

APPENDIX 1**Spectra Relevant to Chapter 3**

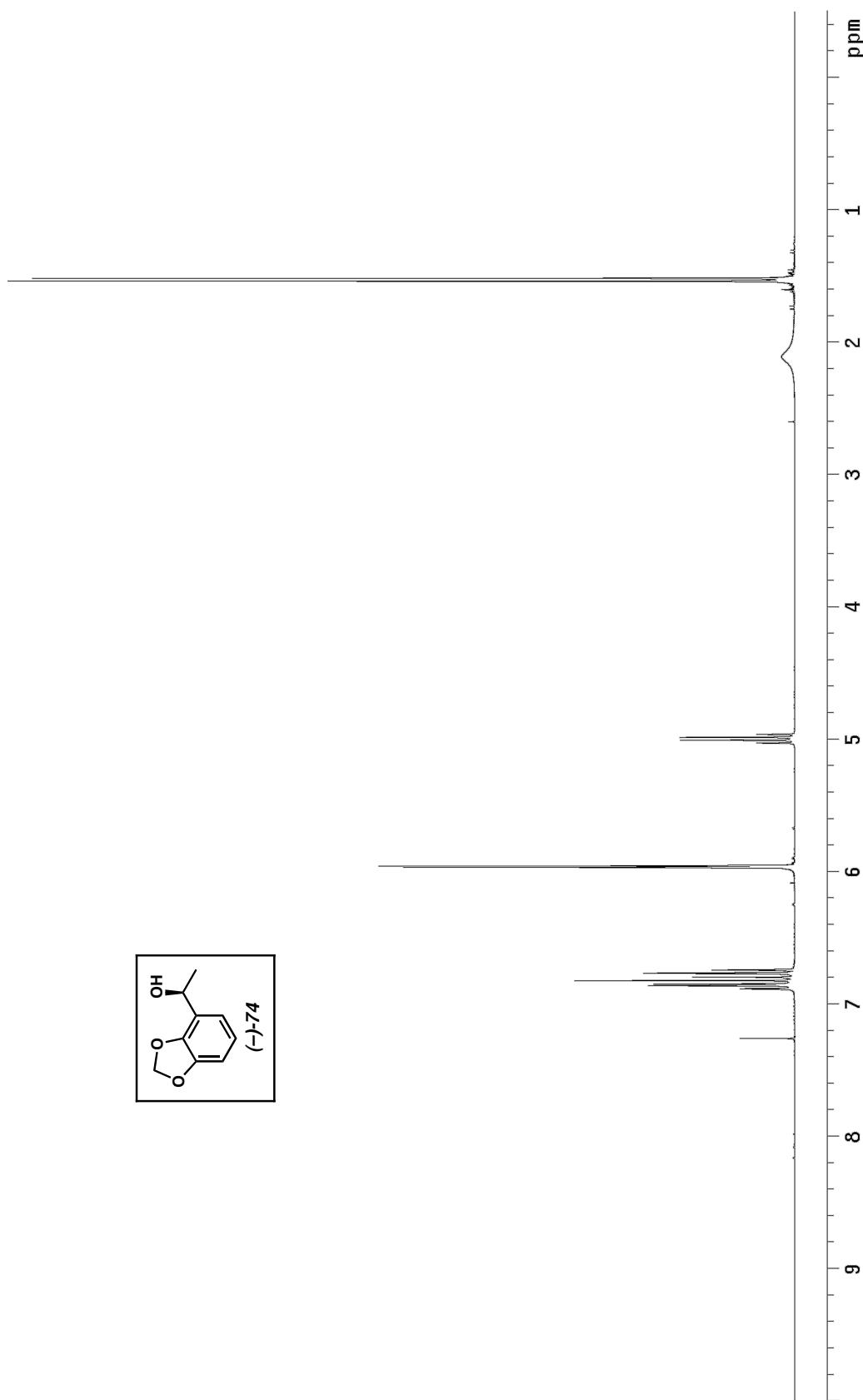


Figure A1.1 ^1H NMR (300 MHz, CDCl_3) of compound (-)-74.

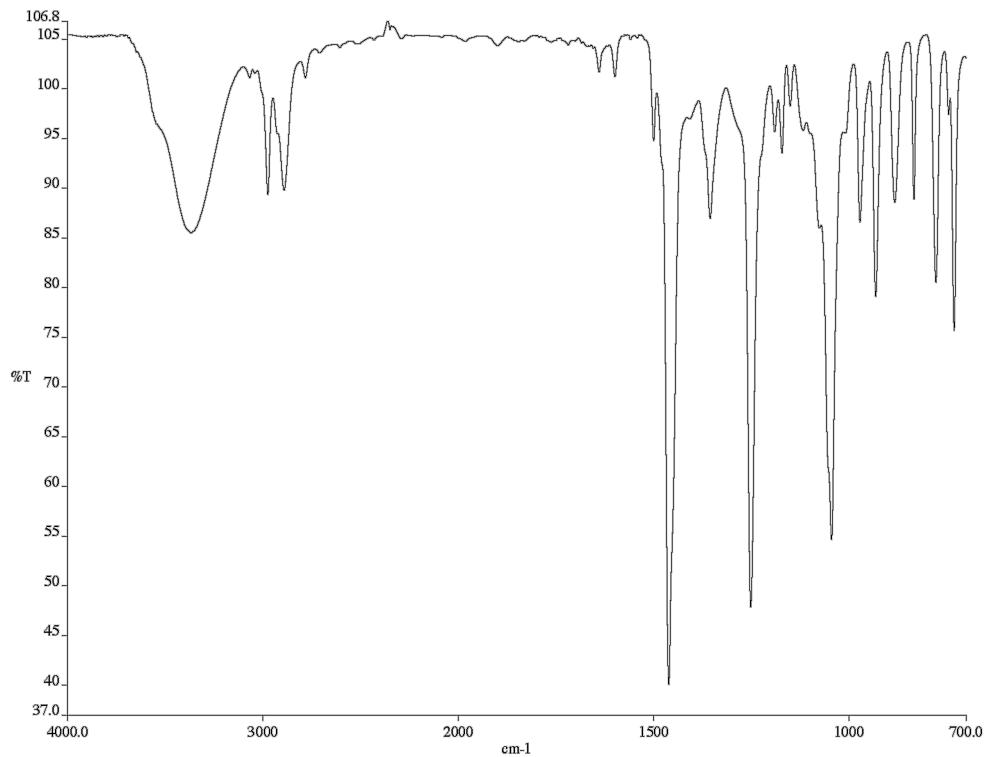


Figure A1.2 Infrared spectrum (thin film/NaCl) of compound (-)-74.

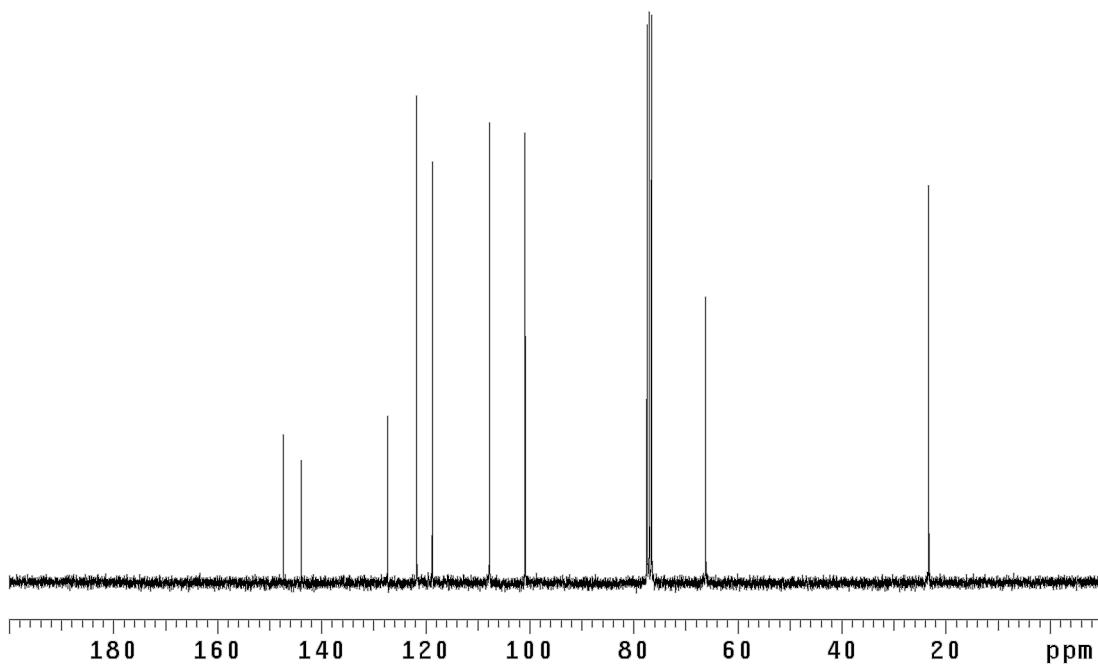


Figure A1.3 ^{13}C NMR (75 MHz, CDCl_3) of compound (-)-74.

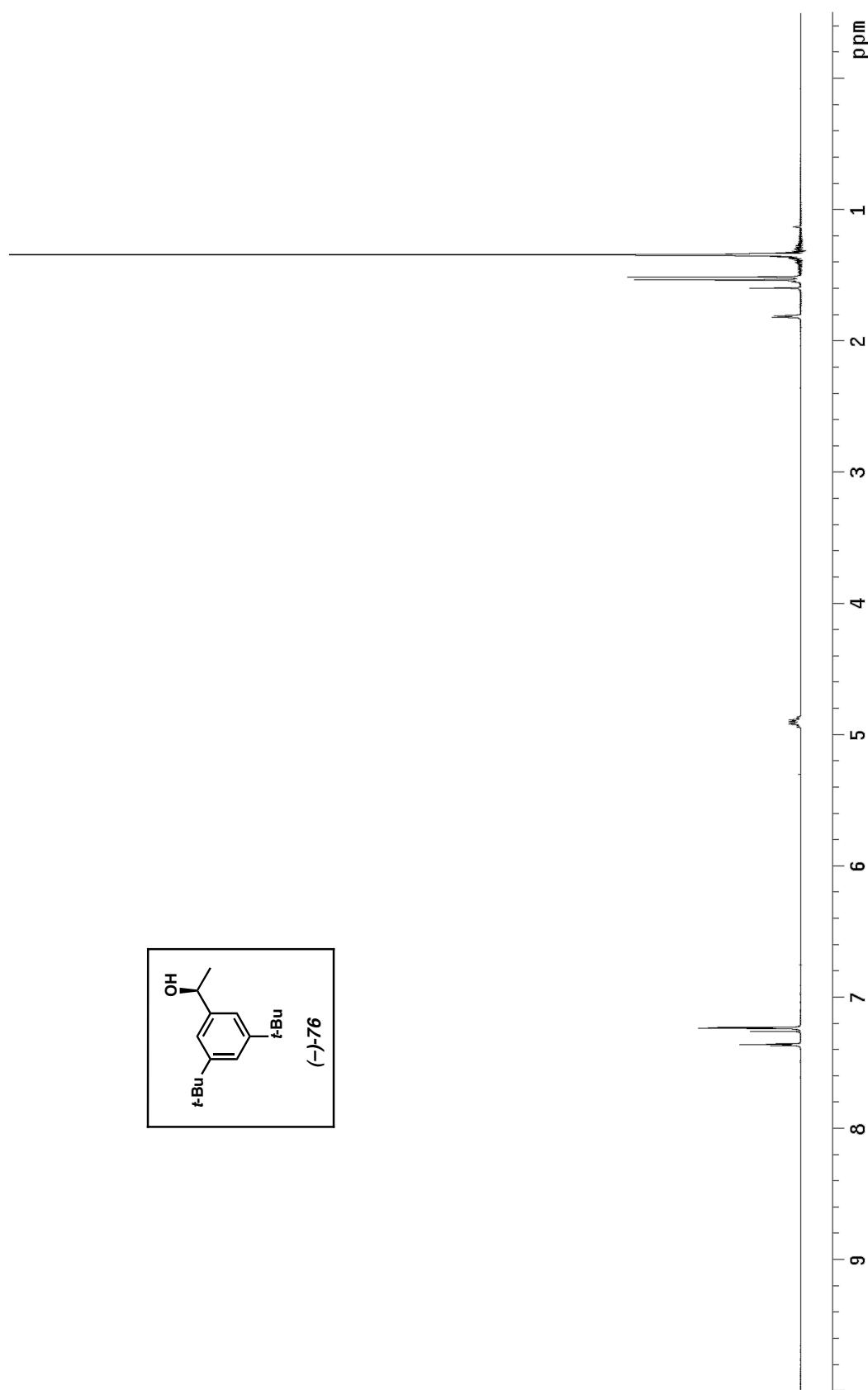


Figure A1.4 ^1H NMR (300 MHz, CDCl_3) of compound ($-$)-76.

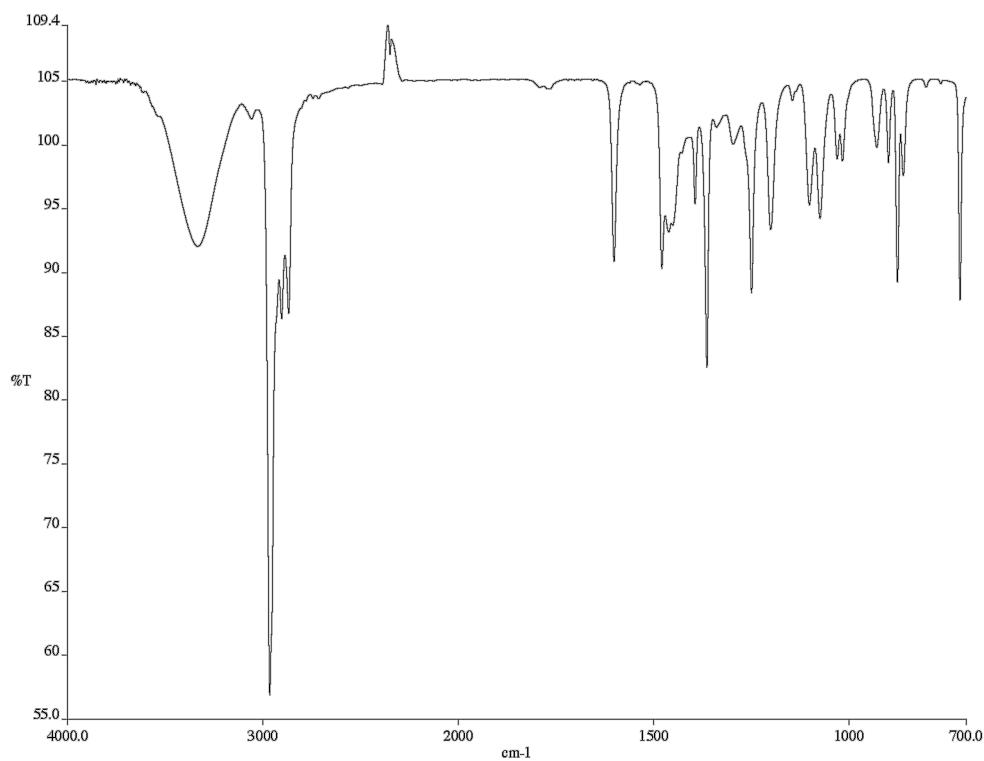


Figure A1.5 Infrared spectrum (thin film/NaCl) of compound (-)-76.

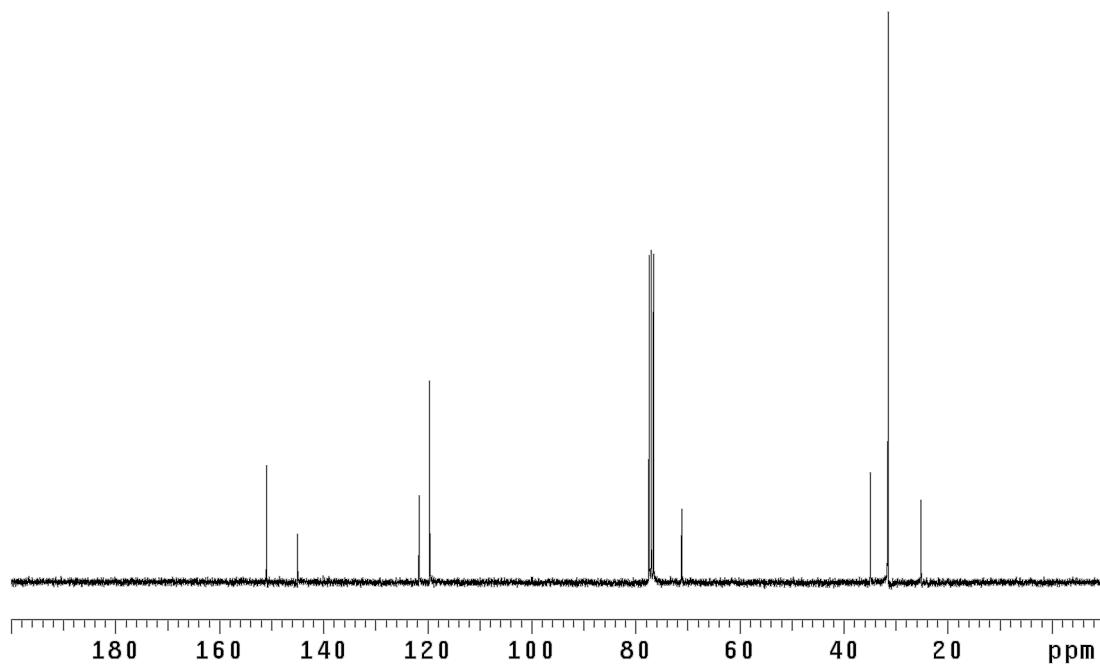


Figure A1.6 ¹³C NMR (75 MHz, CDCl₃) of compound (-)-76.

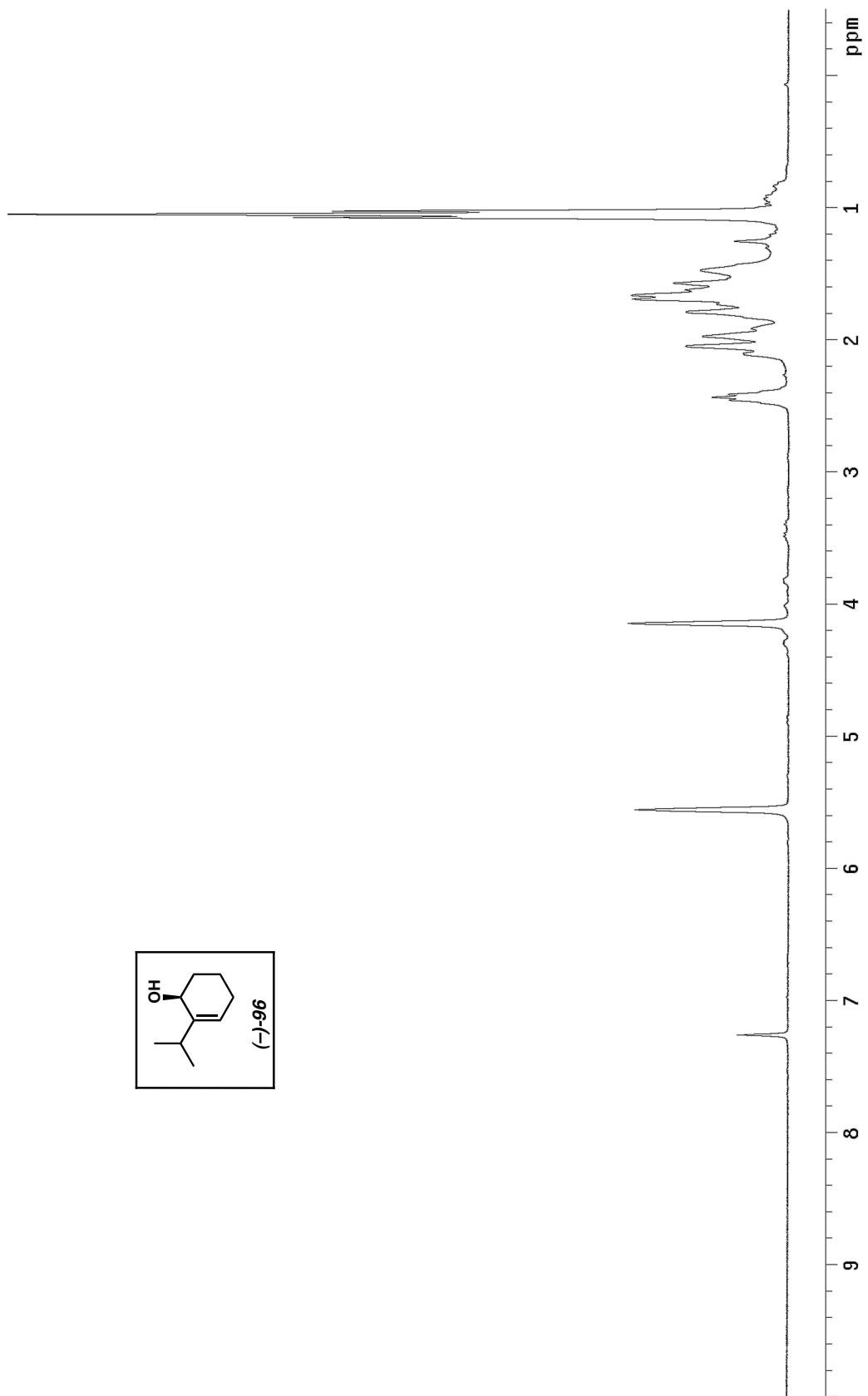


Figure A1.7 ^1H NMR (300 MHz, CDCl_3) of compound ($-$)-96.

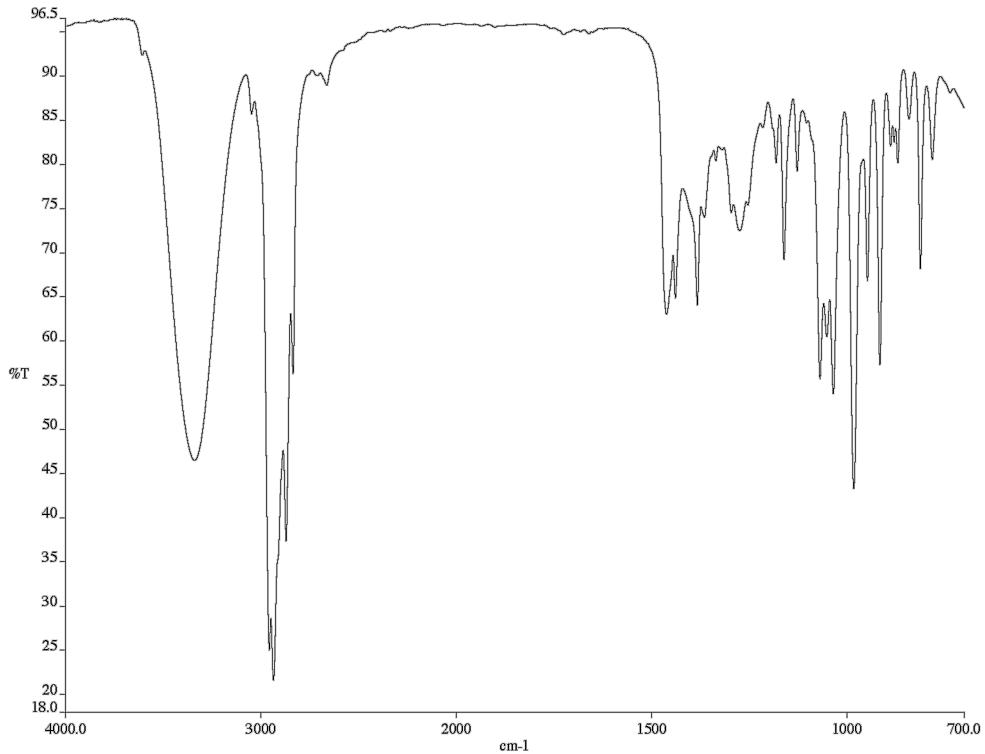


Figure A1.8 Infrared spectrum (thin film/NaCl) of compound (-)-96.

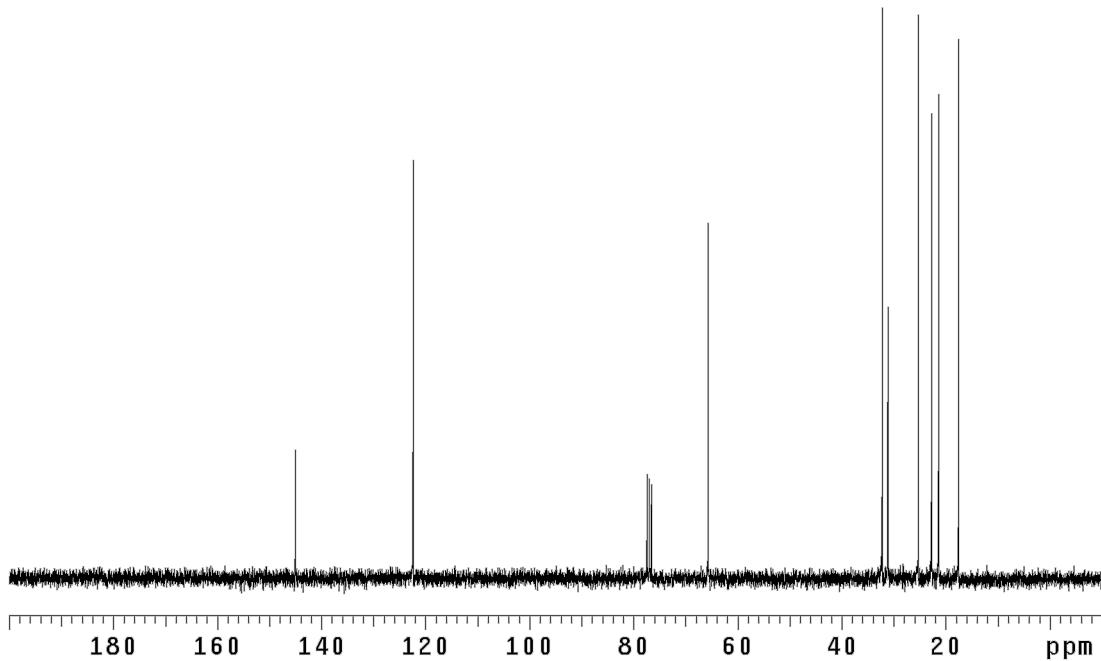


Figure A1.9 ^{13}C NMR (75 MHz, CDCl_3) of compound (-)-96.

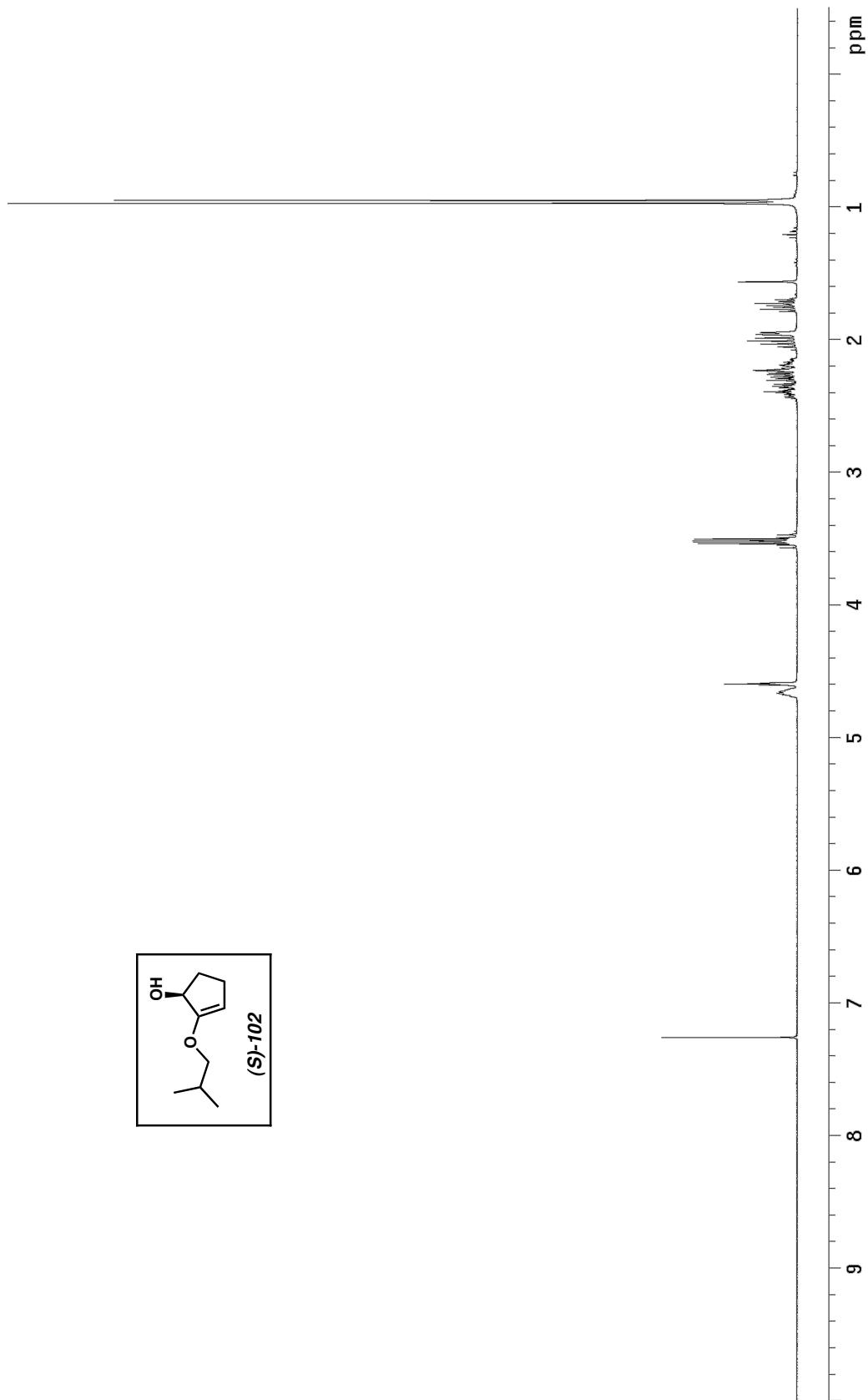


Figure A1.10 ¹H NMR (300 MHz, CDCl₃) of compound (S)-102.

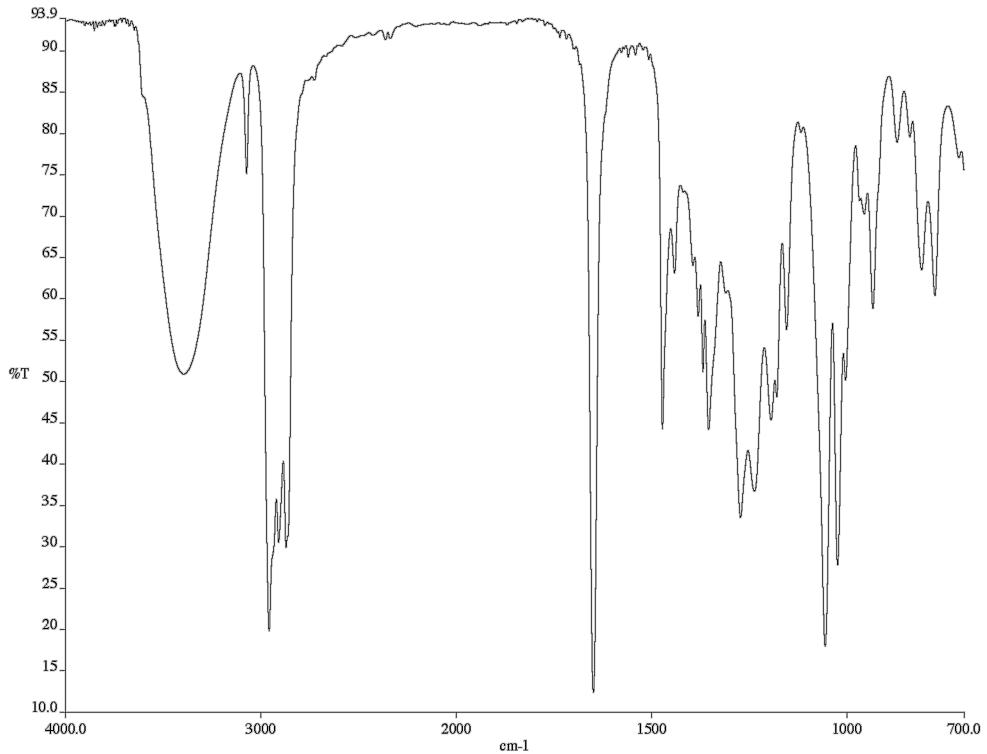


Figure A1.11 Infrared spectrum (thin film/NaCl) of compound (S)-**102**.

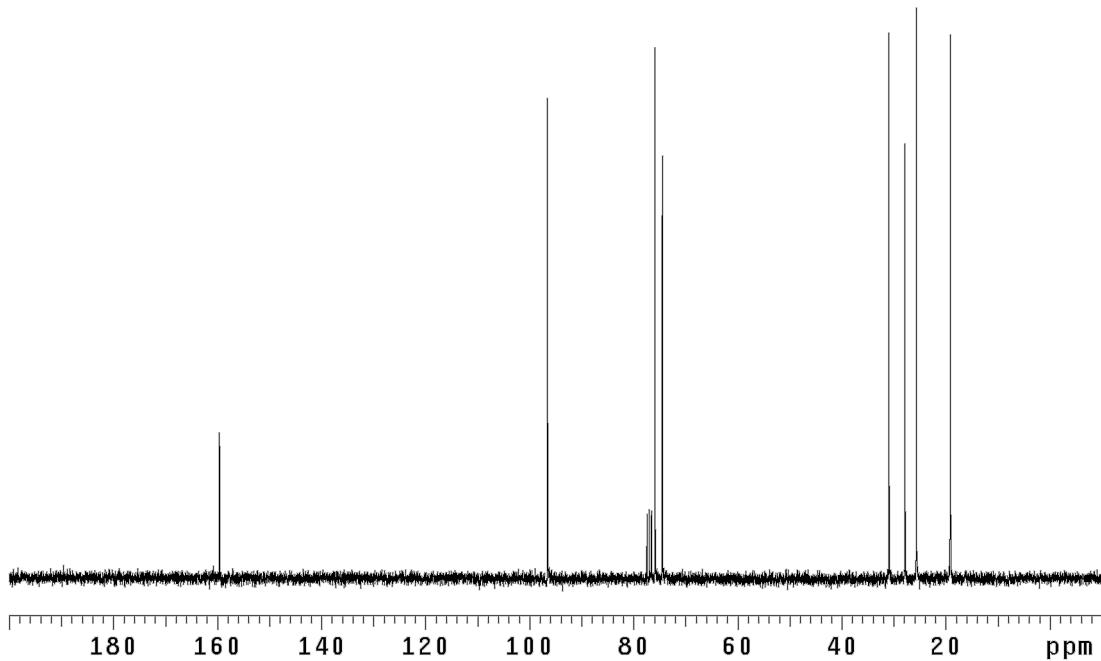
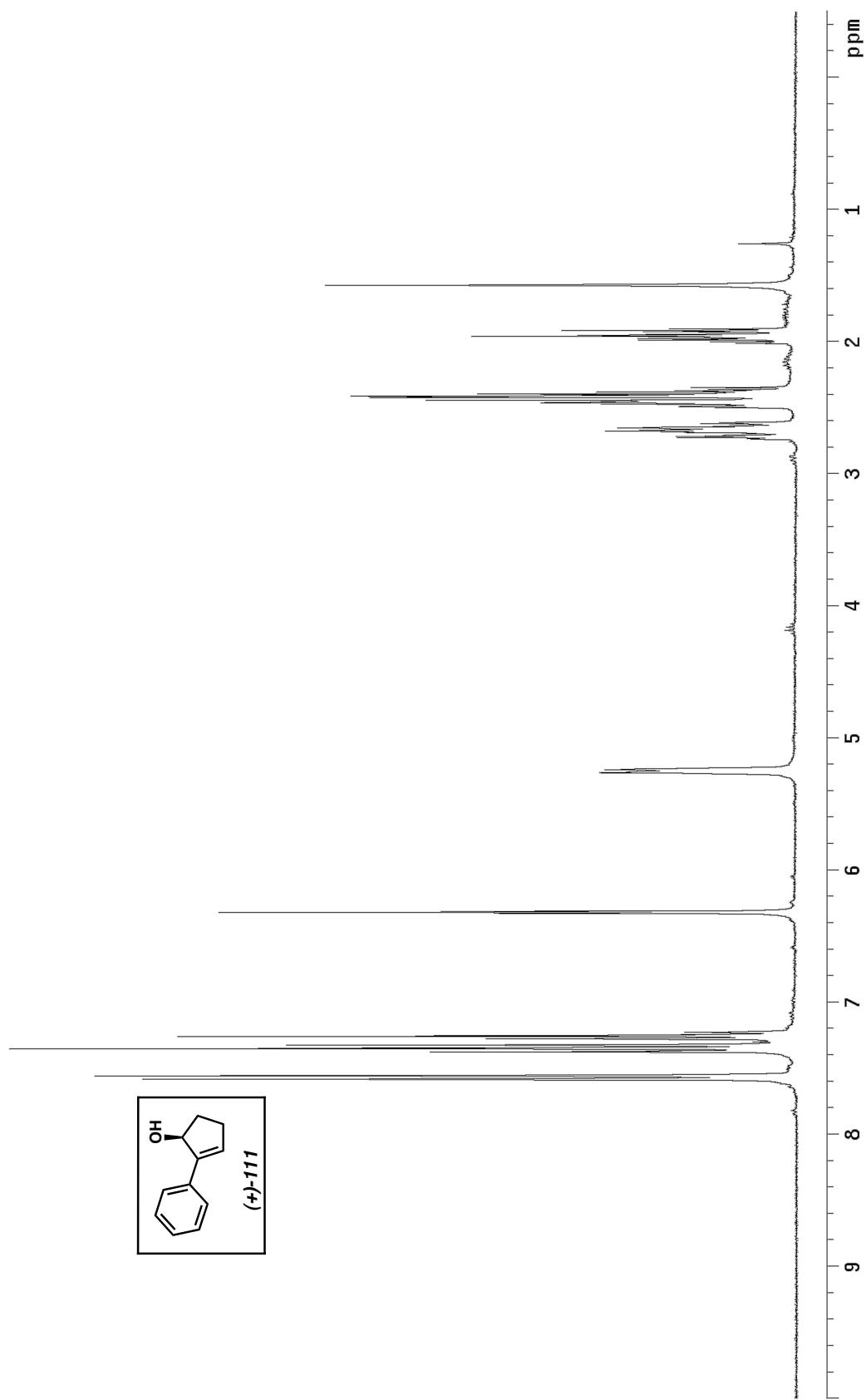


Figure A1.12 ^{13}C NMR (75 MHz, CDCl_3) of compound (S)-**102**.

Figure A1.13 ^1H NMR (300 MHz, CDCl_3) of compound (+)-111.



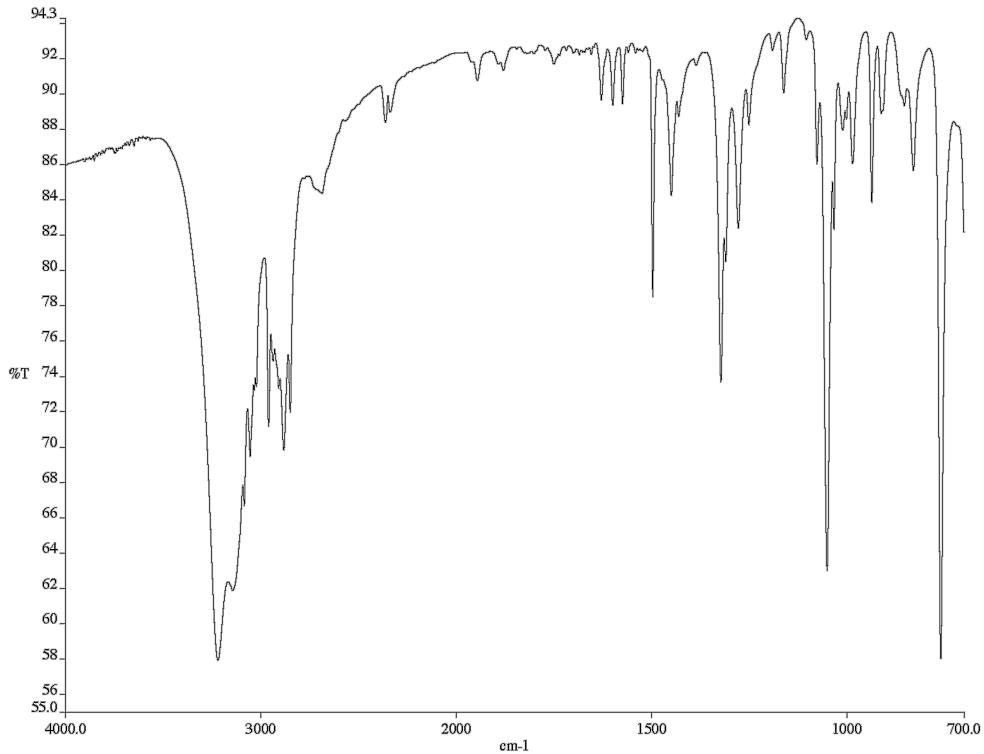


Figure A1.14 Infrared spectrum (thin film/NaCl) of compound (+)-**111**.

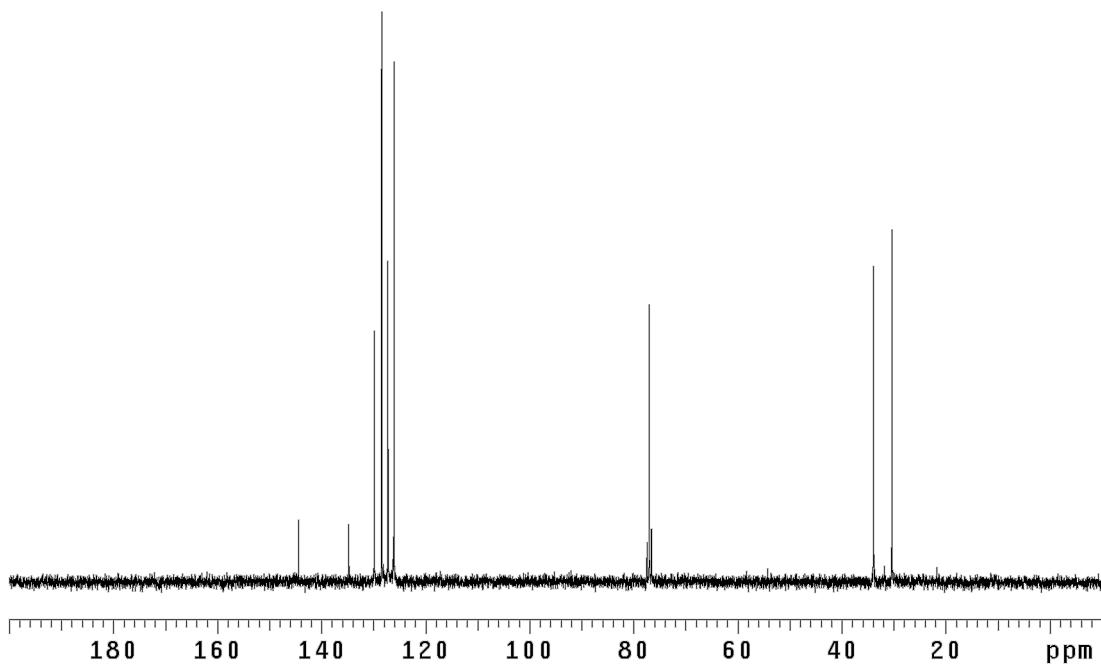
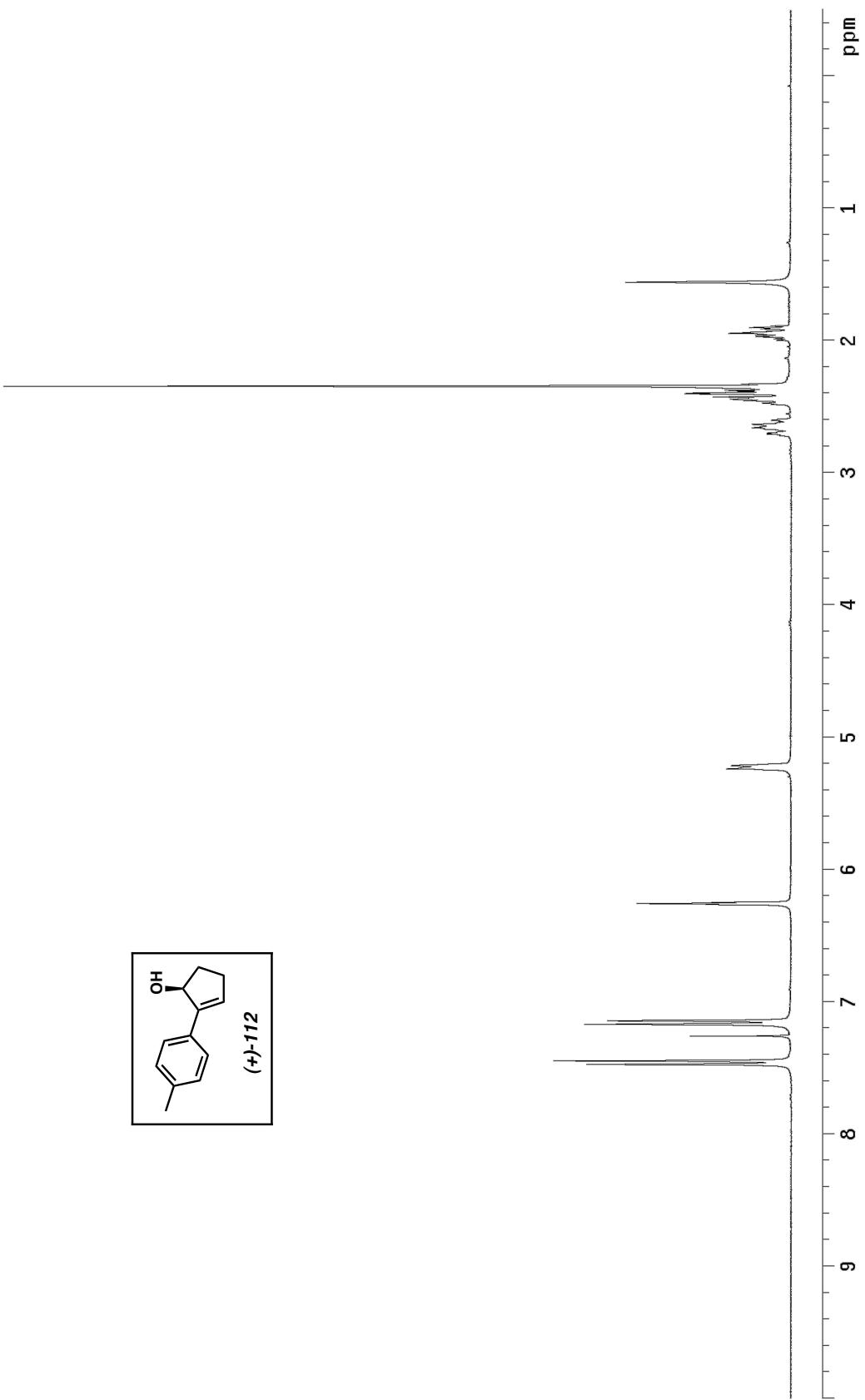


Figure A1.15 ^{13}C NMR (75 MHz, CDCl_3) of compound (+)-**111**.

Figure A1.16 ^1H NMR (300 MHz, CDCl_3) of compound (+)-112.



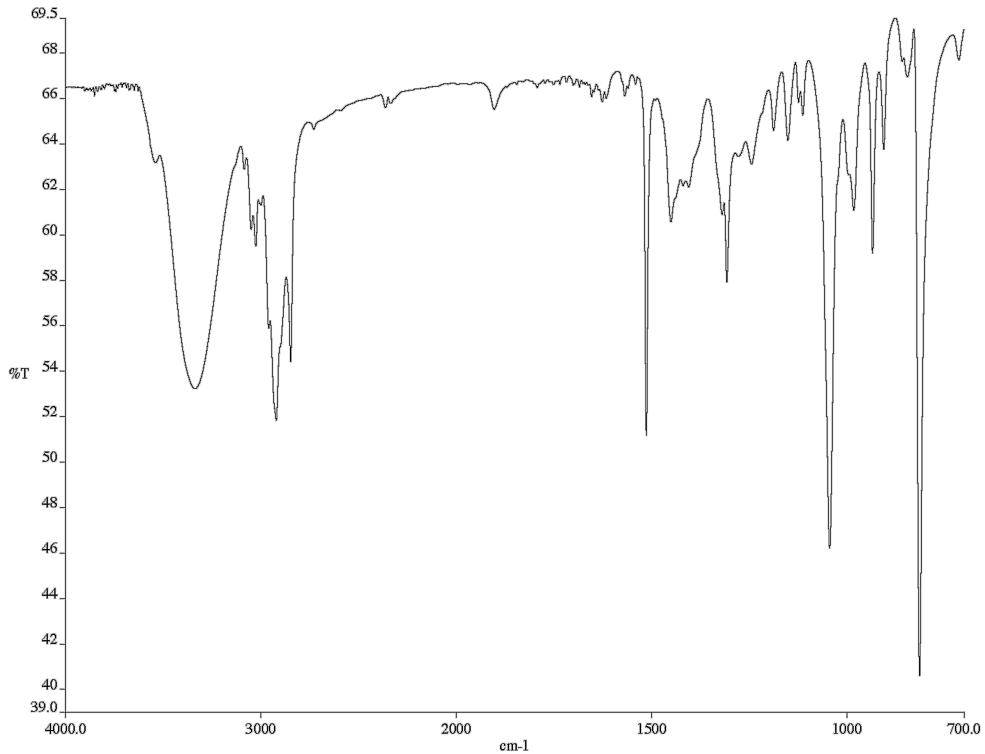


Figure A1.17 Infrared spectrum (thin film/NaCl) of compound (+)-**112**.

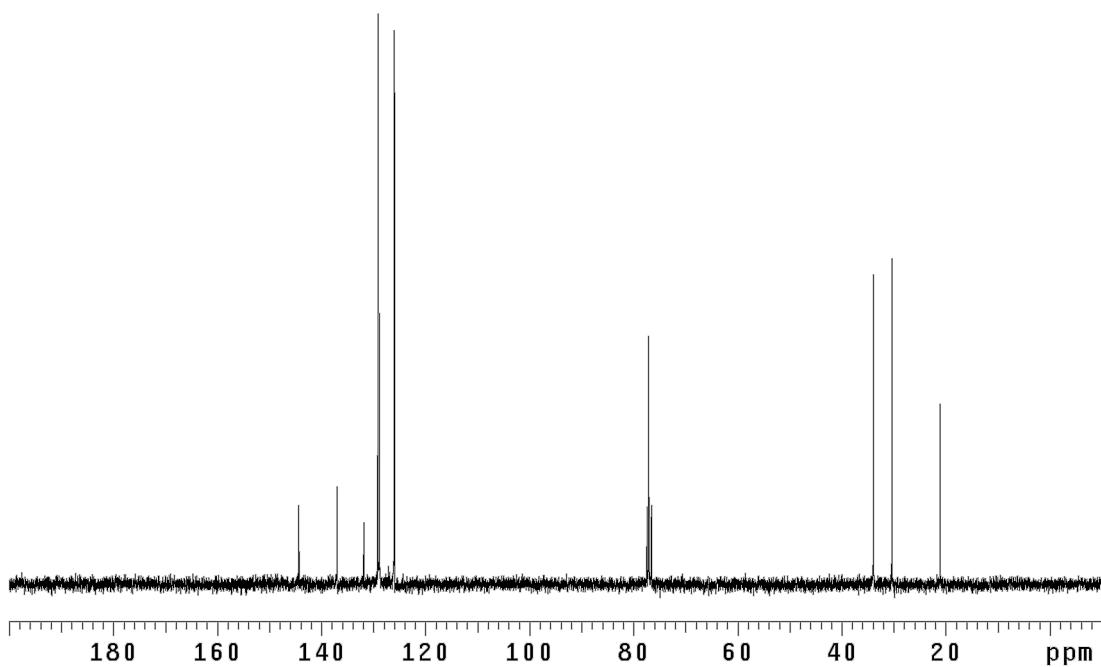


Figure A1.18 ¹³C NMR (75 MHz, CDCl₃) of compound (+)-**112**.

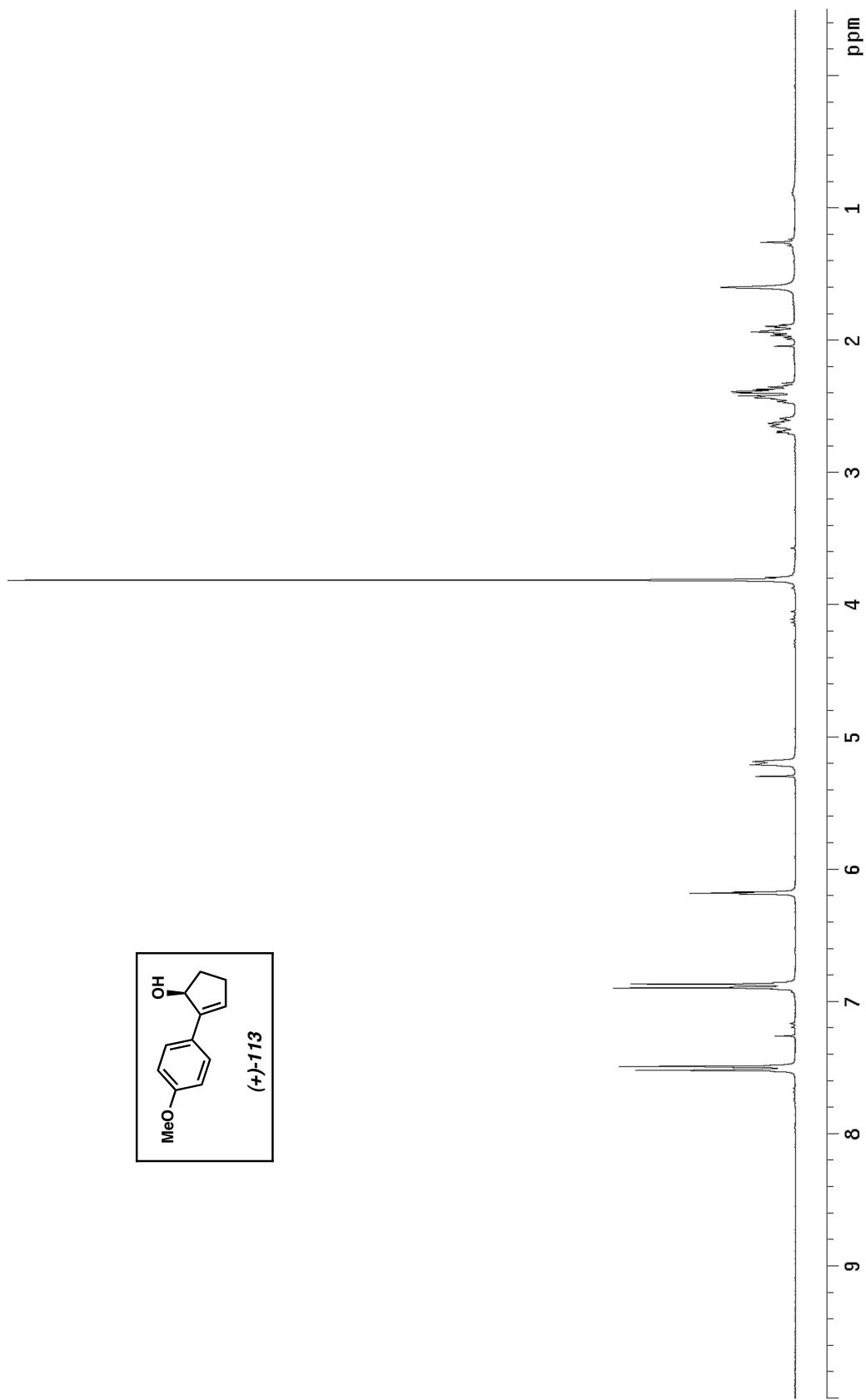


Figure A1.19 ^1H NMR (300 MHz, CDCl_3) of compound (+)-113.

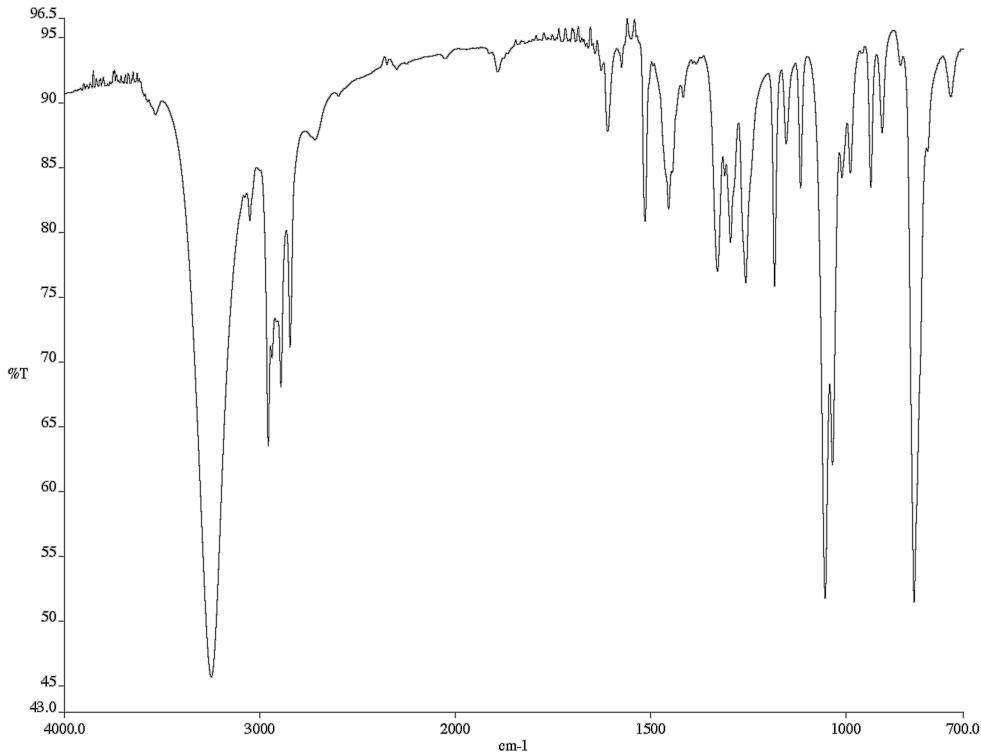


Figure A1.20 Infrared spectrum (thin film/NaCl) of compound (+)-**113**.

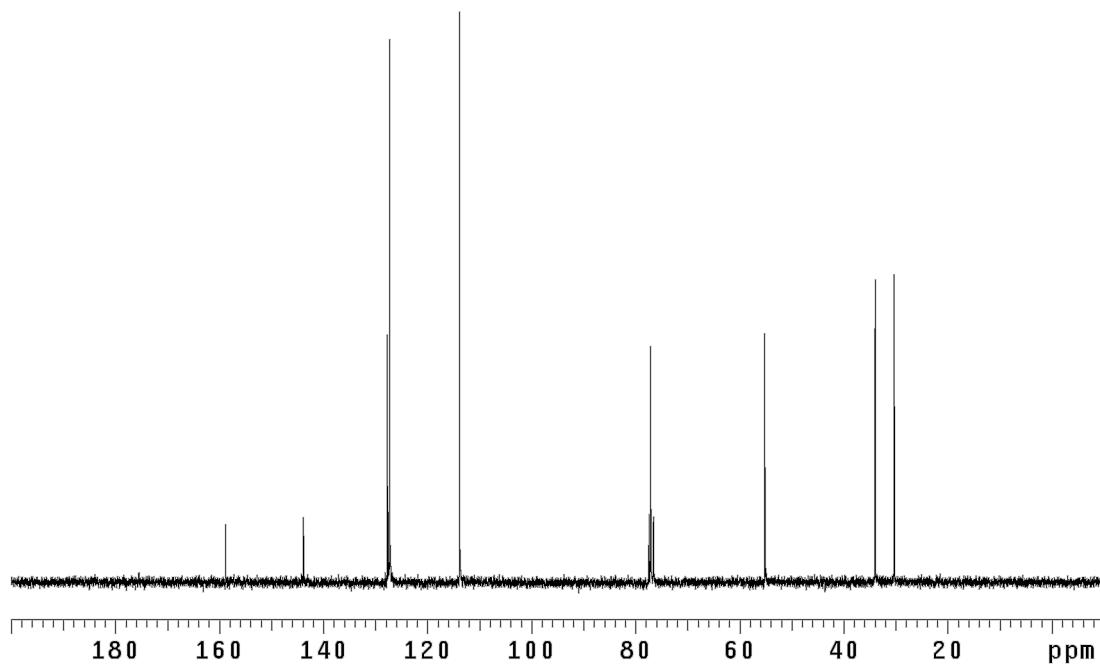


Figure A1.21 ^{13}C NMR (75 MHz, CDCl_3) of compound (+)-**113**.

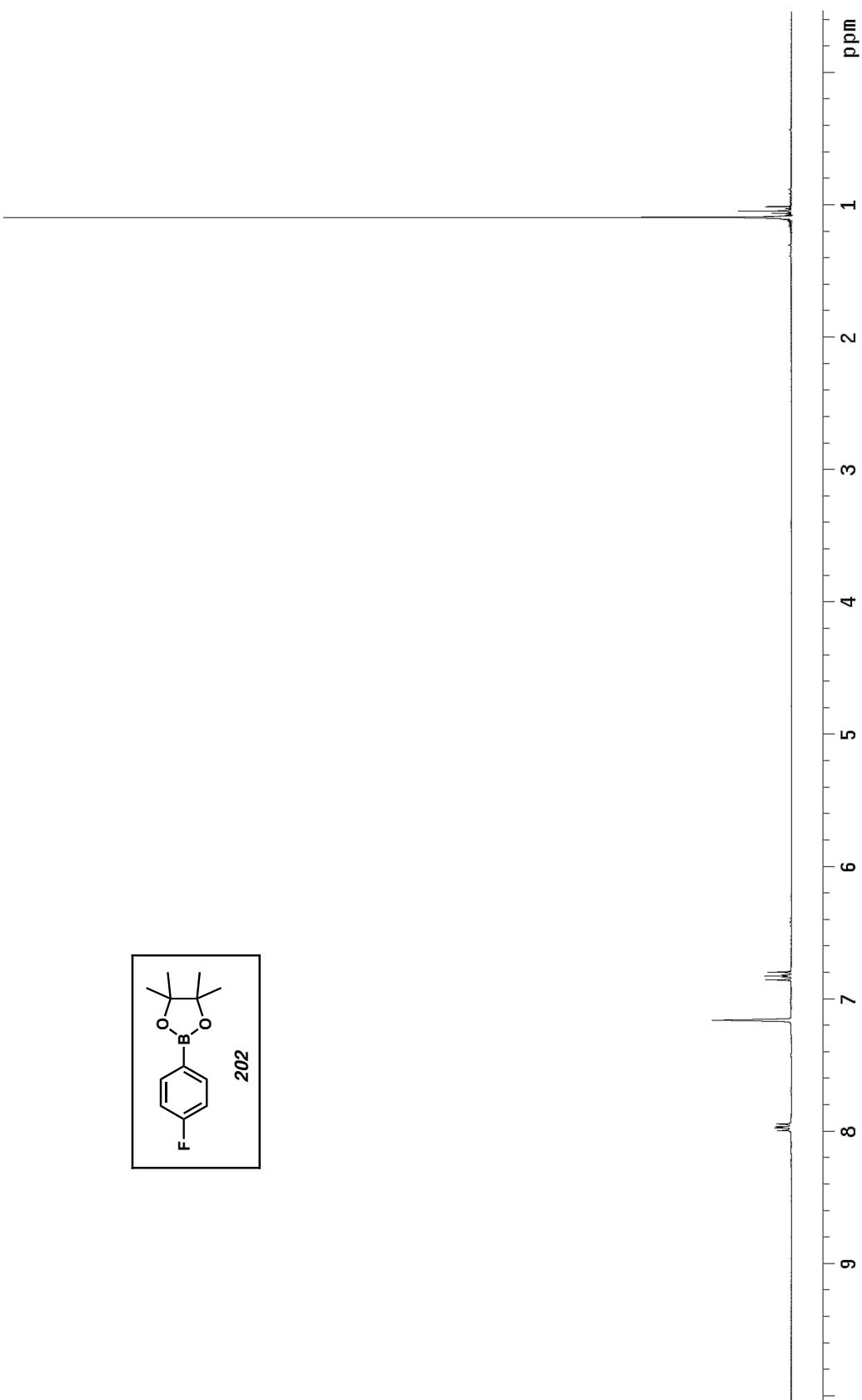


Figure A1.22 ^1H NMR (300 MHz, C_6D_6) of compound 202.

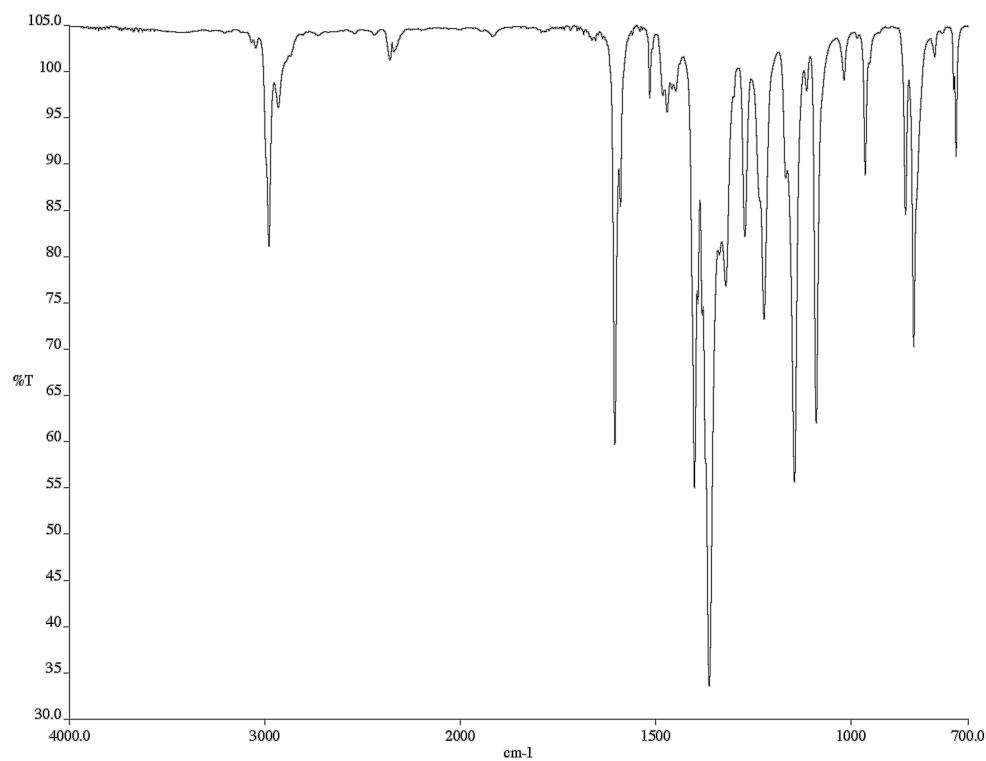


Figure A1.23 Infrared spectrum (thin film/NaCl) of compound **202**.

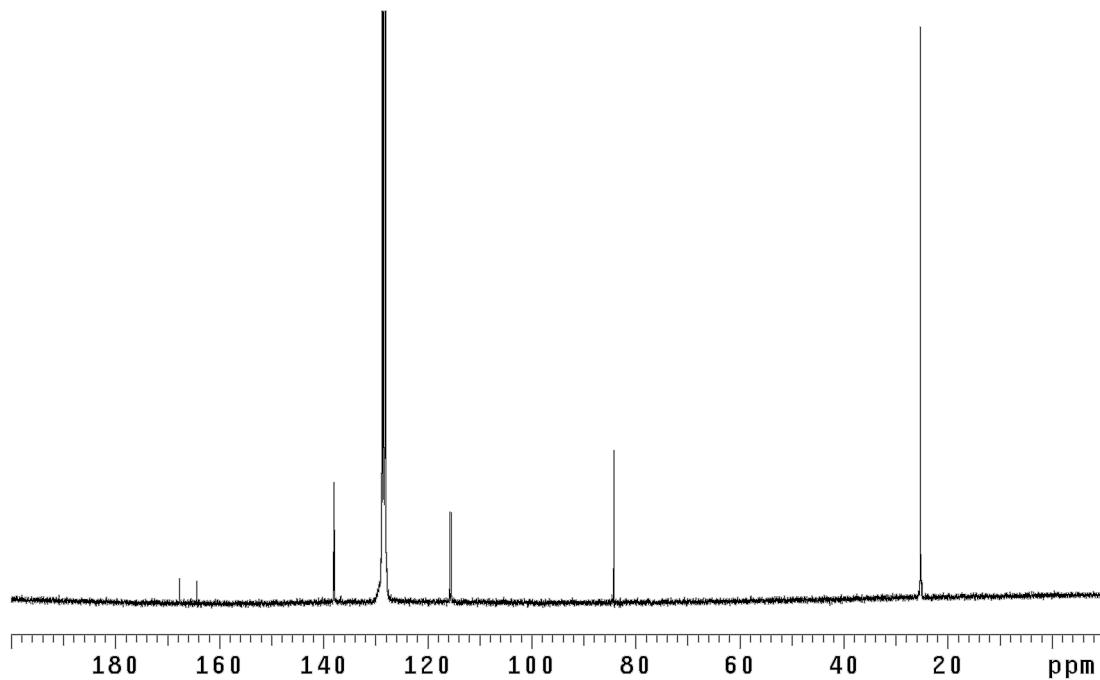


Figure A1.24 ^{13}C NMR (75 MHz, C_6D_6) of compound **202**.

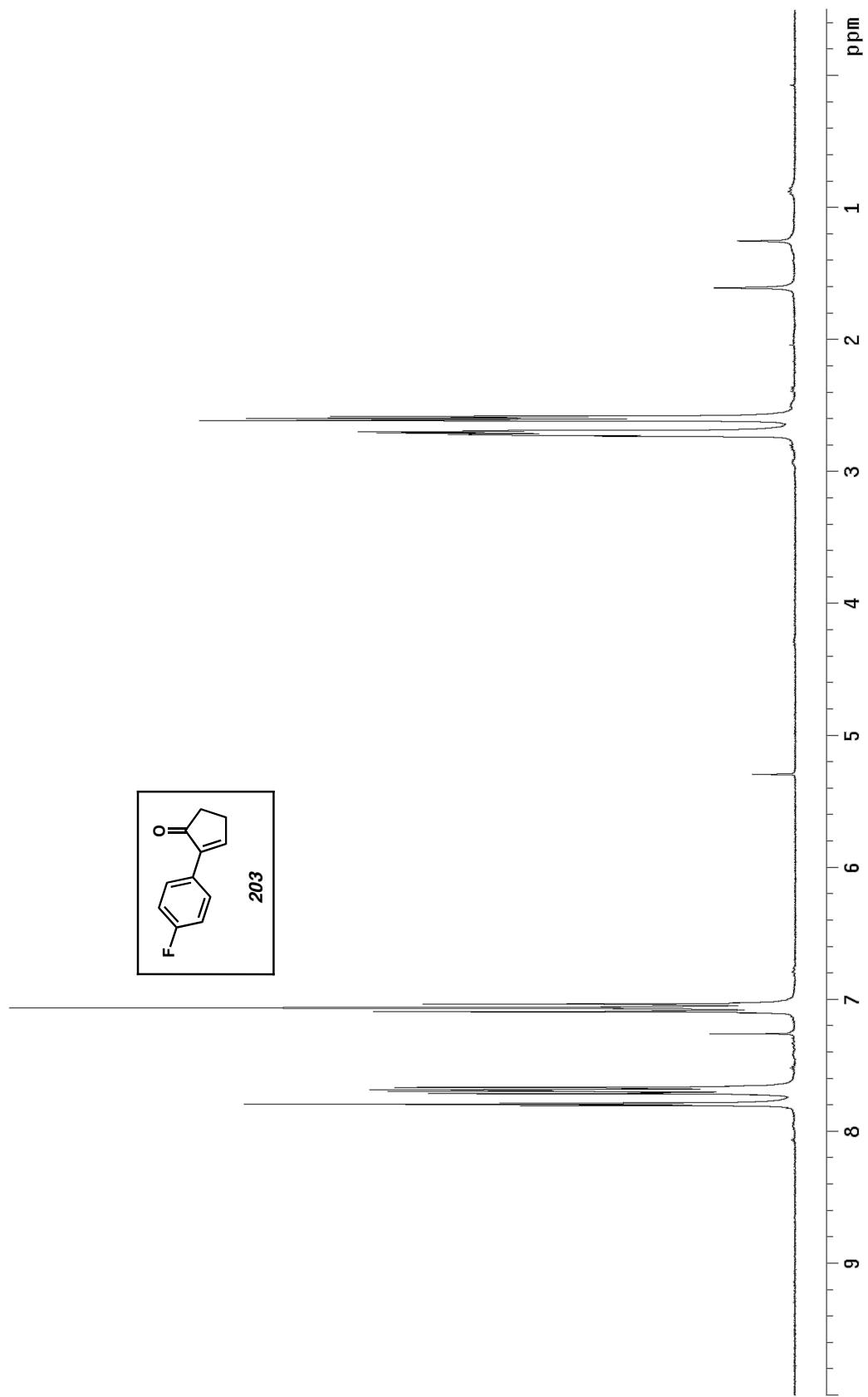


Figure A1.25 ^1H NMR (300 MHz, CDCl_3) of compound 203.

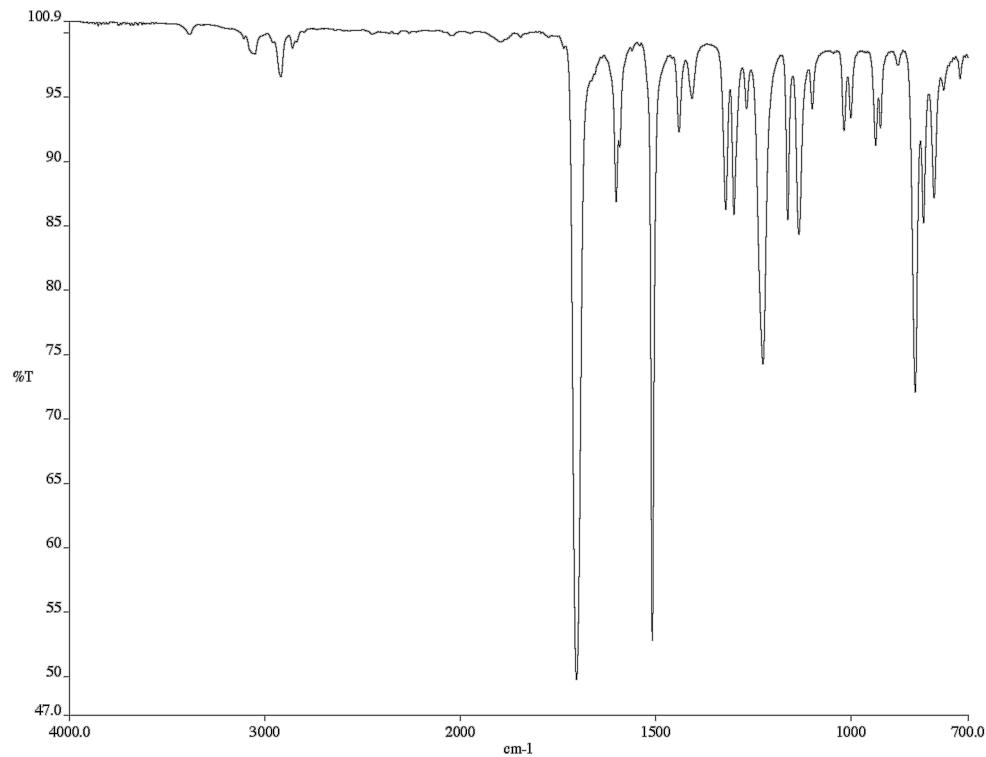


Figure A1.26 Infrared spectrum (thin film/NaCl) of compound **203**.

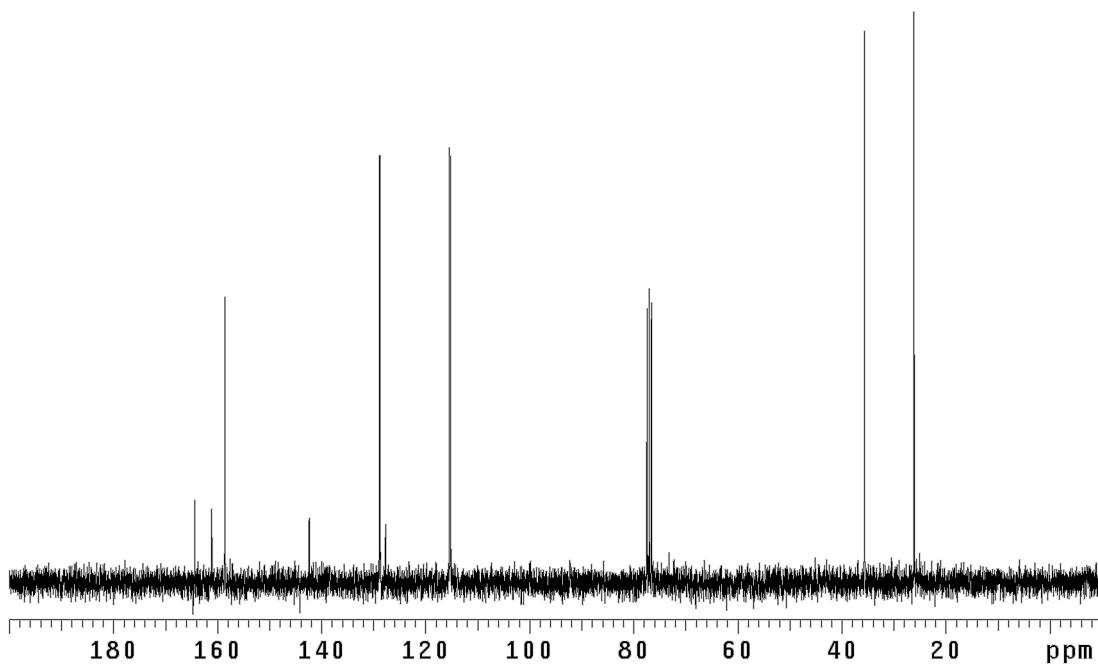
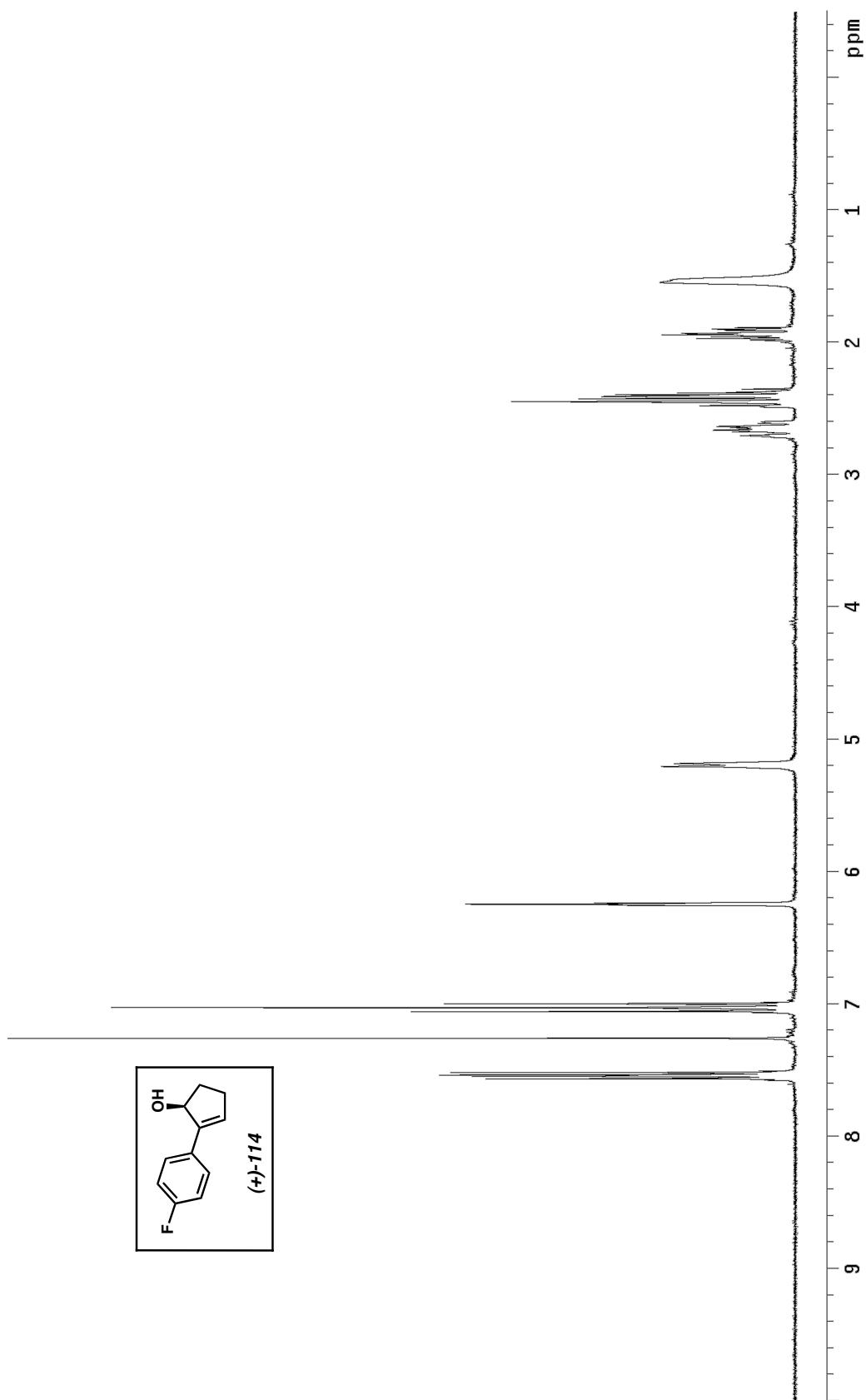


Figure A1.27 ^{13}C NMR (75 MHz, CDCl_3) of compound **203**.

Figure A1.28 ^1H NMR (300 MHz, CDCl_3) of compound (+)-114.



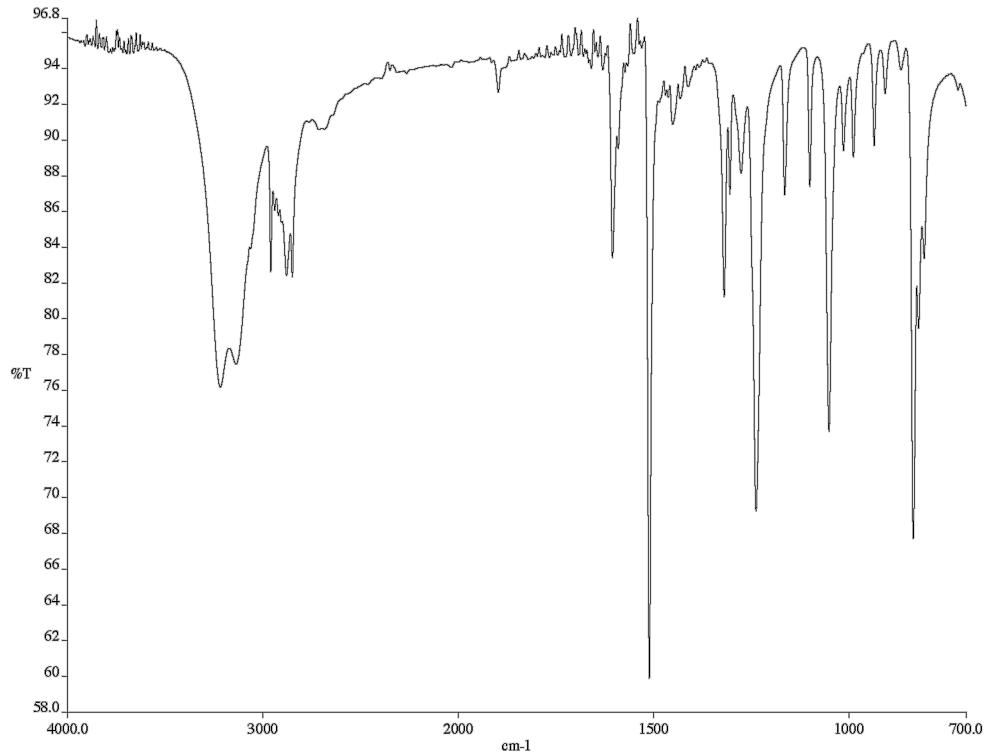


Figure A1.29 Infrared spectrum (thin film/NaCl) of compound (+)-**114**.

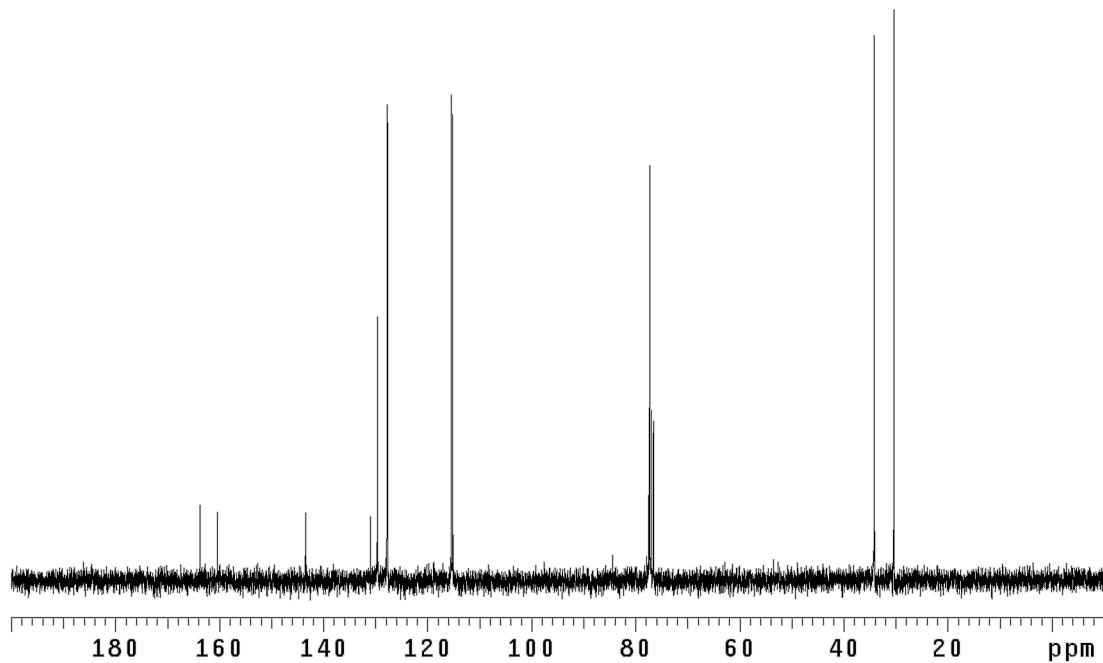


Figure A1.30 ¹³C NMR (75 MHz, CDCl₃) of compound (+)-**114**.

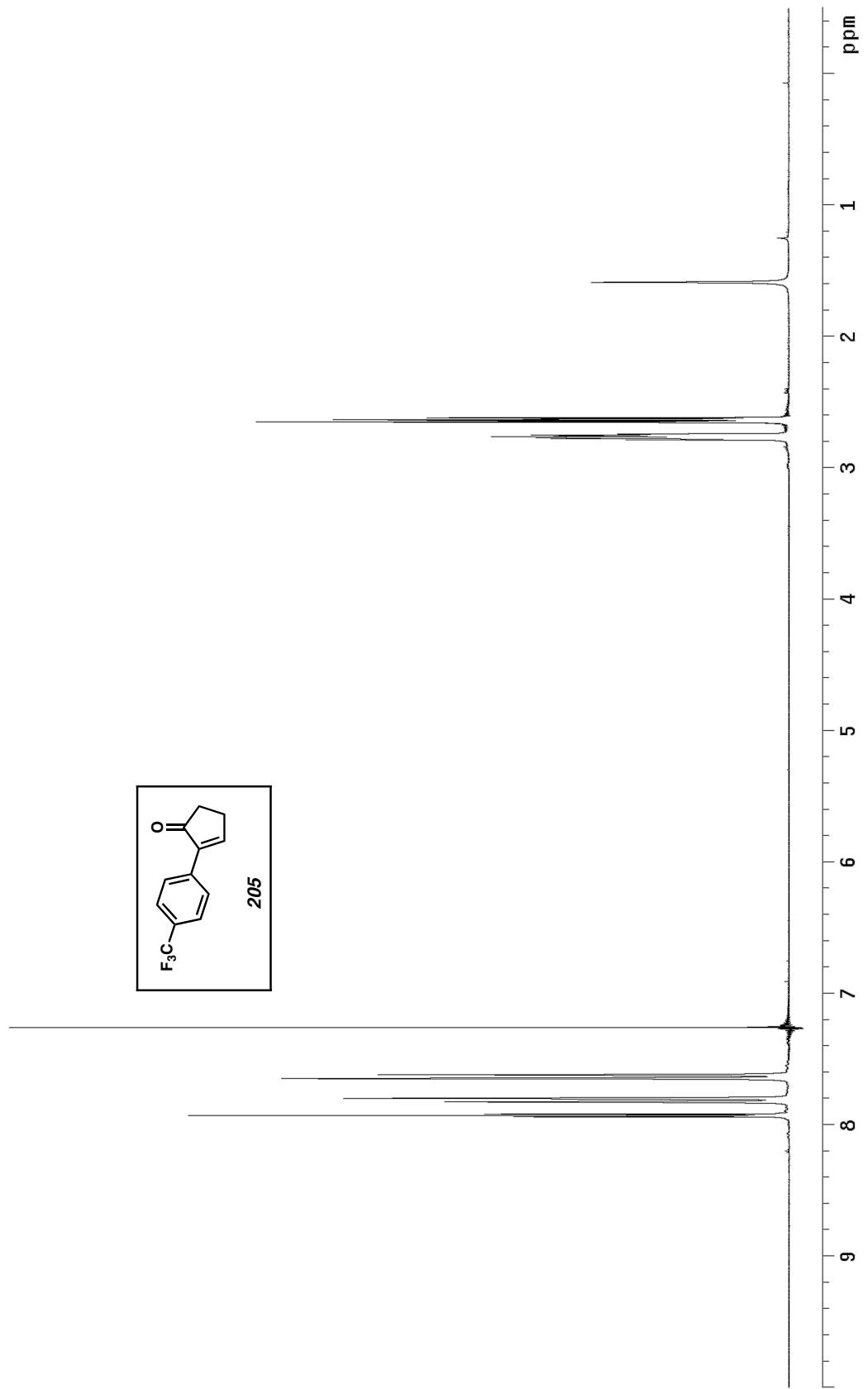


Figure A1.31 ^1H NMR (300 MHz, CDCl_3) of compound 205.

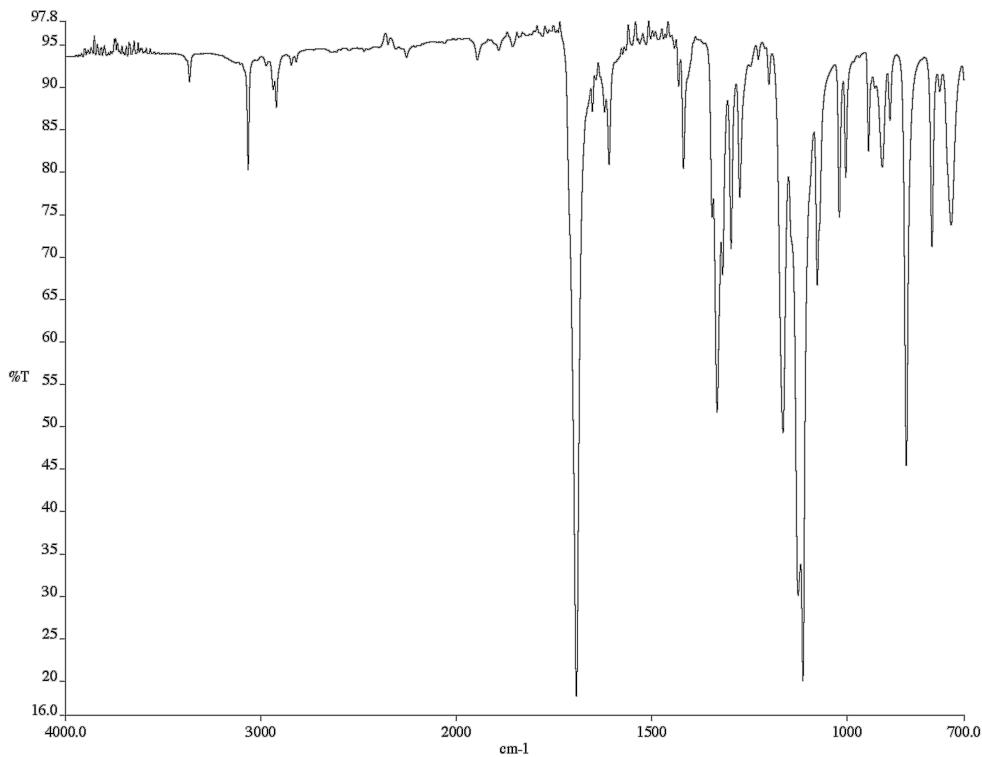


Figure A1.32 Infrared spectrum (thin film/NaCl) of compound **205**.

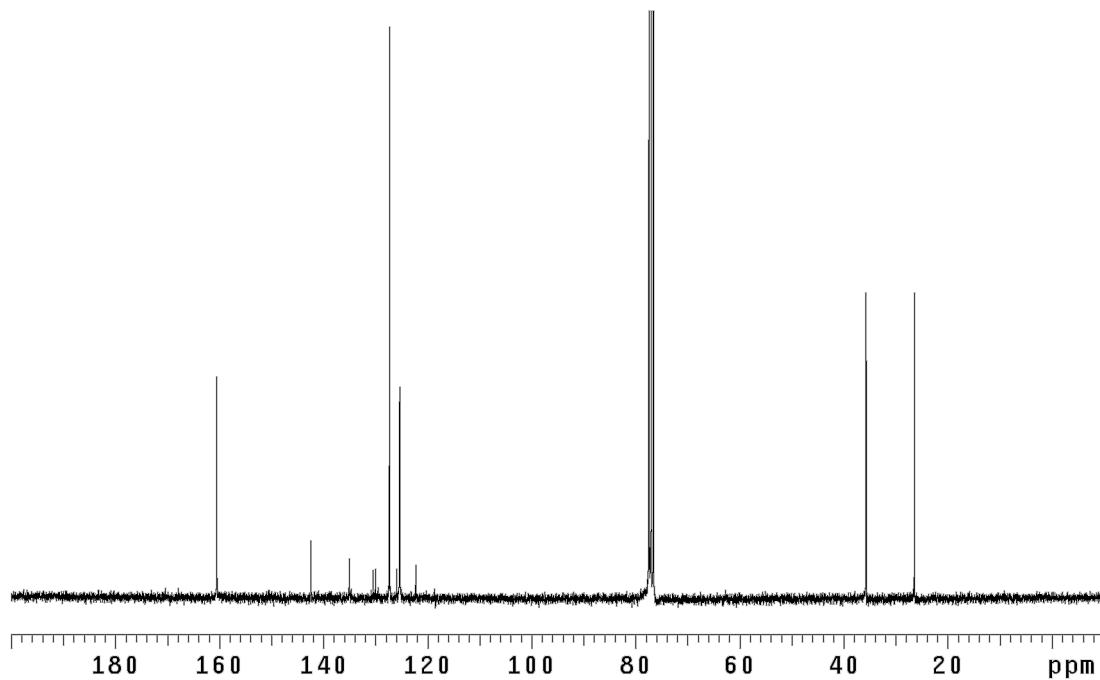


Figure A1.33 ^{13}C NMR (75 MHz, CDCl_3) of compound **205**.

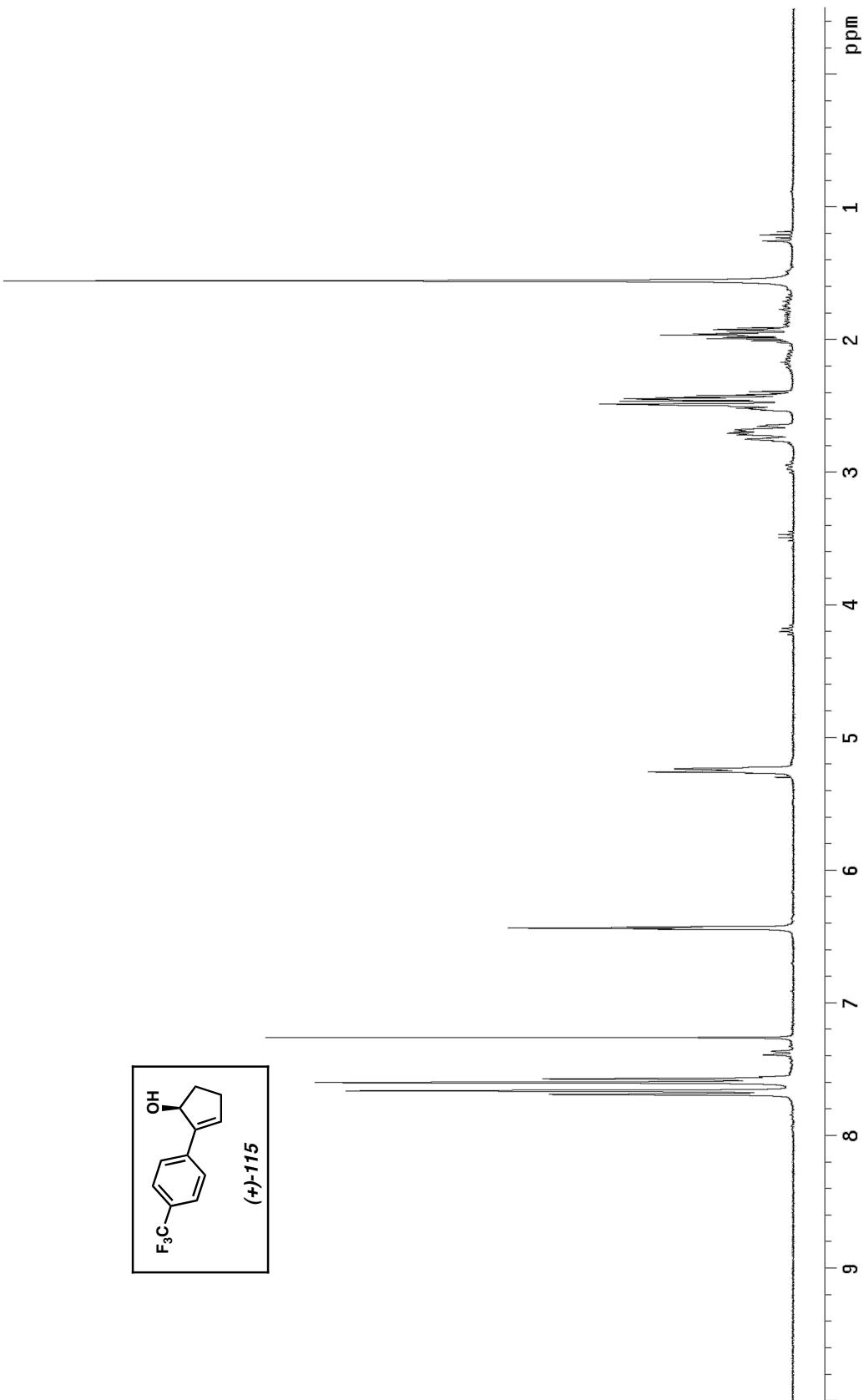


Figure A1.34 ^1H NMR (300 MHz, CDCl_3) of compound (+)-115.

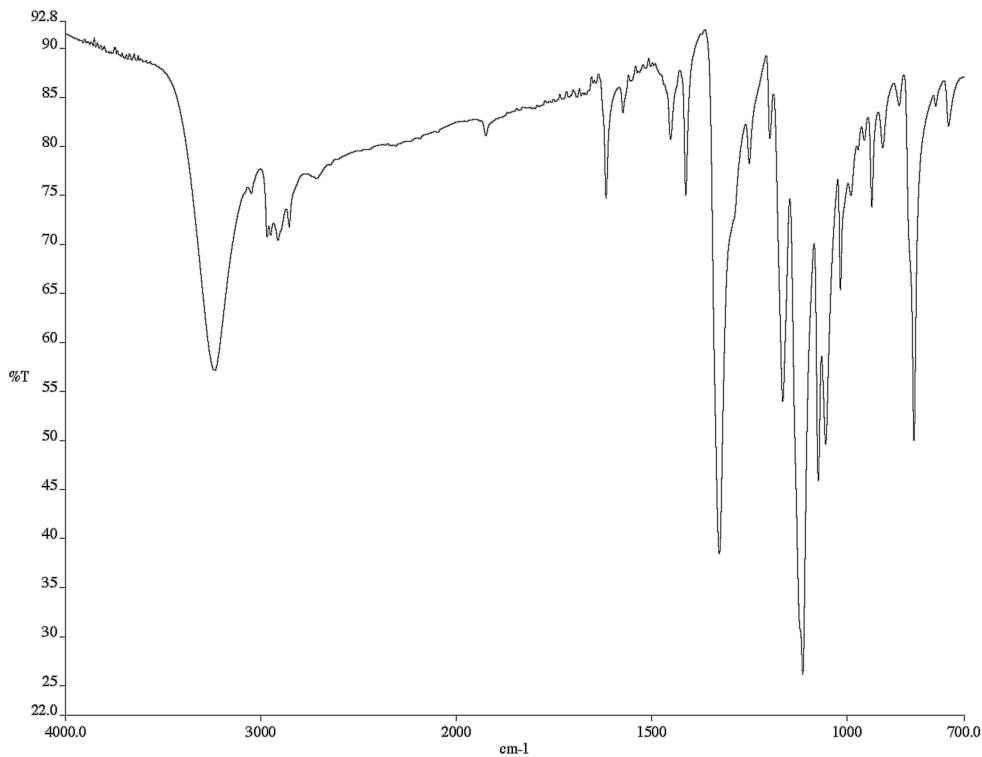


Figure A1.35 Infrared spectrum (thin film/NaCl) of compound (+)-**115**.

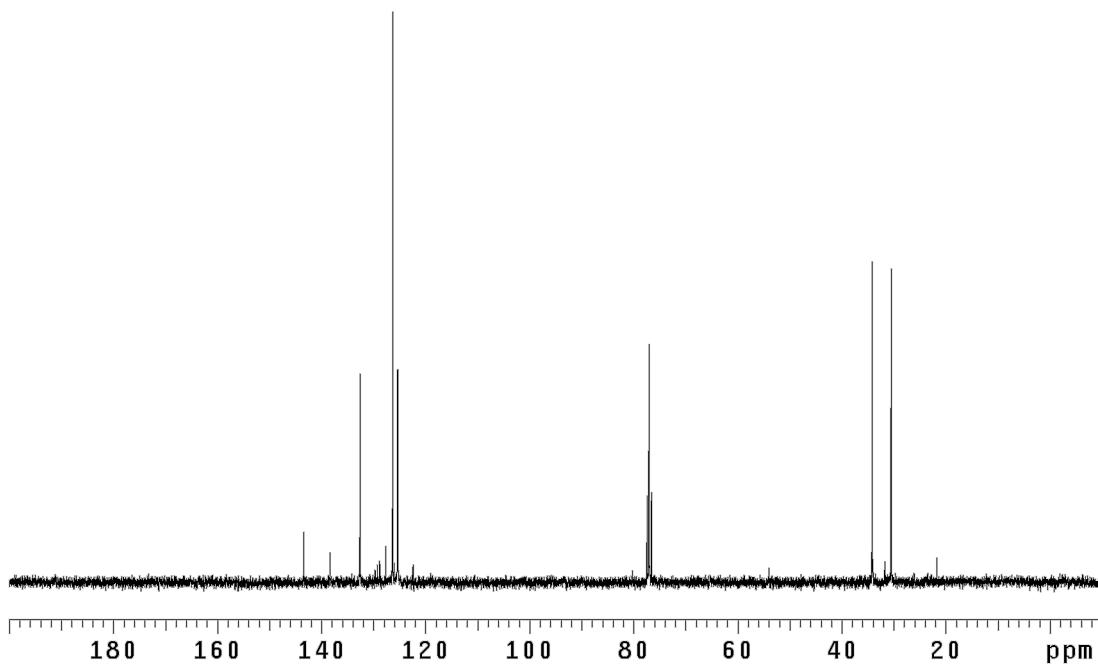


Figure A1.36 ^{13}C NMR (75 MHz, CDCl_3) of compound (+)-**115**.

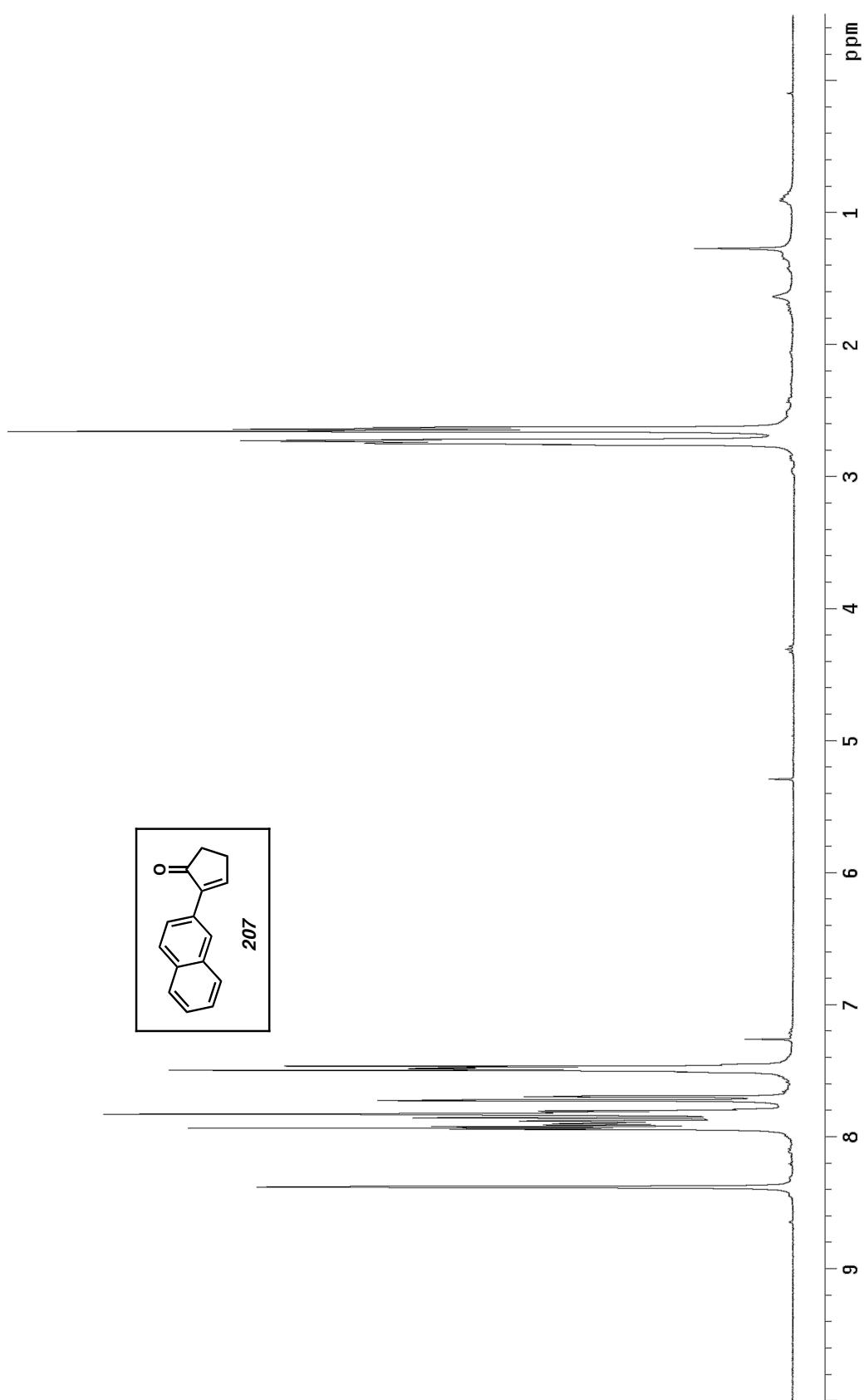


Figure A1.37 ^1H NMR (300 MHz, CDCl_3) of compound 207.

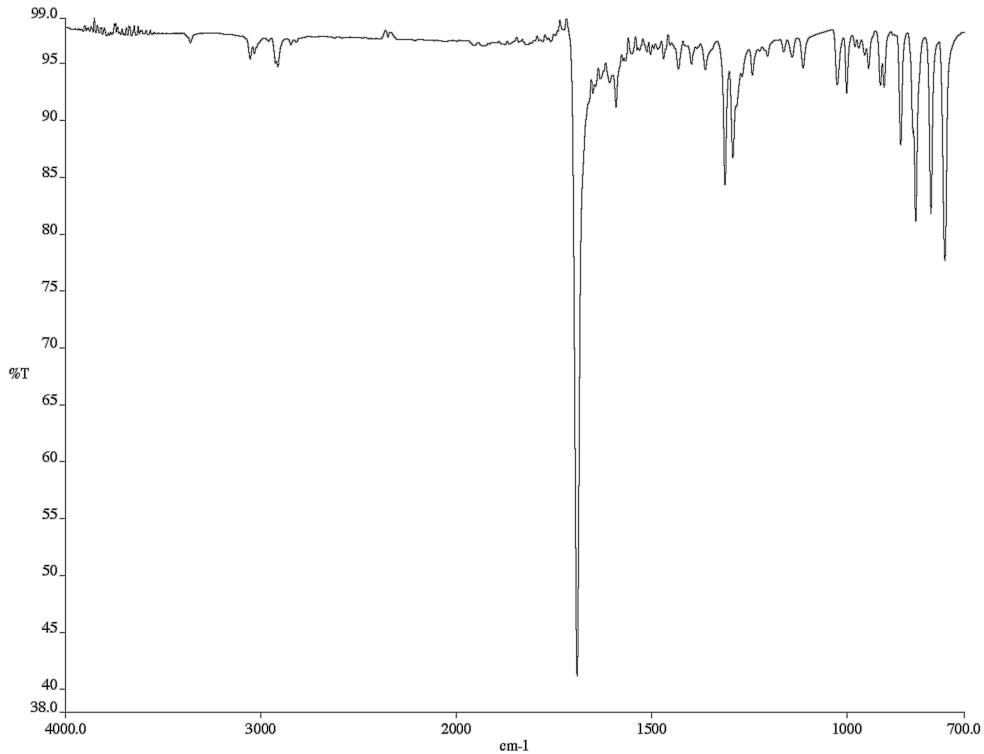


Figure A1.38 Infrared spectrum (thin film/NaCl) of compound **207**.

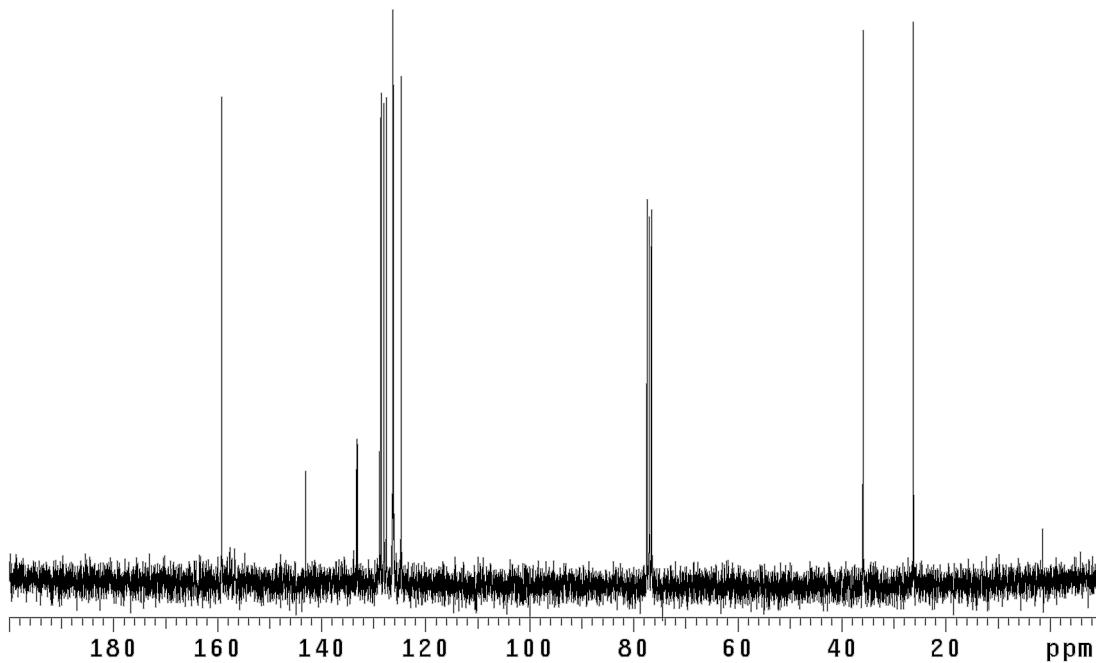
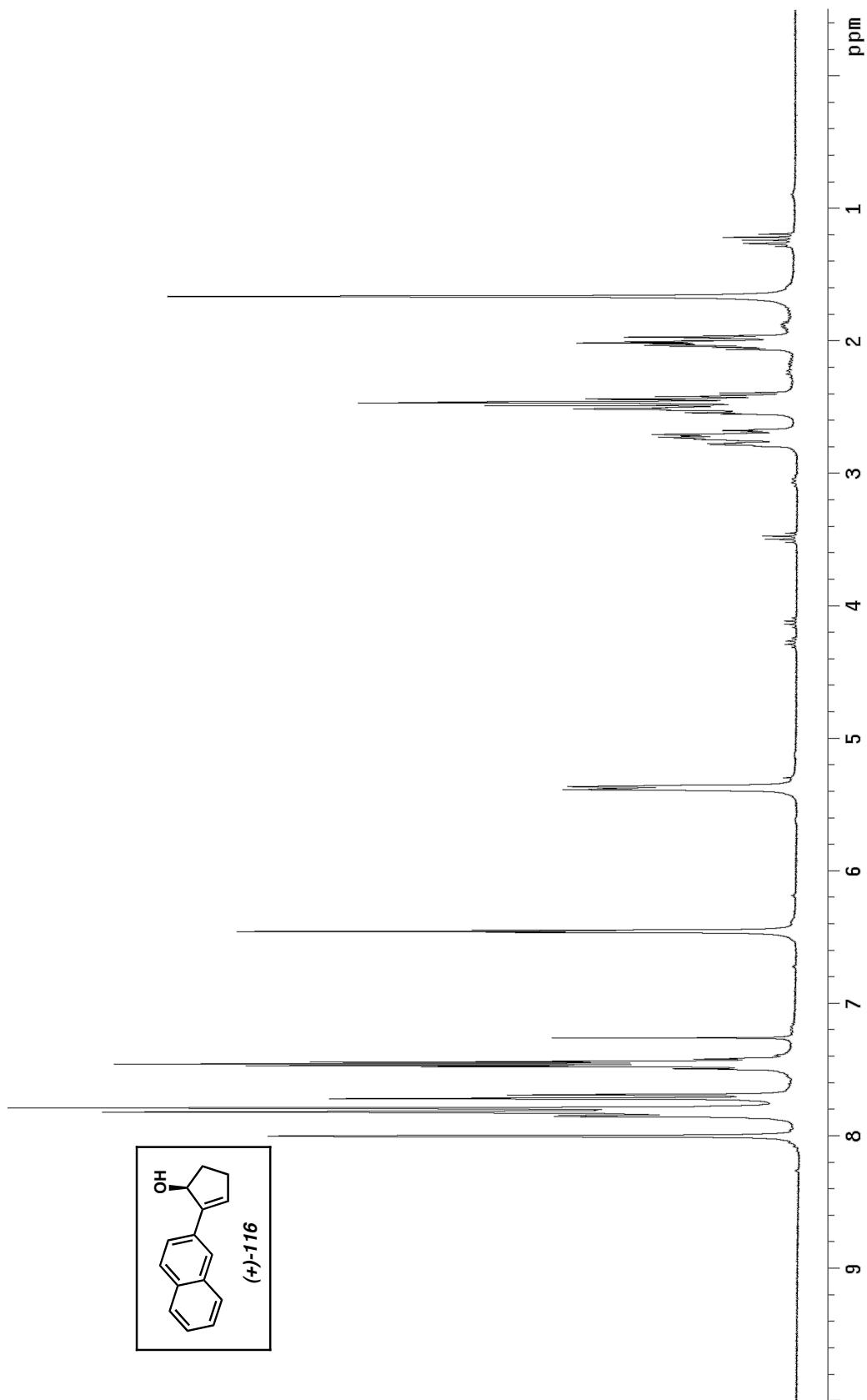


Figure A1.39 ^{13}C NMR (75 MHz, CDCl_3) of compound **207**.

Figure A1.40 ^1H NMR (300 MHz, CDCl_3) of compound (+)-116.



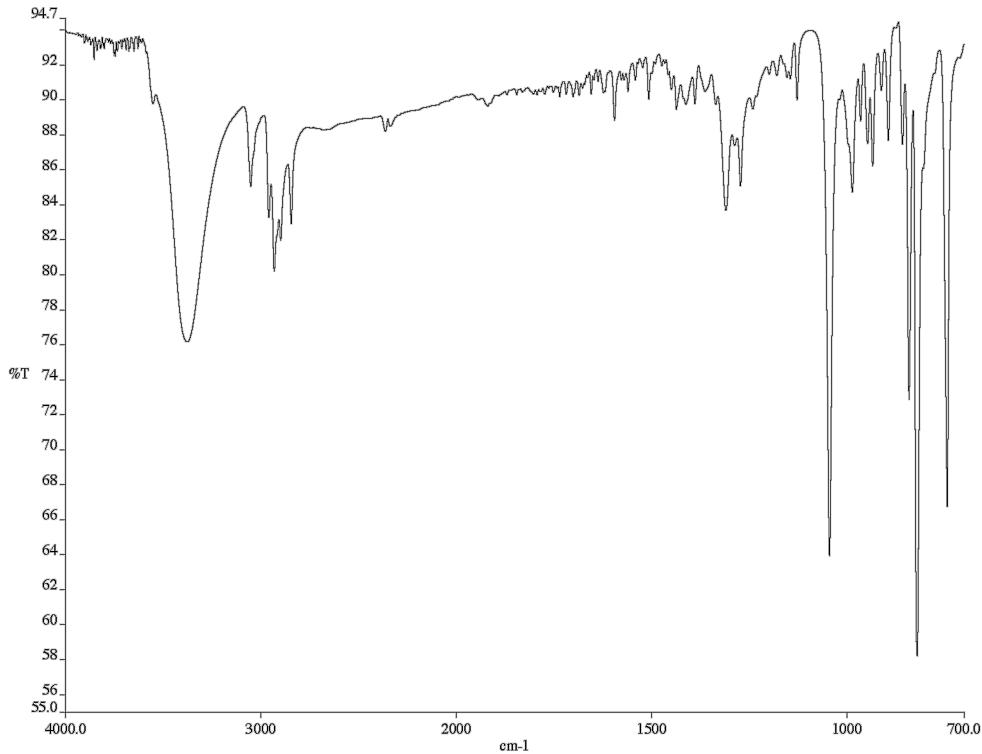


Figure A1.41 Infrared spectrum (thin film/NaCl) of compound (+)-**116**.

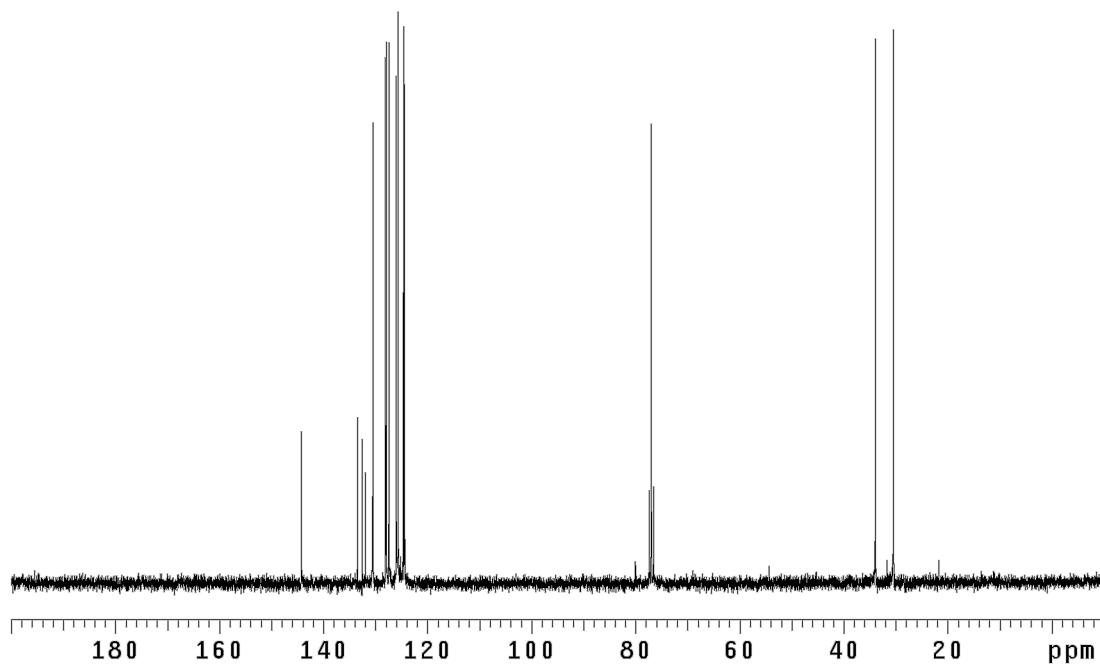


Figure A1.42 ¹³C NMR (75 MHz, CDCl₃) of compound (+)-**116**.

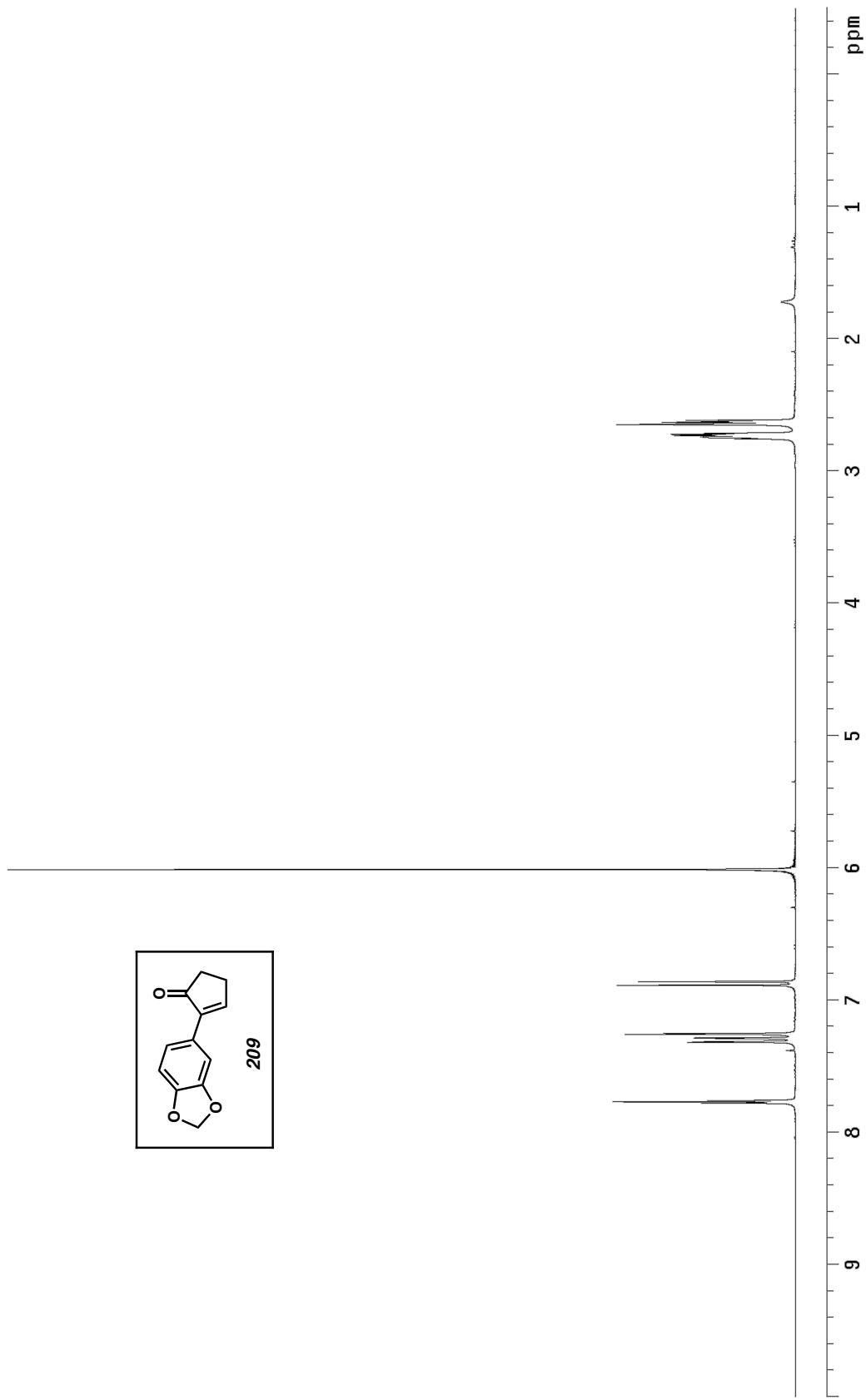


Figure A1.43 ^1H NMR (300 MHz, CDCl_3) of compound 209.

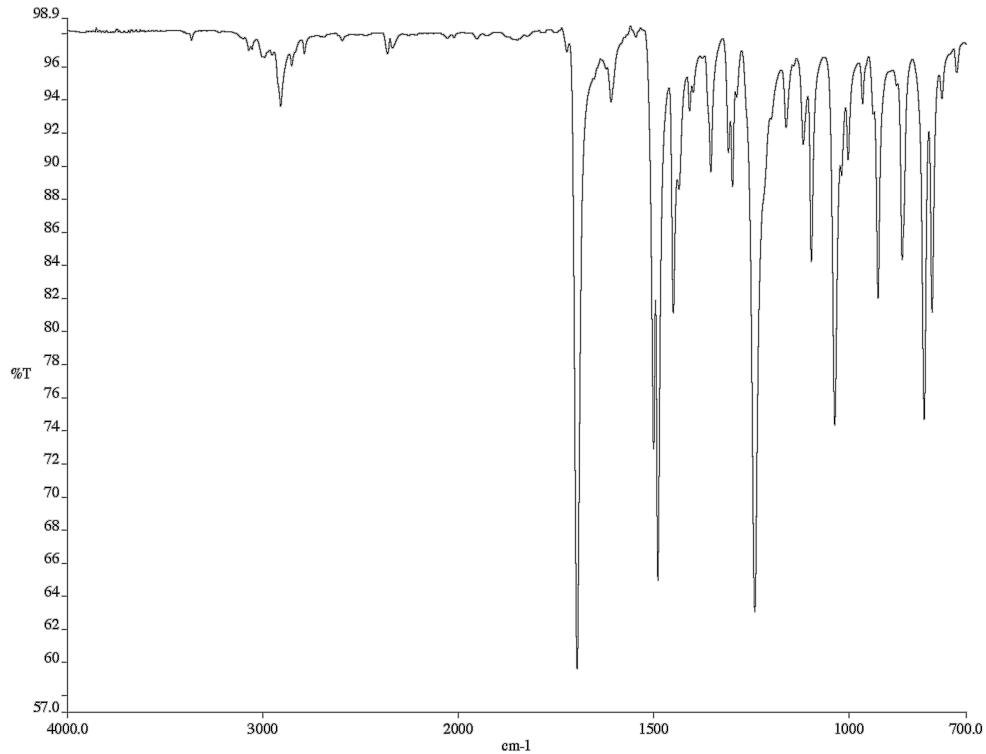


Figure A1.44 Infrared spectrum (thin film/NaCl) of compound **209**.

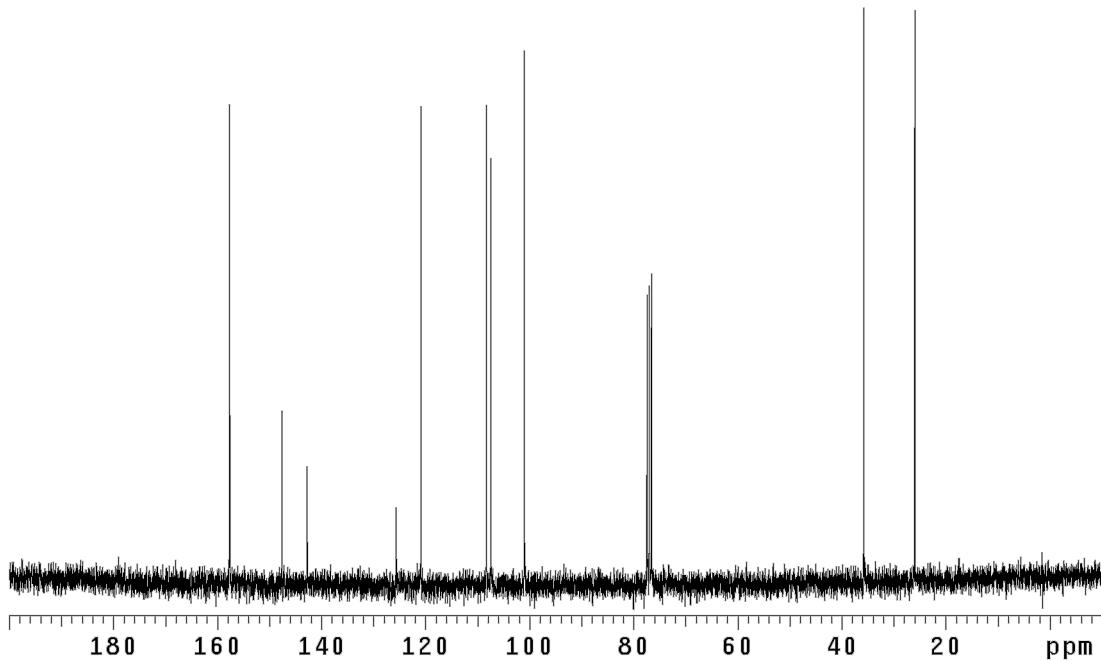


Figure A1.45 ^{13}C NMR (75 MHz, CDCl_3) of compound **209**.

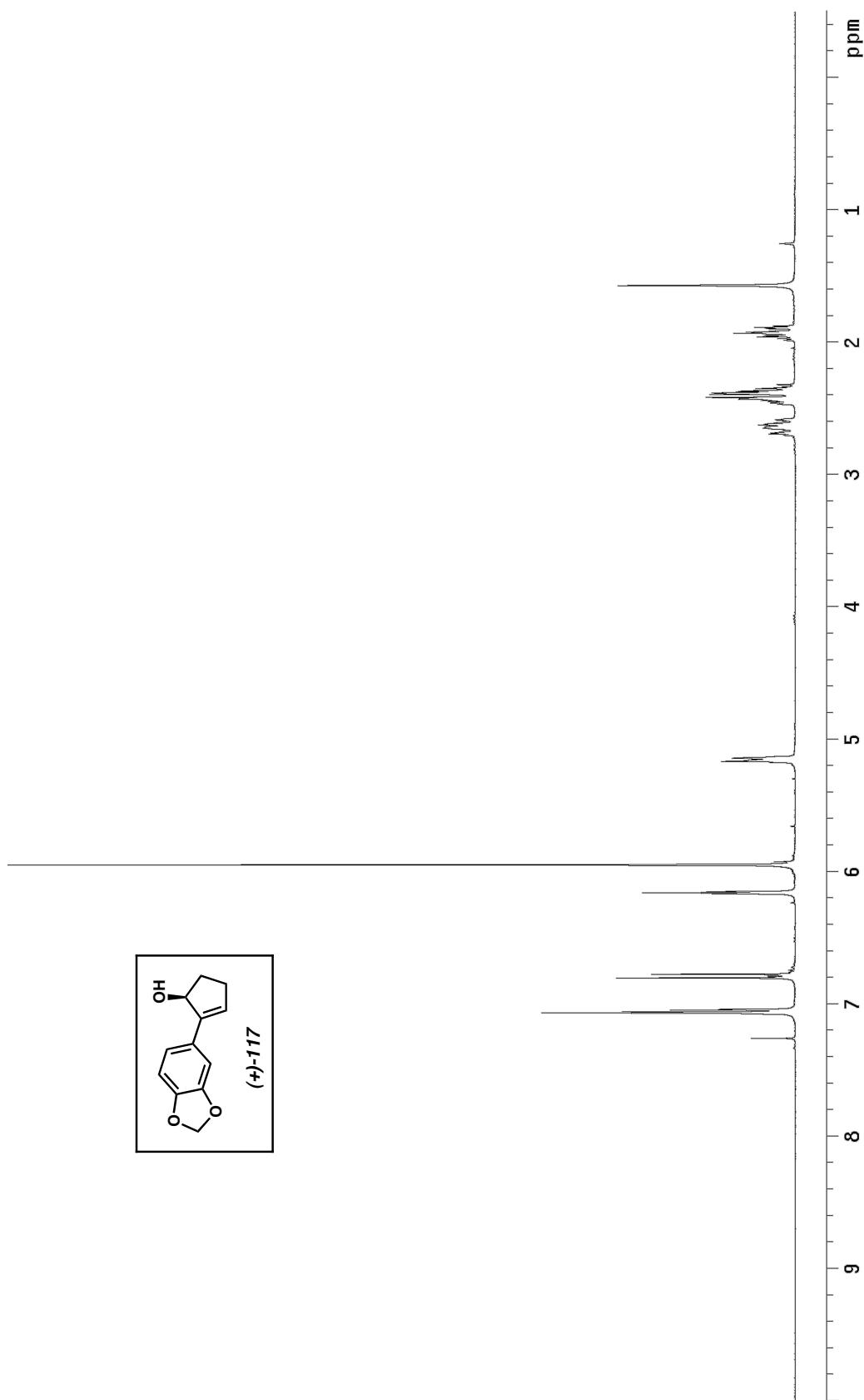


Figure A1.46 ^1H NMR (300 MHz, CDCl_3) of compound (+)-117.

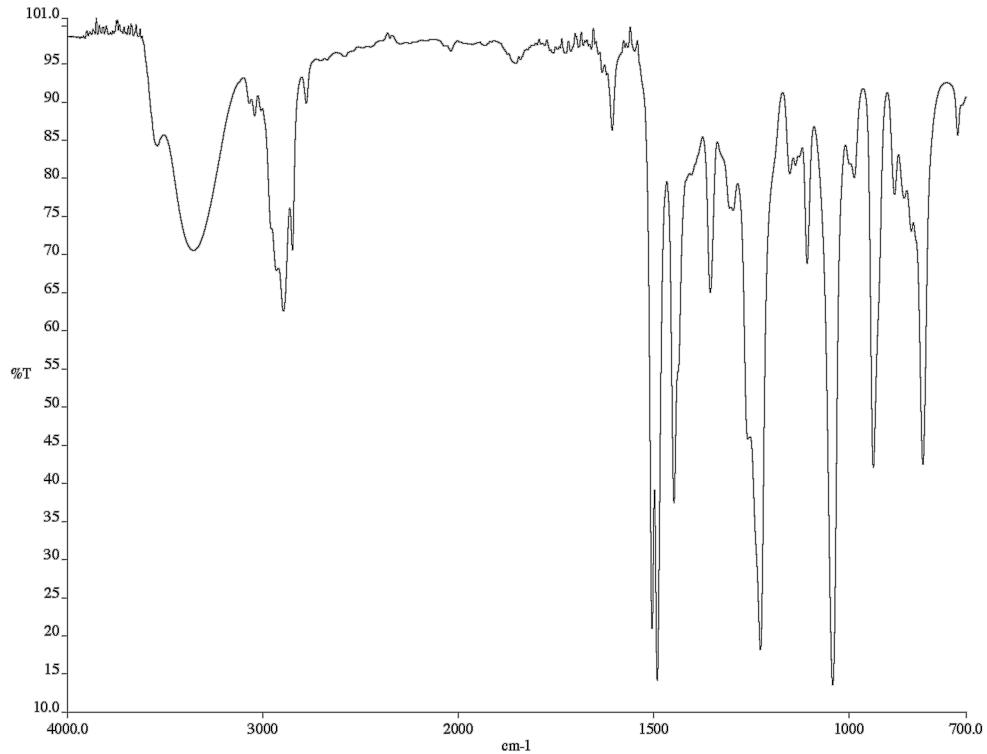


Figure A1.47 Infrared spectrum (thin film/NaCl) of compound (+)-**117**.

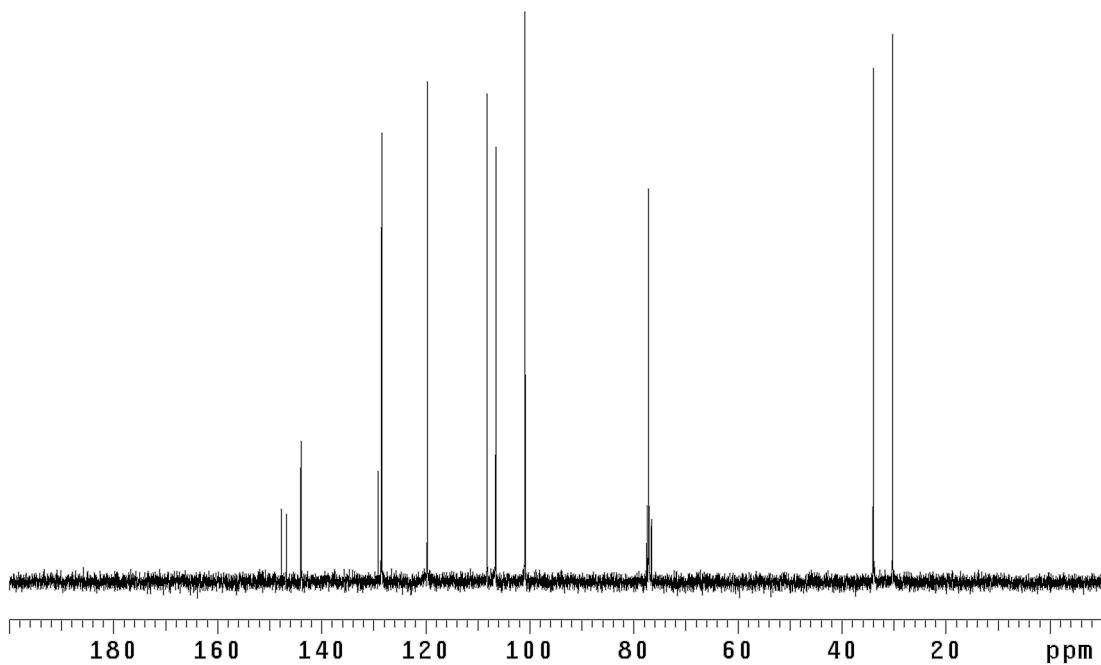
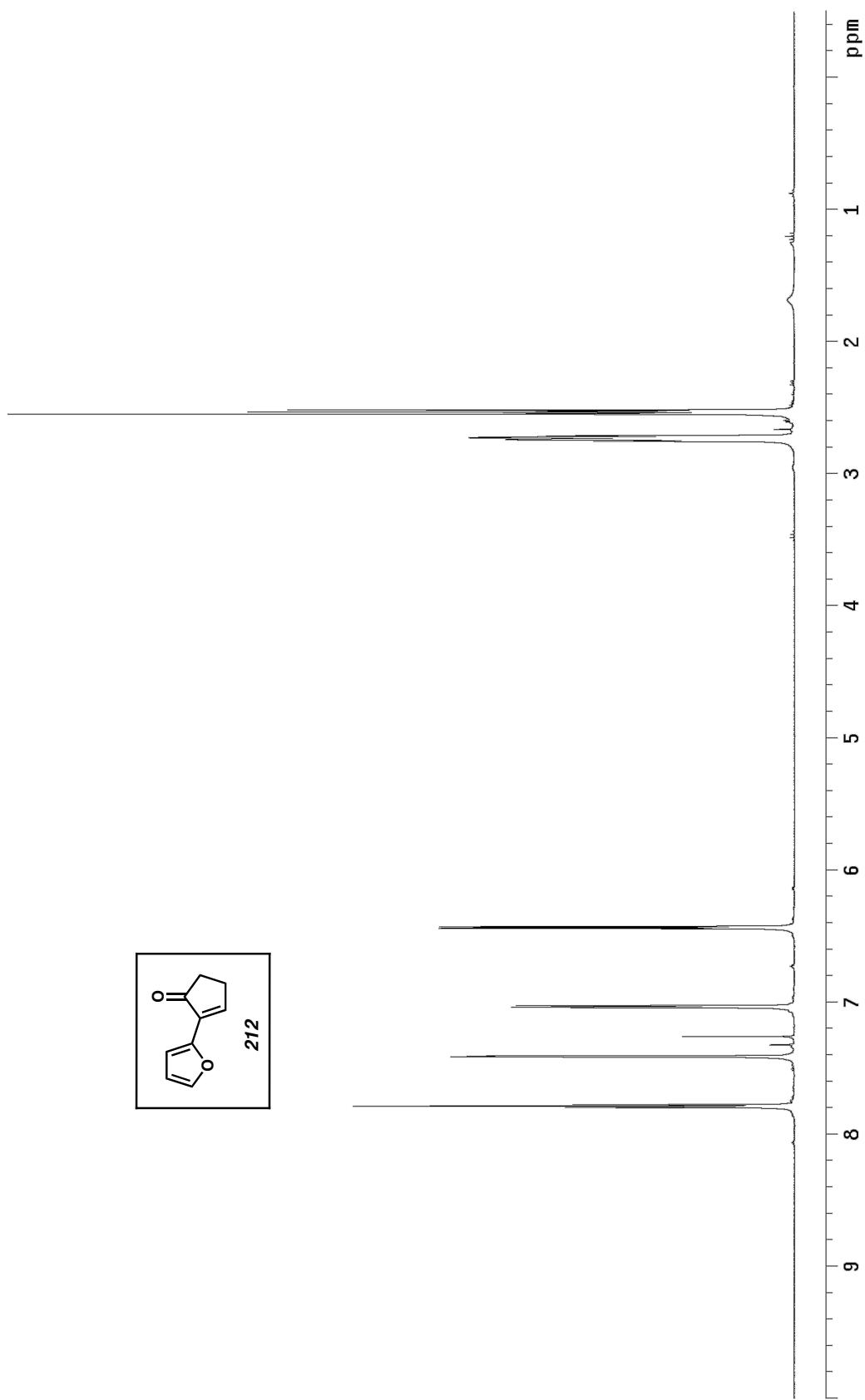


Figure A1.48 ^{13}C NMR (75 MHz, CDCl_3) of compound (+)-**117**.

Figure A1.49 ^1H NMR (300 MHz, CDCl_3) of compound 212.



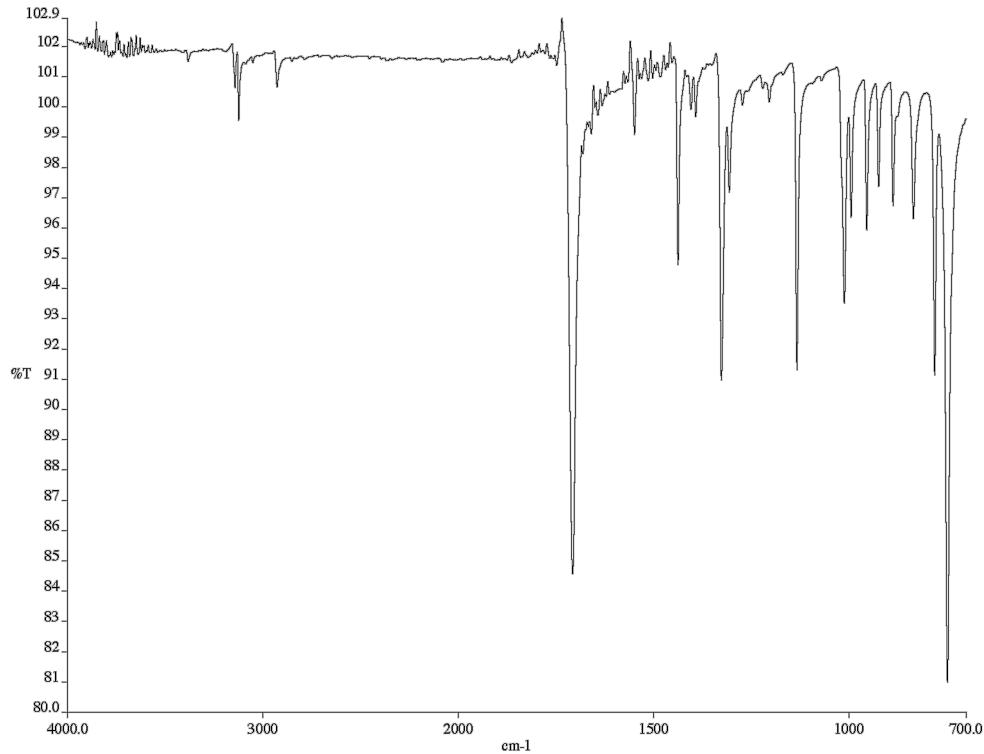


Figure A1.50 Infrared spectrum (thin film/NaCl) of compound **212**.

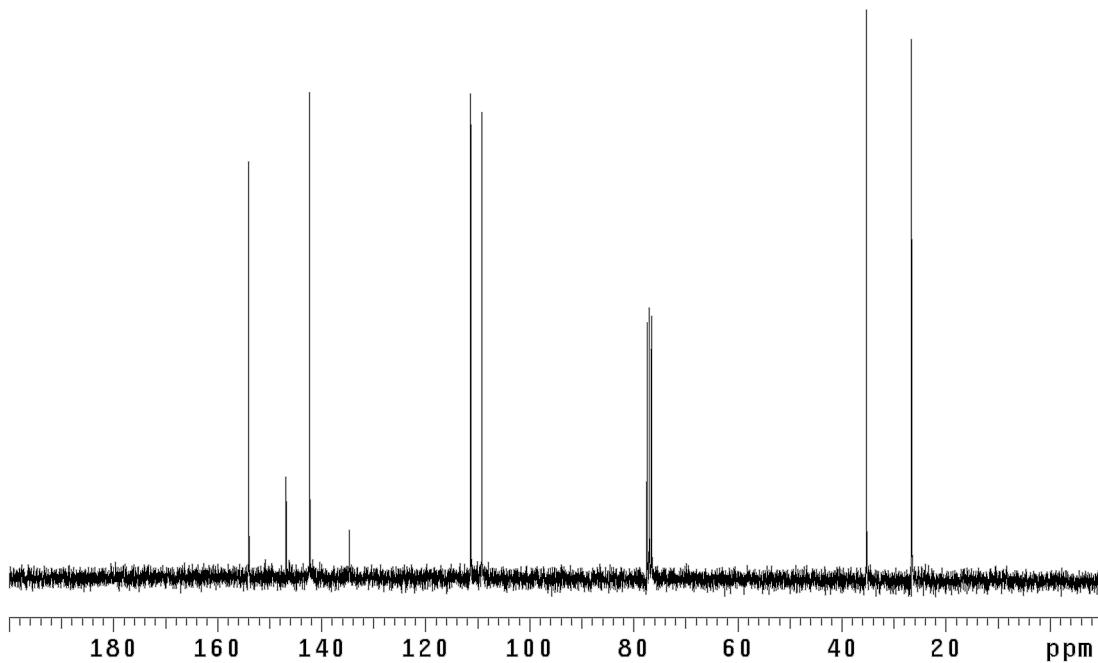
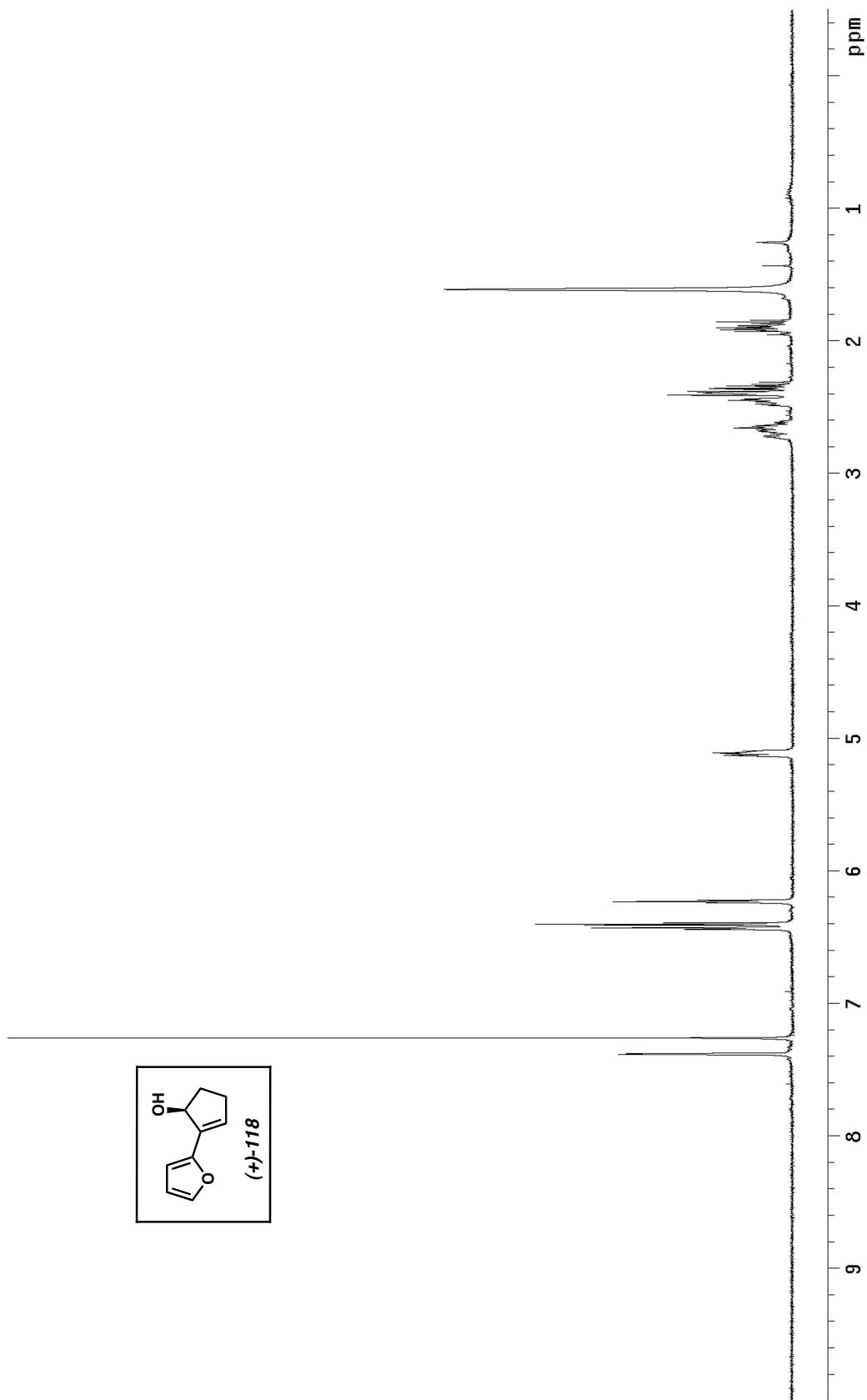


Figure A1.51 ^{13}C NMR (75 MHz, CDCl_3) of compound **212**.

Figure A1.52 ^1H NMR (300 MHz, CDCl_3) of compound (+)-118.



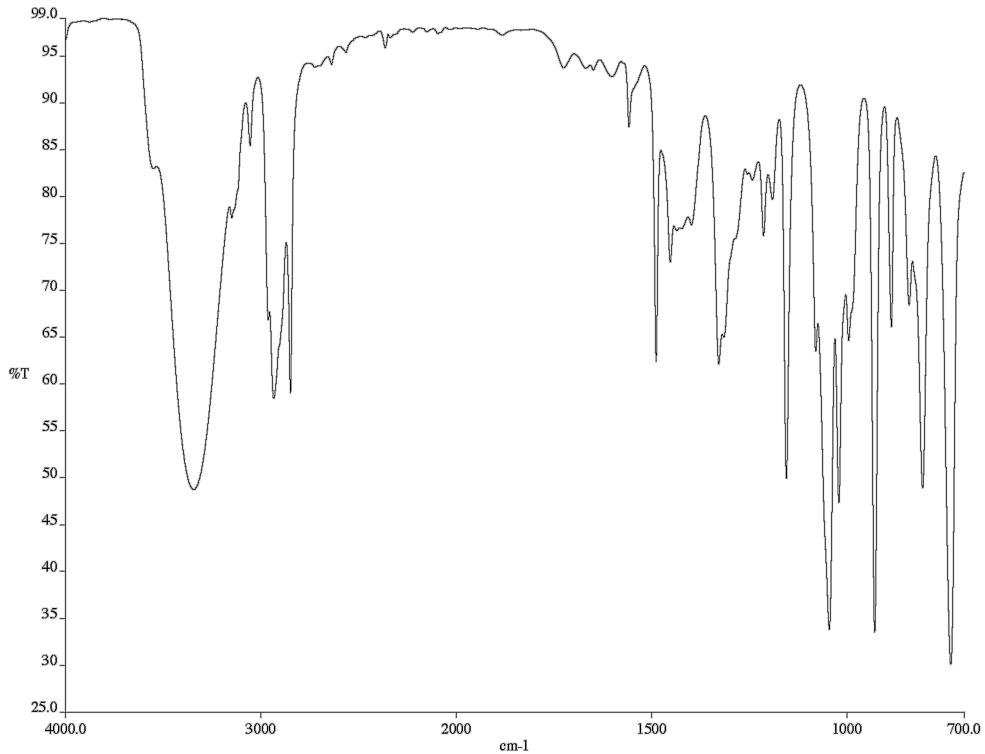


Figure A1.53 Infrared spectrum (thin film/NaCl) of compound (+)-**118**.

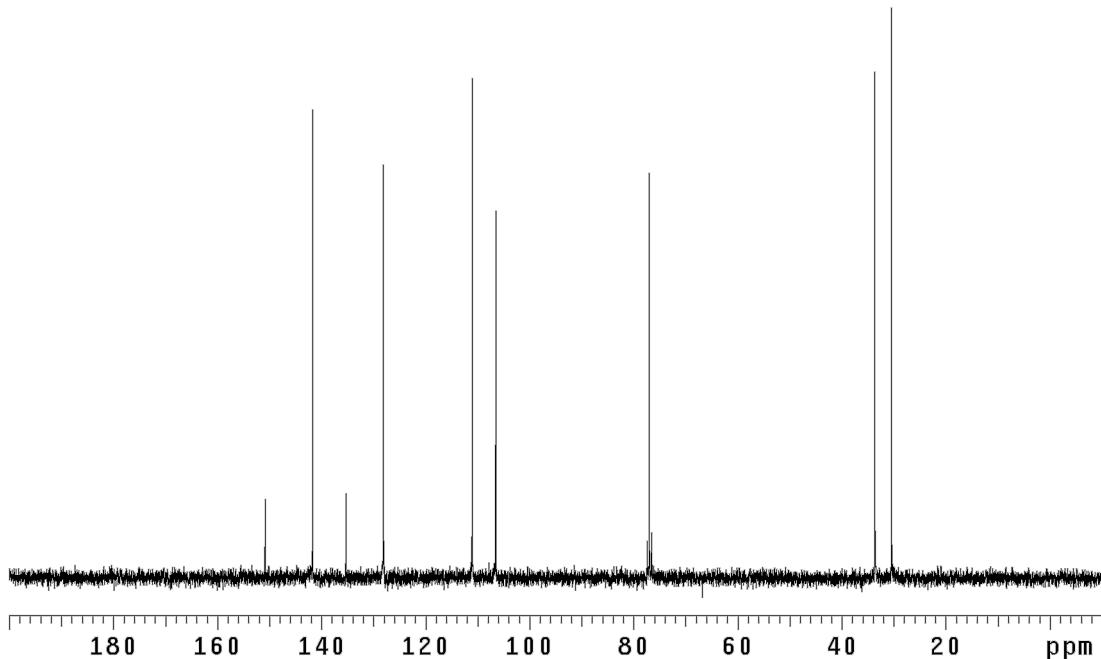


Figure A1.54 ^{13}C NMR (75 MHz, CDCl_3) of compound (+)-**118**.

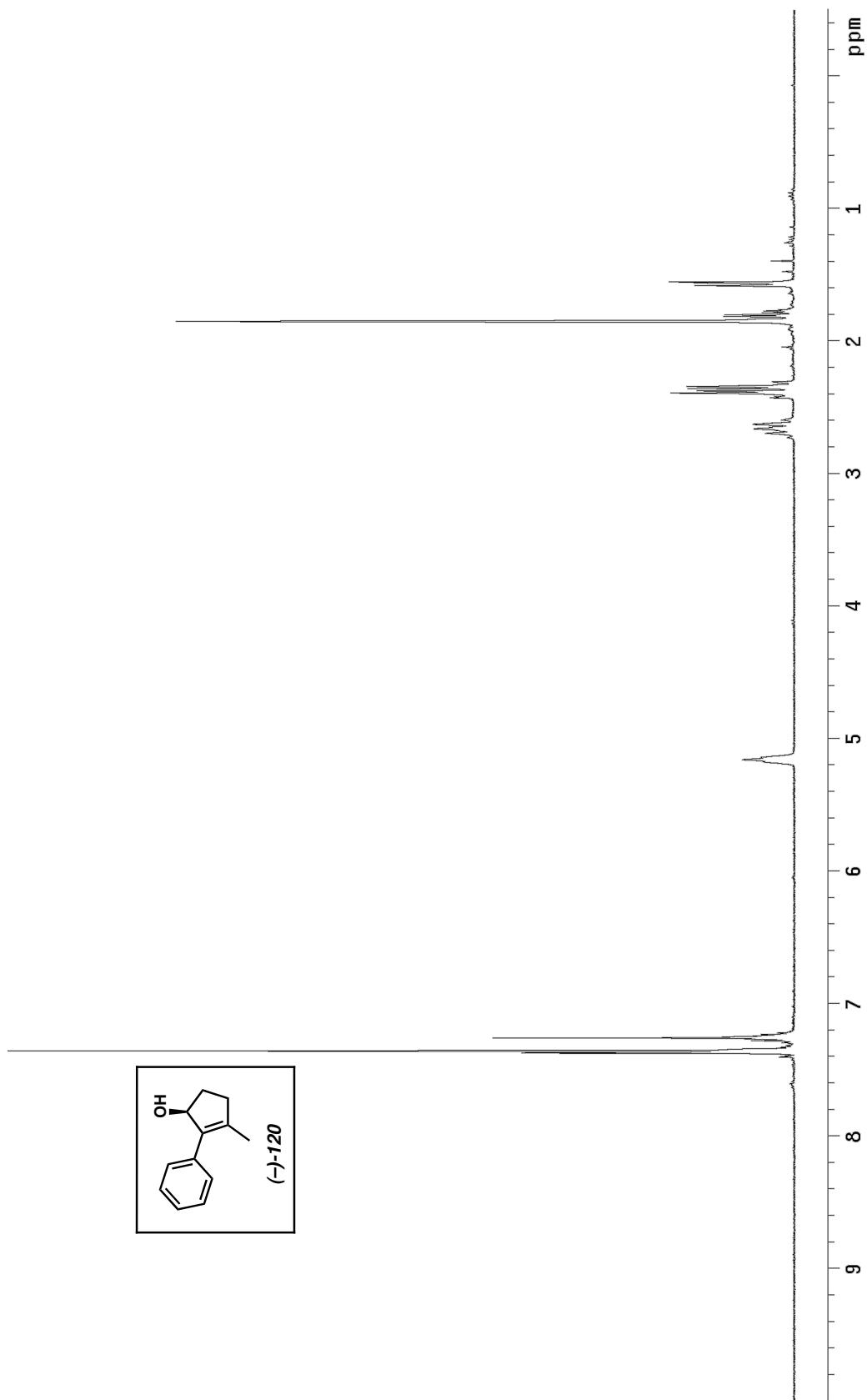


Figure A1.55 ^1H NMR (300 MHz, CDCl₃) of compound ($-$)-120.

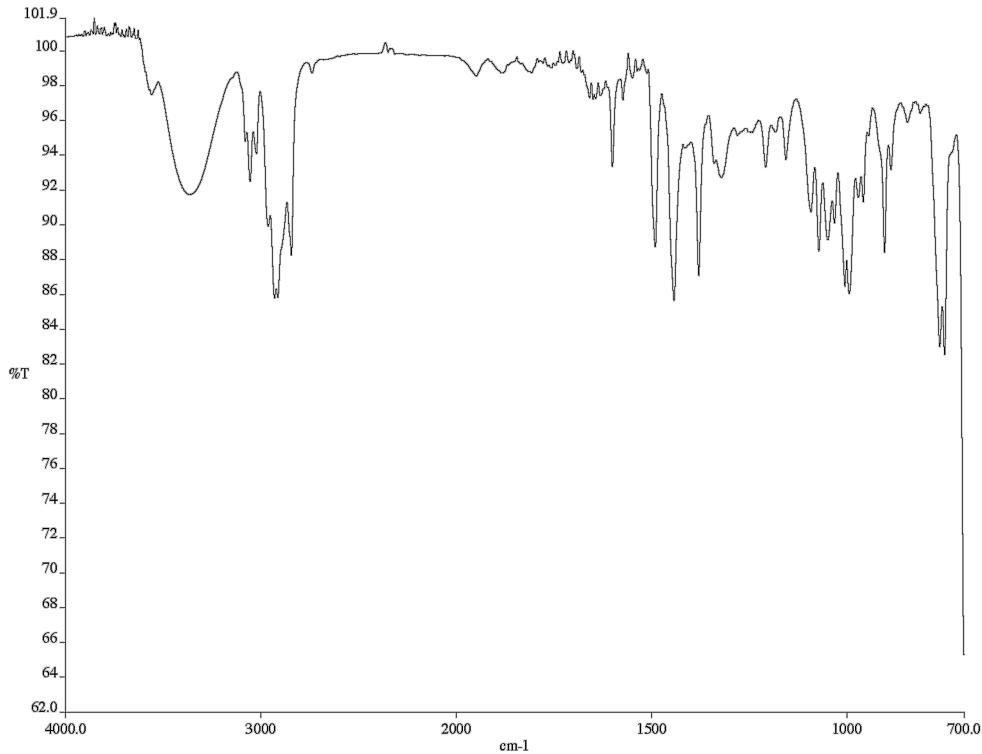


Figure A1.56 Infrared spectrum (thin film/NaCl) of compound (-)-**120**.

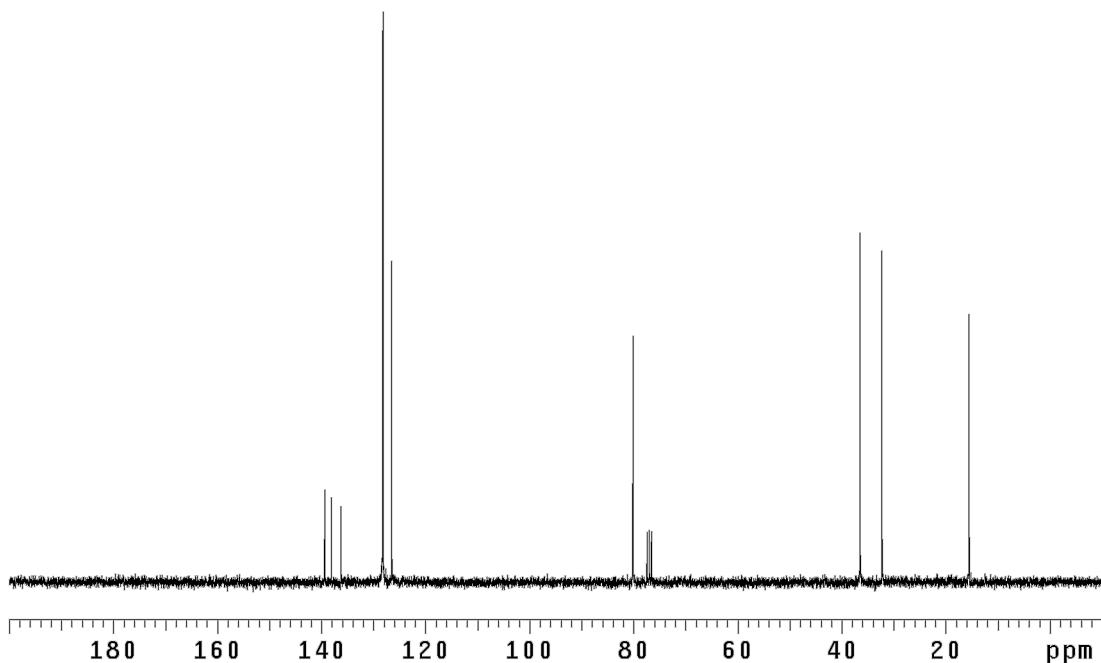


Figure A1.57 ¹³C NMR (75 MHz, CDCl₃) of compound (-)-**120**.

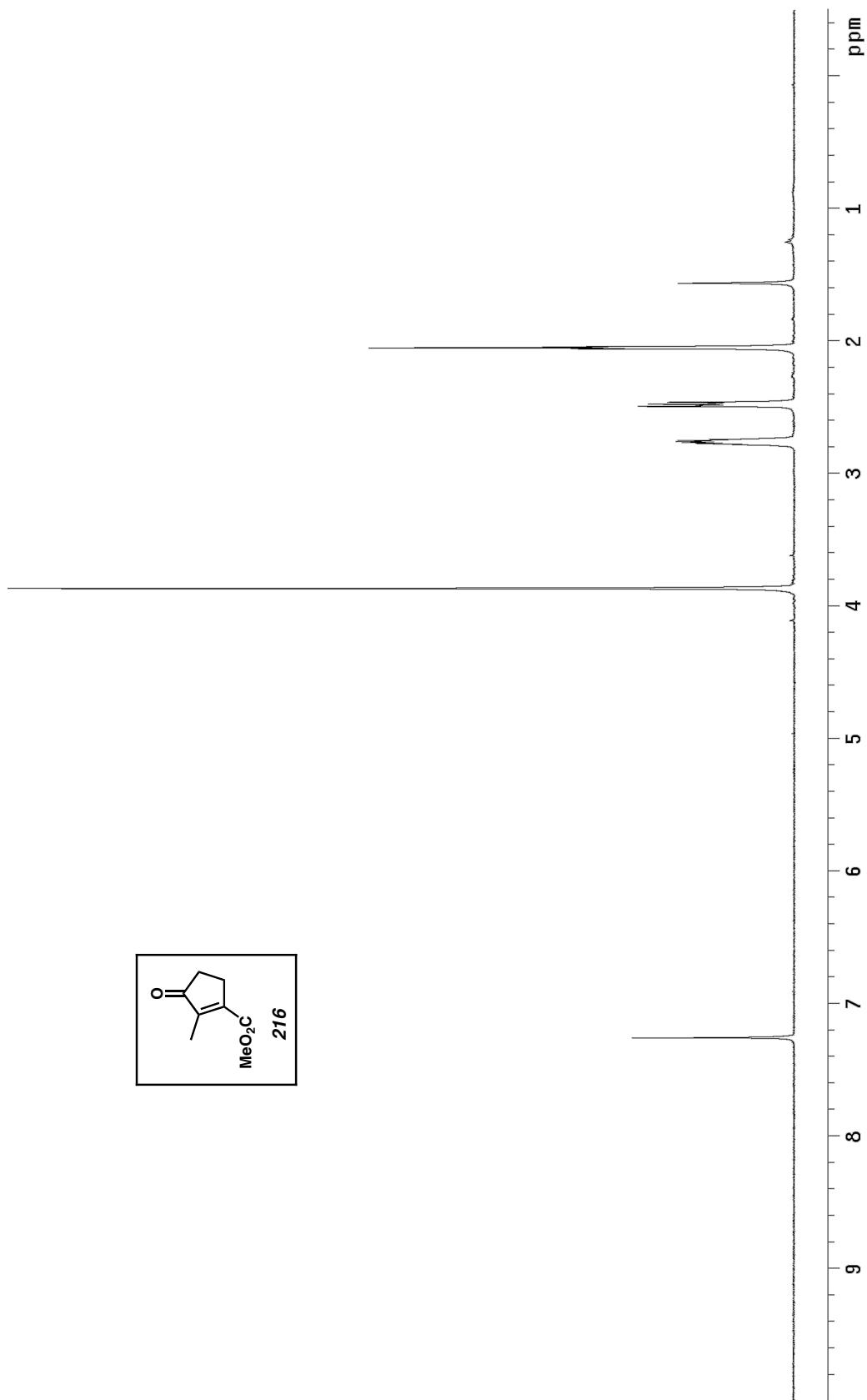


Figure A1.58 ^1H NMR (300 MHz, CDCl_3) of compound 216.

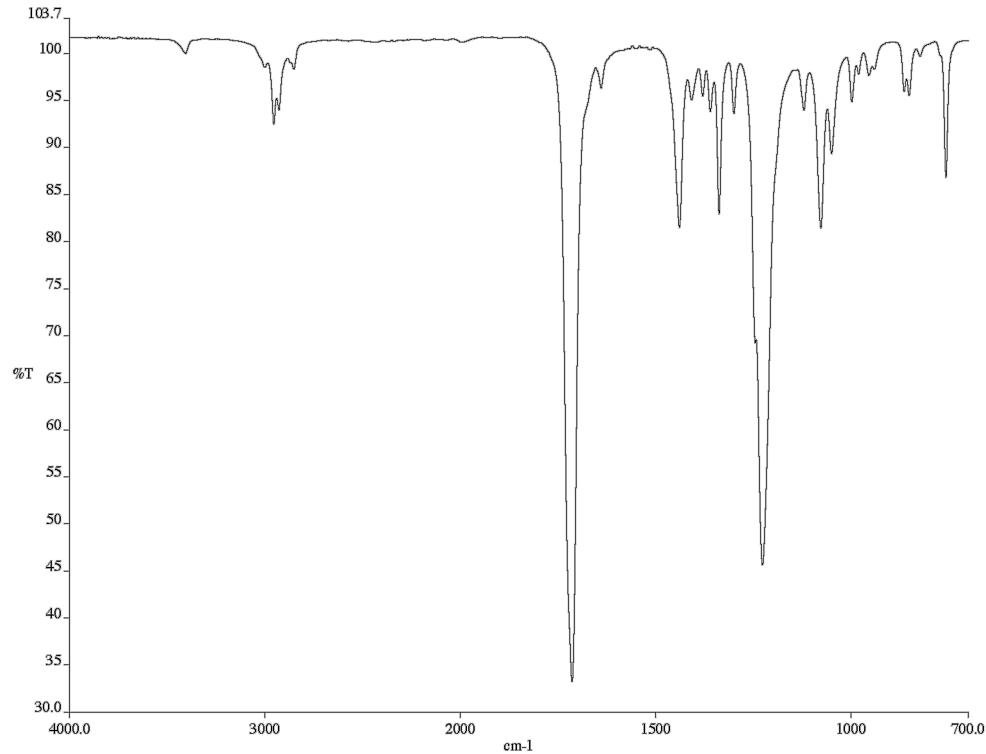


Figure A1.59 Infrared spectrum (thin film/NaCl) of compound **216**.

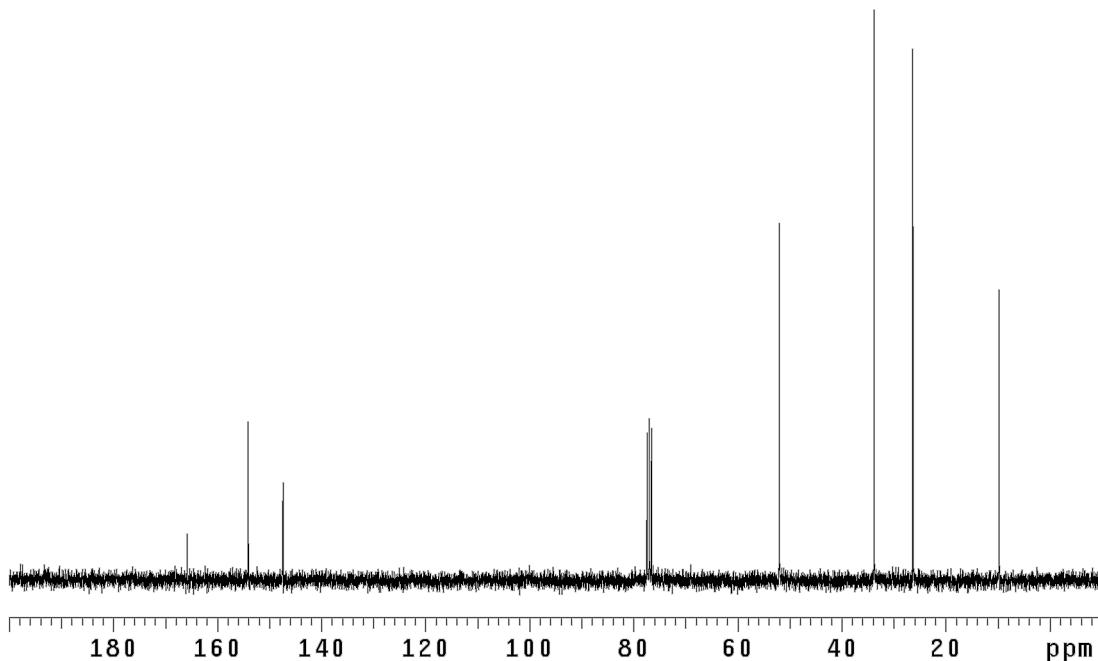
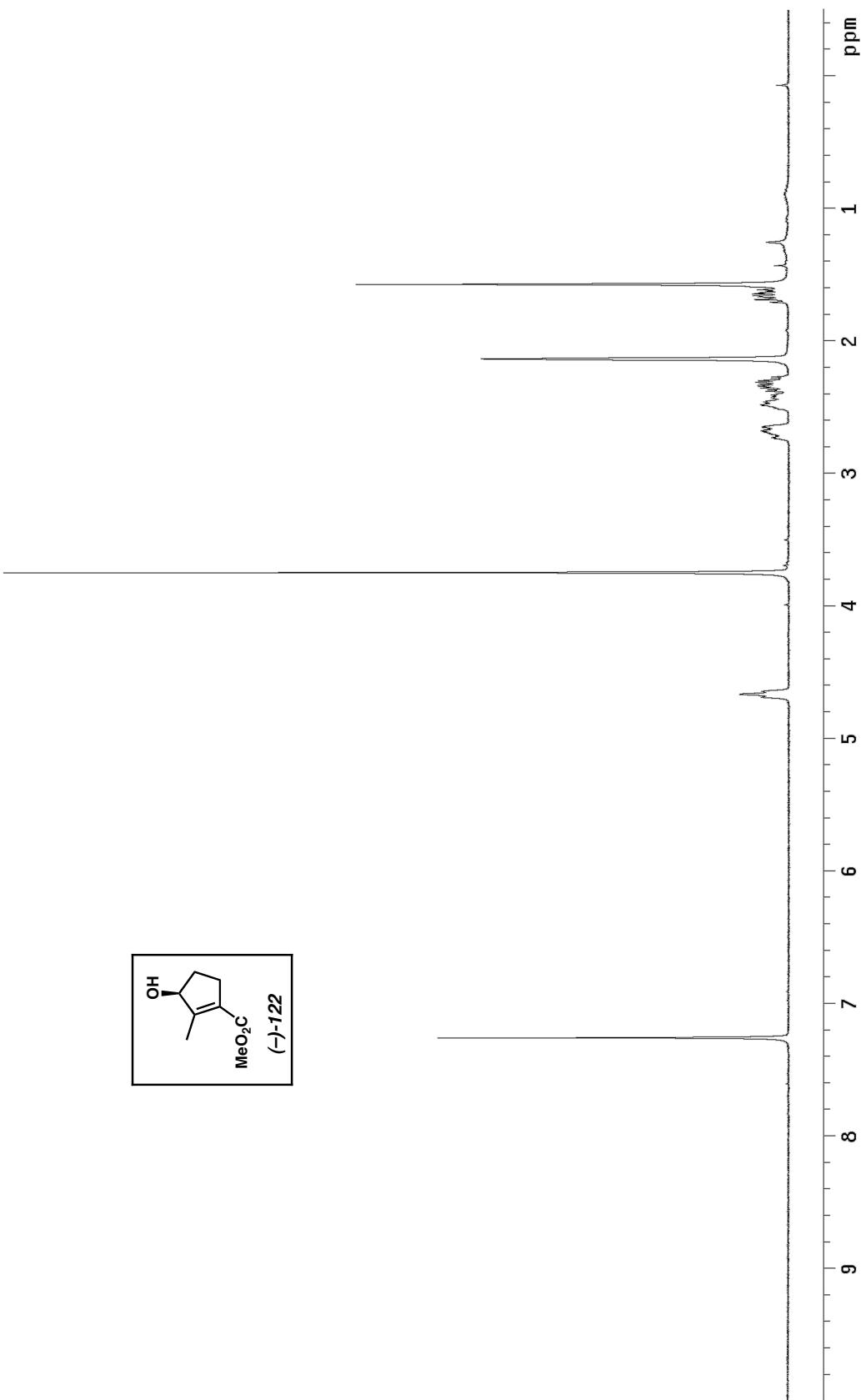


Figure A1.60 ^{13}C NMR (75 MHz, CDCl_3) of compound **216**.

Figure A1.61 ^1H NMR (300 MHz, CDCl_3) of compound (*-*)-122.



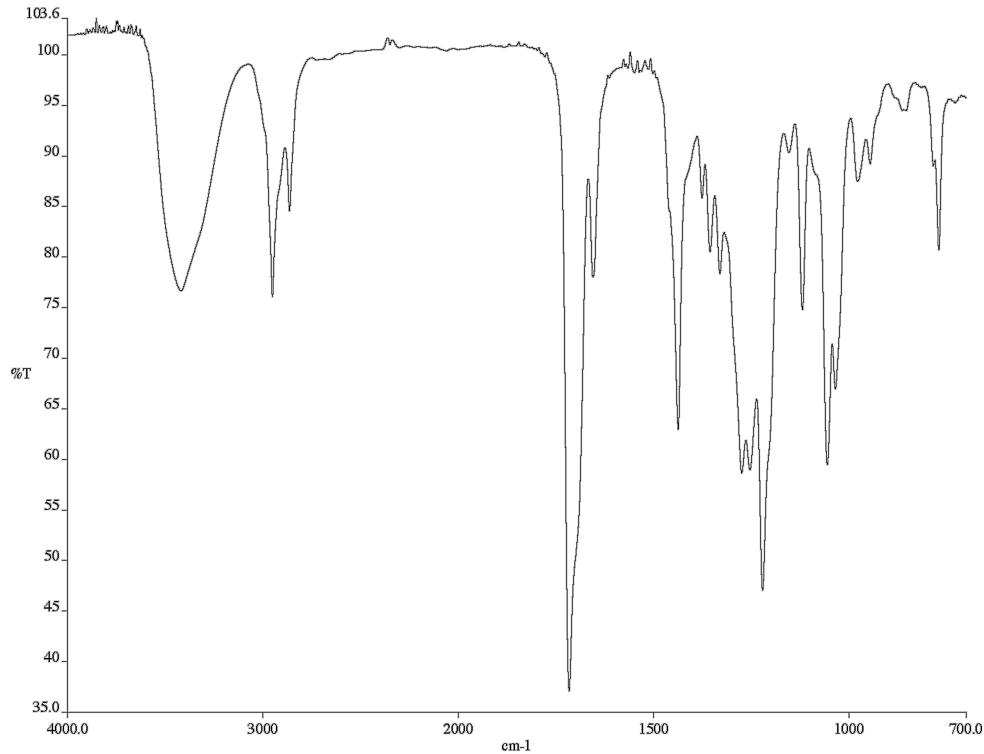


Figure A1.62 Infrared spectrum (thin film/NaCl) of compound (-)-**122**.

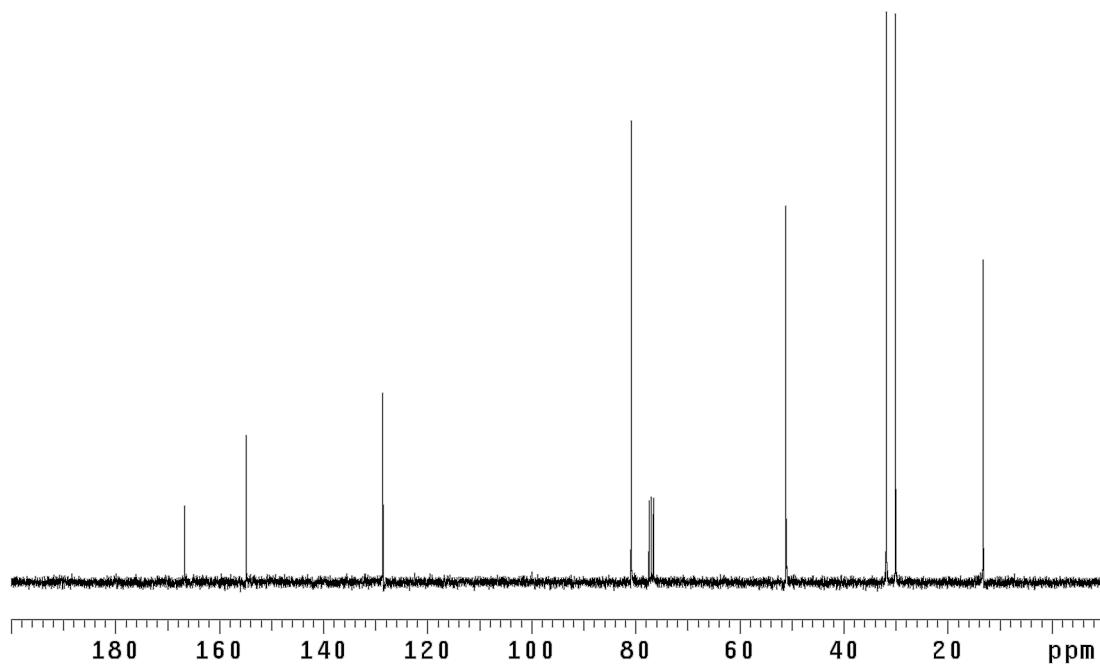


Figure A1.63 ^{13}C NMR (75 MHz, CDCl_3) of compound (-)-**122**.

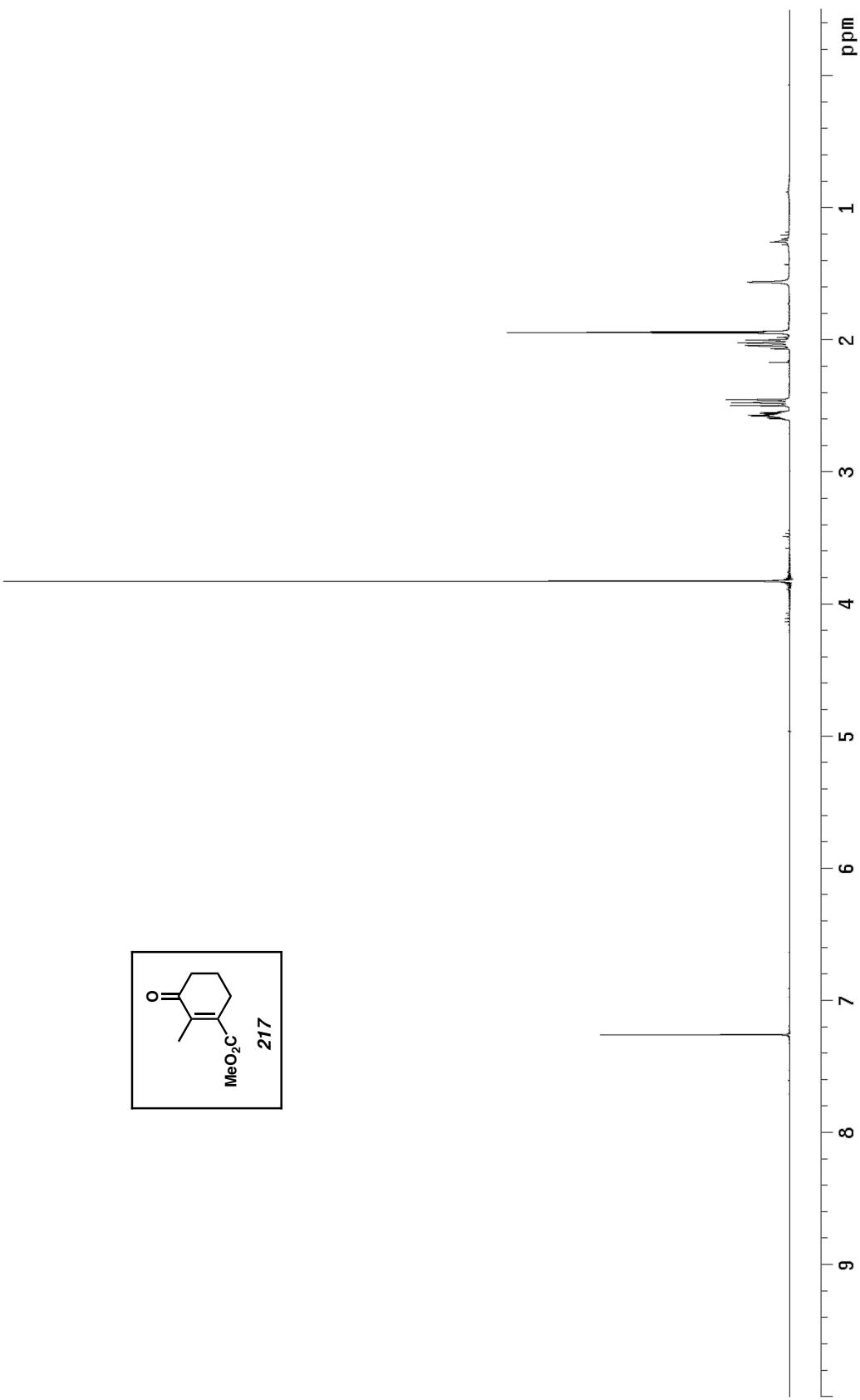


Figure A1.64 ^1H NMR (300 MHz, CDCl_3) of compound 217.

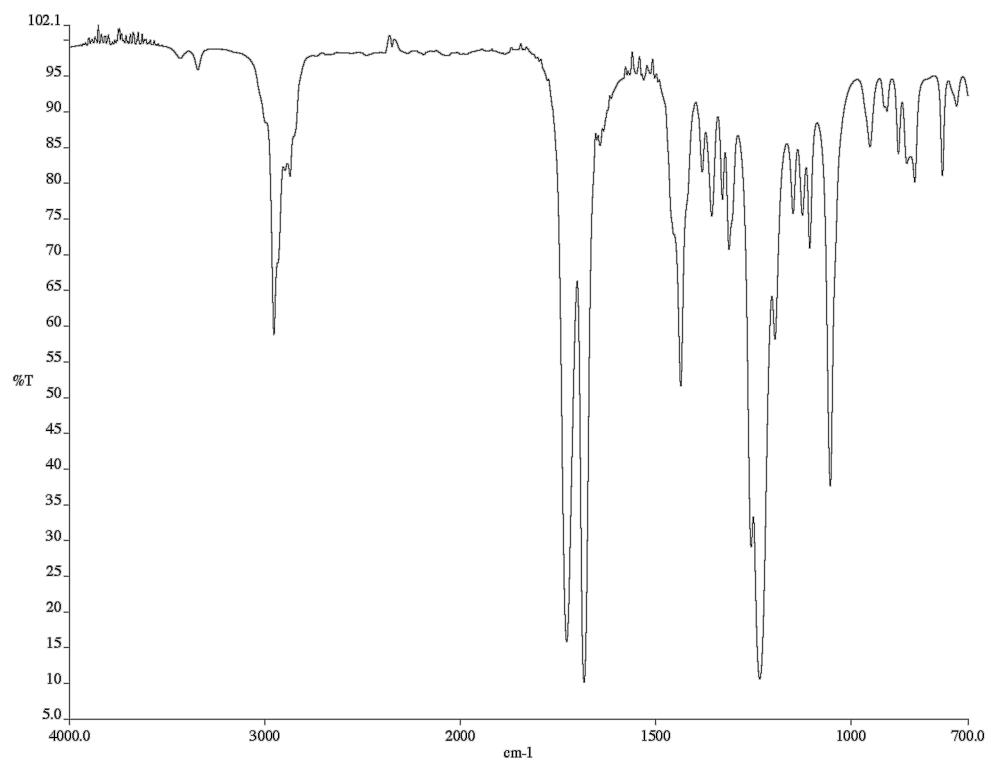


Figure A1.65 Infrared spectrum (thin film/NaCl) of compound **217**.

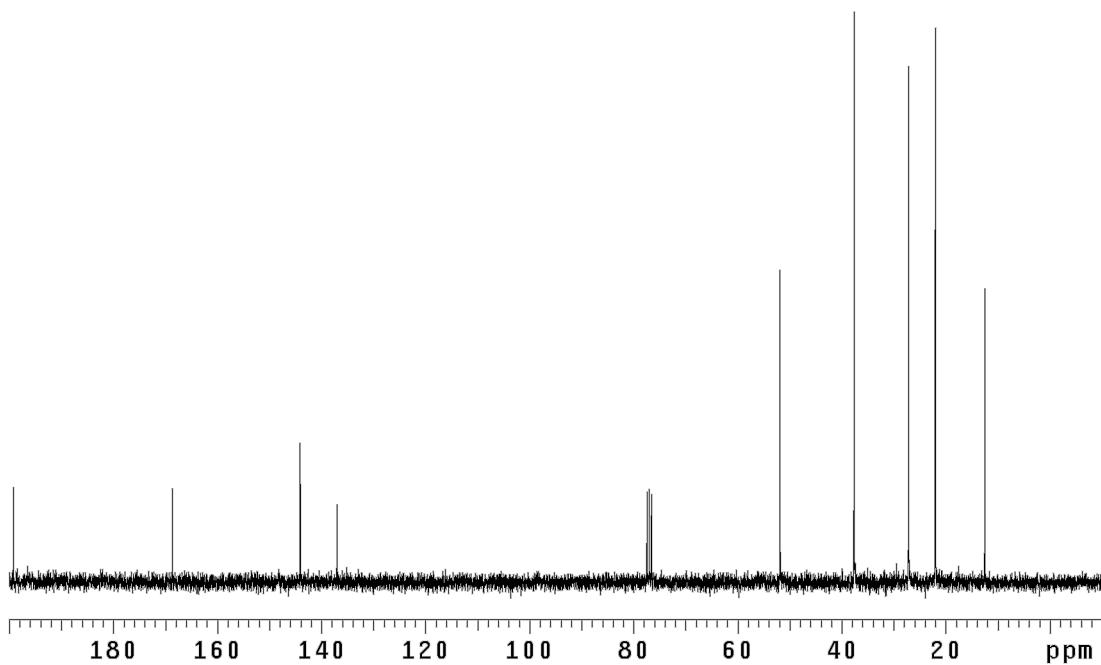


Figure A1.66 ^{13}C NMR (75 MHz, CDCl_3) of compound **217**.

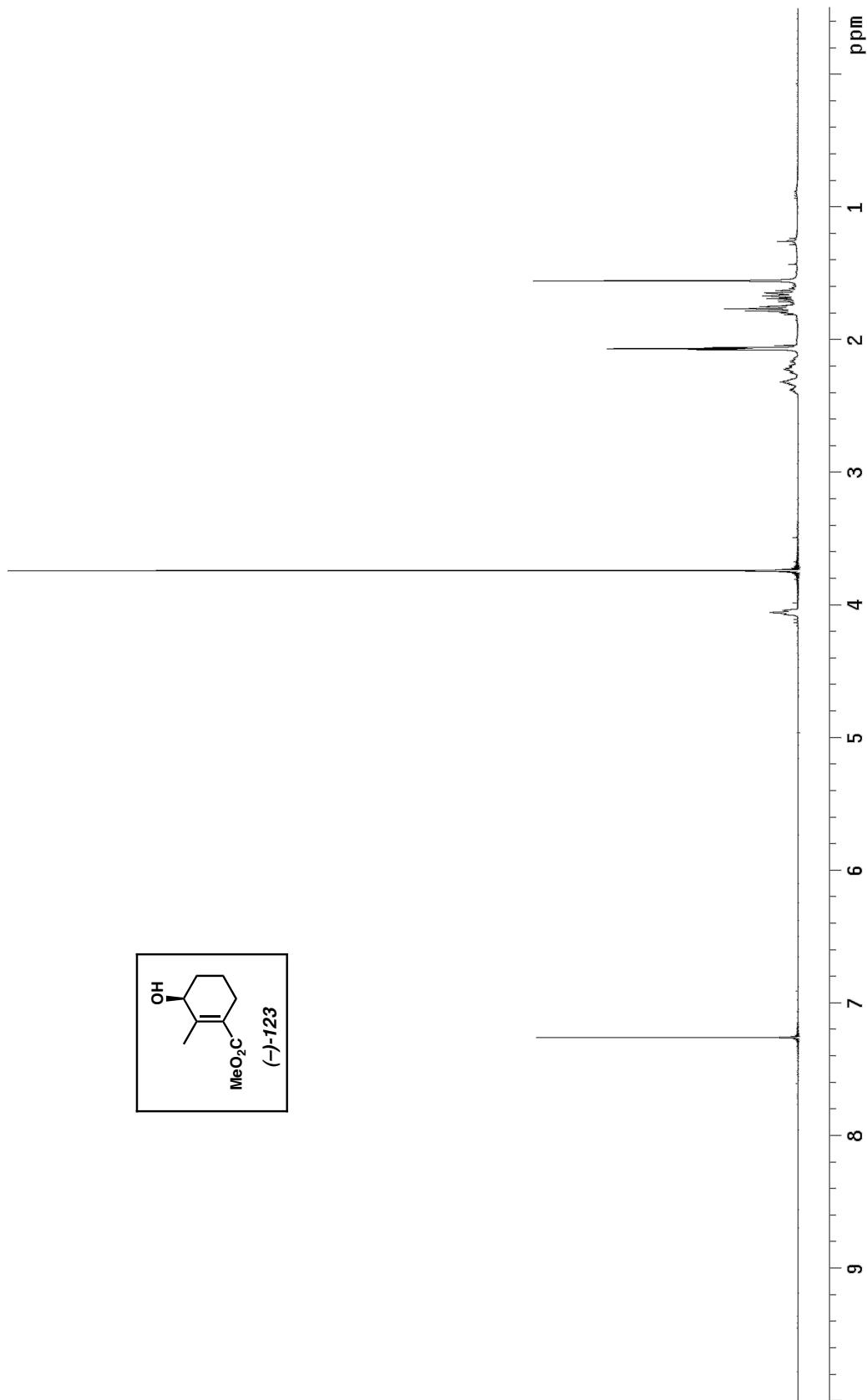


Figure A1.67 ^1H NMR (300 MHz, CDCl_3) of compound ($-$)-123.

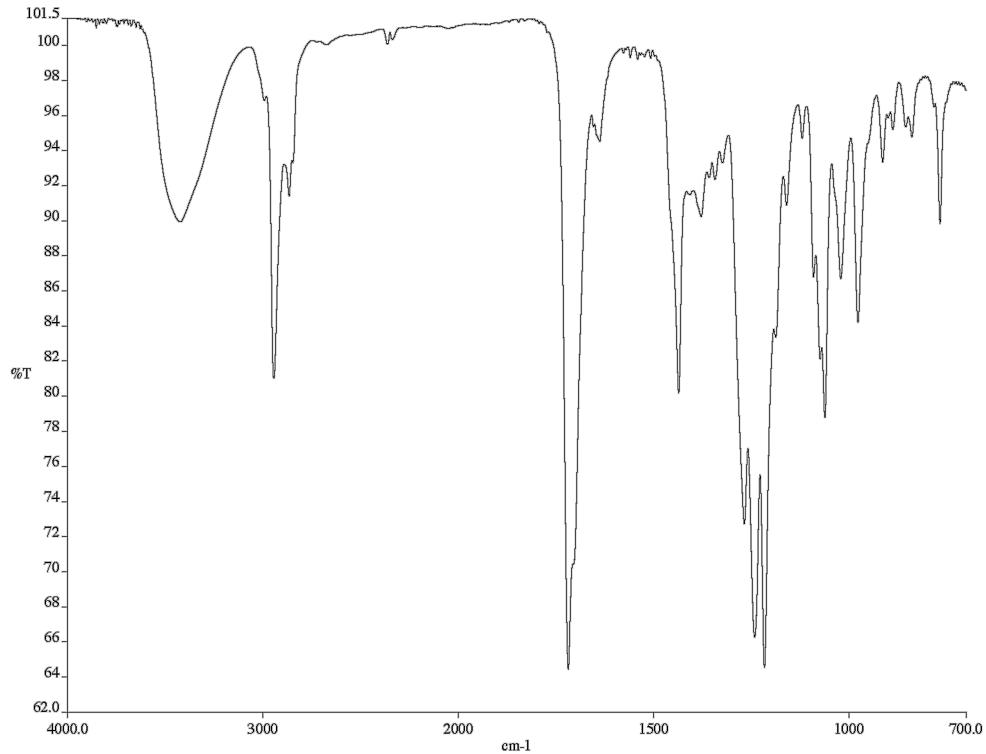


Figure A1.68 Infrared spectrum (thin film/NaCl) of compound (-)-**123**.

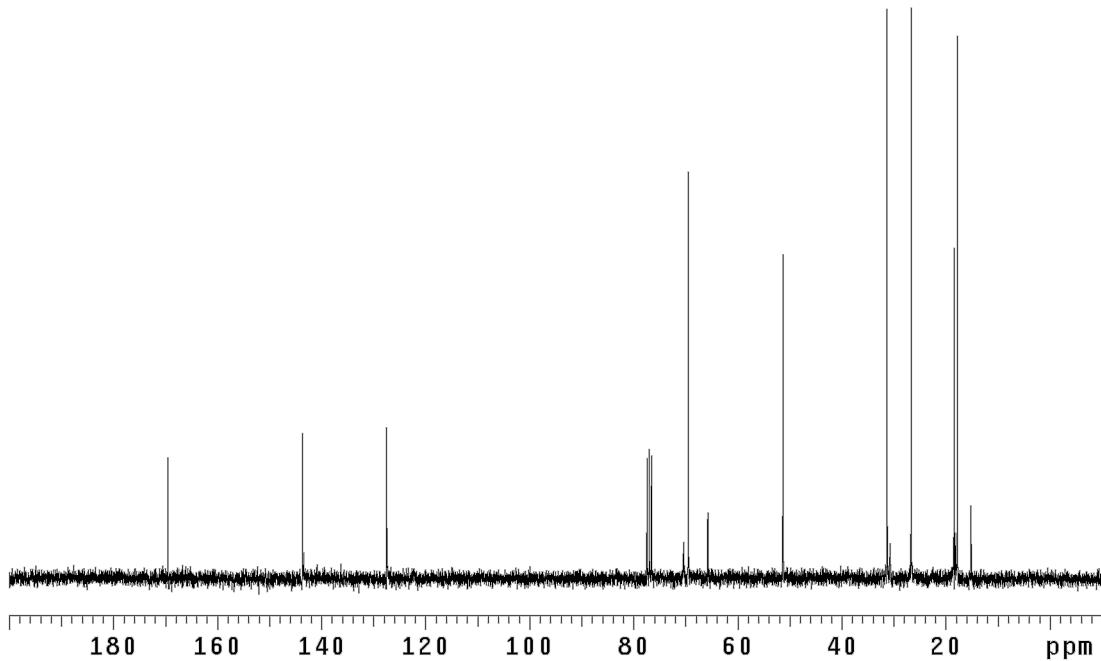


Figure A1.69 ^{13}C NMR (75 MHz, CDCl_3) of compound (-)-**123**.

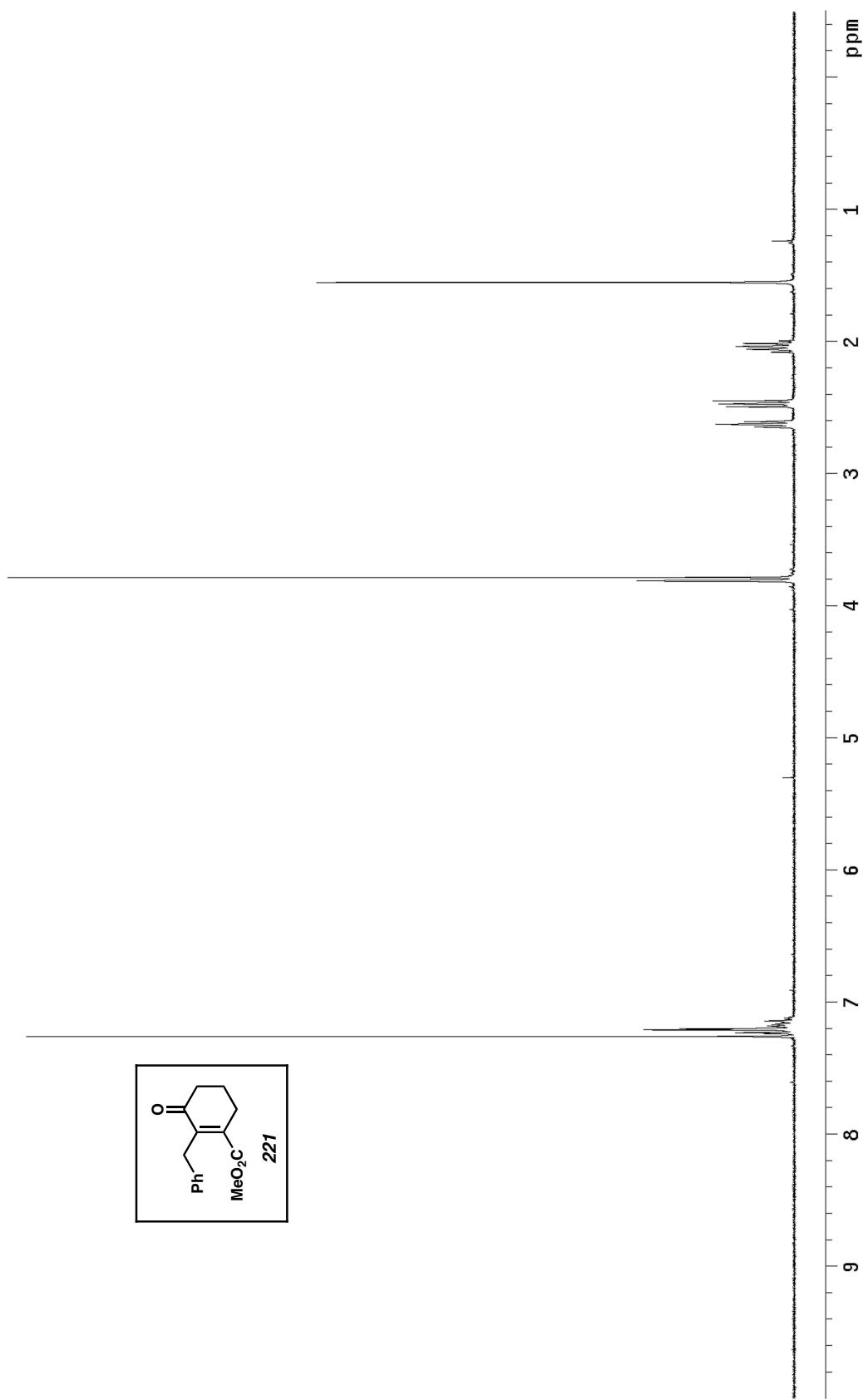


Figure A1.70 ^1H NMR (300 MHz, CDCl_3) of compound 221.

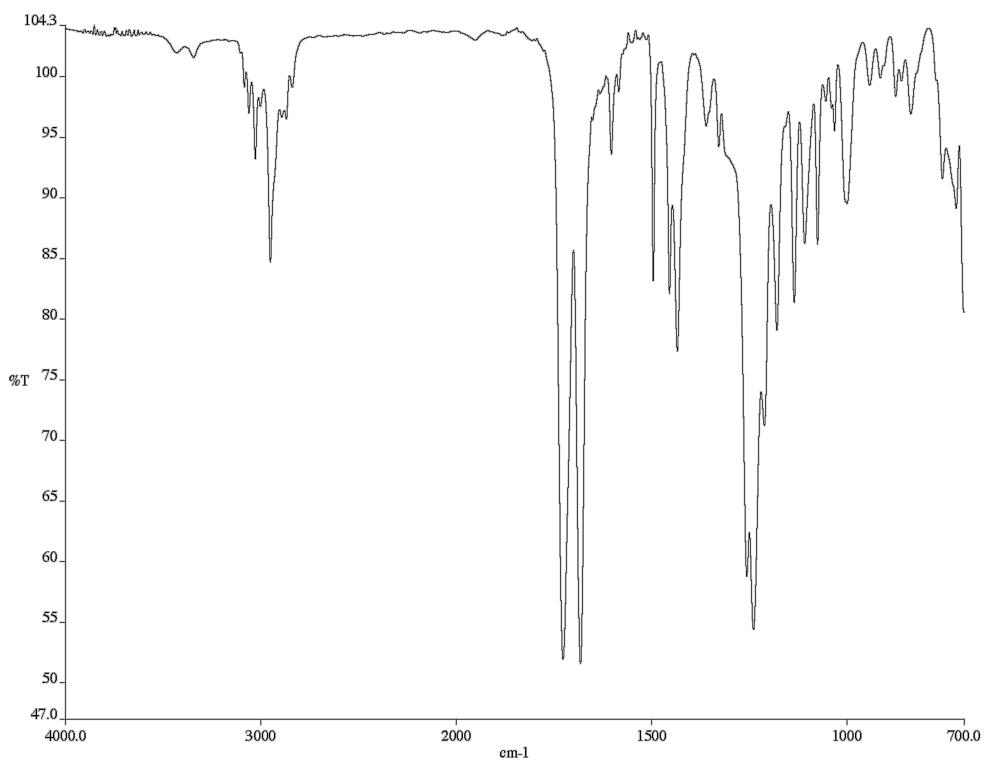


Figure A1.71 Infrared spectrum (thin film/NaCl) of compound **221**.

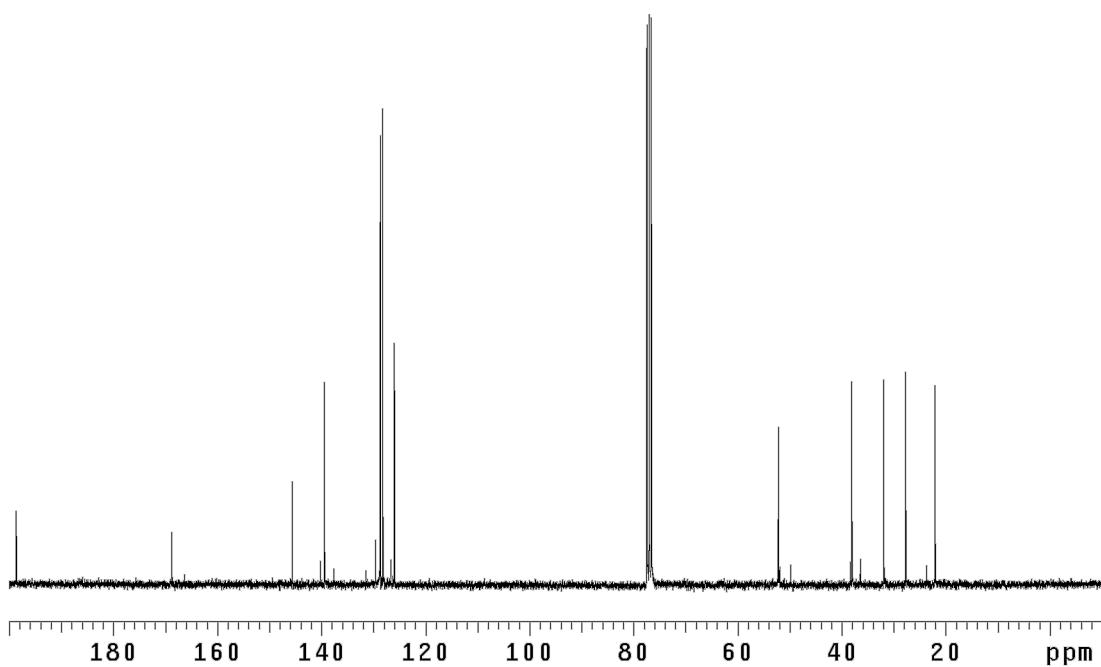


Figure A1.72 ^{13}C NMR (75 MHz, CDCl_3) of compound **221**.

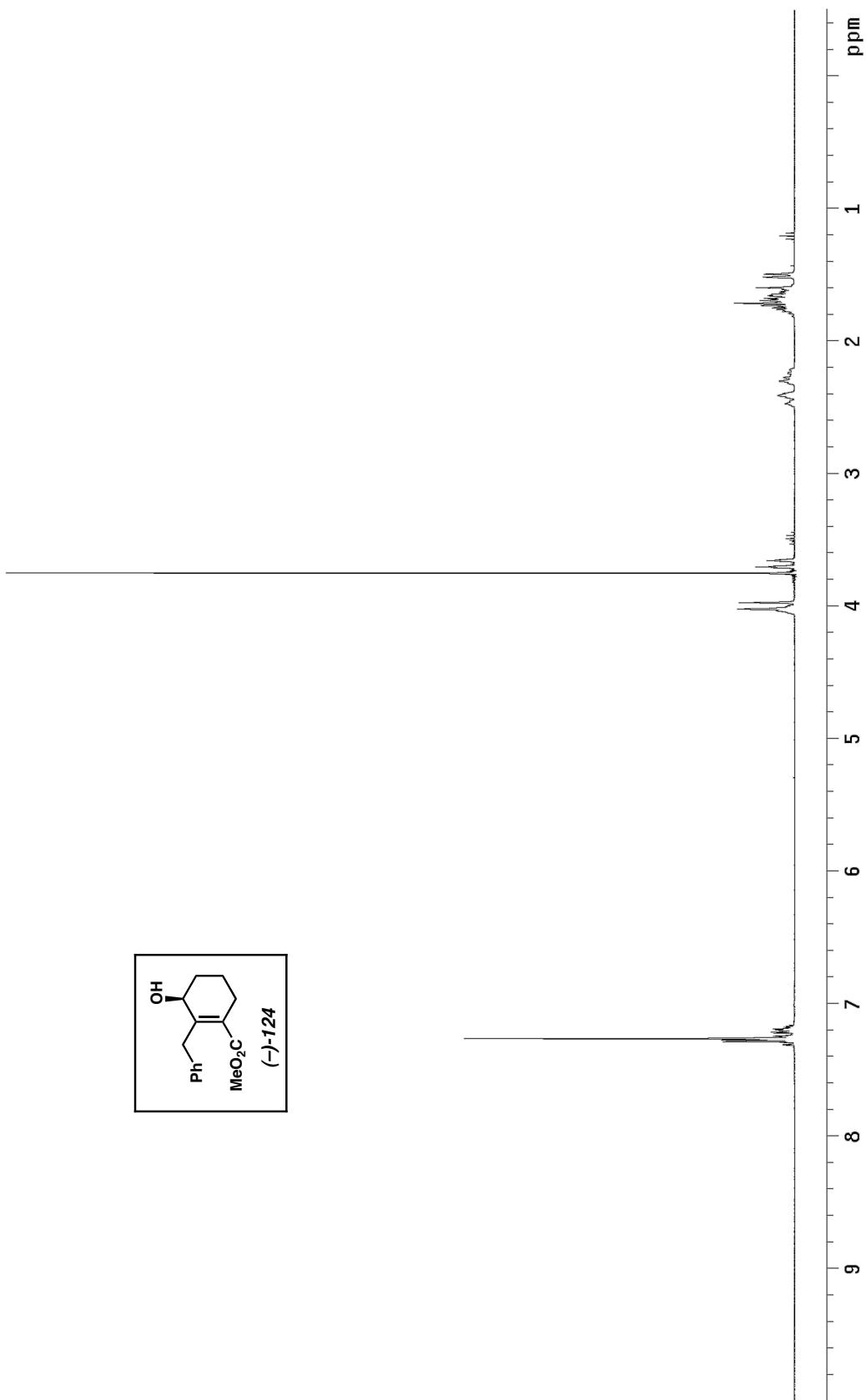


Figure A1.73 ^1H NMR (300 MHz, CDCl_3) of compound ($-$)-124.

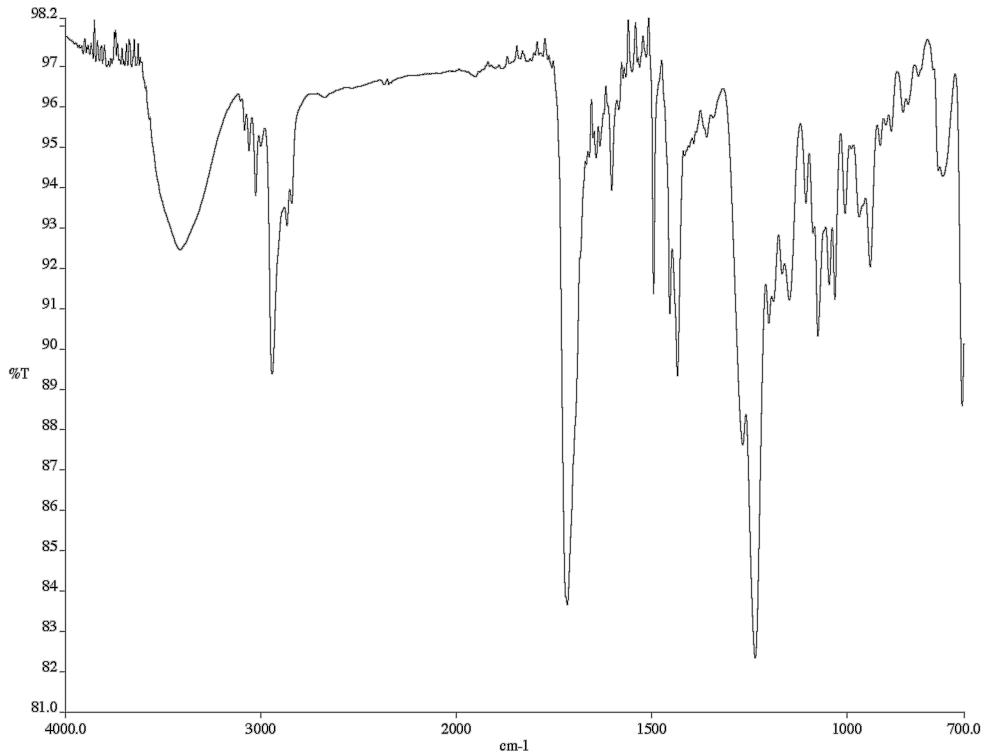


Figure A1.74 Infrared spectrum (thin film/NaCl) of compound (-)-**124**.

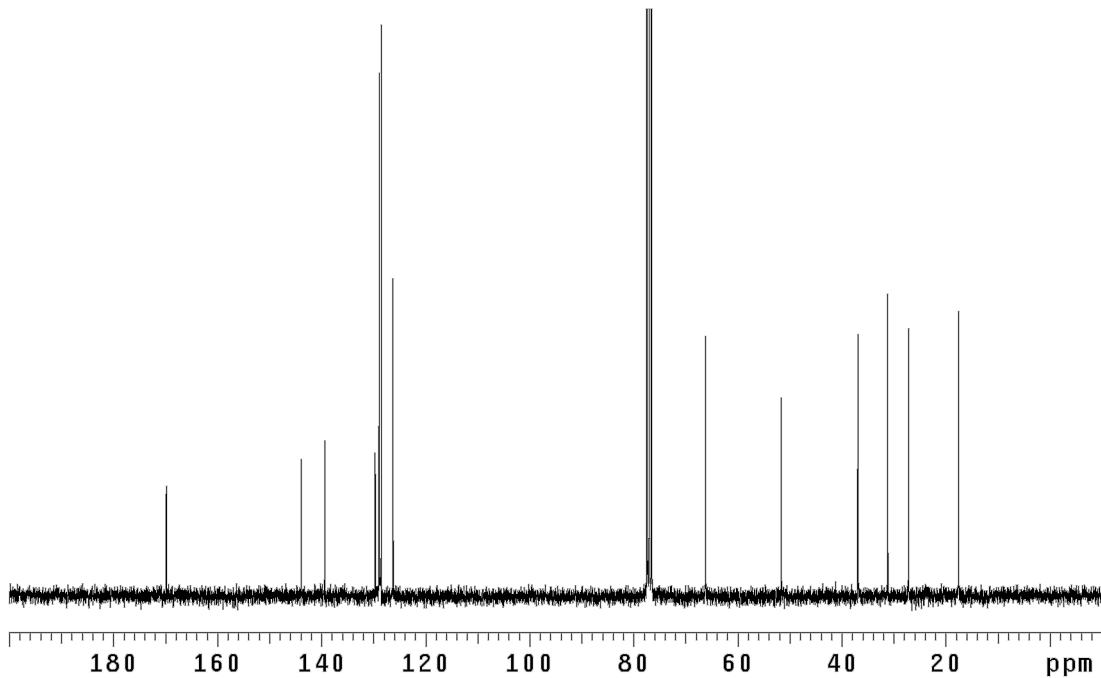


Figure A1.75 ^{13}C NMR (75 MHz, CDCl_3) of compound (-)-**124**.

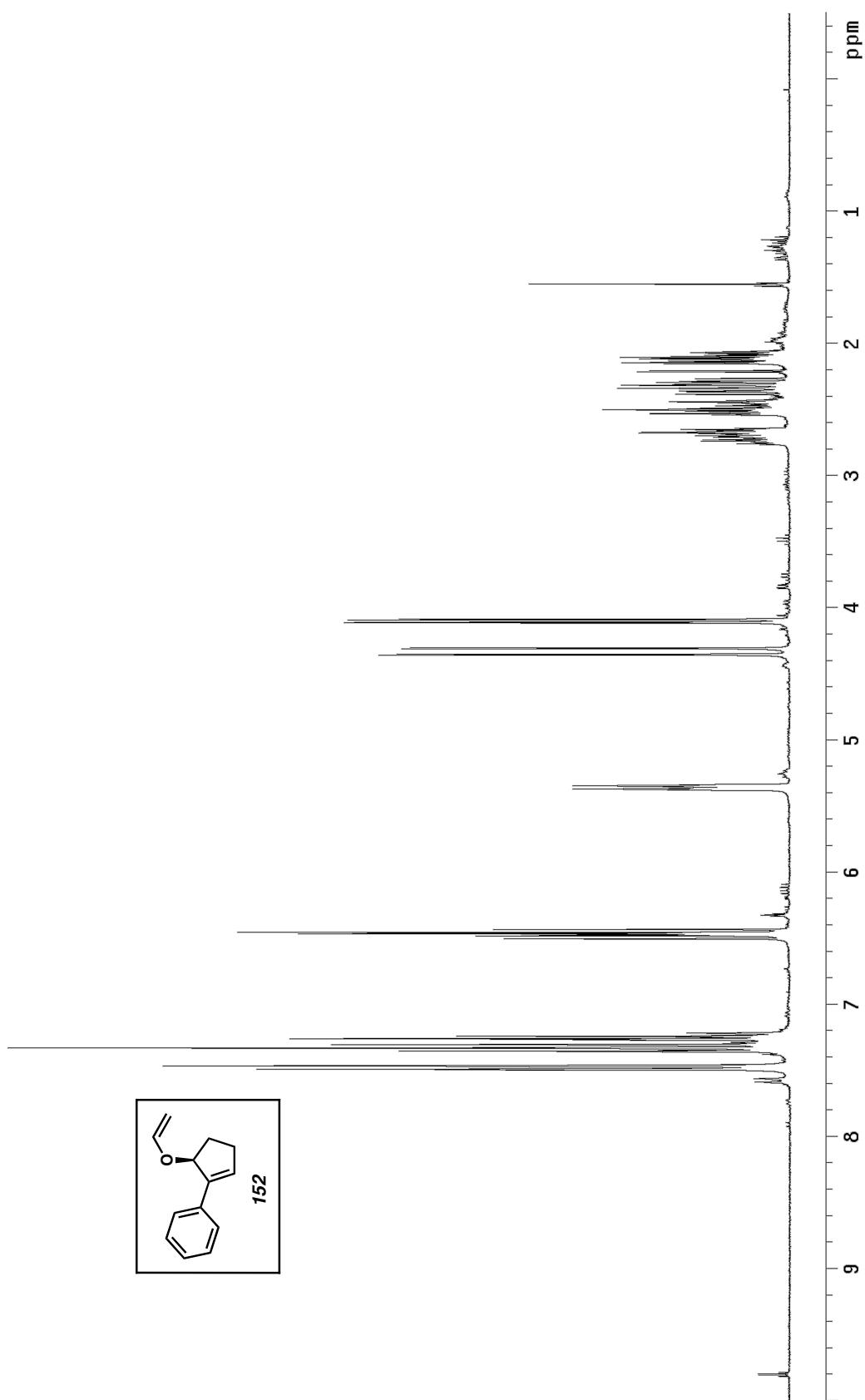


Figure A1.76 ^1H NMR (300 MHz, CDCl_3) of compound 152.

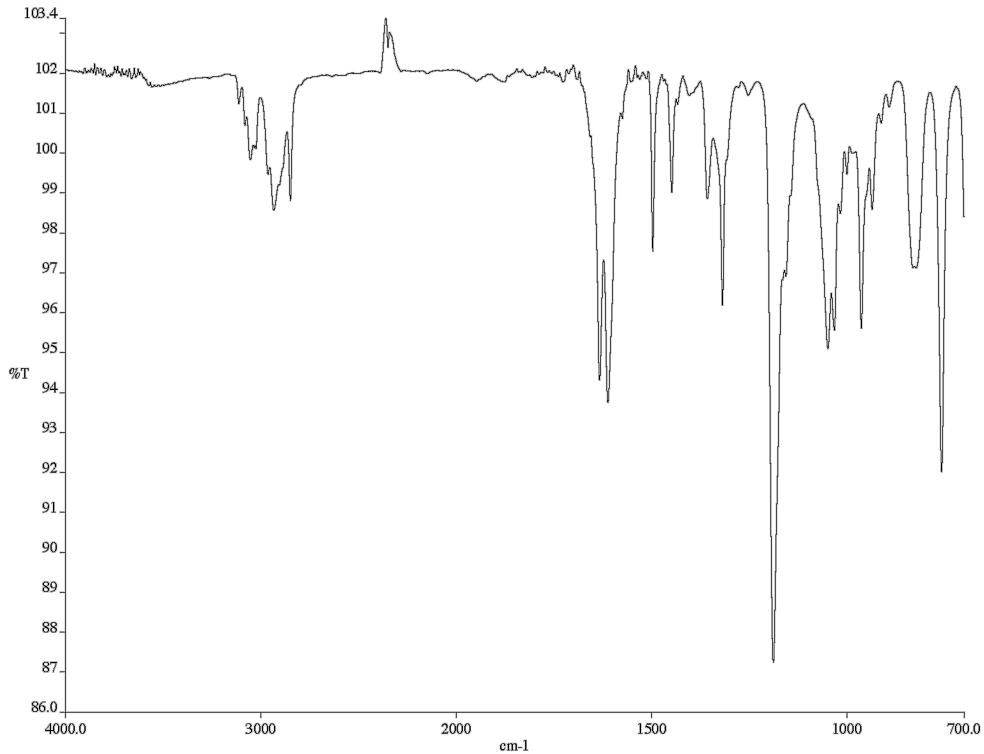


Figure A1.77 Infrared spectrum (thin film/NaCl) of compound **152**.

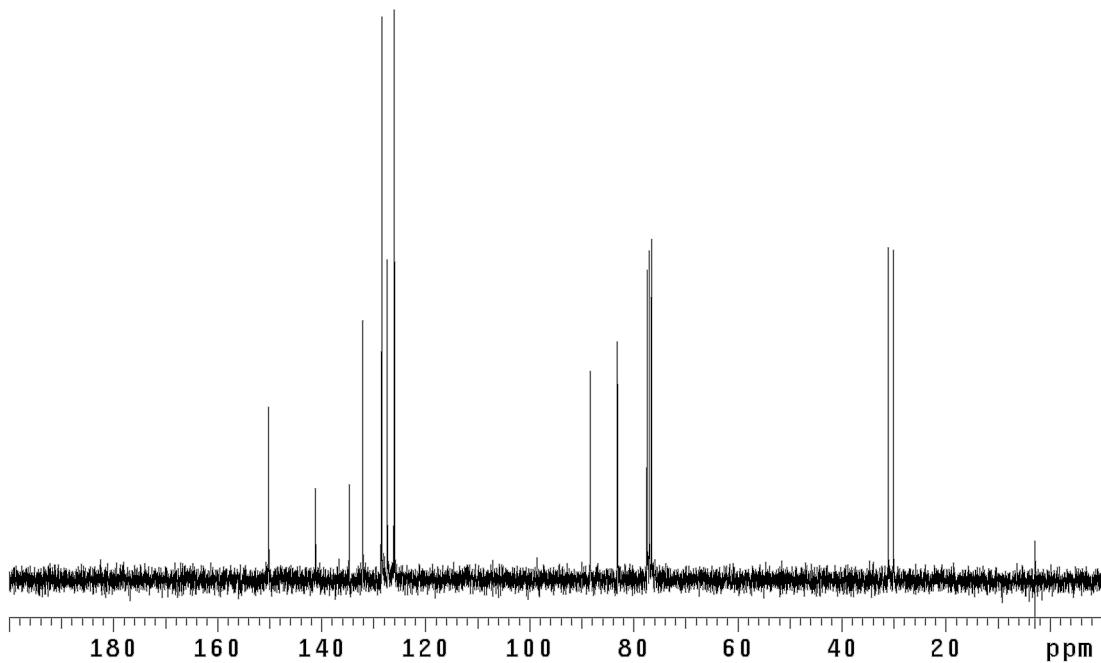
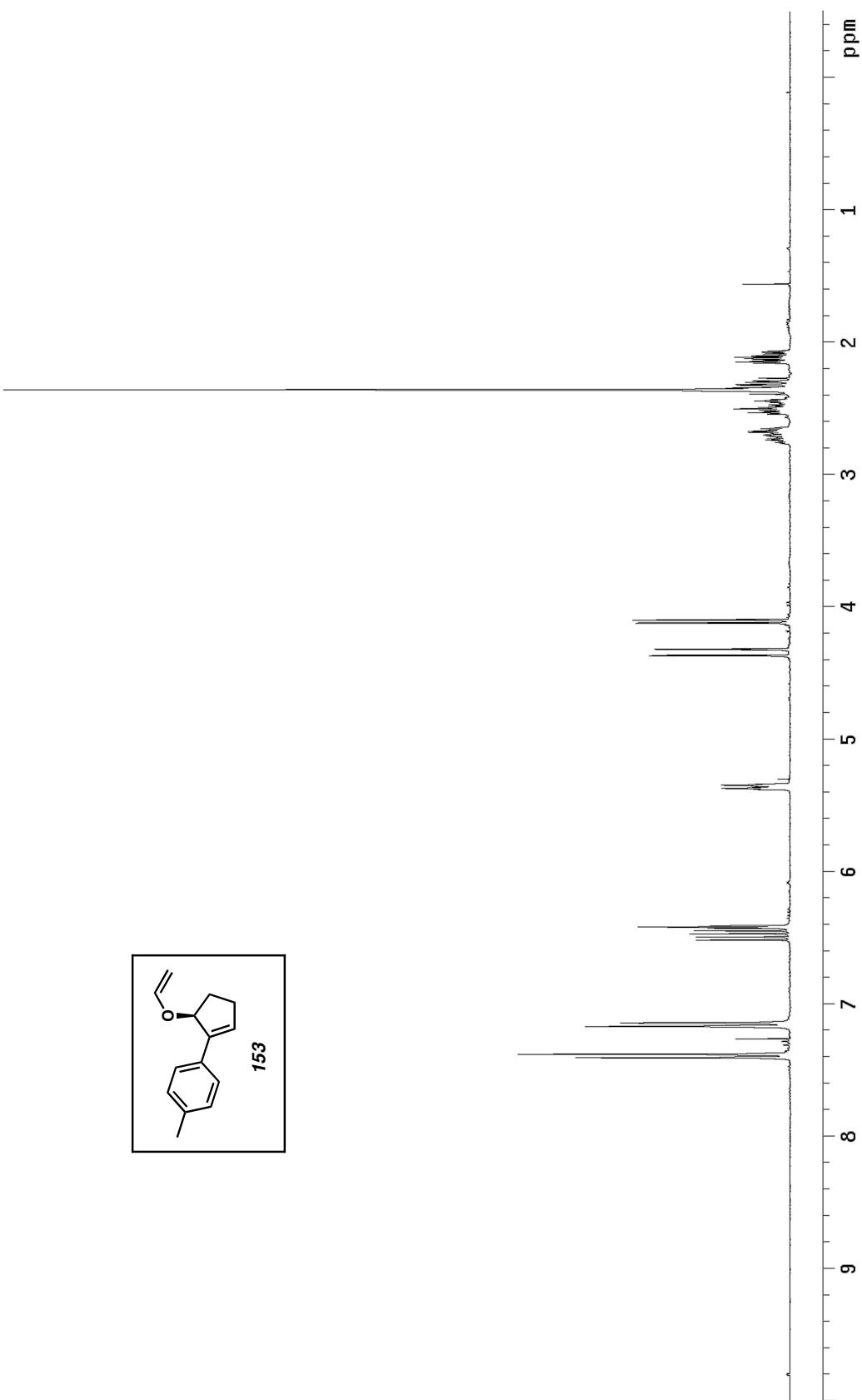


Figure A1.78 ^{13}C NMR (75 MHz, CDCl_3) of compound **152**.

Figure A1.79 ^1H NMR (300 MHz, CDCl_3) of compound **153**.



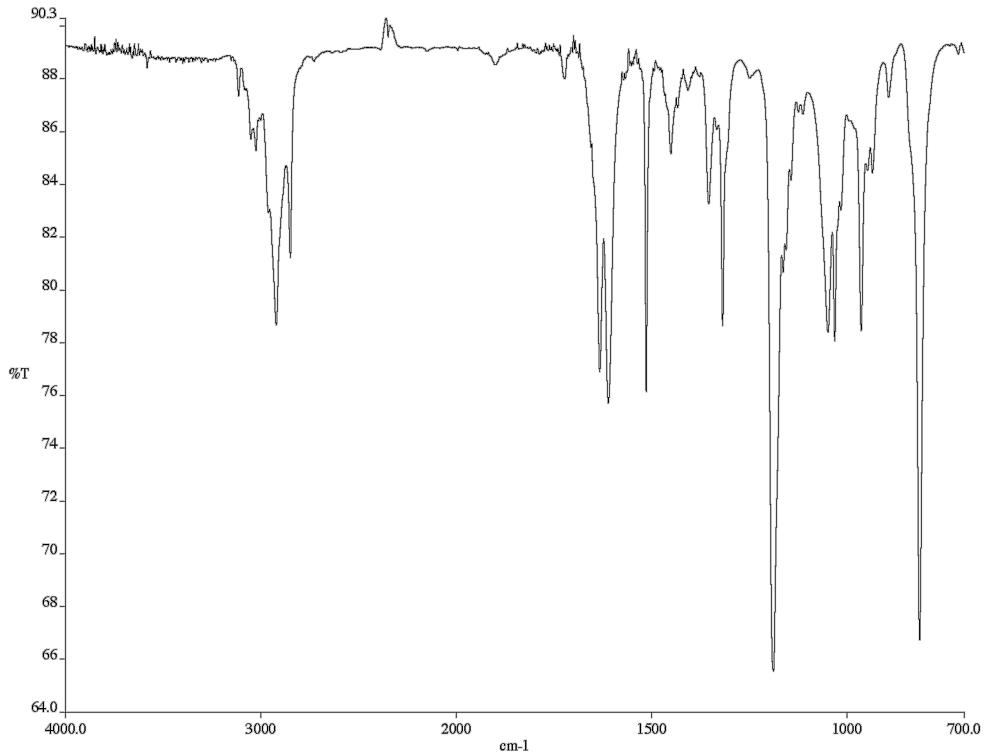


Figure A1.80 Infrared spectrum (thin film/NaCl) of compound **153**.

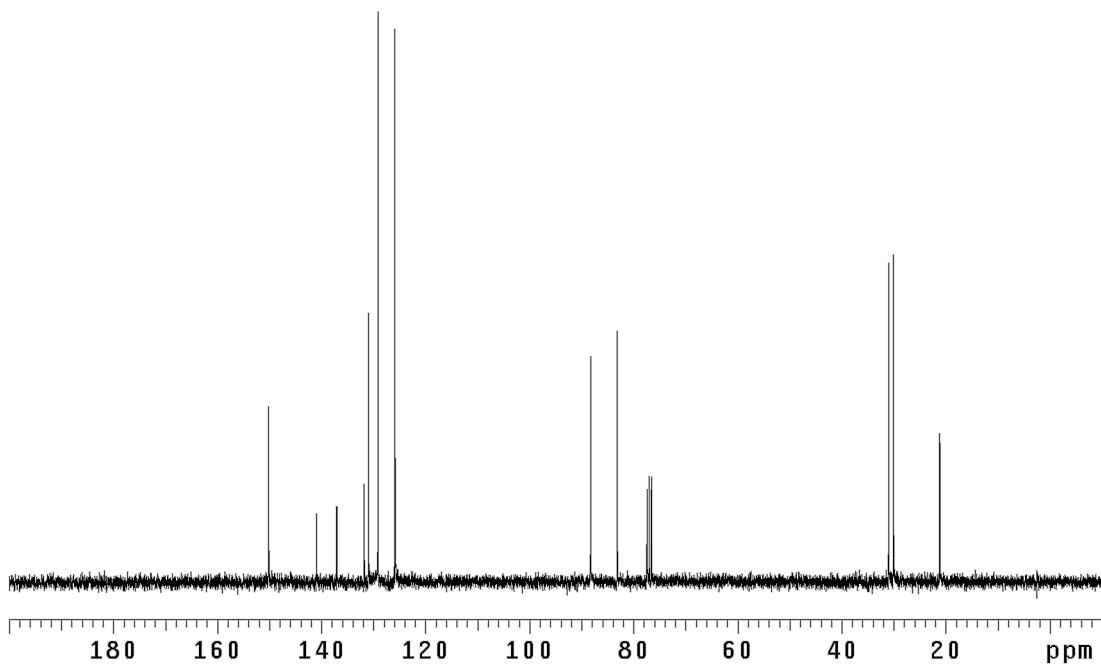


Figure A1.81 ^{13}C NMR (75 MHz, CDCl_3) of compound **153**.

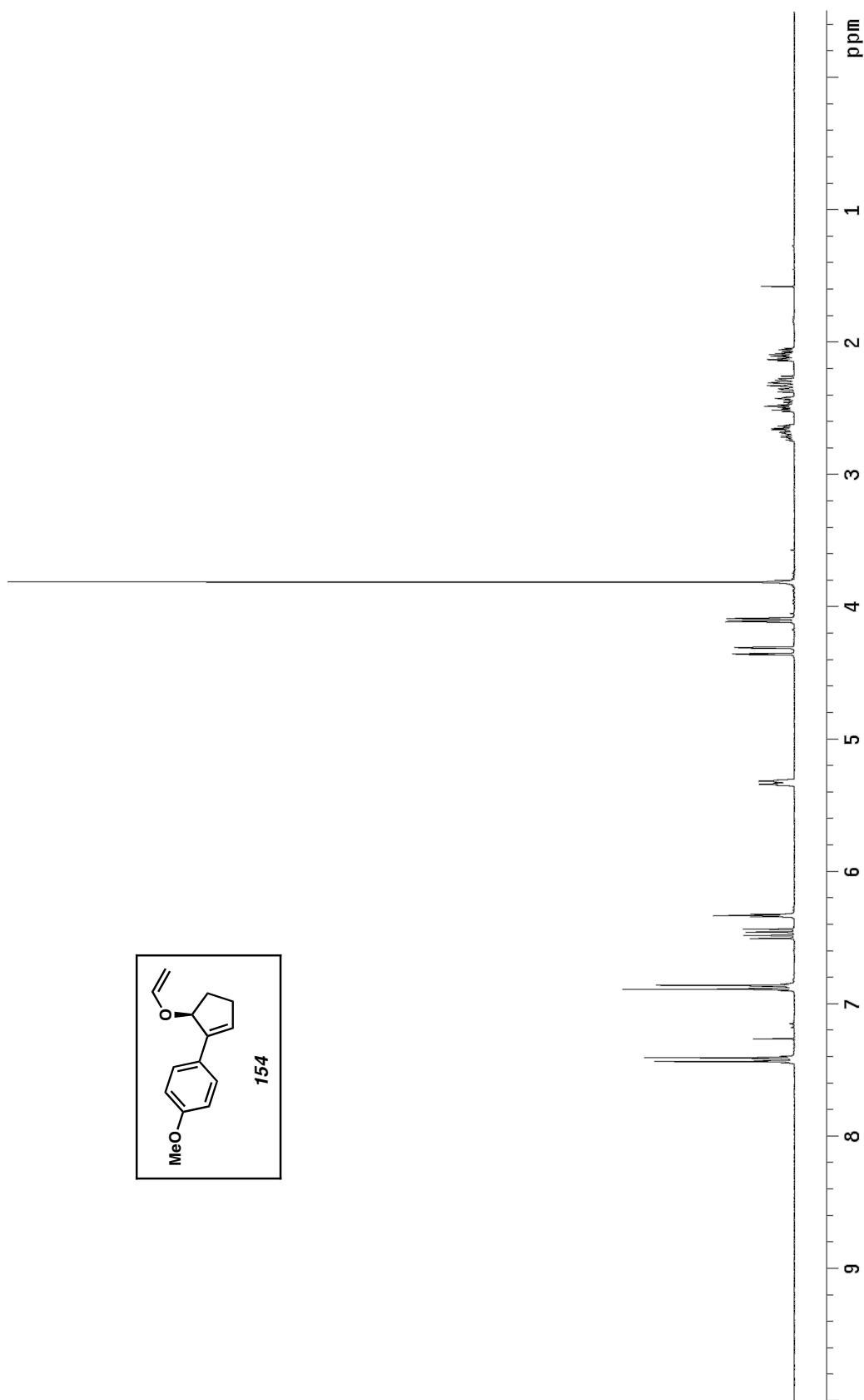


Figure A1.82 ^1H NMR (300 MHz, CDCl_3) of compound 154.

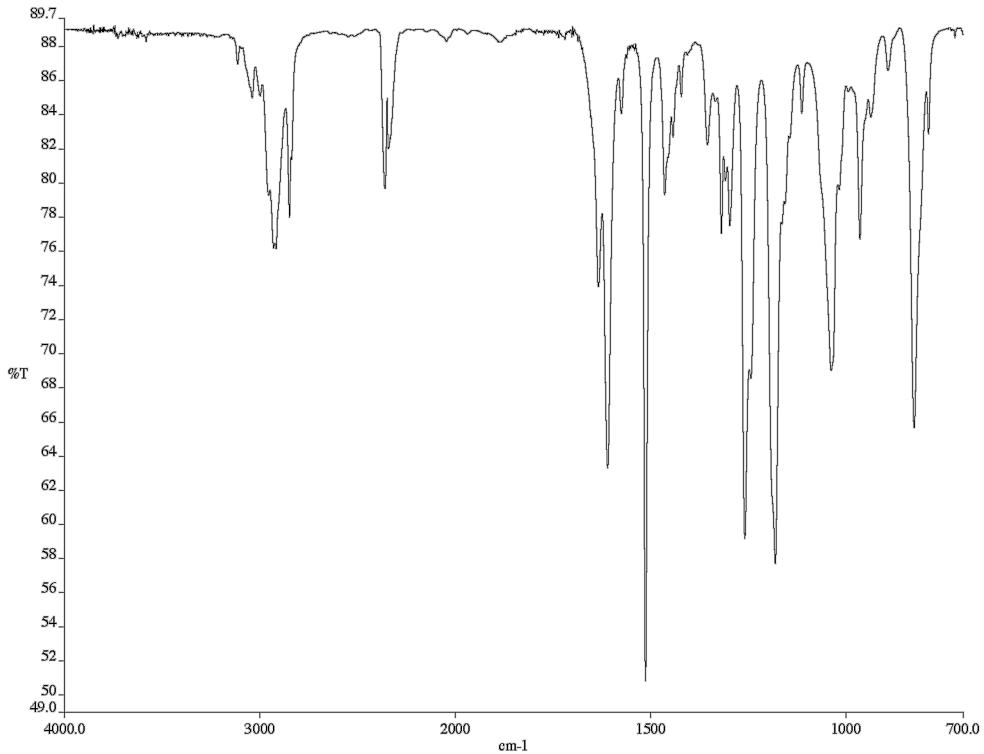


Figure A1.83 Infrared spectrum (thin film/NaCl) of compound **154**.

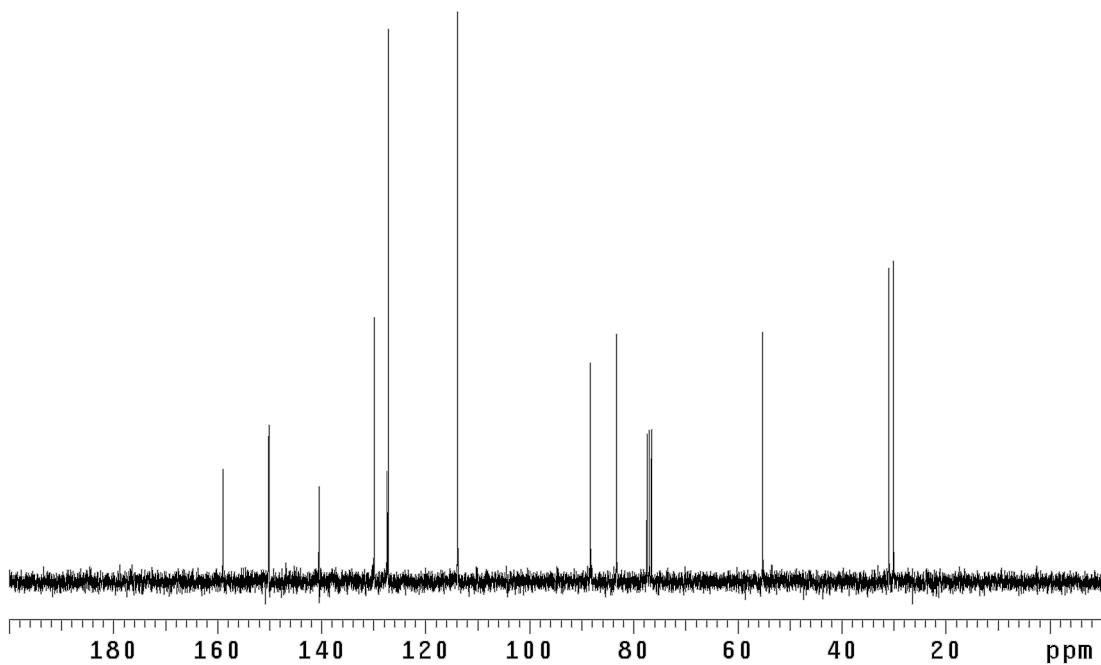


Figure A1.84 ^{13}C NMR (75 MHz, CDCl_3) of compound **154**.

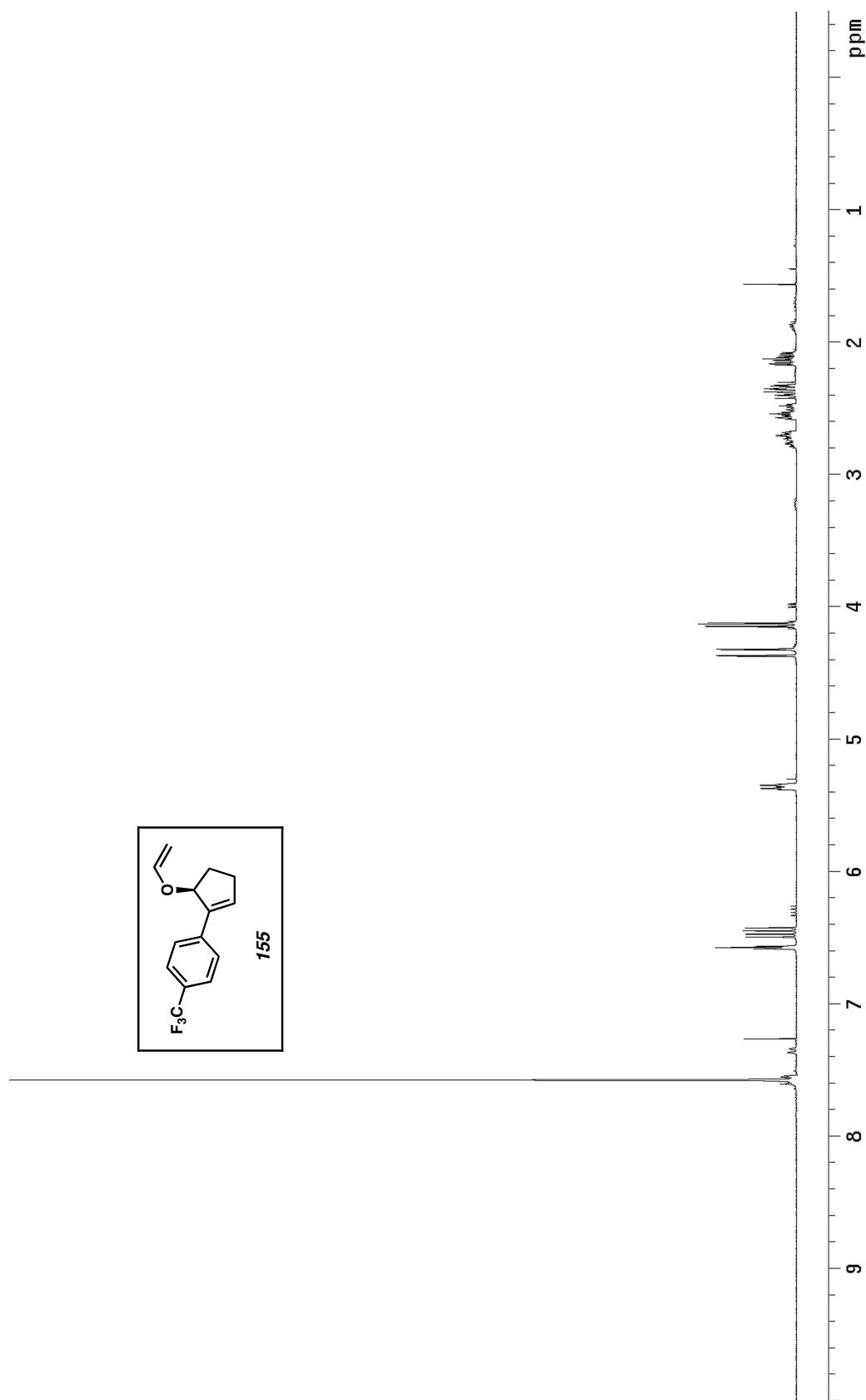


Figure A1.85 ^1H NMR (300 MHz, CDCl_3) of compound 155.

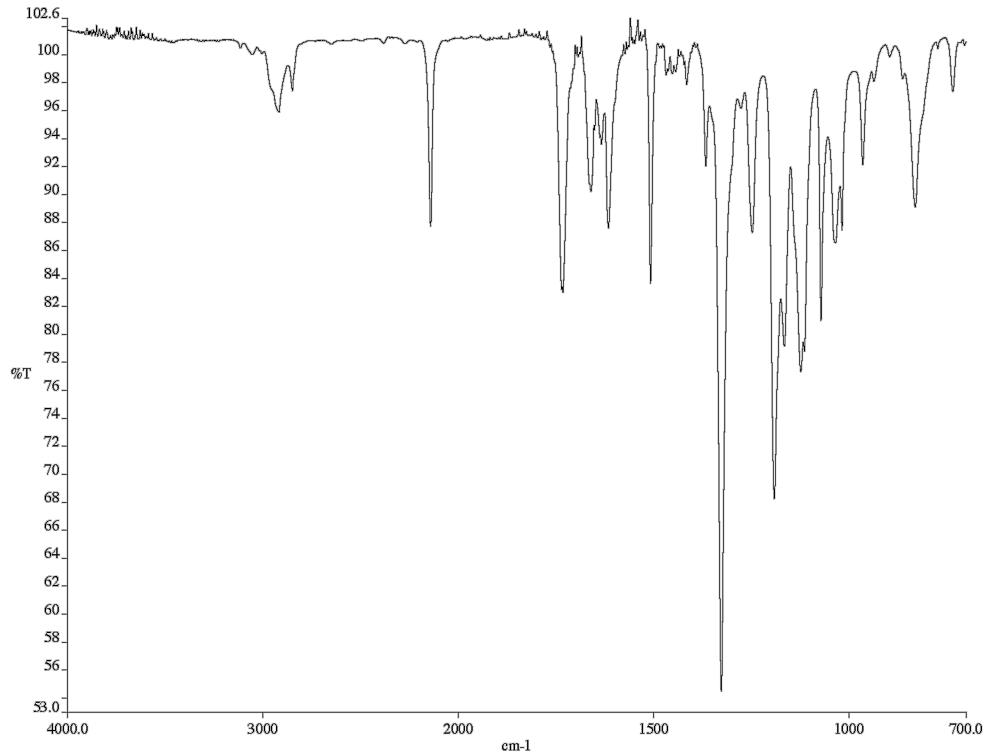


Figure A1.86 Infrared spectrum (thin film/NaCl) of compound **155**.

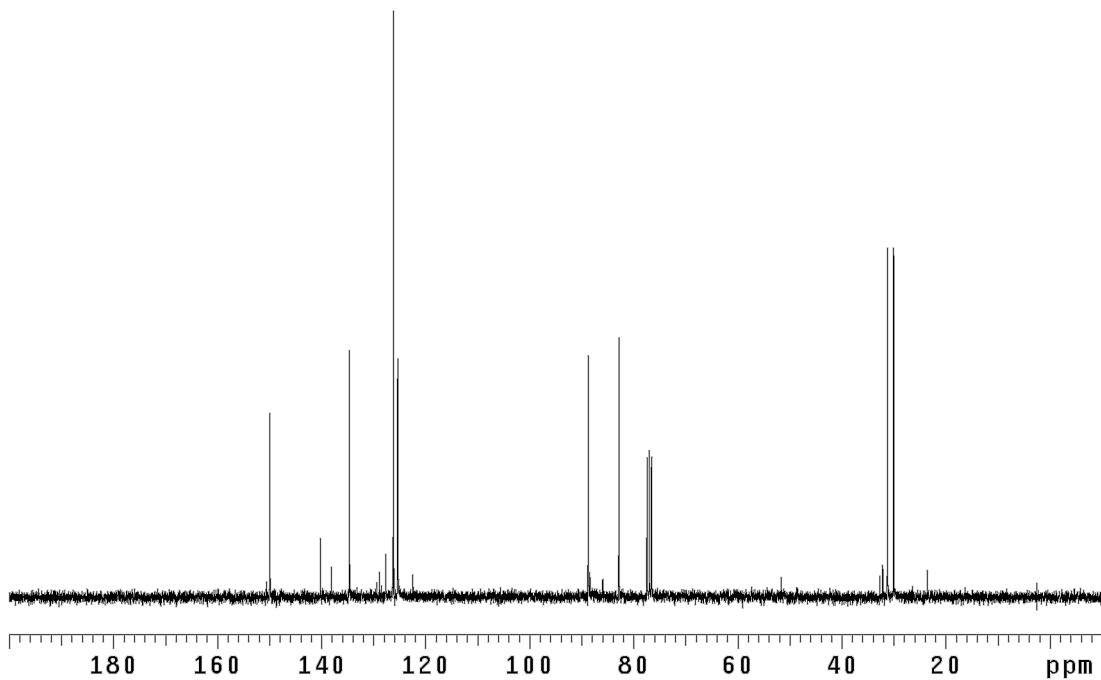


Figure A1.87 ^{13}C NMR (75 MHz, CDCl_3) of compound **155**.

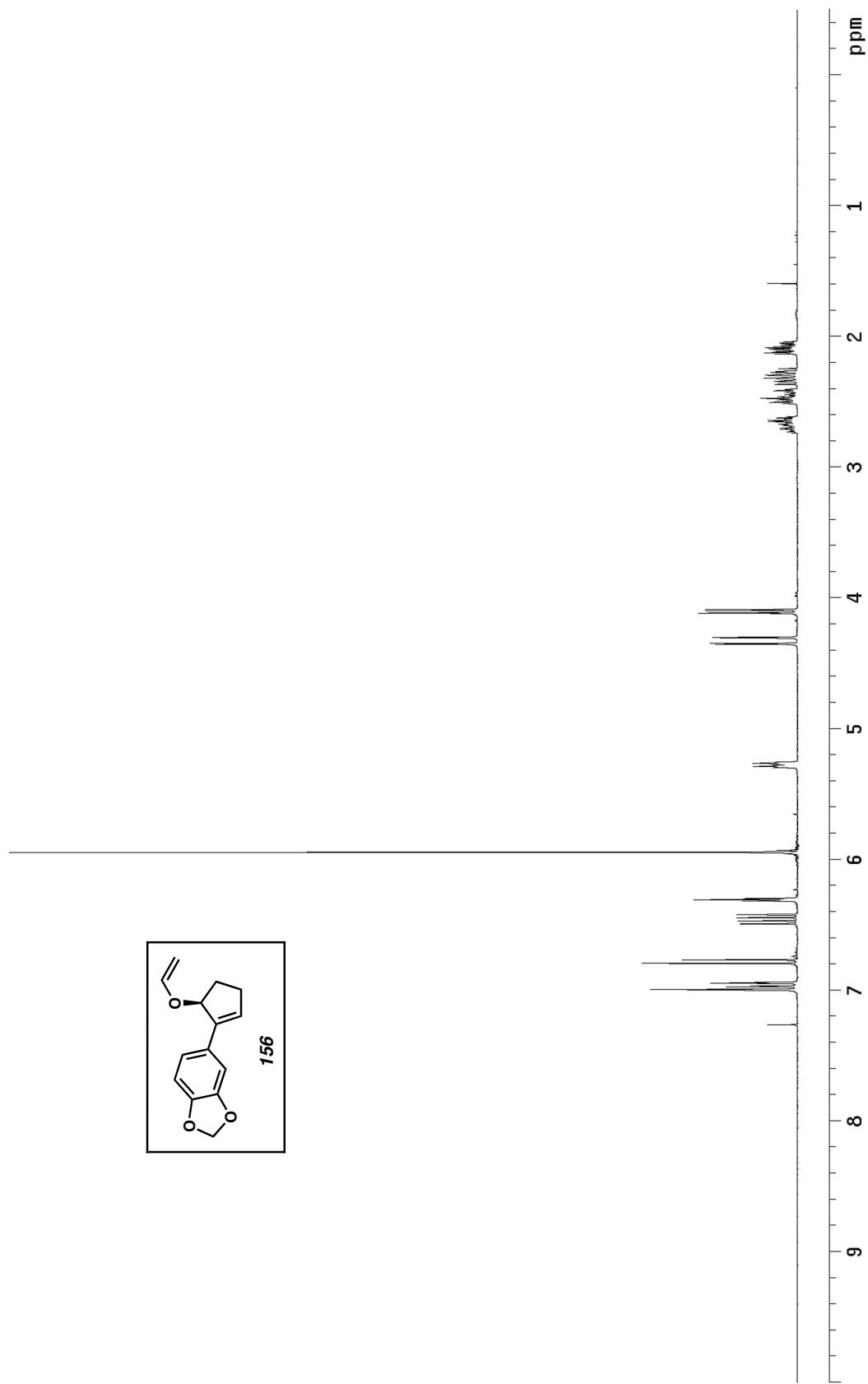


Figure A1.88 ^1H NMR (300 MHz, CDCl_3) of compound **156**.

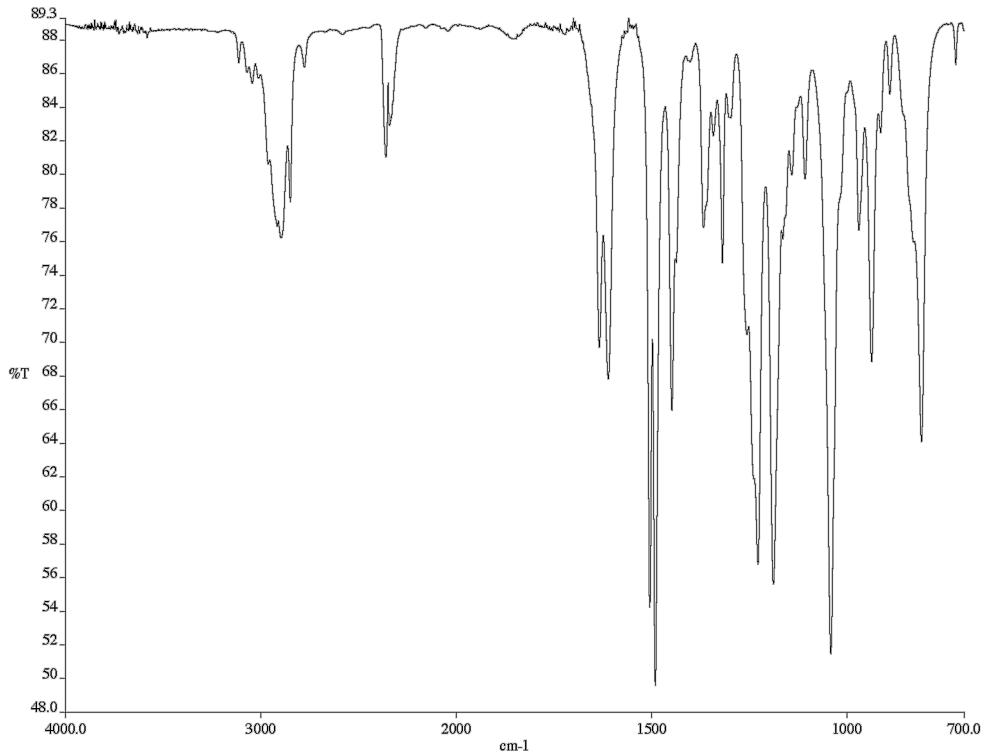


Figure A1.89 Infrared spectrum (thin film/NaCl) of compound **156**.

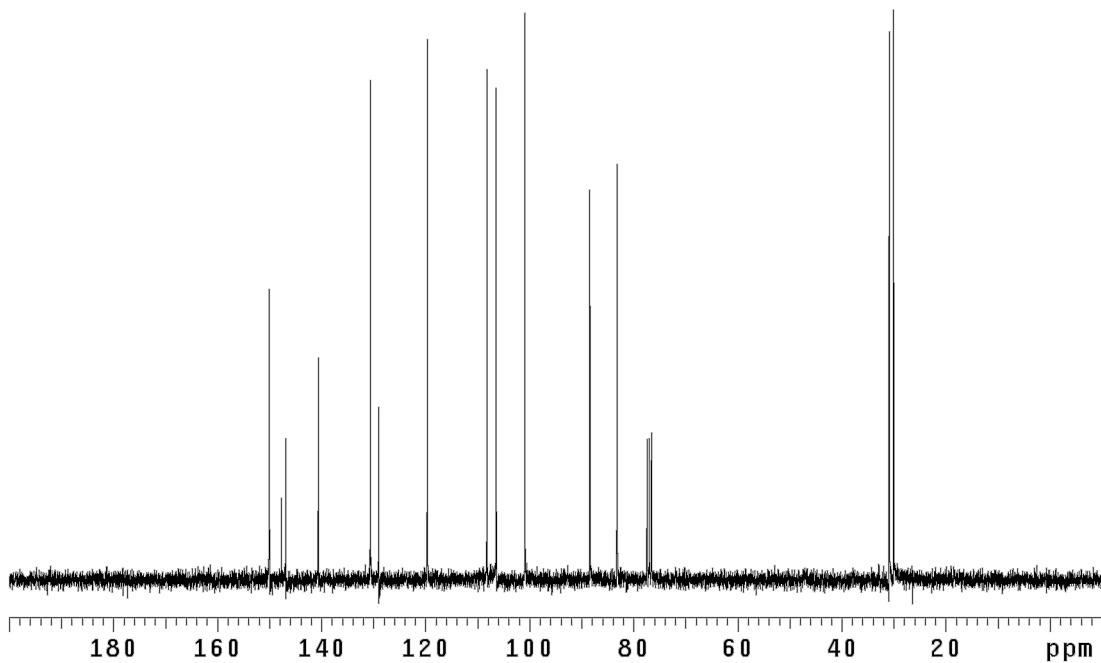


Figure A1.90 ^{13}C NMR (75 MHz, CDCl_3) of compound **156**.

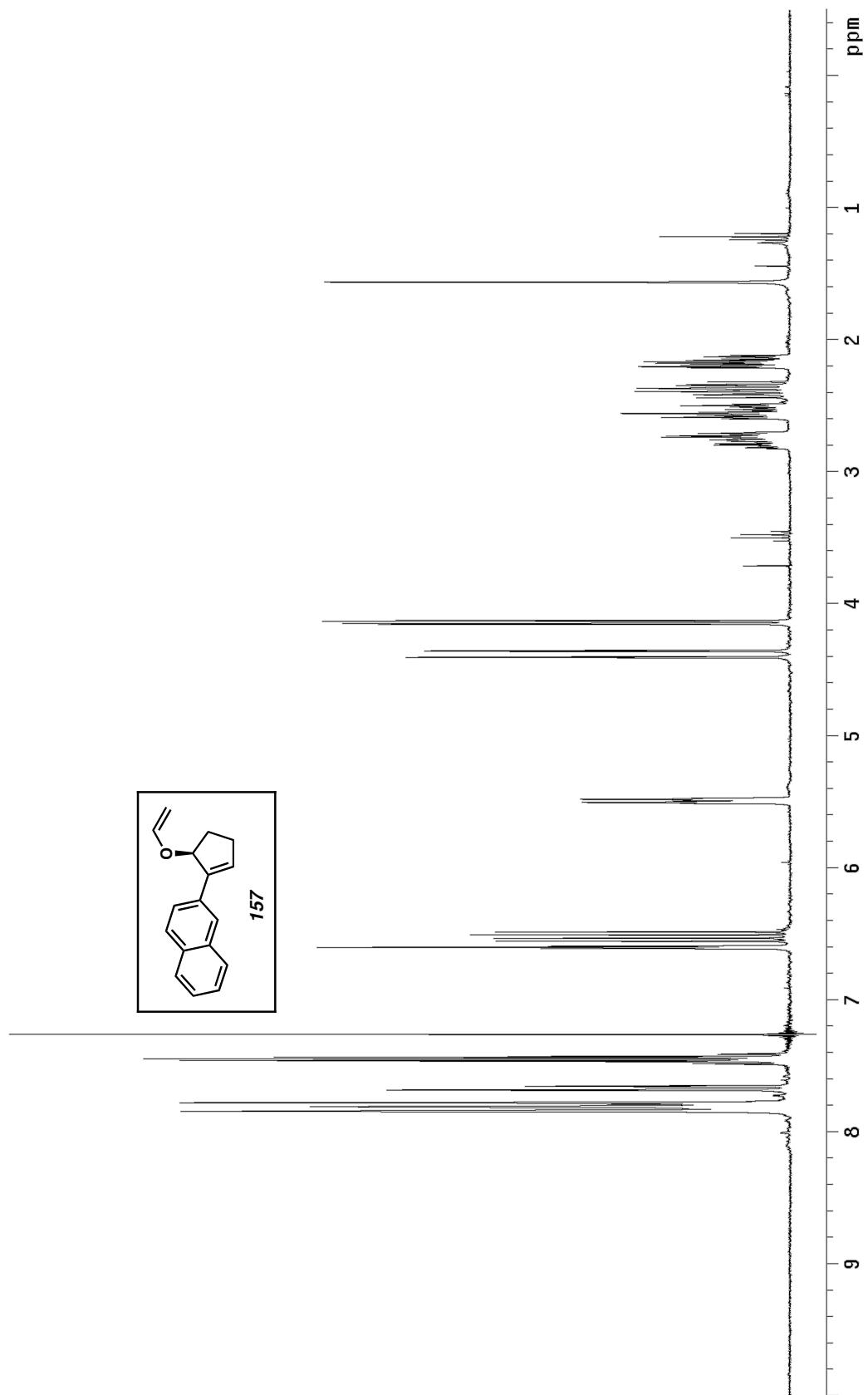


Figure A1.91 ^1H NMR (300 MHz, CDCl_3) of compound 157.

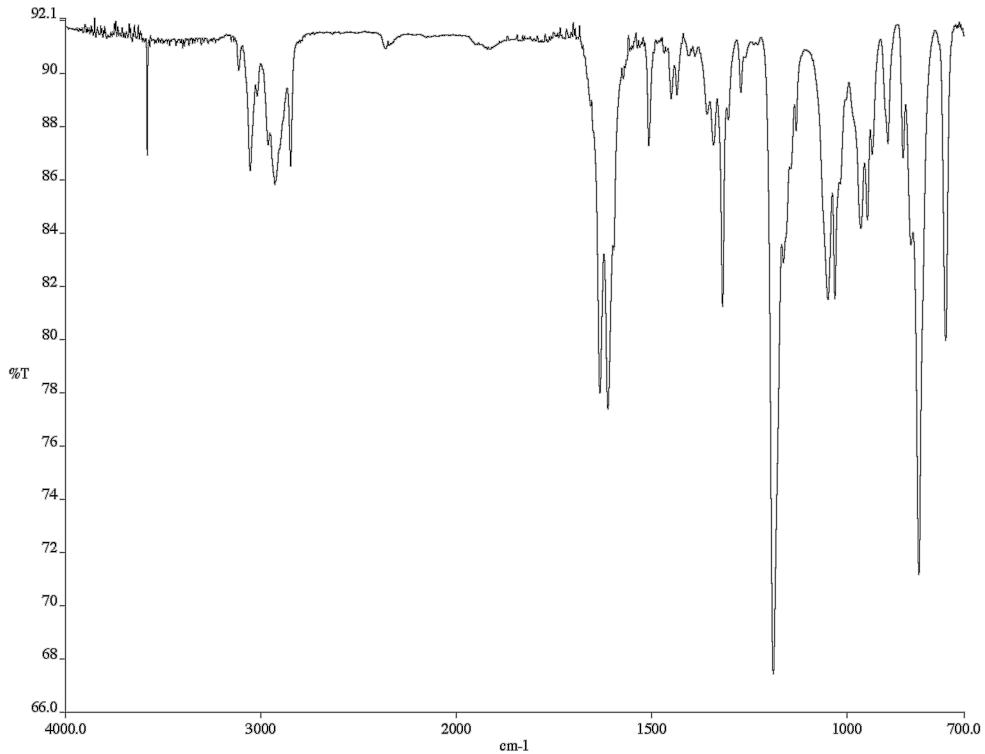


Figure A1.92 Infrared spectrum (thin film/NaCl) of compound **157**.

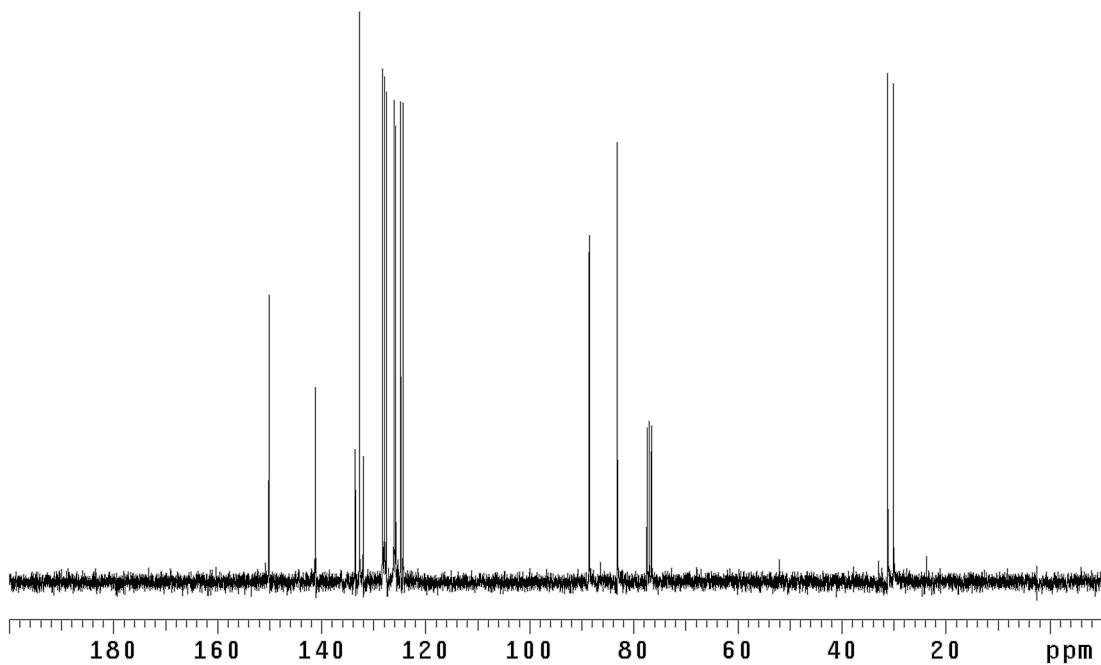


Figure A1.93 ^{13}C NMR (75 MHz, CDCl_3) of compound **157**.

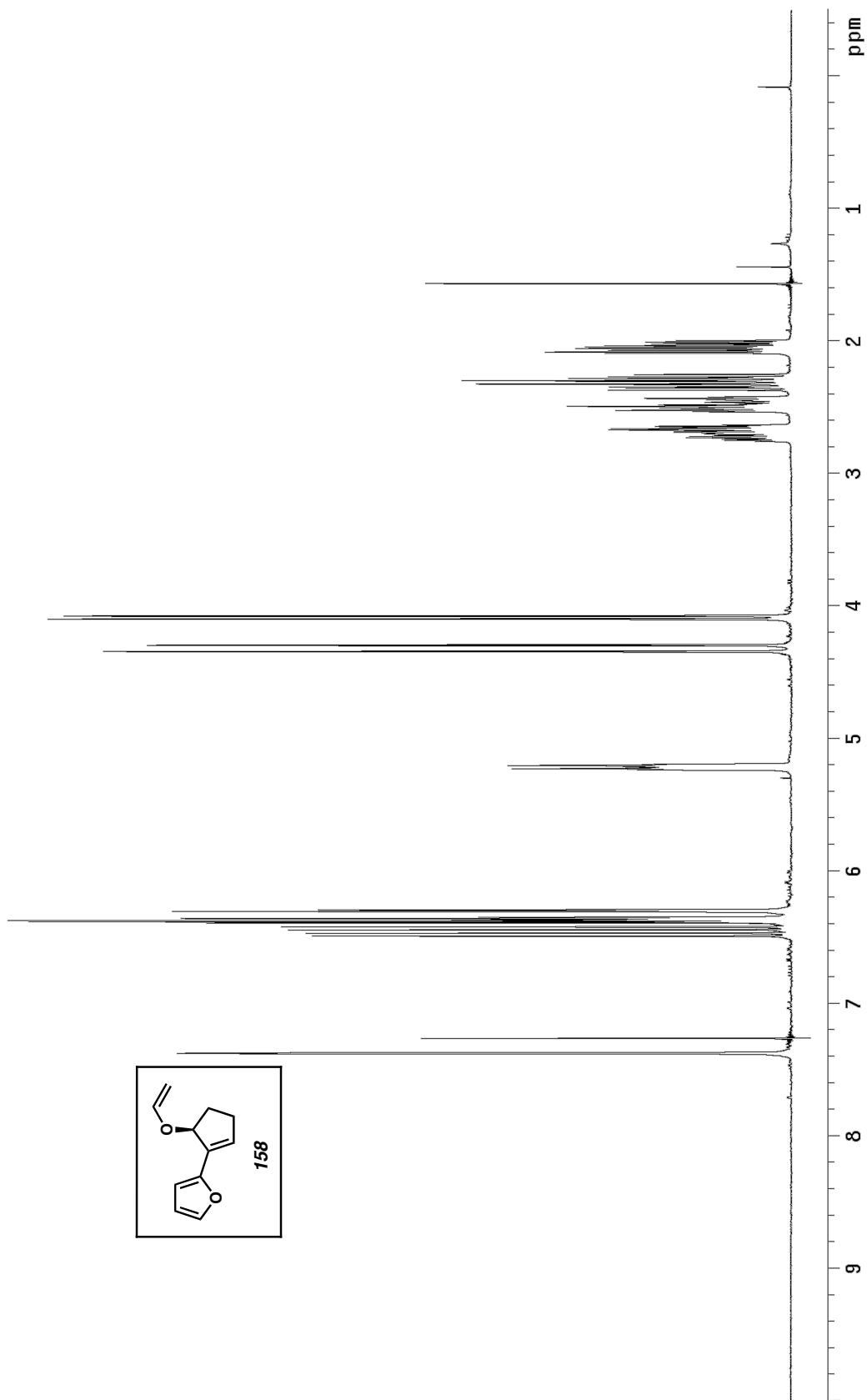


Figure A1.94 ^1H NMR (300 MHz, CDCl_3) of compound 158.

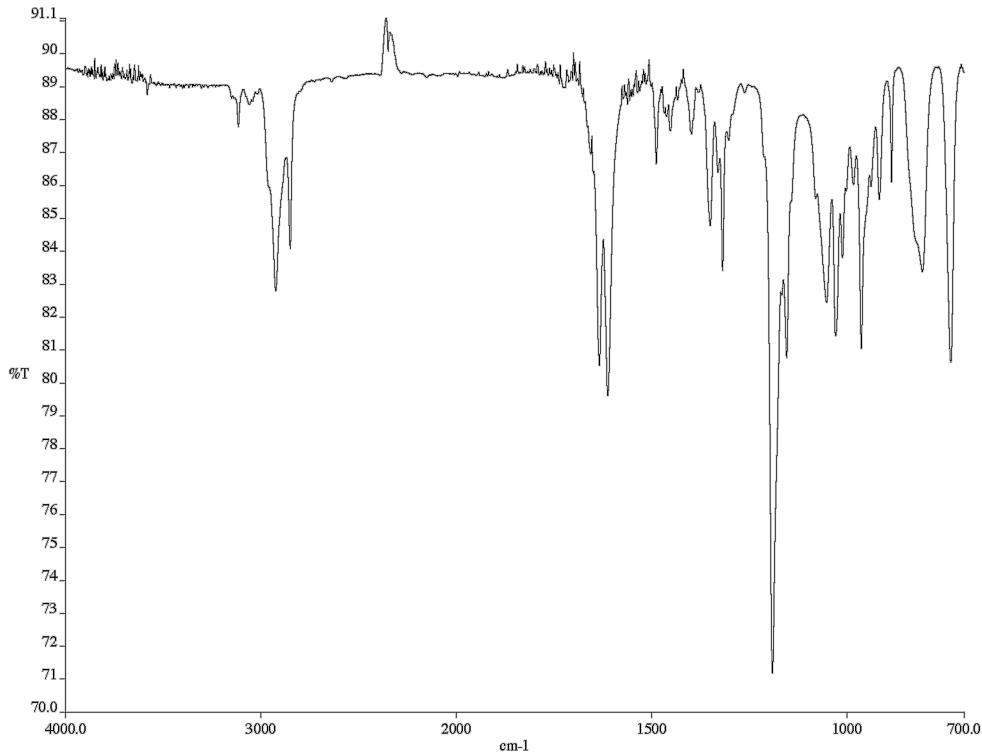


Figure A1.95 Infrared spectrum (thin film/NaCl) of compound **158**.

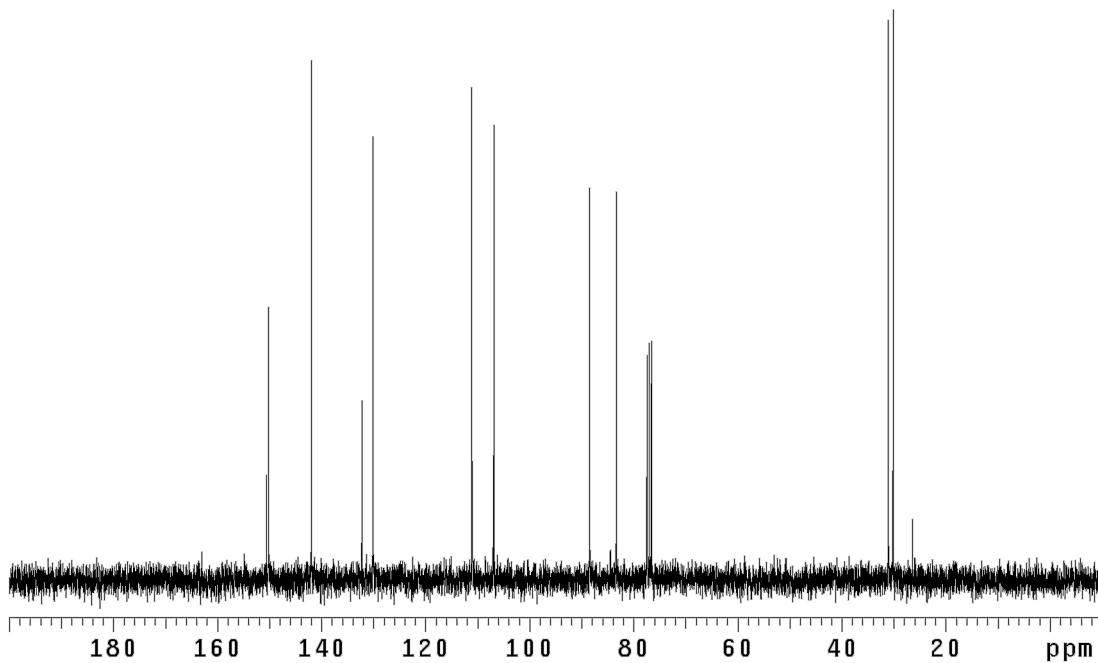


Figure A1.96 ^{13}C NMR (75 MHz, CDCl_3) of compound **158**.

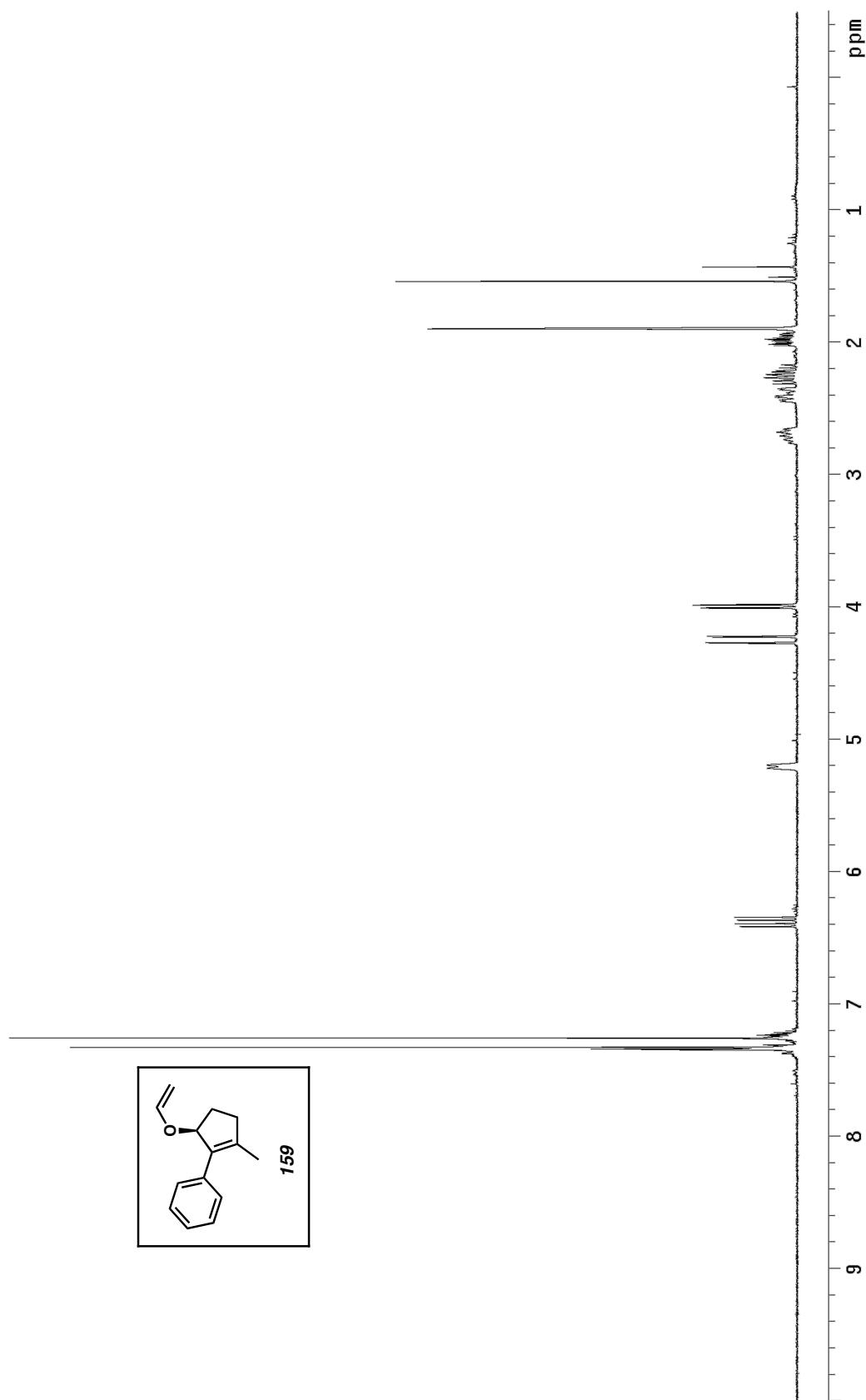


Figure A1.97 ^1H NMR (300 MHz, CDCl_3) of compound 159.

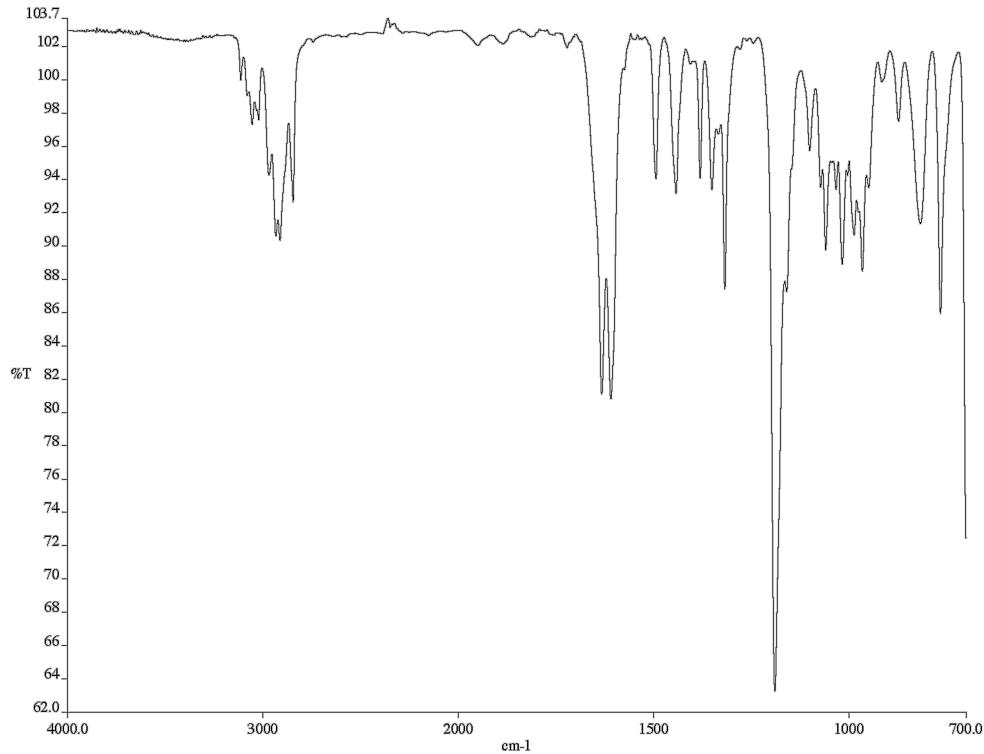


Figure A1.98 Infrared spectrum (thin film/NaCl) of compound **159**.

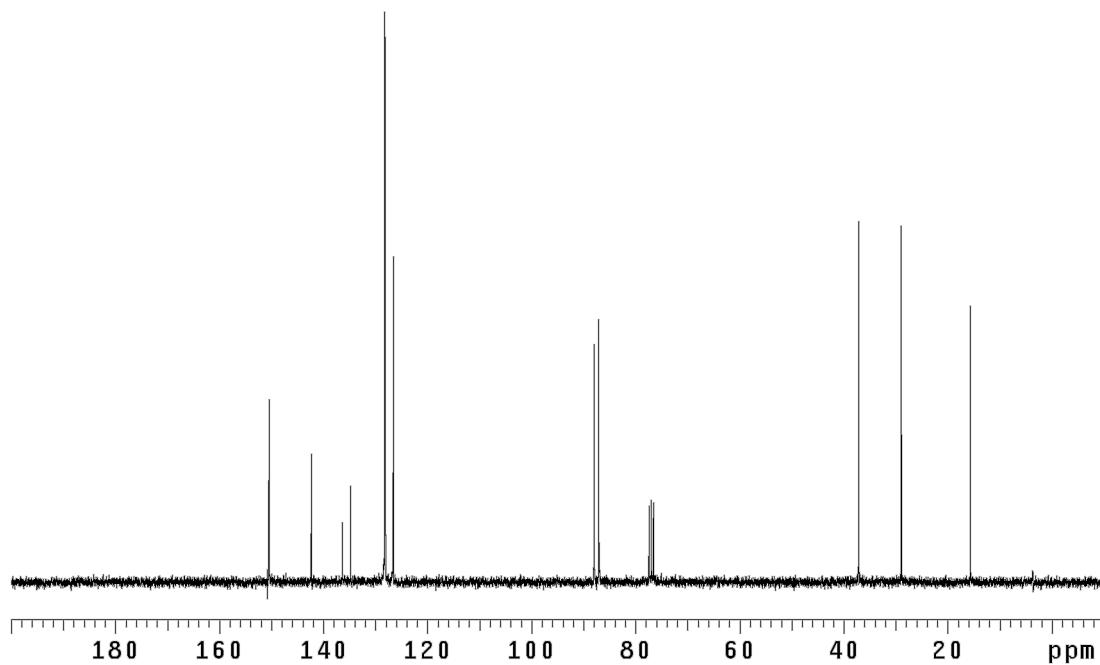


Figure A1.99 ^{13}C NMR (75 MHz, CDCl_3) of compound **159**.

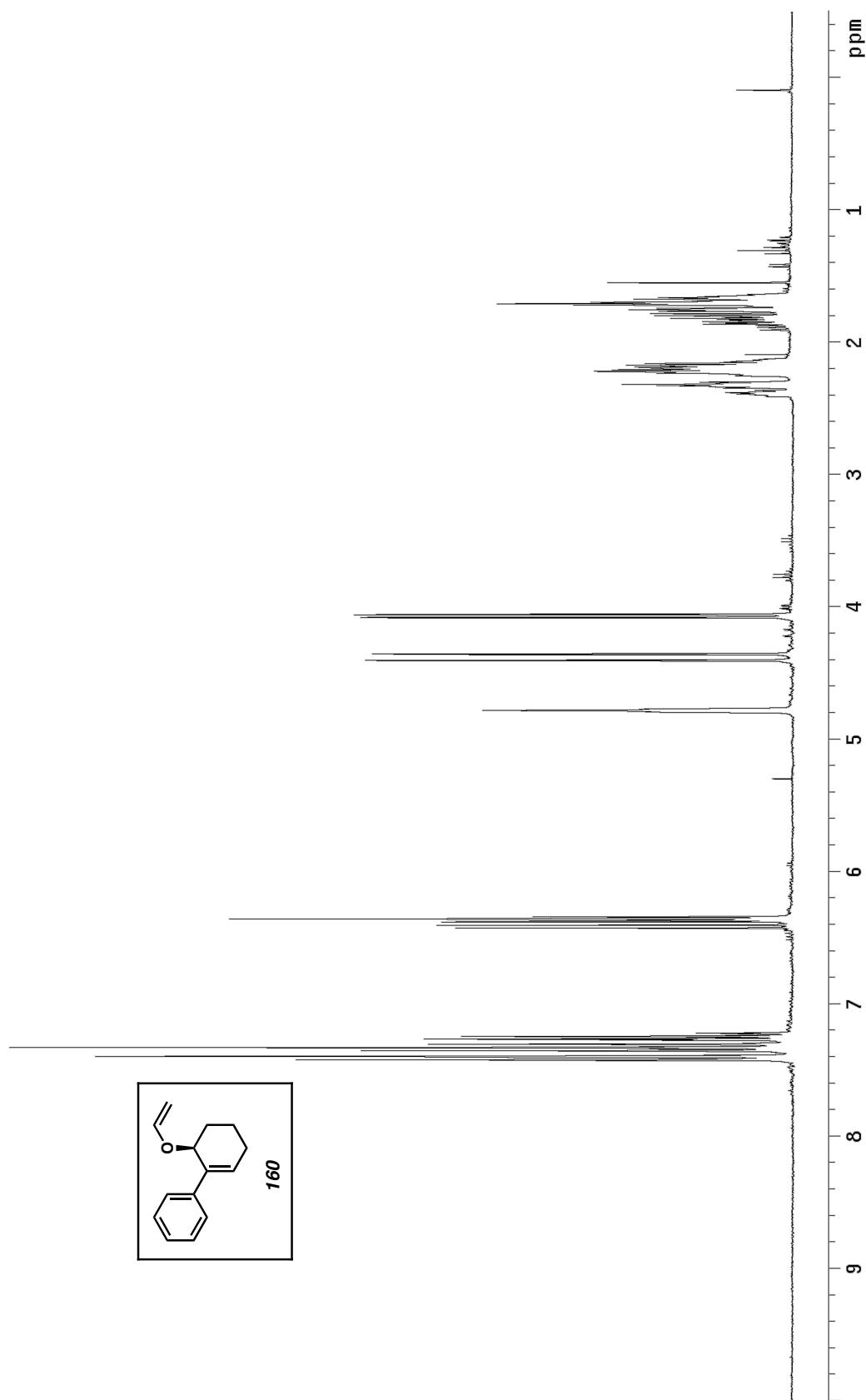


Figure A1.100 ^1H NMR (300 MHz, CDCl_3) of compound 160.

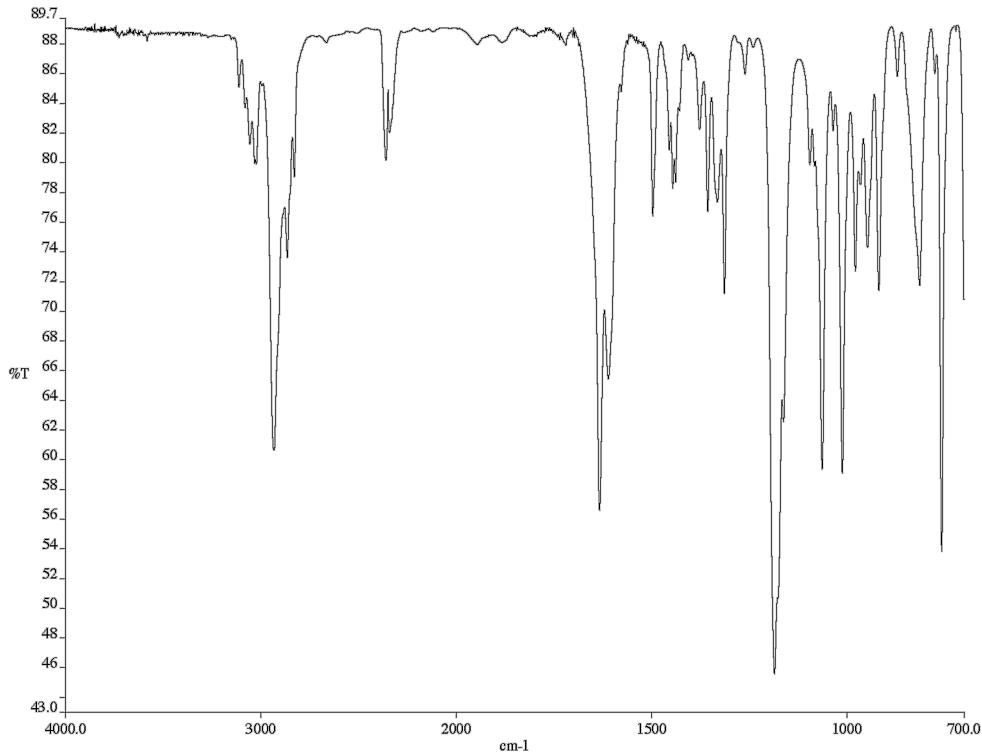


Figure A1.101 Infrared spectrum (thin film/NaCl) of compound **160**.

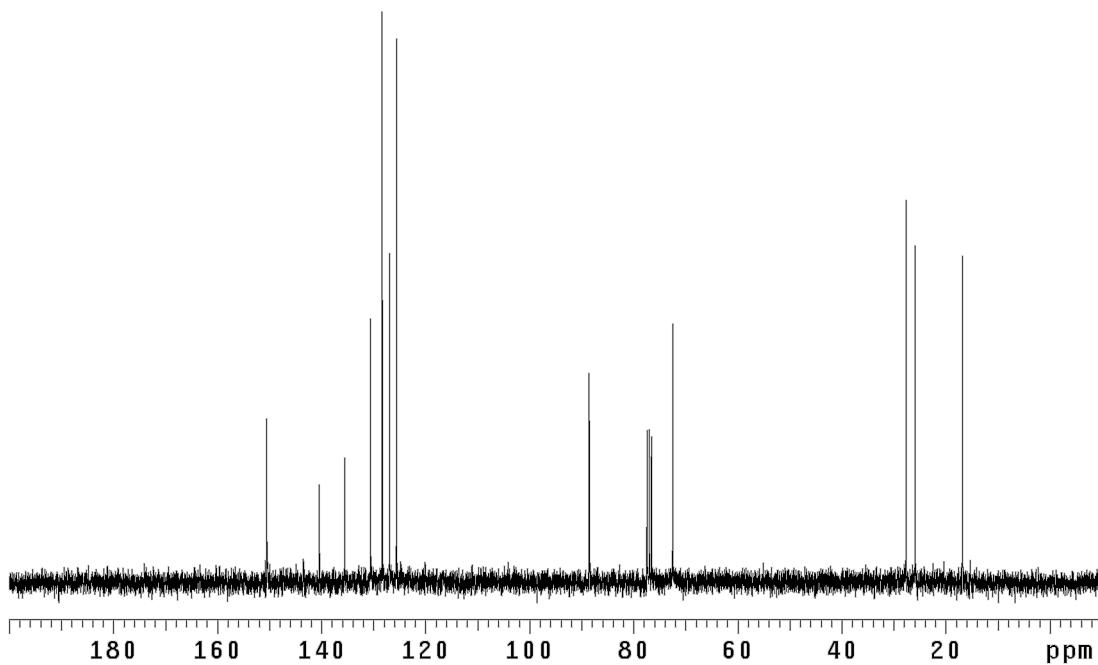
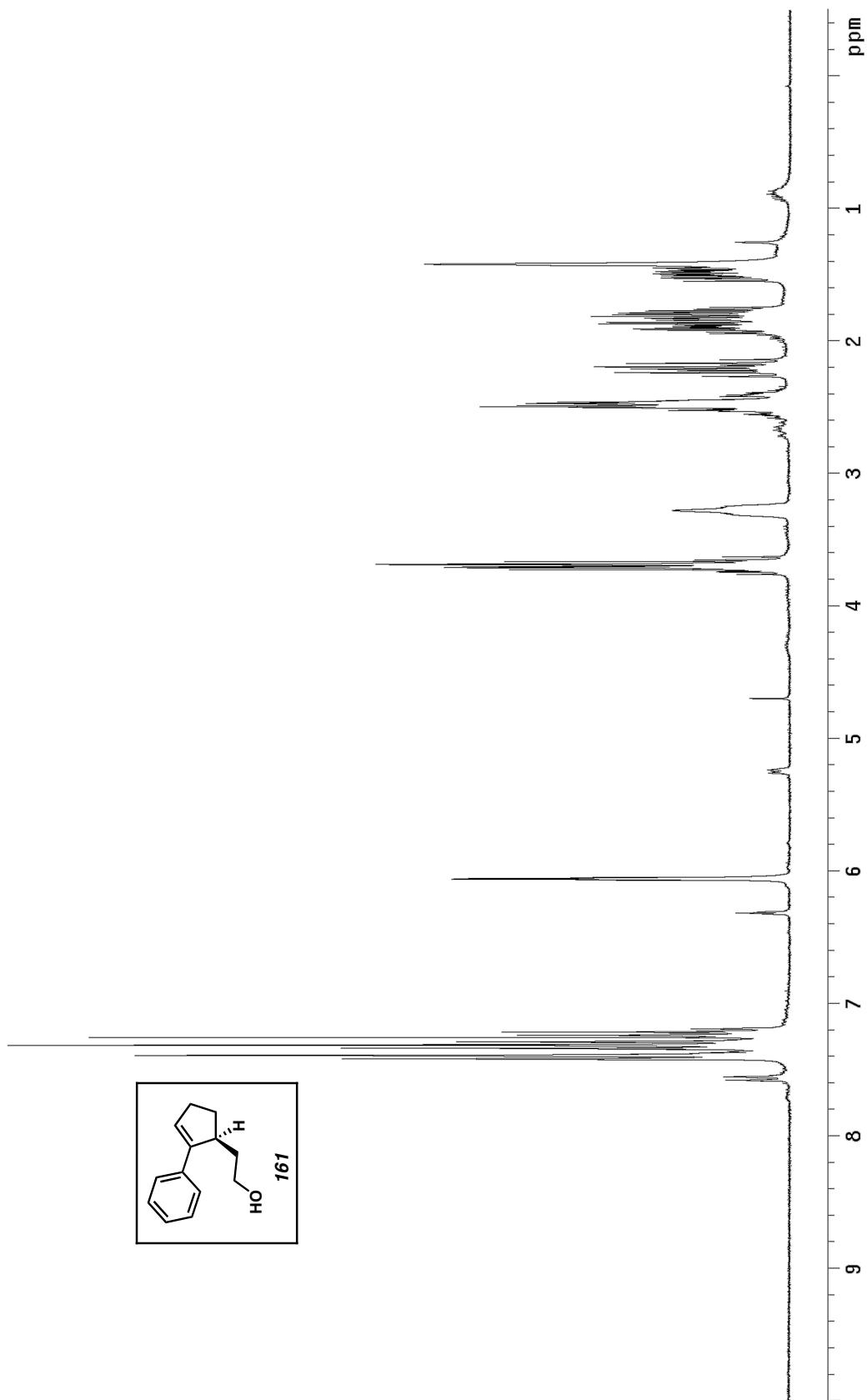


Figure A1.102 ¹³C NMR (75 MHz, CDCl₃) of compound **160**.

Figure A1.103 ^1H NMR (300 MHz, CDCl_3) of compound 161.



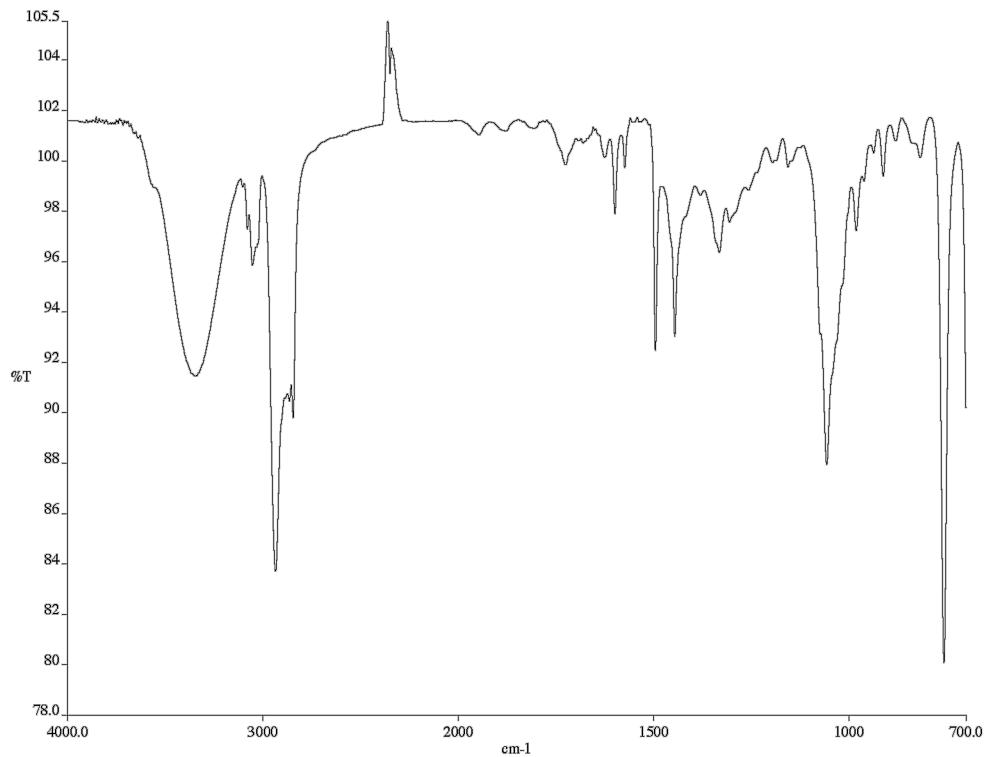


Figure A1.104 Infrared spectrum (thin film/NaCl) of compound **161**.

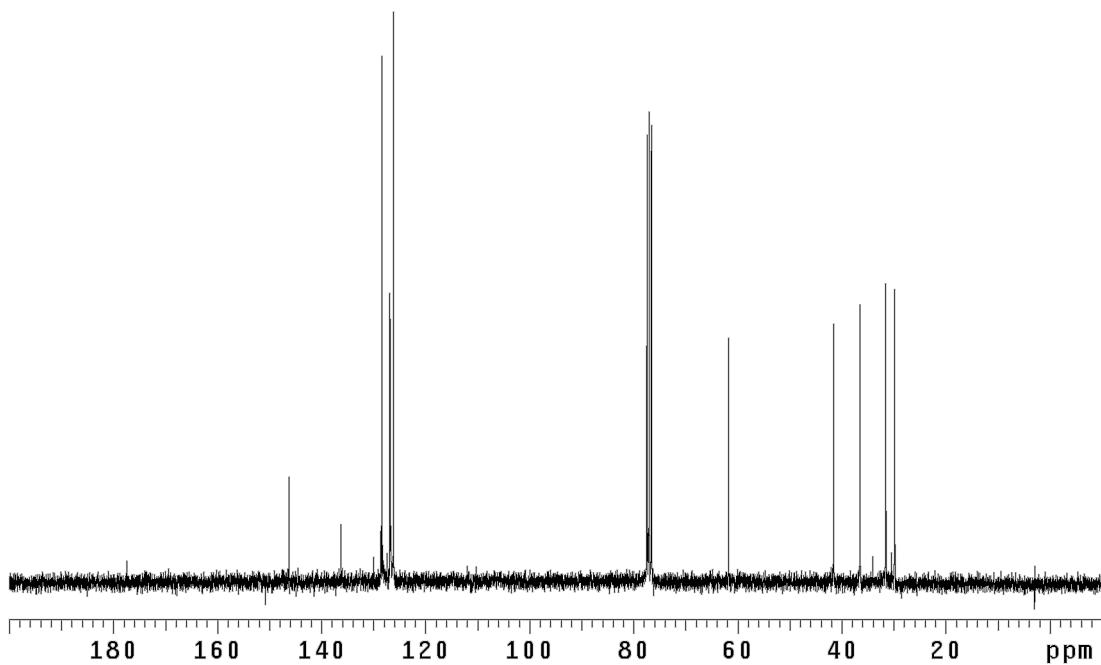
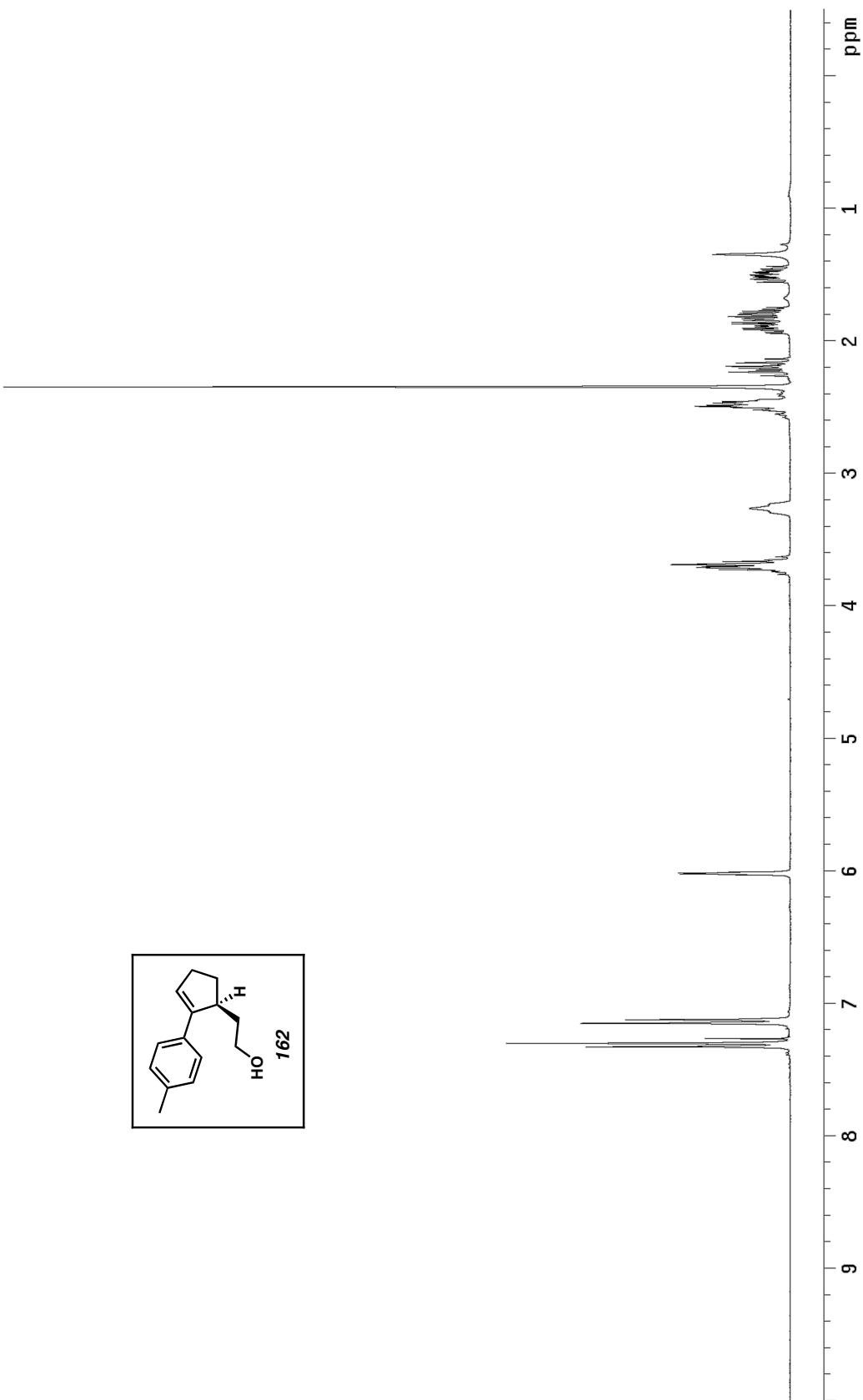


Figure A1.105 ^{13}C NMR (75 MHz, CDCl_3) of compound **161**.

Figure A1.106 ^1H NMR (300 MHz, CDCl_3) of compound 162.



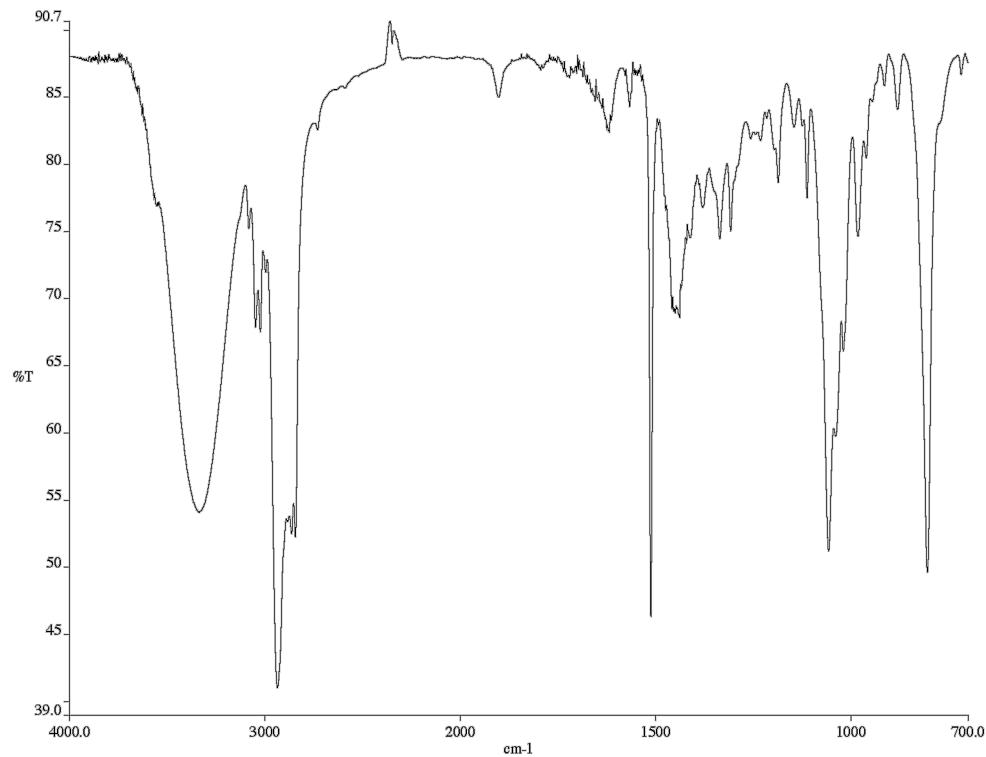


Figure A1.107 Infrared spectrum (thin film/NaCl) of compound **162**.

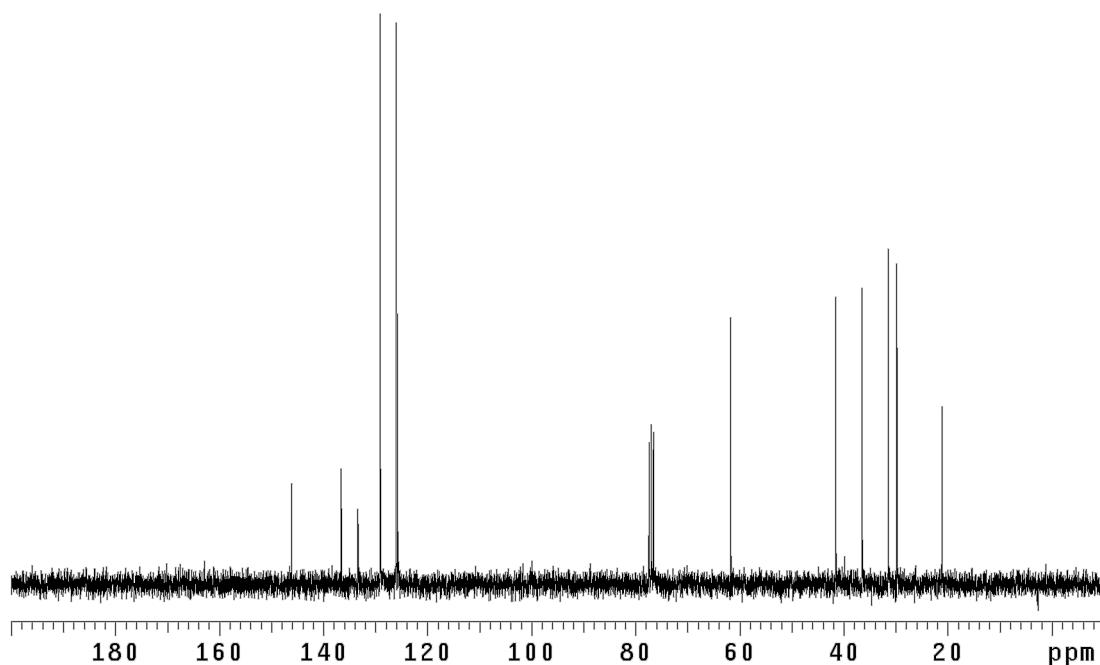


Figure A1.108 ^{13}C NMR (75 MHz, CDCl_3) of compound **162**.

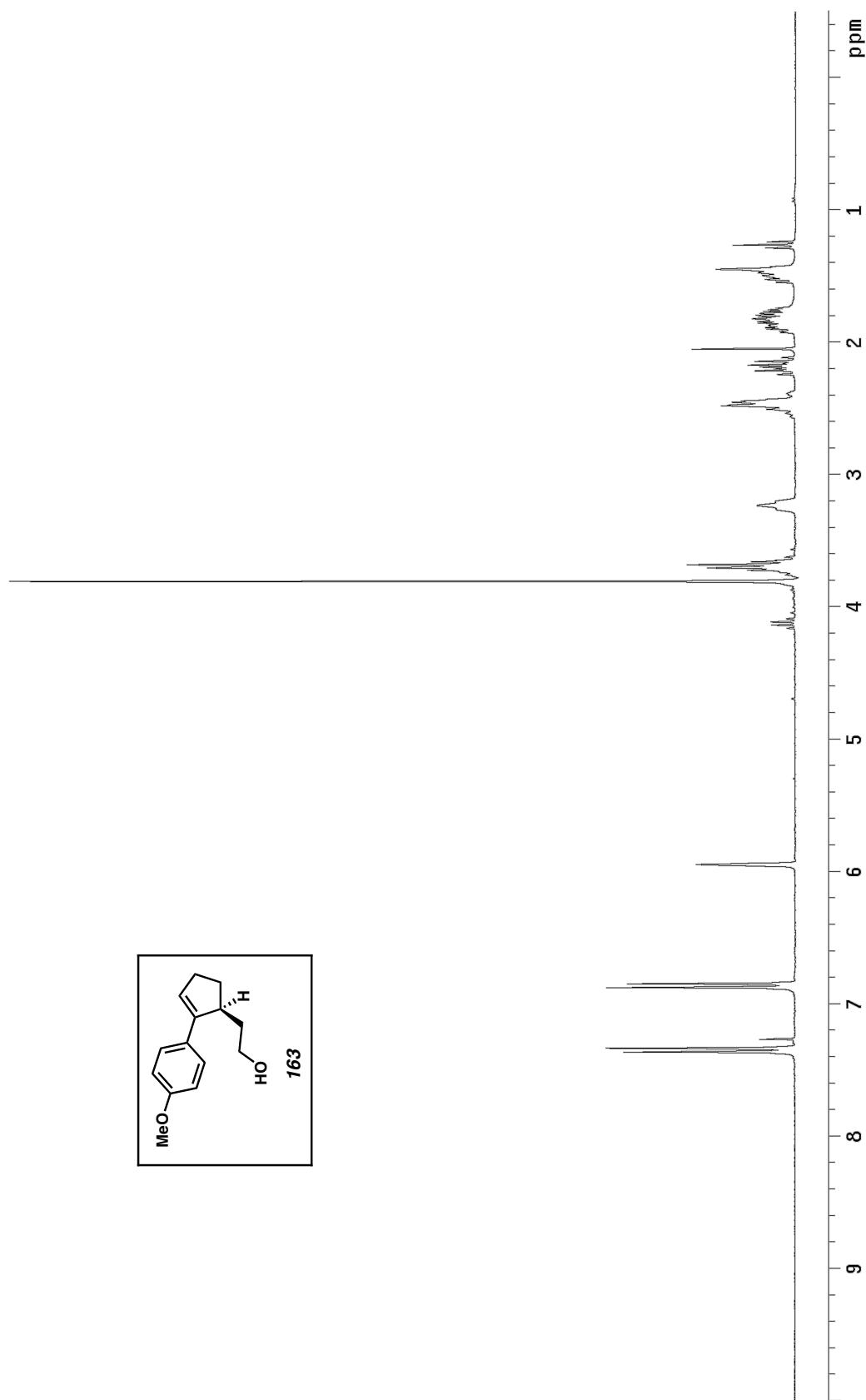


Figure A1.109 ^1H NMR (300 MHz, CDCl_3) of compound 163.

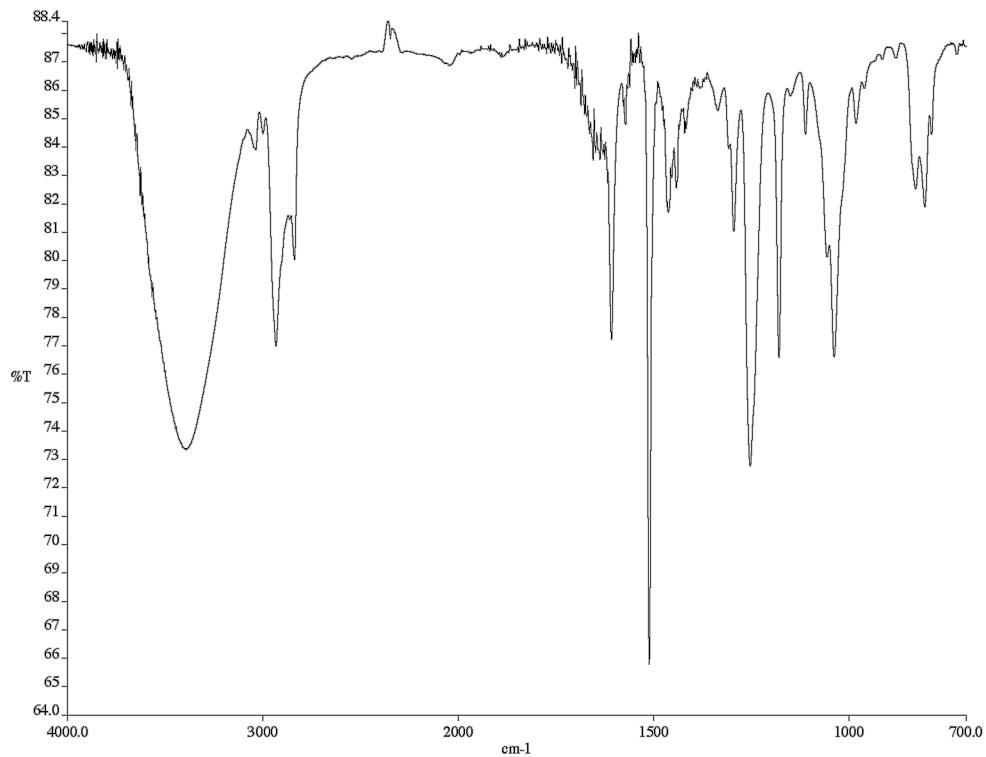


Figure A1.110 Infrared spectrum (thin film/NaCl) of compound **163**.

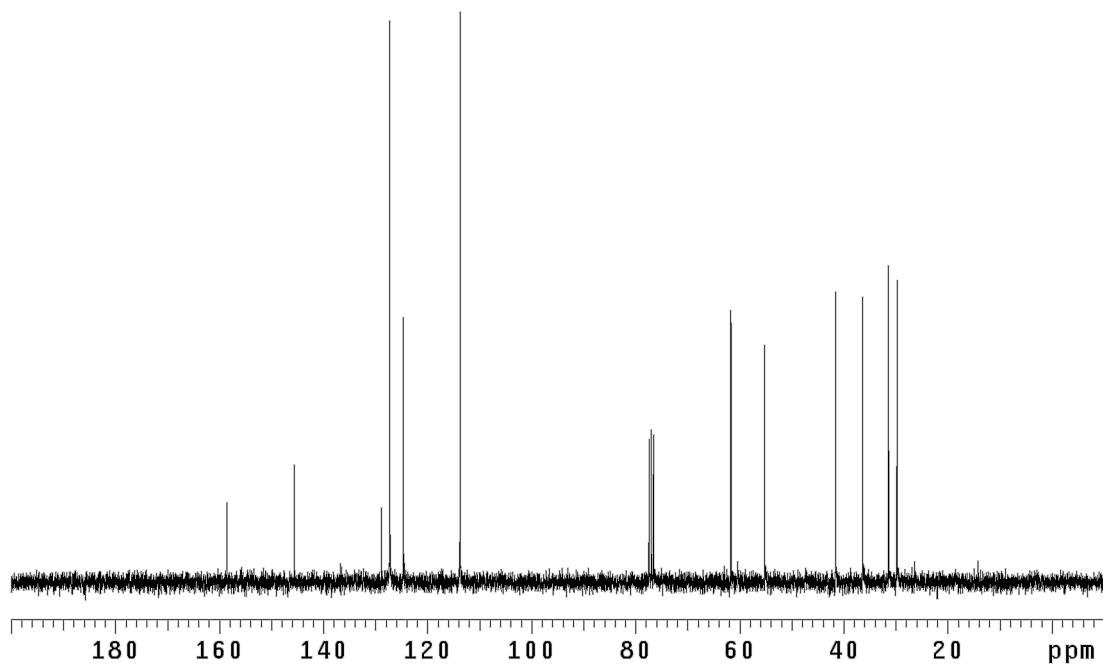


Figure A1.111 ^{13}C NMR (75 MHz, CDCl_3) of compound **163**.

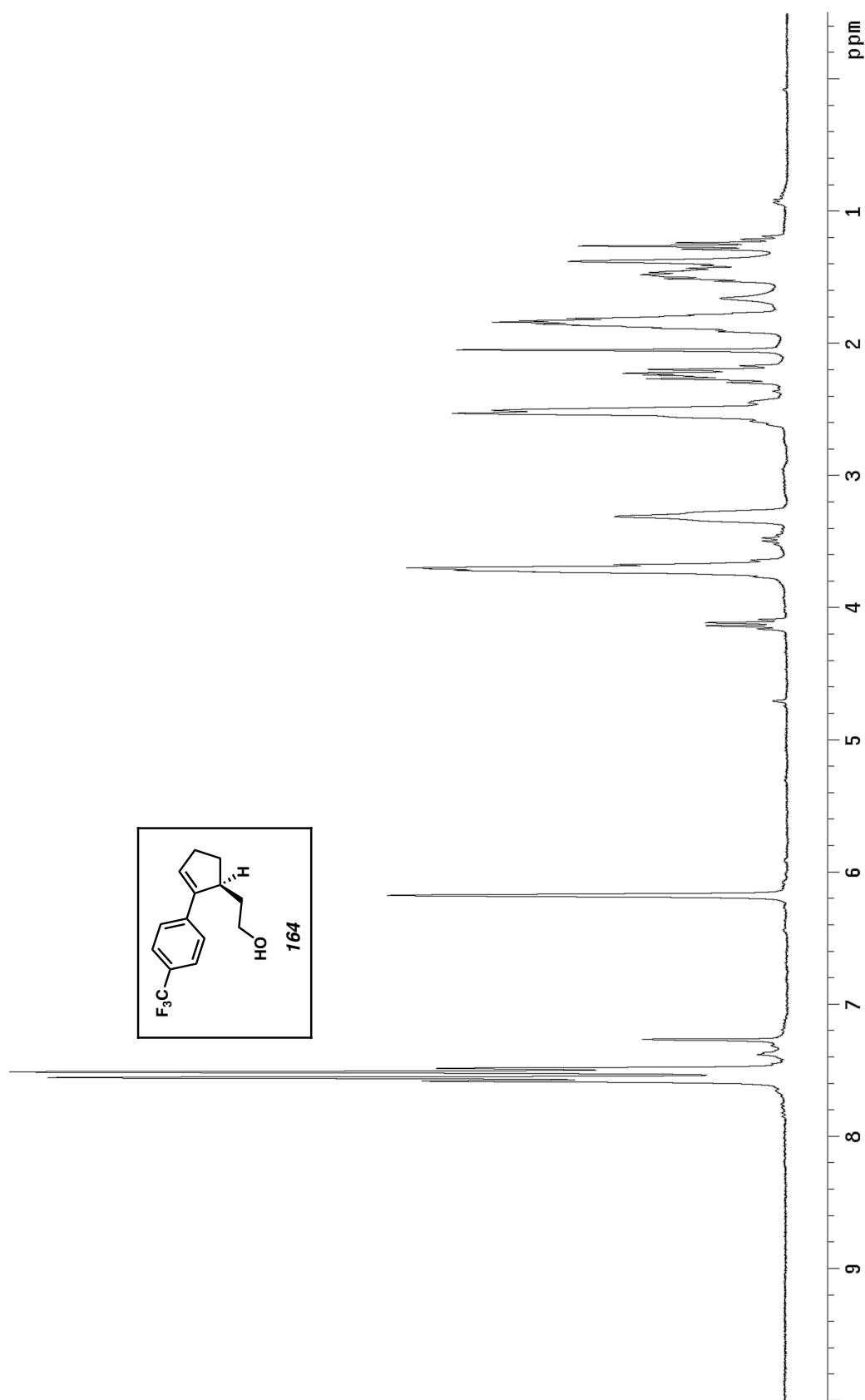


Figure A1.112 ^1H NMR (300 MHz, CDCl_3) of compound 164.

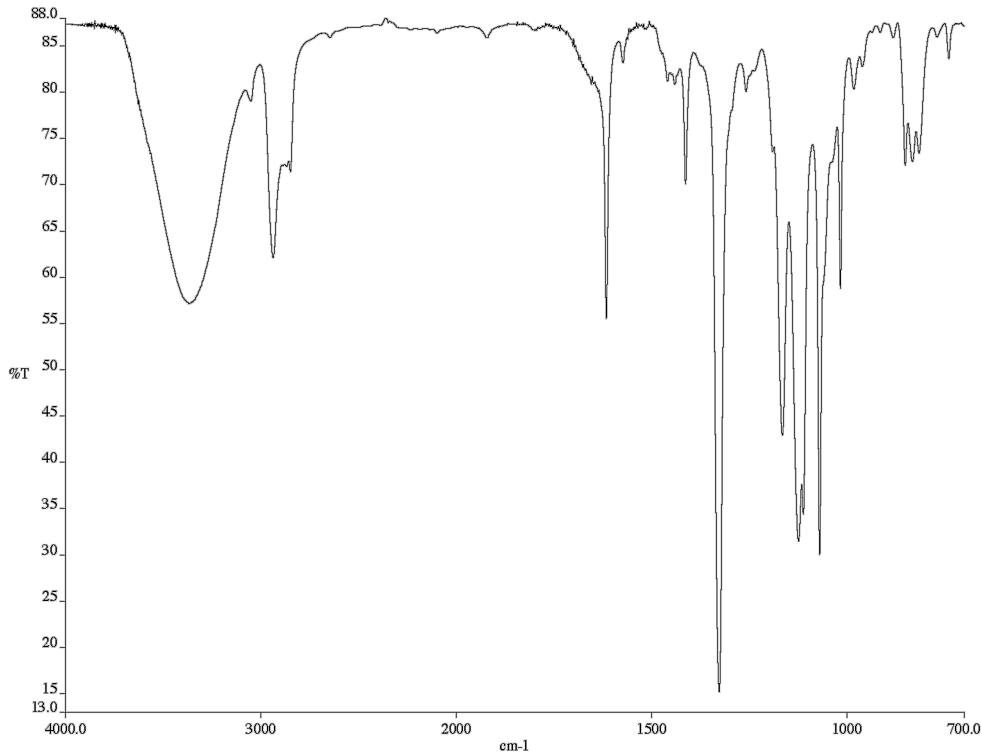


Figure A1.113 Infrared spectrum (thin film/NaCl) of compound **164**.

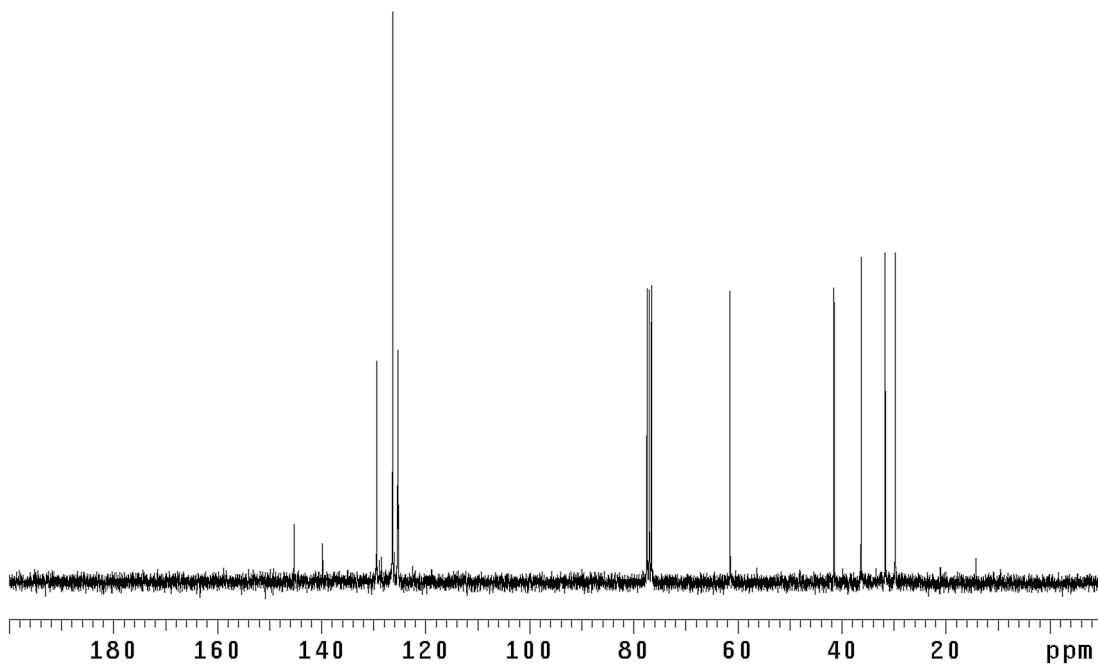


Figure A1.114 ^{13}C NMR (75 MHz, CDCl_3) of compound **164**.

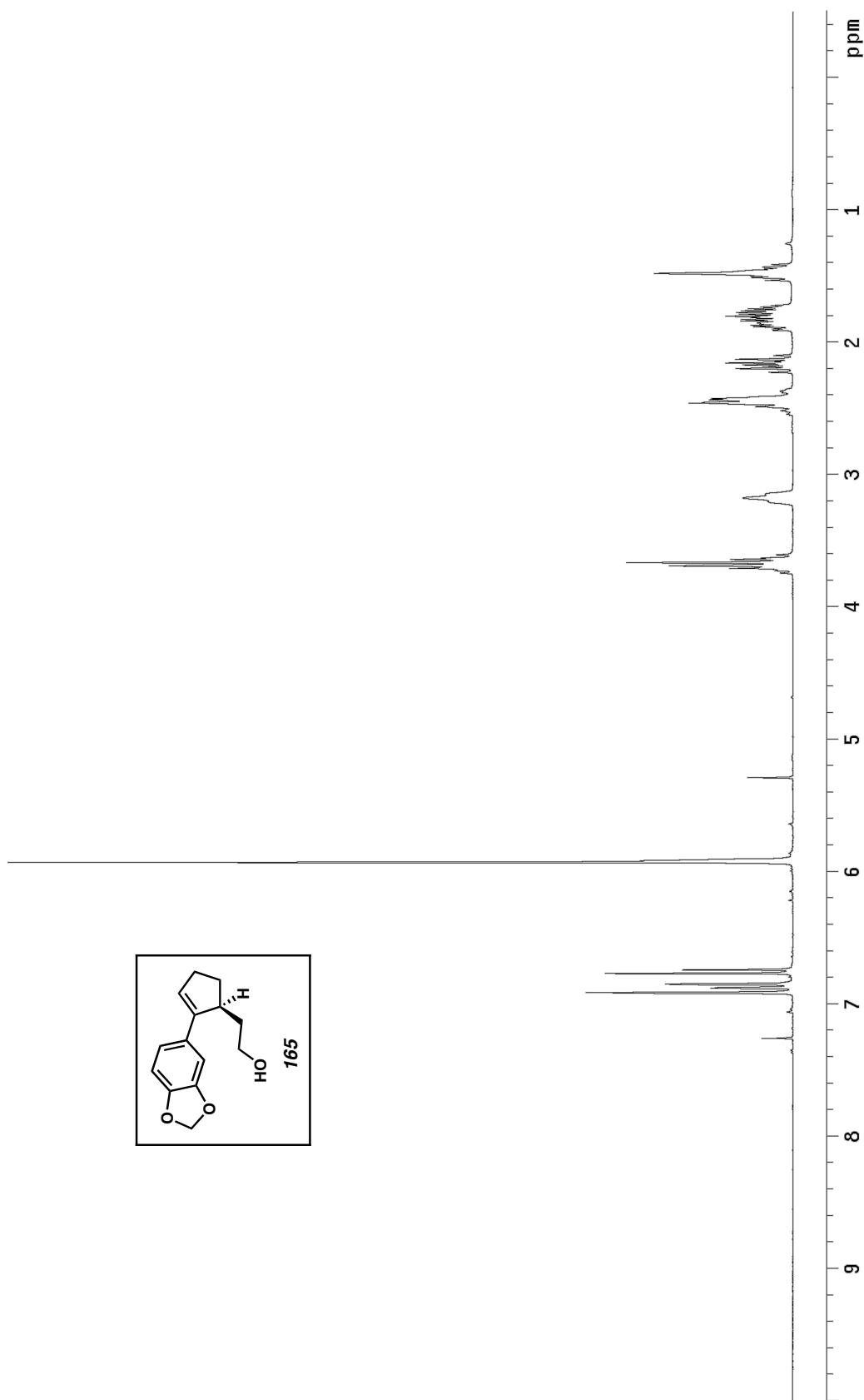


Figure A1.115 ^1H NMR (300 MHz, CDCl_3) of compound 165.

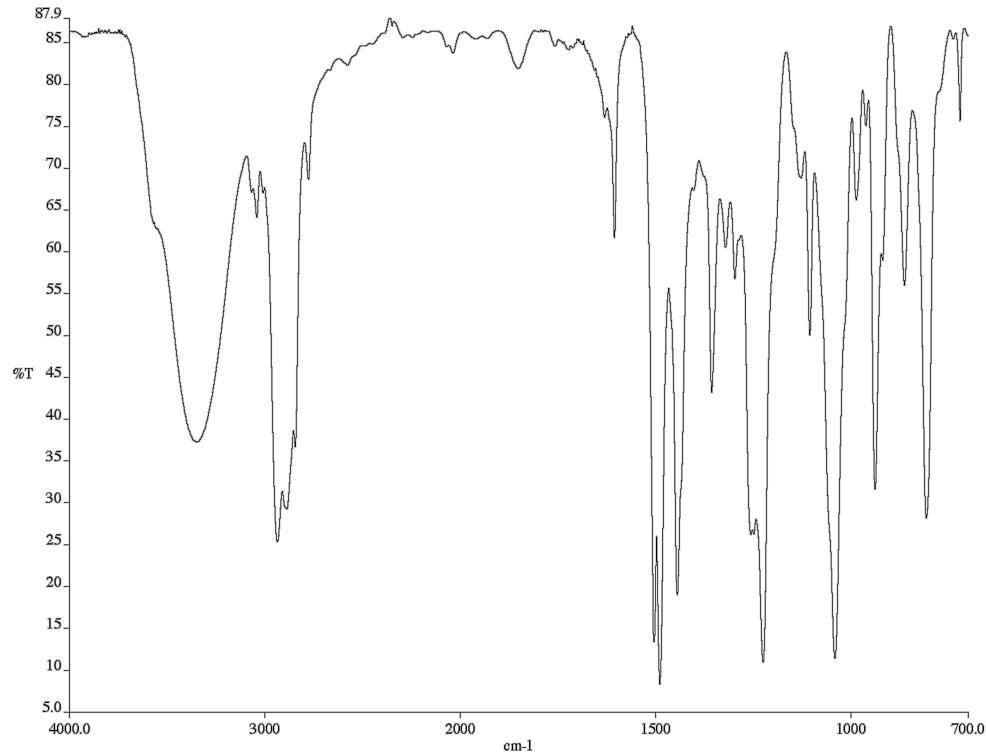


Figure A1.116 Infrared spectrum (thin film/NaCl) of compound **165**.

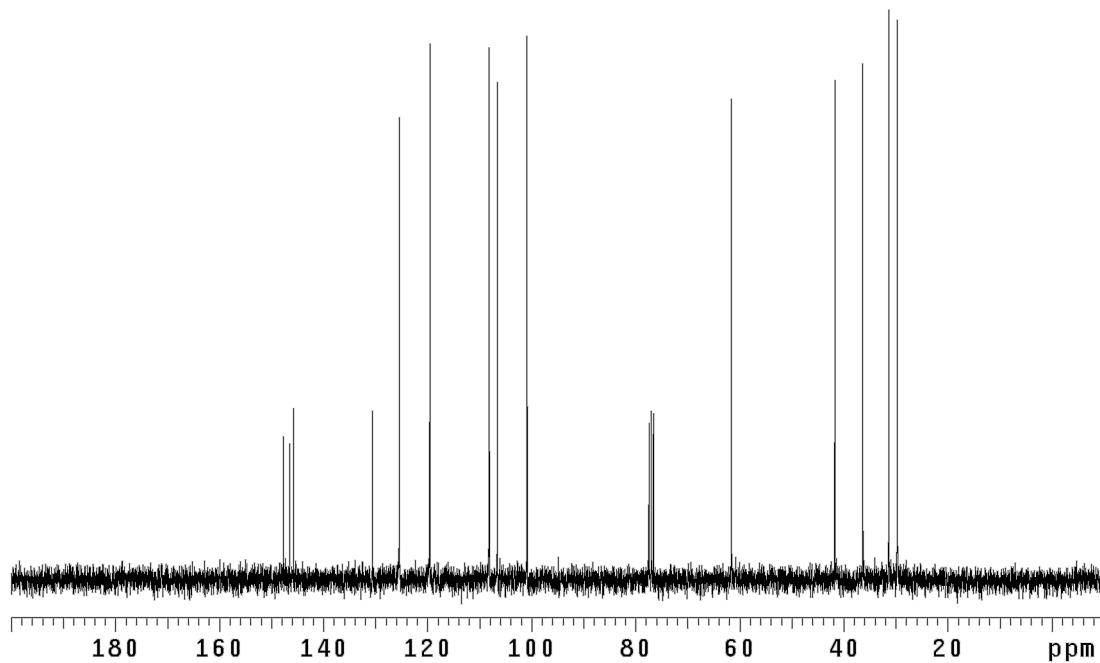


Figure A1.117 ^{13}C NMR (75 MHz, CDCl_3) of compound **165**.

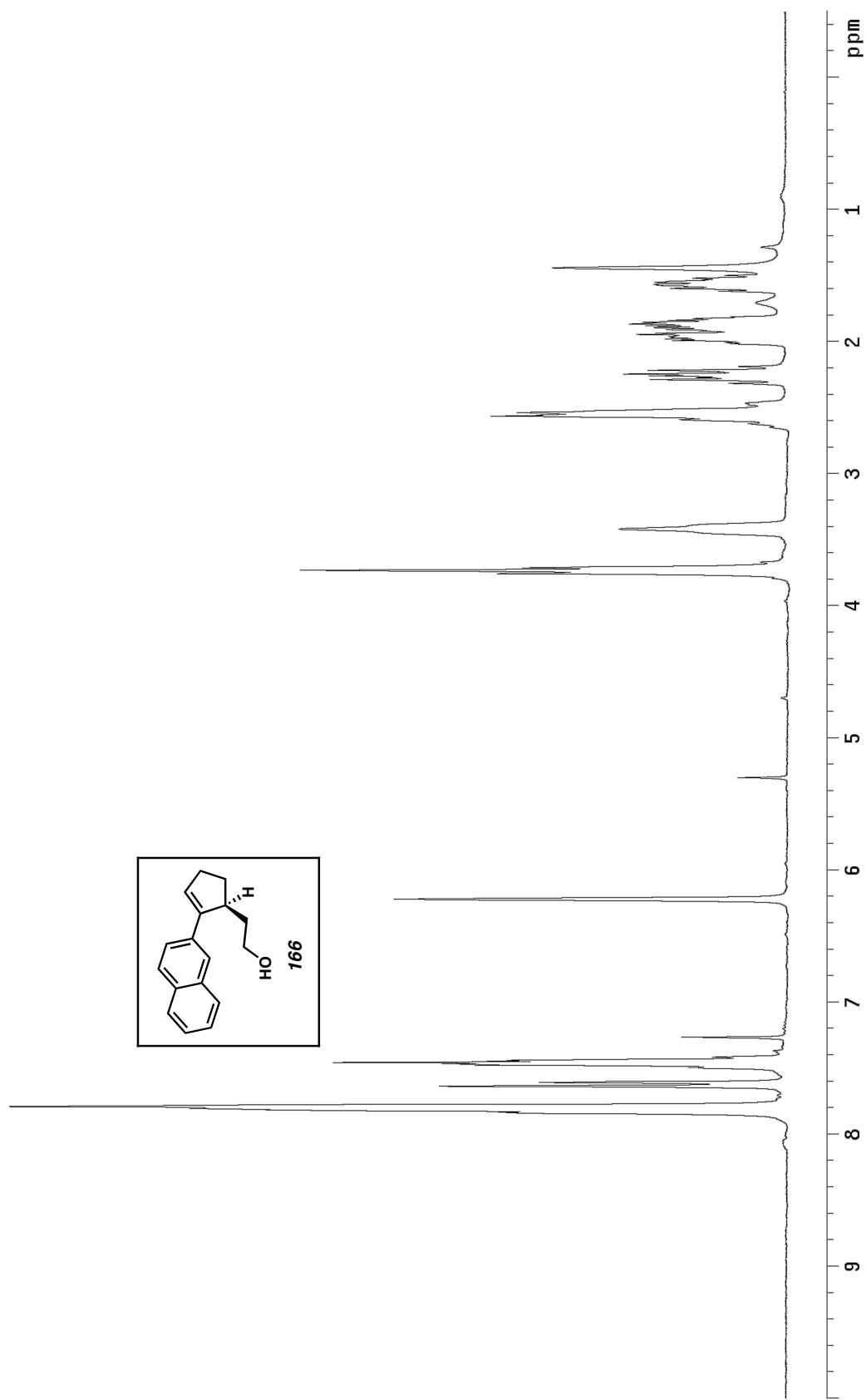


Figure A1.118 ^1H NMR (300 MHz, CDCl_3) of compound 166.

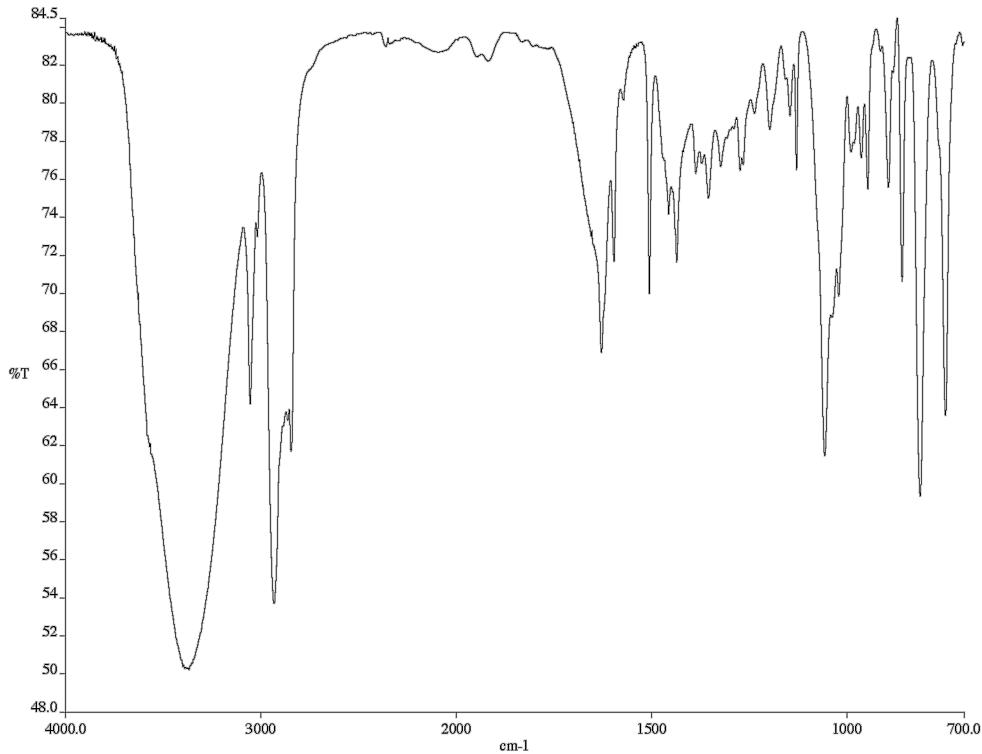


Figure A1.119 Infrared spectrum (thin film/NaCl) of compound **166**.

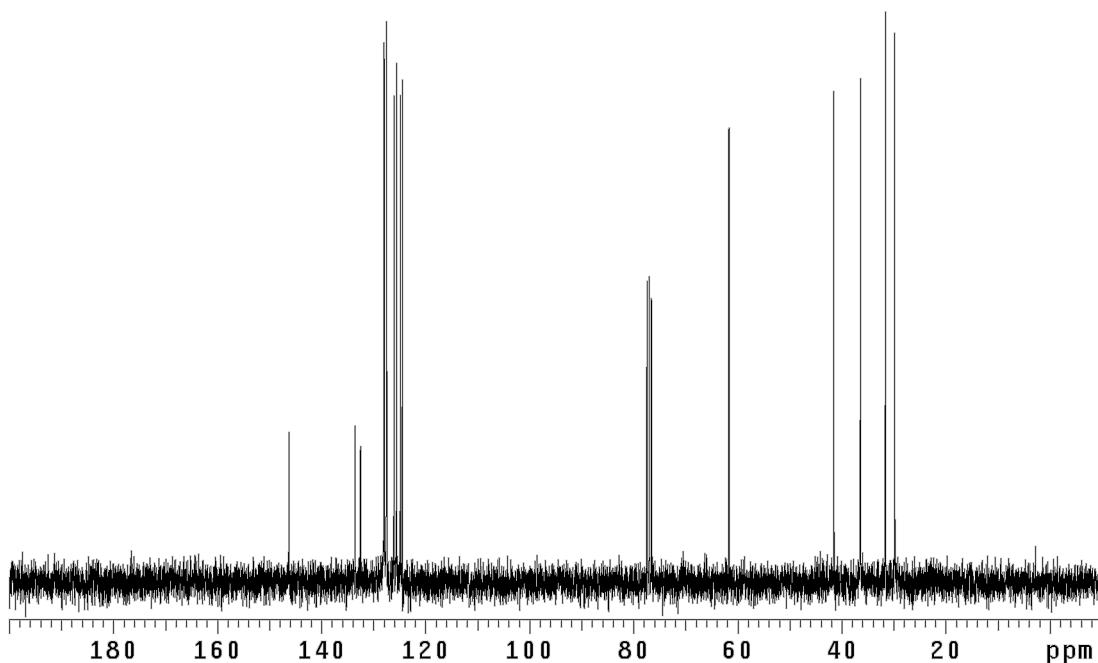


Figure A1.120 ^{13}C NMR (75 MHz, CDCl_3) of compound **166**.

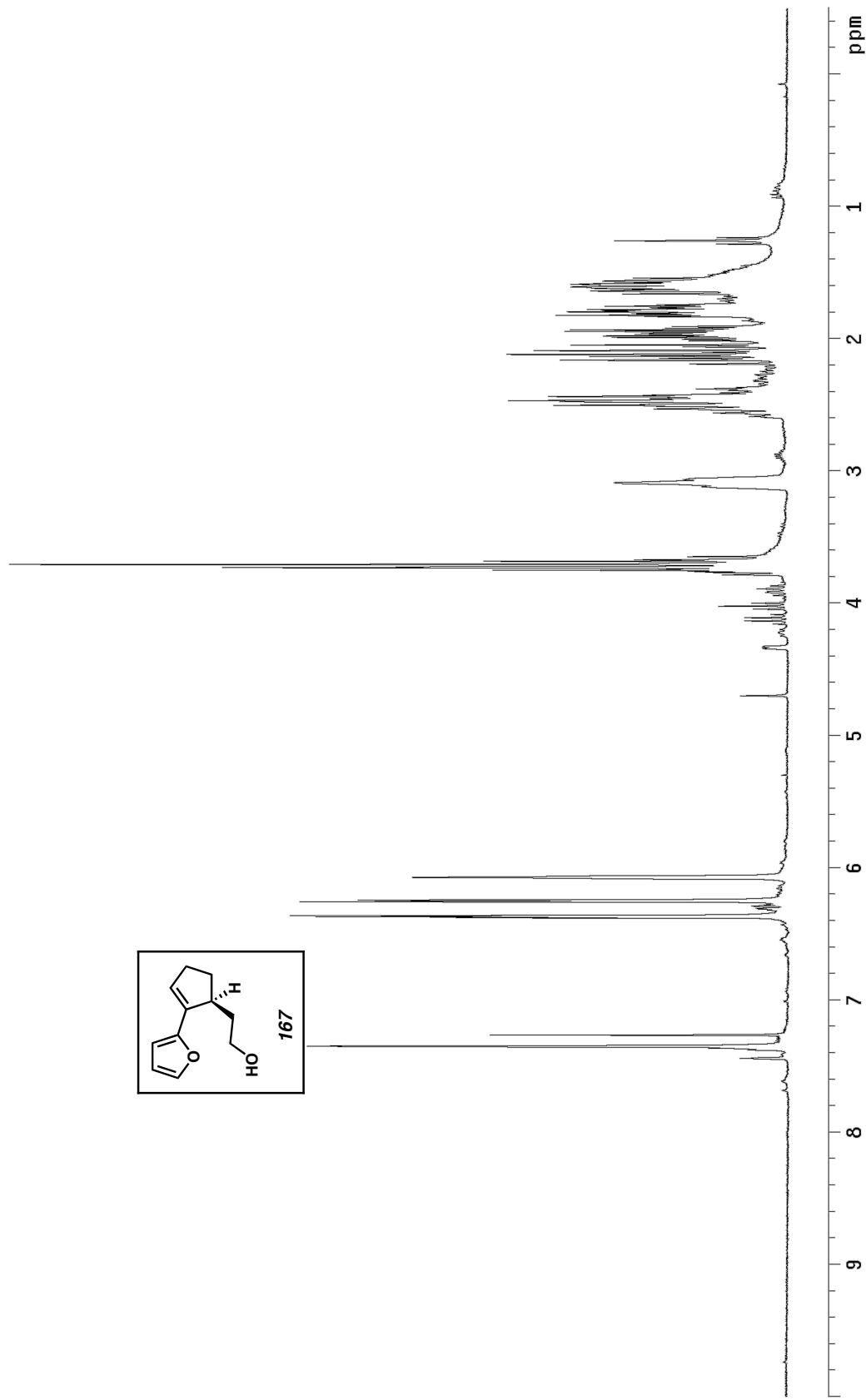


Figure A1.121 ^1H NMR (300 MHz, CDCl_3) of compound 167.

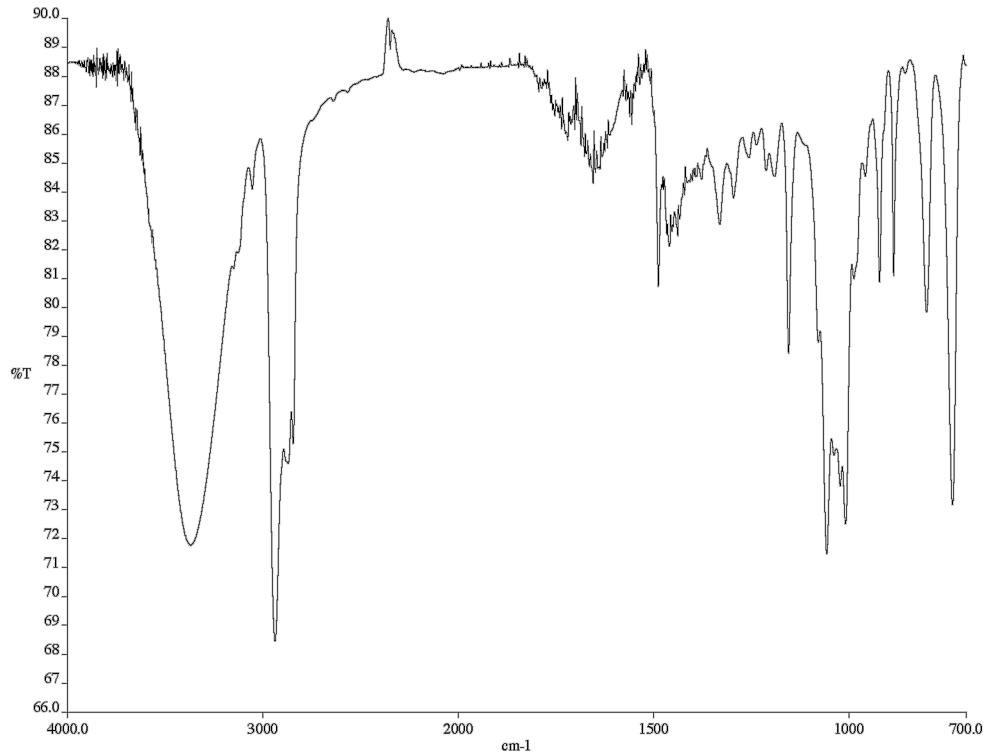


Figure A1.122 Infrared spectrum (thin film/NaCl) of compound **167**.

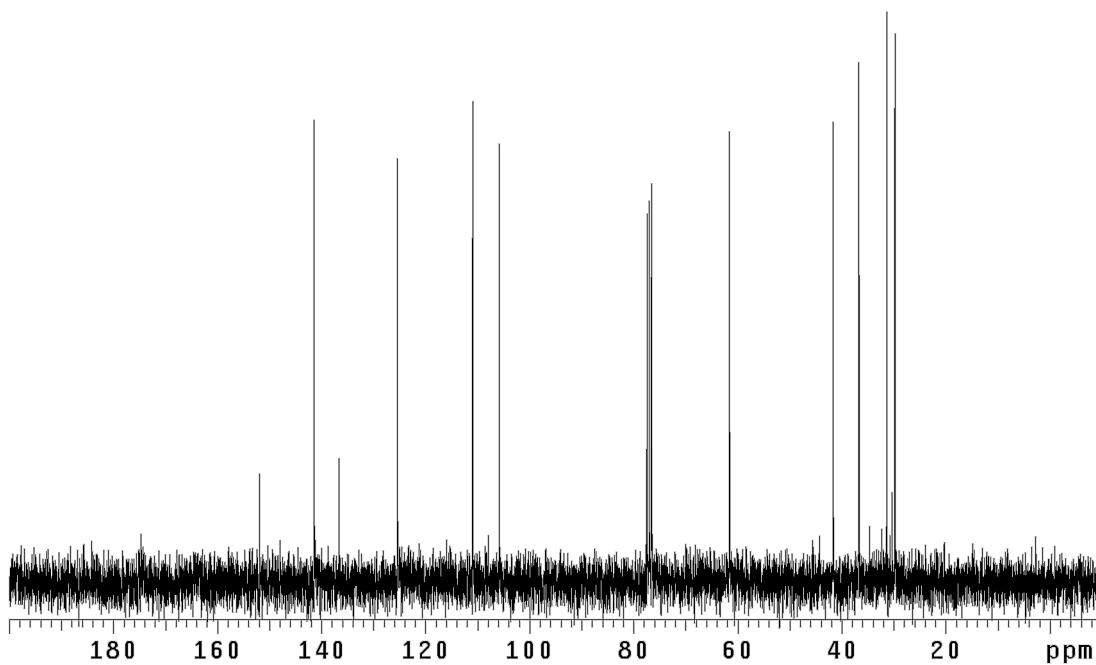


Figure A1.123 ^{13}C NMR (75 MHz, CDCl_3) of compound **167**.

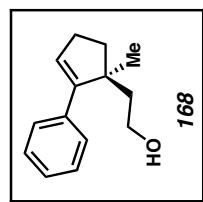
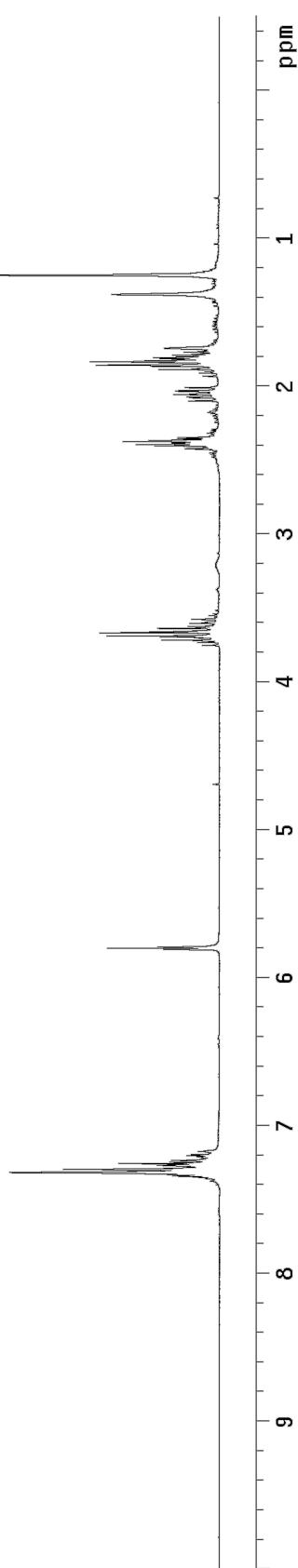


Figure A1.124 ¹H NMR (300 MHz, CDCl₃) of compound 168.

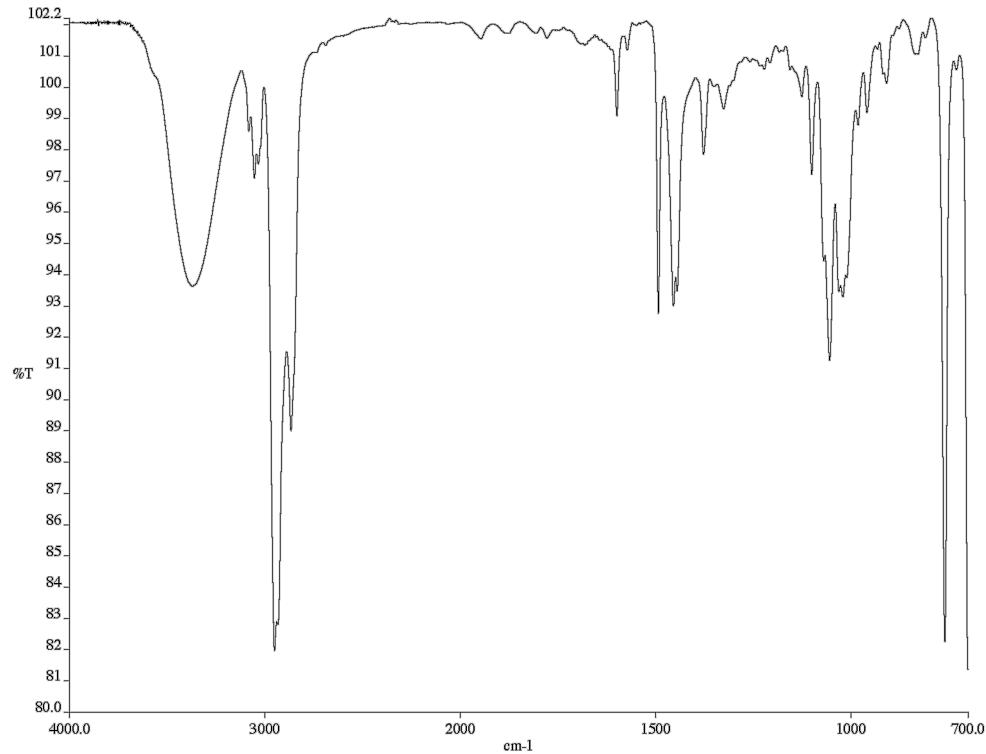


Figure A1.125 Infrared spectrum (thin film/NaCl) of compound **168**.

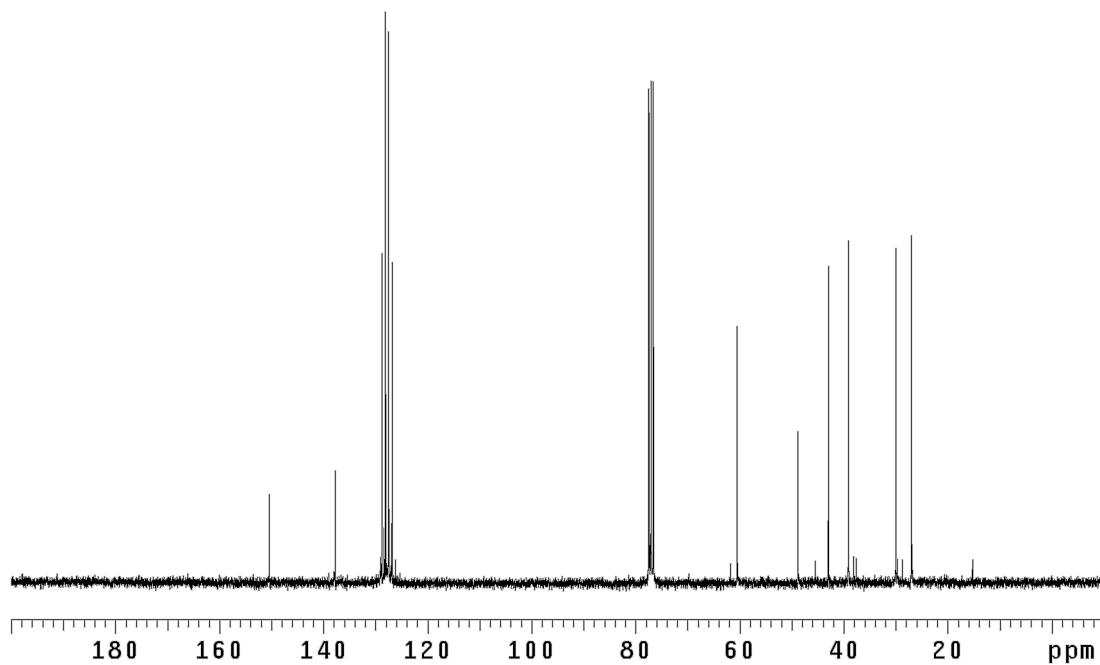


Figure A1.126 ^{13}C NMR (75 MHz, CDCl_3) of compound **168**.

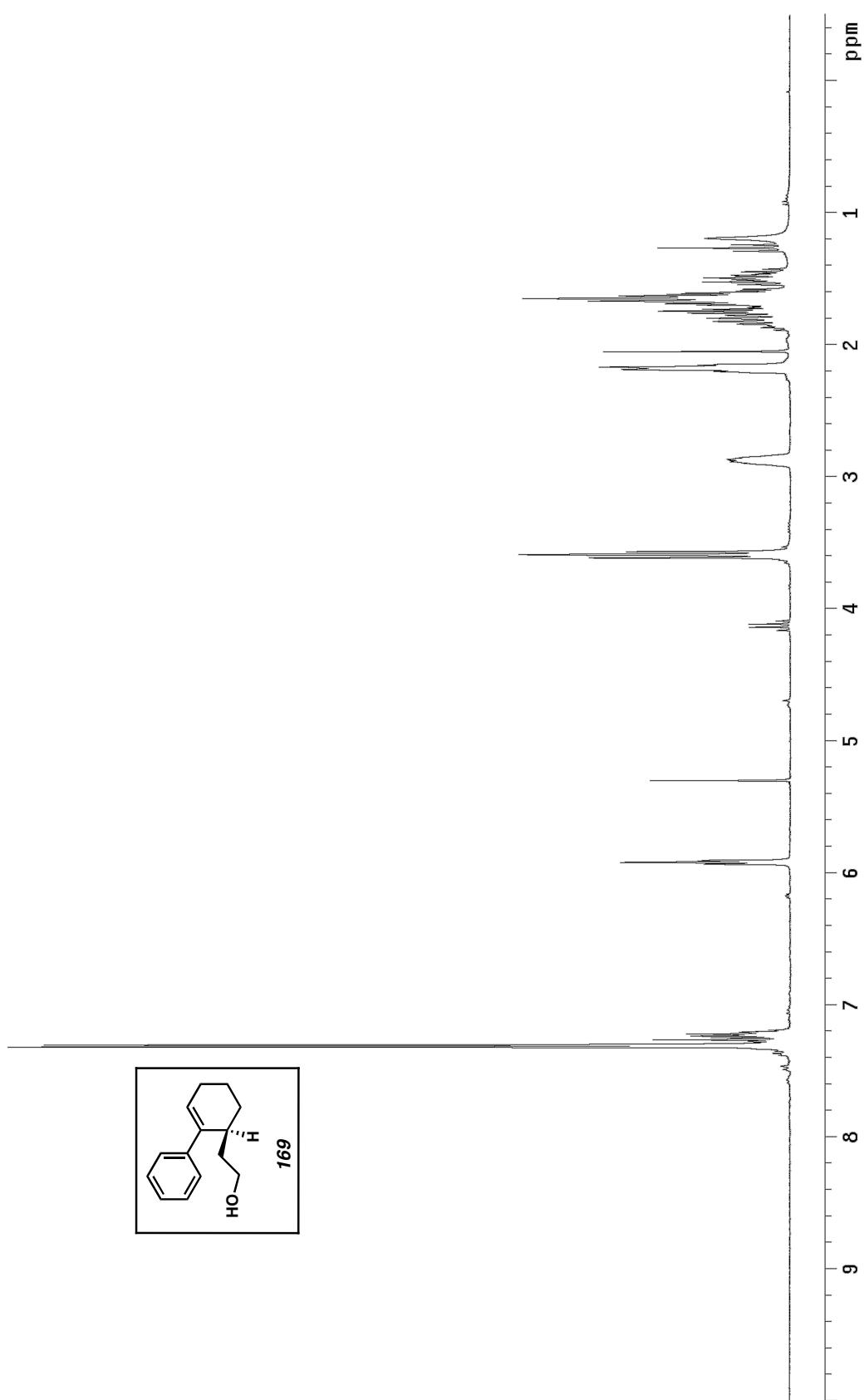


Figure A1.127 ^1H NMR (300 MHz, CDCl_3) of compound 169.

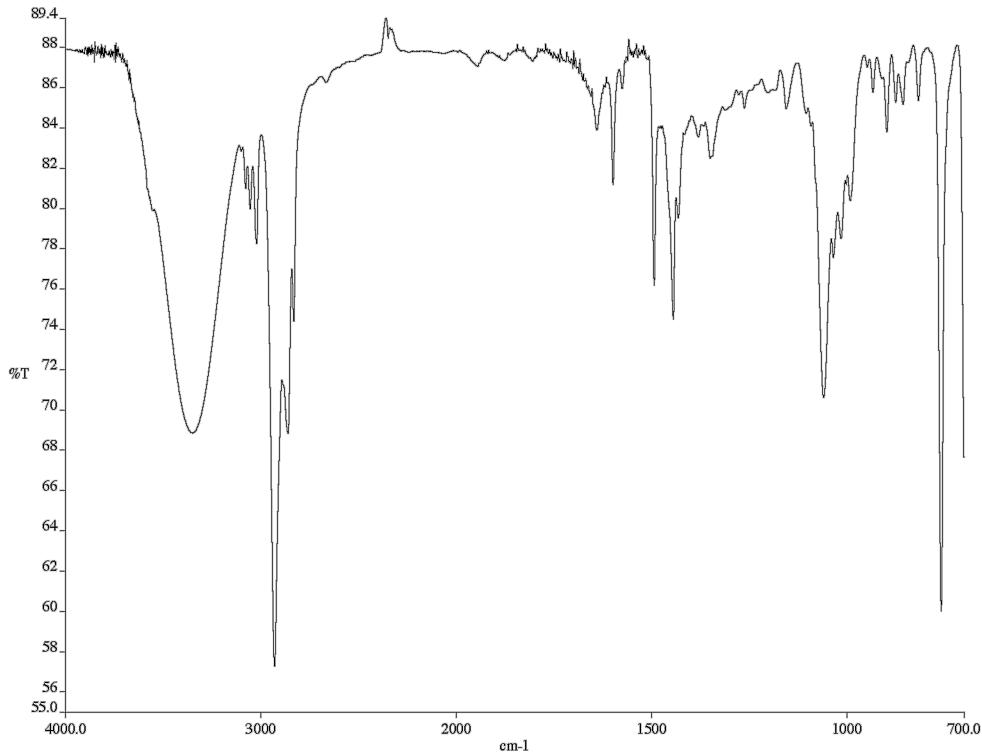


Figure A1.128 Infrared spectrum (thin film/NaCl) of compound **169**.

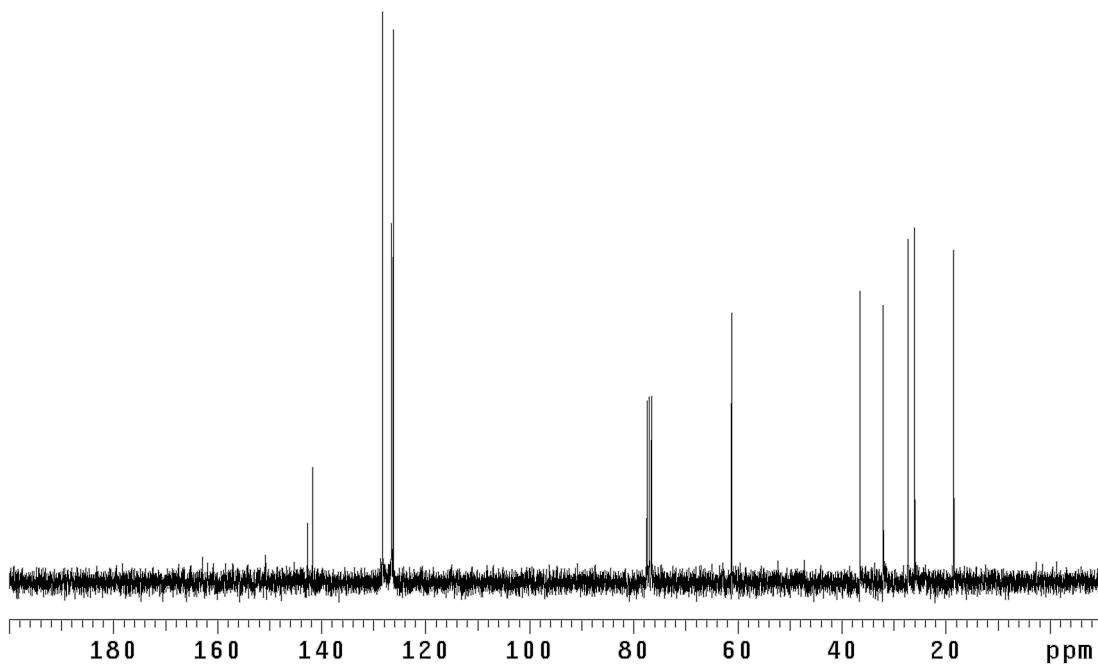
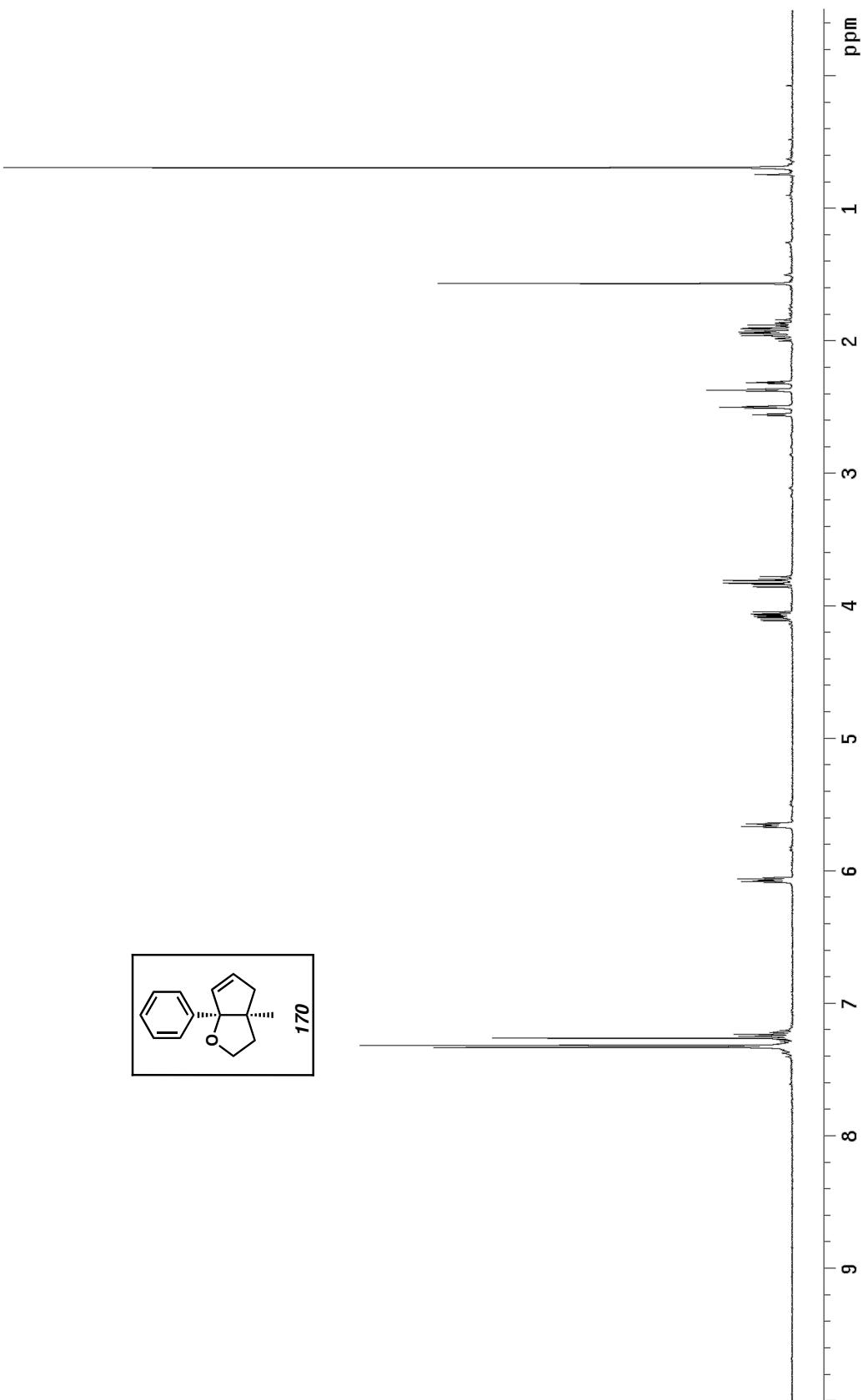


Figure A1.129 ¹³C NMR (75 MHz, CDCl₃) of compound **169**.

Figure A1.130 ^1H NMR (300 MHz, CDCl_3) of compound 170.



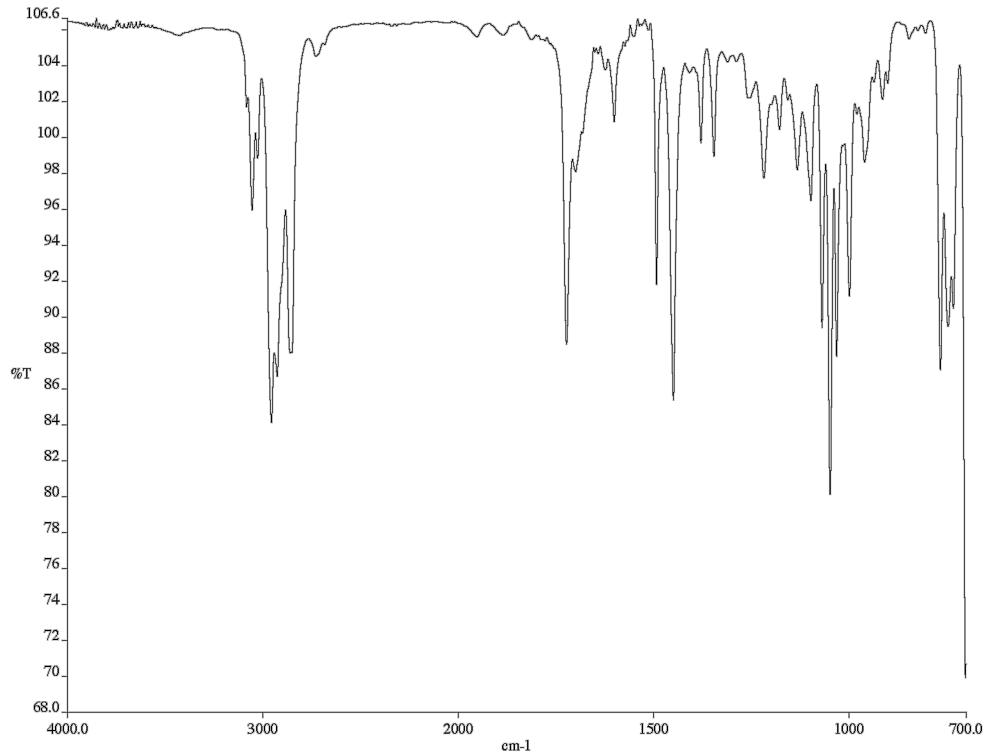


Figure A1.131 Infrared spectrum (thin film/NaCl) of compound **170**.

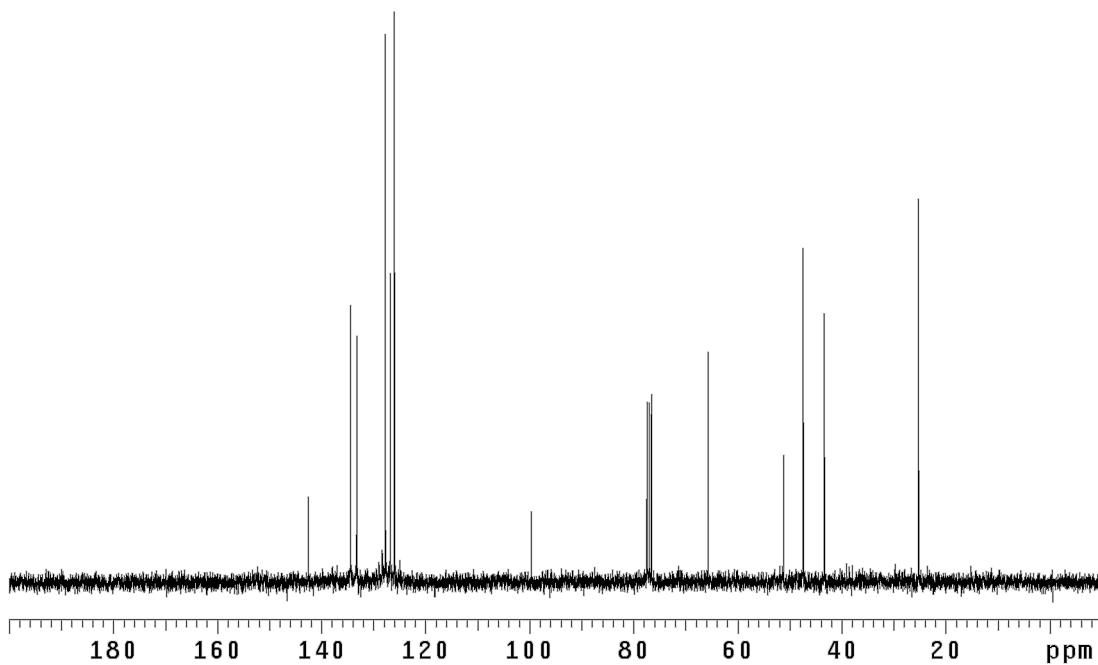


Figure A1.132 ^{13}C NMR (75 MHz, CDCl_3) of compound **170**.