APPENDIX 5

Spectra Relevant to Chapter 5
Figure A5.1 $^1$H NMR (300 MHz, CDCl$_3$) of compound 301.
Figure A5.2 Infrared spectrum (thin film/NaCl) of compound 301.

Figure A5.3 $^{13}$C NMR (75 MHz, CDCl$_3$) of compound 301.
Figure A5.4  $^1$H NMR (500 MHz, CDCl$_3$) of compound 296.
Figure A5.5 Infrared spectrum (thin film/NaCl) of compound 296.

Figure A5.6 $^{13}$C NMR (125 MHz, CDCl$_3$) of compound 296.
Figure A5.7 $^1$H NMR (300 MHz, C$_6$D$_6$) of compound 303.
Figure A5.8 Infrared spectrum (thin film/NaCl) of compound 303.

Figure A5.9 $^{13}$C NMR (75 MHz, C$_6$D$_6$) of compound 303.
Figure A5.10 $^1$H NMR (300 MHz, CDCl$_3$) of compound 304.
Figure A5.11 Infrared spectrum (thin film/NaCl) of compound 304.

Figure A5.12 $^{13}$C NMR (75 MHz, CDCl$_3$) of compound 304.
Figure A5.13  $\text{H NMR (300 MHz, C}_{6}D_{6})$ of compound $(+)-308$. 
Figure A5.14  Infrared spectrum (thin film/NaCl) of compound (+)-308.

Figure A5.15  $^{13}$C NMR (75 MHz, C$_6$D$_6$) of compound (+)-308.
Figure A5.16. $^1\text{H}$ NMR (500 MHz, CDCl$_3$) of compound (−)-309.
Figure A5.17 Infrared spectrum (thin film/NaCl) of compound (−)-309.

Figure A5.18 $^{13}$C NMR (125 MHz, CDCl$_3$) of compound (−)-309.
Figure A5.19. $^1$H NMR (500 MHz, CDCl$_3$) of compound (+)-293.
Figure A5.20 Infrared spectrum (thin film/NaCl) of compound (+)-293.

Figure A5.21 $^{13}$C NMR (125 MHz, CDCl$_3$) of compound (+)-293.
Figure A5.22 $^1$H NMR (300 MHz, CDCl$_3$) of compound (+)-282.
Figure A5.23 Infrared spectrum (thin film/NaCl) of compound (+)-282.

Figure A5.24 $^{13}$C NMR (75 MHz, CDCl$_3$) of compound (+)-282.
Figure A5.25 $^1$H NMR (300 MHz, CDCl$_3$) of compound (±)-314.
Figure A5.26 Infrared spectrum (thin film/NaCl) of compound (±)-314.

Figure A5.27 $^{13}$C NMR (126 MHz, CDCl$_3$) of compound (±)-314.
Figure A5.28 $^1$H NMR (300 MHz, C$_6$D$_6$) of compound (+)-321.
Figure A5.29  Infrared spectrum (thin film/NaCl) of compound (+)-321.

Figure A5.30  $^{13}$C NMR (75 MHz, C$_6$D$_6$) of compound (+)-321.
Figure A5.31 $^1$H NMR (300 MHz, $C_6D_6$) of compound (–)-315.
Figure A5.32  Infrared spectrum (thin film/NaCl) of compound (–)-315.

Figure A5.33  $^{13}$C NMR (75 MHz, C$_6$D$_6$) of compound (–)-315.
Figure A5.34 $^1$H NMR (300 MHz, C$_6$D$_6$) of compound (–)-316.
Figure A5.35  Infrared spectrum (thin film/NaCl) of compound (–)-316.

Figure A5.36  $^{13}$C NMR (75 MHz, C$_6$D$_6$) of compound (–)-316.
Figure A5.37  $^1$H NMR (300 MHz, CD$_3$OD) of compound (–)-317.
Figure A5.38  Infrared spectrum (thin film/NaCl) of compound (–)-317.

Figure A5.39  $^{13}$C NMR (75 MHz, $C_6D_6$) of compound (–)-317.
Figure A5.40 $^1$H NMR (300 MHz, $C_6D_6$) of compound (−)-318.
Figure A5.41 Infrared spectrum (thin film/NaCl) of compound (−)-318.

Figure A5.42 $^{13}$C NMR (75 MHz, C$_6$D$_6$) of compound (−)-318.
Figure A5.43: 1H NMR (300 MHz, CD$_3$OD) of compound (+)-319.
Figure A5.44  Infrared spectrum (thin film/NaCl) of compound (+)-319.

Figure A5.45  $^{13}$C NMR (75 MHz, C$_6$D$_6$) of compound (+)-319.
Figure A5.46: $^1$H NMR (300 MHz, CD$_3$)$_2$ of compound (–)-320.
Figure A5.47 Infrared spectrum (thin film/NaCl) of compound (−)-320.

Figure A5.48 $^{13}$C NMR (75 MHz, C$_6$D$_6$) of compound (−)-320.