

SUPPLEMENTARY MATERIAL

Design, Semisynthesis, Insecticidal and Antibacterial Activities of a Series of Marine-Derived Geodin Derivatives and Their Preliminary Structure-Activity Relationships

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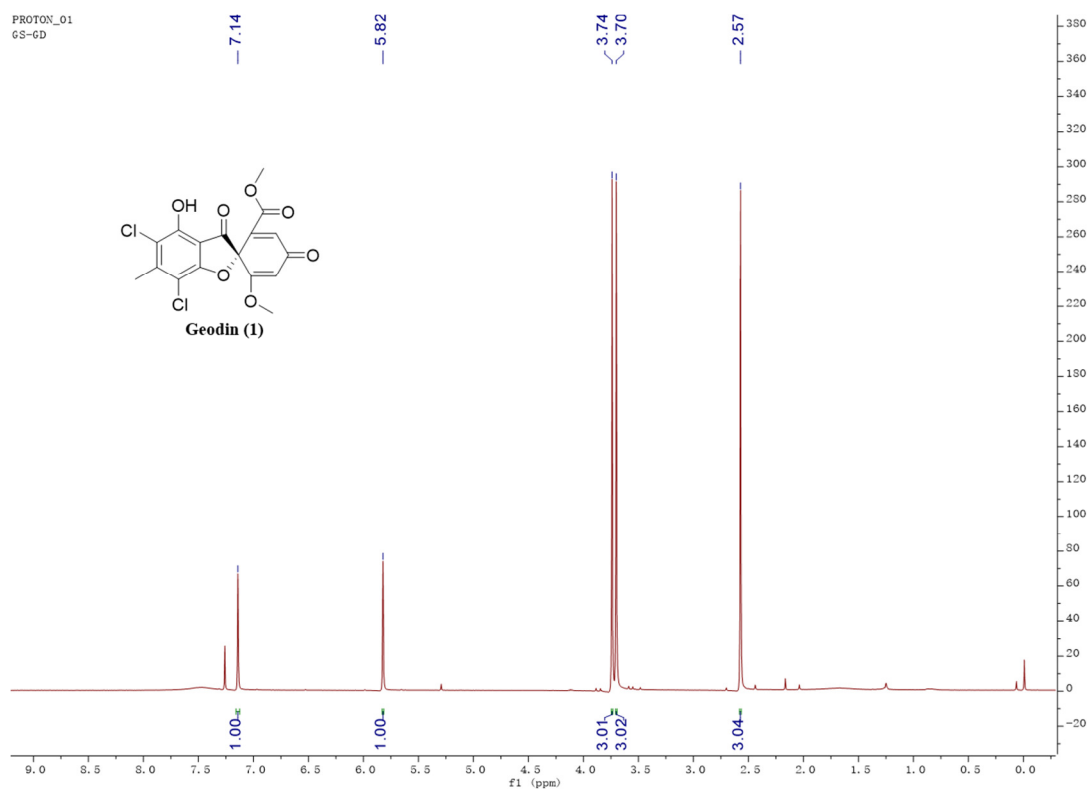


Figure S1. ^1H NMR (500 MHz, CDCl_3) spectrum of compound **1**

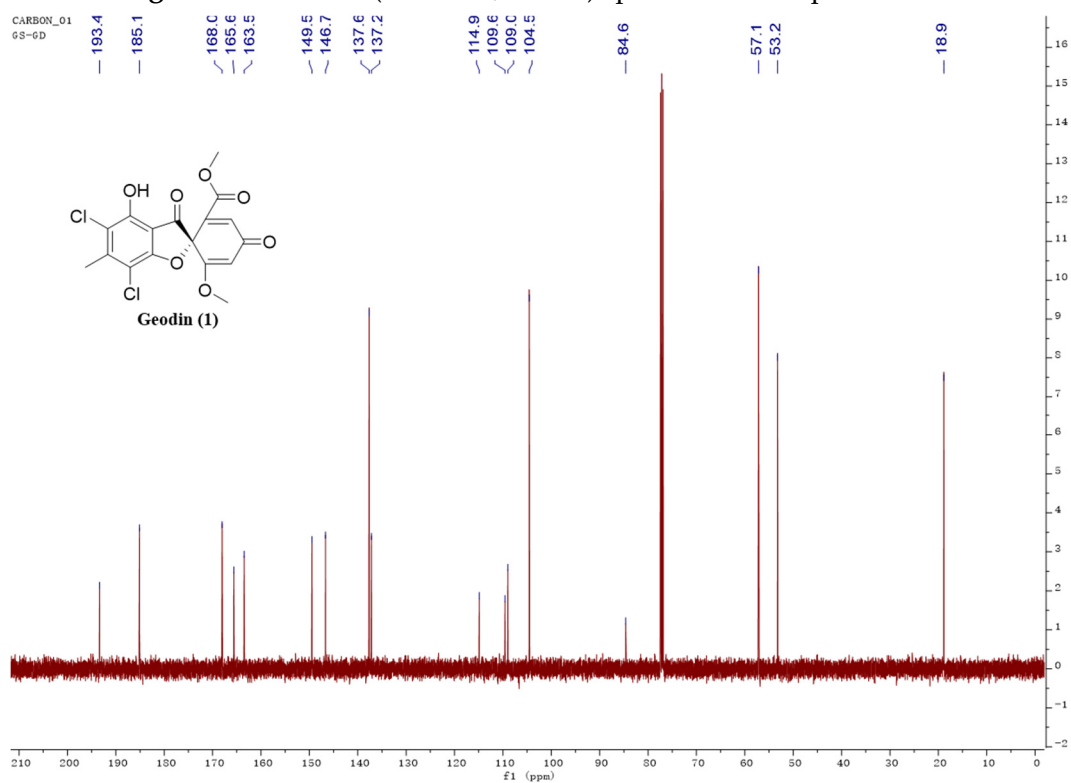


Figure S2. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **1**

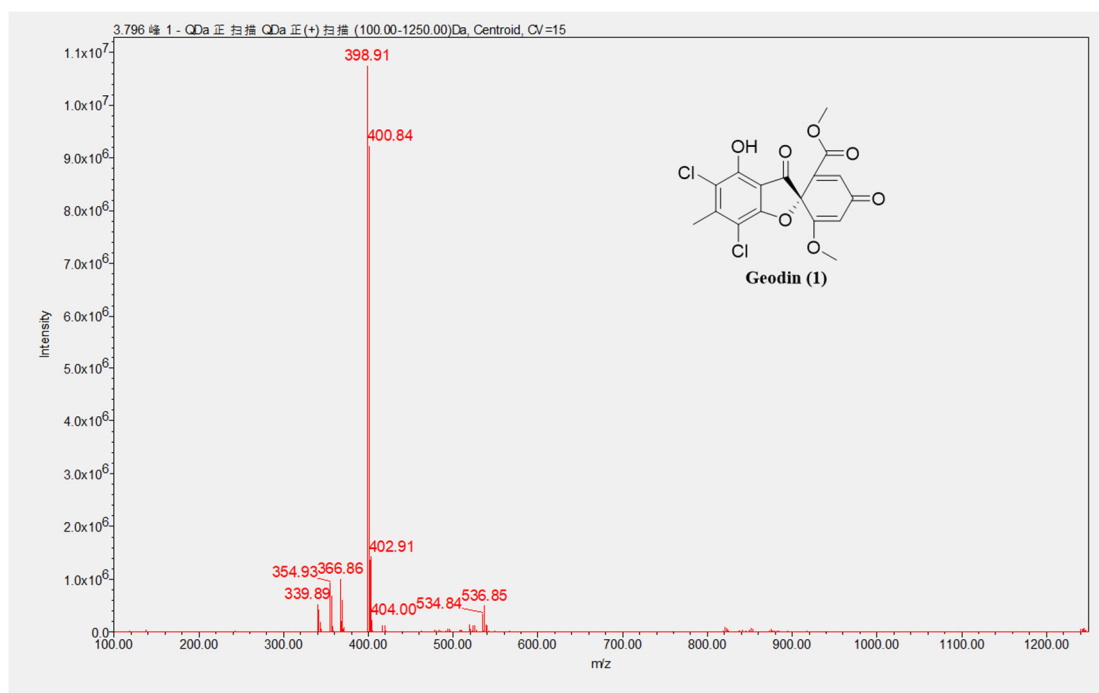


Figure S3. ESIMS spectrum of compound 1.

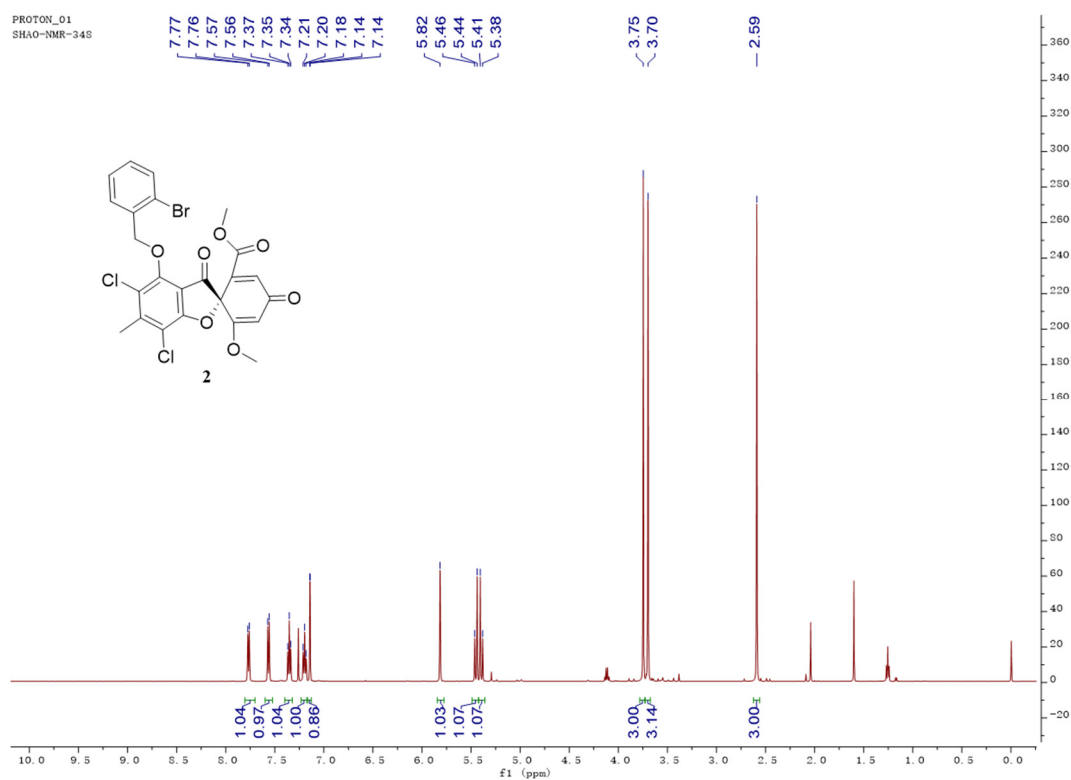


Figure S4. ^1H NMR (500 MHz, CDCl_3) spectrum of compound 2

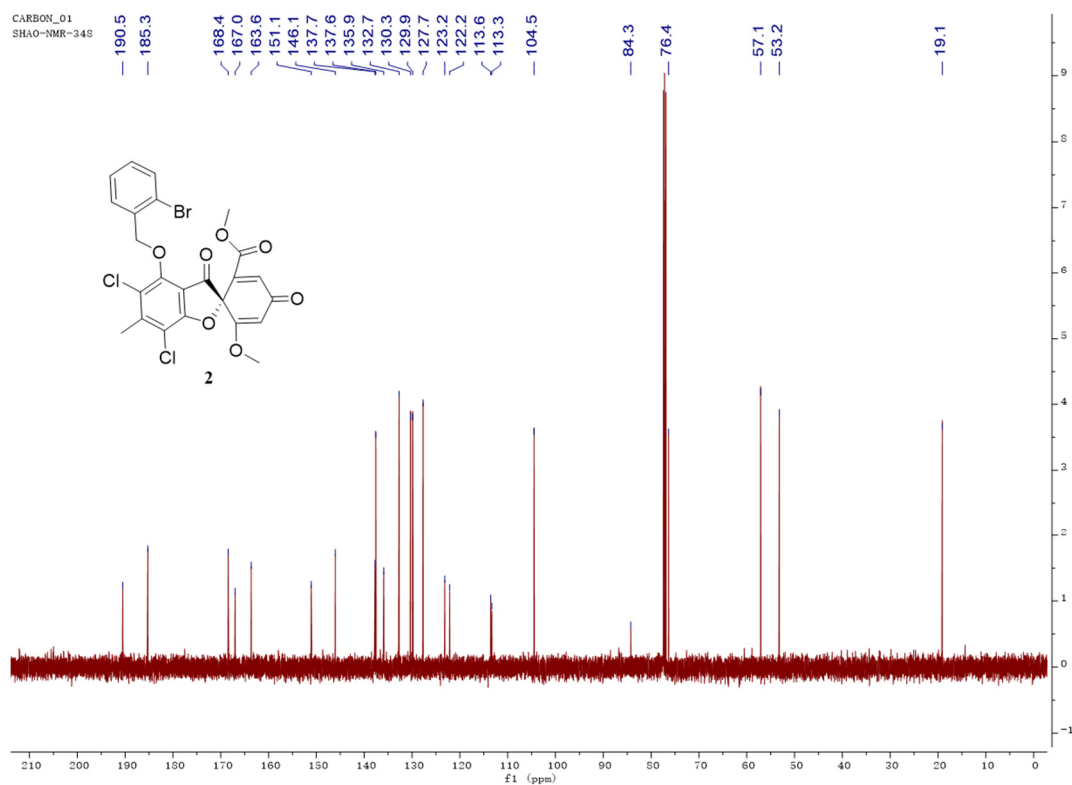


Figure S5. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound 2

CHNQD-02104 #1-615 RT: 0.00-5.92 AV: 615 NL: 3.54E6
T: FTMS + p ESI Full ms [100.00-1500.00]

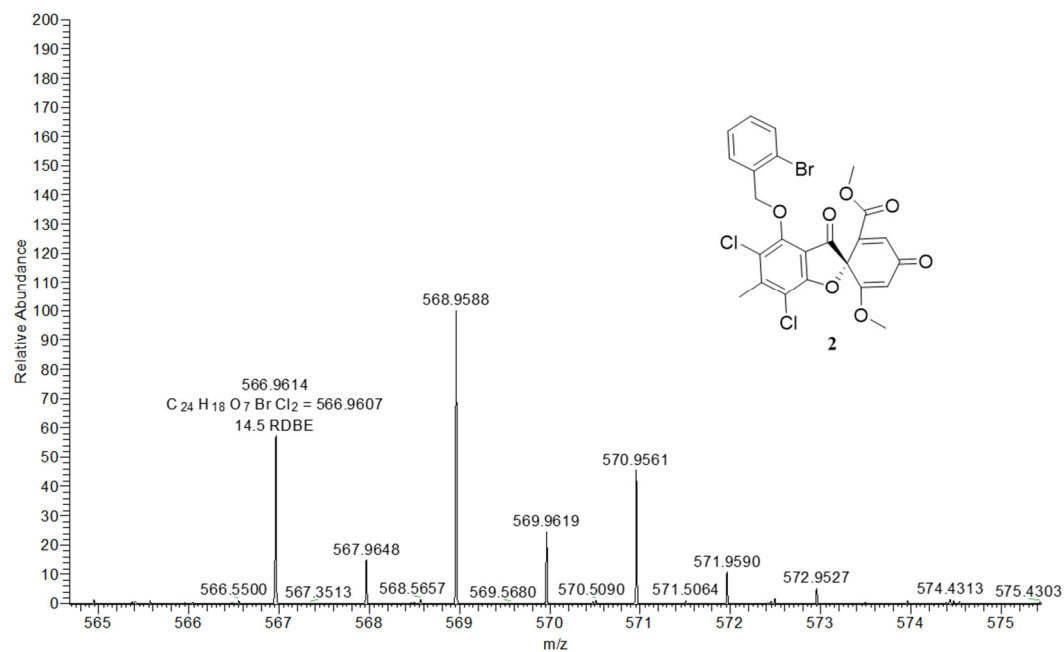


Figure S6. HRESIMS spectrum of compound 2

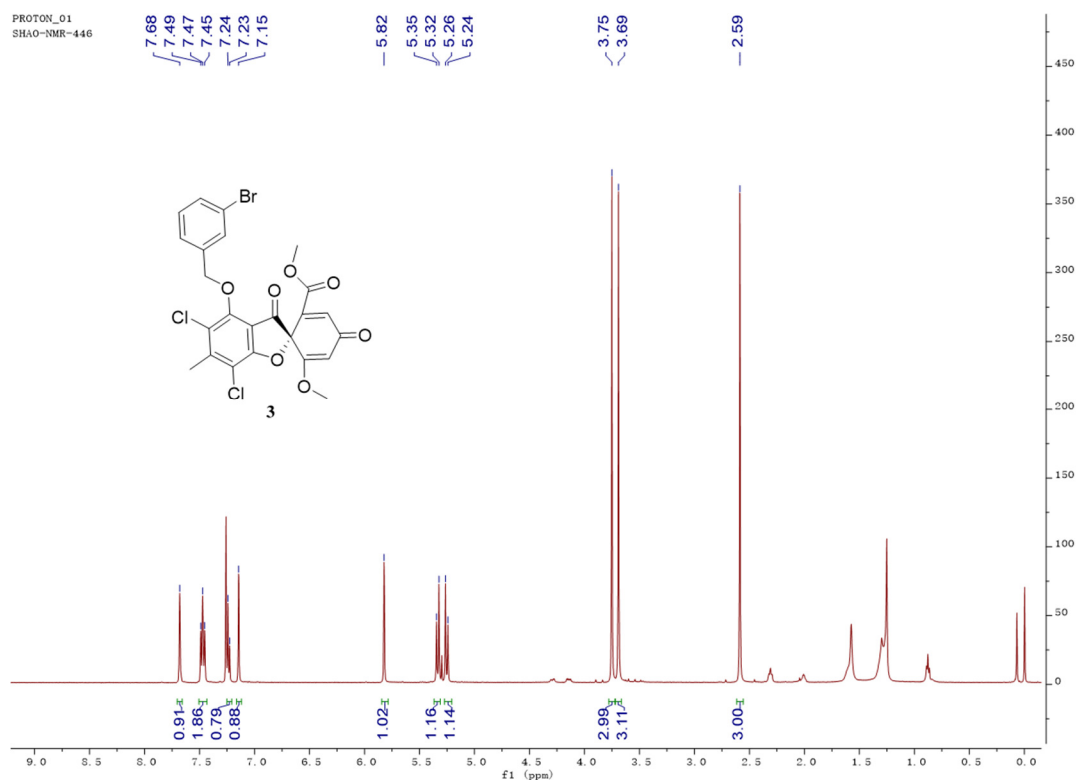


Figure S7. ^1H NMR (500 MHz, CDCl_3) spectrum of compound **3**

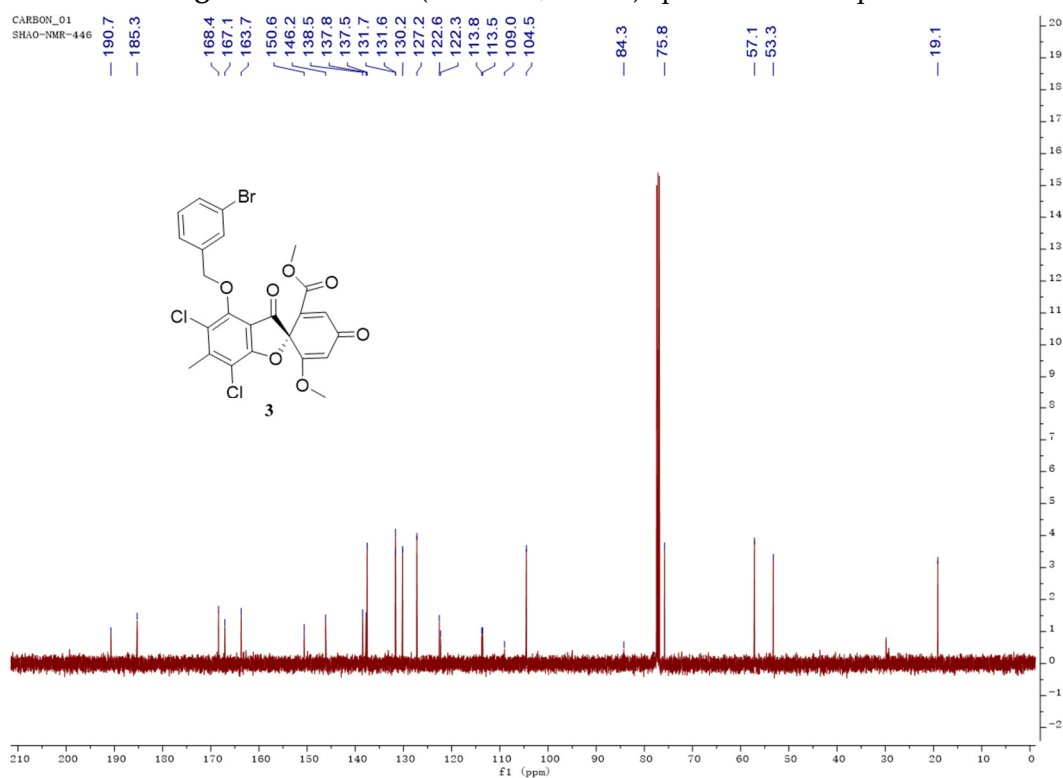


Figure S8. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **3**

20201106-CHNQ-02152_201106083945 #22 RT: 0.59 AV: 1 NL: 5.13E6
T: FTMS + p ESI Full ms [100.00-2000.00]

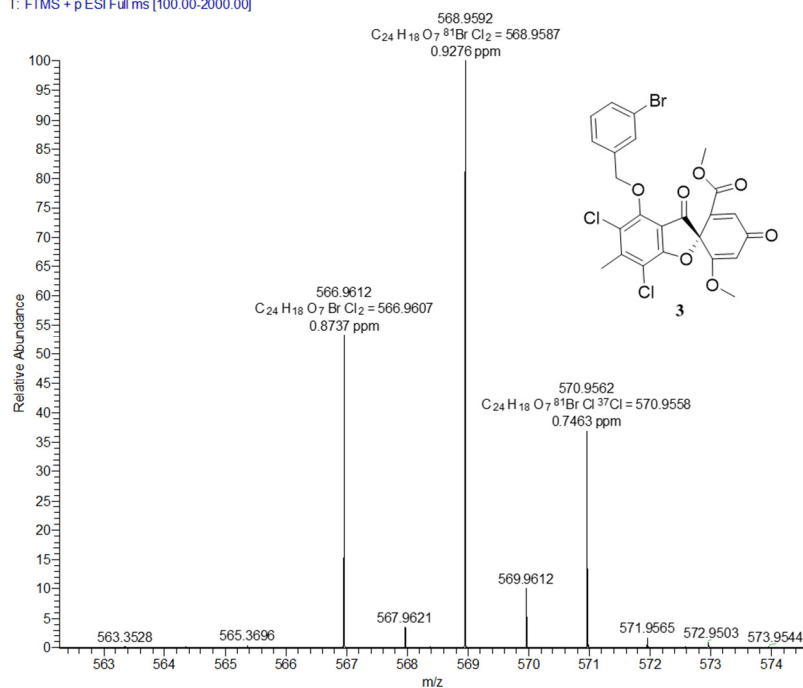


Figure S9. HRESIMS spectrum of compound 3

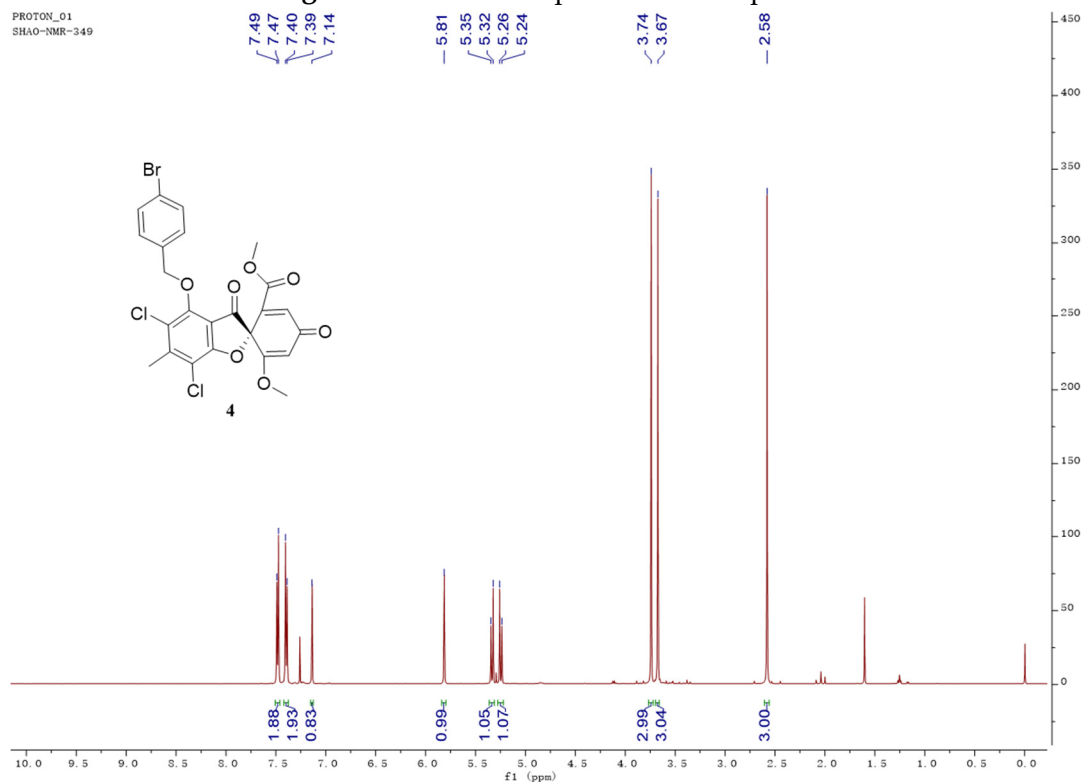


Figure S10. 1H NMR (500 MHz, $CDCl_3$) spectrum of compound 4

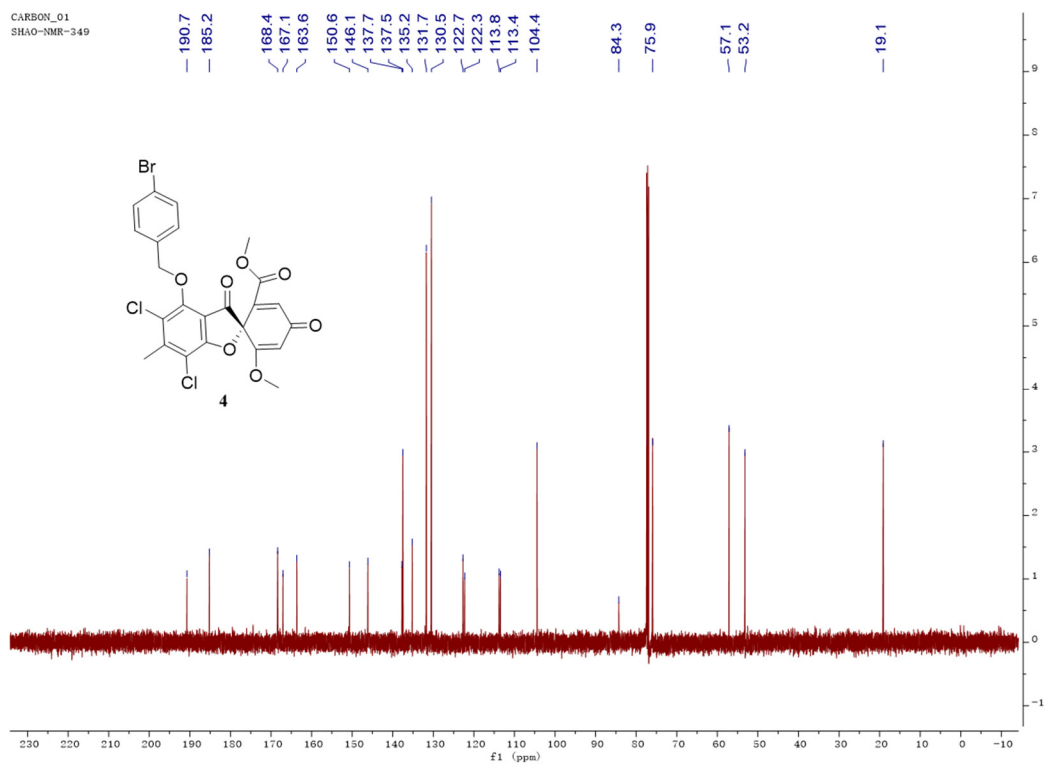


Figure S11. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **4**

CHNQD-02105 #1 RT: 0.00 AV: 1 NL: 4.51E4
T: FTMS + p ESI Full ms [100.00-1500.00]

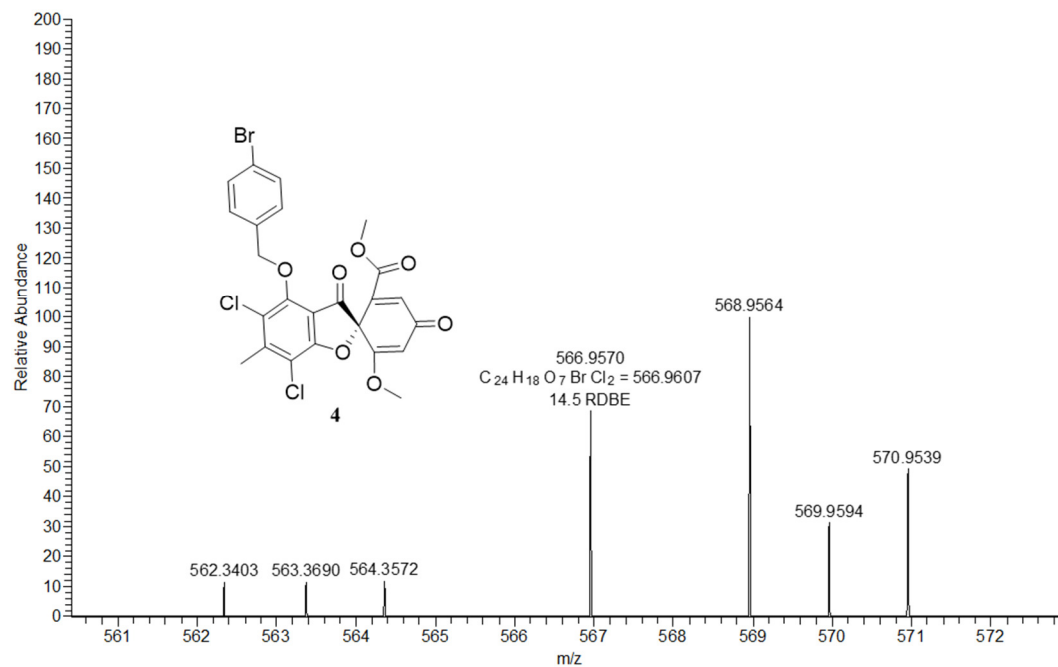


Figure S12. HRESIMS spectrum of compound **4**

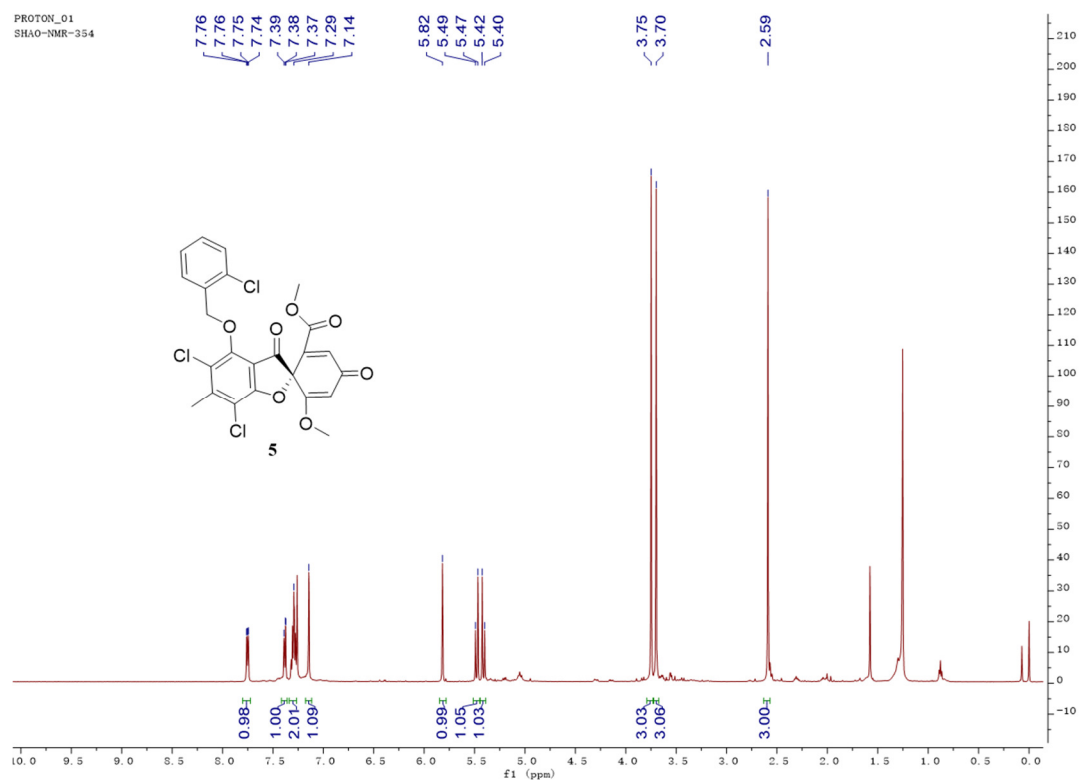


Figure S13. ^1H NMR (500 MHz, CDCl_3) spectrum of compound **5**

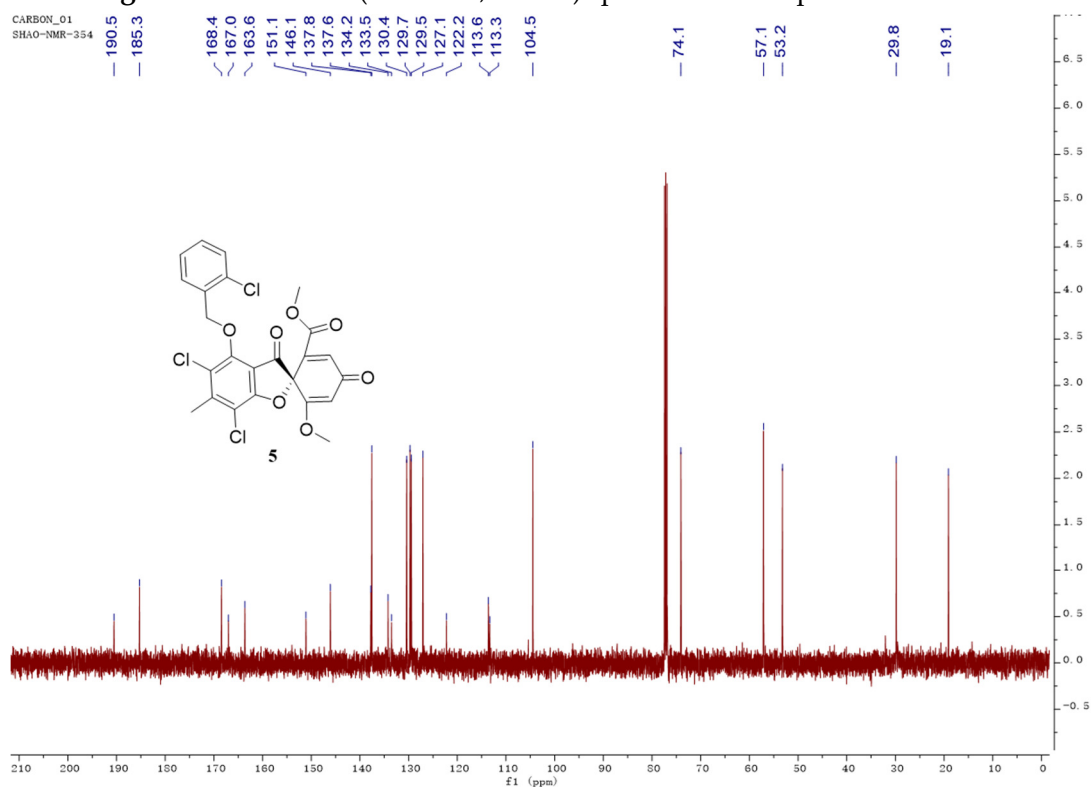


Figure S14. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **5**

CHNQD-02110 #529 RT: 5.10 AV: 1 NL: 7.86E8
T: FTMS + p ESI Fullms [100.00-1500.00]

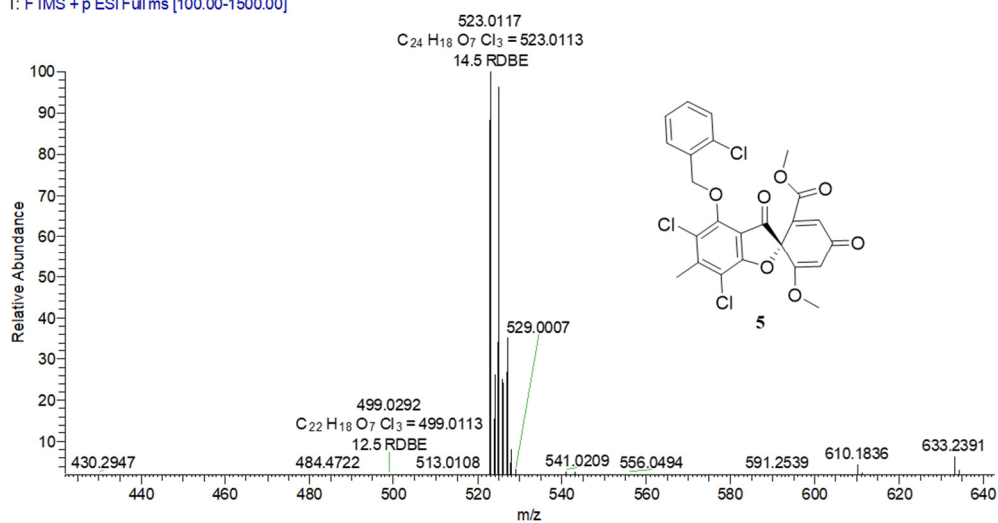


Figure S15. HRESIMS spectrum of compound 5

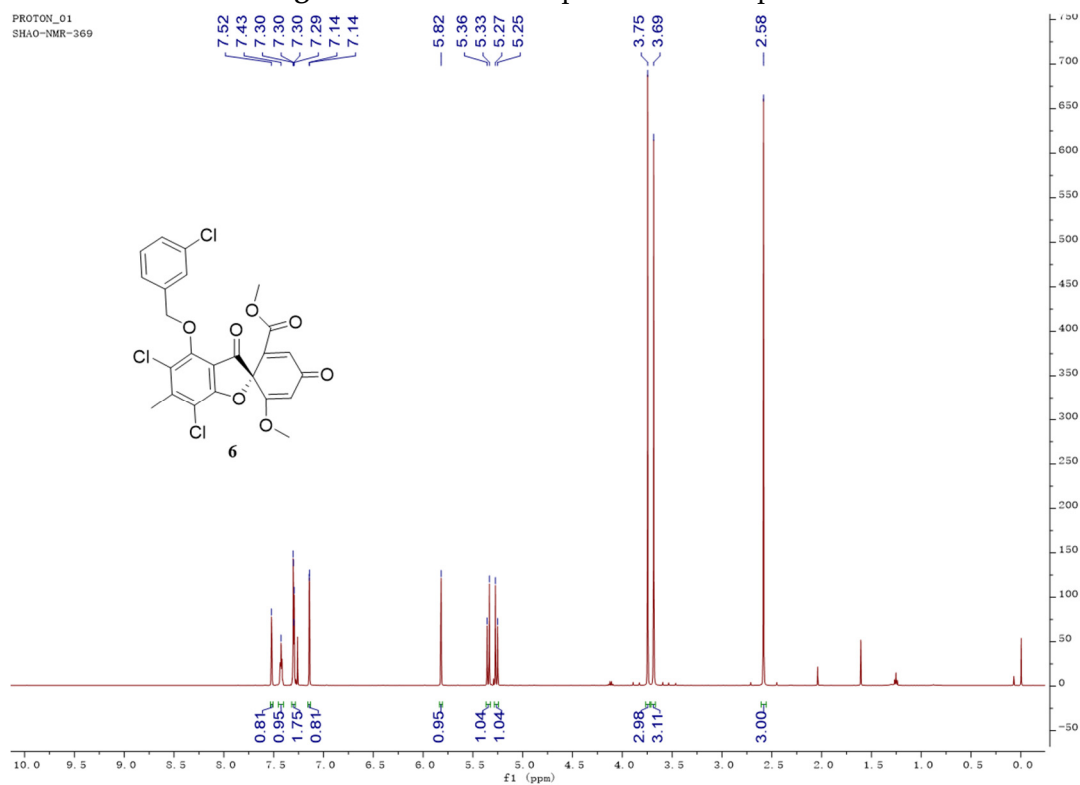


Figure S16. ¹H NMR (500 MHz, CDCl₃) spectrum of compound 6

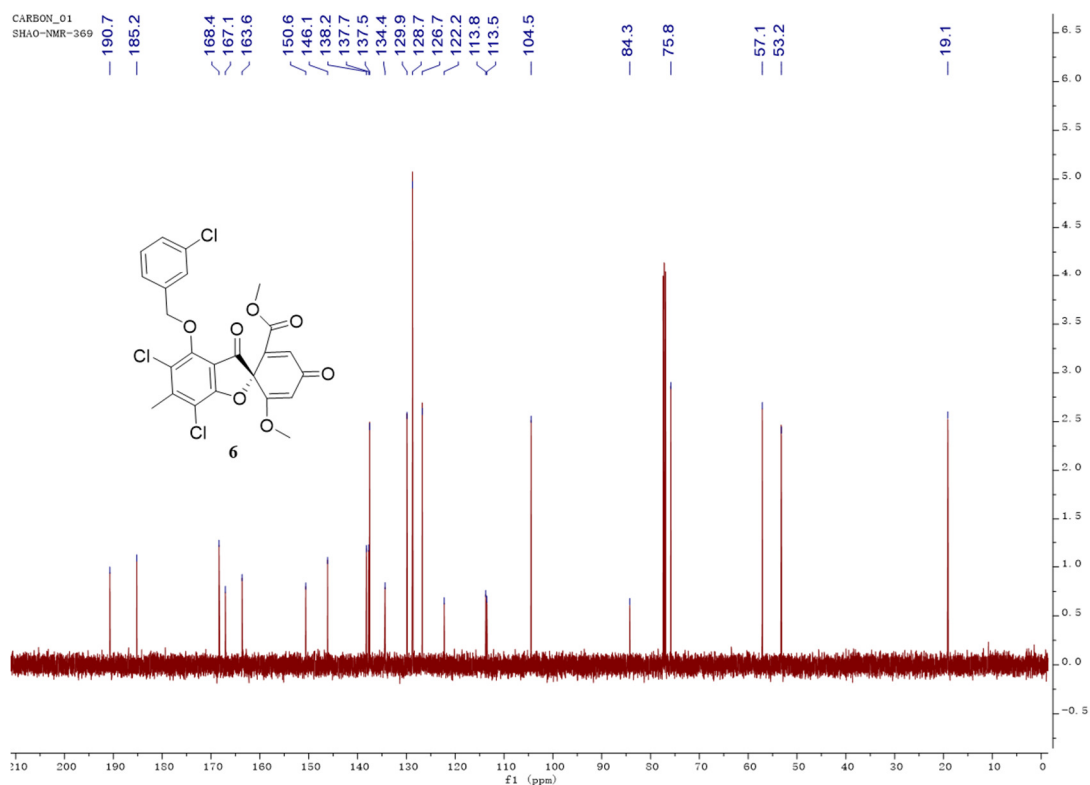


Figure S17. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **6**

CHNQD-02121 #3-622 RT: 0.02-5.99 AV: 620 NL: 1.11E7
T: FTMS + p ESI Full ms [100.00-1500.00]

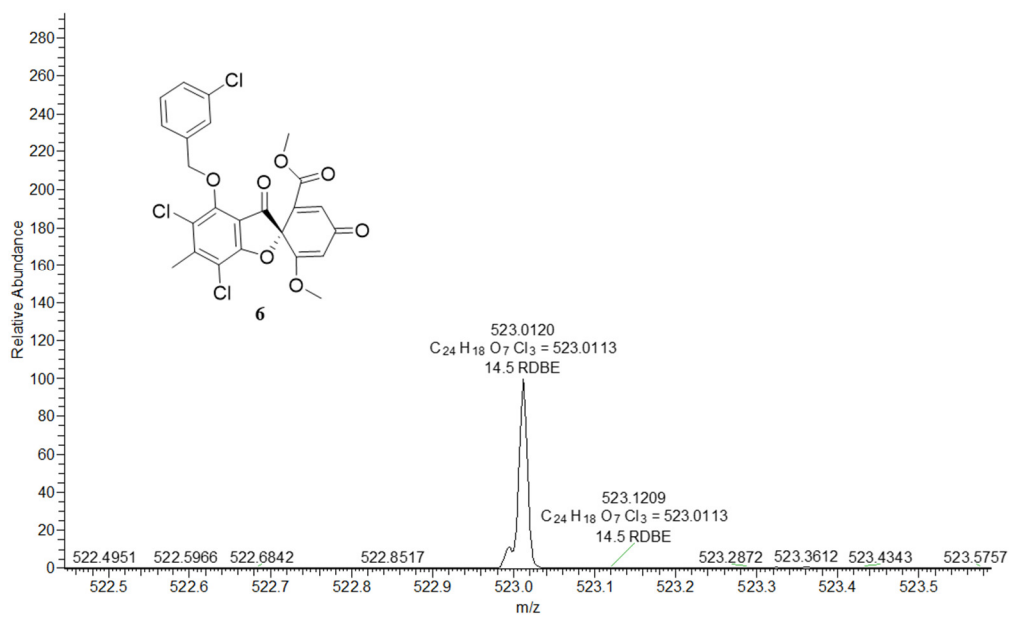


Figure S18. HRESIMS spectrum of compound **6**

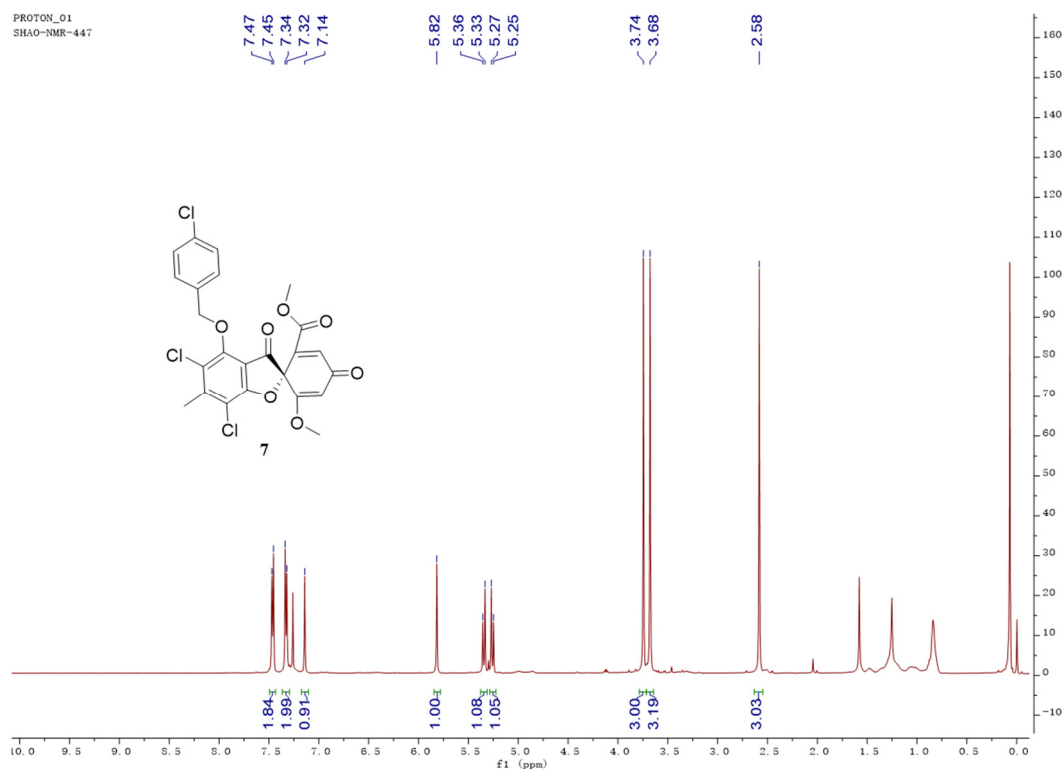


Figure S19. ^1H NMR (500 MHz, CDCl_3) spectrum of compound 7

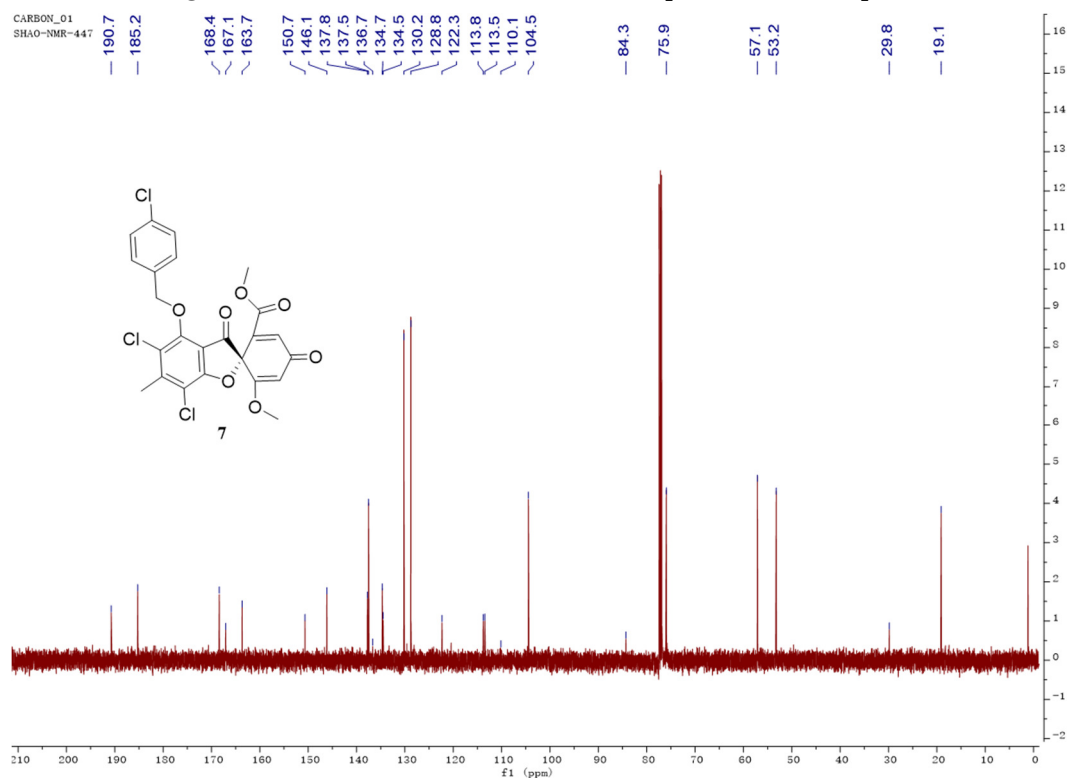


Figure S20. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound 7

20201106-CHNQ-02148_201106083949 #21-22 RT: 0.58-0.61 AV: 2 NL: 4.54E6
T: FTMS + p ESI Full ms [100.00-2000.00]

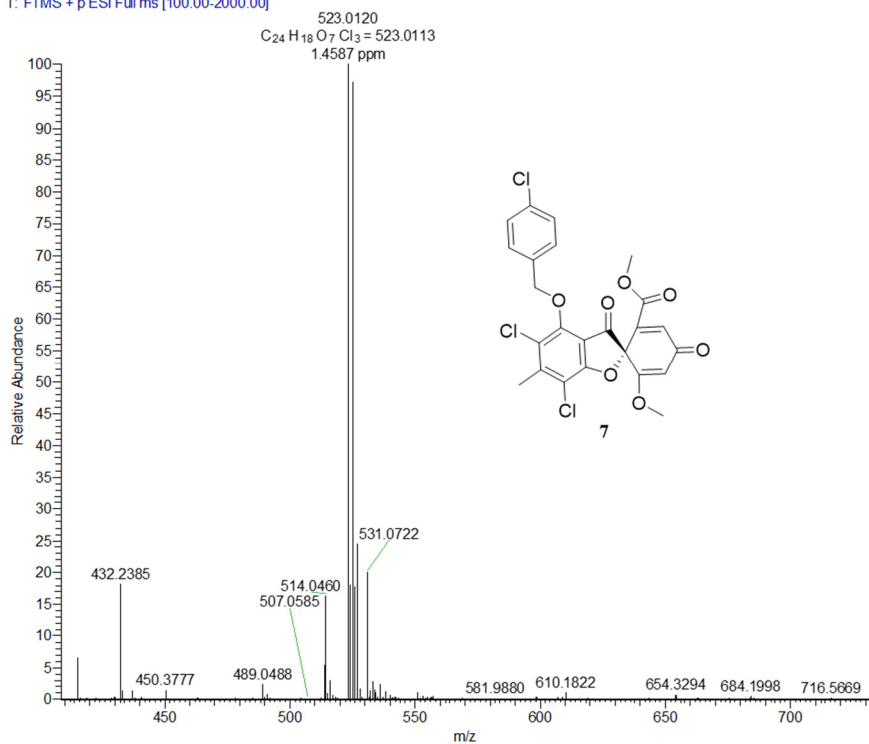


Figure S21. HRESIMS spectrum of compound 7

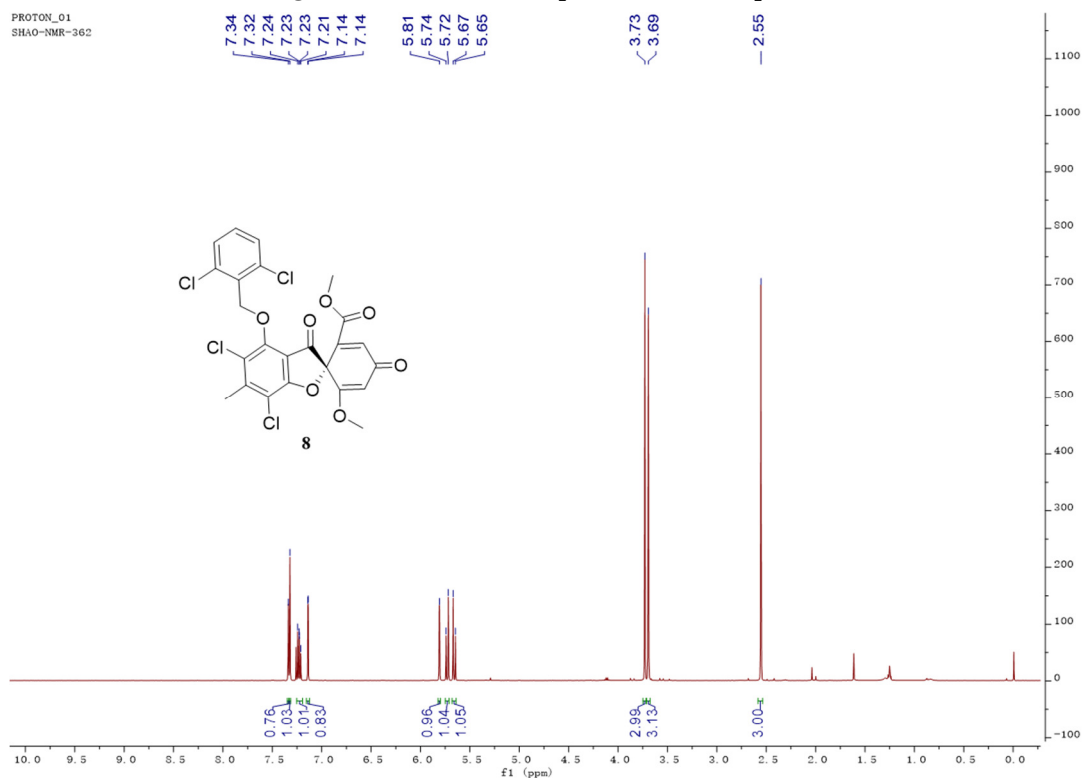


Figure S22. ¹H NMR (500 MHz, CDCl₃) spectrum of compound 8

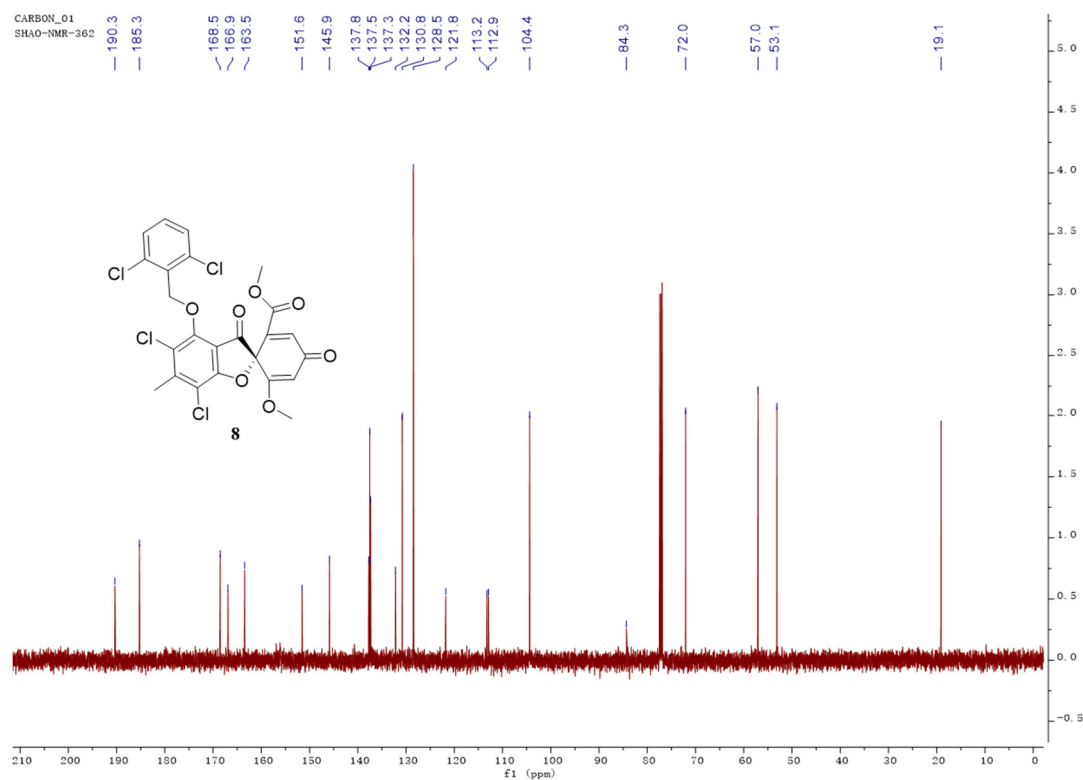


Figure S23. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **8**

CHNQD-02116 #1-624 RT: 0.00-6.01 AV: 624 NL: 1.11E7
T: FTMS + p ESI Full ms [100.00-1500.00]

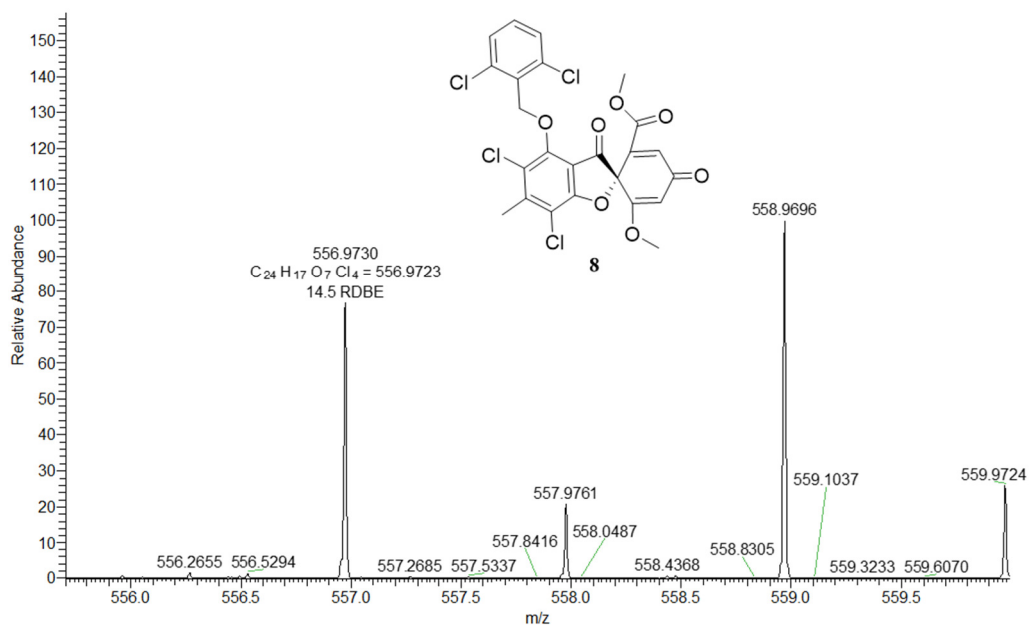


Figure S24. HRESIMS spectrum of compound **8**

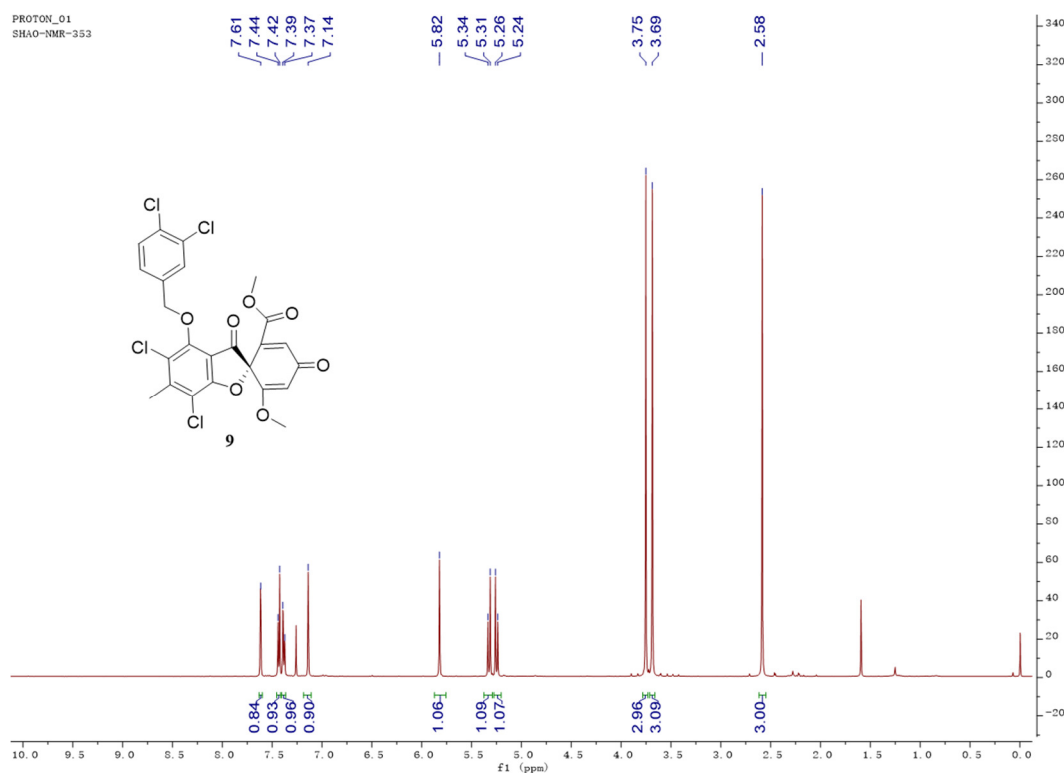


Figure S25. ^1H NMR (500 MHz, CDCl_3) spectrum of compound 9

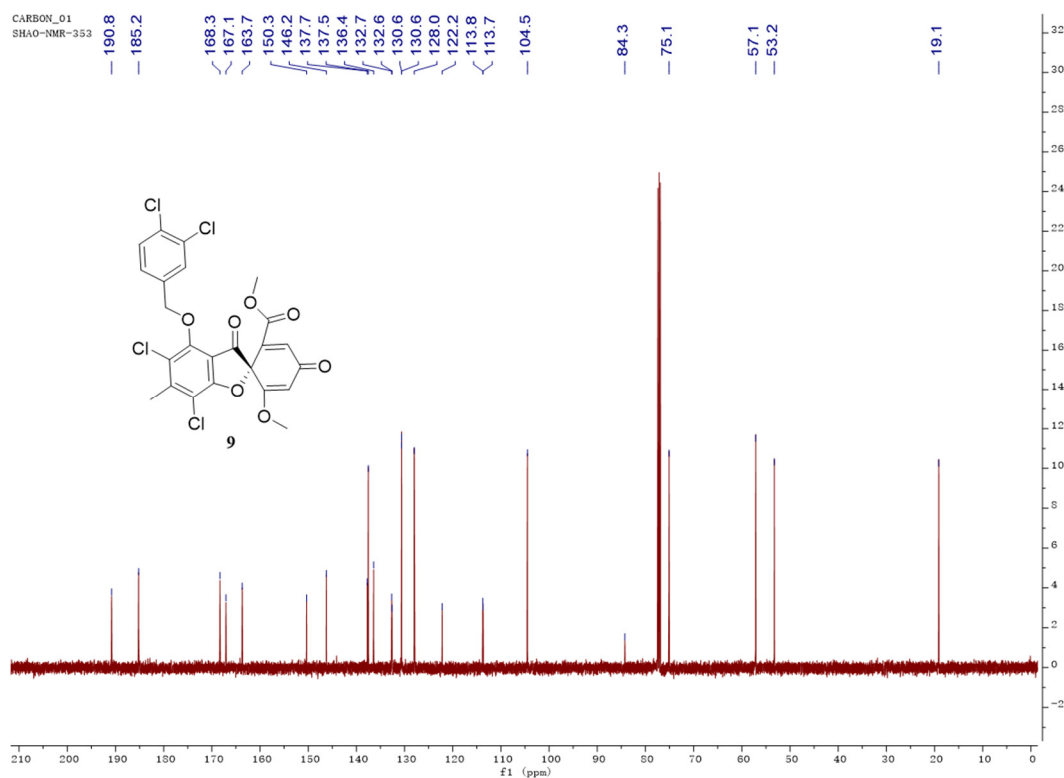


Figure S26. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound 9

CHNQD-02109 #2-625 RT: 0.01-6.02 AV: 624 NL: 5.01E6
T: FTMS - p ESI Full ms [100.00-1500.00]

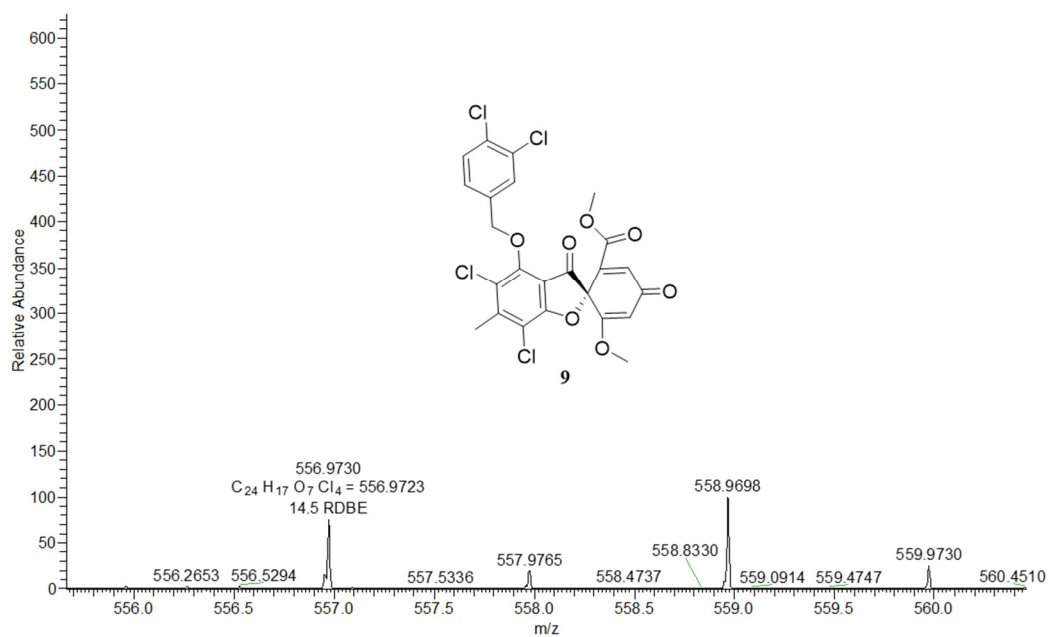


Figure S27. HRESIMS spectrum of compound 9

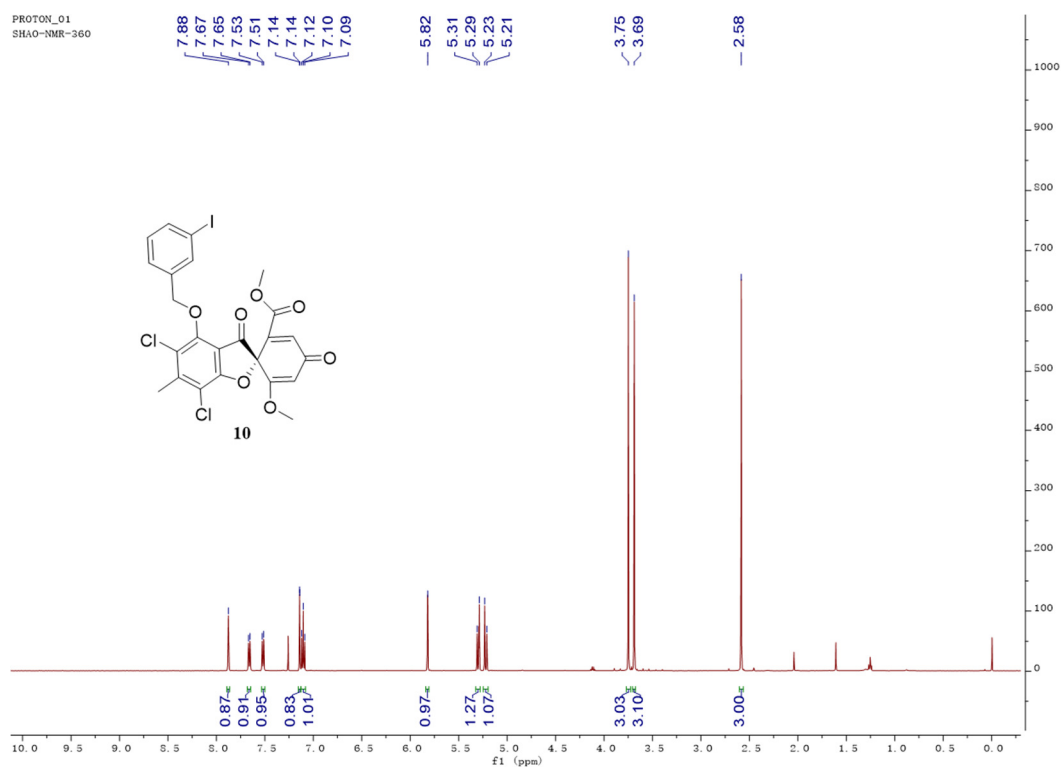


Figure S28. ¹H NMR (500 MHz, CDCl₃) spectrum of compound 10

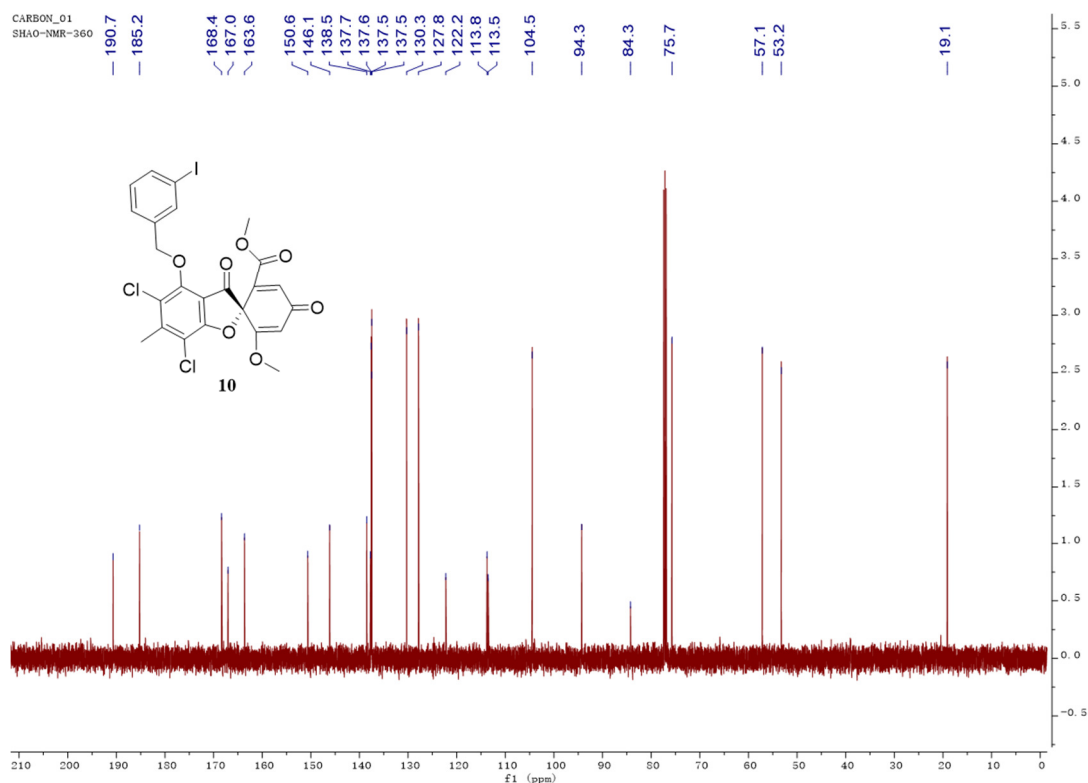


Figure S29. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **10**

CHNQD-02114 #551 RT: 5.31 AV: 1 NL: 6.05E8
T: FTMS + p ESI Full ms [100.00-1500.00]

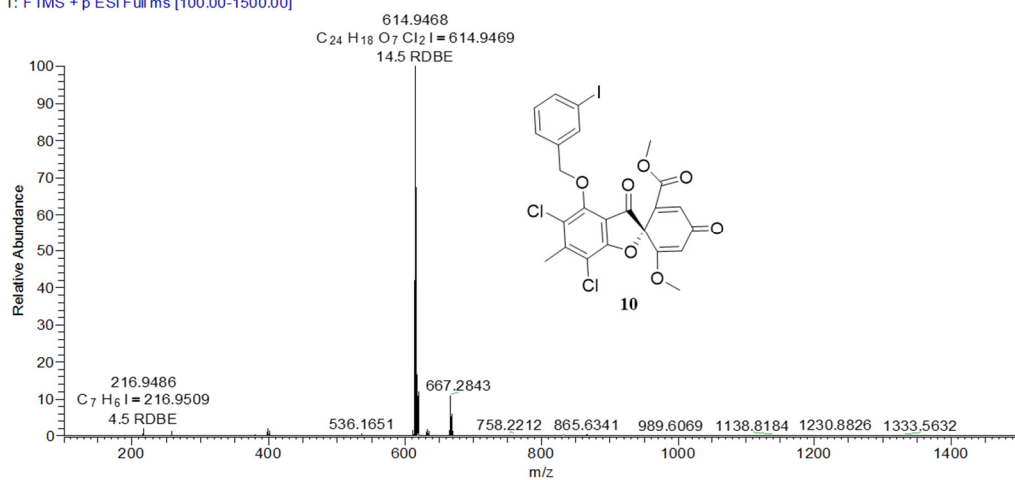


Figure S30. HRESIMS spectrum of compound **10**

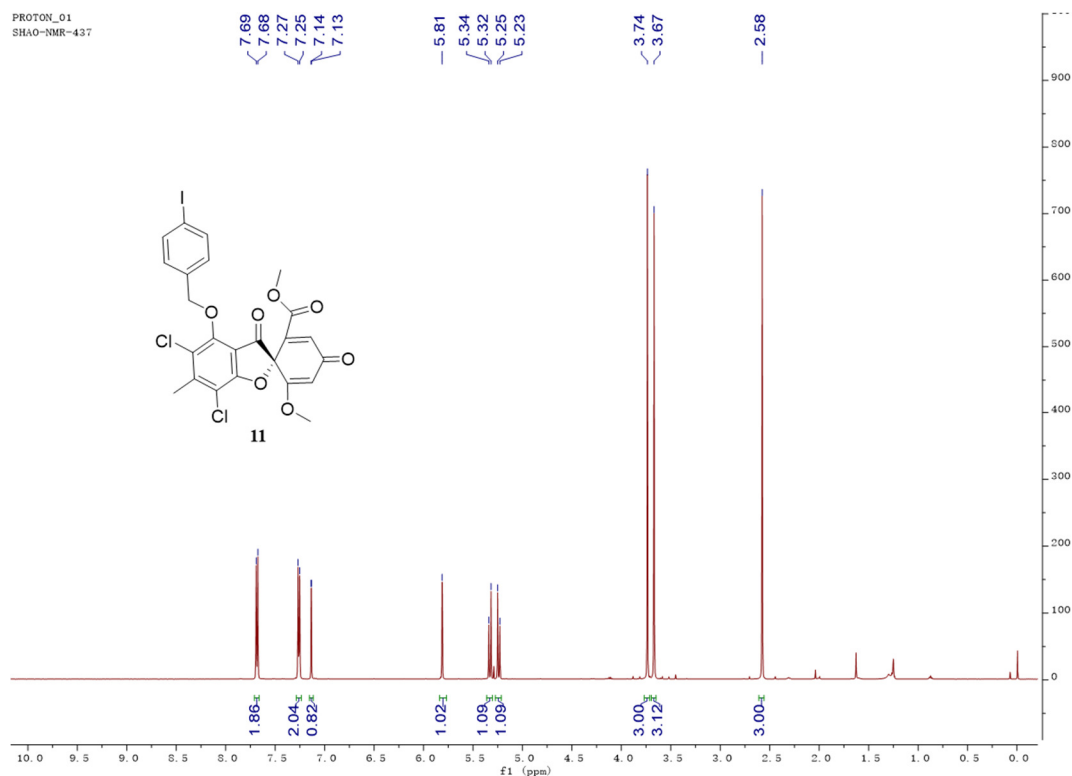


Figure S31. ^1H NMR (500 MHz, CDCl_3) spectrum of compound **11**

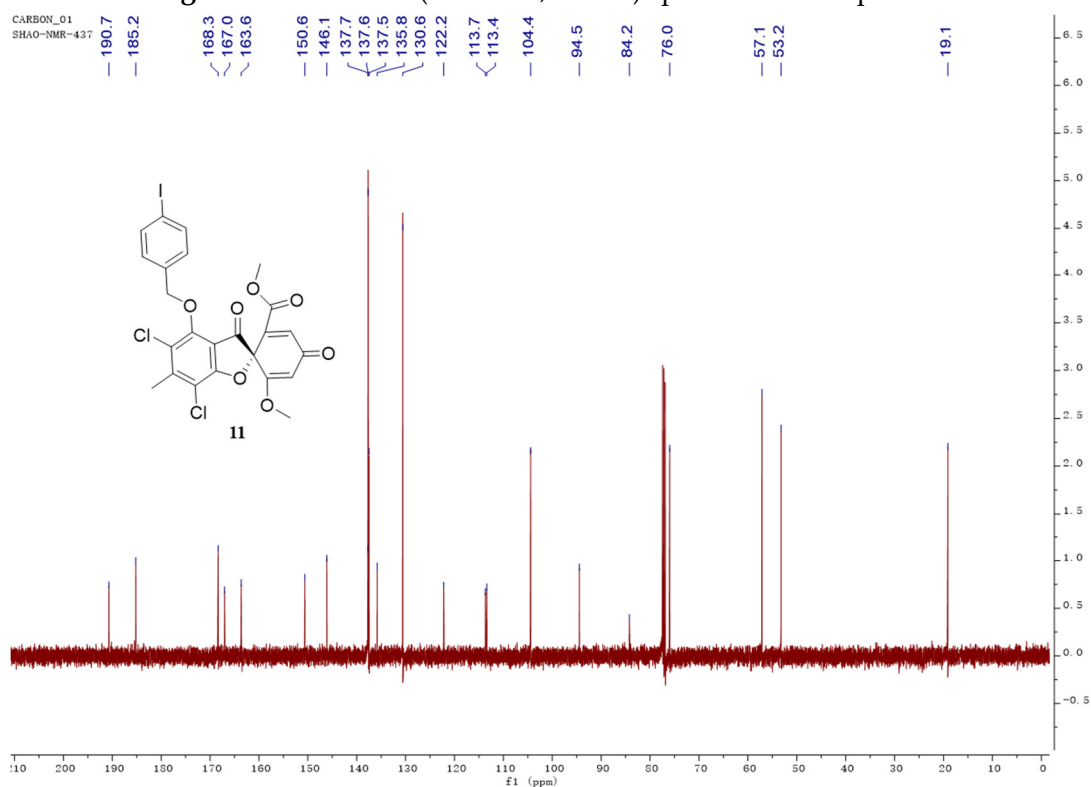


Figure S32. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **11**

CHNQD-02127 #538 RT: 5.19 AV: 1 NL: 3.44E7
T: FTMS - p ESI Full ms [100.00-1500.00]

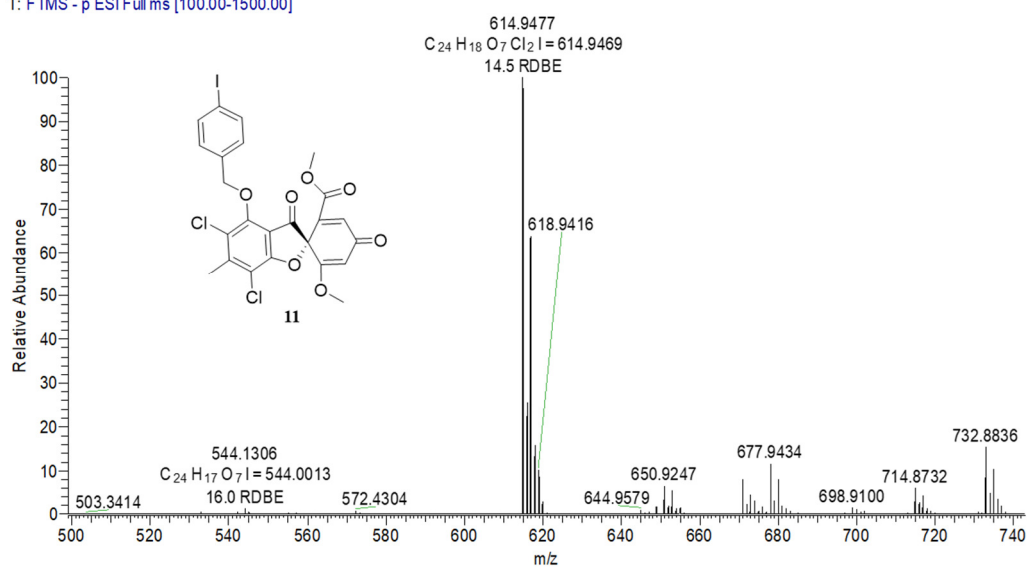


Figure S33. HRESIMS spectrum of compound **11**

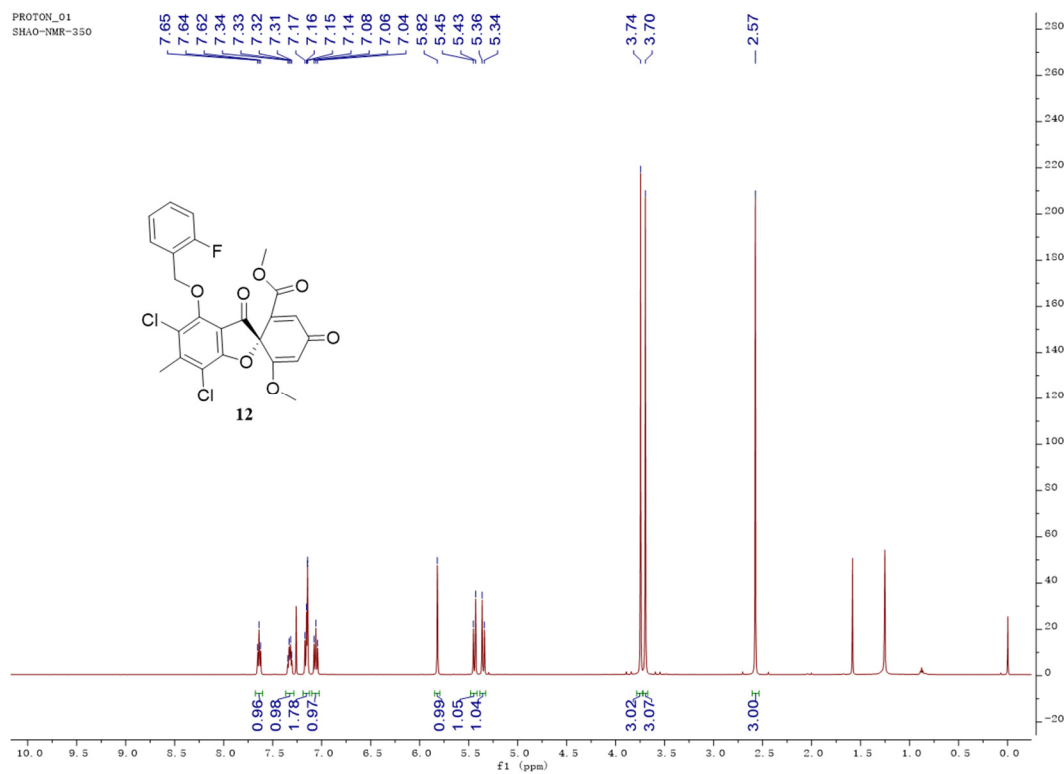


Figure S34. ¹H NMR (500 MHz, CDCl₃) spectrum of compound **12**

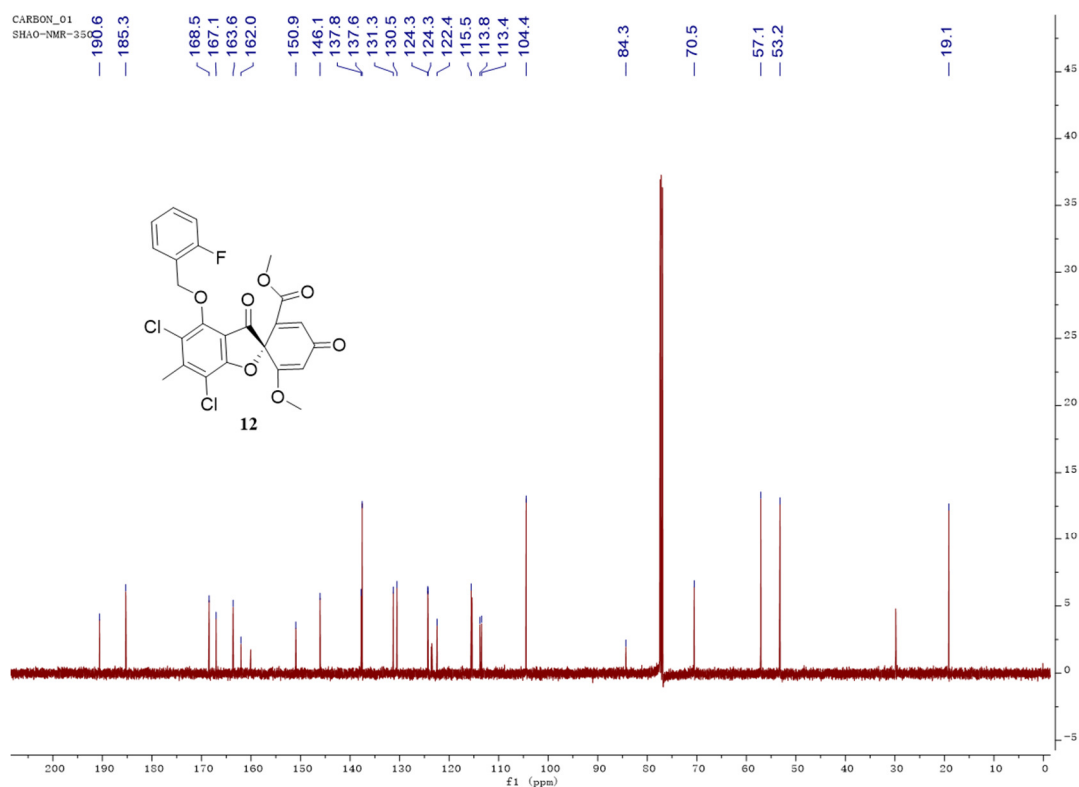


Figure S35. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **12**

CHNQD-02106 #497 RT: 4.78 AV: 1 NL: 1.02E9
T: FTMS + p ESI Full ms [100.00-1500.00]

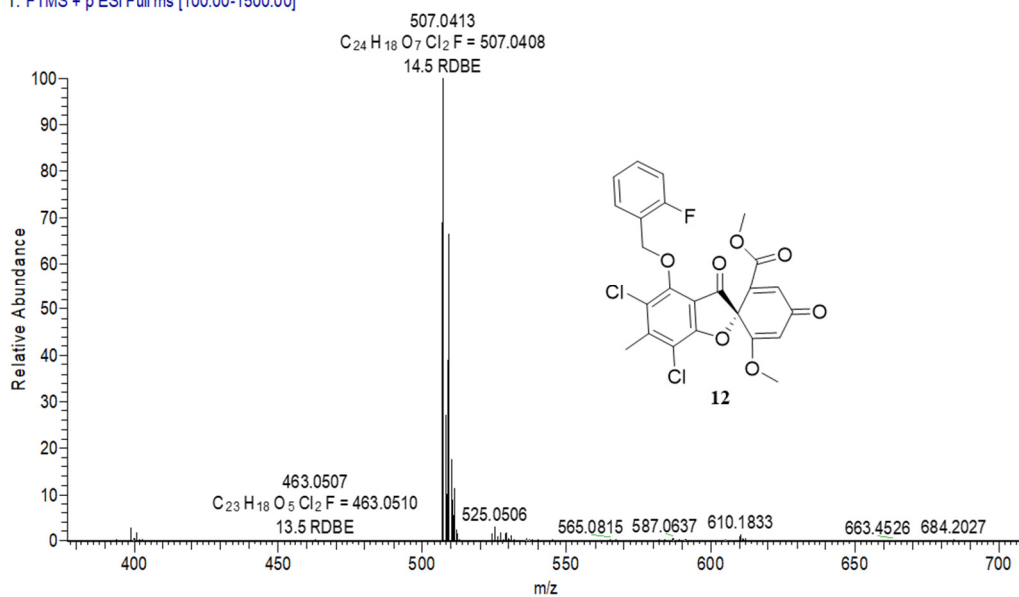


Figure S36. HRESIMS spectrum of compound **12**

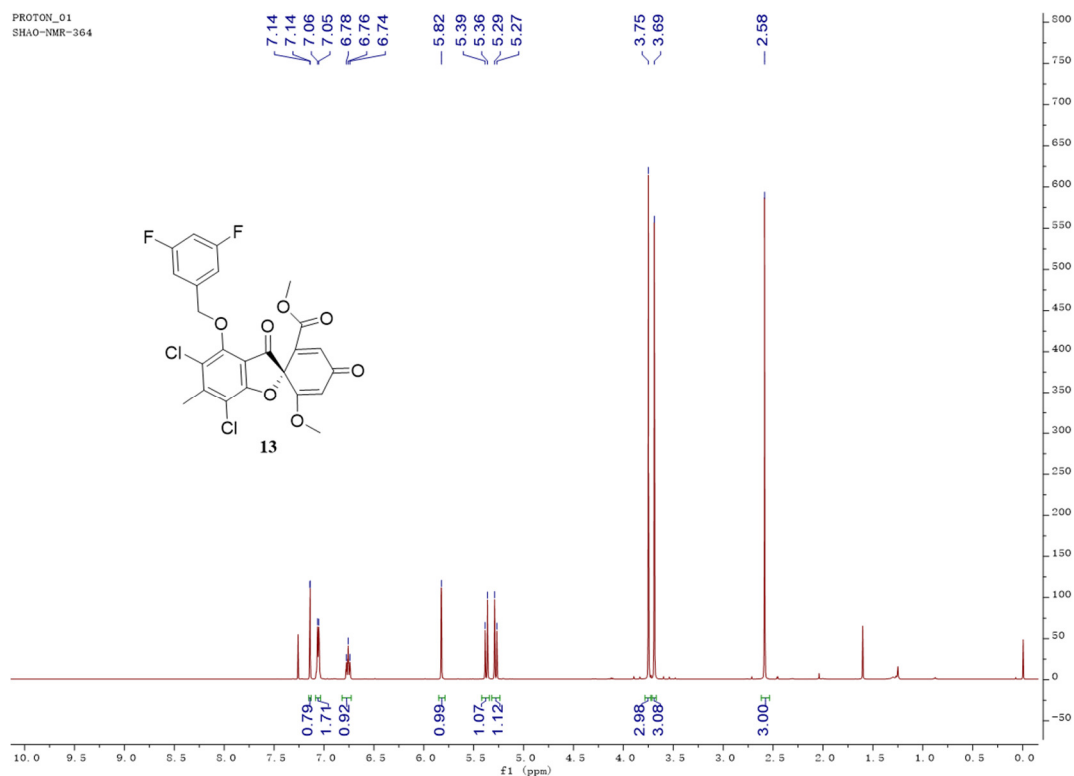


Figure S37. ^1H NMR (500 MHz, CDCl_3) spectrum of compound **13**

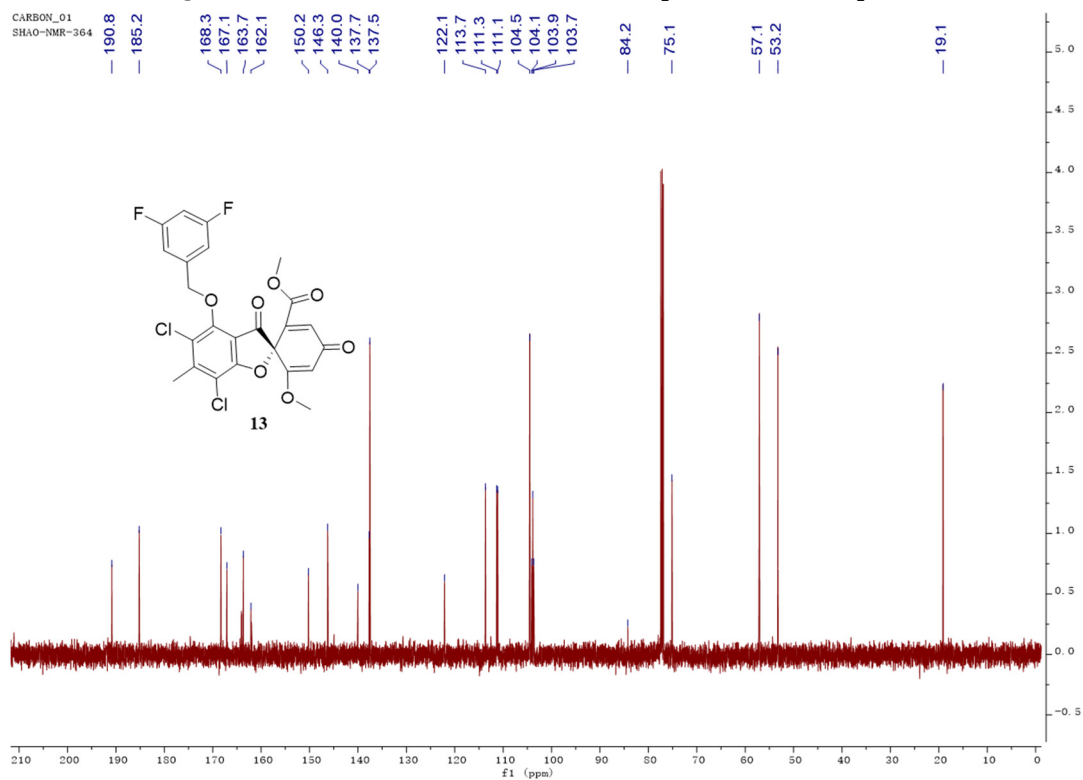


Figure S38. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **13**

CHNOD-02117 #521 RT: 5.03 AV: 1 NL: 5.26E8
T: FTMS + p ESI Full ms [100.00-1500.00]

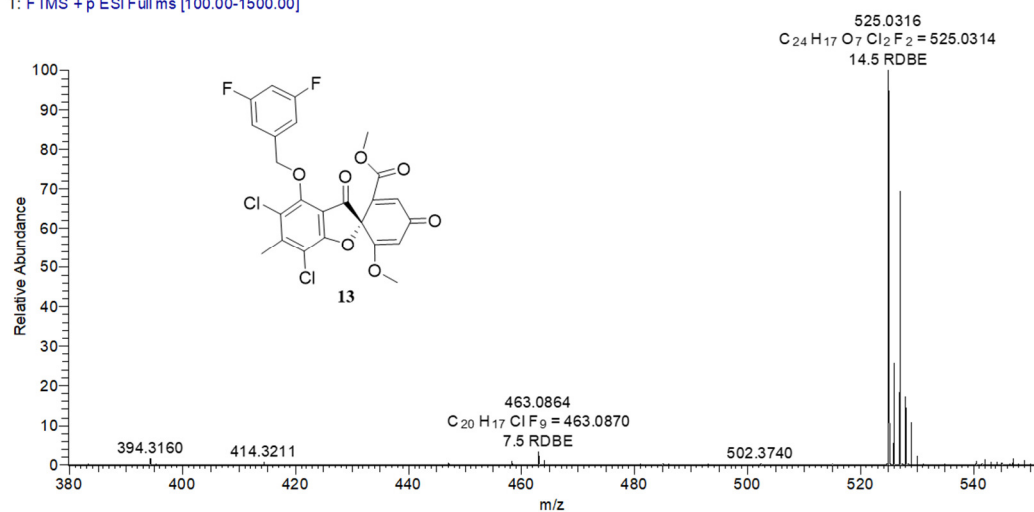


Figure S39. HRESIMS spectrum of compound 13

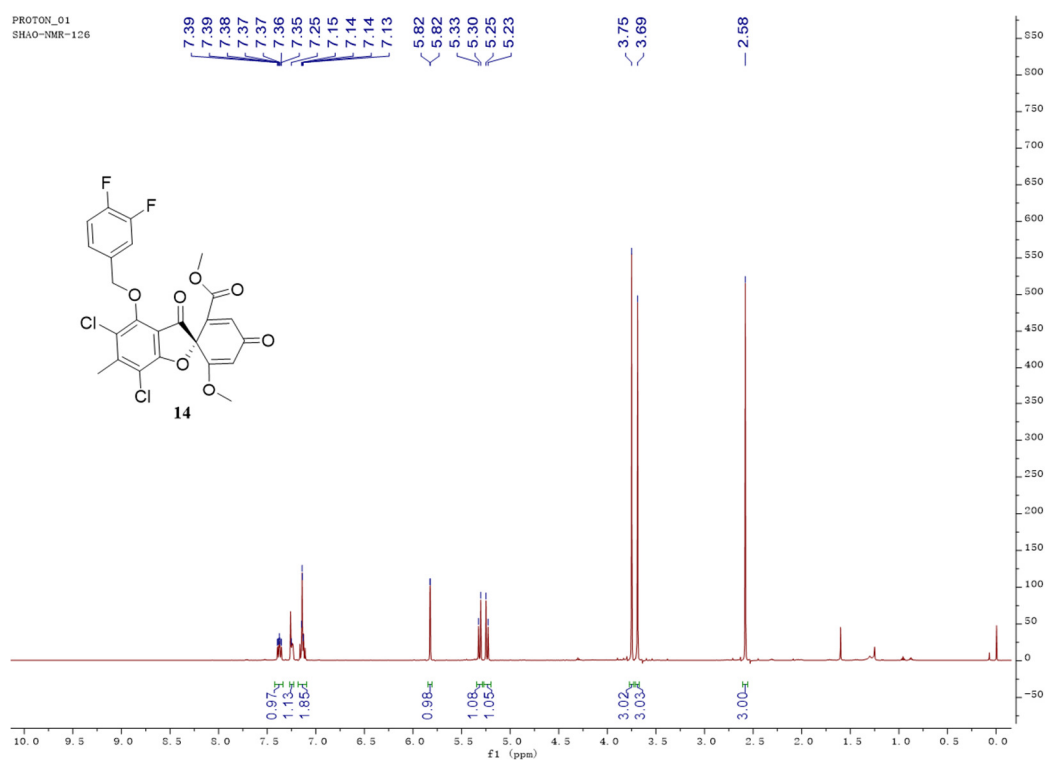


Figure S40. 1H NMR (500 MHz, $CDCl_3$) spectrum of compound 14

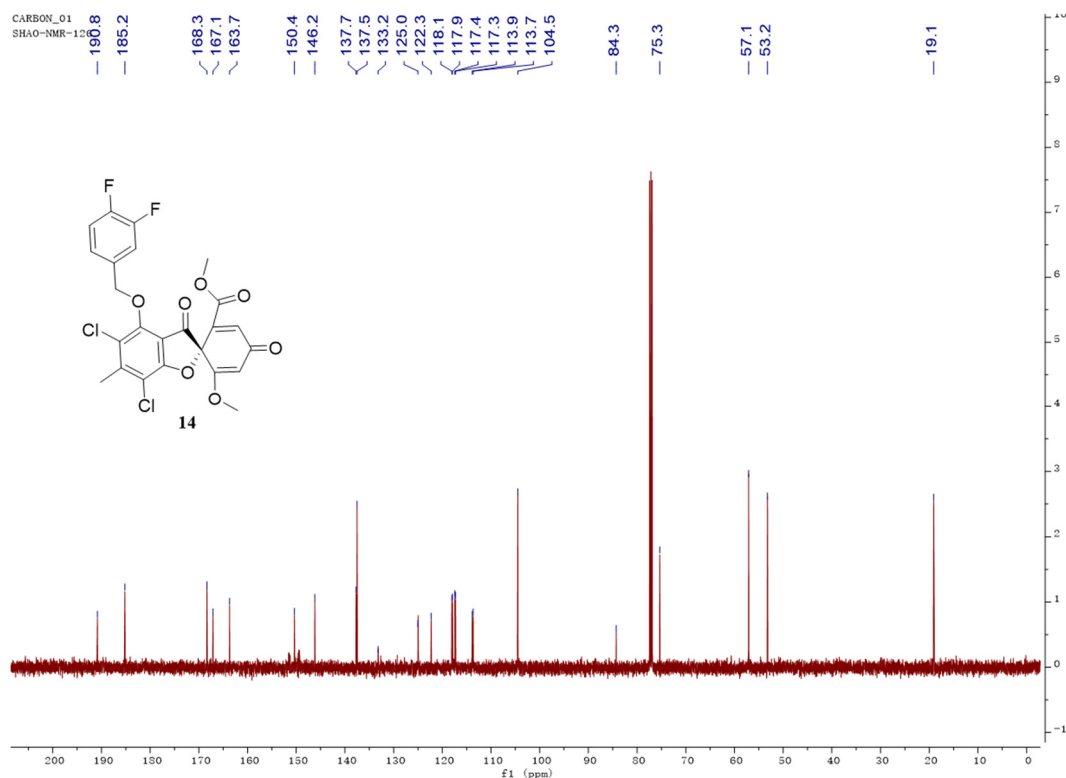


Figure S41. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **14**

CHNQD-02103 #500 RT: 4.81 AV: 1 NL: 2.09E8
T: FTMS - p ESI Full ms [100.00-1500.00]

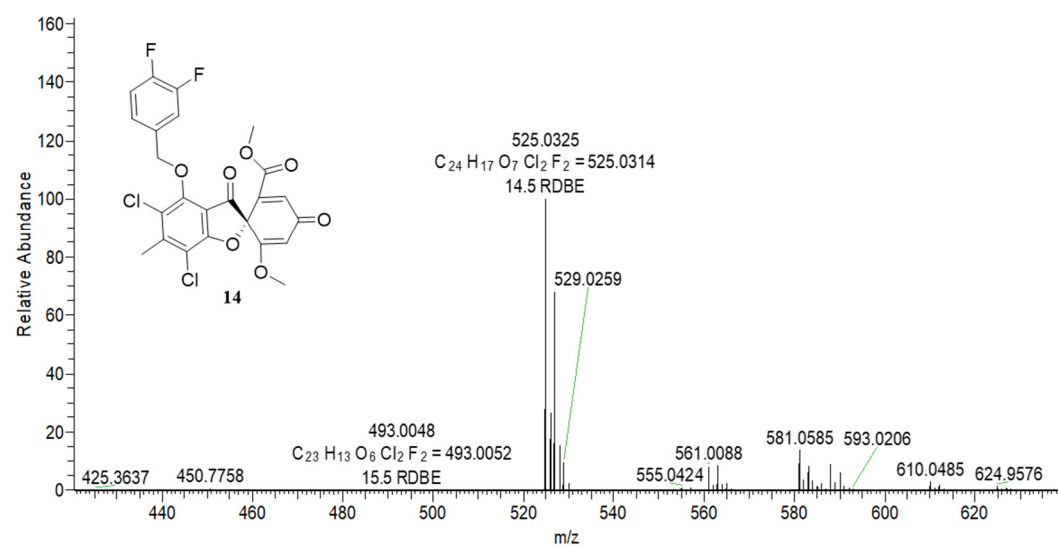
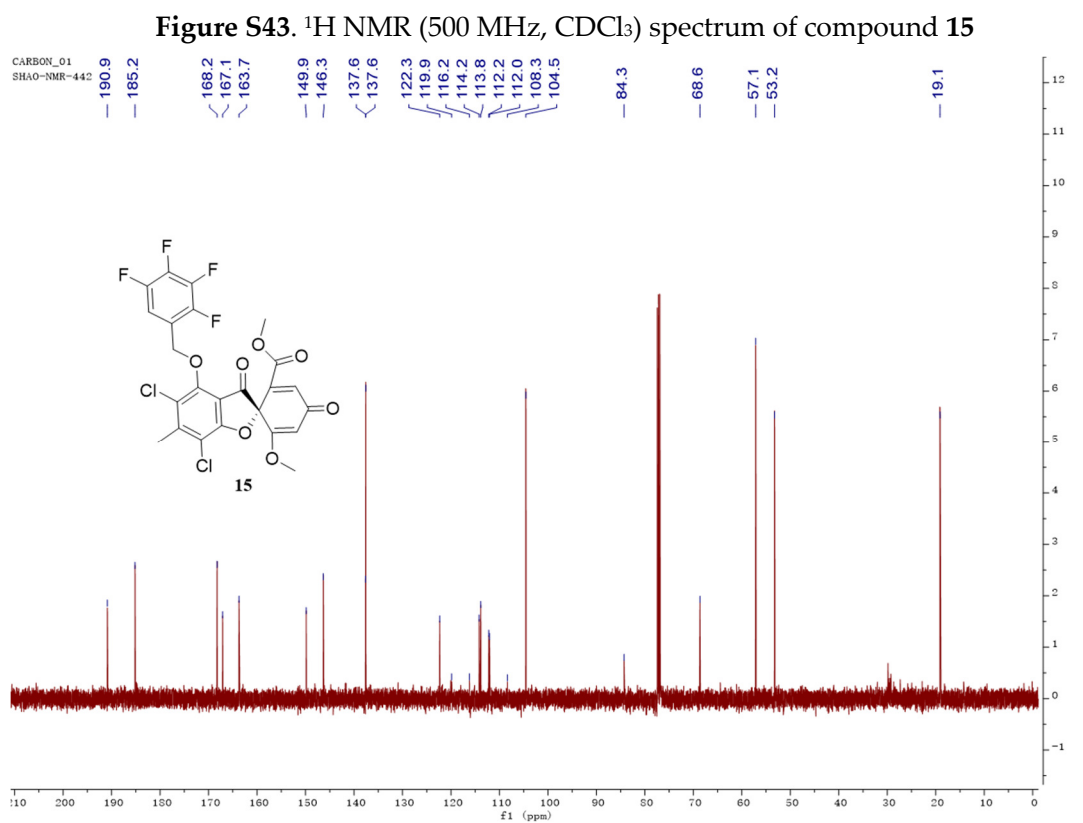
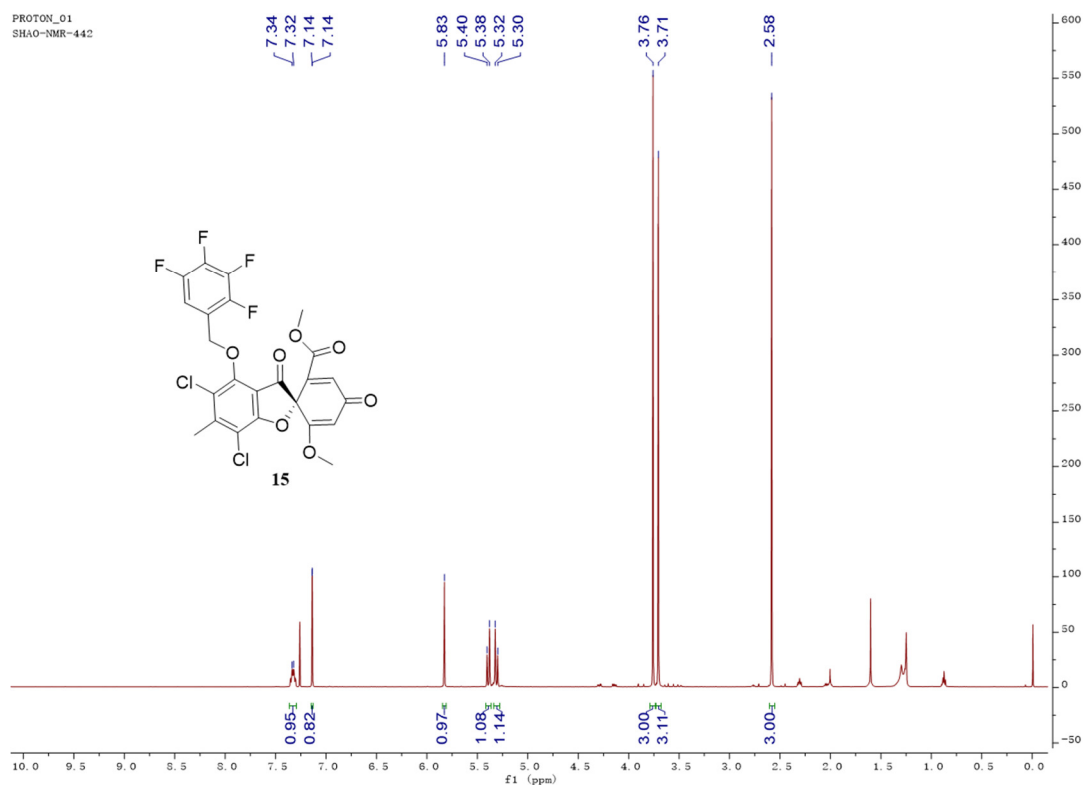


Figure S42. HRESIMS spectrum of compound **14**



CHNQD-02128 #520 RT: 5.02 AV: 1 NL: 1.30E9
T: FTMS -p ESI/Full ms [100.00-1500.00]

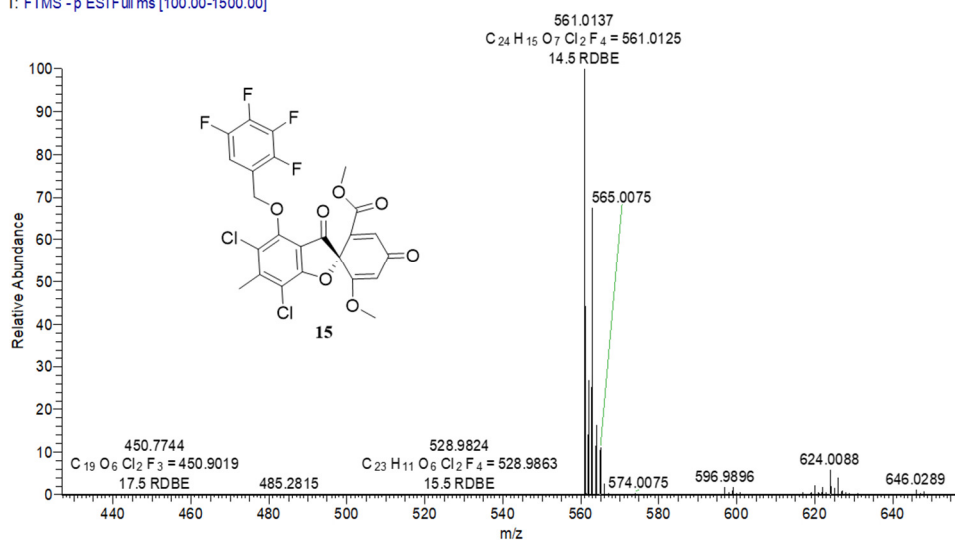


Figure S45. HRESIMS spectrum of compound 15

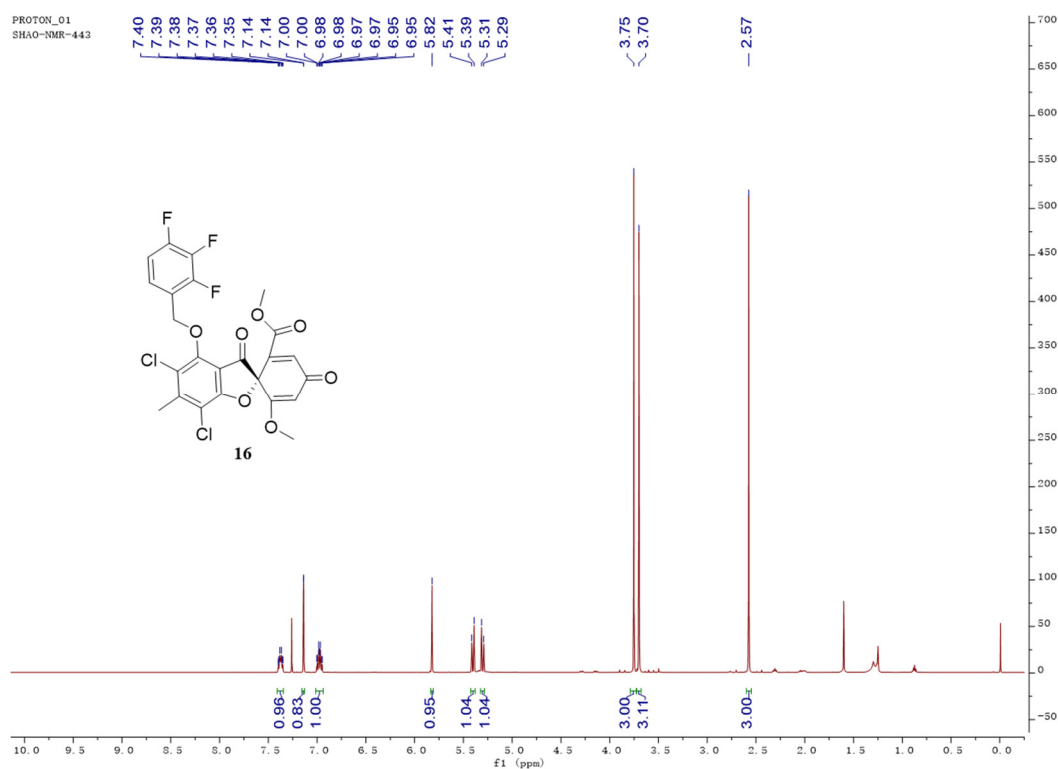


Figure S46. ¹H NMR (500 MHz, CDCl₃) spectrum of compound 16

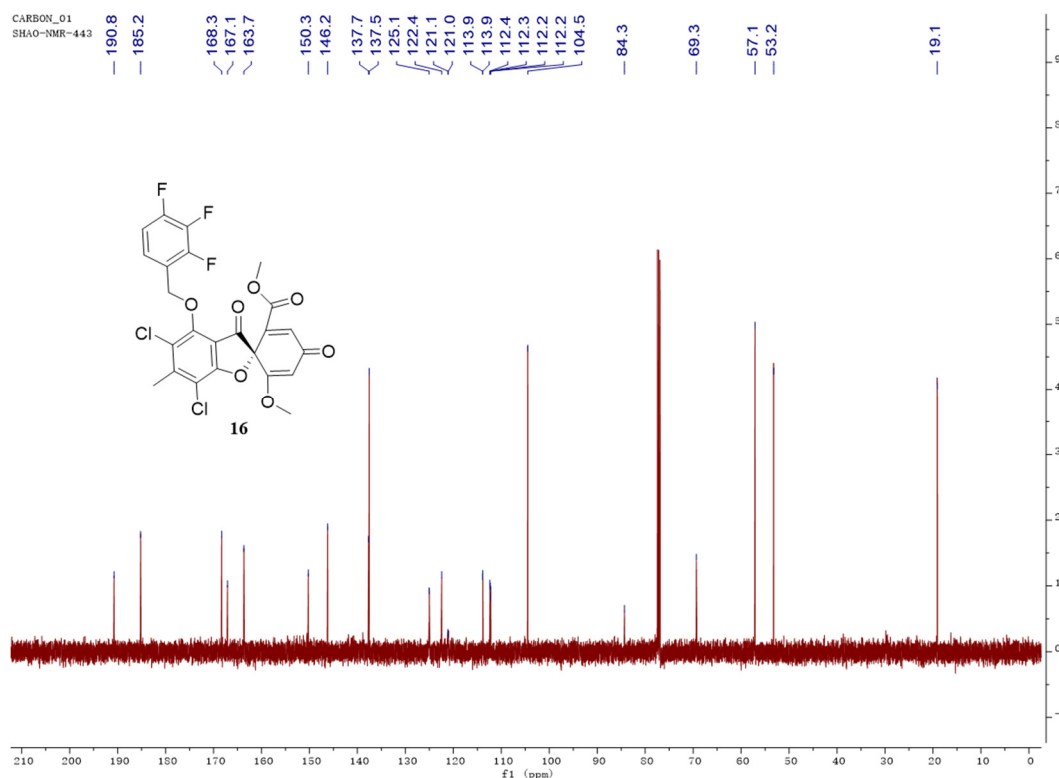


Figure S47. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **16**

CHNQD-02129 #487-528 RT: 4.71-5.10 AV: 42 NL: 1.88E8
T: FTMS + p ESI Fullms [100.00-1500.00]

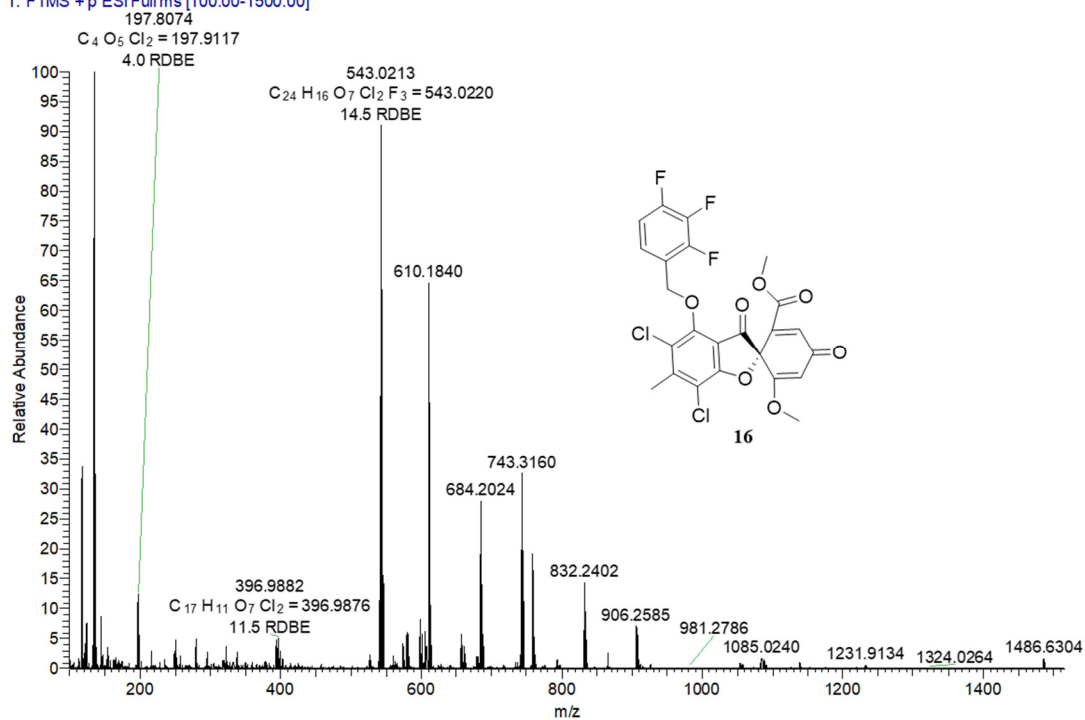


Figure S48. HRESIMS spectrum of compound **16**

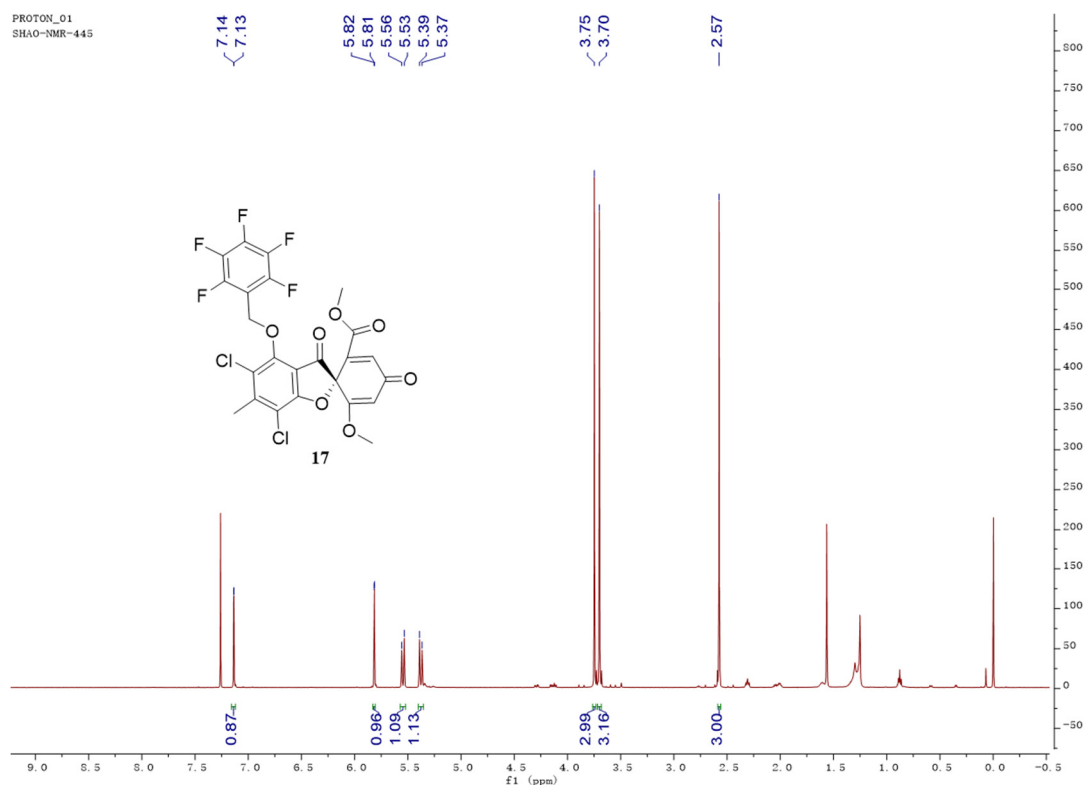


Figure S49. ^1H NMR (500 MHz, CDCl_3) spectrum of compound 17

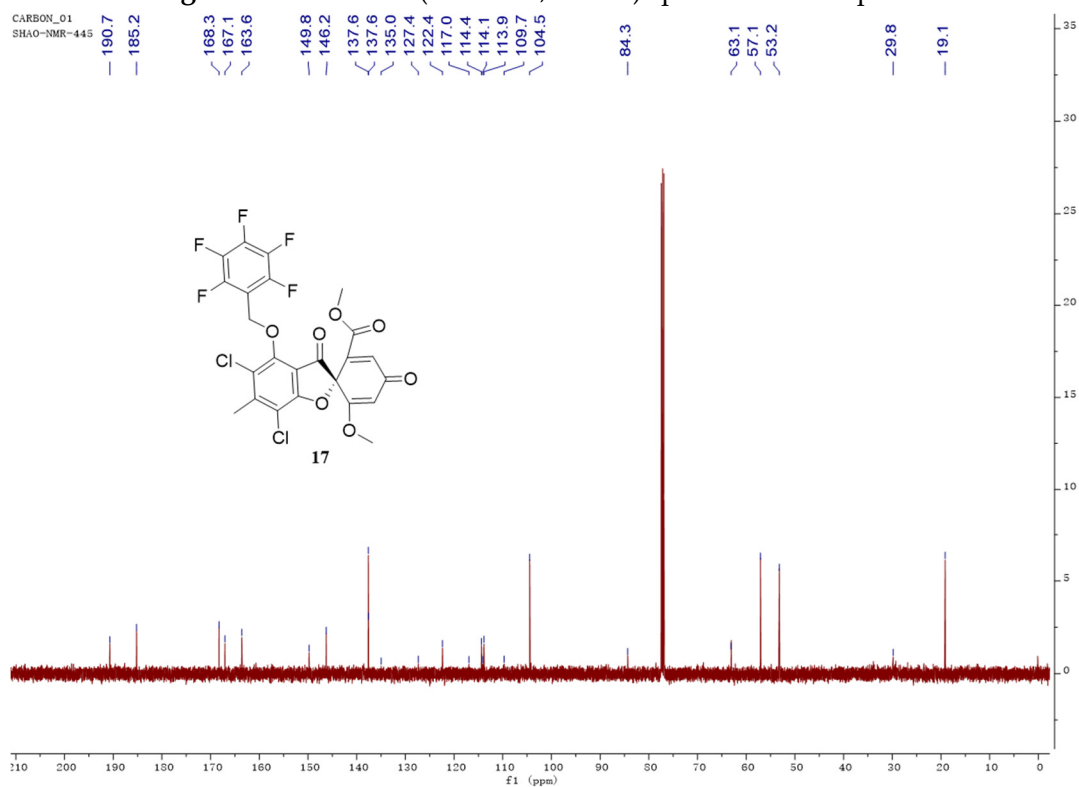


Figure S50. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound 17

CHNQD-02130 #515 RT: 4.98 AV: 1 NL: 7.65E7

T: FTMS + p ESIFulms [100.00-1500.00]

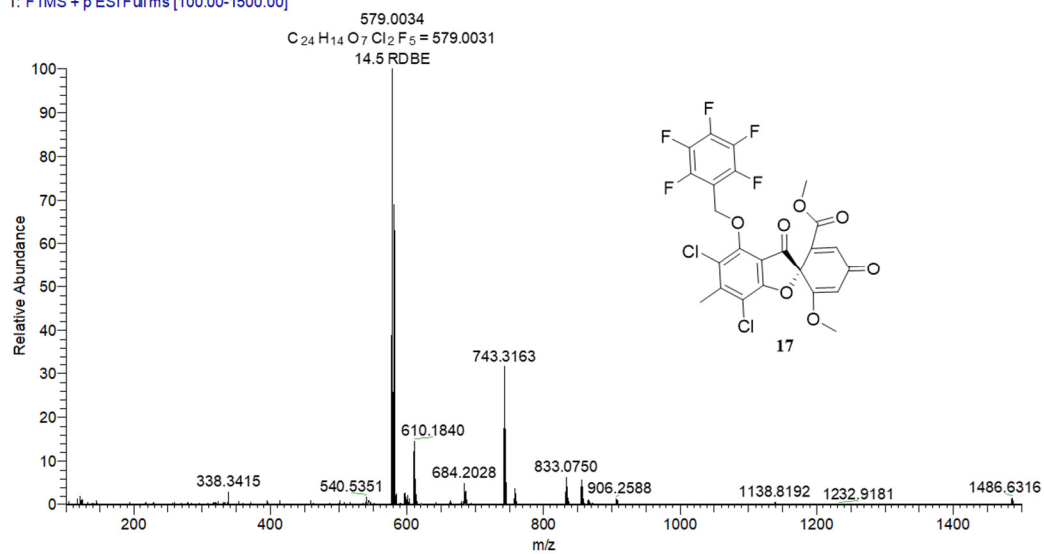


Figure S51. HRESIMS spectrum of compound 17

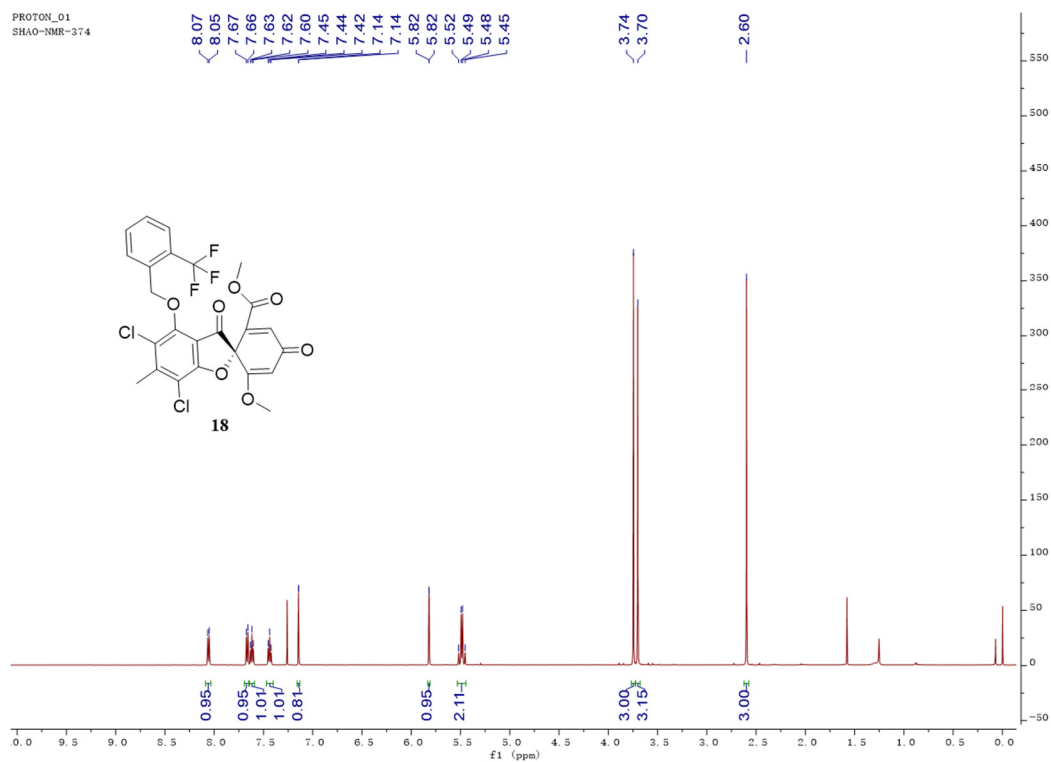


Figure S52. ¹H NMR (500 MHz, CDCl₃) spectrum of compound 18

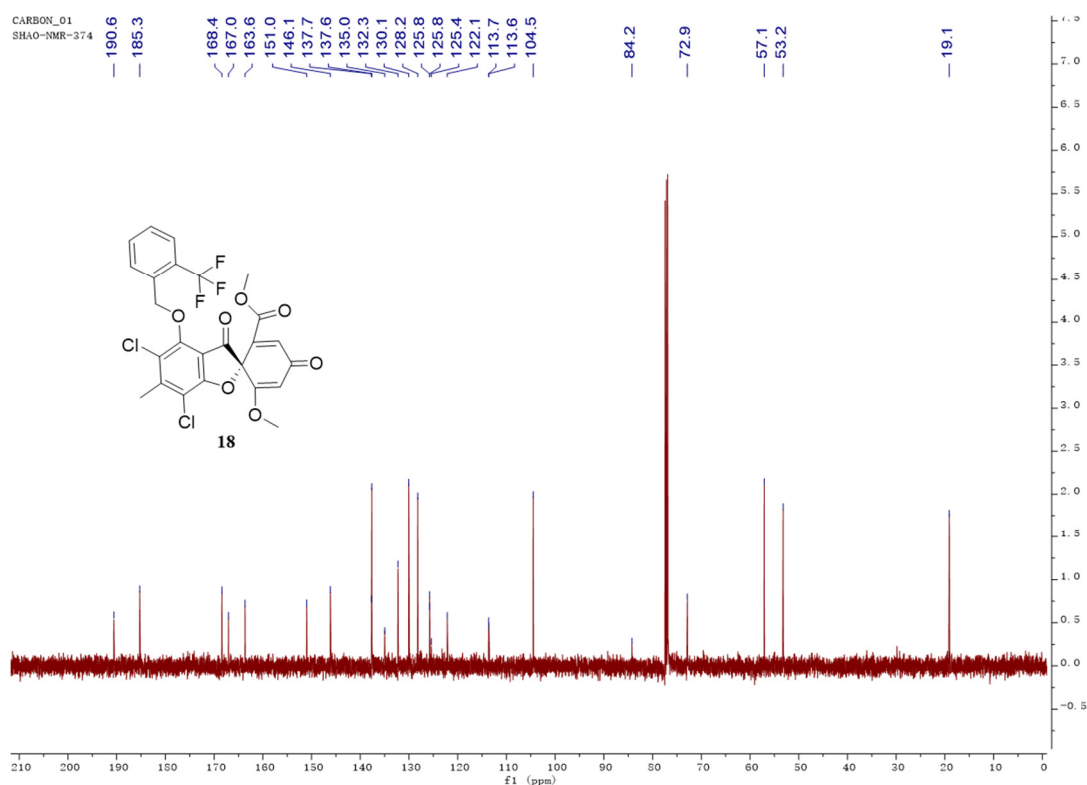


Figure S53. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **18**

CHNQD-02126 #524 RT: 5.06 AV: 1 NL: 1.01E9
T: FTMS - p ESI Full ms [100.00-1500.00]

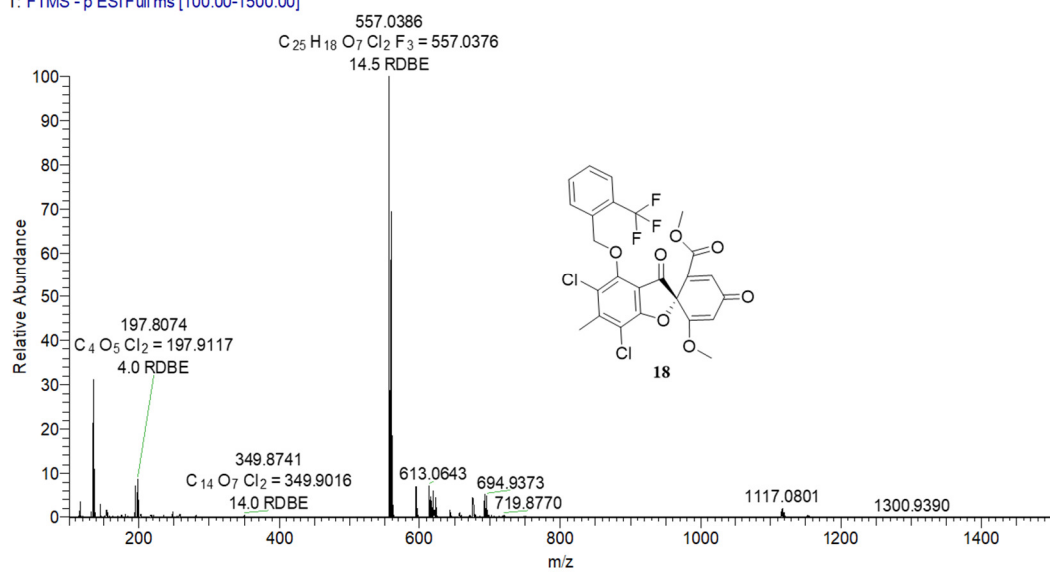


Figure S54. HRESIMS spectrum of compound **18**

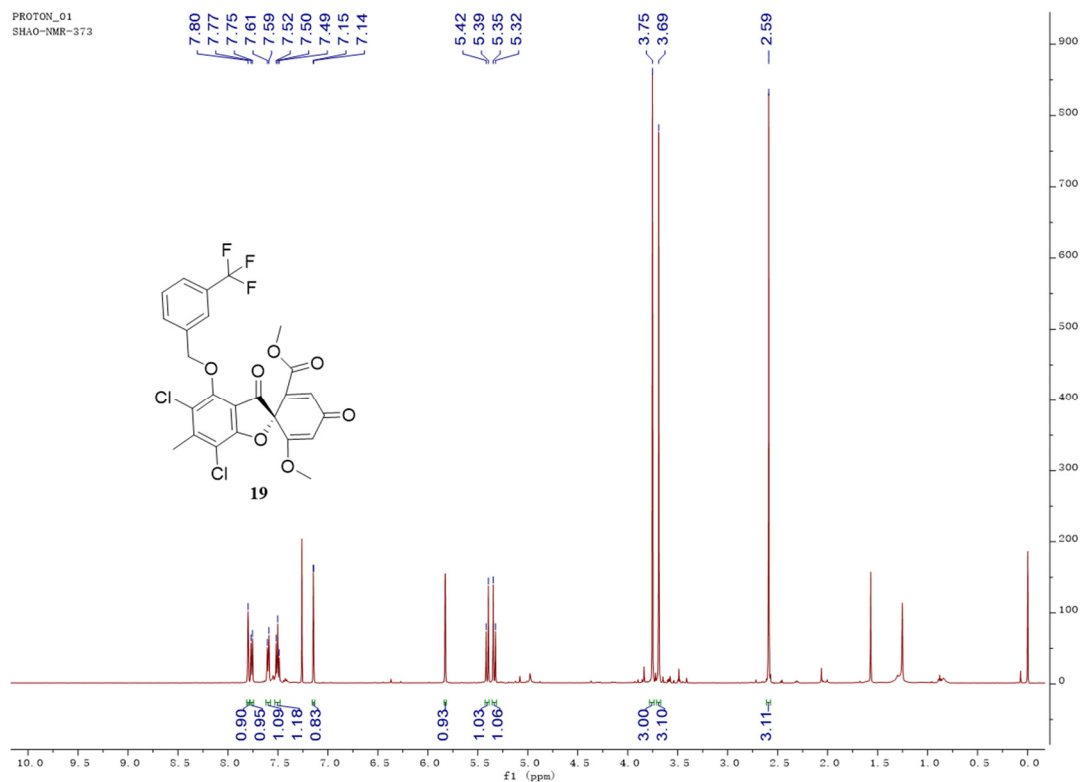


Figure S55. ¹H NMR (500 MHz, CDCl₃) spectrum of compound **19**

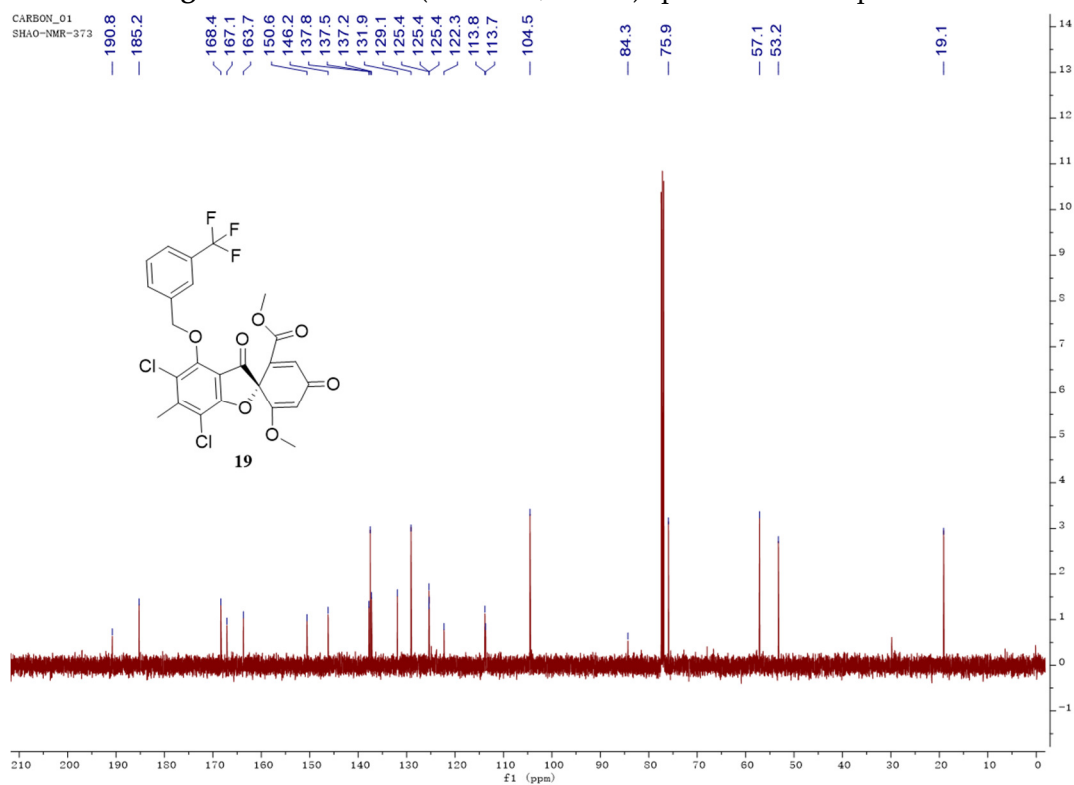


Figure S56. ¹³C NMR (125 MHz, CDCl₃) spectrum of compound **19**

CHNQD-02125 #529 RT: 5.10 AV: 1 NL: 3.70E8
T: FTMS + p ESI Full ms [100.00-1500.00]

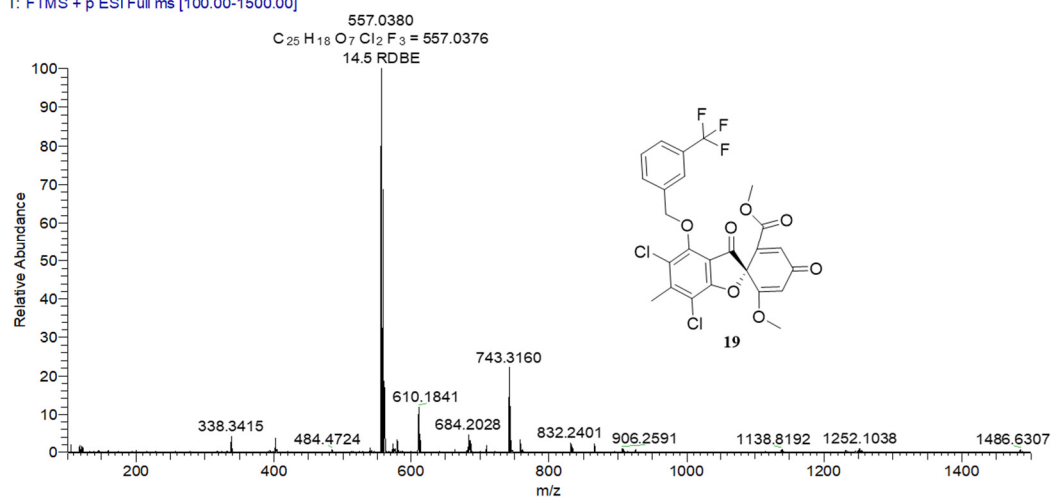


Figure S57. HRESIMS spectrum of compound 19

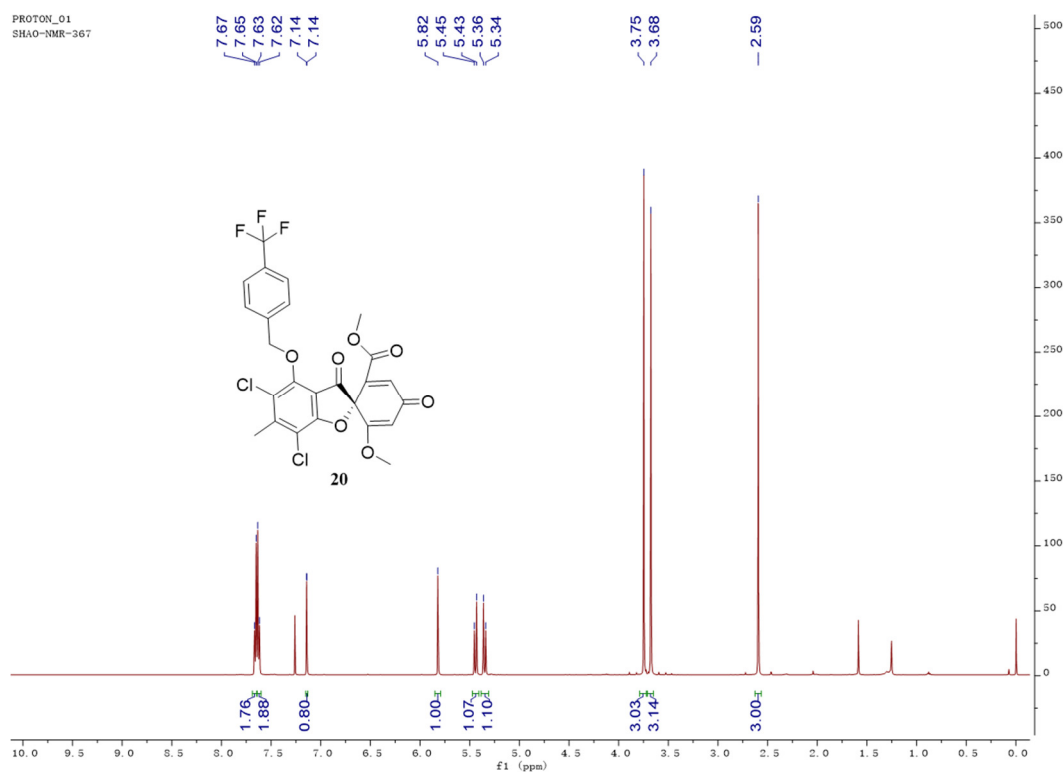


Figure S58. 1H NMR (500 MHz, $CDCl_3$) spectrum of compound 20

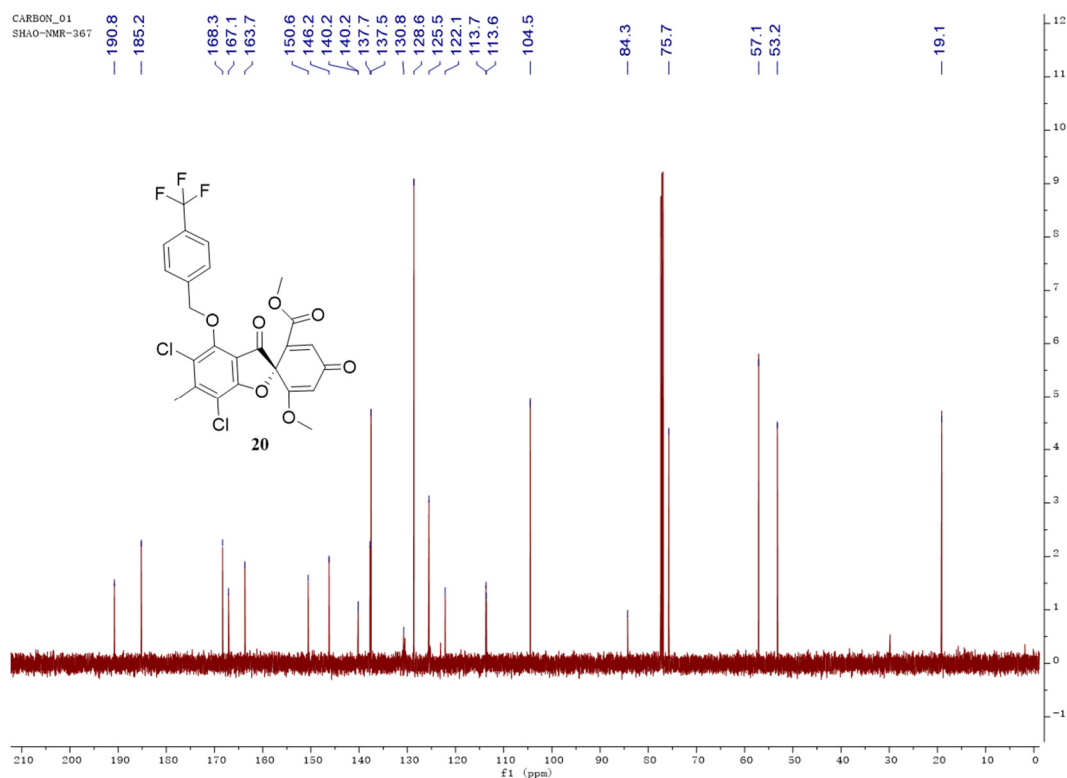


Figure S59. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **20**

CHNQD-02119 #537 RT: 5.19 AV: 1 NL: 4.12E8
T: FTMS + p ESI Full ms [100.00-1500.00]

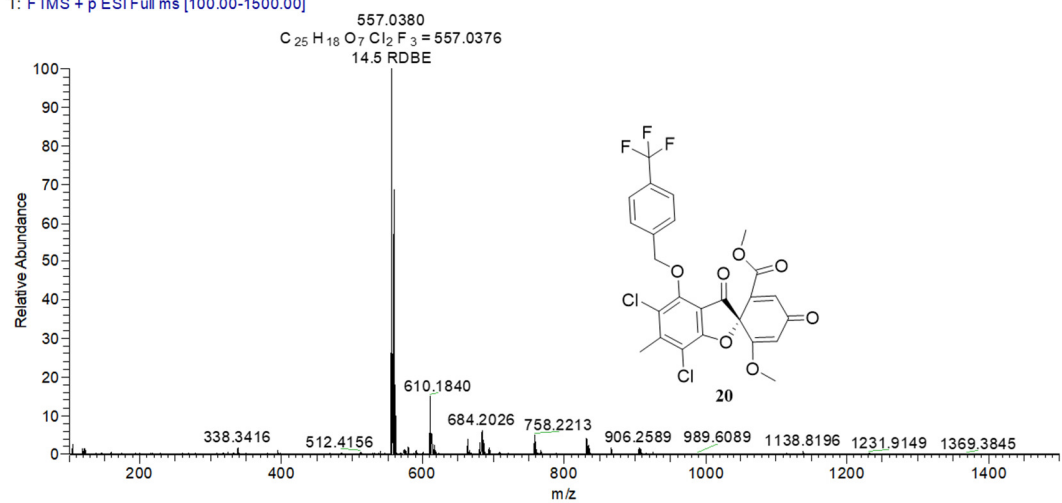


Figure S60. HRESIMS spectrum of compound **20**

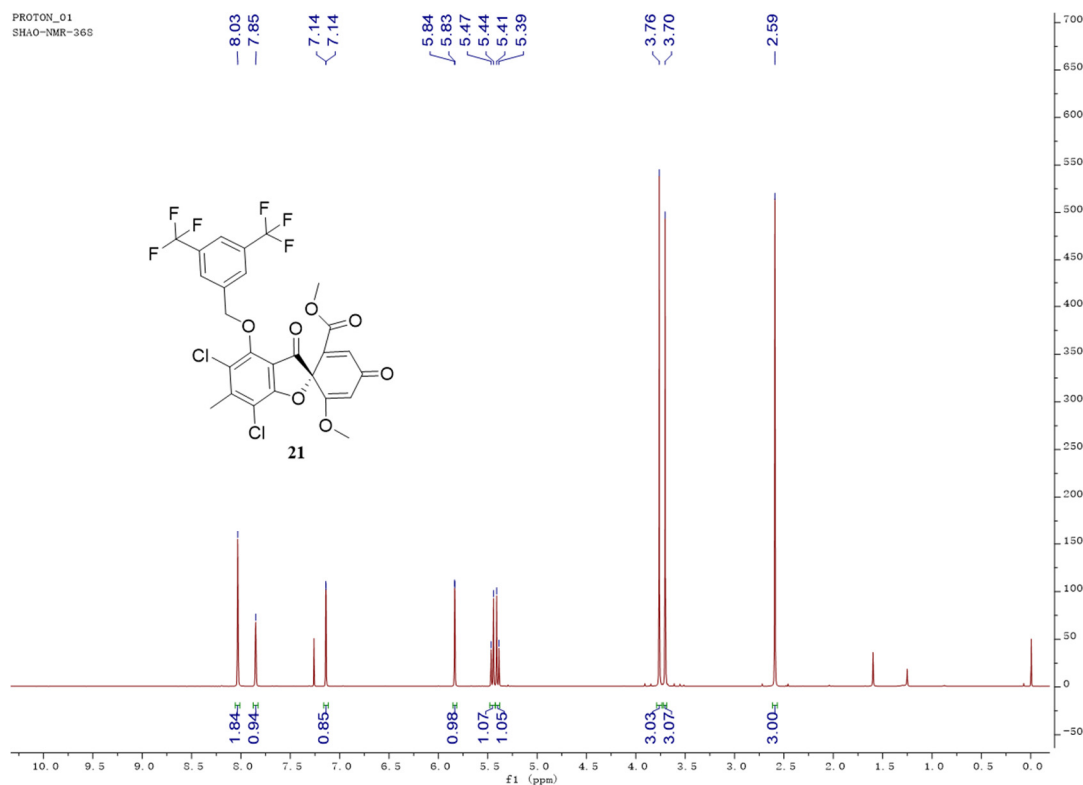


Figure S61. ^1H NMR (500 MHz, CDCl_3) spectrum of compound **21**

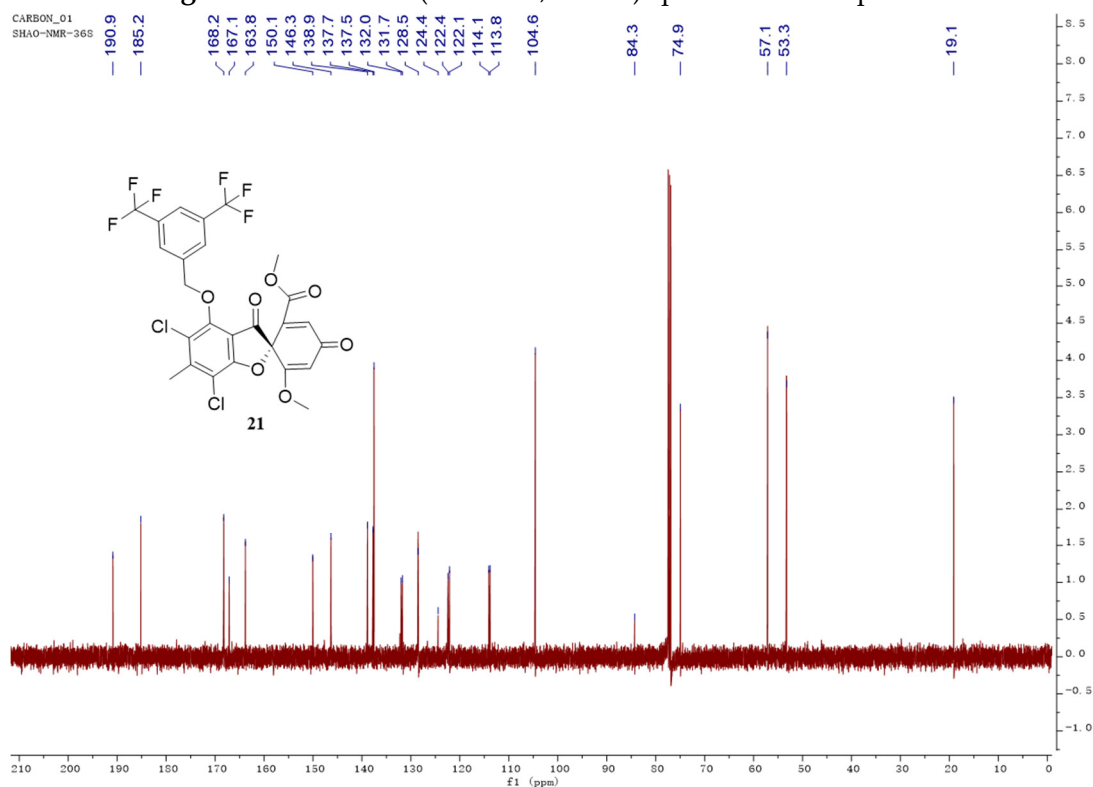


Figure S62. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **21**

CHNQD-02120 #569 RT: 5.49 AV: 1 NL: 3.01E8
T: FTMS + p ESI/Full ms [100.00-1500.00]

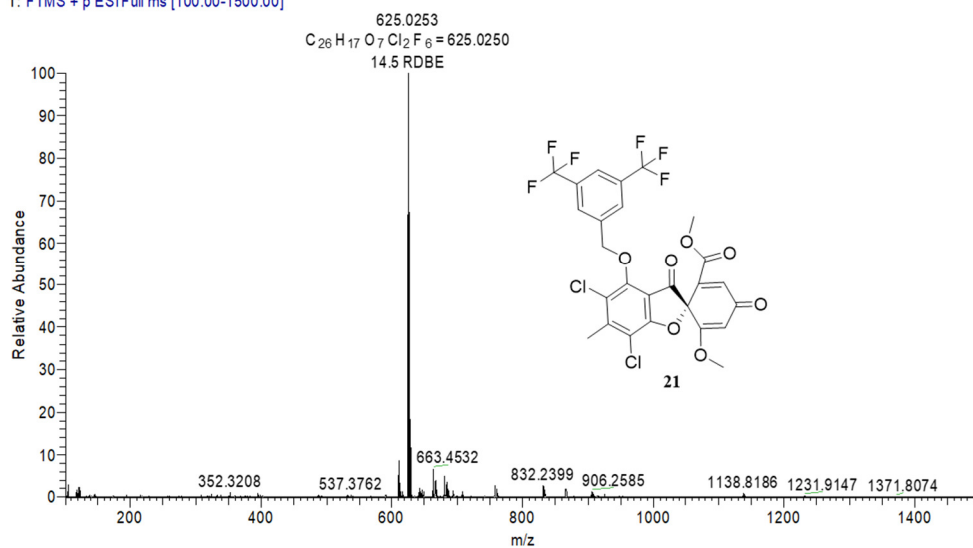


Figure S63. HRESIMS spectrum of compound 21

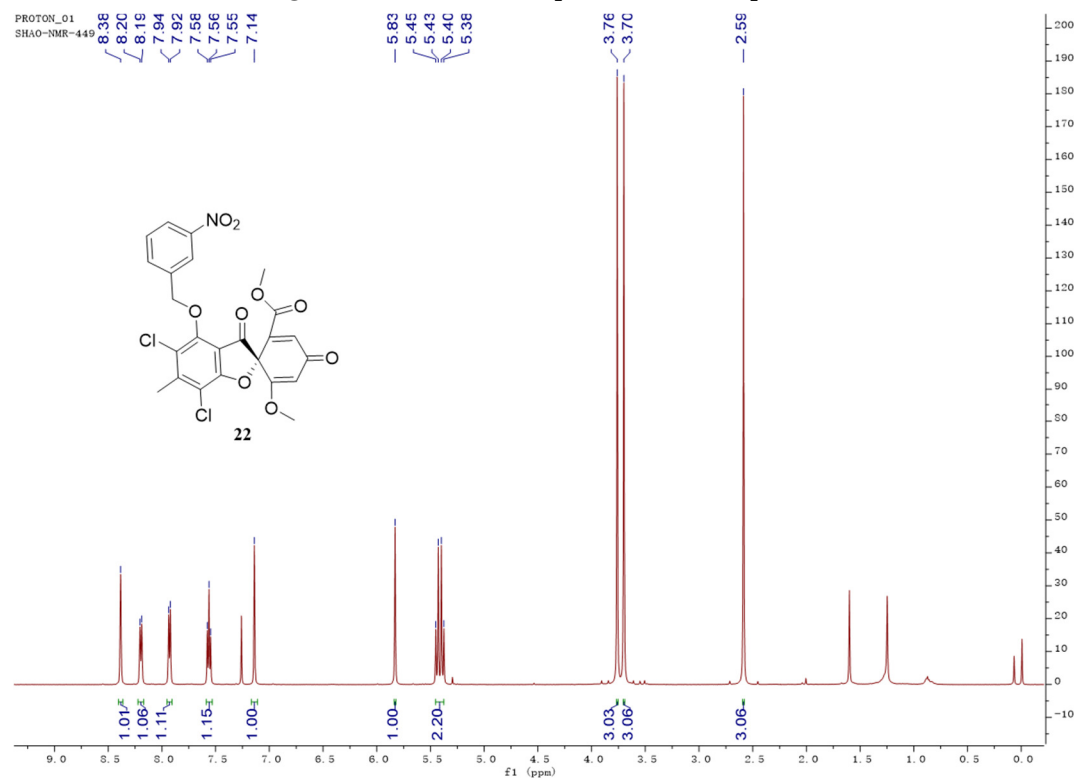


Figure S64. ¹H NMR (500 MHz, CDCl₃) spectrum of compound 22

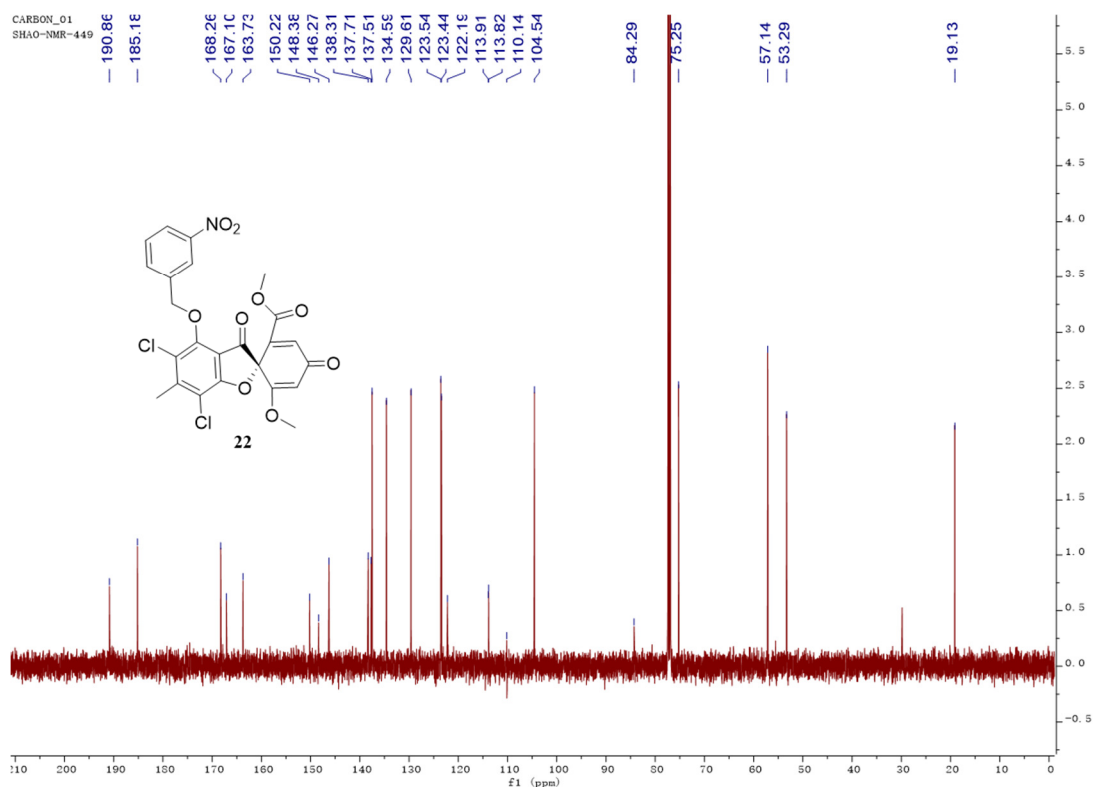


Figure S65. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound 22

20201106-CHNQ-02146_20110608394S #13 RT: 0.33 AV: 1 NL: 1.37E7
T: FTMS + p ESI Full ms [100.00-2000.00]

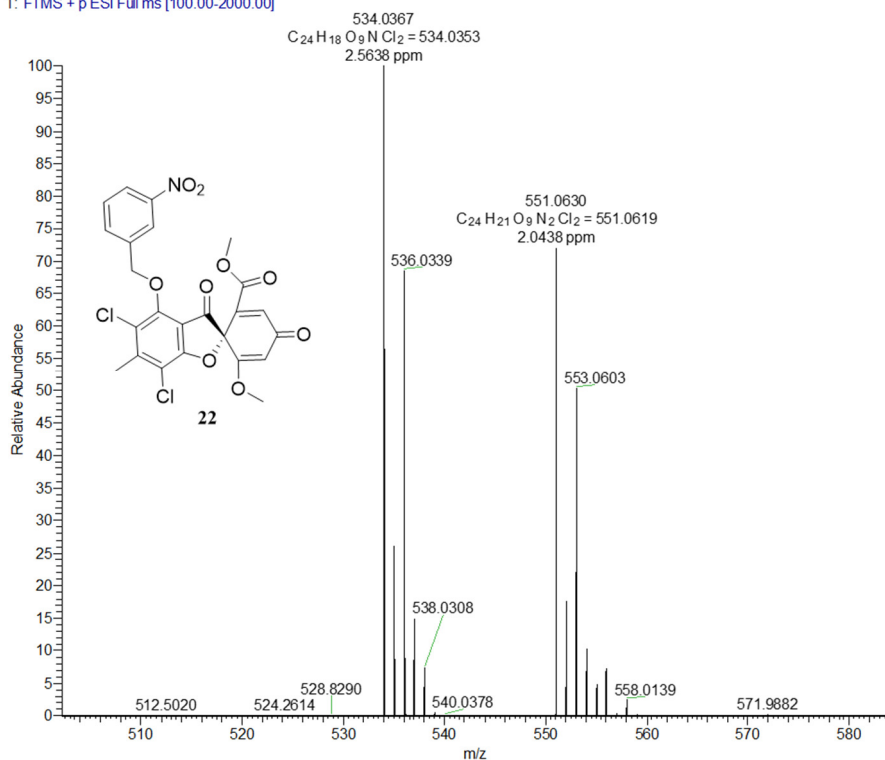


Figure S66. HRESIMS spectrum of compound 22

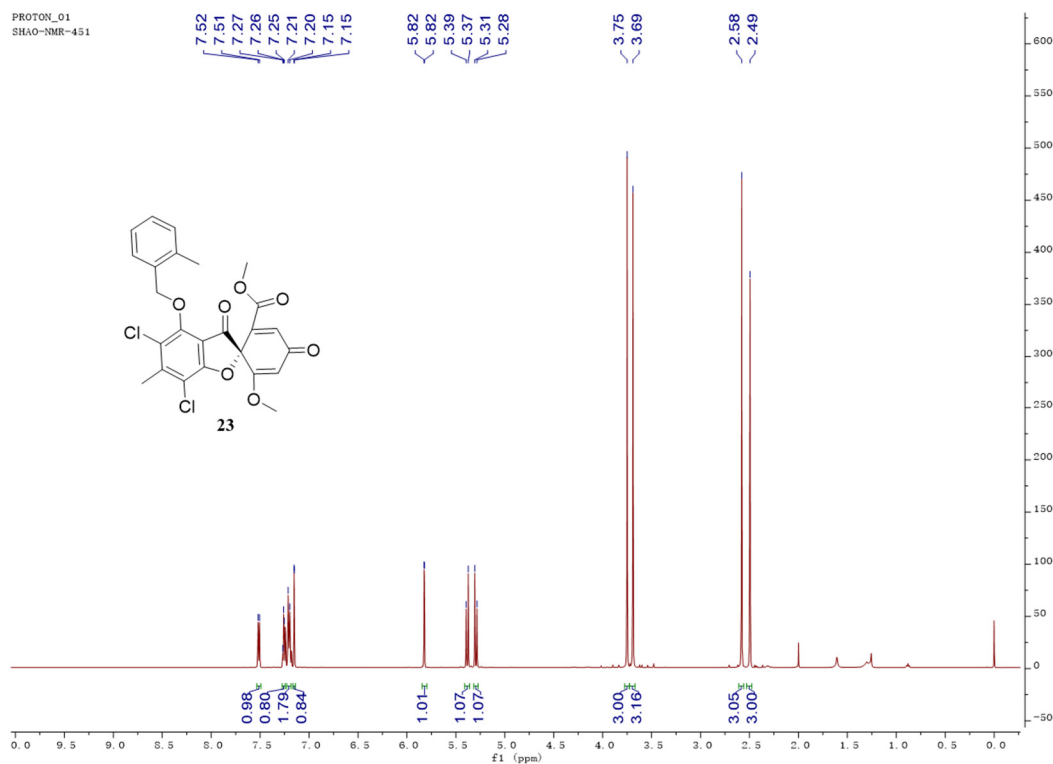


Figure S67. ¹H NMR (500 MHz, CDCl₃) spectrum of compound **23**

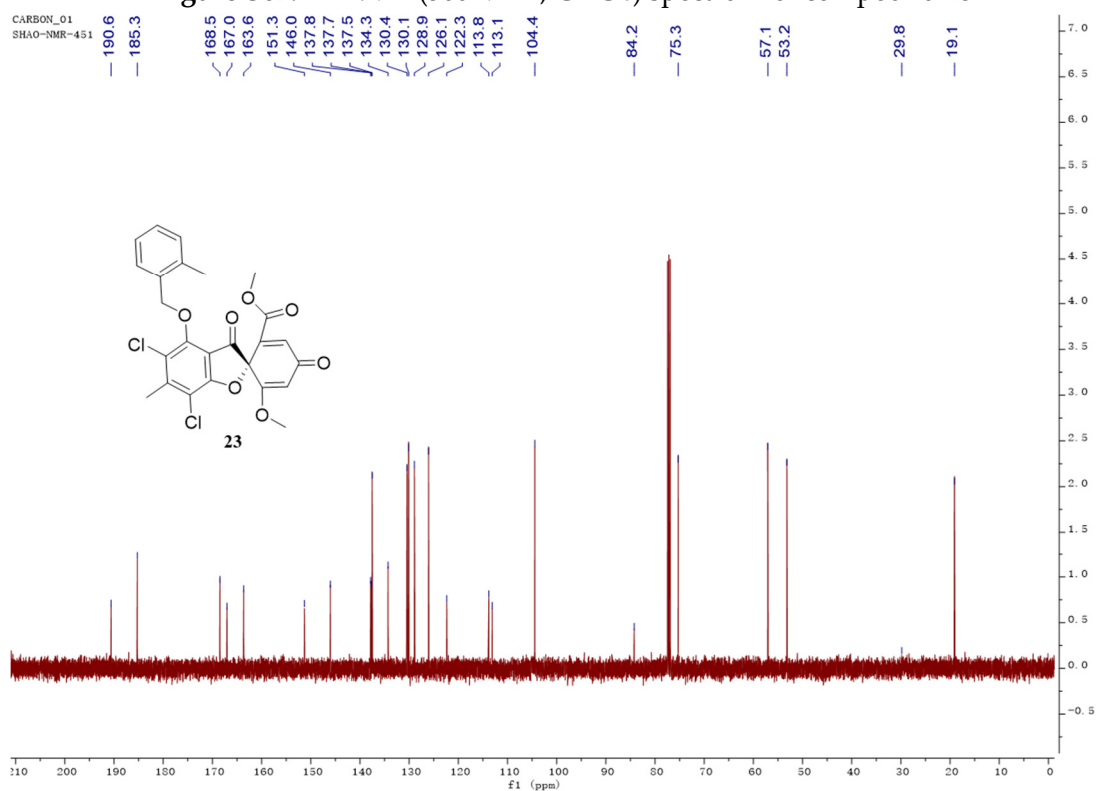


Figure S68. ¹³C NMR (125 MHz, CDCl₃) spectrum of compound **23**

2021106-CHNQ-02149_201106083949 #18-19 RT: 0.47-0.50 AV: 2 NL: 5.86E6
T: FTMS + p ESI Full ms [100.00-2000.00]

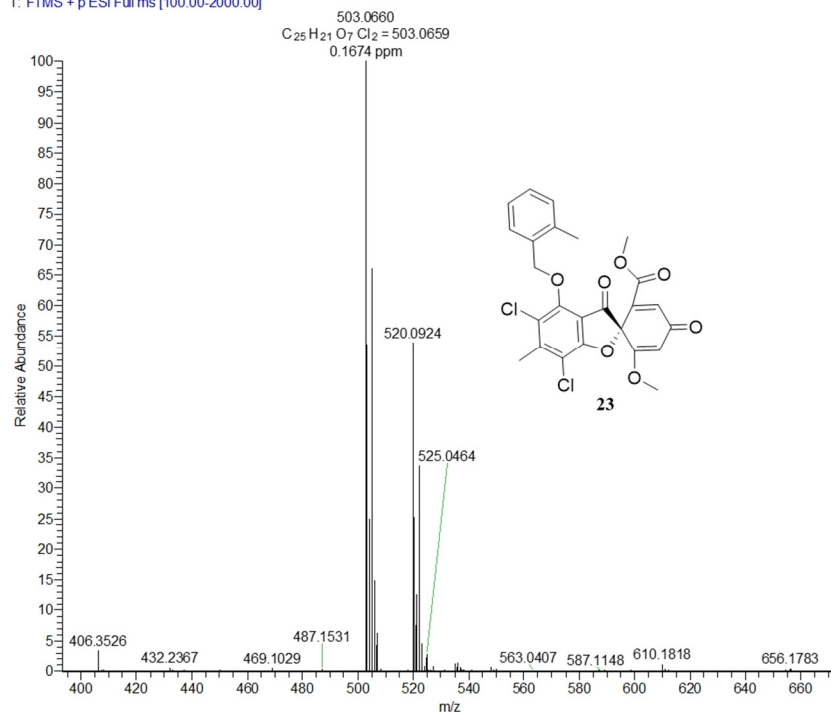


Figure S69. HRESIMS spectrum of compound 23

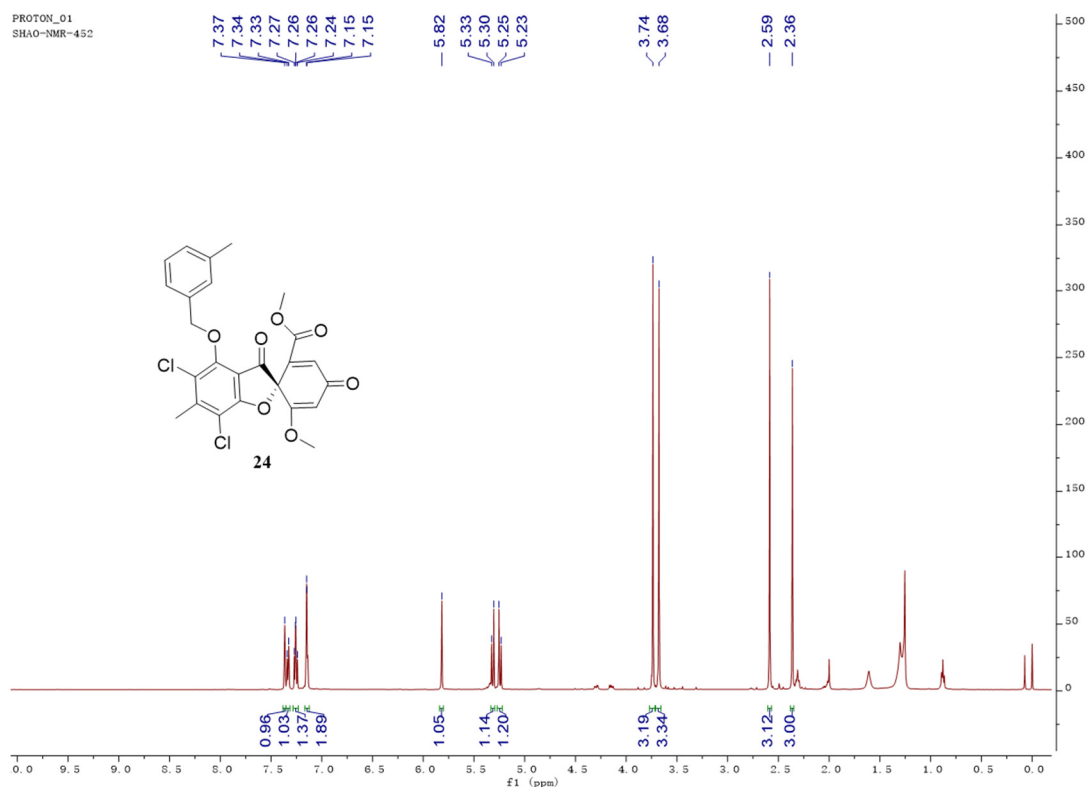


Figure S70. ¹H NMR (500 MHz, CDCl₃) spectrum of compound 24

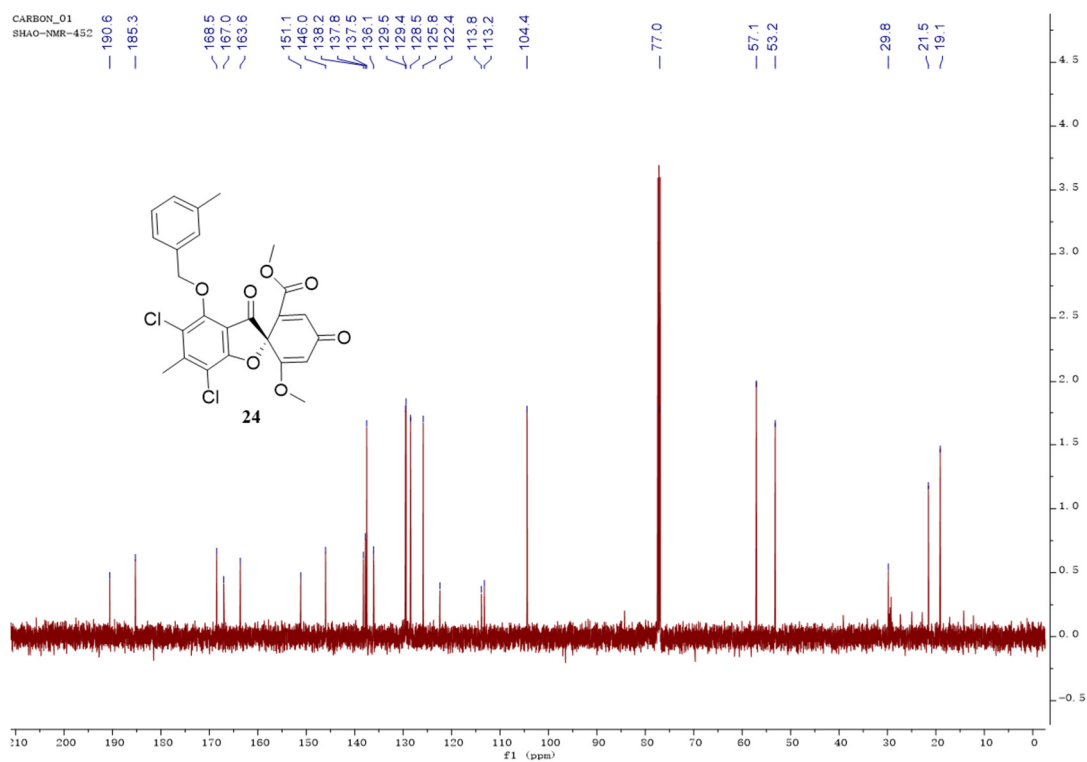


Figure S71. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound 24

20201106-CHNQ-02150_201106083949 #29-30 RT: 0.81-0.84 AV: 2 NL: 9.53E6
T: FTMS + p ESI Full ms [100.00-2000.00]

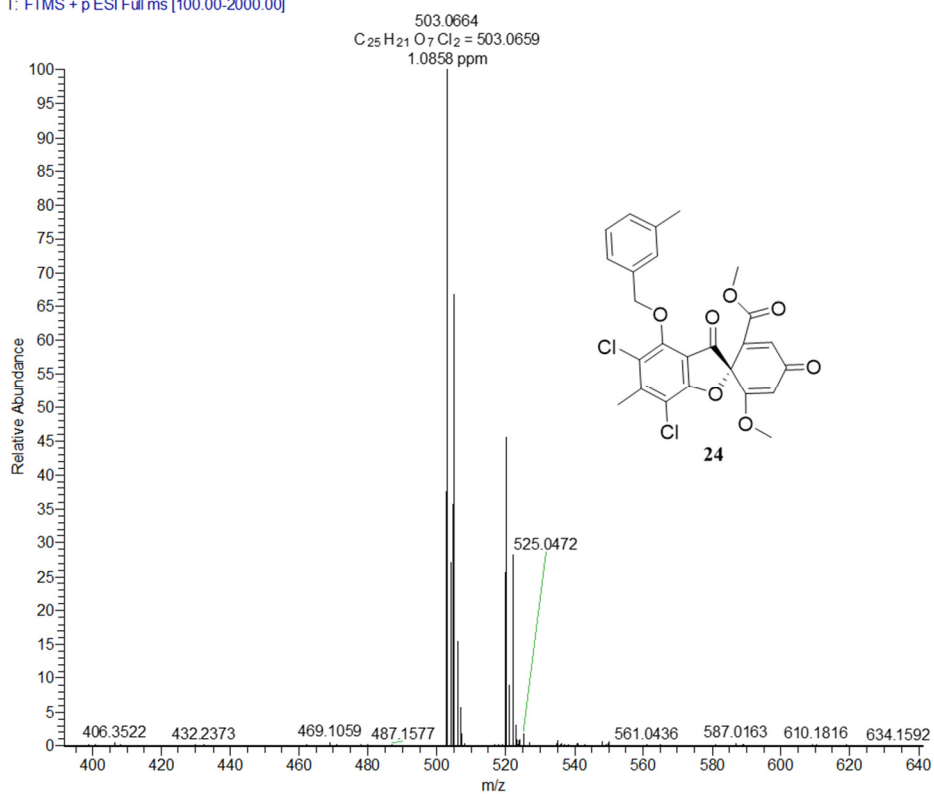


Figure S72. HRESIMS spectrum of compound 24

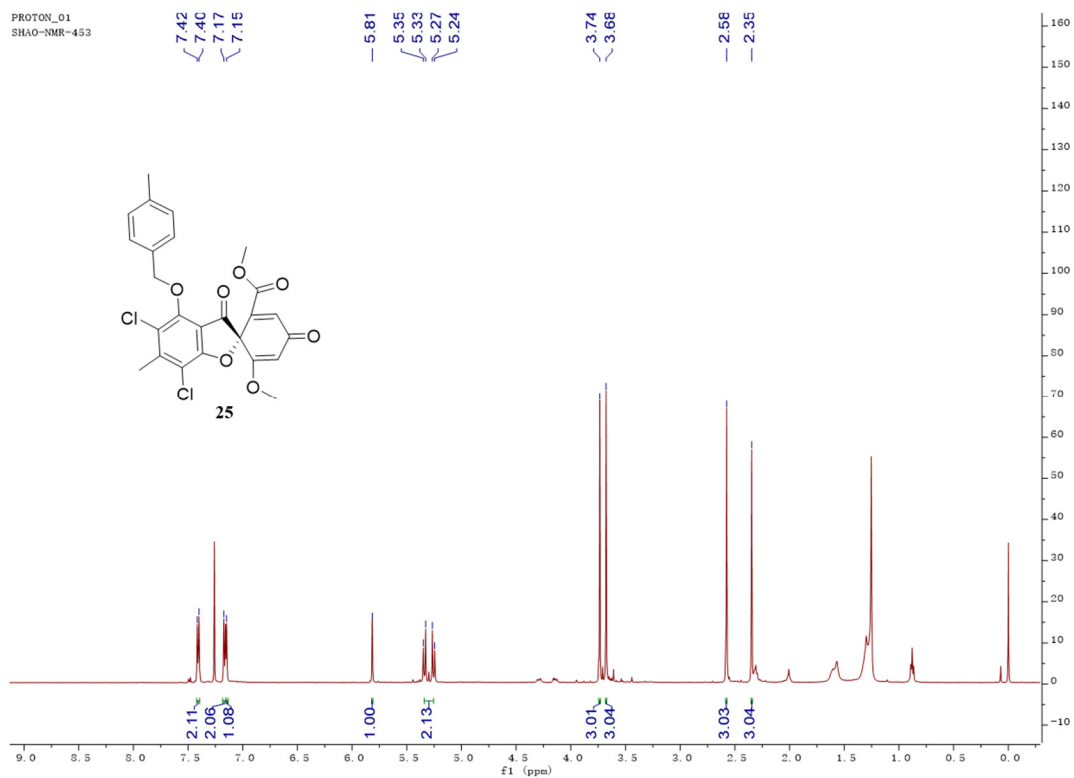


Figure S73. ^1H NMR (500 MHz, CDCl_3) spectrum of compound 25

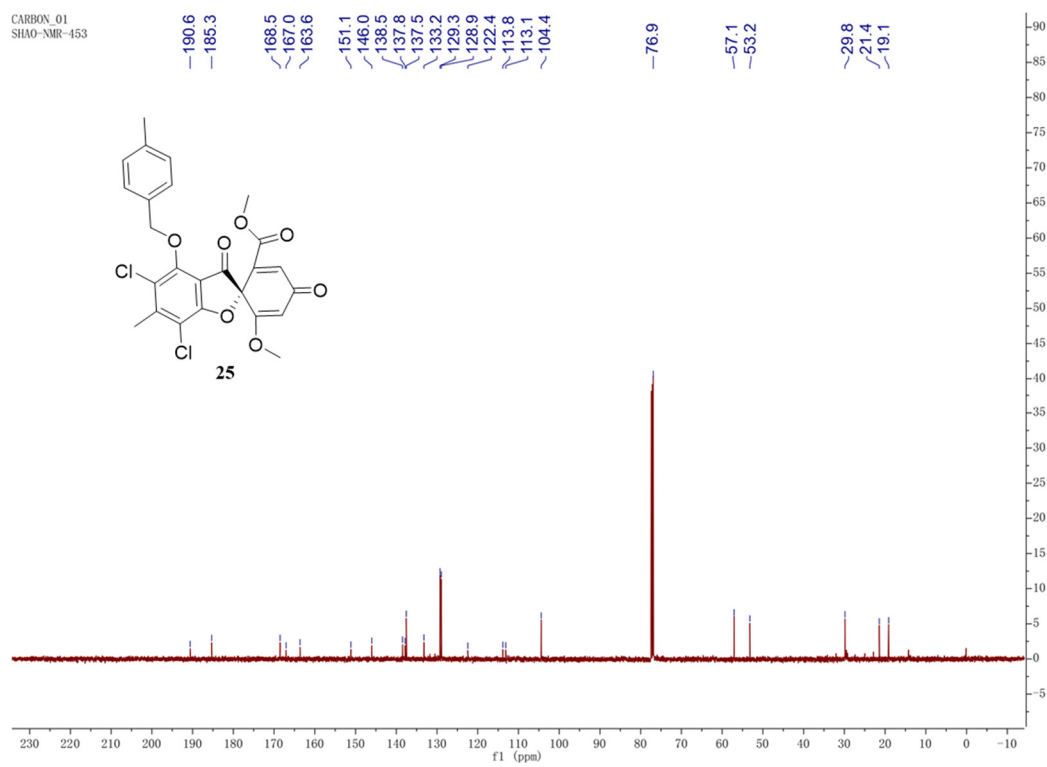


Figure S74. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound 25

20201106-CHNQ-02151_201106083949 #16-17 RT: 0.44-0.47 AV: 2 NL: 9.28E6
T: FTMS + p ESI Full ms [100.00-2000.00]

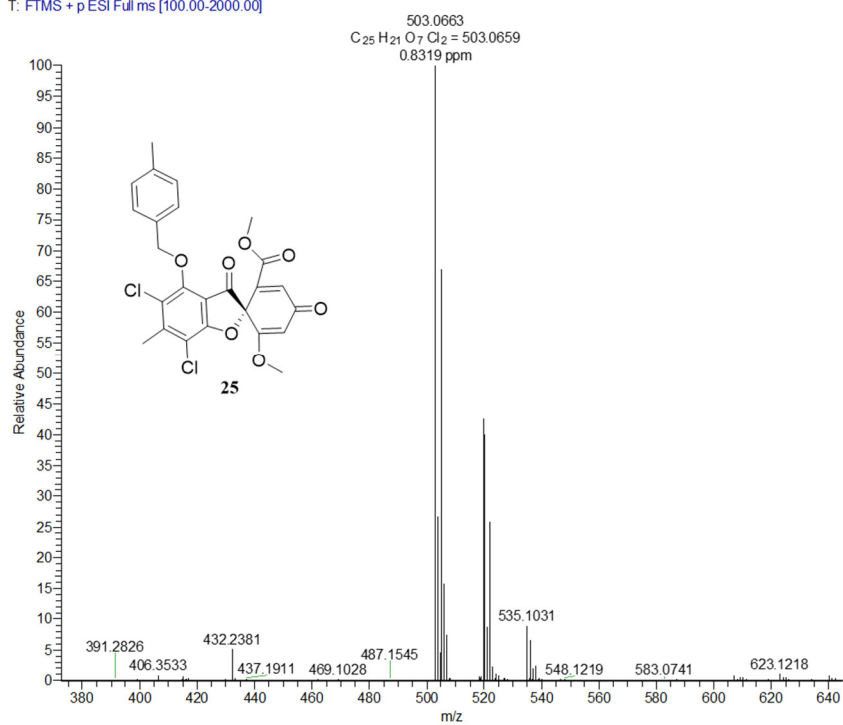


Figure S75. HRESIMS spectrum of compound 25

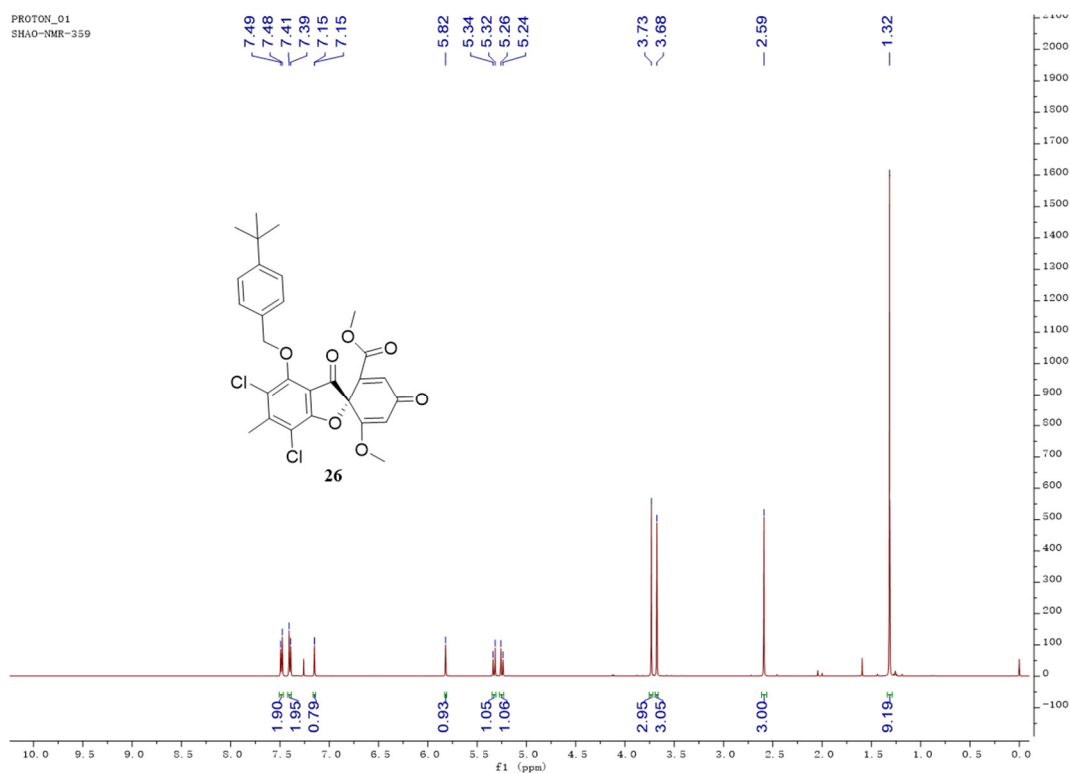


Figure S76. ¹H NMR (500 MHz, CDCl₃) spectrum of compound 26

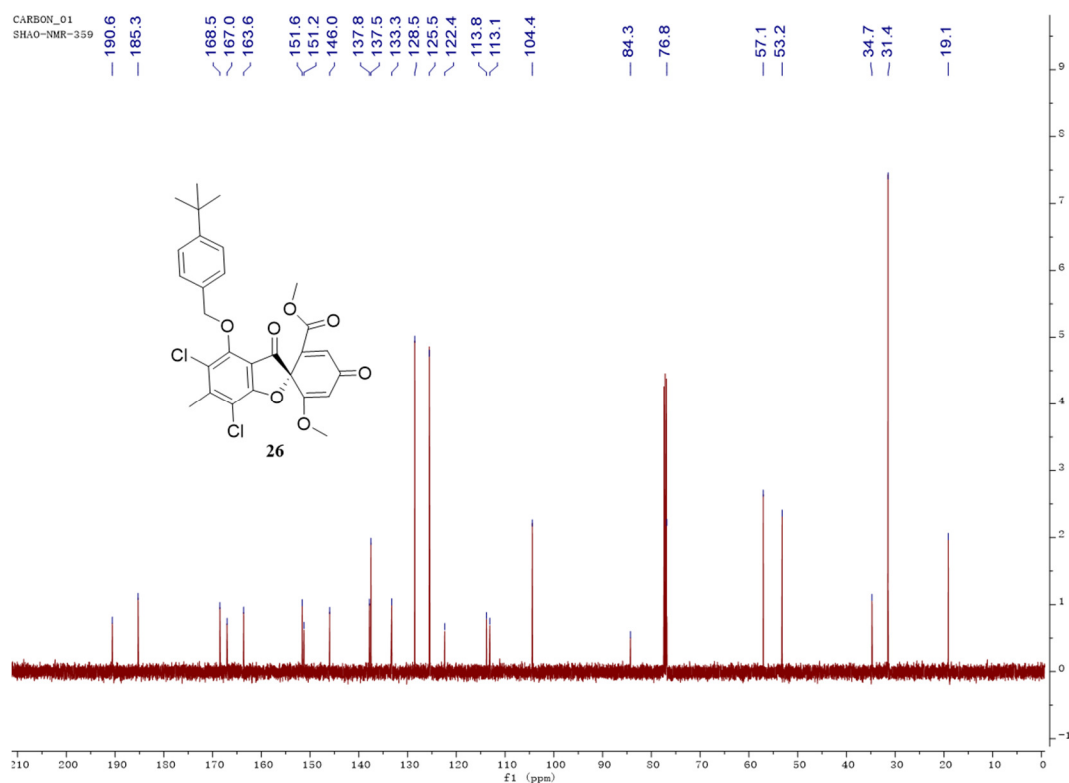


Figure S77. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound 26

CHNQD-02113 #593 RT: 5.71 AV: 1 NL: 7.26E8
T: FTMS + p ESI Full ms [100.00-1500.00]

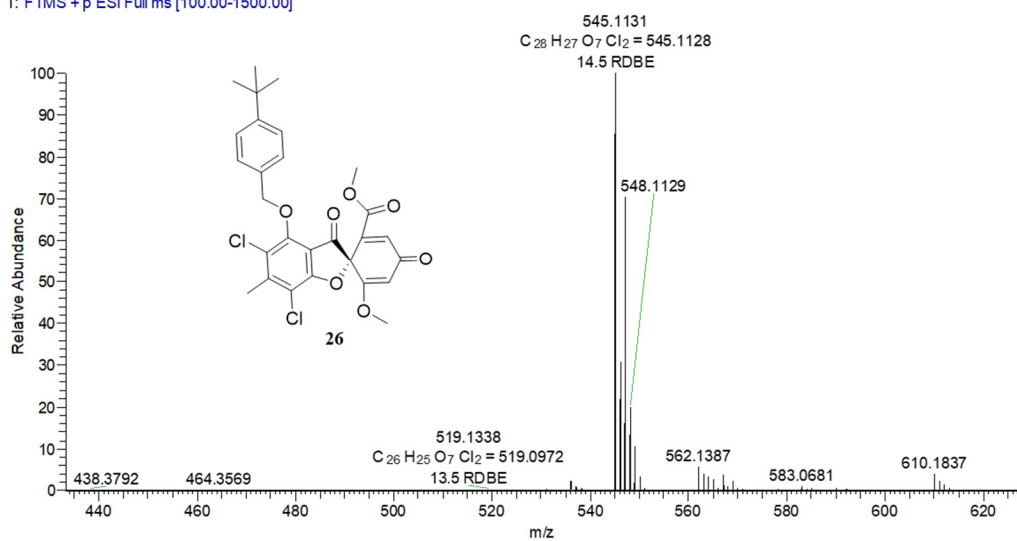


Figure S78. HRESIMS spectrum of compound 26

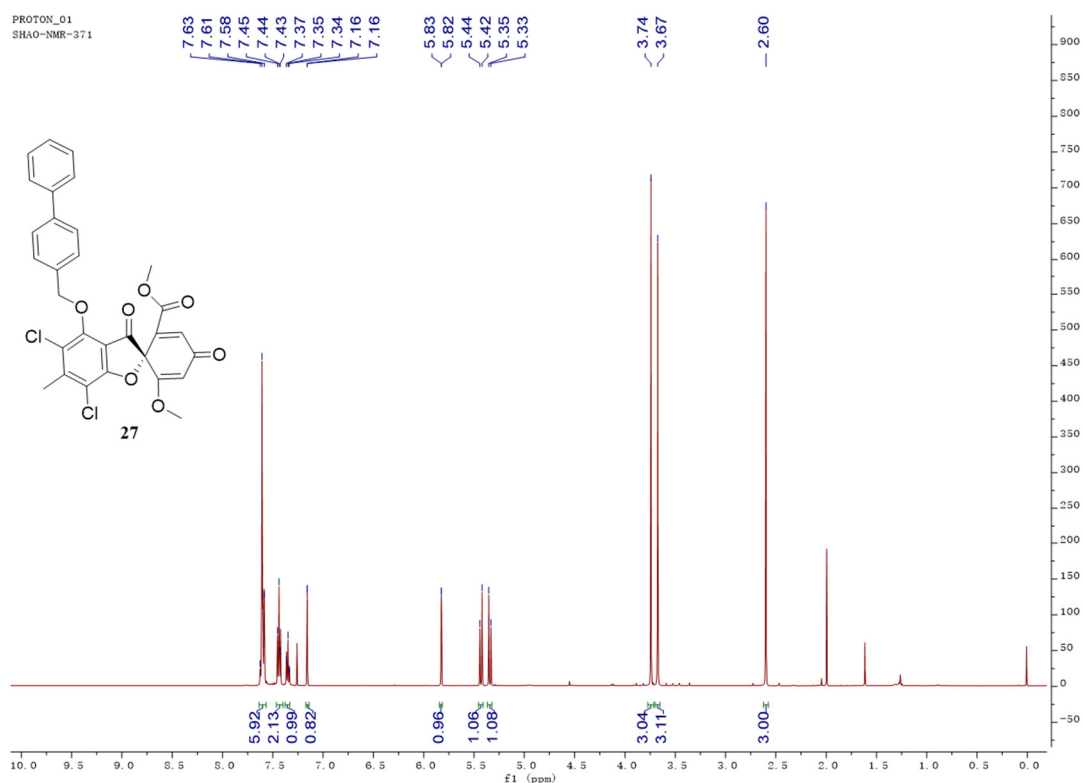


Figure S79. ^1H NMR (500 MHz, CDCl_3) spectrum of compound 27

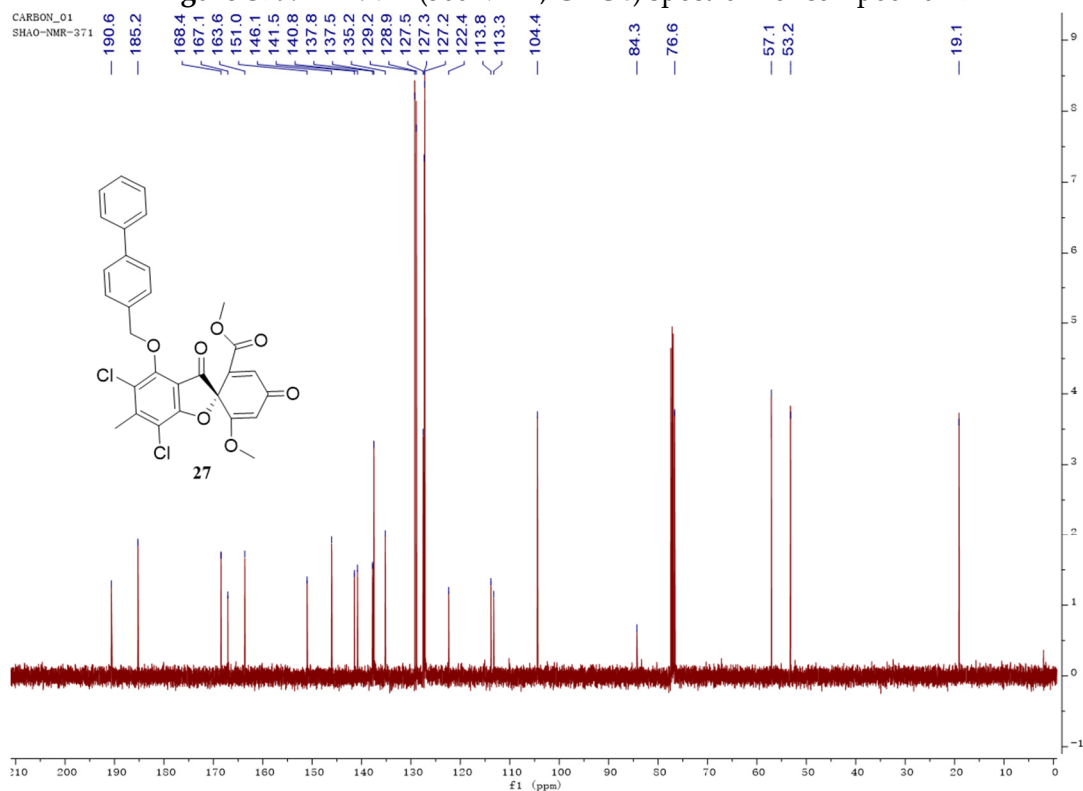


Figure S80. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound 27

CHNQD-02123 #567 RT: 5.47 AV: 1 NL: 4.66E8
T: FTMS + p ESI Full ms [100.00-1500.00]

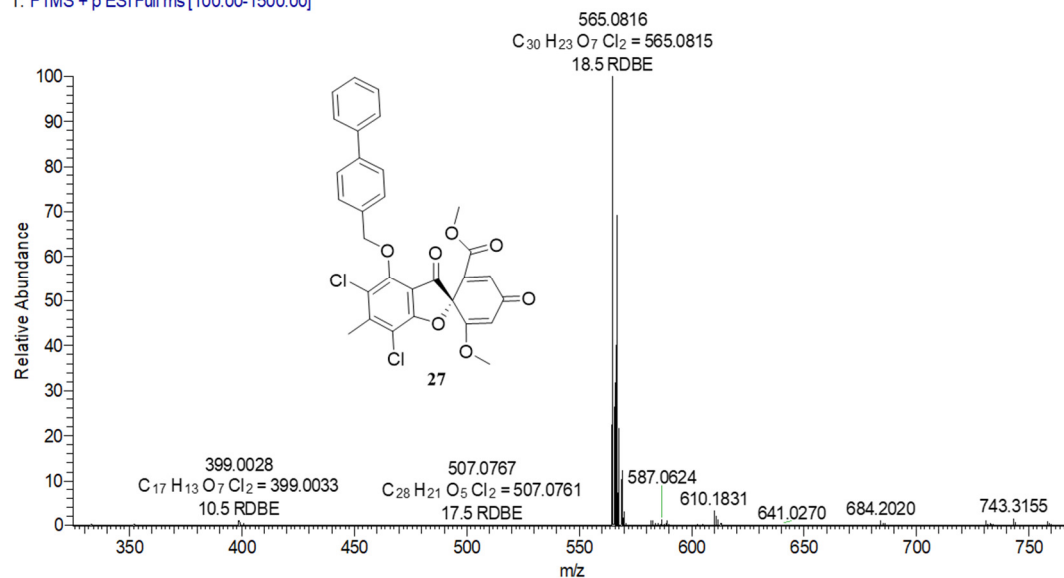


Figure S81. HRESIMS spectrum of compound 27

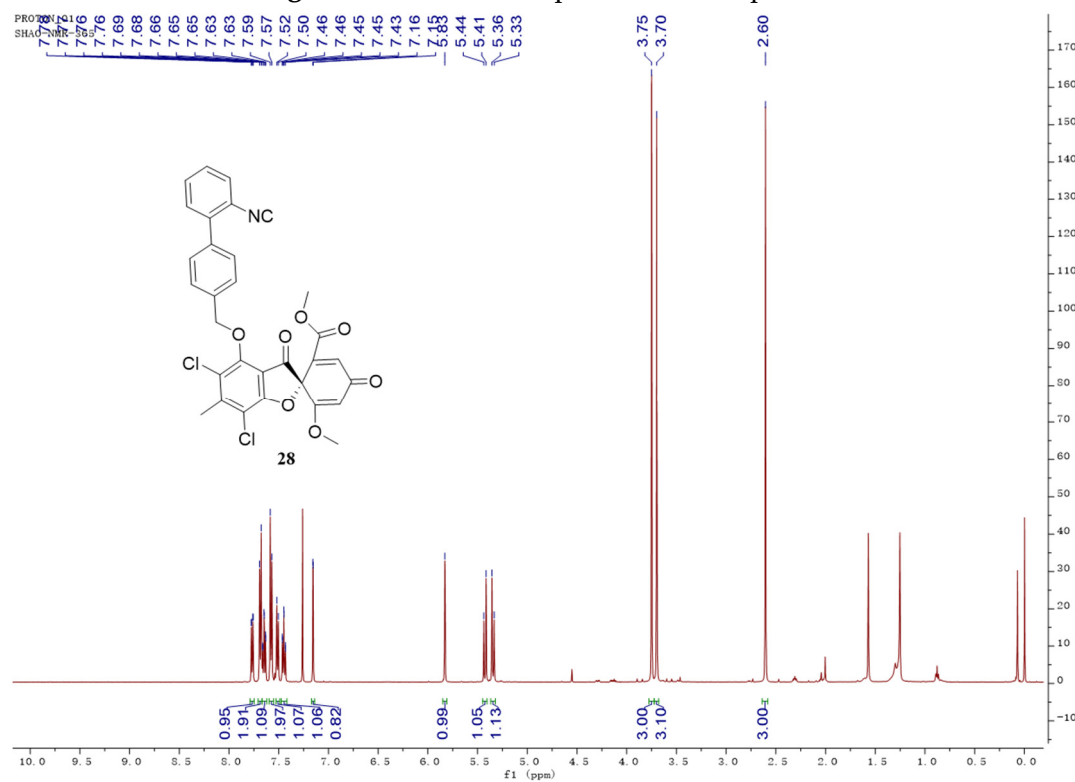


Figure S82. ¹H NMR (500 MHz, CDCl₃) spectrum of compound 28

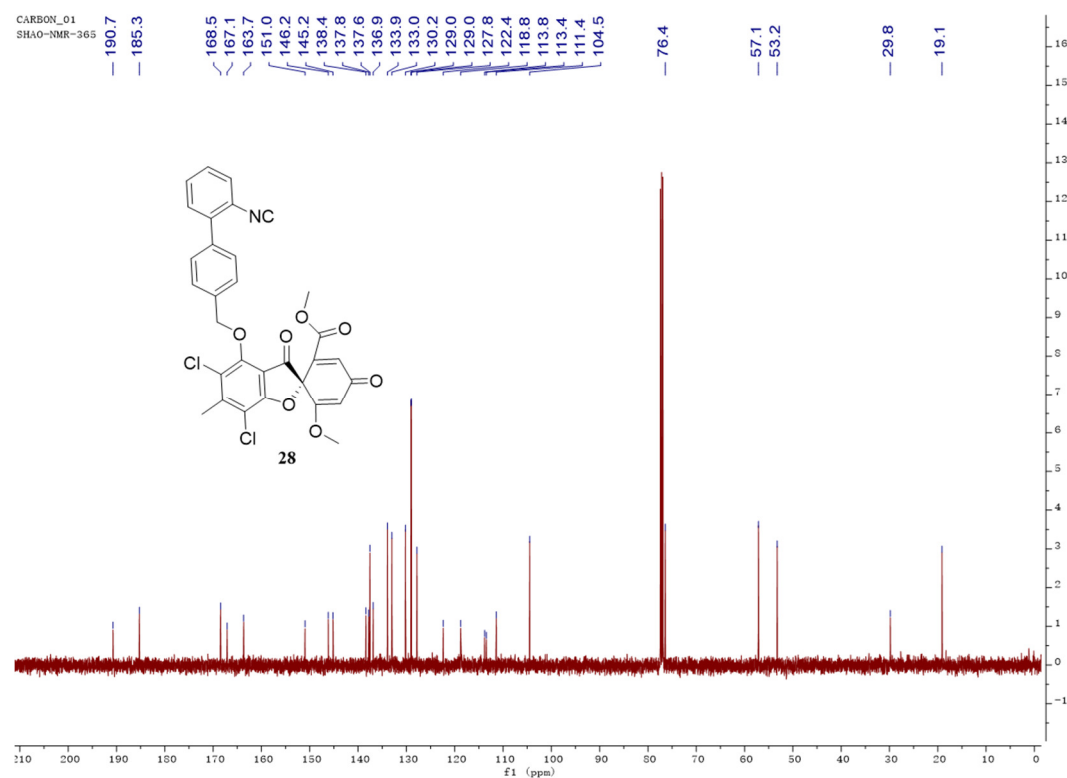


Figure S83. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound 28

CHNQD-02118 #523 RT: 5.05 AV: 1 NL: 9.52E8
T: FTMS + p ESIFull ms [100.00-1500.00]

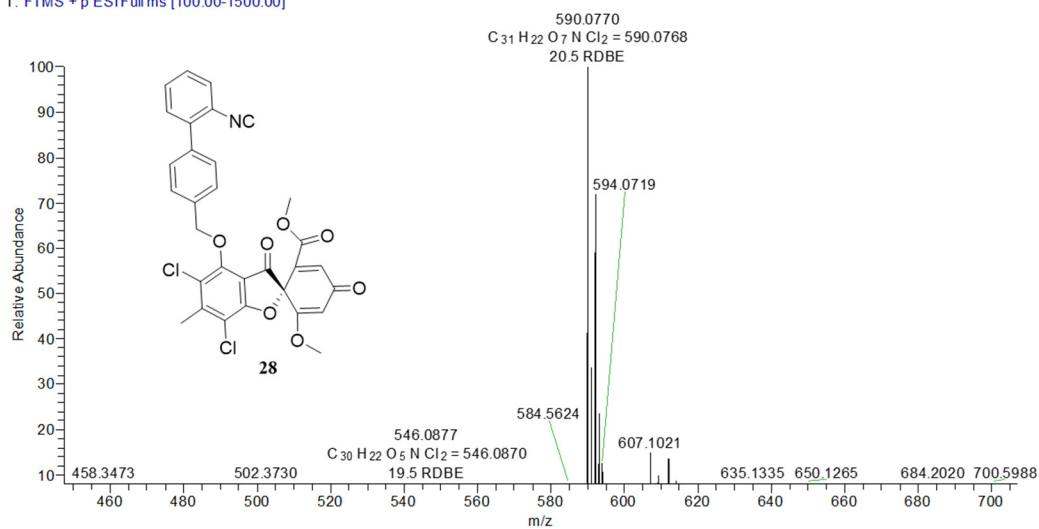


Figure S84. HRESIMS spectrum of compound 28

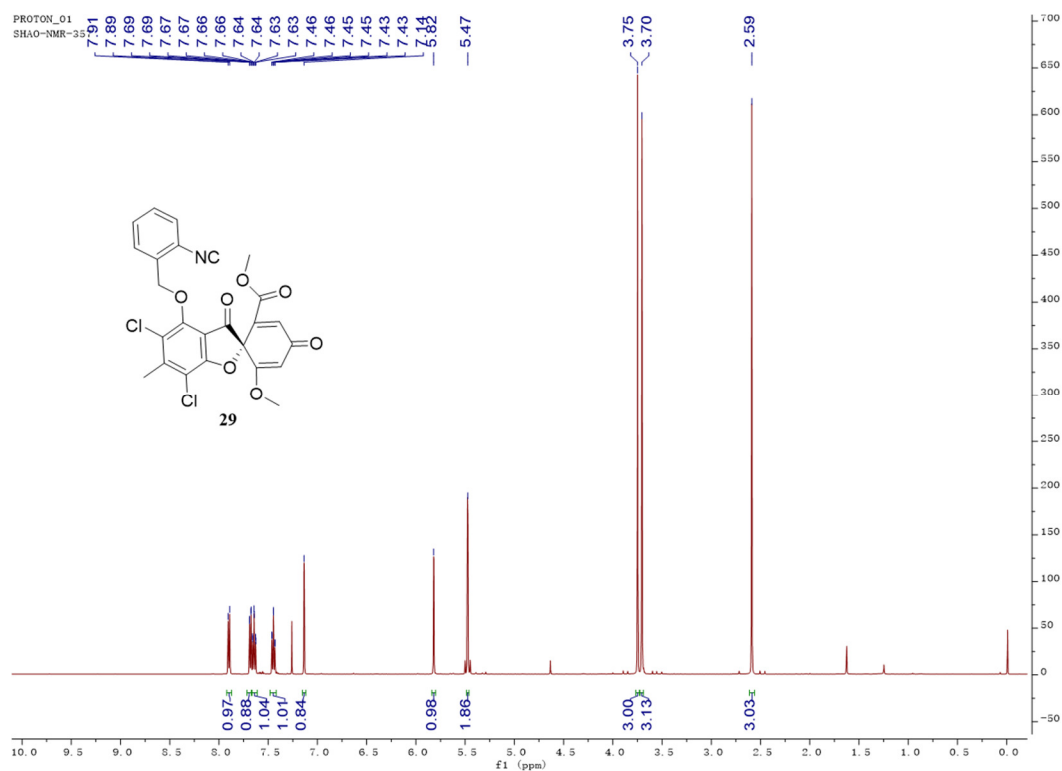


Figure S85. ^1H NMR (500 MHz, CDCl_3) spectrum of compound **29**

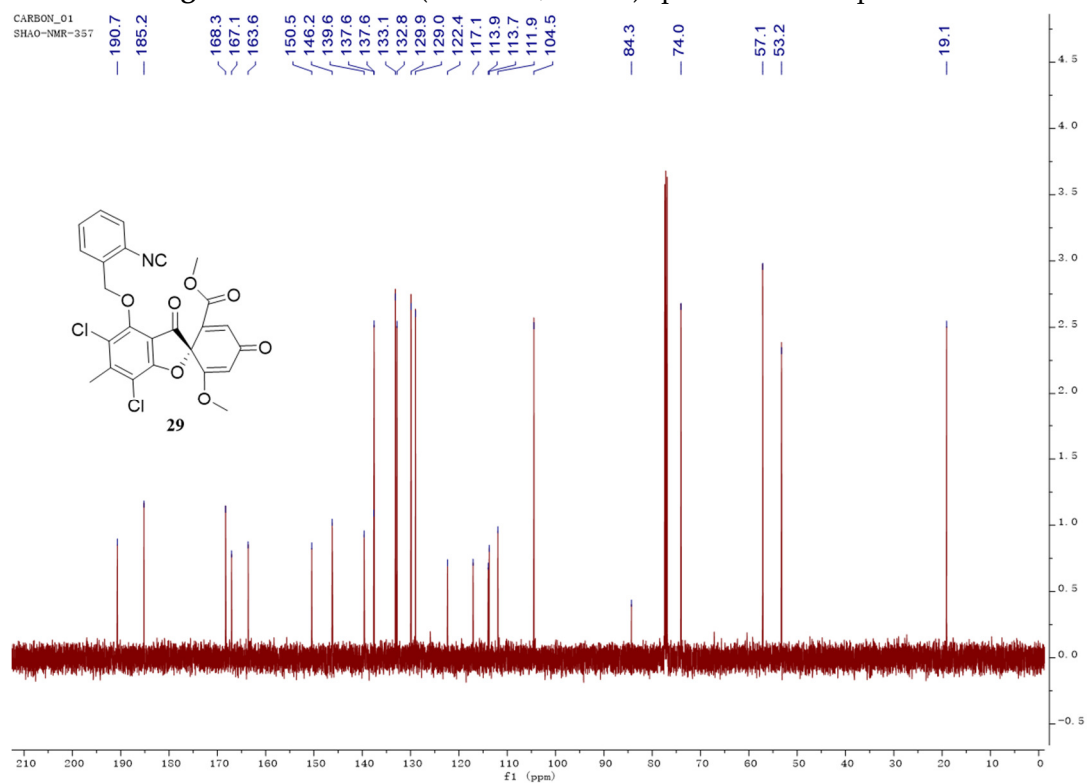


Figure S86. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **29**

CHNQD-02112 #477 RT: 4.60 AV: 1 NL: 1.90E9
T: FTMS + p ESI Fullms [100.00-1500.00]

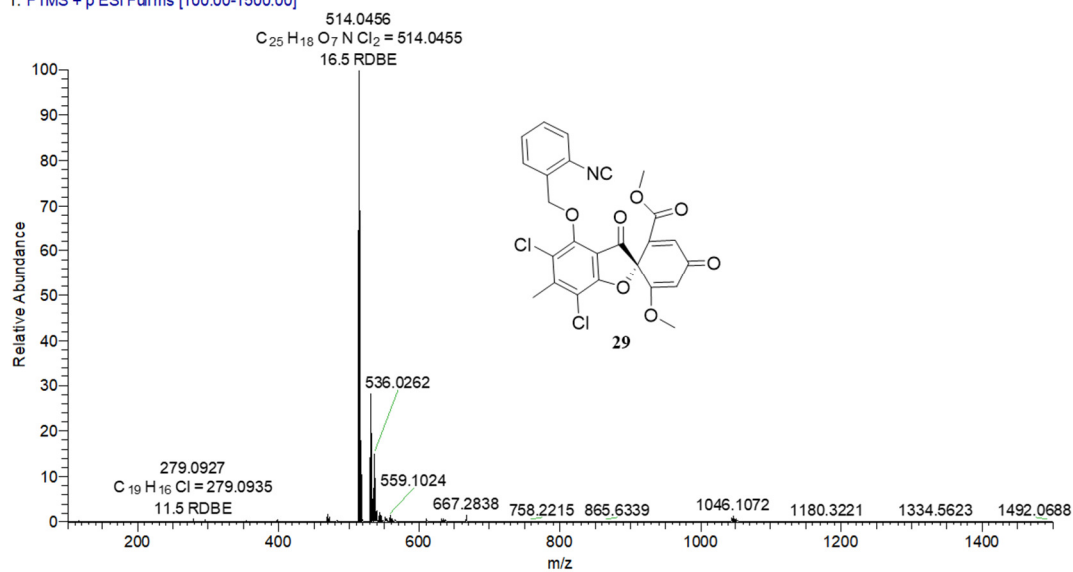


Figure S87. HRESIMS spectrum of compound 29

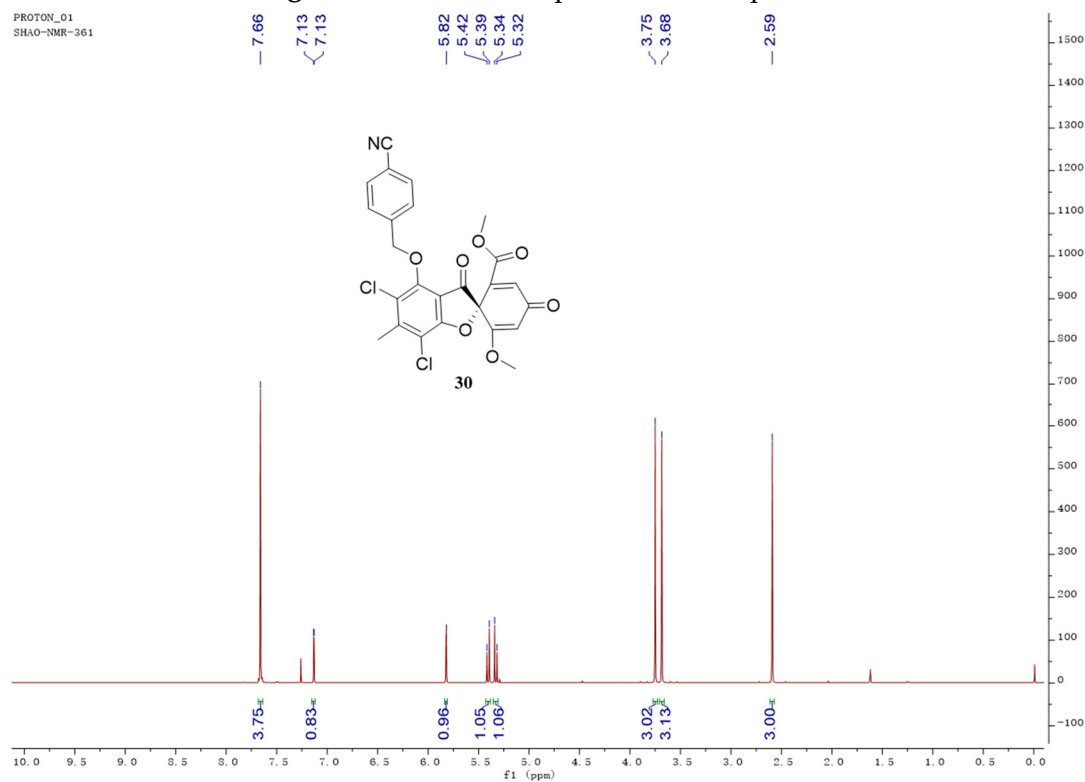


Figure S88. 1H NMR (500 MHz, $CDCl_3$) spectrum of compound 30

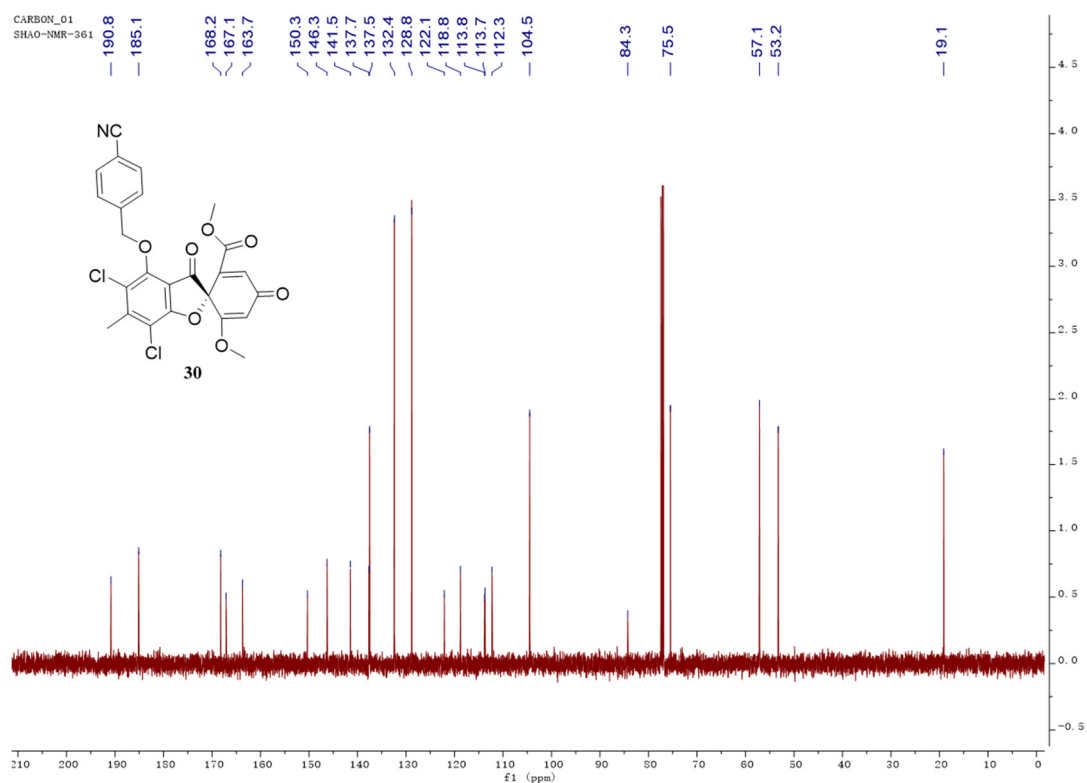


Figure S89. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound 30

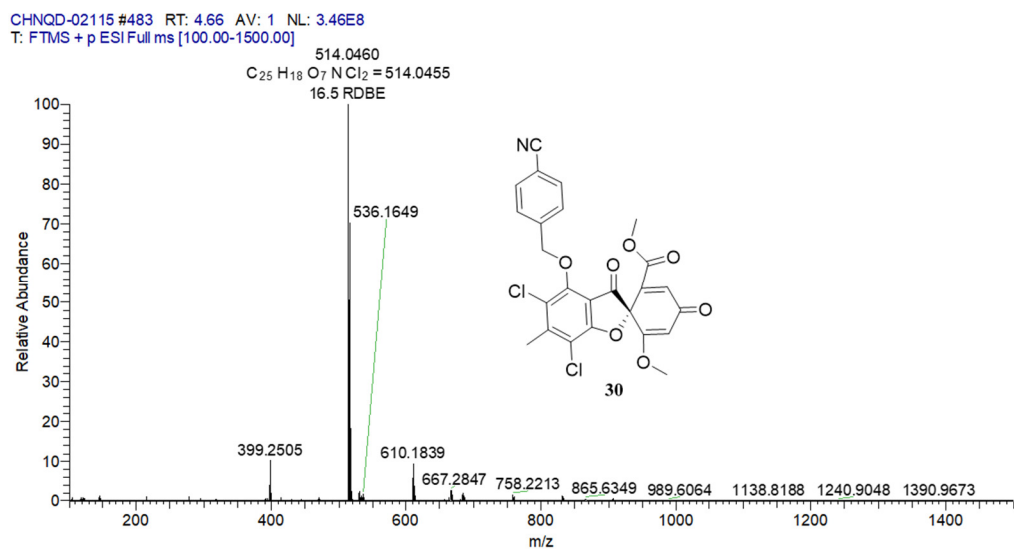


Figure S90. HRESIMS spectrum of compound 30

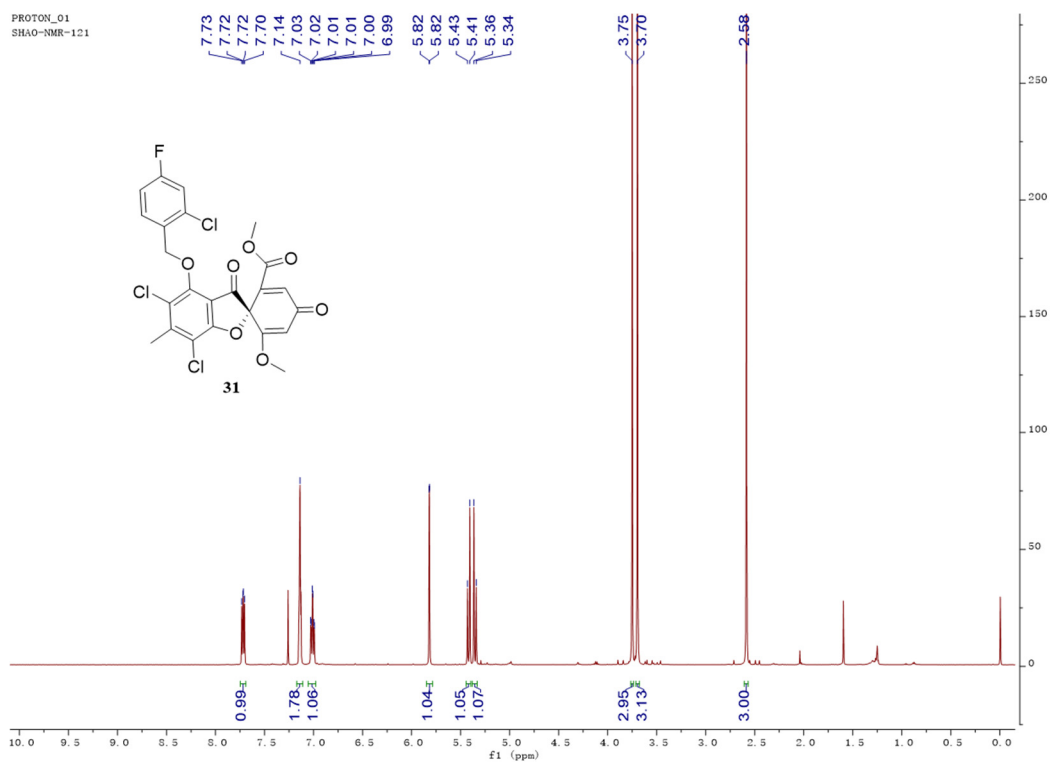


Figure S91. ^1H NMR (500 MHz, CDCl_3) spectrum of compound **31**

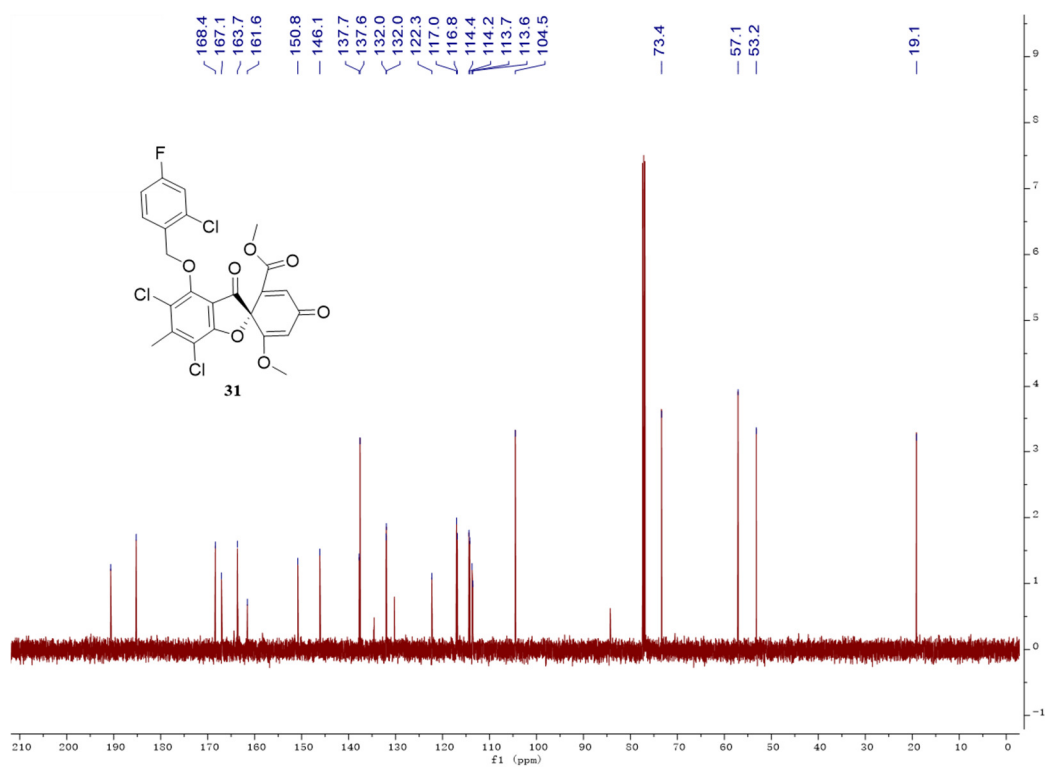


Figure S92. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **31**

CHNQD-02102 #530 RT: 5.10 AV: 1 NL: 3.02E7
T: FTMS -p ESI Full ms [100.00-1500.00]

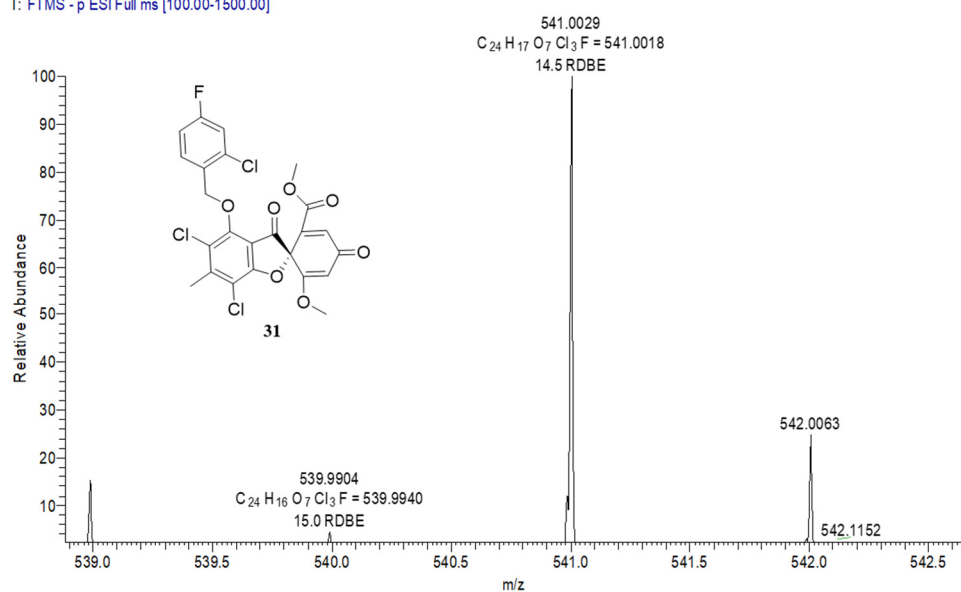


Figure S93. HRESIMS spectrum of compound 31

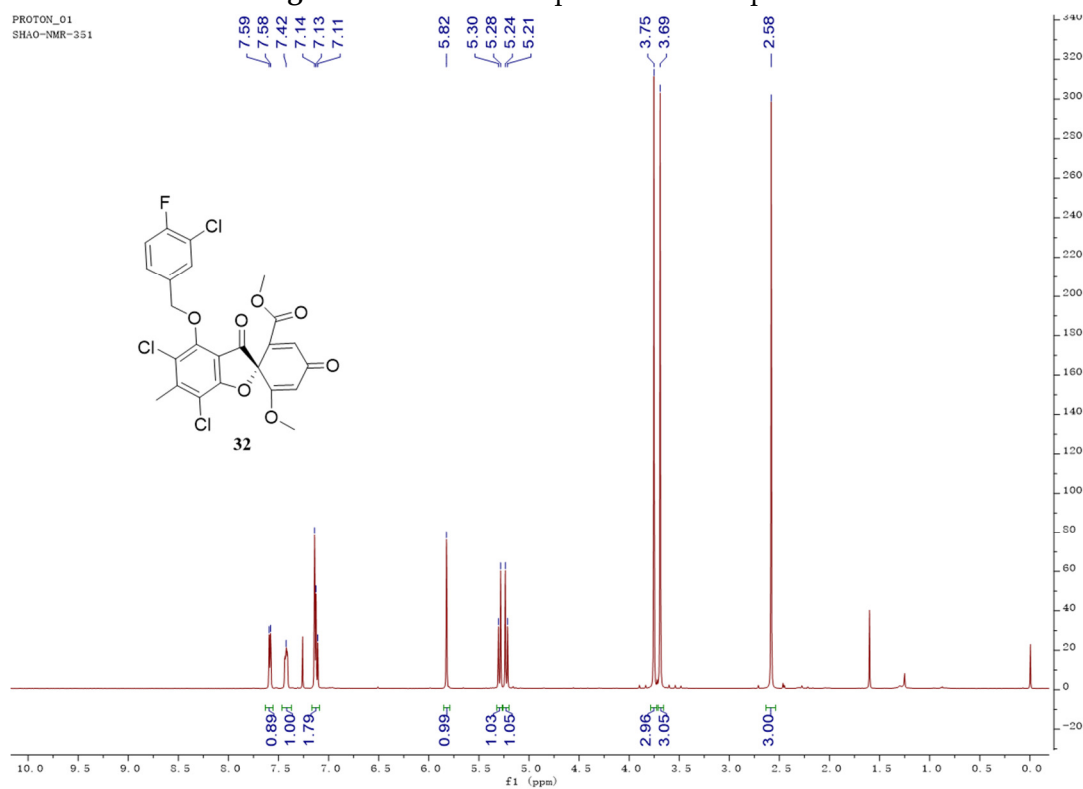


Figure S94. ¹H NMR (500 MHz, CDCl₃) spectrum of compound 32

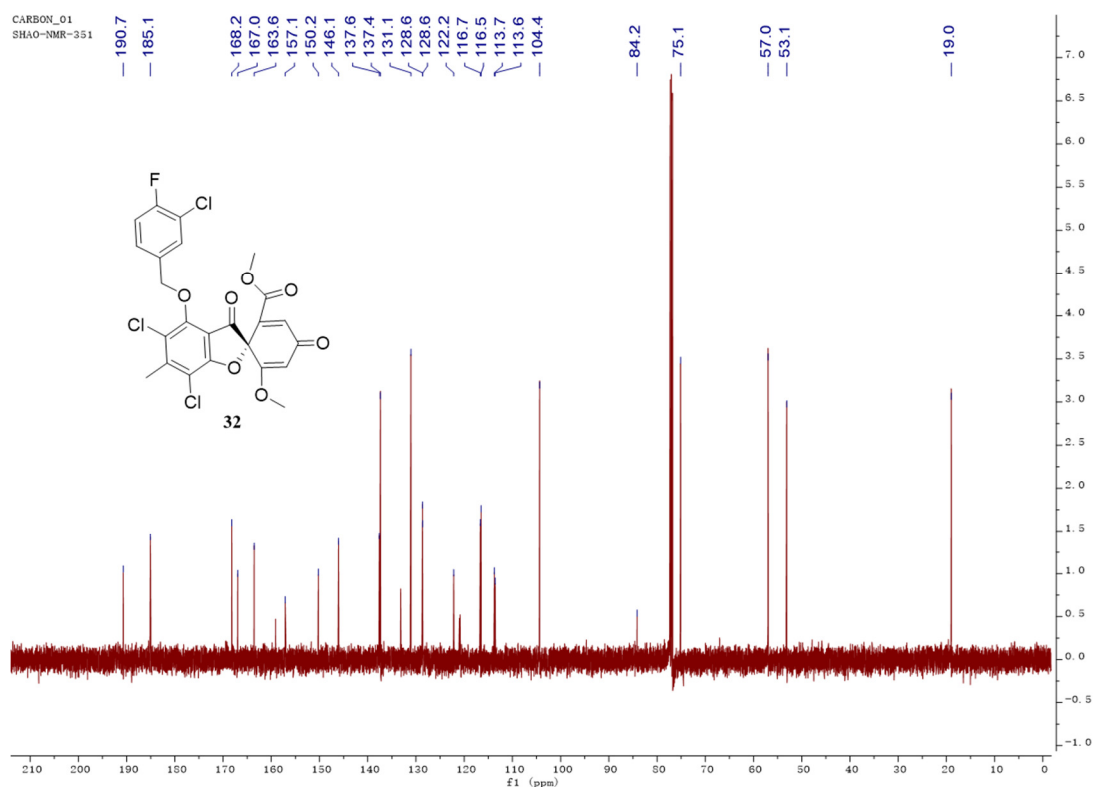


Figure S95. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound 32

CHNQD-02107 #516 RT: 4.97 AV: 1 NL: 2.89E8
T: FTMS - p ESI Full ms [100.00-1500.00]

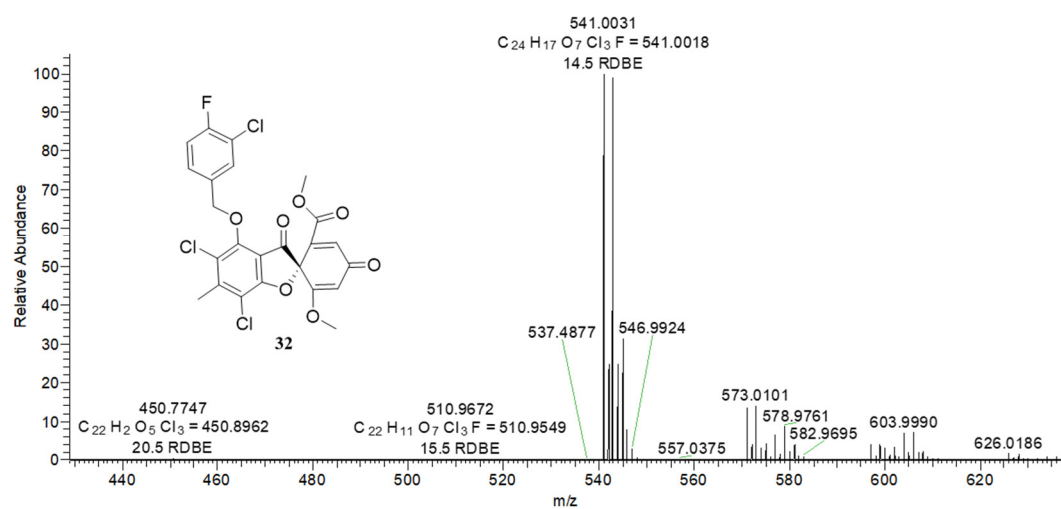


Figure S96. HRESIMS spectrum of compound 32

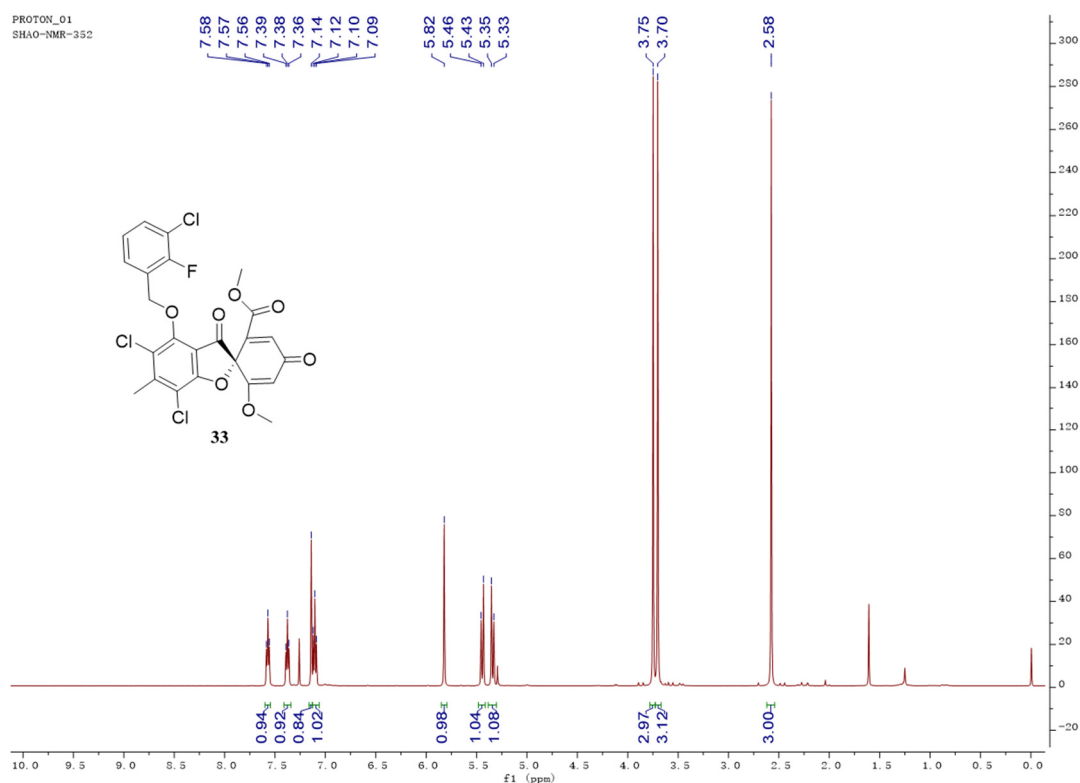


Figure S97. ^1H NMR (500 MHz, CDCl_3) spectrum of compound 33

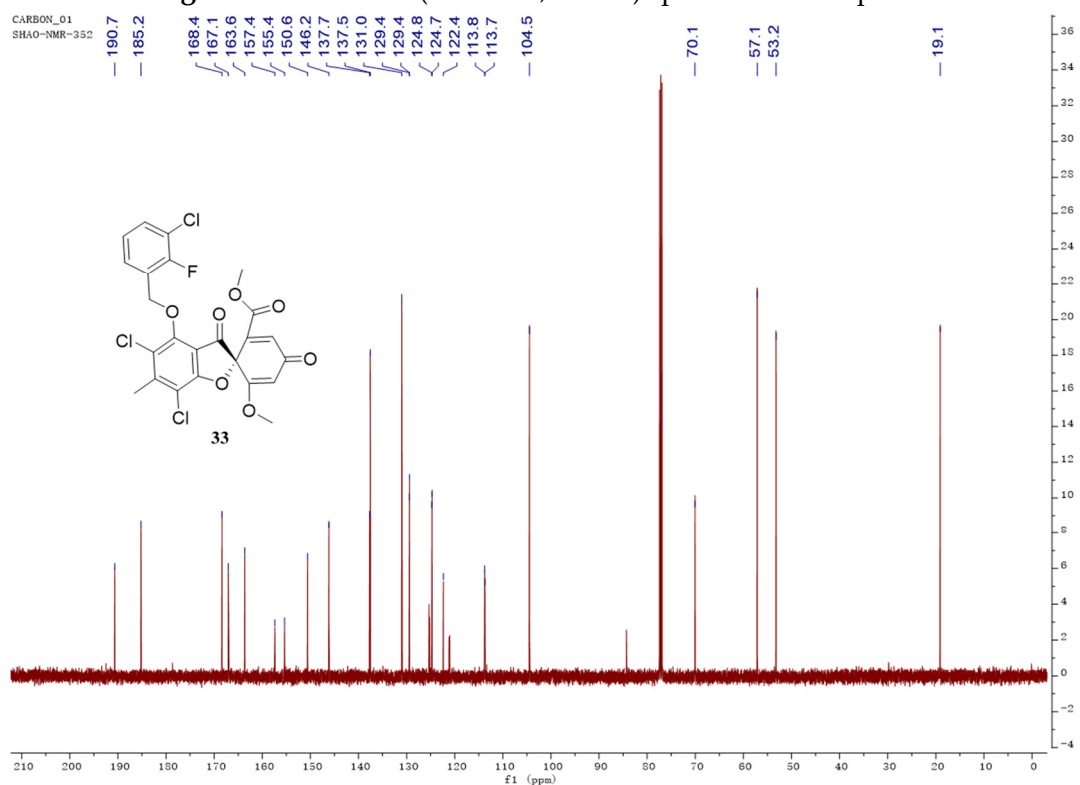


Figure S98. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound 33

CHNQD-02108 #527 RT: 5.08 AV: 1 NL: 7.06E8
T: FTMS + p ESI Full ms [100.00-1500.00]

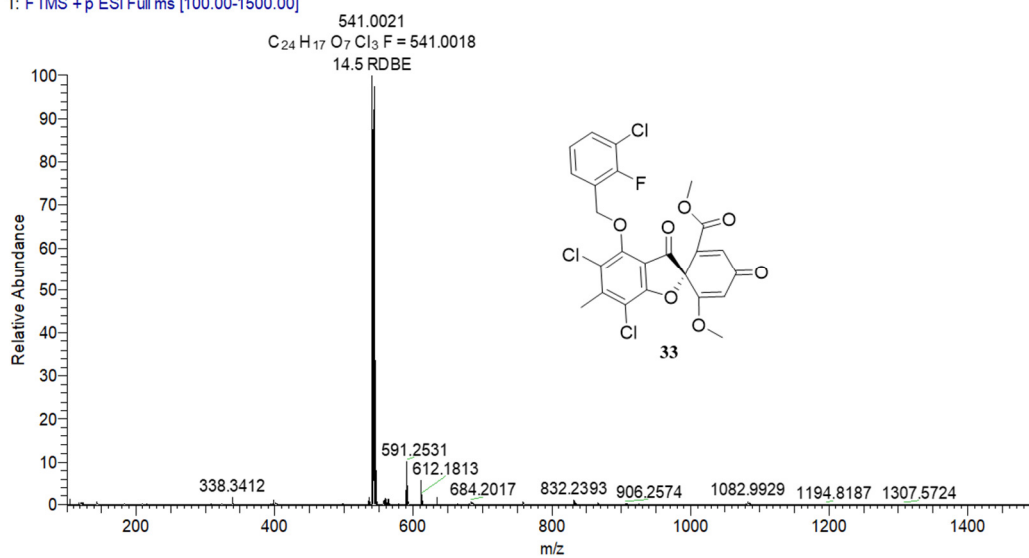


Figure S99. HRESIMS spectrum of compound 33

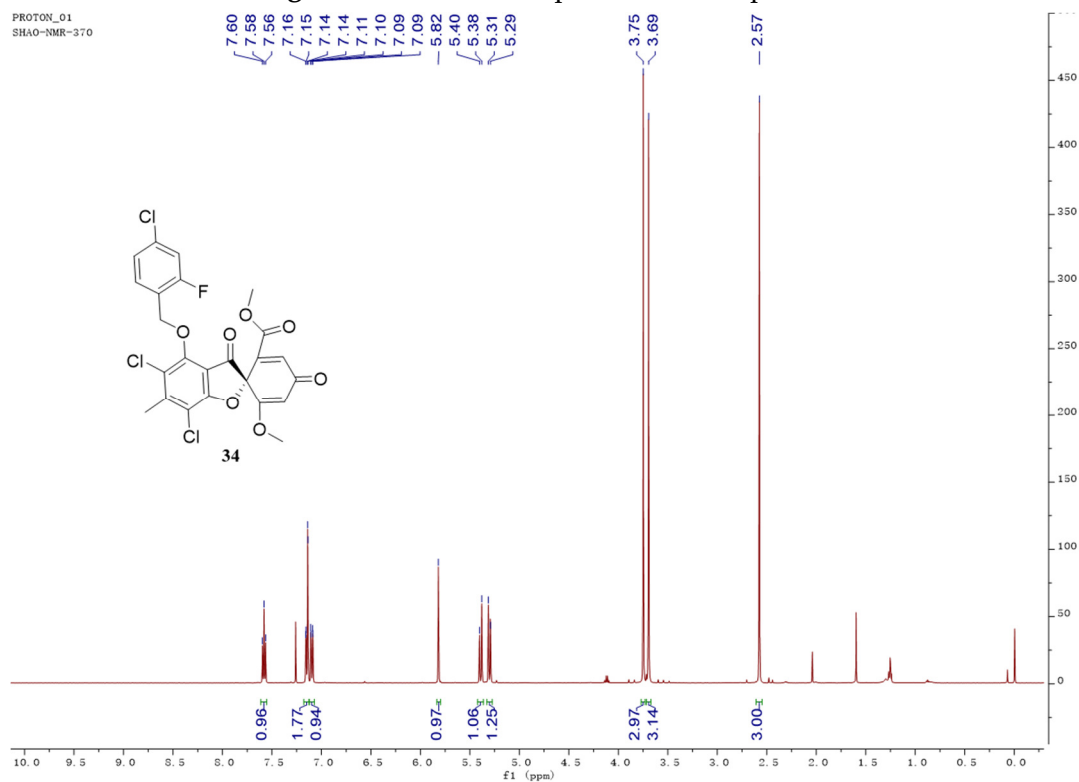


Figure S100. ¹H NMR (500 MHz, CDCl₃) spectrum of compound 34

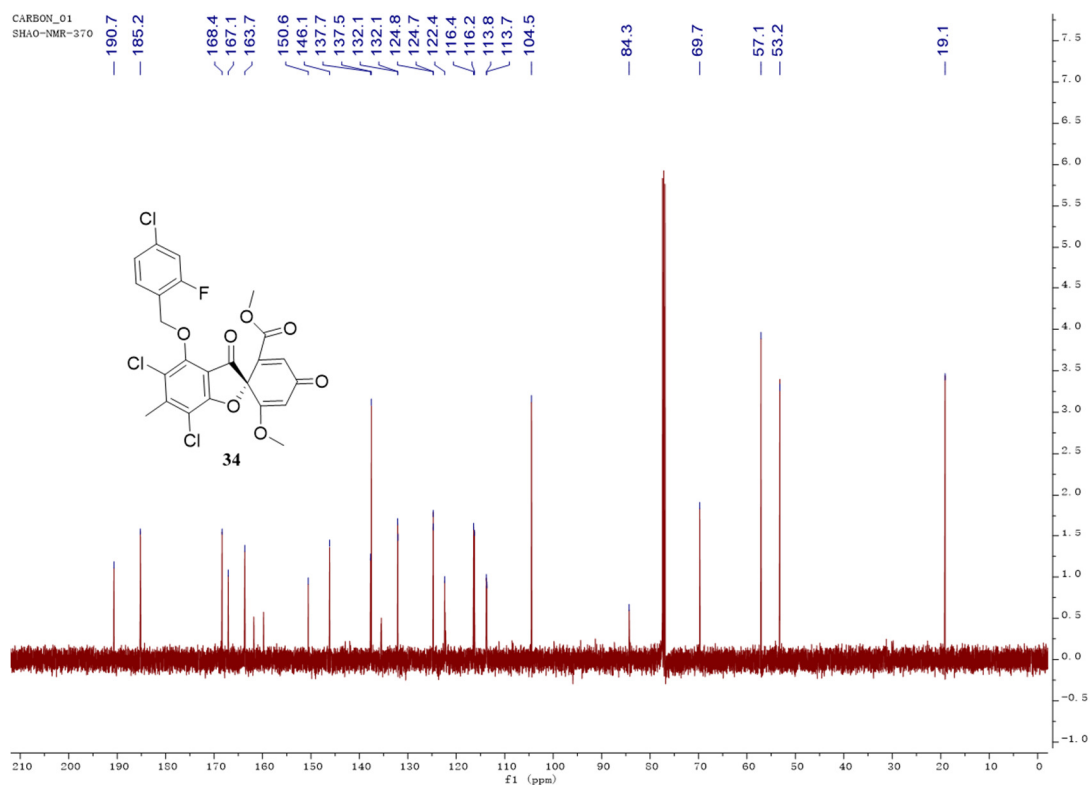


Figure S101. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound **34**

CHNQD-02122 #533 RT: 5.14 AV: 1 NL: 6.38E8

T: FTMS + p ESI Full ms [100.00-1500.00]

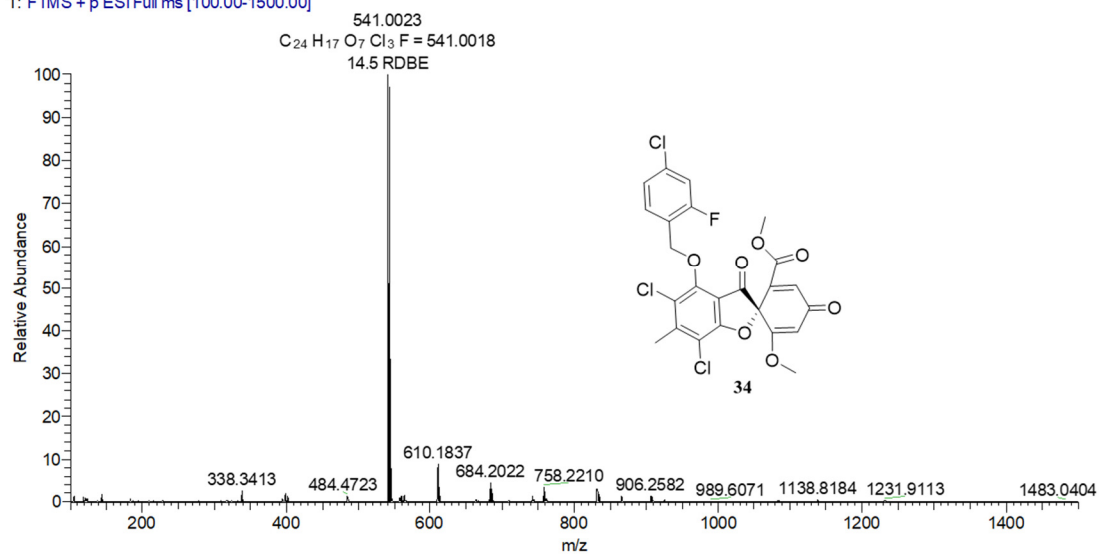


Figure S102. HRESIMS spectrum of compound **34**

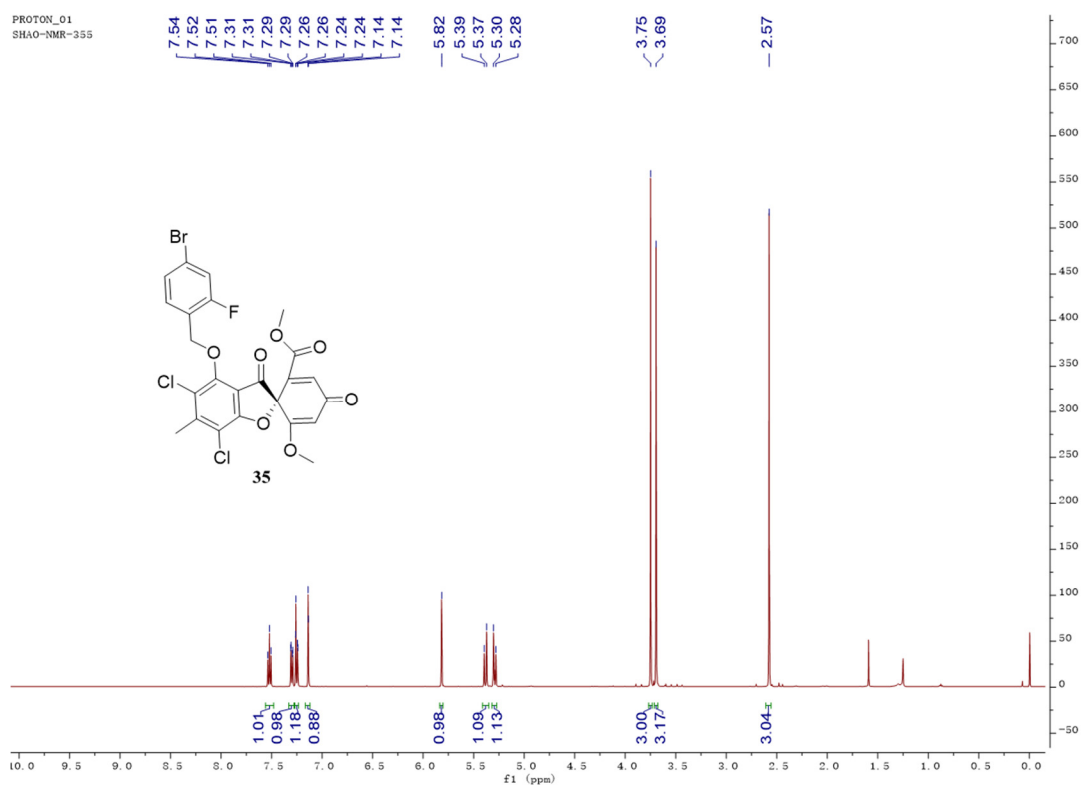


Figure S103. ^1H NMR (500 MHz, CDCl_3) spectrum of compound 35

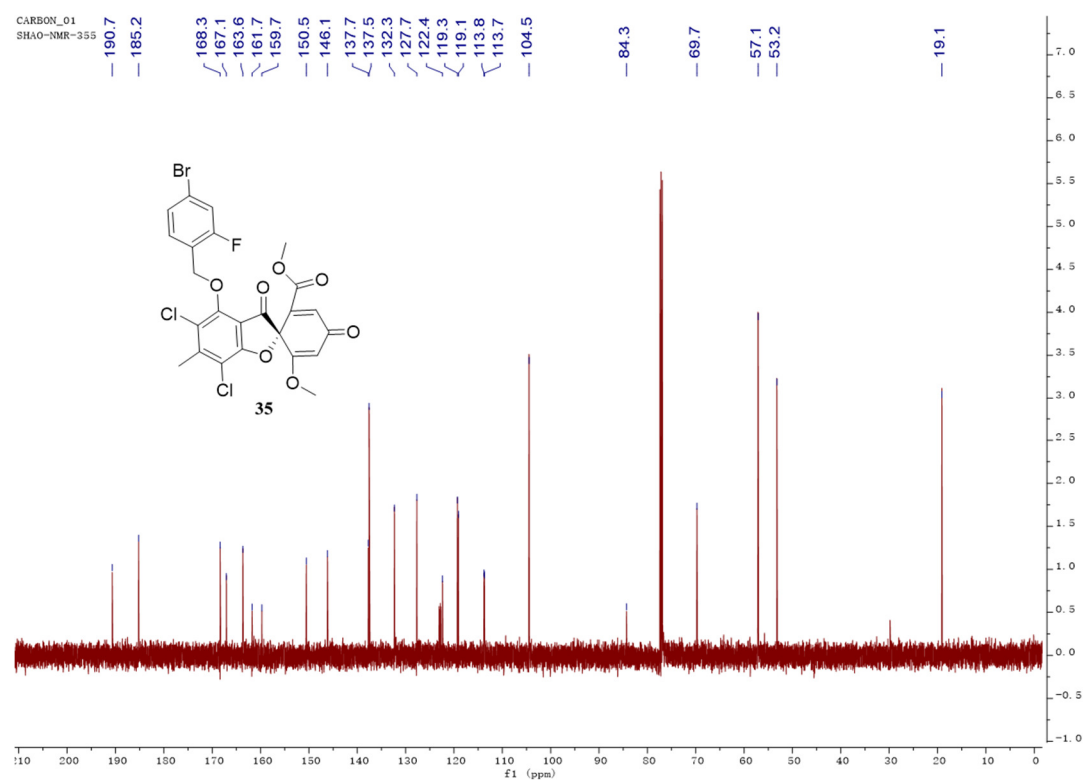


Figure S104. ^{13}C NMR (125 MHz, CDCl_3) spectrum of compound 35

CHNQD-02111 #1-622 RT: 0.00-5.99 AV: 622 NL: 4.79E6
T: FTMS + p ESIFull.ms [100.00-1500.00]

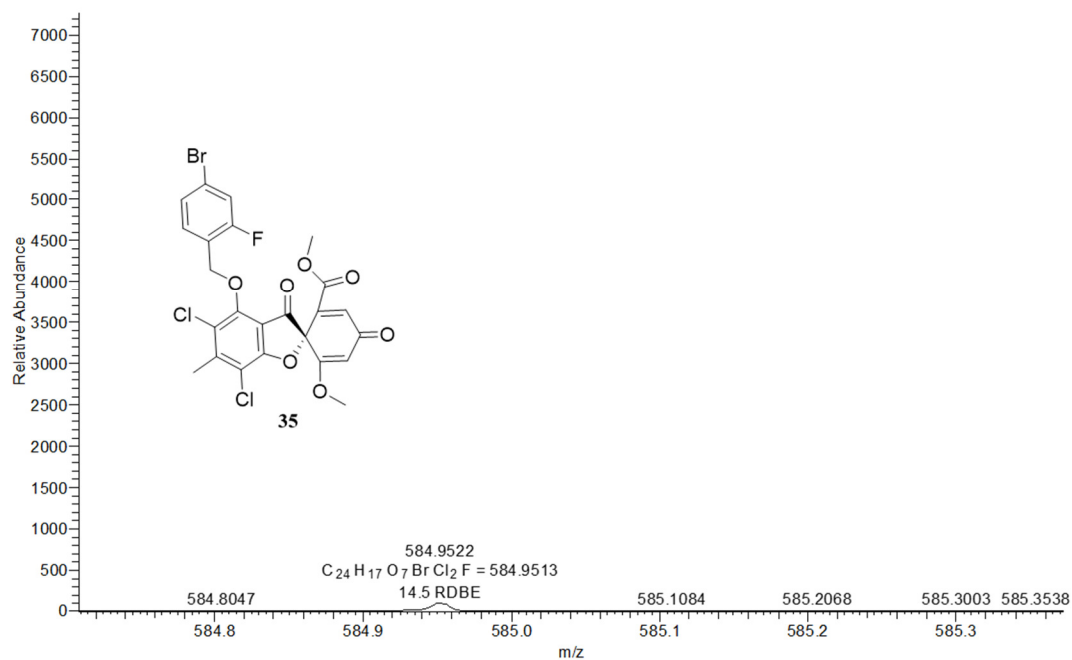


Figure S105. HRESIMS spectrum of compound **35**

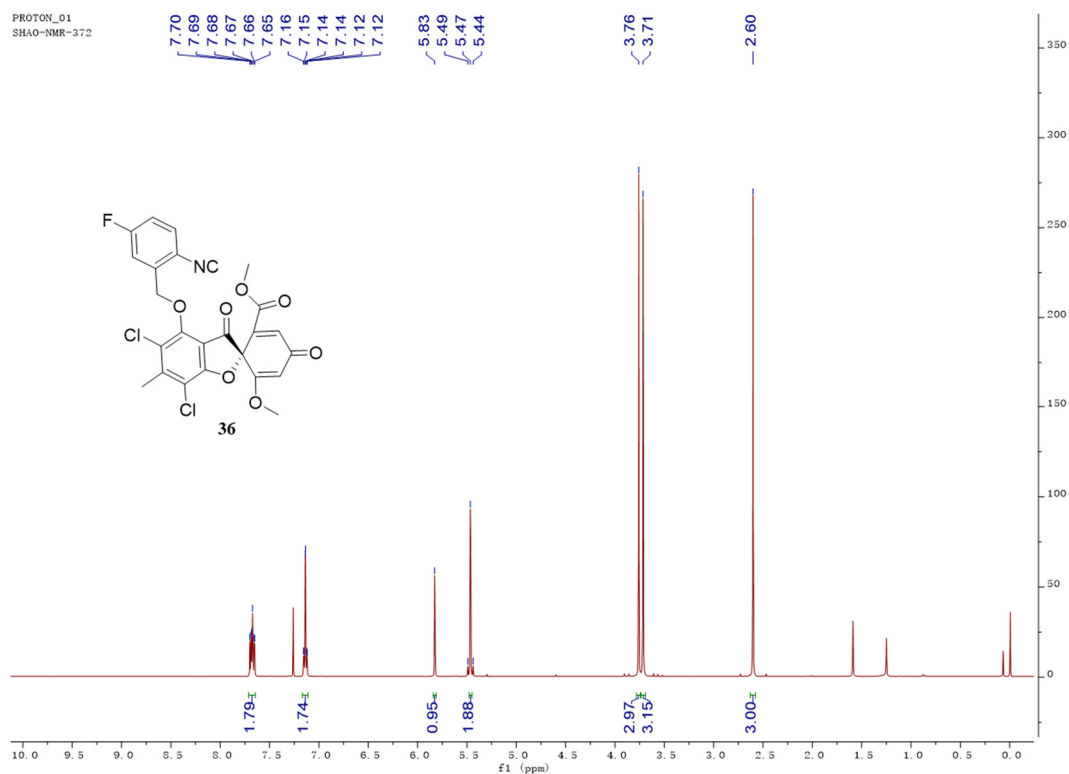
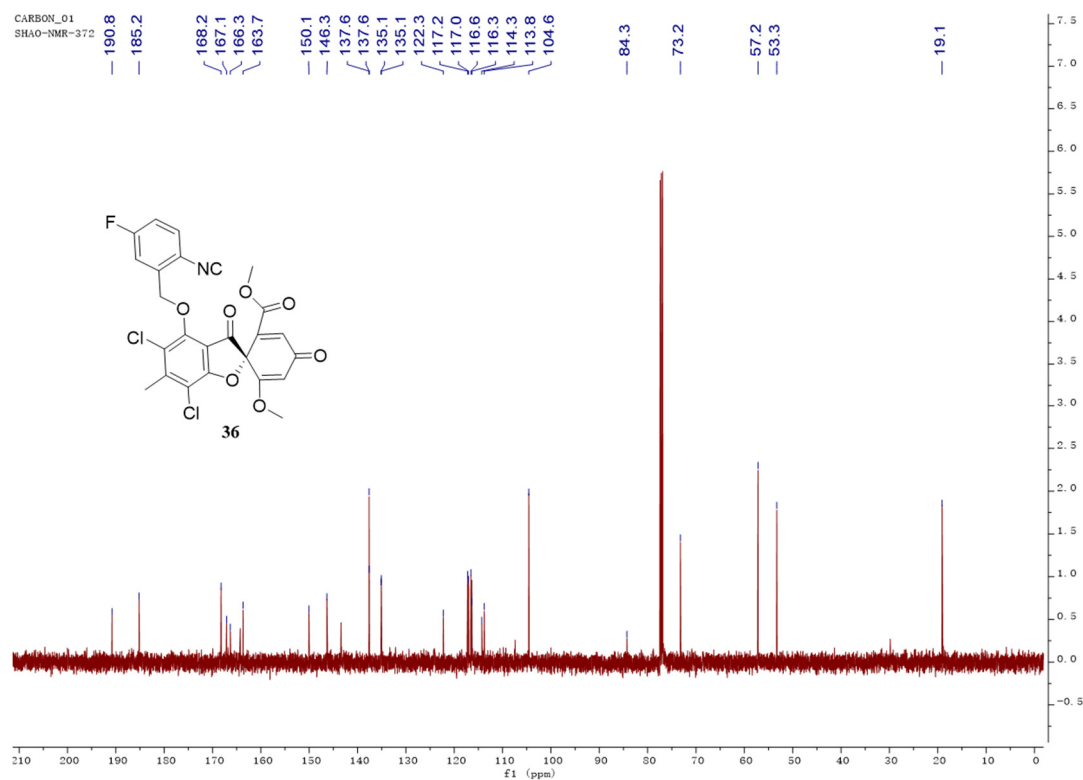
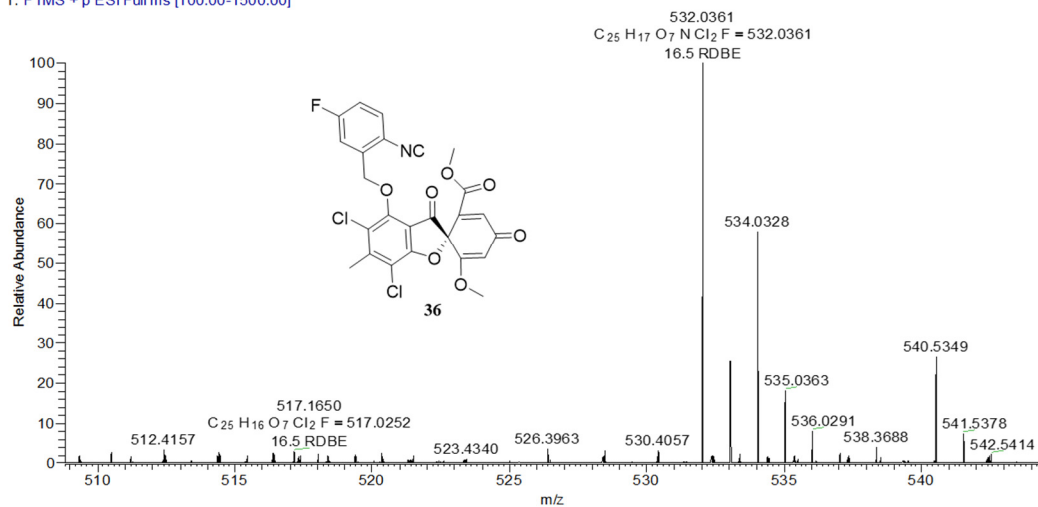
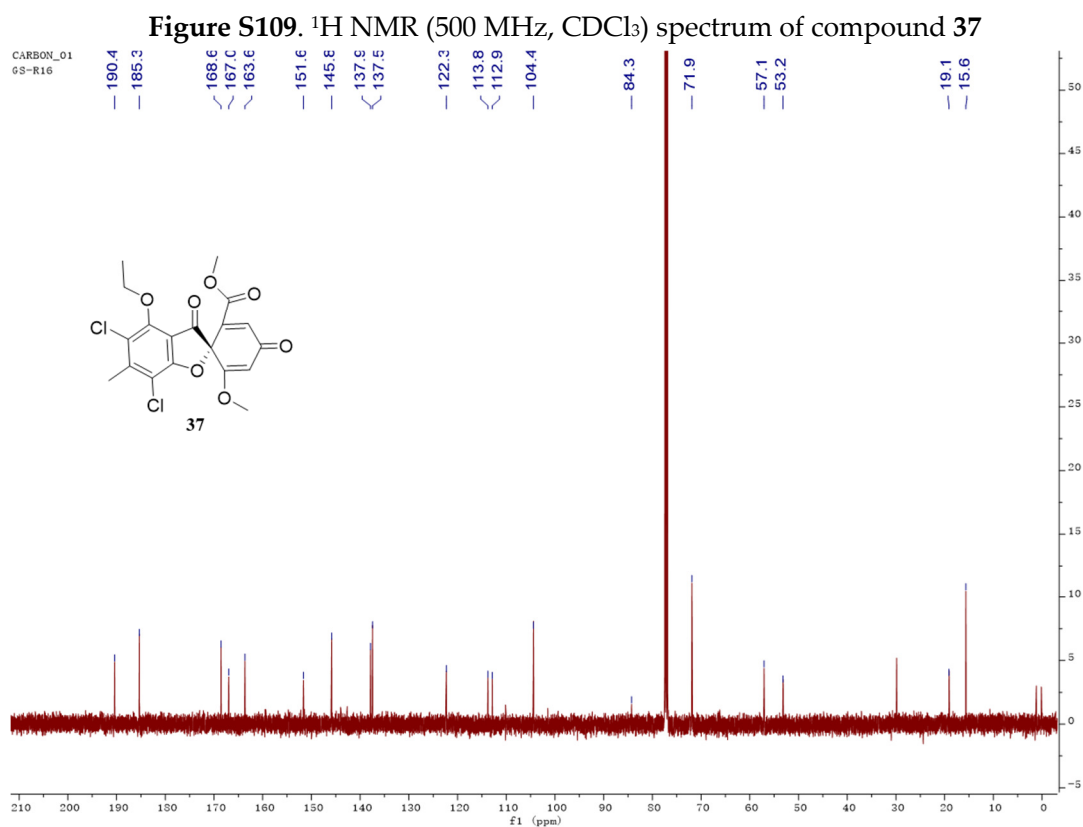
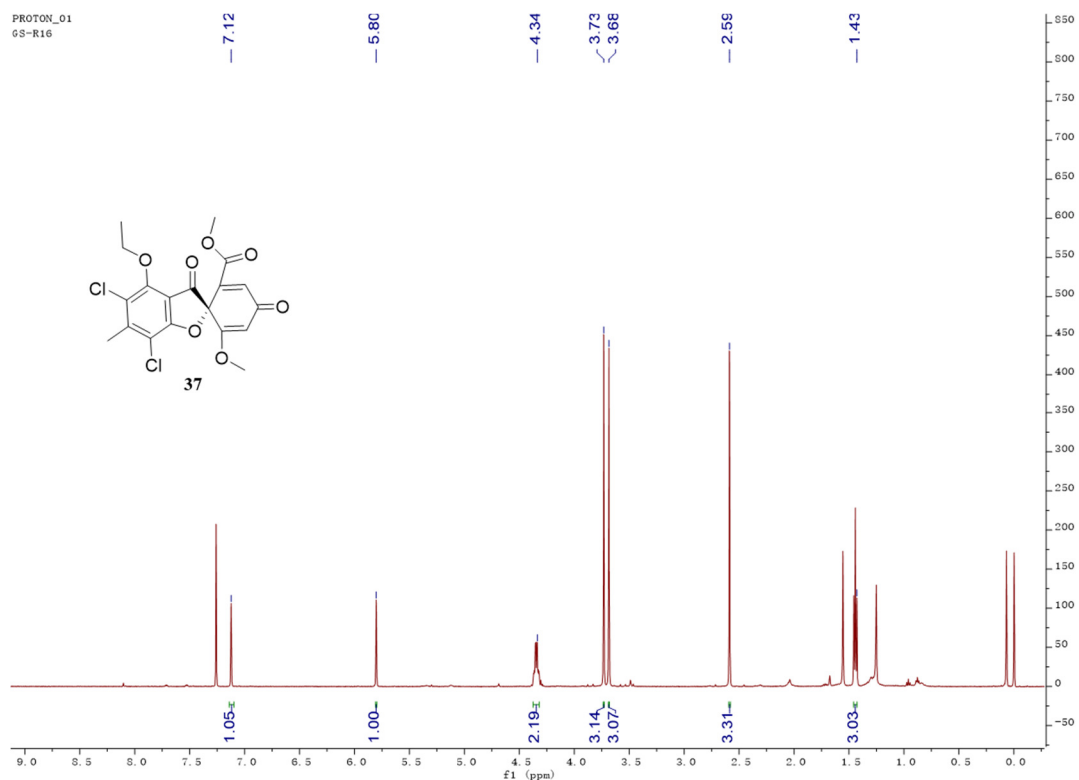


Figure S106. 1H NMR (500 MHz, $CDCl_3$) spectrum of compound **36**



CHNQD-02124 #505 RT: 4.87 AV: 1 NL: 2.53E7
T: FTMS + p ESI Full ms [100.00-1500.00]





CHNQD-02144 #475 RT: 4.61 AV: 1 NL: 6.01E8
T: FTMS + p ESI Full ms [100.00-1500.00]

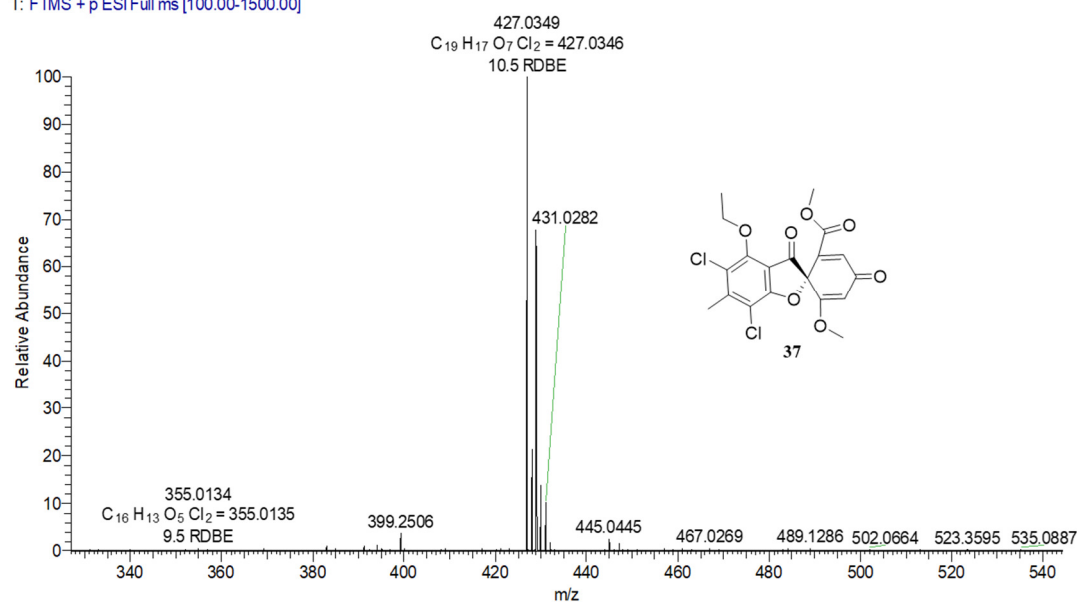


Figure S111. HRESIMS spectrum of compound **37**

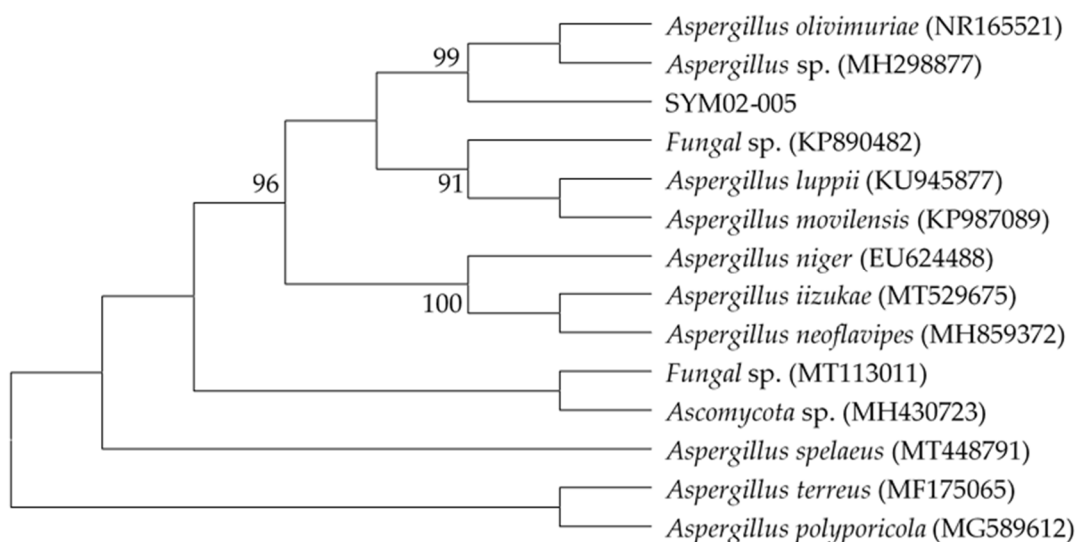


Figure S112. Neighbor-joining phylogenetic tree based on ITS sequences of cultured fungi associated with the fungus SYM02-005. The values at each node represent the bootstrap values from 1,000 replicates, and the scale bar=0.05 substitutions per nucleo.