

Hypervalent Iodine-Mediated Cyclization of *N*-Vinyl Amides for the Synthesis of 4-Functionalized Dihydrooxazolines

Jiwoo Lee^{§,a}, Suhui Kim^{§,a}, Chang Sung Hong^{§,c}, Bomcha Park^b, Yeong-Joon Kim^{c,*}, Sungwook Choi^{b,*},
and Ki Bum Hong^{a,*}

^aNew Drug Development Center, Daegu-Gyeongbuk Medical Innovation Foundation, Daegu 41061, Korea.
Email: kbhong@kmedihub.re.kr.

^bDepartment of New Drug Discovery and Development, Chungnam National University, Daejeon 34134,
Korea; email: swchoi2010@cnu.ac.kr.

^cDepartment of Chemistry, Chungnam National University, Daejeon 34134, Korea; email: y2kim@cnu.ac.kr.

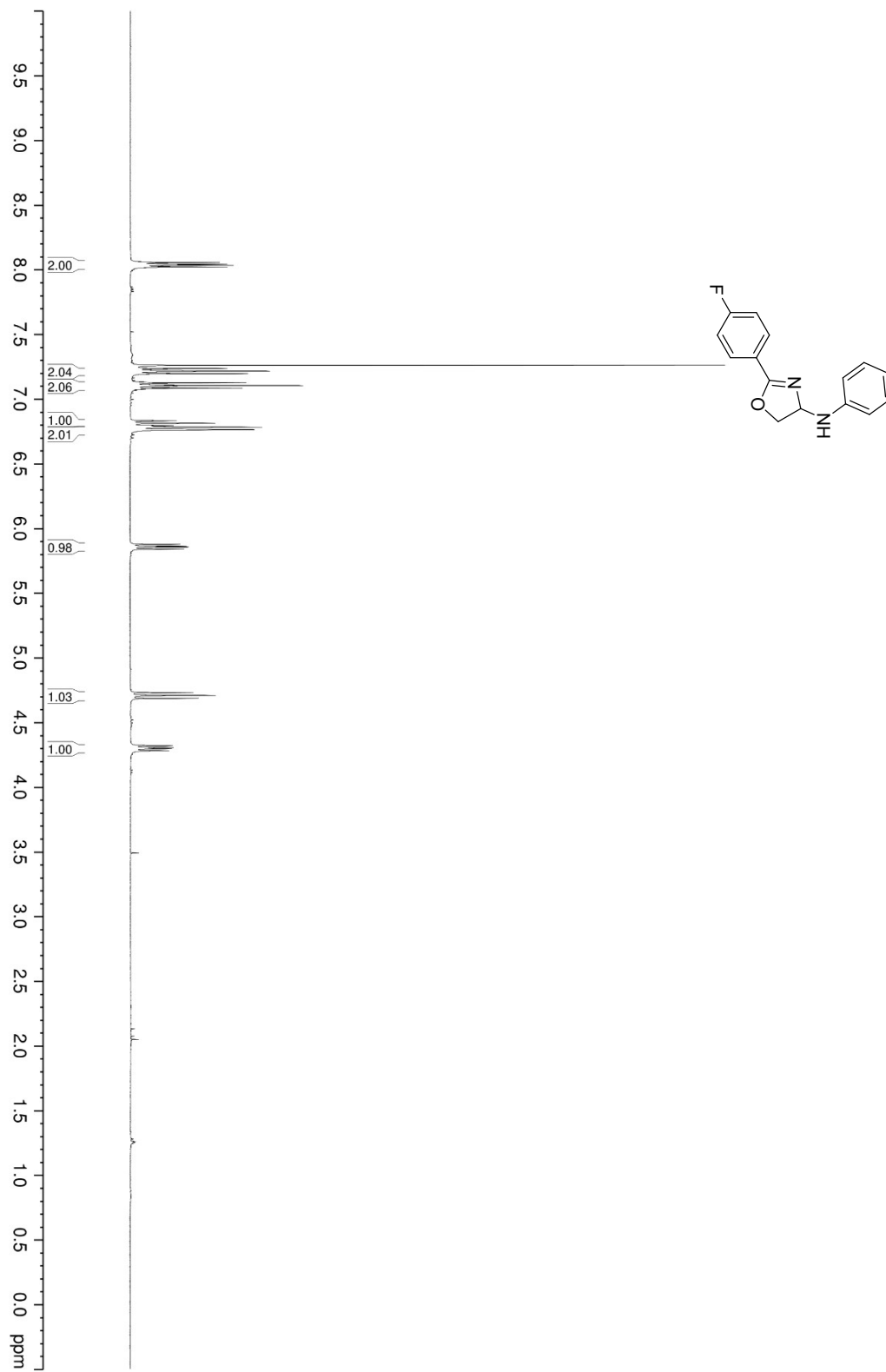
S-II-X

Figure 1. ¹ H NMR (CDCl ₃) of 3a	3
Figure 2. ¹³ C NMR (CDCl ₃) of 3a	4
Figure 3. ¹⁹ F NMR (CDCl ₃) of 3a	5
Figure 4. ¹ H NMR (CDCl ₃) of 3b	6
Figure 5. ¹³ C NMR (CDCl ₃) of 3b	7
Figure 6. ¹ H NMR (CDCl ₃) of 3c	8
Figure 7. ¹³ C NMR (CDCl ₃) of 3c	9
Figure 8. ¹ H NMR (CDCl ₃) of 3d	10
Figure 9. ¹³ C NMR (CDCl ₃) of 3d	11
Figure 10. ¹⁹ F NMR (CDCl ₃) of 3d	12
Figure 11. ¹ H NMR (CDCl ₃) of 3e	13
Figure 12. ¹³ C NMR (CDCl ₃) of 3e	14
Figure 13. ¹ H NMR (CDCl ₃) of 3f	15
Figure 14. ¹³ C NMR (CDCl ₃) of 3f	16
Figure 15. ¹⁹ F NMR (CDCl ₃) of 3f	17
Figure 16. ¹ H NMR (CDCl ₃) of 3g	18
Figure 17. ¹³ C NMR (CDCl ₃) of 3g	19
Figure 18. ¹ H NMR (CDCl ₃) of 3h	20
Figure 19. ¹³ C NMR (CDCl ₃) of 3h	21
Figure 20. ¹ H NMR (CDCl ₃) of 3i	22
Figure 21. ¹³ C NMR (CDCl ₃) of 3i	23
Figure 22. ¹ H NMR (CDCl ₃) of 3j	24
Figure 23. ¹³ C NMR (CDCl ₃) of 3j	25
Figure 24. ¹⁹ F NMR (CDCl ₃) of 3j	26
Figure 25. ¹ H NMR (CDCl ₃) of 3k	27
Figure 26. ¹³ C NMR (CDCl ₃) of 3k	28
Figure 27. ¹ H NMR (CDCl ₃) of 3l	29
Figure 28. ¹³ C NMR (CDCl ₃) of 3l	30
Figure 29. ¹ H NMR (CDCl ₃) of 3m	31
Figure 30. ¹³ C NMR (CDCl ₃) of 3m	32
Figure 31. ¹ H NMR (CDCl ₃) of 7a	33
Figure 32. ¹³ C NMR (CDCl ₃) of 7a	34
Figure 33. ¹⁹ F NMR (CDCl ₃) of 7a	35
Figure 34. ¹ H NMR (CDCl ₃) of 7c	36

Figure 35. ^{13}C NMR (CDCl_3) of 7c	37
Figure 36. ^1H NMR (CDCl_3) of 7e	38
Figure 37. ^{13}C NMR (CDCl_3) of 7e	39
Figure 38. ^1H NMR (CDCl_3) of 7h	40
Figure 39. ^{13}C NMR (CDCl_3) of 7h	41
Figure 41. ^{13}C NMR (CDCl_3) of 7l	43
Figure 42. ^1H NMR (CDCl_3) of 7m	44
Figure 43. ^{13}C NMR (CDCl_3) of 7m	45
Figure 44. ^1H NMR ($\text{DMSO}-d_6$) of 8a	46
Figure 45. ^{13}C NMR ($\text{DMSO}-d_6$) of 8a	47
Figure 46. ^{19}F NMR ($\text{DMSO}-d_6$) of 8a	48
Figure 47. ^1H NMR ($\text{DMSO}-d_6$) of 8b	49
Figure 48. ^{13}C NMR ($\text{DMSO}-d_6$) of 8b	50
Figure 49. ^1H NMR ($\text{MeOD}-d_4$) of 8l	51
Figure 50. ^{13}C NMR ($\text{MeOD}-d_4$) of 8l	52
Figure 51. ^1H NMR ($\text{DMSO}-d_6$) of 9c	53
Figure 52. ^{13}C NMR ($\text{DMSO}-d_6$) of 9c	54
Figure 53. ^1H NMR (CDCl_3) of 9e	55
Figure 54. ^{13}C NMR (CDCl_3) of 9e	56
Figure 55. ^1H NMR (CDCl_3) of 10a	57
Figure 56. ^{13}C NMR (CDCl_3) of 10a	58
Figure 57. ^{19}F NMR (CDCl_3) of 10a	59
Figure 58. ^1H NMR (CDCl_3) of 10b	60
Figure 59. ^{13}C NMR (CDCl_3) of 10b	61
Figure 60. ^1H NMR (CDCl_3) of 10c	62
Figure 61. ^{13}C NMR (CDCl_3) of 10c	63
Figure 62. ^1H NMR (CDCl_3) of 10d	64
Figure 63. ^{13}C NMR (CDCl_3) of 10d	65
Figure 64. ^{19}F NMR (CDCl_3) of 10d	66
Figure 65. ^1H NMR (CDCl_3) of 10g	67
Figure 66. ^{13}C NMR (CDCl_3) of 10g	68
Figure 67. ^1H NMR (CDCl_3) of 10i	69
Figure 68. ^{13}C NMR (CDCl_3) of 10i	70
Figure 69. ^1H NMR (CDCl_3) of 10j	71
Figure 70. ^{13}C NMR (CDCl_3) of 10j	72
Figure 71. ^{19}F NMR (CDCl_3) of 10j	73
Figure 72. ^1H NMR (CDCl_3) of 10l	74
Figure 73. ^{13}C NMR (CDCl_3) of 10l	75
Figure 74. ^1H NMR (CDCl_3) of 10m	76
Figure 75. ^{13}C NMR (CDCl_3) of 10m	77

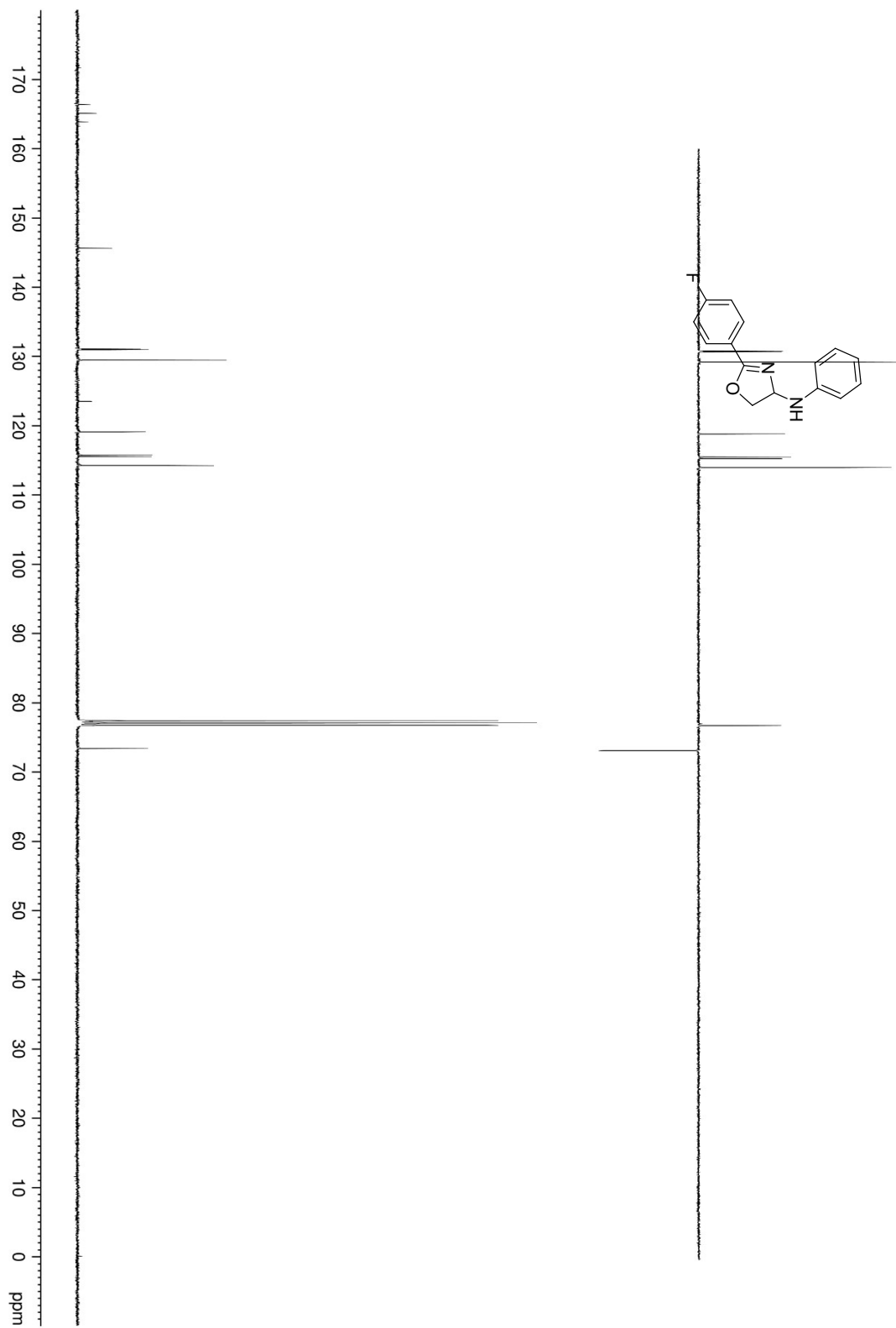
Hong et al.

Figure 1. ^1H NMR (



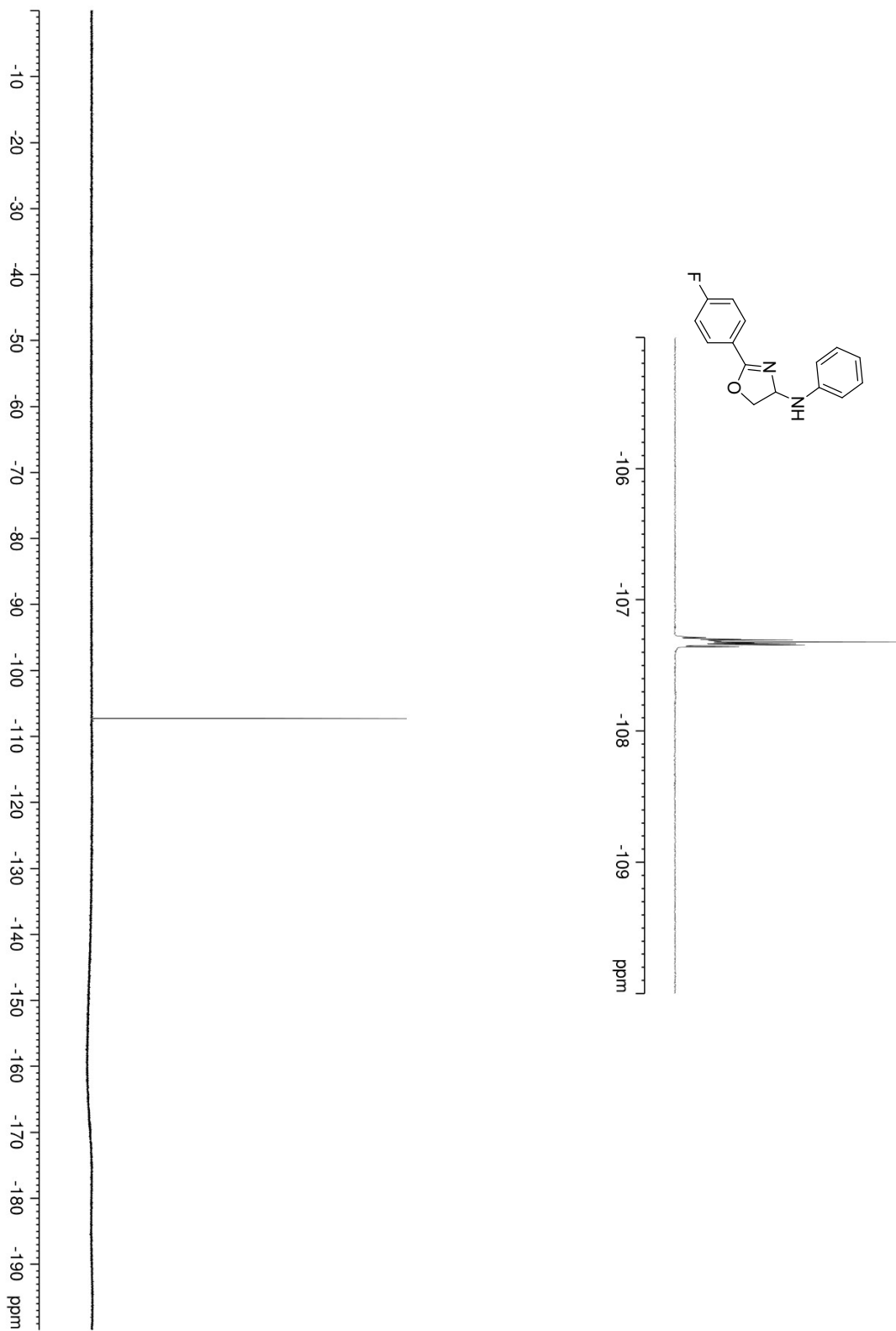
Hong et al.

Figure 2. ^{13}C NMR



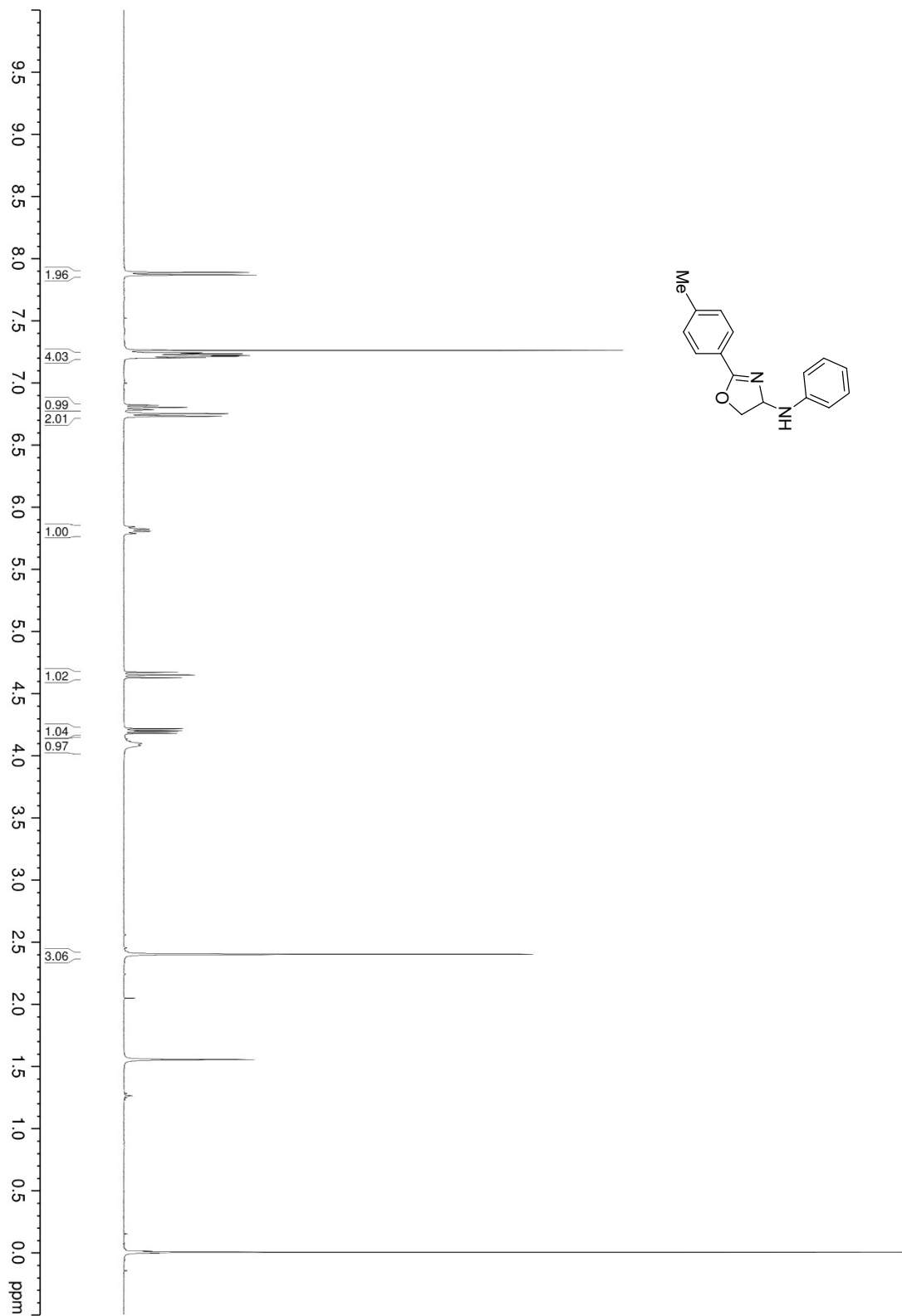
Hong et al.

Figure 3. ^{19}F NMR



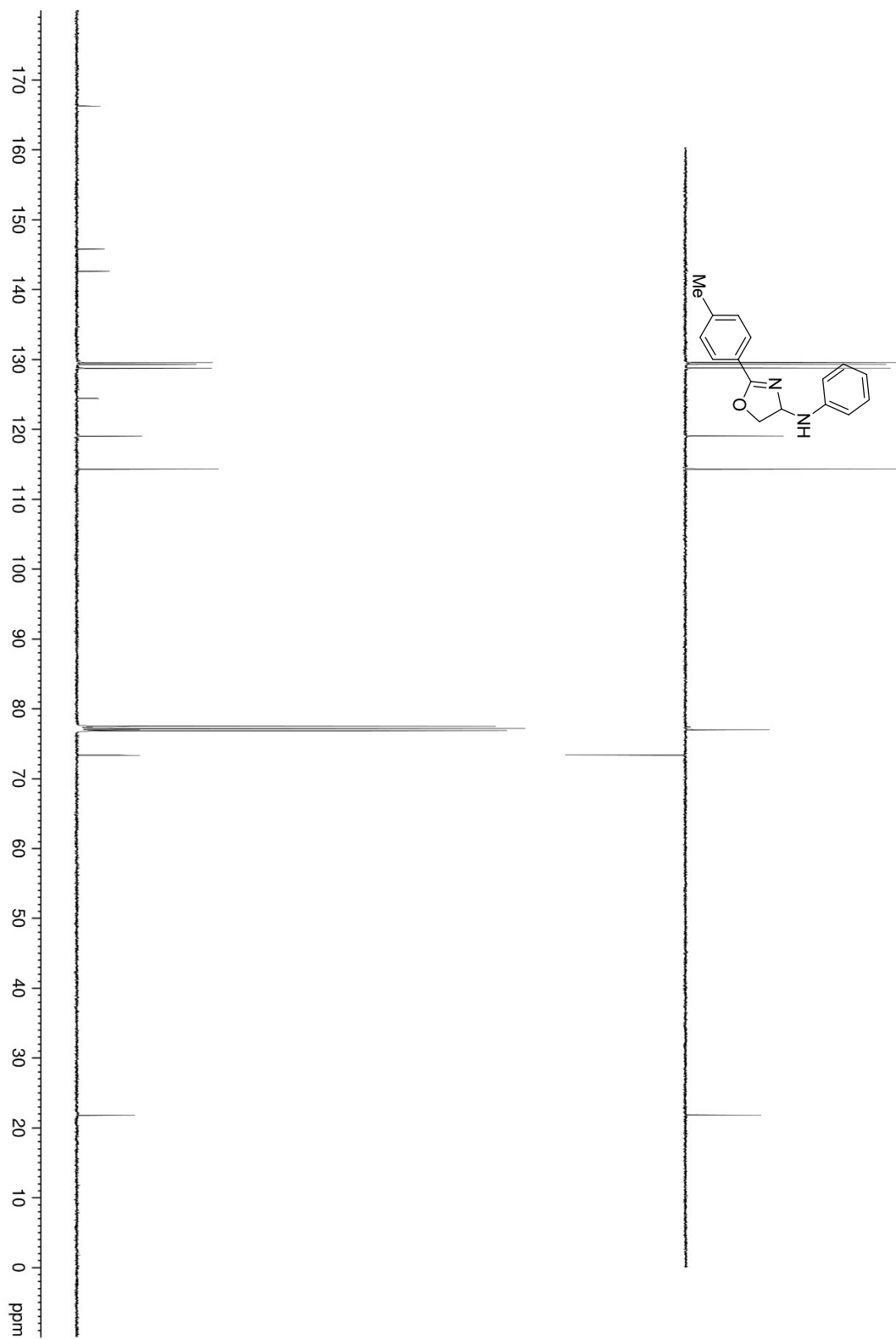
Hong et al.

Figure 4. ^1H NMR (



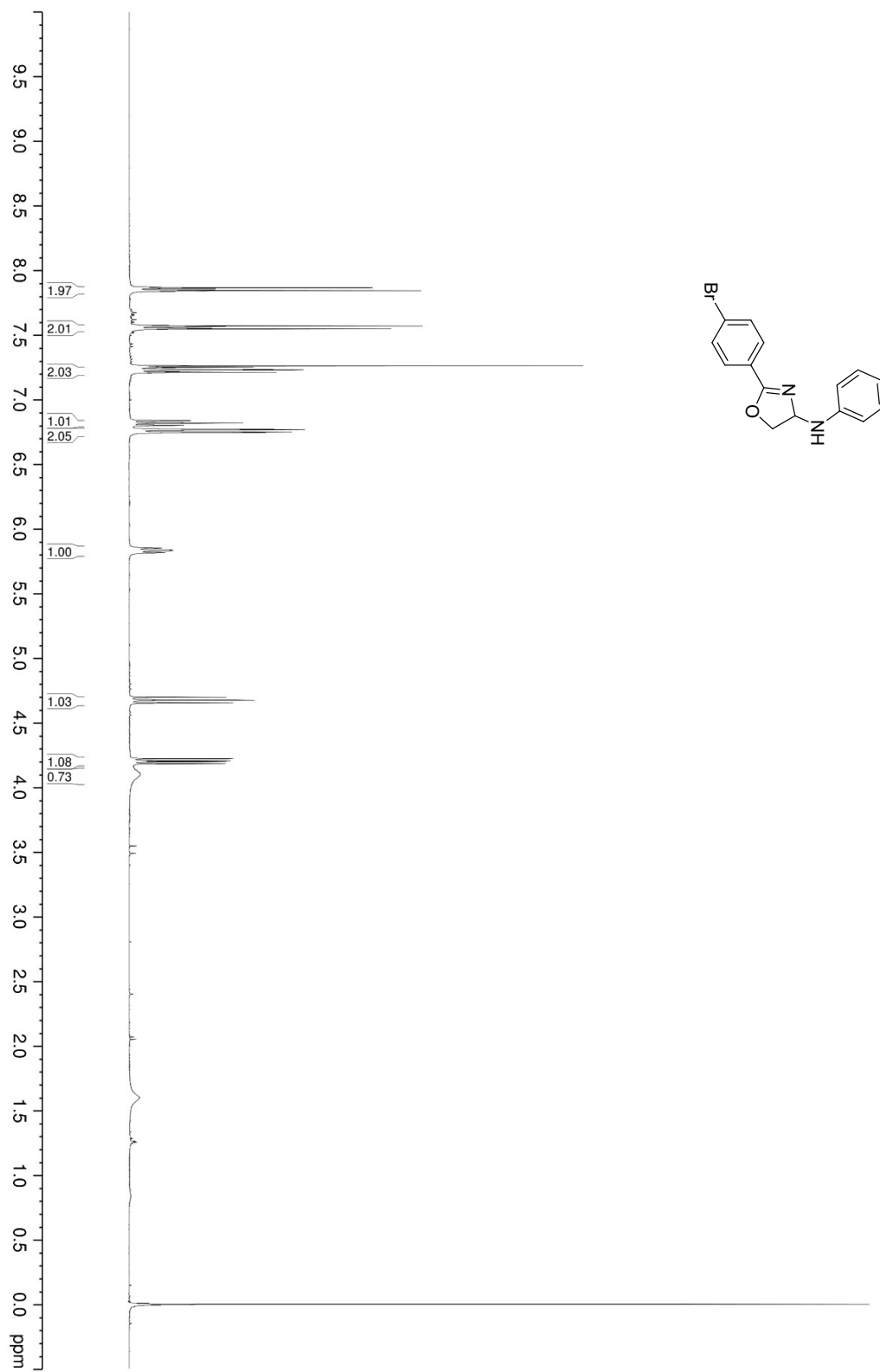
Hong et al.

Figure 5. ^{13}C NMR



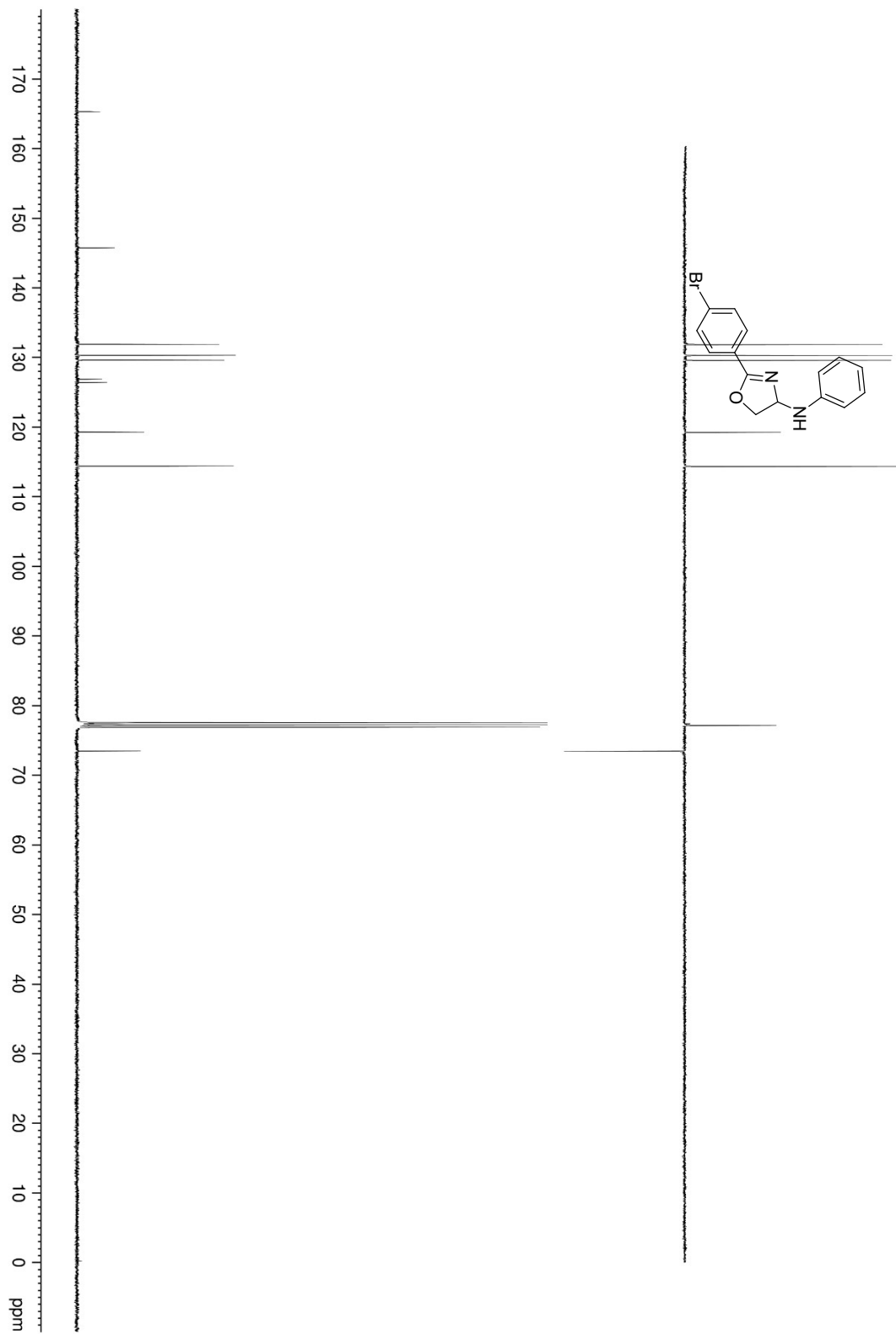
Hong et al.

Figure 6. ^1H NMR (



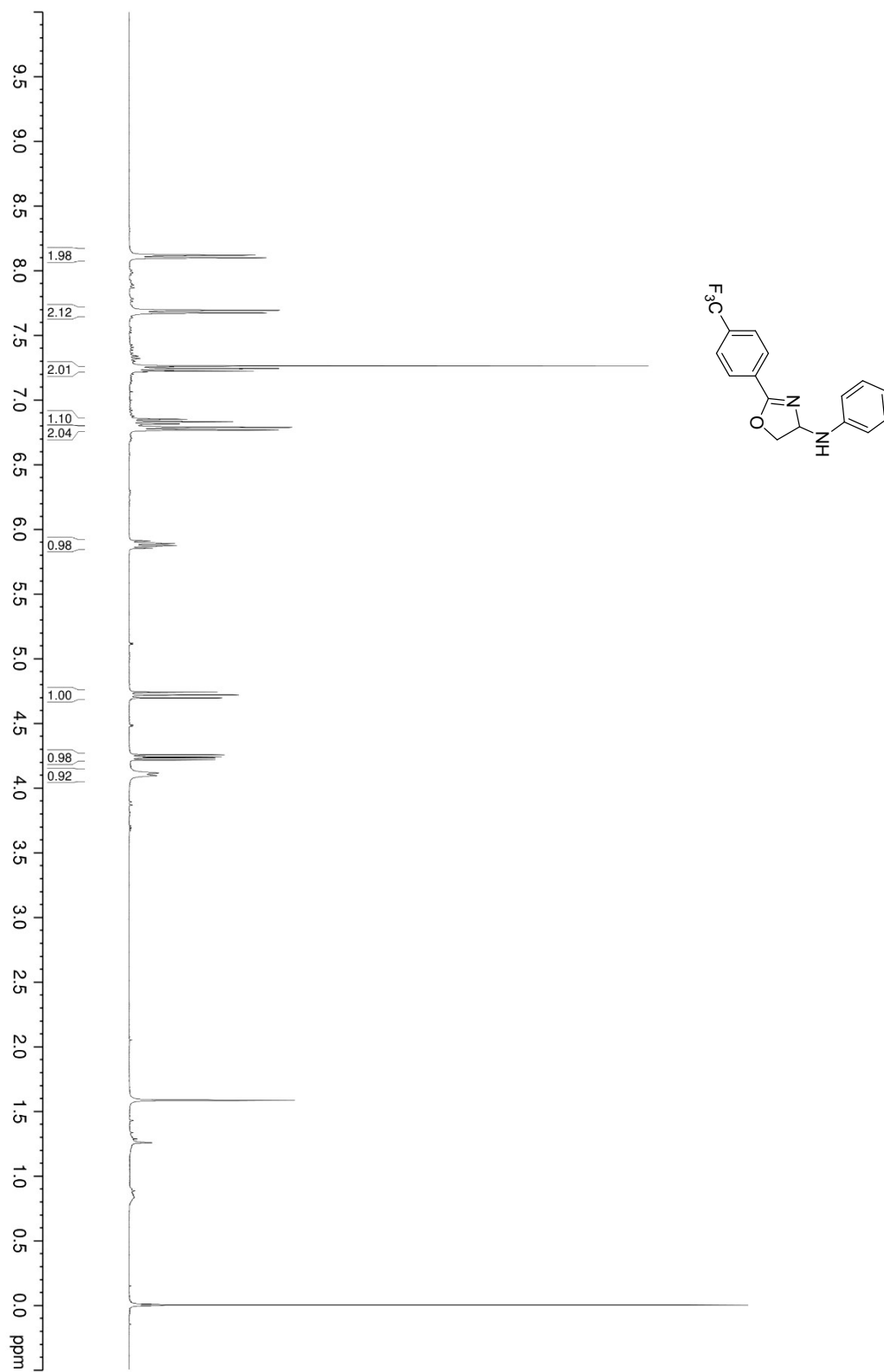
Hong et al.

Figure 7. ^{13}C NMR



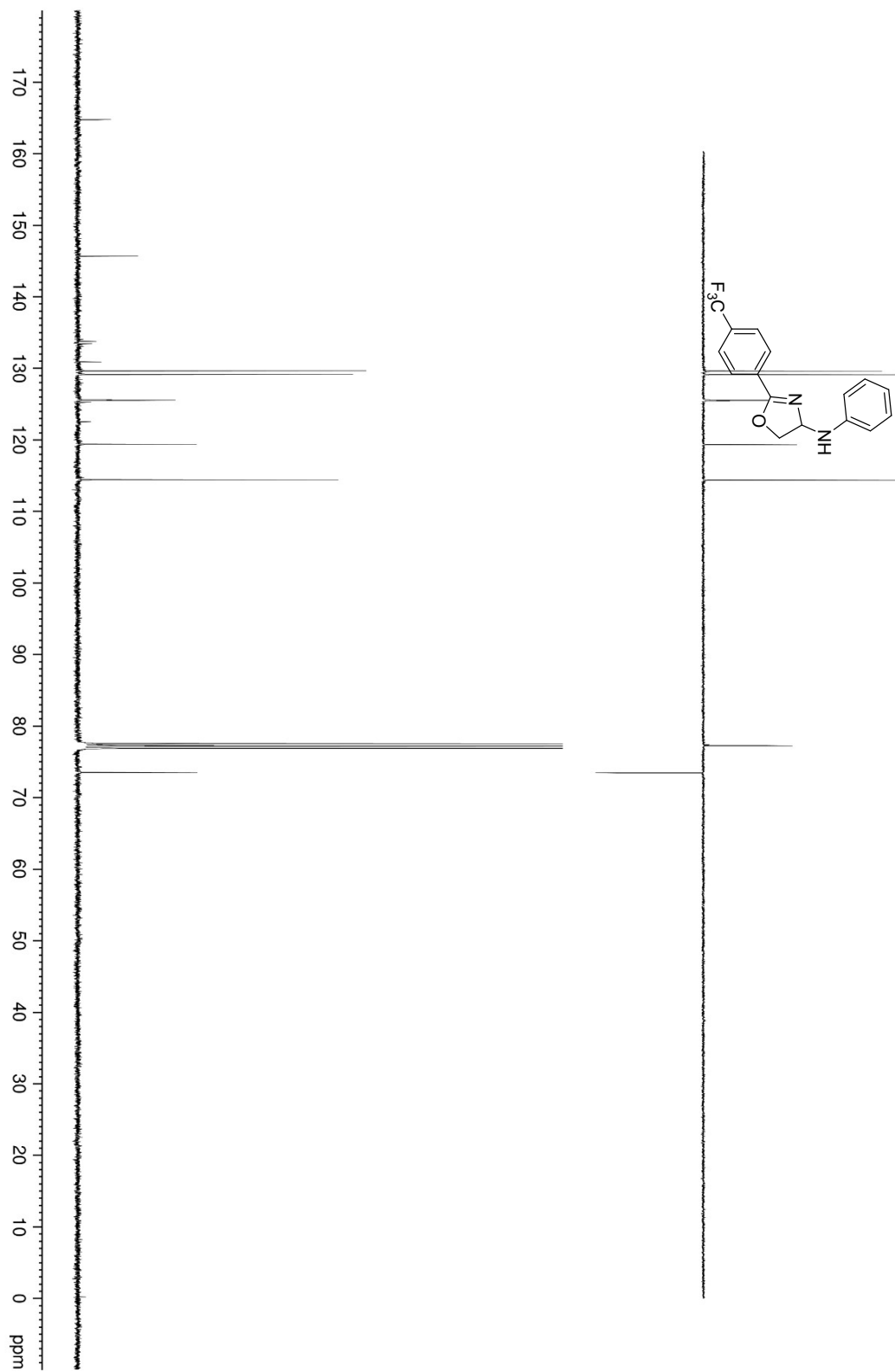
Hong et al.

Figure 8. ^1H NMR (



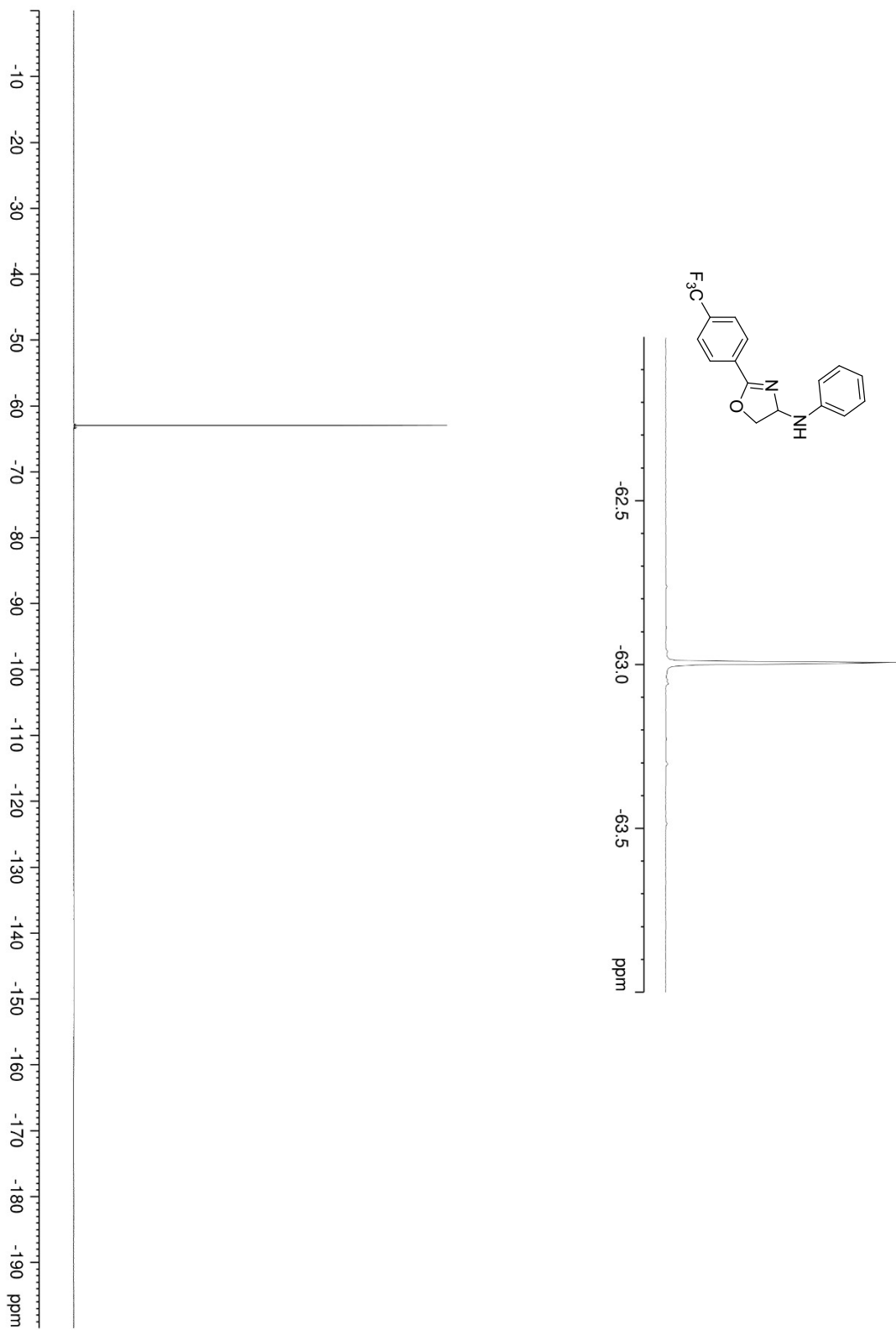
Hong et al.

Figure 9. ^{13}C NMR



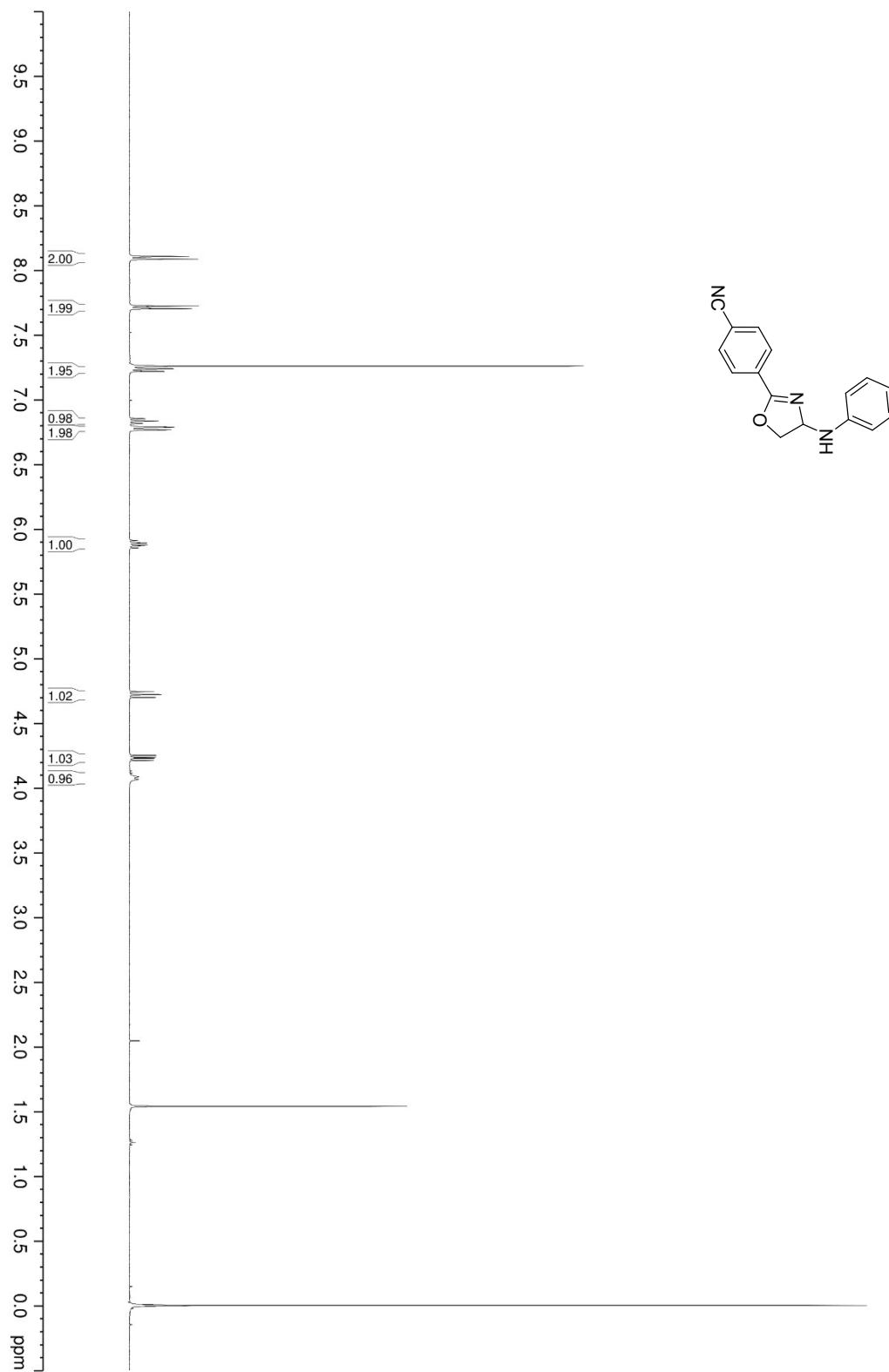
Hong et al.

Figure 10. ^{19}F NMR



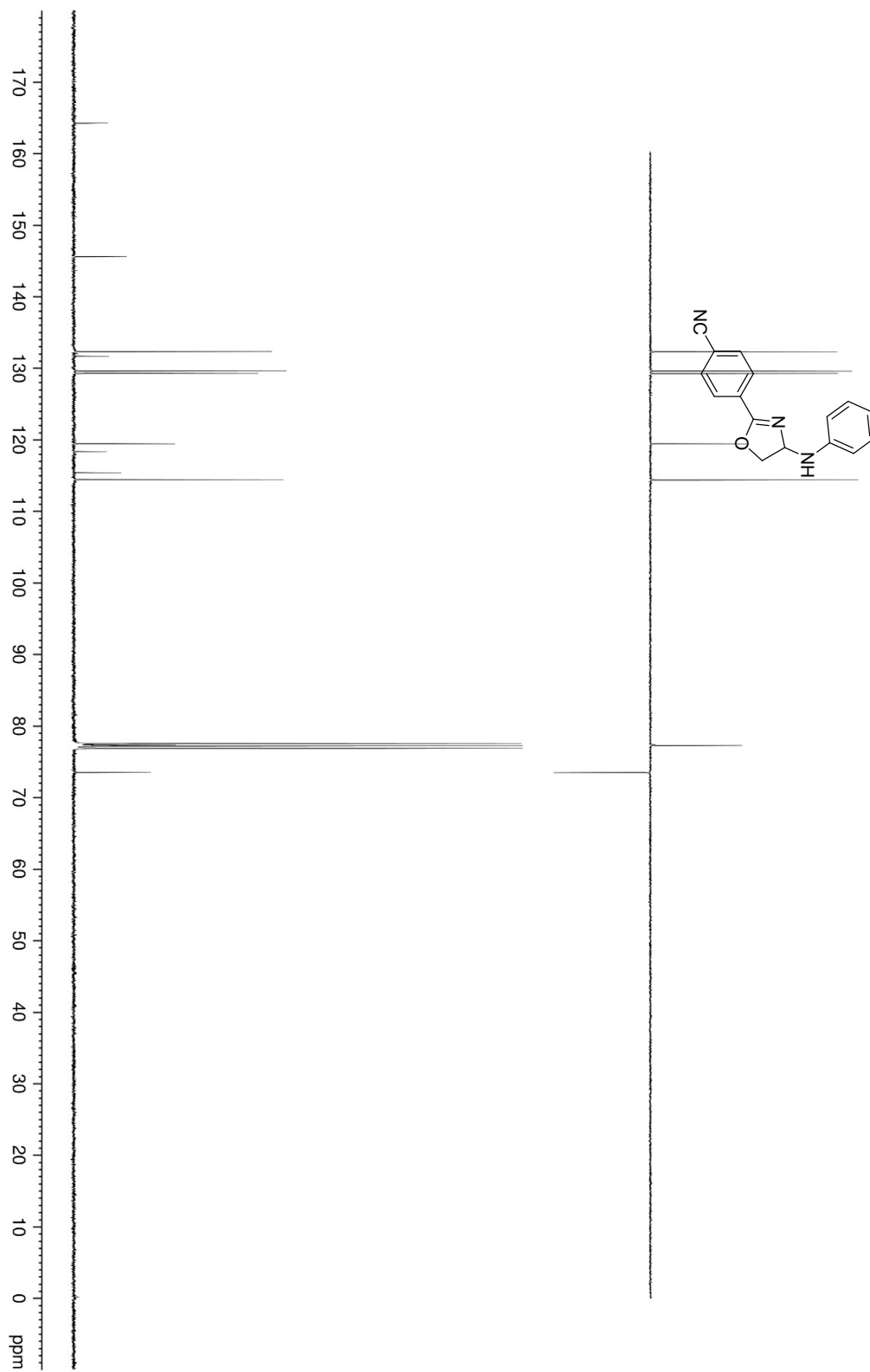
Hong et al.

Figure 11. ^1H NMR



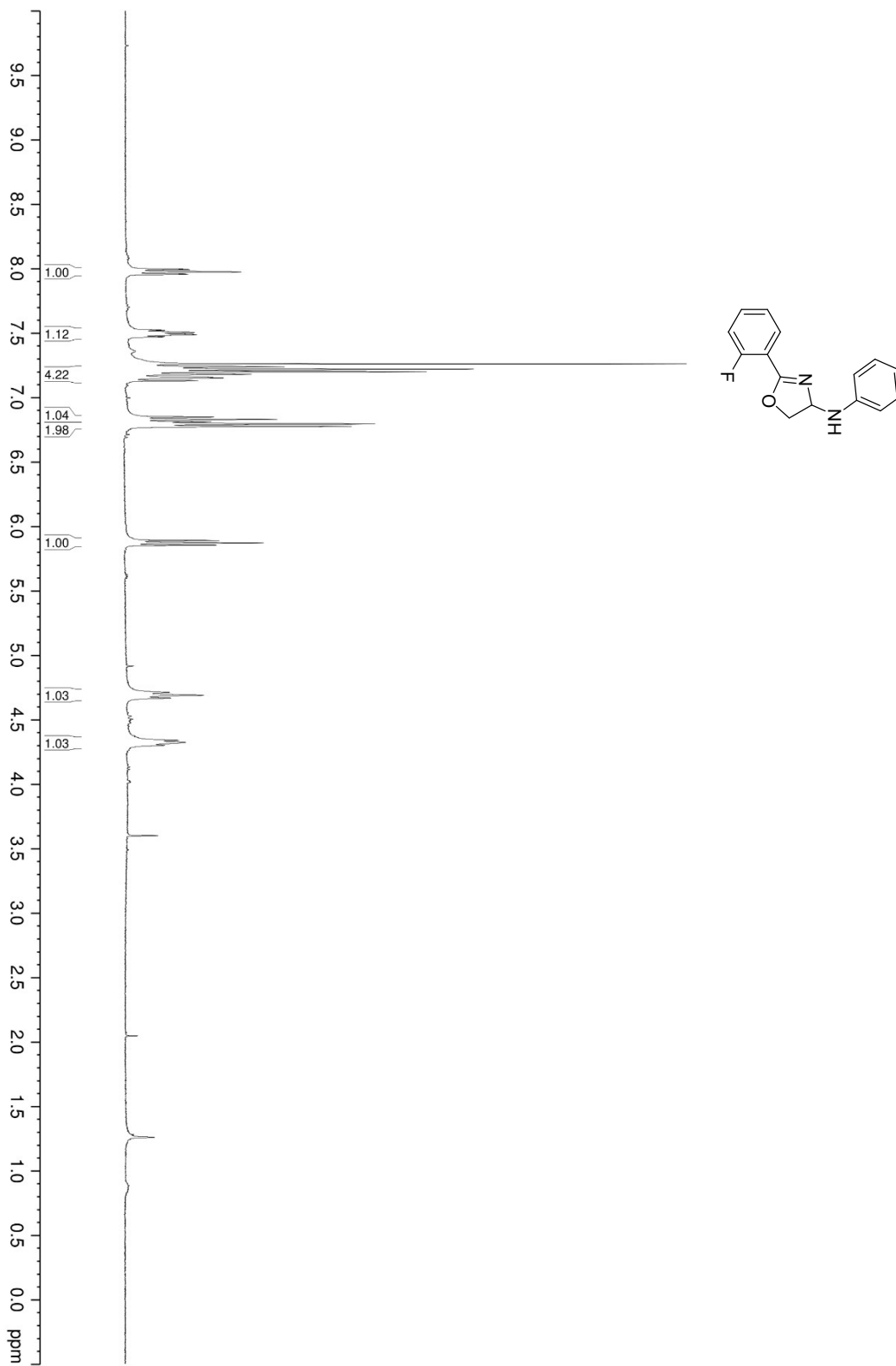
Hong et al.

Figure 12. ^{13}C NMI



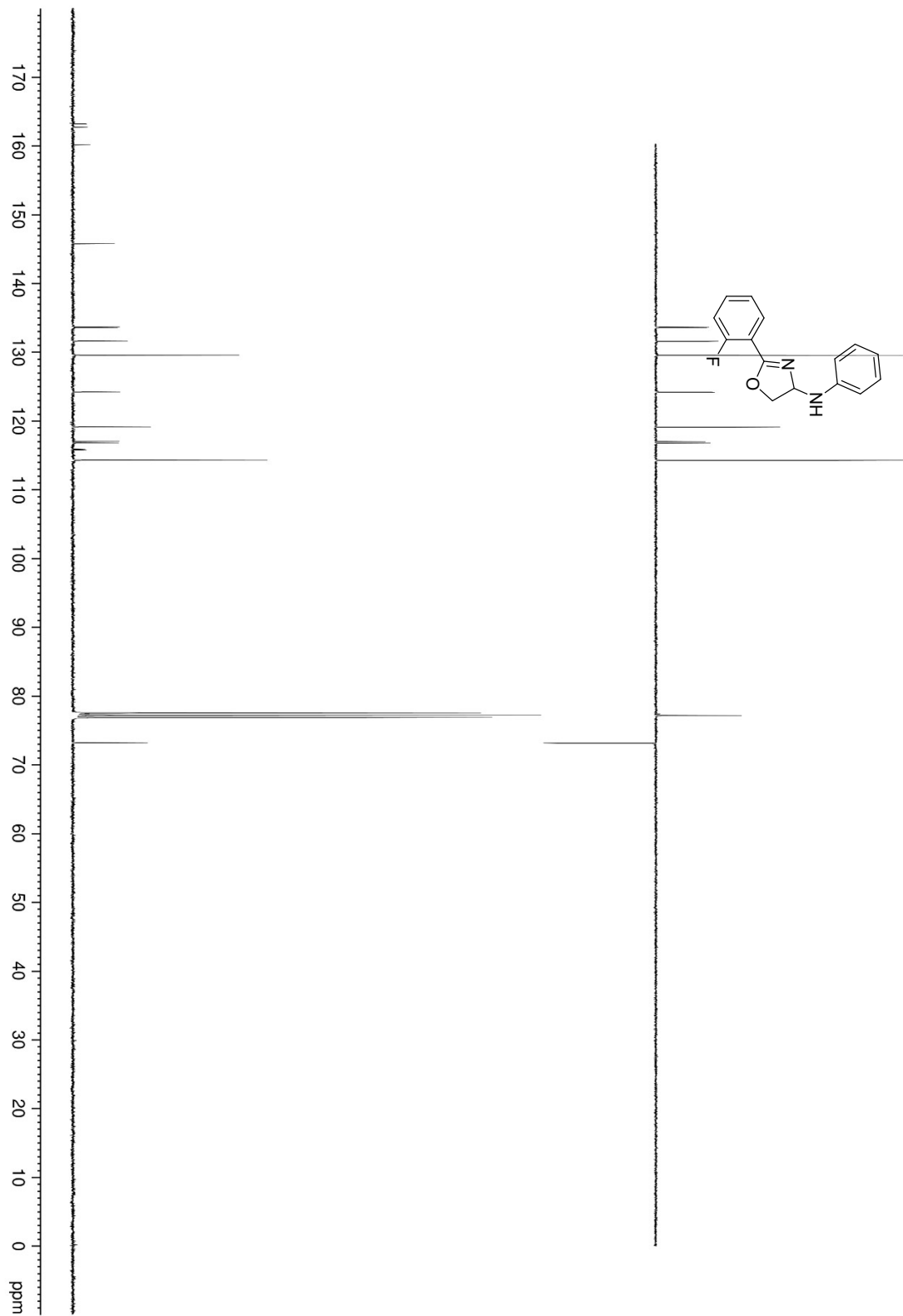
Hong et al.

Figure 13. ^1H NMR



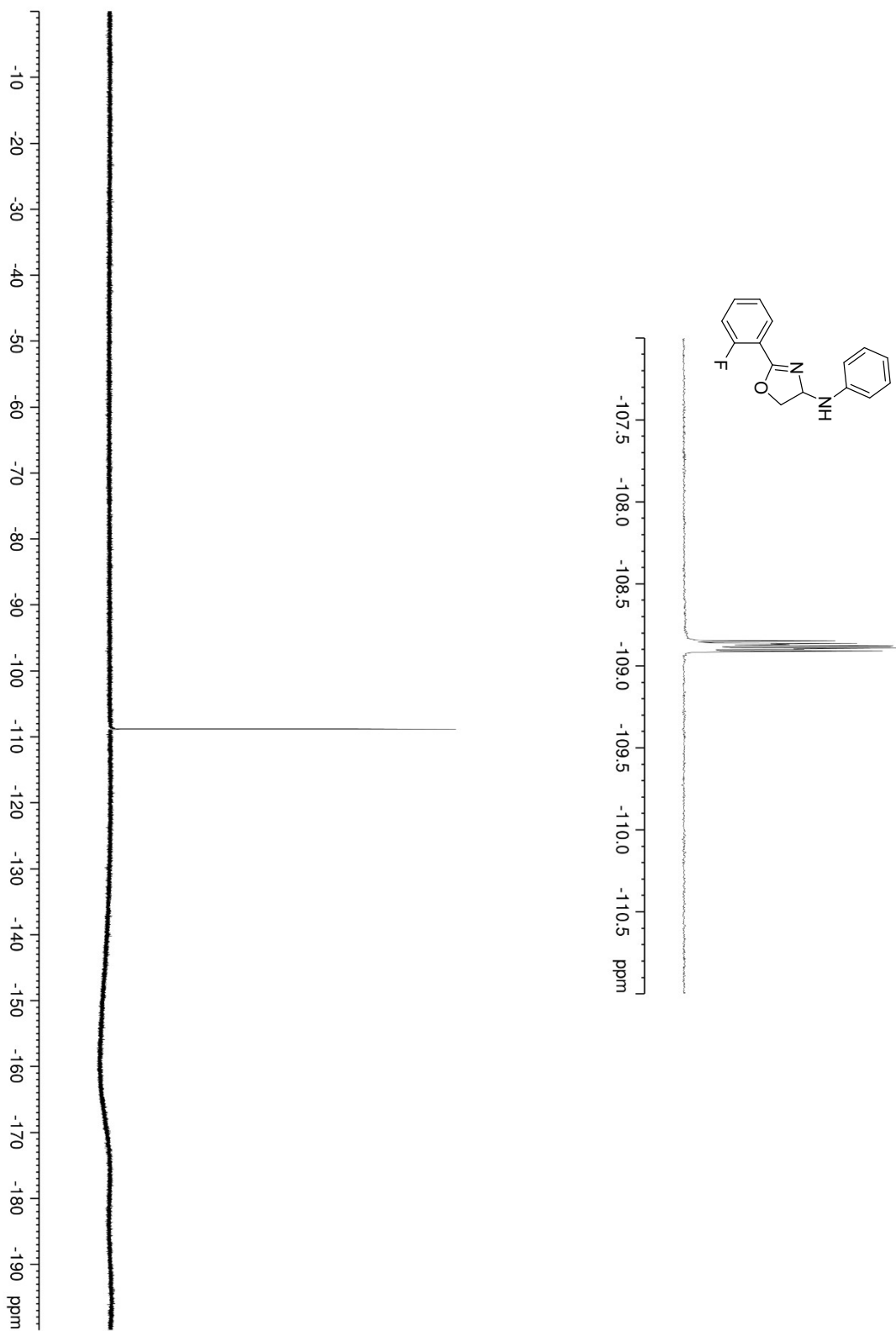
Hong et al.

Figure 14. ^{13}C NMI



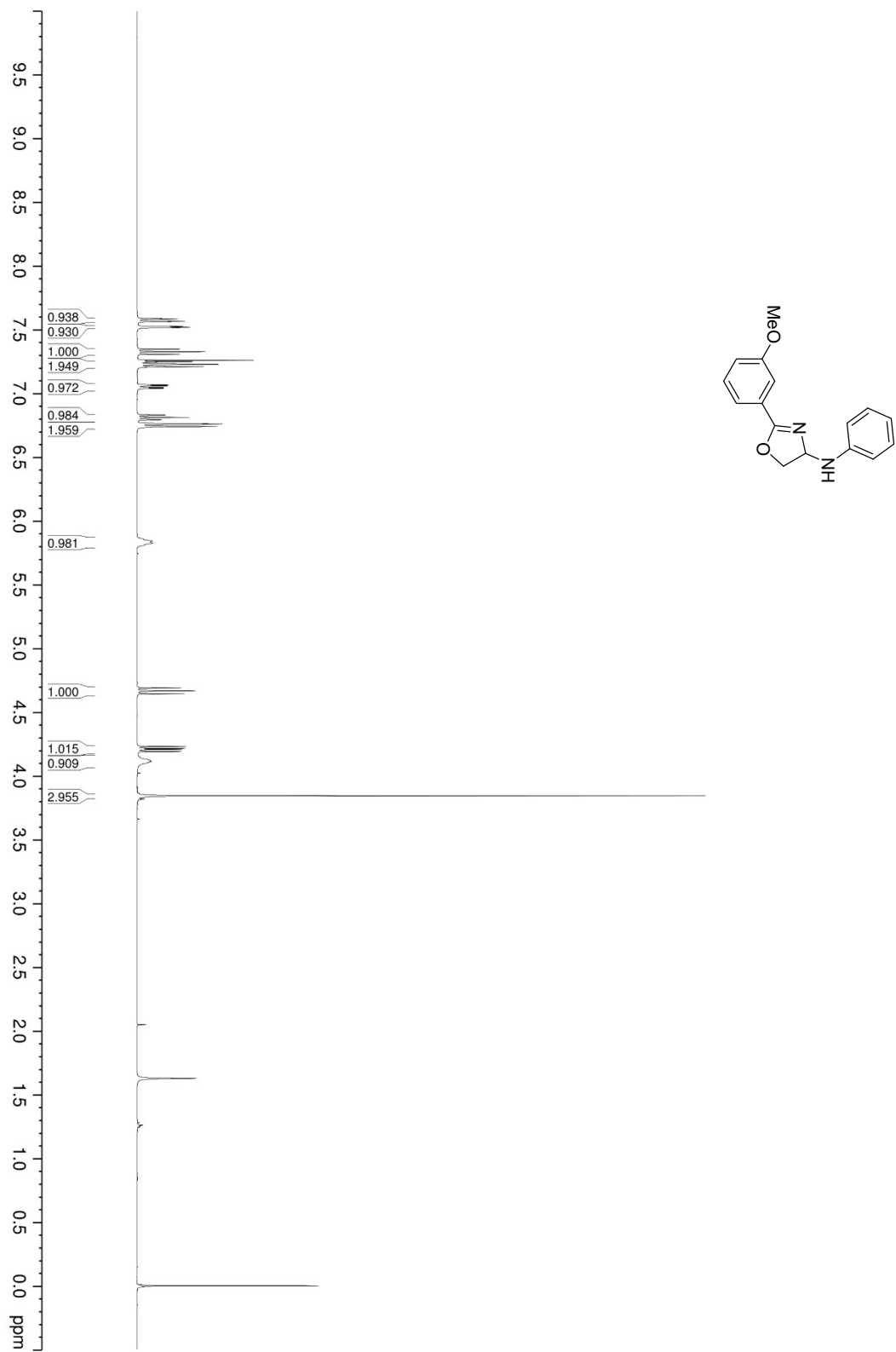
Hong et al.

Figure 15. ^{19}F NMR



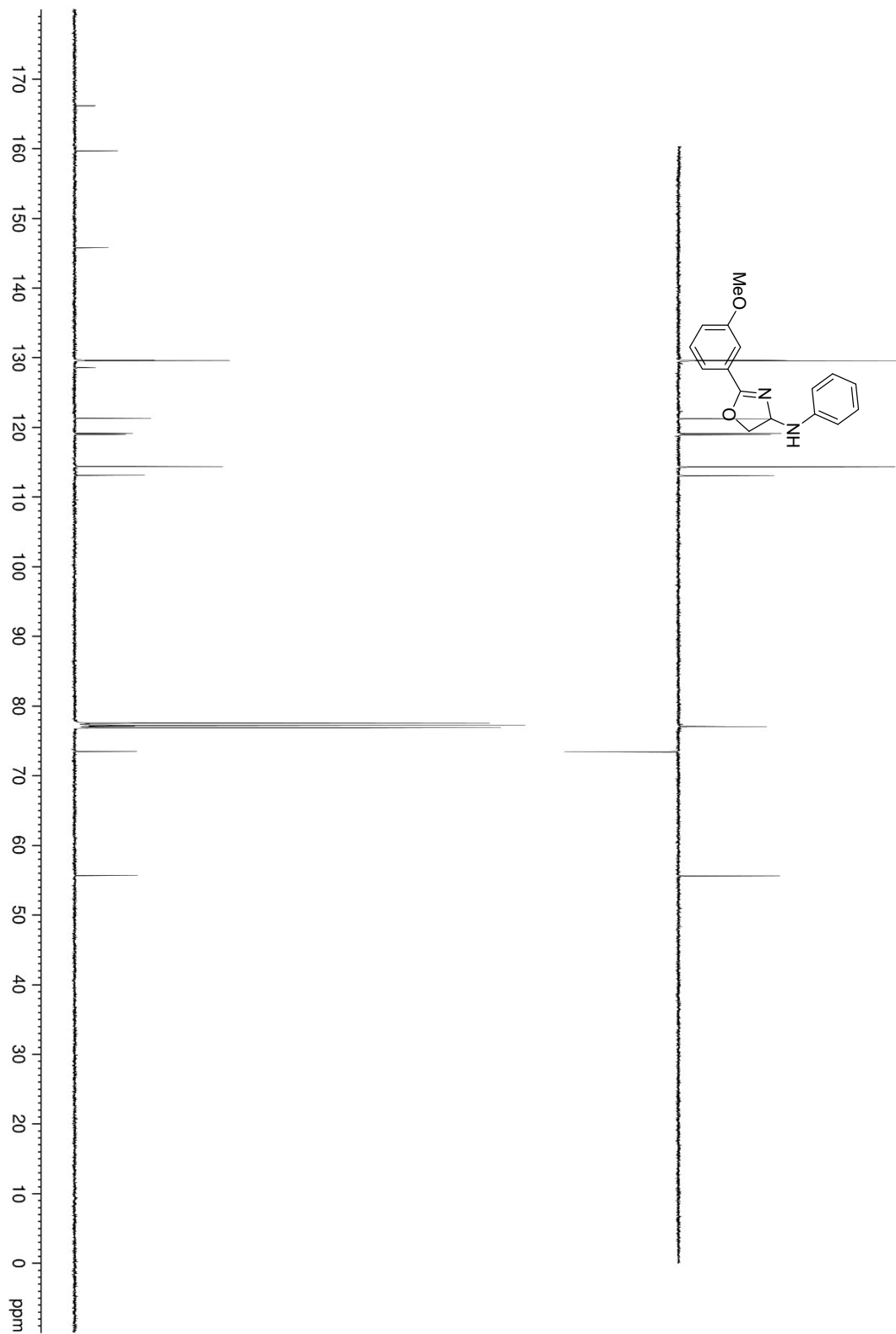
Hong et al.

Figure 16. ^1H NMR



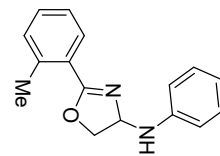
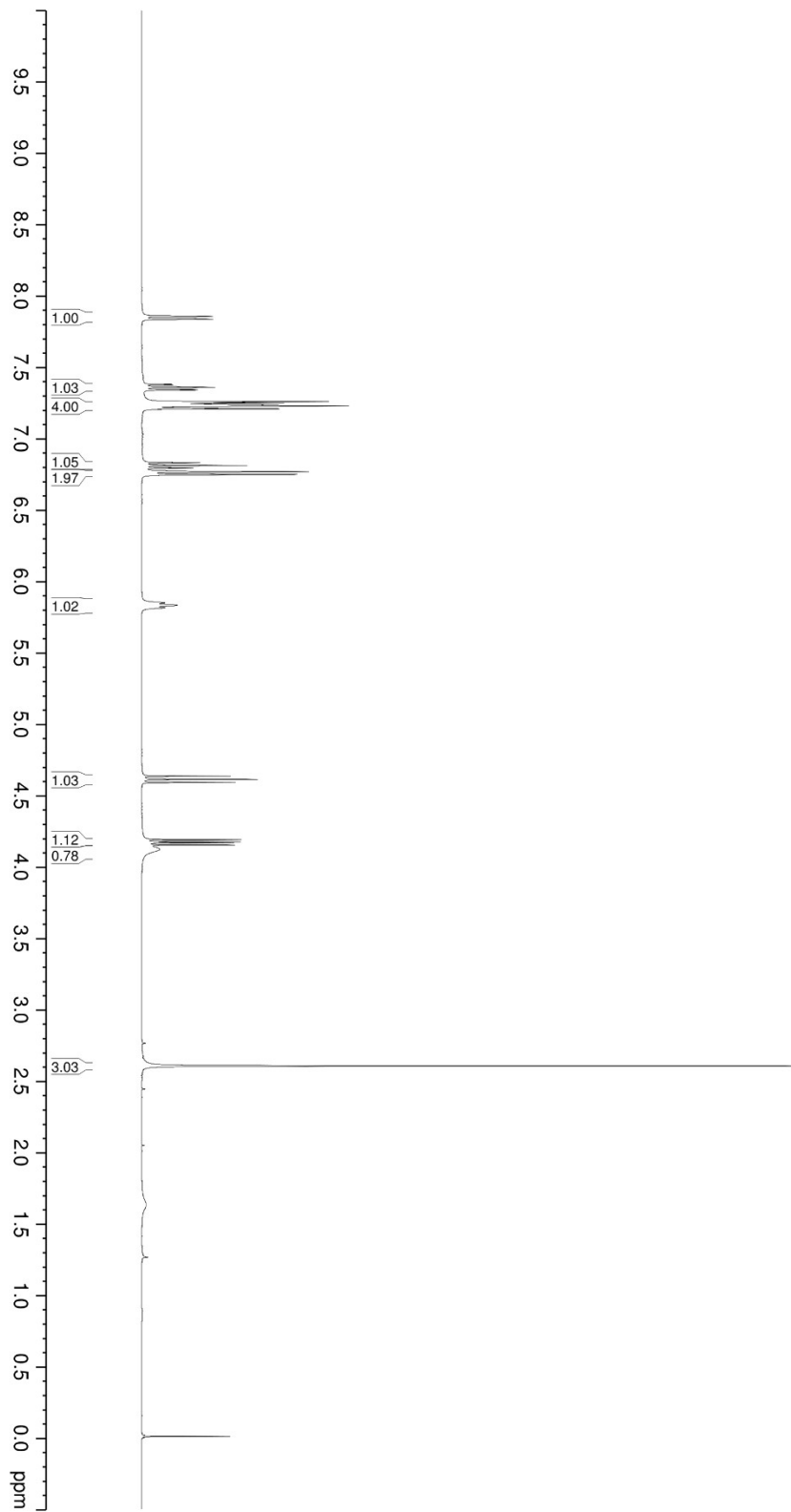
Hong et al.

Figure 17. ^{13}C NMI



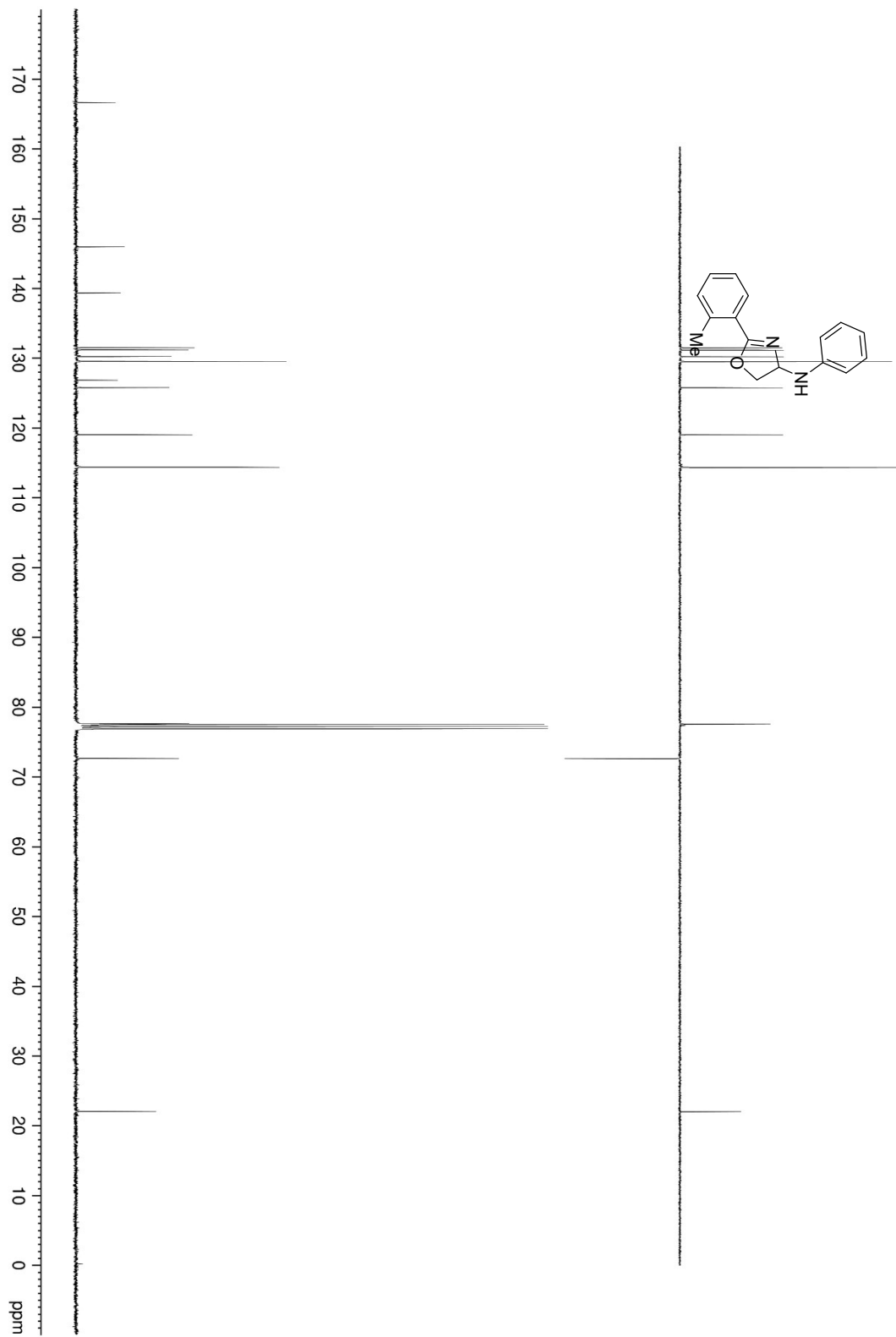
Hong et al.

Figure 18. ^1H NMR



Hong et al.

Figure 19. ^{13}C NMI



Hong et al.

Figure 20. ^1H NMR

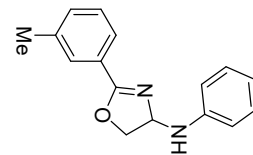
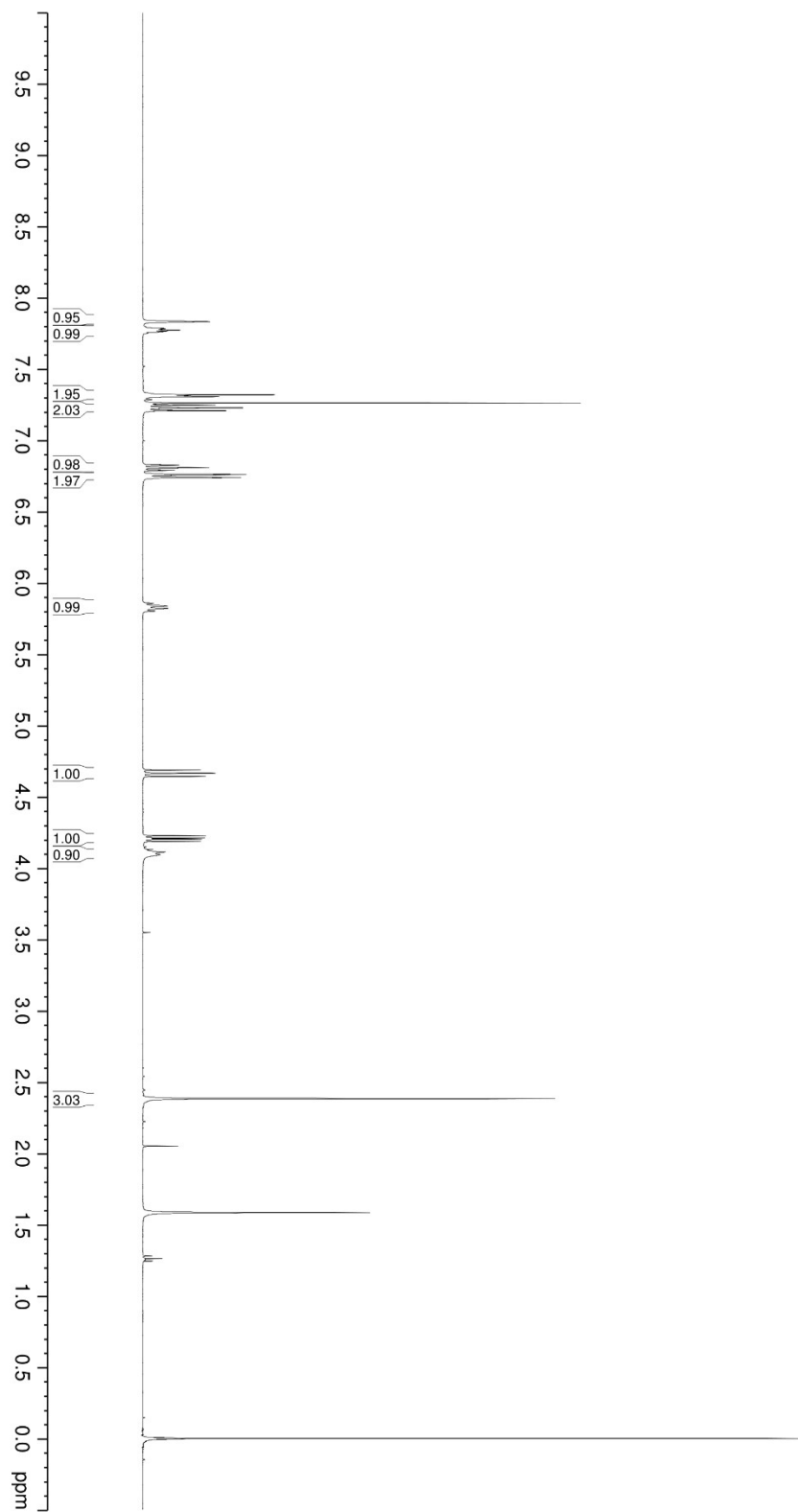
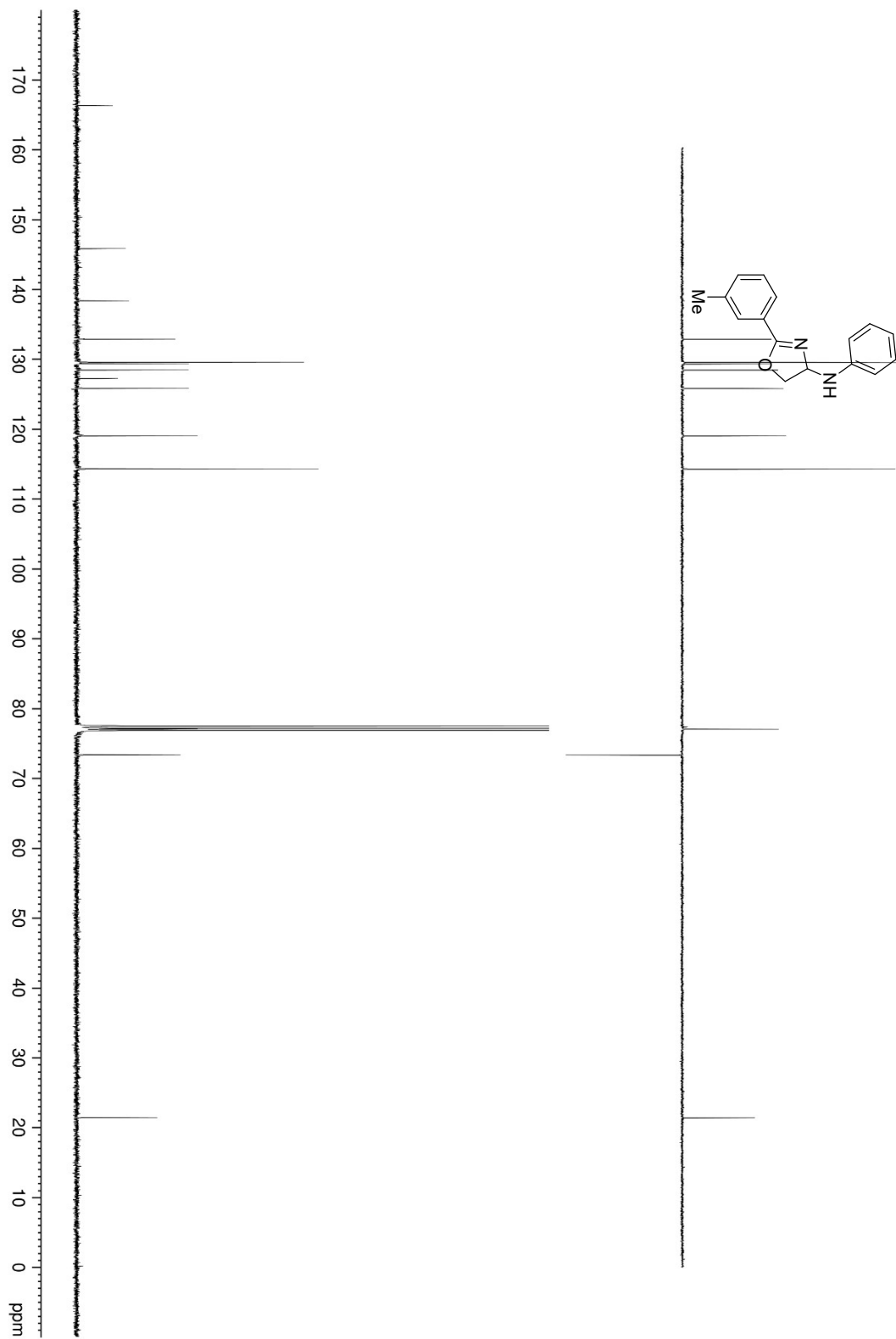
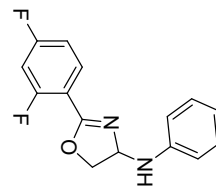
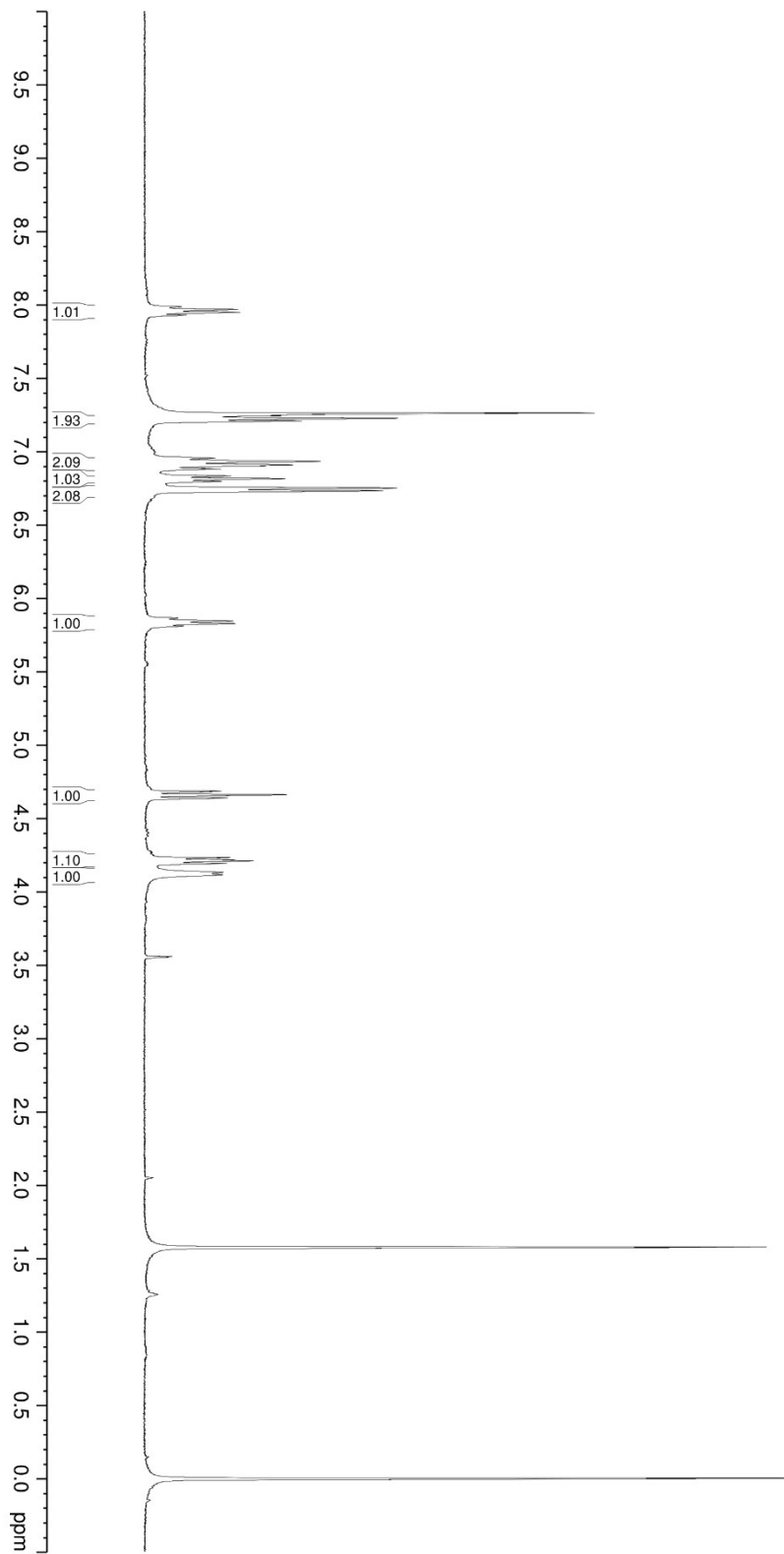


Figure 21. ^{13}C NMR



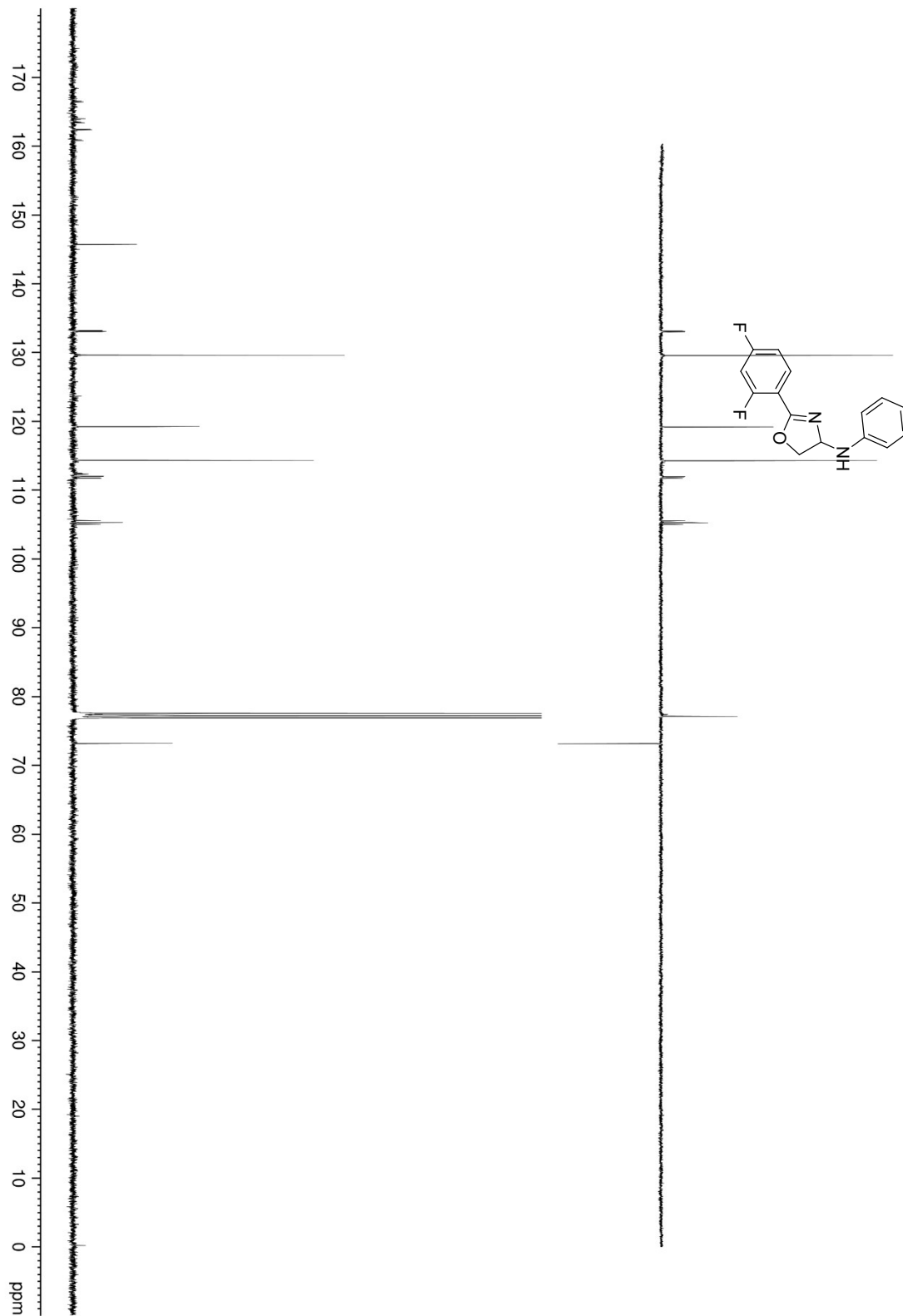
Hong et al.

Figure 22. ^1H NMR



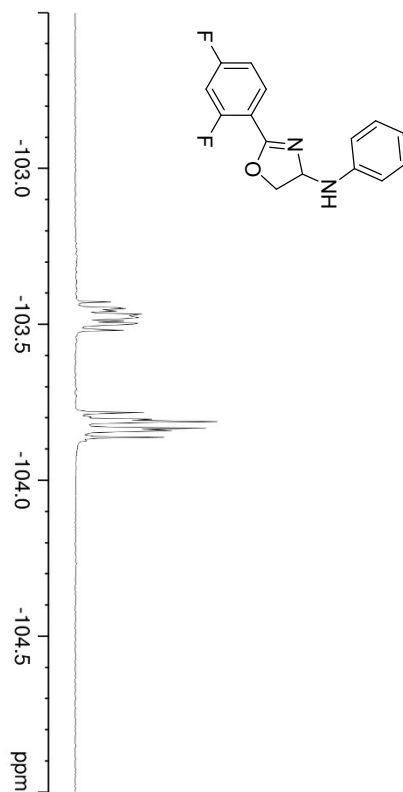
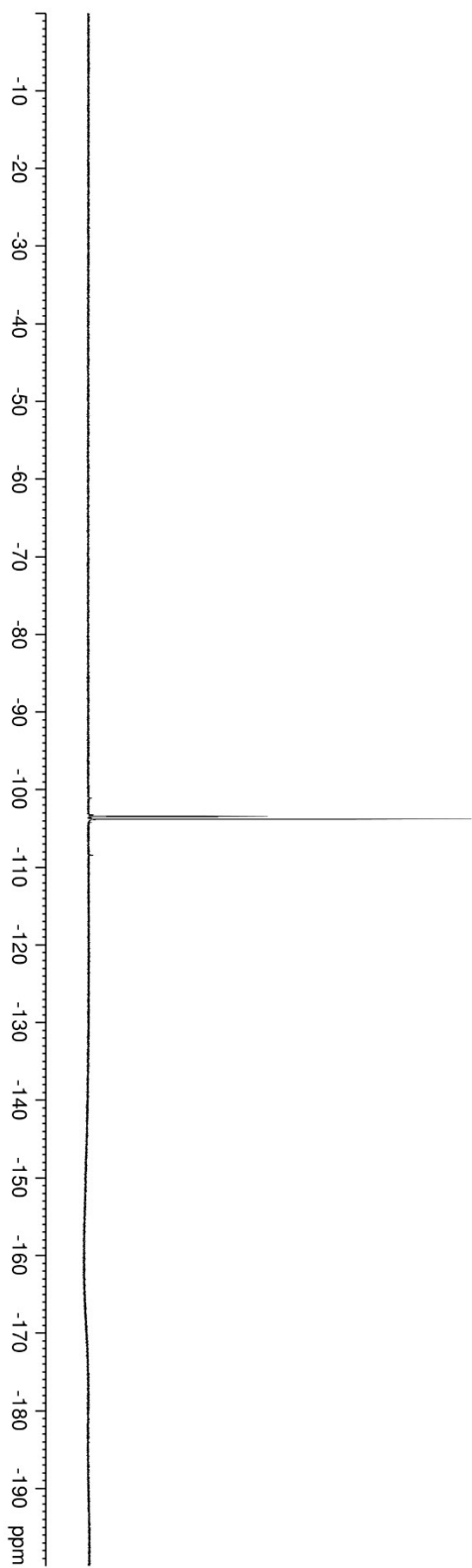
Hong et al.

Figure 23. ^{13}C NMR



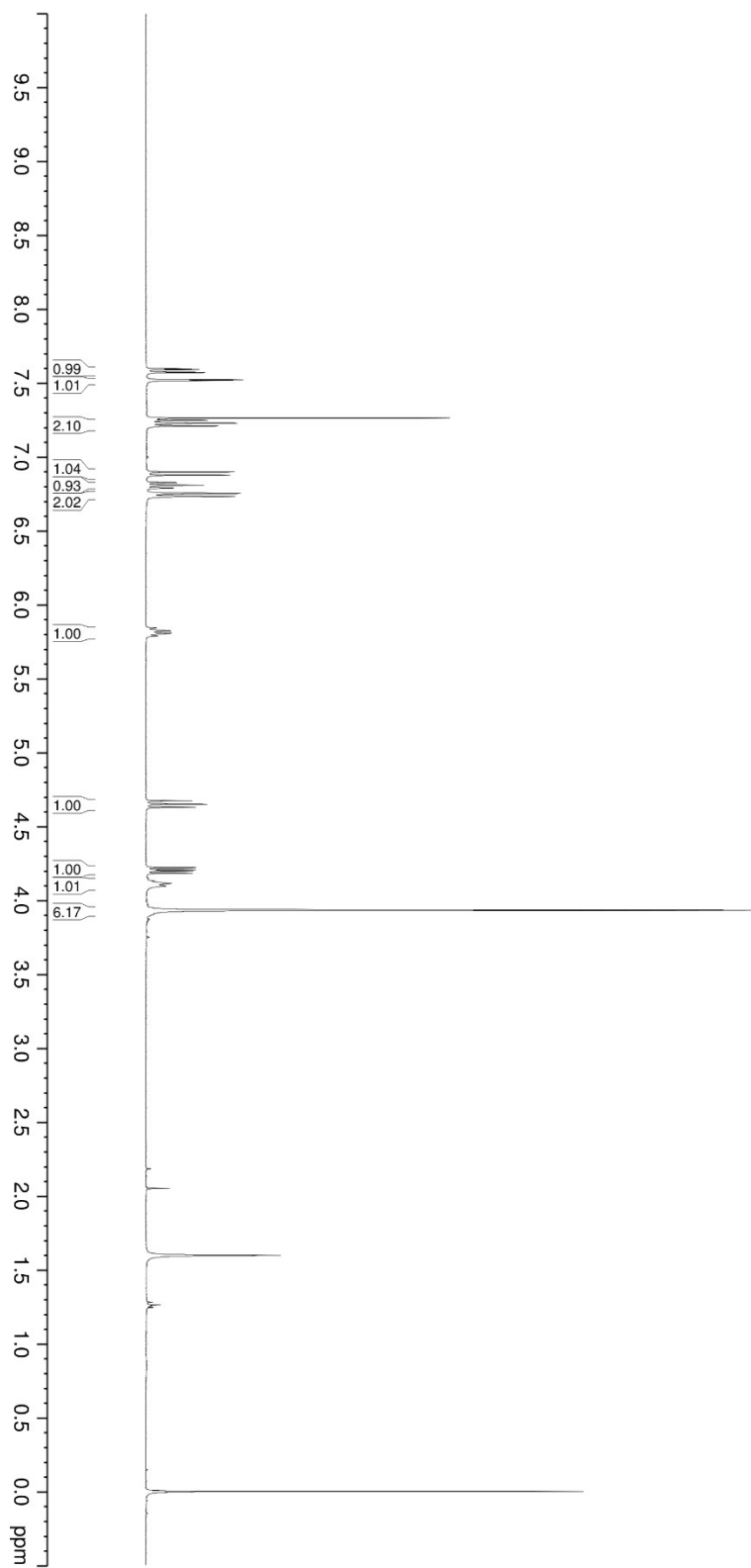
Hong et al.

Figure 24. ^{19}F NMR



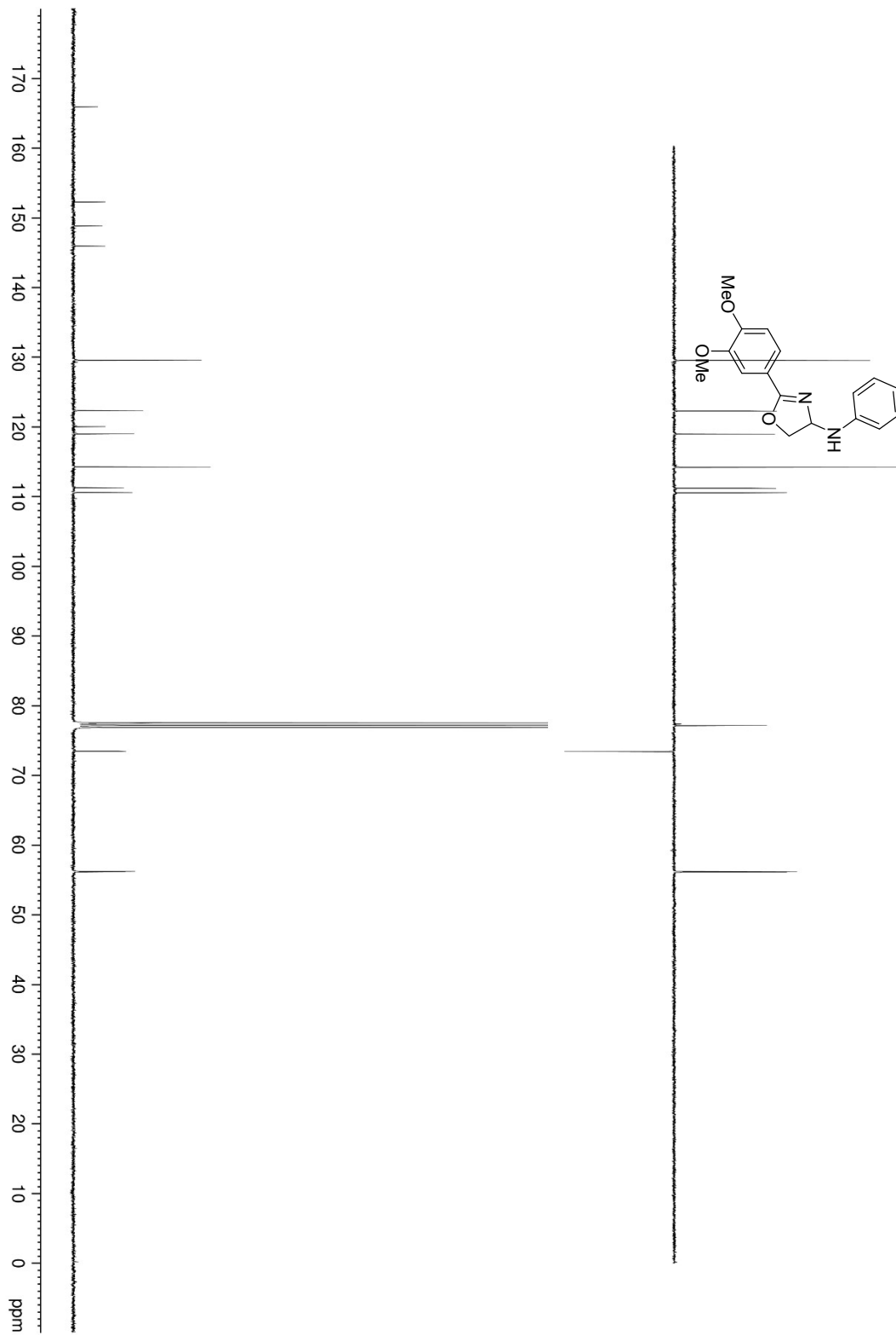
Hong et al.

Figure 25. ^1H NMR



Hong et al.

Figure 26. ^{13}C NMI



Hong et al.

Figure 27. ^1H NMR

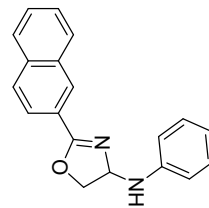
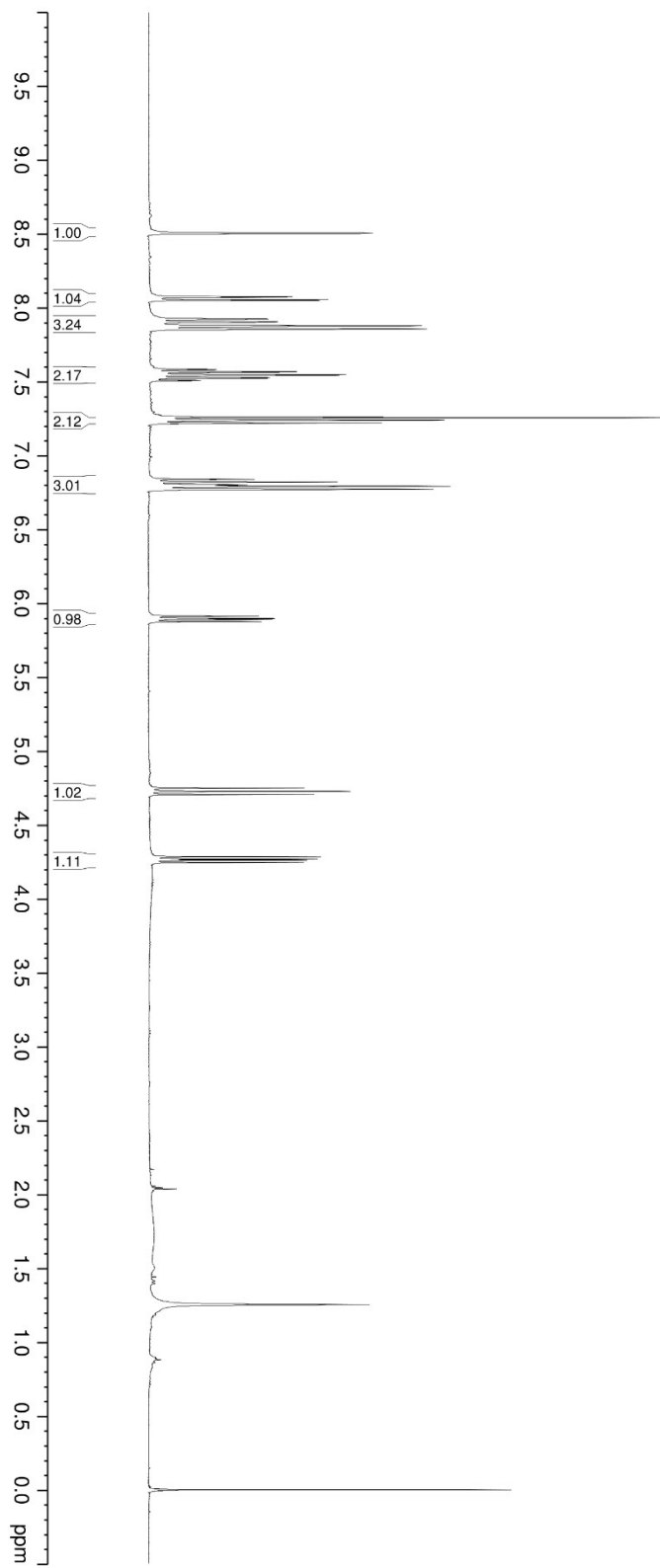
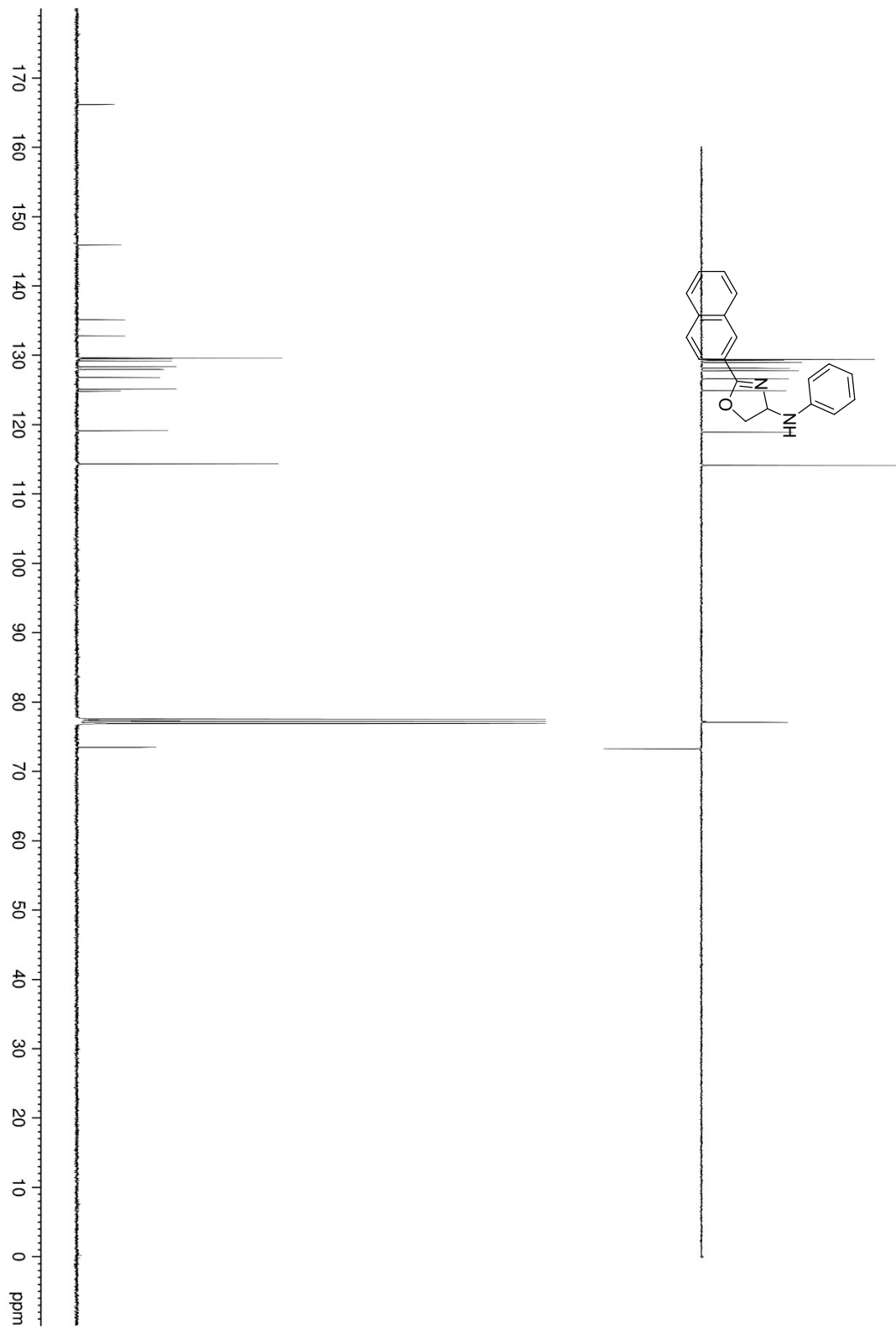
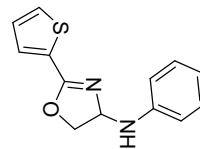
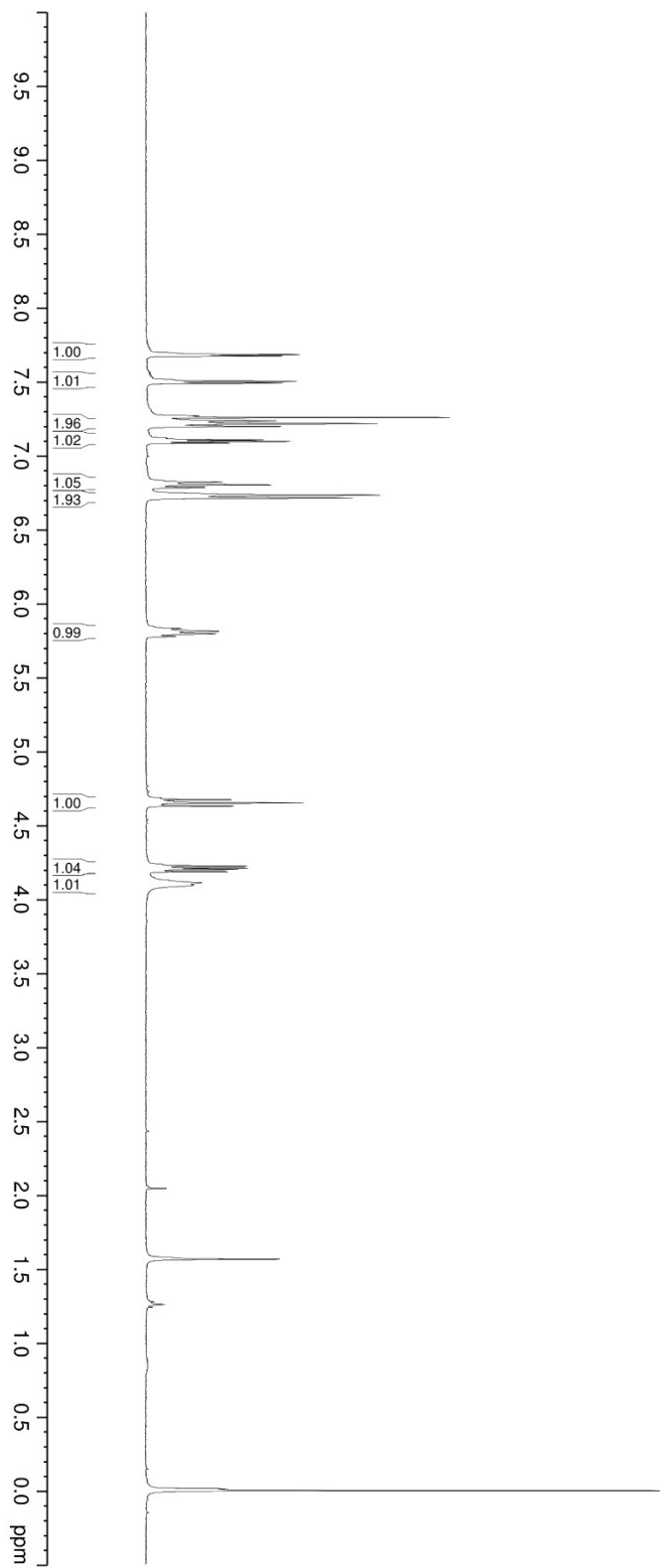


Figure 28. ^{13}C NMI



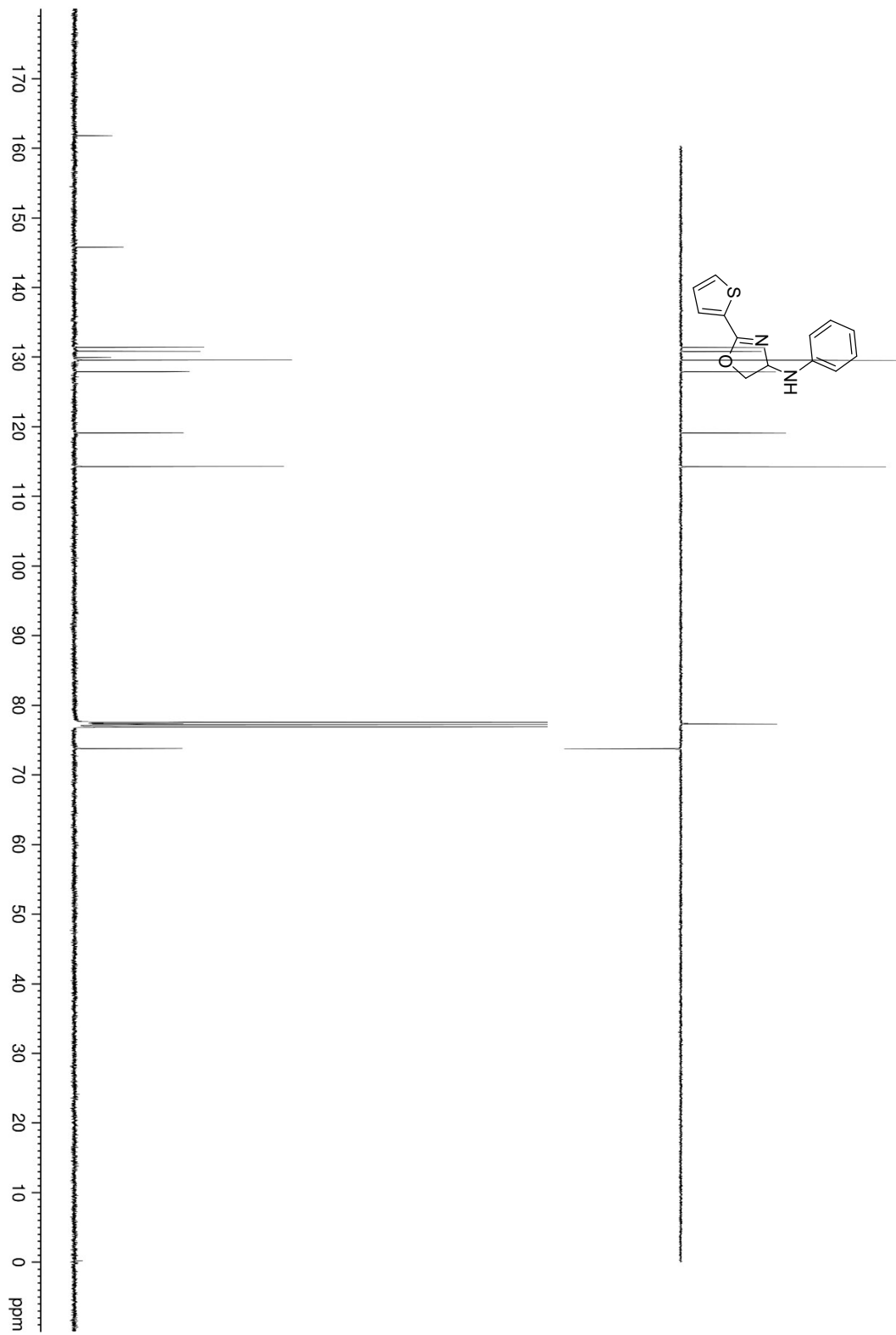
Hong et al.

Figure 29. ^1H NMR



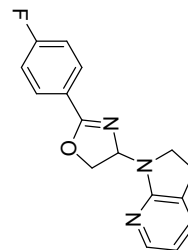
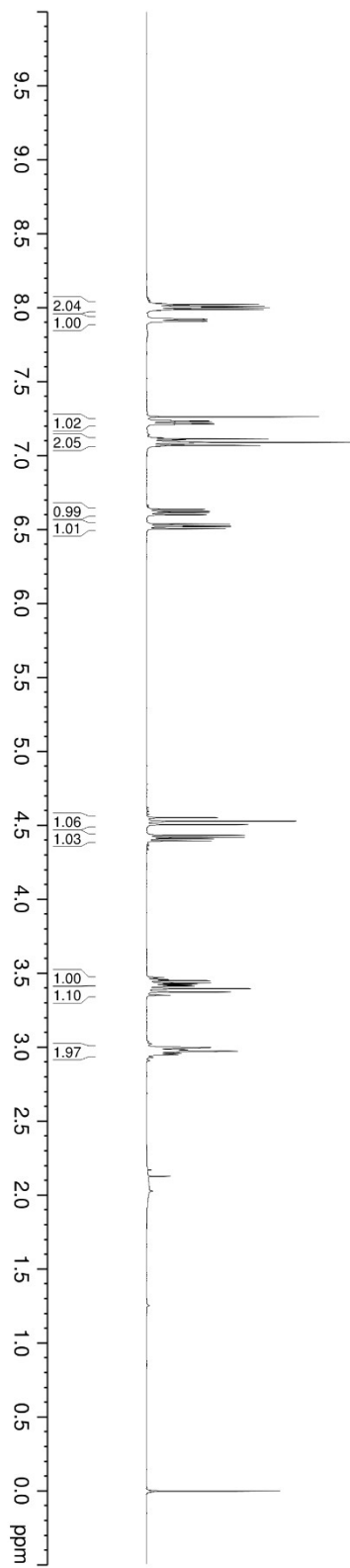
Hong et al.

Figure 30. ^{13}C NMI



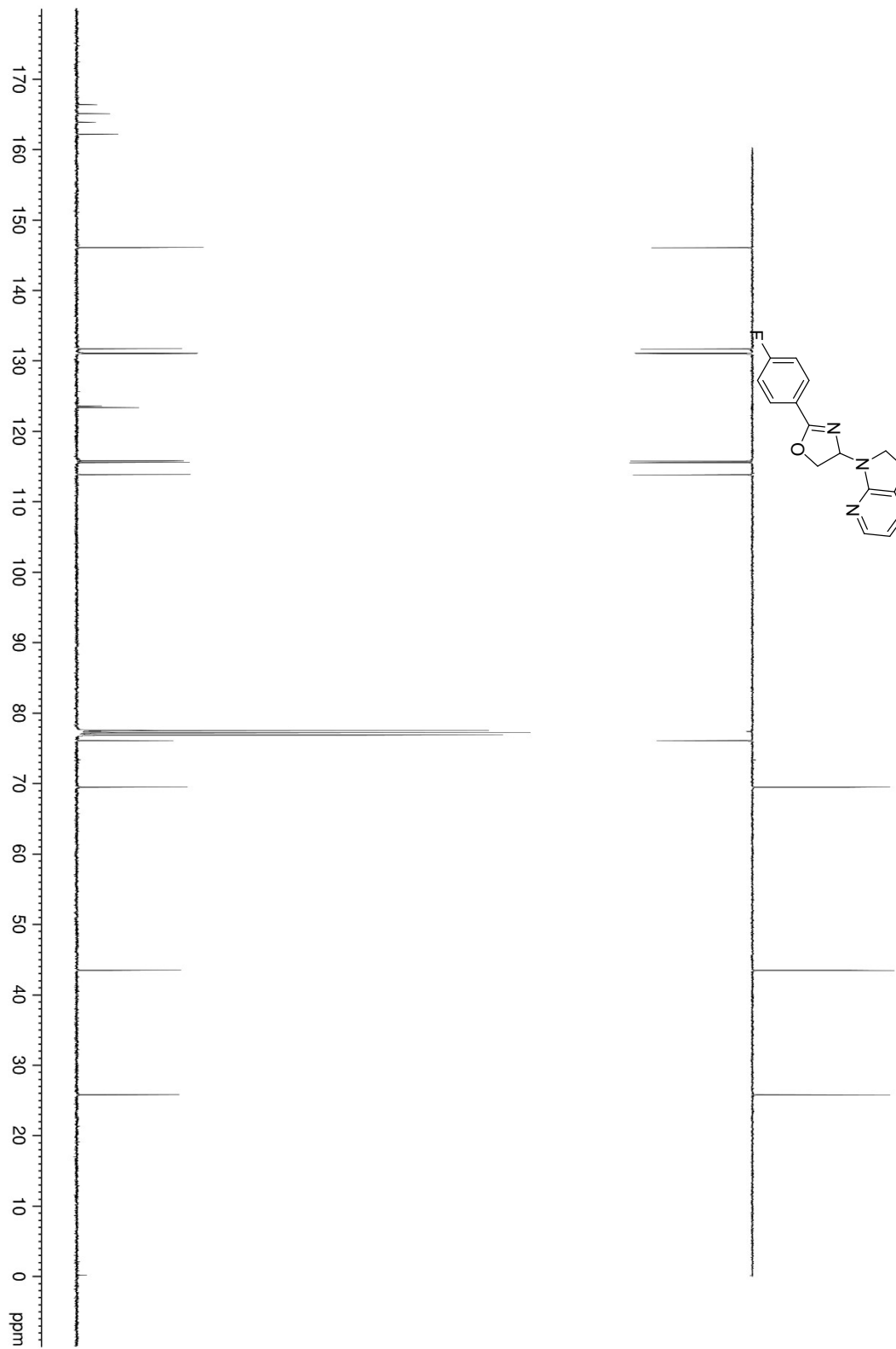
Hong et al.

Figure 31. ^1H NMR



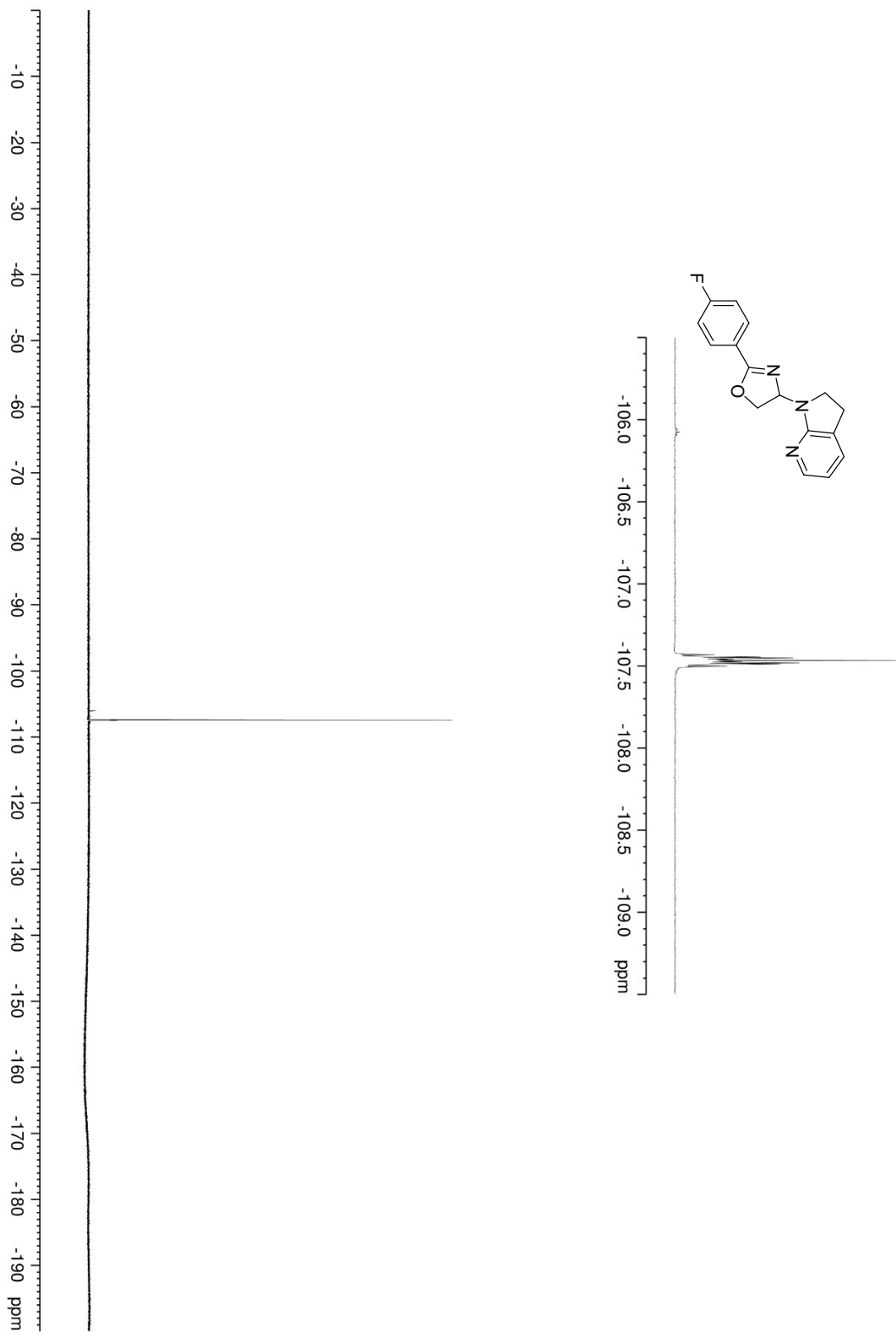
Hong et al.

Figure 32. ^{13}C NMI



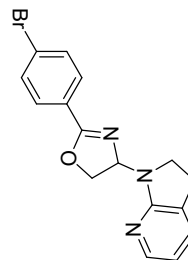
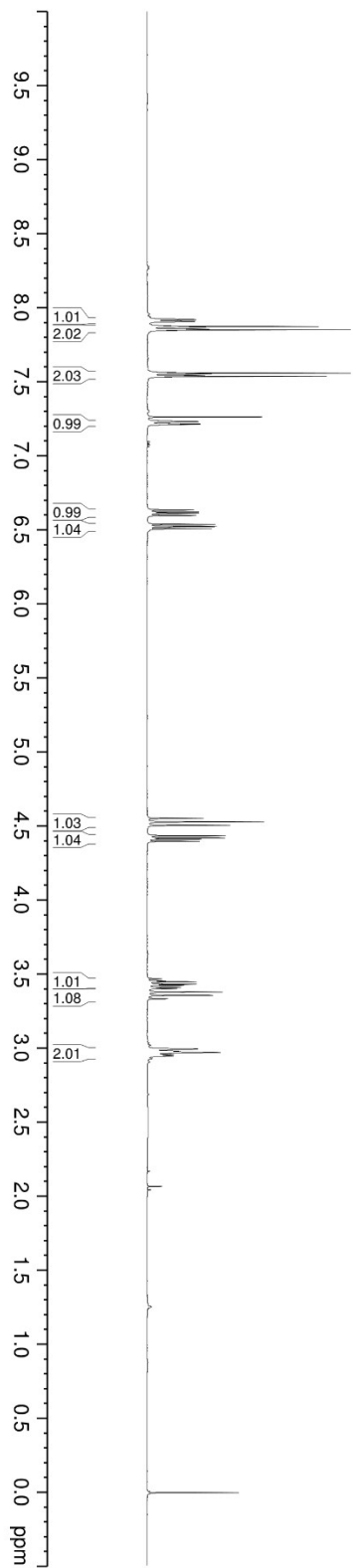
Hong et al.

Figure 33. ^{19}F NMR



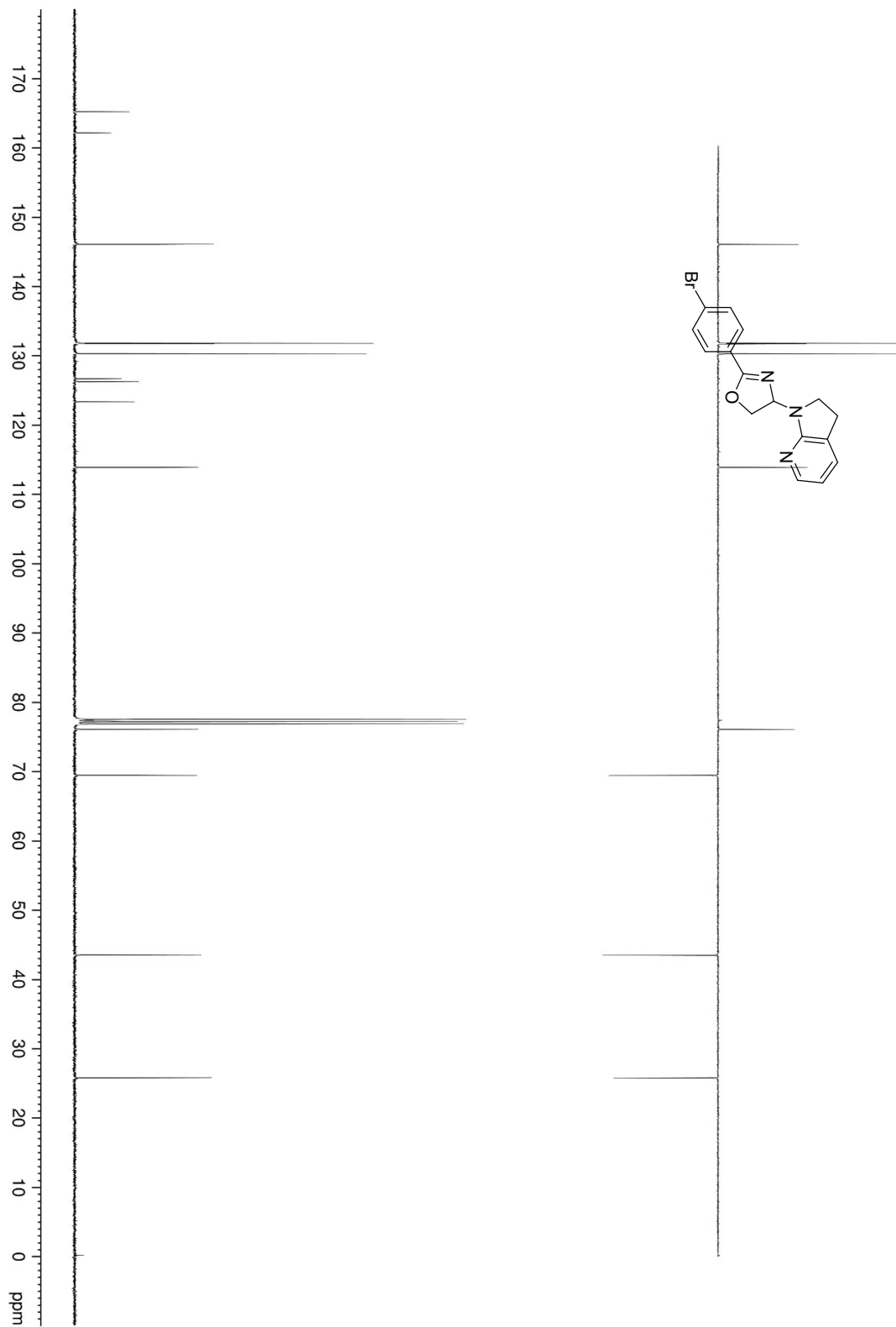
Hong et al.

Figure 34. ^1H NMR



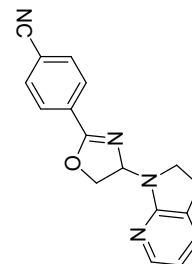
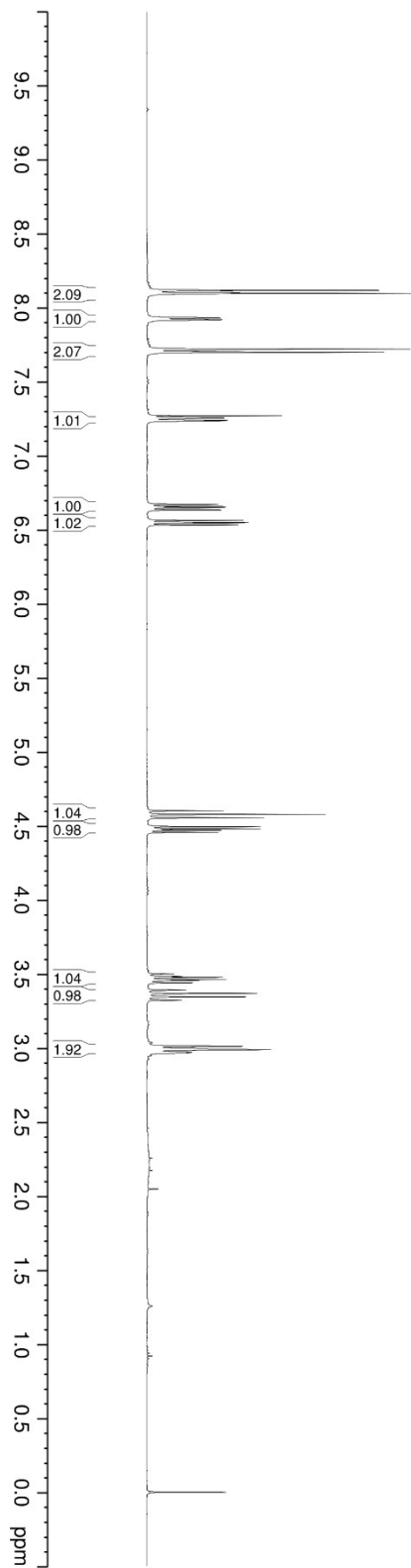
Hong et al.

Figure 35. ^{13}C NMI



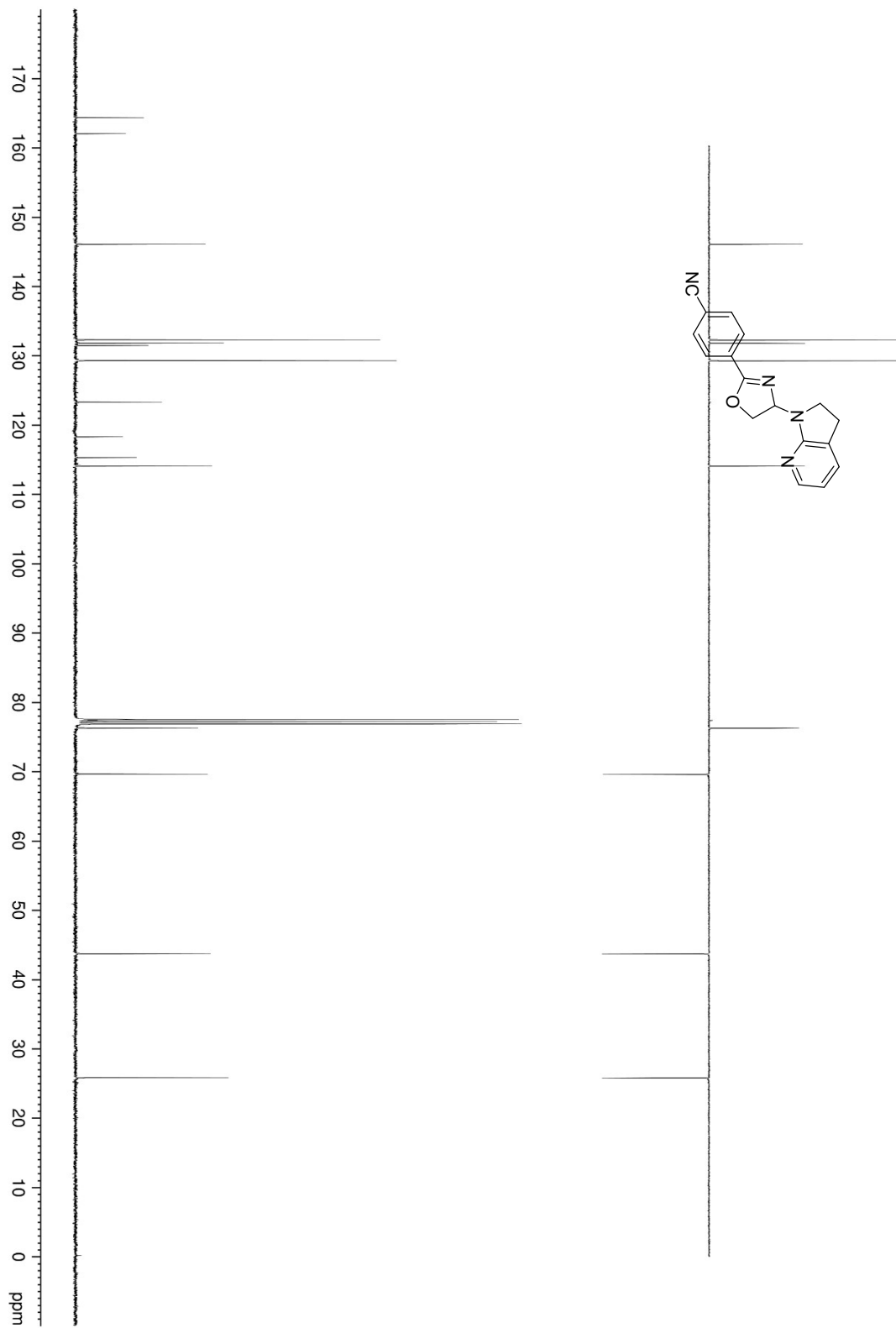
Hong et al.

Figure 36. ^1H NMR



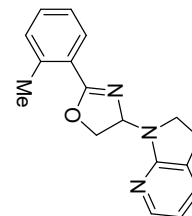
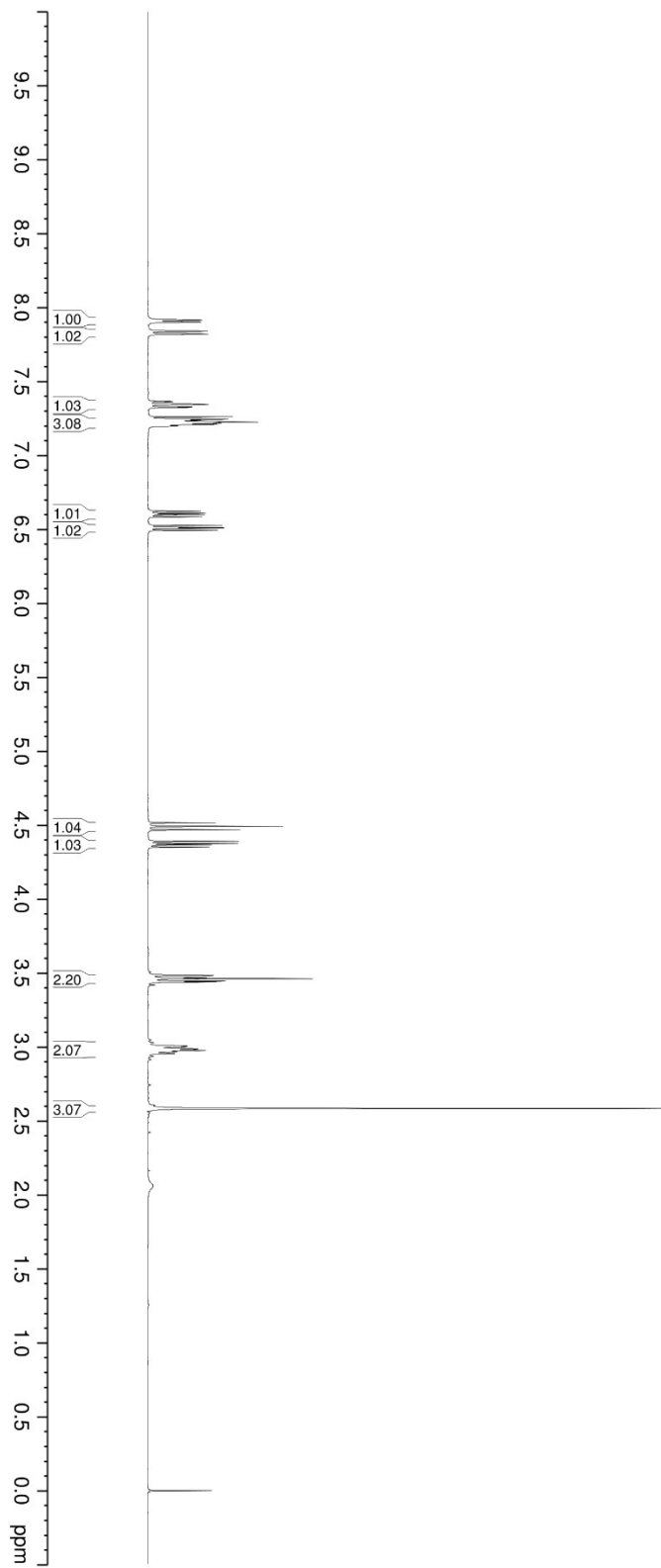
Hong et al.

Figure 37. ^{13}C NMI



Hong et al.

Figure 38. ^1H NMR



Hong et al.

Figure 39. ^{13}C NMI

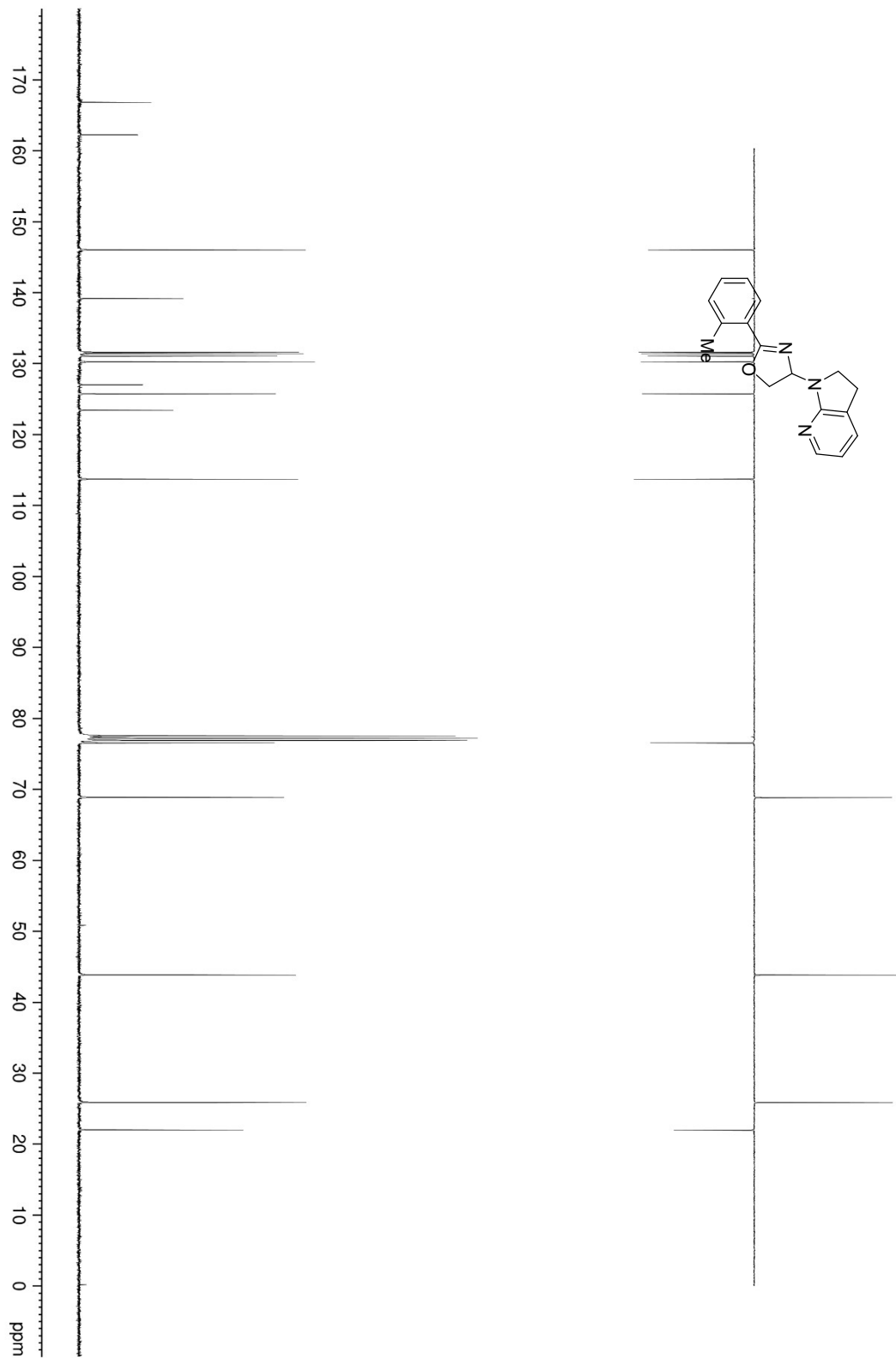


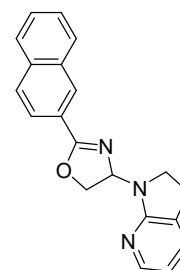
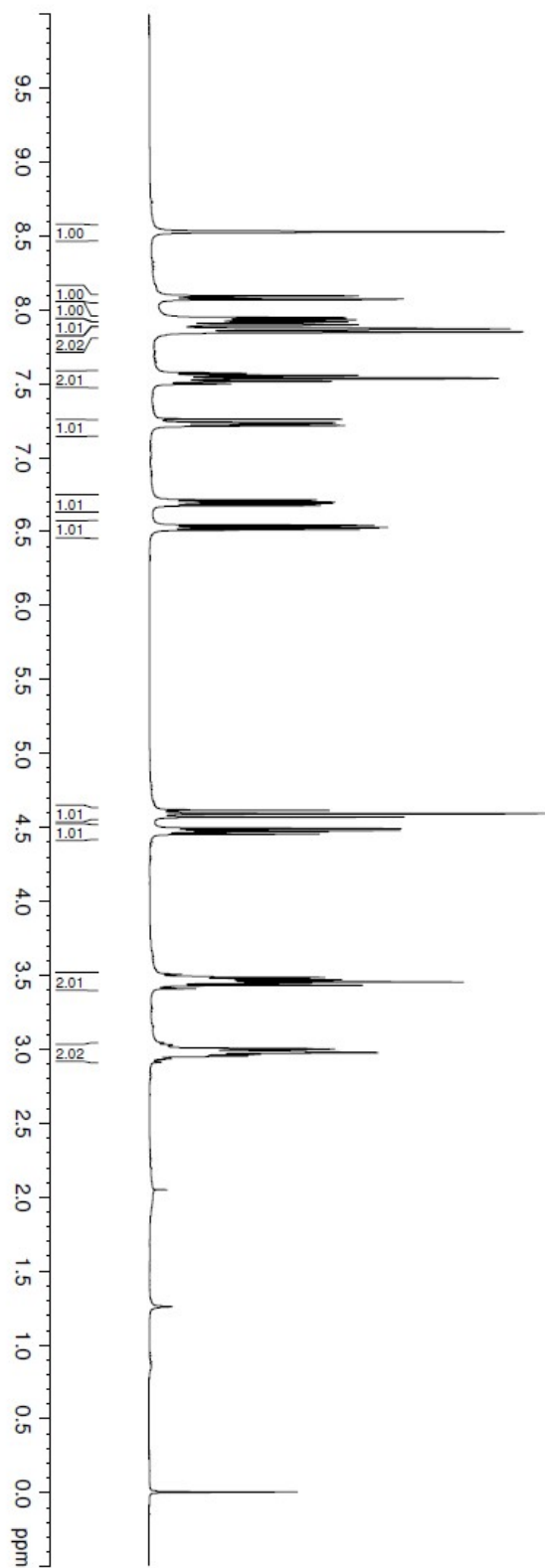
Figure 40. ^1H NMR (CDCl_3) of **71**

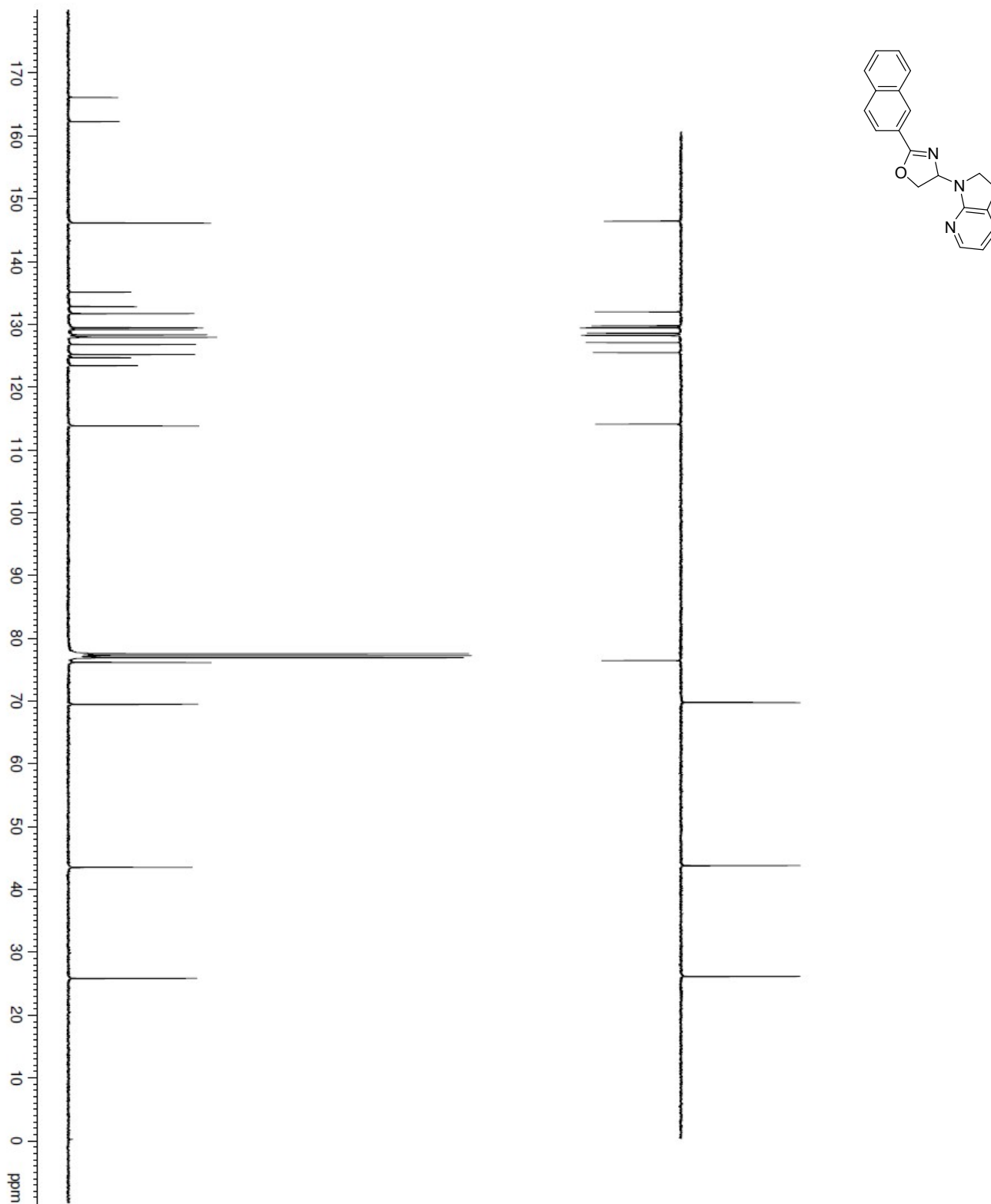
Figure 41. ^{13}C NMR (CDCl_3) of **71**

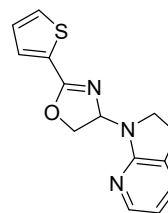
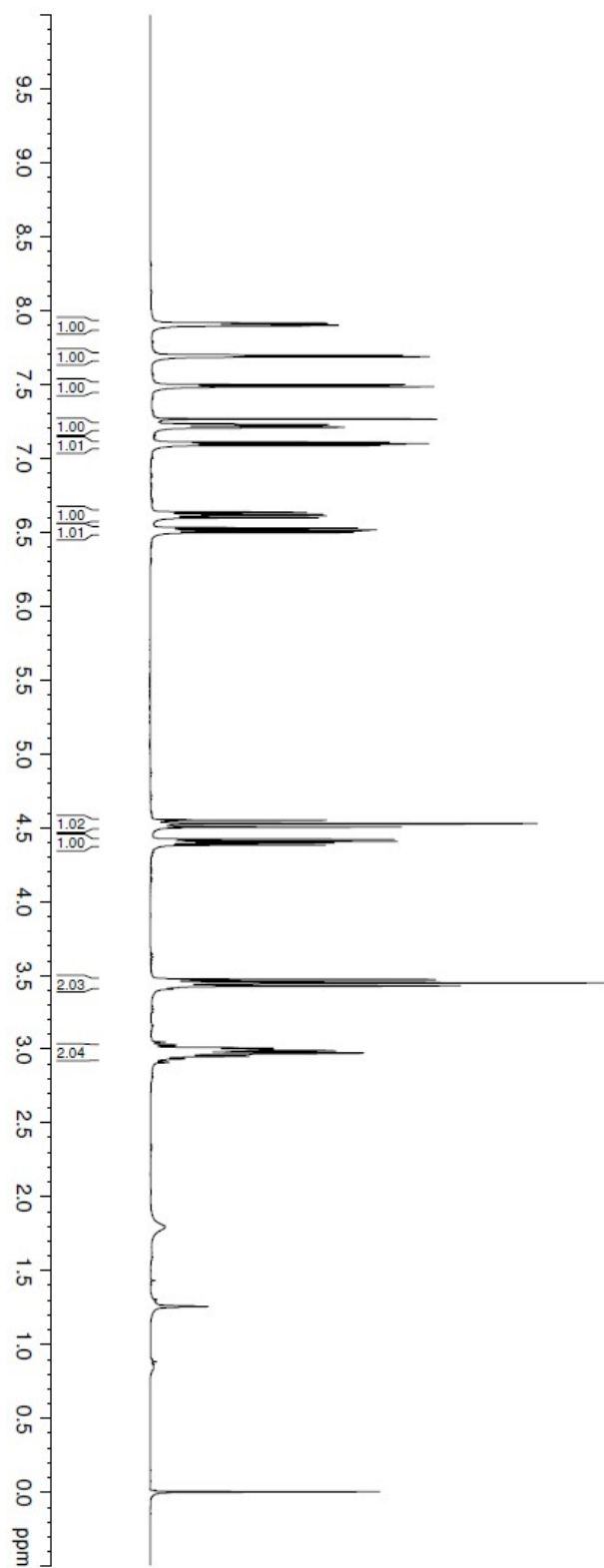
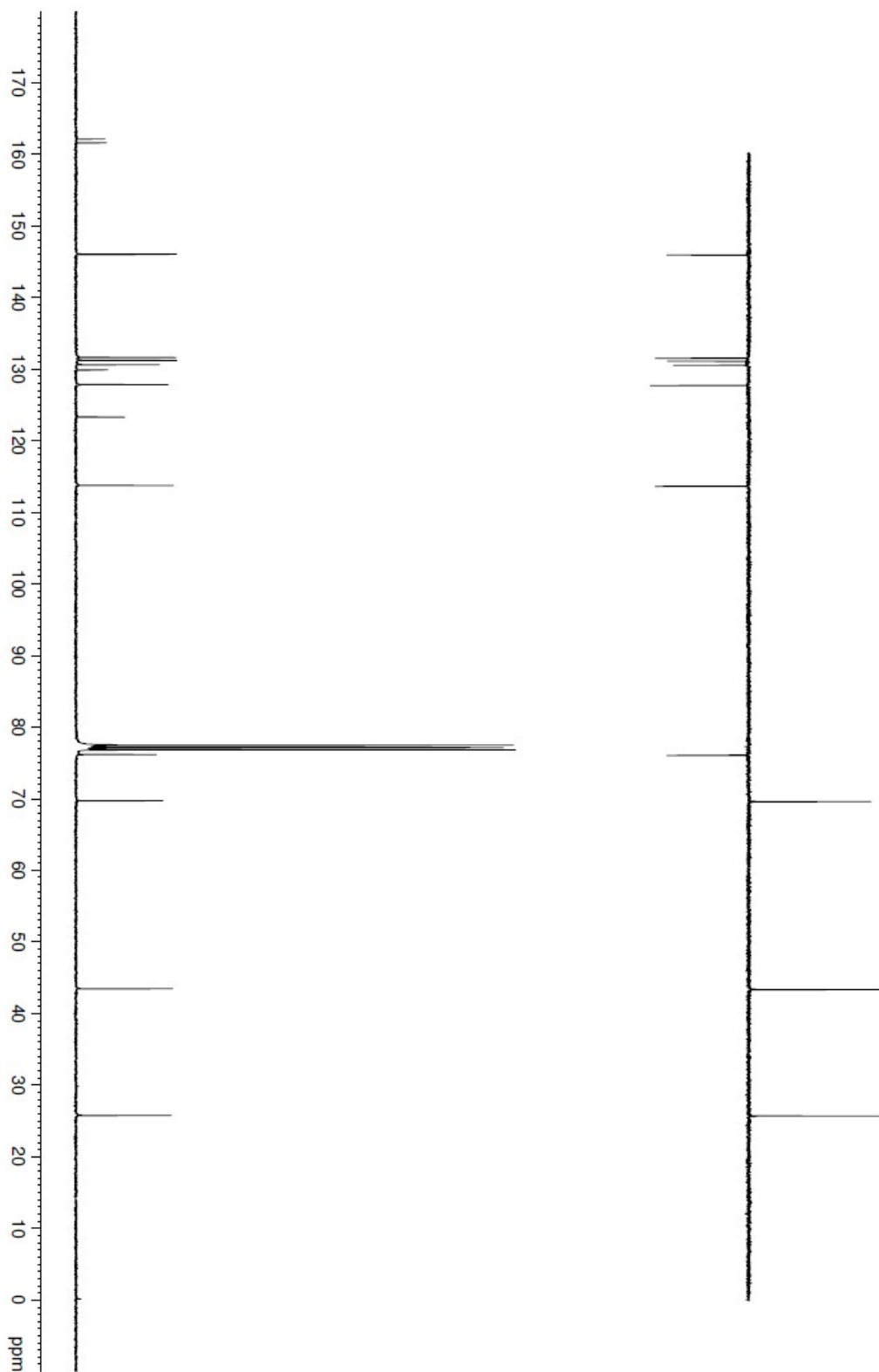
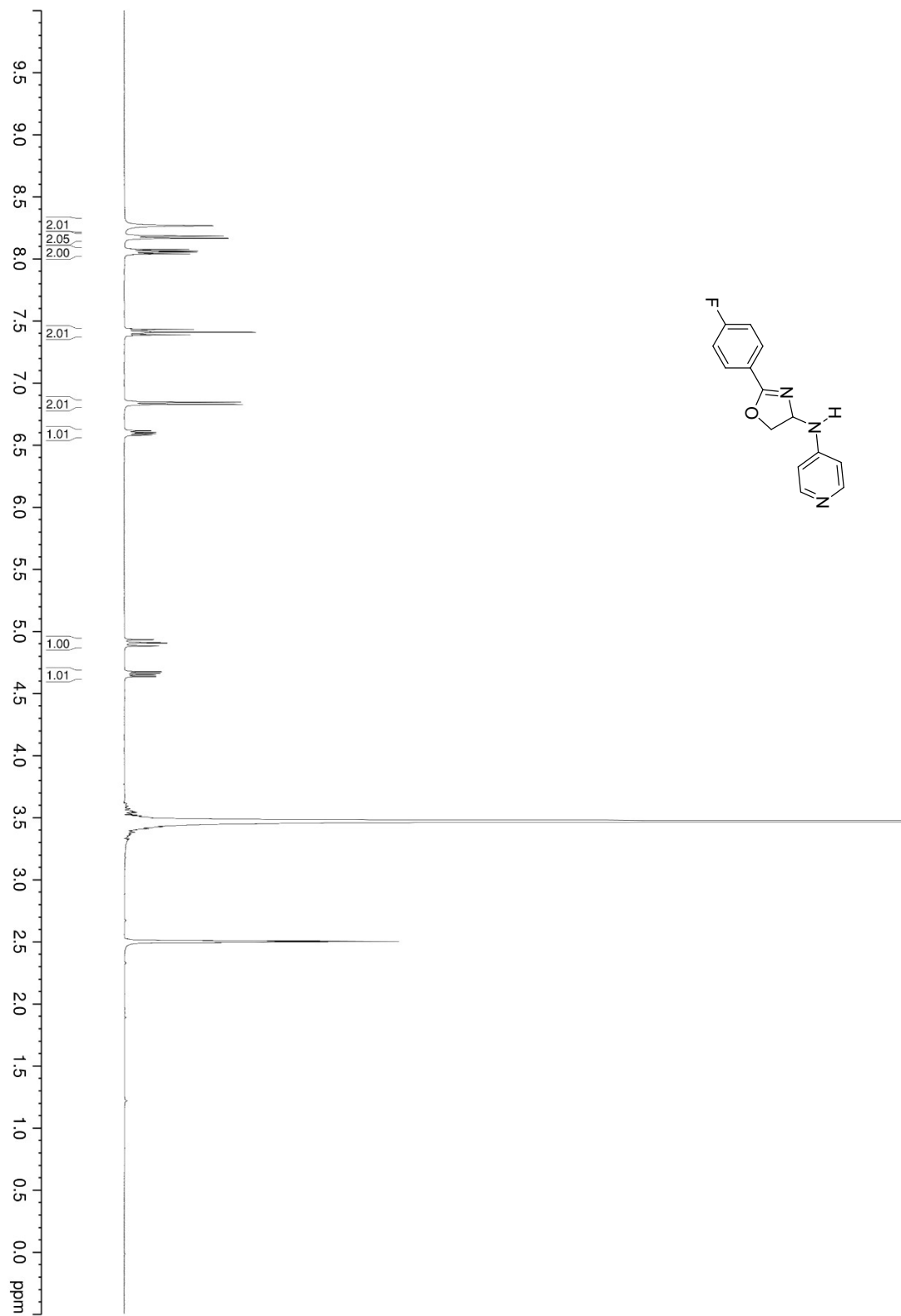
Figure 42. ^1H NMR (CDCl_3) of **7m**

Figure 43. ^{13}C NMR (CDCl_3) of **7m**

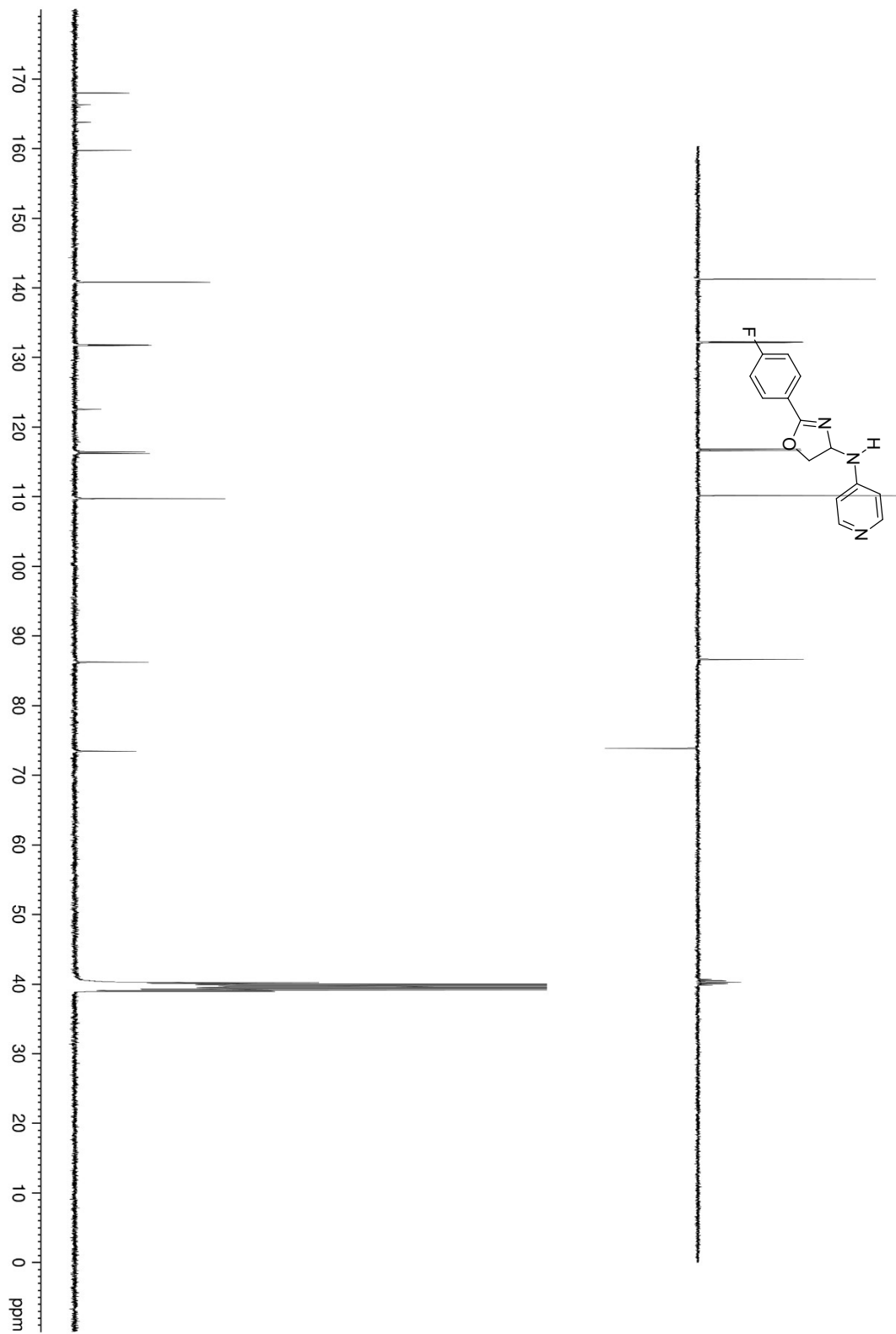
Hong et al.

Figure 44. ^1H NMR



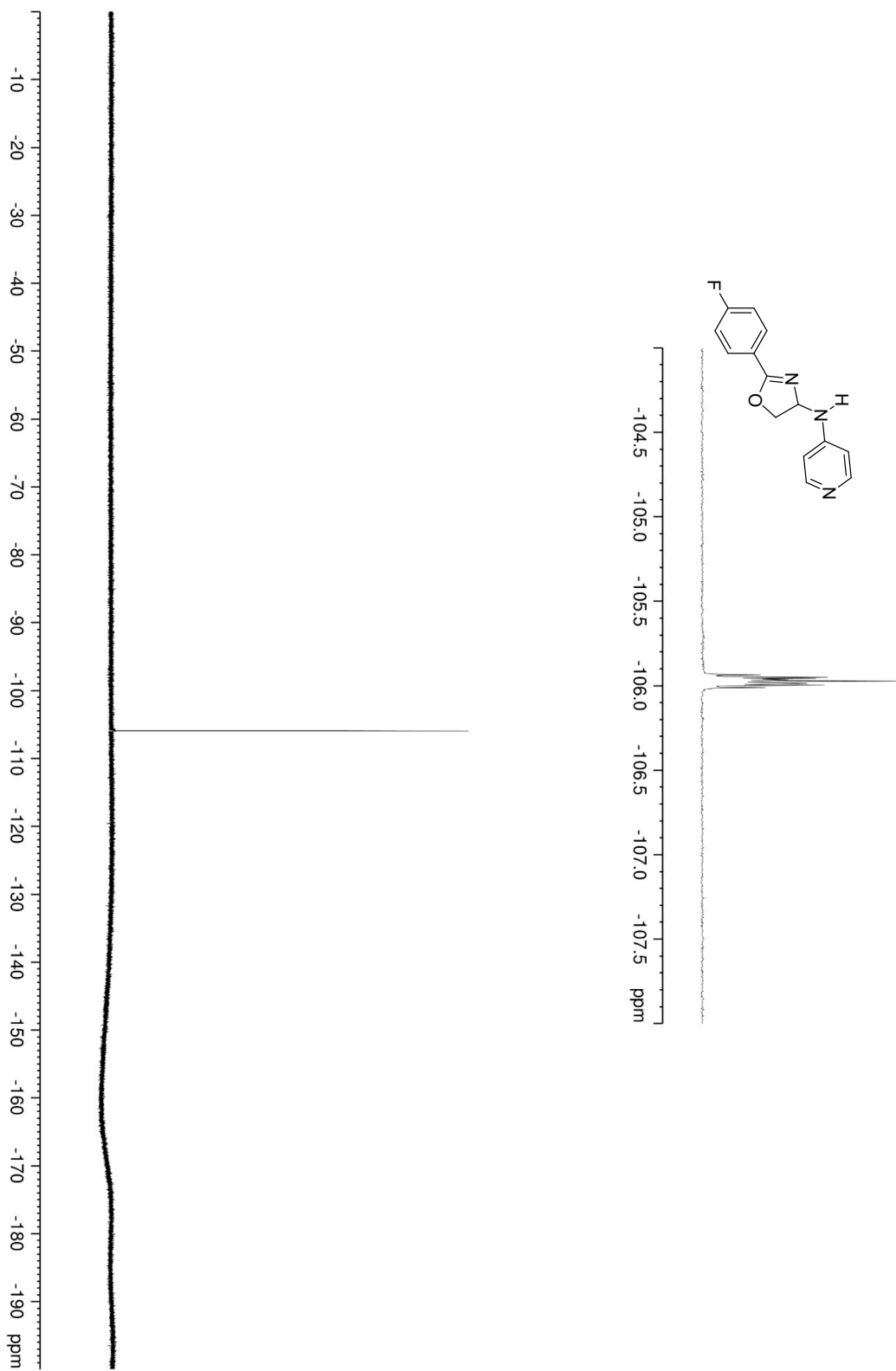
Hong et al.

Figure 45. ^{13}C NMI



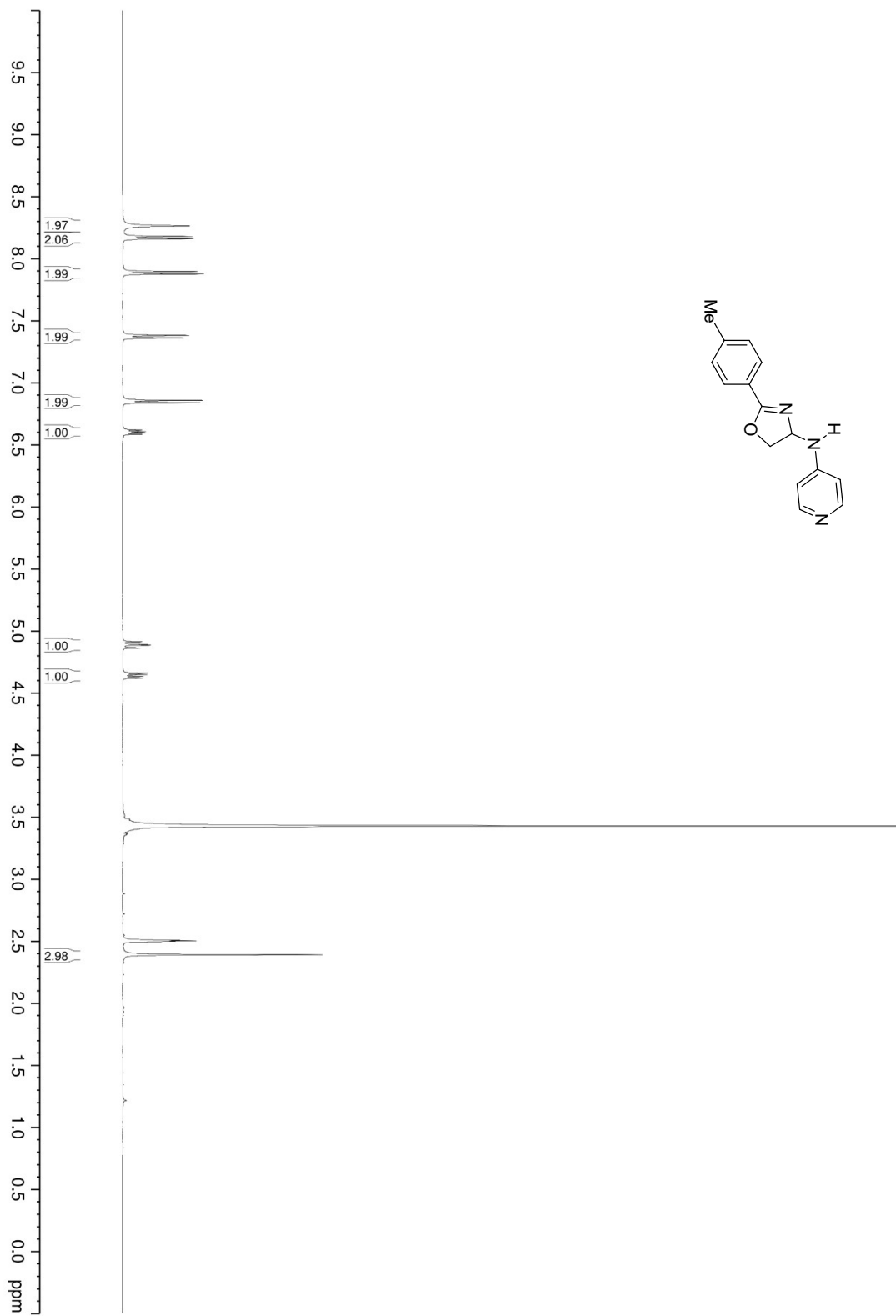
Hong et al.

Figure 46. ^{19}F NMR



Hong et al.

Figure 47. ^1H NMR



Hong et al.

Figure 48. ^{13}C NMI

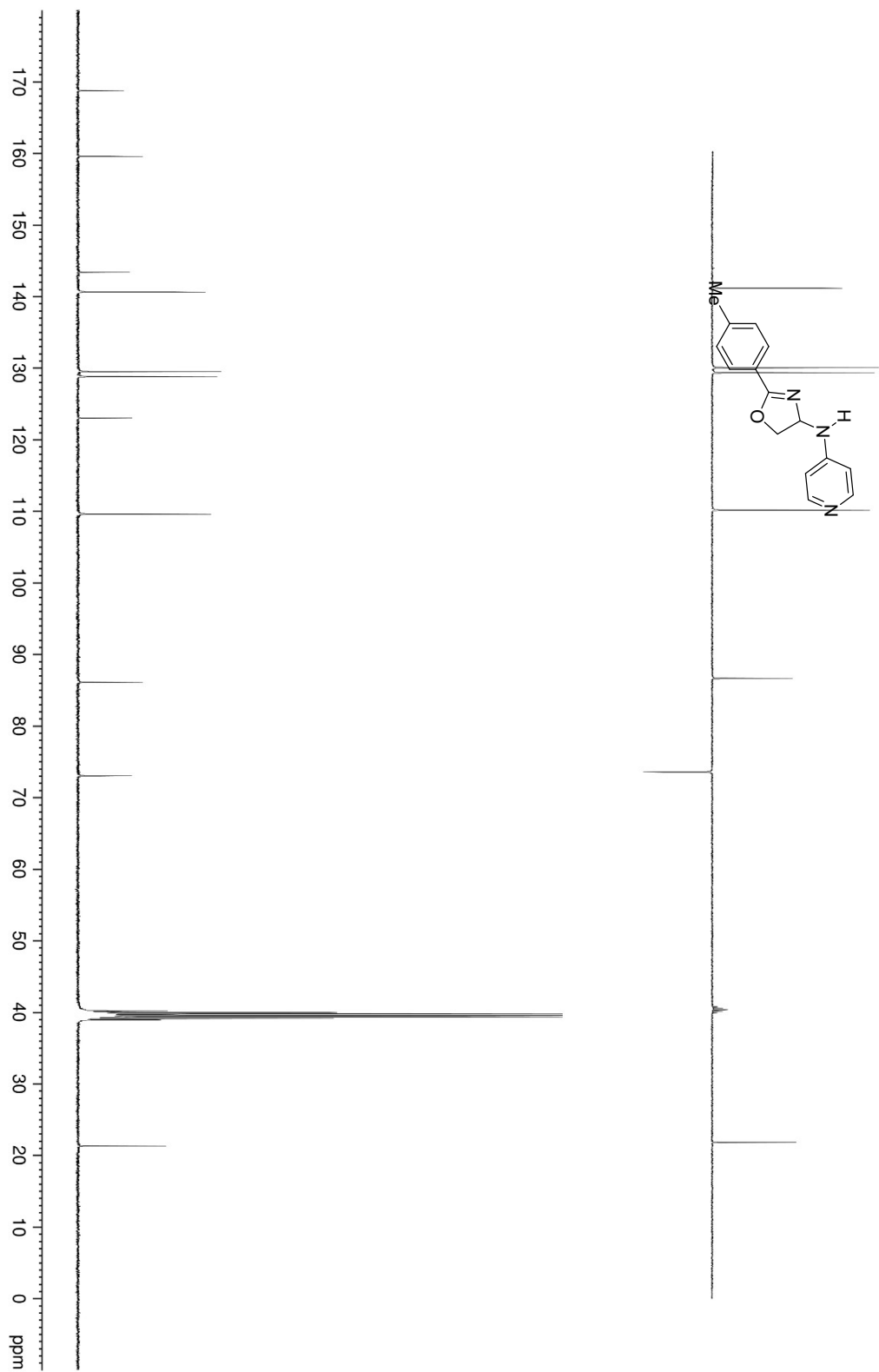


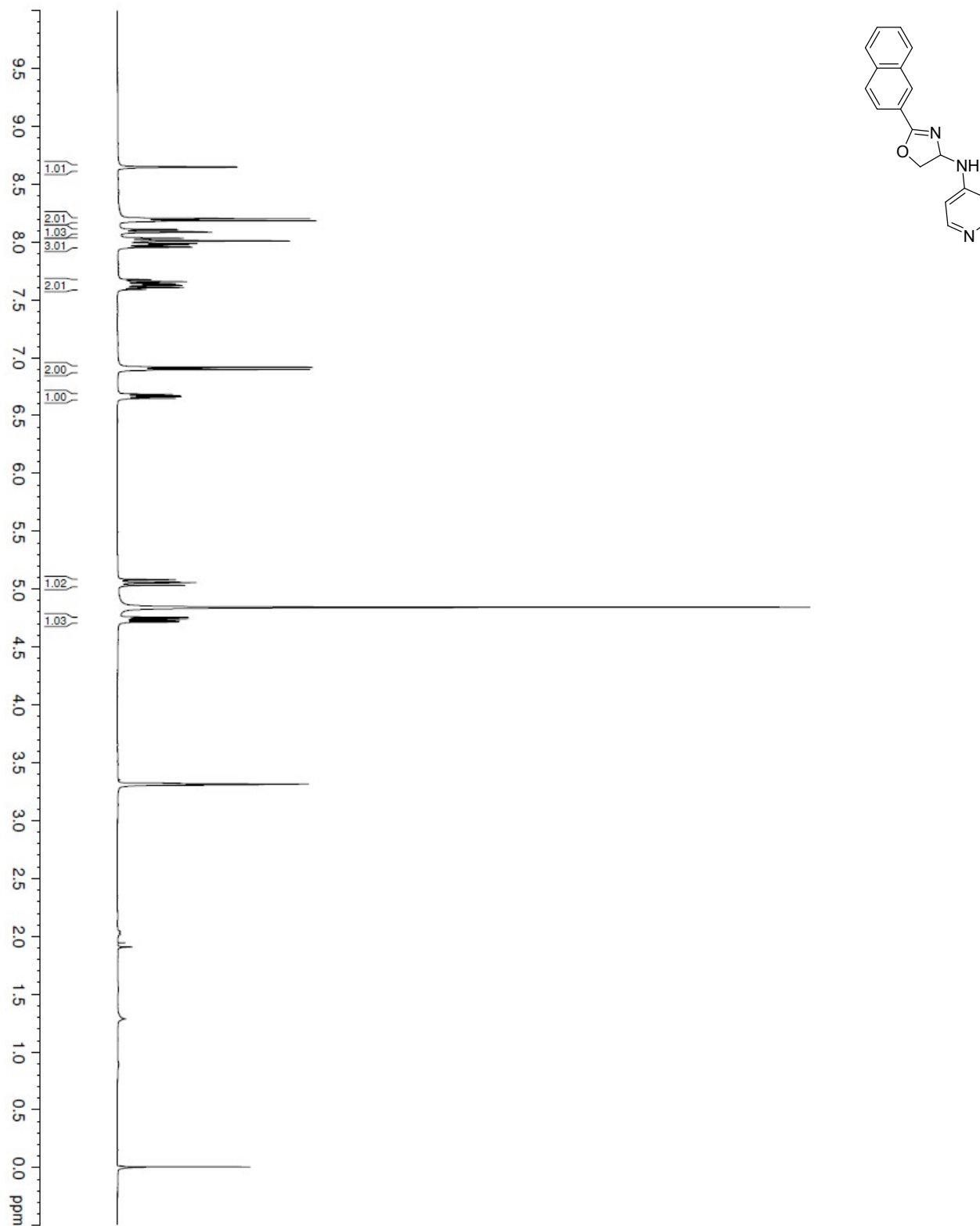
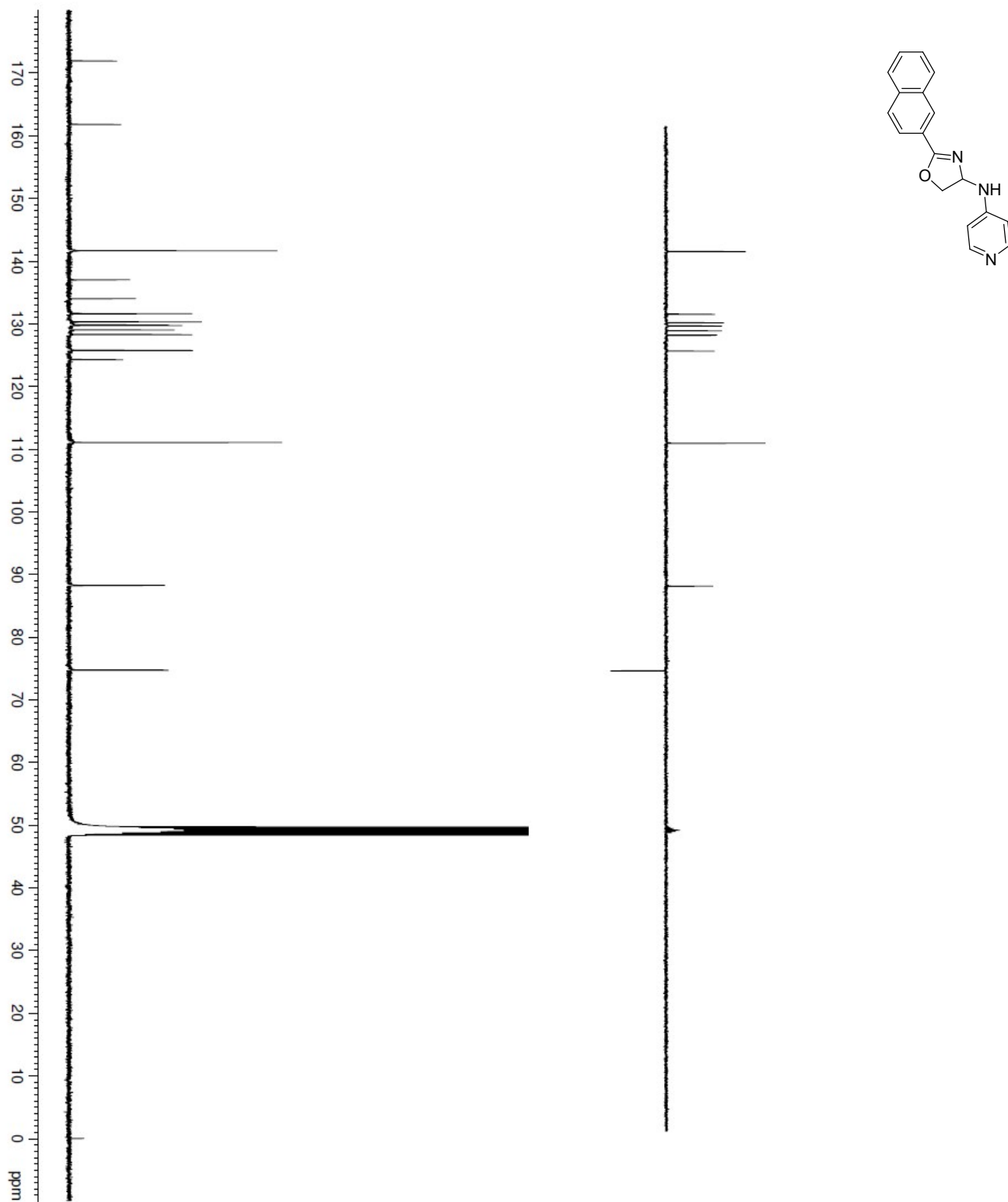
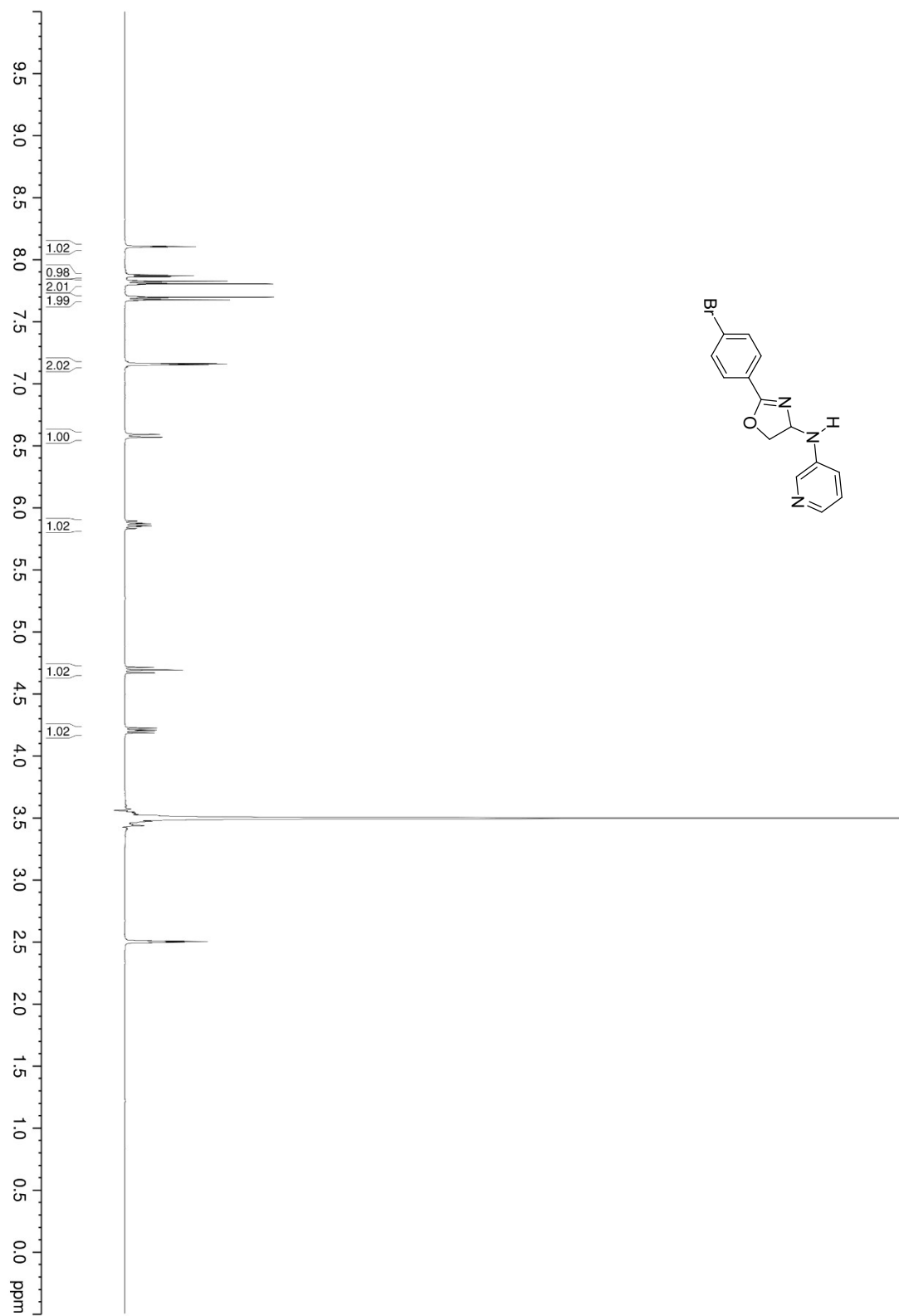
Figure 49. ^1H NMR (MeOD- d_4) of **81**

Figure 50. ^{13}C NMR (MeOD- d_4) of **8I**

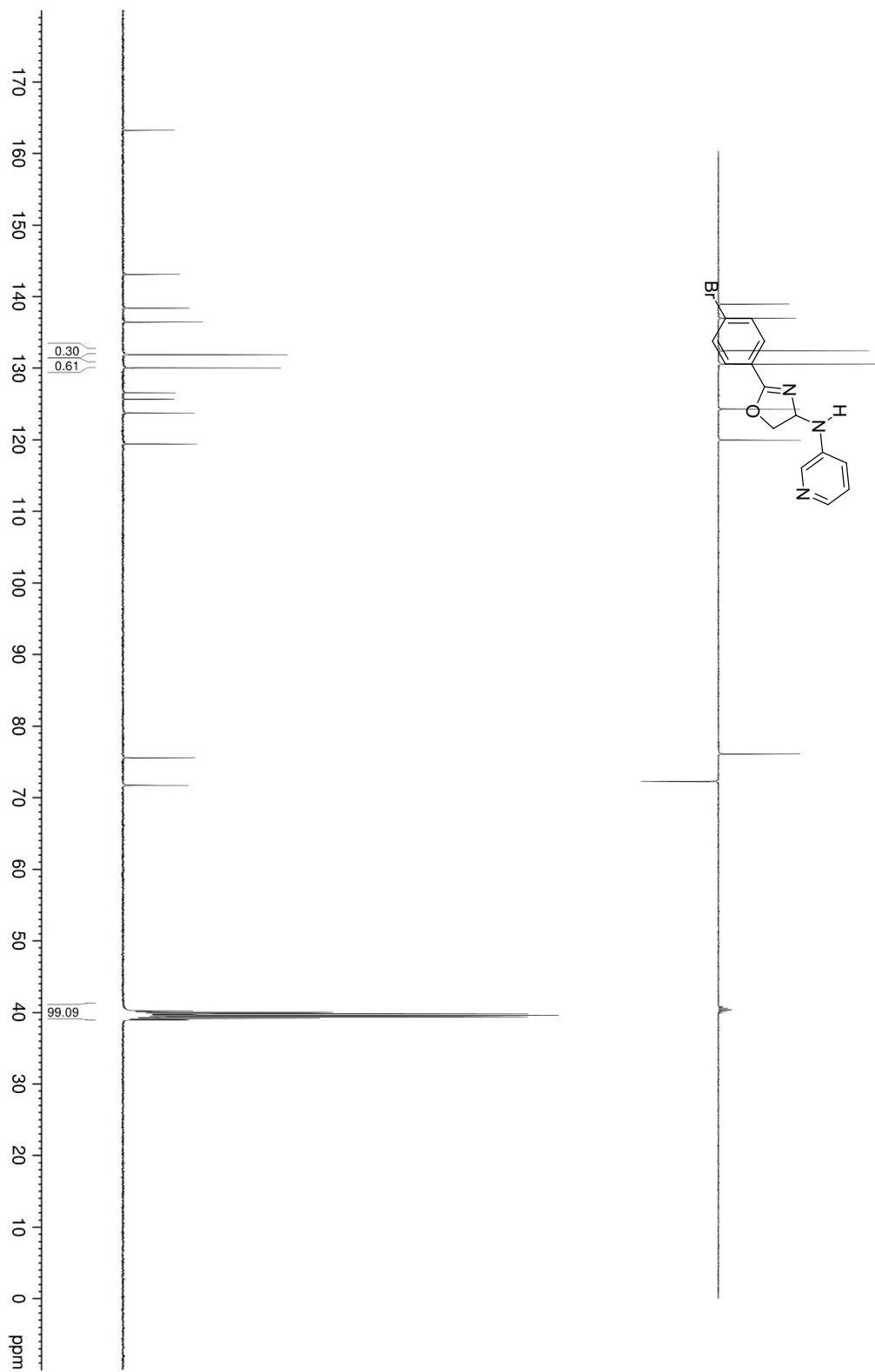
Hong et al.

Figure 51. ^1H NMR



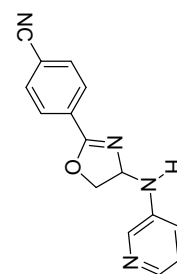
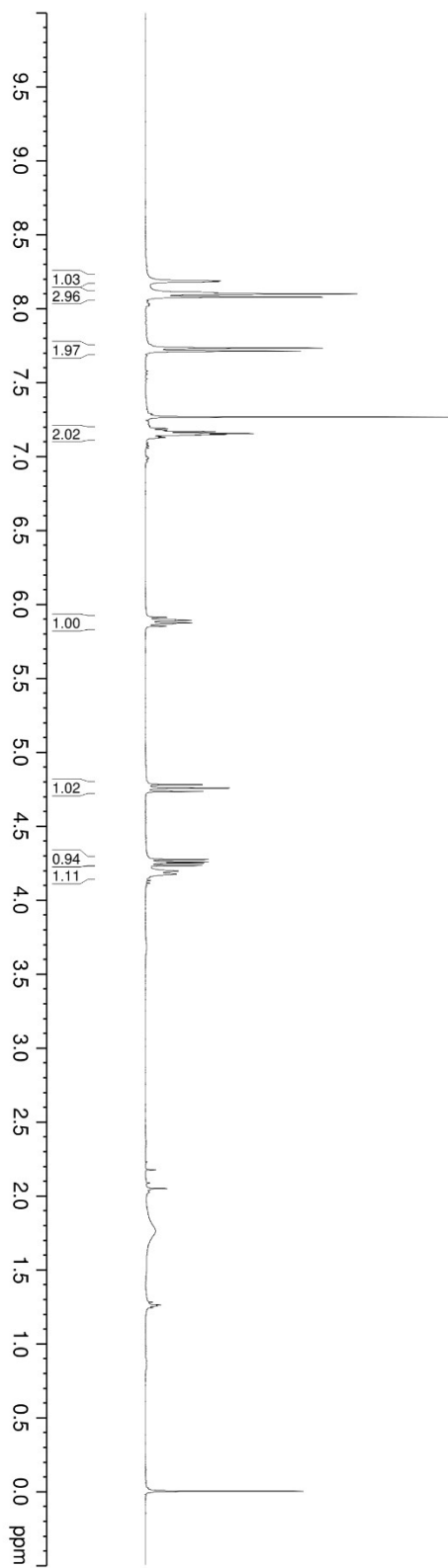
Hong et al.

Figure 52. ^{13}C NMI



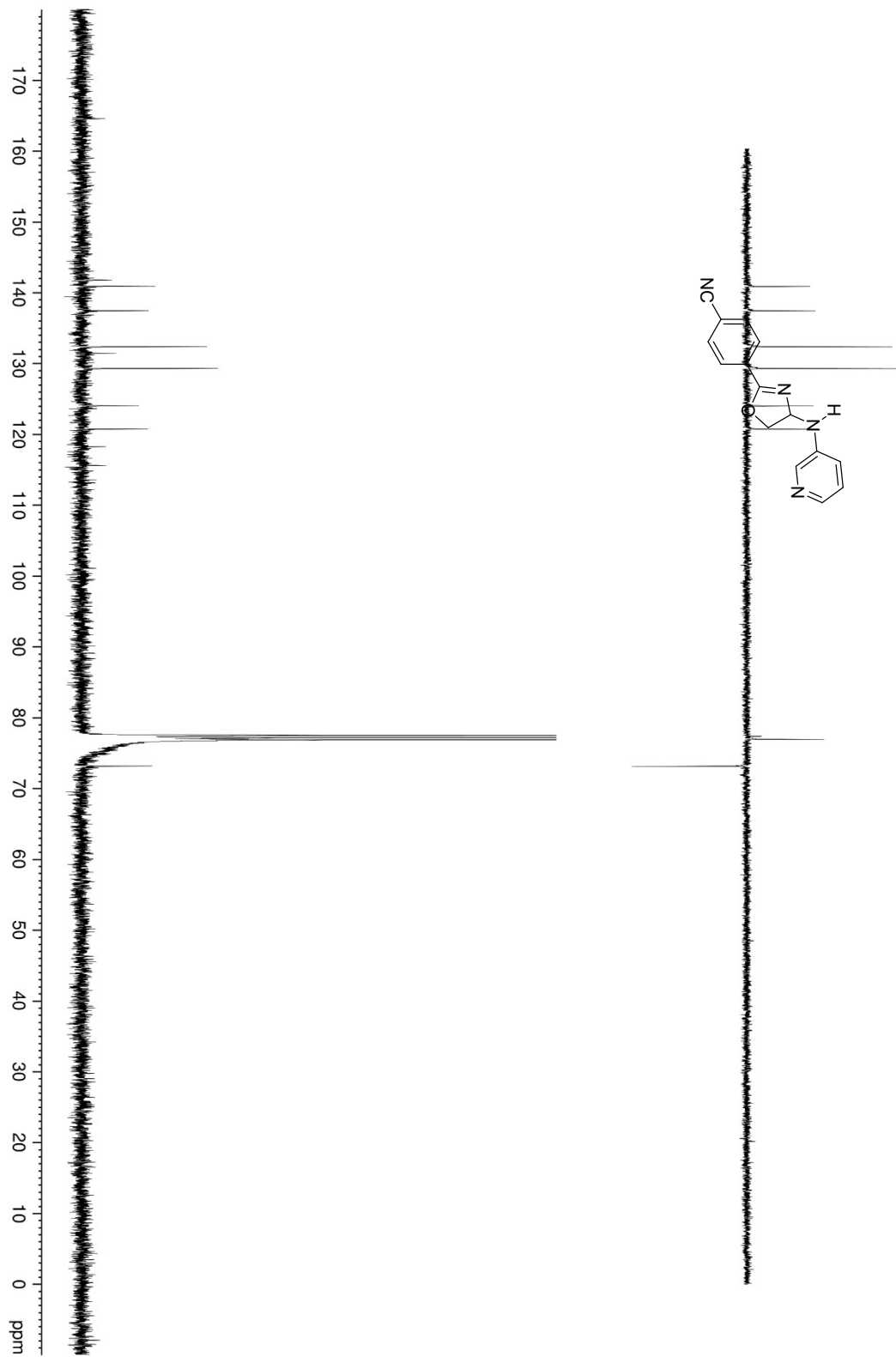
Hong et al.

Figure 53. ^1H NMR



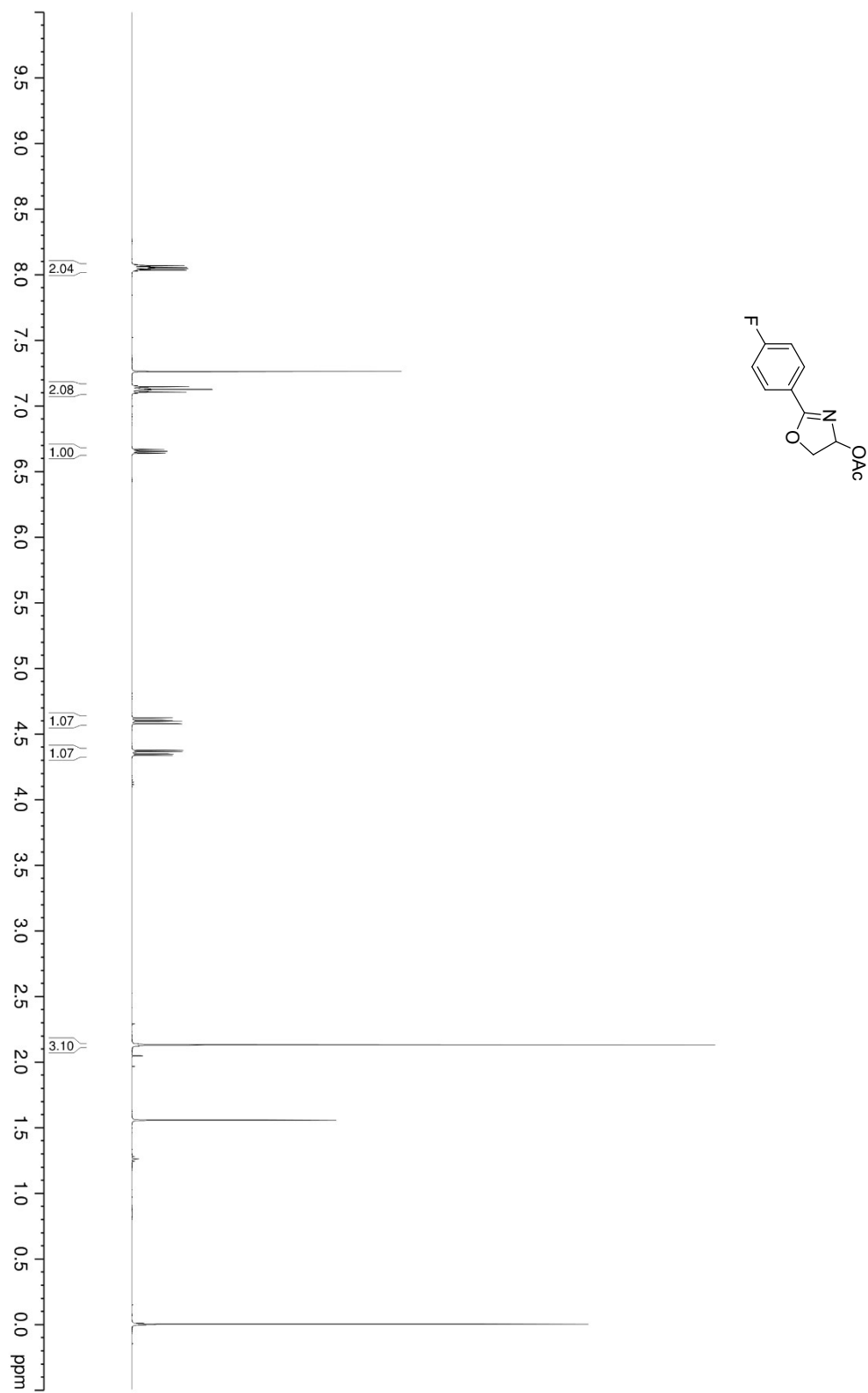
Hong et al.

Figure 54. ^{13}C NMI



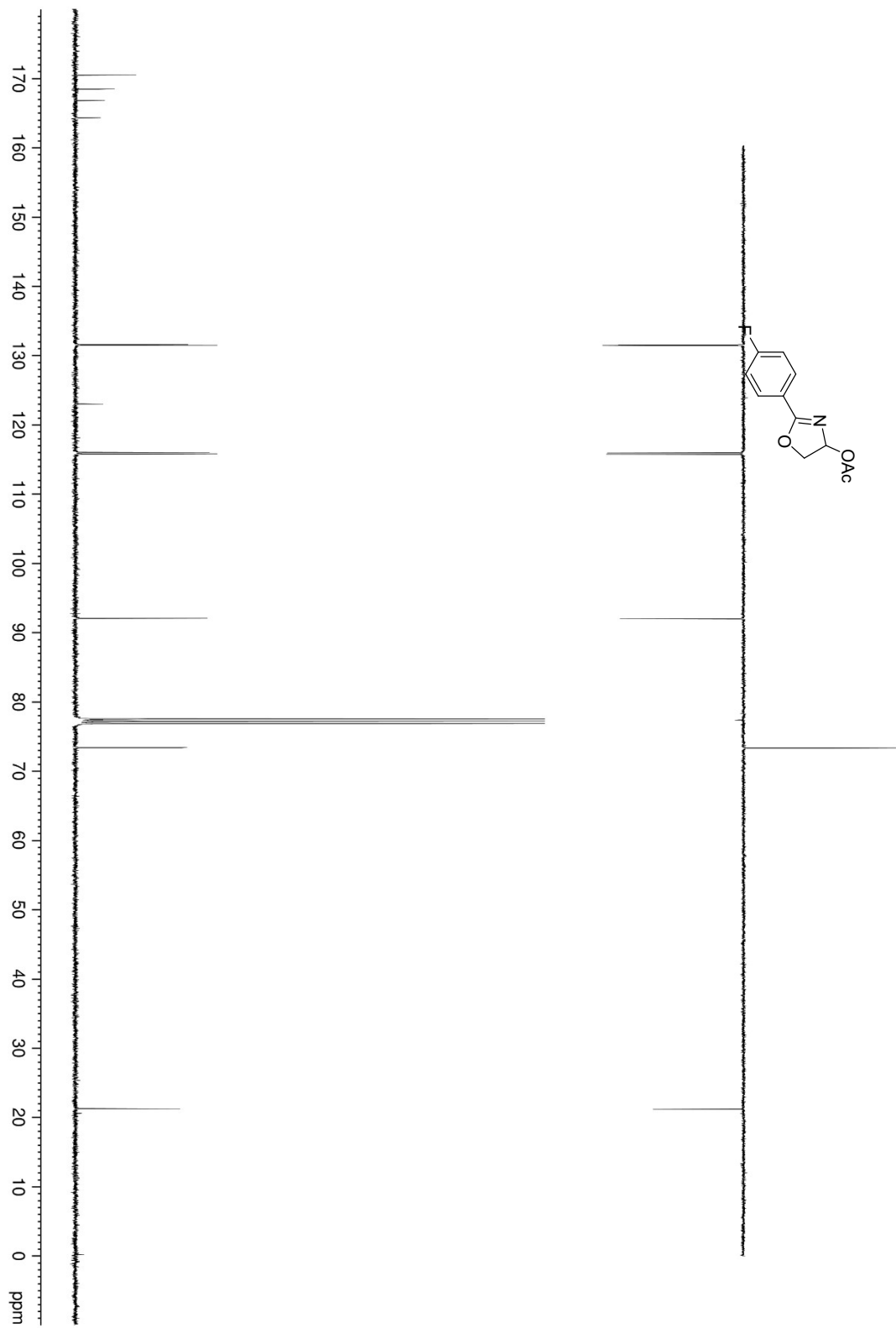
Hong et al.

Figure 55. ^1H NMR



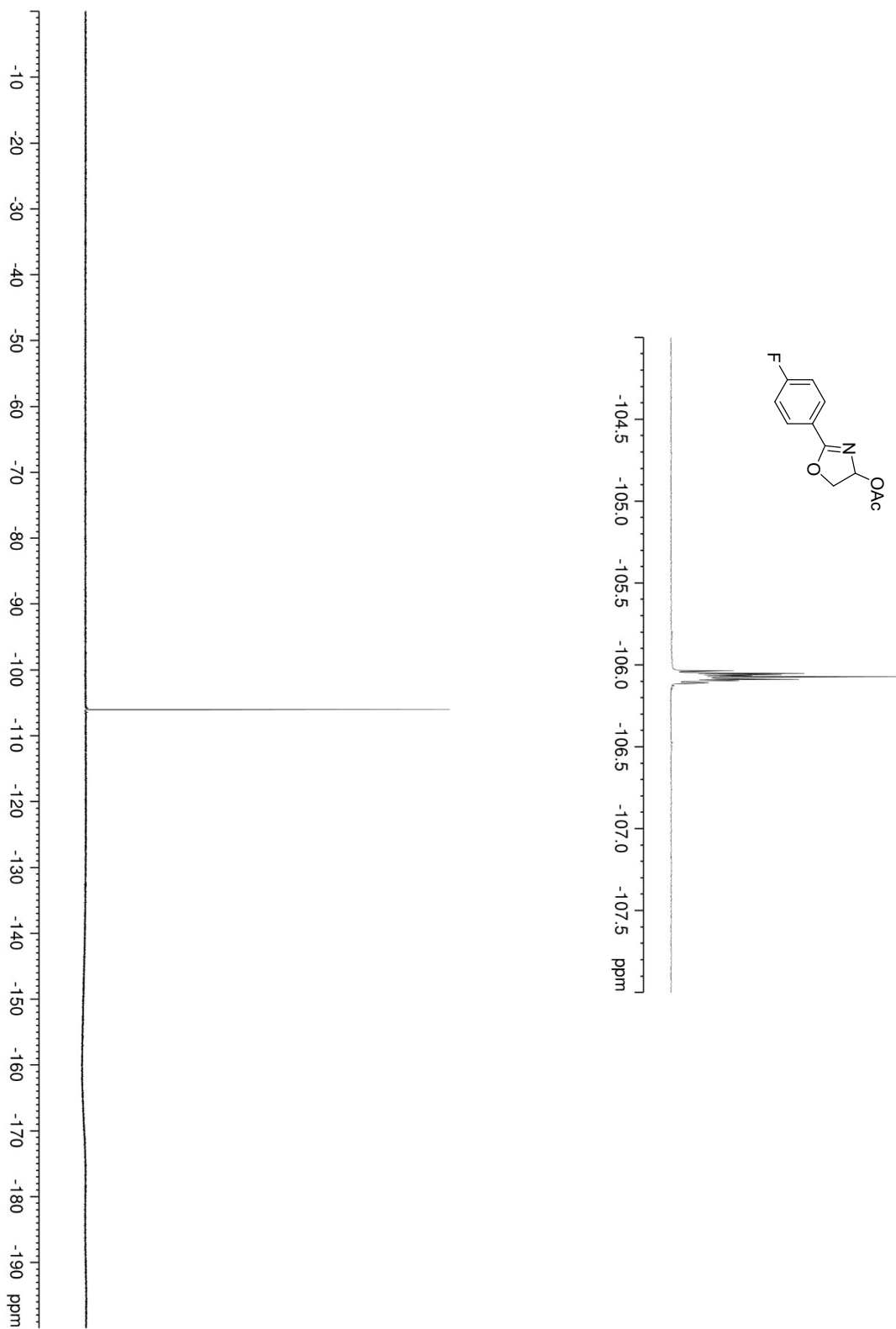
Hong et al.

Figure 56. ^{13}C NMI



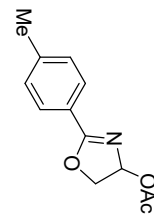
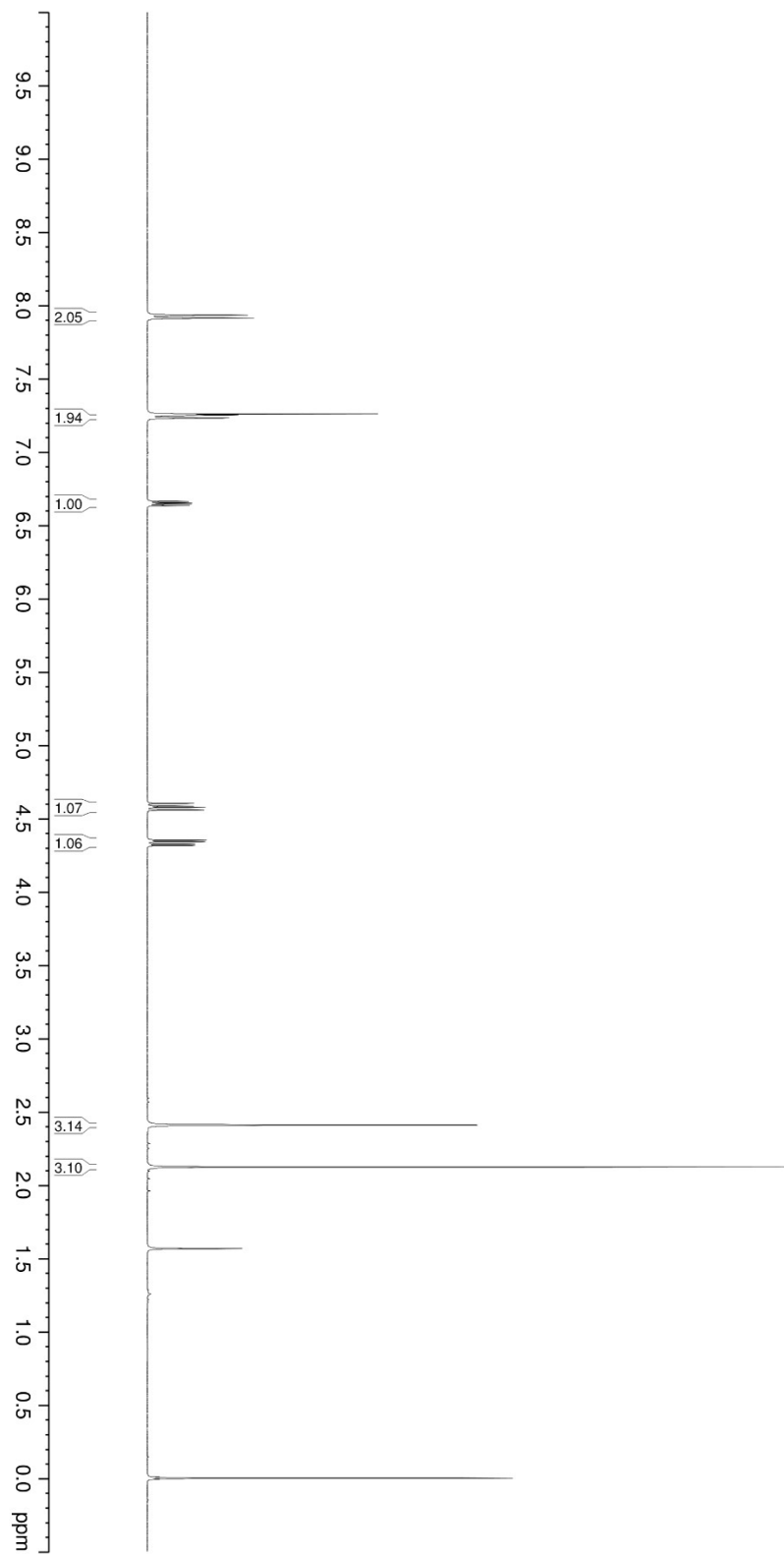
Hong et al.

Figure 57. ^{19}F NMR



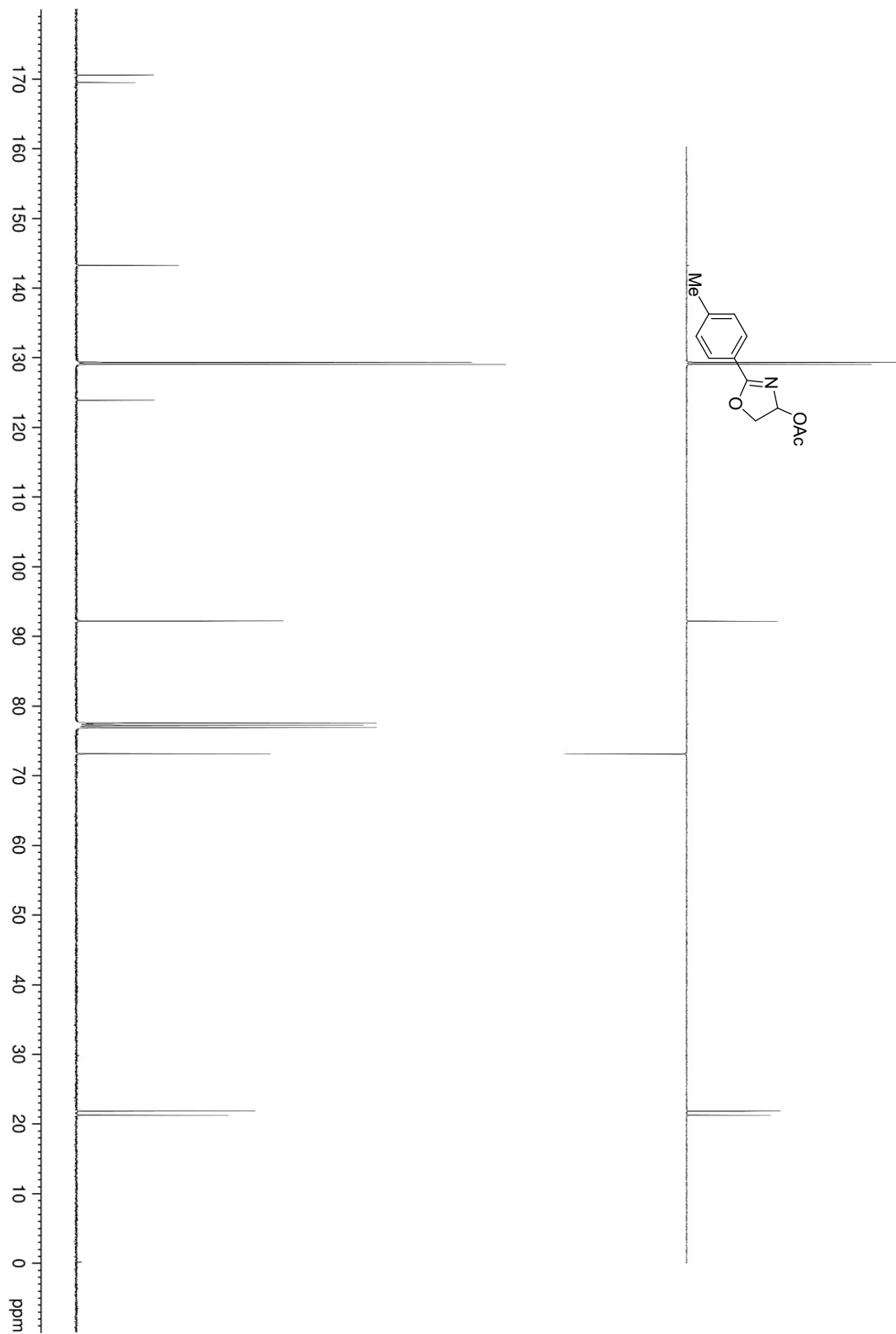
Hong et al.

Figure 58. ^1H NMR



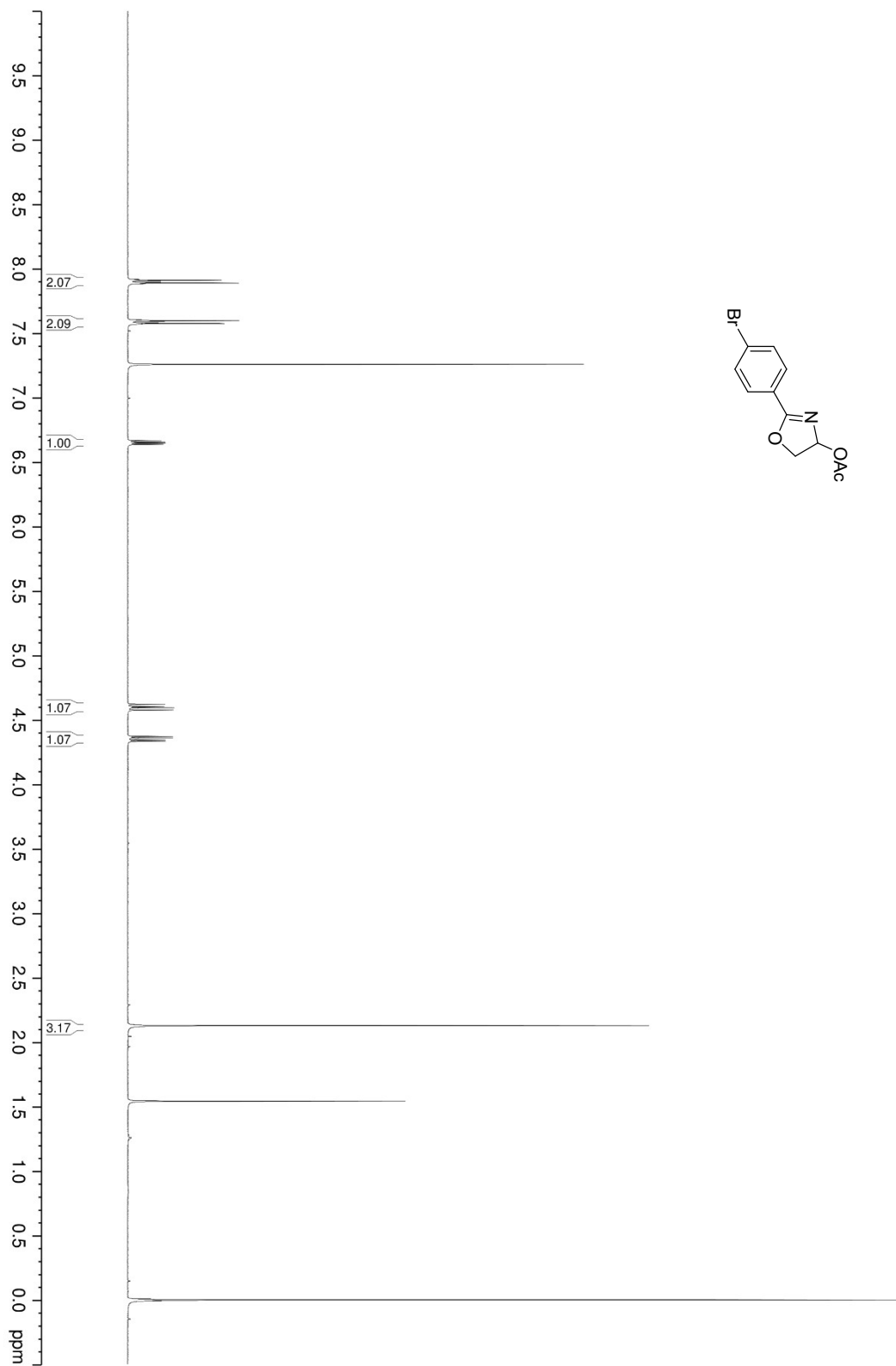
Hong et al.

Figure 59. ^{13}C NMI



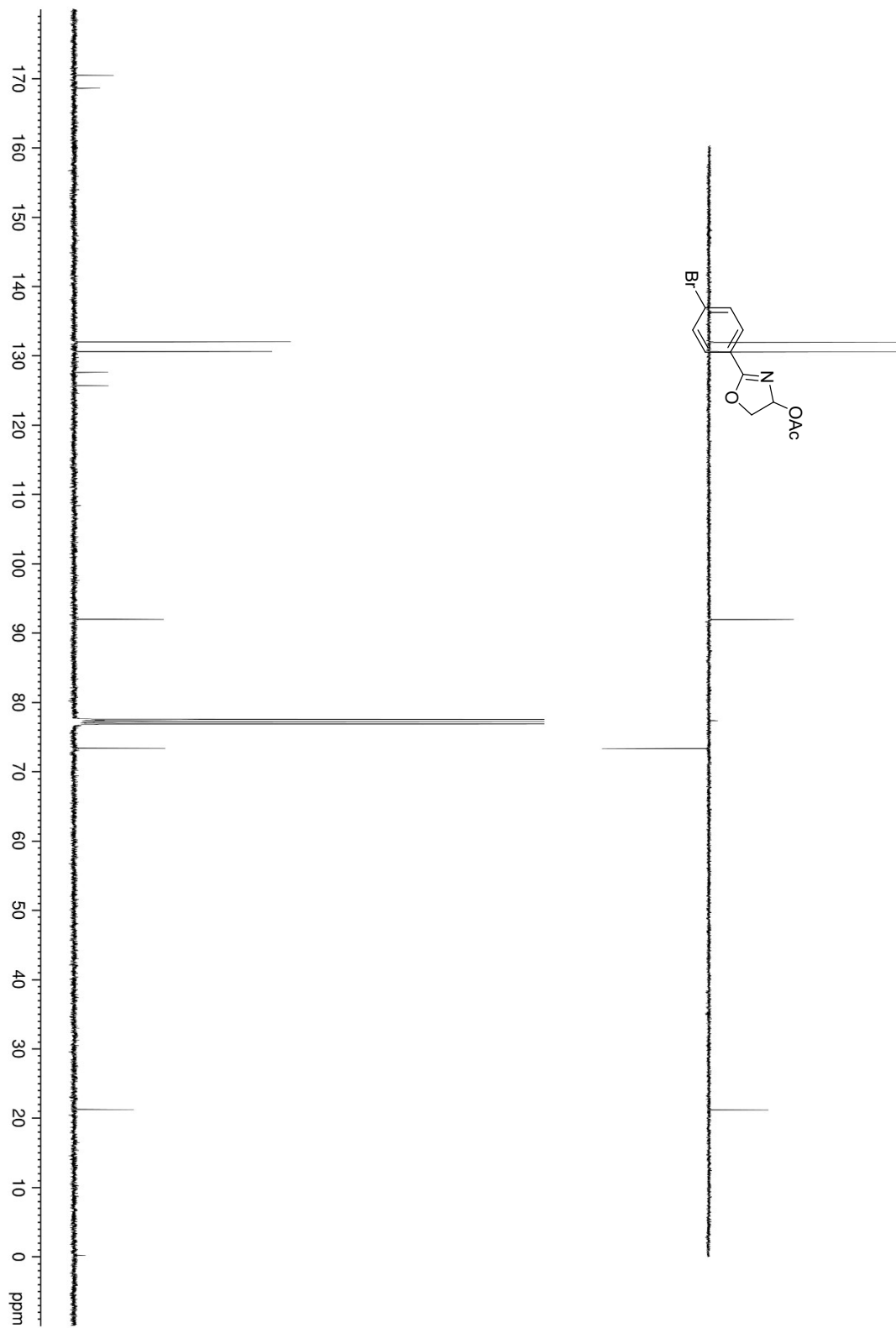
Hong et al.

Figure 60. ^1H NMR



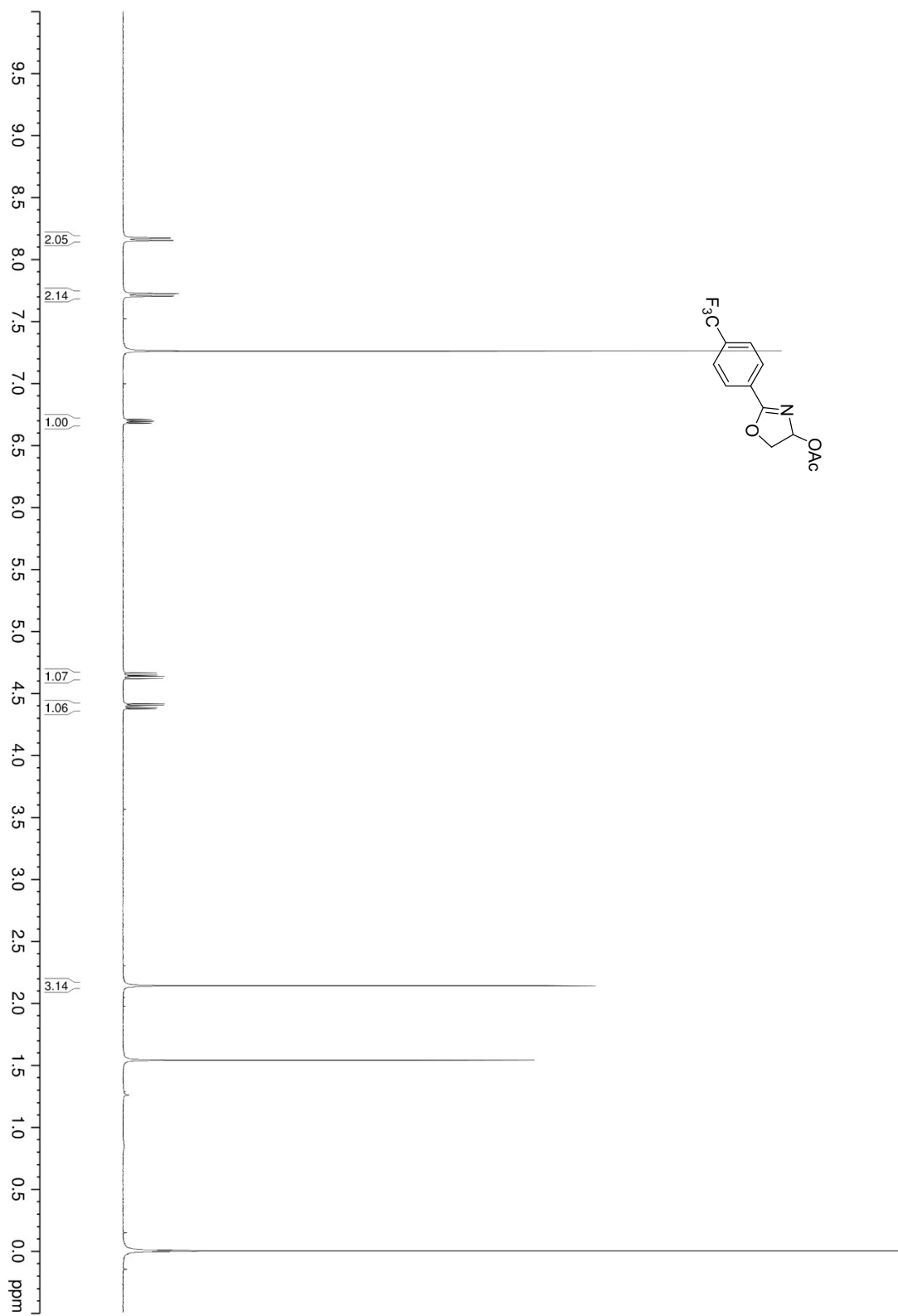
Hong et al.

Figure 61. ^{13}C NMI



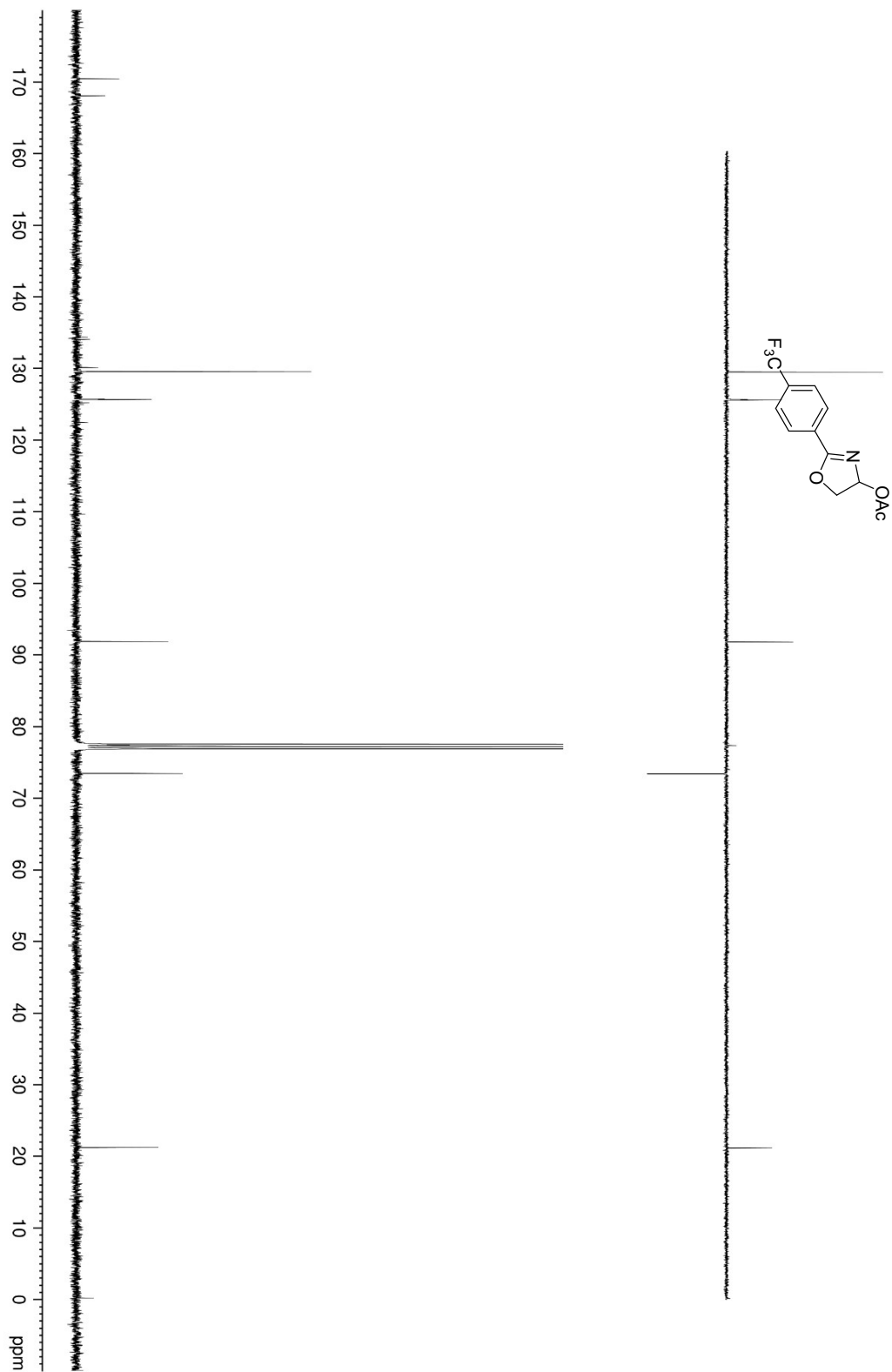
Hong et al.

Figure 62. ^1H NMR



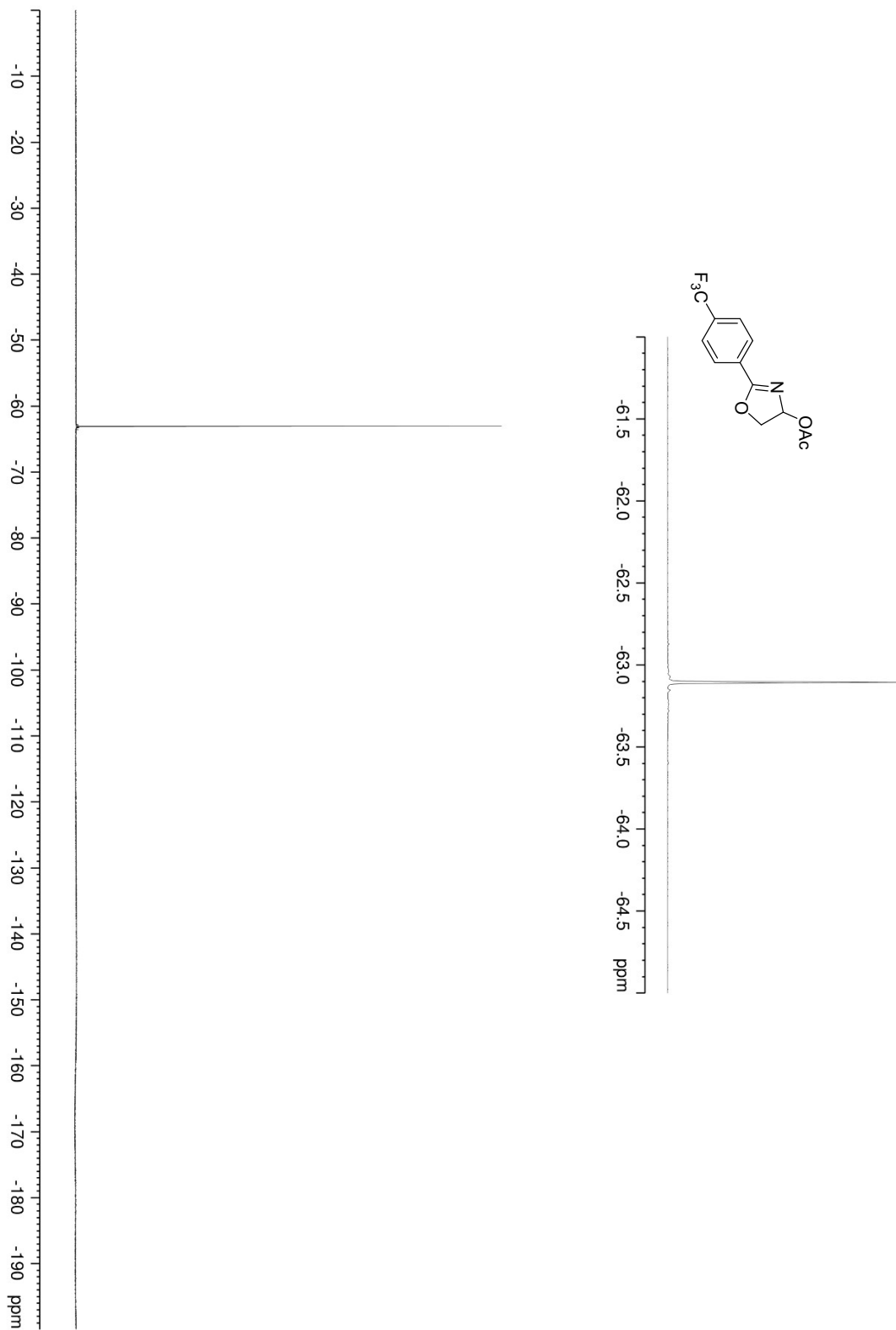
Hong et al.

Figure 63. ^{13}C NMR



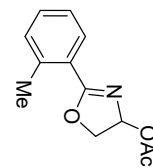
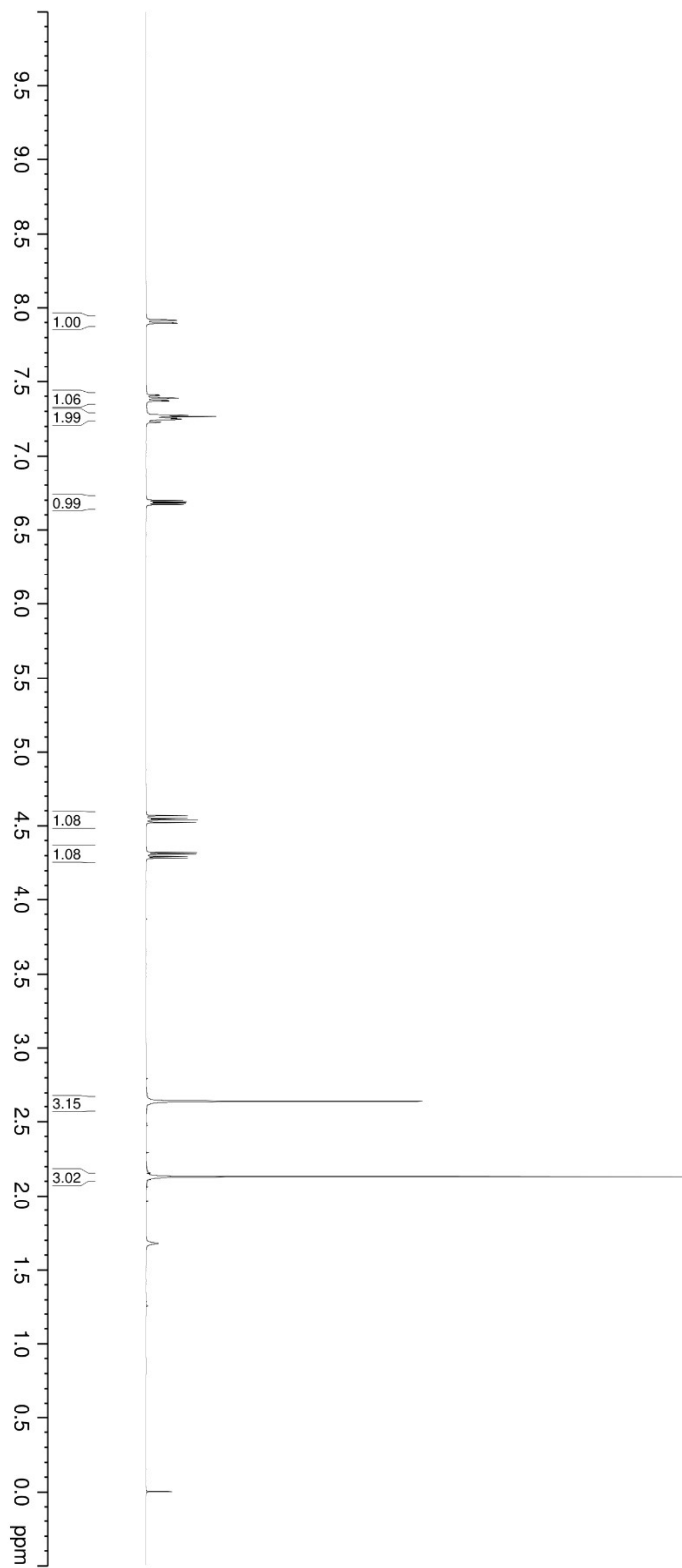
Hong et al.

Figure 64. ^{19}F NMR



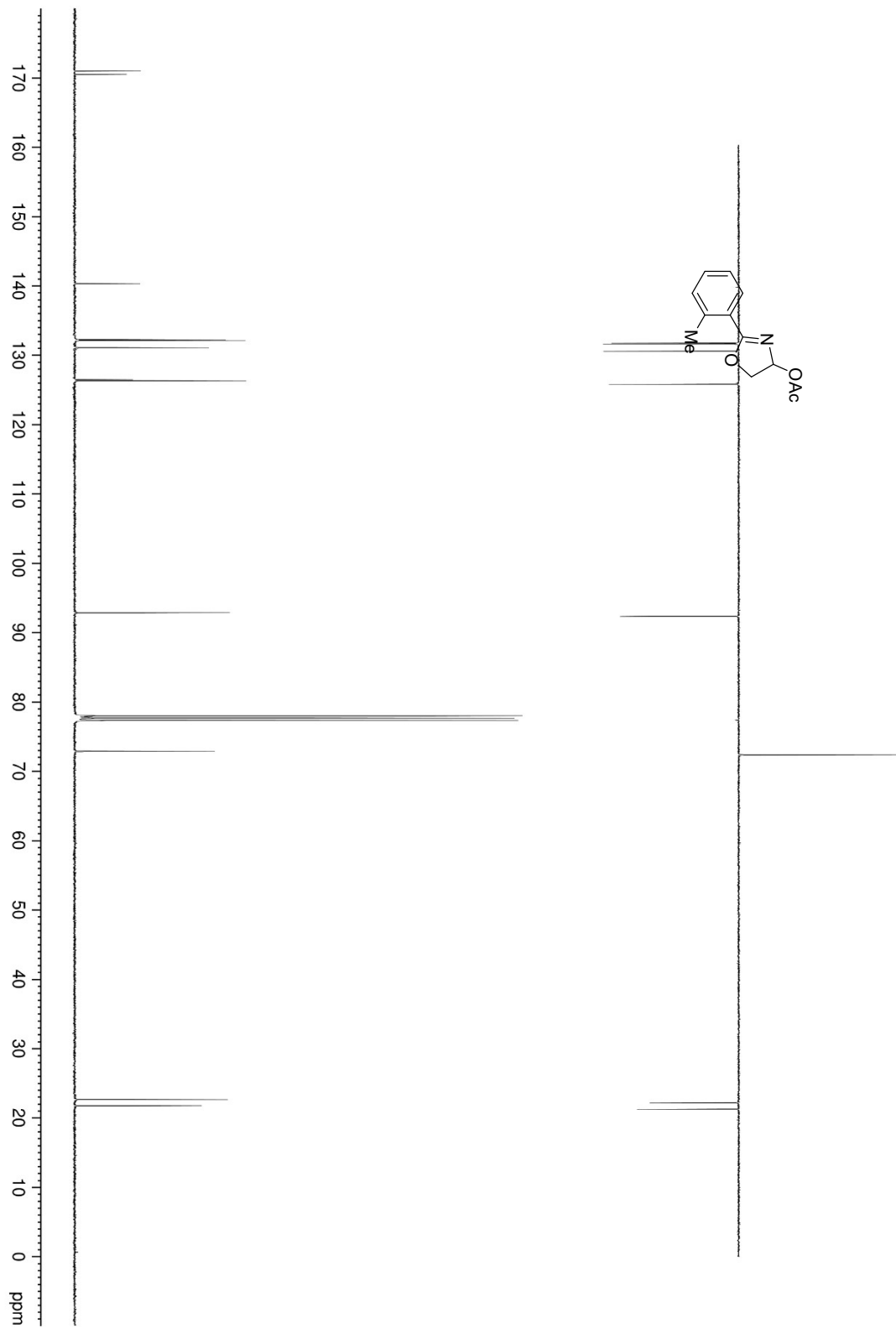
Hong et al.

Figure 65. ^1H NMR



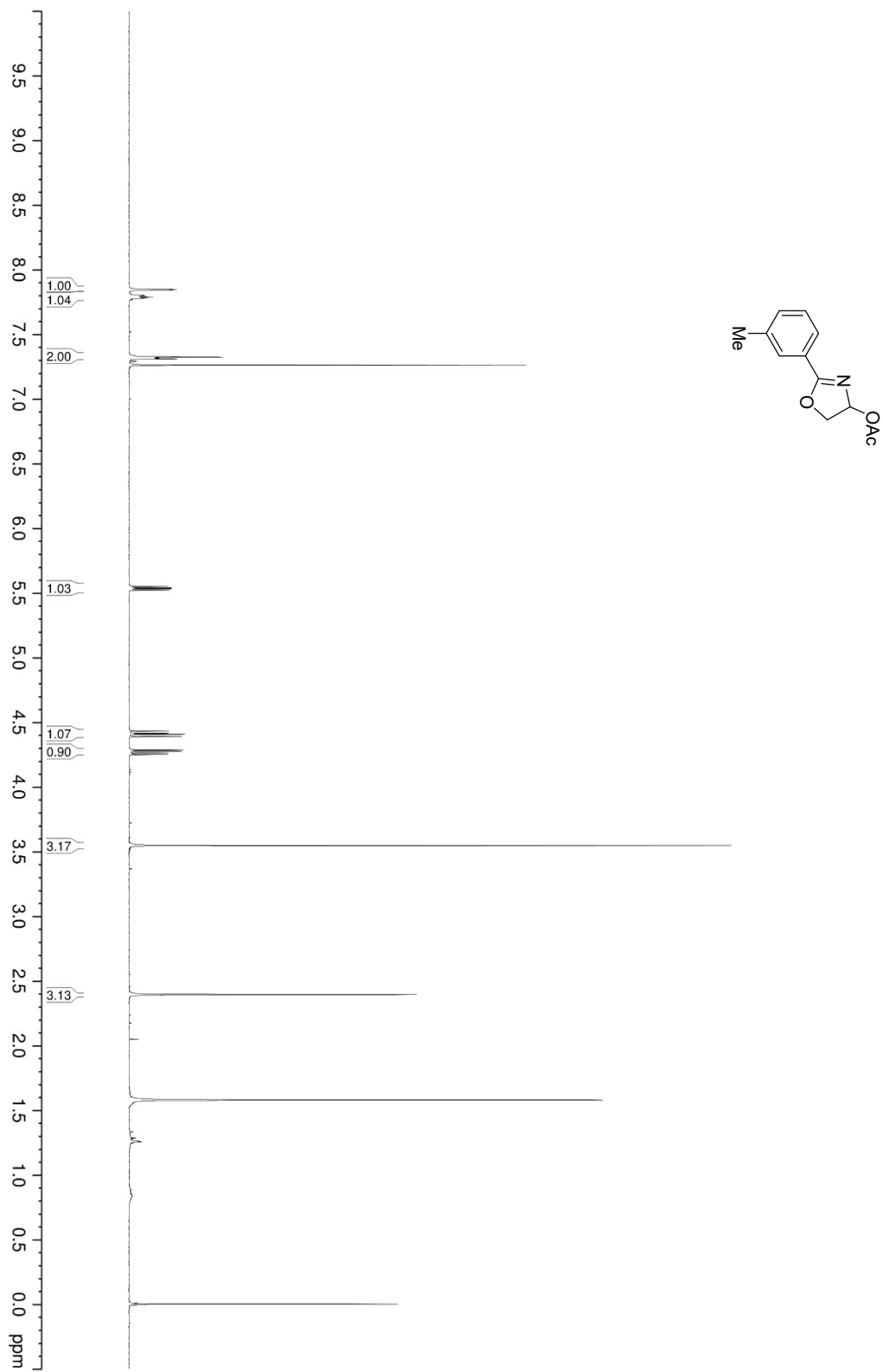
Hong et al.

Figure 66. ^{13}C NMF



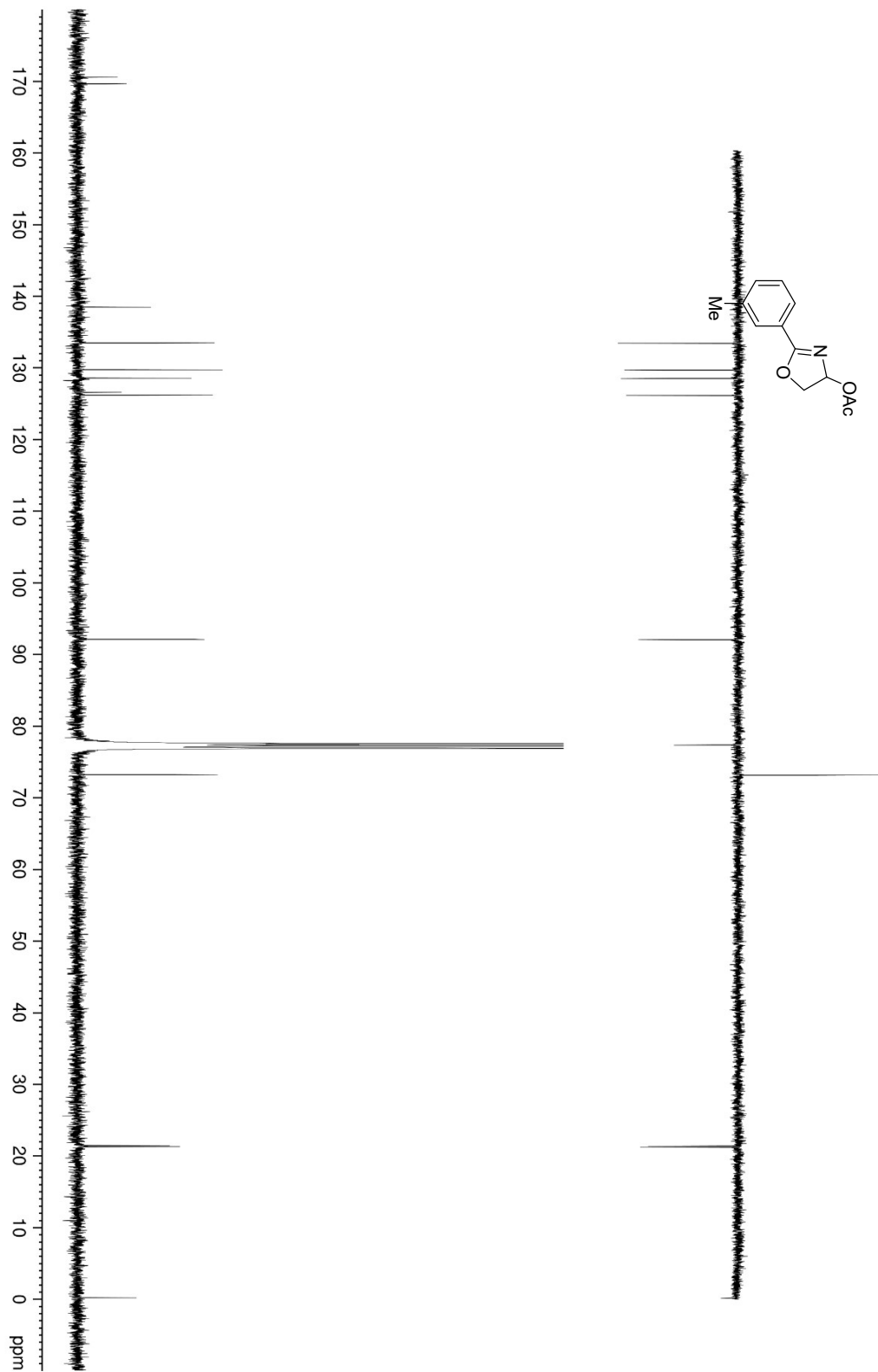
Hong et al.

Figure 67. ^1H NMR



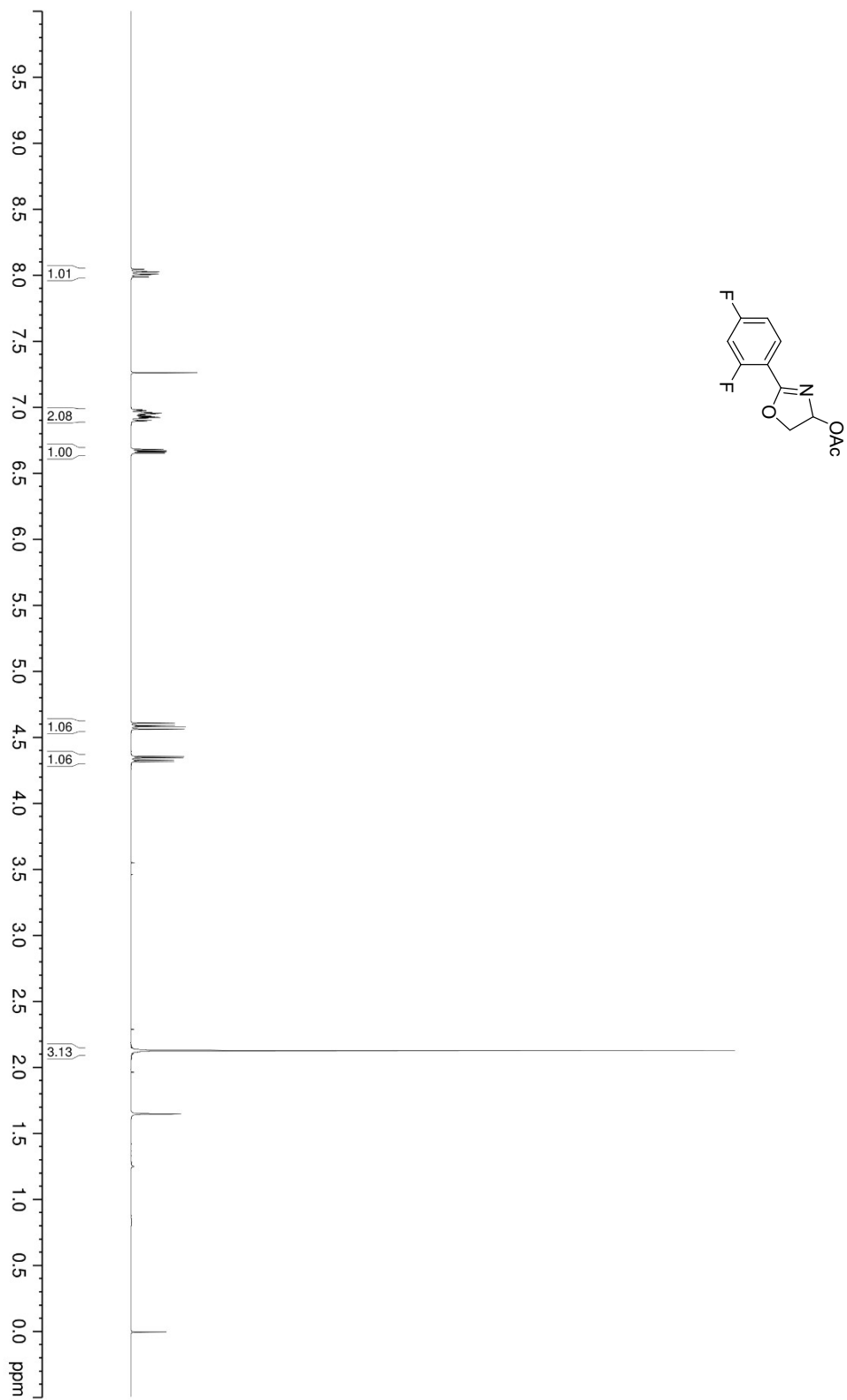
Hong et al.

Figure 68. ^{13}C NMI



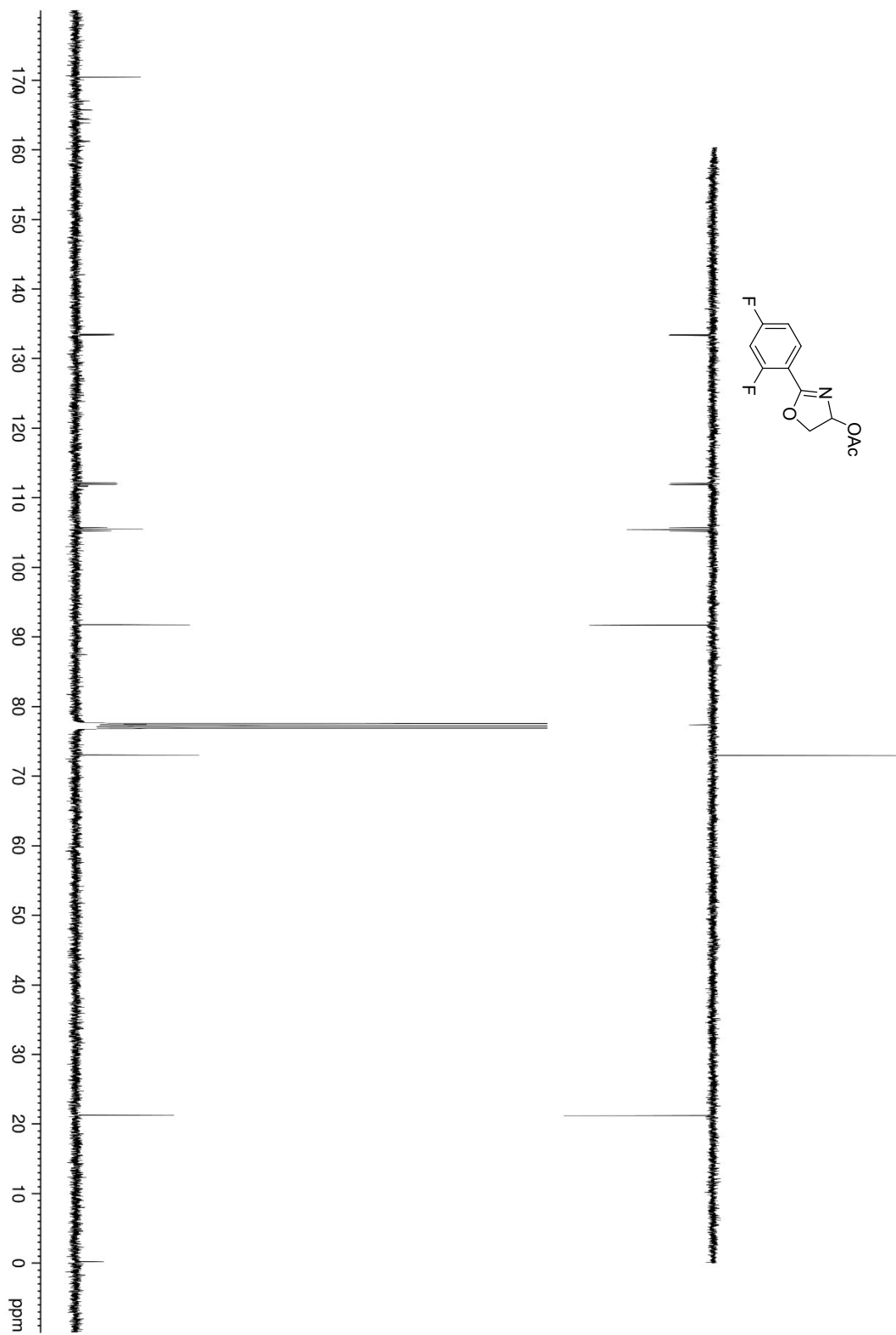
Hong et al.

Figure 69. ^1H NMR



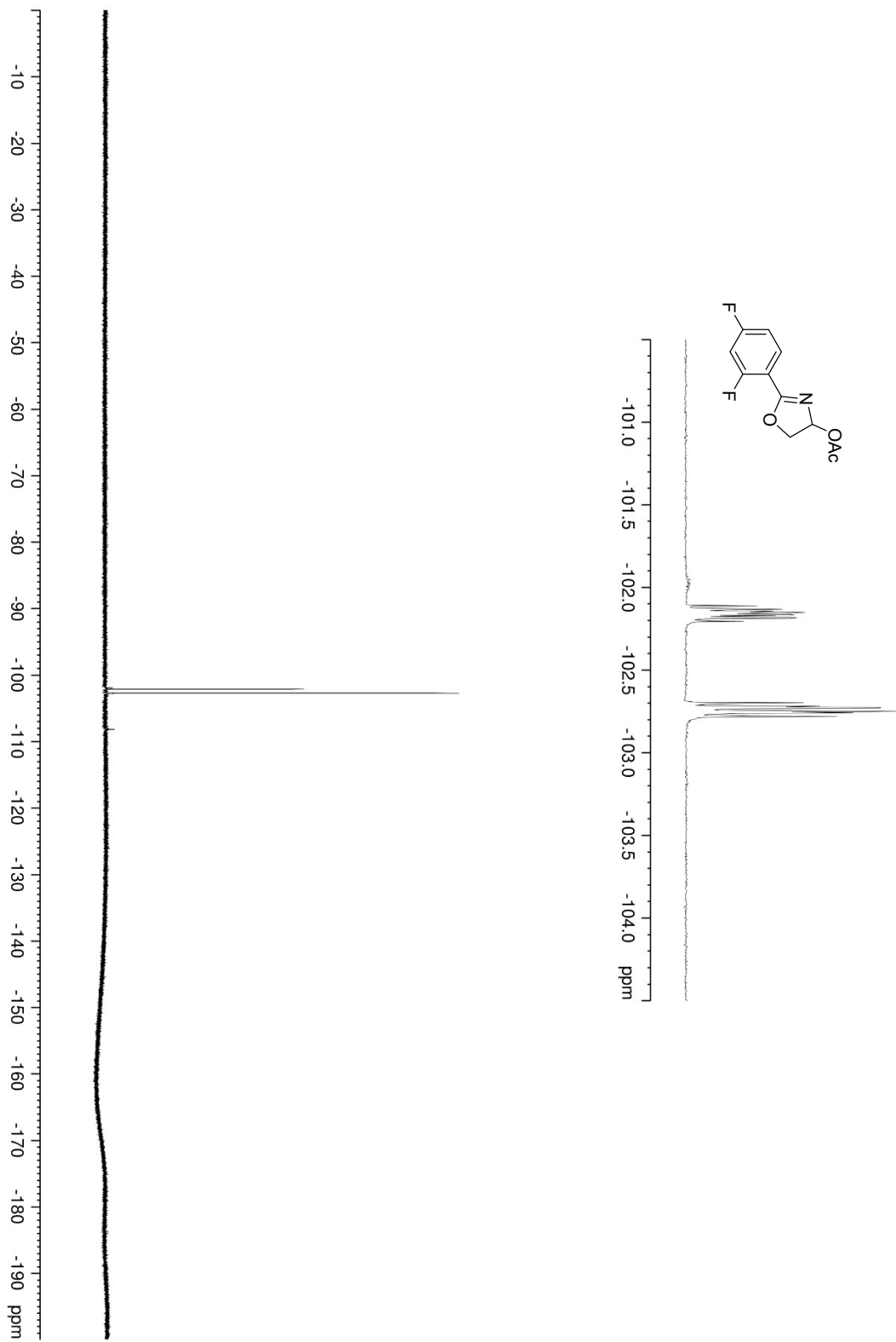
Hong et al.

Figure 70. ^{13}C NMI



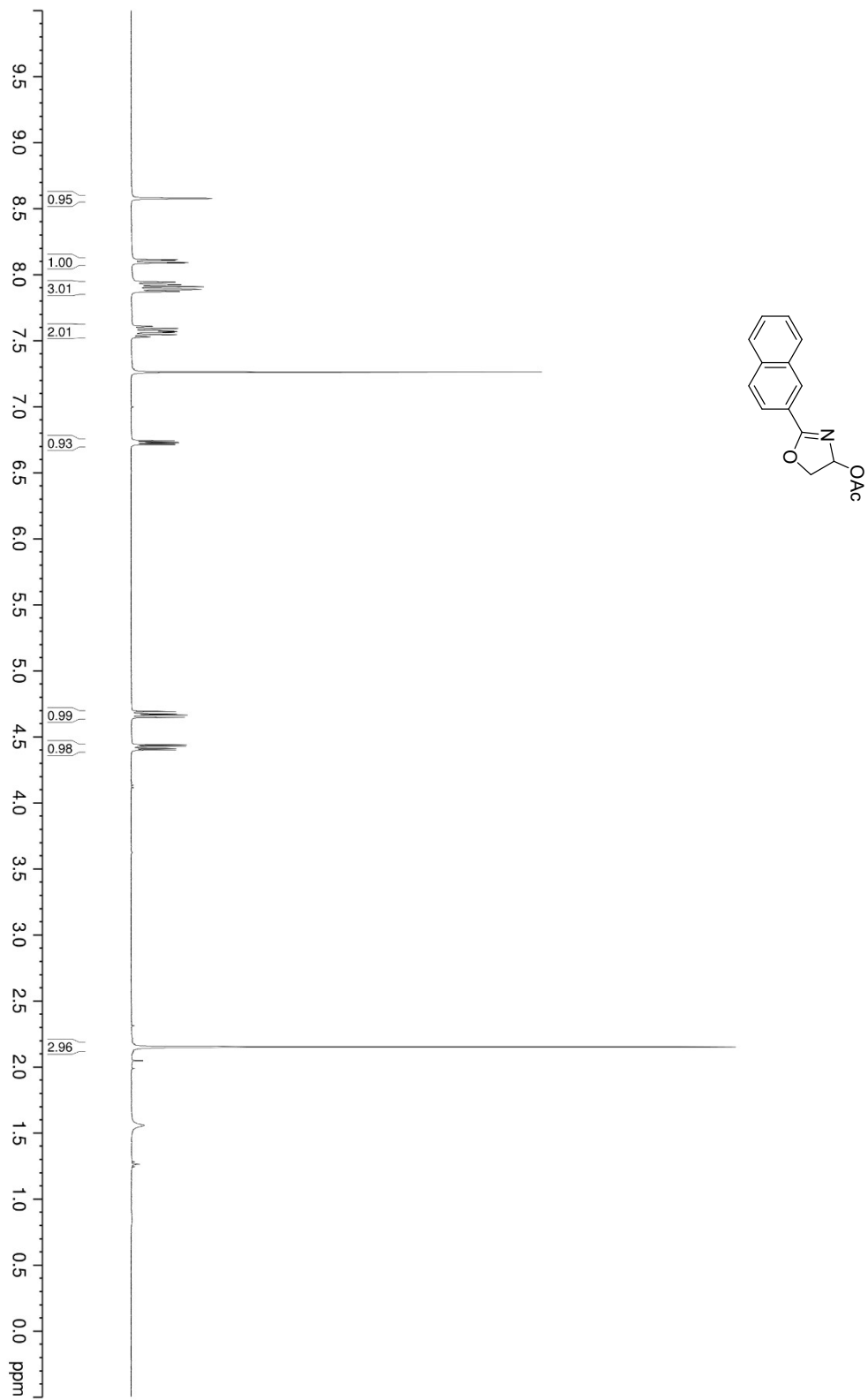
Hong et al.

Figure 71. ^{19}F NMR



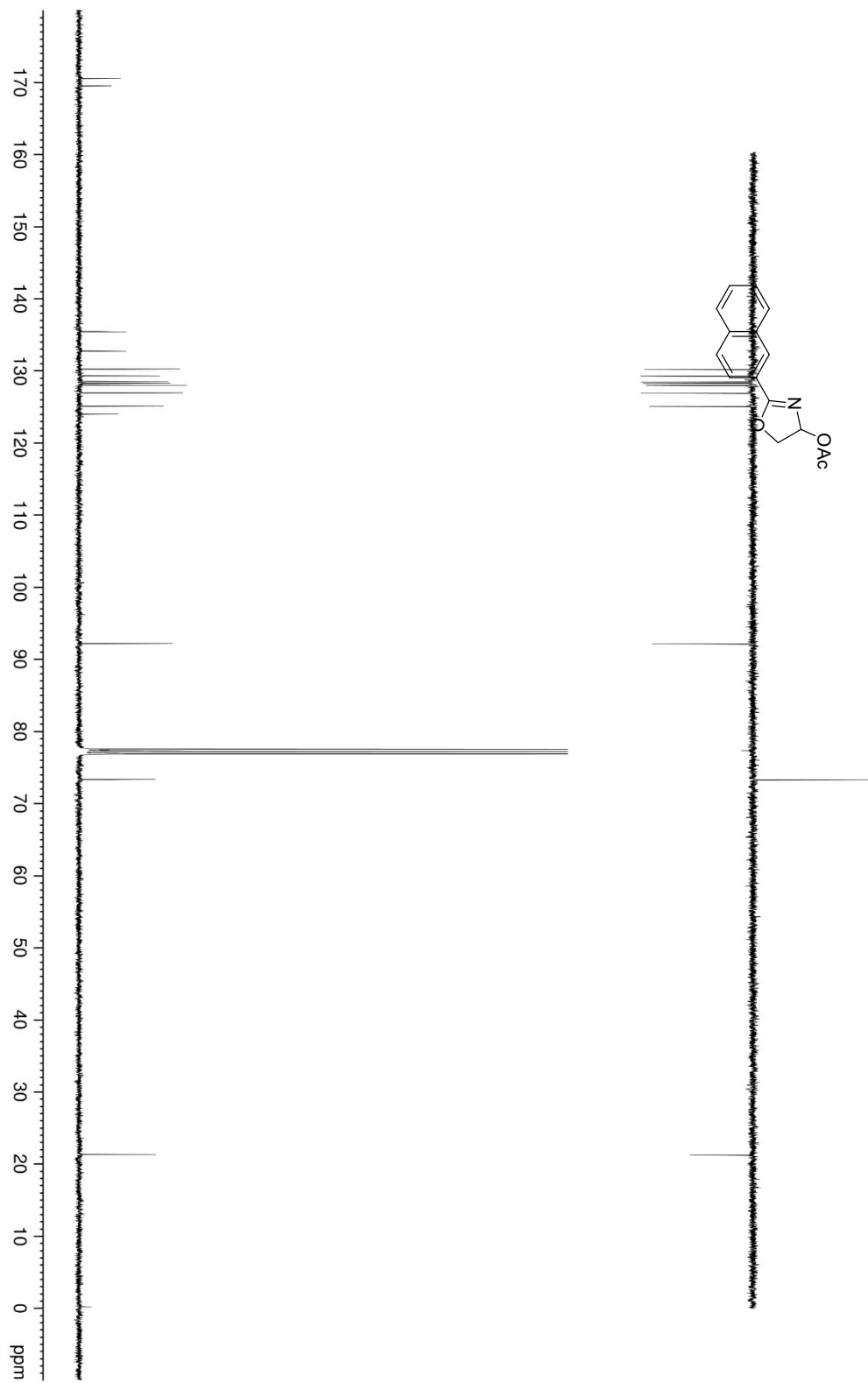
Hong et al.

Figure 72. ^1H NMR



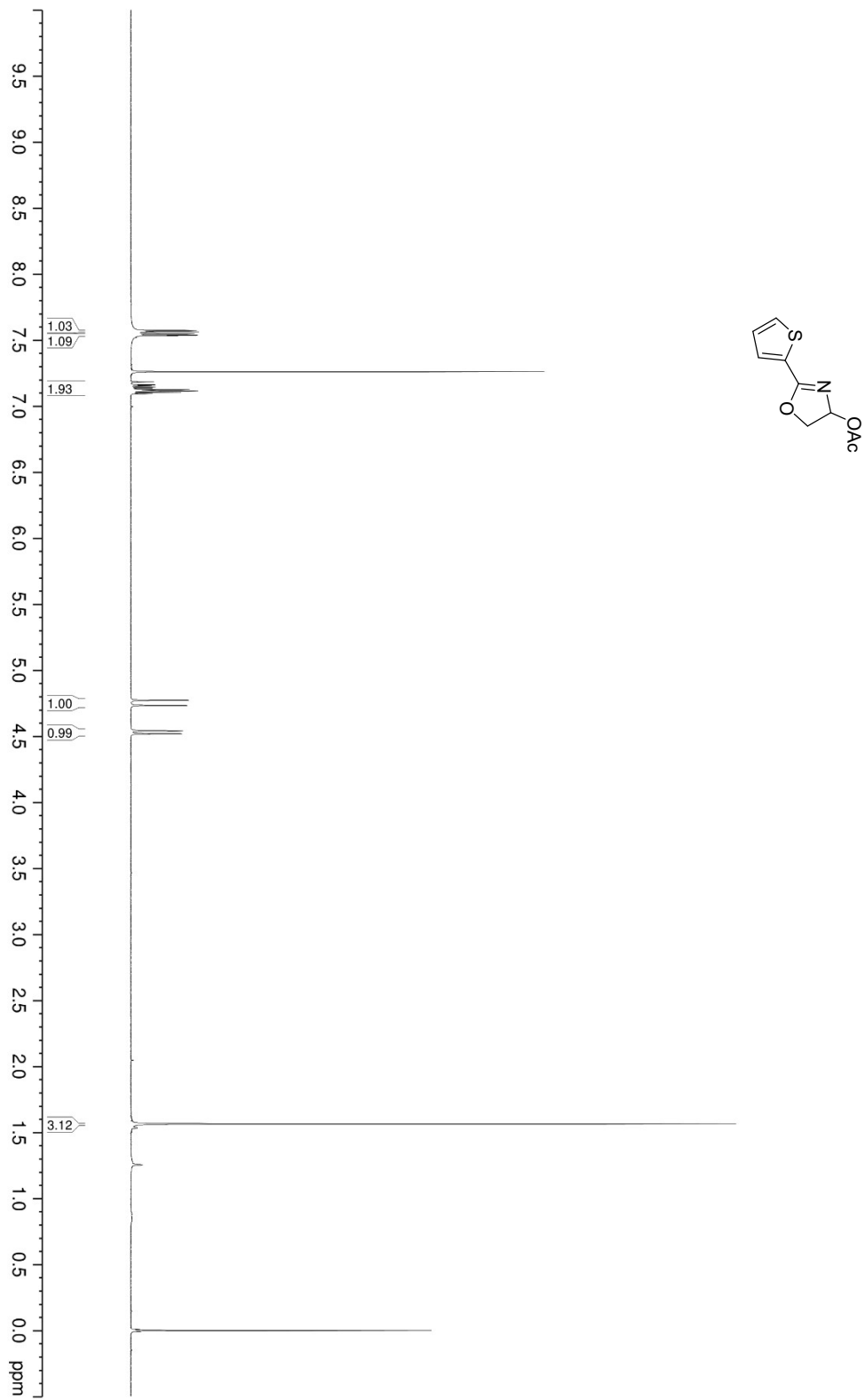
Hong et al.

Figure 73. ^{13}C NMR



Hong et al.

Figure 74. ^1H NMR



Hong et al.

Figure 75. ^{13}C NMI

