

Polyethylene Glycol-Bonded Triethylammonium *L*-Prolinate: A New Biodegradable Amino Acid-Based Ionic Liquid for One-Pot Synthesis of Bis(pyrazolyl)methanes as DNA Binding Agents

Reza Kordnezhadian, Mohsen Shekouhy, Somaye Karimian, Zohreh Tavaf, Saeed Malek-Hosseini, Mohammad Bagher Shahsavani, Zahra Amirghofran, Reza Yousefi, Ali Khalafi-Nezhad

Contents	Page No.
Figure 1. FT-IR spectrum of compound (4a)	5
Figure 2. ¹ H-NMR spectrum of compound (4a)	6
Figure 3. ¹³ C-NMR spectrum of compound (4a).....	7
Figure 4. FT-IR spectrum of compound (4b)	8
Figure 5. ¹ H-NMR spectrum of compound (4b)	9
Figure 6. ¹³ C-NMR spectrum of compound (4b)	10
Figure 7. FT-IR spectrum of compound (4c)	11
Figure 8. ¹ H-NMR spectrum of compound (4c).....	12
Figure 9. ¹³ C-NMR spectrum of compound (4c).....	13
Figure 10. FT-IR spectrum of compound (6aa)	14
Figure 11. ¹ H-NMR spectrum of compound (6aa).....	15
Figure 12. FT-IR spectrum of compound (6ab)	16
Figure 13. ¹ H-NMR spectrum of compound (6ab)	17
Figure 14. FT-IR spectrum of compound (6ac).....	18
Figure 15. ¹ H-NMR spectrum of compound (6ac).....	19
Figure 16. FT-IR spectrum of compound (6ad)	20
Figure 17. ¹ H-NMR spectrum of compound (6ad)	21
Figure 18. FT-IR spectrum of compound (6ae)	22
Figure 19. ¹ H-NMR spectrum of compound (6ae).....	23
Figure 20. FT-IR spectrum of compound (6af)	24
Figure 21. ¹ H-NMR spectrum of compound (6af)	25
Figure 22. ¹³ C-NMR spectrum of compound (6af)	26
Figure 23. FT-IR spectrum of compound (6ag)	27
Figure 24. ¹ H-NMR spectrum of compound (6ag).....	28

Figure 25. FT-IR spectrum of compound (6ah)	29
Figure 26. ¹ H-NMR spectrum of compound (6ah)	30
Figure 27. FT-IR spectrum of compound (6ai)	31
Figure 28. ¹ H-NMR spectrum of compound (6ai).....	32
Figure 29. FT-IR spectrum of compound (6aj)	33
Figure 30. ¹ H-NMR spectrum of compound (6aj).....	34
Figure 31. FT-IR spectrum of compound (6ak)	35
Figure 32. ¹ H-NMR spectrum of compound (6ak).....	36
Figure 33. FT-IR spectrum of compound (6al)	37
Figure 34. ¹ H-NMR spectrum of compound (6al).....	38
Figure 35. ¹³ C-NMR spectrum of compound (6al).....	39
Figure 36. FT-IR spectrum of compound (6am)	40
Figure 37. ¹ H-NMR spectrum of compound (6am)	41
Figure 38. FT-IR spectrum of compound (6an)	42
Figure 39. ¹ H-NMR spectrum of compound (6an)	43
Figure 40. FT-IR spectrum of compound (6ao)	44
Figure 41. ¹ H-NMR spectrum of compound (6ao)	45
Figure 42. FT-IR spectrum of compound (6ap)	46
Figure 43. ¹ H-NMR spectrum of compound (6ap)	47
Figure 44. FT-IR spectrum of compound (6aq)	48
Figure 45. ¹ H-NMR spectrum of compound (6aq)	49
Figure 46. FT-IR spectrum of compound (6ar)	50
Figure 47. ¹ H-NMR spectrum of compound (6ar)	51
Figure 48. FT-IR spectrum of compound (6as).....	52
Figure 49. ¹ H-NMR spectrum of compound (6as)	53
Figure 50. FT-IR spectrum of compound (6at)	54
Figure 51. ¹ H-NMR spectrum of compound (6at)	55
Figure 52. FT-IR spectrum of compound (6au)	56
Figure 53. ¹ H-NMR spectrum of compound (6au)	57
Figure 54. ¹³ C-NMR spectrum of compound (6au).....	58
Figure 55. FT-IR spectrum of compound (6av).....	59
Figure 56. ¹ H-NMR spectrum of compound (6av).....	60
Figure 57. FT-IR spectrum of compound (6aw).....	61
Figure 58. ¹ H-NMR spectrum of compound (6aw).....	62
Figure 59. FT-IR spectrum of compound (6ax).....	63

Figure 60. ^1H -NMR spectrum of compound (6ax)	64
Figure 61. FT-IR spectrum of compound (6ay).....	65
Figure 62. ^1H -NMR spectrum of compound (6ay).....	66
Figure 63. FT-IR spectrum of compound (6az).....	67
Figure 64. ^1H -NMR spectrum of compound (6az)	68
Figure 65. ^{13}C -NMR spectrum of compound (6az)	69
Figure 66. FT-IR spectrum of compound (6ba)	70
Figure 67. ^1H -NMR spectrum of compound (6ba)	71
Figure 68. ^{13}C -NMR spectrum of compound (6ba).....	72
Figure 69. FT-IR spectrum of compound (6bb)	73
Figure 70. ^1H -NMR spectrum of compound (6bb)	74
Figure 71. ^{13}C -NMR spectrum of compound (6bb)	75
Figure 72. FT-IR spectrum of compound (6bc)	76
Figure 73. ^1H -NMR spectrum of compound (6bc).....	77
Figure 74. ^{13}C -NMR spectrum of compound (6bc).....	78
Figure 75. FT-IR spectrum of compound (6bd)	79
Figure 76. ^1H -NMR spectrum of compound (6bd)	80
Figure 77. ^{13}C -NMR spectrum of compound (6bd)	81
Figure 78. FT-IR spectrum of compound (6be)	82
Figure 79. ^1H -NMR spectrum of compound (6be)	83
Figure 80. ^{13}C -NMR spectrum of compound (6be).....	84
Figure 81. FT-IR spectrum of compound (6bf)	85
Figure 82. ^1H -NMR spectrum of compound (6bf)	86
Figure 83. ^{13}C -NMR spectrum of compound (6bf)	87
Figure 84. FT-IR spectrum of compound (6bg)	88
Figure 85. ^1H -NMR spectrum of compound (6bg).....	89
Figure 86. ^{13}C -NMR spectrum of compound (6bg).....	90
Figure 87. FT-IR spectrum of compound (6bh)	91
Figure 88. ^1H -NMR spectrum of compound (6bh)	92
Figure 89. ^{13}C -NMR spectrum of compound (6bh)	93
Figure 90. FT-IR spectrum of compound (6bi)	94
Figure 91. ^1H -NMR spectrum of compound (6bi)	95
Figure 92. ^{13}C -NMR spectrum of compound (6bi).....	96
Figure 93. FT-IR spectrum of compound (6bj)	97
Figure 94. ^1H -NMR spectrum of compound (6bj)	98

Figure 95. ^{13}C -NMR spectrum of compound (6bj)	99
Figure 96. FT-IR spectrum of compound (6bk)	100
Figure 97. ^1H -NMR spectrum of compound (6bk).....	101
Figure 98. ^{13}C -NMR spectrum of compound (6bk).....	102
Figure 99. FT-IR spectrum of compound (6bl)	103
Figure 100. ^1H -NMR spectrum of compound (6bl)	104
Figure 101. ^{13}C -NMR spectrum of compound (6bl).....	105
Figure 102. FT-IR spectrum of compound (6bm)	106
Figure 103. ^1H -NMR spectrum of compound (6bm)	107
Figure 104. ^{13}C -NMR spectrum of compound (6bm)	108
Figure 105. FT-IR spectrum of compound (6bn)	109
Figure 106. ^1H -NMR spectrum of compound (6bn)	110
Figure 107. ^{13}C -NMR spectrum of compound (6bn)	111
Figure 108. FT-IR spectrum of compound (6bo)	112
Figure 109. ^1H -NMR spectrum of compound (6bo)	113
Figure 110. ^{13}C -NMR spectrum of compound (6bo)	114
Figure 111. FT-IR spectrum of compound (6bp)	115
Figure 112. ^1H -NMR spectrum of compound (6bp)	116
Figure 113. ^{13}C -NMR spectrum of compound (6bp)	117
Figure 114. FT-IR spectrum of compound (6bq)	118
Figure 115. ^1H -NMR spectrum of compound (6bq)	119
Figure 116. ^{13}C -NMR spectrum of compound (6bq)	120
Figure 117. FT-IR spectrum of compound (6br).....	121
Figure 118. ^1H -NMR spectrum of compound (6br)	122
Figure 119. ^{13}C -NMR spectrum of compound (6br)	123
Figure 120. FT-IR spectrum of compound (6bs).....	124
Figure 121. ^1H -NMR spectrum of compound (6bs)	125
Figure 122. ^{13}C -NMR spectrum of compound (6bs)	126
Figure 123. FT-IR spectrum of compound (6bt).....	127
Figure 124. ^1H -NMR spectrum of compound (6bt)	128
Figure 125. ^{13}C -NMR spectrum of compound (6bt)	129

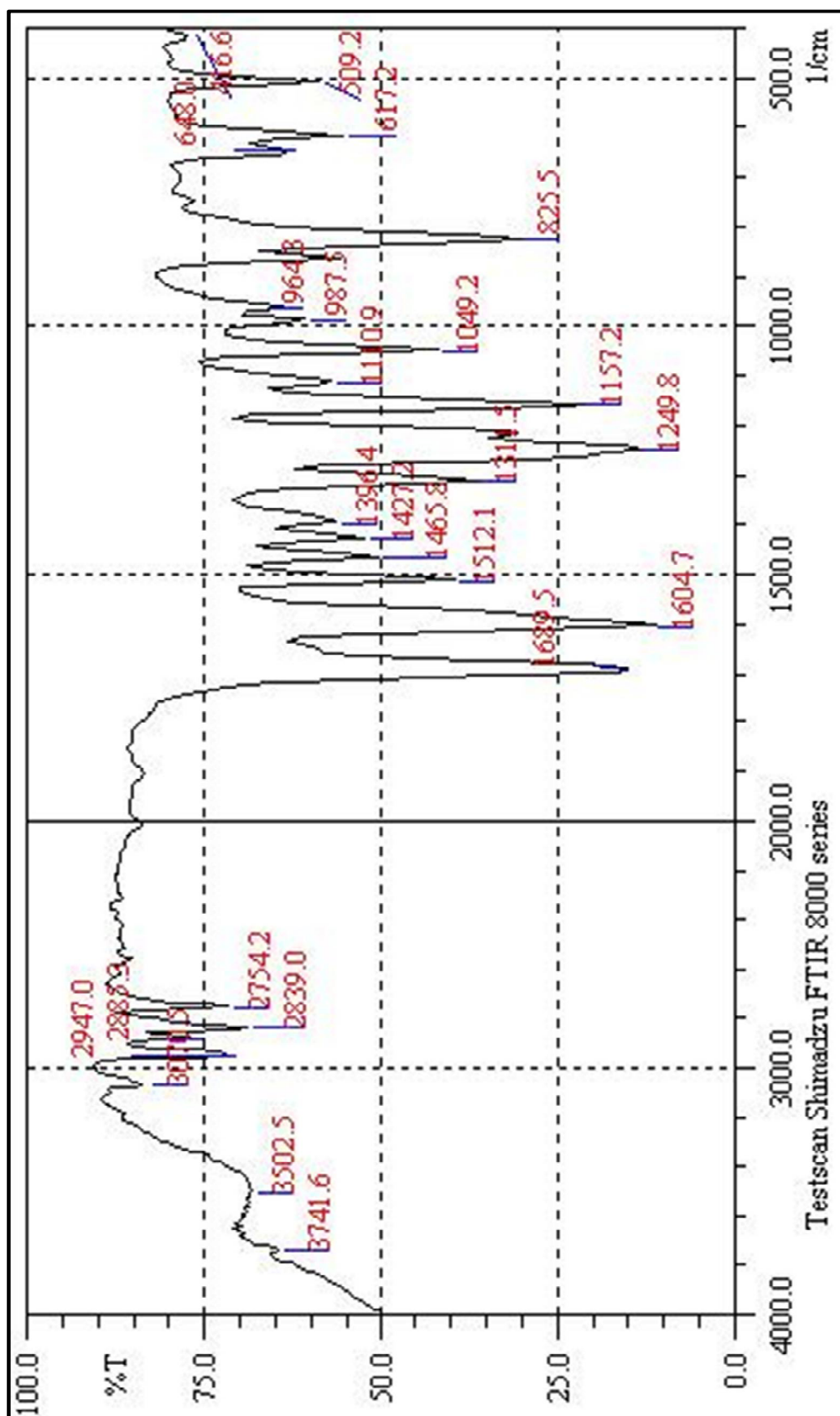


Figure 1. FT-IR spectrum of compound (4a)

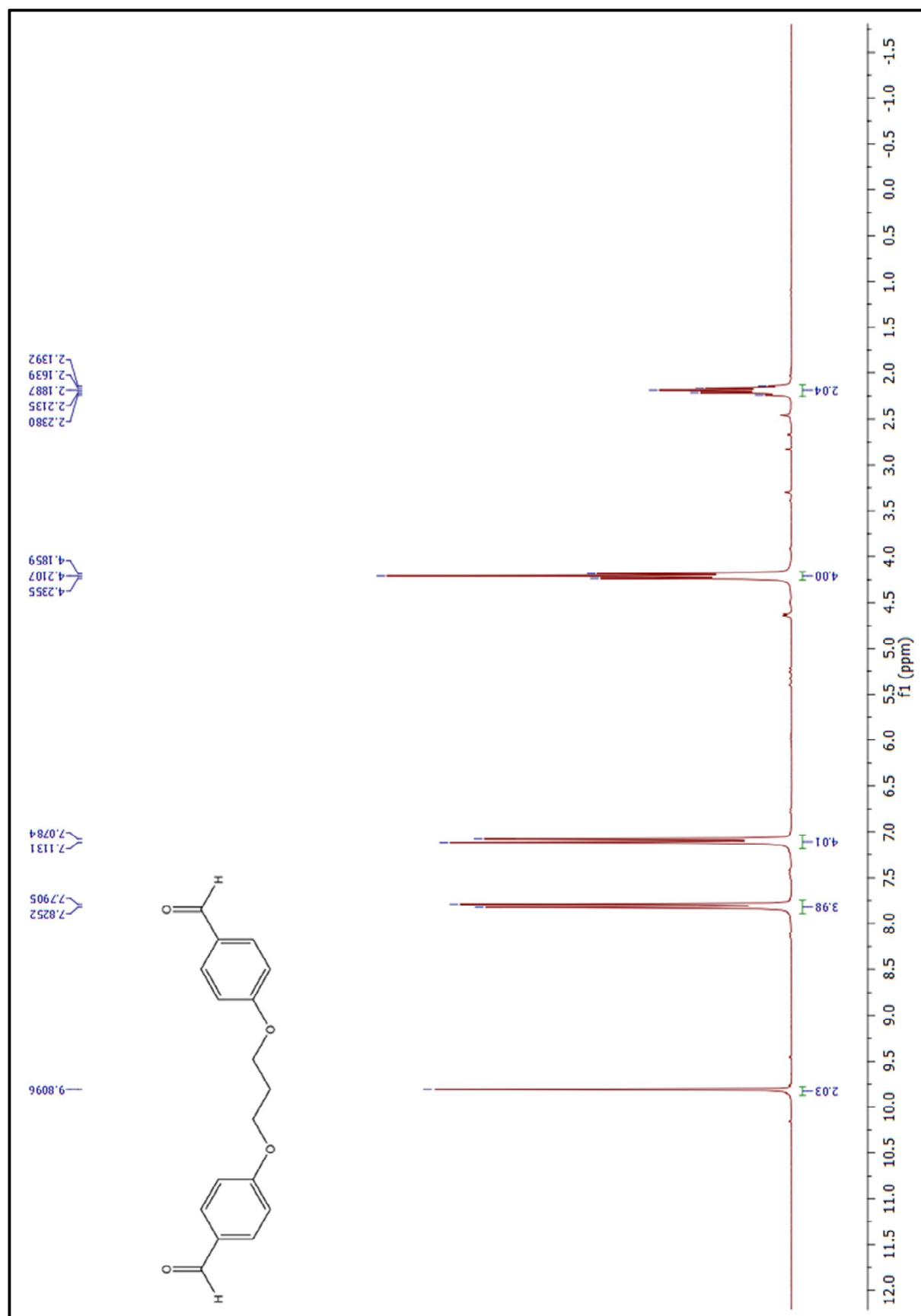


Figure 2. ^1H -NMR spectrum of compound (4a)

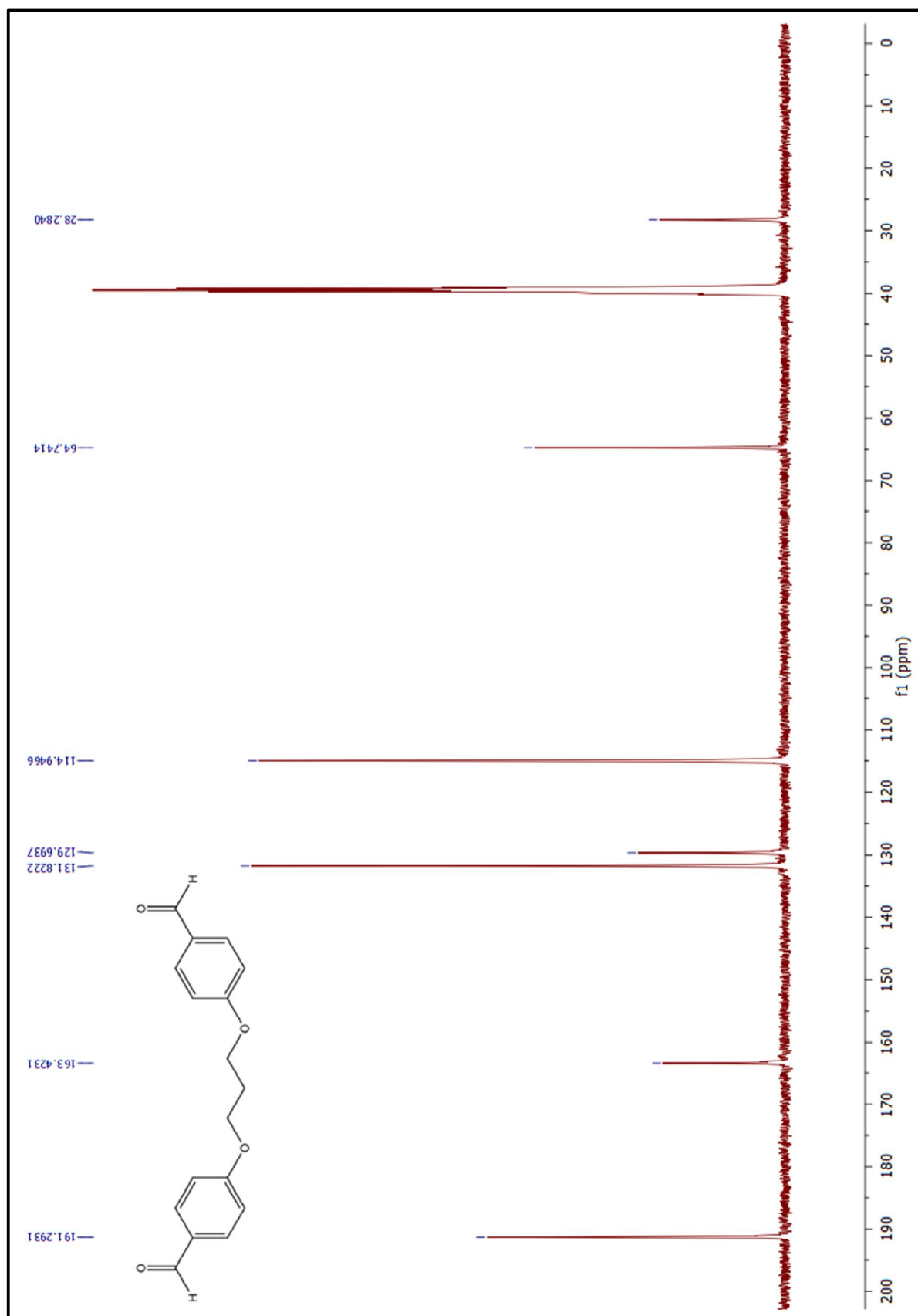


Figure 3. ^{13}C -NMR spectrum of compound (4a)

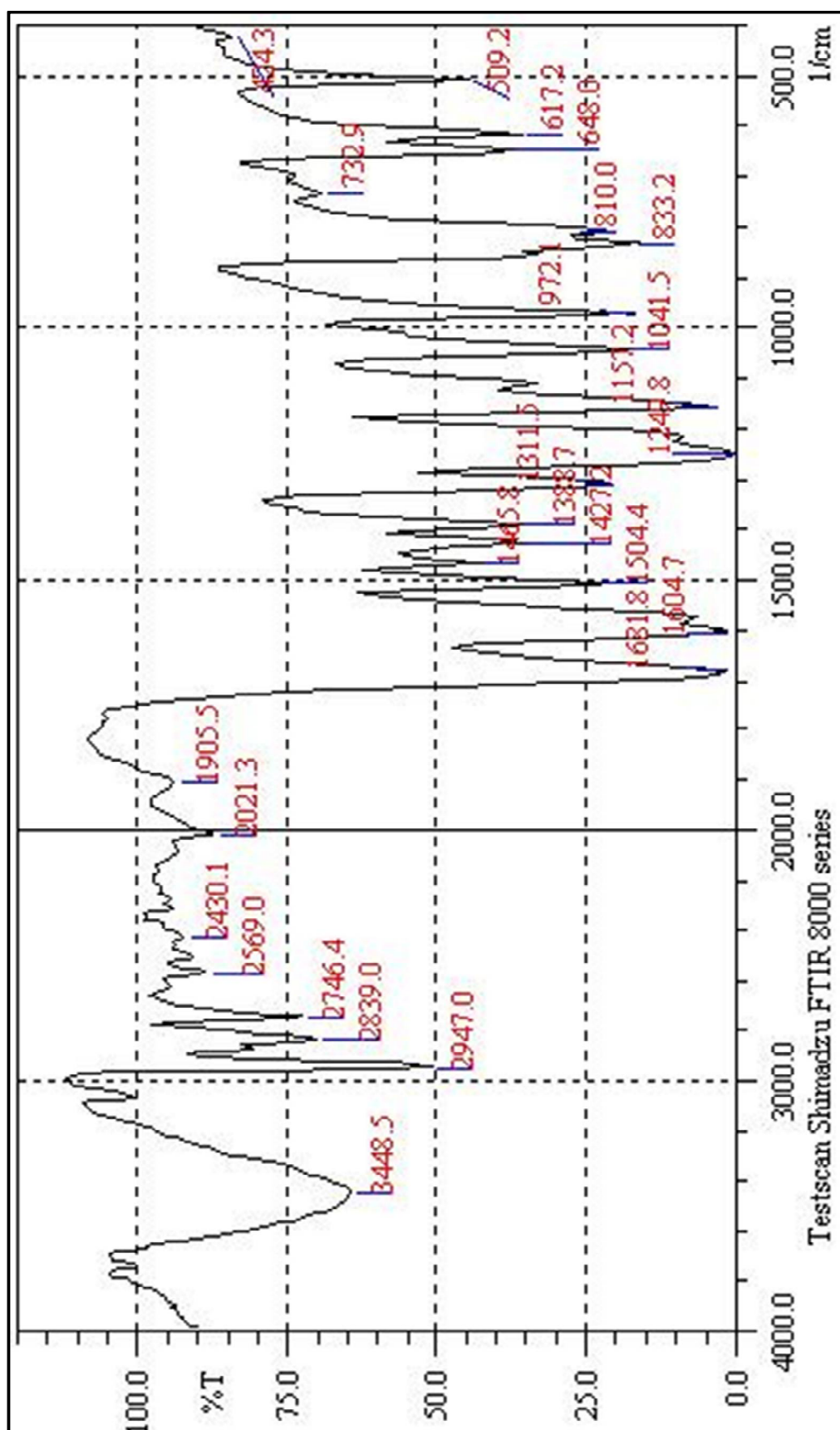


Figure 4. FT-IR spectrum of compound (4b)

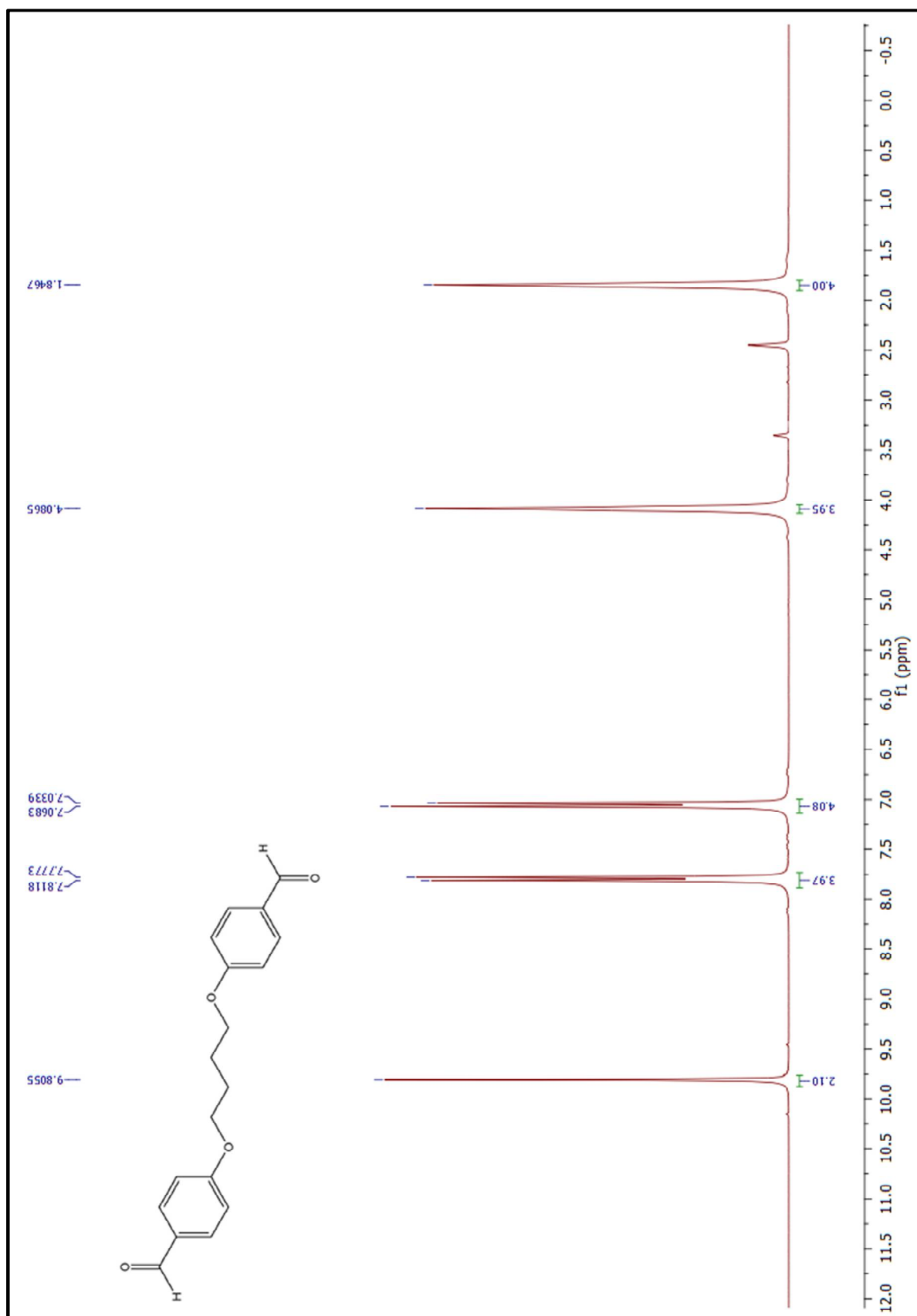


Figure 5. ^1H -NMR spectrum of compound (4b)

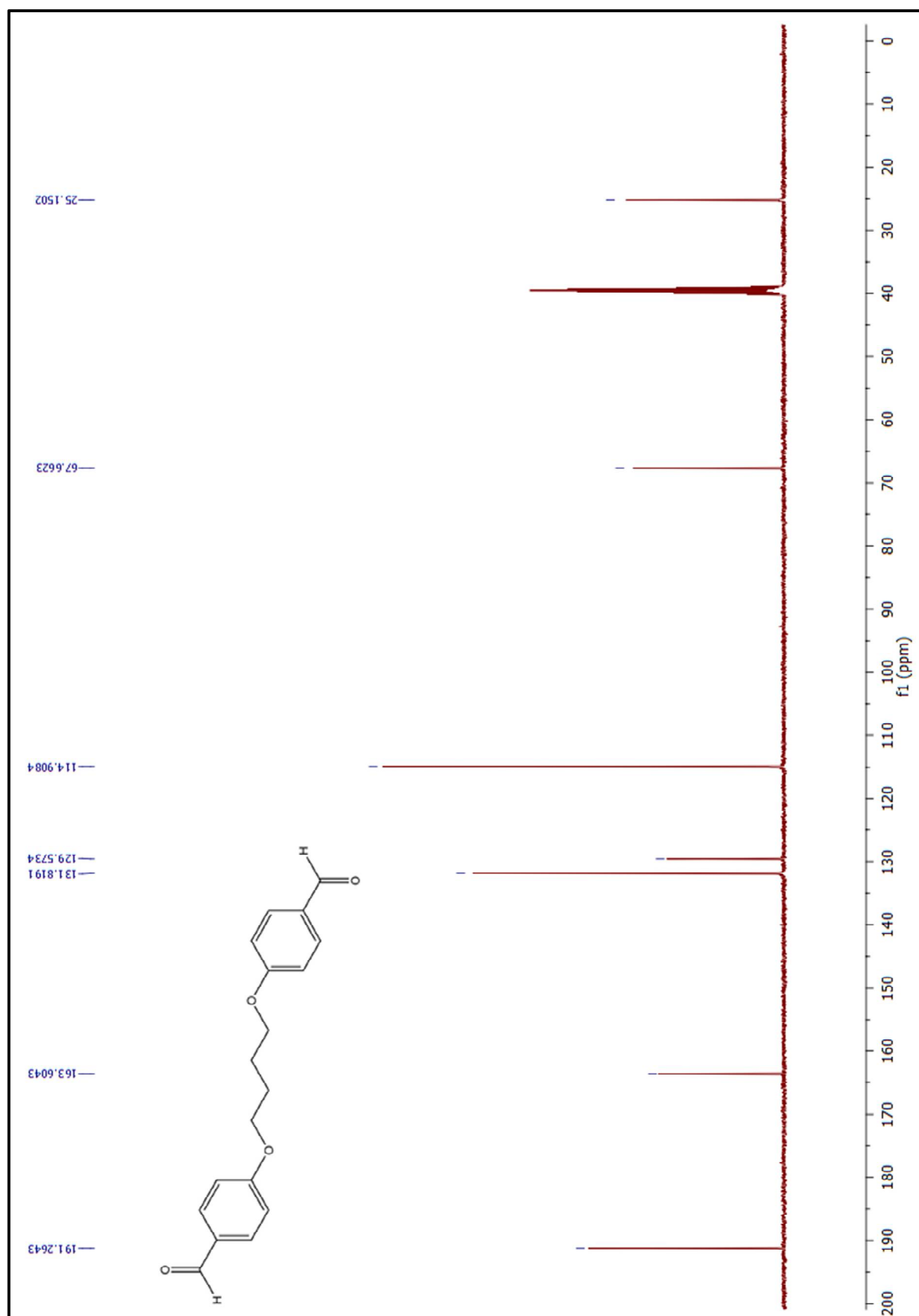


Figure 6. ^{13}C -NMR spectrum of compound (4b)

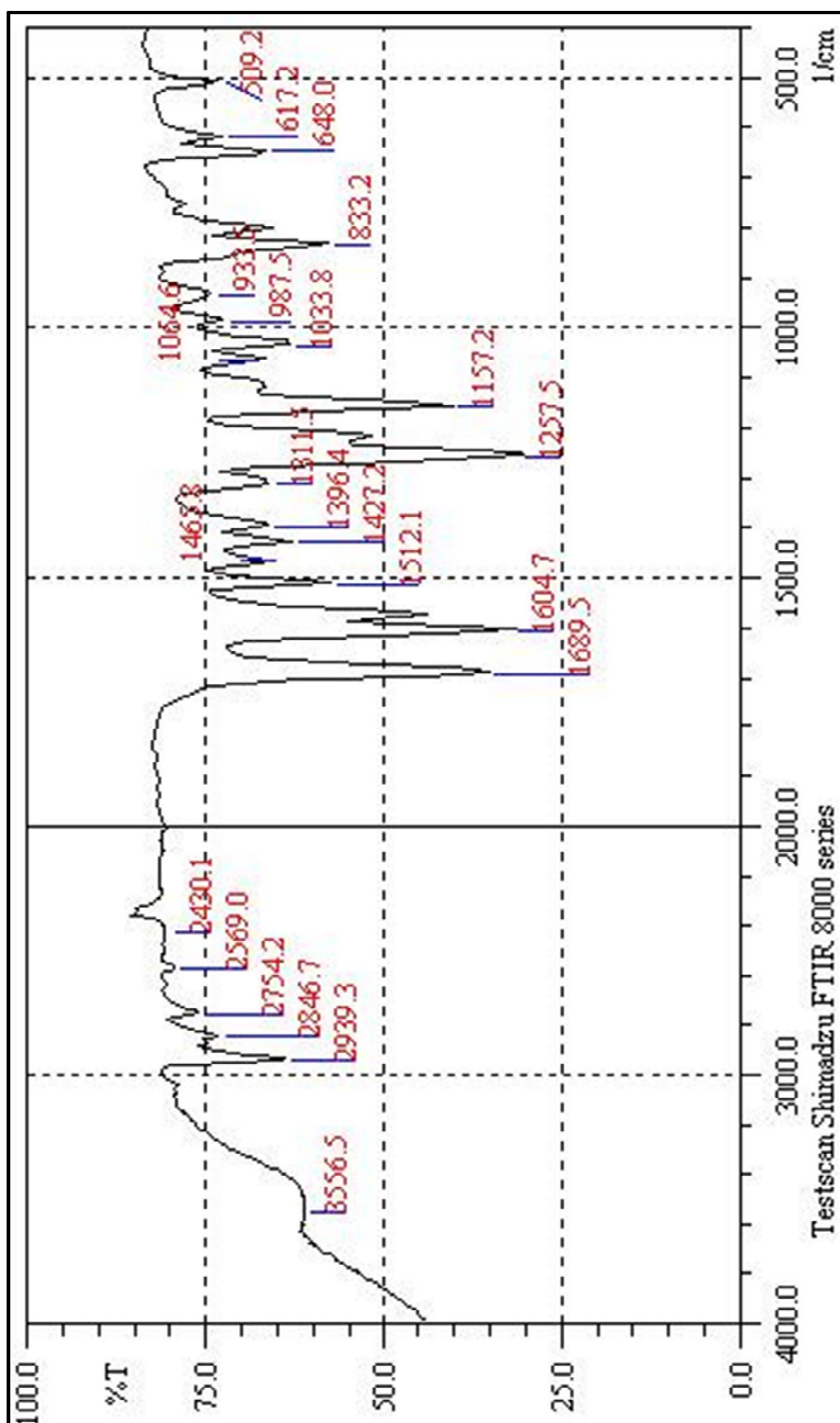


Figure 7. FT-IR spectrum of compound (4c)

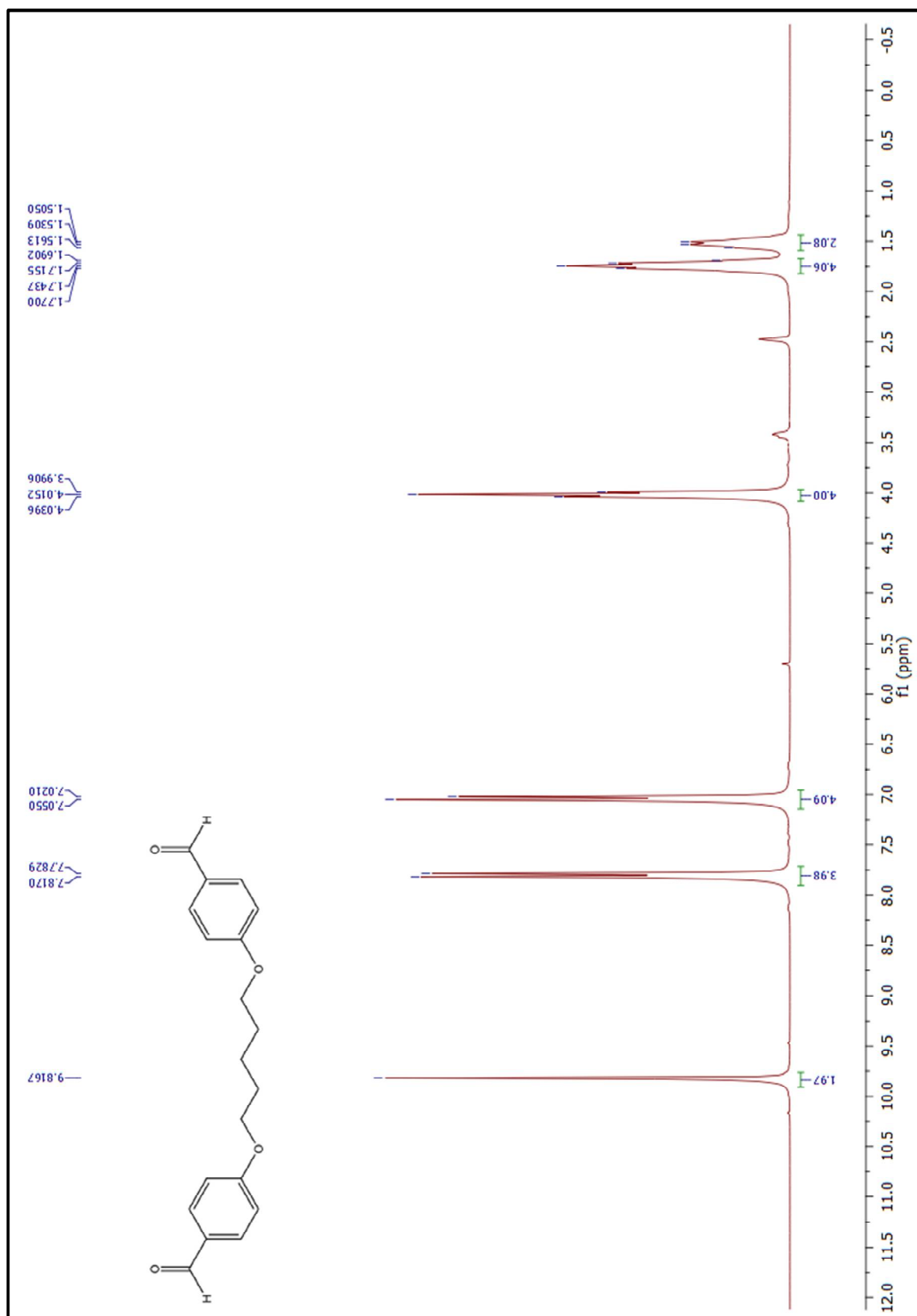


Figure 8. ¹H-NMR spectrum of compound (4c)

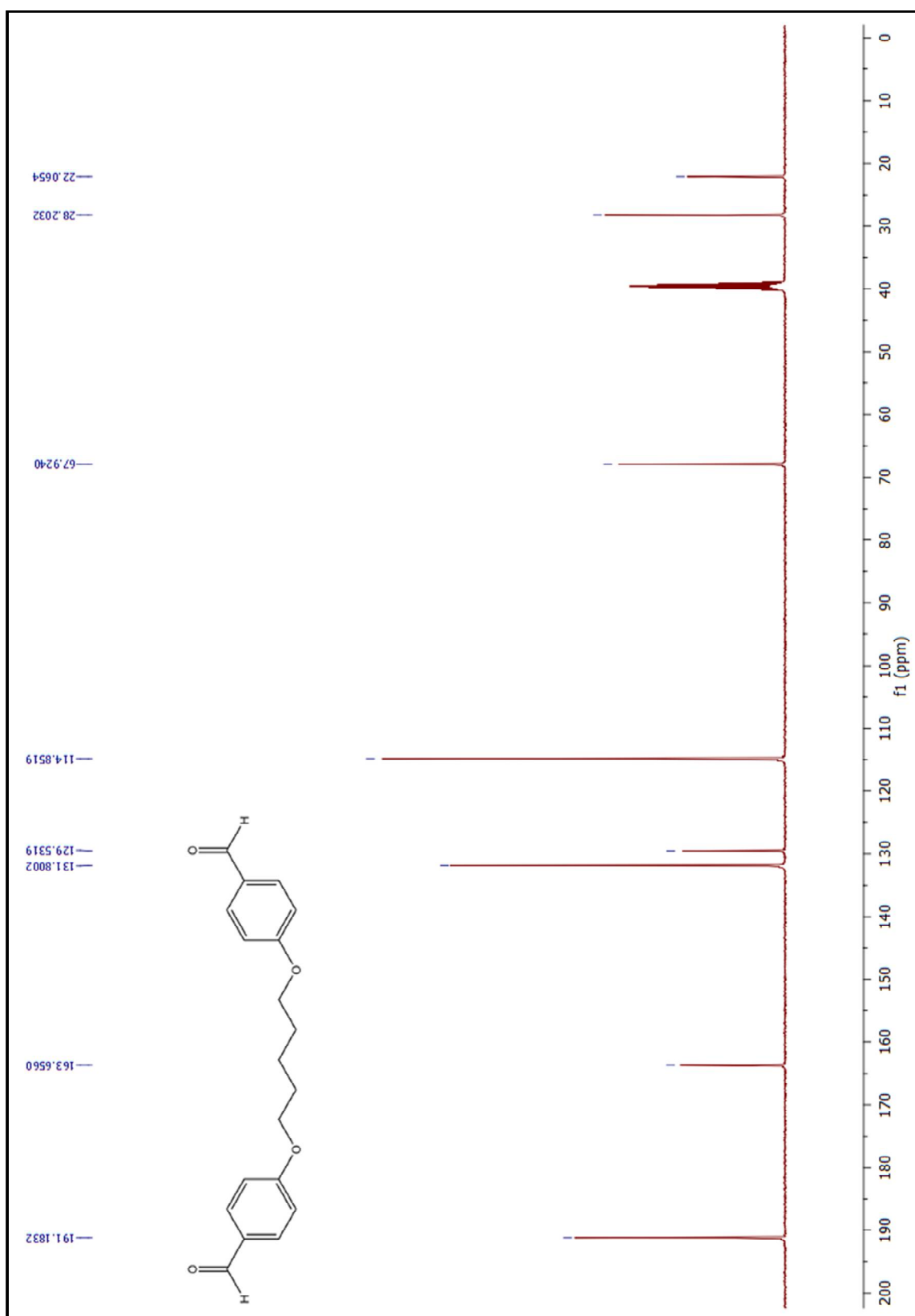


Figure 9. ^{13}C -NMR spectrum of compound (4c)

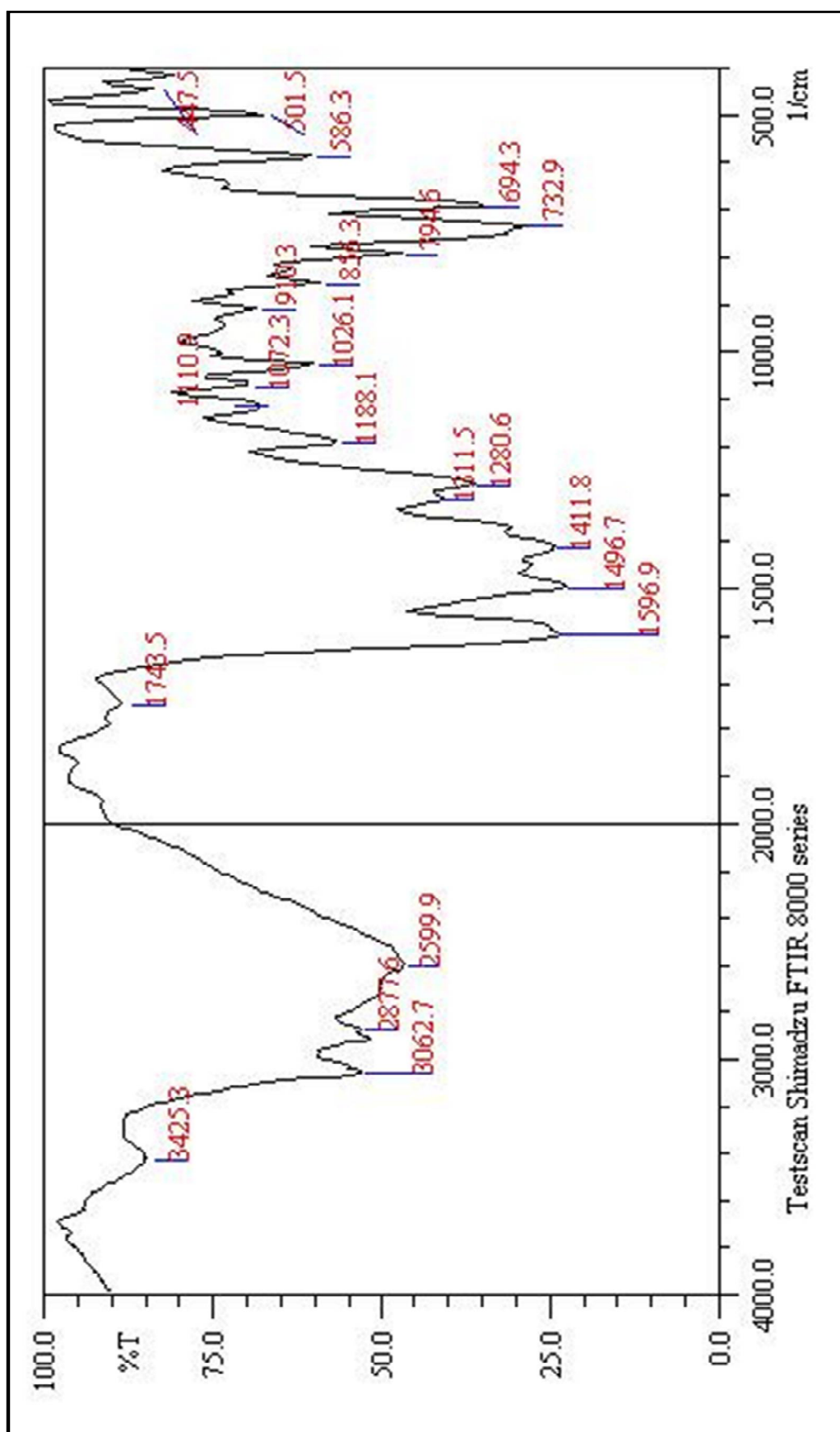


Figure 10. FT-IR spectrum of compound (6aa)

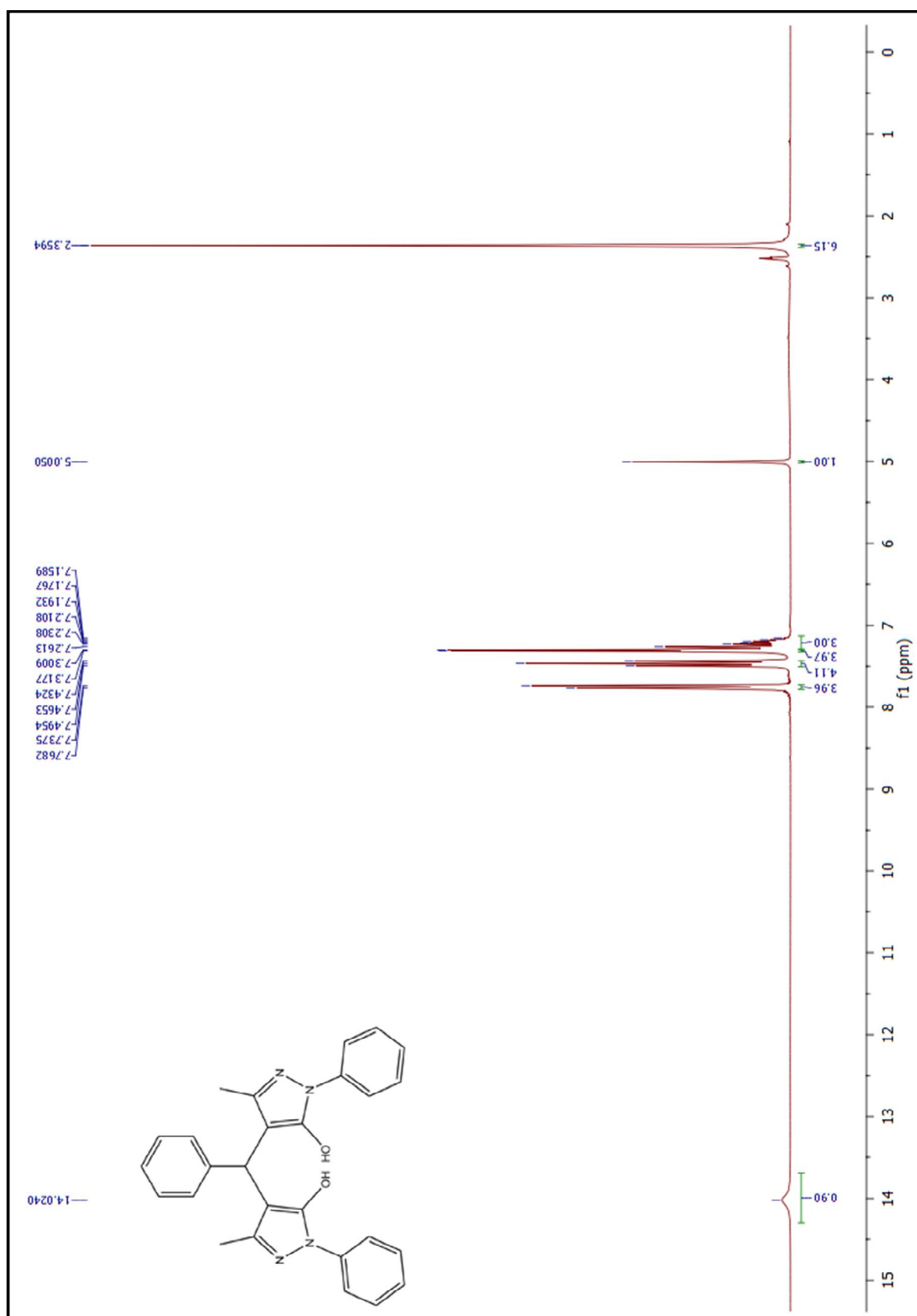


Figure 11. ^1H -NMR spectrum of compound (6aa)

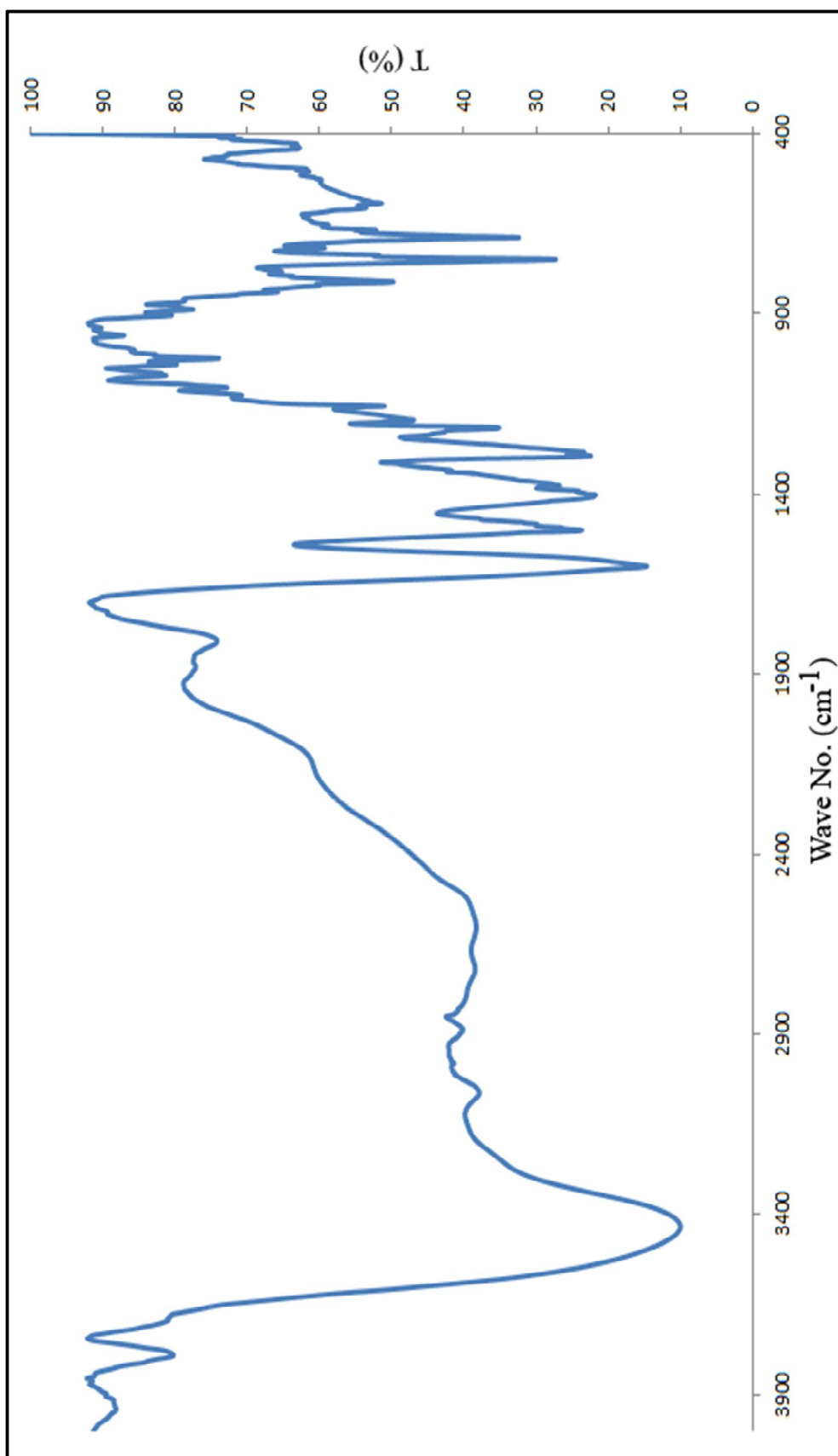


Figure 12. FT-IR spectrum of compound (6ab)

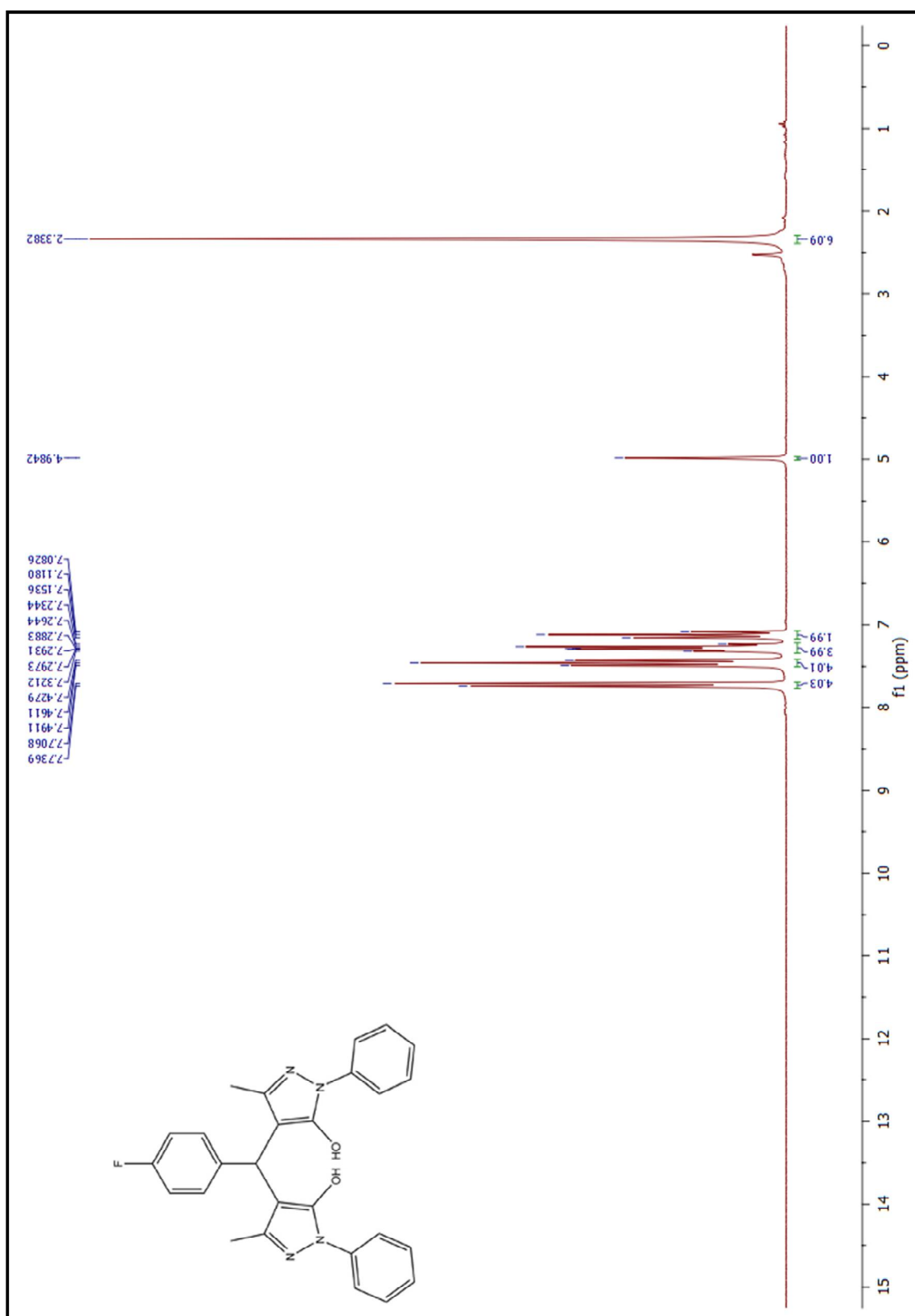


Figure 13. ^1H -NMR spectrum of compound (6ab)

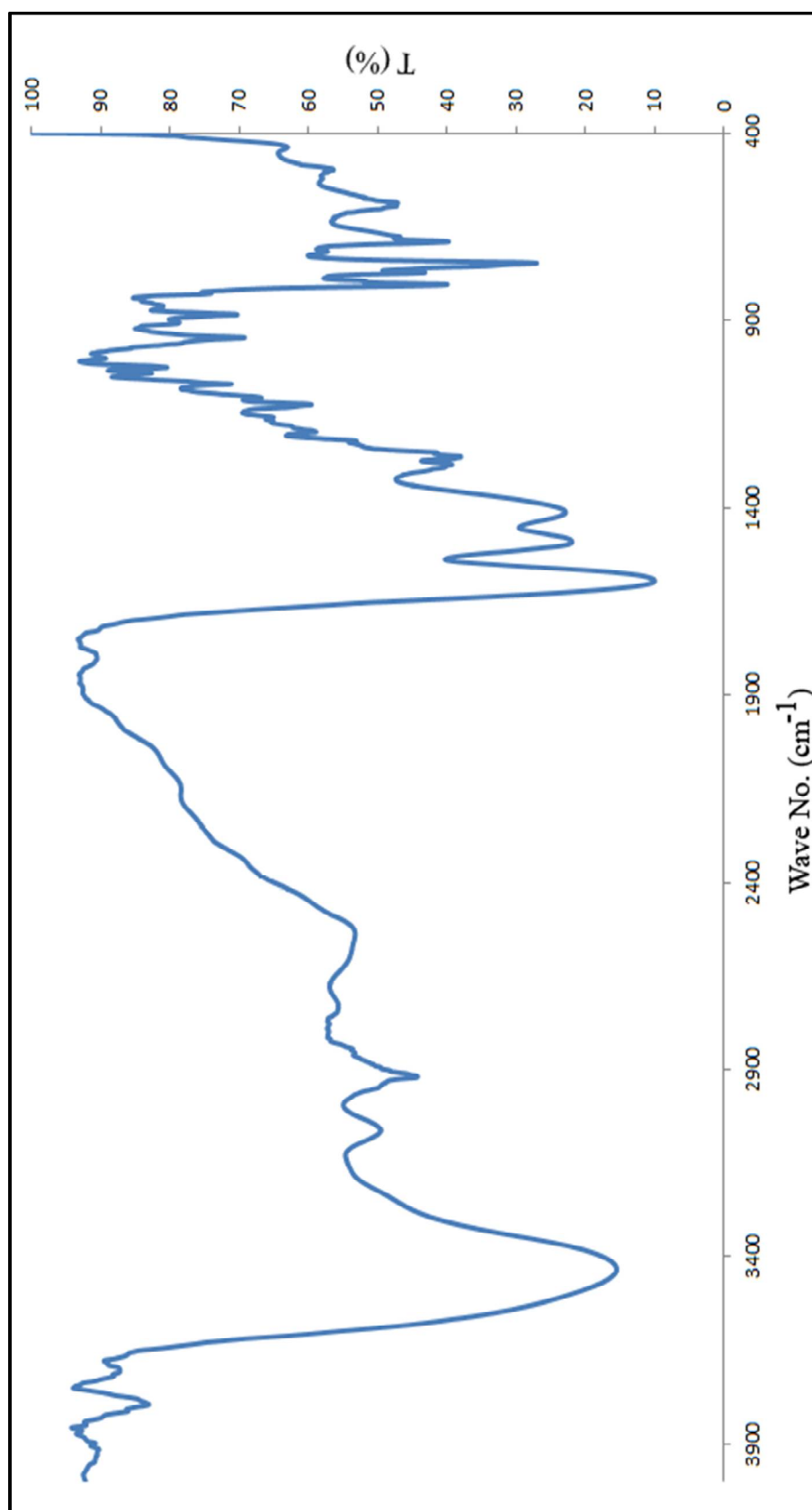


Figure 14. FT-IR spectrum of compound (6ac)

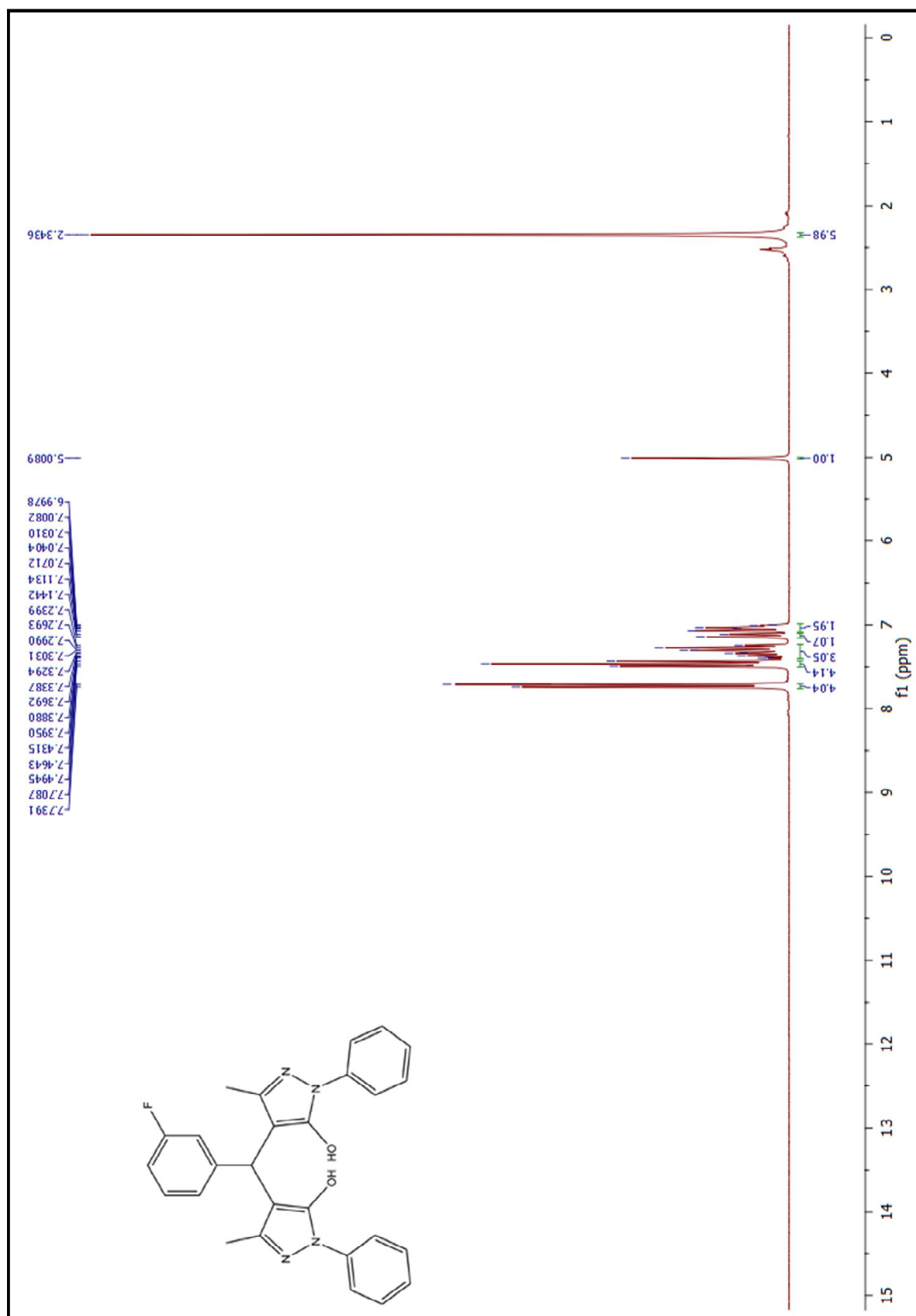


Figure 15. ^1H -NMR spectrum of compound (6ac)

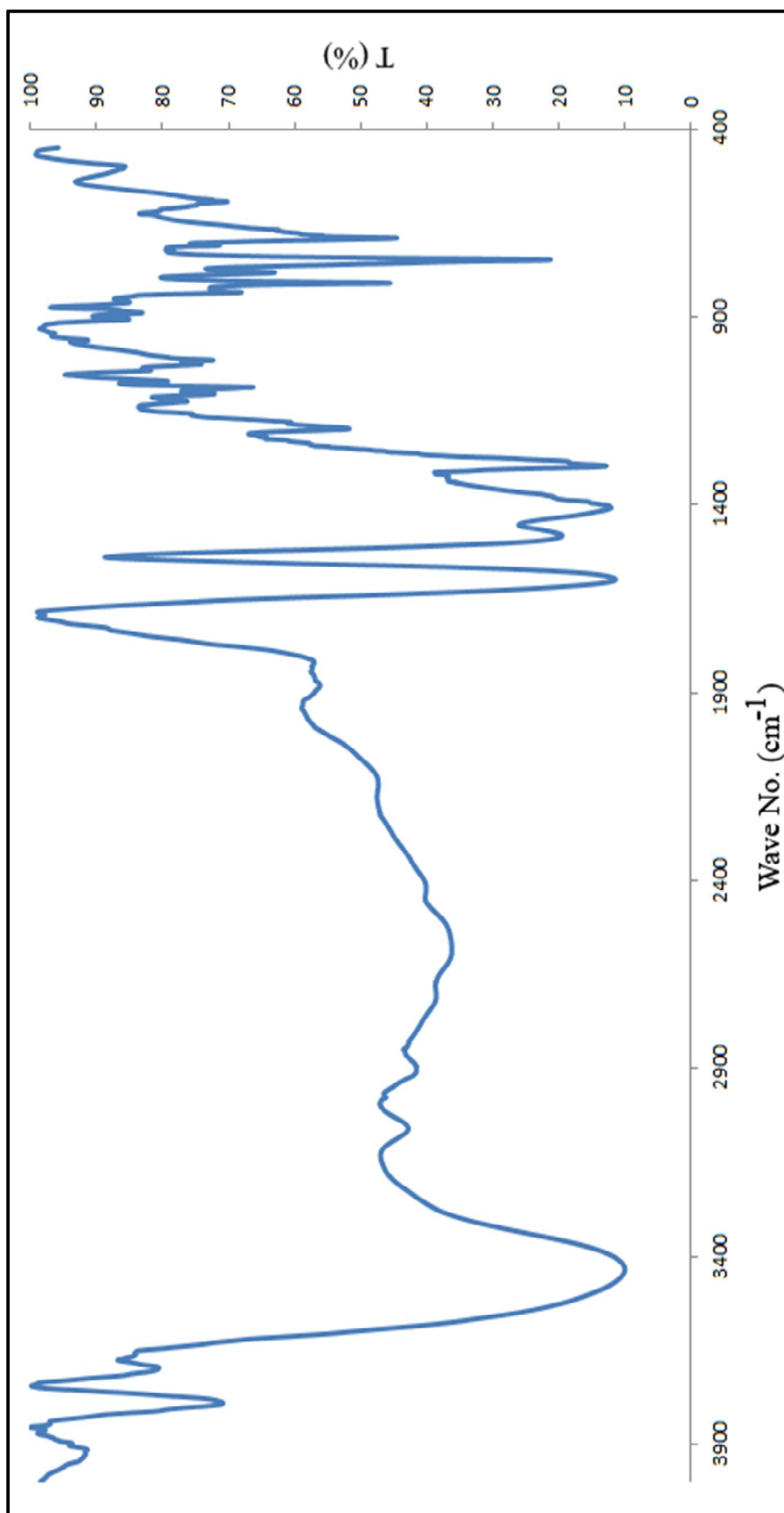


Figure 16. FT-IR spectrum of compound (6ad)

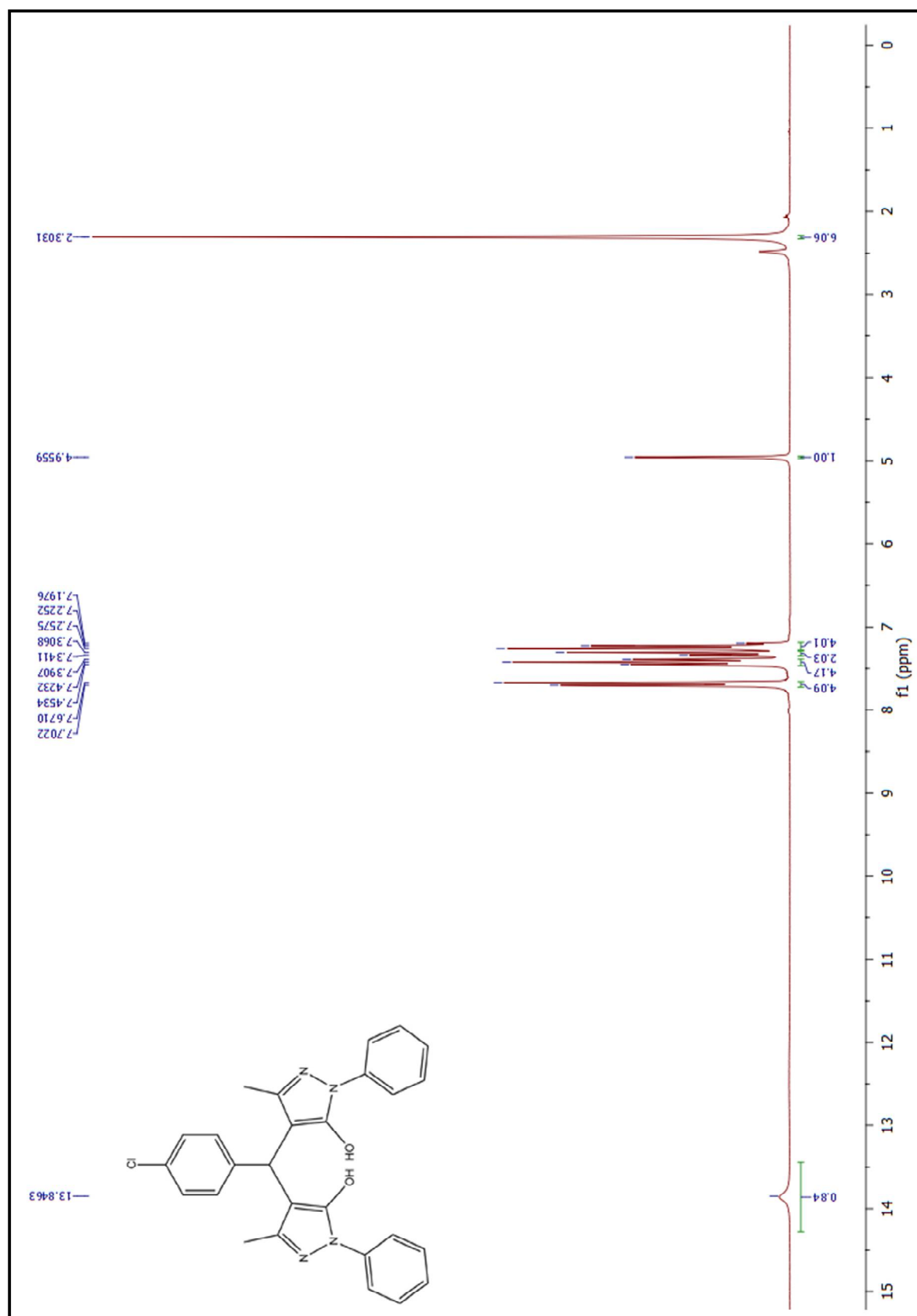


Figure 17. ¹H-NMR spectrum of compound (6ad)

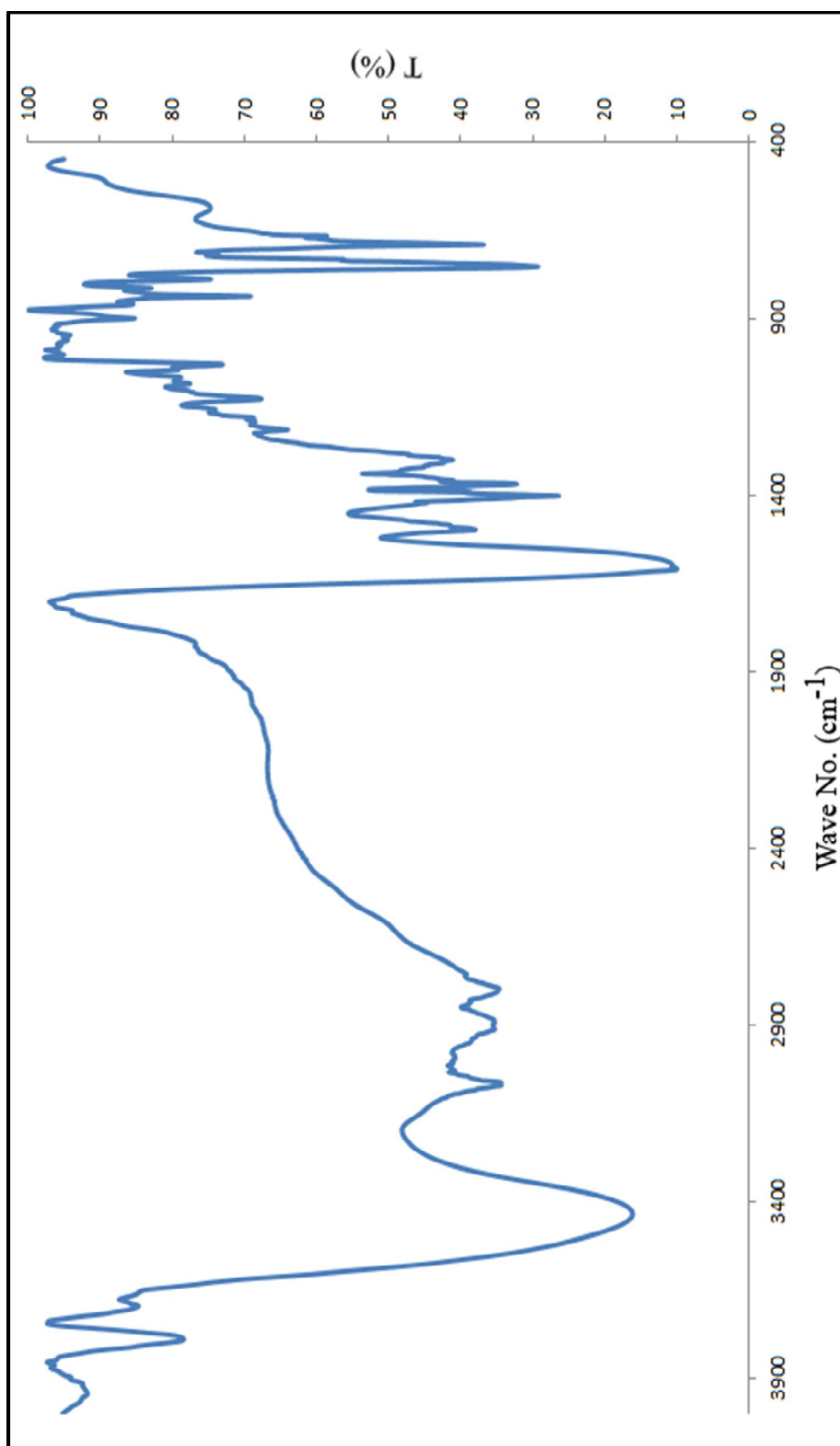


Figure 18. FT-IR spectrum of compound (6ae)

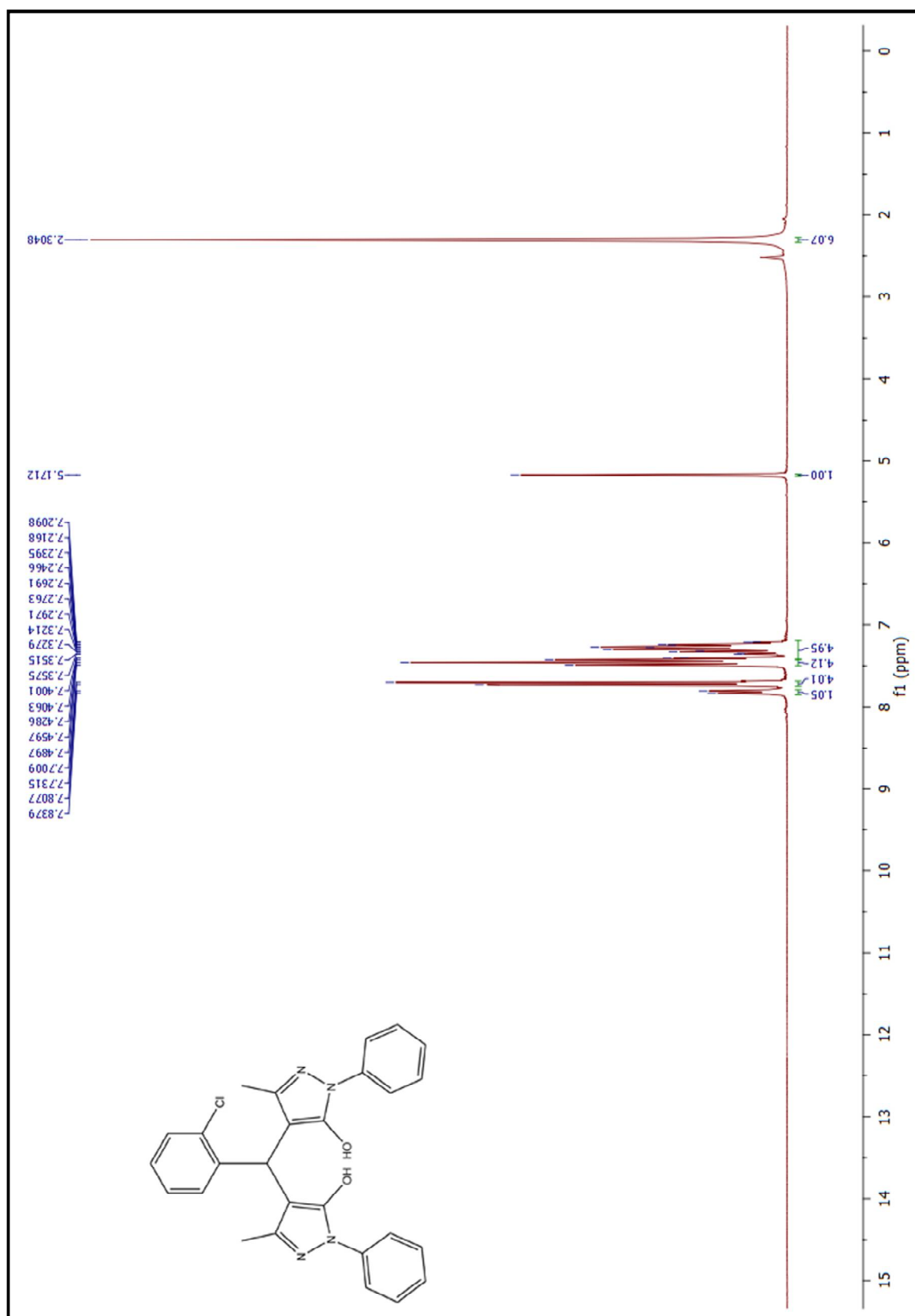


Figure 19. ^1H -NMR spectrum of compound (6ae)

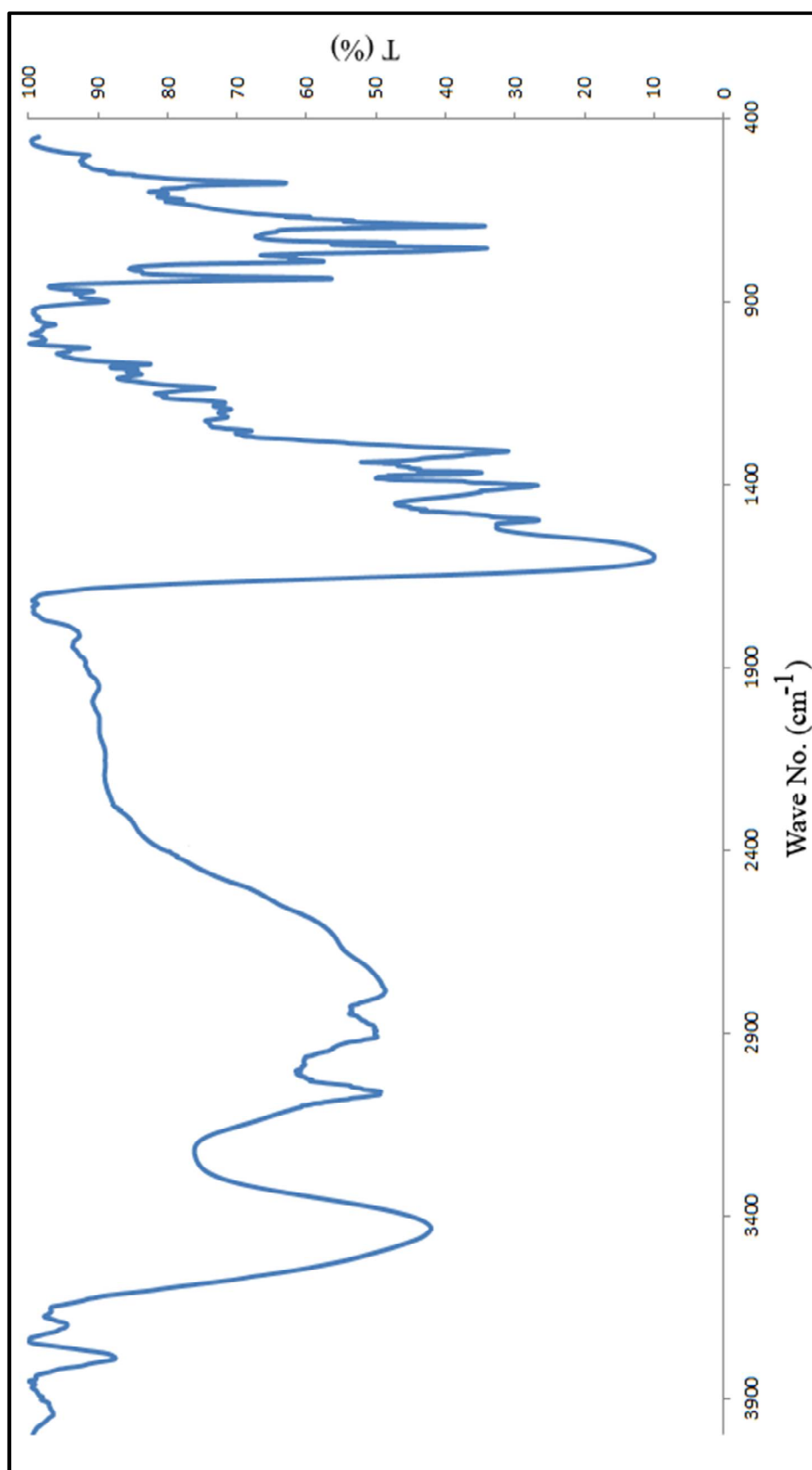


Figure 20. FT-IR spectrum of compound (6af)

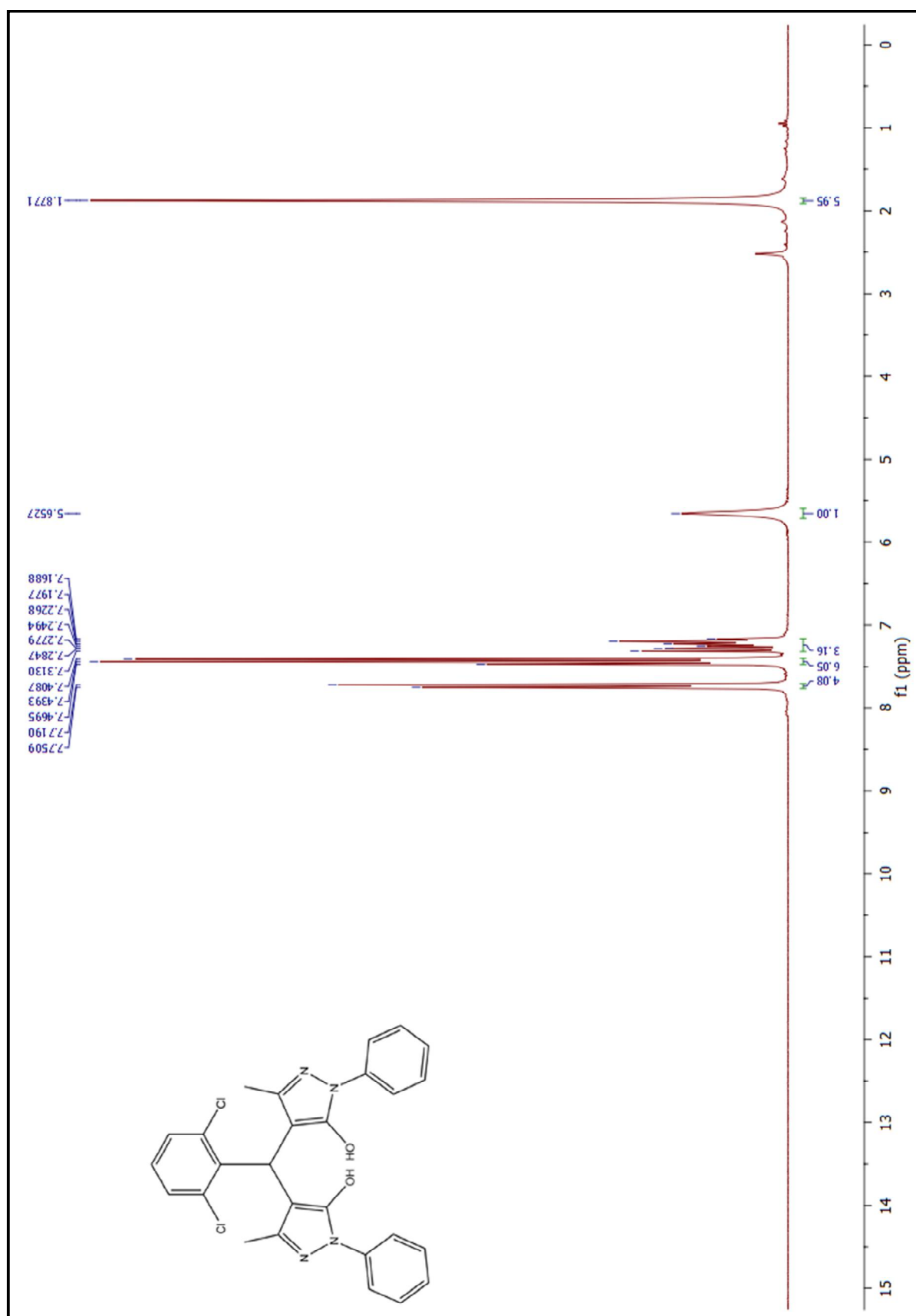


Figure 21. ^1H -NMR spectrum of compound (6af)

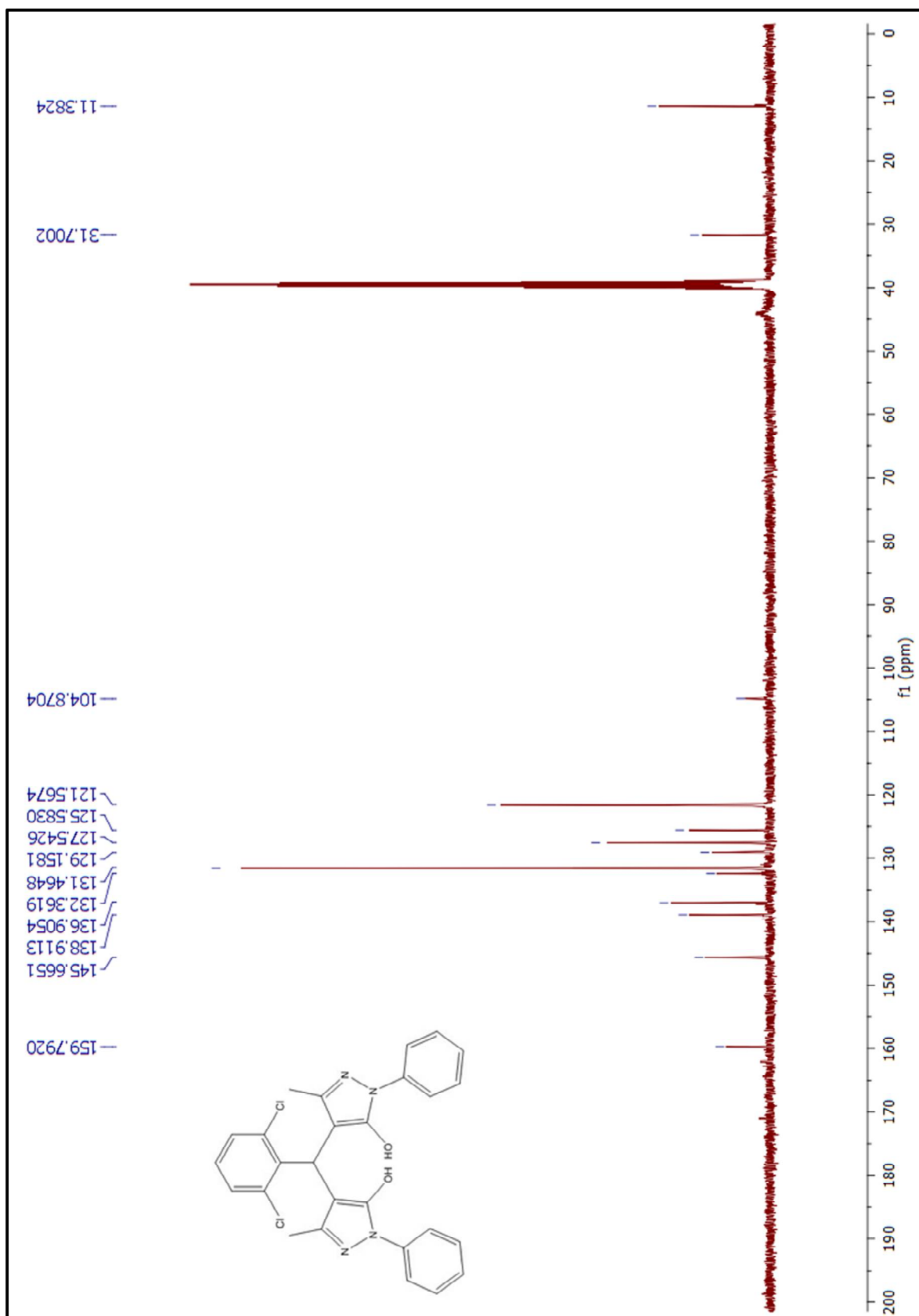


Figure 22. ^{13}C -NMR spectrum of compound (6af)

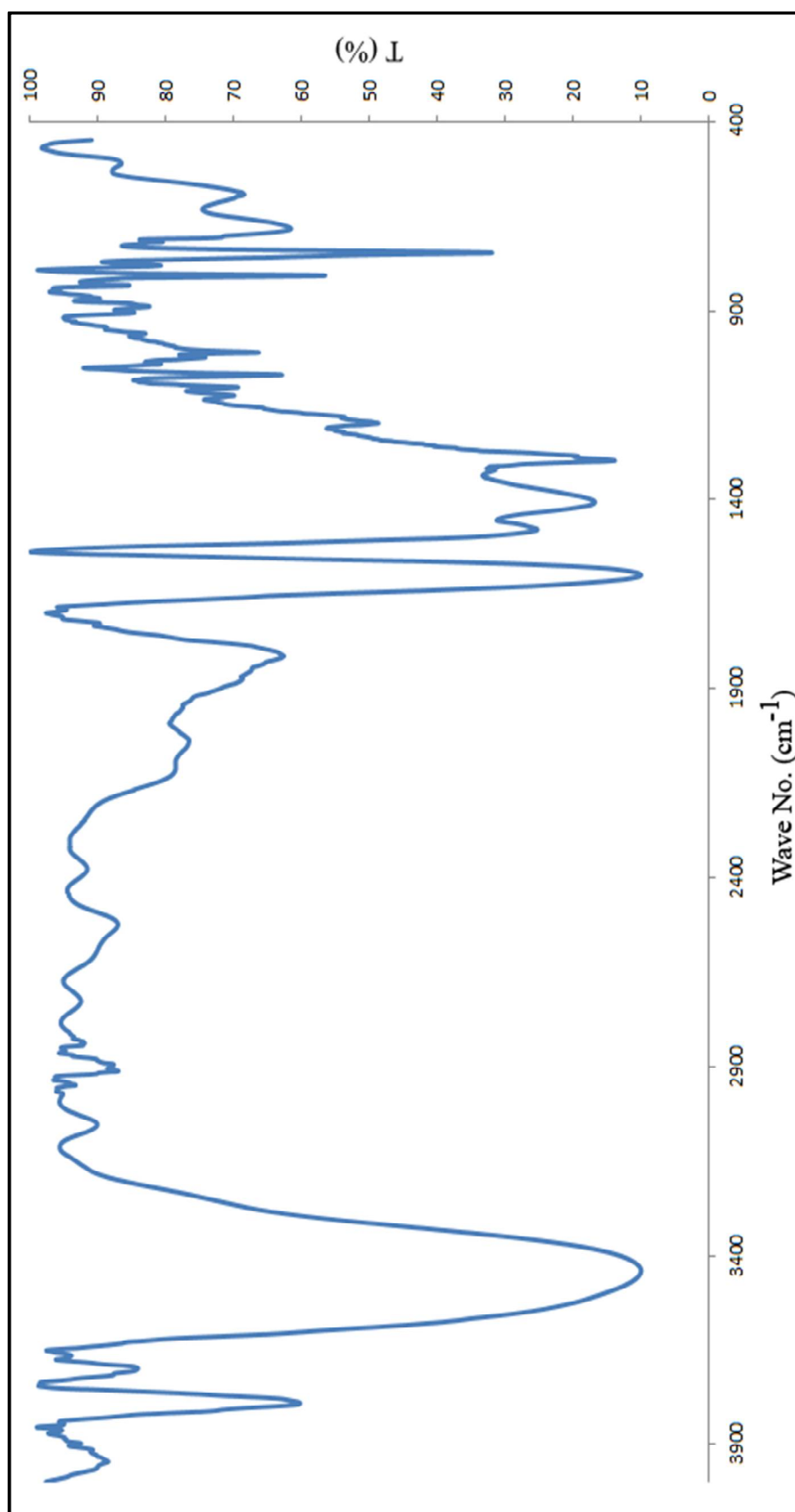


Figure 23. FT-IR spectrum of compound (6ag)

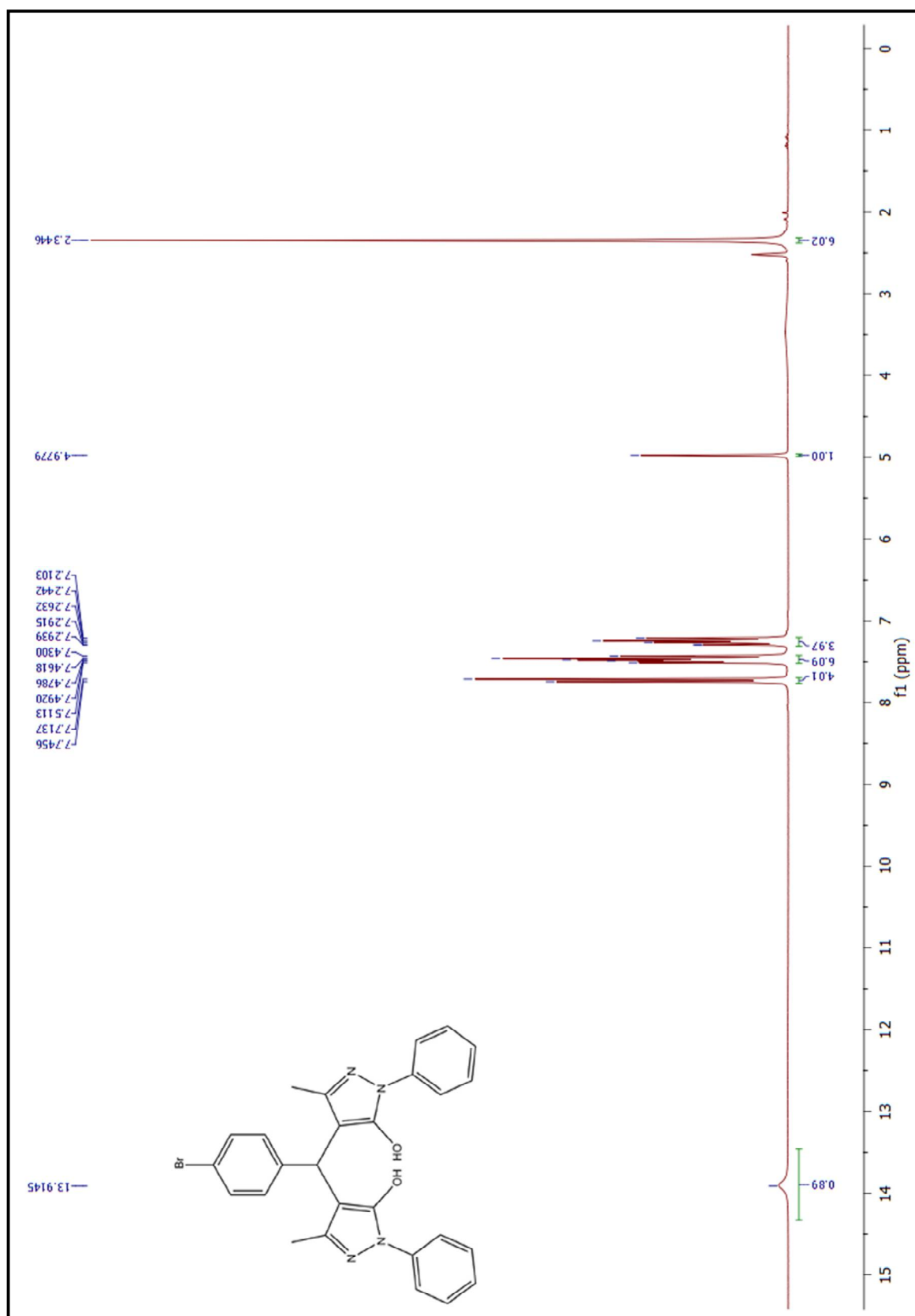


Figure 24. ^1H -NMR spectrum of compound (6ag)

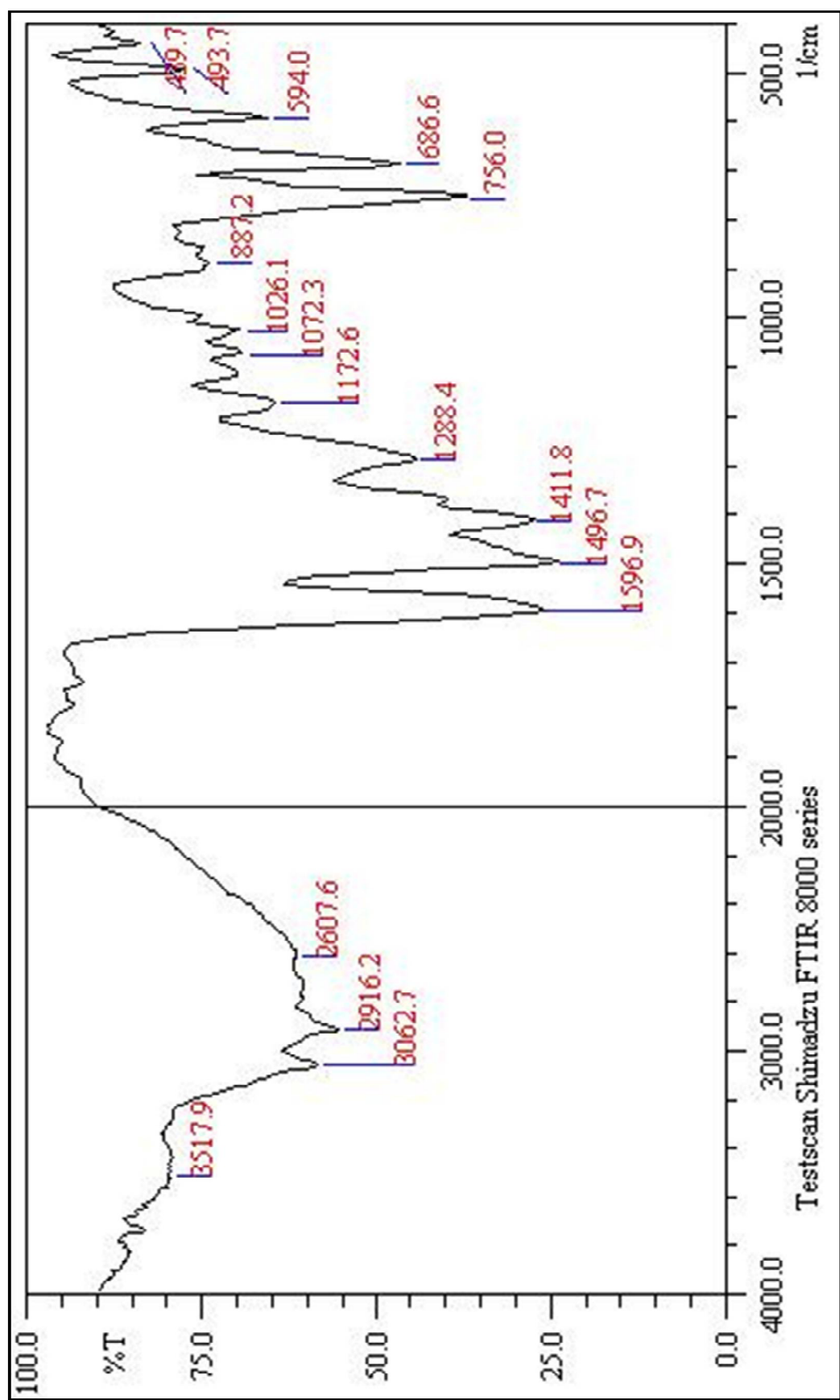


Figure 25. FT-IR spectrum of compound (6ah)

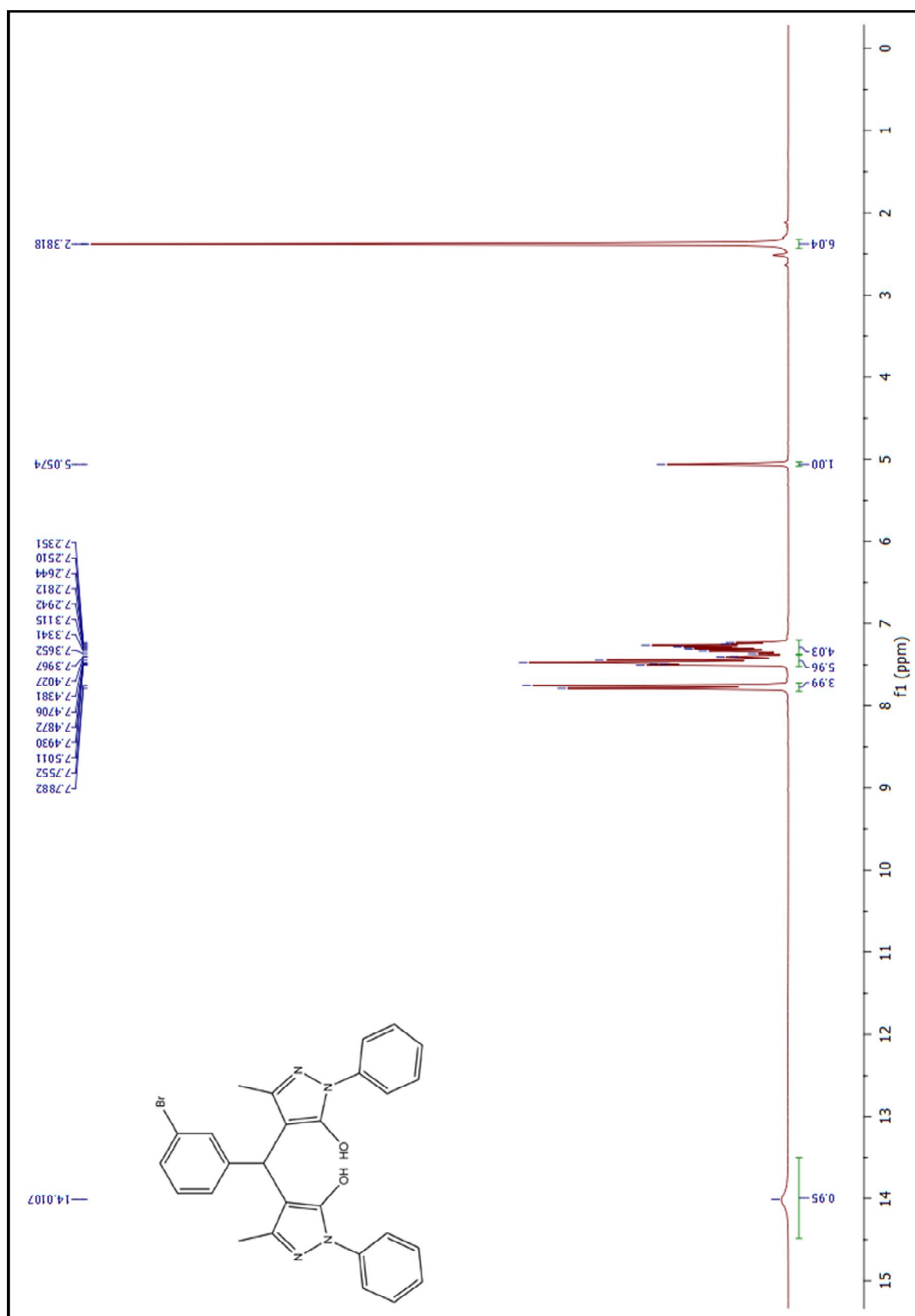


Figure 26. ¹H-NMR spectrum of compound (6ah)

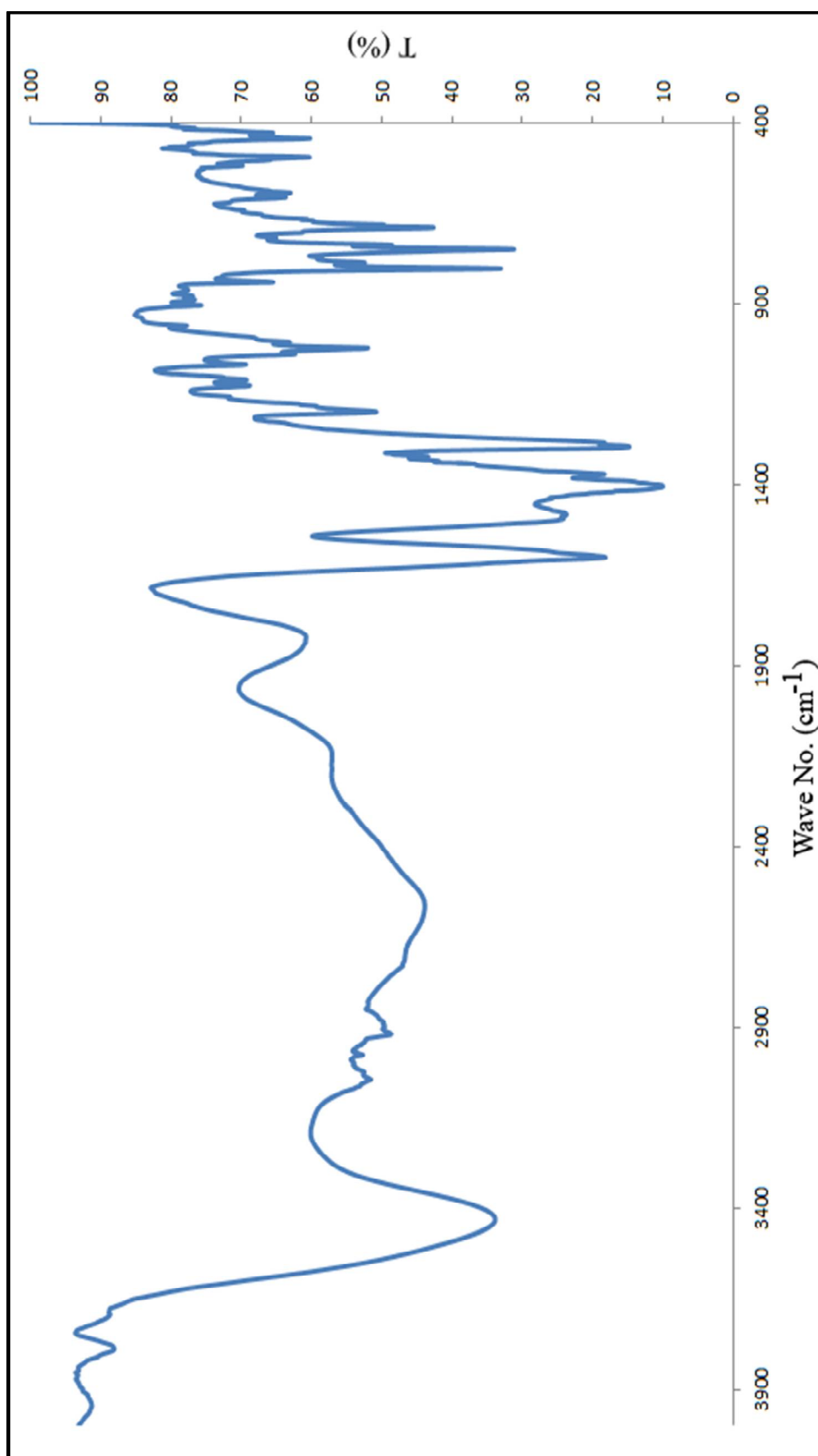


Figure 27. FT-IR spectrum of compound (6ai)

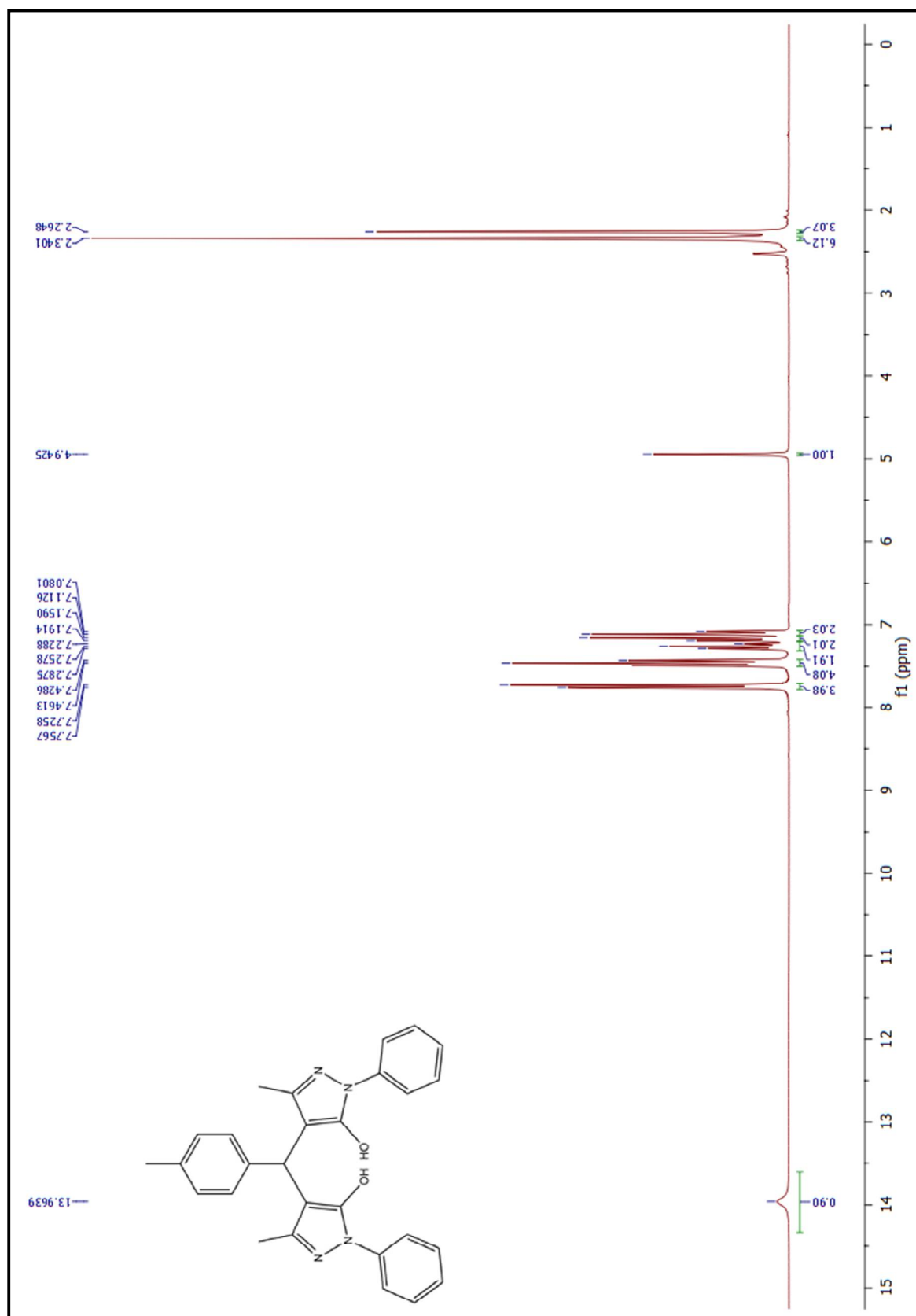


Figure 28. ¹H-NMR spectrum of compound (6ai)

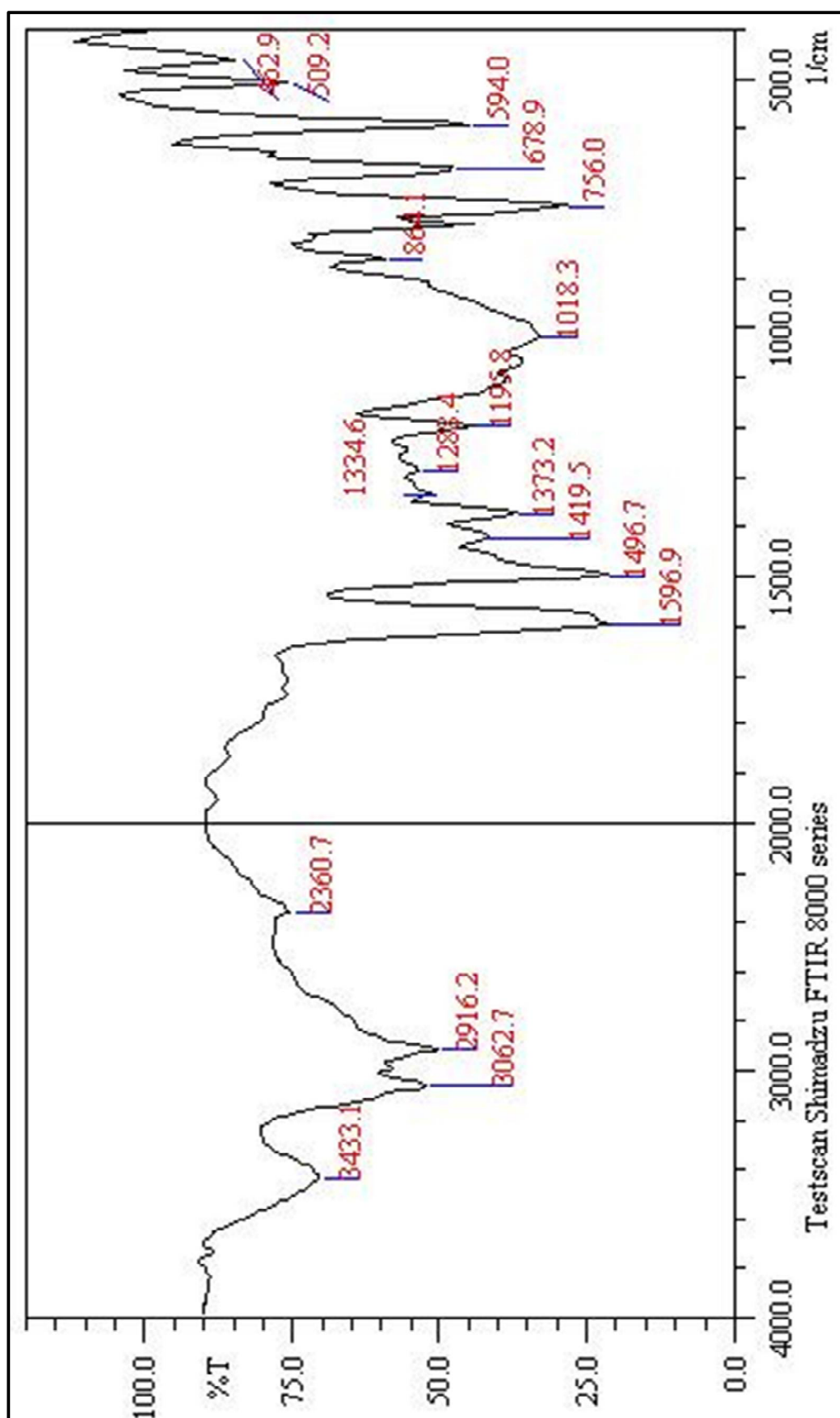


Figure 29. FT-IR spectrum of compound (6aj)

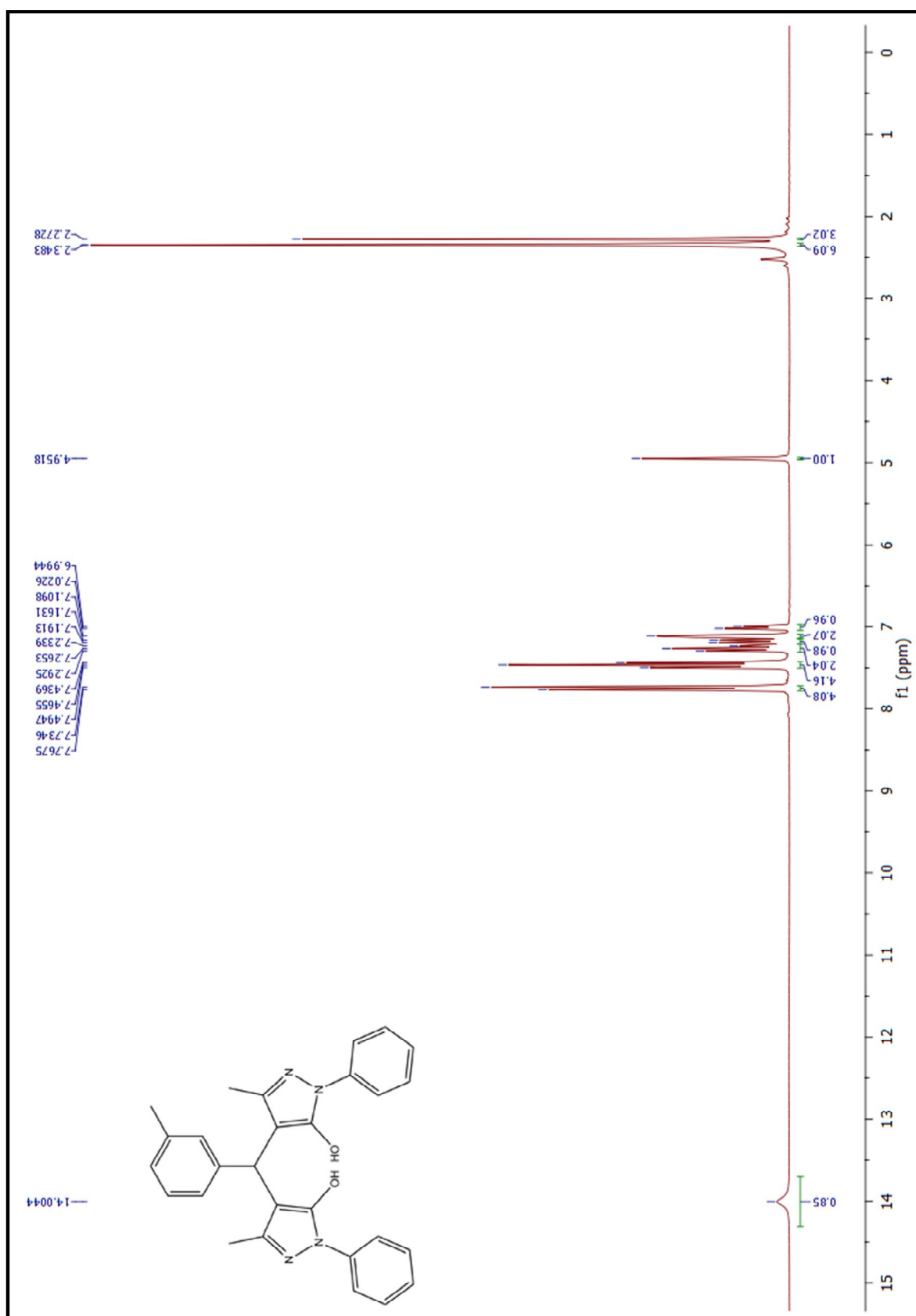


Figure 30. ¹H-NMR spectrum of compound (6aj)

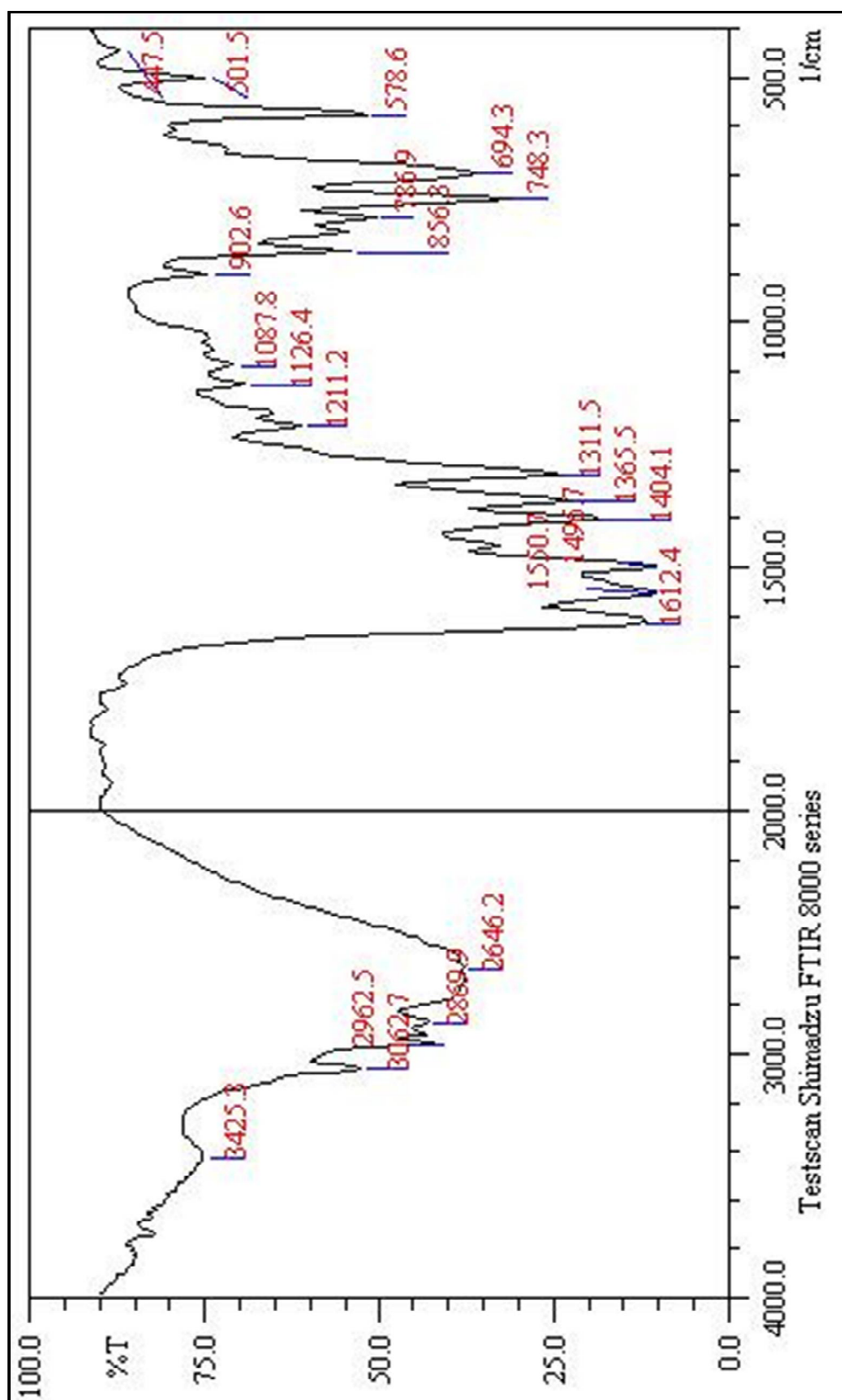


Figure 31. FT-IR spectrum of compound (6ak)

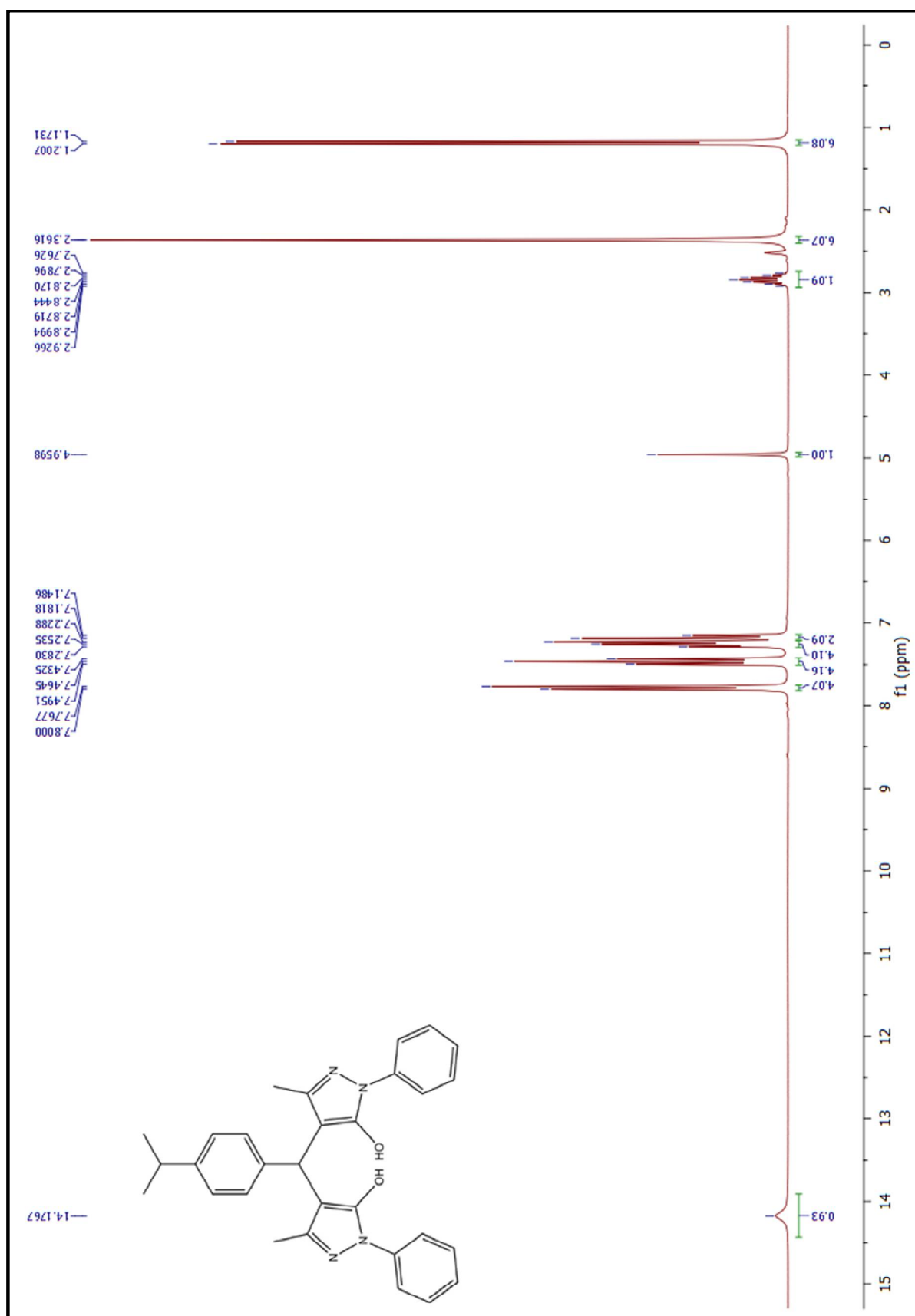


Figure 32. ¹H-NMR spectrum of compound (6ak)

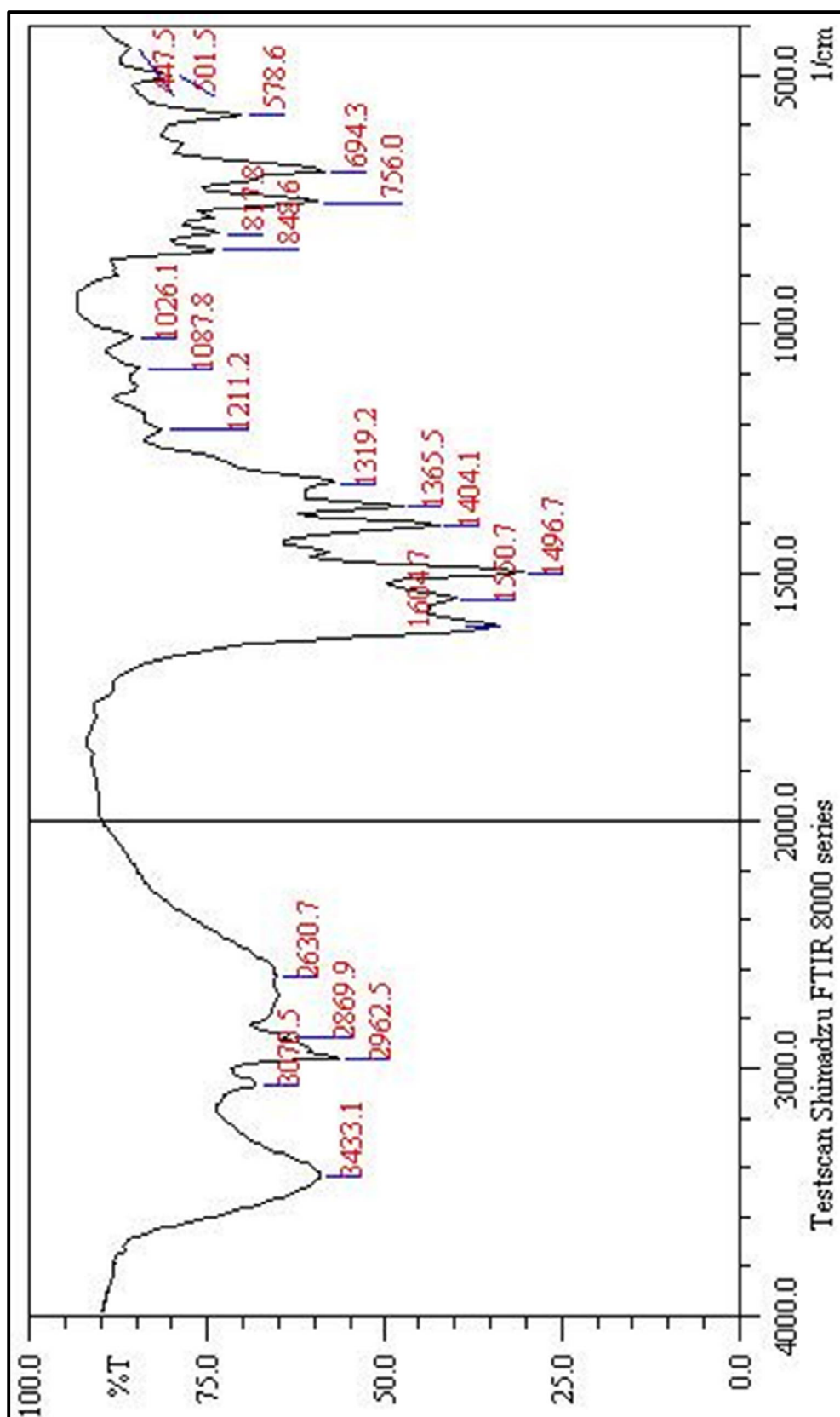
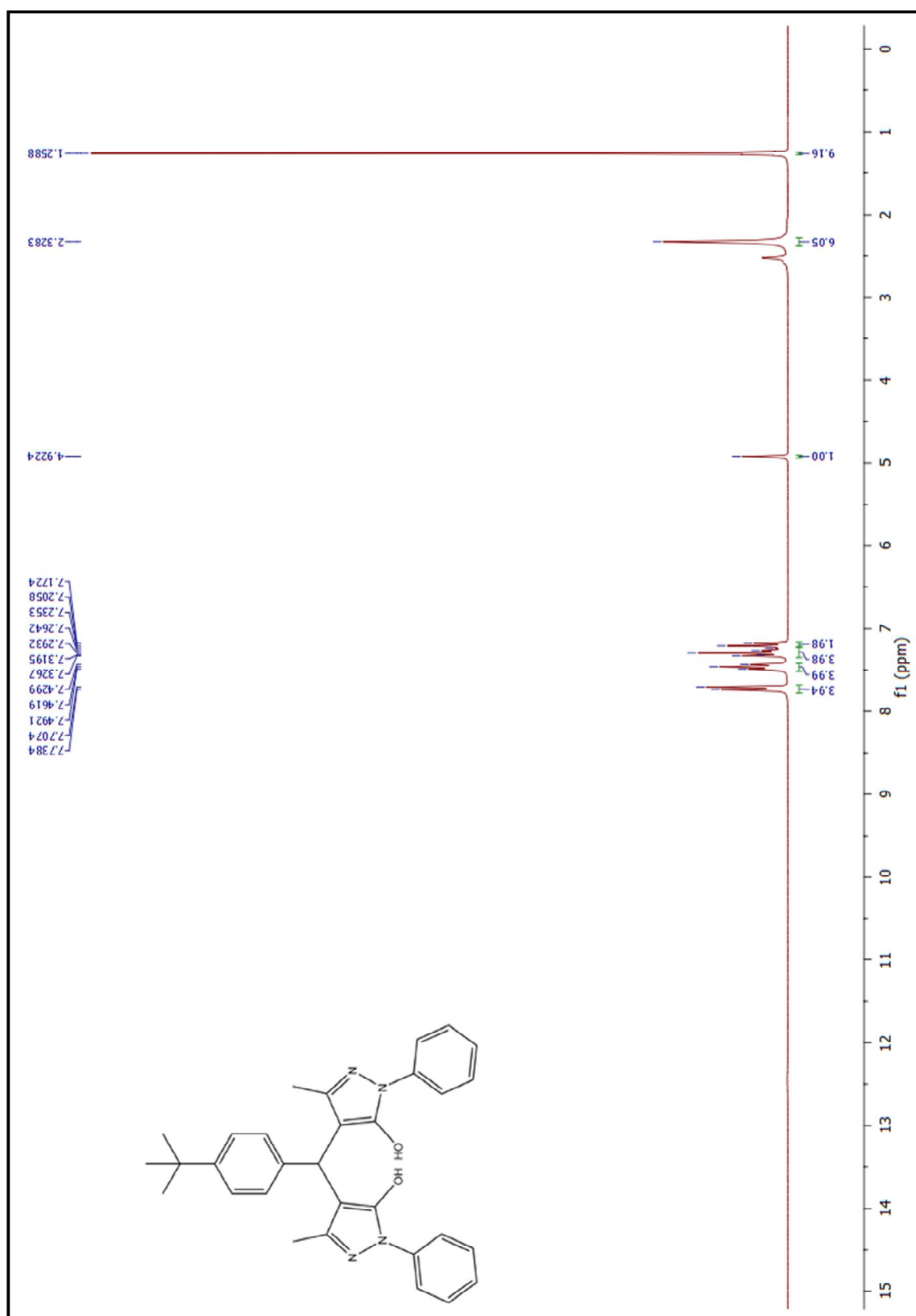


Figure 33. FT-IR spectrum of compound (6al)



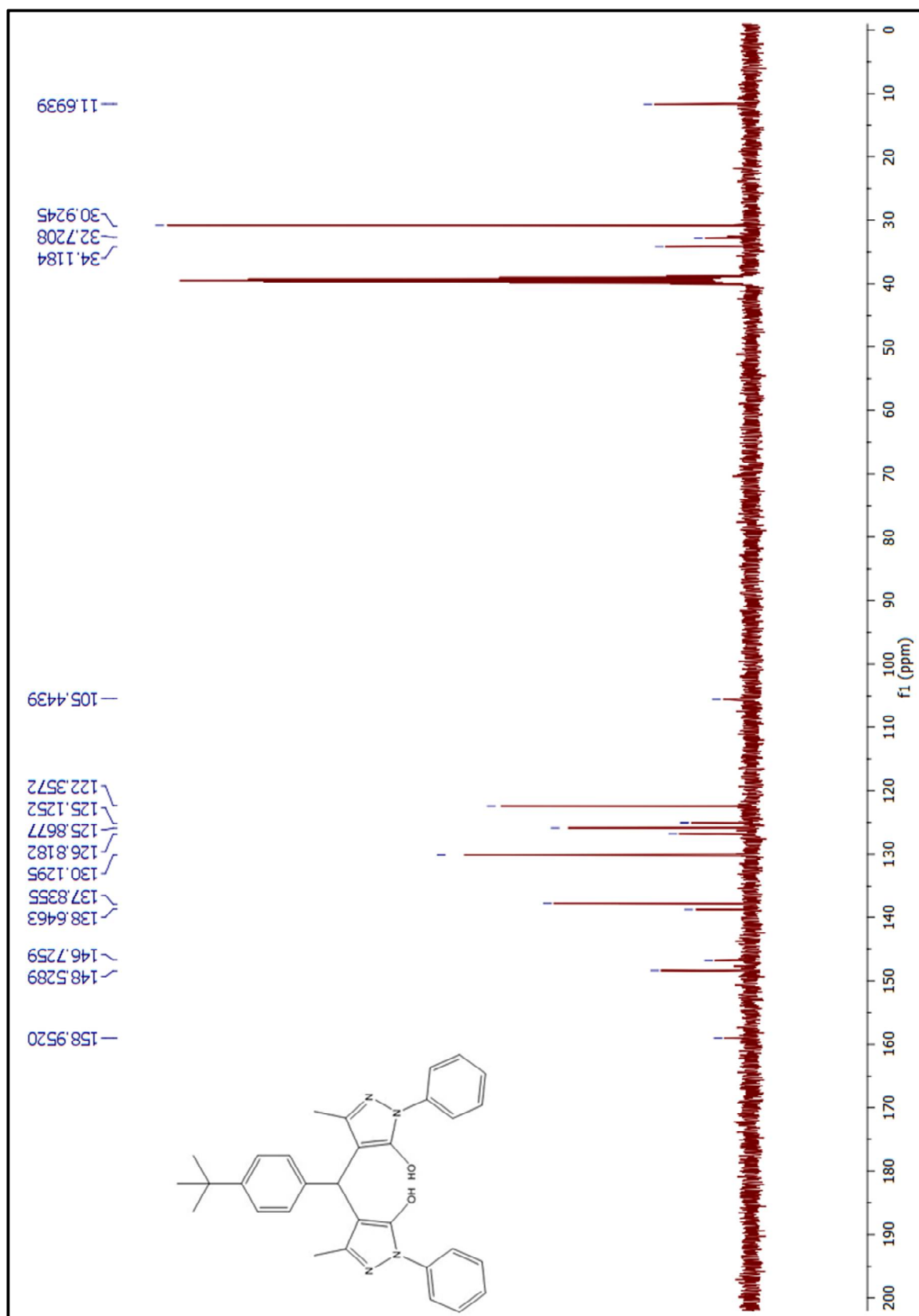


Figure 35. ^{13}C -NMR spectrum of compound (6al)

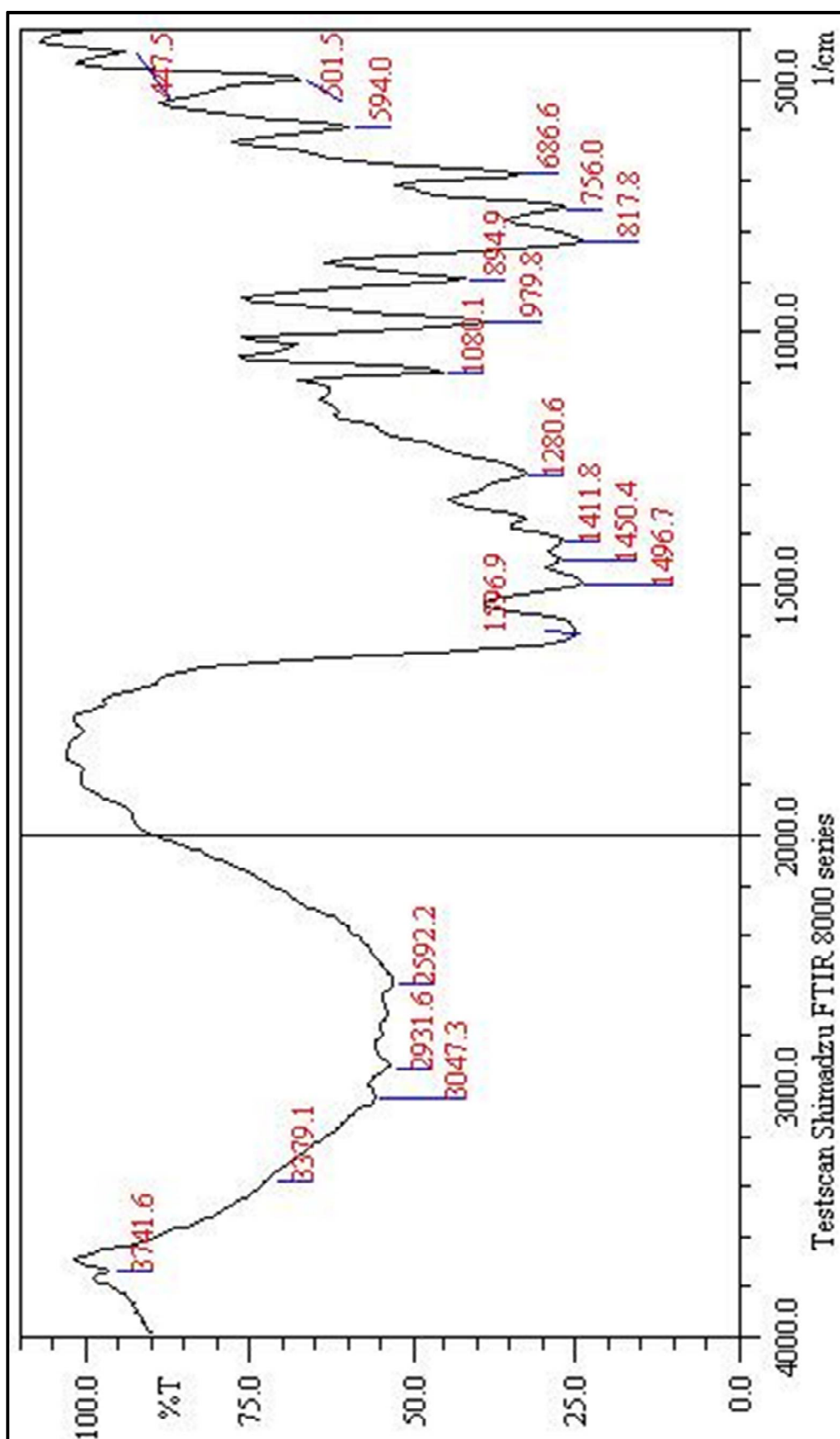


Figure 36. FT-IR spectrum of compound (6am)

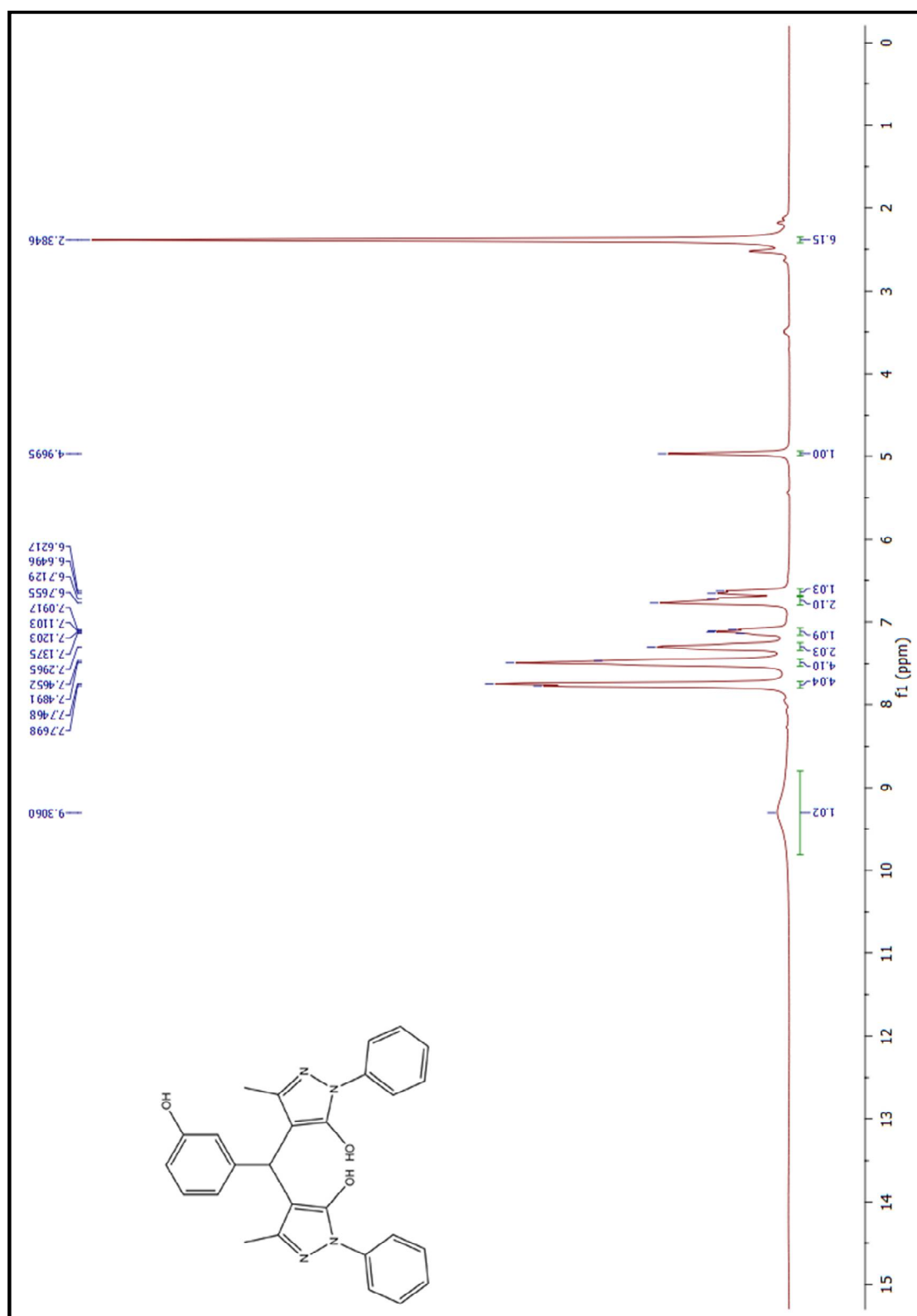


Figure 37. ^1H -NMR spectrum of compound (6am)

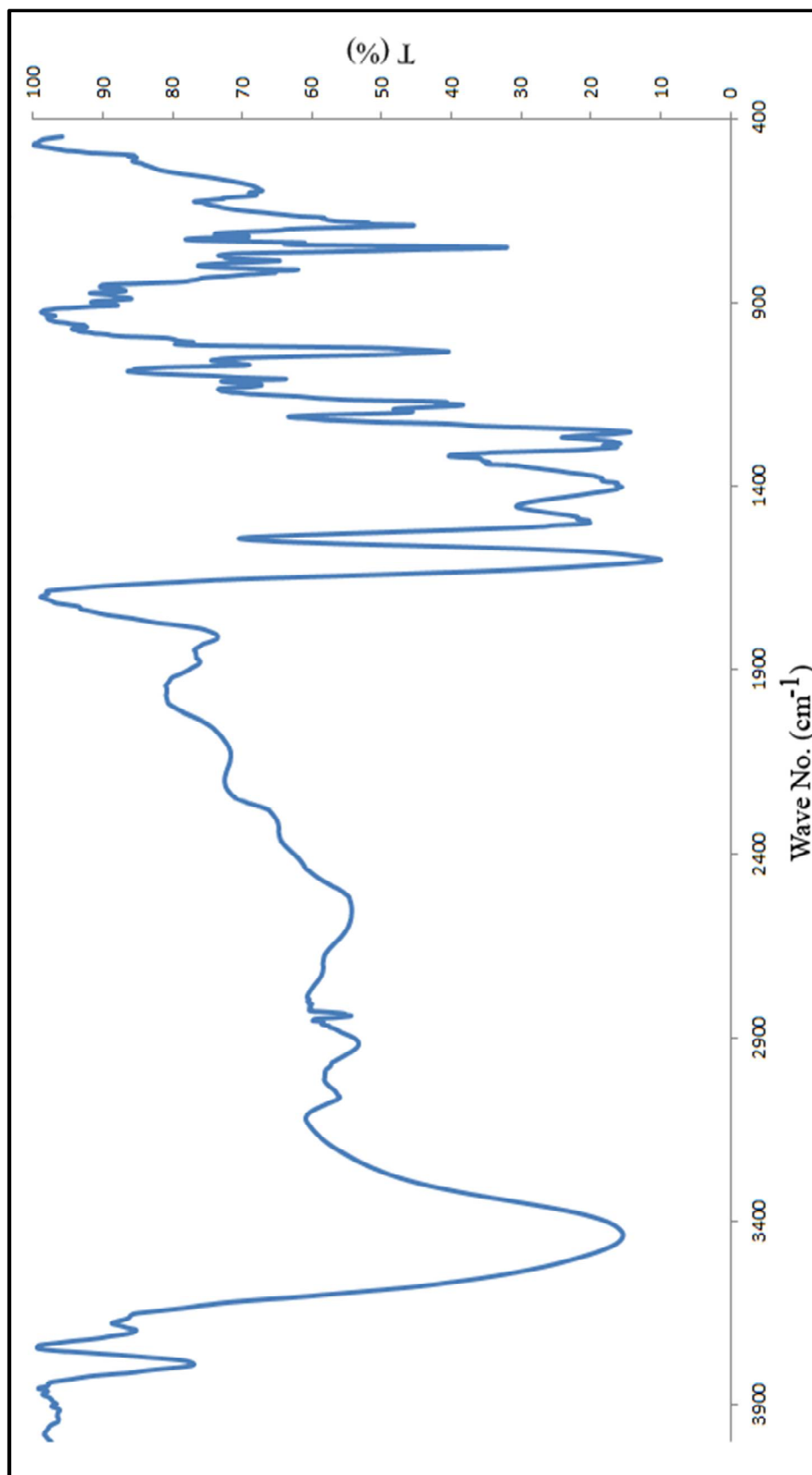


Figure 38. FT-IR spectrum of compound (6an)

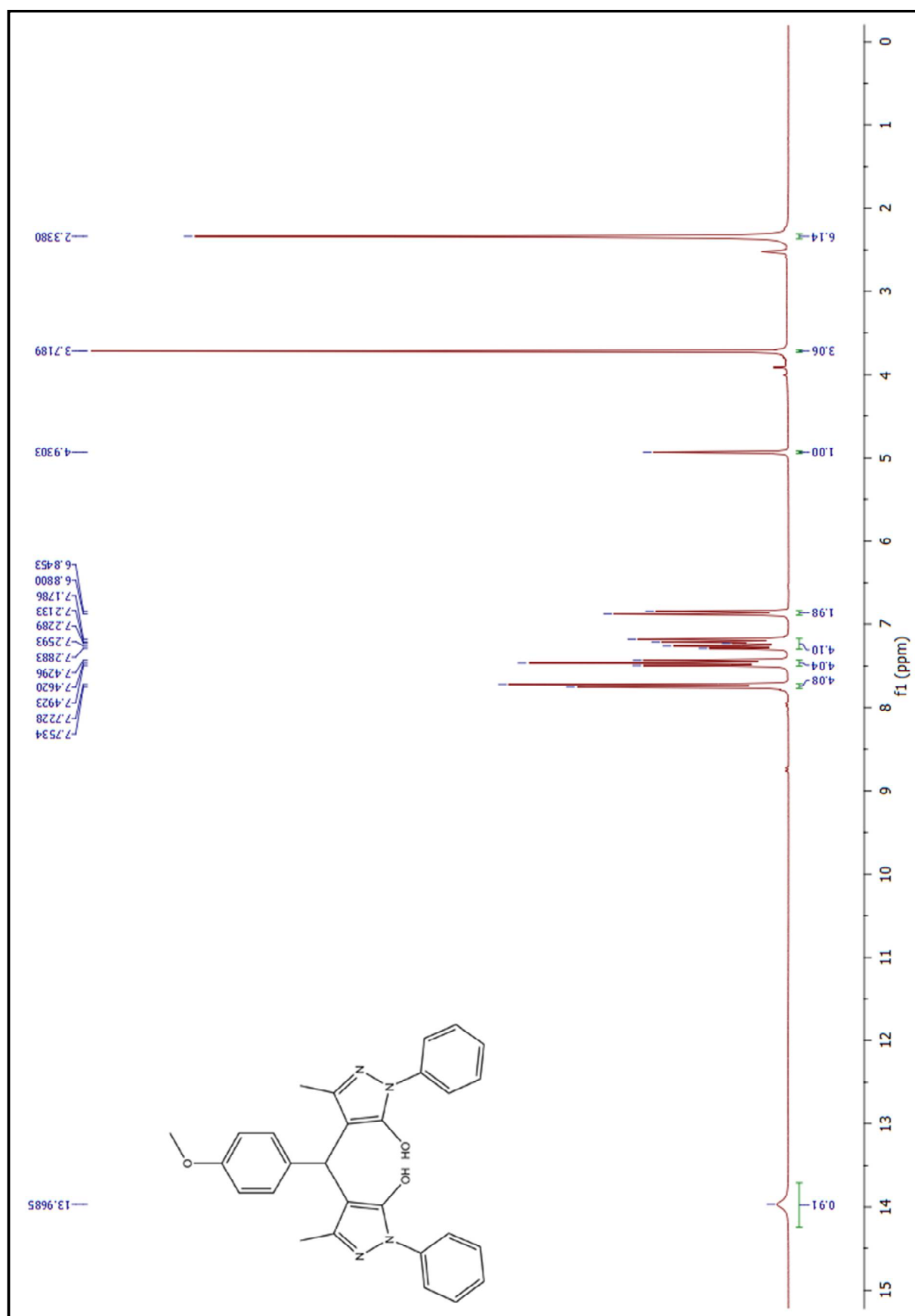


Figure 39. ¹H-NMR spectrum of compound (6an)

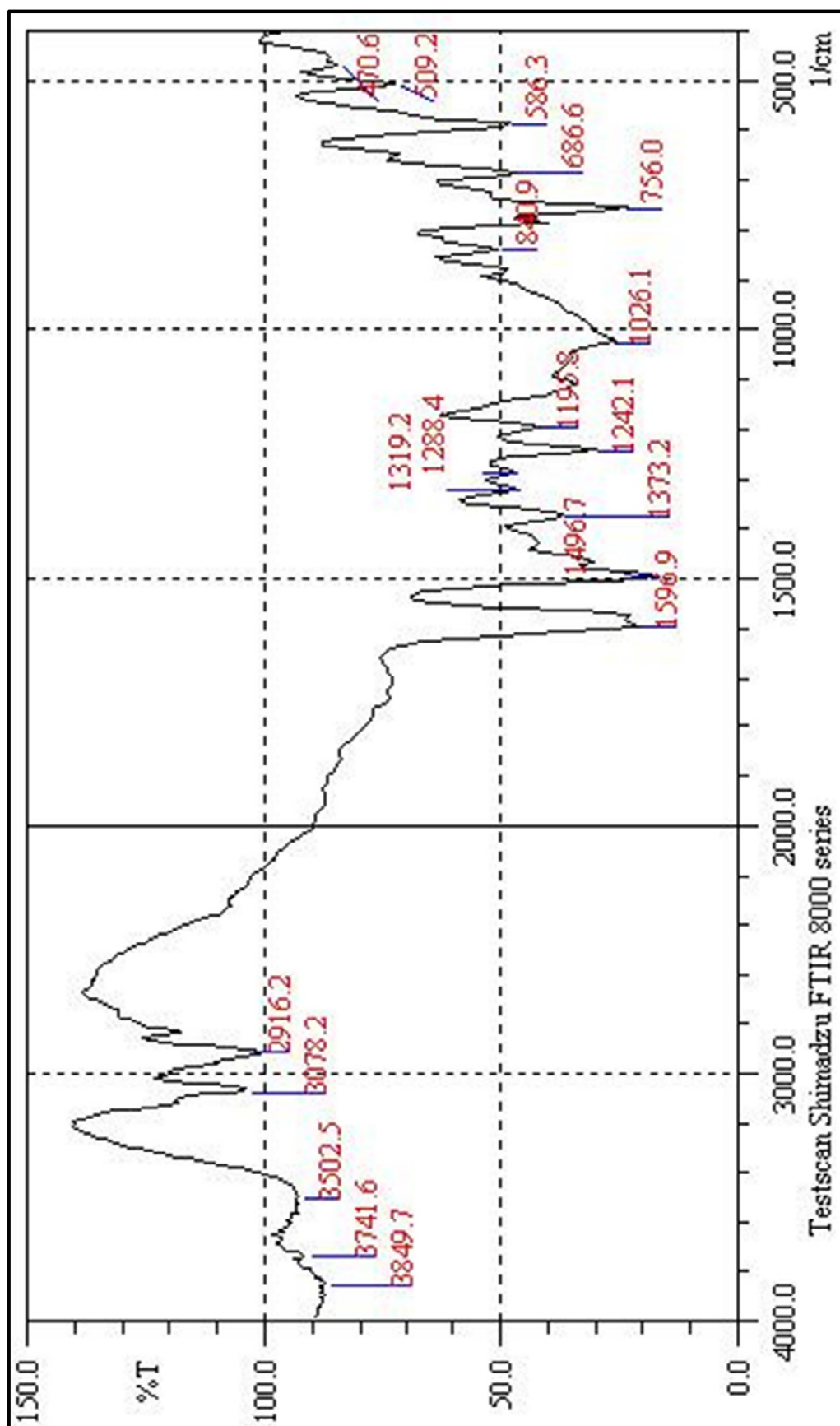


Figure 40. FT-IR spectrum of compound (6ao)

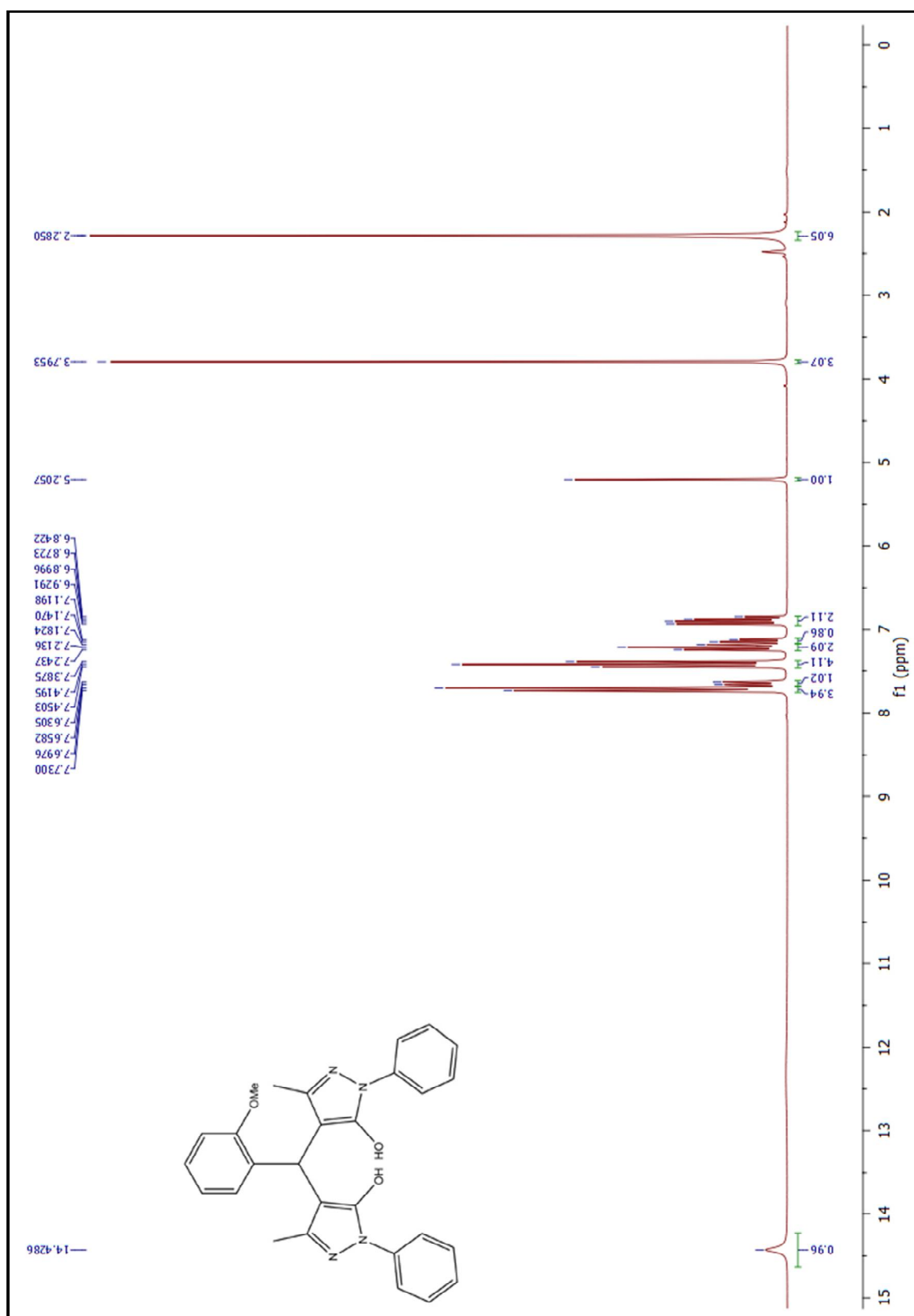


Figure 41. ^1H -NMR spectrum of compound (6ao)

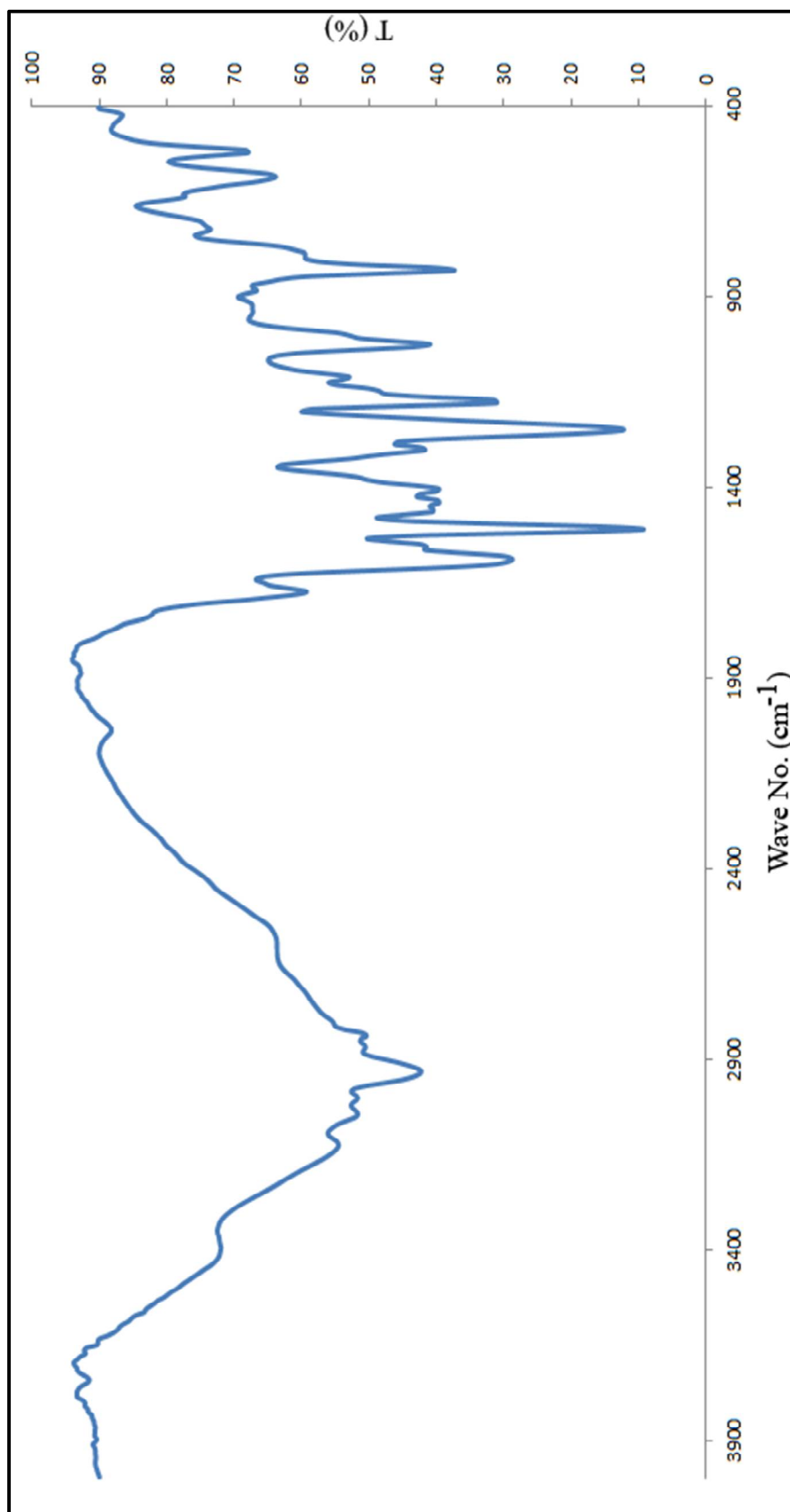


Figure 42. FT-IR spectrum of compound (6ap)

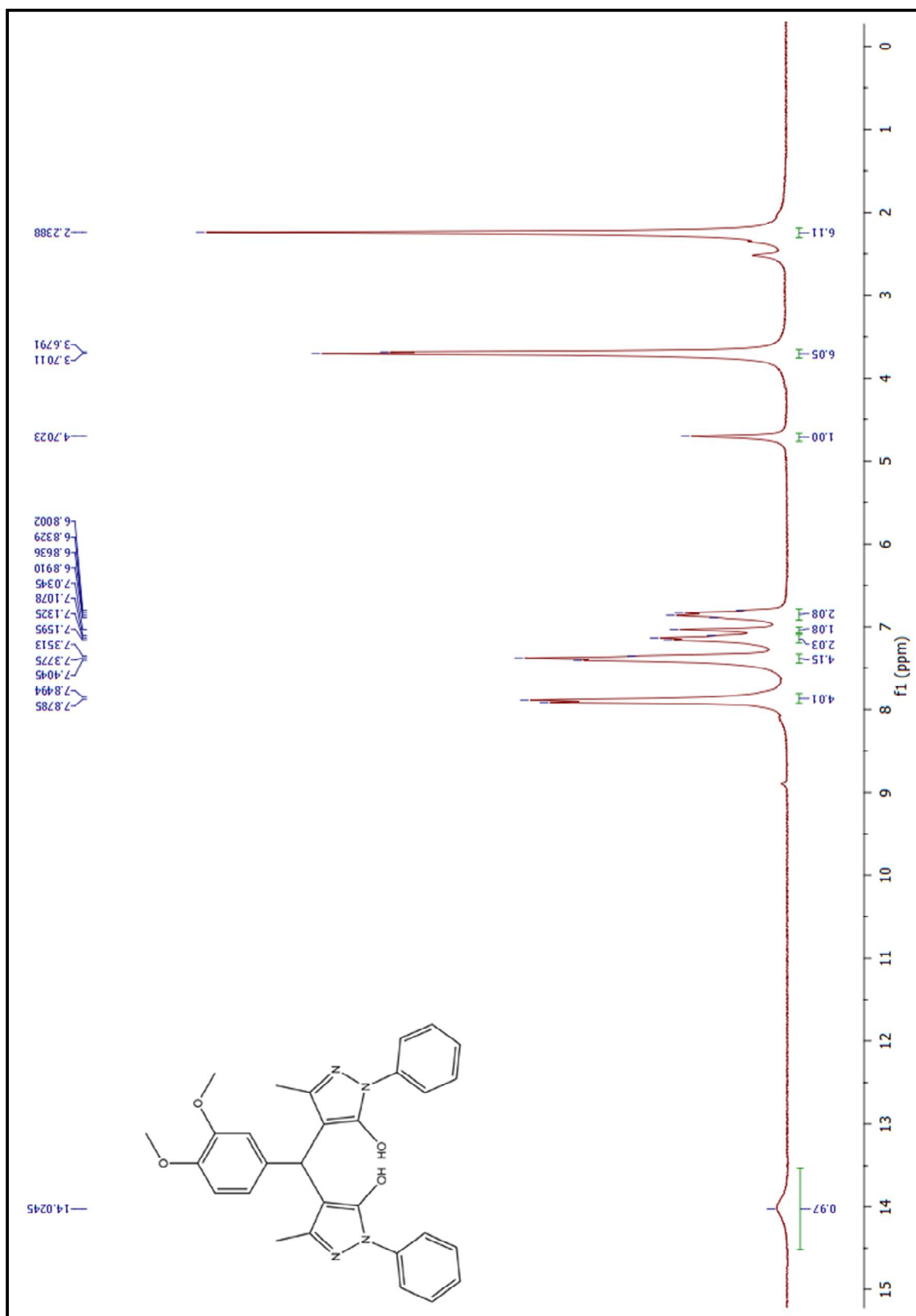


Figure 43. ^1H -NMR spectrum of compound (6ap)

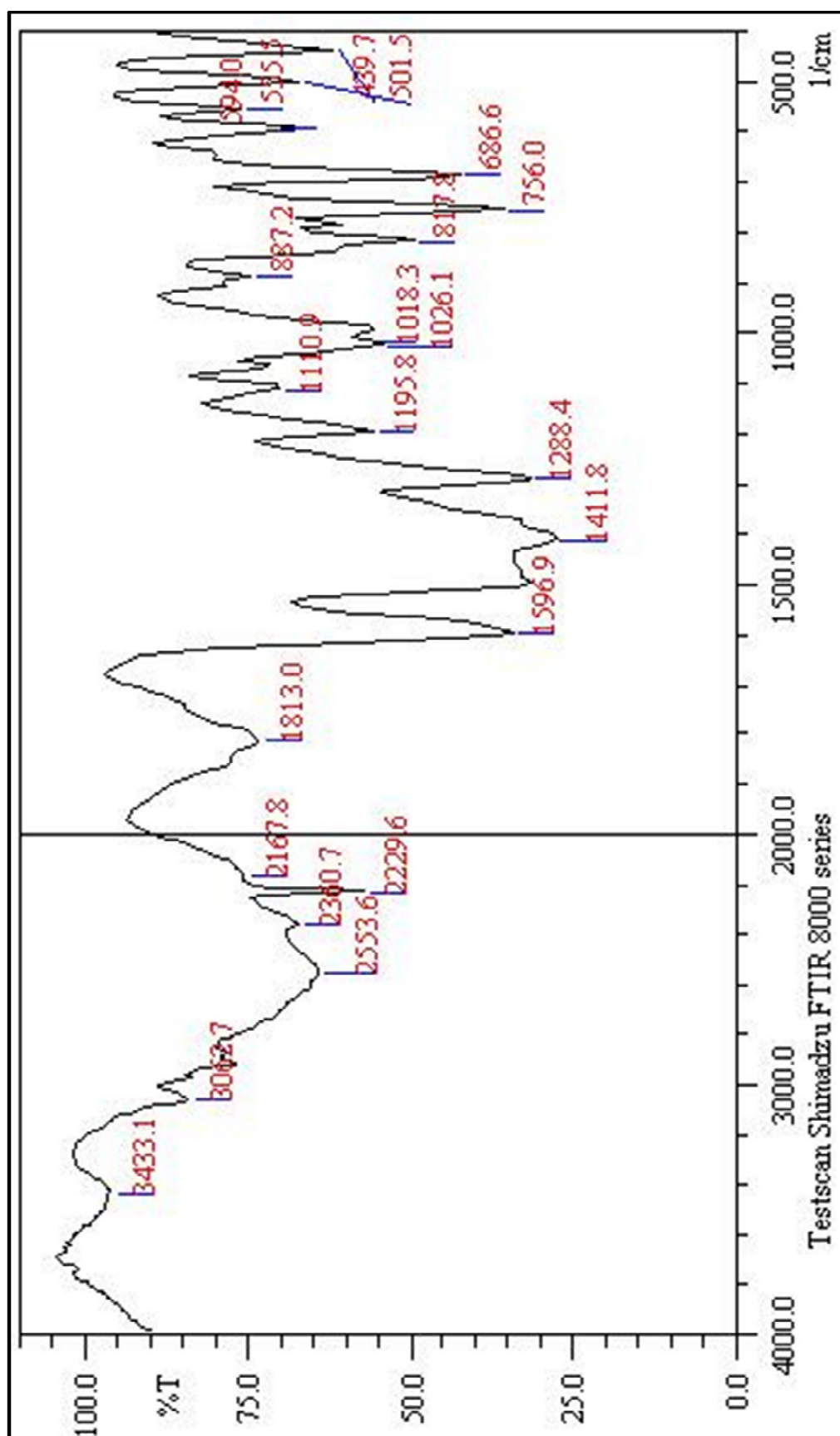


Figure 44. FT-IR spectrum of compound (6aq)

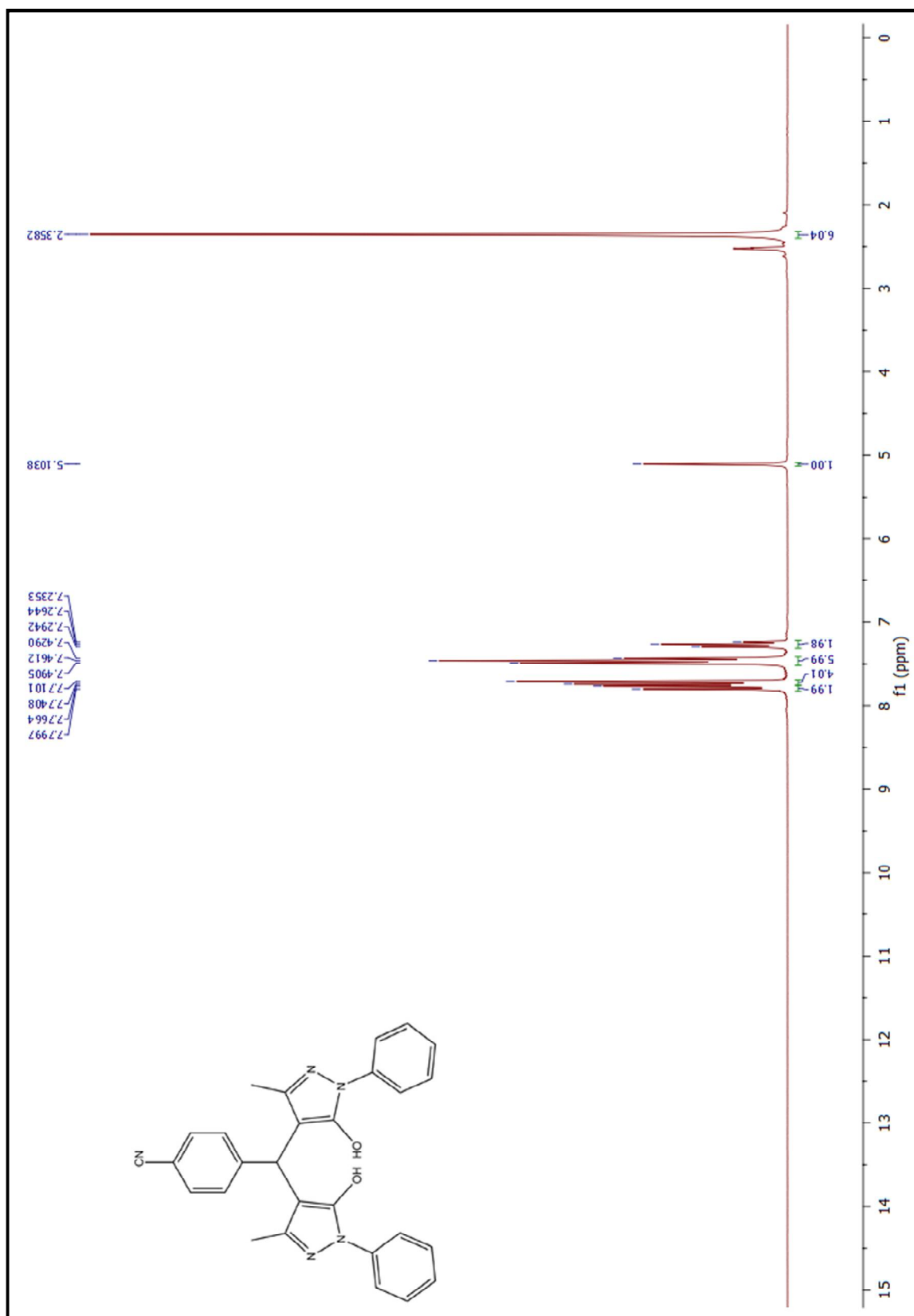


Figure 45. ¹H-NMR spectrum of compound (6aq)

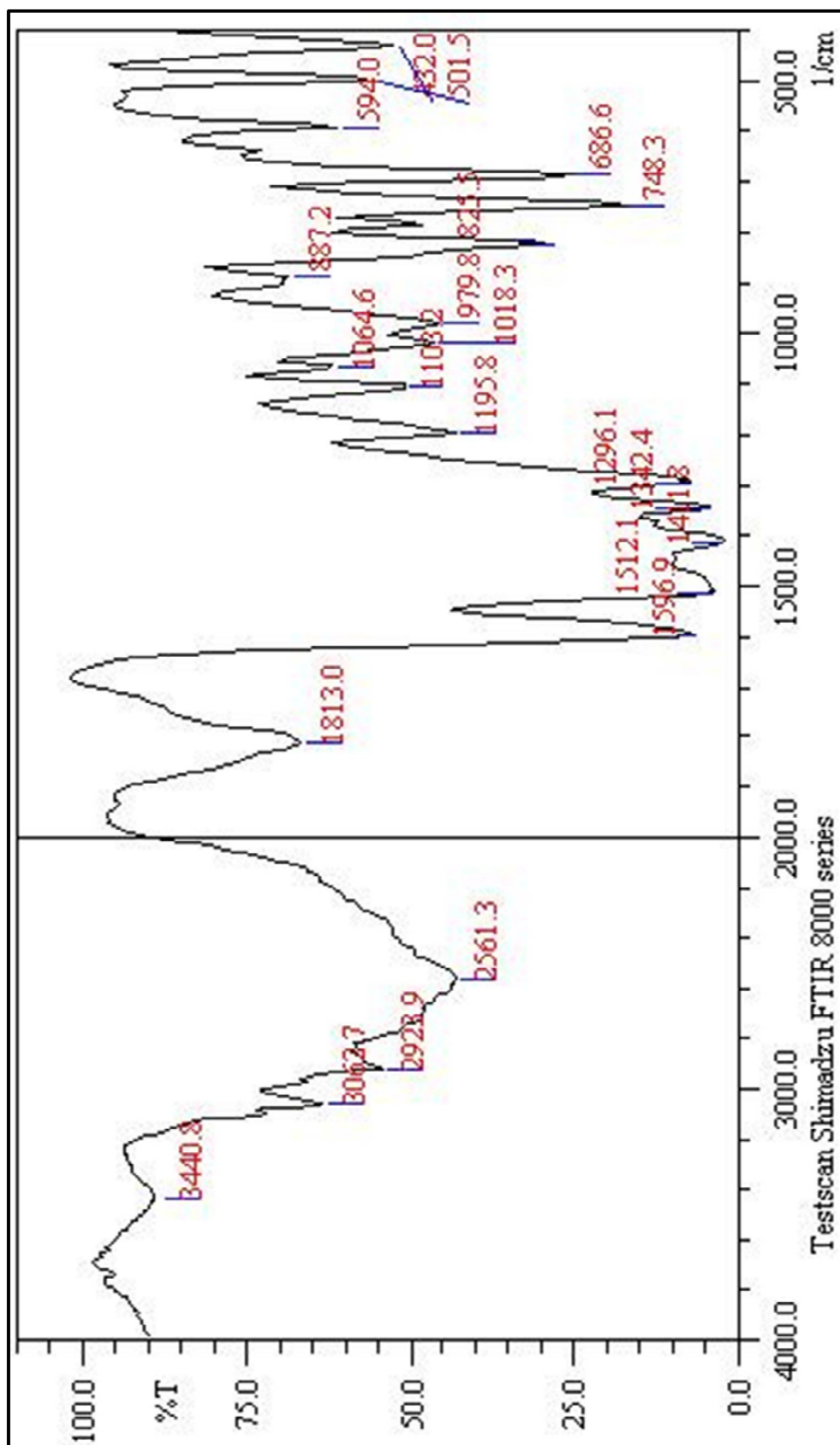


Figure 46. FT-IR spectrum of compound (6ar)

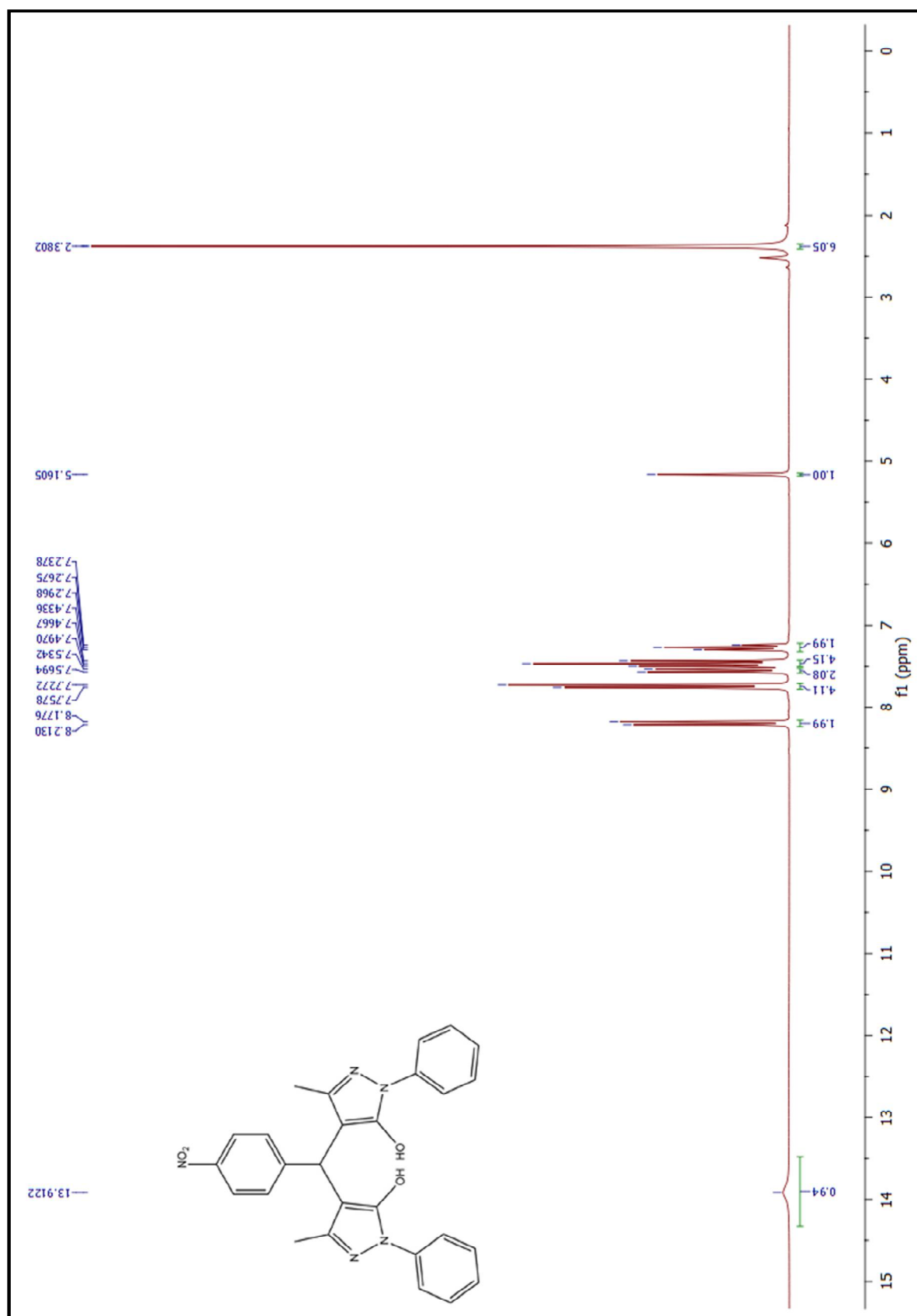


Figure 47. ¹H-NMR spectrum of compound (6ar)

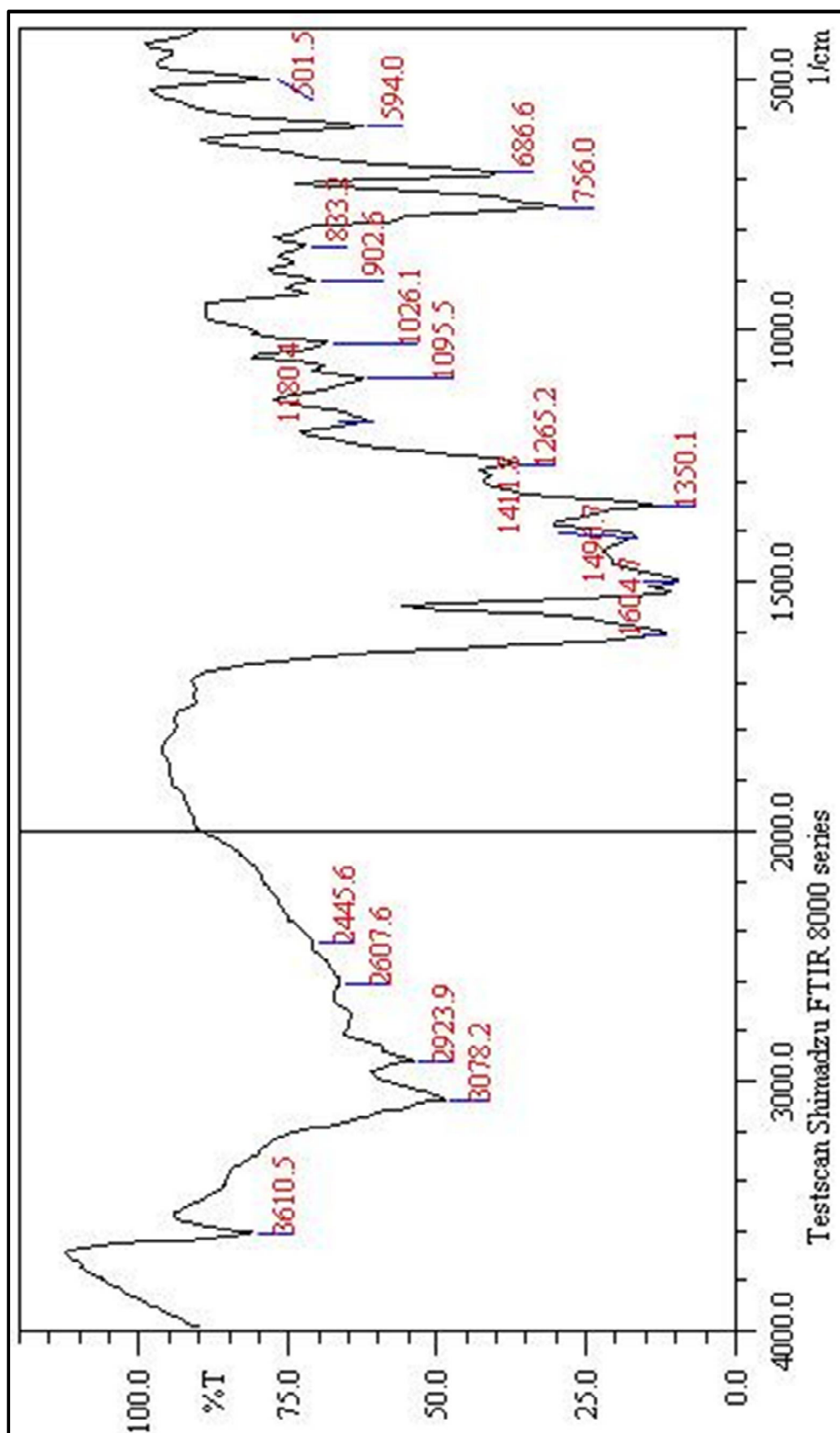


Figure 48. FT-IR spectrum of compound (6as)

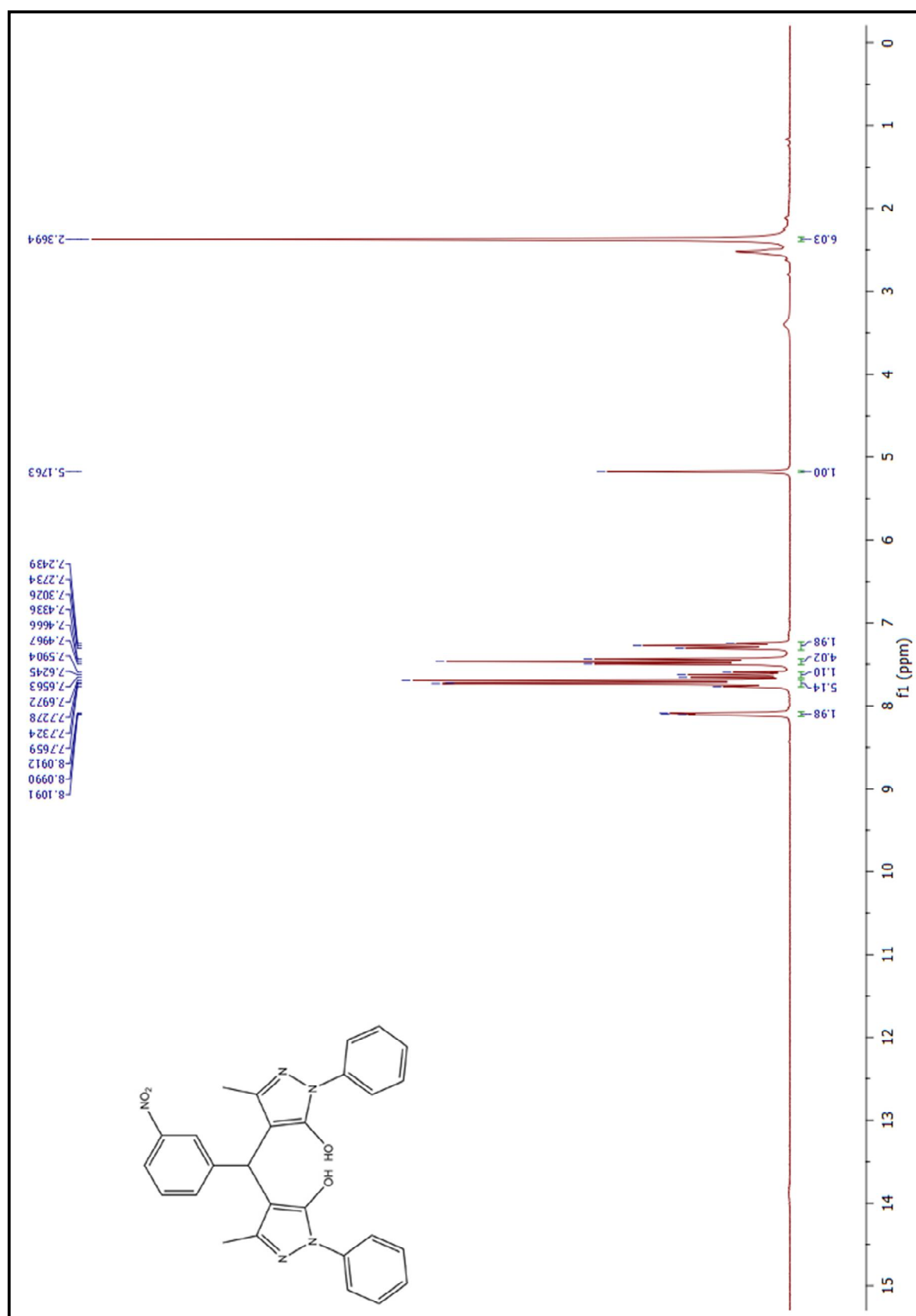


Figure 49. ¹H-NMR spectrum of compound (6as)

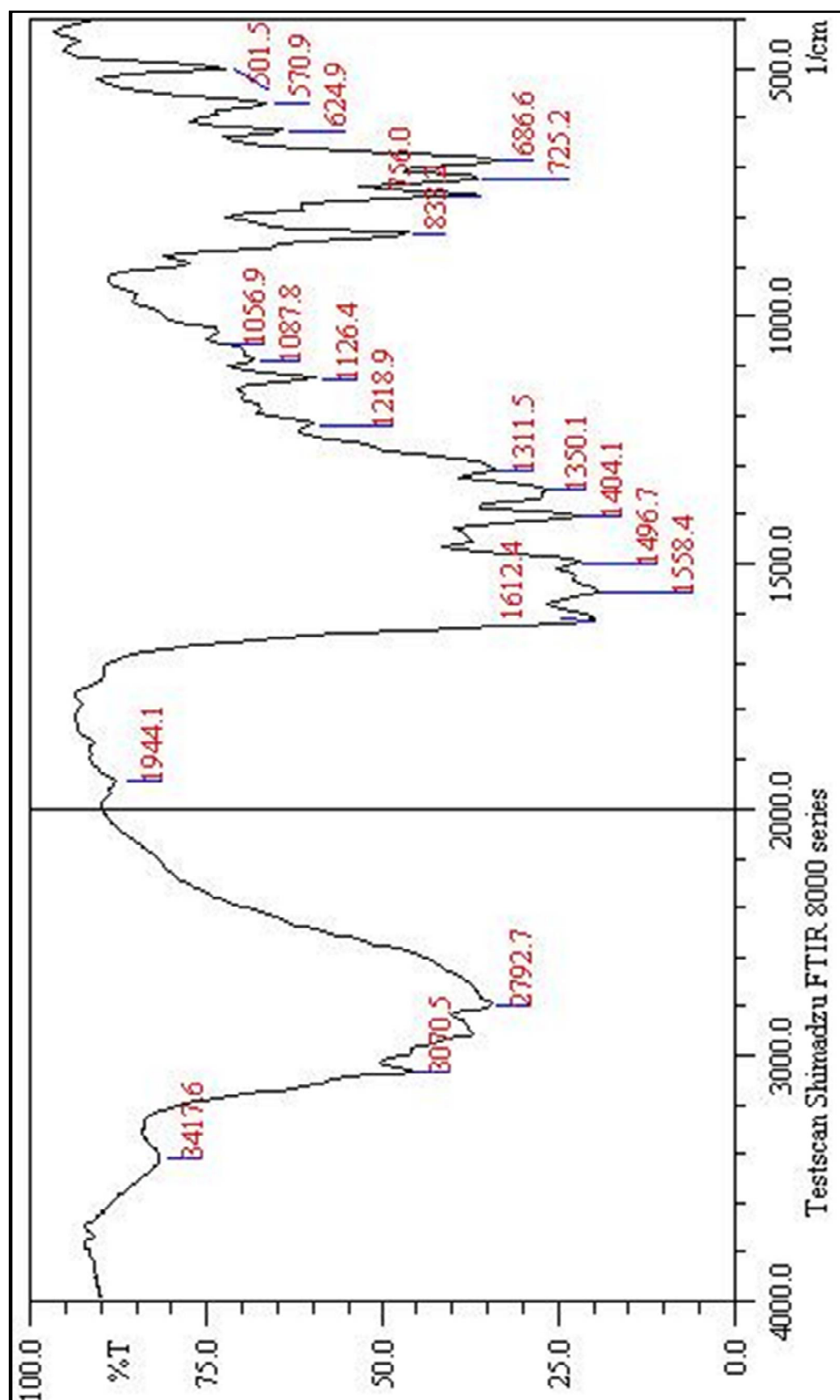


Figure 50. FT-IR spectrum of compound (6at)

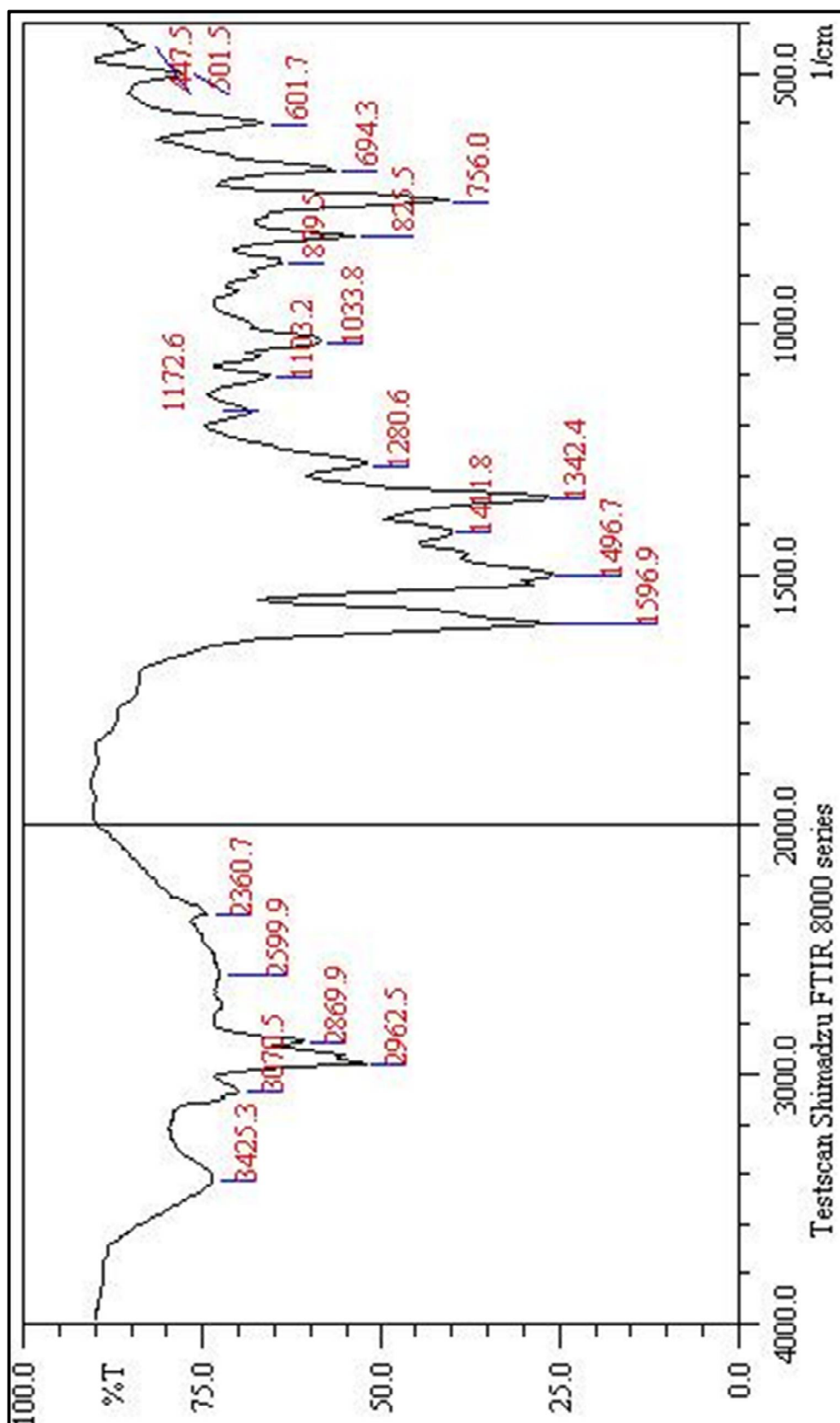


Figure 52. FT-IR spectrum of compound (6au)

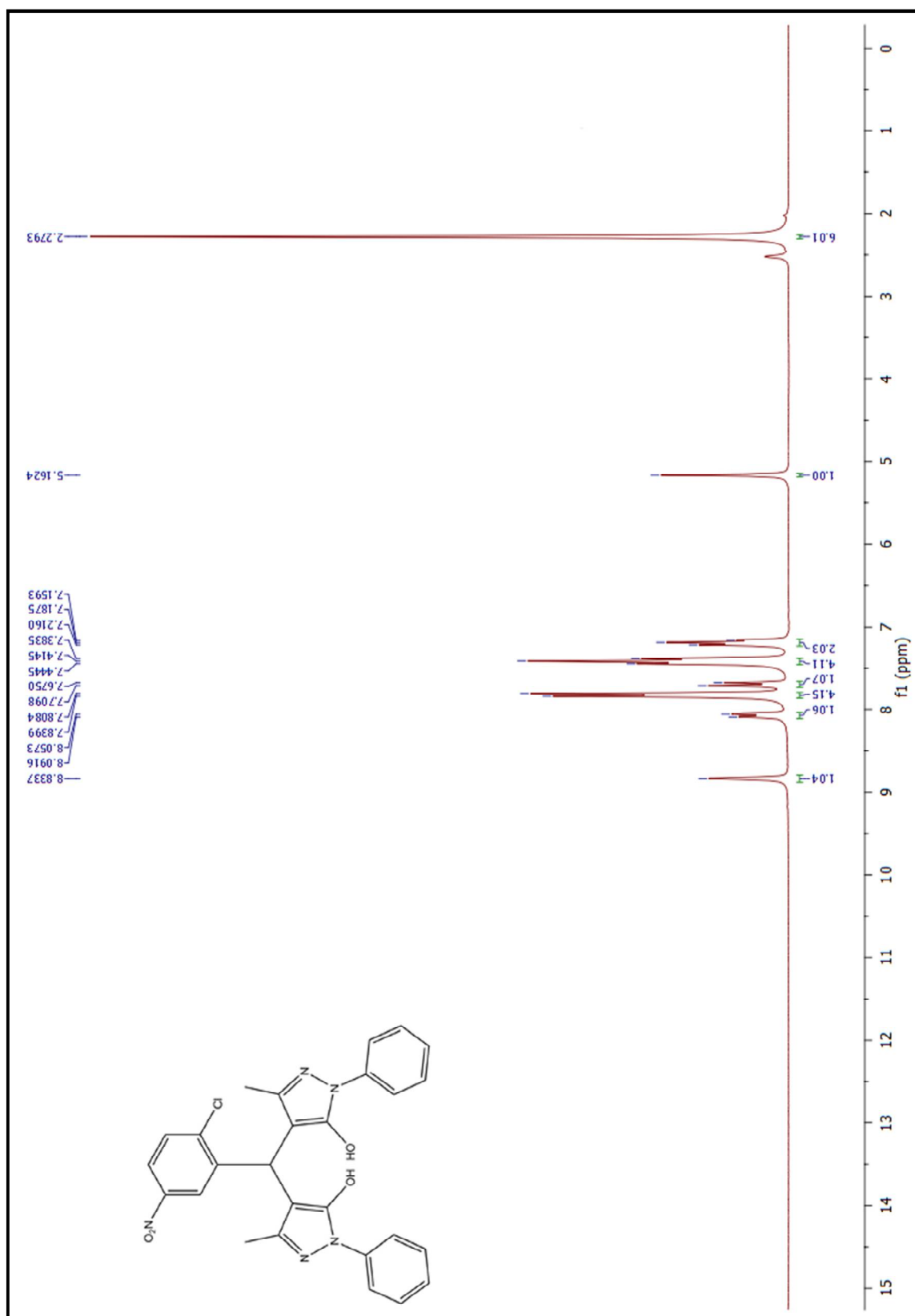


Figure 53. ¹H-NMR spectrum of compound (6au)

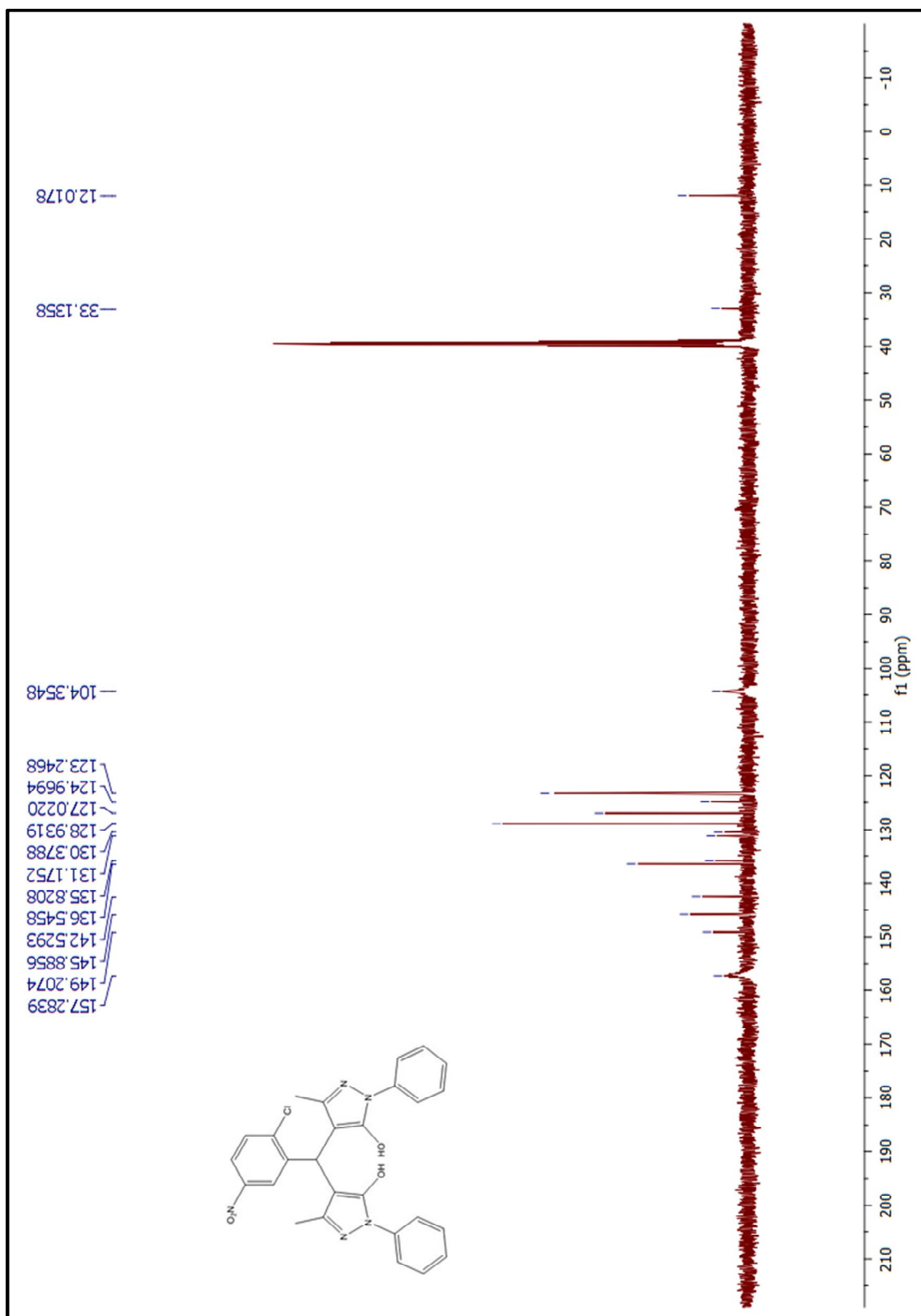


Figure 54. ^{13}C -NMR spectrum of compound (6au)

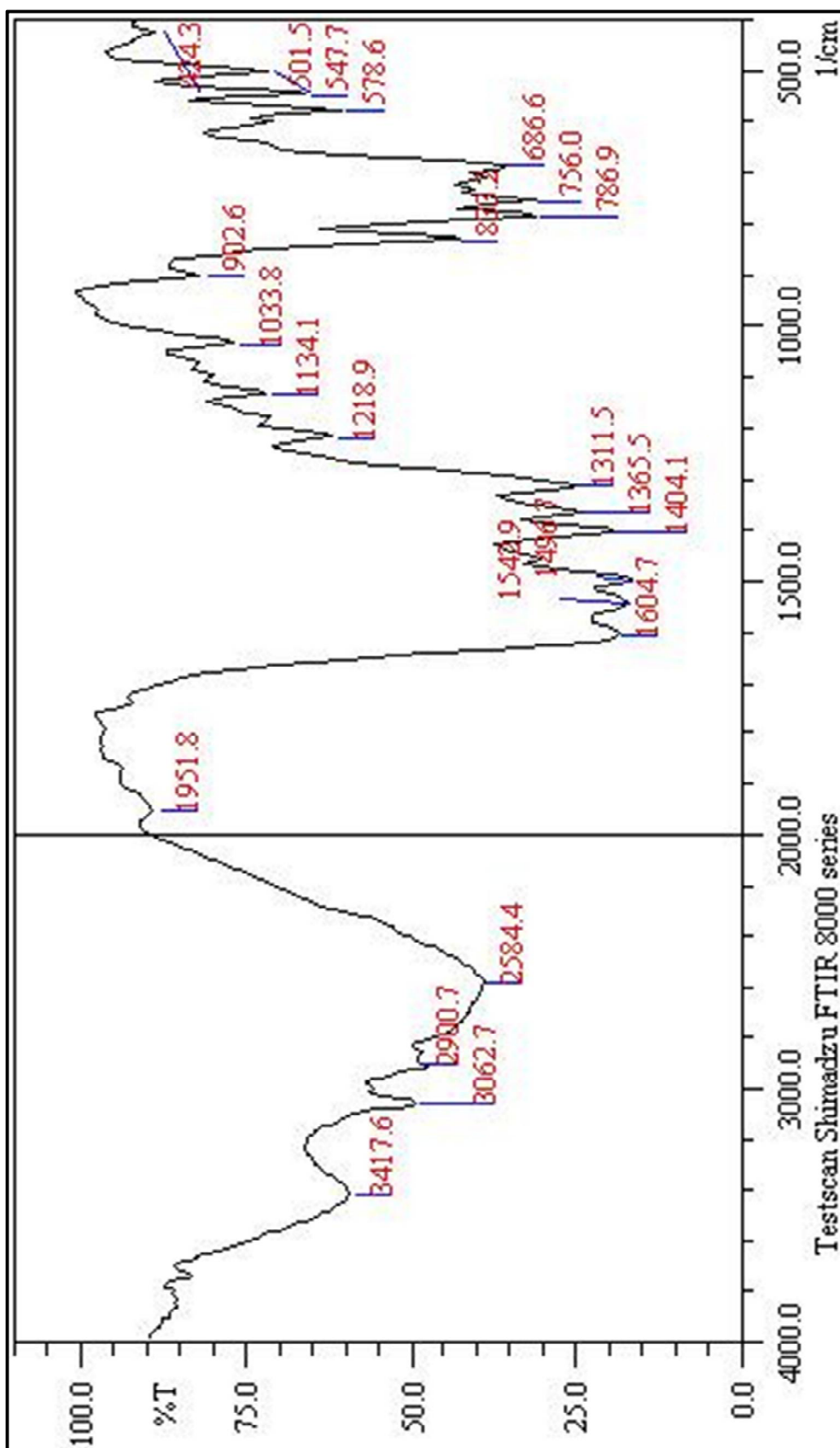


Figure 55. FT-IR spectrum of compound (6av)

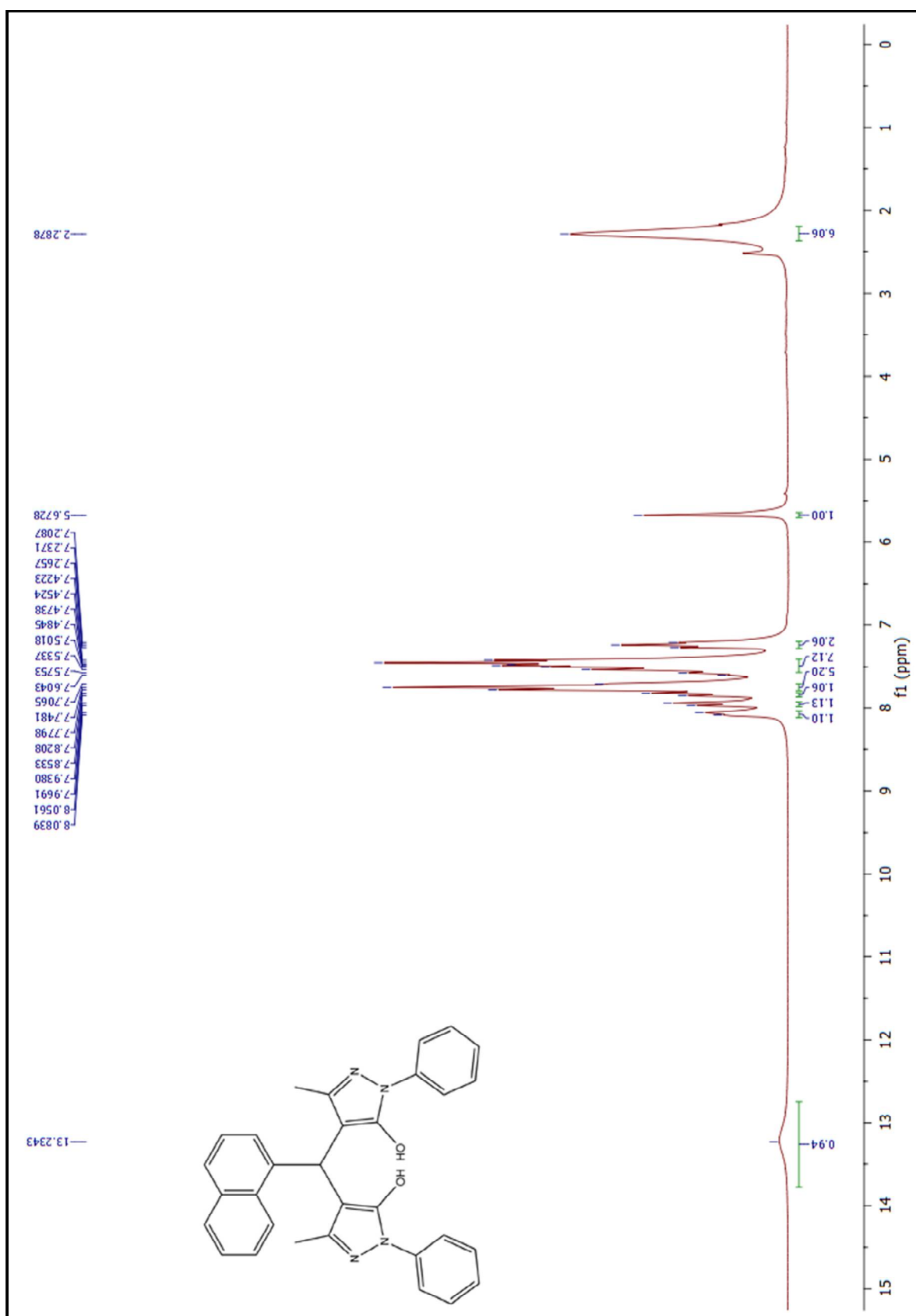


Figure 56. ¹H-NMR spectrum of compound (6av)

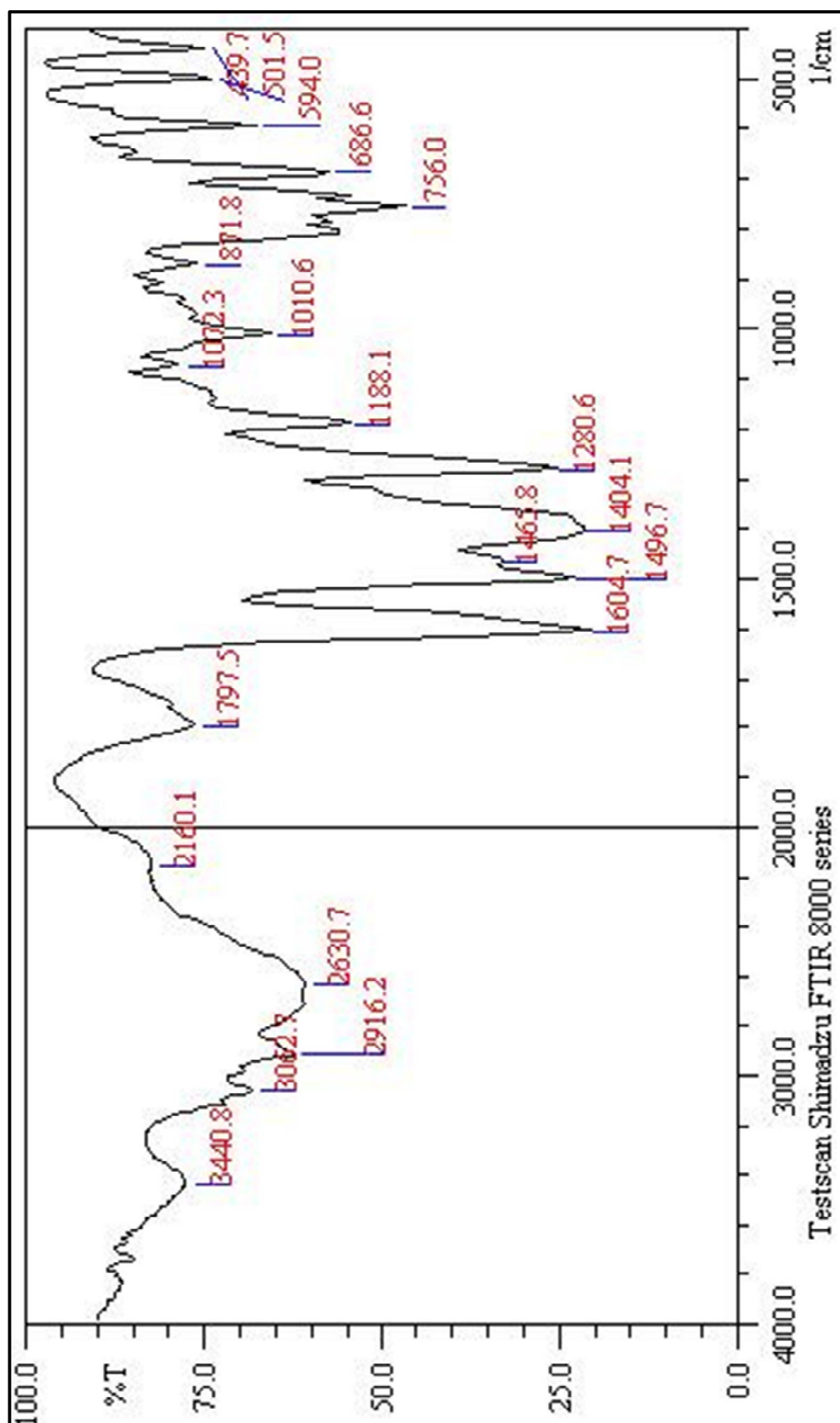


Figure 57. FT-IR spectrum of compound (6aw)

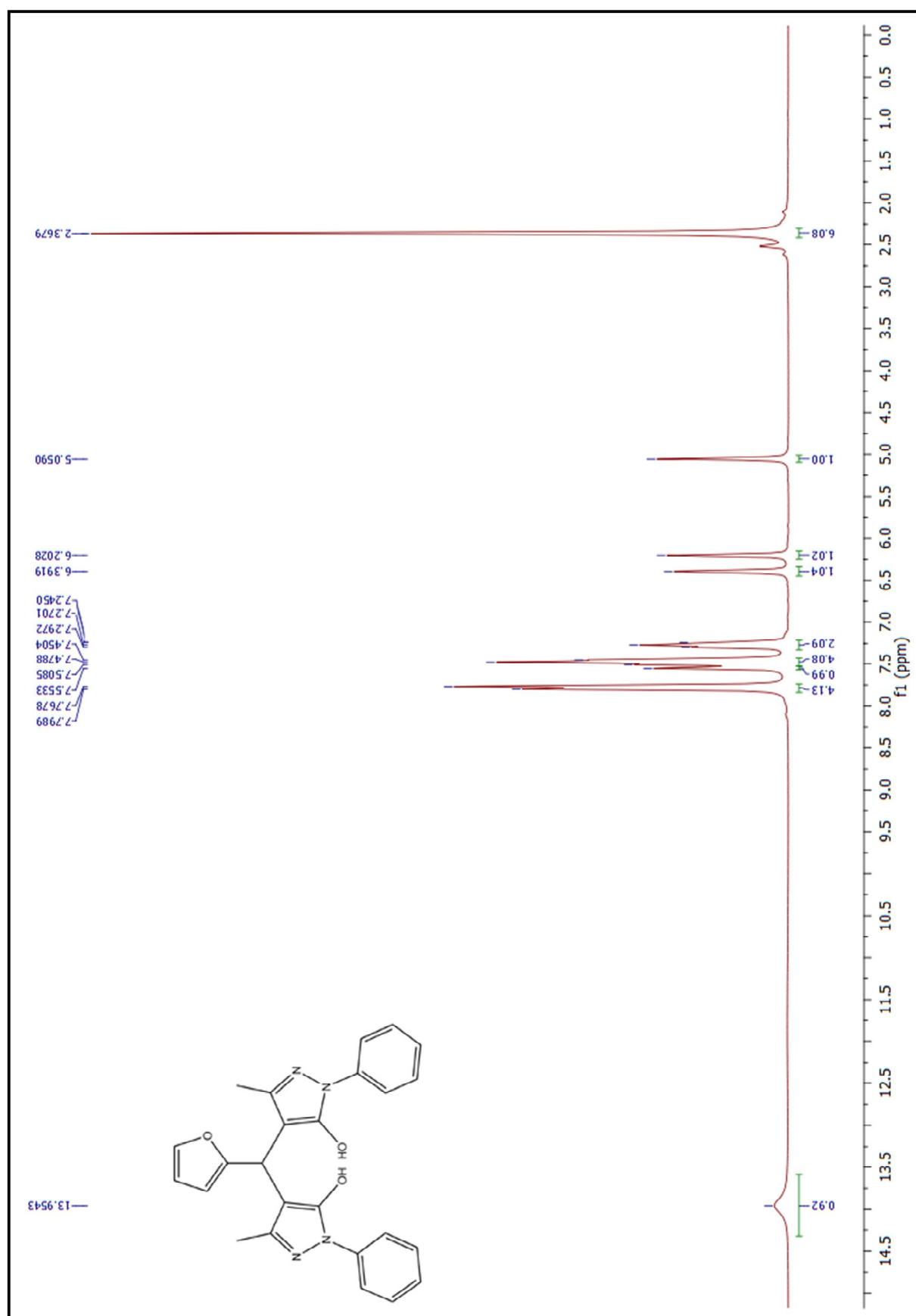


Figure 58. ^1H -NMR spectrum of compound (6aw)

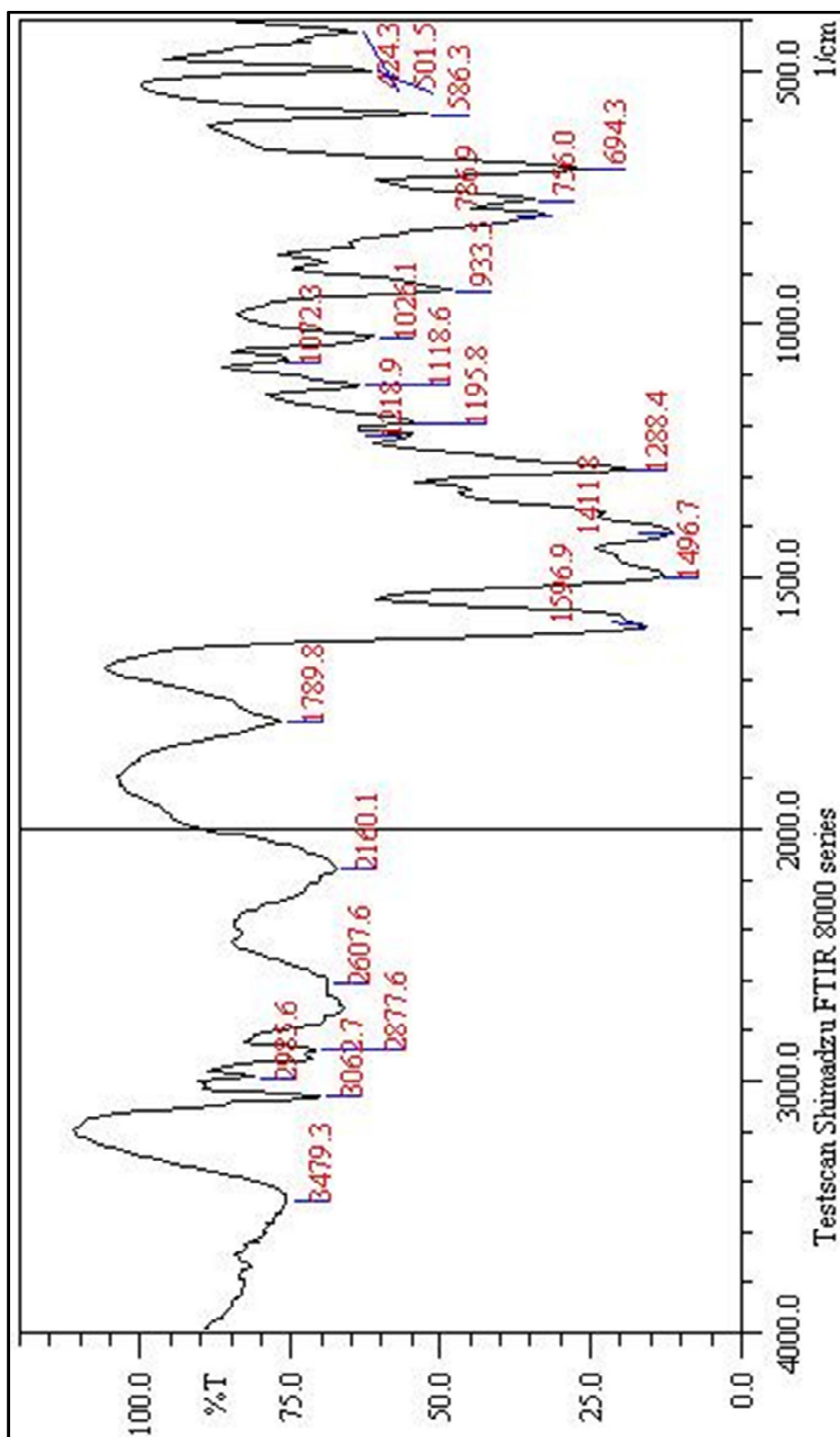


Figure 59. FT-IR spectrum of compound (6ax)

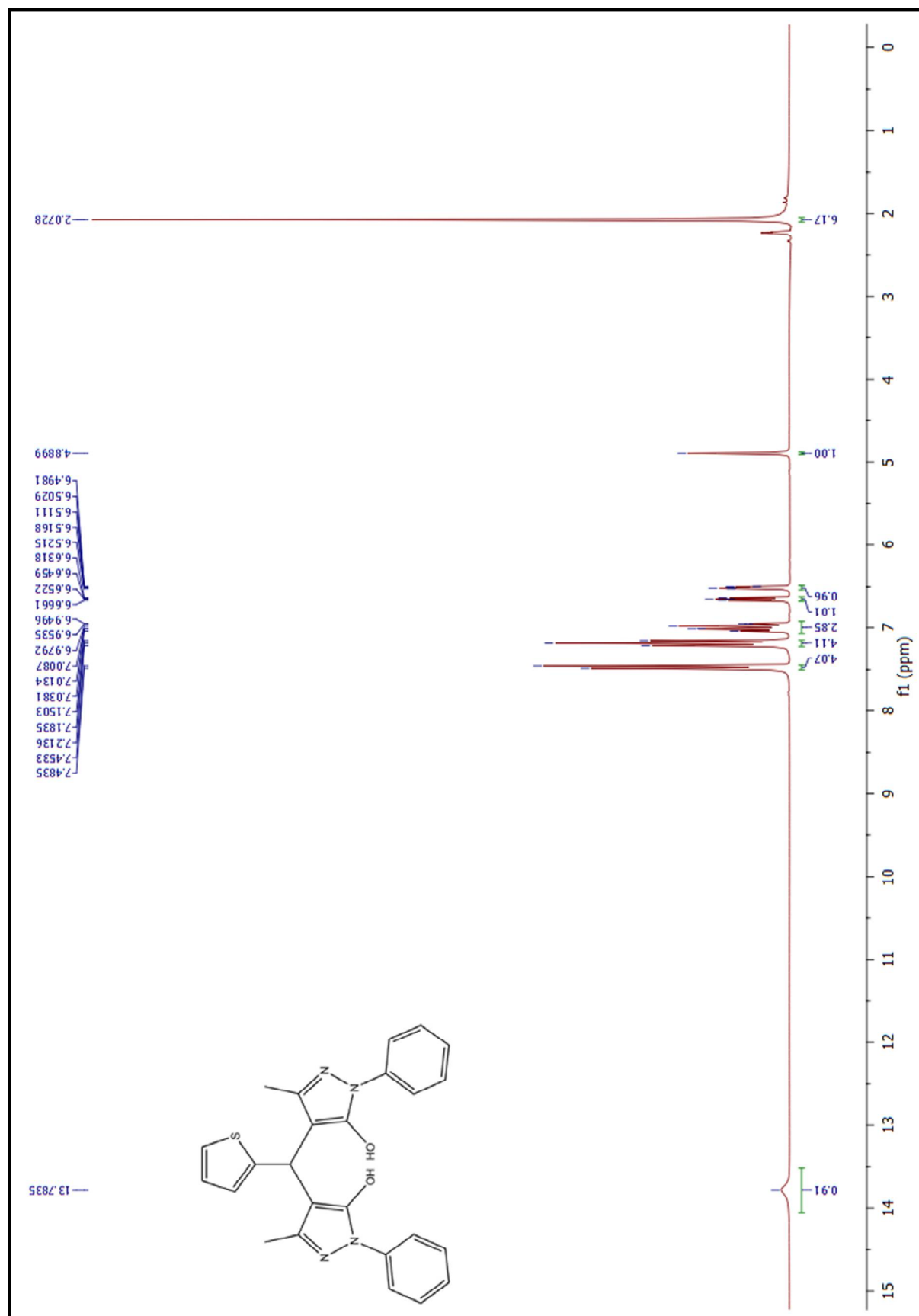


Figure 60. ^1H -NMR spectrum of compound (6ax)

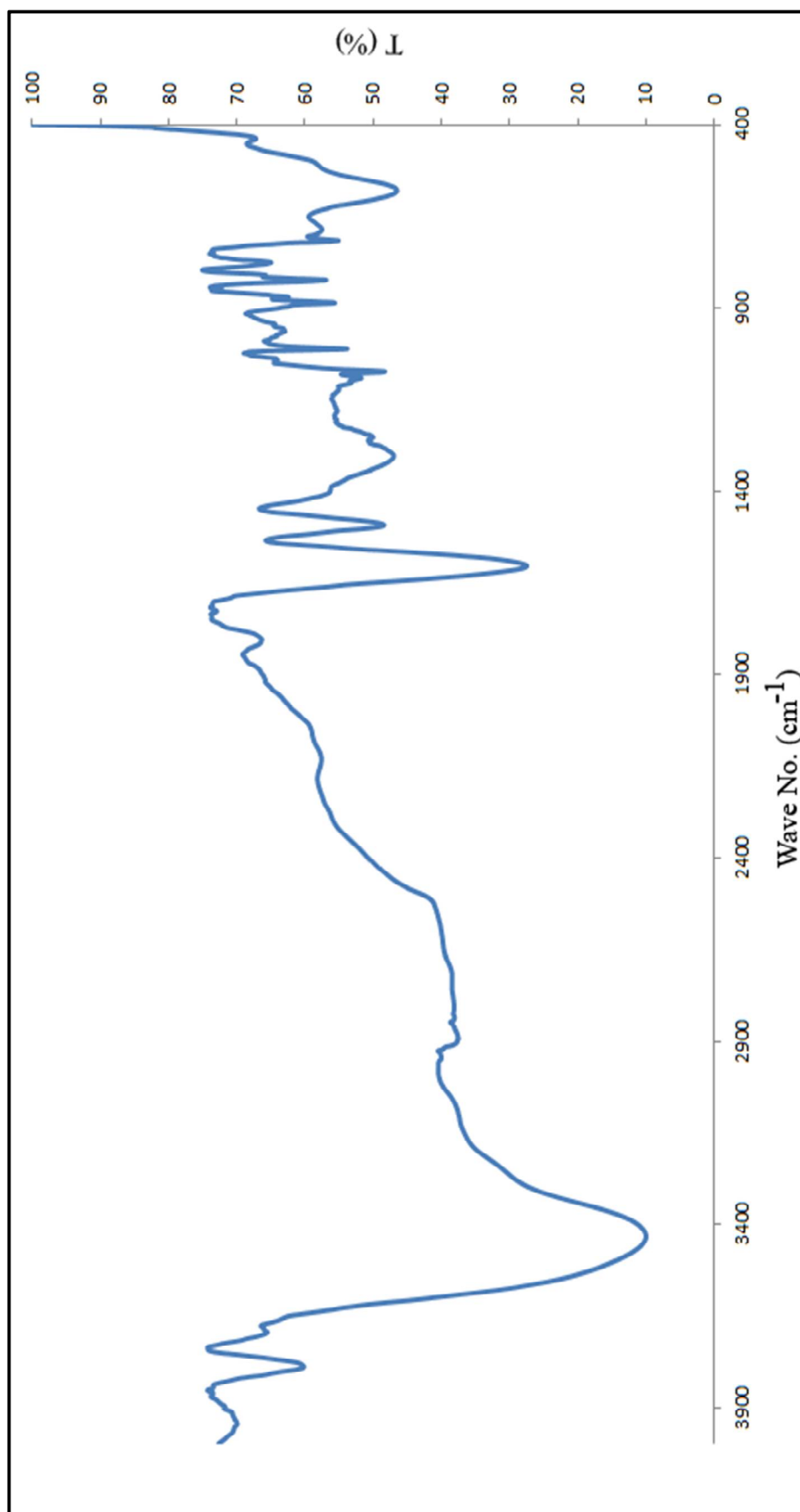


Figure 61. FT-IR spectrum of compound (6ay)

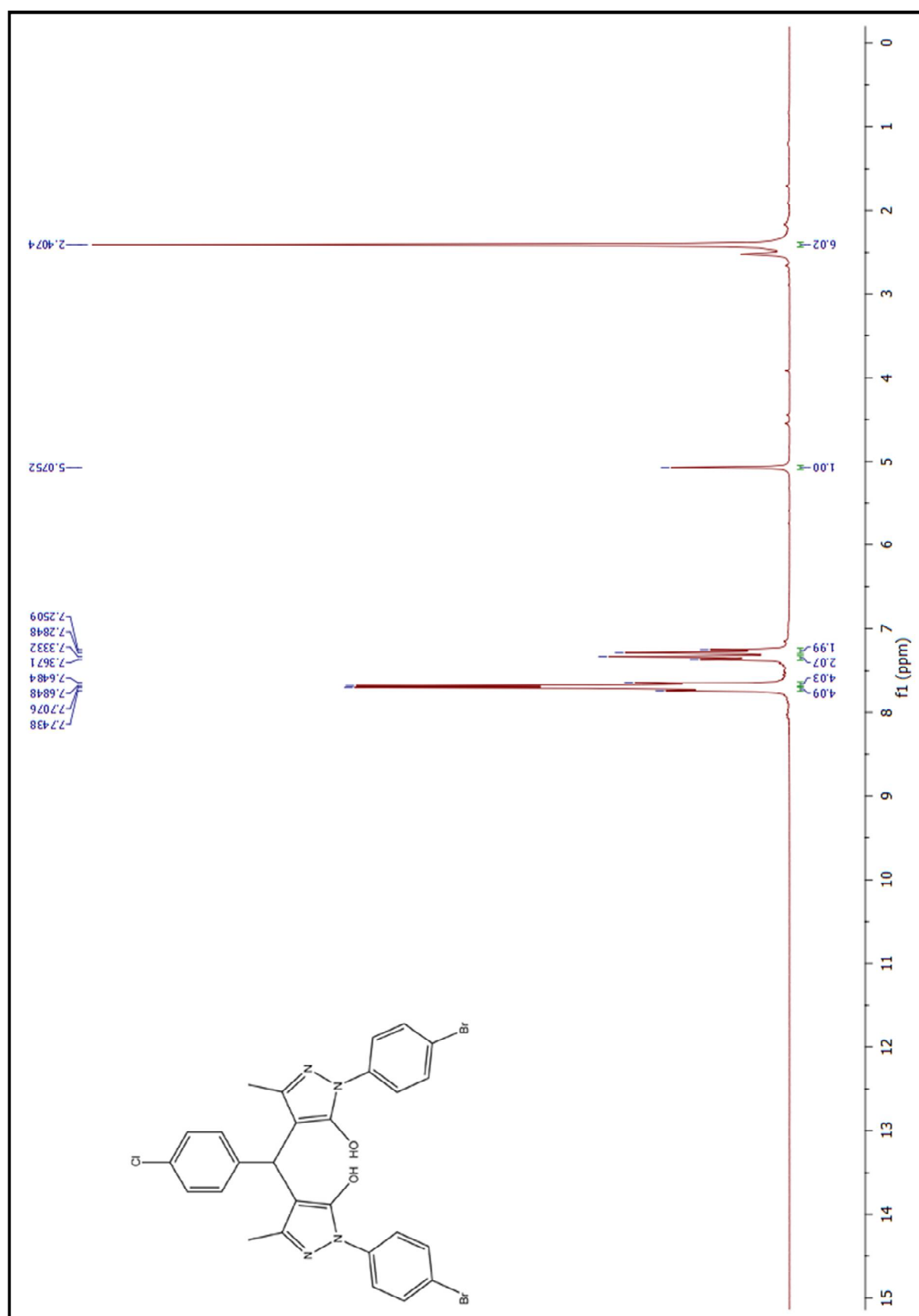


Figure 62. ^1H -NMR spectrum of compound (6ay)

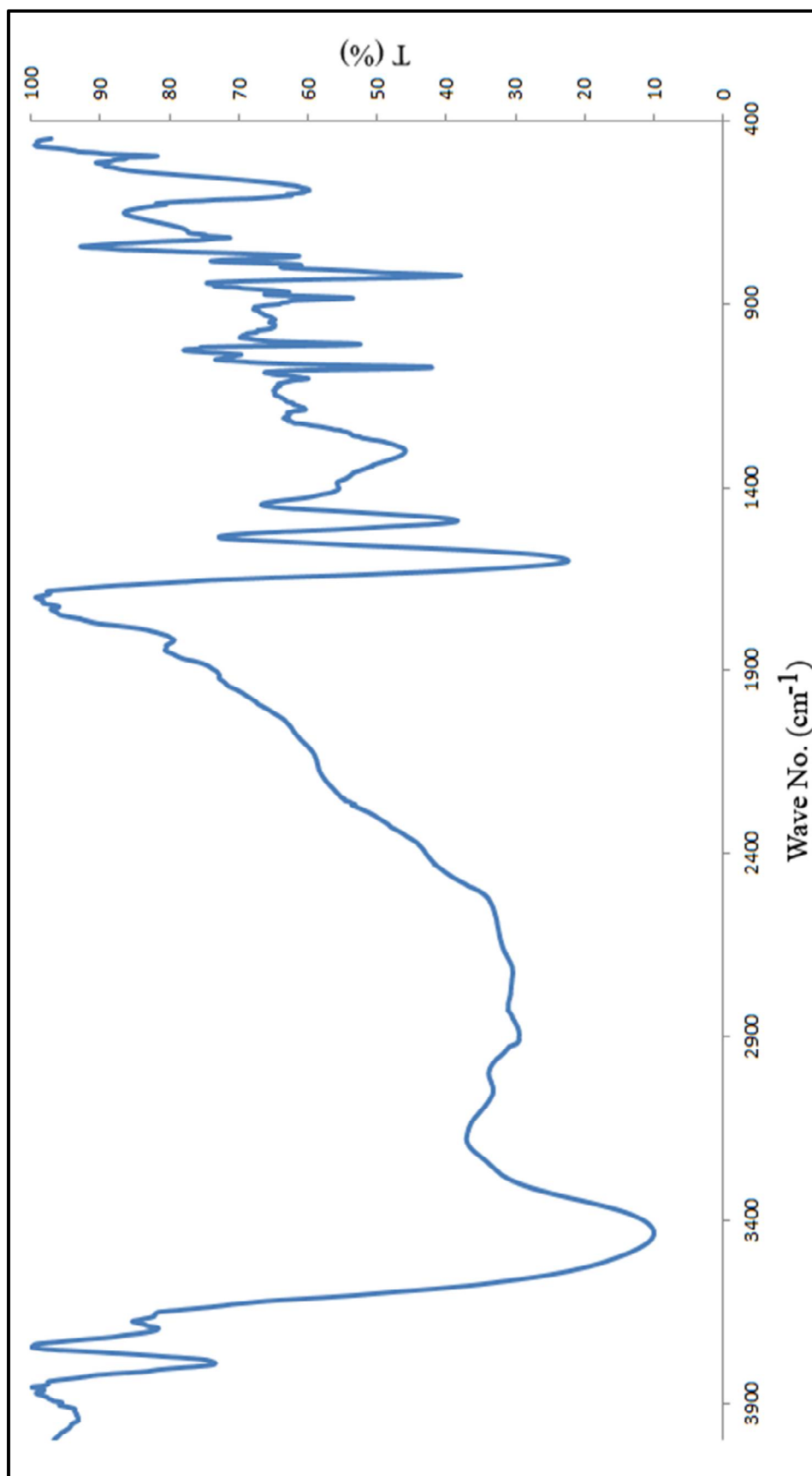


Figure 63. FT-IR spectrum of compound (6az)

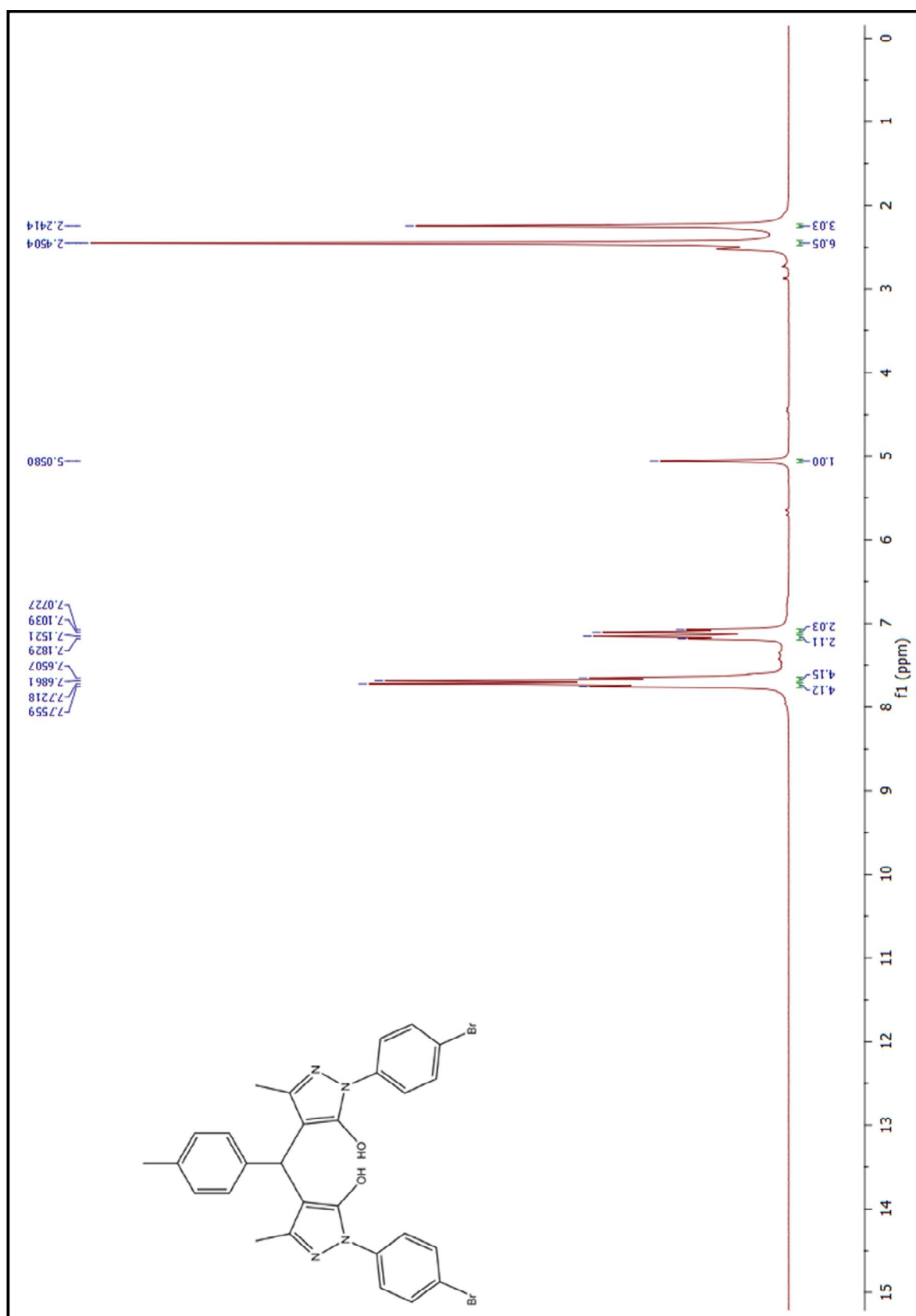


Figure 64. ^1H -NMR spectrum of compound (6az)

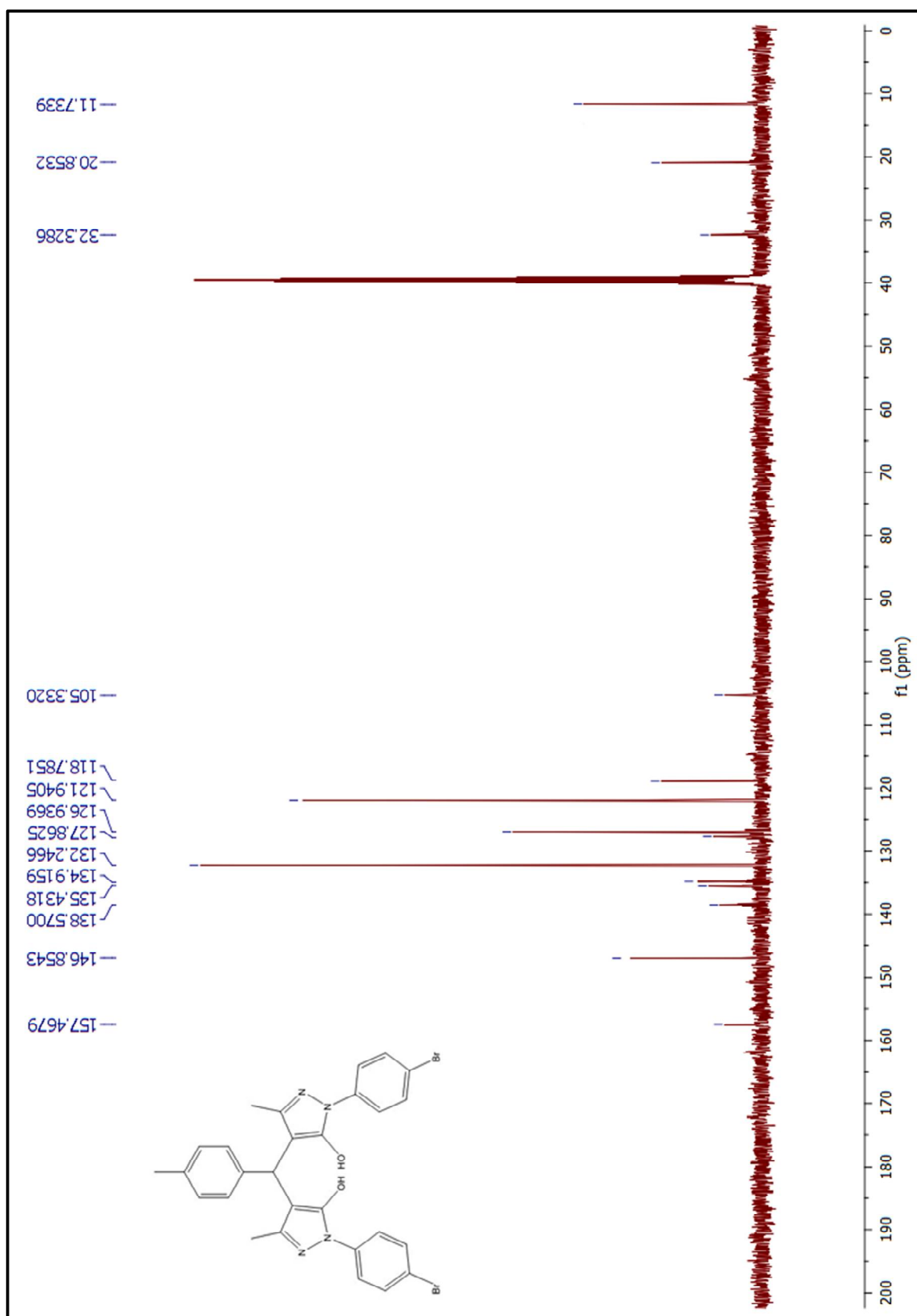


Figure 65. ^{13}C -NMR spectrum of compound (6az)

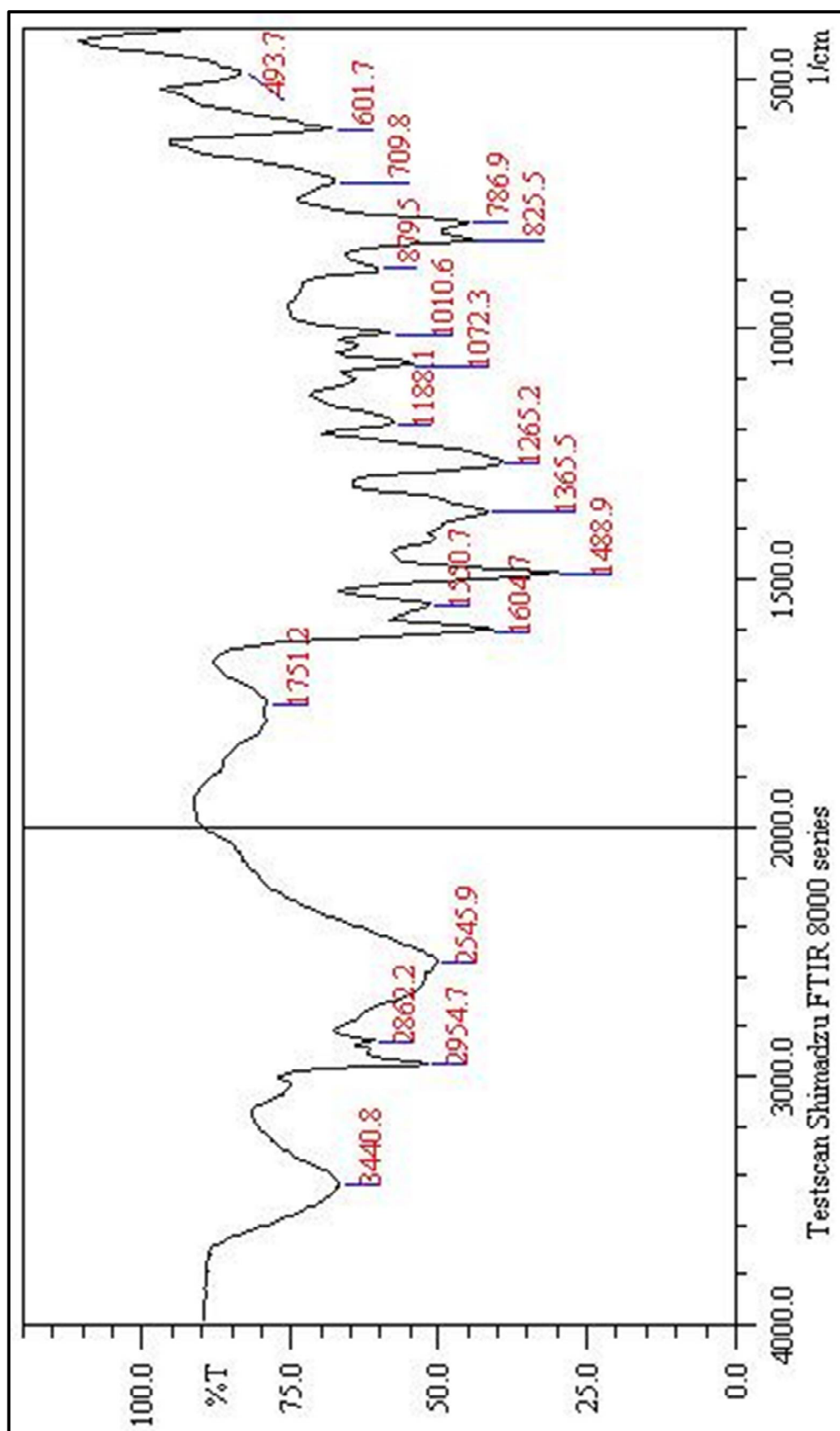


Figure 66. FT-IR spectrum of compound (6ba)

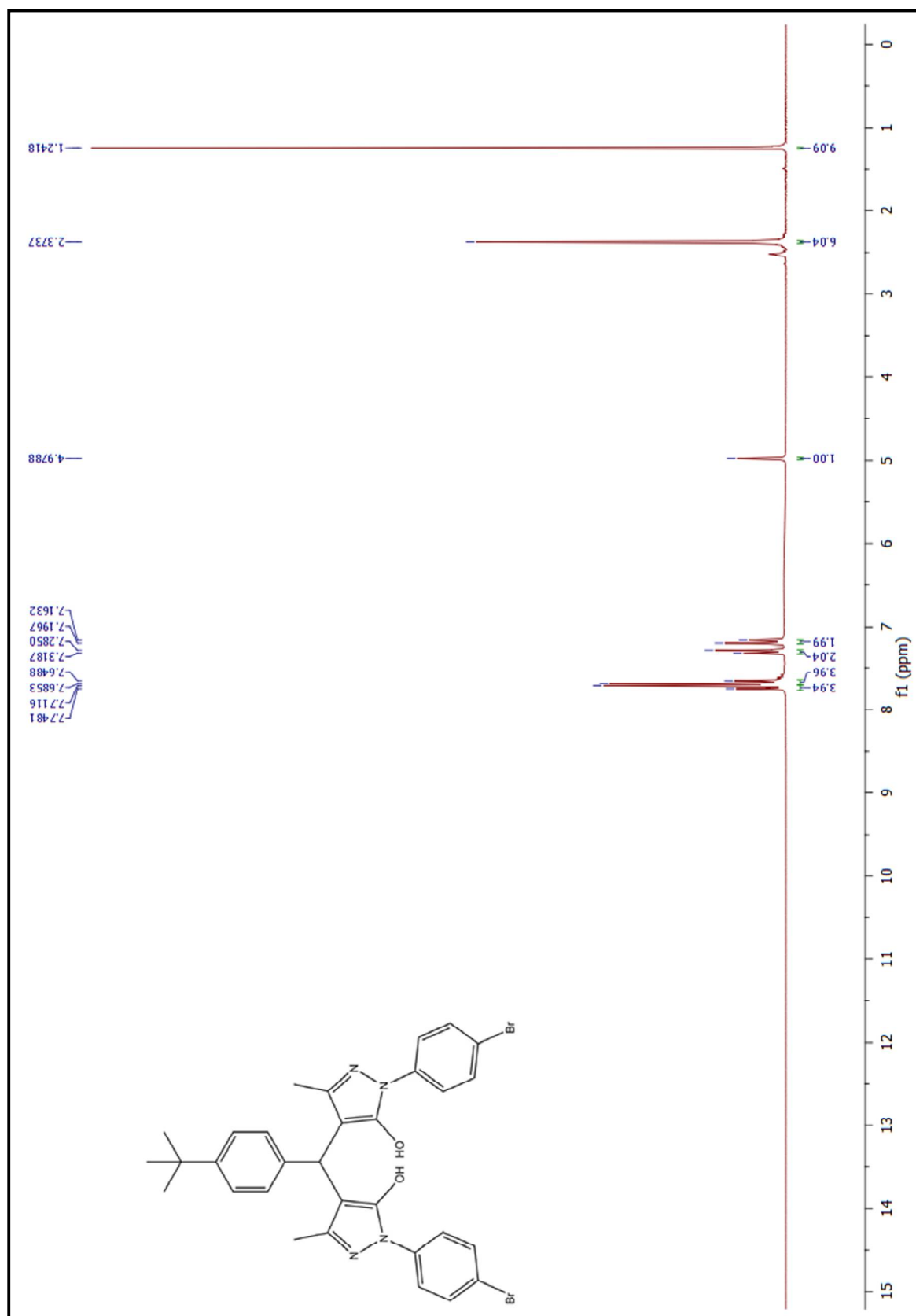


Figure 67. ¹H-NMR spectrum of compound (6ba)

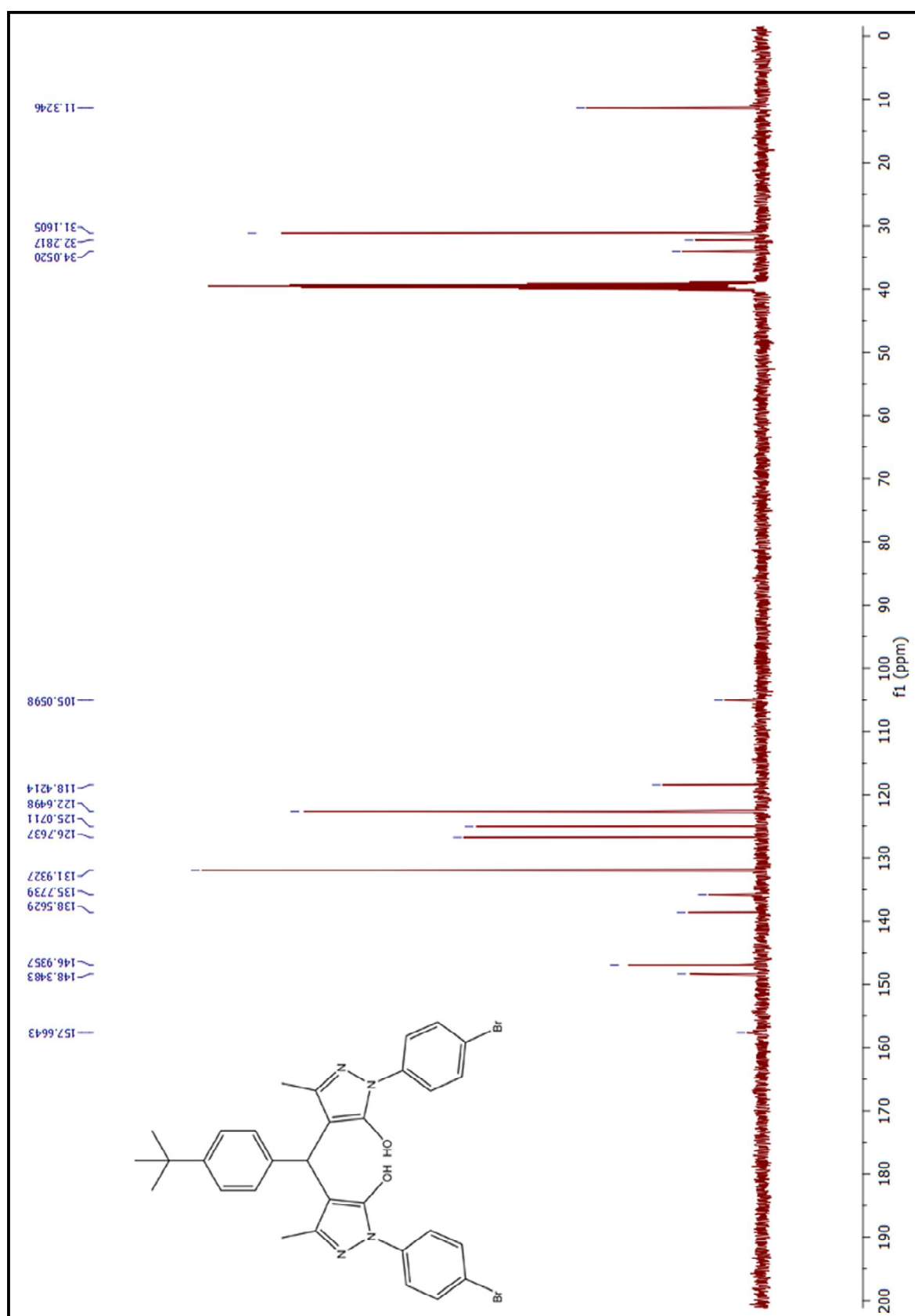


Figure 68. ^{13}C -NMR spectrum of compound (6ba)

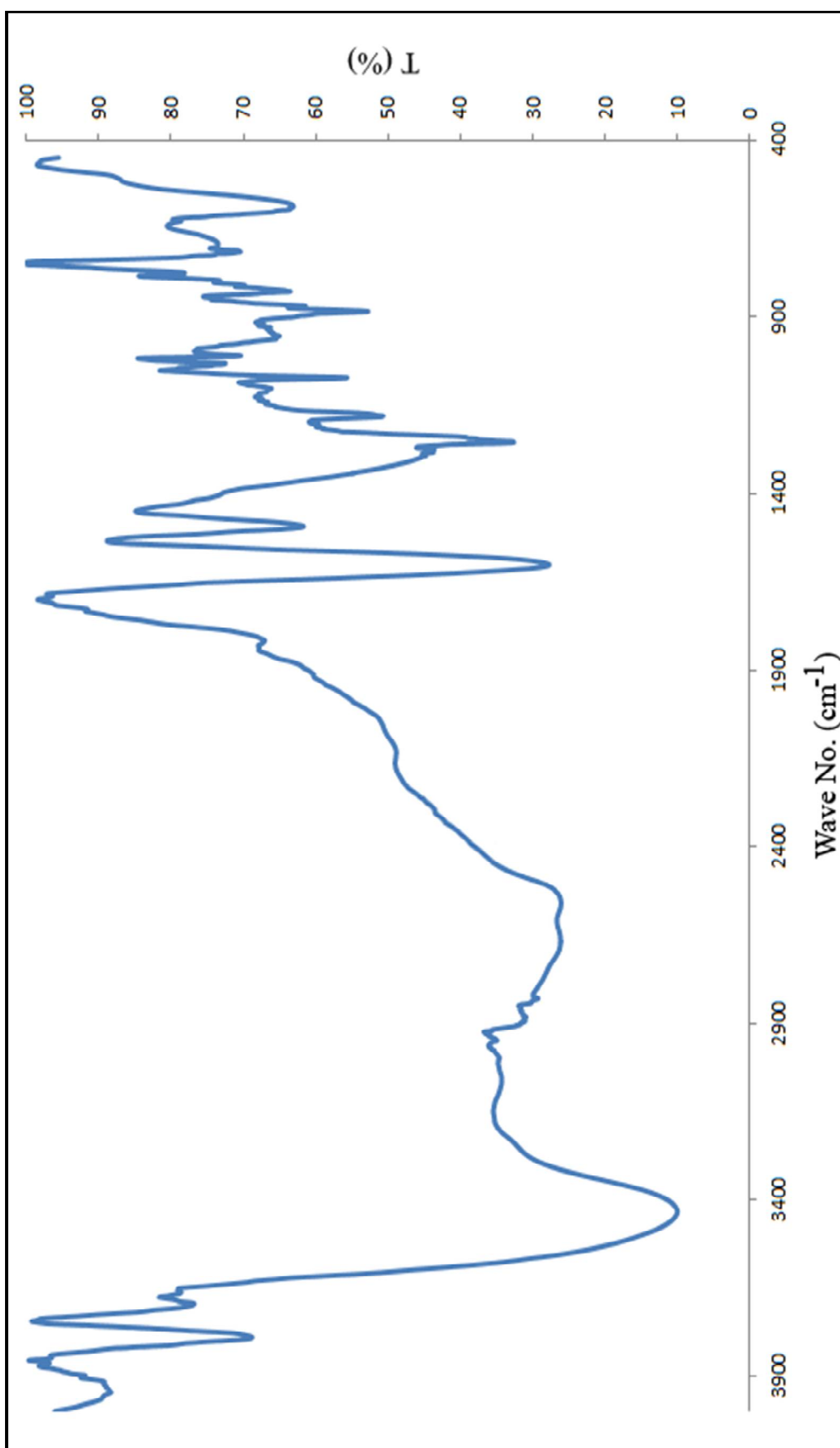


Figure 69. FT-IR spectrum of compound (6bb)

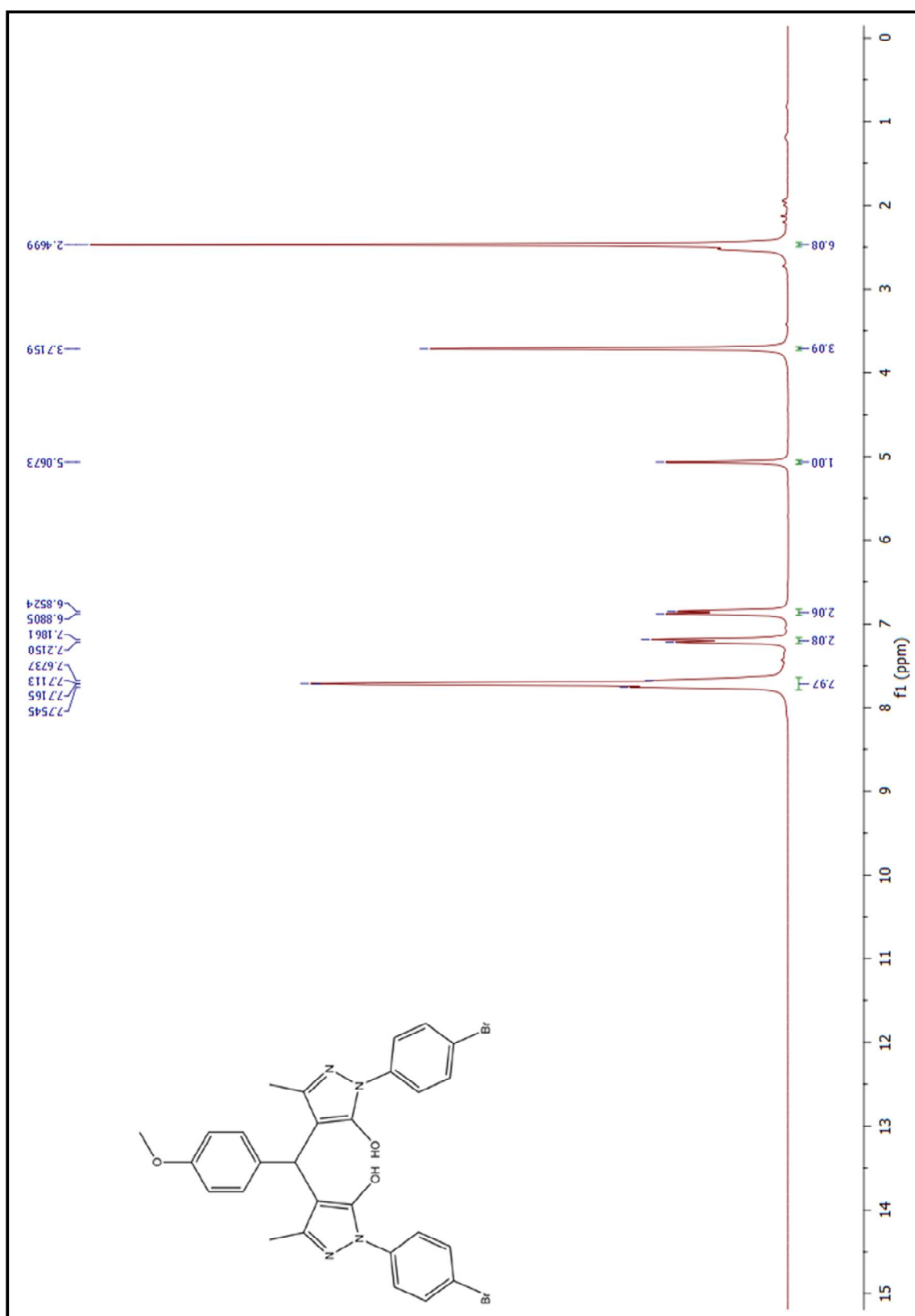


Figure 70. ¹H-NMR spectrum of compound (6bb)

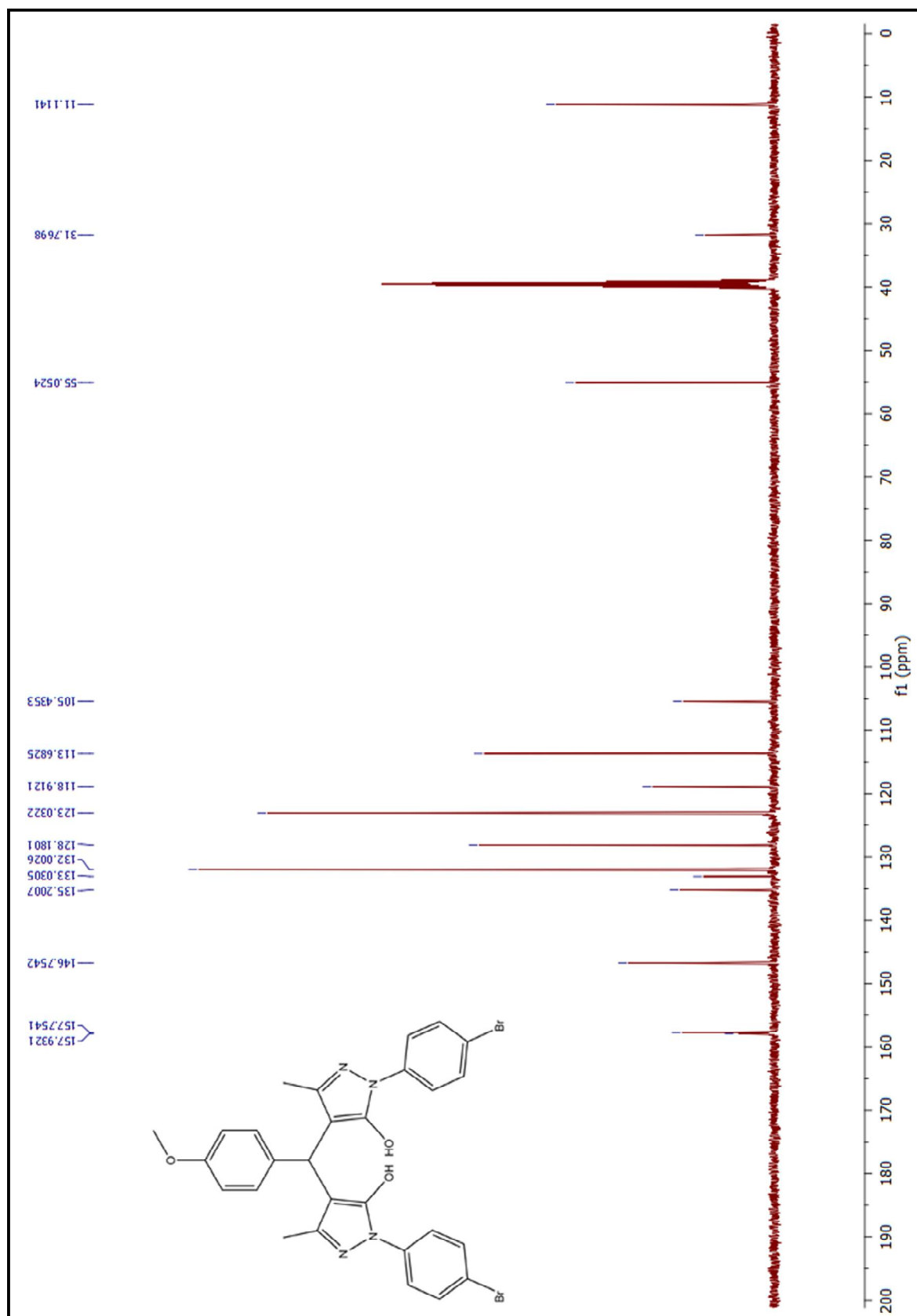


Figure 71. ^{13}C -NMR spectrum of compound (6bb)

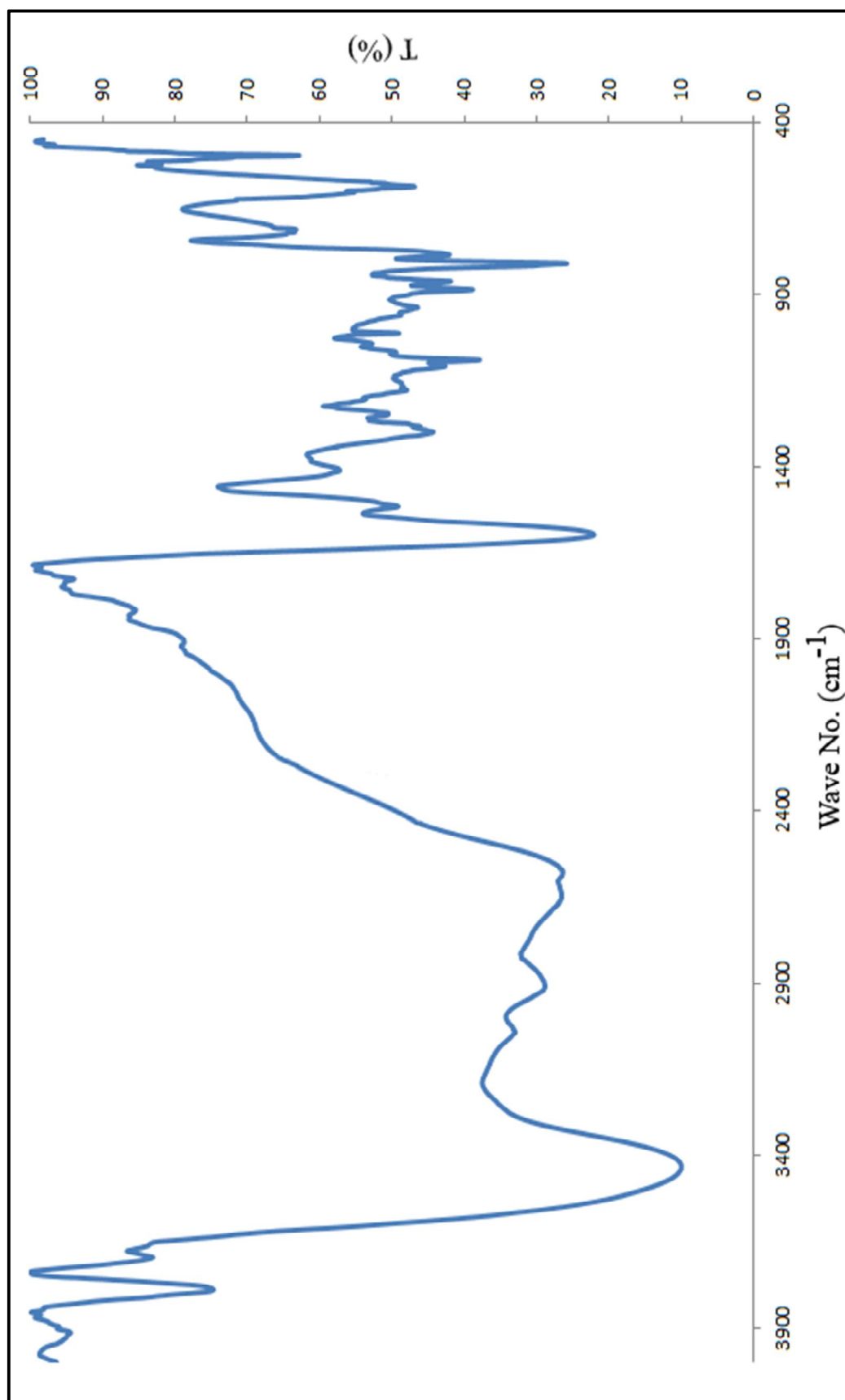


Figure 72. FT-IR spectrum of compound (6bc)

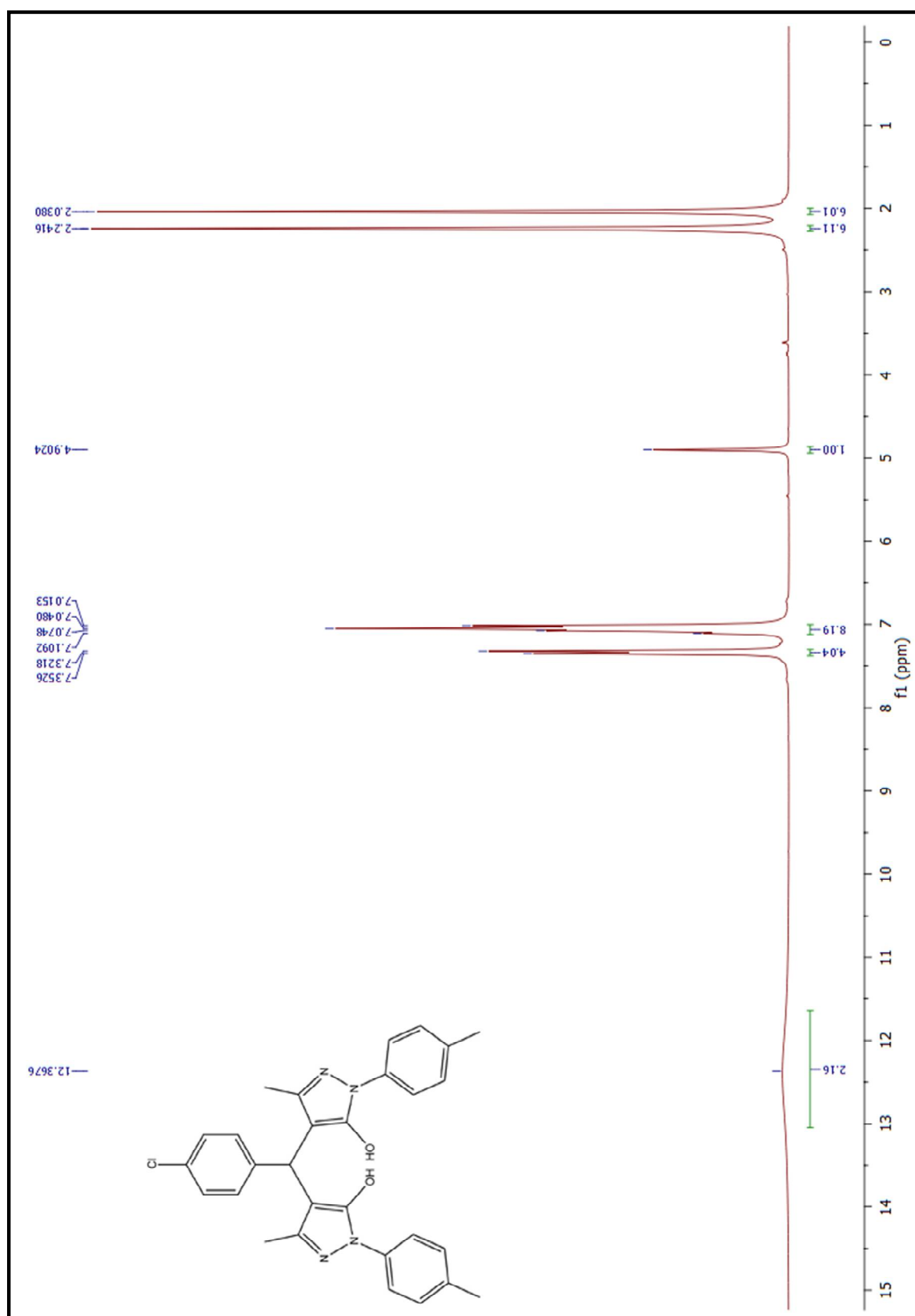


Figure 73. ¹H-NMR spectrum of compound (6bc)

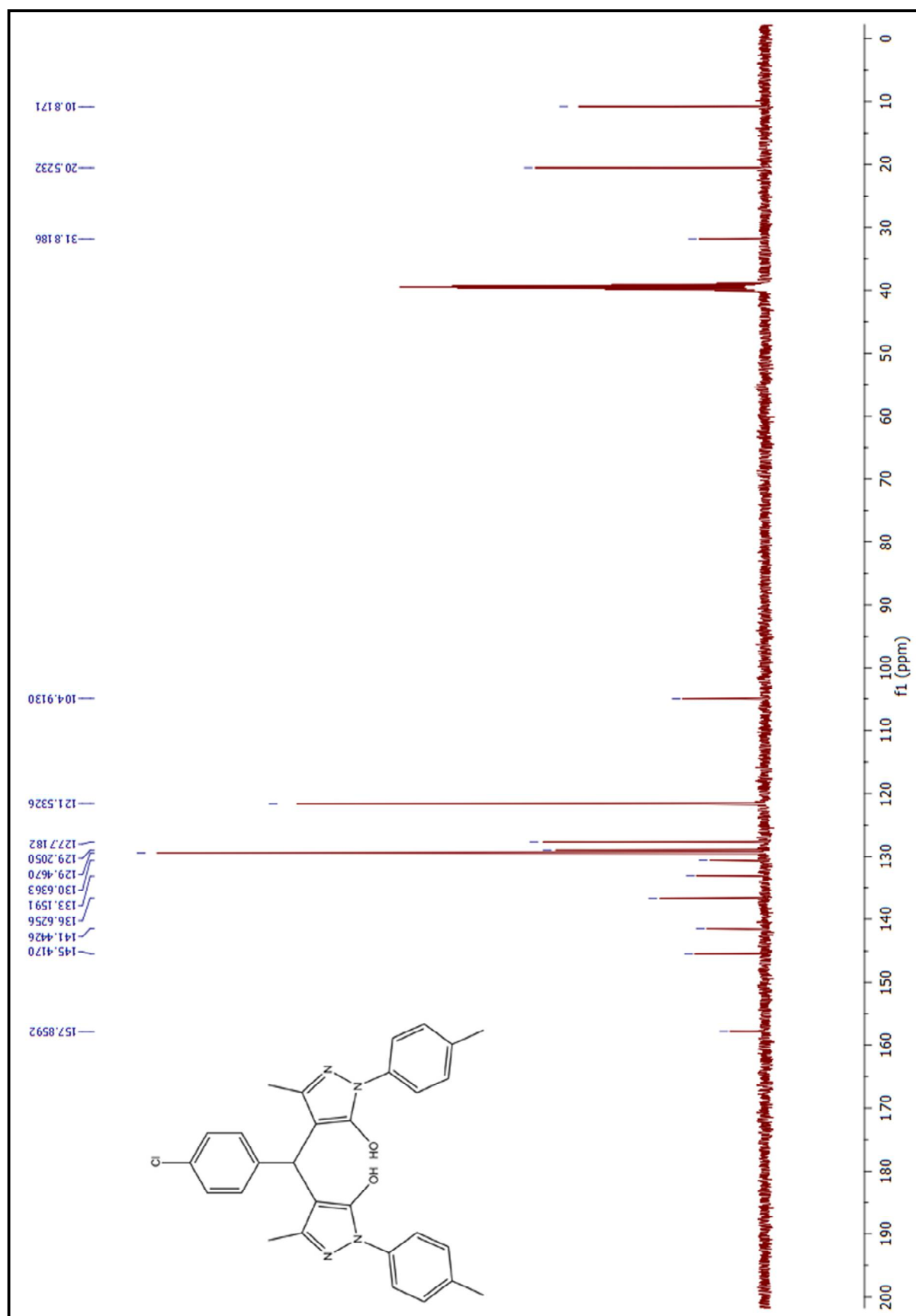


Figure 74. ^{13}C -NMR spectrum of compound (6bc)

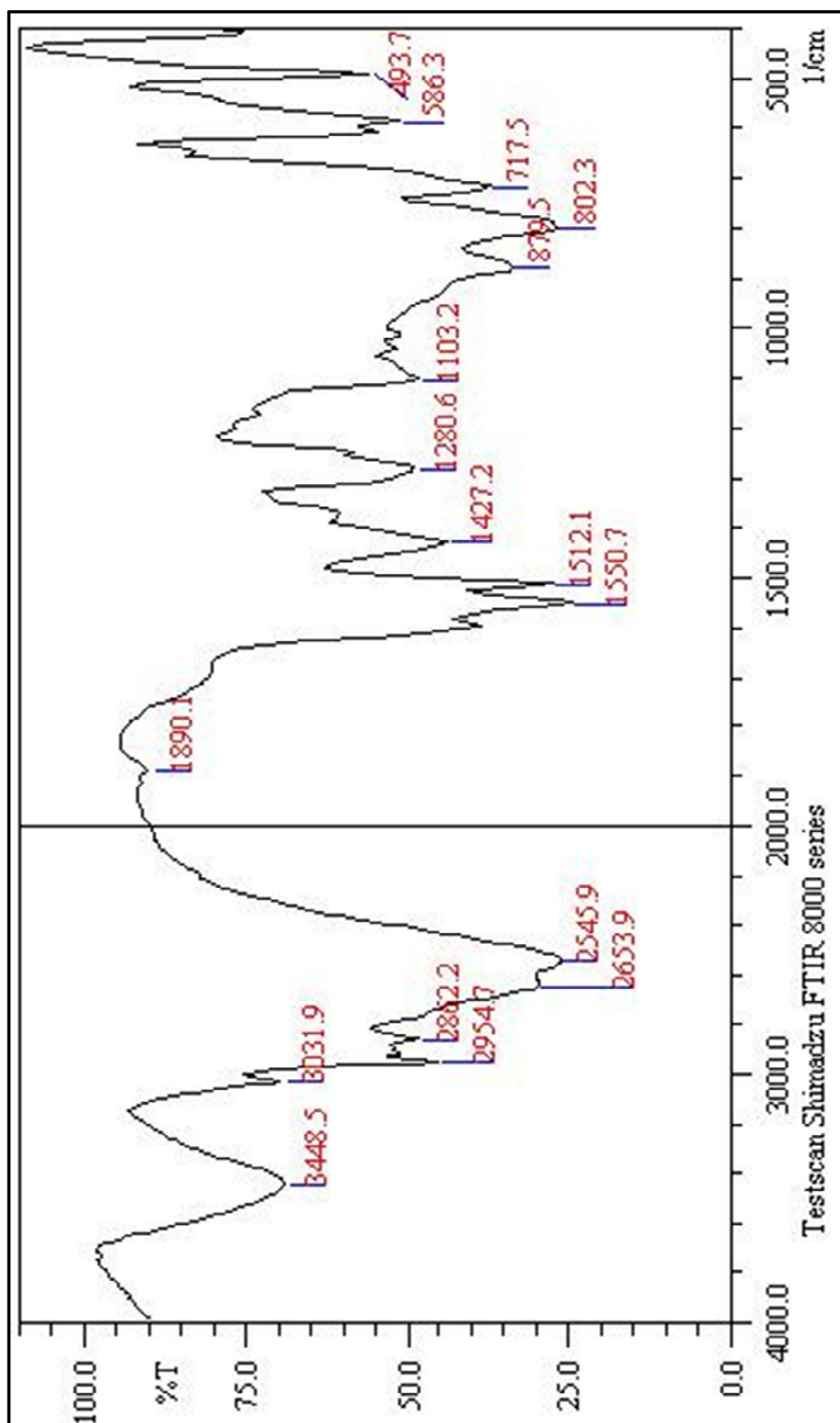


Figure 75. FT-IR spectrum of compound (6bd)

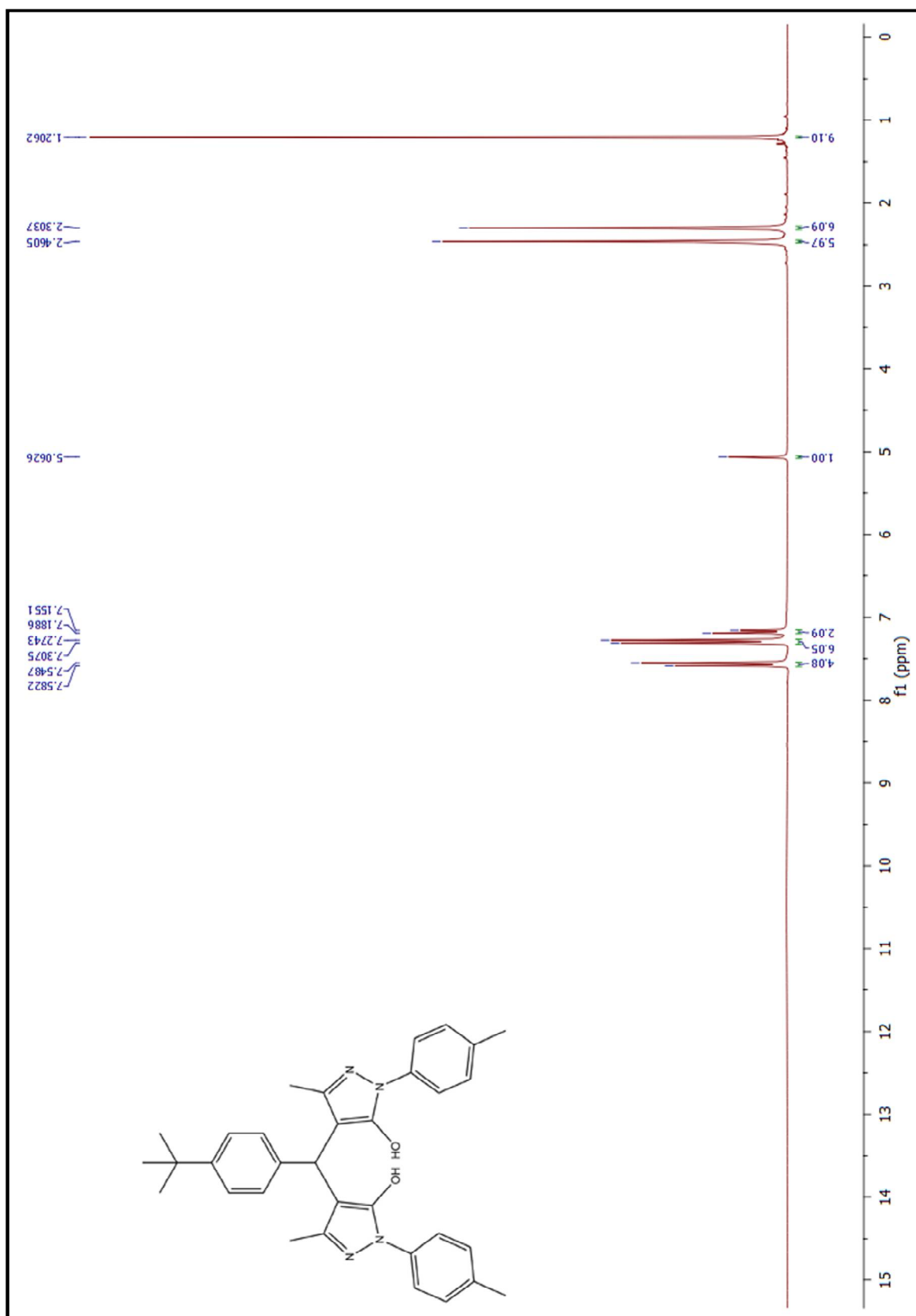


Figure 76. ^1H -NMR spectrum of compound (6bd)

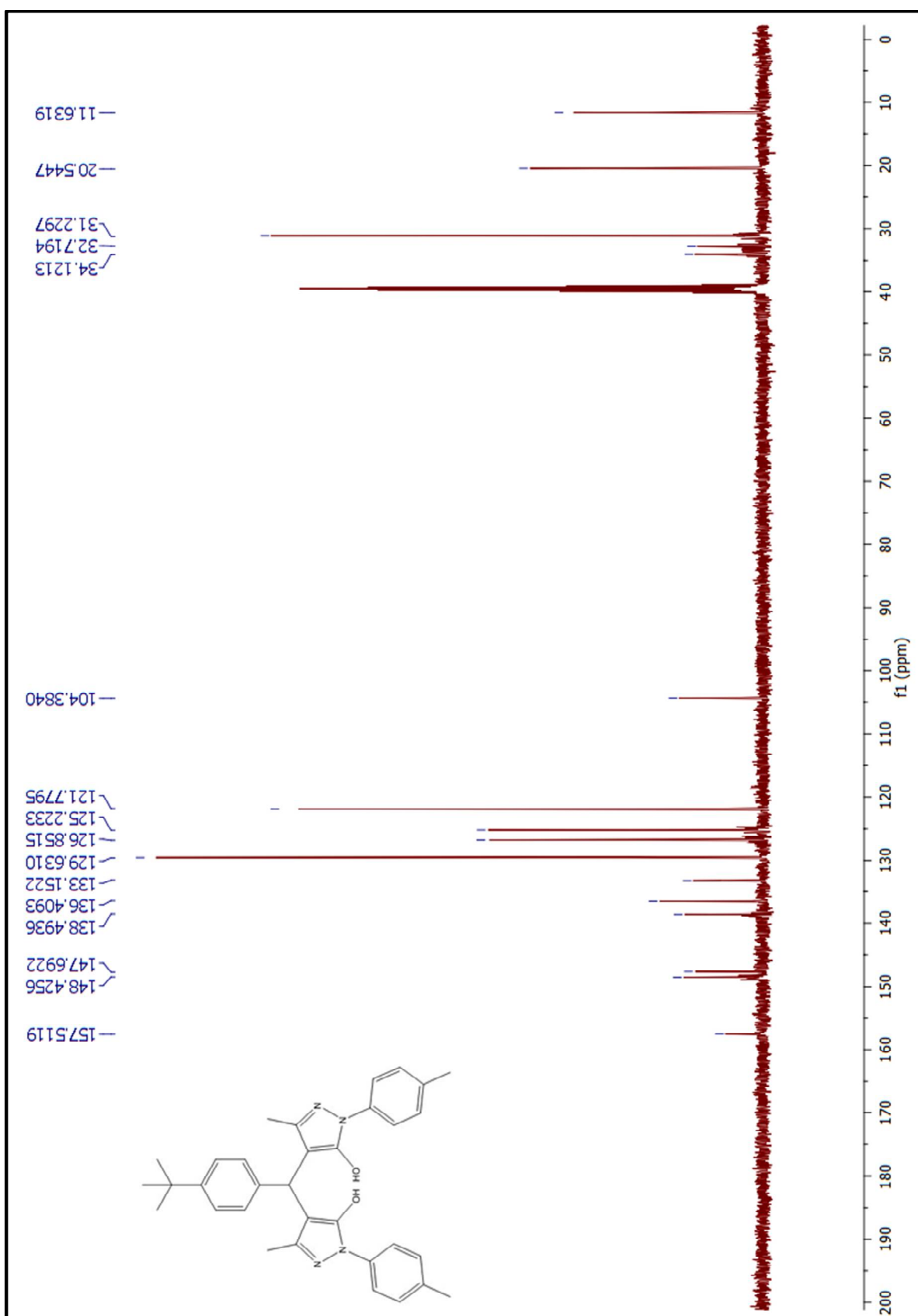


Figure 77. ¹³C-NMR spectrum of compound (6bd)

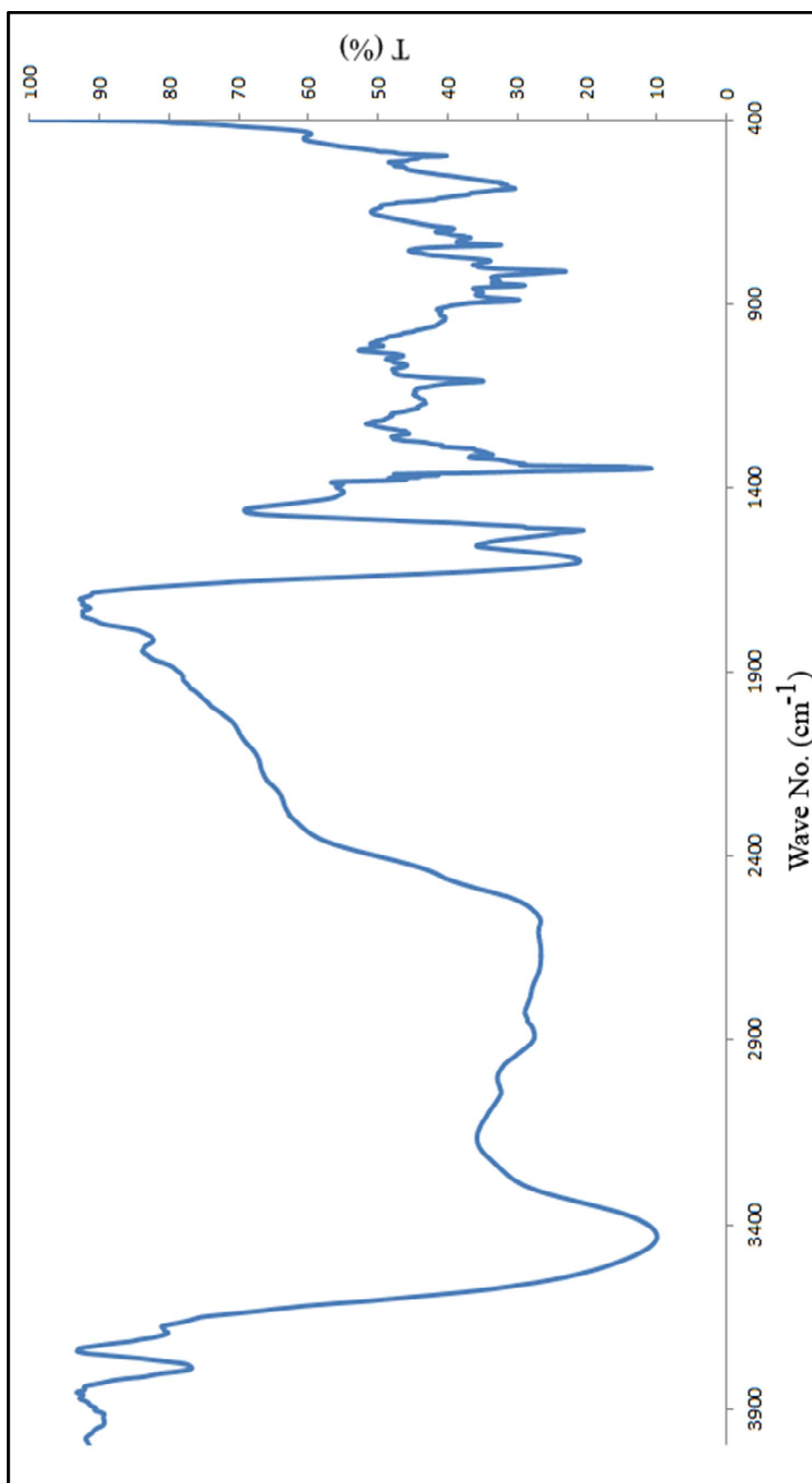


Figure 78. FT-IR spectrum of compound (6be)

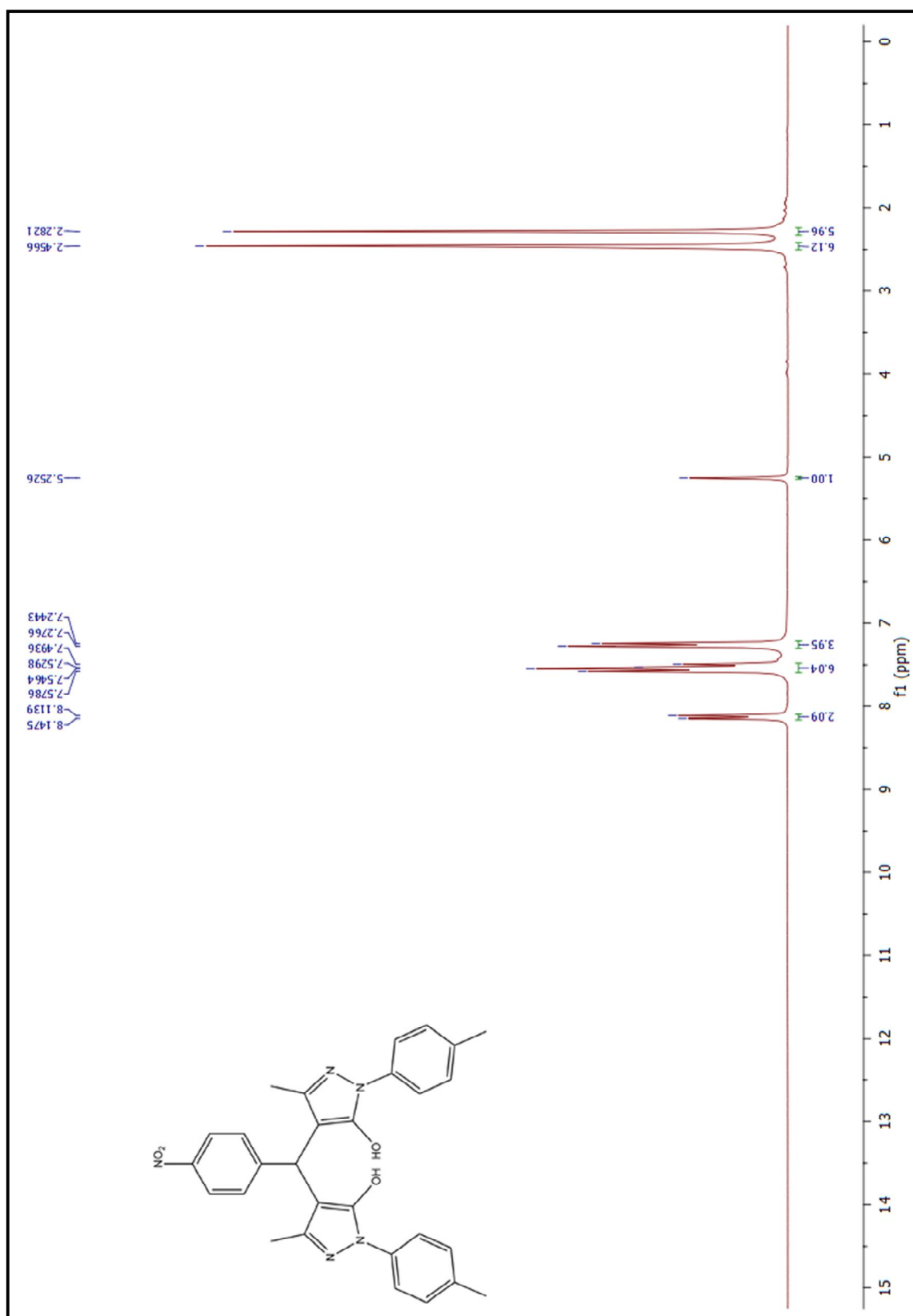


Figure 79. ¹H-NMR spectrum of compound (6be)

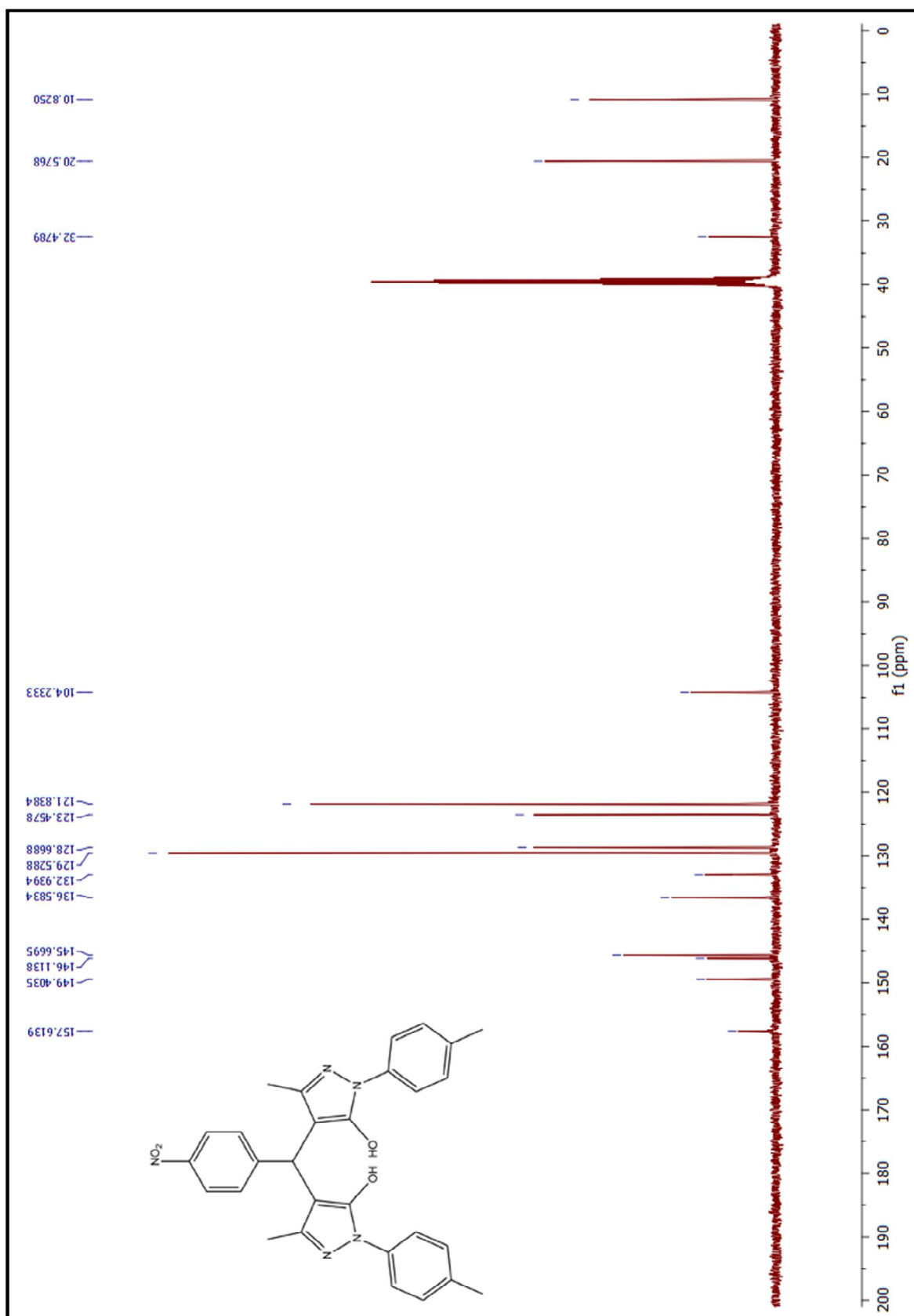


Figure 80. ^{13}C -NMR spectrum of compound (6be)

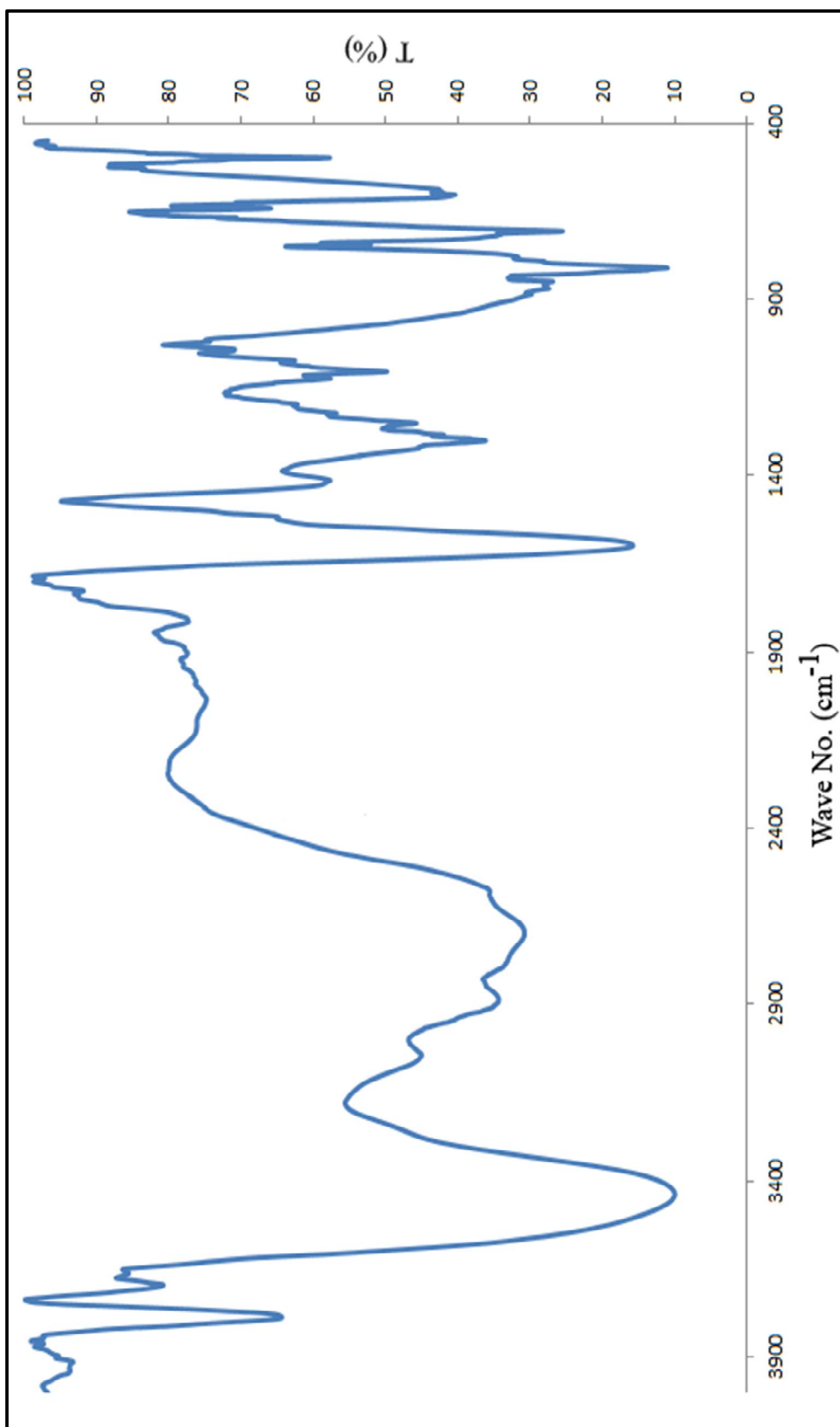


Figure 81. FT-IR spectrum of compound (6bf)

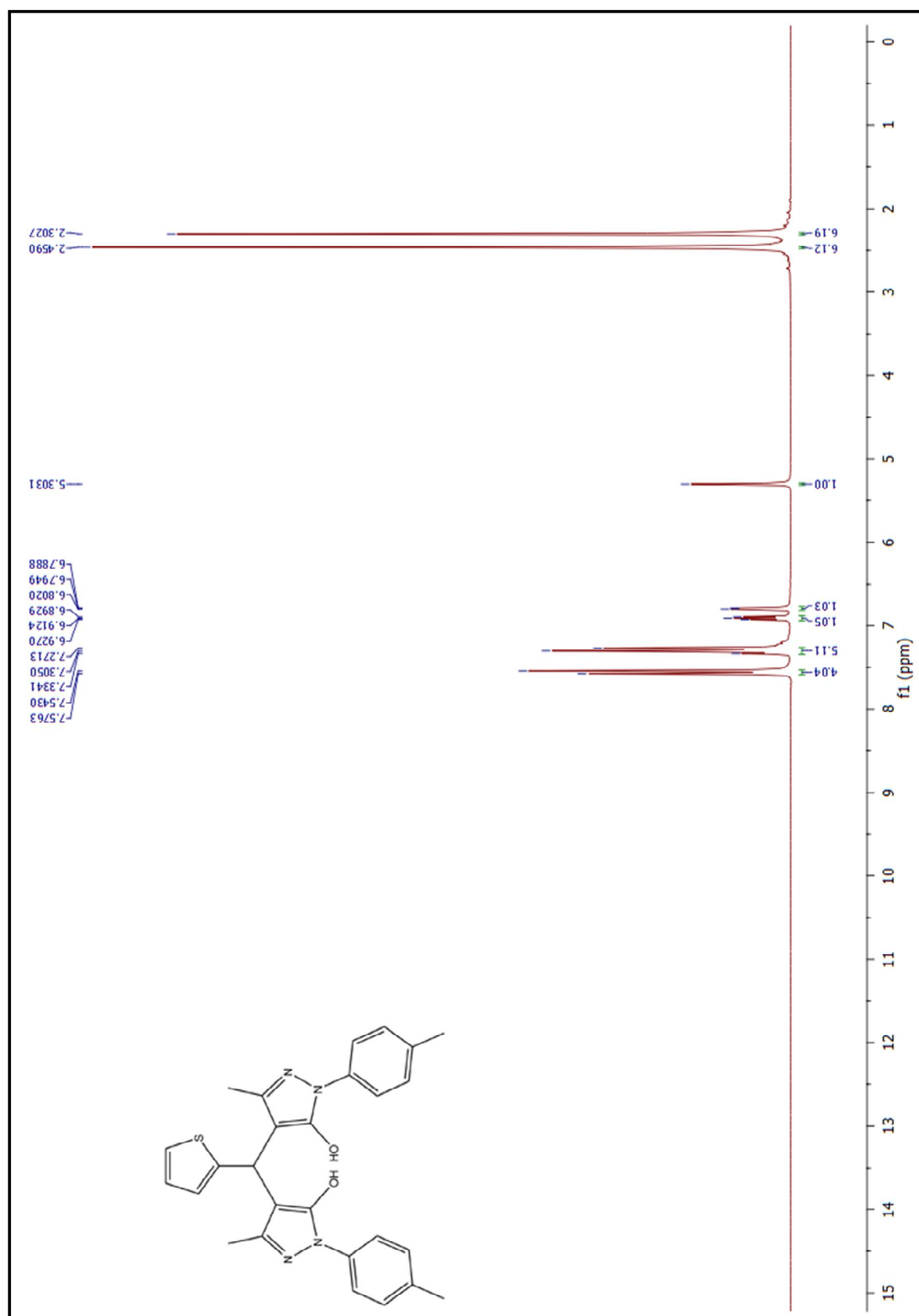


Figure 82. ¹H-NMR spectrum of compound (6bf)

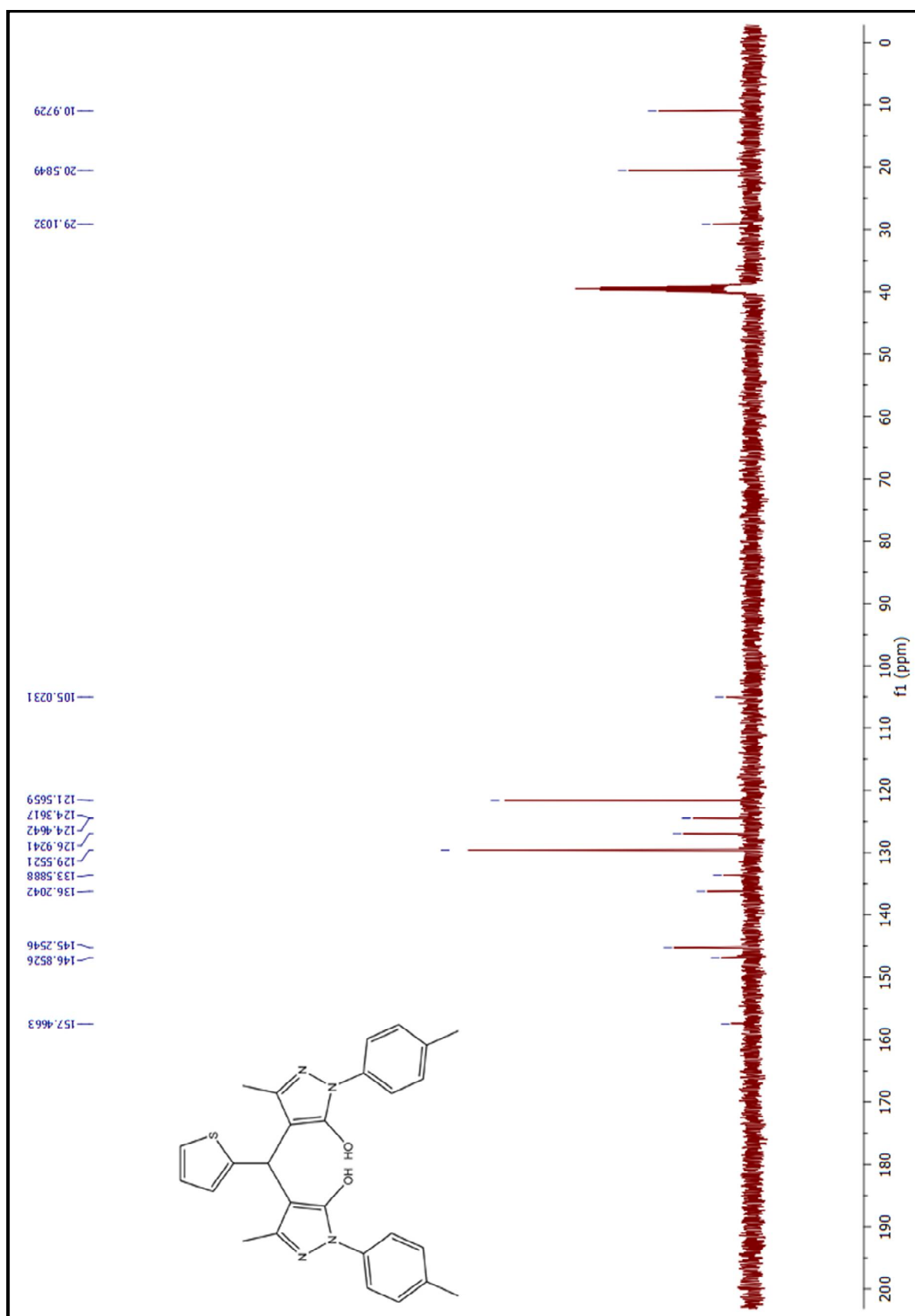


Figure 83. ^{13}C -NMR spectrum of compound (6bf)

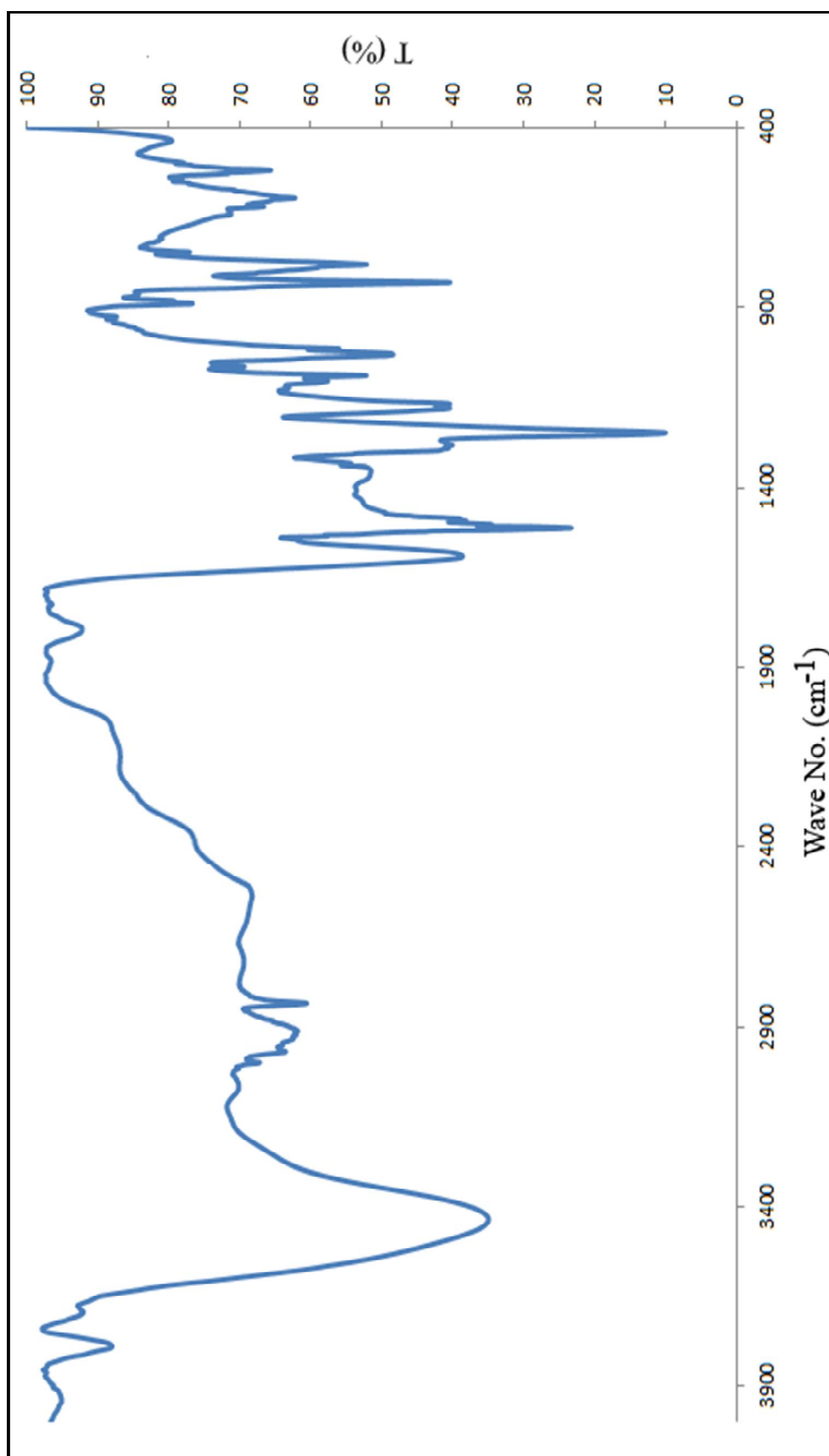


Figure 84. FT-IR spectrum of compound (6bg)

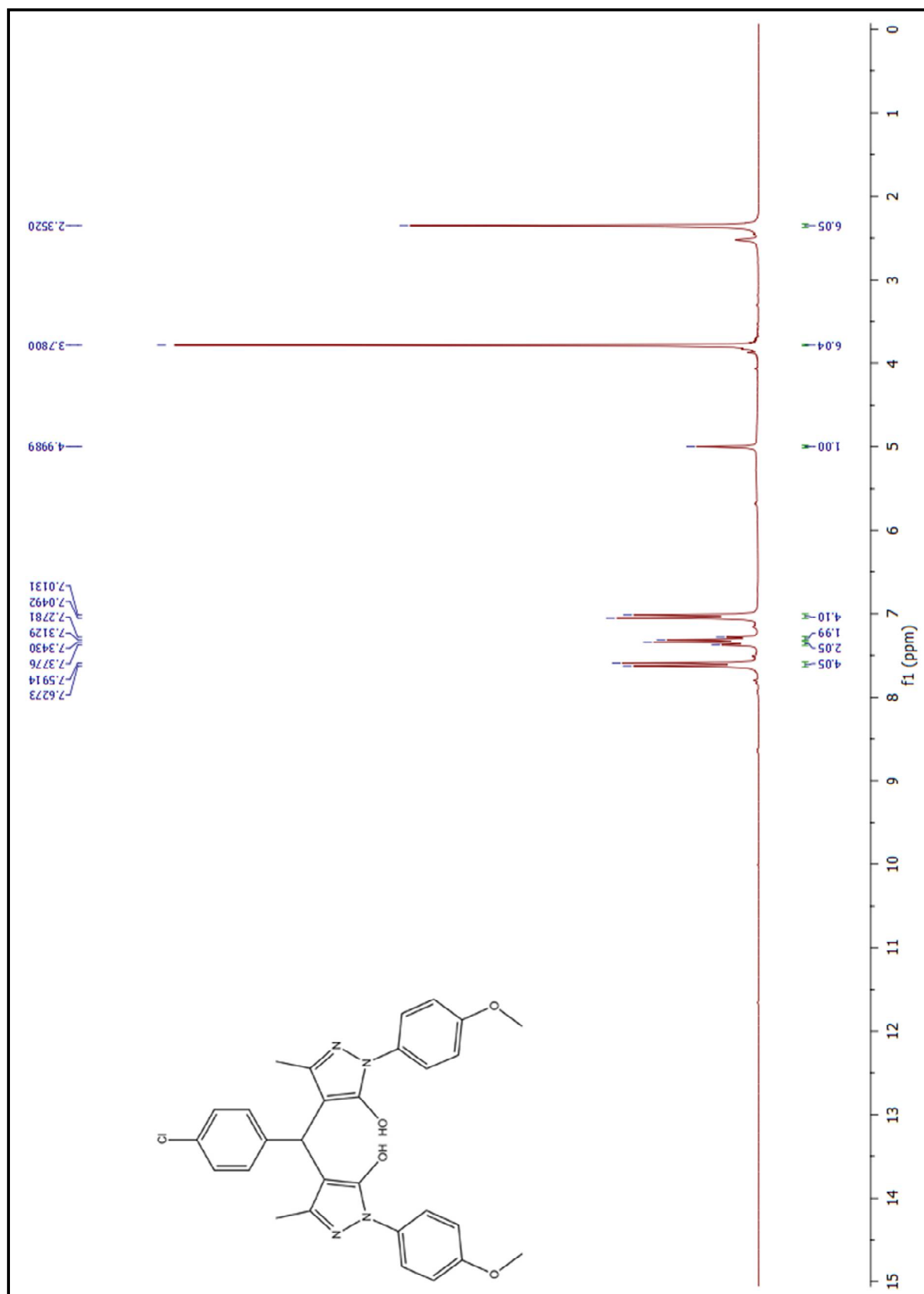


Figure 85. ¹H-NMR spectrum of compound (6bg)

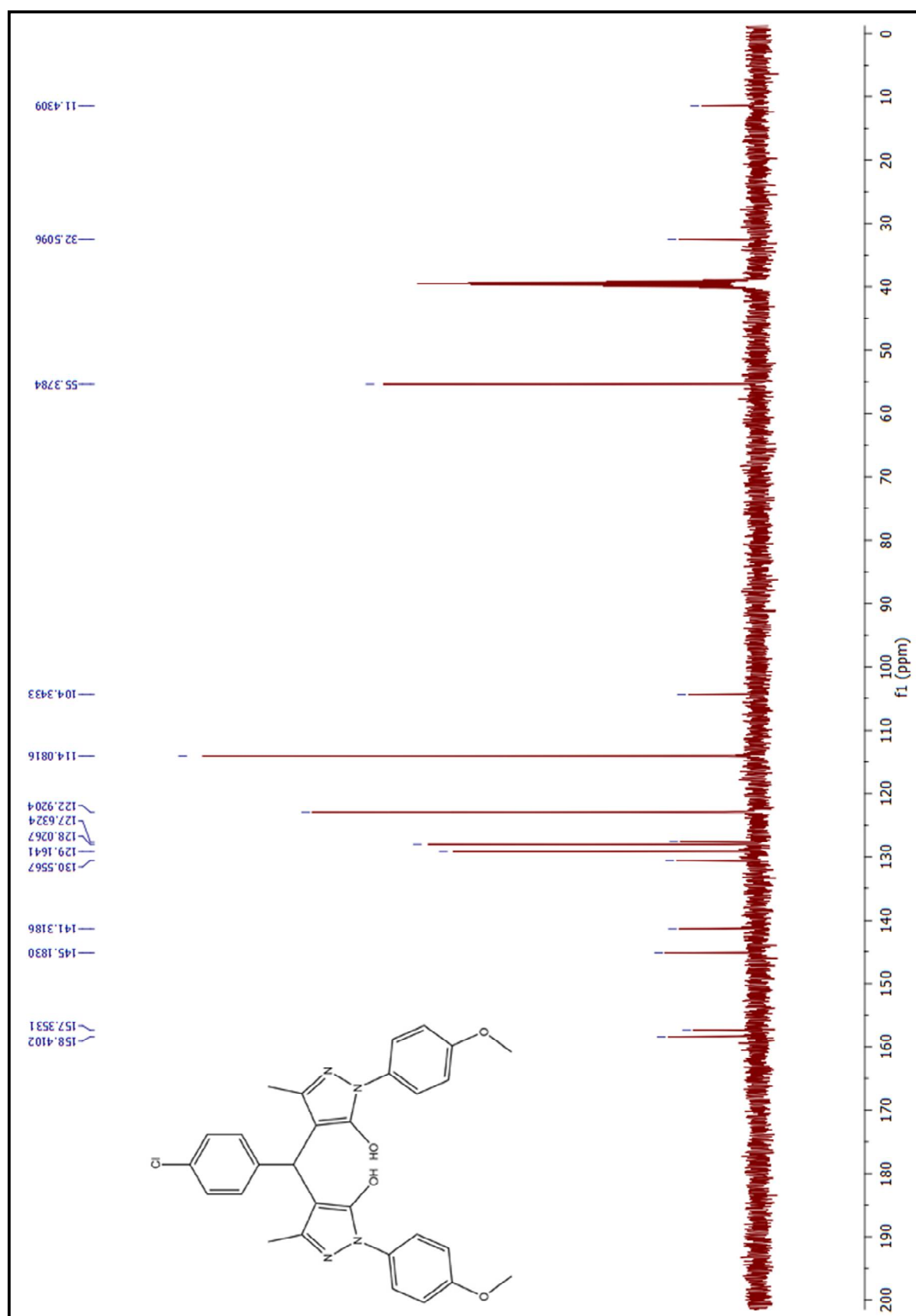


Figure 86. ^{13}C -NMR spectrum of compound (6bg)

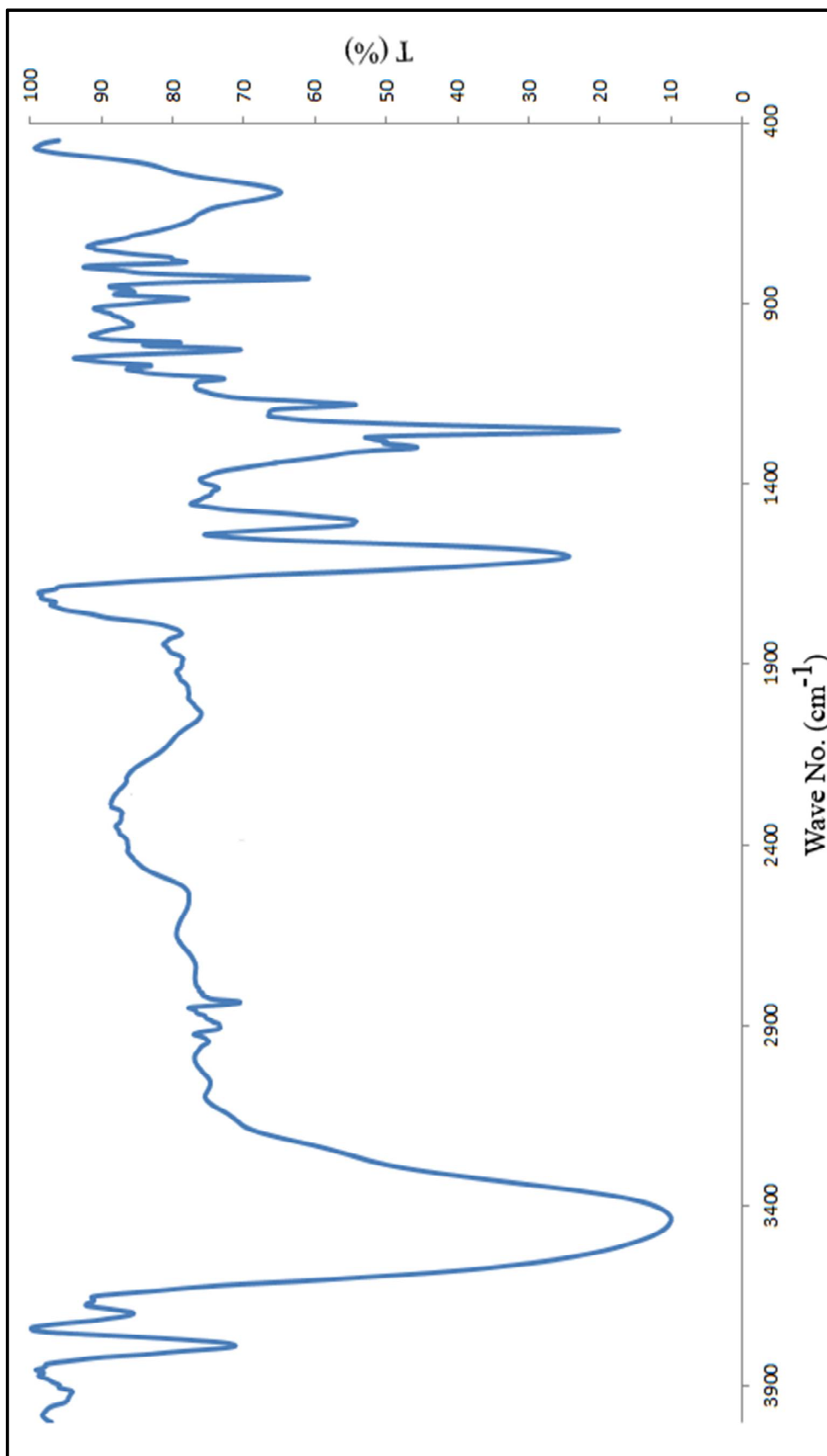


Figure 87. FT-IR spectrum of compound (6bh)

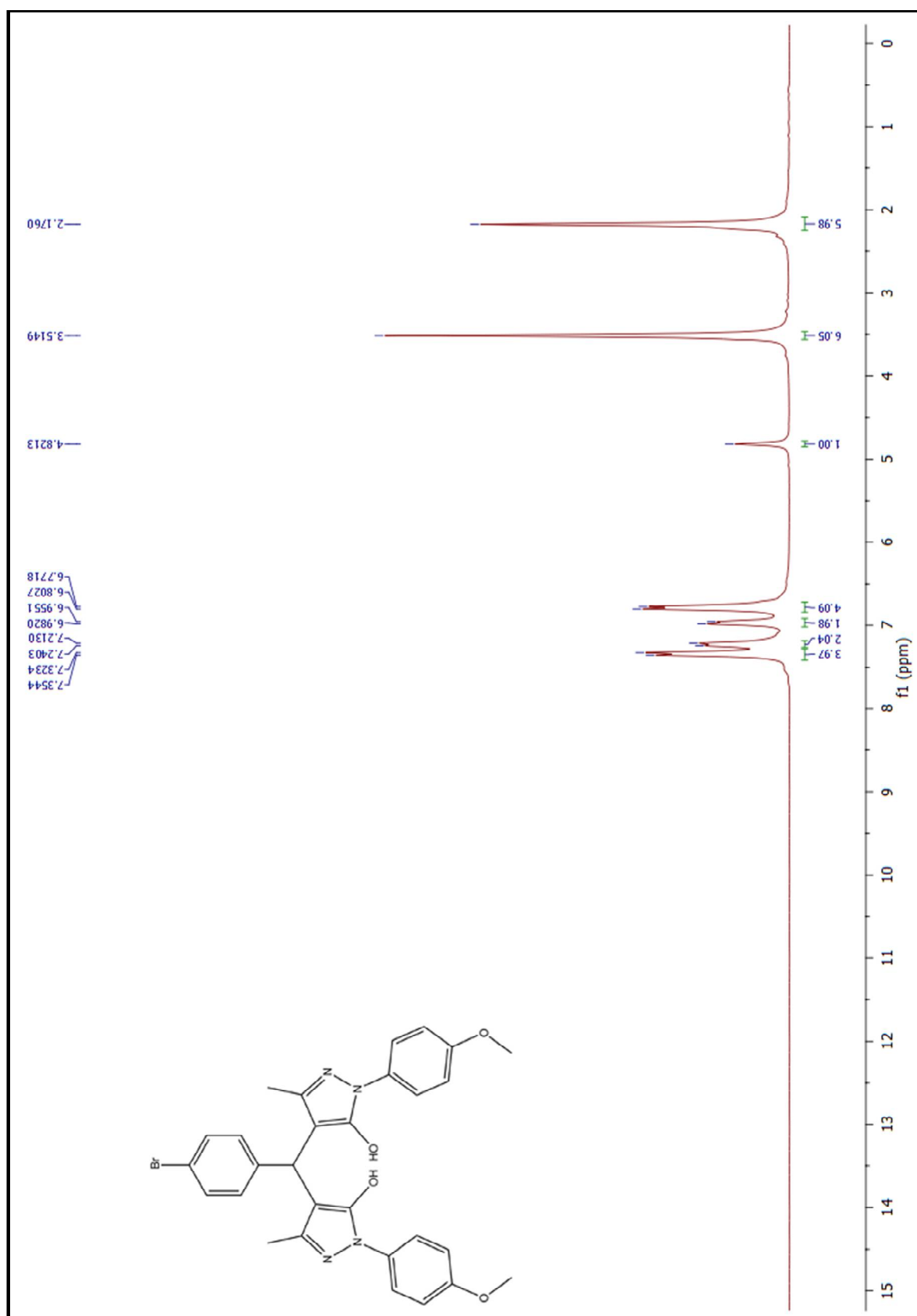


Figure 88. ¹H-NMR spectrum of compound (6bh)

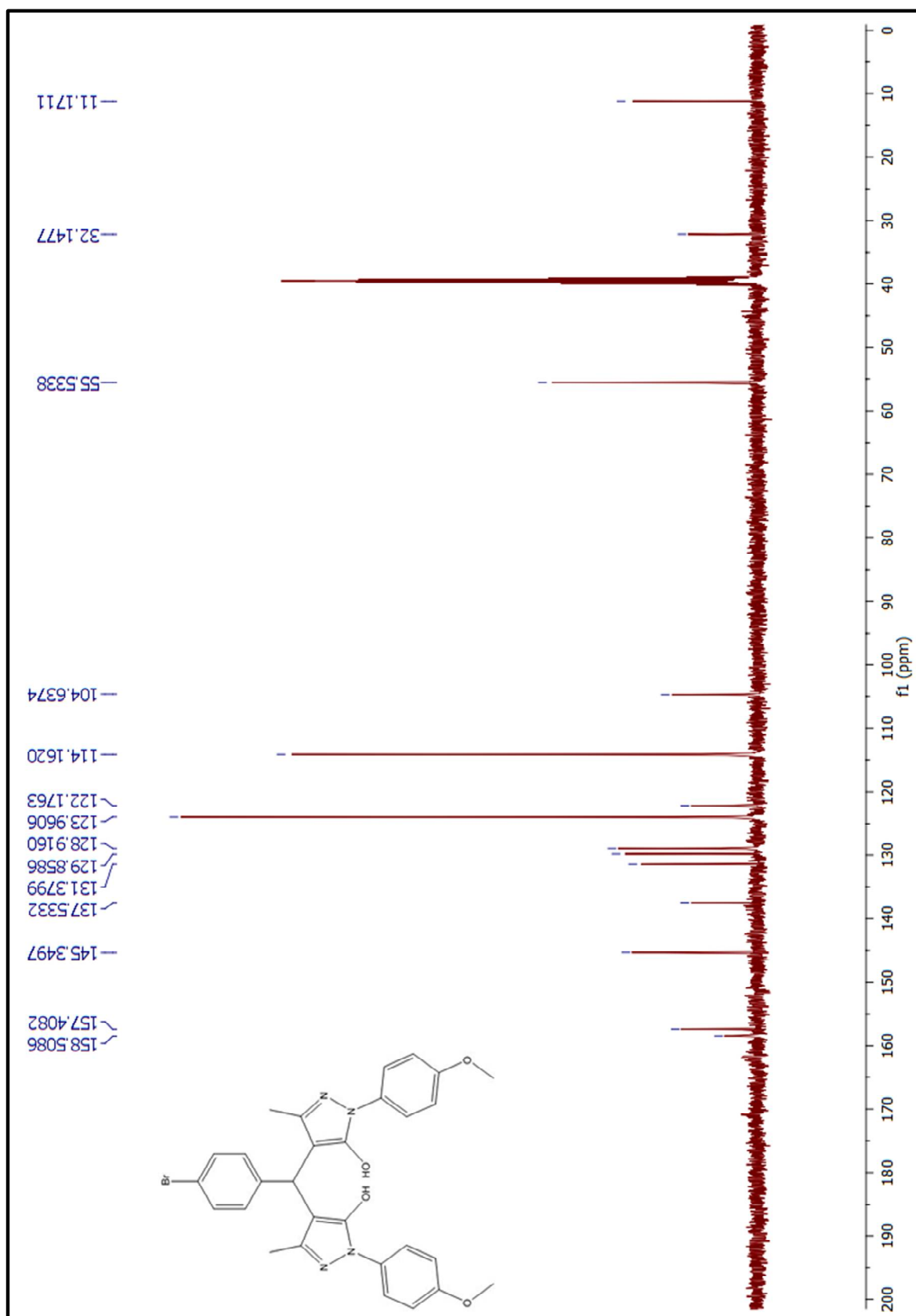


Figure 89. ^{13}C -NMR spectrum of compound (6bh)

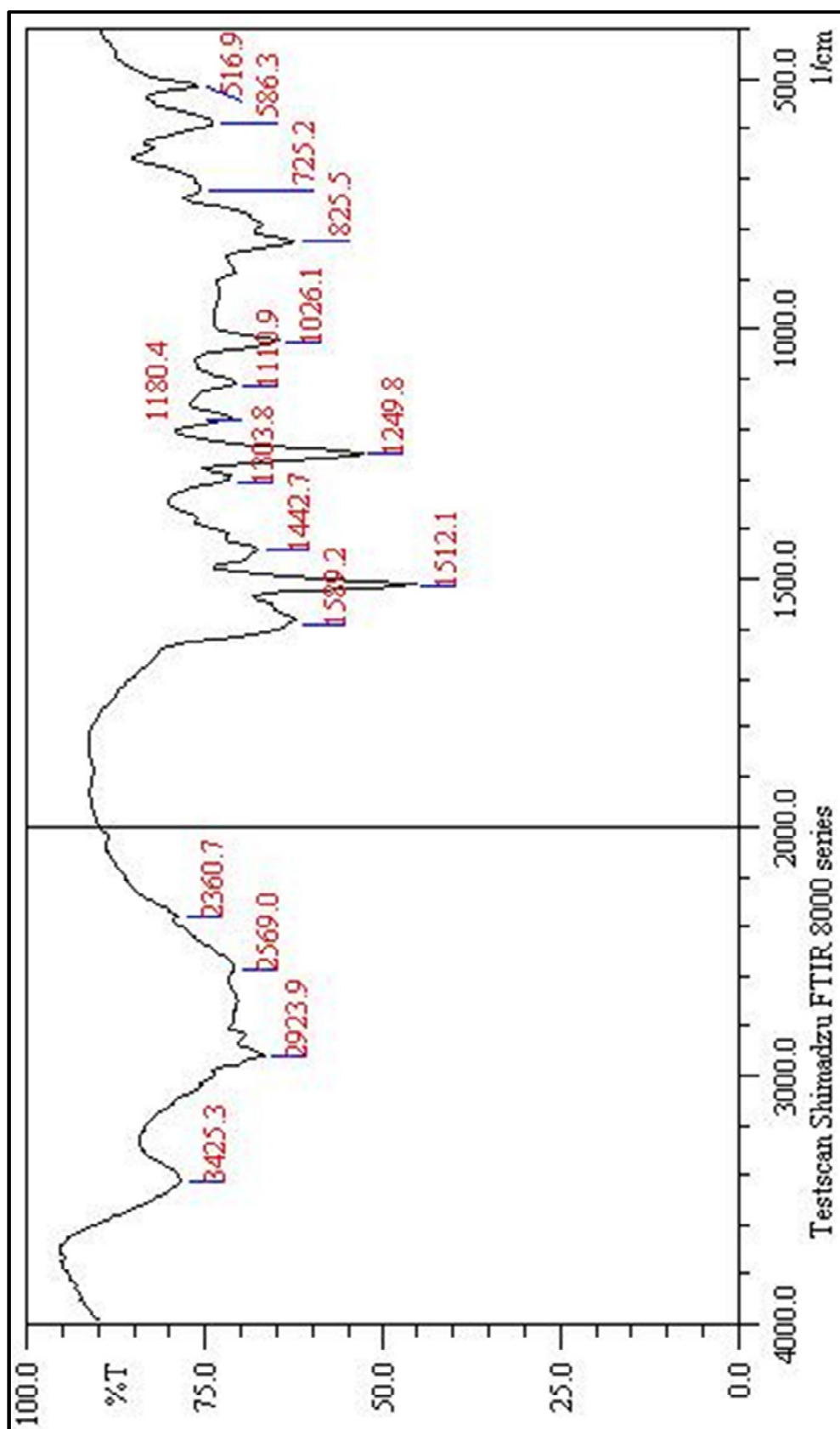


Figure 90. FT-IR spectrum of compound (6bi)

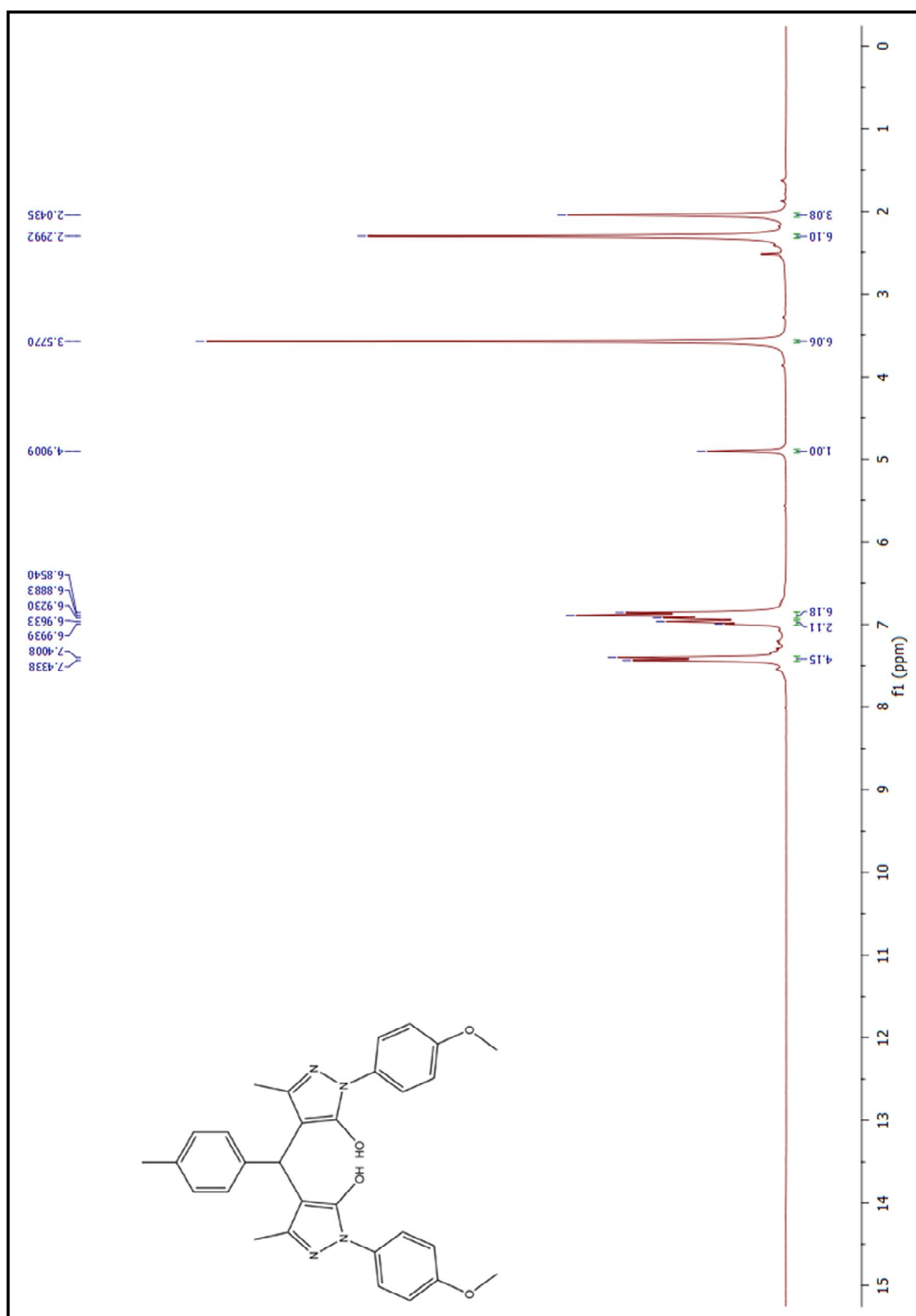


Figure 91. ^1H -NMR spectrum of compound (6bi)

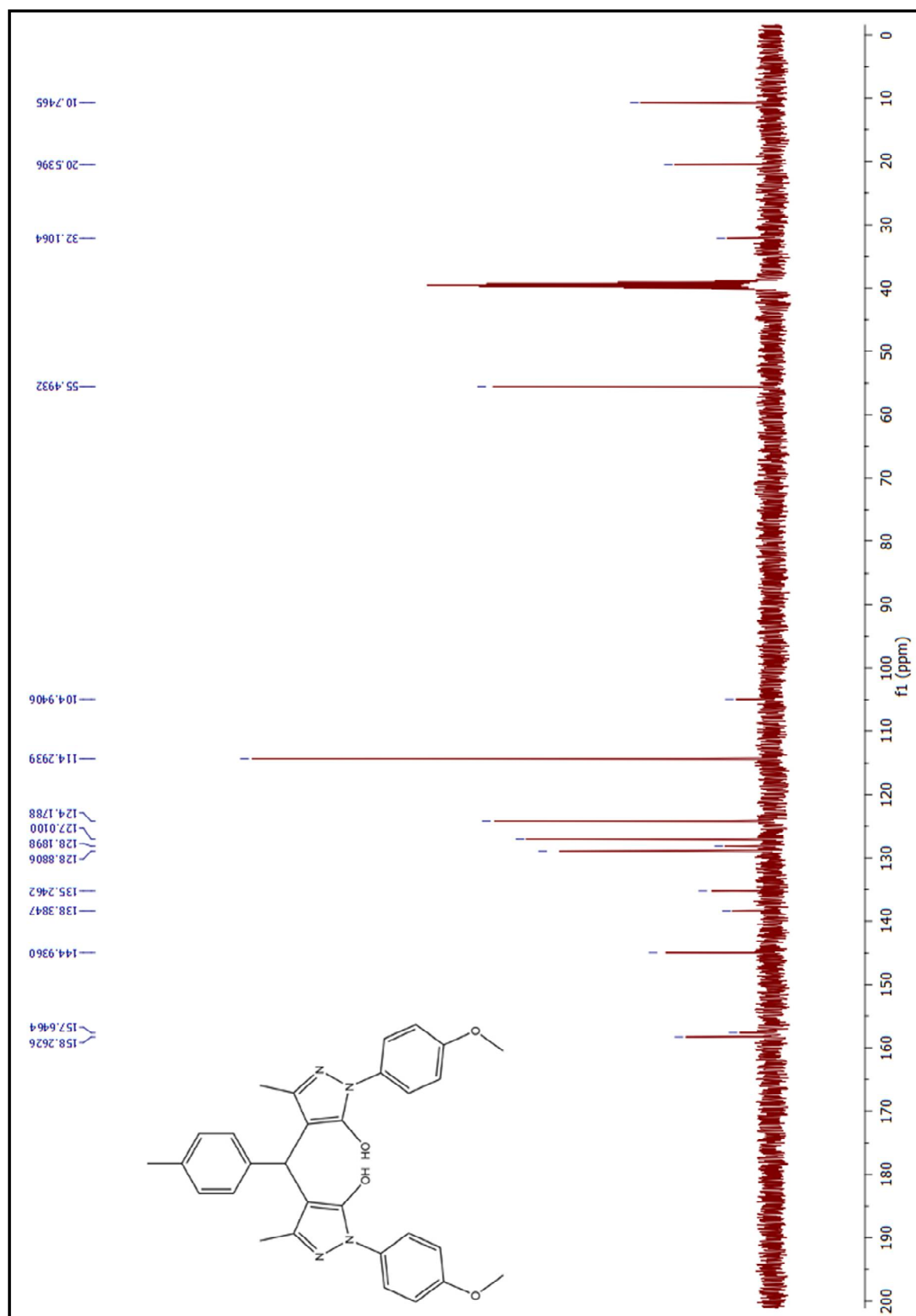


Figure 92. ^{13}C -NMR spectrum of compound (6bi)

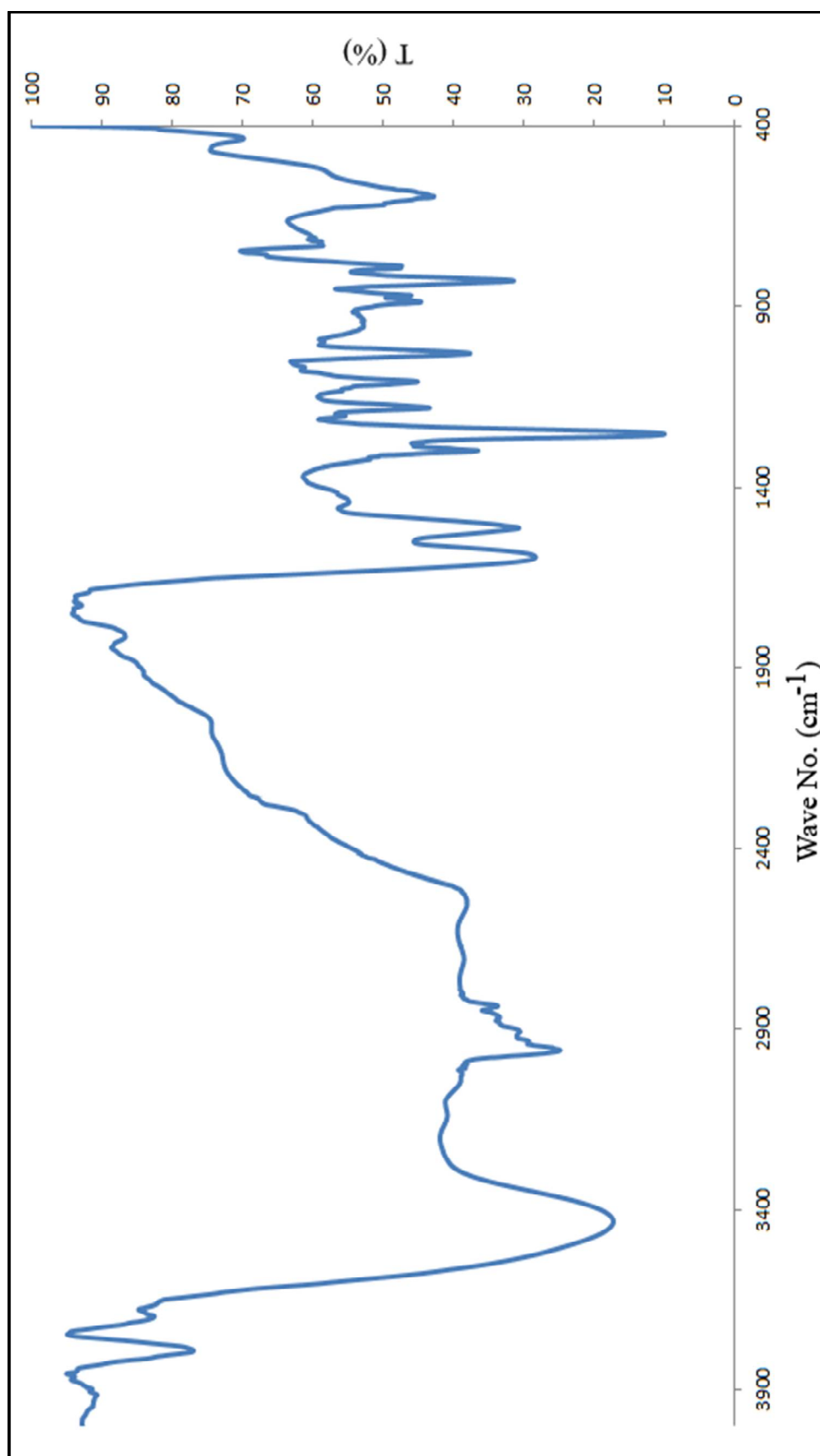


Figure 93. FT-IR spectrum of compound (6bj)

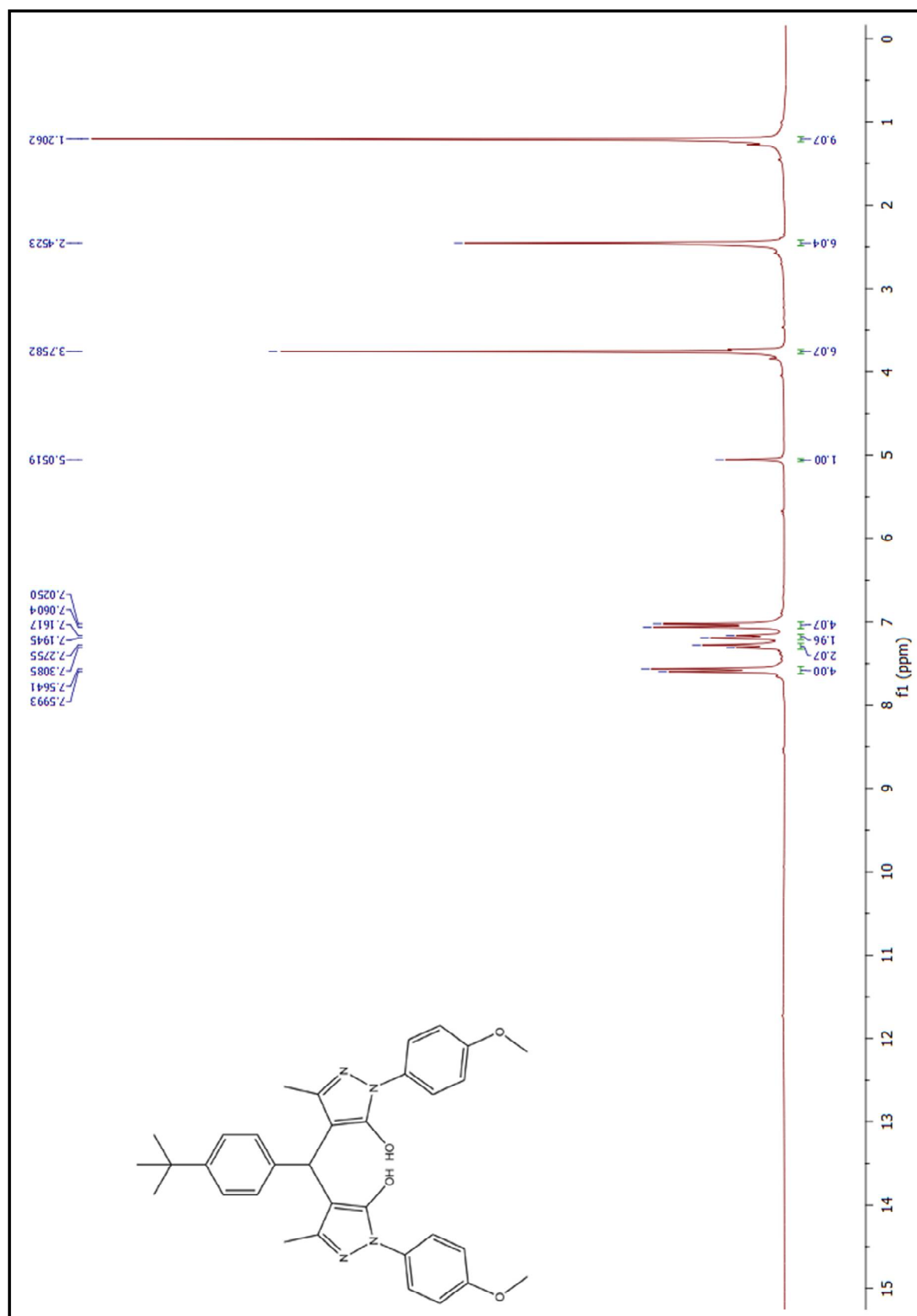


Figure 94. ¹H-NMR spectrum of compound (6bj)

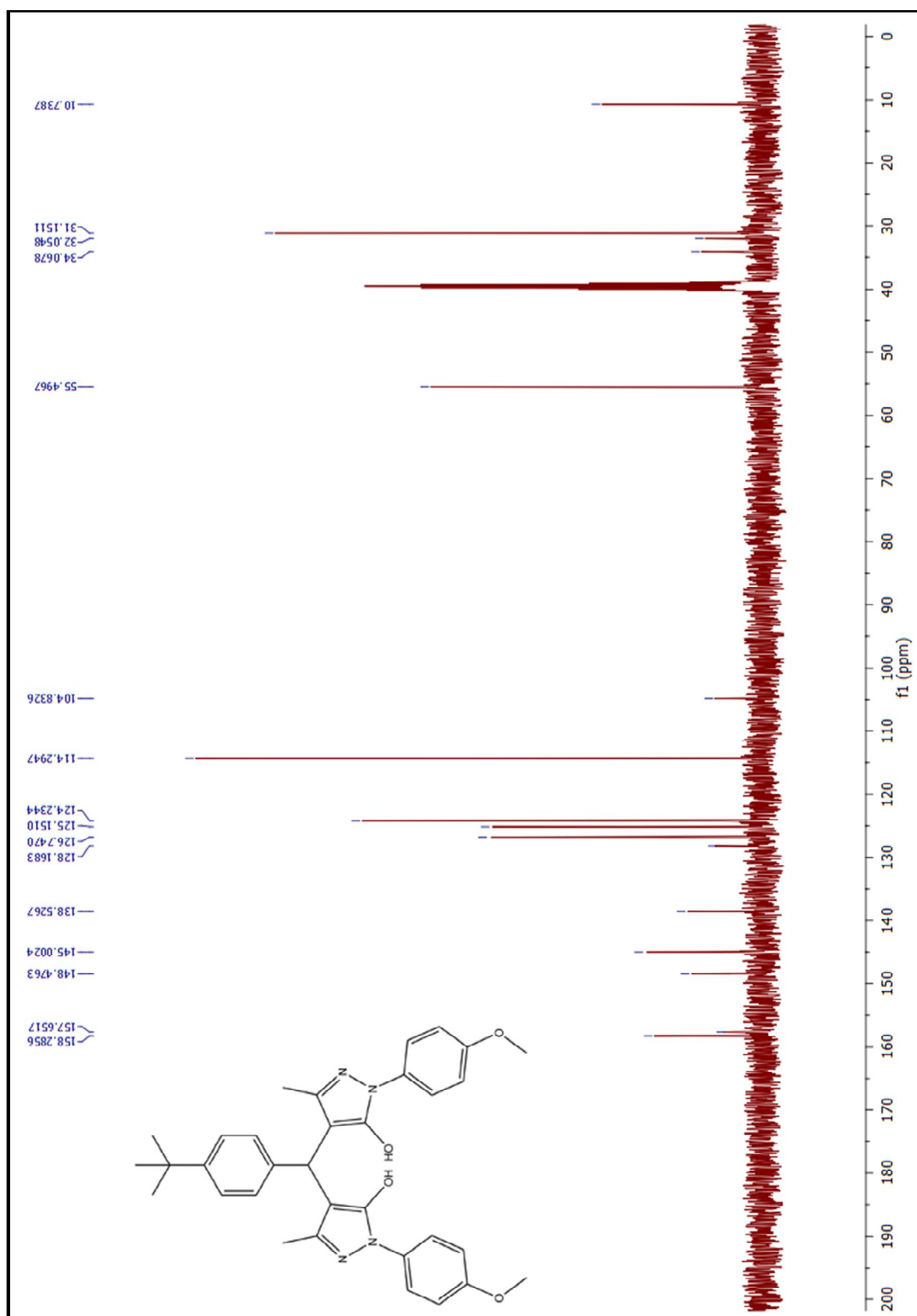


Figure 95. ^{13}C -NMR spectrum of compound (6bj)

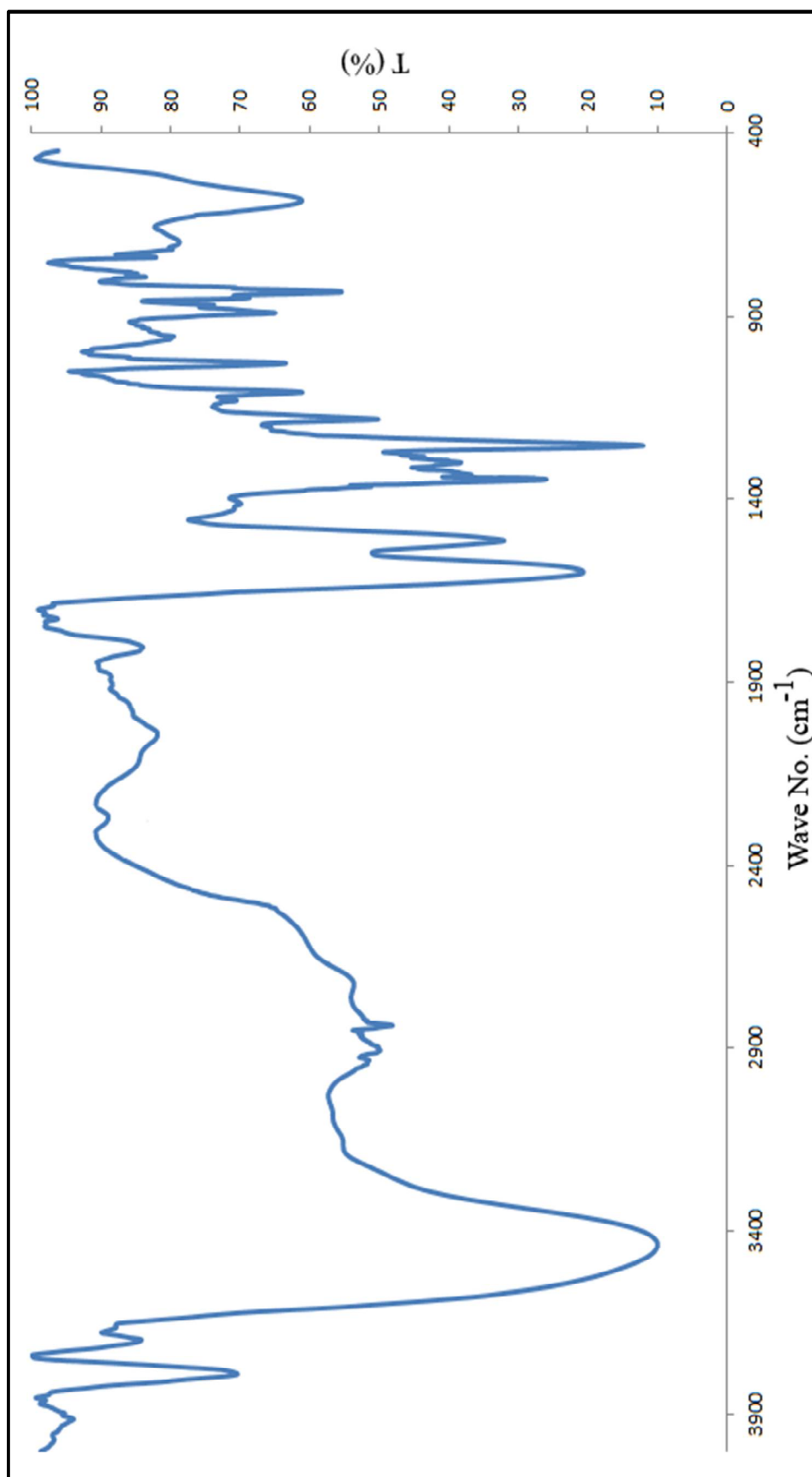


Figure 96. FT-IR spectrum of compound (6bk)

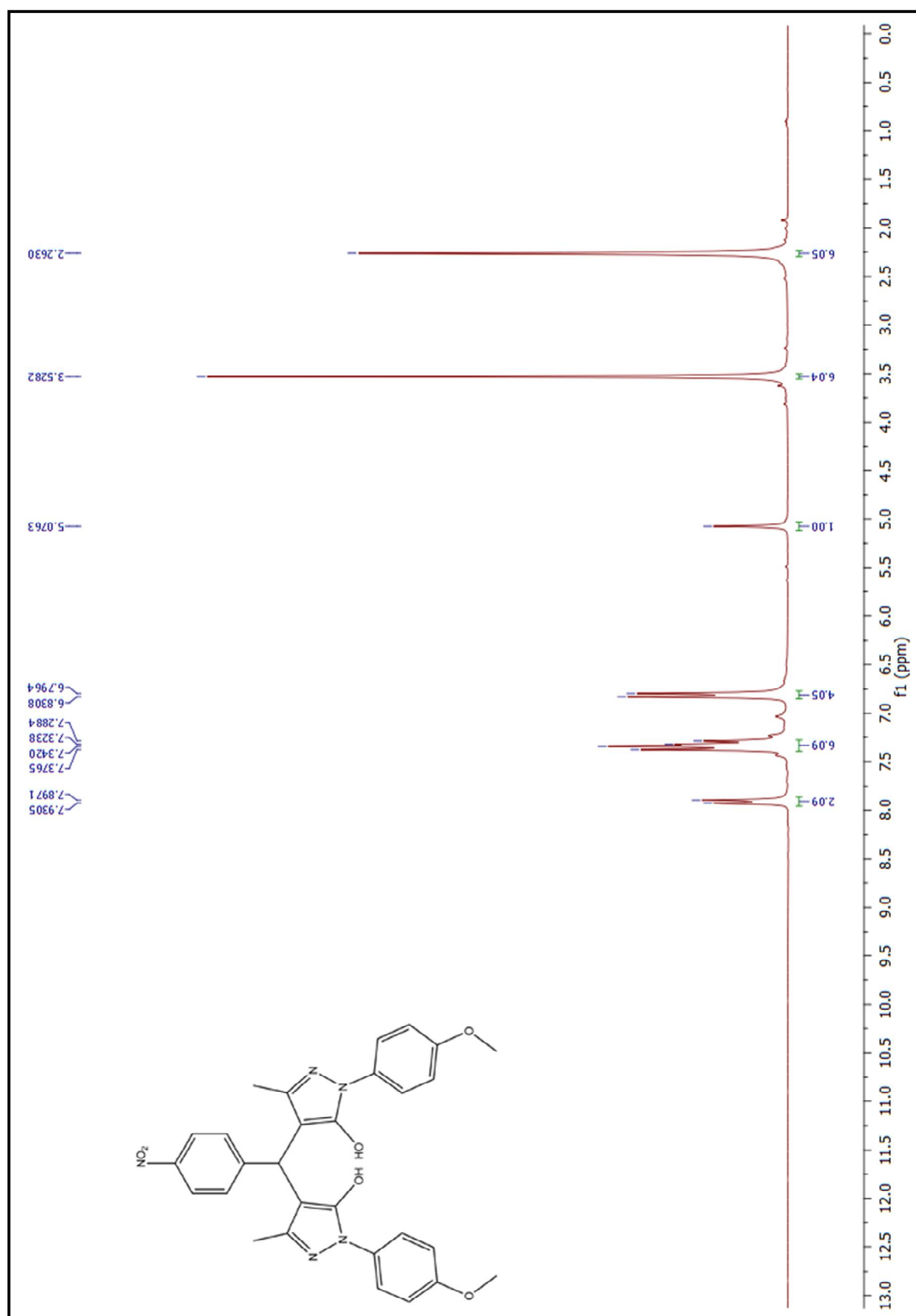


Figure 97. ^1H -NMR spectrum of compound (6bk)

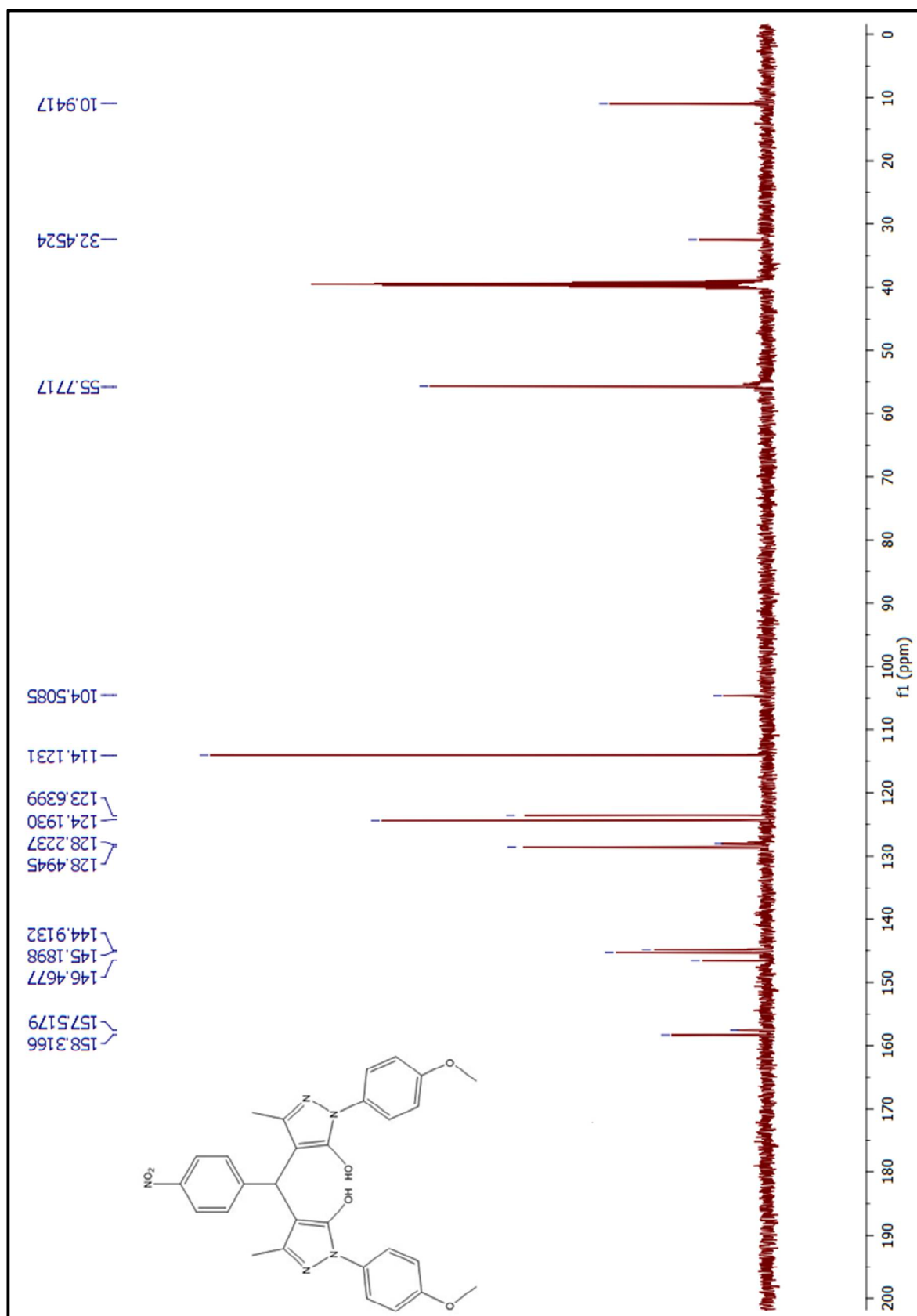


Figure 98. ^{13}C -NMR spectrum of compound (6bk)

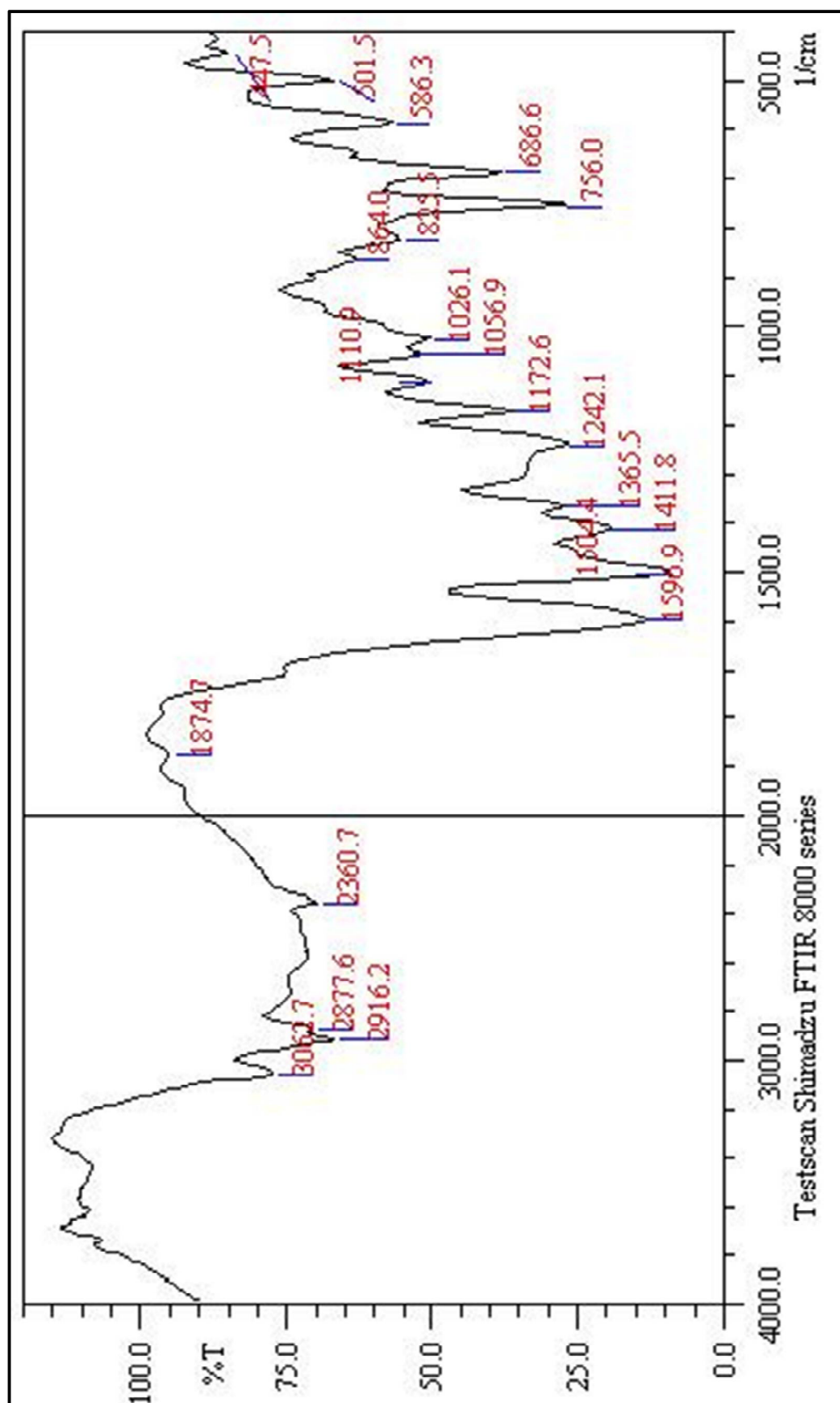


Figure 99. FT-IR spectrum of compound (6bl)

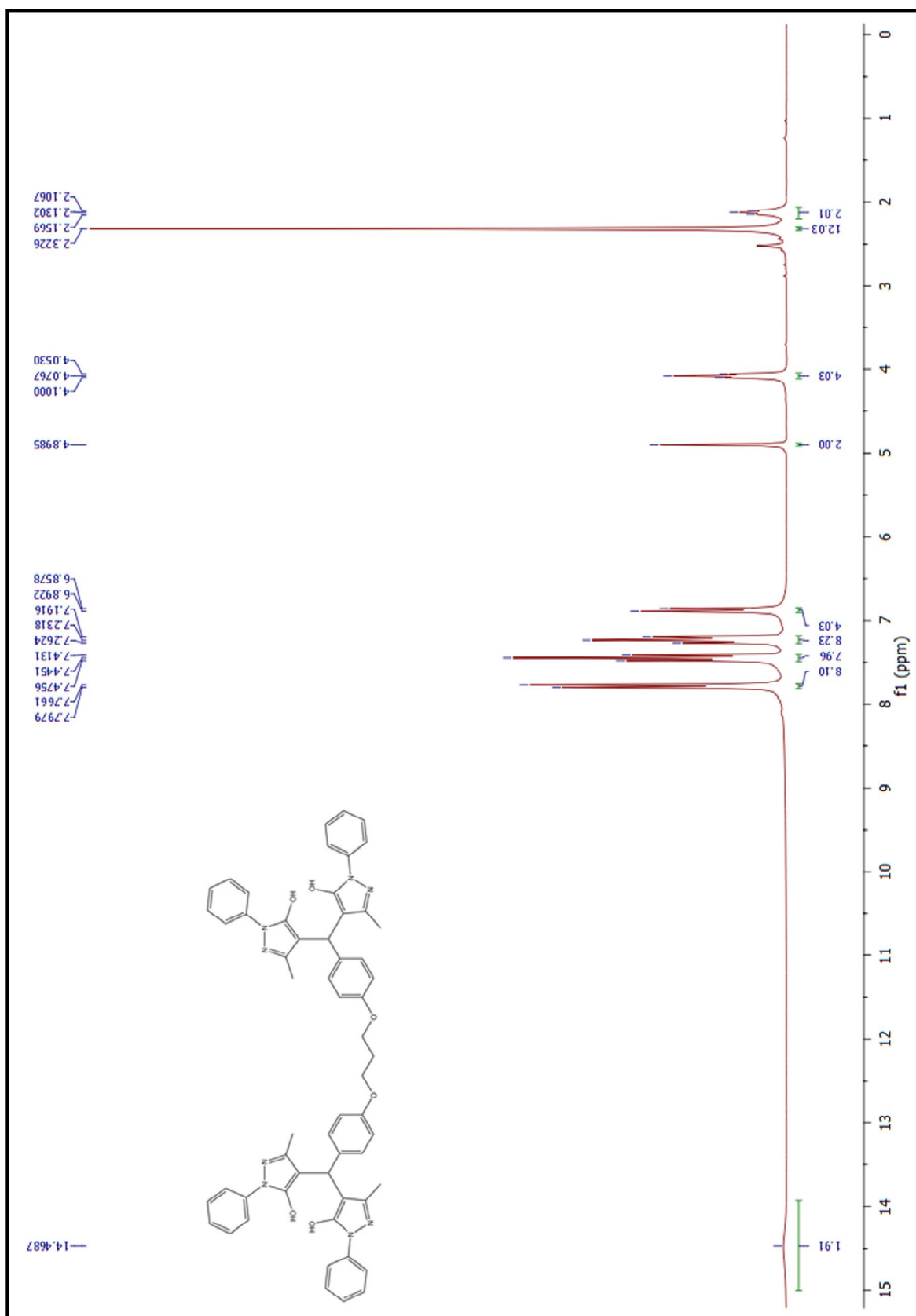
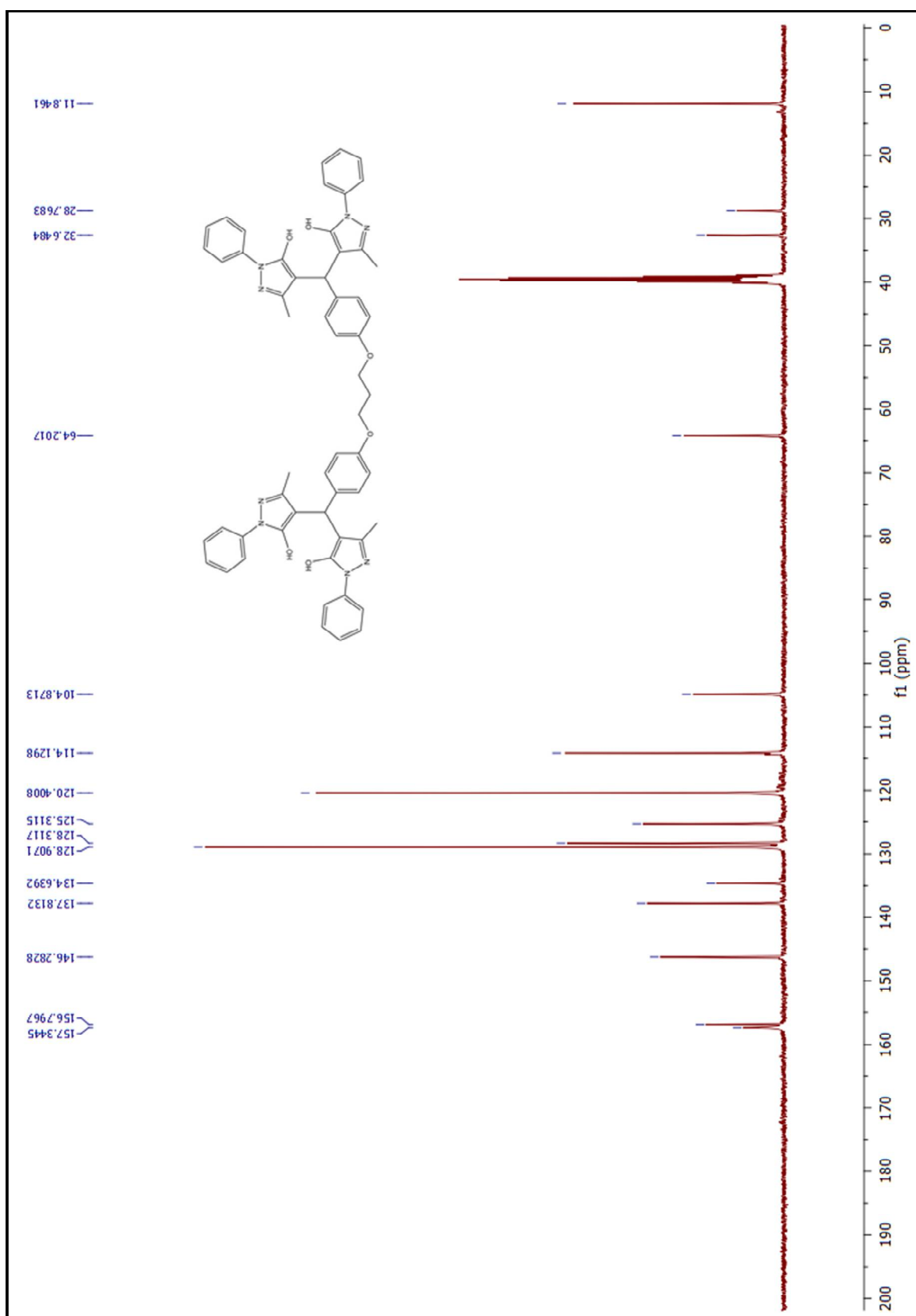


Figure 100. ¹H-NMR spectrum of compound (6bl)



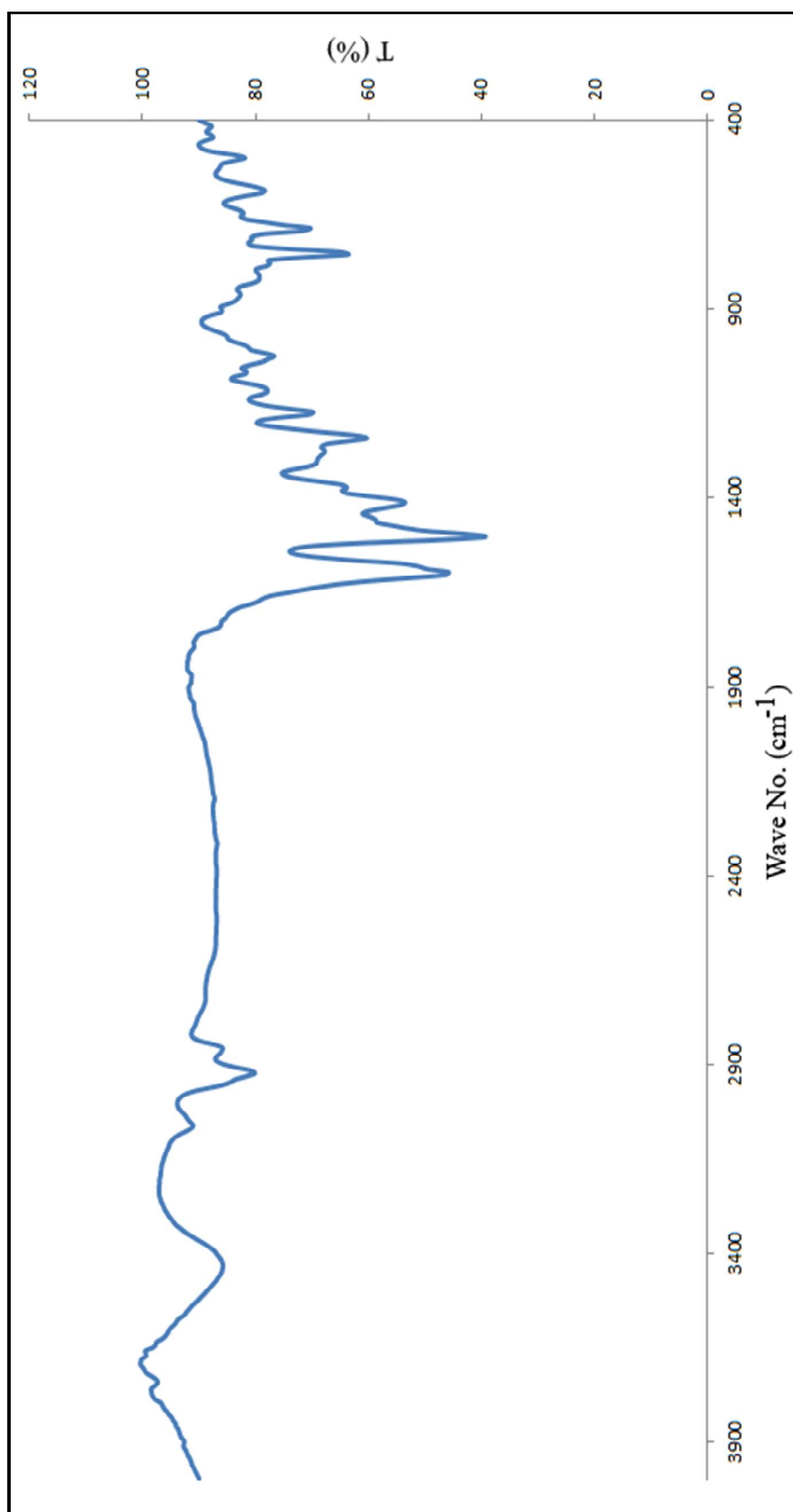


Figure 102. FT-IR spectrum of compound (6bm)

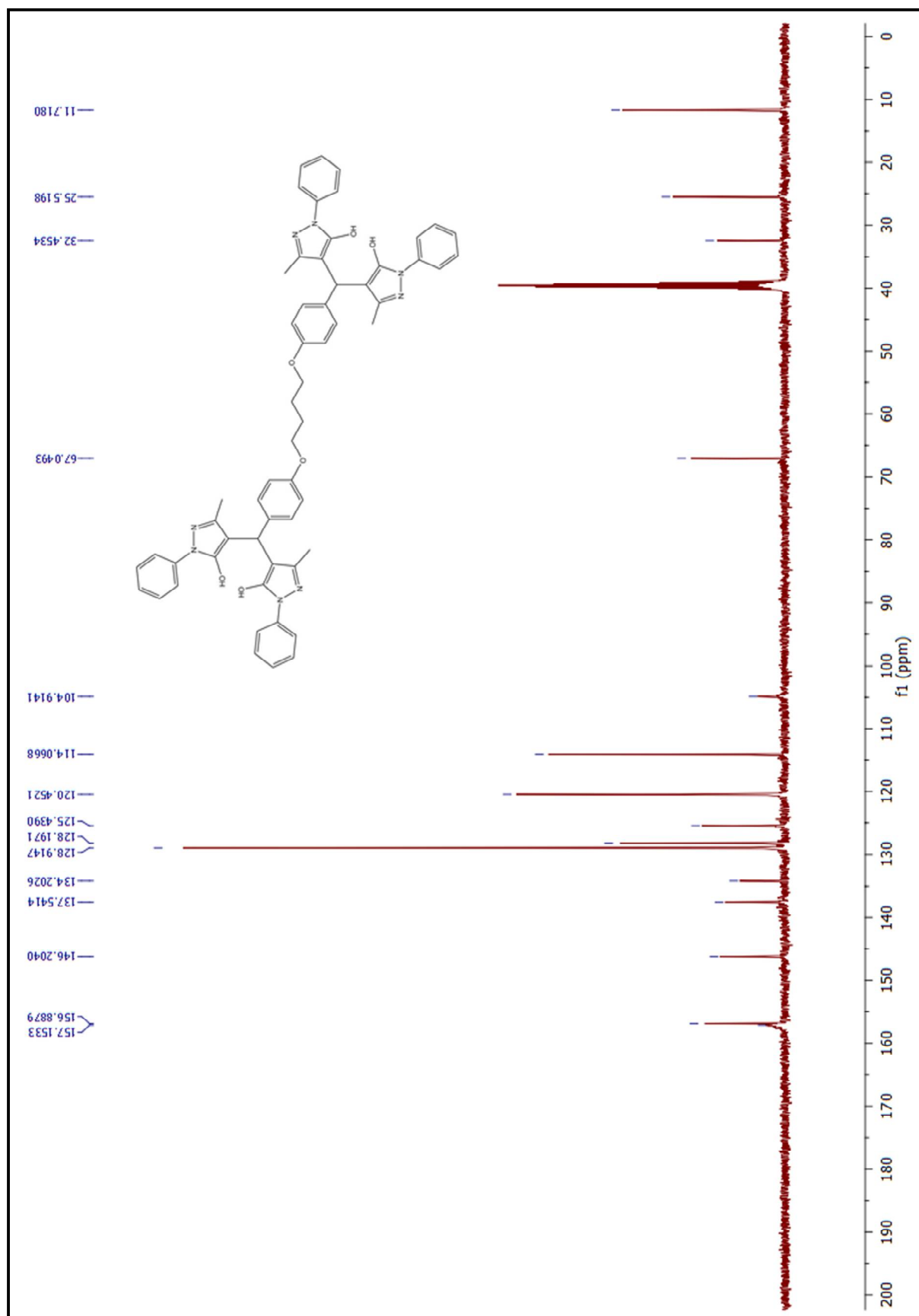


Figure 104. ^{13}C -NMR spectrum of compound (6bm)

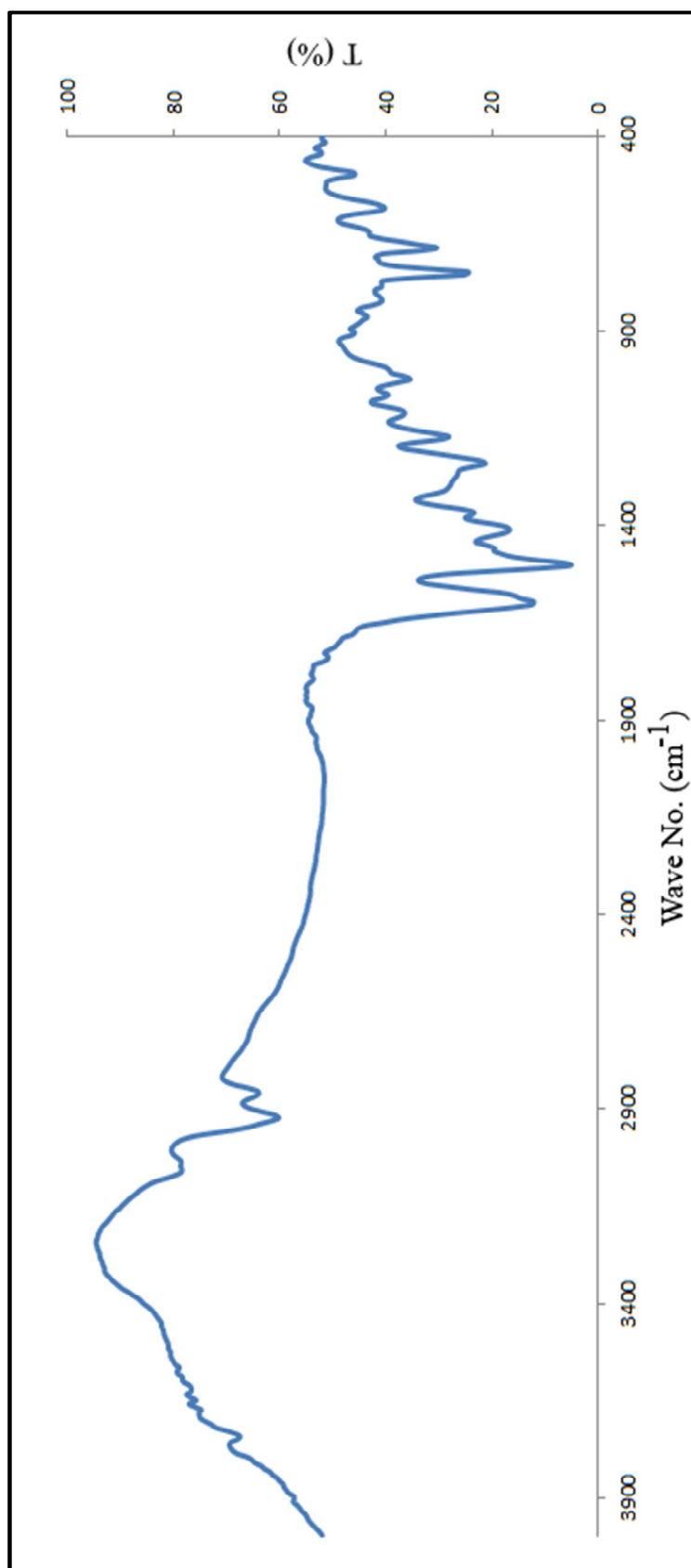


Figure 105. FT-IR spectrum of compound (6bn)

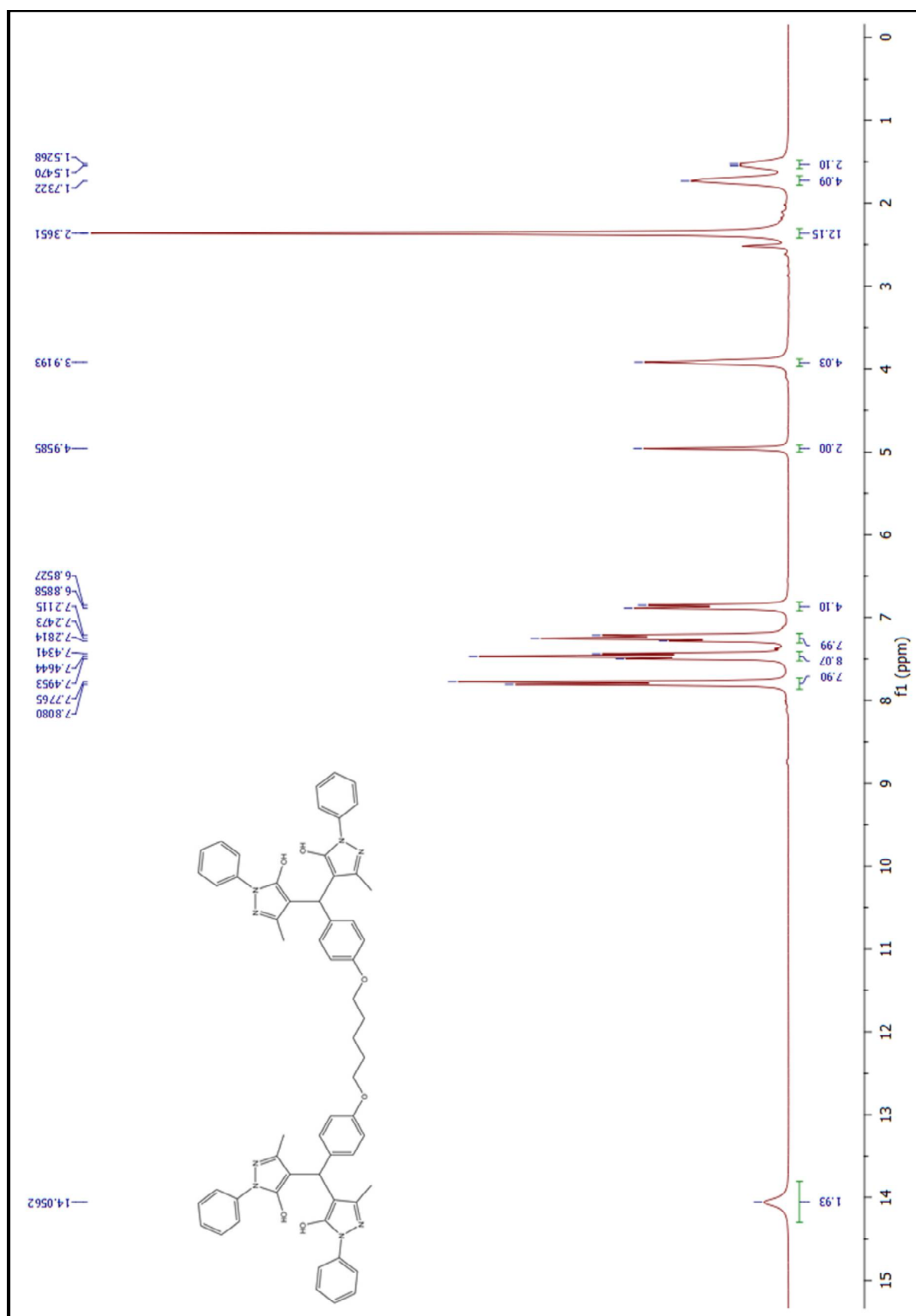


Figure 106. ^1H -NMR spectrum of compound (6bn)

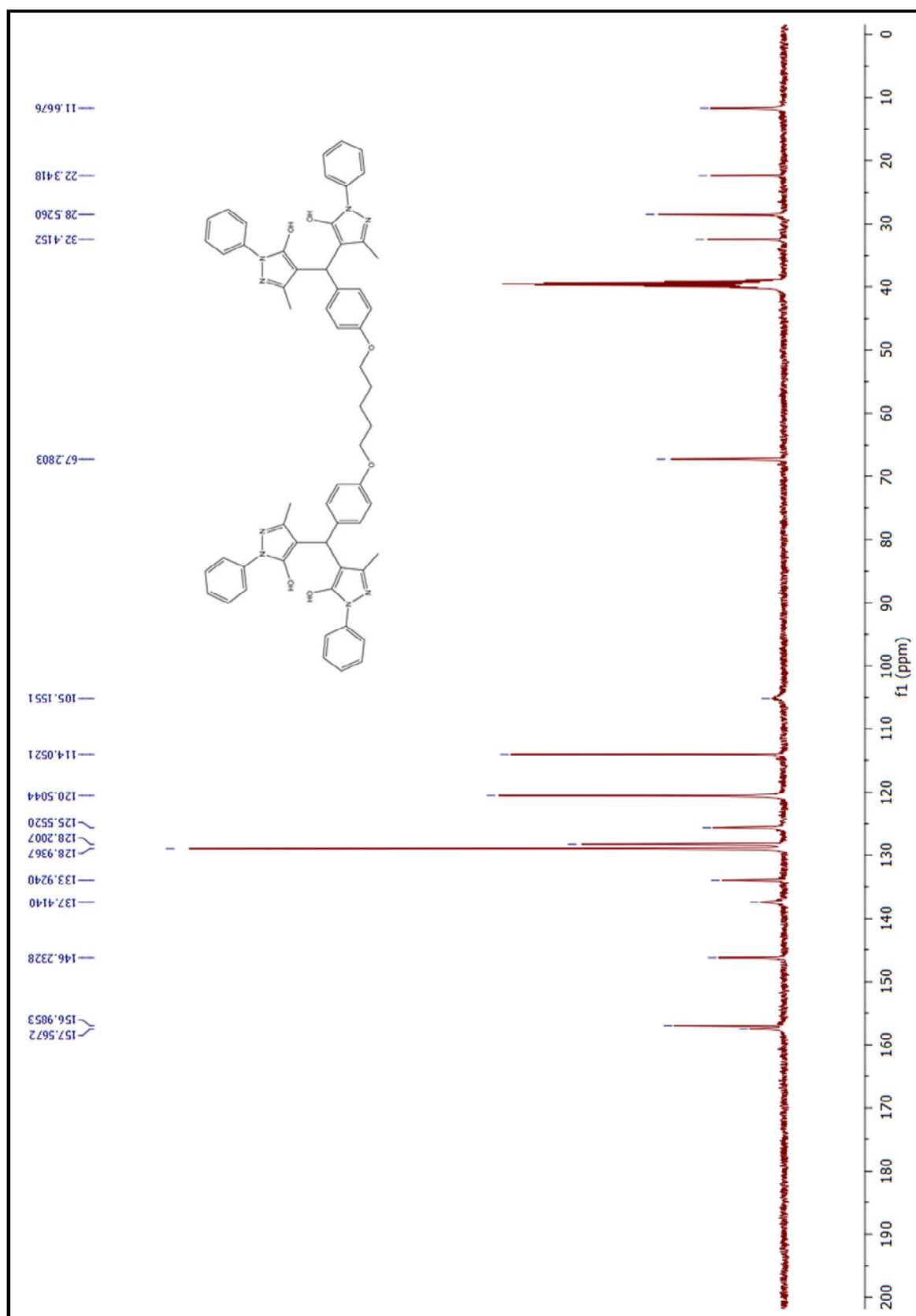


Figure 107. ^{13}C -NMR spectrum of compound (6bn)

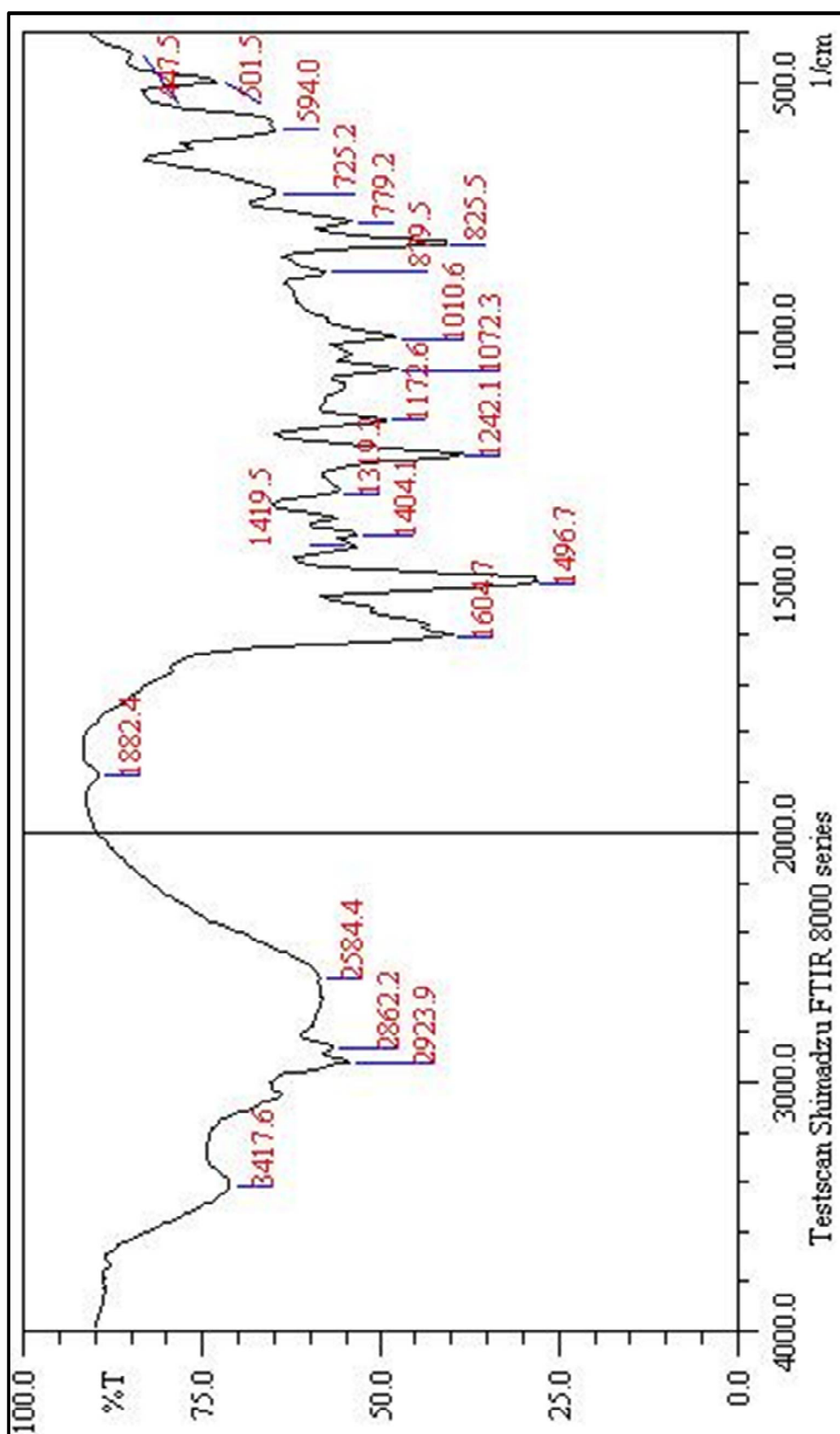


Figure 108. FT-IR spectrum of compound (6bo)

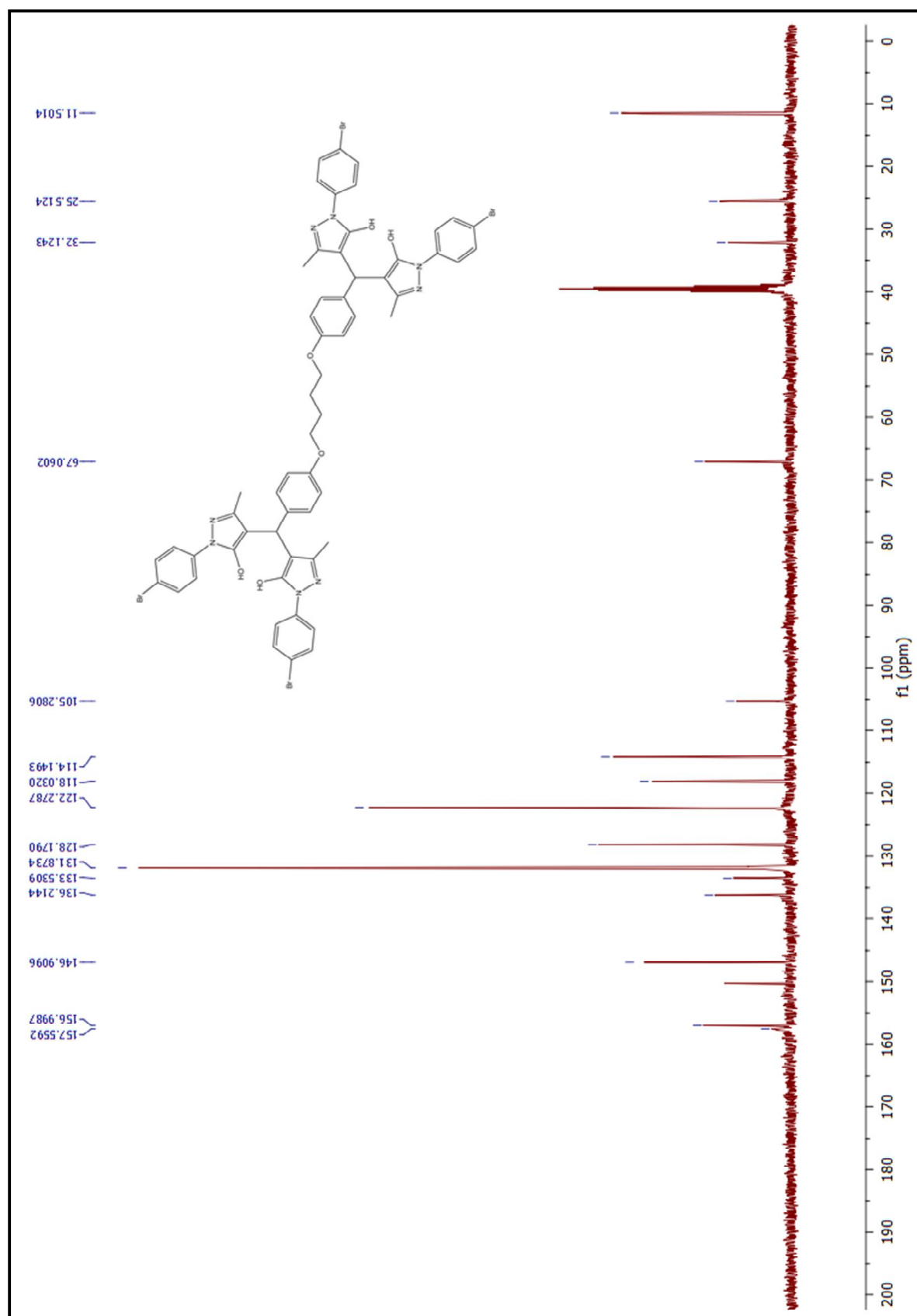


Figure 110. ^{13}C -NMR spectrum of compound (6bo)

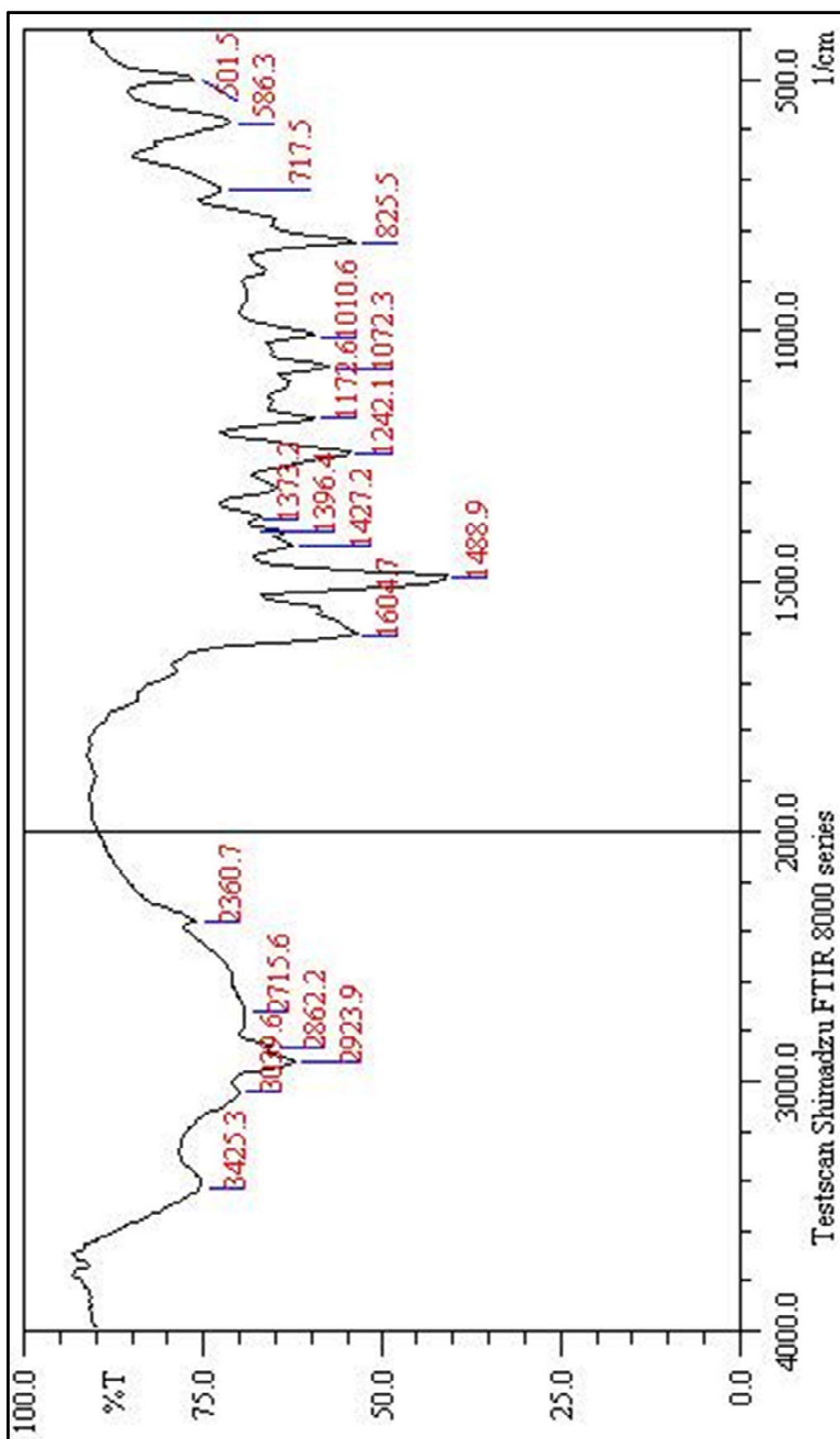


Figure 111. FT-IR spectrum of compound (6bp)

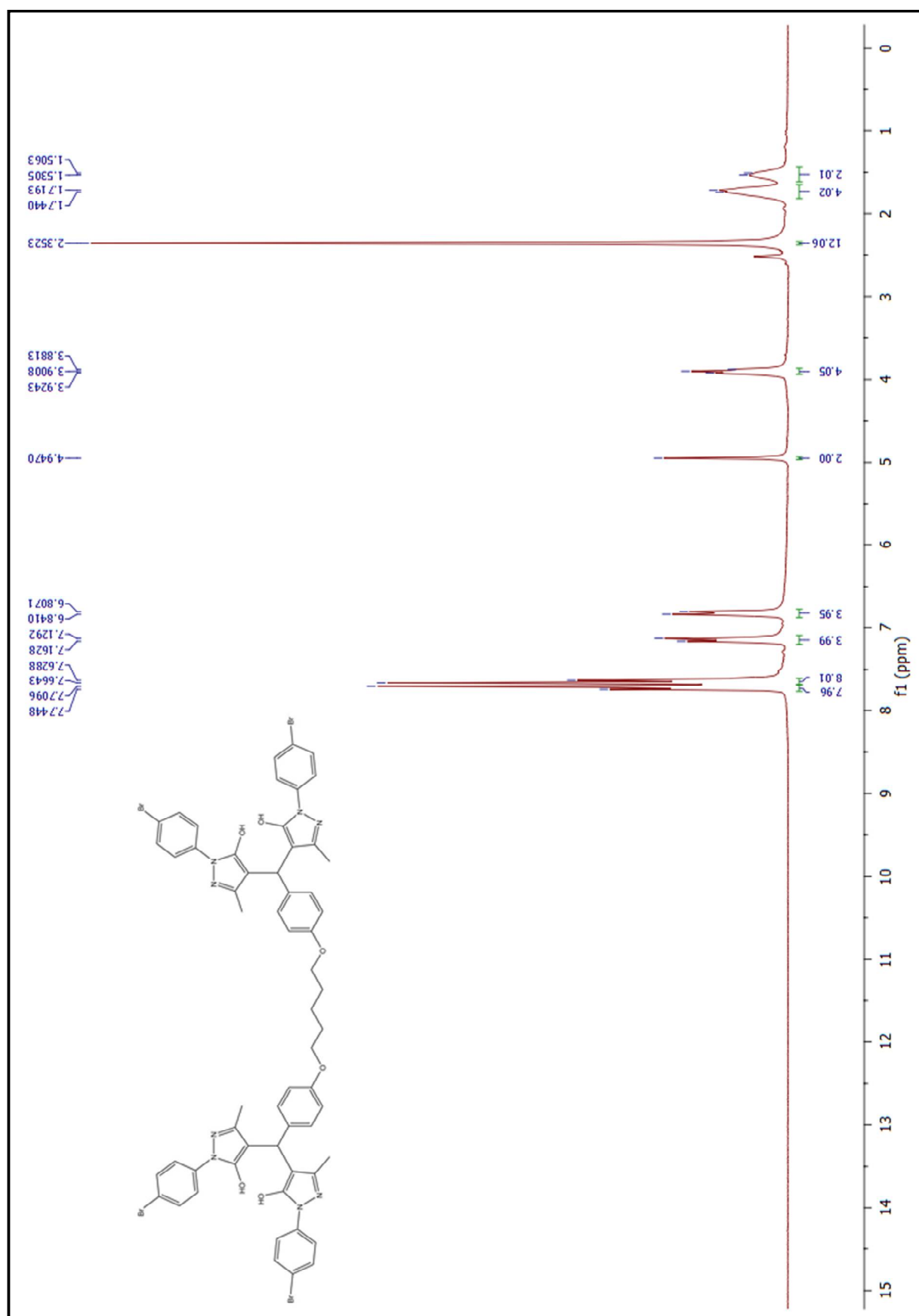


Figure 112. ^1H -NMR spectrum of compound (6bp)

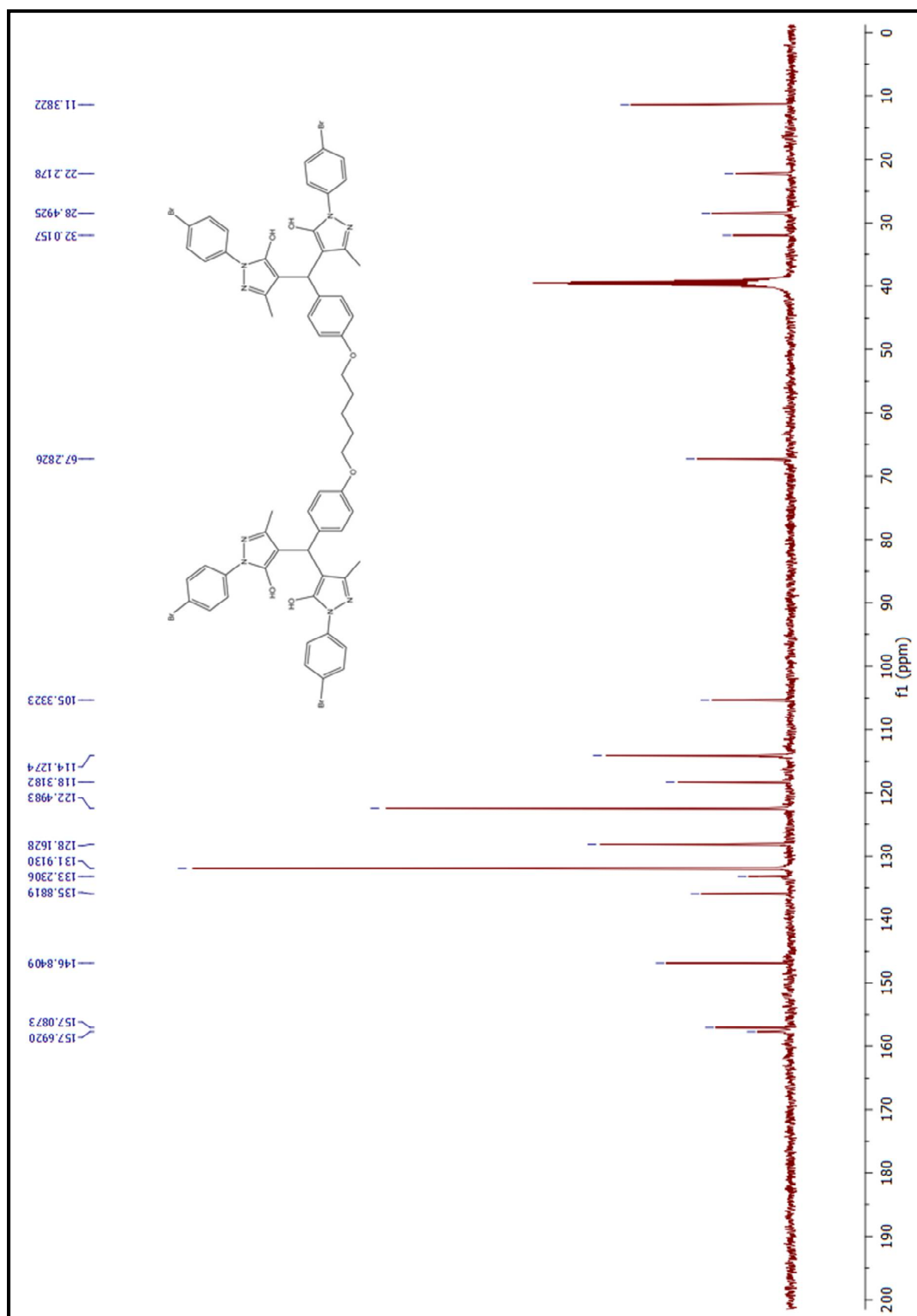


Figure 113. ^{13}C -NMR spectrum of compound (6bp)

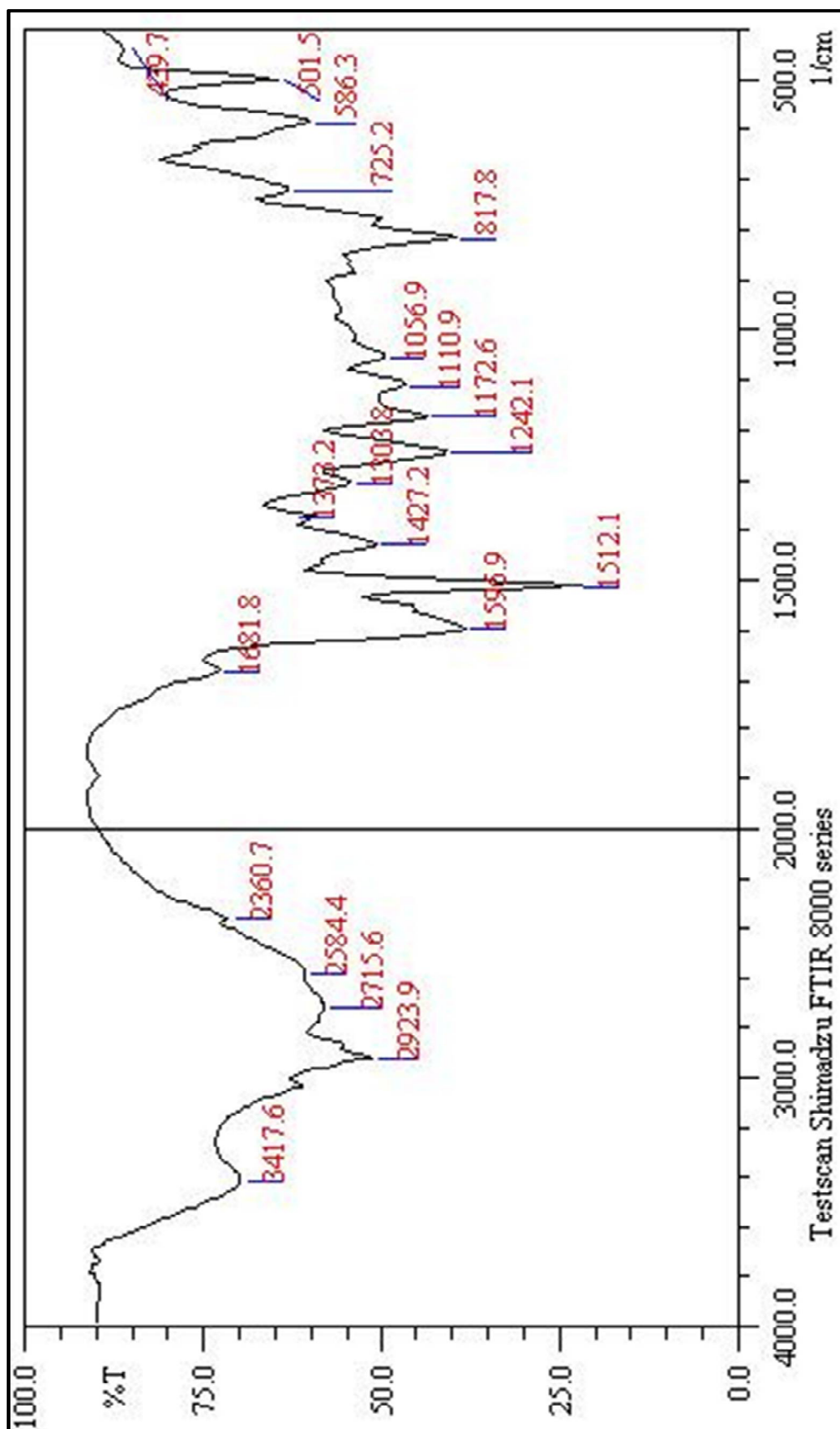


Figure 114. FT-IR spectrum of compound (6bq)

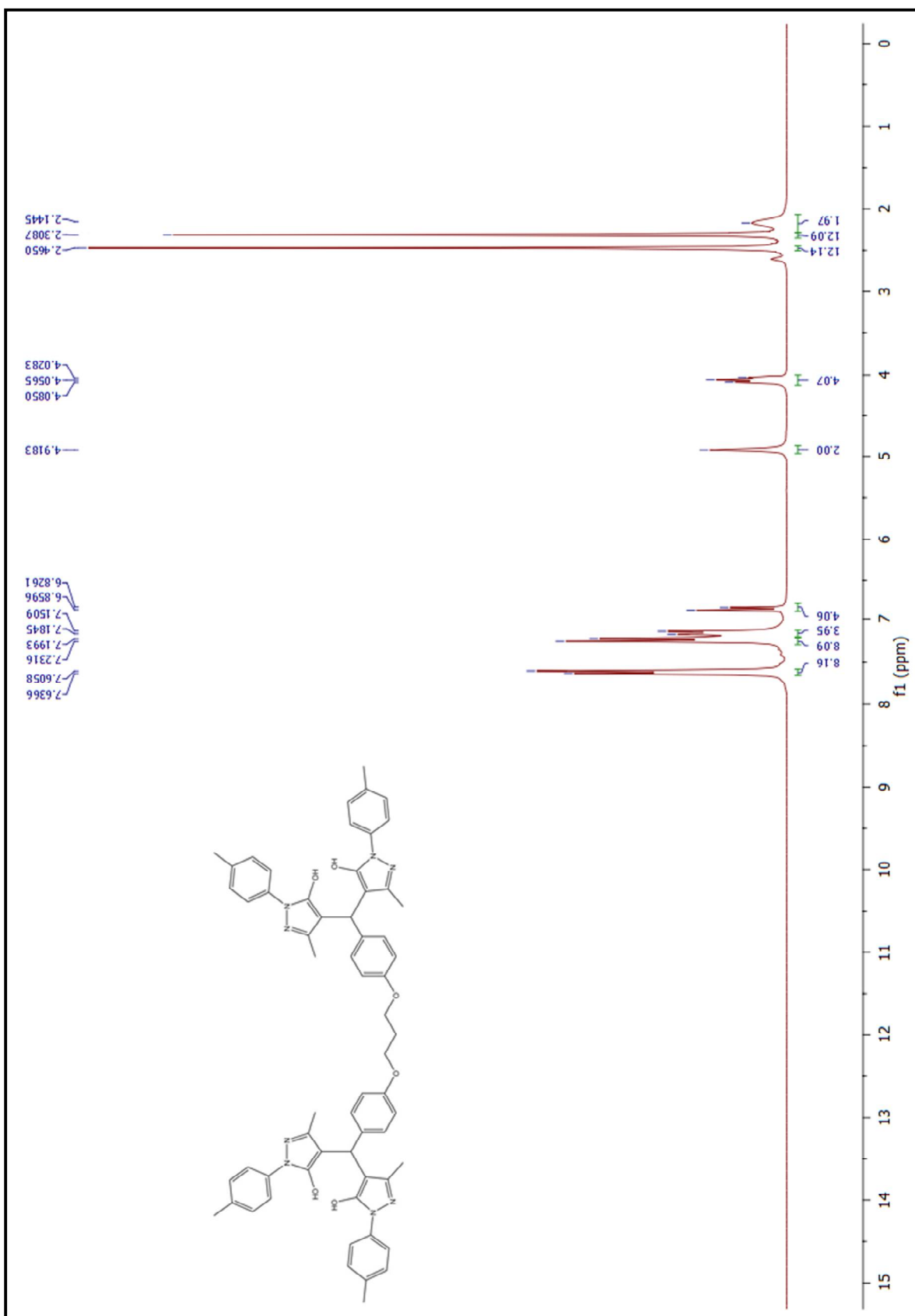


Figure 115. ^1H -NMR spectrum of compound (6bq)

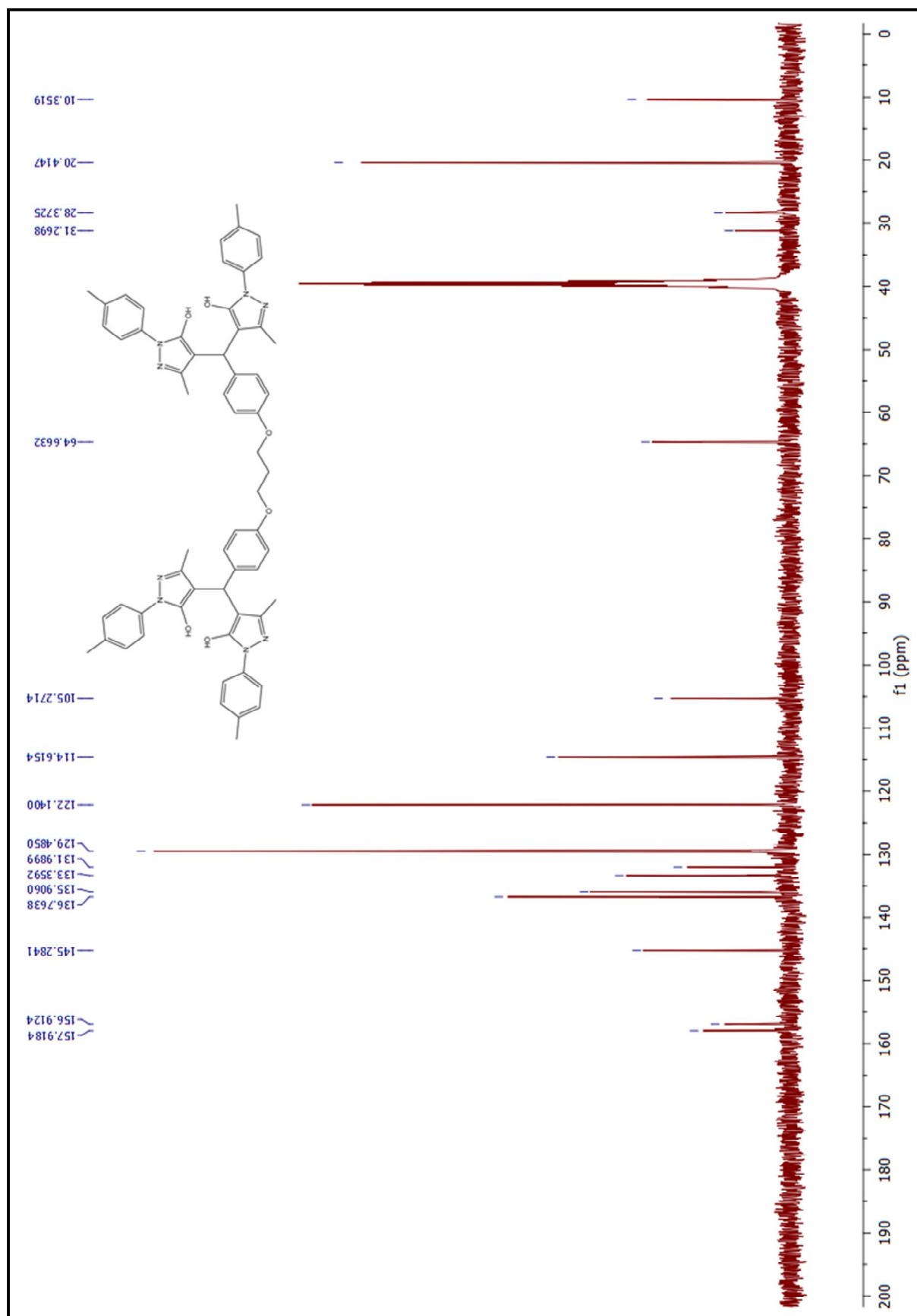


Figure 116. ^{13}C -NMR spectrum of compound (6bq)

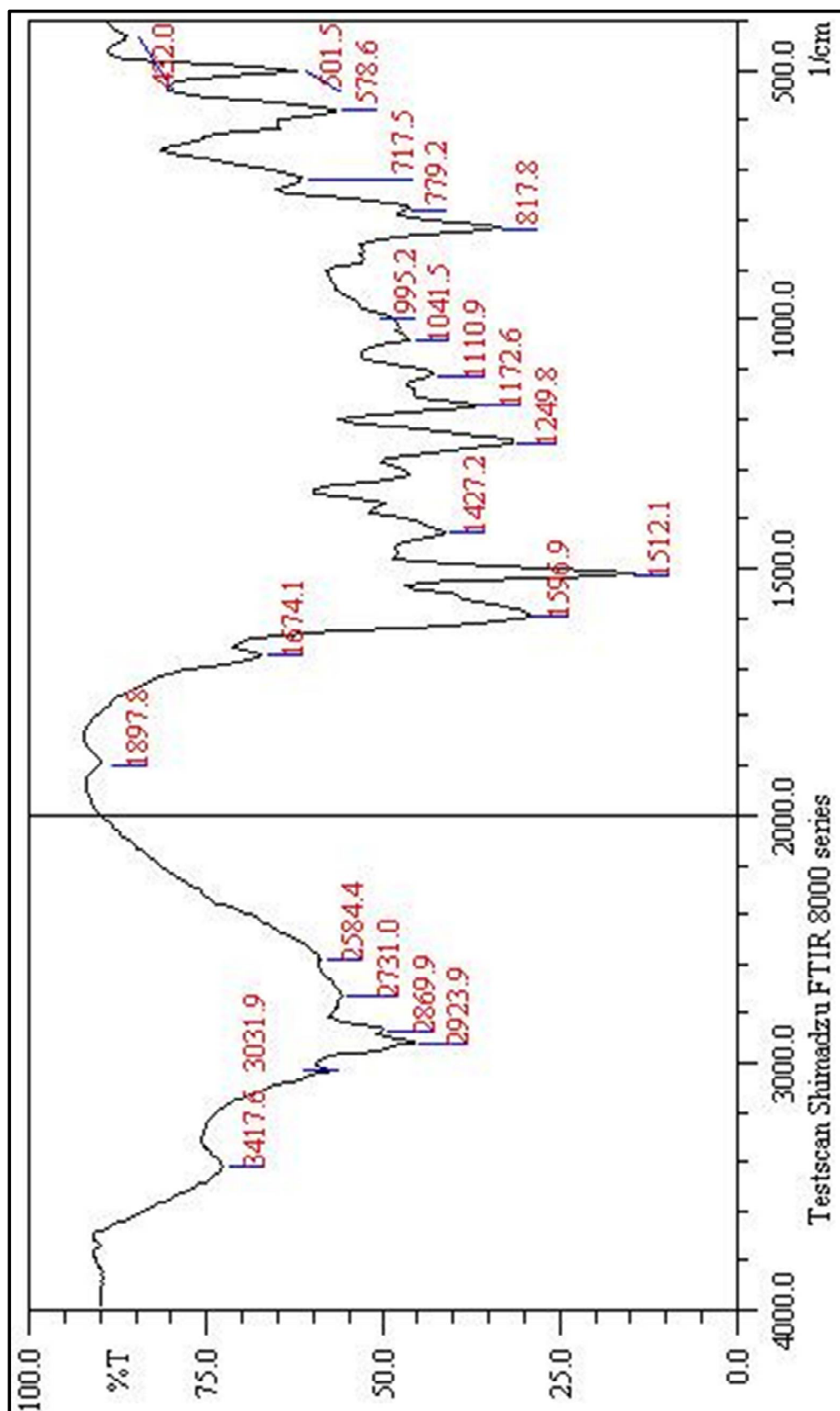


Figure 117. FT-IR spectrum of compound (6br)

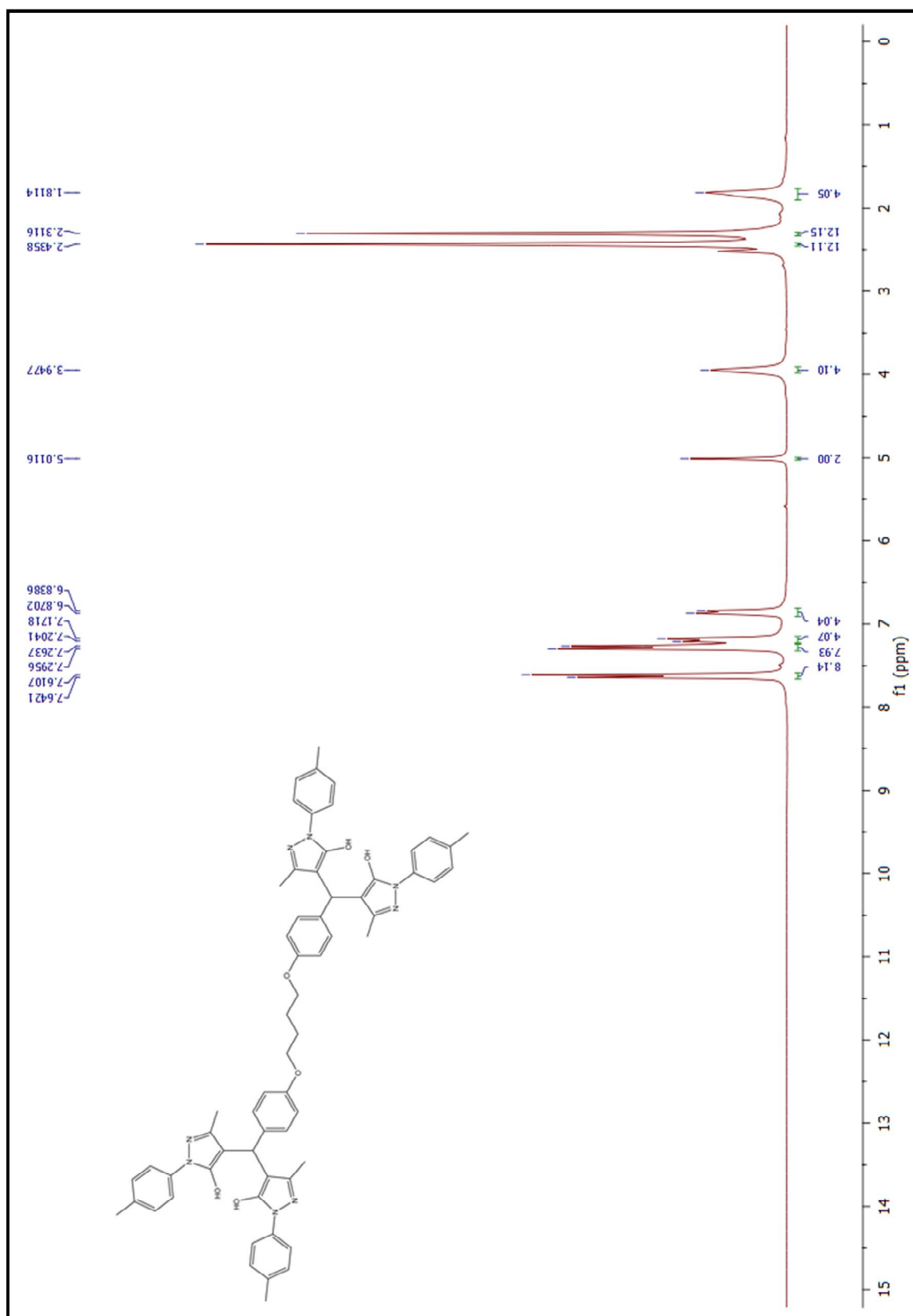


Figure 118. ¹H-NMR spectrum of compound (6br)

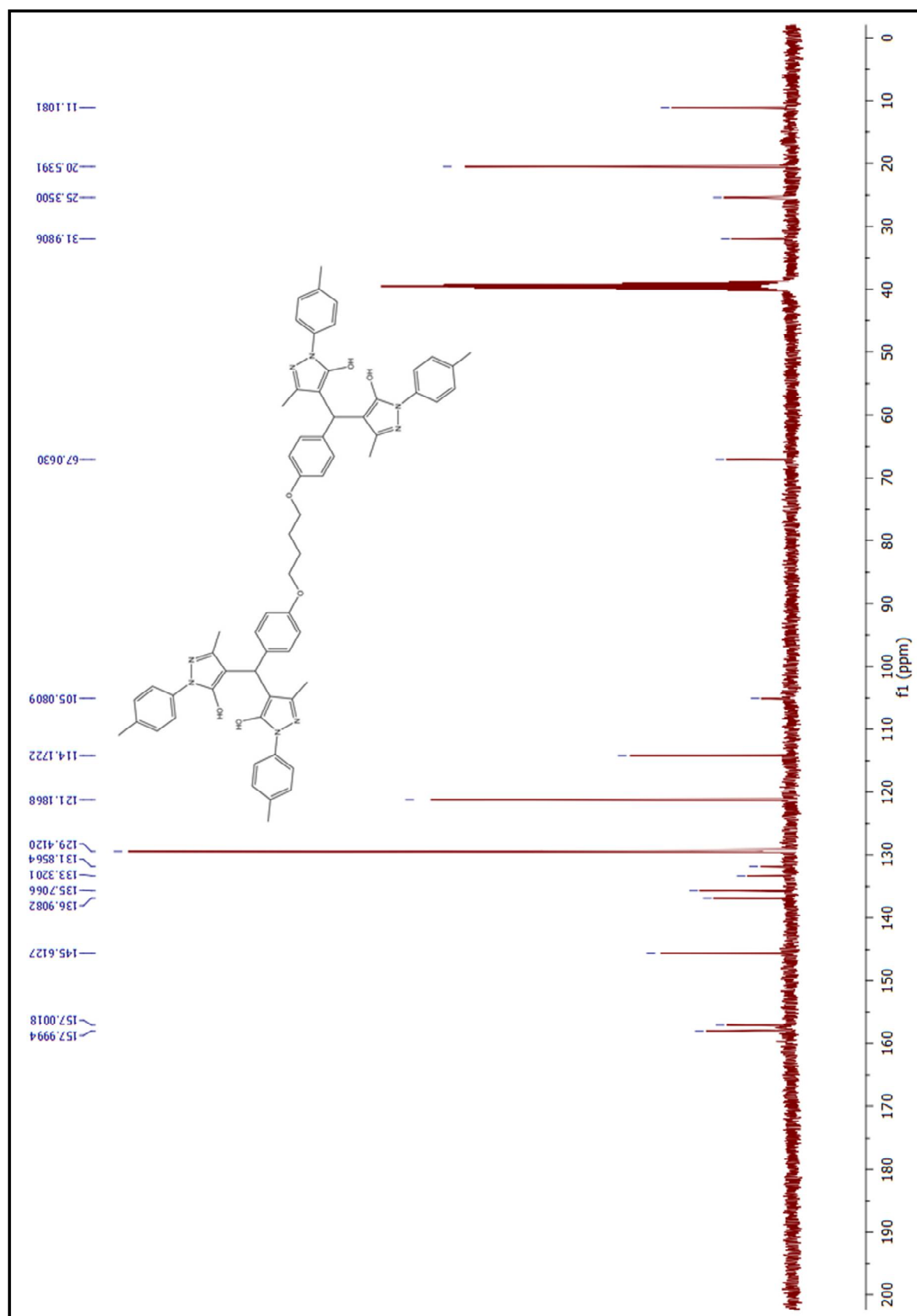


Figure 119. ^{13}C -NMR spectrum of compound (6br)

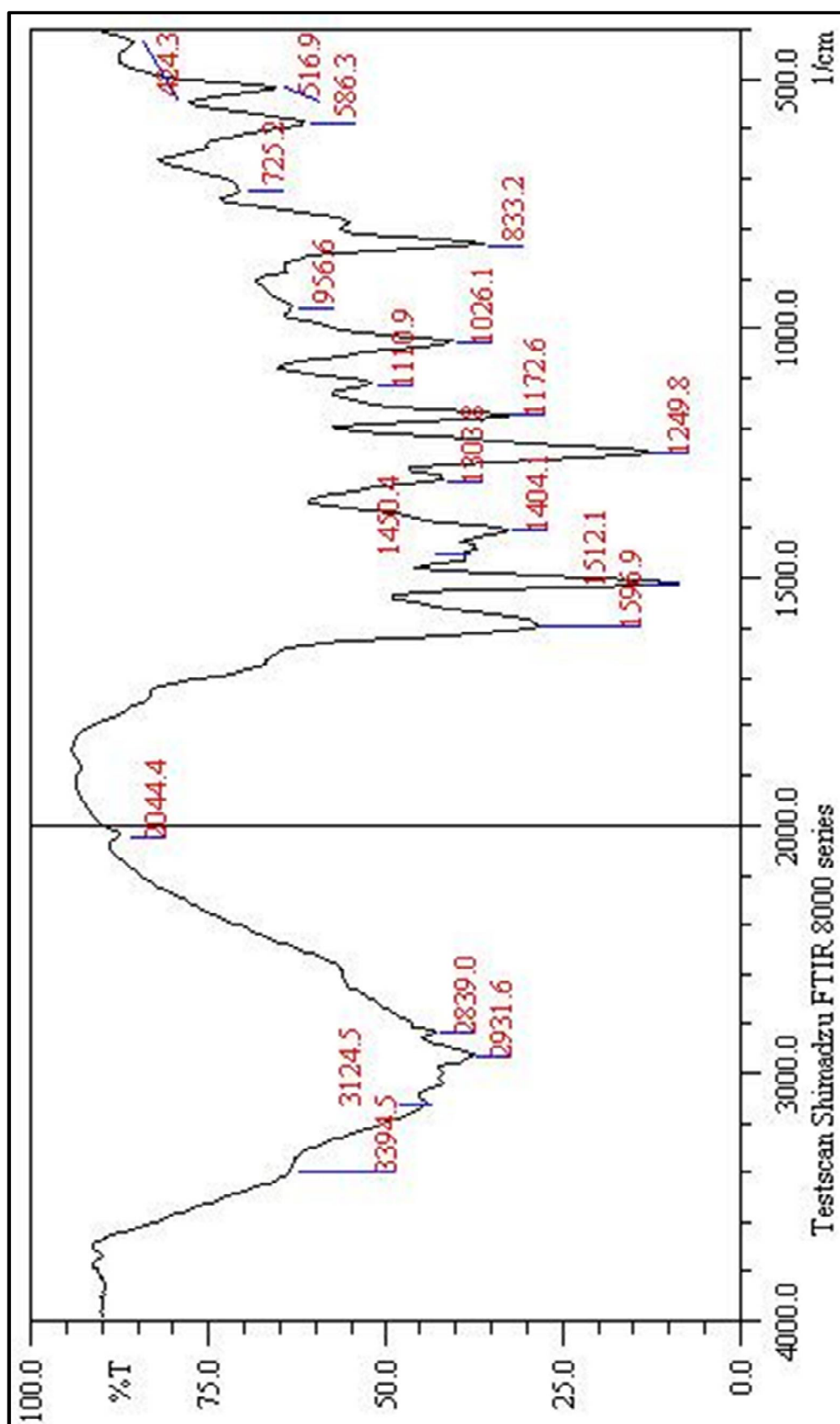


Figure 120. FT-IR spectrum of compound (6bs)

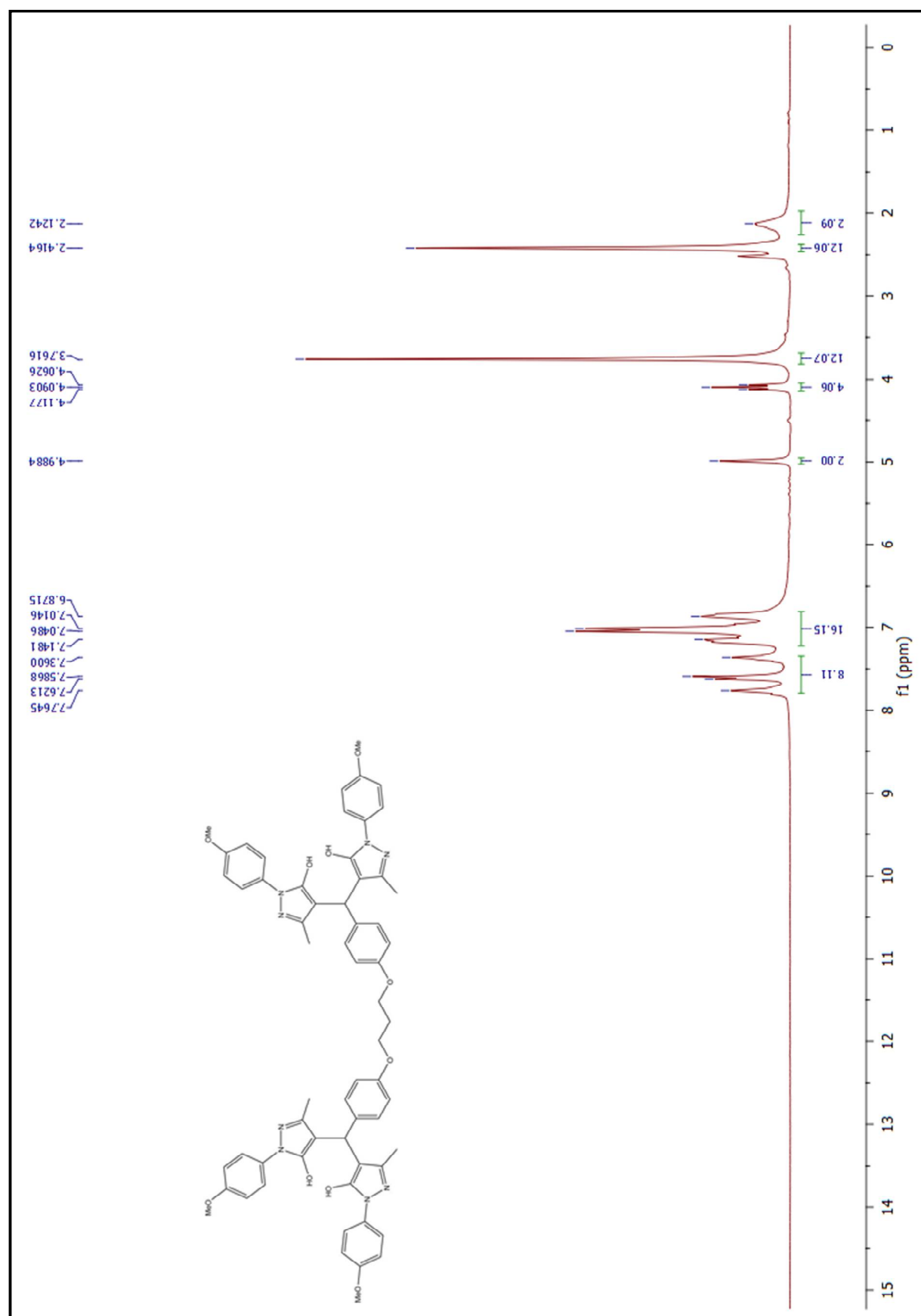


Figure 121. ^1H -NMR spectrum of compound (6bs)

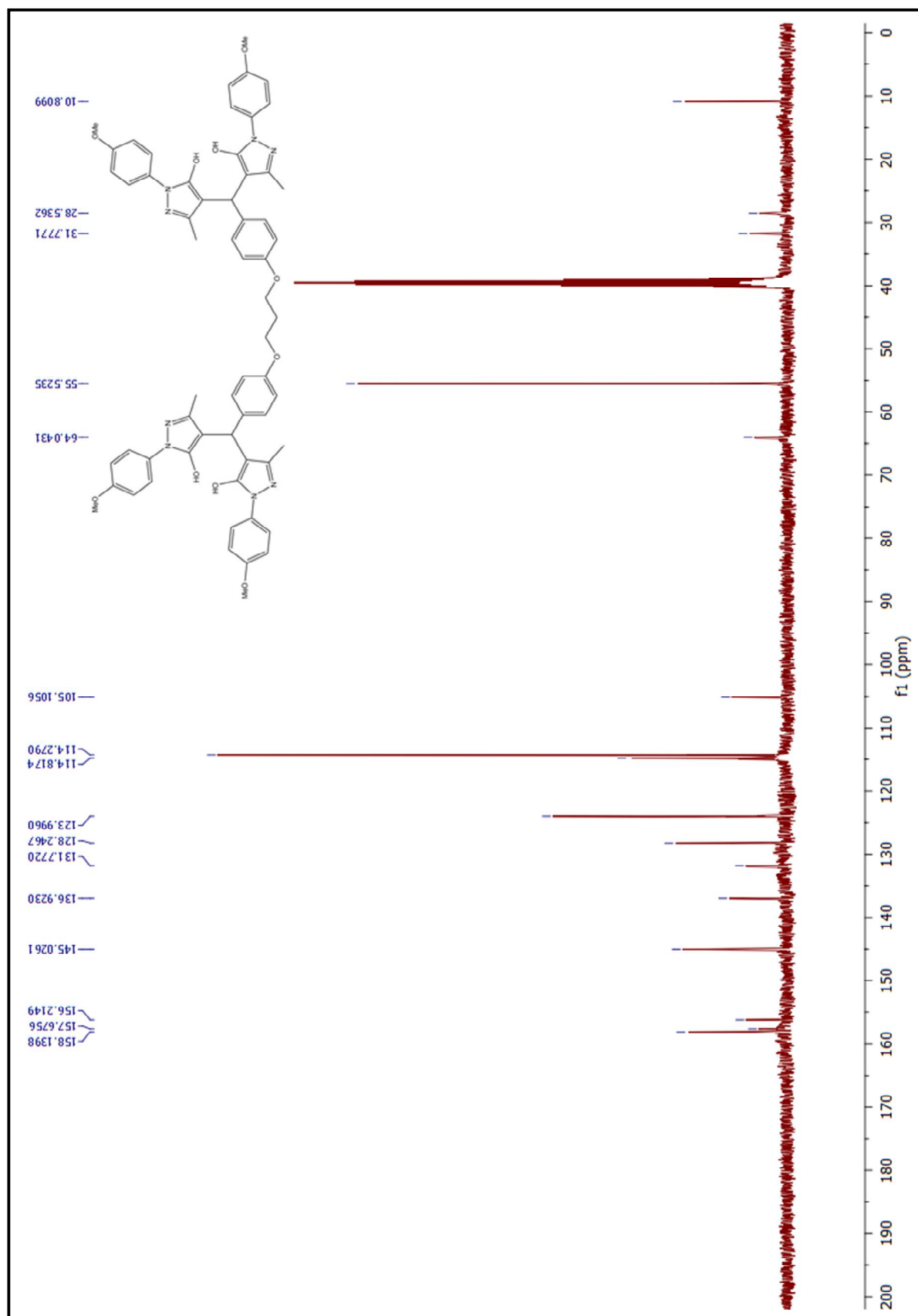


Figure 122. ^{13}C -NMR spectrum of compound (6bs)

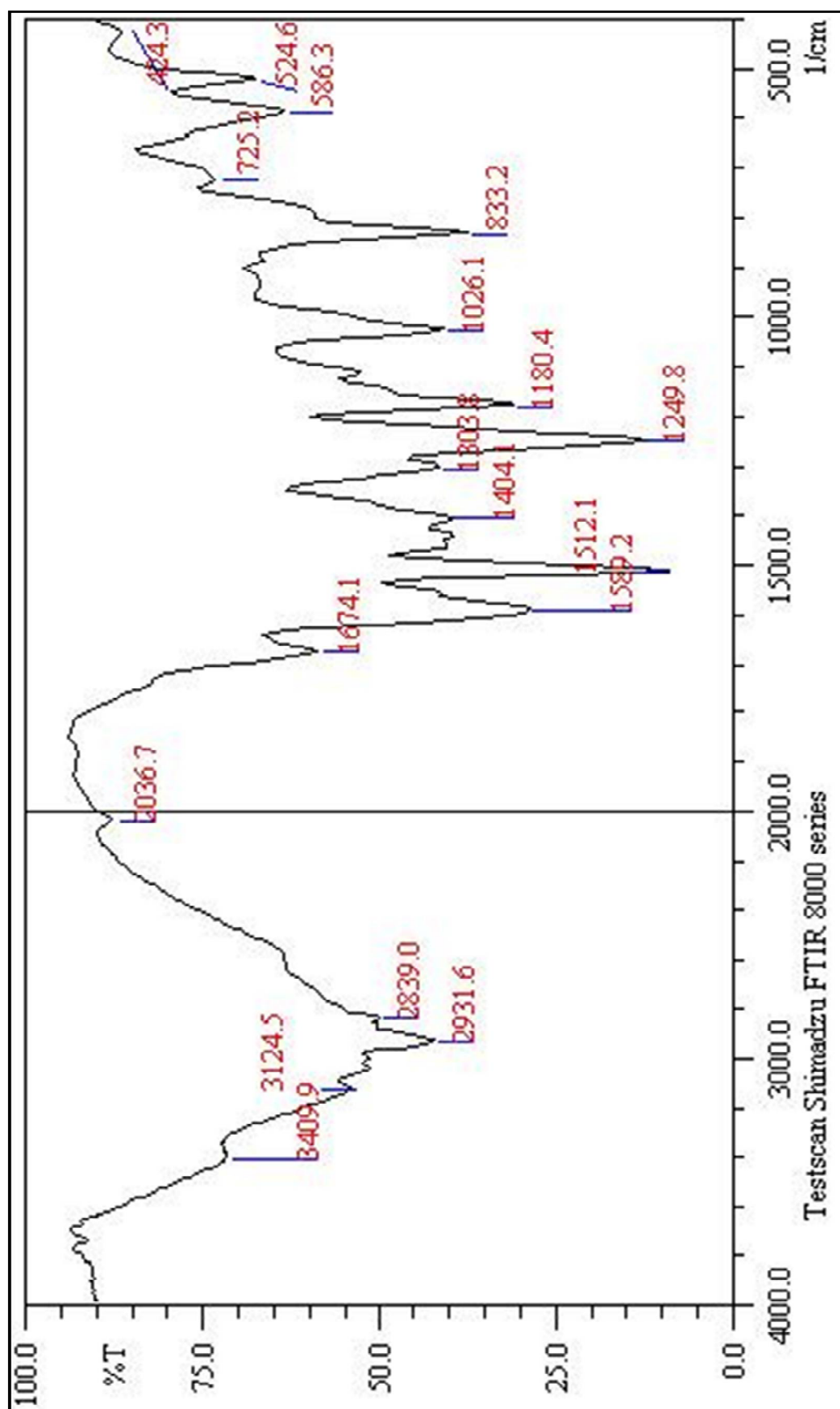


Figure 123. FT-IR spectrum of compound (6bt)

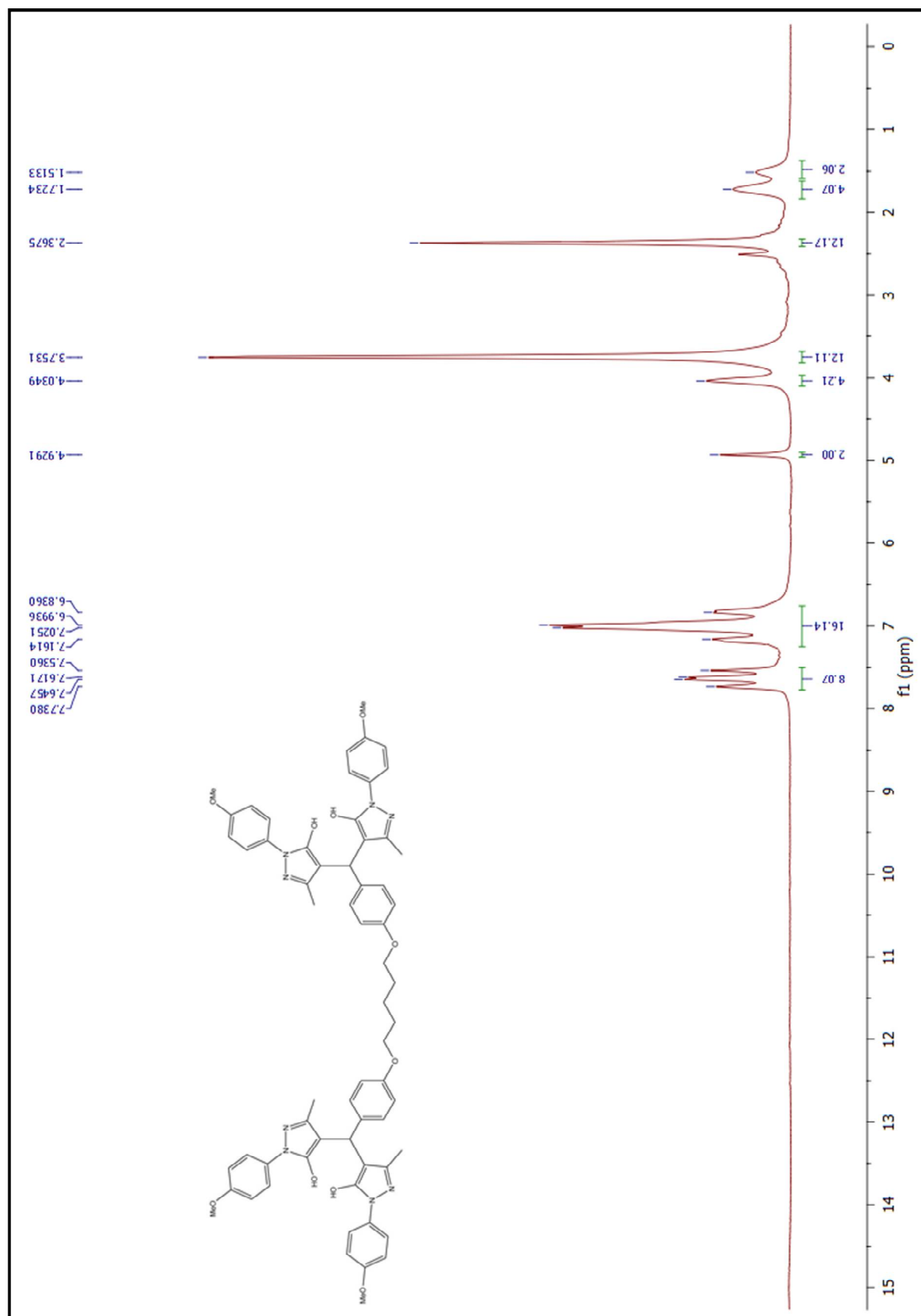


Figure 124. ¹H-NMR spectrum of compound (6bt)

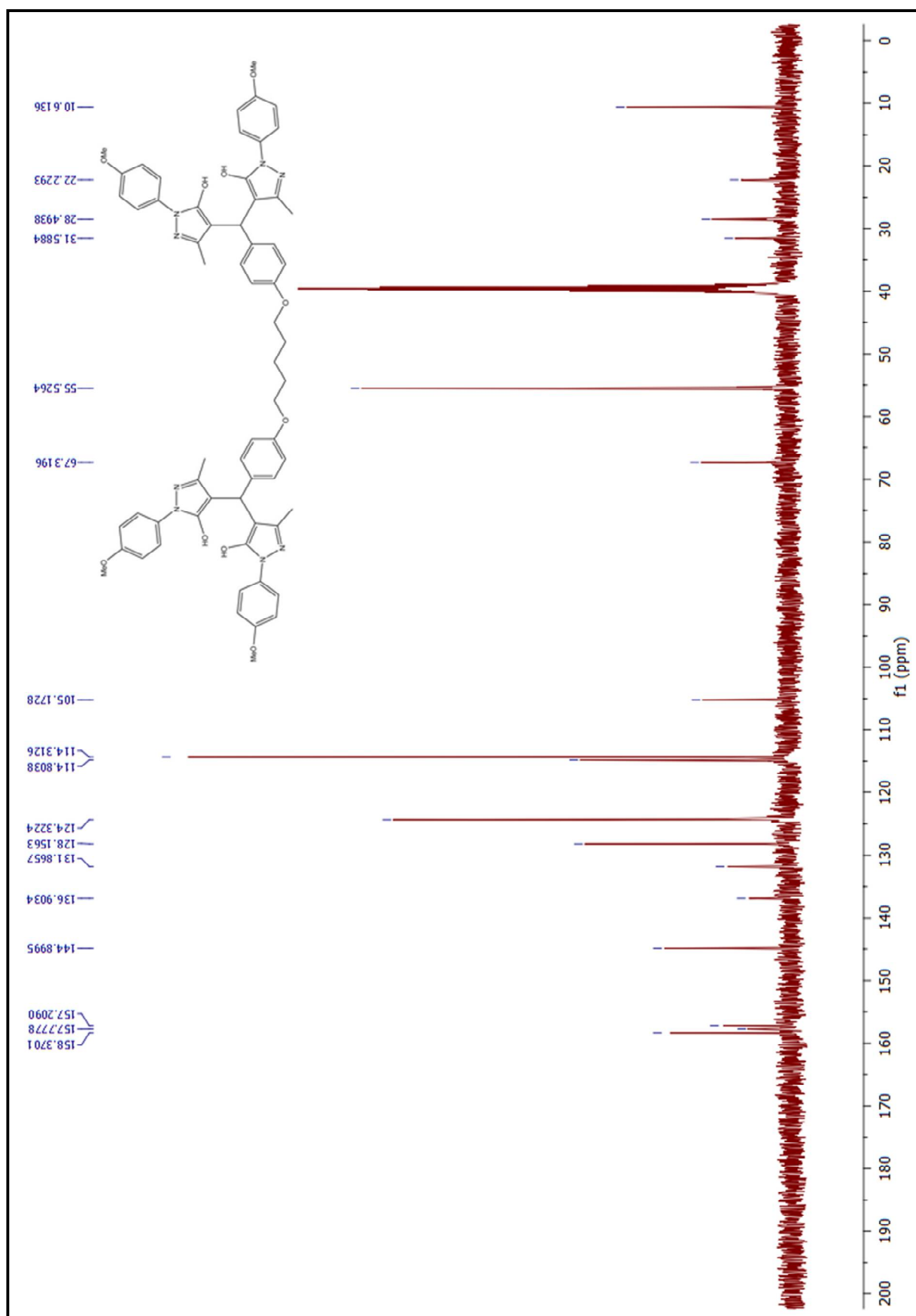


Figure 125. ¹³C-NMR spectrum of compound (6bt)