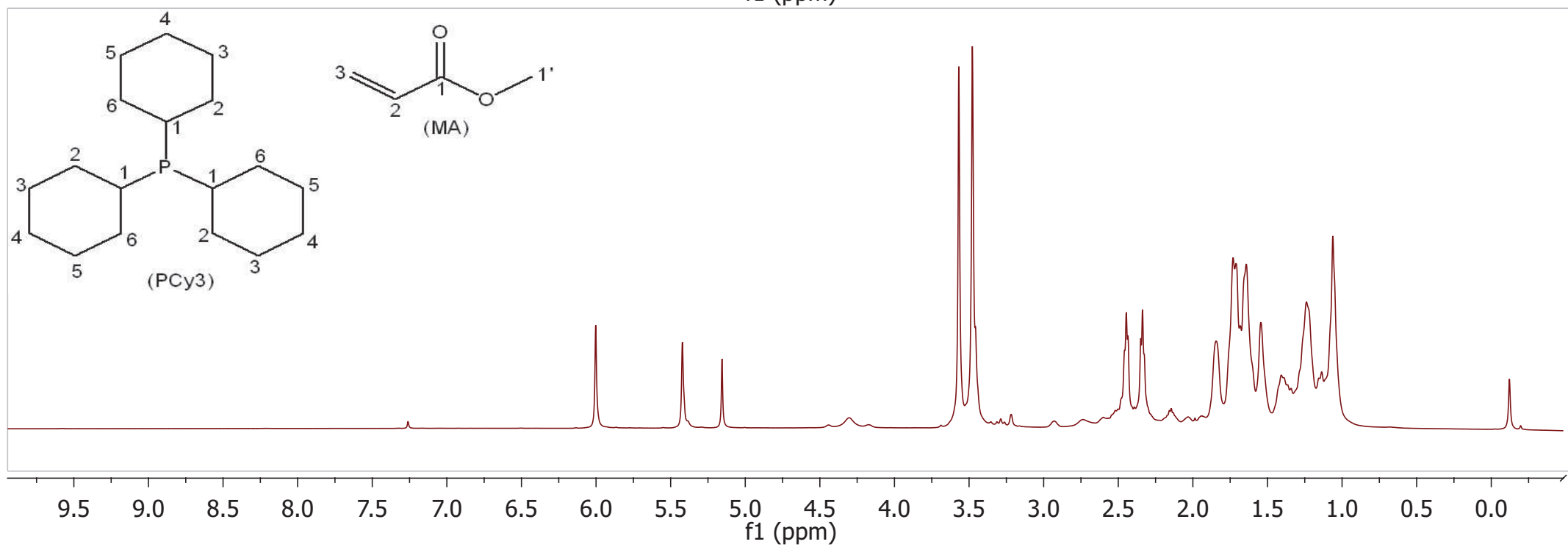
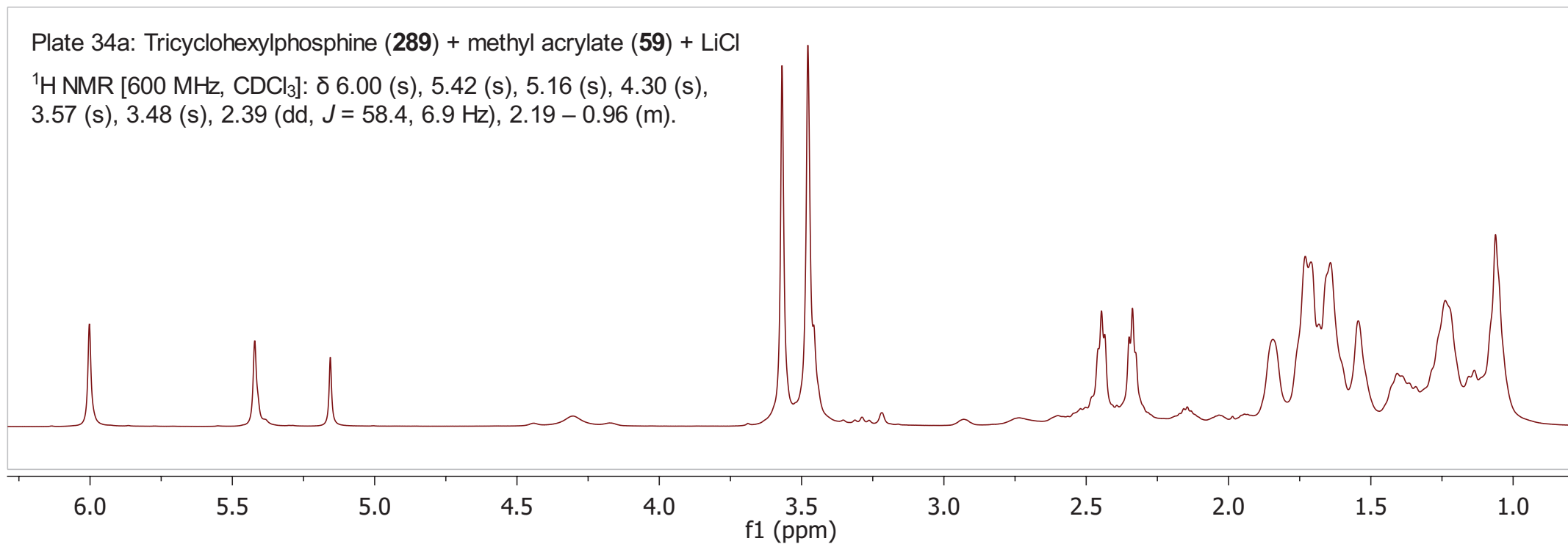


Plate 34g: Tricyclohexylphosphine (**289**) + methyl acrylate (**59**) + LiCl

^{31}P NMR [243 MHz, CDCl_3]: δ 57.8, 51.2, 33.4, 32.6, 32.5, 32.3, 31.9, 31.3.

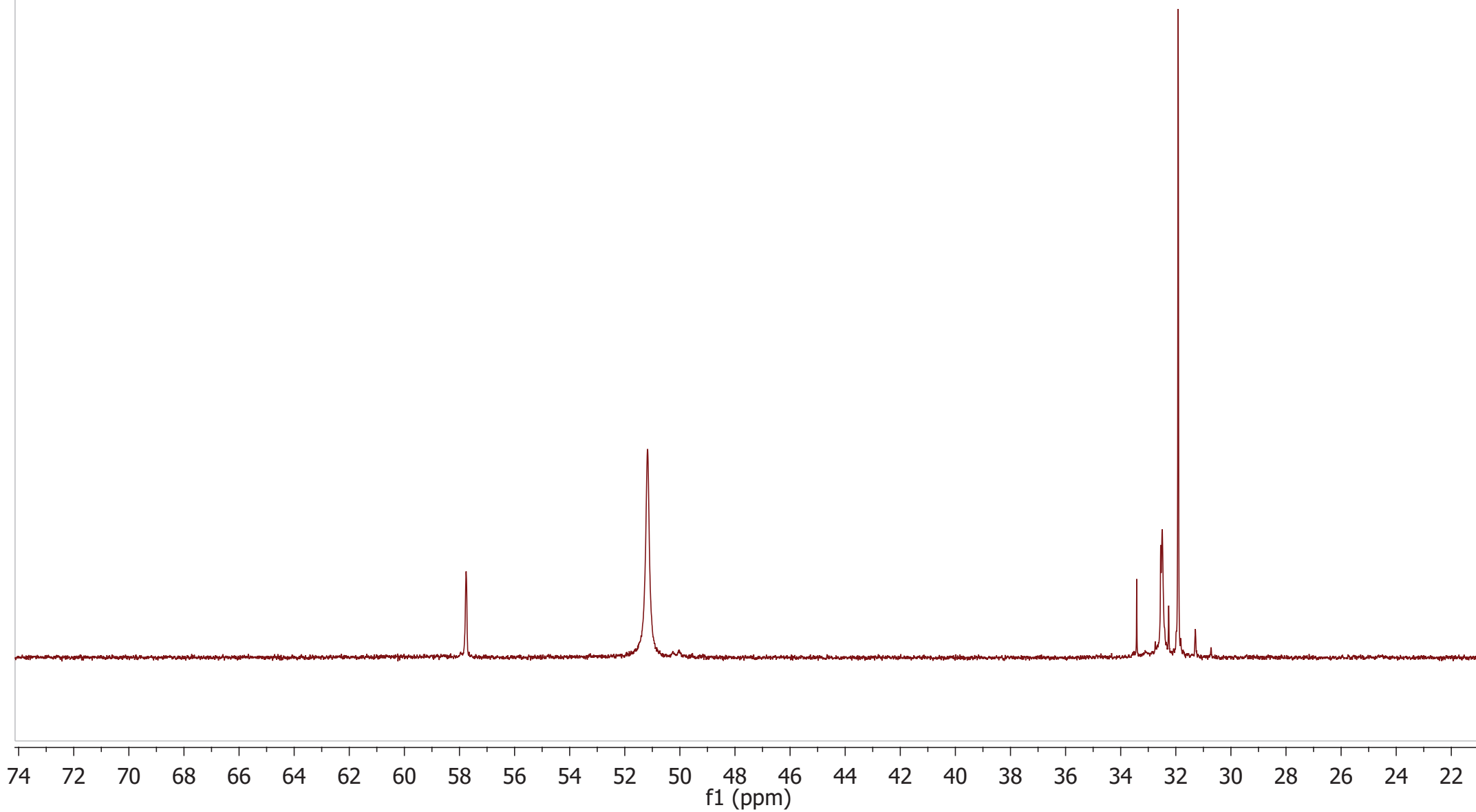


Plate 35a: Tricyclohexylphosphine (**289**) + methyl acrylate (**59**) + LiCl + p-cresol (**266**)

$^1\text{H NMR}$ [600 MHz, CDCl_3]: δ 8.03(s), 7.11 – 7.01 (m), 6.93 and 6.87 (d, $J = 8.5$ Hz, C: H-Ar), 6.84 – 6.78 (m), 6.43 (dt, $J = 18.2, 9.1$ Hz), 6.20 – 6.09 (m), 5.86 (dd, $J = 10.5, 1.3$ Hz), 5.63 (d, $J = 1.2$ Hz), 5.27 (s), 4.23 (t, $J = 6.4$ Hz), 3.77 (t, $J = 2.7$ Hz), 3.74 (s), 3.71 – 3.68 (m), 3.67 – 3.62 (m), 3.42 (s), 2.83 – 2.63 (m), 2.59 – 2.28 (m), 2.23 (s, C:H-Me), 2.04 – 1.88 (m), 1.86 – 1.77 (m), 1.73 – 1.42 (m), 1.40 – 0.97

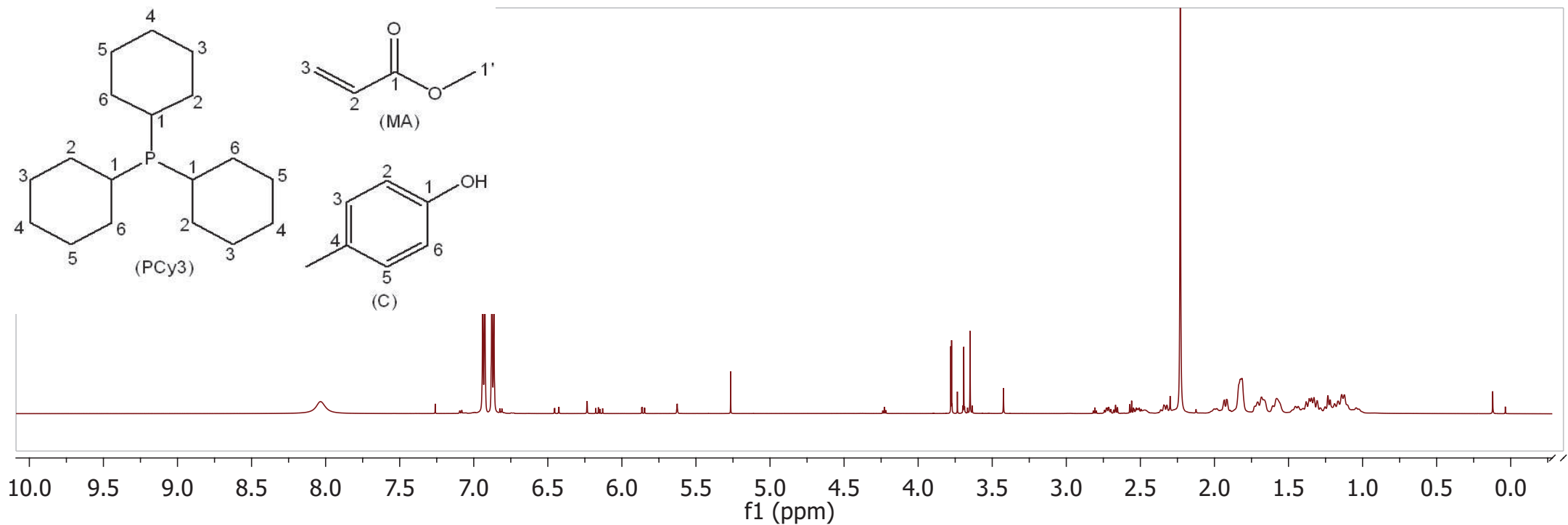
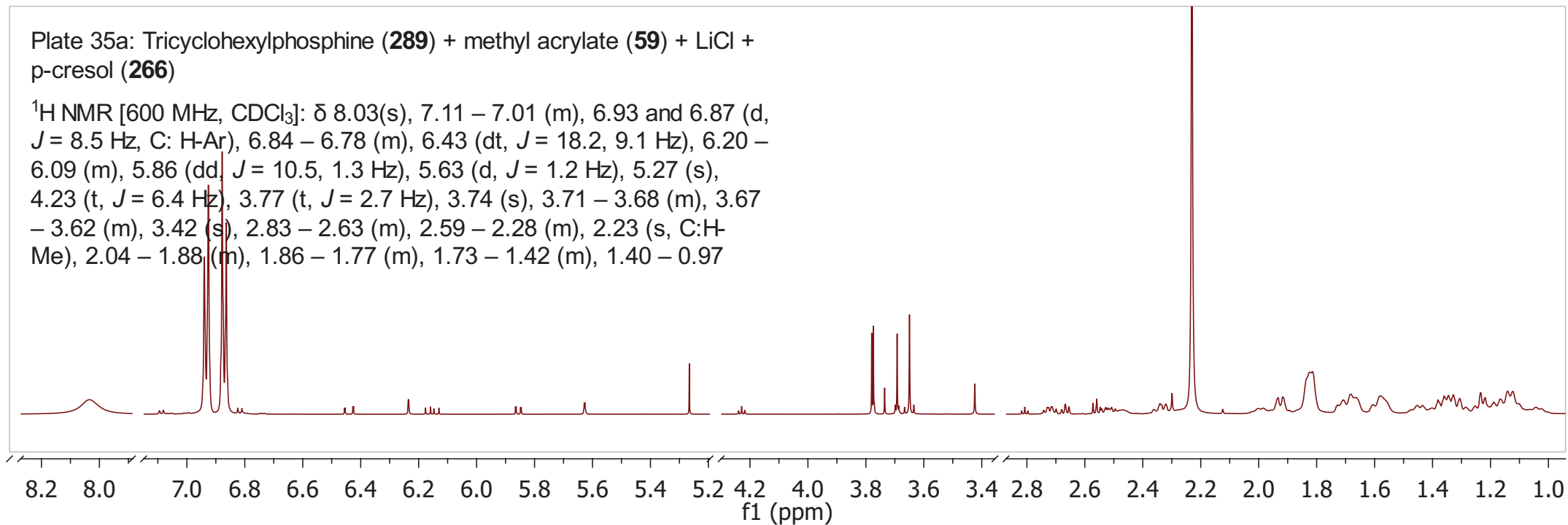


Plate 35g: Tricyclohexylphosphine (**289**) + methyl acrylate (**59**) + LiCl + p-cresol (**266**)

^{31}P NMR [243 MHz, CDCl_3]: δ 60.3, 55.6, 32.3, 32.2, 31.7.

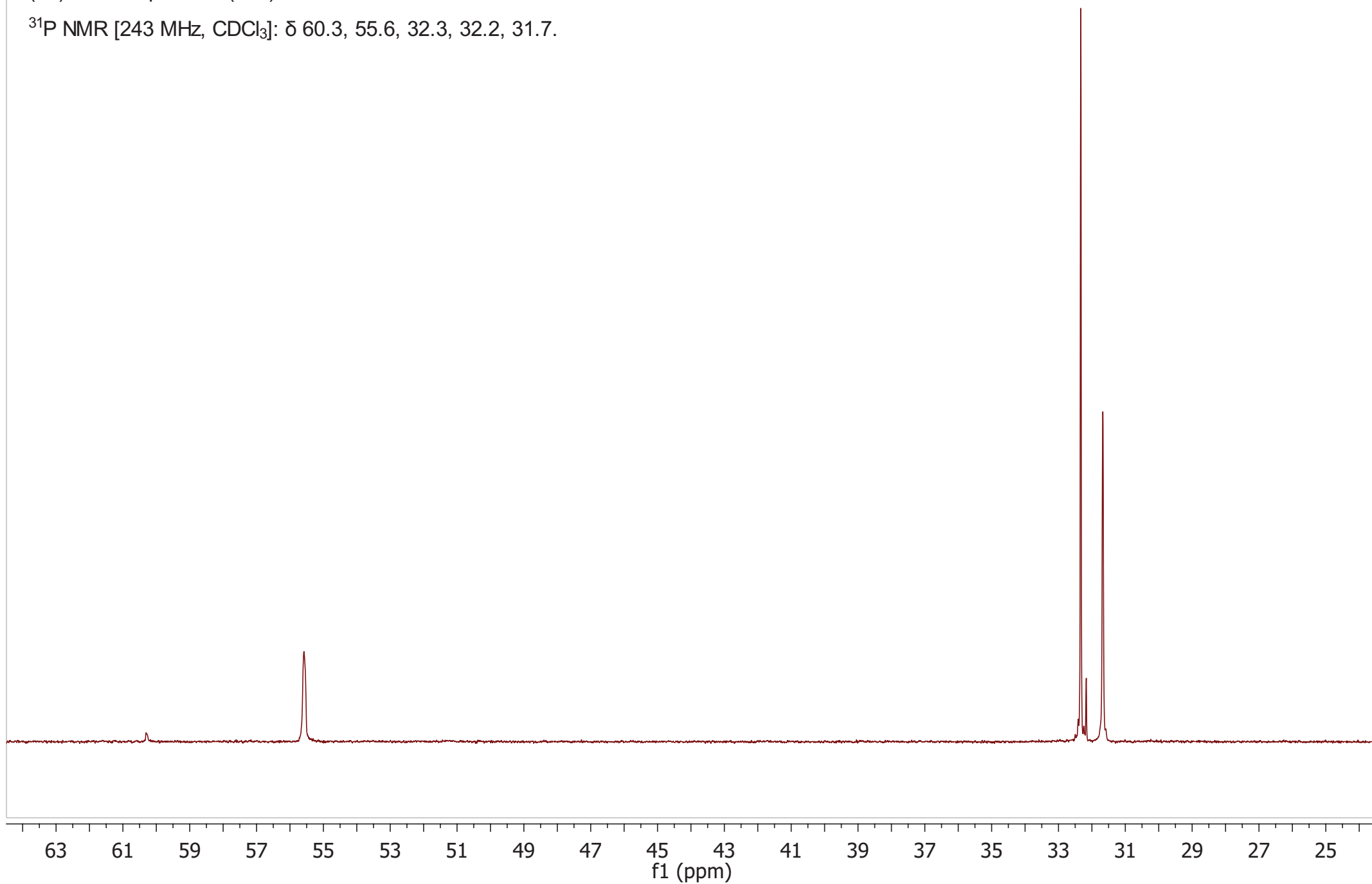


Plate 36a: Grubbs 2nd generation catalyst (**125**) + methyl acrylate (**59**) + trans- β -methylstyrene (**69**) + *p*-cresol (**266**)

¹H NMR [600 MHz, CDCl₃]: δ 19.12 (s, GII:H-1'), 18.53 (q, $J = 5.6$ Hz), 17.78 (s), 7.94 – 7.77 (m), 7.67 (d, $J = 16.0$ Hz), 7.63 – 7.52 (m), 7.50 – 7.44 (m), 7.38 – 7.30 (m), 7.27 (dd, $J = 15.7, 8.7$ Hz), 7.22 (dd, $J = 13.5, 6.2$ Hz), 7.16 – 7.11 (m), 7.07 (s), 7.00 – 6.91 (m), 6.87 (d, $J = 19.1$ Hz), 6.83 (s), 6.79 (d, $J = 8.1$ Hz), 6.67 (dt, $J = 22.1, 10.9$ Hz), 6.57 – 6.52 (m), 6.41 (d, $J = 16.0$ Hz), 6.38 – 6.06 (m), 5.82 (dd, $J = 15.5, 1.5$ Hz), 5.78 (d, $J = 11.4$ Hz), 5.23 (s), 3.84 (d, $J = 52.0$ Hz), 3.76 (s), 3.75 (s), 3.72 – 3.66 (m), 3.67 (s), 3.64 (d, $J = 10.6$ Hz), 3.55 (s), 2.75 (s), 2.64 – 2.30 (m), 2.29 – 2.24 (m), 2.22 (s), 2.21 – 2.14 (m), 2.11 (s), 2.10 (d, $J = 1.6$ Hz), 2.00 (s), 1.94 – 1.89 (m), 1.86 (d, $J = 25.7$ Hz), 1.82 (dd, $J = 6.9, 1.4$ Hz), 1.76 – 0.72 (m).

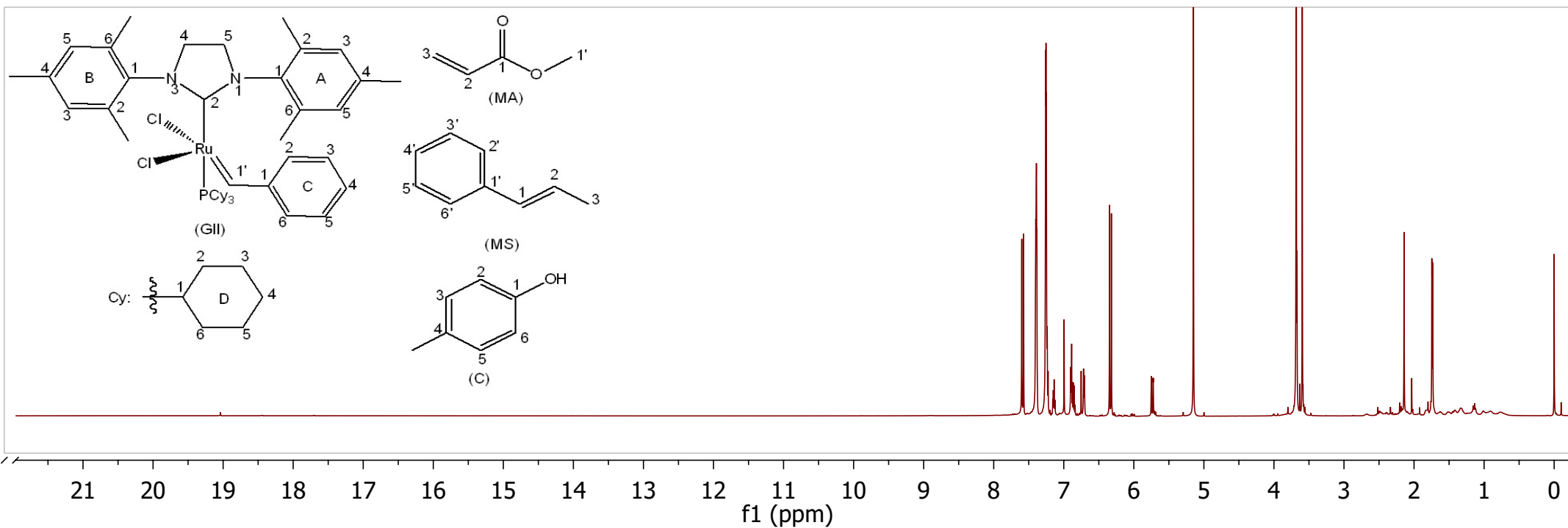
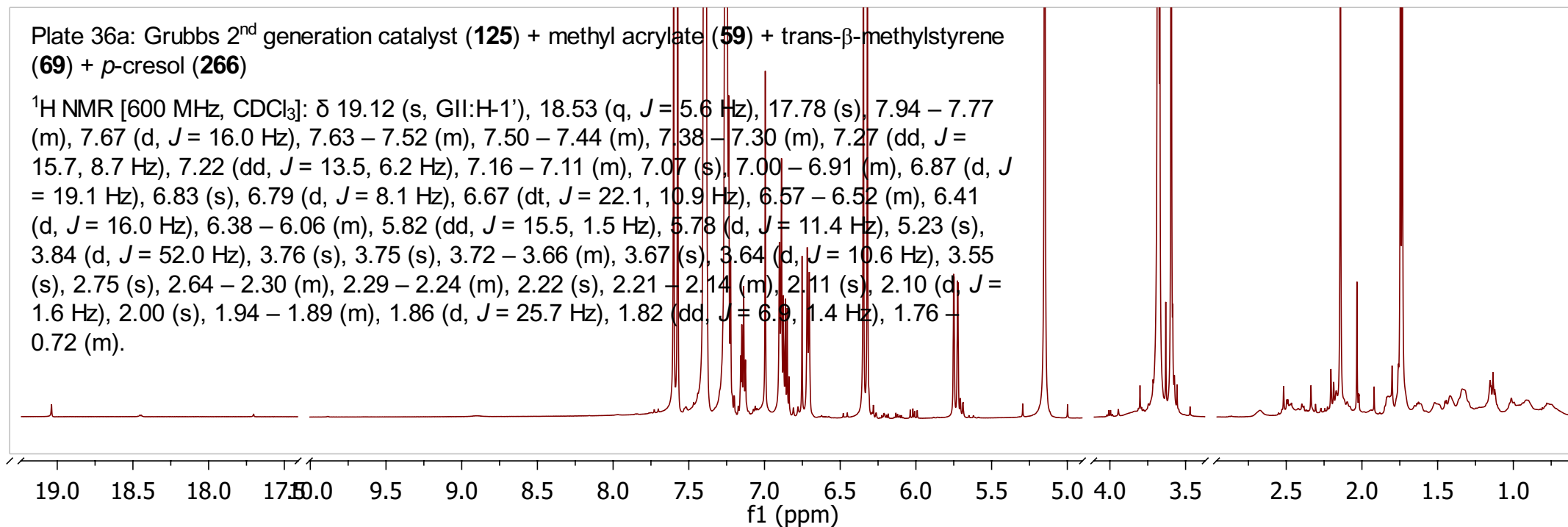


Plate 36b: Grubbs 2nd generation catalyst (**125**) + methyl acrylate (**59**) + trans- β -methylstyrene (**69**) + *p*-cresol (**266**)

¹³C NMR [151 MHz, CDCl₃]: δ 167.4, 167.0, 165.3, 154.33, 144.8, 144.8, 137.2, 134.2, 133.3, 130.9, 130.7, 130.2, 130.1, 129.8, 128.9, 128.8, 128.7, 128.58, 128.55, 128.41, 128.36, 128.2, 128.12, 128.08, 128.0, 127.8, 127.5, 126.6, 126.4, 126.1, 125.7, 125.5, 122.2, 120.1, 117.6, 117.4, 115.2, 77.4, 77.2, 77.0, 53.5, 52.2, 51.6, 51.5, 51.3, 35.2, 34.8, 31.4, 30.8, 28.8, 27.7, 27.6, 27.13, 26.8, 26.7, 26.4, 26.3, 26.1, 26.04, 25.96, 25.3, 21.0, 20.4, 19.9, 18.4, 17.9.

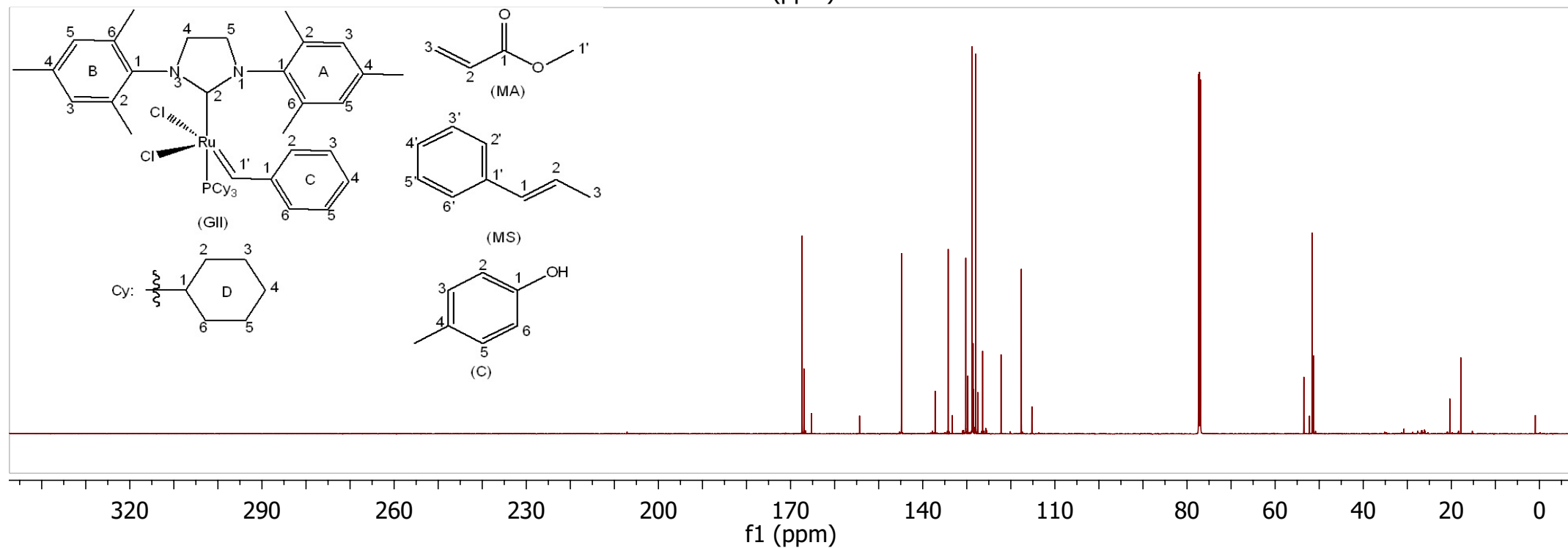
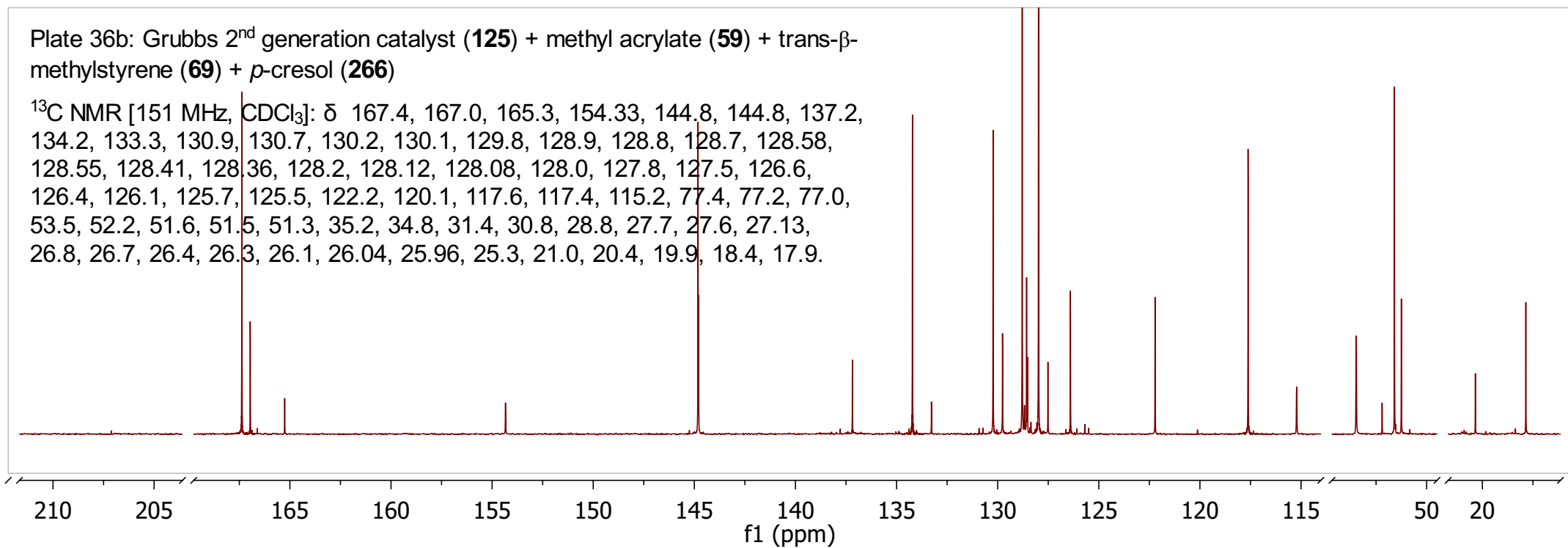


Plate 36c: Grubbs 2nd generation catalyst (**125**) + methyl acrylate (**59**) + trans- β -methylstyrene (**69**) + *p*-cresol (**266**)

HSQC NMR

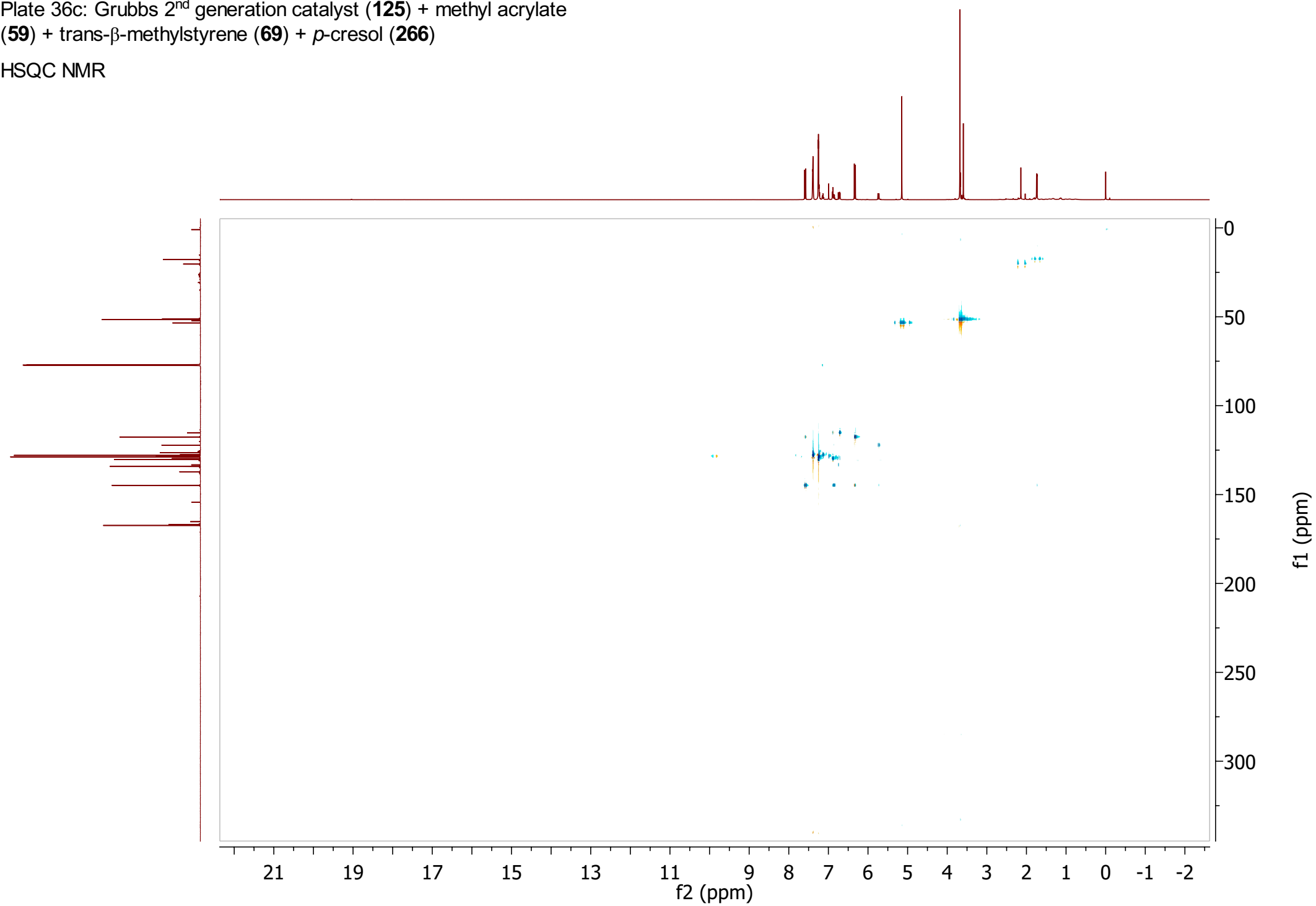


Plate 36d: Grubbs 2nd generation catalyst (**125**) + methyl acrylate (**59**) + trans- β -methylstyrene (**69**) + *p*-cresol (**266**)

HMBC NMR

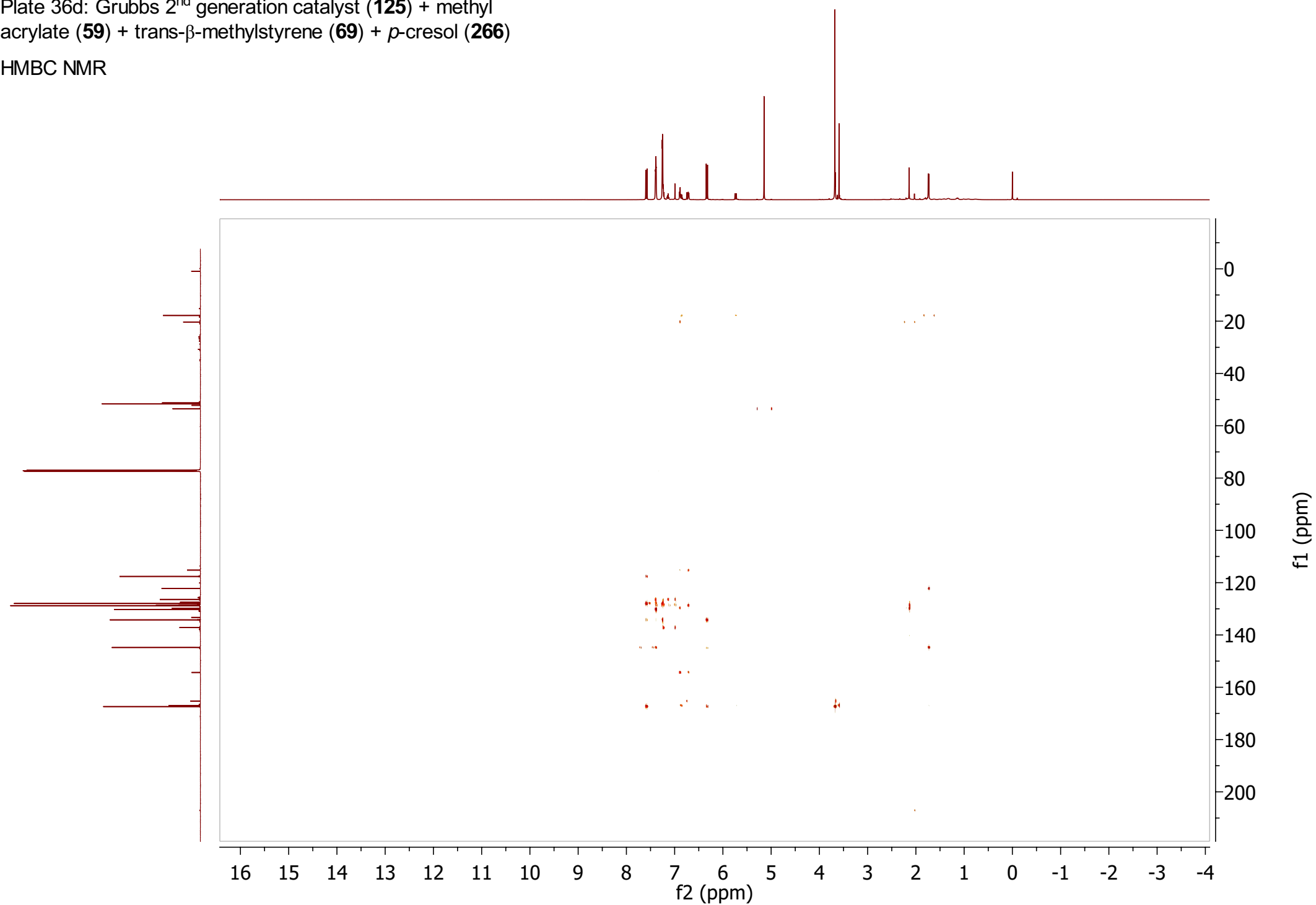


Plate 36g: Grubbs 2nd generation catalyst (**125**) + methyl acrylate (**59**) + trans- β -methylstyrene (**69**) + *p*-cresol (**266**)

³¹P NMR [243 MHz, CDCl₃]: δ 52.9, 32.4, 31.5, 28.9(GII), 27.4, 25.6, 16.1.

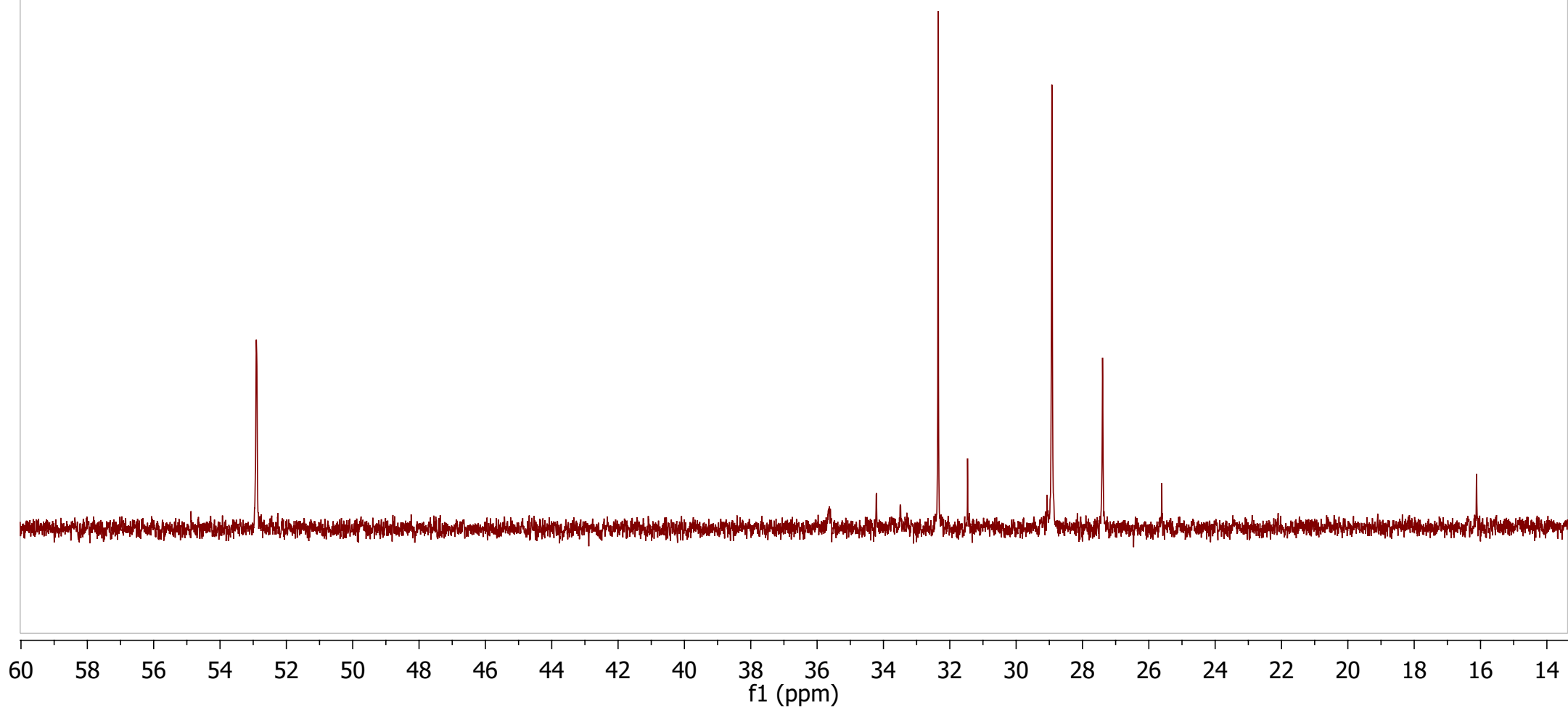


Plate 36h: Grubbs 2nd generation catalyst (**125**) + methyl acrylate (**59**) + trans- β -methylstyrene (**69**) + *p*-cresol (**266**)

NOE NMR

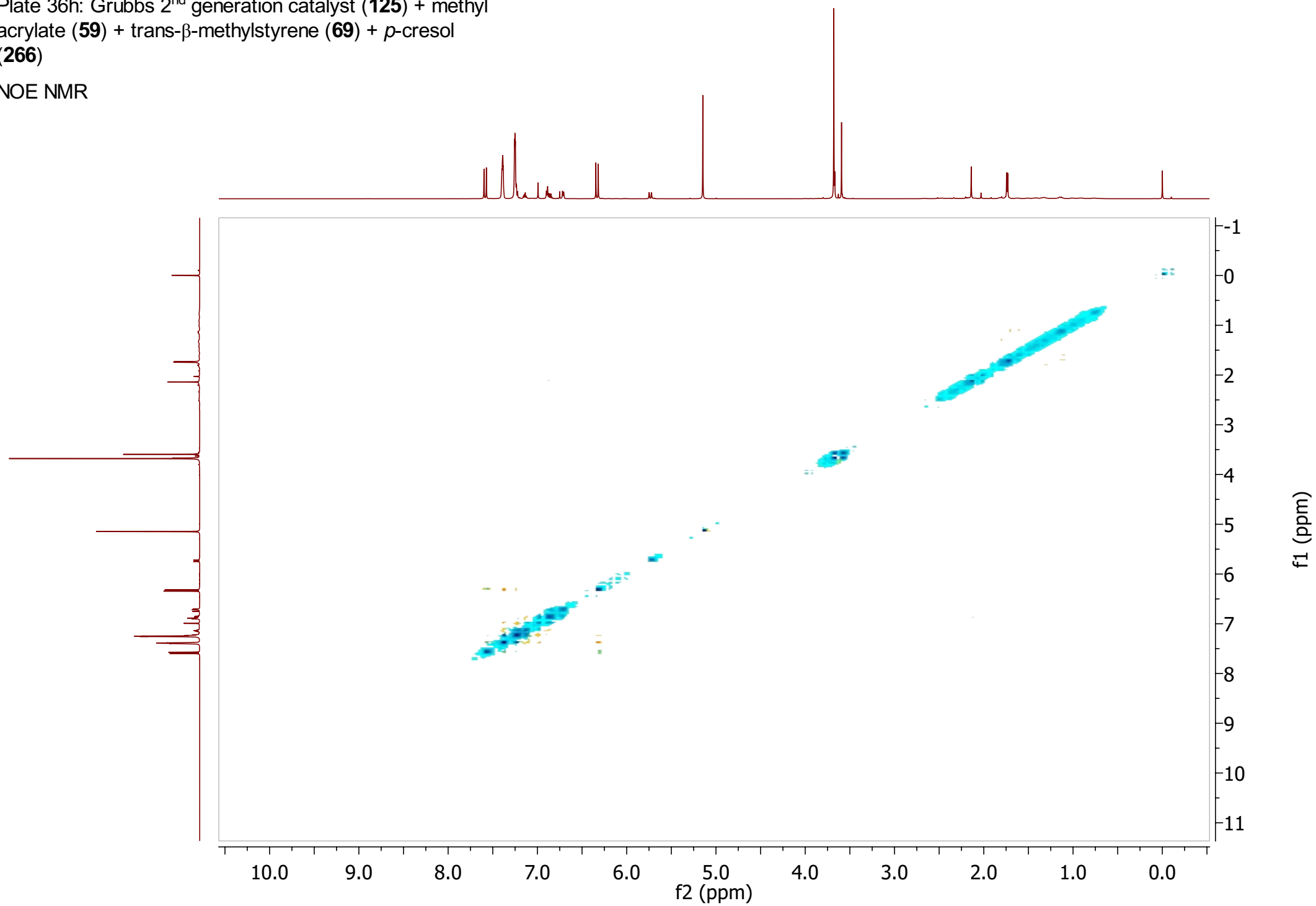


Plate 36i: Grubbs 2nd generation catalyst (**125**) + methyl acrylate (**59**) + trans- β -methylstyrene (**69**) + *p*-cresol (**266**)

Cosy NMR

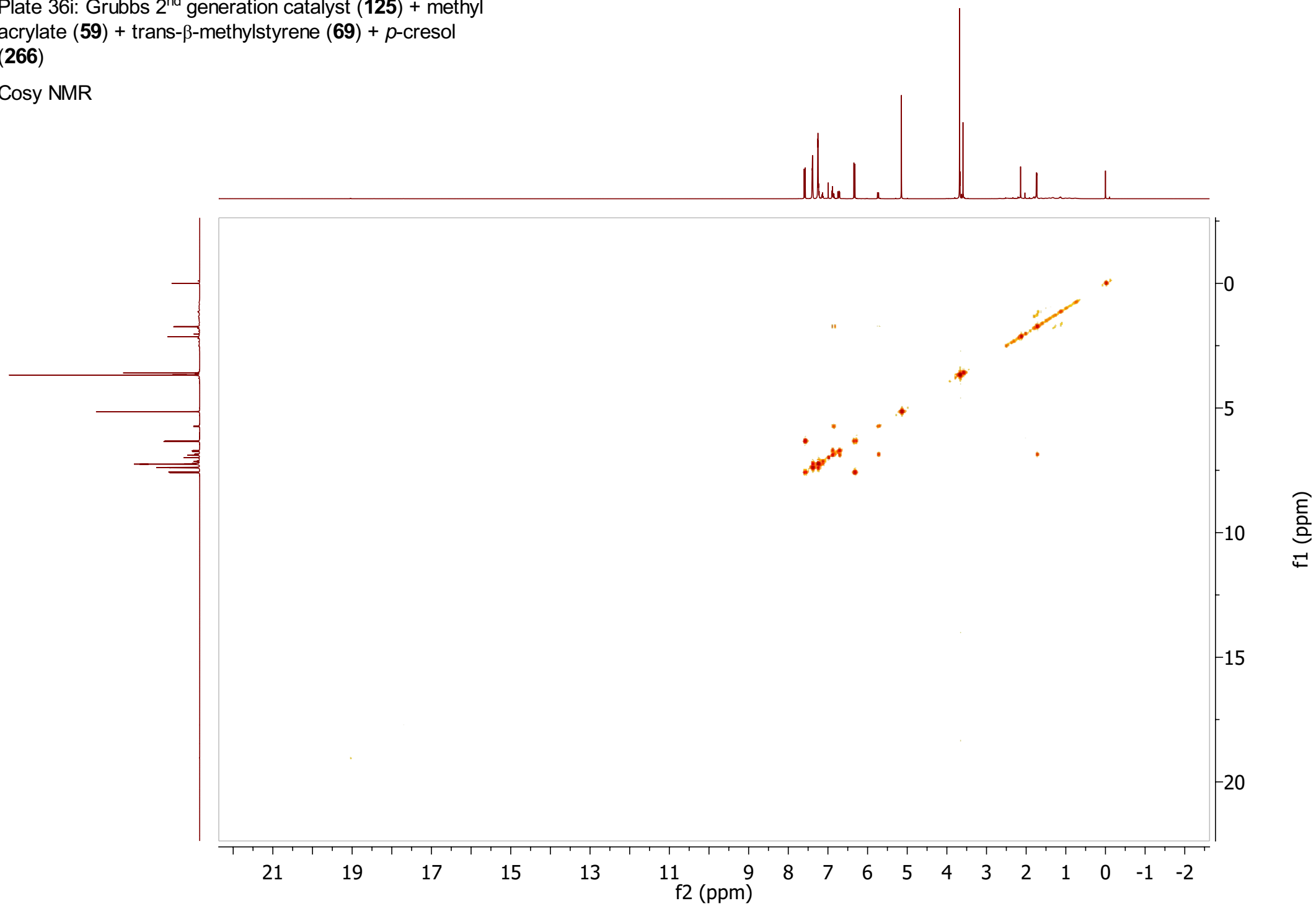


Plate 36j: Grubbs 2nd generation catalyst (**125**) +
methyl acrylate (**59**) + trans- β -methylstyrene (**69**) +
p-cresol (**266**)

^1H - ^{31}P HMBC NMR

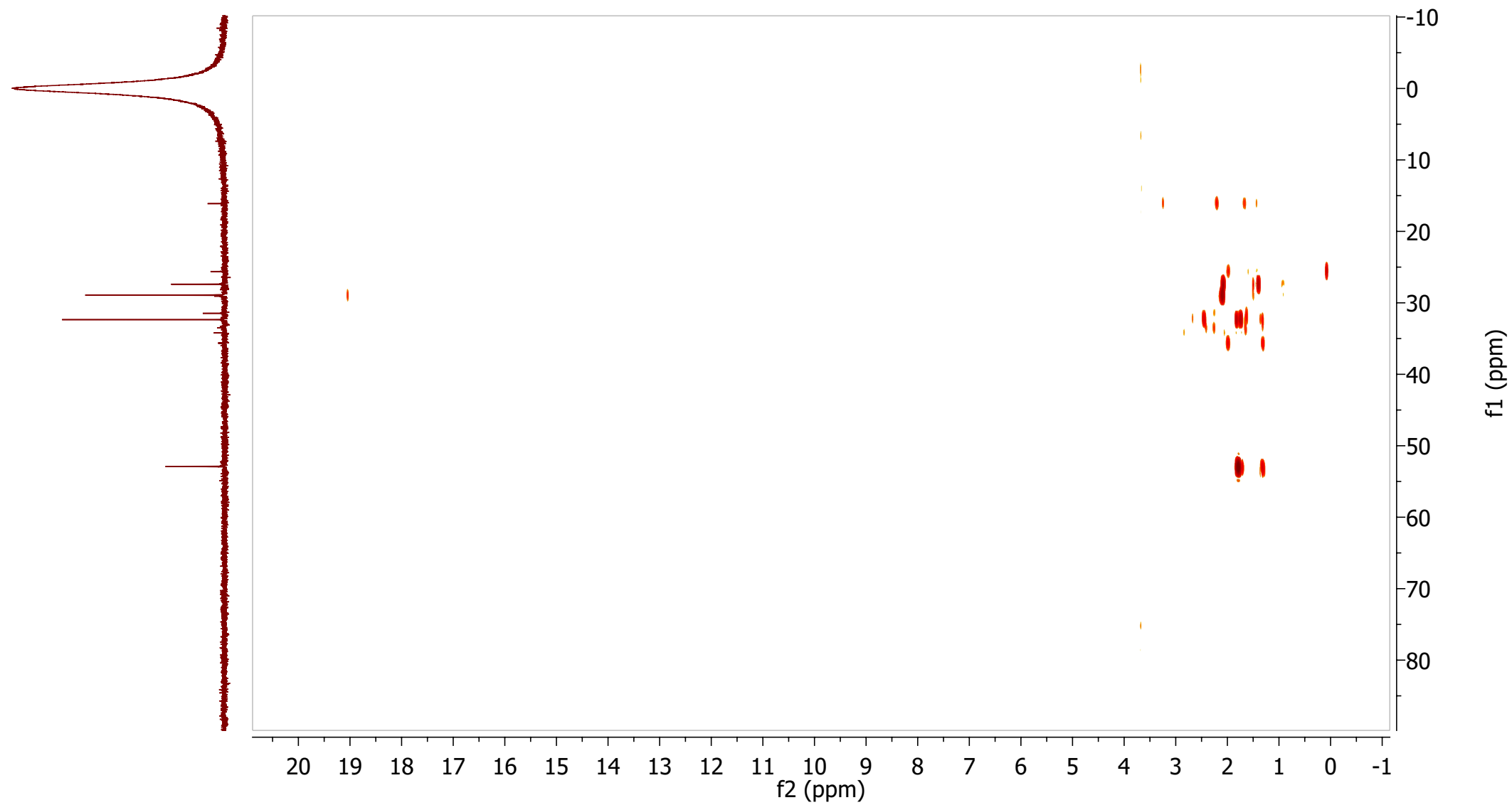


Plate 37a: Grubbs 2nd generation catalyst (**125**) + *cis*-stilbene (**310**) + methyl acrylate (**59**)

¹H NMR [600 MHz, CDCl₃]: δ 19.12 (s, GII: H-1'), 9.04 (s), 7.49 – 7.43 (m), 7.34 – 7.28 (m), 7.23 – 7.19 (m), 7.19 – 7.08 (m), 7.06 (s, GII: H-3(B)), 7.02 – 6.79 (m), 6.55 (s), 6.40 (d, *J* = 16.0 Hz), 5.92 – 5.06 (m), 4.03 – 3.78 (m, GII: H-4,5), 3.74 (s), 3.72 (s), 3.67 – 3.39 (m), 2.75 (s, GII: H-2-Me(B)), 2.63 – 2.42 (m), 2.62 – 2.34 (m), 2.29 (s), 2.19 (s, GII: H-4-Me(B)), 2.20 – 2.12 (m), 2.06 (s, H-2-Me(A)), 2.00 (s), 1.87 (s), 1.93 – 1.63 (m), 1.62 – 0.48 (m, GII: H-2-6(D)).

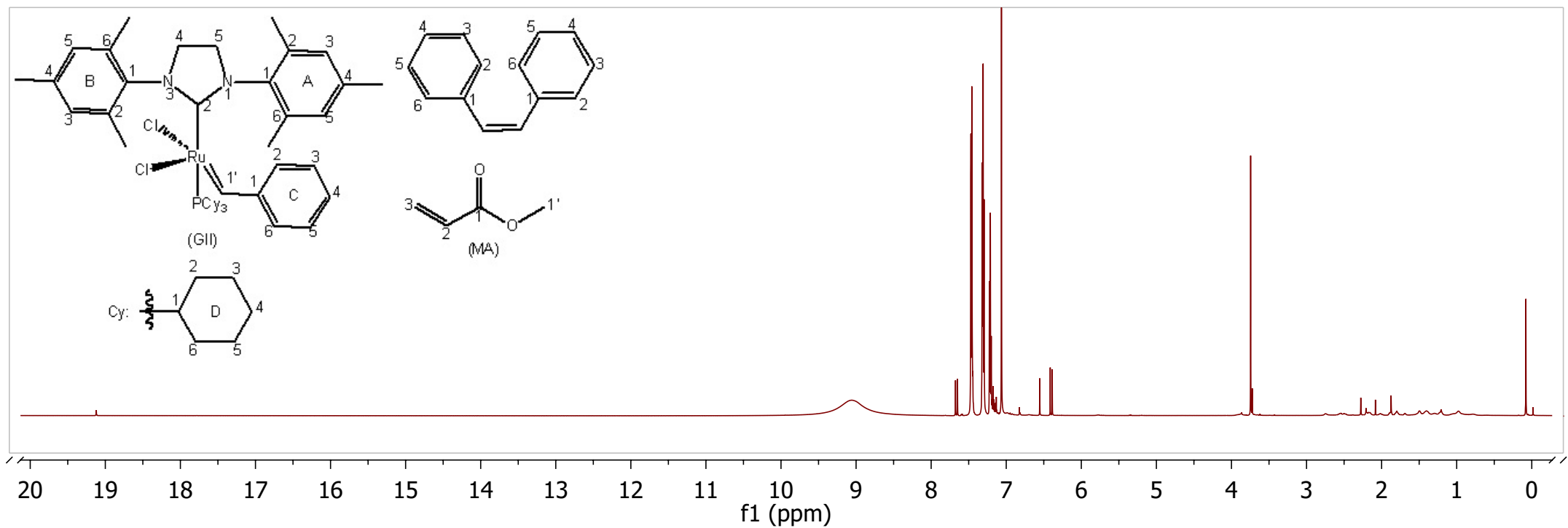
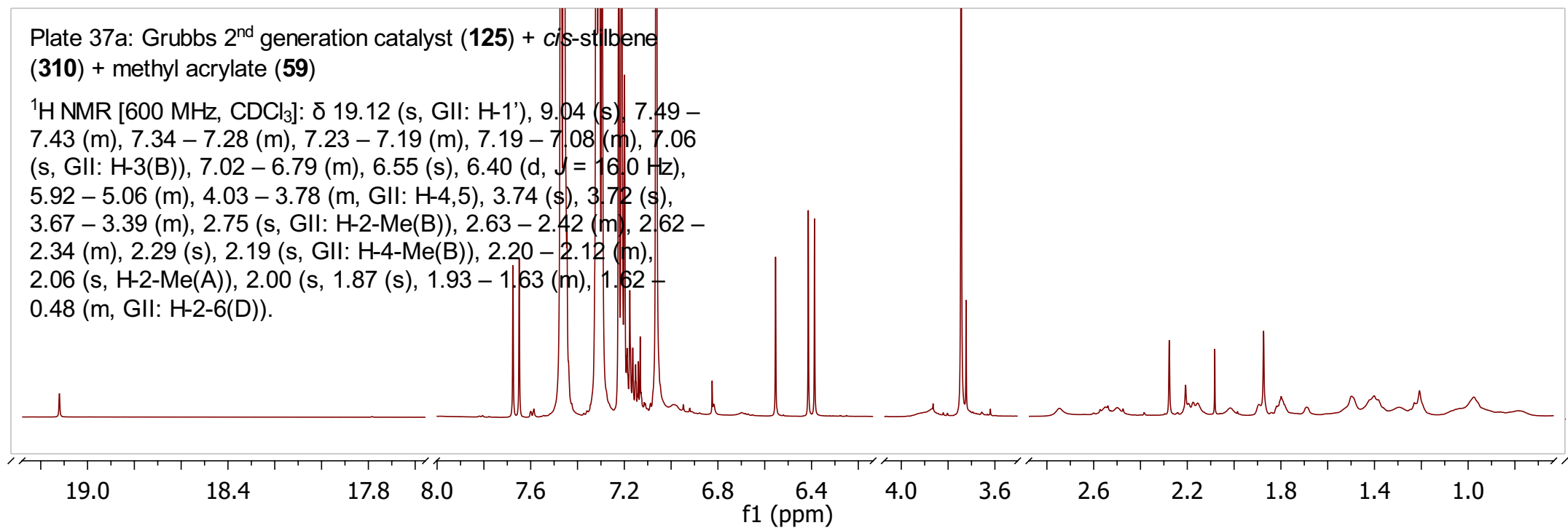


Plate 37b: Grubbs 2nd generation catalyst (**125**) + *cis*-stilbene (**310**) + methyl acrylate (**59**)

¹³C NMR [151 MHz, CDCl₃]: δ 220.4 (d, J = 77.4 Hz, GII: C-2), 167.4, 165.4, 151.3(GII: C-1(C)), 144.9, 144.8, 138.3(GII: C-4(B)), 137.6(GII: C-4(A)), 137.4, 137.33, 137.25, 135.2(GII: C-1(B or A)), 134.4, 133.4, 130.29, 130.26, 129.9, 128.9, 128.7, 128.5, 128.2, 128.1, 127.9, 127.8, 127.6, 127.1(GII: C-5(B)), 126.7, 126.5, 126.3, 117.8, 52.2, 51.7, 51.2, 35.5, 35.2, 31.4 (d, J = 16.7 Hz, GII: C-2,6(D)), 30.9, 29.1, 27.8 (d, J = 9.8 Hz, GII: C-3,5(D)), 27.0 (d, J = 11.8 Hz), 26.4 (d, J = 2.7 Hz), 26.2, 21.0 (d, J = 34.8 Hz), 20.0.

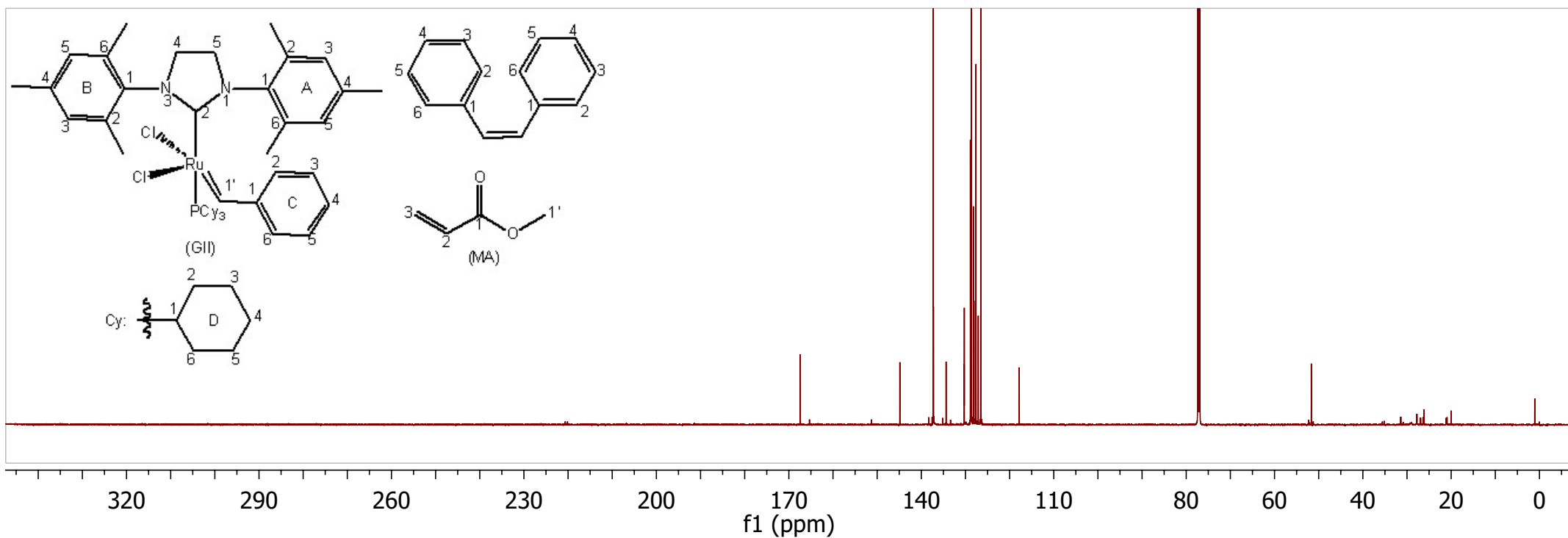
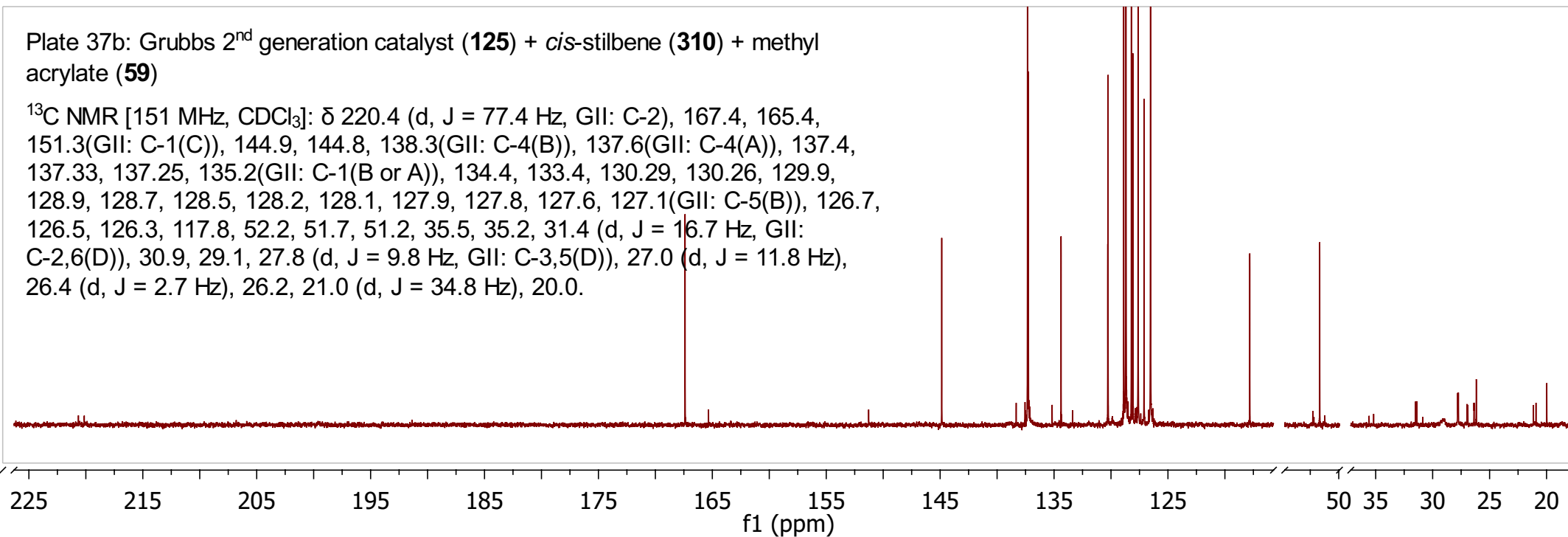


Plate 37c: Grubbs 2nd generation catalyst (**125**) + *cis*-stilbene (**310**) + methyl acrylate (**59**)

HSQC NMR

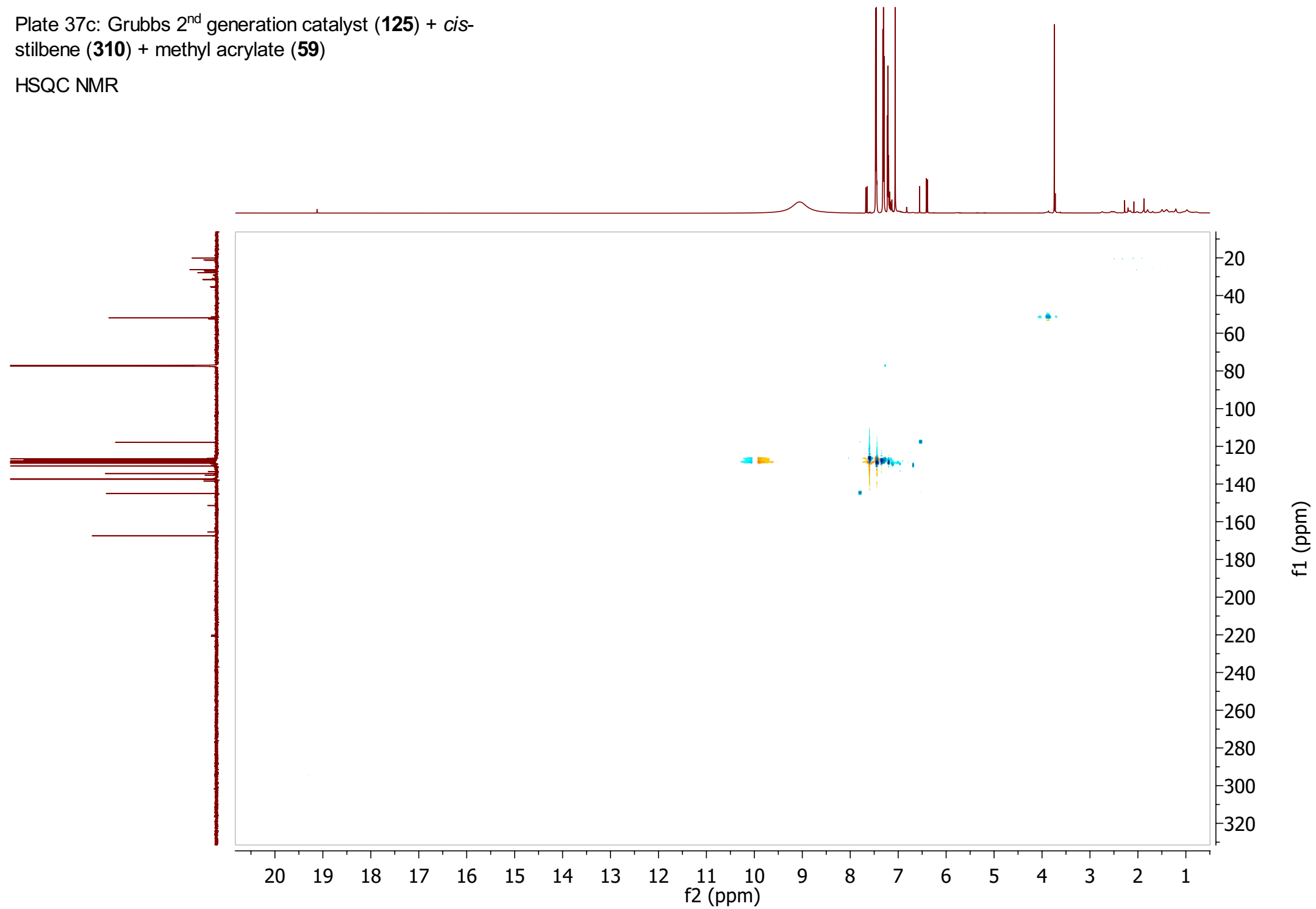


Plate 37g: Grubbs 2nd generation catalyst (**125**) + *cis*-stilbene (**310**) + methyl acrylate (**59**)

³¹P NMR [243 MHz, CDCl₃]: δ 49.9, 31.5, 28.9(GII).

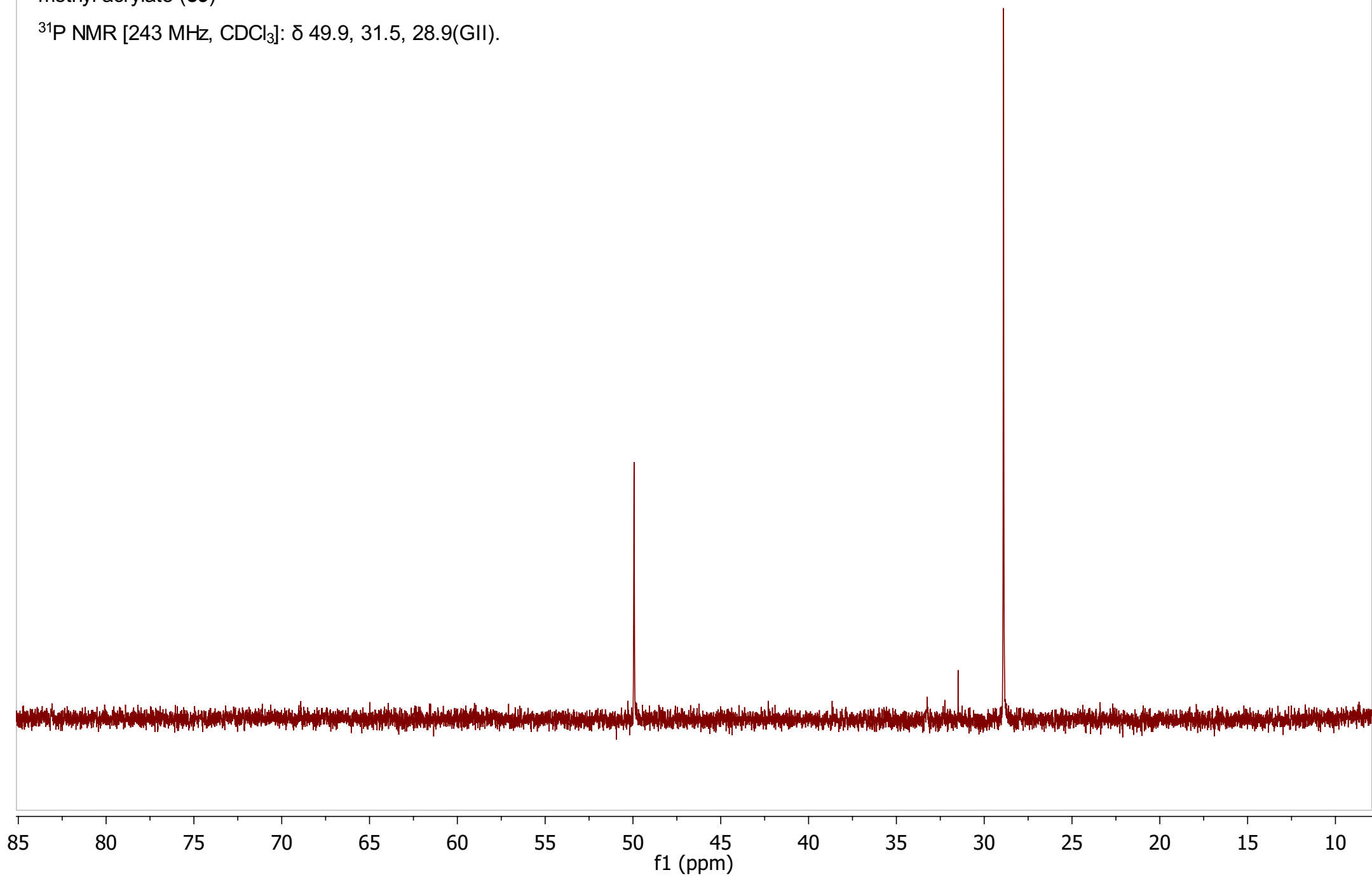


Plate 38a: Grubbs 2nd generation catalyst (**125**) + *cis*-stilbene (**310**) + methyl acrylate (**59**) + *p*-cresol (**266**)

¹H NMR [600 MHz, CDCl₃]: δ 19.12 (s, GII: C-1'), 9.10 (s), 7.89 – 7.79 (m), 7.70 (s), 7.68 (s), 7.63 (d, *J* = 8.2 Hz), 7.52 – 7.47 (m), 7.39 – 7.31 (m), 7.27 – 7.22 (m), 7.20 (s), 7.19 (s), 7.09 (s), 6.99 (d, *J* = 8.1 Hz, C:H-3,5), 6.85 (s), 6.84 (s), 6.78 (d, *J* = 8.1 Hz, C:H-2,6), 6.58 (s), 6.44 (s), 6.42 (s), 6.29 (s), 5.81 (s), 4.02 – 3.82 (m), 3.78 (s), 3.77 (s), 3.70 – 3.63 (m), 2.79 – 2.33 (m), 2.30 (s), 2.24 (s), 2.21 – 1.98 (m), 1.97 – 0.68 (m, GII: C-2-6(D)).

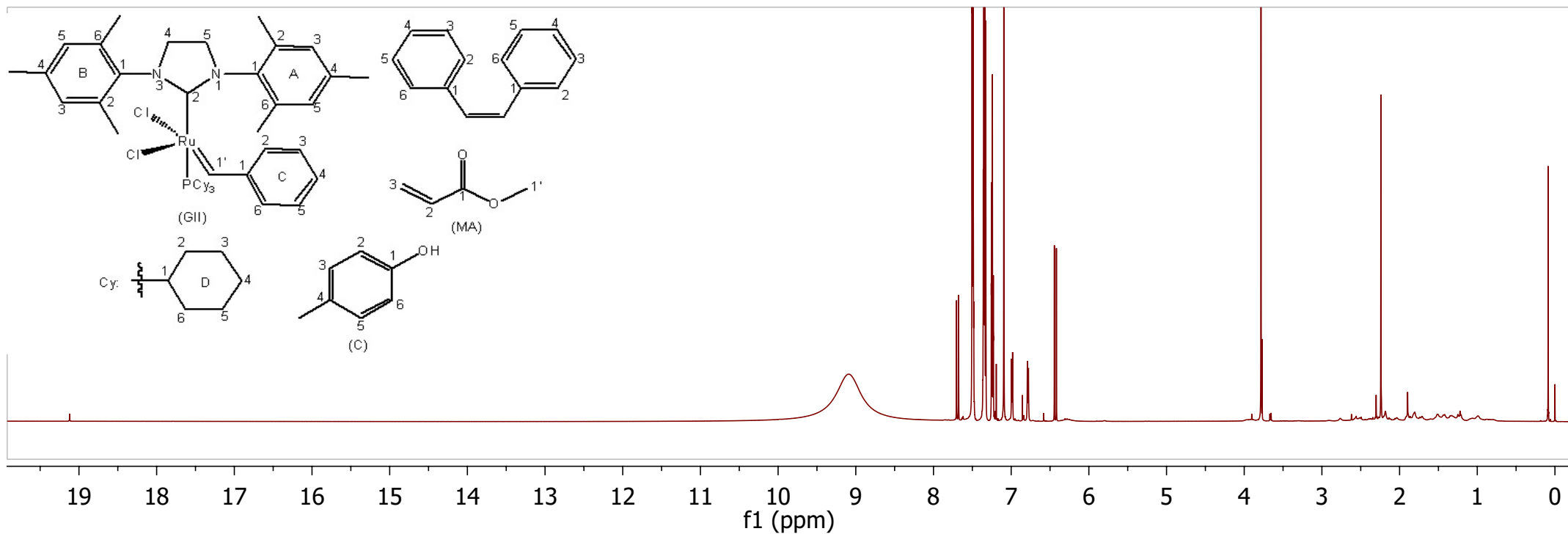
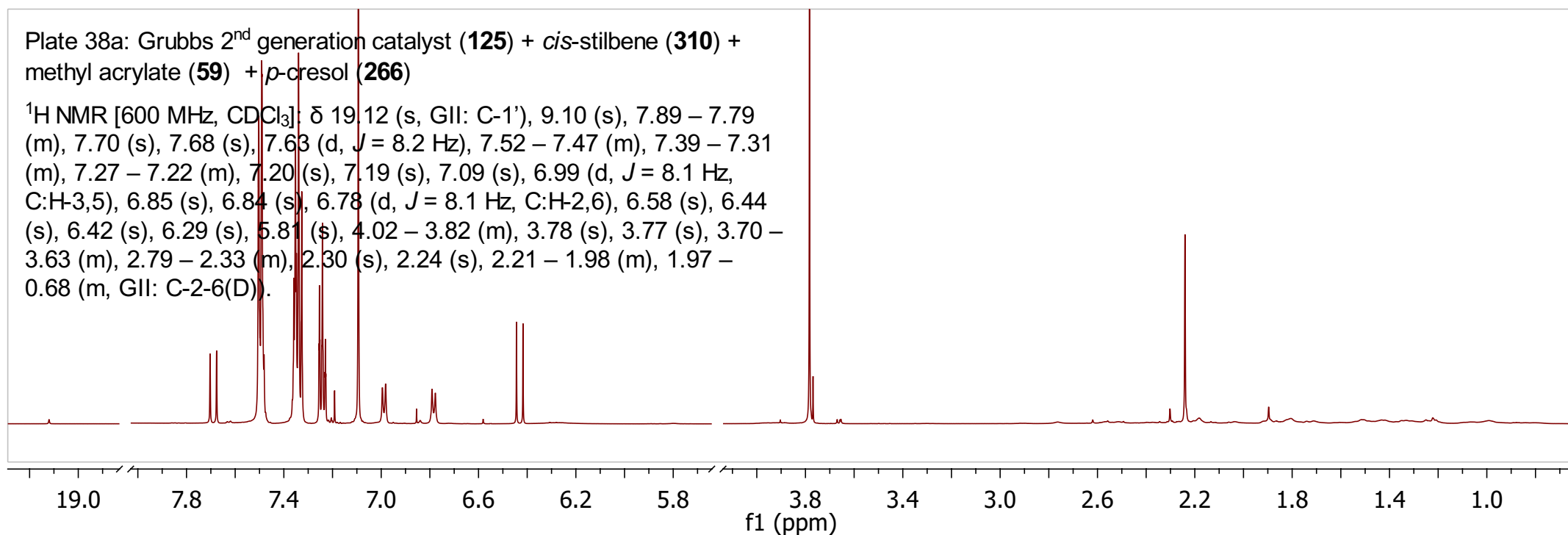


Plate 38b: Grubbs 2nd generation catalyst (**125**) + *cis*-stilbene (**310**) + methyl acrylate (**59**) + *p*-cresol (**266**)

Int. ¹³C NMR [151 MHz, CDCl₃]: δ 282.7, 220.2, 167.6, 165.5, 154.1, 145.0, 138.4, 137.64, 137.57, 137.4, 137.3, 137.2, 134.4, 133.5, 130.4, 130.3, 130.0, 129.2, 128.96, 128.94, 128.76, 128.75, 128.6, 128.3, 128.2, 128.0, 127.8, 127.7, 127.2, 126.6, 126.4, 117.8, 115.4, 77.4, 77.2, 77.0, 52.4, 51.8, 31.6, 31.5, 27.9, 27.8, 27.0, 26.9, 26.2, 21.2, 21.0,

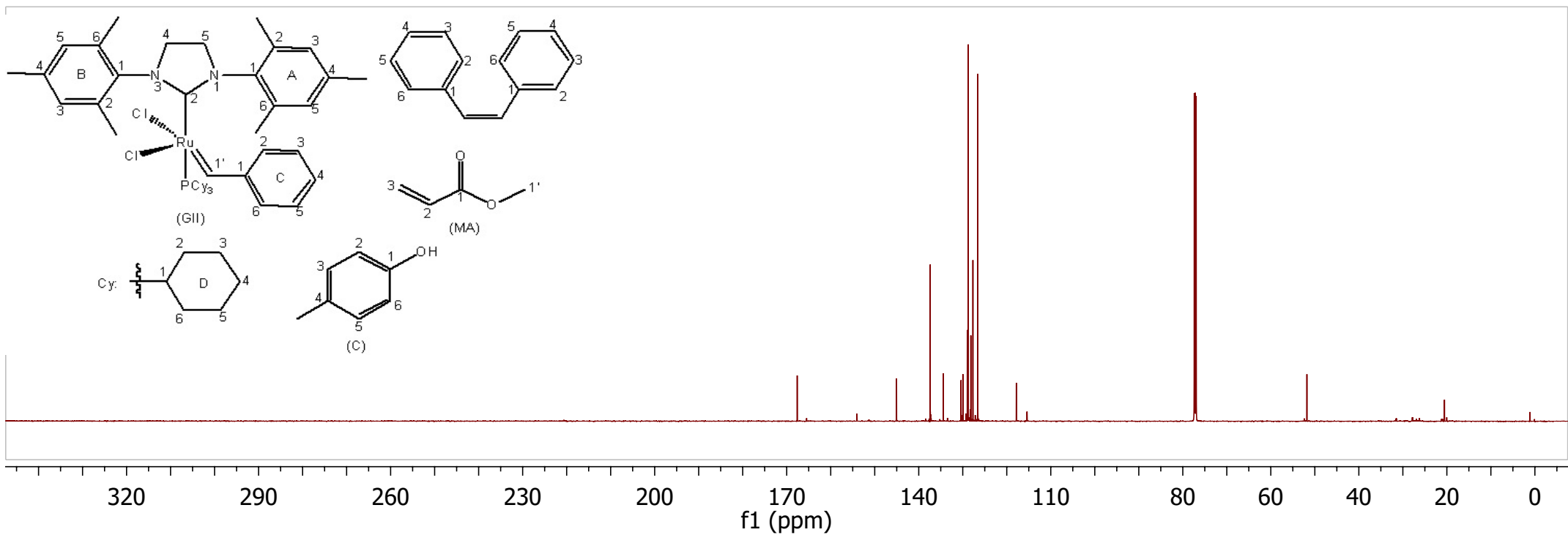
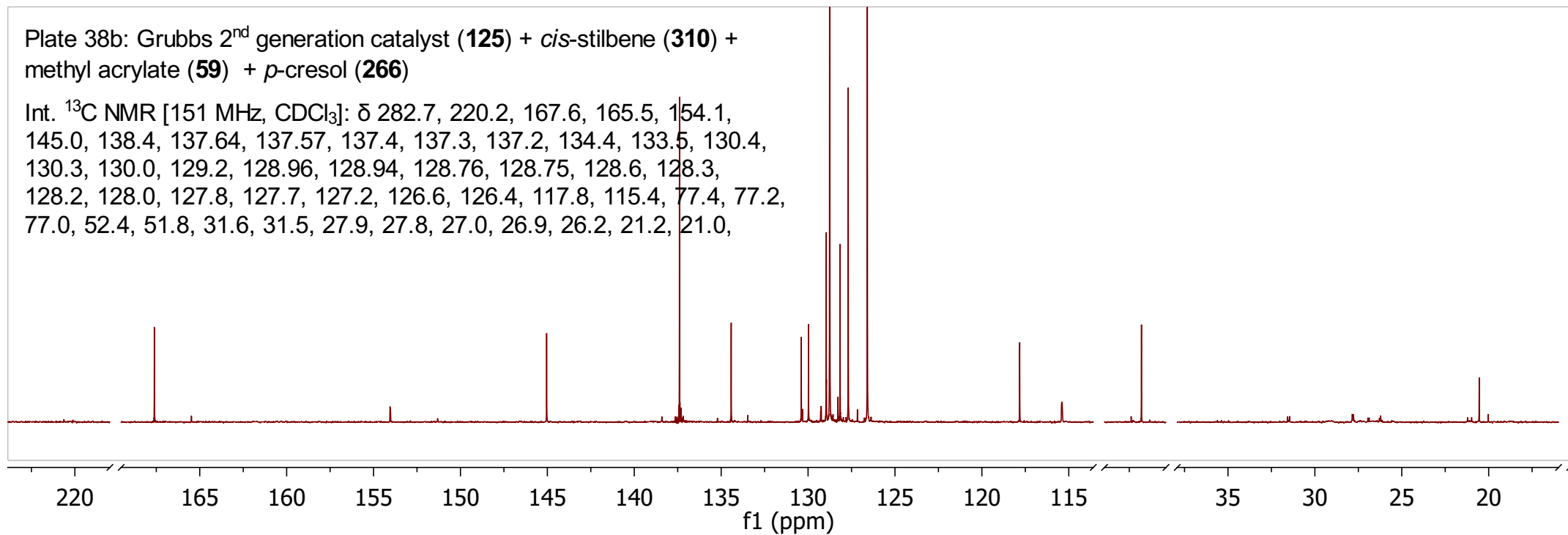


Plate 38c: Grubbs 2nd generation catalyst (**125**) +
cis-stilbene (**310**) + methyl acrylate (**59**) + *p*-cresol
(**266**)

HSQC NMR

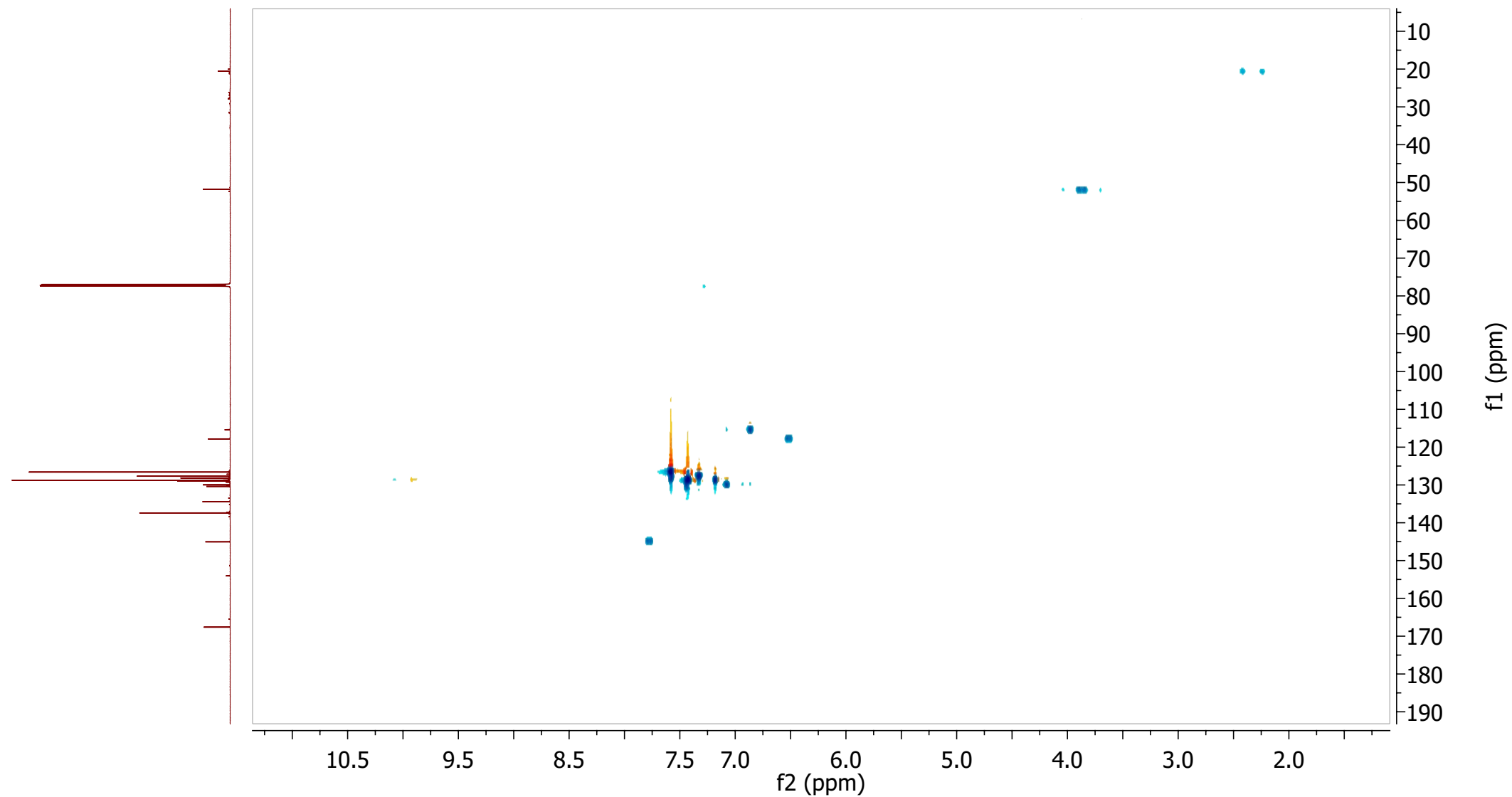


Plate 38g: Grubbs 2nd generation catalyst (**125**) + *cis*-stilbene (**310**) + methyl acrylate (**59**) + *p*-cresol (**266**)

³¹P NMR [243 MHz, CDCl₃]: δ 53.1, 34.2, 32.5, 31.5, 28.9(GII), 21.0.

