

Diversity-Oriented General Protocol for the Synthesis of Privileged Oxygen Scaffolds: Pyrones, Coumarins, Benzocoumarins and Naphthocoumarins

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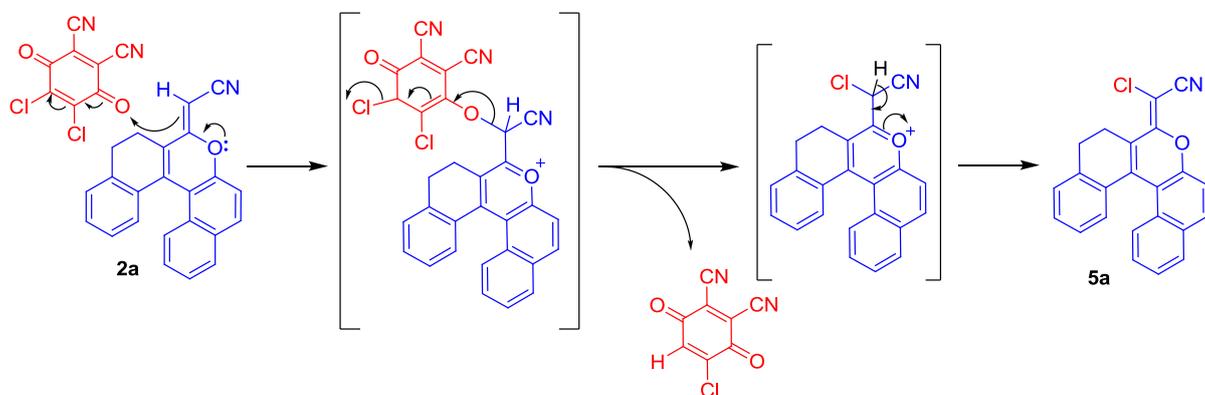
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Scheme S1 Proposed Mechanism of compound **5a**.



NMR spectra of synthesized compounds

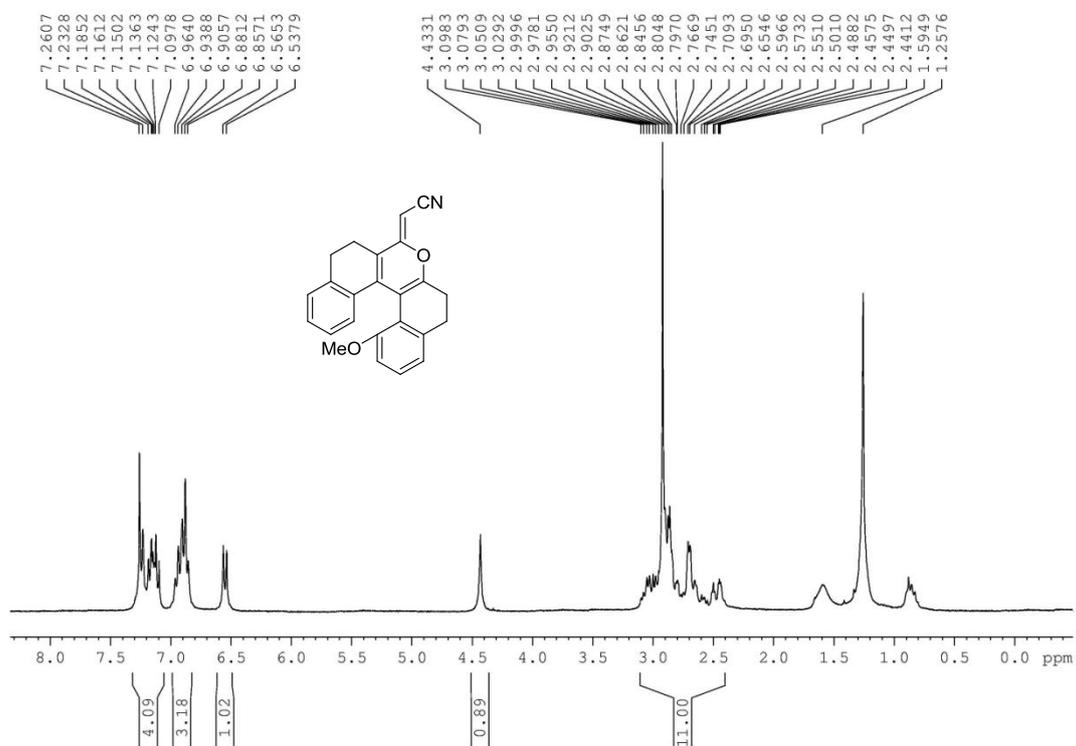


Figure S1. ^1H NMR spectrum of **1b** in CDCl_3 .

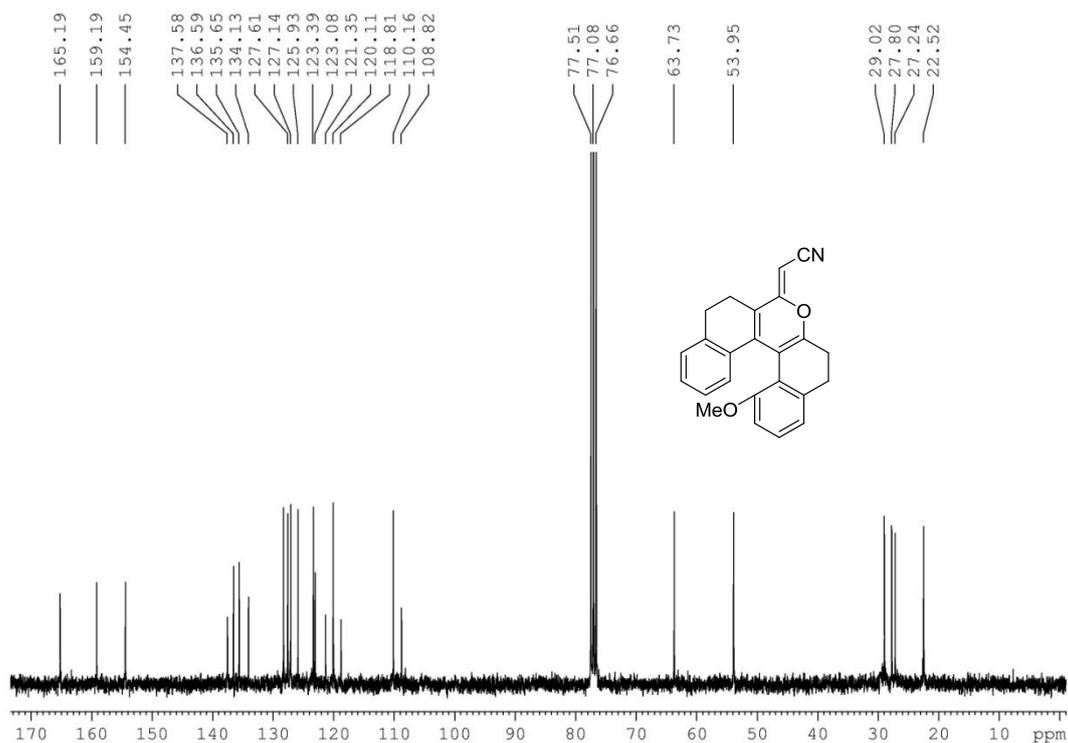


Figure S2. ^{13}C NMR spectrum of **1b** in CDCl_3 .

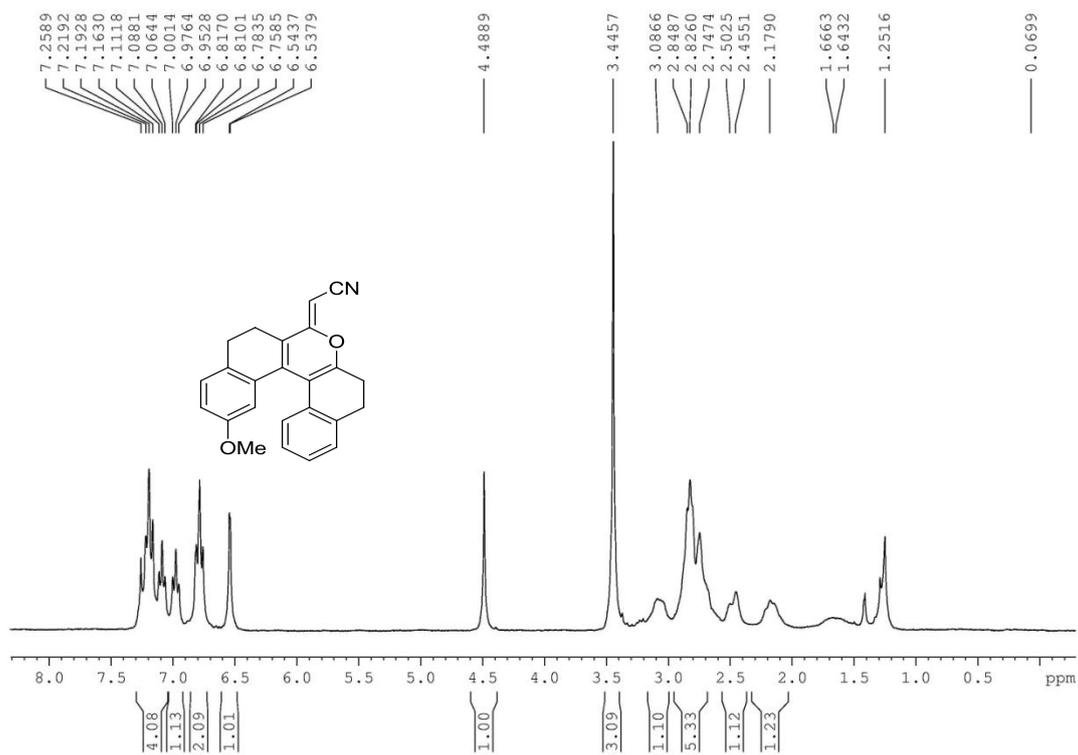


Figure S3. ¹H NMR spectrum of **1e** in CDCl₃.

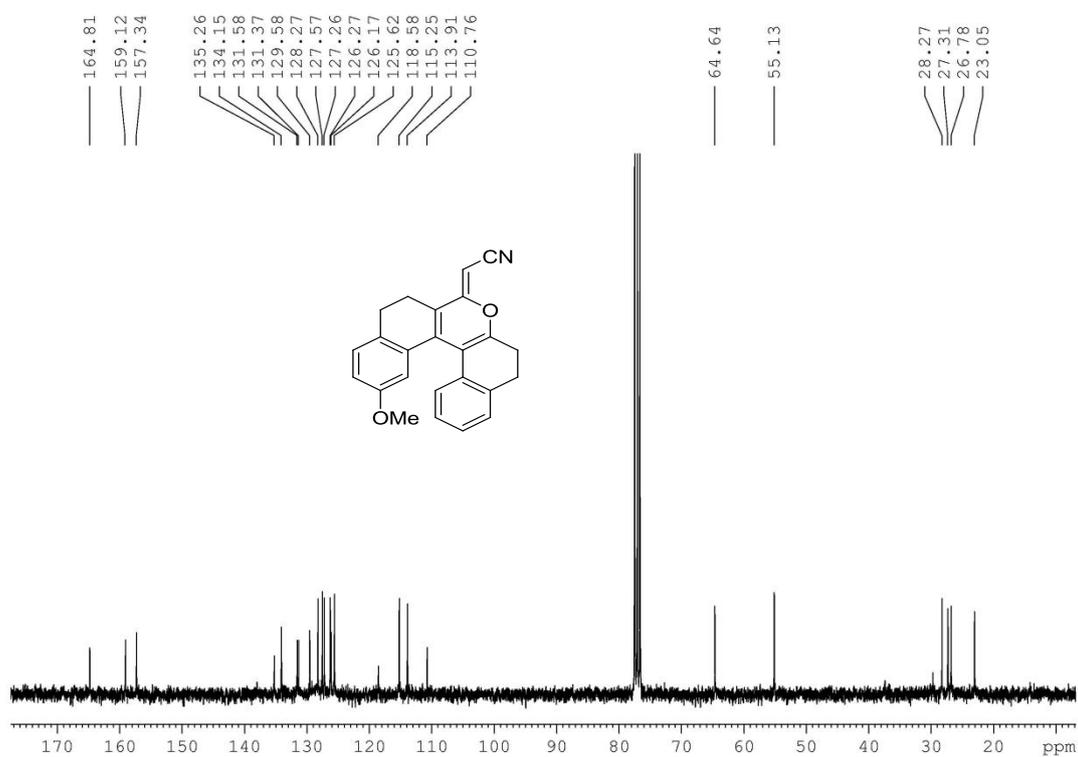


Figure S4. ¹³C NMR spectrum of **1e** in CDCl₃.

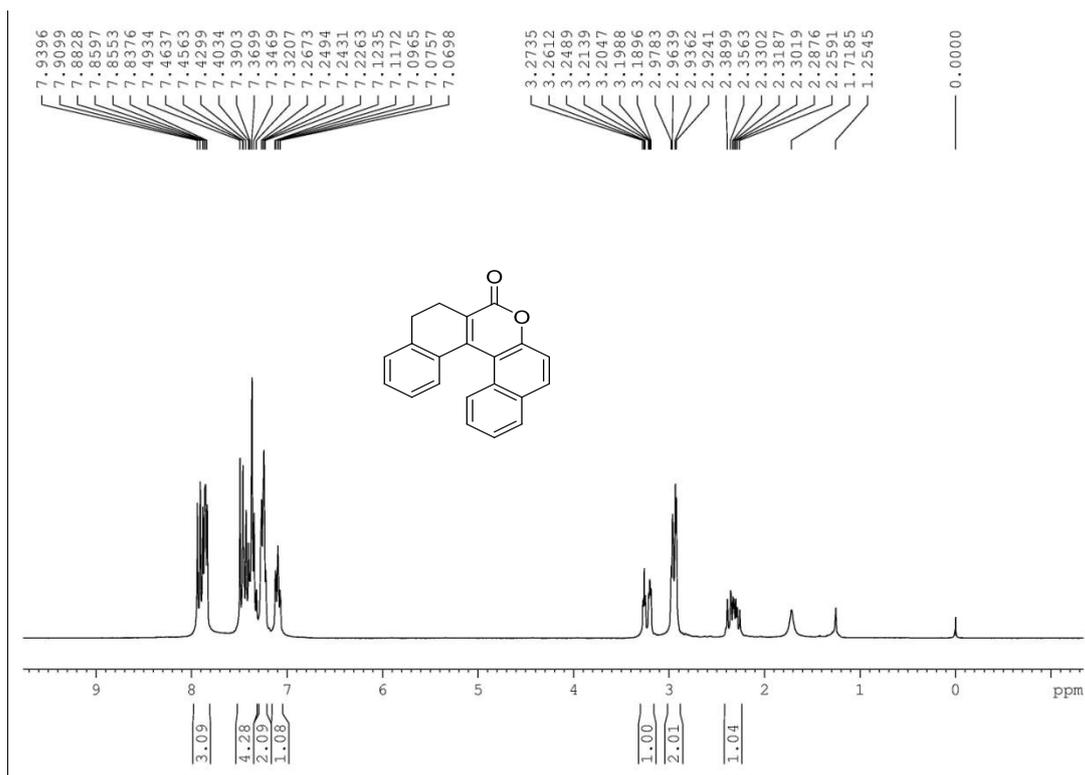


Figure S5. ¹H NMR spectrum of **4a** in CDCl₃.

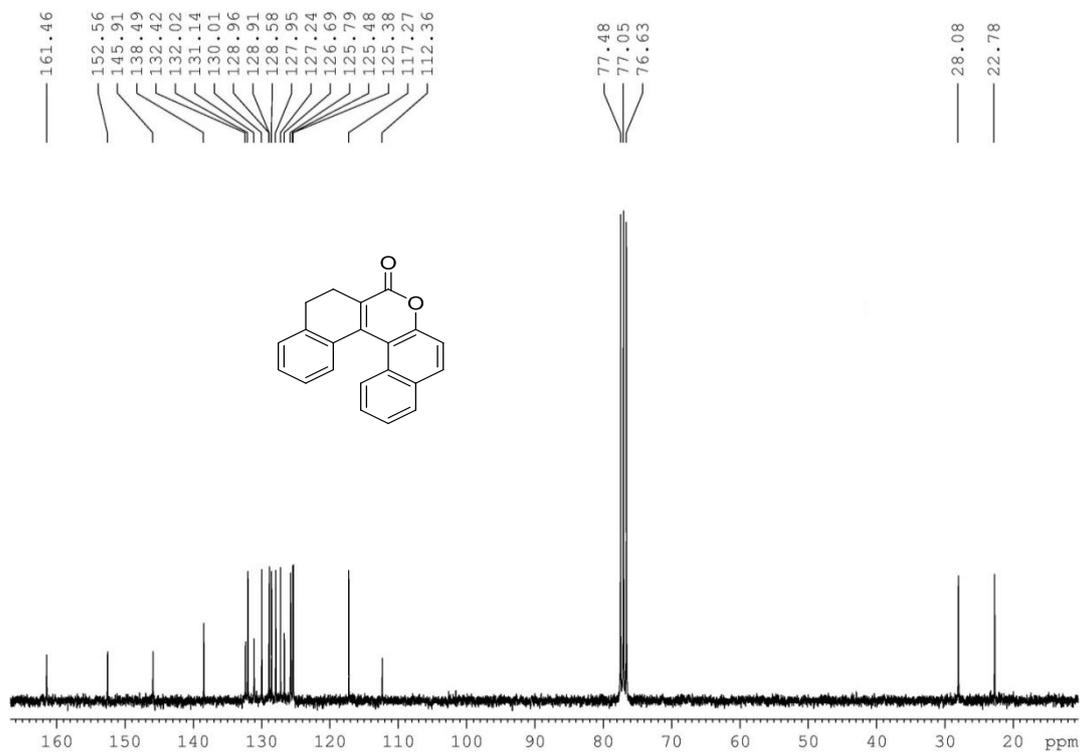


Figure S6. ¹³C NMR spectrum of **4a** in CDCl₃.

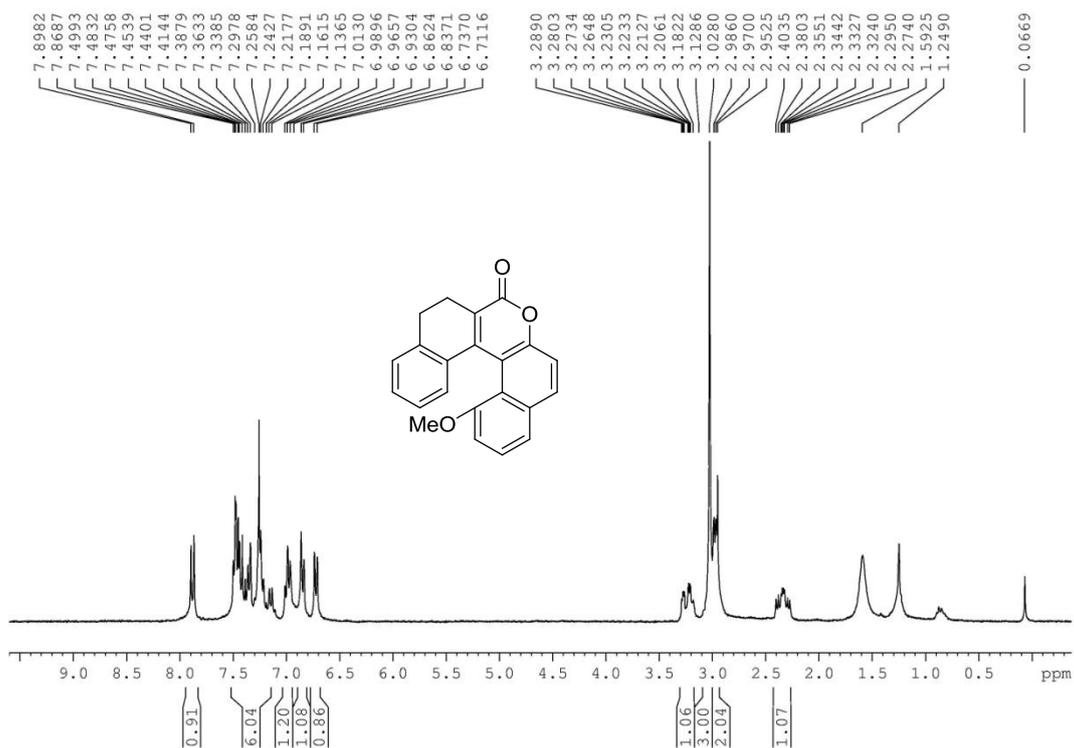


Figure S7. ^1H NMR spectrum of **4b** in CDCl_3 .

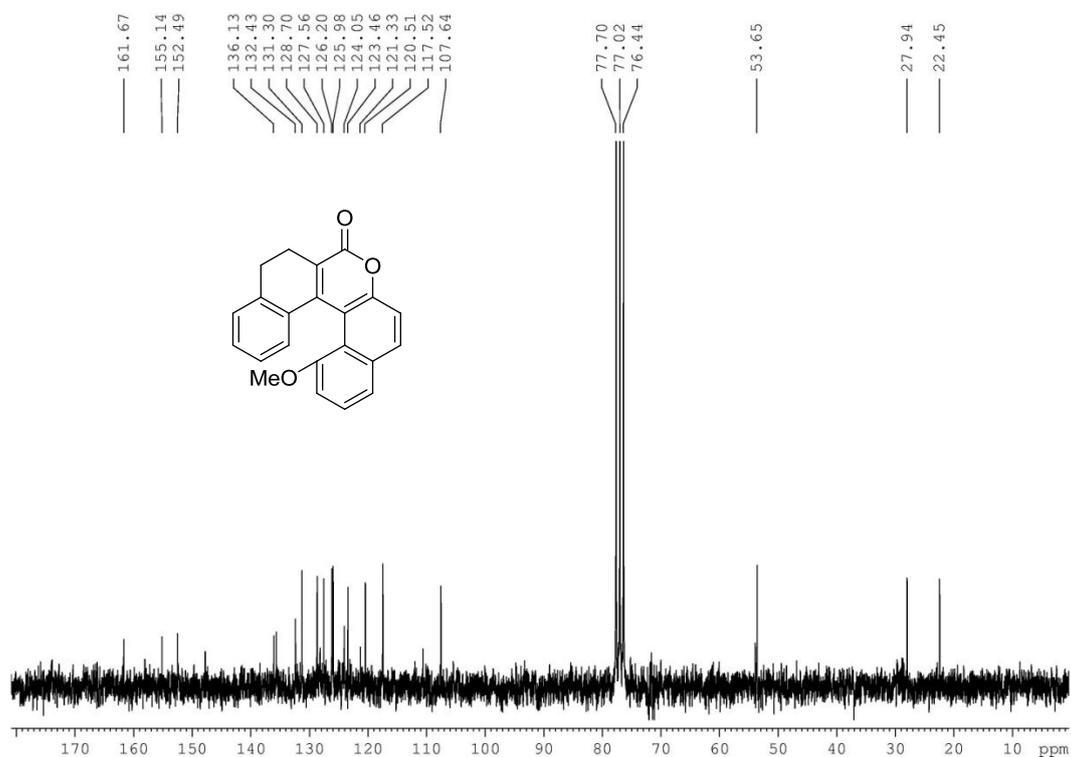
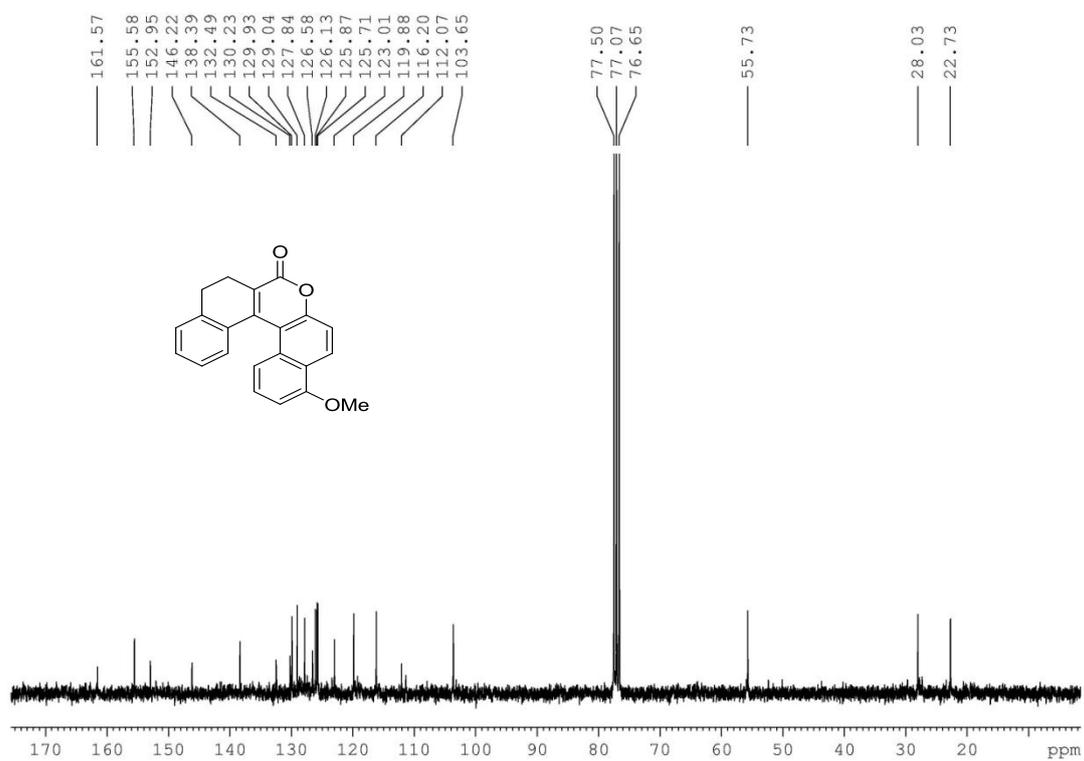
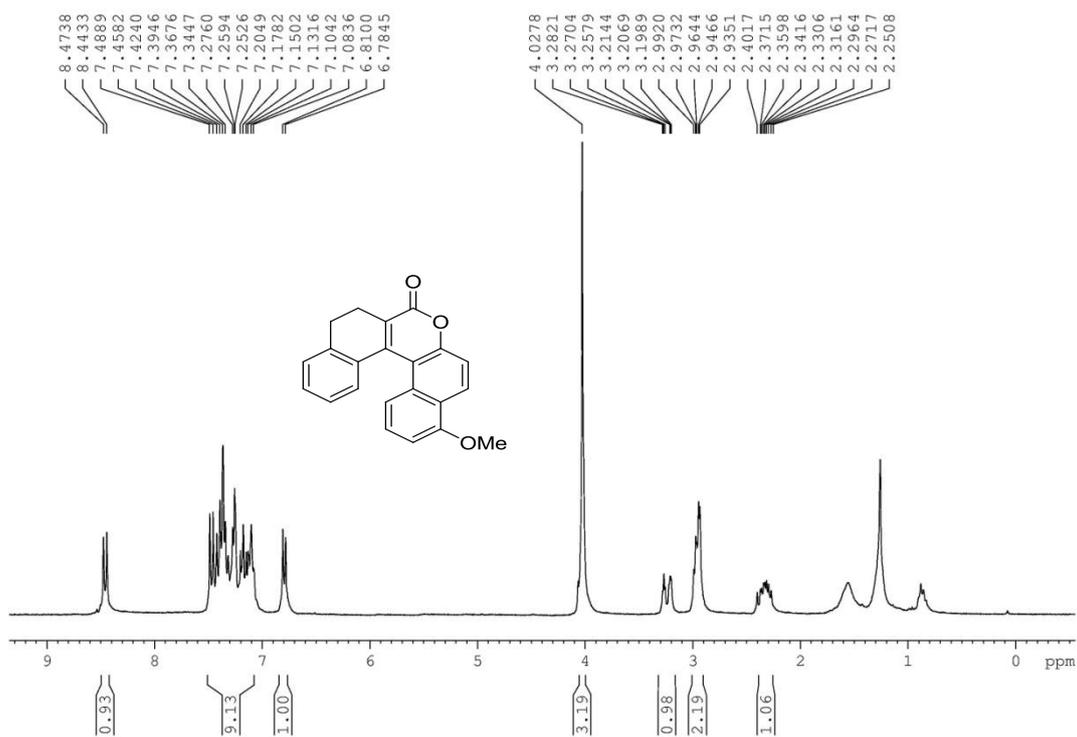


Figure S8. ^{13}C NMR spectrum of **4b** in CDCl_3 .



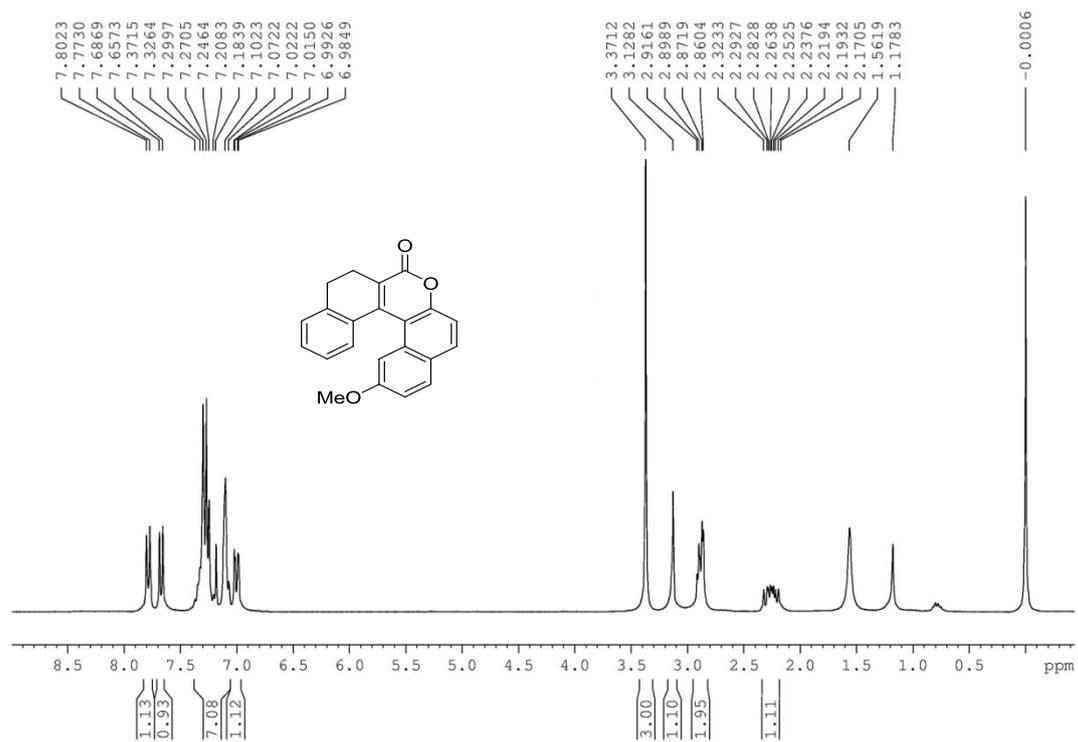


Figure S11. ^1H NMR spectrum of **4d** in CDCl_3 .

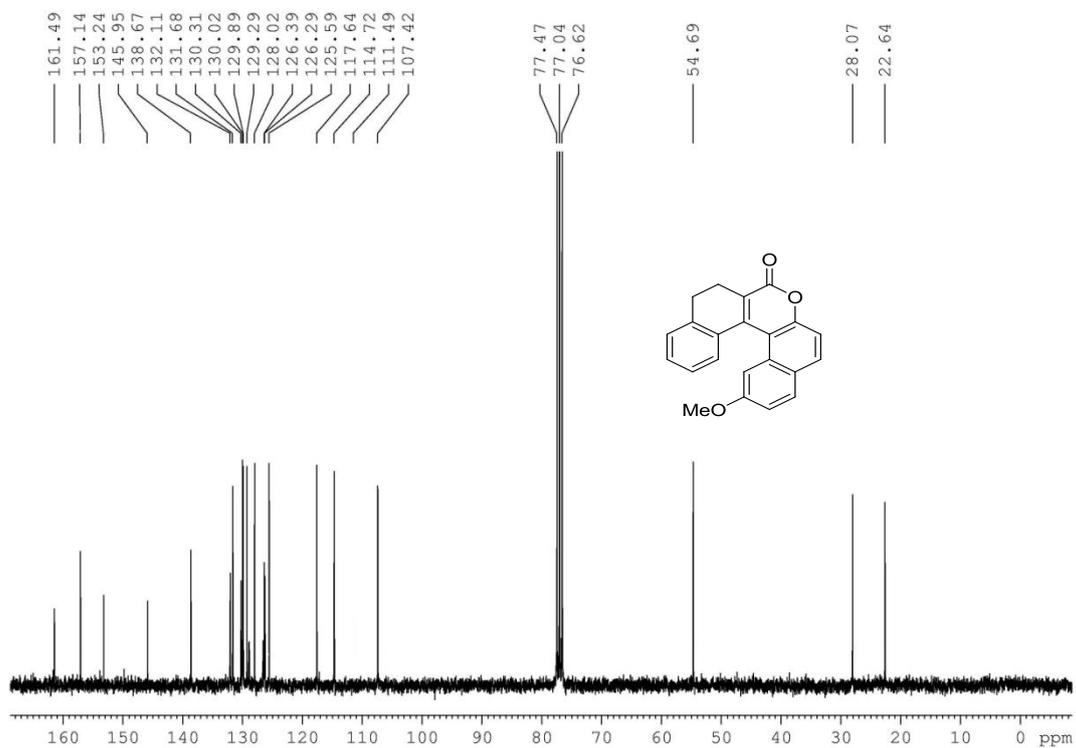


Figure S12. ^{13}C NMR spectrum of **4d** in CDCl_3 .

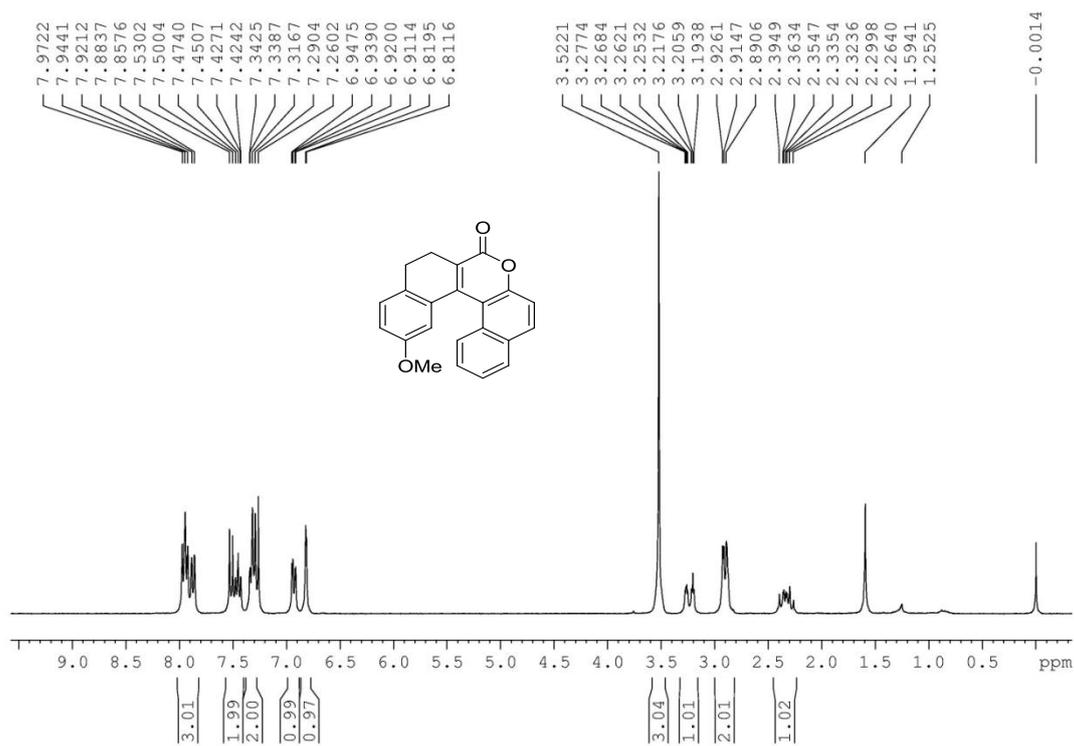


Figure S13. ^1H NMR spectrum of **4e** in CDCl_3 .

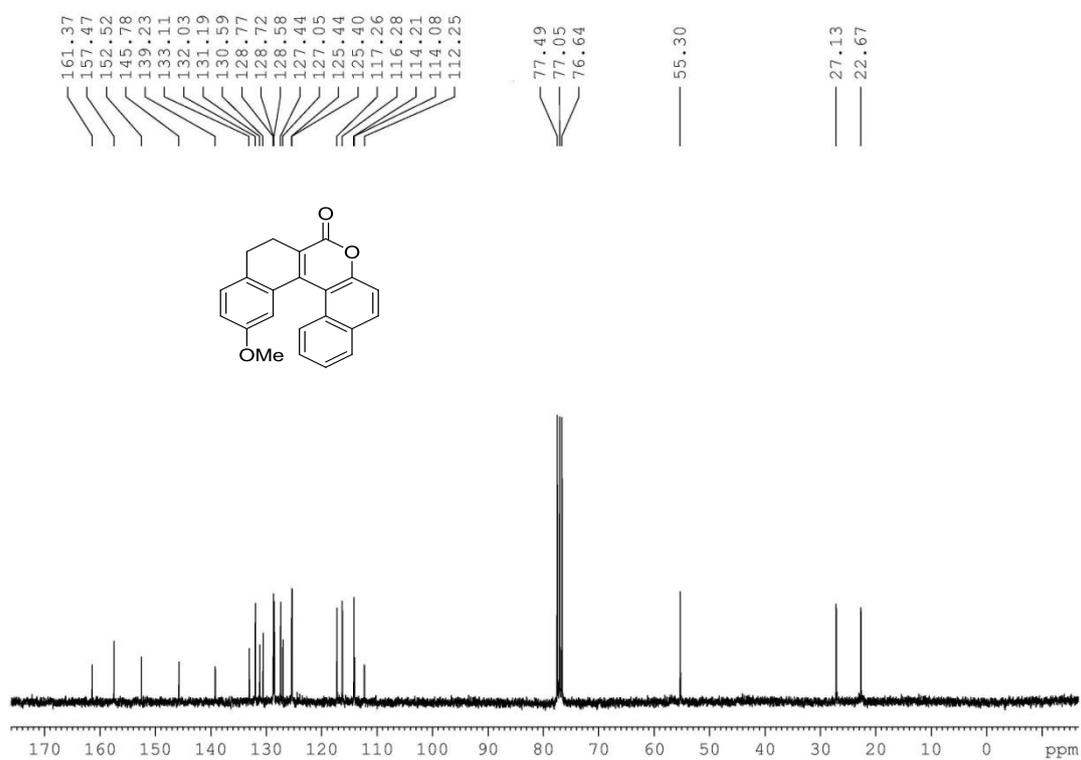


Figure S14. ^{13}C NMR spectrum of **4e** in CDCl_3 .

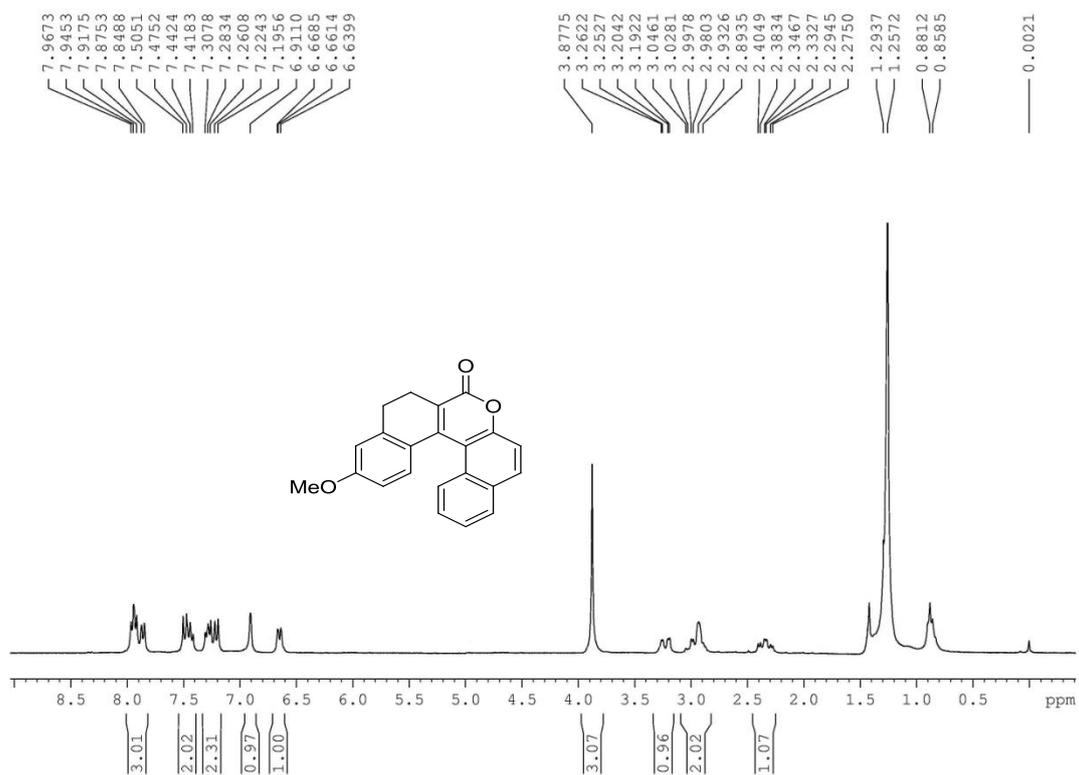


Figure S15. ¹H NMR spectrum of **4f** in CDCl₃.

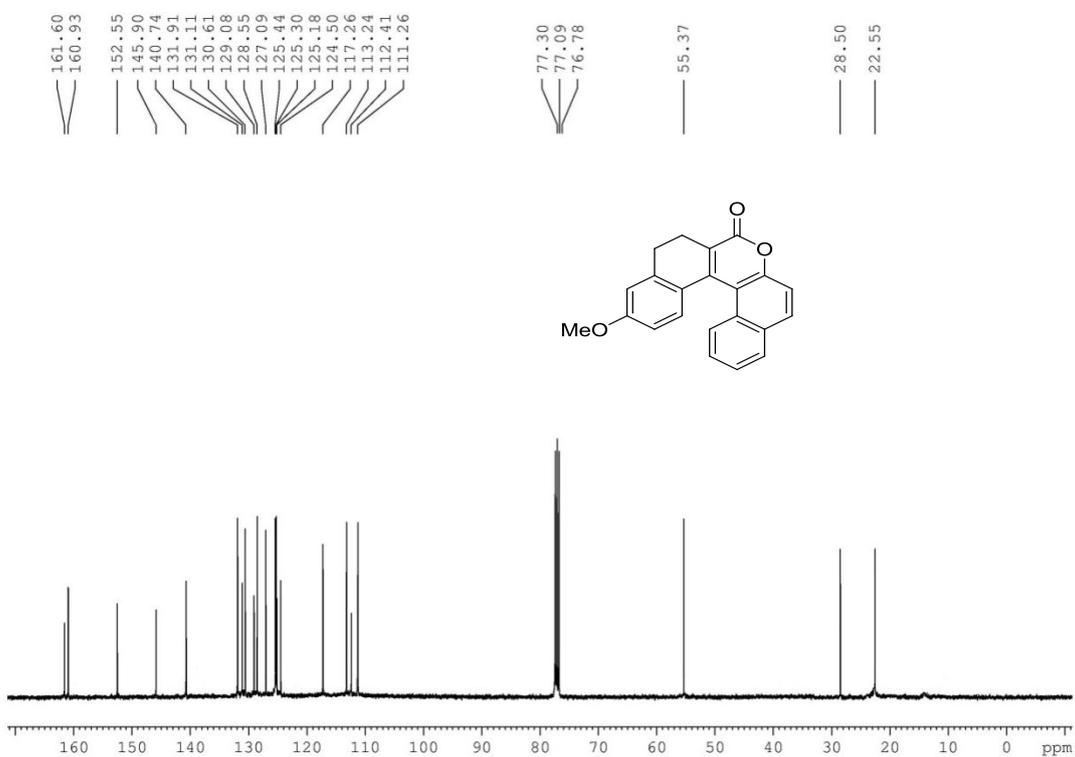


Figure S16. ¹³C NMR spectrum of **4f** in CDCl₃.

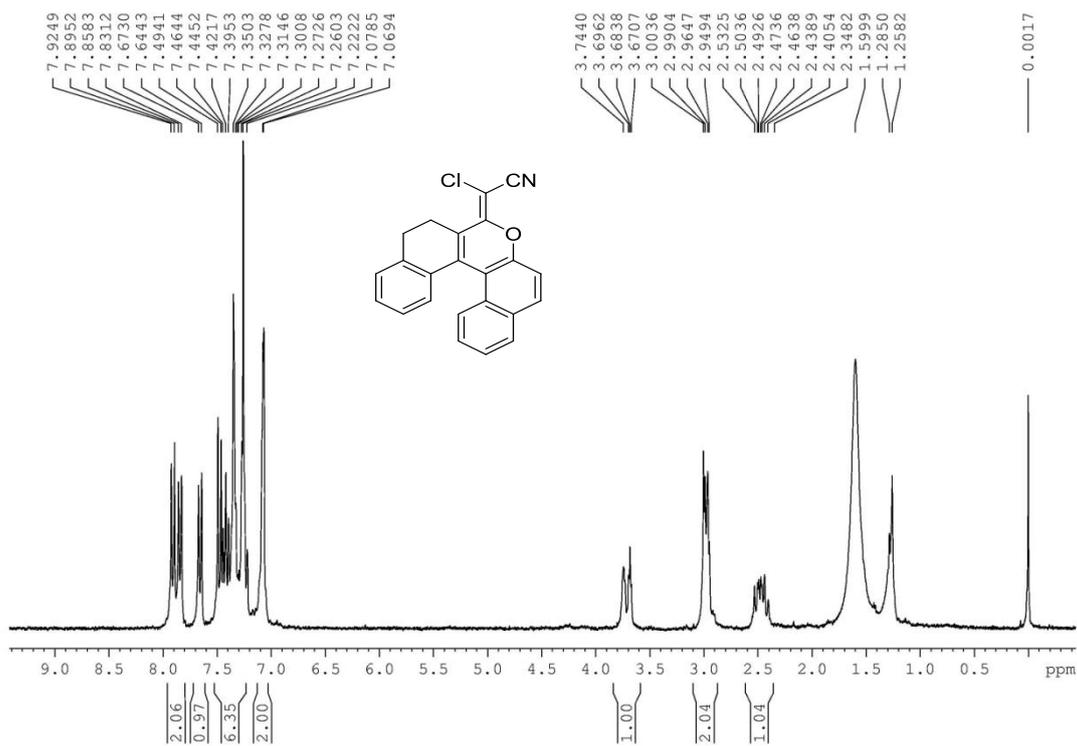


Figure S17. ^1H NMR spectrum of **5a** in CDCl_3 .

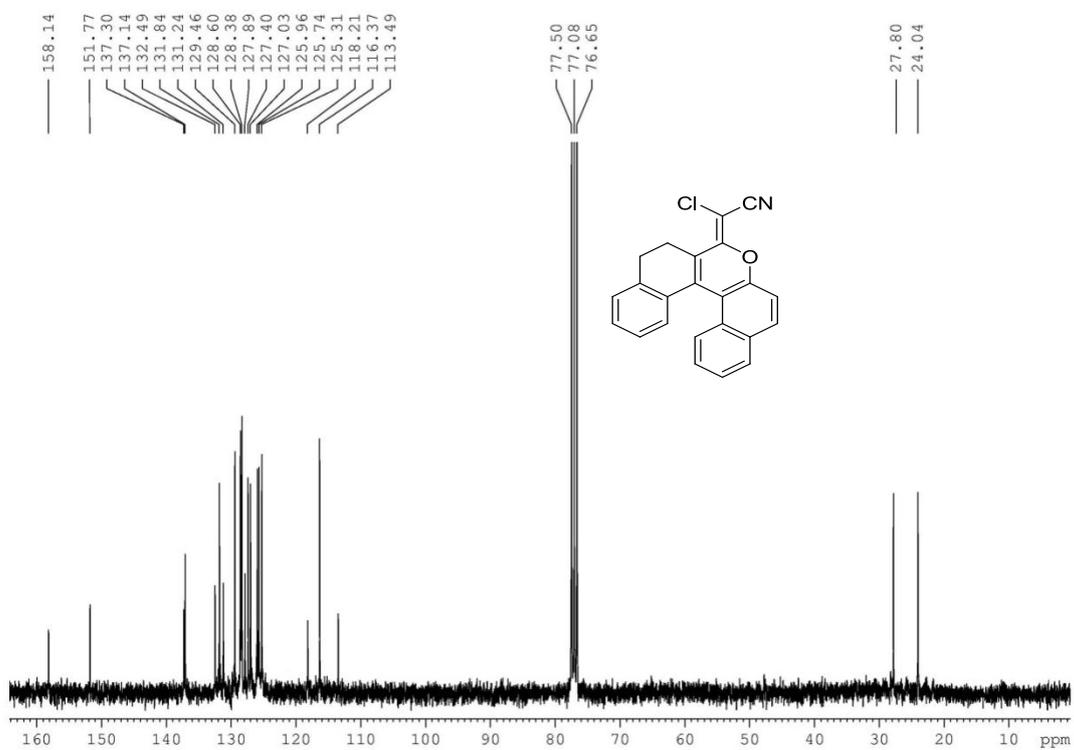


Figure S18. ^{13}C NMR spectrum of **5a** in CDCl_3 .

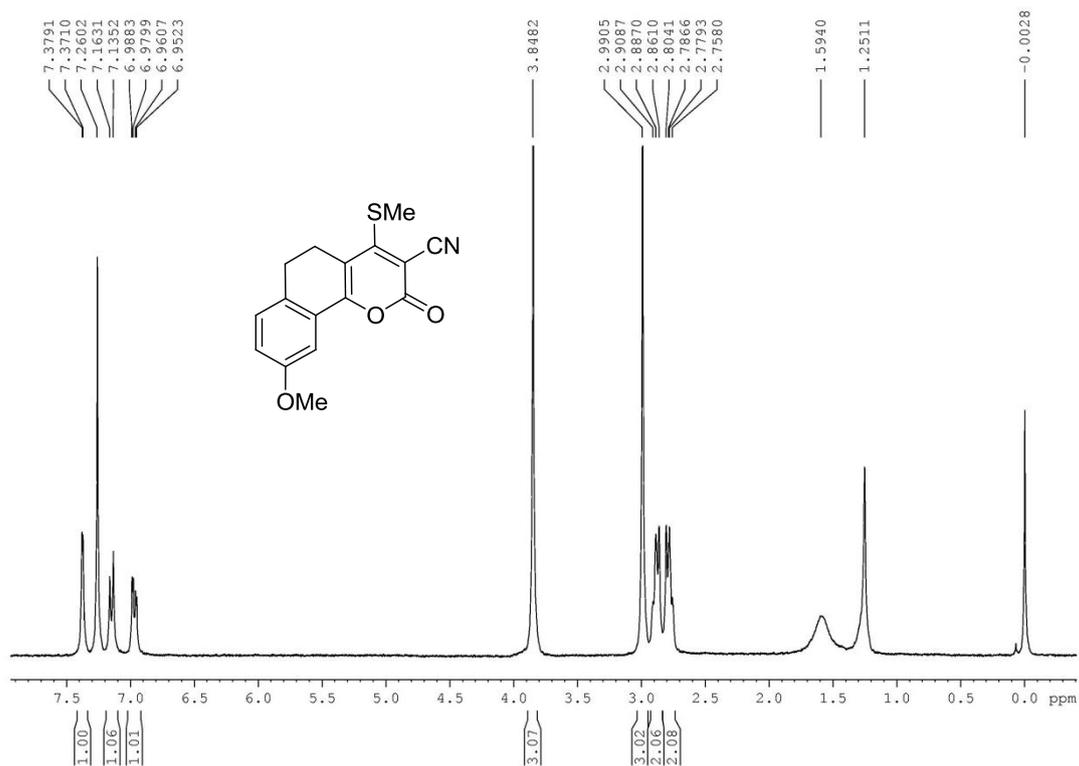


Figure S19. ¹H NMR spectrum of **8c** in CDCl₃.

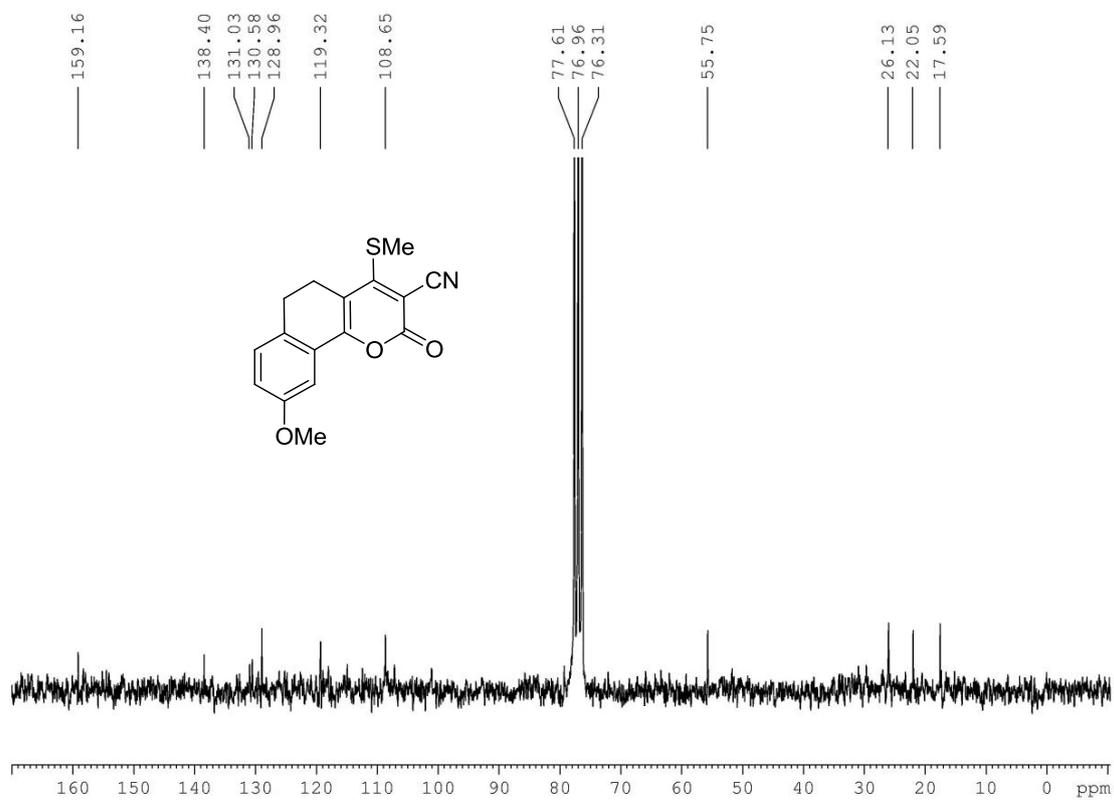


Figure S20. ¹³C NMR spectrum of **8c** in CDCl₃.

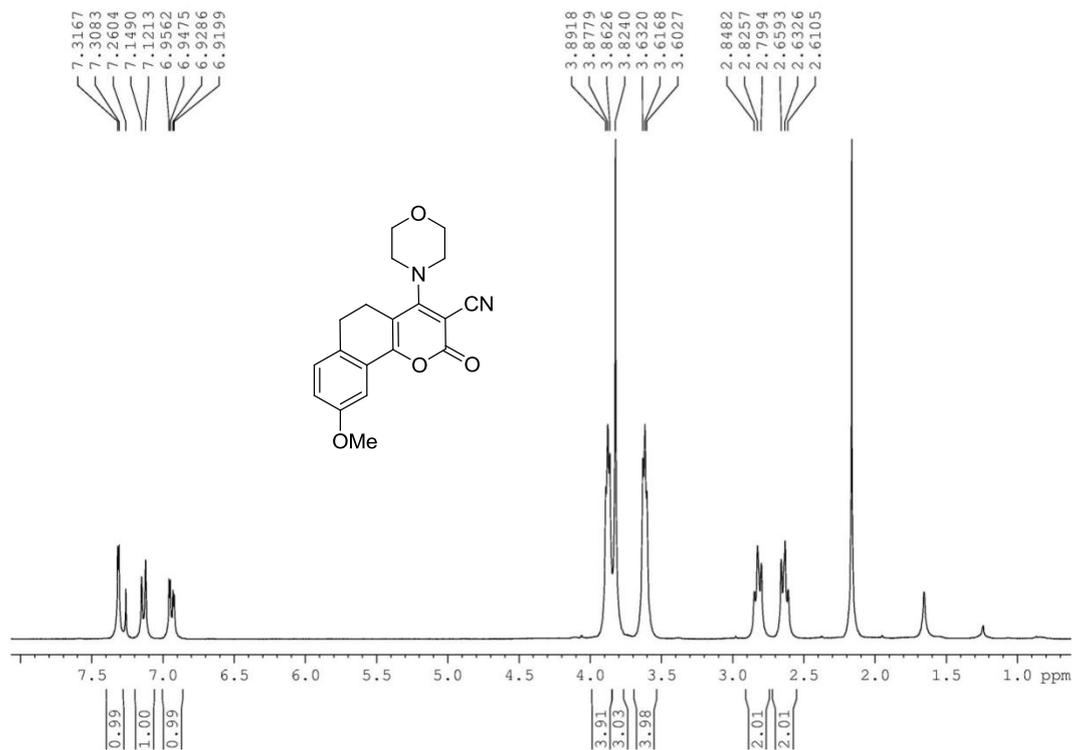


Figure S21. ¹H NMR spectrum of **9c** in CDCl₃.

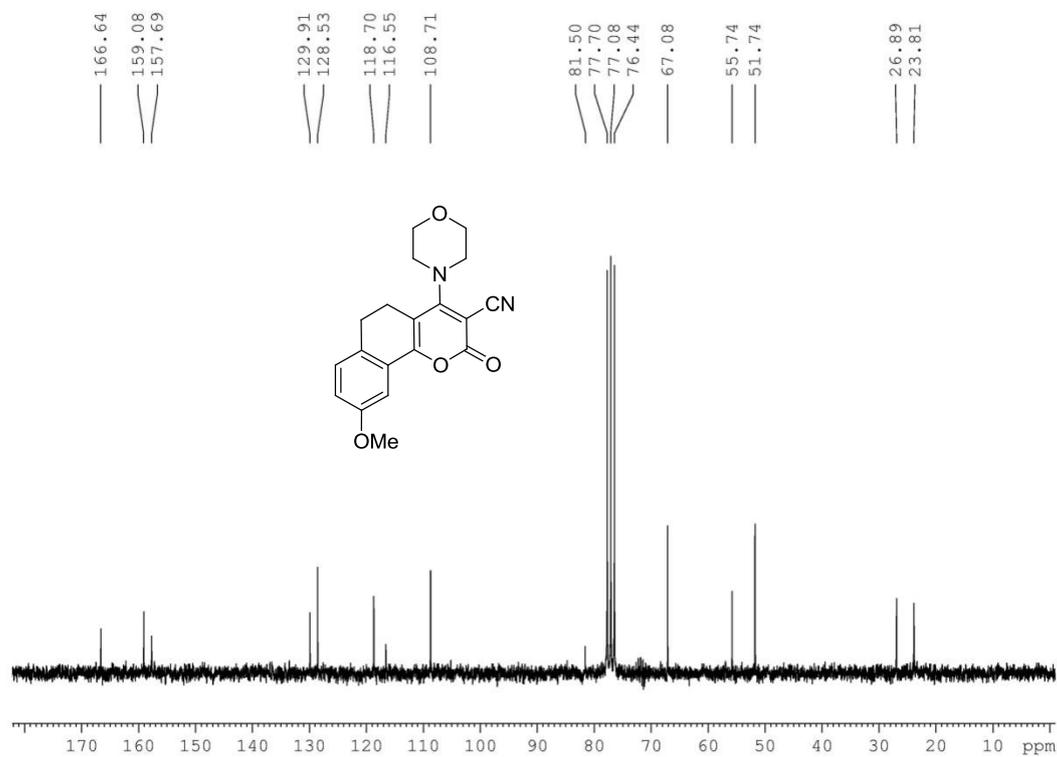


Figure S22. ¹³C NMR spectrum of **9c** in CDCl₃.

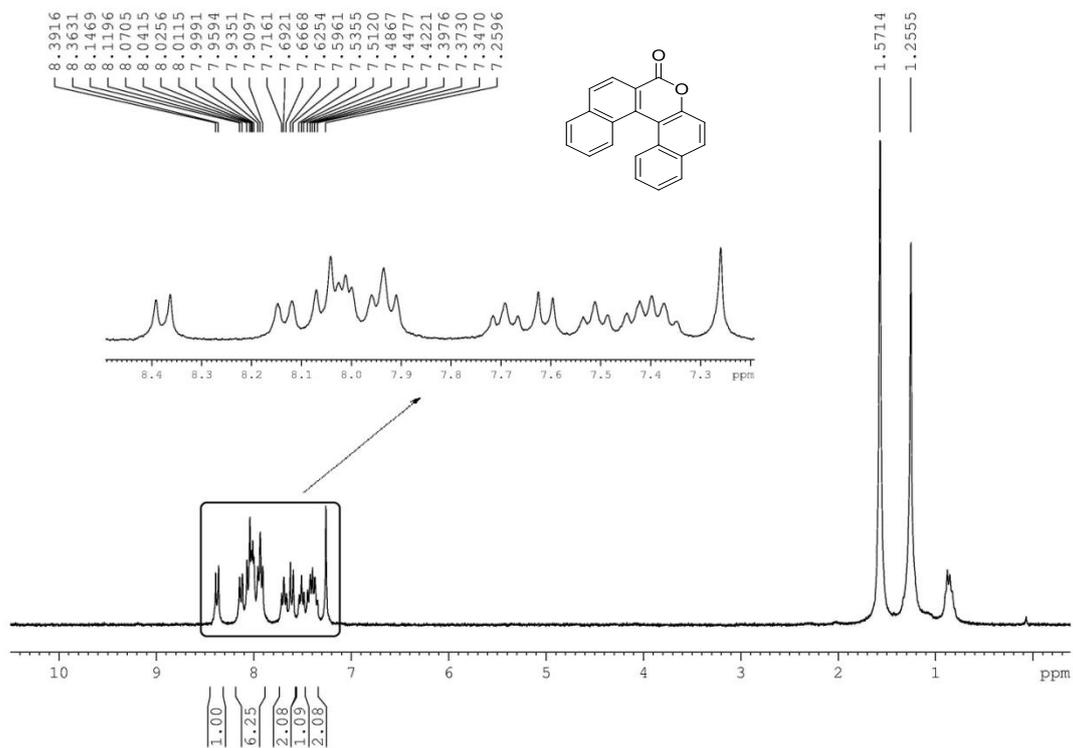


Figure S23. ^1H NMR spectrum of **11a** in CDCl_3 .

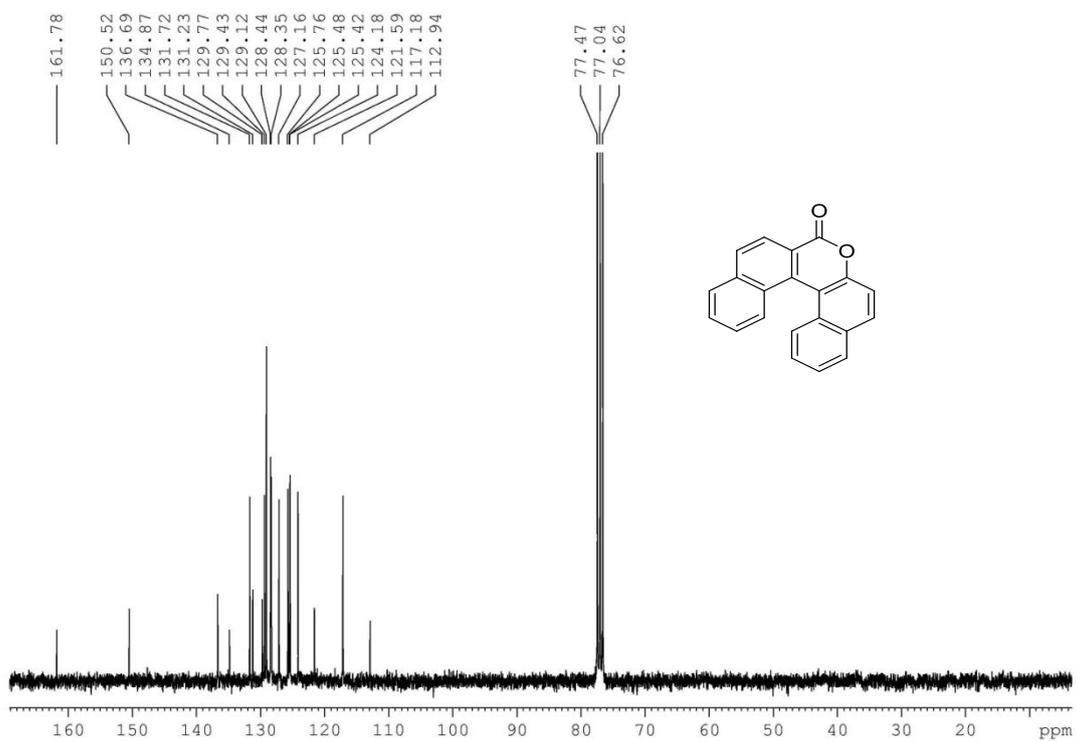


Figure S24. ^{13}C NMR spectrum of **11a** in CDCl_3 .

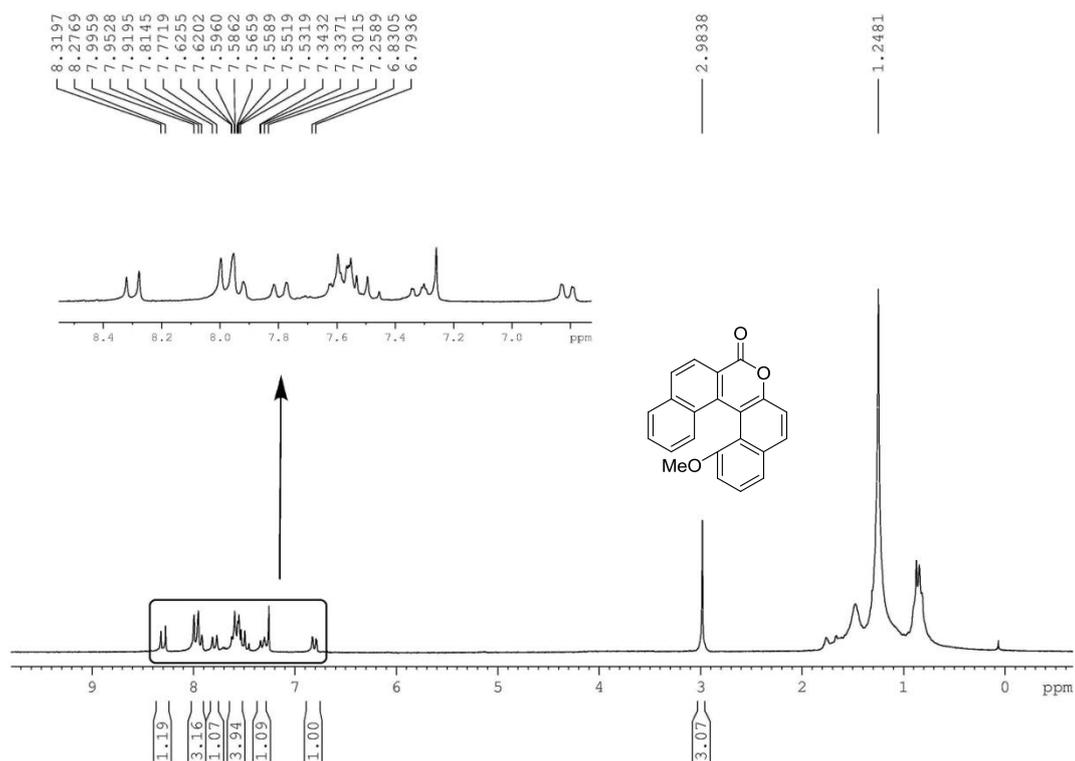


Figure S25. ¹H NMR spectrum of **11b** in CDCl₃.

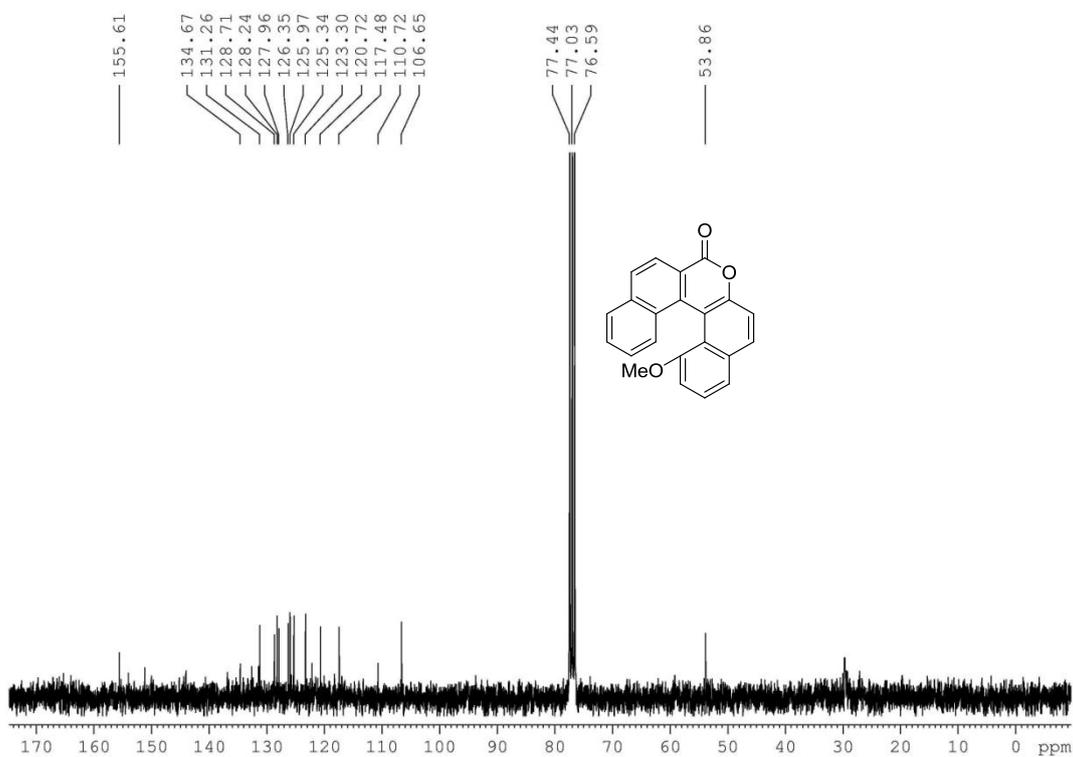


Figure S26. ¹³C NMR spectrum of **11b** in CDCl₃.

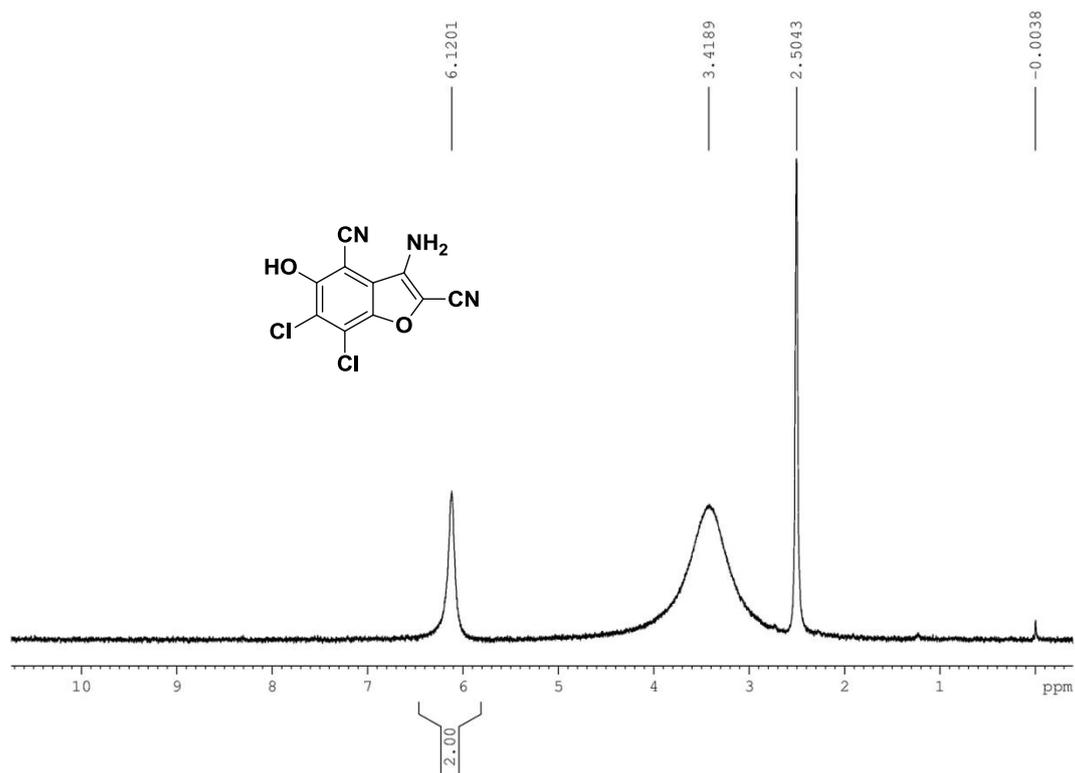


Figure S27. $^1\text{H NMR}$ spectrum of **12** in DMSO-d_6 .

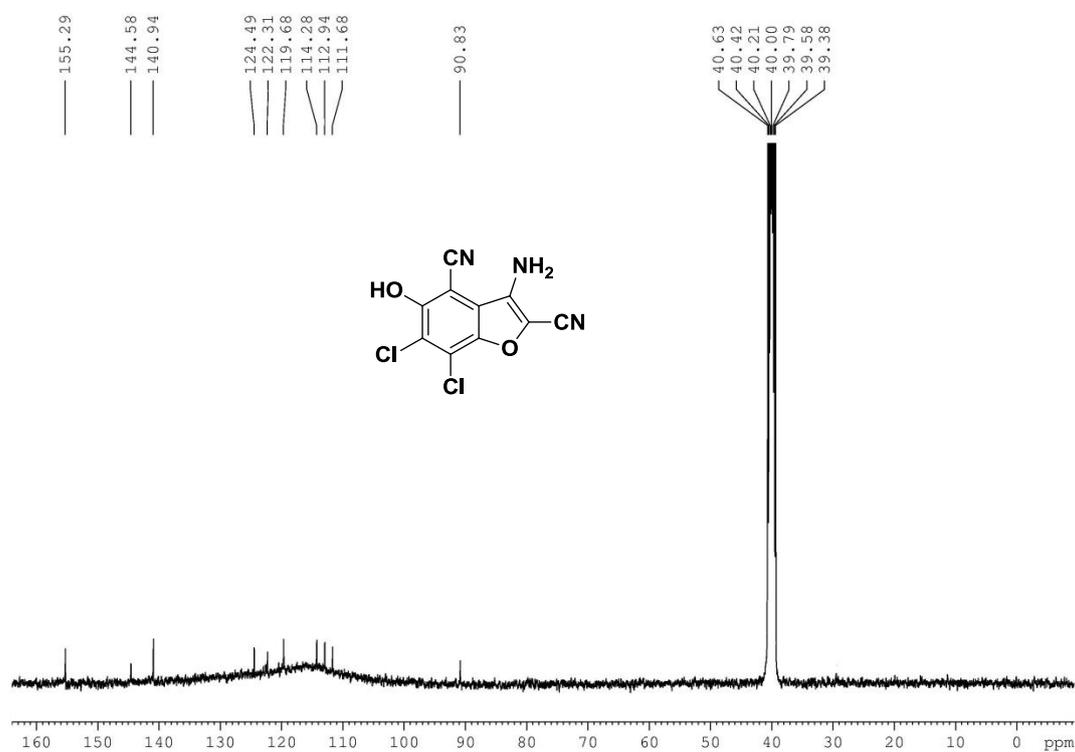


Figure S28. $^{13}\text{C NMR}$ spectrum of **12** in DMSO-d_6 .

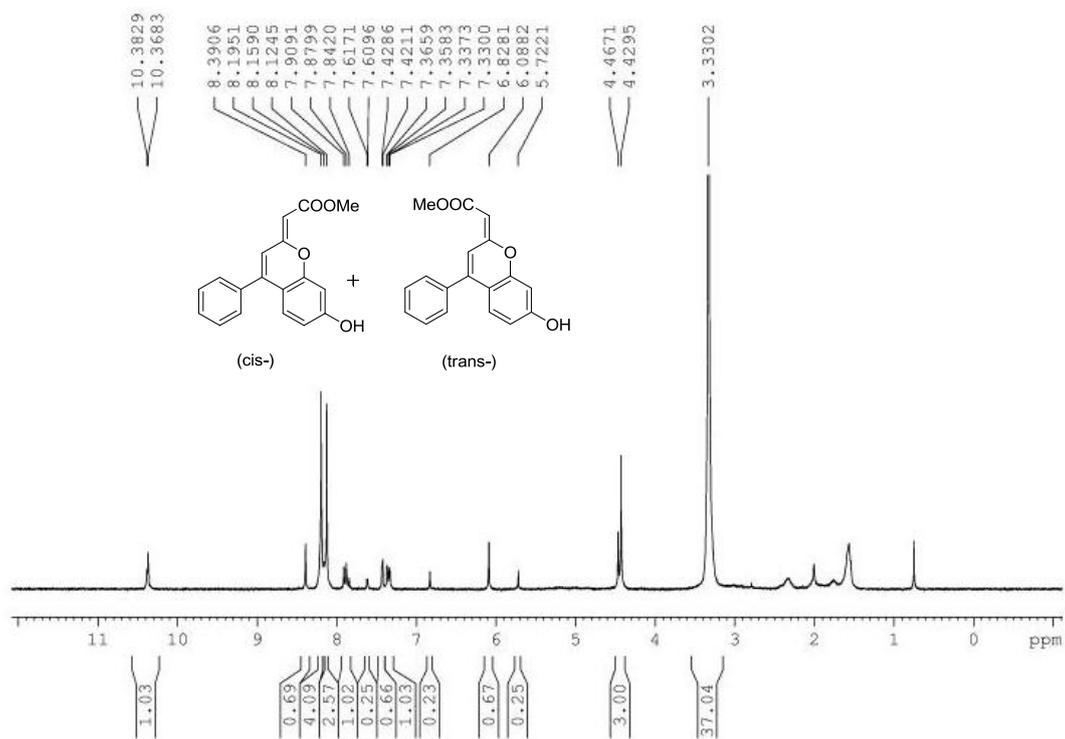


Figure S29. ^1H NMR spectrum of **15a** in ($\text{CDCl}_3+\text{DMSO-d}_6$)

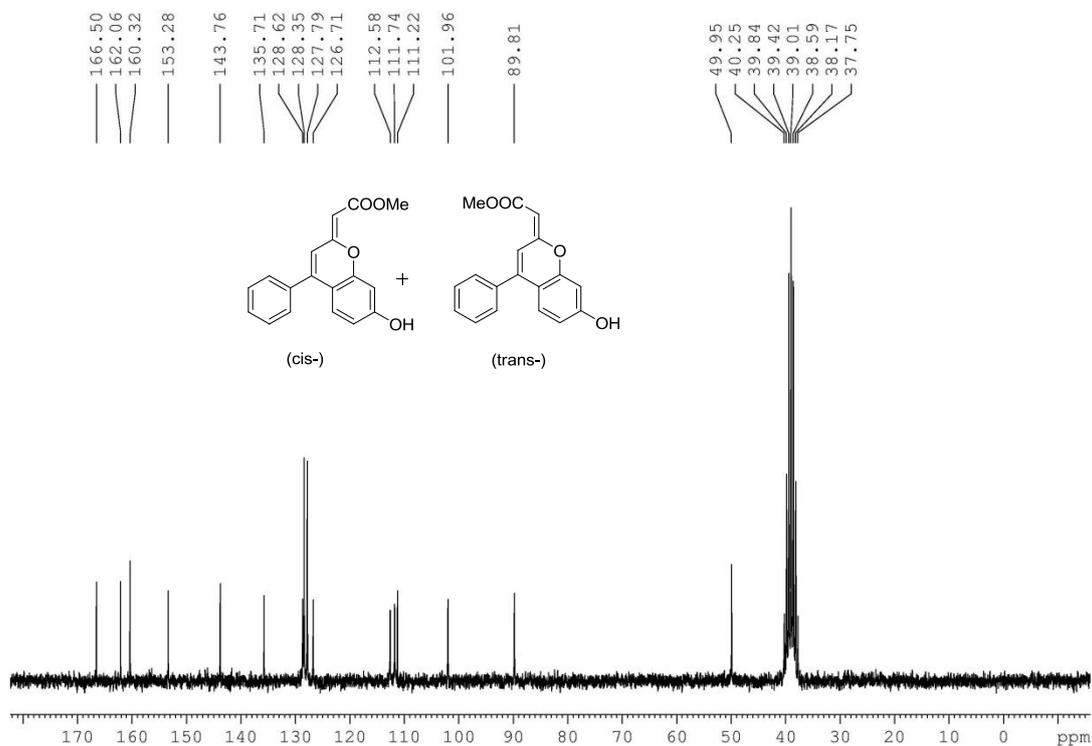


Figure S30. ^{13}C NMR spectrum of **15a** in DMSO-d_6 .

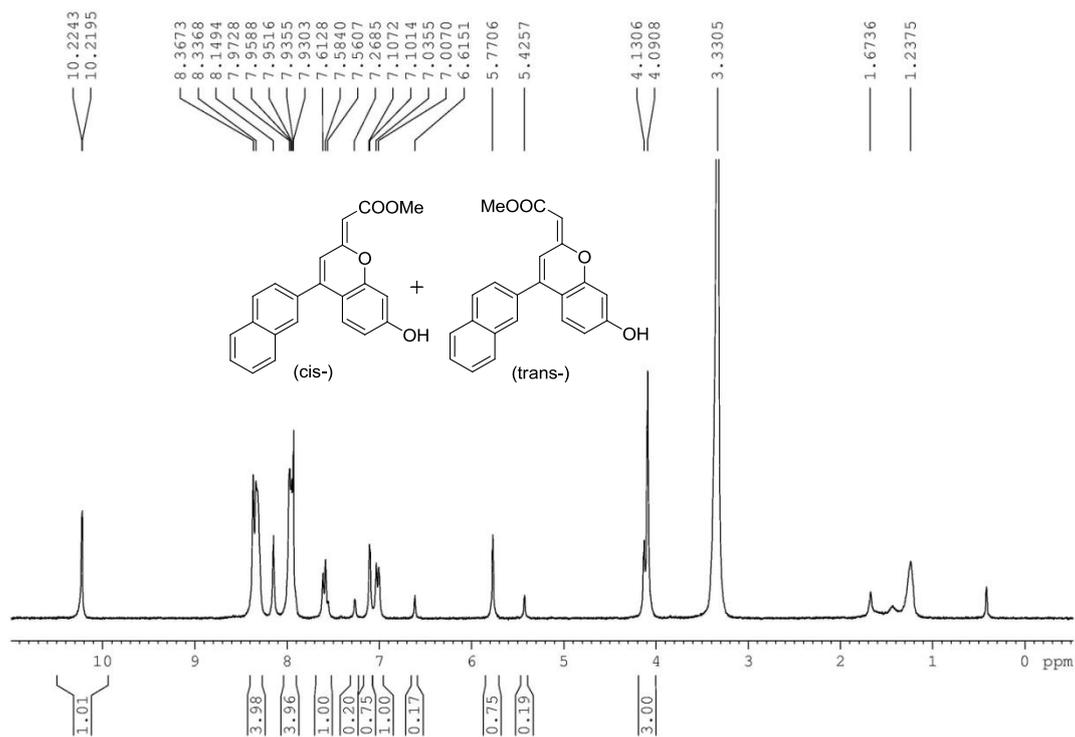


Figure S31. ¹H NMR spectrum of **15b** in (CDCl₃+DMSO-d₆)

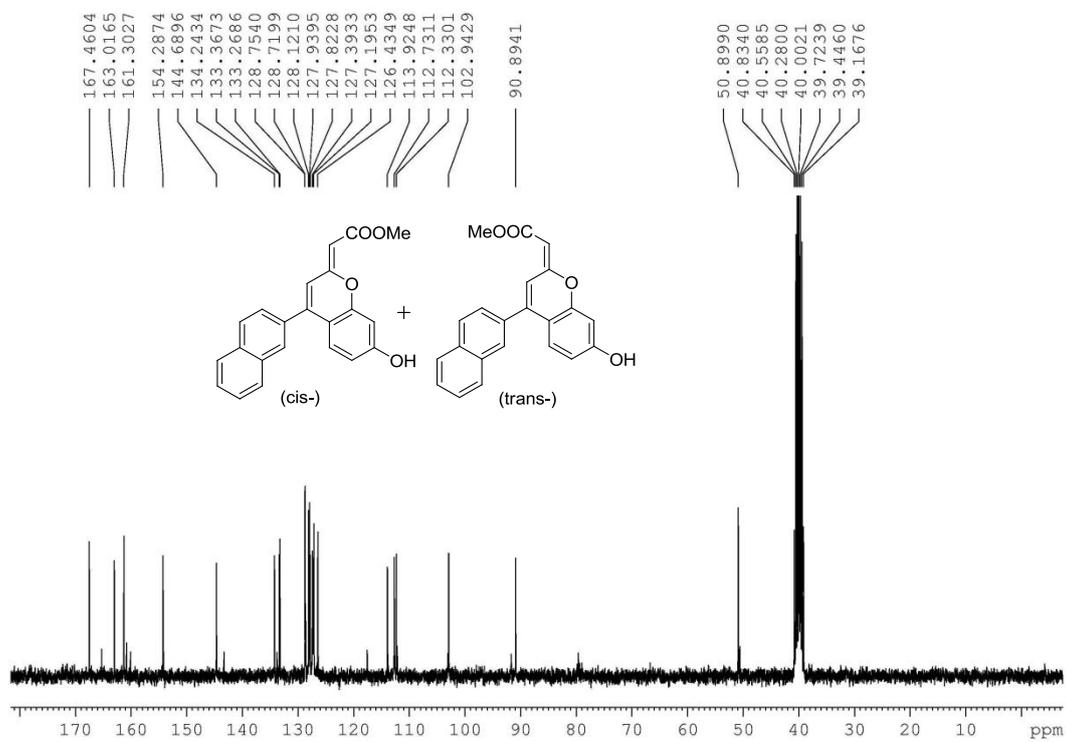


Figure S32. ¹³C NMR spectrum of **15b** in DMSO-d₆.

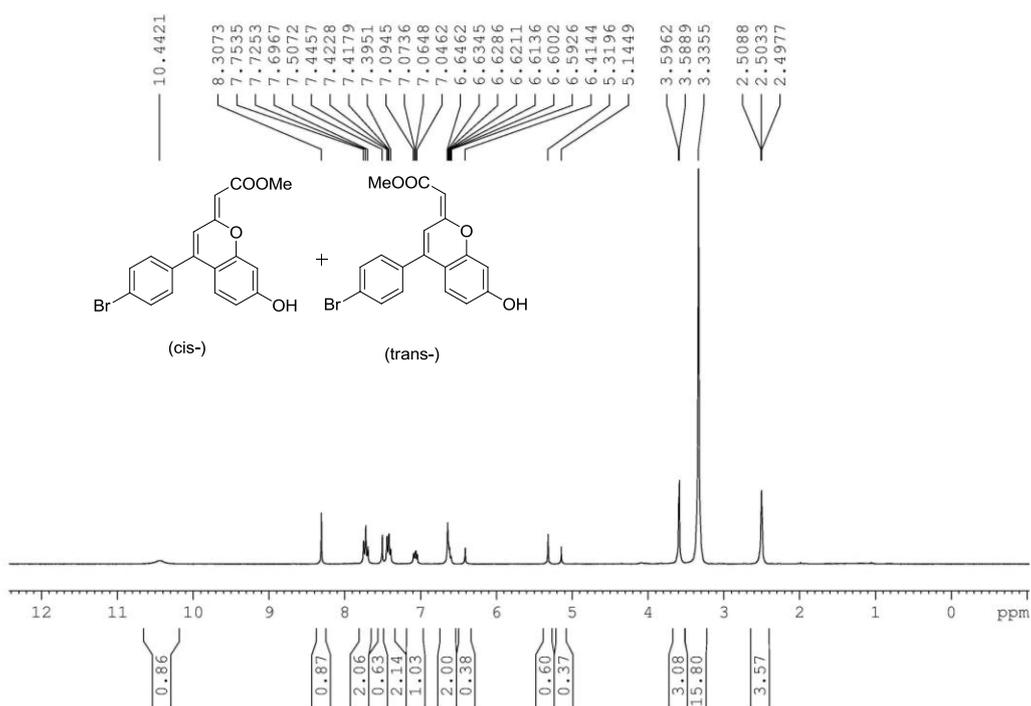


Figure S33. ^1H NMR spectrum of **15c** in ($\text{CDCl}_3+\text{DMSO-d}_6$)

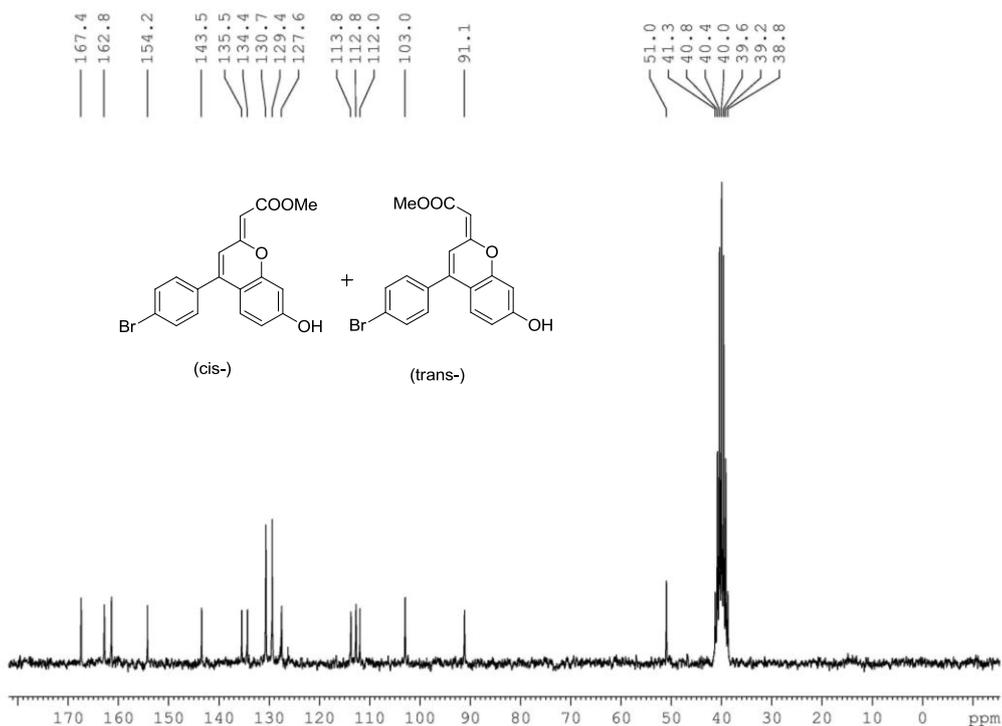


Figure S34. ^{13}C NMR spectrum of **15c** in (DMSO-d_6)

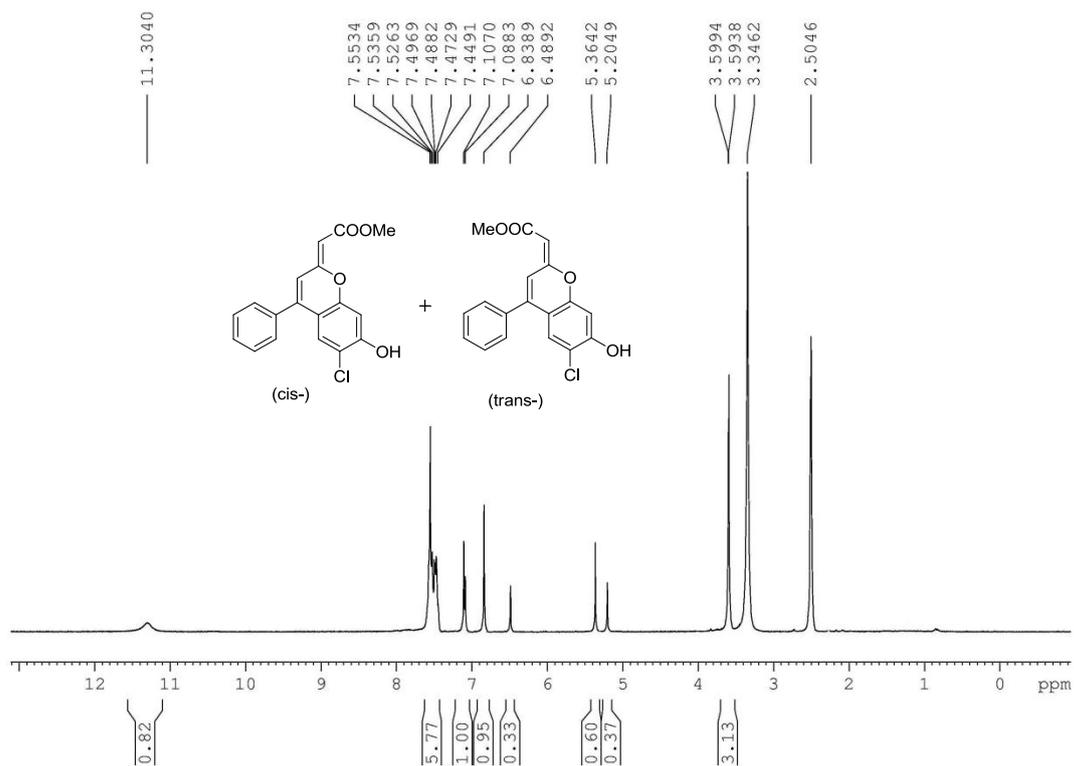


Figure S35. ^1H NMR spectrum of **15d** in DMSO-d_6 .

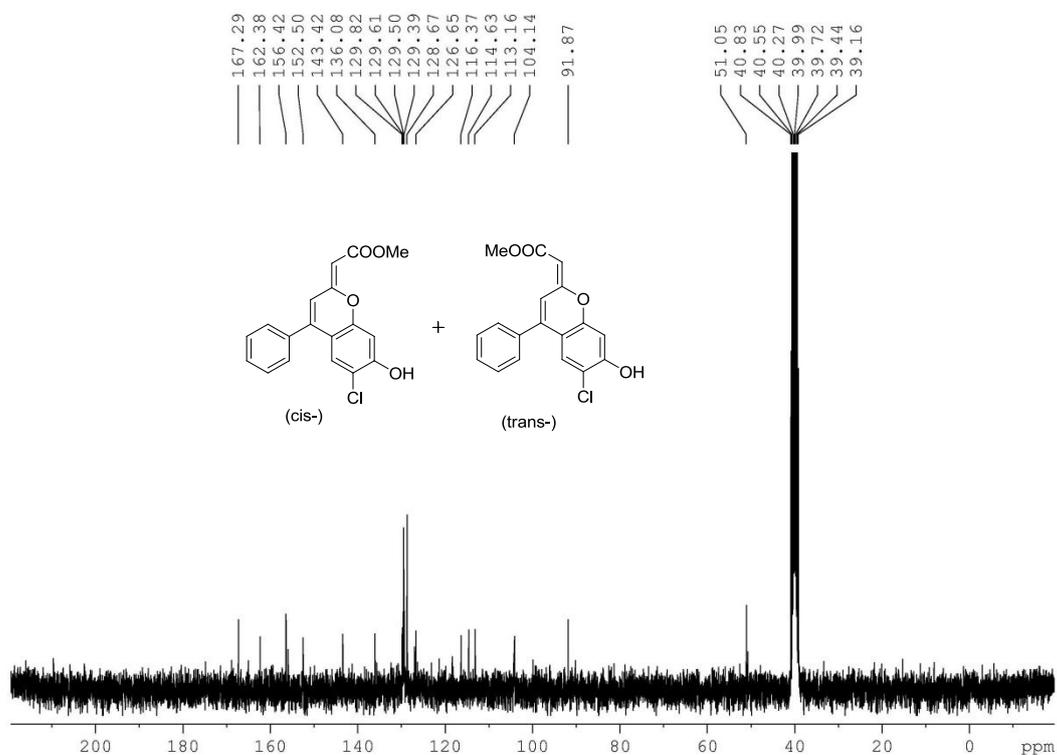


Figure S36. ^{13}C NMR spectrum of **15d** in DMSO-d_6 .

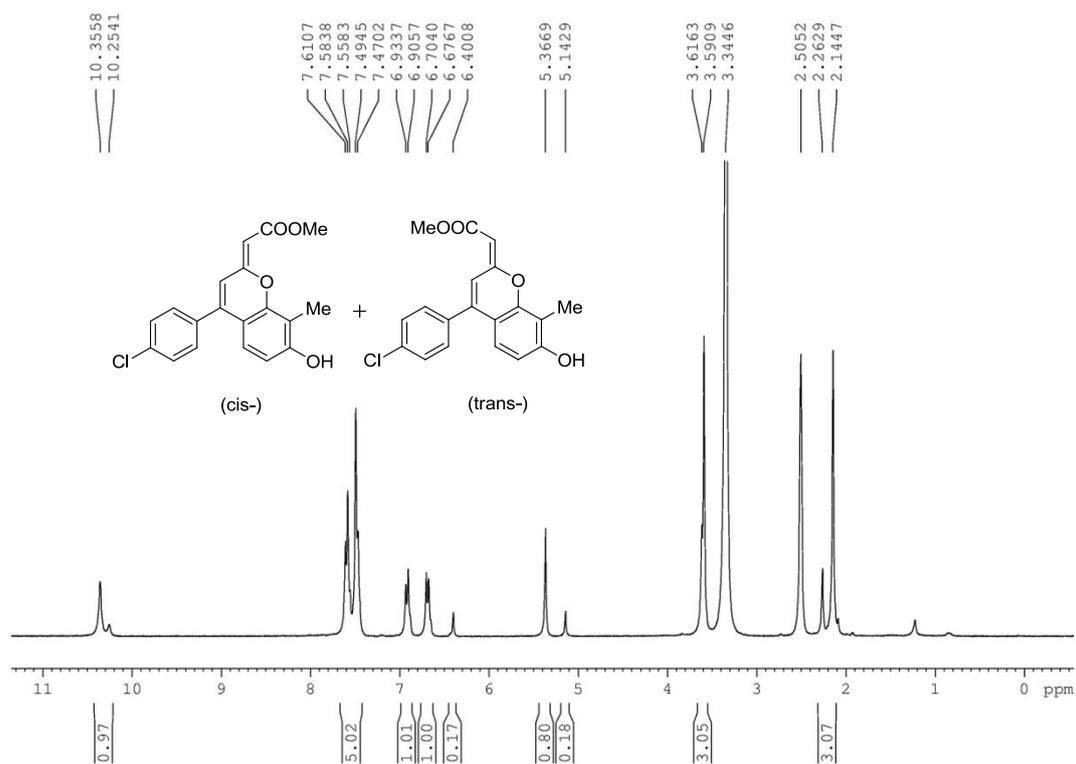


Figure S37. ¹H NMR spectrum of **15e** in DMSO-d₆.

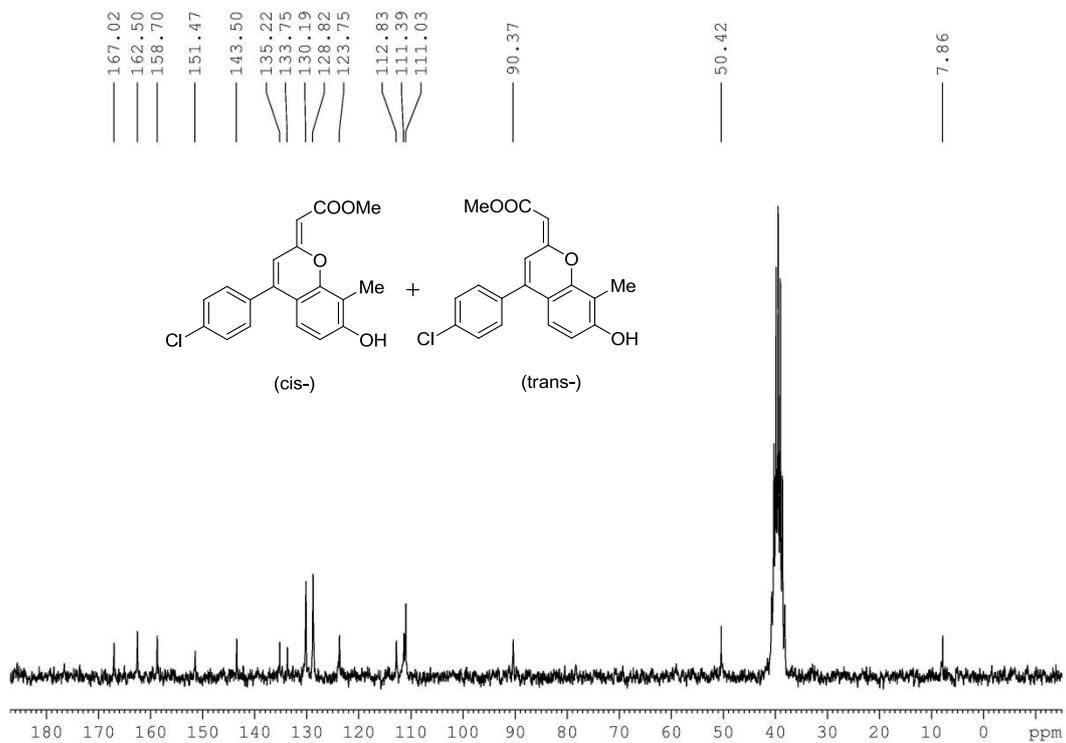


Figure S38. ¹³C NMR spectrum of **15e** in DMSO-d₆.

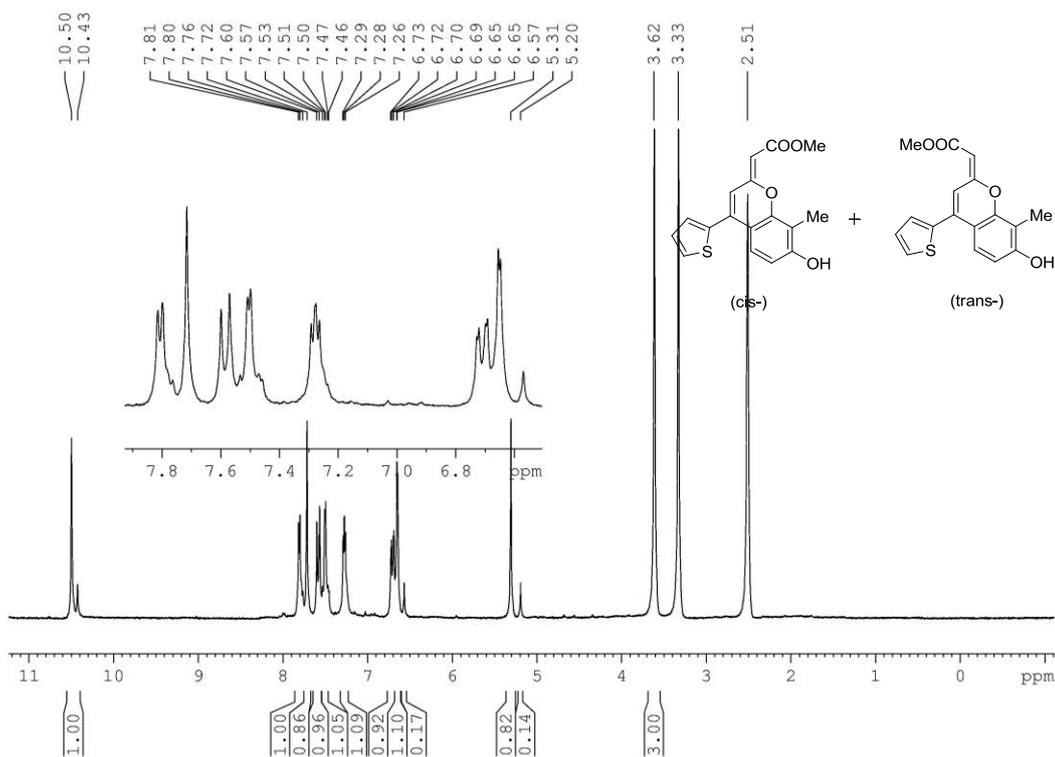


Figure S39. ¹H NMR spectrum of **15f** in (CDCl₃+DMSO-d₆)

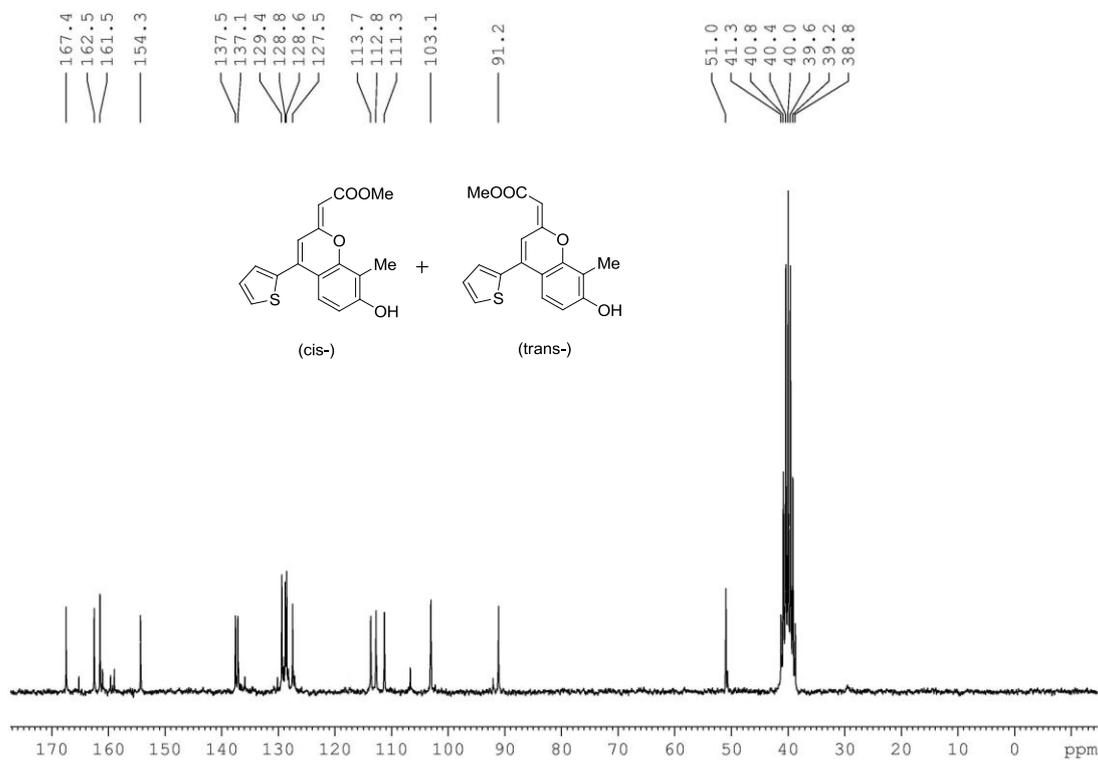


Figure S40. ¹³C NMR spectrum of **15f** in (DMSO-d₆)

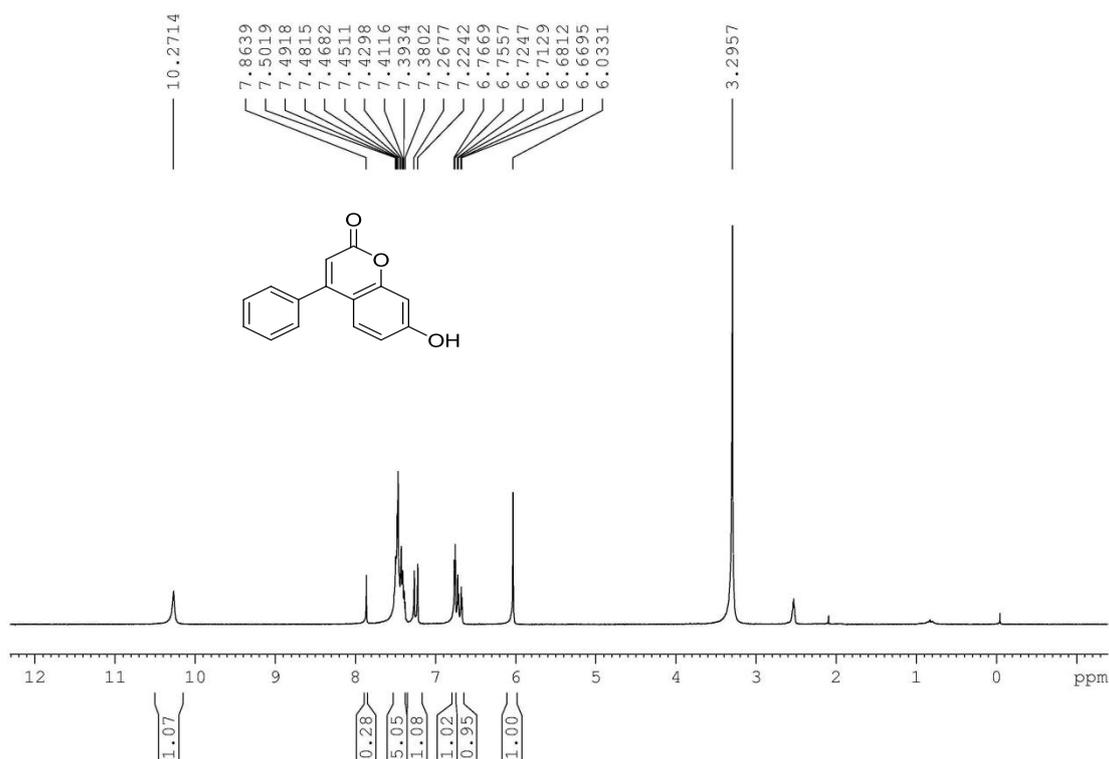


Figure S41. ¹H NMR spectrum of **16a** in (CDCl₃ + DMSO-d₆)

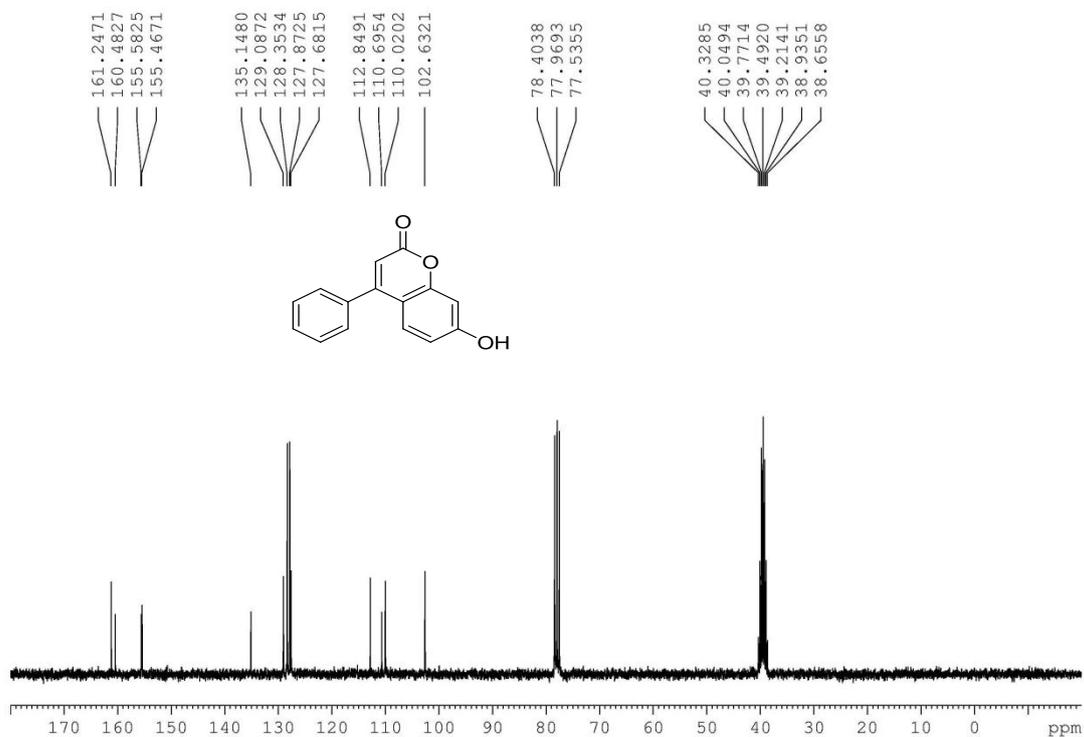


Figure S42. ¹³C NMR spectrum of **16a** in (CDCl₃ + DMSO-d₆)

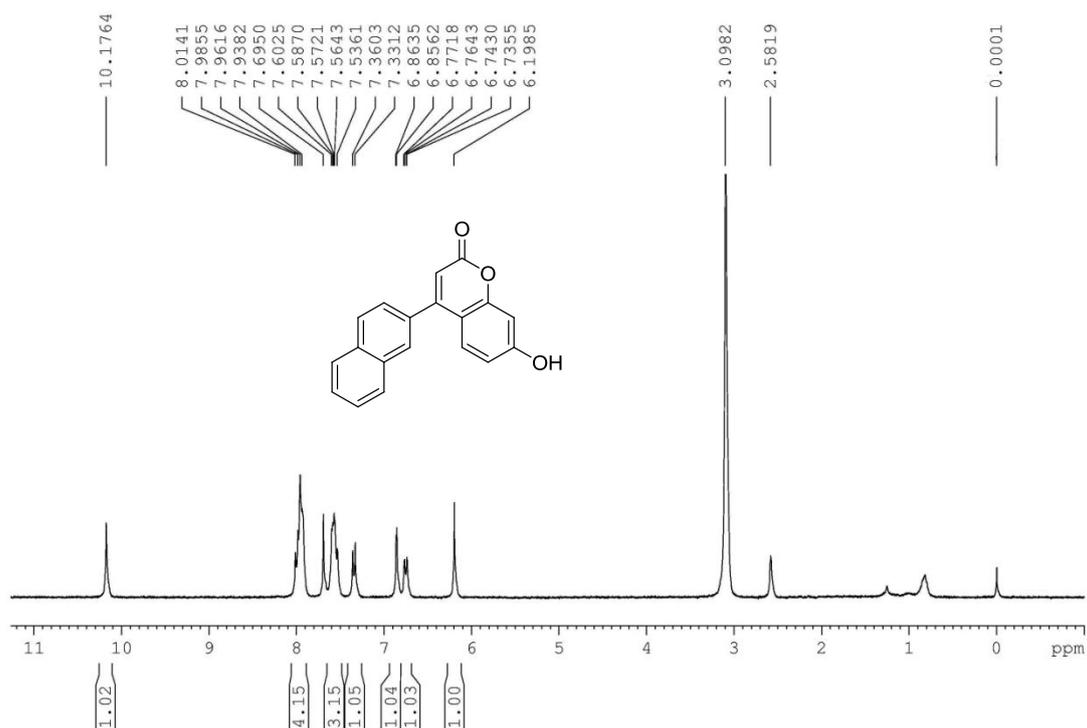


Figure S43. ¹H NMR spectrum of **16b** in (CDCl₃ + DMSO-d₆).

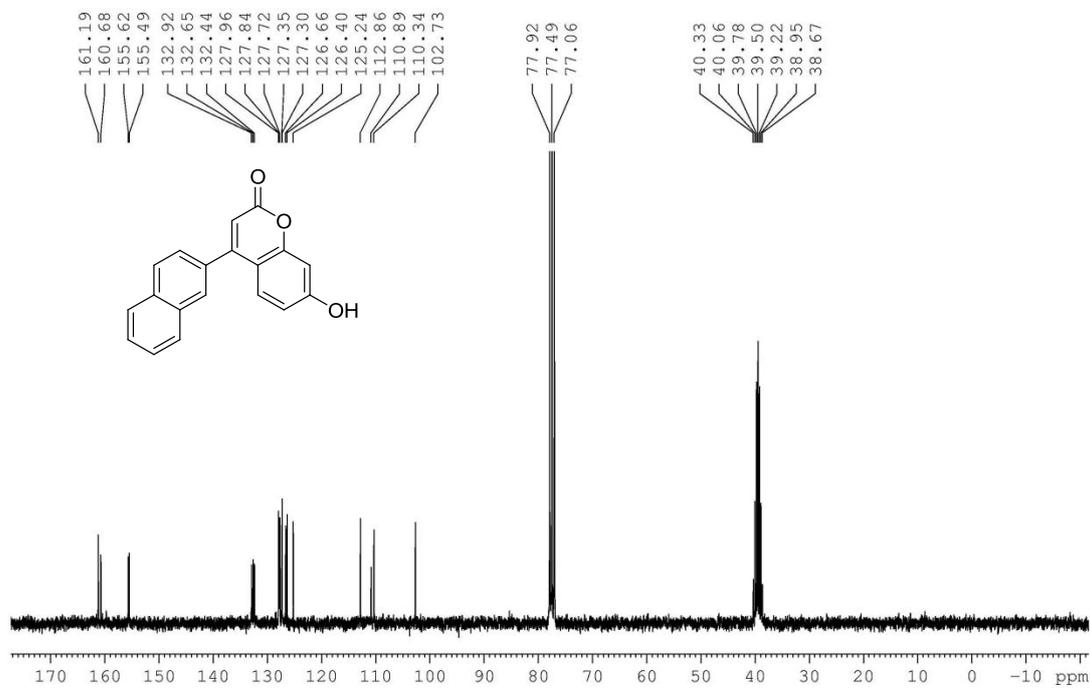


Figure S44. ¹³C NMR spectrum of **16b** in (CDCl₃ + DMSO-d₆).

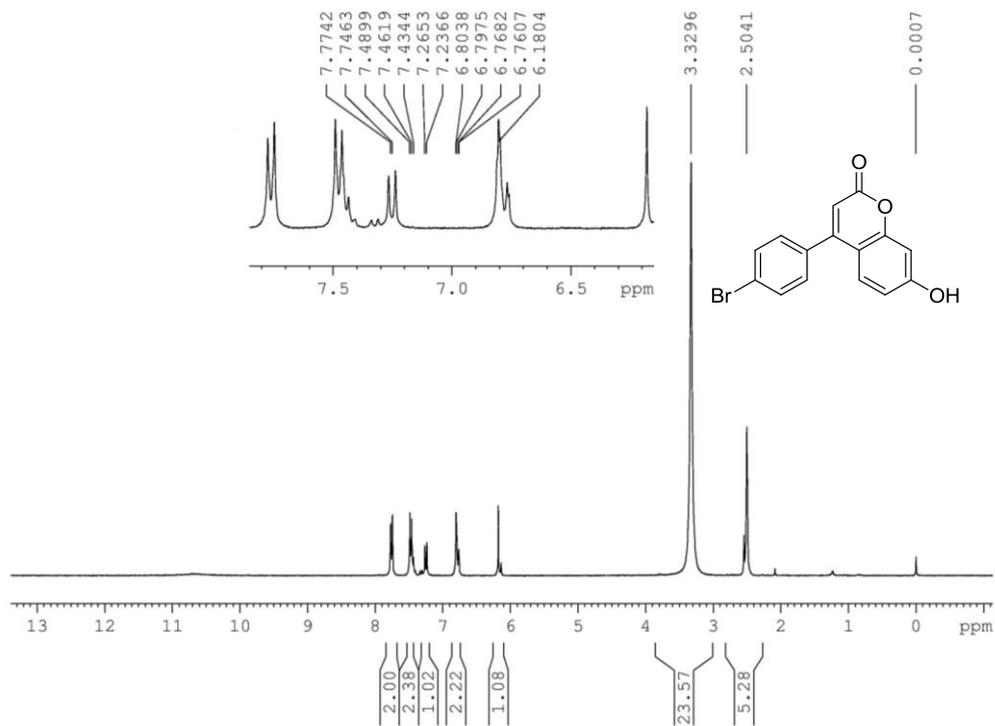


Figure S45. ¹H NMR spectrum of **16c** in (DMSO-d₆).

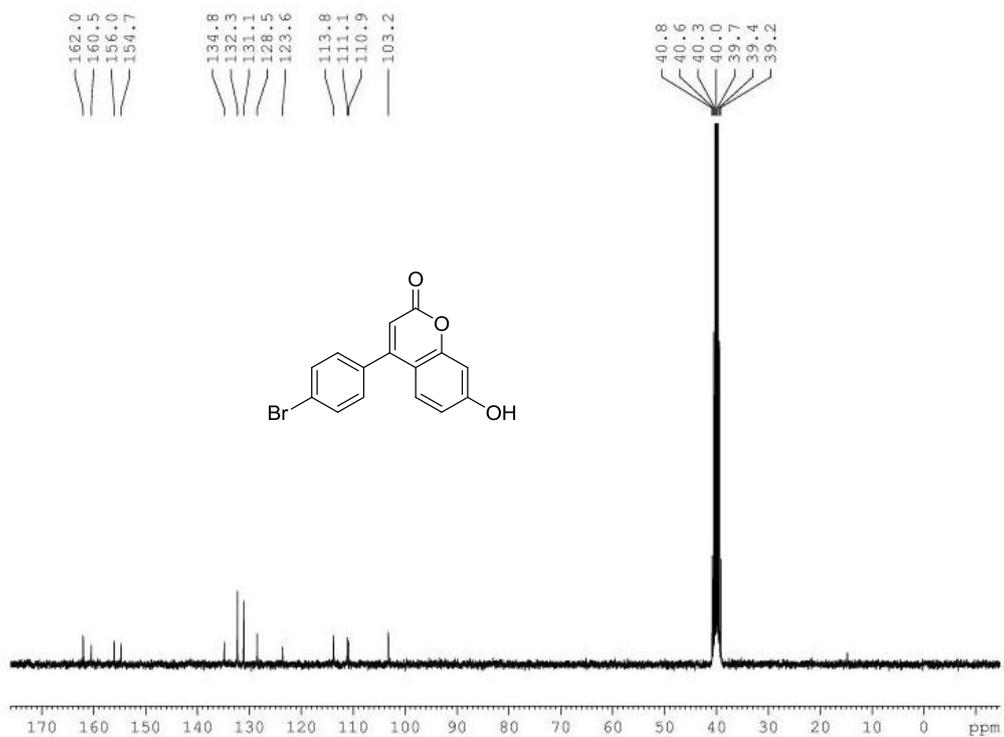


Figure S46. ¹³C NMR spectrum of **16c** in (DMSO-d₆).

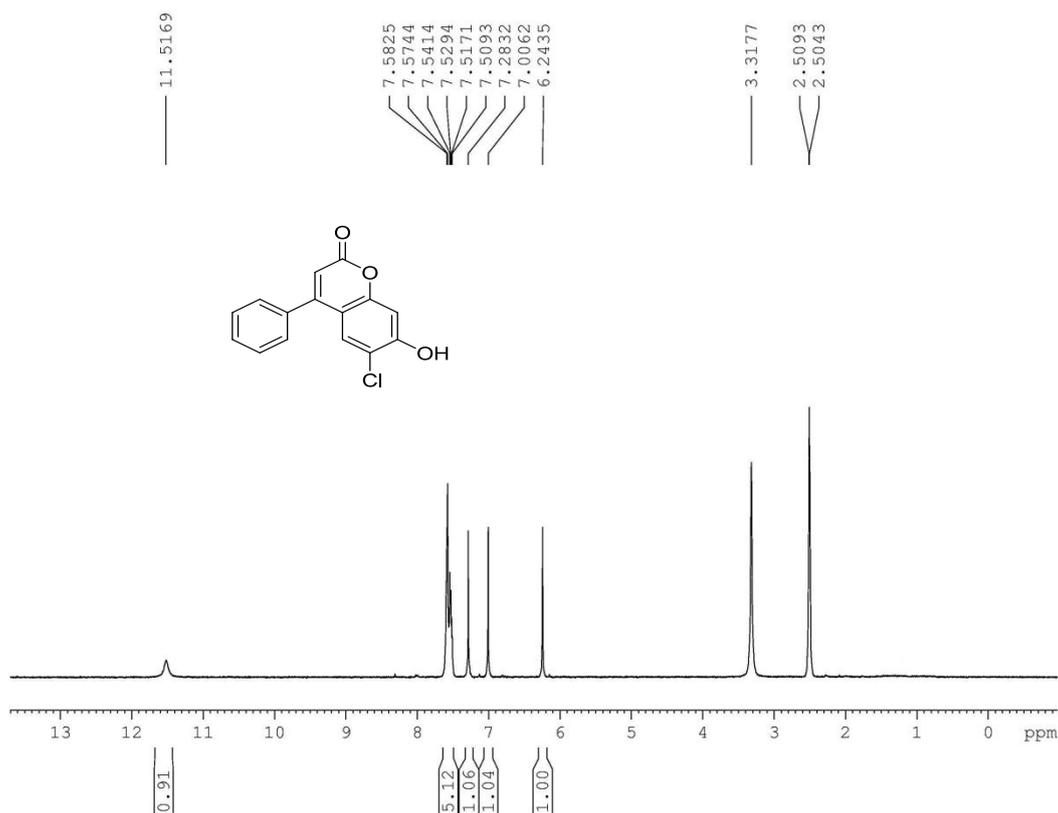


Figure S47. $^1\text{H NMR}$ spectrum of **16d** in DMSO-d_6

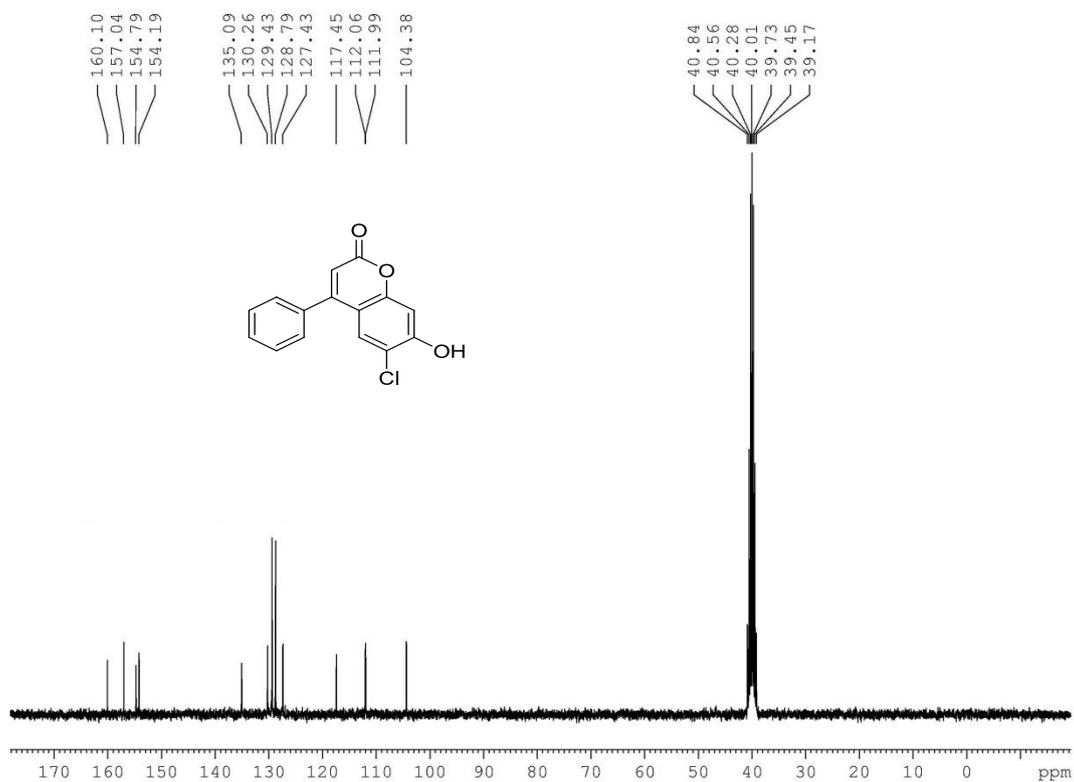


Figure S48. $^{13}\text{C NMR}$ spectrum of **16d** in DMSO-d_6

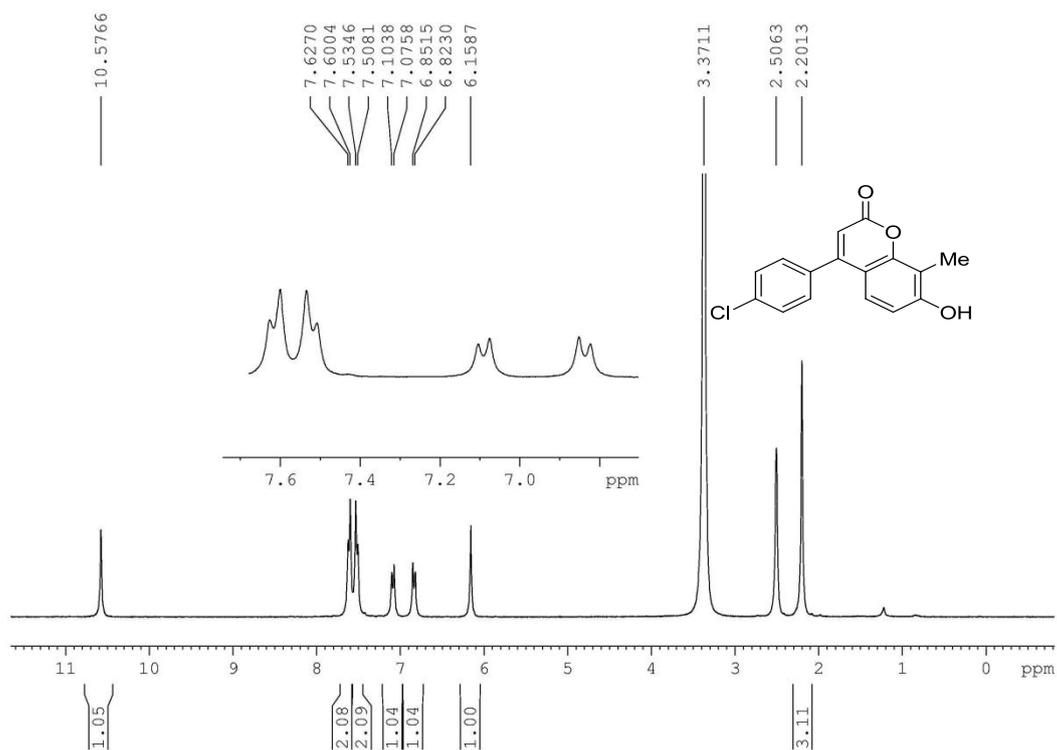


Figure S49. ¹H NMR spectrum of **16e** in DMSO-d₆

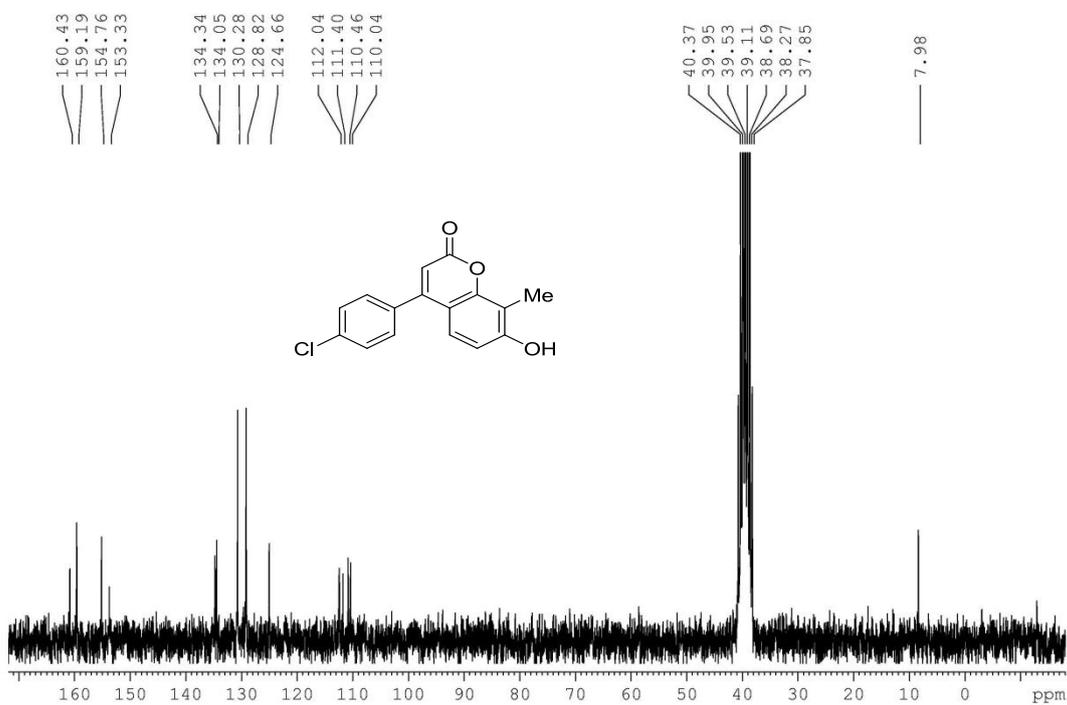


Figure S50. ¹³C NMR spectrum of **16e** in DMSO-d₆

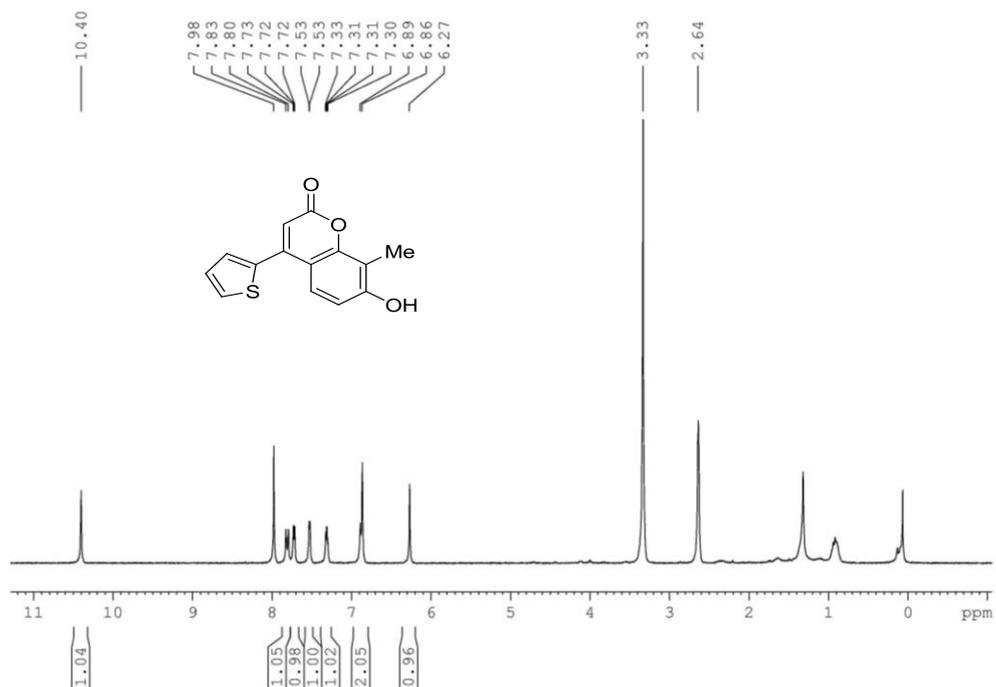


Figure S51. ¹H NMR spectrum of **16f** in (CDCl₃ + DMSO-d₆)

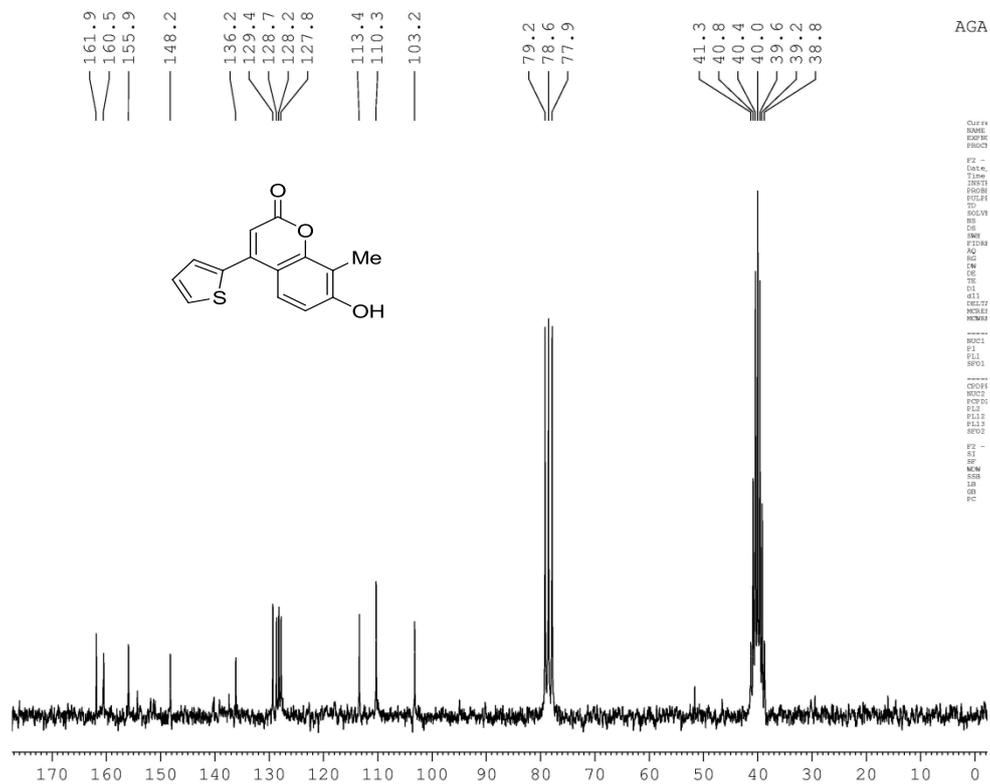


Figure S52. ¹³C NMR spectrum of **16f** in (CDCl₃ + DMSO-d₆)

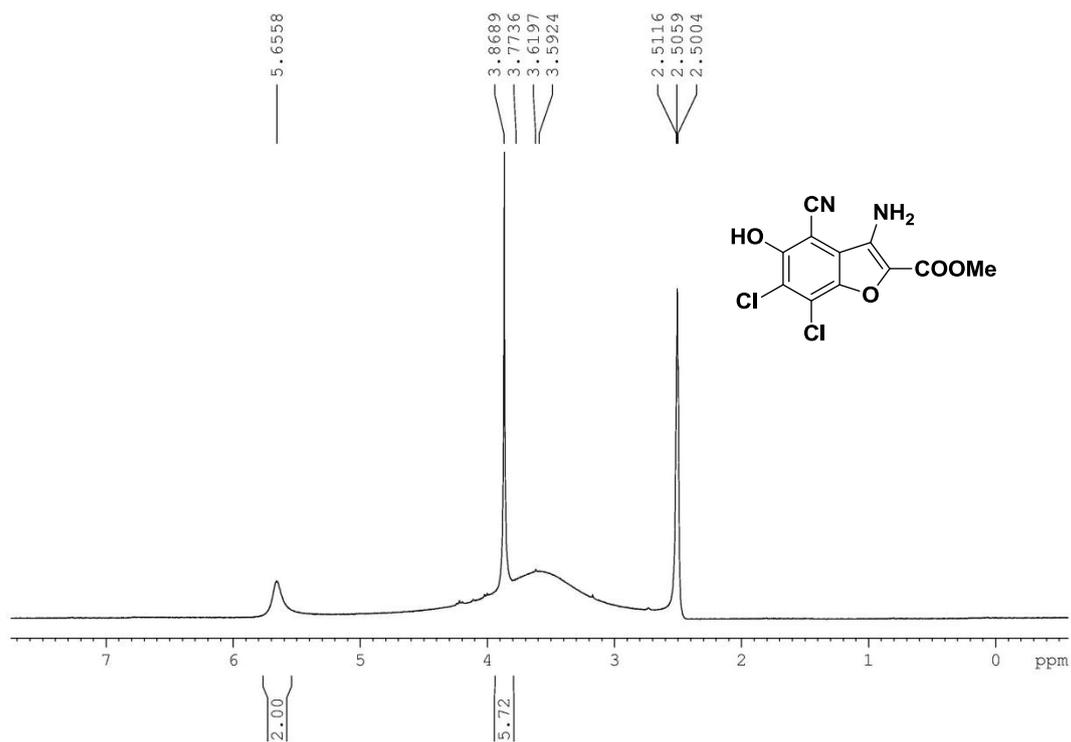


Figure S53. ^1H NMR spectrum of **17** in DMSO-d_6

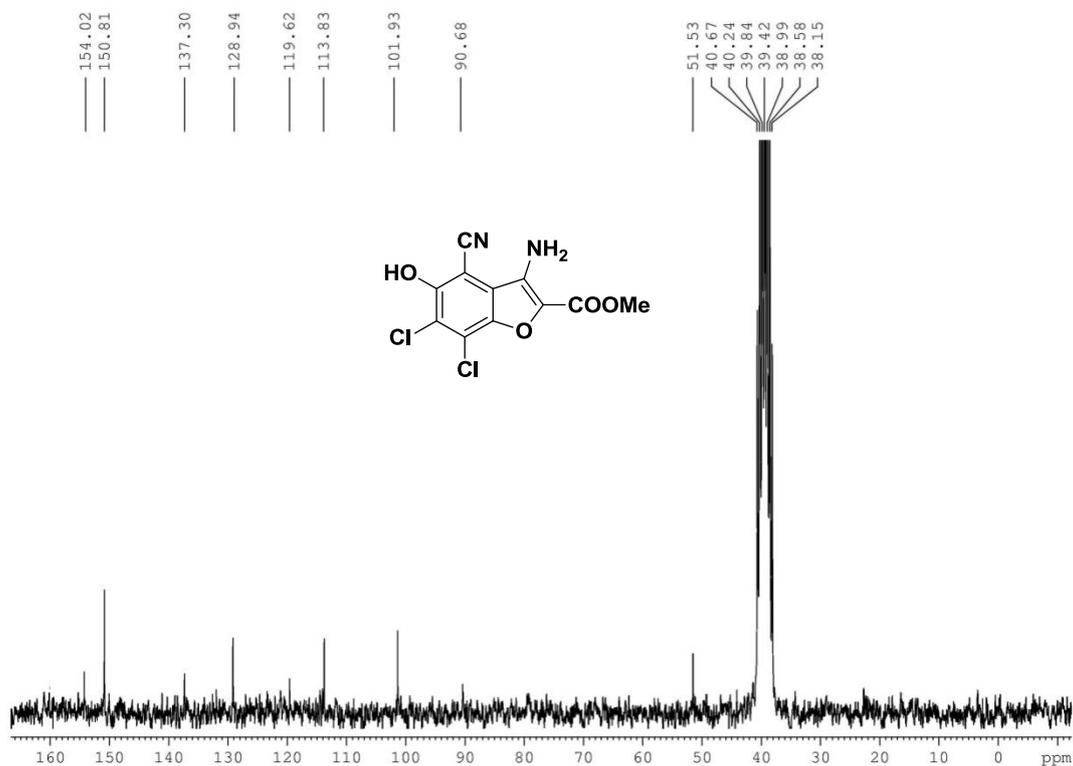


Figure S54. ^{13}C NMR spectrum of **17** in DMSO-d_6

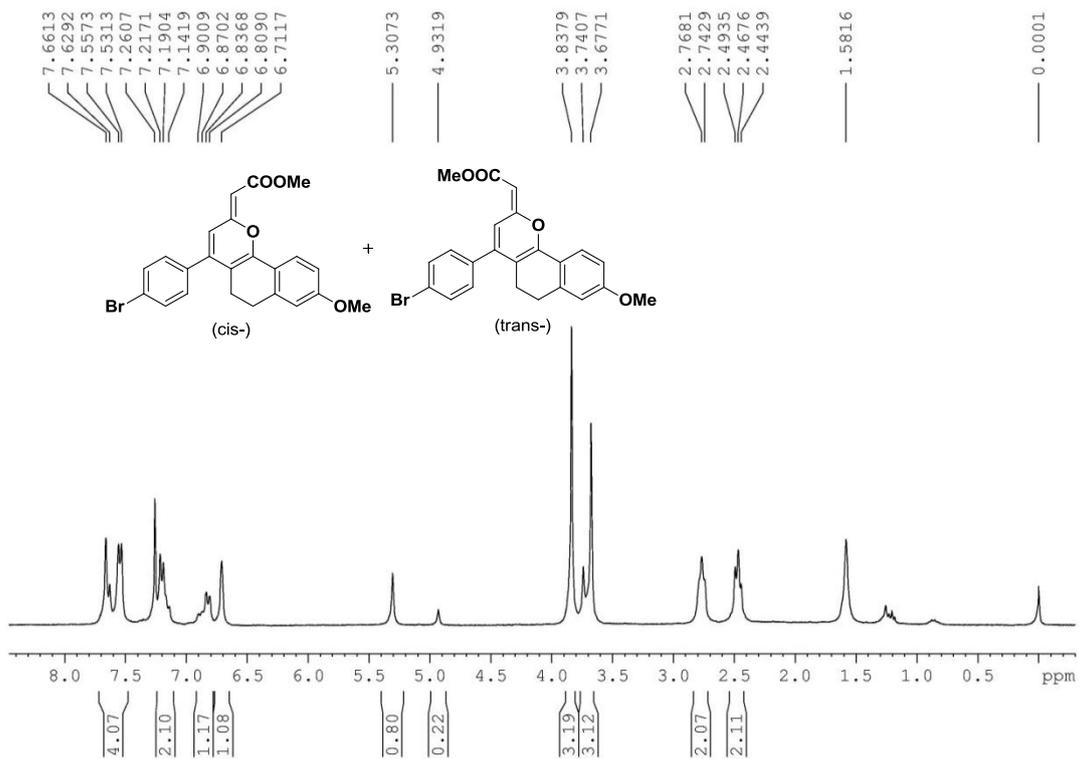


Figure S55. ¹H NMR spectrum of 18a in CDCl₃.

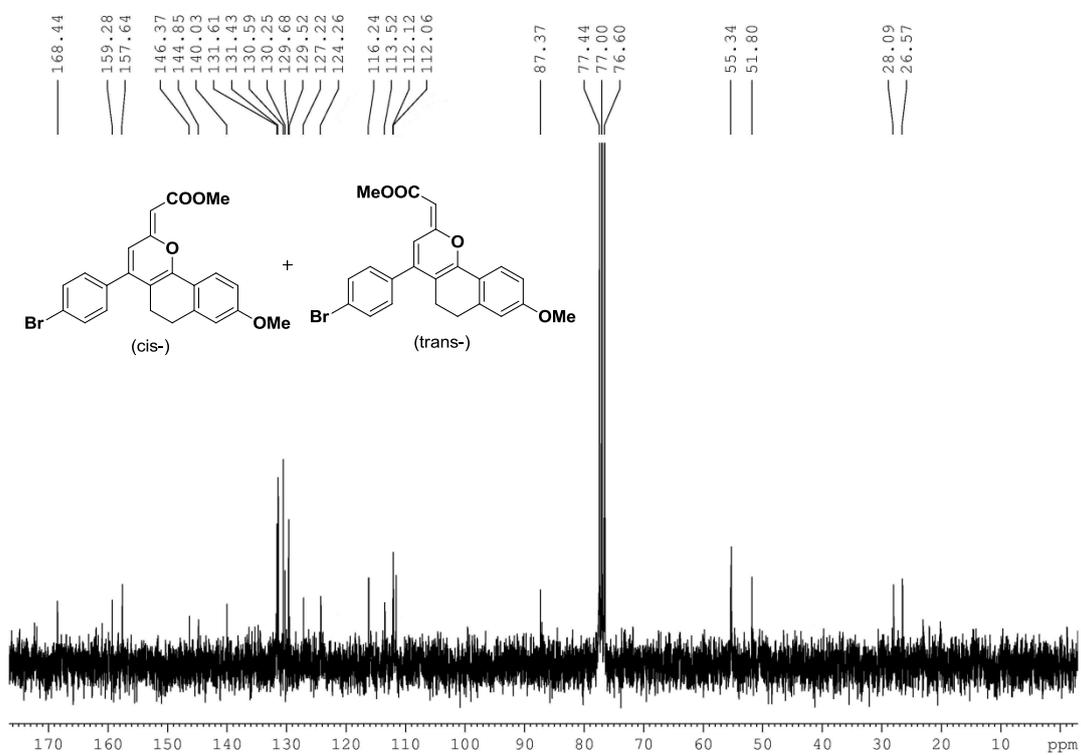


Figure S56. ¹³C NMR spectrum of 18a in CDCl₃.

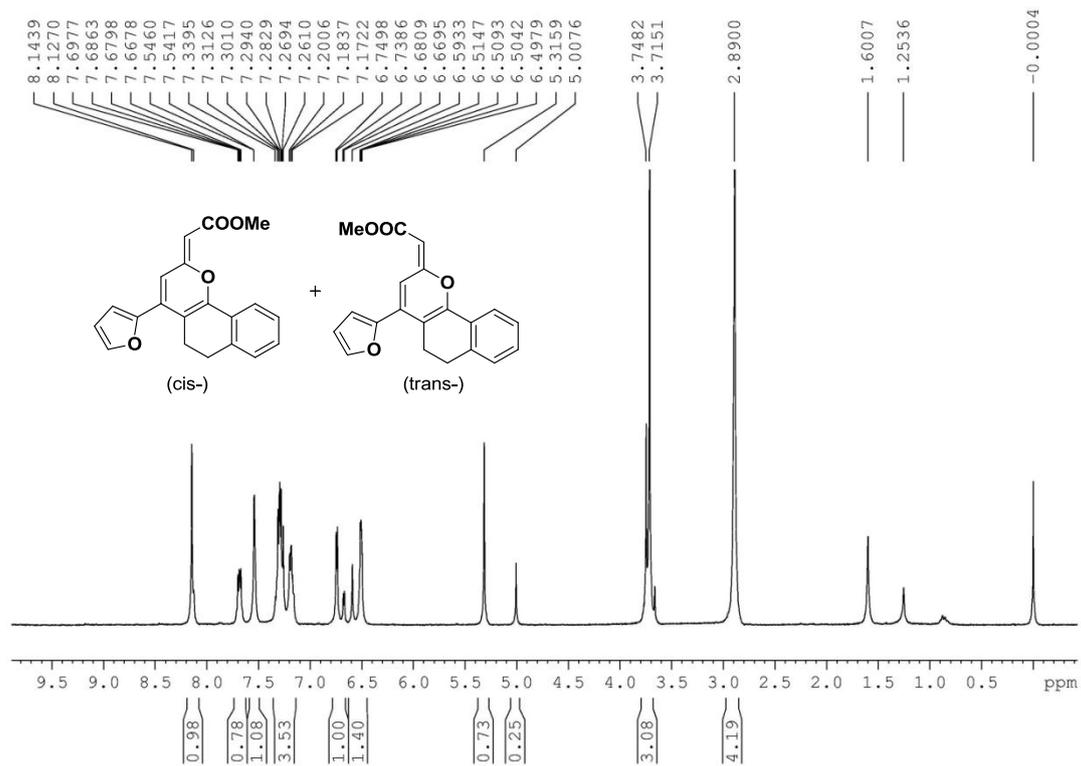


Figure S57. ^1H NMR spectrum of **18b** in CDCl_3 .

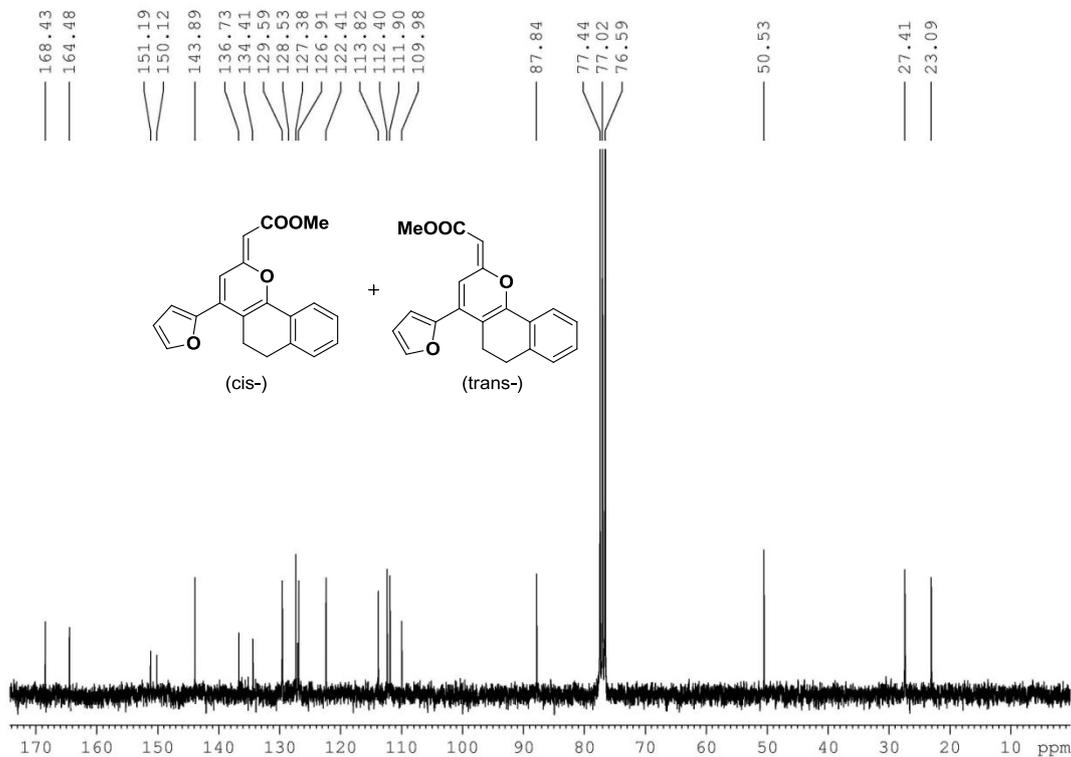
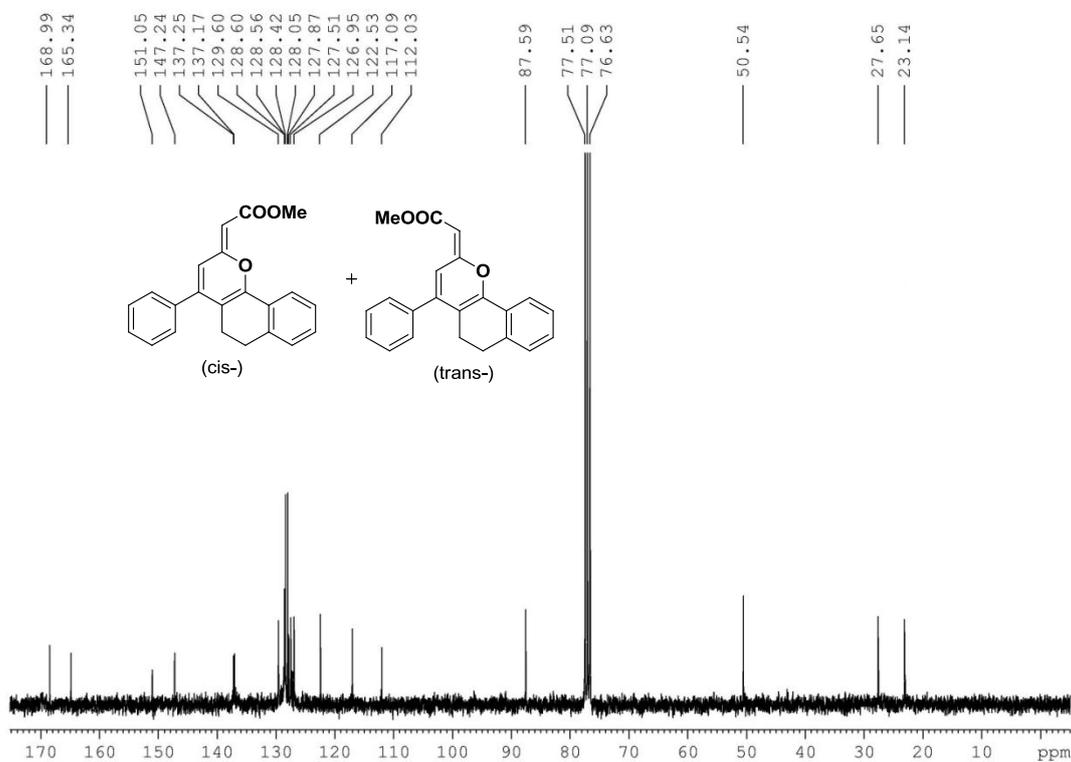
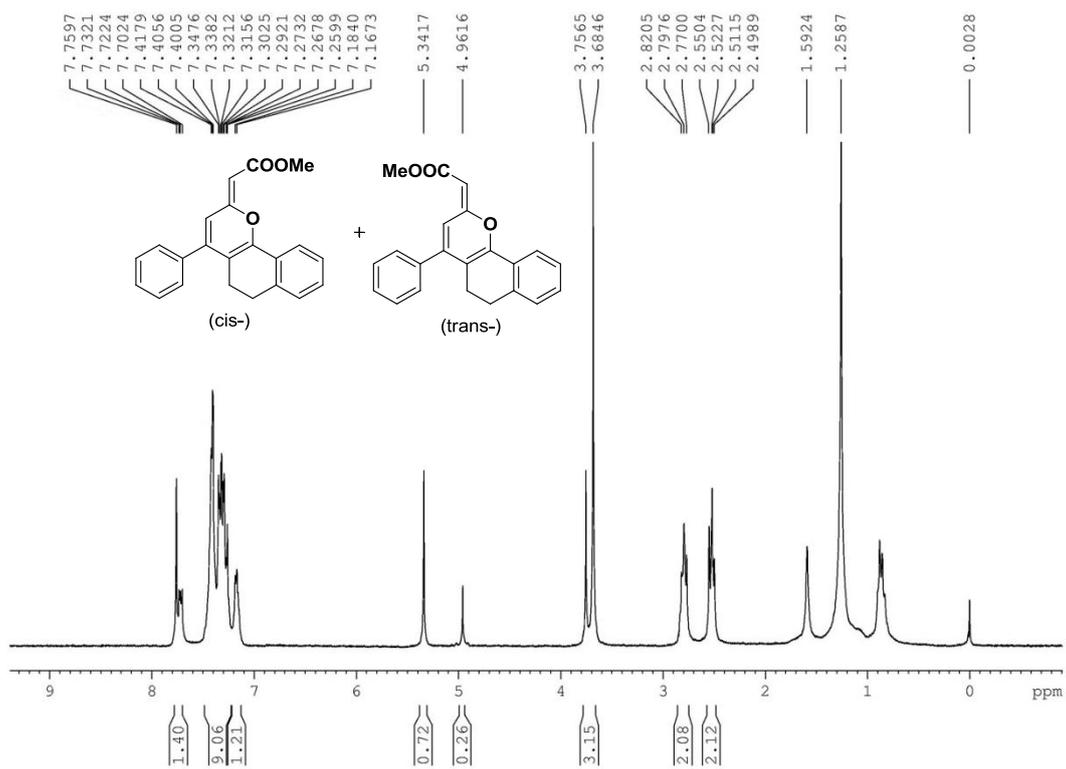


Figure S58. ^{13}C NMR spectrum of **18b** in CDCl_3 .



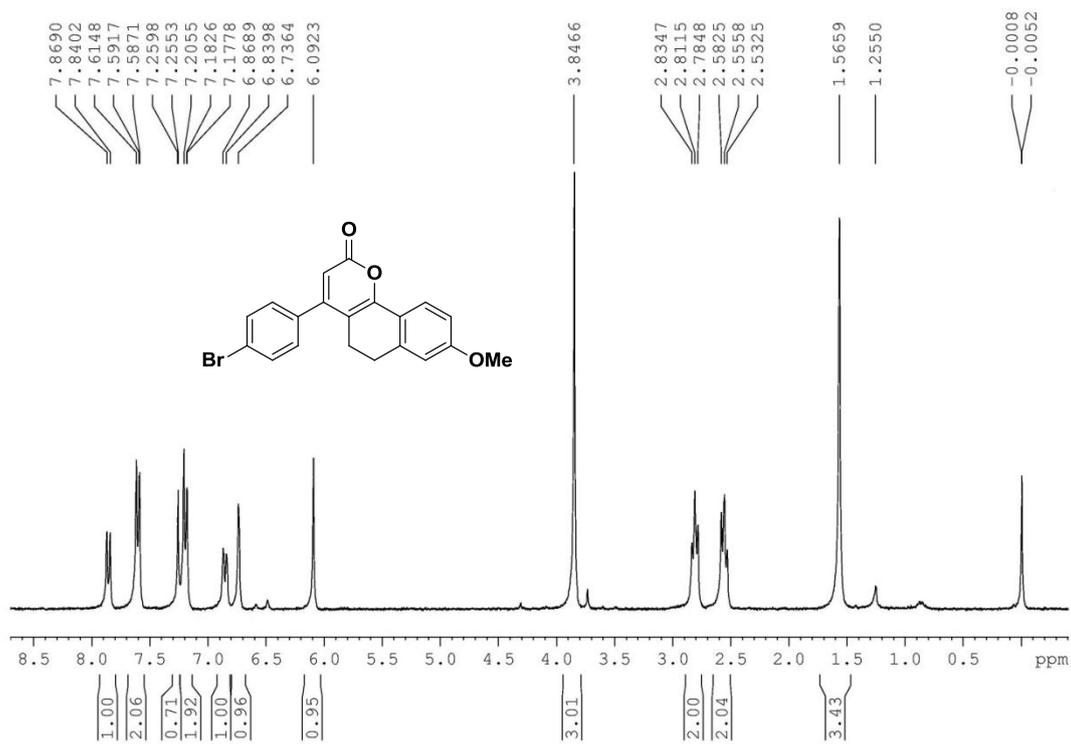


Figure S61. ¹H NMR spectrum of **19a** in CDCl₃.

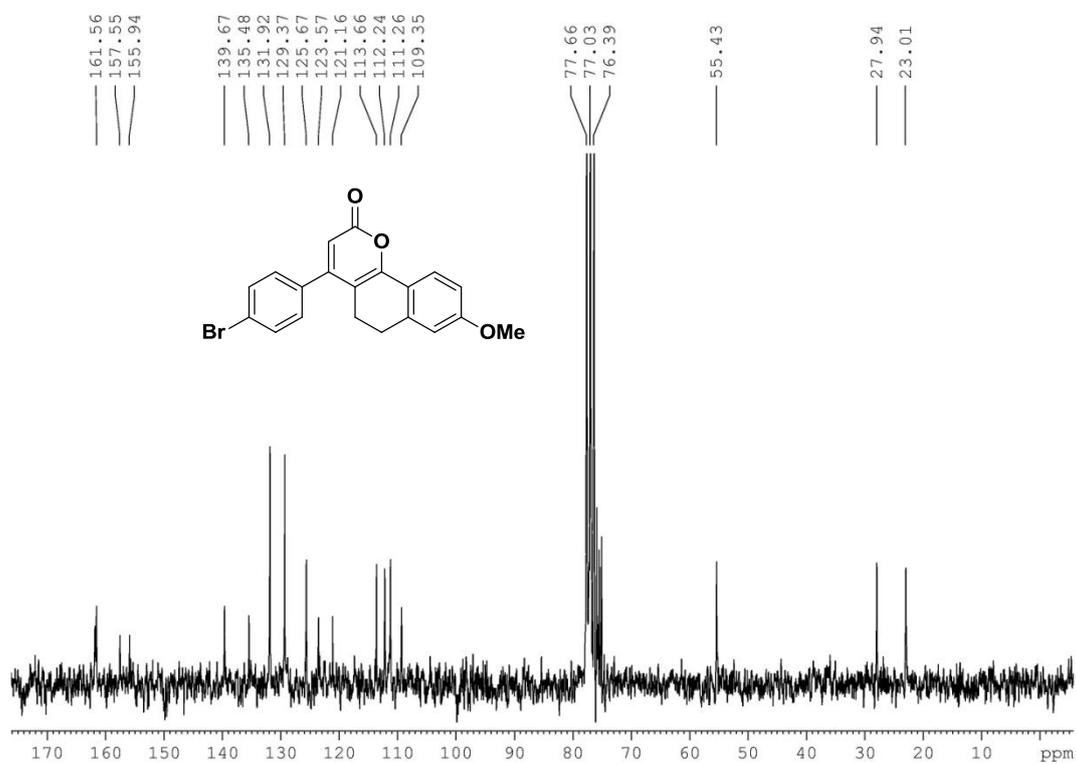


Figure S62. ¹³C NMR spectrum of **19a** in CDCl₃.

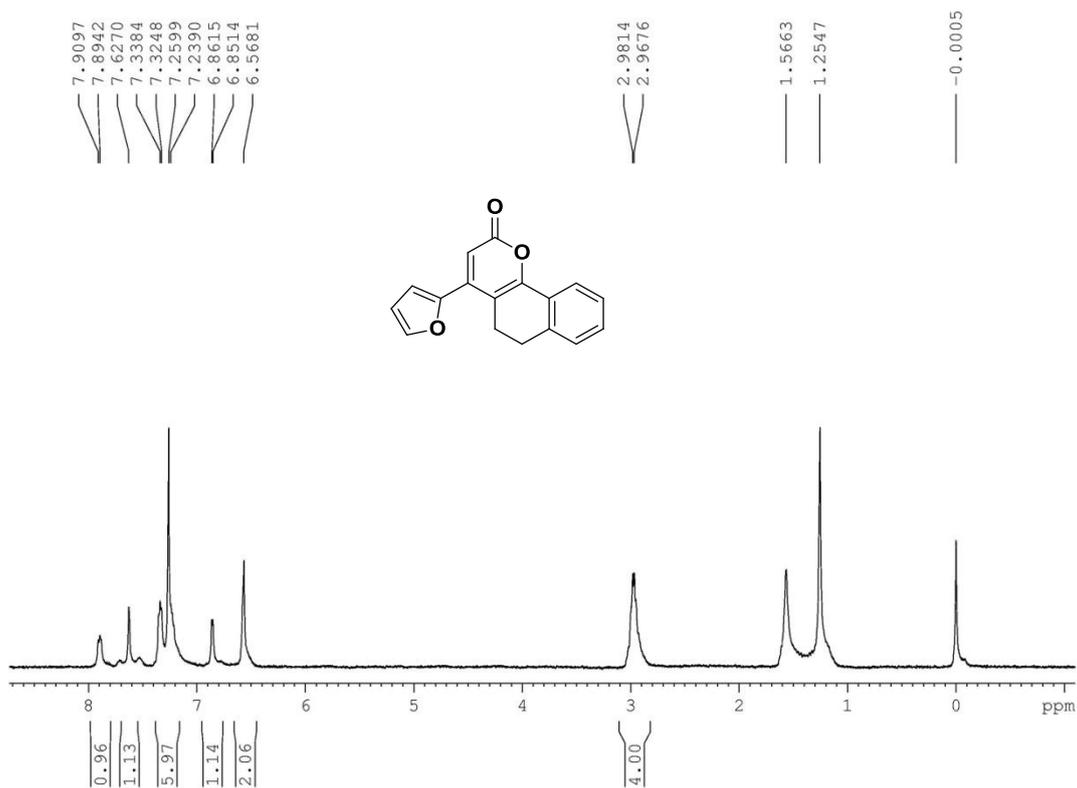


Figure S63. ¹H NMR spectrum of **19b** in CDCl₃.

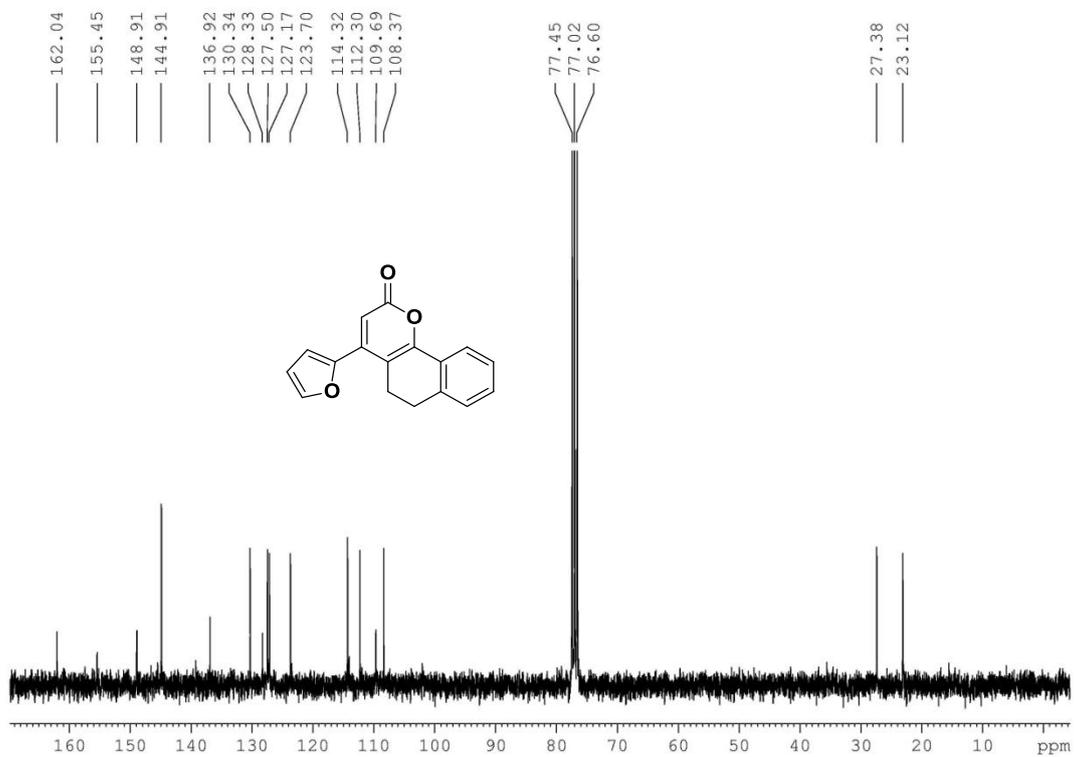


Figure S64. ¹³C NMR spectrum of **19b** in CDCl₃.

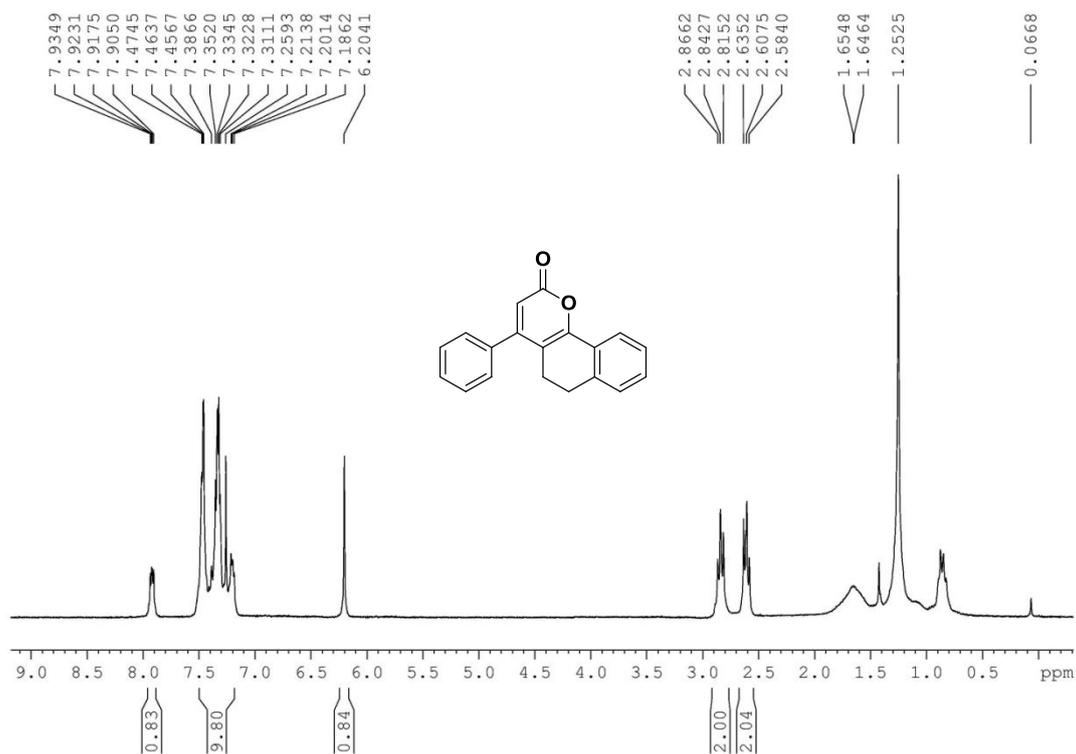


Figure S65. ¹H NMR spectrum of **19c** in CDCl₃.

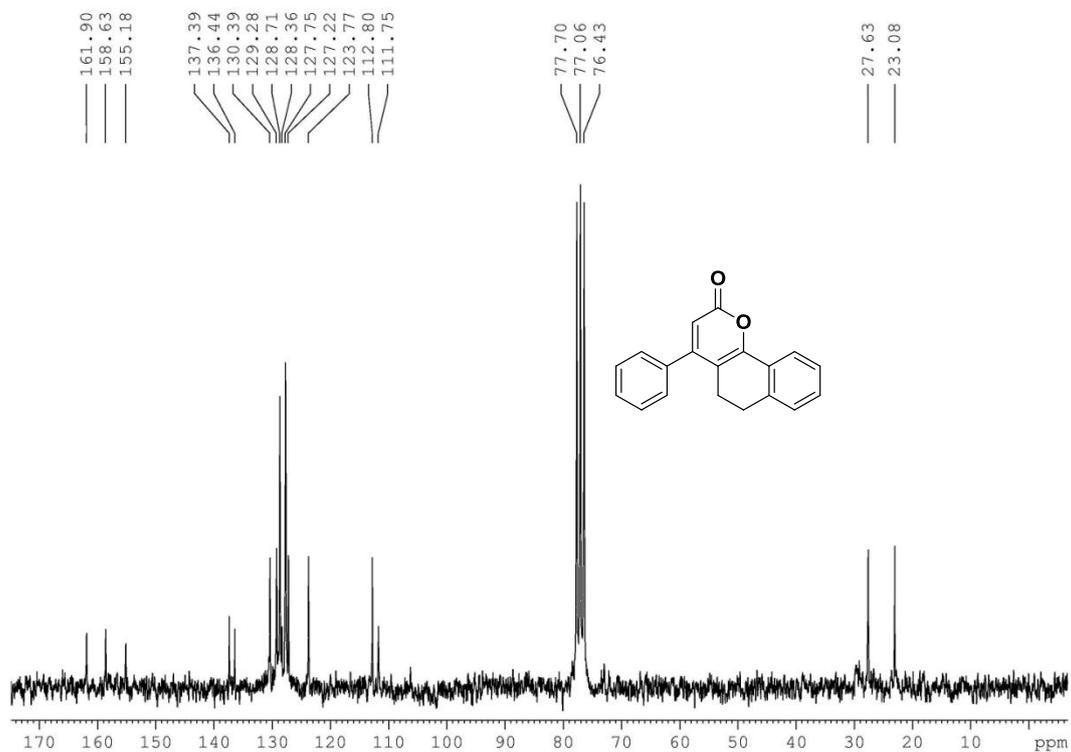


Figure S66. ¹³C NMR spectrum of **19c** in CDCl₃.

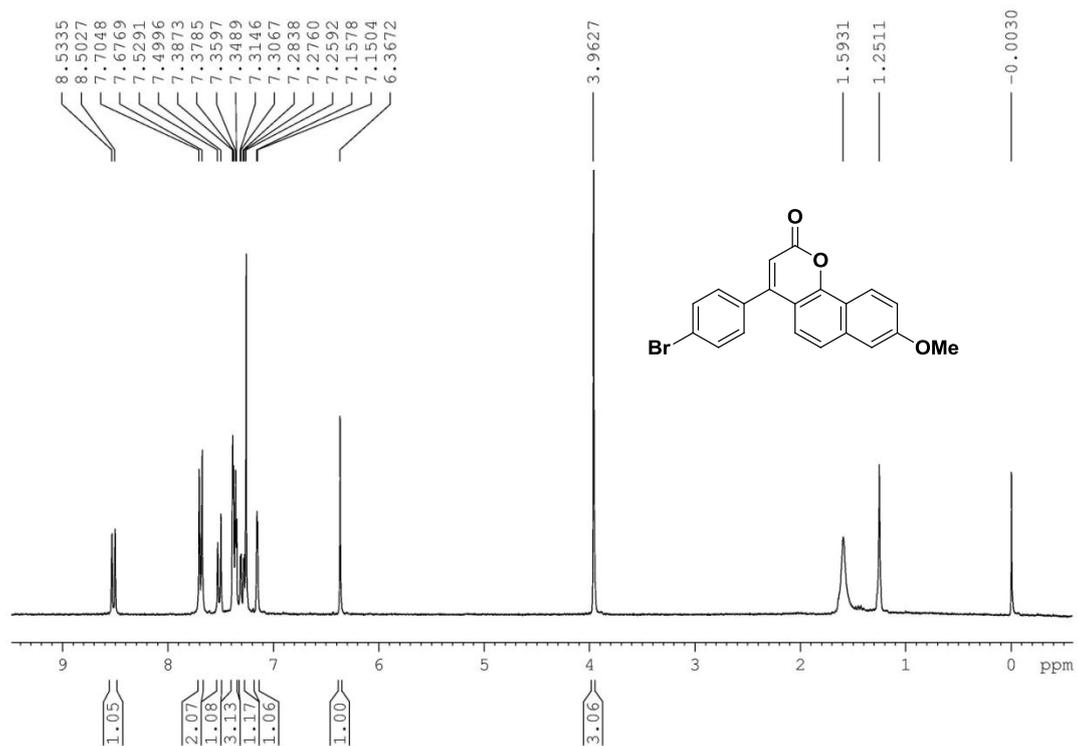


Figure S67. $^1\text{H NMR}$ spectrum of **20a** in CDCl_3 .

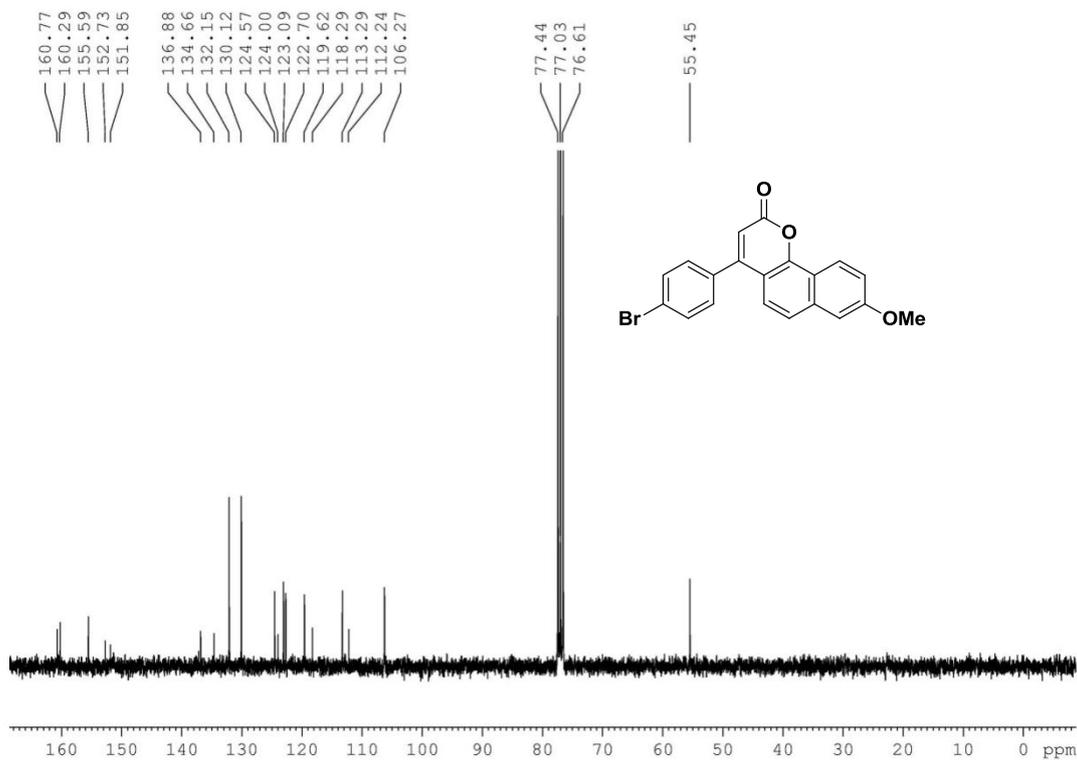


Figure S68. $^{13}\text{C NMR}$ spectrum of **20a** in CDCl_3 .

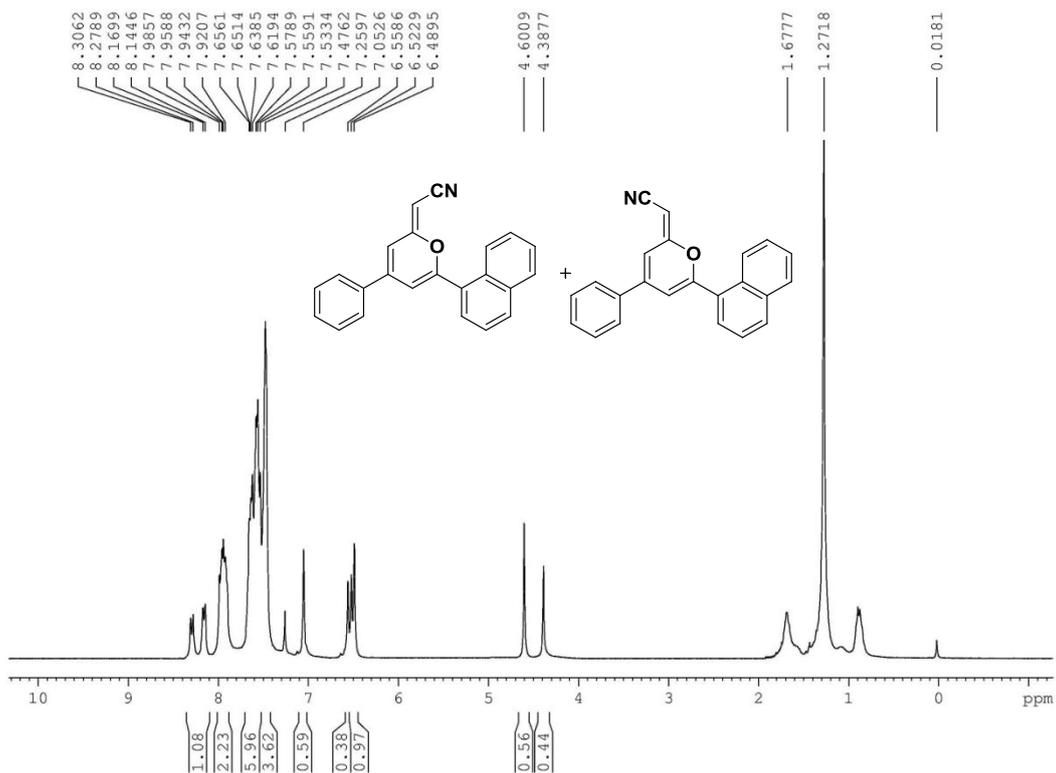


Figure S69. ^1H NMR spectrum of **23a** in CDCl_3 .

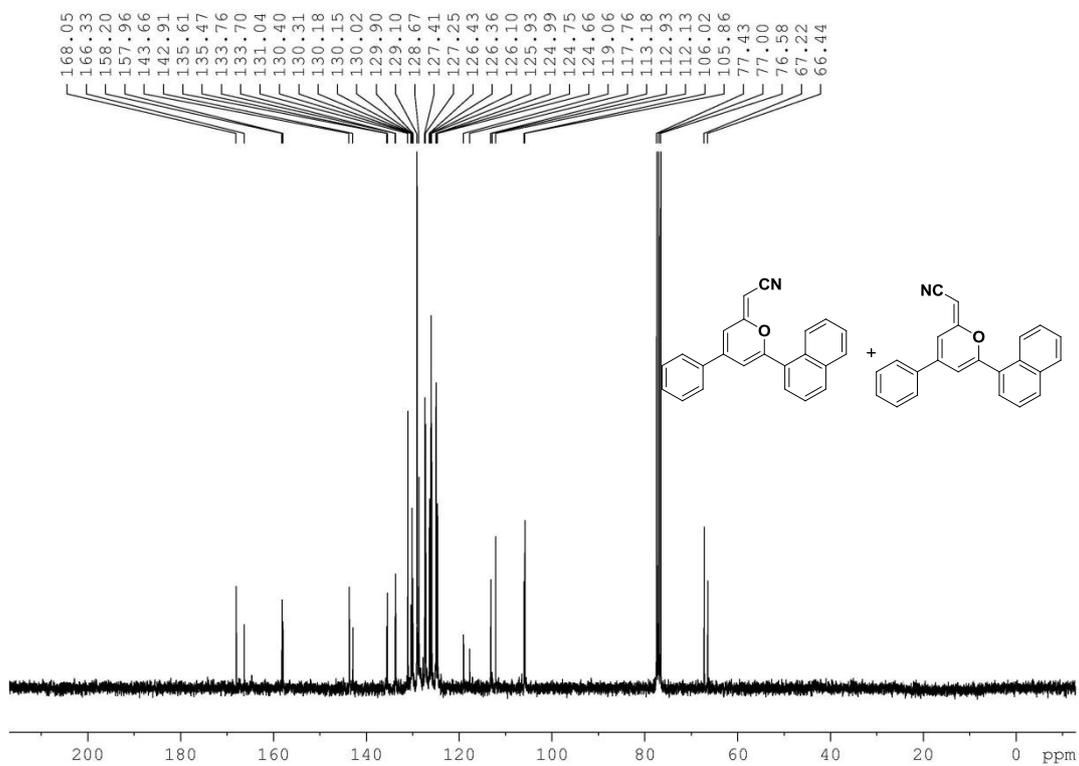


Figure S70. ^{13}C NMR spectrum of **23a** in CDCl_3 .

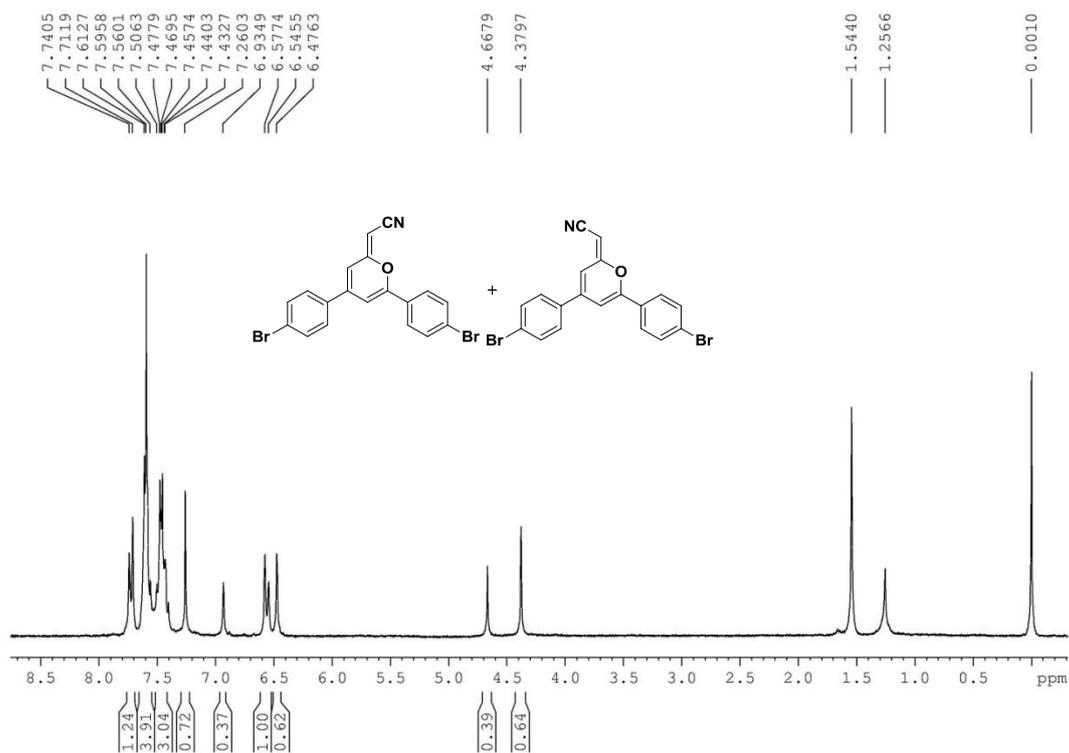


Figure S71. ¹H NMR spectrum of **23b** in CDCl₃.

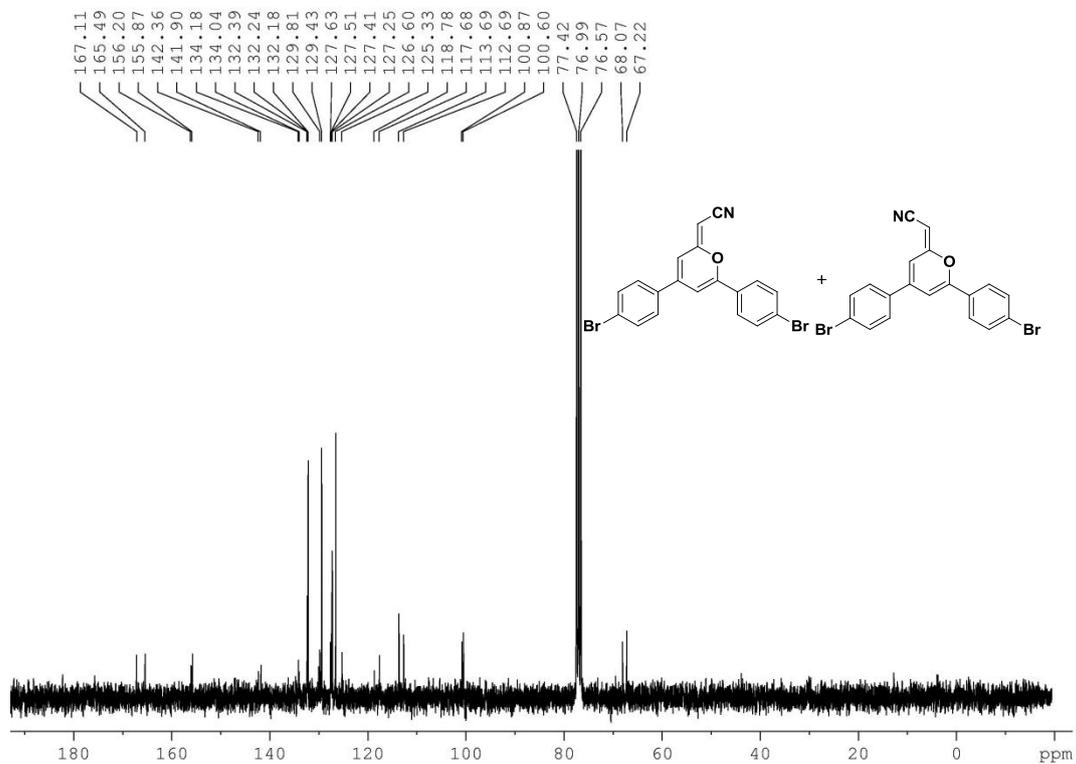


Figure S72. ¹³C NMR spectrum of **23b** in CDCl₃.

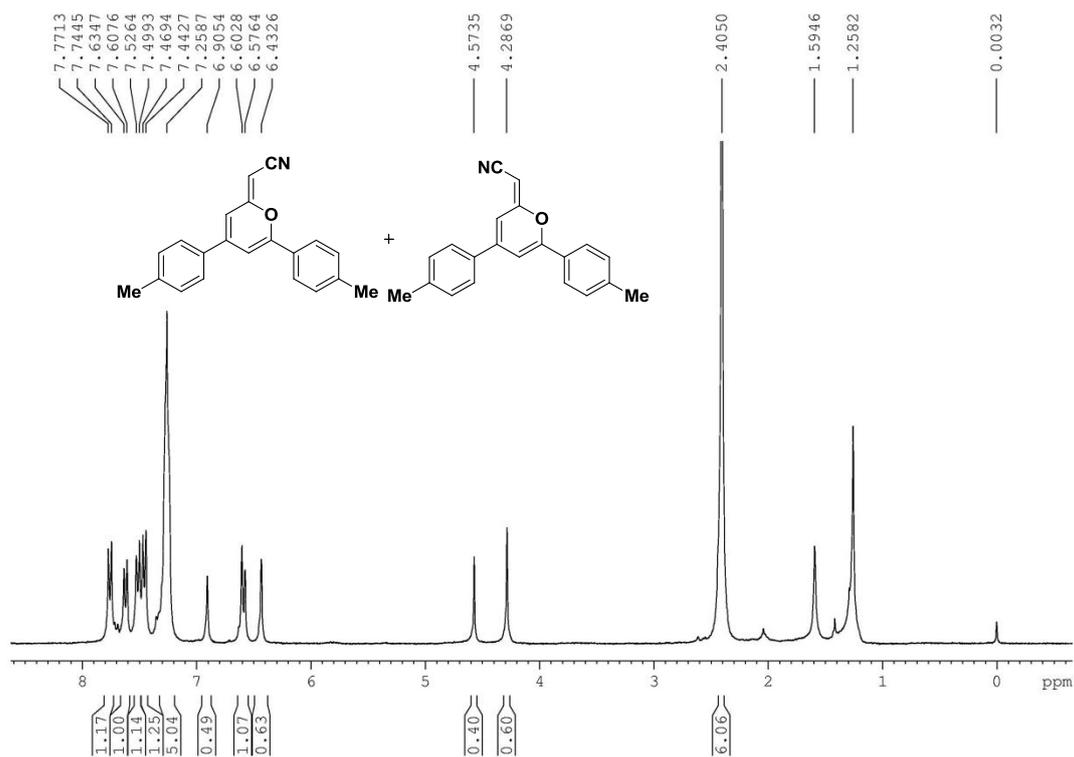


Figure S73. ¹H NMR spectrum of **23c** in CDCl₃.

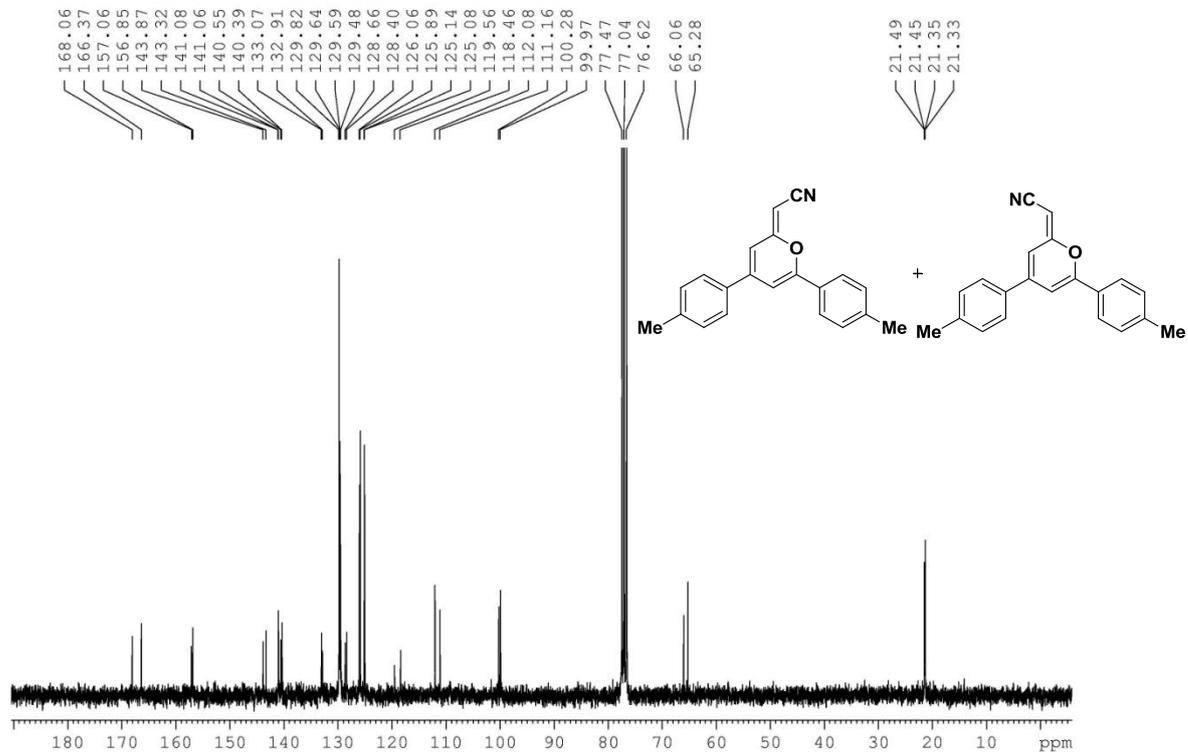


Figure S74. ¹³C NMR spectrum of **23c** in CDCl₃.

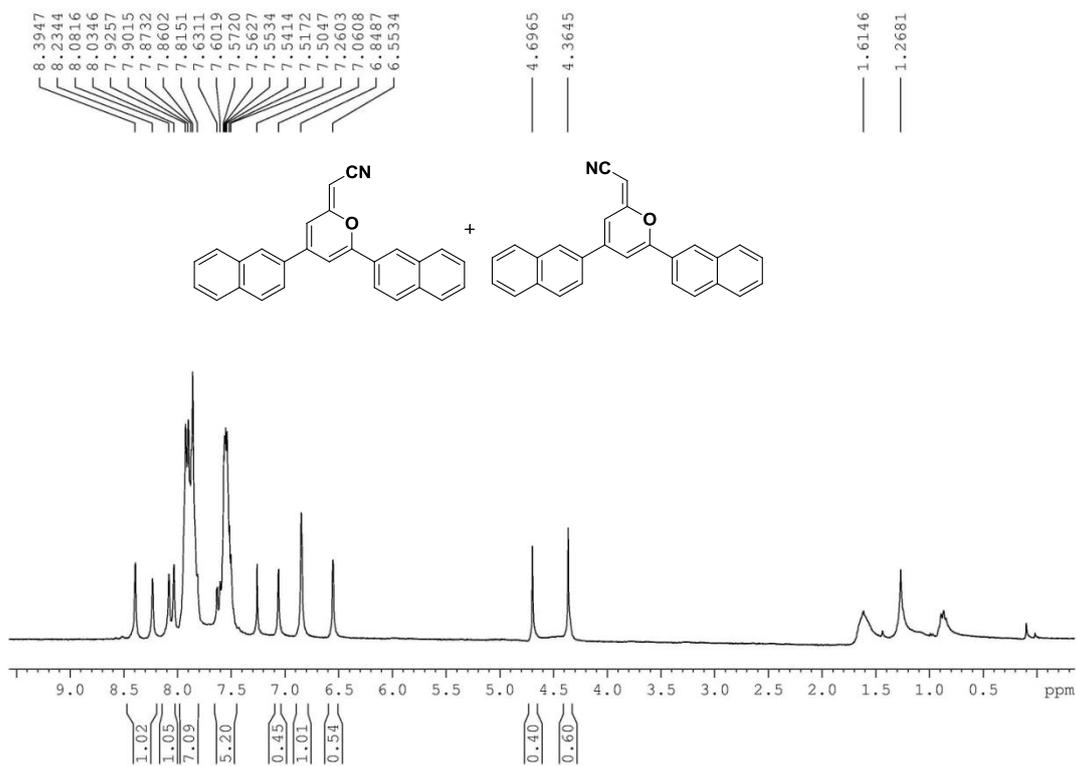


Figure S75. ^1H NMR spectrum of **23d** in CDCl_3 .

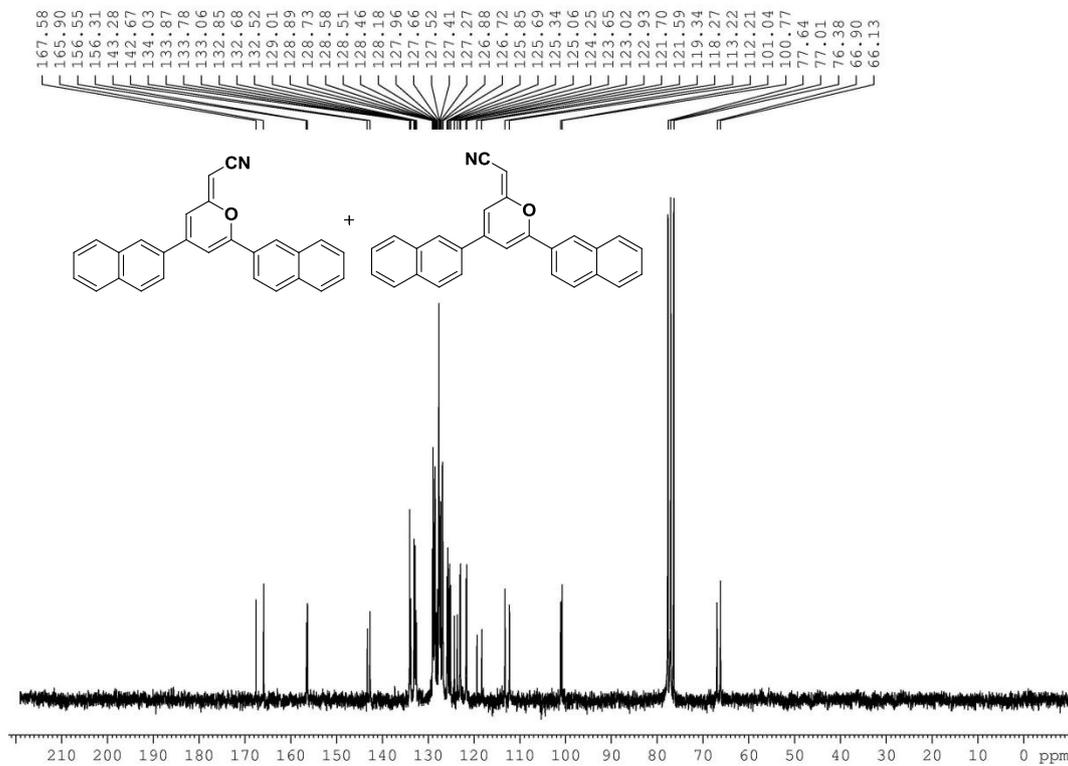


Figure S76. ^{13}C NMR spectrum of **23d** in CDCl_3 .

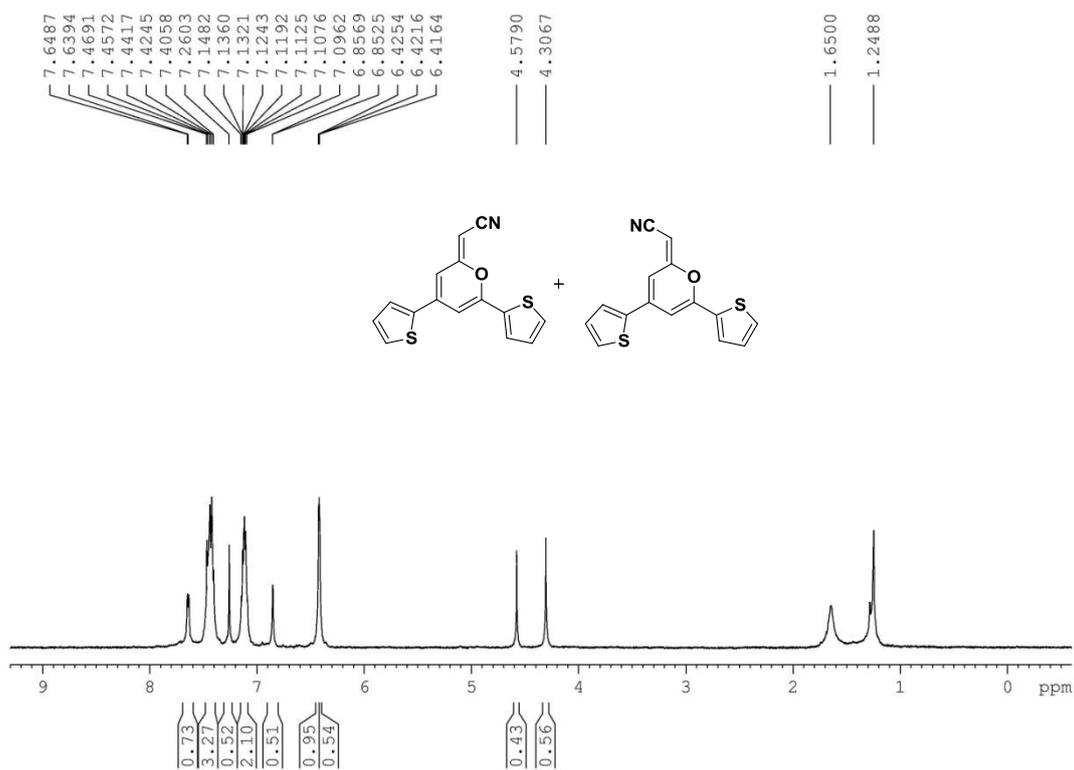


Figure S77. ¹H NMR spectrum of **23e** in CDCl₃.

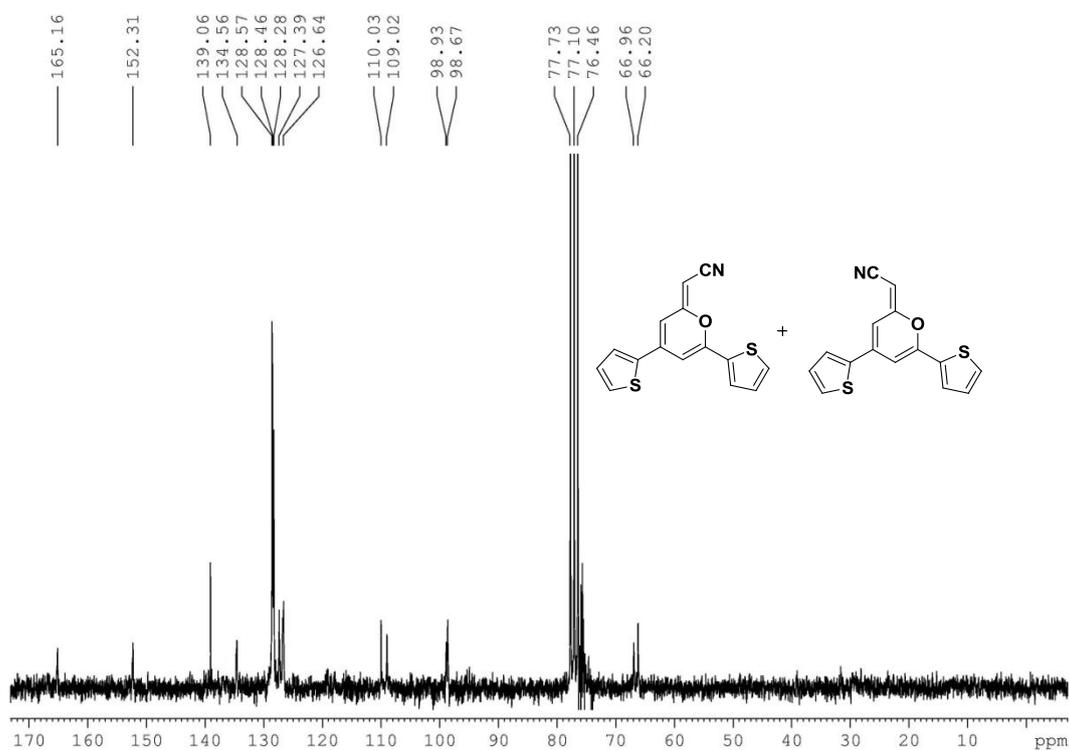


Figure S78. ¹³C NMR spectrum of **23e** in CDCl₃.

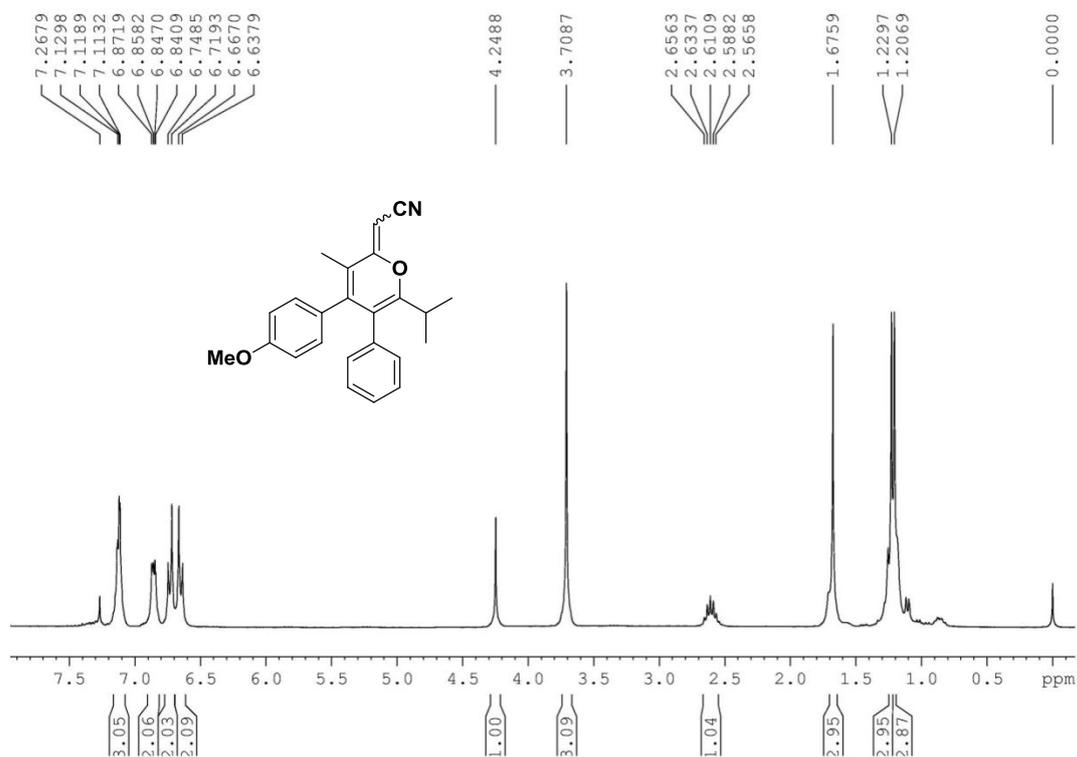


Figure S79. ¹H NMR spectrum of **23f** in CDCl₃.

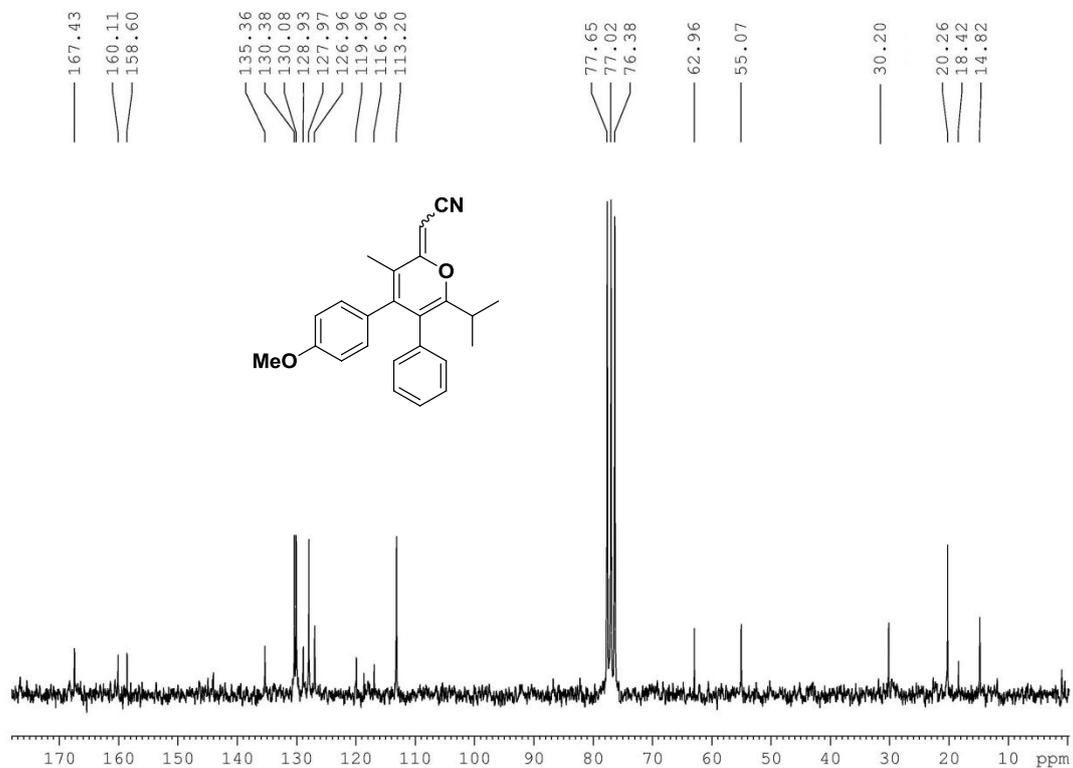


Figure S80. ¹³C NMR spectrum of **23f** in CDCl₃.

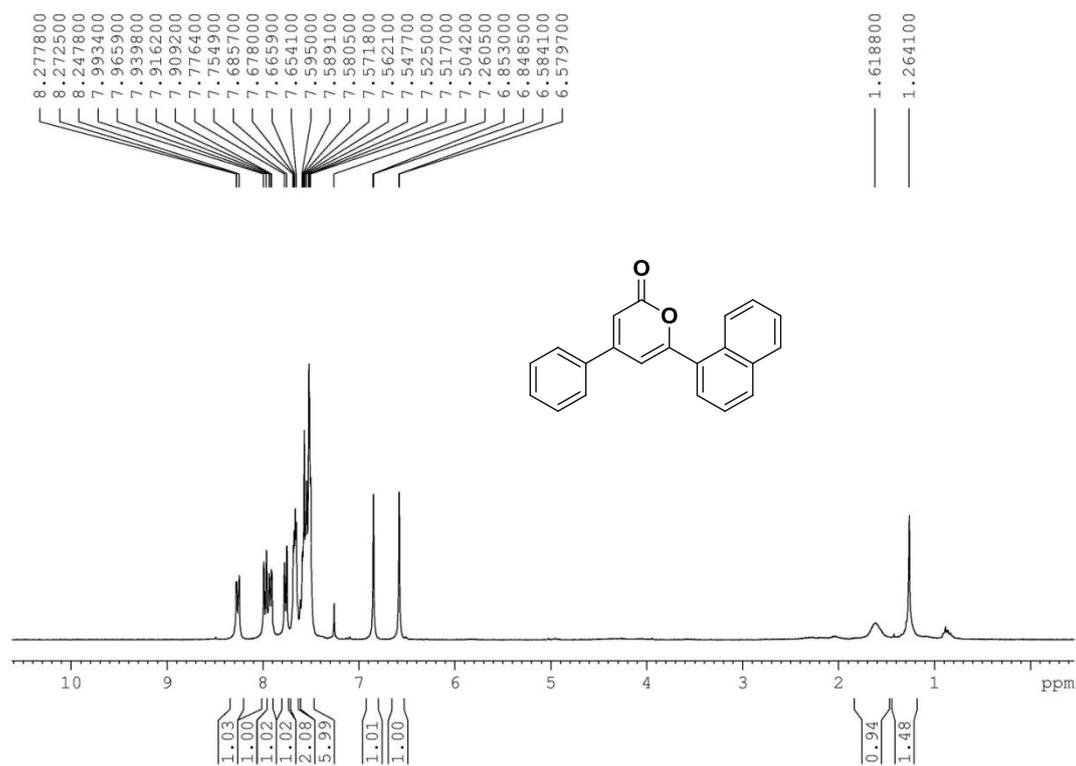


Figure S81. ¹H NMR spectrum of **24a** in CDCl₃.

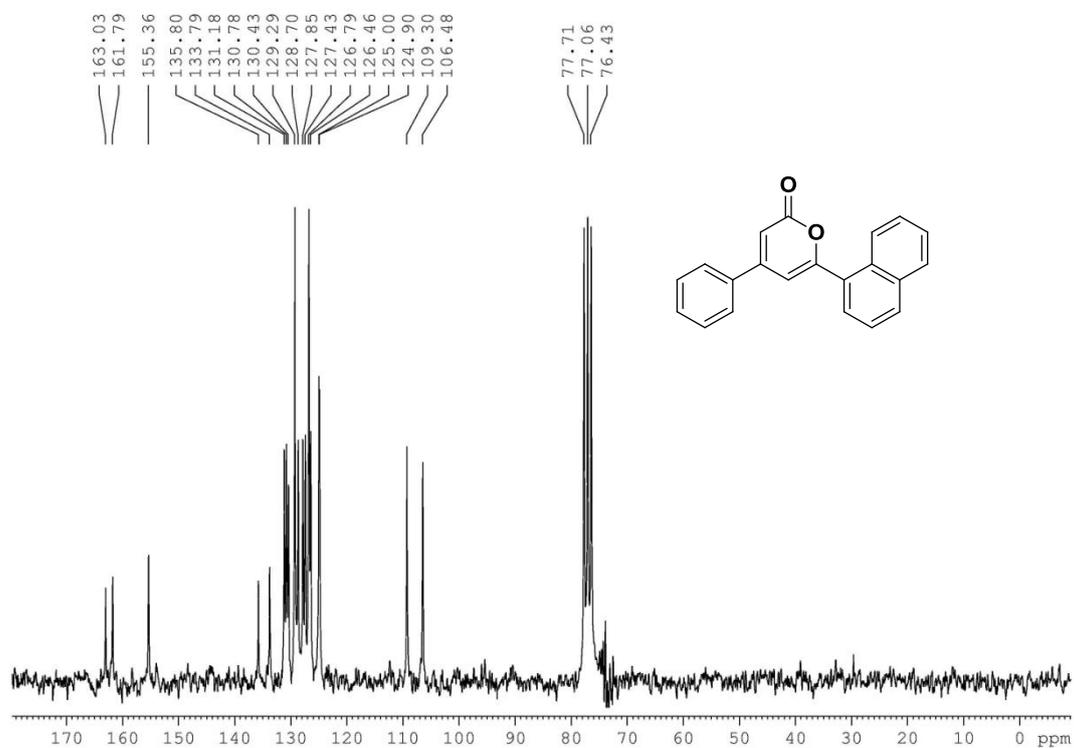


Figure S82. ¹³C NMR spectrum of **24a** in CDCl₃.

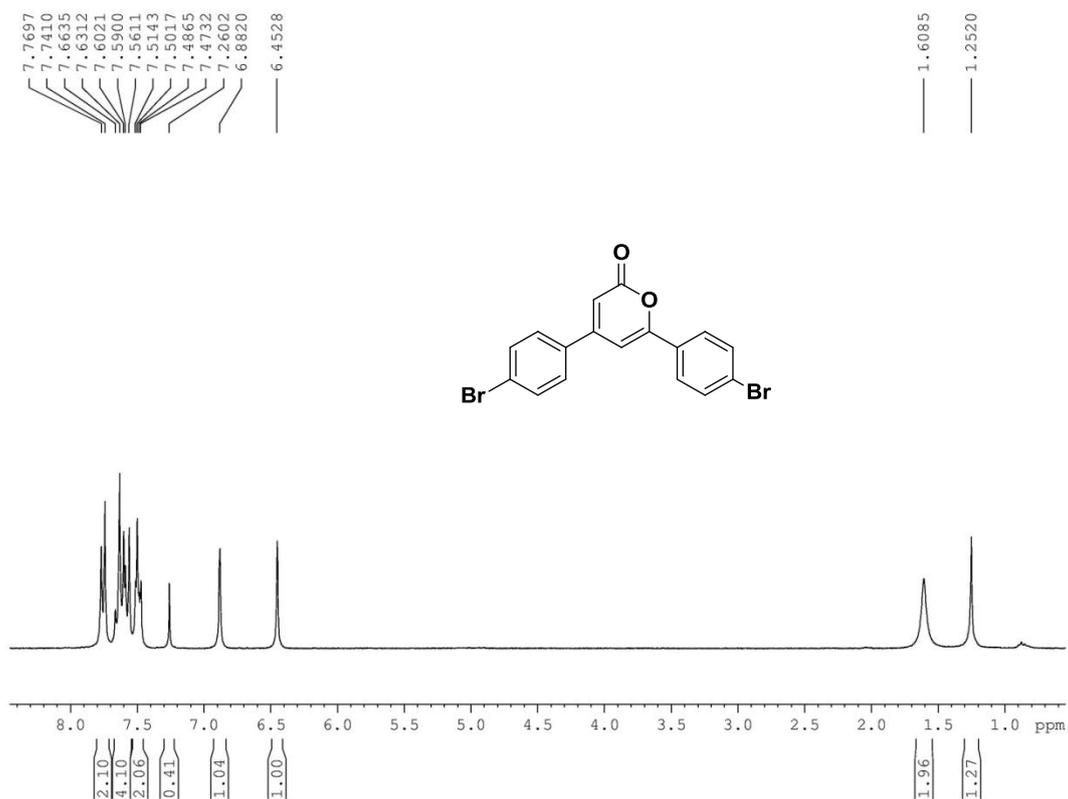


Figure S83. ¹H NMR spectrum of **24b** in CDCl₃.

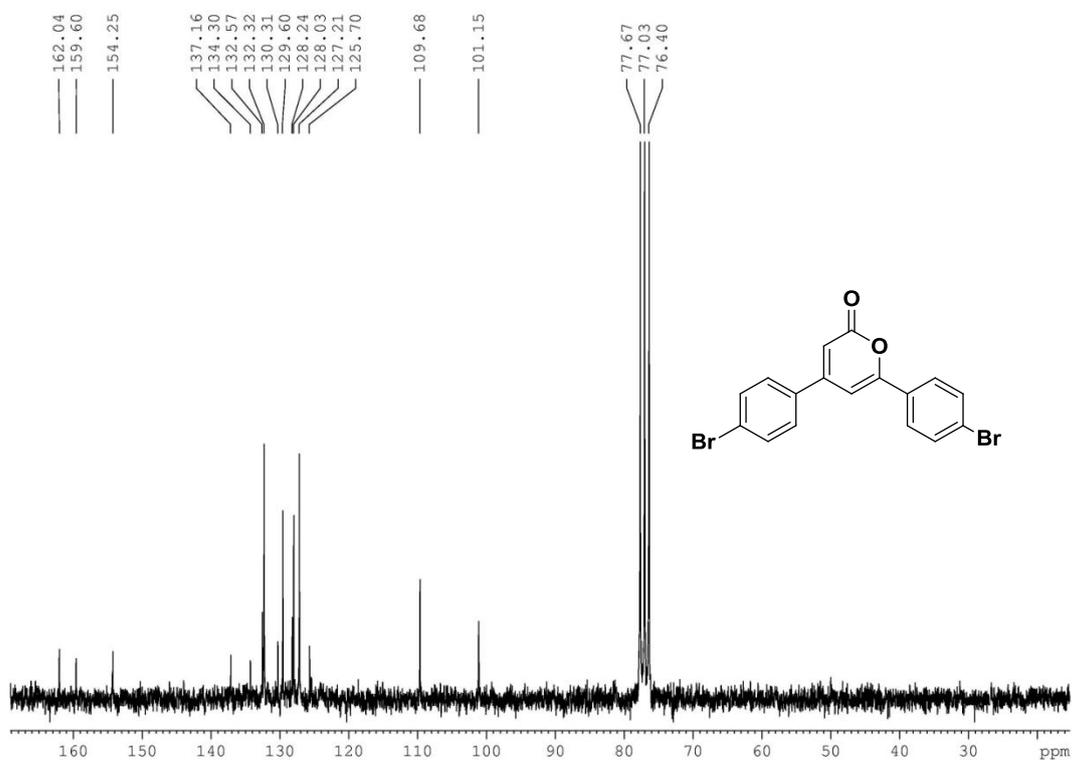


Figure S84. ¹³C NMR spectrum of **24b** in CDCl₃.

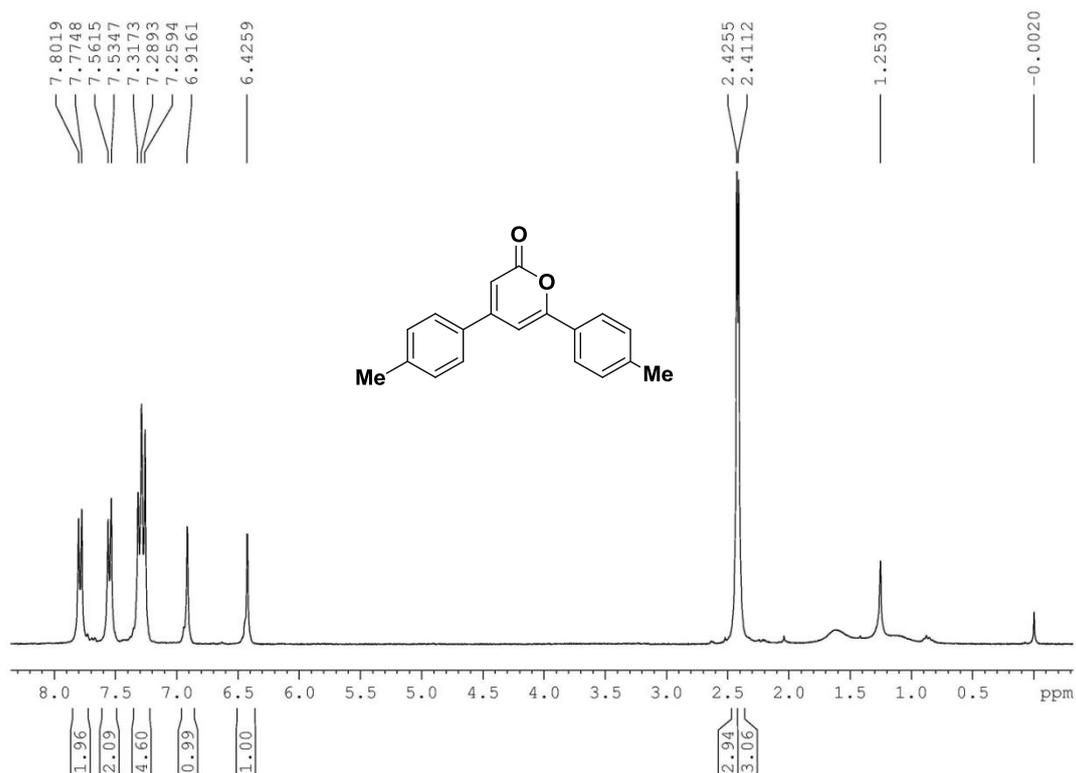


Figure S85. ^1H NMR spectrum of **24c** in CDCl_3 .

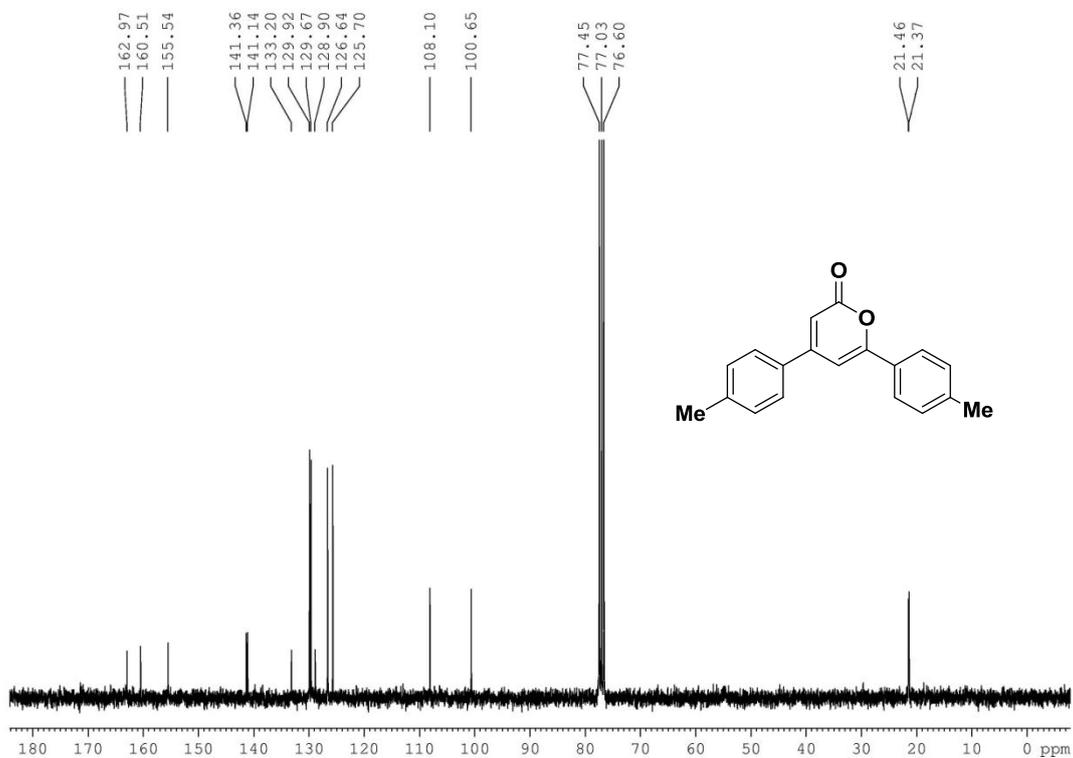


Figure S86. ^{13}C NMR spectrum of **24c** in CDCl_3 .

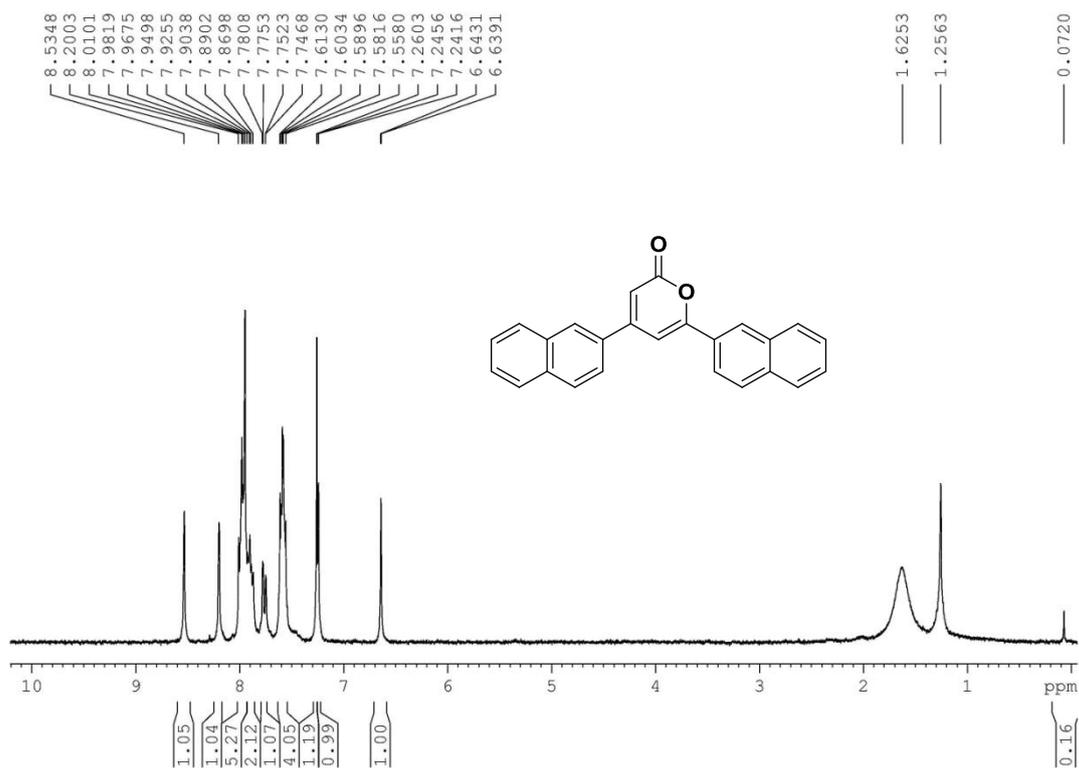


Figure S87. ¹H NMR spectrum of **24d** in CDCl₃.

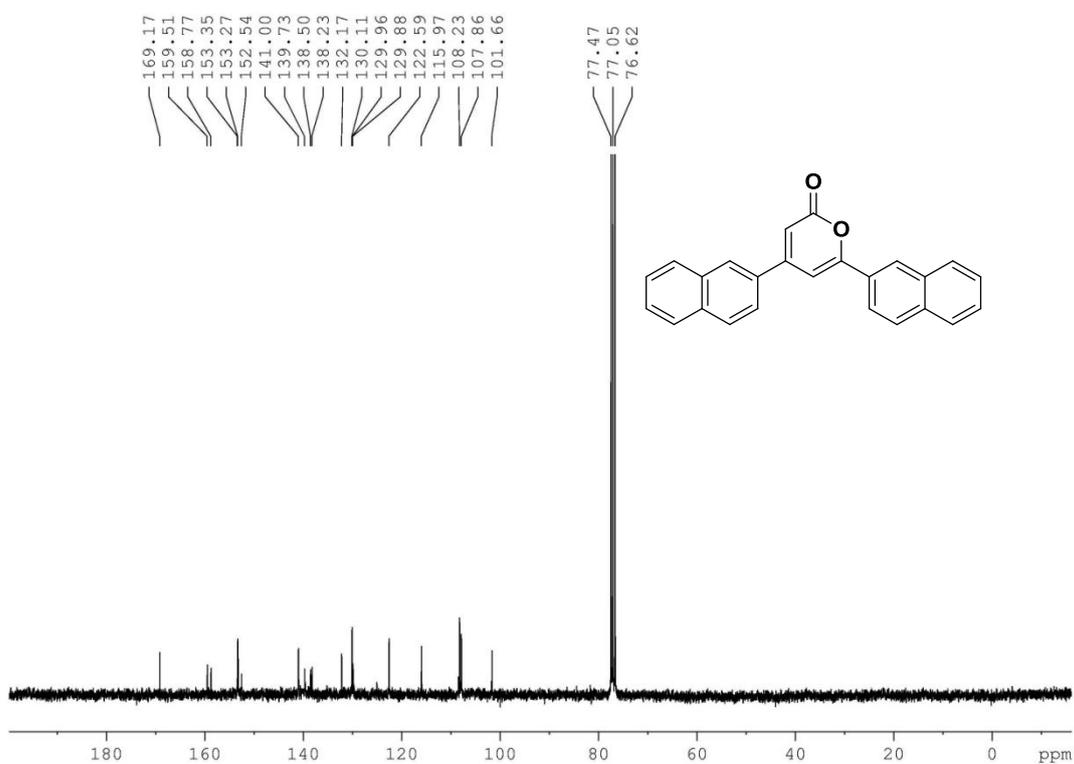


Figure S88. ¹³C NMR spectrum of **24d** in CDCl₃.

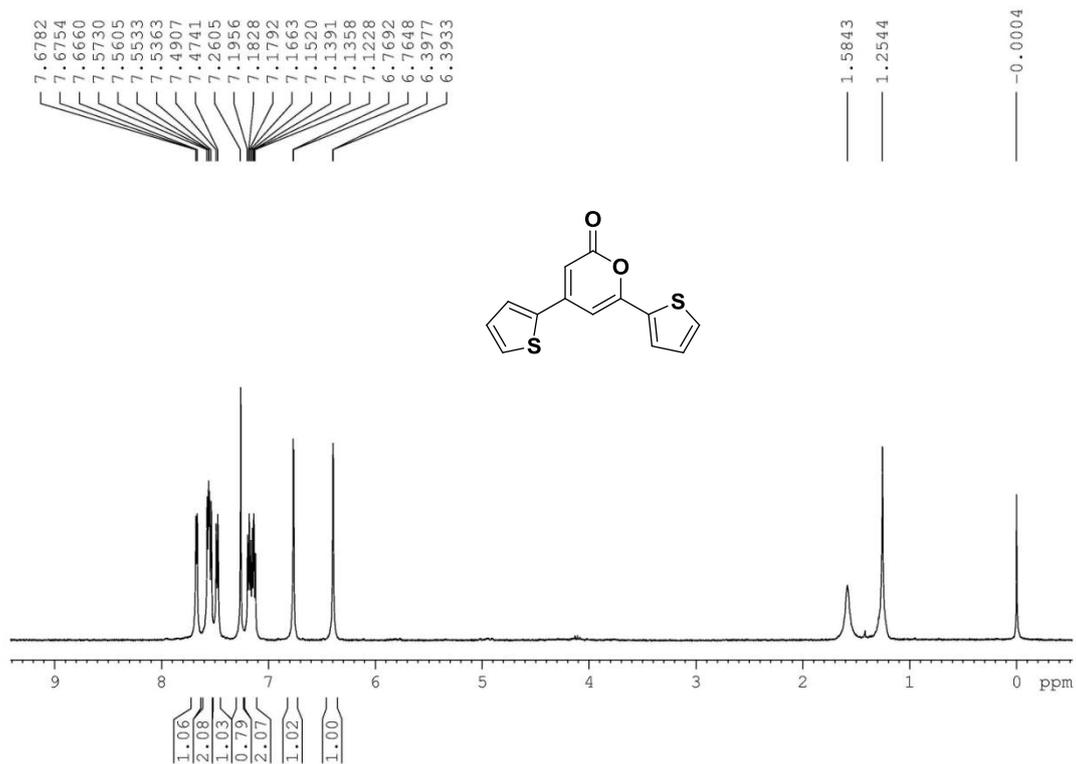


Figure S89. ¹H NMR spectrum of **24e** in CDCl₃.

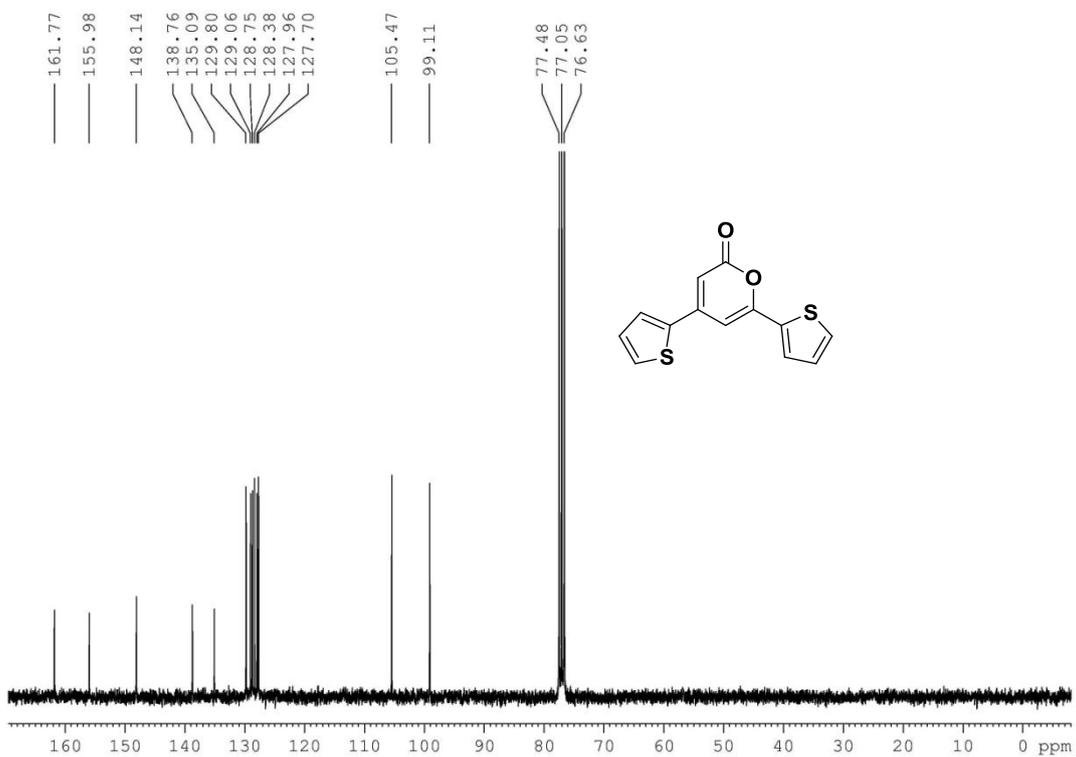


Figure S90. ¹³C NMR spectrum of **24e** in CDCl₃.

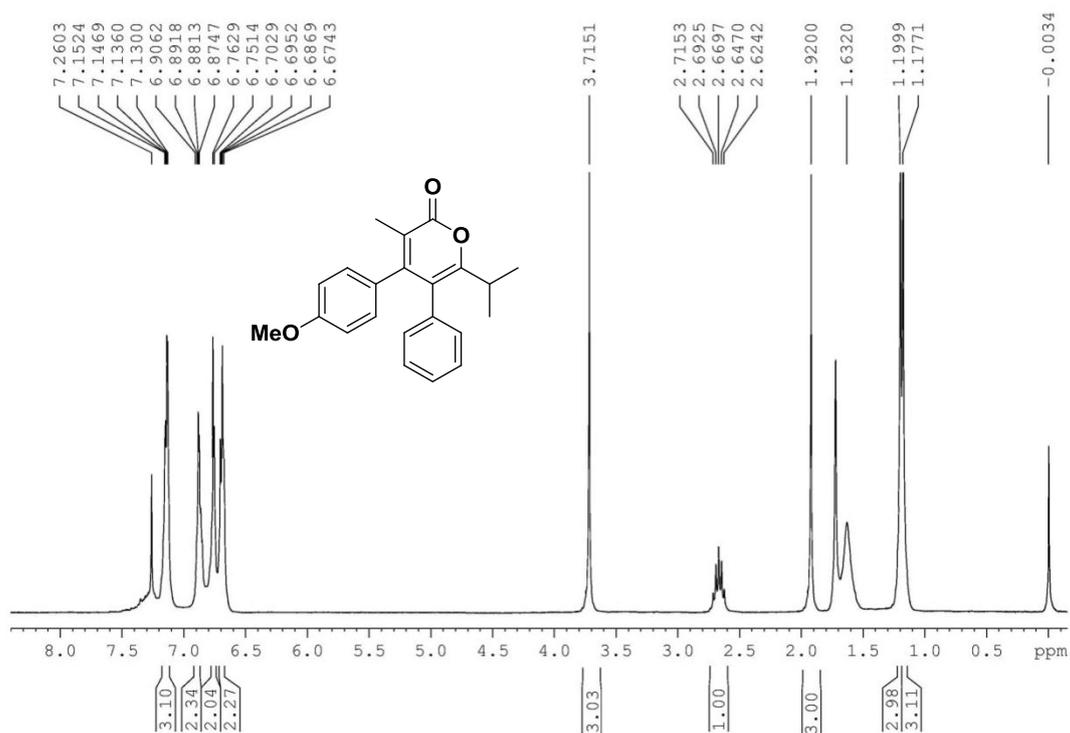


Figure S91. ¹H NMR spectrum of **24f** in CDCl₃.

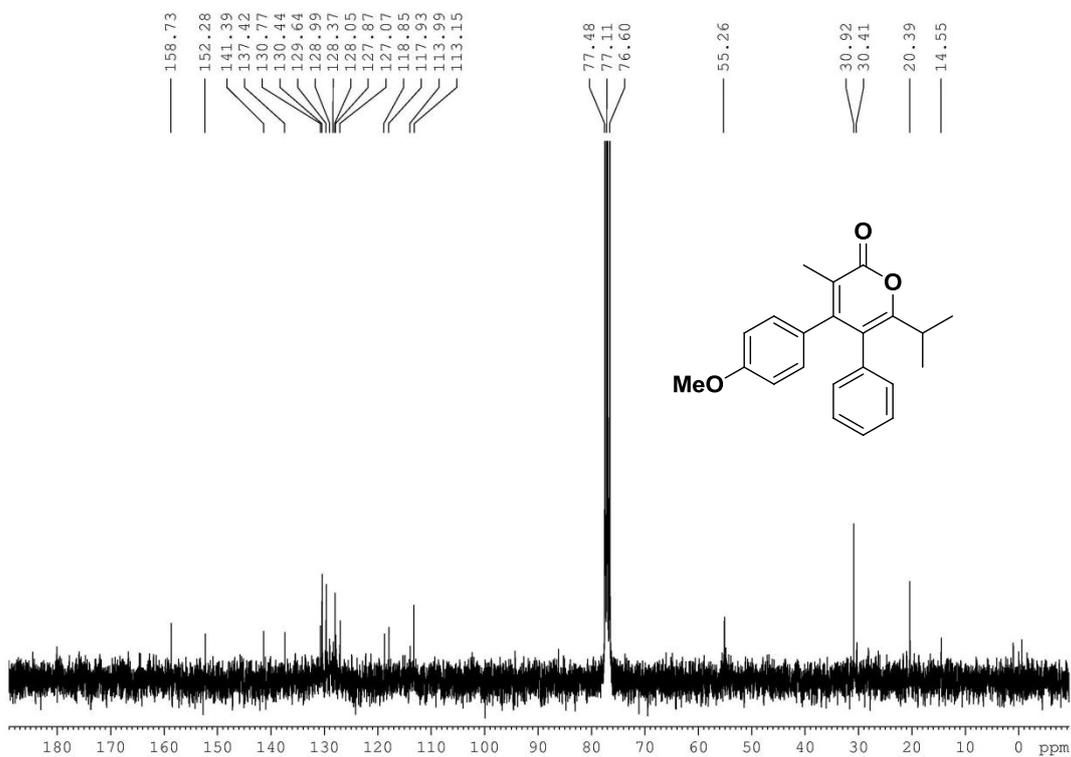


Figure S92. ¹³C NMR spectrum of **24f** in CDCl₃.