

Supplementary Materials

Figure S1. $^1\text{H-NMR}$ of 4a.

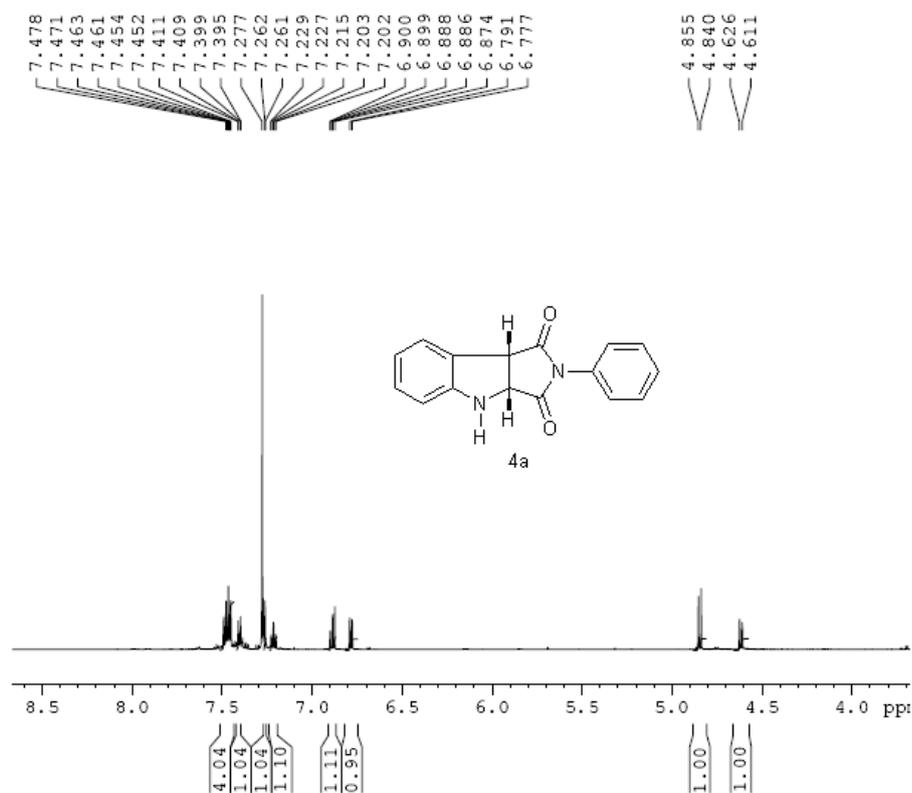


Figure S2. $^{13}\text{C-NMR}$ of 4a.

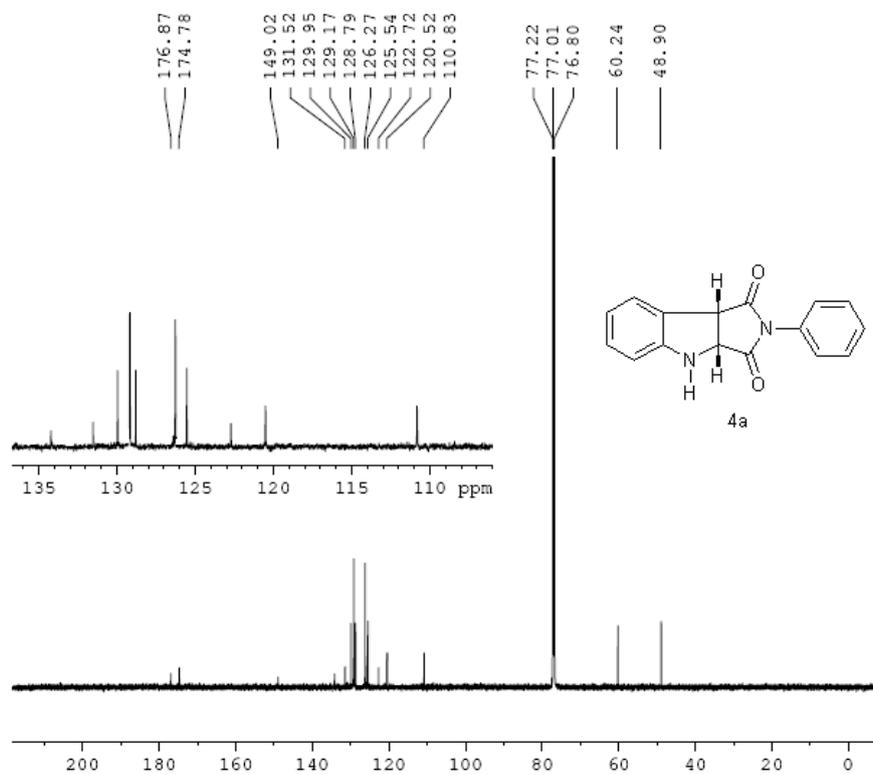


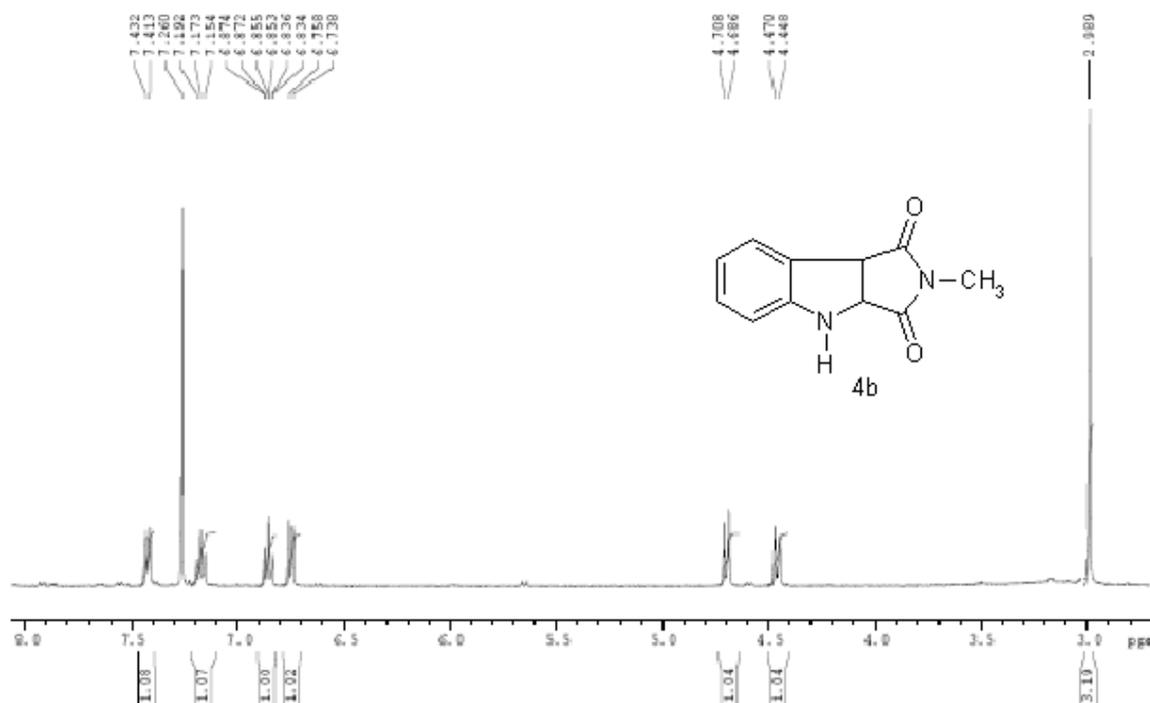
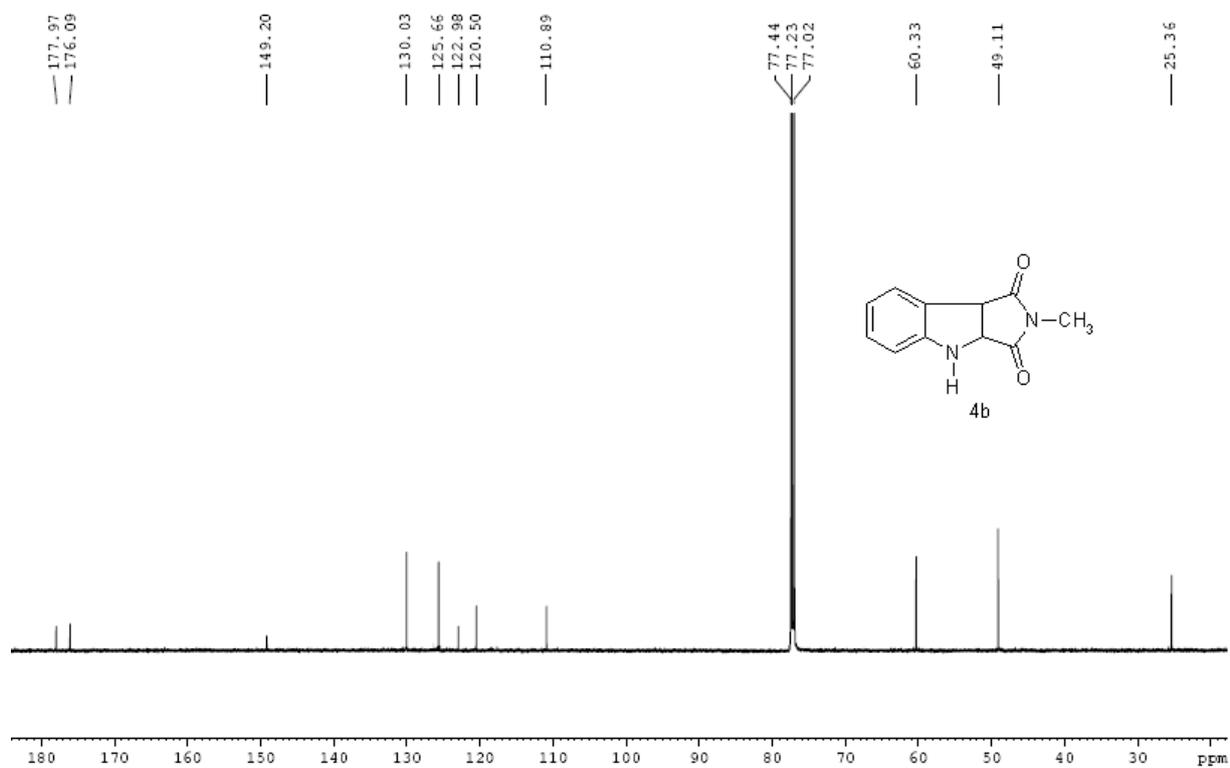
Figure S3. $^1\text{H-NMR}$ and $^{13}\text{C-NMR}$ of **4b**.**Figure S4.** $^{13}\text{C-NMR}$ of **4b**.

Figure S5. HSQC of 4b.

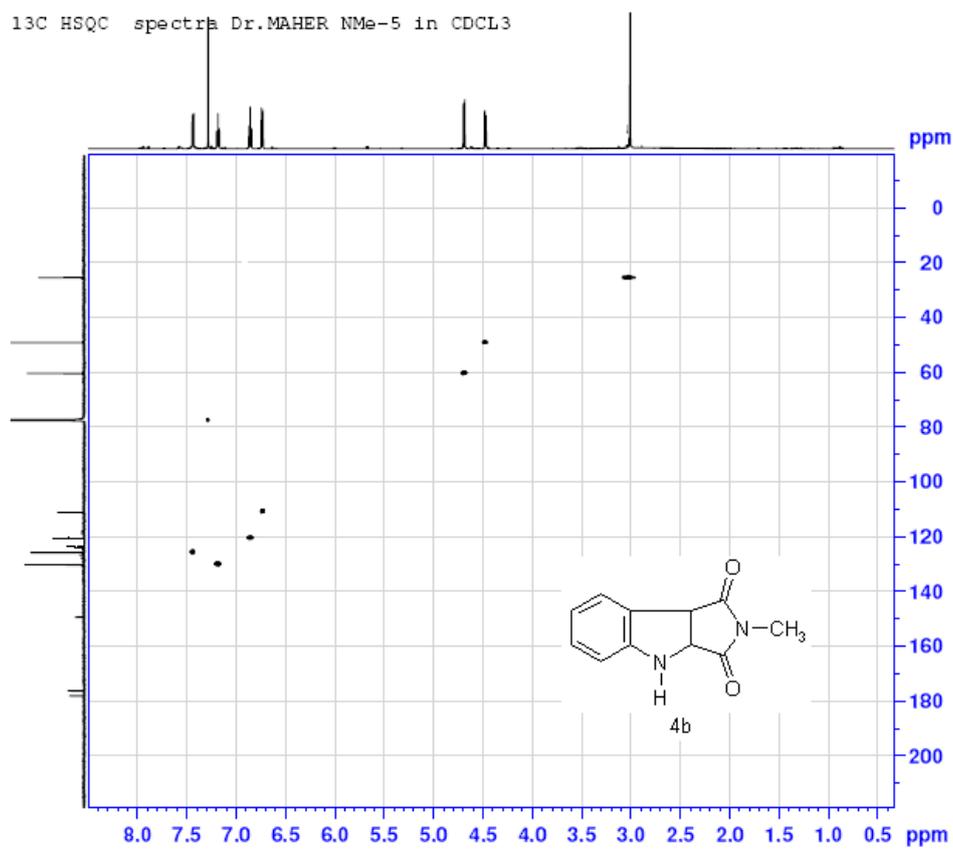


Figure S6. H,H COSY of 4b.

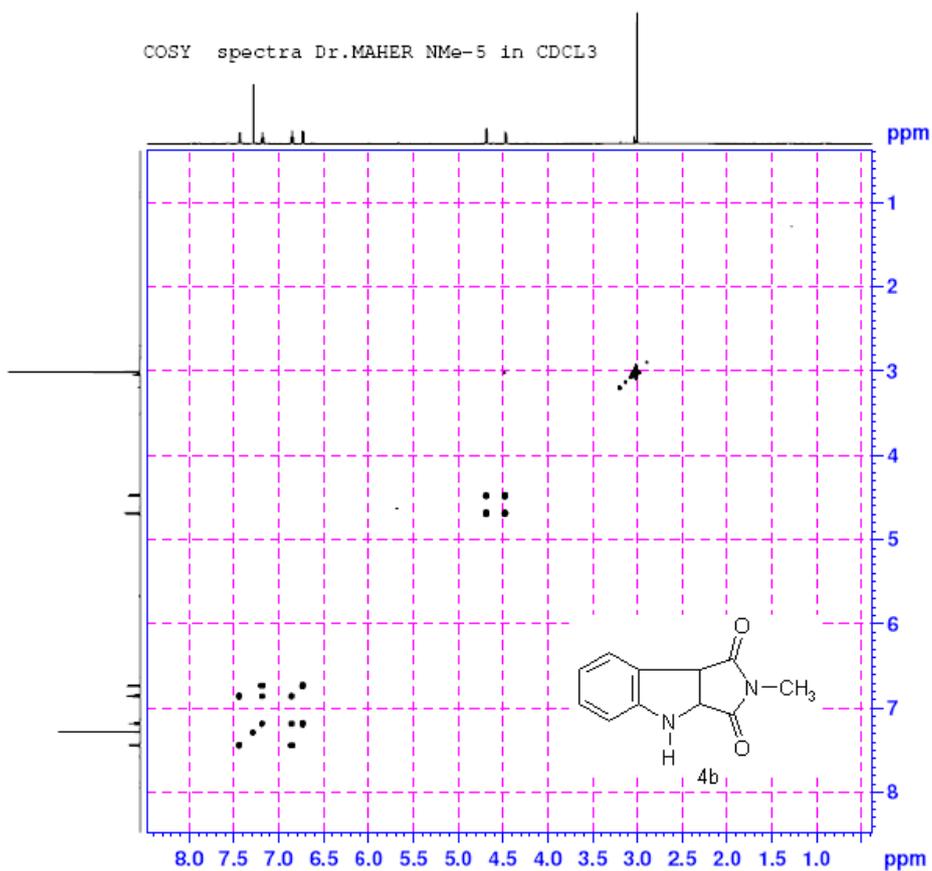


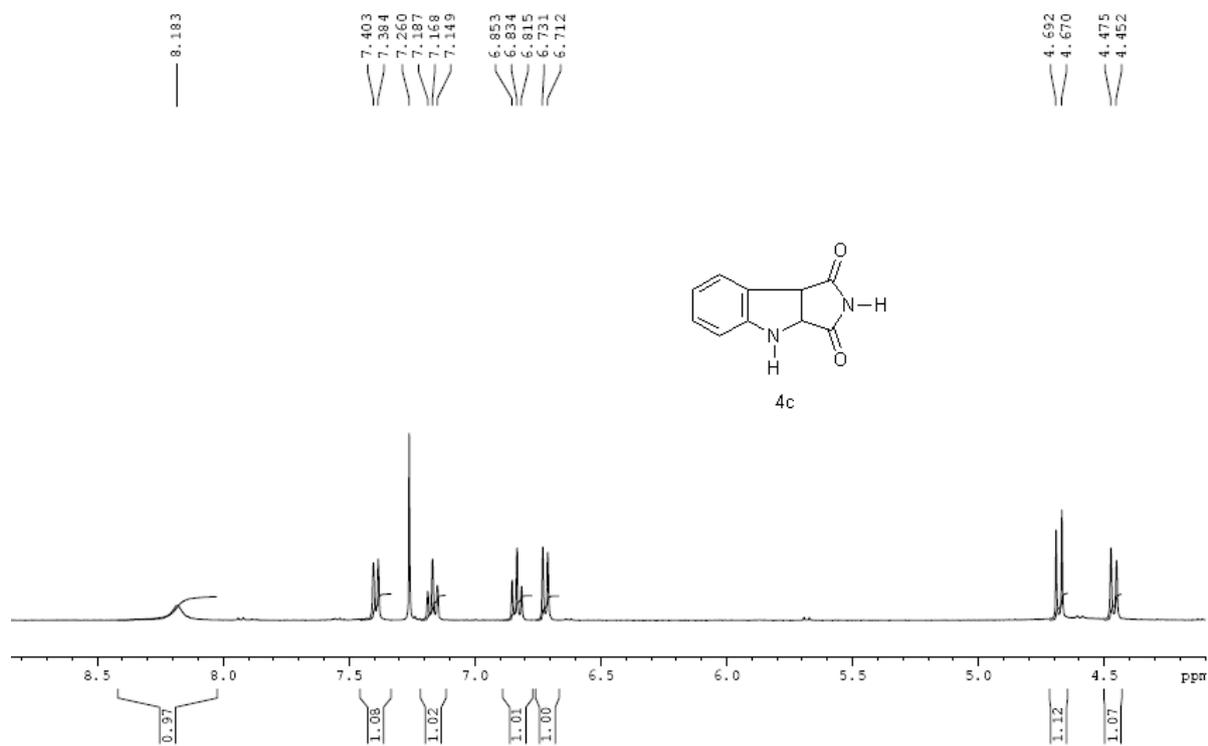
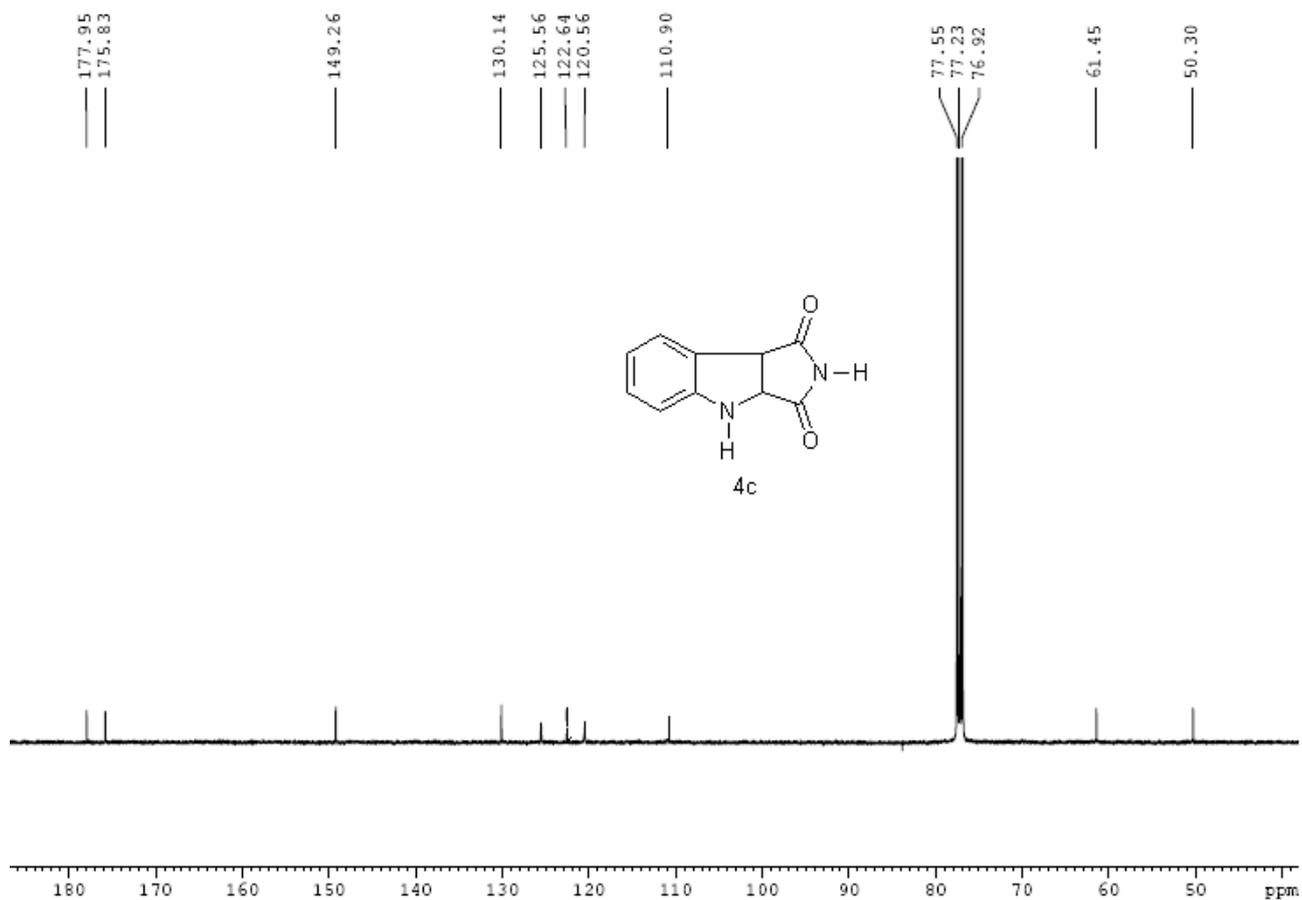
Figure S7. $^1\text{H-NMR}$ of 4c.Figure S8. $^{13}\text{C-NMR}$ of 4c.

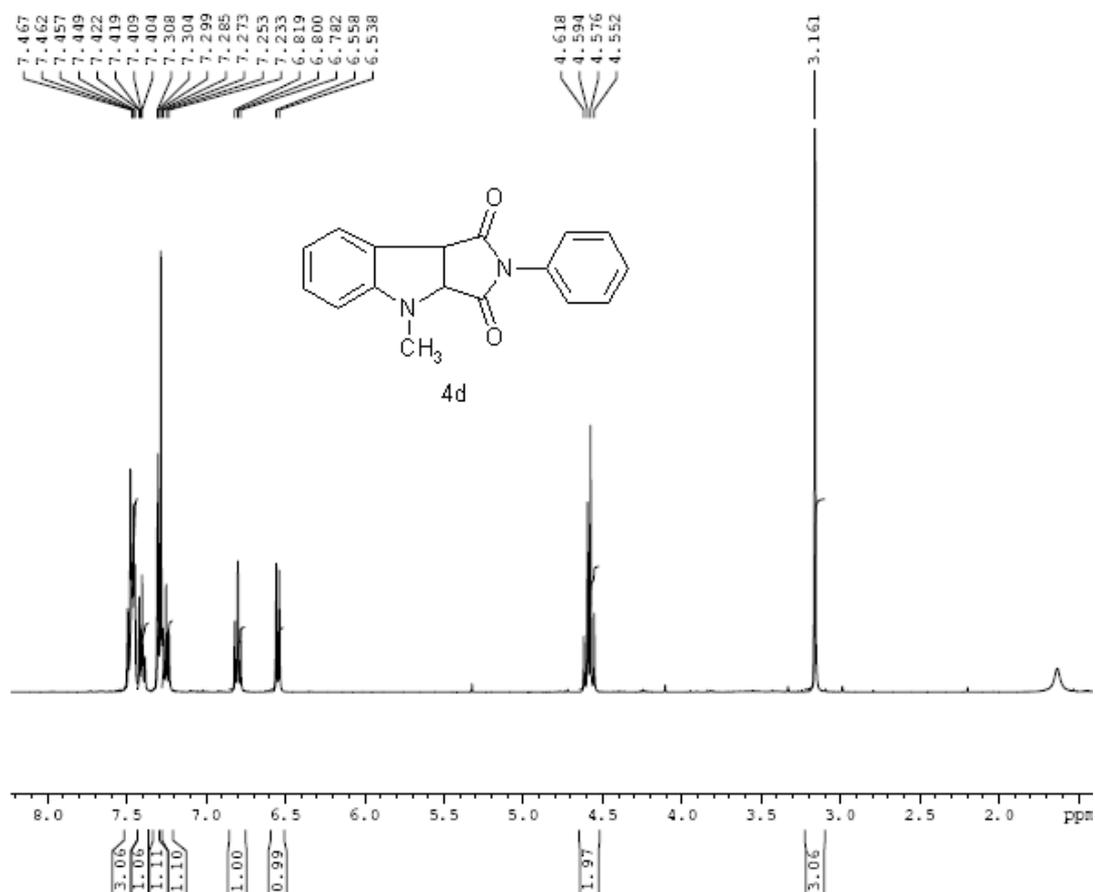
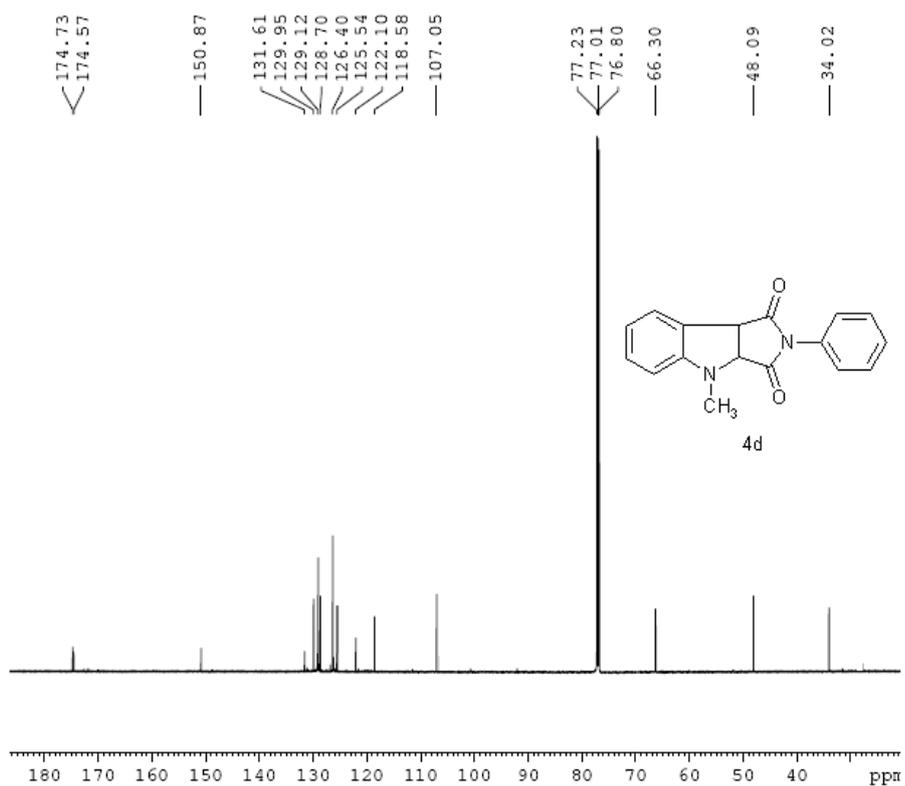
Figure S9. $^1\text{H-NMR}$ of 4d.Figure S10. $^{13}\text{C-NMR}$ of 4d.

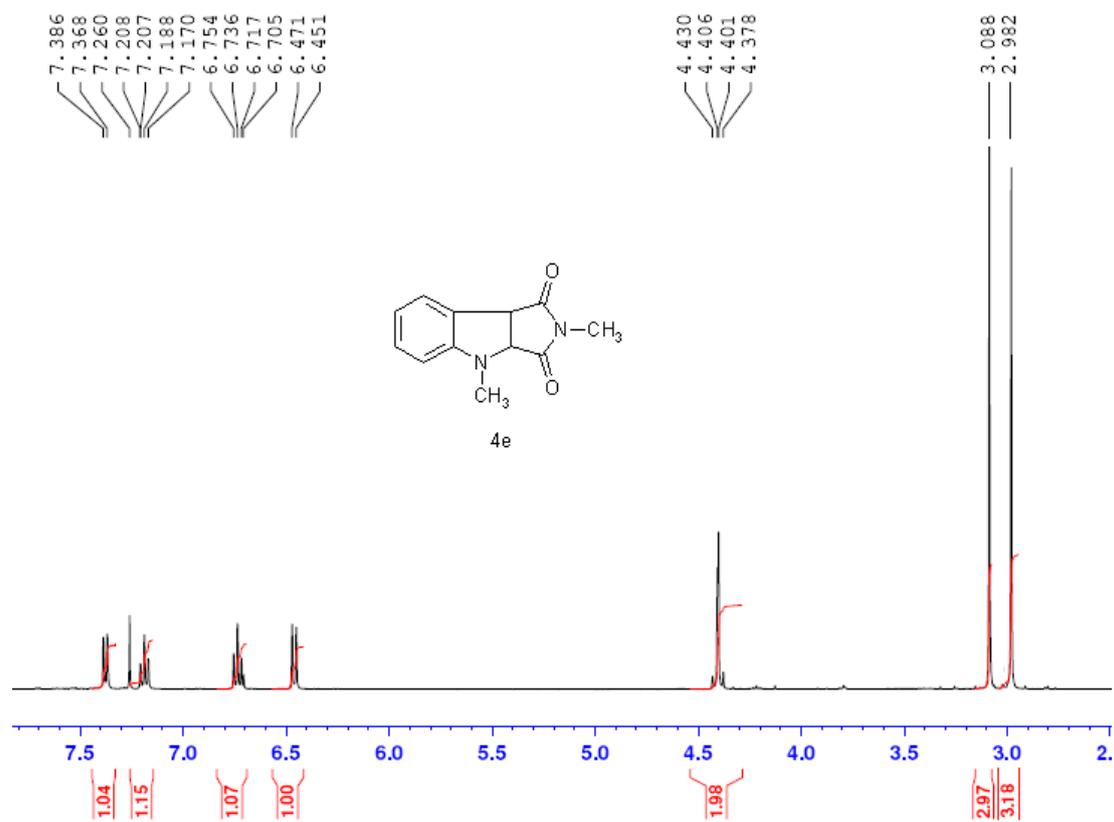
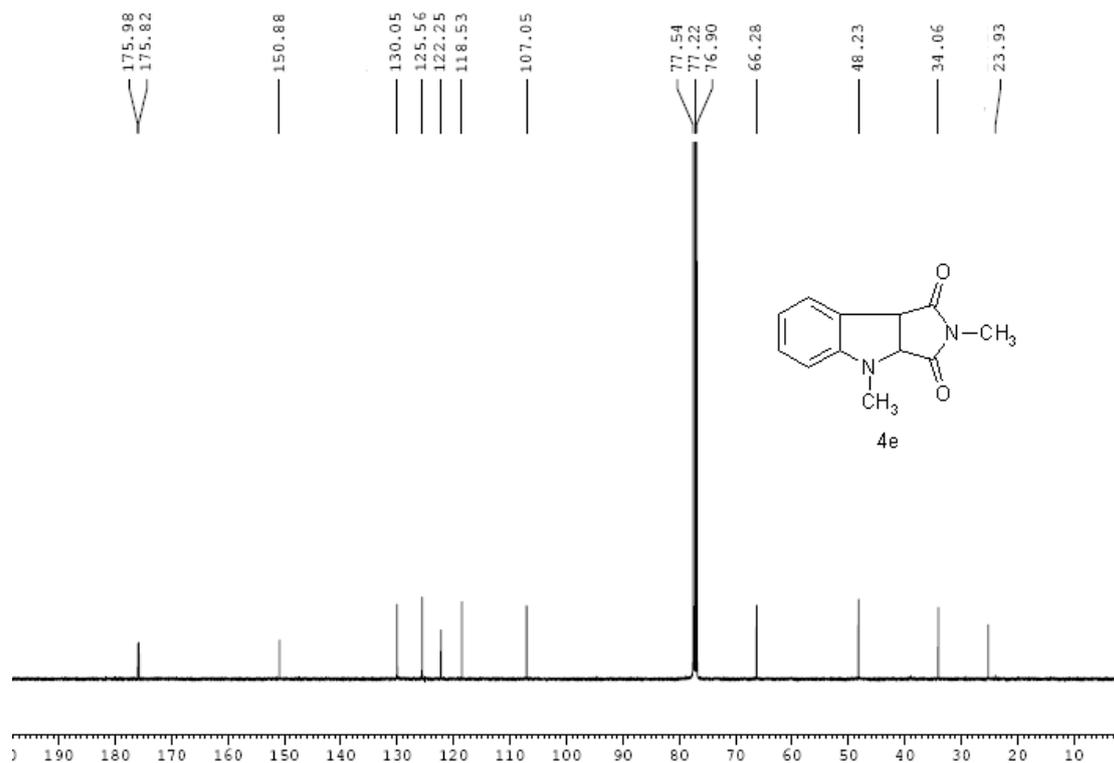
Figure S11. $^1\text{H-NMR}$ of 4e.Figure S12. $^{13}\text{C-NMR}$ of 4e.

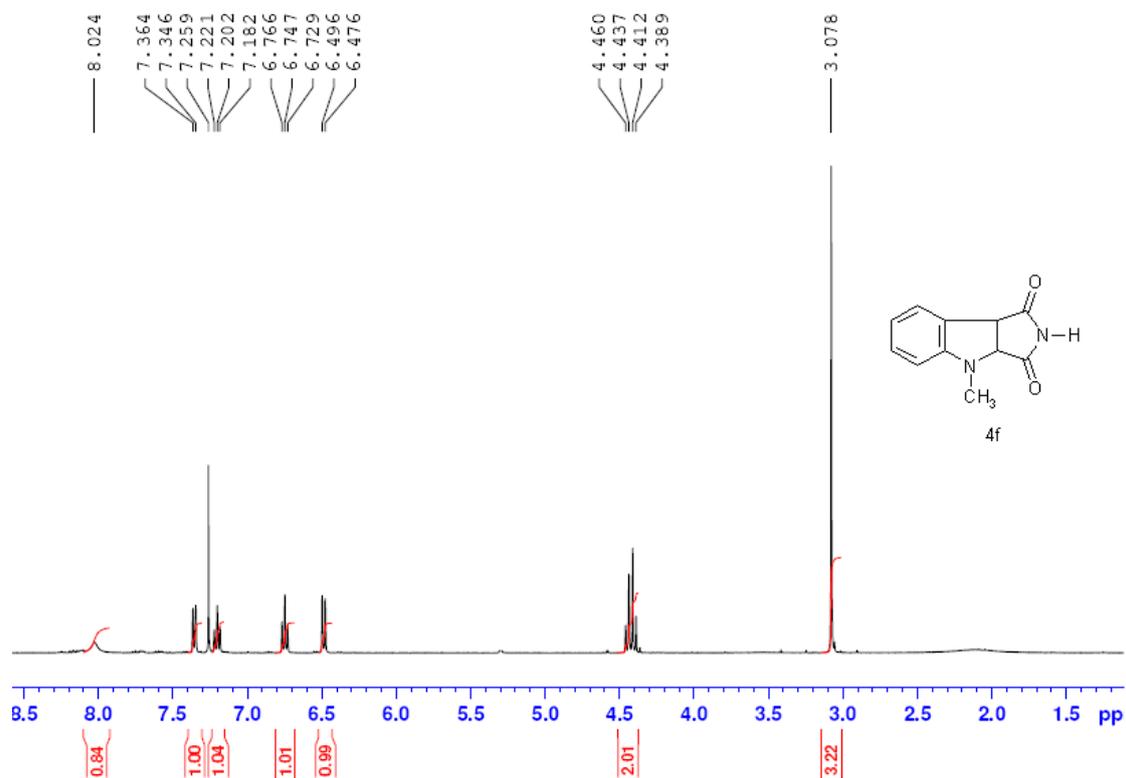
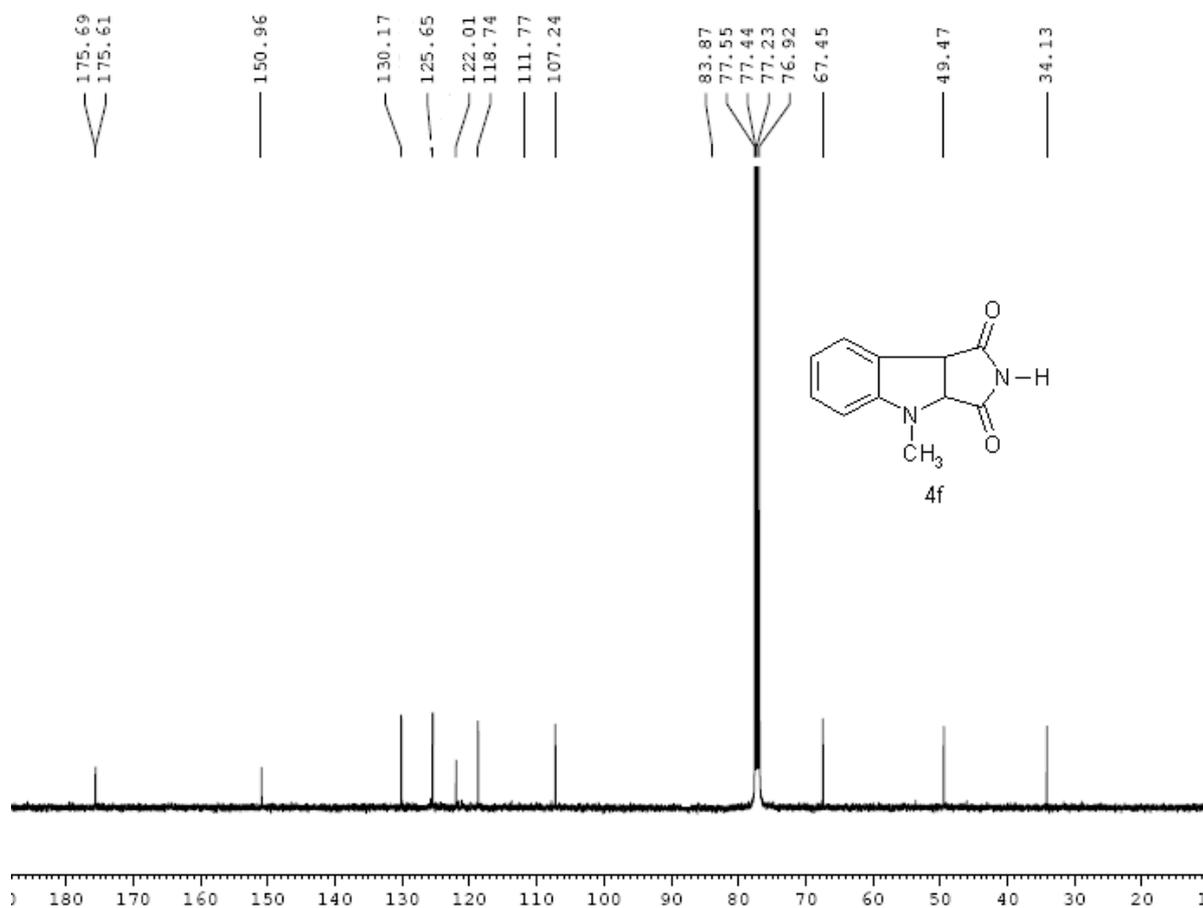
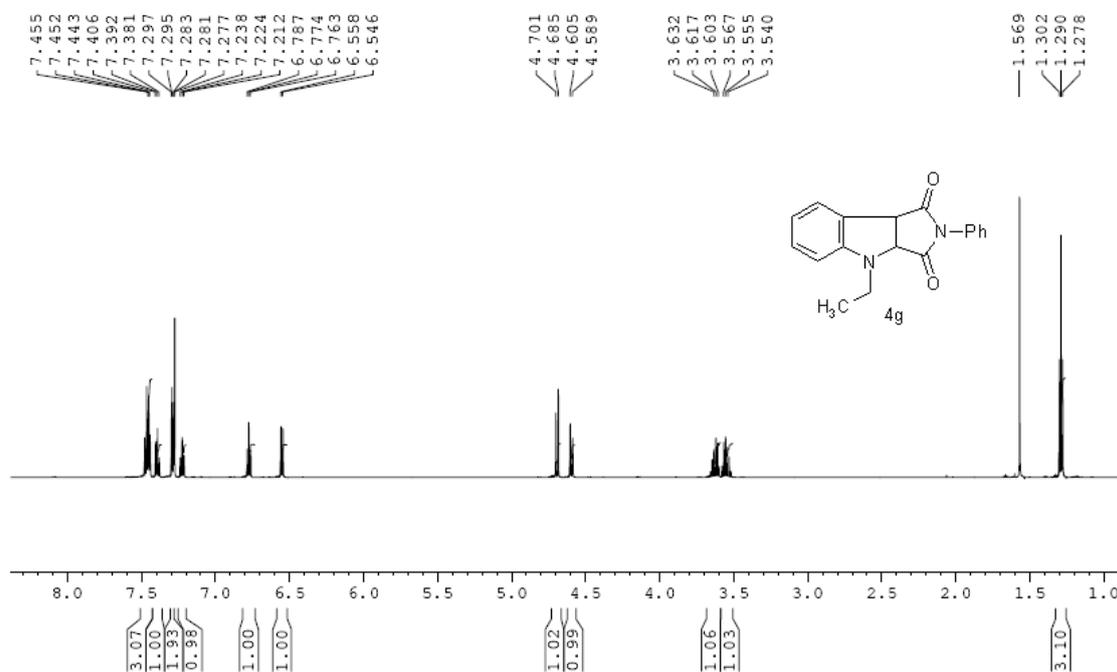
Figure S13. $^1\text{H-NMR}$ of **4f**.Figure S14. $^{13}\text{C-NMR}$ of **4f**.

Figure S15. $^1\text{H-NMR}$ of **4g**.

^1H Spectra Dr.MAHER N Eth 11 in CDCl_3

Figure S16. $^{13}\text{C-NMR}$ of **4g**.

^{13}C decoupled Spectra Dr.MAHER Neth 11 in CDCl_3

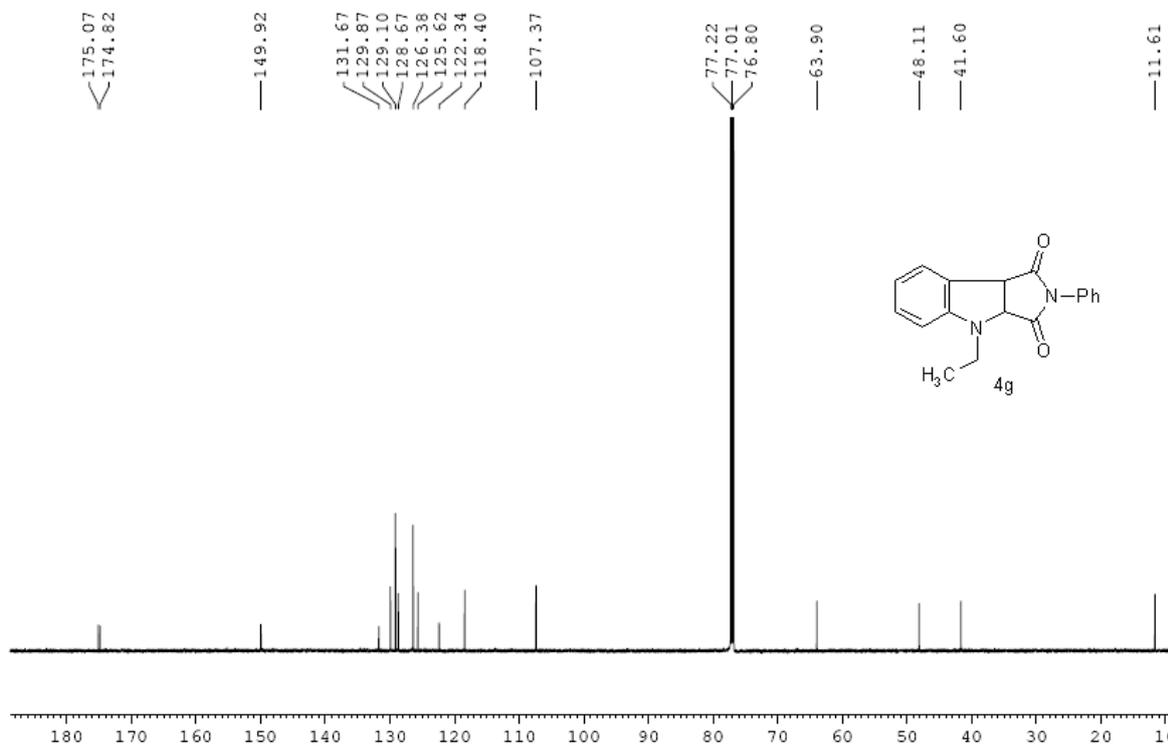


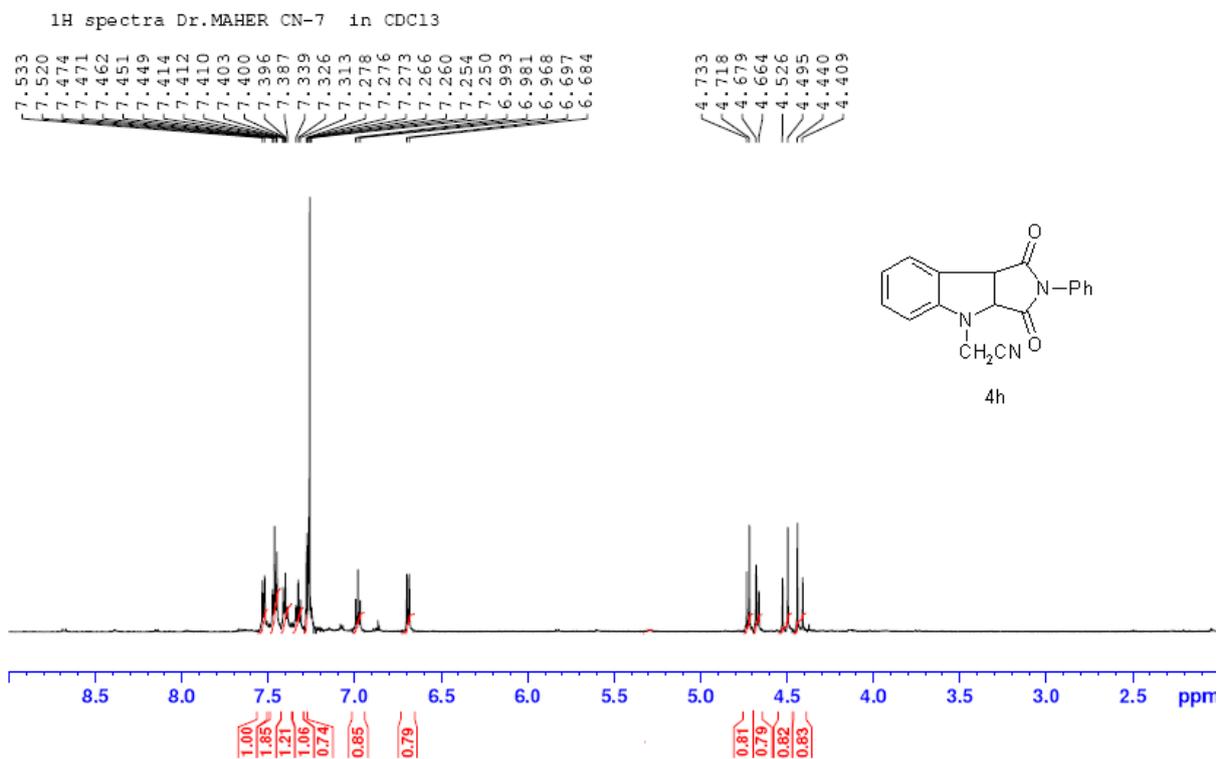
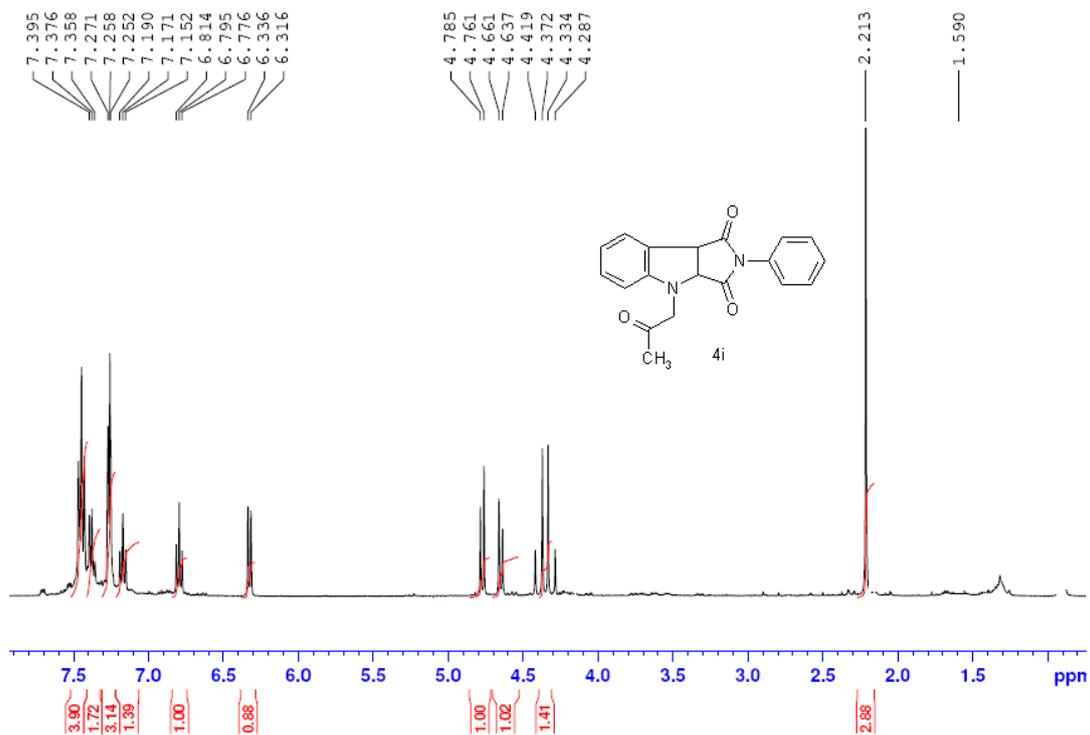
Figure S17. $^1\text{H-NMR}$ of 4h.Figure S18. $^1\text{H-NMR}$ of 4i.

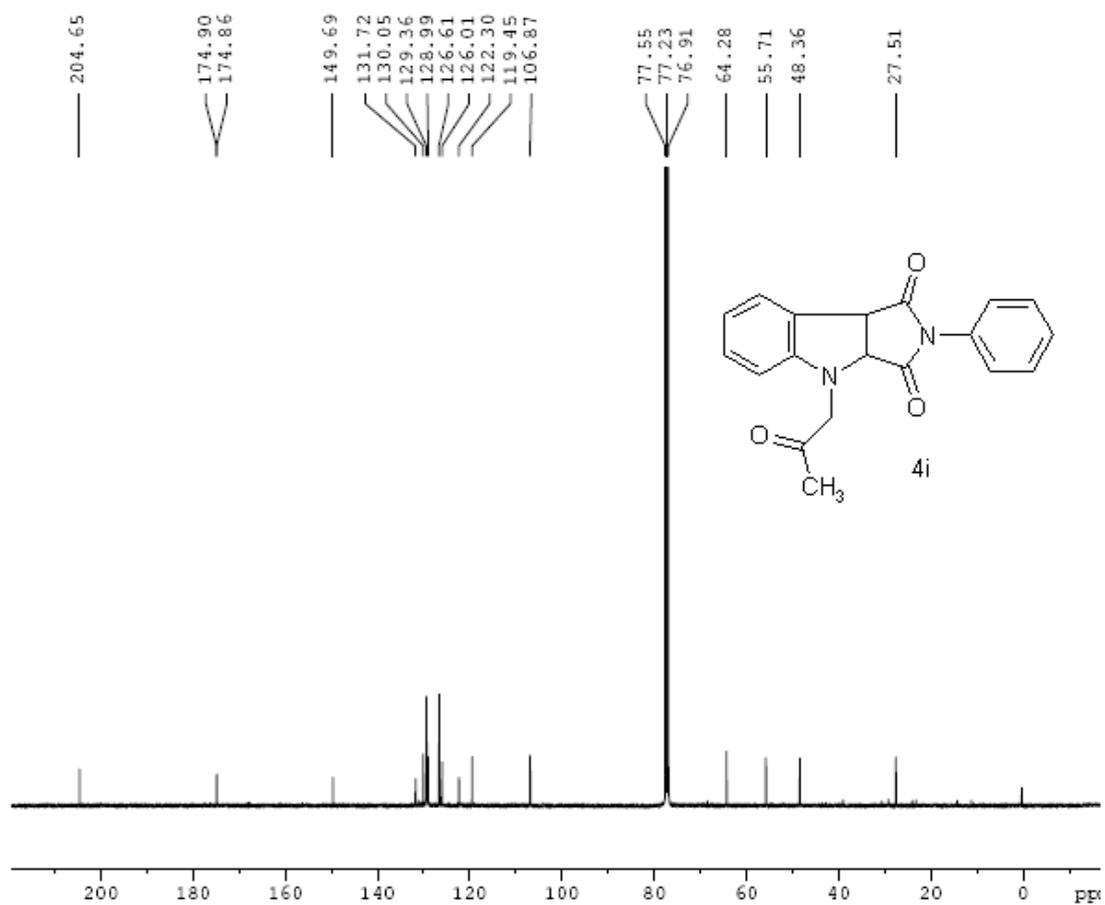
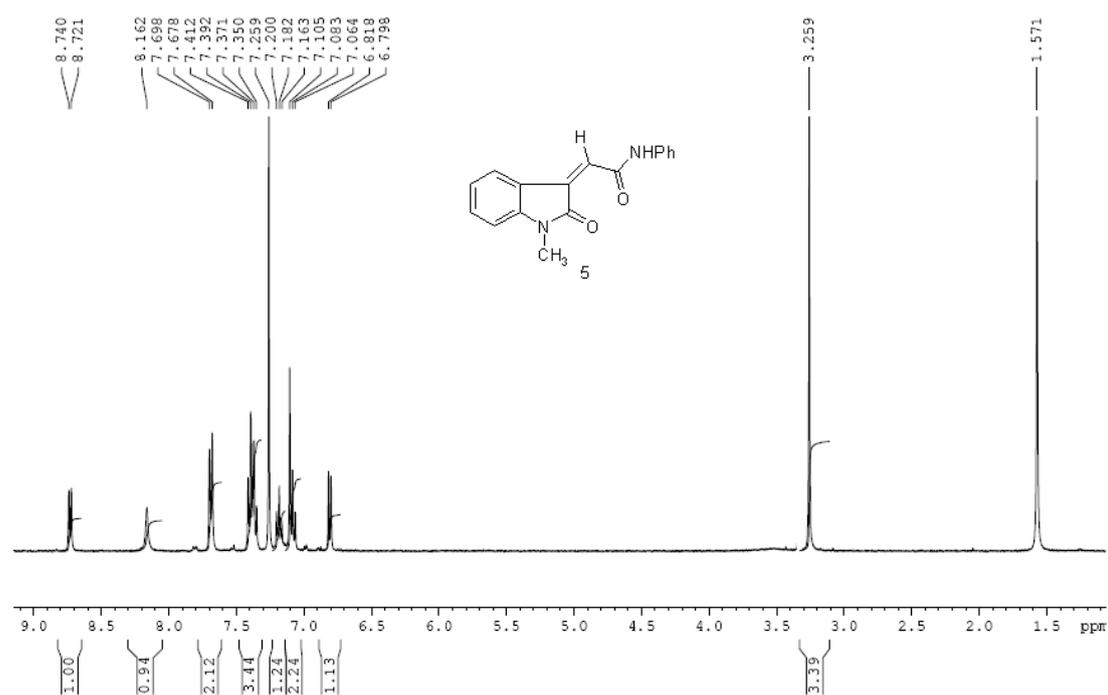
Figure S19. ^{13}C -NMR of 4i.Figure S20. ^1H -NMR of 5.

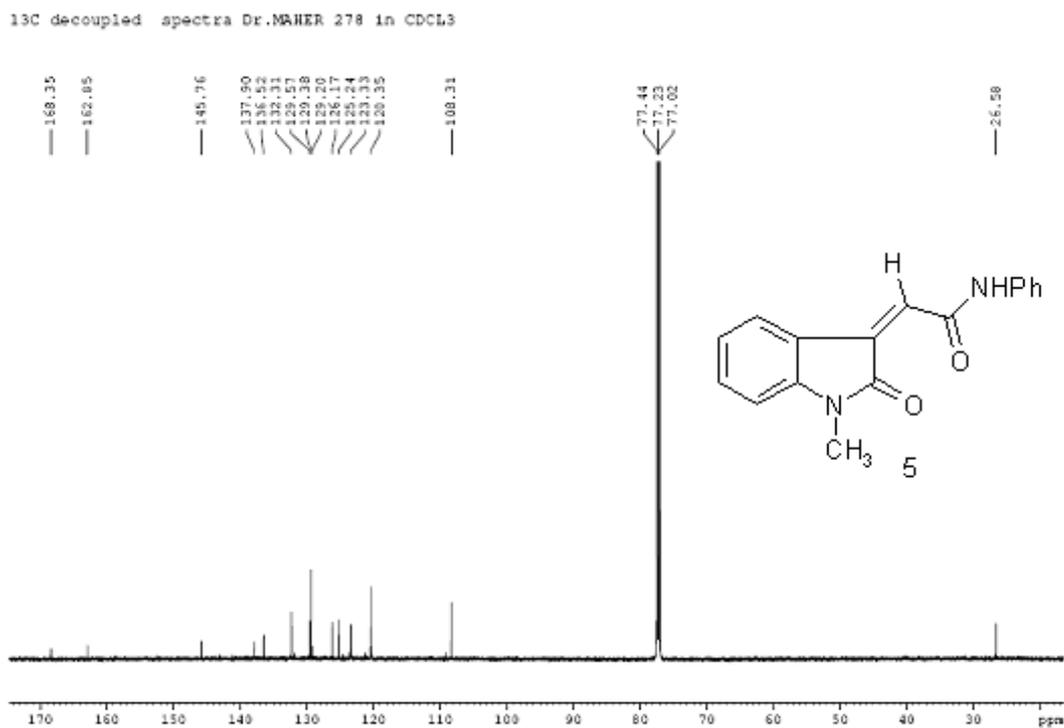
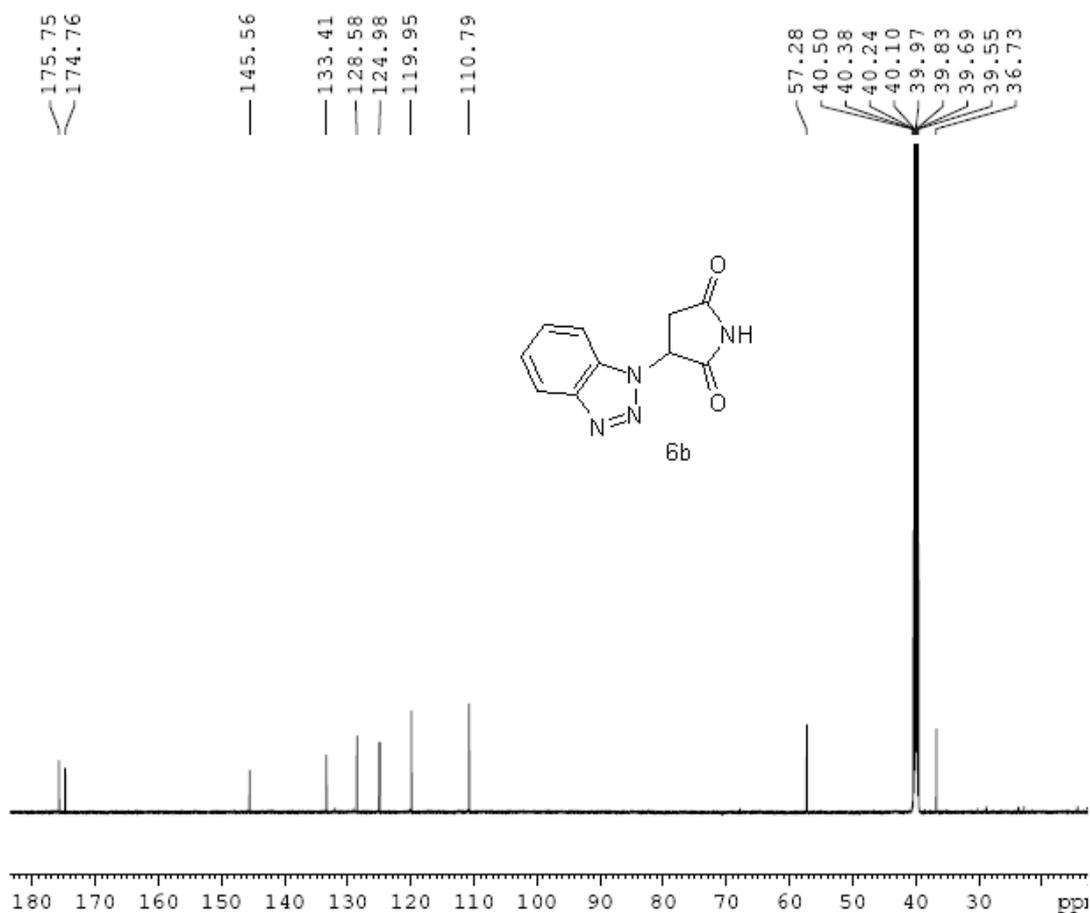
Figure S21. ^{13}C -NMR of 5.Figure S22. ^{13}C -NMR of 6b.

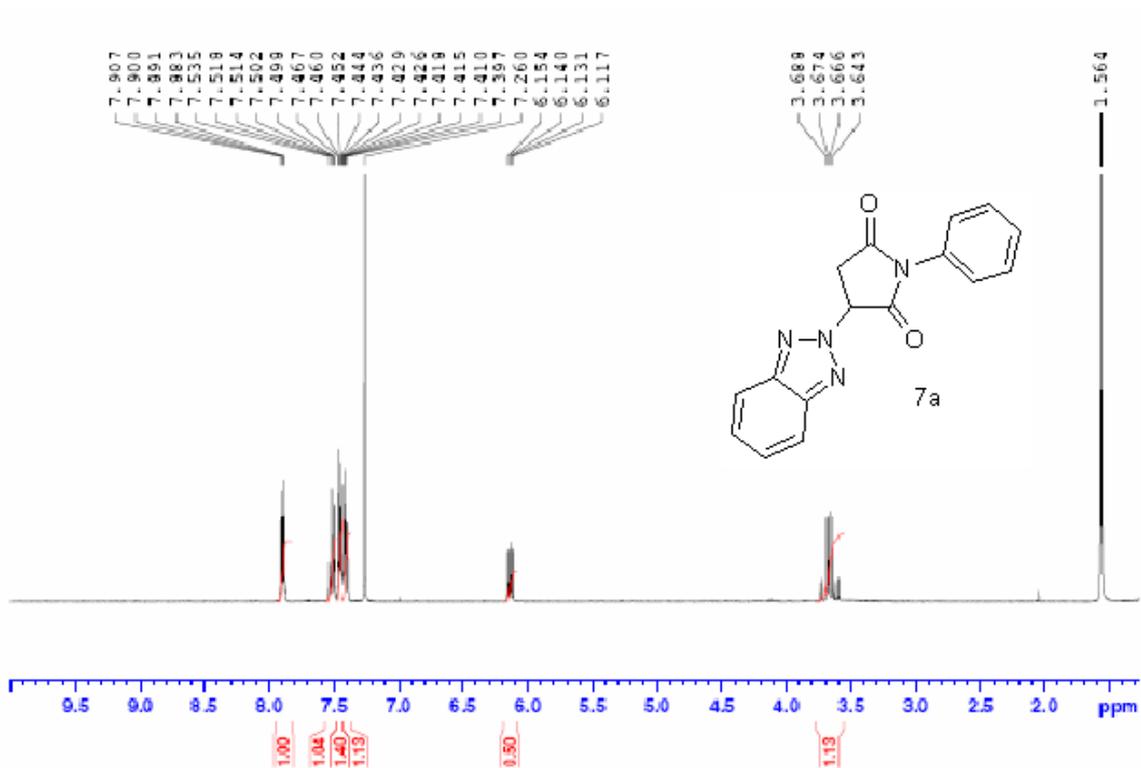
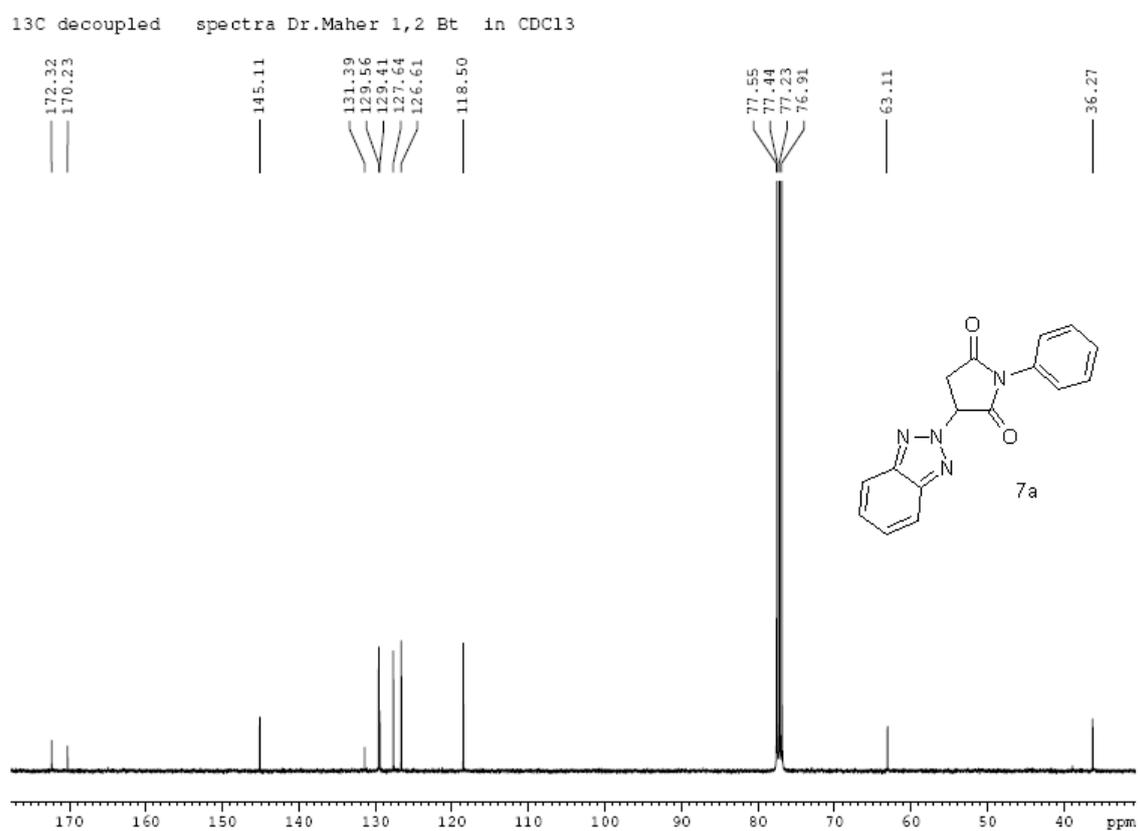
Figure S23. $^1\text{H-NMR}$ of 7a.Figure S24. $^{13}\text{C-NMR}$ of 7a.

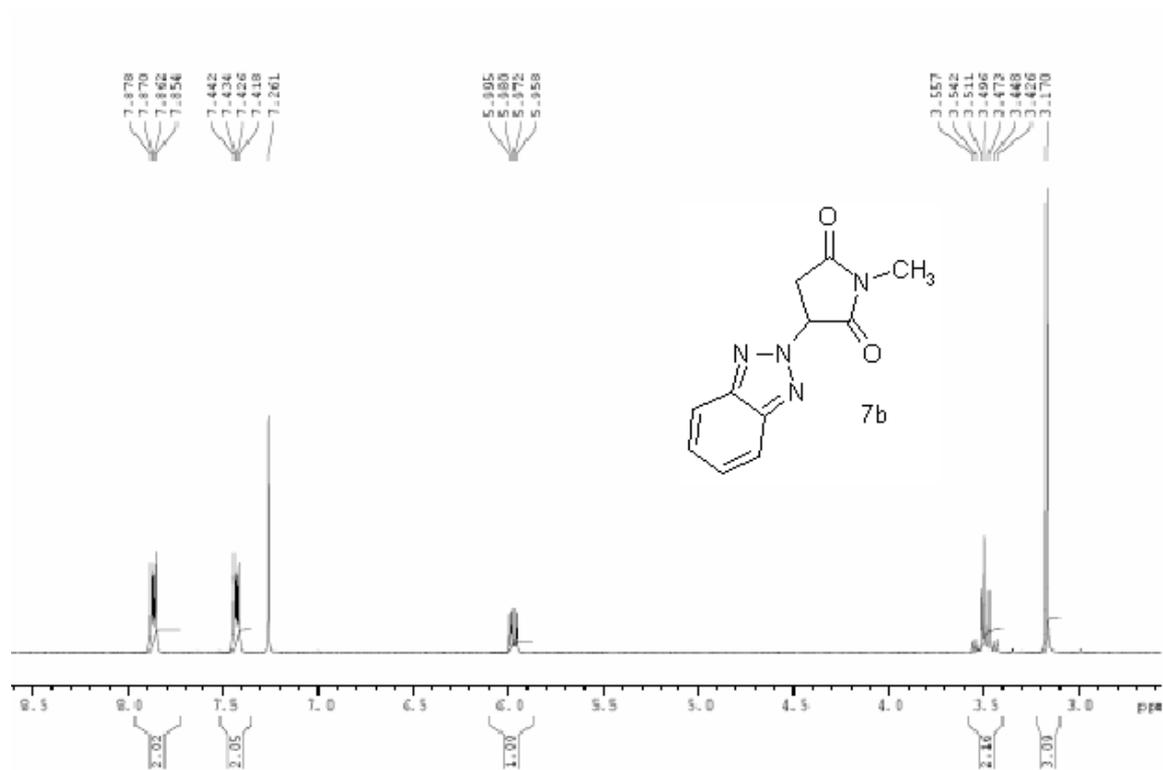
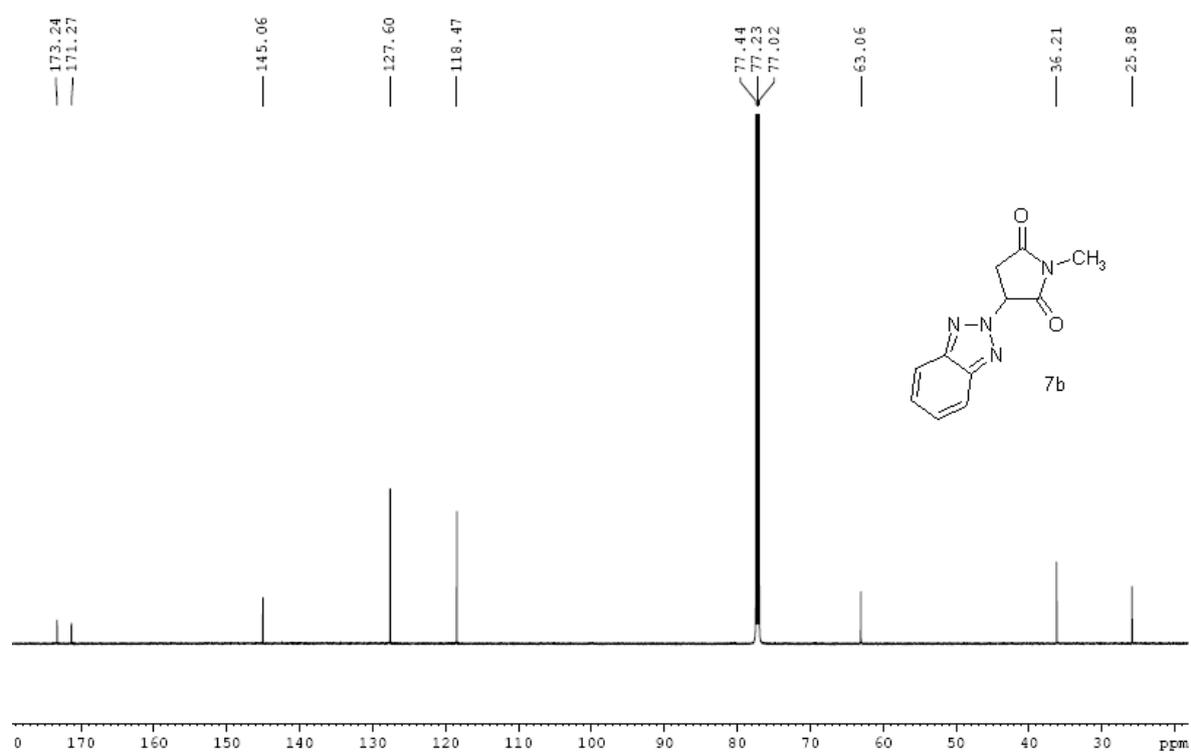
Figure S25. $^1\text{H-NMR}$ of 7b.Figure S26. $^{13}\text{C-NMR}$ of 7b.

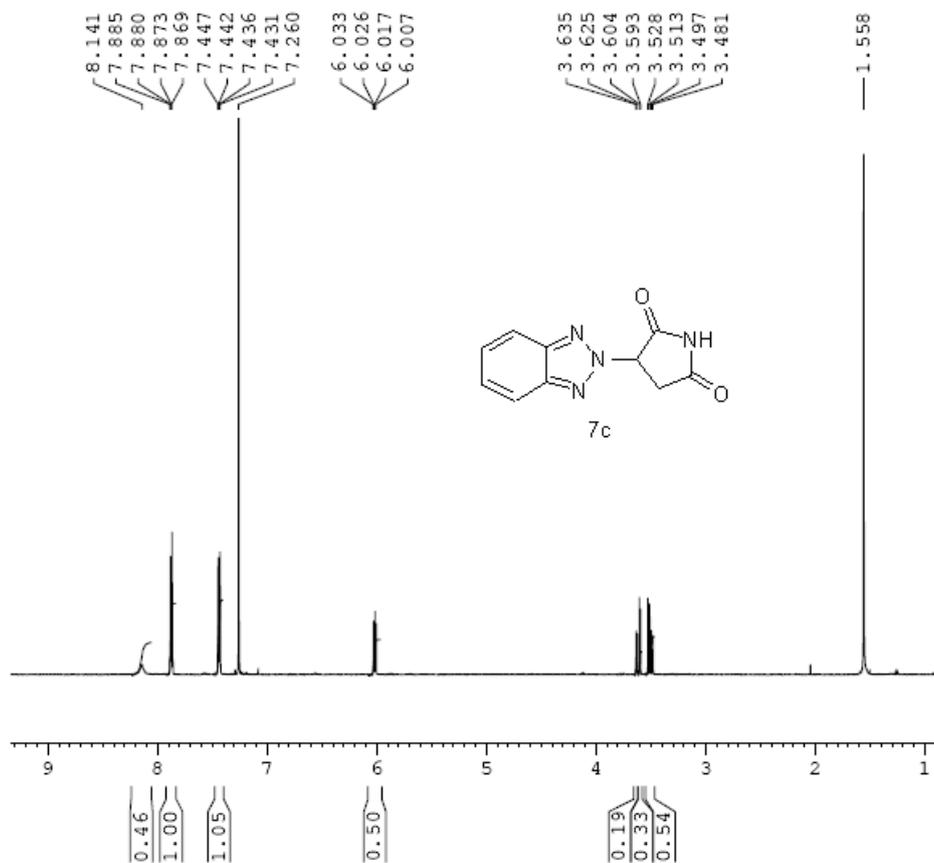
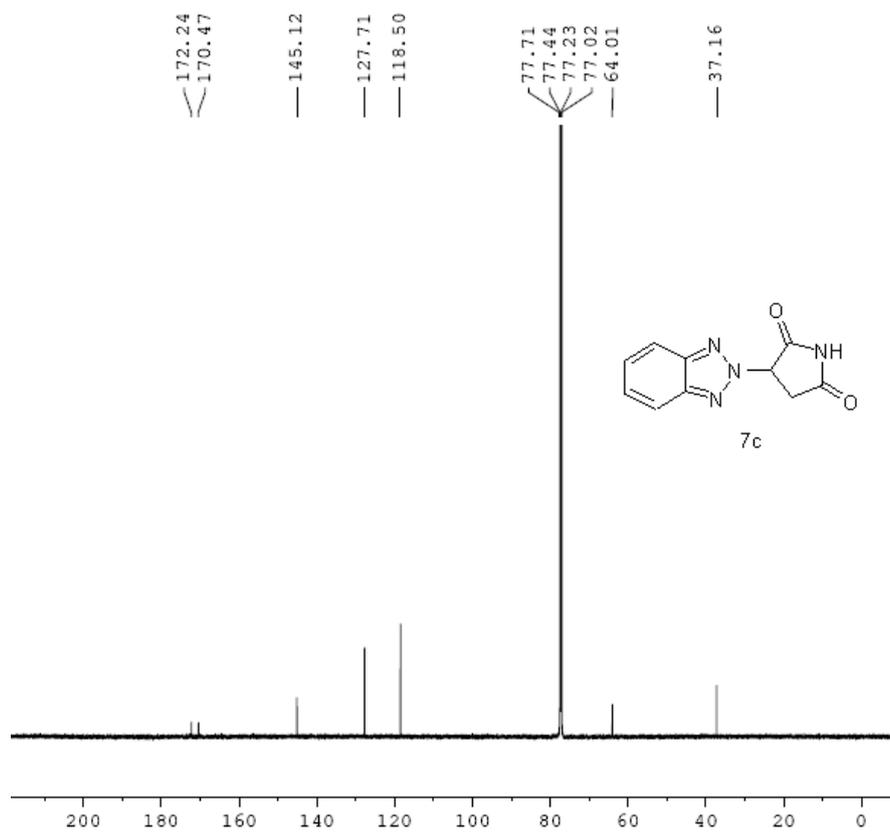
Figure S27. $^1\text{H-NMR}$ of 7c.Figure S28. $^{13}\text{C-NMR}$ of 7c.

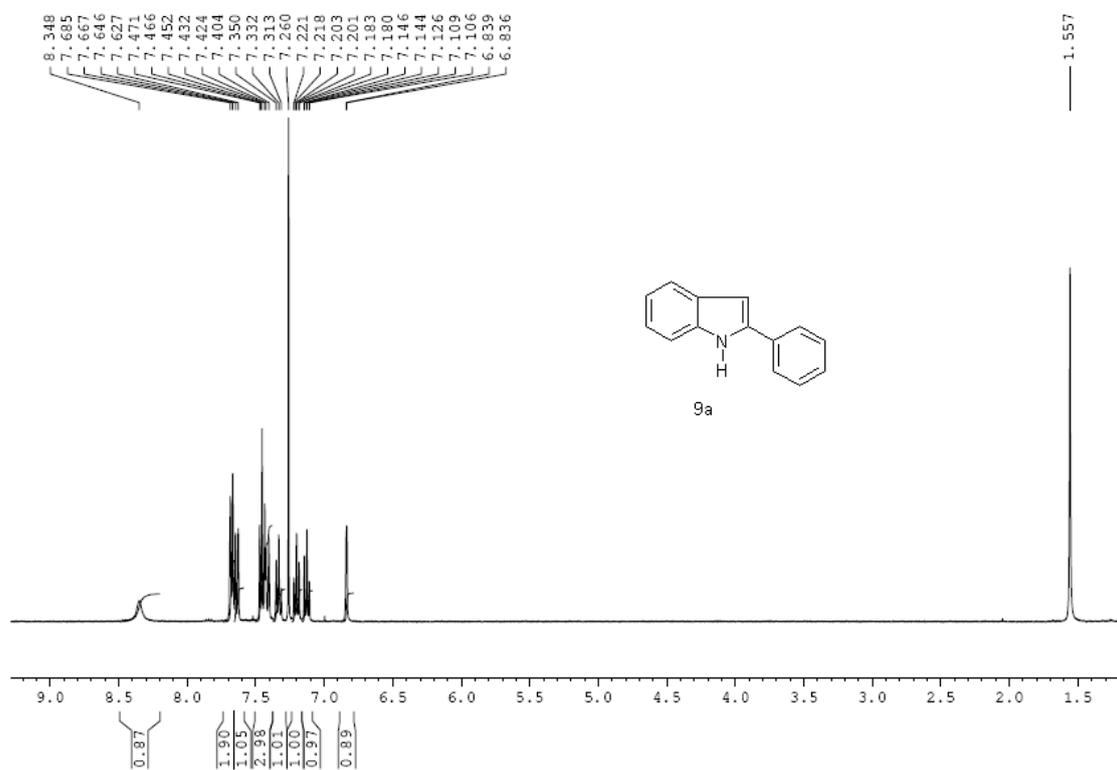
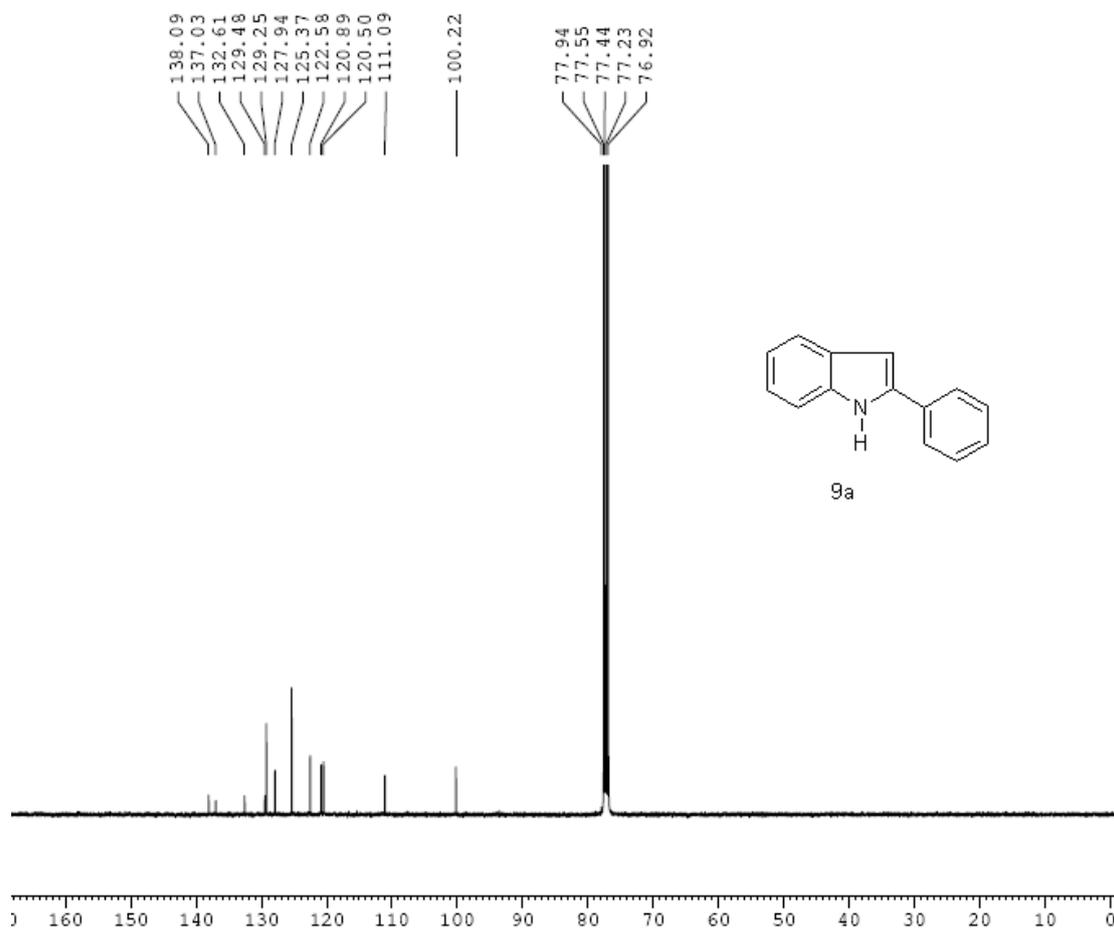
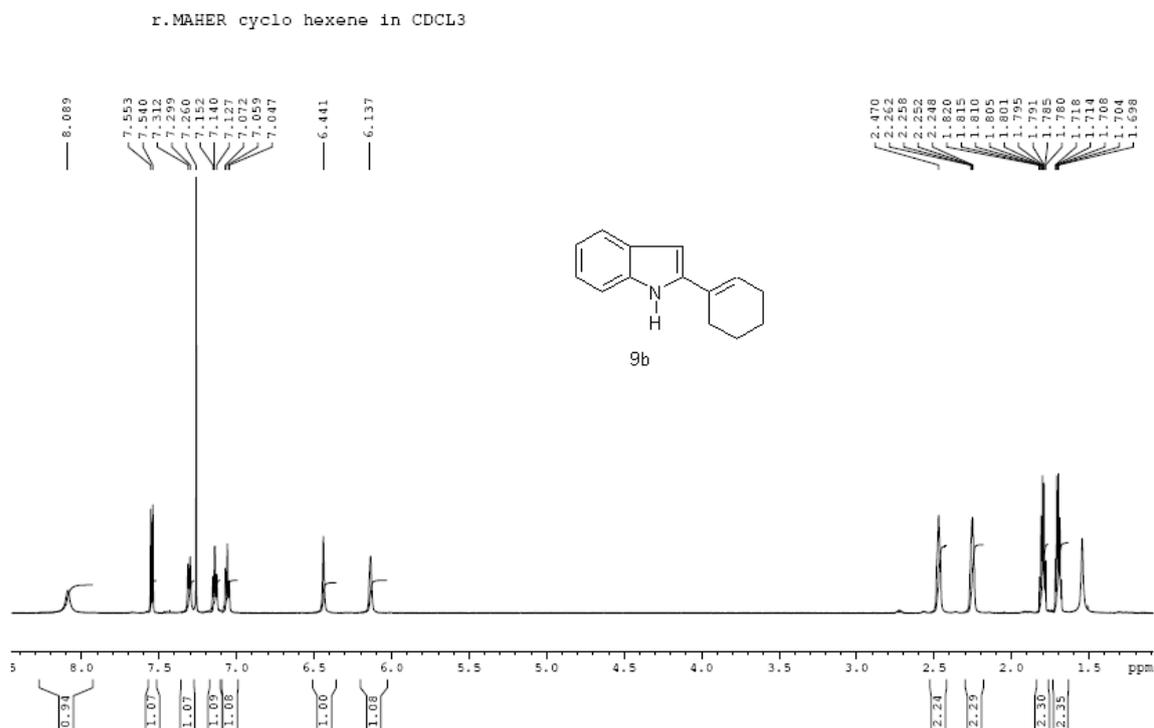
Figure S29. $^1\text{H-NMR}$ of **9a**.Figure S30. $^{13}\text{C-NMR}$ of **9a**.

Figure S31. $^1\text{H-NMR}$ of **9b**.Figure S32. $^{13}\text{C-NMR}$ of **9b**.

^{13}C decoupled spectra Dr.MAHER cyclo hexene in CDCl_3

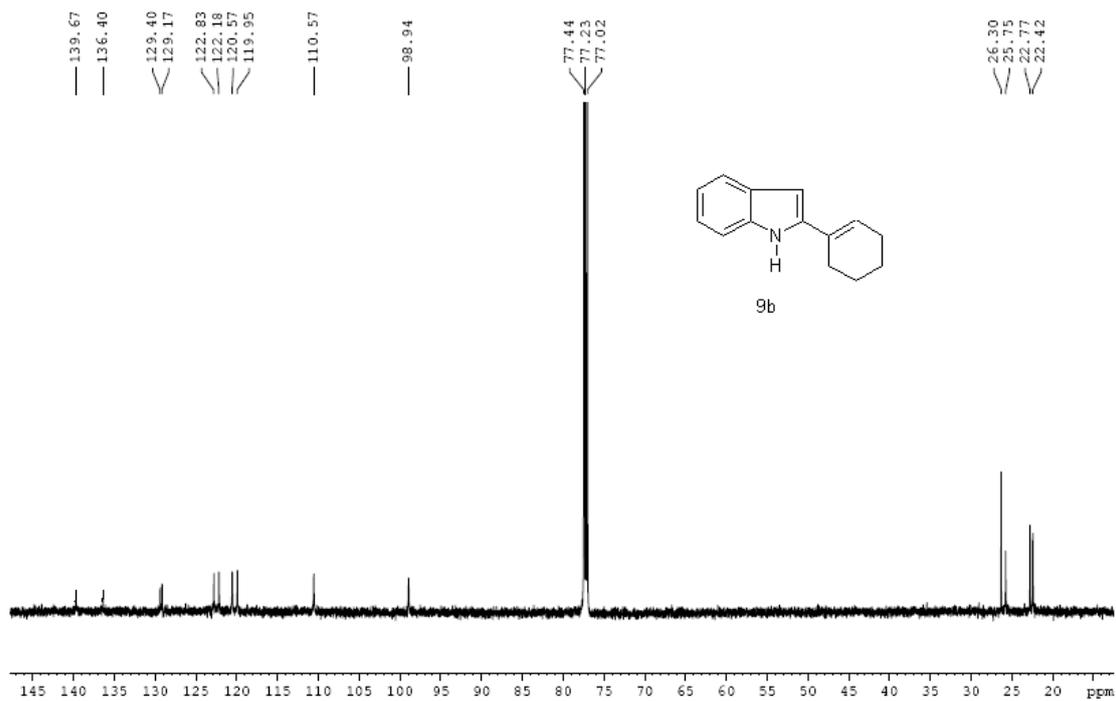


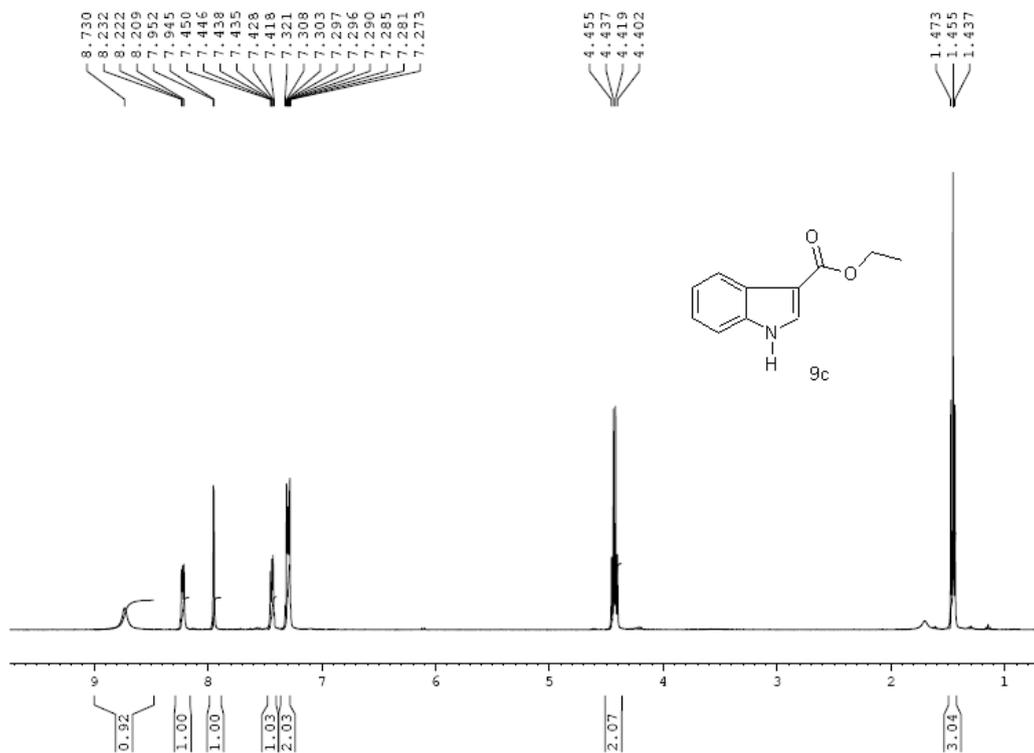
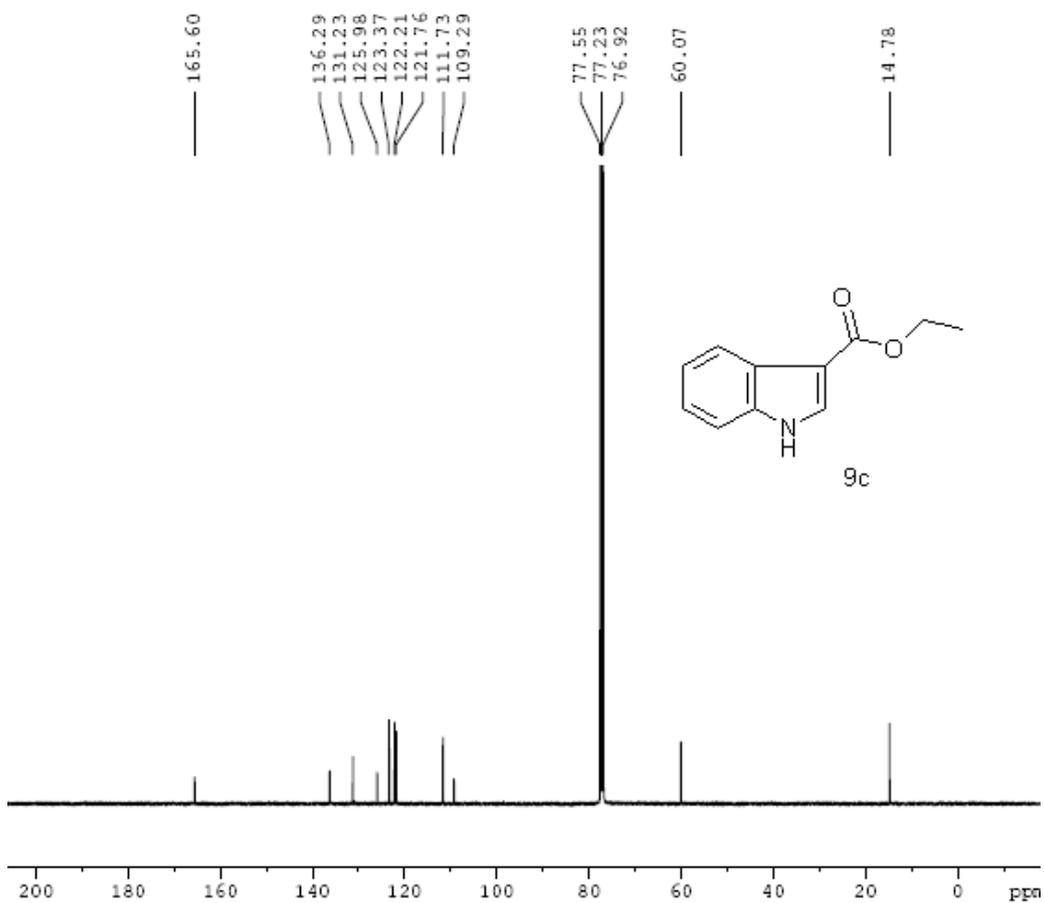
Figure S33. $^1\text{H-NMR}$ of **9c**.Figure S34. $^{13}\text{C-NMR}$ of **9c**.

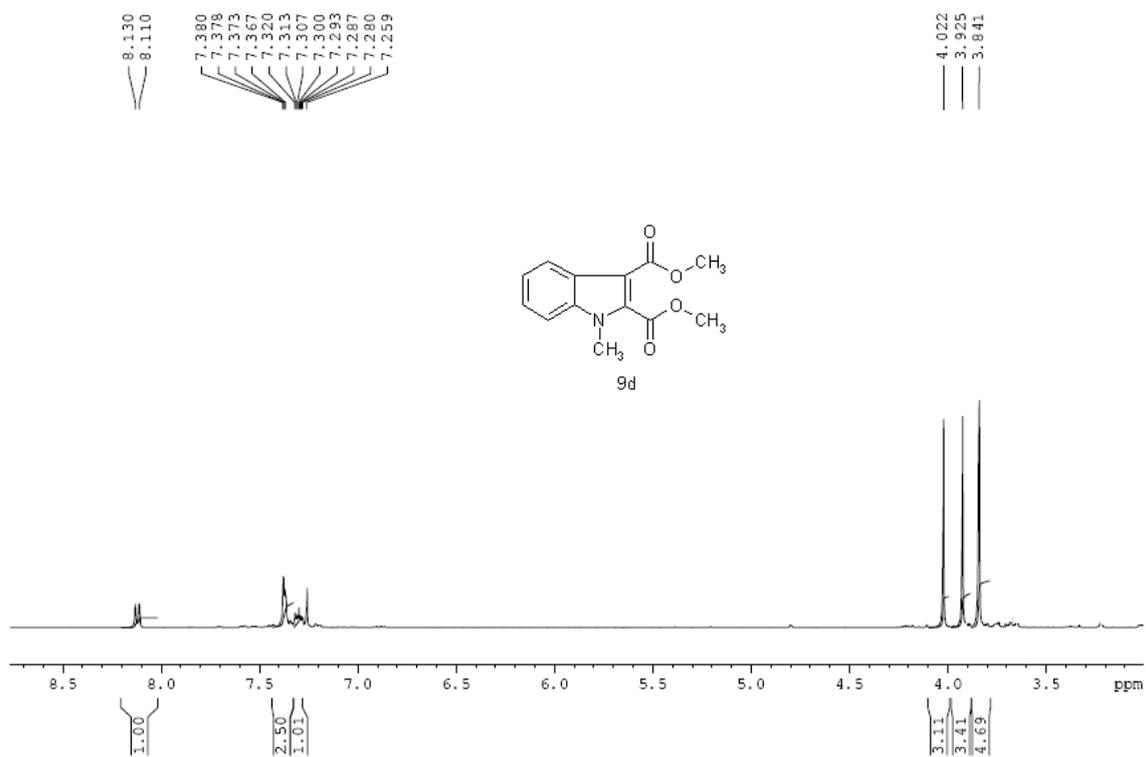
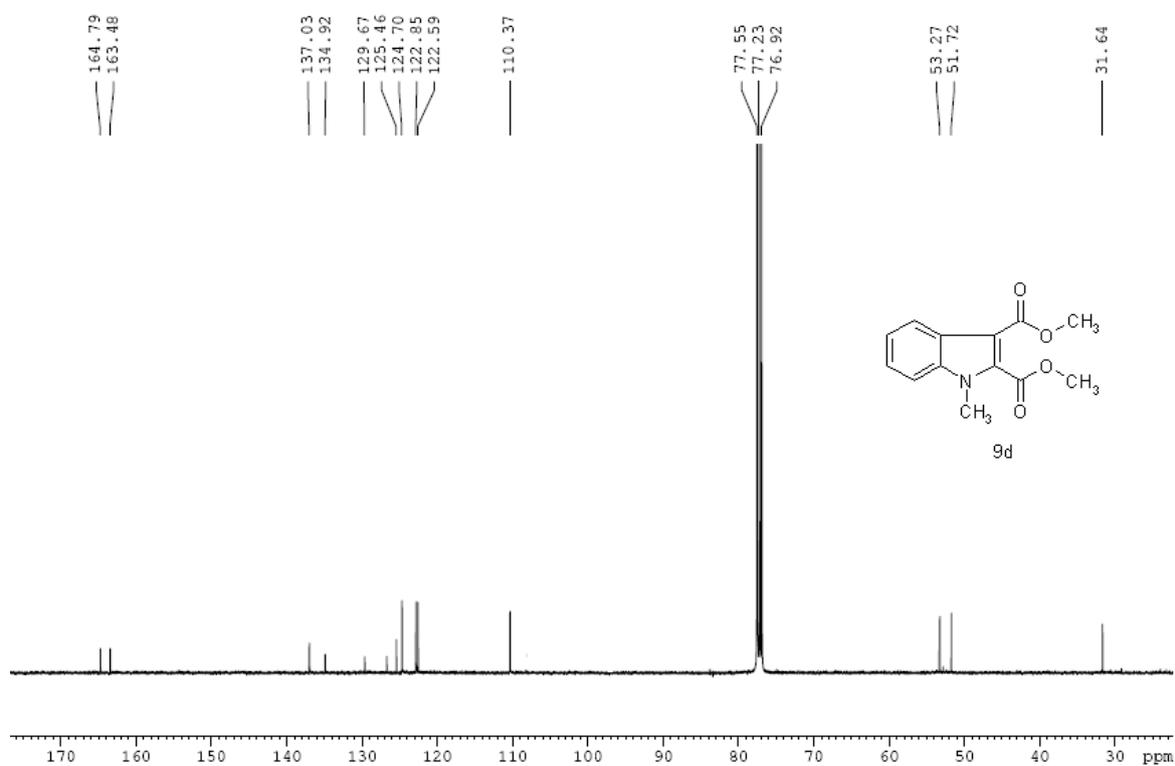
Figure S35. $^1\text{H-NMR}$ of 9d.Figure S36. $^{13}\text{C-NMR}$ of 9d.

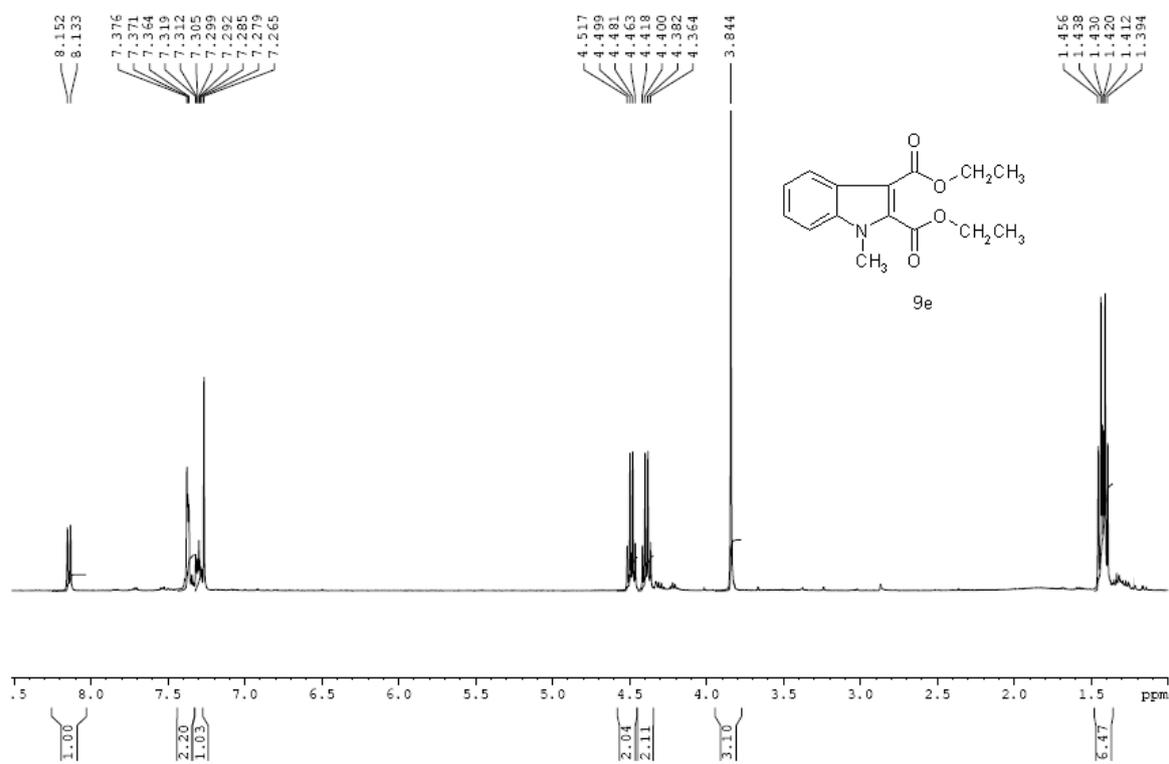
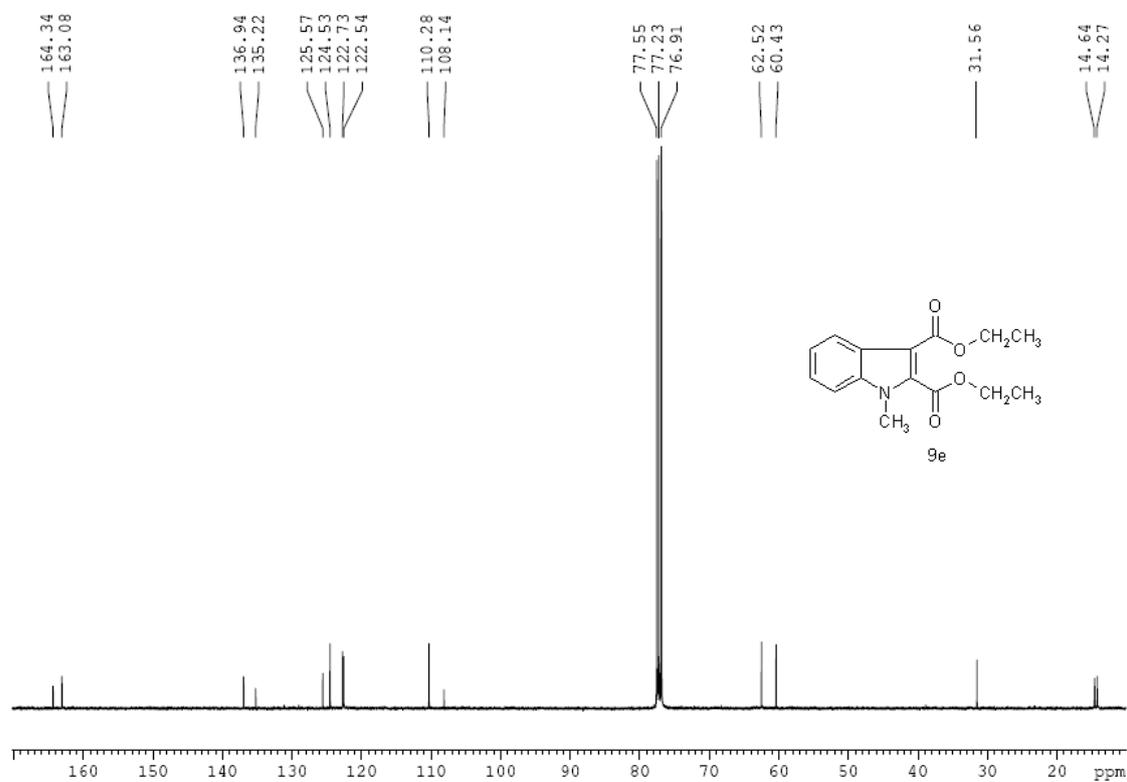
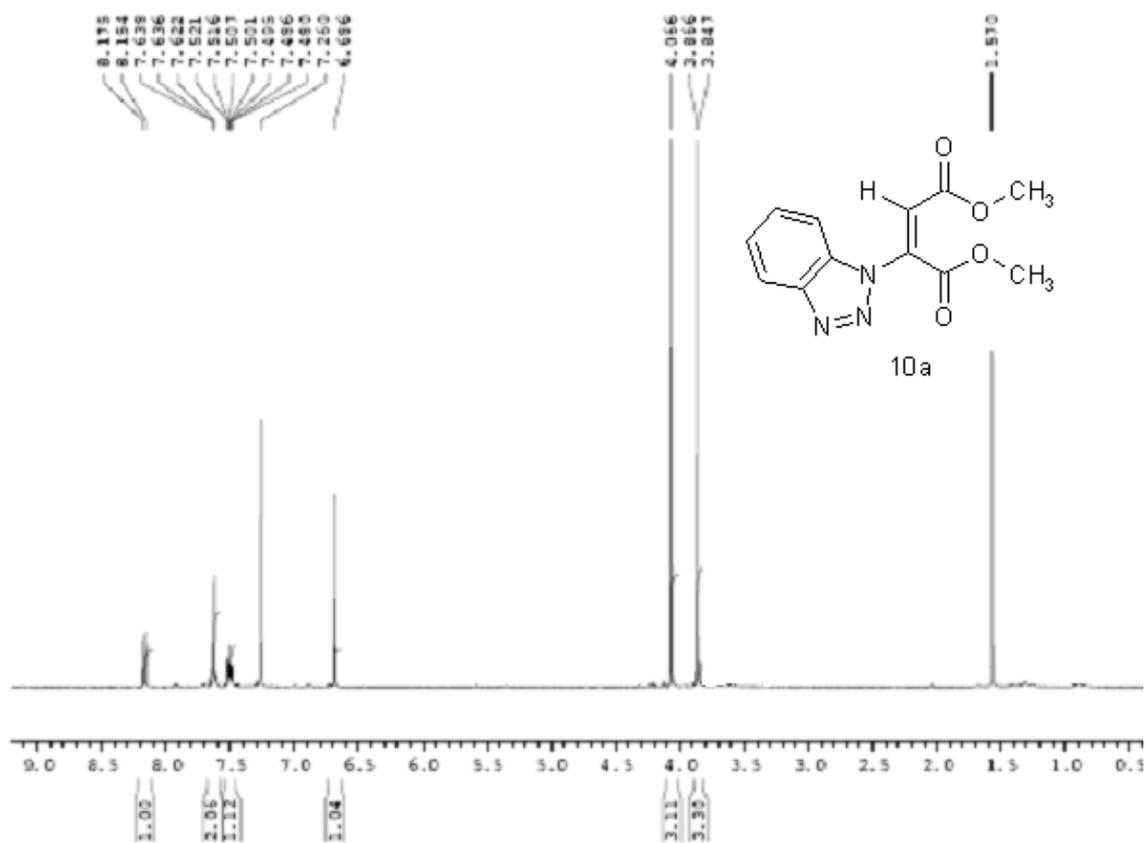
Figure S37. $^1\text{H-NMR}$ of 9e.Figure S38. $^{13}\text{C-NMR}$ of 9e.

Figure S39. $^1\text{H-NMR}$ of 10a.Figure S40. $^{13}\text{C-NMR}$ of 10a.

^{13}C decoupled Spectra Dr. MAHER C3 in CDCl₃

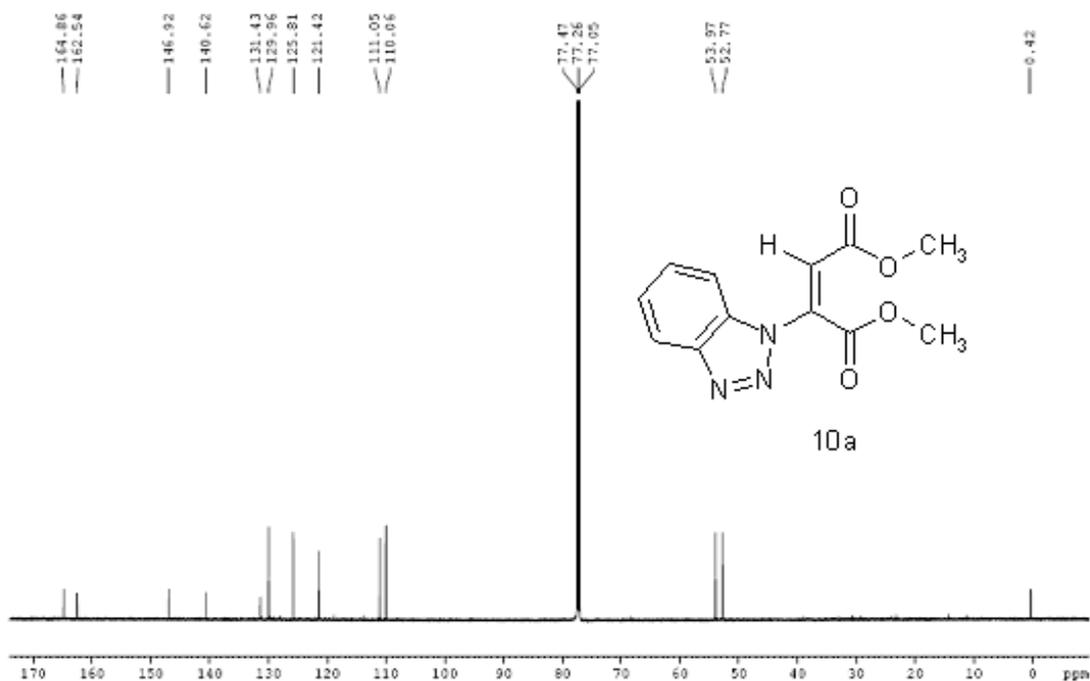


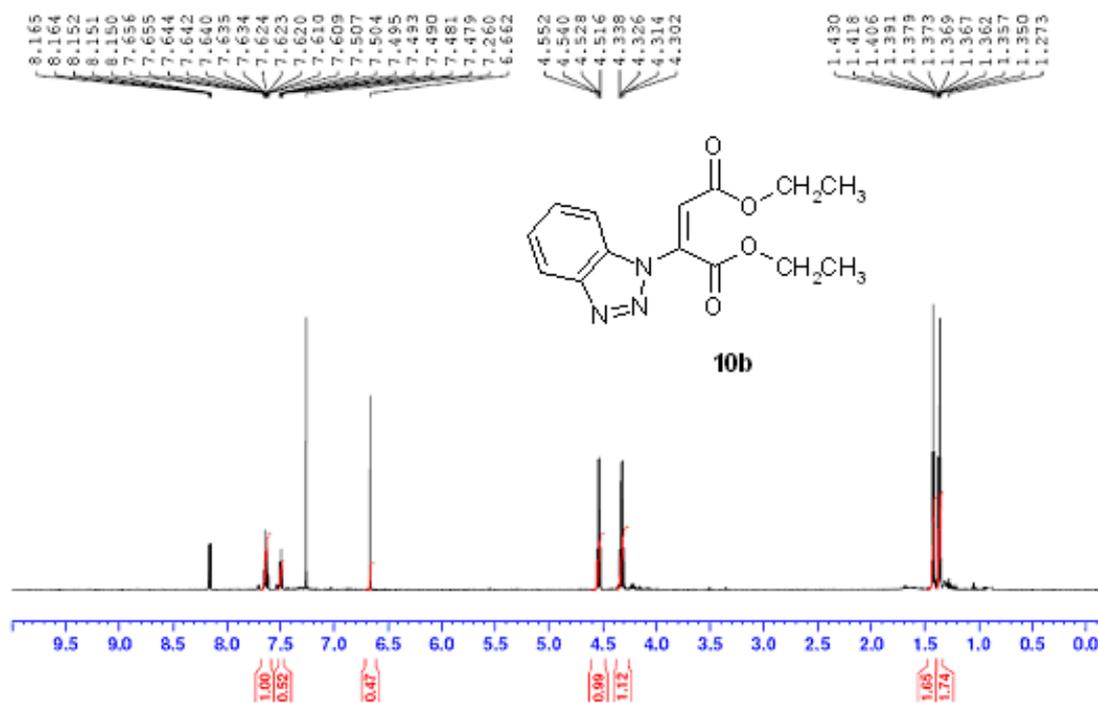
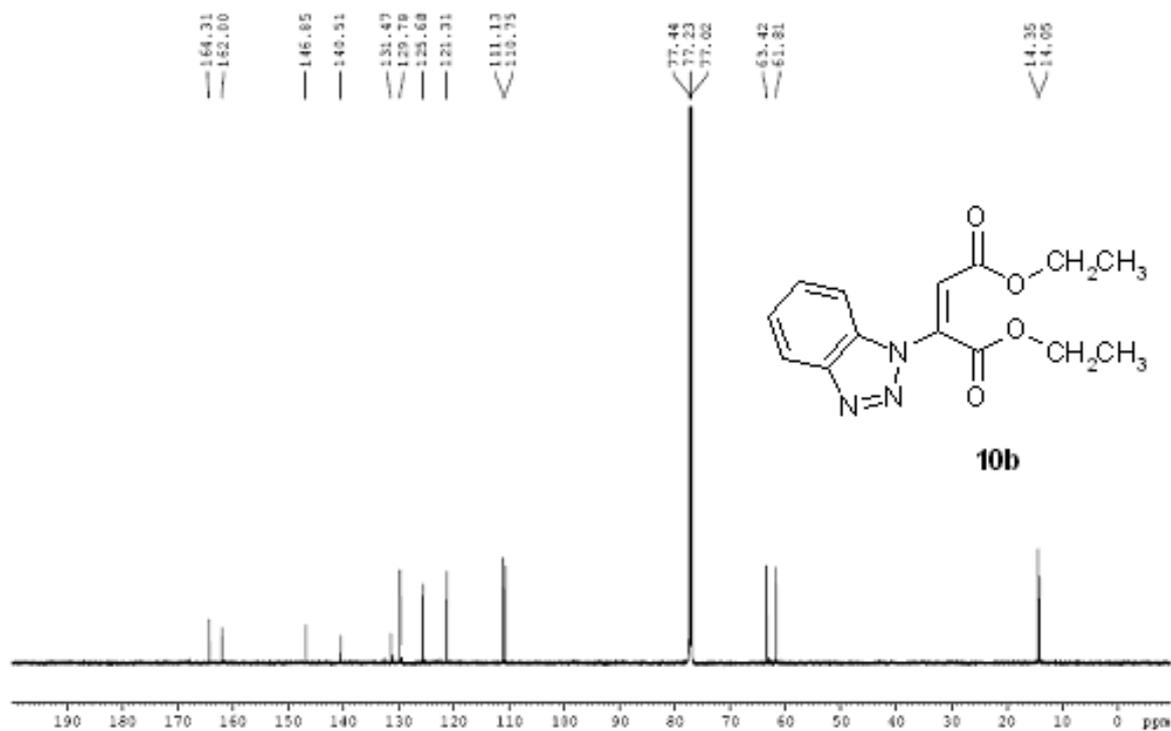
Figure S41. $^1\text{H-NMR}$ of **10b**.Figure S42. $^{13}\text{C-NMR}$ of **10b**.

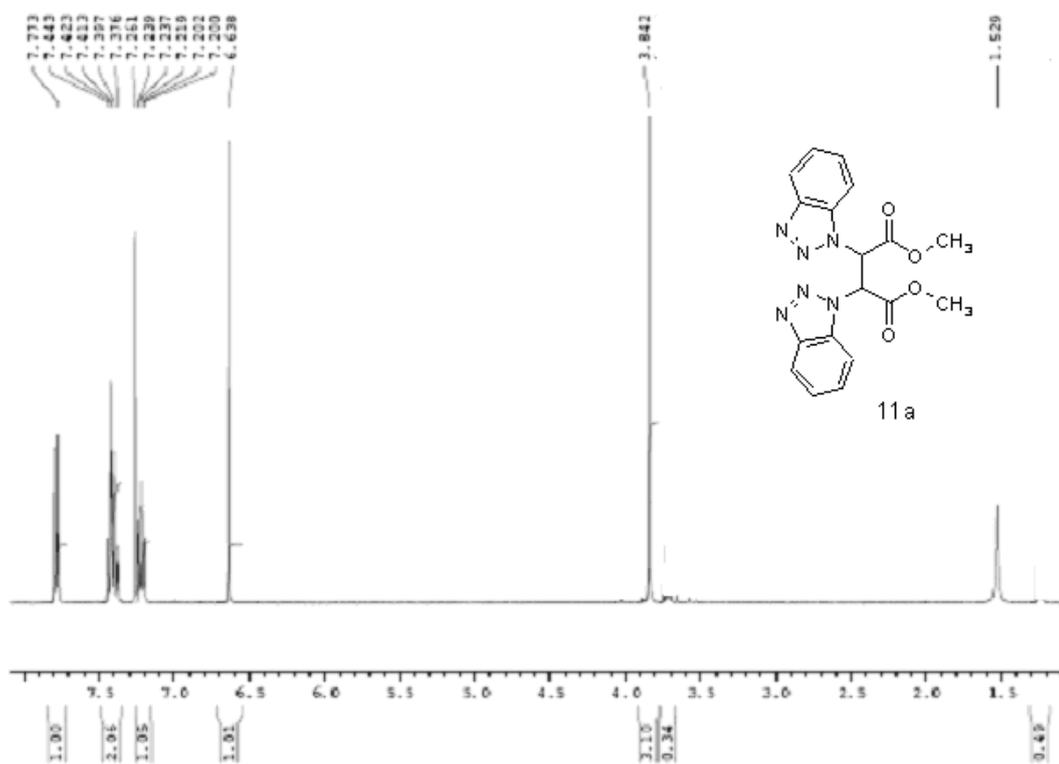
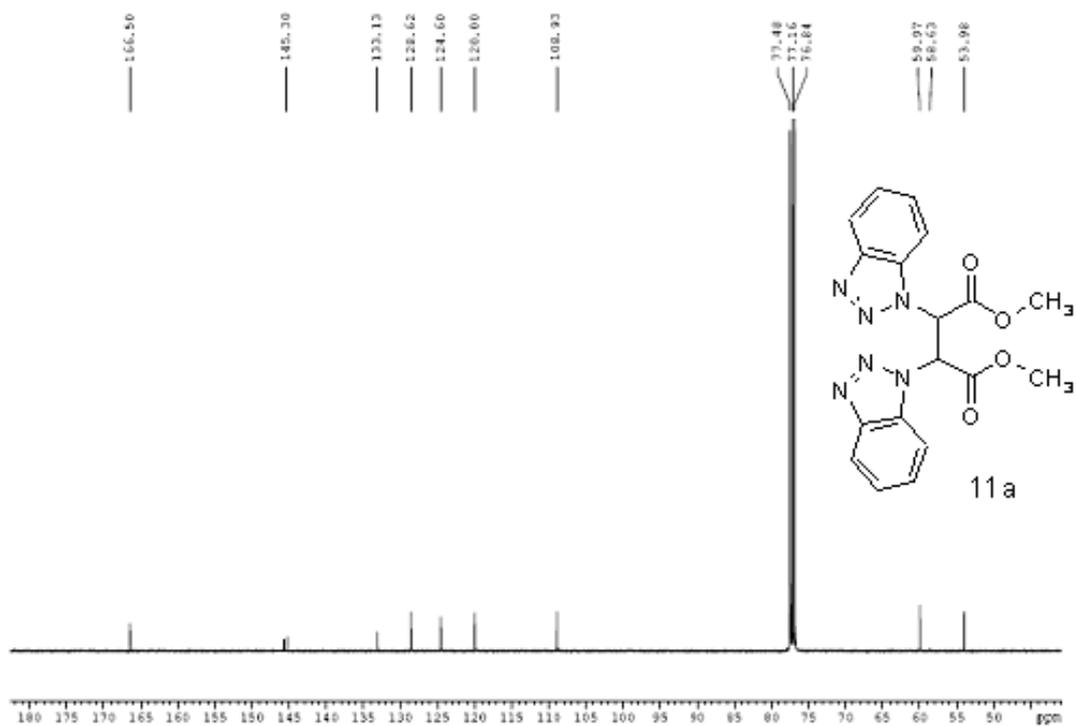
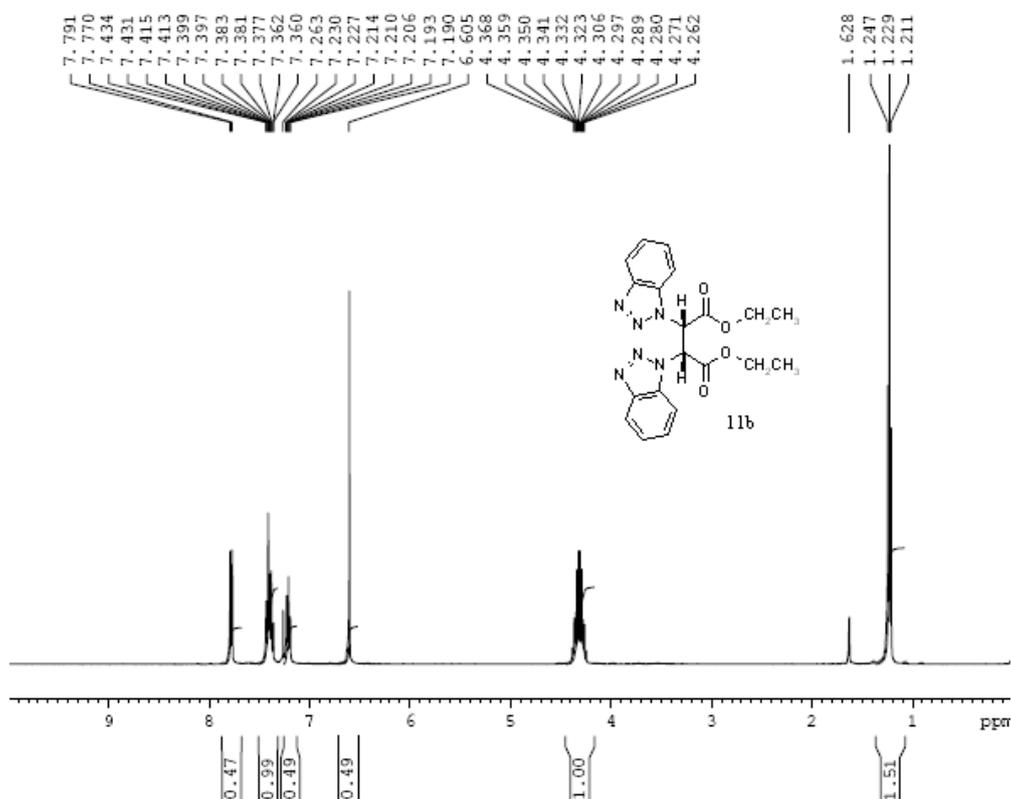
Figure S43. $^1\text{H-NMR}$ of 11a.Figure S44. $^{13}\text{C-NMR}$ of 11a.

Figure S45. $^1\text{H-NMR}$ of **11b**.Figure S46. $^{13}\text{C-NMR}$ of **11b**.

^{13}C decoupled spectrum Dr. Maher Ester in CDCl_3

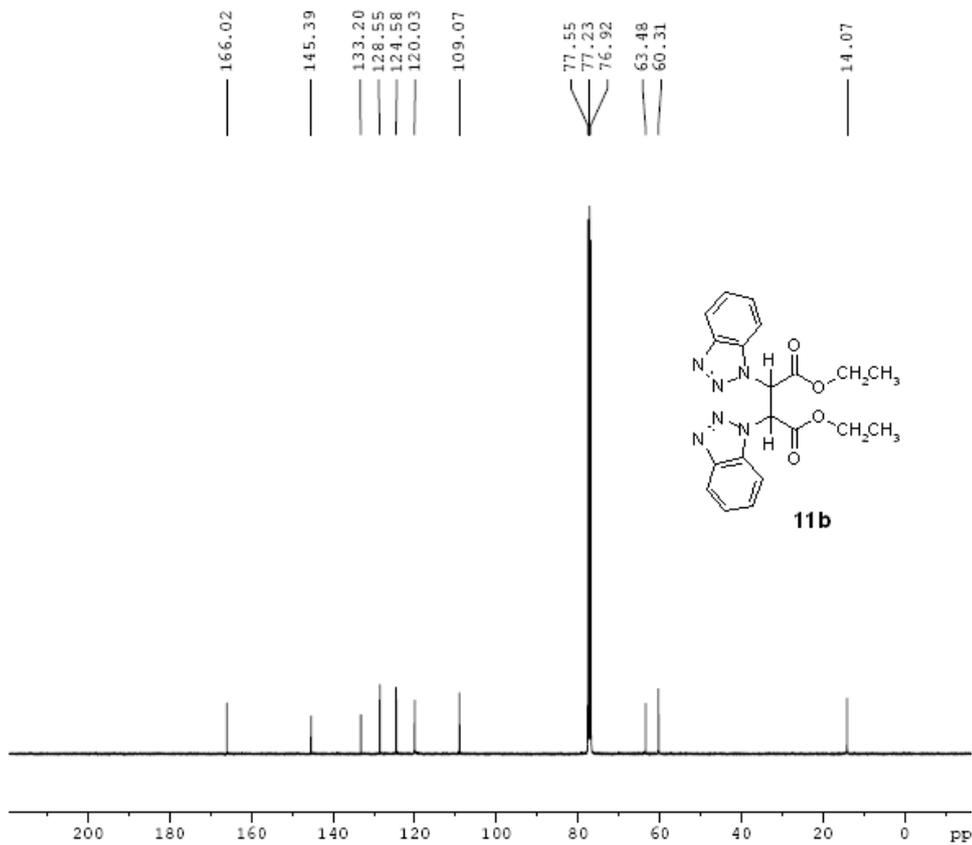


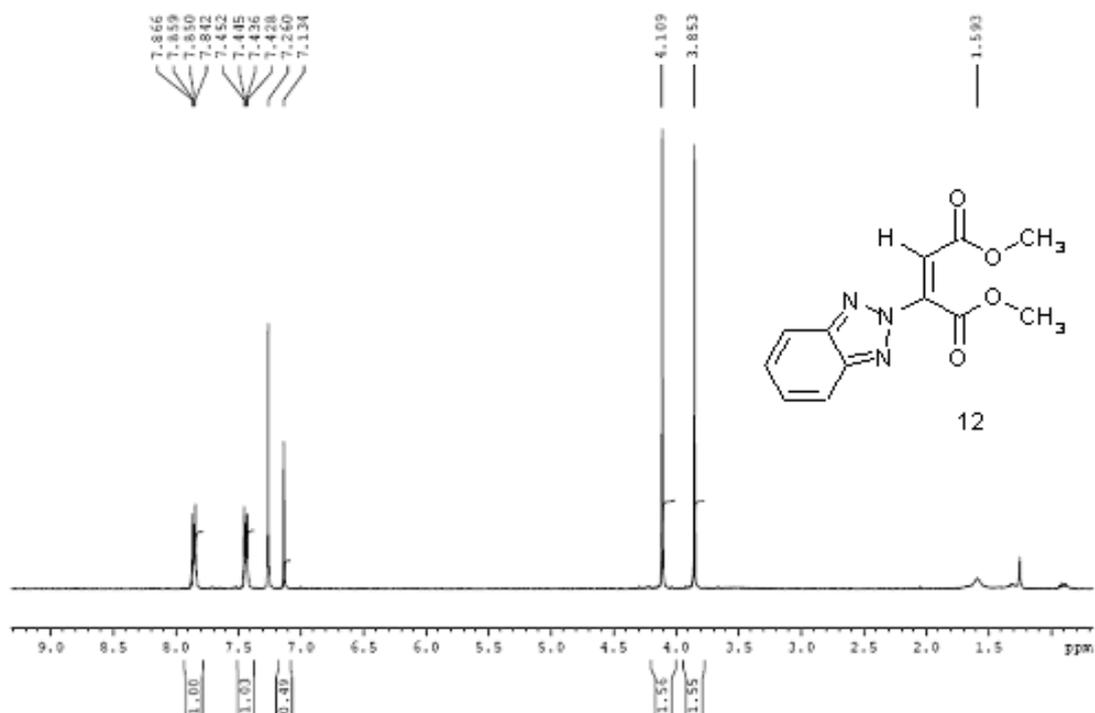
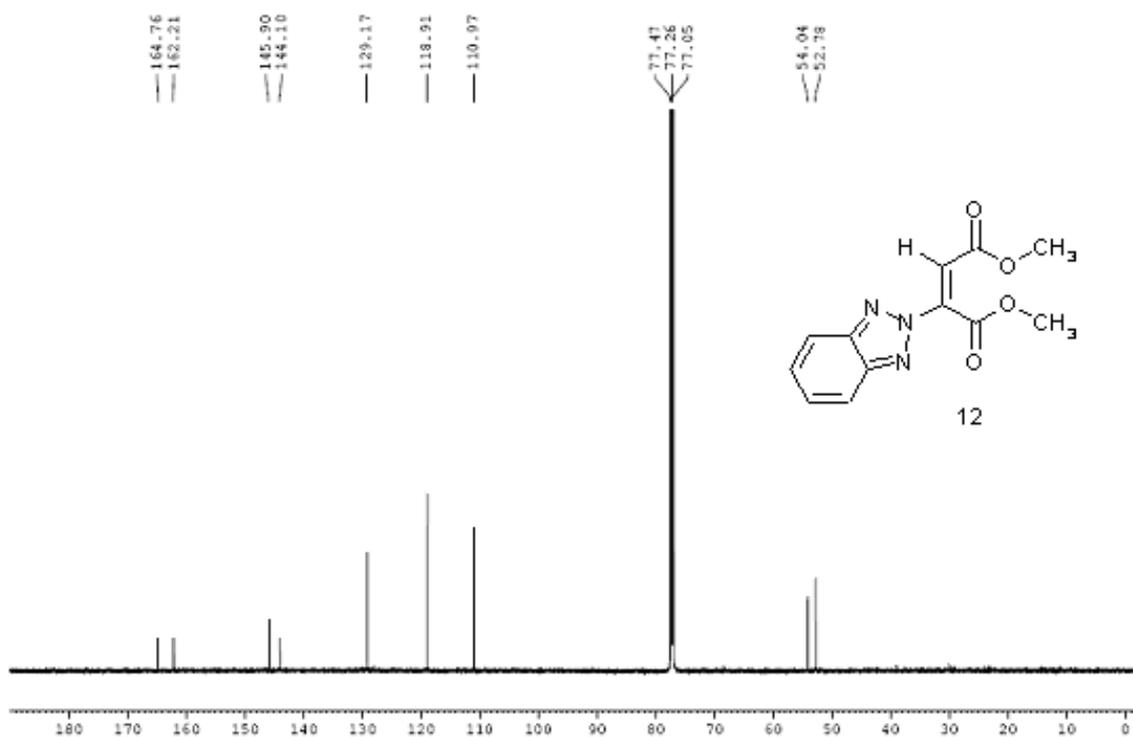
Figure S47. $^1\text{H-NMR}$ of 12.Figure S48. $^{13}\text{C-NMR}$ of 12.

Figure S49. GC-Mass of 4a.

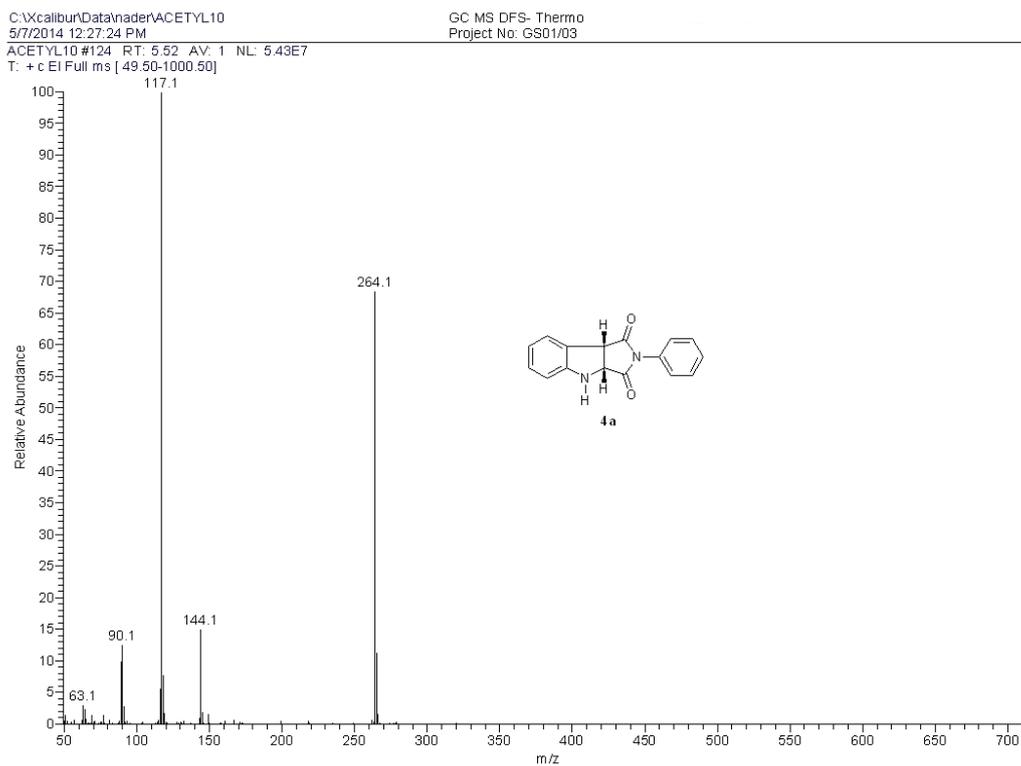


Figure S50. GC-Mass of 4b.

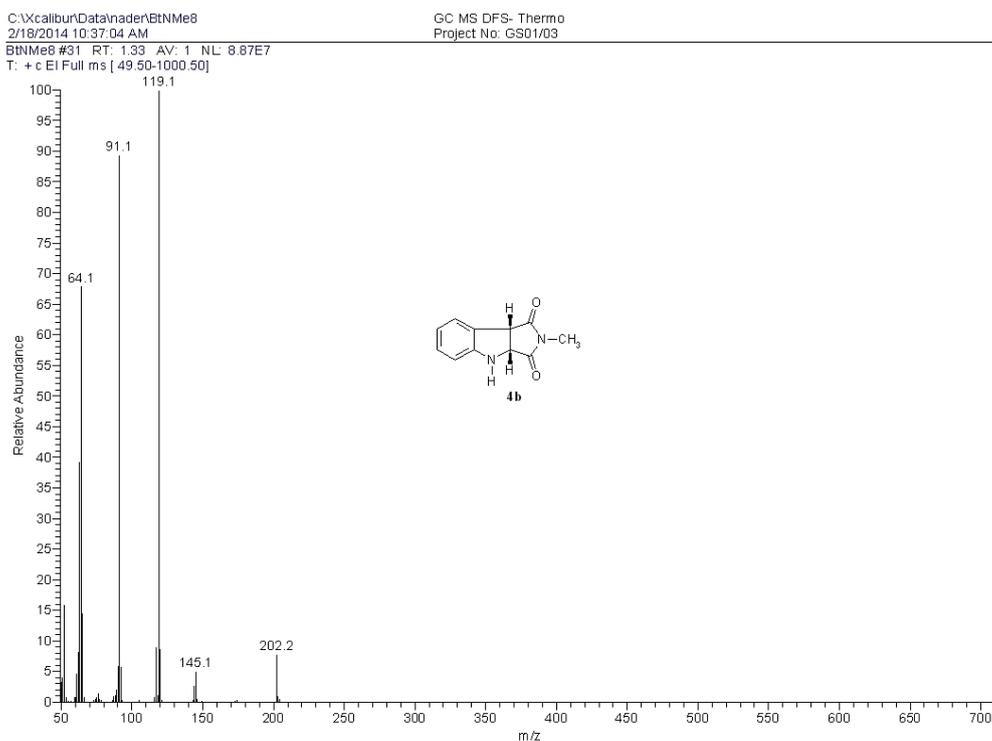


Figure S51. GC-Mass of 4d.

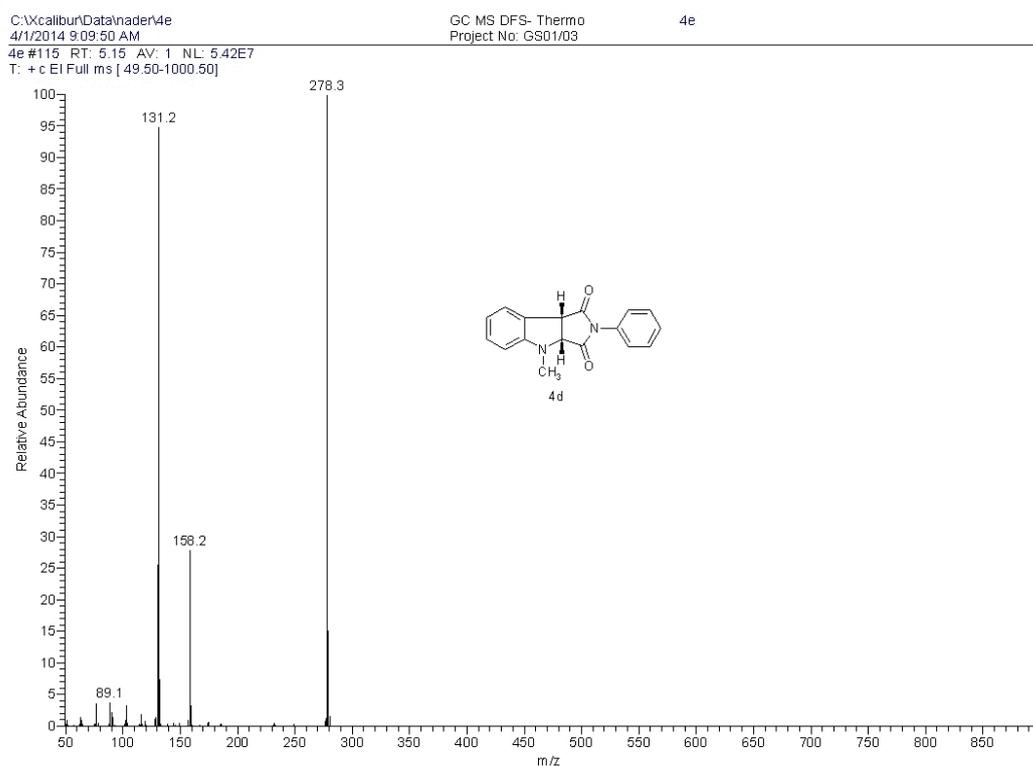


Figure S52. GC-Mass of 4e.

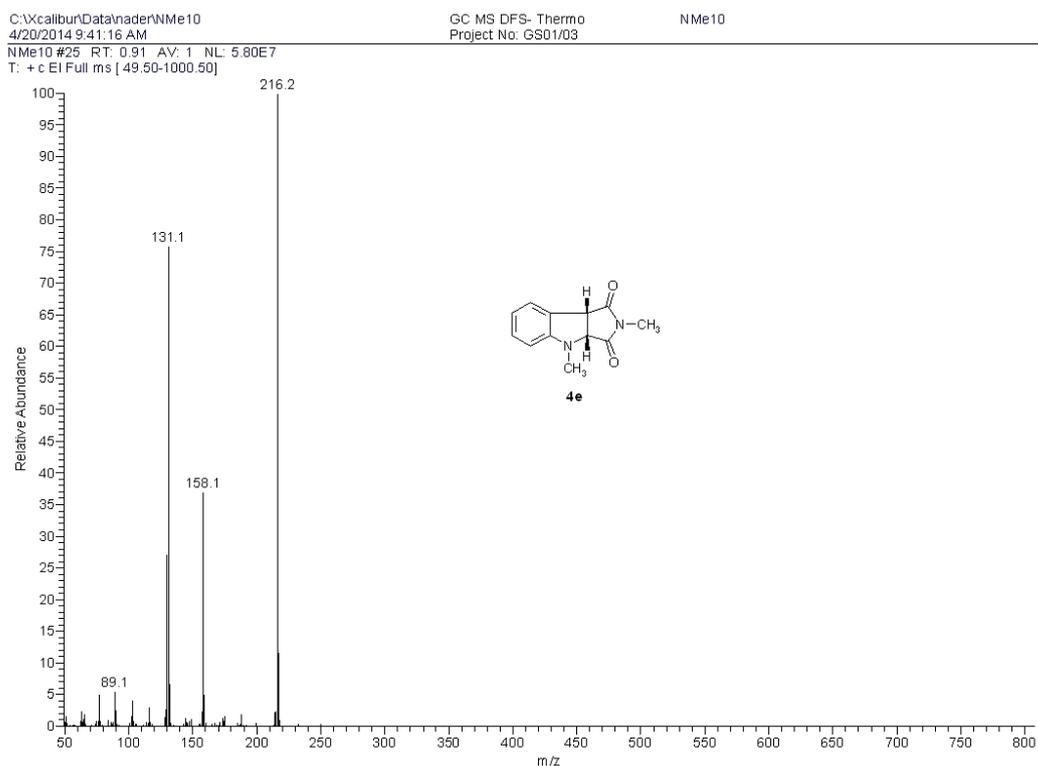


Figure S53. GC-Mass of 4g.

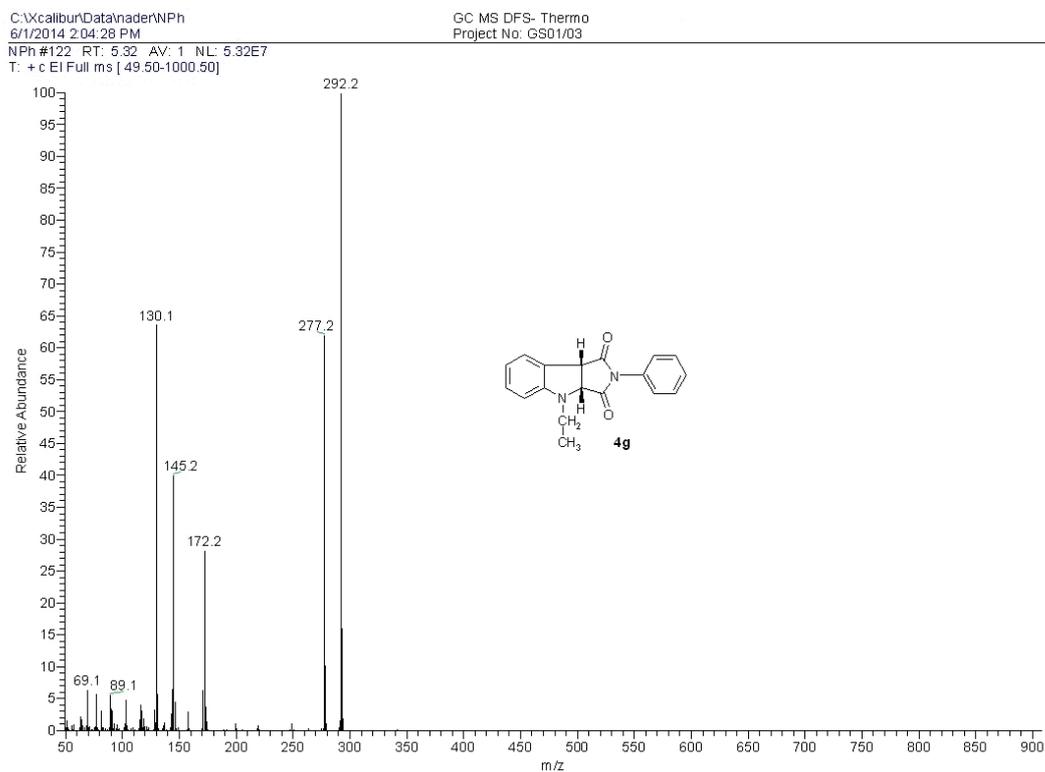


Figure S54. GC-Mass of 4h.

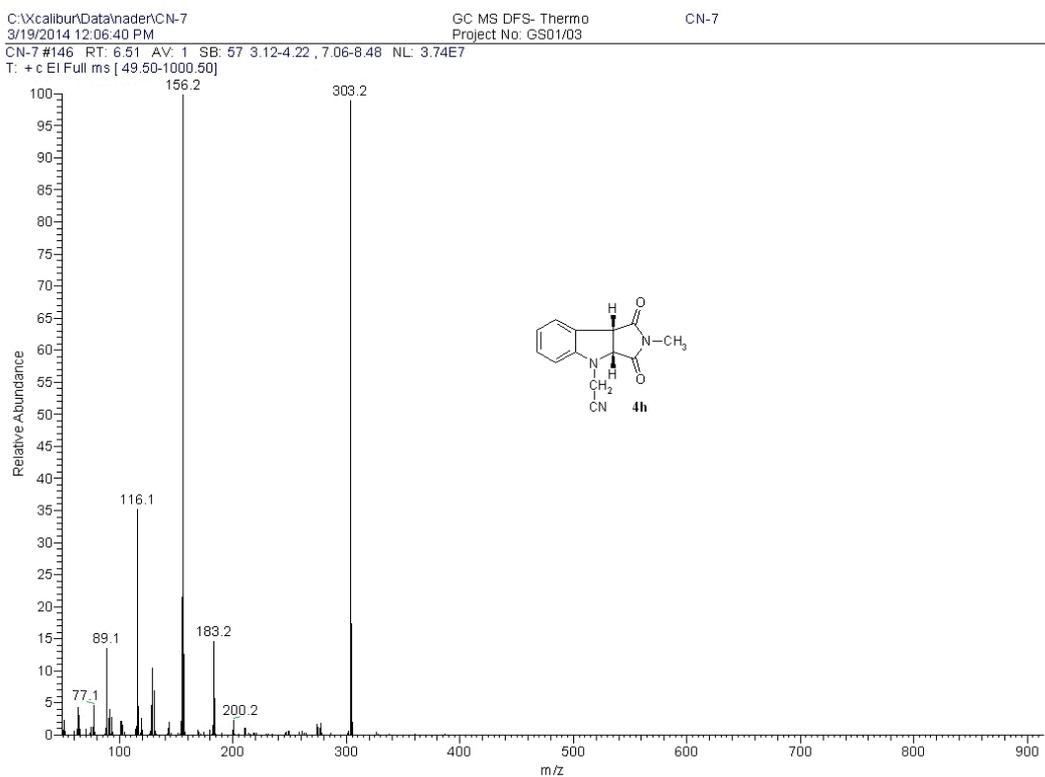


Figure S55. GC-Mass of 4i.

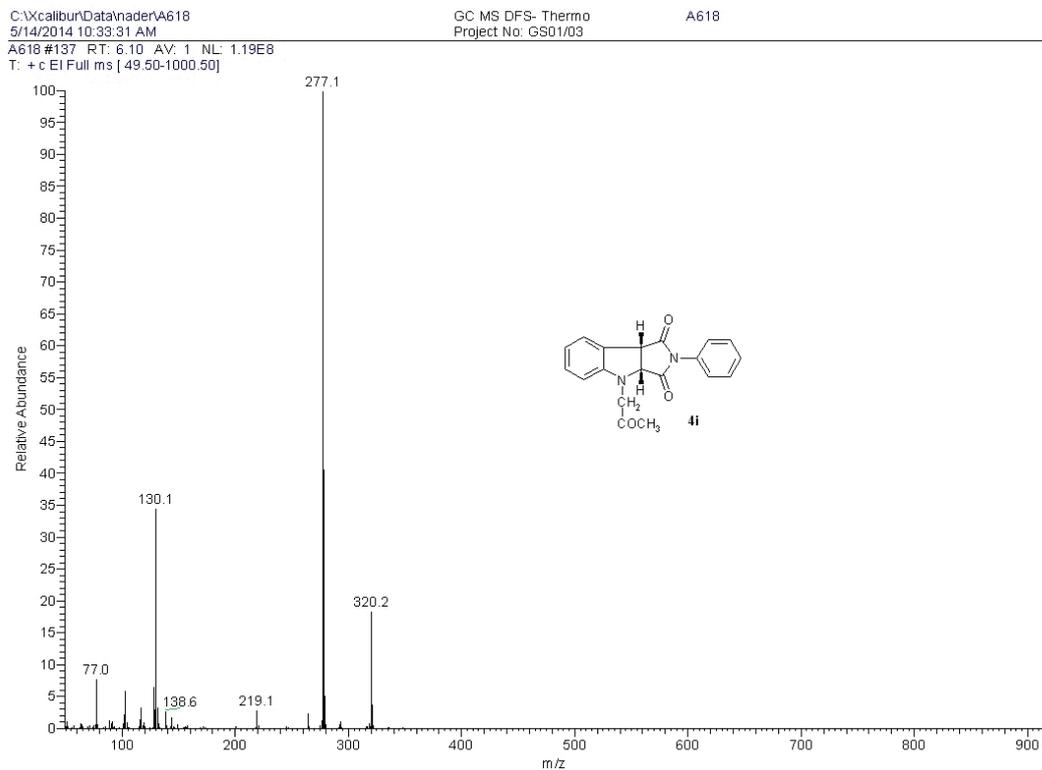


Figure S56. GC-Mass of 5.

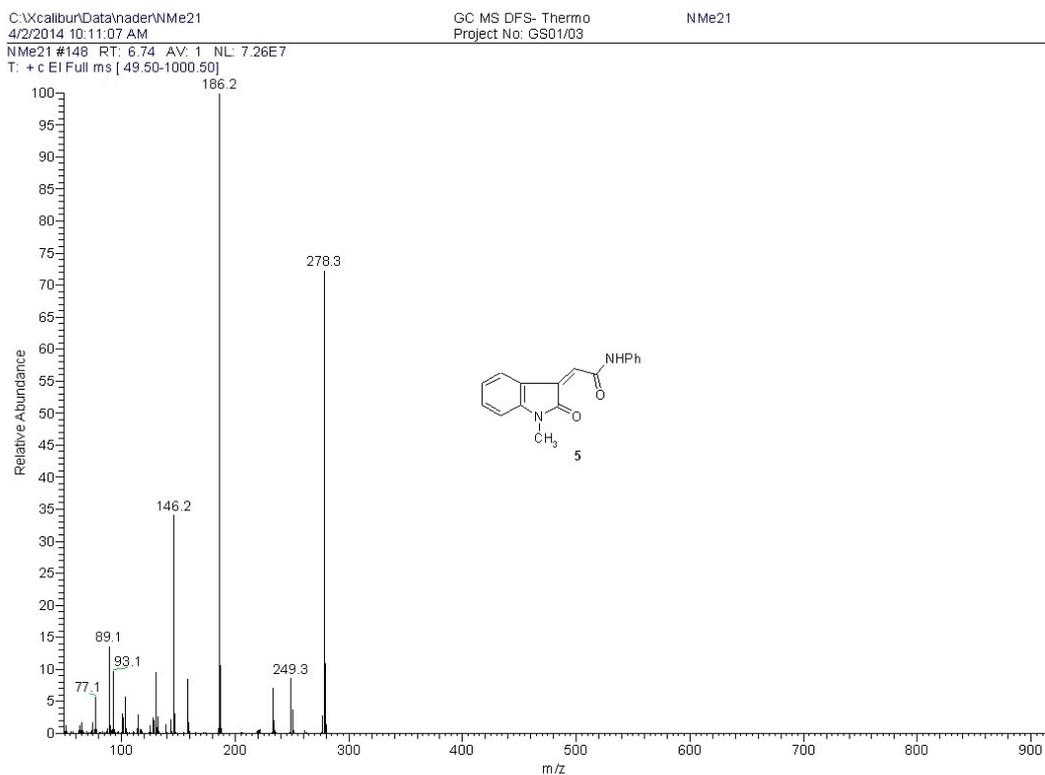


Figure S57. GC-Mass of 6a.

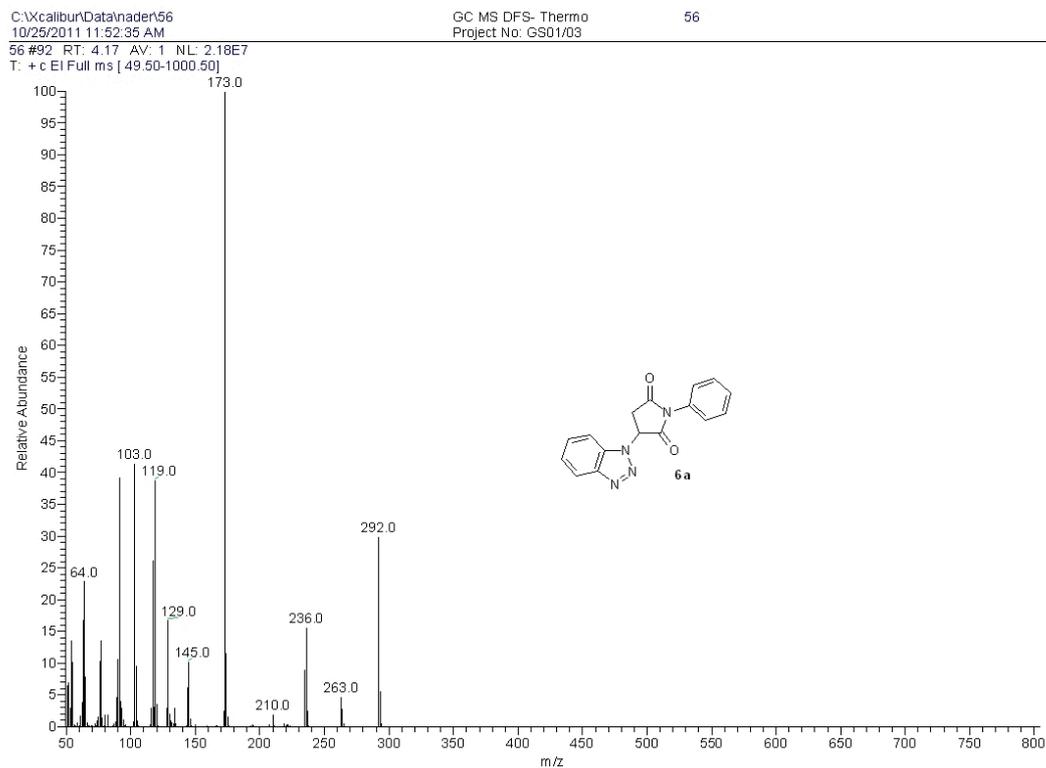


Figure S58. GC-Mass of 6b.

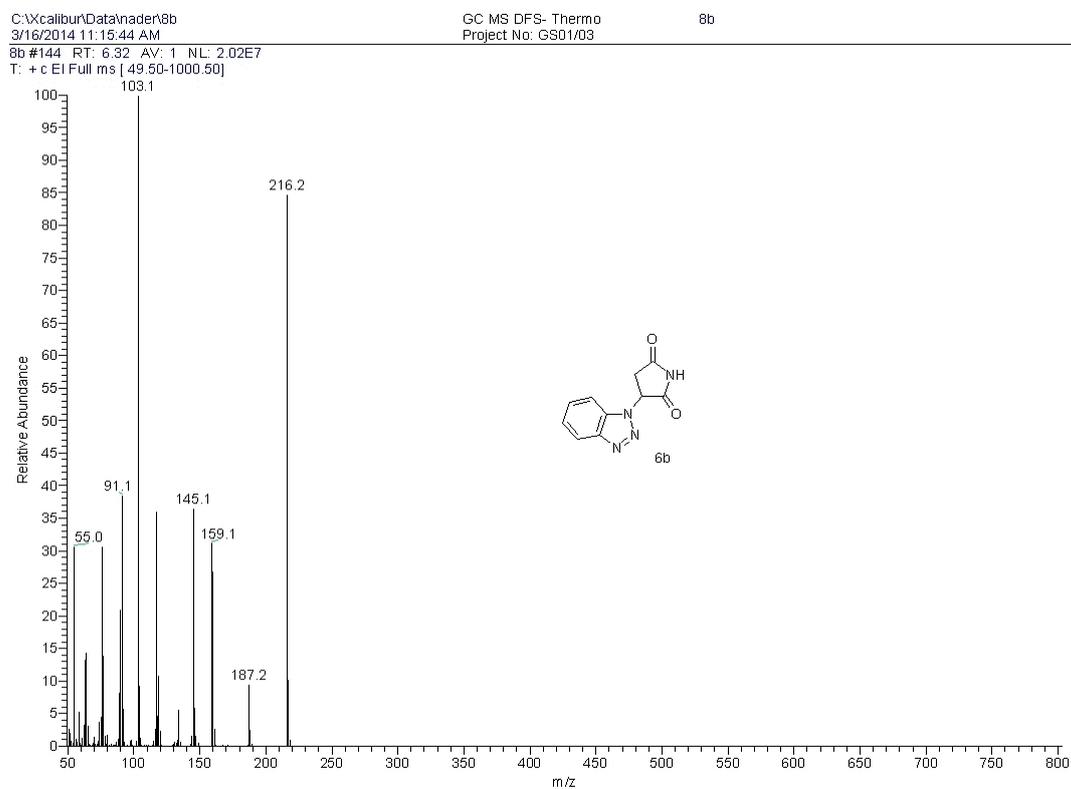


Figure S59. GC-Mass of 7a.

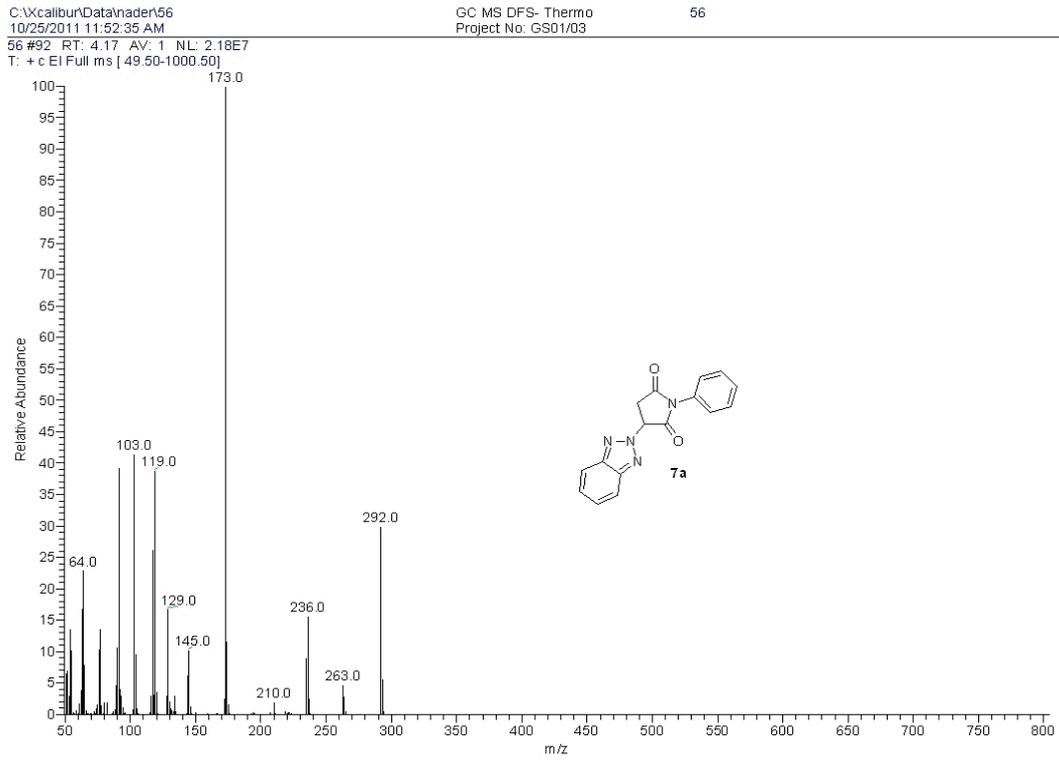


Figure S60. GC-Mass of 7b.

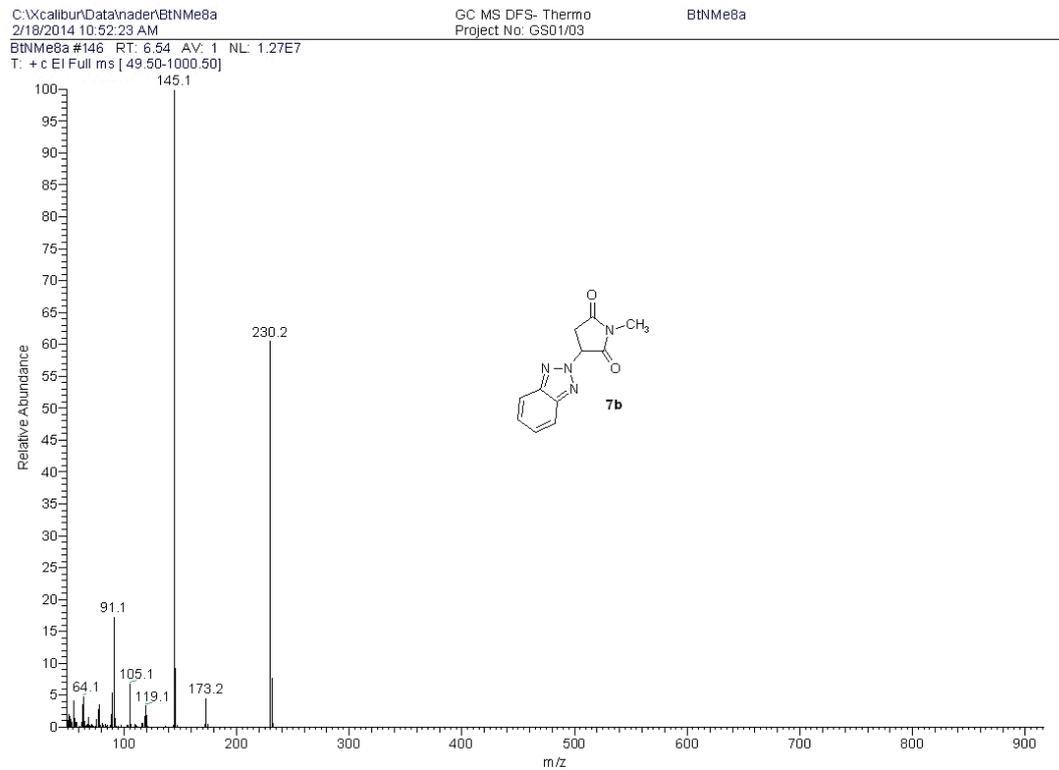


Figure S61. GC-Mass of 9d.

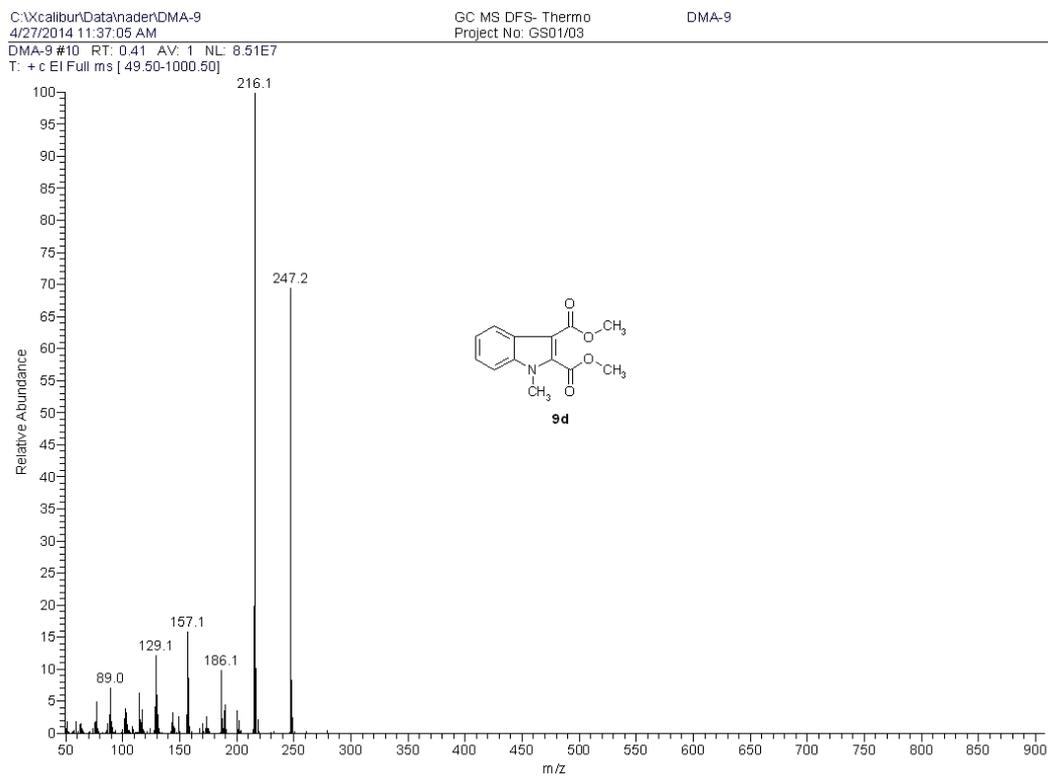


Figure S62. GC-Mass of 9e.

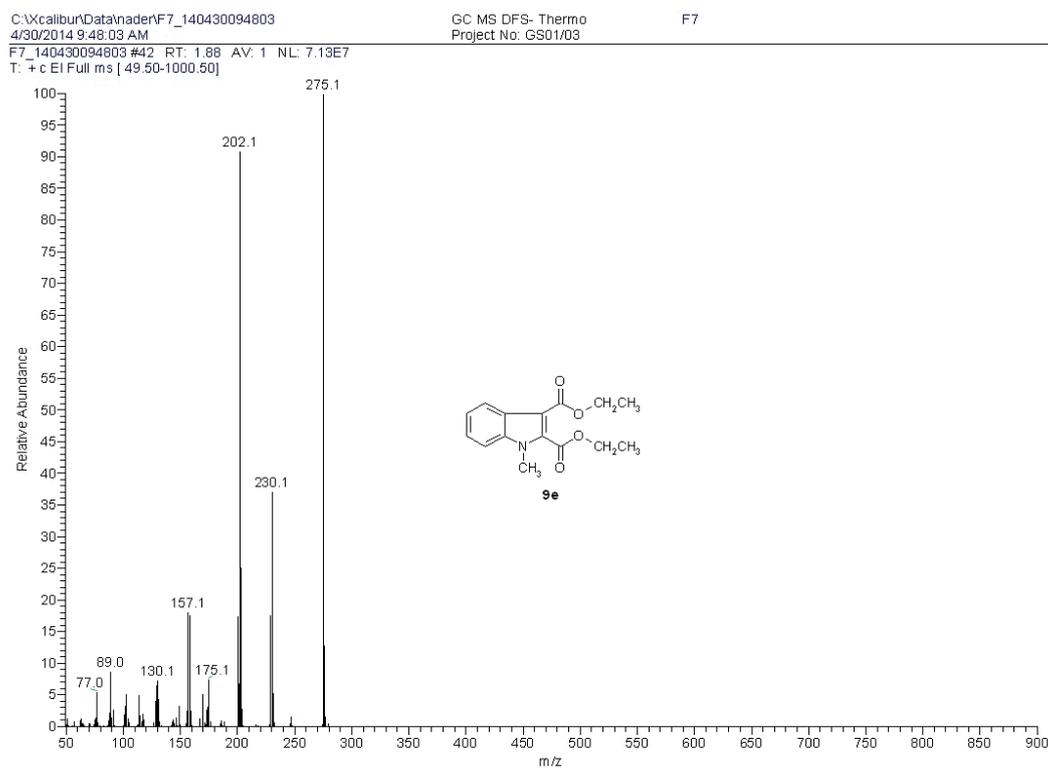


Figure S63. GC-Mass of 11a.

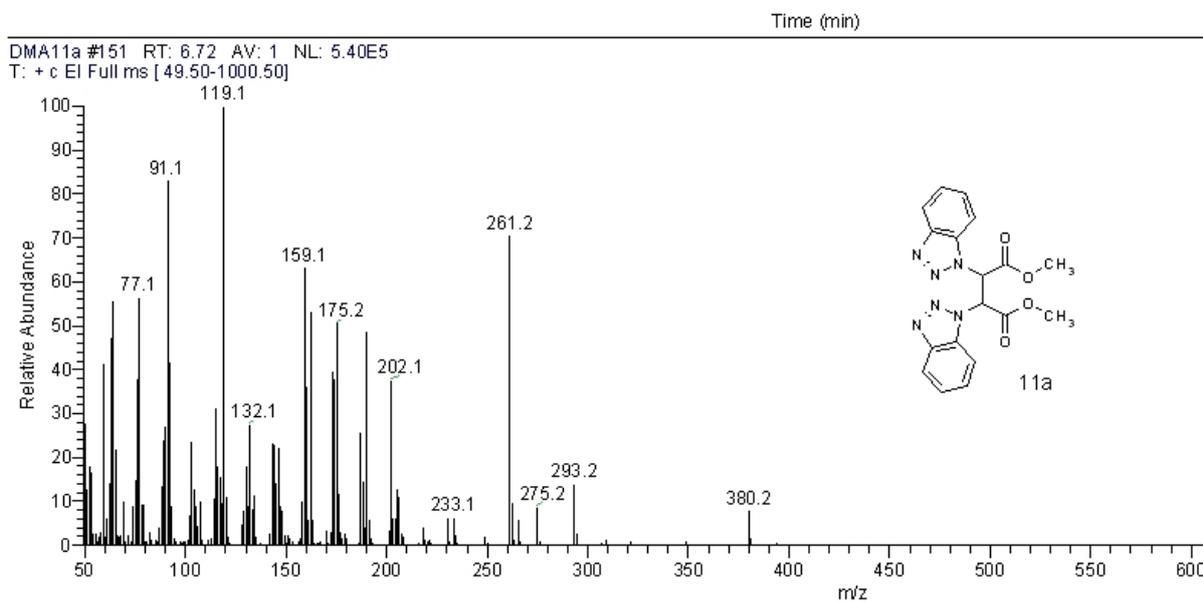


Figure S64. GC-Mass of 11b.

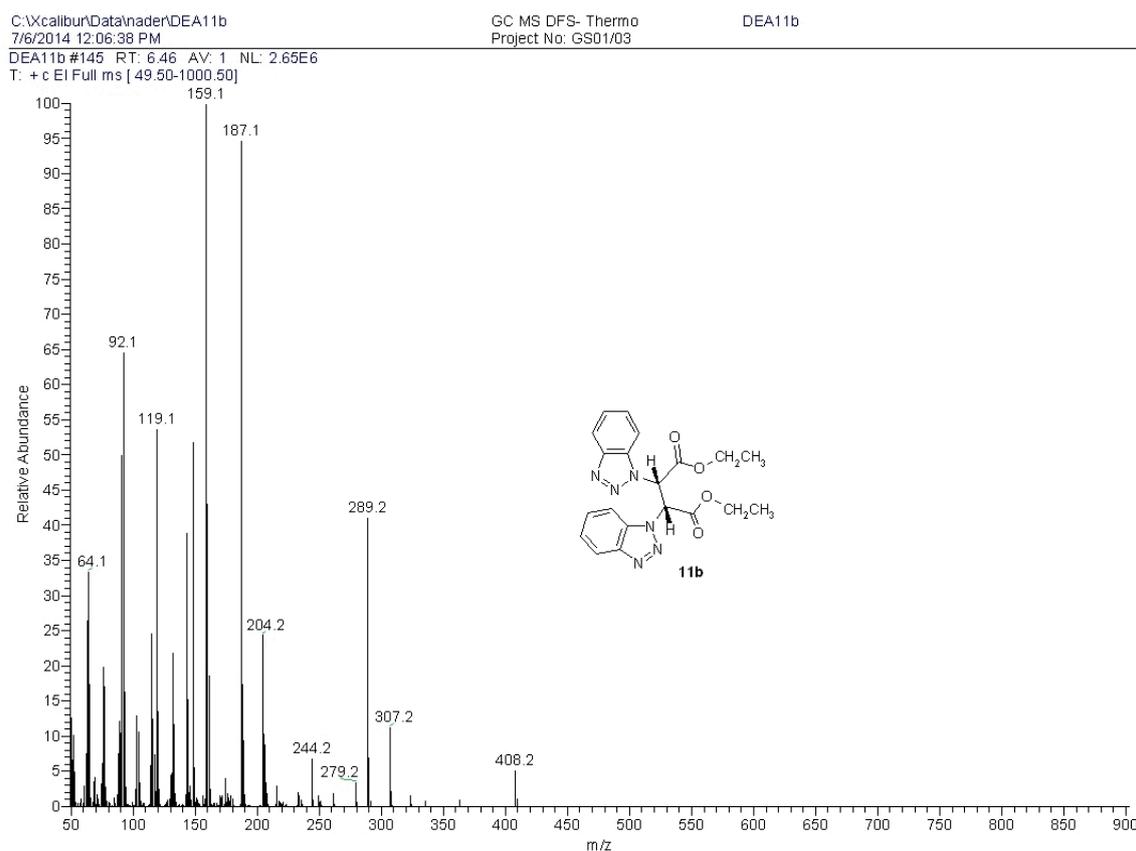


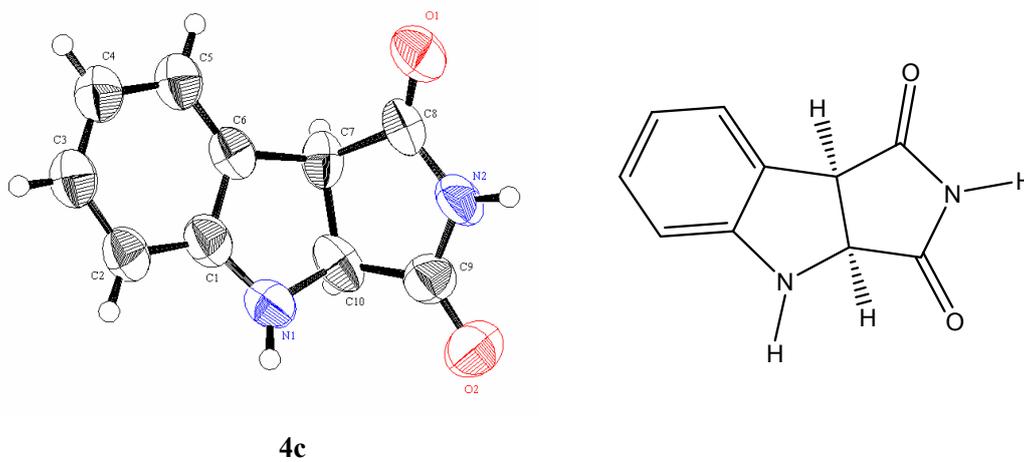
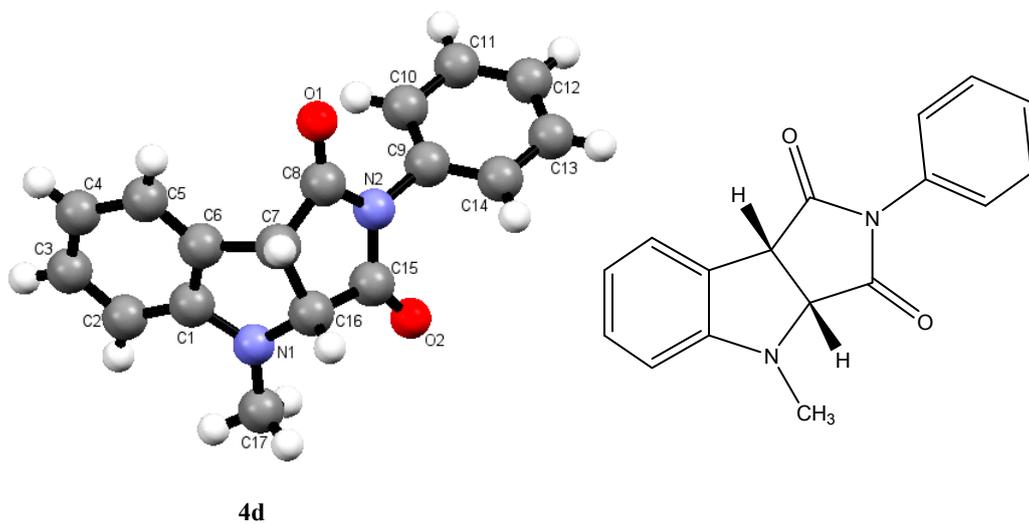
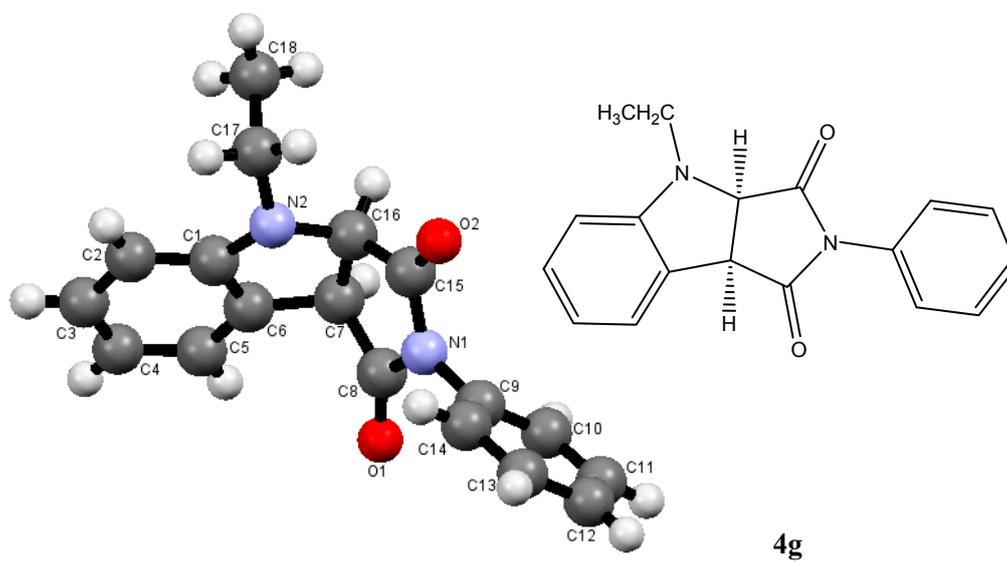
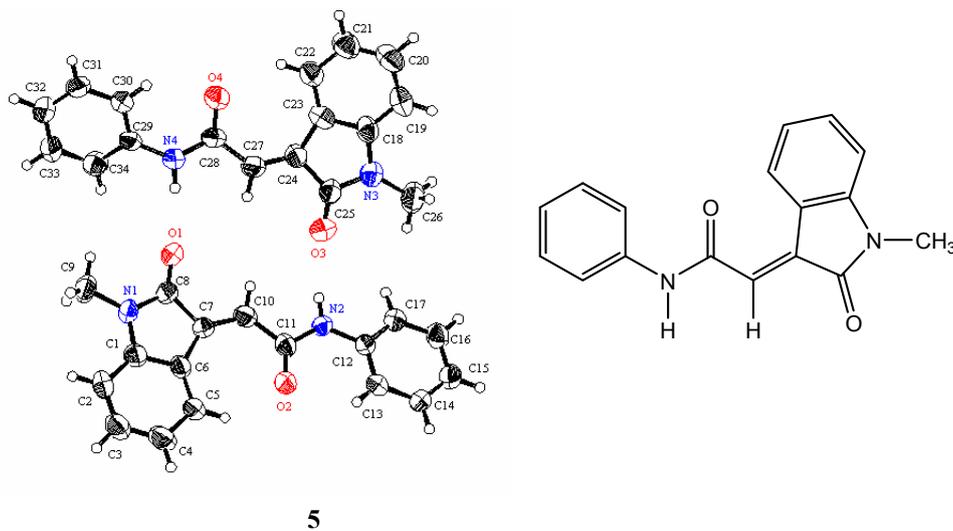
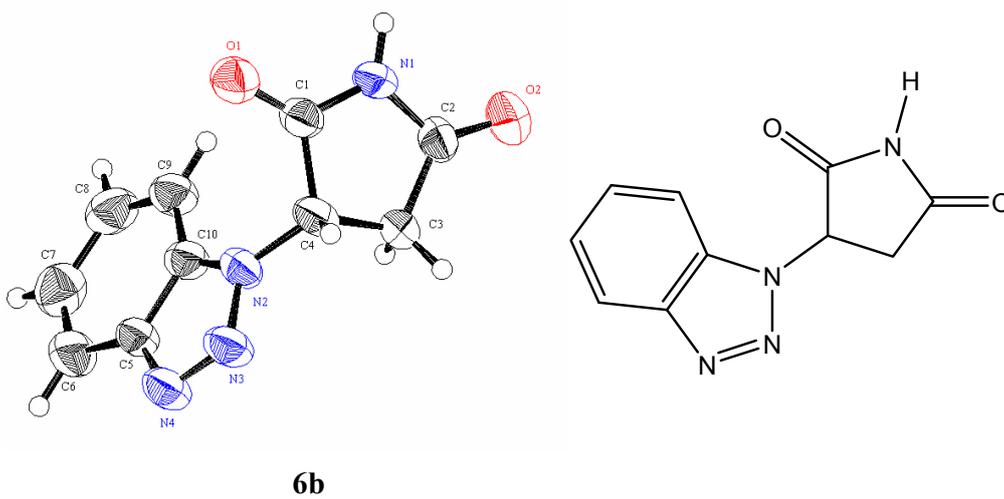
Figure S65. X-Ray Crystal Structure of 4c.**Figure S66. X-Ray Crystal Structure of 4d.****Figure S67. X-Ray Crystal Structure of 4g.**

Figure S68. X-Ray Crystal Structure of 5.**Figure S69. X-Ray Crystal Structure of 6b.****Figure S70. X-Ray Crystal Structure of 11a.**