Supporting information

Naphthoquinone-based Chalcone Hybrids and derivatives: Synthesis and Potent Activity Against Cancer Cell Lines

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Contents

1) Compound 10

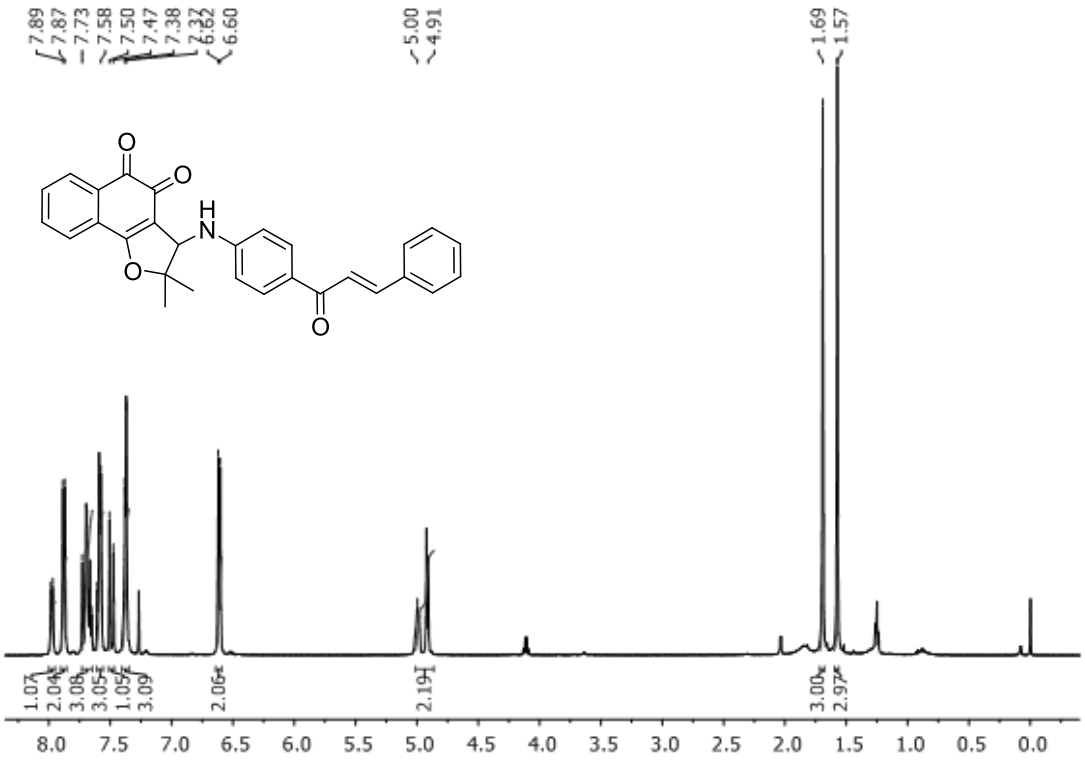

Figure 1. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **10**.

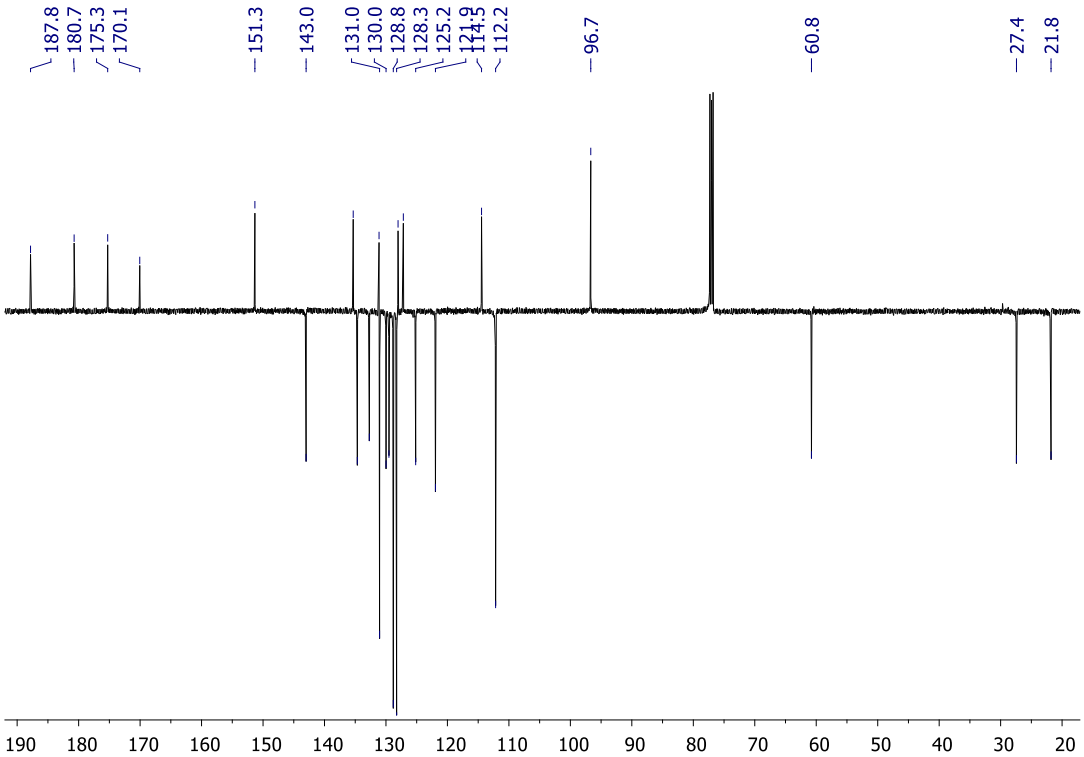

Figure 2. ^{13}C-APT NMR spectrum (125 MHz, $CDCl_3$) of compound **10**.

2) Compound 11

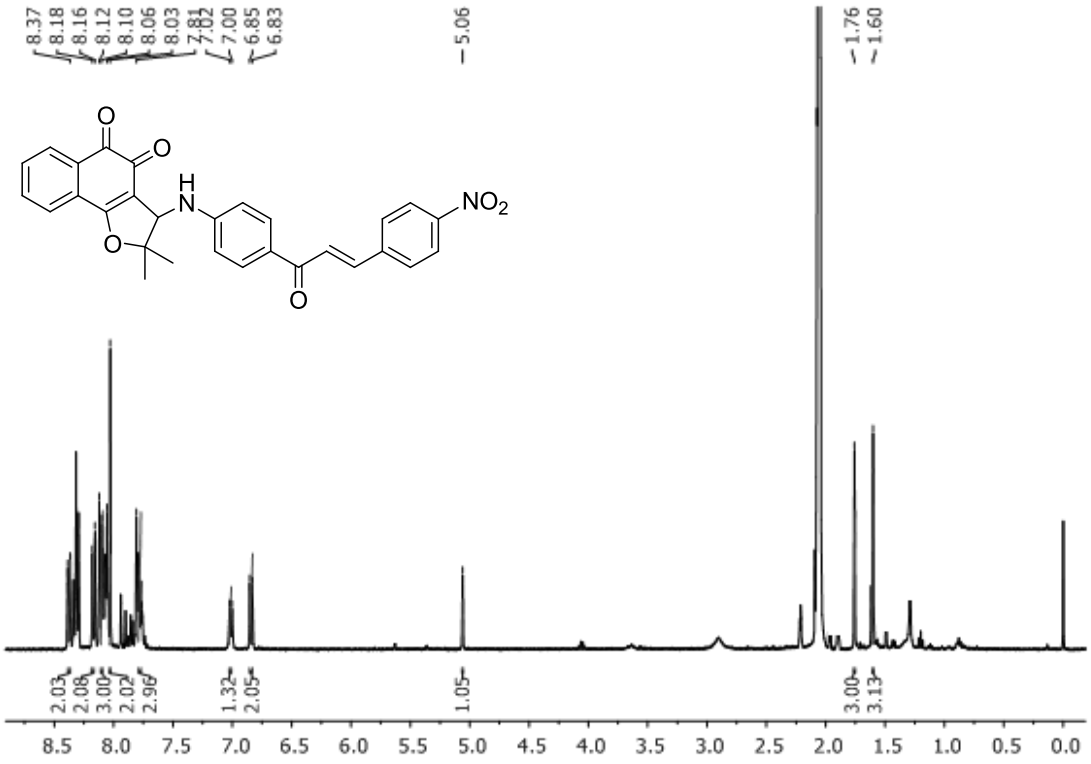

Figure 3. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **11**.

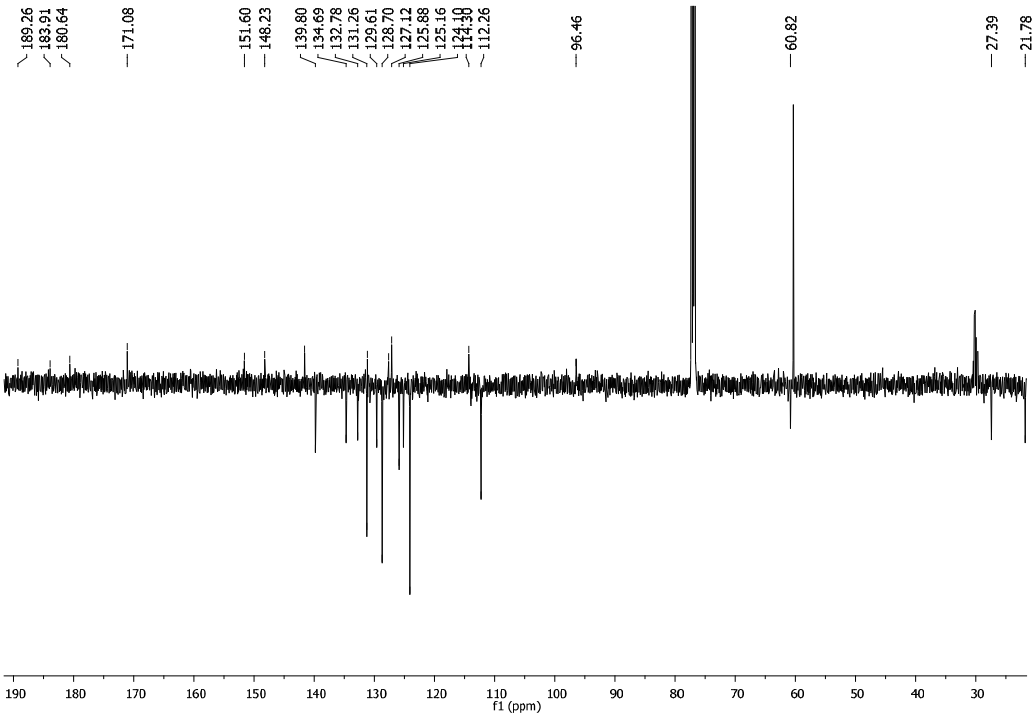

Figure 4. ^{13}C-APT NMR spectrum (100 MHz, $CDCl_3$) of compound **11**.

3) Compound 12

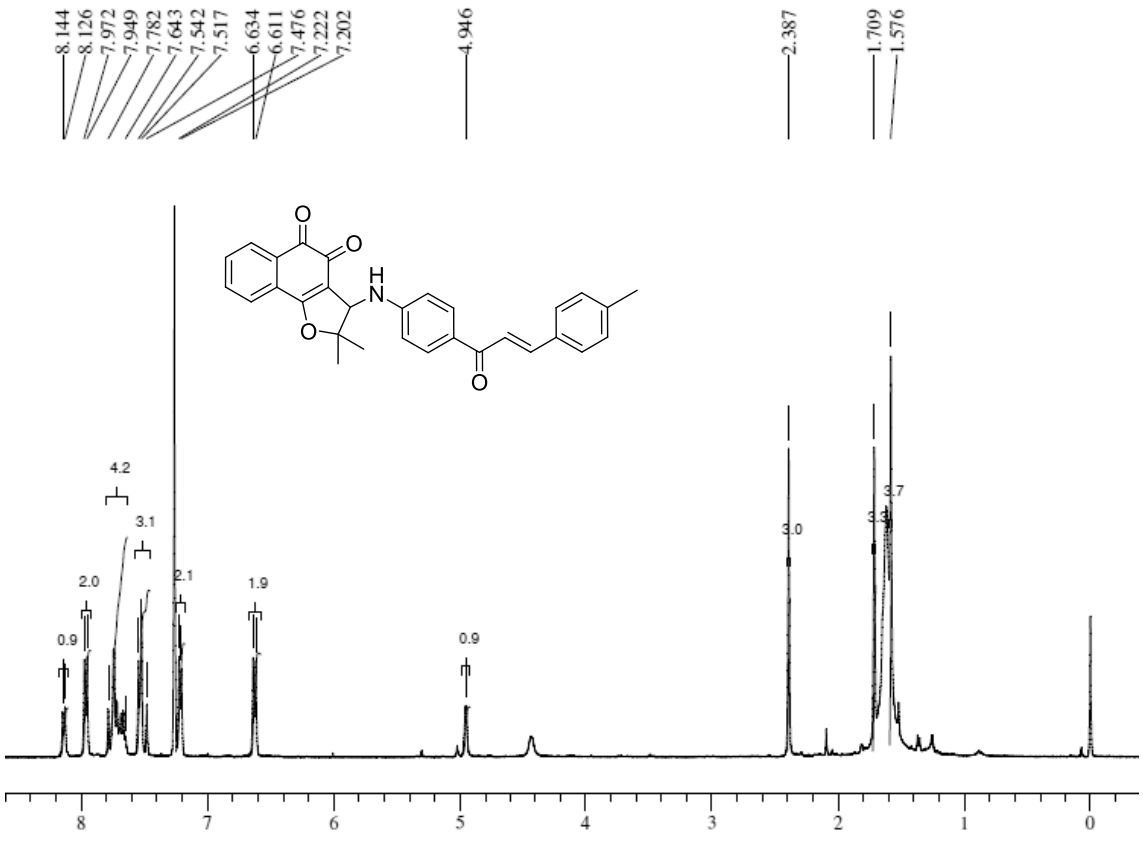

Figure 5. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **12**.

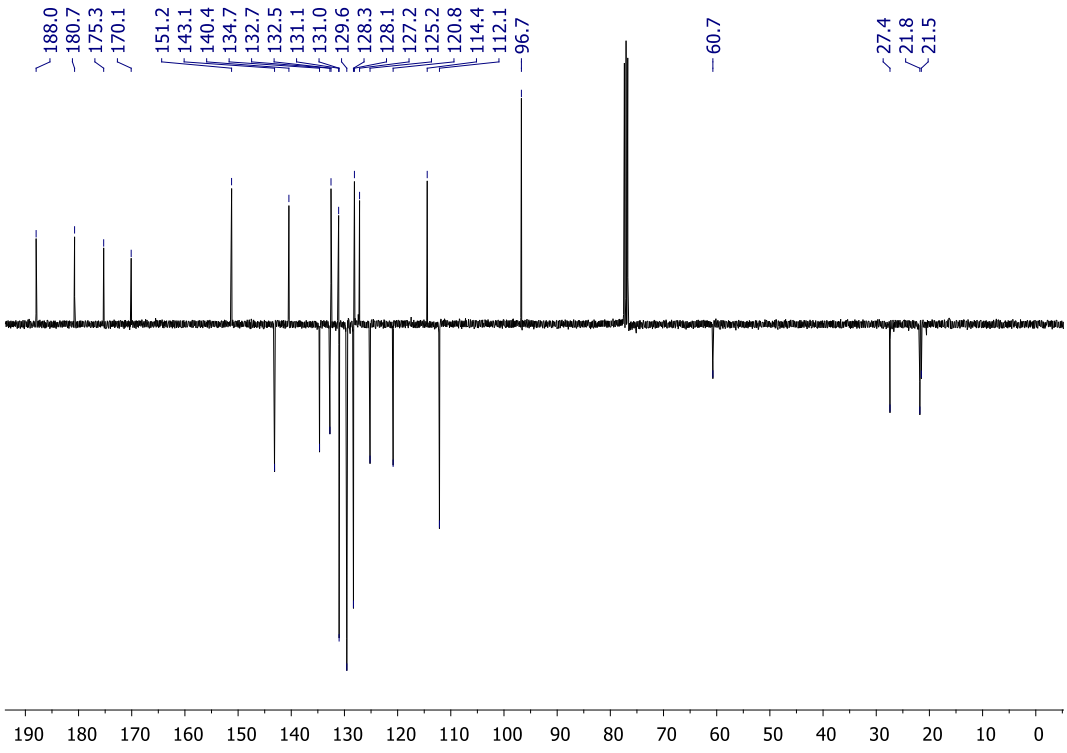

Figure 6. ^{13}C-APT NMR spectrum (100 MHz, $CDCl_3$) of compound **12**.

4) Compound 13

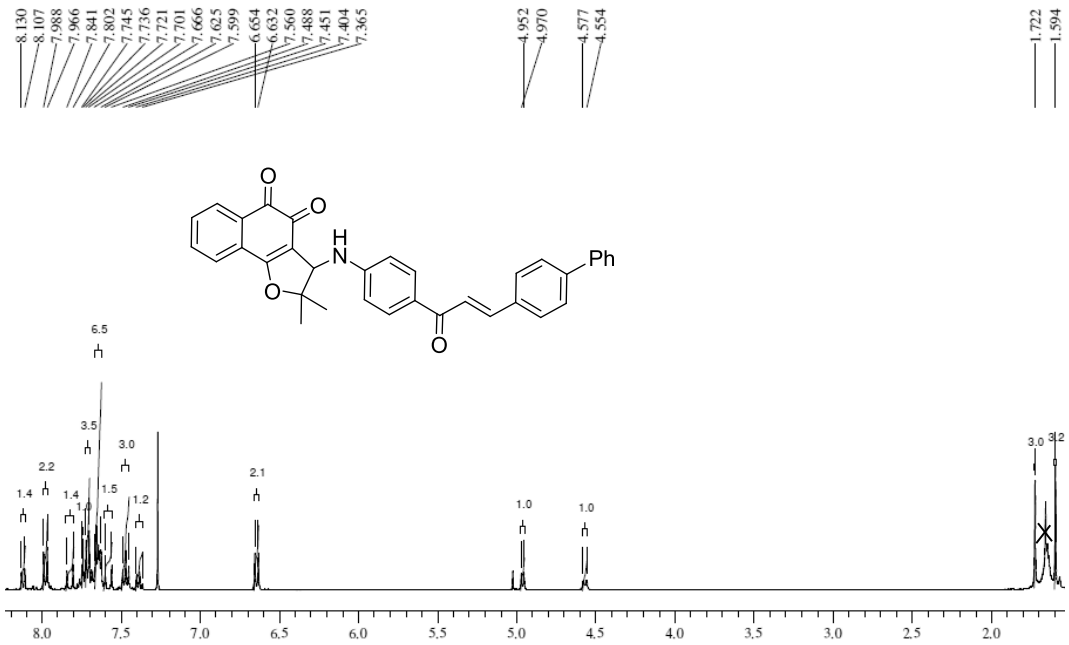

Figure 7. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **13**.

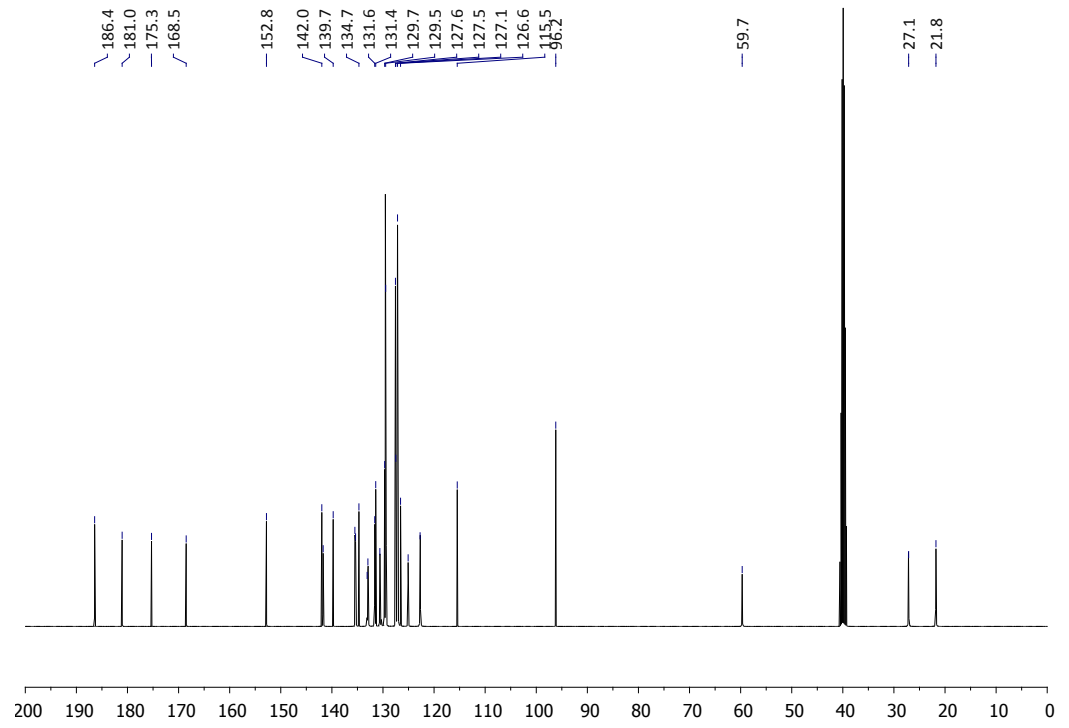

Figure 8. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **13**.

5) Compound 14

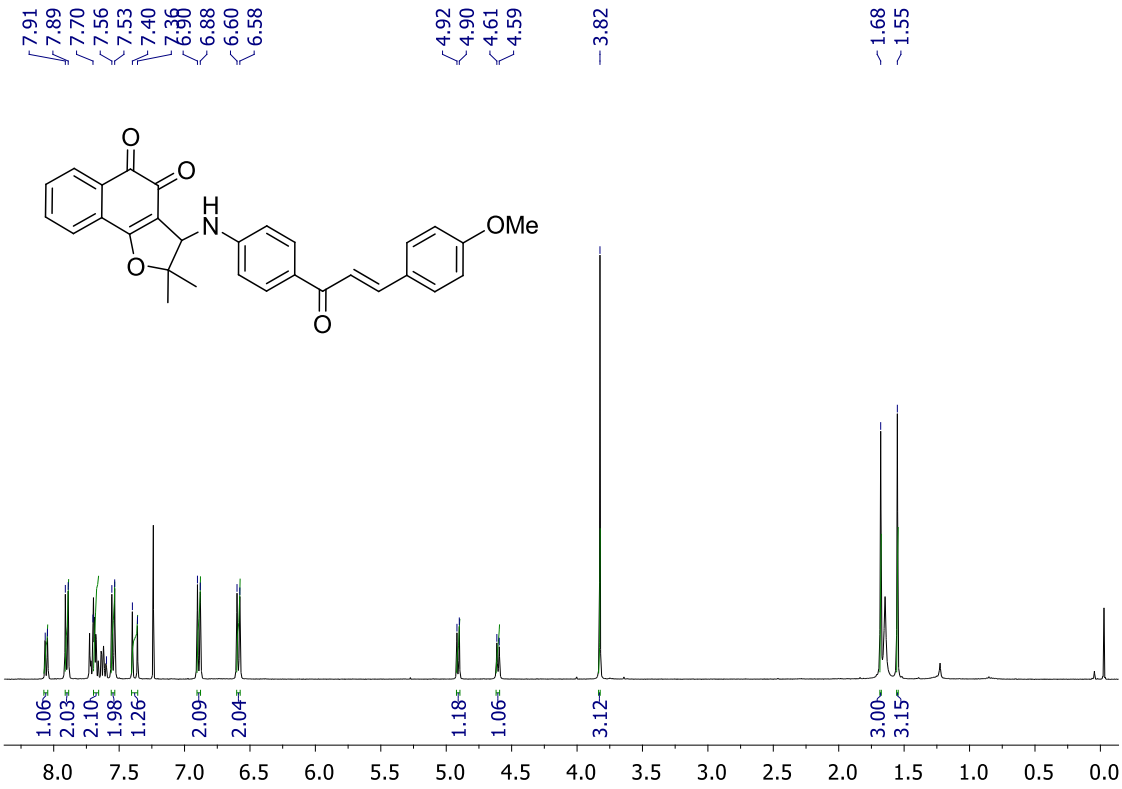

Figure 9. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **14**.

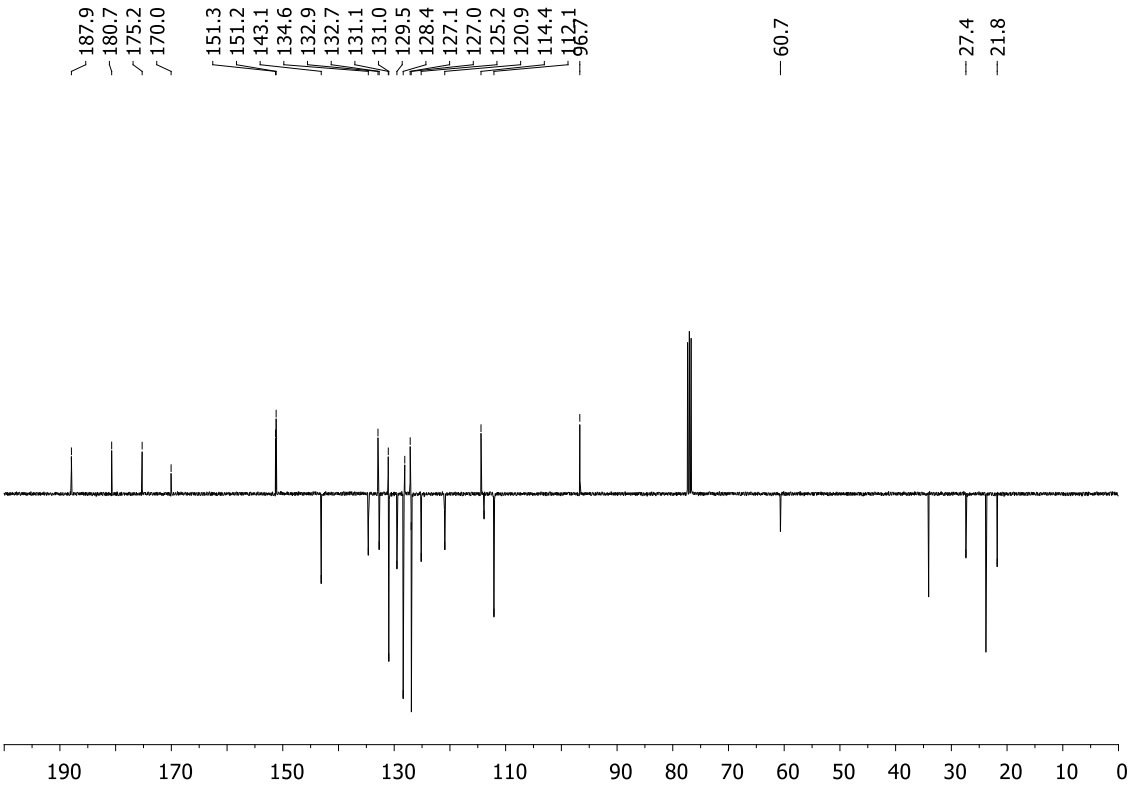

Figure 10. ^{13}C-APT NMR spectrum (100 MHz, $CDCl_3$) of compound **14**.

6) Compound 15

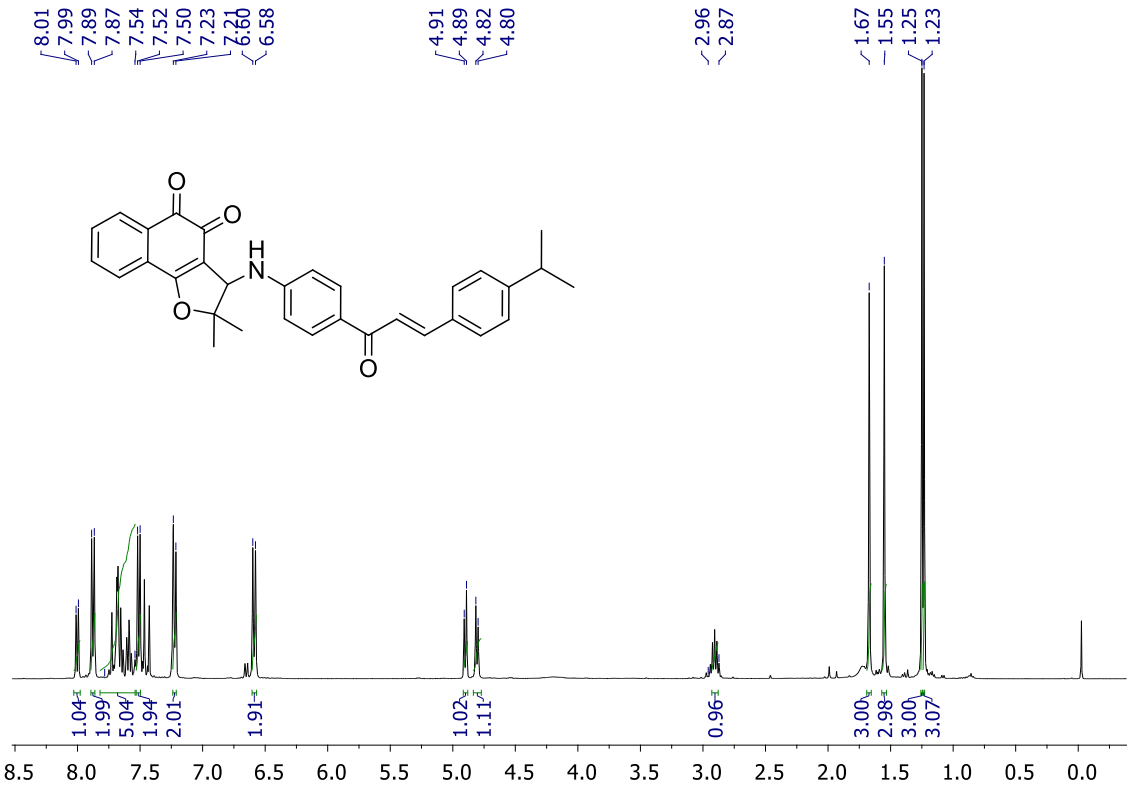

Figure 11. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **15**.

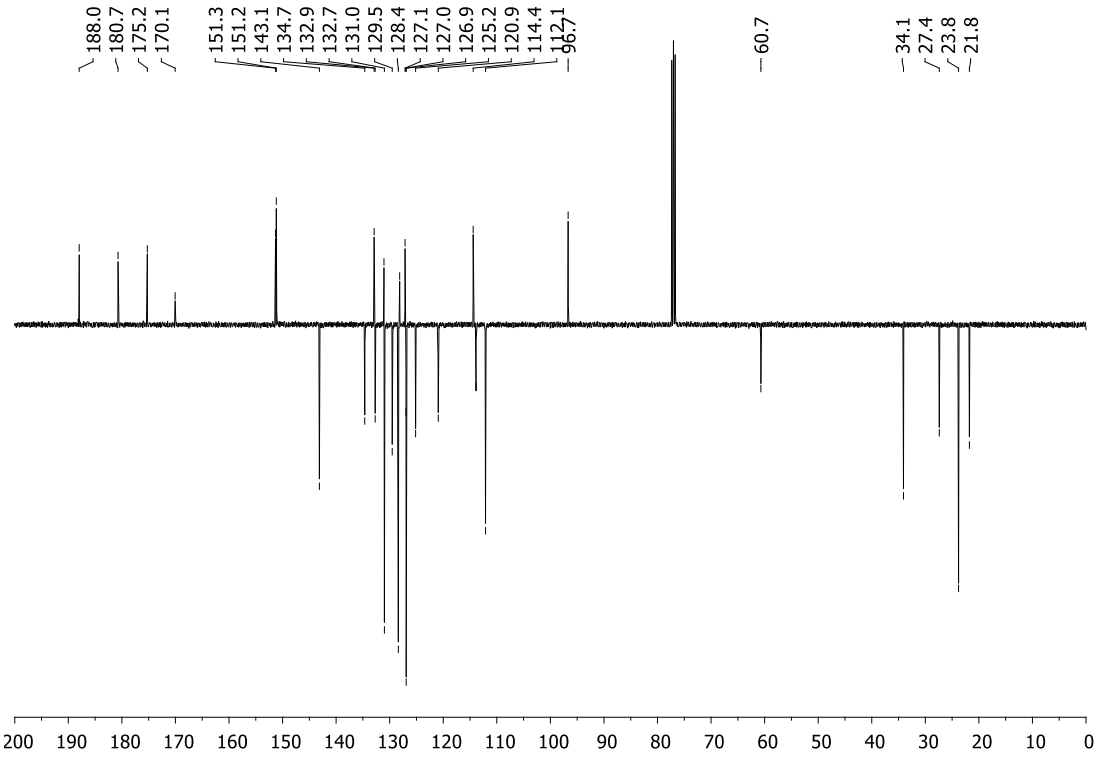

Figure 12. ^{13}C-APT NMR spectrum (100 MHz, $CDCl_3$) of compound **15**.

7) Compound 30

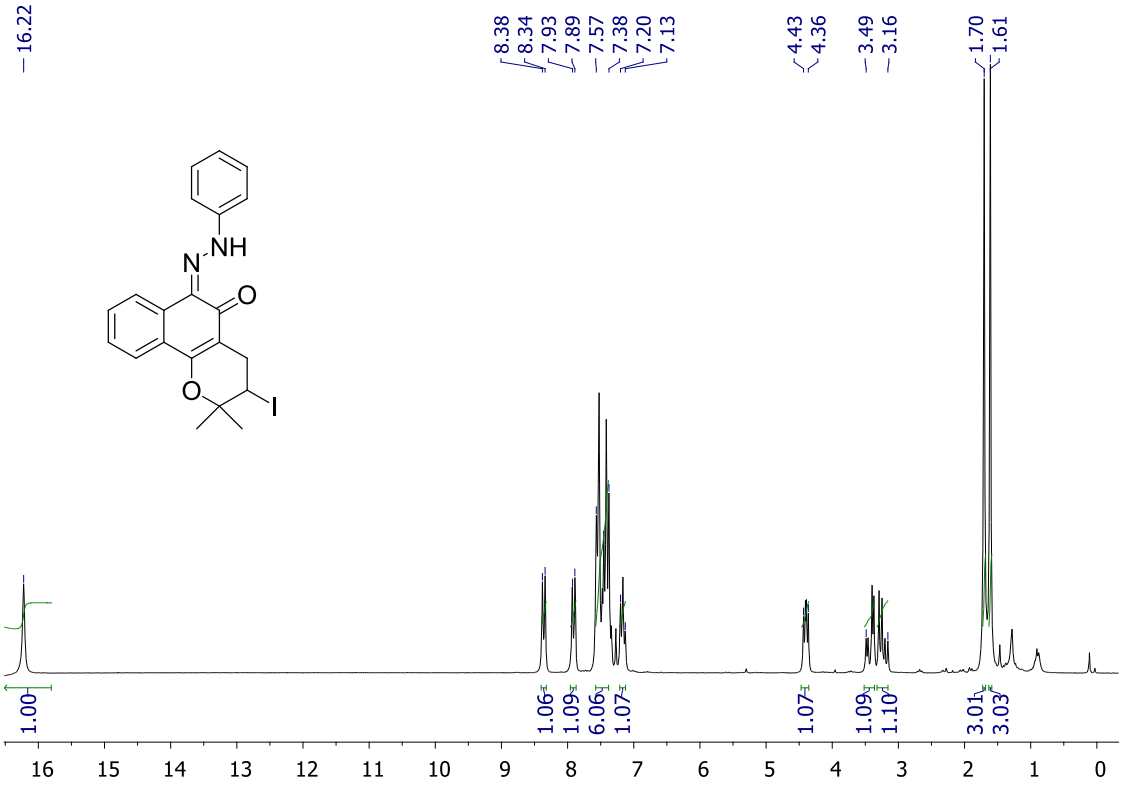

Figure 13. ^{1}H NMR spectrum (200 MHz, $CDCl_3$) of compound **30**.

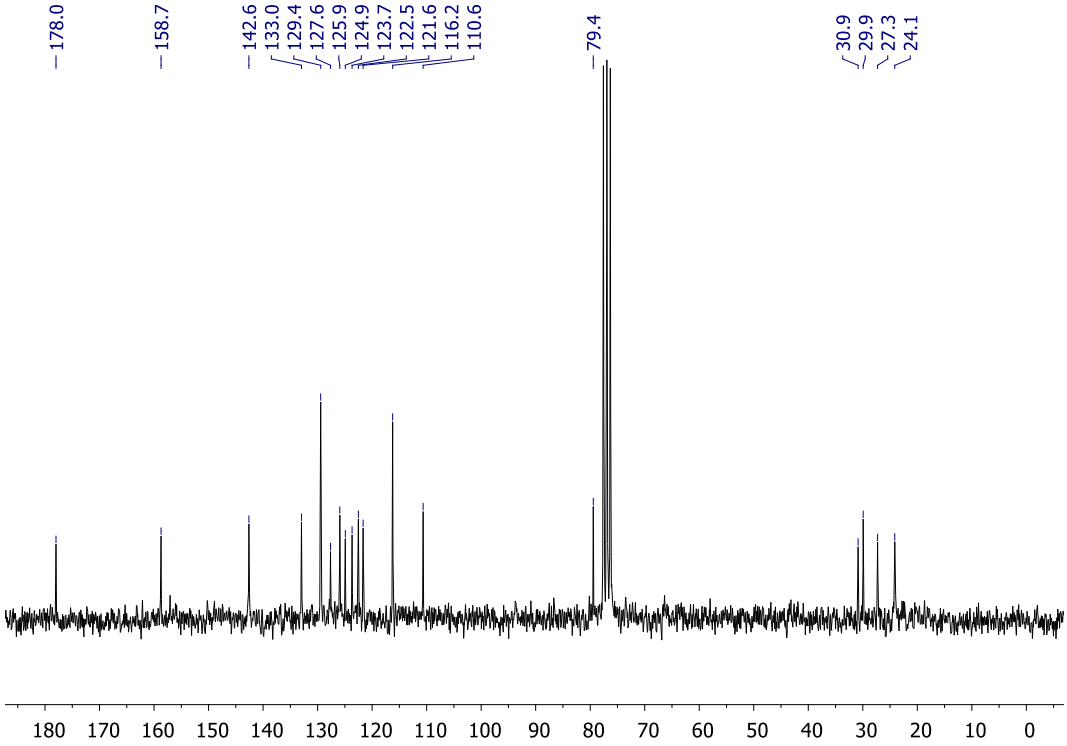

Figure 14. ^{13}C NMR spectrum (50 MHz, $CDCl_3$) of compound **30**.

8) Compound 35

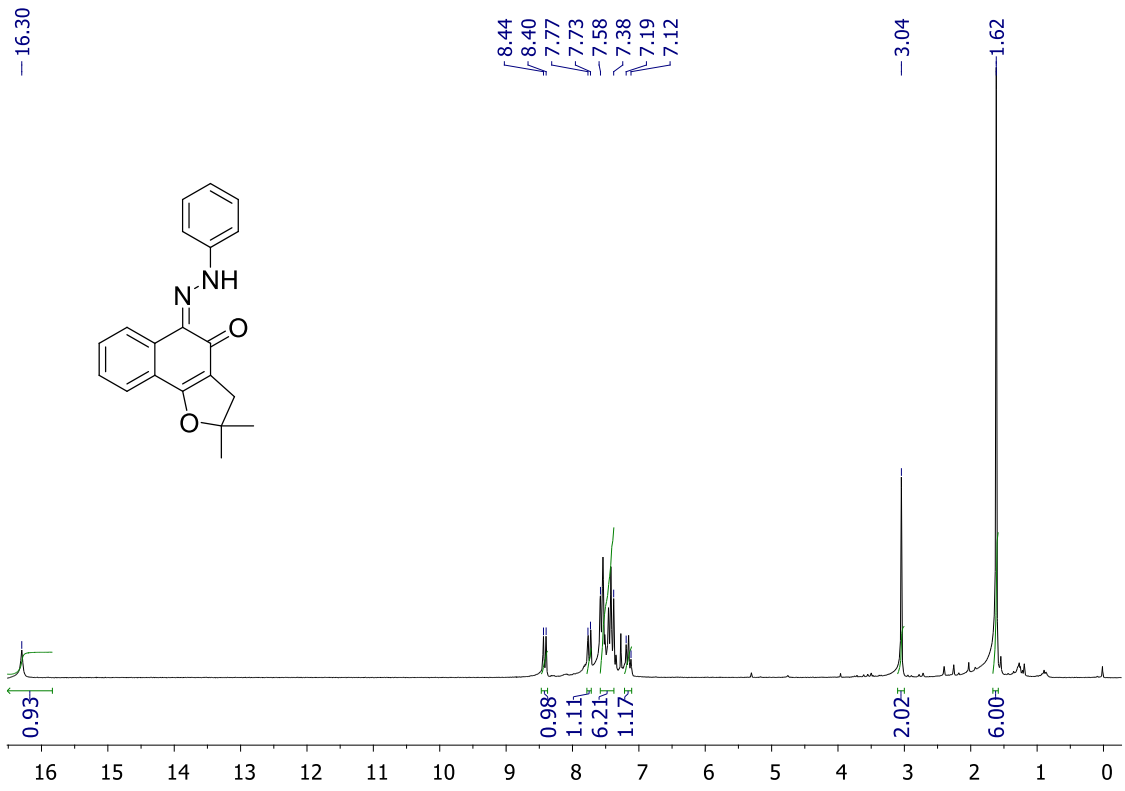

Figure 15. ^{1}H NMR spectrum (200 MHz, $CDCl_3$) of compound **35**.

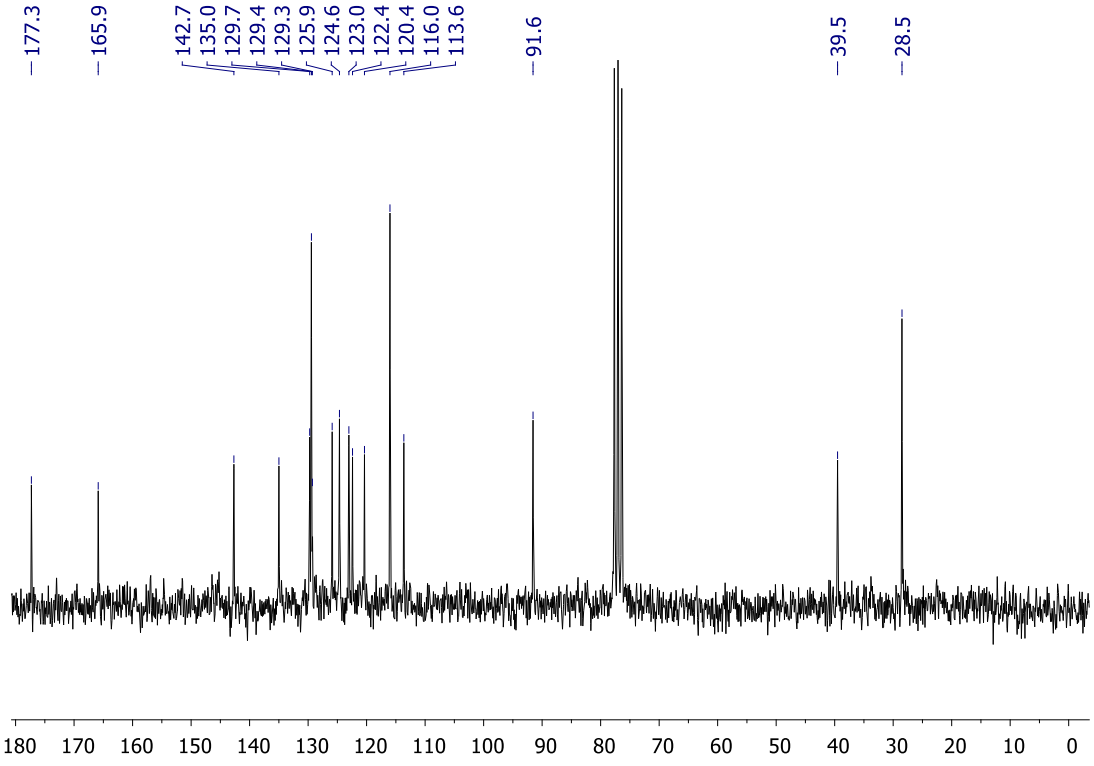

Figure 16. ^{13}C NMR spectrum (50 MHz, $CDCl_3$) of compound **35**.

9) Compound 37

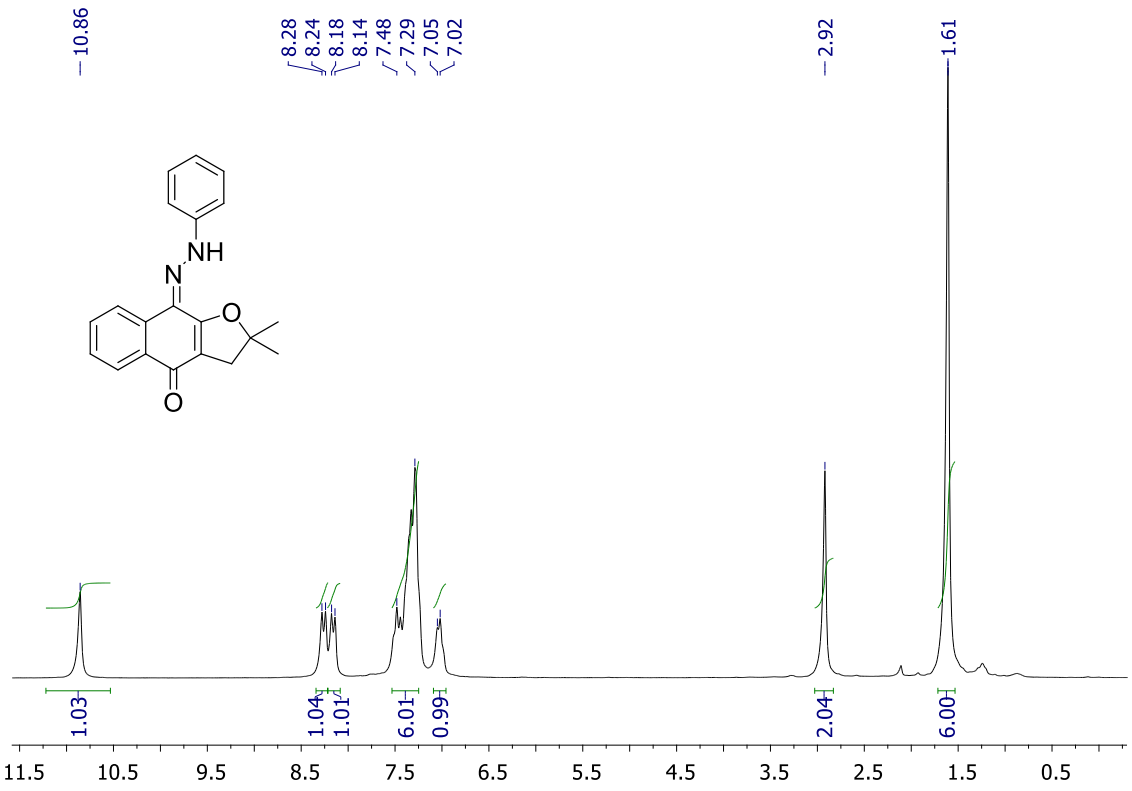

Figure 17. ^{1}H NMR spectrum (200 MHz, $CDCl_3$) of compound **37**.

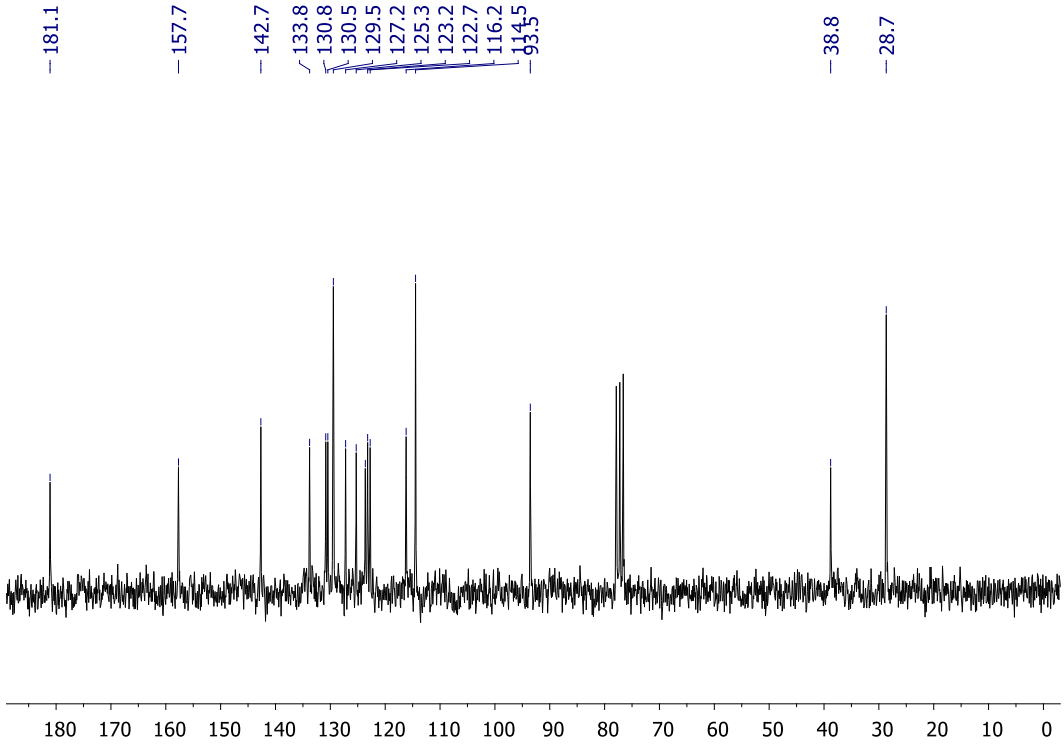

Figure 18. ^{13}C NMR spectrum (50 MHz, $CDCl_3$) of compound **37**.

10) Compound 39

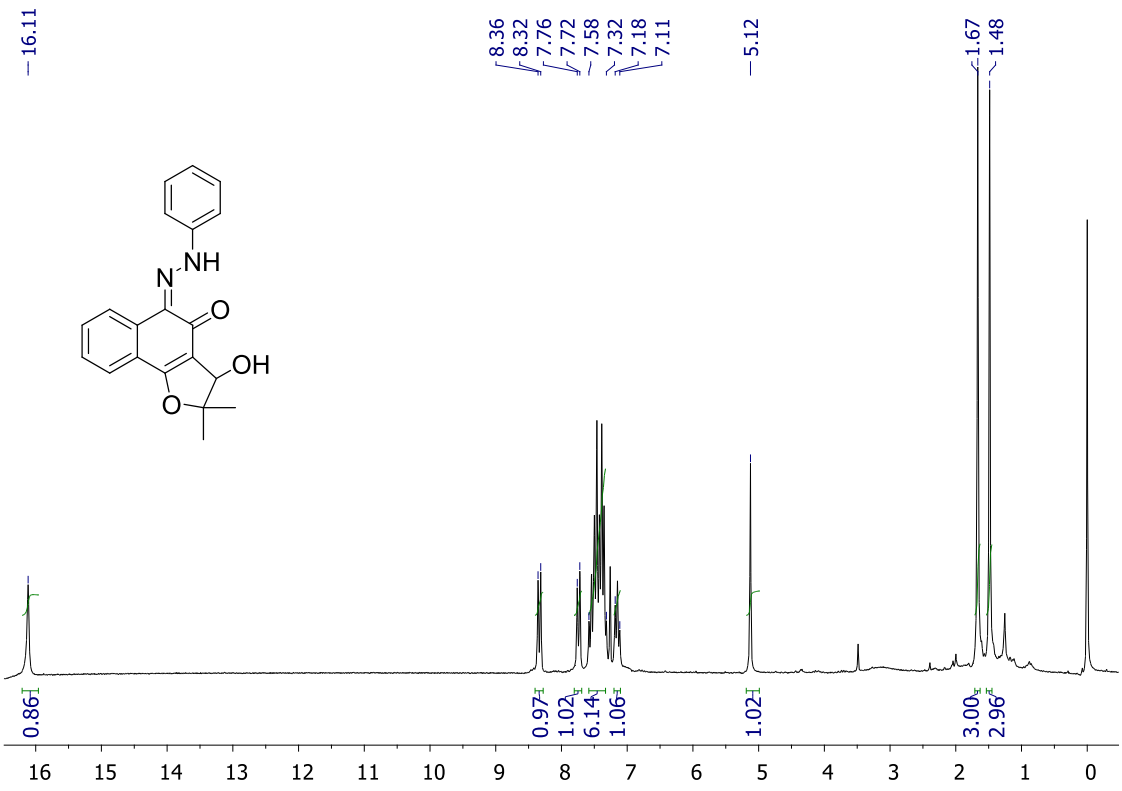

Figure 19. ^{1}H NMR spectrum (200 MHz, $CDCl_3$) of compound **39**.

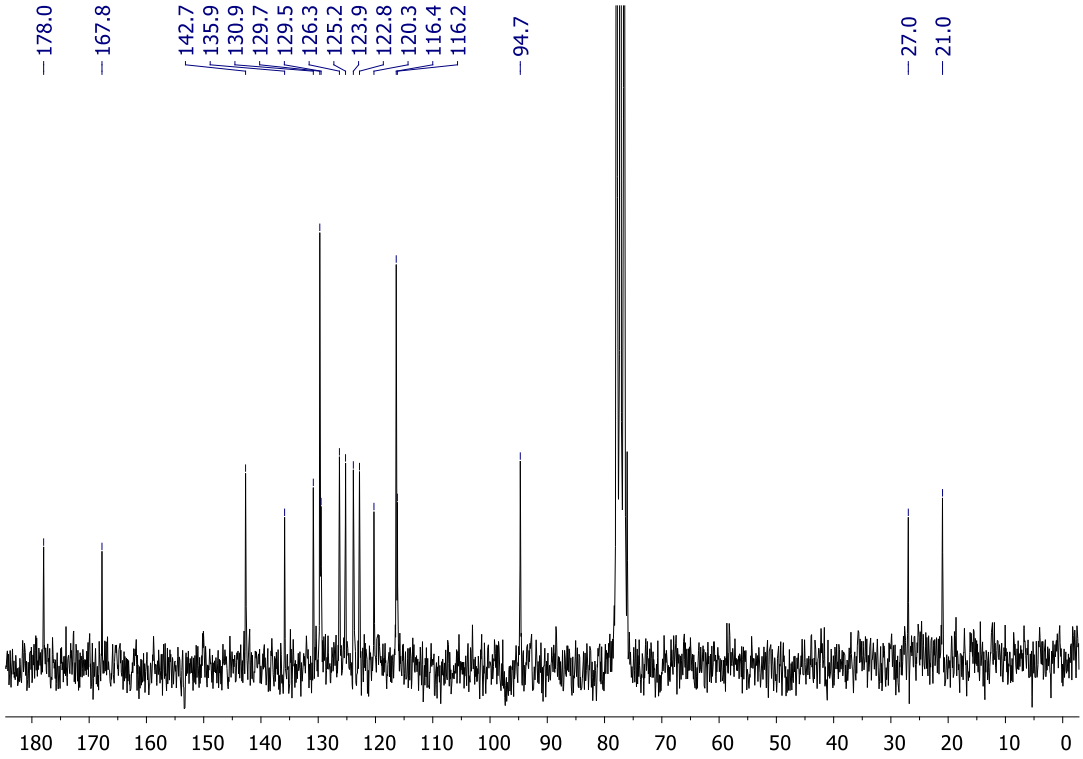

Figure 20. ^{13}C NMR spectrum (50 MHz, $CDCl_3$) of compound **39**.

11) Compound 1

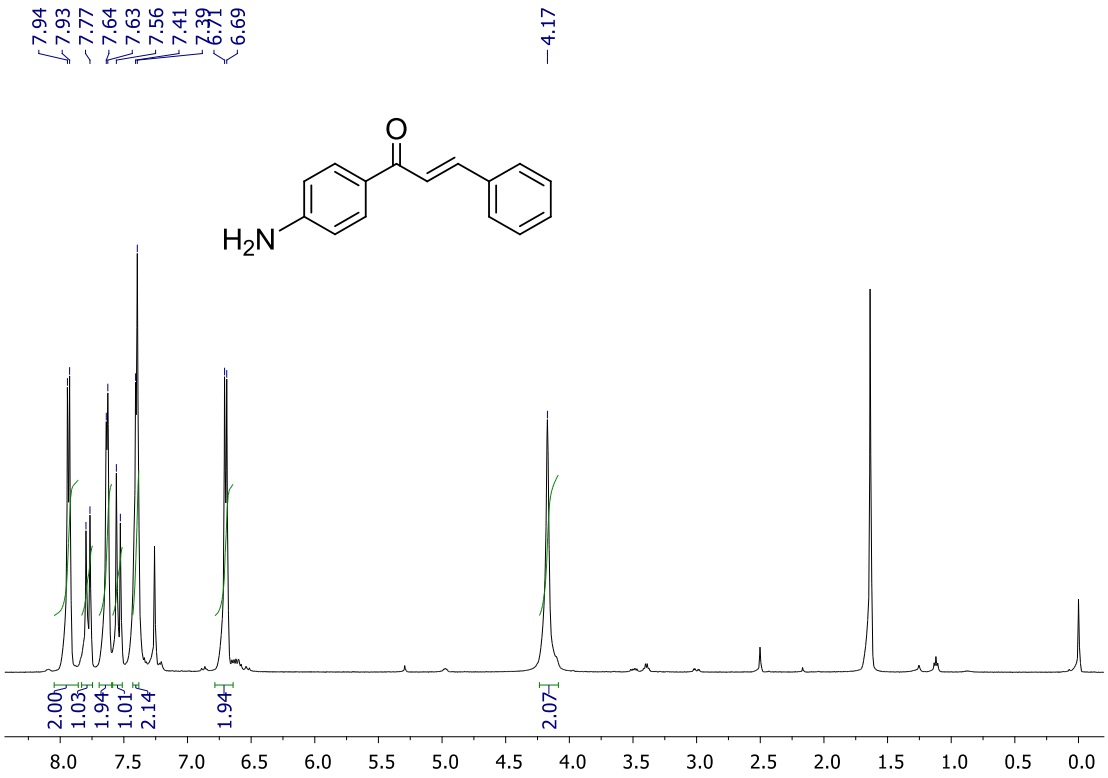

Figure 21. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of compound **1**.

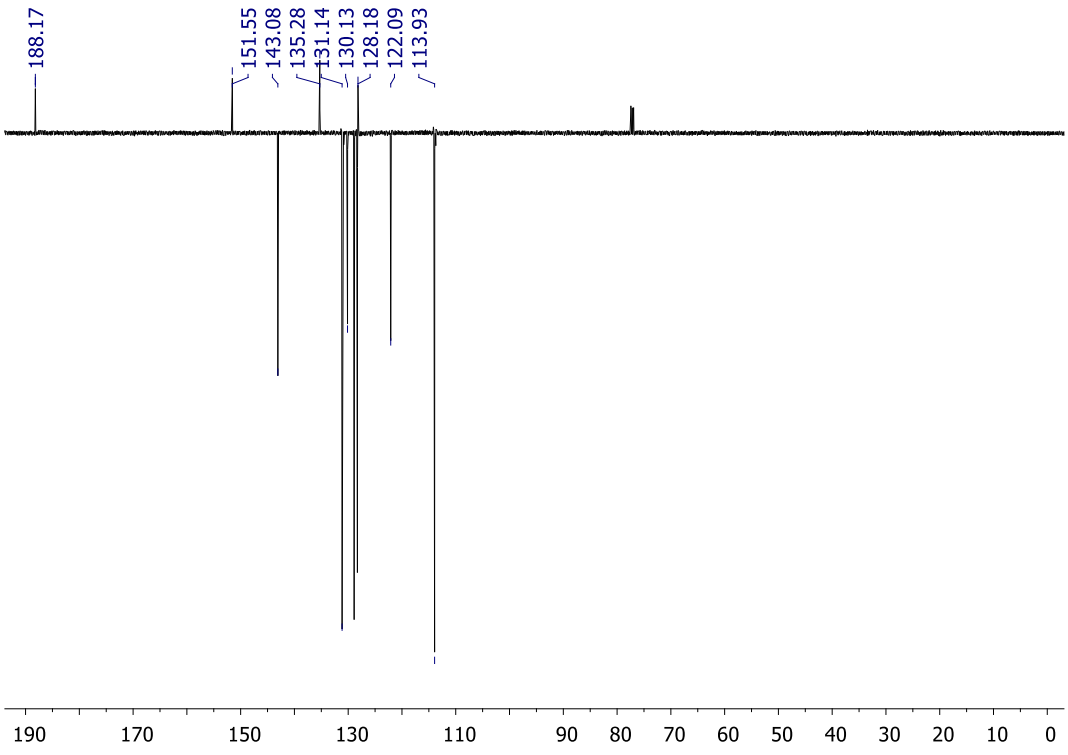

Figure 22. ^{13}C-APT NMR spectrum (50 MHz, $CDCl_3$) of compound **1**.

12) Compound 2

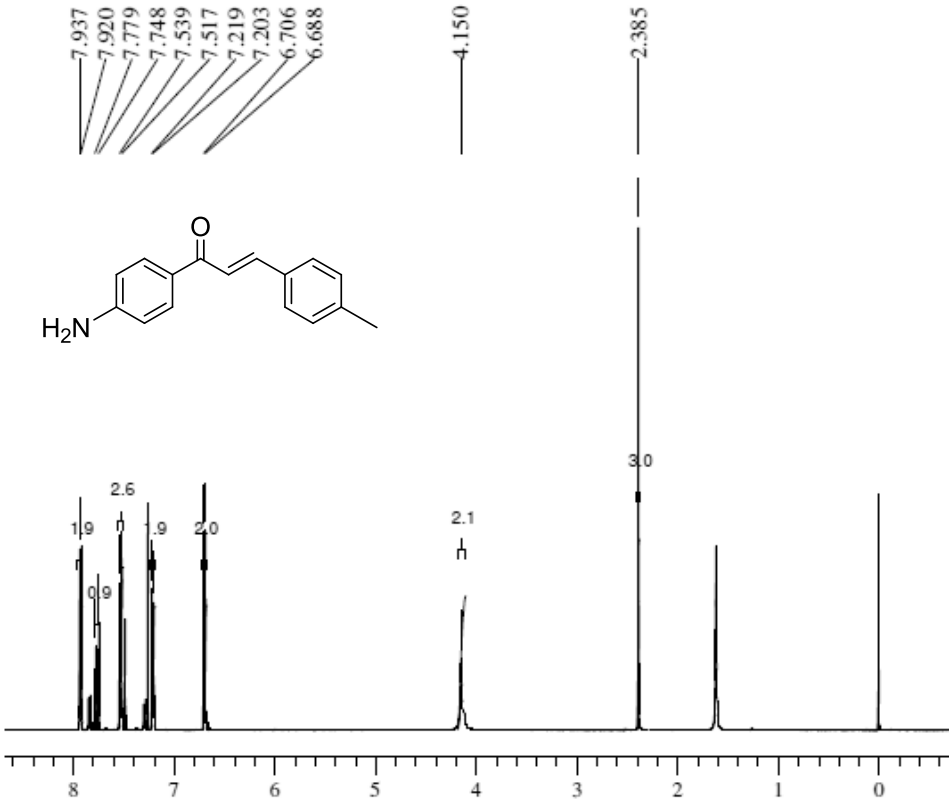

Figure 23. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of compound **2**.

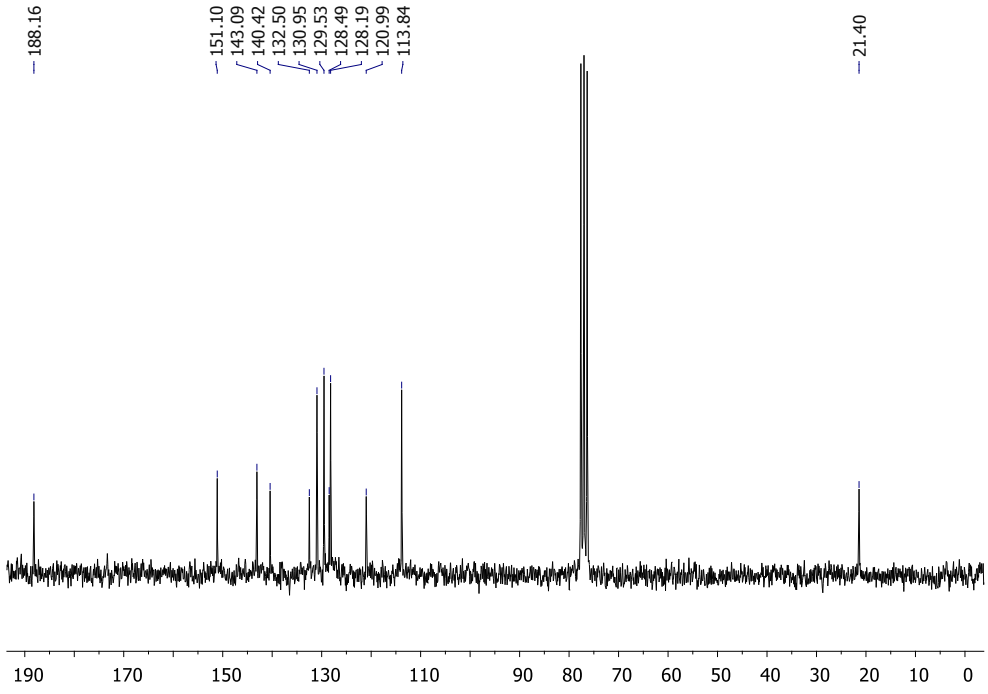

Figure 24. ^{13}C NMR spectrum (50 MHz, $CDCl_3$) of compound **2**.

13) Compound 3

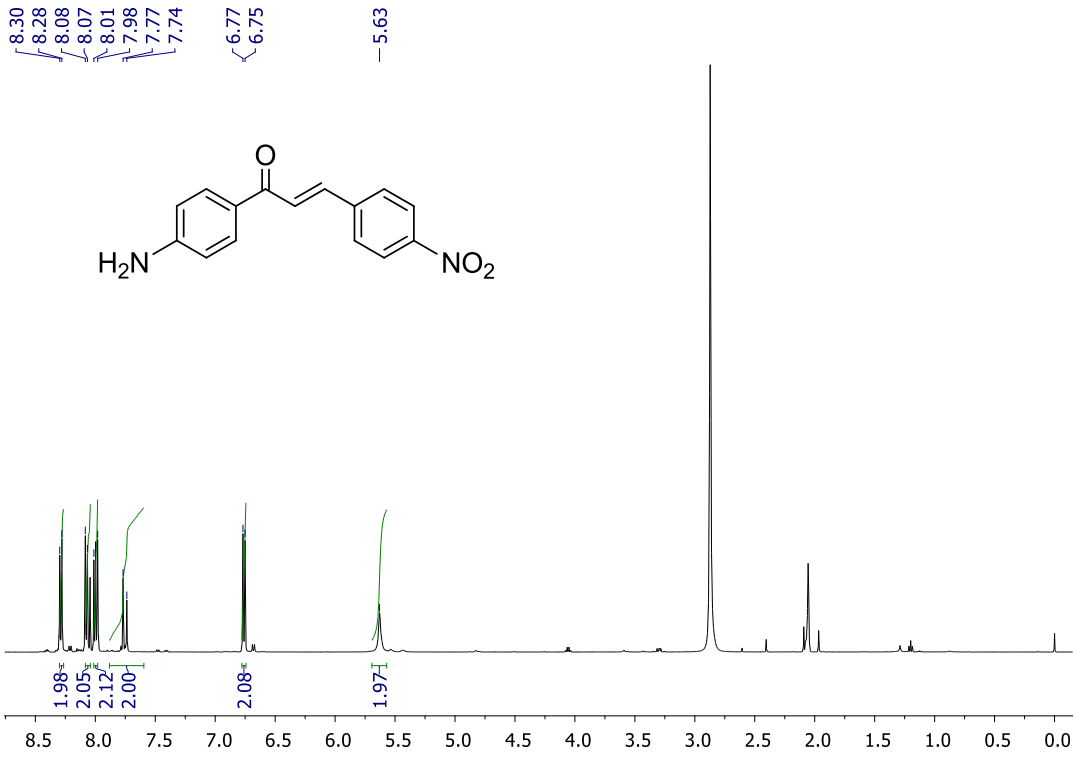

Figure 25. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of compound **3**.

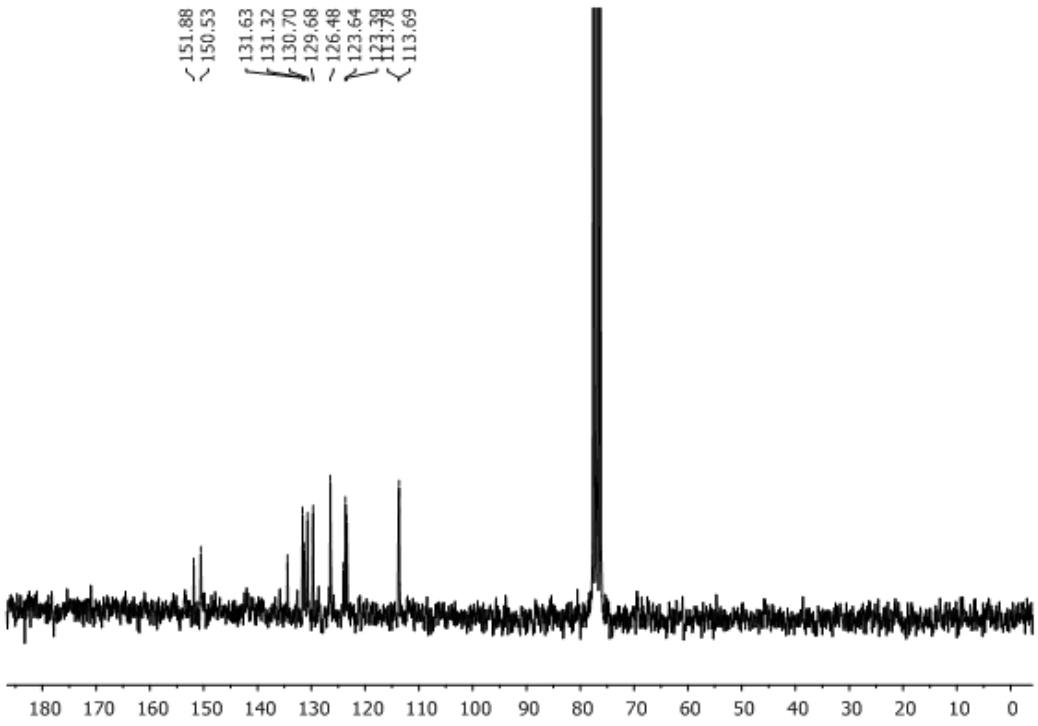

Figure 26. ^{13}C NMR spectrum (50 MHz, $CDCl_3$) of compound **3**.

14) Compound 4

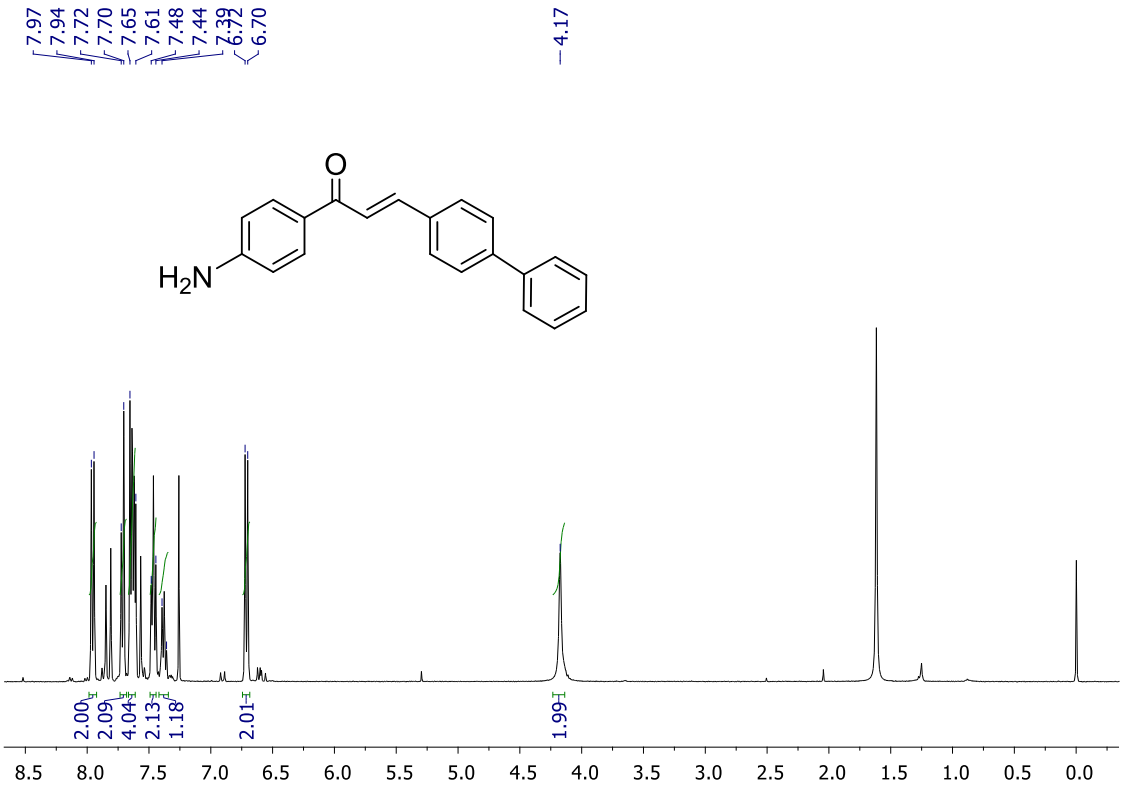

Figure 27. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of compound **4**.

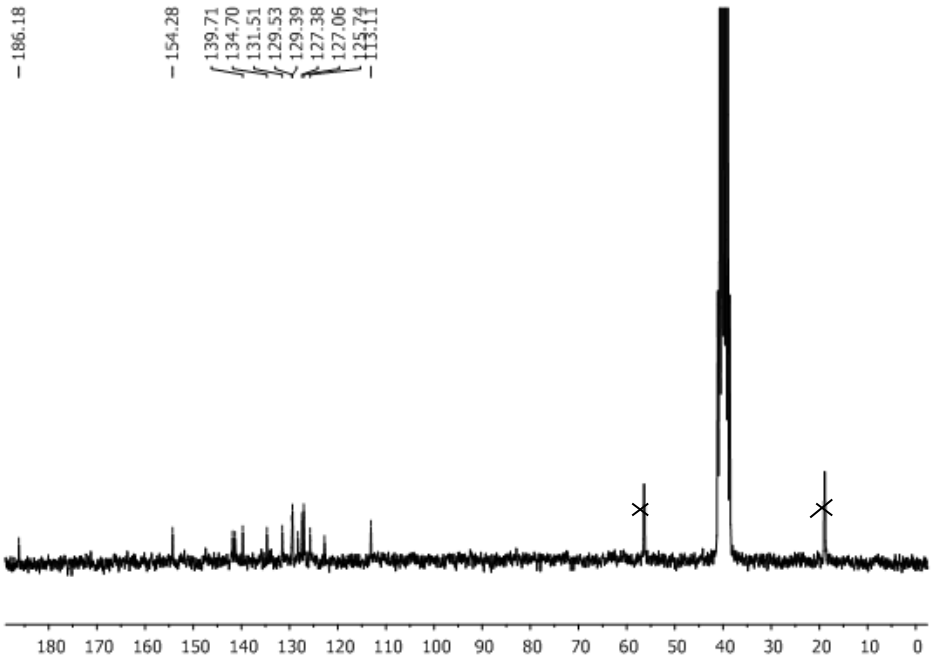

Figure 28. ^{13}C NMR spectrum (50 MHz, DMSO-d_6) of compound **4**.

15) Compound 5

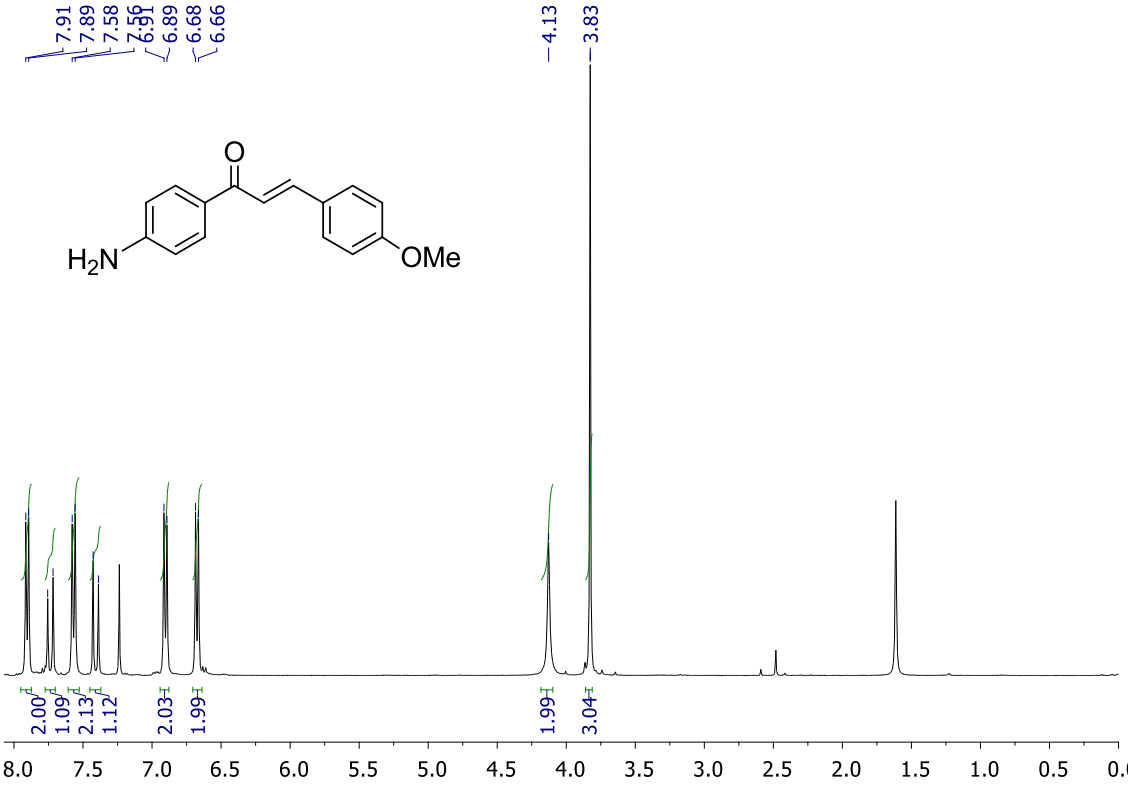

Figure 29. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of compound **5**.

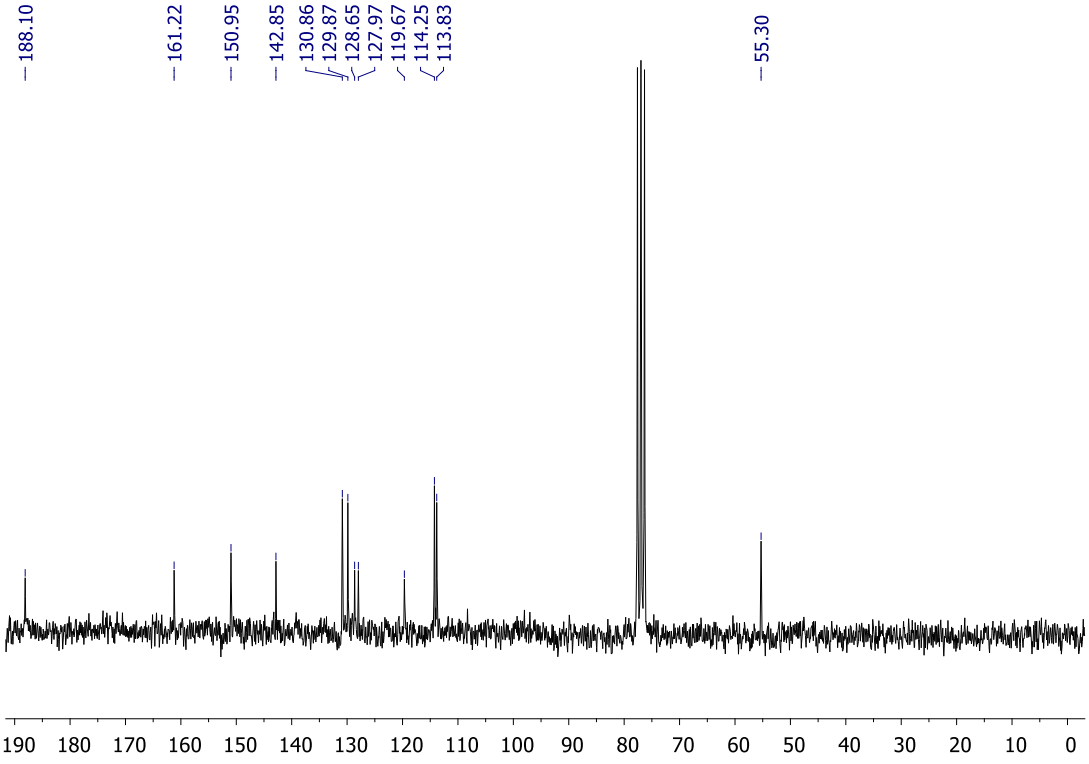

Figure 30. ^{13}C NMR spectrum (50 MHz, $CDCl_3$) of compound **5**.

16) Compound 6

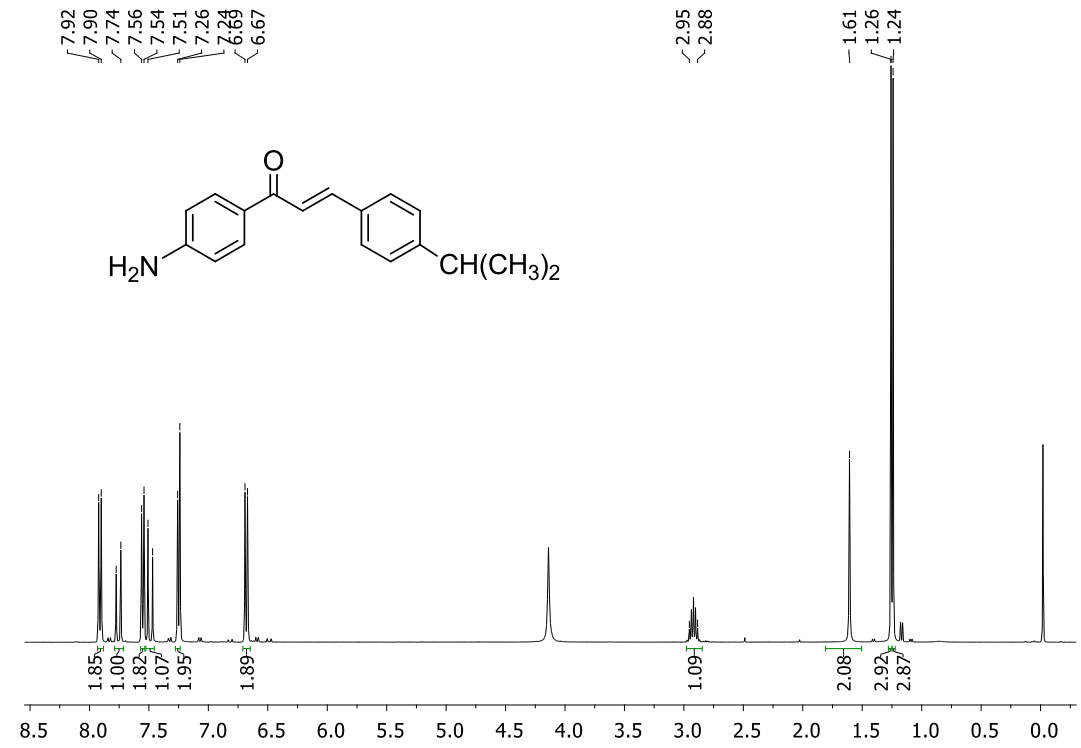

Figure 31. ^{1}H NMR spectrum (300 MHz, $CDCl_3$) of compound **6**.

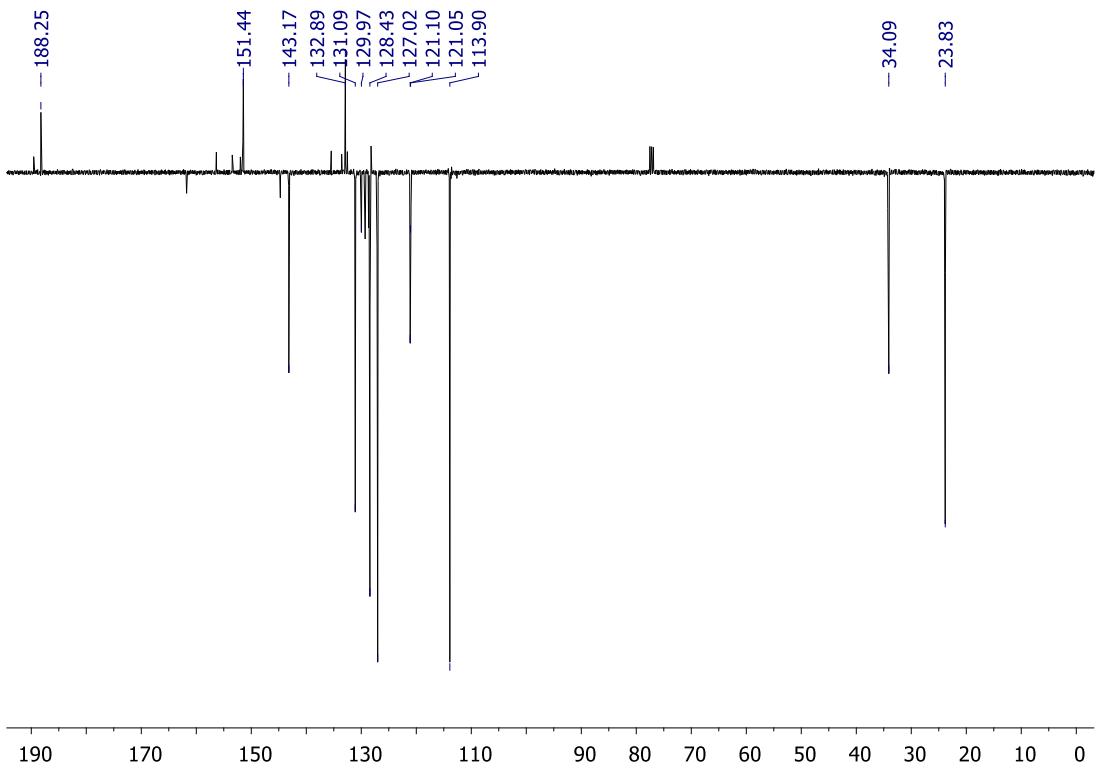

Figure 32. ^{13}C-APT NMR spectrum (75 MHz, $CDCl_3$) of compound **6**.

17) Compound 16

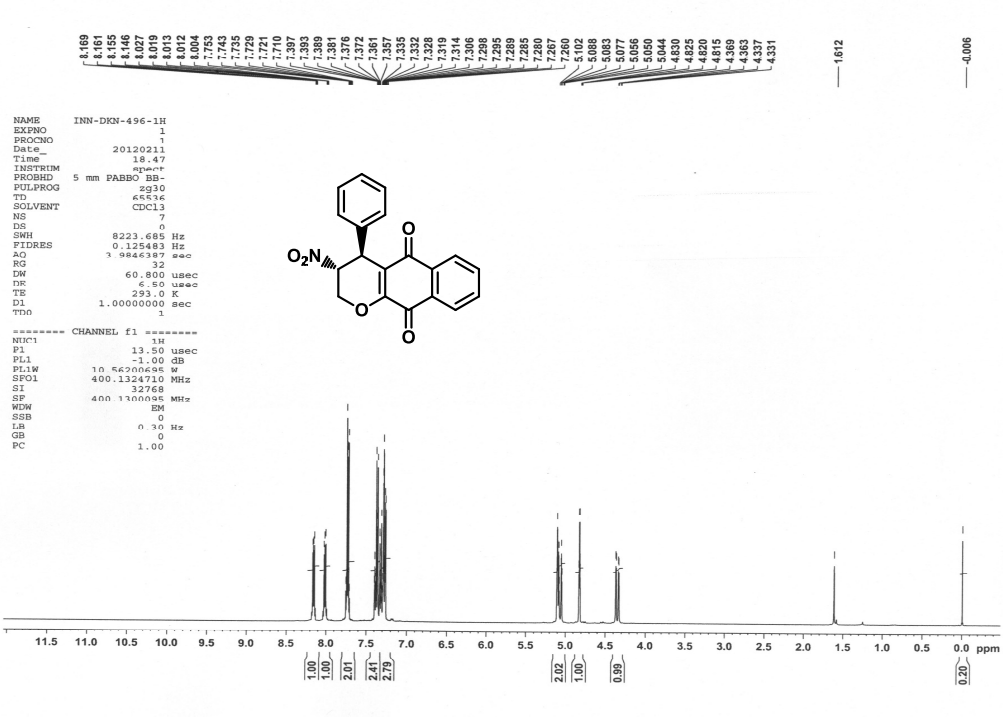

Figure 33. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **16**.

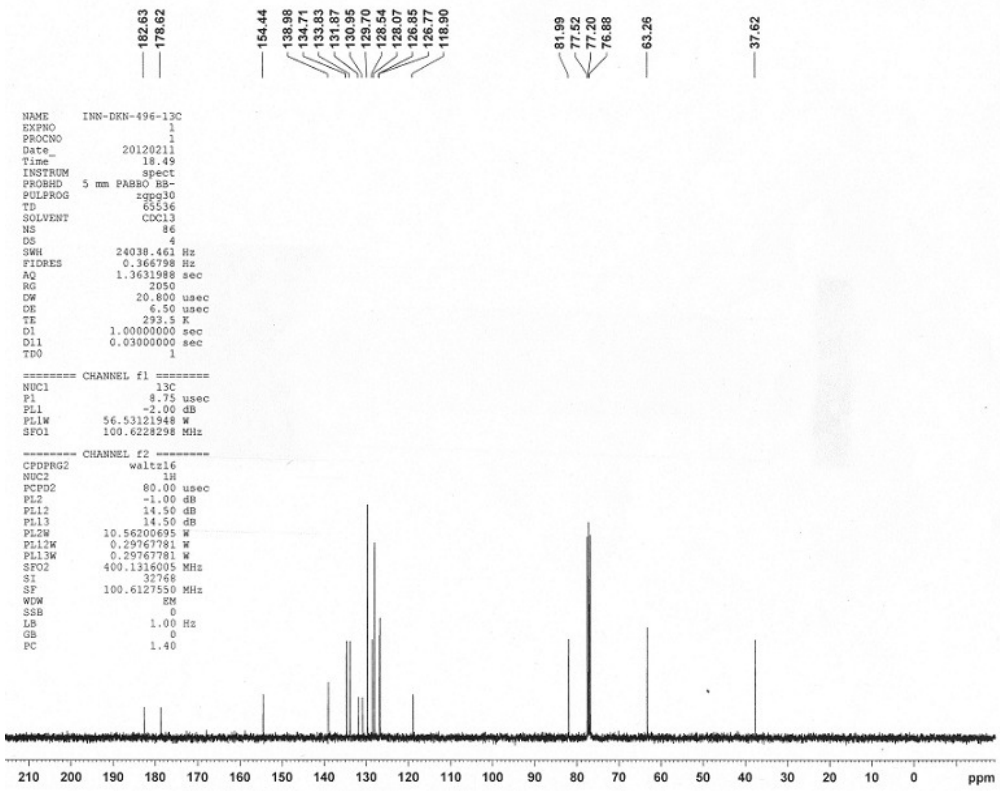

Figure 34. ^{13}C NMR spectrum (125 MHz, $CDCl_3$) of compound **16**.

18) Compound 17

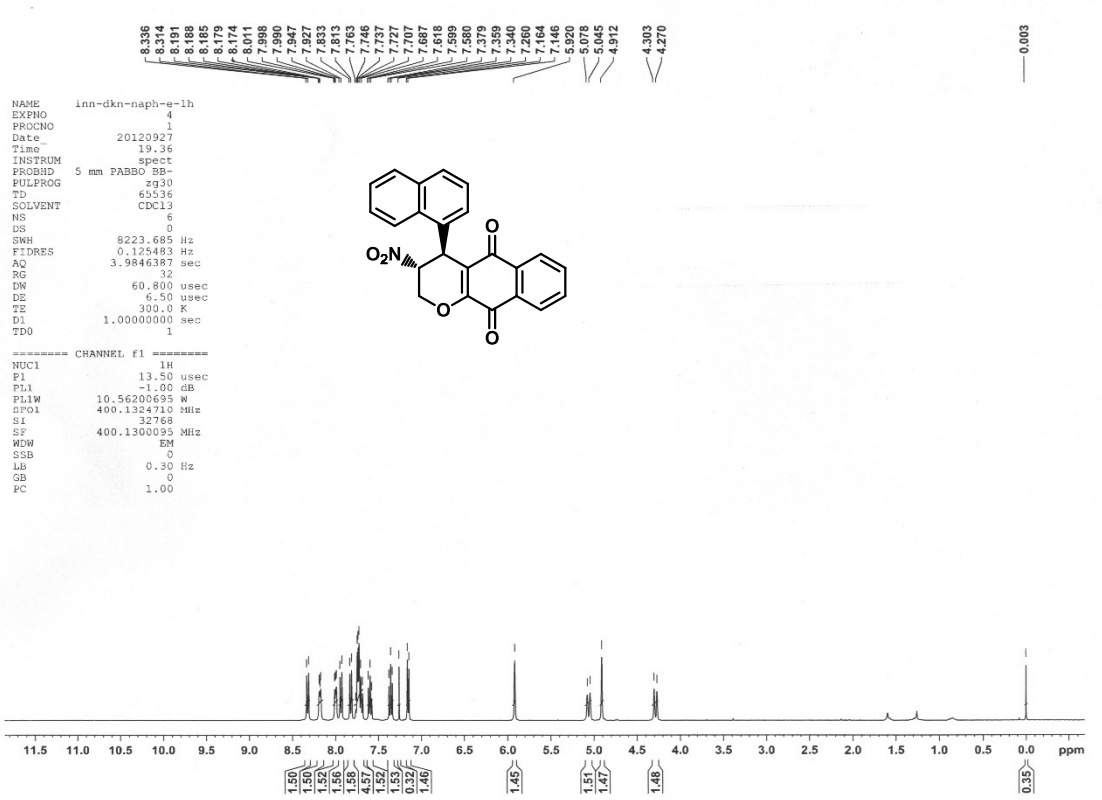

Figure 35. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **17**.

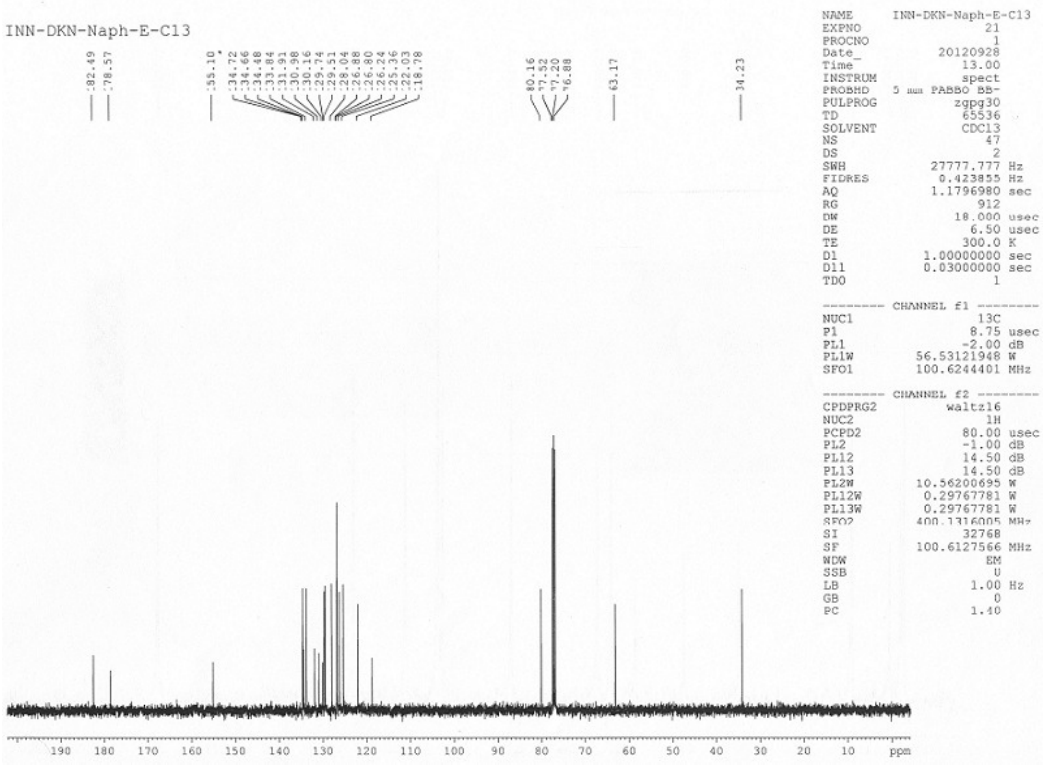

Figure 36. ^{13}C NMR spectrum (125 MHz, $CDCl_3$) of compound **17**.

19) Compound 18

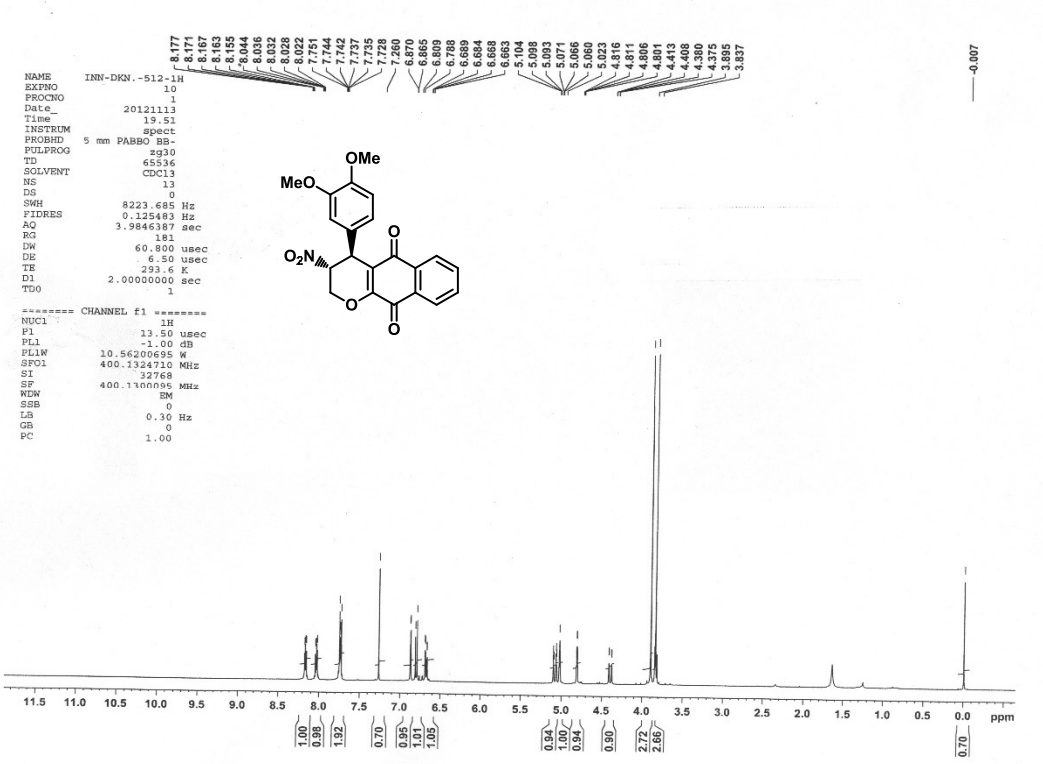

Figure 37. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **18**.

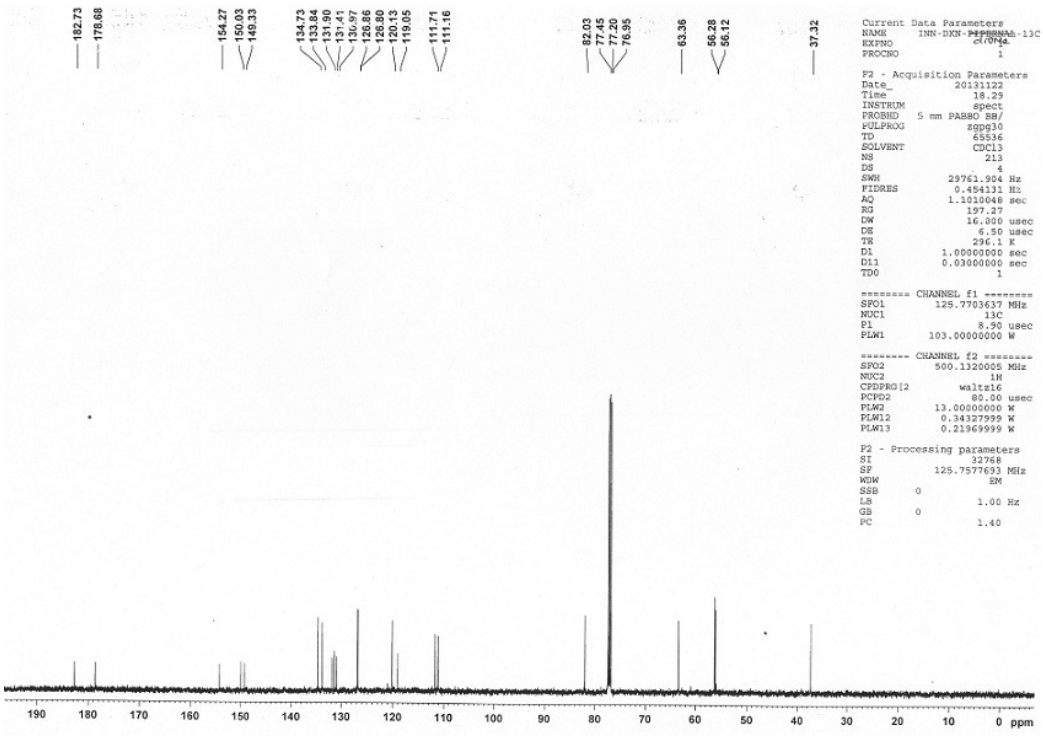

Figure 38. ^{13}C NMR spectrum (125 MHz, $CDCl_3$) of compound **18**.

20) Compound 19

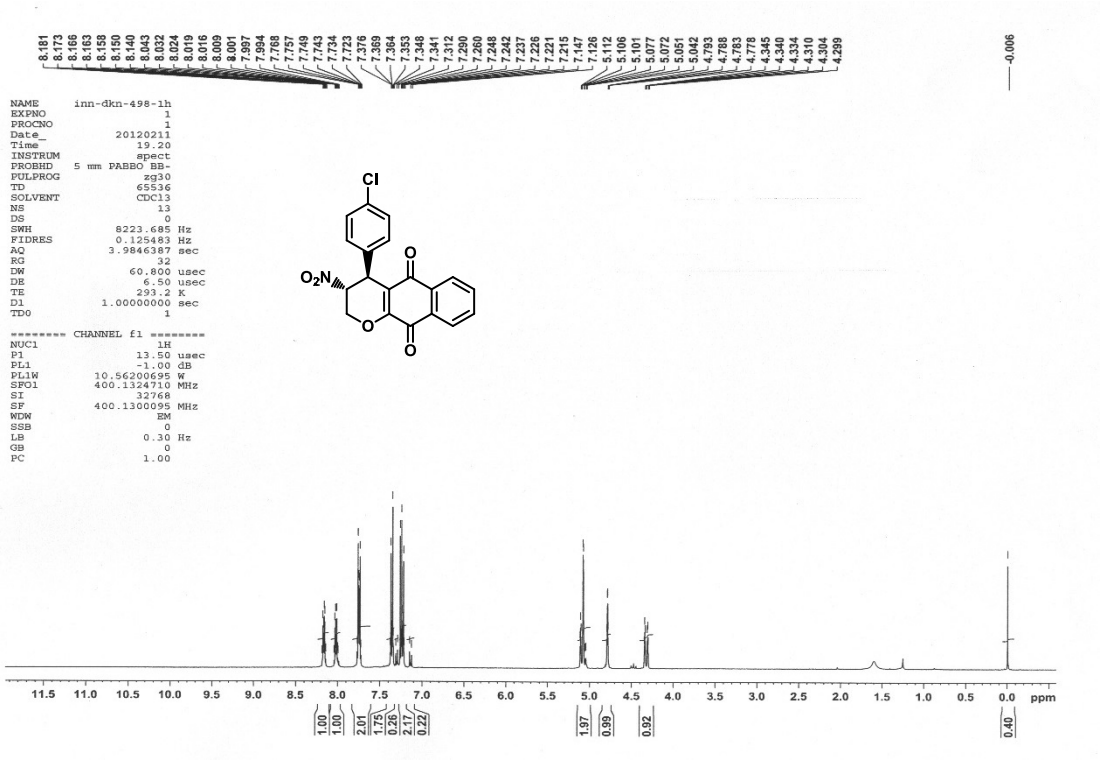

Figure 39. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **19**.

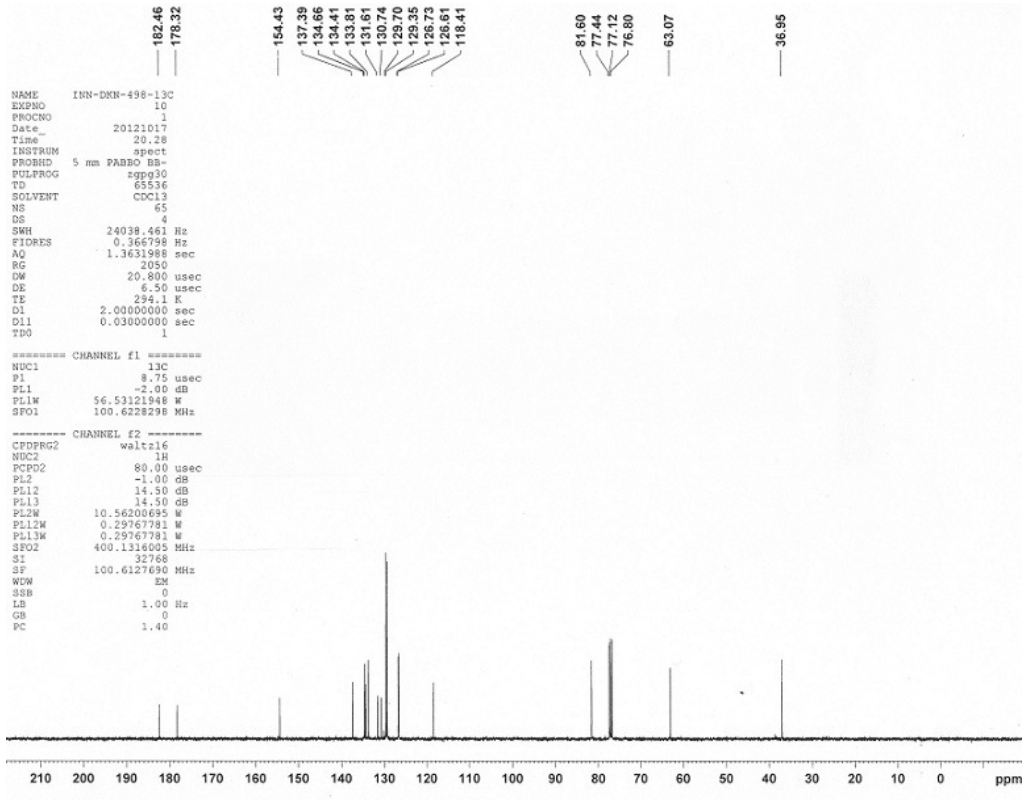

Figure 40. ^{13}C NMR spectrum (125 MHz, $CDCl_3$) of compound **19**.

21) Compound 20

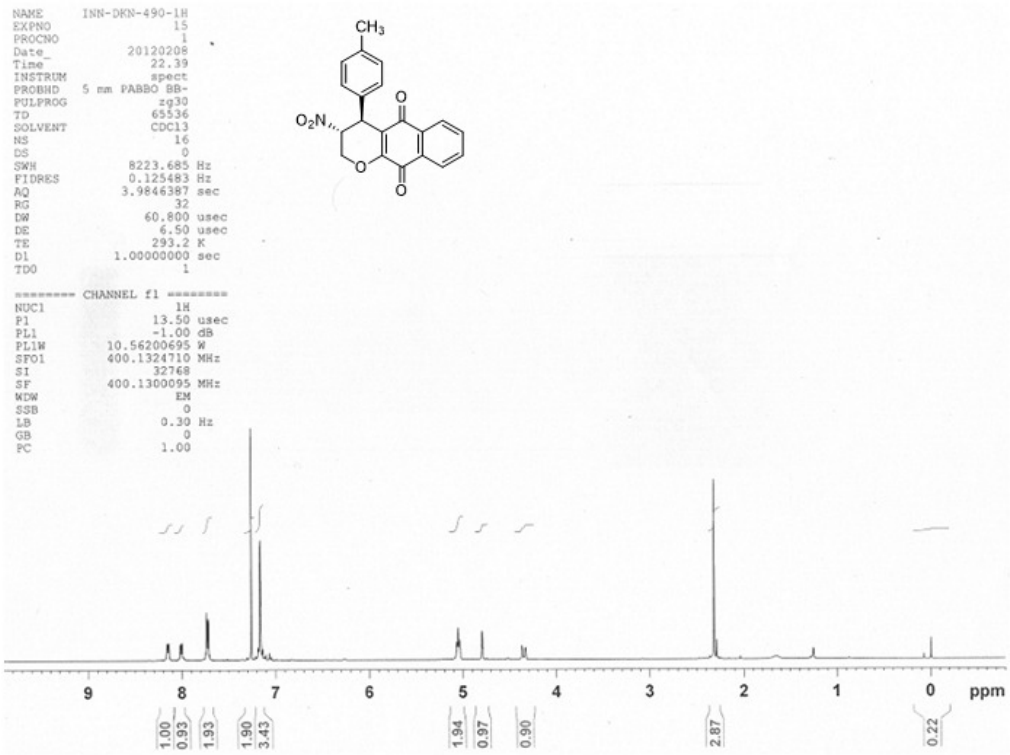

Figure 41. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **20**.

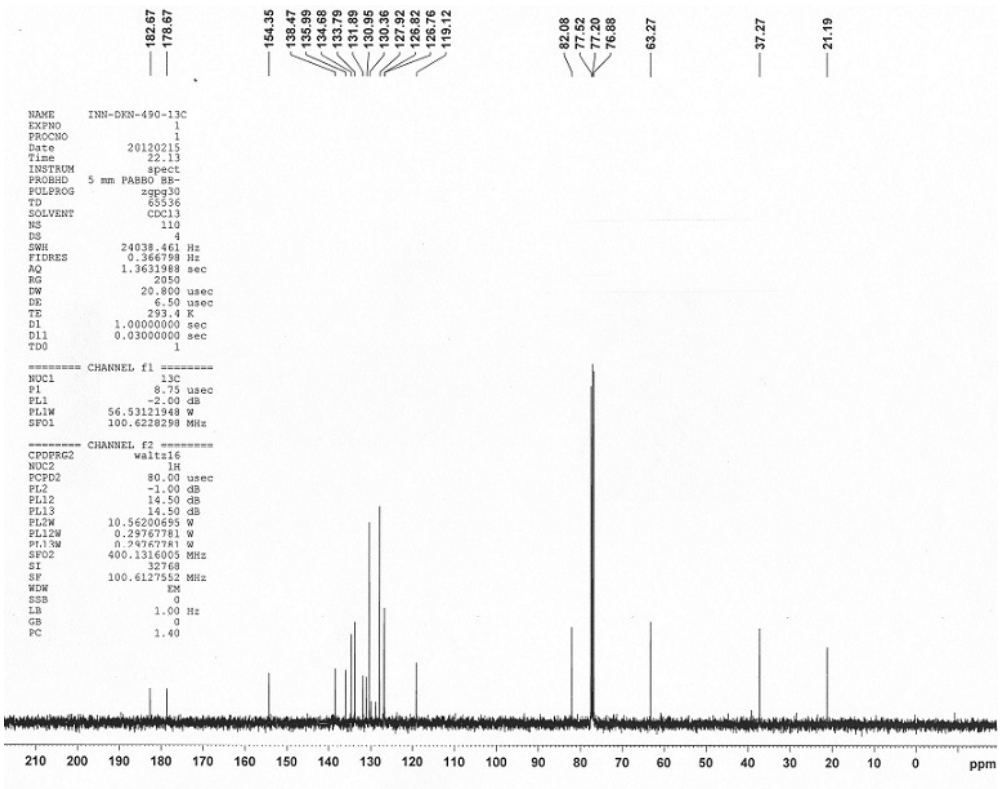

Figure 42. ^{13}C NMR spectrum (125 MHz, $CDCl_3$) of compound **20**.

22) Compound 21

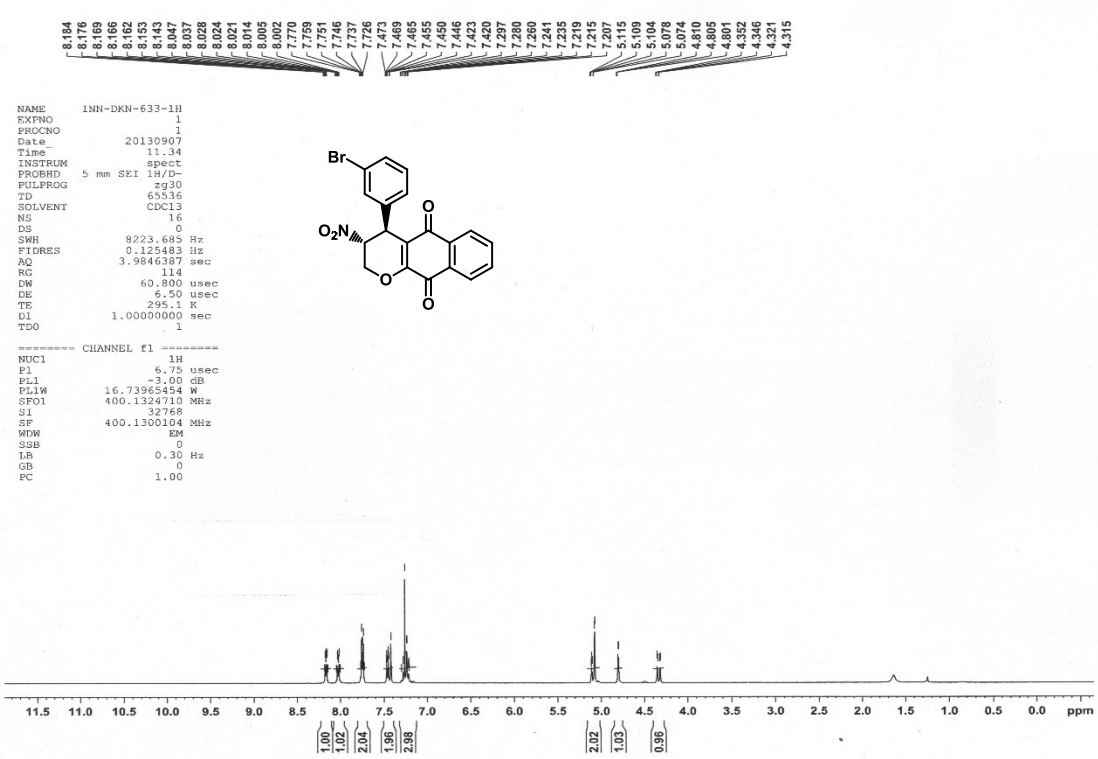

Figure 43. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **21**.

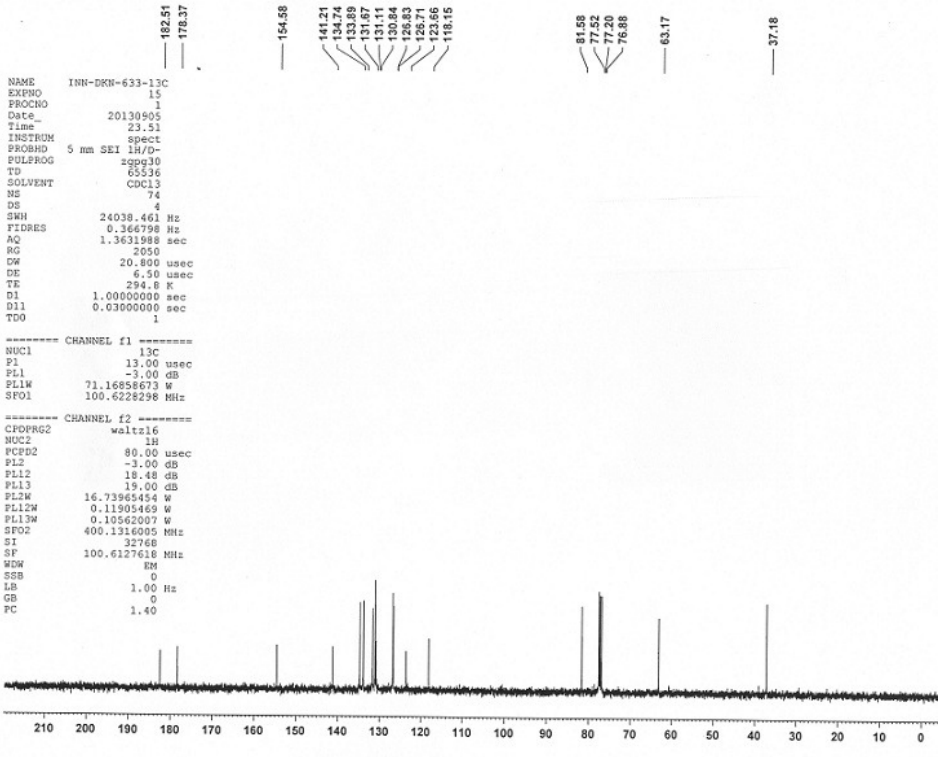

Figure 44. ^{13}C NMR spectrum (125 MHz, $CDCl_3$) of compound **21**.

23) Compound 22

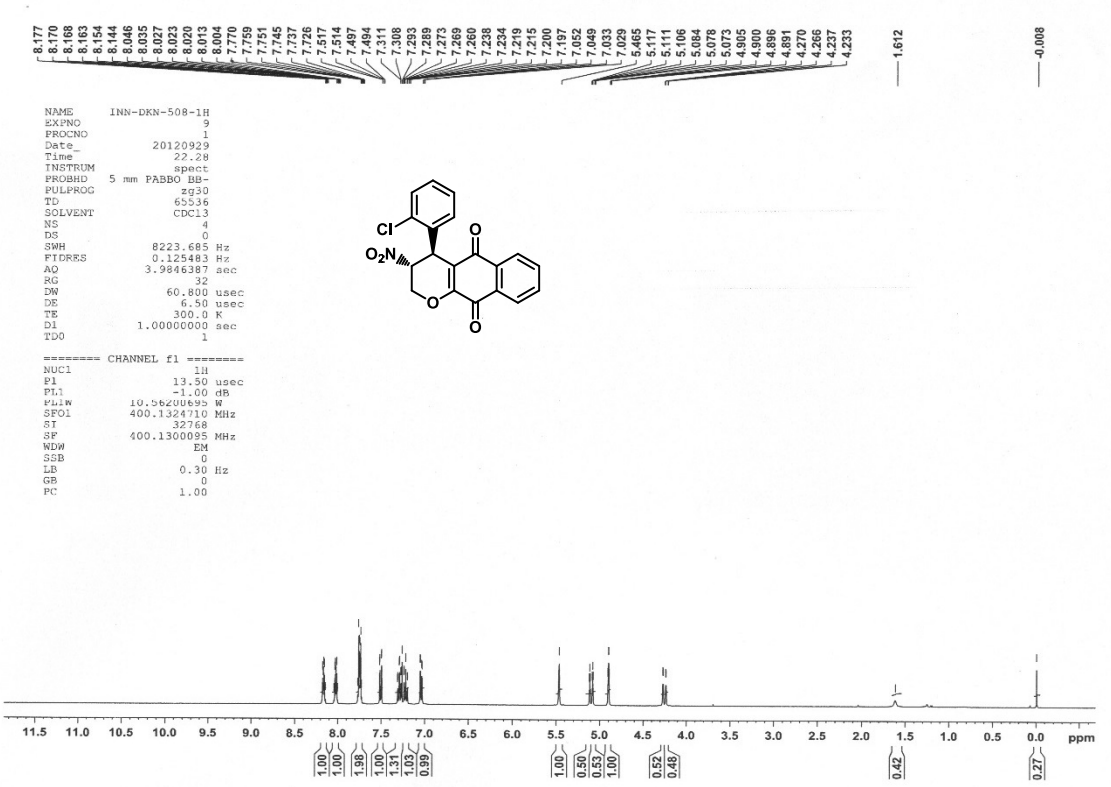

Figure 45. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **22**.

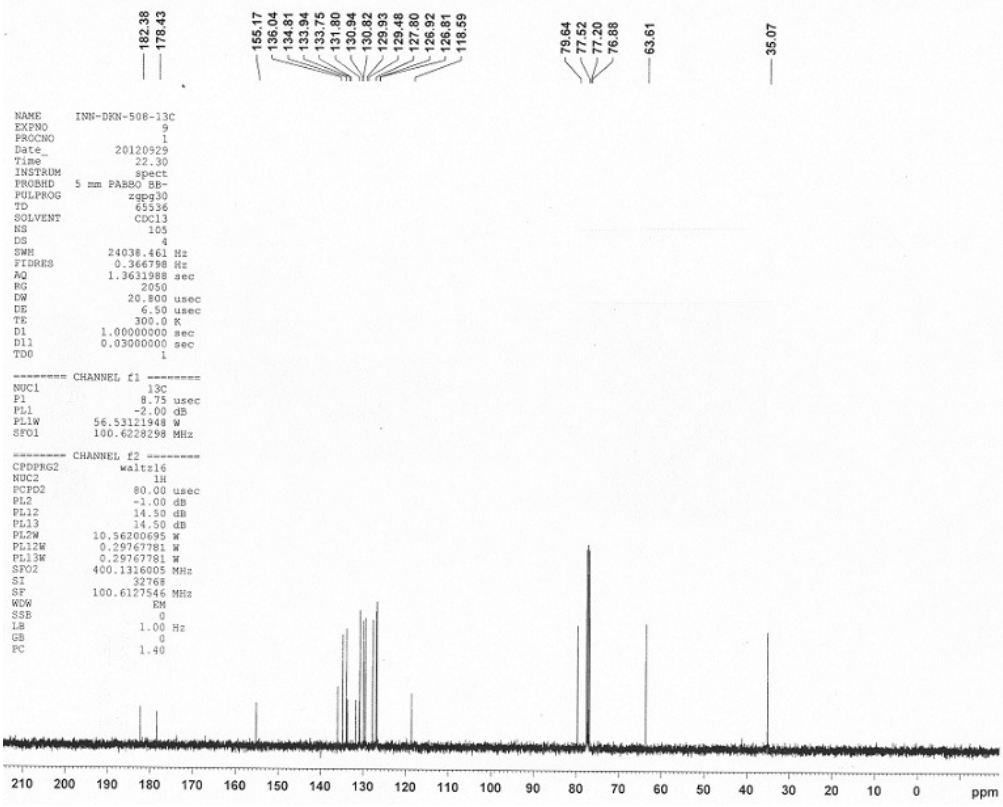

Figure 46. ^{13}C NMR spectrum (125 MHz, $CDCl_3$) of compound **22**.

24) Compound 23

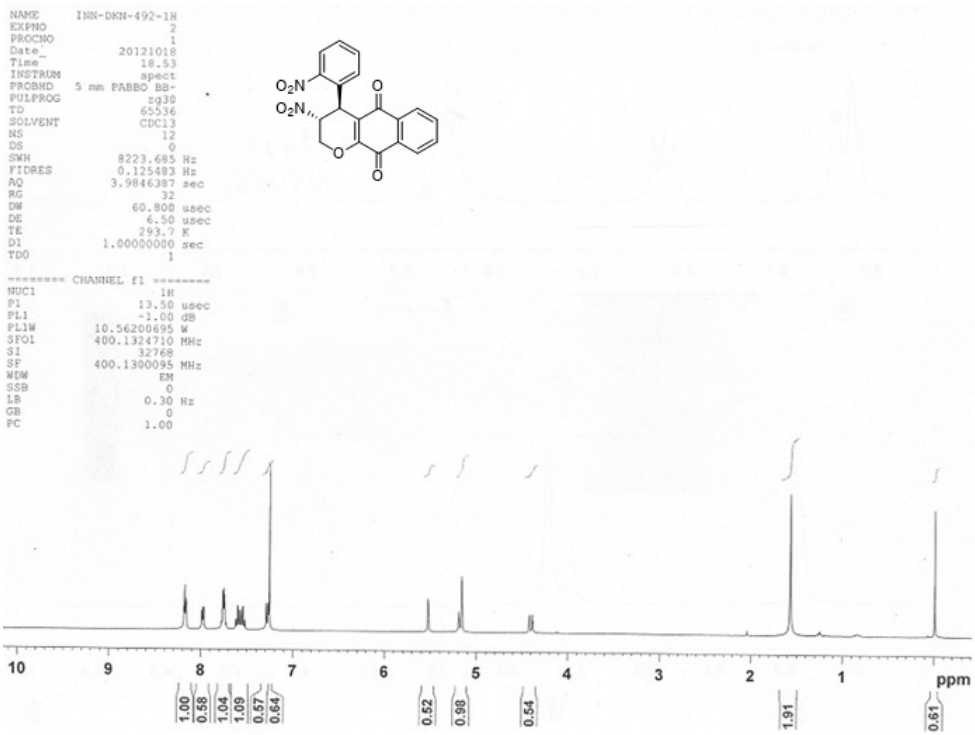

Figure 47. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **23**.

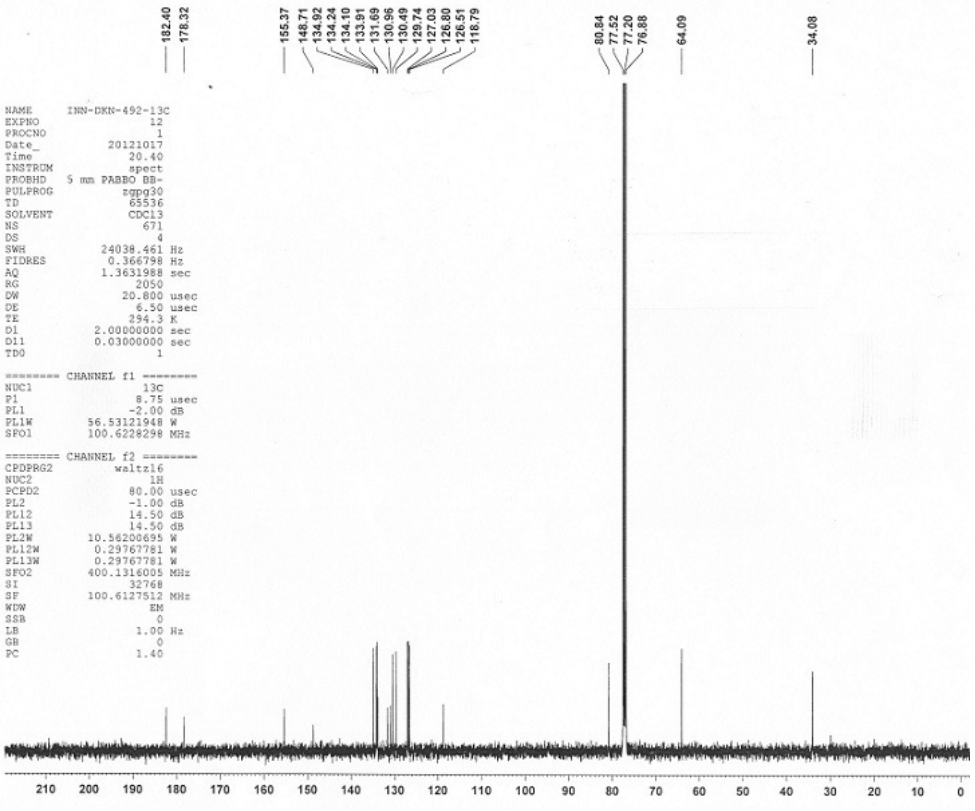

Figure 48. ^{13}C NMR spectrum (125 MHz, $CDCl_3$) of compound **23**.

25) Compound 24

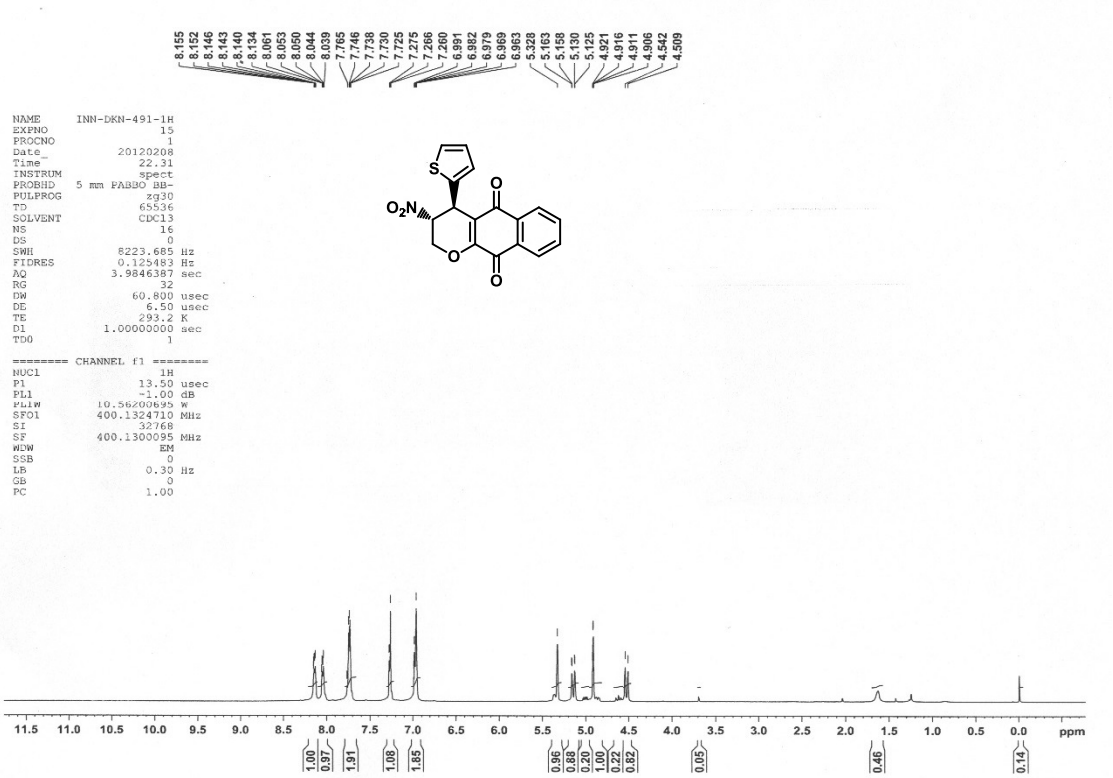

Figure 49. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **24**.

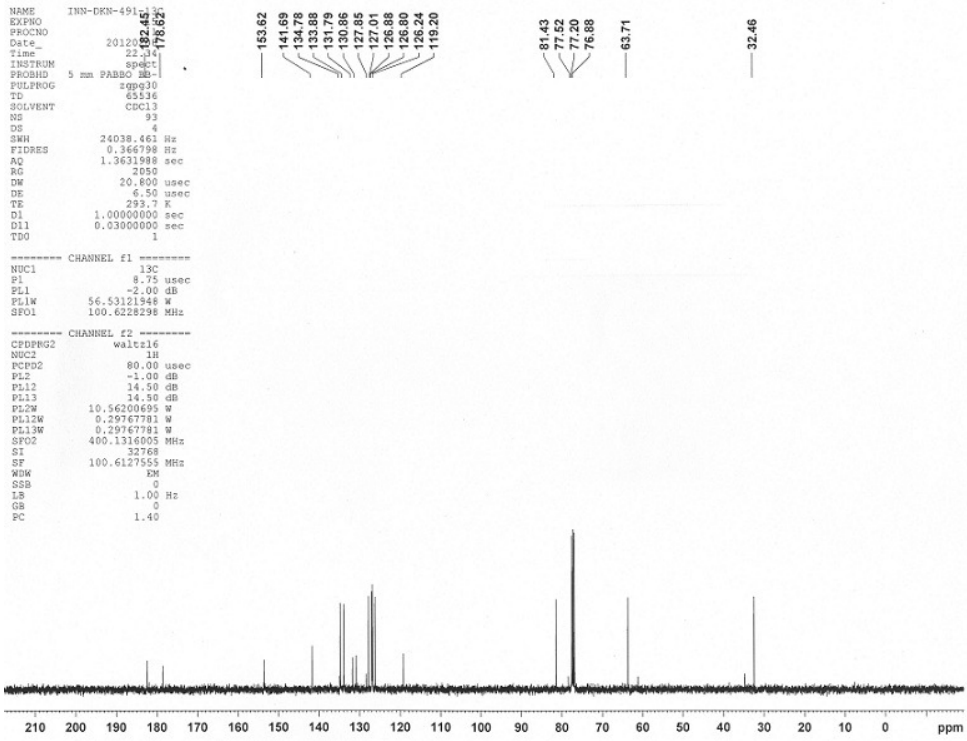

Figure 50. ^{13}C NMR spectrum (125 MHz, $CDCl_3$) of compound **24**.

26) Compound 25

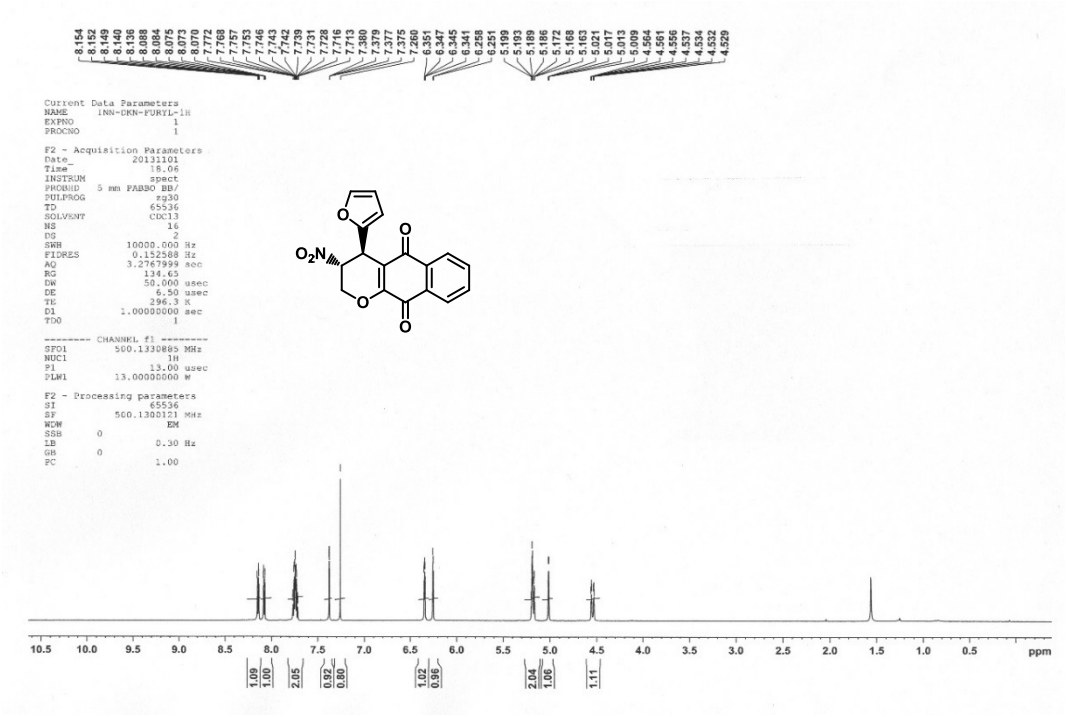

Figure 51. ^{1}H NMR spectrum (500 MHz, $CDCl_3$) of compound **25**.

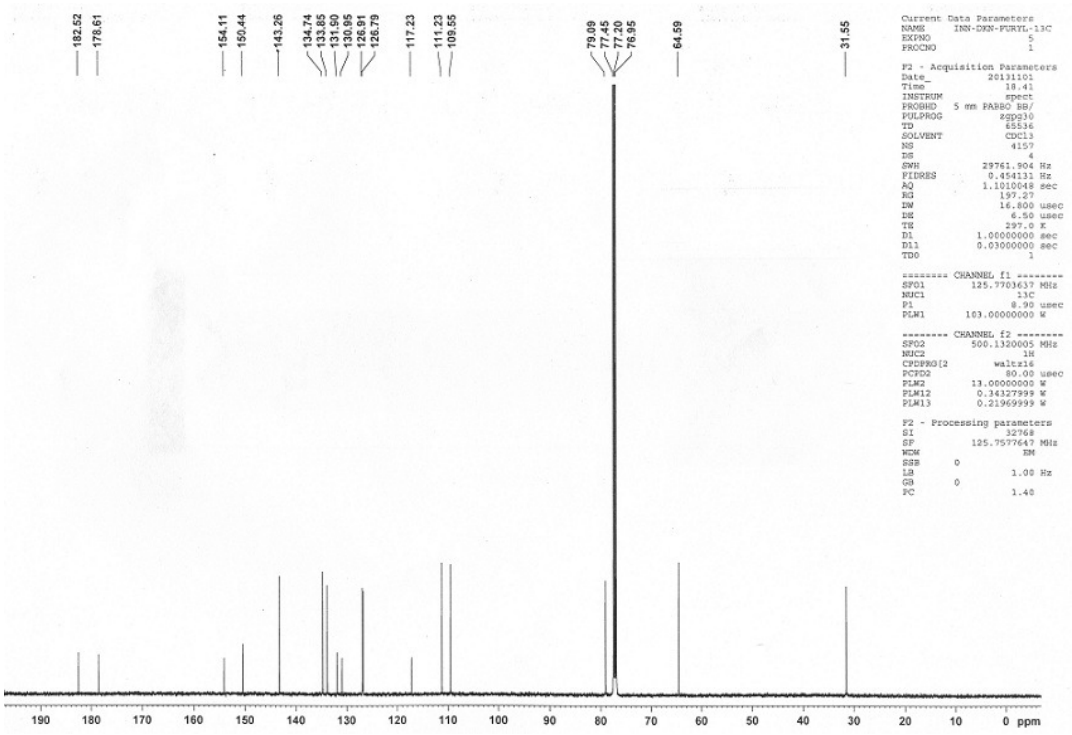

Figure 52. ^{13}C NMR spectrum (125 MHz, $CDCl_3$) of compound **25**.

27) Compound 29

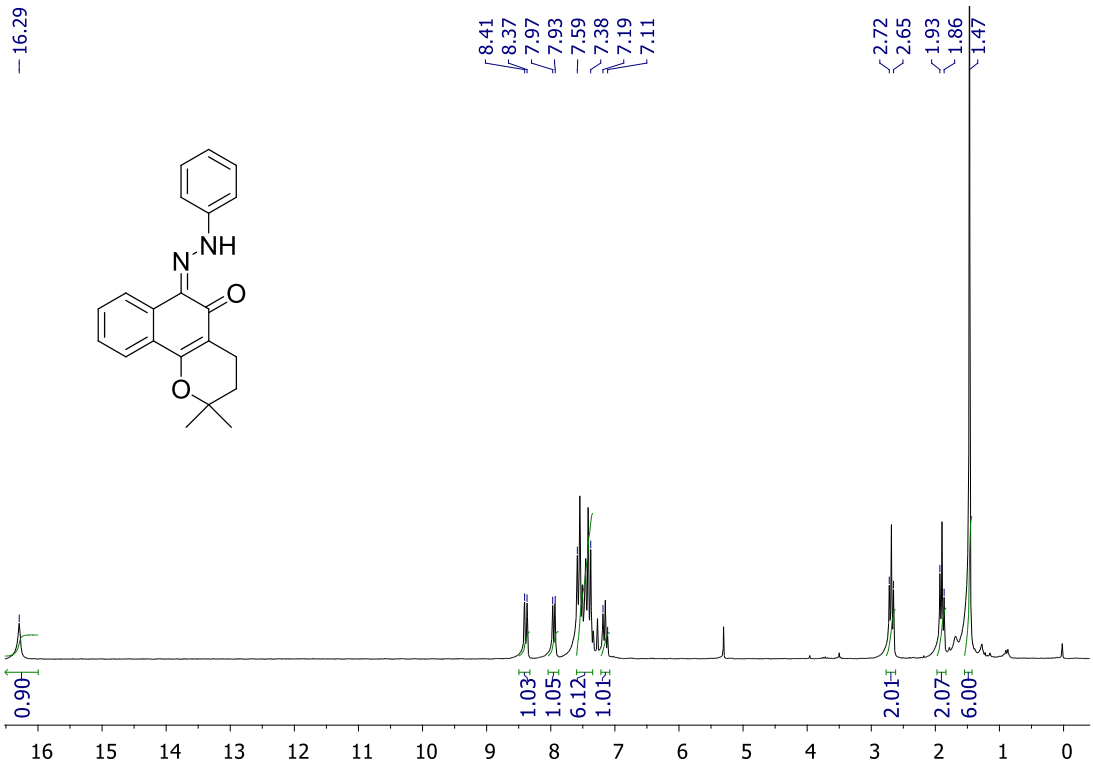

Figure 53. ^{1}H NMR spectrum (200 MHz, $CDCl_3$) of compound **29**.

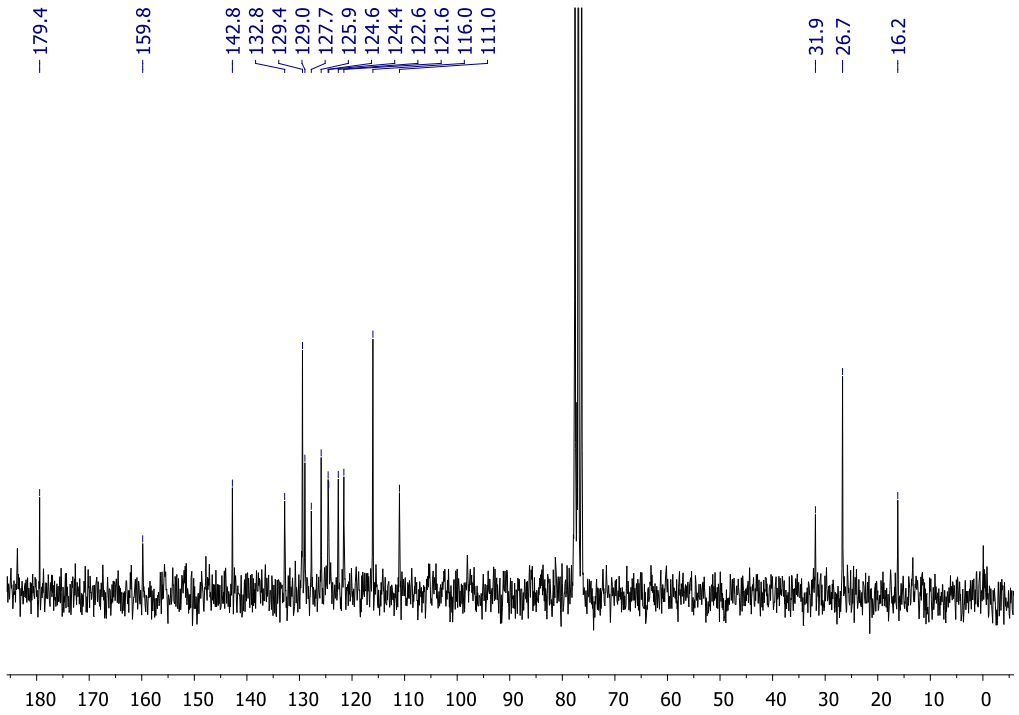

Figure 54. ^{13}C NMR spectrum (50 MHz, $CDCl_3$) of compound **29**.

28) Compound 31

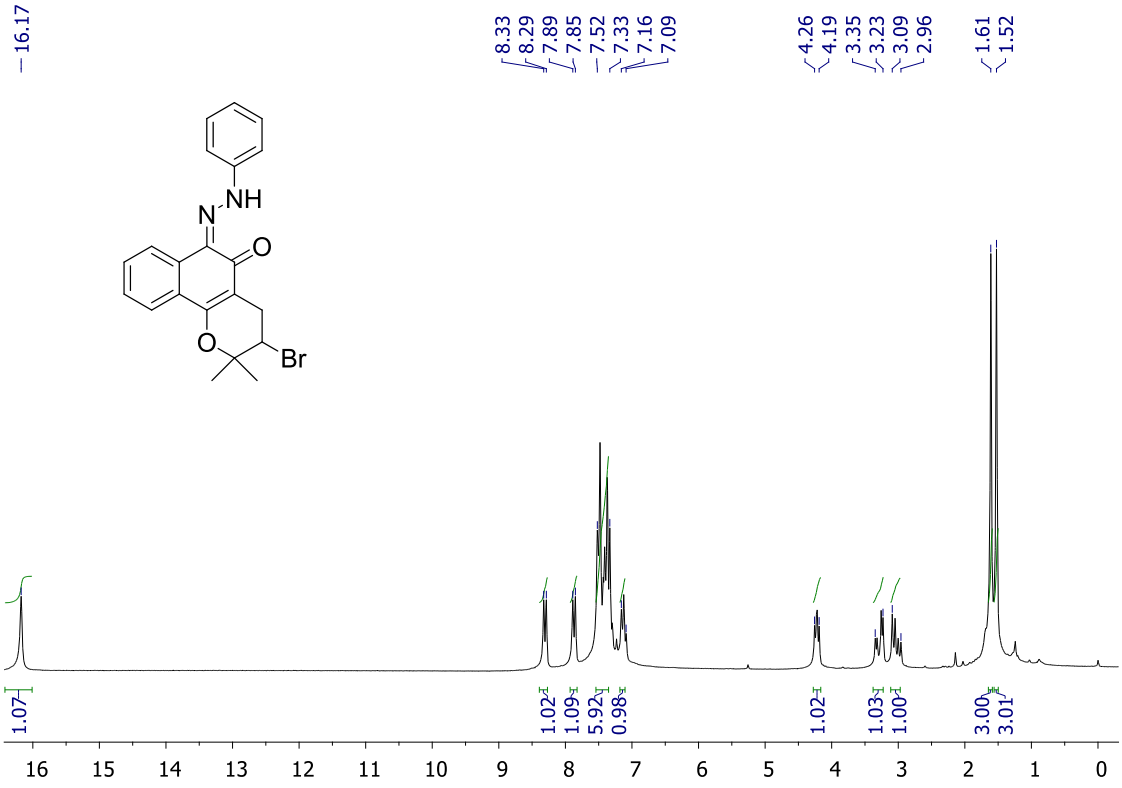

Figure 55. ^{1}H NMR spectrum (200 MHz, $CDCl_3$) of compound **31**.

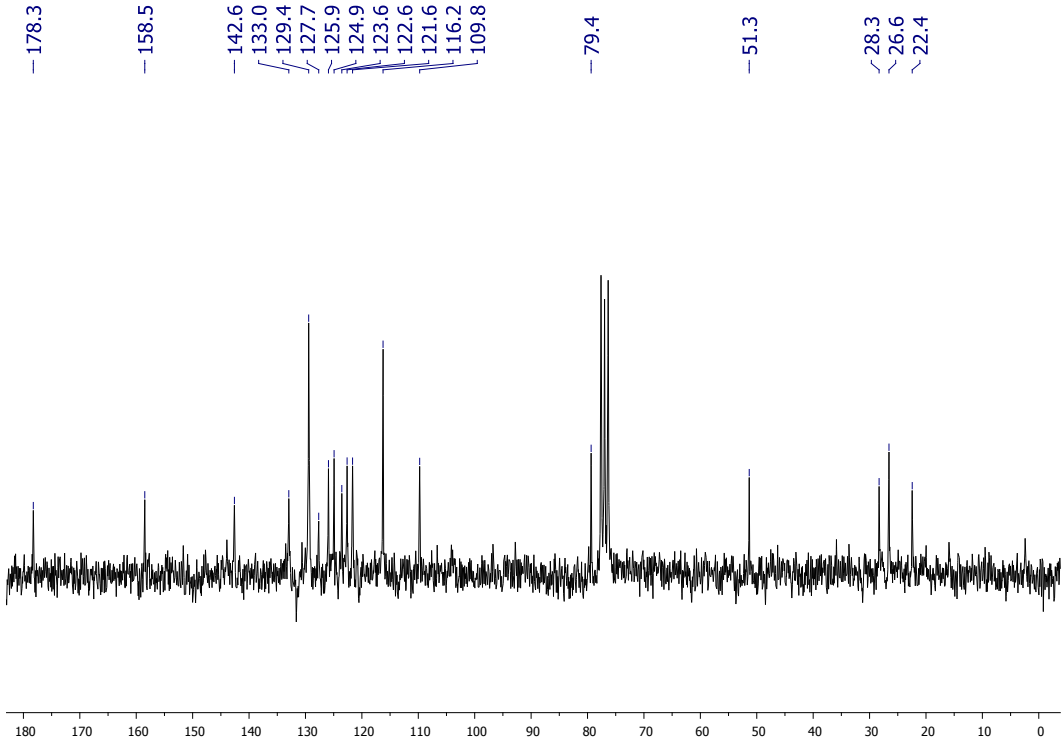

Figure 56. ^{13}C NMR spectrum (50 MHz, $CDCl_3$) of compound **31**.

29) Compound 33

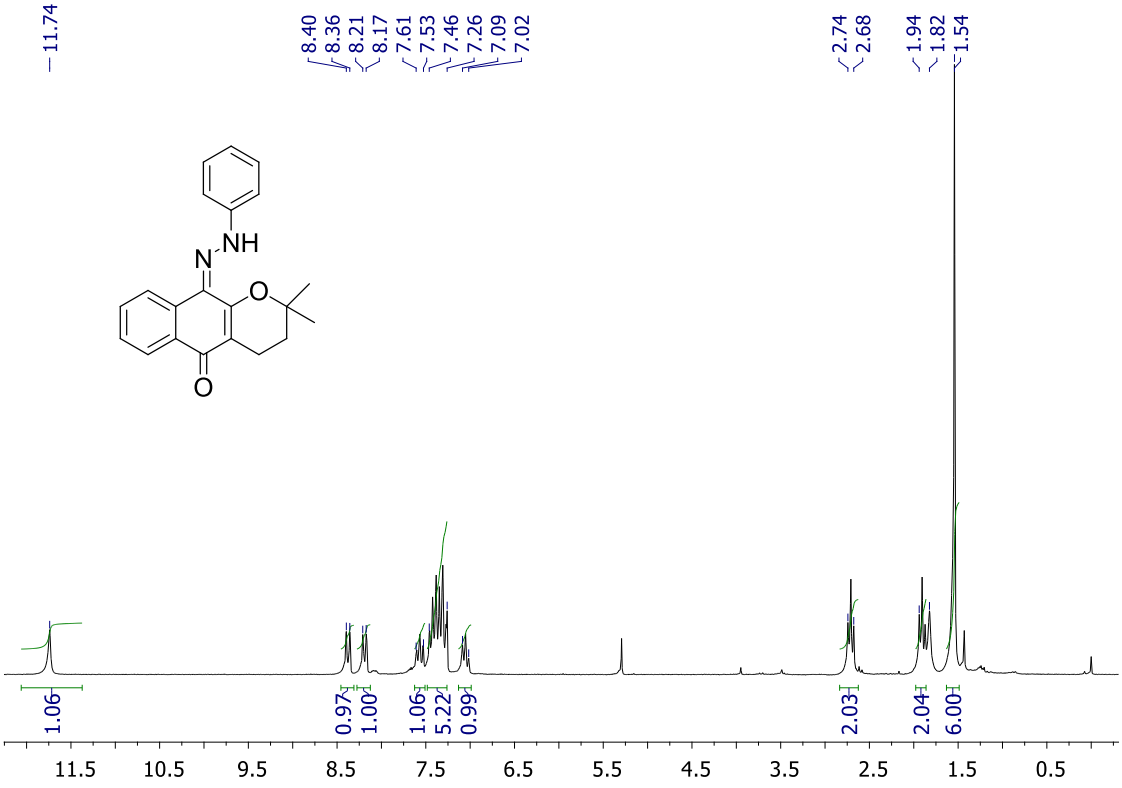

Figure 57. ^{1}H NMR spectrum (200 MHz, $CDCl_3$) of compound **33**.

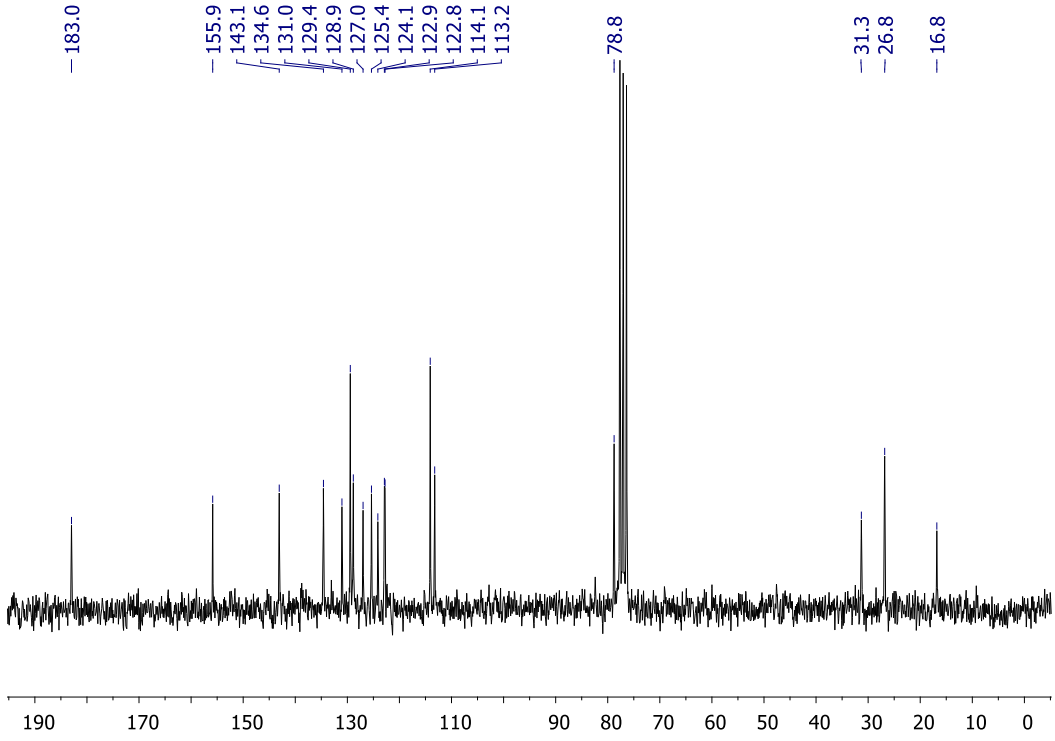

Figure 58. ^{13}C NMR spectrum (50 MHz, $CDCl_3$) of compound **33**.

30) Compound 41

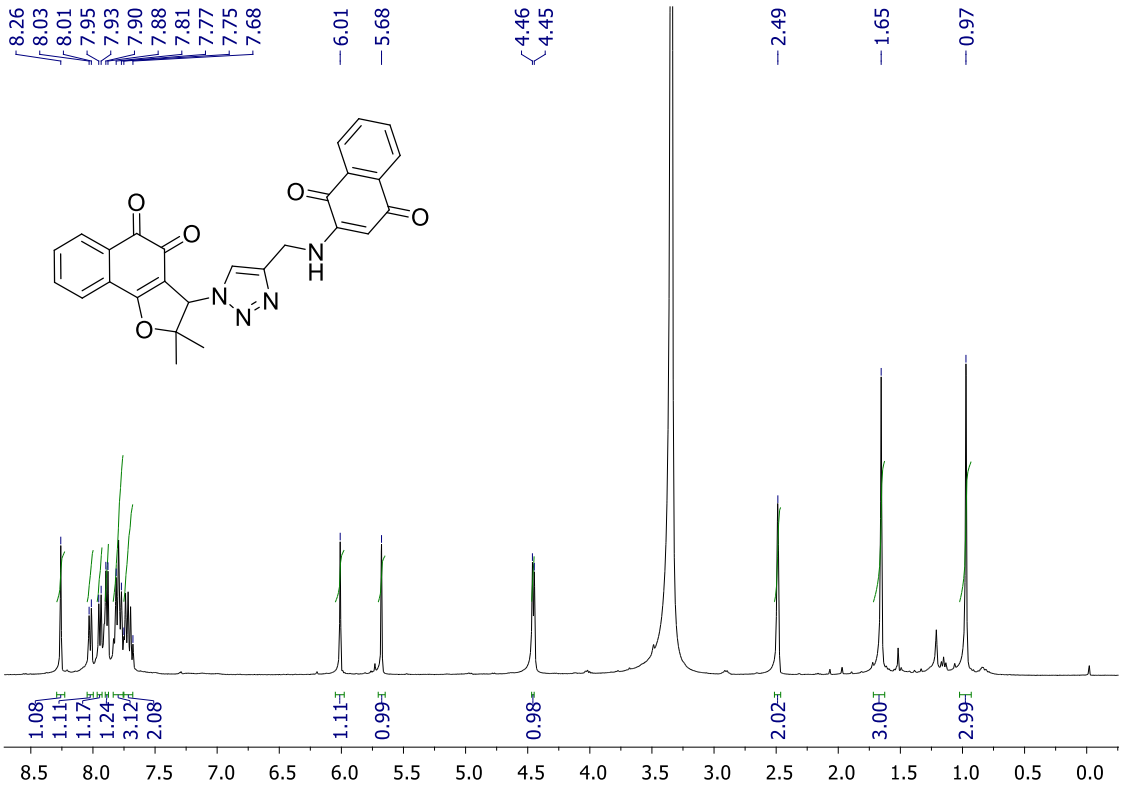

Figure 59. ^{1}H NMR spectrum (300 MHz, DMSO-d_6) of compound **41**.

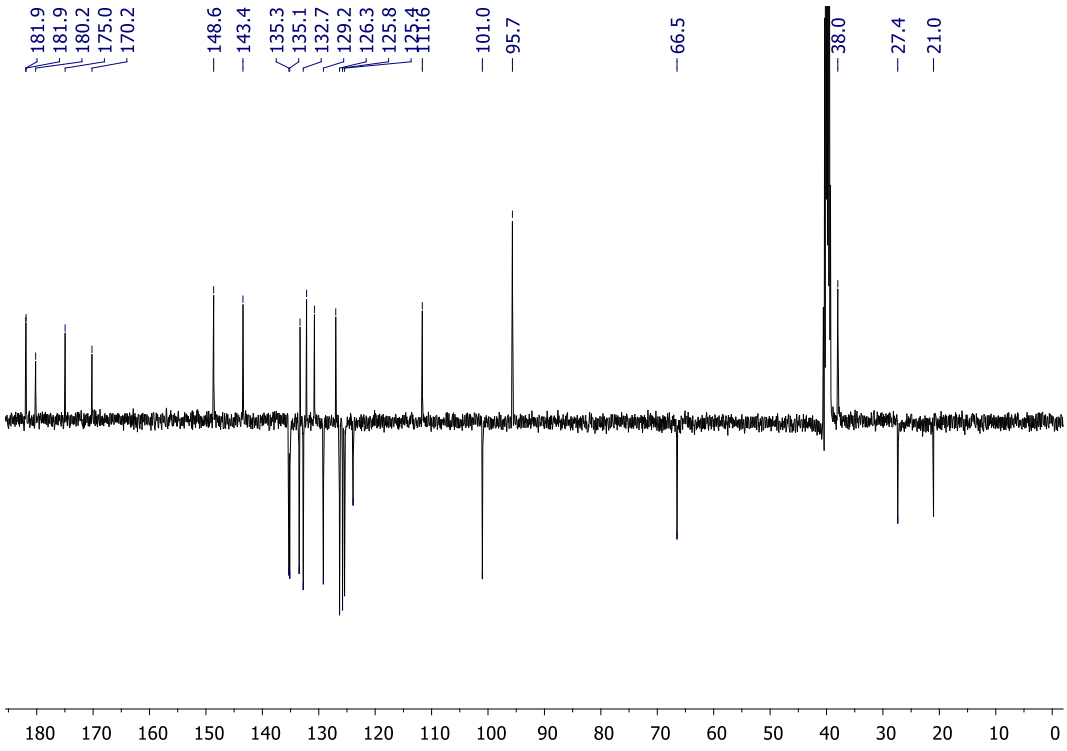

Figure 60. ^{13}C-APT NMR spectrum (75 MHz, DMSO-d_6) of compound **41**.

31) Compound 42

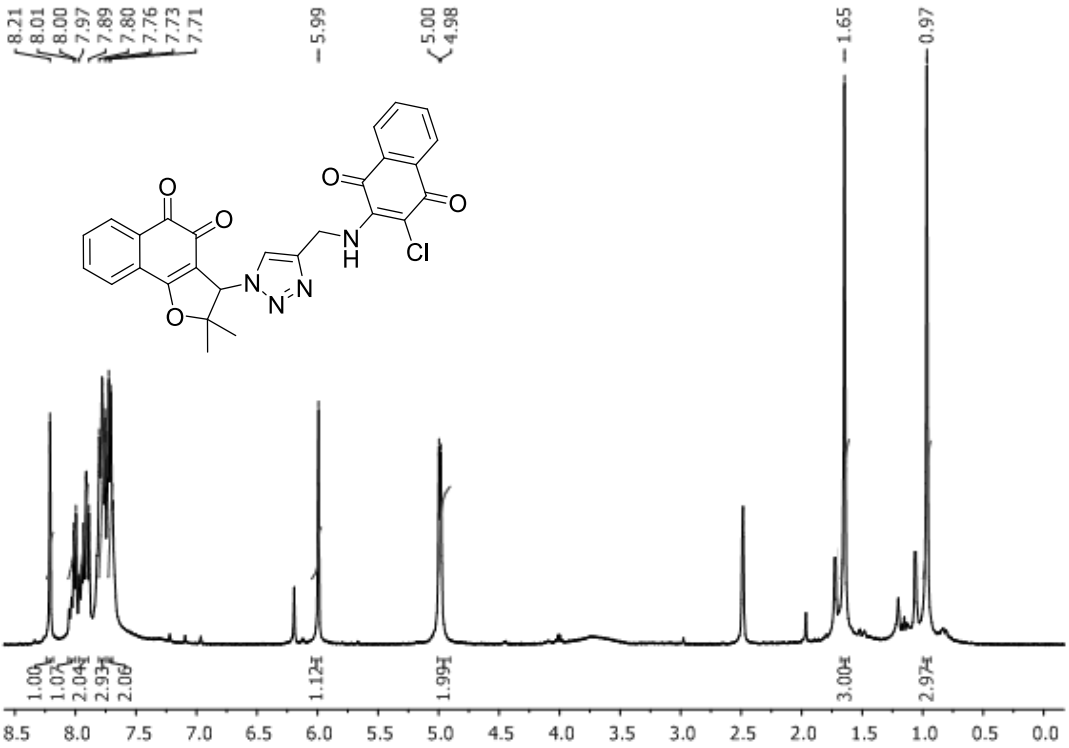

Figure 61. ^{1}H NMR spectrum (300 MHz, DMSO-d_6) of compound **42**.

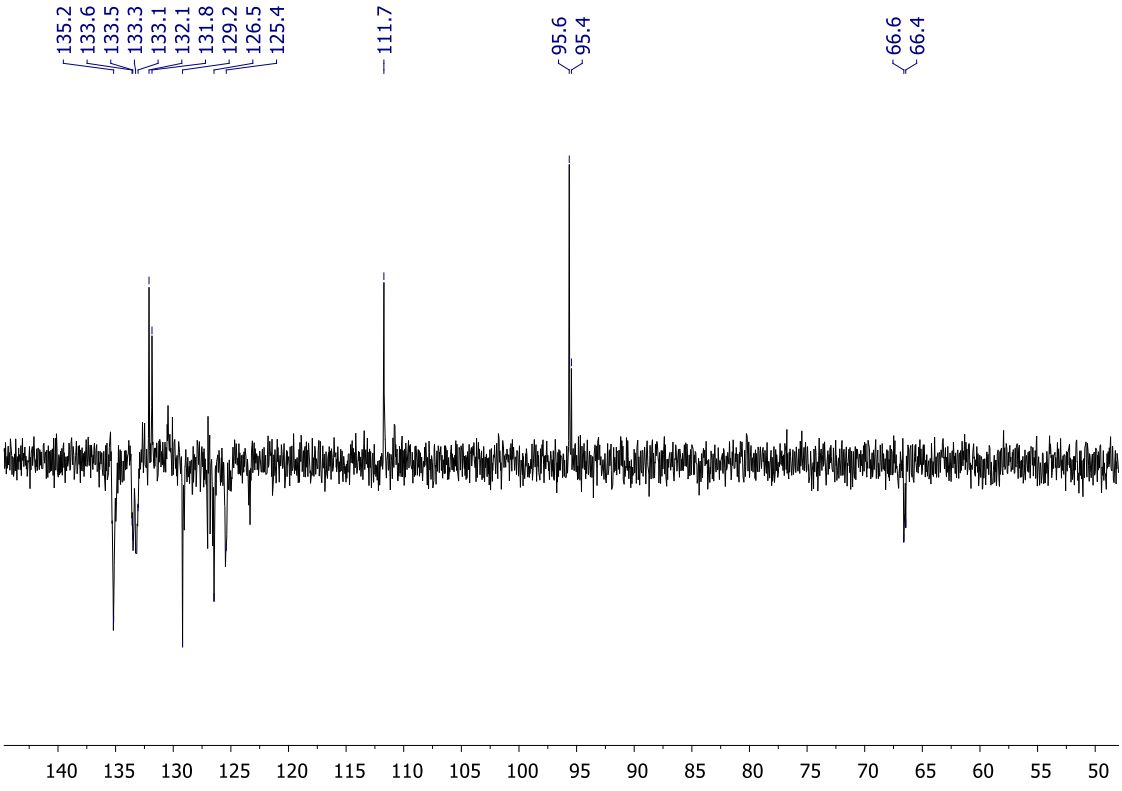

Figure 62. ^{13}C-APT NMR spectrum (75 MHz, DMSO-d_6) of compound **42**.

32) Compound 43

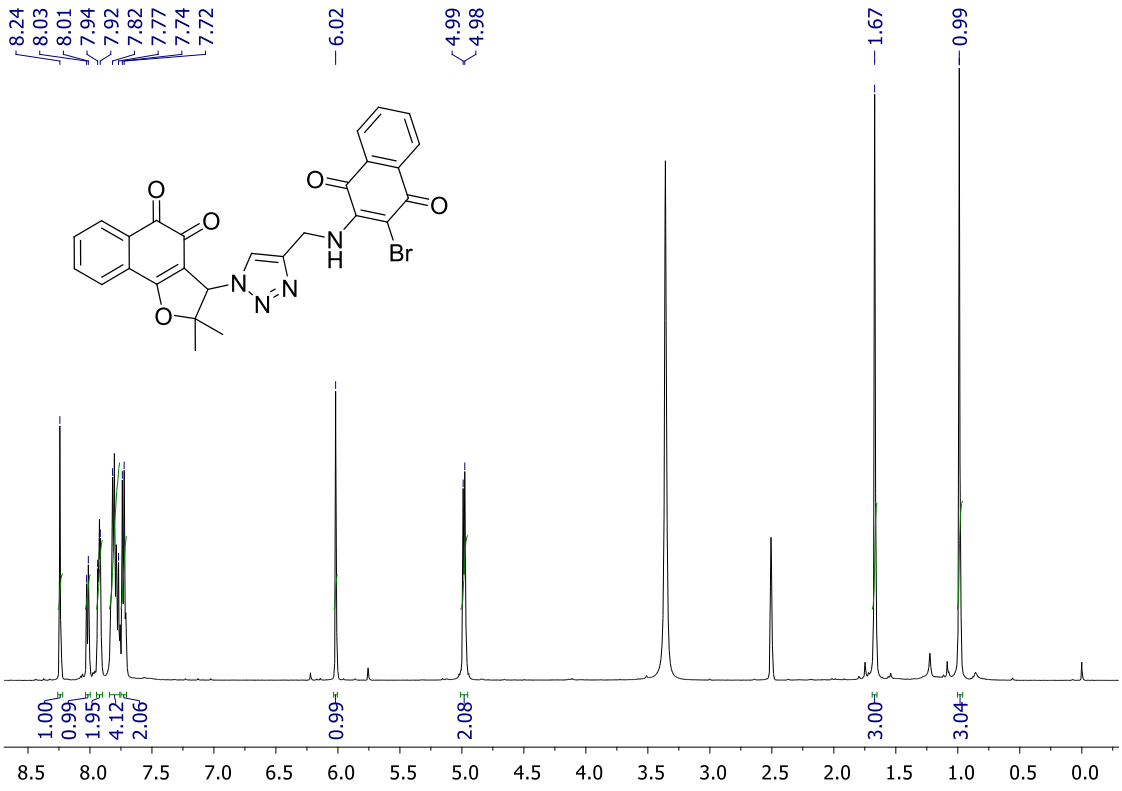

Figure 63. ^{1}H NMR spectrum (300 MHz, DMSO-d_6) of compound **43**.

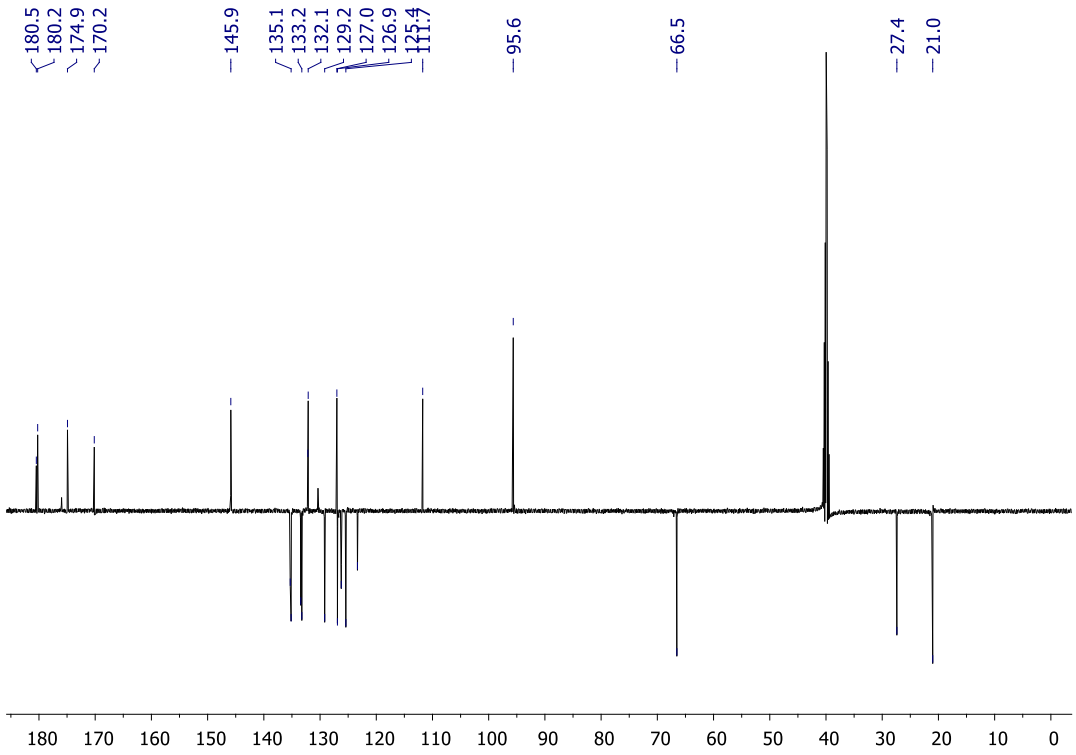

Figure 64. ^{13}C-APT NMR spectrum (75 MHz, DMSO-d_6) of compound **43**.