



UNIVERSITAT DE  
BARCELONA

## Enantio- and Diastereoselective Cyclocondensation Reactions. Stereocontrolled Access to Azabicycles and Application to Natural Product Synthesis

Elena Ghirardi

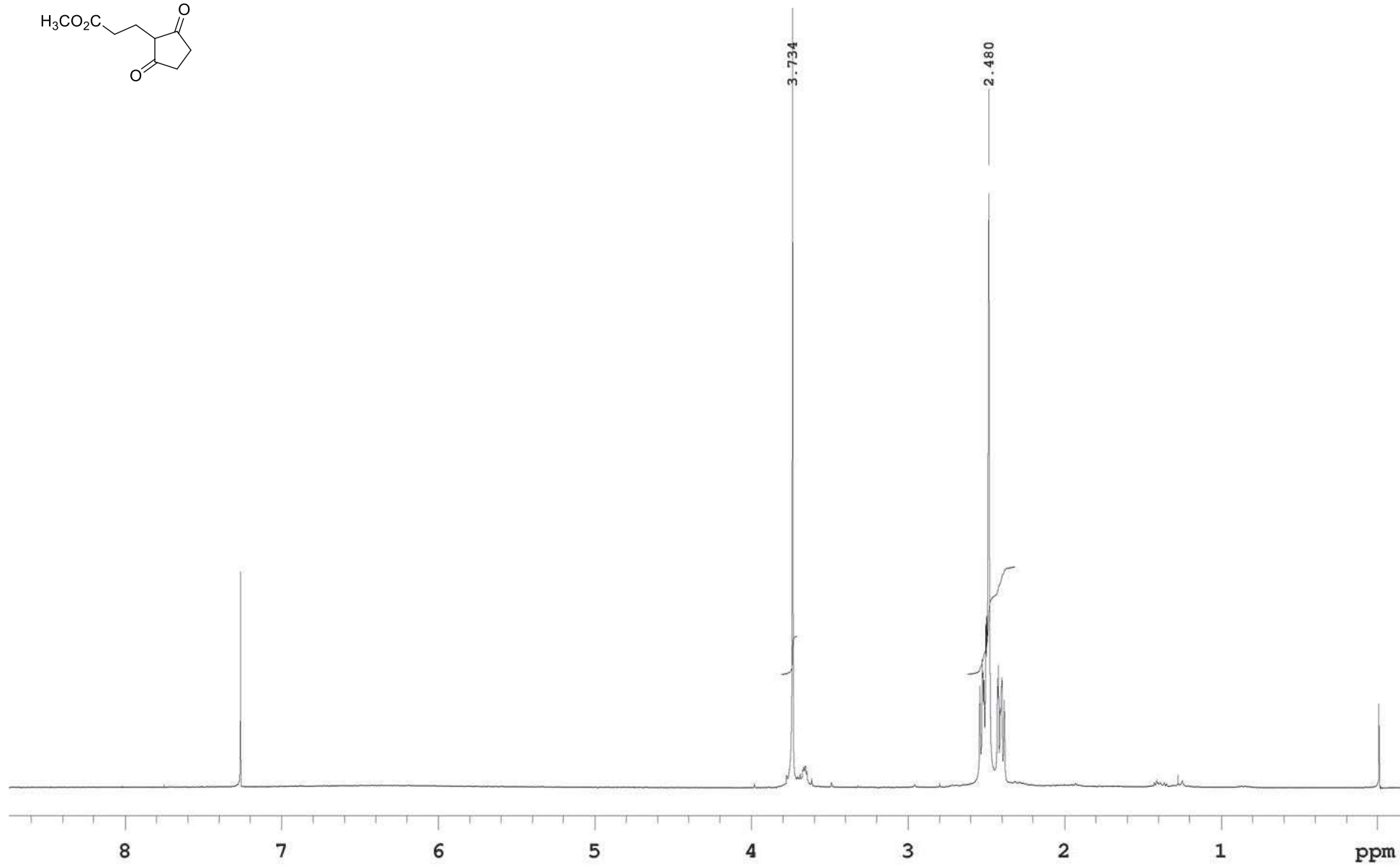
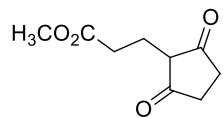
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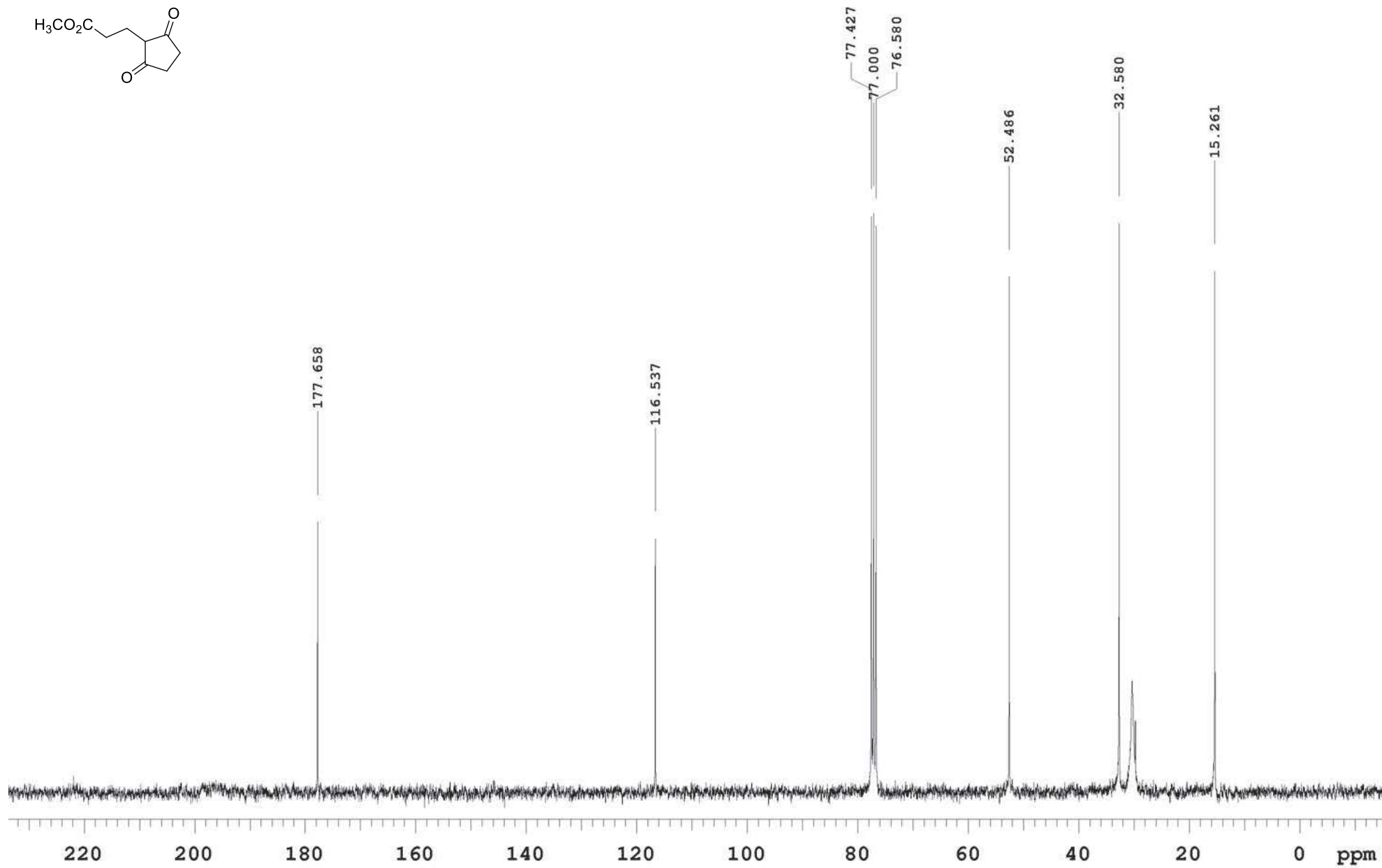
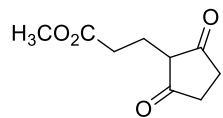
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$^1\text{H}$  and  $^{13}\text{C}$  SPECTRA CHAPTER 2

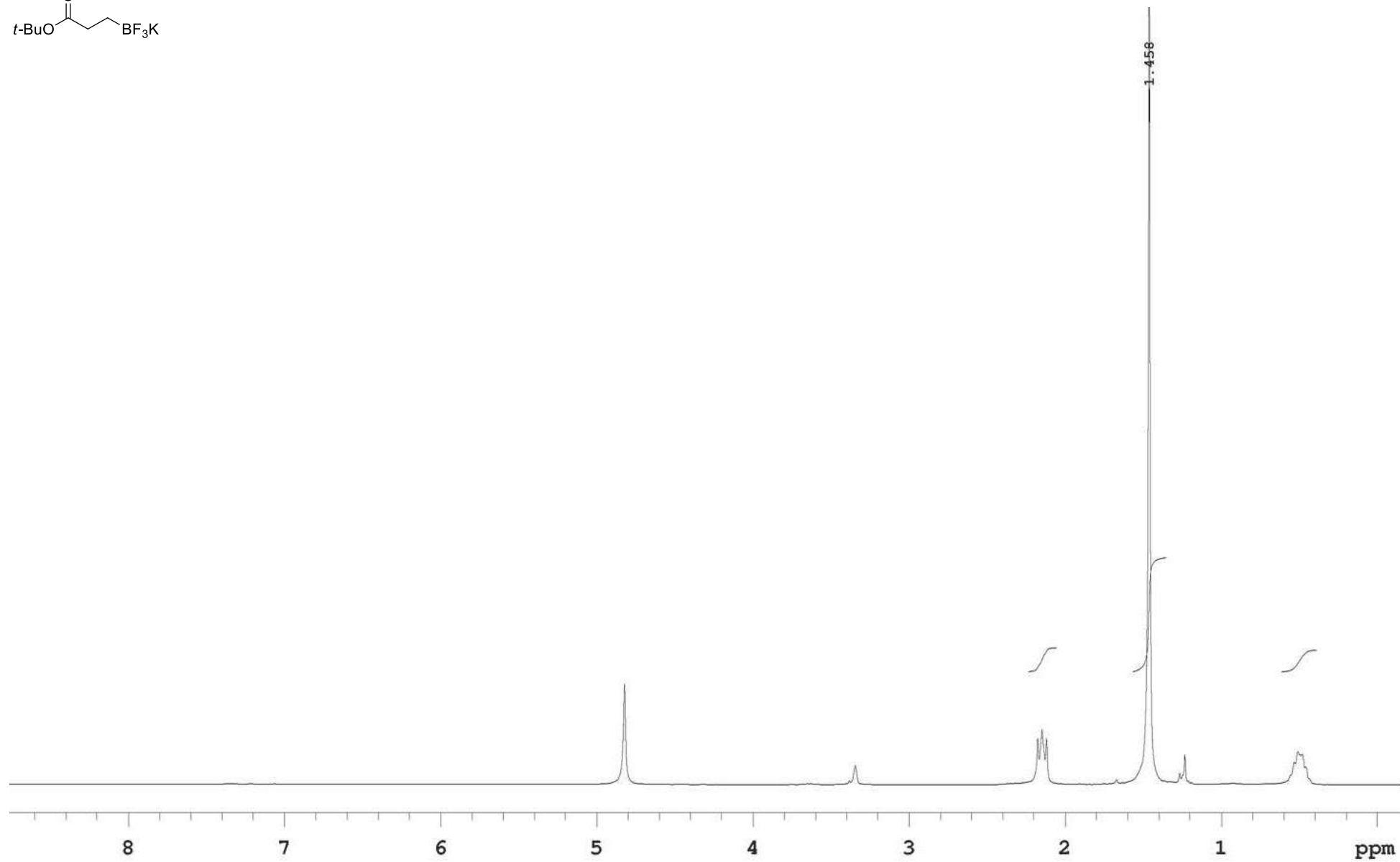
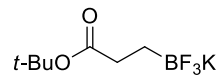




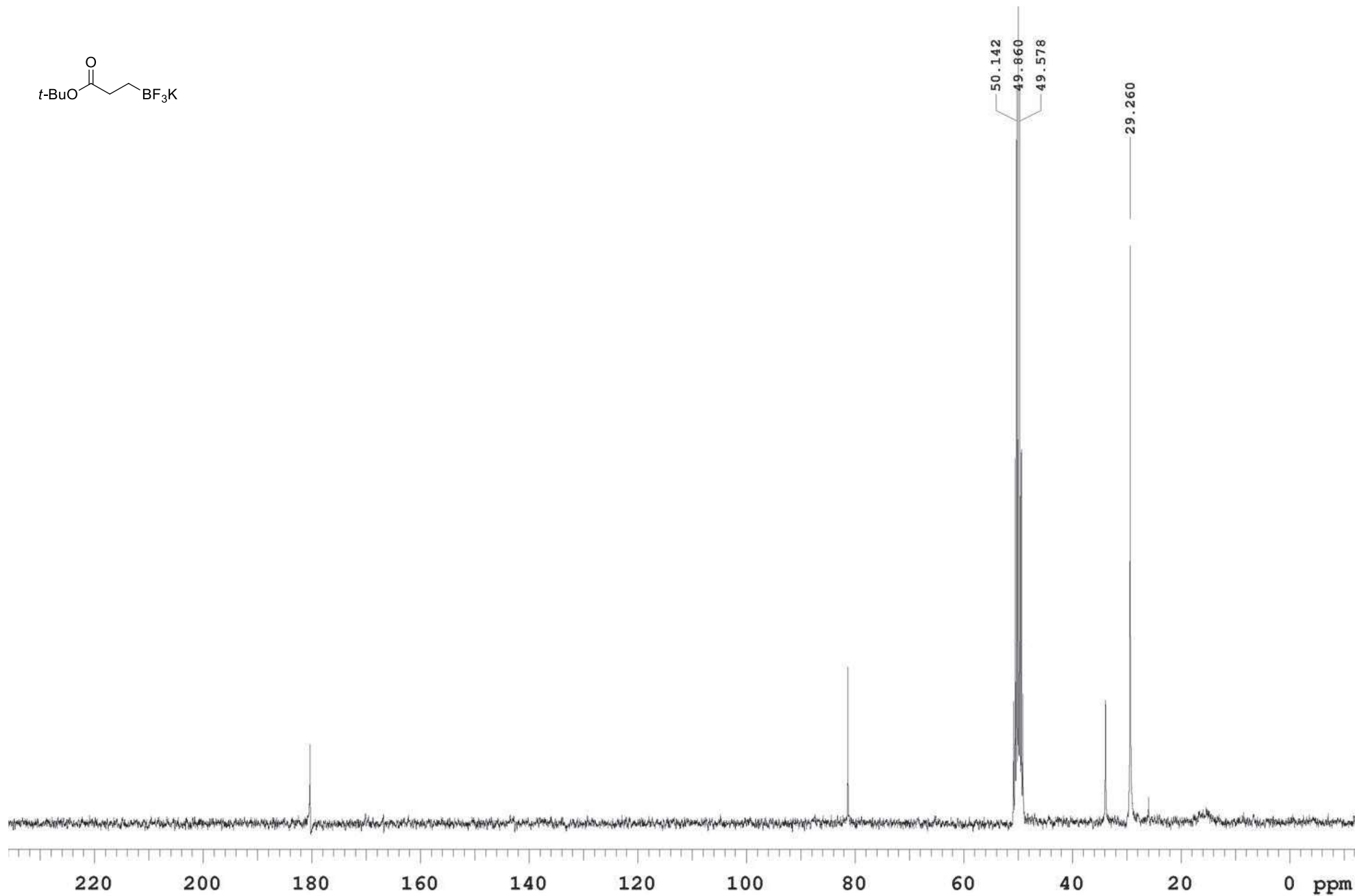
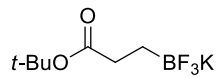
Methyl 2,5-dioxocyclopentanepropionate (2)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 300 MHz, 25 °C



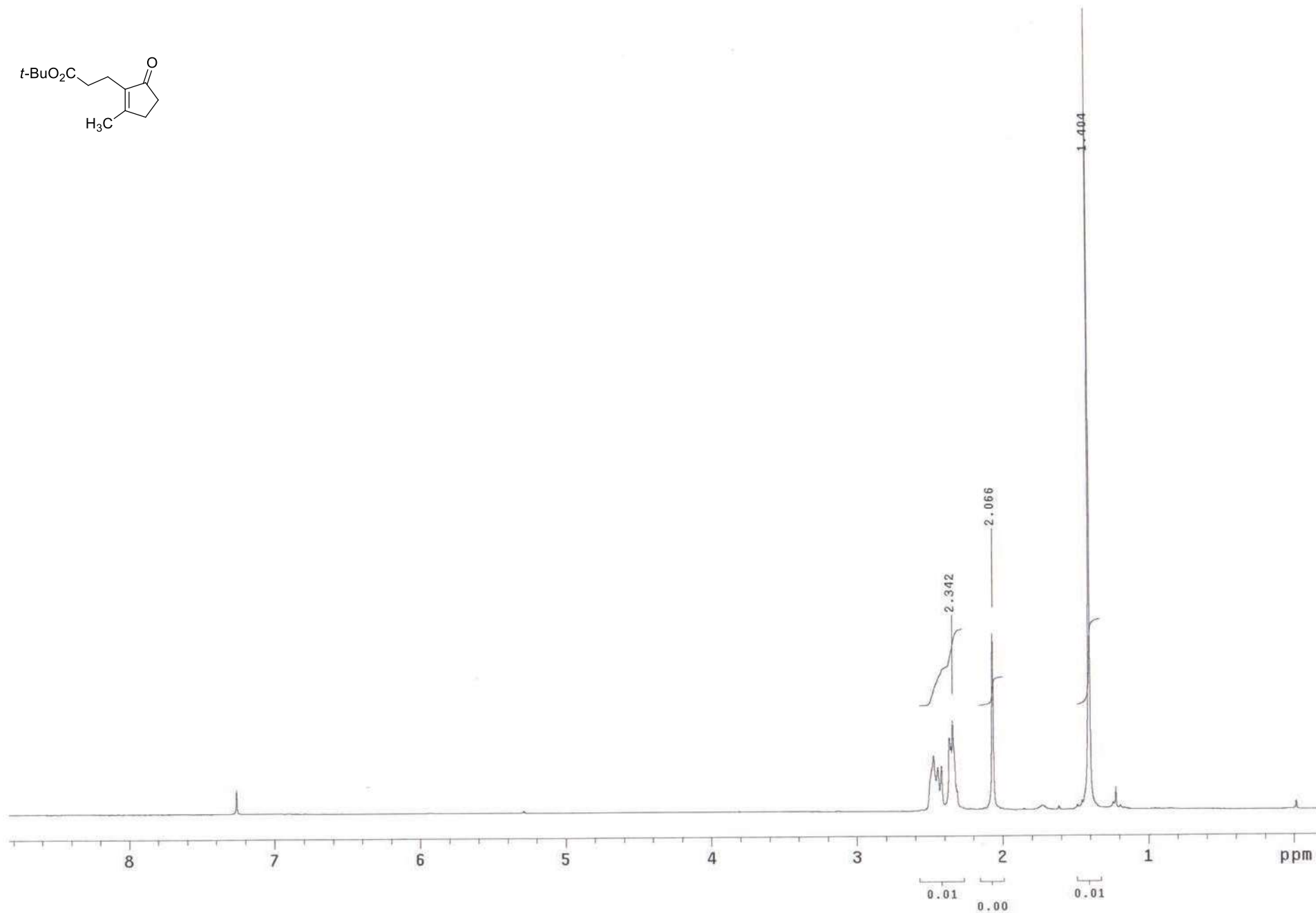
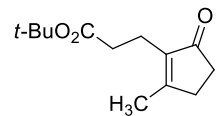
Methyl 2,5-dioxocyclopentanepropionate (2)- $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 75.4 MHz, 25 °C



Potassium 2-(*tert*-butoxycarbonyl)ethyltrifluoroborate (6)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 300 MHz, 25 °C

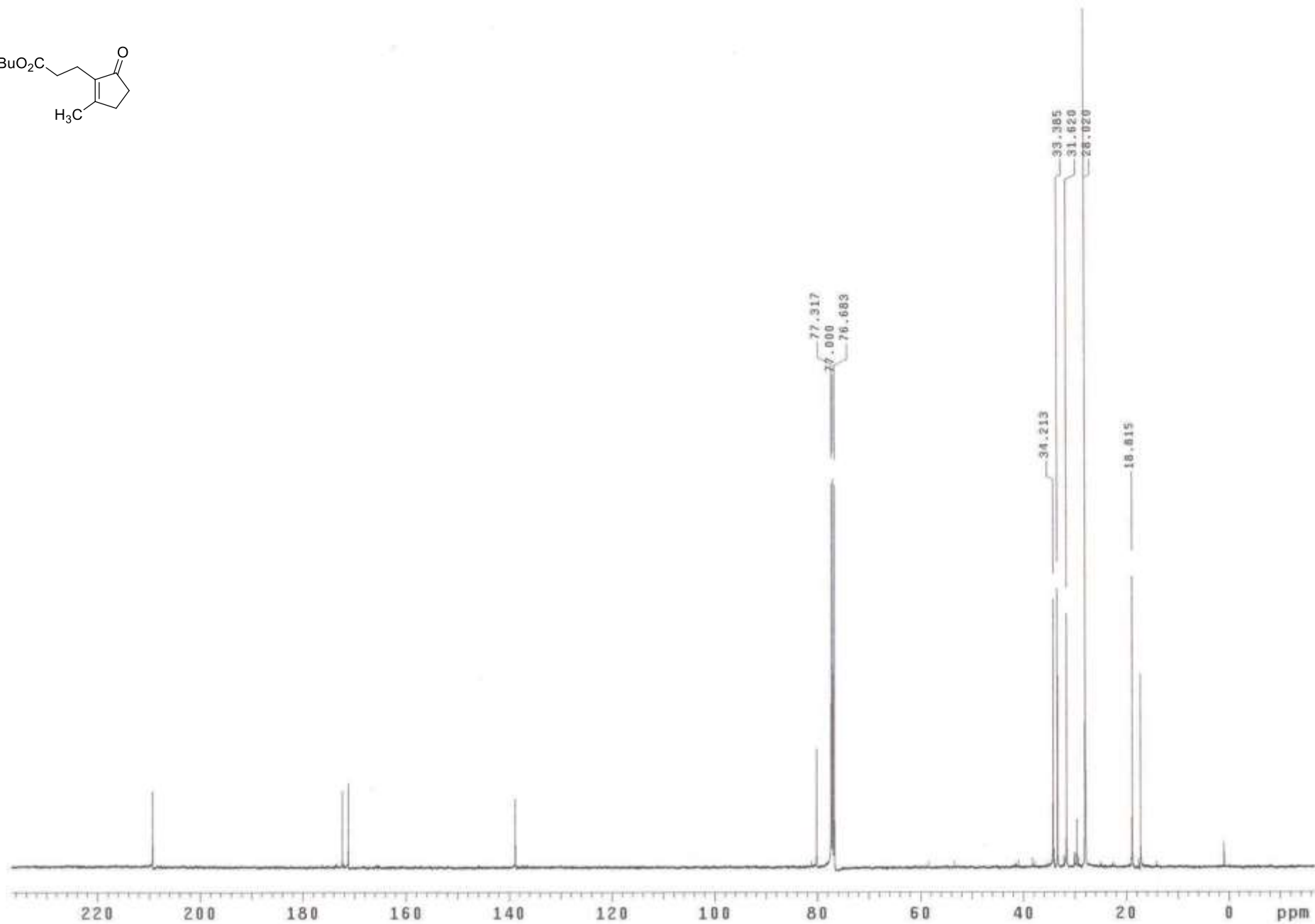
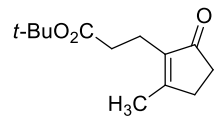


Potassium 2-(*tert*-butoxycarbonyl)ethyltrifluoroborate (6)-  $^{13}\text{C}$ -NMR,  $\text{CD}_3\text{OD}$ , 75.4 MHz, 25 °C

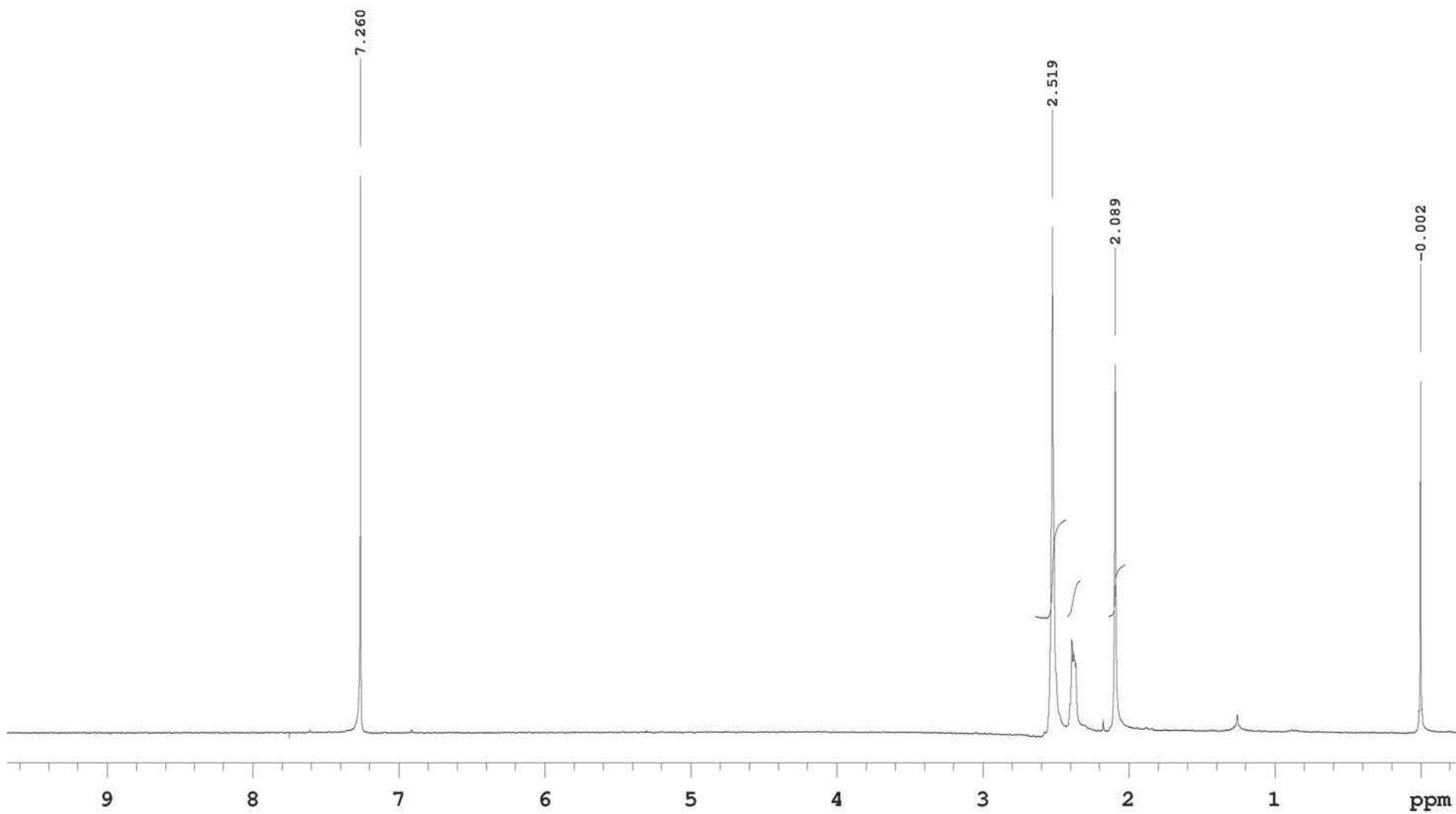
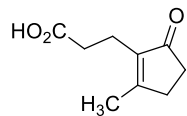


*tert*-Butyl 3-methyl-2-oxocyclopentenepropionate (4)-<sup>1</sup>H-NMR, CD<sub>3</sub>OD, 300 MHz, 25 °C

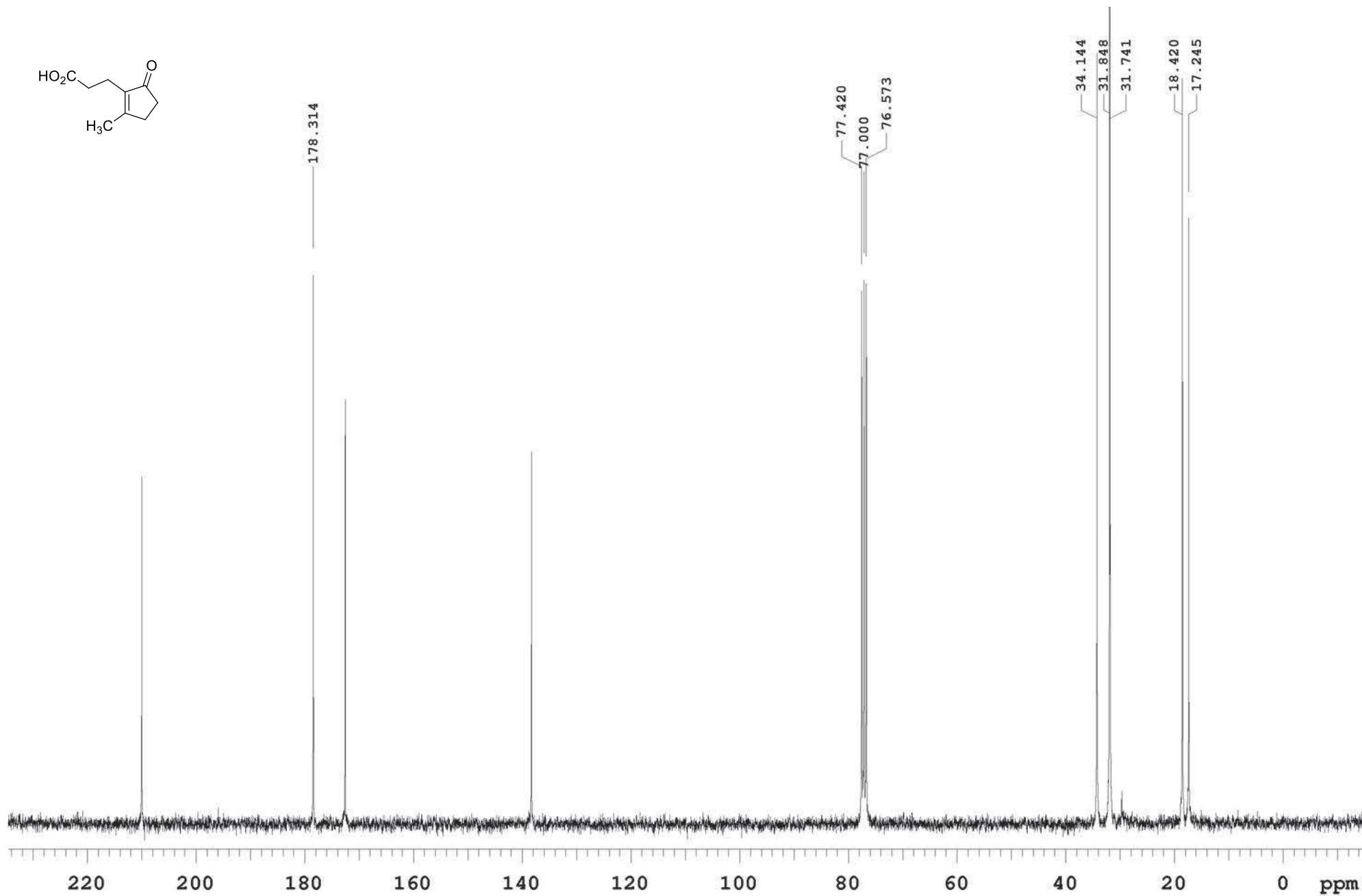
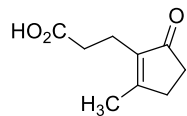




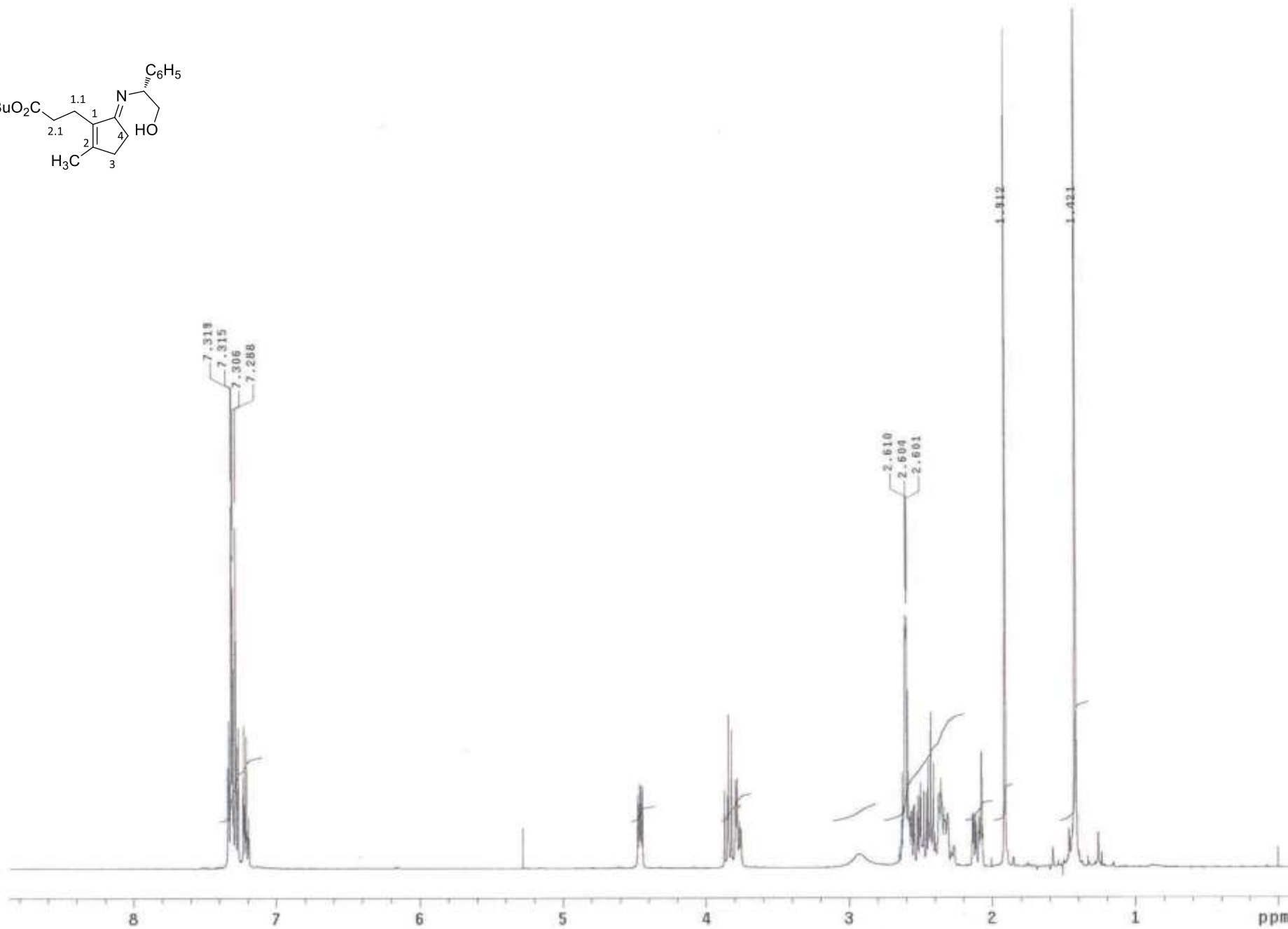
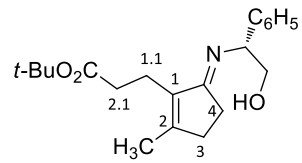
*tert*-Butyl 3-methyl-2-oxocyclopentenopropionate (4)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



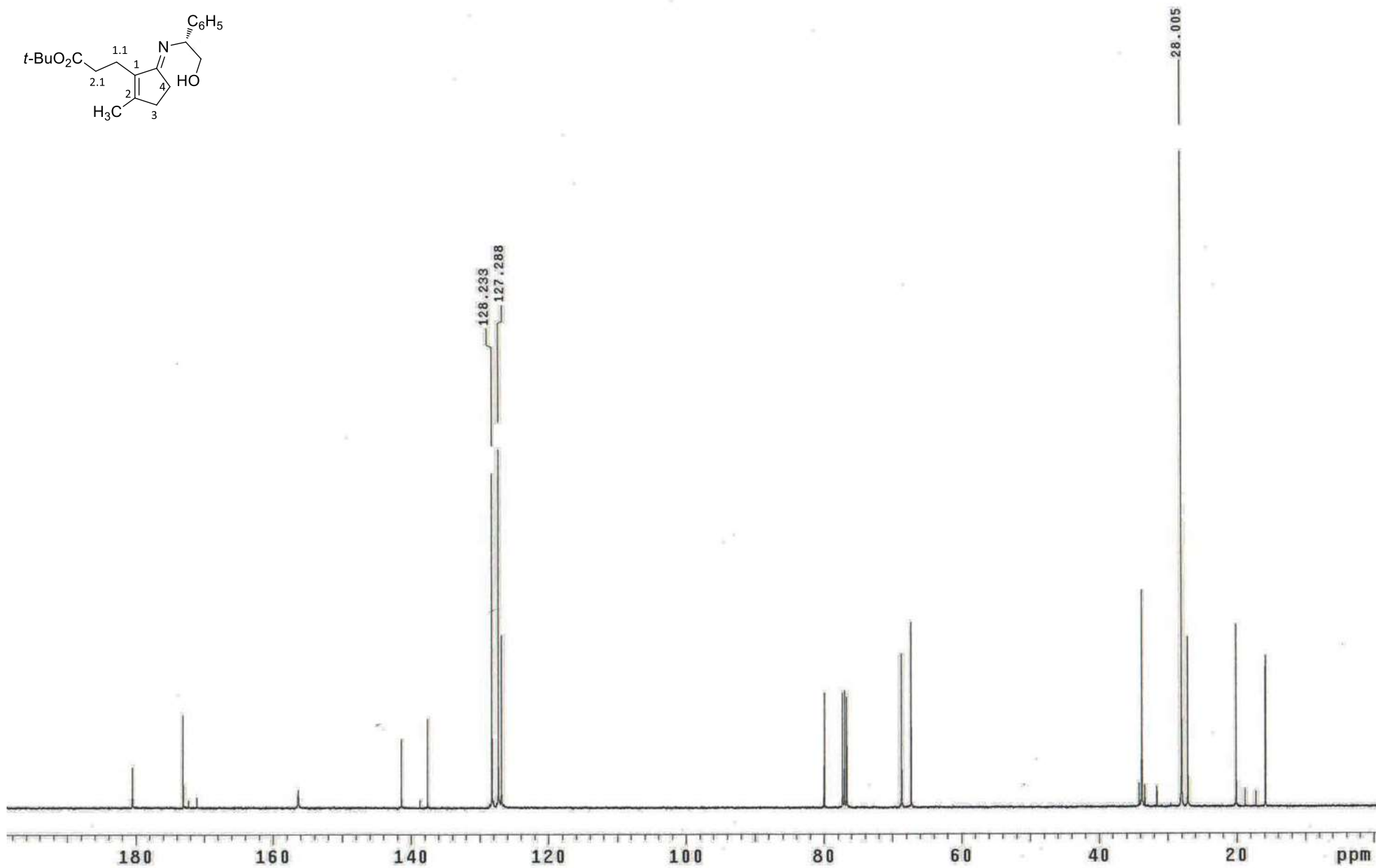
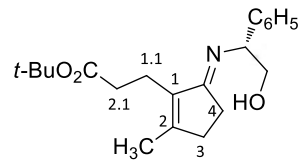
3-Methyl-5-oxo-2-cyclopentenepropionic acid (7)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 300 MHz, 25 °C



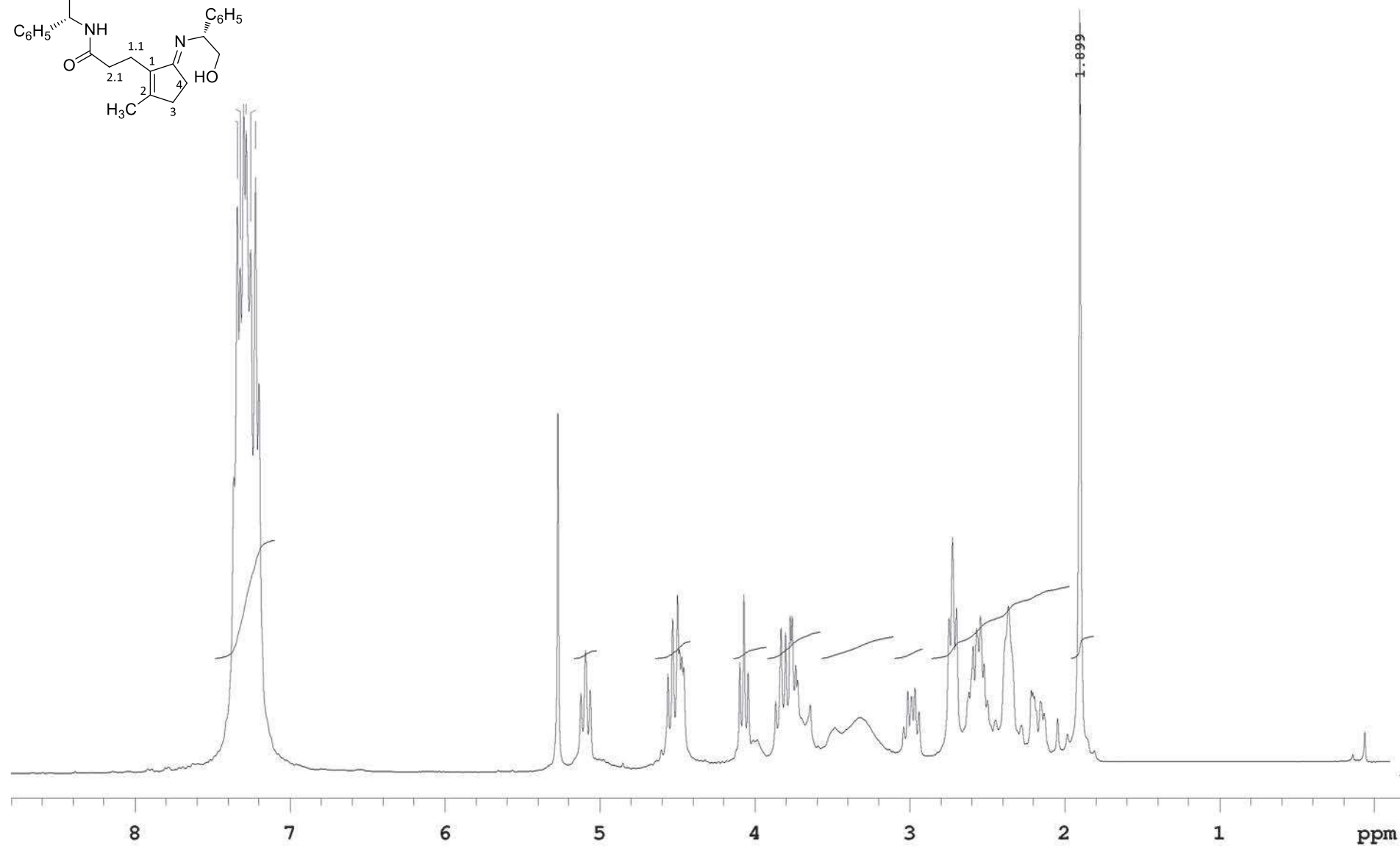
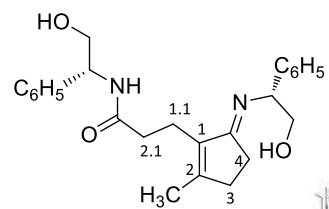
3-Methyl-5-oxo-2-cyclopentenepropionic acid (7)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 75.4 MHz, 25 °C



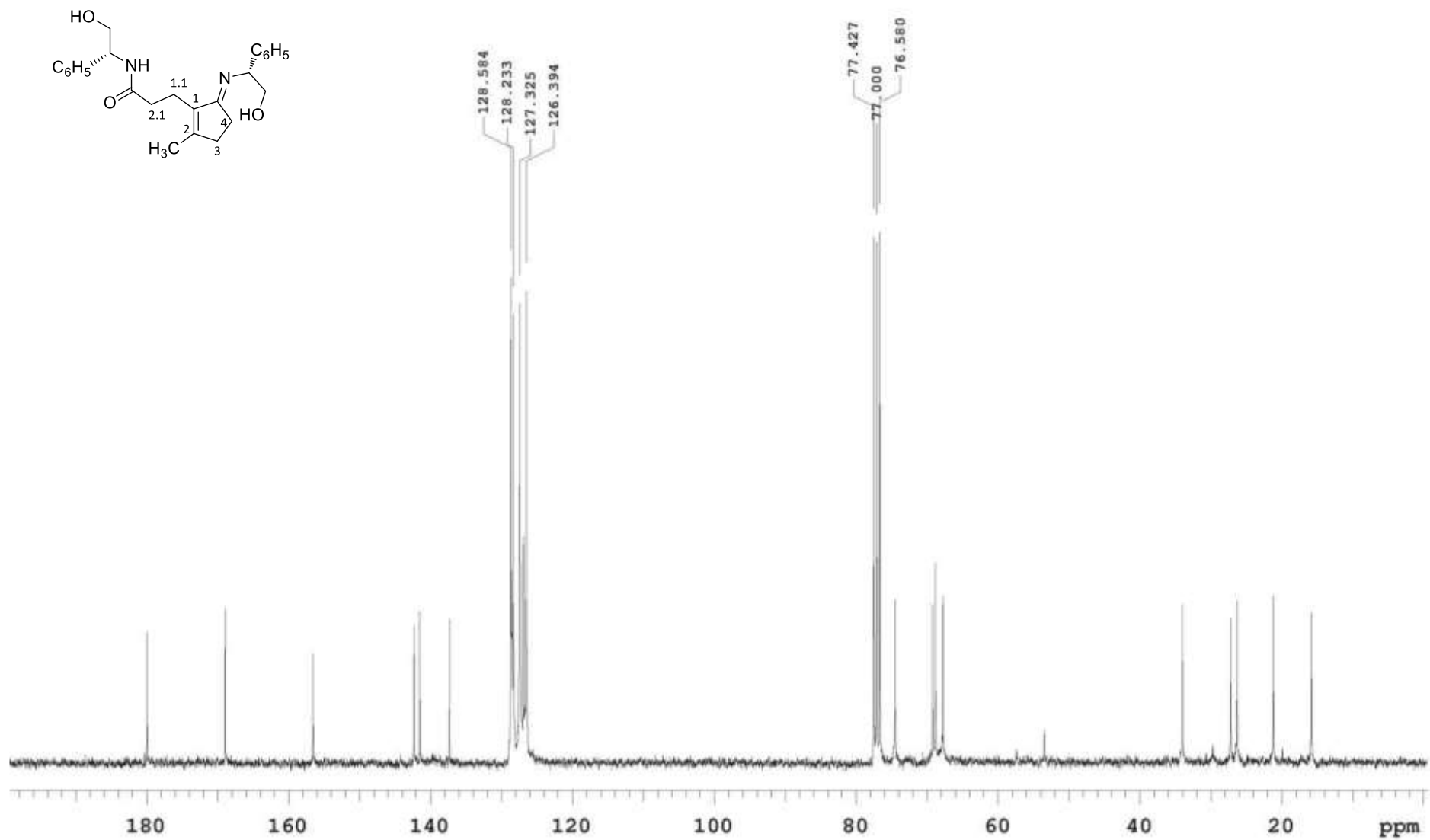
*tert*-Butyl (*R*)-5-[*N*-(2-hydroxy-1-phenylethyl)imino]-2-methyl-1-cyclopentenepropionate (8)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



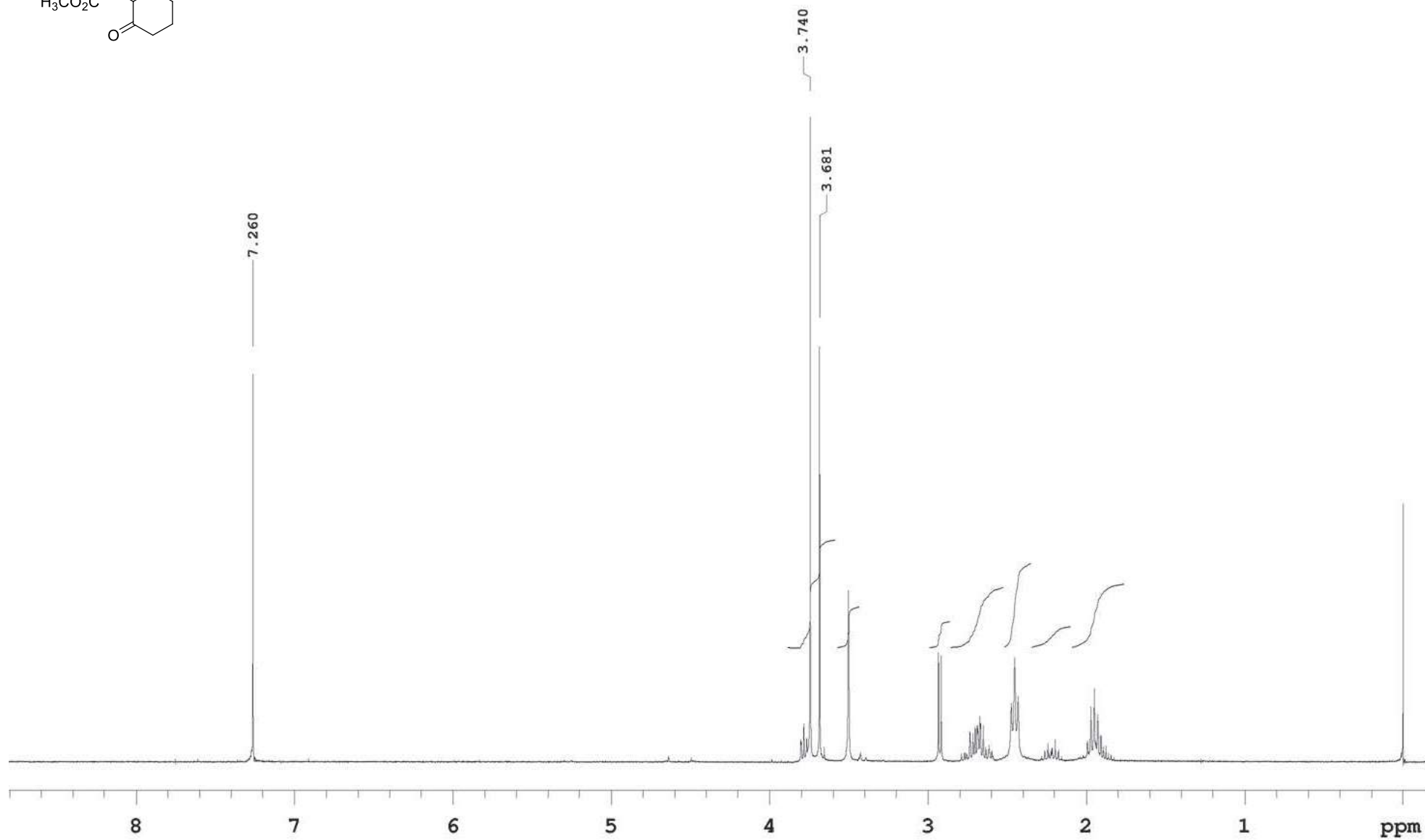
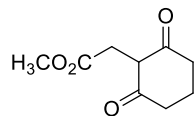
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N-[(1R)-2-hydroxy-1-phenylethyl]-5-[[[(1R)-N-(2-hydroxy-1-phenylethyl)imino]]-2-methyl-1-cyclopentenepropionamide (9)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 300 MHz, 25 °C

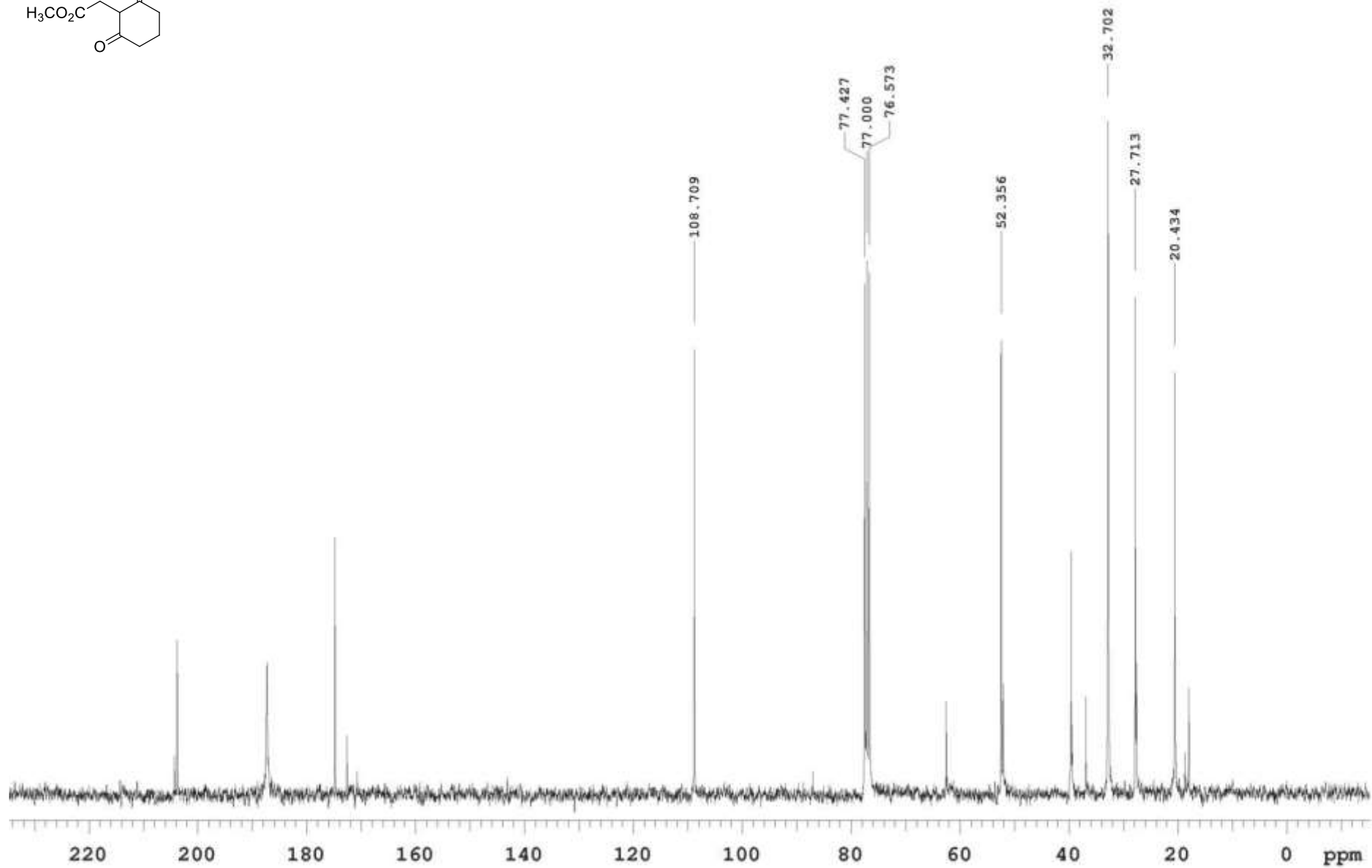
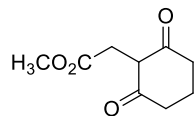


N-[(1R)-2-hydroxy-1-phenylethyl]-5-[[[(1R)-N-(2-hydroxy-1-phenylethyl)imino]]-2-methyl-1-cyclopentenpropionamide (9)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 75.4 MHz, 25 °C

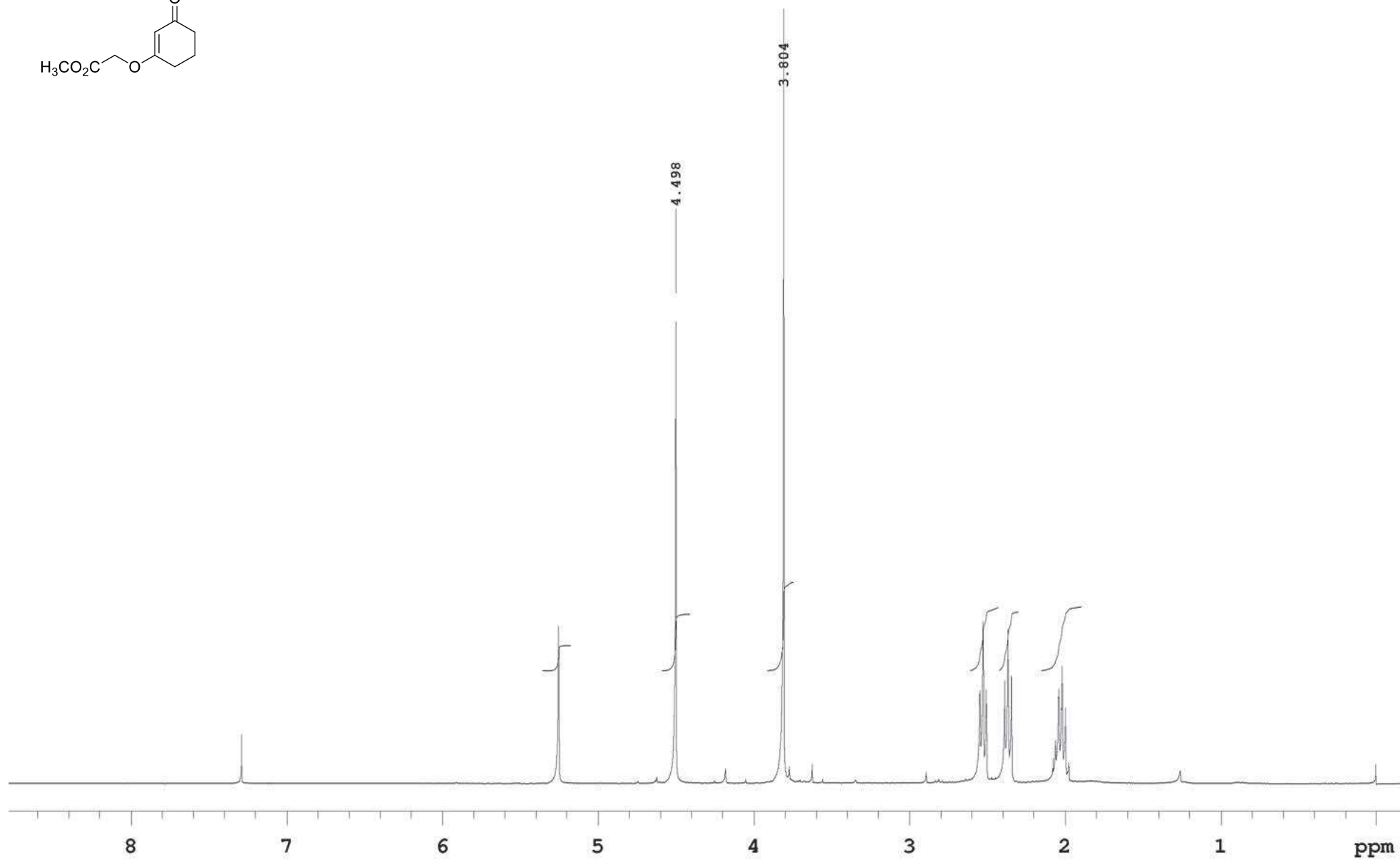
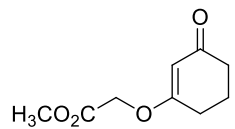


Methyl 2,6-dioxocyclohexaneacetate (12)- $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 300 MHz, 25 °C

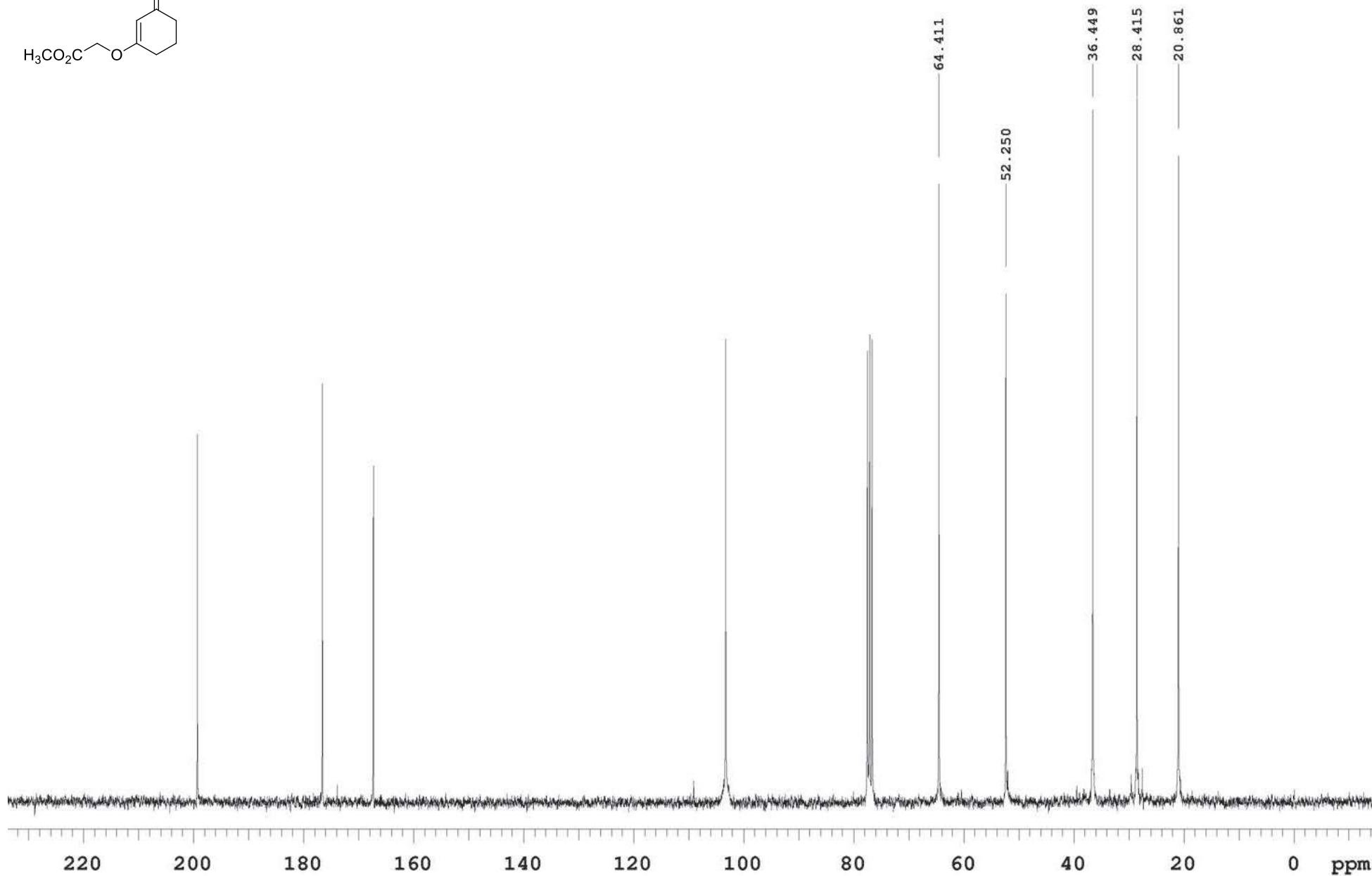
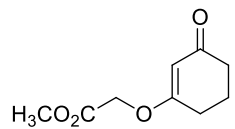




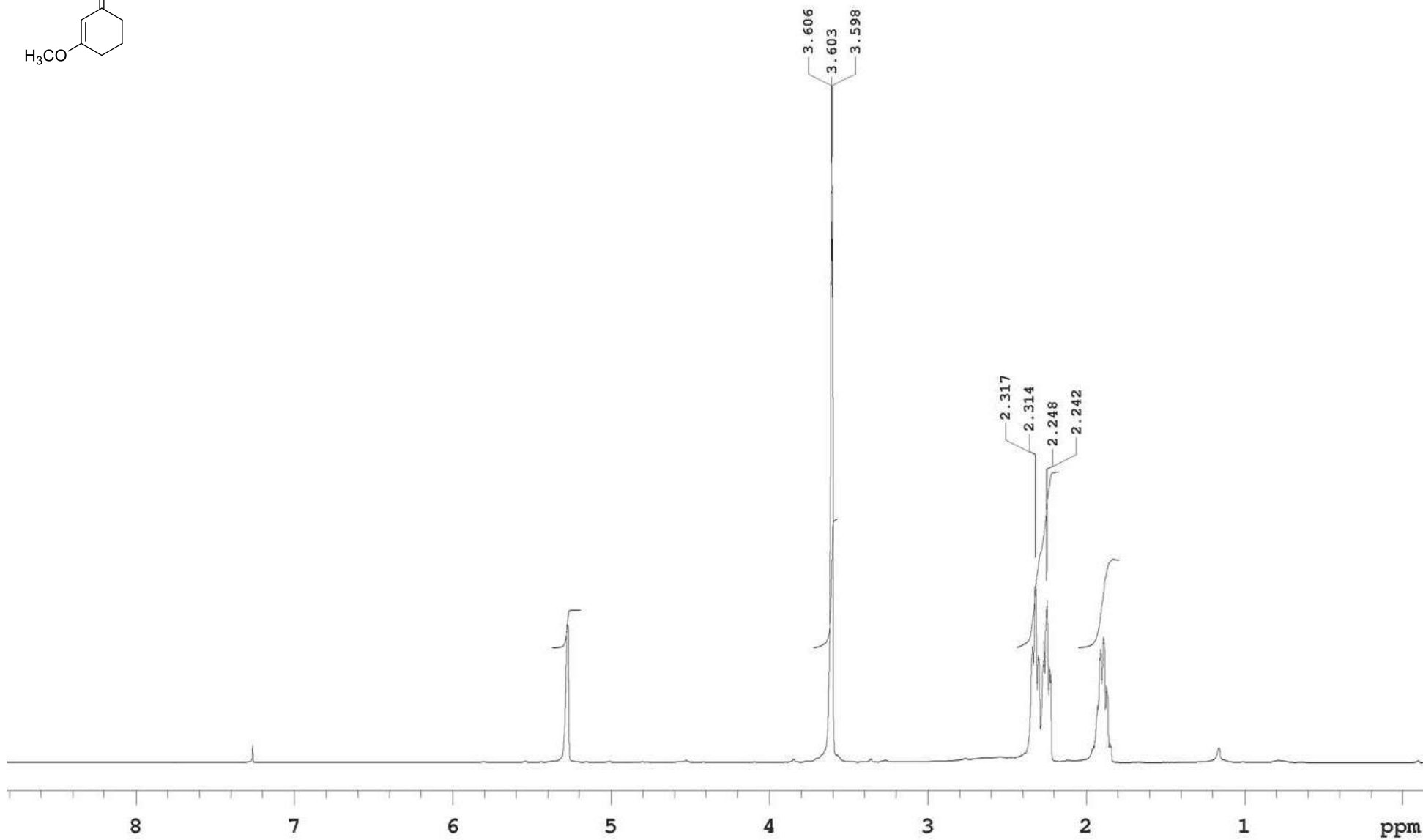
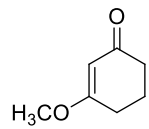
Methyl 2,6-dioxocyclohexaneacetate (12)-  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 75.4 MHz, 25 °C



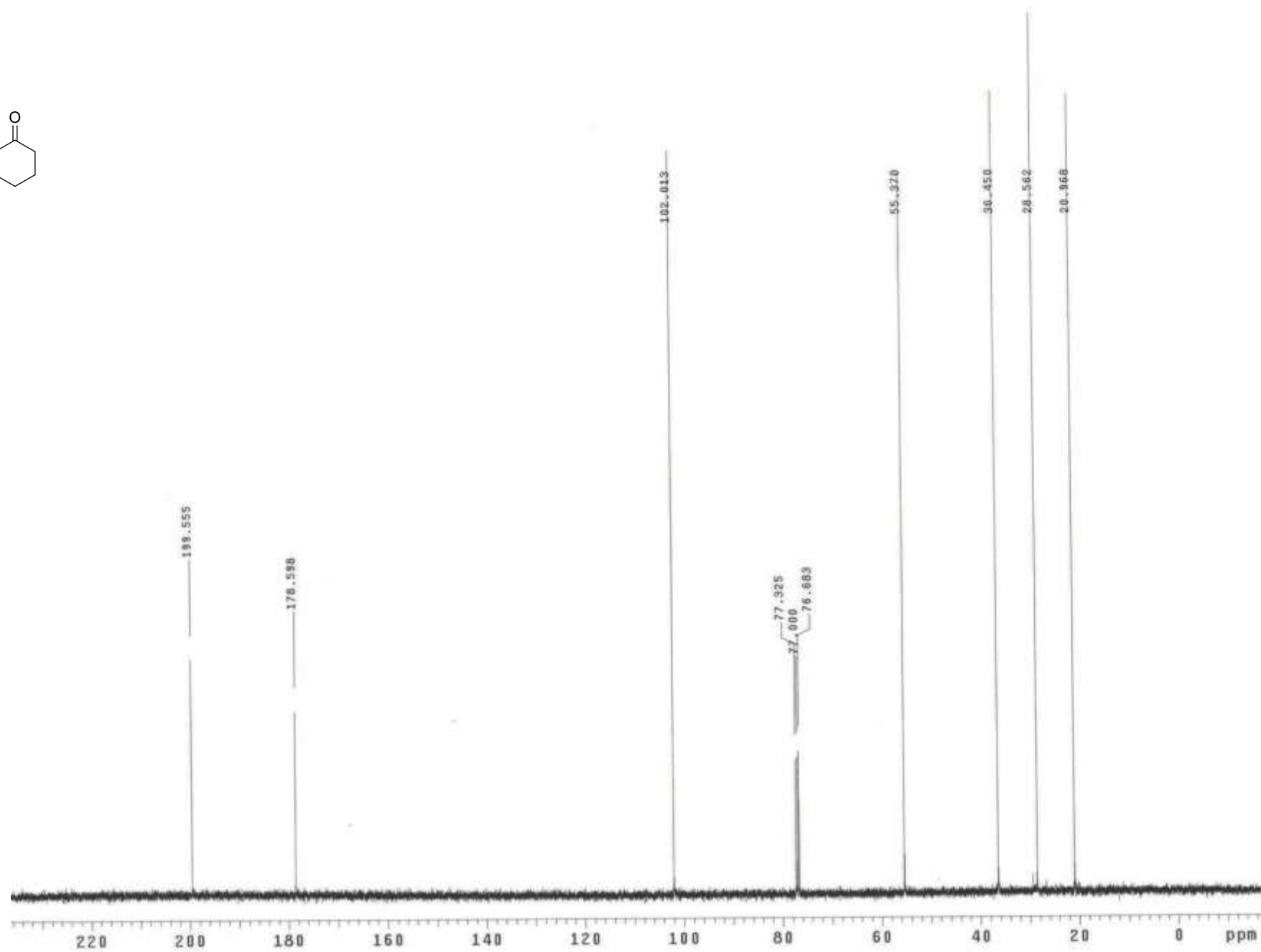
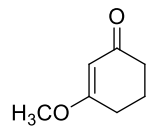
Methyl (3-oxocyclohex-1-enyloxy)acetate (13)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 300 MHz, 25  $^\circ\text{C}$



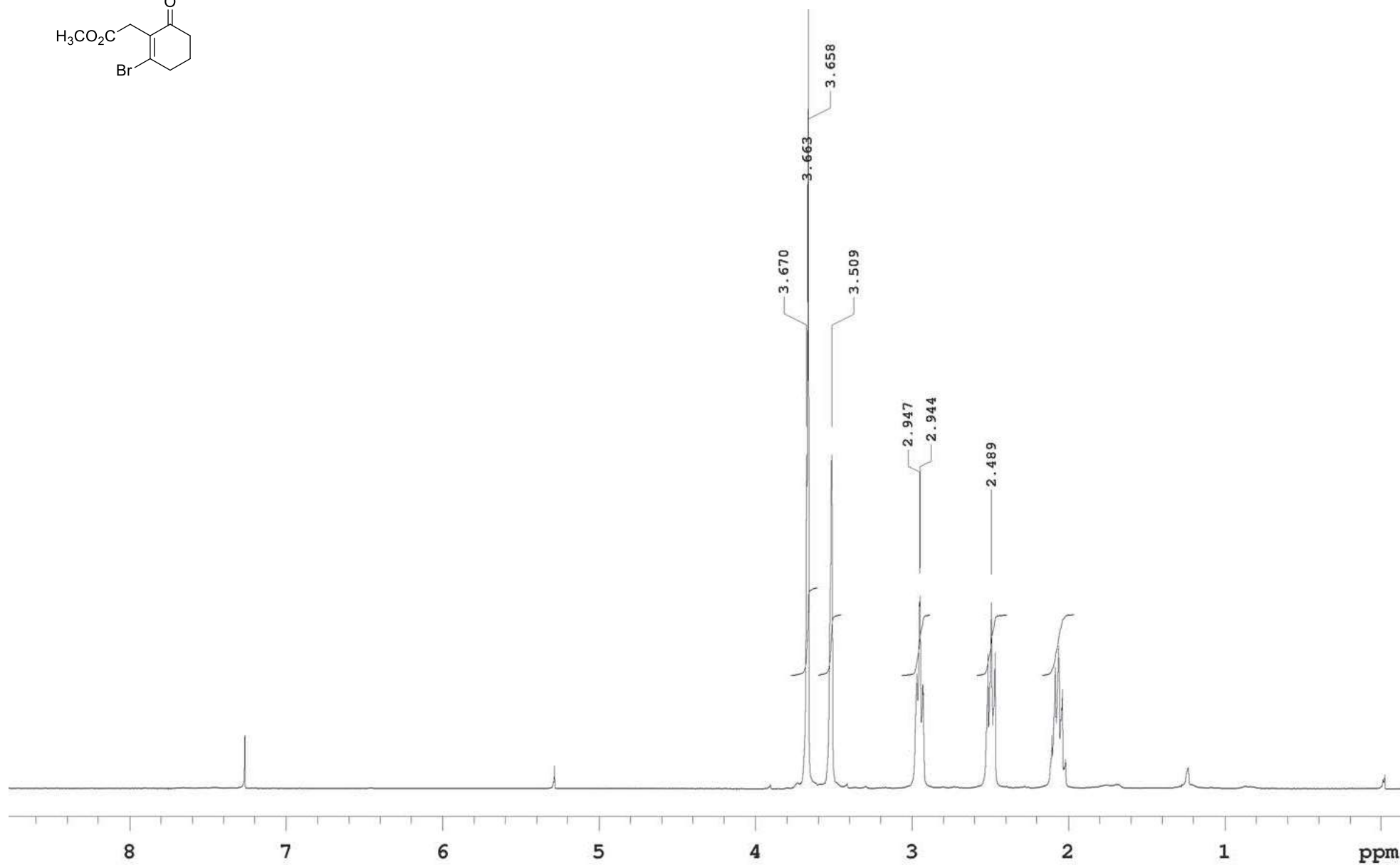
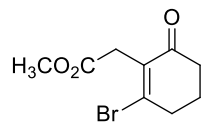
Methyl (3-oxocyclohex-1-en-1-yloxy)acetate (13)- $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 75.4 MHz, 25 °C



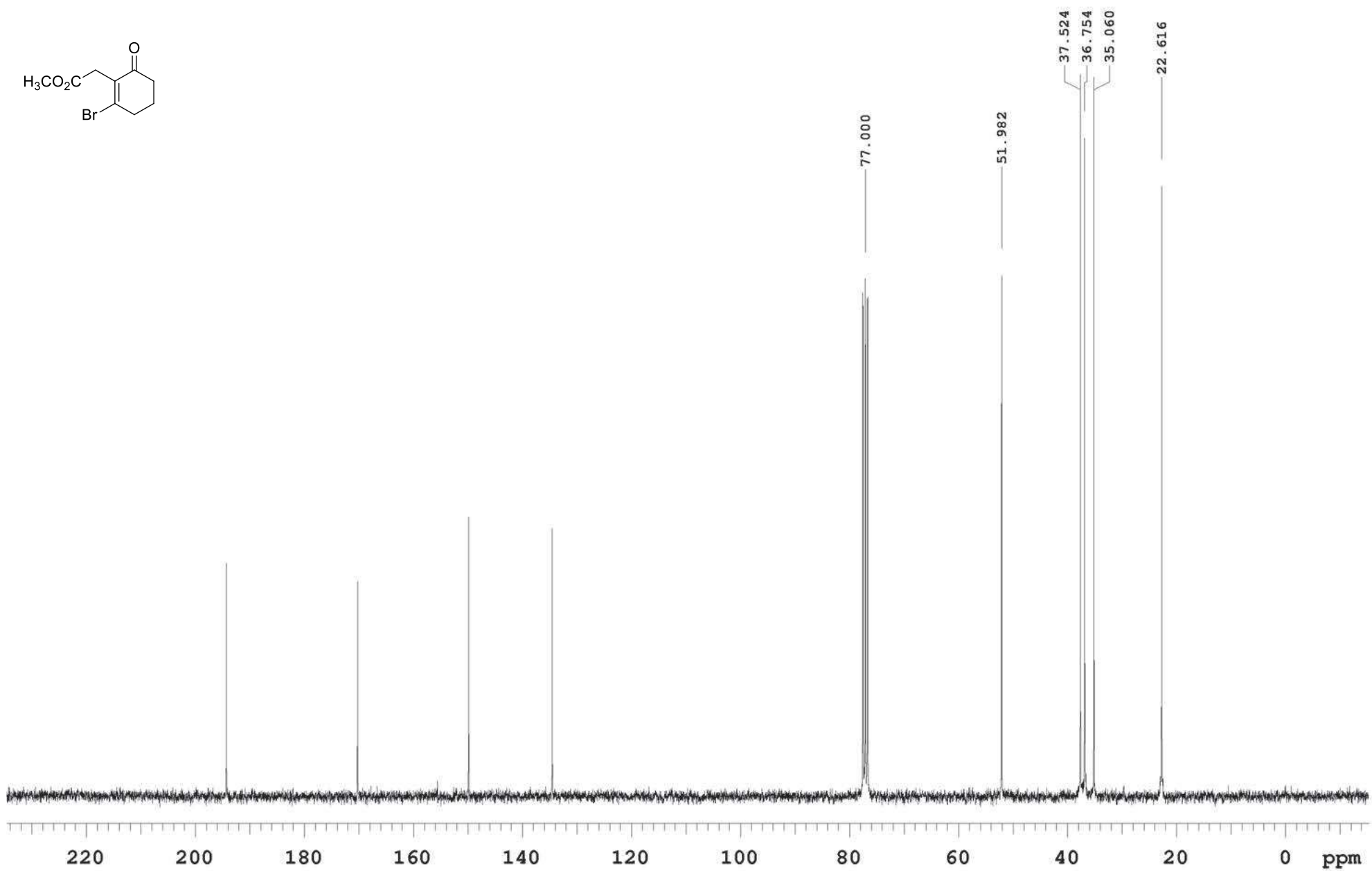
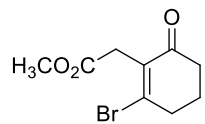
3-Methoxycyclohex-2-enone (14)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 300 MHz, 25 °C



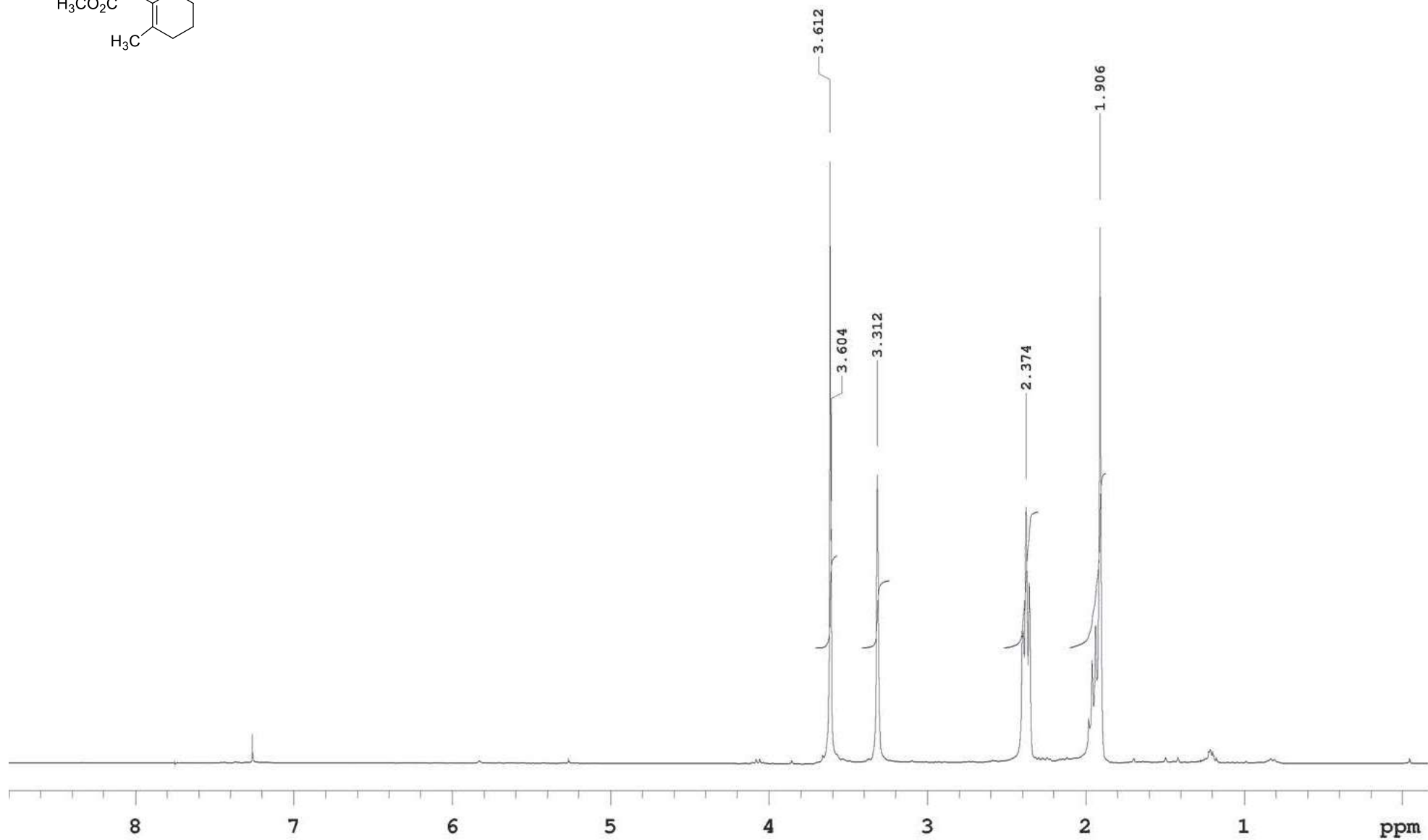
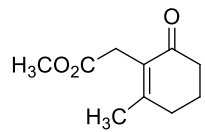
3-Methoxycyclohex-2-enone (14)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 75.4 MHz, 25 °C



Methyl 2-bromo-6-oxocyclohexeneacetate (15)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 300 MHz, 25 °C

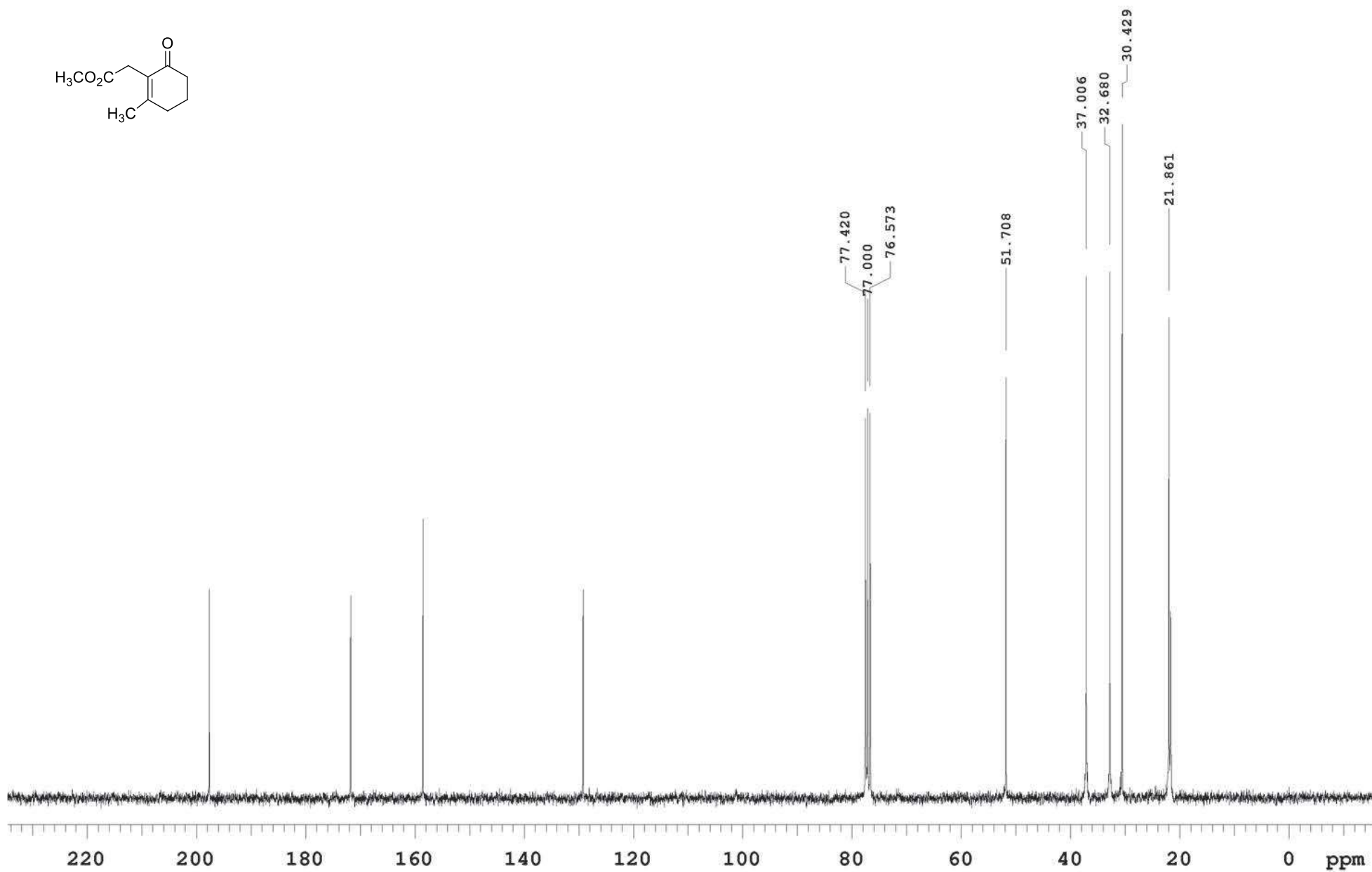
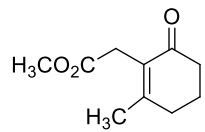


Methyl 2-bromo-6-oxocyclohexeneacetate (15)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 75.4 MHz, 25 °C

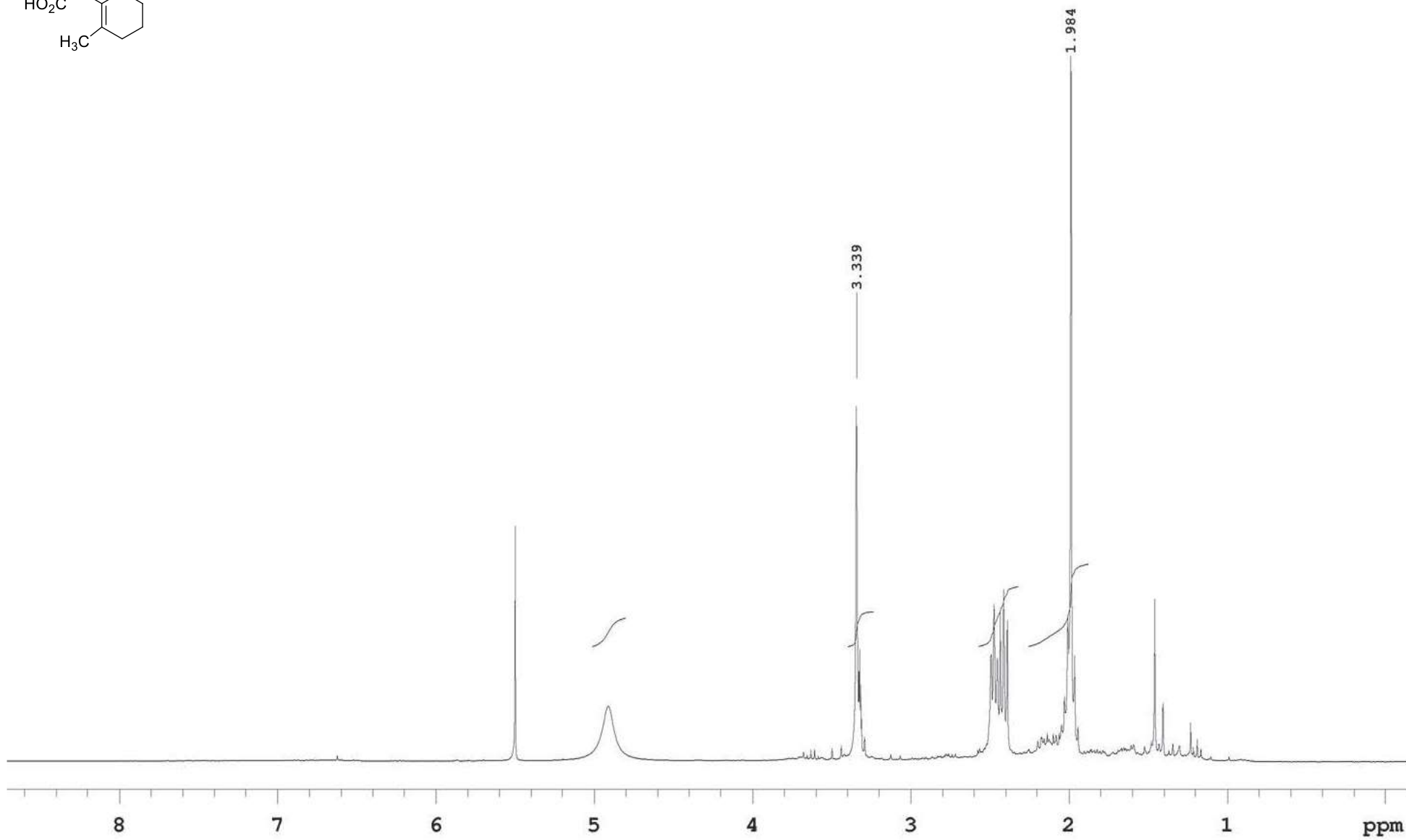
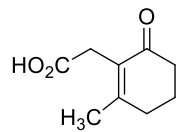


Methyl 2-methyl-6-oxocyclohexeneacetate (16)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 300 MHz, 25 °C

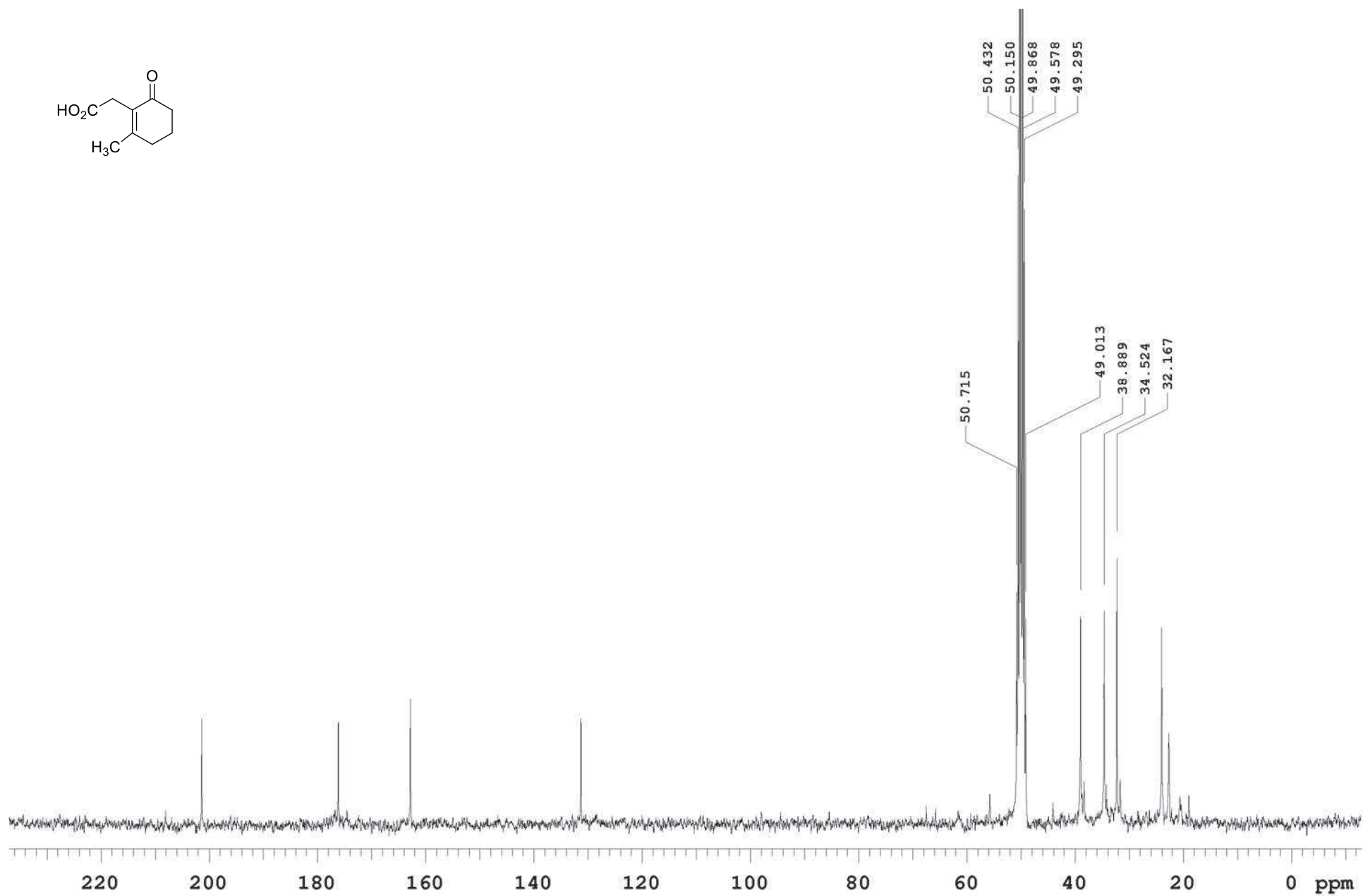
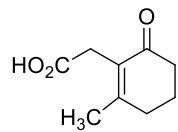




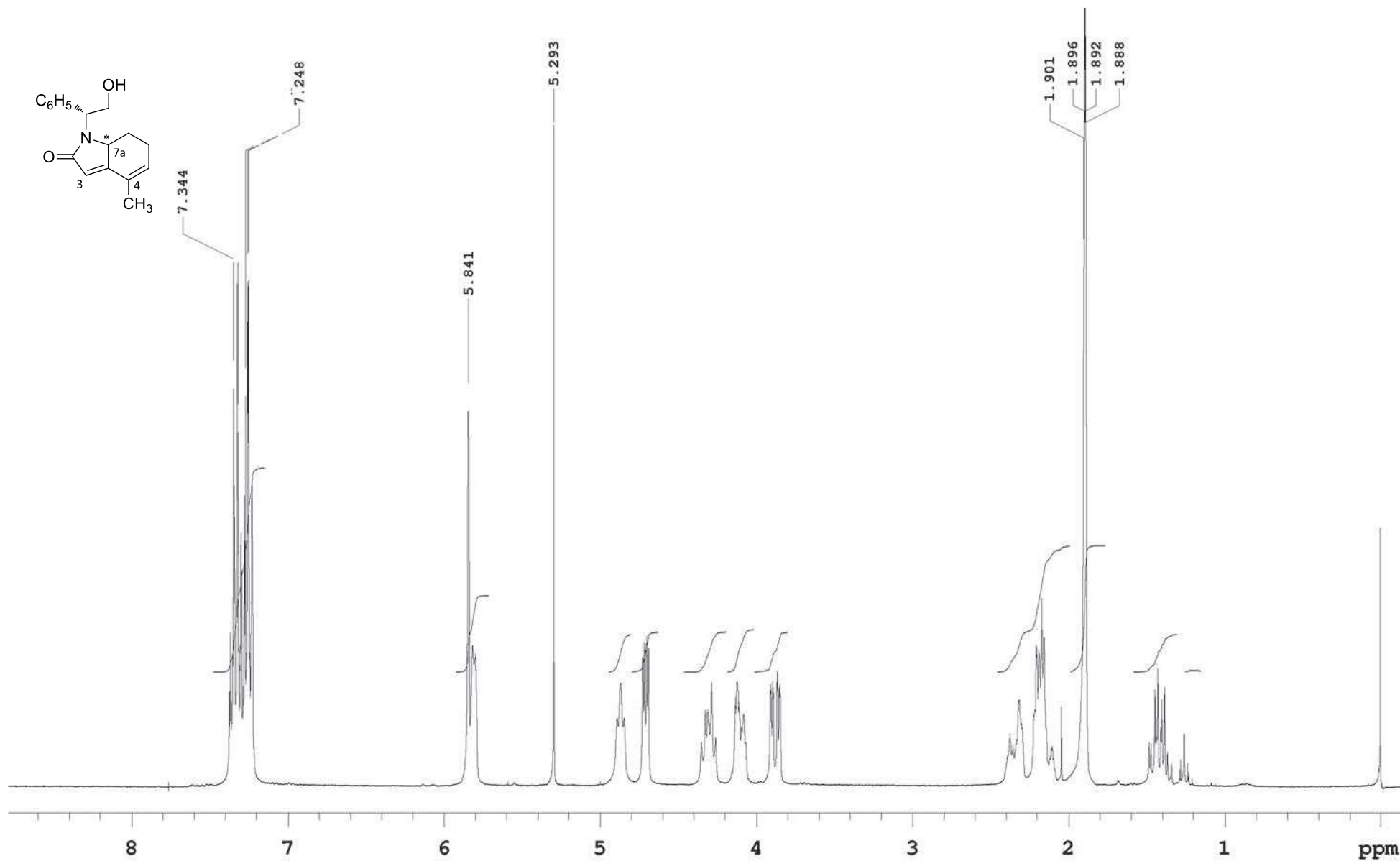
Methyl 2-methyl-6-oxocyclohexeneacetate (16)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 75.4 MHz, 25 °C



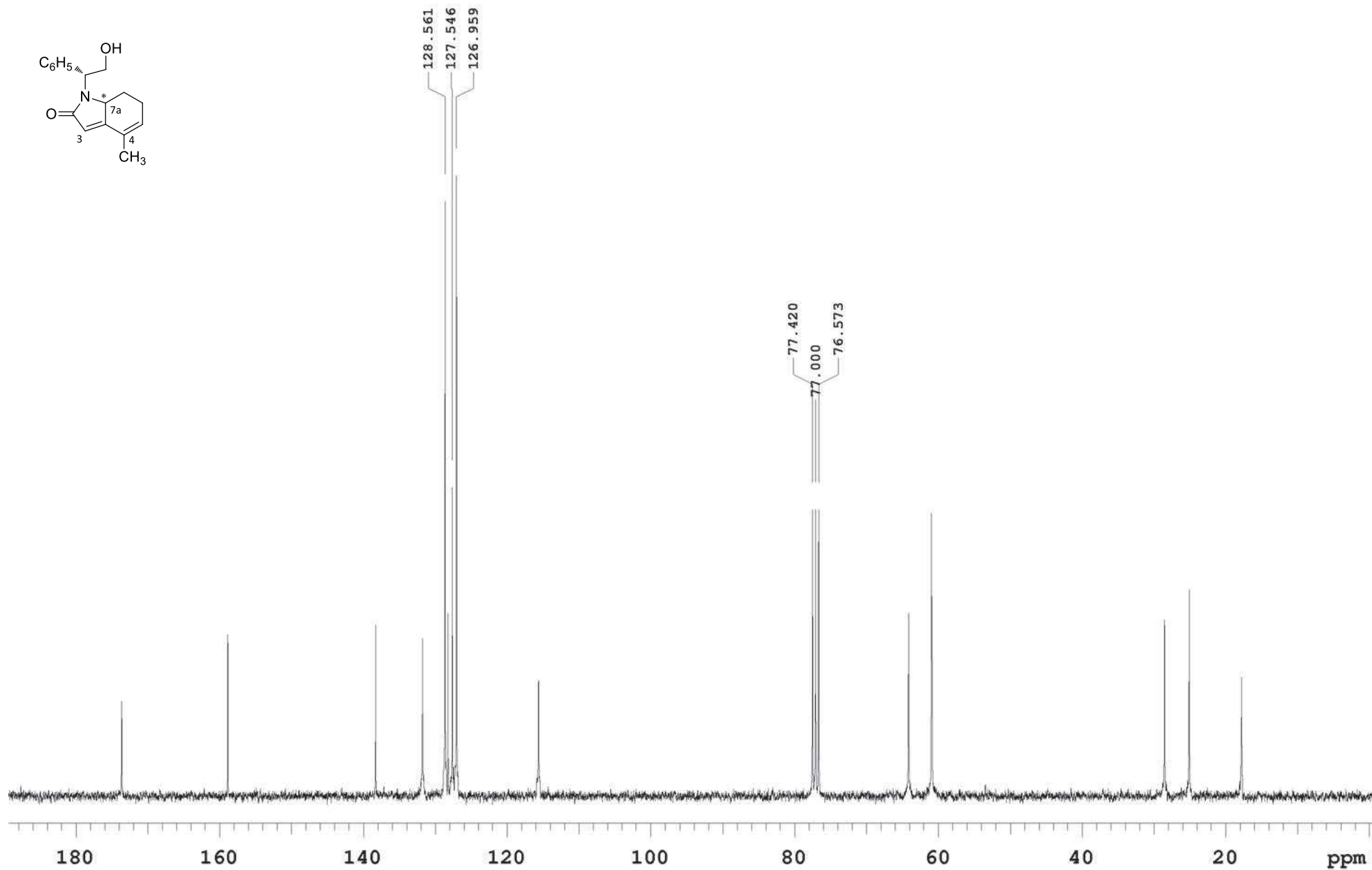
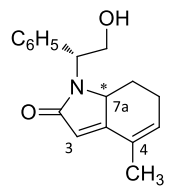
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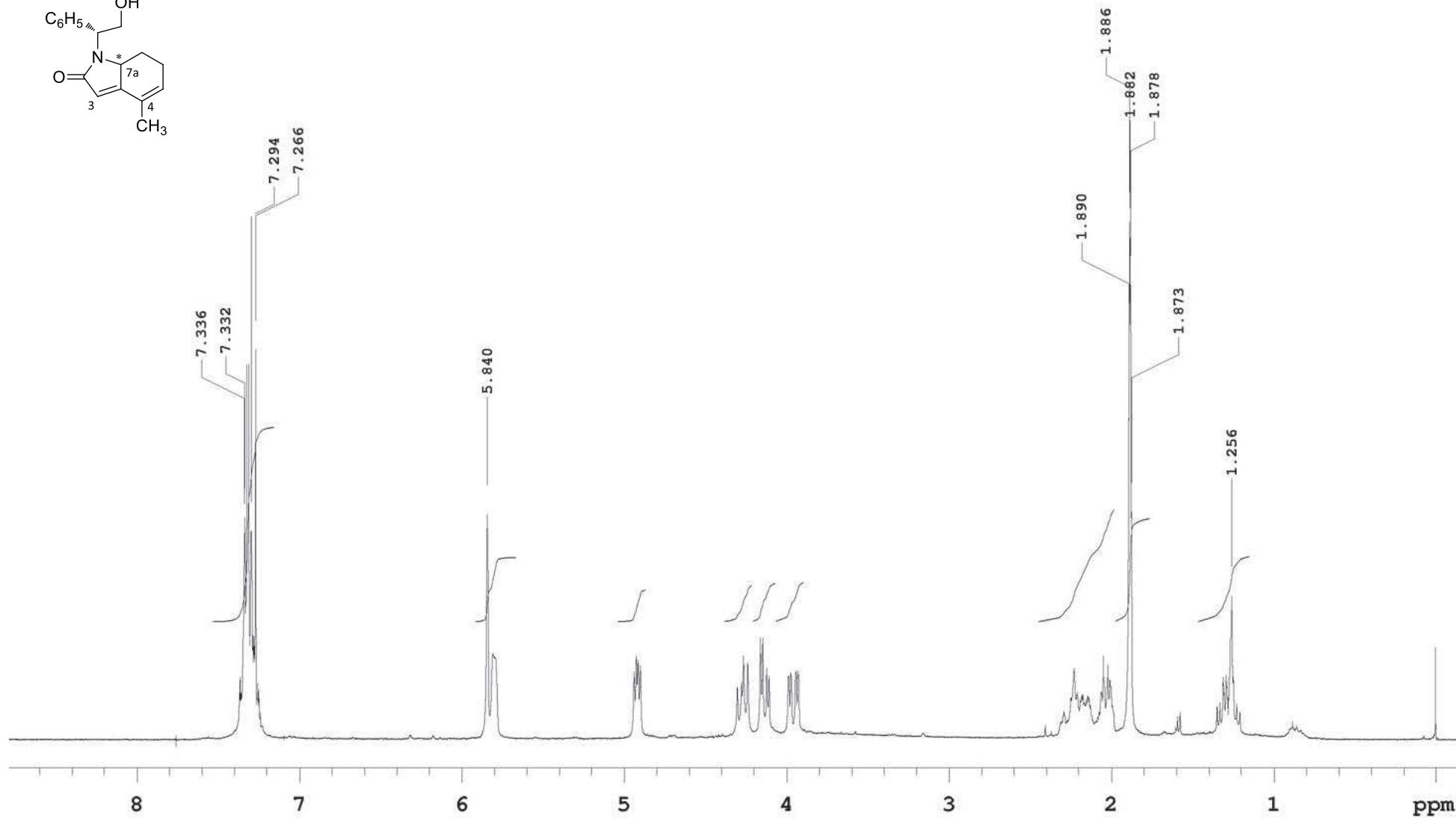
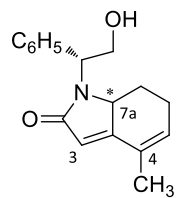
2-Methyl-6-oxocyclohexeneacetic acid (17)- <sup>13</sup>C-NMR, CD<sub>3</sub>OD, 75.4 MHz, 25 °C



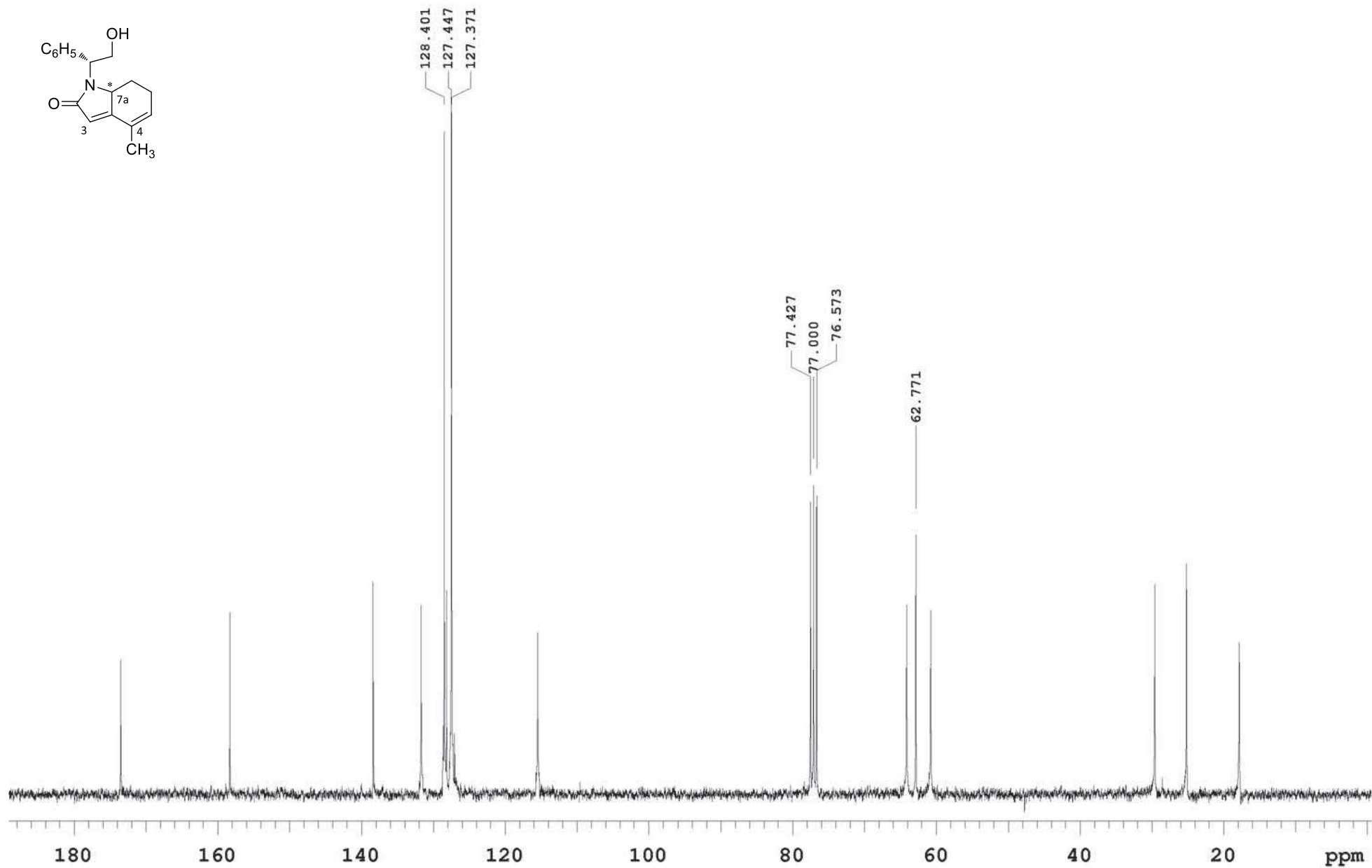
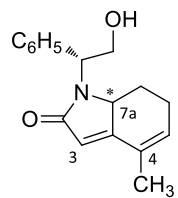
1-[(1R)-2-Hydroxy-1-phenylethyl]-4-methyl-2-oxo-2,6,7,7a-tetrahydroindole (18a)-  $^1\text{H-NMR}$ , CDCl<sub>3</sub>, 300 MHz, 25 °C



1-[(1*R*)-2-Hydroxy-1-phenylethyl]-4-methyl-2-oxo-2,6,7,7a-tetrahydroindole (18a)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 75.4 MHz, 25 °C



1-[(1R)-2-Hydroxy-1-phenylethyl]-4-methyl-2-oxo-2,6,7,7a-tetrahydroindole (18b)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 300 MHz, 25 °C

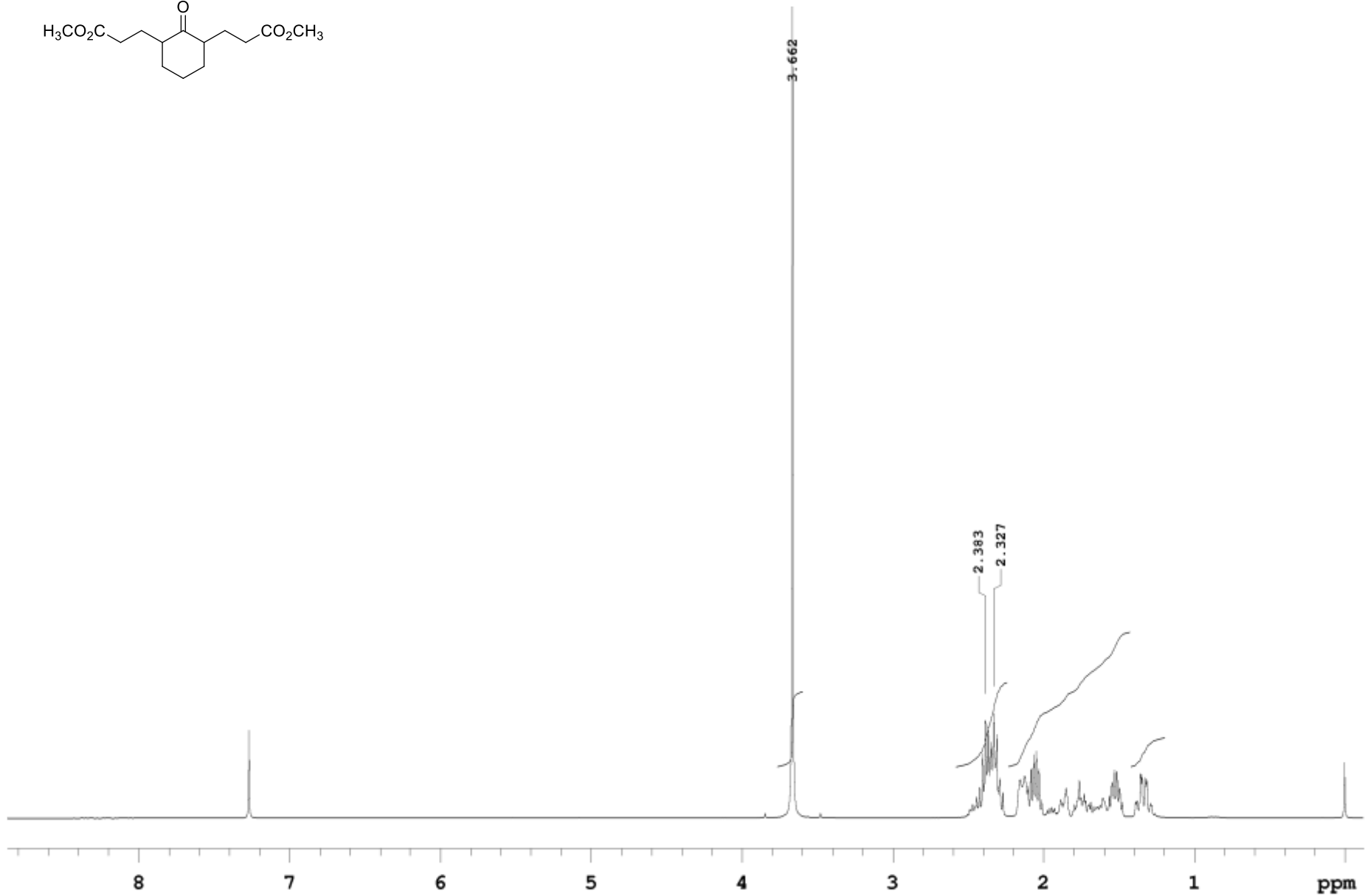
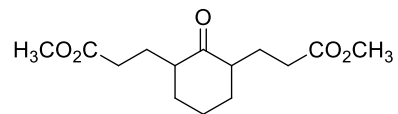


1-[(1R)-2-Hydroxy-1-phenylethyl]-4-methyl-2-oxo-2,6,7,7a-tetrahydroindole (18a)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 75.4 MHz, 25 °C

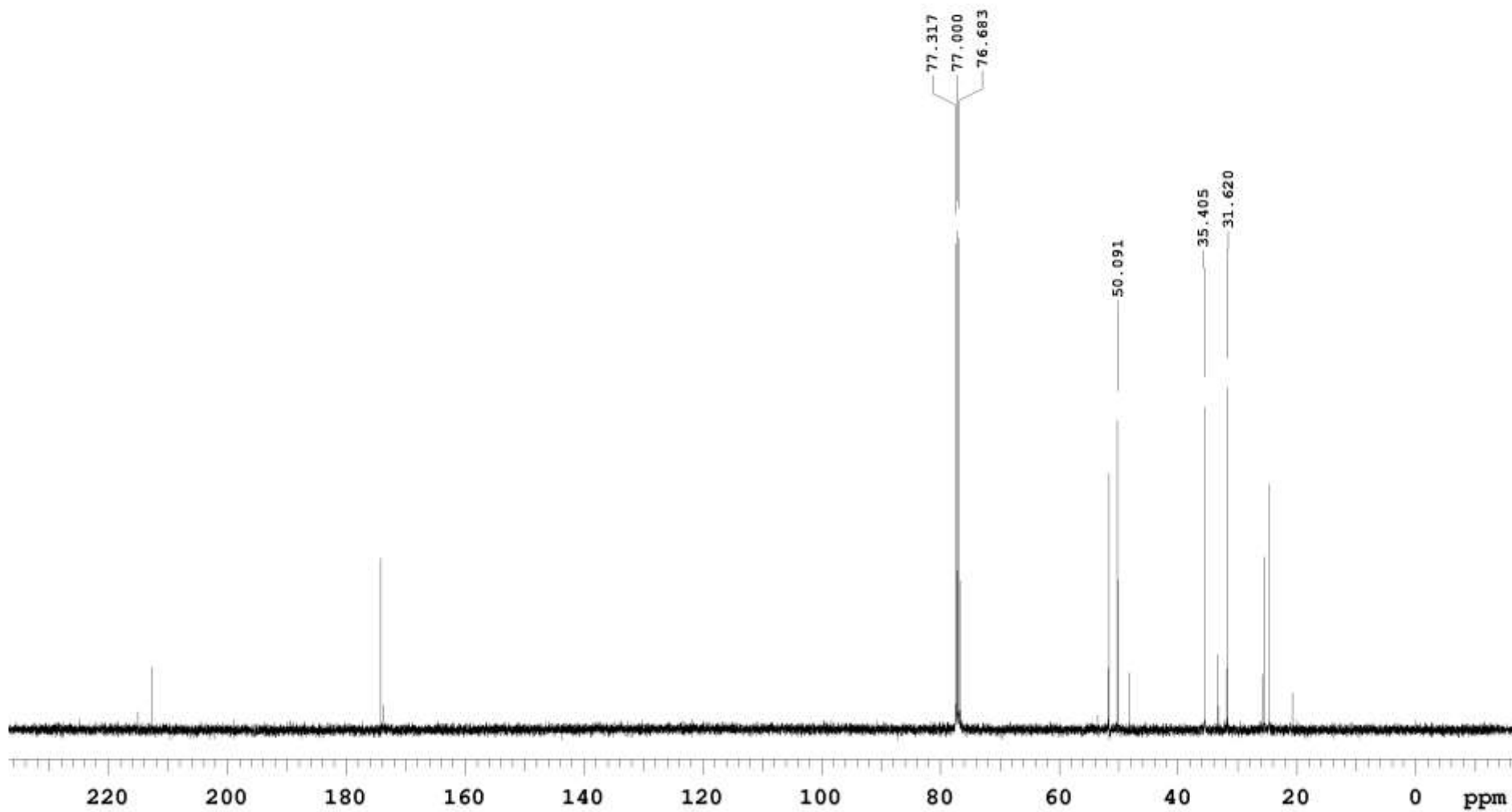
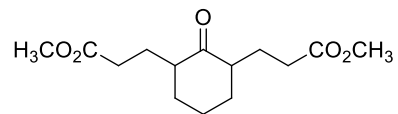
$^1\text{H}$  and  $^{13}\text{C}$  SPECTRA CHAPTER 3



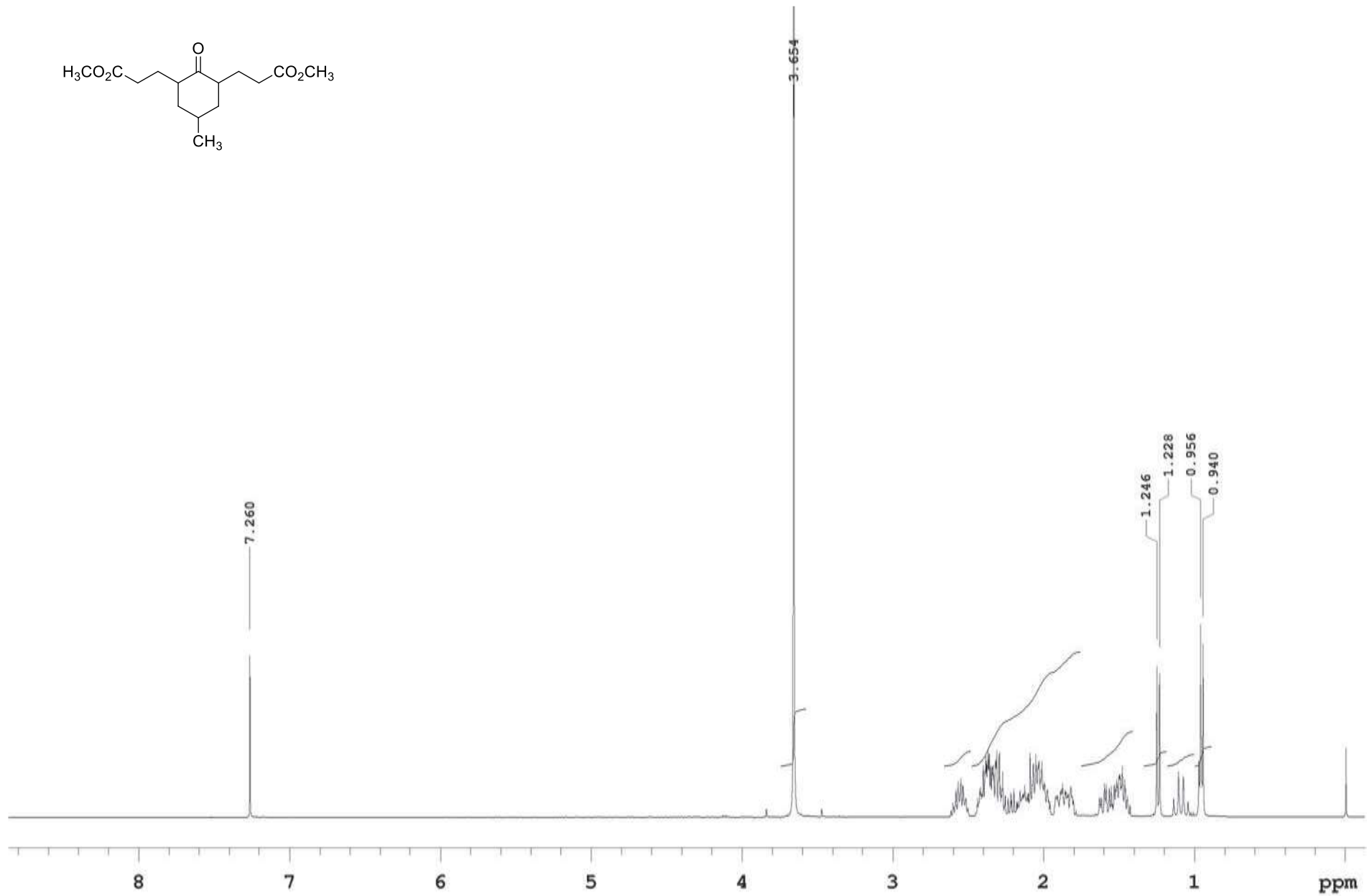
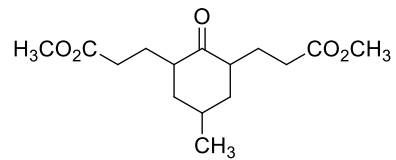




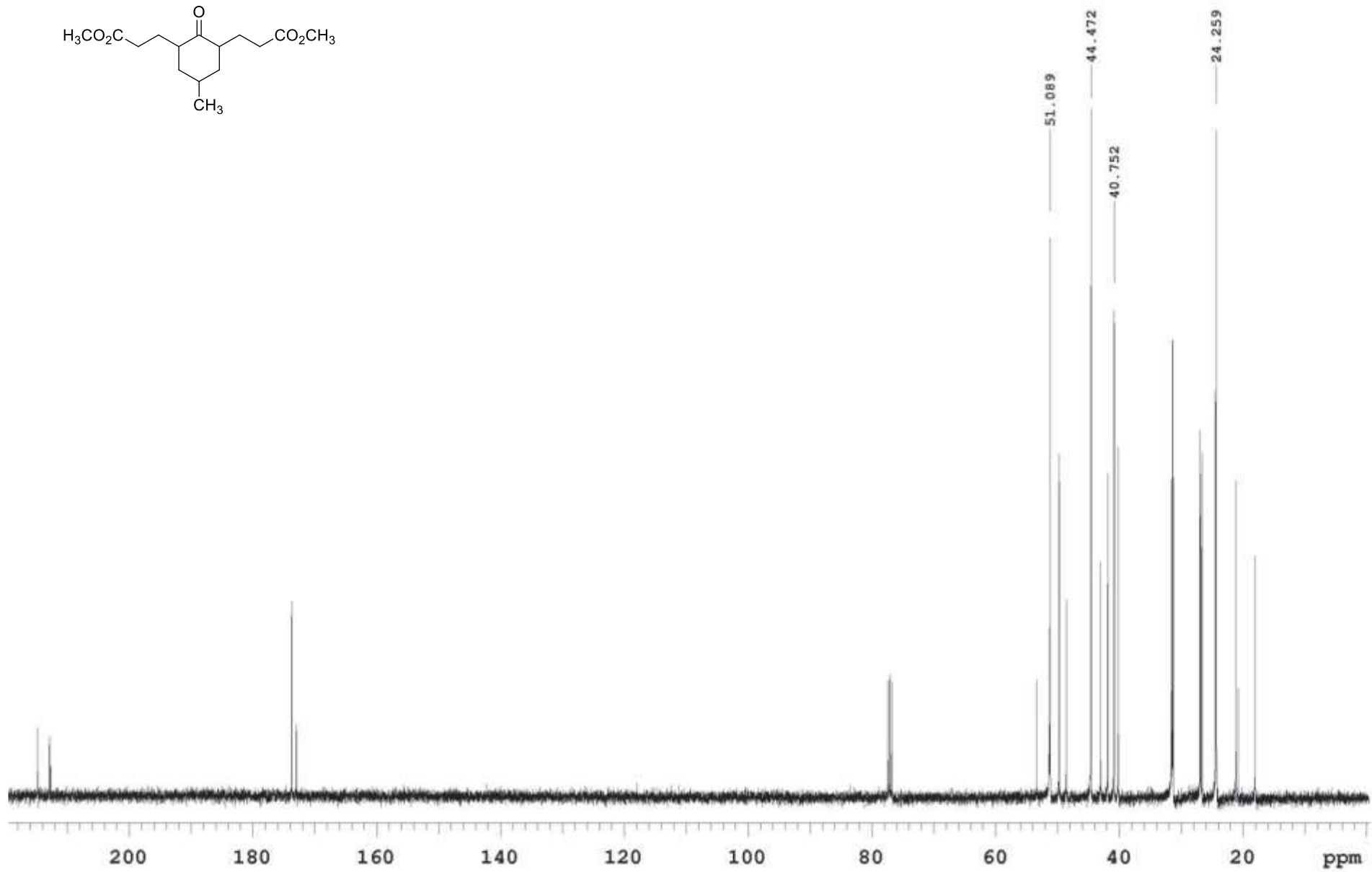
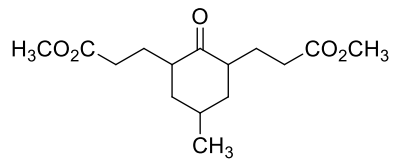
Dimethyl 2-oxo-1,3-cyclohexanedipropionate (20)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 400 MHz, 25 °C



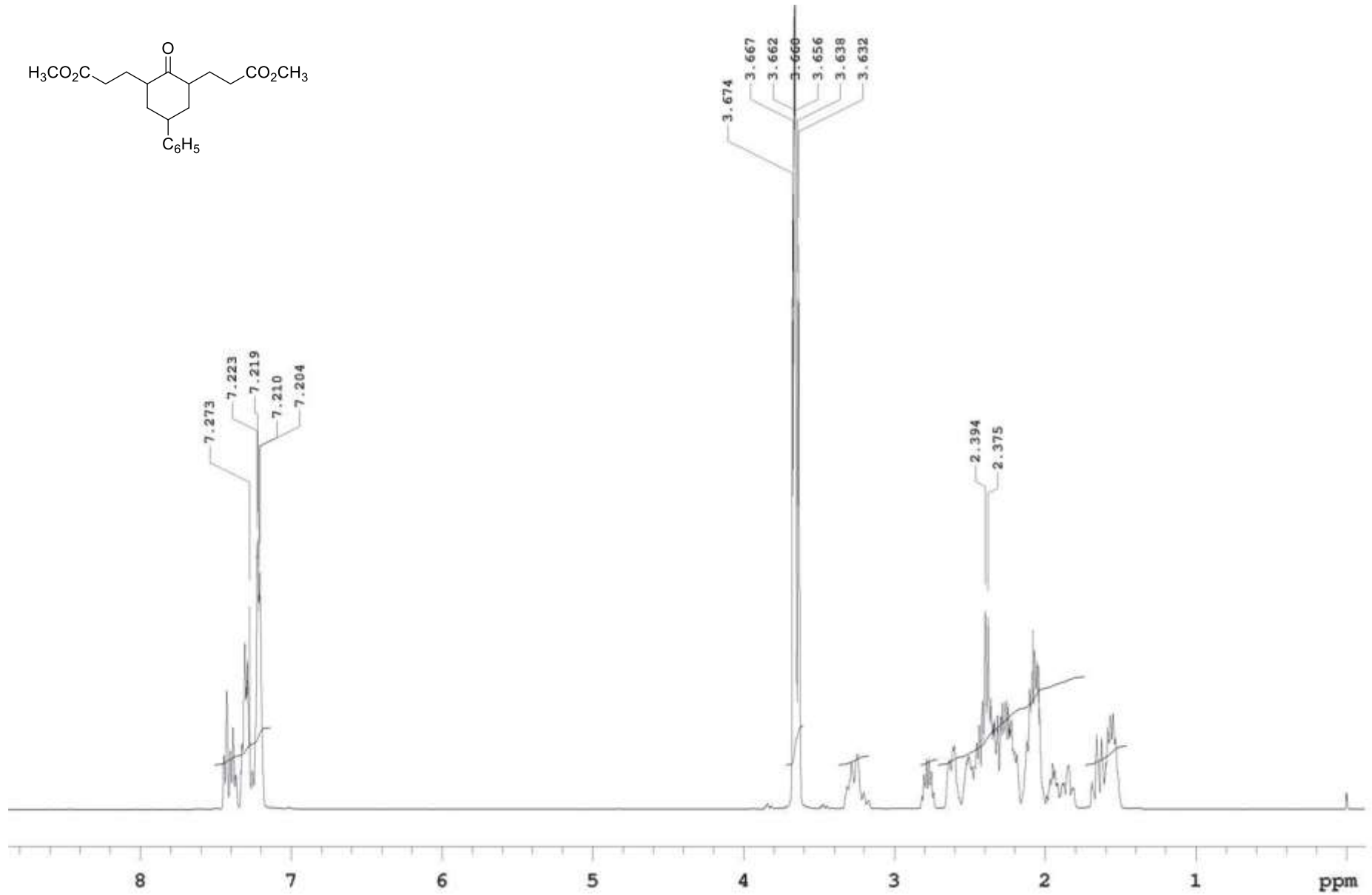
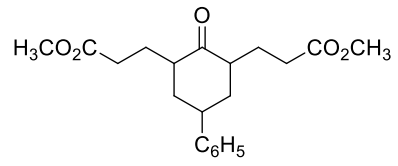
Dimethyl 2-oxo-1,3-cyclohexanedipropionate (20)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



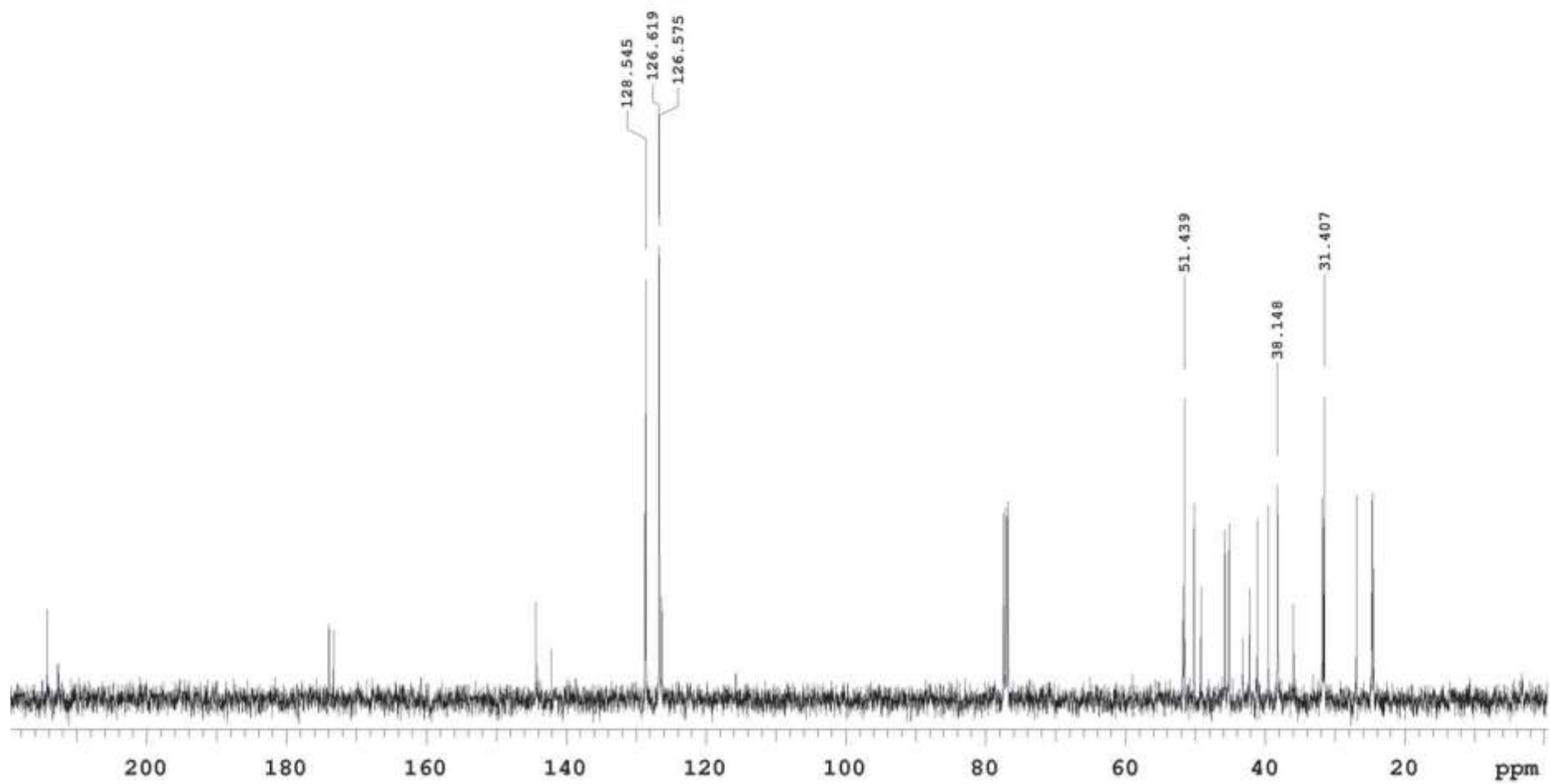
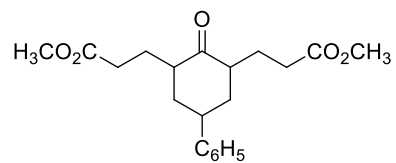
Dimethyl 5-methyl-2-oxo-1,3-cyclohexanedipropionate (21)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



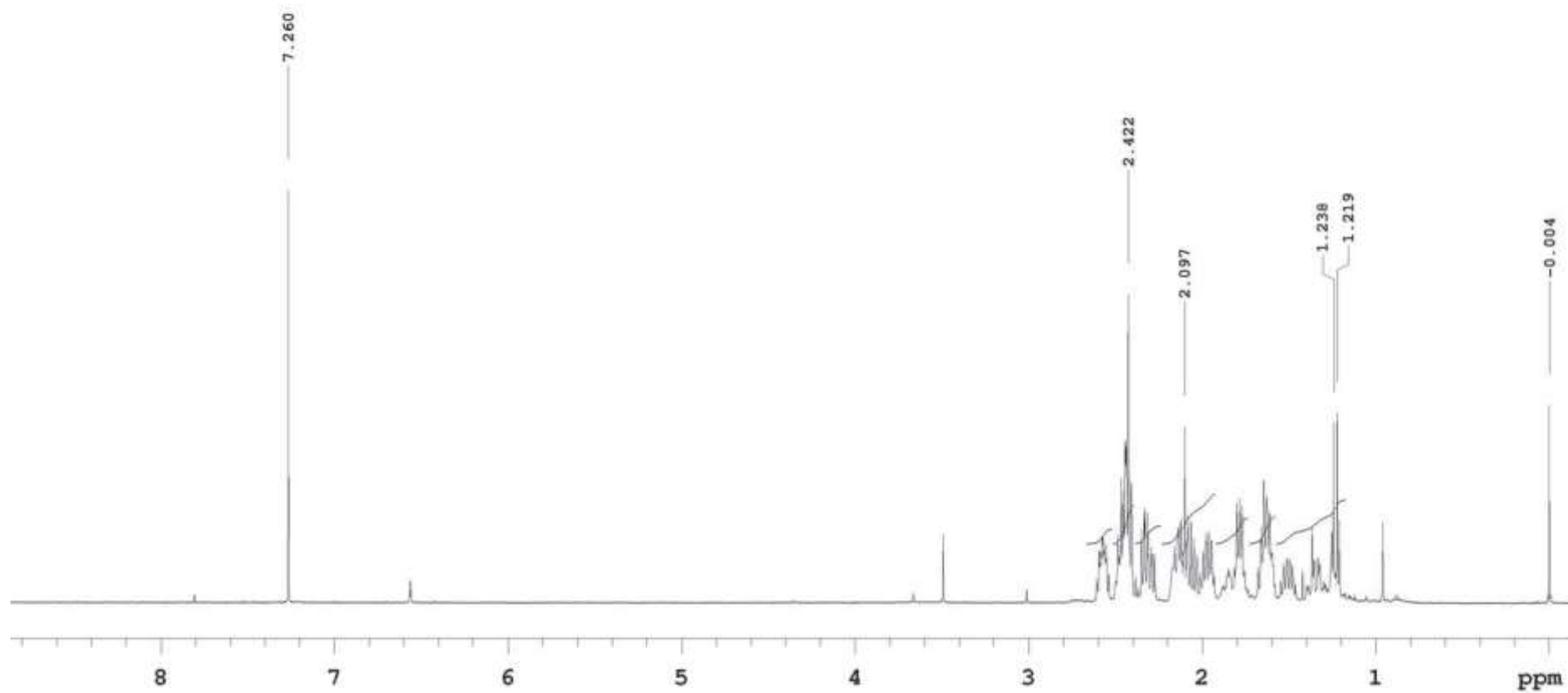
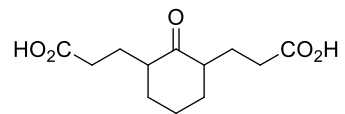
Dimethyl 5-methyl-2-oxo-1,3-cyclohexanedipropionate (21)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



Dimethyl 2-oxo-5-phenyl-1,3-cyclohexanedipropionate (22)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C

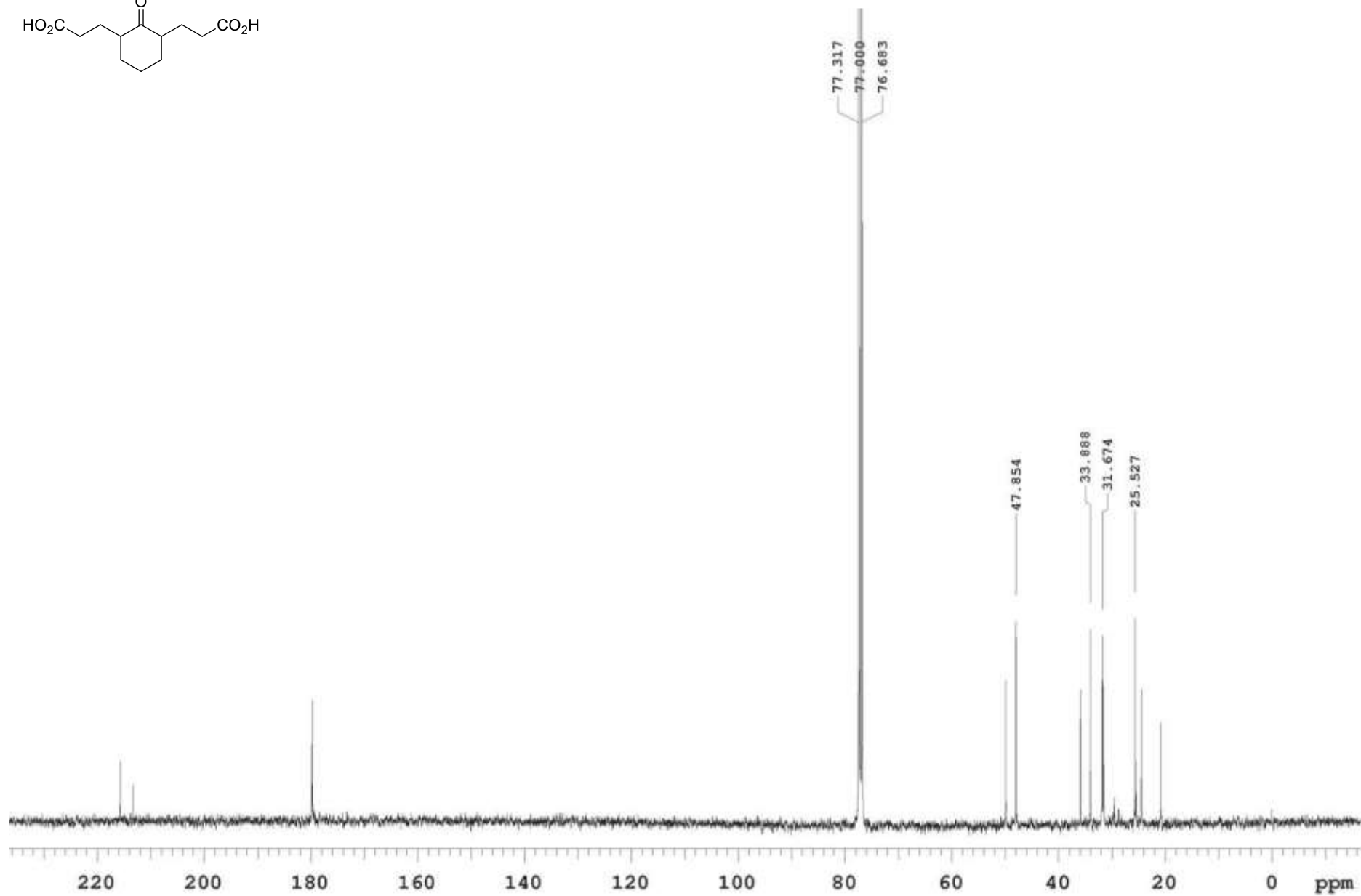
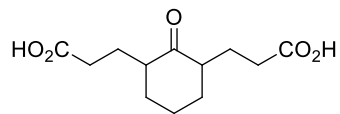


Dimethyl 2-oxo-5-phenyl-1,3-cyclohexanepropionate (22)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C

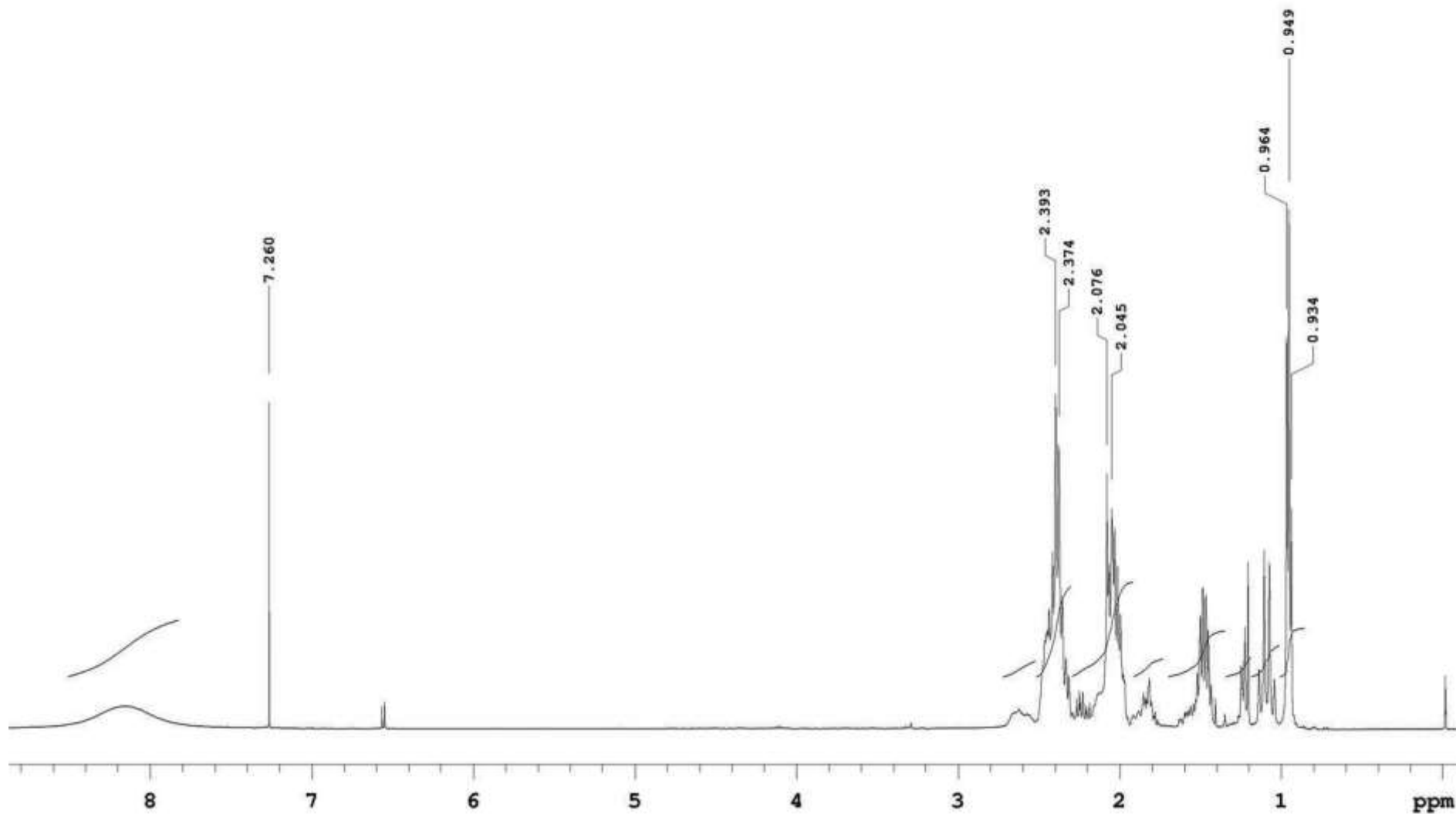
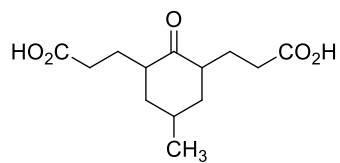


2-Oxo-1,3-cyclohexanedipropionic acid (26)-  $^1\text{H}$ -NMR,  $\text{CDCl}_3$ , 400 MHz, 25 °C

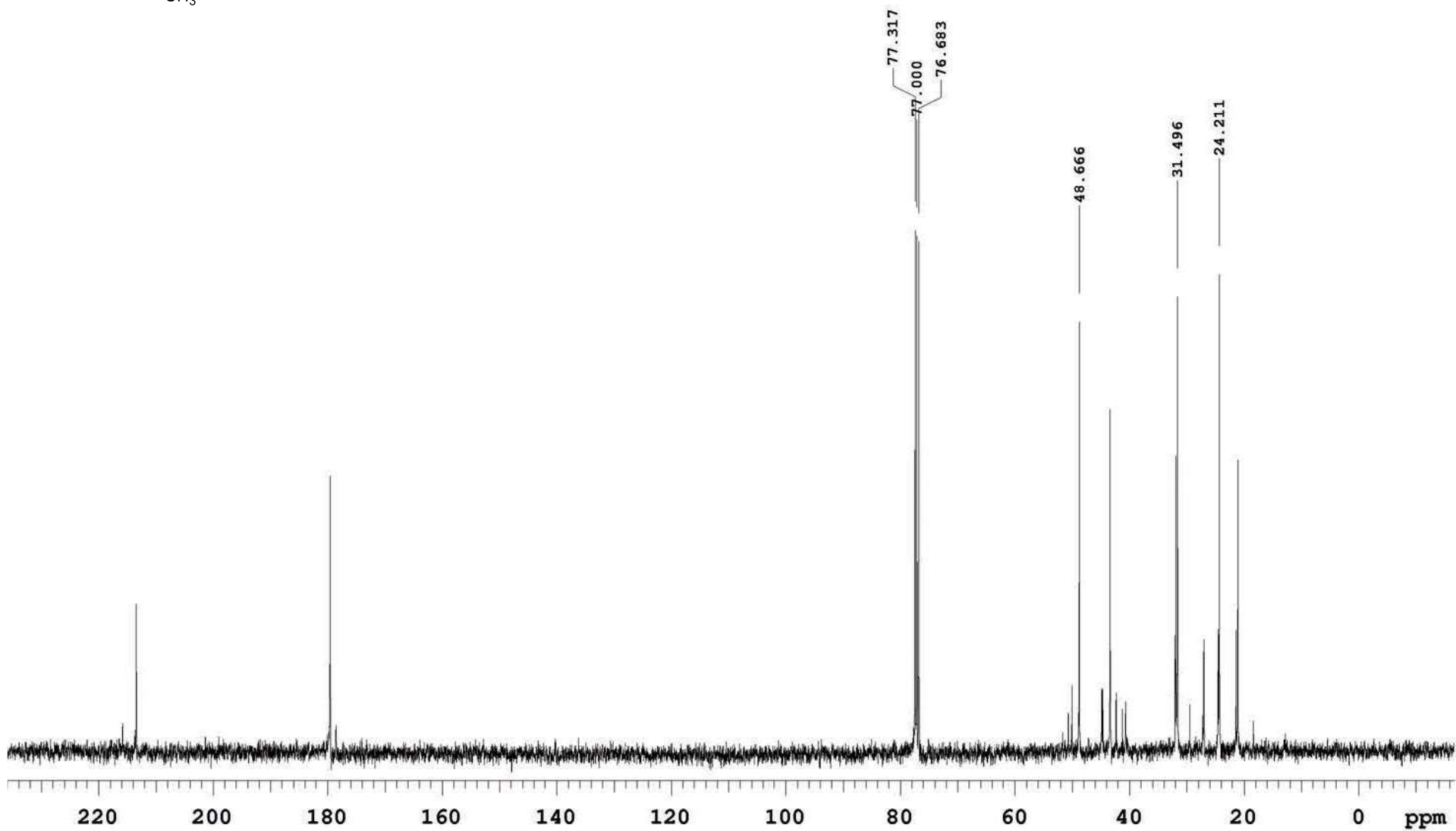
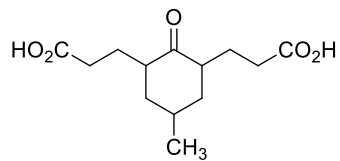




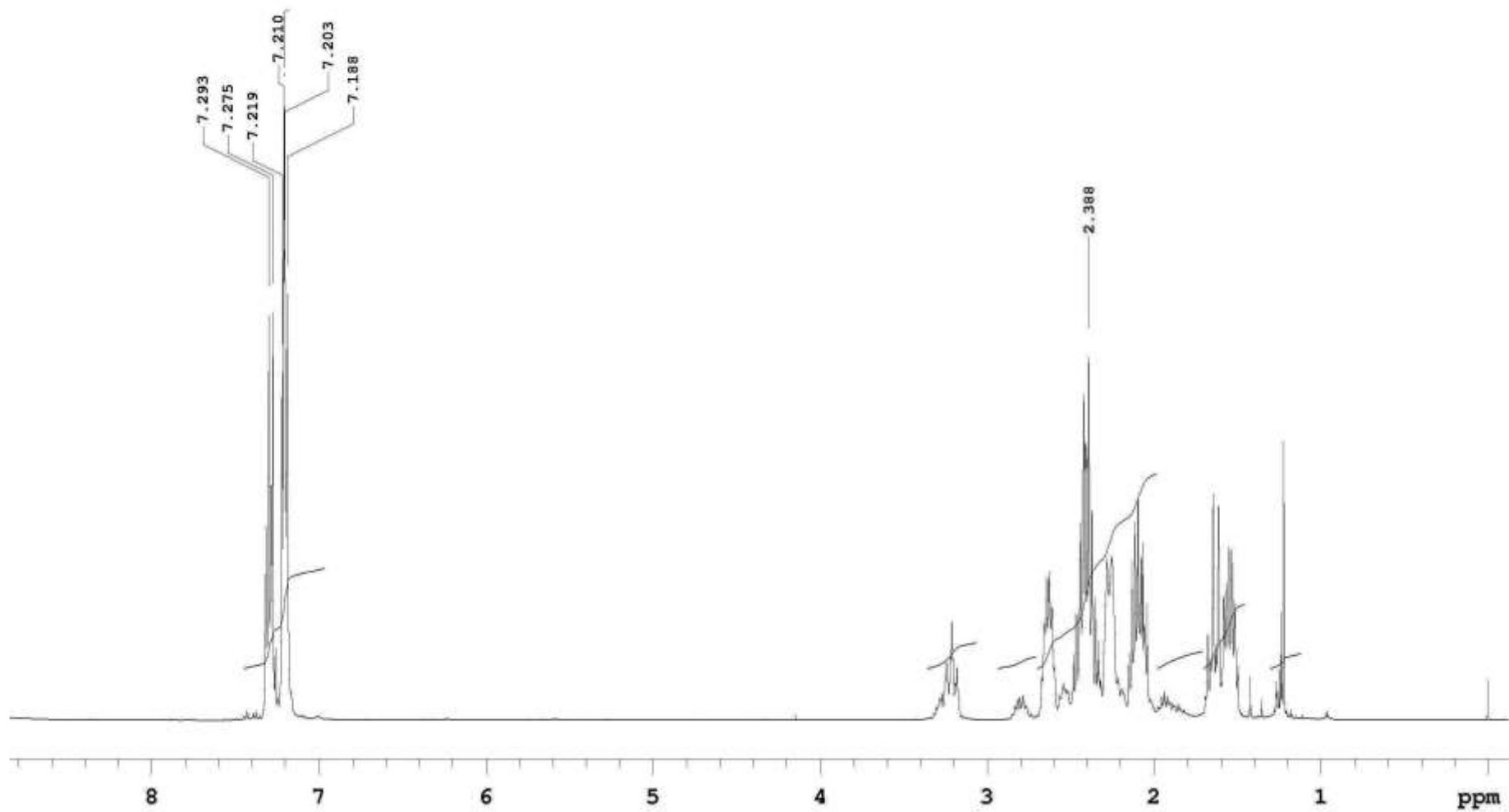
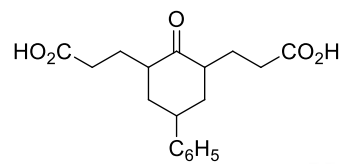
2-Oxo-1,3-cyclohexanedipropionic acid (26)- <sup>13</sup>C- NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



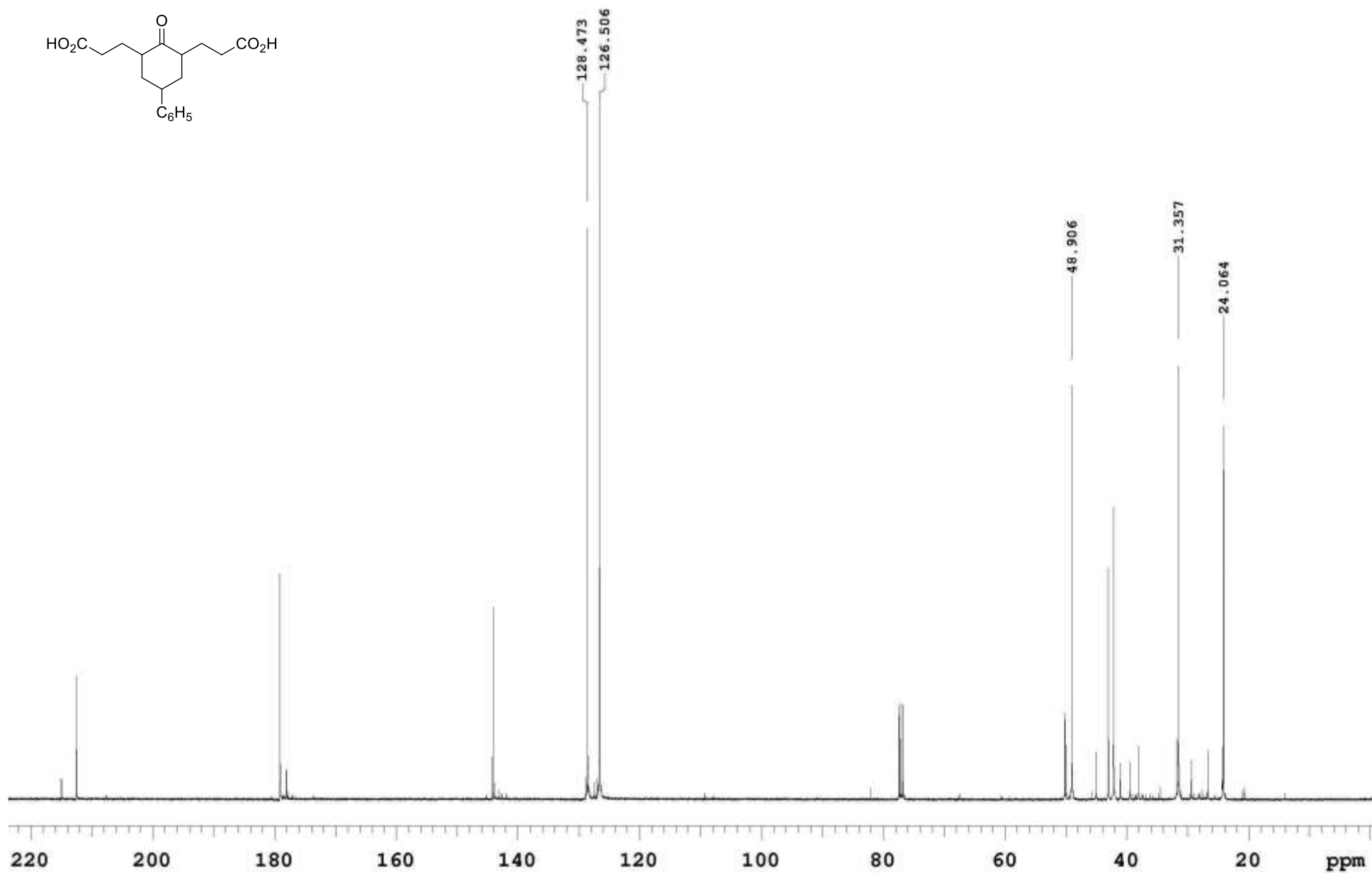
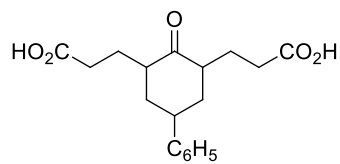
5-Methyl-2-oxo-1,3-cyclohexanedipropionic acid (27)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



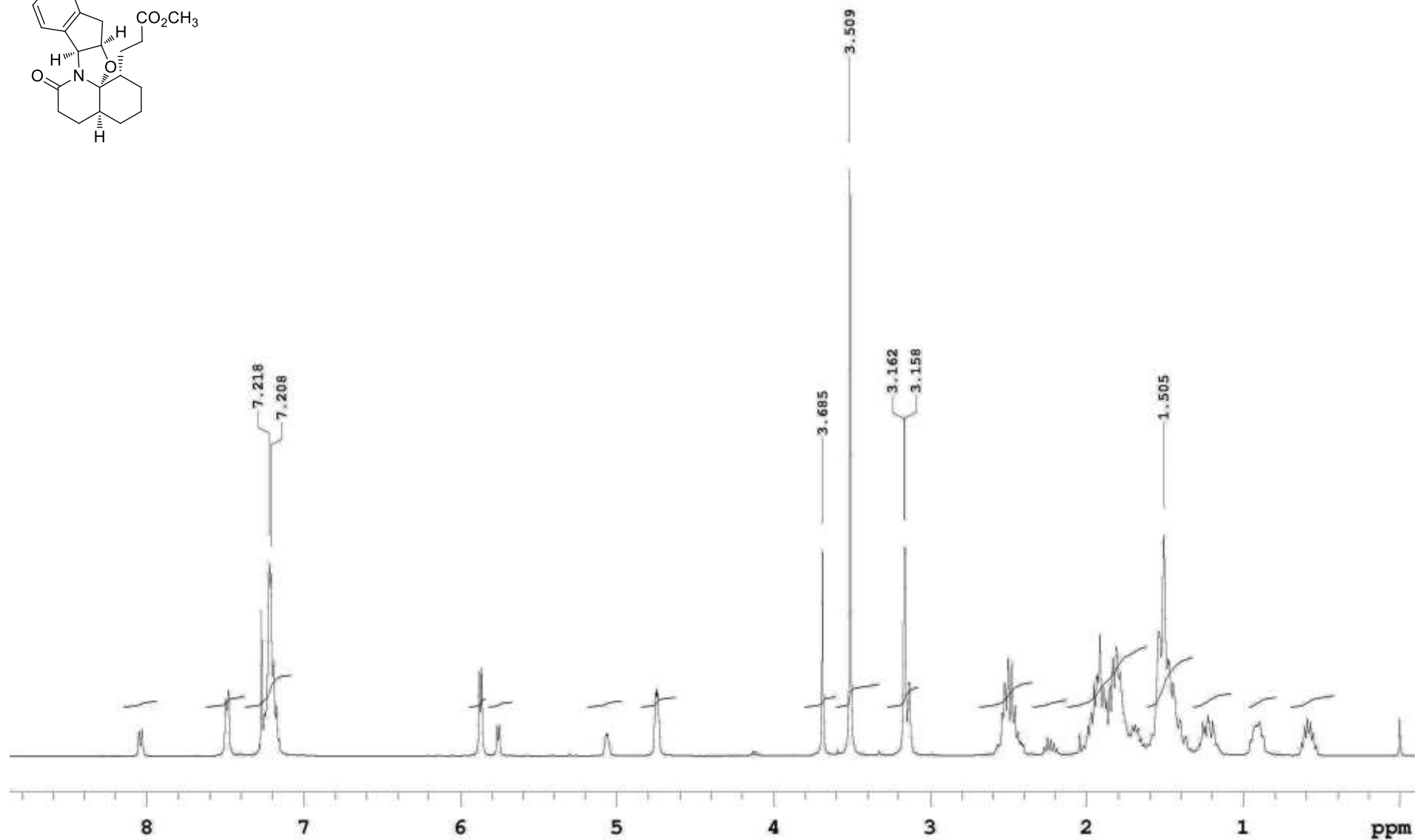
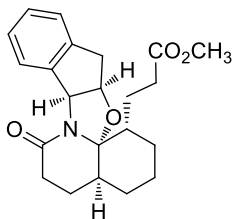
5-Methyl-2-oxo-1,3-cyclohexanedipropionic acid (27)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



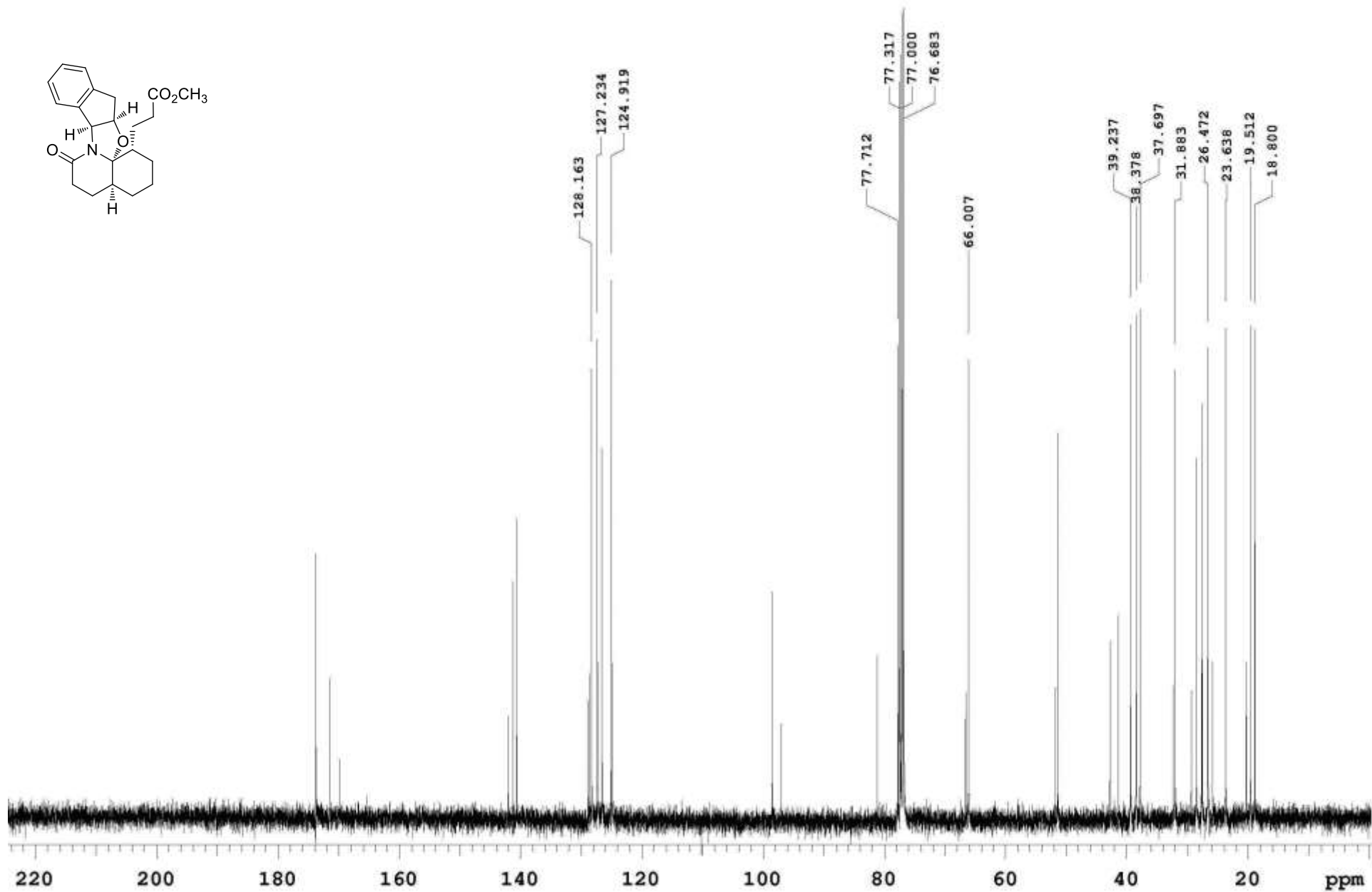
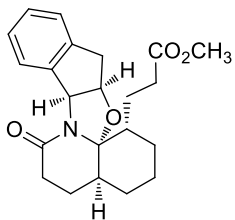
2-Oxo-5-phenyl-1,3-cyclohexanedipropionic acid (28)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



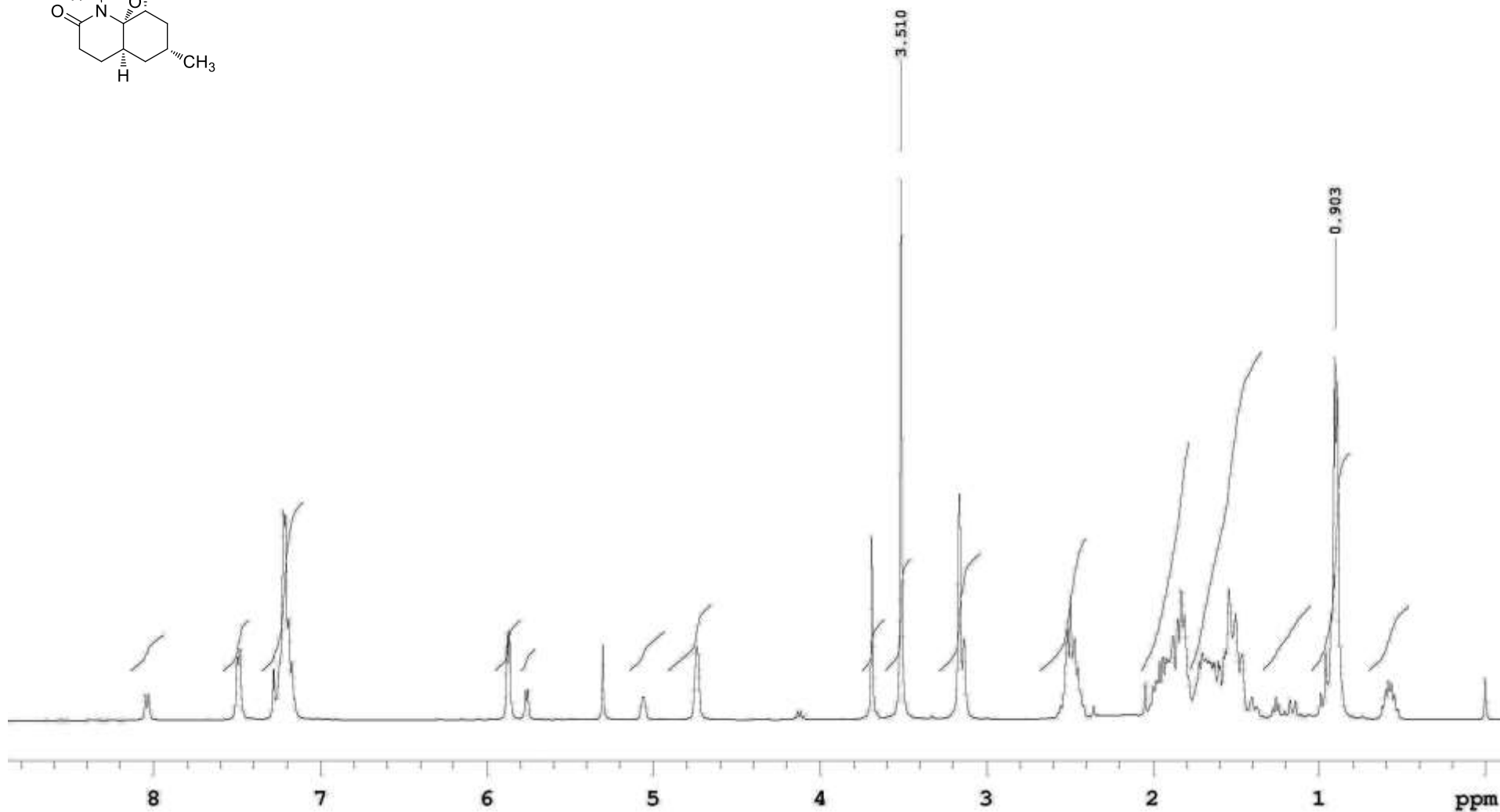
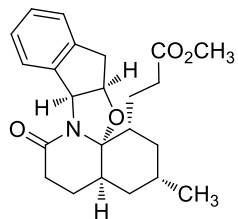
2-Oxo-5-phenyl-1,3-cyclohexanedipropionic acid (28)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



Methyl (1S,4aS,8aS,13aR,14aS)-7-oxo-1,2,3,4,4a,5,6,7,8,8a,13,13a,14a-dodecahydro-indeno[1',2':4,5]oxazolo[2,3-j]quinoline-1-propionate (29)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C

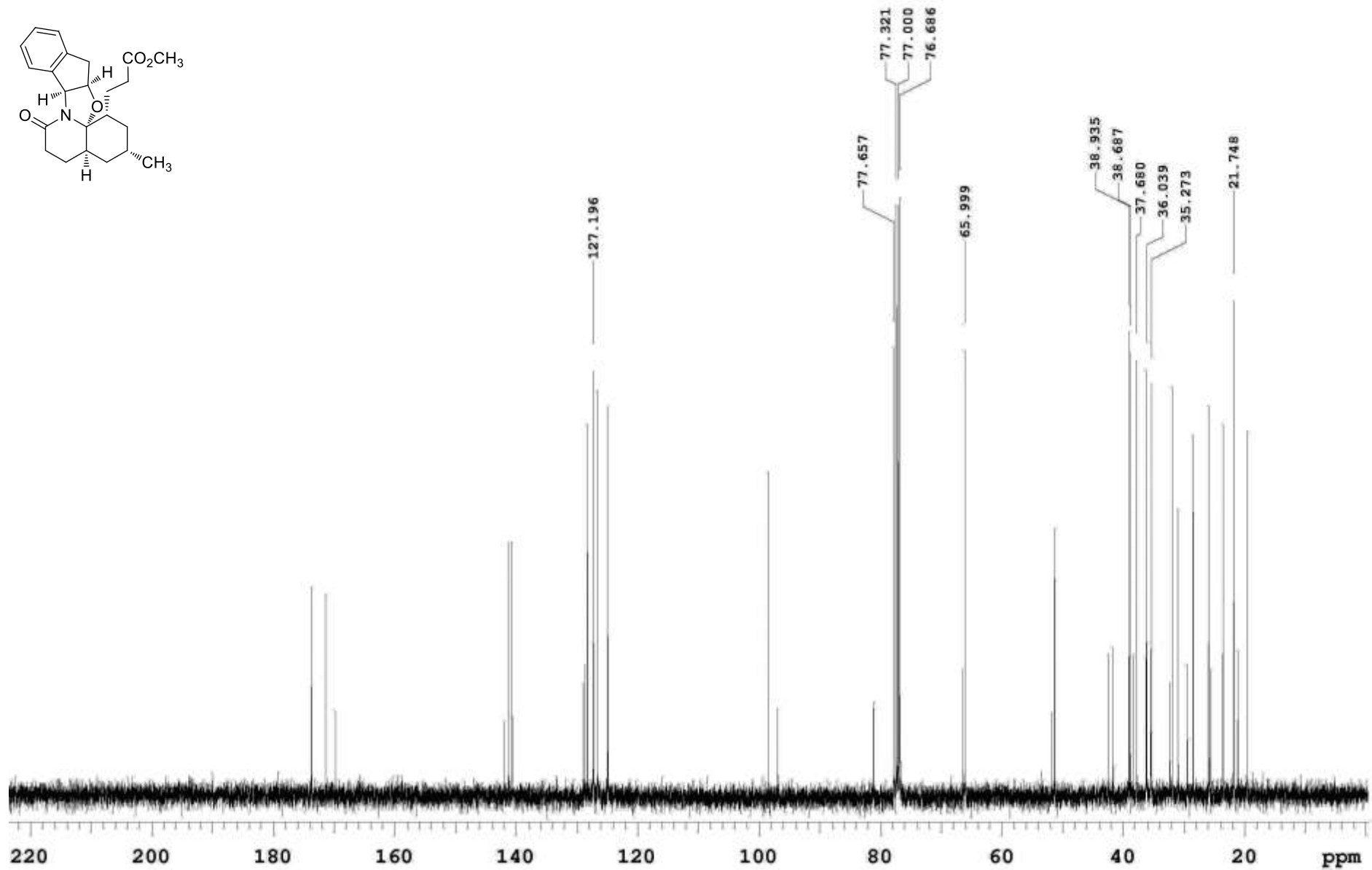
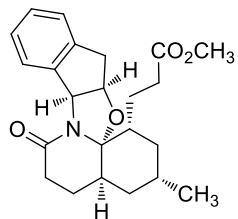


Methyl (15,4a*S*,8a*S*,13a*R*,14a*S*)-7-oxo-1,2,3,4,4a,5,6,7,8,8a,13,13a,14a-dodecahydro-indeno[1',2':4,5]oxazolo[2,3-*j*]quinoline-1-propionate (29)-  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 100.6 MHz, 25  $^\circ\text{C}$

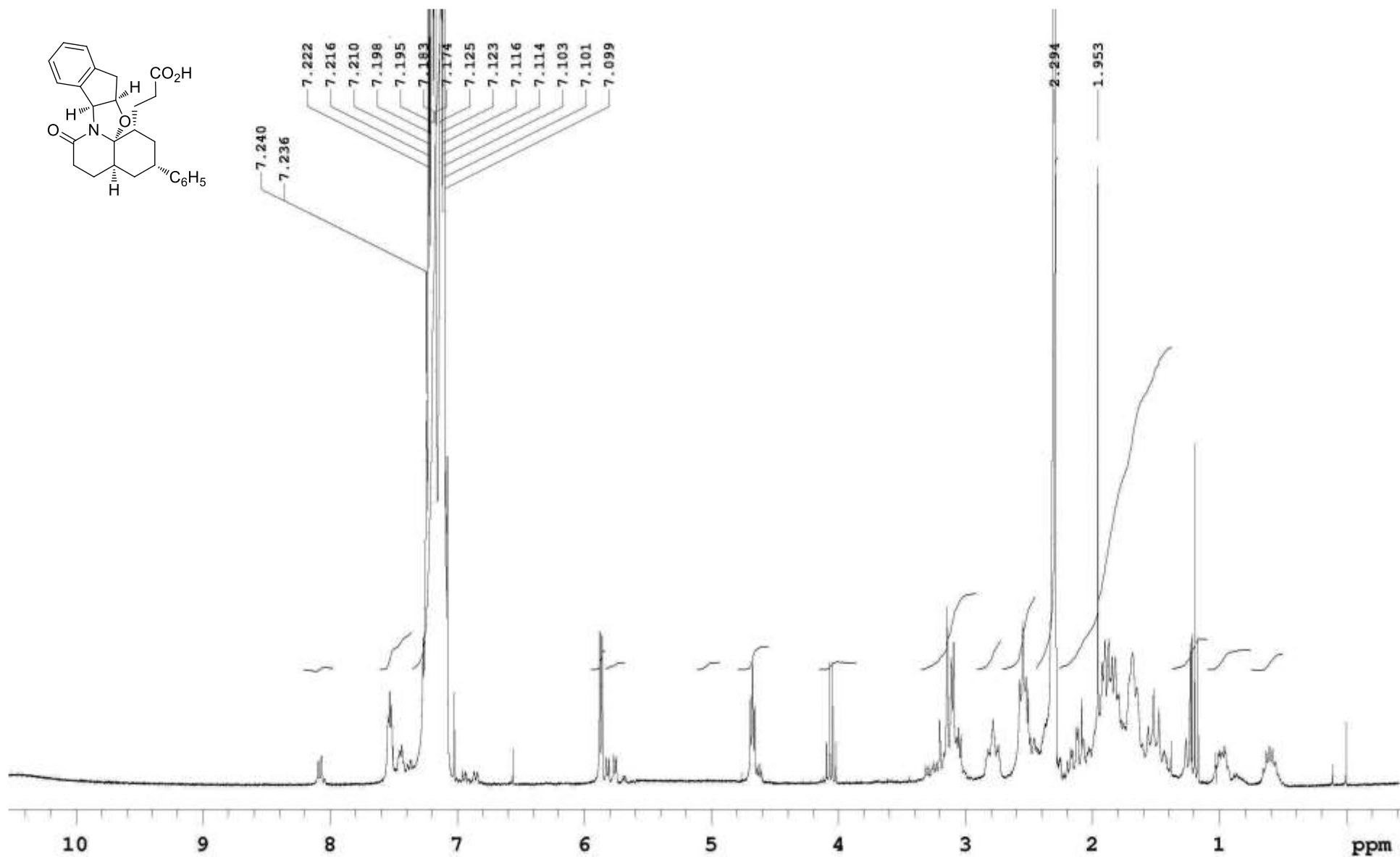


Methyl (1*R*,3*R*,4*aR*,8*aS*,13*aR*,14*aS*)-3-Methyl-7-oxo-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydro-indeno[1',2':4,5]oxazolo[2,3-*j*]quinoline-1-propionate (31*a*)-<sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C

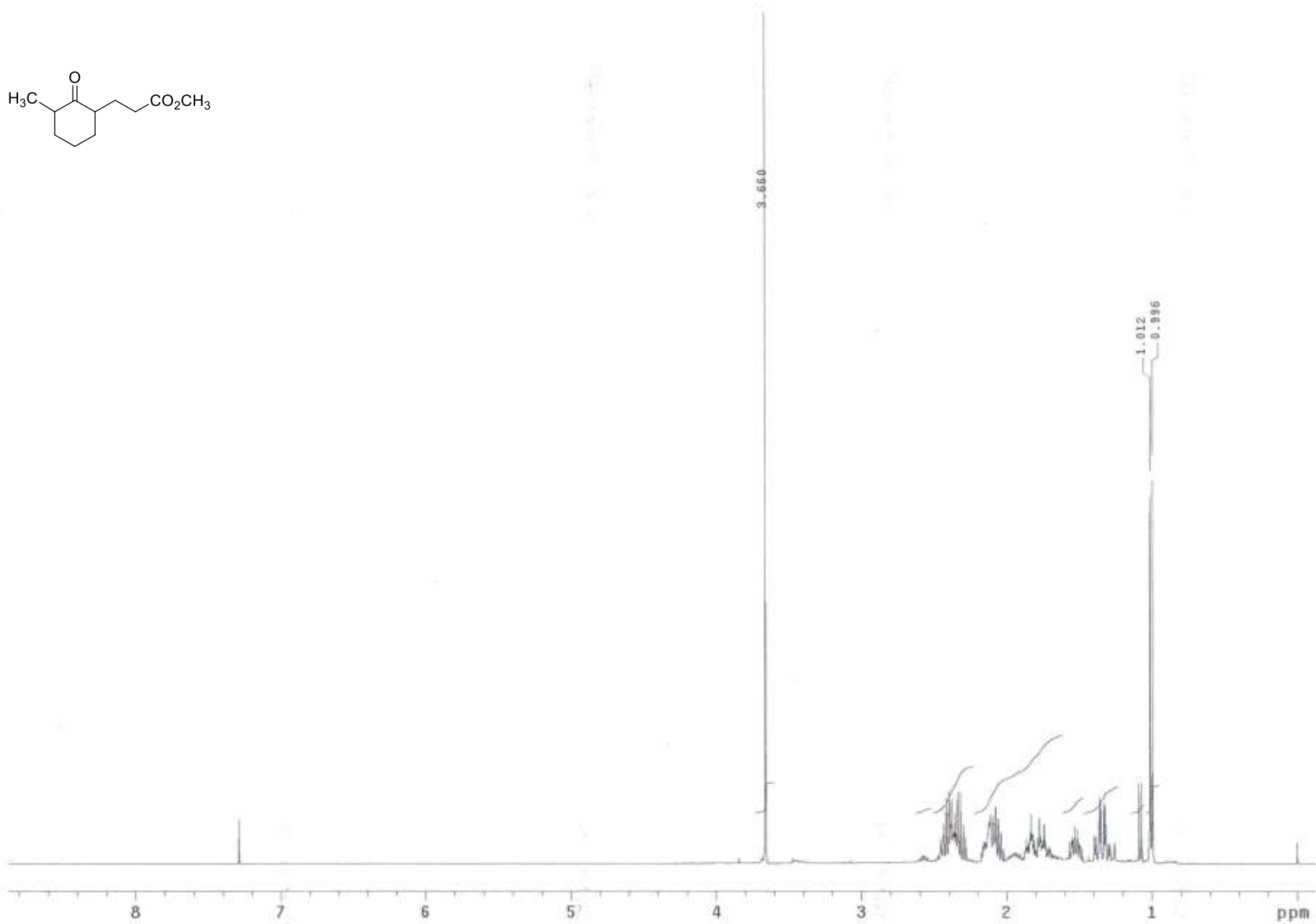
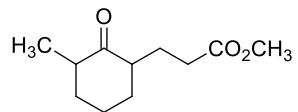




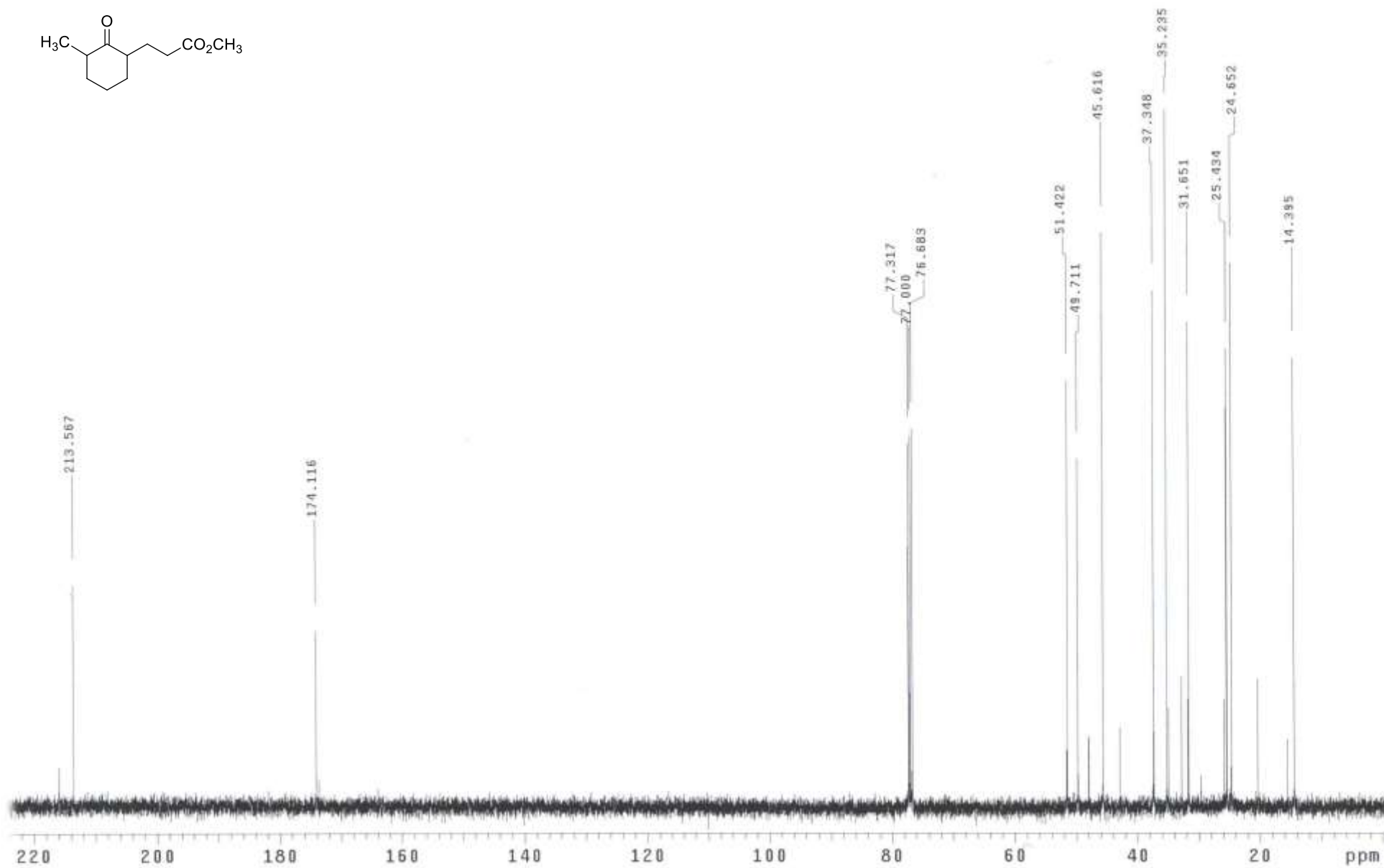
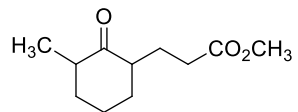
Methyl (1*R*,3*R*,4*aR*,8*aS*,13*aR*,14*aS*)-3-Methyl-7-oxo-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydro-indeno[1',2':4,5]oxazolo[2,3-*j*]quinoline-1-propionate (31*a*)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



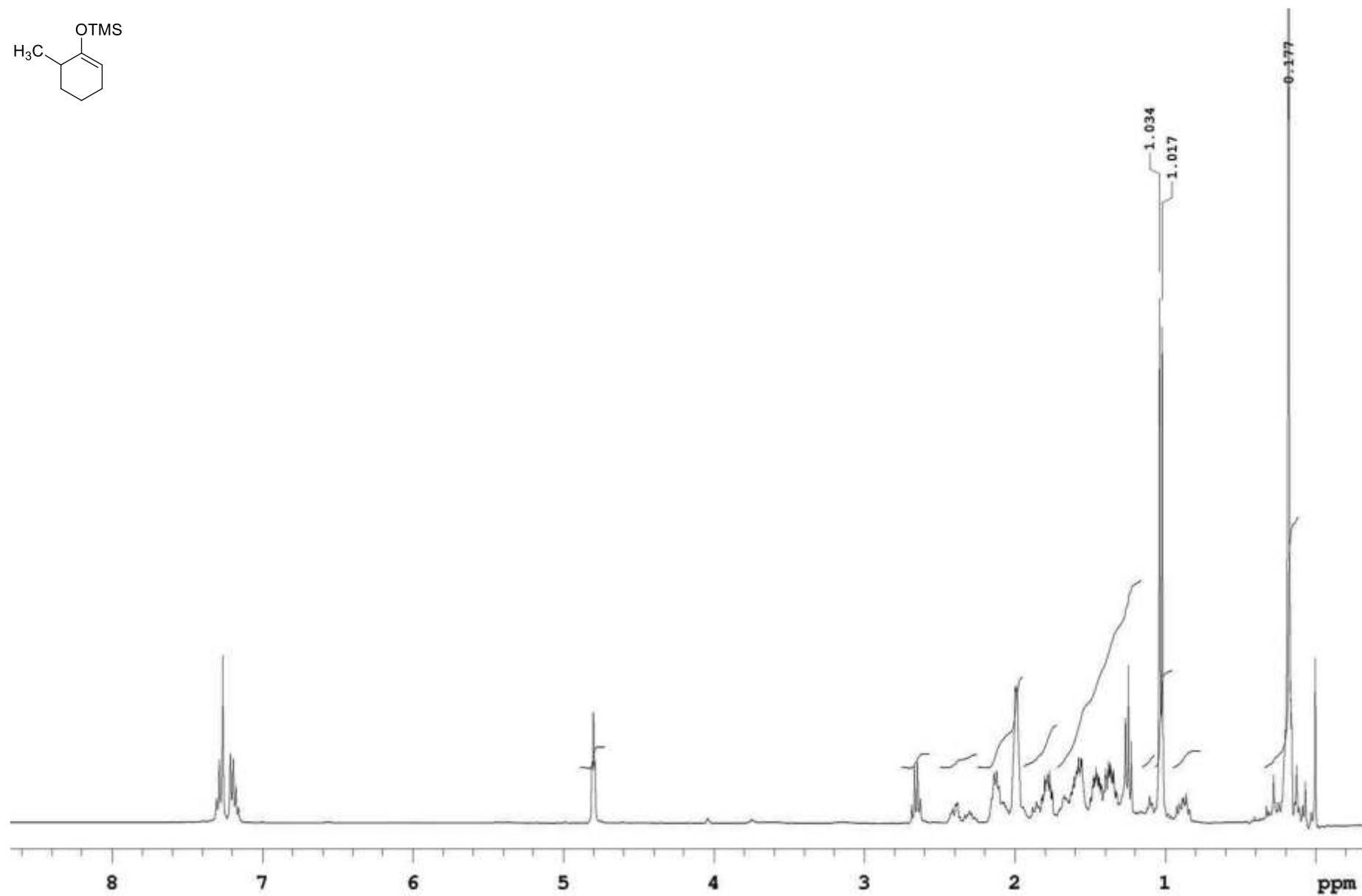
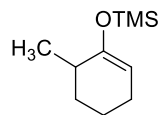
(1*R*,3*R*,4*aR*,8*aS*,13*aR*,14*aS*)-7-Oxo-3-phenyl-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydroindeno[1',2':4,5]oxazolo[2,3-*j*]quinoline-1-propanoic acid (33a)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 300 MHz, 25 °C



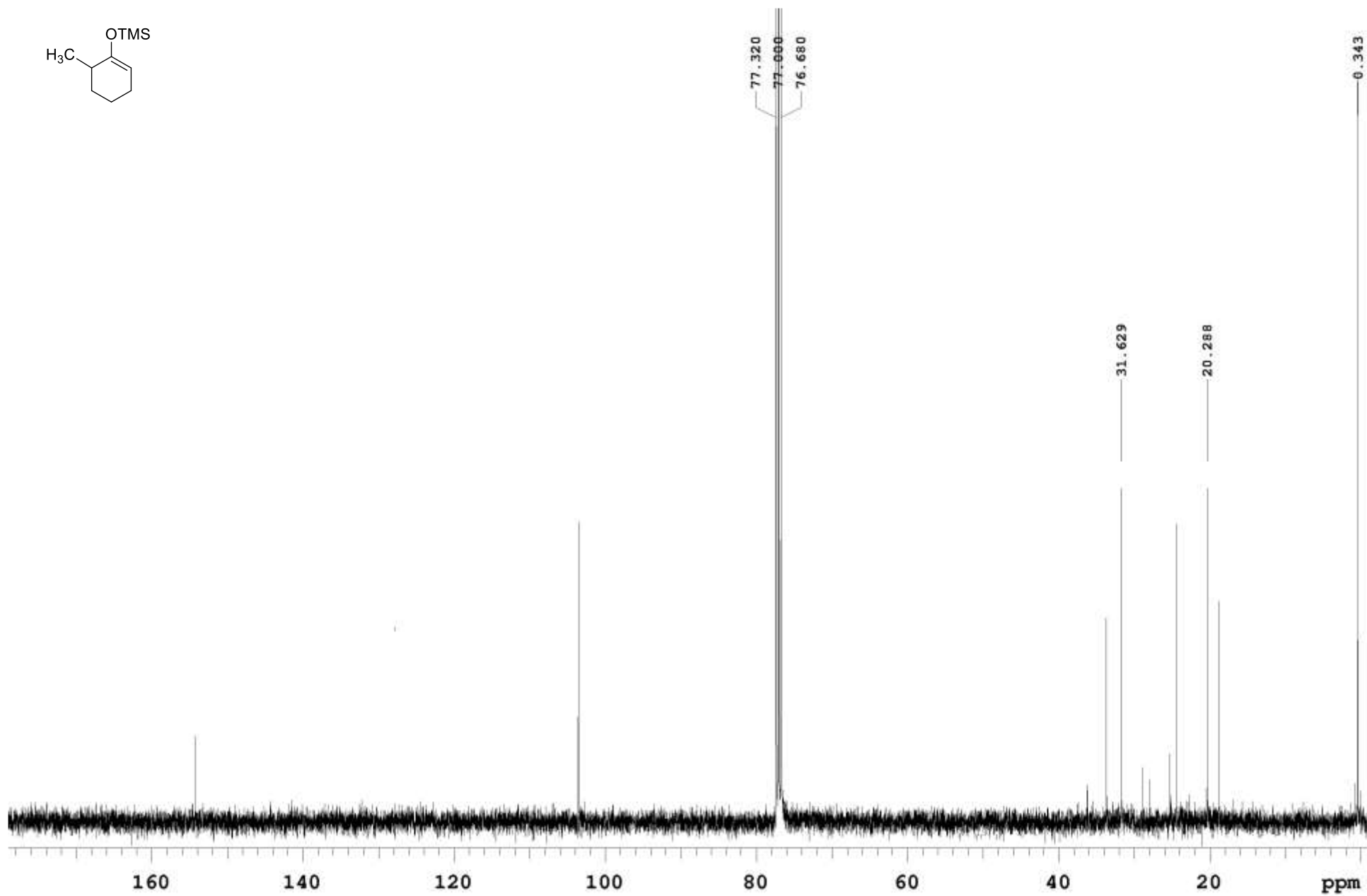
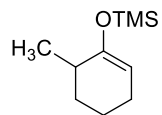
Methyl 3-(3-methyl-2-oxocyclohexyl)propionate ester (36)-  $^1\text{H}$ -NMR,  $\text{CDCl}_3$ , 400 MHz, 25 °C



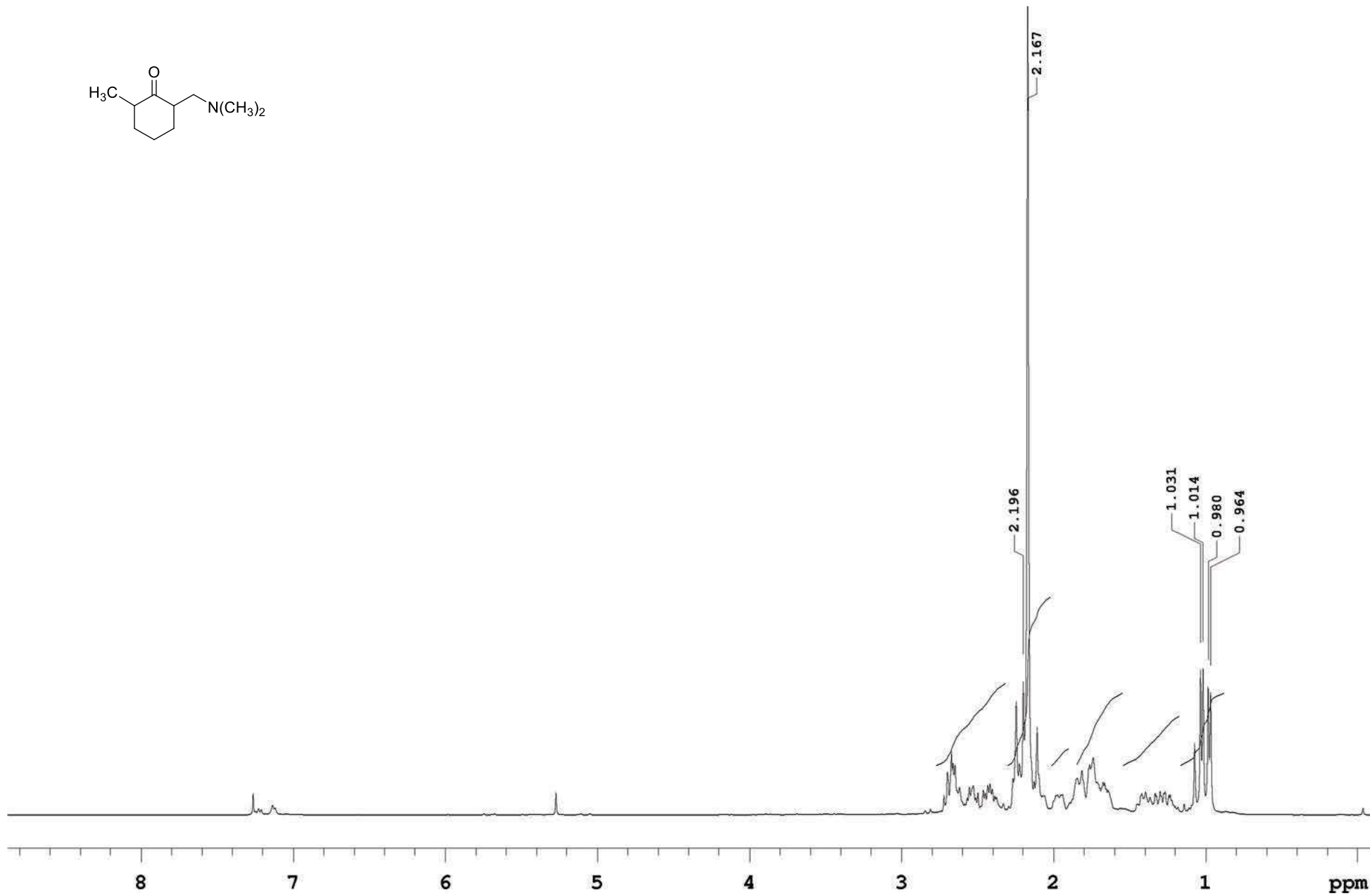
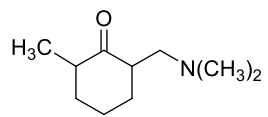
Methyl 3-(3-methyl-2-oxocyclohexyl)propionate ester (36)- <sup>13</sup>C- NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



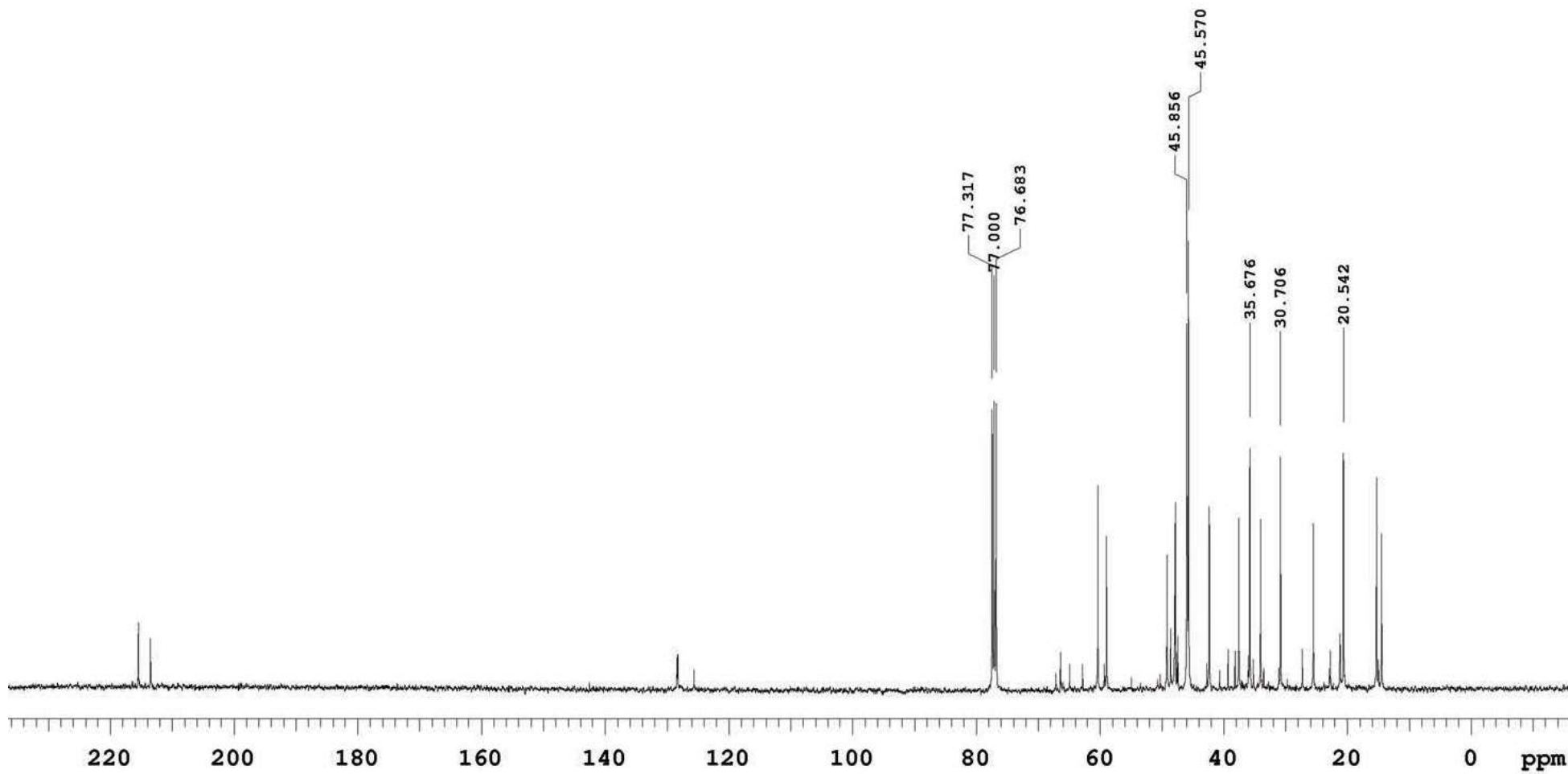
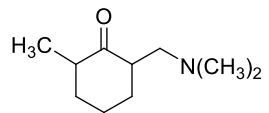
(48)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 300 MHz, 25 °C



(48)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 75.4 MHz, 25 °C

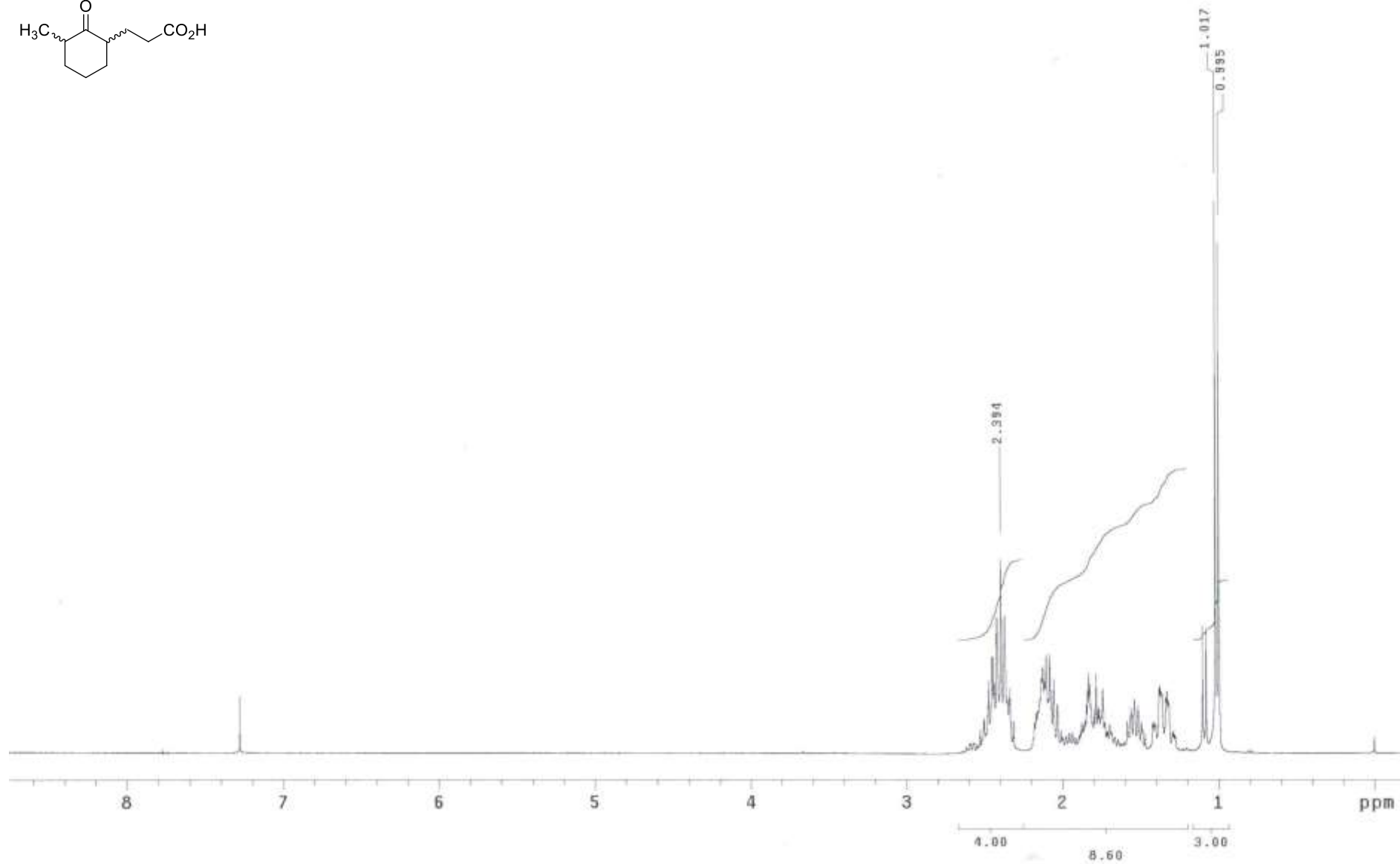
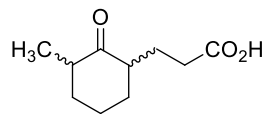


(44)-  $^1\text{H}$ -NMR,  $\text{CDCl}_3$ , 400 MHz, 25 °C

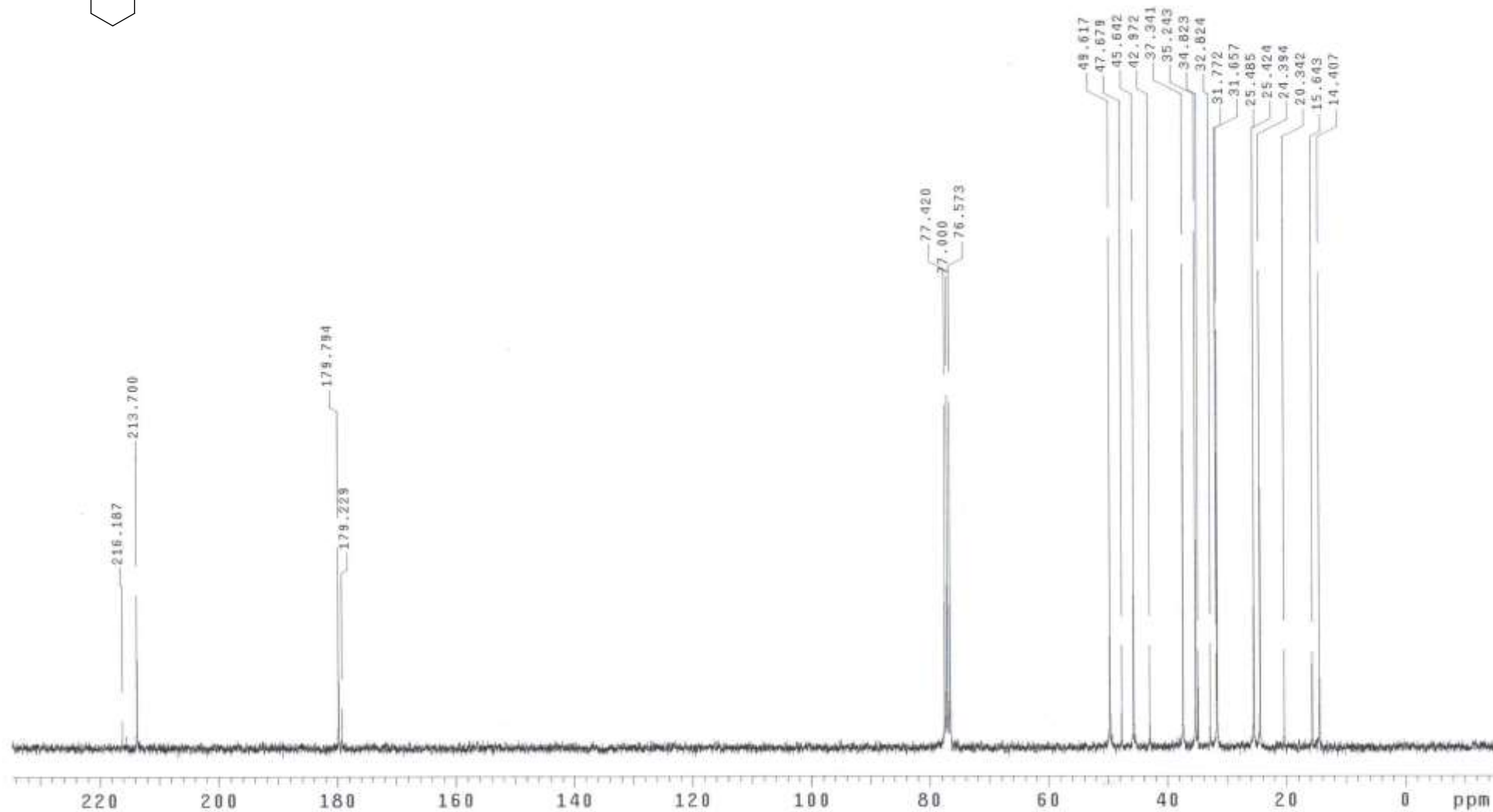
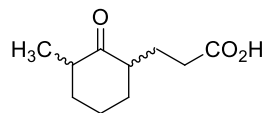


(44)-  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 100.6 MHz, 25 °C

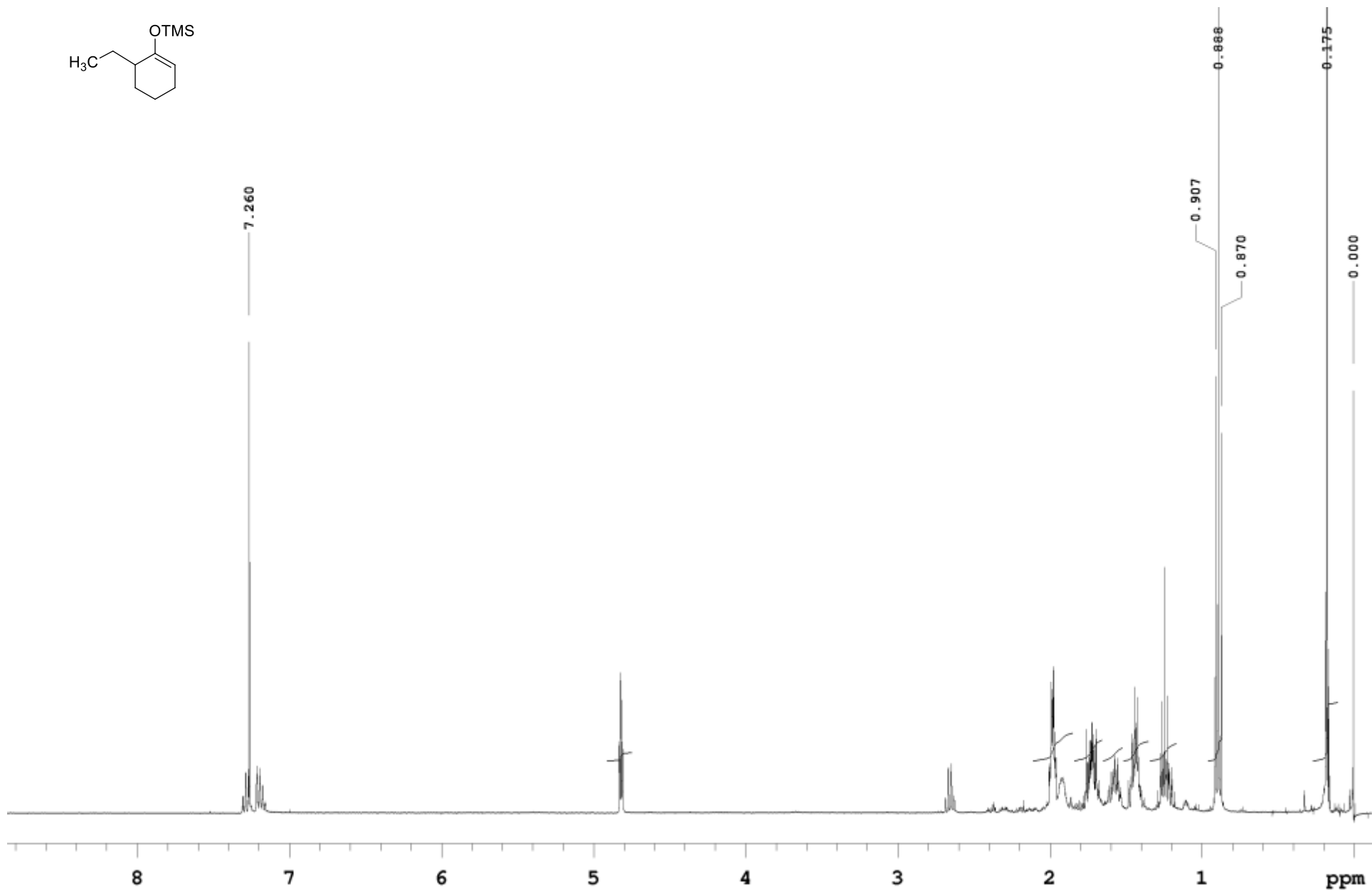
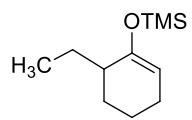




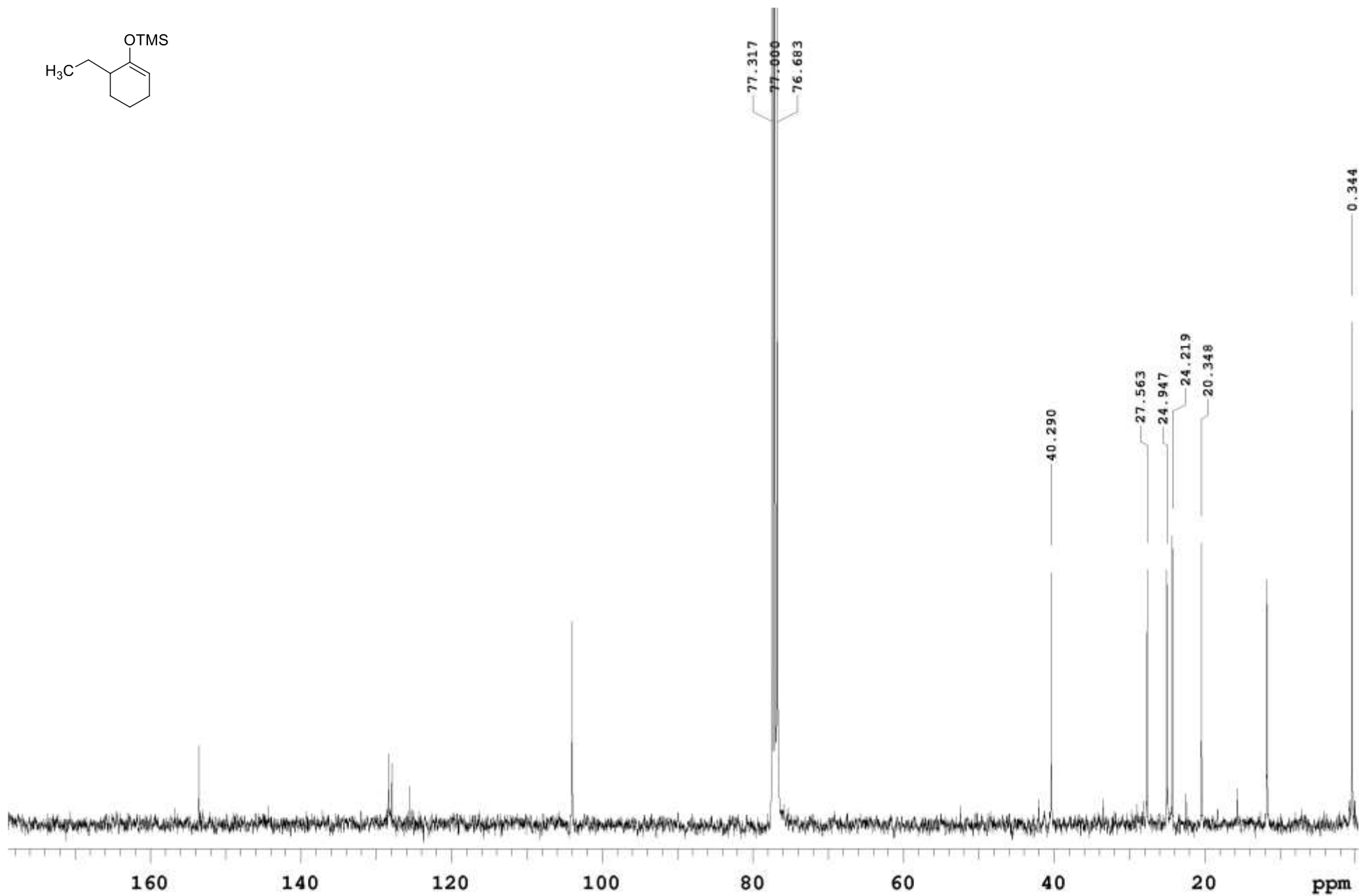
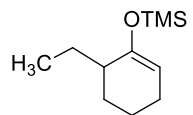
(3-Methyl-2-oxocyclohexyl)propionic acid (49)-  $^1\text{H}$ -NMR,  $\text{CDCl}_3$ , 300 MHz, 25 °C



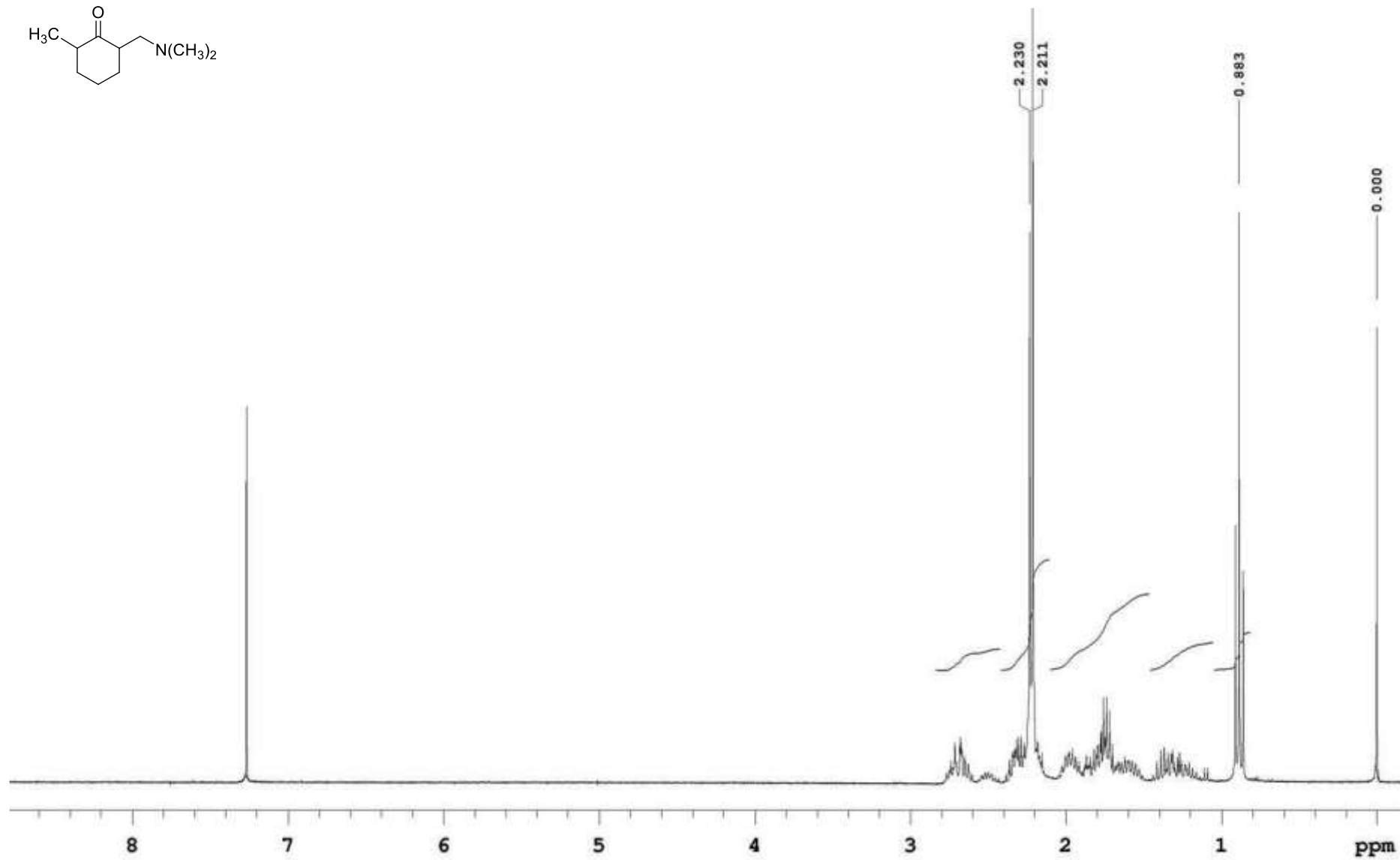
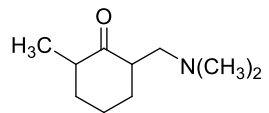
(3-Methyl-2-oxocyclohexyl)propionic acid (49)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



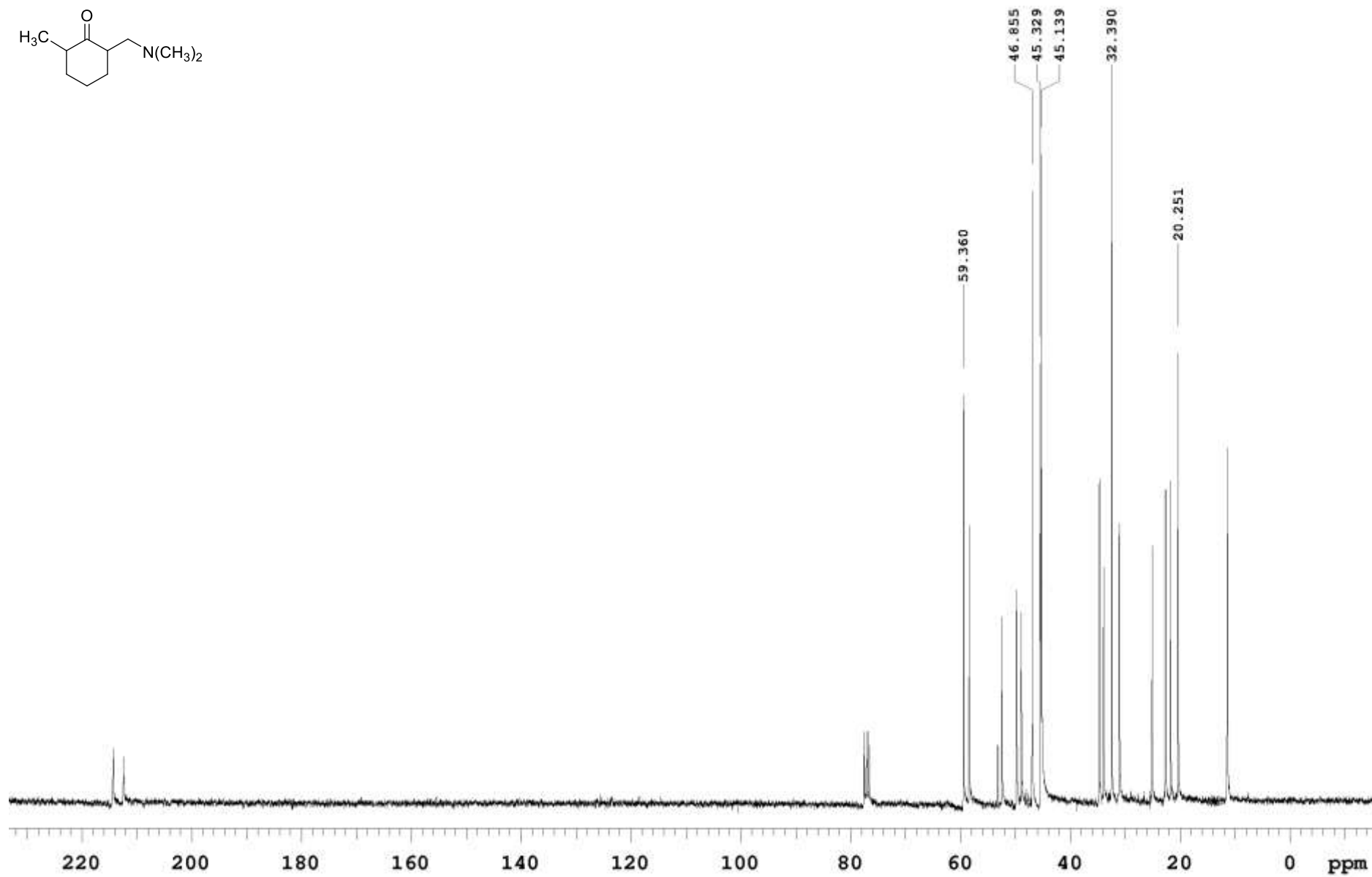
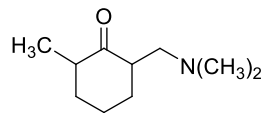
(5)-<sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



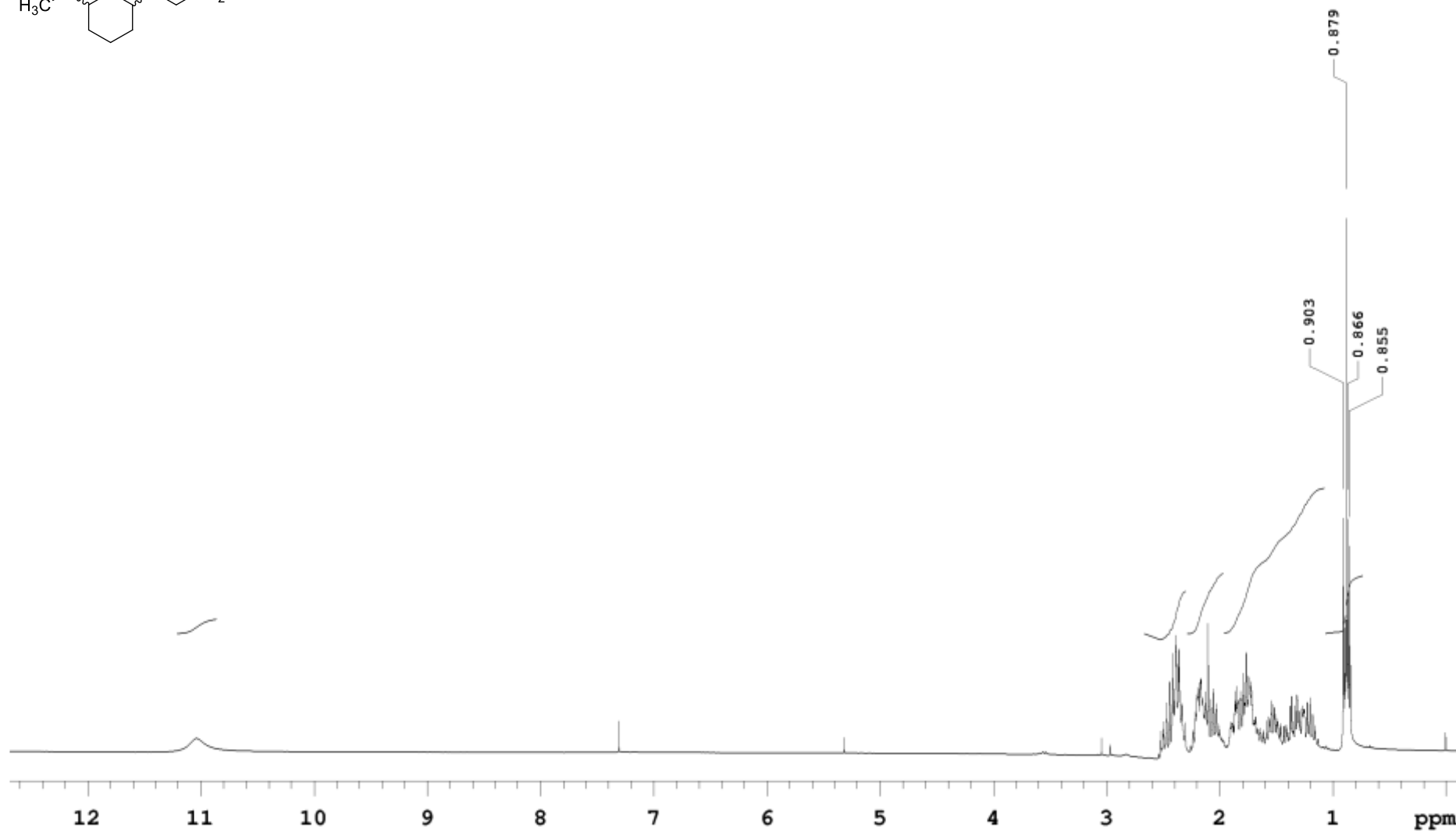
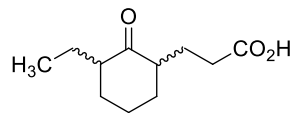
(50)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



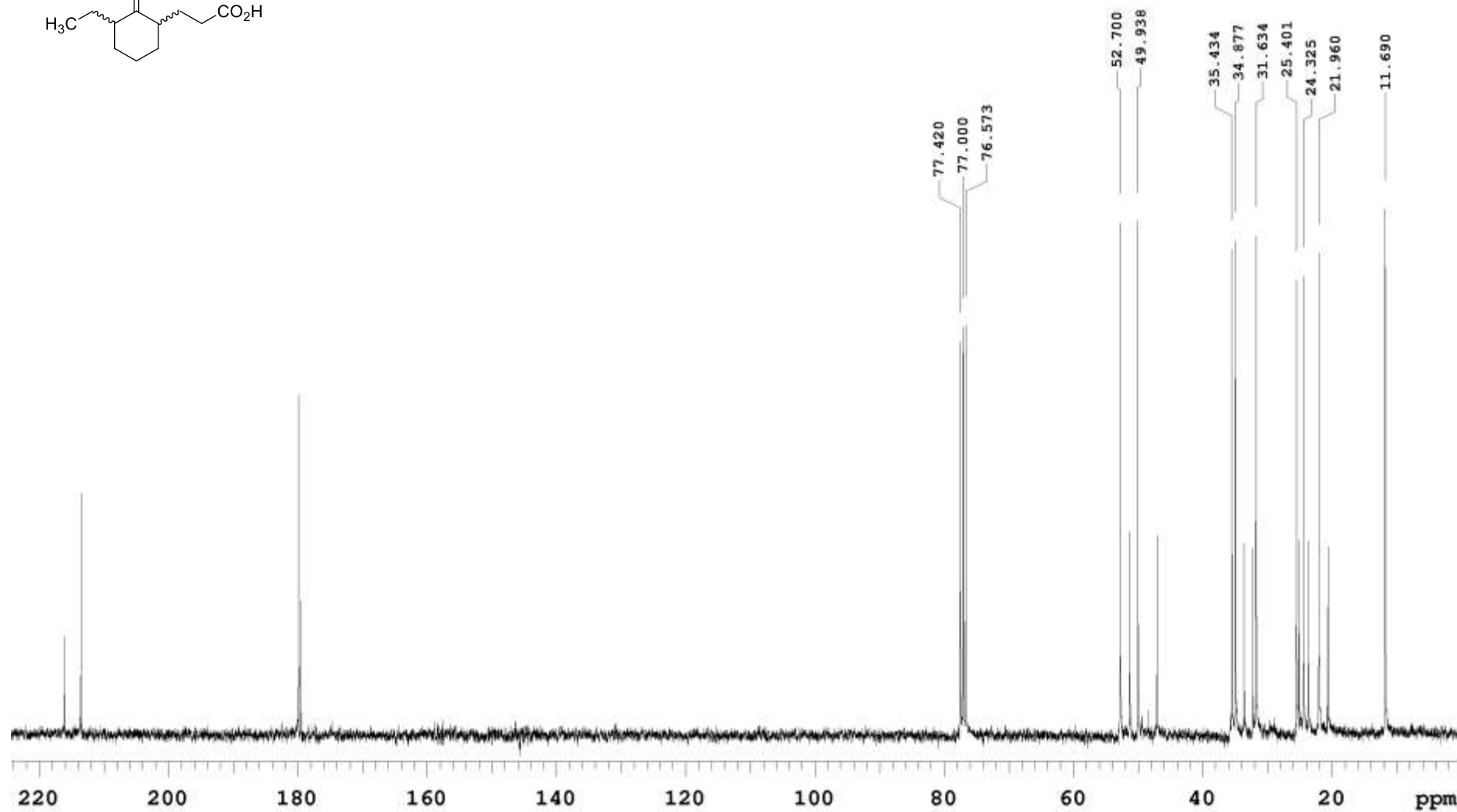
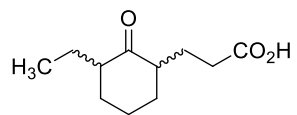
(46)-  $^1\text{H}$ - NMR,  $\text{CDCl}_3$ , 300 MHz, 25 °C



(46)-  $^{13}\text{C}$ - NMR, CDCl<sub>3</sub>, 75.4 MHz, 25 °C

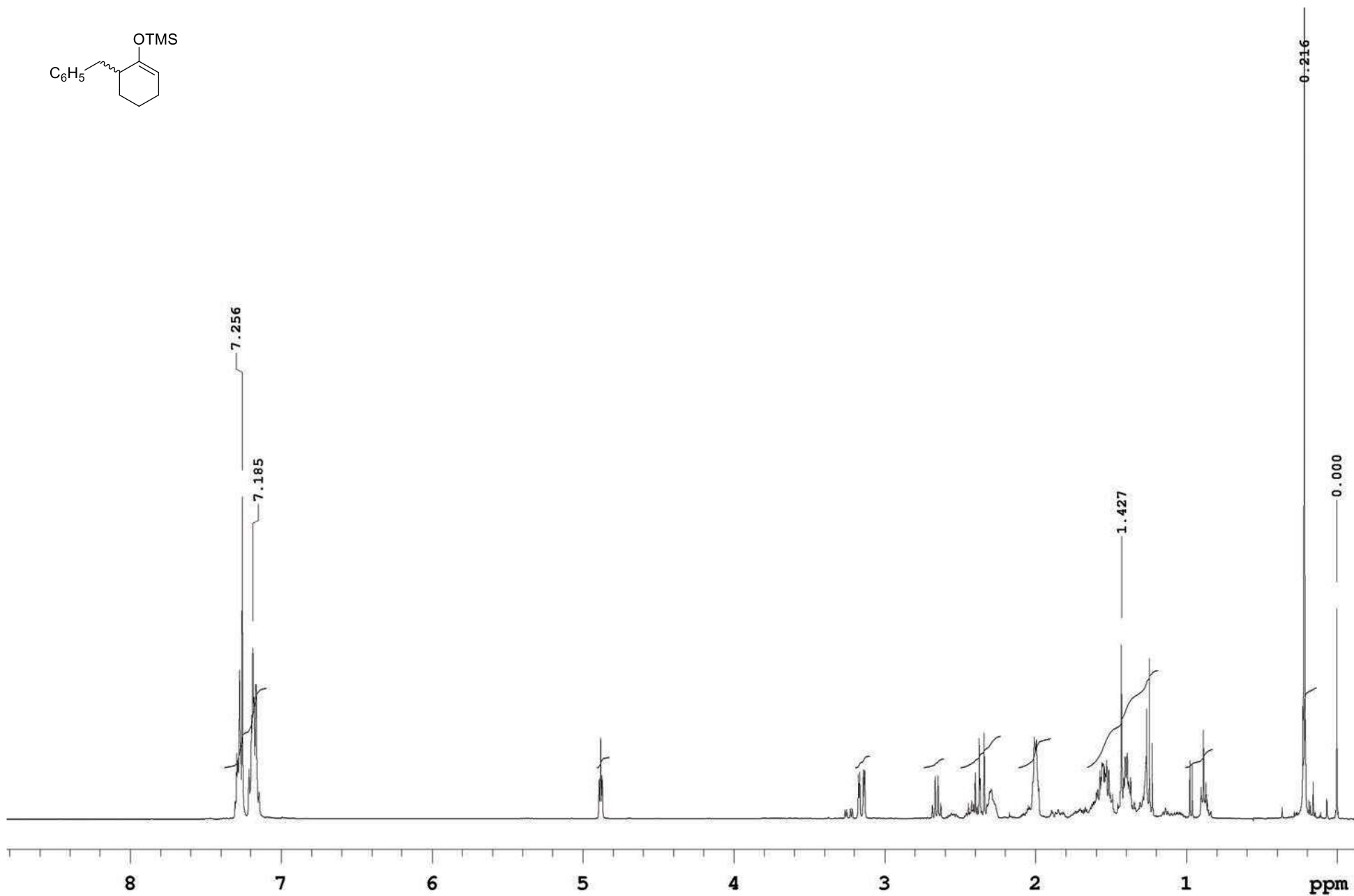
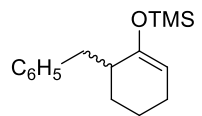


(3-Ethyl-2-oxocyclohexyl)propionic acid (53)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 300 MHz, 25 °C

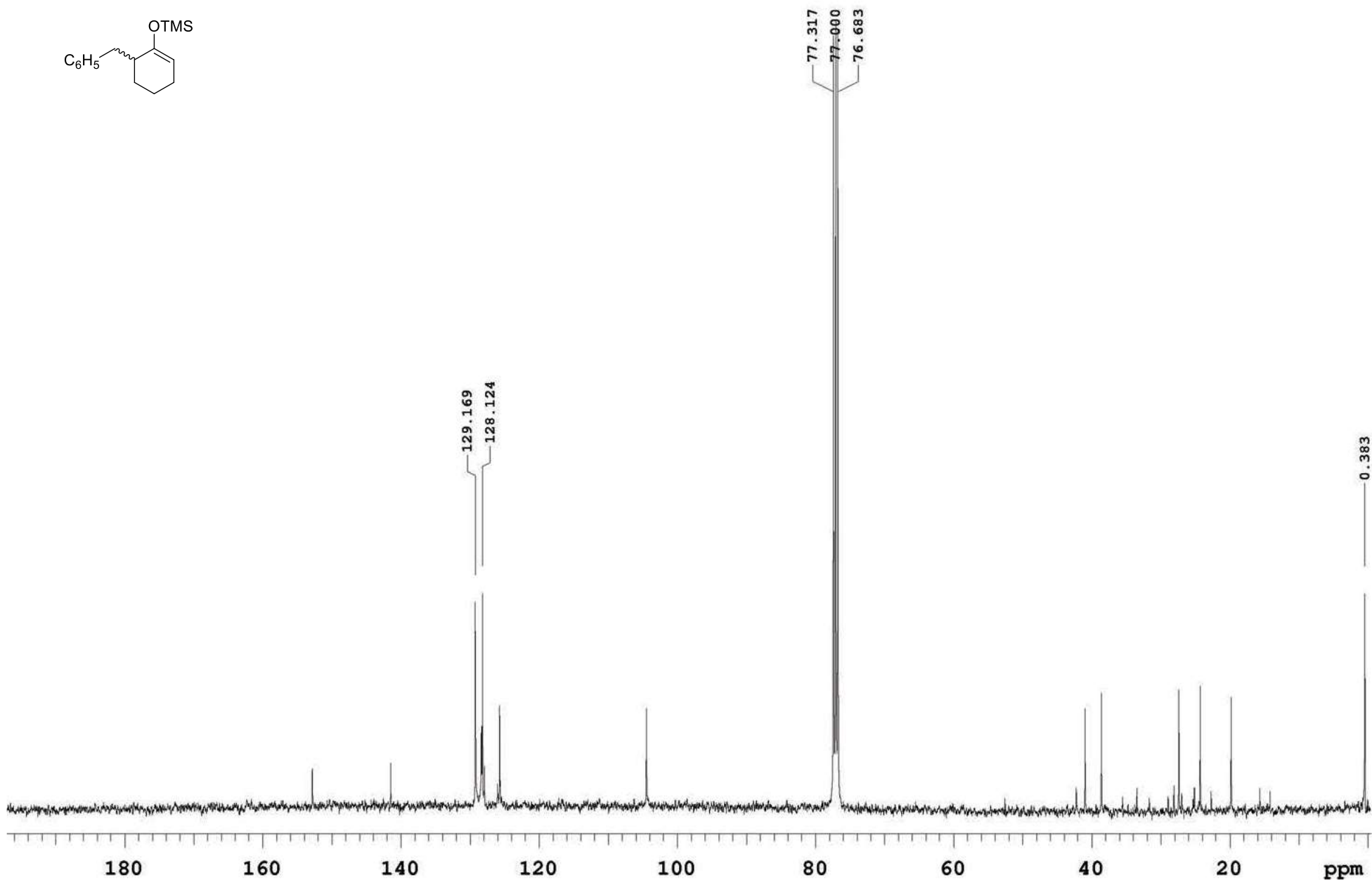
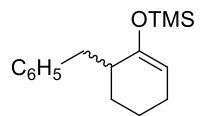


(3-Ethyl-2-oxocyclohexyl)propionic acid (53)-  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 75.4 MHz, 25 °C

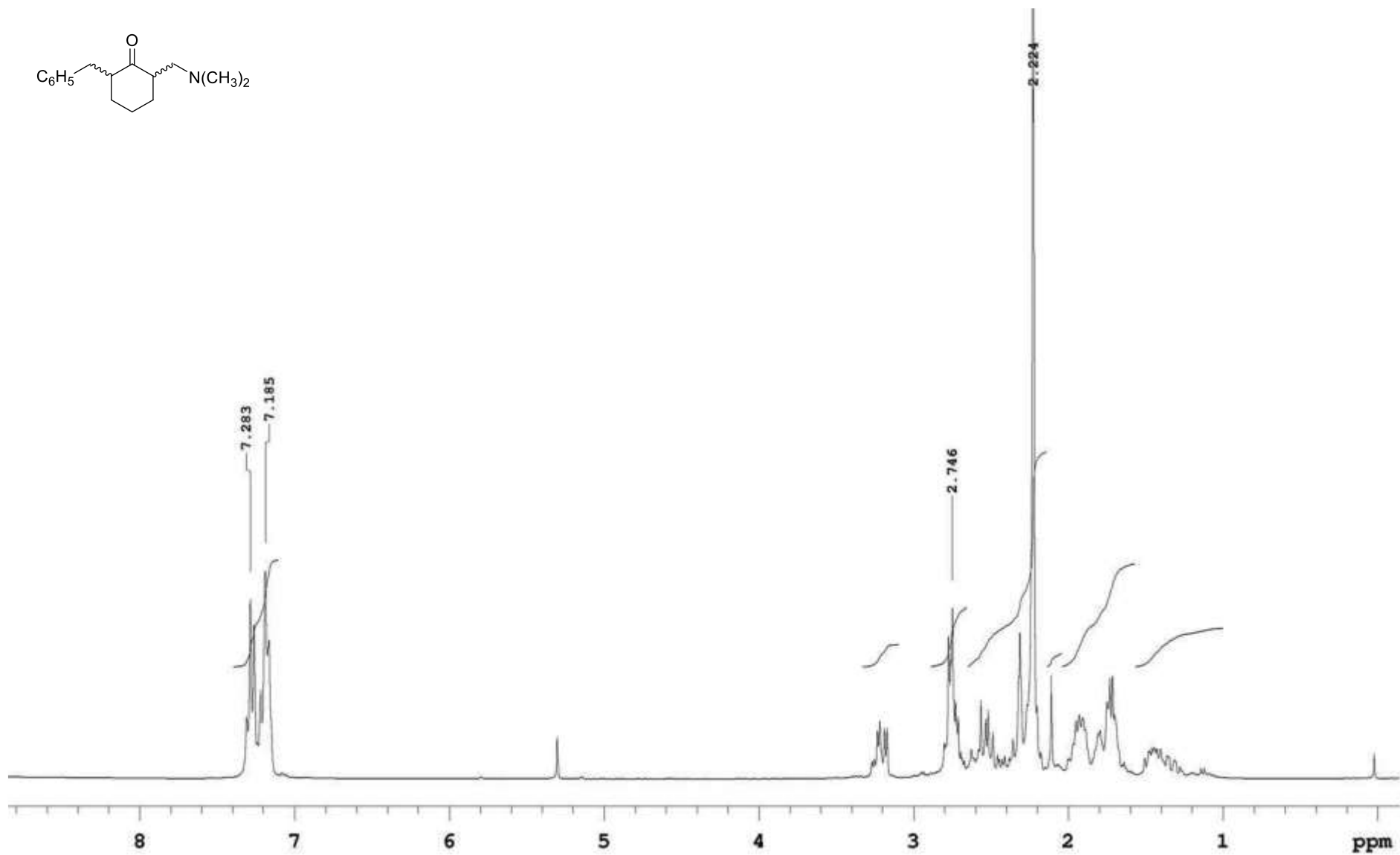
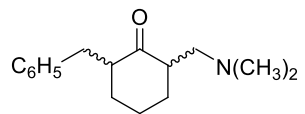




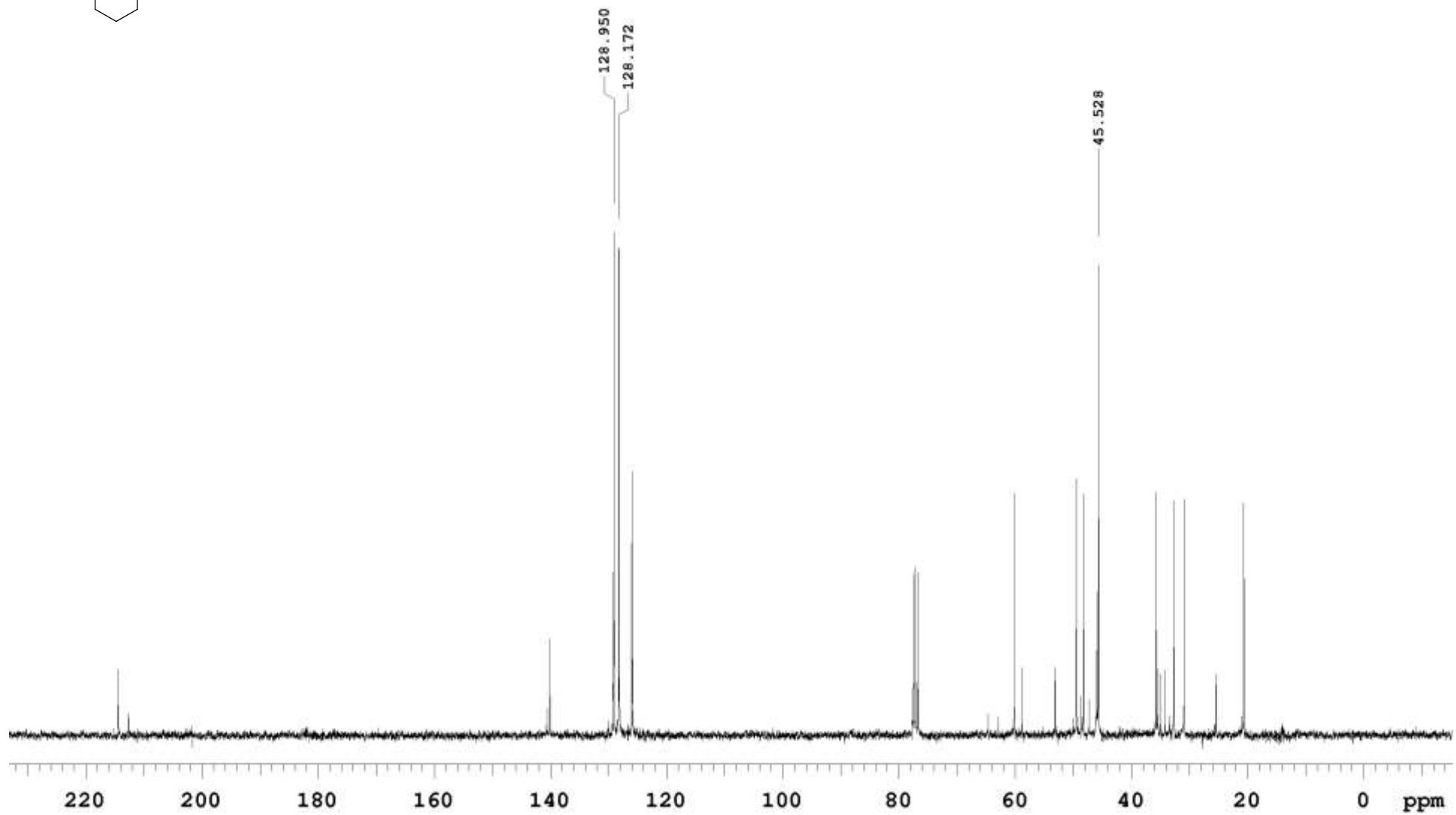
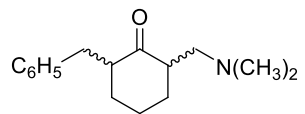
(51)- <sup>1</sup>H- NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



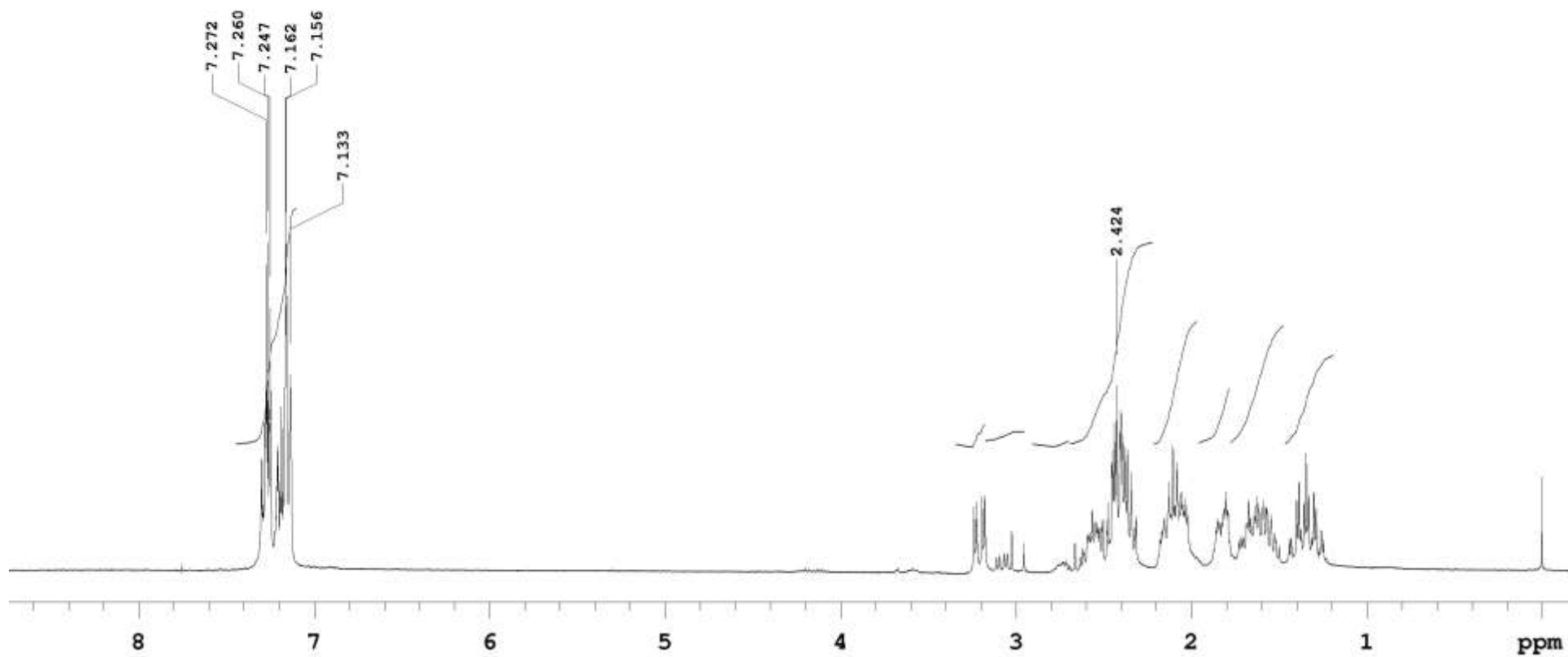
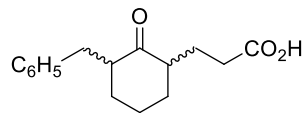
(51)- <sup>1</sup>H- NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



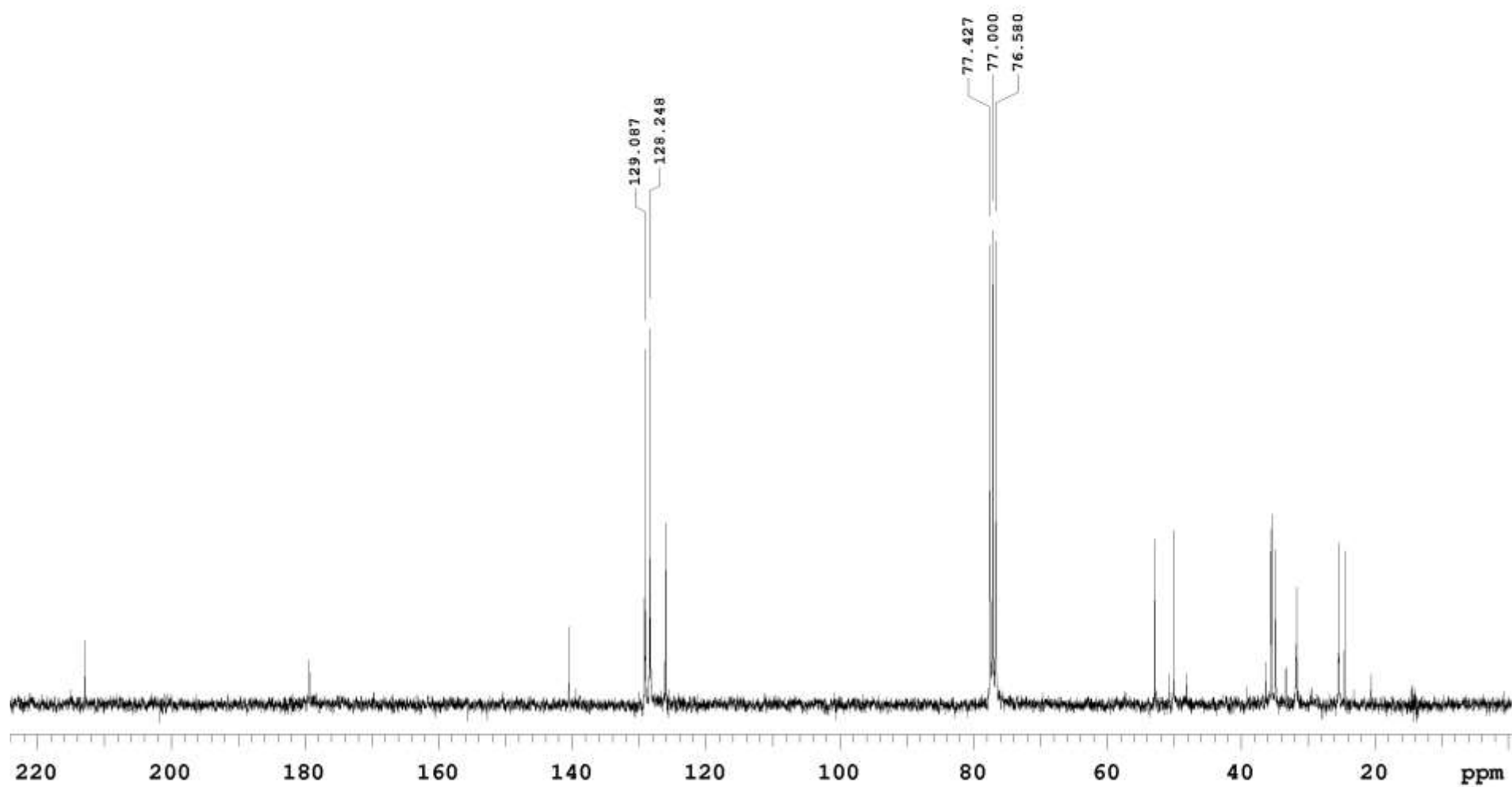
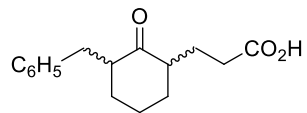
(52)-  $^1\text{H}$ - NMR,  $\text{CDCl}_3$ , 300 MHz, 25 °C



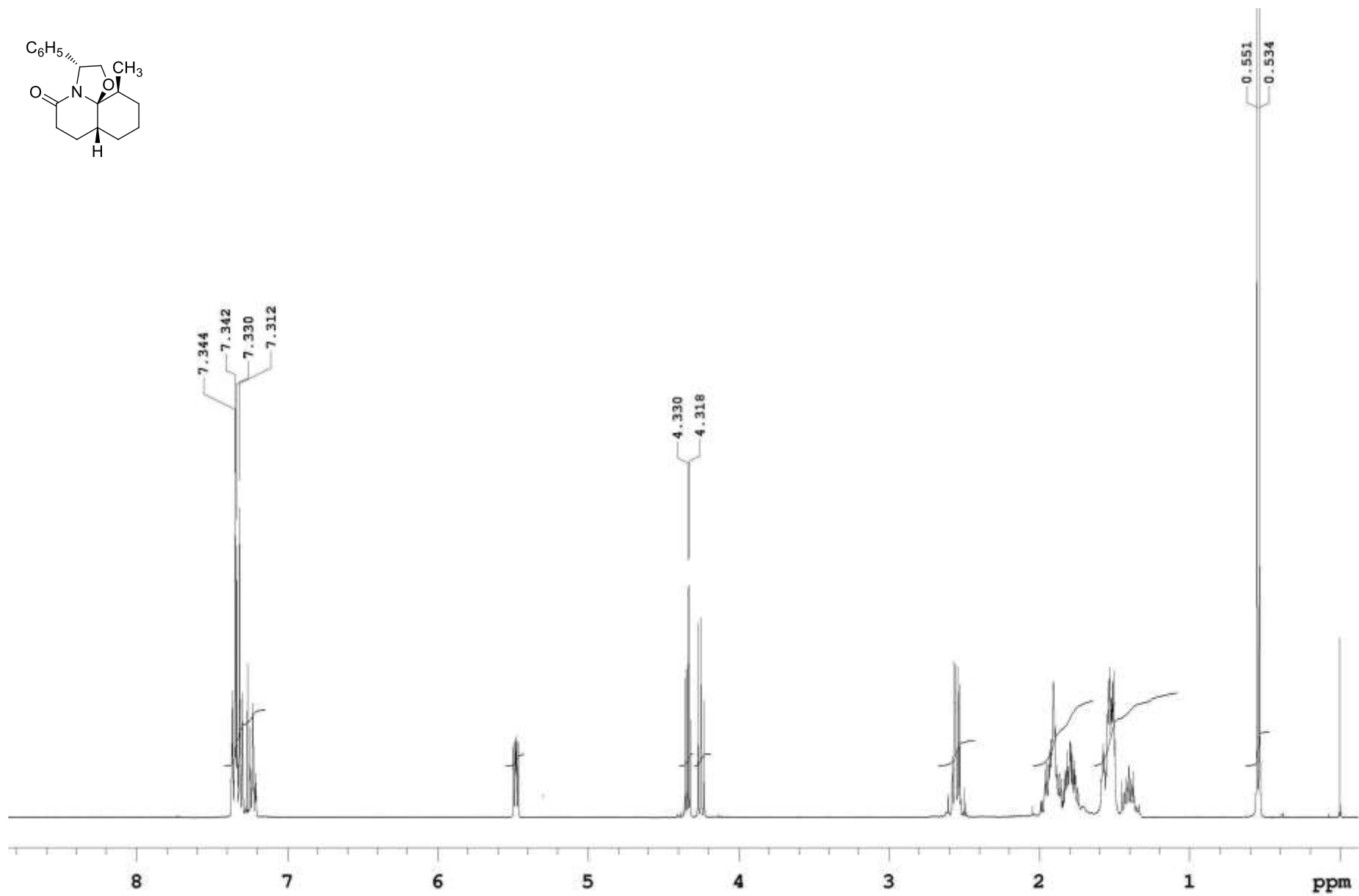
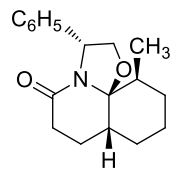
(52)- <sup>1</sup>H- NMR, CDCl<sub>3</sub>, 75.4 MHz, 25 °C



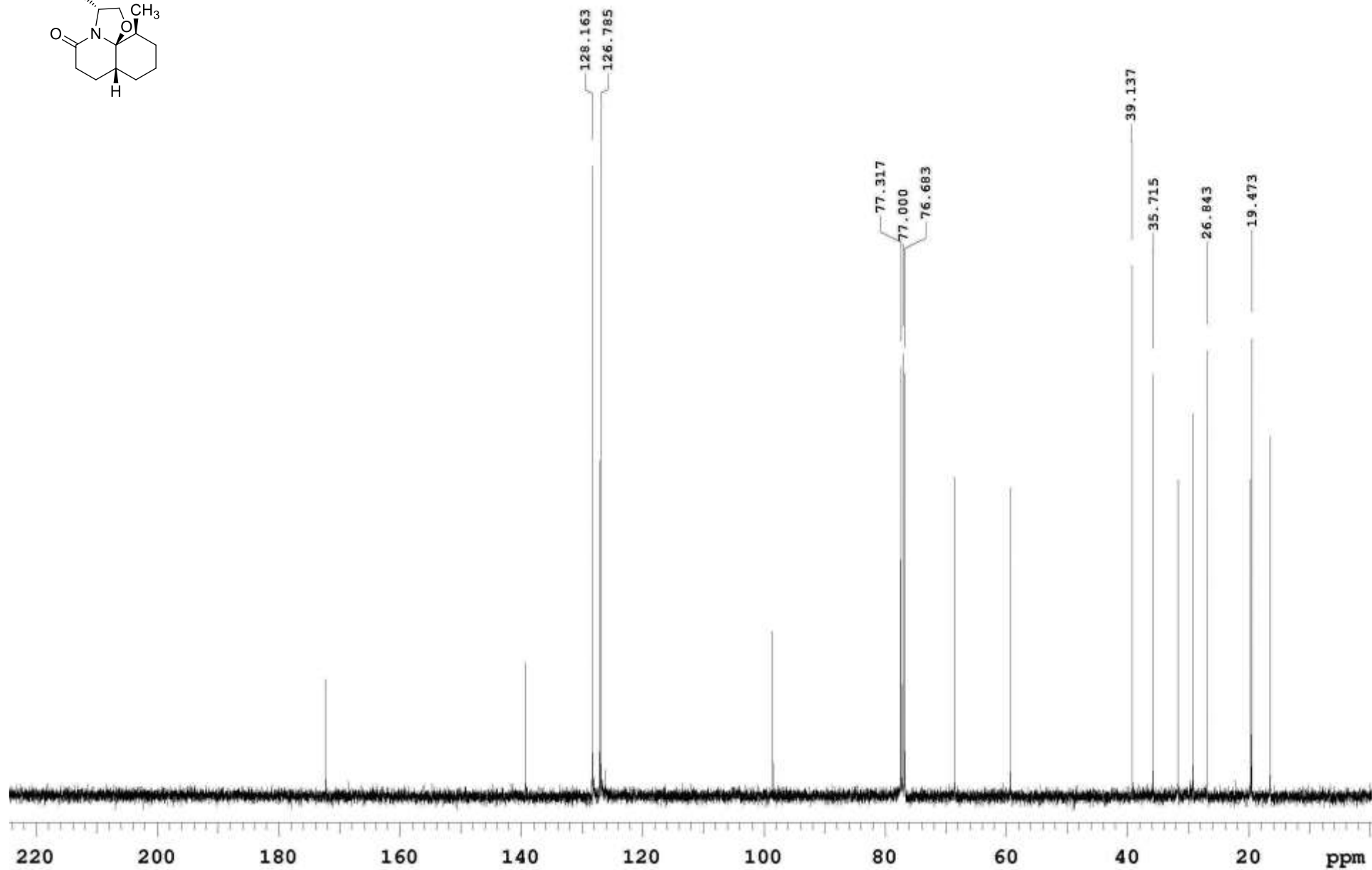
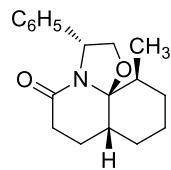
(3-Benzyl-2-oxocyclohexyl)propionic acid (54)-<sup>1</sup>H- NMR, CDCl<sub>3</sub>, 300 MHz, 25 °C



(3-Benzyl-2-oxocyclohexyl)propionic acid (54)- $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 75.4 MHz, 25 °C

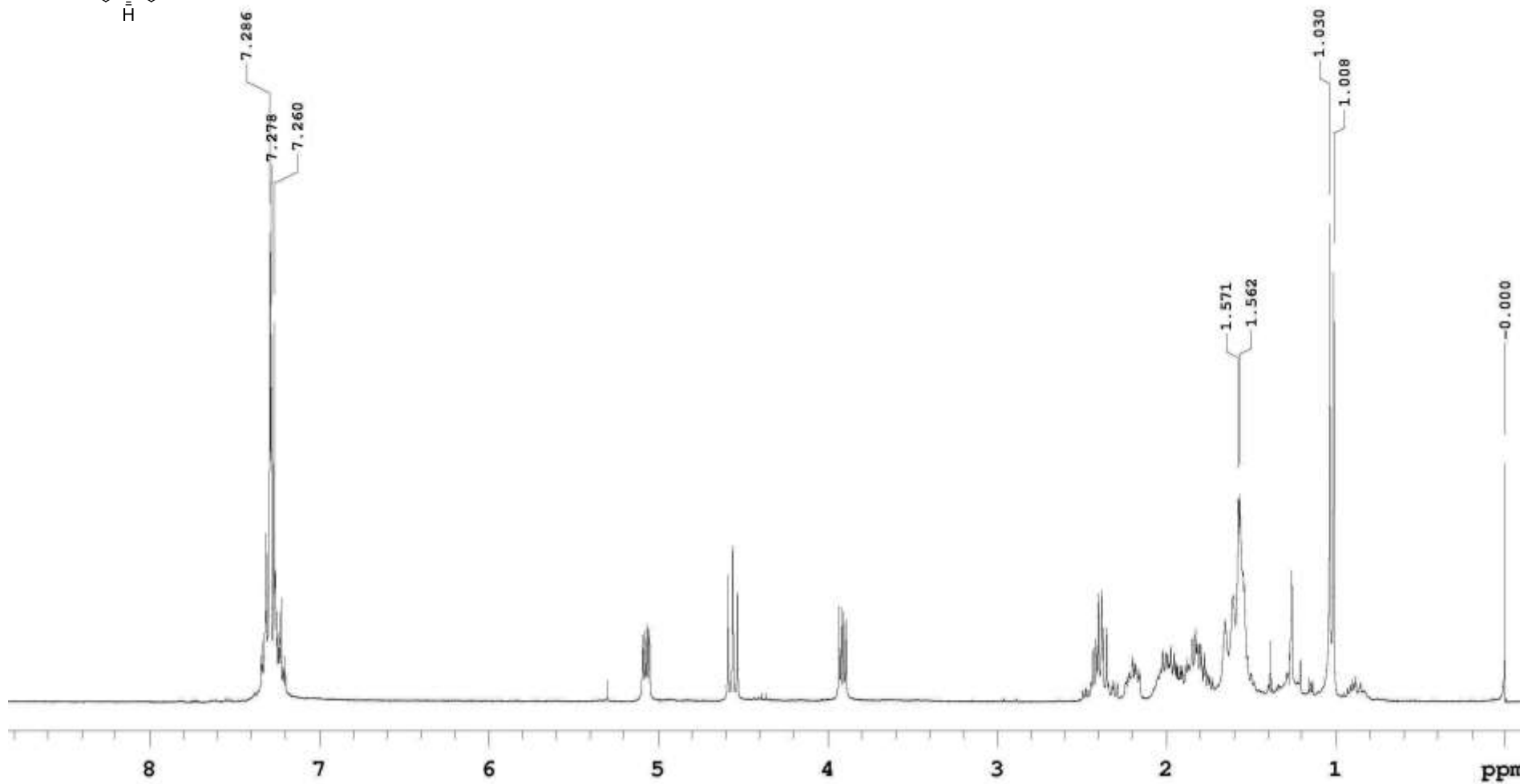
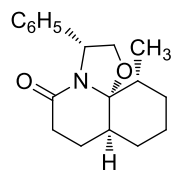


(3R,7aR,11S,11aS)-11-Methyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (55a)- <sup>1</sup>H- NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C

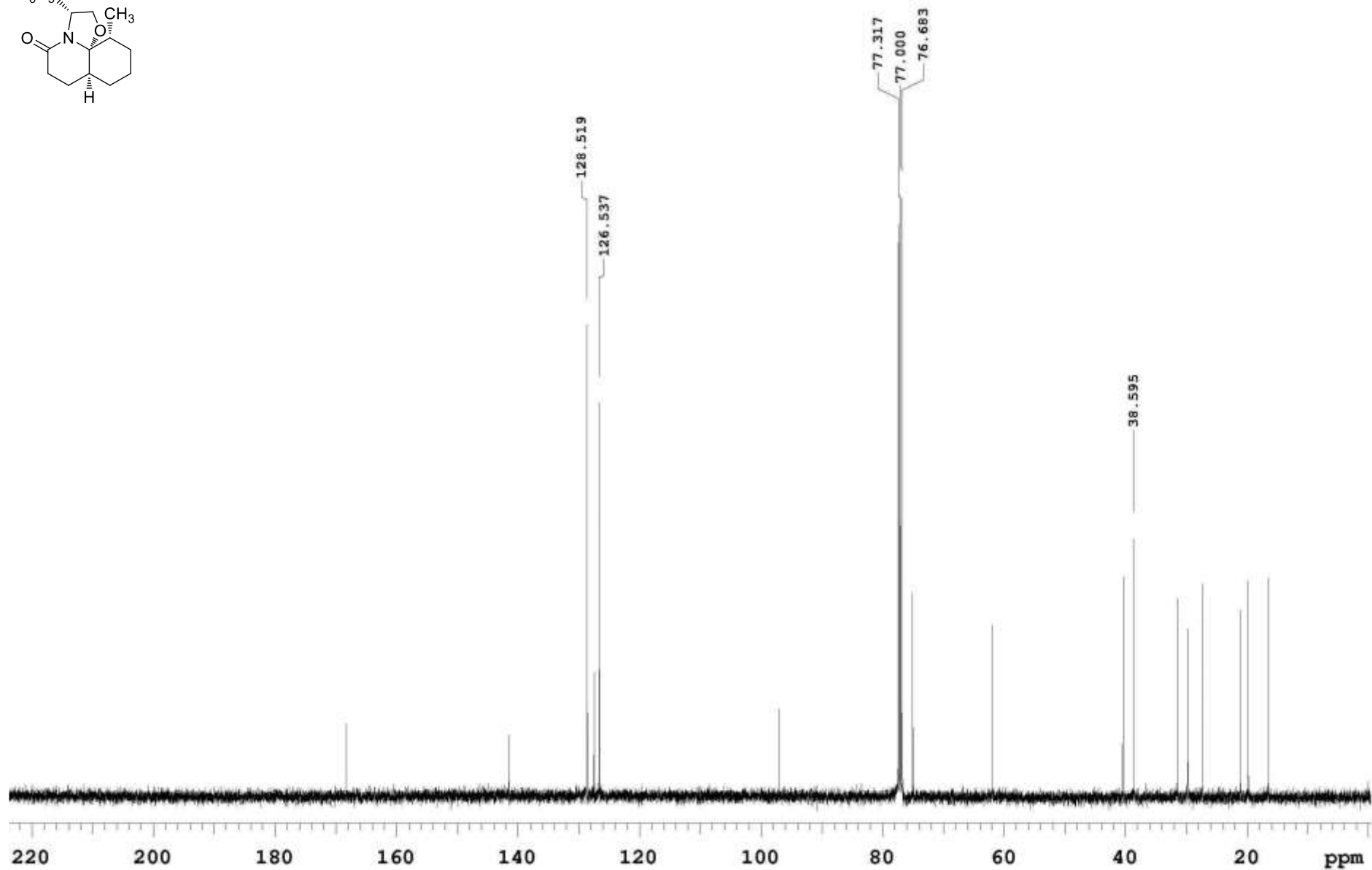
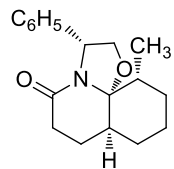


(3R,7aR,11S,11aS)-11-Methyl-5-oxo-3-phenyldecahydrooxazolo[2,3-f]quinoline (55a)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C

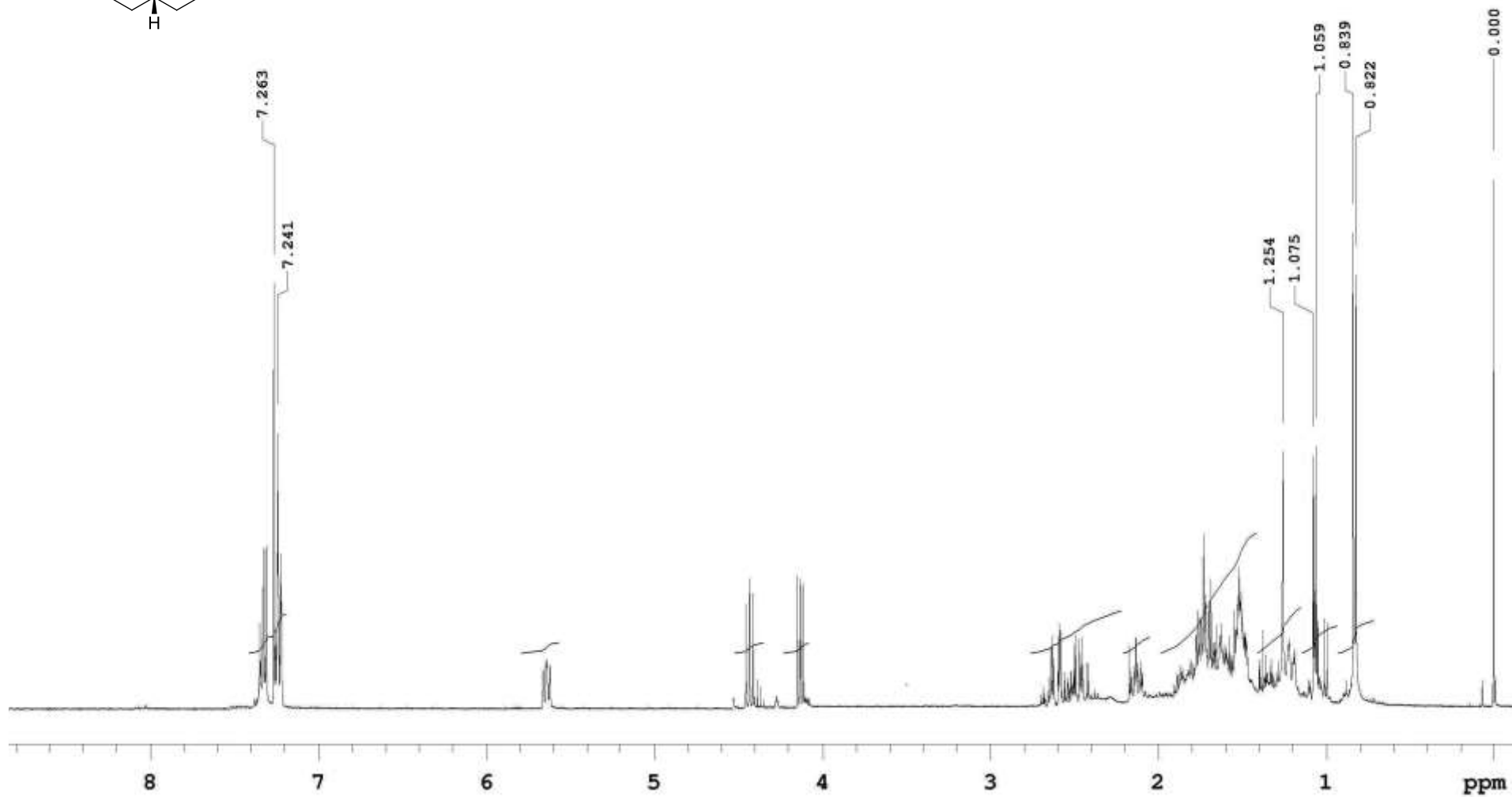
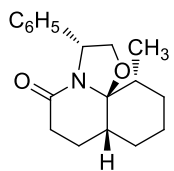




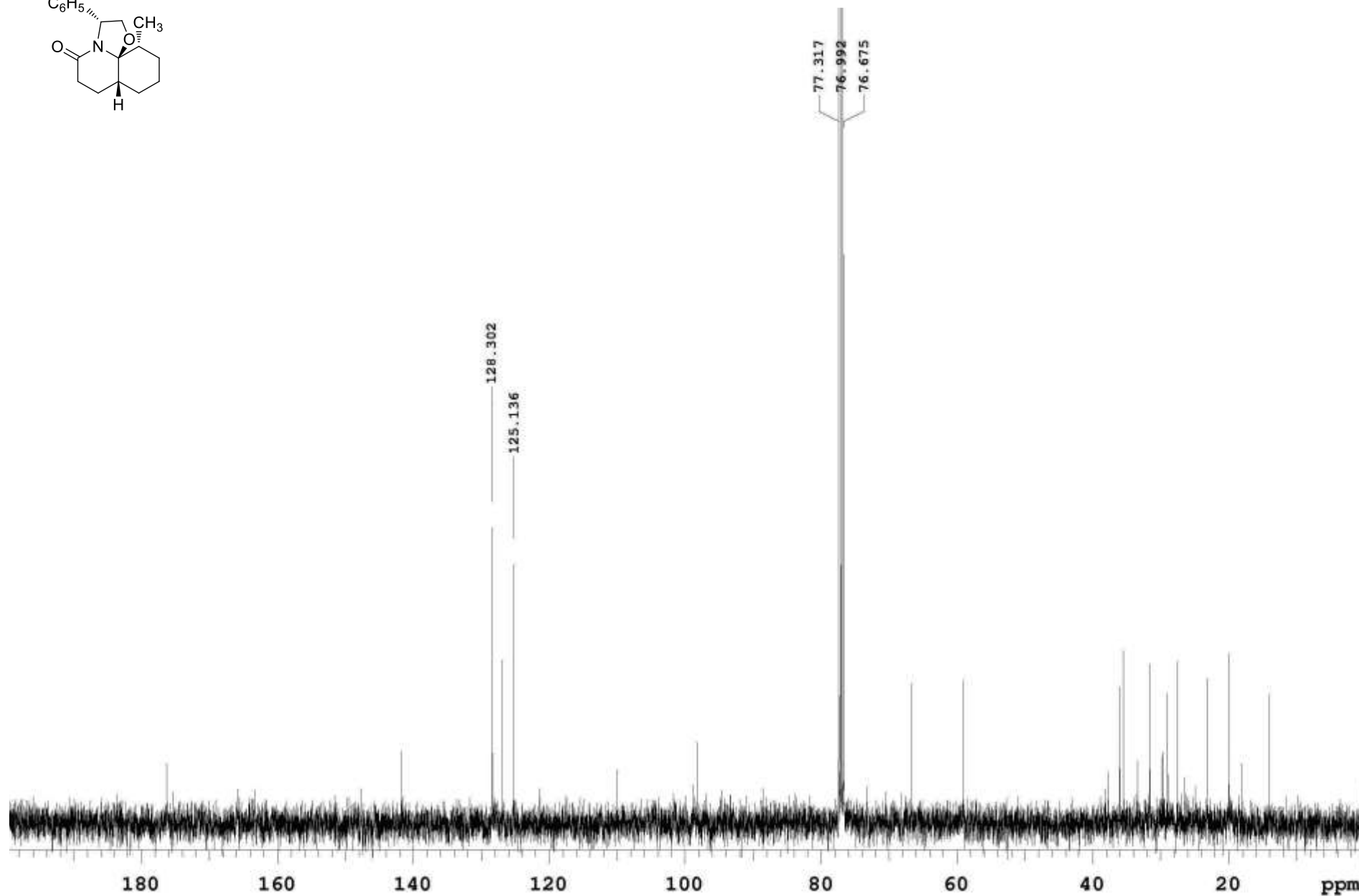
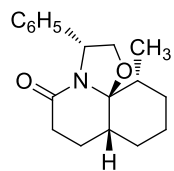
(3R,7aS,11R,11aR)-11-Methyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (55b)-  $^1\text{H}$ -NMR,  $\text{CDCl}_3$ , 400 MHz, 25 °C



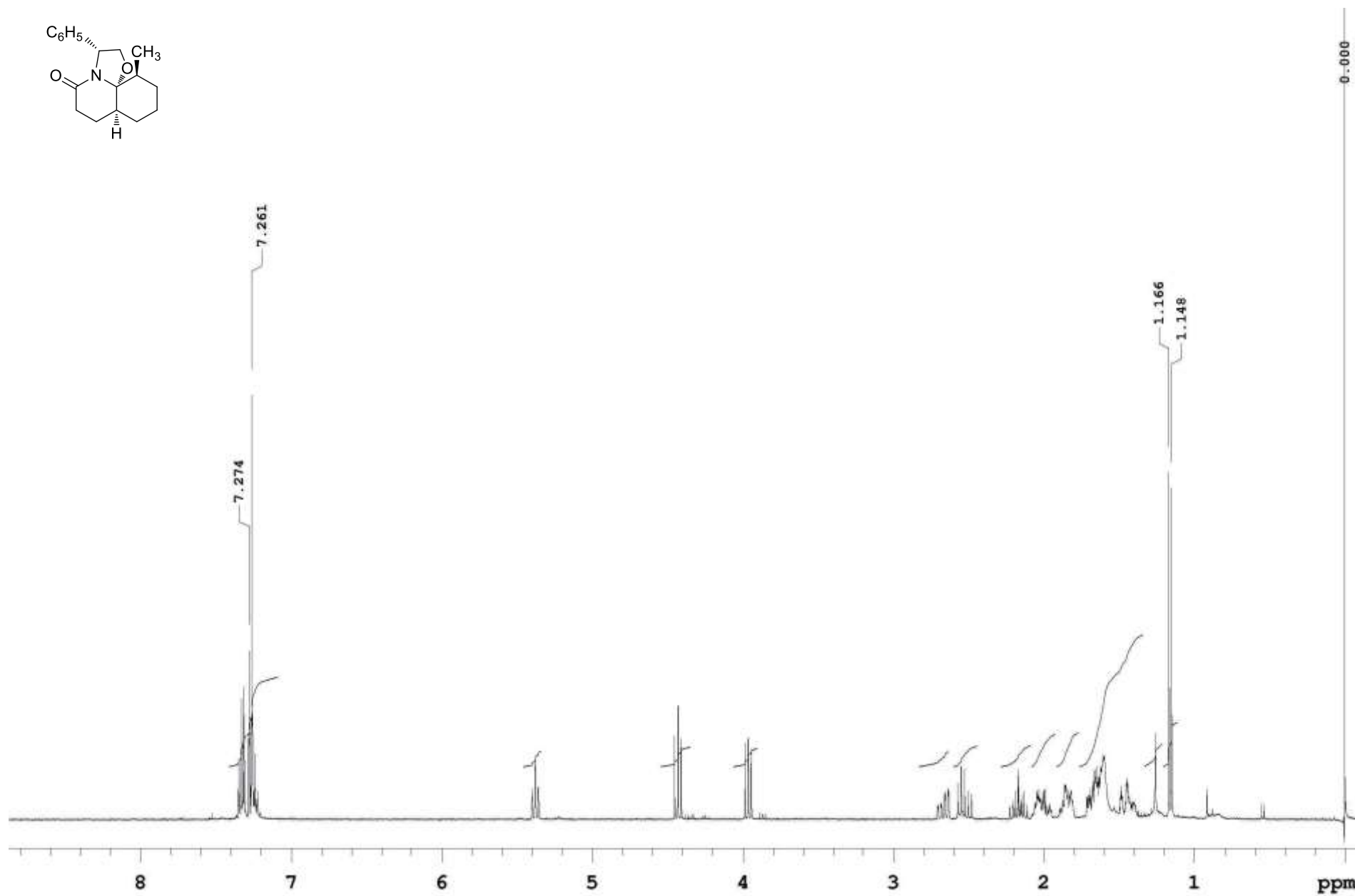
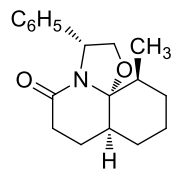
(3R,7aS,11R,11aR)-11-Methyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (55b)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



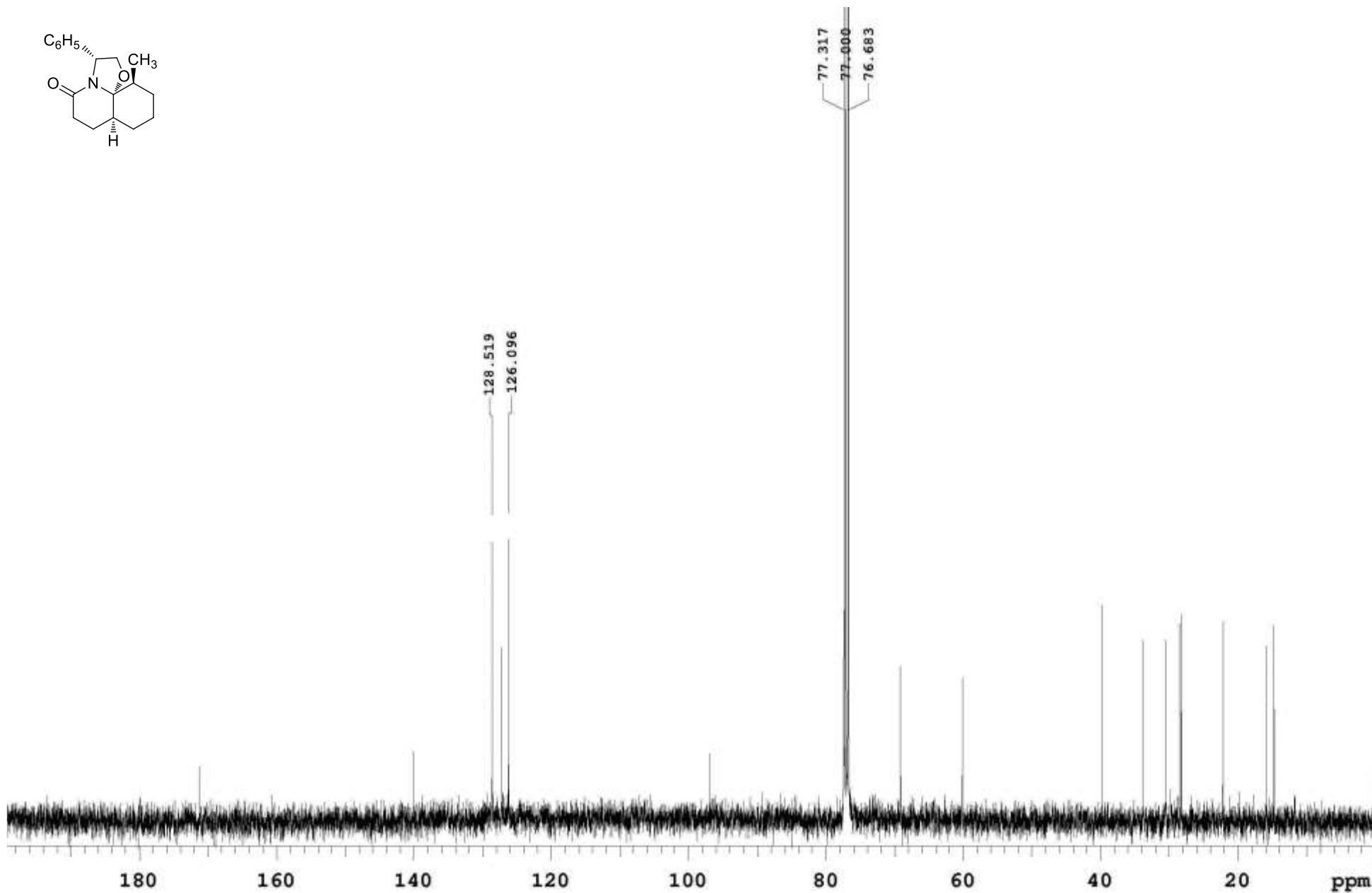
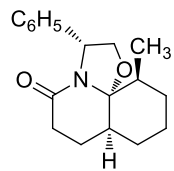
(3R,7aR,11R,11aS)-11-Methyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (55c)- <sup>1</sup>H- NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



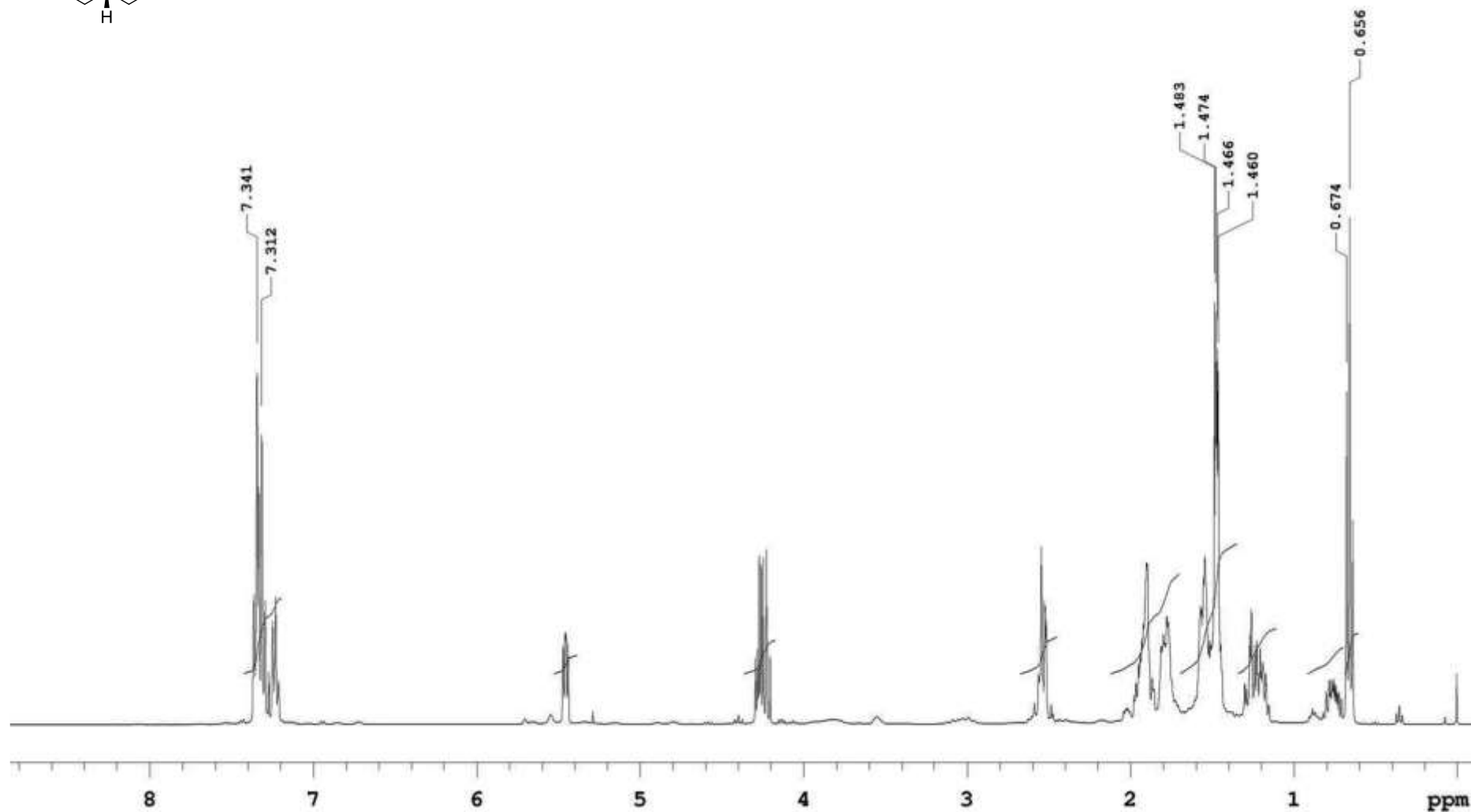
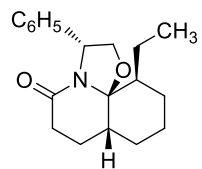
(3R,7aR,11R,11aS)-11-Methyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (55c)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



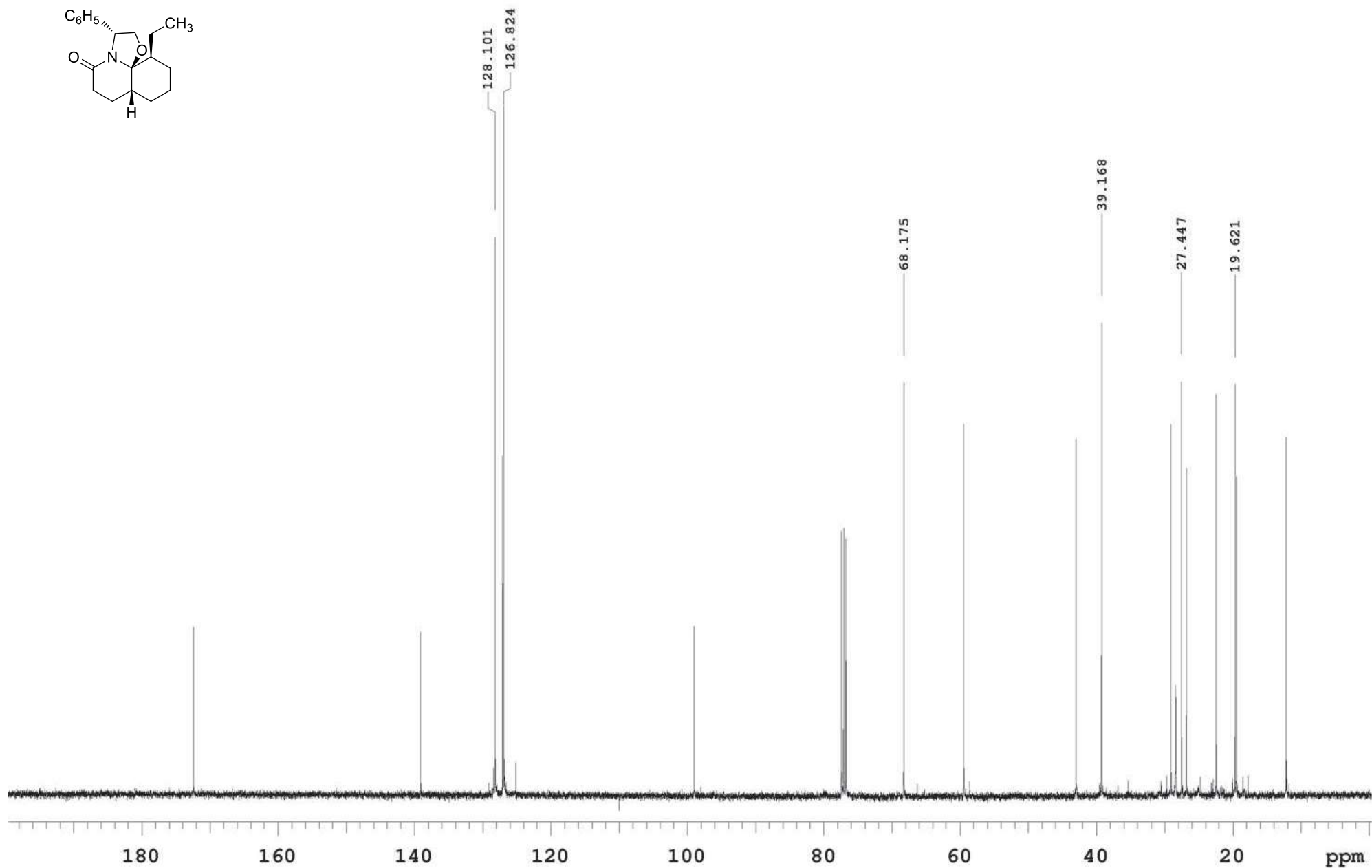
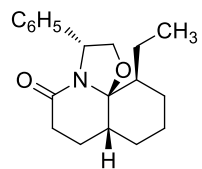
(3R,7aS,11S,11aR)-11-Methyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (55d)- <sup>1</sup>H- NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



(3R,7aS,11S,11aR)-11-Methyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (55d)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C

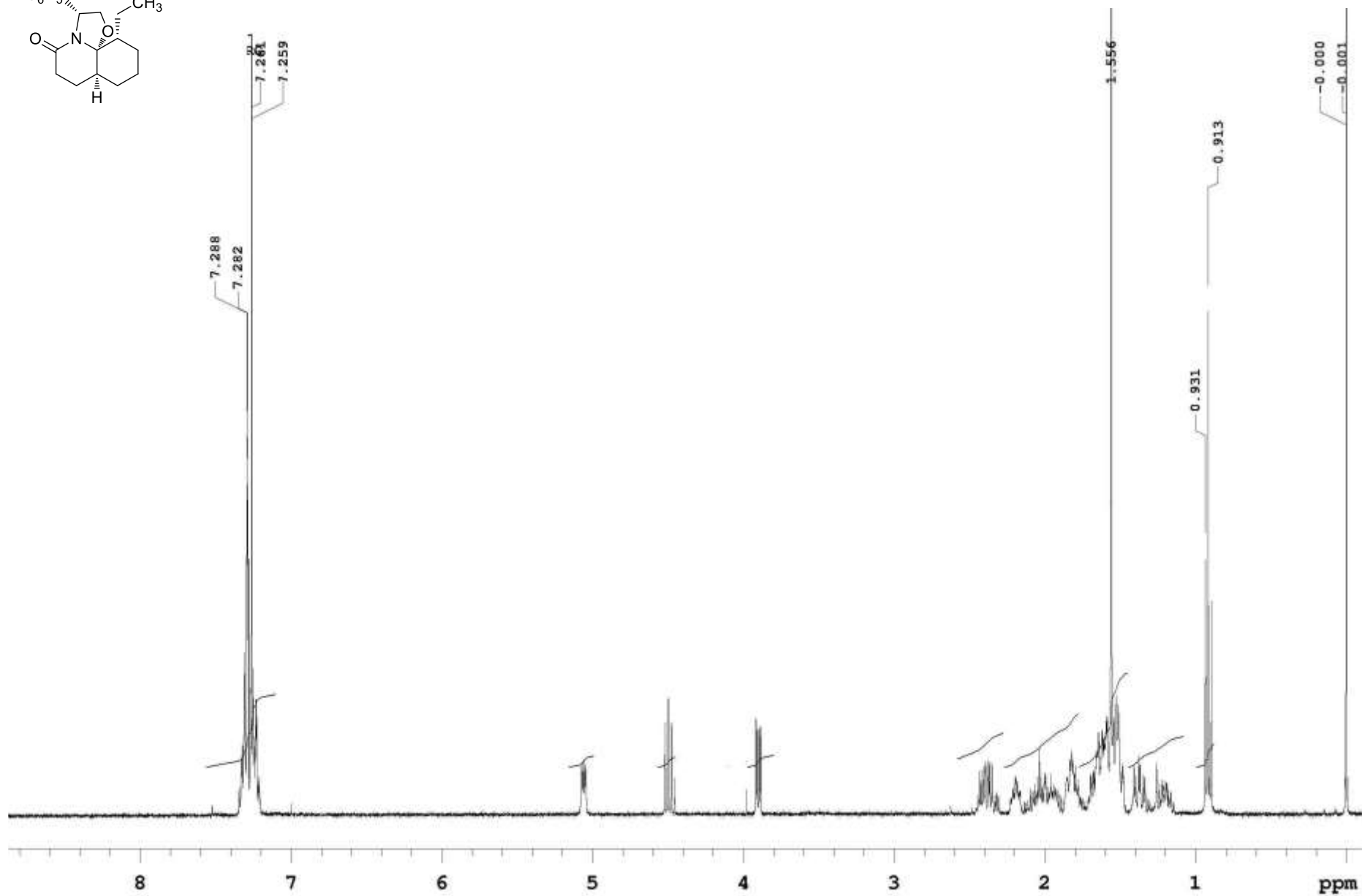
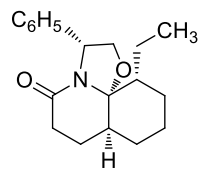


(3*R*,7*aR*,11*S*,11*aS*)-11-Ethyl-5-oxo-3-phenyldecahydrooxazolo[2,3-*j*]quinoline (56a)-  $^1\text{H}$ - NMR,  $\text{CDCl}_3$ , 400 MHz, 25 °C

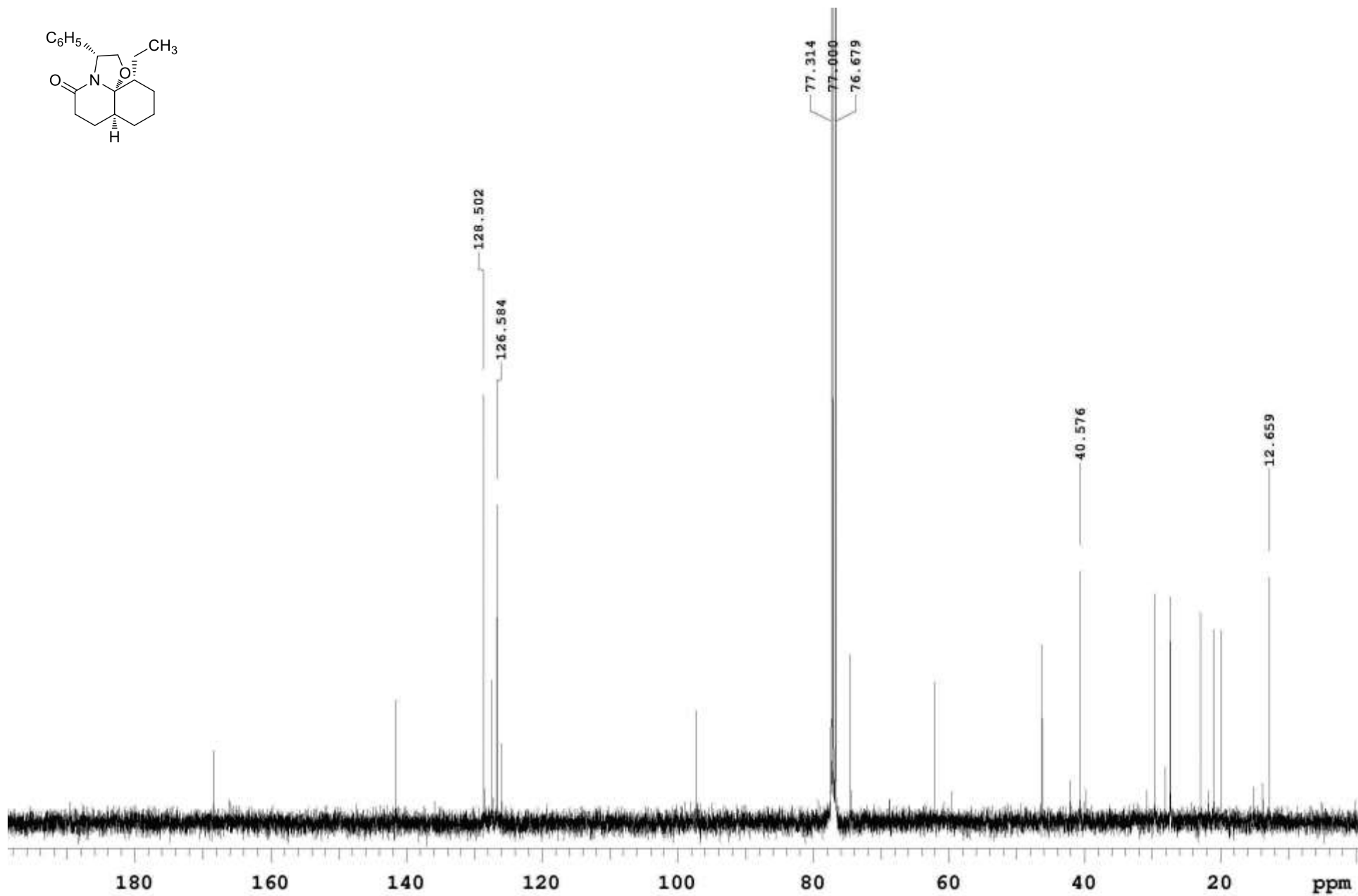
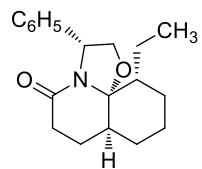


(3R,7aR,11S,11aS)-11-Ethyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (56a)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C

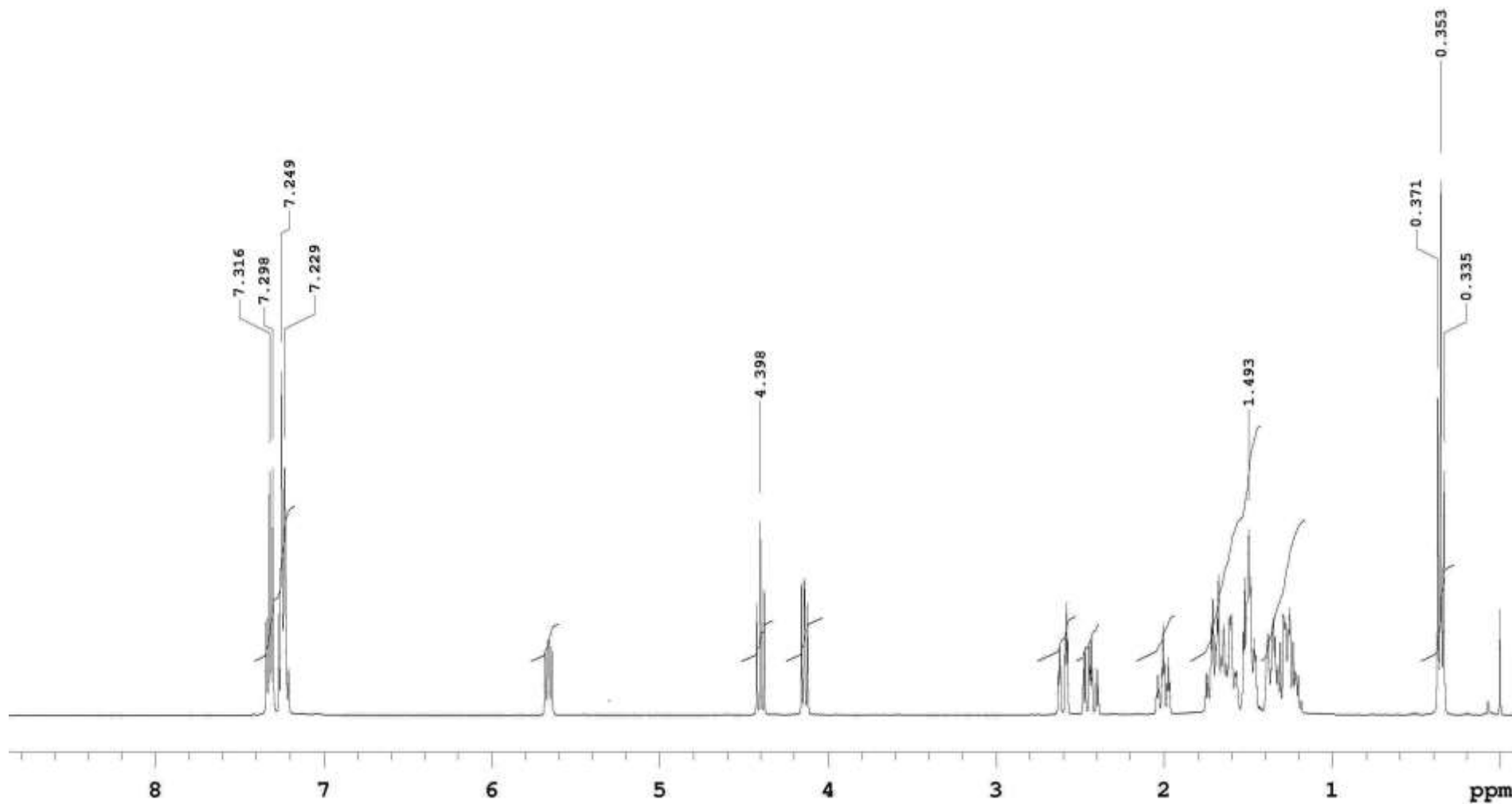
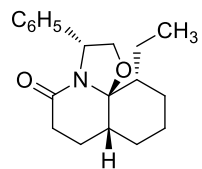




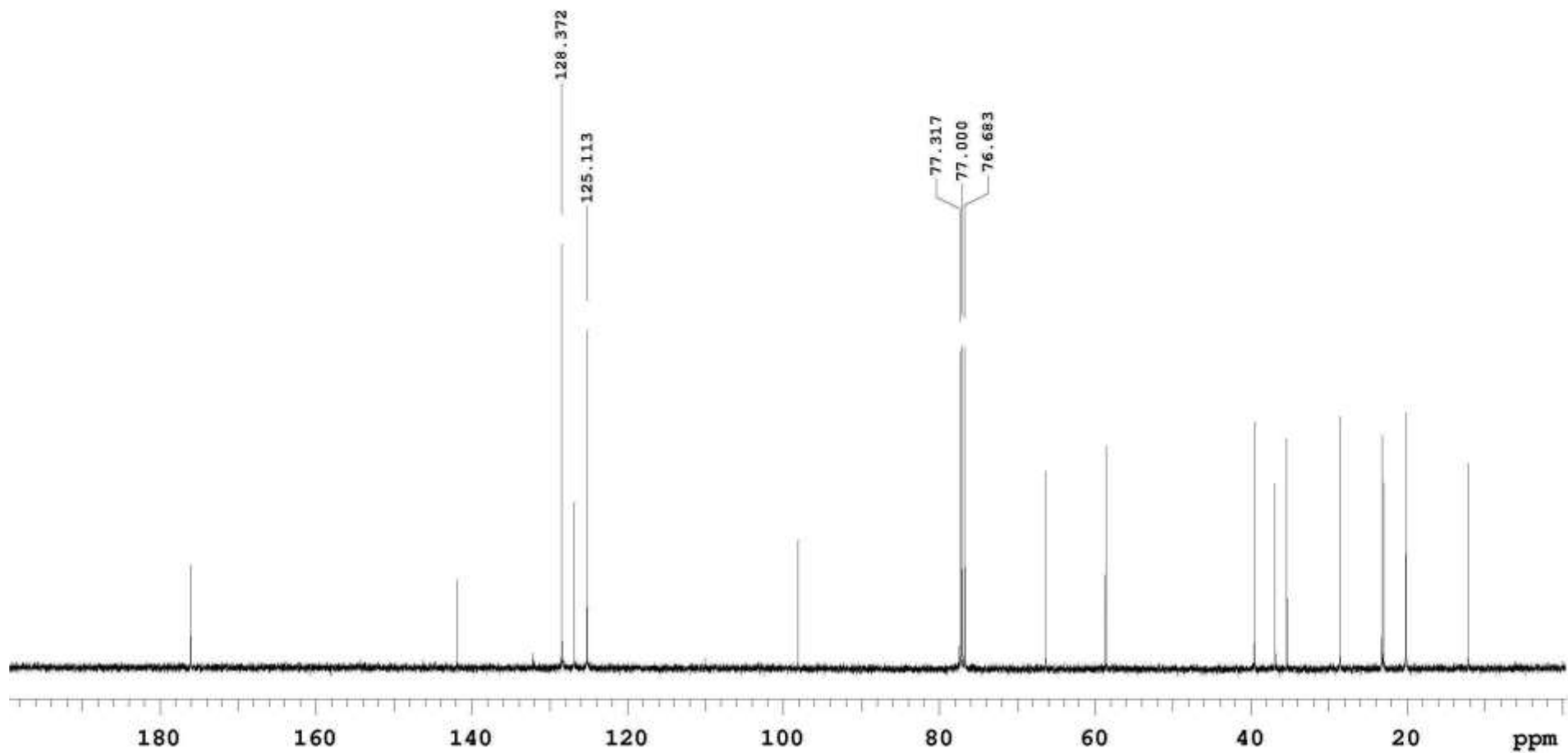
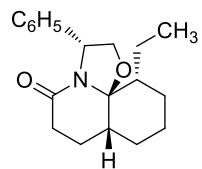
(3R,7aS,11R,11aR)-11-Ethyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (56b)- <sup>1</sup>H- NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



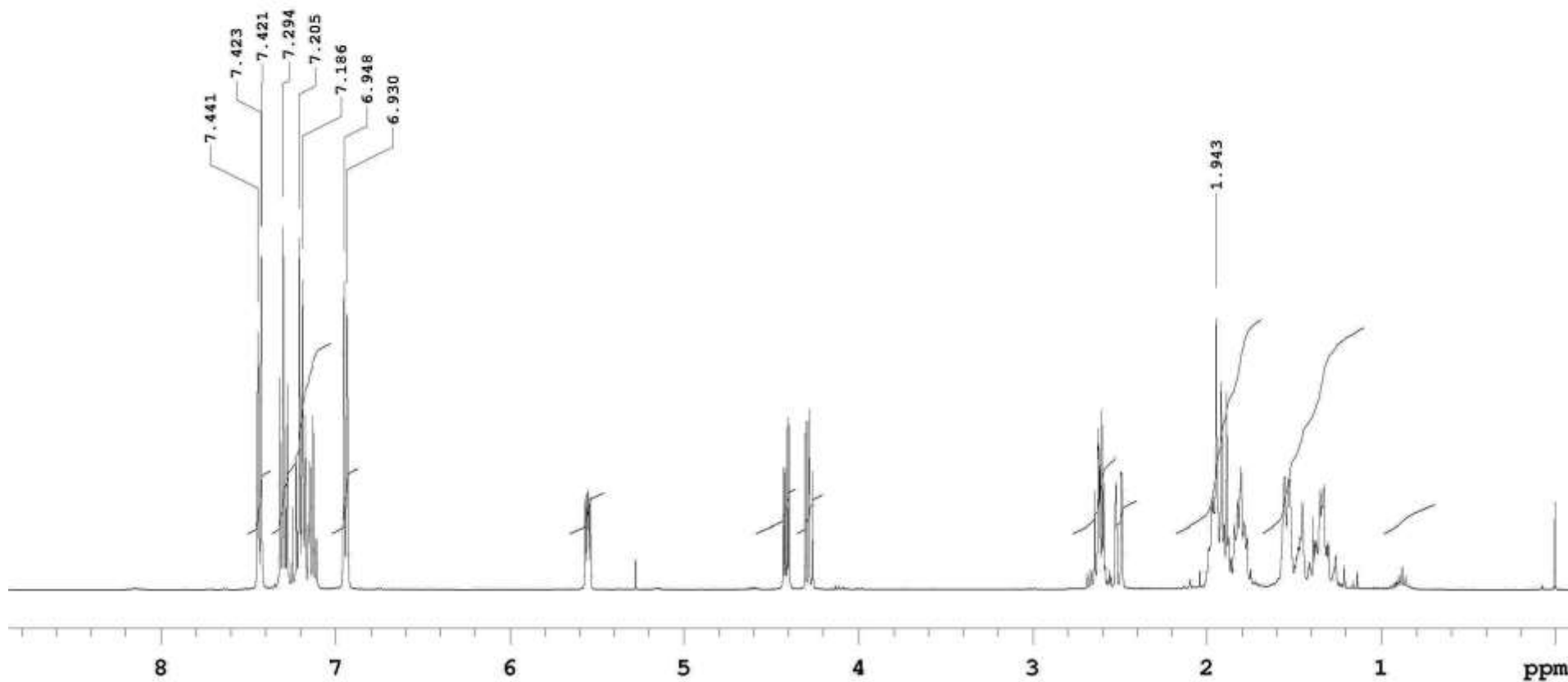
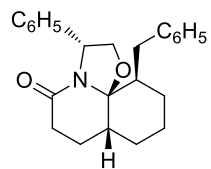
(3*R*,7*aS*,11*R*,11*aR*)-11-Ethyl-5-oxo-3-phenyldecahydrooxazolo[2,3-*f*]quinoline (56b)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



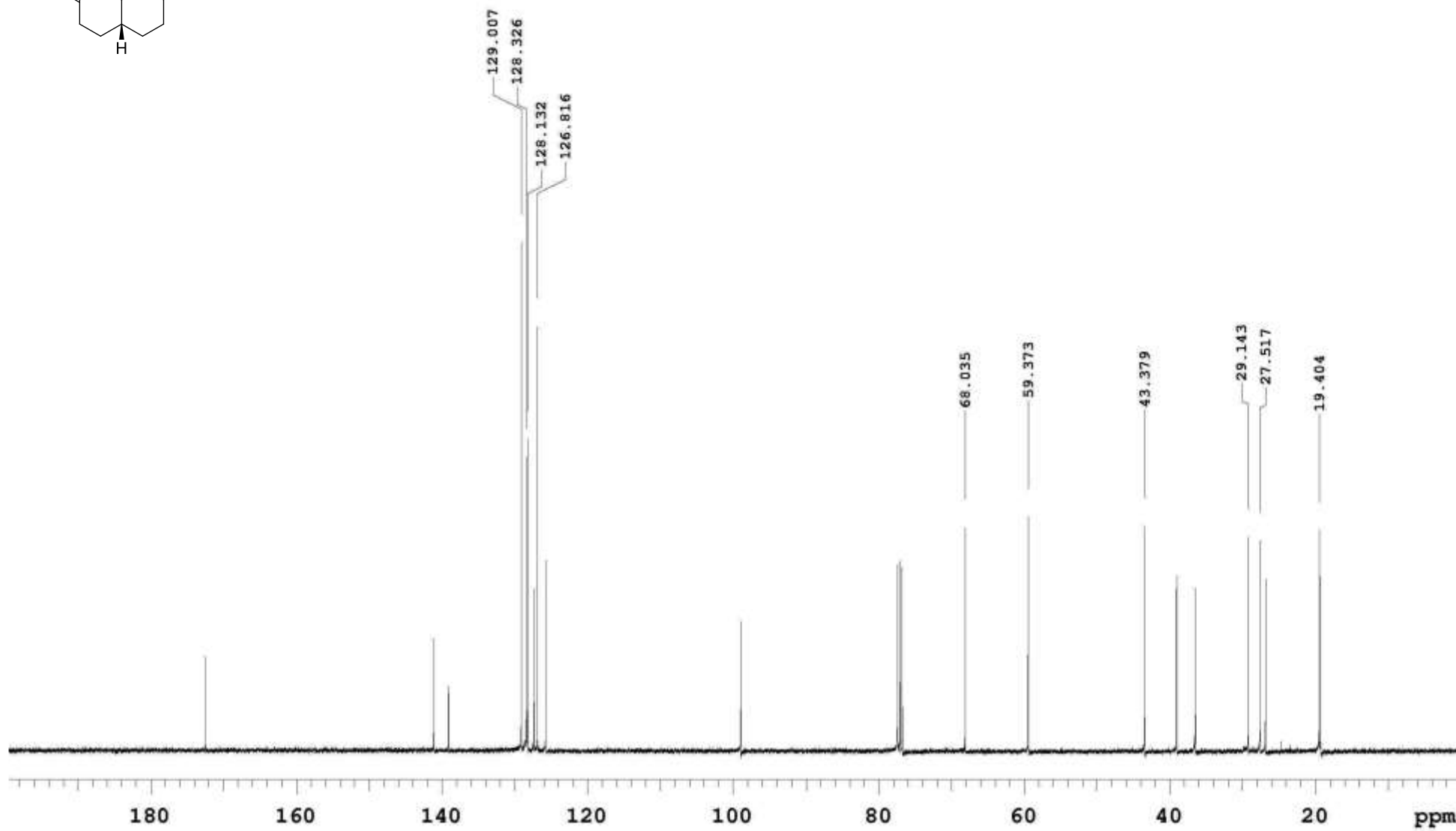
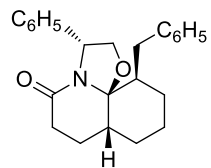
(3R,7aR,11R,11aS)-11-Ethyl-5-oxo-3-phenyldecahydrooxazolo[2,3-f]quinoline (56c)- <sup>1</sup>H- NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



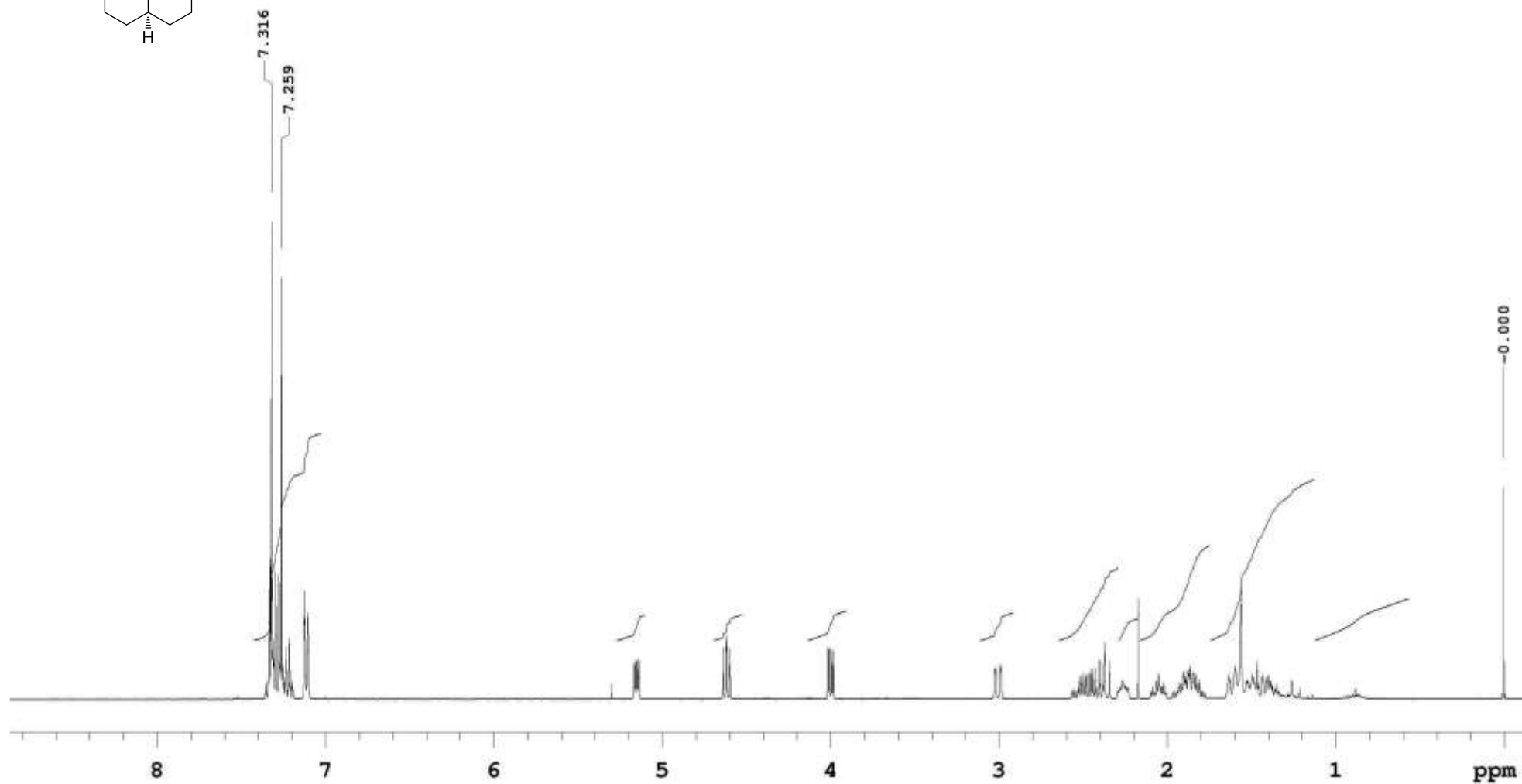
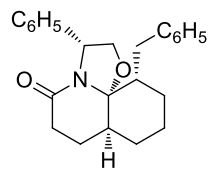
(3R,7aR,11R,11aS)-11-Ethyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (56c)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



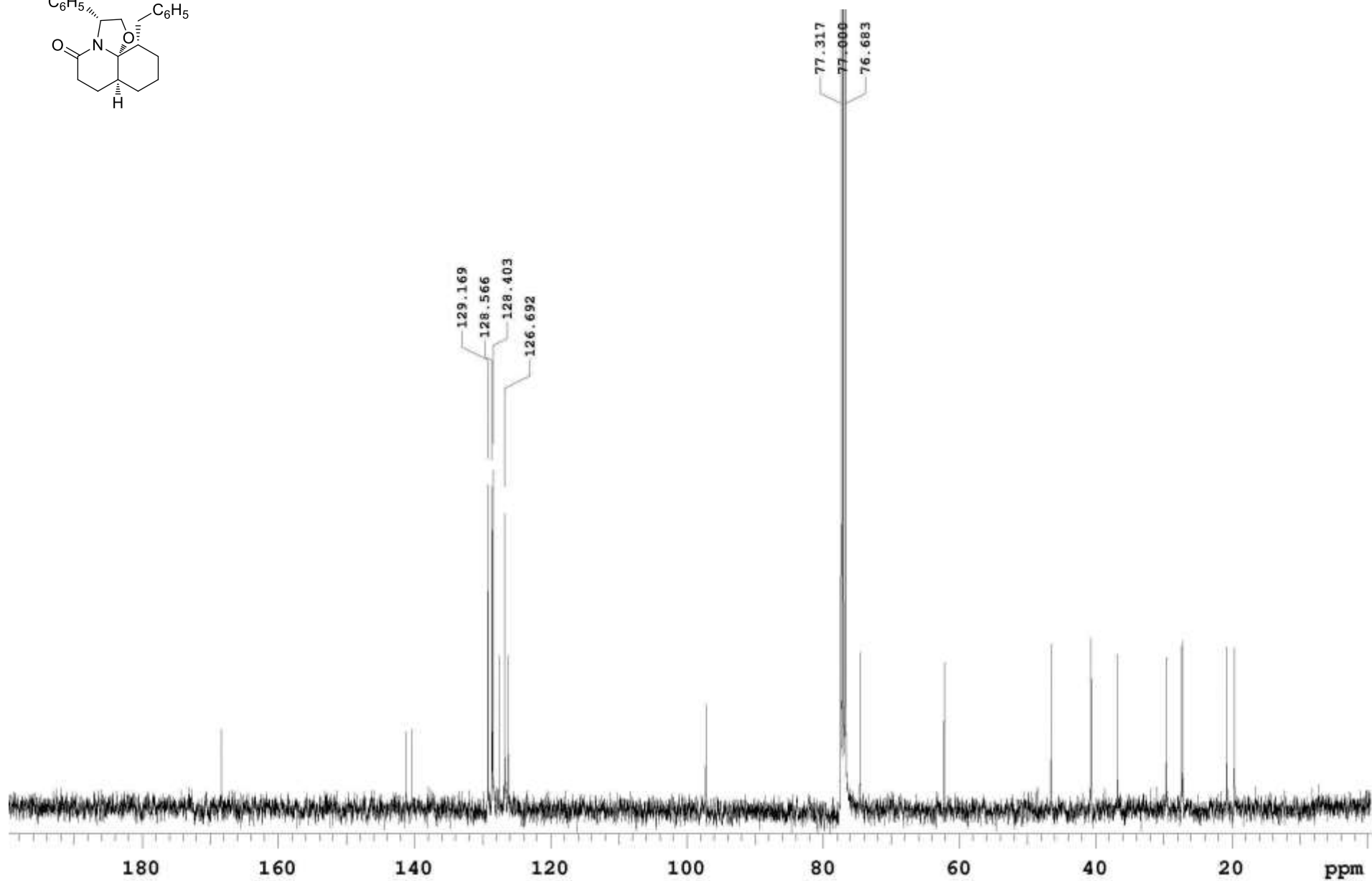
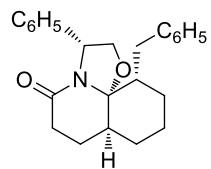
(3R,7aR,11R,11aR)-11-Benzyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (57a)- <sup>1</sup>H- NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



(3R,7aR,11R,11aR)-11-Benzyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (57a)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C

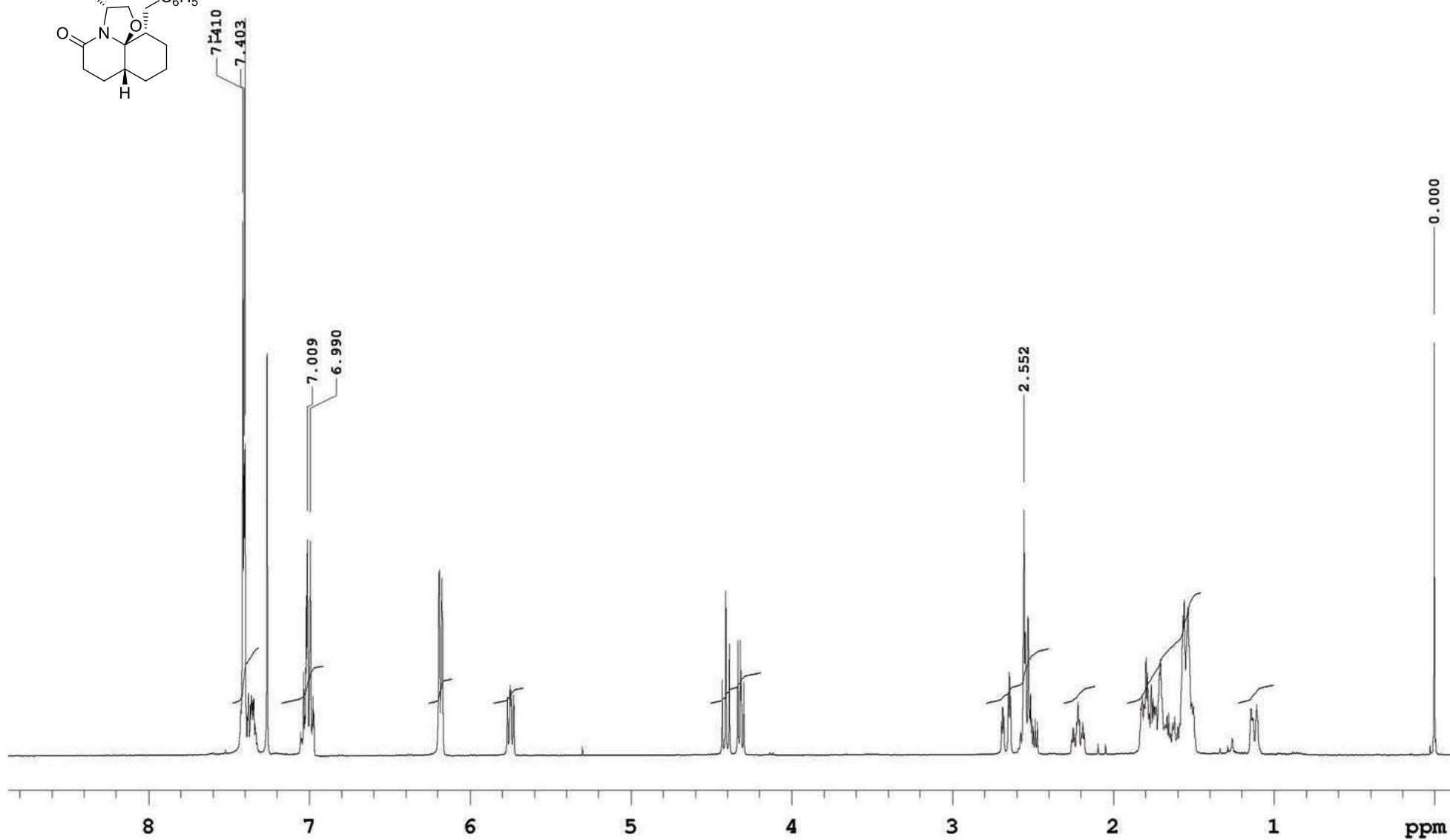
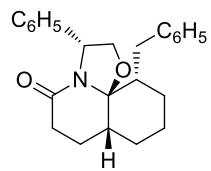


(3*R*,7*aS*,11*S*,11*aS*)-11-Benzyl-5-oxo-3-phenyldecahydrooxazolo[2,3-*j*]quinoline (57b)- <sup>1</sup>H- NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C

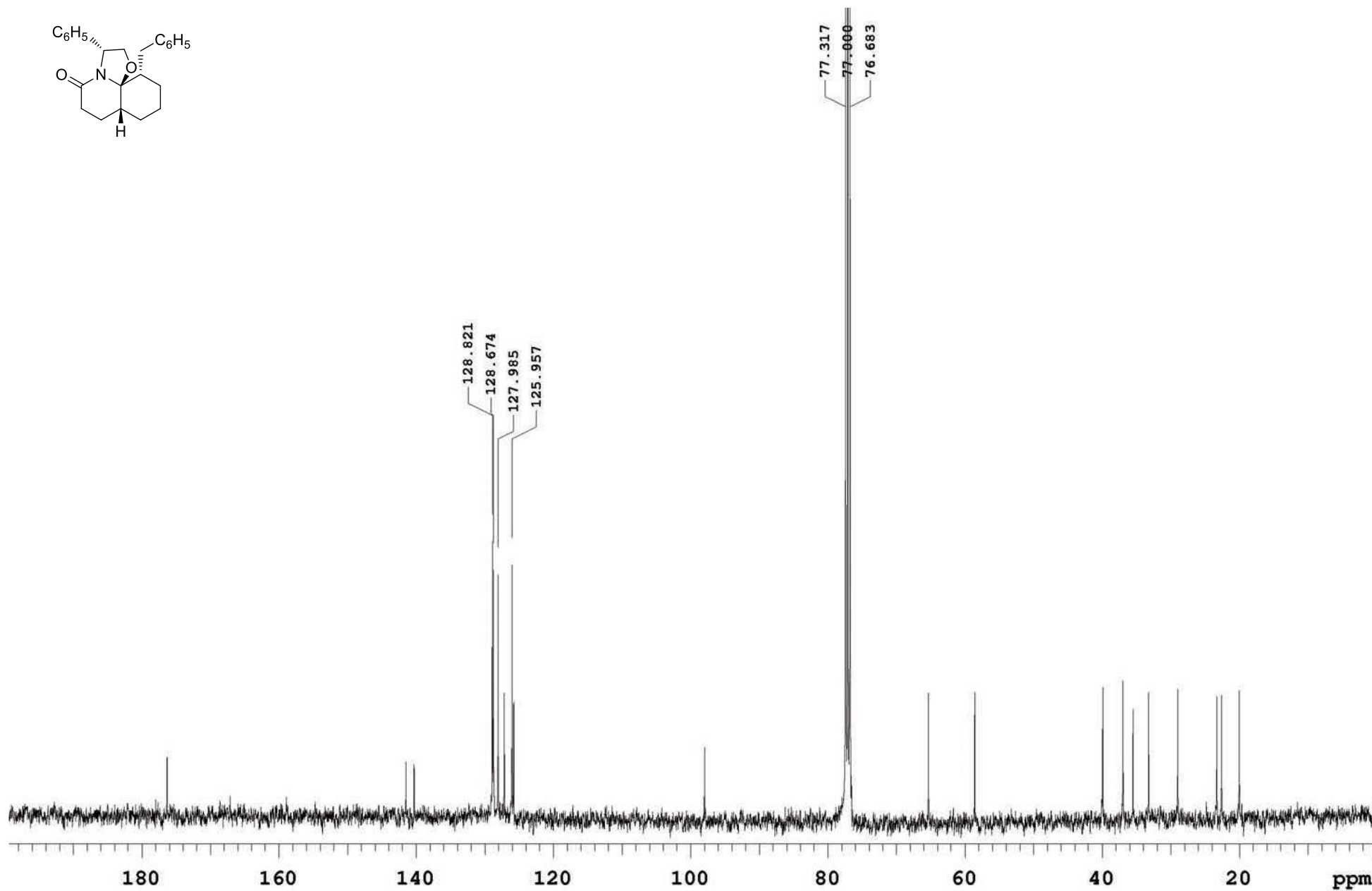
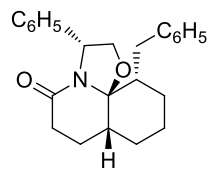


(3R,7aS,11S,11aS)-11-Benzyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (57b)-  $^{13}\text{C}$ -NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C

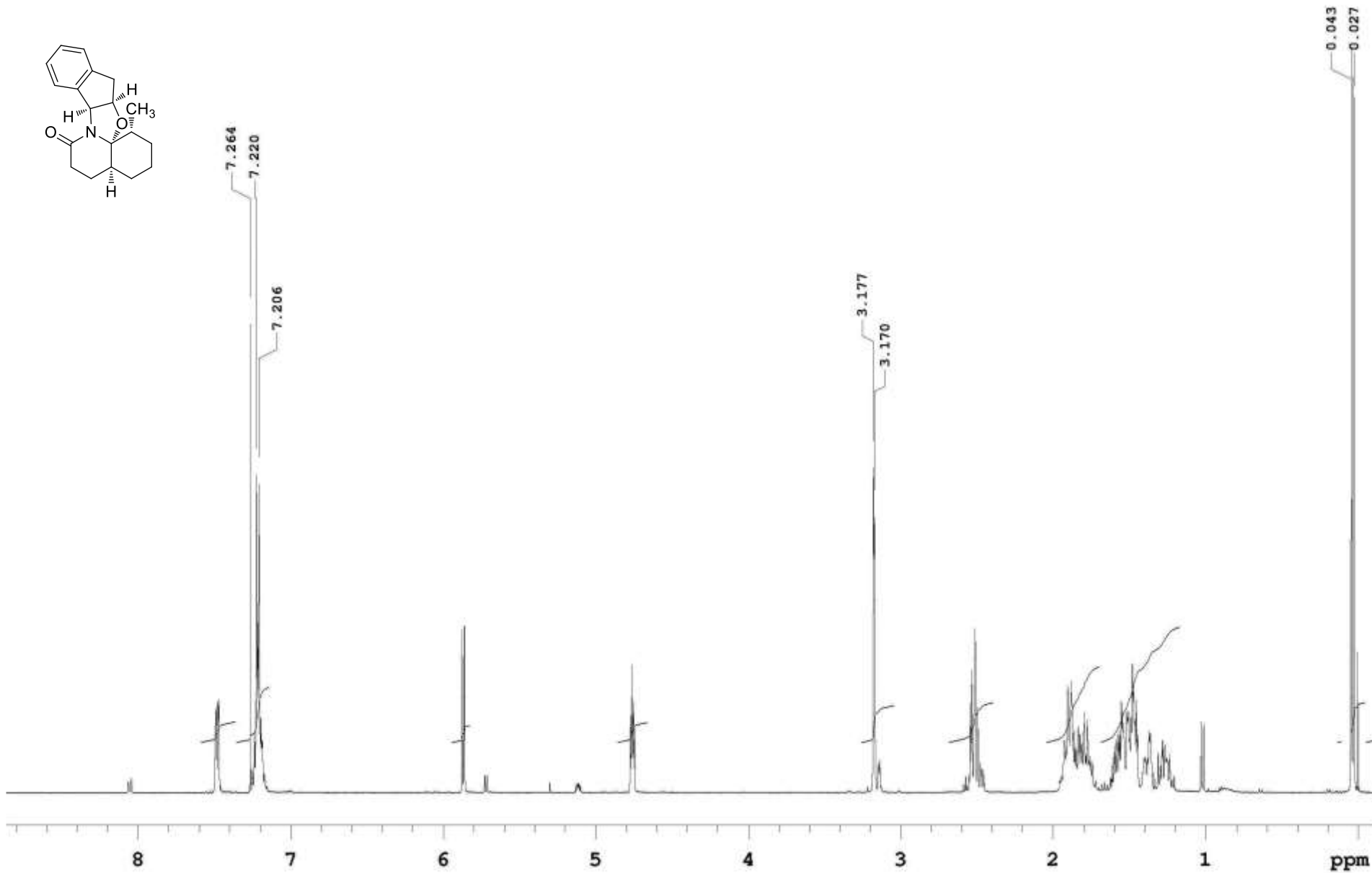
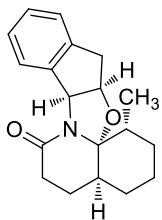




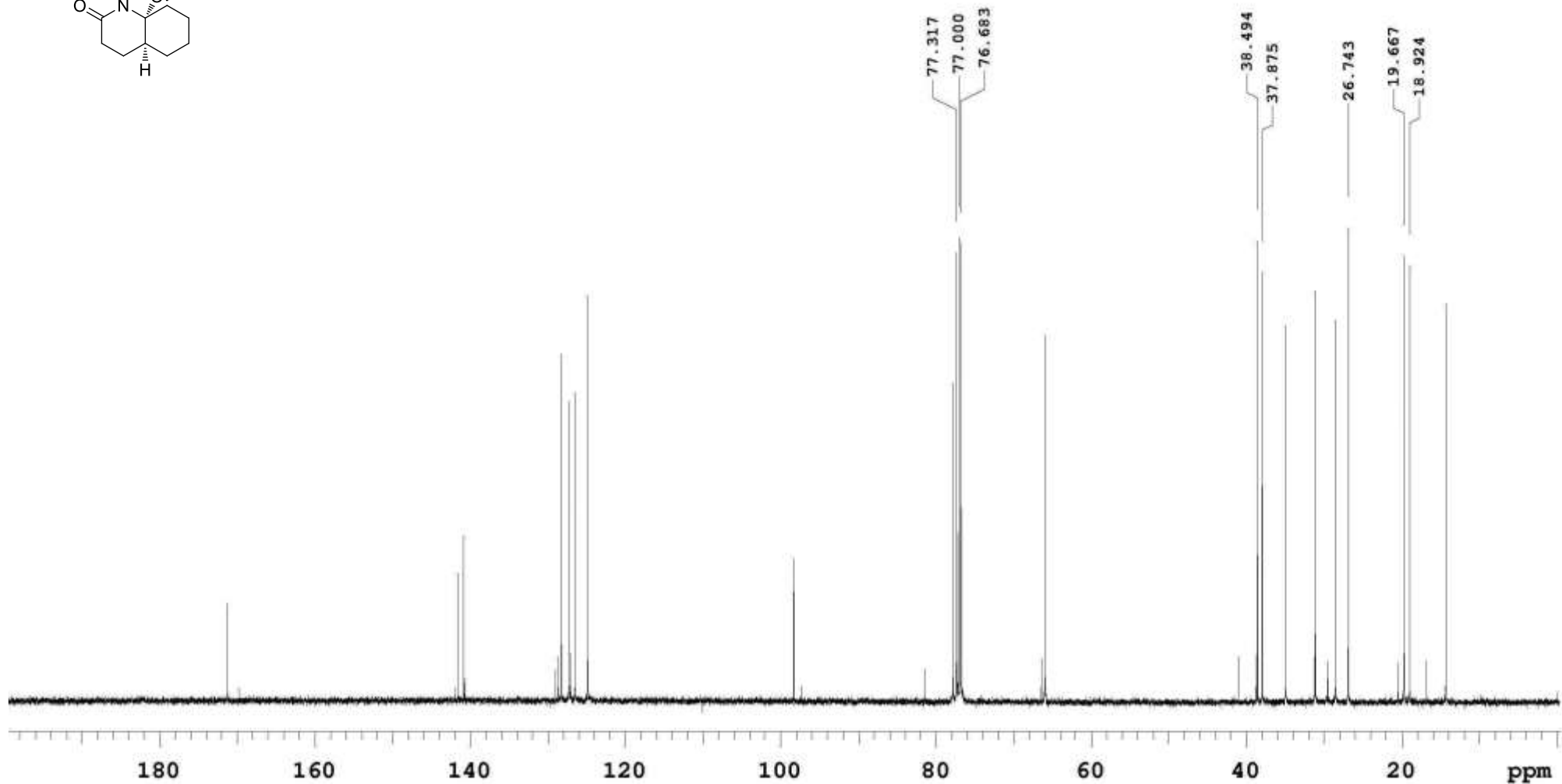
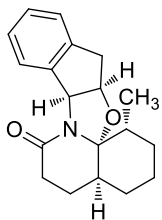
(3R,7aR,11S,11aR)-11-Benzyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (57c)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 400 MHz, 25 °C



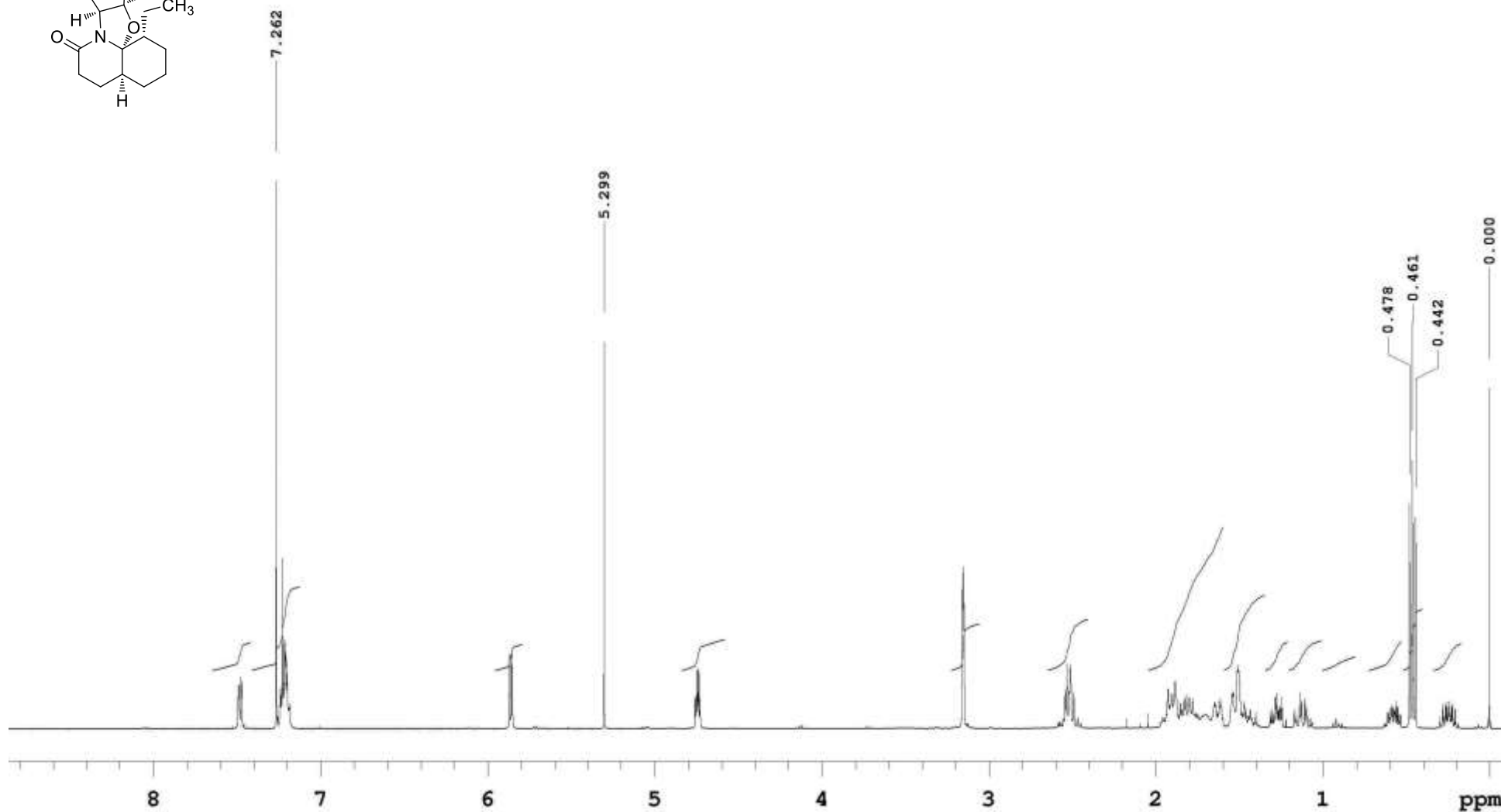
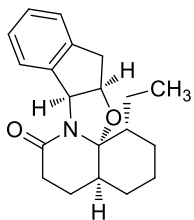
(3R,7aR,11S,11aR)-11-Benzyl-5-oxo-3-phenyldecahydrooxazolo[2,3-j]quinoline (57c)-  $^{13}\text{C}$ - NMR,  $\text{CDCl}_3$ , 100.6 MHz, 25 °C



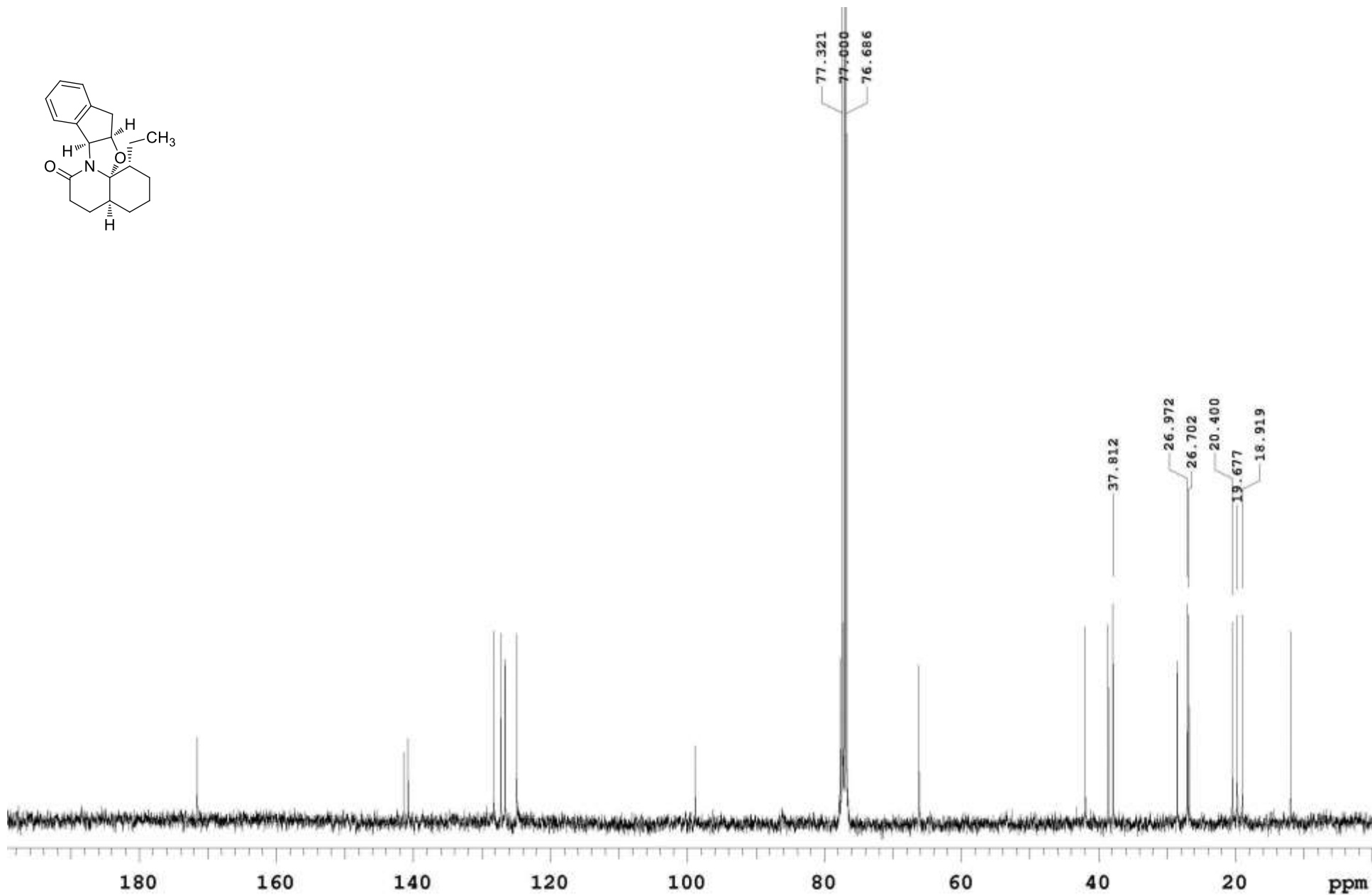
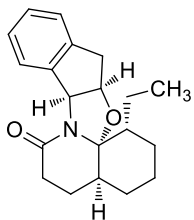
(1*R*,4*aS*,8*aS*,13*aR*,14*aR*)-1-Methyl-7-oxo-3-phenyl-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydroindeno[1',2':4,5]oxazolo[2,3-*j*]quinoline (58a)- <sup>1</sup>H- NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



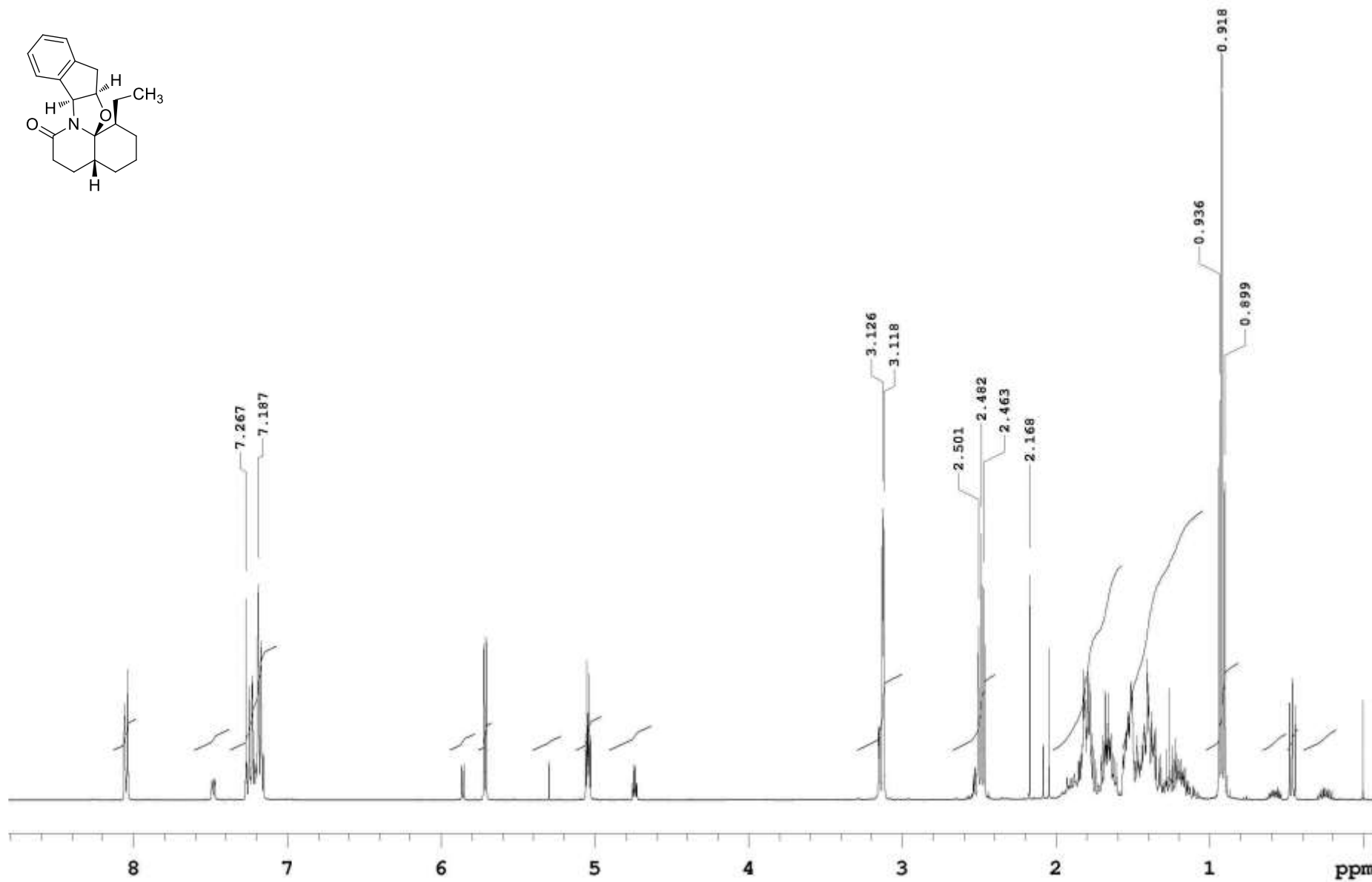
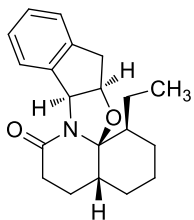
(1*R*,4*aS*,8*aS*,13*aR*,14*aR*)-1-Methyl-7-oxo-3-phenyl-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydroindeno[1',2':4,5]oxazolo[2,3-*j*]quinoline (58a)- <sup>13</sup>C- NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



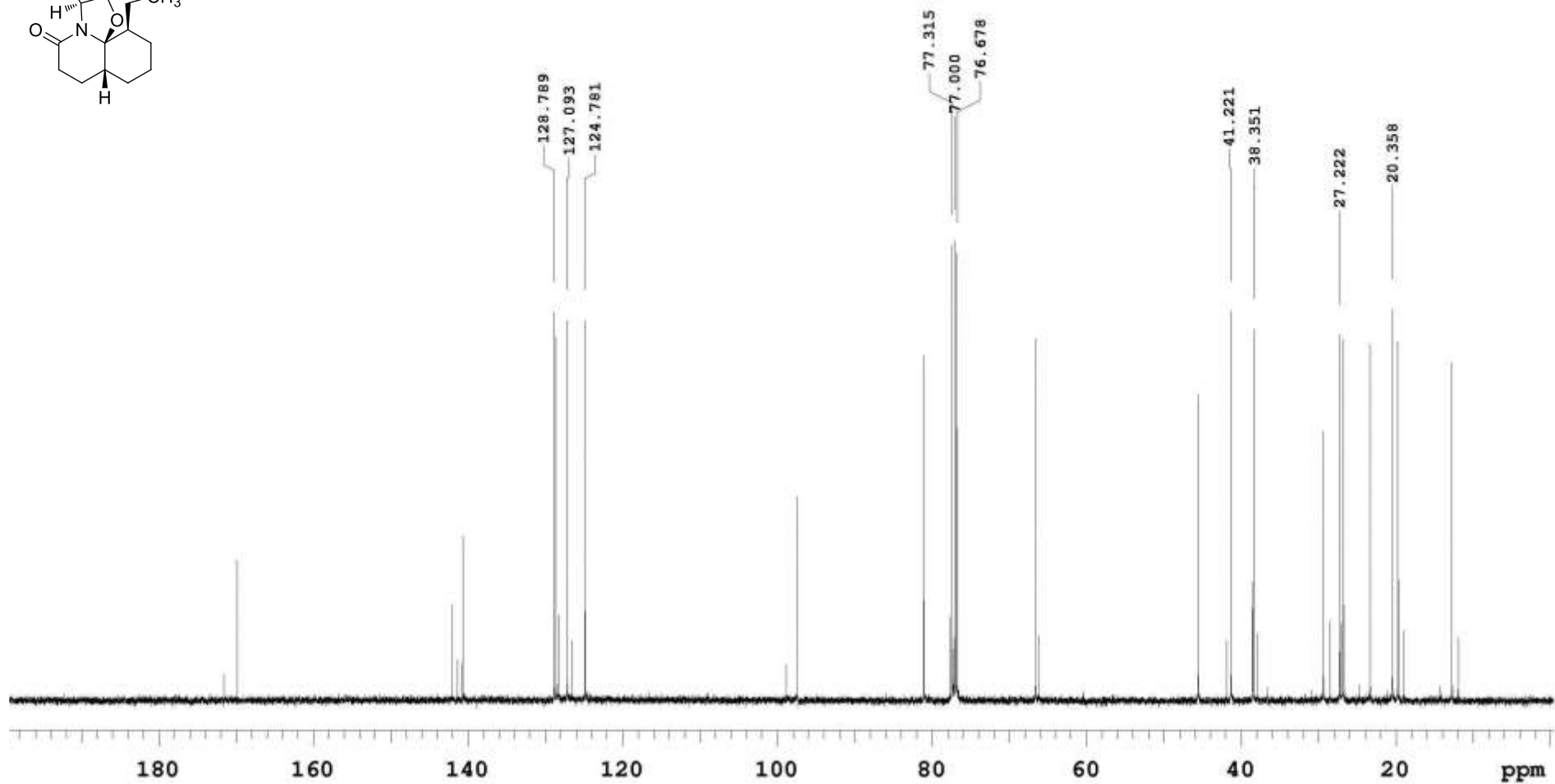
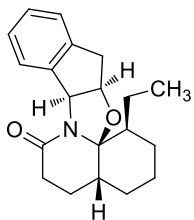
(1*R*,4*aS*,8*aS*,13*aR*,14*aR*)-1-Ethyl-7-oxo-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydro-indeno[1',2':4,5]oxazolo[2,3-*j*]quinoline (59a)- <sup>1</sup>H- NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



(1R,4aS,8aS,13aR,14aR)-1-Ethyl-7-oxo-1,2,3,4,4a,5,6,7,8a,13,13a,14a-dodecahydro-indeno[1',2':4,5]oxazolo[2,3-j]quinoline (59a)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C

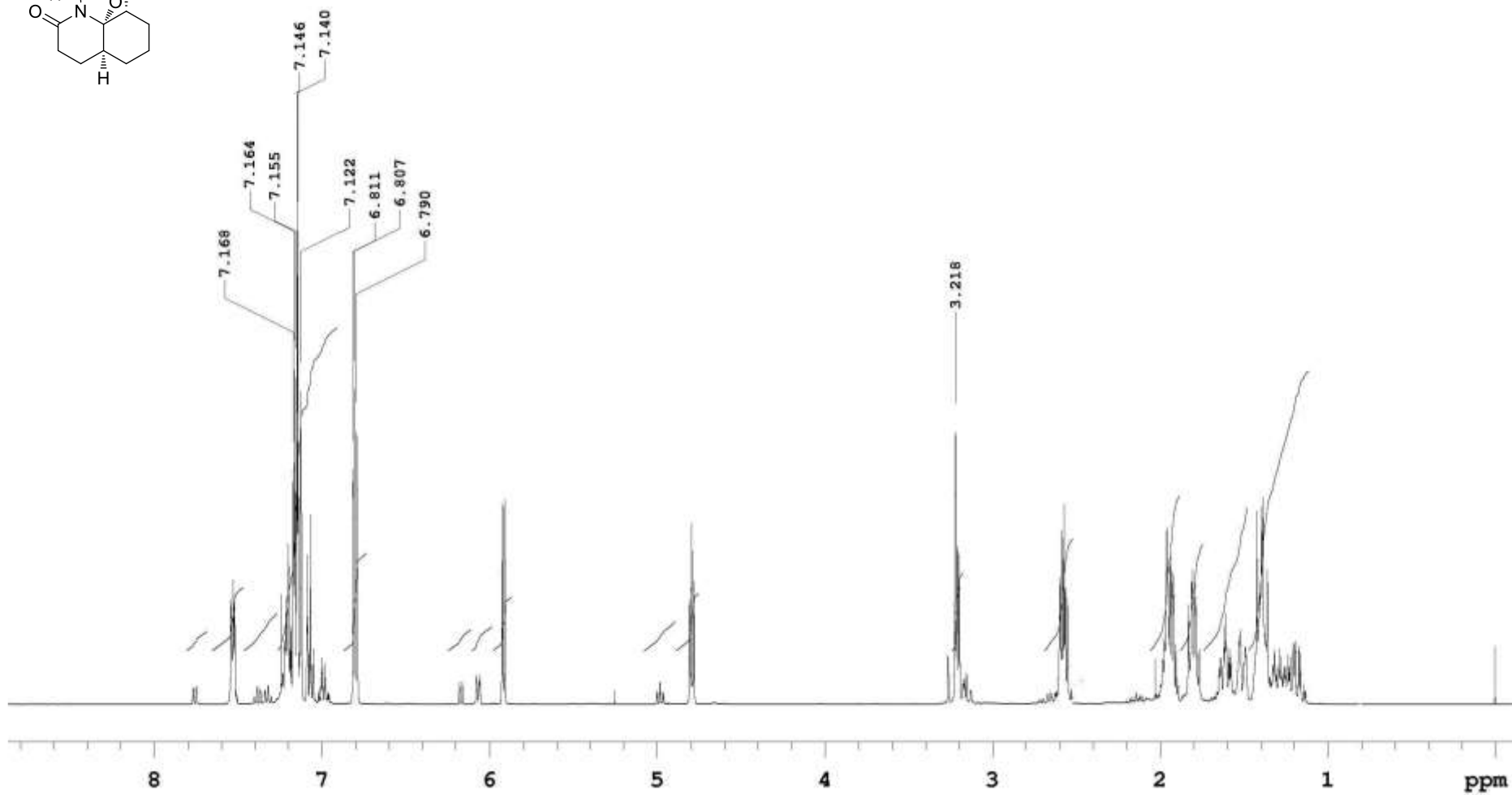
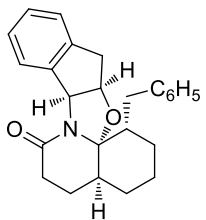


(1*S*,4*aR*,8*aS*,13*aR*,14*aS*)-1-Ethyl-7-oxo-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydro-indeno[1',2':4,5]oxazolo[2,3-*j*]quinoline (59b)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C

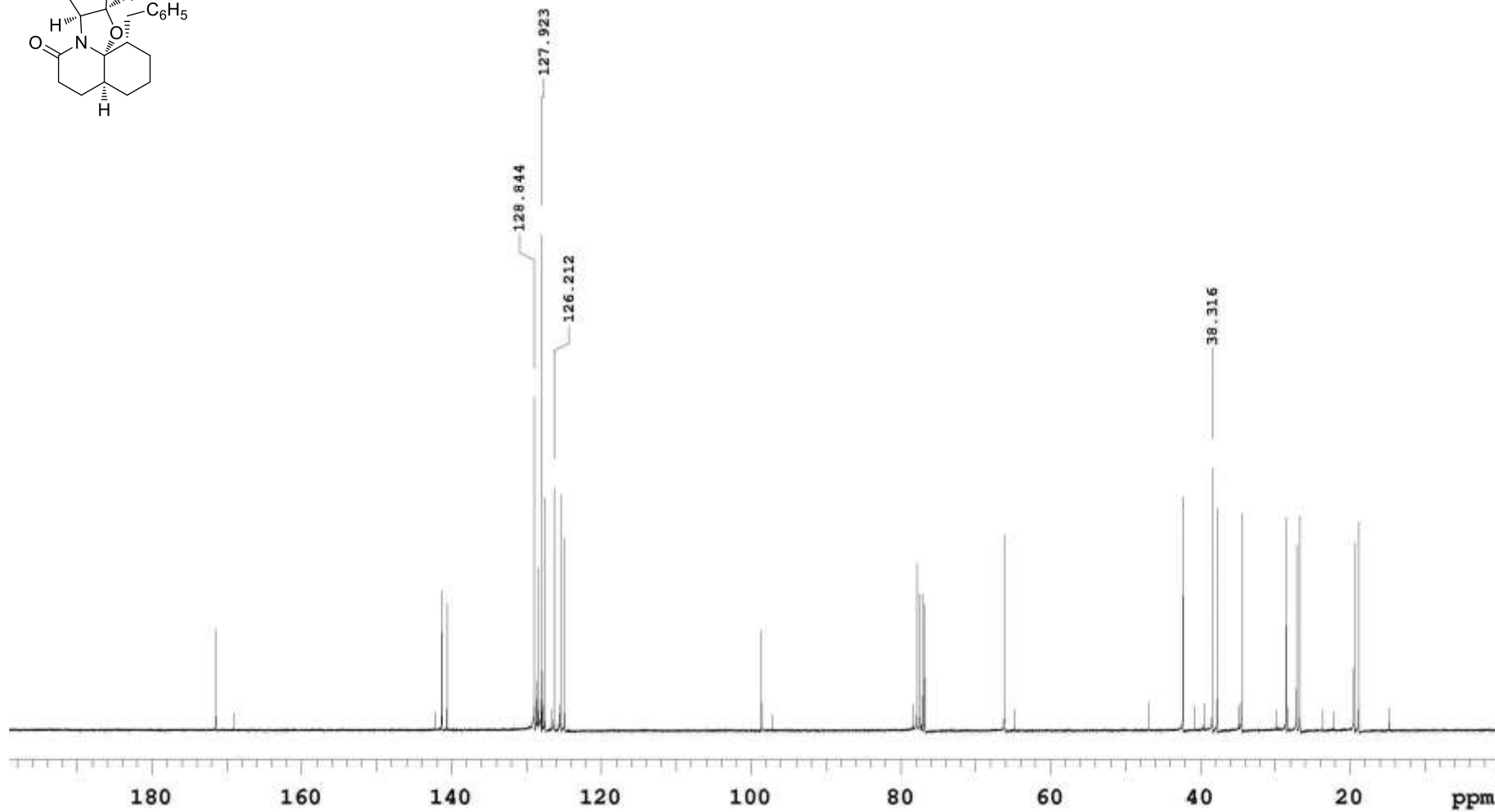
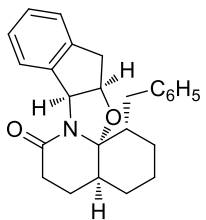


(1*S*,4*aR*,8*aS*,13*aR*,14*aS*)-1-Ethyl-7-oxo-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydro-indeno[1',2':4,5]oxazolo[2,3-*j*]quinoline (59b)- <sup>13</sup>C- NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C

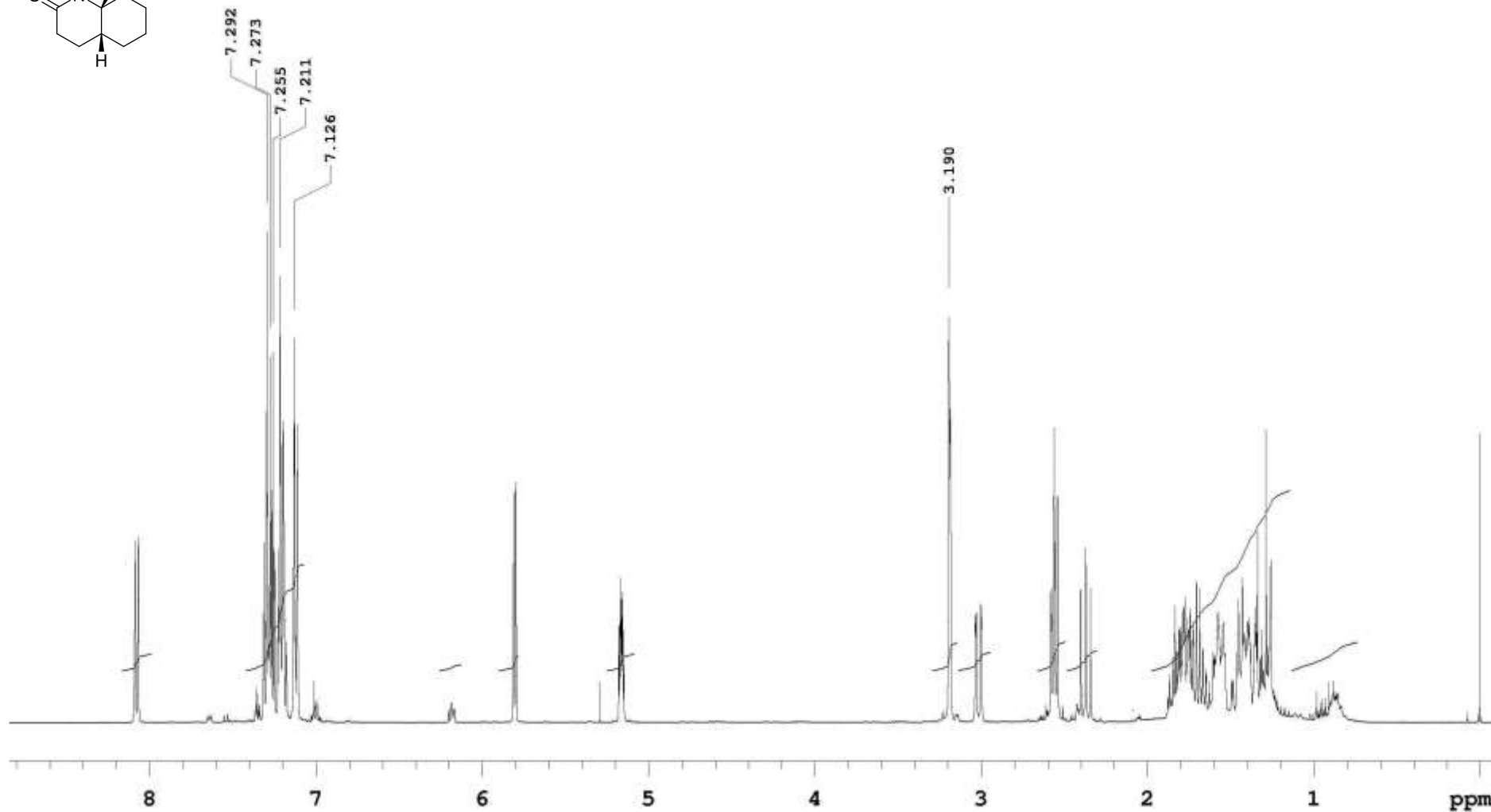
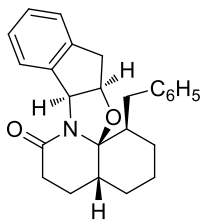




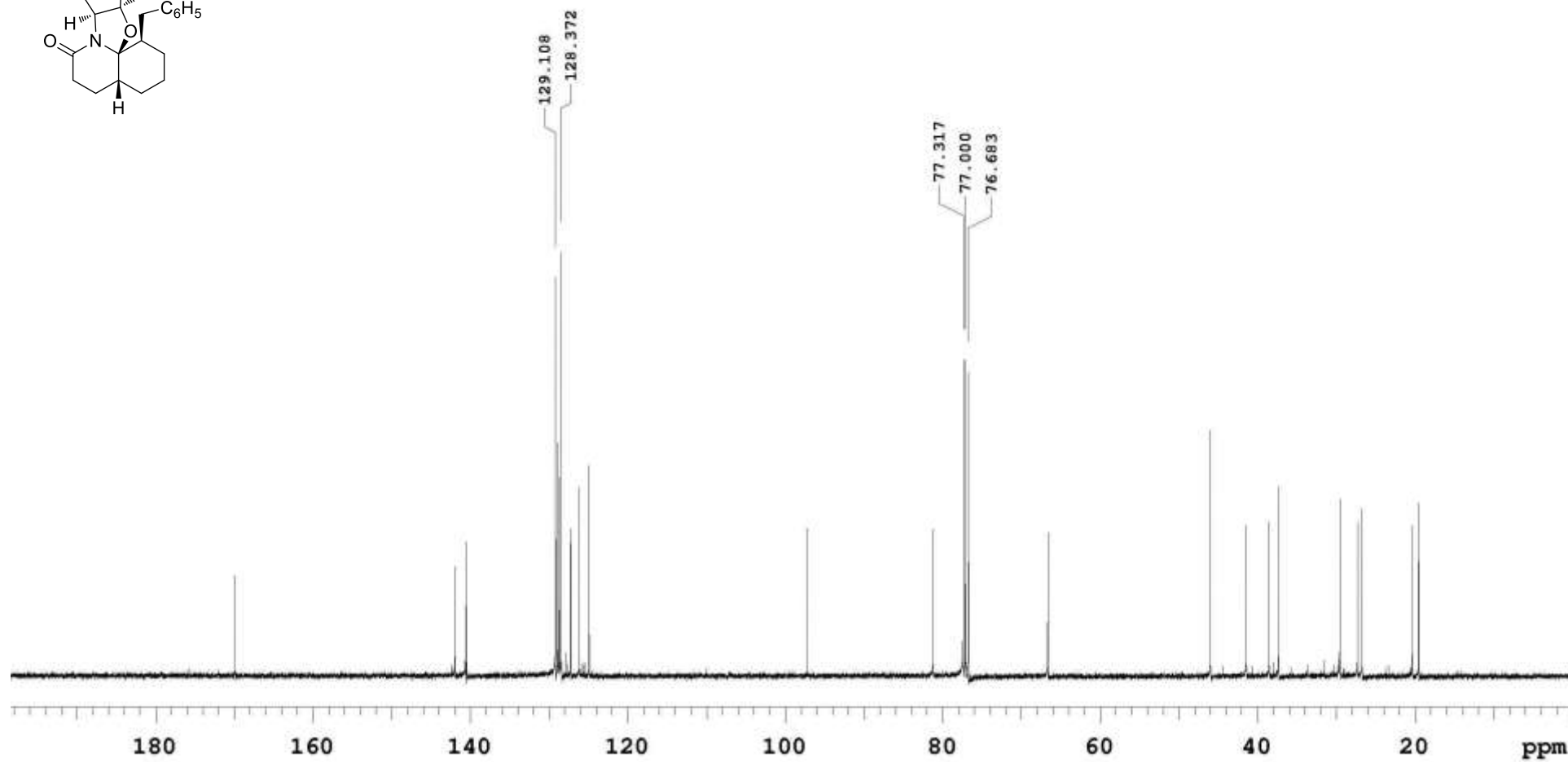
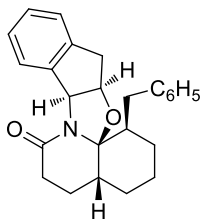
(1*S*,4*aS*,8*aS*,13*aR*,14*aS*)-1-Benzyl-7-oxo-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydroindeno[1.1,2':4,5]oxazolo[2,3-*j*]quinoline (60*a*)- <sup>1</sup>H- NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



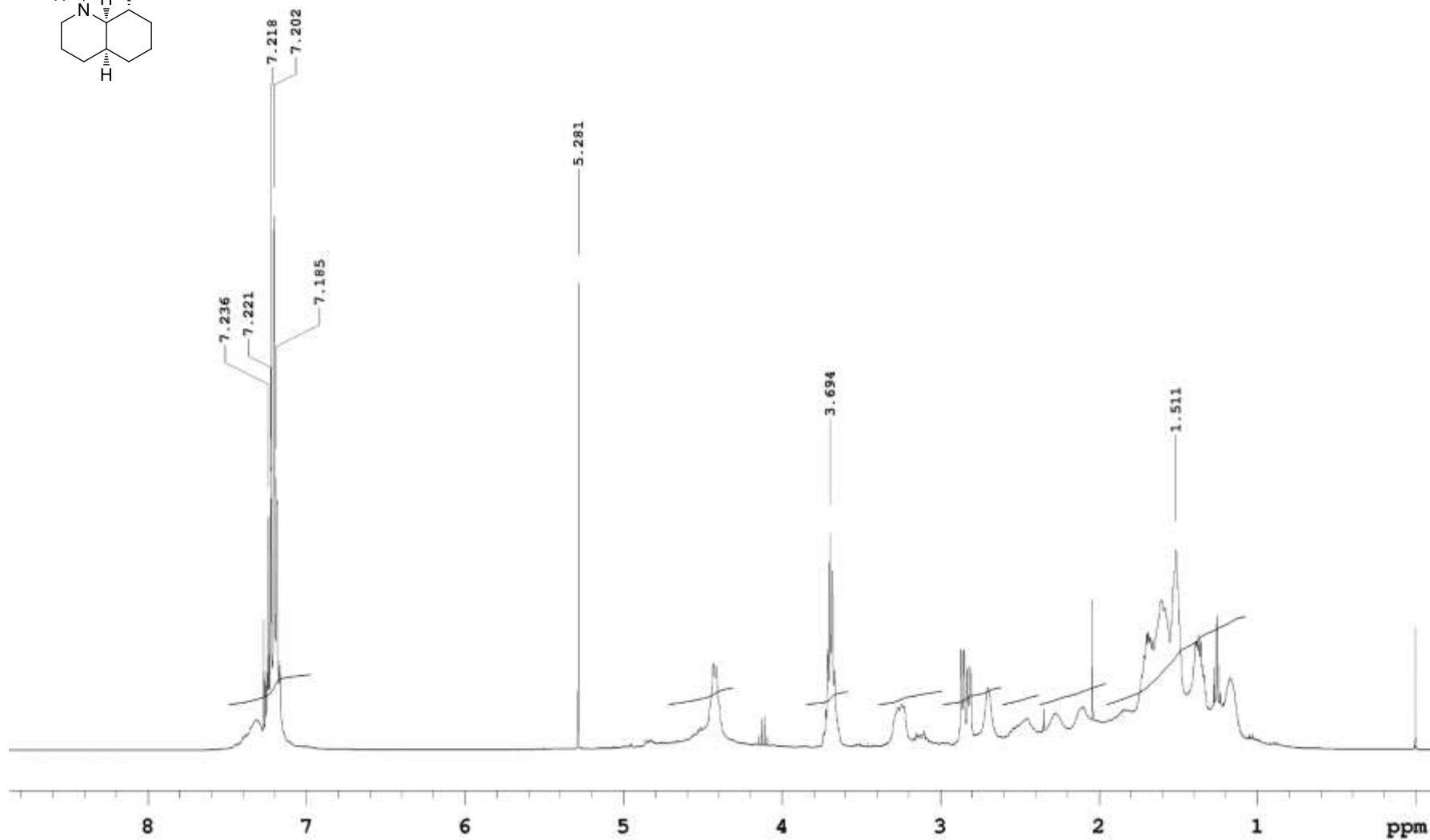
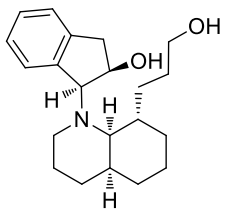
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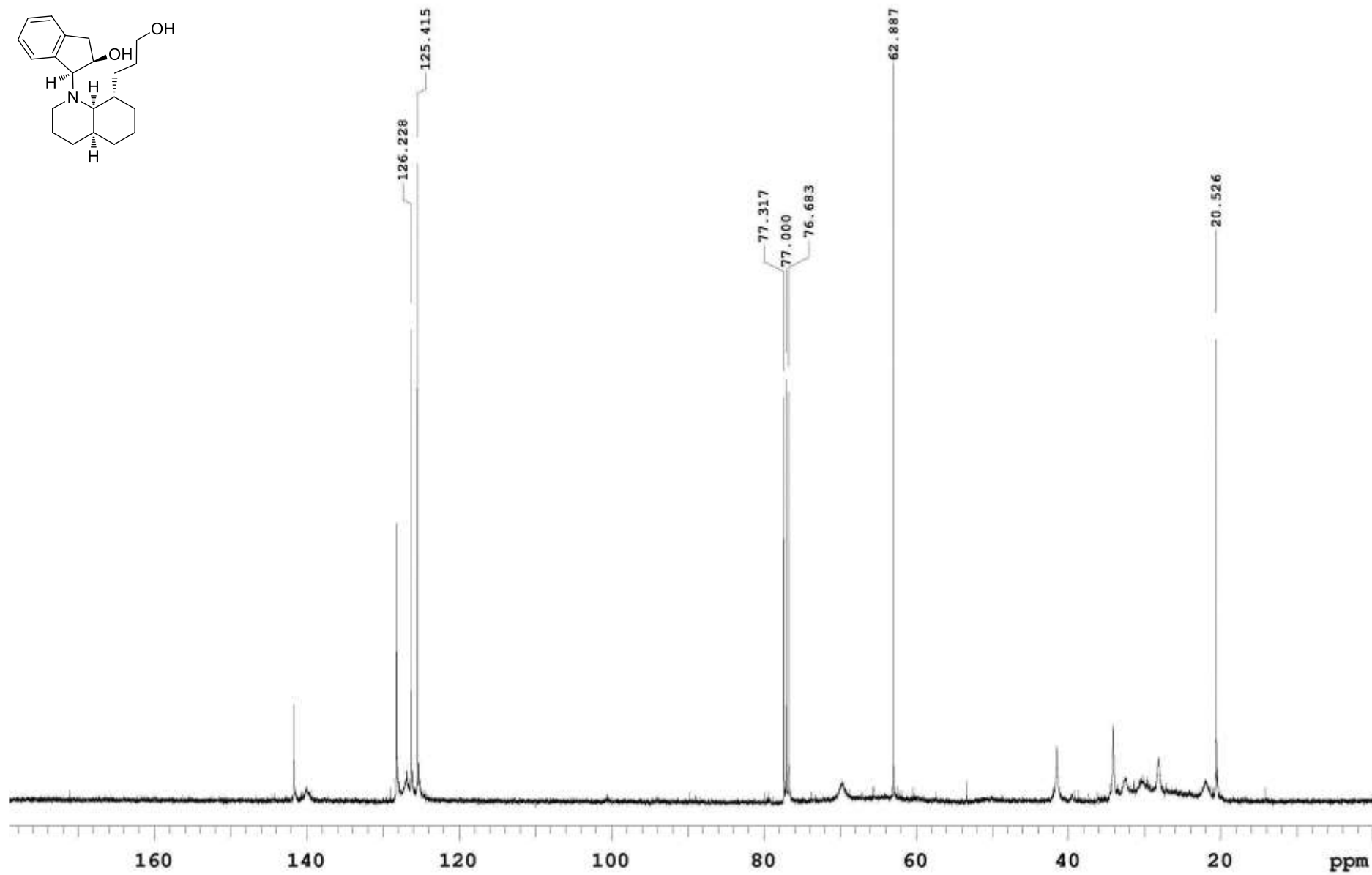
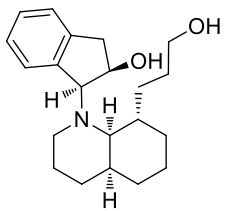
(1*R*,4*aR*,8*aS*,13*aR*,14*aR*)-1-Benzyl-7-oxo-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydroindeno[1.1,2':4,5]oxazolo[2,3-*j*]quinoline (60b)- <sup>1</sup>H- NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



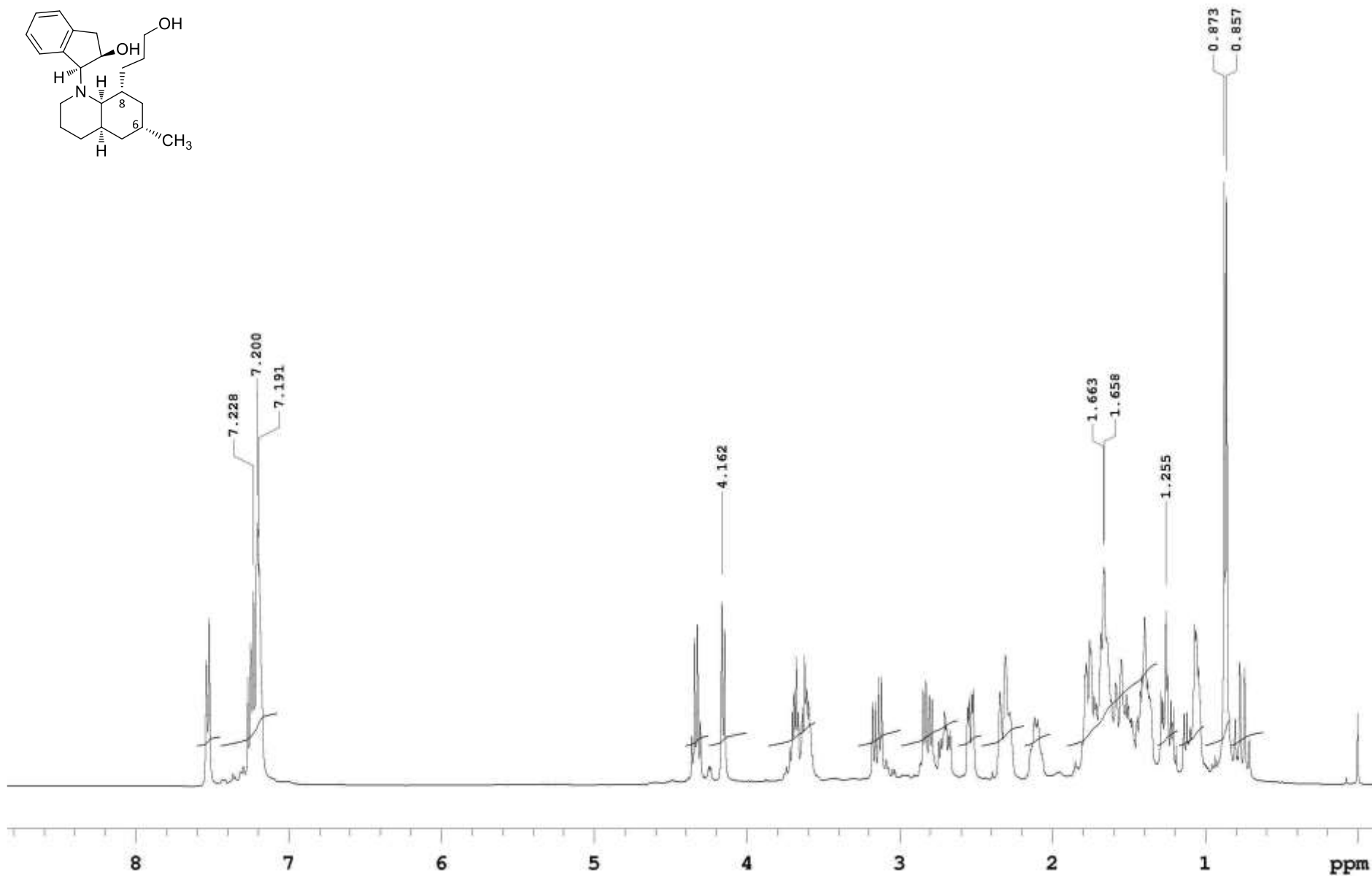
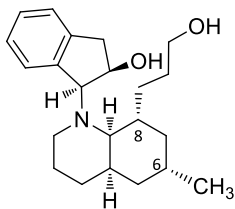
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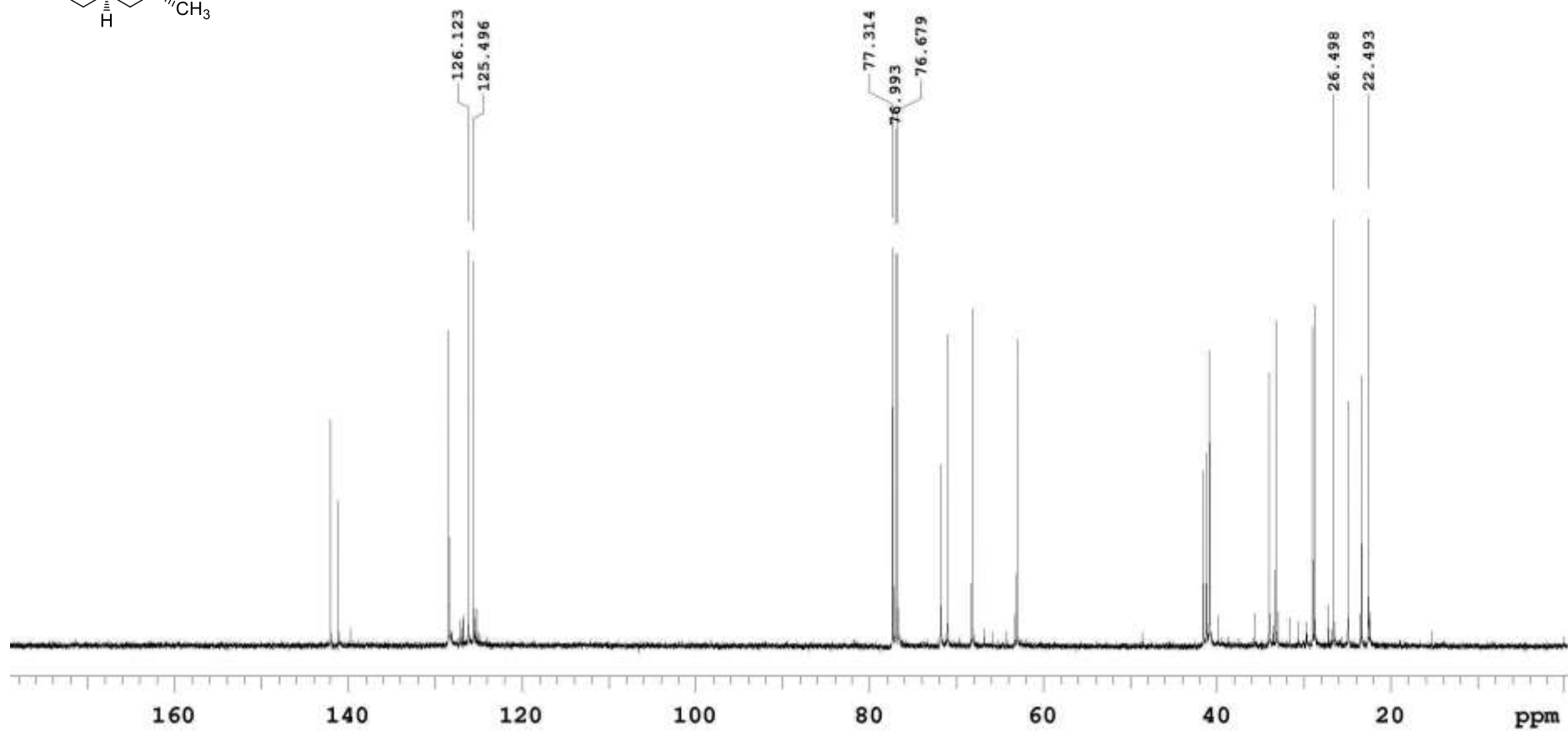
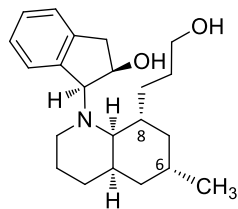
(4a*S*,8*S*,8a*R*)-1-[(1*S*,2*R*)-2-Hydroxy-1-indanyl]-8-(3-hydroxypropyl)decahydroquinoline (62a)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 400 MHz, 25 °C



(4a*S*,8*S*,8a*R*)-1-[(1*S*,2*R*)-2-Hydroxy-1-indanyl]-8-(3-hydroxypropyl)decahydroquinoline (62a)-  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 100.6 MHz, 25 °C

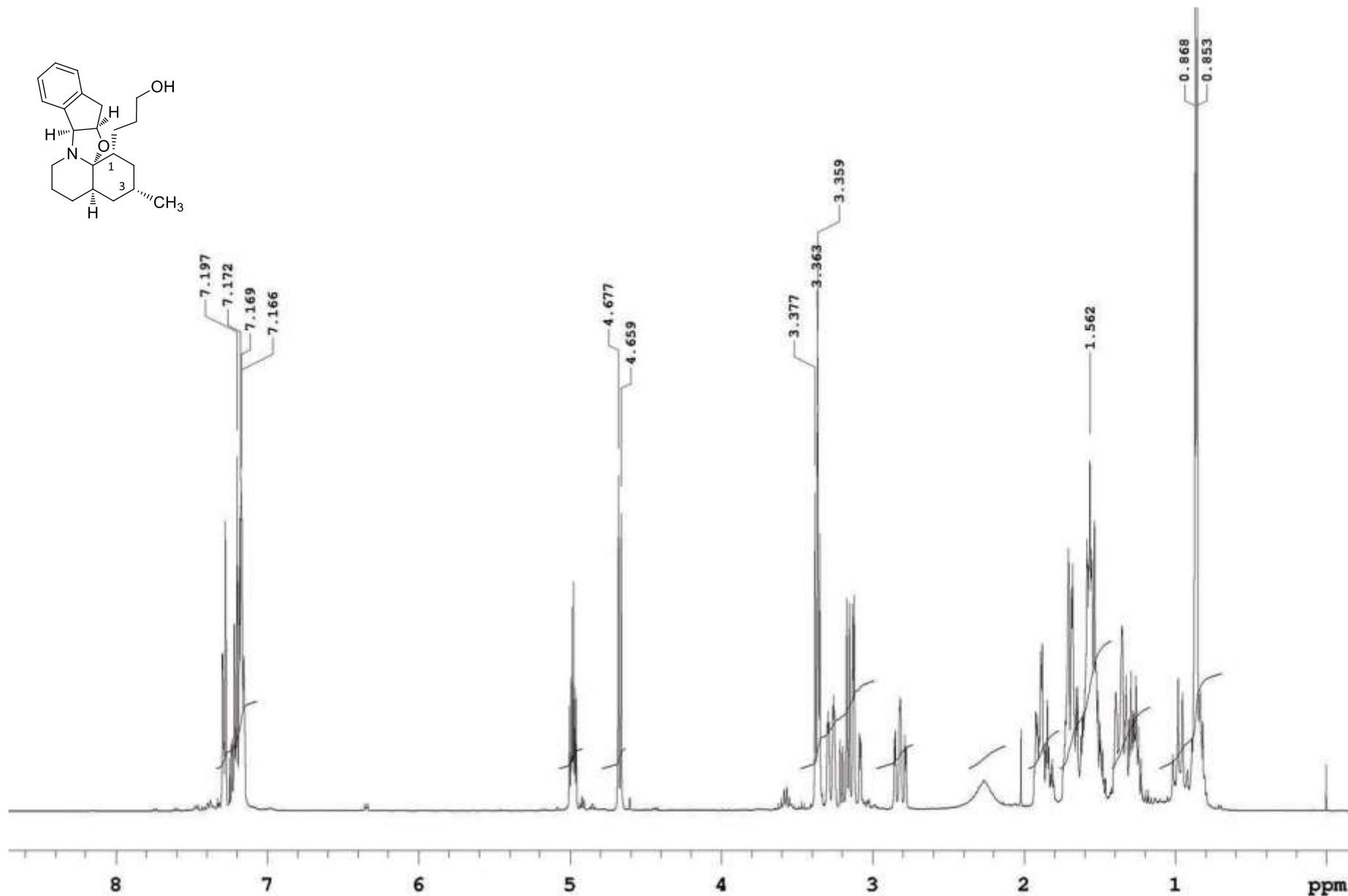
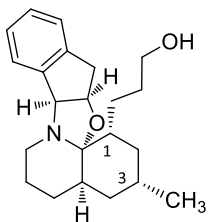


(4aR,6R,8R,8aR)-1-[(1S,2R)-2-Hydroxy-1-indanyl]-8-(3-hydroxypropyl)-6-methyldecahydroquinoline (64a)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 400 MHz, 25  $^\circ\text{C}$

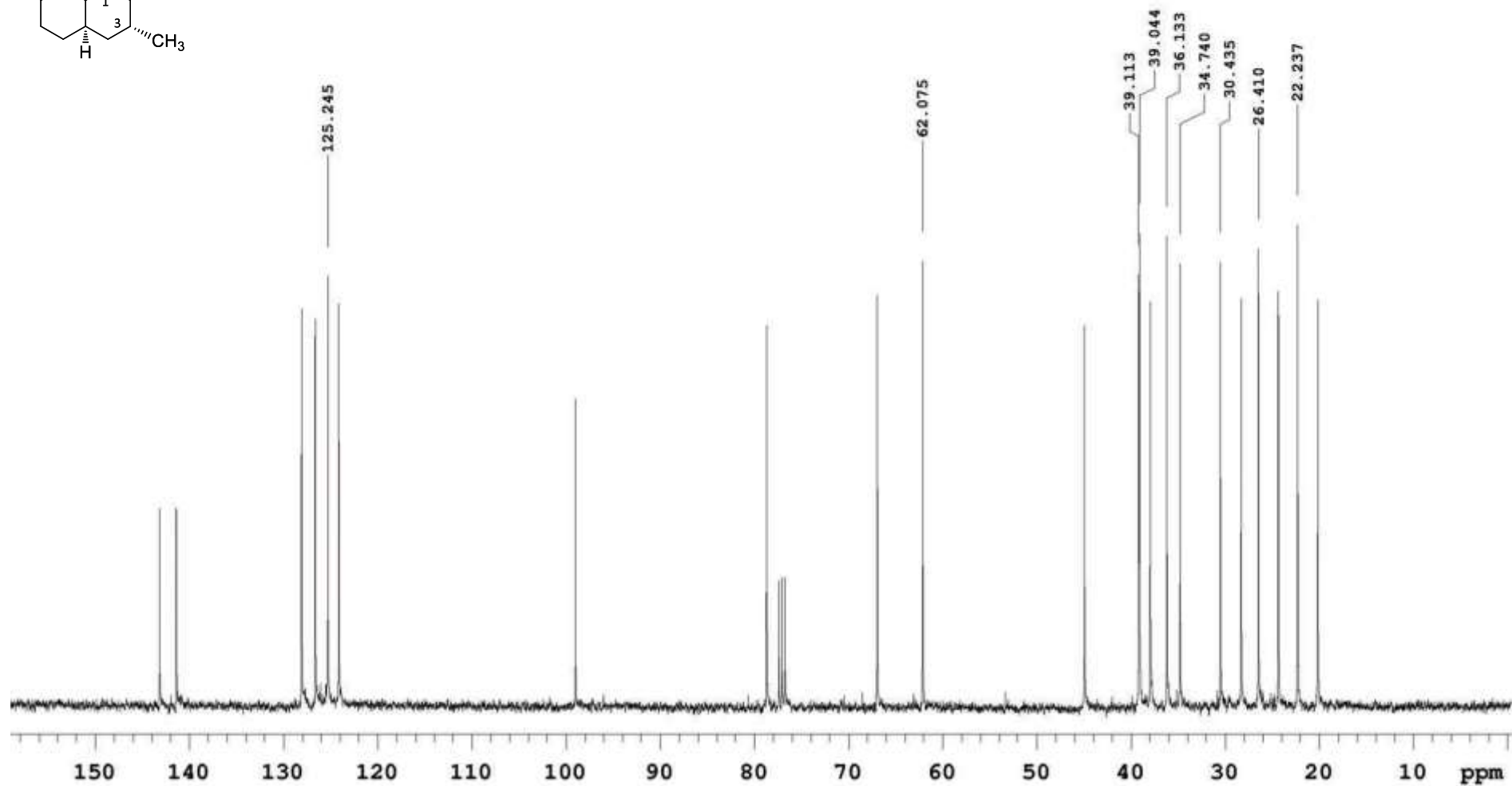
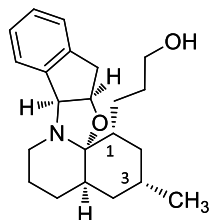


(4aR,6R,8R,8aR)-1-[(1S,2R)-2-Hydroxy-1-indanyl]-8-(3-hydroxypropyl)-6-methyldecahydroquinoline (64a)-  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 100.6 MHz, 25 °C

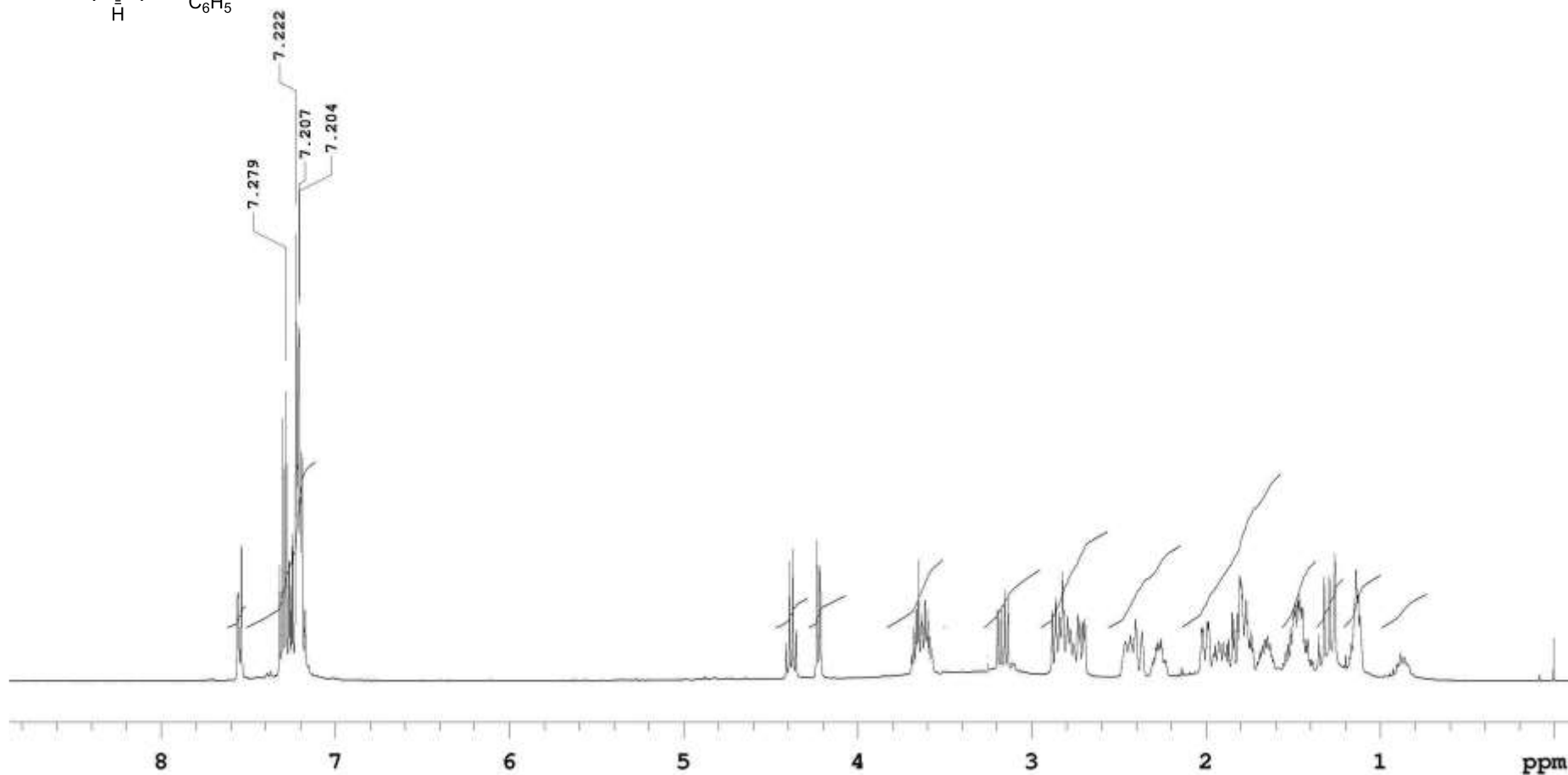
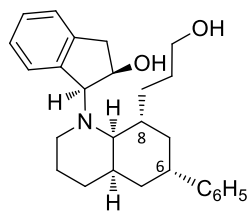




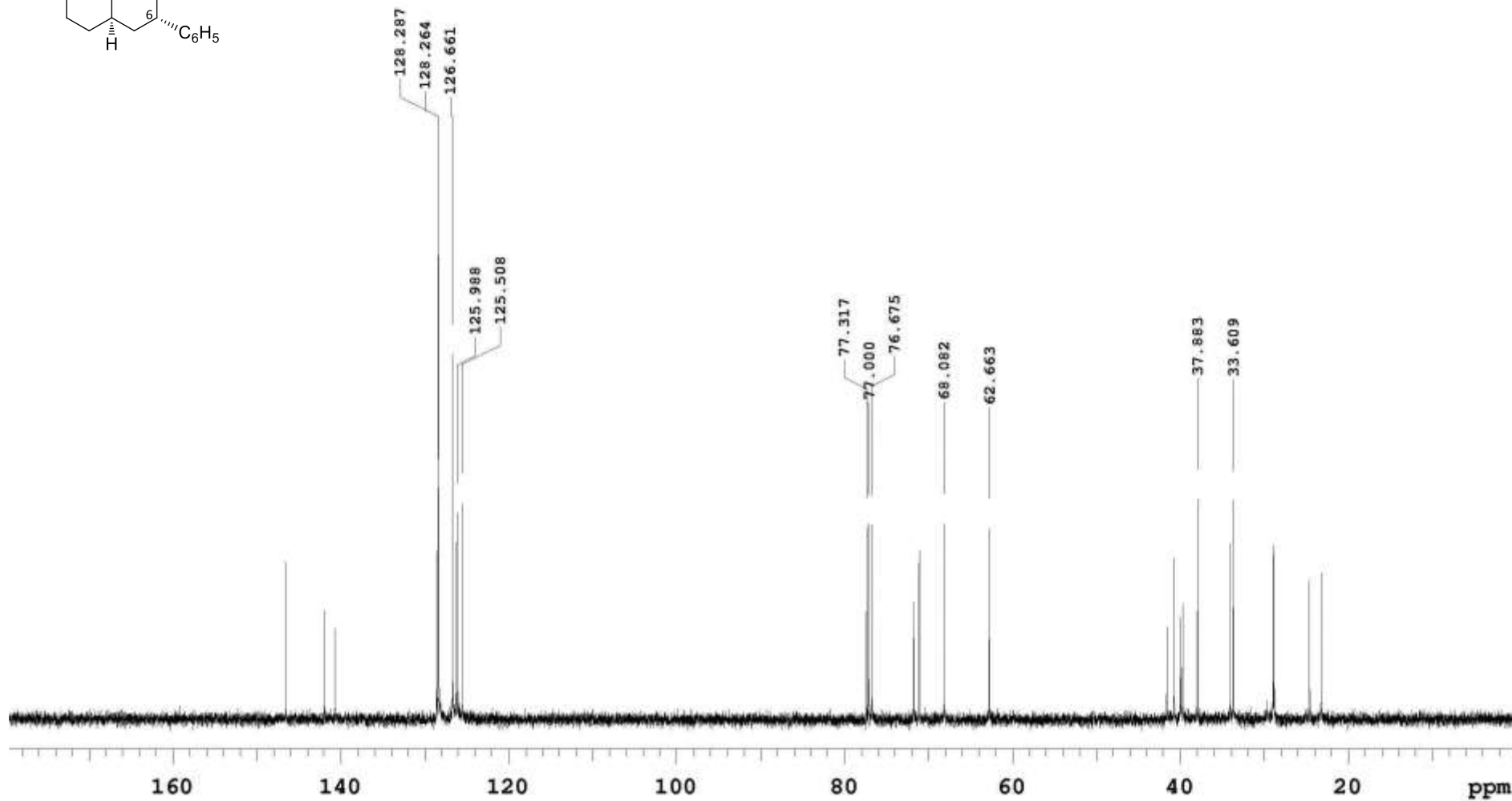
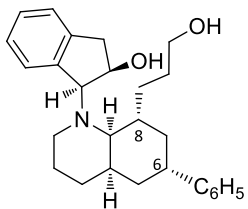
(1R,3R,4aR,8aS,13aR,14aS)-1-(3-Hydroxypropyl)-3-methyl-1,2,3,4,4a,5,6,7,8a,13,13a,14a-dodecahydro-indeno[1',2':4,5]oxazolo[2,3-j]quinoline (63)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



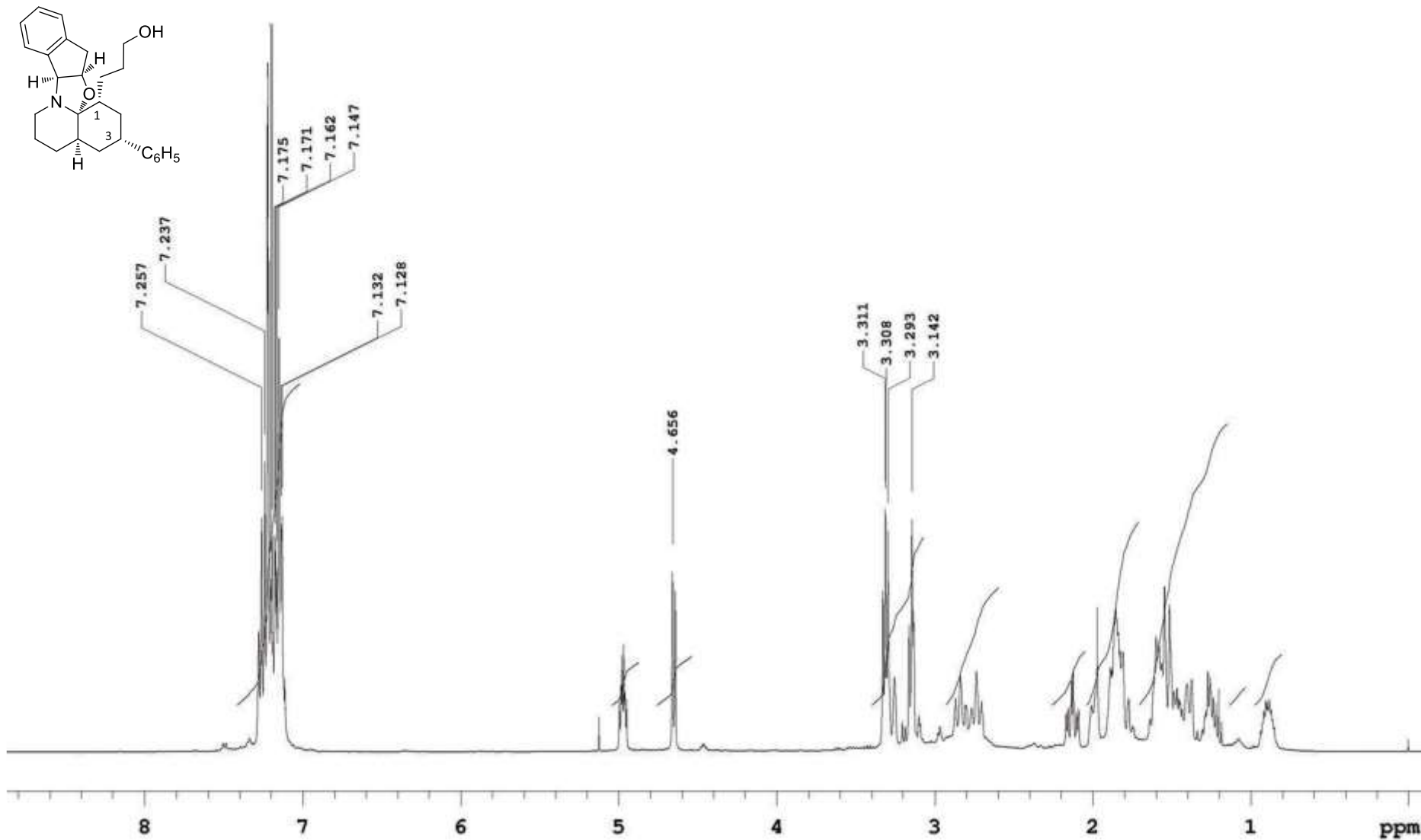
(1R,3R,4aR,8aS,13aR,14aS)-1-(3-Hydroxypropyl)-3-methyl-1,2,3,4,4a,5,6,7,8a,13,13a,14a-dodecahydro-indeno[1',2':4,5]oxazolo[2,3-j]quinoline (63)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



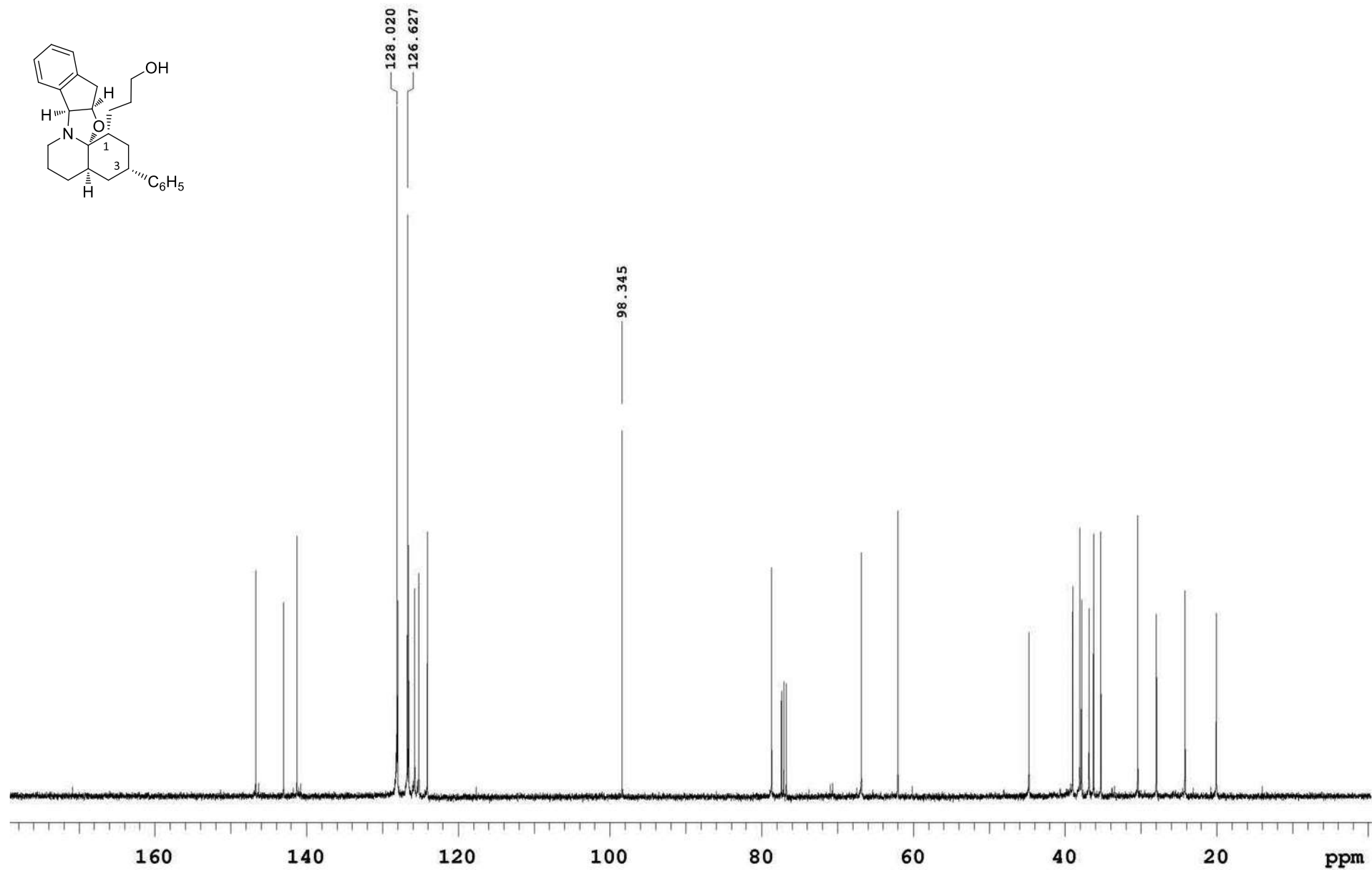
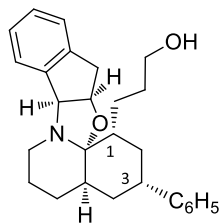
(4aR,6R,8R,8aR)-1-[(1S,2R)-2-Hydroxy-1-indanyl]-8-(3-hydroxypropyl)-6-phenyldecahydroquinoline (66a)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400MHz, 25 °C



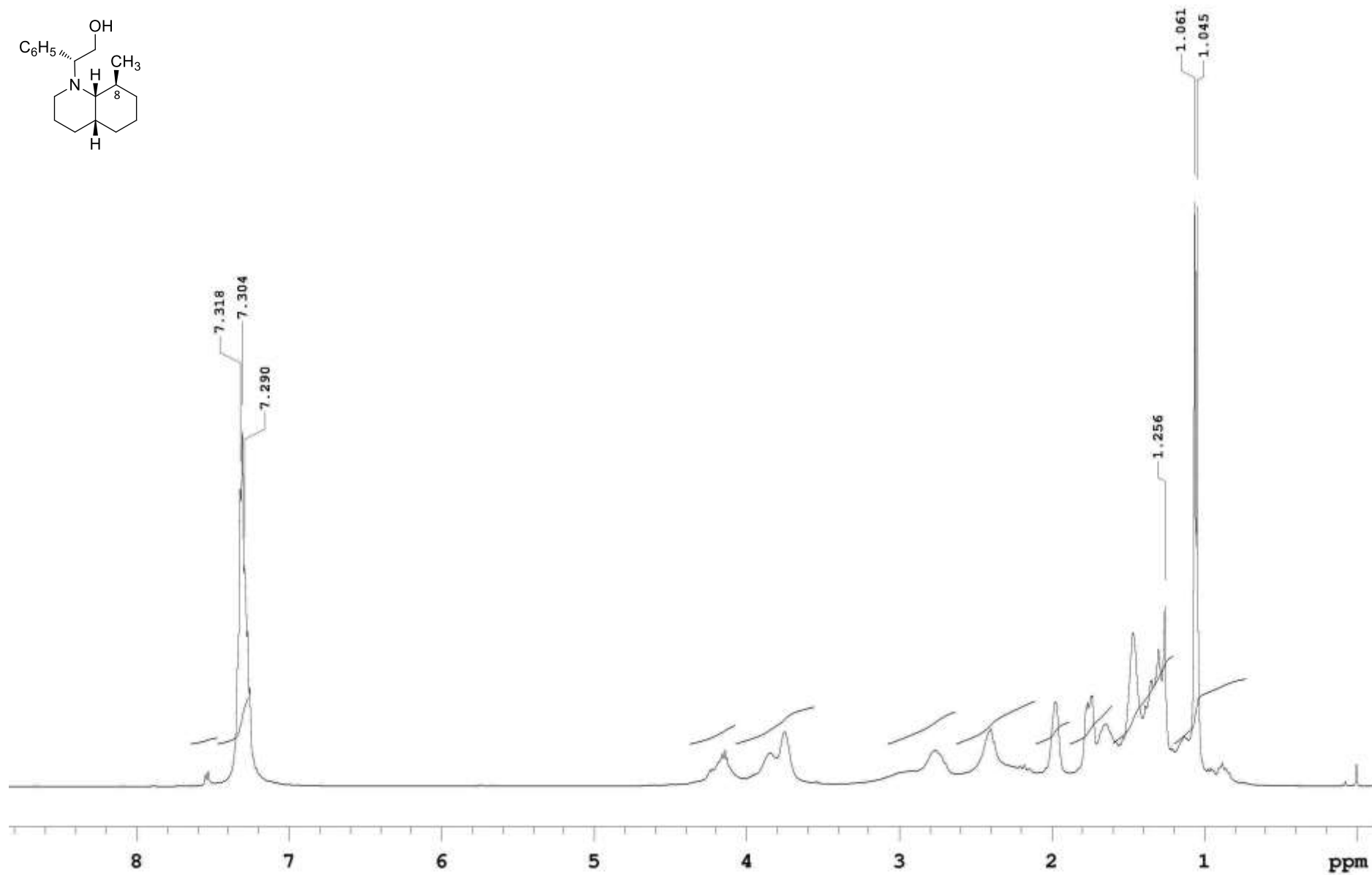
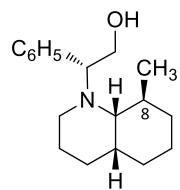
(4aR,6R,8R,8aR)-1-[(1S,2R)-2-Hydroxy-1-indanyl]-8-(3-hydroxypropyl)-6-phenyldecahydroquinoline (66a)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



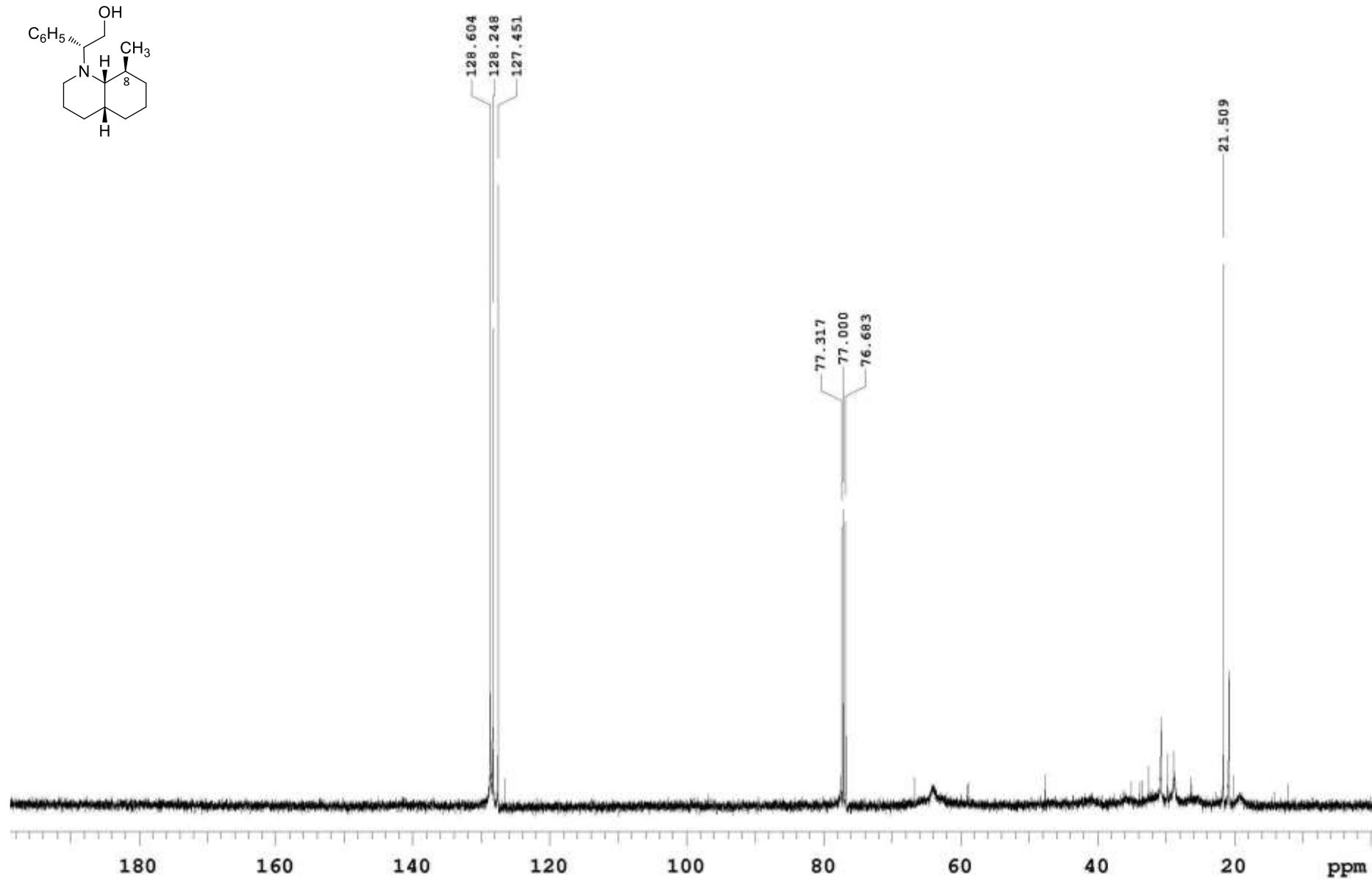
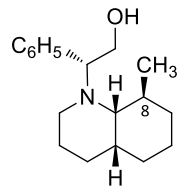
(1*R*,3*R*,4*aR*,8*aS*,13*aR*,14*aS*)-11-(3-Hydroxypropyl)-3-phenyl-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydroindeno[1',2':4,5]oxazolo[2,3-*j*]quinoline (65)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



(1R,3R,4aR,8aS,13aR,14aS)-11-(3-Hydroxypropyl)-3-phenyl-1,2,3,4,4a,5,6,7,8a,13,13a,14a-dodecahydroindeno[1',2':4,5]oxazolo[2,3-j]quinoline (65)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C

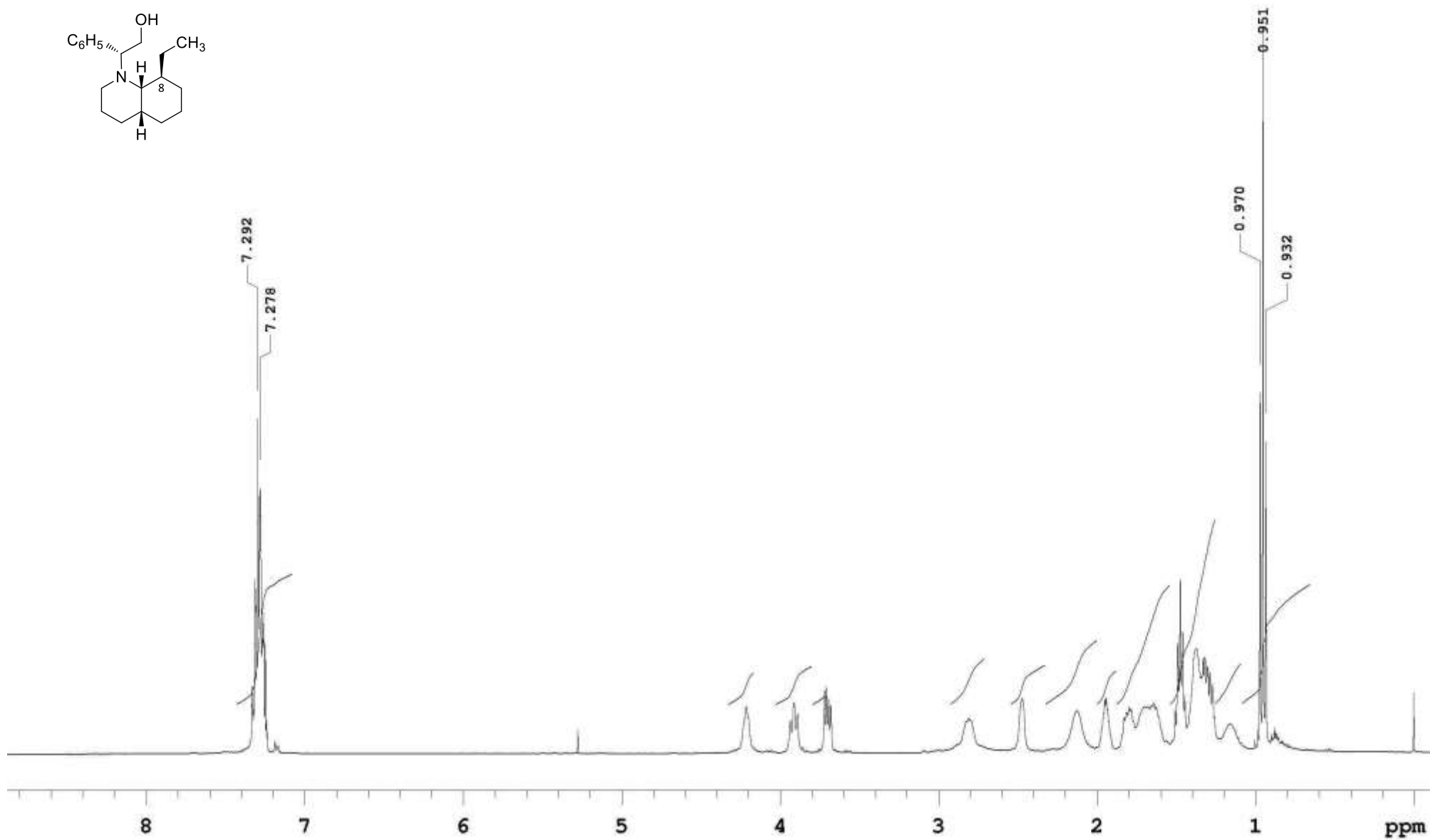
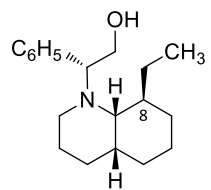


(4aR,8S,8aR)-1-[(1R)-2-Hydroxy-1-phenylethyl]-8-methyldecahydroquinoline (67)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C

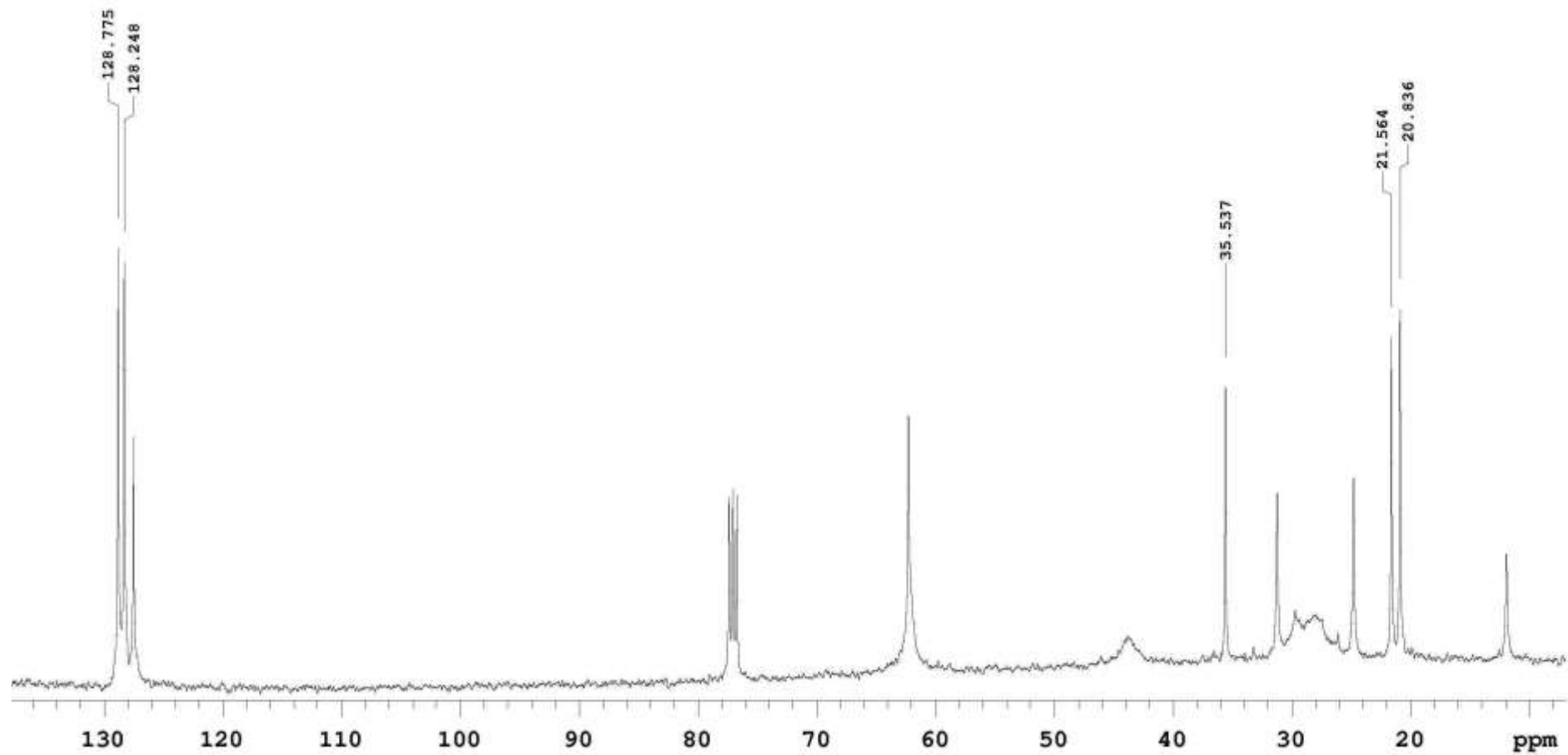
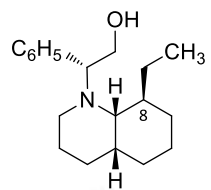


(4aR,8S,8aR)-1-[(1R)-2-Hydroxy-1-phenylethyl]-8-methyldecahydroquinoline (67)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C

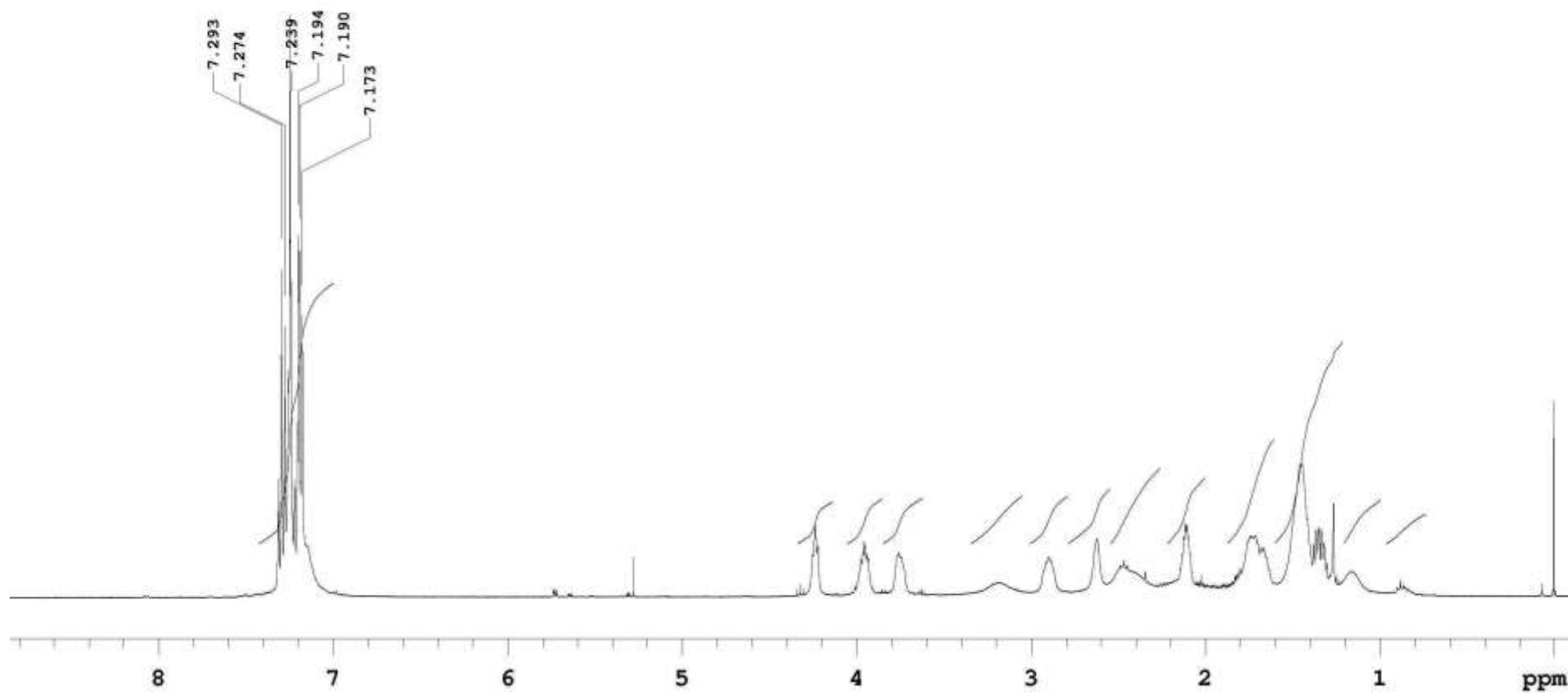
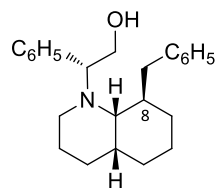




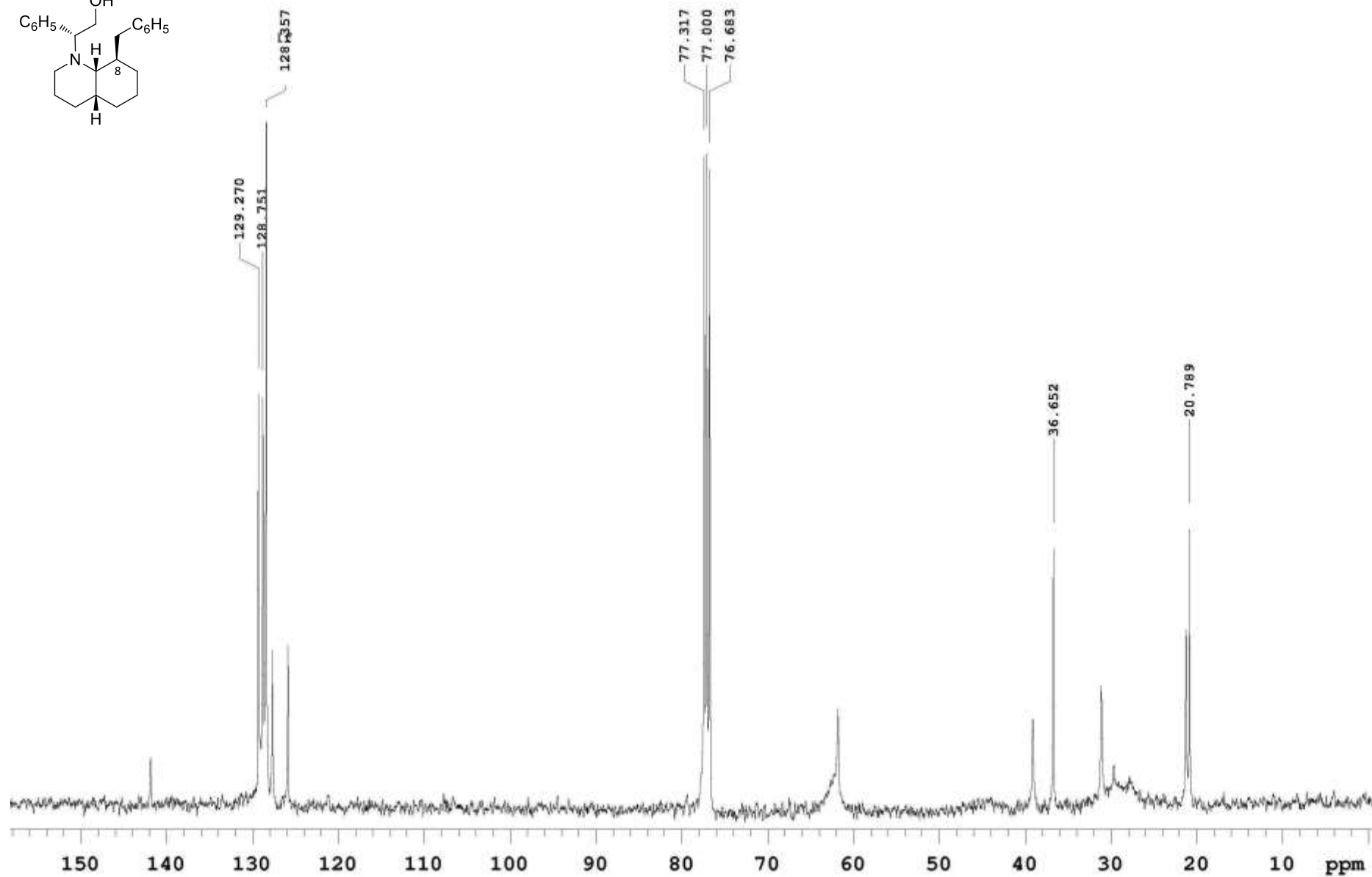
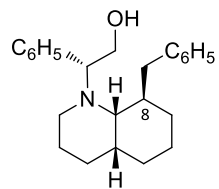
(4aR,8S,8aR)-8-Ethyl-1-[(1R)-2-hydroxy-1-phenylethyl]decahydroquinoline (68)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 52 °C



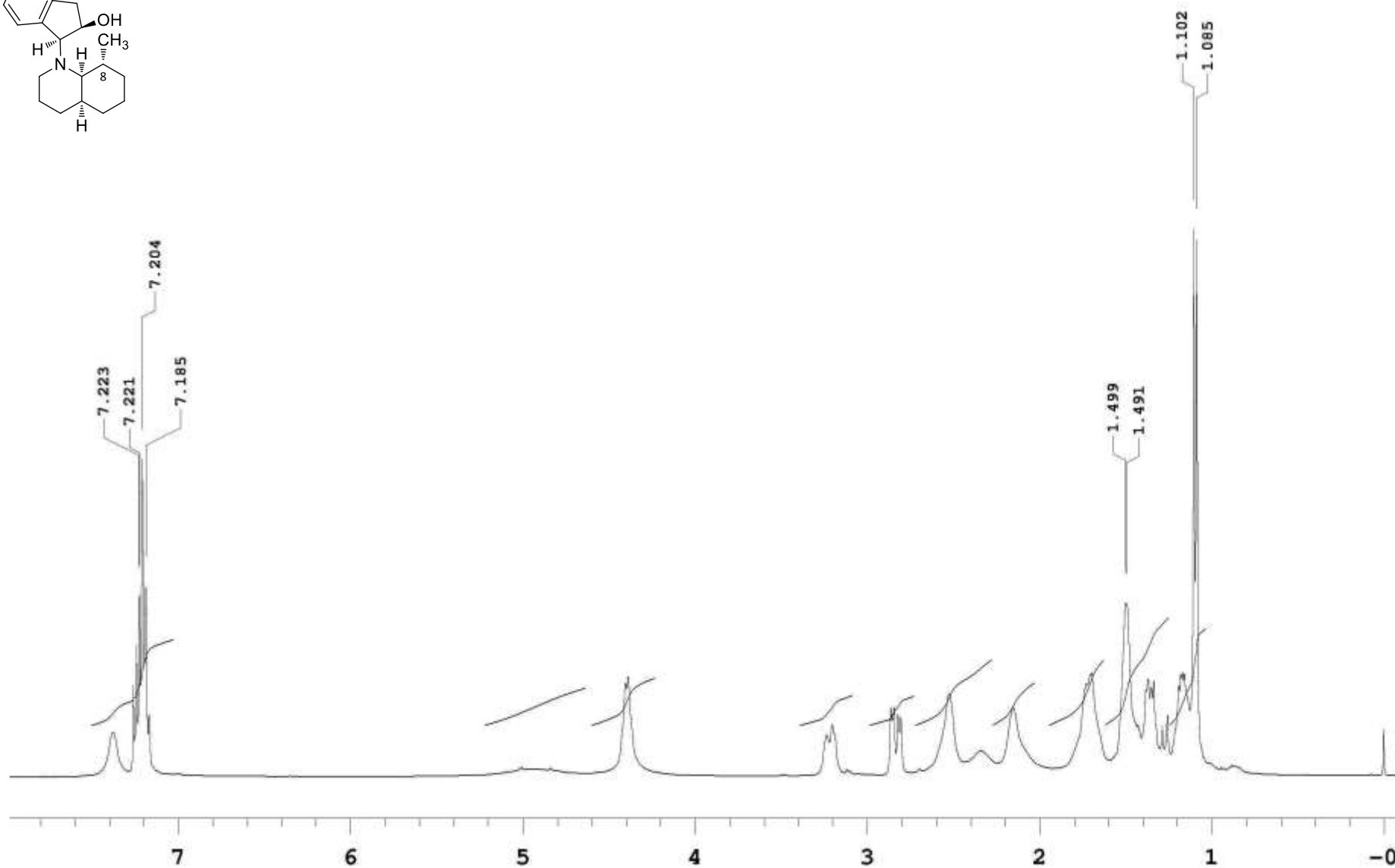
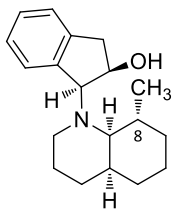
(4a*R*,8*S*,8a*R*)-8-Ethyl-1-[(1*R*)-2-hydroxy-1-phenylethyl]decahydroquinoline (68)-<sup>13</sup>C-MMR, CDCl<sub>3</sub>, 100.6 MHz, 52 °C



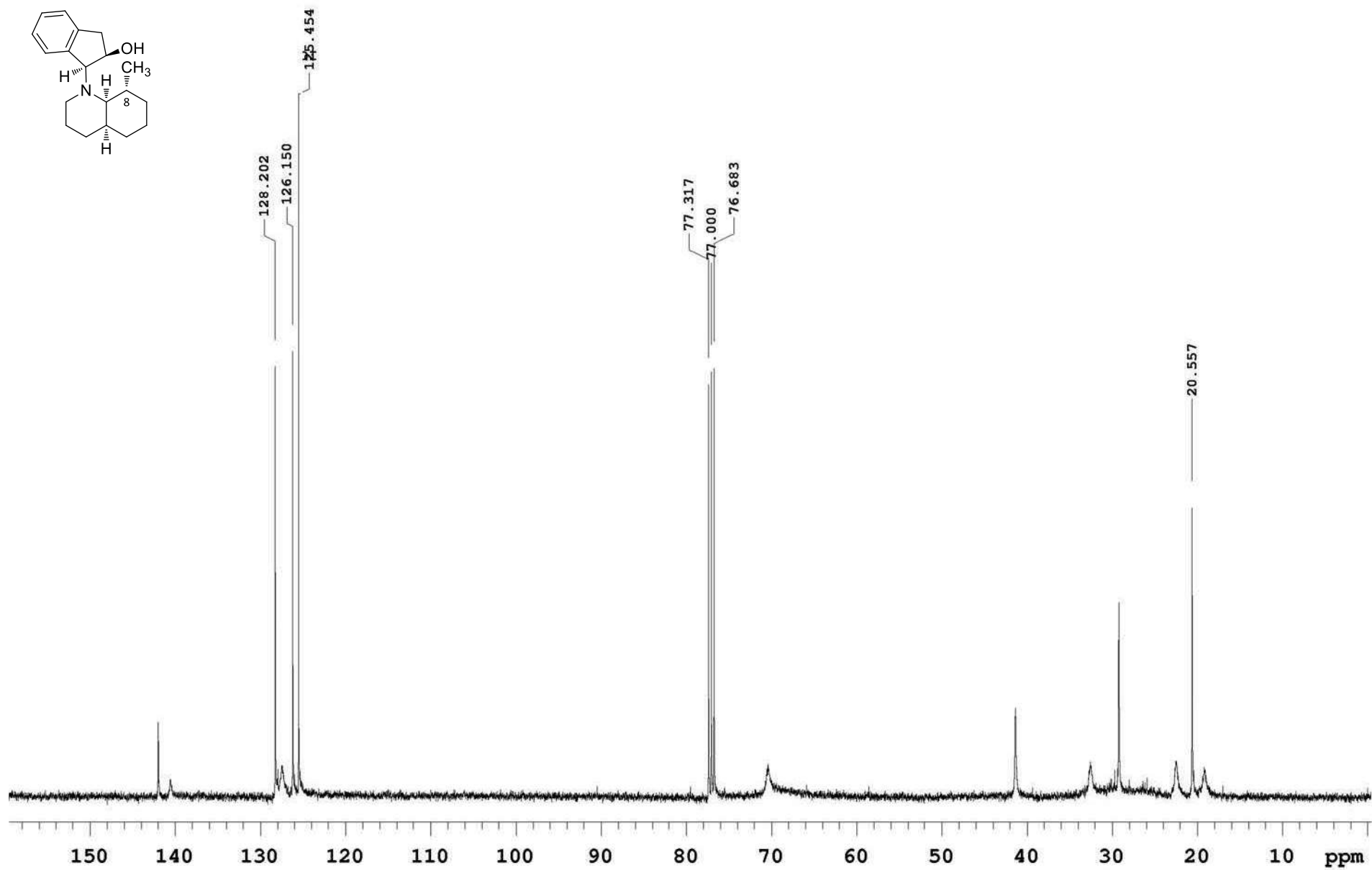
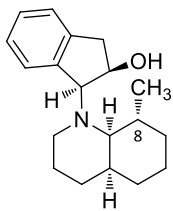
(4aR,8R,8aS)-8-Benzyl-1-[(1R)-2-hydroxy-1-phenylethyl]decahydroquinoline (69)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 52 °C



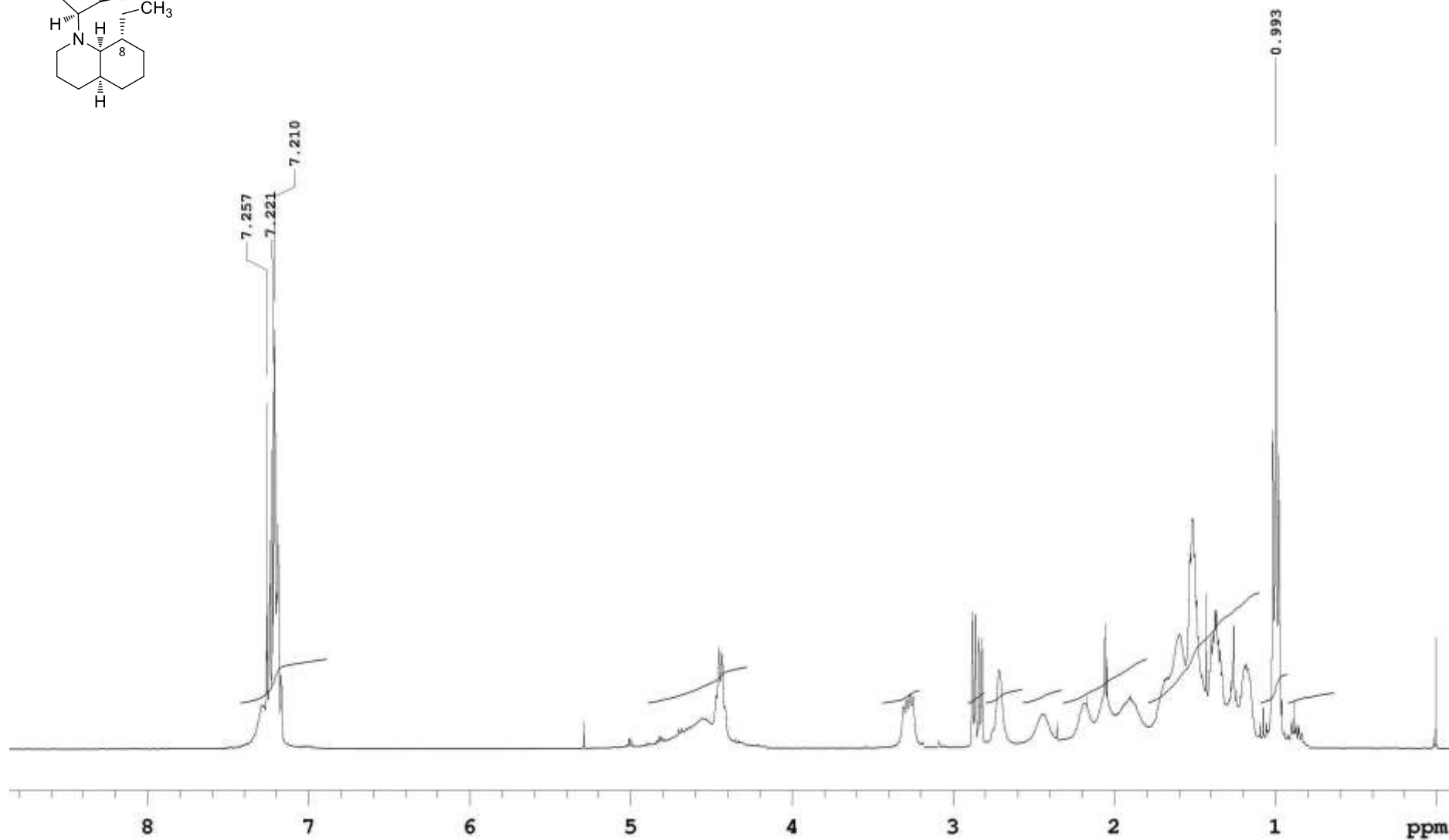
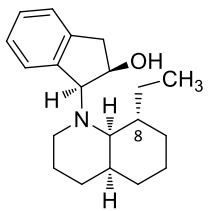
(4*aR*,8*R*,8*aS*)-8-Benzyl-1-[(1*R*)-2-hydroxy-1-phenylethyl]decahydroquinoline (69)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 52 °C



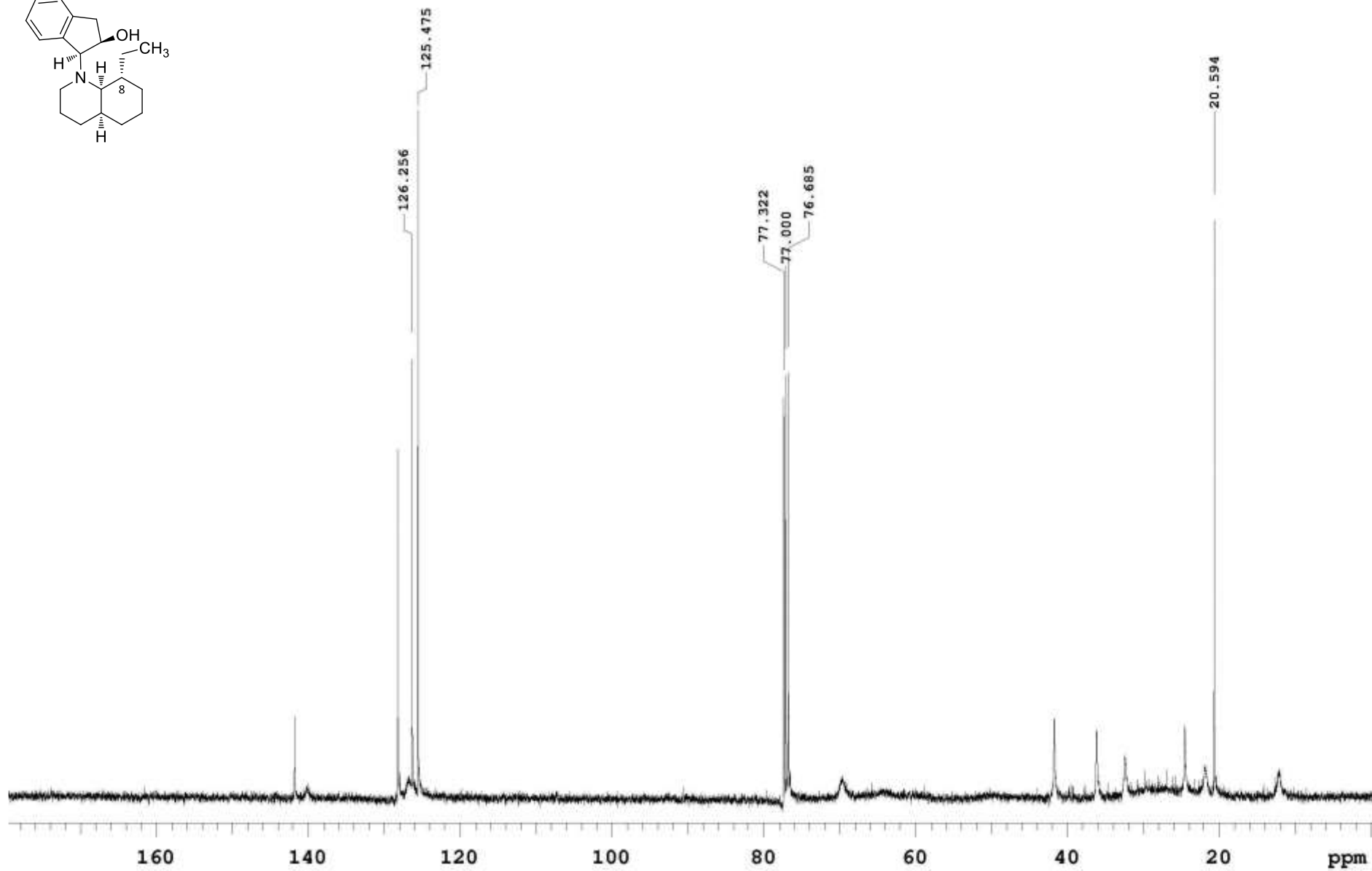
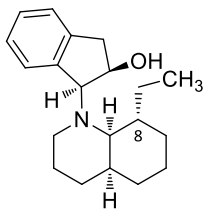
(4a*S*,8*R*,8a*S*)-1-[(1*S*,2*R*)-2-Hydroxy-1-indanyl]-8-methyldecahydroquinoline (70a)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



(4a*S*,8*R*,8a*S*)-1-[(1*S*,2*R*)-2-Hydroxy-1-indanyl]-8-methyldecahydroquinoline (70a)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C

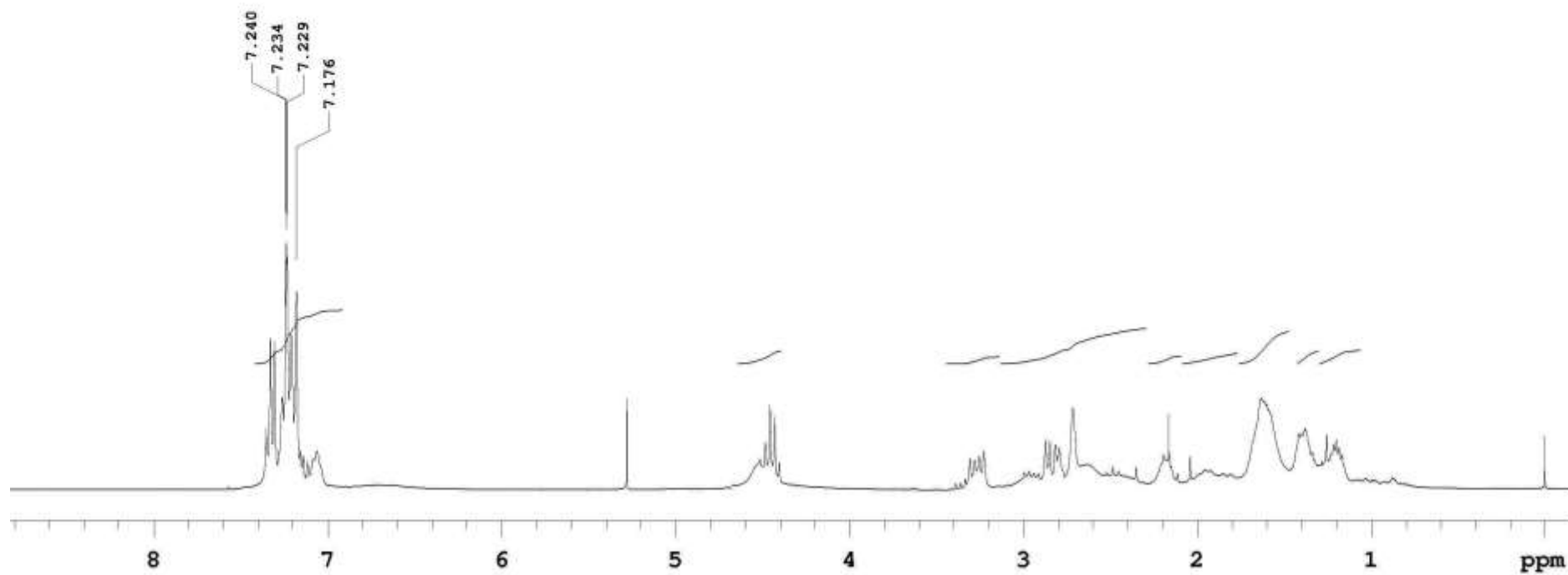
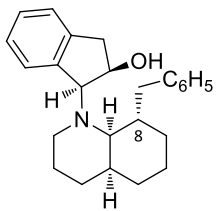


(4a*S*,8*R*,8a*S*)-8-Ethyl-1-[(1*S*,2*R*)-2-hydroxy-1-indanyl]decahydroquinoline (71a)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C

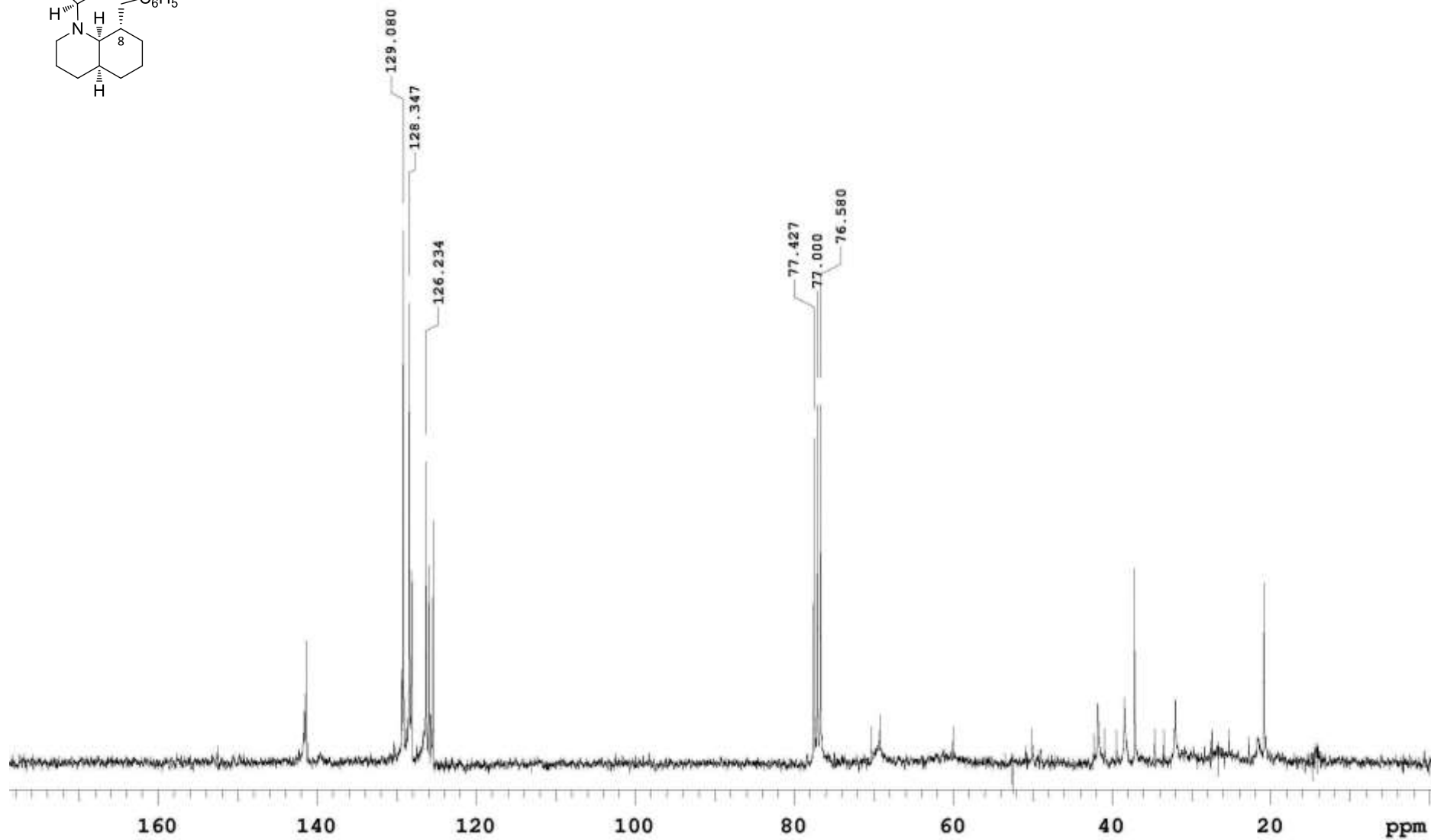
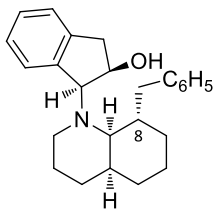


(4aS,8R,8aS)-8-Ethyl-1-[(1S,2R)-2-hydroxy-1-indanyl]decahydroquinoline (71a)-  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 100.6 MHz, 25 °C

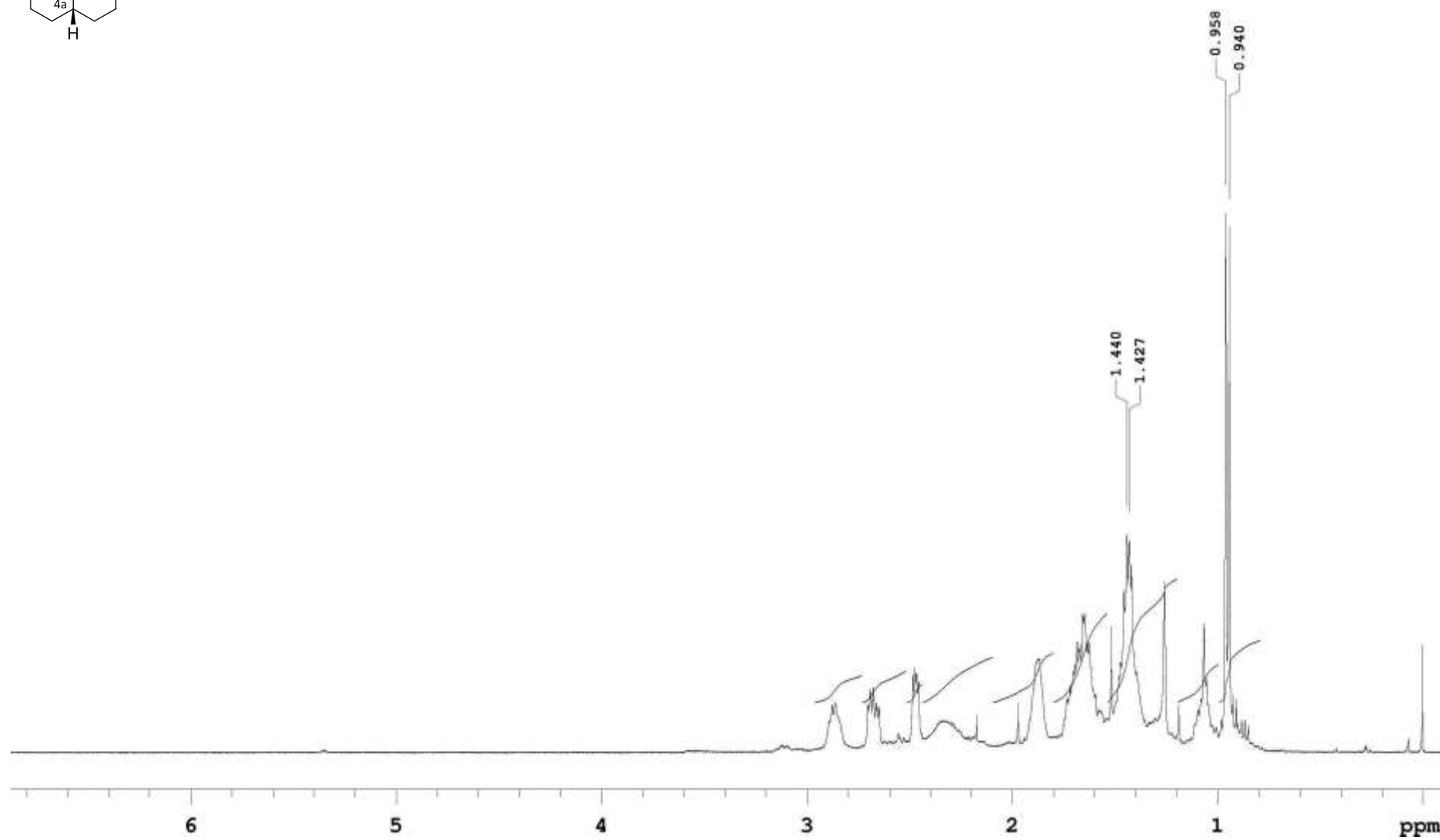
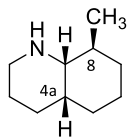




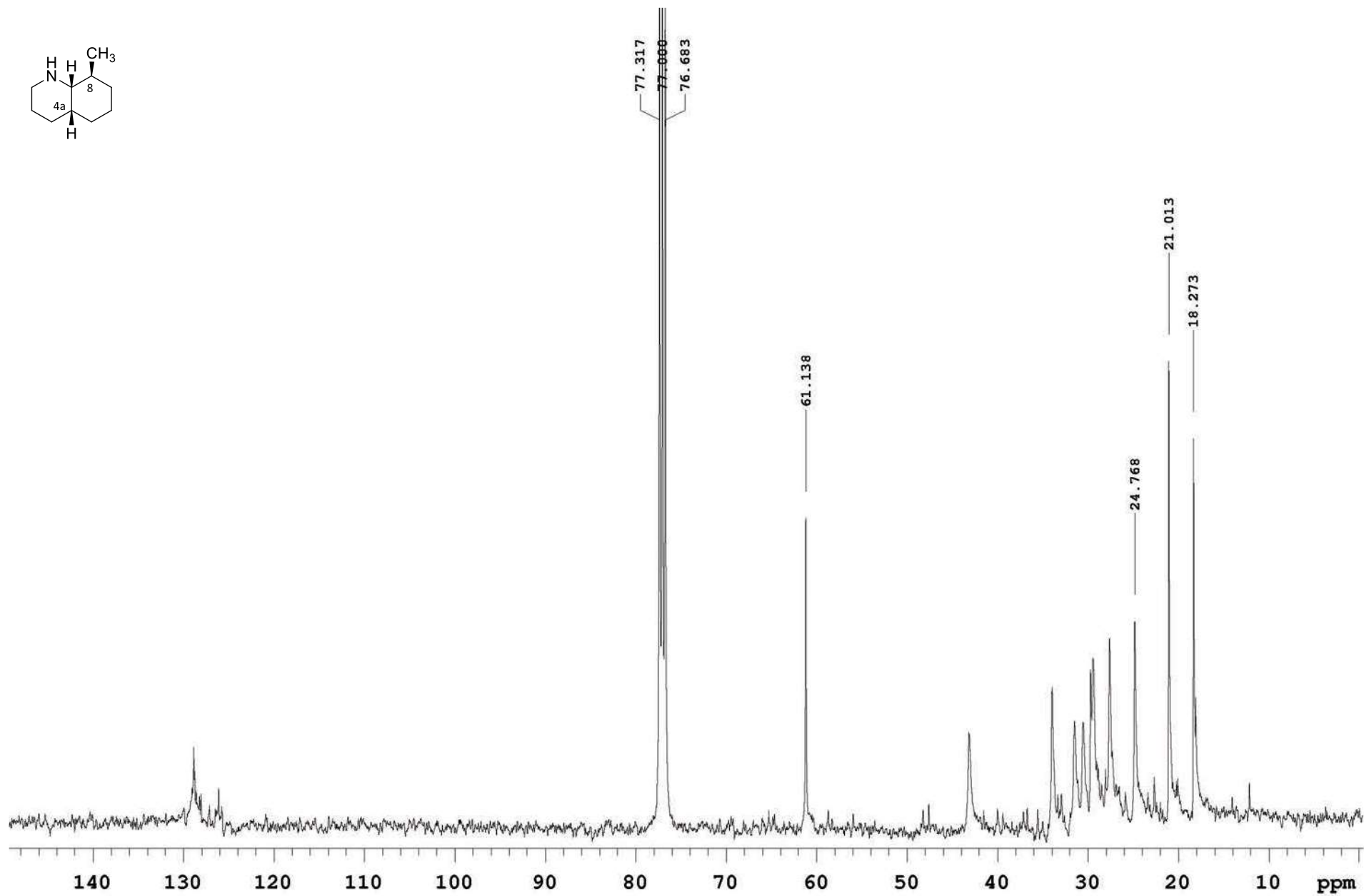
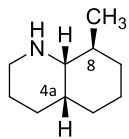
(4a*S*,8*S*,8a*R*)-8-Benzyl-1-[(1*S*,2*R*)-2-hydroxy-1-indanyl]decahydroquinoline (72a)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 300 MHz, 25 °C



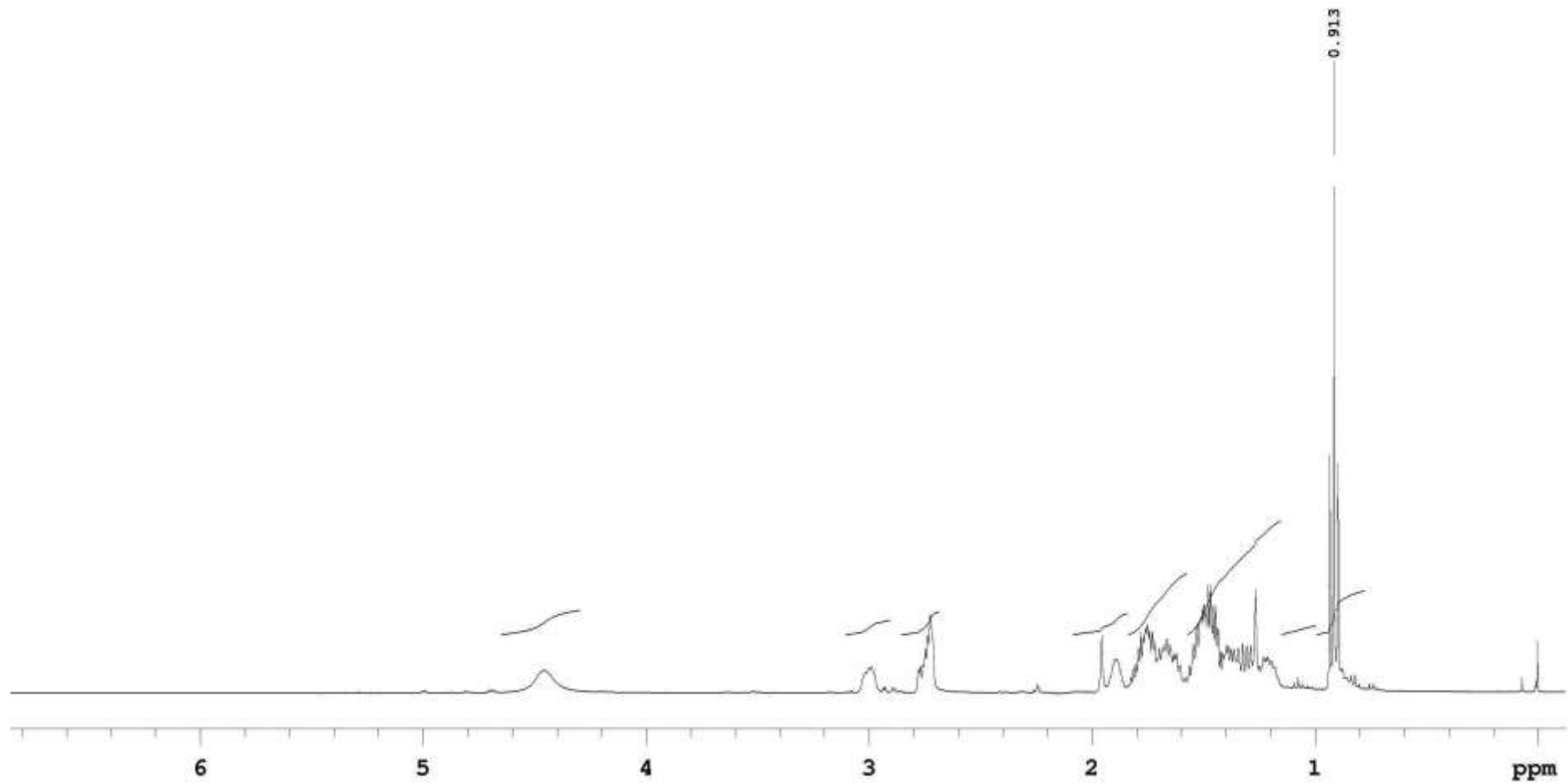
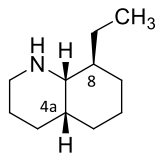
(4a*S*,8*S*,8a*R*)-8-Benzyl-1-[(1*S*,2*R*)-2-hydroxy-1-indanyl]decahydroquinoline (72a)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 75.4 MHz, 25 °C



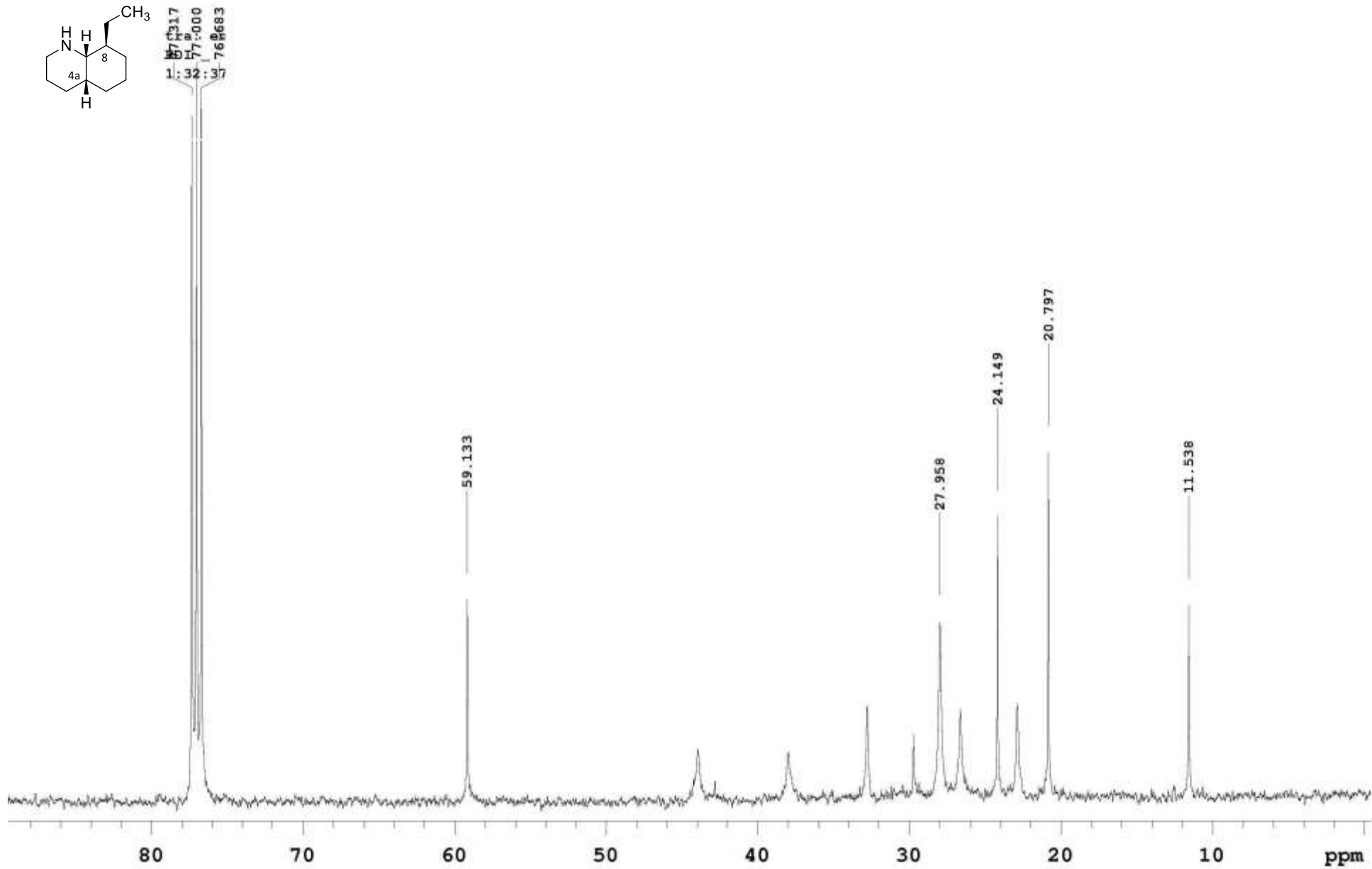
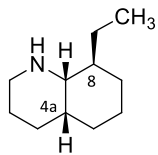
(4a*R*,8*S*,8a*R*)-8-Methyldecahydroquinoline (73)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 400 MHz, 25 °C



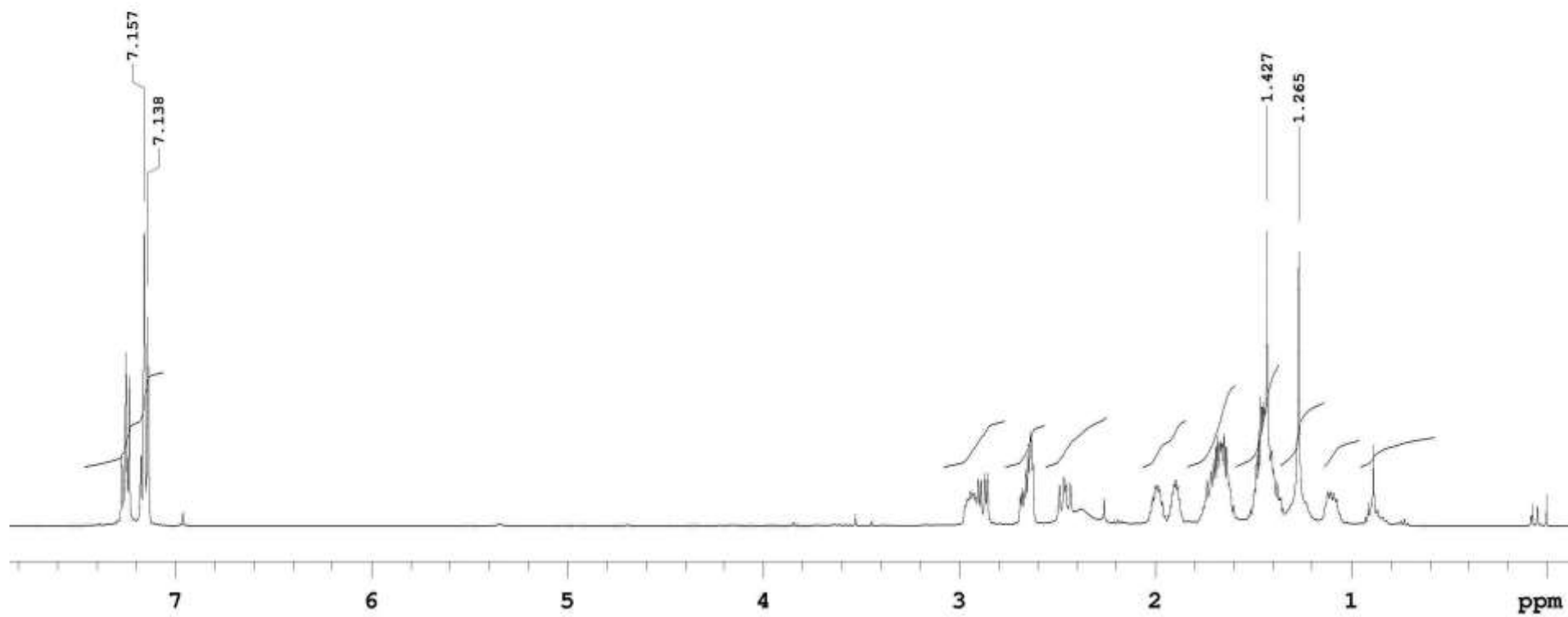
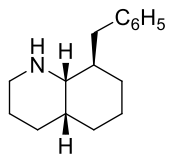
(4aR,8S,8aR)-8-Methyldecahydroquinoline (73)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 52 °C



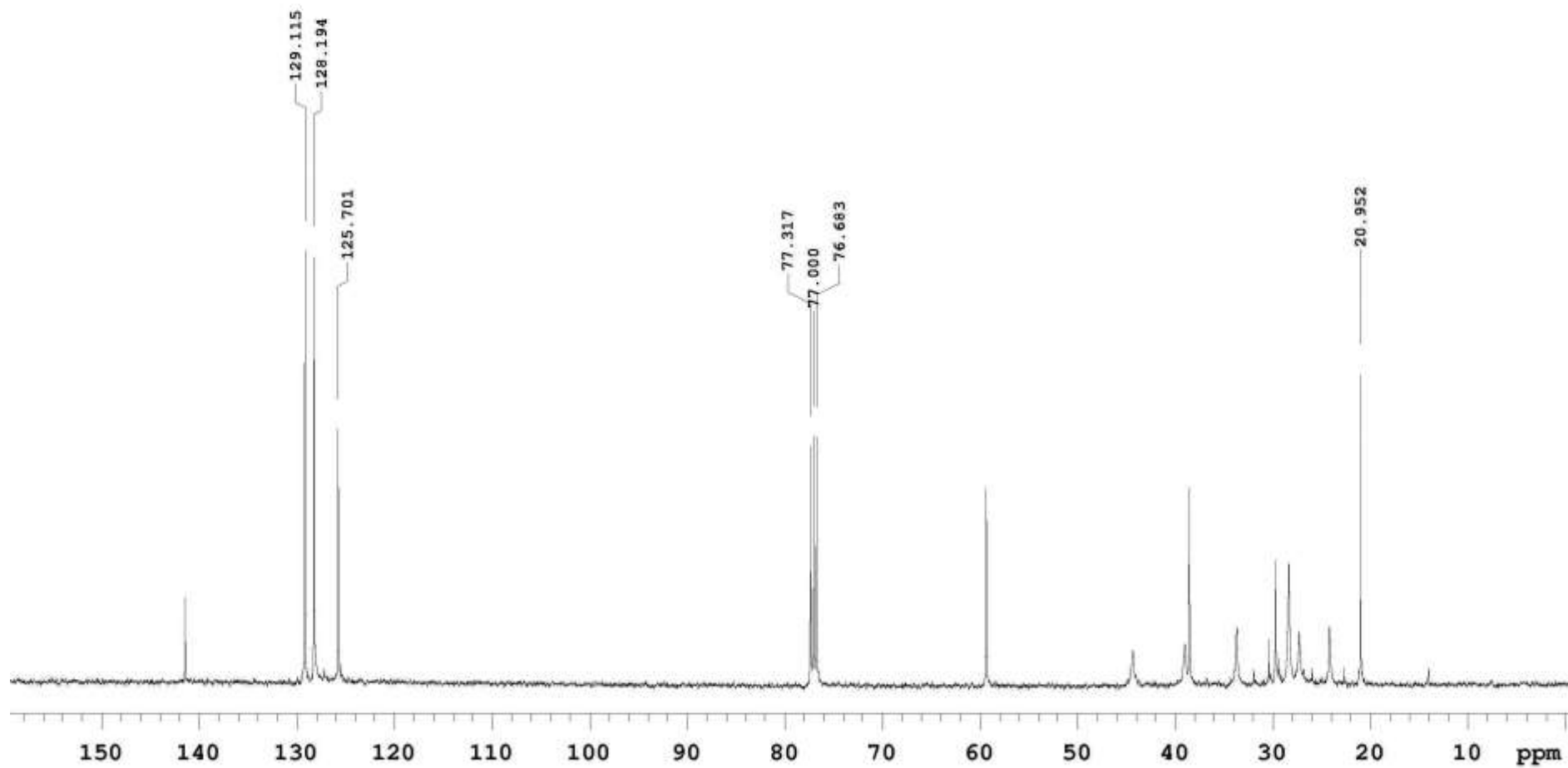
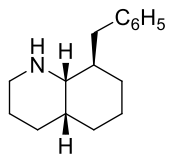
(4*R*,8*S*,8*aR*)-8-Ethyldecahydroquinoline (74)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 52 °C



(4aR,8S,8aR)-8-Ethyldecahydroquinoline (74)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 52 °C

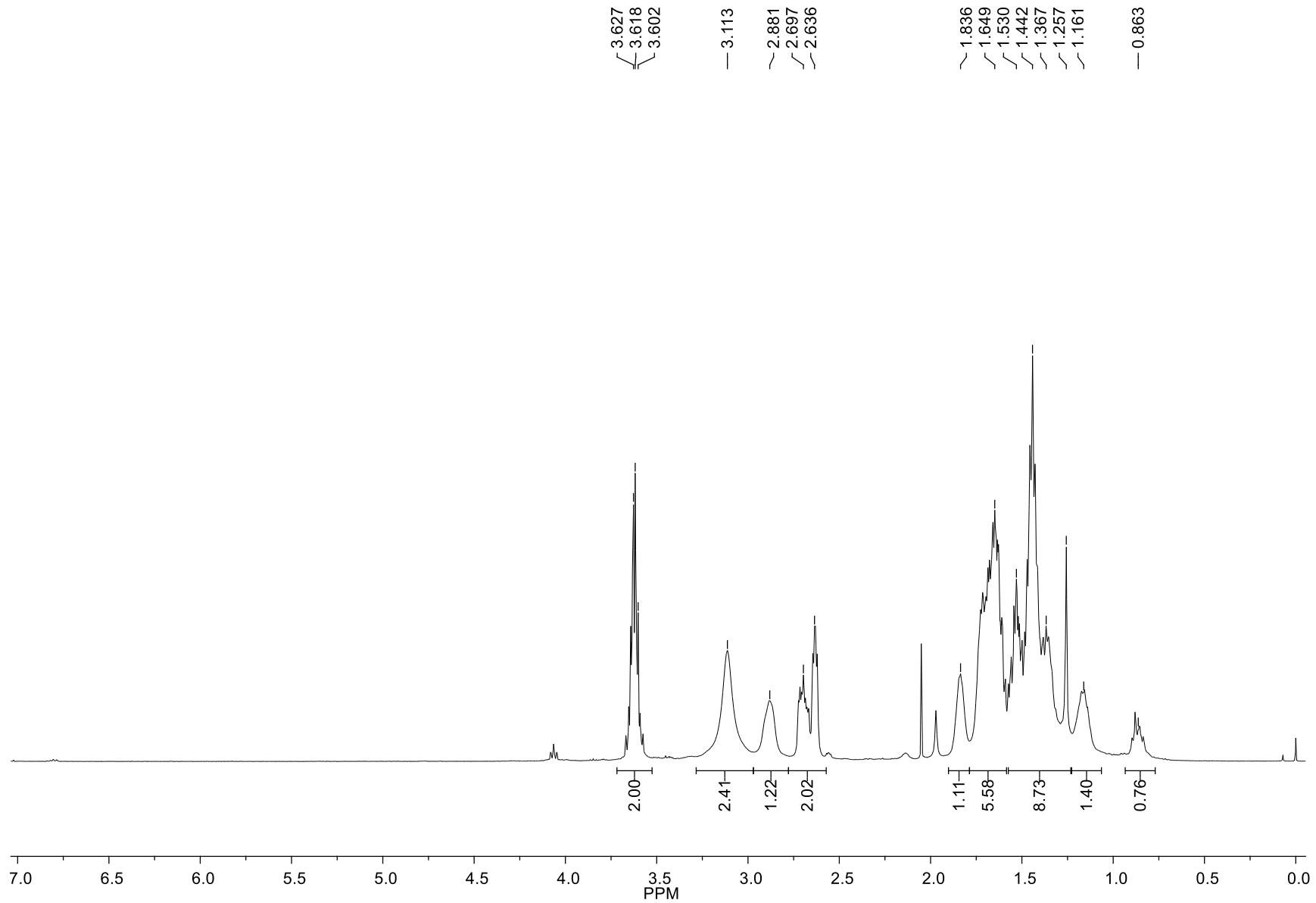
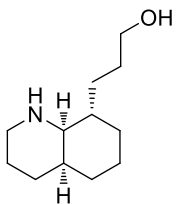


(4aR,8R,8aS)-8-Benzyldecahydroquinoline (75)-<sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 52 °C

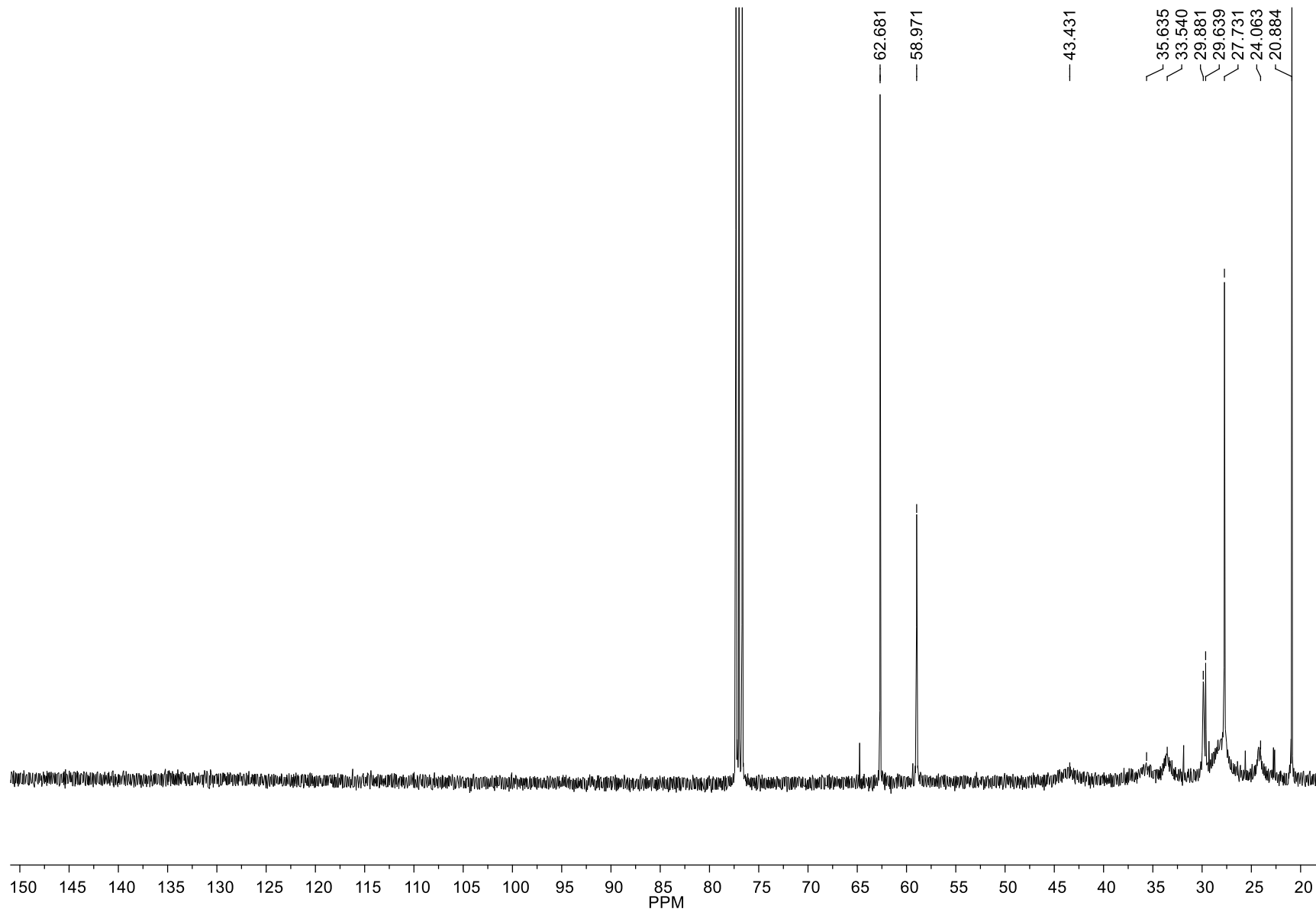
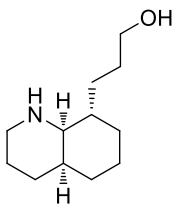


(4*R*,8*R*,8*a*S)-8-benzyldecahydroquinoline (75)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C

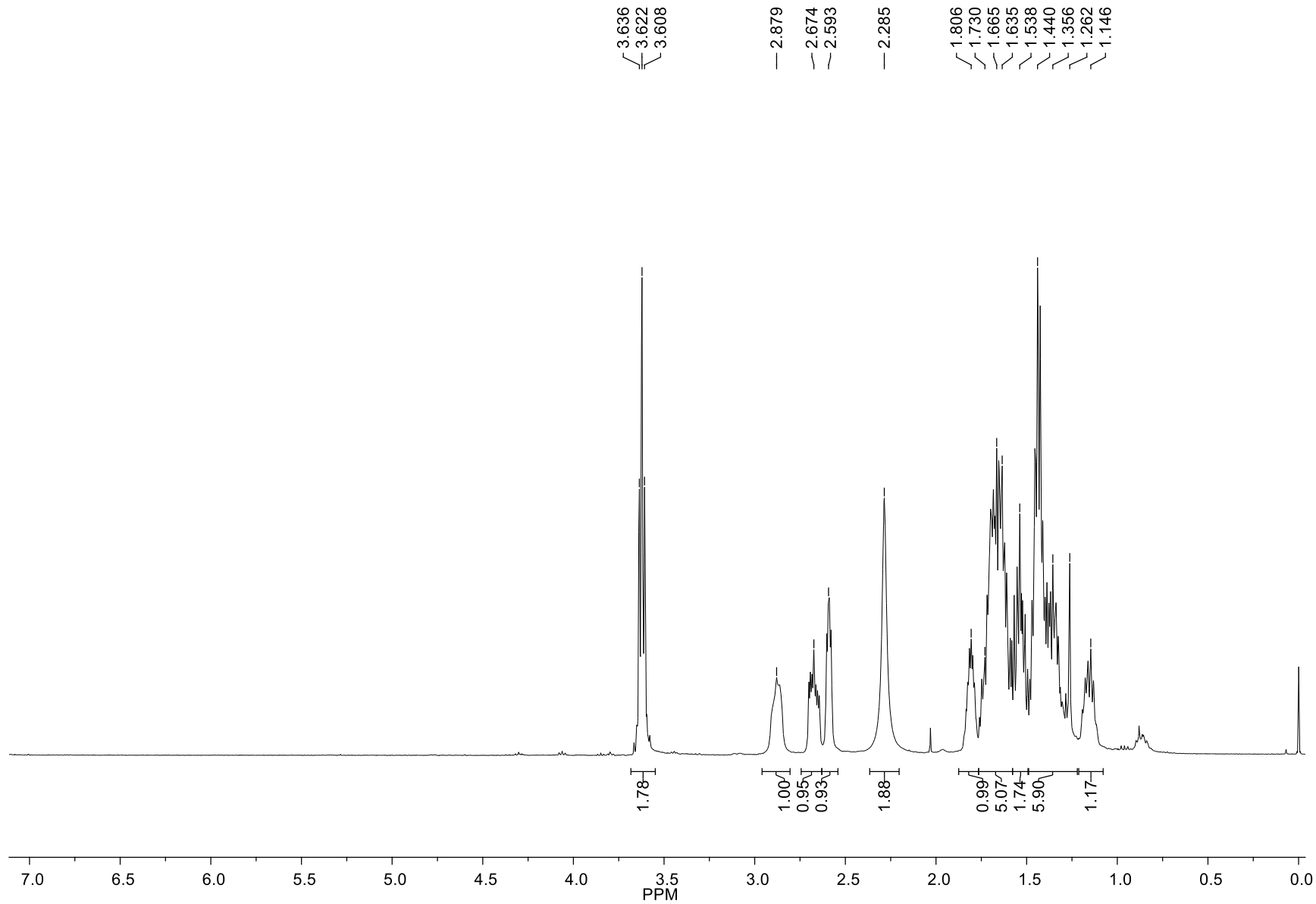
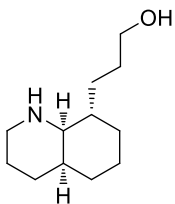




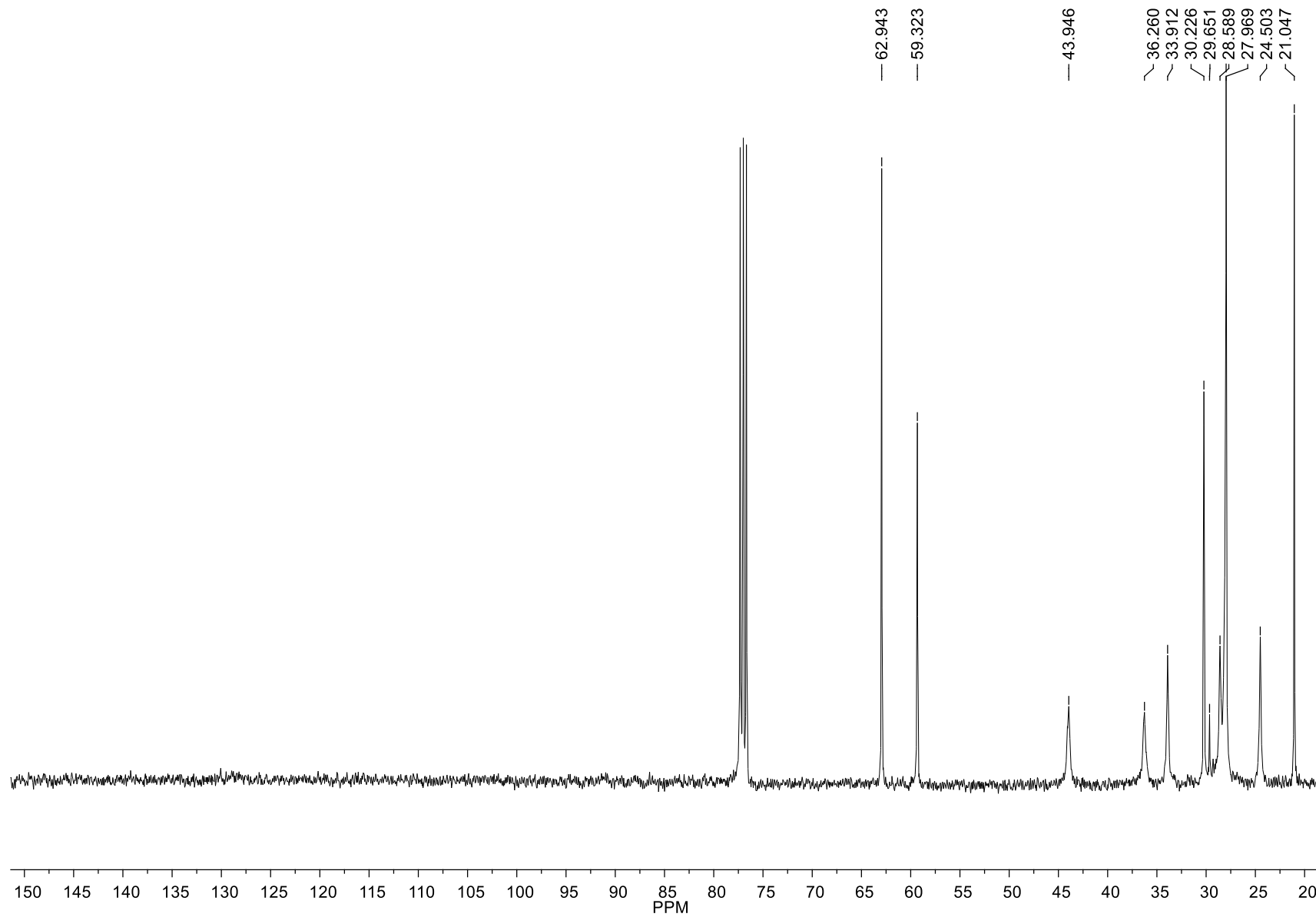
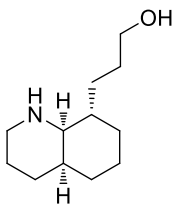
(4a*S*,8*R*,8a*S*)-8-(3-Hydroxypropyl)decahydroquinoline (76)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



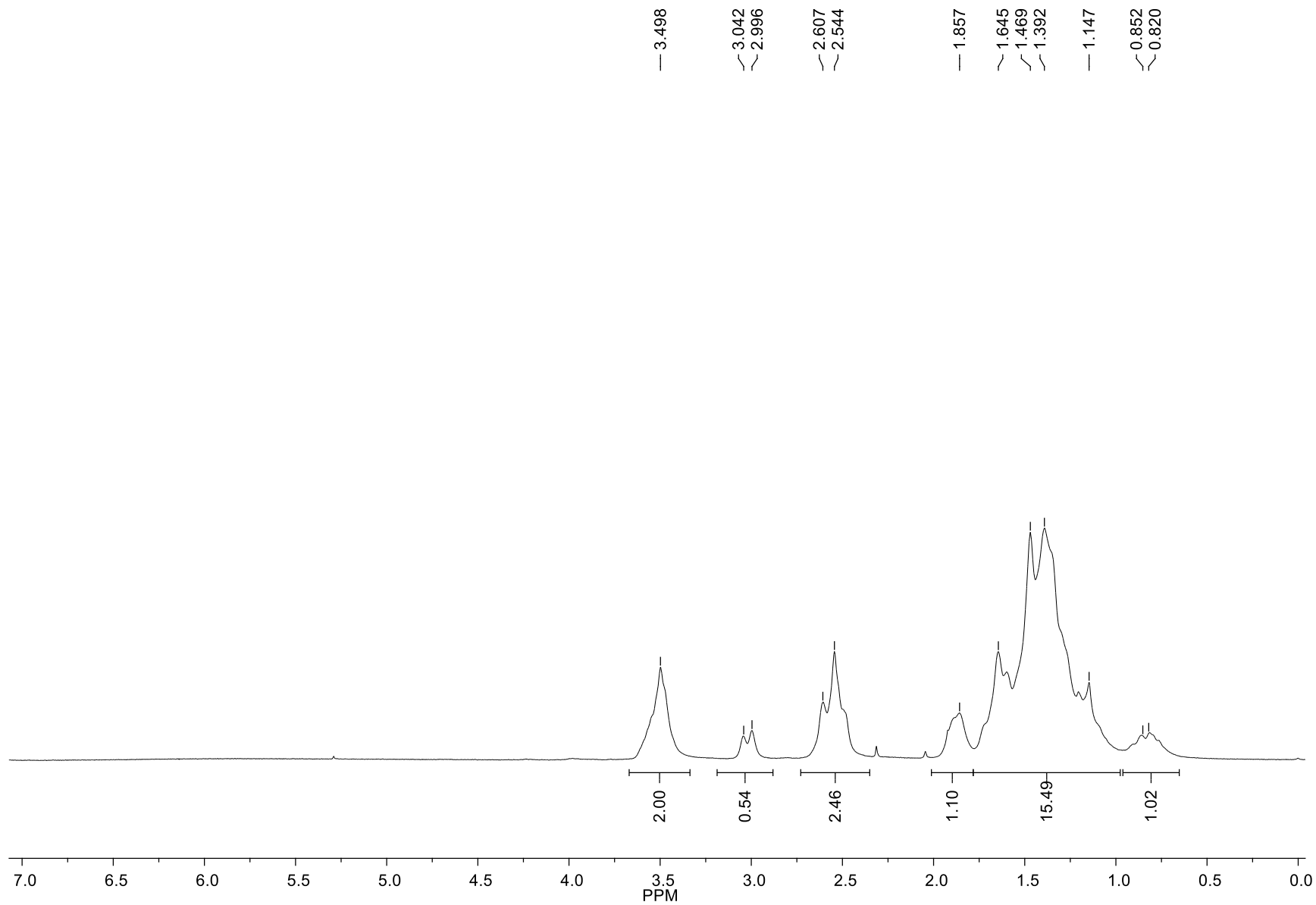
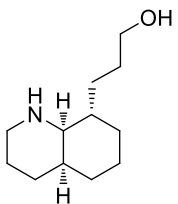
(4a*S*,8*R*,8a*S*)-8-(3-Hydroxypropyl)decahydroquinoline (76)- $^{13}\text{C-NMR}$ ,  $\text{CDCl}_3$ , 100.6 MHz, 25 °C



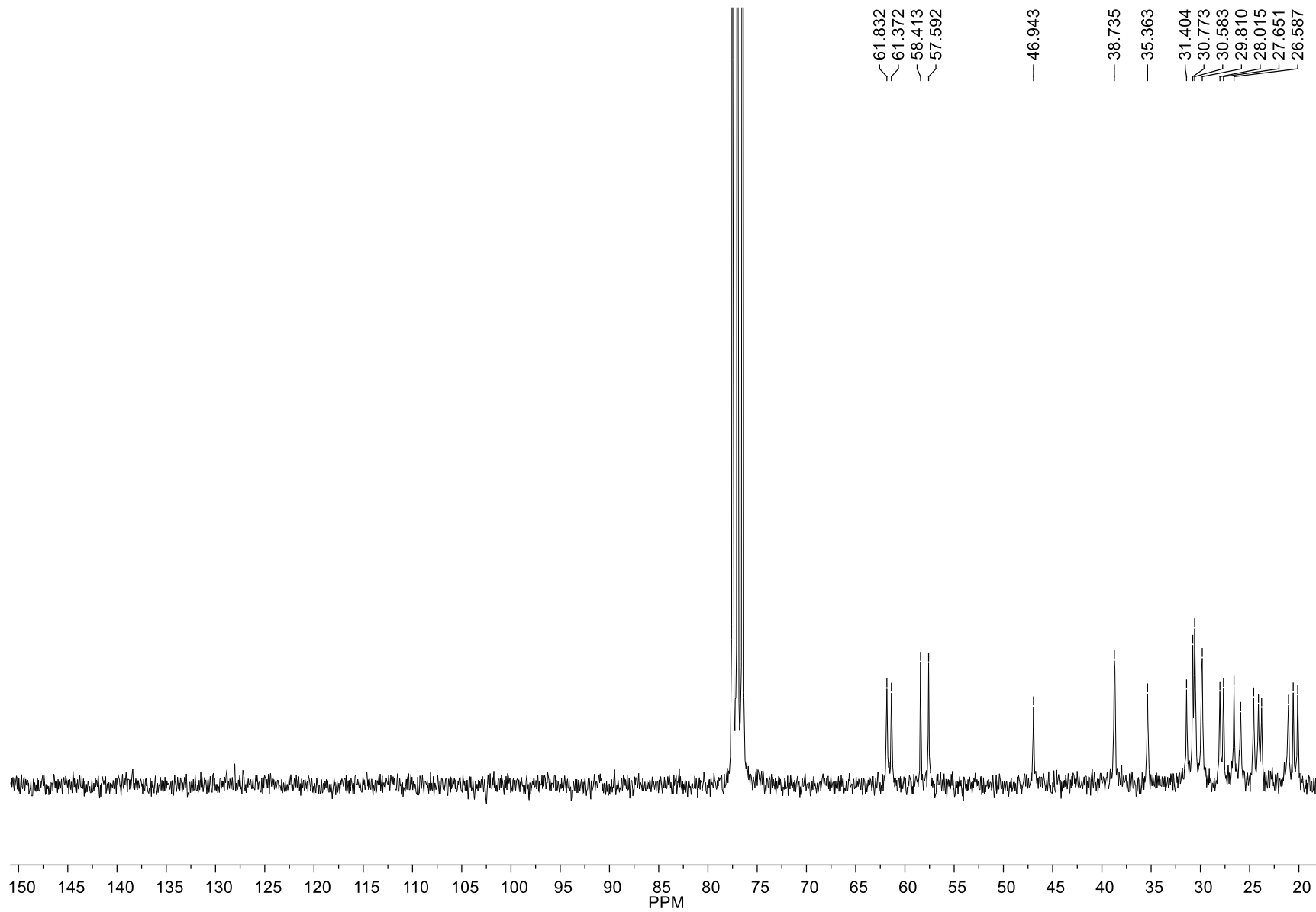
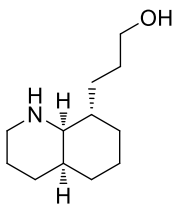
(4*aS*,8*R*,8*aS*)-8-(3-Hydroxypropyl)decahydroquinoline (76)-<sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 50 °C



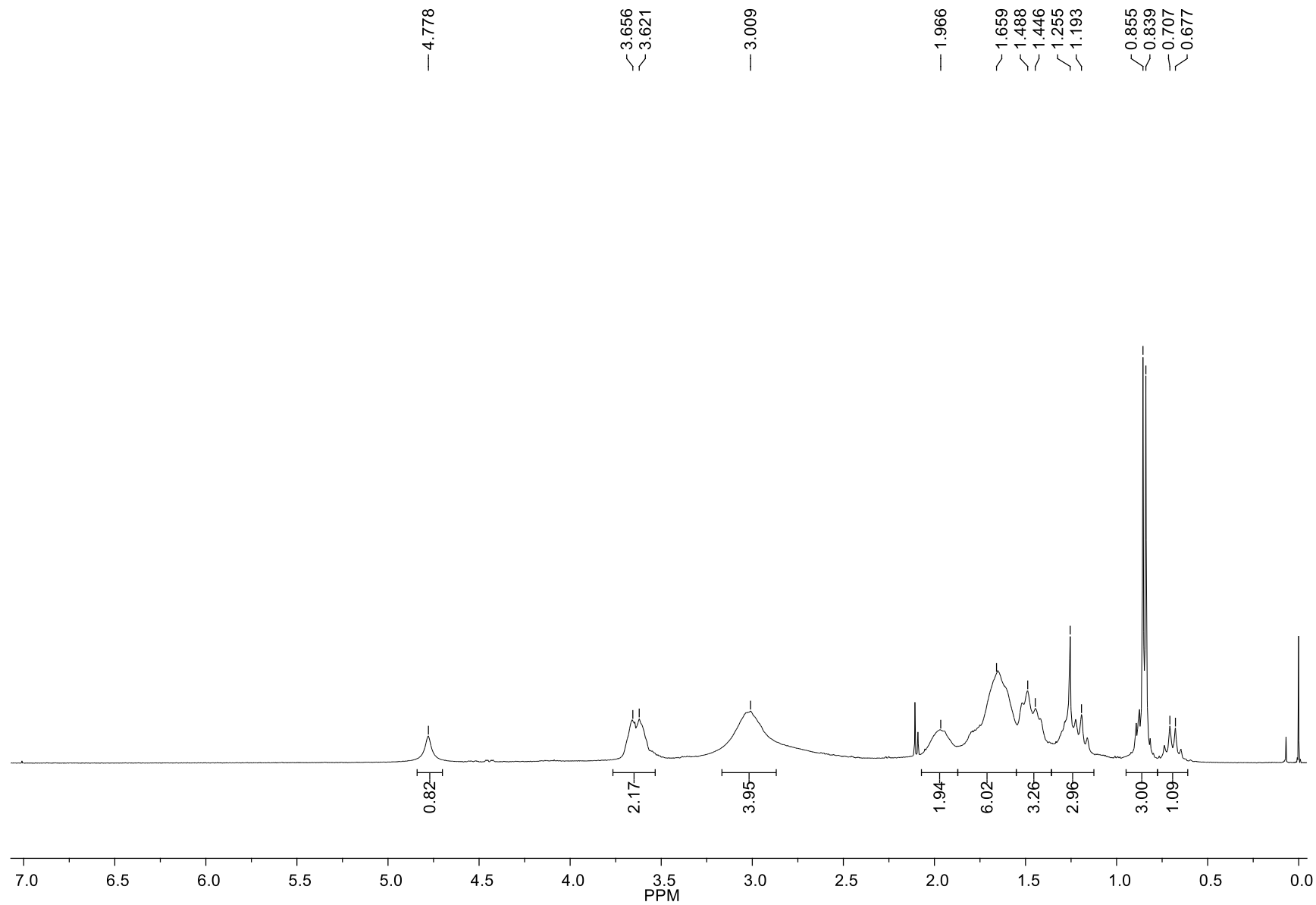
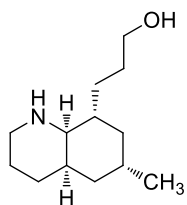
(4*aS*,8*R*,8*aS*)-8-(3-Hydroxypropyl)decahydroquinoline (76)- $^{13}\text{C-NMR}$ ,  $\text{CDCl}_3$ , 100.6 MHz, 50 °C



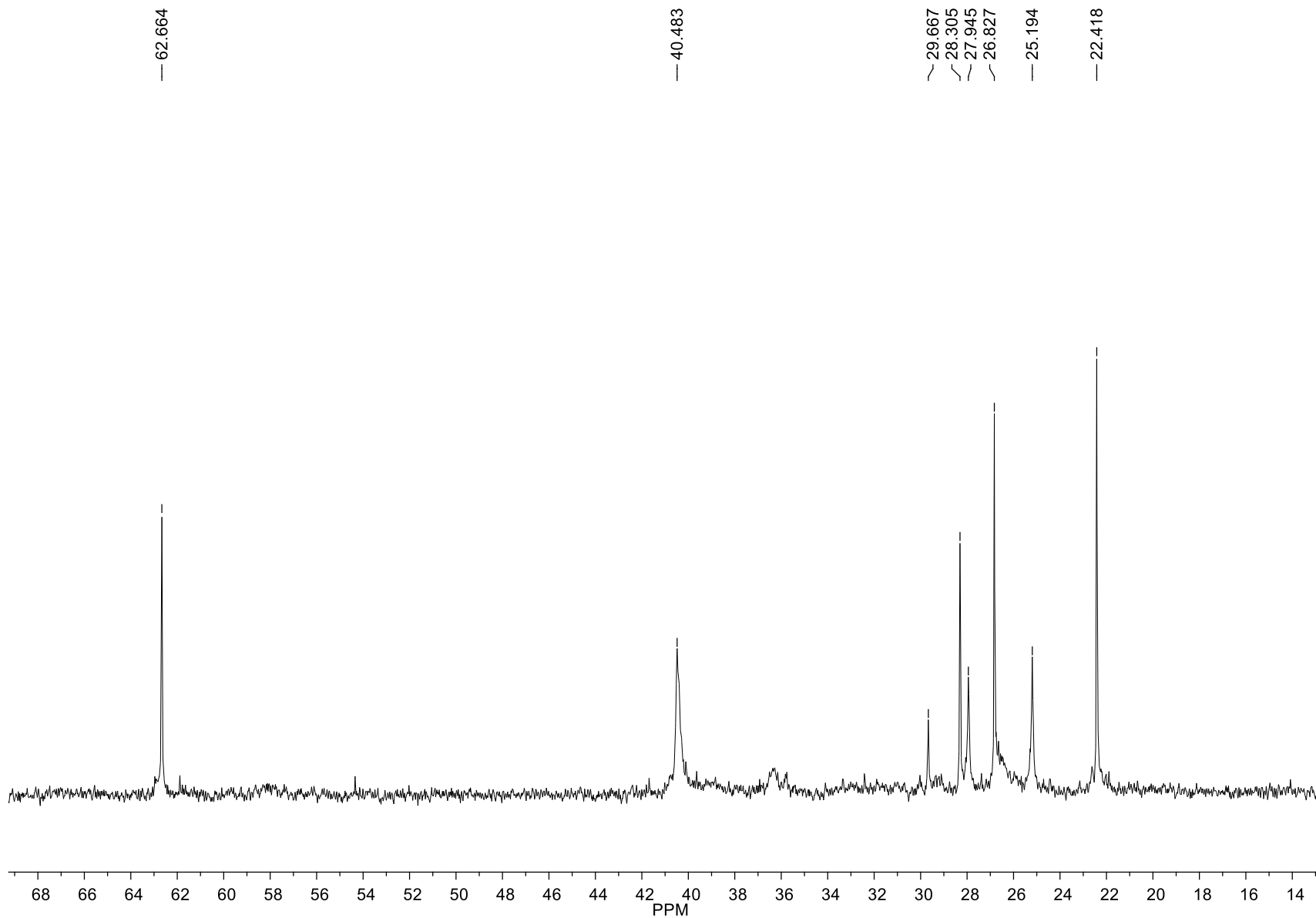
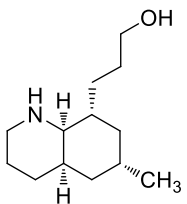
**(4a*S*,8*R*,8a*S*)-8-(3-Hydroxypropyl)decahydroquinoline (76)- $^1\text{H-NMR}$ , CDCl<sub>3</sub>, 400 MHz, -23 °C**



(4*S*,8*R*,8*aS*)-8-(3-Hydroxypropyl)decahydroquinoline (76)- $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 100.6 MHz,  $-23\text{ }^\circ\text{C}$

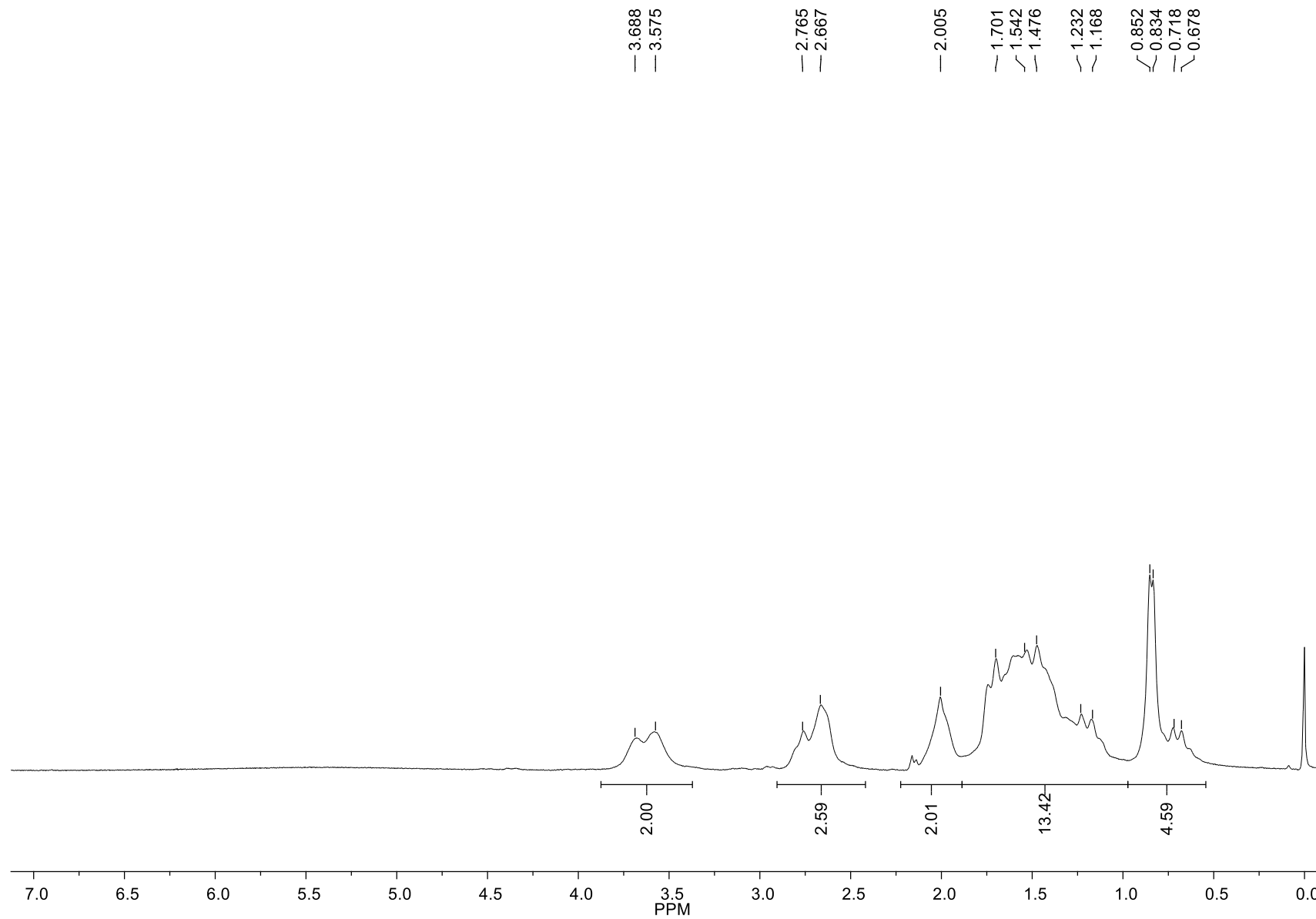
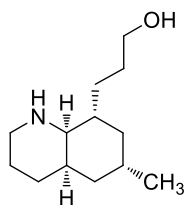


(4R,6R,8R,8aR)-8-(3-Hydroxypropyl)-6-methyldecahydroquinoline (77)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C

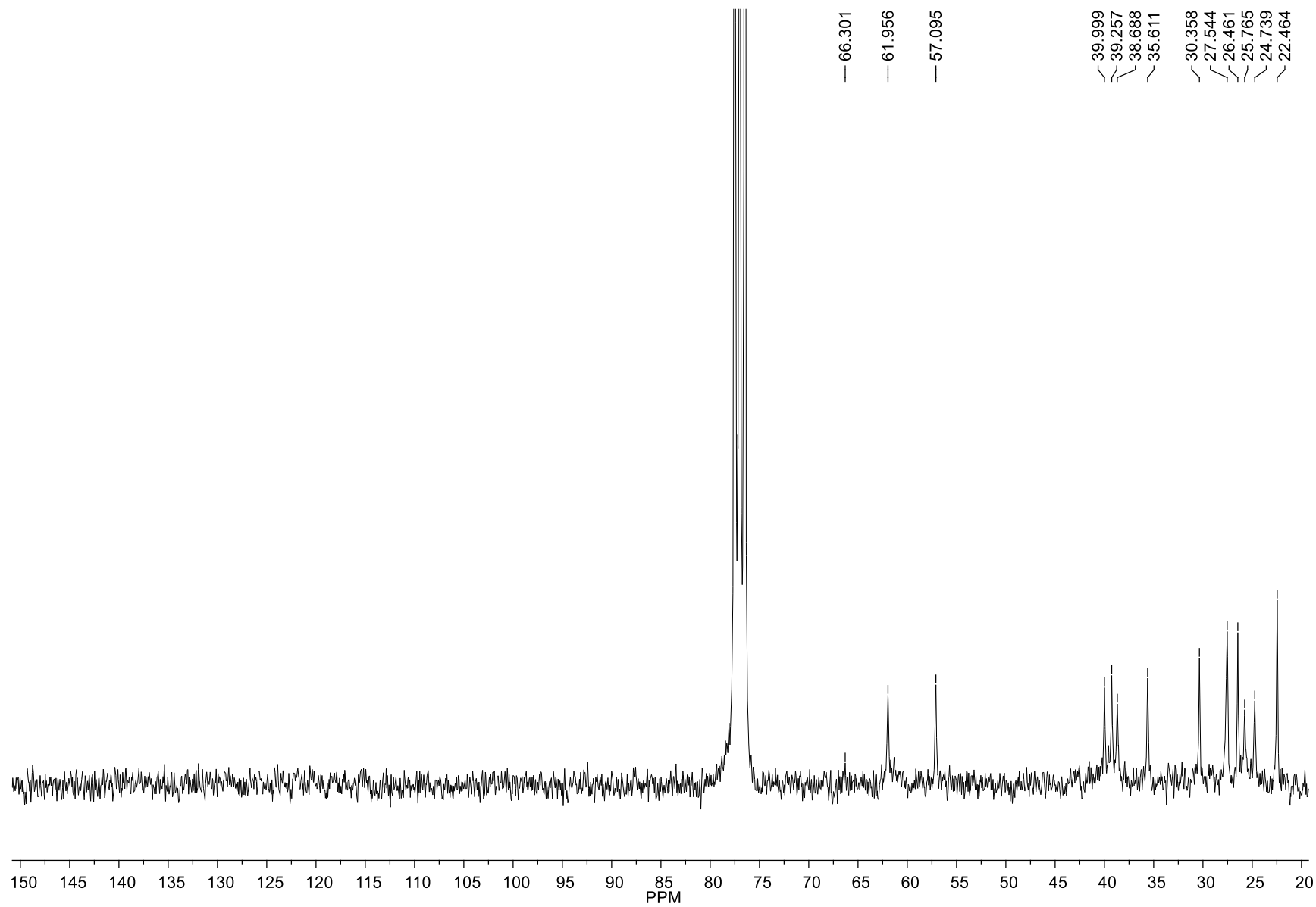
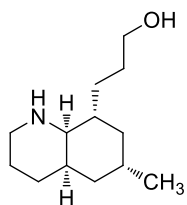


(4*R*,6*R*,8*R*,8*aR*)-8-(3-Hydroxypropyl)-6-methyldecahydroquinoline (77)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C

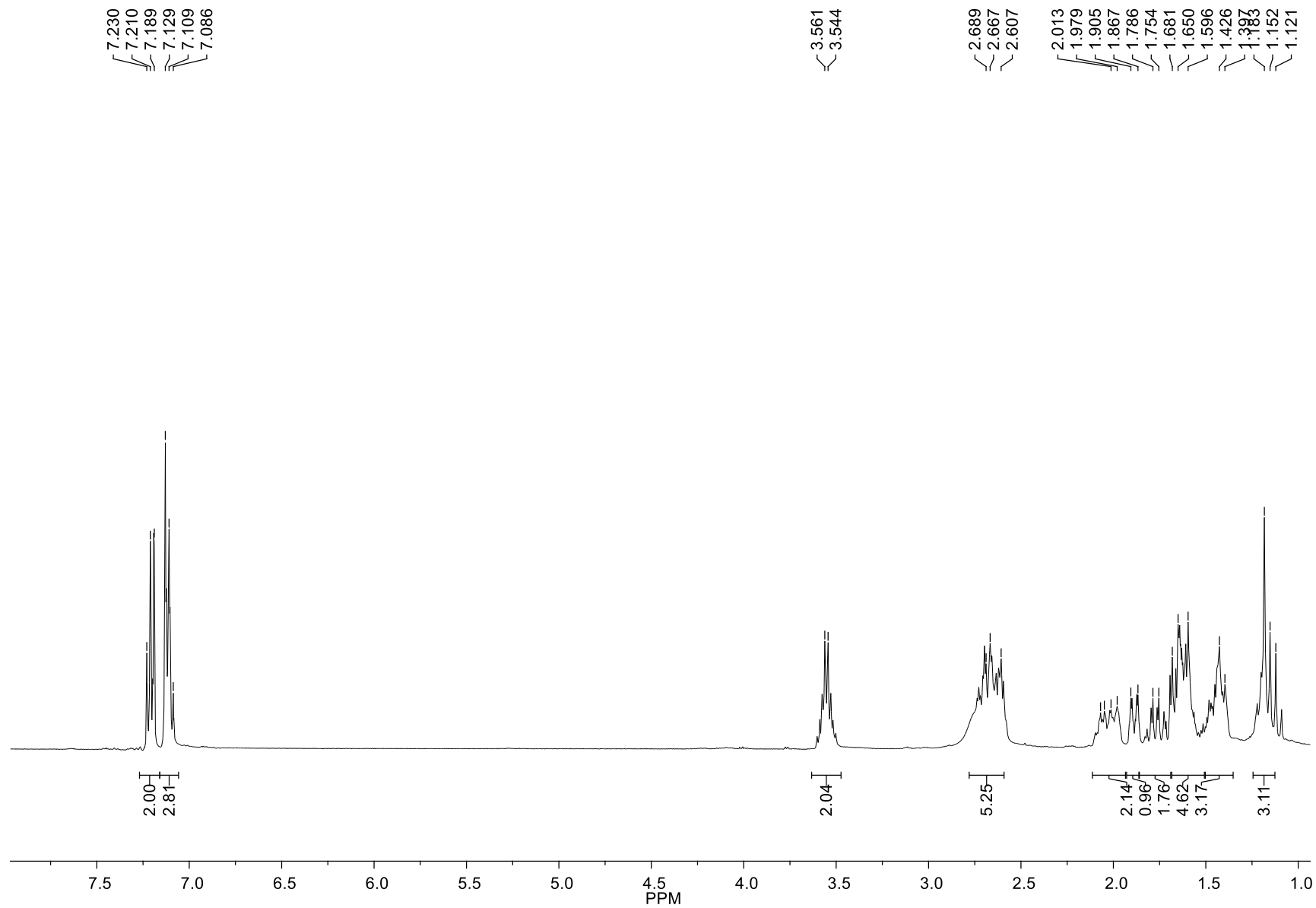
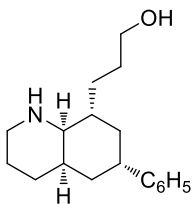




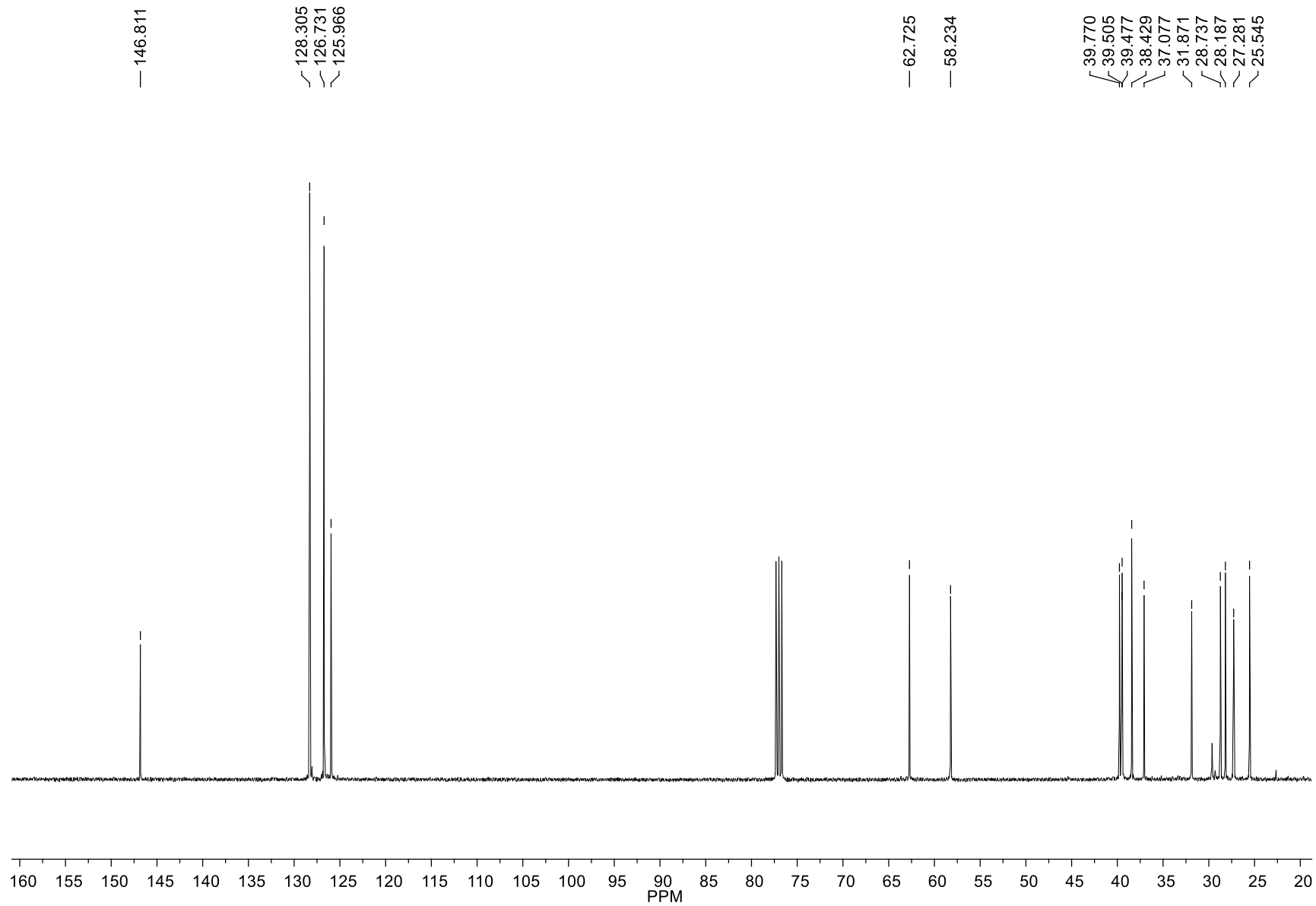
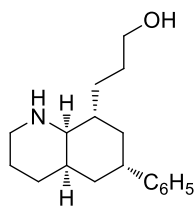
**(4R,6R,8R,8aR)-8-(3-Hydroxypropyl)-6-methyldecahydroquinoline (77)-<sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, -23 °C**



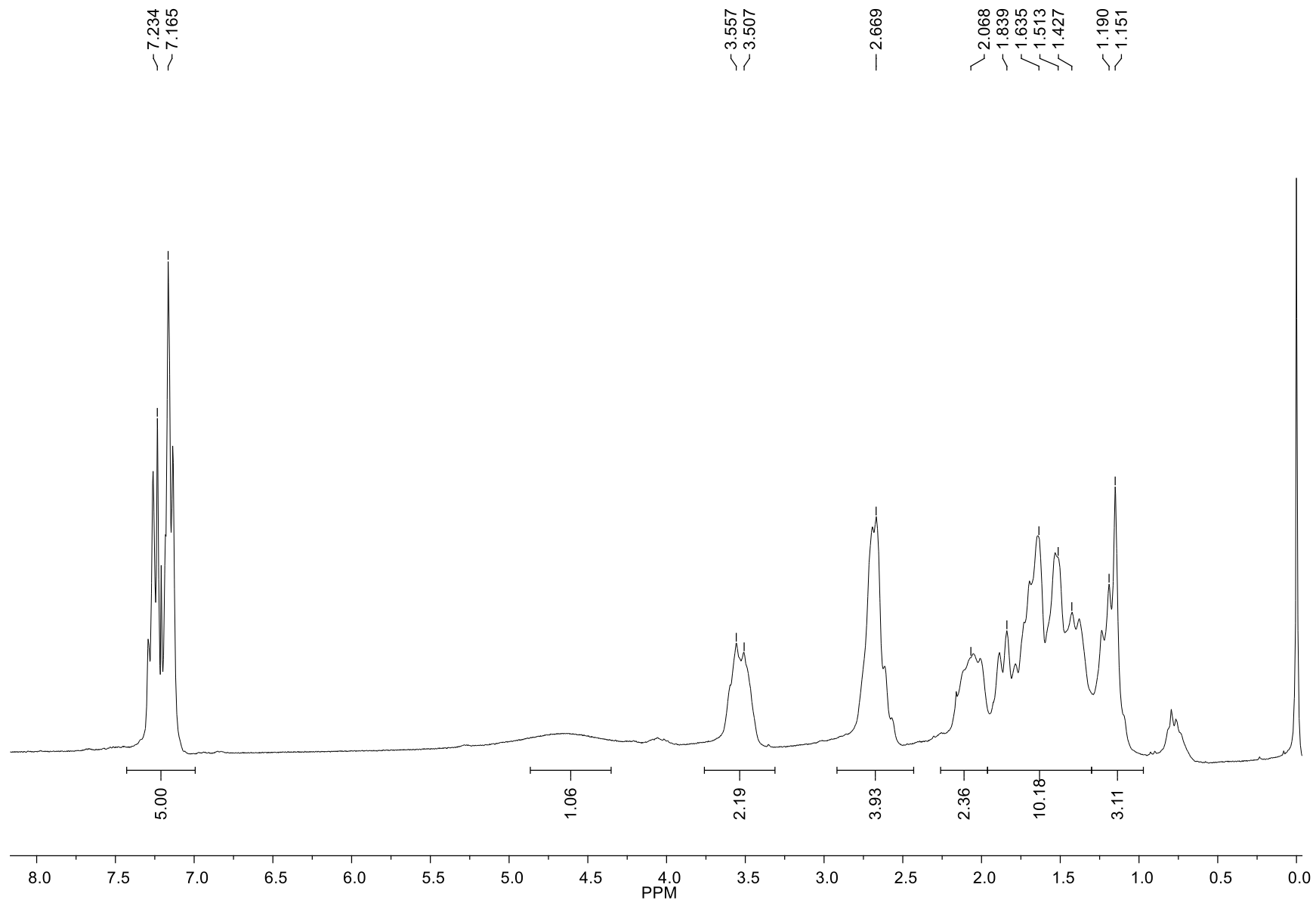
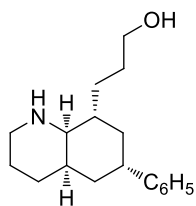
(4R,6R,8R,8aR)-8-(3-Hydroxypropyl)-6-methyldecahydroquinoline (77)- $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 100.6 MHz,  $-23^\circ\text{C}$



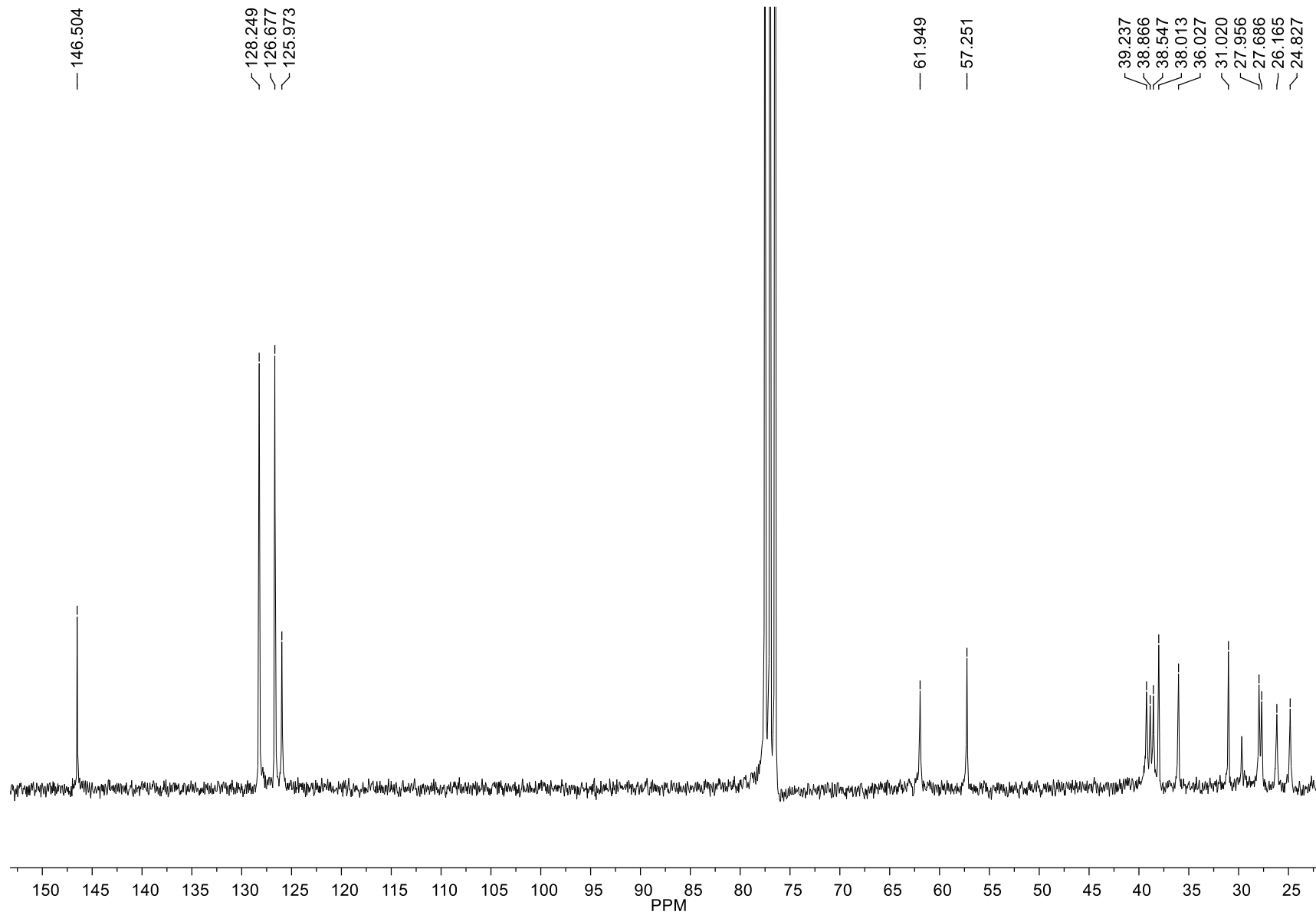
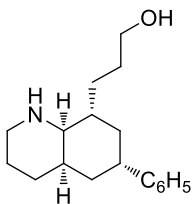
(4*R*,6*R*,8*R*,8*aR*)-8-(Hydroxypropyl)-6-phenyldecahydroquinoline (78)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



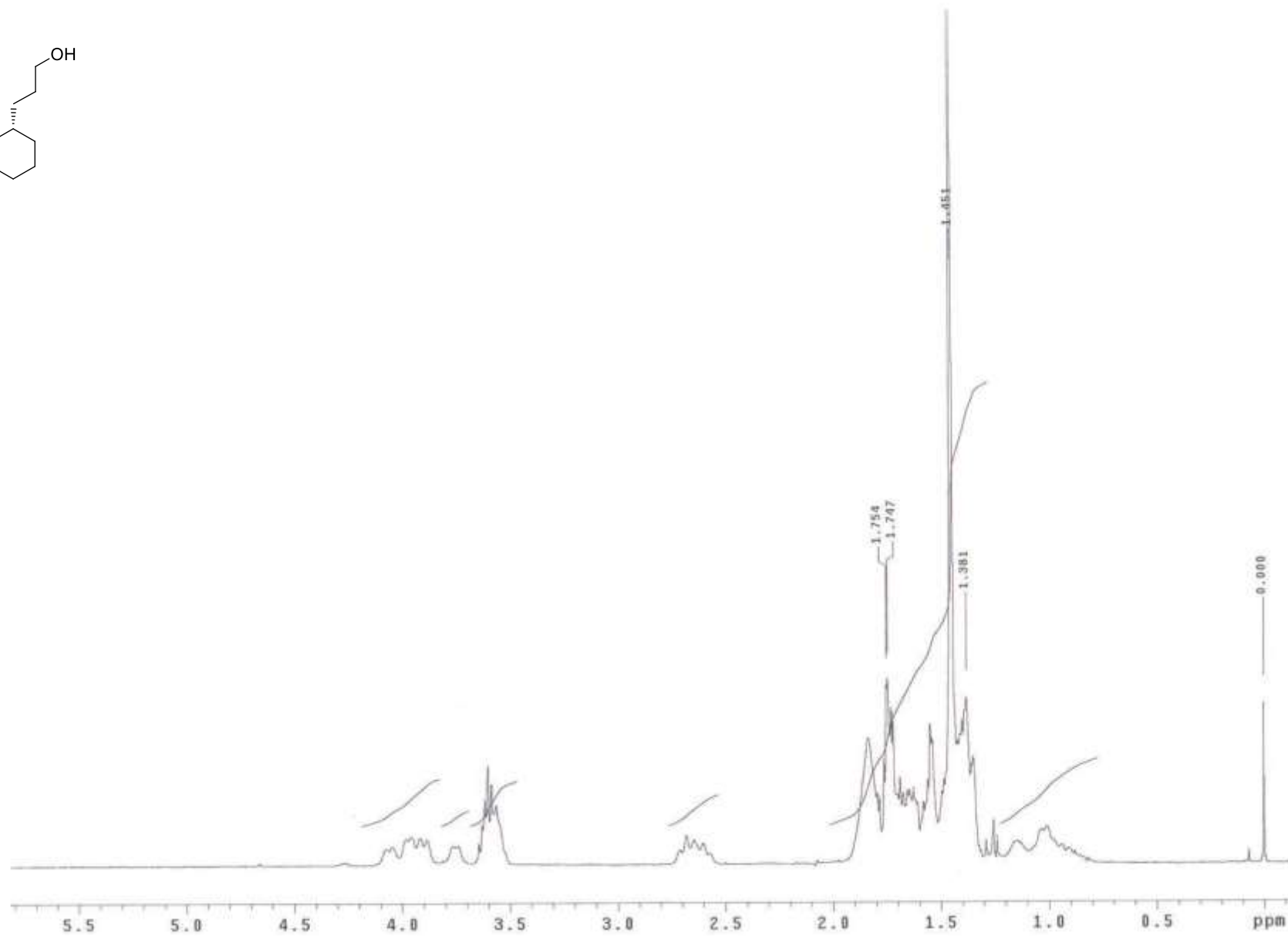
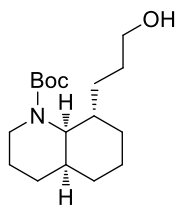
**(4*R*,6*R*,8*R*,8*aR*)-8-(Hydroxypropyl)-6-phenyldecahydroquinoline (78)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C**



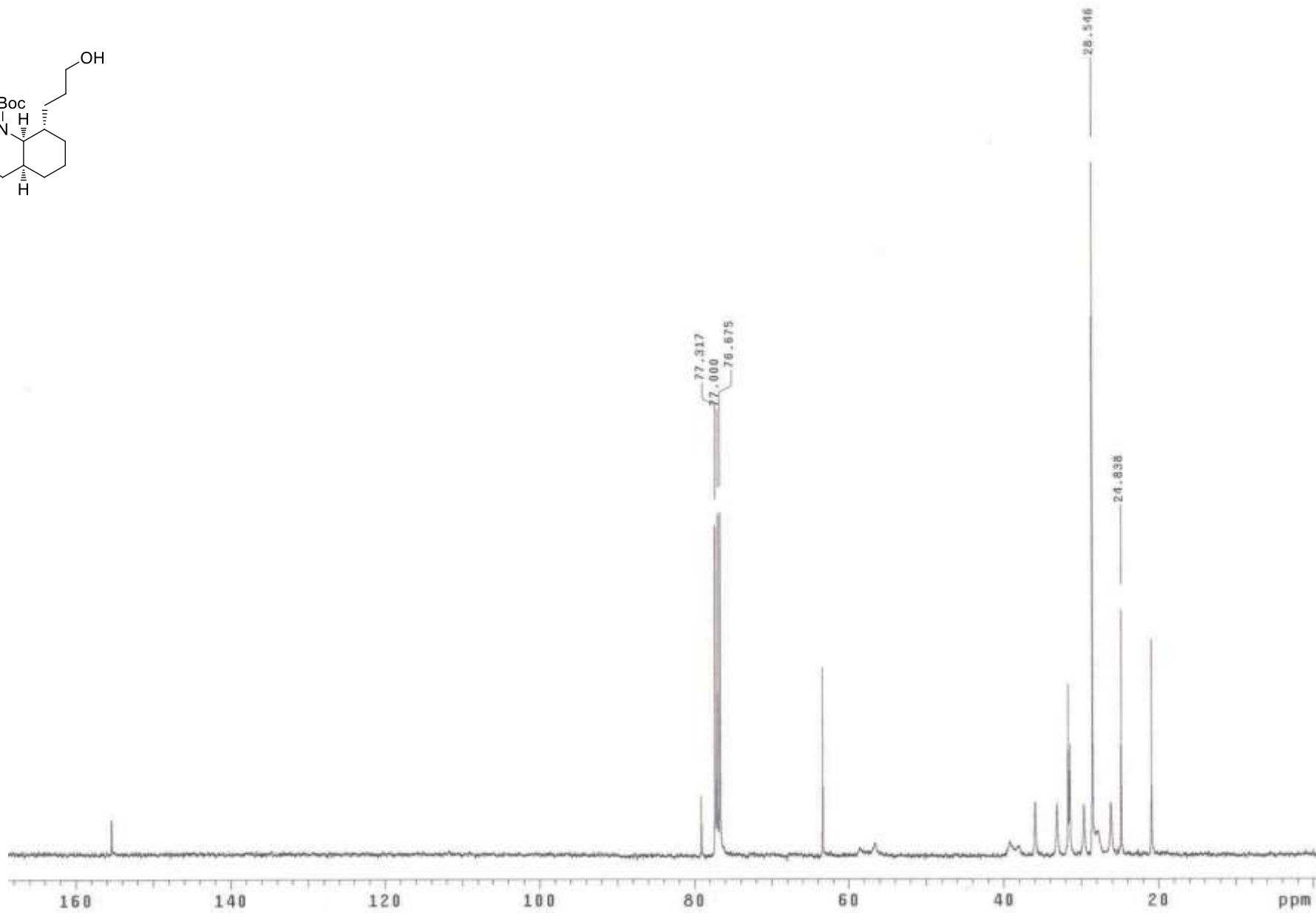
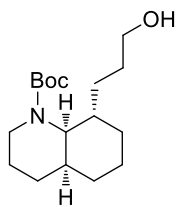
(4*R*,6*R*,8*R*,8*aR*)-8-(Hydroxypropyl)-6-phenyldecahydroquinoline (78)-<sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, -23 °C



**(4R,6R,8R,8aR)-8-(Hydroxypropyl)-6-phenyldecahydroquinoline (78)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, -23 °C**

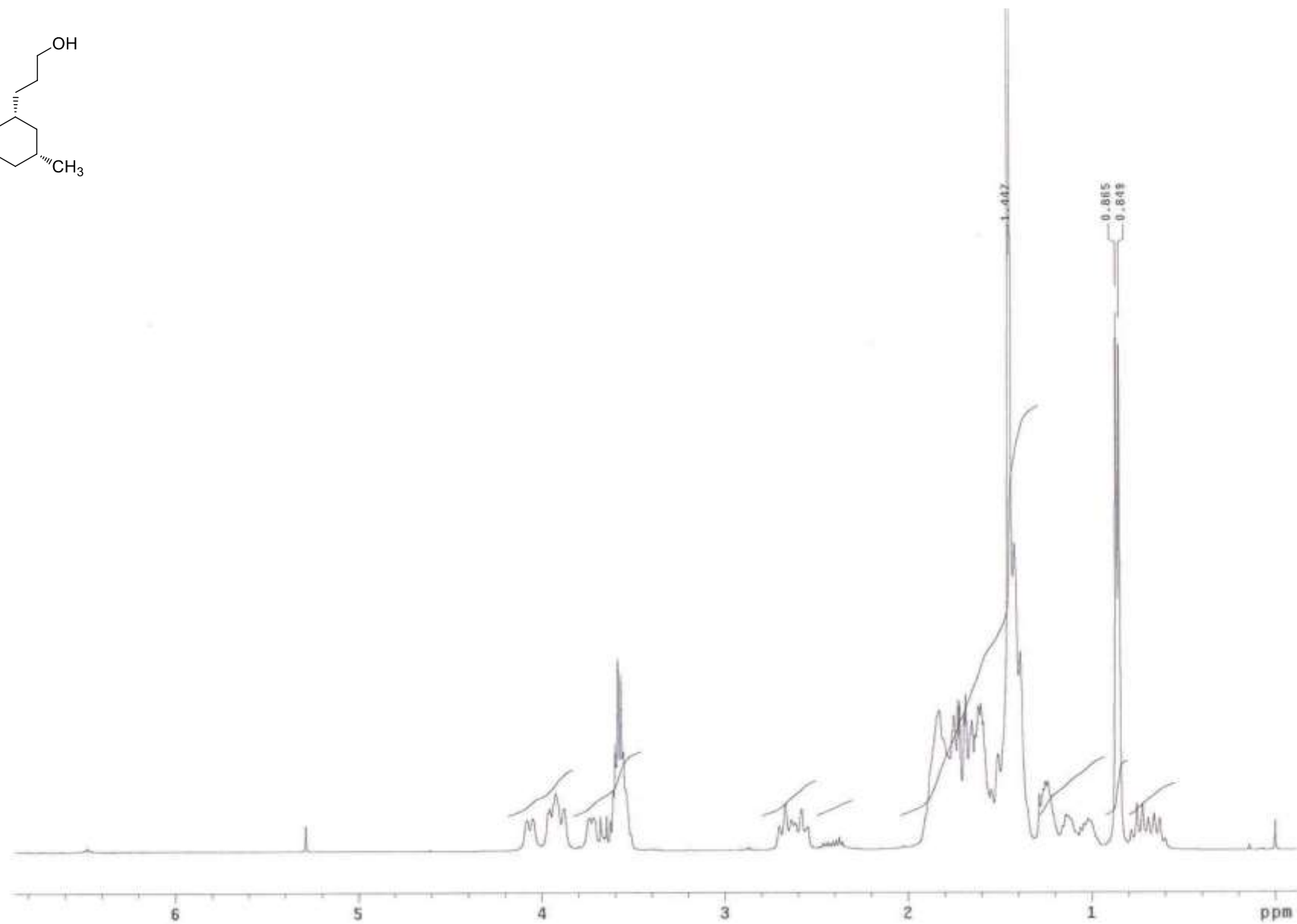
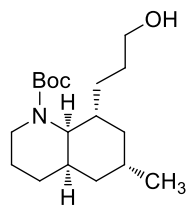


(4*S*,8*S*,8*aR*)-1-(*tert*-Butoxycarbonyl)-8-(3-hydroxypropyl)decahydroquinoline (79)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$  400 MHz, 25 °C

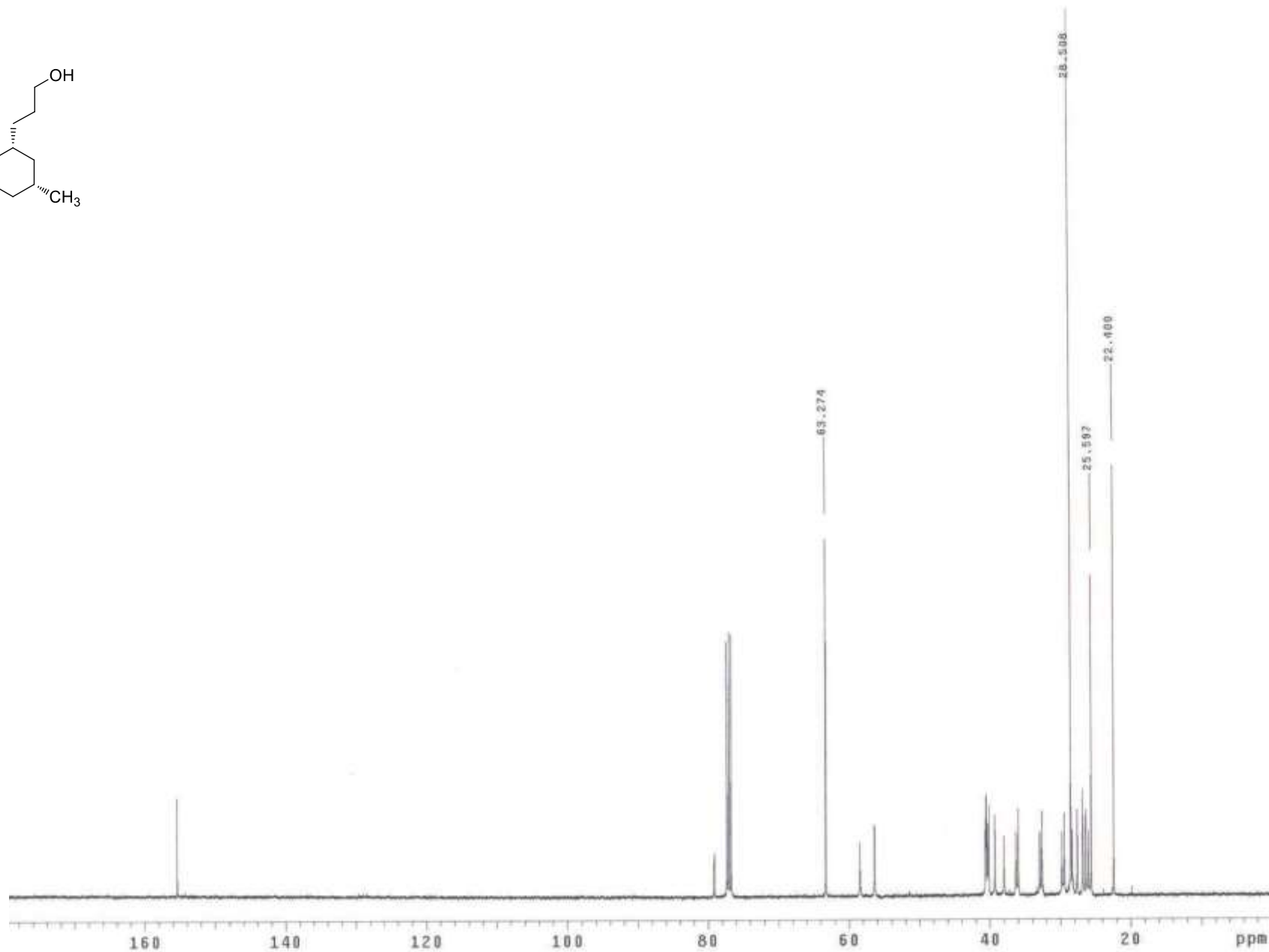
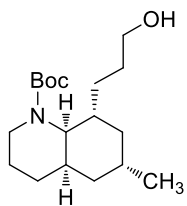


(4*S*,8*S*,8*aR*)-1-(*tert*-Butoxycarbonyl)-8-(3-hydroxypropyl)decahydroquinoline (79)- <sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 52 °C

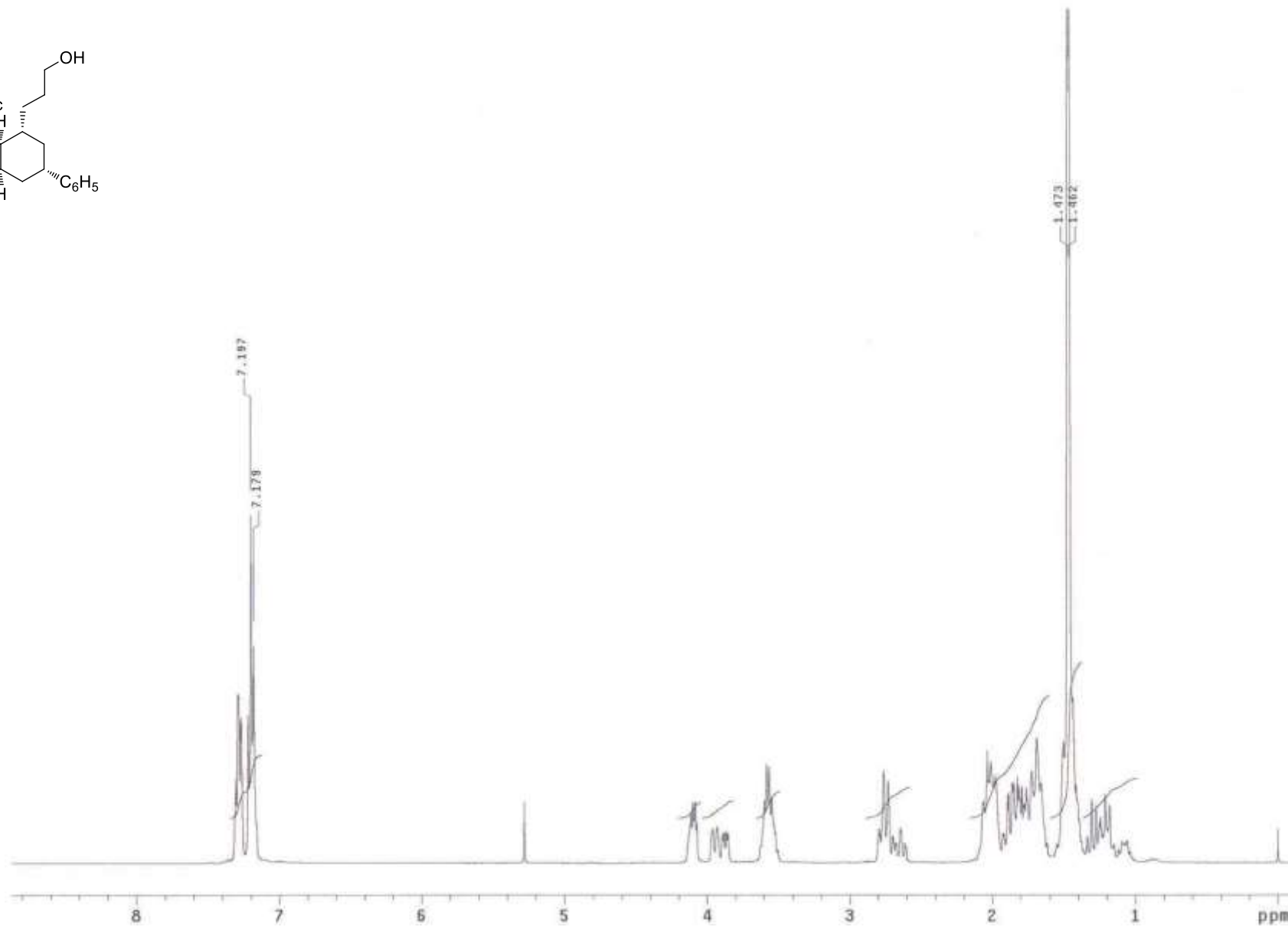
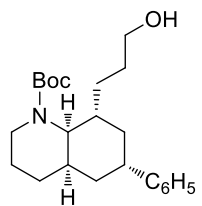




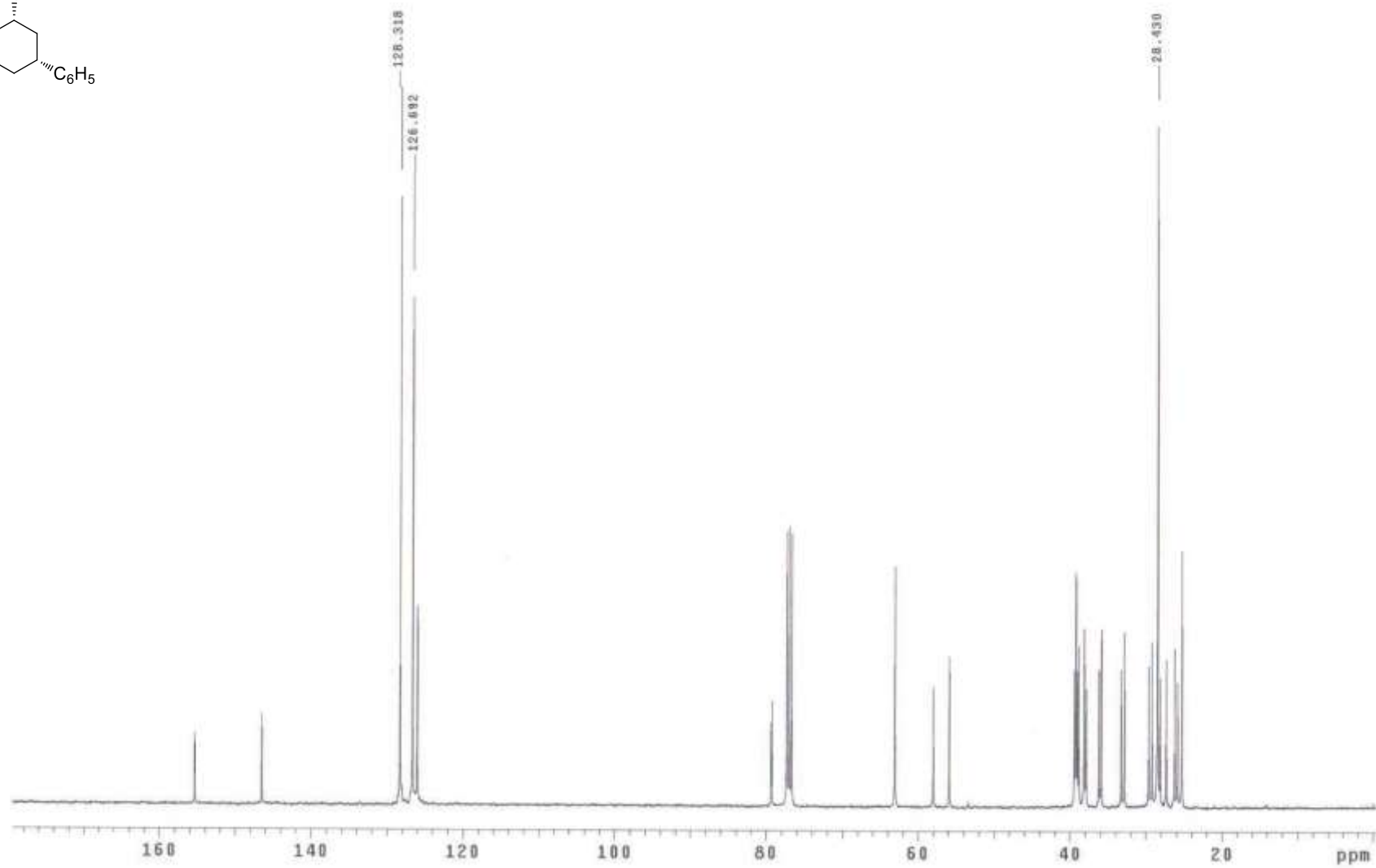
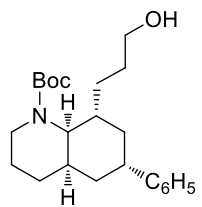
(4*R*,6*R*,8*R*,8*aR*)-1-(*tert*-Butoxycarbonyl)-8-(3-hydroxypropyl)-6-methyldecahydroquinoline (80)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 400 MHz, 50 °C



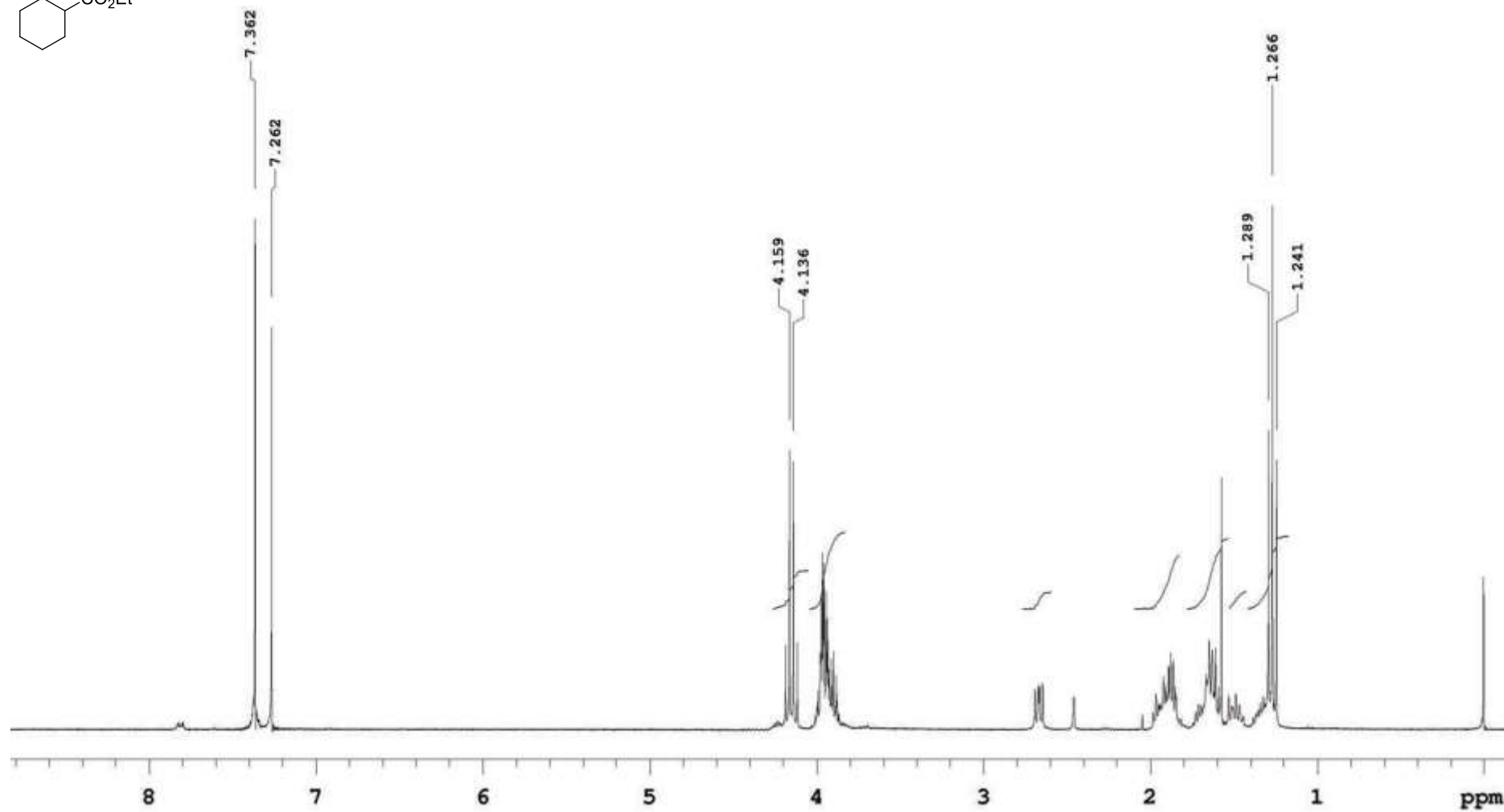
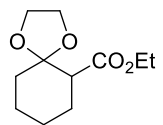
(4aR,6R,8R,8aR)-1-(tert-Butoxycarbonyl)-8-(3-hydroxypropyl)-6-methyldecahydroquinoline (80)-<sup>13</sup>C, CDCl<sub>3</sub>, 100.6 MHz, 50 °C



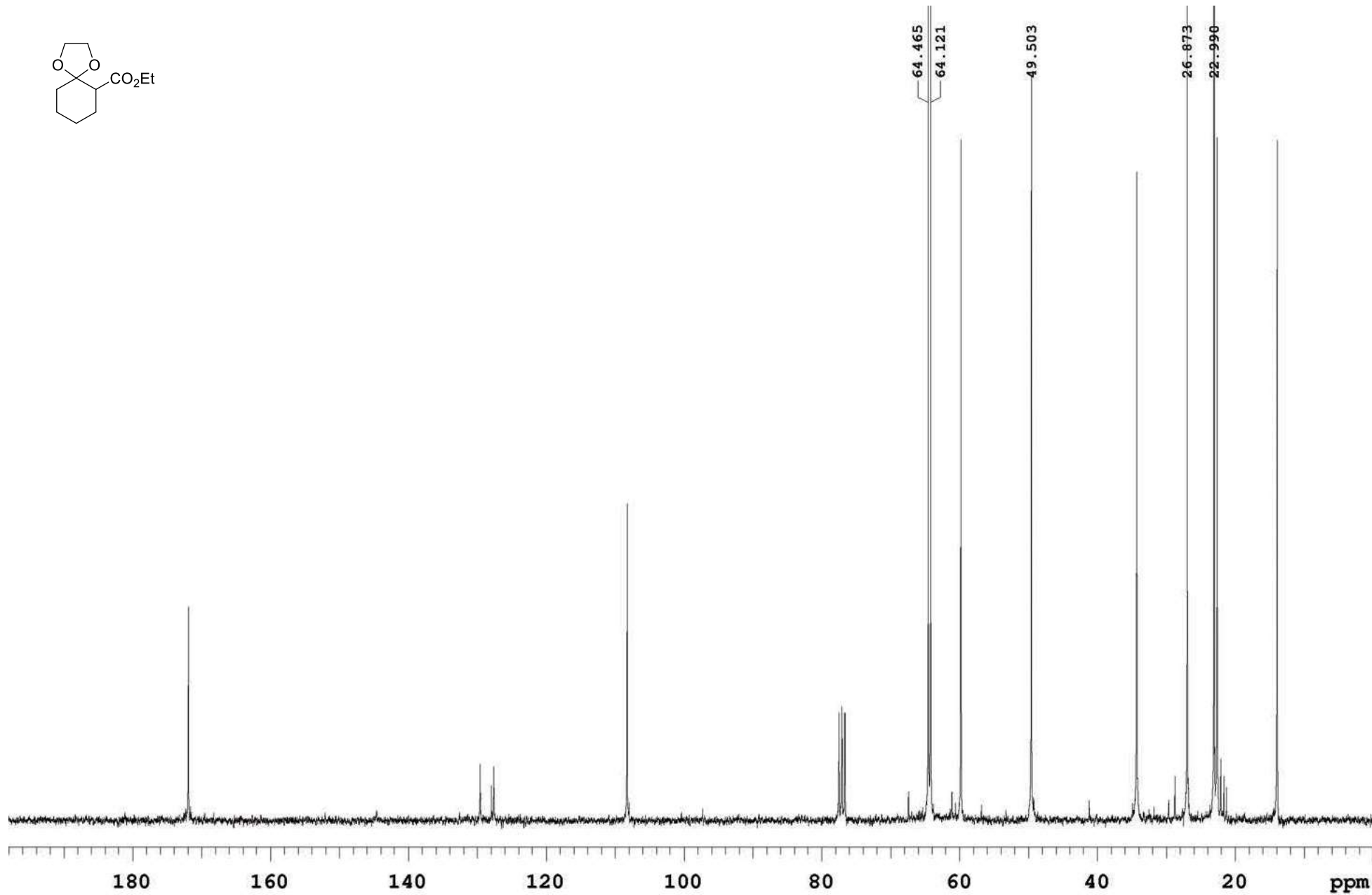
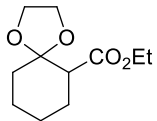
(4*aR*,6*R*,8*R*,8*aR*)-1-(*tert*-Butoxycarbonyl)-8-(3-hydroxypropyl)-6-phenyldecahydroquinoline (81)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



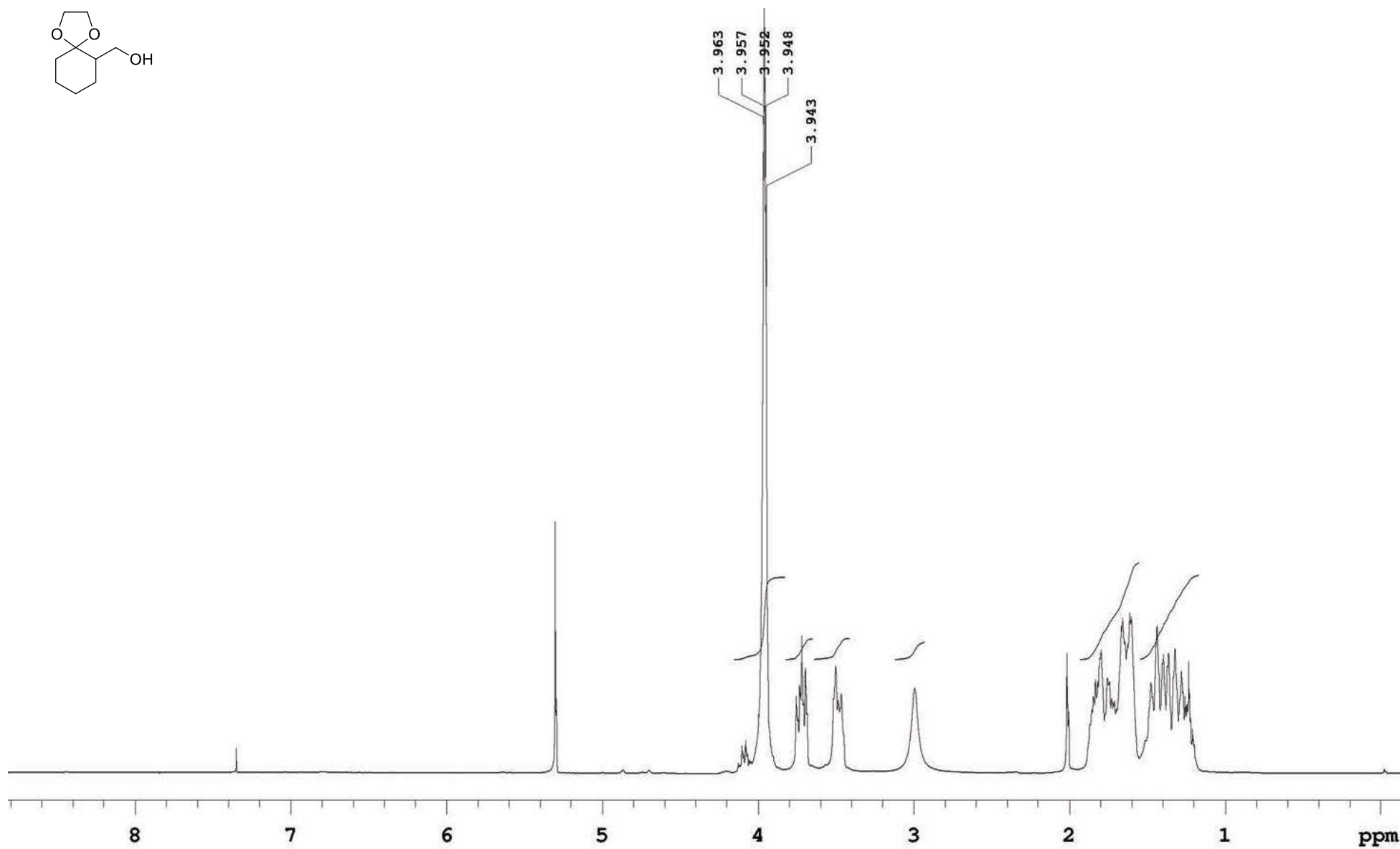
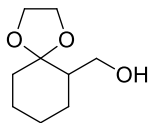
(4aR,6R,8R,8aR)-1-(tert-Butoxycarbonyl)-8-(3-hydroxypropyl)-6-phenyldecahydroquinoline (81)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



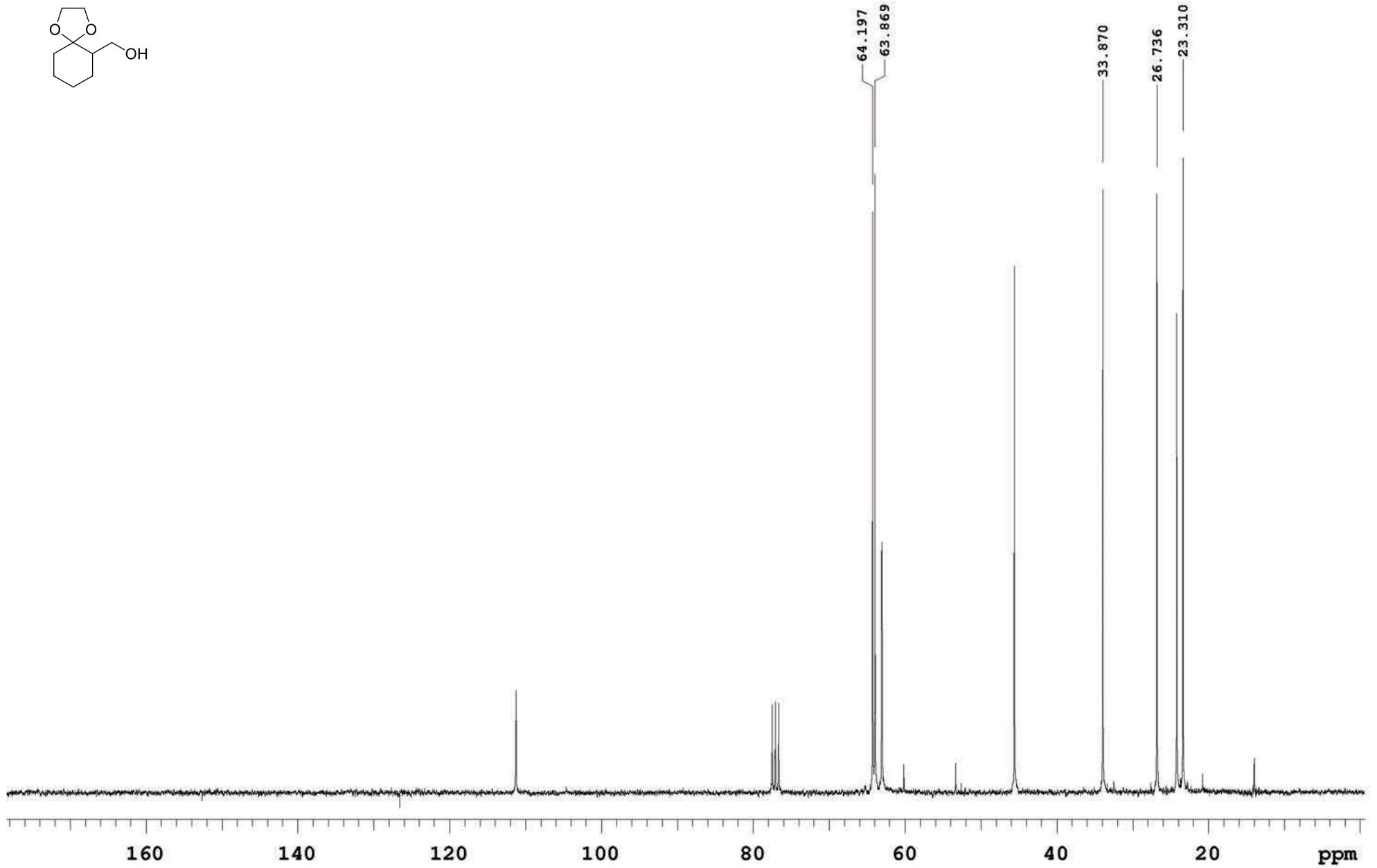
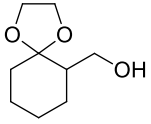
2-Ethoxycarbonylcyclohexanone ethylene acetal (84)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 300 MHz, 25 °C



2-Ethoxycarbonylcyclohexanone ethylene acetal (84)- $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 75.4 MHz, 25 °C

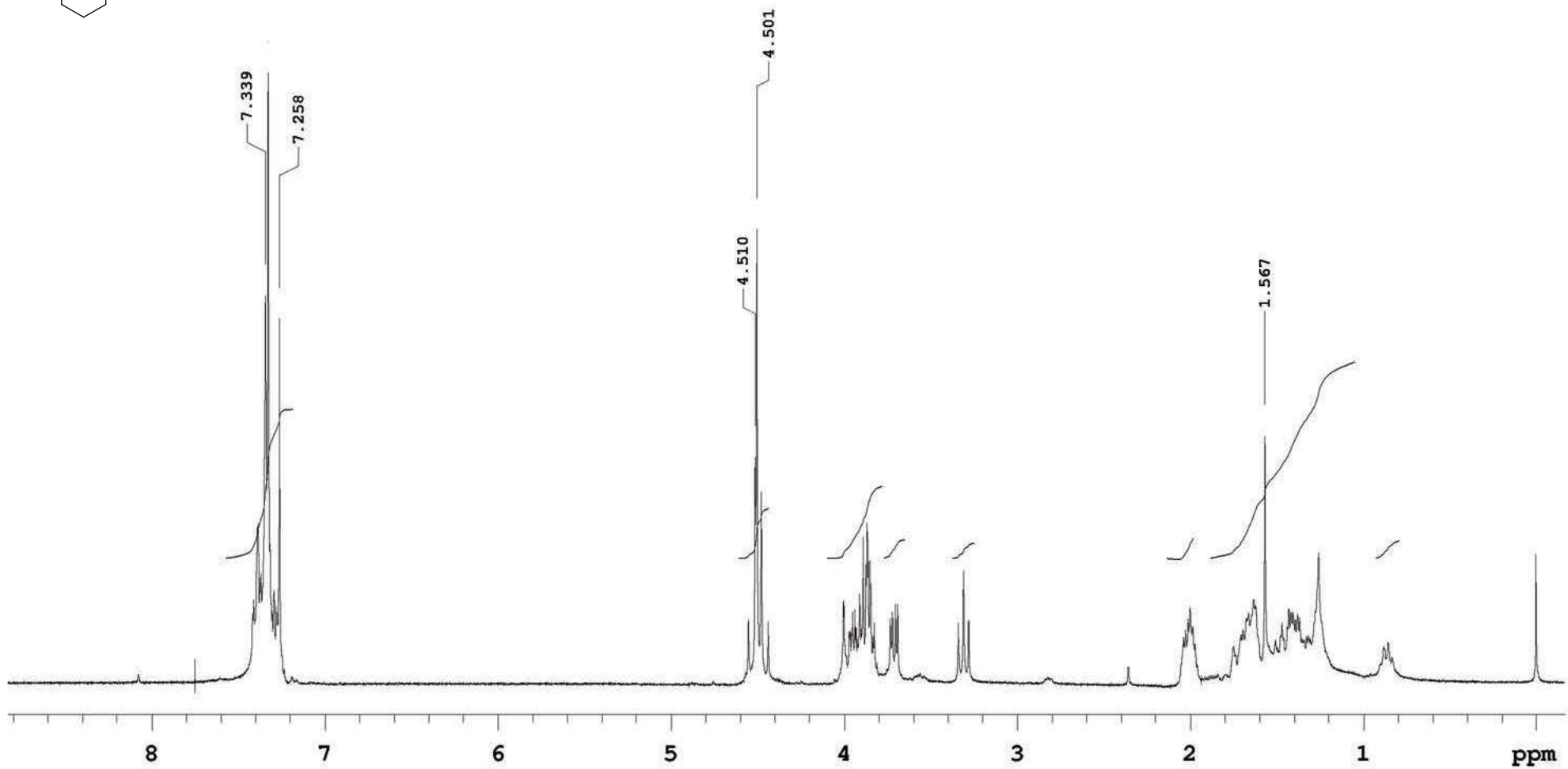
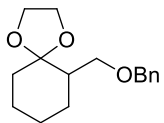


2-Hydroxymethylcyclohexanonethylene acetal (85)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 300 MHz, 25 °C

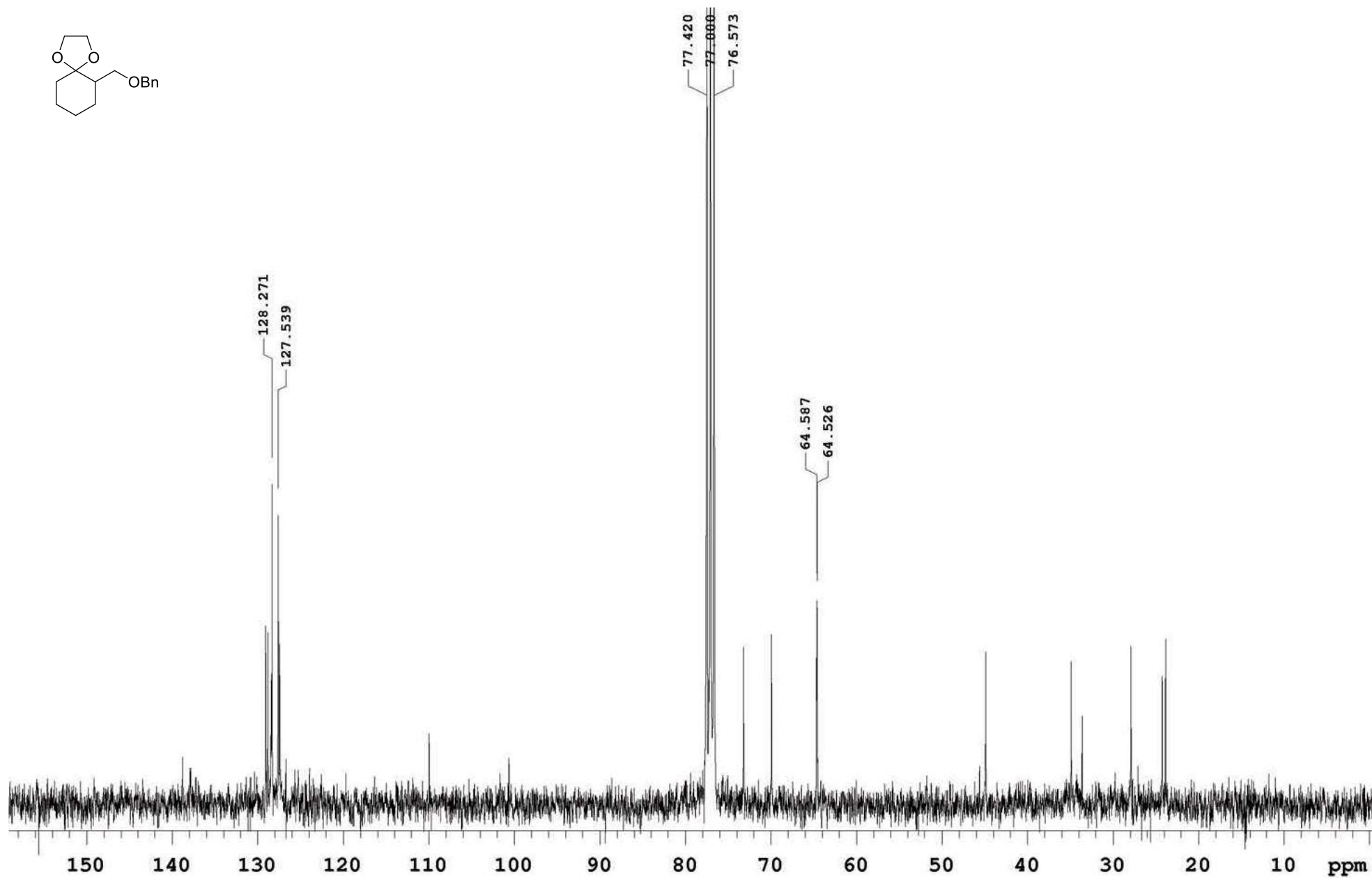
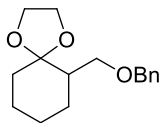


2-Hydroxymethylcyclohexanonethylene acetal (85)- $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 75.4 MHz, 25 °C

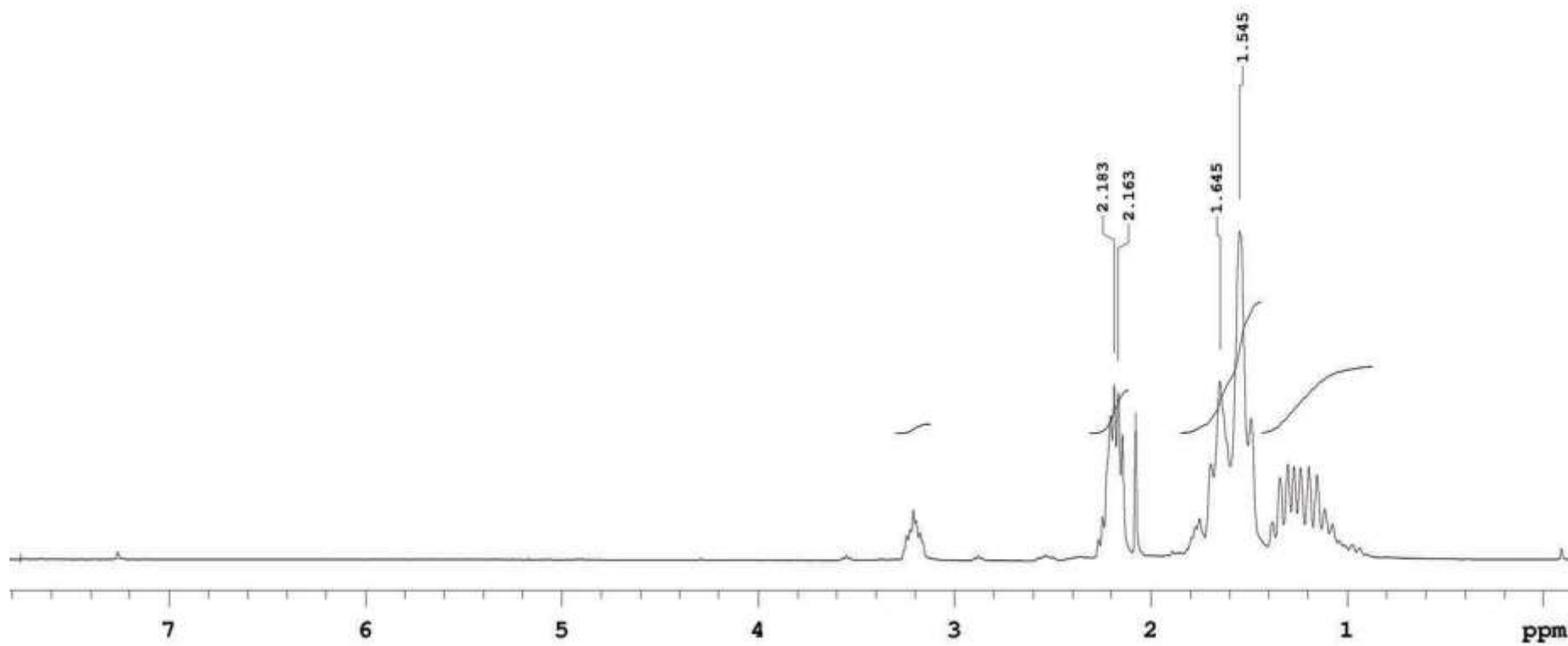
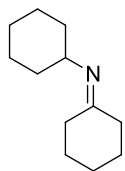




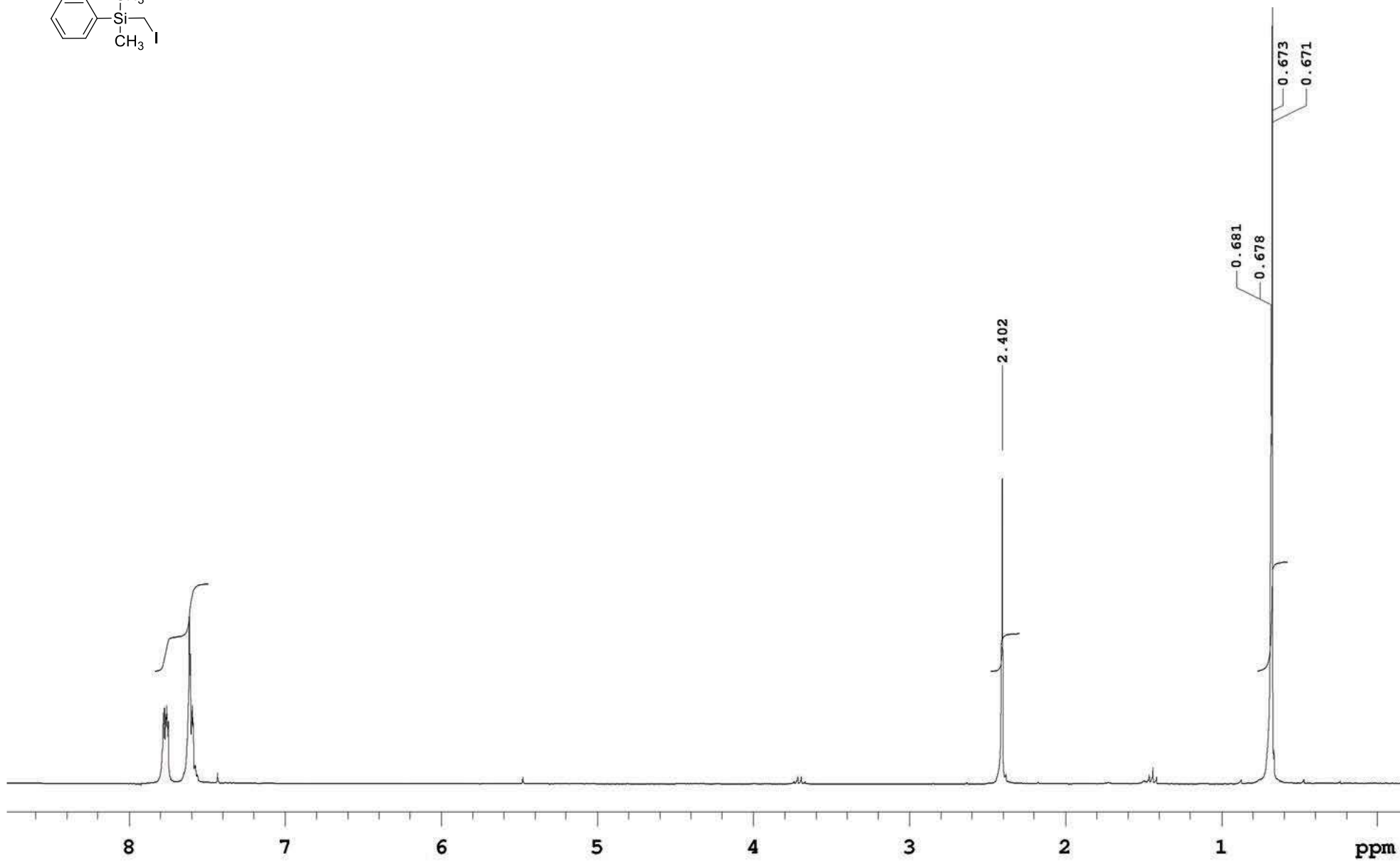
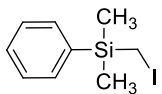
2-[(Benzyloxy)methyl]cyclohexanone ethylene acetal (86)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 300 MHz, 25 °C



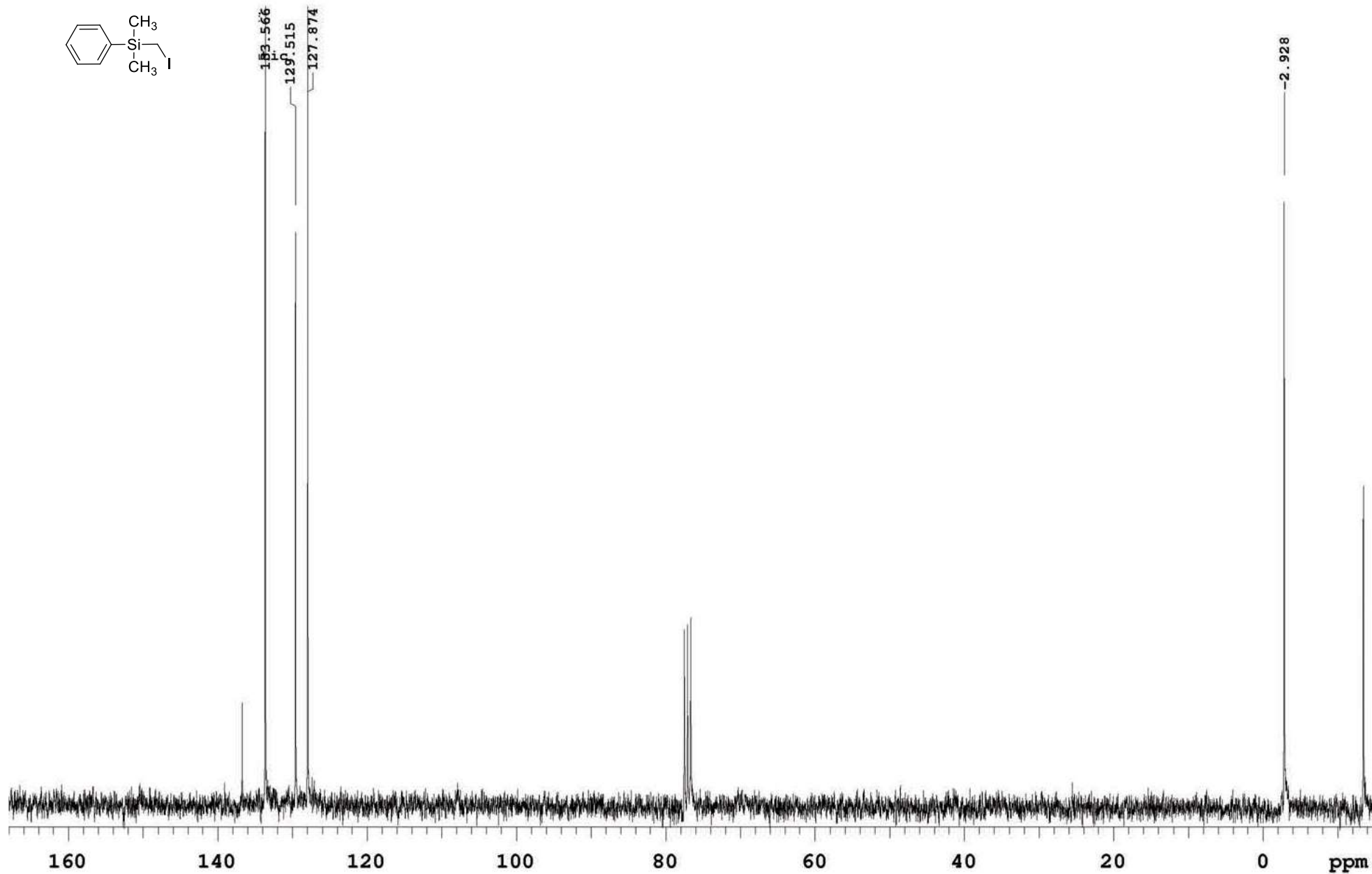
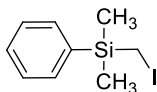
2-[(Benzyloxy)methyl]cyclohexanone ethylene acetal (86)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 75.4 MHz, 25 °C



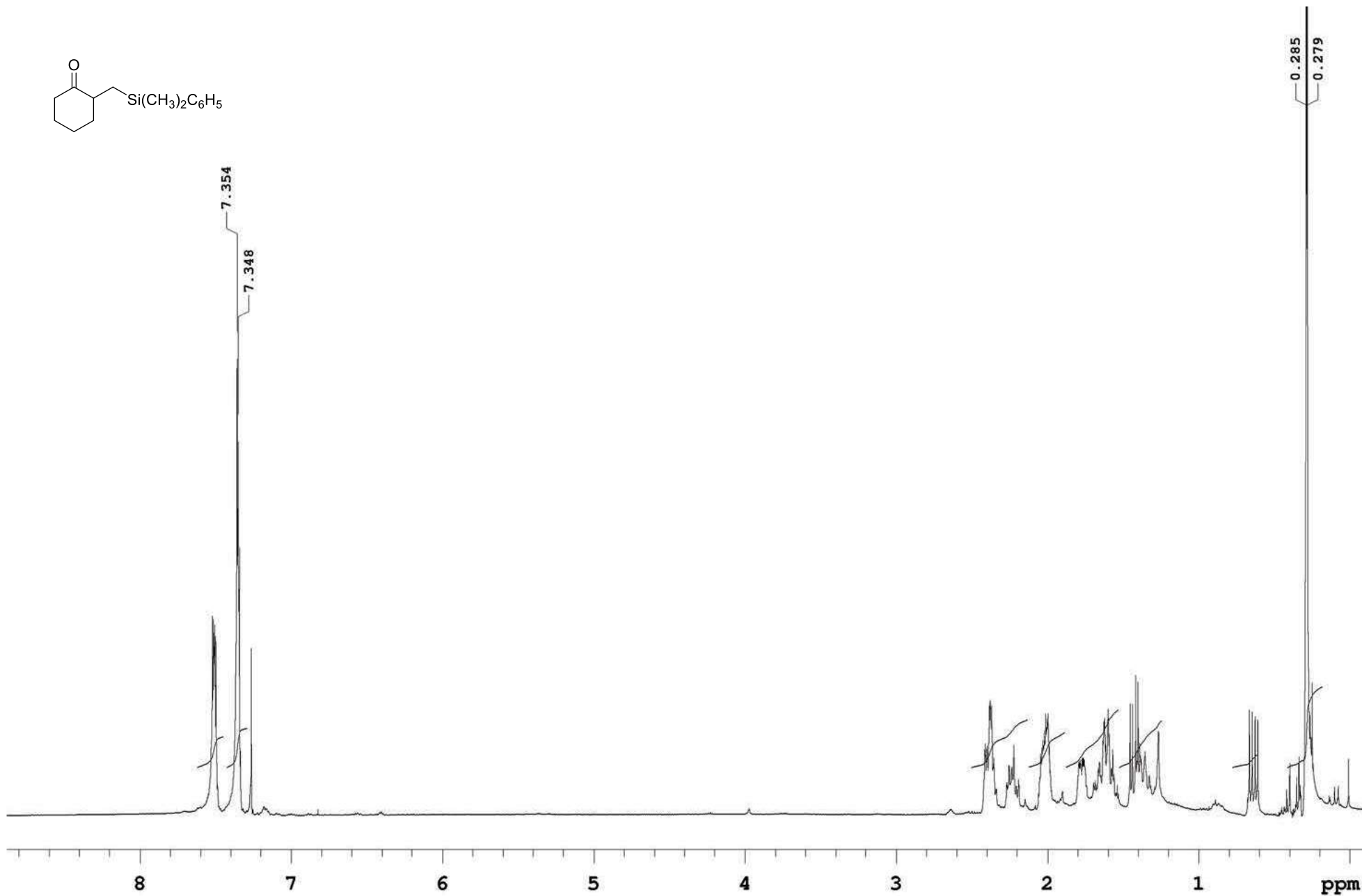
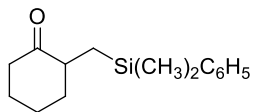
*N*-Cyclohexylidenecyclohexylamine (88)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 300 MHz, 25 °C



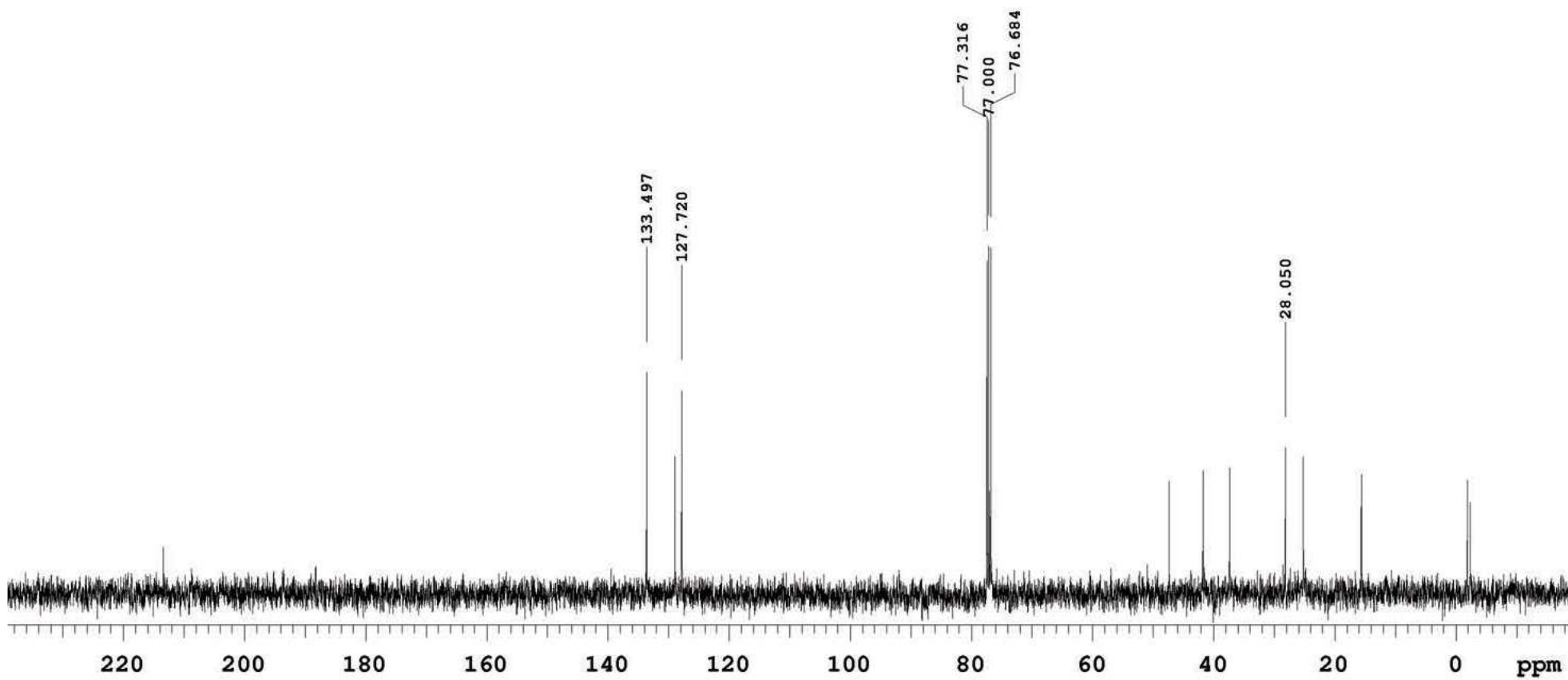
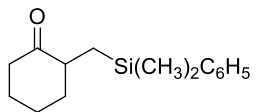
(iodomethyl)dimethylphenylsilane-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 300 MHz, 25 °C



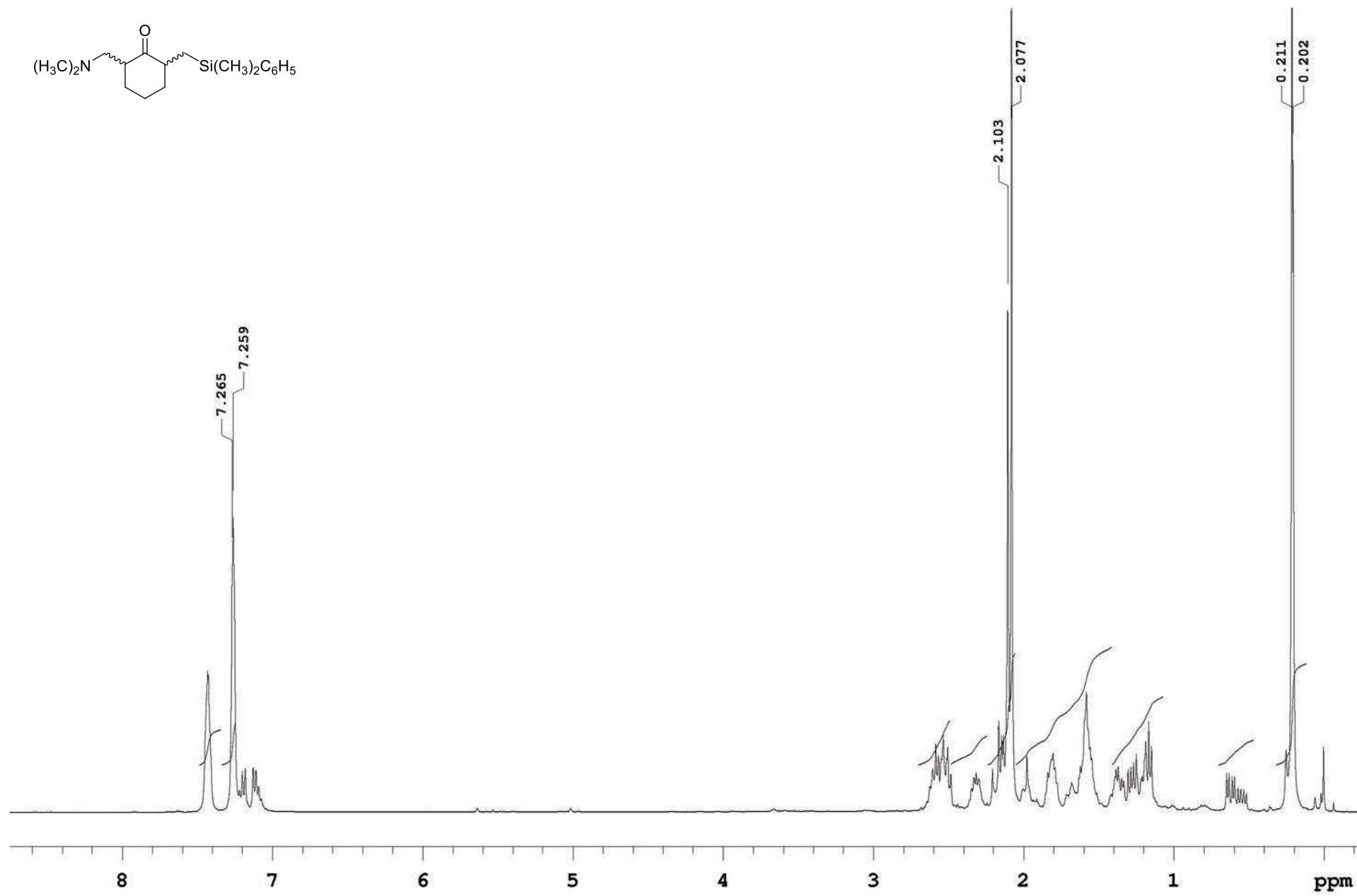
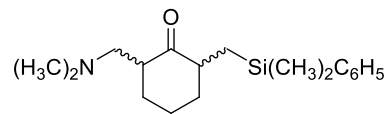
(Iodomethyl)dimethylphenylsilane- $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 75.4 MHz, 25 °C



2-(Dimethylphenylsilylmethyl)cyclohexanone (89)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 400 MHz, 25 °C

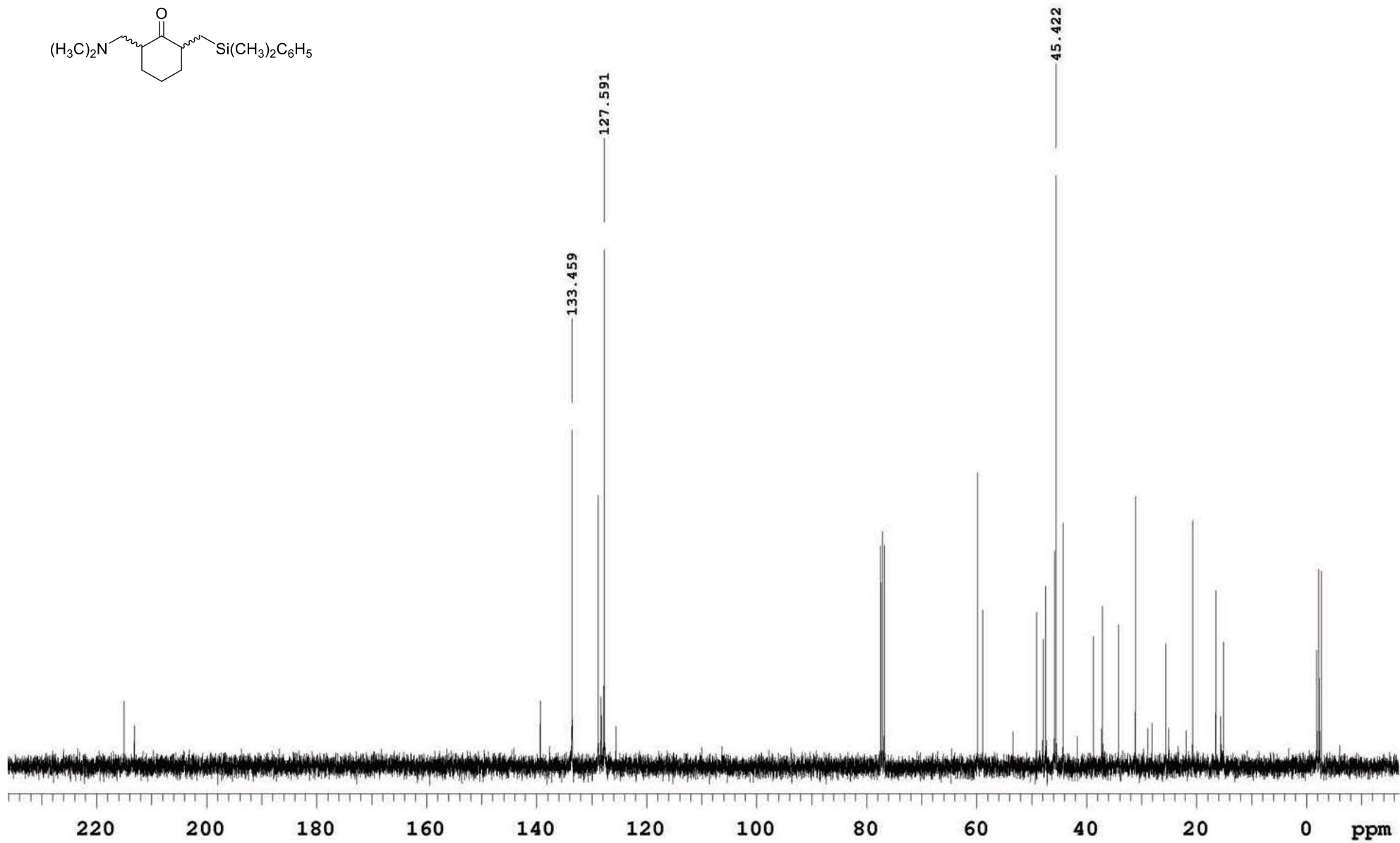
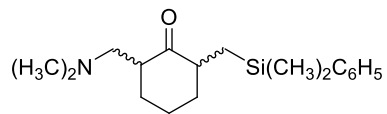


2-(Dimethylphenylsilylmethyl)cyclohexanone (89)- $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 100.6 MHz, 25 °C

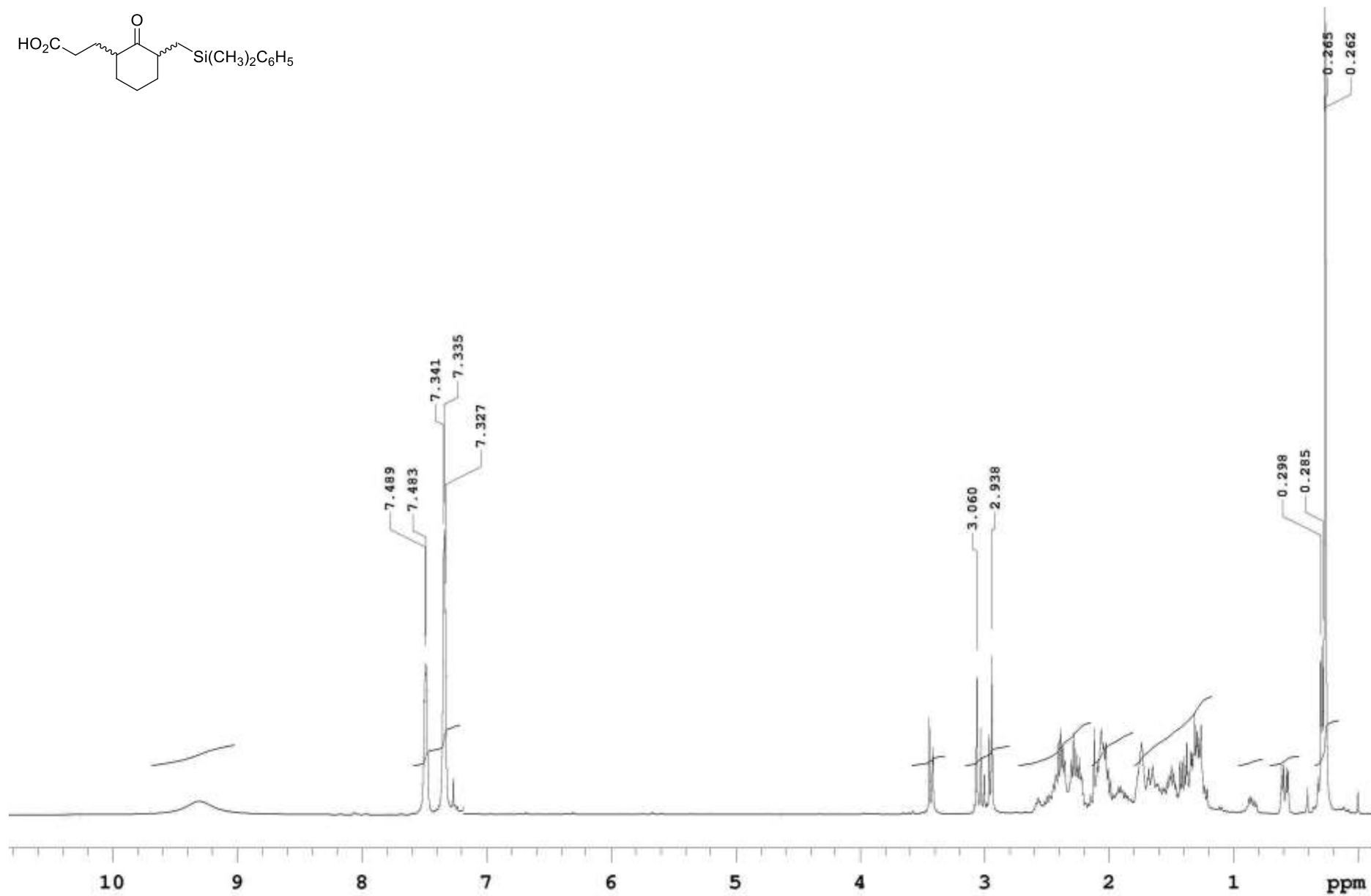
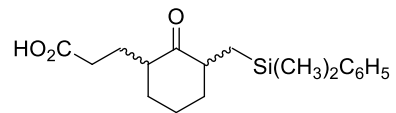


(90)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 400 MHz, 25 °C

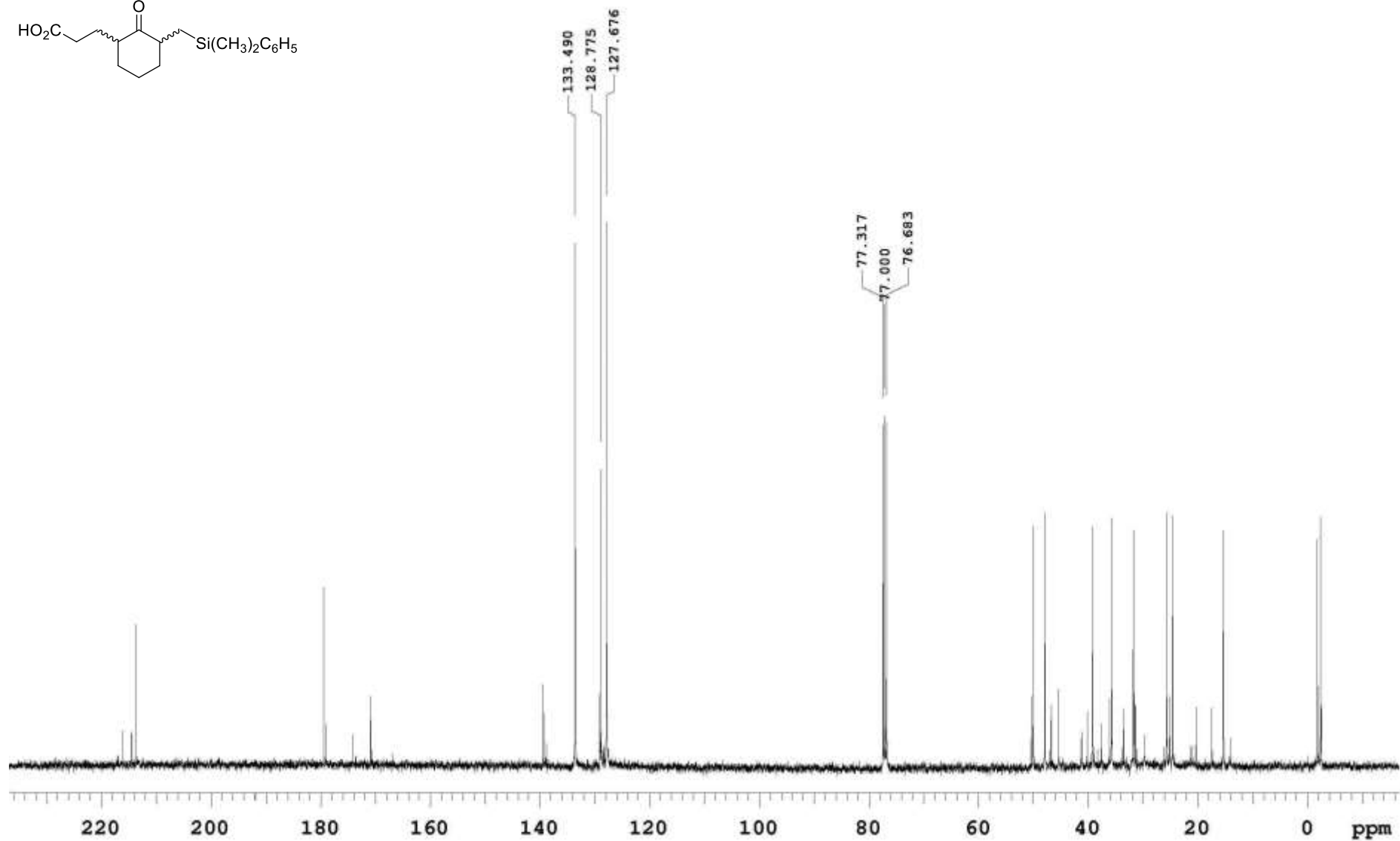
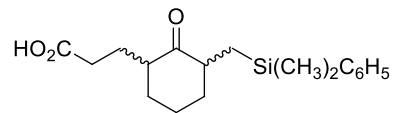




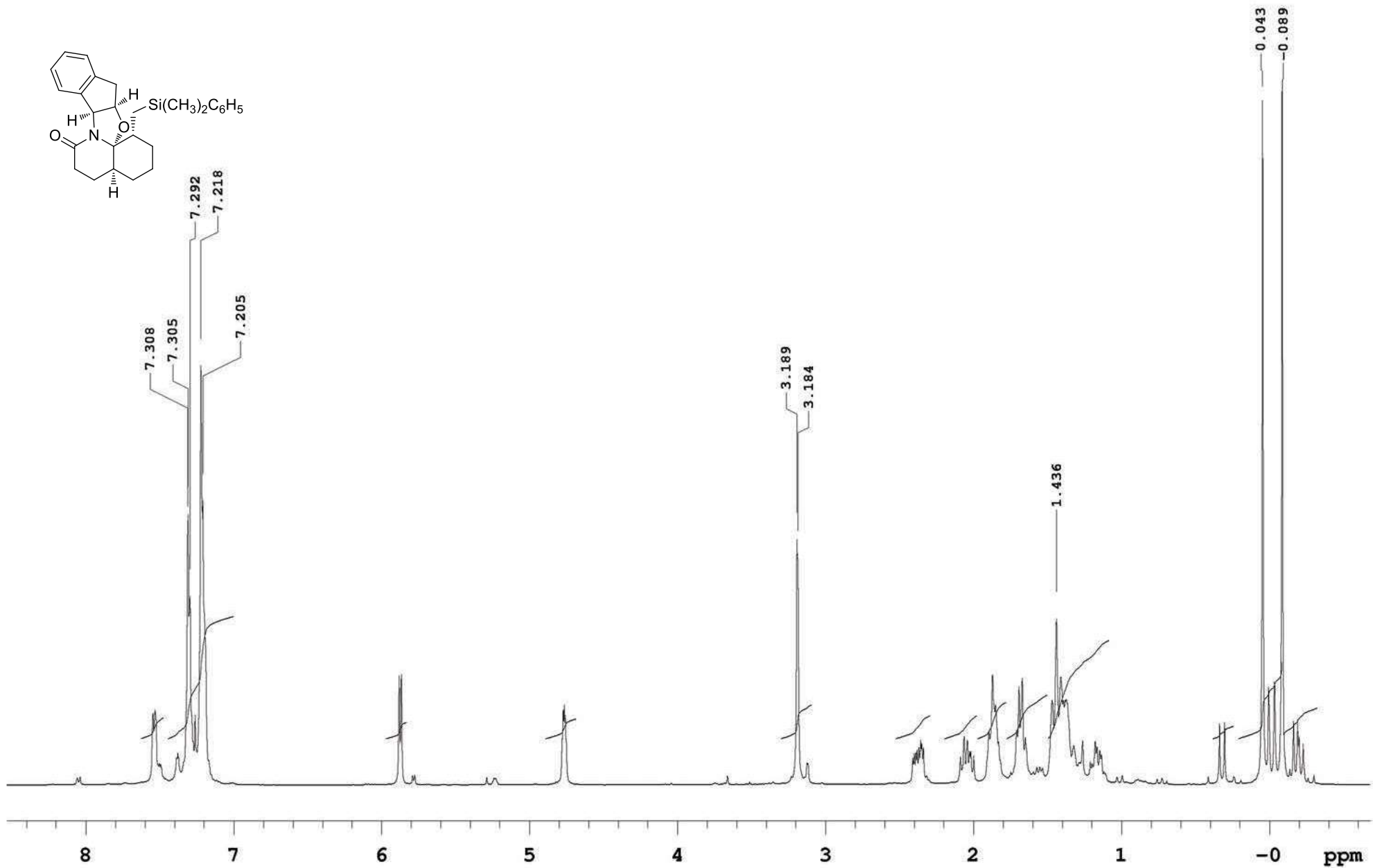
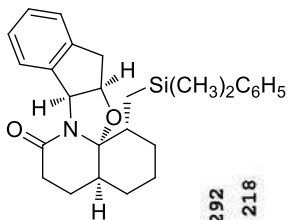
(90)-  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 100.6 MHz, 25 °C



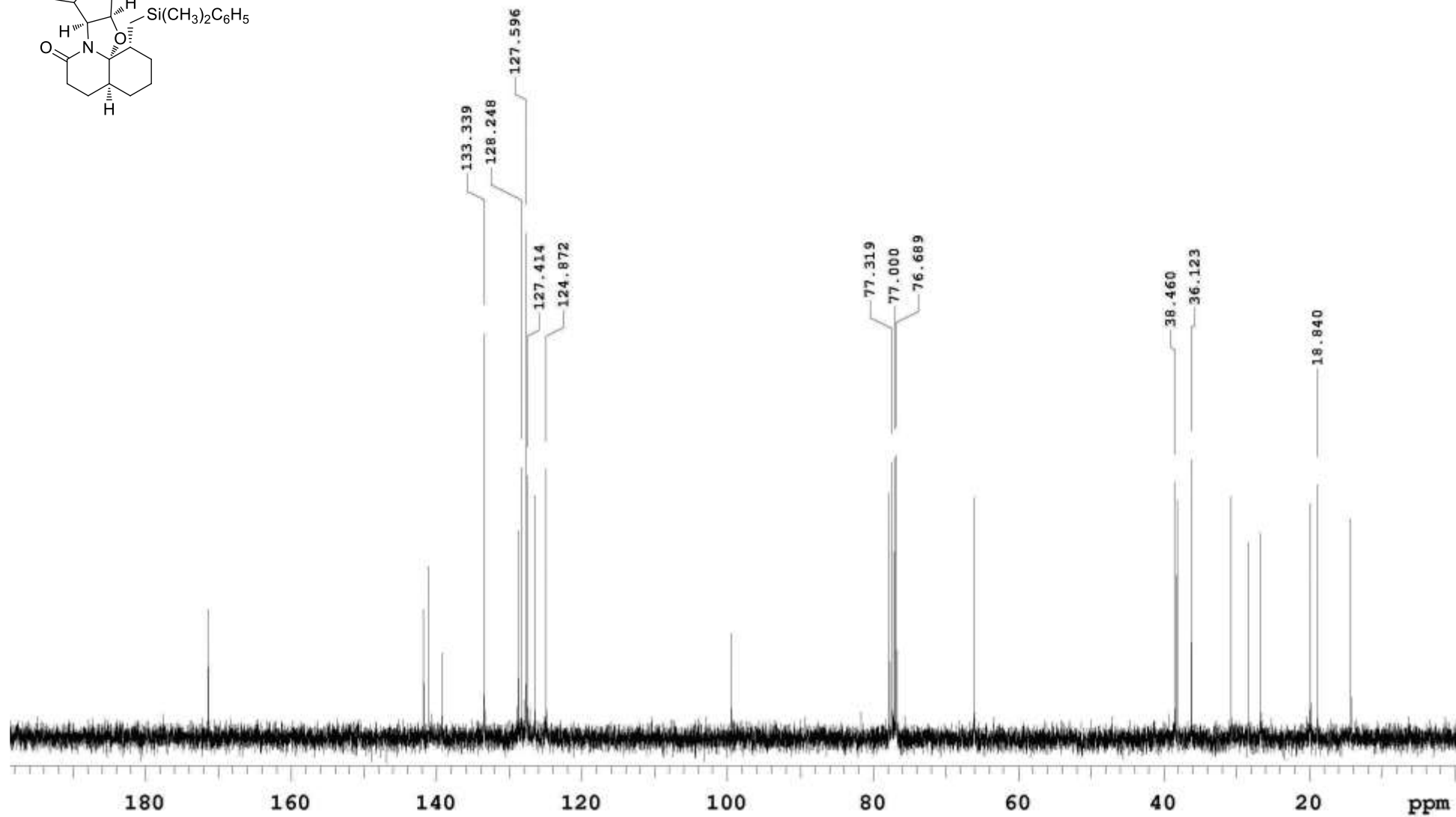
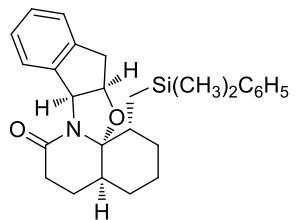
[3-(2-Dimethylphenylsilylmethyl)-2-oxocyclohexyl]propionic acid (91)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



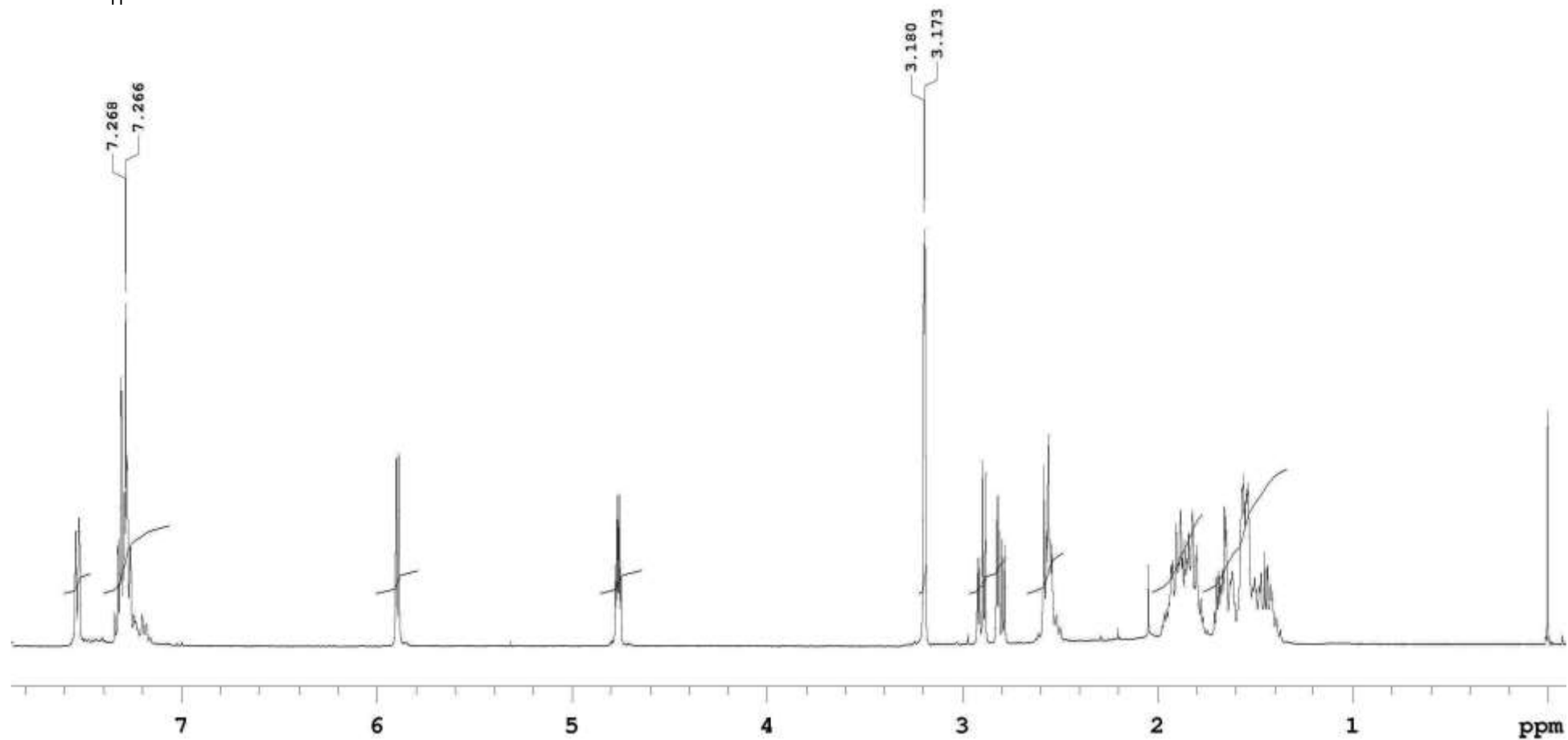
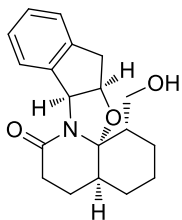
[3-(2-Dimethylphenylsilylmethyl)-2-oxocyclohexyl]propionic acid (91)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



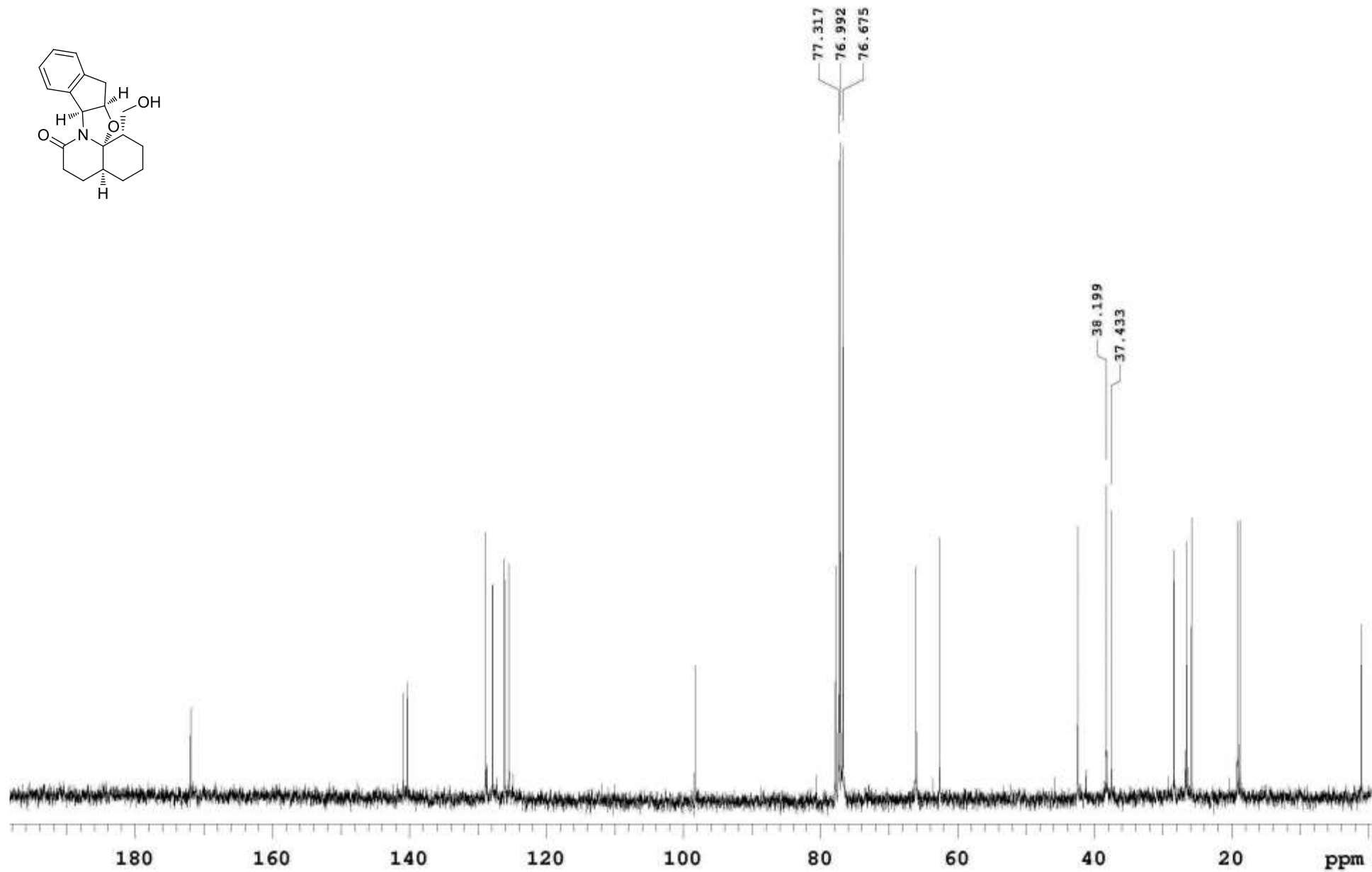
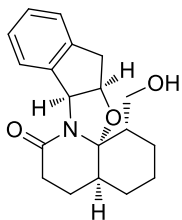
(1*R*,4*aS*,8*aS*,13*aR*,14*aR*)-1-[(Dimethylphenylsilyl)methyl]-7-oxo-3-phenyl-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydroindenol[1',2':4,5]oxazolo-[2,3-*j*]quinolone (93a)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



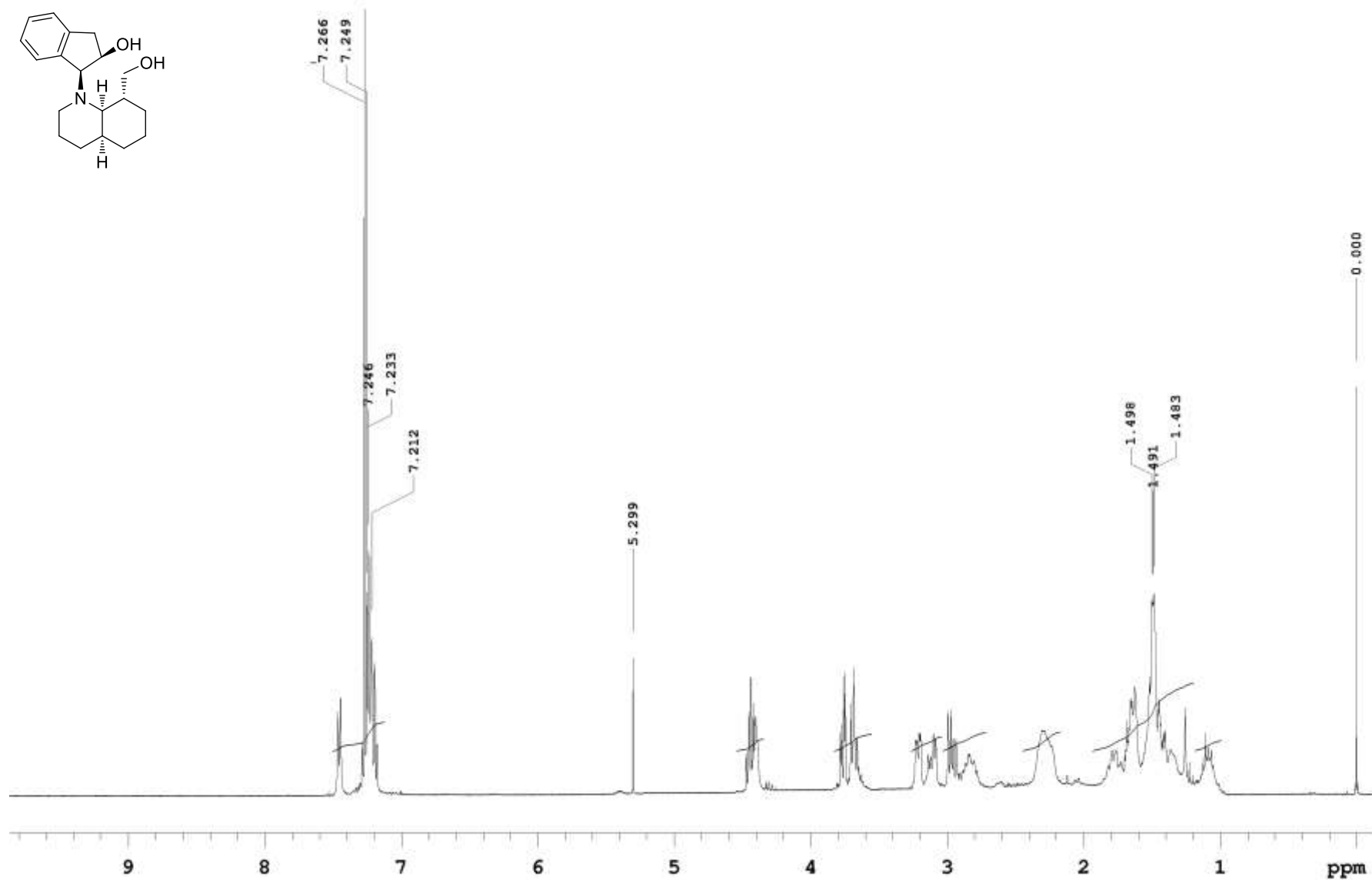
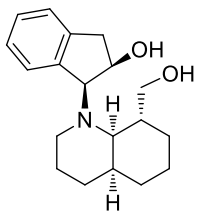
(1*R*,4*aS*,8*aS*,13*aR*,14*aR*)-1-[(Dimethylphenylsilyl)methyl]-7-oxo-3-phenyl-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydroindeno[1',2':4,5]oxazolo-[2,3-*j*]quinolone (93a)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C



(1*R*,4*aS*,8*aS*,13*aR*,14*aR*)-1-(Hydroxymethyl)-7-oxo-3-phenyl-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydroindenol[1',2':4,5]oxazolo-[2,3-*j*]quinolone (94)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C

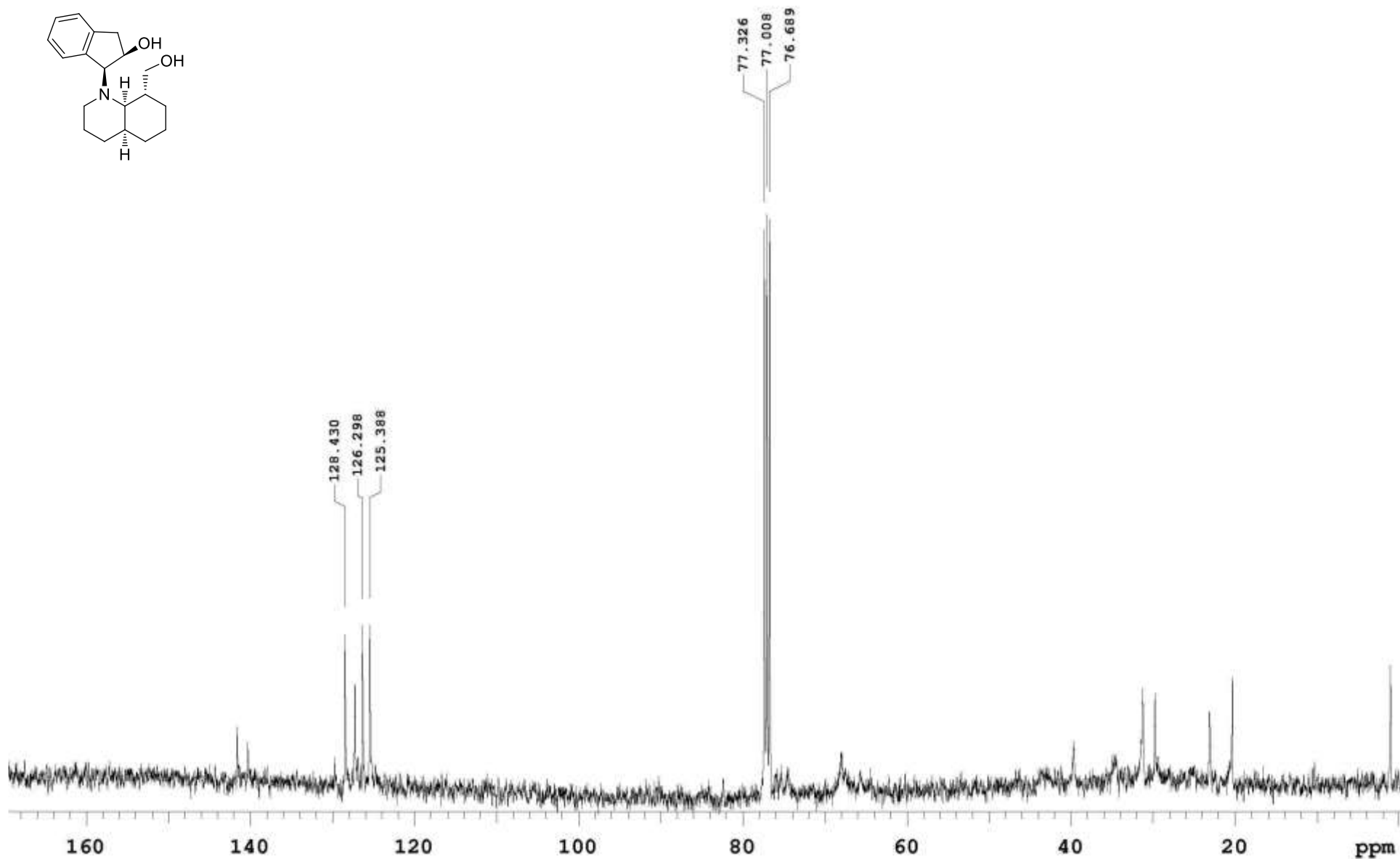
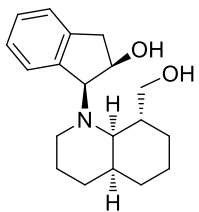


(1*R*,4*aS*,8*aS*,13*aR*,14*aR*)-1-(Hydroxymethyl)-7-oxo-3-phenyl-1,2,3,4,4*a*,5,6,7,8*a*,13,13*a*,14*a*-dodecahydroindenol[1',2':4,5]oxazolo-[2,3-*j*]quinolone (94)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C

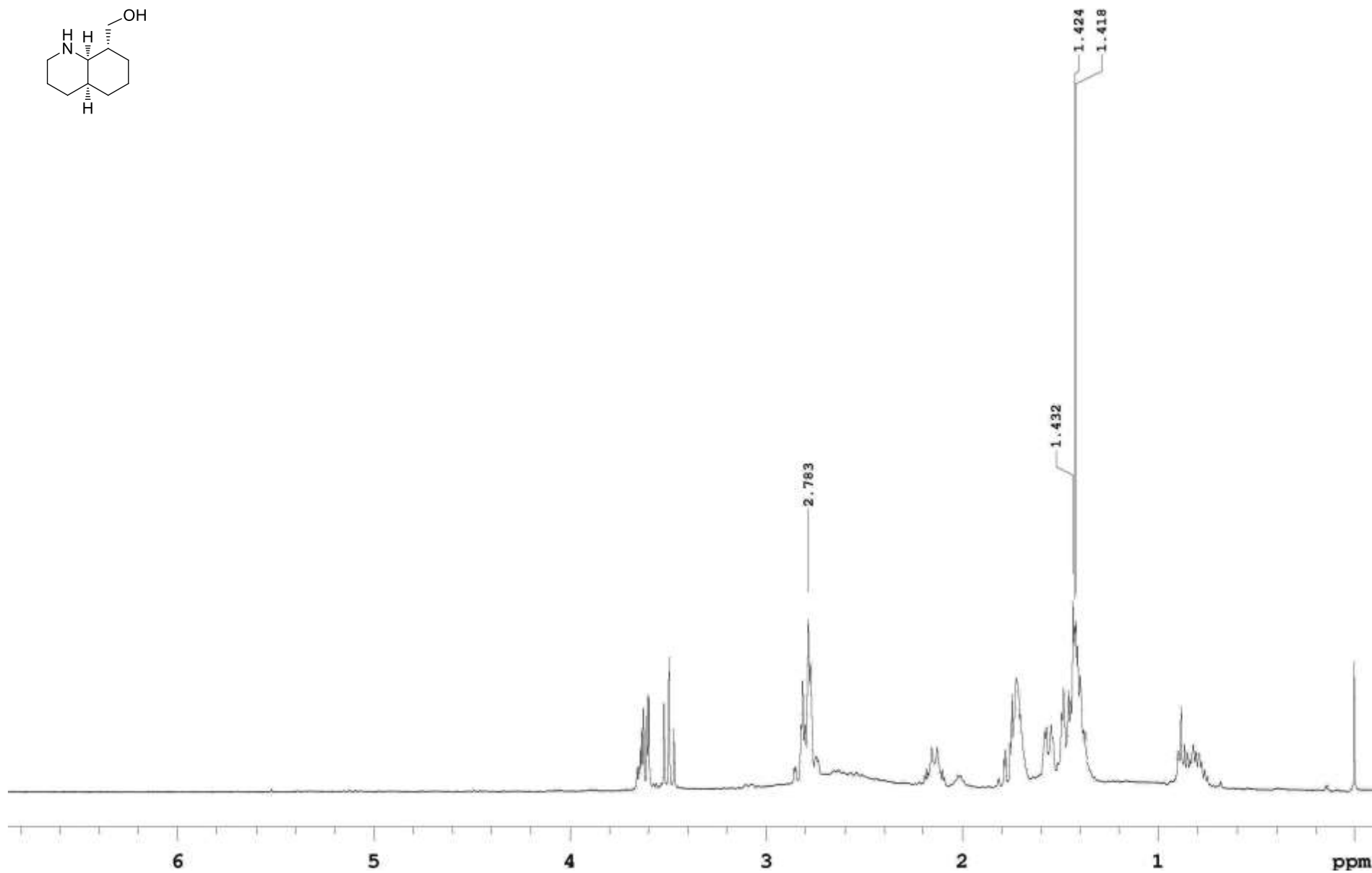
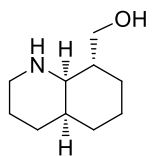


(4a*S*,8*R*,8a*S*)-1-[(1*S*,2*R*)-2-Hydroxy-1-indanyl]-8-(hydroxymethyl)decahydroquinoline (95)-  $^1\text{H-NMR}$ ,  $\text{CDCl}_3$ , 400 MHz, 25 °C

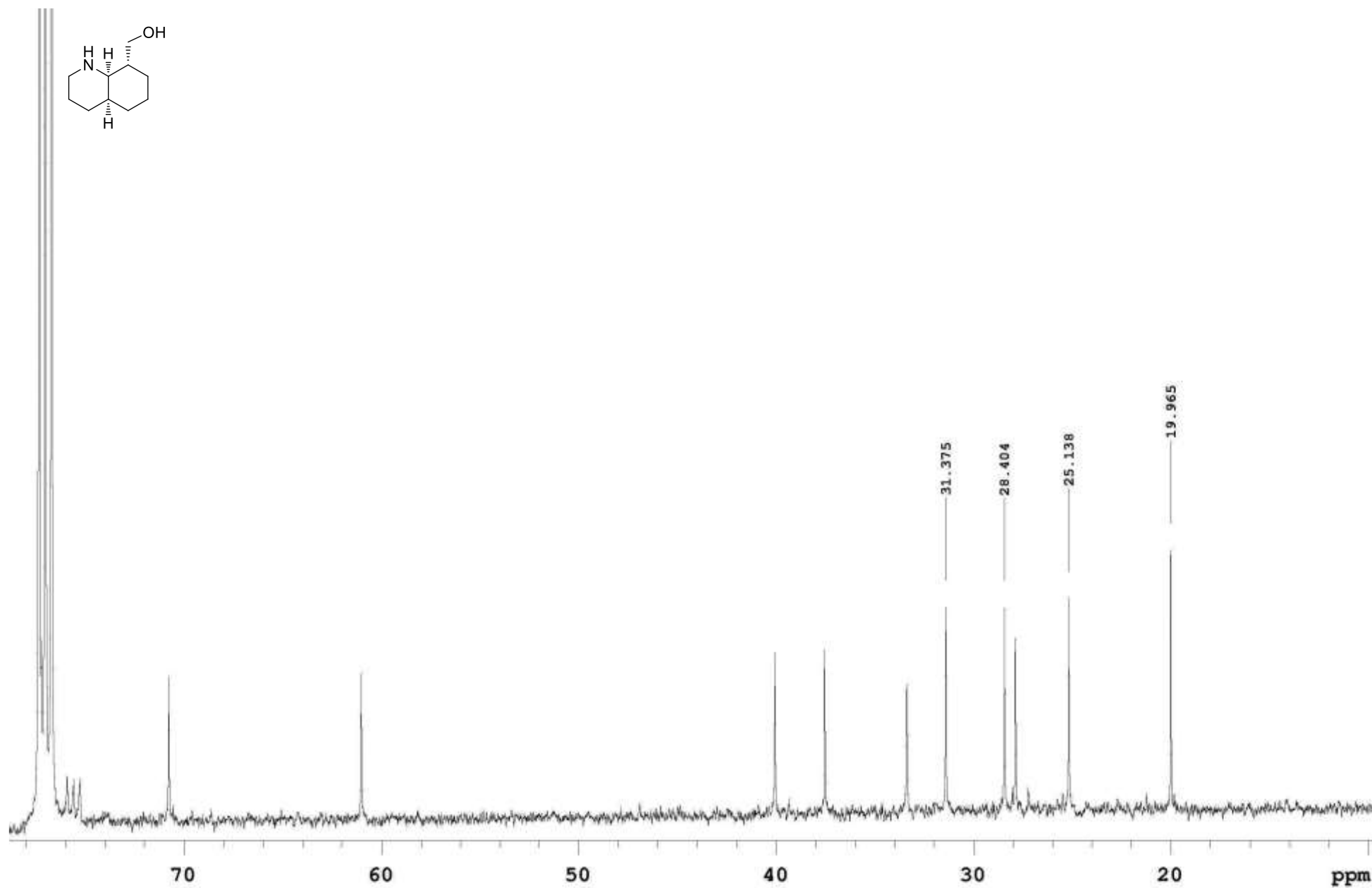
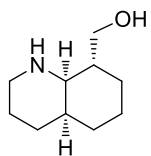




(4a*S*,8*R*,8a*S*)-1-[(1*S*,2*R*)-2-Hydroxy-1-indanyl]-8-(hydroxymethyl)decahydroquinoline (95)-  $^{13}\text{C}$ -NMR,  $\text{CDCl}_3$ , 100.6 MHz, 25 °C



(4a*S*,8*S*,8a*R*)-8-(Hydroxymethyl)decahydroquinoline (82)- <sup>1</sup>H-NMR, CDCl<sub>3</sub>, 400 MHz, 25 °C



(4a*S*,8*S*,8a*R*)-8-(Hydroxymethyl)decahydroquinoline (82)-<sup>13</sup>C-NMR, CDCl<sub>3</sub>, 100.6 MHz, 25 °C