

Design of 1-methylimidazolium tricyanomethanide as the first nanostructured molten salt and its catalytic application on the condensation reaction of various aromatic aldehydes, amide and β -naphthol compared with tin dioxide nano particles

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Supplementary data:

Fig. S1. The mass spectrum of 1-methylimidazolium tricyanomethanide as a nano molten salt catalyst

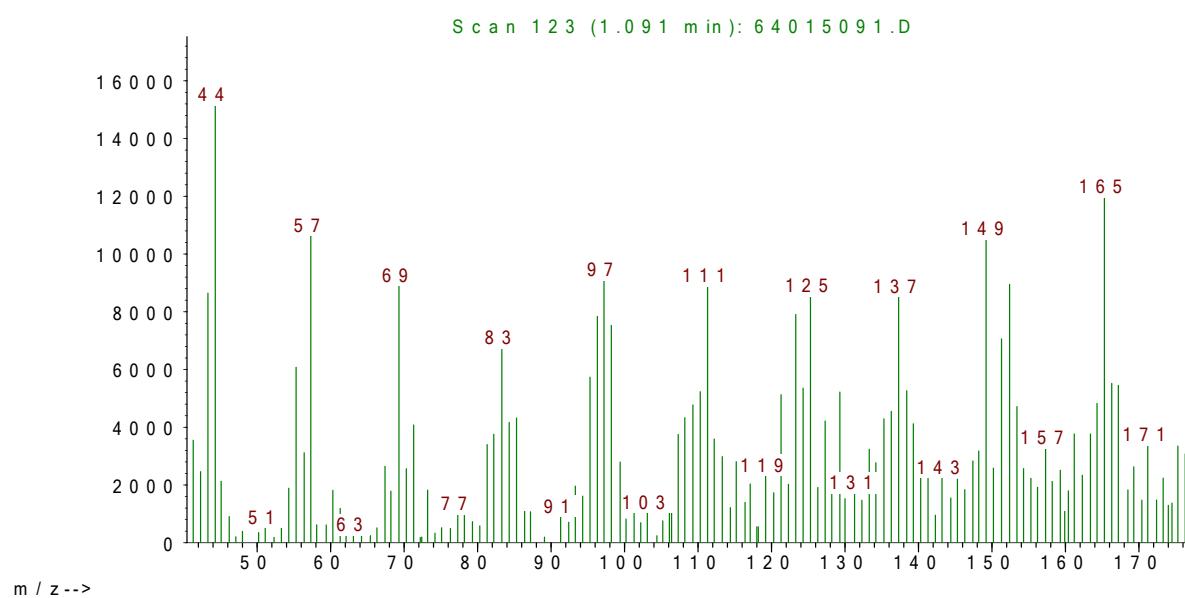


Fig. S2. The mass spectrum of 1-methylimidazolium tricyanomethanide as a nano molten salt catalyst

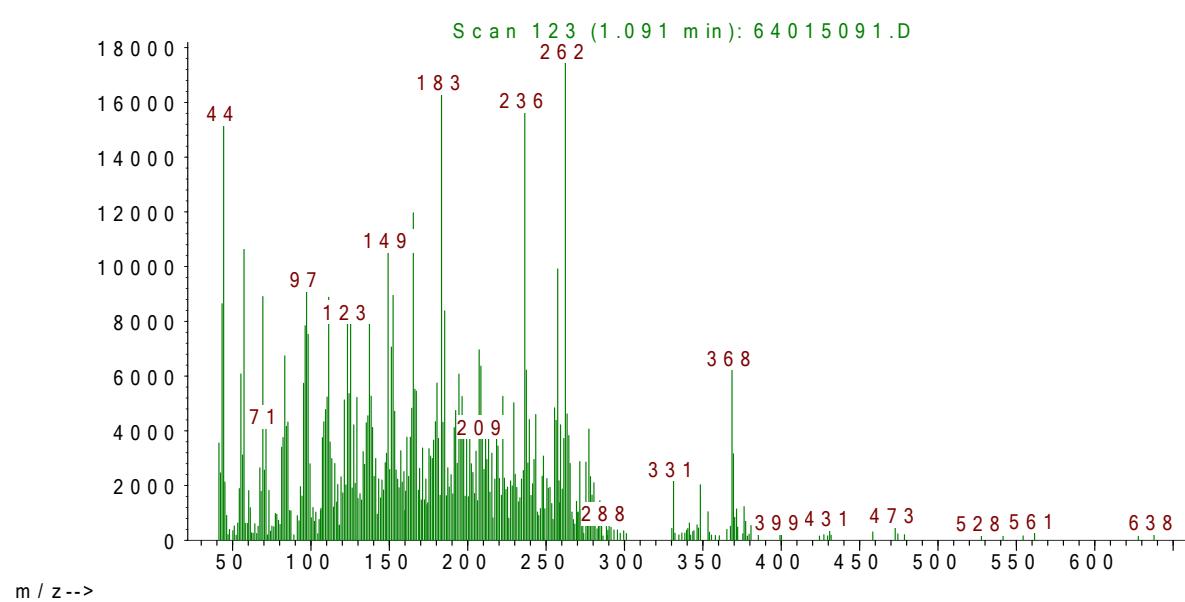


Fig. S3. The IR spectrum of 1-methylimidazolium tricyanomethanide as a nano molten salt catalyst after recycling

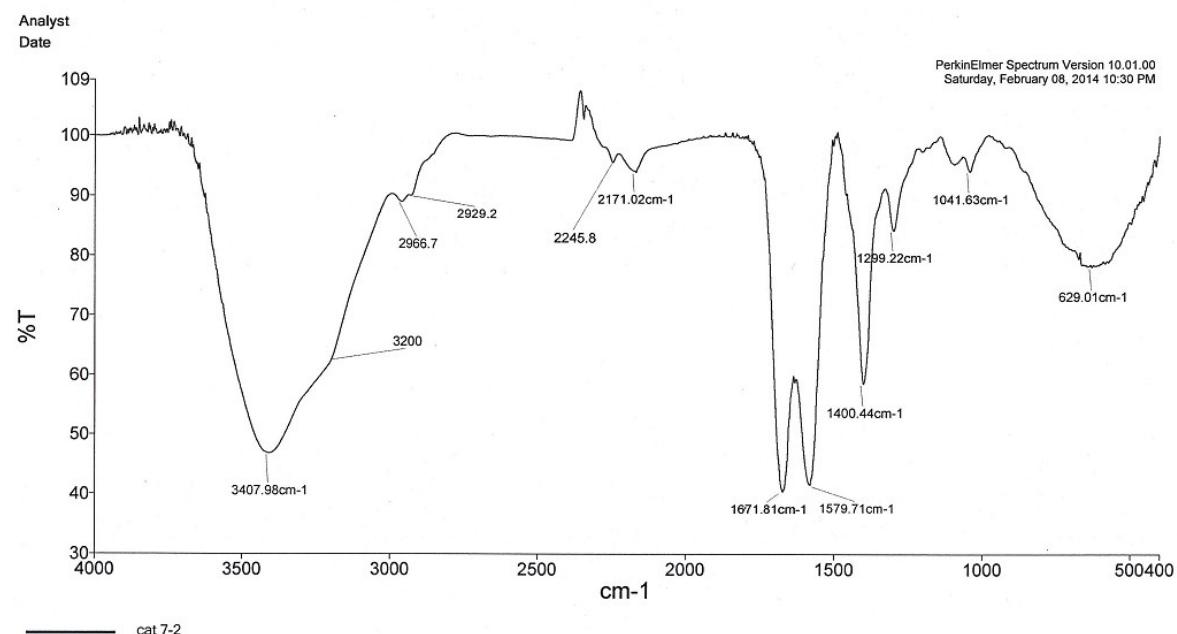


Fig. S4. The ¹H NMR spectrum of 1-methylimidazolium tricyanomethanide as a nano molten salt catalyst after recycling

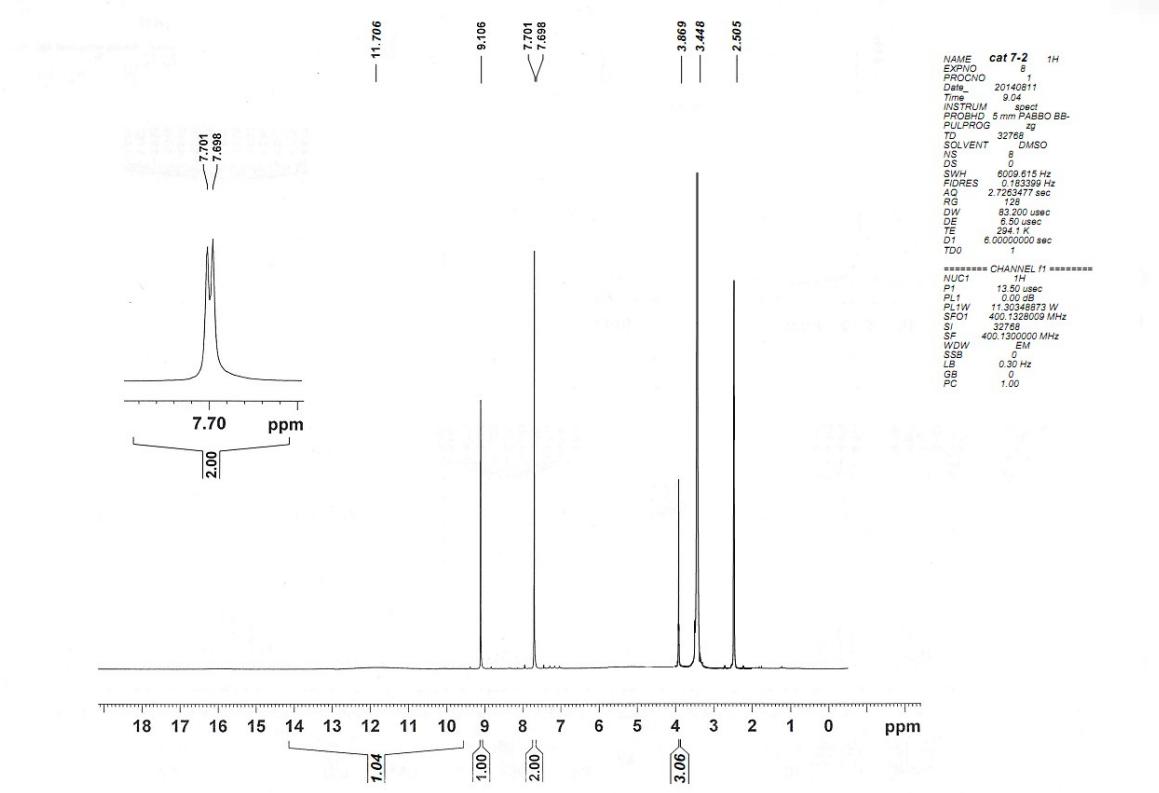


Fig. S5. The ^{13}C NMR spectrum of 1-methylimidazolium tricyanomethanide as a nano molten salt catalyst after recycling

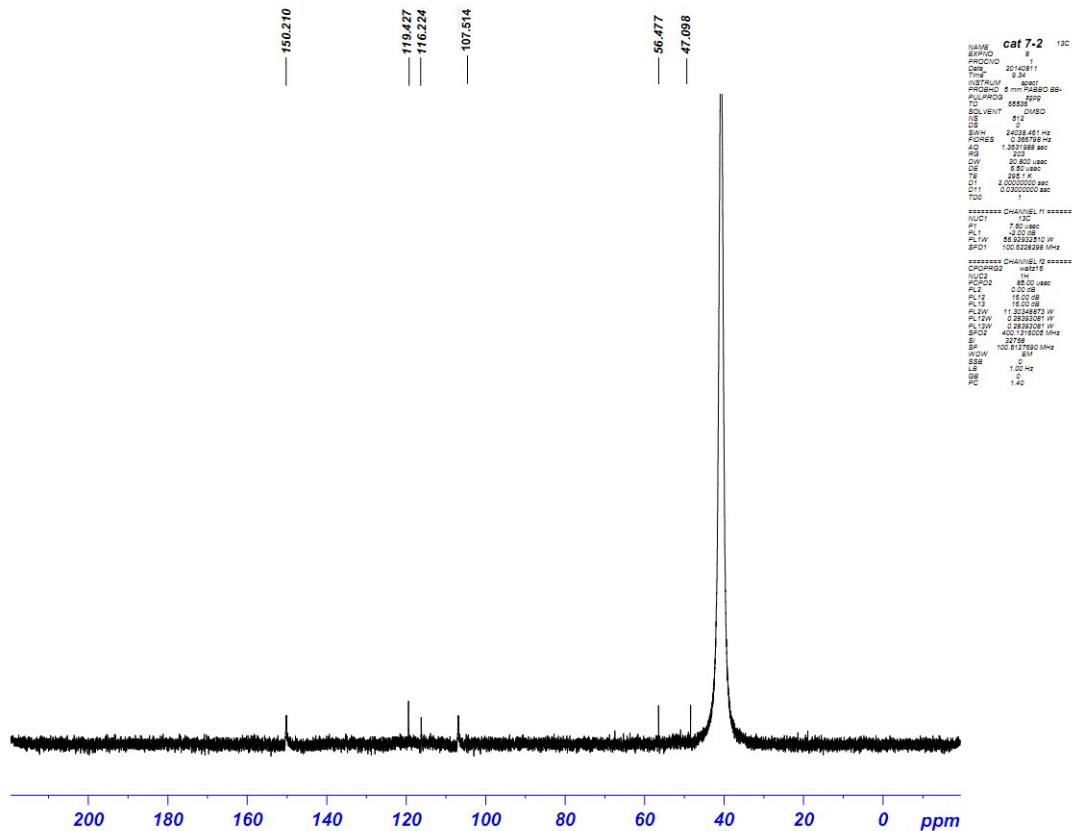


Fig. S6. The scanning electron microscopy (SEM) (a) and transmission electron microscopy (TEM) (b, c and d) of 1-methylimidazolium tricyanomethanide as a nano molten salt catalyst after recycling

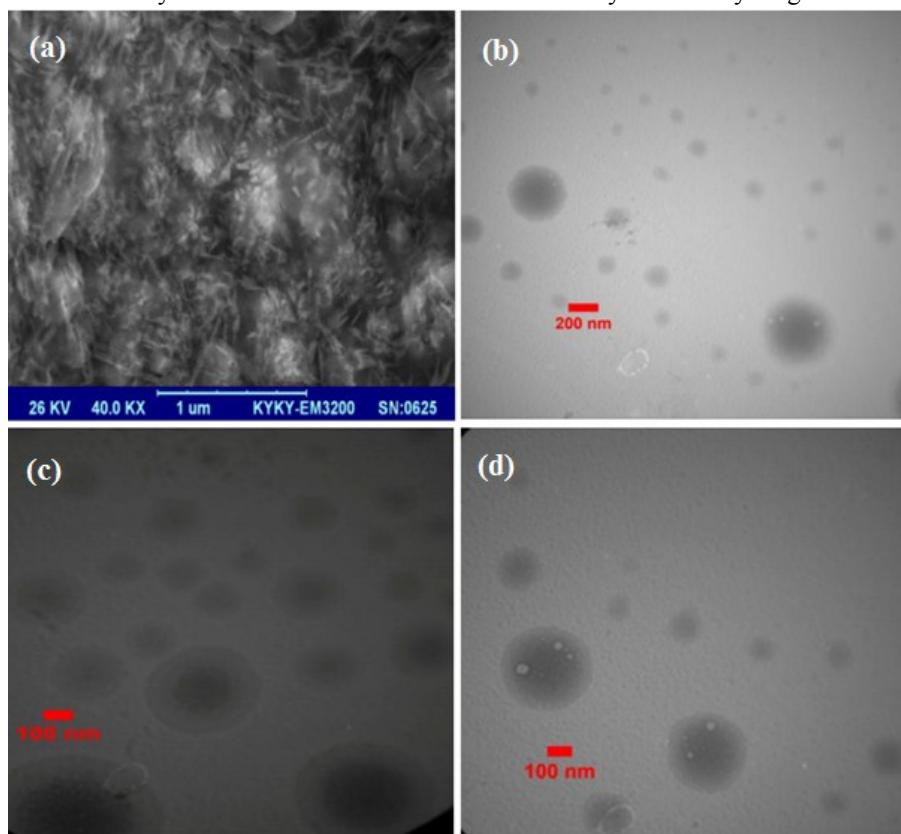


Fig. S7. The field emission scanning electron microscopy (FE-SEM) (a and b) and transmission electron microscopy (TEM) (c and d) of SnO₂ nano particles catalyst after recycling

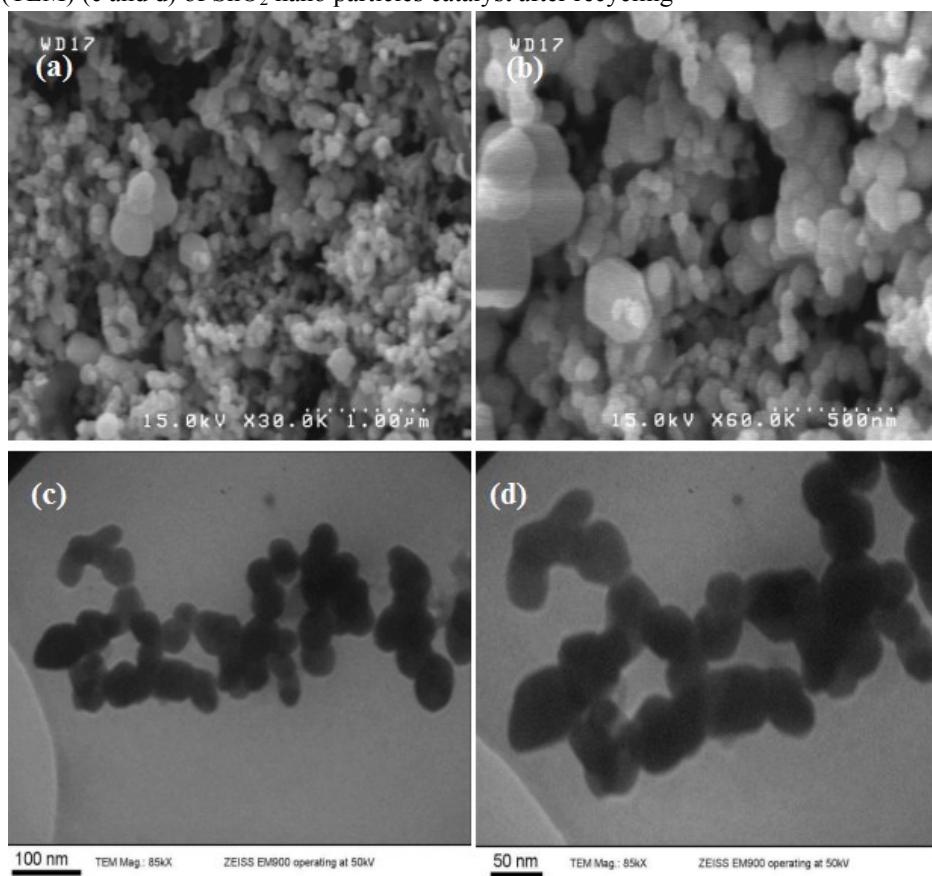


Fig. S8. The IR spectrum of 1-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)urea (Table 3, entry 2)

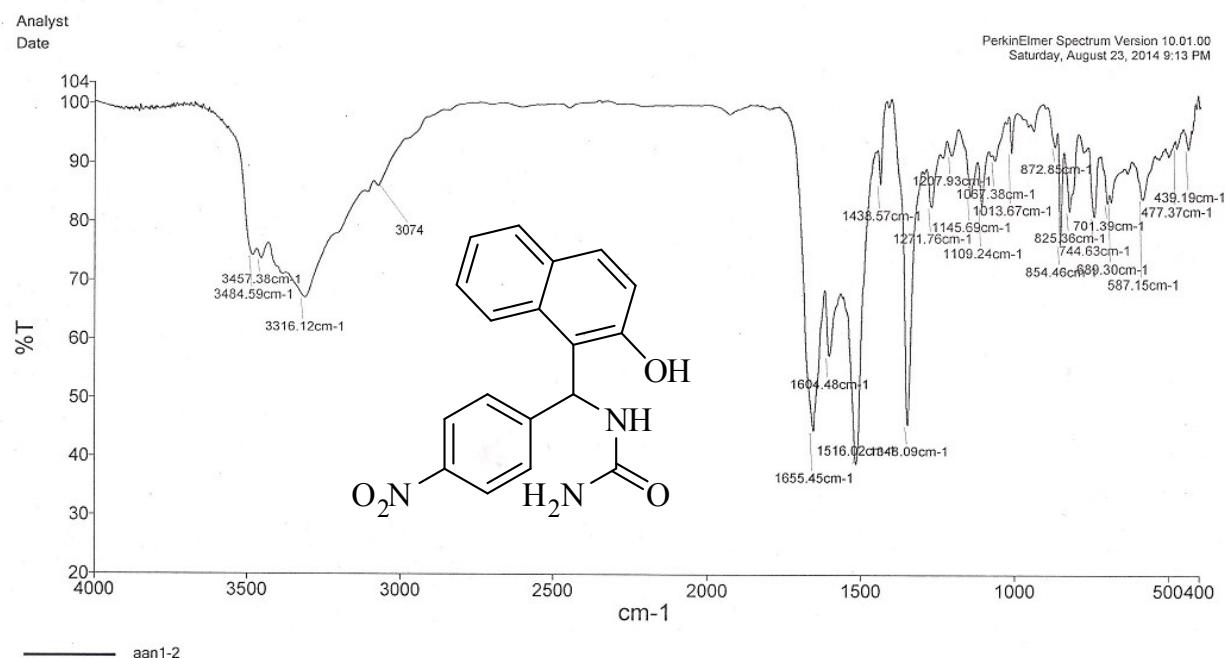


Fig. S9. The ^1H NMR spectrum of 1-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)urea (Table 3, entry 2)

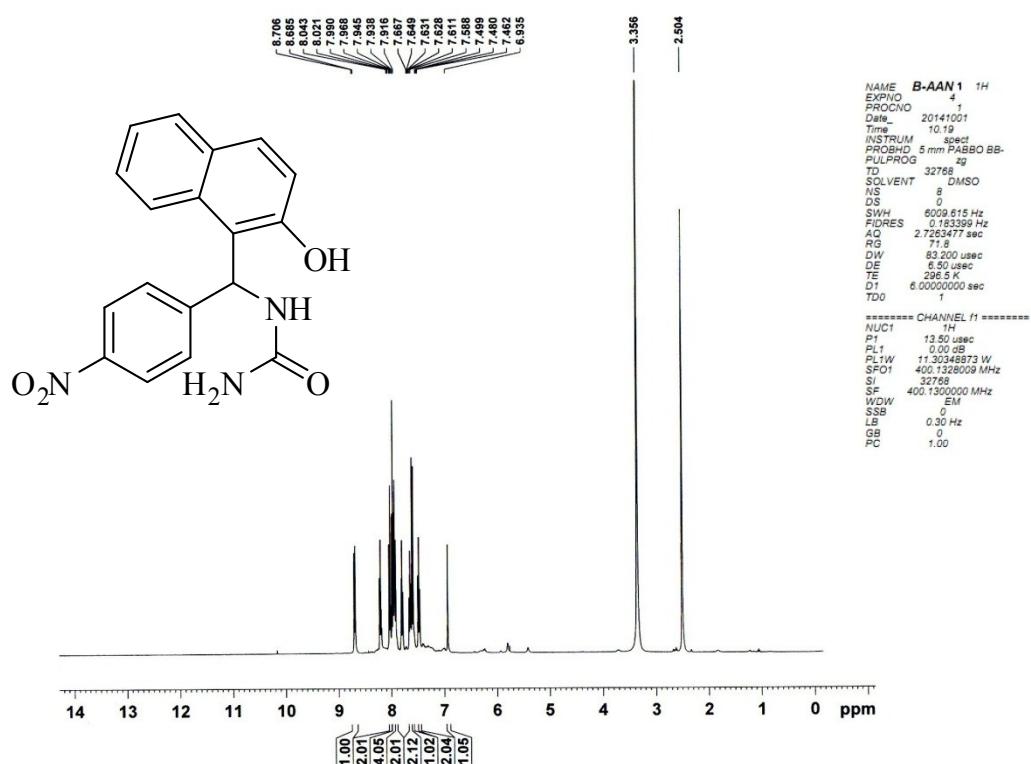


Fig. S10. The ^1H NMR spectrum of 1-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)urea (Table 3, entry 2)

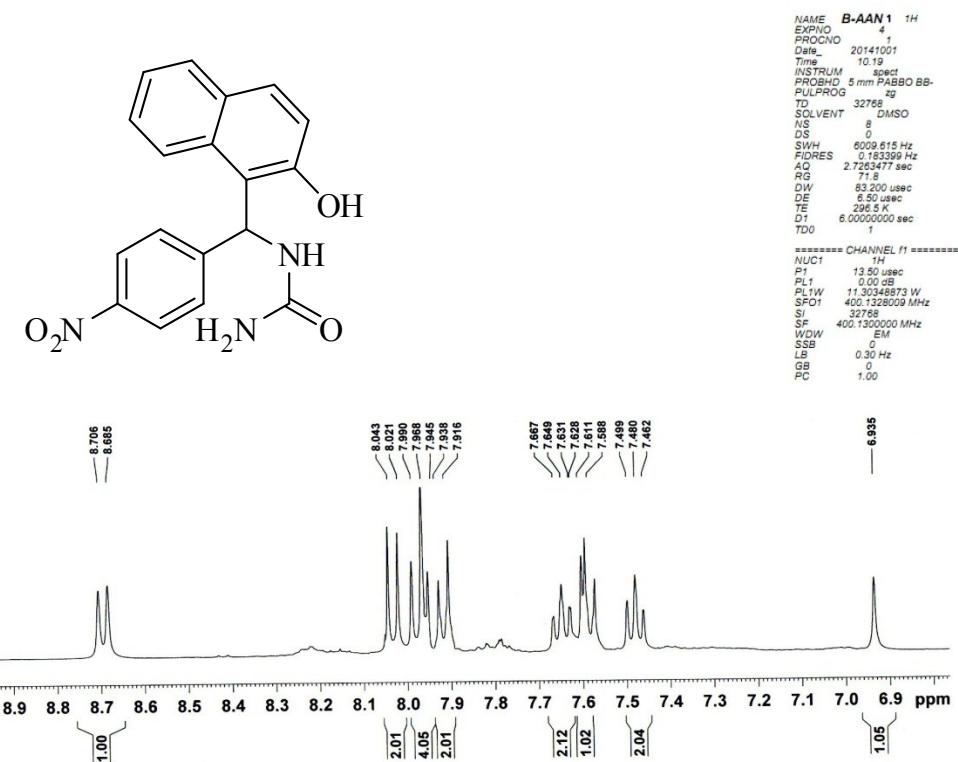


Fig. S11. The ^{13}C NMR spectrum of 1-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)urea (Table 3, entry 2)

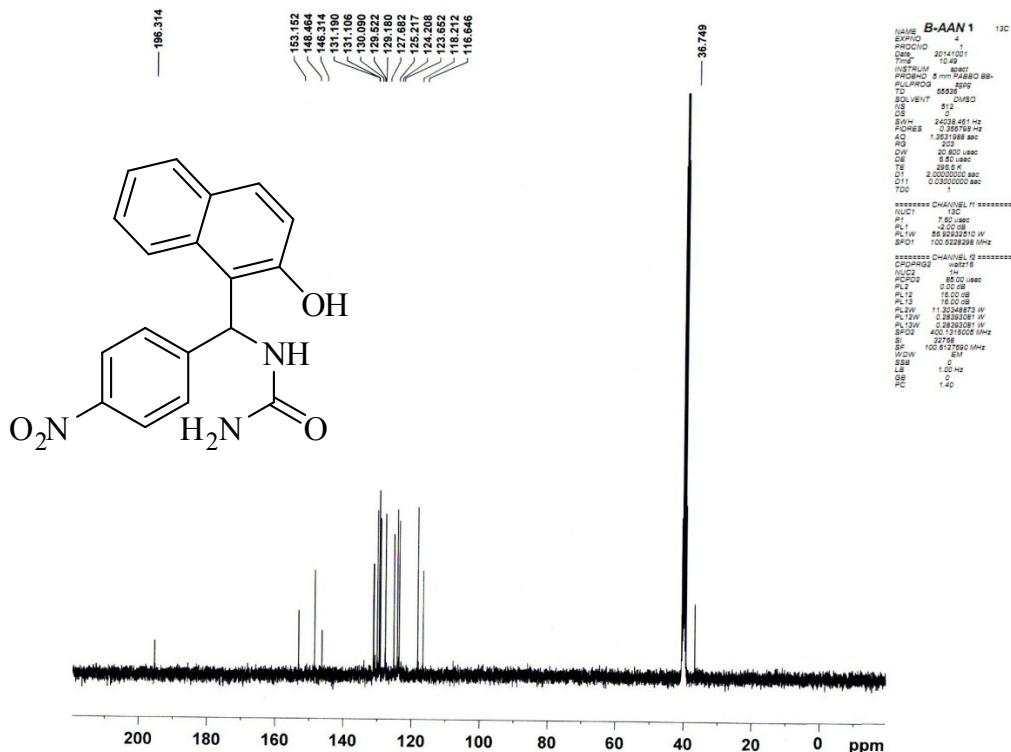


Fig. S12. The ^{13}C NMR spectrum of 1-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)urea (Table 3, entry 2)

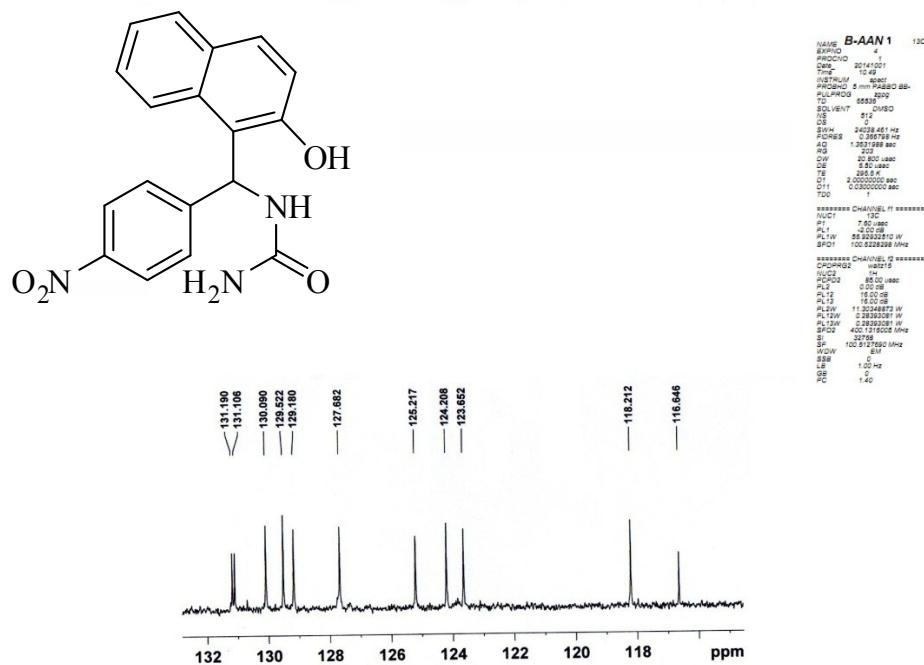
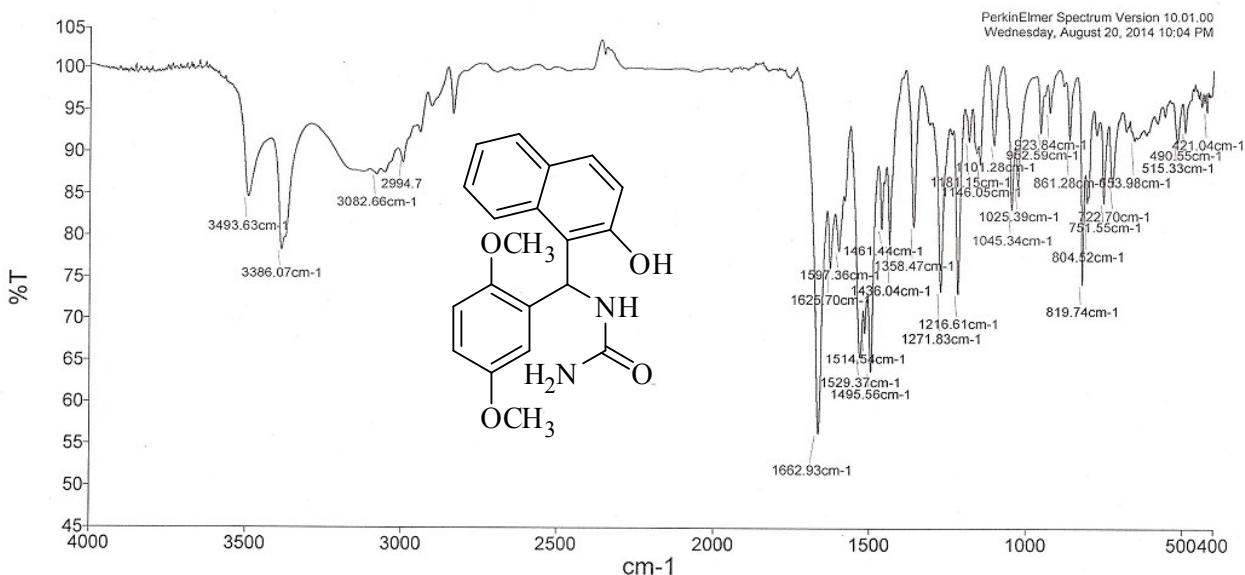


Fig. S13. The IR spectrum of 1-((2,5-dimethoxyphenyl)(2-hydroxynaphthalen-1-yl)methyl)urea (Table 3, entry 4)

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Fig. S14. The ¹H NMR spectrum of 1-((2,5-dimethoxyphenyl)(2-hydroxynaphthalen-1-yl)methyl)urea (Table 3, entry 4)

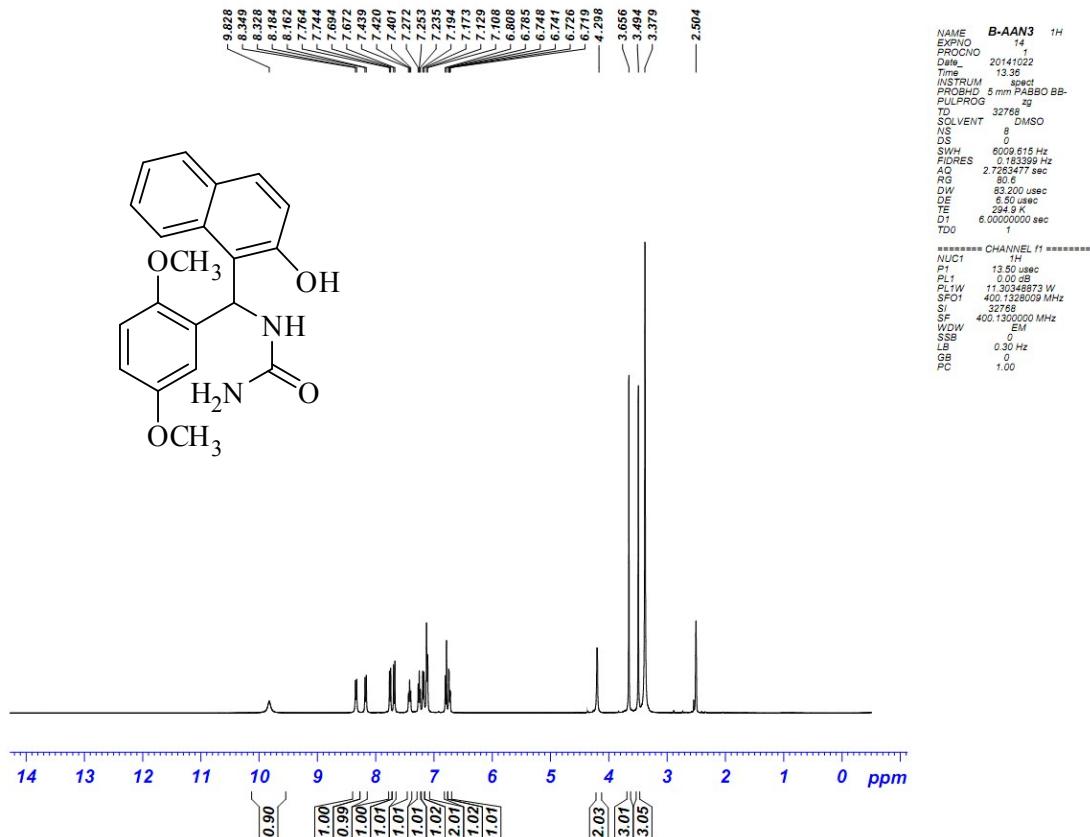


Fig. S15. The ^1H NMR spectrum of 1-((2,5-dimethoxyphenyl)(2-hydroxynaphthalen-1-yl)methyl)urea (Table 3, entry 4)

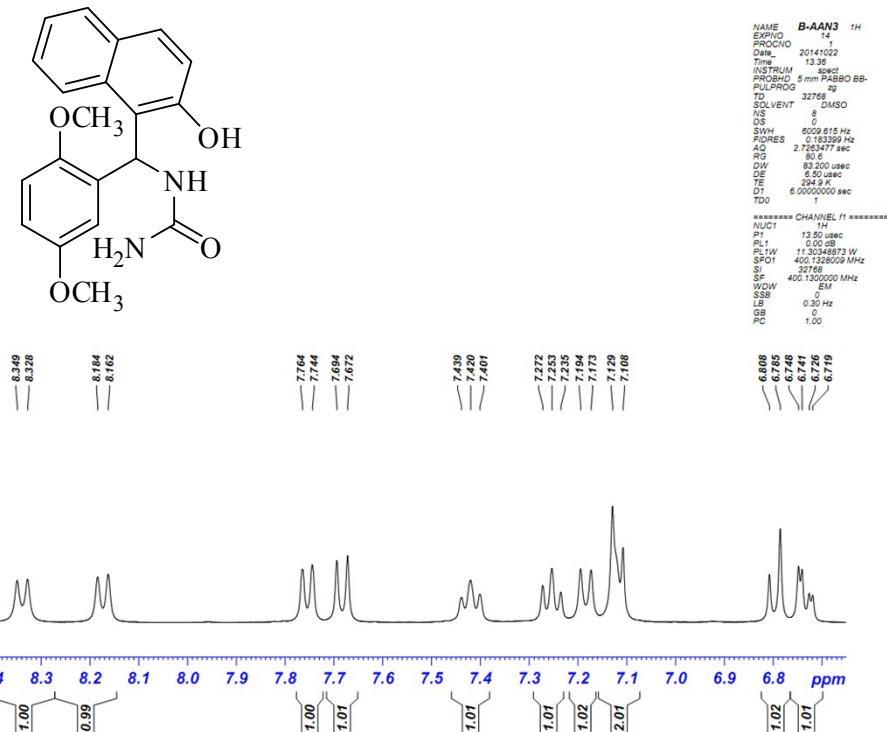


Fig. S16. The ^{13}C NMR spectrum of 1-((2,5-dimethoxyphenyl)(2-hydroxynaphthalen-1-yl)methyl)urea (Table 3, entry 4)

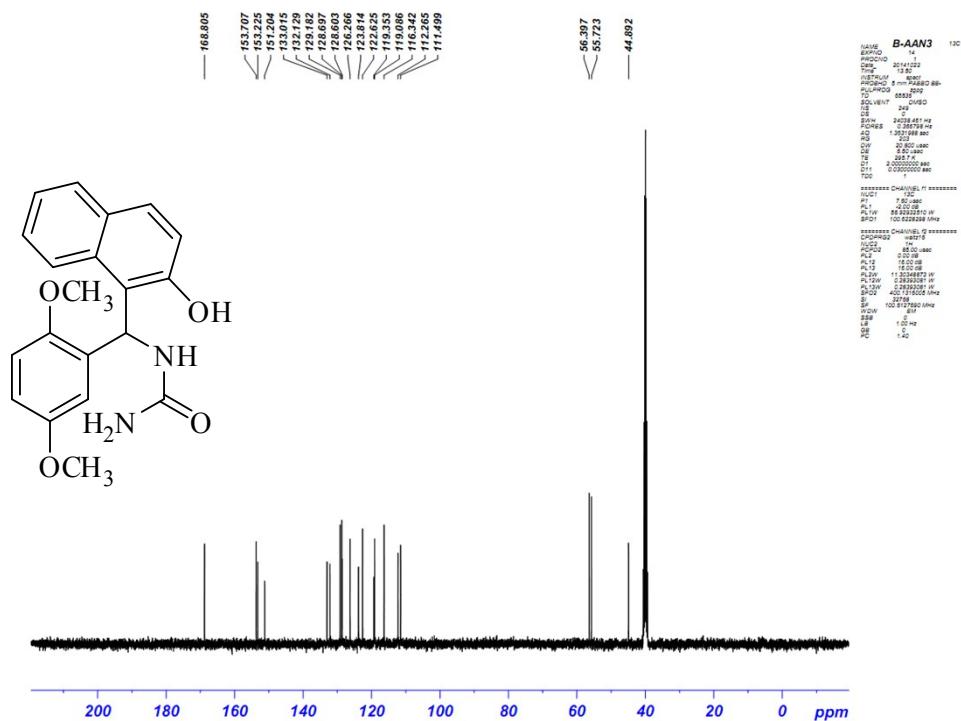


Fig. S17. The ^{13}C NMR spectrum of 1-((2,5-dimethoxyphenyl)(2-hydroxynaphthalen-1-yl)methyl)urea (Table 3, entry 4)

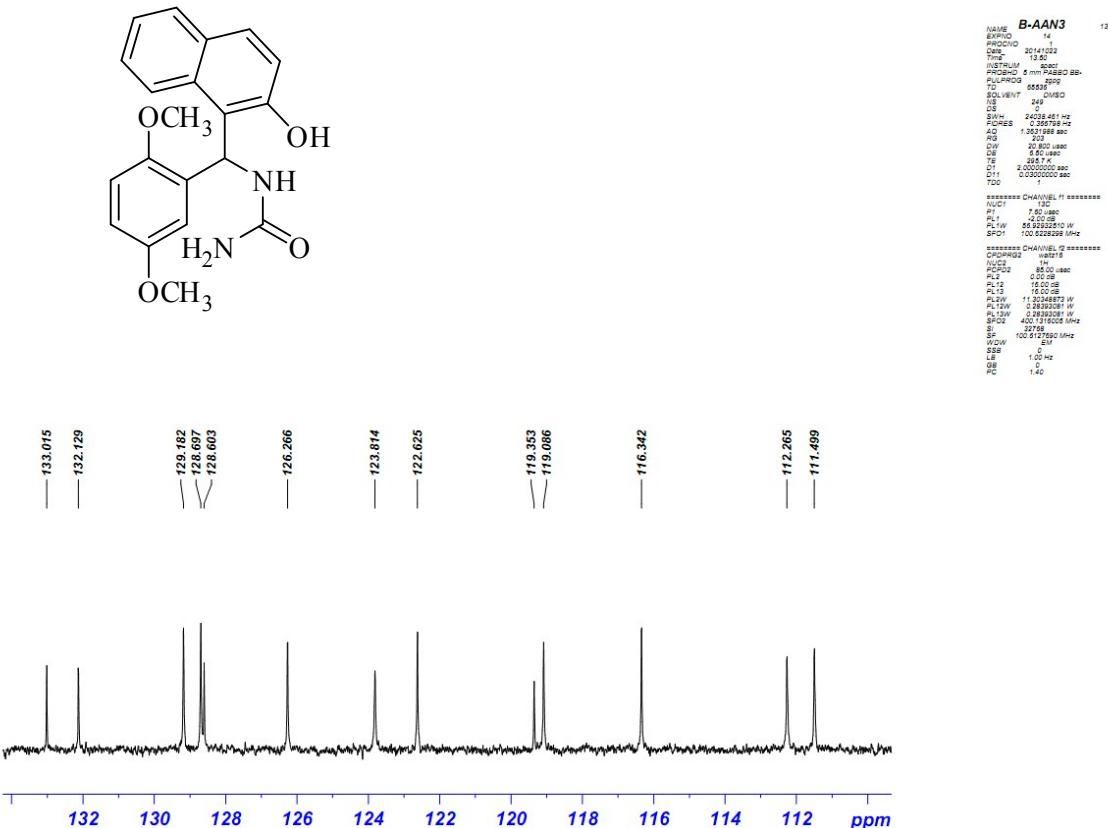


Fig. S18. The mass spectrum of 1-((2,5-dimethoxyphenyl)(2-hydroxynaphthalen-1-yl)methyl)urea (Table 3, entry 4)

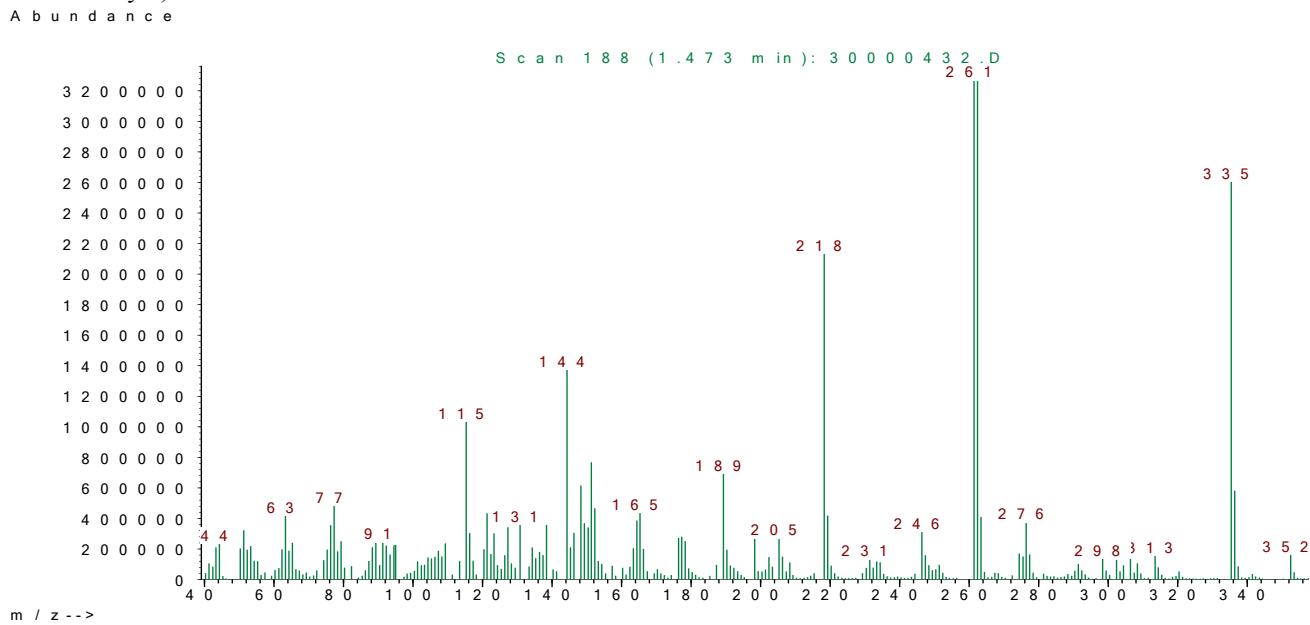


Fig. S19. The IR spectrum of 1-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)urea (Table 3, entry 7)

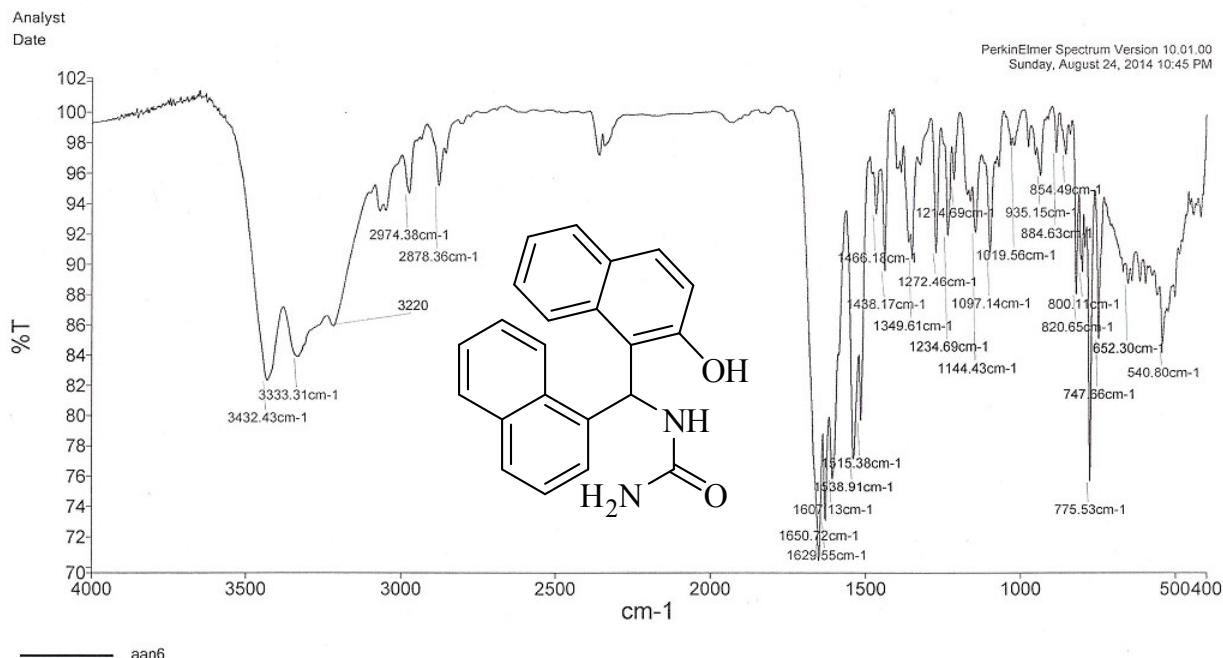


Fig. S20. The ¹H NMR spectrum of 1-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)urea (Table 3, entry 7)

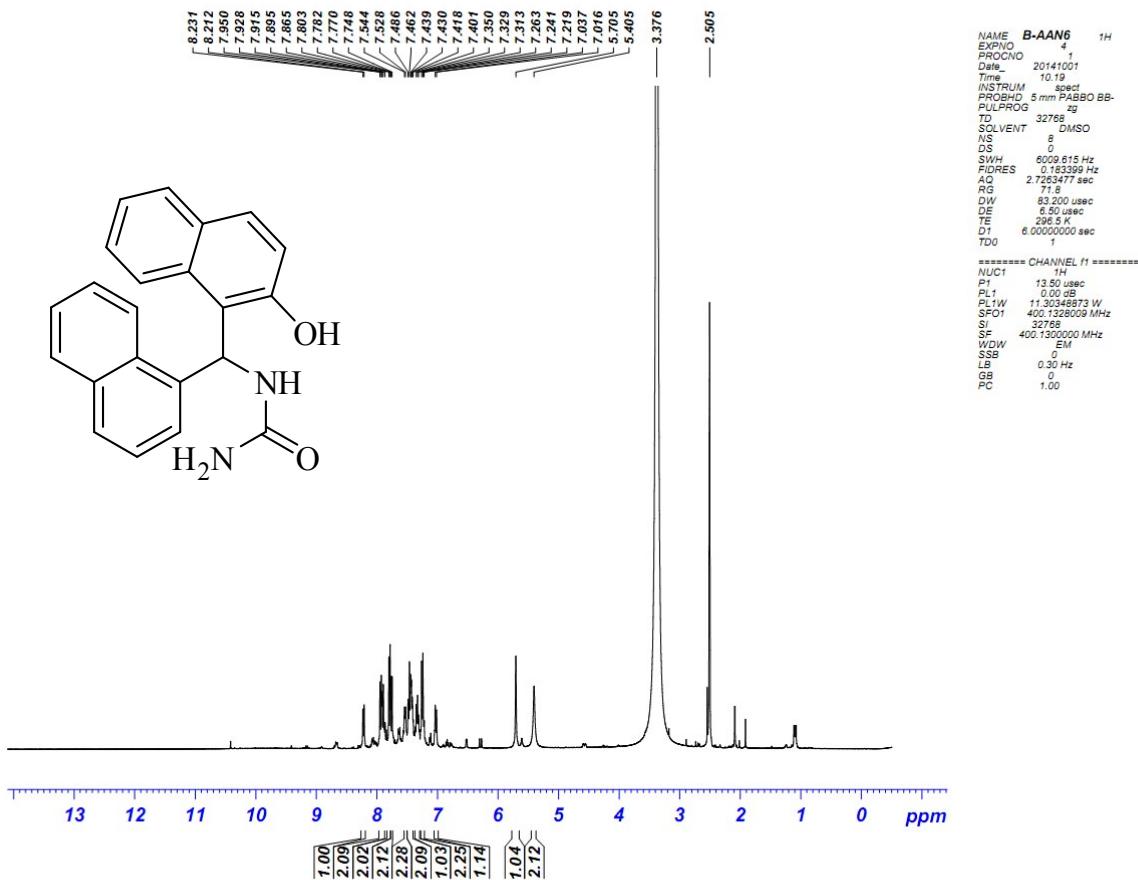


Fig. S21. The ¹H NMR spectrum of 1-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)urea (Table 3, entry 7)

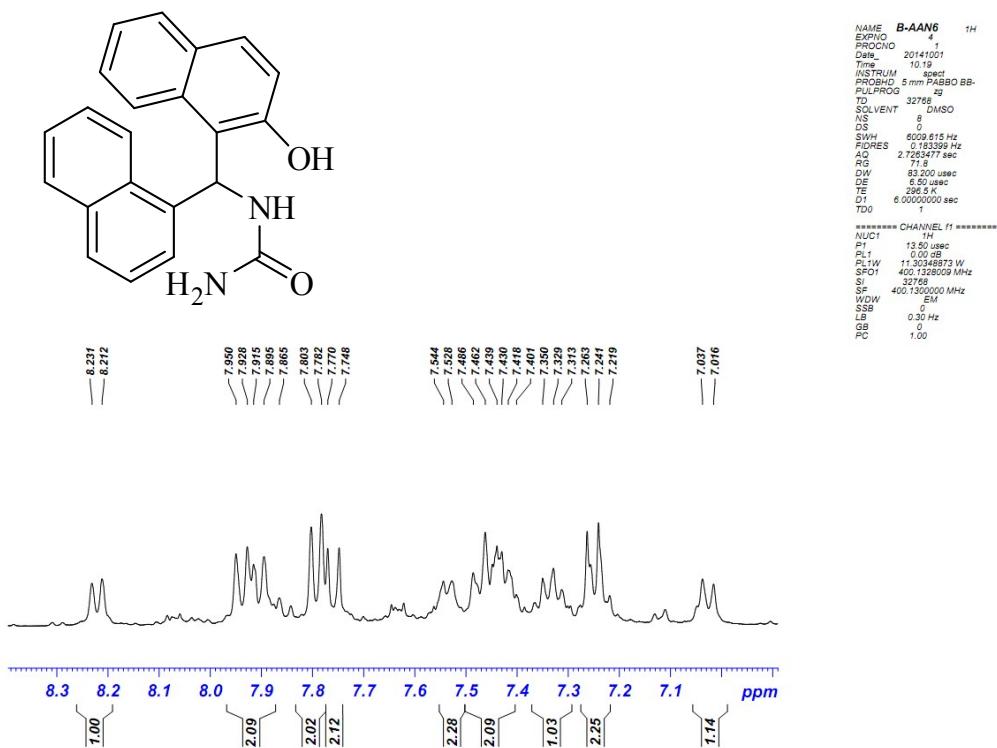


Fig. S22. The ¹³C NMR spectrum of 1-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)urea (Table 3, entry 7)

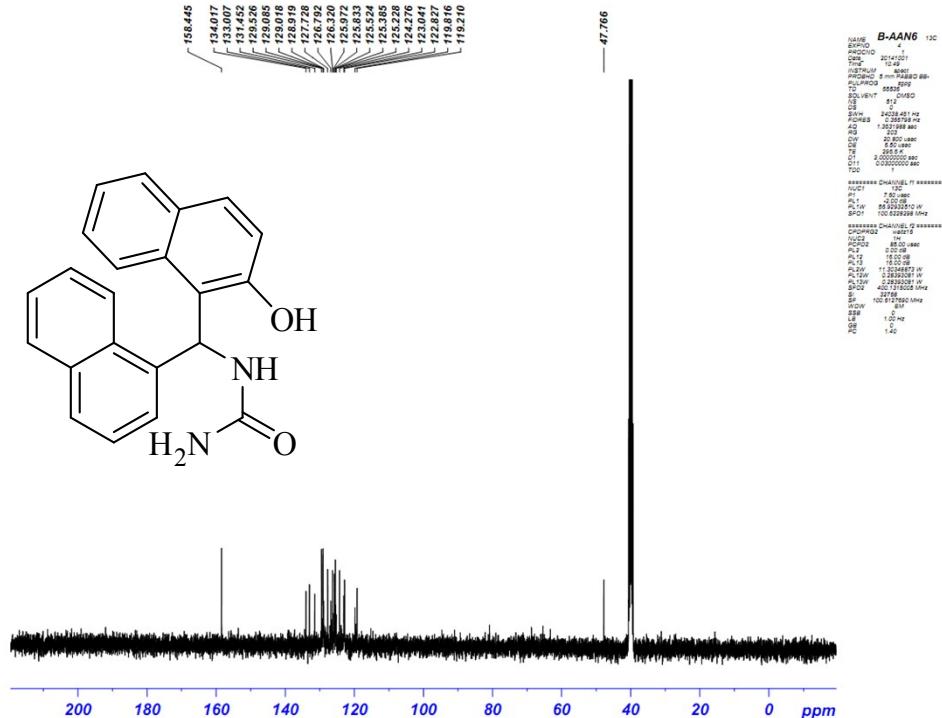


Fig. S23. The ^{13}C NMR spectrum of 1-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)urea (Table 3, entry 7)

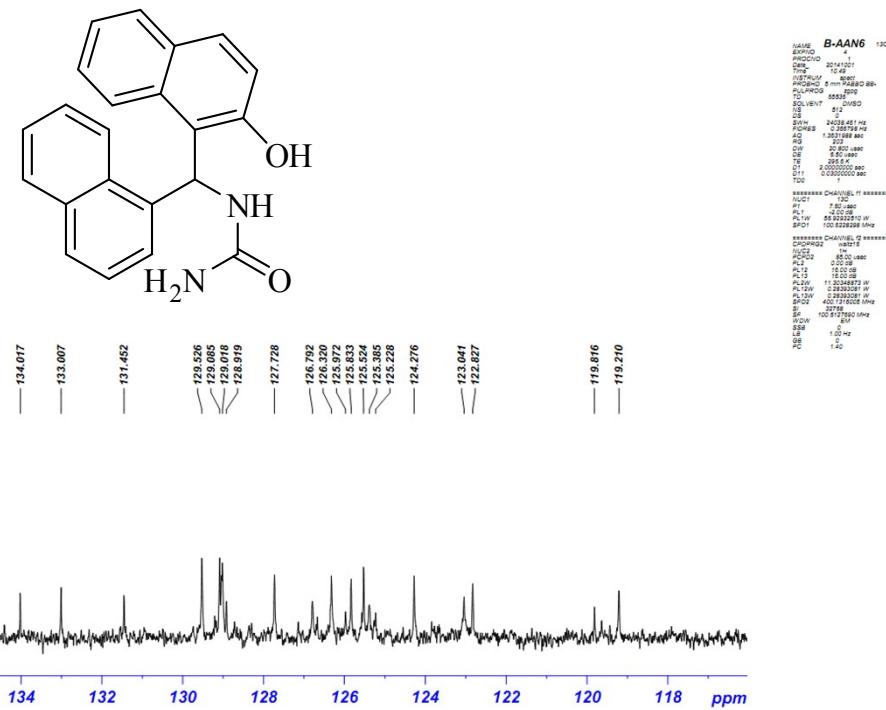


Fig. S24. The IR spectrum of 1-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)urea (Table 3, entry 8)

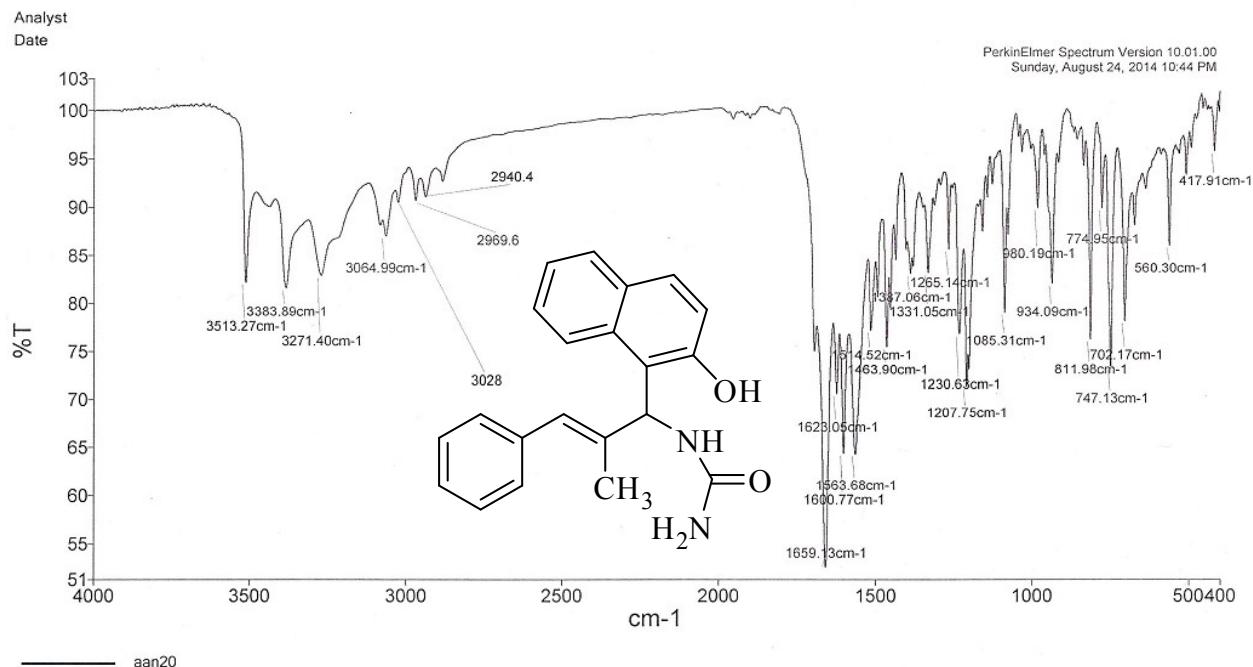


Fig. S25. The ^1H NMR spectrum of 1-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)urea (Table 3, entry 8)

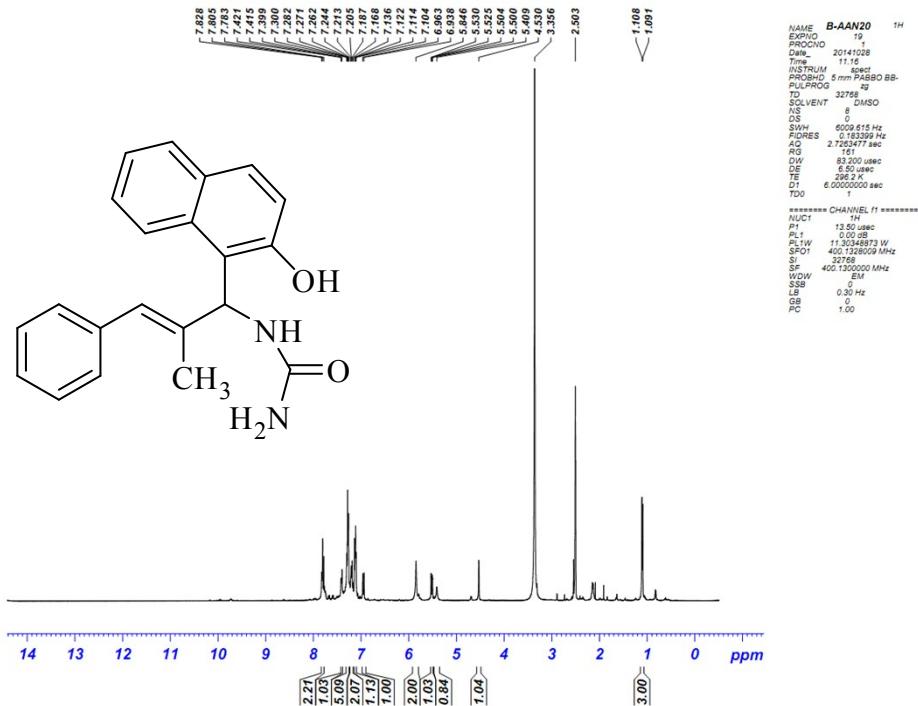


Fig. S26. The ^1H NMR spectrum of 1-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)urea (Table 3, entry 8)

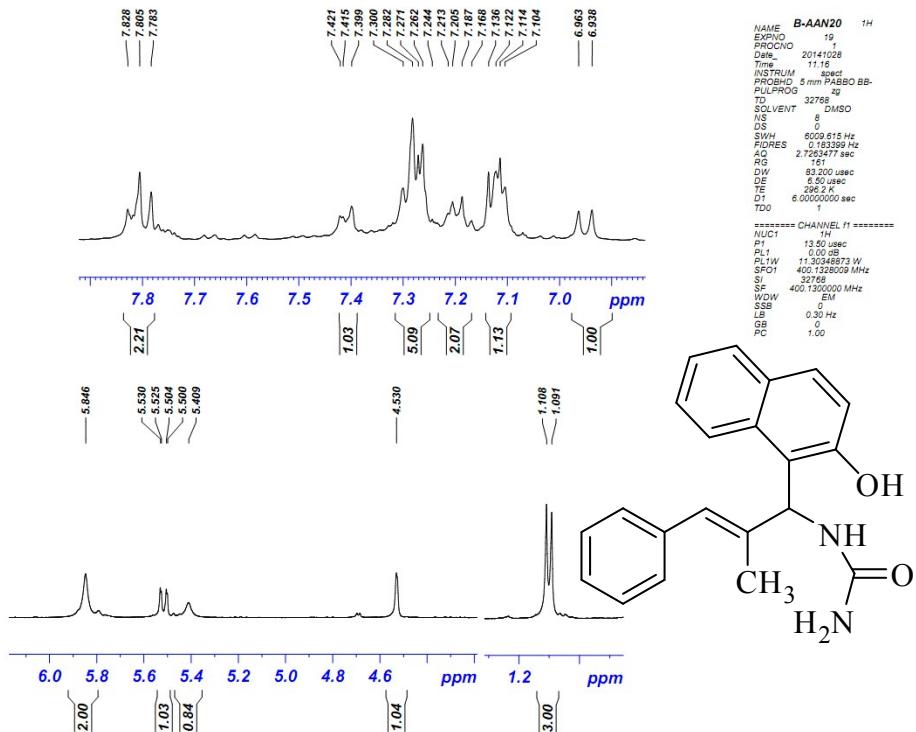


Fig. S27. The ^{13}C NMR spectrum of 1-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)urea (Table 3, entry 8)

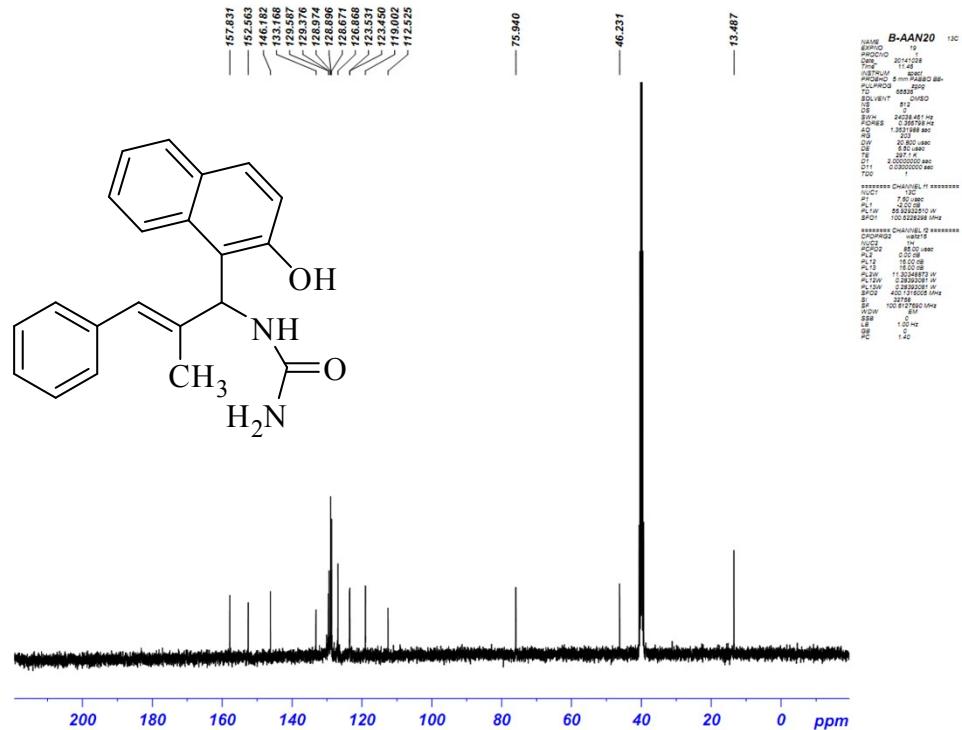


Fig. S28. The ^{13}C NMR spectrum of 1-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)urea (Table 3, entry 8)

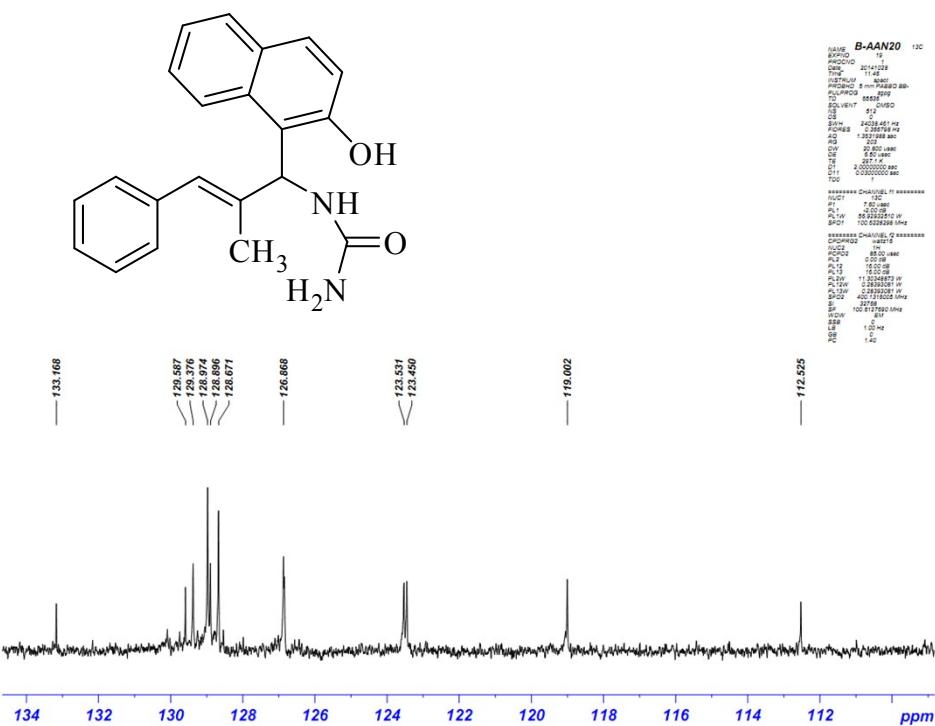


Fig. S29. The mass spectrum of 1-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)urea (Table 3, entry 8)

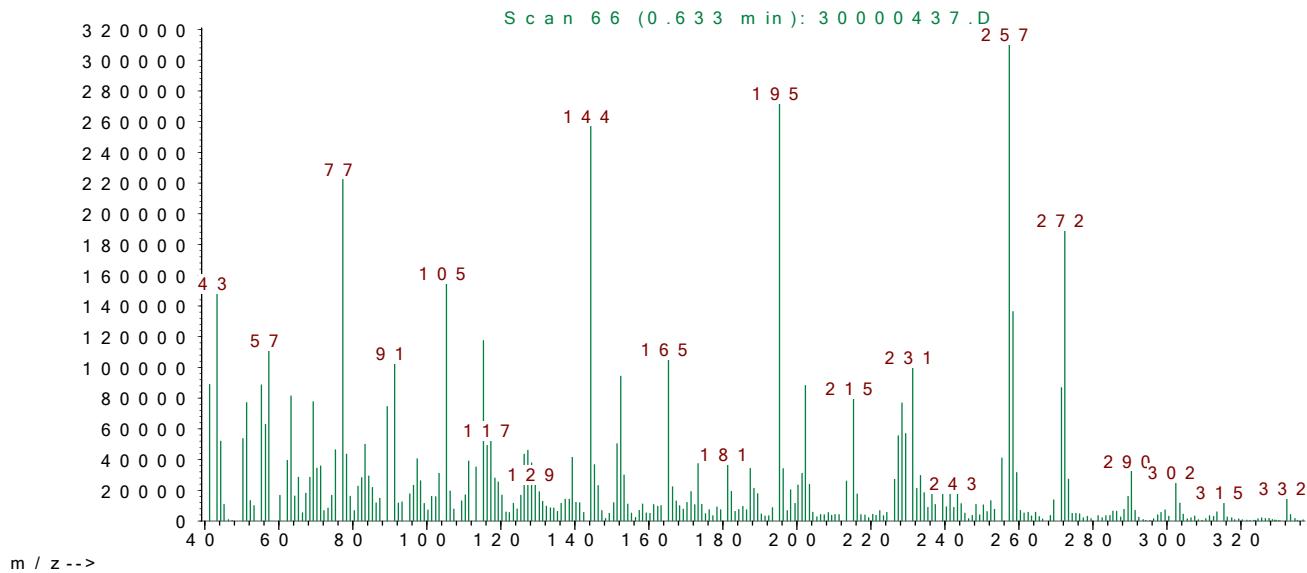


Fig. S30. The IR spectrum of *N*-(4-chlorophenyl)(2-hydroxynaphthalen-1-yl)methyl)acetamide (Table 3, entry 10)

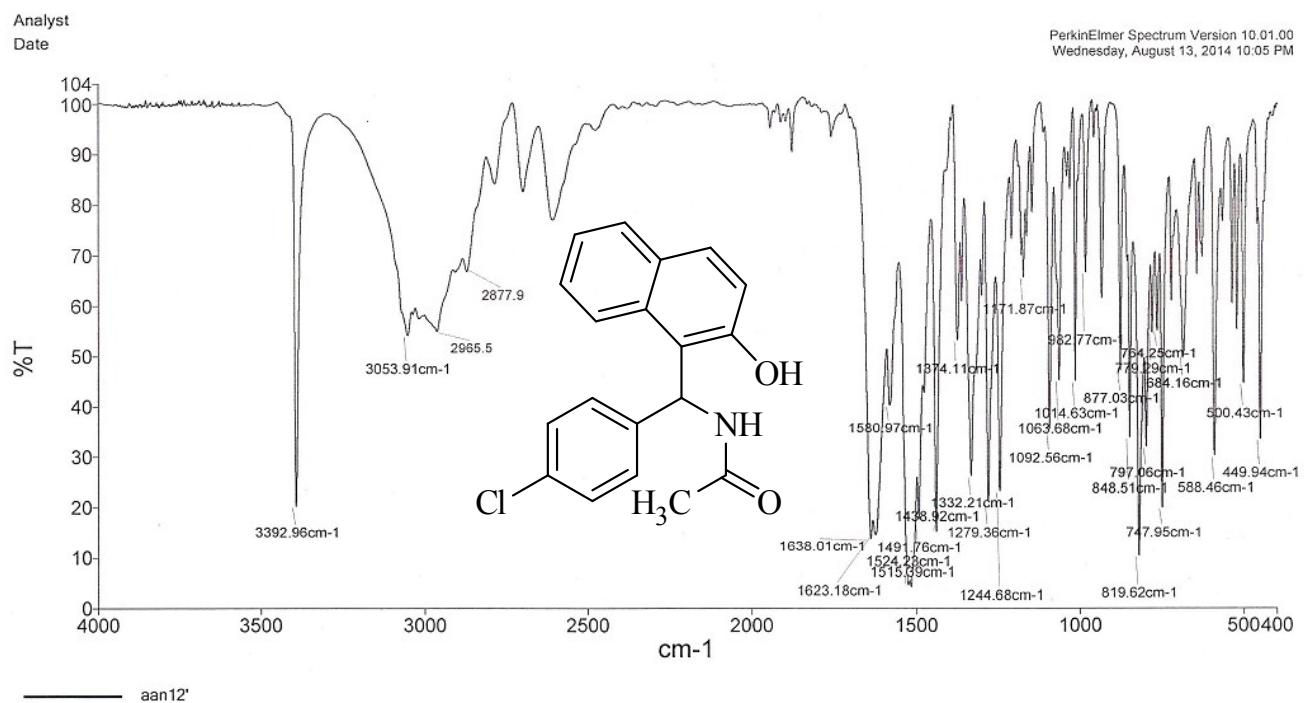


Fig. S31. The ^1H NMR spectrum of *N*-(4-chlorophenyl)(2-hydroxynaphthalen-1-yl)methyl)acetamide (Table 3, entry 10)

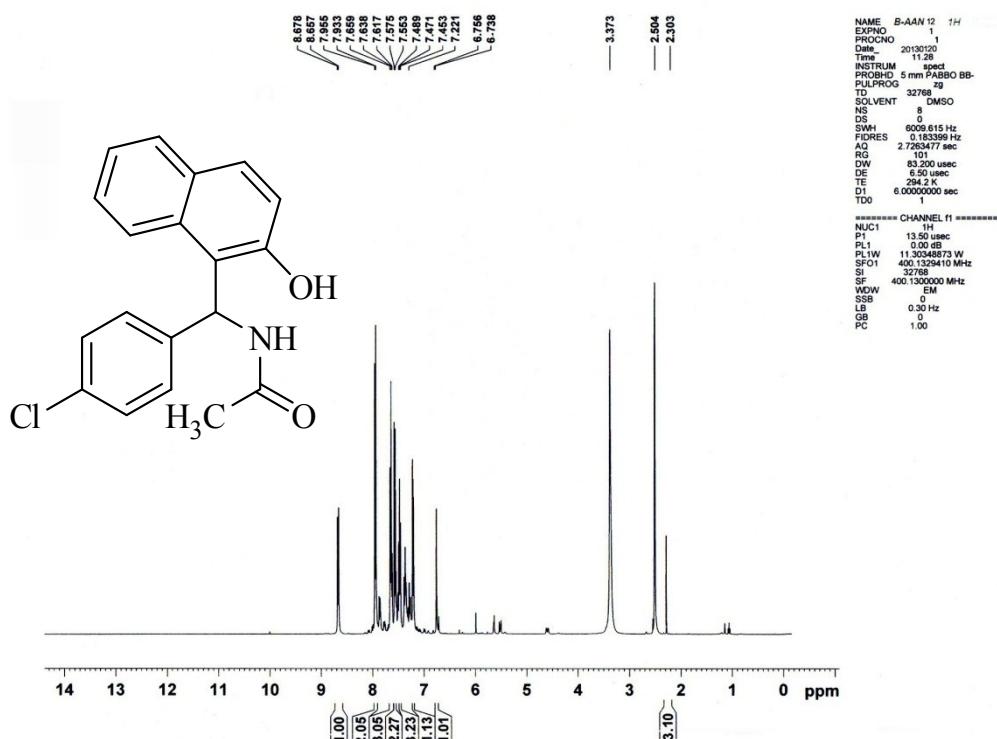


Fig. S32. The ^1H NMR spectrum of *N*-(4-chlorophenyl)(2-hydroxynaphthalen-1-yl)methyl)acetamide (Table 3, entry 10)

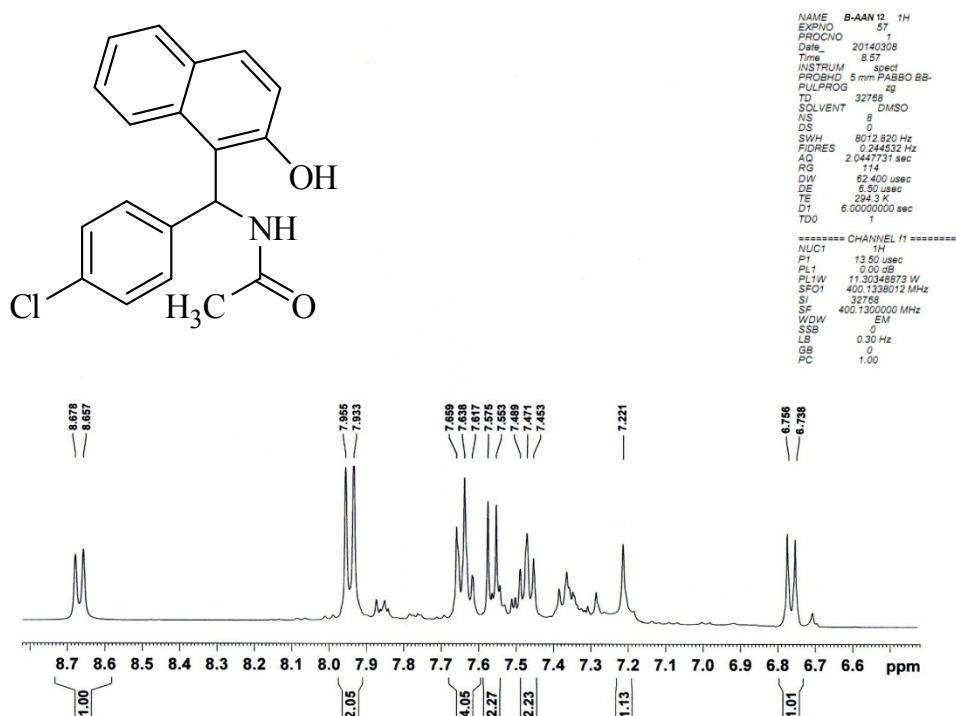


Fig. S33. The ^{13}C NMR spectrum of *N*-(4-chlorophenyl)(2-hydroxynaphthalen-1-yl)methyl)acetamide (Table 3, entry 10)

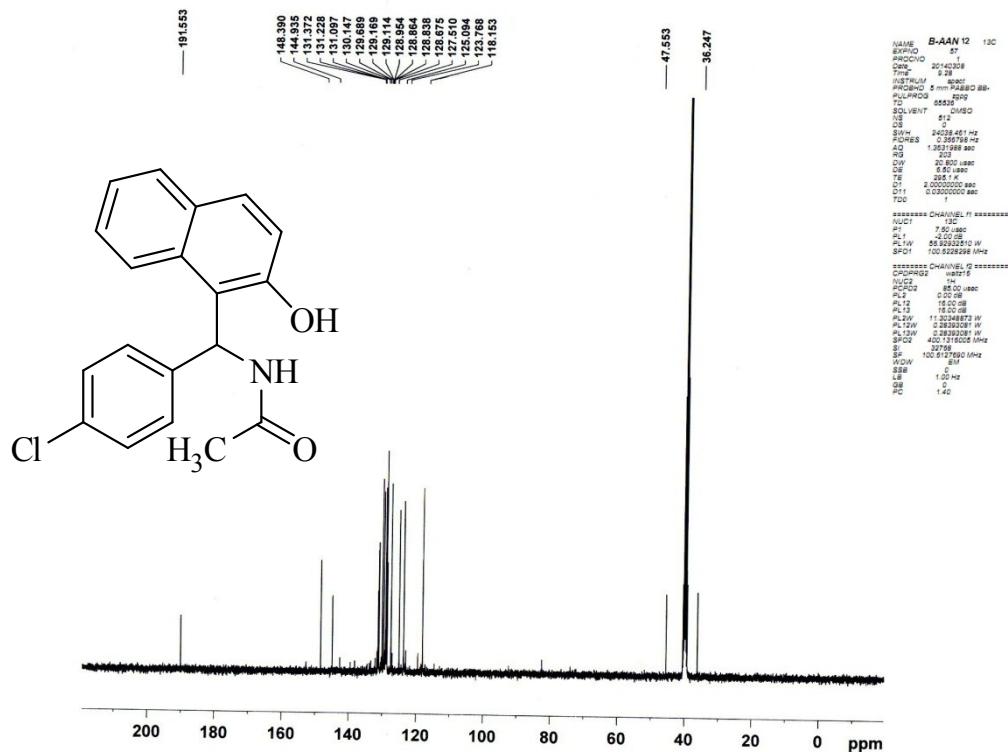


Fig. S34. The ^{13}C NMR spectrum of *N*-(4-chlorophenyl)(2-hydroxynaphthalen-1-yl)methyl)acetamide (Table 3, entry 10)

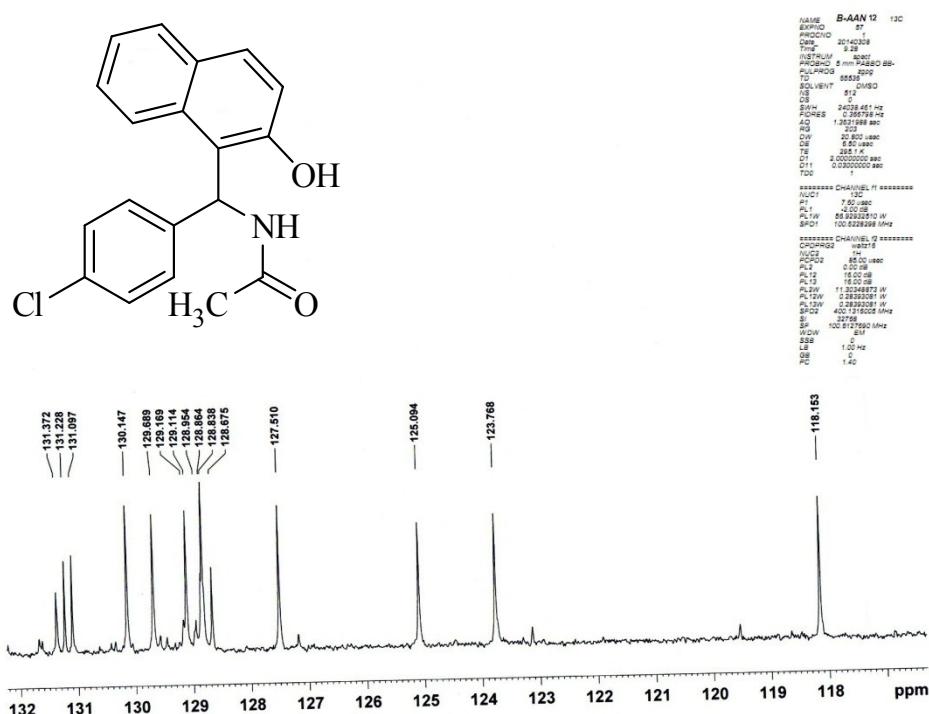


Fig. S35. The IR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-1-yl)methyl)acetamide (Table 3, entry 12)

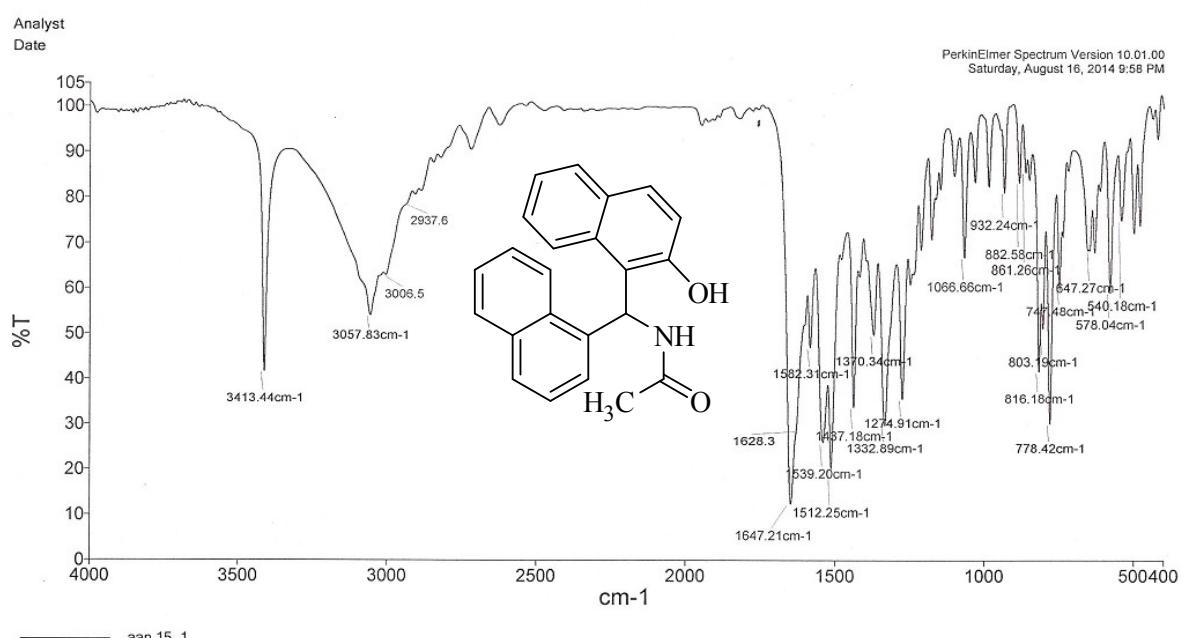


Fig. S36. The ¹H NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-1-yl)methyl)acetamide (Table 3, entry 12)

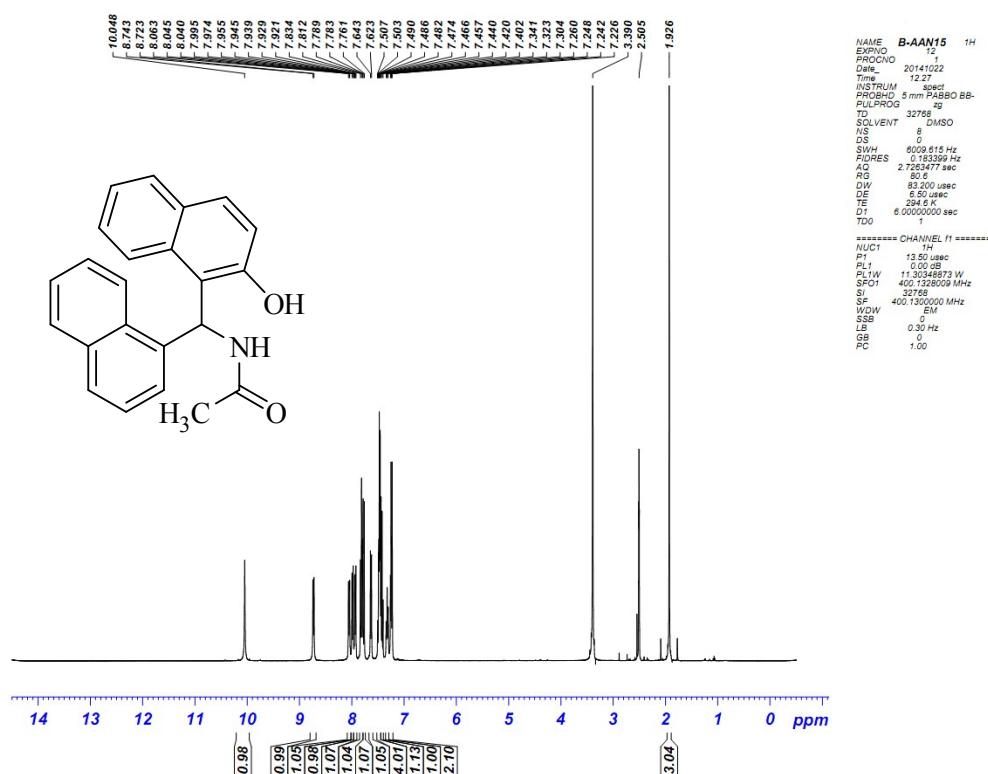


Fig. S37. The ^1H NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-1-yl)methyl)acetamide (Table 3, entry 12)

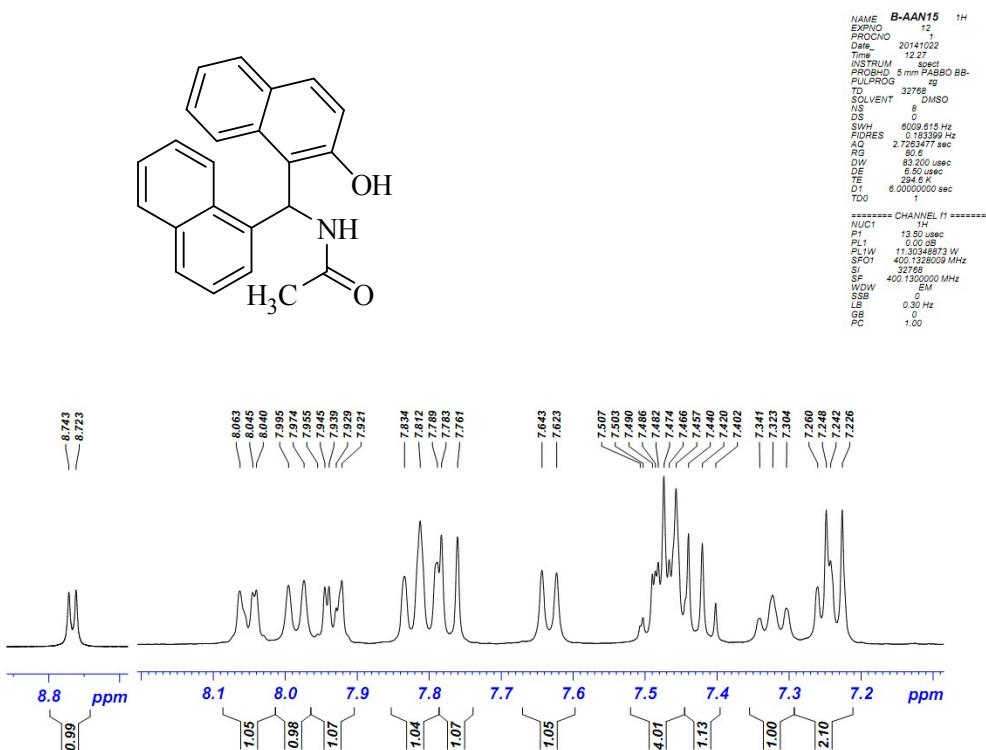


Fig. S38. The ^{13}C NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-1-yl)methyl)acetamide (Table 3, entry 12)

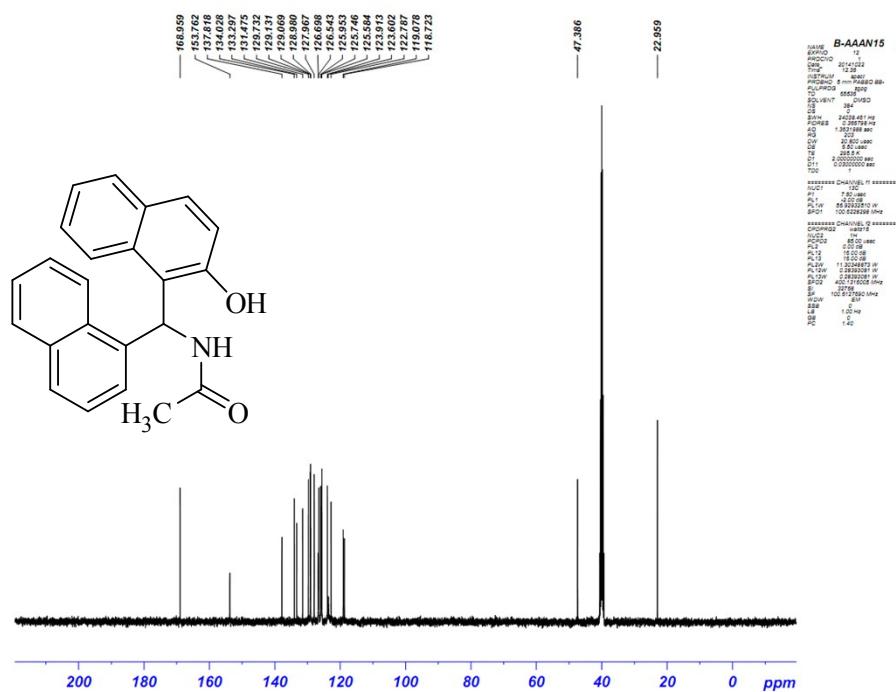


Fig. S39. The ^{13}C NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-1-yl)methyl)acetamide (Table 3, entry 12)

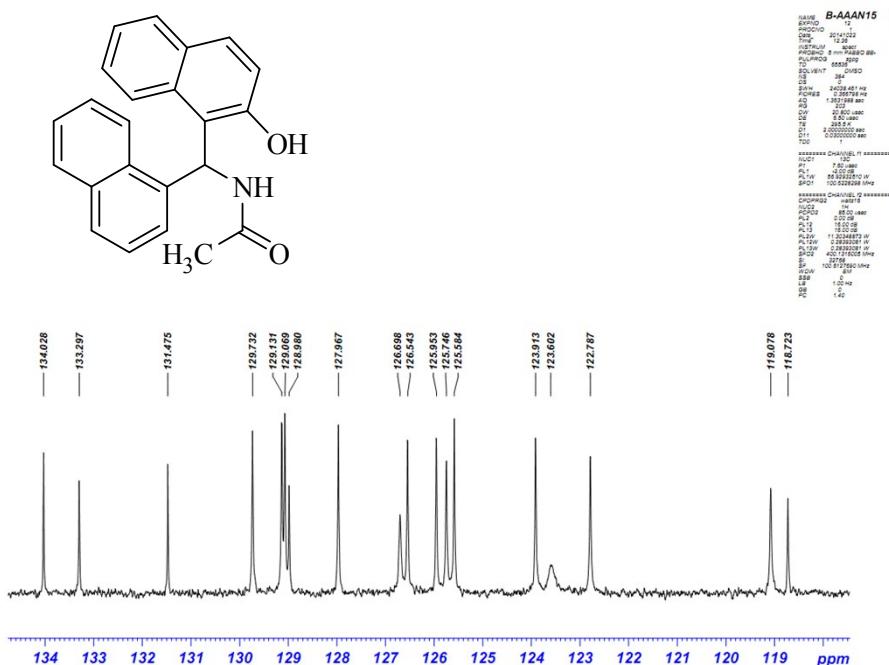


Fig. S40. The mass spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-1-yl)methyl)acetamide (Table 3, entry 12)

Abundance

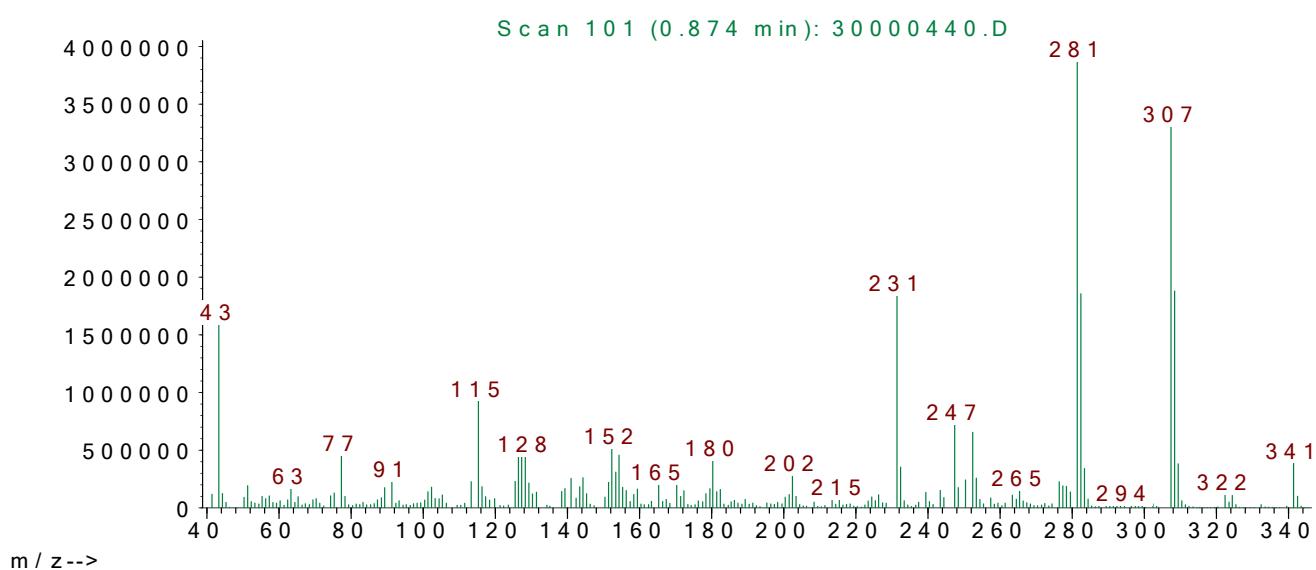


Fig. S41. The IR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-3-phenylallyl)acetamide (Table 3, entry 13)

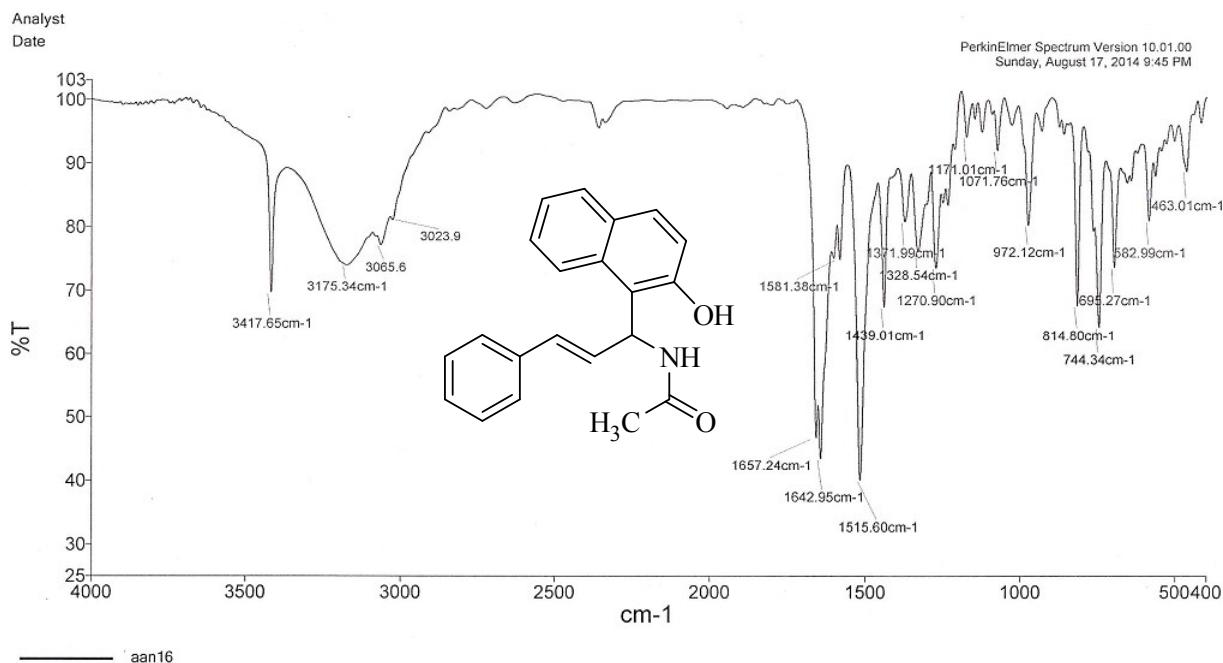


Fig. S42. The ¹H NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-3-phenylallyl)acetamide (Table 3, entry 13)

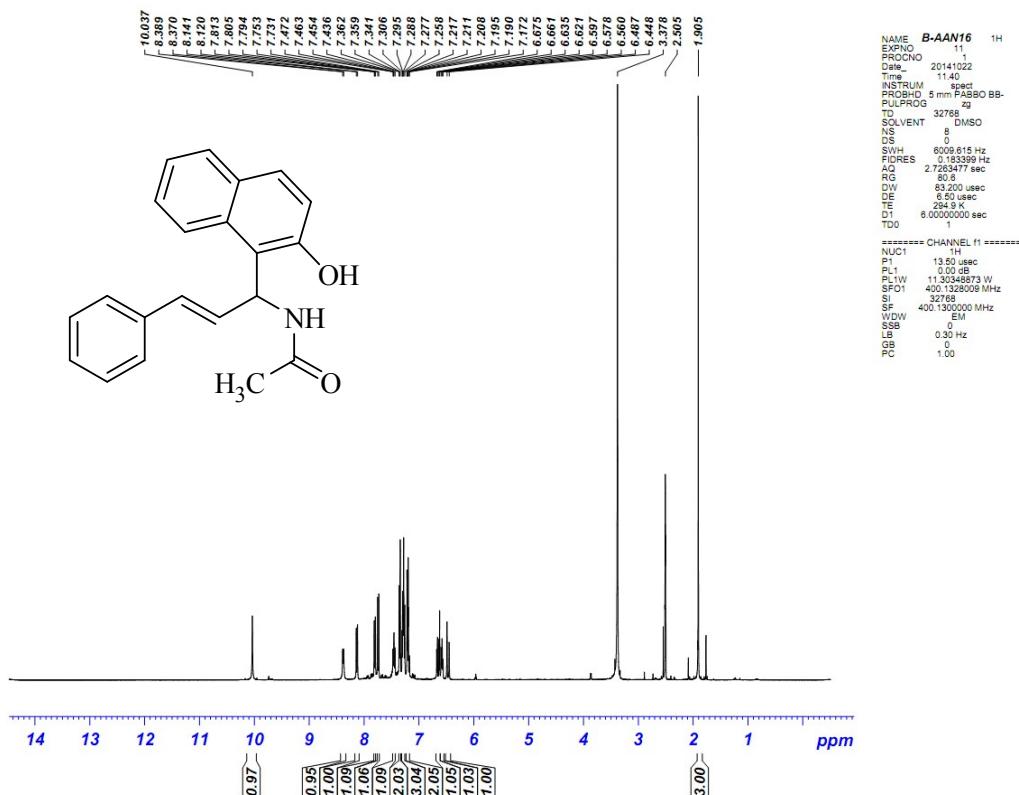


Fig. S43. The ^1H NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-3-phenylallyl)acetamide (Table 3, entry 13)

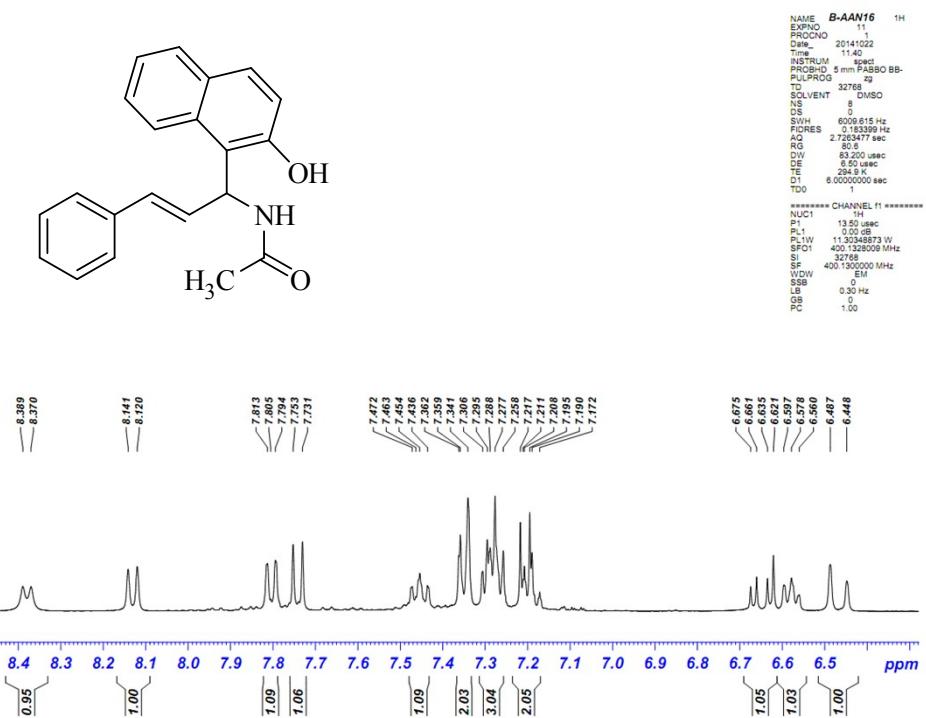


Fig. S44. The ^{13}C NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-3-phenylallyl)acetamide (Table 3, entry 13)

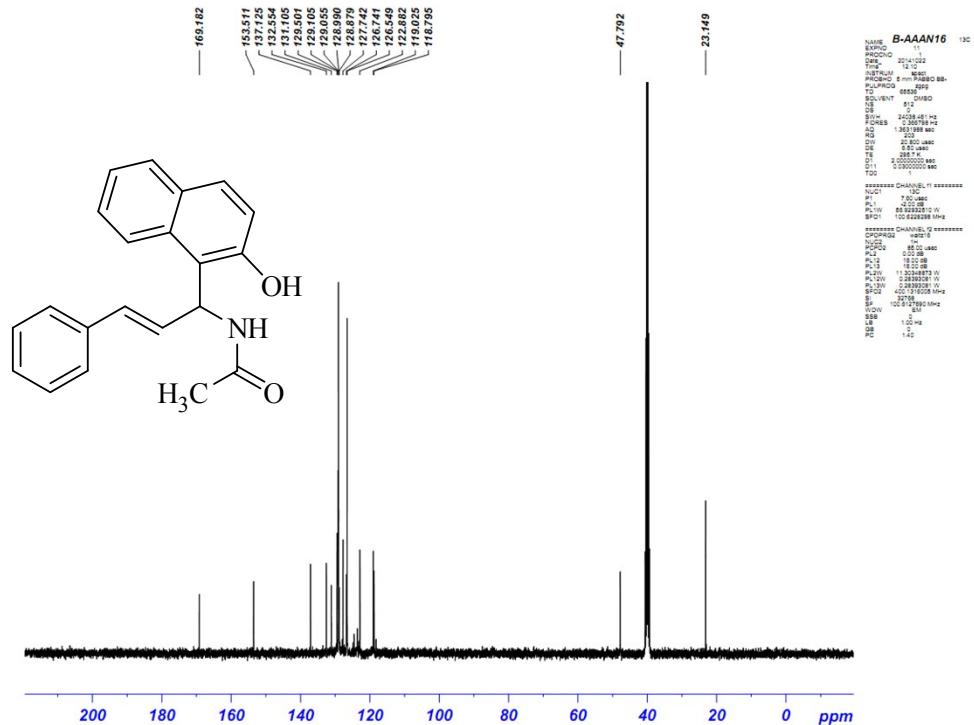


Fig. S45. The ^{13}C NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-3-phenylallyl)acetamide (Table 3, entry 13)

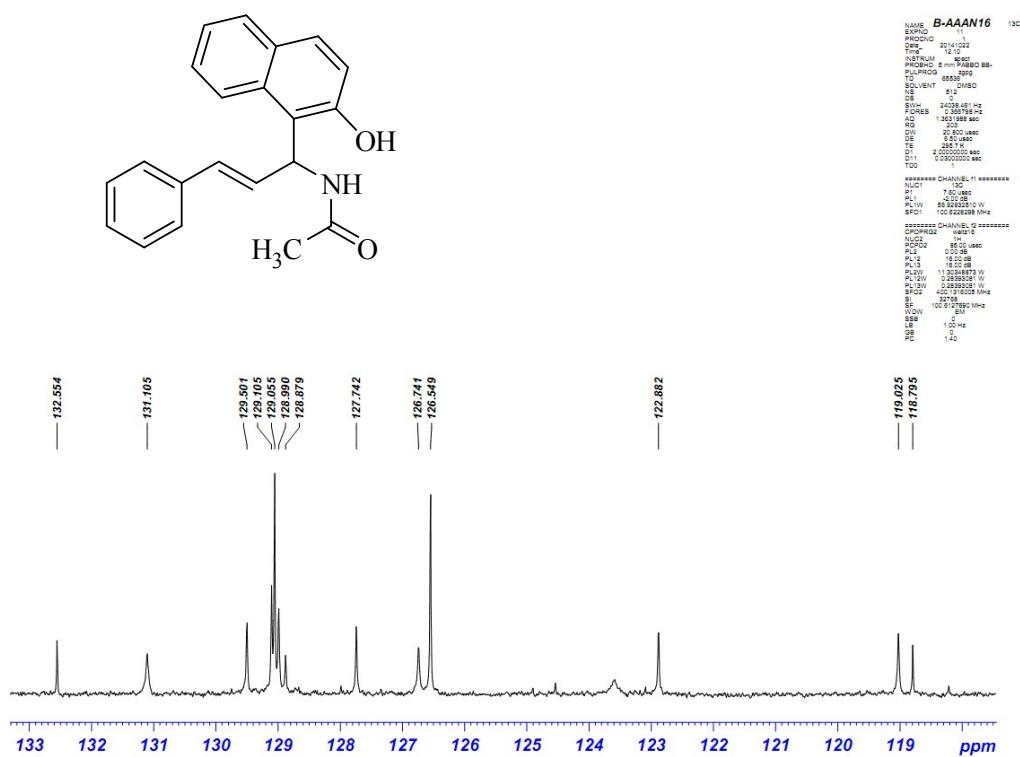


Fig. S46. The IR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-2-yl)methyl)acetamide (Table 3, entry 14)

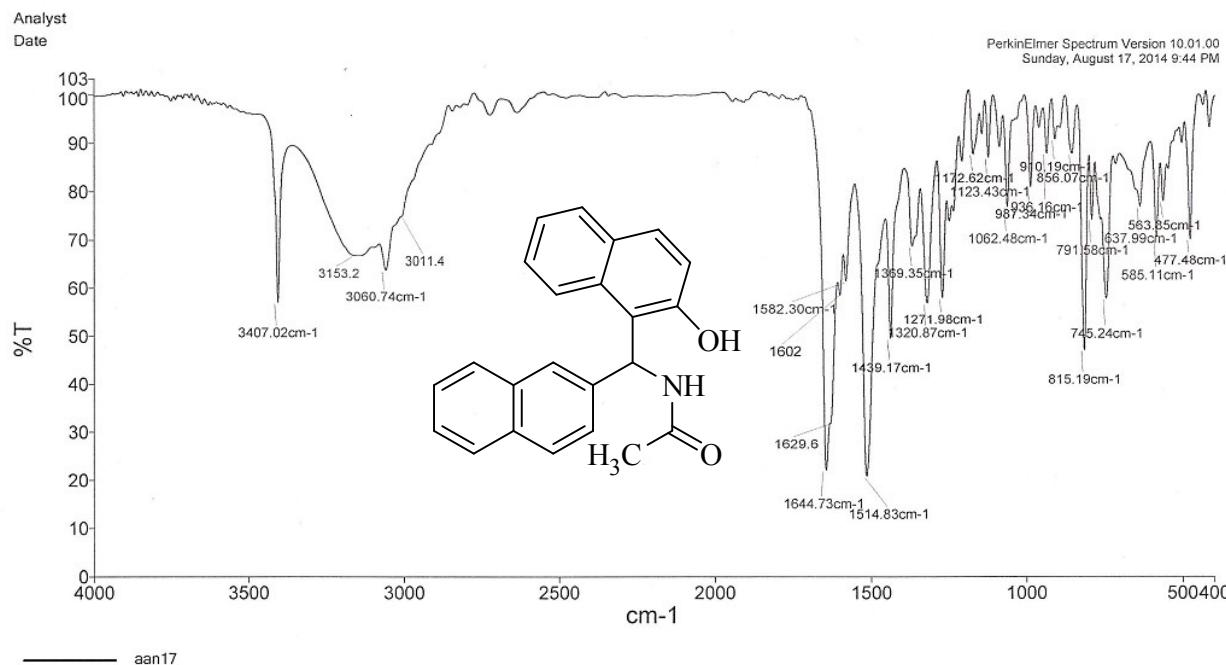


Fig. S47. The ^1H NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-2-yl)methyl)acetamide (Table 3, entry 14)

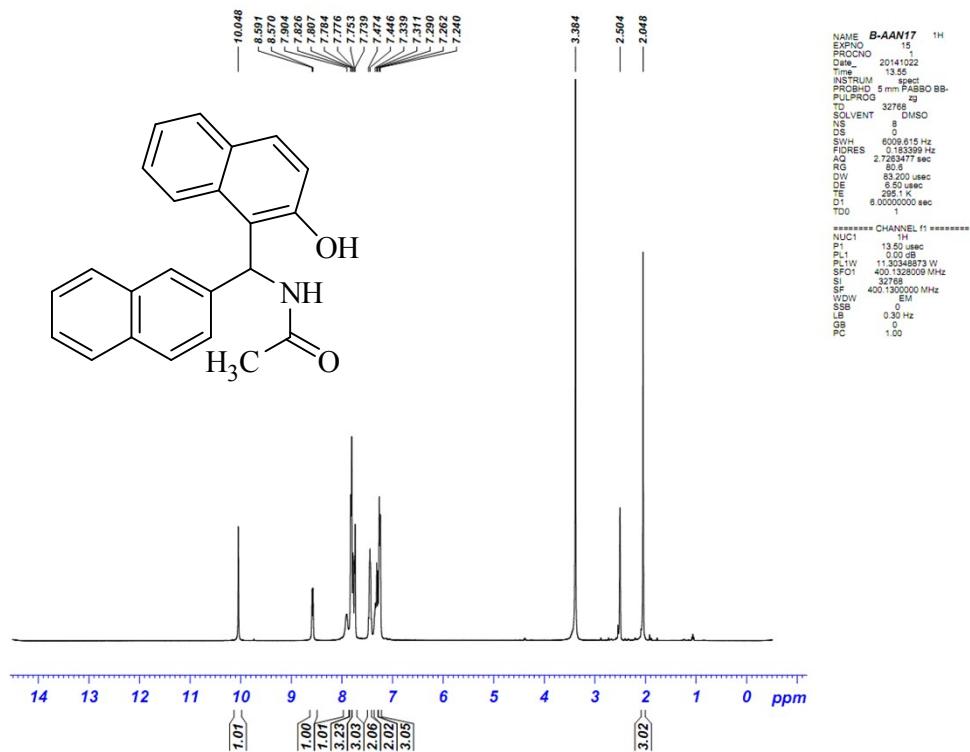


Fig. S48. The ^1H NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-2-yl)methyl)acetamide (Table 3, entry 14)

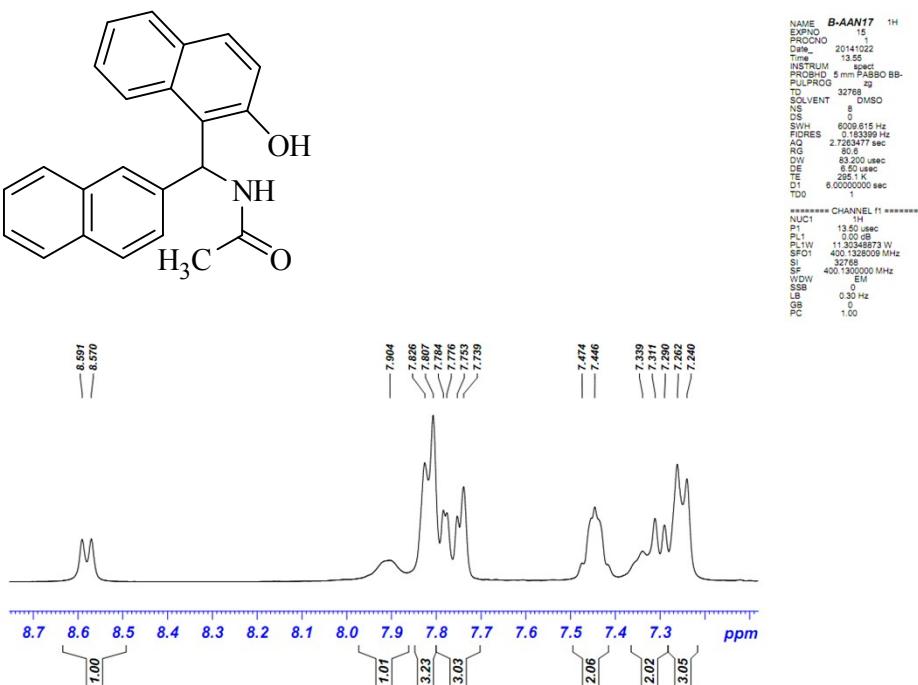


Fig. S49. The ^{13}C NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-2-yl)methyl)acetamide (Table 3, entry 14)

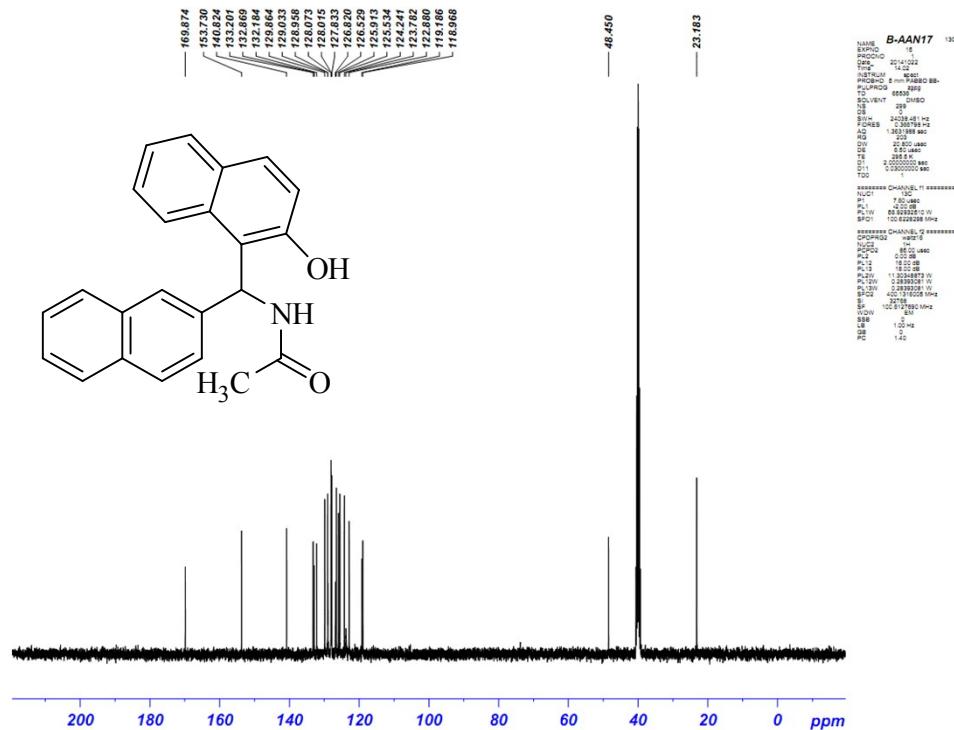


Fig. S50. The ^{13}C NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-2-yl)methyl)acetamide (Table 3, entry 14)

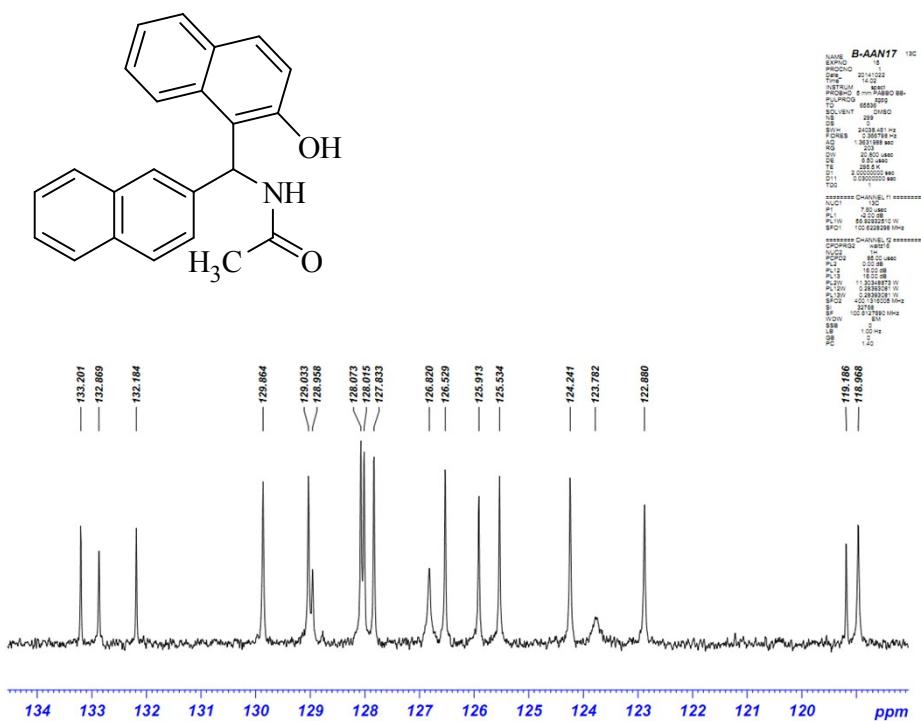


Fig. S51. The IR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)acetamide (Table 3, entry 15)

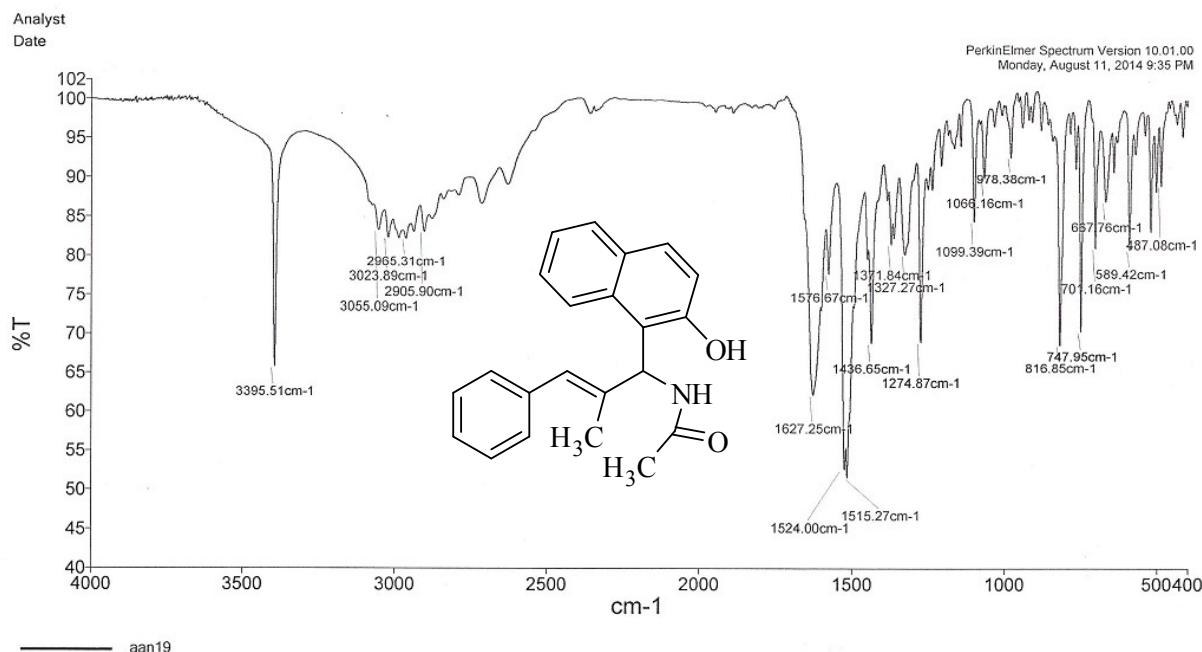


Fig. S52. The ¹H NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)acetamide (Table 3, entry 15)

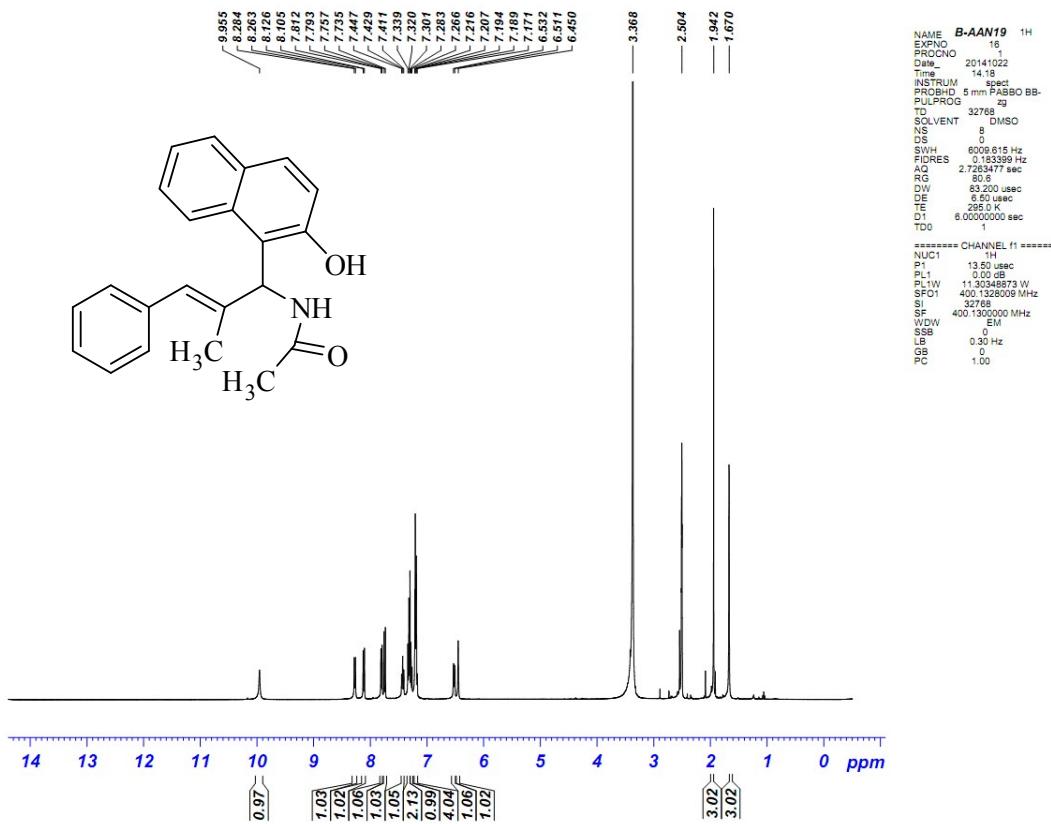


Fig. S53. The ^1H NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)acetamide (Table 3, entry 15)

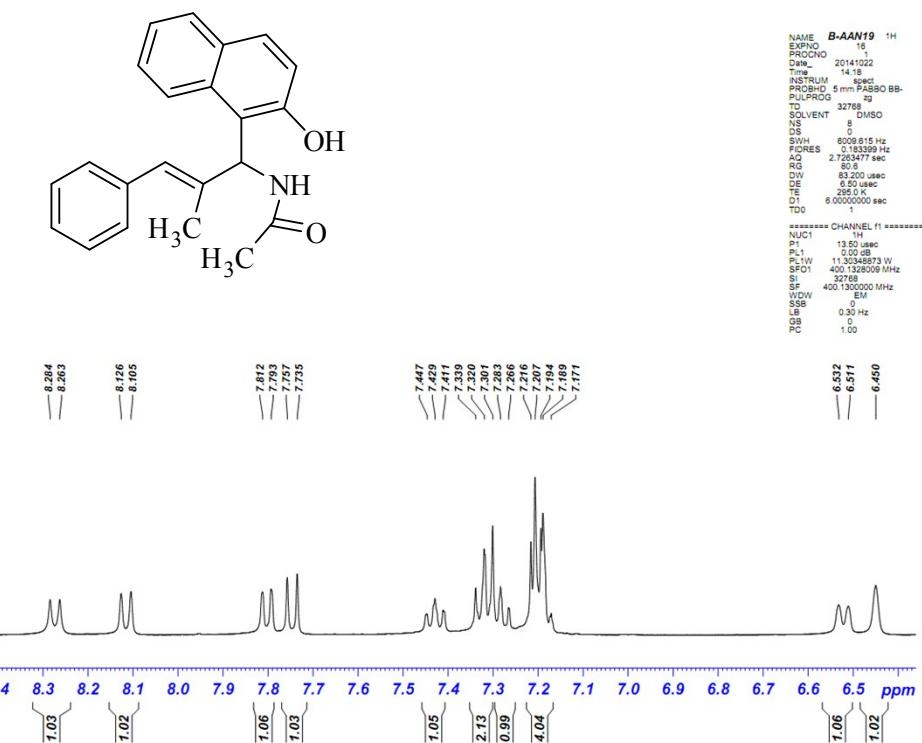


Fig. S54. The ^{13}C NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)acetamide (Table 3, entry 15)

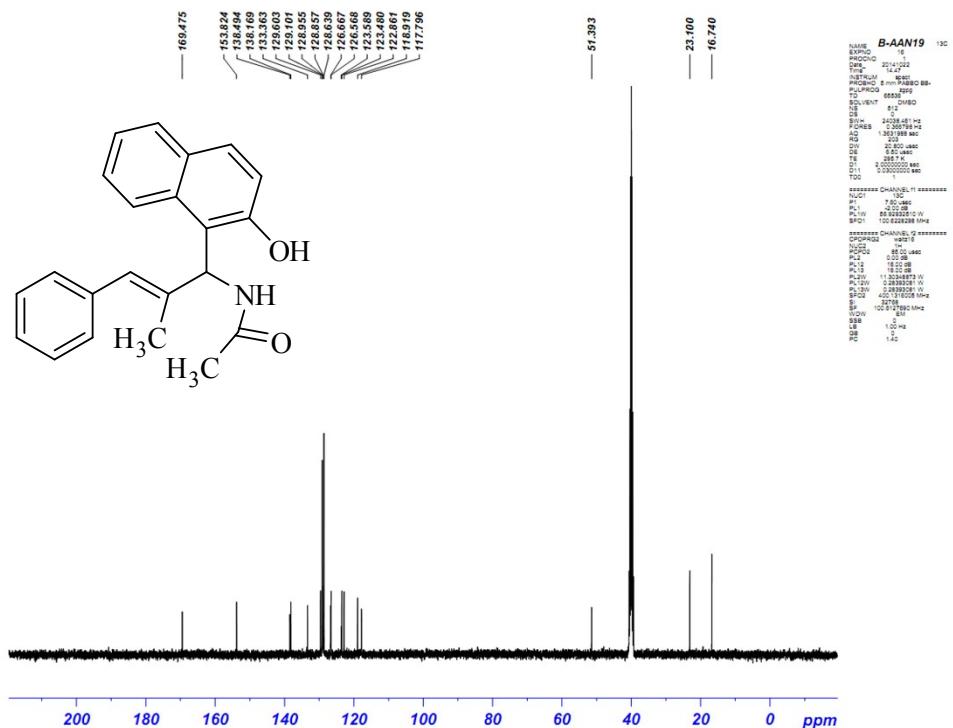


Fig. S55. The ^{13}C NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)acetamide (Table 3, entry 15)

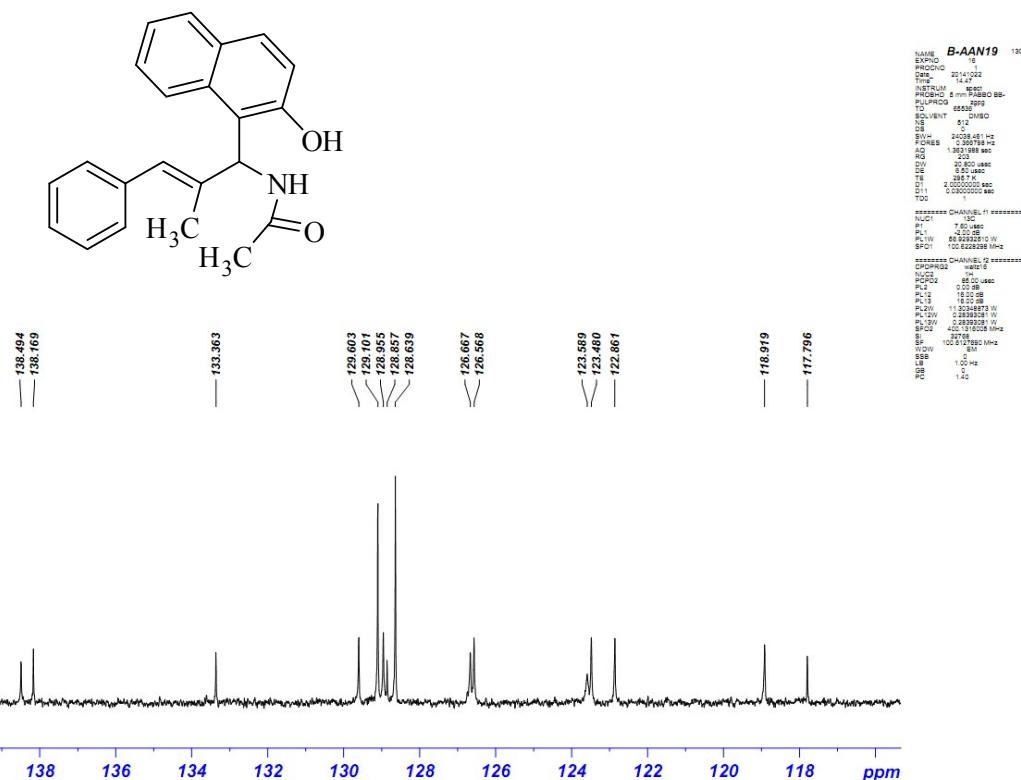


Fig. S56. The mass spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)acetamide (Table 3, entry 15)

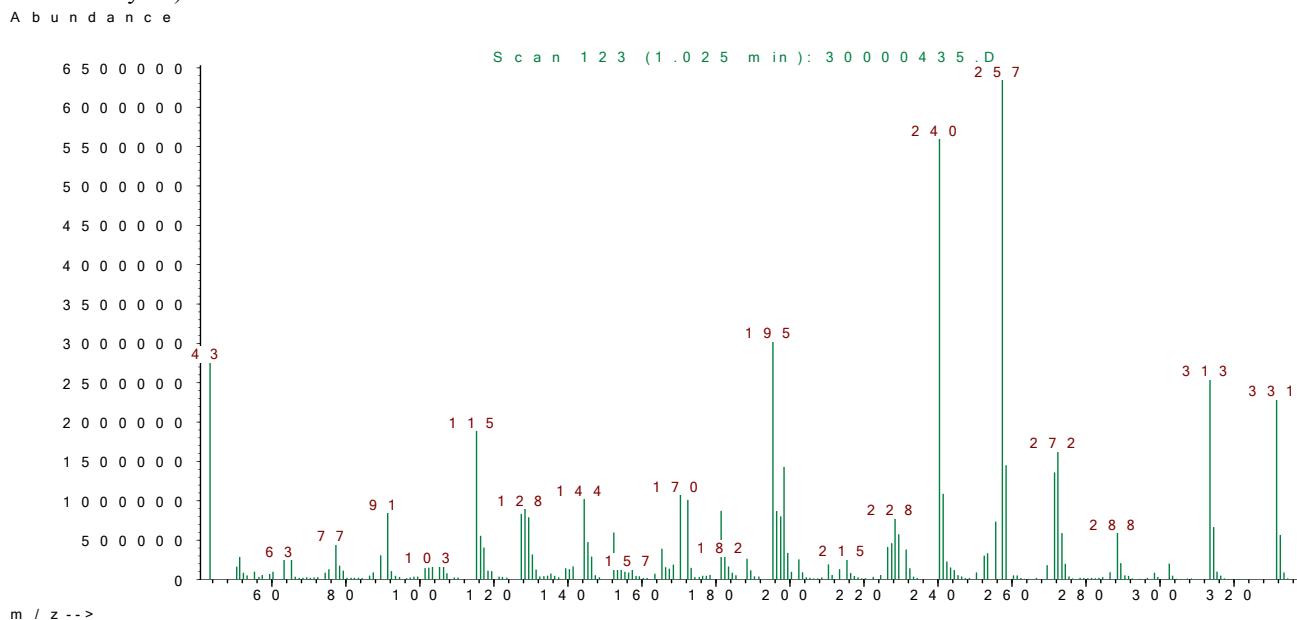


Fig. S57. The IR spectrum of N-(biphenyl-4-yl(2-hydroxynaphthalen-1-yl)methyl)acetamide (Table 3, entry 16)

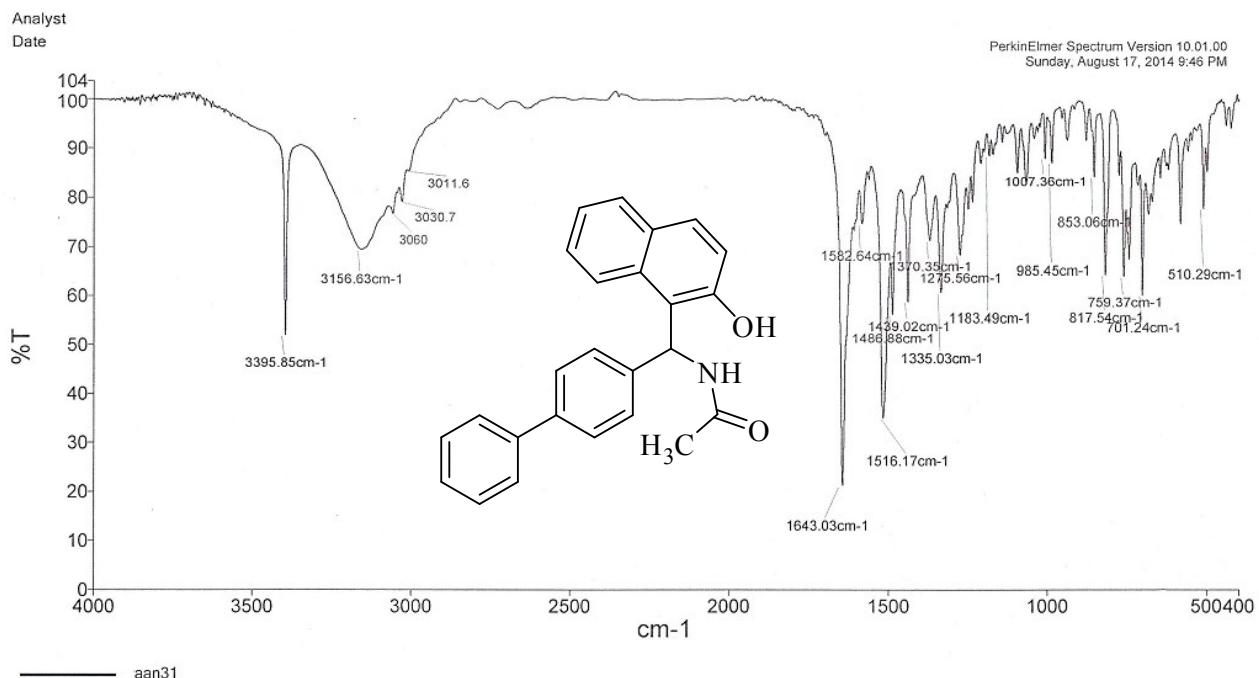


Fig. S58. The ¹H NMR spectrum of N-(biphenyl-4-yl(2-hydroxynaphthalen-1-yl)methyl)acetamide (Table 3, entry 16)

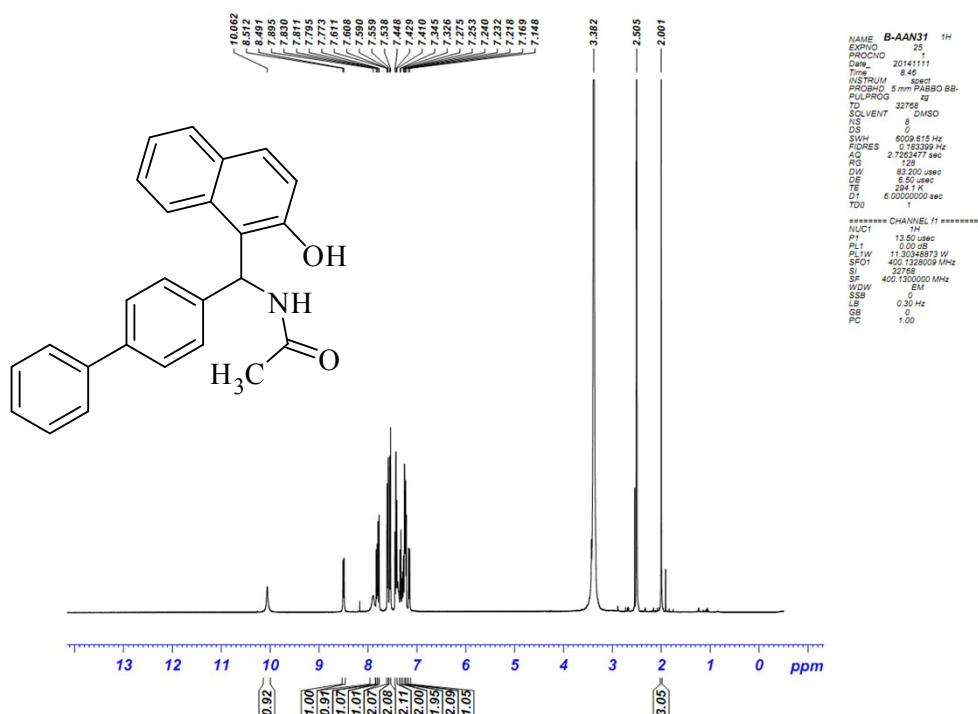


Fig. S59. The ^1H NMR spectrum of N-(biphenyl-4-yl(2-hydroxynaphthalen-1-yl)methyl)acetamide (Table 3, entry 16)

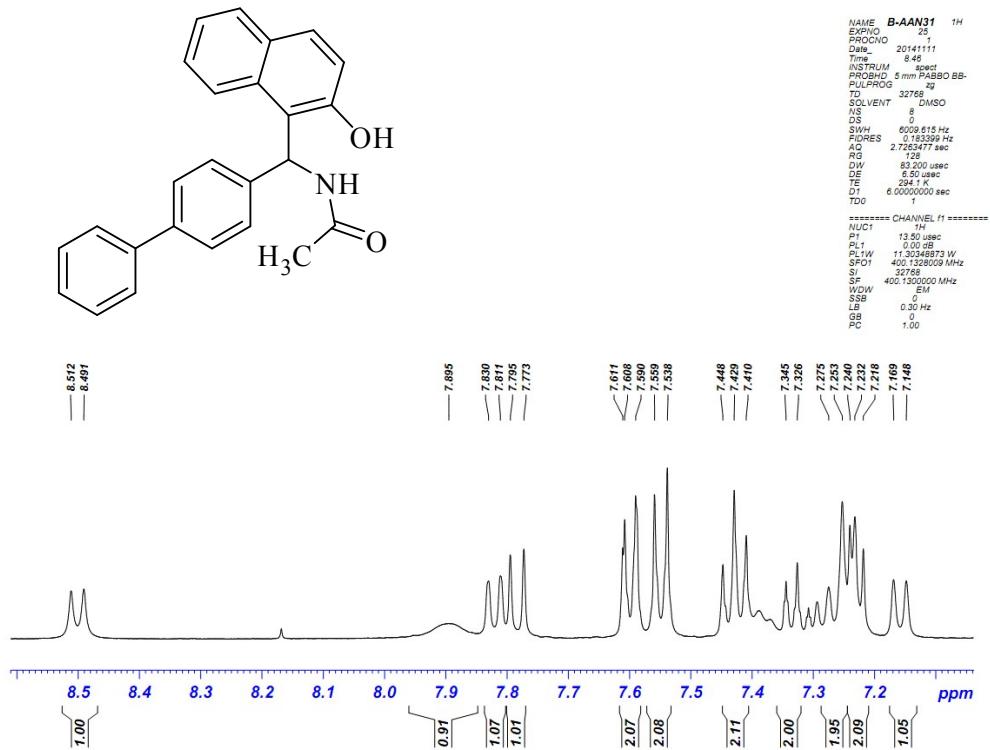


Fig. S60. The ^{13}C NMR spectrum of N-(biphenyl-4-yl(2-hydroxynaphthalen-1-yl)methyl)acetamide (Table 3, entry 16)

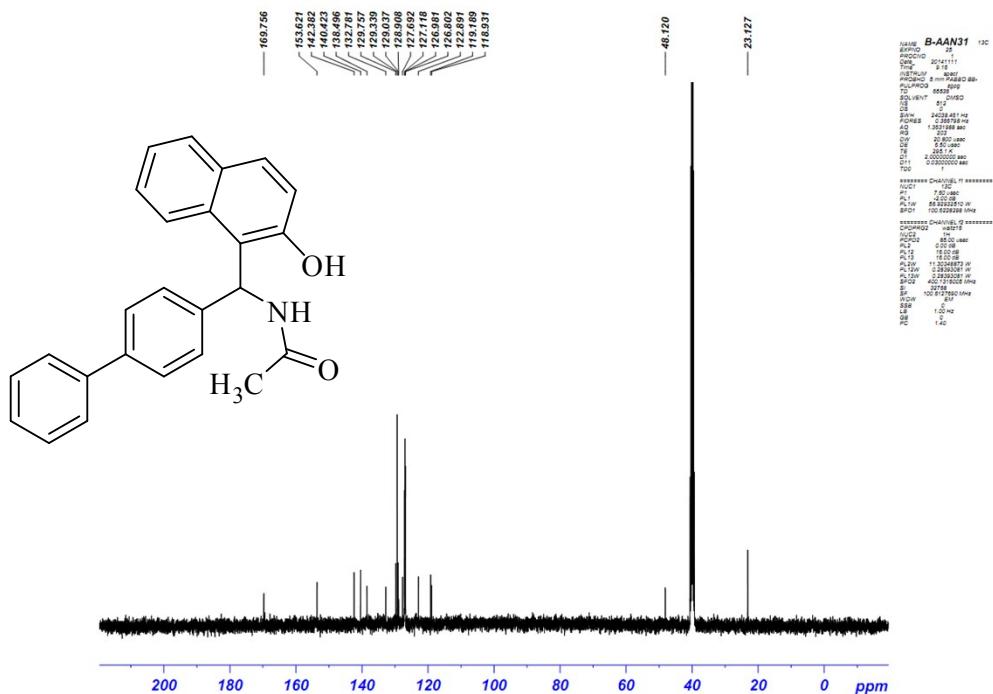


Fig. S61. The ^{13}C NMR spectrum of N-(biphenyl-4-yl(2-hydroxynaphthalen-1-yl)methyl)acetamide (Table 3, entry 16)

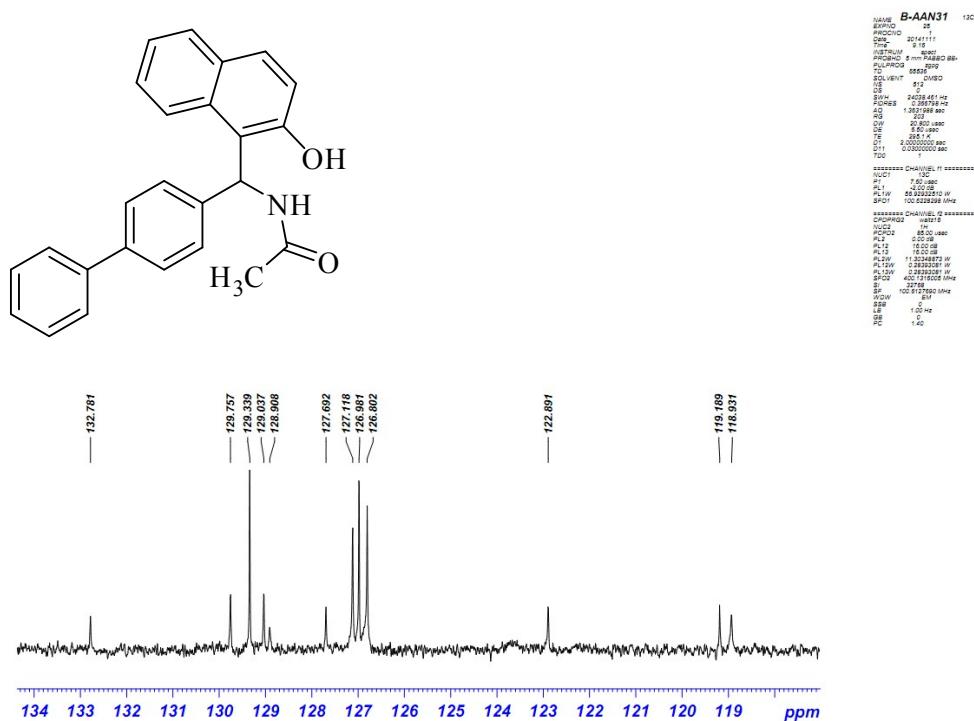


Fig. S62. The mass spectrum of N-(biphenyl-4-yl(2-hydroxynaphthalen-1-yl)methyl)acetamide (Table 3, entry 16)

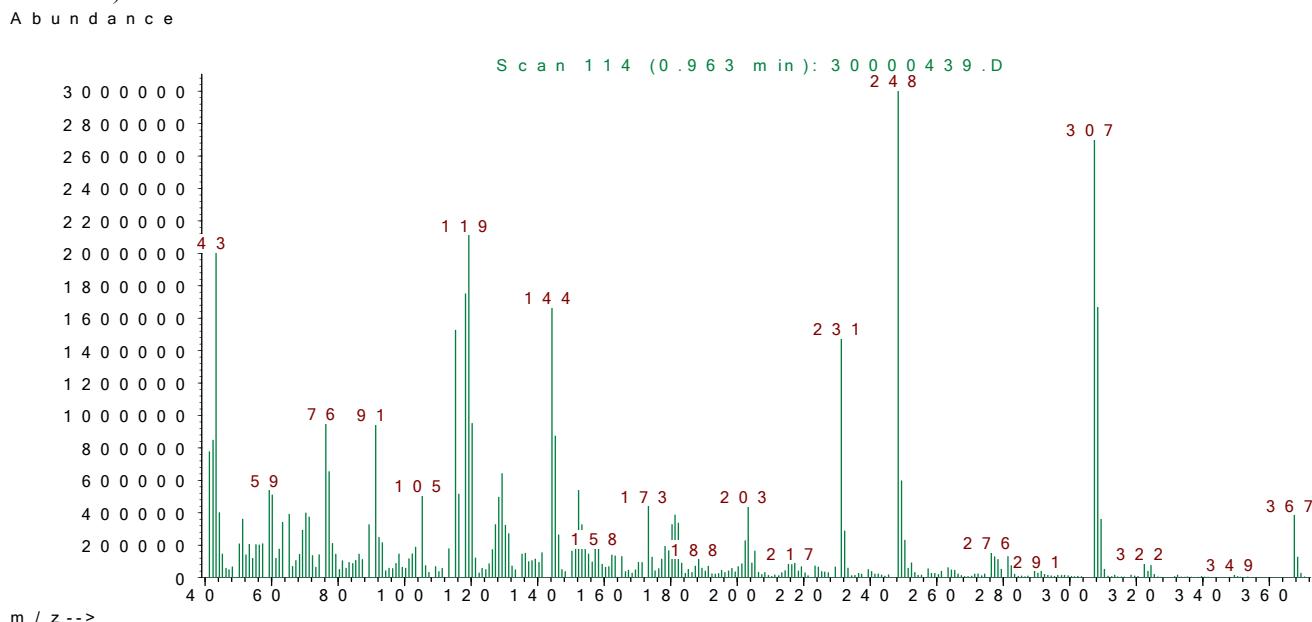
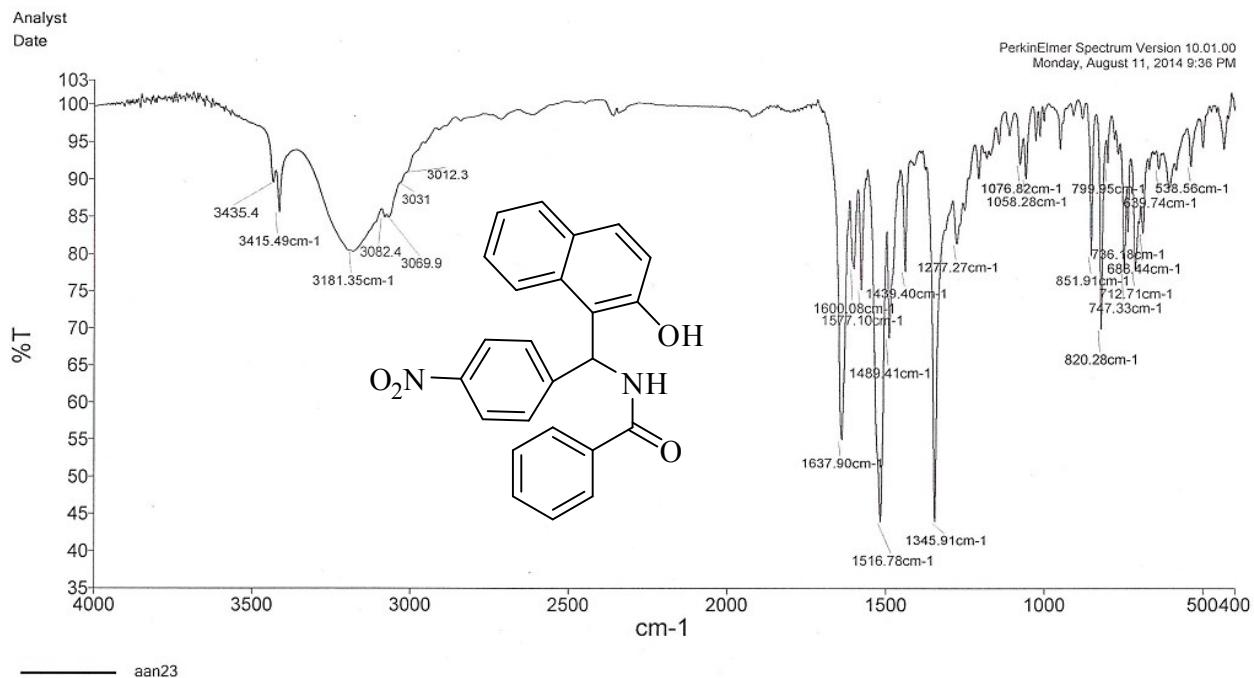


Fig. S63. The IR spectrum of N-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)benzamide (Table 3, entry 17)



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Fig. S64. The ¹H NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)benzamide (Table 3, entry 17)

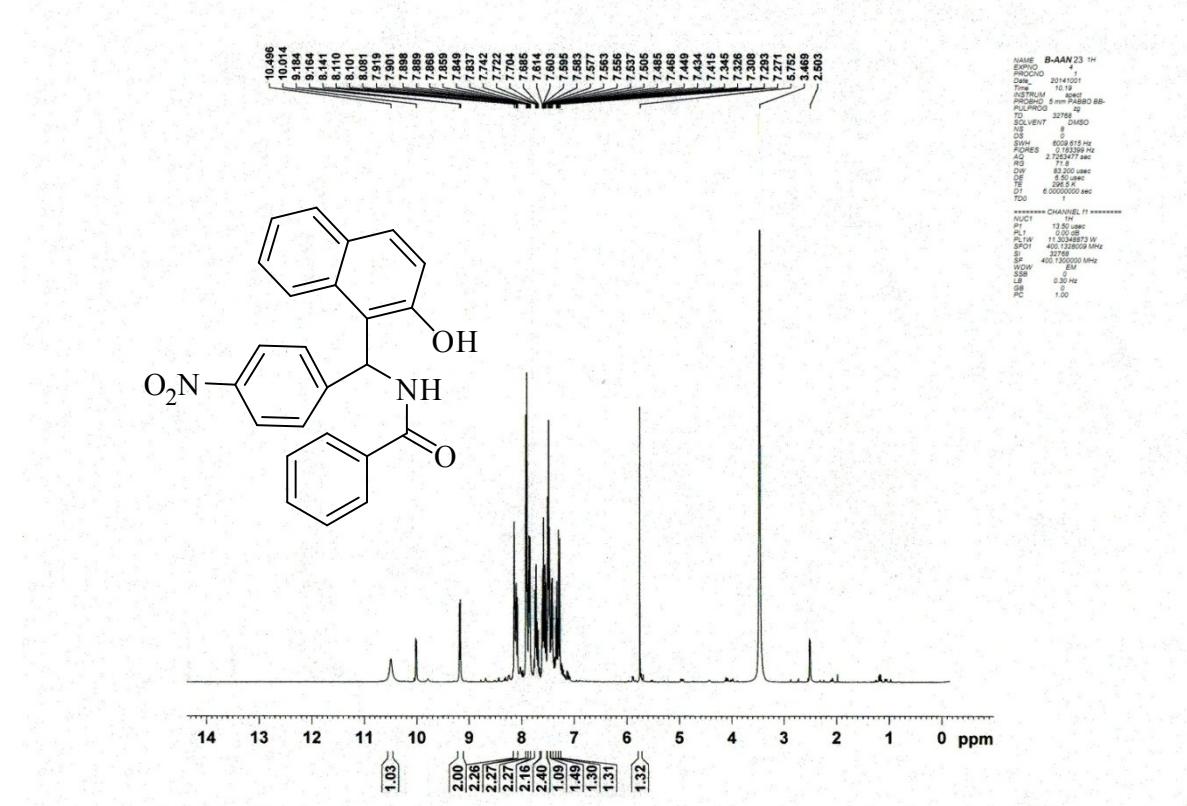


Fig. S65. The ^1H NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)benzamide (Table 3, entry 17)

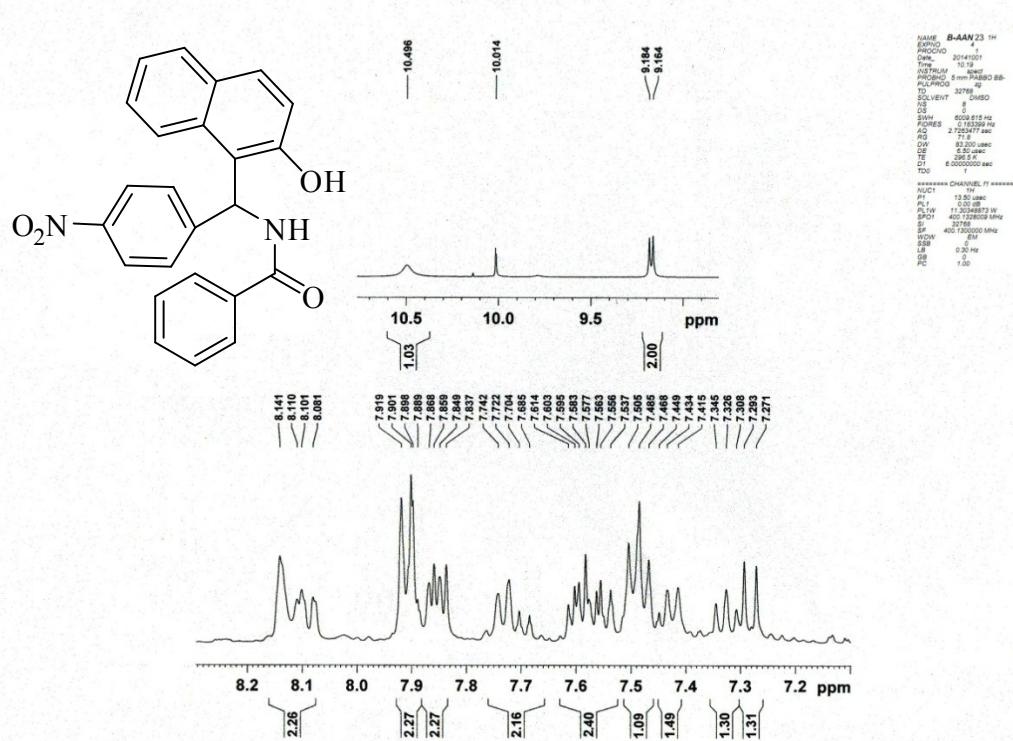


Fig. S66. The ^{13}C NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)benzamide (Table 3, entry 17)

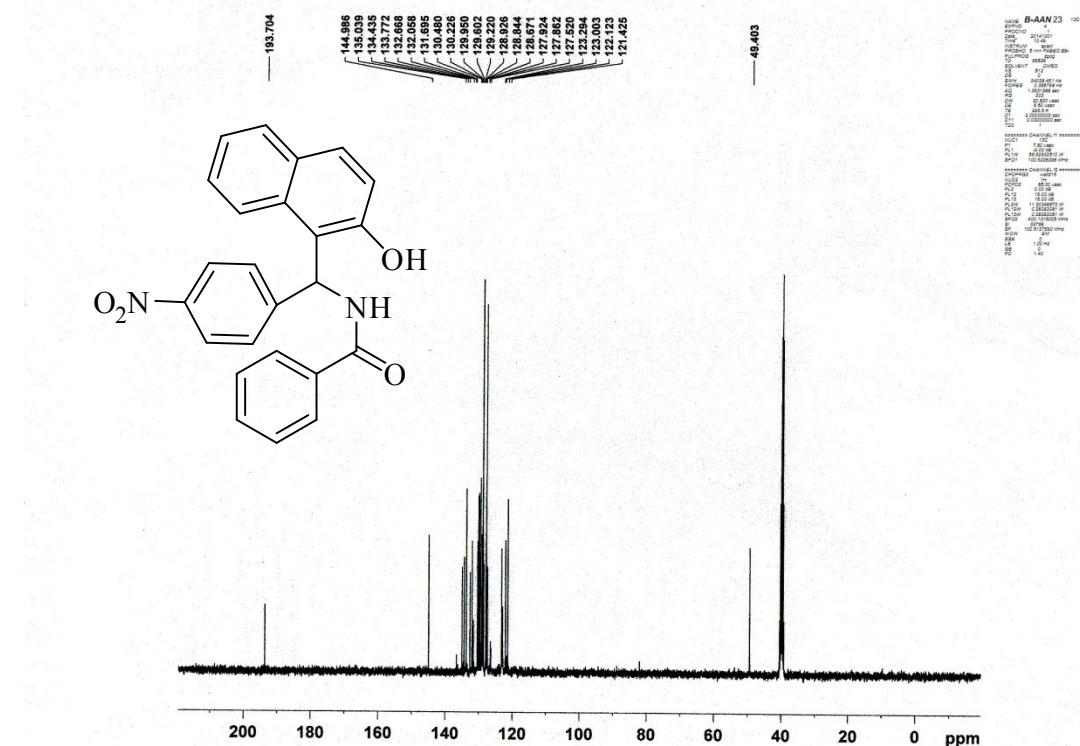


Fig. S67. The ^{13}C NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)benzamide (Table 3, entry 17)

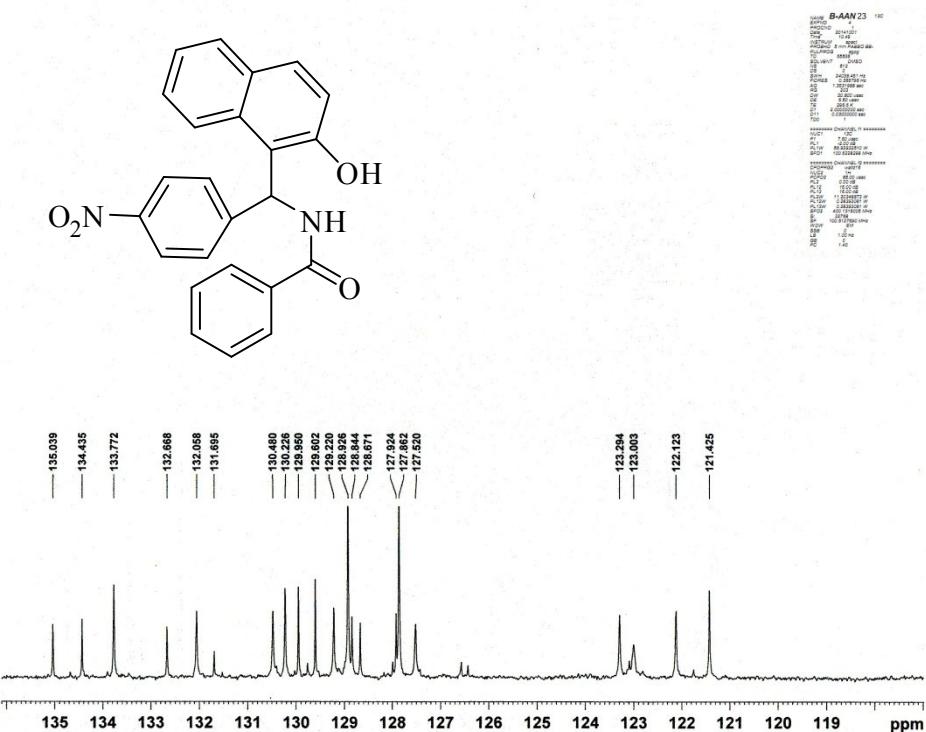
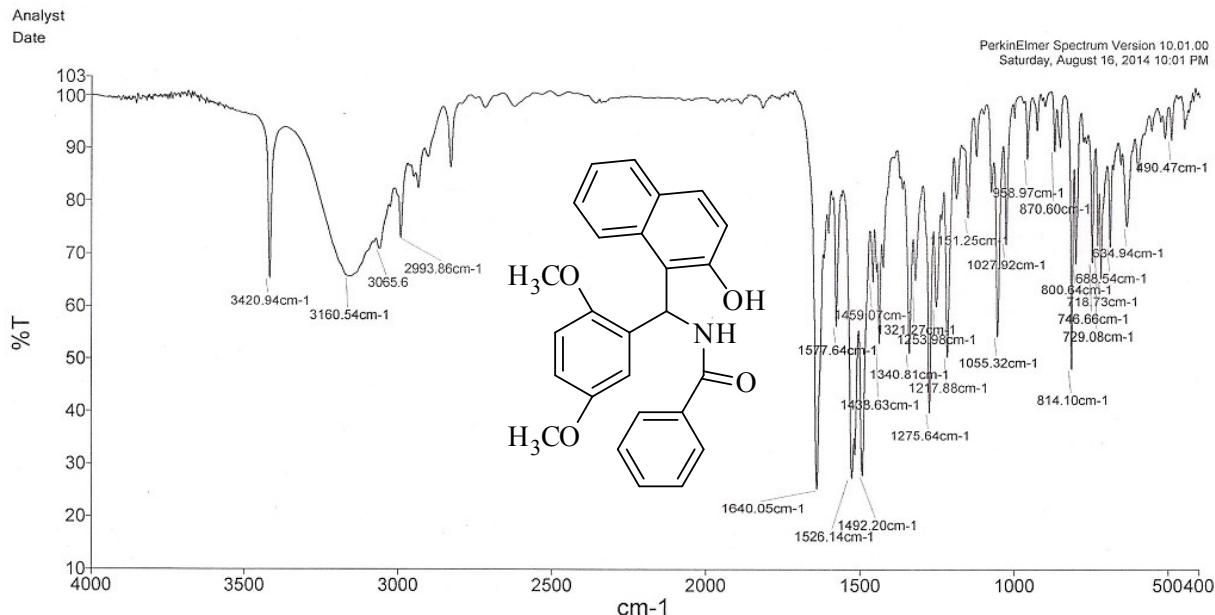


Fig. S68. The IR spectrum of N-((2,5-dimethoxyphenyl)(2-hydroxynaphthalen-1-yl)methyl)benzamide (Table 3, entry 19)



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Fig. S69. The ^1H NMR spectrum of N-((2,5-dimethoxyphenyl)(2-hydroxynaphthalen-1-yl)methyl)benzamide (Table 3, entry 19)

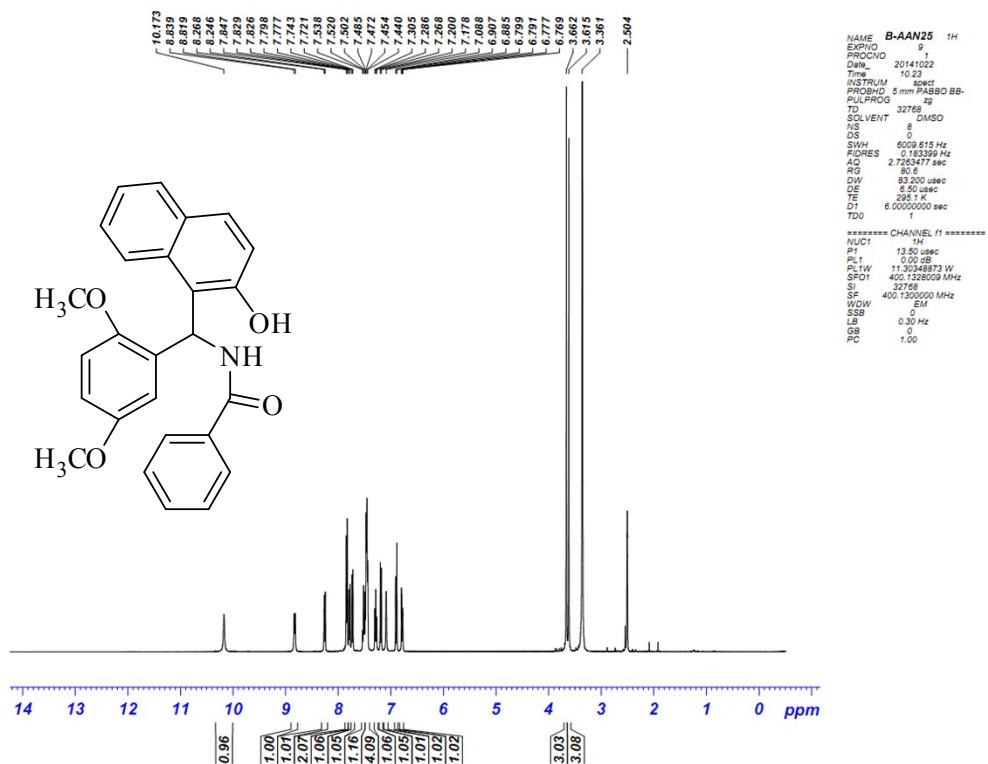


Fig. S70. The ^1H NMR spectrum of N-((2,5-dimethoxyphenyl)(2-hydroxynaphthalen-1-yl)methyl)benzamide (Table 3, entry 19)

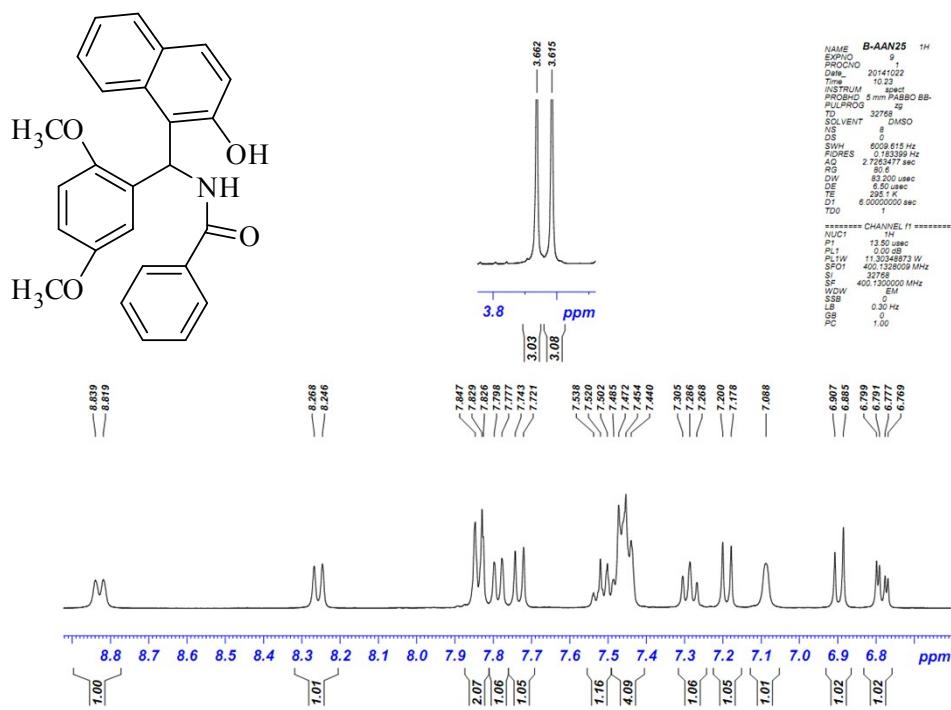


Fig. S71. The ^{13}C NMR spectrum of N-((2,5-dimethoxyphenyl)(2-hydroxynaphthalen-1-yl)methyl)benzamide (Table 3, entry 19)

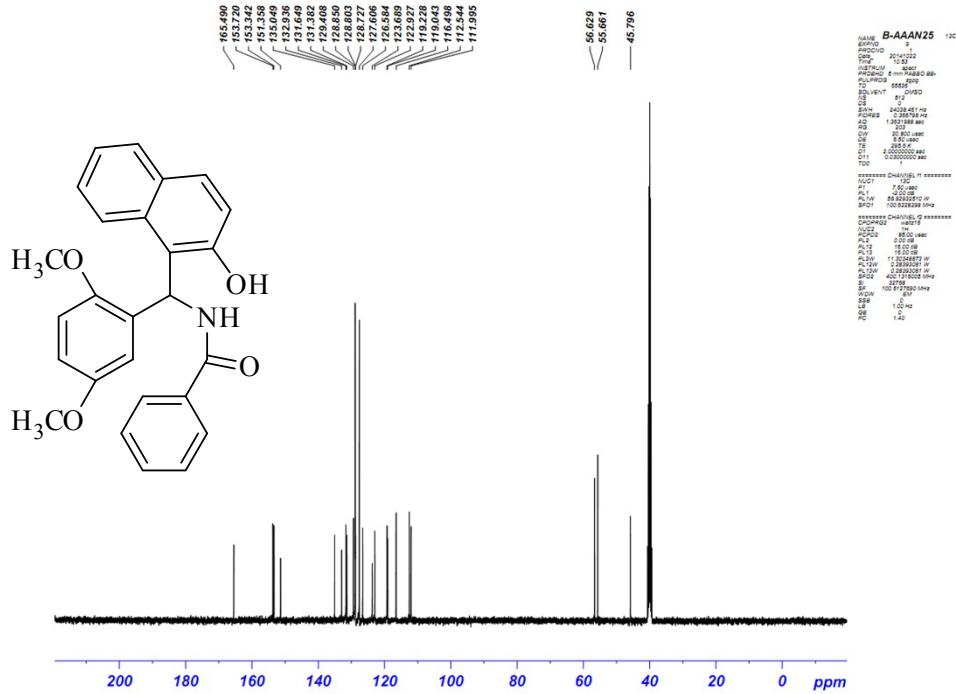


Fig. S72. The ^{13}C NMR spectrum of N-((2,5-dimethoxyphenyl)(2-hydroxynaphthalen-1-yl)methyl)benzamide (Table 3, entry 19)

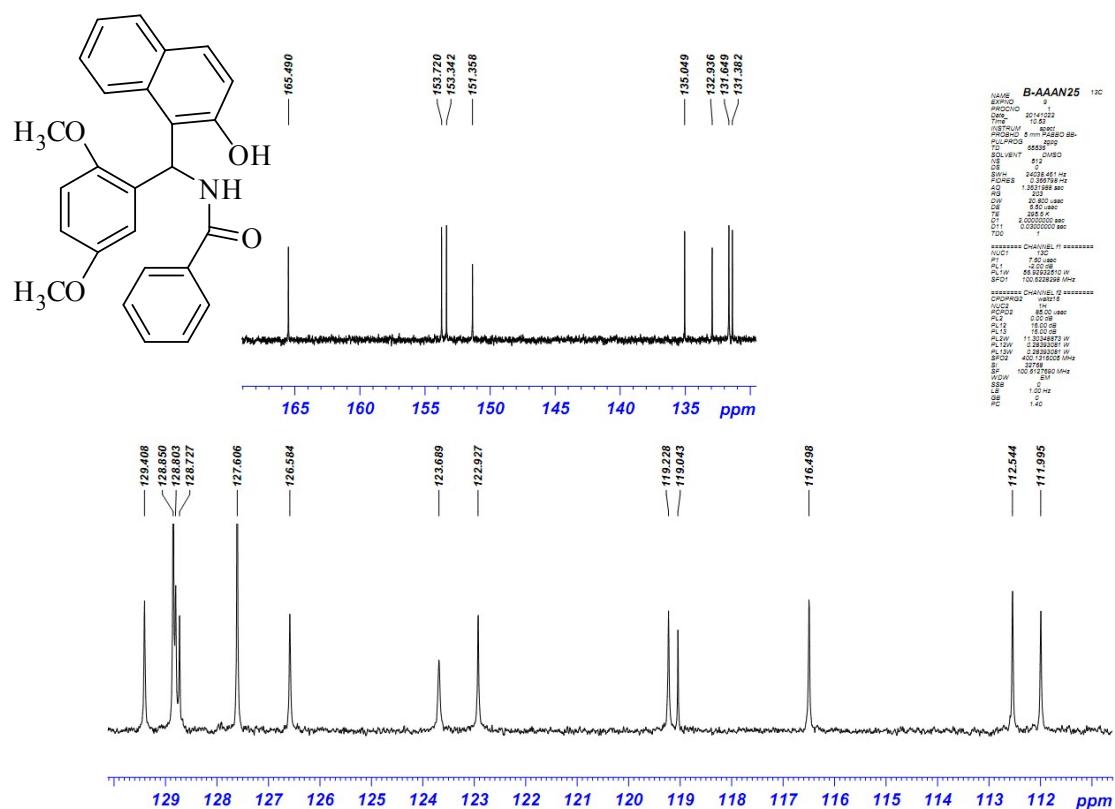


Fig. S73. The mass spectrum of N-((2,5-dimethoxyphenyl)(2-hydroxynaphthalen-1-yl)methyl)benzamide (Table 3, entry 19)

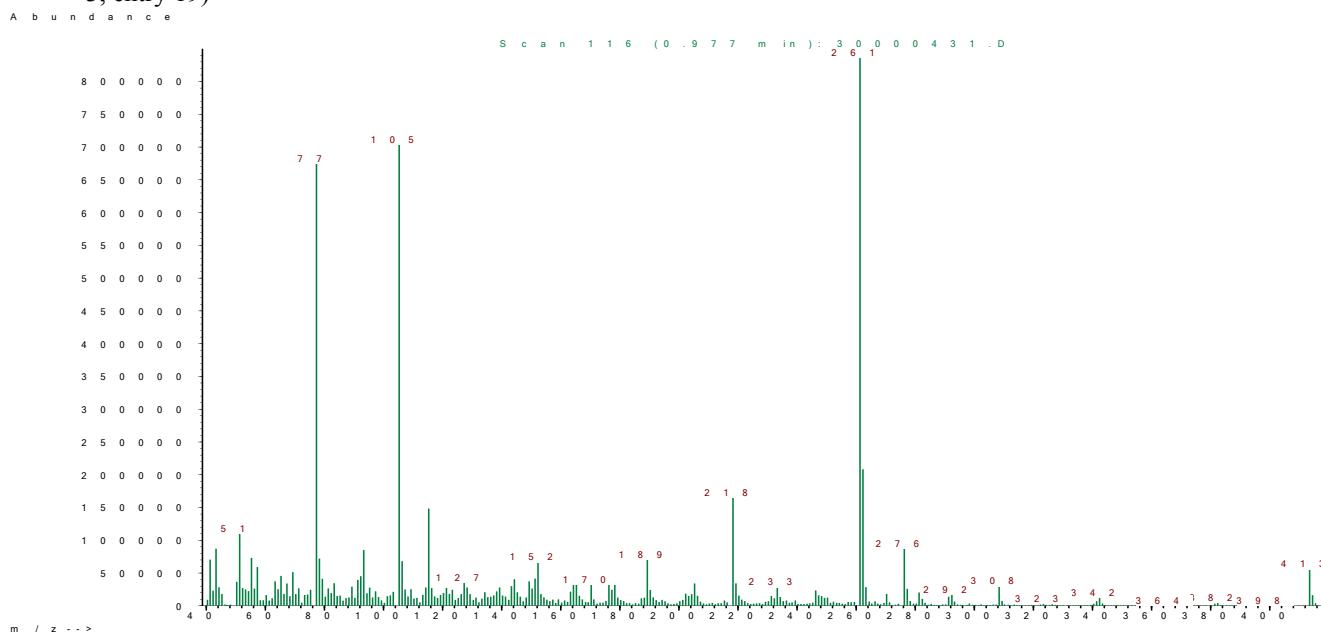


Fig. S74. The IR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-1-yl)methyl)benzamide (Table 3, entry 20)

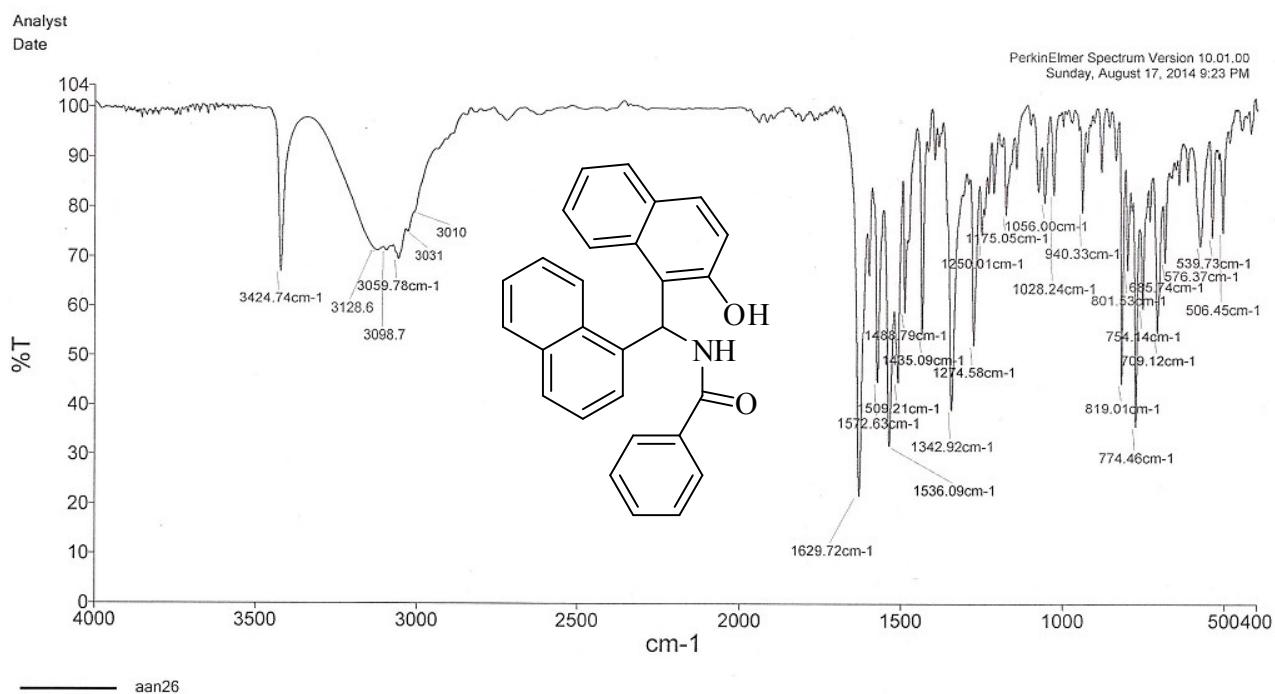


Fig. S75. The ^1H NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-1-yl)methyl)benzamide (Table 3, entry 20)

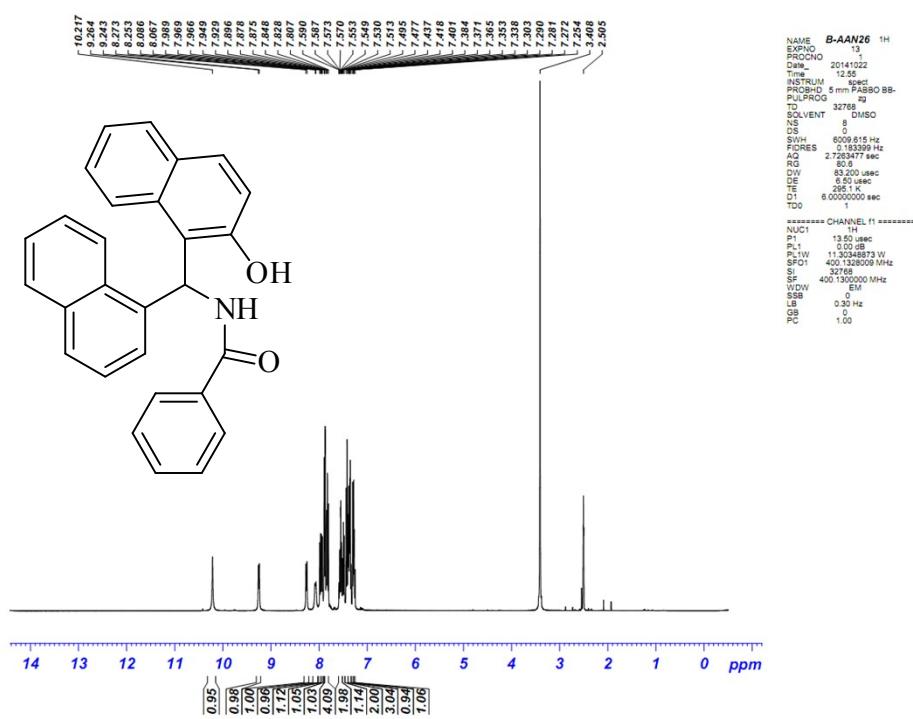


Fig. S76. The ^1H NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-1-yl)methyl)benzamide (Table 3, entry 20)

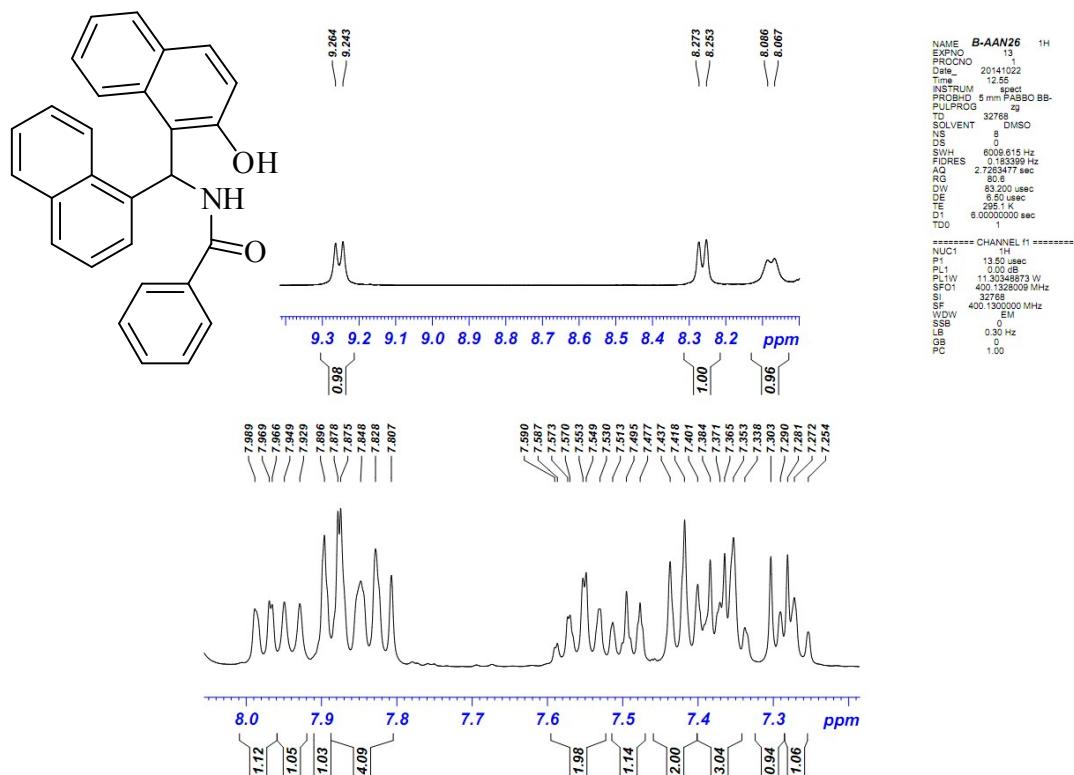


Fig. S77. The ^{13}C NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-1-yl)methyl)benzamide (Table 3, entry 20)

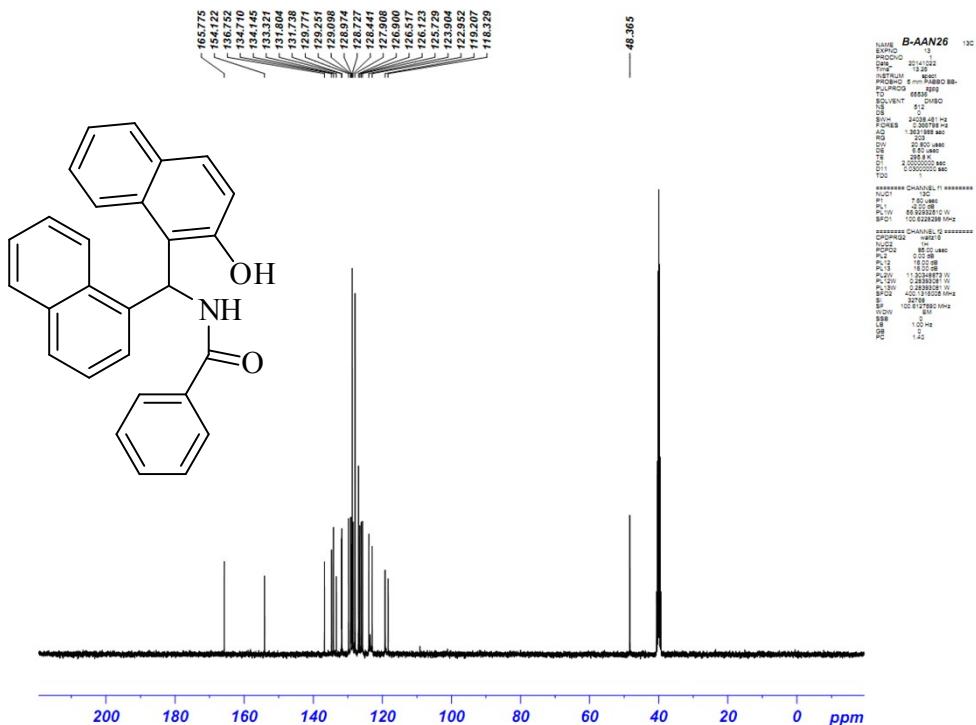


Fig. S78. The ^{13}C NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-1-yl)methyl)benzamide (Table 3, entry 20)

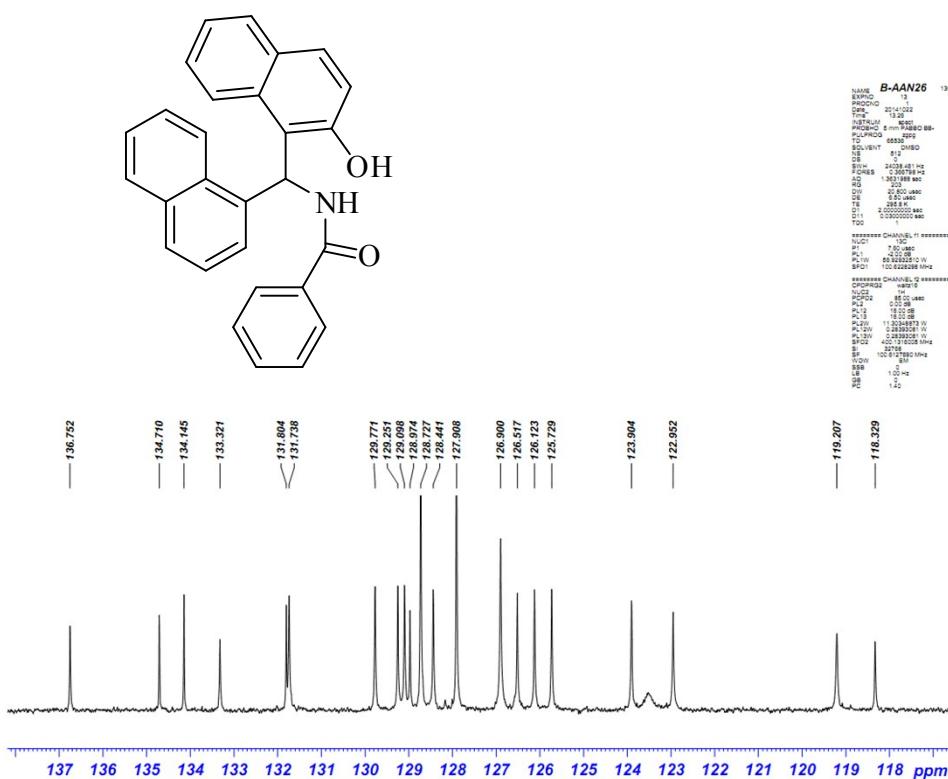


Fig. S79. The mass spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-1-yl)methyl)benzamide (Table 3, entry 20)

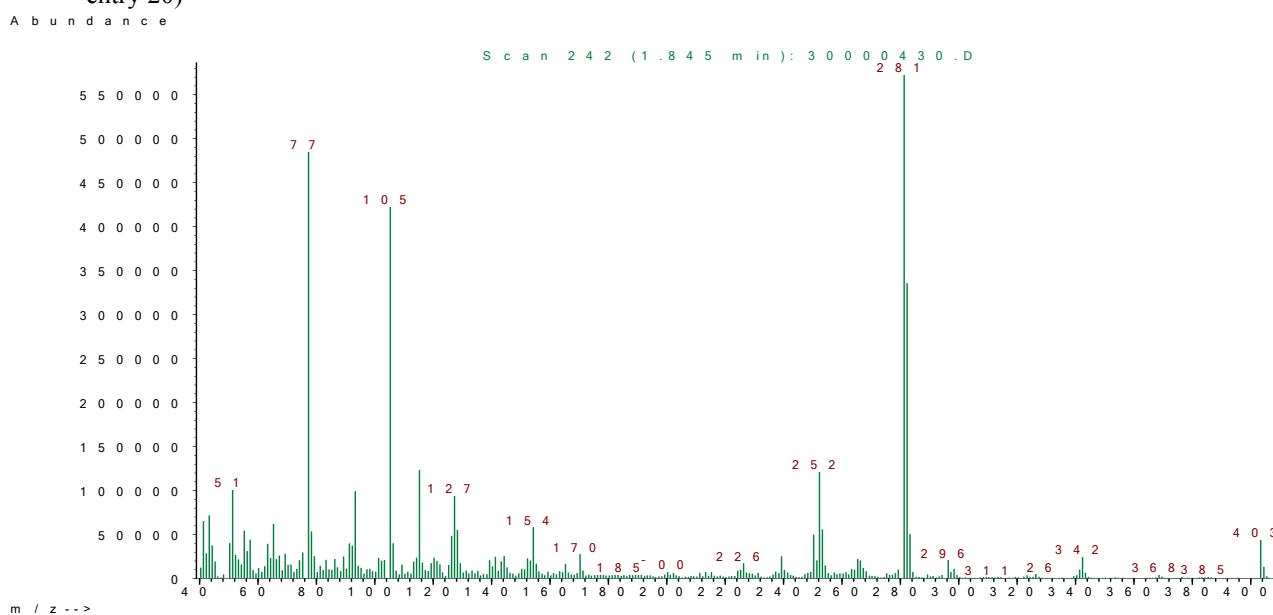


Fig. S80. The IR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-3-phenylallyl)benzamide (Table 3, entry 21)

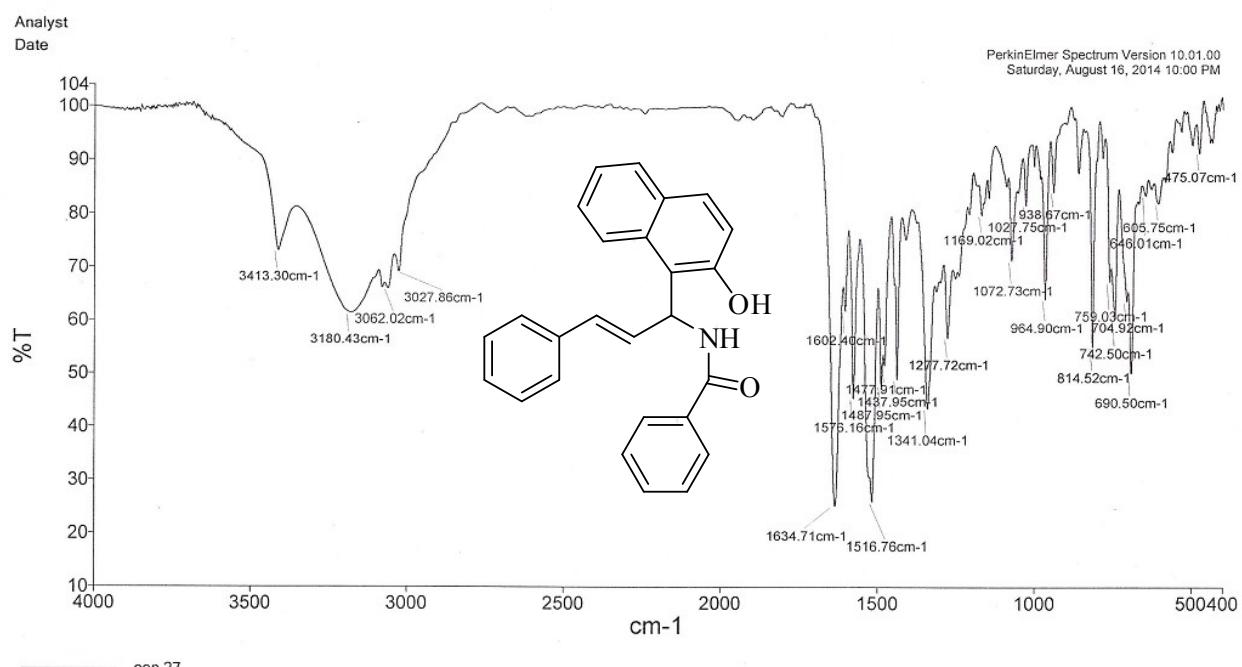


Fig. S81. The ^1H NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-3-phenylallyl)benzamide (Table 3, entry 21)

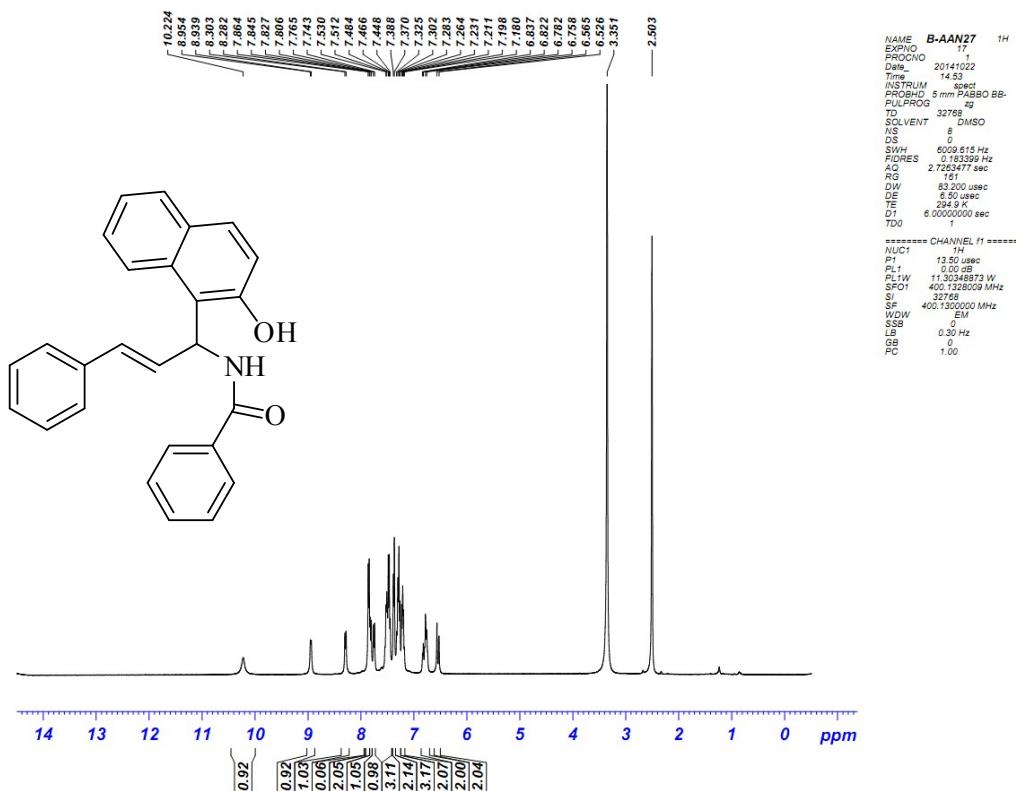


Fig. S82. The ^1H NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-3-phenylallyl)benzamide (Table 3, entry 21)

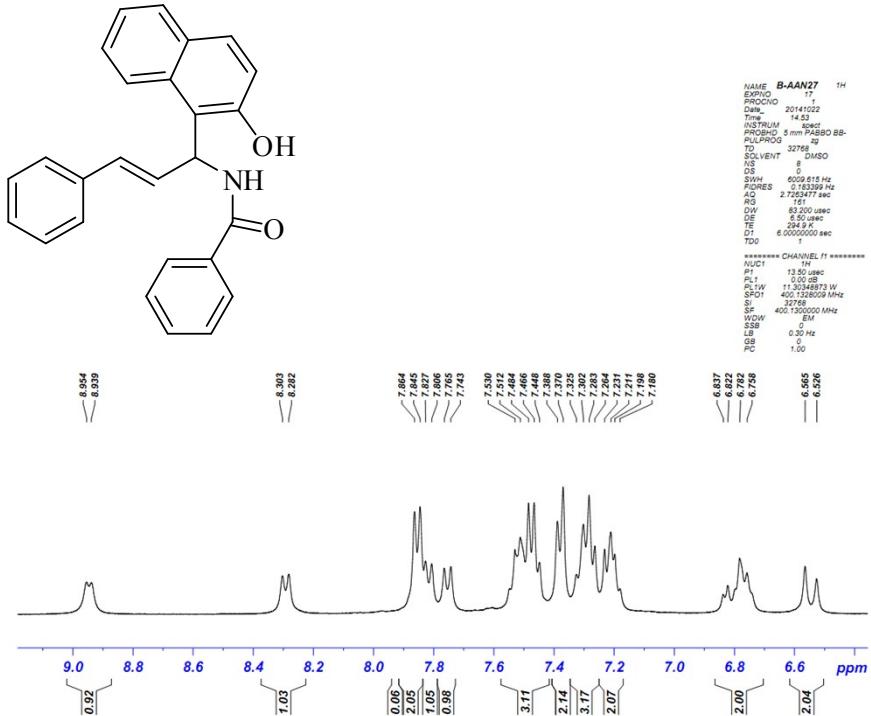


Fig. S83. The ^{13}C NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-3-phenylallyl)benzamide (Table 3, entry 21)

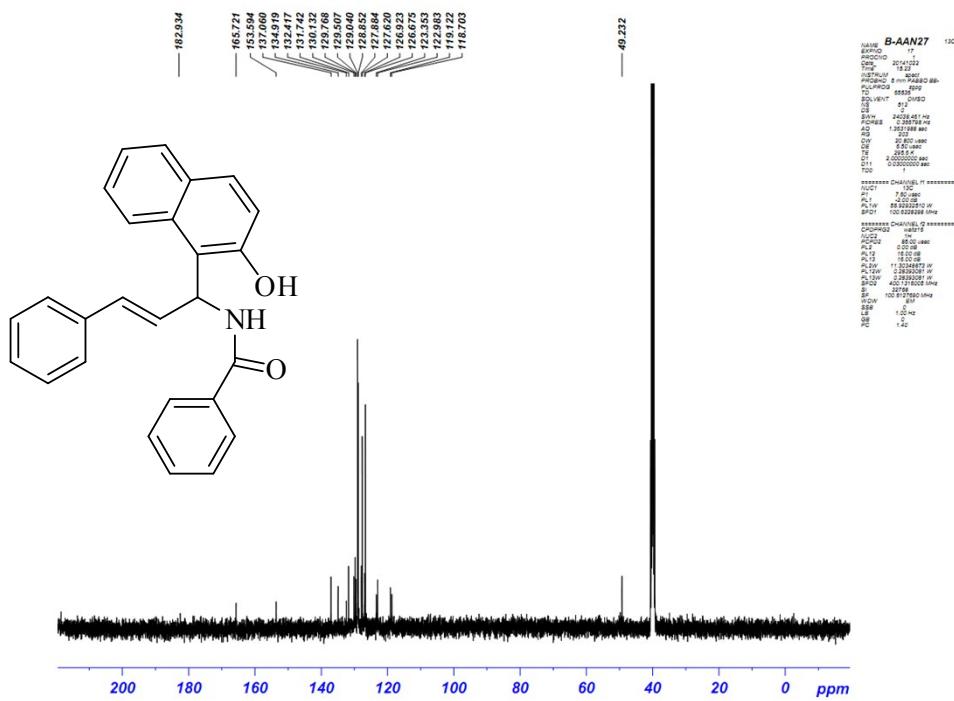


Fig. S84. The ^{13}C NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-3-phenylallyl)benzamide (Table 3, entry 21)

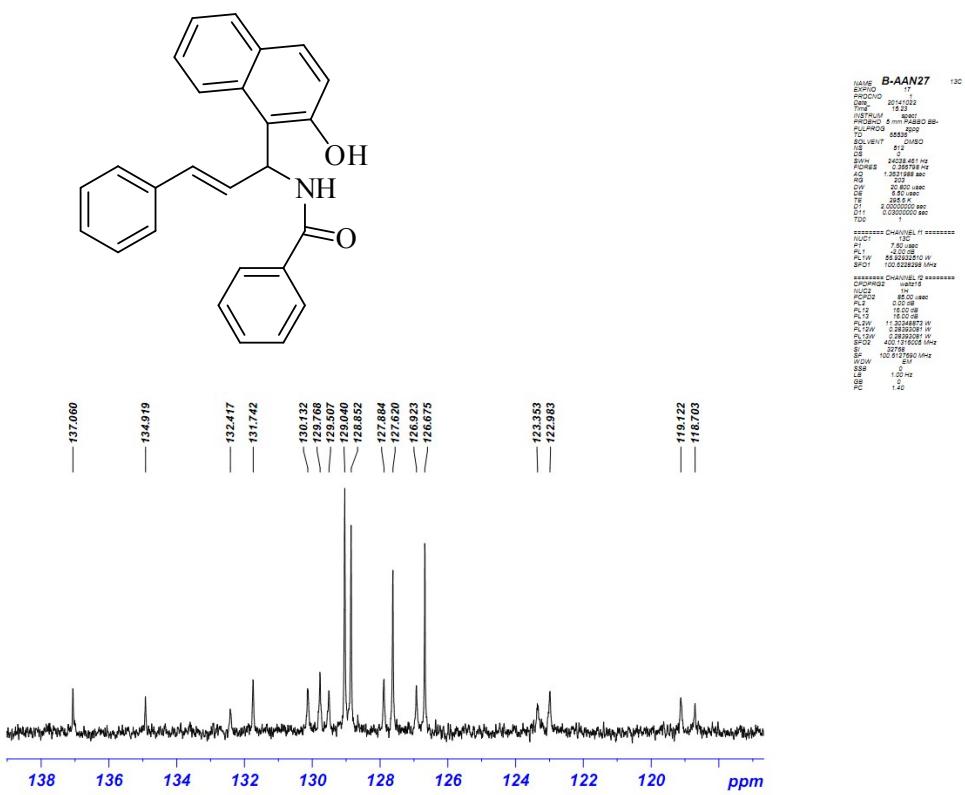


Fig. S85. The mass spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-3-phenylallyl)benzamide (Table 3, entry 21)

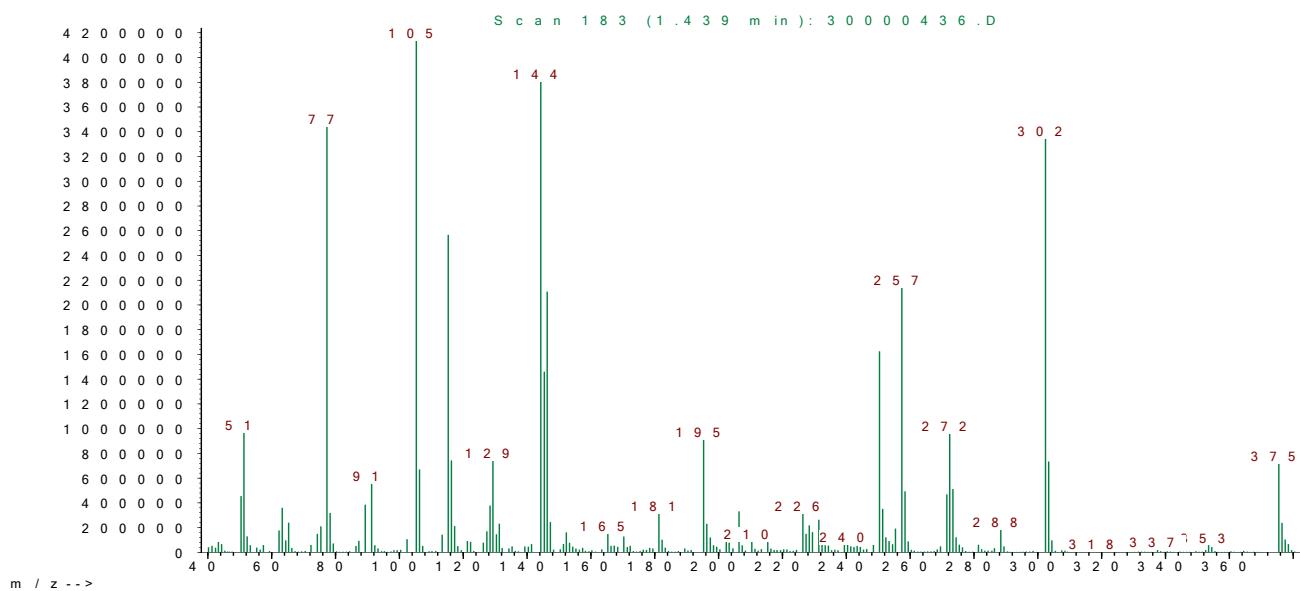


Fig. S86. The IR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-2-yl)methyl)benzamide (Table 3, entry 22)

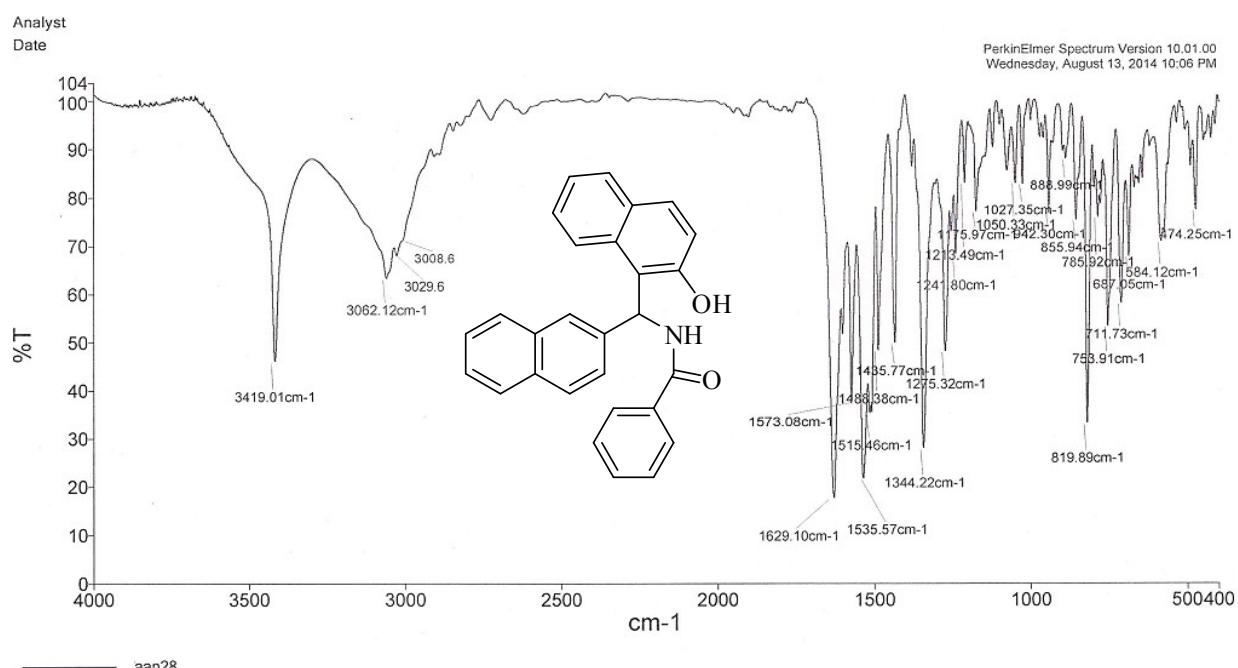


Fig. S87. The ^1H NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-2-yl)methyl)benzamide (Table 3, entry 22)

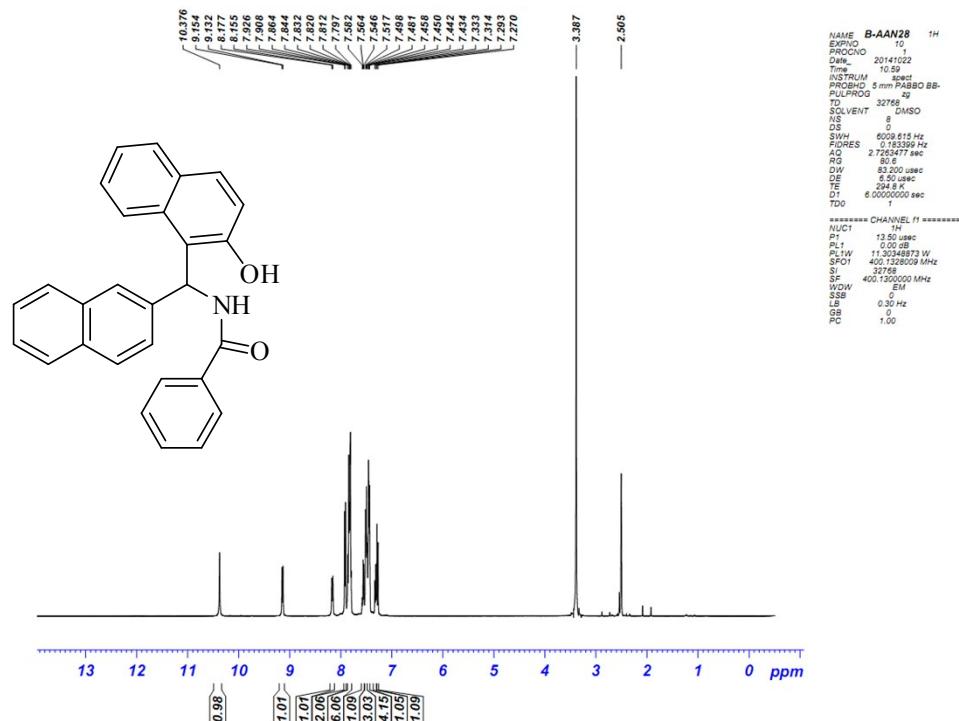


Fig. S88. The ^1H NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-2-yl)methyl)benzamide (Table 3, entry 22)

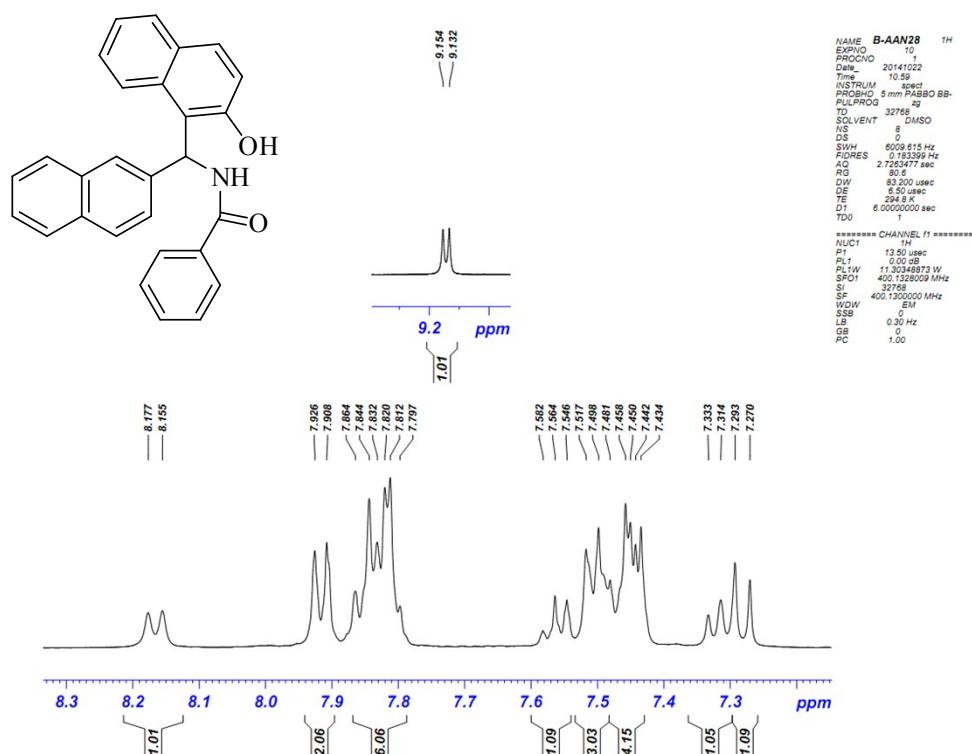


Fig. S89. The ^{13}C NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-2-yl)methyl)benzamide (Table 3, entry 22)

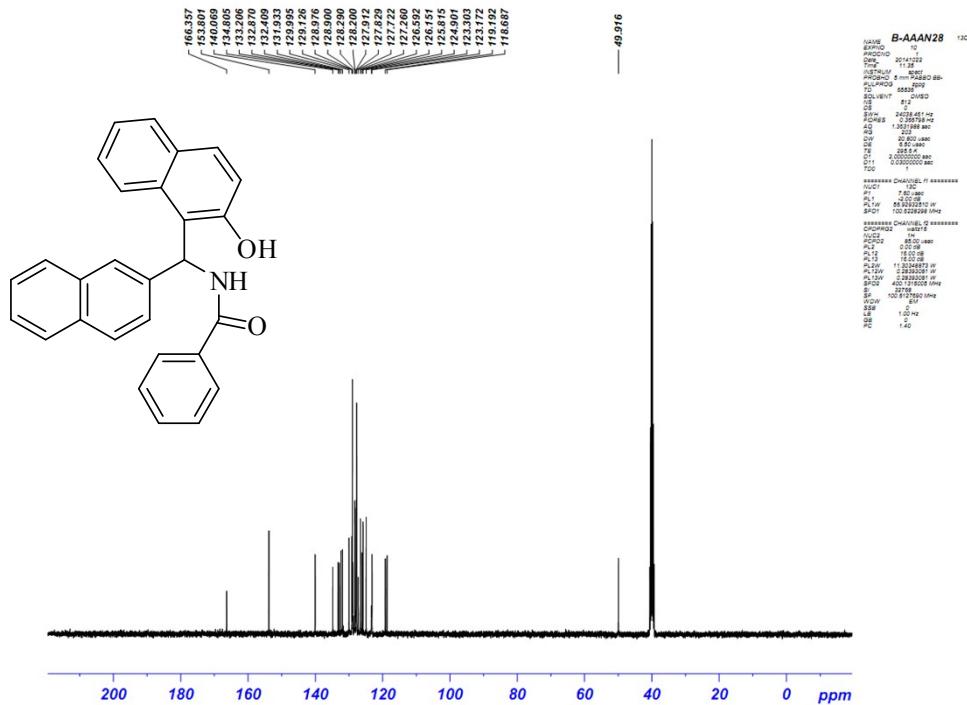


Fig. S90. The ^{13}C NMR spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-2-yl)methyl)benzamide (Table 3, entry 22)

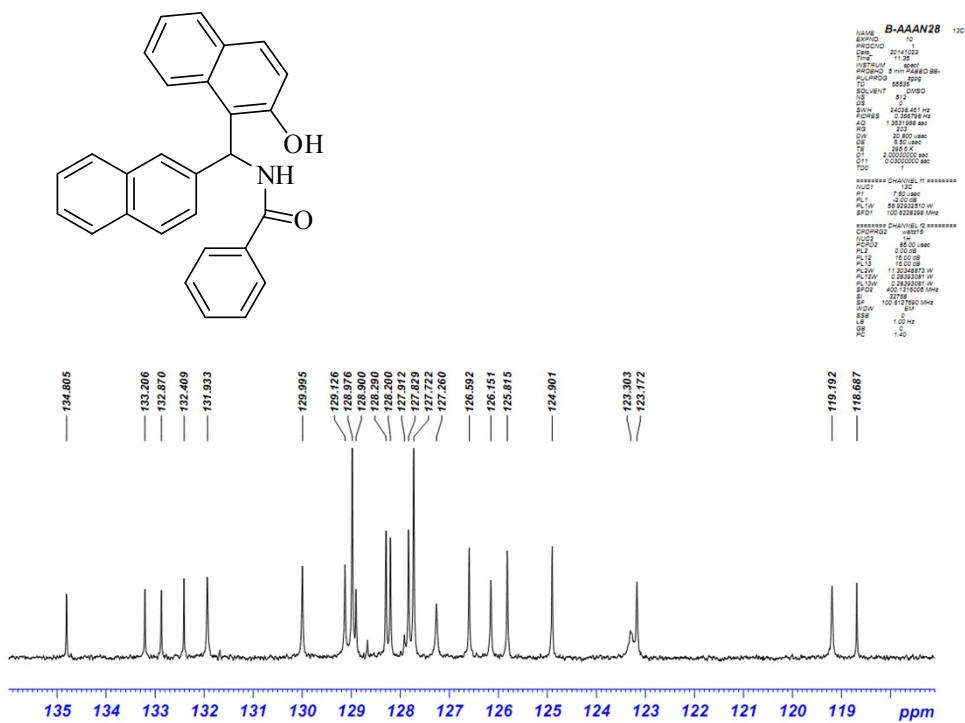


Fig. S91. The mass spectrum of N-((2-hydroxynaphthalen-1-yl)(naphthalen-2-yl)methyl)benzamide (Table 3, entry 22)

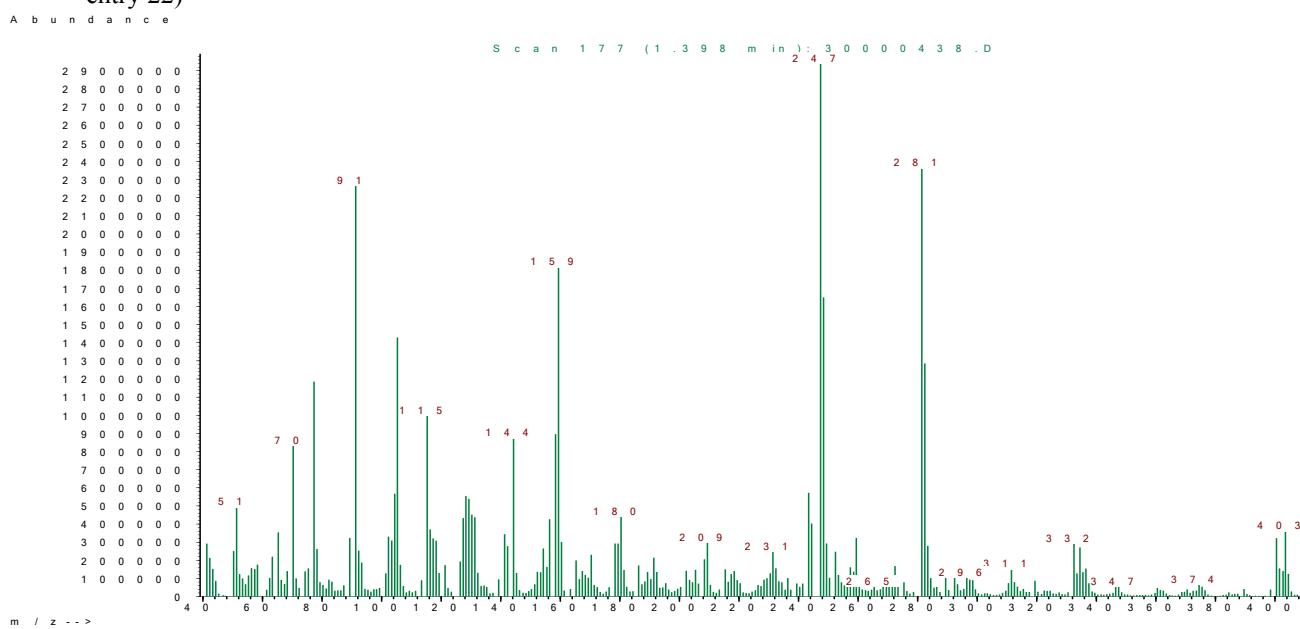


Fig. S92. The IR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)benzamide (Table 3, entry 23)

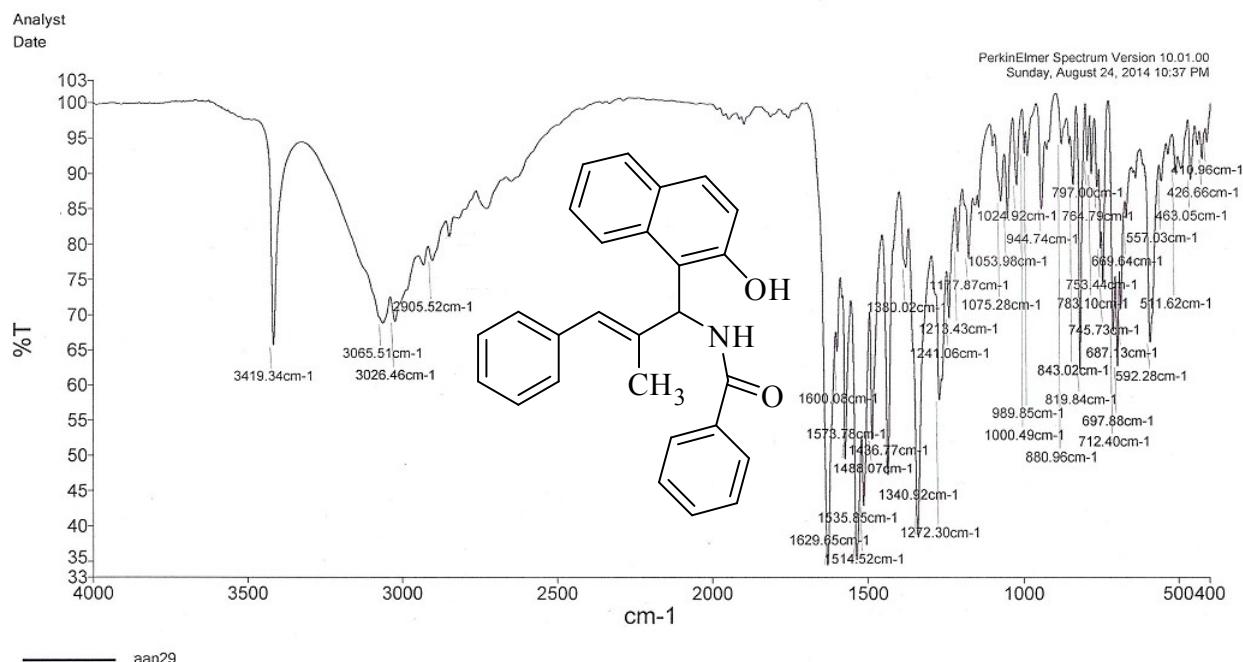


Fig. S93. The ^1H NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)benzamide (Table 3, entry 23)

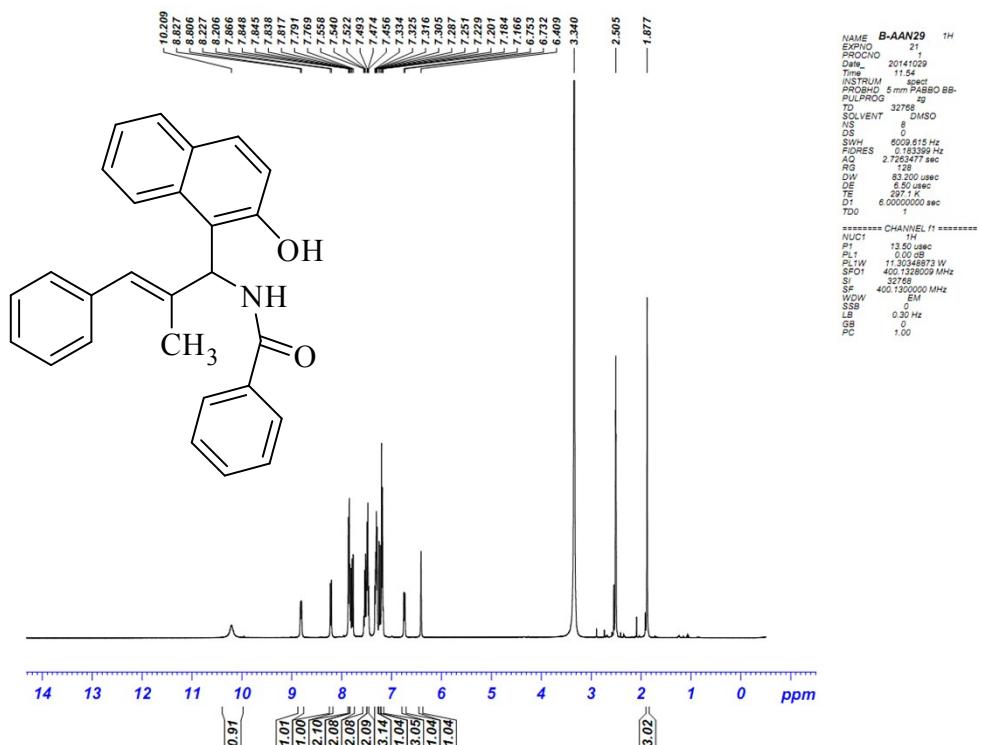


Fig. S94. The ^1H NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)benzamide (Table 3, entry 23)

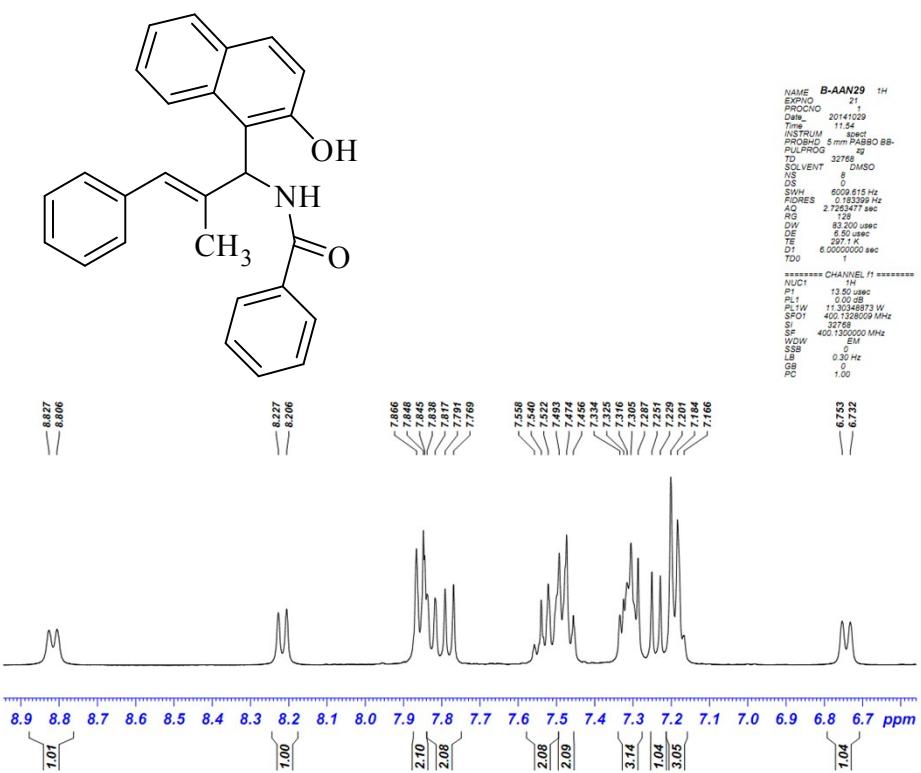


Fig. S95. The ^{13}C NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)benzamide (Table 3, entry 23)

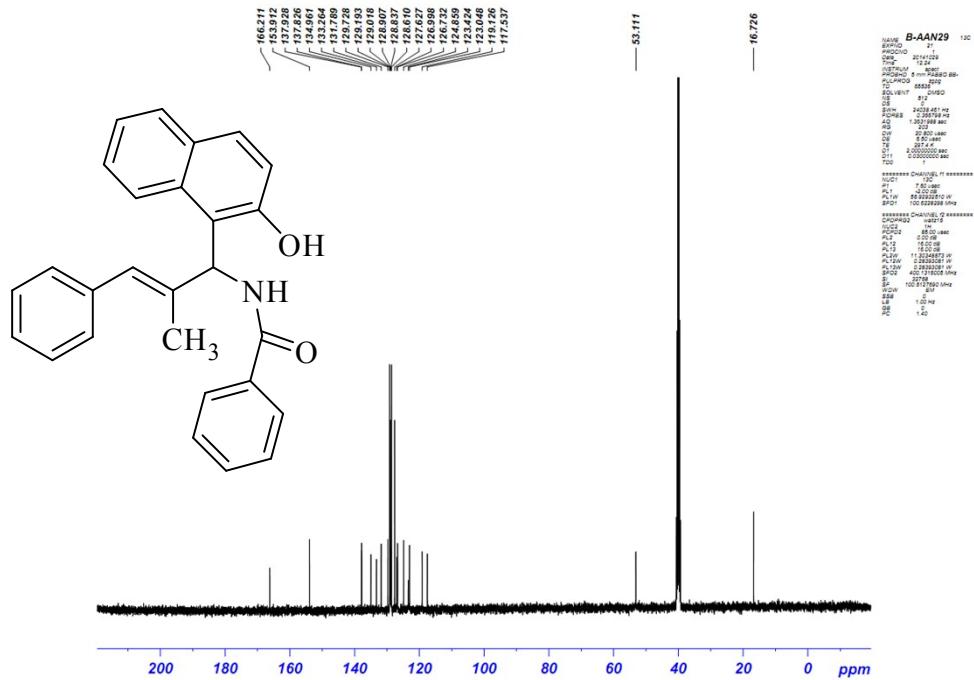


Fig. S96. The ^{13}C NMR spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)benzamide (Table 3, entry 23)

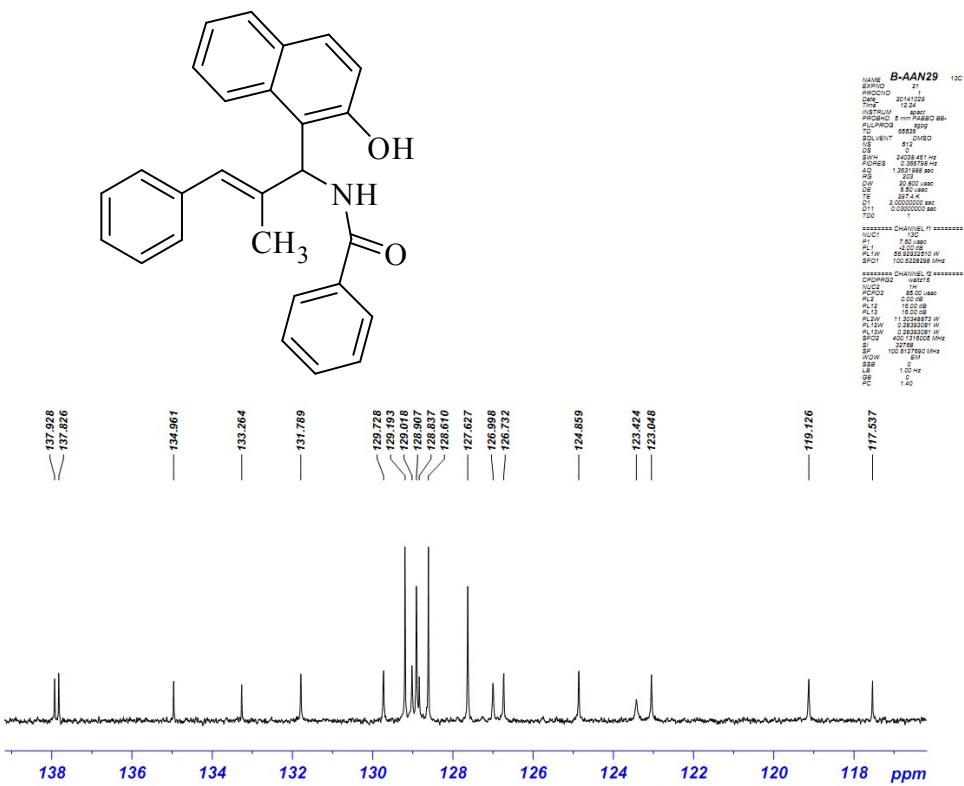


Fig. S97. The mass spectrum of N-(1-(2-hydroxynaphthalen-1-yl)-2-methyl-3-phenylallyl)benzamide (Table 3, entry 23)

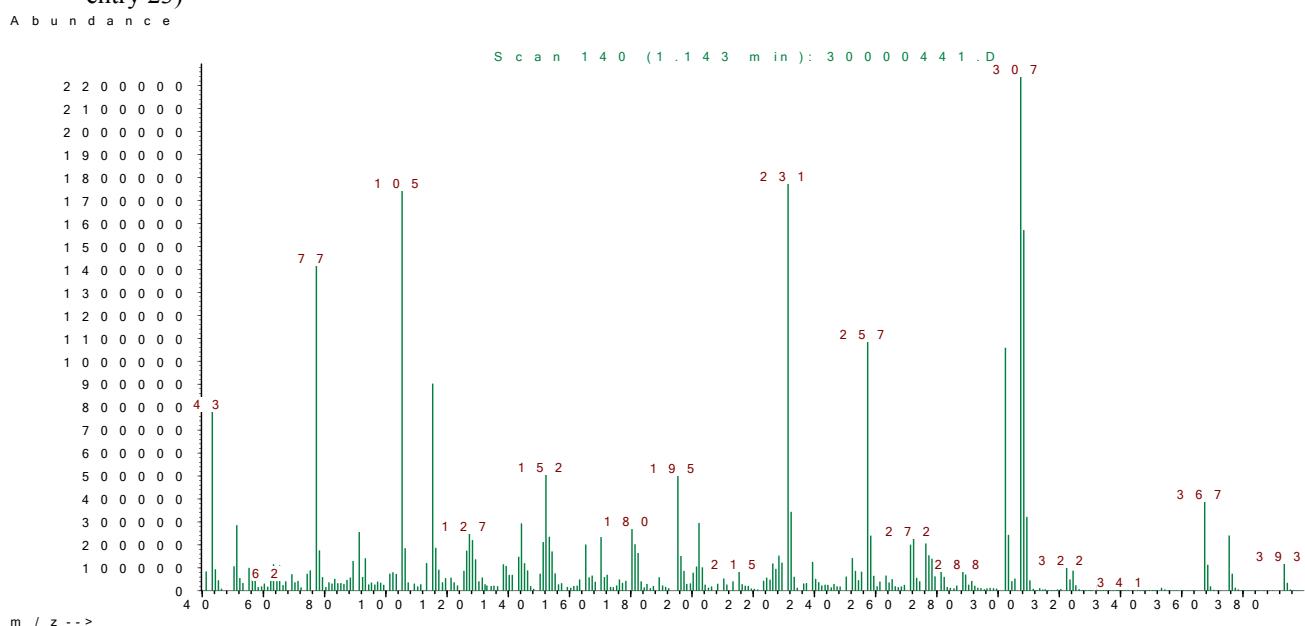


Fig. S98. The IR spectrum of N-(biphenyl-4-yl(2-hydroxynaphthalen-1-yl)methyl)benzamide (Table 3, entry 24)

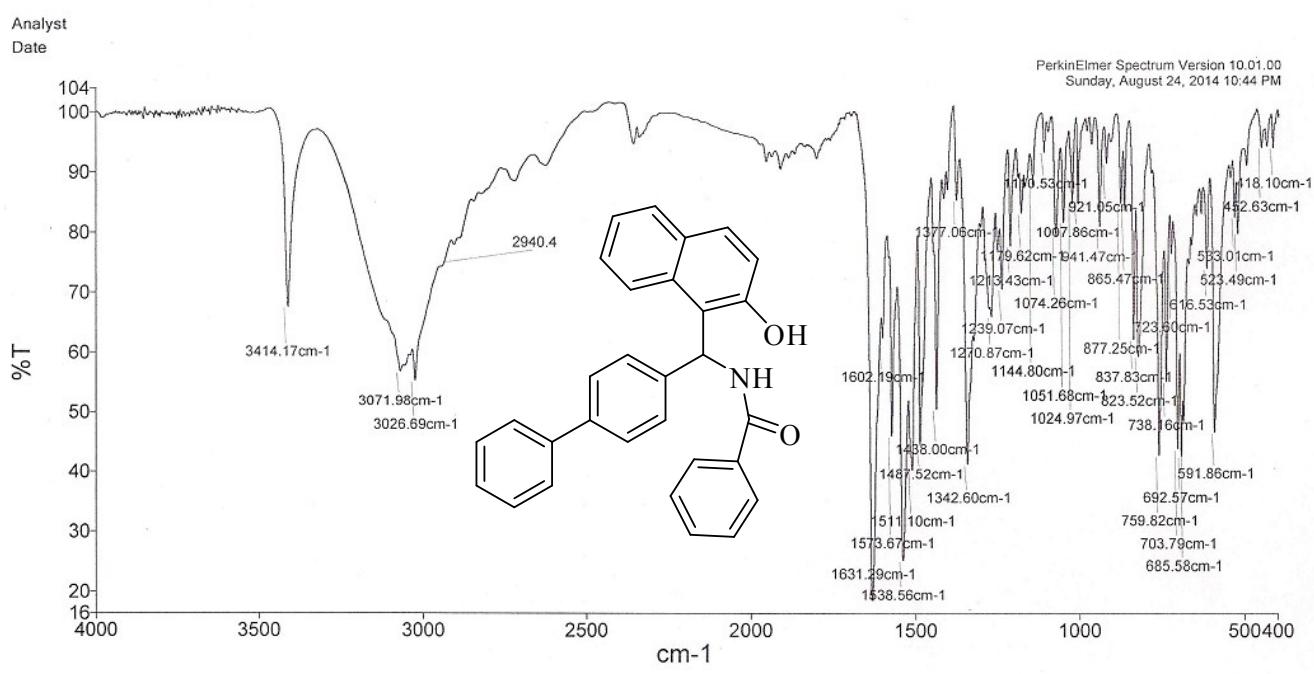


Fig. S99. The ^1H NMR spectrum of N-(biphenyl-4-yl(2-hydroxynaphthalen-1-yl)methyl)benzamide (Table 3, entry 24)

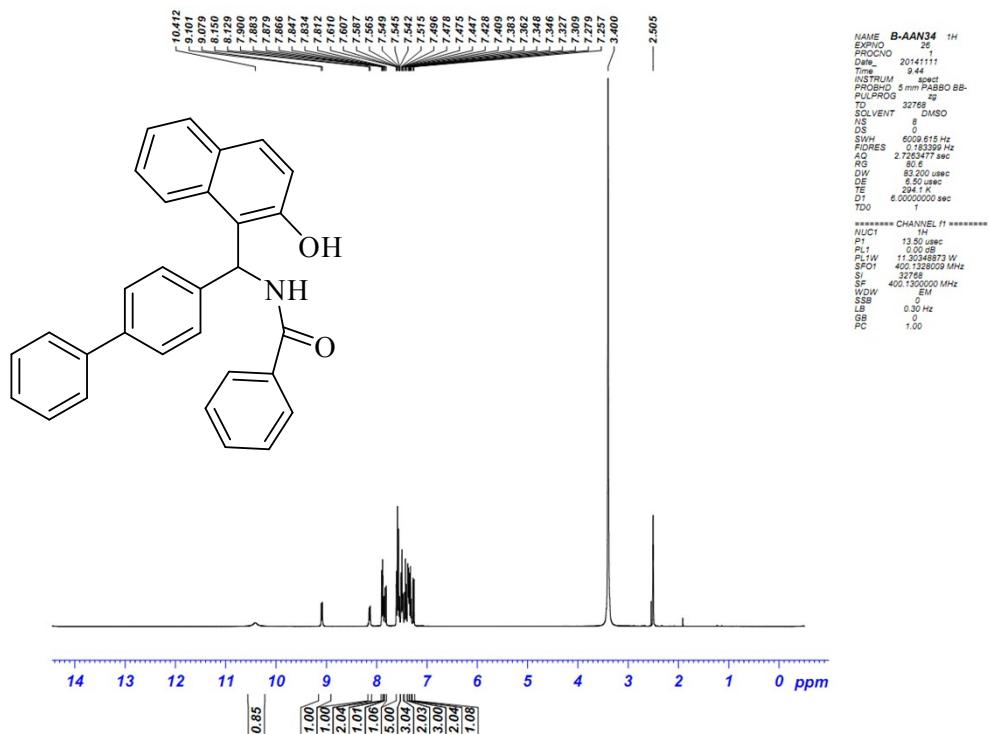


Fig. S100. The ^1H NMR spectrum of N-(biphenyl-4-yl(2-hydroxynaphthalen-1-yl)methyl)benzamide (Table 3, entry 24)

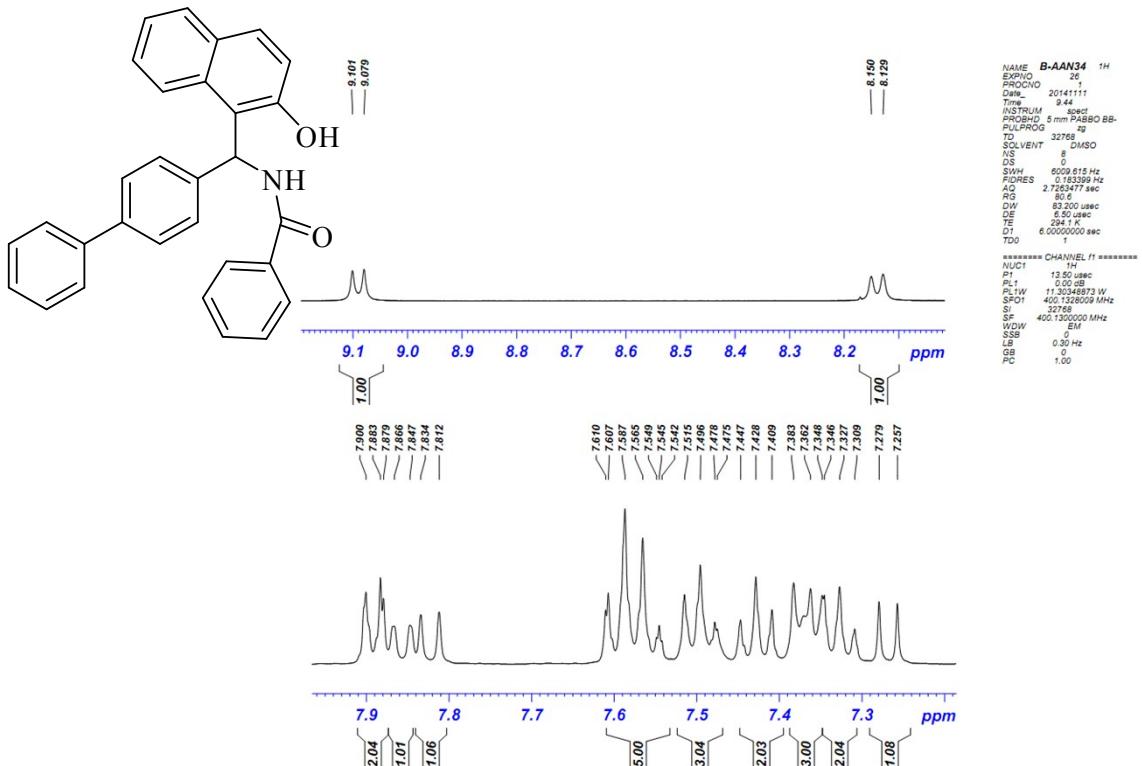


Fig. S101. The ^{13}C NMR spectrum of N-(biphenyl-4-yl(2-hydroxynaphthalen-1-yl)methyl)benzamide (Table 3, entry 24)

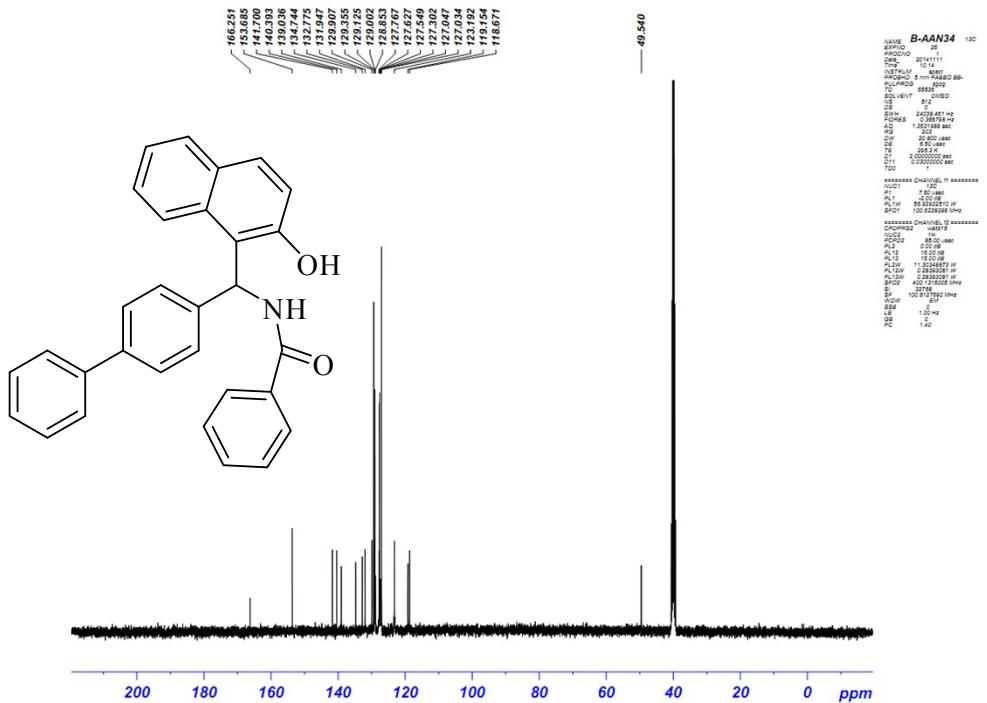


Fig. S102. The ^{13}C NMR spectrum of N-(biphenyl-4-yl(2-hydroxynaphthalen-1-yl)methyl)benzamide (Table 3, entry 24)

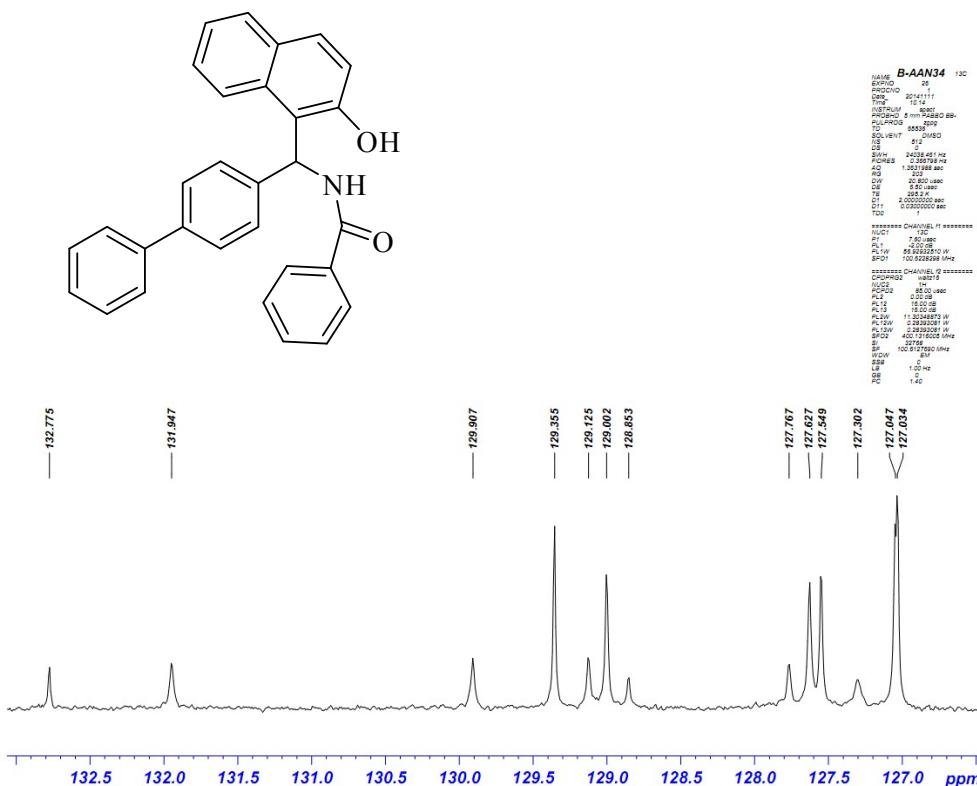


Fig. S103. The mass spectrum of N-(biphenyl-4-yl(2-hydroxynaphthalen-1-yl)methyl)benzamide (Table 3, entry 24)

