

Design, synthesis of urolithin A, the metabolite of ellagitannins, and its biological activity of phosphodiesterase II (PDE2) inhibitors

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1. ^1H , ^{13}C NMR spectra

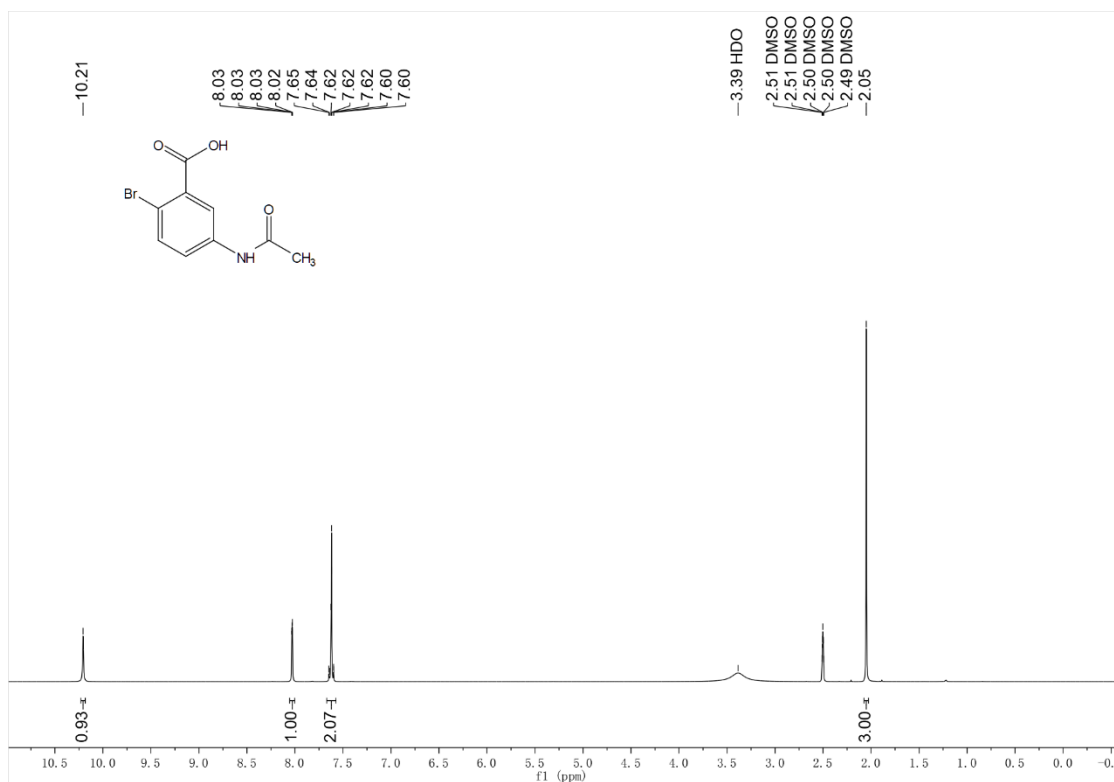


Figure S1. ^1H -NMR of 2-bromo-5-acetaminobenzoic acid monohydrate

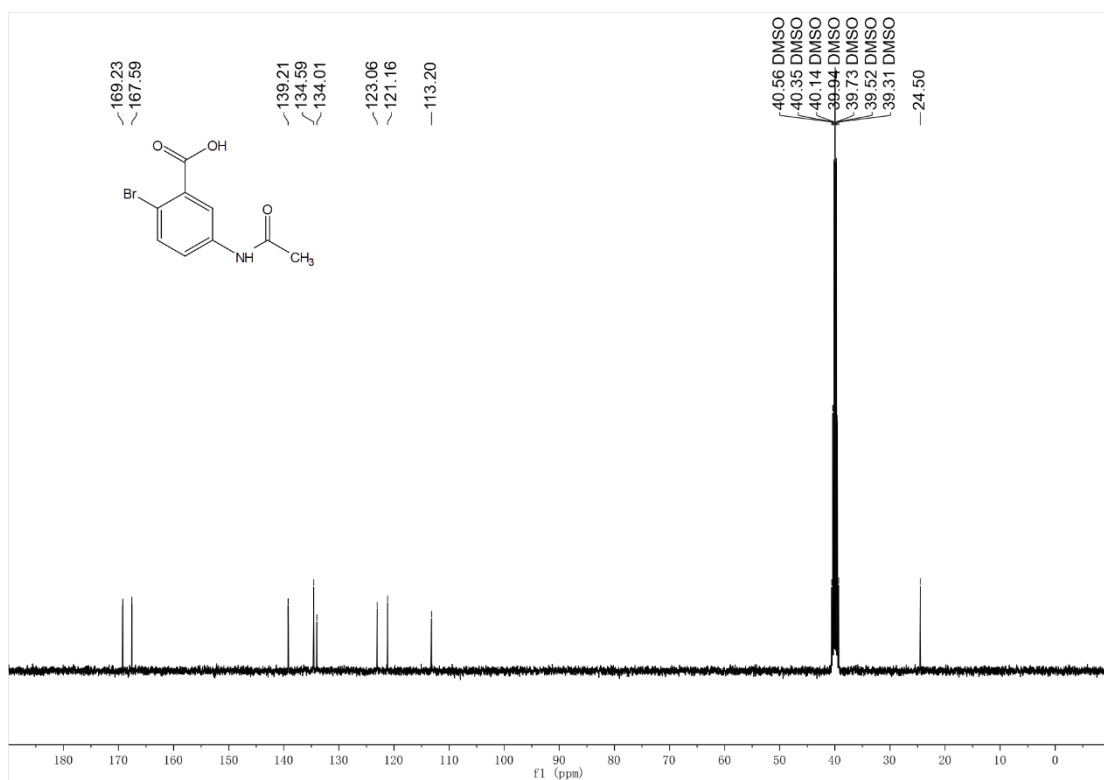


Figure S2. ^{13}C -NMR of 2-bromo-5-acetaminobenzoic acid monohydrate

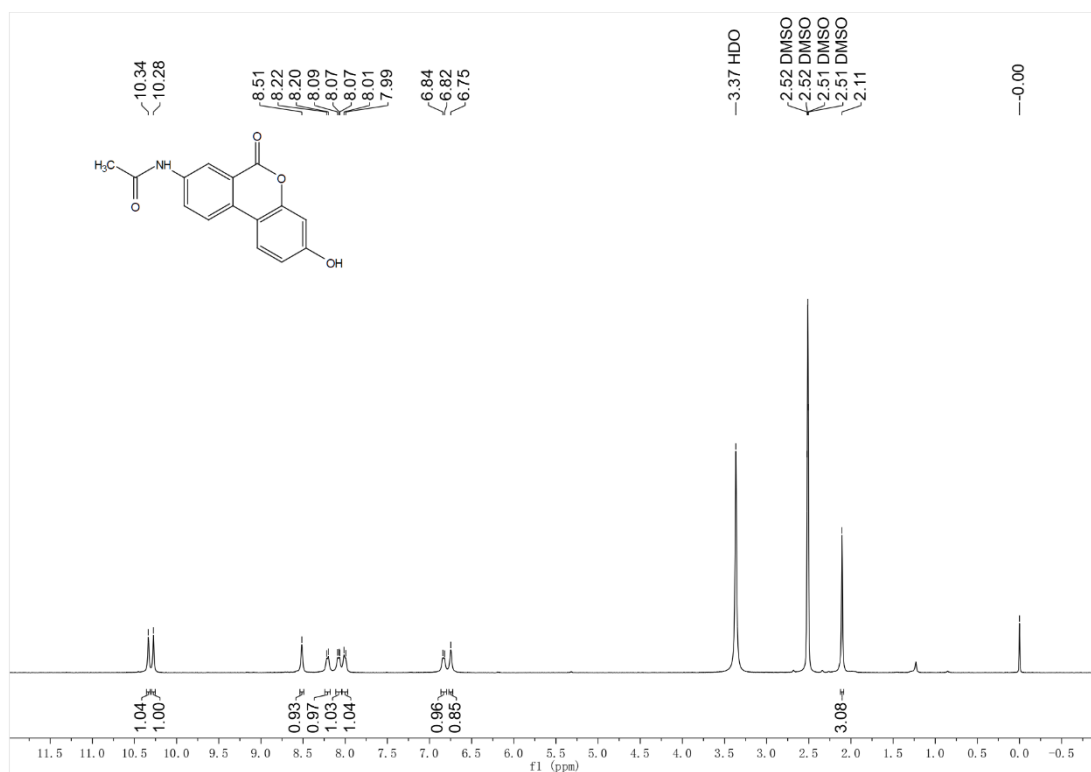


Figure S3. ¹H-NMR of D

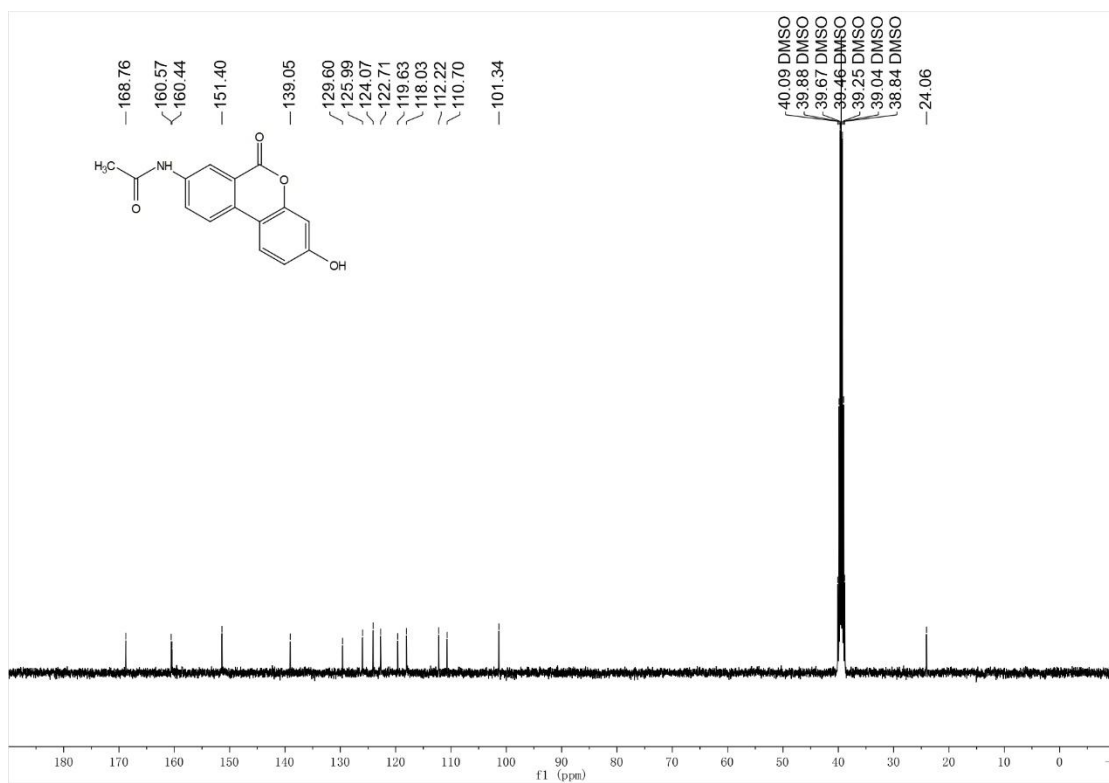


Figure S4. ¹³C-NMR of D

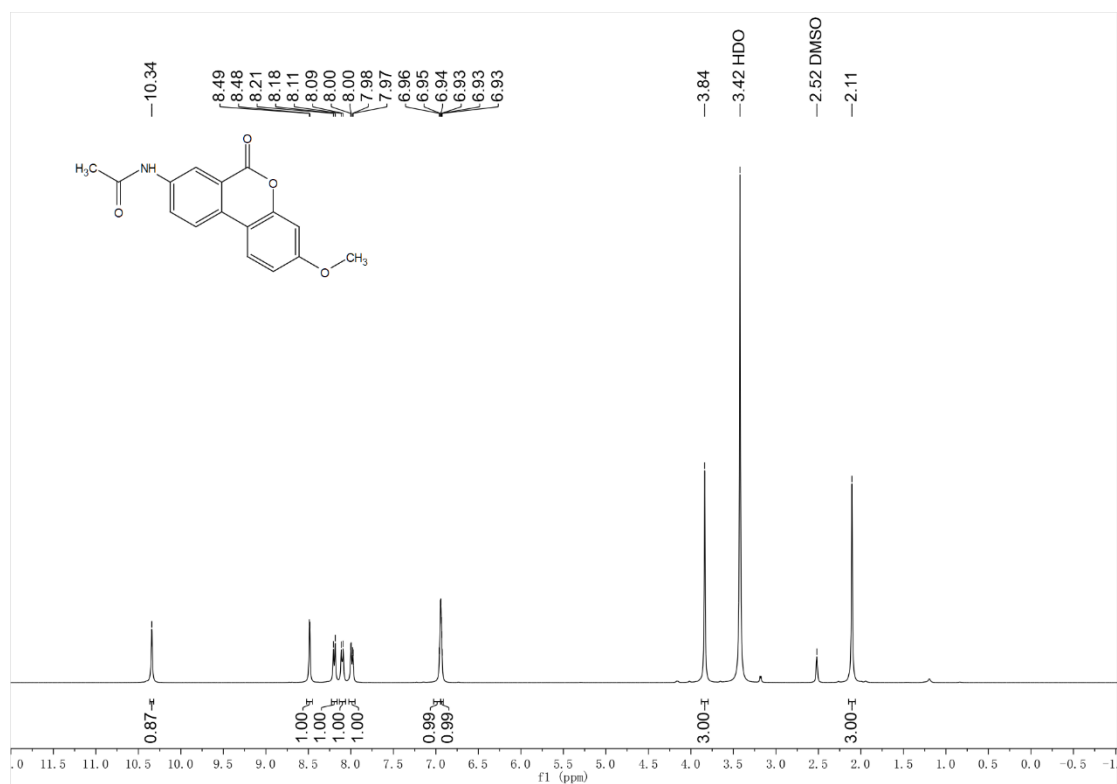


Figure S5. ¹H-NMR of D1

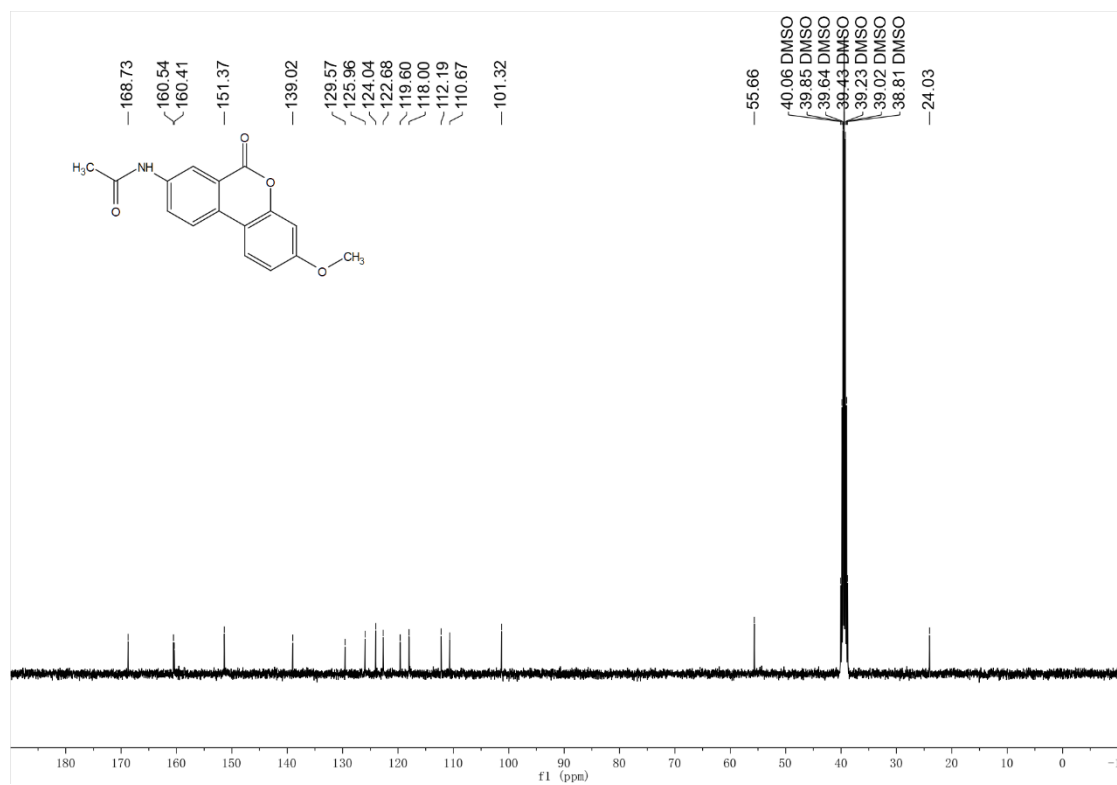


Figure S6. ¹³C-NMR of D1

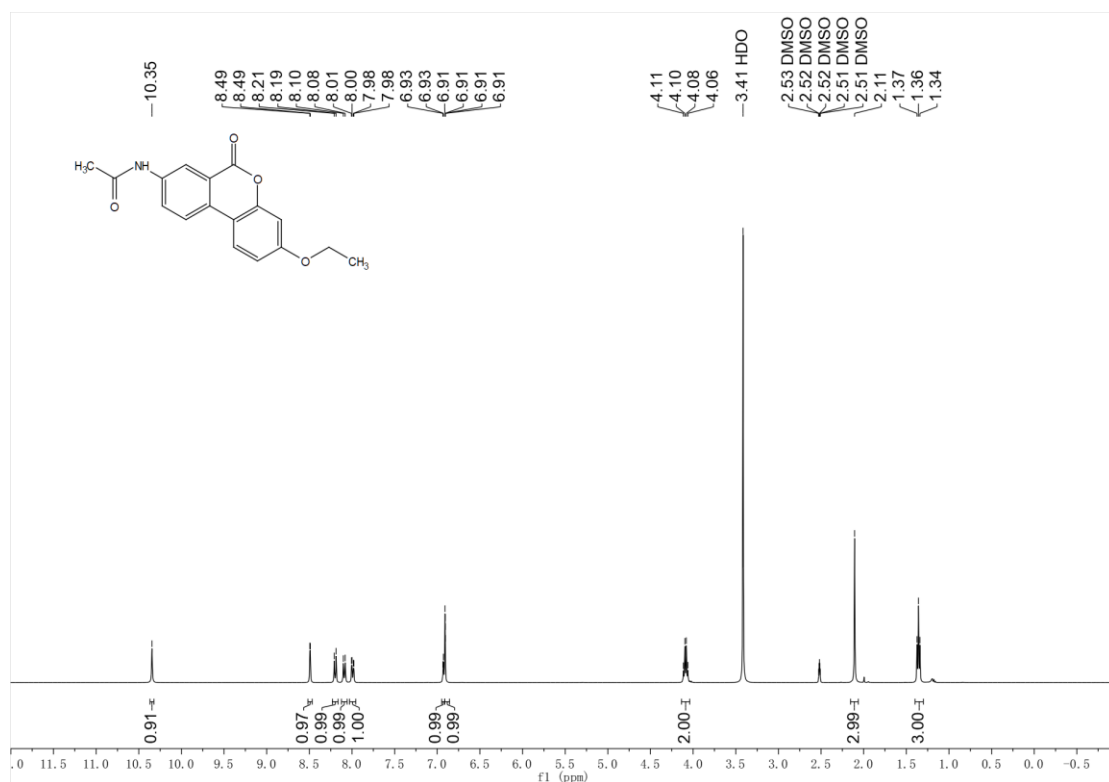


Figure S7. ¹H-NMR of D2

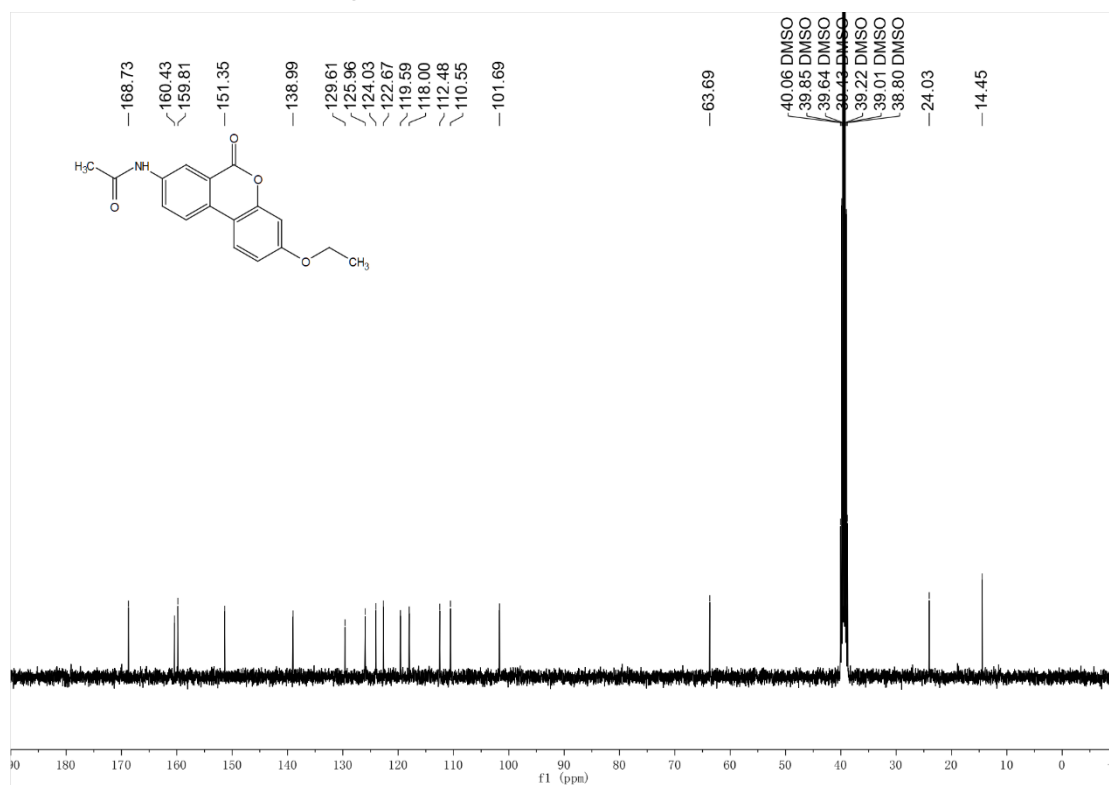


Figure S8. ¹³C-NMR of D2

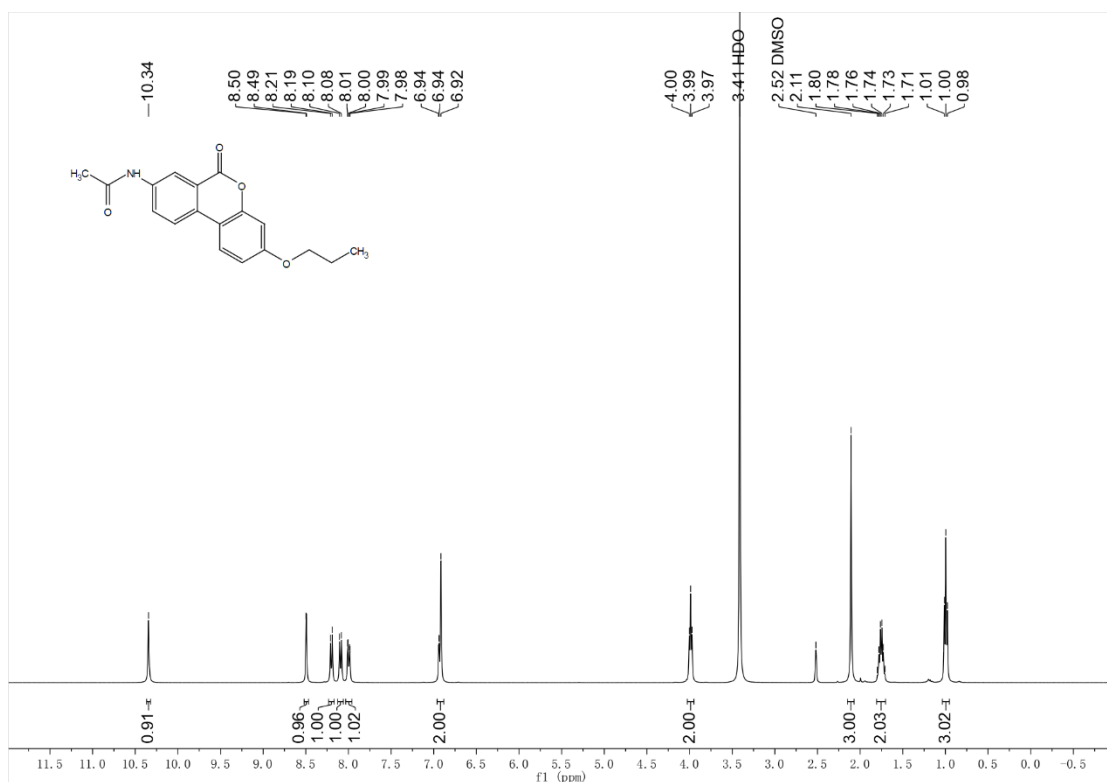


Figure S9. ¹H-NMR of D3

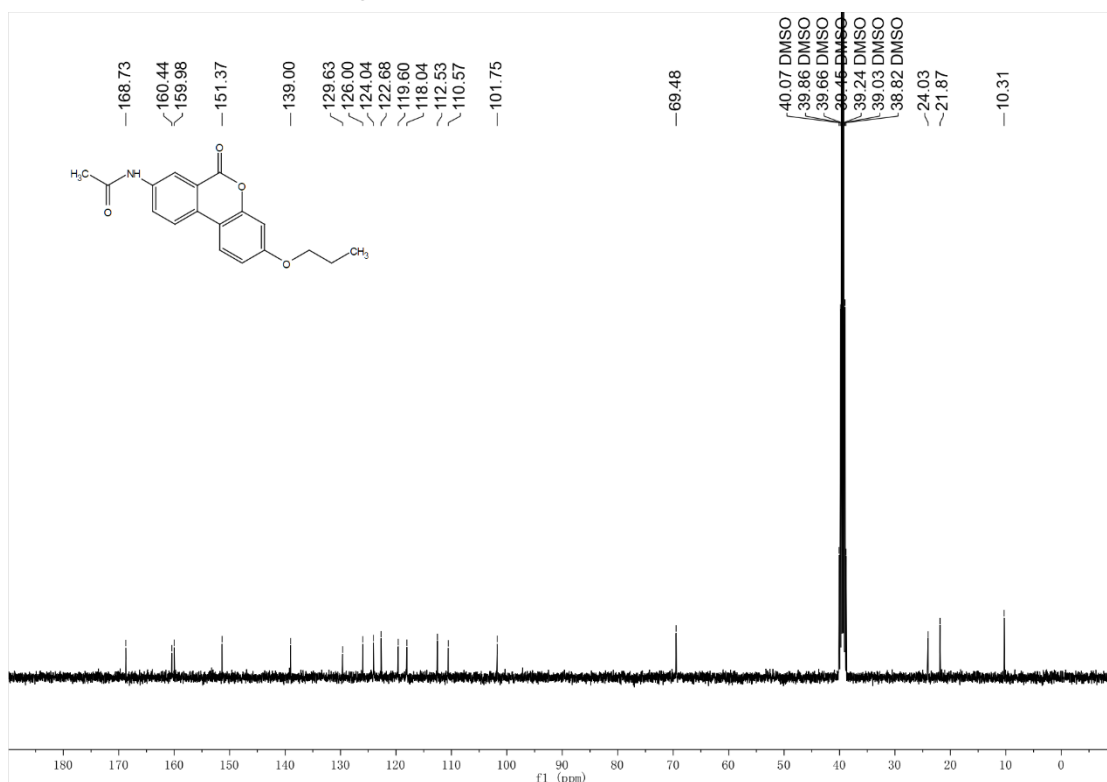


Figure S10. ¹³C-NMR of D3

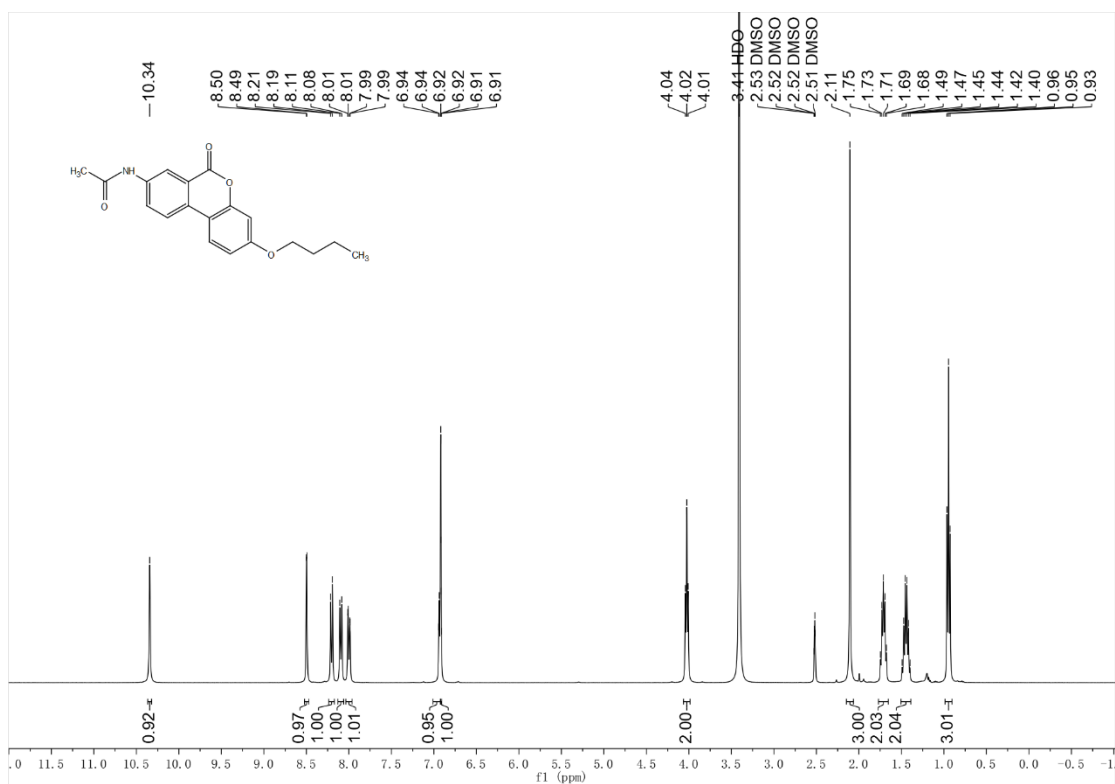


Figure S11. ¹H-NMR of D4

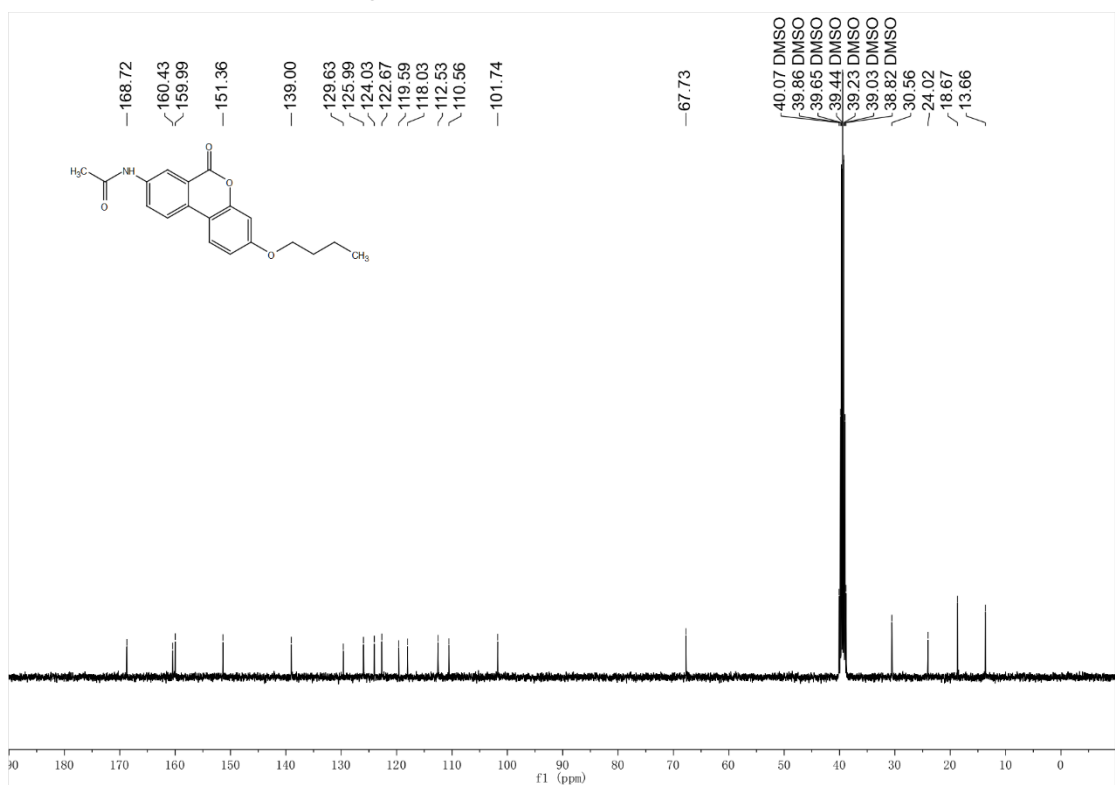


Figure S12. ¹³C-NMR of D4

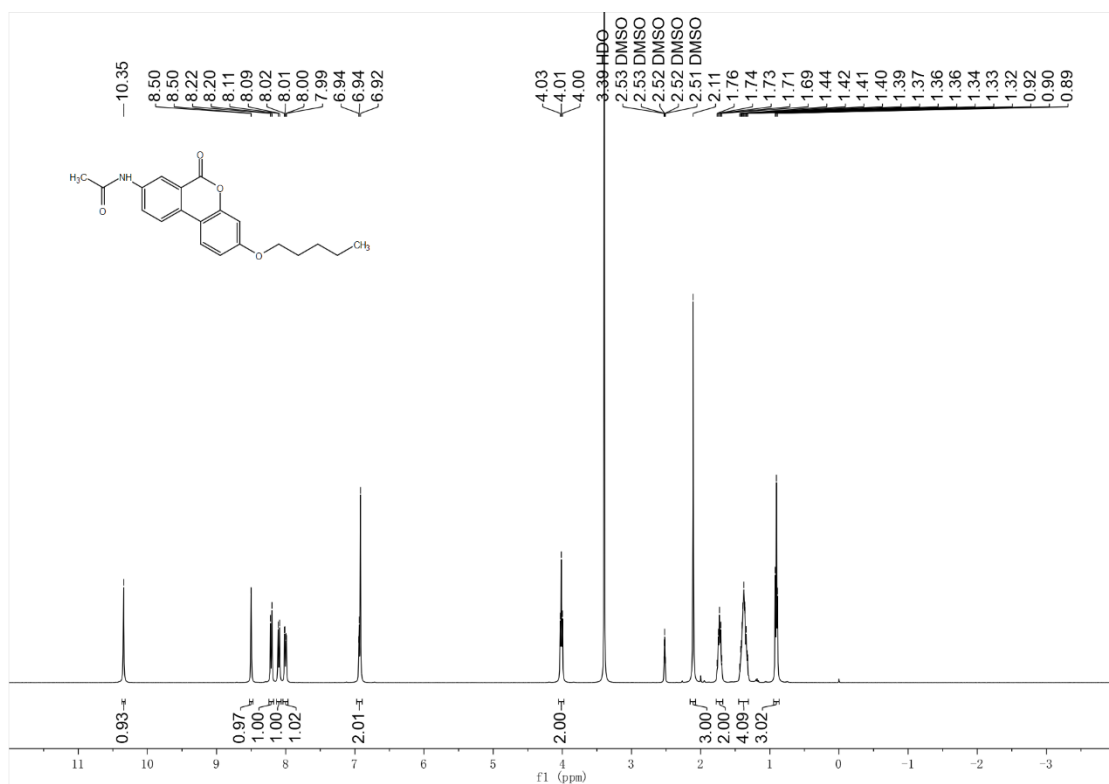


Figure S13. ¹H-NMR of D5

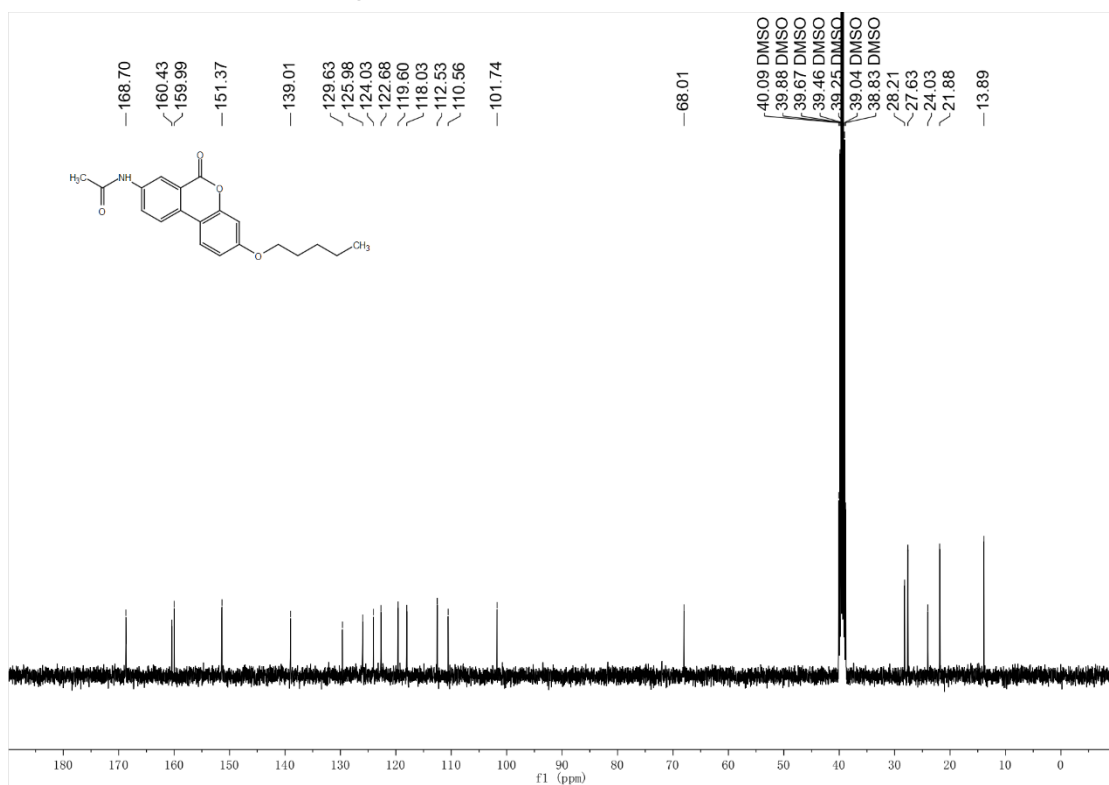


Figure S14. ¹³C-NMR of D5

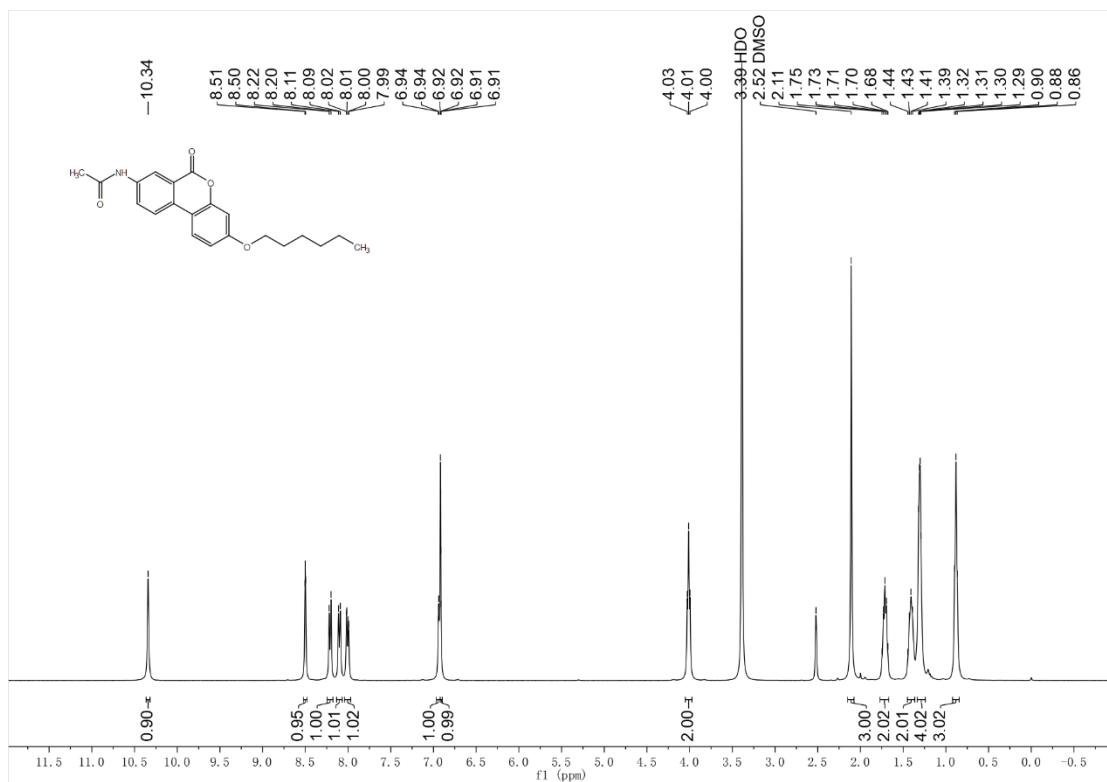


Figure S15. ¹H-NMR of D6

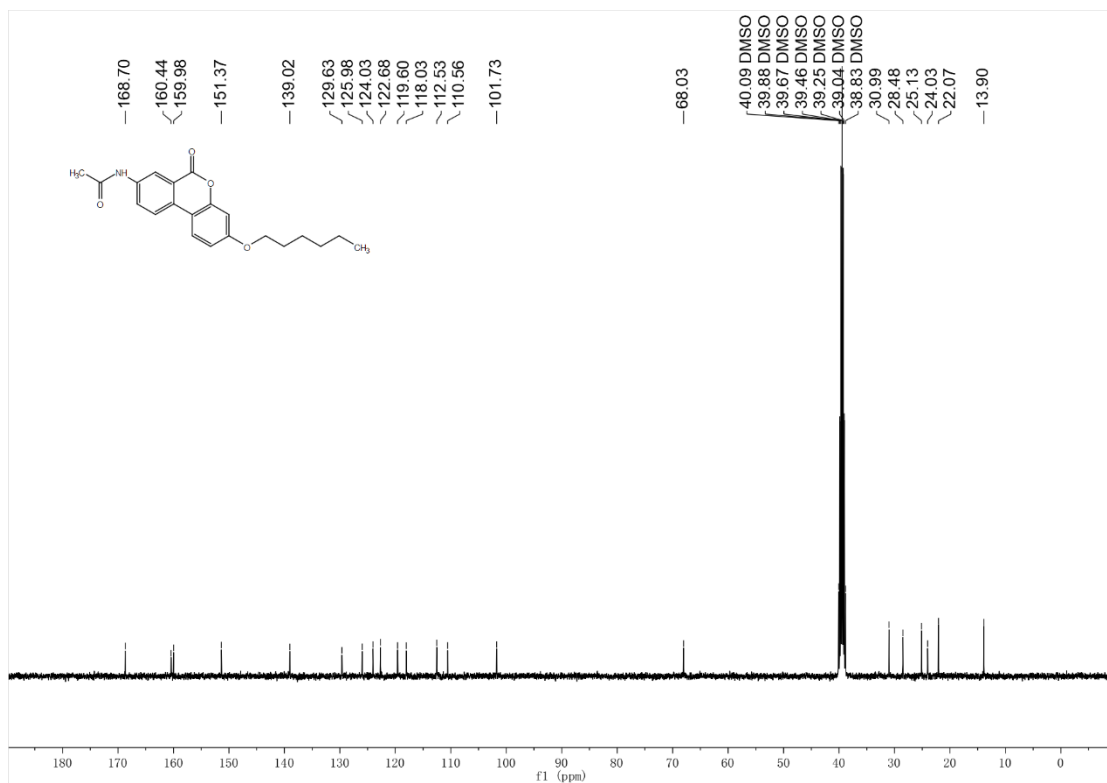


Figure S16. ¹³C-NMR of D6

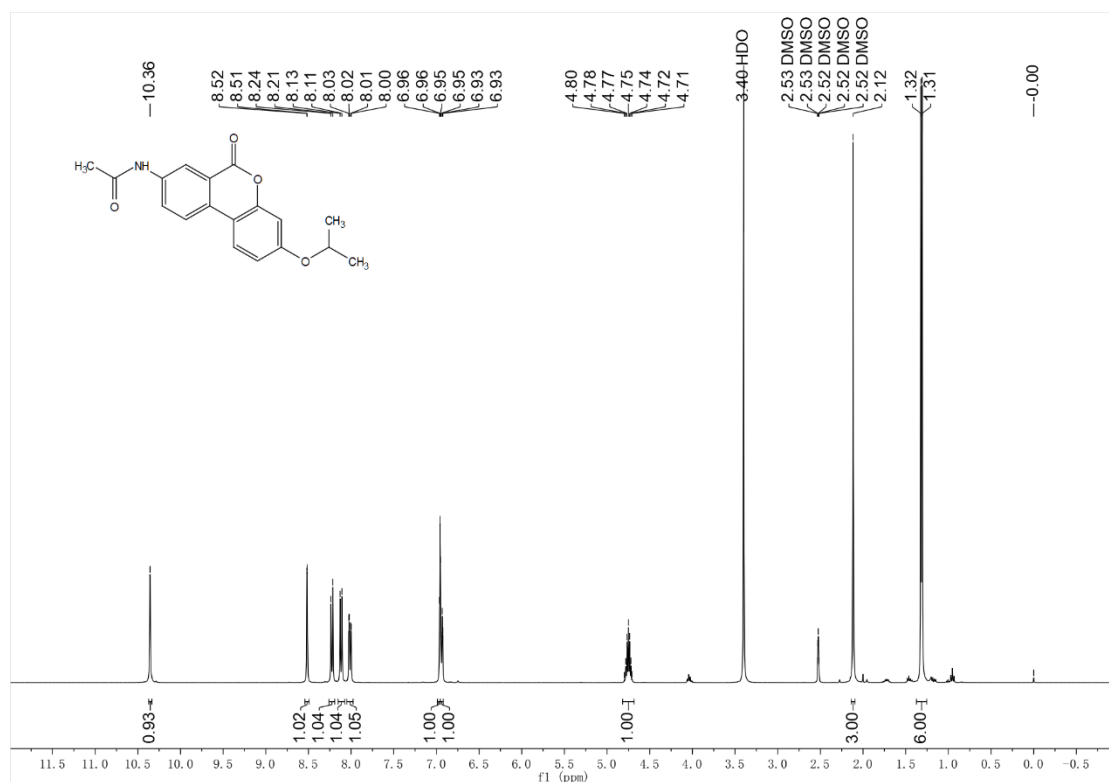


Figure S17. ¹H-NMR of D7

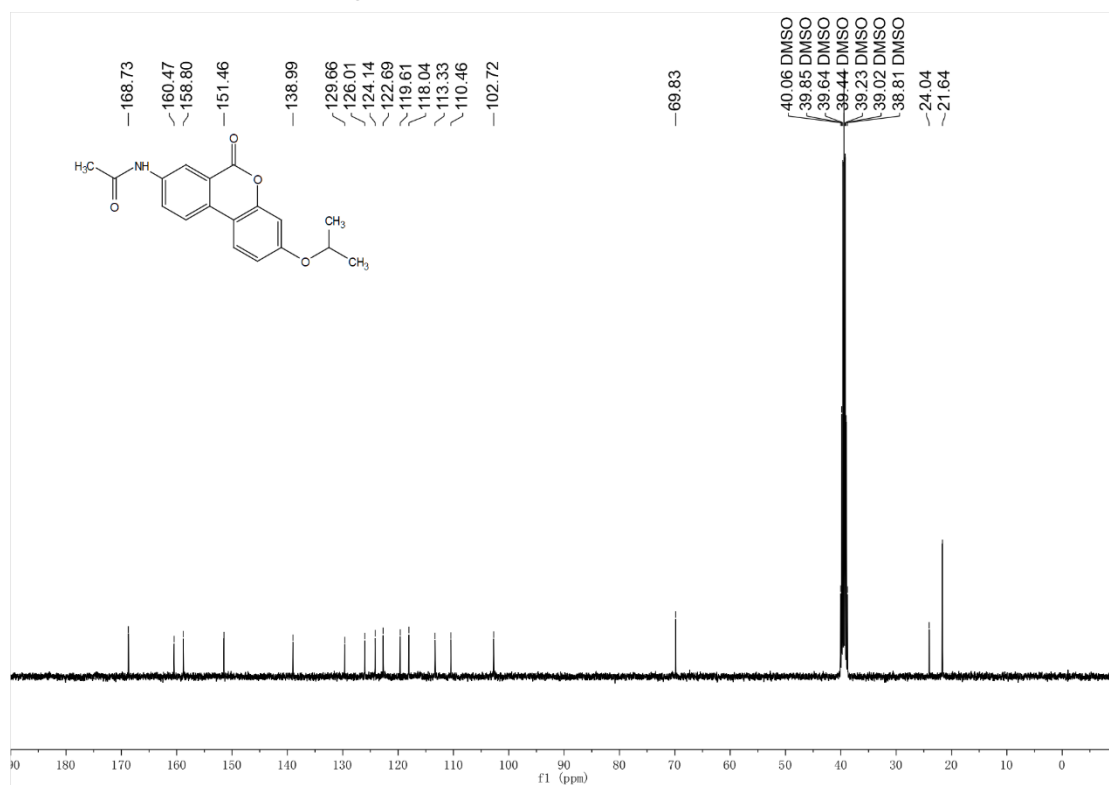


Figure S18. ¹³C-NMR of D7

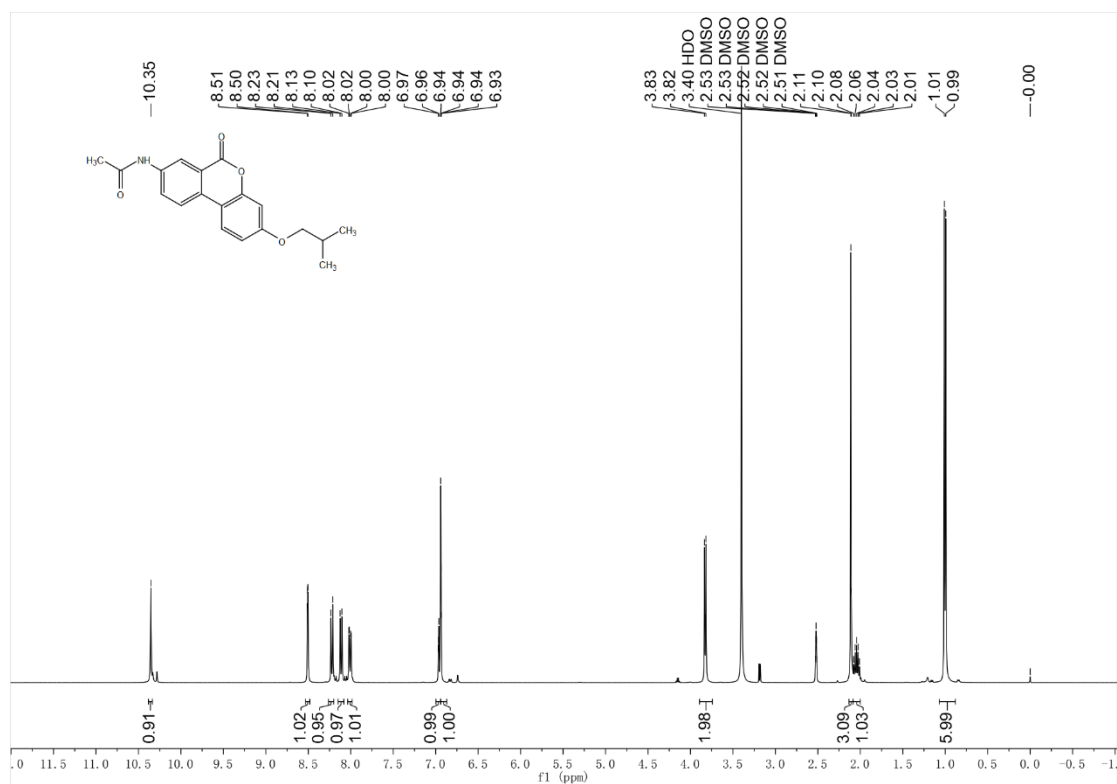


Figure S19. ¹H-NMR of D8

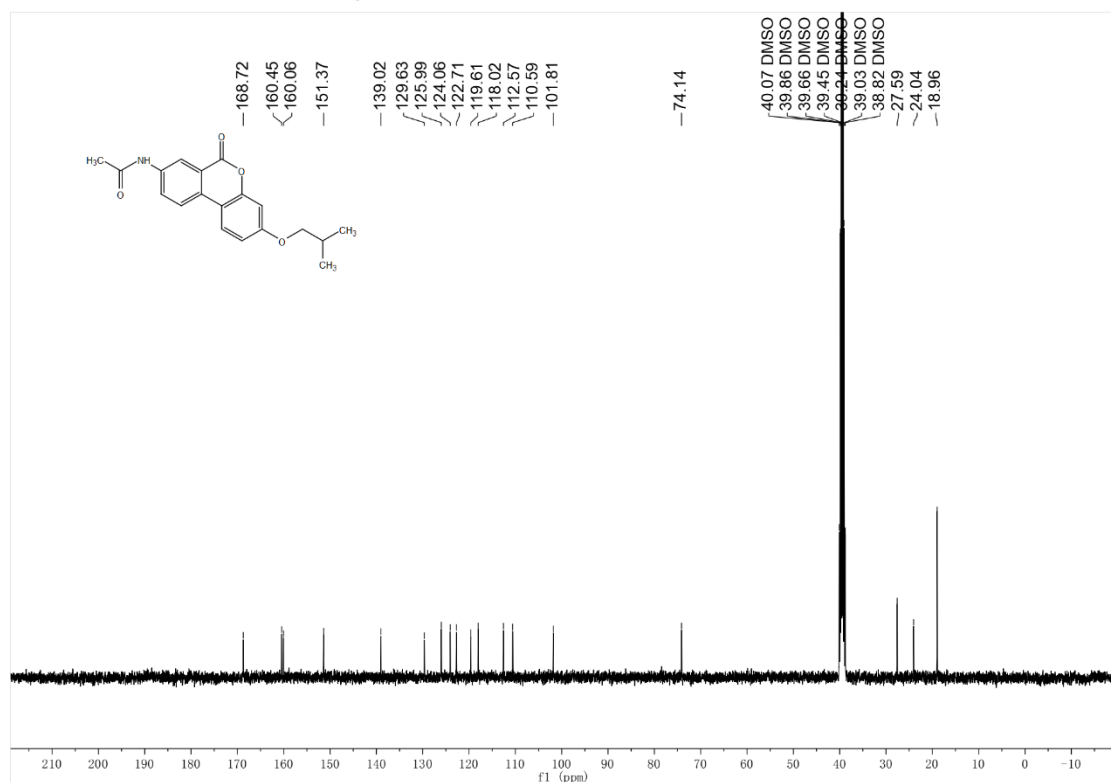


Figure S20. ¹³C-NMR of D8

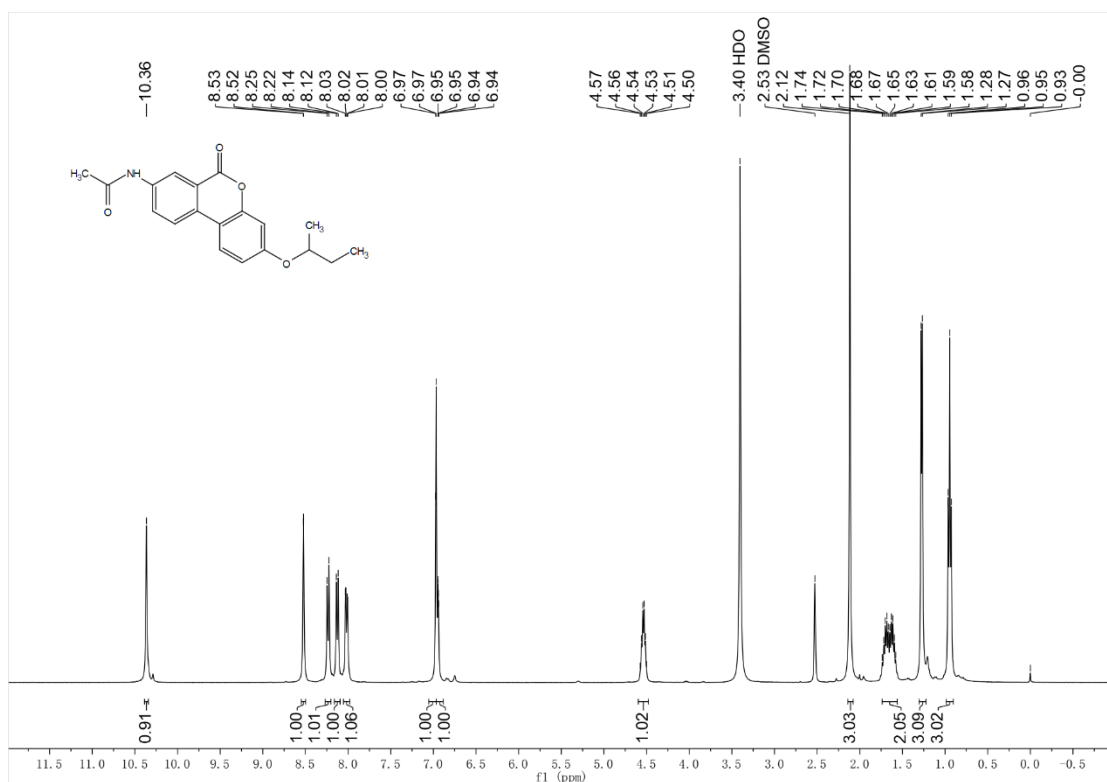


Figure S21. ¹H-NMR of D9

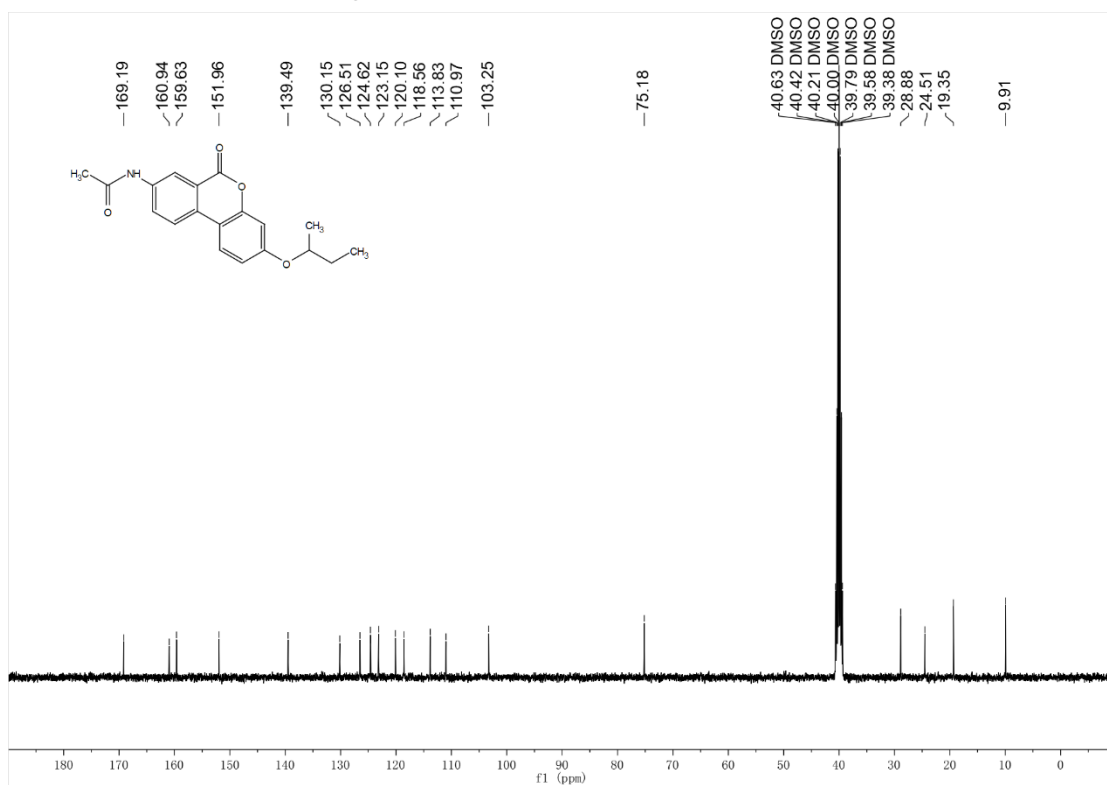


Figure S22. ¹³C-NMR of D9

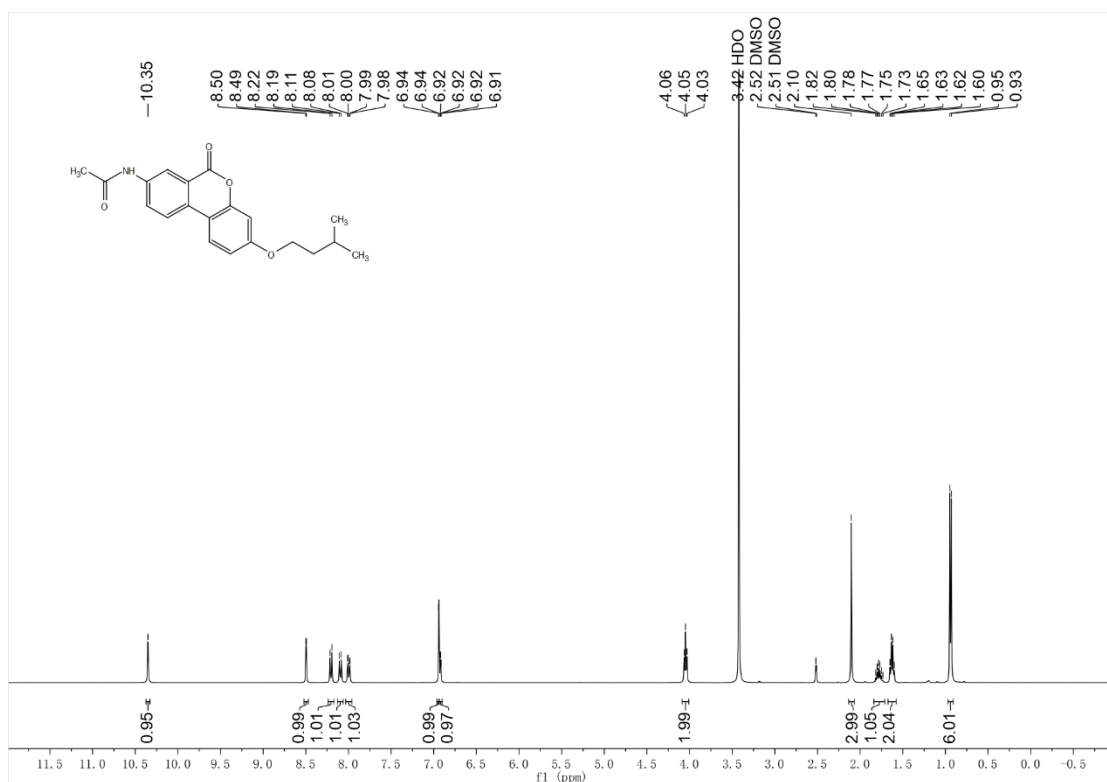


Figure S23. ¹H-NMR of D10

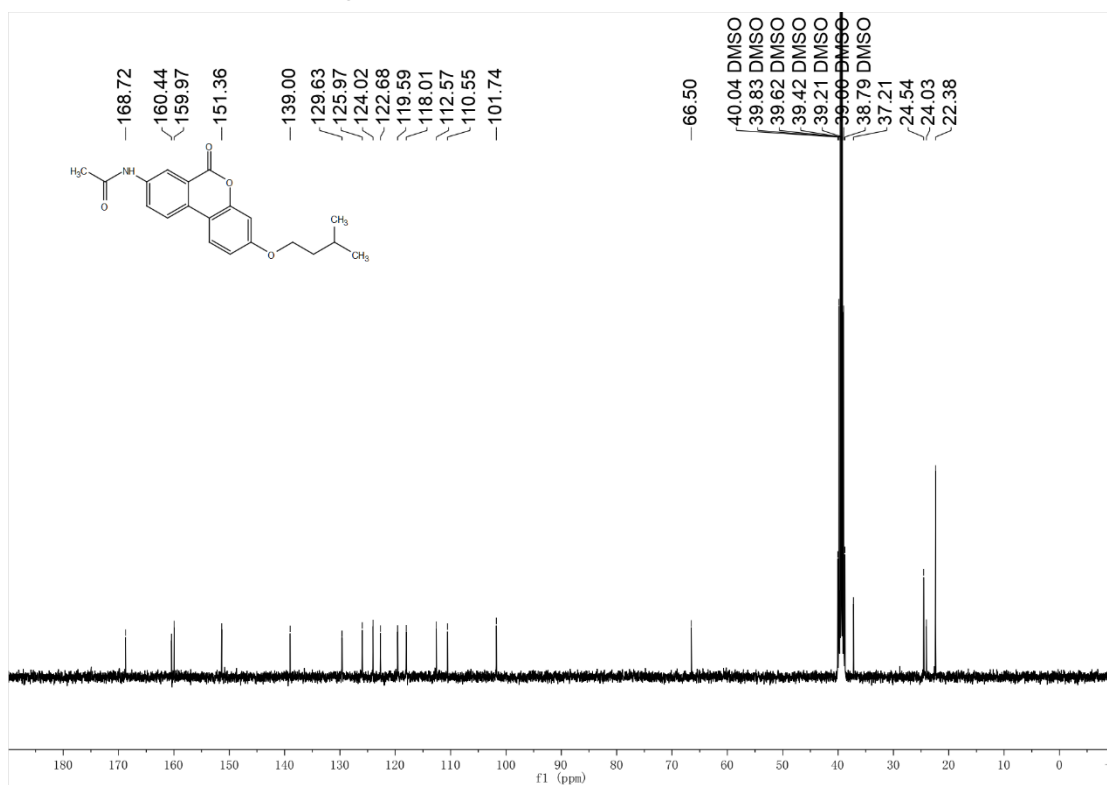


Figure S24. ¹³C-NMR of D10

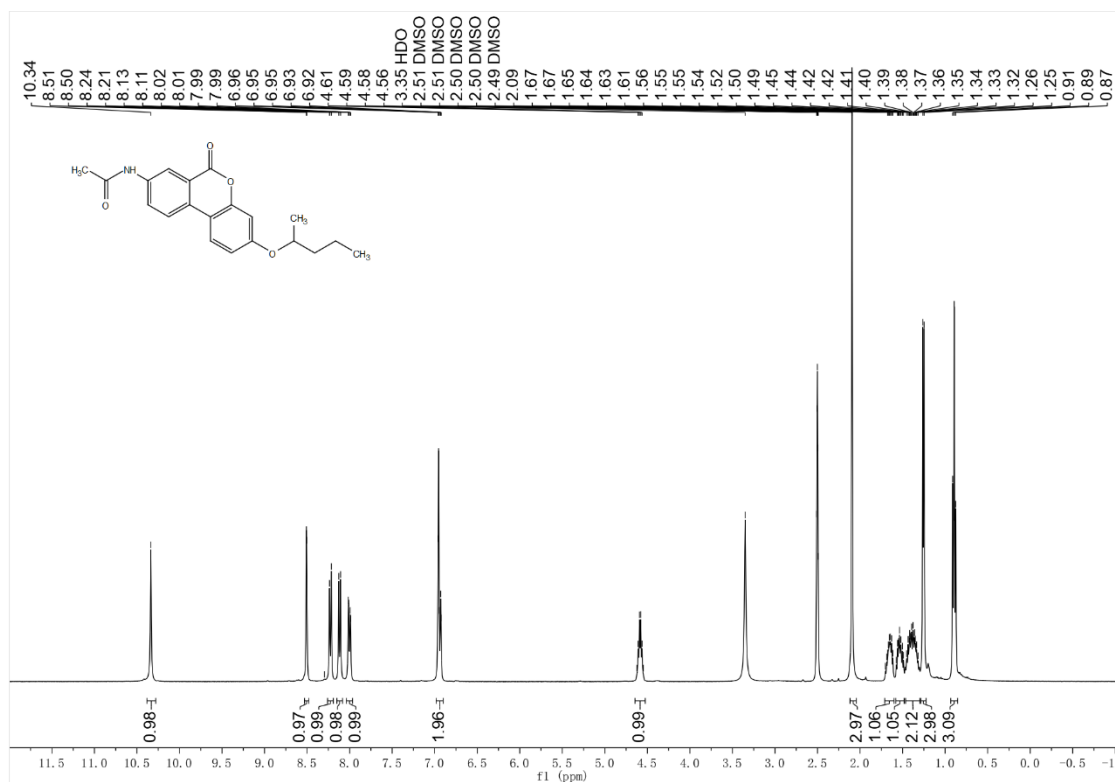


Figure S25. ¹H-NMR of D11

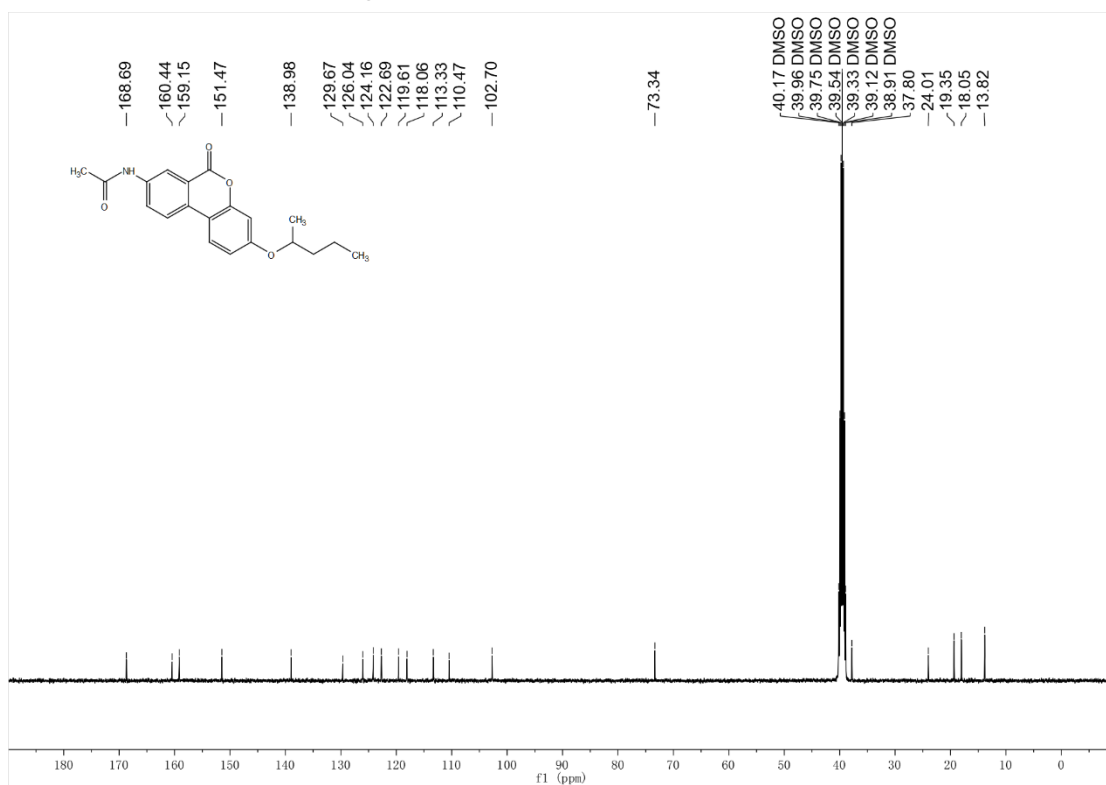


Figure S26. ¹³C-NMR of D11

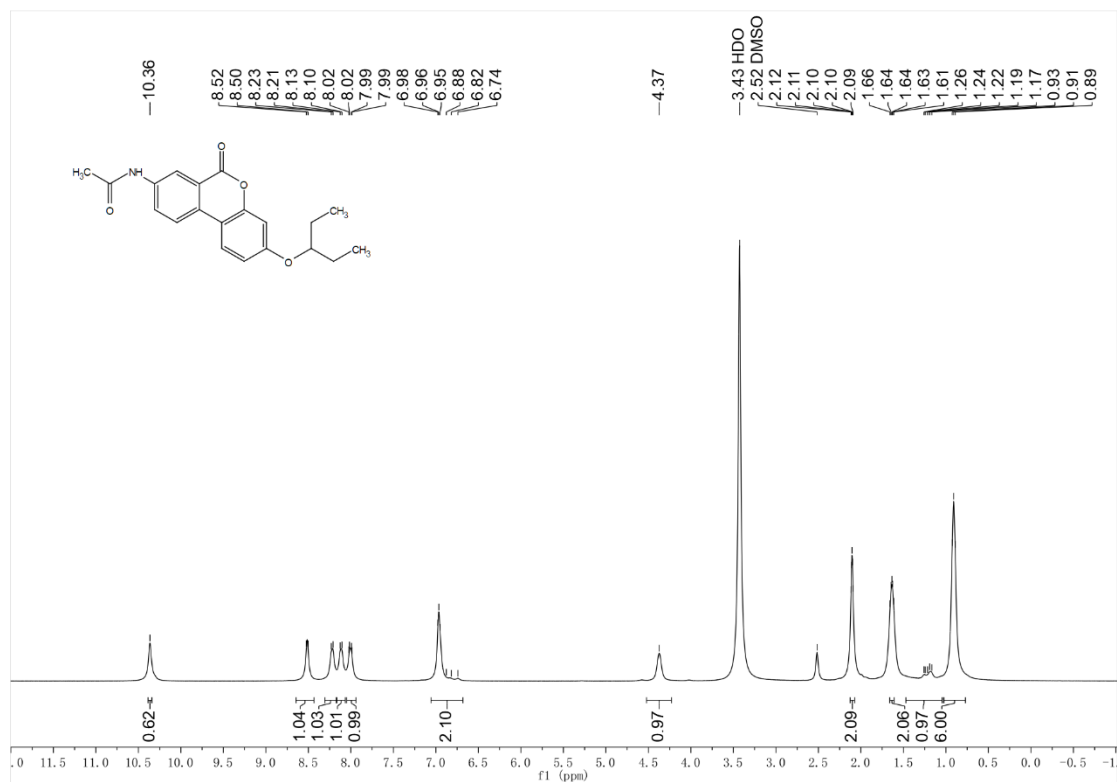


Figure S27. ¹H-NMR of D12

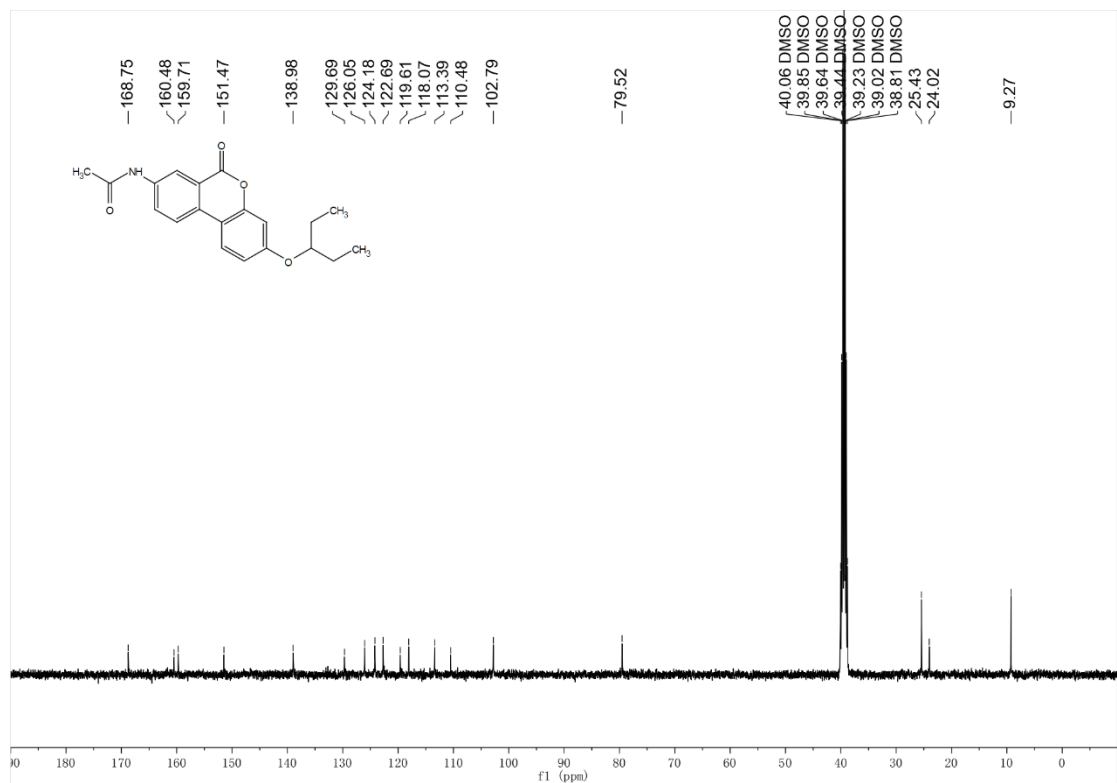


Figure S28. ¹³C-NMR of D12

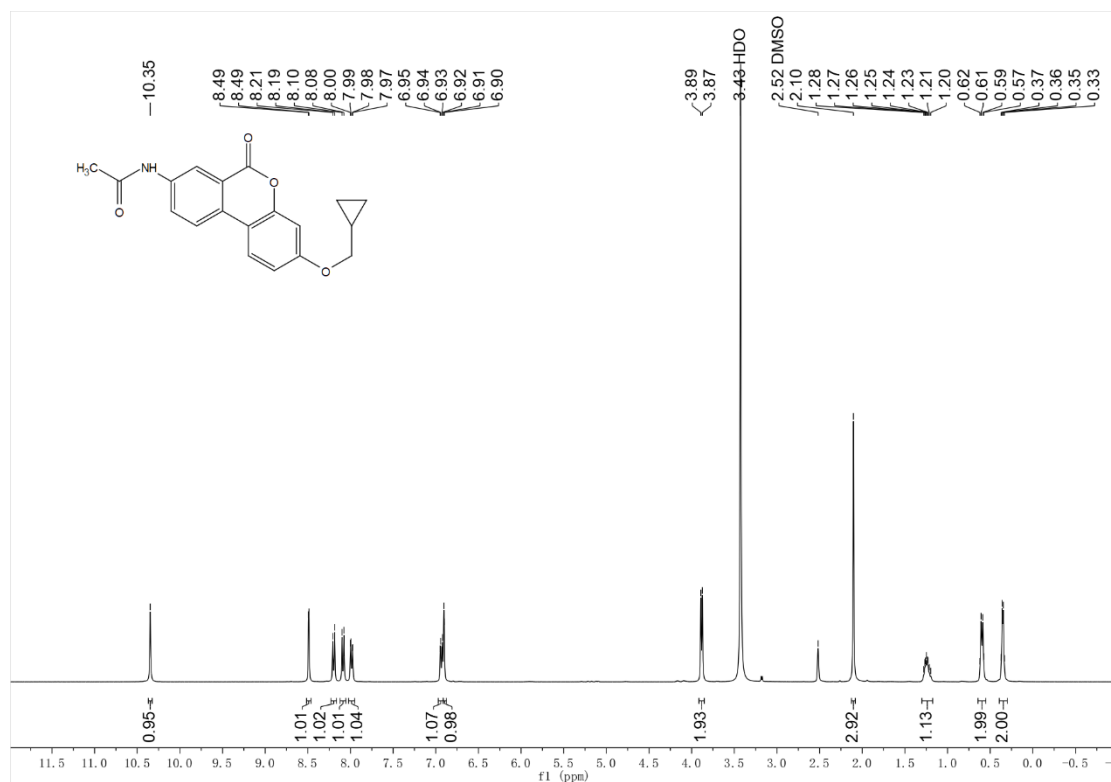


Figure S29. ¹H-NMR of D13

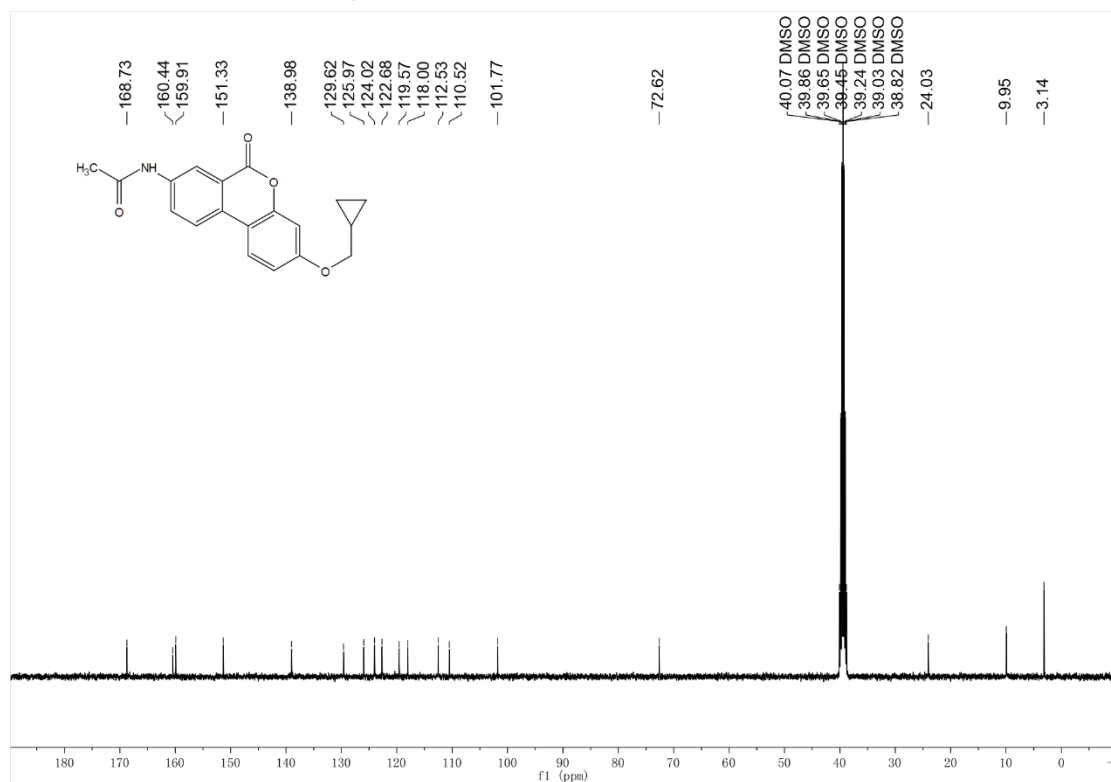


Figure S30. ¹³C-NMR of D13

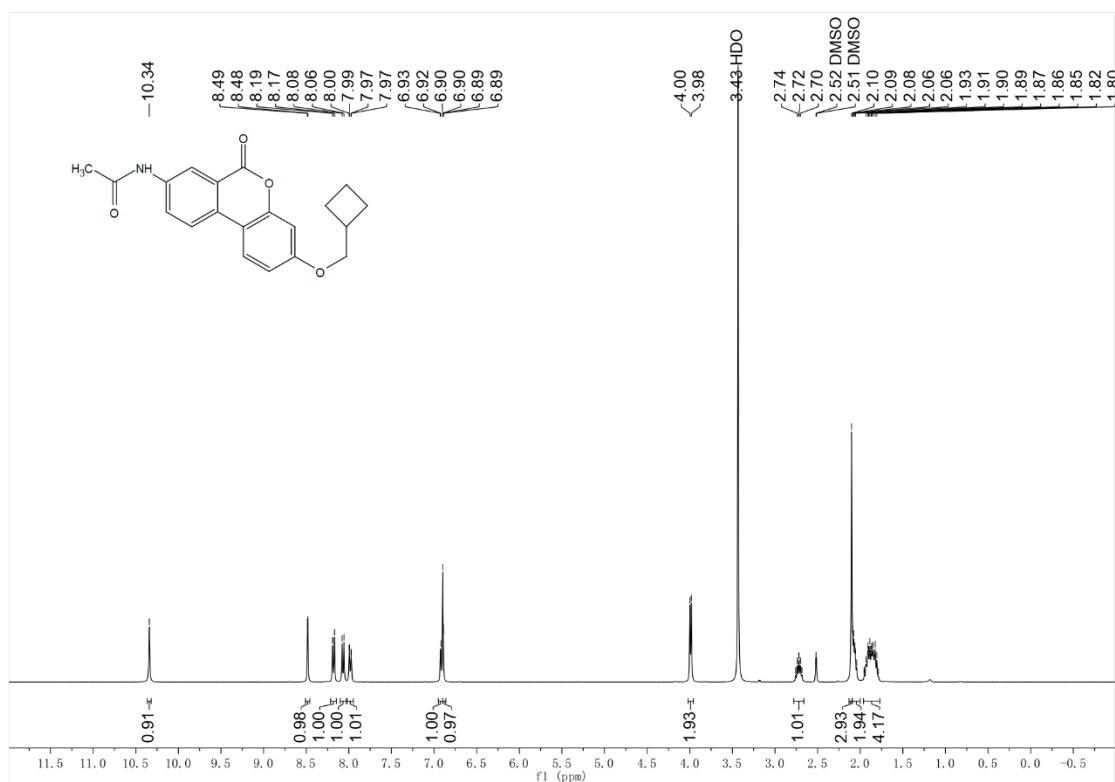


Figure S31. ¹H-NMR of D14

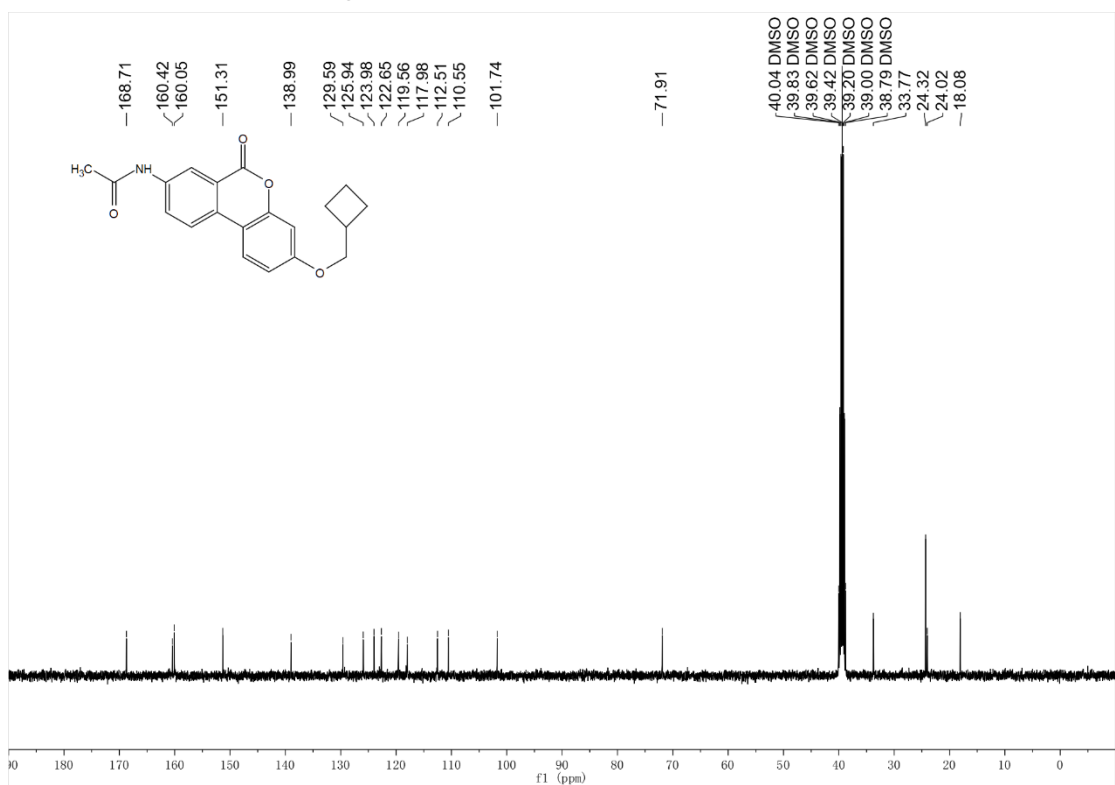


Figure S32. ¹³C-NMR of D14

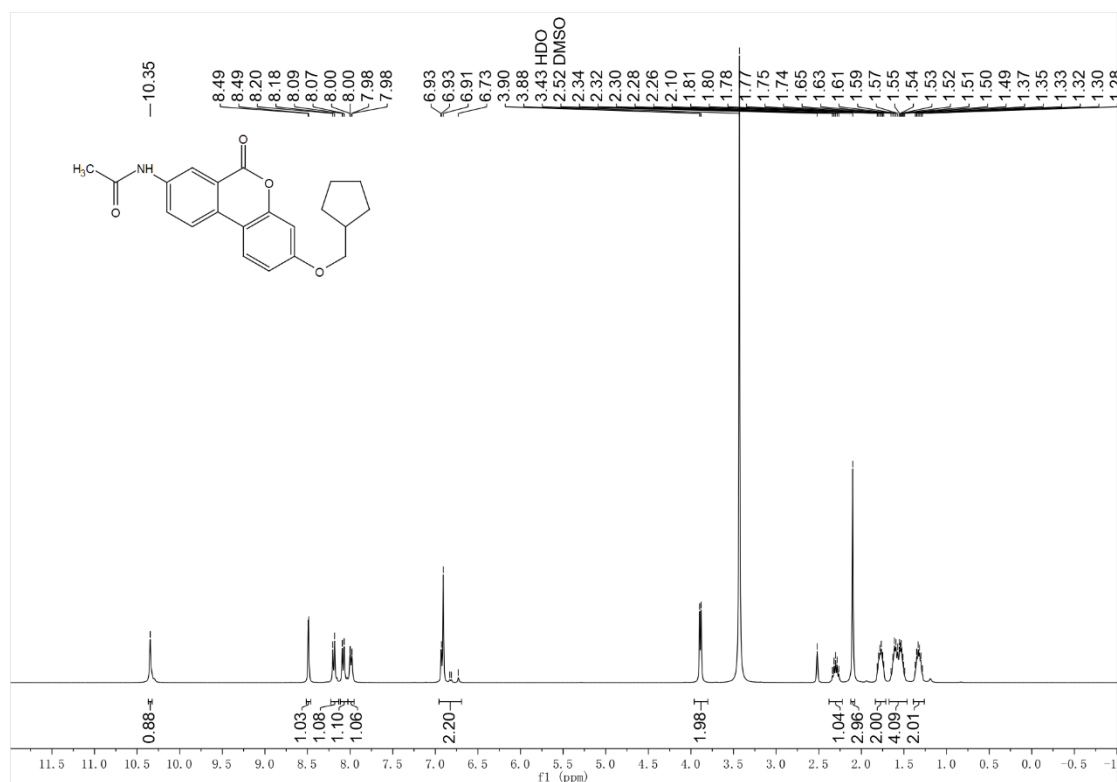


Figure S33. ¹H-NMR of D15

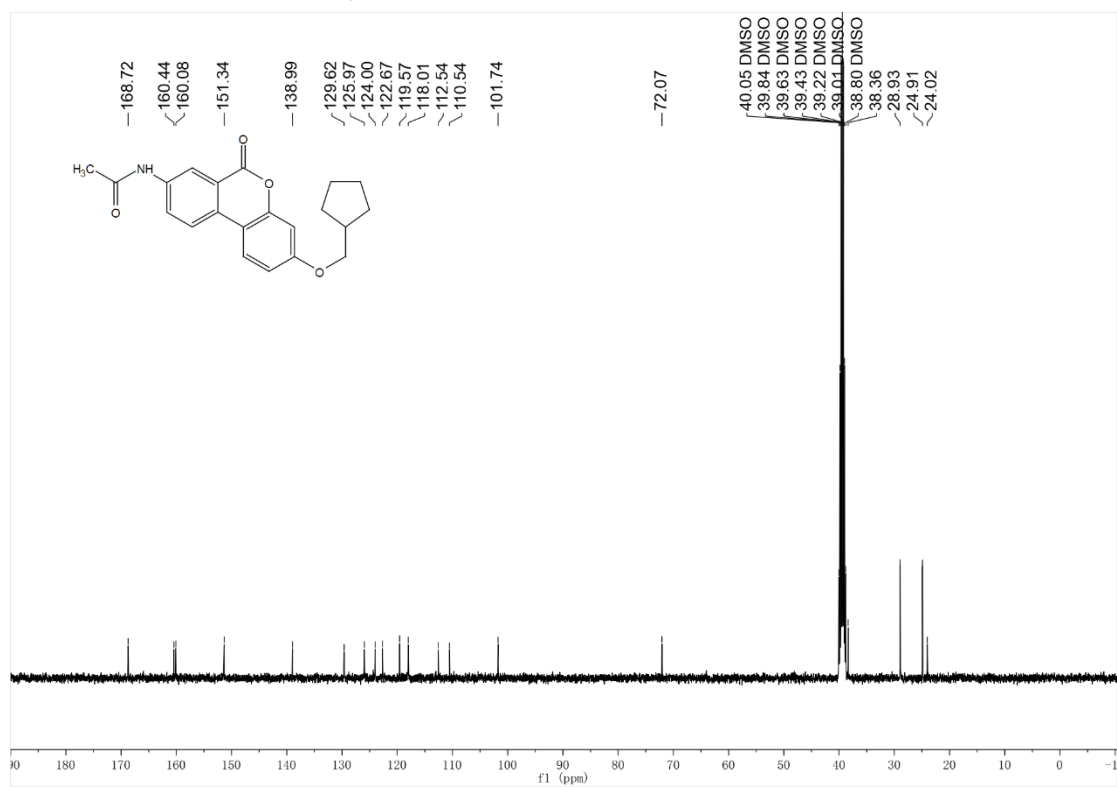


Figure S34. ¹³C-NMR of D15

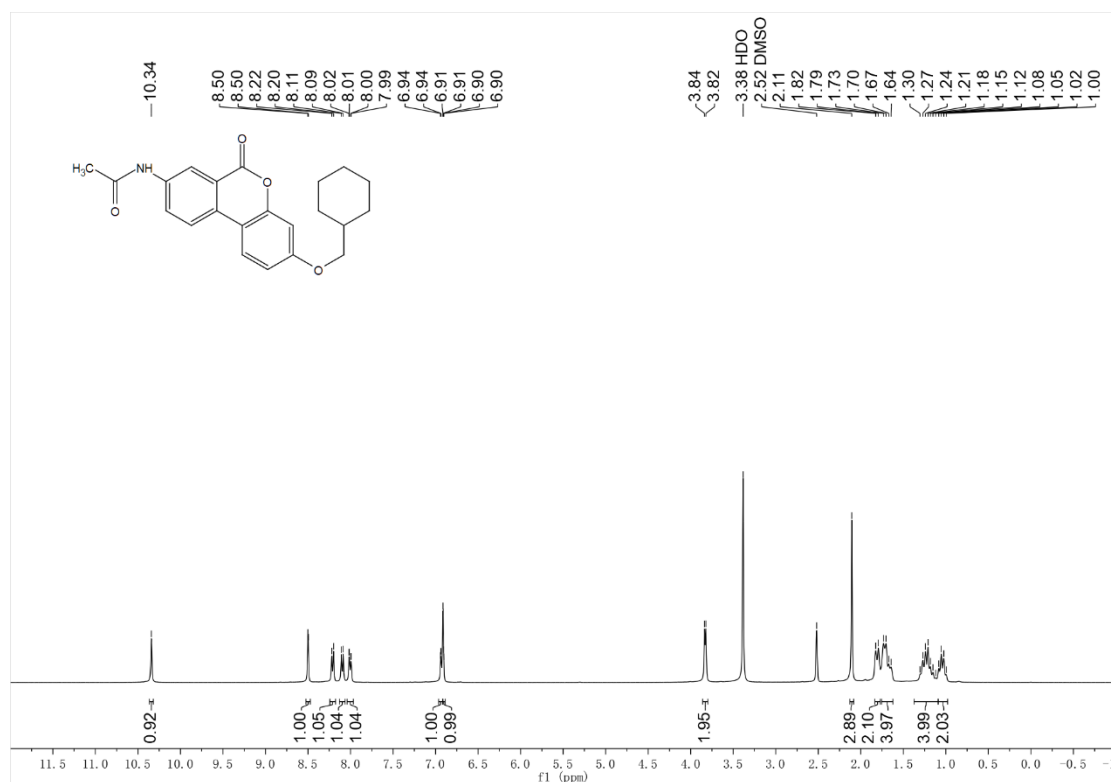


Figure S35. ¹H-NMR of D16

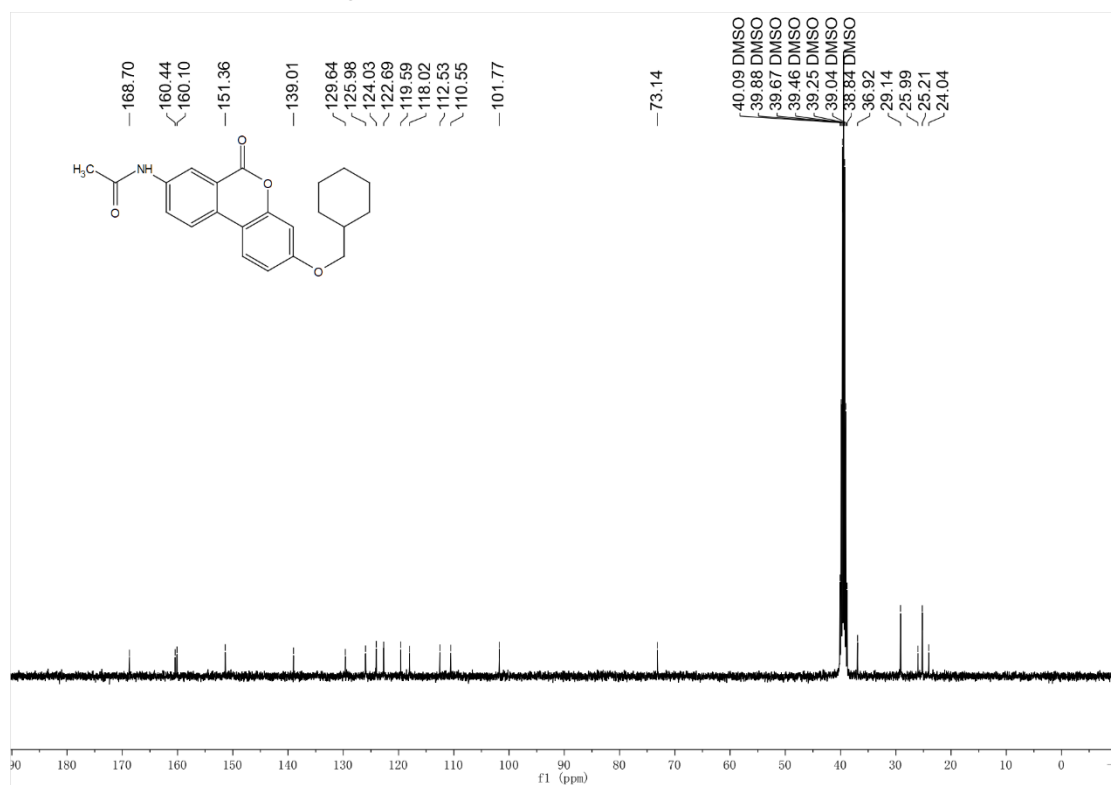


Figure S36. ¹³C-NMR of D16

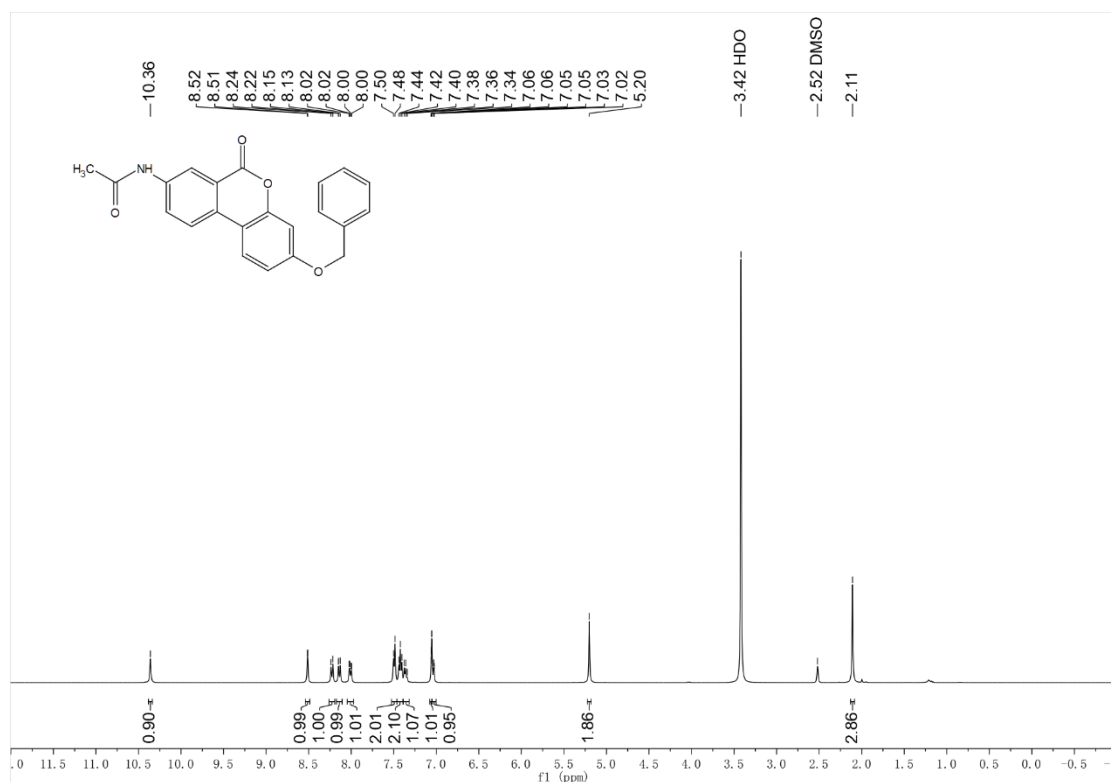


Figure S37. ¹H-NMR of D17

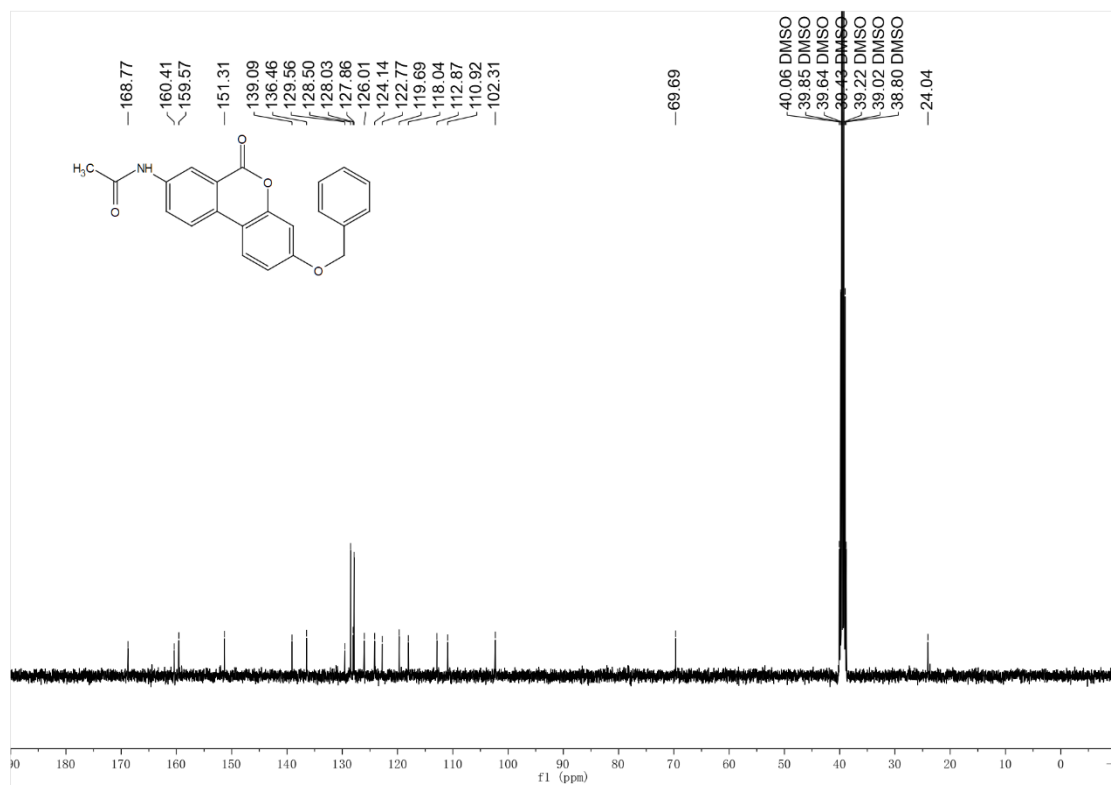


Figure S38. ¹³C-NMR of D17

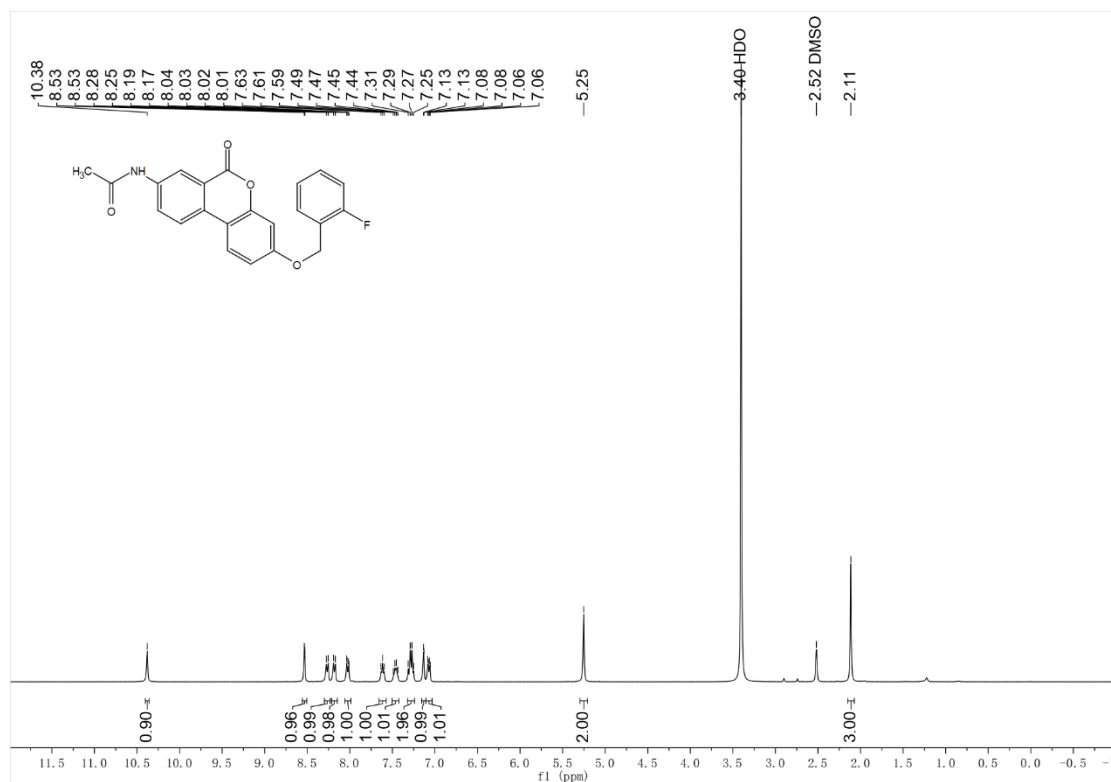


Figure S39. ¹H-NMR of D18

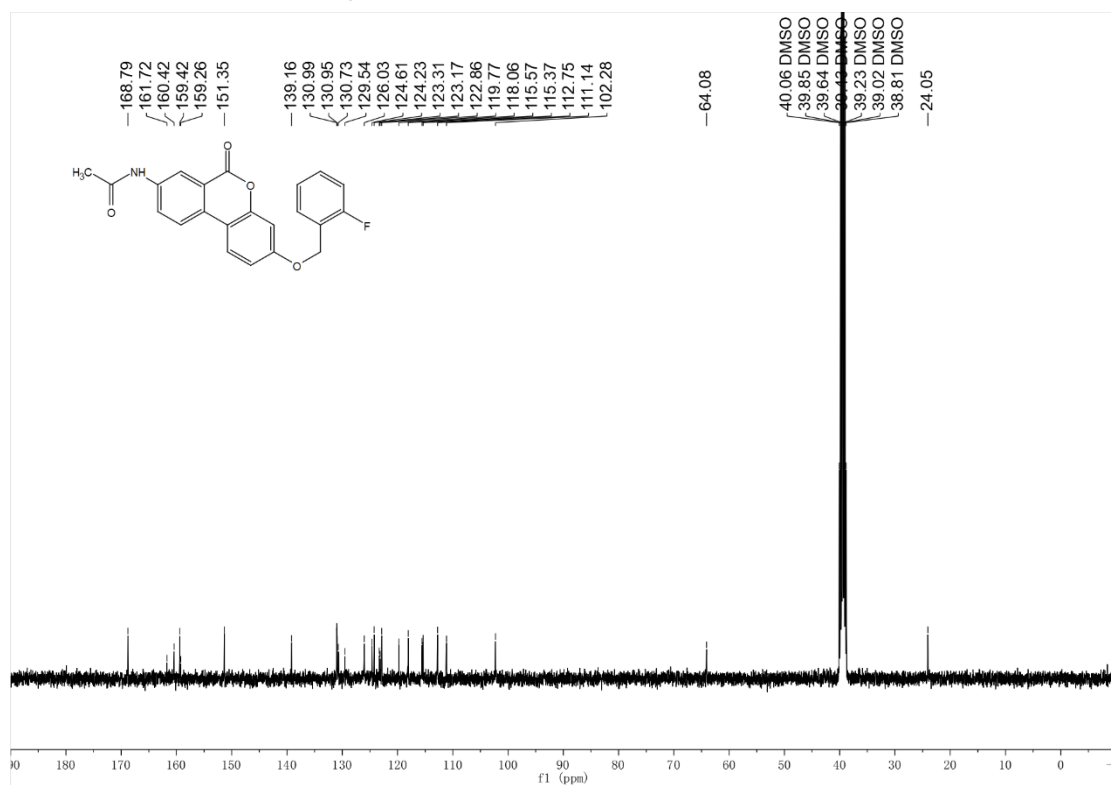


Figure S40. ¹³C-NMR of D18

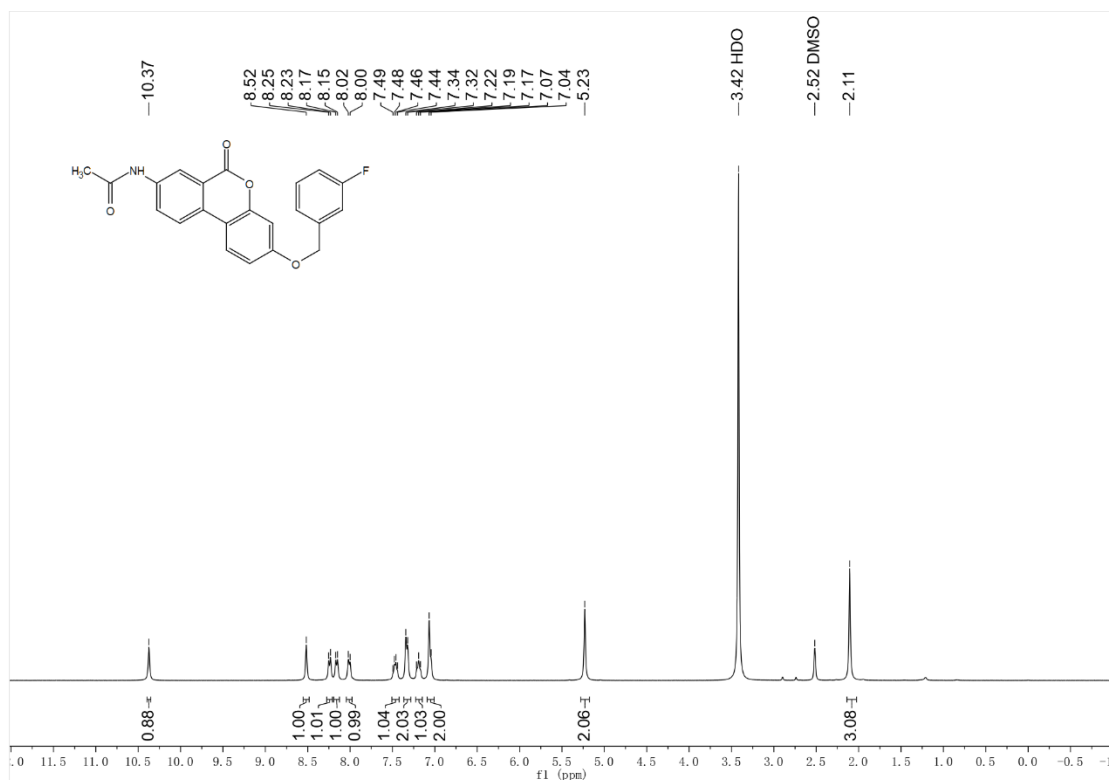


Figure S41. ¹H-NMR of D19

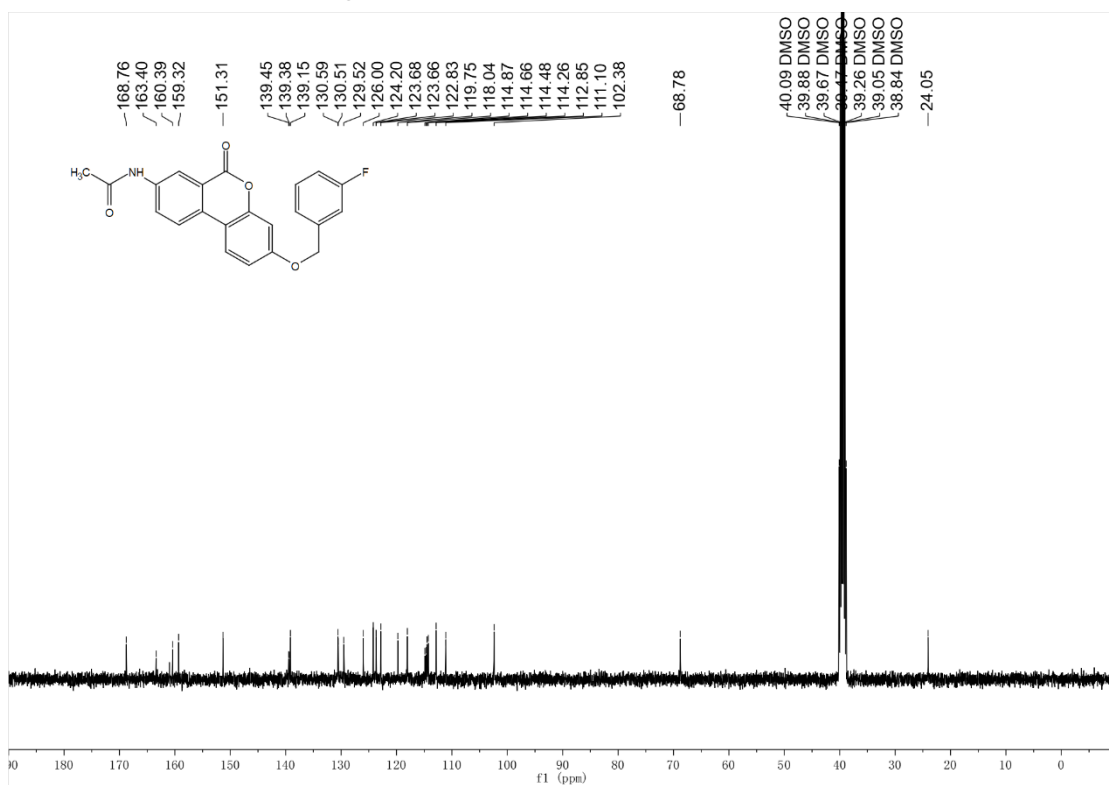


Figure S42. ¹³C-NMR of D19

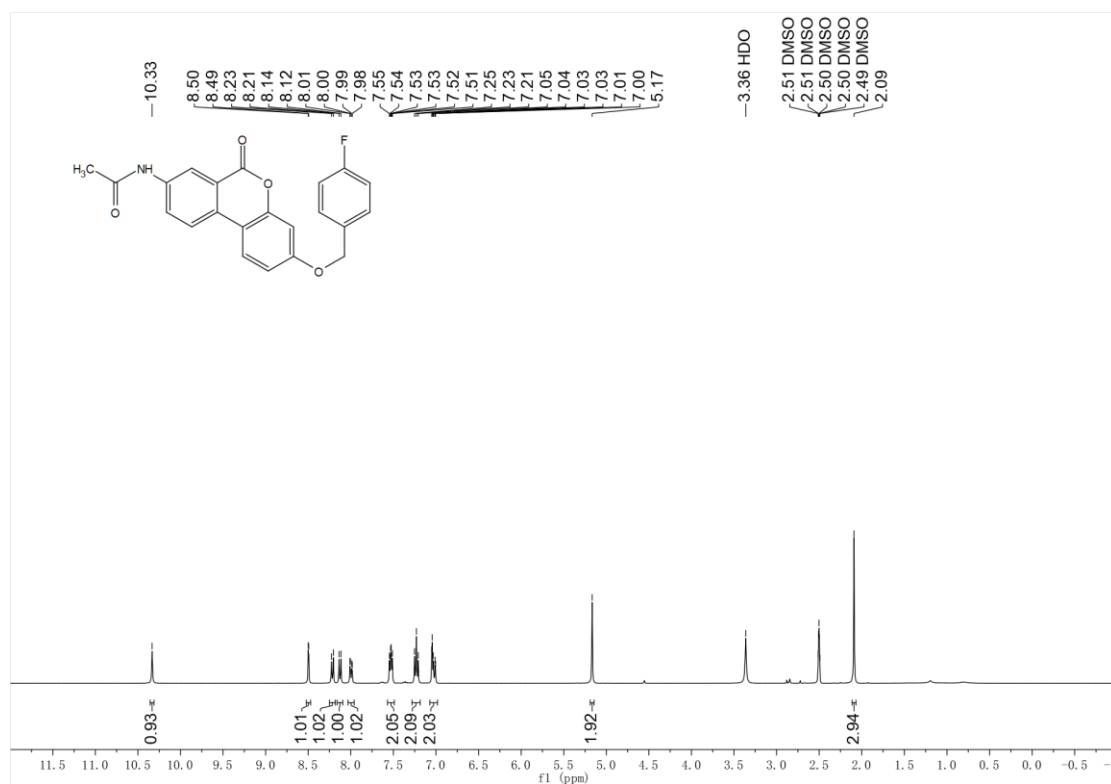


Figure S43. ¹H-NMR of D20

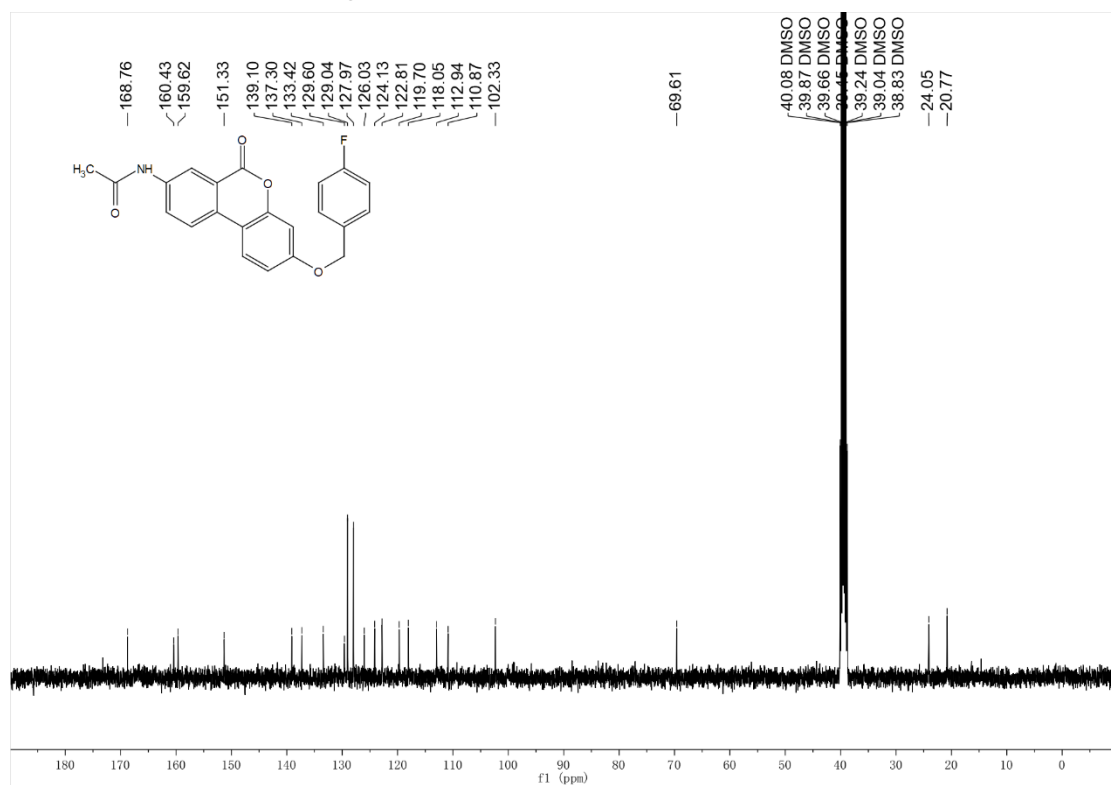


Figure S44. ¹³C-NMR of D20

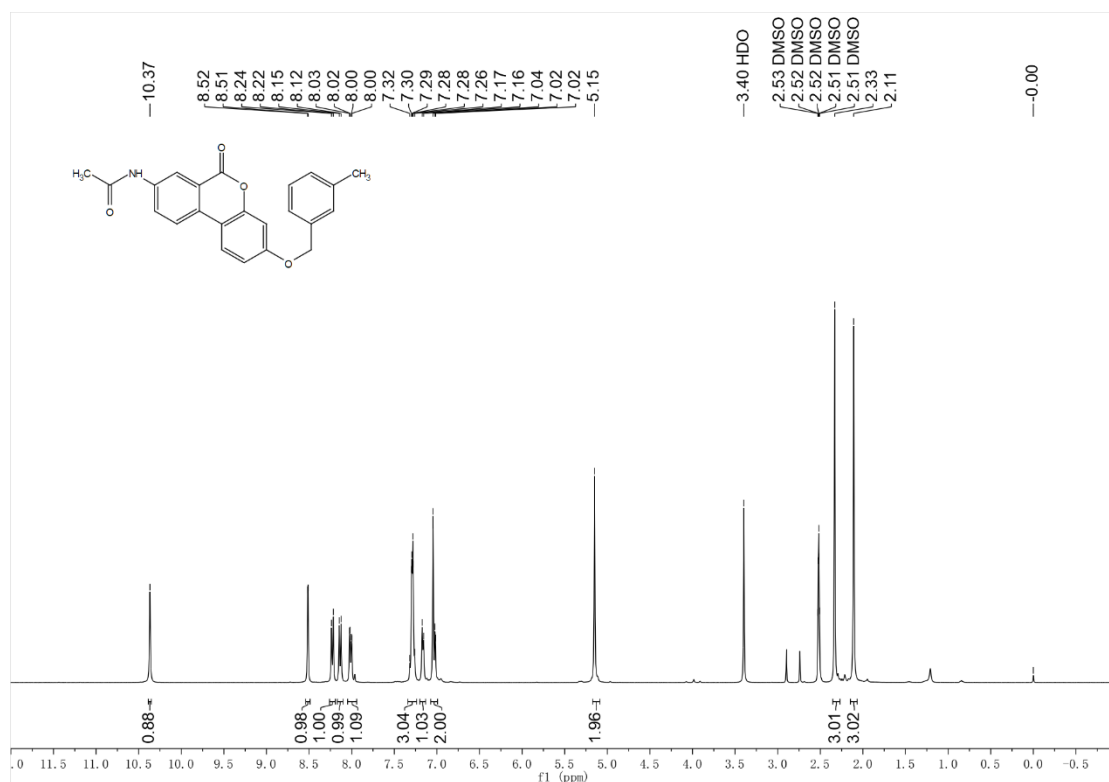


Figure S45. ¹H-NMR of D21

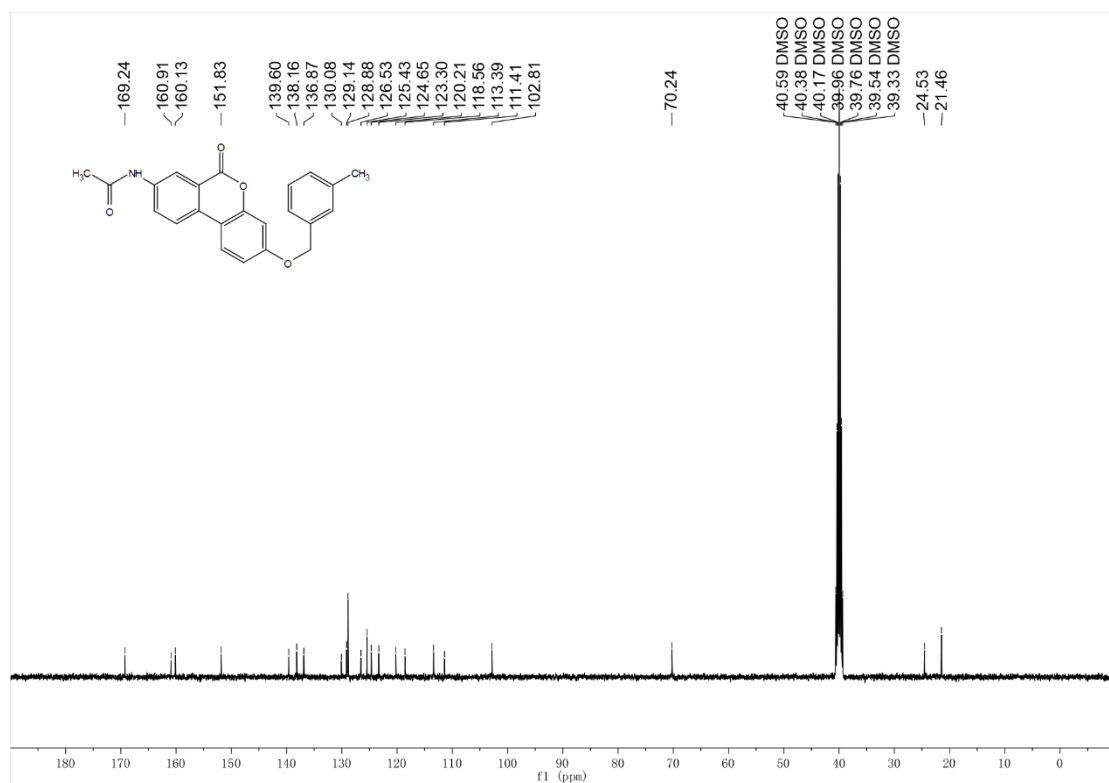


Figure S46. ¹³C-NMR of D21

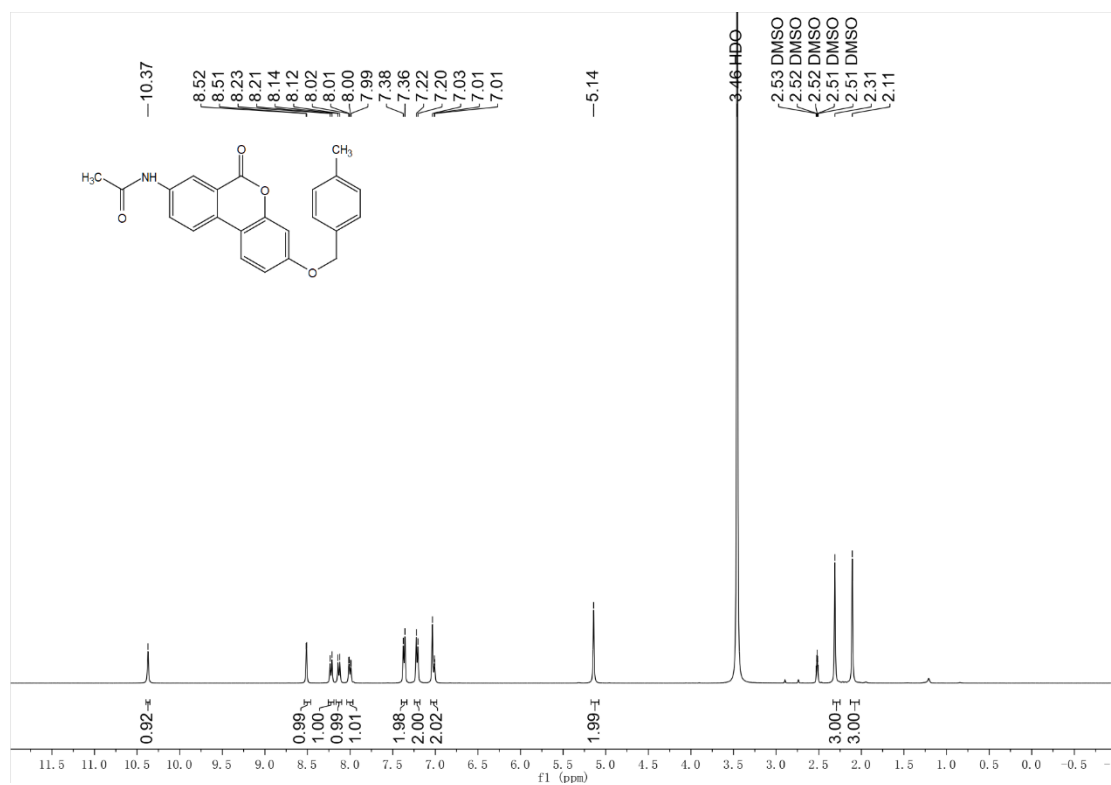


Figure S47. ¹H-NMR of D22

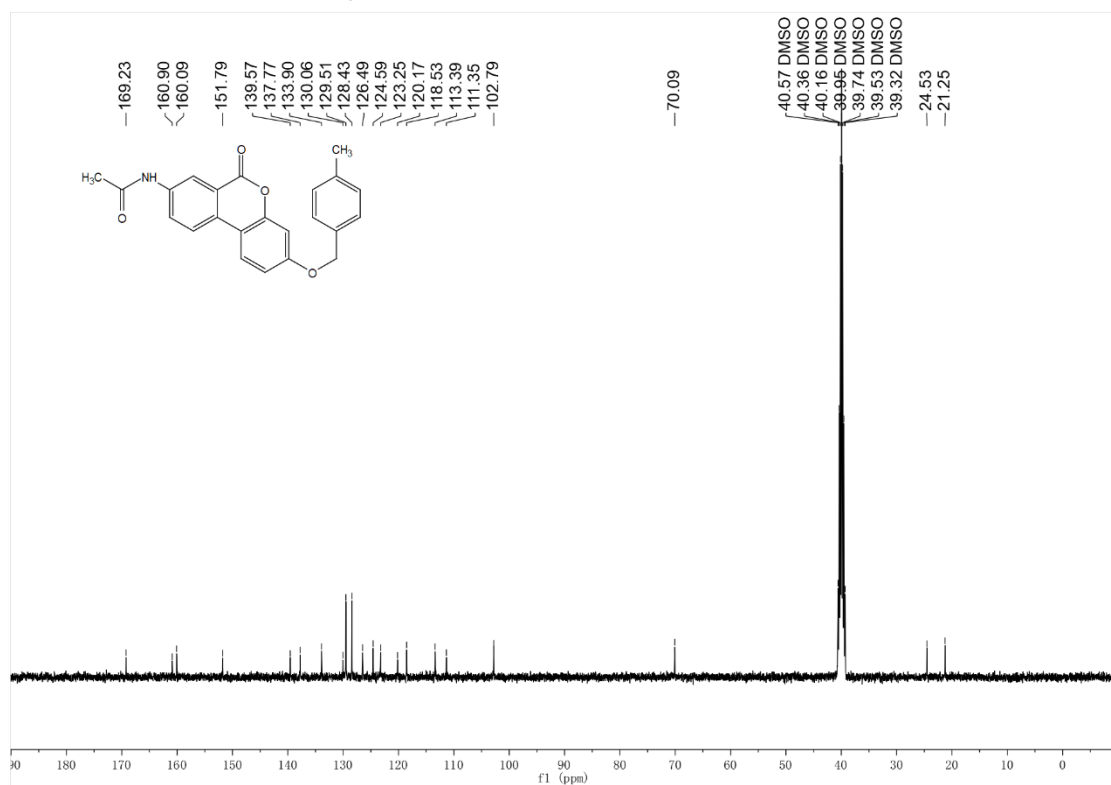


Figure S48. ¹³C-NMR of D22

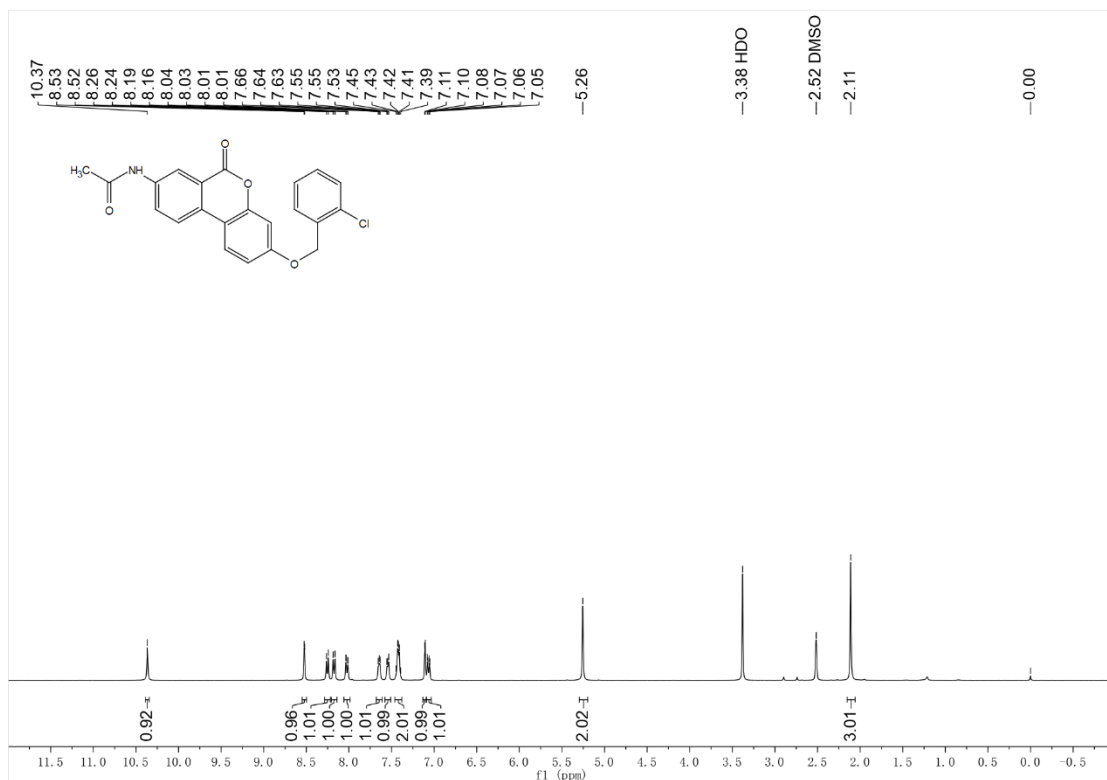


Figure S49. ¹H-NMR of D23

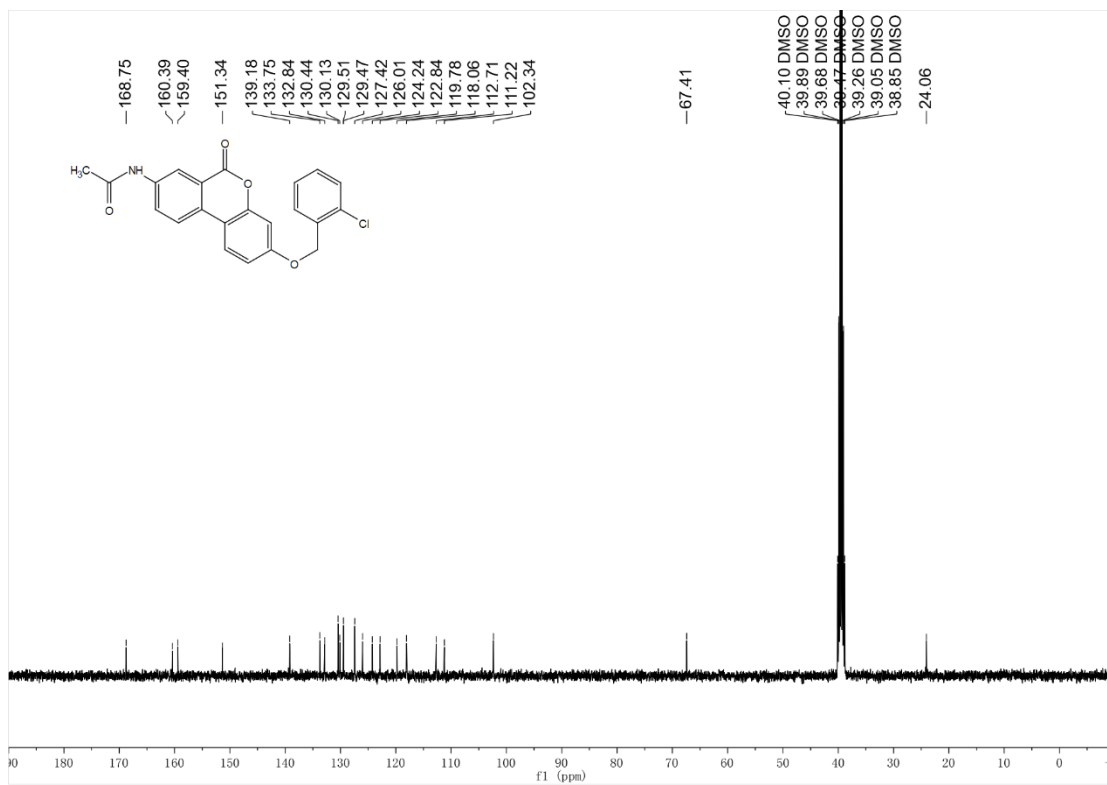


Figure S50. ¹³C-NMR of D23

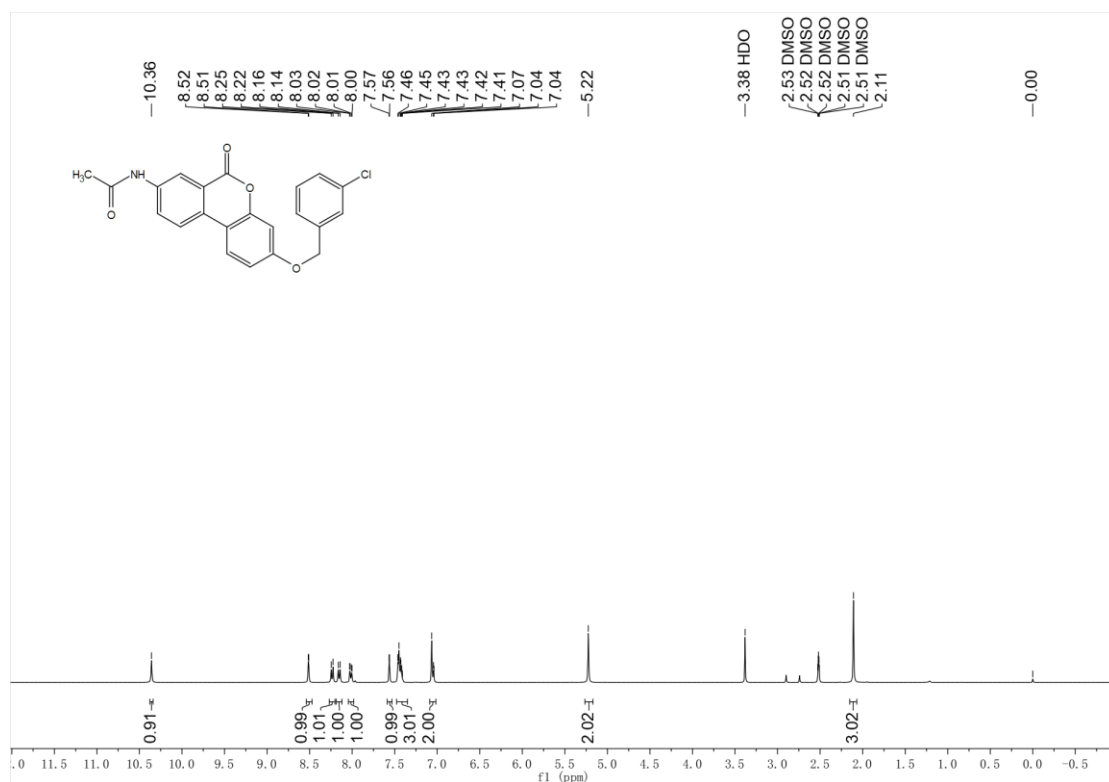


Figure S51. ¹H-NMR of D24

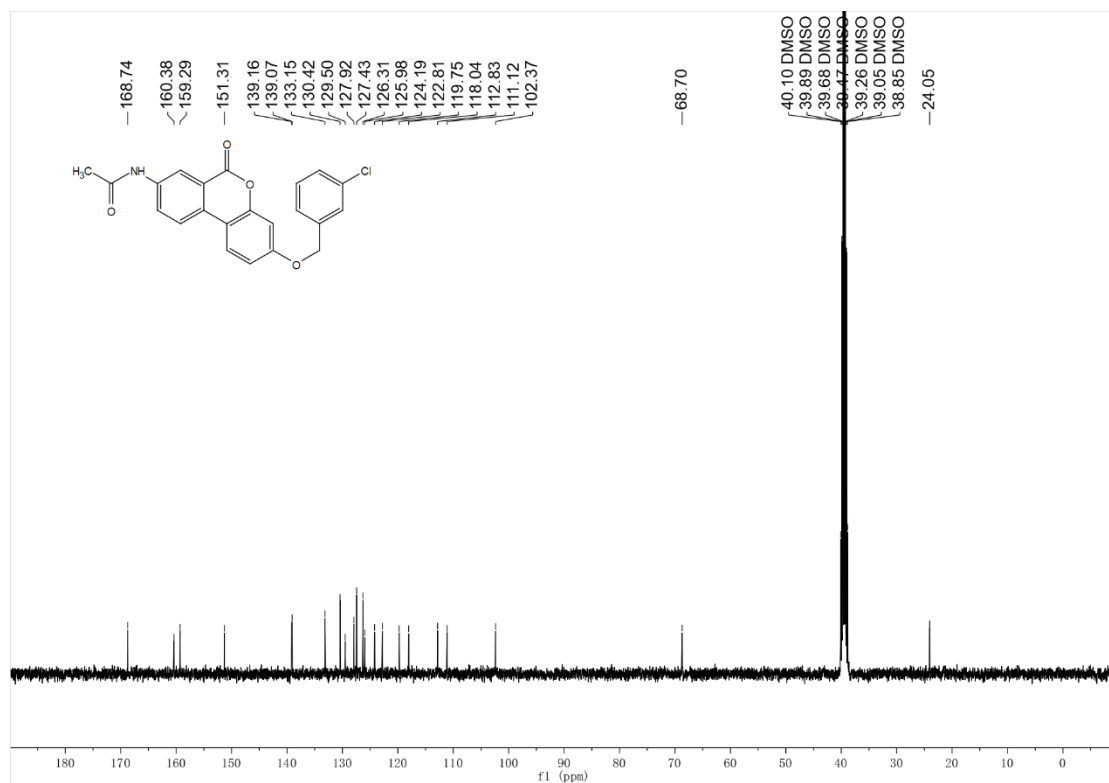


Figure S52. ¹³C-NMR of D24

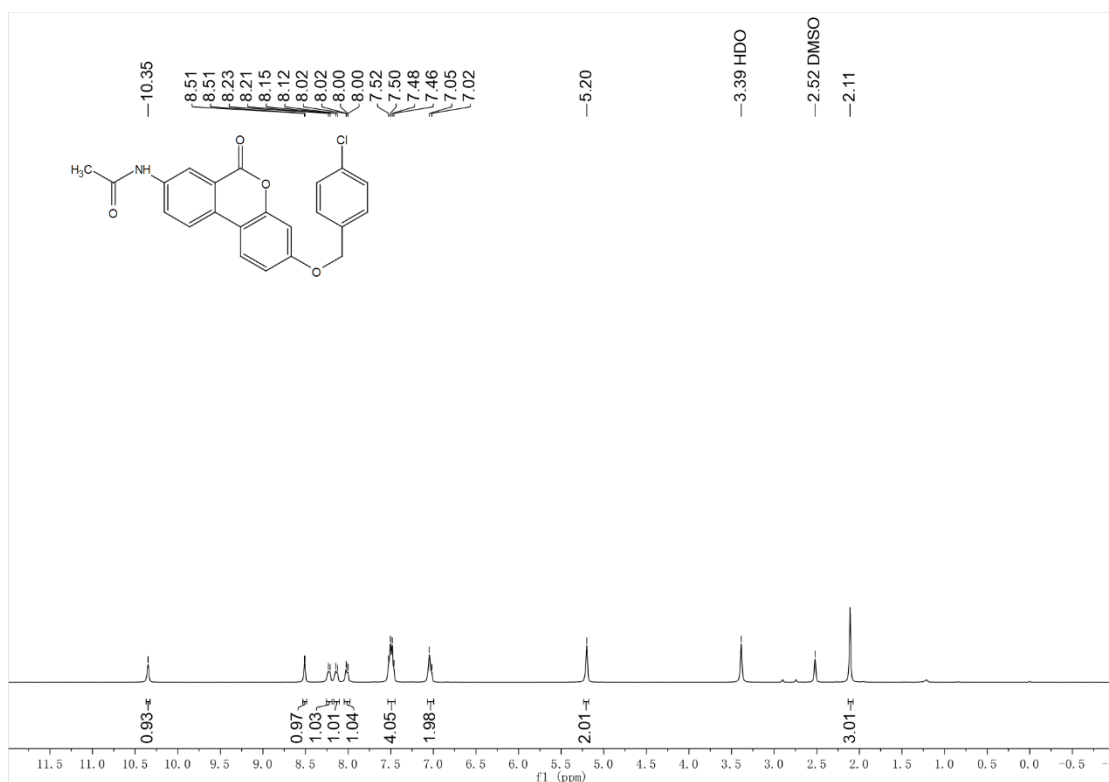


Figure S53. ¹H-NMR of D25

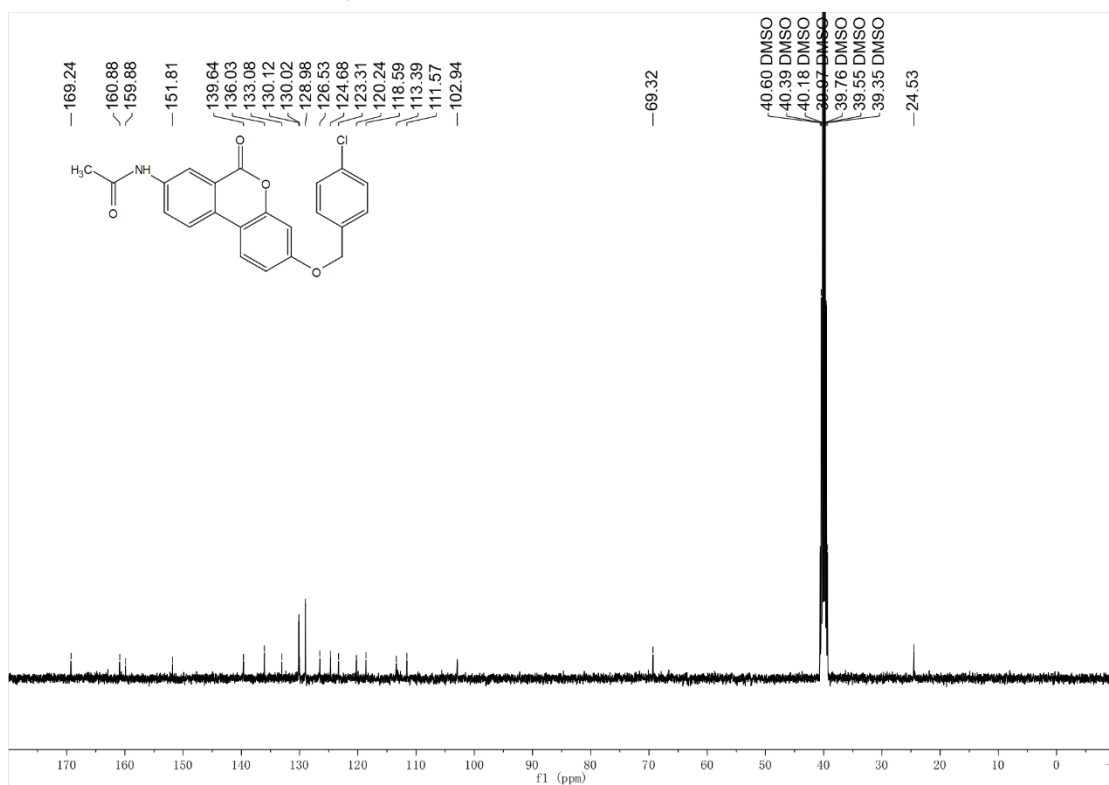


Figure S54. ¹³C-NMR of D25

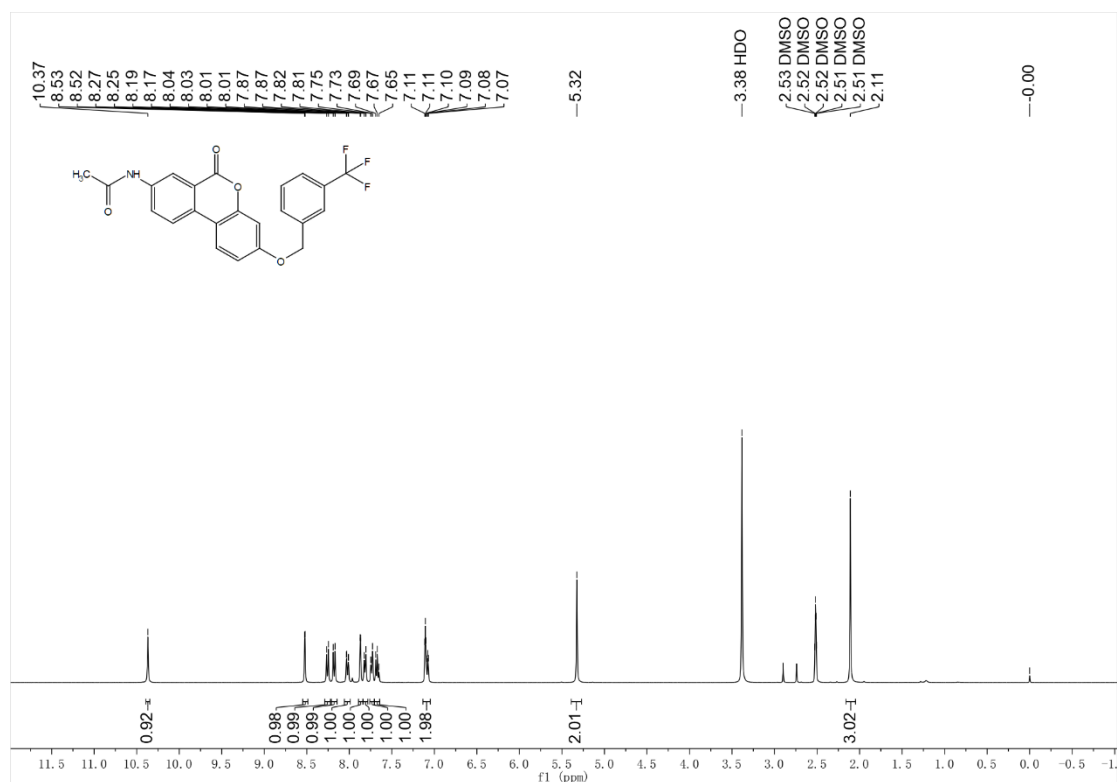


Figure S55. ¹H-NMR of D26

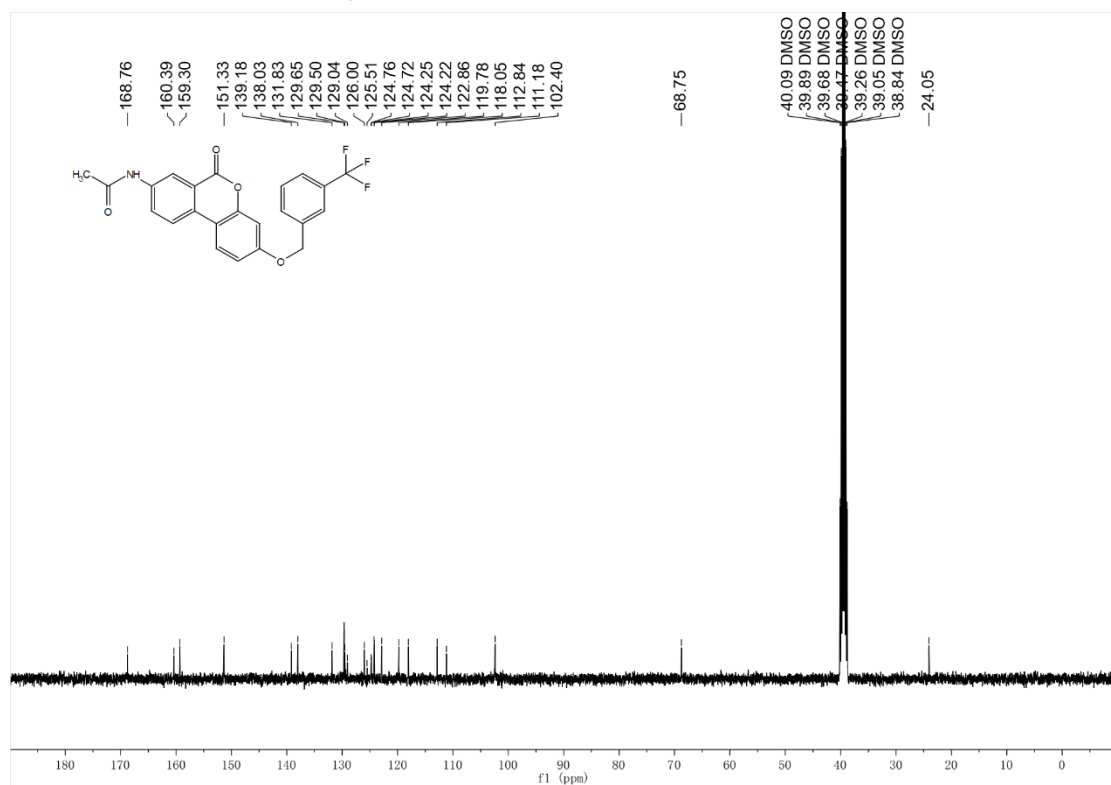


Figure S56. ¹³C-NMR of D26

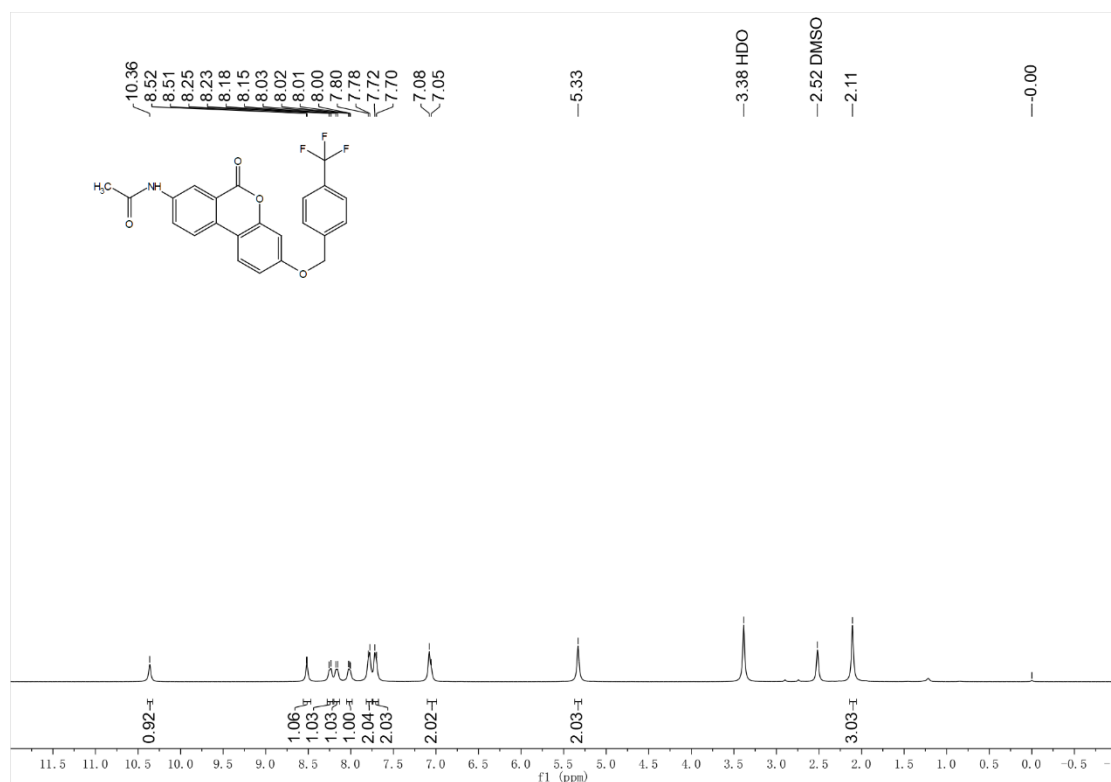


Figure S57. ¹H-NMR of D27

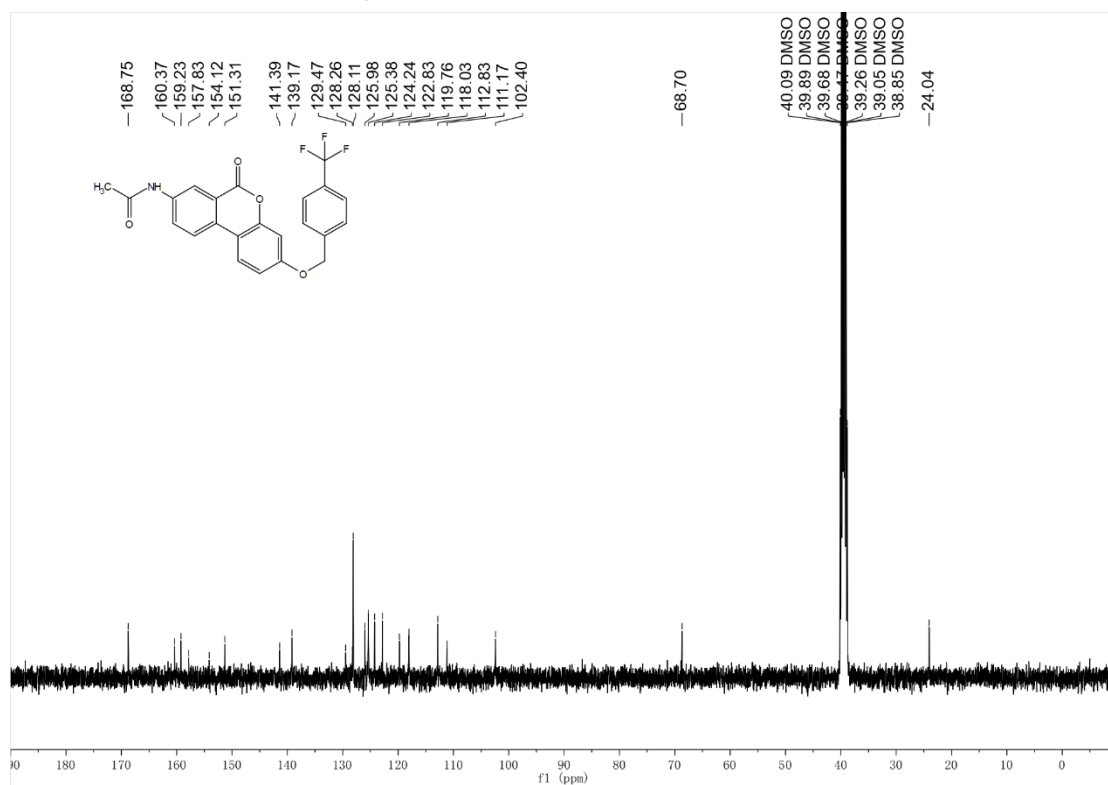


Figure S58. ¹³C-NMR of D27

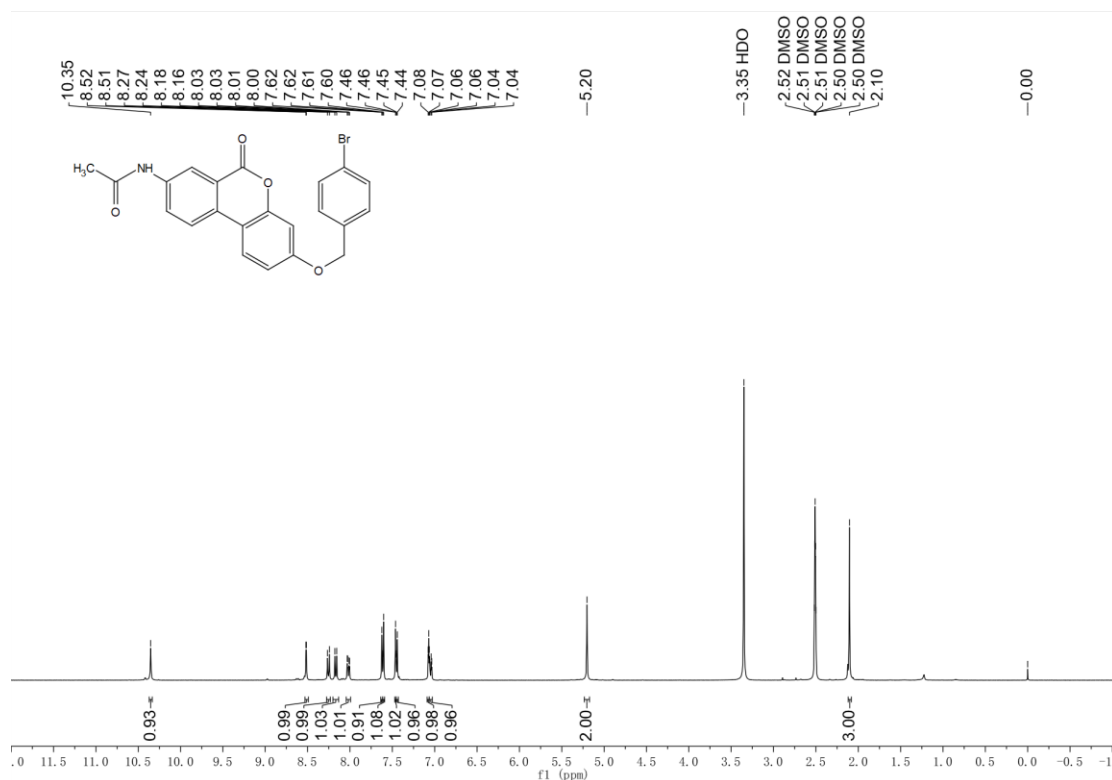


Figure S59. ¹H-NMR of D28

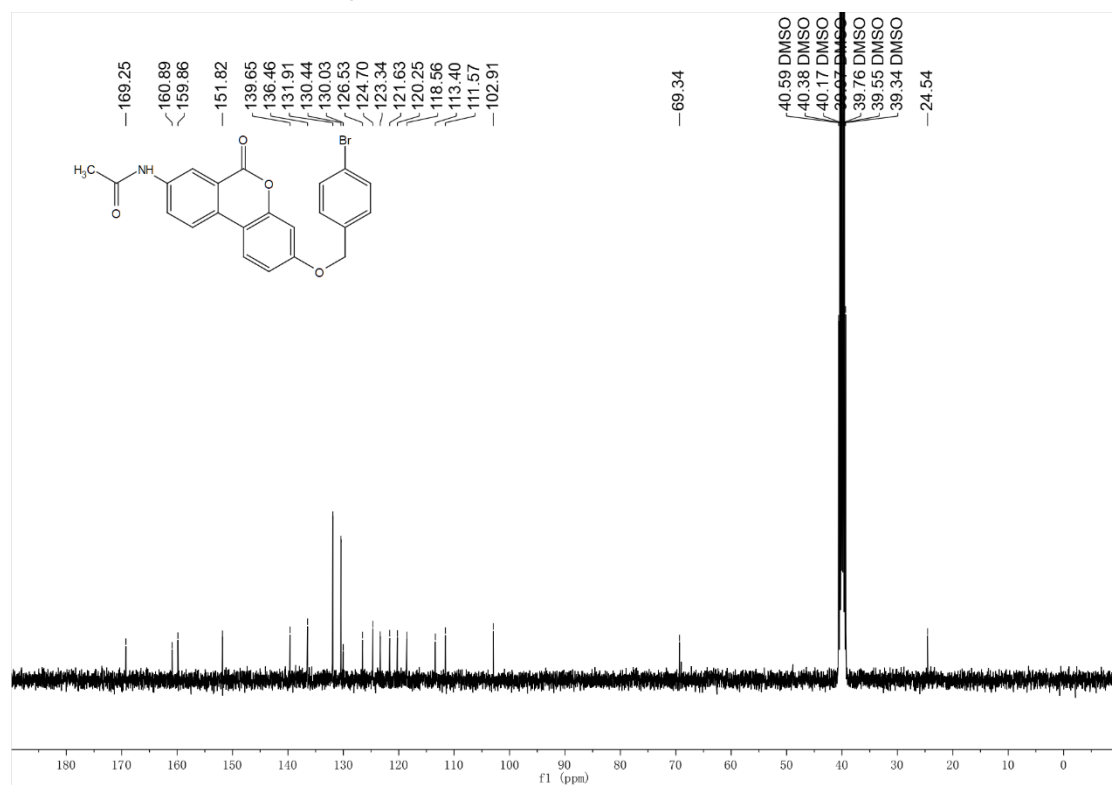


Figure S60. ¹³C-NMR of D28

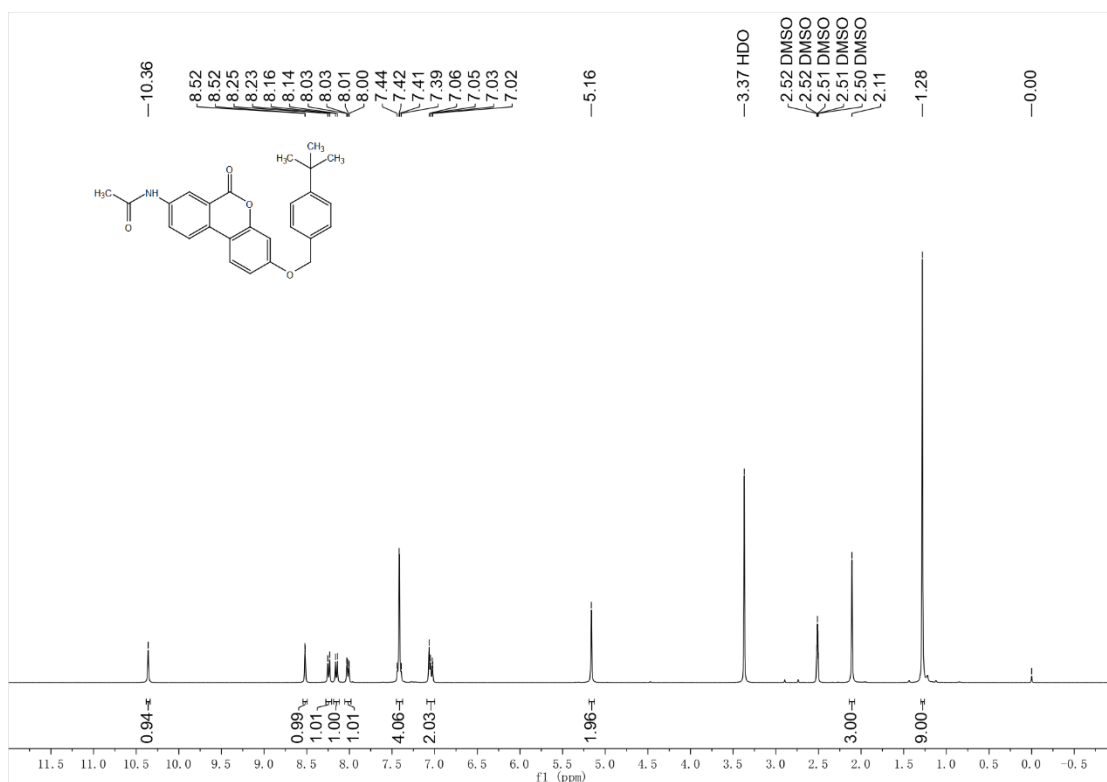


Figure S61. ¹H-NMR of D29

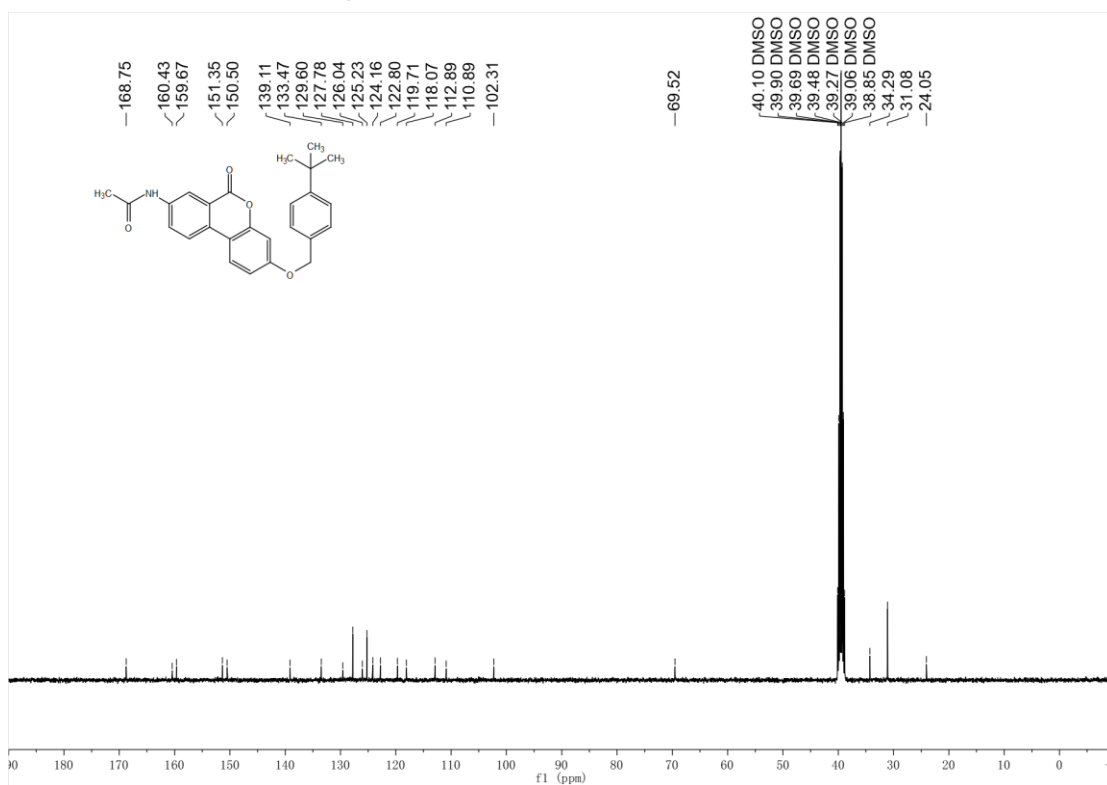


Figure S62. ¹³C-NMR of D29

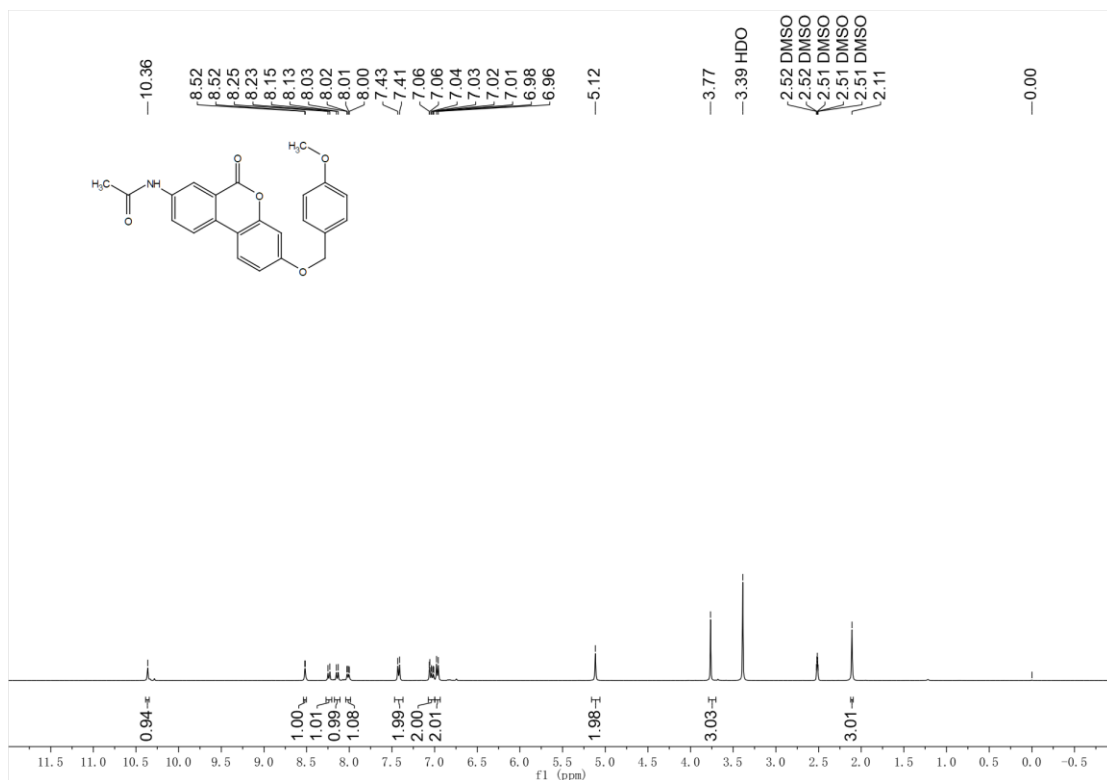


Figure S63. ¹H-NMR of D30

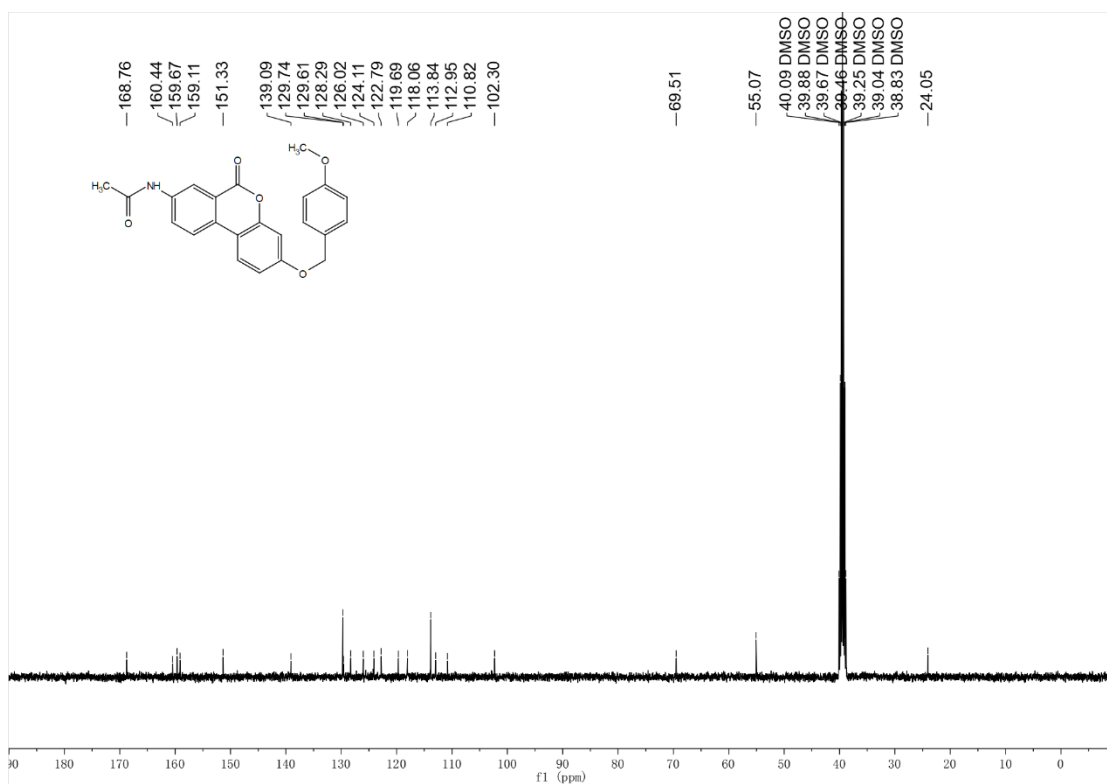


Figure S64. ¹³C-NMR of D30

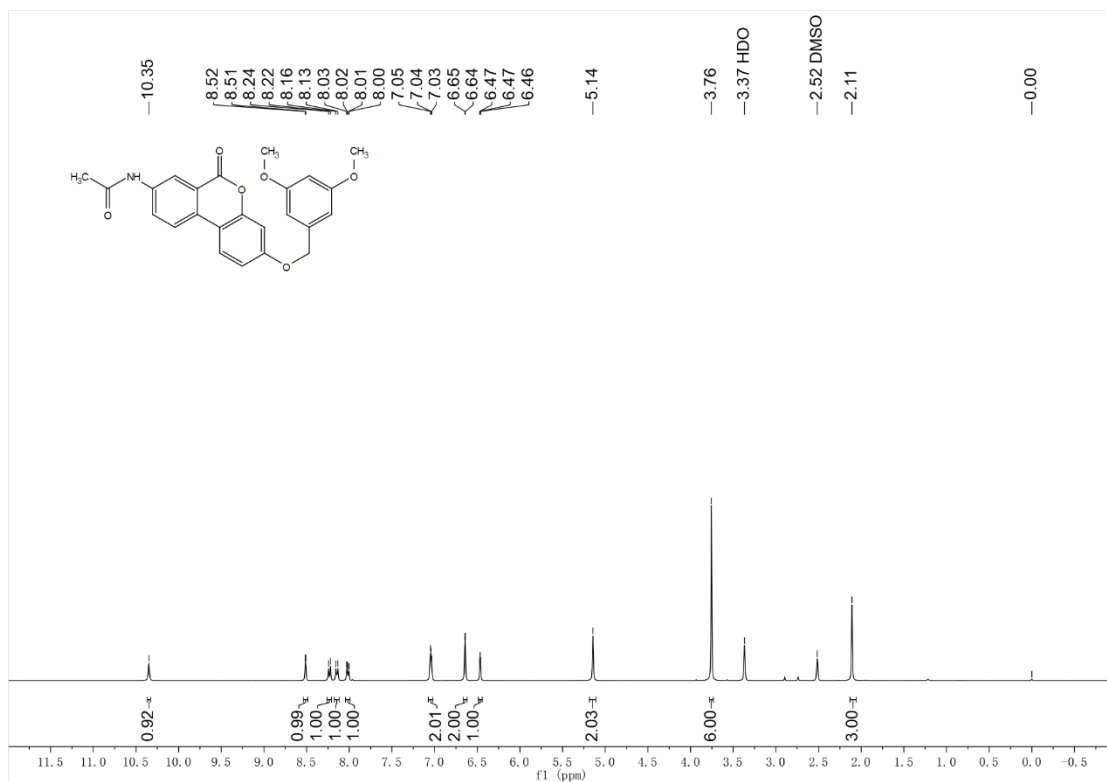


Figure S65. ¹H-NMR of D31

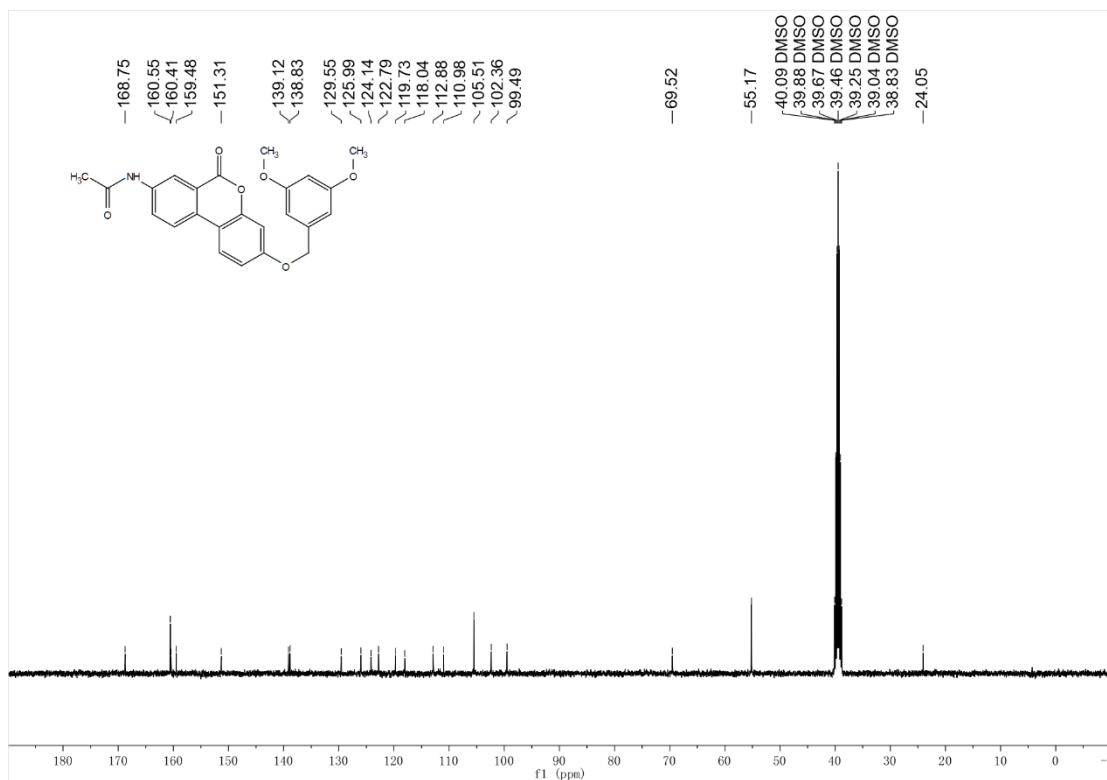


Figure S66. ¹³C-NMR of D31

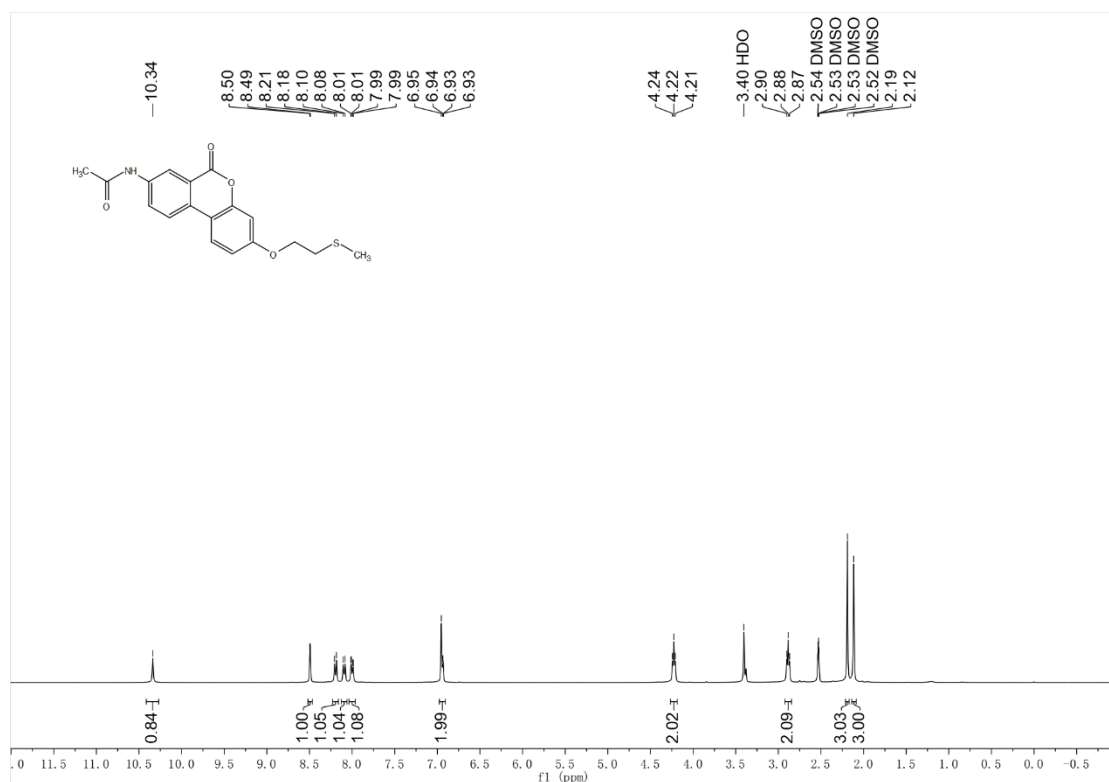


Figure S67. ¹H-NMR of D32

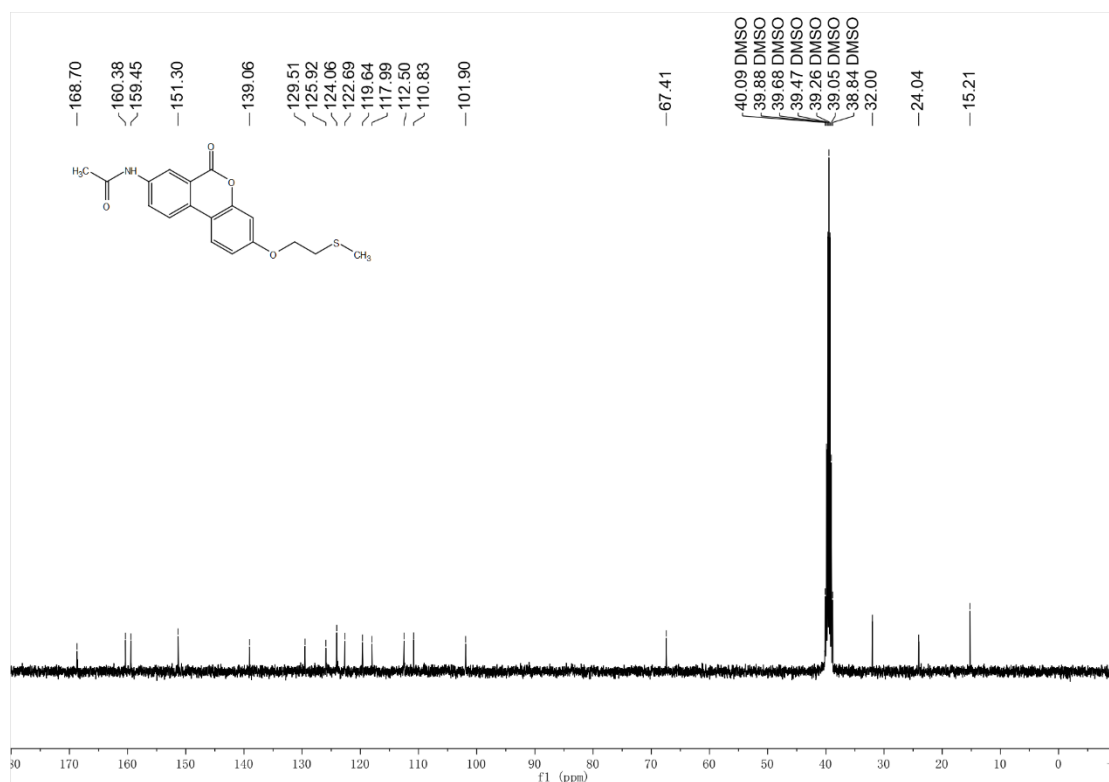


Figure S68. ¹³C-NMR of D32

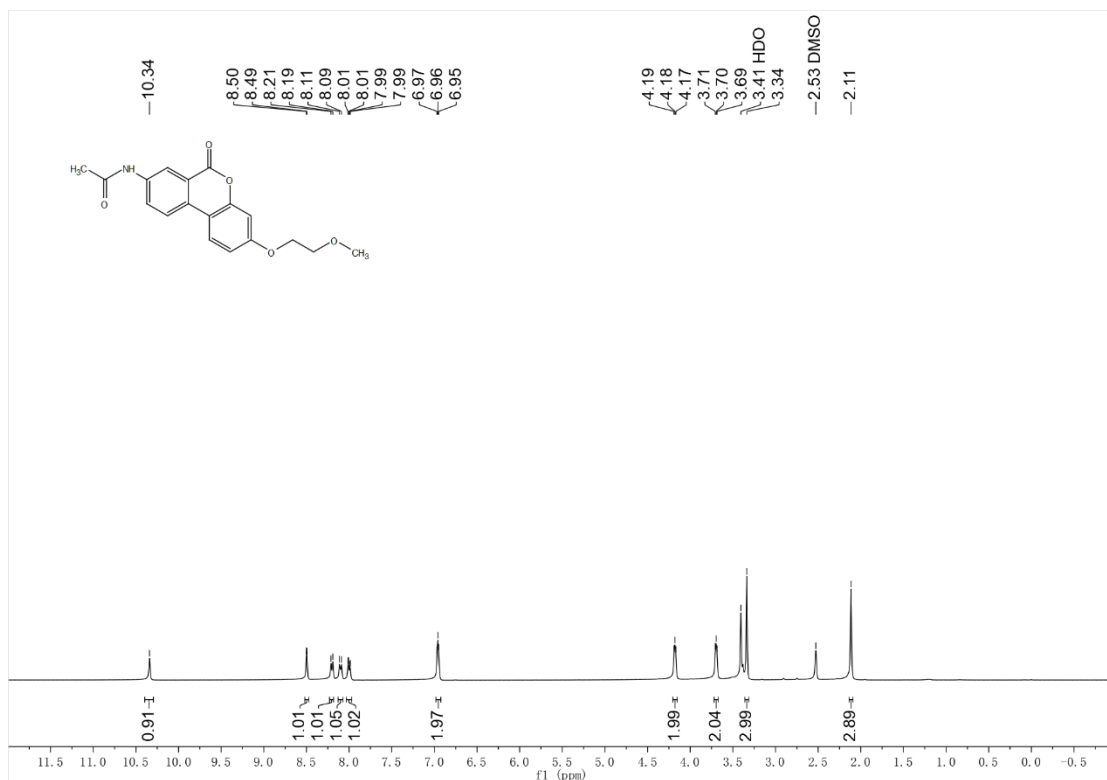


Figure S69. ¹H-NMR of D33

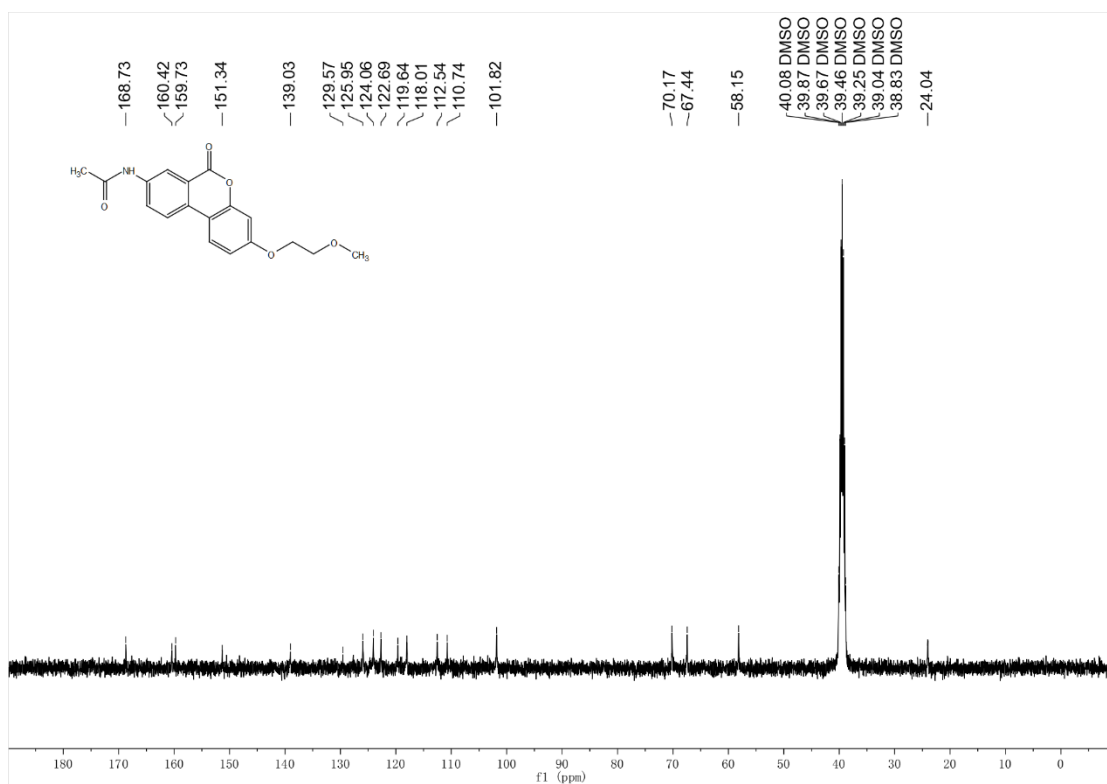


Figure S70. ¹³C-NMR of D33

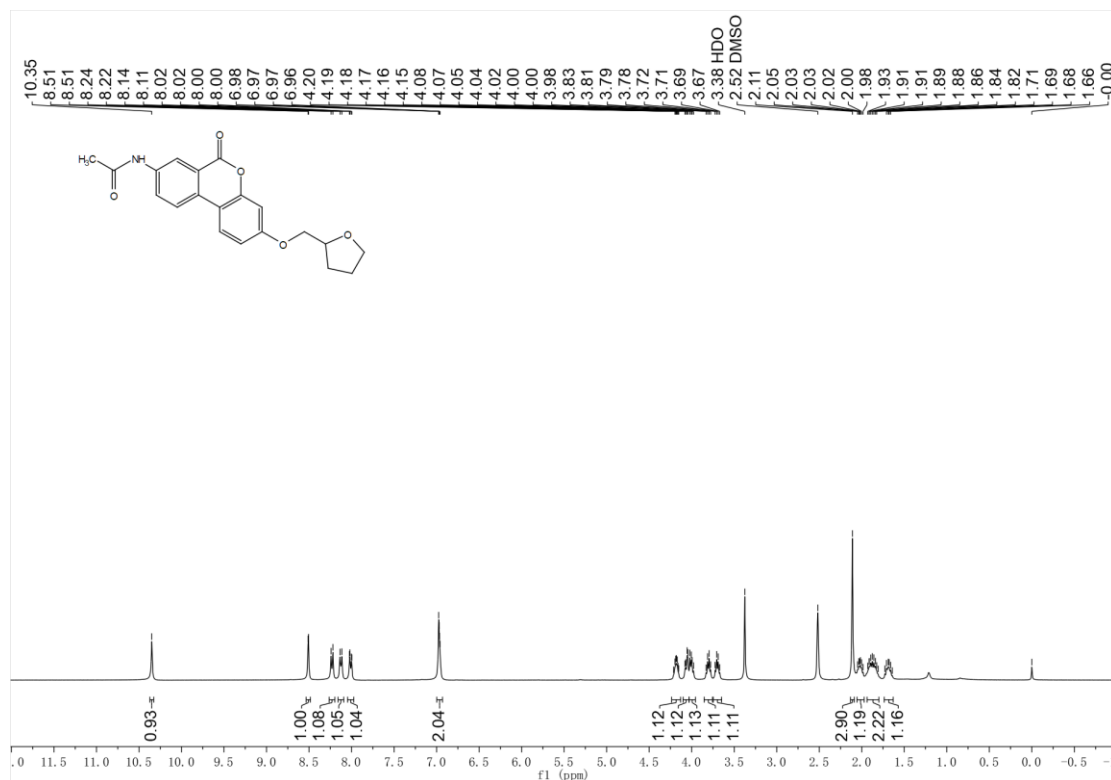


Figure S71. ¹H-NMR of D34

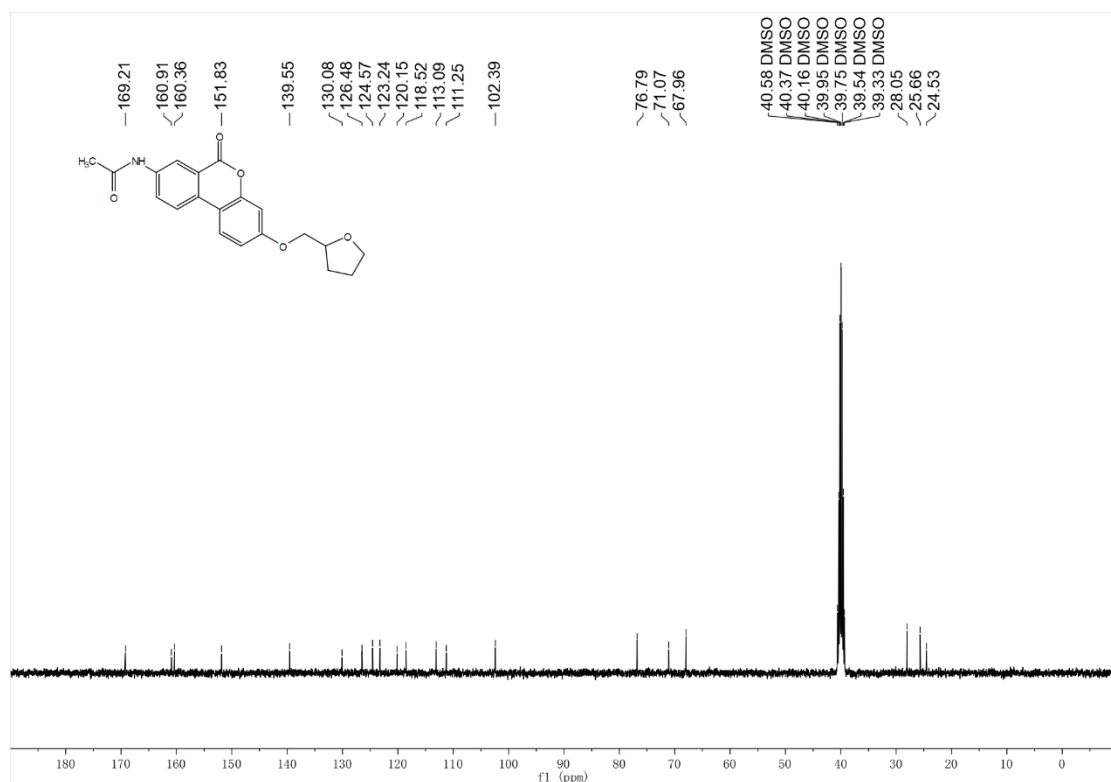


Figure S72. ¹³C-NMR of D34

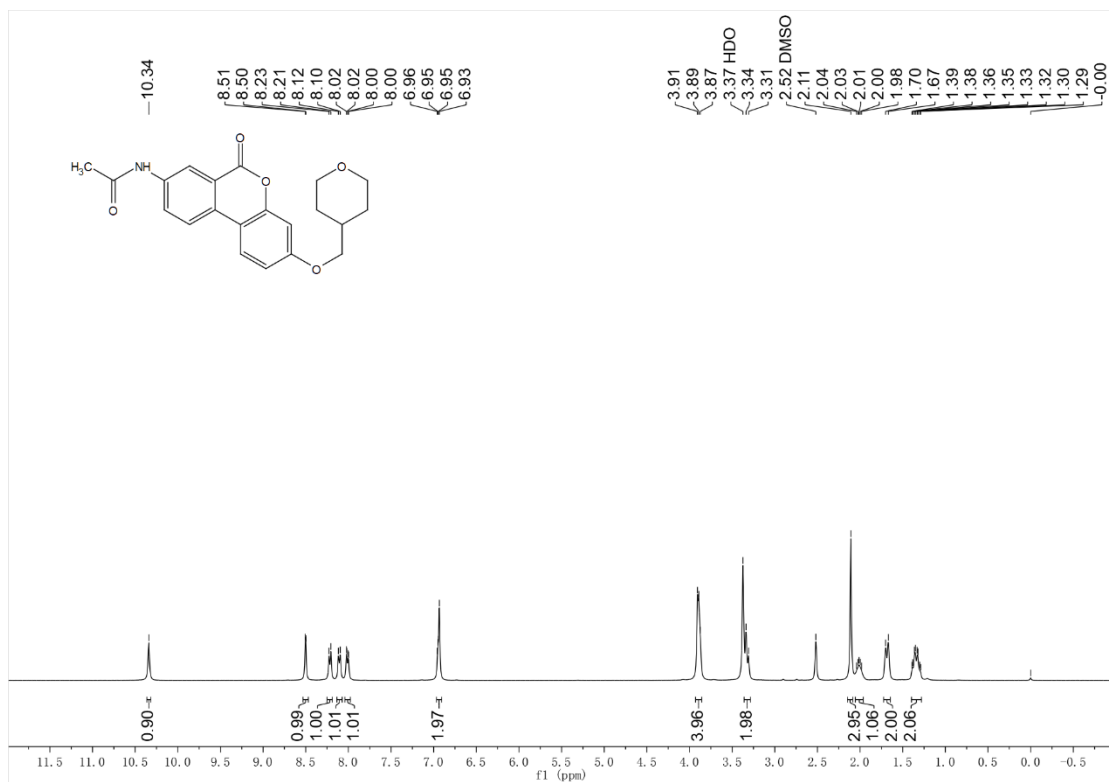


Figure S73. ¹H-NMR of D35

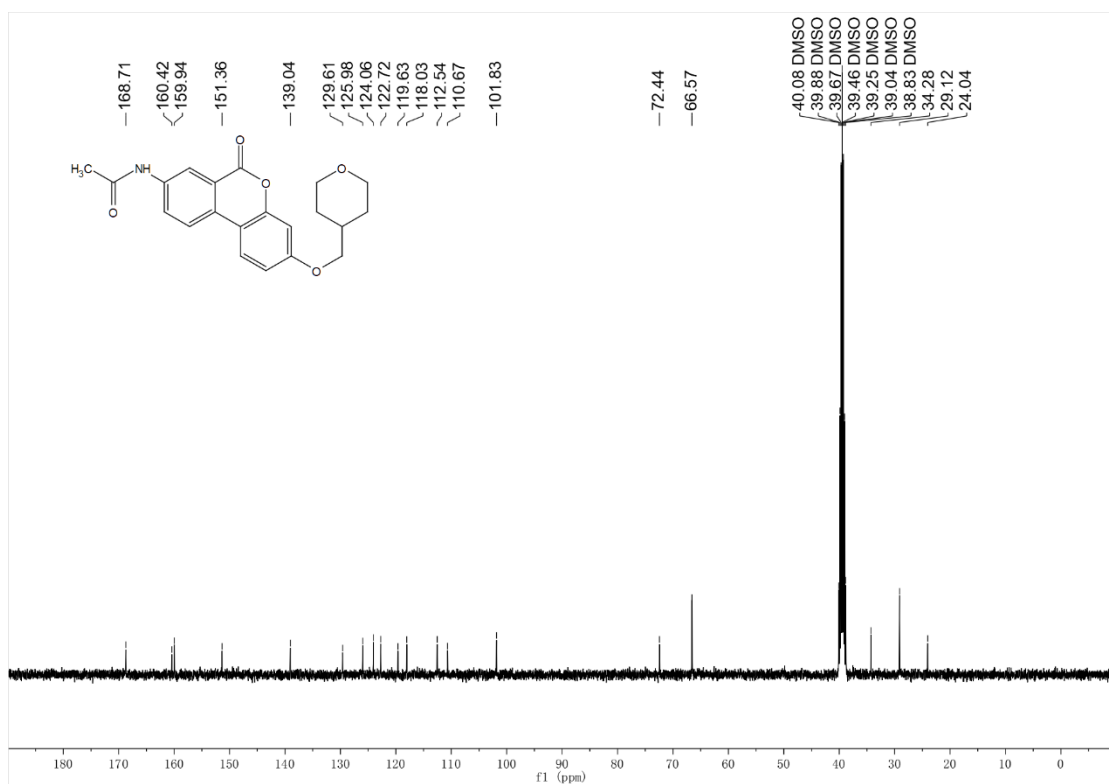


Figure S74. ¹³C-NMR of D35

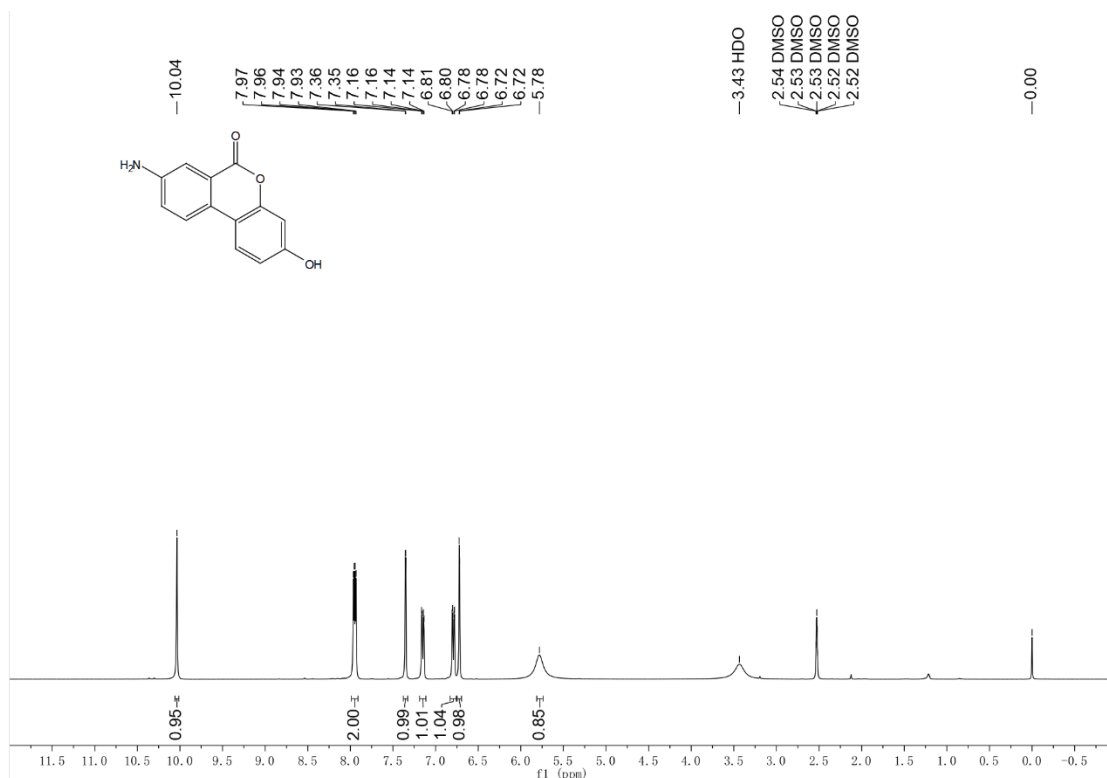


Figure S75. ¹H-NMR of E

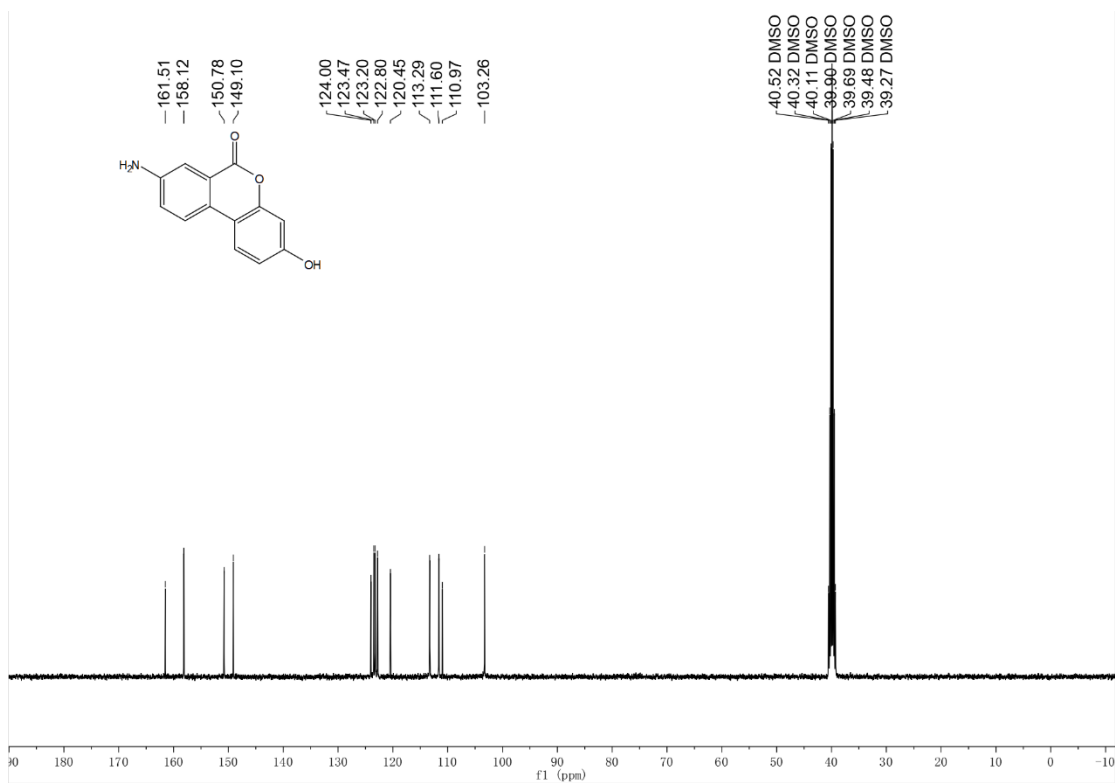


Figure S76. ¹³C-NMR of E

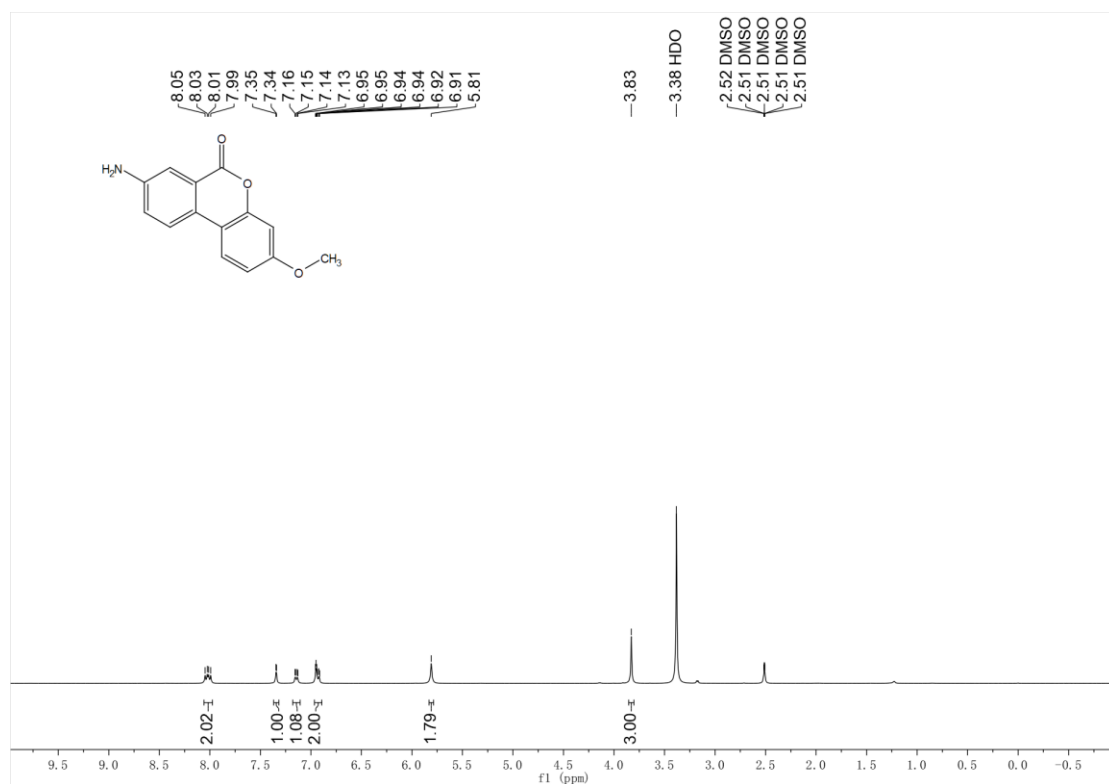


Figure S77. ¹H-NMR of E1

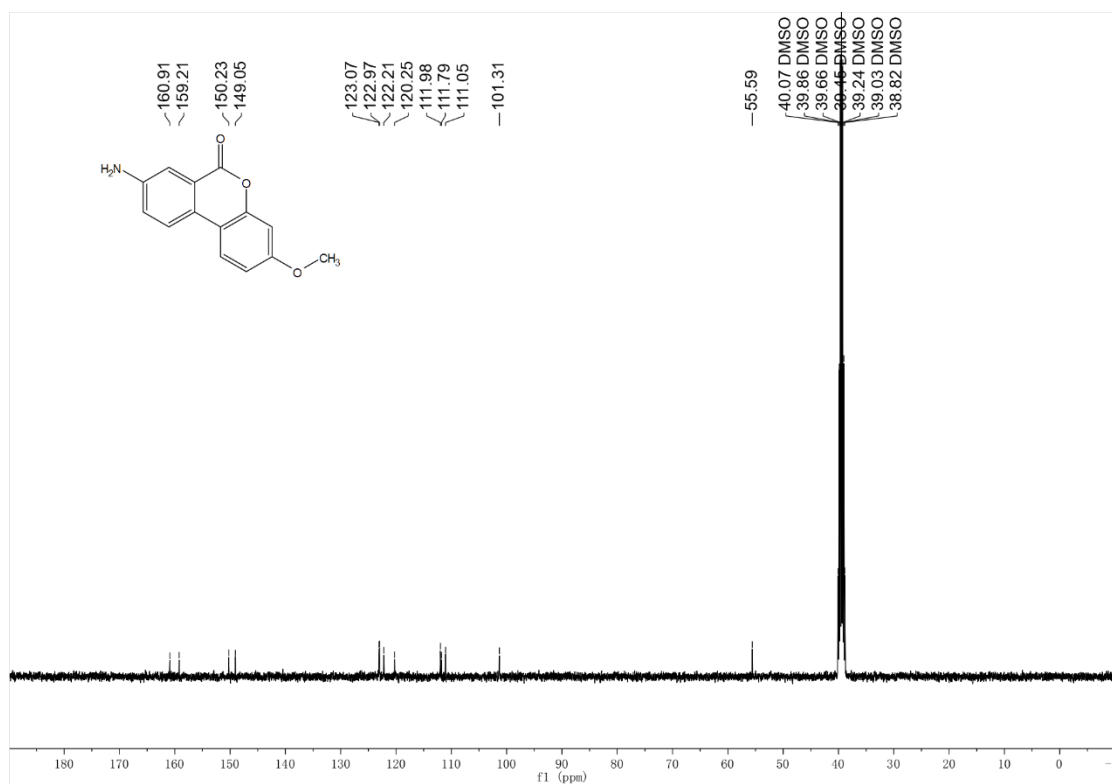


Figure S78. ¹³C-NMR of E1

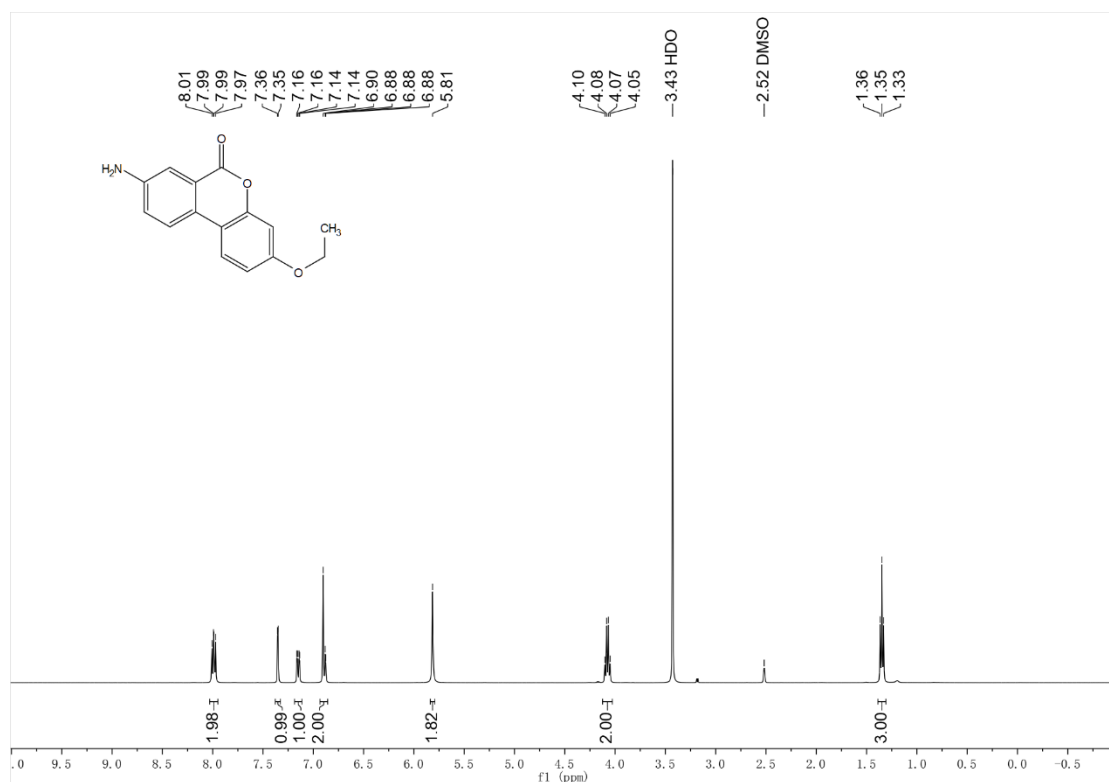


Figure S79. ¹H-NMR of E2

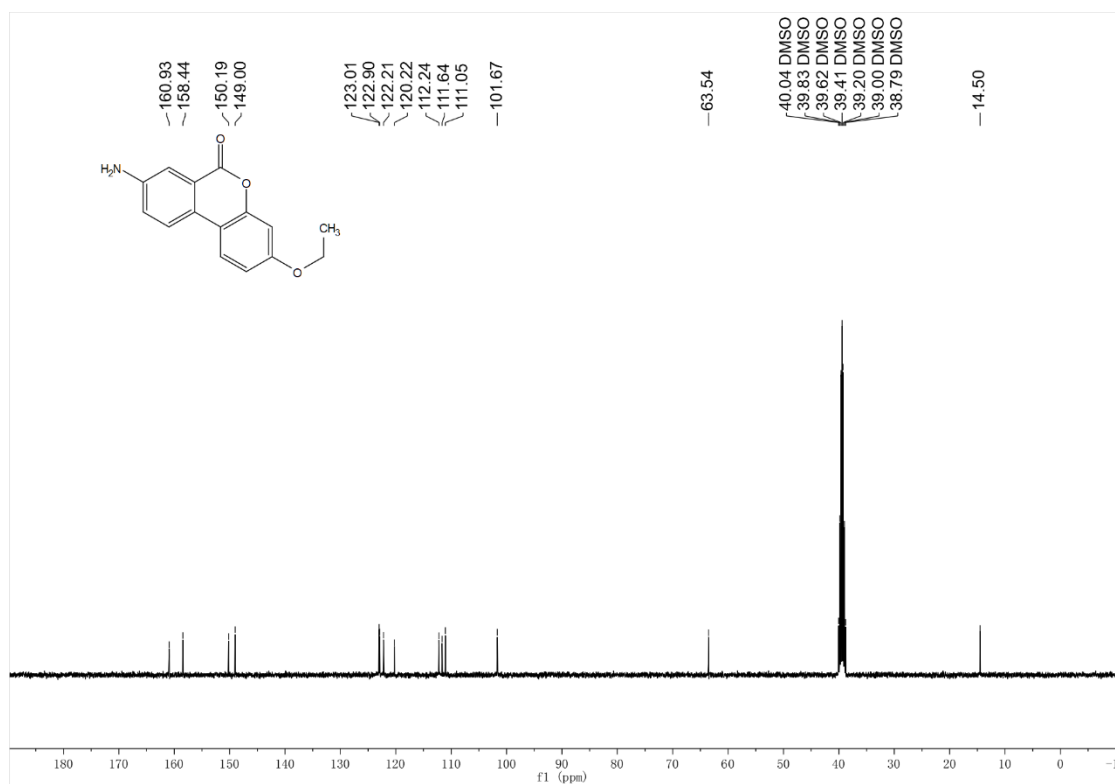


Figure S80. ¹³C-NMR of E2



Figure S81. ¹H-NMR of E3

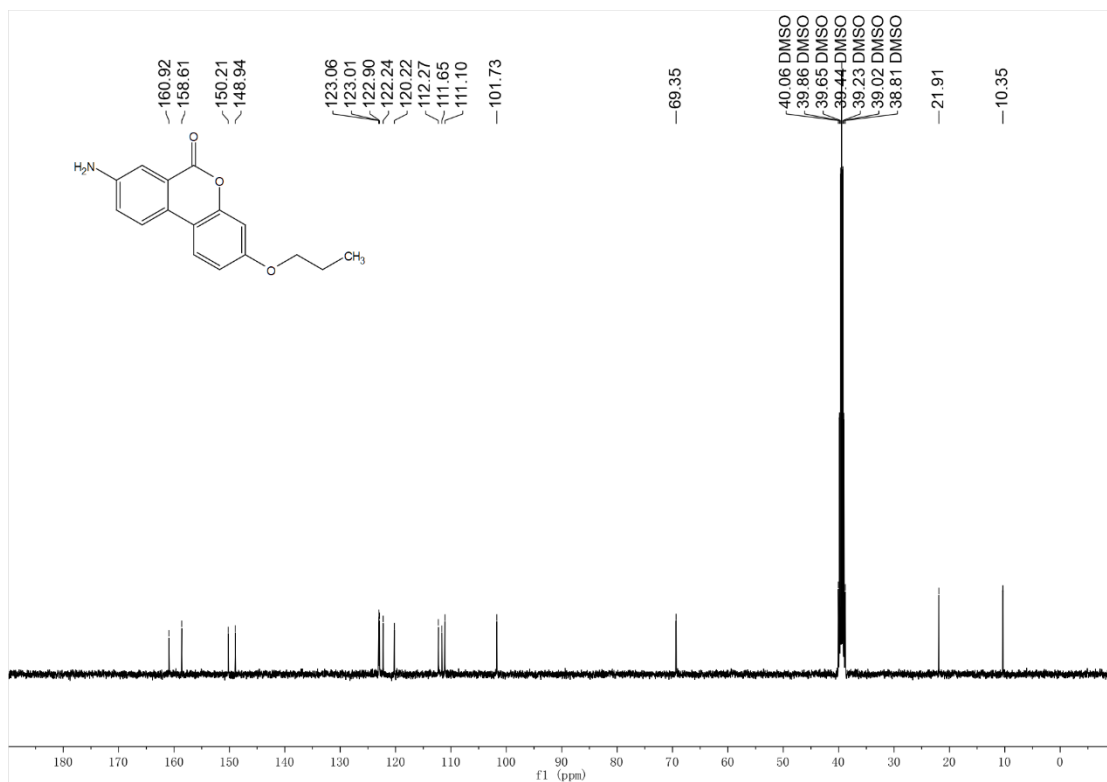


Figure S82. ¹³C-NMR of E3

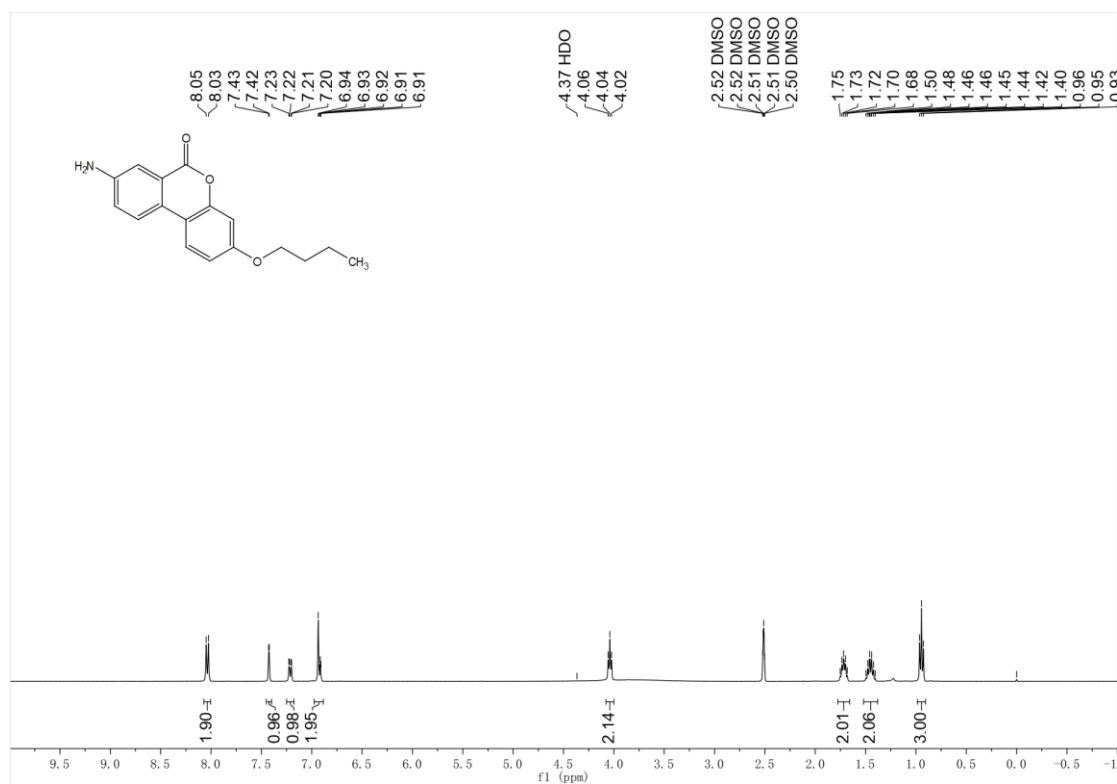


Figure S83. ¹H-NMR of E4

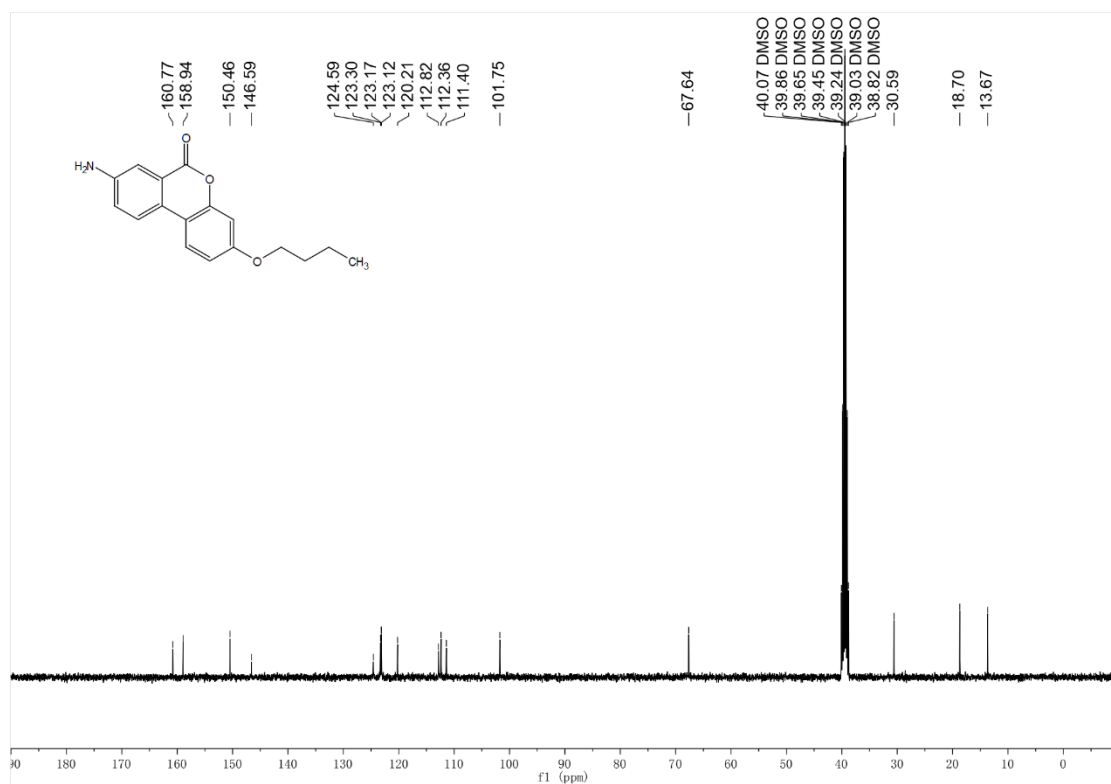


Figure S84. ¹³C-NMR of E4

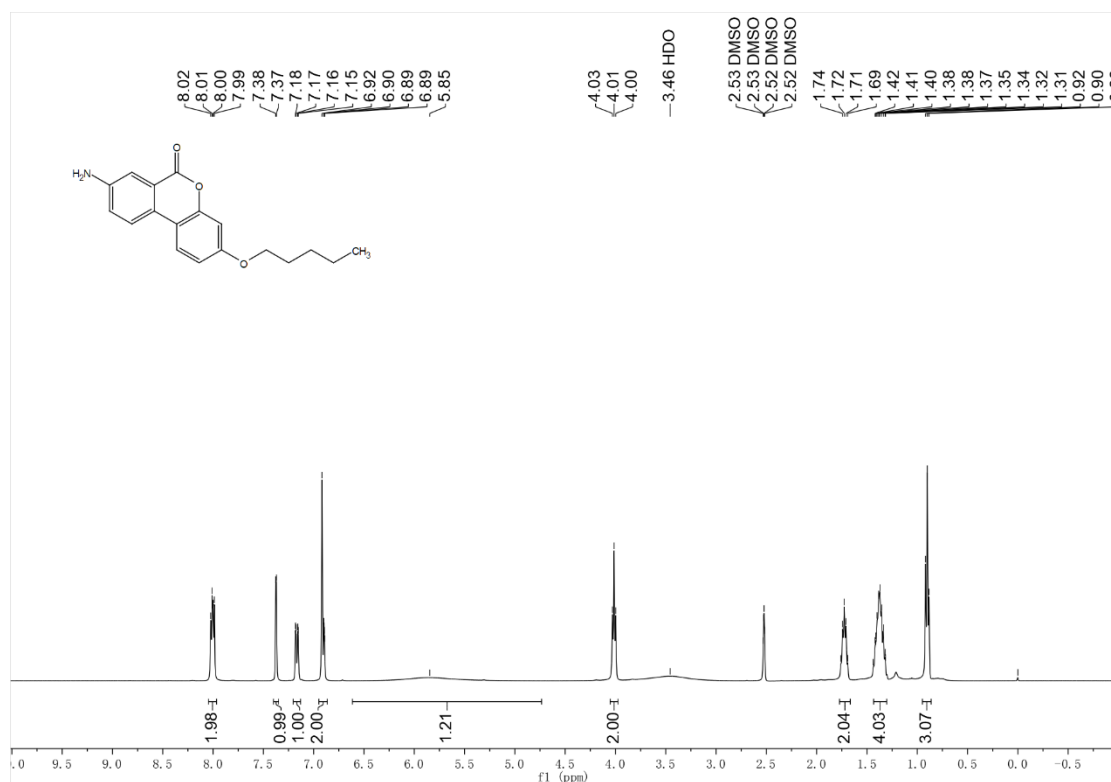


Figure S85. ¹H-NMR of E5

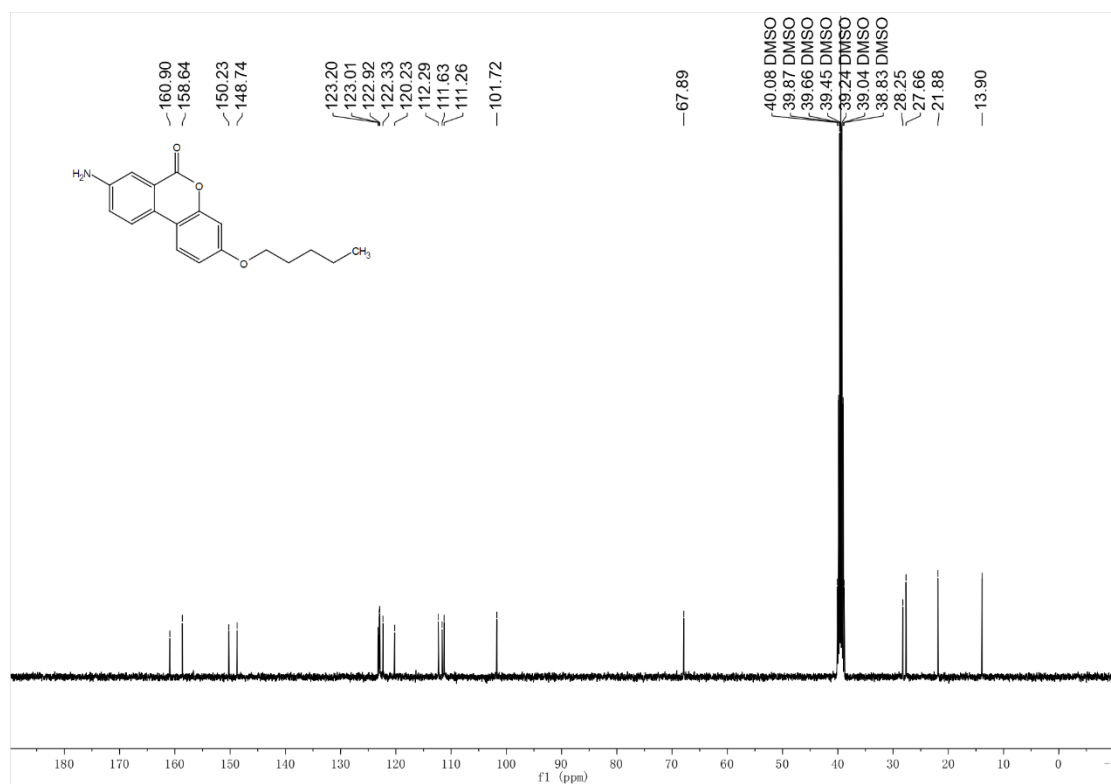


Figure S86. ¹³C-NMR of E5

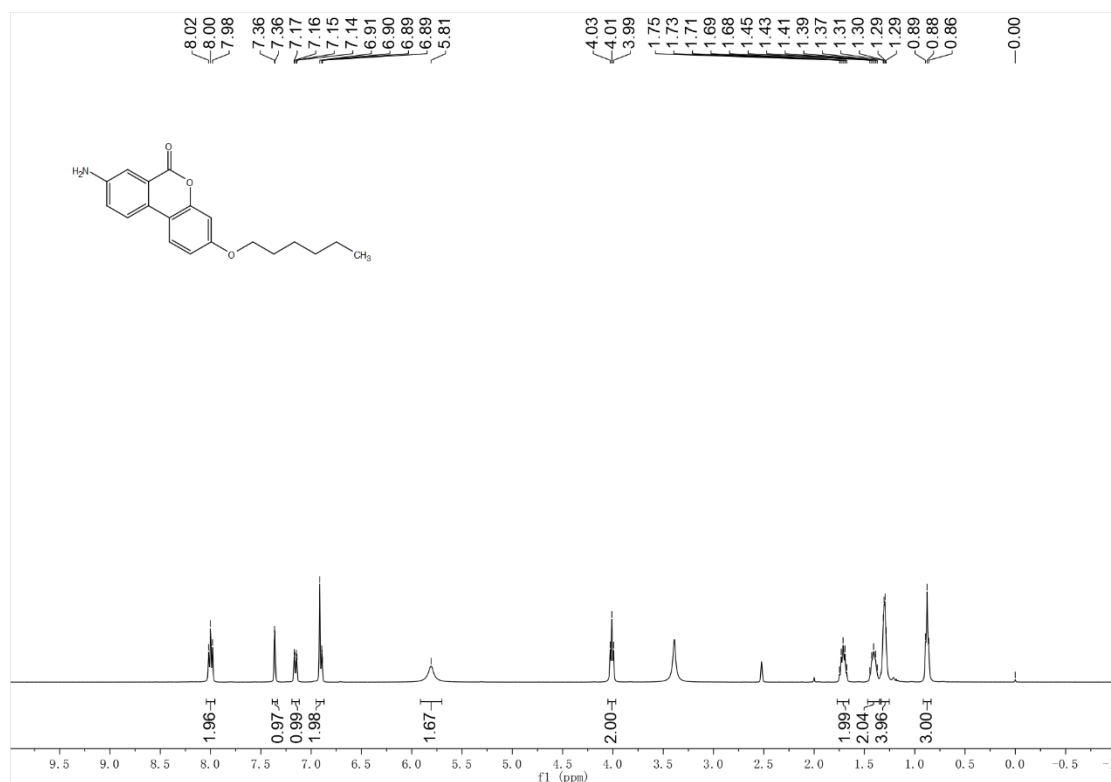


Figure S87. ¹H-NMR of E6

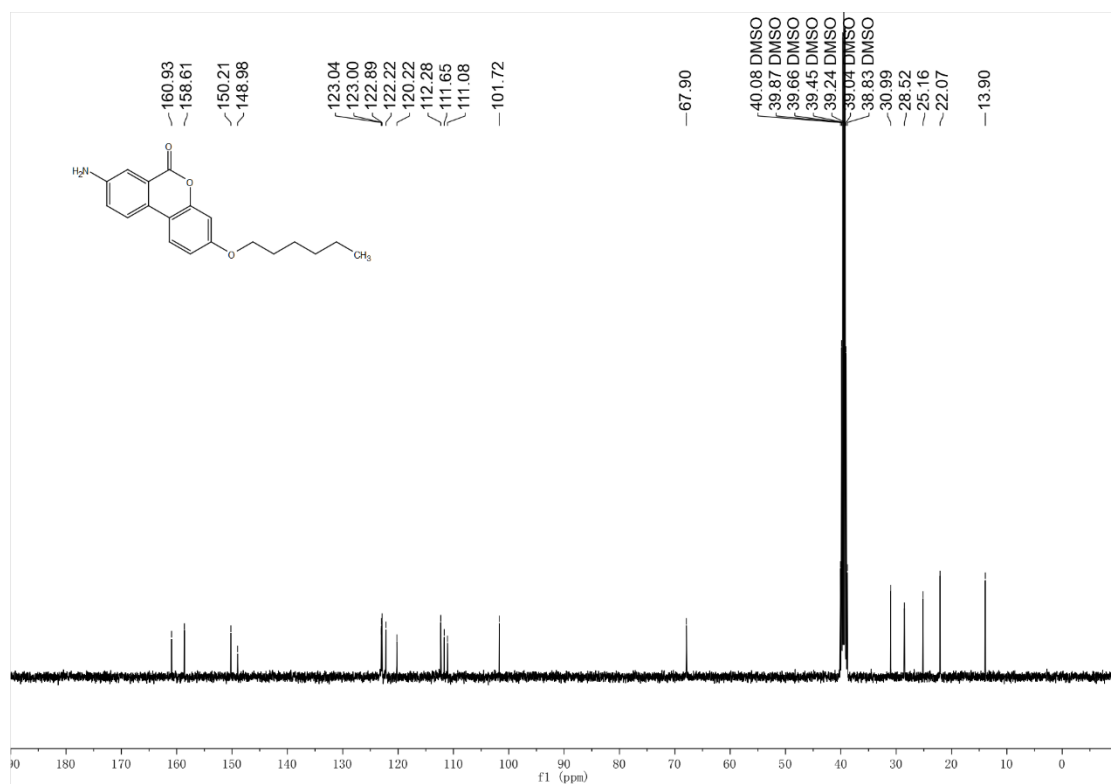


Figure S88. ¹³C-NMR of E6

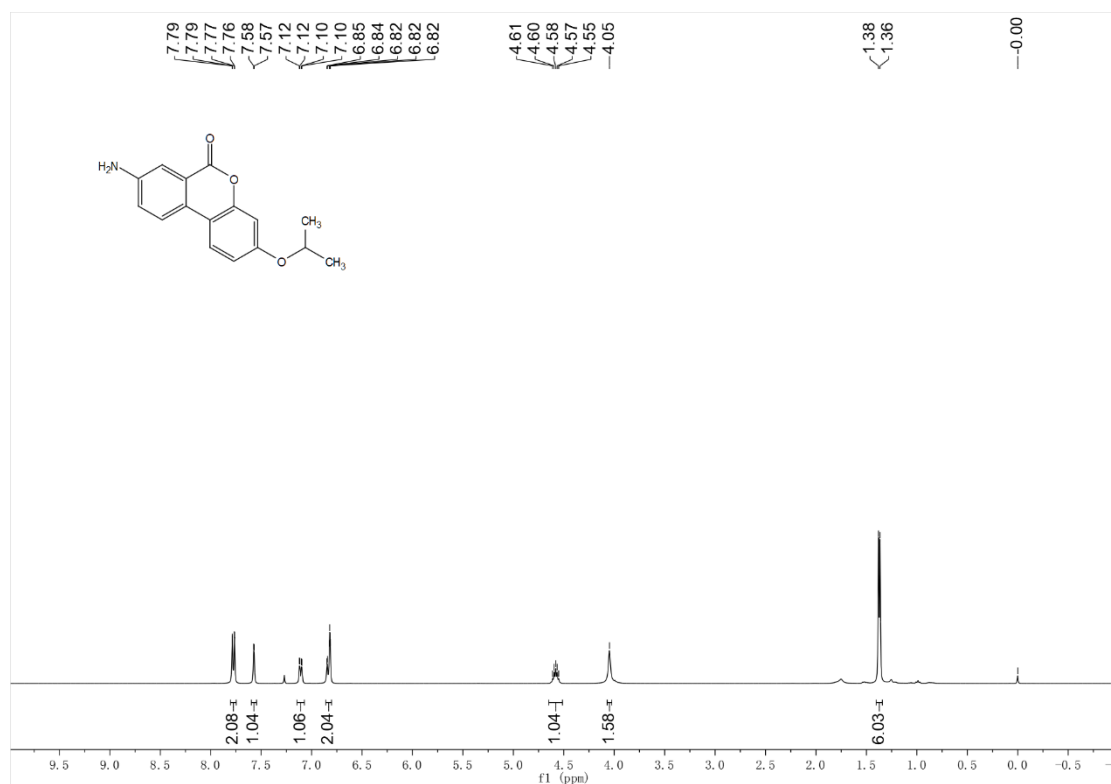


Figure S89. ¹H-NMR of E7

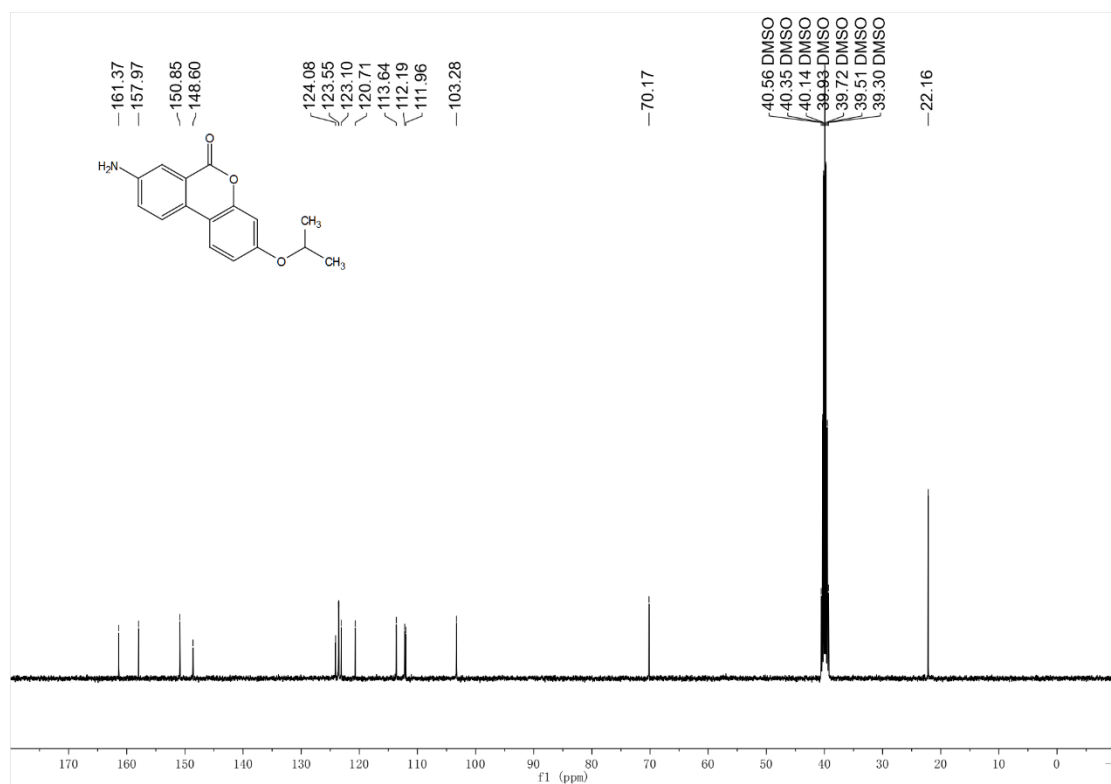


Figure S90. ¹³C-NMR of E7

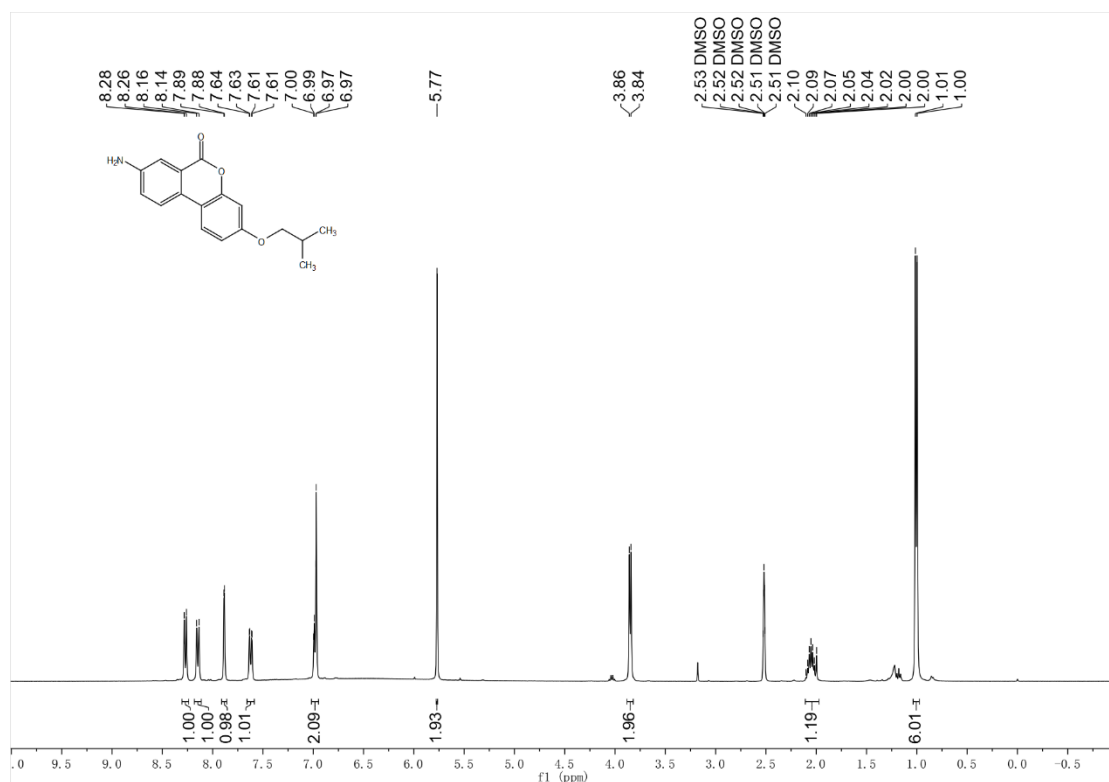


Figure S91. ¹H-NMR of E8

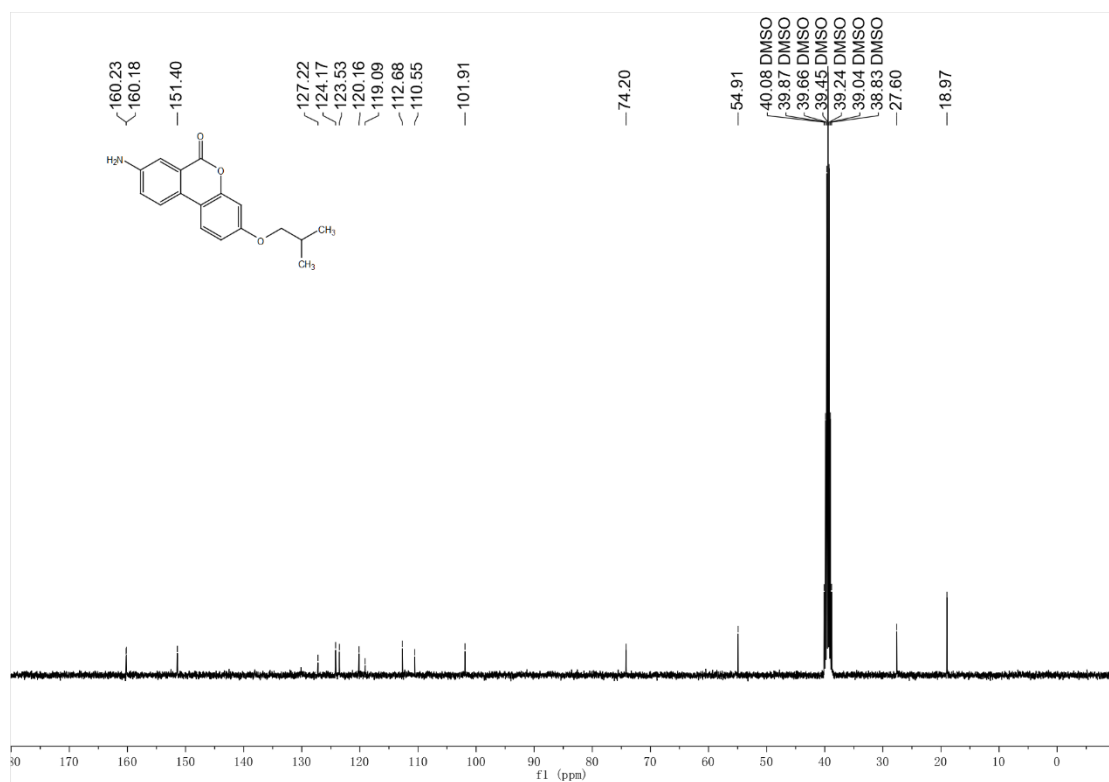


Figure S92. ¹³C-NMR of E8

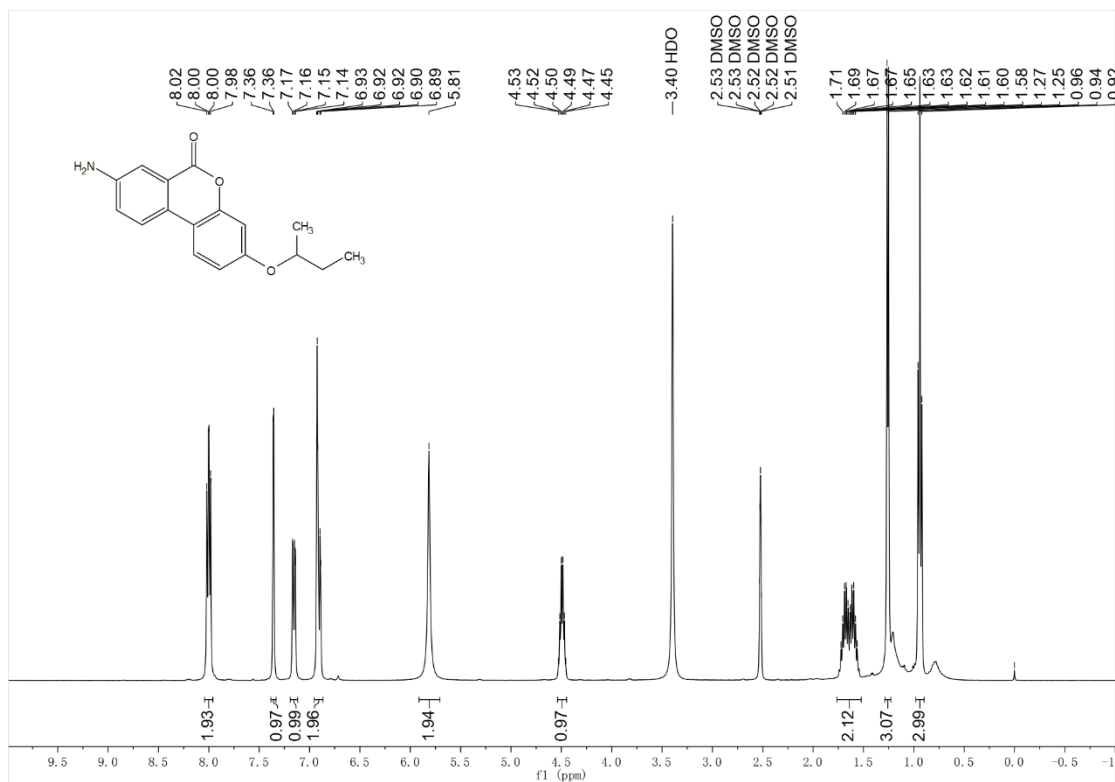


Figure S93. ¹H-NMR of E9

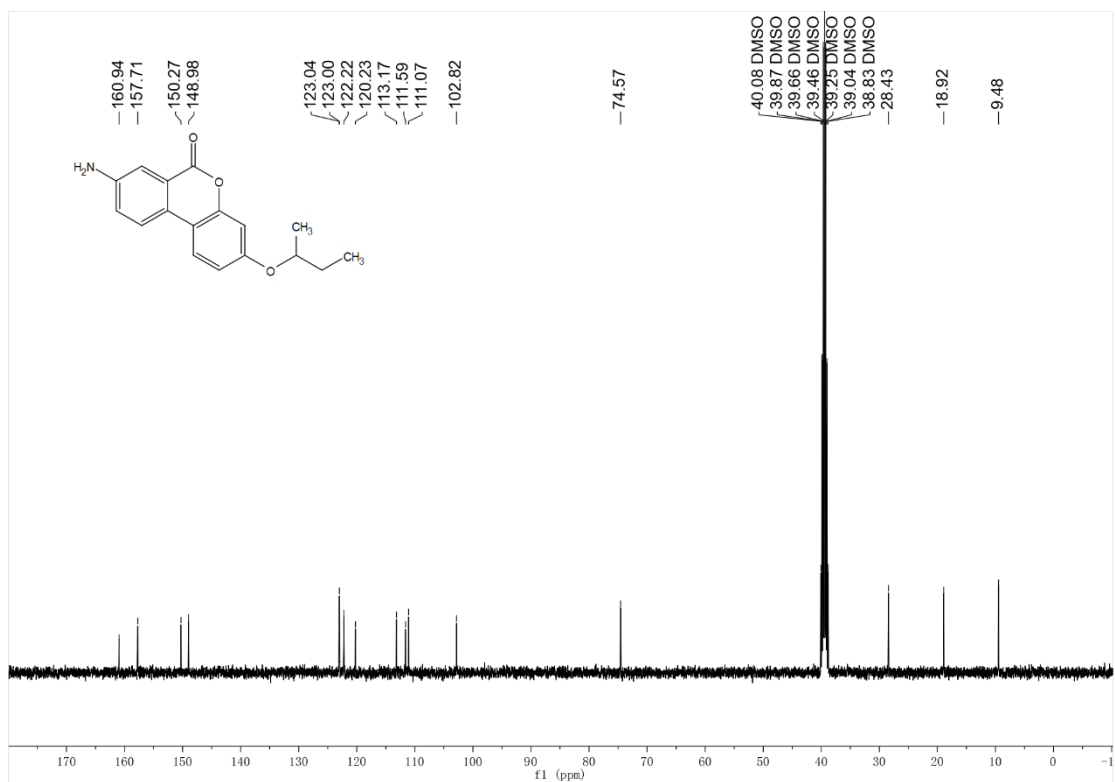


Figure S94. ¹³C-NMR of E9

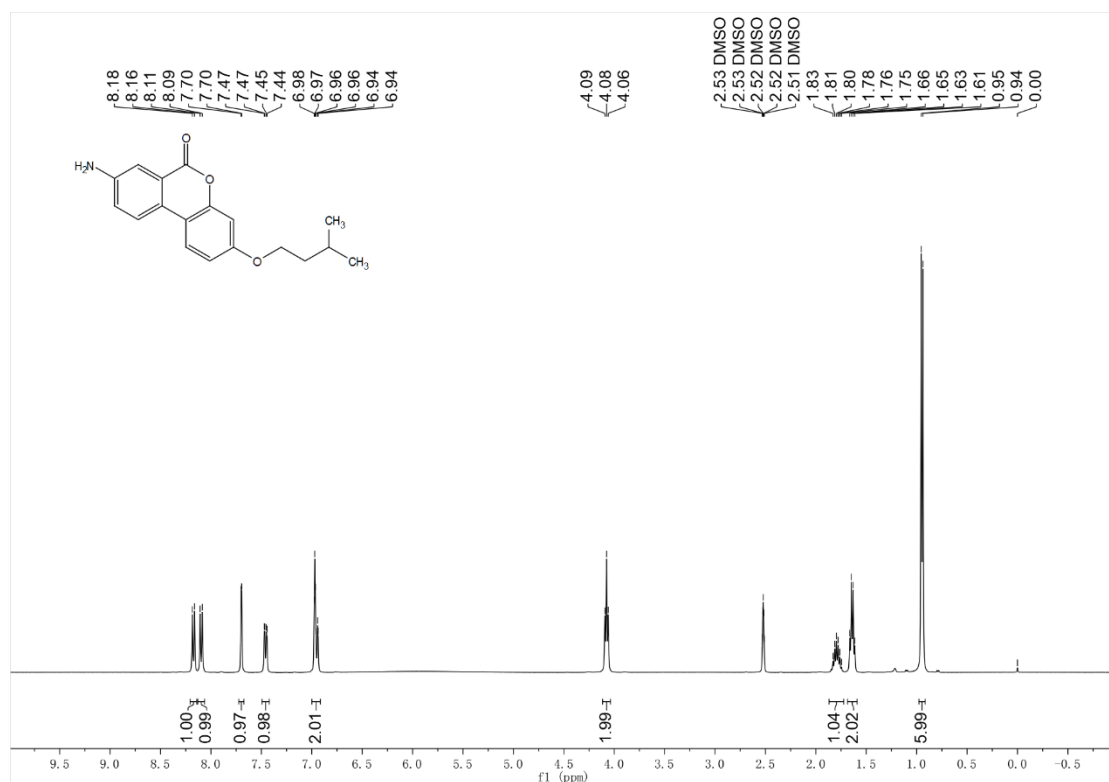


Figure S95. ¹H-NMR of E10

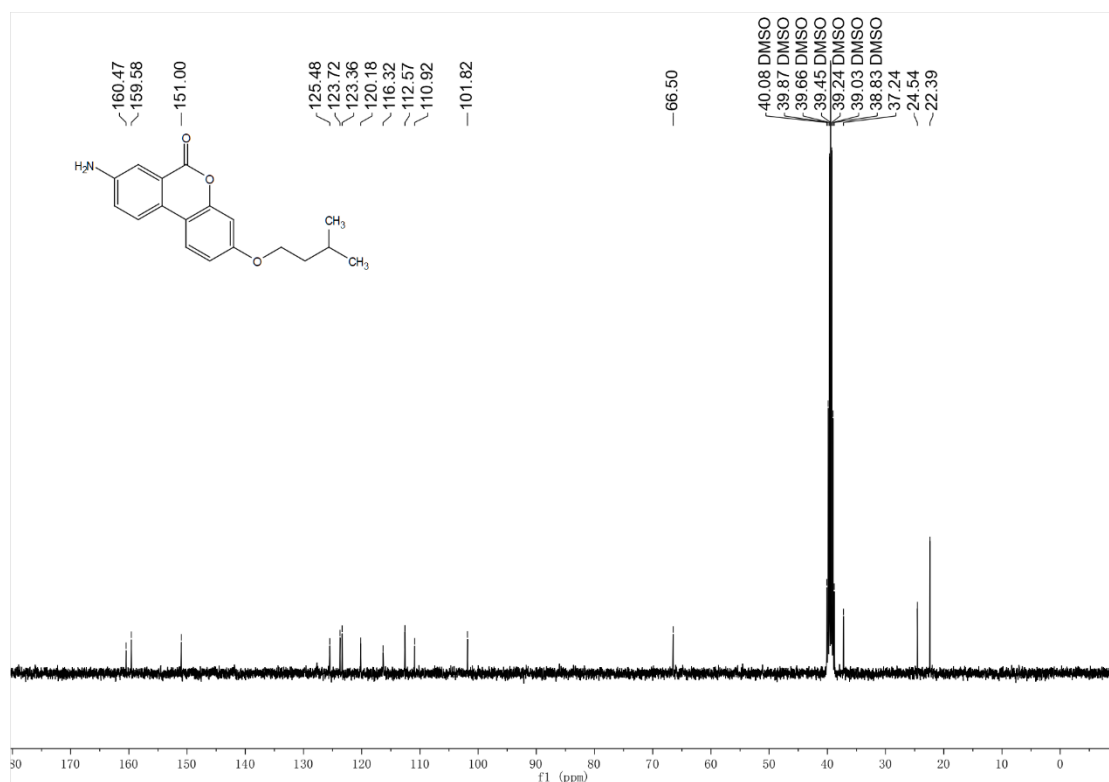


Figure S96. ¹³C-NMR of E10

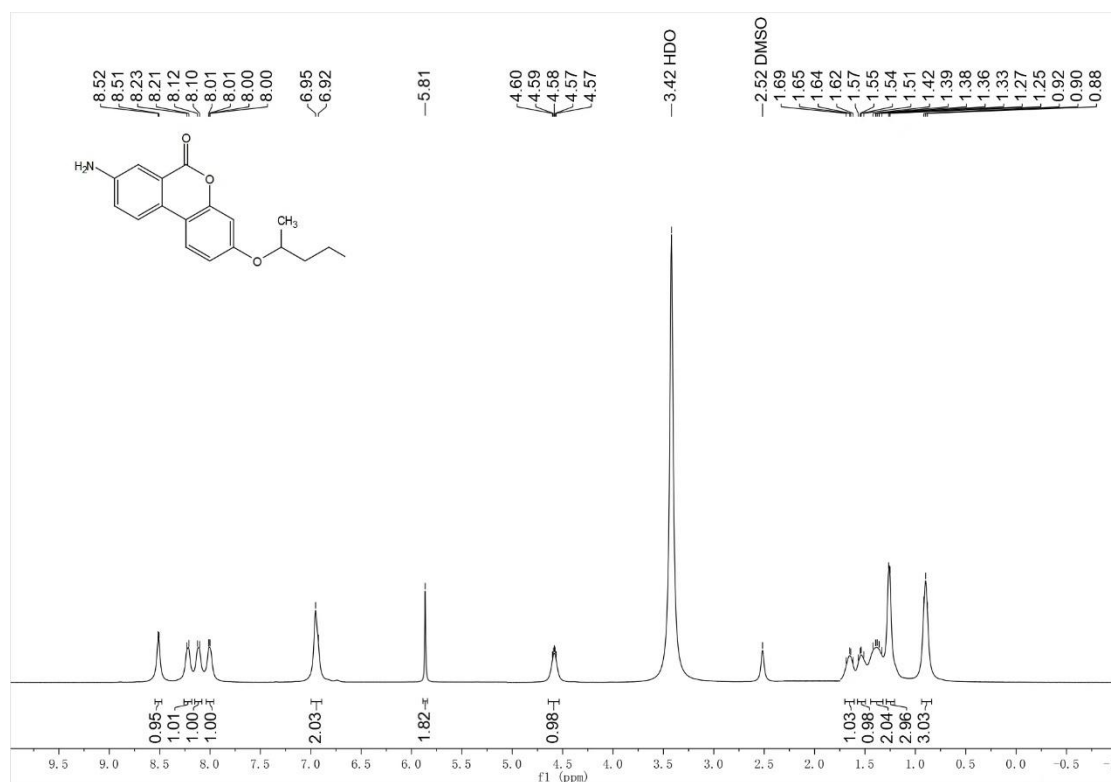


Figure S97. ¹H-NMR of E11

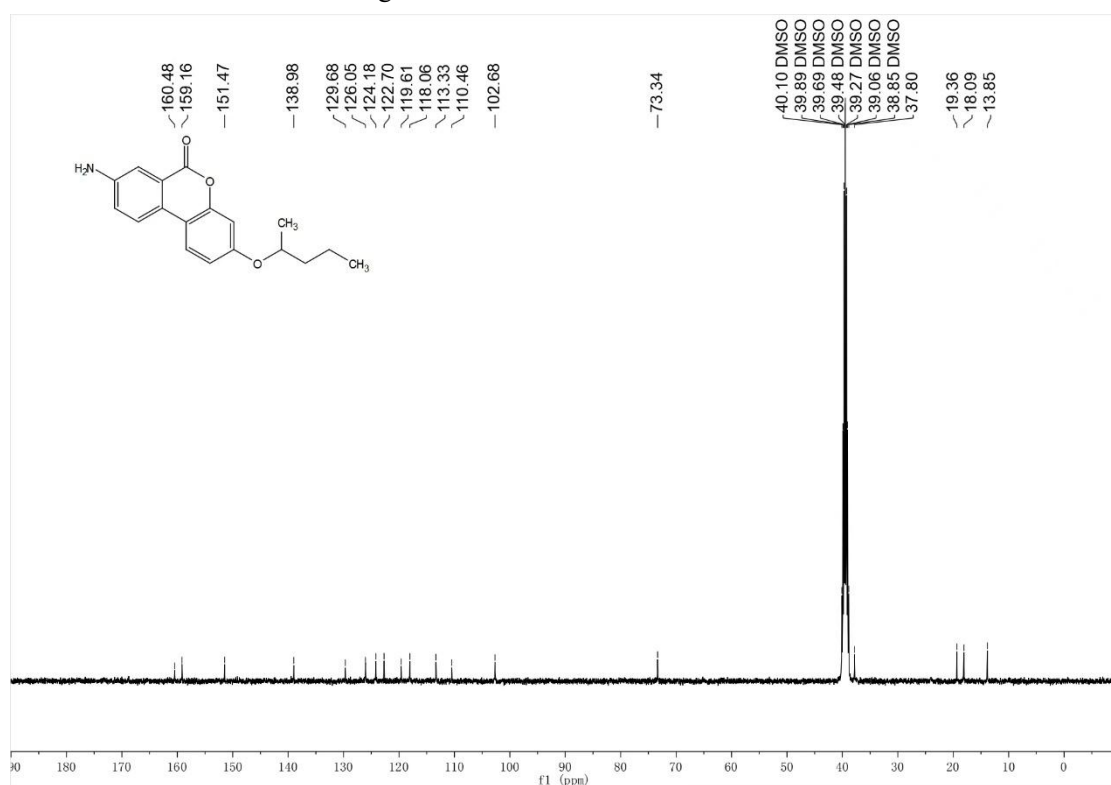


Figure S98. ¹³C-NMR of E11

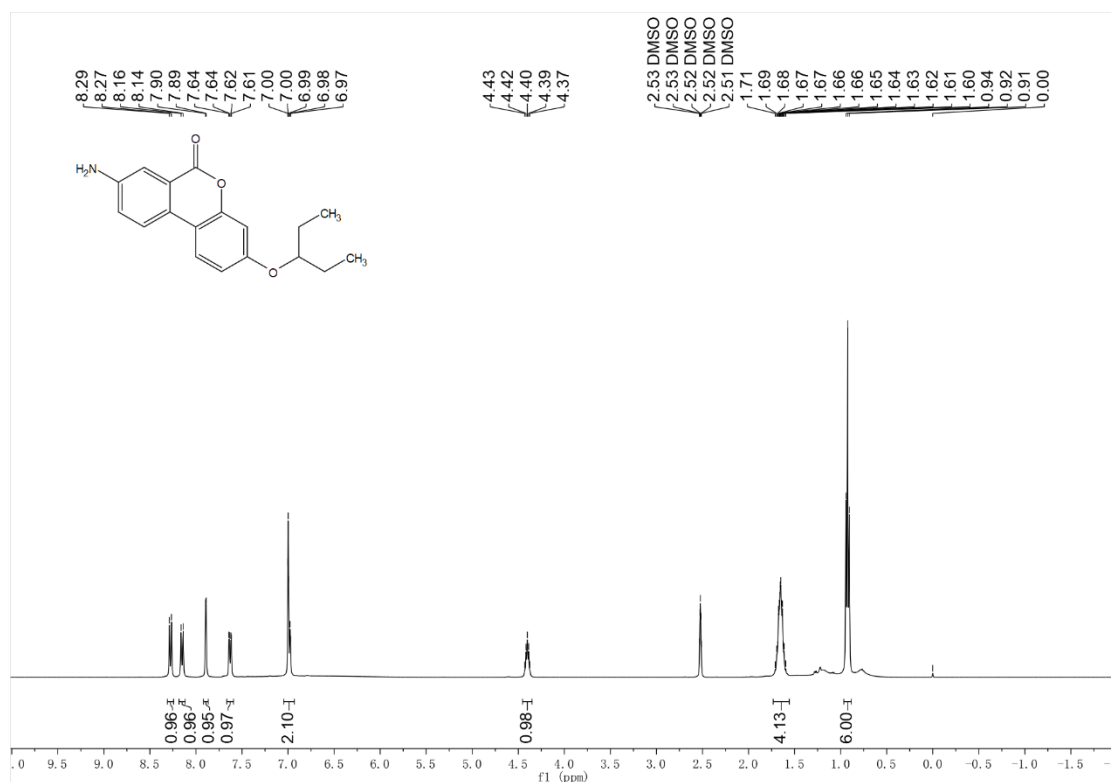


Figure S99. ¹H-NMR of E12

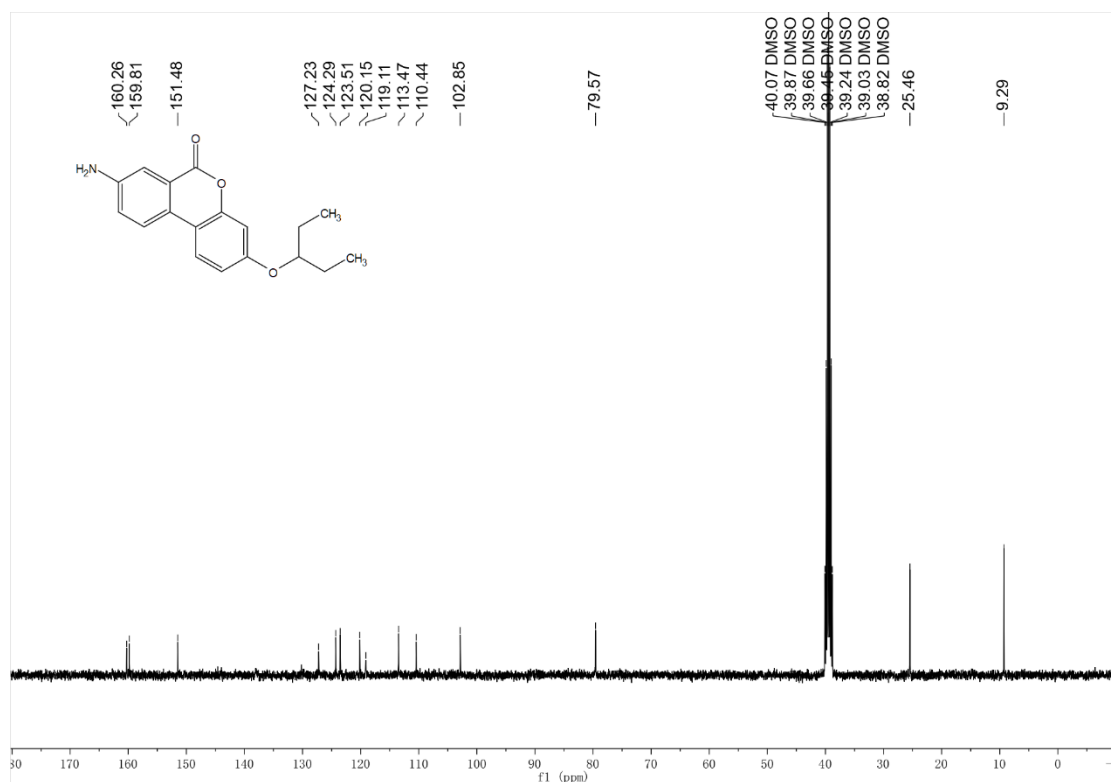


Figure S100. ¹³C-NMR of E12

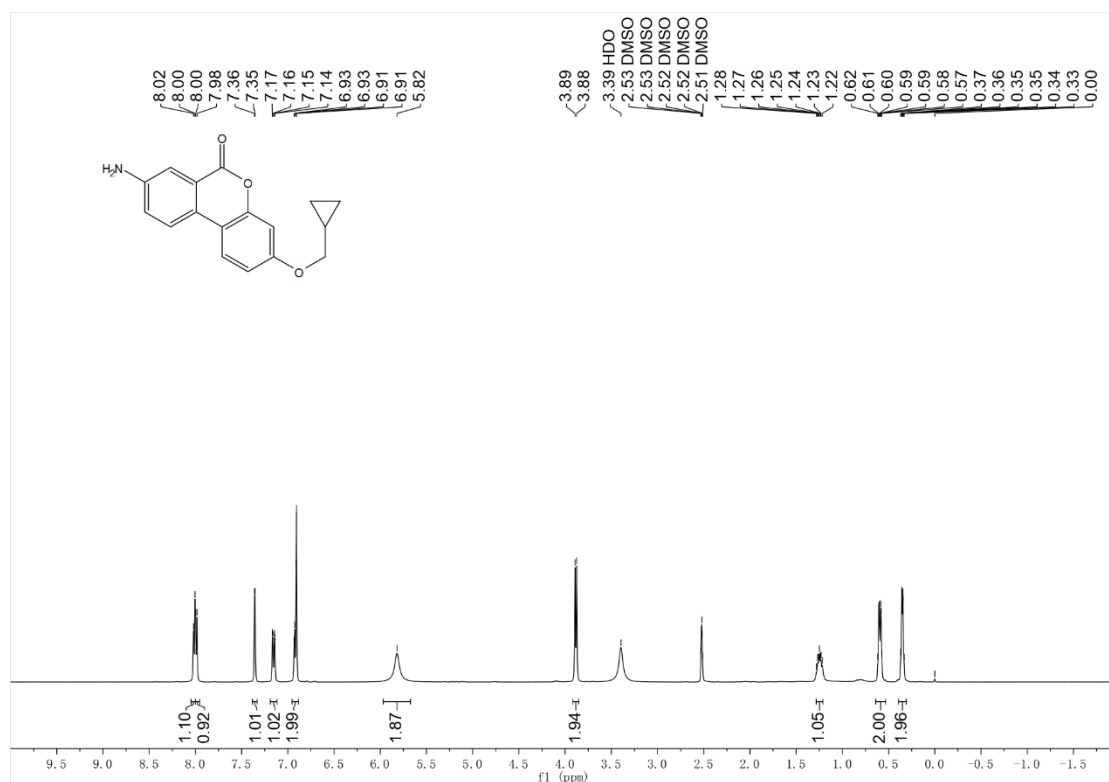


Figure S101. ¹H-NMR of E13

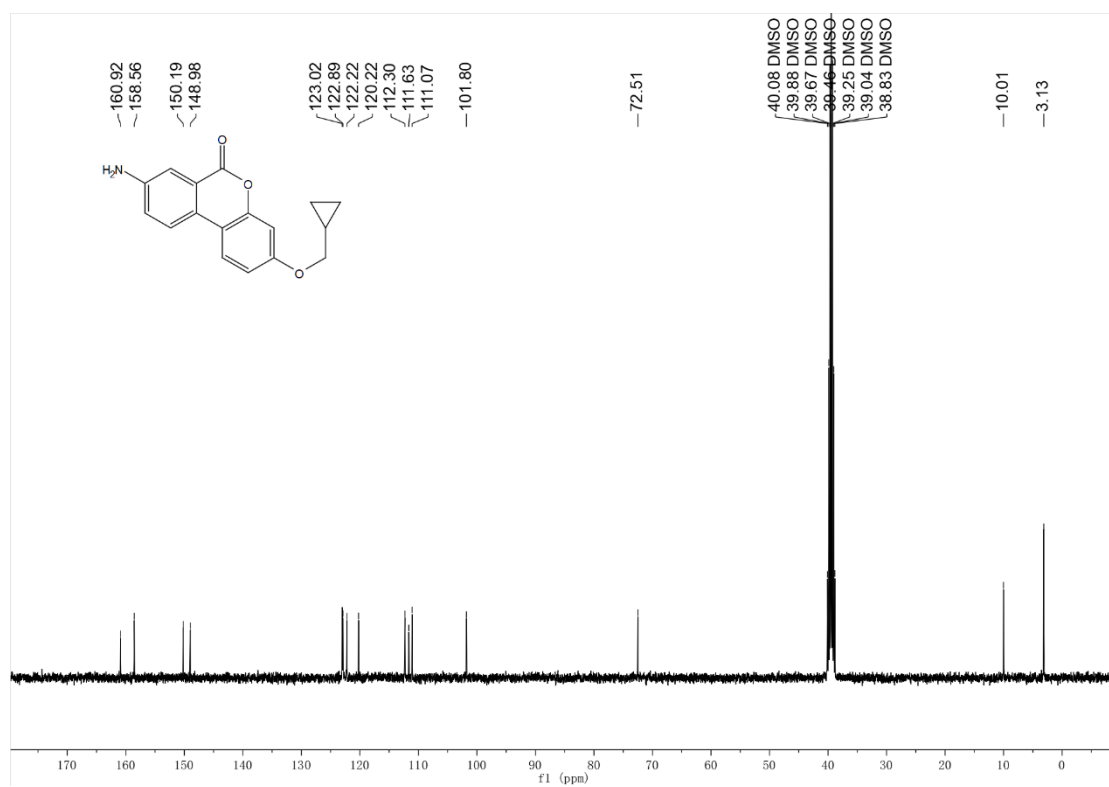


Figure S102. ¹³C-NMR of E13

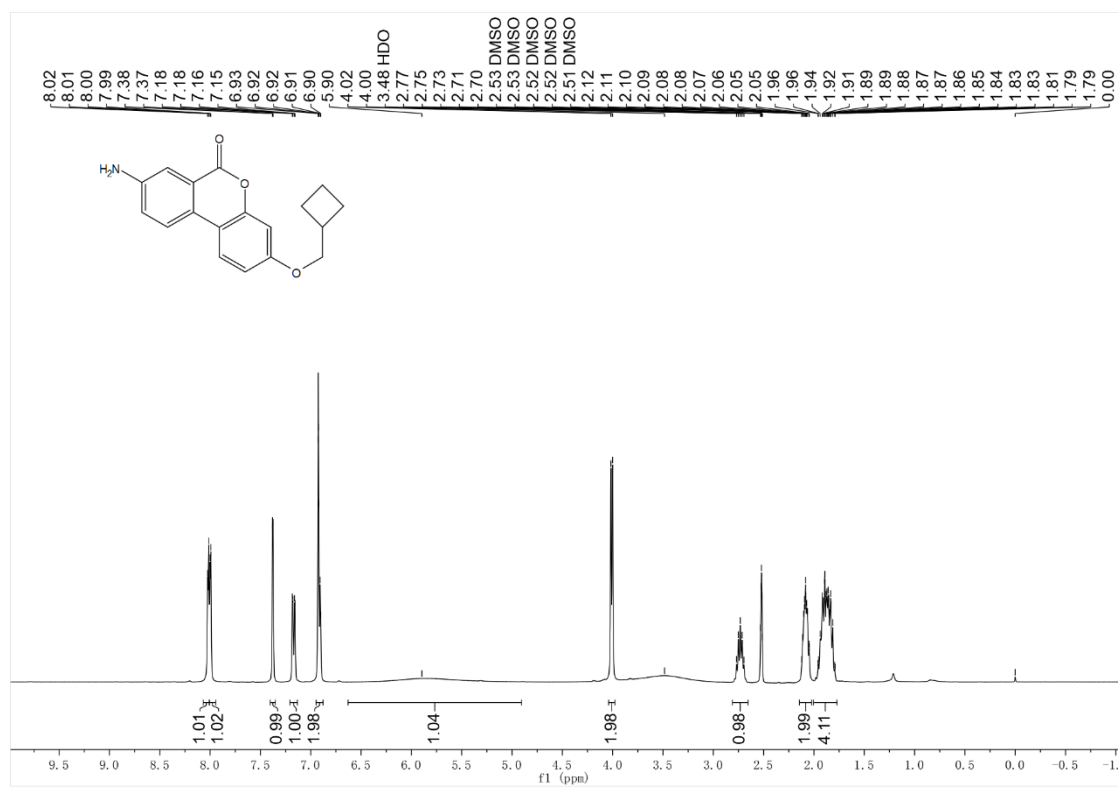


Figure S103. ¹H-NMR of E14

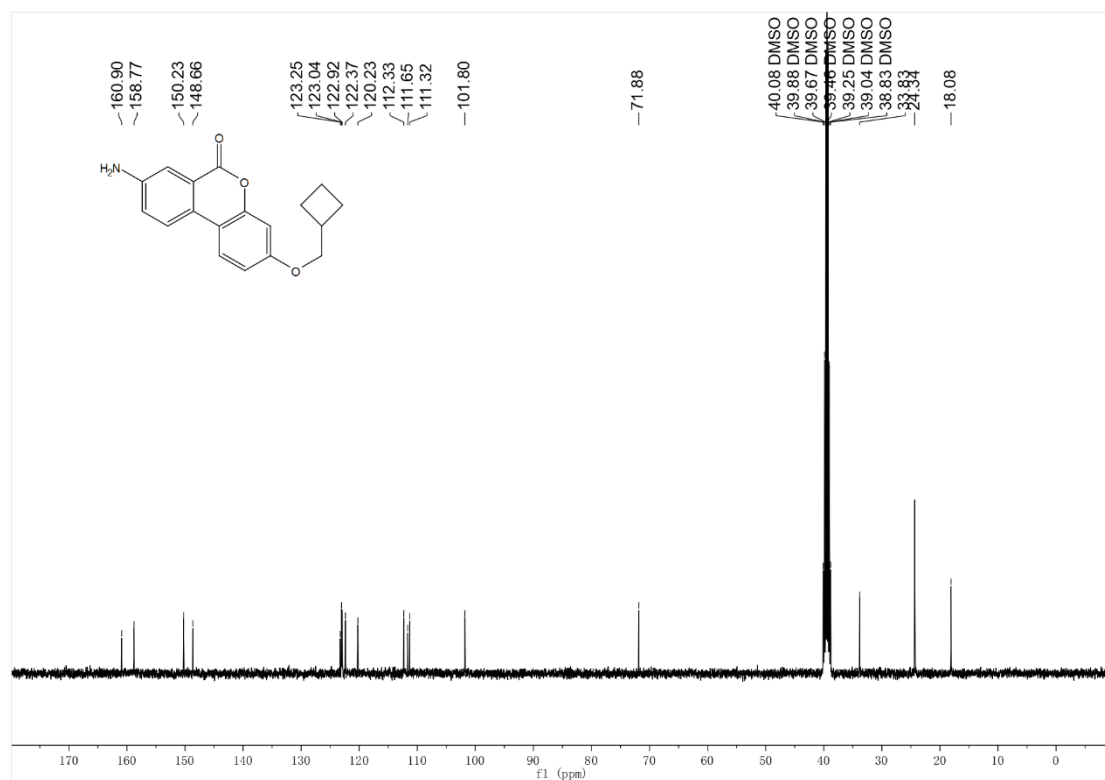


Figure S104. ¹³C-NMR of E14

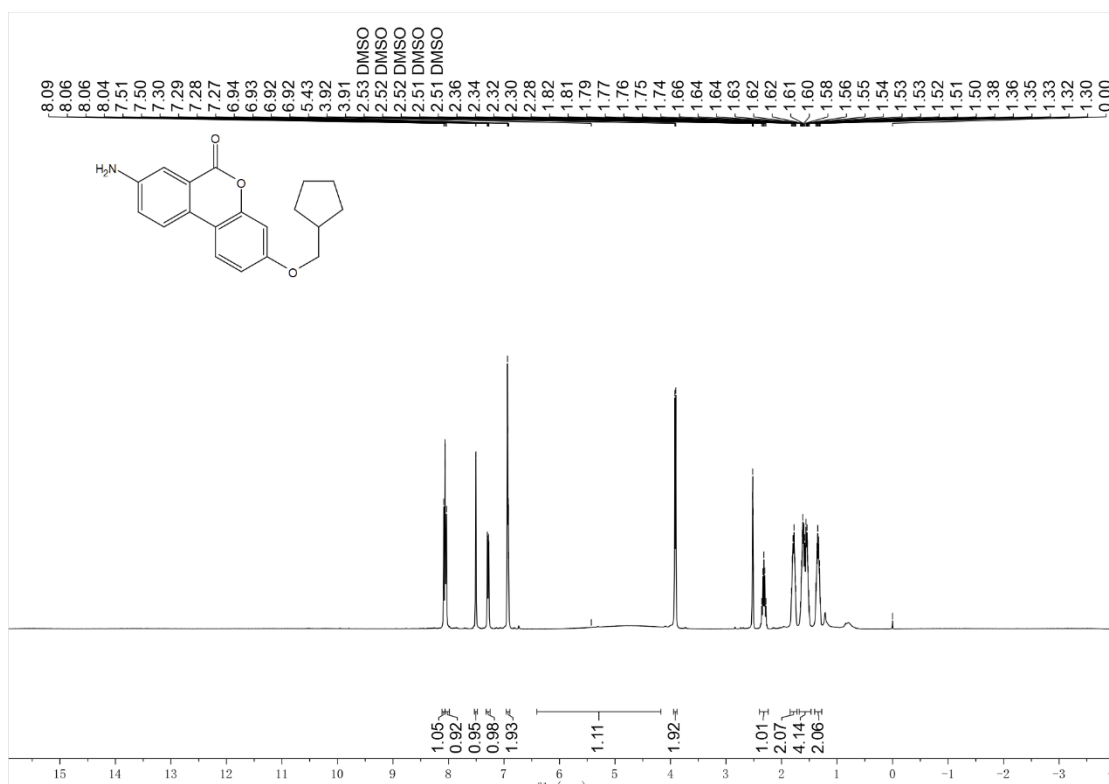


Figure S105. ¹H-NMR of E15

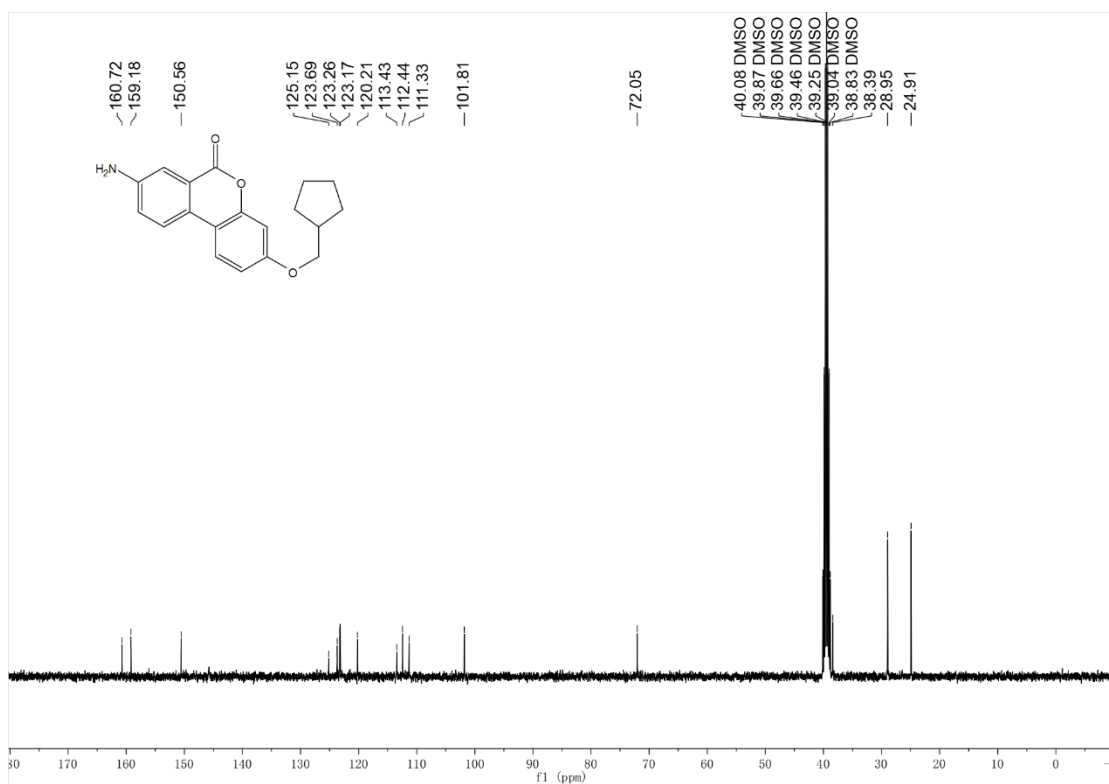


Figure S106. ¹³C-NMR of E15

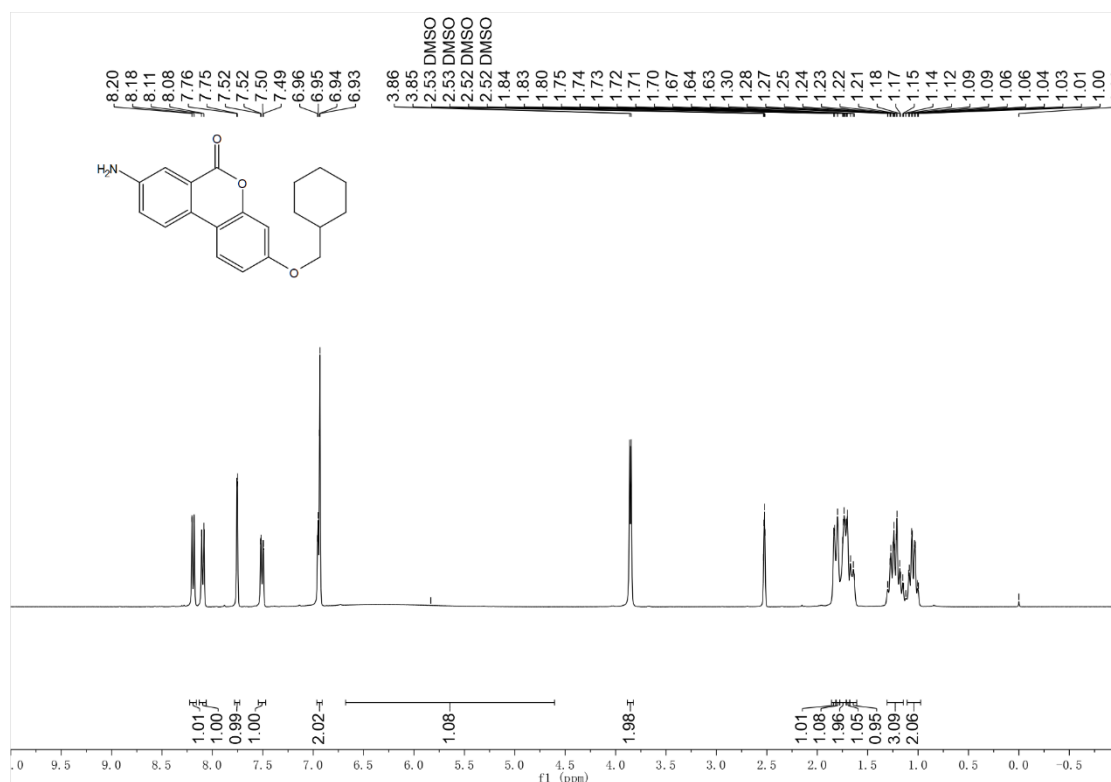


Figure S107. ¹H-NMR of E16

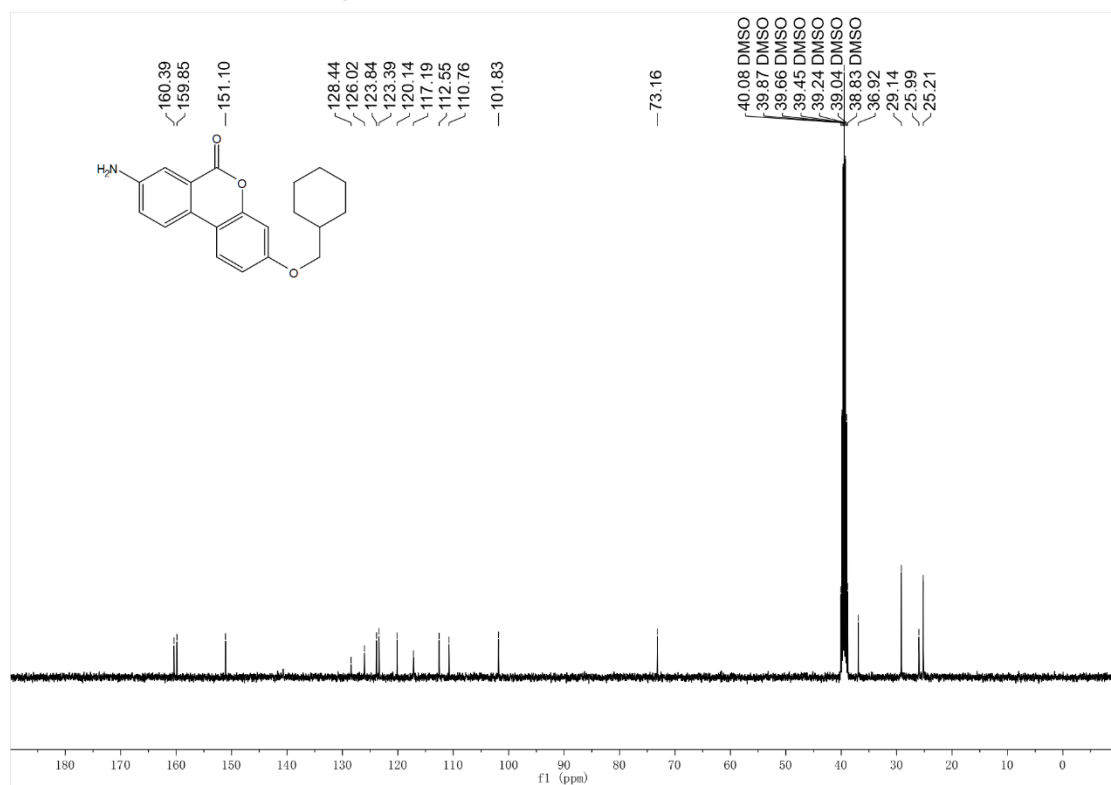


Figure S108. ¹³C-NMR of E16

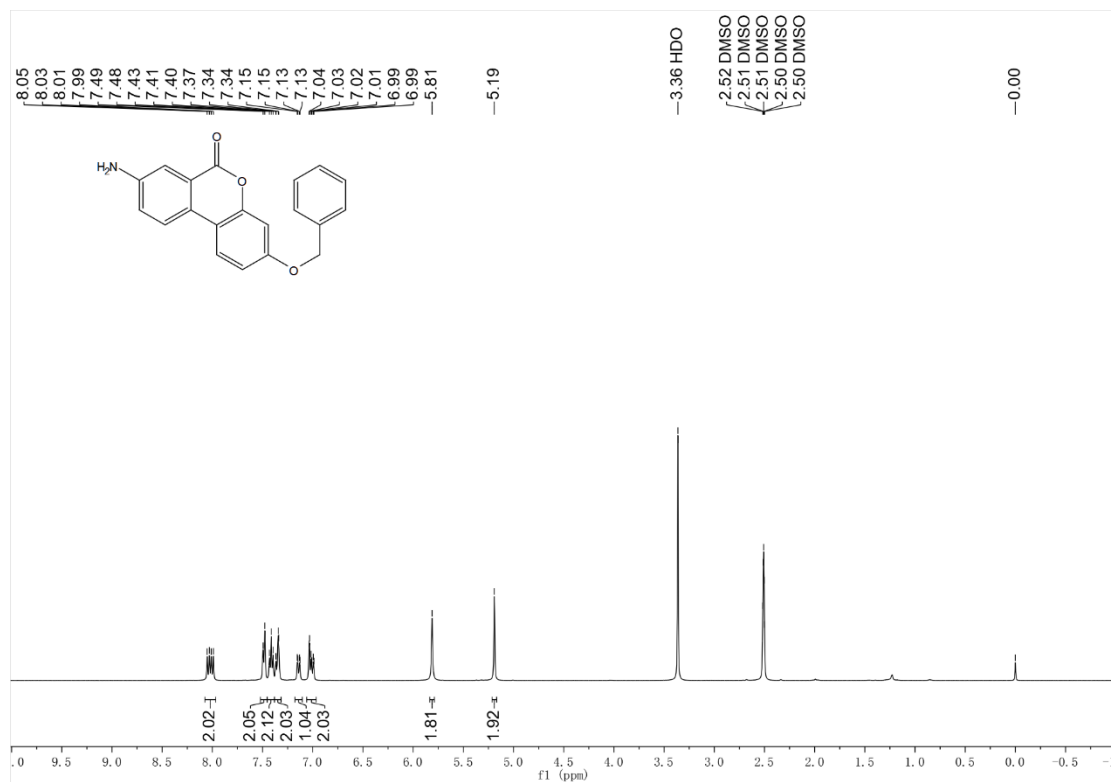


Figure S109. ¹H-NMR of E17

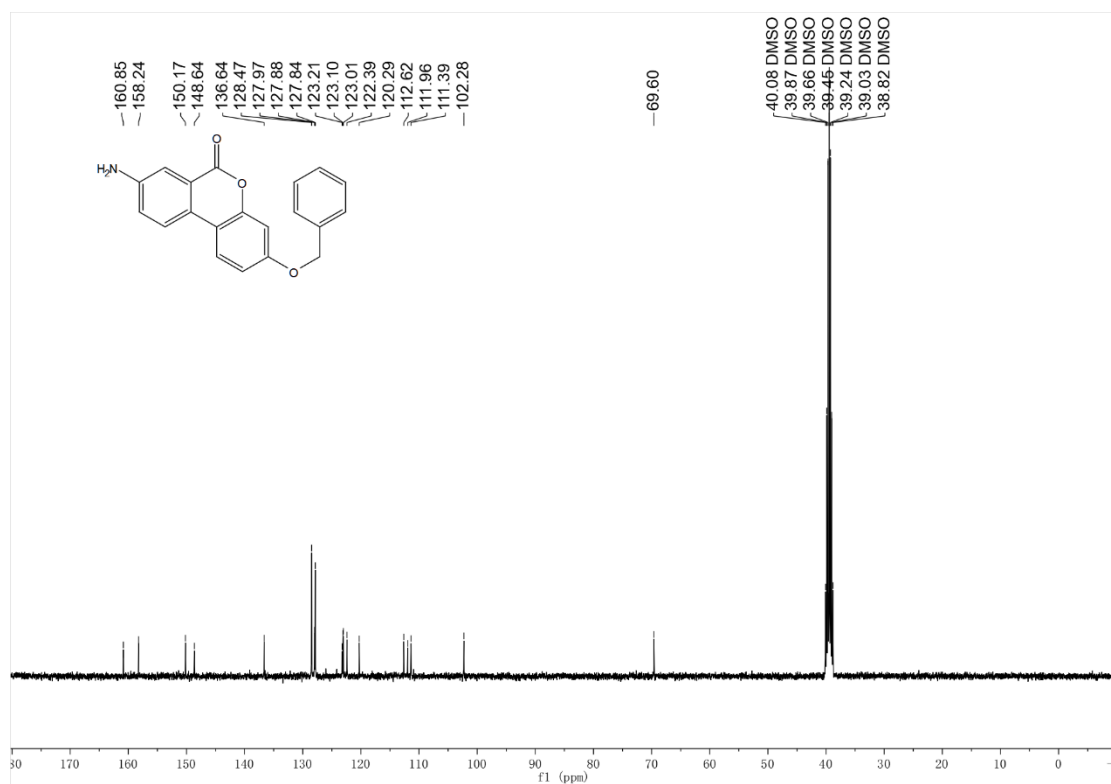


Figure S110. ¹³C-NMR of E17



Figure S111. ¹H-NMR of E18

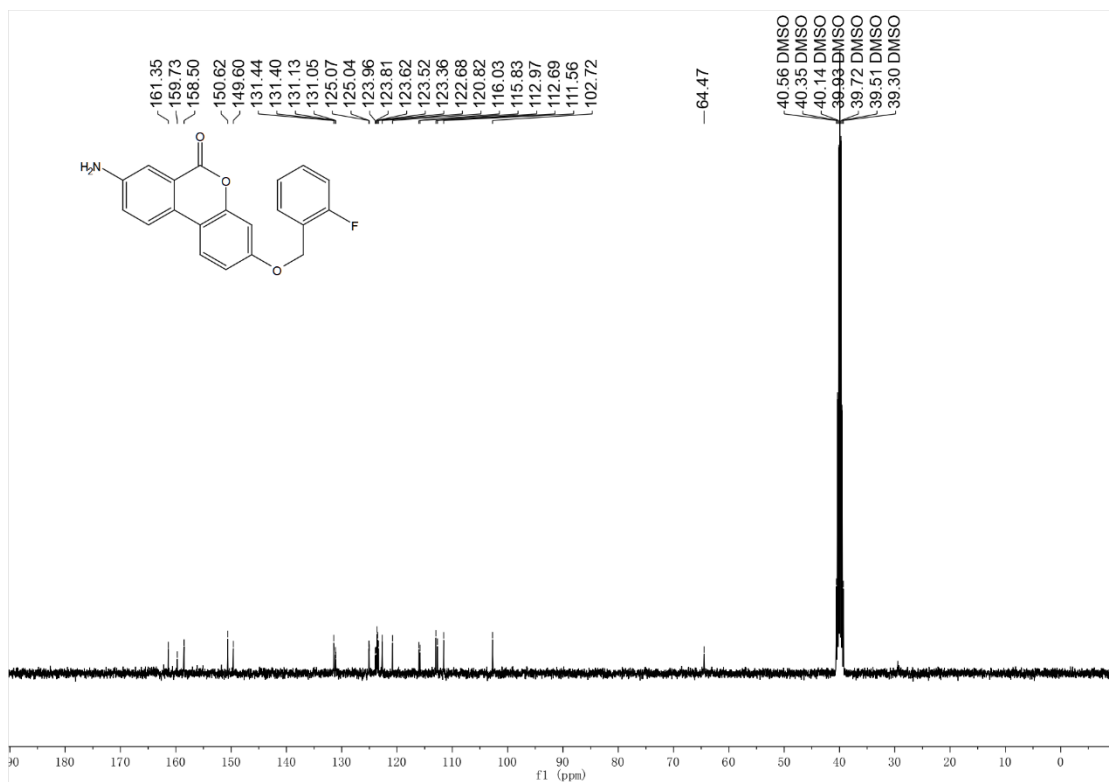


Figure S112. ¹³C-NMR of E18

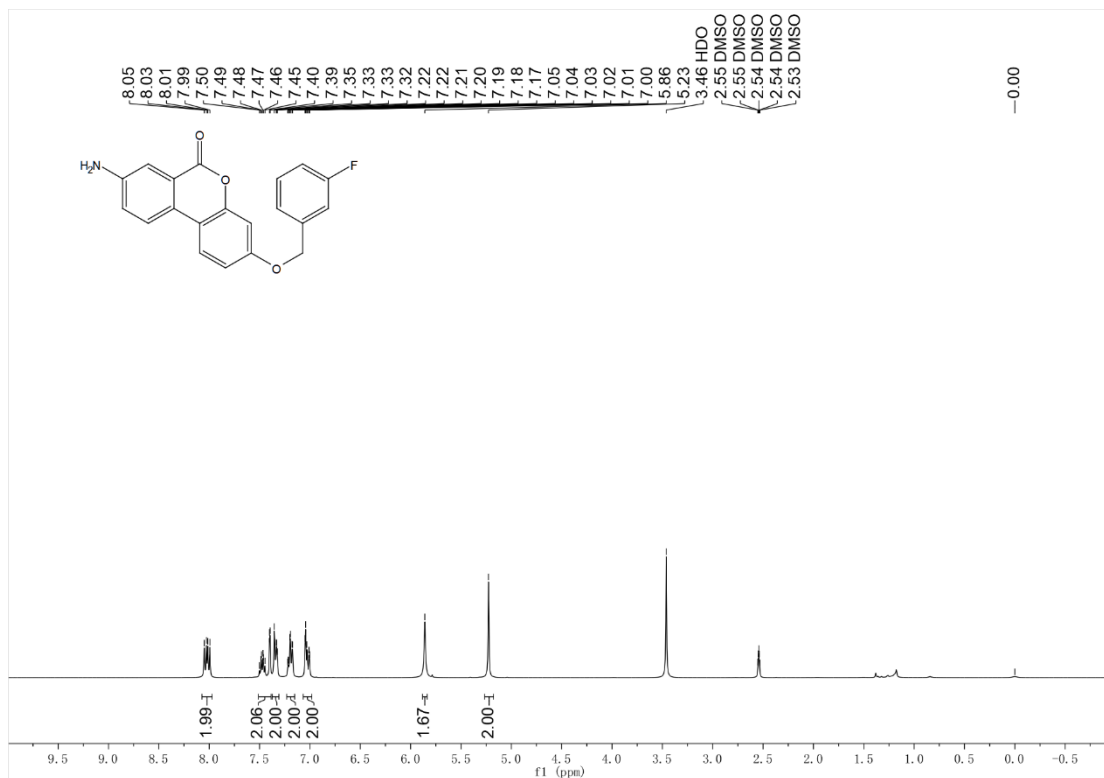


Figure S113. ¹H-NMR of E19

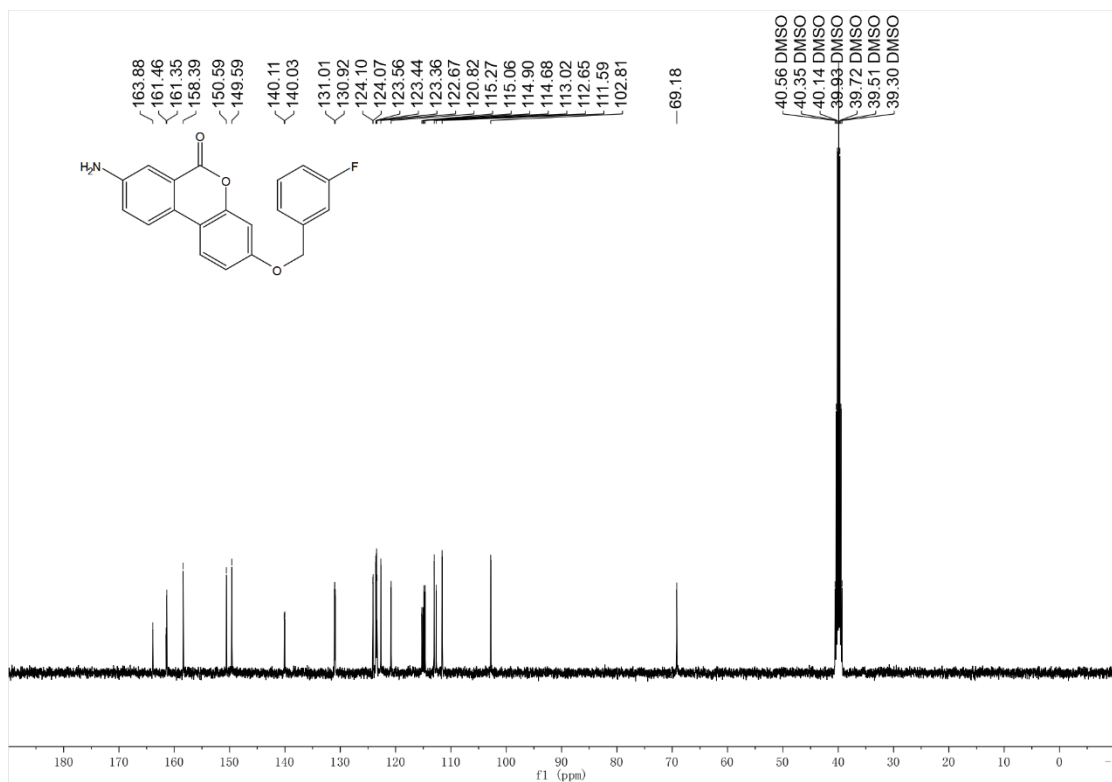


Figure S114. ¹³C-NMR of E19

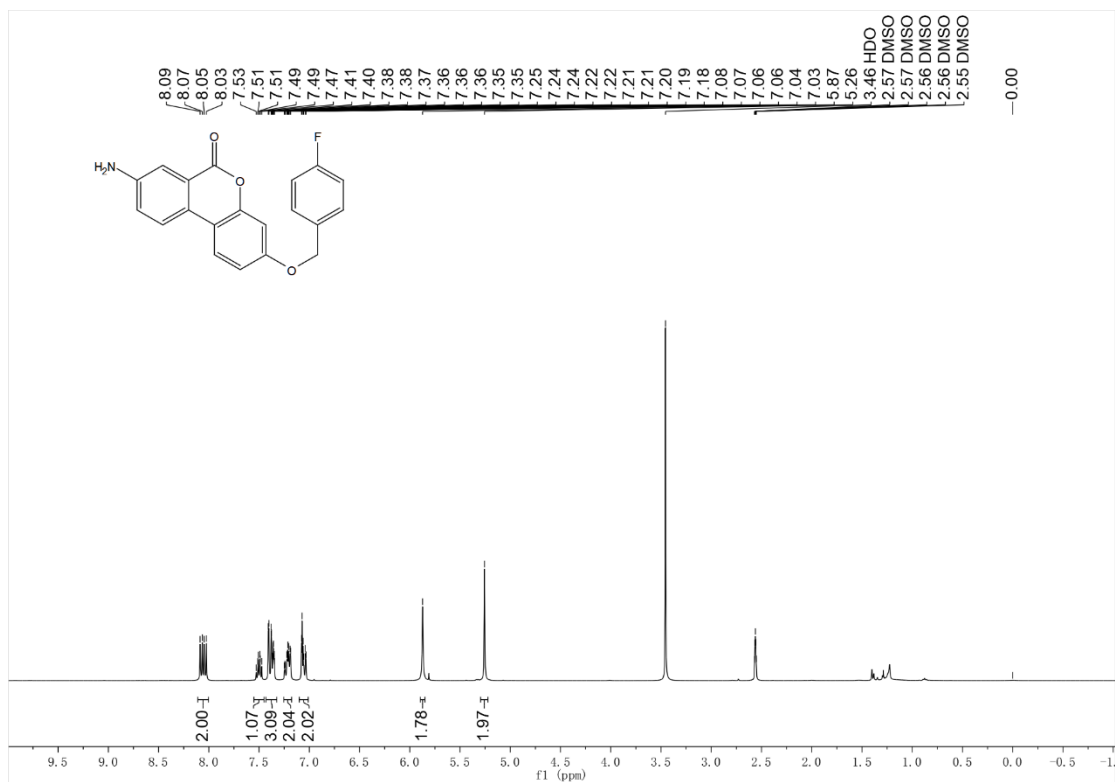


Figure S115. ¹H-NMR of E20

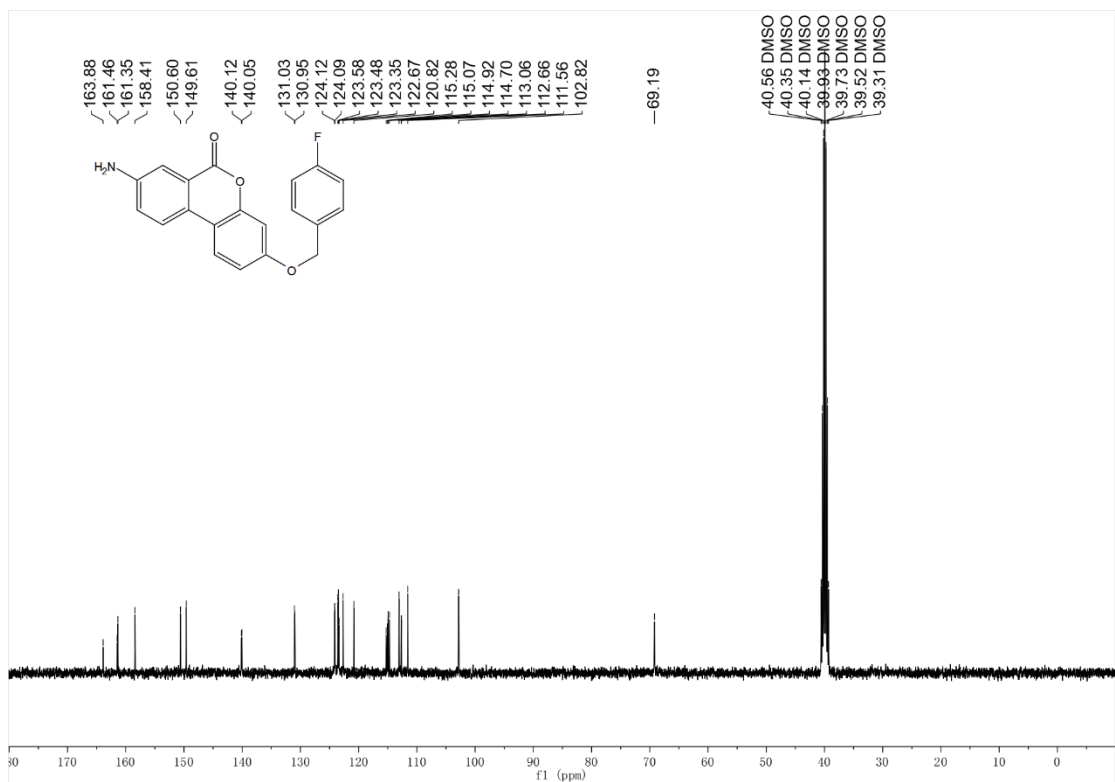


Figure S116. ¹³C-NMR of E20

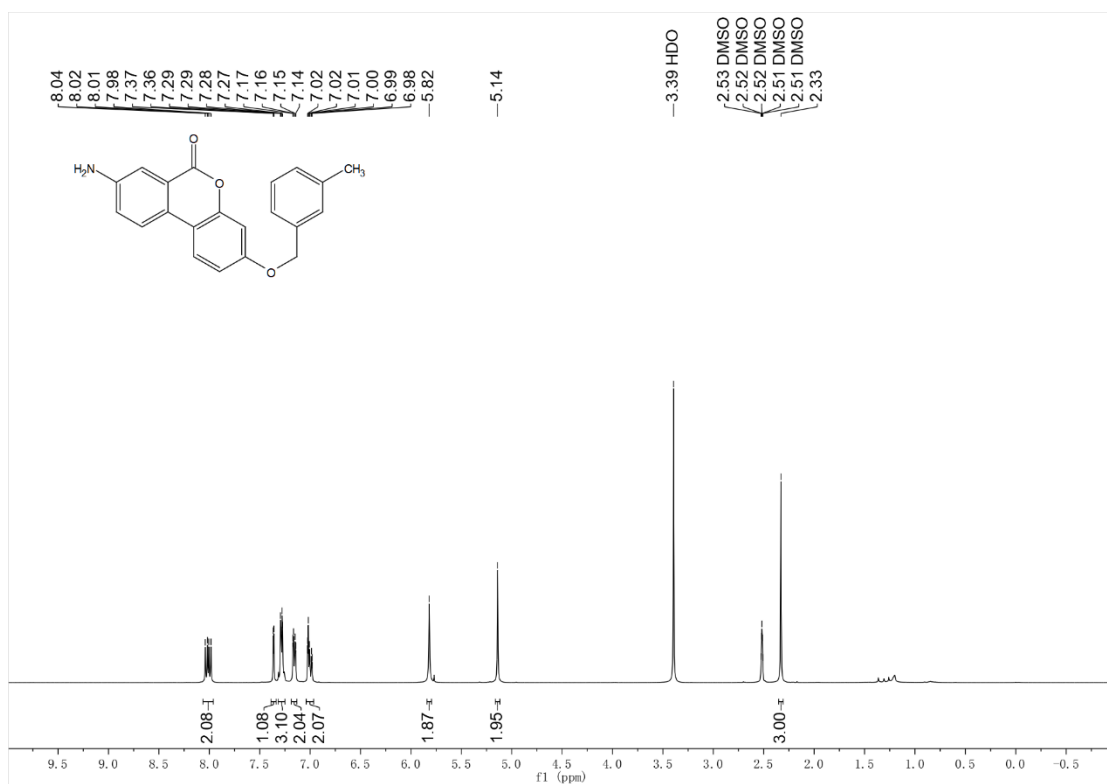


Figure S117. ¹H-NMR of E21

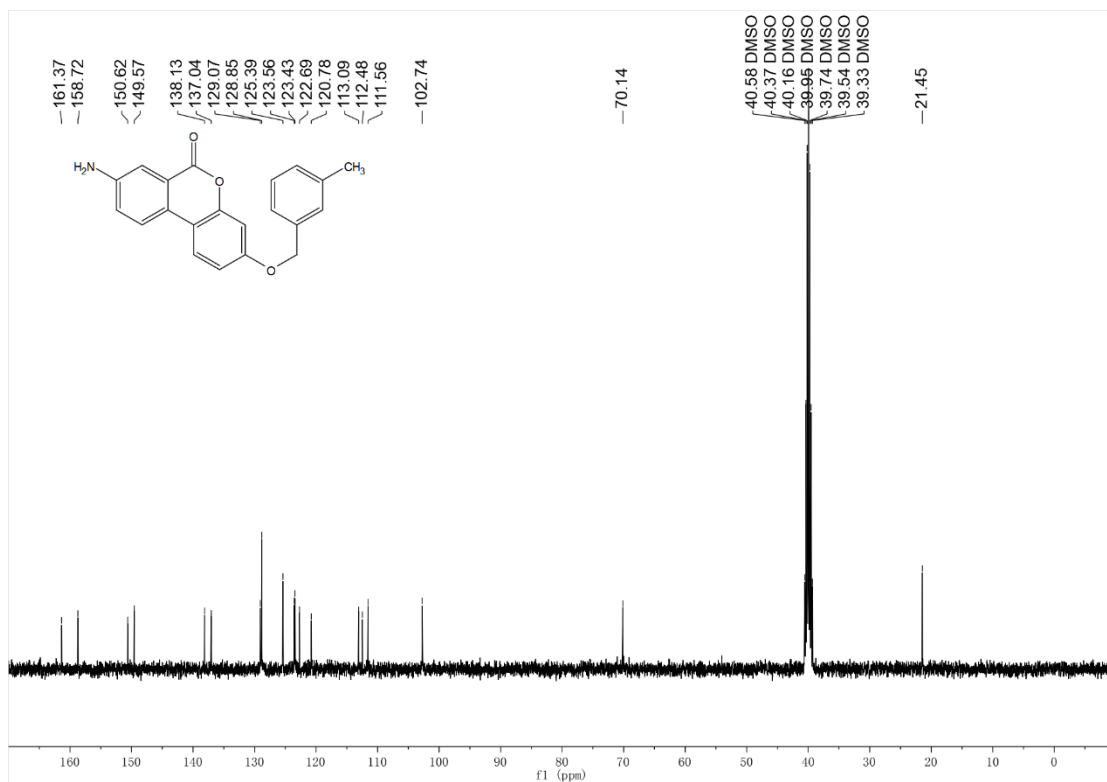


Figure S118. ¹³C-NMR of E21

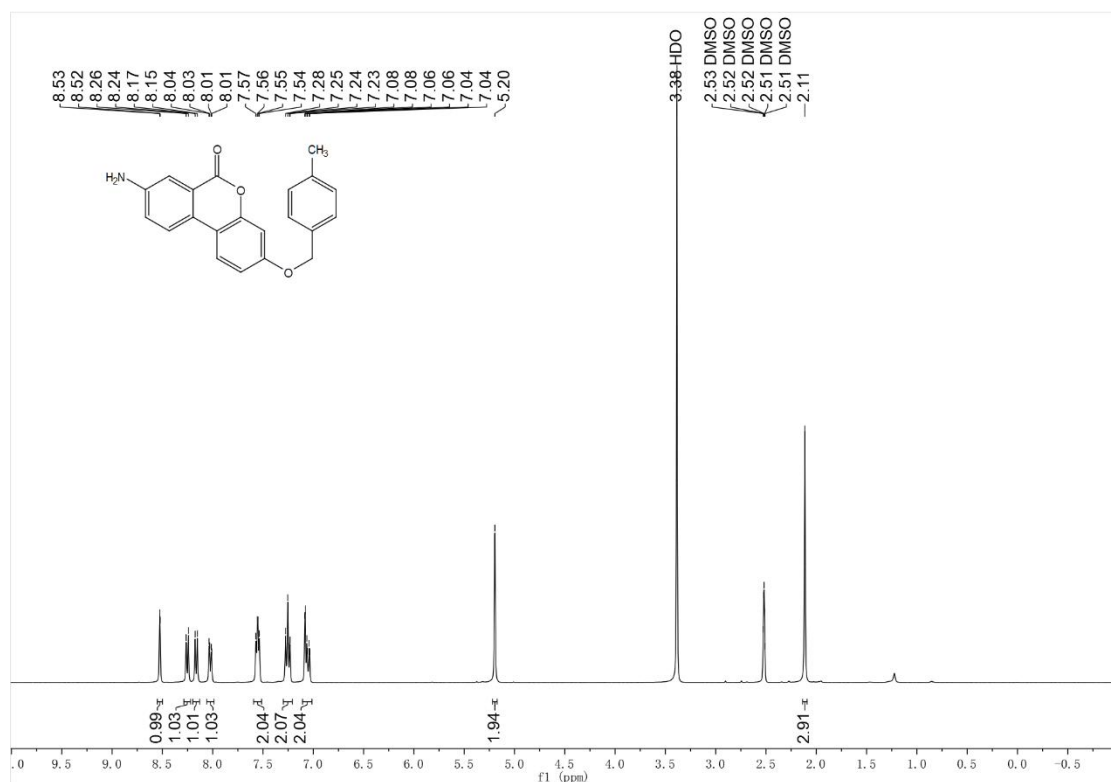


Figure S119. ¹H-NMR of E22

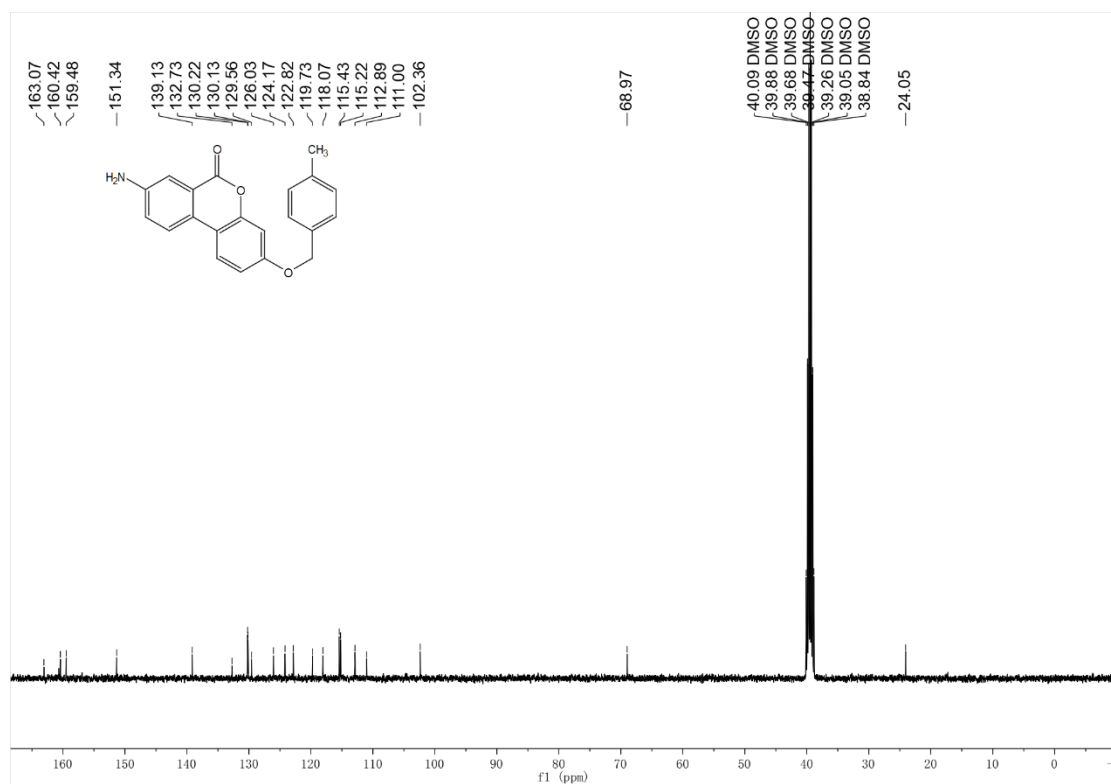


Figure S120. ¹³C-NMR of E22



Figure S121. ¹H-NMR of E23

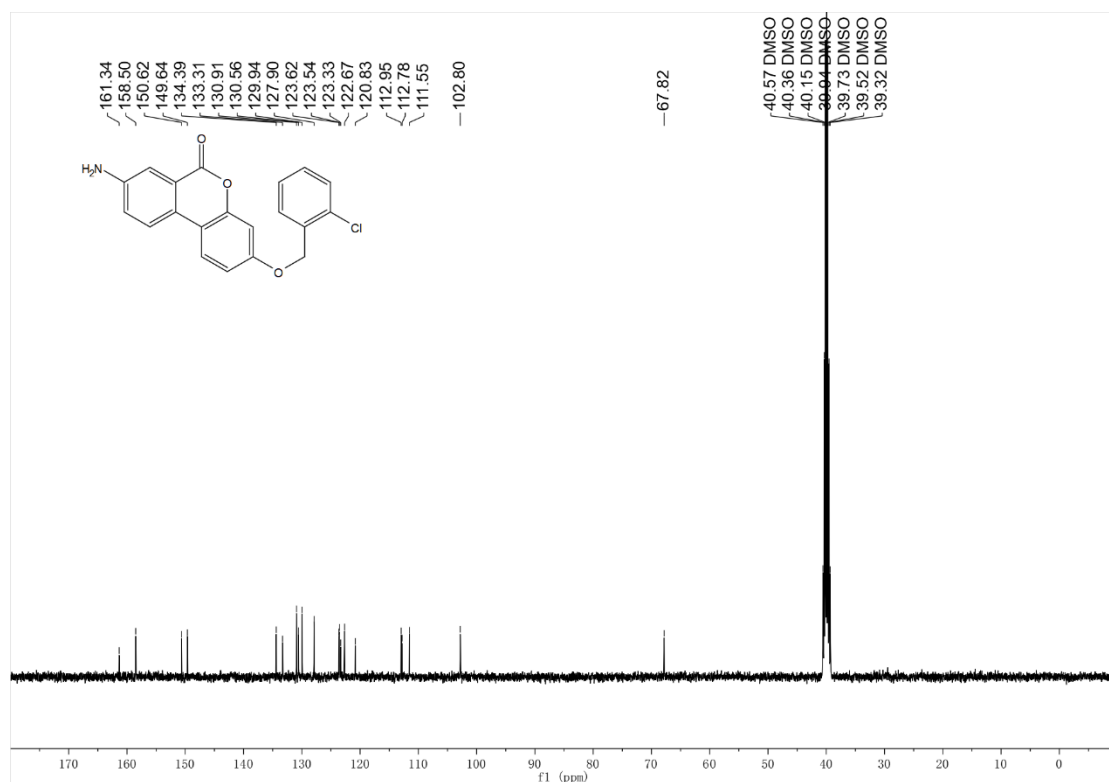


Figure S122. ¹³C-NMR of E23



Figure S123. ¹H-NMR of E24

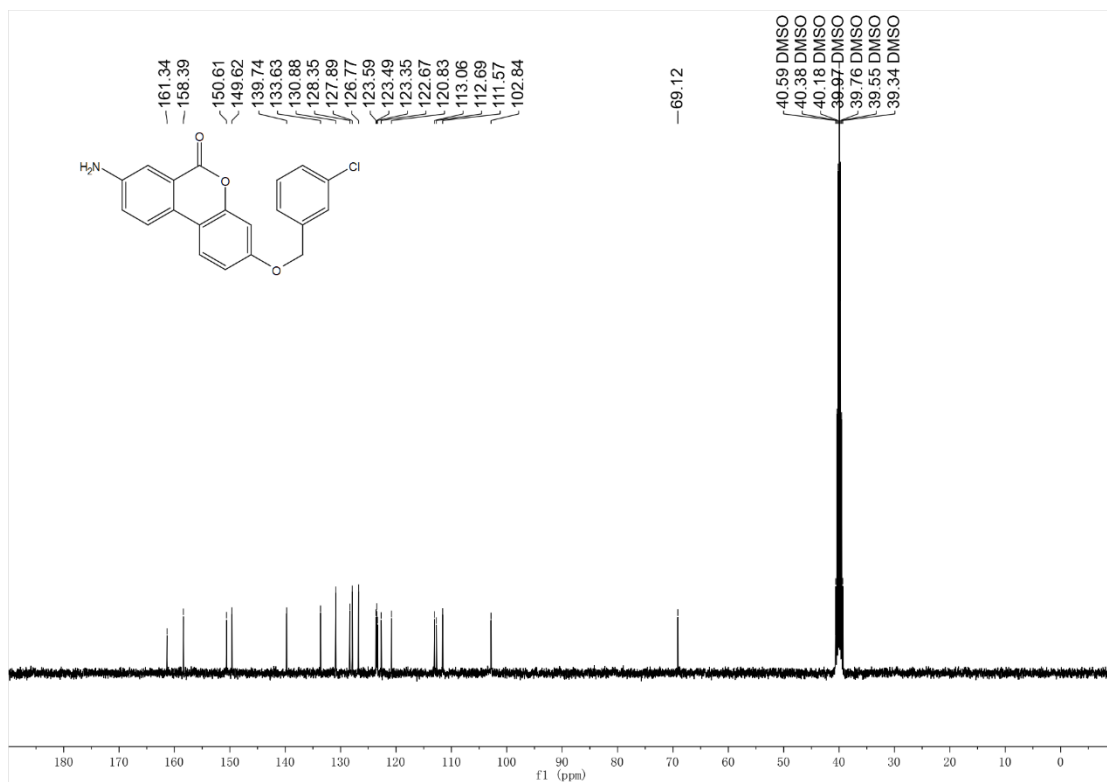


Figure S124. ¹³C-NMR of E24

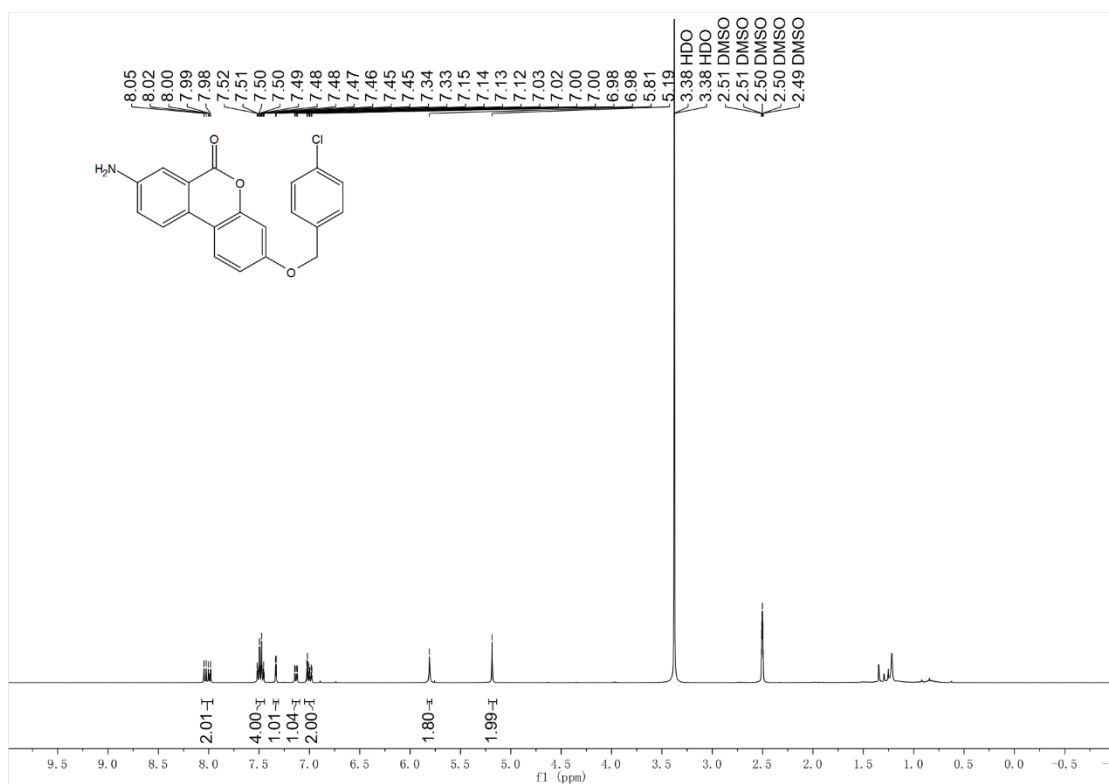


Figure S125. ¹H-NMR of E25

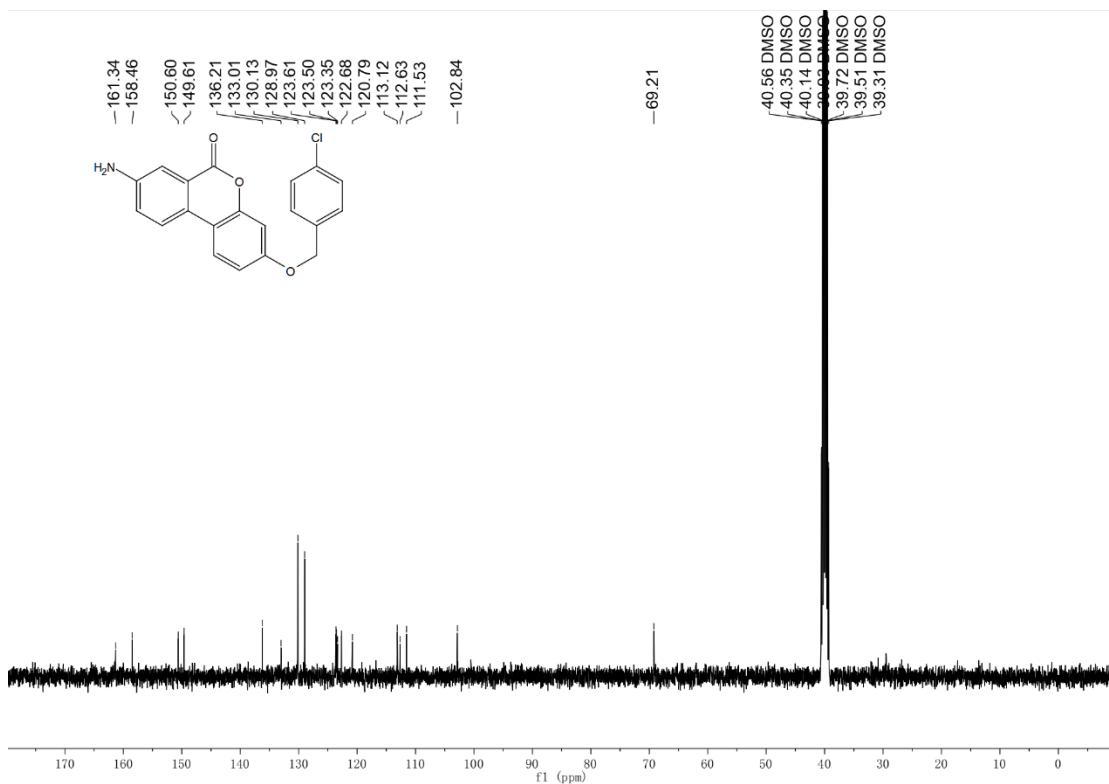


Figure S126. ¹³C-NMR of E25

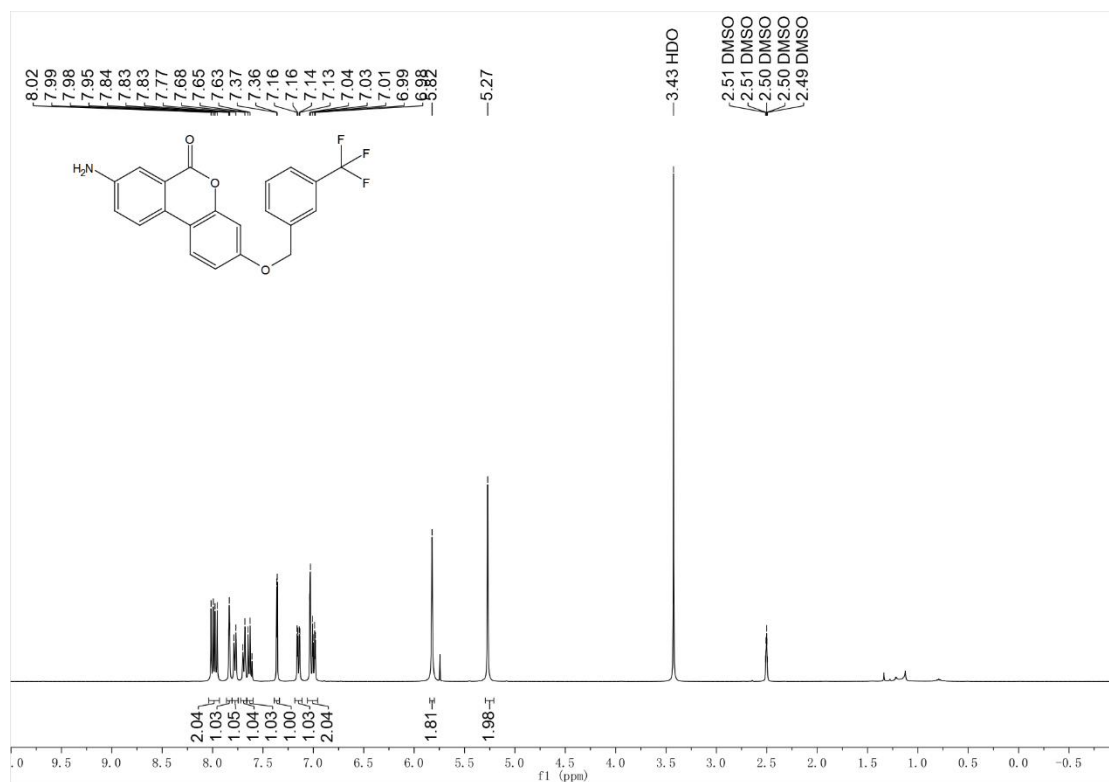


Figure S127. ¹H-NMR of E26

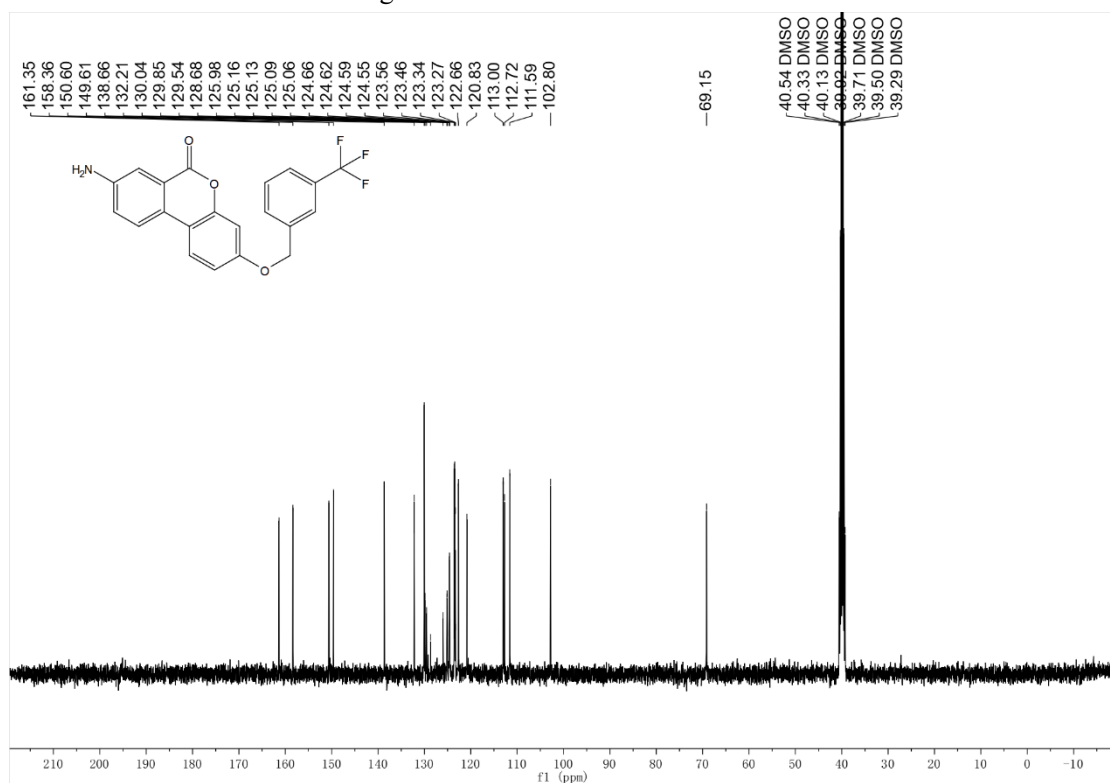


Figure S128. ¹³C-NMR of E26

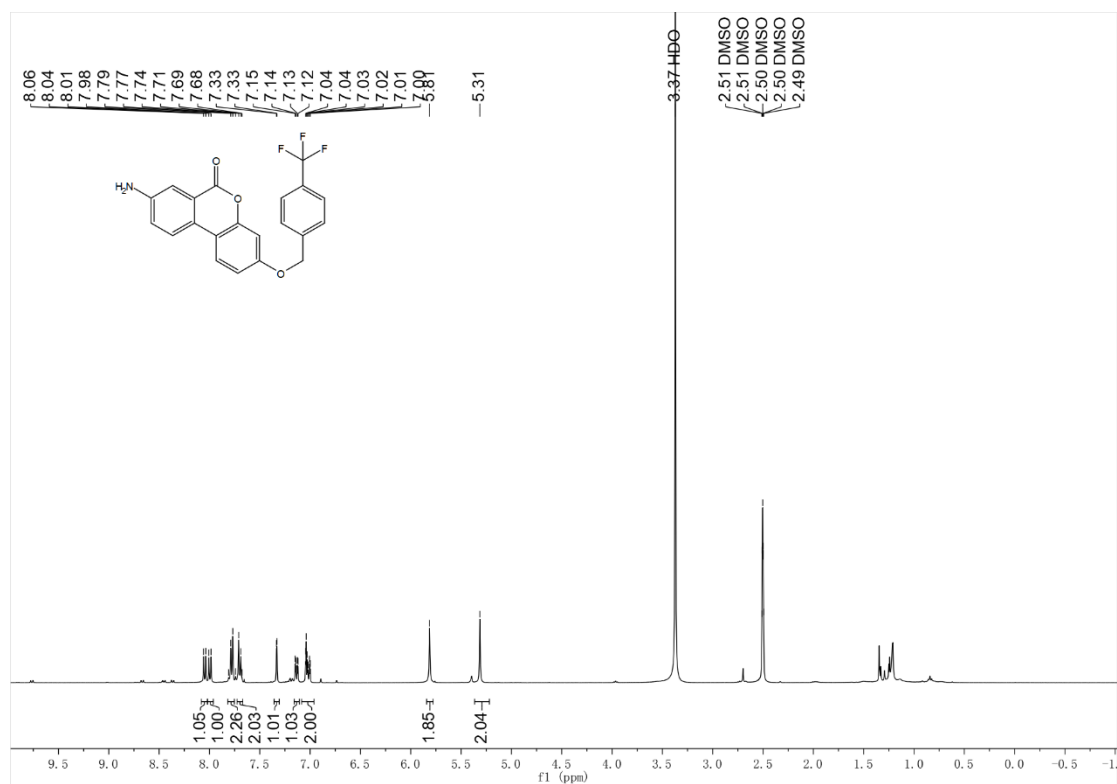


Figure S129. ¹H-NMR of E27

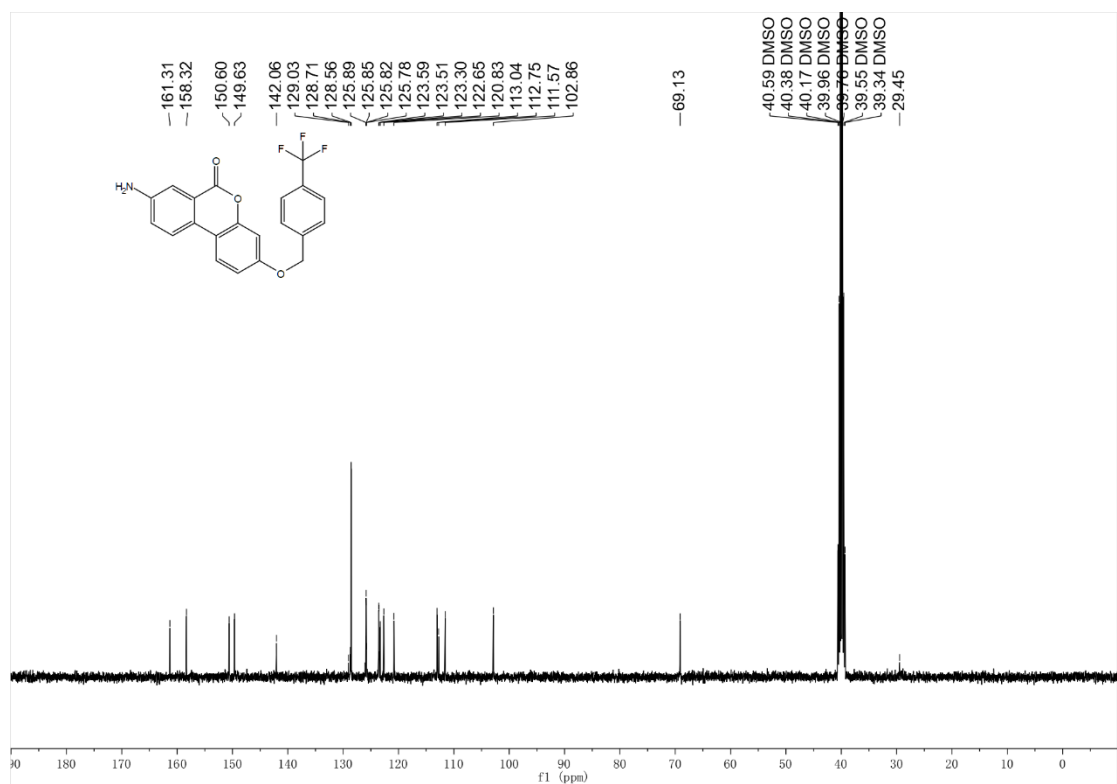


Figure S130. ¹³C-NMR of E27

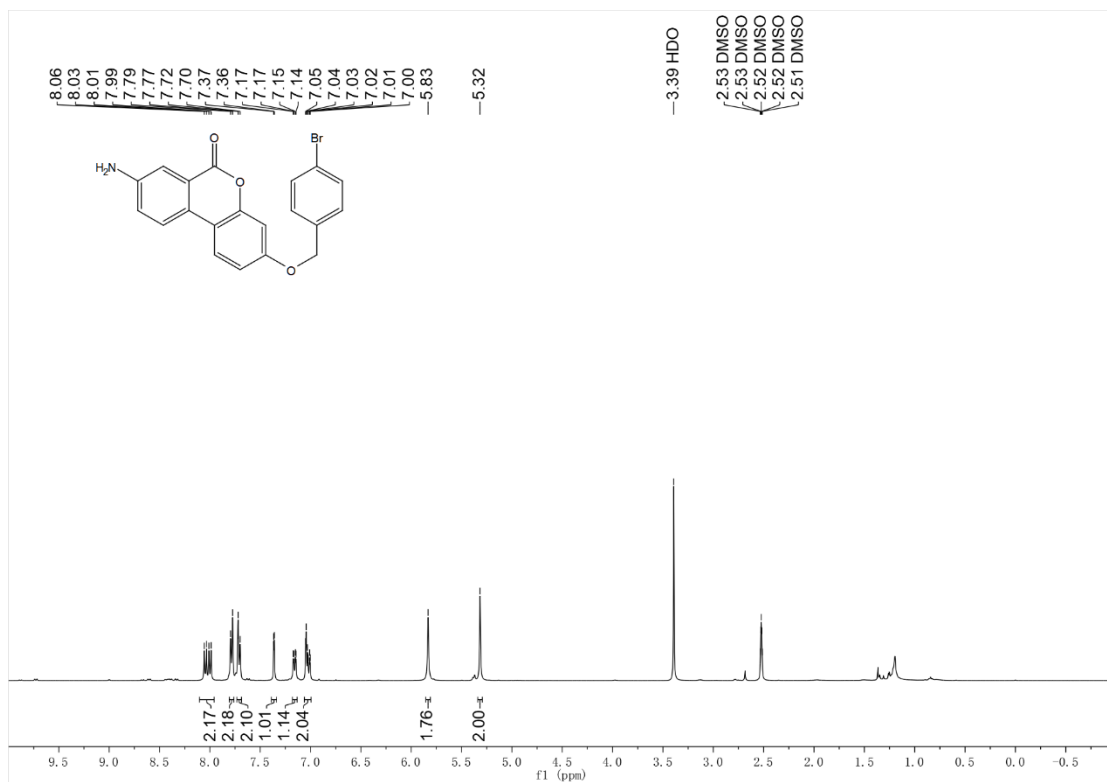


Figure S131. ¹H-NMR of E28

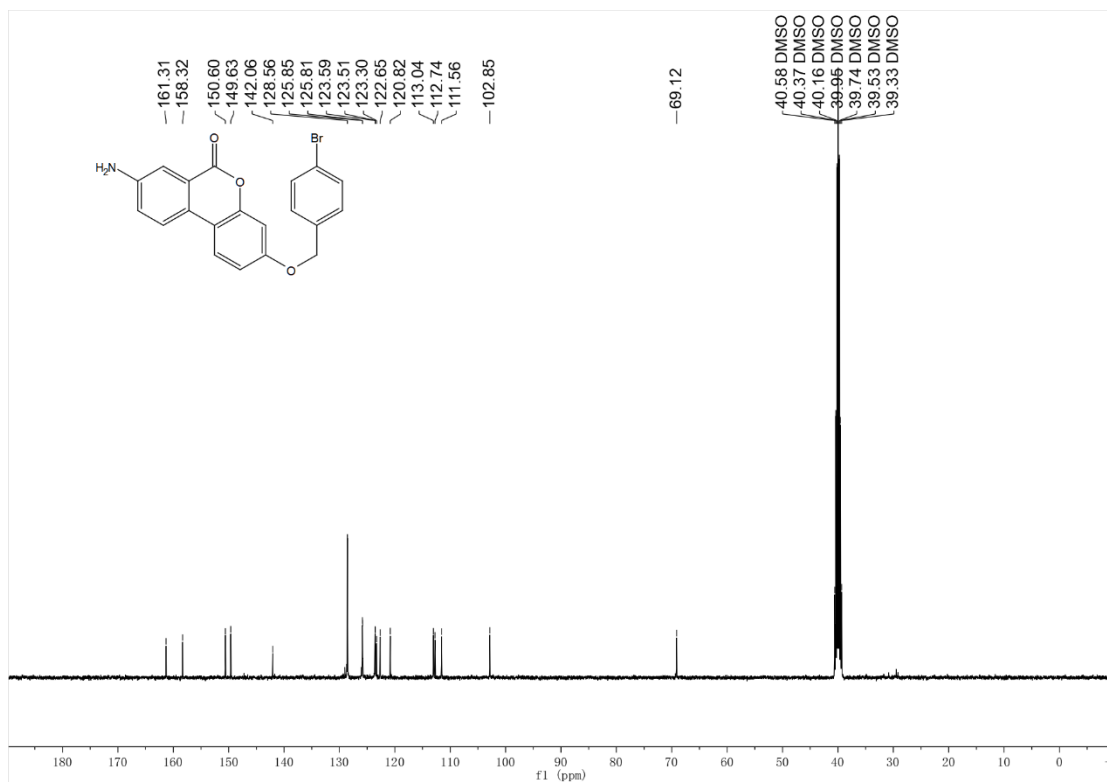


Figure S132. ¹³C-NMR of E28

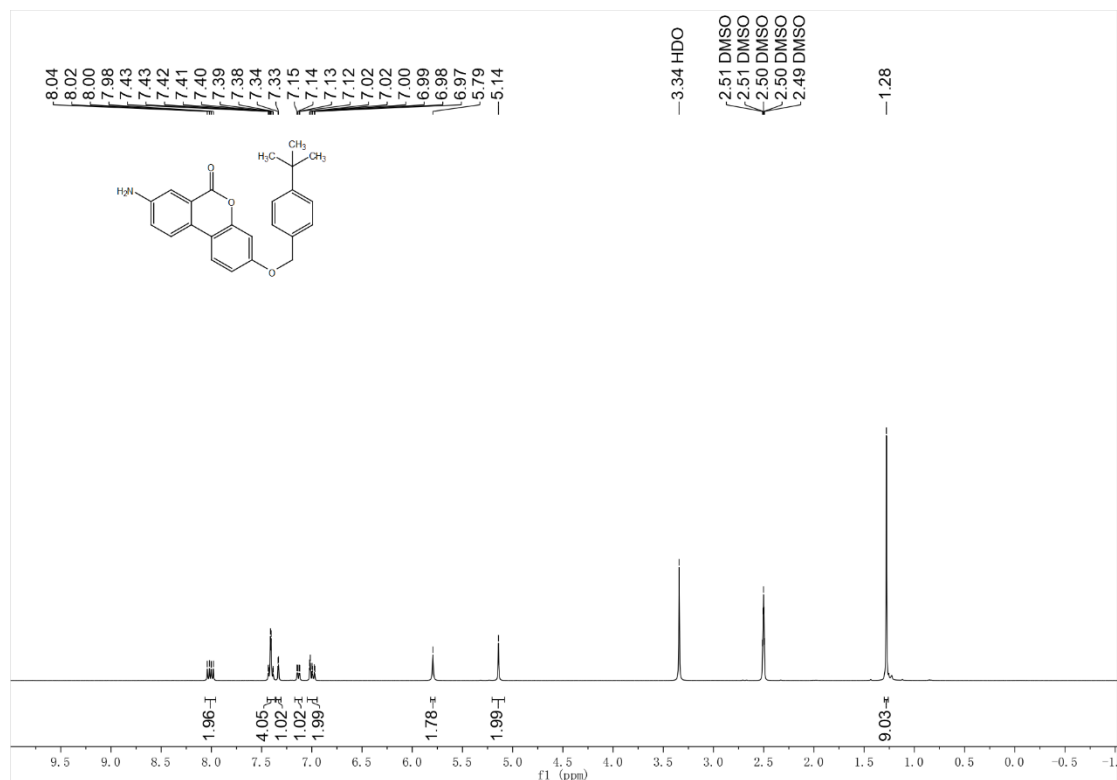


Figure S133. ¹H-NMR of E29

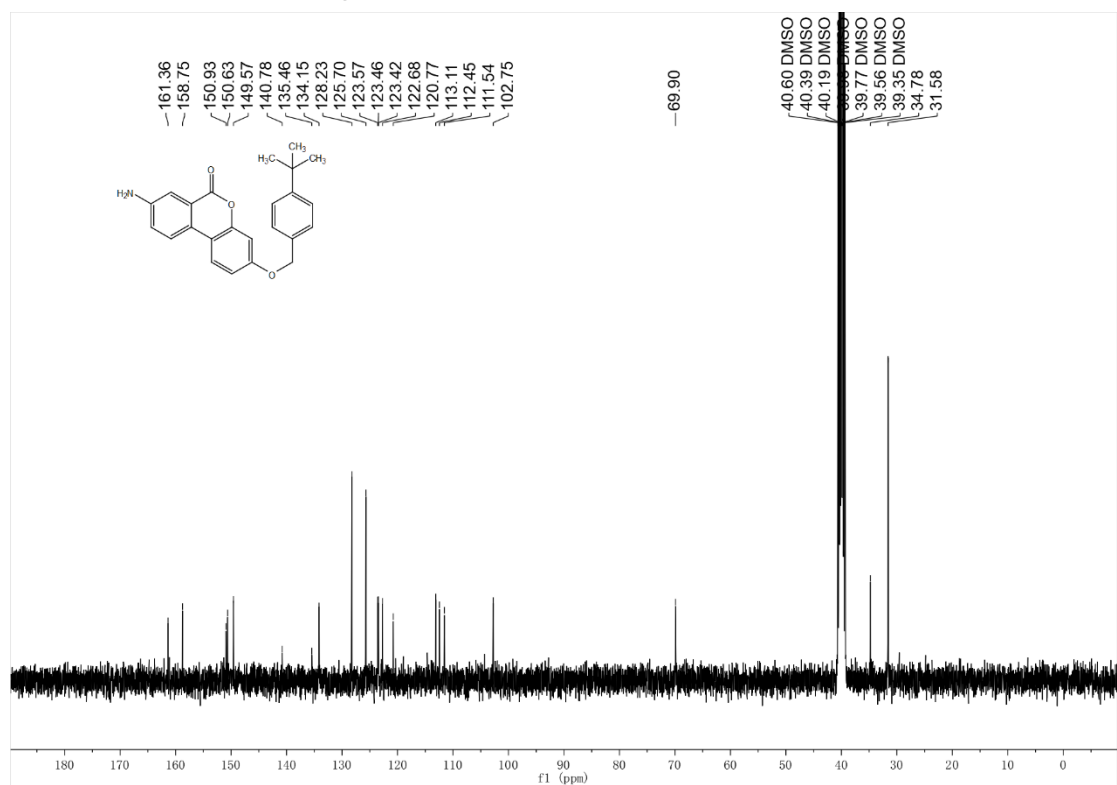


Figure S134. ¹³C-NMR of E29

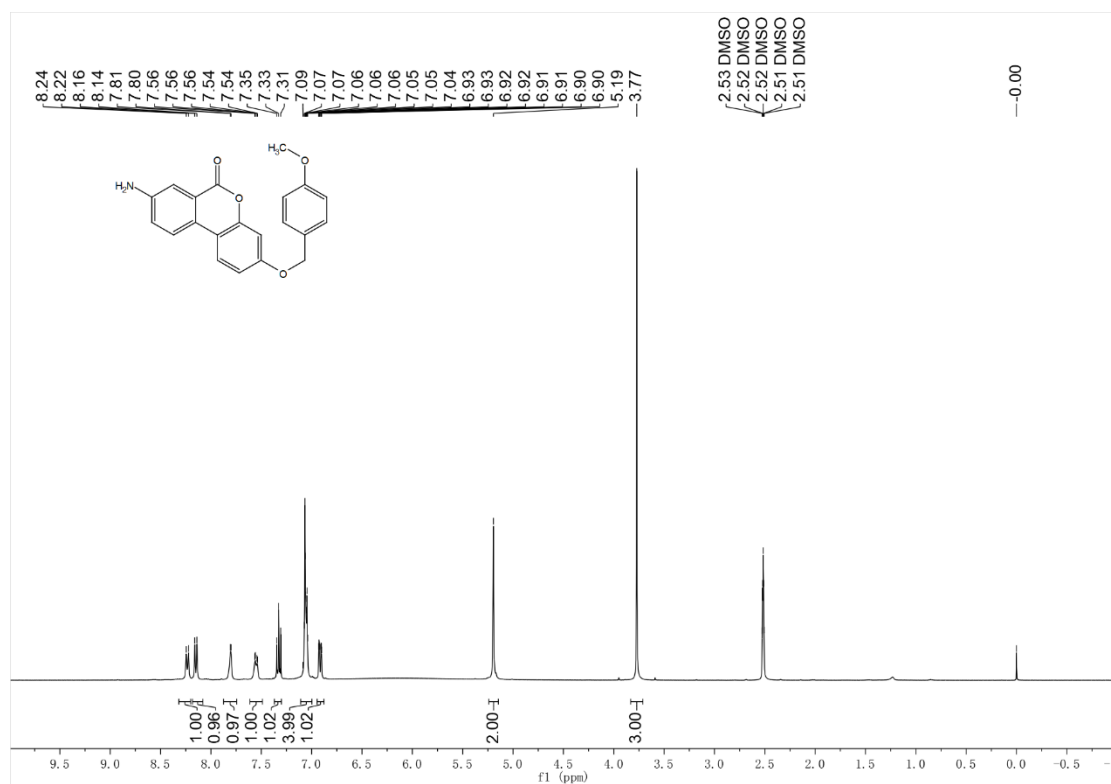


Figure S135. ¹H-NMR of E30

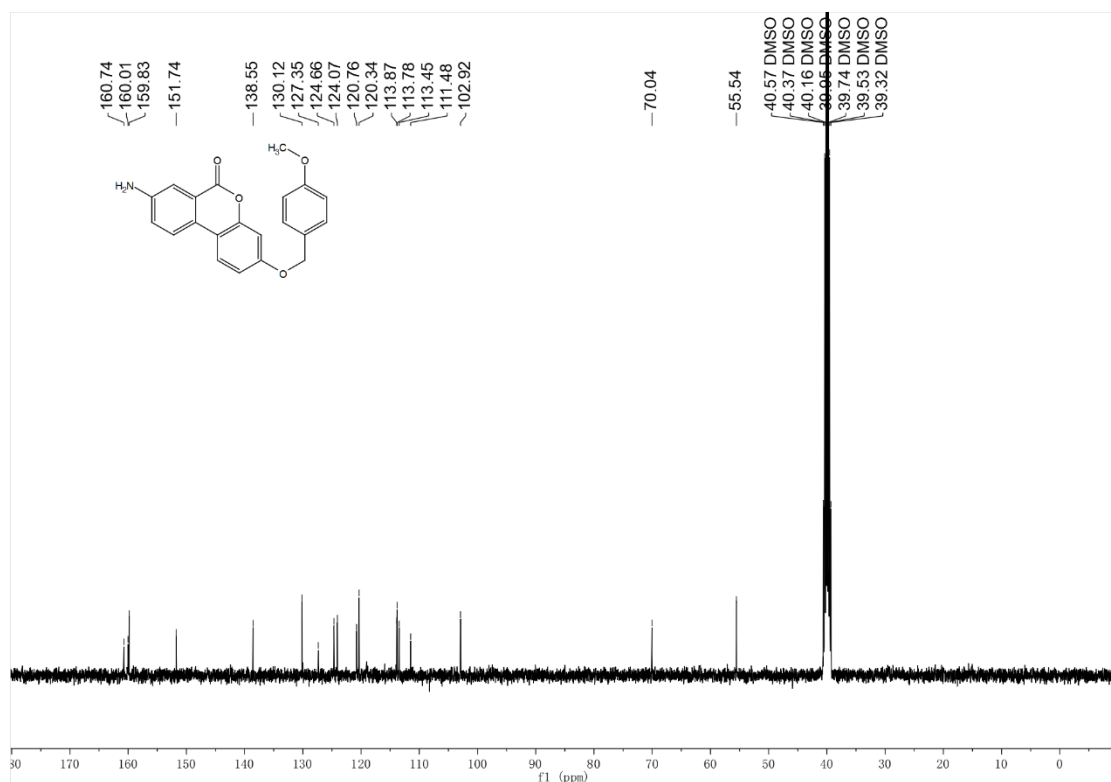


Figure S136. ¹³C-NMR of E30

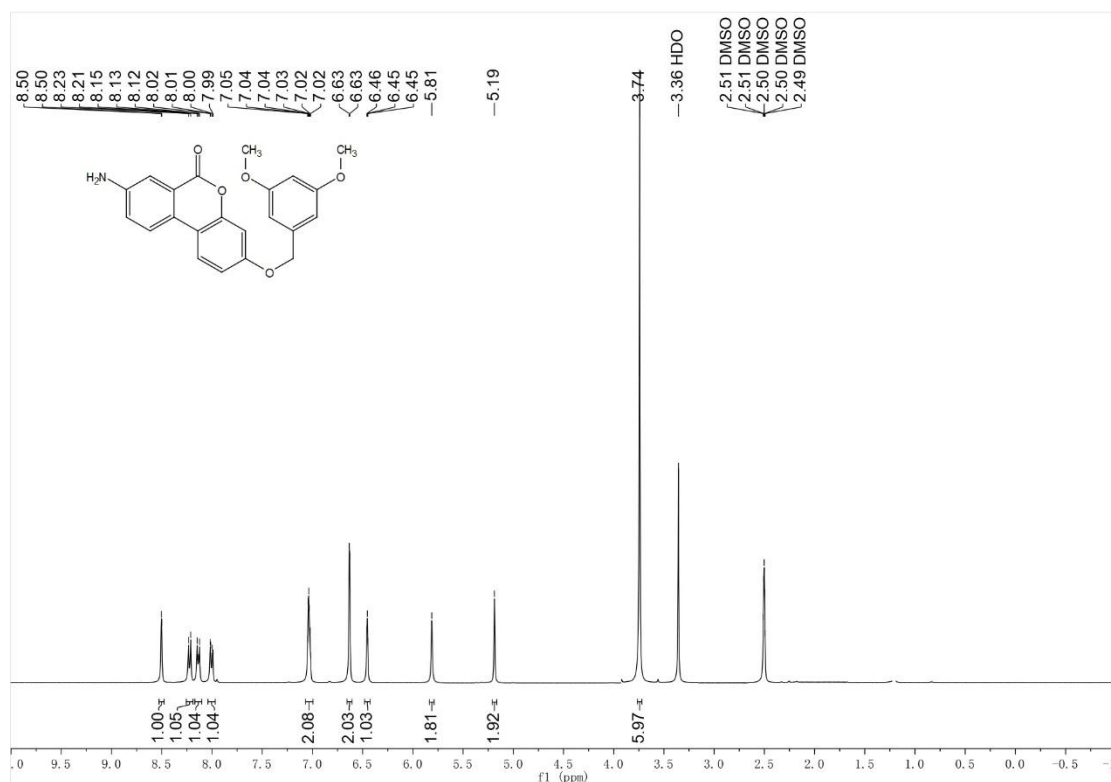


Figure S137. ¹H-NMR of E313

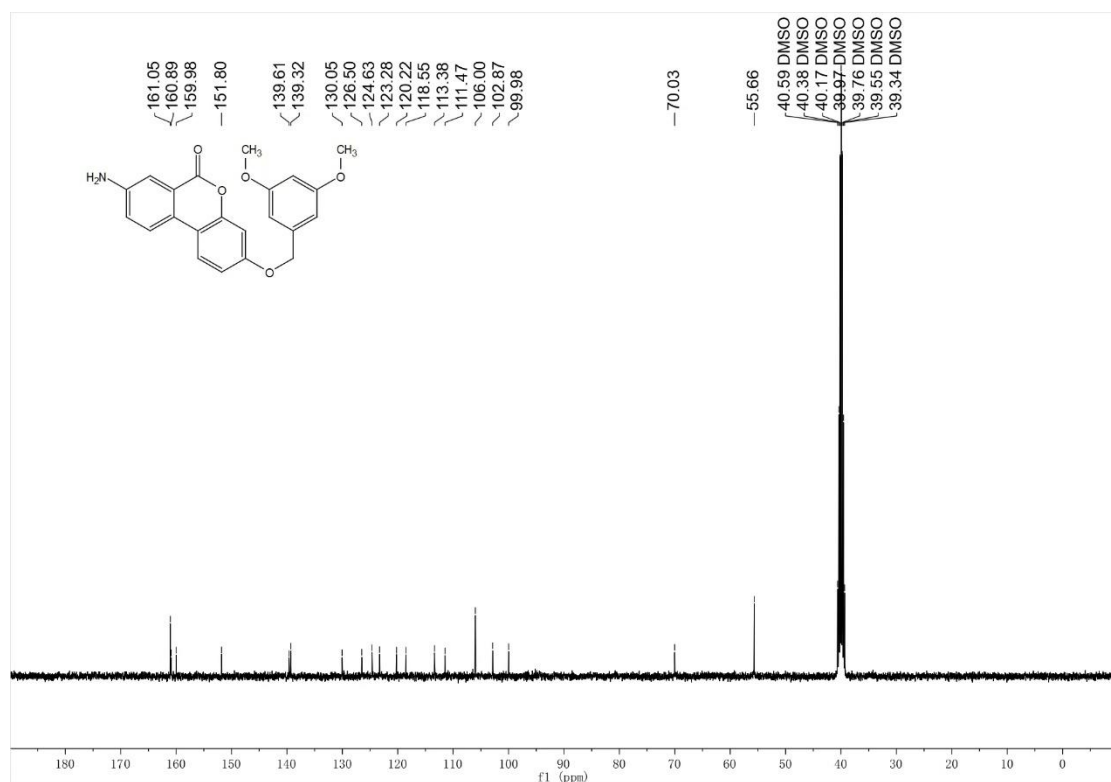


Figure S138. ¹³C-NMR of E31

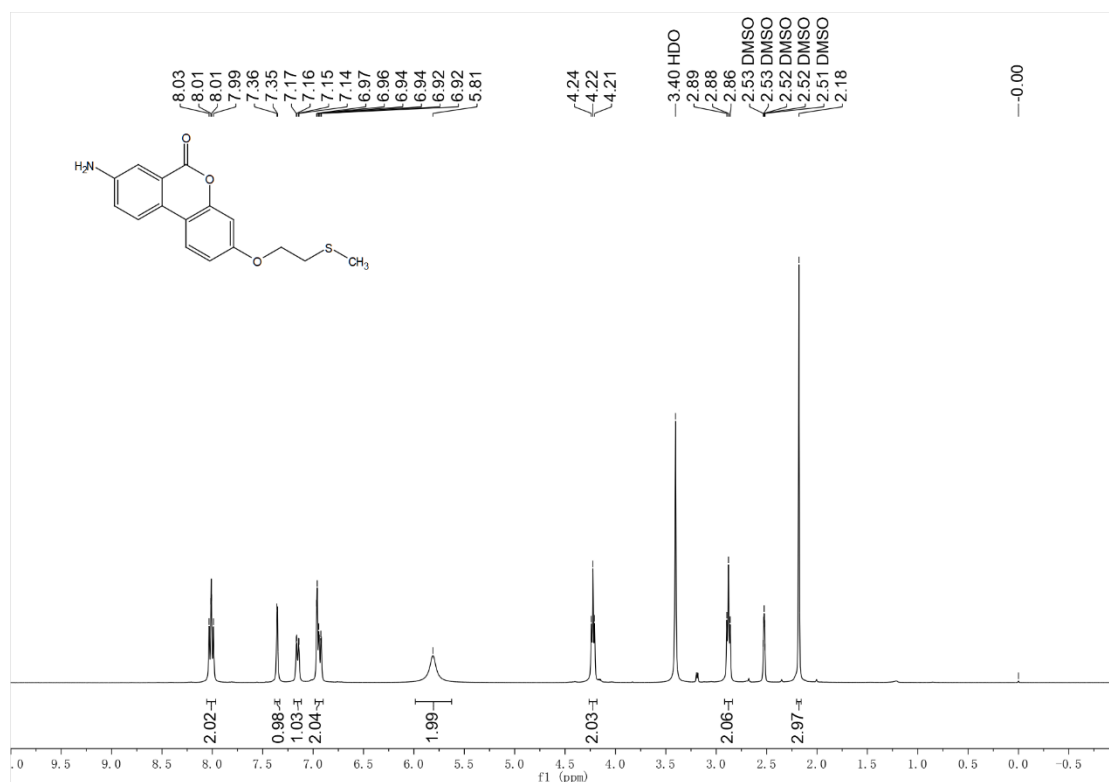


Figure S139. ¹H-NMR of E32

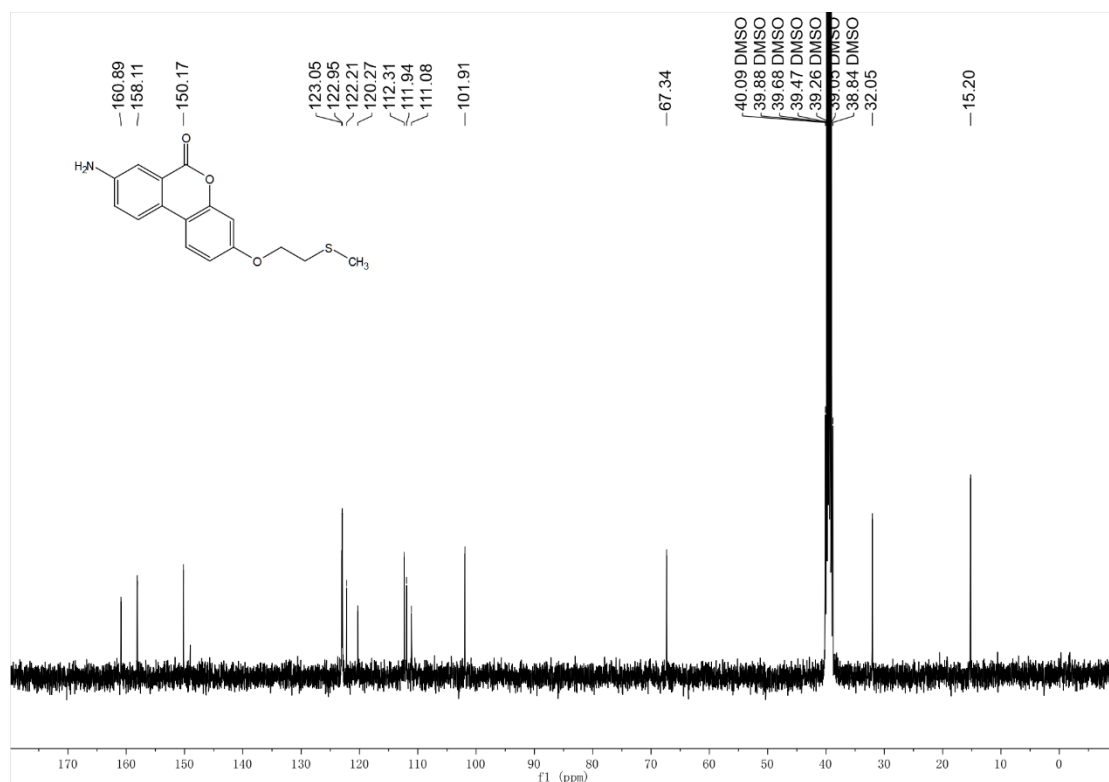


Figure S140. ¹³C-NMR of E32

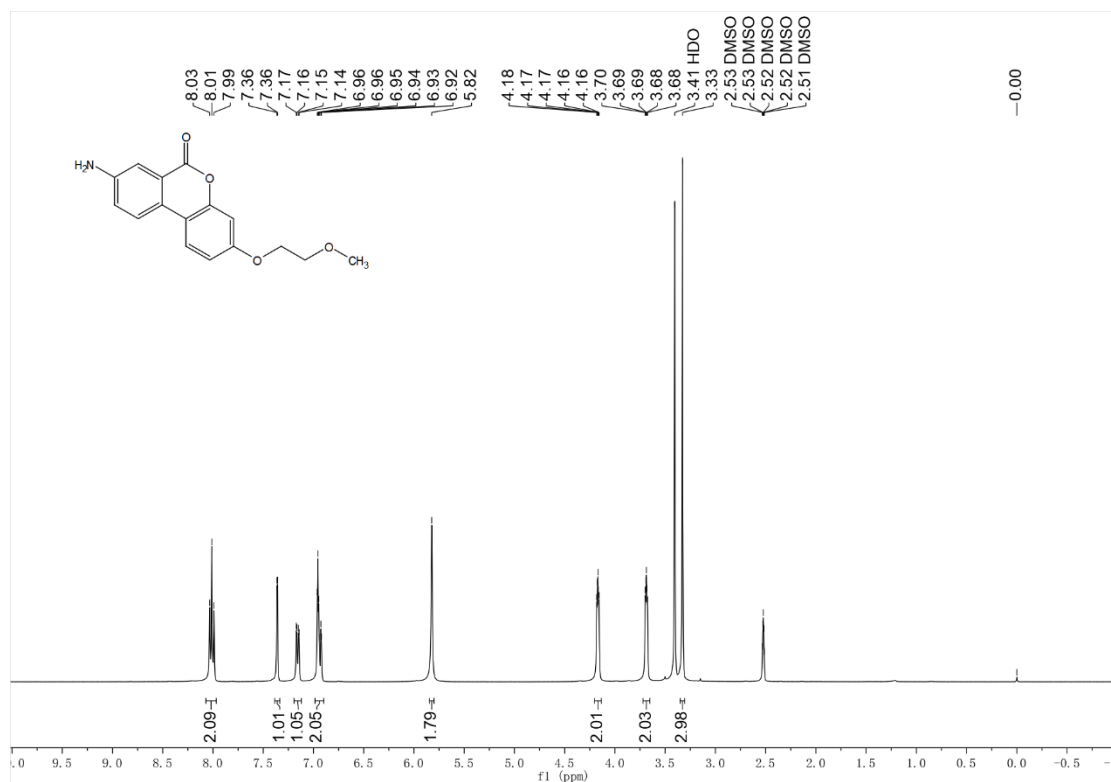


Figure S141. ¹H-NMR of E33

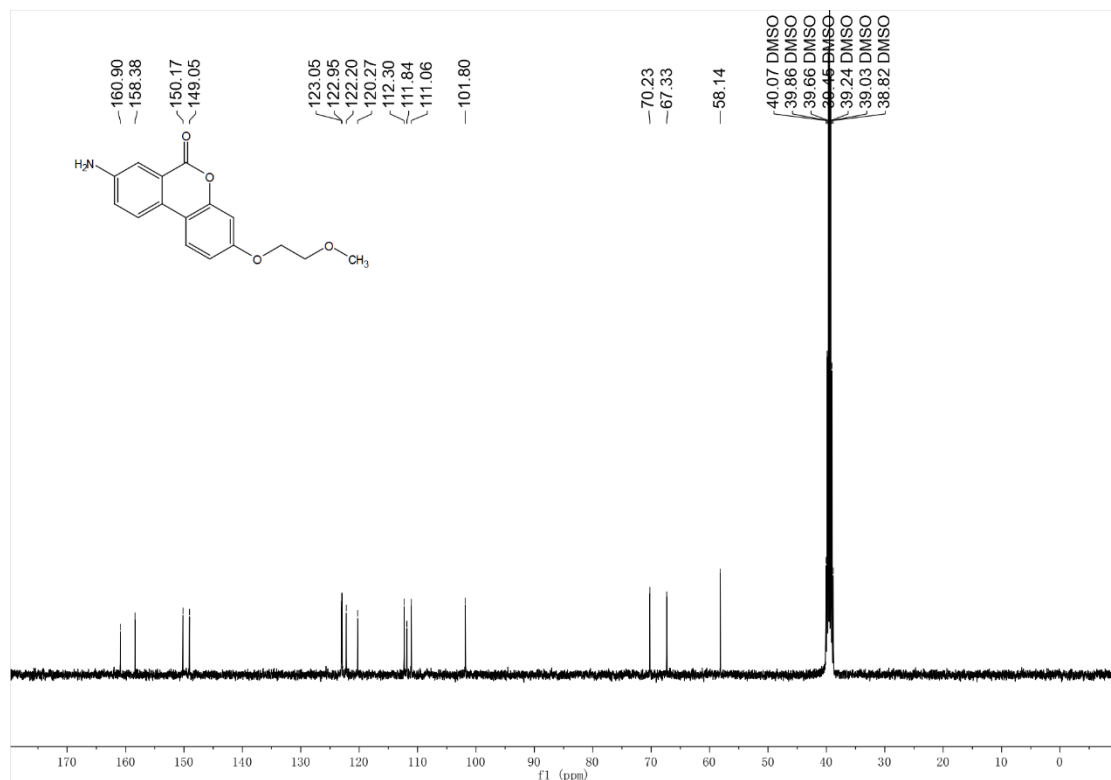


Figure S142. ¹³C-NMR of E33

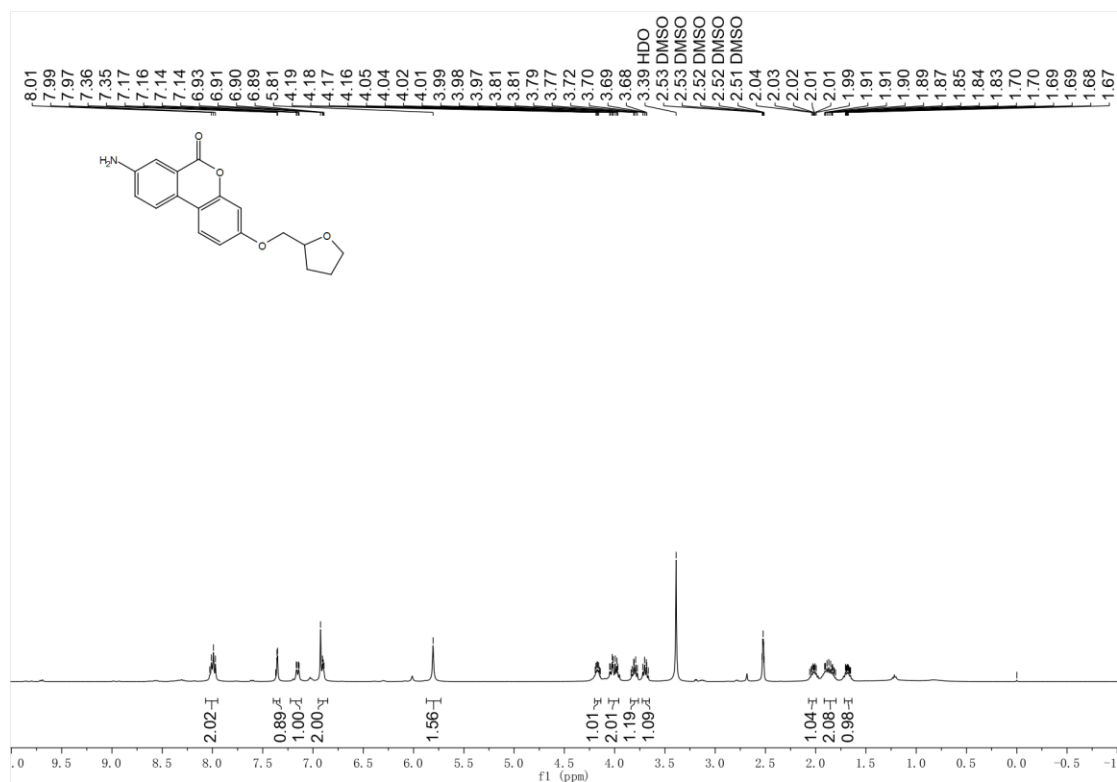


Figure S143. ¹H-NMR of E343

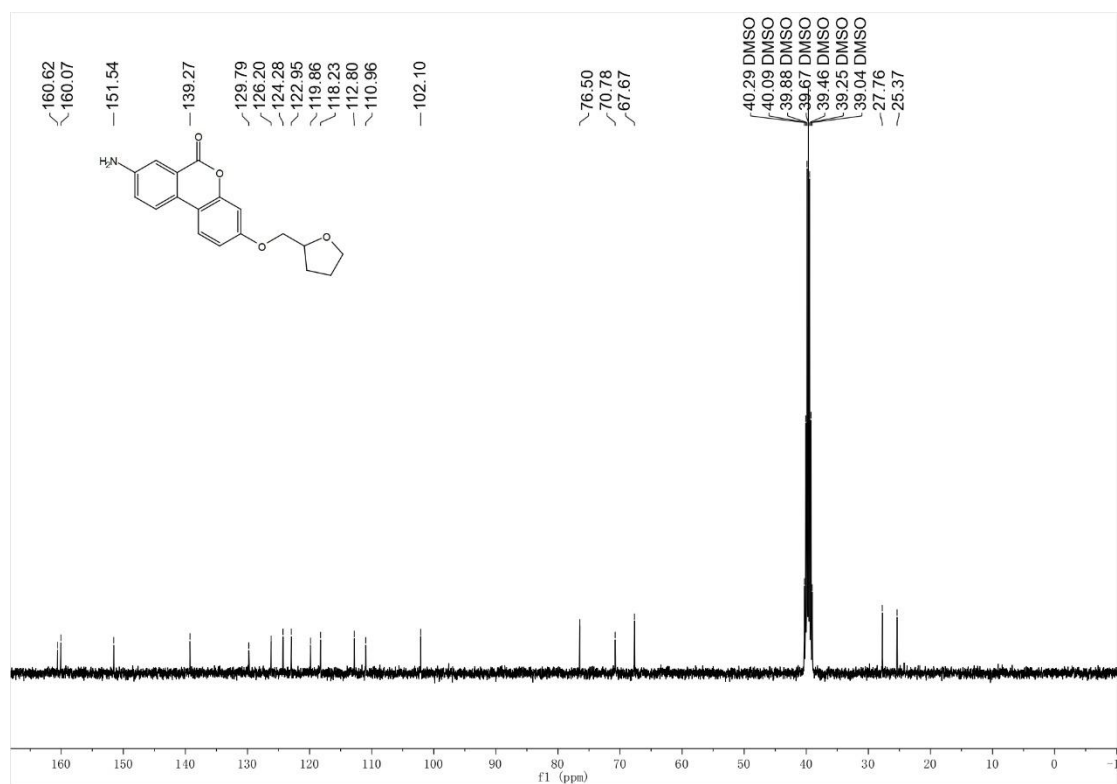


Figure S144. ¹³C-NMR of E34

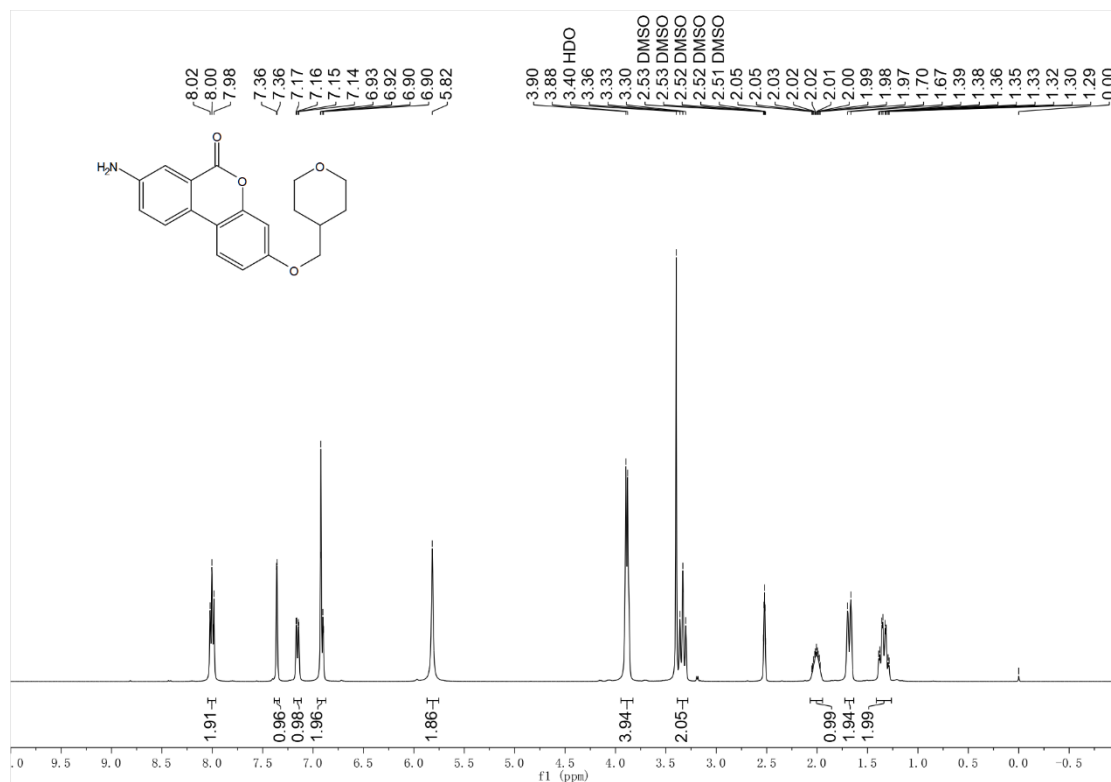


Figure S145. ¹H-NMR of E35

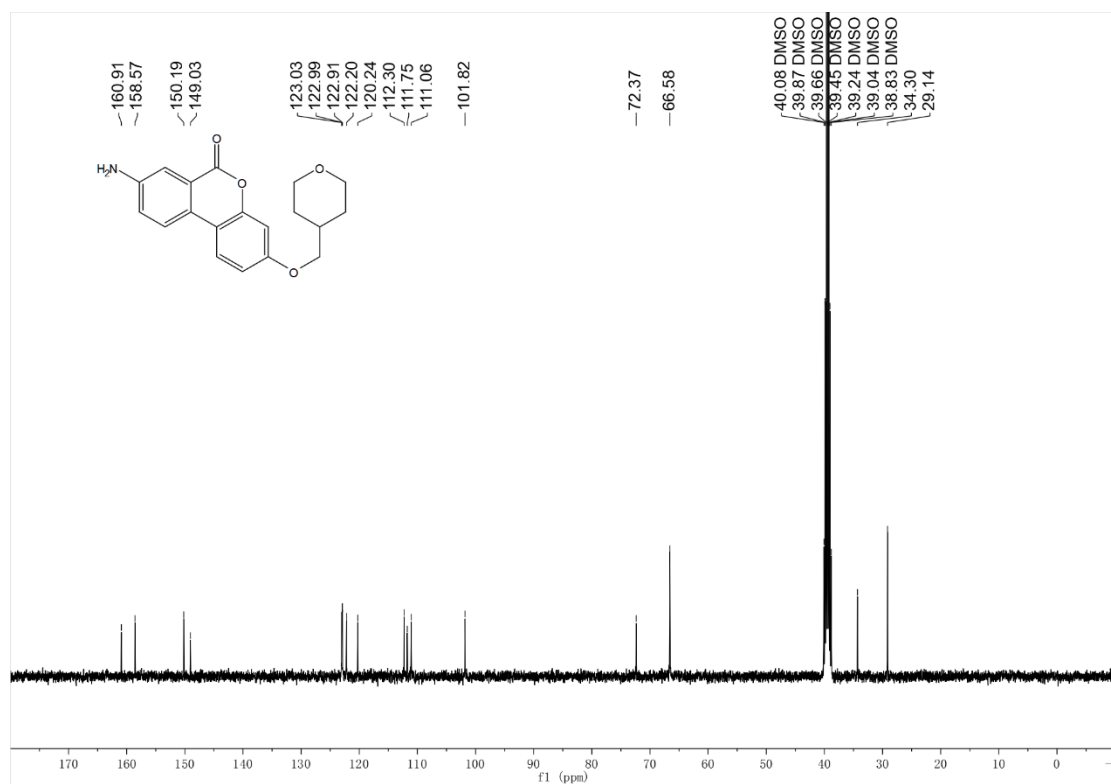


Figure S146. ¹³C-NMR of E35

1. Appearance, Yield, Melting point, ^1H and ^{13}C NMR data

2-bromo-5-acetaminobenzoic acid monohydrate: white solid, Yield: 92 %, m.p.178.6-181.3 °C. ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.21 (s, 1H), 8.03 (dd, J = 2.2, 0.9 Hz, 1H), 7.67 – 7.57 (m, 2H), 2.05 (s, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 169.23, 167.59, 139.21, 134.59, 134.01, 123.06, 121.16, 113.20, 24.50.

D: white solid, Yield: 76 %, m.p.234.8-236.9 °C. ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.34 (s, 1H), 10.28 (s, 1H), 8.51 (s, 1H), 8.21 (d, J = 8.6 Hz, 1H), 8.11 – 8.04 (m, 1H), 8.00 (d, J = 8.6 Hz, 1H), 6.83 (d, J = 8.2 Hz, 1H), 6.75 (s, 1H), 2.11 (s, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.76, 160.57, 160.44, 151.40, 139.05, 129.60, 125.99, 124.07, 122.71, 119.63, 118.03, 112.22, 110.70, 101.34, 24.06.

D1: white solid, Yield: 69 %, m.p.299.6-300.2 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.34 (s, 1H), 8.49 (d, 1H), 8.19 (d, J = 8.7 Hz, 1H), 8.10 (d, J = 9.4 Hz, 1H), 7.99 (dd, 1H), 6.95 (d, J = 4.5 Hz, 1H), 6.93 (dd, 1H), 3.84 (s, 3H), 2.11 (s, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.73, 160.54, 160.41, 151.37, 139.02, 129.57, 125.96, 124.04, 122.68, 119.60, 118.00, 112.19, 110.67, 101.32, 55.66, 24.03.

D2: white solid, Yield: 67 %, m.p.262.4-263.6 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.35 (s, 1H), 8.49 (d, J = 2.3 Hz, 1H), 8.20 (d, J = 8.8 Hz, 1H), 8.09 (d, J = 8.8 Hz, 1H), 7.99 (dd, J = 8.8, 2.3 Hz, 1H), 6.93 (d, J = 2.5 Hz, 1H), 6.91 (dd, 1H), 4.09 (q, J = 6.9 Hz, 2H), 2.11 (s, 3H), 1.36 (t, J = 6.9 Hz, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.73, 160.43, 159.81, 151.35, 138.99, 129.61, 125.96, 124.03, 122.67, 119.59, 118.00, 112.48, 110.55, 101.69, 63.69, 24.03, 14.45.

D3: white solid, Yield: 70 %, 256.2-257.6 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.34 (s, 1H), 8.49 (d, J = 2.3 Hz, 1H), 8.20 (d, J = 8.7 Hz, 1H), 8.09 (d, J = 8.5 Hz, 1H), 8.00 (dd, J = 8.8, 2.4 Hz, 1H), 6.93 (d, J = 8.7 Hz, 2H), 3.99 (t, J = 6.5 Hz, 2H), 2.11 (s, 3H), 1.75 (h, J = 7.1 Hz, 2H), 1.00 (t, J = 7.4 Hz, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.73, 160.44, 159.98, 151.37, 139.00, 129.63, 126.00, 124.04, 122.68, 119.60, 118.04, 112.53, 110.57, 101.75, 69.48, 24.03, 21.87, 10.31.

D4: white solid, Yield: 77 %, m.p.232.0-233.8 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.34 (s, 1H), 8.50 (d, J = 2.3 Hz, 1H), 8.20 (d, J = 8.7 Hz, 1H), 8.10 (d, J = 9.2 Hz, 1H), 8.00 (dd, J = 8.8, 2.3 Hz, 1H), 6.94 (d, J = 2.6 Hz, 1H), 6.91 (dd, J = 1.9, 1.2 Hz, 1H), 4.02 (t, J = 6.5 Hz, 2H), 2.11 (s, 3H), 1.71 (m, J = 6.7 Hz, 2H), 1.44 (m, J = 7.4 Hz, 2H), 0.95 (t, J = 7.4 Hz, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.72, 160.43, 159.99, 151.36, 139.00, 129.63, 125.99, 124.03, 122.67, 119.59, 118.03, 112.53,

110.56, 101.74, 67.73, 30.56, 24.02, 18.67, 13.66.

D5: white solid, Yield: 68 %, m.p.222.6-224.2 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.35 (s, 1H), 8.50 (d, J = 2.3 Hz, 1H), 8.21 (d, J = 8.8 Hz, 1H), 8.10 (d, J = 8.8 Hz, 1H), 8.00 (dd, J = 8.8, 2.4 Hz, 1H), 6.93 (d, J = 7.6 Hz, 2H), 4.01 (t, J = 6.5 Hz, 2H), 2.11 (s, 3H), 1.73 (p, J = 6.6 Hz, 2H), 1.46 – 1.28 (m, 4H), 0.90 (t, J = 6.9 Hz, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.70, 160.43, 159.99, 151.37, 139.01, 129.63, 125.98, 124.03, 122.68, 119.60, 118.03, 112.53, 110.56, 101.74, 68.01, 28.21, 27.63, 24.03, 21.88, 13.89.

D6: pink solid, Yield: 84 %, m.p.216.0-217.7 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.34 (s, 1H), 8.50 (d, J = 2.0 Hz, 1H), 8.21 (d, J = 8.7 Hz, 1H), 8.10 (d, J = 8.7 Hz, 1H), 8.01 (dd, J = 6.9, 1.6 Hz, 1H), 6.94 (d, J = 2.5 Hz, 1H), 6.91 (dd, J = 2.1, 1.1 Hz, 1H), 4.01 (t, J = 6.5 Hz, 2H), 2.11 (s, 3H), 1.71 (p, J = 6.7 Hz, 2H), 1.41 (p, J = 6.8 Hz, 2H), 1.31 (dd, J = 7.3, 3.6 Hz, 4H), 0.92 – 0.84 (m, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.70, 160.44, 159.98, 151.37, 139.02, 129.63, 125.98, 124.03, 122.68, 119.60, 118.03, 112.53, 110.56, 101.73, 68.03, 30.99, 28.48, 25.13, 24.03, 22.07, 13.90.

D7: white solid, Yield: 78 %, m.p.247.6-250.0 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.36 (s, 1H), 8.52 (d, J = 2.3 Hz, 1H), 8.23 (d, J = 8.8 Hz, 1H), 8.12 (d, J = 8.6 Hz, 1H), 8.01 (dd, J = 8.8, 2.4 Hz, 1H), 6.96 (d, J = 2.4 Hz, 1H), 6.94 (dd, J = 8.5, 2.6 Hz, 1H), 4.75 (m, J = 6.0 Hz, 1H), 2.12 (s, 3H), 1.31 (d, J = 5.9 Hz, 6H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.73, 160.47, 158.80, 151.46, 138.99, 129.66, 126.01, 124.14, 122.69, 119.61, 118.04, 113.33, 110.46, 102.72, 69.83, 24.04, 21.64.

D8: white solid, Yield: 76 %, m.p.237.6-240.2 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.35 (s, 1H), 8.51 (d, J = 2.3 Hz, 1H), 8.22 (d, J = 8.8 Hz, 1H), 8.11 (d, J = 8.5 Hz, 1H), 8.01 (dd, J = 8.8, 2.4 Hz, 1H), 6.97 (d, J = 2.5 Hz, 1H), 6.94 – 6.87 (m, 1H), 3.83 (d, J = 6.5 Hz, 2H), 2.11 (s, 3H), 2.04 (dt, J = 13.3, 6.6 Hz, 1H), 1.00 (d, J = 6.7 Hz, 6H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.72, 160.45, 160.06, 151.37, 139.02, 129.63, 125.99, 124.06, 122.71, 119.61, 118.02, 112.57, 110.59, 101.81, 74.14, 27.59, 24.04, 18.96.

D9: white solid, Yield: 81 %, m.p.208.4-210.2 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.36 (s, 1H), 8.52 (d, J = 2.2 Hz, 1H), 8.23 (d, J = 8.7 Hz, 1H), 8.13 (d, J = 8.6 Hz, 1H), 8.02 (dd, J = 8.5, 2.5 Hz, 1H), 6.97 (d, J = 1.9 Hz, 1H), 6.94 (dd, J = 2.4, 0.8 Hz, 1H), 4.54 (h, J = 5.9 Hz, 1H), 2.12 (s, 3H), 1.66 (dh, J = 27.7, 6.9 Hz, 2H), 1.27 (d, J = 5.9 Hz, 3H), 0.95 (t, J = 7.4 Hz, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm)

169.19, 160.94, 159.63, 151.96, 139.49, 130.15, 126.51, 124.62, 123.15, 120.10, 118.56, 113.83, 110.97, 103.25, 75.18, 28.88, 24.51, 19.35, 9.91.

D10: white solid, Yield: 82 %, m.p. 210.0-212.4 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.35 (s, 1H), 8.50 (d, $J = 2.2$ Hz, 1H), 8.20 (d, $J = 8.8$ Hz, 1H), 8.10 (d, $J = 9.3$ Hz, 1H), 8.00 (dd, $J = 8.8, 2.4$ Hz, 1H), 6.94 (d, $J = 0.9$ Hz, 1H), 6.92 (dd, $J = 2.6, 0.5$ Hz, 1H), 4.05 (t, $J = 6.7$ Hz, 2H), 2.10 (s, 3H), 1.84 – 1.71 (m, $J = 6.7$ Hz, 1H), 1.62 (q, $J = 6.7$ Hz, 2H), 0.94 (d, $J = 6.6$ Hz, 6H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.72, 160.44, 159.97, 151.36, 139.00, 129.63, 125.97, 124.02, 122.68, 119.59, 118.01, 112.57, 110.55, 101.74, 66.50, 37.21, 24.54, 24.03, 22.38.

D11: white solid, Yield: 81 %, m.p. 206.9-209.2 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.36 (s, 1H), 8.51 (d, $J = 4.0$ Hz, 1H), 8.22 (d, $J = 8.7$ Hz, 1H), 8.11 (d, $J = 8.4$ Hz, 1H), 8.01 (dd, $J = 4.7, 1.1$ Hz, 1H), 6.94 (d, $J = 11.1$ Hz, 2H), 4.58 (dt, $J = 6.9, 3.2$ Hz, 1H), 2.10 (s, 3H), 1.70 – 1.61 (m, 1H), 1.57 – 1.49 (m, 1H), 1.44 – 1.32 (m, 2H), 1.29 – 1.21 (m, 3H), 0.90 (t, $J = 7.0$ Hz, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.69, 160.44, 159.15, 151.47, 138.98, 129.67, 126.04, 124.16, 122.69, 119.61, 118.06, 113.33, 110.47, 102.70, 73.34, 37.80, 24.01, 19.35, 18.05, 13.82.

D12: white solid, Yield: 76 %, m.p. 183.5-186.2, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.36 (s, 1H), 8.51 (d, $J = 8.1$ Hz, 1H), 8.22 (d, $J = 8.4$ Hz, 1H), 8.12 (d, $J = 8.5$ Hz, 1H), 8.00 (dd, $J = 11.8, 2.4$ Hz, 1H), 7.06 – 6.68 (m, 2H), 4.37 (s, 1H), 2.10 (dt, $J = 4.8, 2.4$ Hz, 2H), 1.64 (dt, $J = 8.4, 4.9$ Hz, 2H), 1.47 – 1.04 (m, 1H), 0.91 (t, $J = 7.1$ Hz, 6H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.75, 160.48, 159.71, 151.47, 138.98, 129.69, 126.05, 124.18, 122.69, 119.61, 118.07, 113.39, 110.48, 102.79, 79.52, 25.43, 24.02, 9.27.

D13: white solid, Yield: 85 %, m.p. 247.6-249.5 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.35 (s, 1H), 8.49 (d, $J = 2.3$ Hz, 1H), 8.20 (d, $J = 8.7$ Hz, 1H), 8.09 (d, $J = 8.8$ Hz, 1H), 7.99 (dd, $J = 8.6, 2.3$ Hz, 1H), 6.93 (dd, $J = 8.6, 2.6$ Hz, 1H), 6.90 (d, $J = 2.5$ Hz, 1H), 3.88 (d, $J = 7.0$ Hz, 2H), 2.10 (s, 3H), 1.24 (tq, $J = 12.7, 7.3, 6.1$ Hz, 1H), 0.60 (q, $J = 5.3$ Hz, 2H), 0.35 (q, $J = 5.3$ Hz, 2H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.73, 160.44, 159.91, 151.33, 138.98, 129.62, 125.97, 124.02, 122.68, 119.57, 118.00, 112.53, 110.52, 101.77, 72.62, 24.03, 9.95, 3.14.

D14: white solid, Yield: 75 %, m.p. 254.2-255.6 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.34 (s, 1H), 8.48 (d, $J = 2.3$ Hz, 1H), 8.18 (d, $J = 8.8$ Hz, 1H), 8.07 (d, $J = 8.6$ Hz, 1H), 7.98 (dd, $J = 8.7, 2.4$ Hz, 1H), 6.92 (d, $J = 2.6$ Hz, 1H), 6.89 (dd, $J = 2.1, 0.5$ Hz, 1H), 3.99 (d, $J = 6.7$ Hz, 2H), 2.72 (hept, $J = 7.3$ Hz, 1H), 2.10 (s, 3H), 2.07 (dt,

$J = 9.2, 4.9$ Hz, 2H), 1.87 (ddd, $J = 32.9, 14.7, 8.3$ Hz, 4H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.71, 160.42, 160.05, 151.31, 138.99, 129.59, 125.94, 123.98, 122.65, 119.56, 117.98, 112.51, 110.55, 101.74, 71.91, 33.77, 24.32, 24.02, 18.08.

D15: white solid, Yield: 80 %, m.p.250.4-251.6 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.35 (s, 1H), 8.49 (d, $J = 2.3$ Hz, 1H), 8.19 (d, $J = 8.8$ Hz, 1H), 8.08 (d, $J = 8.6$ Hz, 1H), 6.96 – 6.71 (m, 2H), 3.89 (d, $J = 6.9$ Hz, 2H), 2.30 (hept, $J = 7.3$ Hz, 1H), 2.10 (s, 3H), 1.78 (dt, $J = 13.4, 6.4$ Hz, 2H), 1.67 – 1.46 (m, 4H), 1.33 (dq, $J = 13.3, 6.8$ Hz, 2H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.72, 160.44, 160.08, 151.34, 138.99, 129.62, 125.97, 124.00, 122.67, 119.57, 118.01, 112.54, 110.54, 101.74, 72.07, 38.36, 28.93, 24.91, 24.02.

D16: white solid, Yield: 72 %, m.p.268.3-269.6 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.34 (s, 1H), 8.50 (d, $J = 2.4$ Hz, 1H), 8.21 (d, $J = 8.7$ Hz, 1H), 8.10 (d, $J = 8.6$ Hz, 1H), 8.01 (dd, $J = 8.5, 0.7$ Hz, 1H), 6.94 (d, $J = 2.1$ Hz, 1H), 6.91 (dd, $J = 3.5, 0.8$ Hz, 1H), 3.83 (d, $J = 6.2$ Hz, 2H), 2.11 (s, 3H), 1.81 (d, $J = 12.9$ Hz, 2H), 1.69 (dd, $J = 24.9, 11.7$ Hz, 4H), 1.21 (dp, $J = 24.5, 12.7$ Hz, 4H), 1.04 (q, $J = 11.7$ Hz, 2H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.70, 160.44, 160.10, 151.36, 139.01, 129.64, 125.98, 124.03, 122.69, 119.59, 118.02, 112.53, 110.55, 101.77, 73.14, 36.92, 29.14, 25.99, 25.21, 24.04.

D17: white solid, Yield: 80 %, m.p.294.9-296.7 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.36 (s, 1H), 8.51 (d, $J = 2.3$ Hz, 1H), 8.23 (d, $J = 8.7$ Hz, 1H), 8.14 (d, $J = 8.6$ Hz, 1H), 8.01 (dd, $J = 8.7, 2.3$ Hz, 1H), 7.49 (d, $J = 7.4$ Hz, 2H), 7.42 (t, $J = 7.4$ Hz, 2H), 7.36 (t, $J = 7.2$ Hz, 1H), 7.06 (dd, $J = 2.8, 0.7$ Hz, 1H), 7.03 (d, $J = 2.6$ Hz, 1H), 5.20 (s, 2H), 2.11 (s, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.77, 160.41, 159.57, 151.31, 139.09, 136.46, 129.56, 128.50, 128.03, 127.86, 126.01, 124.14, 122.77, 119.69, 118.04, 112.87, 110.92, 102.31, 69.69, 24.04.

D18: white solid, Yield: 73 %, m.p.301.8-303.9 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.38 (s, 1H), 8.53 (d, $J = 2.5$ Hz, 1H), 8.27 (d, $J = 8.6$ Hz, 1H), 8.18 (d, $J = 8.7$ Hz, 1H), 8.02 (dd, $J = 8.7, 2.4$ Hz, 1H), 7.61 (t, $J = 7.8$ Hz, 1H), 7.46 (q, $J = 7.1$ Hz, 1H), 7.28 (q, $J = 8.6, 7.3$ Hz, 2H), 7.13 (d, $J = 2.6$ Hz, 1H), 7.07 (dd, $J = 8.7, 2.7$ Hz, 1H), 5.25 (s, 2H), 2.11 (s, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.79, 161.72, 160.42, 159.34(d, $J = 16.16$ Hz), 151.35, 139.16, 130.97(d, $J = 4.04$ Hz), 129.54, 126.03, 124.61, 124.23, 123.24(d, $J = 14.14$ Hz), 122.86, 119.77, 118.06, 115.47(d, $J = 20.2$ Hz), 112.75, 111.14, 102.28, 64.08, 24.05.

D19: white solid, Yield: 79 %, m.p.290.5-294.6 °C, ^1H NMR (400 MHz, DMSO-

d_6) δ (ppm) 10.37 (s, 1H), 8.52 (s, 1H), 8.24 (d, $J = 8.8$ Hz, 1H), 8.16 (d, $J = 8.7$ Hz, 1H), 8.01 (d, $J = 8.7$ Hz, 1H), 7.47 (q, $J = 7.2$ Hz, 1H), 7.33 (d, $J = 8.7$ Hz, 2H), 7.18 (d, $J = 8.6$ Hz, 1H), 7.06 (d, $J = 9.3$ Hz, 2H), 5.23 (s, 2H), 2.11 (s, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.76, 163.40, 160.39, 159.32, 151.31, 139.42(d, $J = 7.07\text{Hz}$), 139.15, 130.55(d, $J = 8.08\text{Hz}$), 129.52, 126.00, 124.20, 123.67(d, $J = 2.02\text{Hz}$), 122.83, 119.75, 118.04, 114.76(d, $J = 21.21\text{Hz}$), 114.37(d, $J = 22.22\text{Hz}$), 112.85, 111.10, 102.38, 68.78, 24.05.

D20: white solid, Yield: 80 %, m.p.291.6-293.4 °C , ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.33 (s, 1H), 8.50 (d, $J = 2.2$ Hz, 1H), 8.22 (d, $J = 8.7$ Hz, 1H), 8.13 (d, $J = 8.7$ Hz, 1H), 8.00 (dd, $J = 8.7, 2.3$ Hz, 1H), 7.57 – 7.49 (m, 2H), 7.23 (t, $J = 8.8$ Hz, 2H), 7.07 – 6.98 (m, 2H), 5.17 (s, 2H), 2.09 (s, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.76, 160.43, 159.62, 151.33, 139.10, 137.30, 133.42, 129.60, 129.04, 127.97, 126.03, 124.13, 122.81, 119.70, 118.05, 112.94, 110.87, 102.33, 69.61, 24.05, 20.77.

D21: yellow solid, Yield: 79 %, m.p.293.7-296.4 °C , ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.37 (s, 1H), 8.51 (d, $J = 2.3$ Hz, 1H), 8.23 (d, $J = 8.8$ Hz, 1H), 8.14 (d, $J = 8.6$ Hz, 1H), 8.01 (dd, $J = 8.7, 2.3$ Hz, 1H), 7.28 (dt, $J = 9.1, 4.7$ Hz, 3H), 7.16 (d, $J = 7.1$ Hz, 1H), 7.03 (d, $J = 8.7$ Hz, 2H), 5.15 (s, 2H), 2.33 (s, 3H), 2.11 (s, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 169.24, 160.91, 160.13, 151.83, 139.60, 138.16, 136.87, 130.08, 129.14, 128.88, 126.53, 125.43, 124.65, 123.30, 120.21, 118.56, 113.39, 111.41, 102.81, 70.24, 24.53, 21.46.

D22: white solid, Yield: 69 %, m.p.291.7-294.2 °C , ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.37 (s, 1H), 8.51 (d, $J = 2.3$ Hz, 1H), 8.22 (d, $J = 8.8$ Hz, 1H), 8.13 (d, $J = 8.6$ Hz, 1H), 8.00 (dd, $J = 8.7, 2.3$ Hz, 1H), 7.37 (d, $J = 7.6$ Hz, 2H), 7.21 (d, $J = 7.6$ Hz, 2H), 7.02 (d, $J = 8.9$ Hz, 2H), 5.14 (s, 2H), 3.46 (s, 27H), 2.31 (s, 3H), 2.11 (s, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 169.23, 160.90, 160.09, 151.79, 139.57, 137.77, 133.90, 130.06, 129.51, 128.43, 126.49, 124.59, 123.25, 120.17, 118.53, 113.39, 111.35, 102.79, 70.09, 24.53, 21.25.

D23: white solid, Yield: 73 %, m.p.291.4-294.6 °C , ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 10.37 (s, 1H), 8.52 (d, $J = 2.4$ Hz, 1H), 8.25 (d, $J = 8.8$ Hz, 1H), 8.17 (d, $J = 8.8$ Hz, 1H), 8.02 (dd, $J = 8.5, 1.8$ Hz, 1H), 7.68 – 7.61 (m, 1H), 7.58 – 7.51 (m, 1H), 7.46 – 7.38 (m, 2H), 7.11 (d, $J = 2.4$ Hz, 1H), 7.07 (dd, $J = 8.7, 2.5$ Hz, 1H), 5.26 (s, 2H), 2.11 (s, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 168.75, 160.39, 159.40, 151.34, 139.18, 133.75, 132.84, 130.44, 130.13, 129.51, 129.47, 127.42, 126.01, 124.24, 122.84, 119.78, 118.06, 112.71, 111.22, 102.34, 67.41, 24.06.

D24: white solid, Yield: 72 %, m.p.290.2-293.5 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 10.36 (s, 1H), 8.51 (d, *J* = 2.3 Hz, 1H), 8.24 (d, *J* = 8.8 Hz, 1H), 8.15 (d, *J* = 8.6 Hz, 1H), 8.02 (dd, *J* = 8.8, 2.3 Hz, 1H), 7.56 (d, *J* = 2.1 Hz, 1H), 7.49 – 7.38 (m, 3H), 7.05 (d, *J* = 8.3 Hz, 2H), 5.22 (s, 2H), 2.11 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 168.74, 160.38, 159.29, 151.31, 139.16, 139.07, 133.15, 130.42, 129.50, 127.92, 127.43, 126.31, 125.98, 124.19, 122.81, 119.75, 118.04, 112.83, 111.12, 102.37, 68.70, 24.05.

D25: white solid, Yield: 64 %, m.p.326.3-328.1 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 10.35 (s, 1H), 8.51 (d, *J* = 2.6 Hz, 1H), 8.22 (d, *J* = 8.3 Hz, 1H), 8.13 (d, *J* = 8.6 Hz, 1H), 8.01 (dd, *J* = 7.7, 1.1 Hz, 1H), 7.49 (q, *J* = 8.2 Hz, 4H), 7.03 (d, *J* = 11.2 Hz, 2H), 5.20 (s, 2H), 2.11 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 169.24, 160.88, 159.88, 151.81, 139.64, 136.03, 133.08, 130.12, 130.02, 128.98, 126.53, 124.68, 123.31, 120.24, 118.59, 113.39, 111.57, 102.94, 69.32, 24.53.

D26: brown solid, Yield: 77 %, m.p.245.9-247.2 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 10.37 (s, 1H), 8.52 (d, *J* = 2.3 Hz, 1H), 8.26 (d, *J* = 8.8 Hz, 1H), 8.18 (d, *J* = 8.7 Hz, 1H), 8.02 (dd, *J* = 8.8, 2.3 Hz, 1H), 7.87 (d, *J* = 2.1 Hz, 1H), 7.82 (d, *J* = 7.7 Hz, 1H), 7.74 (d, *J* = 7.8 Hz, 1H), 7.67 (t, *J* = 7.7 Hz, 1H), 7.13 – 7.05 (m, 2H), 5.32 (s, 2H), 2.11 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 168.76, 160.39, 159.30, 151.33, 139.18, 138.03, 131.83, 129.65, 129.50, 129.04, 126.00, 125.51, 124.74 (d, *J* = 4.04 Hz), 124.24 (d, *J* = 3.03 Hz), 122.86, 119.78, 118.05, 112.84, 111.18, 102.40, 68.75, 24.05.

D27: white solid, Yield: 74 %, m.p.319.3-322.6 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 10.36 (s, 1H), 8.52 (d, *J* = 3.9 Hz, 1H), 8.24 (d, *J* = 8.7 Hz, 1H), 8.17 (d, *J* = 8.7 Hz, 1H), 8.02 (dd, *J* = 8.0, 1.3 Hz, 1H), 7.79 (d, *J* = 7.8 Hz, 2H), 7.71 (d, *J* = 8.1 Hz, 2H), 7.07 (d, *J* = 10.2 Hz, 2H), 5.33 (s, 2H), 2.11 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 168.75, 160.37, 159.23, 157.83, 154.12, 151.31, 141.39, 139.17, 129.47, 128.26, 128.11, 125.98, 125.38, 124.24, 122.83, 119.76, 118.03, 112.83, 111.17, 102.40, 68.70, 24.04.

D28: white solid, Yield: 83 %, m.p.332.6-335.4 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 10.35 (s, 1H), 8.52 (d, *J* = 2.3 Hz, 1H), 8.25 (d, *J* = 8.8 Hz, 1H), 8.17 (d, *J* = 8.8 Hz, 1H), 8.02 (dd, *J* = 8.8, 2.4 Hz, 1H), 7.62 (d, *J* = 1.9 Hz, 1H), 7.61 (d, *J* = 2.0 Hz, 1H), 7.46 (d, *J* = 2.0 Hz, 1H), 7.44 (d, *J* = 2.0 Hz, 1H), 7.07 (d, *J* = 2.5 Hz, 1H), 7.05 (dd, *J* = 8.7, 2.6 Hz, 1H), 5.20 (s, 2H), 2.10 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 169.25, 160.89, 159.86, 151.82, 139.65, 136.46, 131.91, 130.44,

130.03, 126.53, 124.70, 123.34, 121.63, 120.25, 118.56, 113.40, 111.57, 102.91, 69.34, 24.54.

D29: white solid, Yield: 80 %, m.p.291.9-294.5 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 10.36 (s, 1H), 8.52 (d, *J* = 2.3 Hz, 1H), 8.24 (d, *J* = 8.8 Hz, 1H), 8.15 (d, *J* = 8.7 Hz, 1H), 8.02 (dd, *J* = 8.8, 2.3 Hz, 1H), 7.41 (d, *J* = 1.8 Hz, 4H), 7.04 (dd, *J* = 12.7, 3.9 Hz, 2H), 5.16 (s, 2H), 2.11 (s, 3H), 1.28 (s, 9H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 168.75, 160.43, 159.67, 151.35, 150.50, 139.11, 133.47, 129.60, 127.78, 126.04, 125.23, 124.16, 122.80, 119.71, 118.07, 112.89, 110.89, 102.31, 69.52, 34.29, 31.08, 24.05.

D30: gray solid, Yield: 72 %, m.p.251.0-253.2 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 10.36 (s, 1H), 8.52 (d, *J* = 2.2 Hz, 1H), 8.24 (d, *J* = 8.8 Hz, 1H), 8.14 (d, *J* = 8.8 Hz, 1H), 8.01 (dd, *J* = 8.8, 2.3 Hz, 1H), 7.42 (d, *J* = 8.3 Hz, 2H), 7.07 – 7.00 (m, 2H), 6.97 (d, *J* = 8.2 Hz, 2H), 5.12 (s, 2H), 3.77 (s, 3H), 2.11 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 168.76, 160.44, 159.67, 159.11, 151.33, 139.09, 129.74, 129.61, 128.29, 126.02, 124.11, 122.79, 119.69, 118.06, 113.84, 112.95, 110.82, 102.30, 69.51, 55.07, 24.05.

D31: white solid, Yield: 67 %, m.p.280.0-282.4 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 10.35 (s, 1H), 8.51 (d, *J* = 2.9 Hz, 1H), 8.23 (d, *J* = 8.8 Hz, 1H), 8.15 (d, *J* = 9.5 Hz, 1H), 8.02 (dd, *J* = 8.5, 2.3 Hz, 1H), 7.07 – 7.02 (m, 2H), 6.64 (d, *J* = 2.5 Hz, 2H), 6.49 – 6.44 (m, 1H), 5.14 (s, 2H), 3.76 (s, 6H), 2.11 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 168.75, 160.55, 160.41, 159.48, 151.31, 139.12, 138.83, 129.55, 125.99, 124.14, 122.79, 119.73, 118.04, 112.88, 110.98, 105.51, 102.36, 99.49, 69.52, 55.17, 24.05.

D32: white solid, Yield: 73 %, m.p.235.8-238.6 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 10.34 (s, 1H), 8.49 (d, *J* = 2.1 Hz, 1H), 8.19 (d, *J* = 8.7 Hz, 1H), 8.09 (d, *J* = 8.8 Hz, 1H), 8.00 (dd, *J* = 8.8, 1.8 Hz, 1H), 6.98 – 6.91 (m, 2H), 4.22 (t, *J* = 6.6 Hz, 2H), 2.88 (t, *J* = 6.6 Hz, 2H), 2.19 (s, 3H), 2.12 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 168.70, 160.38, 159.45, 151.30, 139.06, 129.51, 125.92, 124.06, 122.69, 119.64, 117.99, 112.50, 110.83, 101.90, 67.41, 32.00, 24.04, 15.21.

D33: white solid, Yield: 76 %, m.p.230.6-234.2 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 10.34 (s, 1H), 8.50 (d, *J* = 3.3 Hz, 1H), 8.20 (d, *J* = 8.8 Hz, 1H), 8.10 (d, *J* = 9.1 Hz, 1H), 8.00 (dd, *J* = 7.9, 3.3 Hz, 1H), 6.98 – 6.92 (m, 2H), 4.18 (t, *J* = 4.3 Hz, 2H), 3.72 – 3.67 (m, 2H), 3.34 (s, 3H), 2.11 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 168.73, 160.42, 159.73, 151.34, 139.03, 129.57, 125.95, 124.06,

122.69, 119.64, 118.01, 112.54, 110.74, 101.82, 70.17, 67.44, 58.15, 24.04.

D34: white solid, Yield: 77 %, m.p.233.6-235.8 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 10.35 (s, 1H), 8.51 (d, *J* = 2.3 Hz, 1H), 8.23 (d, *J* = 8.8 Hz, 1H), 8.13 (d, *J* = 9.1 Hz, 1H), 8.01 (dd, *J* = 8.9, 2.3 Hz, 1H), 7.00 – 6.93 (m, 2H), 4.17 (td, *J* = 6.8, 3.5 Hz, 1H), 4.06 (dd, *J* = 10.3, 3.7 Hz, 1H), 4.00 (dd, *J* = 10.3, 6.5 Hz, 1H), 3.80 (q, *J* = 7.2 Hz, 1H), 3.70 (q, *J* = 7.2 Hz, 1H), 2.11 (s, 3H), 2.06 – 1.97 (m, 1H), 1.87 (qt, *J* = 12.3, 6.5 Hz, 2H), 1.68 (dq, *J* = 14.7, 7.3 Hz, 1H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 169.21, 160.91, 160.36, 151.83, 139.55, 130.08, 126.48, 124.57, 123.24, 120.15, 118.52, 113.09, 111.25, 102.39, 76.79, 71.07, 67.96, 28.05, 25.66, 24.53.

D35: white solid, Yield:76 %, m.p.279.6-282.3 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 10.34 (s, 1H), 8.50 (d, *J* = 3.1 Hz, 1H), 8.22 (d, *J* = 8.7 Hz, 1H), 8.11 (d, *J* = 8.9 Hz, 1H), 8.01 (dd, *J* = 8.1, 1.9 Hz, 1H), 6.97 – 6.91 (m, 2H), 3.93 – 3.86 (m, 4H), 3.32 (d, *J* = 11.8 Hz, 2H), 2.11 (s, 3H), 2.01 (dt, *J* = 12.0, 6.2 Hz, 1H), 1.68 (d, *J* = 12.9 Hz, 2H), 1.34 (qd, *J* = 12.3, 4.3 Hz, 2H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 168.71, 160.42, 159.94, 151.36, 139.04, 129.61, 125.98, 124.06, 122.72, 119.63, 118.03, 112.54, 110.67, 101.83, 72.44, 66.57, 34.28, 29.12, 24.04.

E: yellow solid, Yield: 36 %, m.p.293.3-294.7 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 10.04 (s, 1H), 7.95 (dd, *J* = 8.7, 4.1 Hz, 2H), 7.35 (d, *J* = 2.5 Hz, 1H), 7.15 (dd, *J* = 8.6, 2.6 Hz, 1H), 6.79 (dd, *J* = 8.7, 2.5 Hz, 1H), 6.72 (d, *J* = 2.4 Hz, 1H), 5.78 (s, 1H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 161.51, 158.12, 150.78, 149.10, 124.00, 123.47, 123.20, 122.80, 120.45, 113.29, 111.60, 110.97, 103.26.

E1: yellow solid, Yield: 52 %, m.p.246.6-248.6 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.02 (dd, *J* = 13.9, 8.6 Hz, 2H), 7.34 (d, *J* = 2.5 Hz, 1H), 7.14 (dd, *J* = 8.6, 2.6 Hz, 1H), 6.96 – 6.89 (m, 2H), 5.81 (s, 2H), 3.83 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 160.91, 159.21, 150.23, 149.05, 123.07, 122.97, 122.21, 120.25, 111.98, 111.79, 111.05, 101.31, 55.59.

E2: yellow solid, Yield: 56 %, m.p.207.4-208.9 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 7.99 (dd, *J* = 8.6, 6.3 Hz, 2H), 7.35 (d, *J* = 2.6 Hz, 1H), 7.15 (dd, *J* = 8.8, 2.5 Hz, 1H), 6.93 – 6.86 (m, 2H), 5.81 (s, 2H), 4.08 (q, *J* = 6.9 Hz, 2H), 1.35 (t, *J* = 6.9 Hz, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 160.93, 158.44, 150.19, 149.00, 123.01, 122.90, 122.21, 120.22, 112.24, 111.64, 111.05, 101.67, 63.54, 14.50.

E3: yellow solid, Yield: 54 %, m.p.196.7-198.8 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.01 (t, *J* = 9.0 Hz, 2H), 7.35 (d, *J* = 2.9 Hz, 1H), 7.14 (dd, *J* = 8.6, 2.6 Hz, 1H), 6.96 – 6.88 (m, 2H), 5.81 (s, 2H), 3.99 (t, *J* = 6.5 Hz, 2H), 1.75 (h, *J* = 7.1 Hz,

2H), 1.00 (t, $J = 7.4$ Hz, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 160.92, 158.61, 150.21, 148.94, 123.06, 123.01, 122.90, 122.24, 120.22, 112.27, 111.65, 111.10, 101.73, 69.35, 21.91, 10.35.

E4: yellow solid, Yield: 52 %, m.p.173.0-175.4 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 8.04 (d, $J = 8.7$ Hz, 2H), 7.42 (d, $J = 2.4$ Hz, 1H), 7.21 (dd, $J = 8.6, 2.5$ Hz, 1H), 6.97 – 6.88 (m, 2H), 4.04 (t, $J = 6.5$ Hz, 2H), 1.72 (p, $J = 6.7$ Hz, 2H), 1.52 – 1.38 (m, 2H), 0.95 (t, $J = 7.4$ Hz, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 160.77, 158.94, 150.46, 146.59, 124.59, 123.30, 123.17, 123.12, 120.21, 112.82, 112.36, 111.40, 101.75, 67.64, 30.59, 18.70, 13.67.

E5: yellow solid, Yield: 48 %, m.p.163.6-165.2 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 8.01 (dd, $J = 8.8, 5.3$ Hz, 2H), 7.37 (d, $J = 2.5$ Hz, 1H), 7.17 (dd, $J = 8.6, 2.5$ Hz, 1H), 6.95 – 6.86 (m, 2H), 5.85 (s, 2H), 4.01 (t, $J = 6.5$ Hz, 2H), 1.72 (p, $J = 6.8$ Hz, 2H), 1.37 (ddt, $J = 20.1, 13.9, 7.2$ Hz, 4H), 0.90 (t, $J = 6.9$ Hz, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 160.90, 158.64, 150.23, 148.74, 123.20, 123.01, 122.92, 122.33, 120.23, 112.29, 111.63, 111.26, 101.72, 67.89, 28.25, 27.66, 21.88, 13.90.

E6: yellow solid, Yield: 46 %, m.p.160.0-162.5 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 8.00 (dd, $J = 7.9$ Hz, 2H), 7.36 (d, $J = 2.4$ Hz, 1H), 7.16 (dd, $J = 8.6, 2.5$ Hz, 1H), 6.95 – 6.87 (m, 2H), 5.81 (s, 2H), 4.01 (t, $J = 6.5$ Hz, 2H), 1.71 (p, $J = 6.8$ Hz, 2H), 1.41 (p, $J = 7.2$ Hz, 2H), 1.34 – 1.25 (m, 4H), 0.92 – 0.84 (m, 3H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 160.93, 158.61, 150.21, 148.98, 123.04, 123.00, 122.89, 122.22, 120.22, 112.28, 111.65, 111.08, 101.72, 67.90, 30.99, 28.52, 25.16, 22.07, 13.90.

E7: yellow solid, Yield: 52 %, m.p.196.1-198.0 °C, ^1H NMR (400 MHz, Chloroform- d) δ (ppm) 7.78 (dd, $J = 8.6, 1.1$ Hz, 2H), 7.57 (d, $J = 2.5$ Hz, 1H), 7.11 (dd, $J = 8.5, 1.5$ Hz, 1H), 6.87 – 6.79 (m, 2H), 4.58 (hept, $J = 6.0$ Hz, 1H), 4.05 (s, 2H), 1.37 (d, $J = 6.3$ Hz, 6H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 161.37, 157.97, 150.85, 148.60, 124.08, 123.55, 123.10, 120.71, 113.64, 112.19, 111.96, 103.28, 70.17, 22.16.

E8: yellow solid, Yield: 54 %, m.p.180.6-182.6 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 8.27 (d, $J = 8.6$ Hz, 1H), 8.15 (d, $J = 9.4$ Hz, 1H), 7.89 (d, $J = 2.3$ Hz, 1H), 7.62 (dd, $J = 8.6, 2.4$ Hz, 1H), 7.02 – 6.95 (m, 2H), 5.77 (s, 2H), 3.85 (d, $J = 6.6$ Hz, 2H), 2.06 (dq, $J = 13.2, 6.6$ Hz, 1H), 1.01 (d, $J = 6.7$ Hz, 6H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 160.23, 160.18, 151.40, 127.22, 124.17, 123.53, 120.16, 119.09, 112.68, 110.55, 101.91, 74.20, 54.91, 27.60, 18.97.

E9: yellow solid, Yield: 50 %, m.p.153.4-157.3 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.00 (dd, *J* = 8.7, 6.3 Hz, 2H), 7.36 (d, *J* = 2.5 Hz, 1H), 7.16 (dd, *J* = 8.6, 2.5 Hz, 1H), 6.95 – 6.87 (m, 2H), 5.81 (s, 2H), 4.49 (h, *J* = 6.1 Hz, 1H), 1.76 – 1.52 (m, 2H), 1.26 (d, *J* = 6.0 Hz, 3H), 0.94 (t, *J* = 7.4 Hz, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 160.94, 157.71, 150.27, 148.98, 123.04, 123.00, 122.22, 120.23, 113.17, 111.59, 111.07, 102.82, 74.57, 28.43, 18.92, 9.48.

E10: yellow solid, Yield: 45 %, m.p.160.0-163.2 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.17 (d, *J* = 8.7 Hz, 1H), 8.10 (d, *J* = 8.7 Hz, 1H), 7.70 (d, *J* = 2.4 Hz, 1H), 7.46 (dd, *J* = 8.6, 2.4 Hz, 1H), 7.00 – 6.91 (m, 2H), 4.08 (t, *J* = 6.7 Hz, 2H), 1.87 – 1.72 (m, *J* = 6.7 Hz, 1H), 1.64 (q, *J* = 6.7 Hz, 2H), 0.95 (d, *J* = 6.6 Hz, 6H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 160.47, 159.58, 151.00, 125.48, 123.72, 123.36, 120.18, 116.32, 112.57, 110.92, 101.82, 66.50, 37.24, 24.54, 22.39.

E11: yellow solid, Yield: 43 %, m.p.142.7-145.3 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.53 – 8.49 (d, 1H), 8.22 (d, *J* = 8.7 Hz, 1H), 8.11 (d, *J* = 8.4 Hz, 1H), 8.00 (dd, *J* = 8.6, 2.5 Hz, 1H), 6.94 (d, *J* = 11.1 Hz, 2H), 5.81 (s, 2H), 4.60-4.57 (m, 1H), 1.69-1.62 (m, 1H), 1.57-1.51 (m, 1H), 1.42 – 1.33 (m, 2H), 1.26 (d, *J* = 8.7 Hz, 3H), 0.90 (t, *J* = 7.0 Hz, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 160.48, 159.16, 151.47, 138.98, 129.68, 126.05, 124.18, 122.70, 119.61, 118.06, 113.33, 110.46, 102.68, 73.34, 37.80, 19.36, 18.09, 13.85.

E12: yellow solid, Yield: 55 %, m.p.125.5-126.7 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.28 (d, *J* = 8.7 Hz, 1H), 8.15 (d, *J* = 8.8 Hz, 1H), 7.89 (d, *J* = 2.4 Hz, 1H), 7.63 (dd, *J* = 8.6, 2.4 Hz, 1H), 7.05 – 6.93 (m, 2H), 4.40 (p, *J* = 5.8 Hz, 1H), 1.65 (ddq, *J* = 14.3, 7.3, 3.6, 3.2 Hz, 4H), 0.92 (t, *J* = 7.4 Hz, 6H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 160.26, 159.81, 151.48, 127.23, 124.29, 123.51, 120.15, 119.11, 113.47, 110.44, 102.85, 79.57, 25.46, 9.29.

E13: yellow solid, Yield: 64 %, m.p.190.6-193.2 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.01 (d, *J* = 6.7 Hz, 1H), 7.99 (d, *J* = 5.8 Hz, 1H), 7.36 (d, *J* = 2.5 Hz, 1H), 7.15 (dd, *J* = 8.7, 2.5 Hz, 1H), 6.95 – 6.88 (m, 2H), 5.82 (s, 2H), 3.88 (d, *J* = 7.0 Hz, 2H), 1.24 (pd, *J* = 7.3, 3.7 Hz, 1H), 0.59 (dt, *J* = 8.1, 3.0 Hz, 2H), 0.35 (dt, *J* = 6.1, 3.0 Hz, 2H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 160.92, 158.56, 150.19, 148.98, 123.02, 122.89, 122.22, 120.22, 112.30, 111.63, 111.07, 101.80, 72.51, 10.01, 3.13.

E14: yellow solid, Yield: 55 %, m.p.194.7-196.4 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.02 (d, *J* = 3.9 Hz, 1H), 8.00 (d, *J* = 3.3 Hz, 1H), 7.38 (d, *J* = 2.6

Hz, 1H), 7.17 (dd, $J = 8.6, 2.5$ Hz, 1H), 6.95 – 6.88 (m, 2H), 5.90 (s, 2H), 4.01 (d, $J = 6.7$ Hz, 2H), 2.73 (hept, $J = 7.2$ Hz, 1H), 2.08 (dtd, $J = 13.7, 7.3, 2.4$ Hz, 2H), 2.00 – 1.77 (m, 4H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 160.90, 158.77, 150.23, 148.66, 123.25, 123.04, 122.92, 122.37, 120.23, 112.33, 111.65, 111.32, 101.80, 71.88, 33.83, 24.34, 18.08.

E15: yellow solid, Yield: 48 %, m.p.200.4-204.6 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 8.07 (d, $J = 8.9$ Hz, 1H), 8.05 (d, $J = 9.4$ Hz, 1H), 7.51 (d, $J = 2.4$ Hz, 1H), 7.29 (dd, $J = 8.6, 2.5$ Hz, 1H), 6.96 – 6.89 (m, 2H), 5.87 (s, 2H), 3.91 (d, $J = 7.0$ Hz, 2H), 2.32 (hept, $J = 7.5$ Hz, 1H), 1.78 (h, $J = 6.6$ Hz, 2H), 1.68 – 1.47 (m, 4H), 1.34 (dq, $J = 13.3, 6.9$ Hz, 2H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 160.72, 159.18, 150.56, 125.15, 123.69, 123.26, 123.17, 120.21, 113.43, 112.44, 111.33, 101.81, 72.05, 38.39, 28.95, 24.91.

E16: yellow solid, Yield: 52 %, m.p.214.8-216.3 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 8.19 (d, $J = 8.5$ Hz, 1H), 8.10 (d, $J = 9.8$ Hz, 1H), 7.75 (d, $J = 2.3$ Hz, 1H), 7.51 (dd, $J = 8.7, 2.4$ Hz, 1H), 6.95 – 6.89 (m, 2H), 5.83 (s, 2H), 3.85 (d, $J = 6.2$ Hz, 2H), 1.78 – 1.72 (m, 2H), 1.71 (d, $J = 4.0$ Hz, 1H), 1.32 – 1.13 (m, 3H), 1.06 (pd, $J = 12.0, 11.5, 3.4$ Hz, 2H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 160.39, 159.85, 151.10, 128.44, 126.02, 123.84, 123.39, 120.14, 117.19, 112.55, 110.76, 101.83, 73.16, 36.92, 29.14, 25.99, 25.21.

E17: yellow solid, Yield: 32 %, m.p.235.9-237.4 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 8.02 (dd, $J = 16.2, 8.7$ Hz, 2H), 7.49 (d, $J = 6.7$ Hz, 2H), 7.41 (t, $J = 7.4$ Hz, 2H), 7.38 – 7.32 (m, 2H), 7.14 (dd, $J = 8.7, 2.5$ Hz, 1H), 7.06 – 6.97 (m, 2H), 5.81 (s, 2H), 5.19 (s, 2H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 160.85, 158.24, 150.17, 148.64, 136.64, 128.47, 127.97, 127.88, 127.84, 123.21, 123.10, 123.01, 122.39, 120.29, 112.62, 111.96, 111.39, 102.28, 69.60.

E18: yellow solid, Yield: 34 %, m.p.244.3-246.2 °C, ^1H NMR (400 MHz, DMSO- d_6) δ (ppm) 8.03 (dd, $J = 17.3, 8.8$ Hz, 2H), 7.60 (td, $J = 7.6, 1.7$ Hz, 1H), 7.49 – 7.42 (m, 1H), 7.35 (d, $J = 2.5$ Hz, 1H), 7.31 – 7.23 (m, 2H), 7.15 (dd, $J = 8.6, 2.5$ Hz, 1H), 7.08 (d, $J = 2.6$ Hz, 1H), 7.01 (dd, $J = 8.8, 2.6$ Hz, 1H), 5.83 (s, 2H), 5.22 (s, 2H). ^{13}C NMR (101 MHz, DMSO- d_6) δ (ppm) 161.35, 159.73, 158.50, 150.62, 149.60, 131.42(d, $J = 4.04$ Hz), 131.09(d, $J = 8.08$ Hz), 125.06(d, $J = 3.03$ Hz), 123.96, 123.81, 123.57(d, $J = 10.1$ Hz), 123.36, 122.68, 120.82, 115.93(d, $J = 20.2$ Hz), 112.97, 112.69, 111.56, 102.72, 64.47.

E19: yellow solid, Yield: 39 %, m.p.236.5-239.4 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.02 (dd, *J* = 13.9, 8.7 Hz, 2H), 7.51 – 7.39 (m, 2H), 7.37 – 7.31 (m, 2H), 7.20 (td, *J* = 8.4, 2.9 Hz, 2H), 7.07 – 6.98 (m, 2H), 5.86 (s, 2H), 5.23 (s, 2H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 163.88, 161.40(d, *J* = 11.11 Hz), 158.39, 150.59, 149.59, 140.07(d, *J* = 8.08 Hz), 130.96(d, *J* = 9.09 Hz), 124.08(d, *J* = 3.03 Hz), 123.56, 123.44, 123.36, 122.67, 120.82, 115.22(d, *J* = 11.11 Hz), 114.79(d, *J* = 22.22 Hz), 113.02, 112.65, 111.59, 102.81, 69.18.

E20: yellow solid, Yield: 34 %, m.p.237.1-240.5 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.06 (dd, *J* = 16.1, 8.8 Hz, 2H), 7.50 (td, *J* = 8.2, 6.2 Hz, 1H), 7.43 – 7.32 (m, 3H), 7.22 (ddd, *J* = 13.1, 8.1, 2.3 Hz, 2H), 7.10 – 7.01 (m, 2H), 5.87 (s, 2H), 5.26 (s, 2H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 163.88, 161.40(d, *J* = 11.11 Hz), 158.41, 150.60, 149.61, 140.08(d, *J* = 7.07 Hz), 130.99(d, *J* = 8.08 Hz), 124.10(d, *J* = 3.03 Hz), 123.58, 123.48, 123.35, 122.67, 120.82, 115.18(d, *J* = 21.21 Hz), 114.81(d, *J* = 22.22 Hz), 113.06, 112.66, 111.56, 102.82, 69.19.

E21: yellow solid, Yield: 31 %, m.p.238.7-241.5 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.01 (dd, *J* = 14.0, 8.7 Hz, 2H), 7.36 (d, *J* = 2.5 Hz, 1H), 7.28 (dd, *J* = 6.1, 1.9 Hz, 3H), 7.19 – 7.13 (m, 2H), 7.04 – 6.97 (m, 2H), 5.82 (s, 2H), 5.14 (s, 2H), 2.33 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 161.37, 158.72, 150.62, 149.57, 138.13, 137.04, 129.07, 128.85, 125.39, 123.56, 123.43, 122.69, 120.78, 113.09, 112.48, 111.56, 102.74, 70.14, 21.45.

E22: yellow solid, Yield: 36 %, m.p.231.6-235.6 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.52 (d, *J* = 2.3 Hz, 1H), 8.25 (d, *J* = 8.8 Hz, 1H), 8.16 (d, *J* = 8.8 Hz, 1H), 8.02 (dd, *J* = 8.8, 2.3 Hz, 1H), 7.55 (dd, *J* = 8.2, 5.5 Hz, 2H), 7.25 (t, *J* = 8.9 Hz, 2H), 7.11 – 7.01 (m, 2H), 5.20 (s, 2H), 2.11 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 163.07, 160.42, 159.48, 151.34, 139.13, 132.73, 130.22, 130.13, 129.56, 126.03, 124.17, 122.82, 119.73, 118.07, 115.43, 115.22, 112.89, 111.00, 102.36, 68.97, 24.05.

E23: yellow solid, Yield: 37 %, m.p.234.9-236.0 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.05 (d, *J* = 8.9 Hz, 1H), 8.00 (d, *J* = 8.8 Hz, 1H), 7.66 – 7.59 (m, 1H), 7.57 – 7.49 (m, 1H), 7.46 – 7.37 (m, 2H), 7.34 (d, *J* = 2.6 Hz, 1H), 7.14 (dd, *J* = 8.7, 2.5 Hz, 1H), 7.06 (d, *J* = 2.5 Hz, 1H), 7.01 (dd, *J* = 8.8, 2.6 Hz, 1H), 5.82 (s, 2H), 5.23 (s, 2H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 161.34, 158.50, 150.62, 149.64, 134.39, 133.31, 130.91, 130.56, 129.94, 127.90, 123.62, 123.54, 123.33, 122.67, 120.83, 112.95, 112.78, 111.55, 102.80, 67.82.

E24: yellow solid, Yield: 33 %, m.p.235.2-238.4 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.10 (d, *J* = 8.7 Hz, 1H), 8.06 (d, *J* = 8.7 Hz, 1H), 7.61 (d, *J* = 1.9 Hz, 1H), 7.53 – 7.46 (m, 3H), 7.39 (d, *J* = 2.5 Hz, 1H), 7.20 (dd, *J* = 8.7, 2.5 Hz, 1H), 7.11 – 7.05 (m, 2H), 5.87 (s, 2H), 5.27 (s, 2H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 161.34, 158.39, 150.61, 149.62, 139.74, 133.63, 130.88, 128.35, 127.89, 126.77, 123.59, 123.49, 123.35, 122.67, 120.83, 113.06, 112.69, 111.57, 102.84, 69.12.

E25: yellow solid, Yield: 29 %, m.p.266.3-268.1 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.01 (dd, *J* = 17.2, 8.8 Hz, 2H), 7.53 – 7.45 (m, 4H), 7.33 (d, *J* = 2.5 Hz, 1H), 7.13 (dd, *J* = 8.6, 2.5 Hz, 1H), 7.05 – 6.95 (m, 2H), 5.81 (s, 2H), 5.19 (s, 2H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 161.34, 158.46, 150.60, 149.61, 136.21, 133.01, 130.13, 128.97, 123.61, 123.50, 123.35, 122.68, 120.79, 113.12, 112.63, 111.53, 102.84, 69.21.

E26: yellow solid, Yield: 32 %, m.p.192.9-194.2 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 7.98 (dd, *J* = 15.6, 8.8 Hz, 2H), 7.83 (d, *J* = 1.9 Hz, 1H), 7.78 (d, *J* = 7.6 Hz, 1H), 7.69 (d, *J* = 8.0 Hz, 1H), 7.63 (t, *J* = 7.7 Hz, 1H), 7.36 (d, *J* = 2.5 Hz, 1H), 7.15 (dd, *J* = 8.7, 2.5 Hz, 1H), 7.06 – 6.96 (m, 2H), 5.82 (s, 2H), 5.27 (s, 2H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 161.35, 158.36, 150.60, 149.61, 138.66, 132.21, 129.94(d, *J* = 19.19 Hz), 129.54, 128.68, 125.98, 125.11(q, *J* = 10.10 Hz), 124.60(q, *J* = 11.11 Hz), 123.51(d, *J* = 10.10 Hz), 123.30(d, *J* = 7.07 Hz), 122.66, 120.83, 113.00, 112.72, 111.59, 102.80, 69.15.

E27: yellow solid, Yield: 22 %, m.p.267.3-269.8 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.05 (d, *J* = 8.8 Hz, 1H), 8.00 (d, *J* = 8.7 Hz, 1H), 7.78 (d, *J* = 8.1 Hz, 2H), 7.70 (d, *J* = 8.1 Hz, 2H), 7.33 (d, *J* = 2.5 Hz, 1H), 7.13 (dd, *J* = 8.7, 2.6 Hz, 1H), 7.08 – 6.96 (m, 2H), 5.81 (s, 2H), 5.31 (s, 2H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 161.31, 158.32, 150.60, 149.63, 142.06, 129.03, 128.71, 128.56, 125.84(q, *J* = 11.11Hz), 123.55(d, *J* = 8.08 Hz), 123.30, 122.65, 120.83, 113.04, 112.75, 111.57, 102.86, 69.13, 29.45.

E28: yellow solid, Yield: 24 %, m.p.275.6-276.9 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.02 (dd, *J* = 18.4, 8.7 Hz, 2H), 7.78 (d, *J* = 7.9 Hz, 2H), 7.71 (d, *J* = 8.1 Hz, 2H), 7.36 (d, *J* = 2.5 Hz, 1H), 7.16 (dd, *J* = 8.6, 2.6 Hz, 1H), 7.06 – 6.99 (m, 2H), 5.83 (s, 2H), 5.32 (s, 2H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 161.31, 158.32, 150.60, 149.63, 142.06, 128.56, 125.85, 125.81, 123.59, 123.51, 123.30, 122.65, 120.82, 113.04, 112.74, 111.56, 102.85, 69.12.

E29: yellow solid, Yield: 25 %, m.p.232.9-235.1 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.01 (dd, *J* = 15.8, 8.8 Hz, 2H), 7.44 – 7.37 (m, 4H), 7.33 (d, *J* = 2.5 Hz, 1H), 7.13 (dd, *J* = 8.7, 2.5 Hz, 1H), 7.04 – 6.95 (m, 2H), 5.79 (s, 2H), 5.14 (s, 2H), 1.28 (s, 9H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 161.36, 158.75, 150.93, 150.63, 149.57, 140.78, 135.46, 134.15, 128.23, 125.70, 123.57, 123.46, 123.42, 122.68, 120.77, 113.11, 112.45, 111.54, 102.75, 69.90, 34.78, 31.58.

E30: yellow solid, Yield: 28 %, m.p.196.0-198.8 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.23 (d, *J* = 8.6 Hz, 1H), 8.15 (d, *J* = 8.5 Hz, 1H), 7.81 (s, 1H), 7.61 – 7.49 (m, 1H), 7.33 (t, *J* = 8.1 Hz, 1H), 7.06 (dt, *J* = 6.6, 2.6 Hz, 4H), 6.91 (ddd, *J* = 8.3, 2.6, 1.1 Hz, 1H), 5.19 (s, 2H), 3.77 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 160.74, 160.01, 159.83, 151.74, 138.55, 130.12, 127.35, 124.66, 124.07, 120.76, 120.34, 113.87, 113.78, 113.45, 111.48, 102.92, 70.04, 55.54.

E31: gray solid, Yield: 26 %, m.p.188.6-190.2 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.50 (d, *J* = 2.3 Hz, 1H), 8.22 (d, *J* = 8.6 Hz, 1H), 8.14 (d, *J* = 9.5 Hz, 1H), 8.00 (dd, *J* = 8.8, 2.3 Hz, 1H), 7.03 (dq, *J* = 5.5, 2.5 Hz, 2H), 6.63 (d, *J* = 2.3 Hz, 2H), 6.45 (t, *J* = 2.2 Hz, 1H), 5.81 (s, 2H), 5.19 (s, 2H), 3.74 (s, 6H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 161.05, 160.89, 159.98, 151.80, 139.61, 139.32, 130.05, 126.50, 124.63, 123.28, 120.22, 118.55, 113.38, 111.47, 106.00, 102.87, 99.98, 70.03, 55.66.

E32: yellow solid, Yield: 52 %, m.p.178.3-180.0 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.06 – 7.97 (m, 2H), 7.36 (d, *J* = 2.3 Hz, 1H), 7.19 – 7.12 (m, 1H), 6.98 – 6.90 (m, 2H), 5.81 (s, 2H), 4.22 (t, *J* = 6.6 Hz, 2H), 2.88 (t, *J* = 6.5 Hz, 2H), 2.18 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 160.89, 158.11, 150.17, 123.05, 122.95, 122.21, 120.27, 112.31, 111.94, 111.08, 101.91, 67.34, 40.09, 39.88, 39.68, 39.47, 39.26, 39.05, 38.84, 32.05, 15.20.

E33: gray solid, Yield: 51 %, m.p.180.1-183.1 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.01 (t, *J* = 8.7 Hz, 2H), 7.36 (d, *J* = 2.4 Hz, 1H), 7.16 (dd, *J* = 8.7, 2.5 Hz, 1H), 6.98 – 6.90 (m, 2H), 5.82 (s, 2H), 4.20 – 4.14 (m, 2H), 3.72 – 3.65 (m, 2H), 3.33 (s, 3H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 160.90, 158.38, 150.17, 149.05, 123.05, 122.95, 122.20, 120.27, 112.30, 111.84, 111.06, 101.80, 70.23, 67.33, 58.14.

E34: gray solid, Yield: 61 %, m.p.180.6-182.6 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 10.31 (s, 1H), 8.15 (d, *J* = 8.9 Hz, 1H), 8.13 – 8.07 (m, 1H), 7.54 (d, *J* = 2.7 Hz, 1H), 7.34 (dd, *J* = 8.7, 2.7 Hz, 1H), 6.97 (d, *J* = 7.6 Hz, 2H), 6.08 (ddt, *J* = 17.3, 10.5, 5.3 Hz, 1H), 5.46 (dq, *J* = 17.3, 1.7 Hz, 1H), 5.31 (dq, *J* = 10.5, 1.5 Hz, 1H), 4.66 (dt, *J* = 5.3, 1.6 Hz, 2H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 160.62, 160.07,

151.54, 139.27, 129.79, 126.20, 124.28, 122.95, 119.86, 118.23, 112.80, 110.96, 102.10, 76.50, 70.78, 67.67, 40.29, 40.09, 39.88, 39.67, 39.46, 39.25, 39.04, 27.76, 25.37.

E35: white solid, Yield: 50 %, m.p.229.1-231.1 °C , ¹H NMR (400 MHz, DMSO-*d*₆) δ (ppm) 8.00 (t, *J* = 7.7 Hz, 2H), 7.36 (d, *J* = 2.4 Hz, 1H), 7.15 (dd, *J* = 8.6, 2.5 Hz, 1H), 6.96 – 6.87 (m, 2H), 5.82 (s, 2H), 3.89 (d, *J* = 6.7 Hz, 4H), 3.33 (t, *J* = 11.2 Hz, 2H), 2.01 (ddq, *J* = 11.6, 8.5, 4.3 Hz, 1H), 1.68 (d, *J* = 12.5 Hz, 2H), 1.34 (qd, *J* = 12.2, 4.4 Hz, 2H). ¹³C NMR (101 MHz, DMSO-*d*₆) δ (ppm) 160.91, 158.57, 150.19, 149.03, 123.03, 122.99, 122.91, 122.20, 120.24, 112.30, 111.75, 111.06, 101.82, 72.37, 66.58, 34.30, 29.14.