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ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย



APPENDIX

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

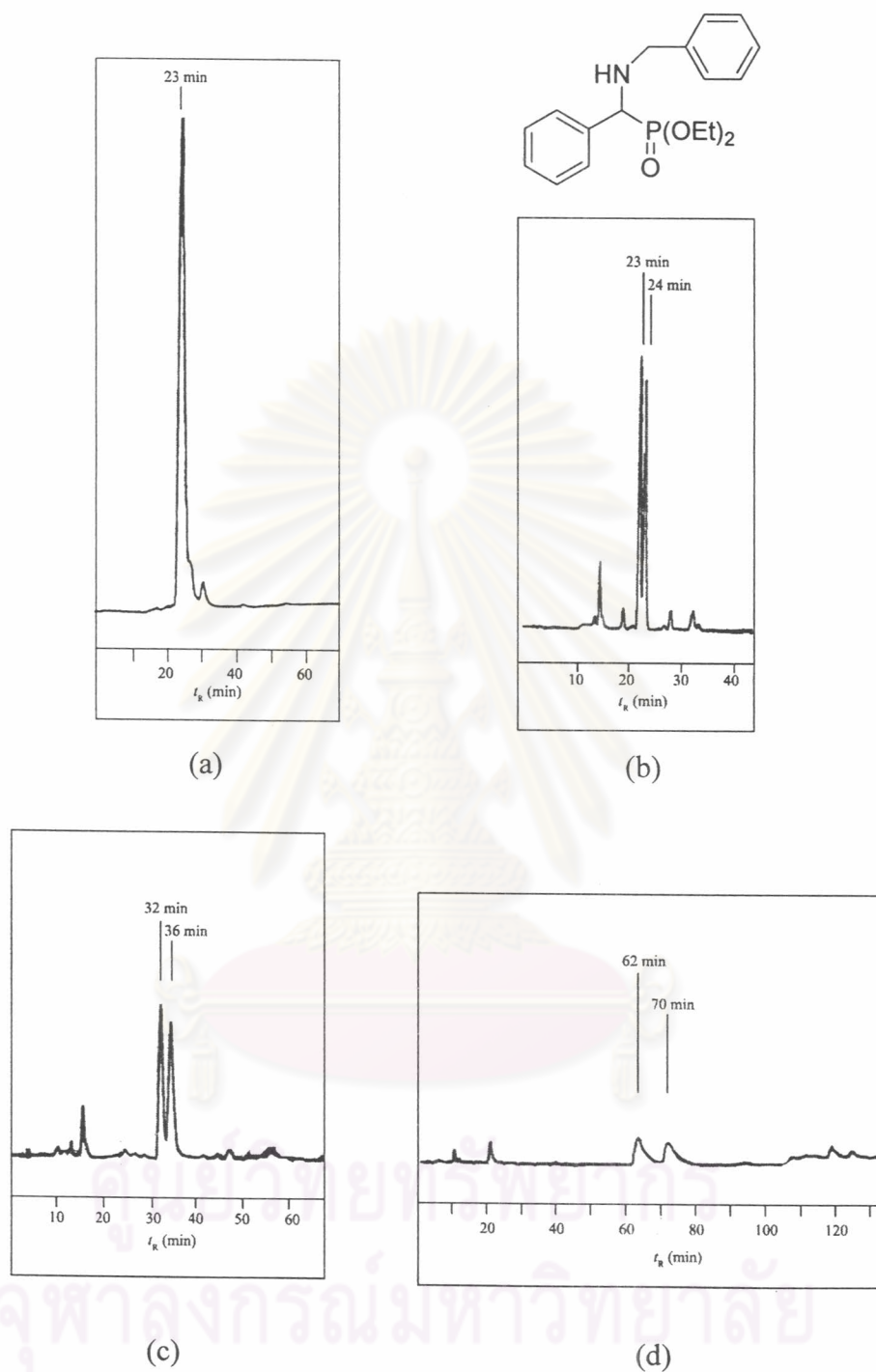


Figure 1 The result of chiral HPLC analysis of **II-1**; (a) Chiralcel OD[®] column, hexanes/2-propanol, 9/1, flow rate = 0.5 mL/min (b) Chiralcel AD[®] column, hexanes/2-propanol, 9/1, flow rate = 0.5 mL/min (c) Chiralcel AD[®] column, hexanes/2-propanol, 95/5, flow rate = 0.5 mL/min (d) Chiralcel AD[®] column, hexanes-2-propanol, 98/2, flow rate = 0.7 mL/min

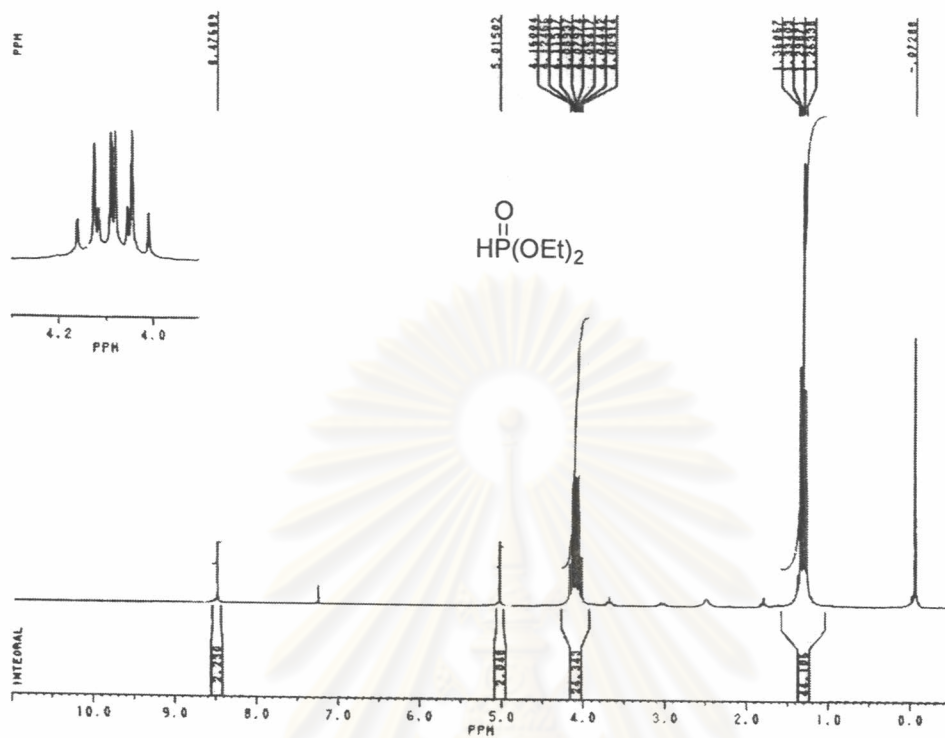


Figure 2 ^1H NMR spectrum of diethyl phosphite

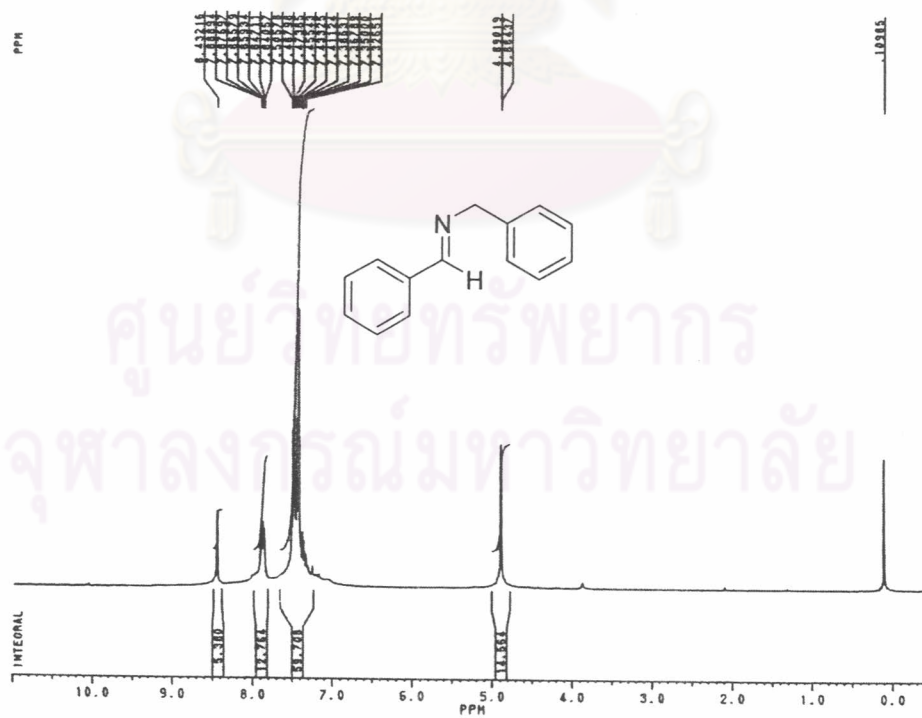
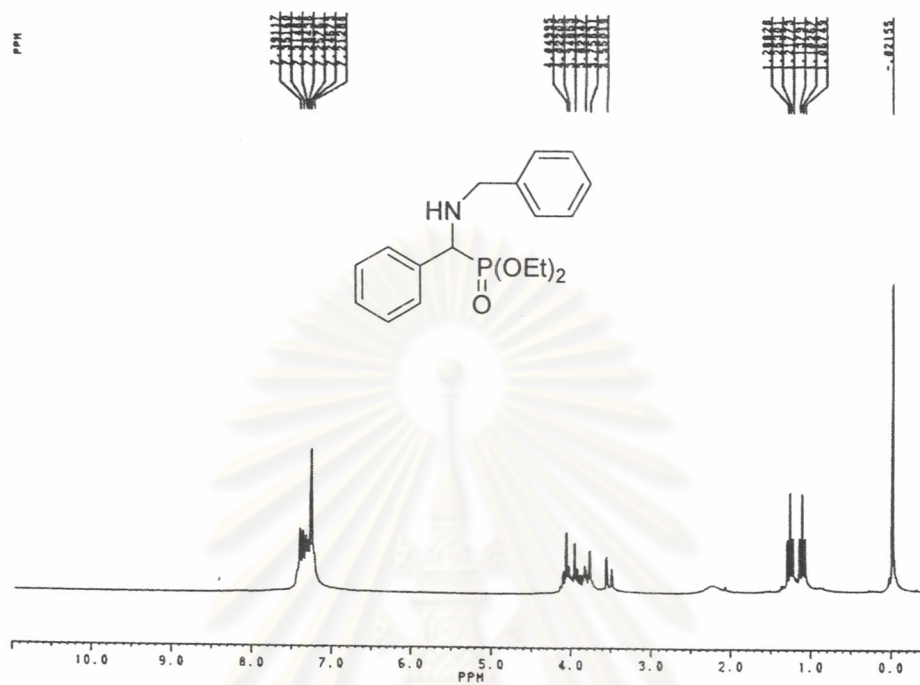
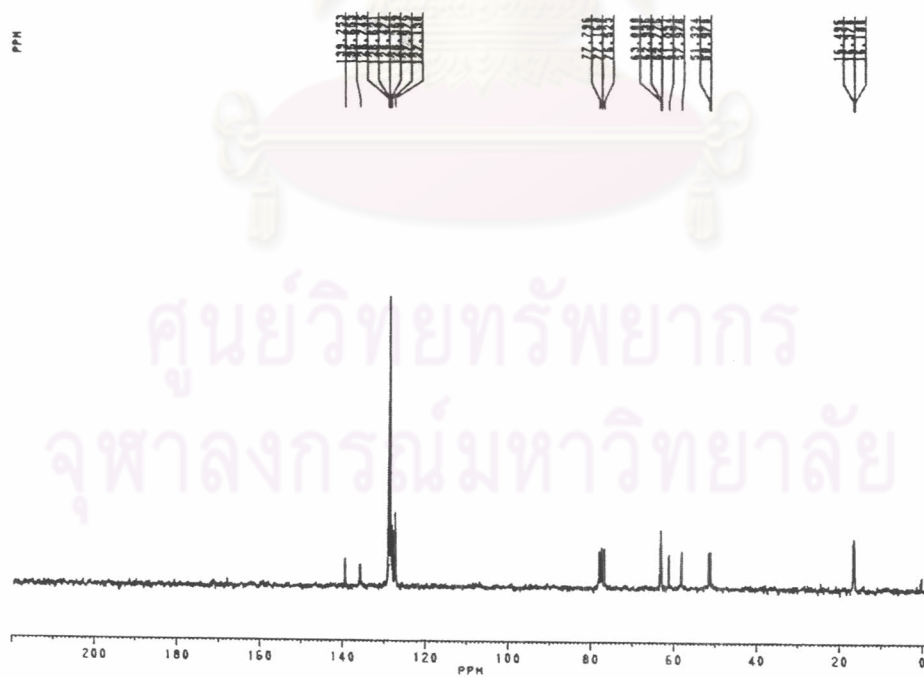


Figure 3 ^1H NMR spectrum of I-1

Figure 4 ^1H NMR spectrum of II-1Figure 5 ^{13}C NMR spectrum of II-1

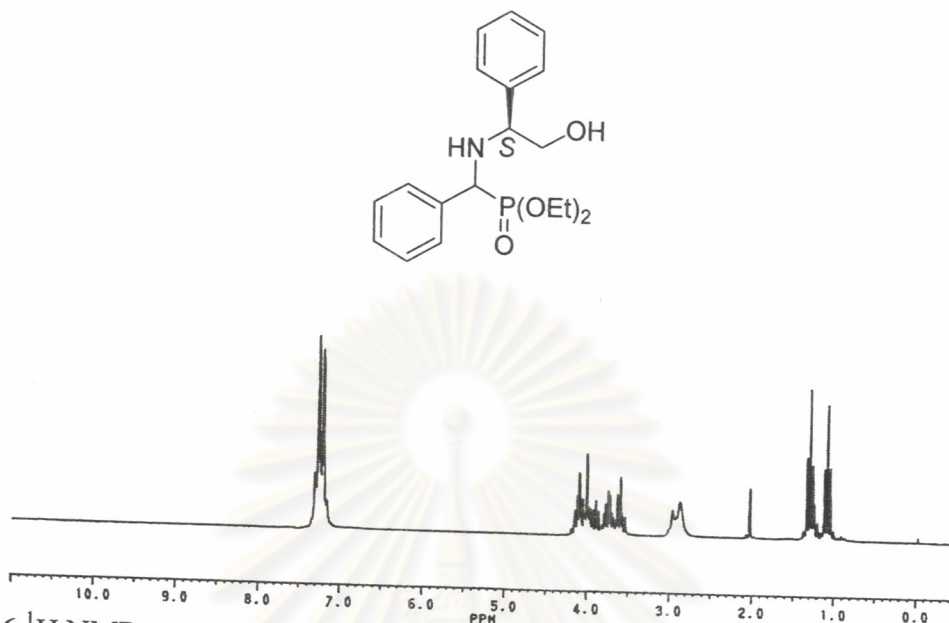


Figure 6 ^1H NMR spectrum of IV-1 (from LiCl-catalyzed hydrophosphonylation of III-1, THF, 80°C, 1d)

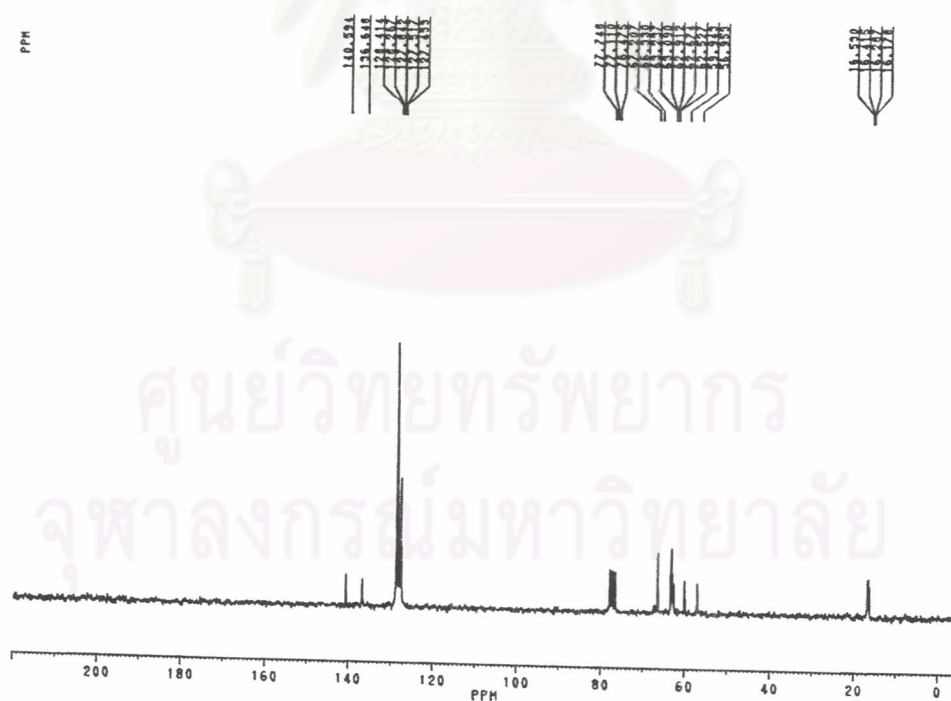


Figure 7 ^{13}C NMR spectrum of IV-1 (from LiCl-catalyzed hydrophosphonylation of III-1, THF, 80°C, 1d)

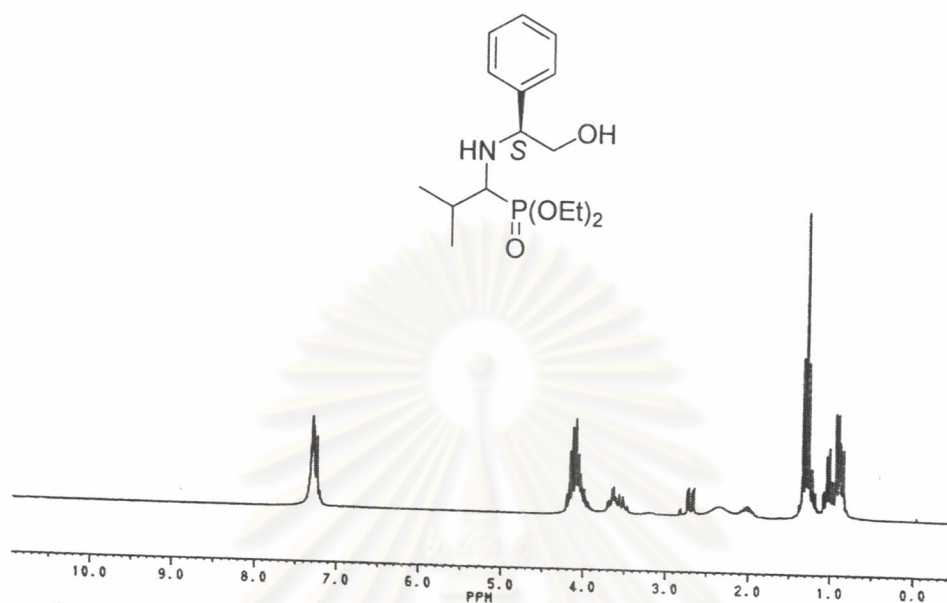


Figure 8 ^1H NMR spectrum of IV-2 (from LiCl-catalyzed hydrophosphonylation of III-2, THF, 80°C, 1d)

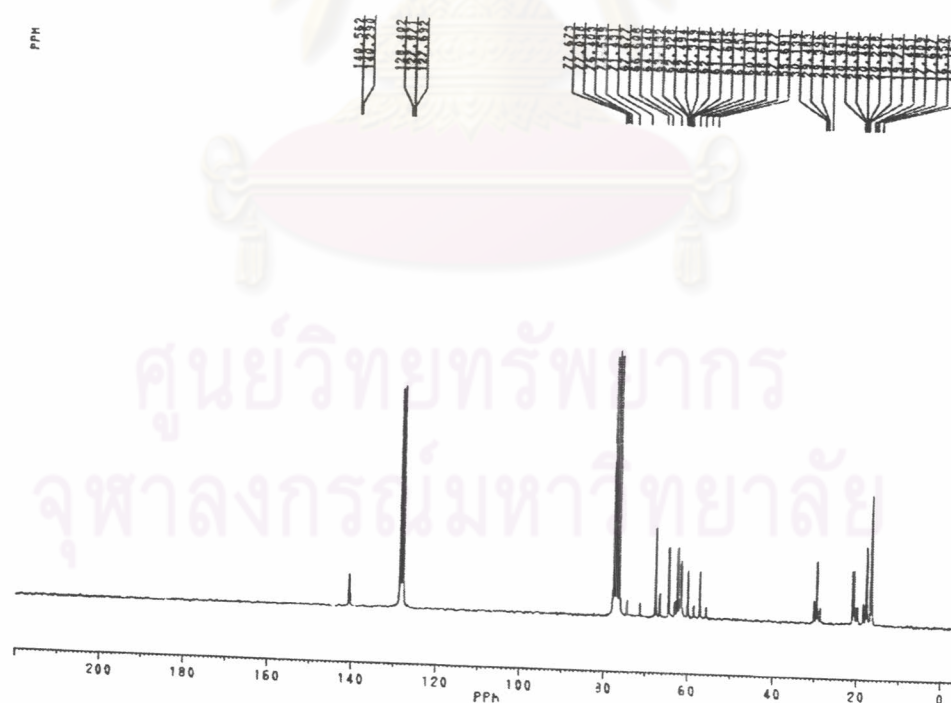
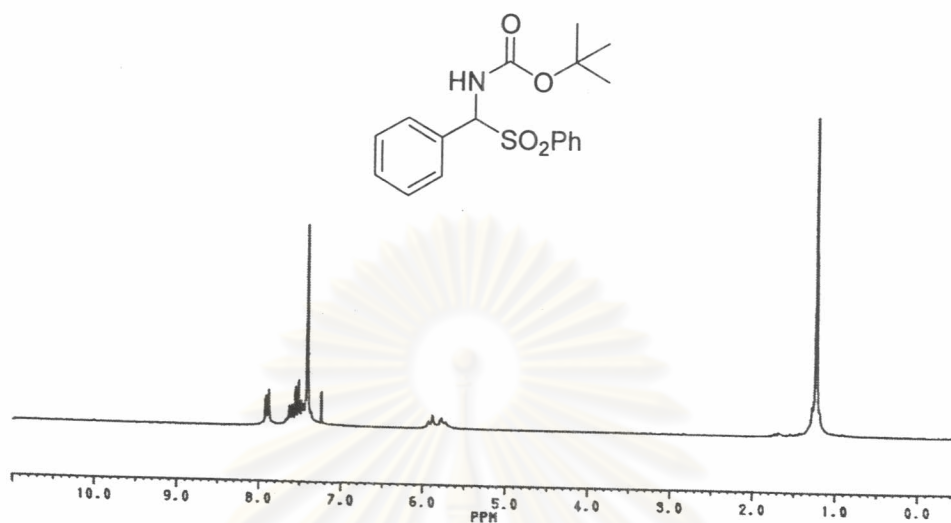
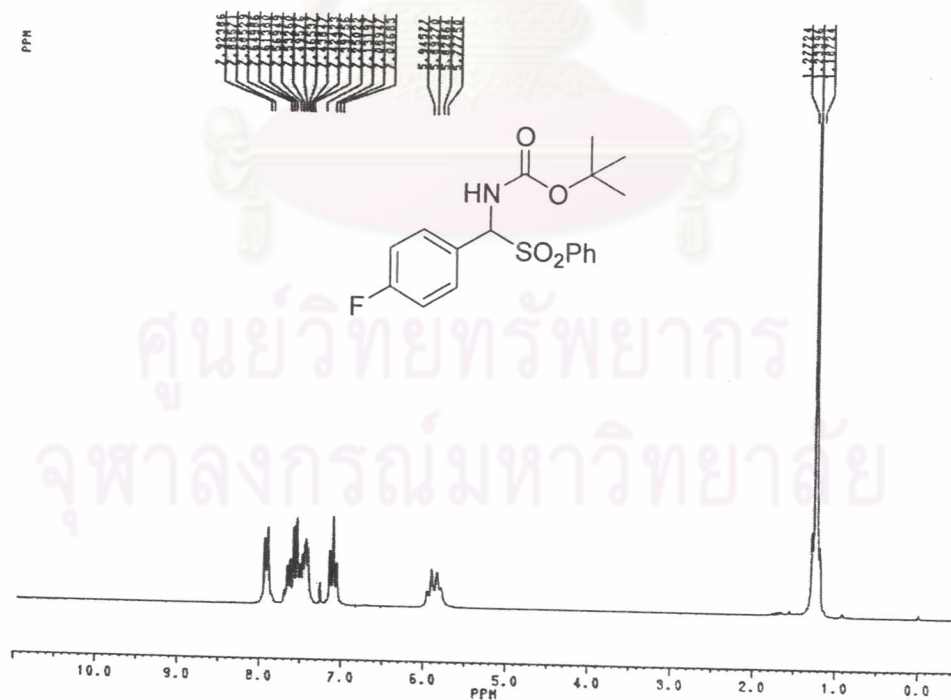
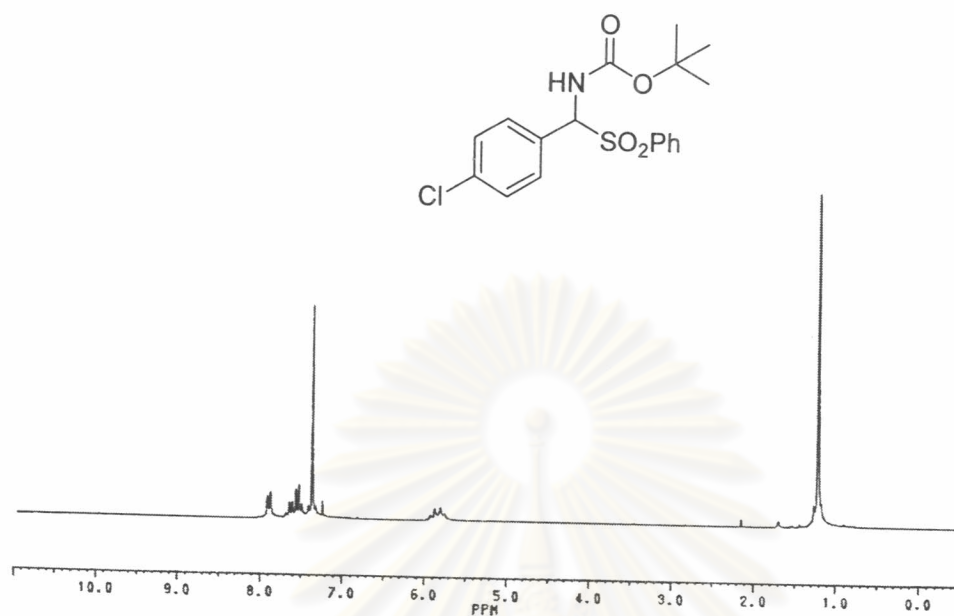
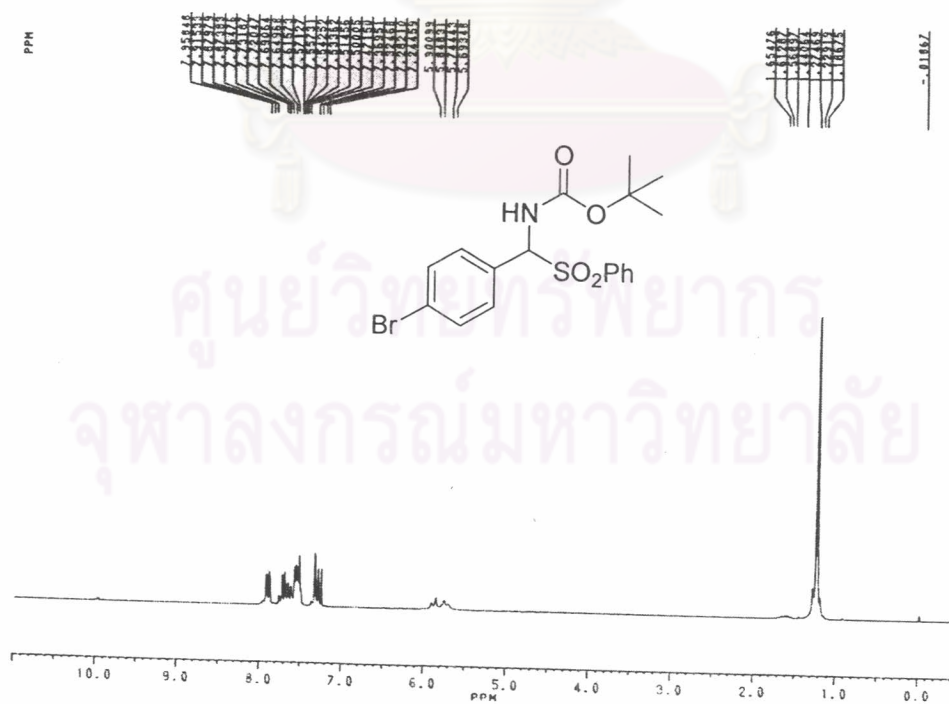


Figure 9 ^{13}C NMR spectrum of IV-2 (from LiCl-catalyzed hydrophosphonylation of III-2, THF, 80°C, 1d)

Figure 10 ¹H NMR spectrum of VI-1Figure 11 ¹H NMR spectrum of VI-2

Figure 12 ¹H NMR spectrum of VI-3Figure 13 ¹H NMR spectrum of VI-4

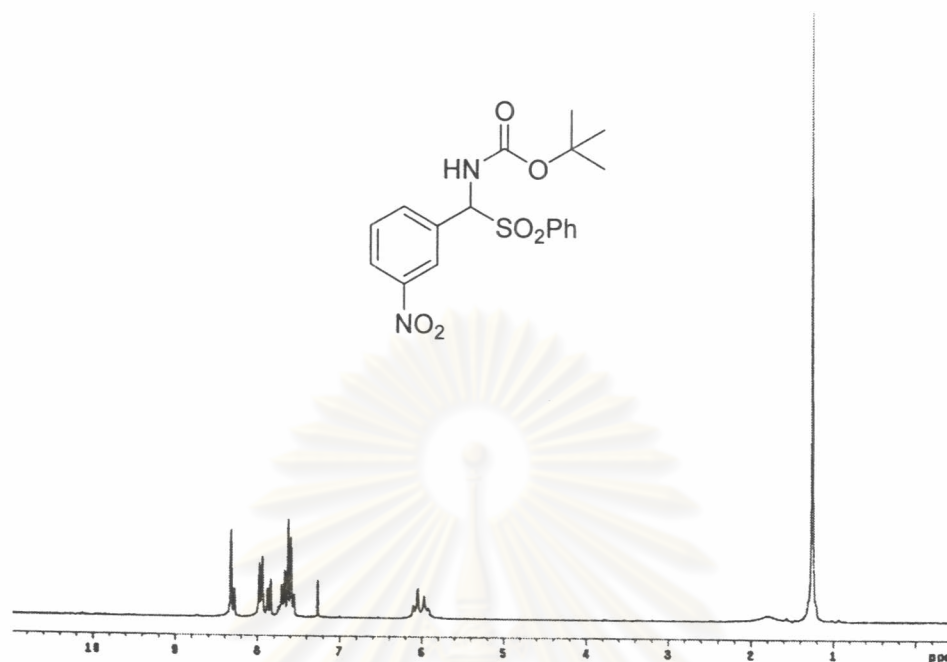


Figure 16 ¹H NMR spectrum of VI-7

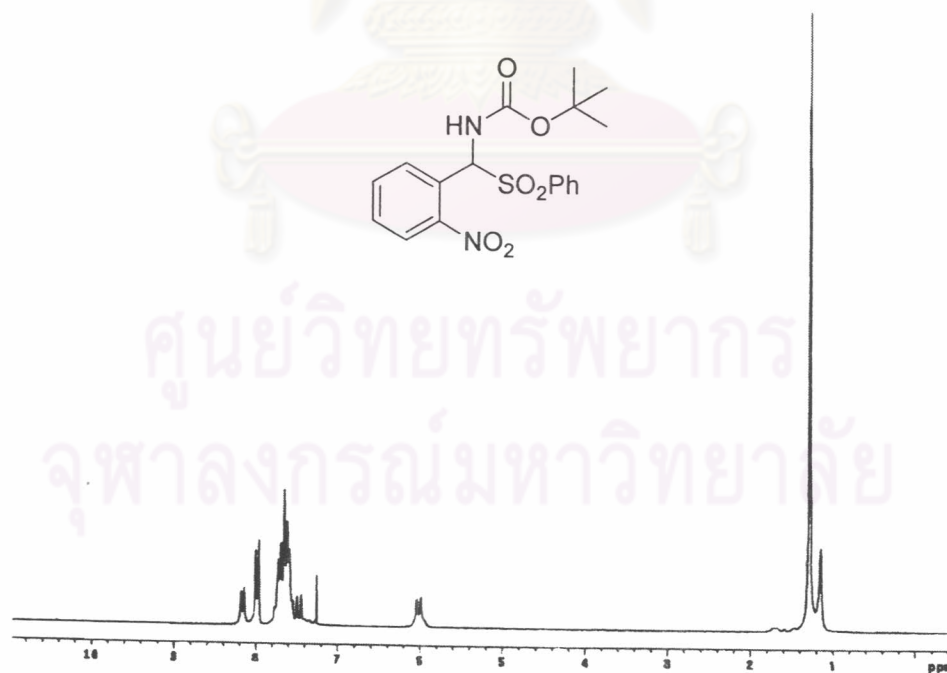


Figure 17 ¹H NMR spectrum of VI-8

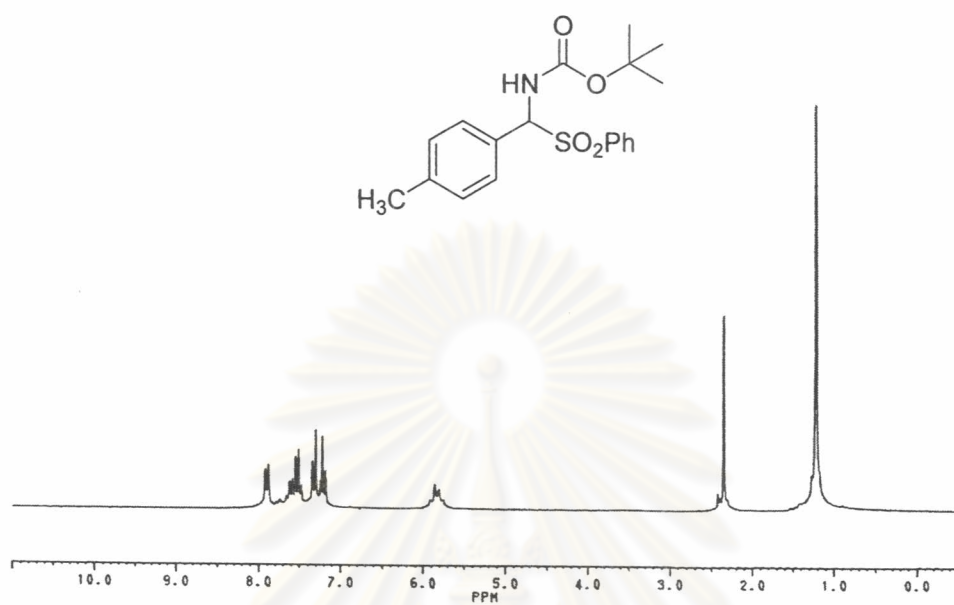


Figure 18 ^1H NMR spectrum of VI-9

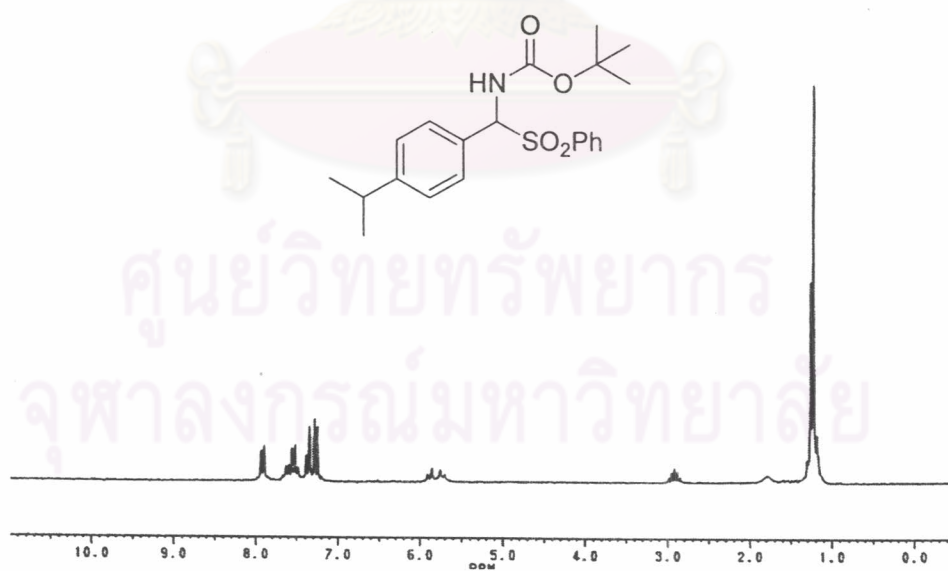
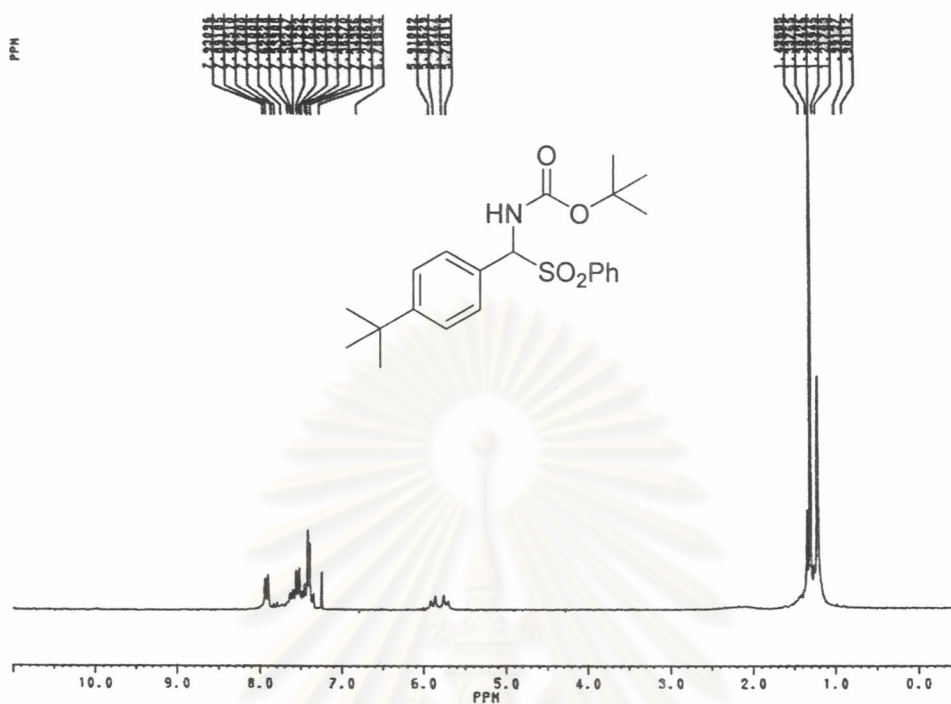
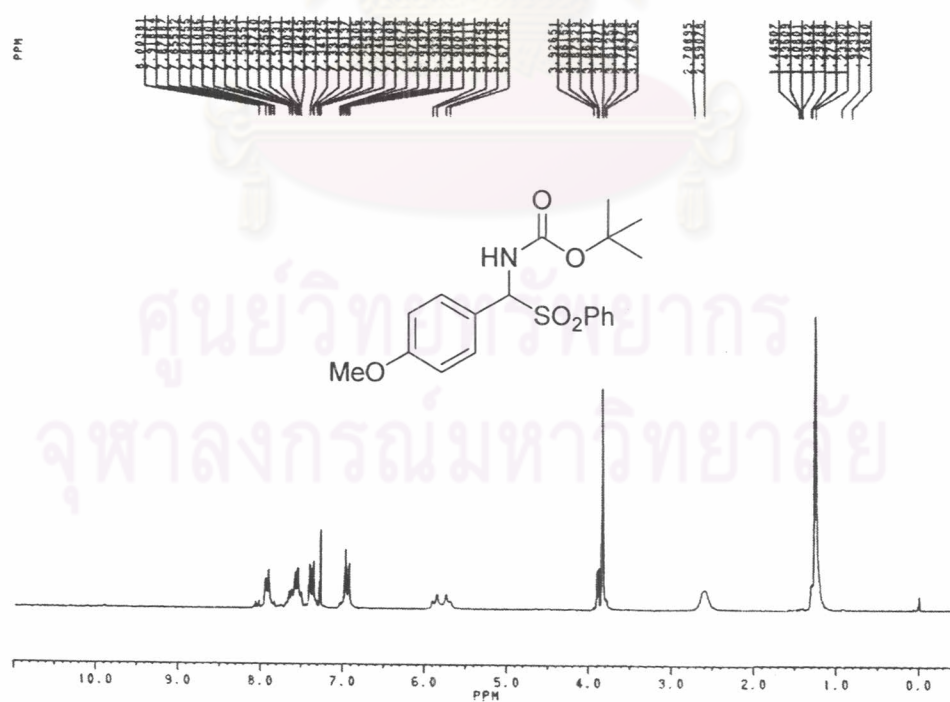
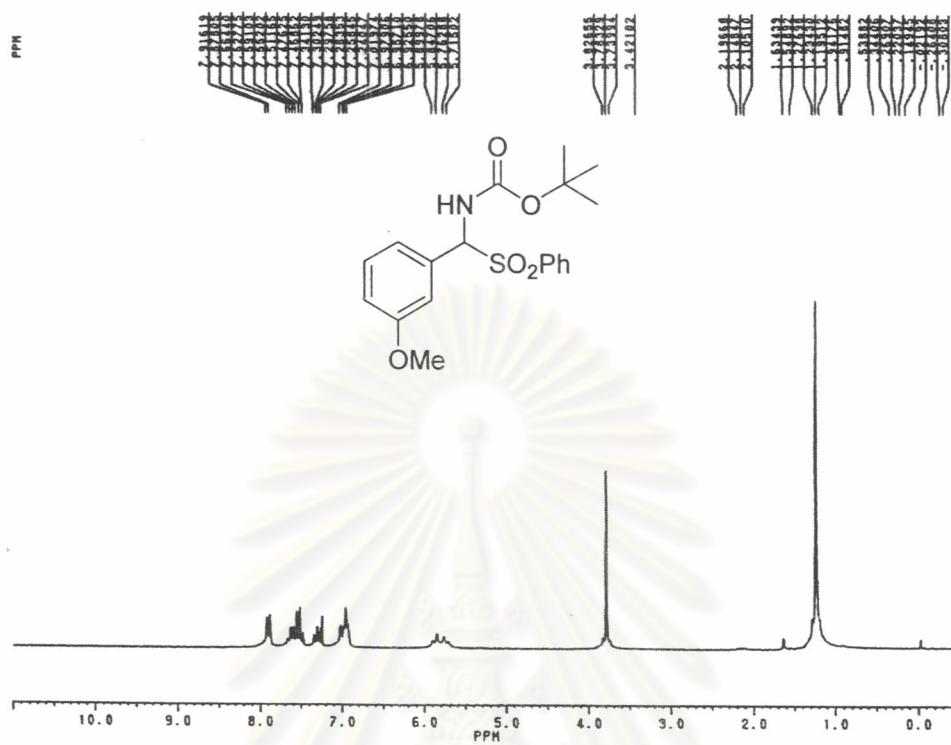
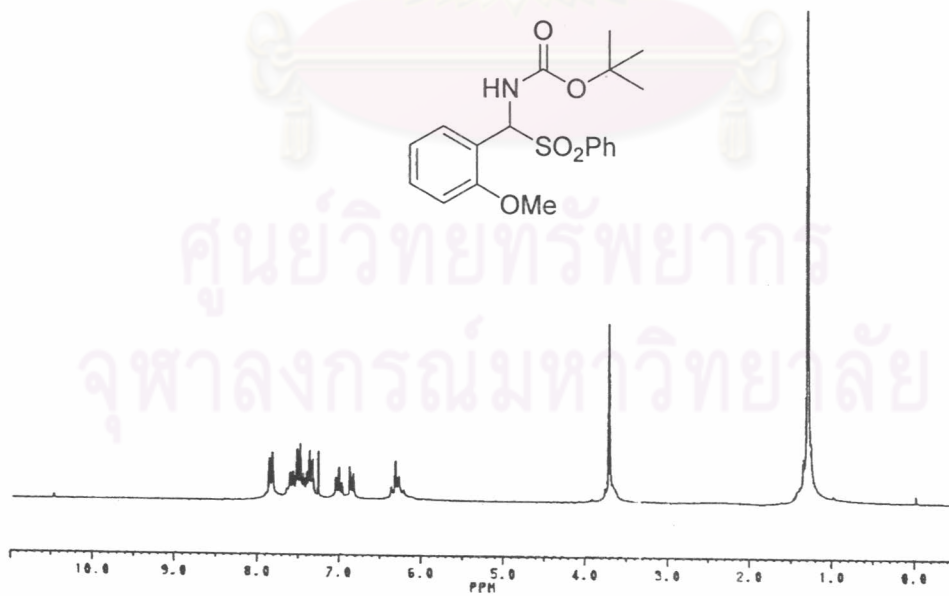
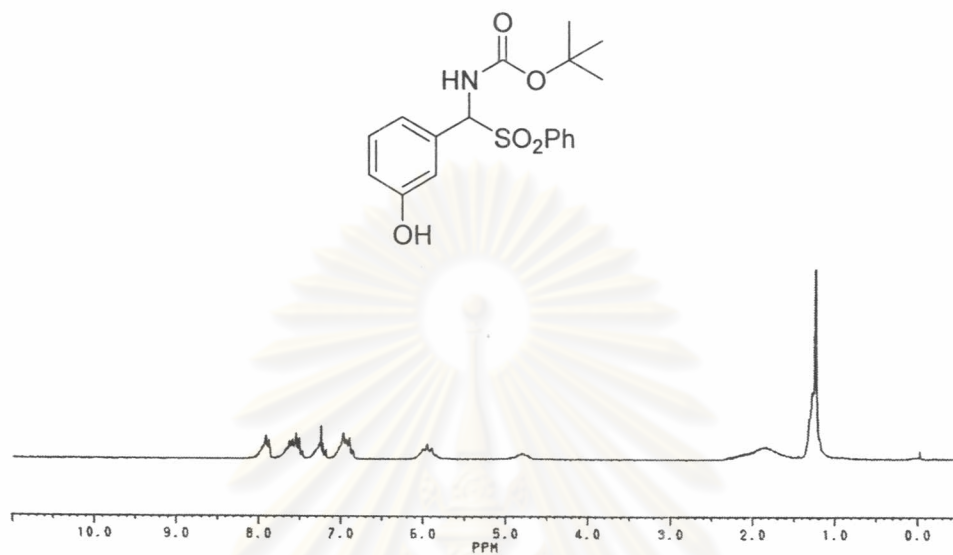
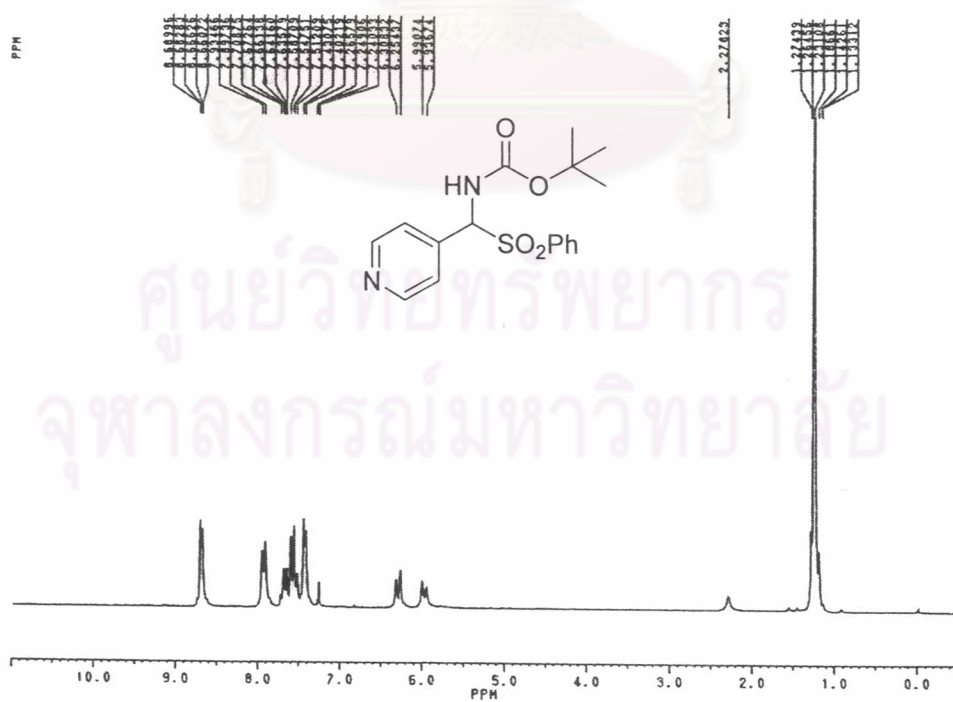


Figure 19 ^1H NMR spectrum of VI-10

Figure 20 ^1H NMR spectrum of VI-11Figure 21 ^1H NMR spectrum of VI-12

Figure 22 ¹H NMR spectrum of VI-13Figure 23 ¹H NMR spectrum of VI-14

Figure 24 ¹H NMR spectrum of VI-15Figure 25 ¹H NMR spectrum of VI-16

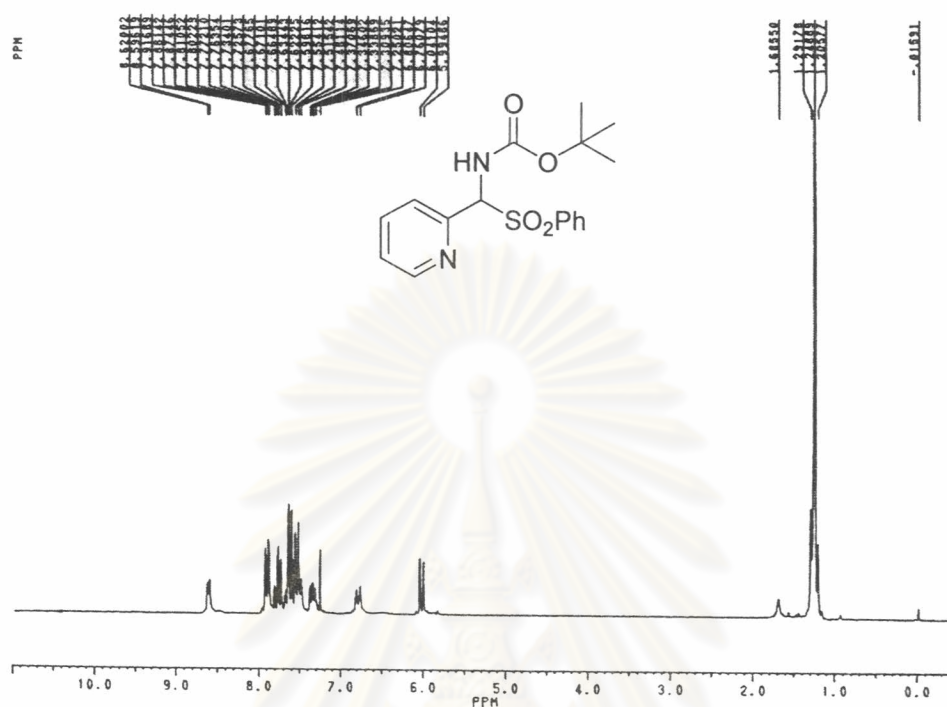


Figure 26 ^1H NMR spectrum of VI-17

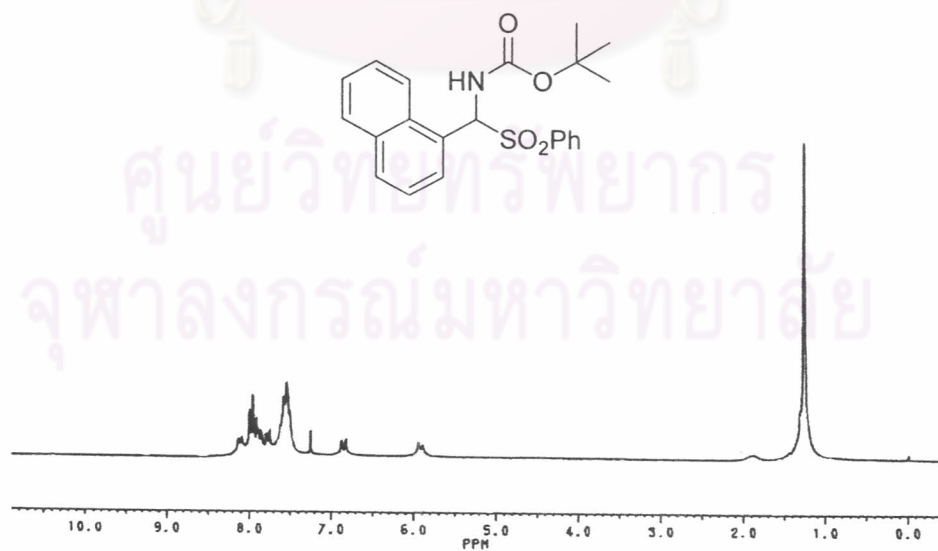


Figure 27 ^1H NMR spectrum of VI-18

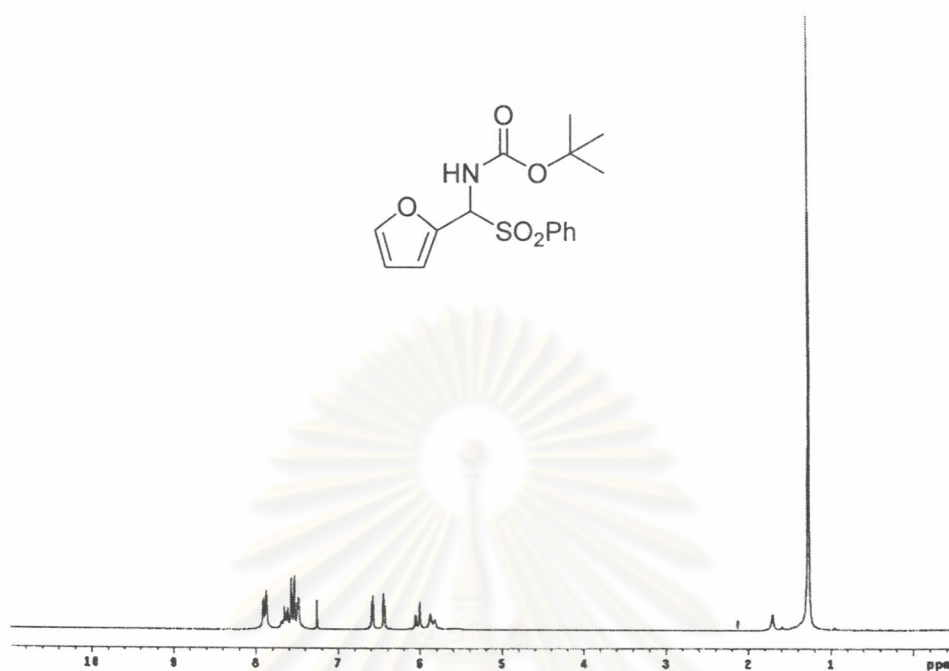


Figure 28 ¹H NMR spectrum of VI-19

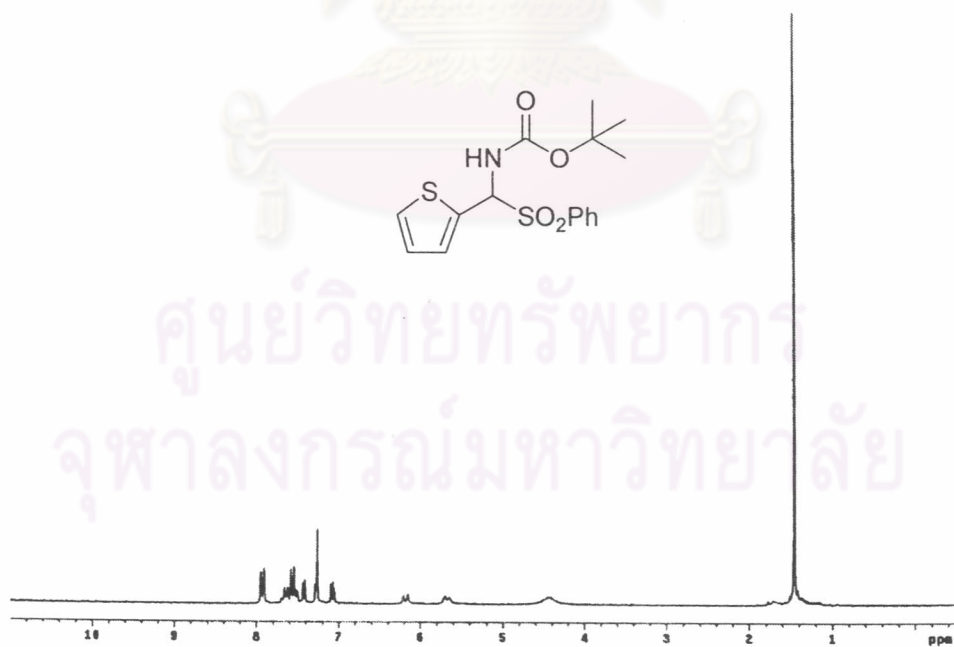
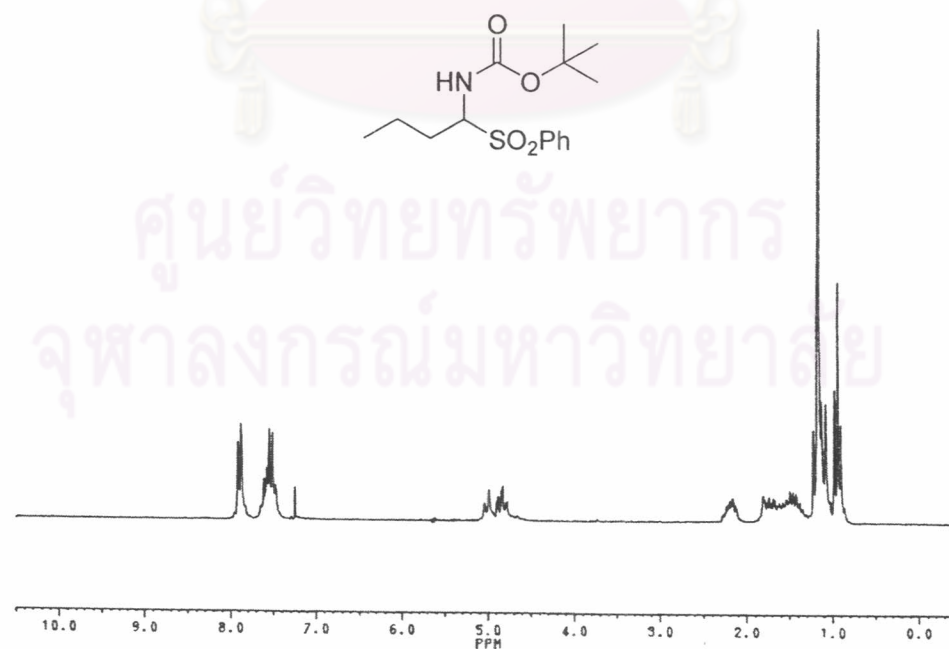
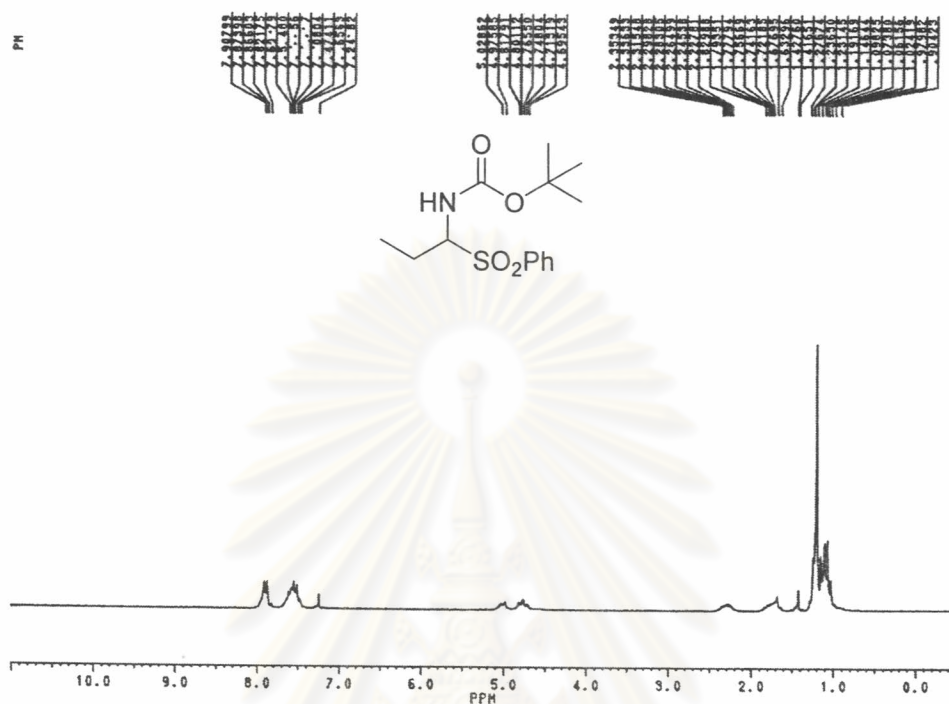


Figure 29 ¹H NMR spectrum of VI-20



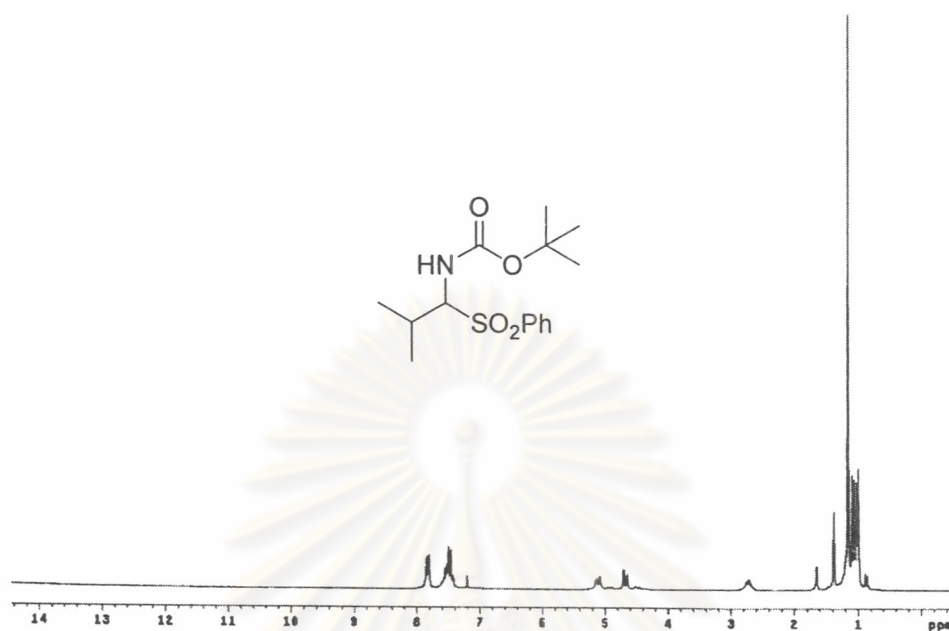


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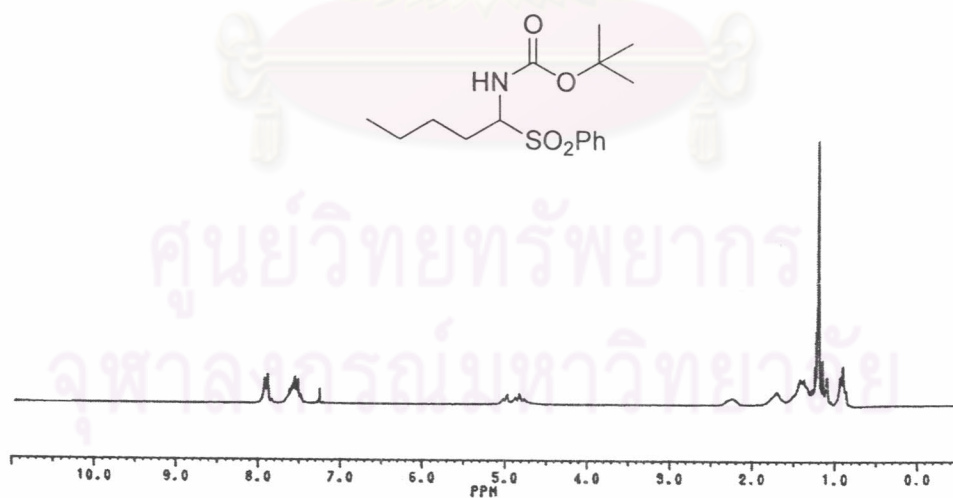


Figure 33 ^1H NMR spectrum of VI-24

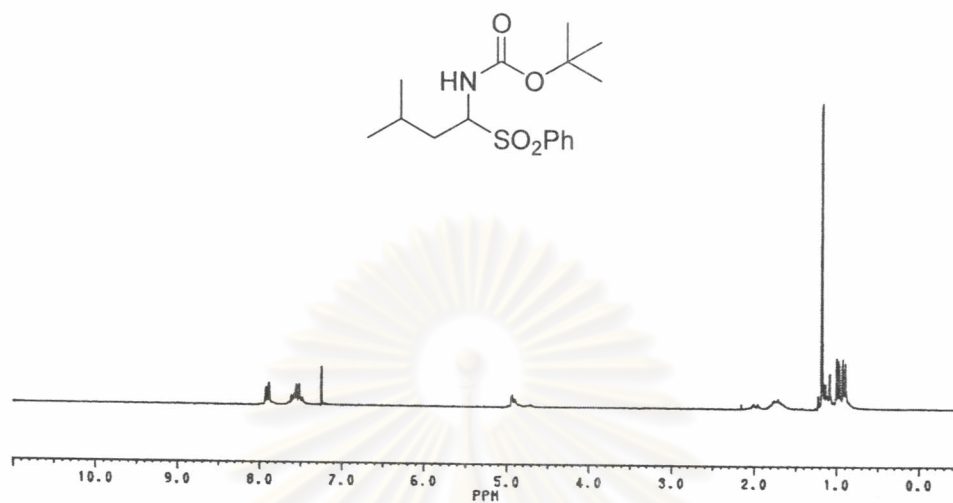


Figure 34 ¹H NMR spectrum of VI-25

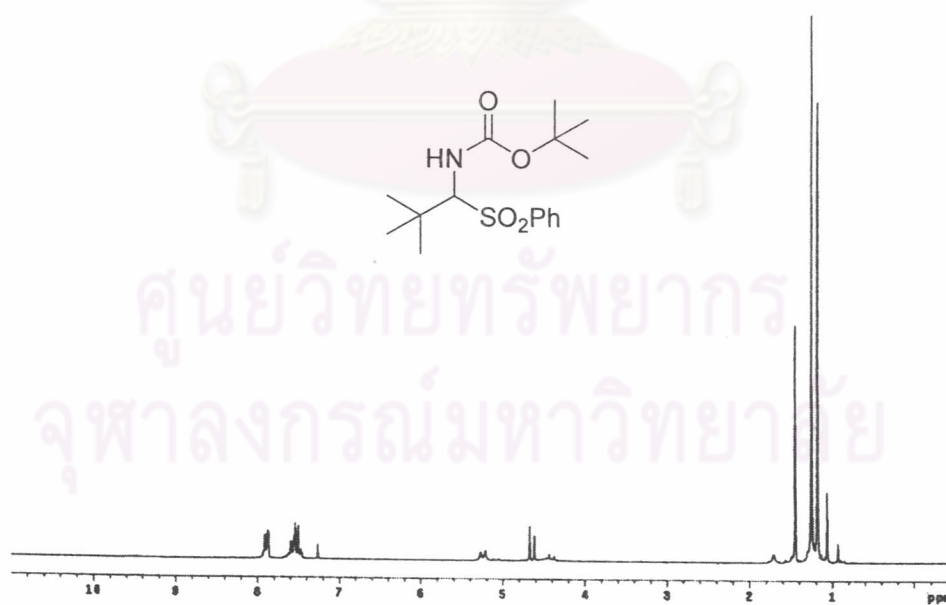


Figure 35 ¹H NMR spectrum of VI-26

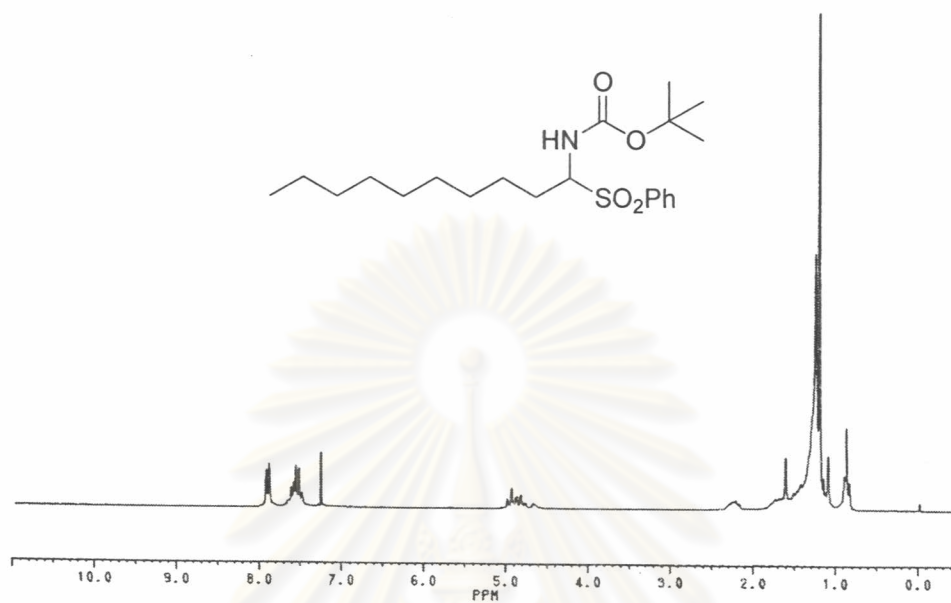


Figure 36 ¹H NMR spectrum of VI-27

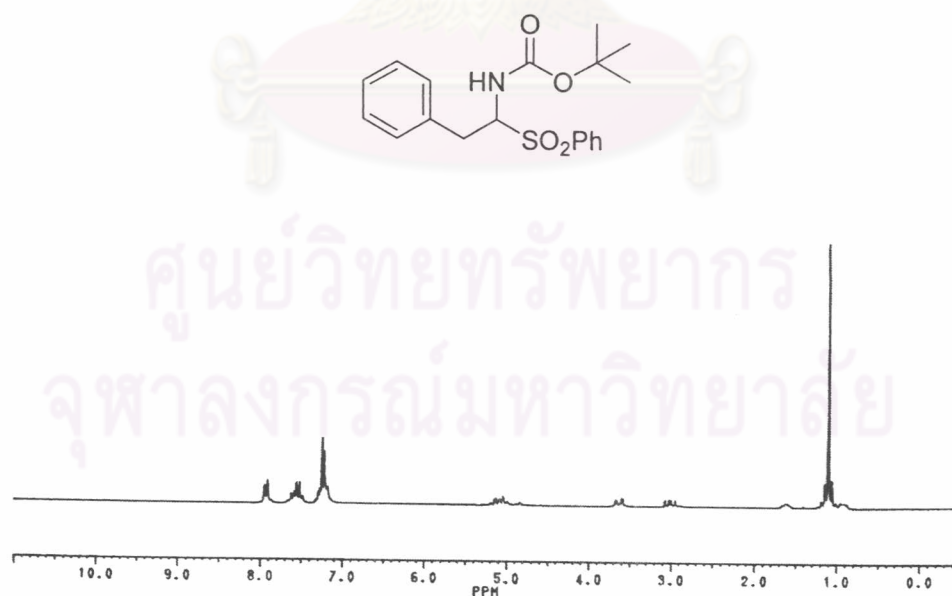


Figure 37 ¹H NMR spectrum of VI-28

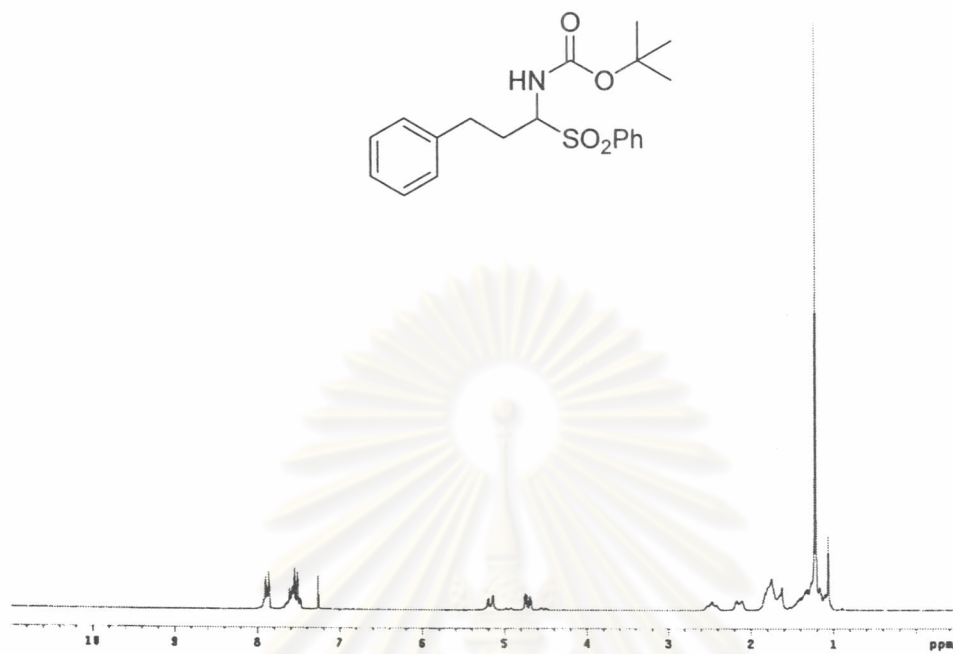


Figure 38 ^1H NMR spectrum of VI-29

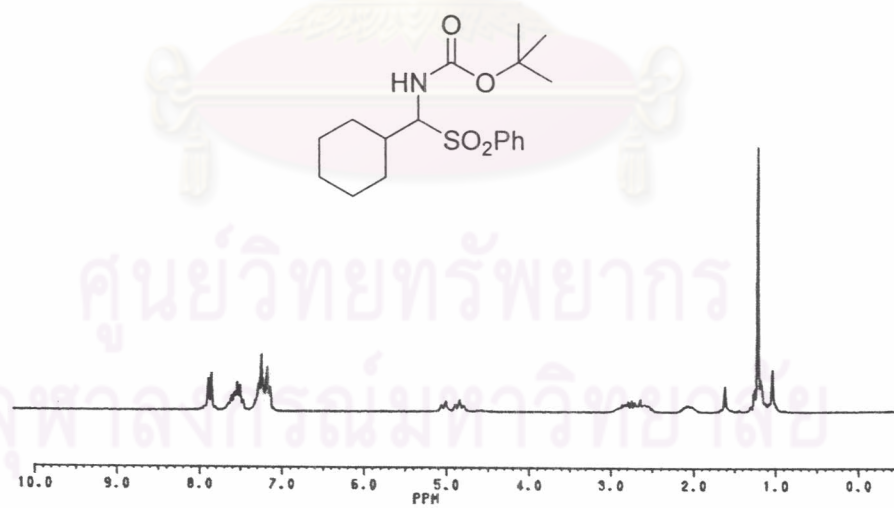


Figure 39 ^1H NMR spectrum of VI-30

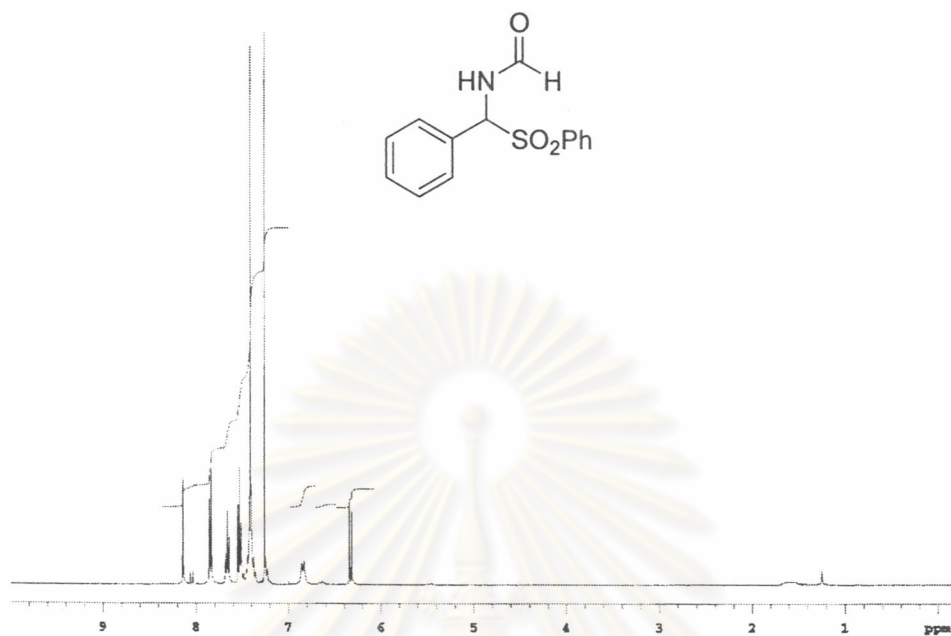


Figure 40 ¹H NMR spectrum of VII-1

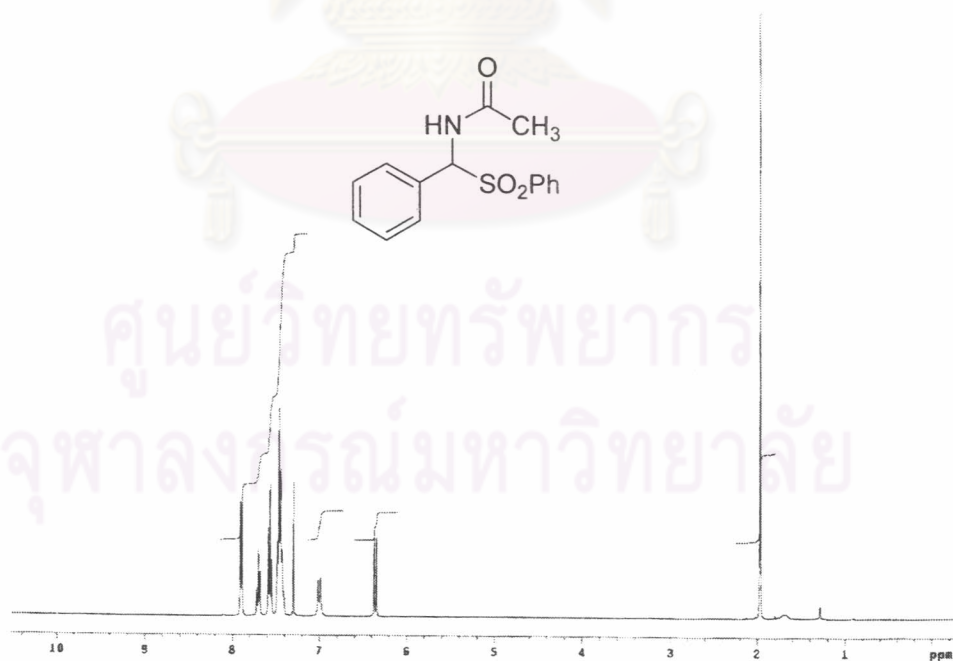


Figure 41 ¹H NMR spectrum of VII-2

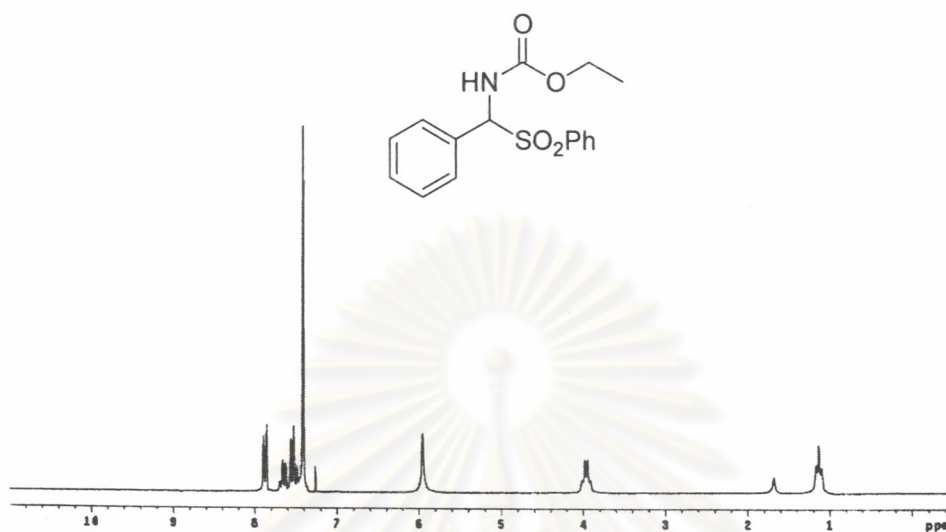


Figure 42 ¹H NMR spectrum of VII-3

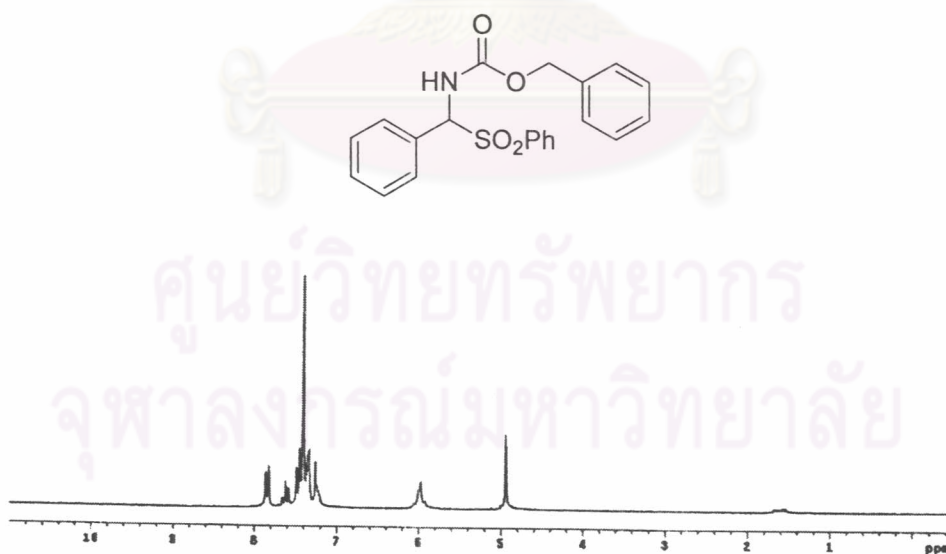
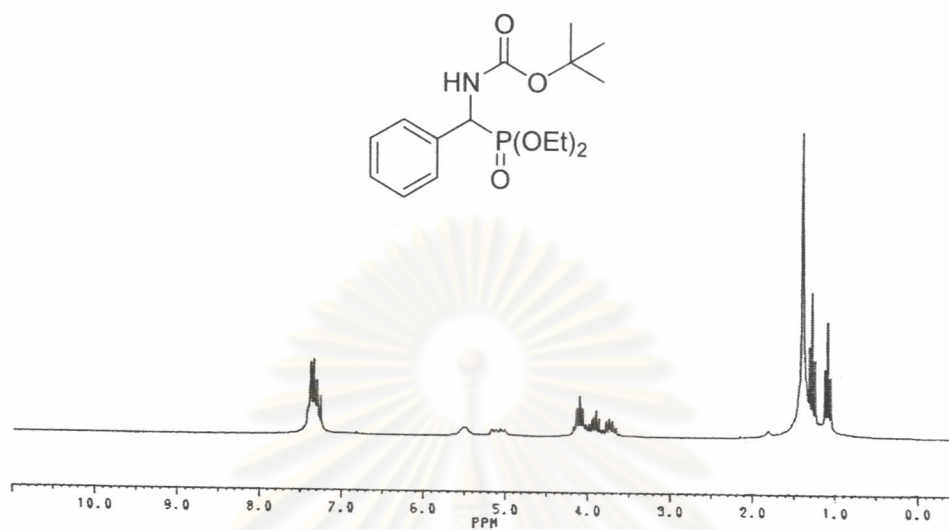
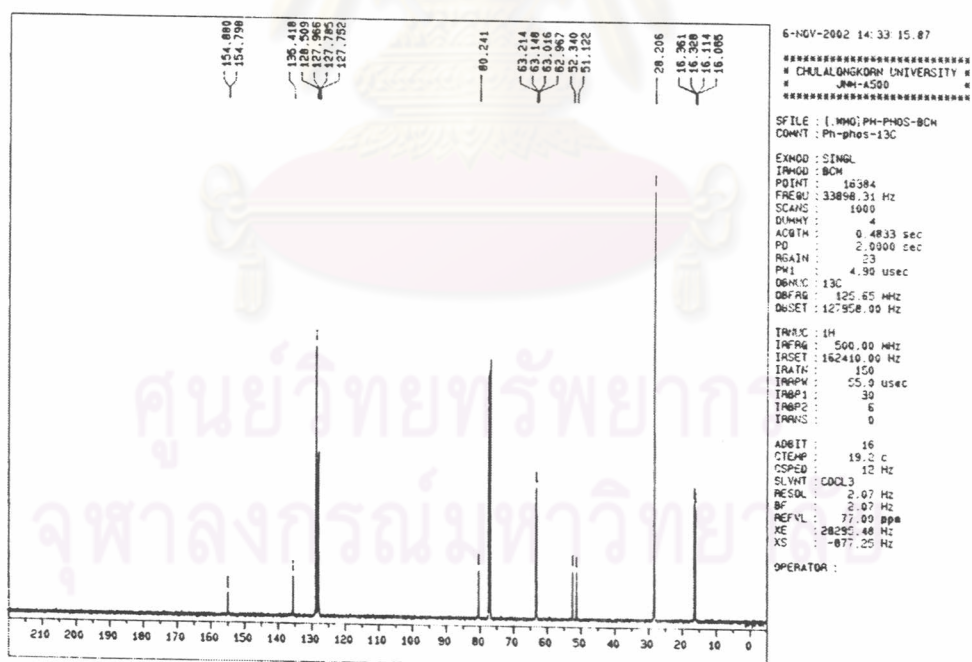
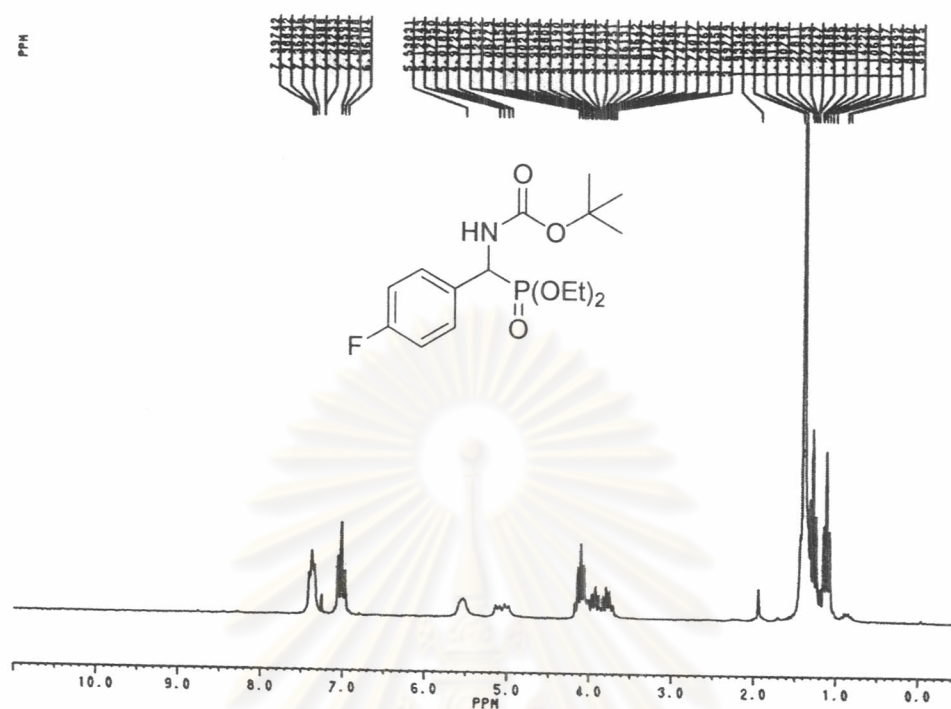
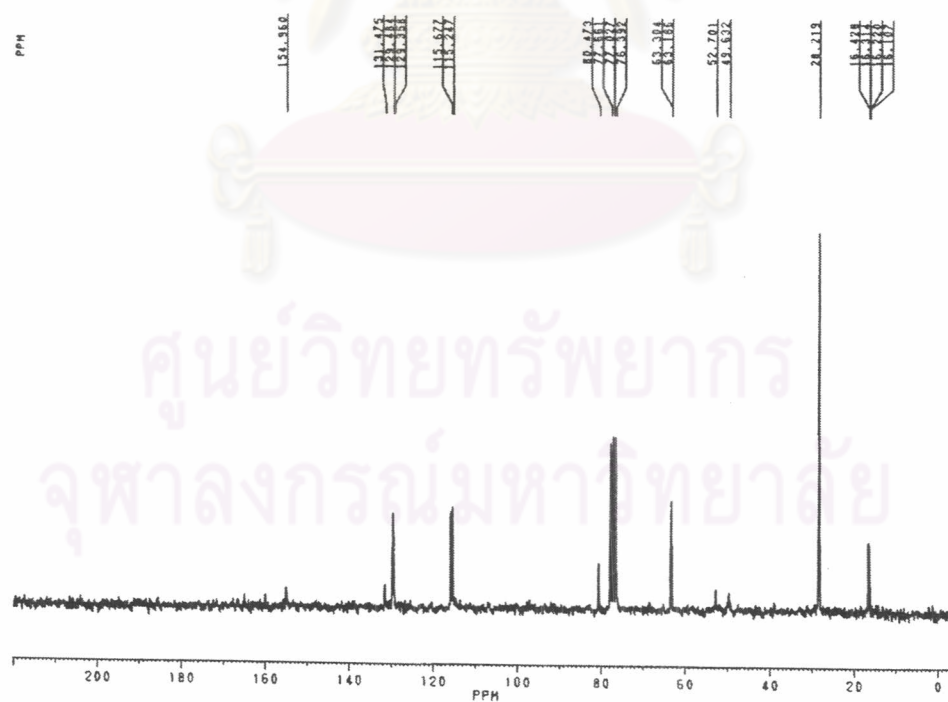
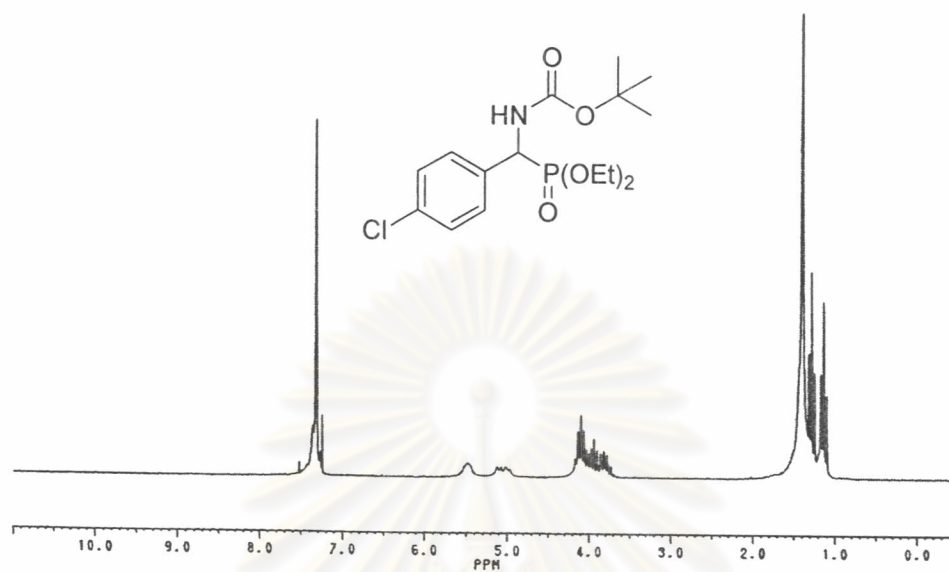
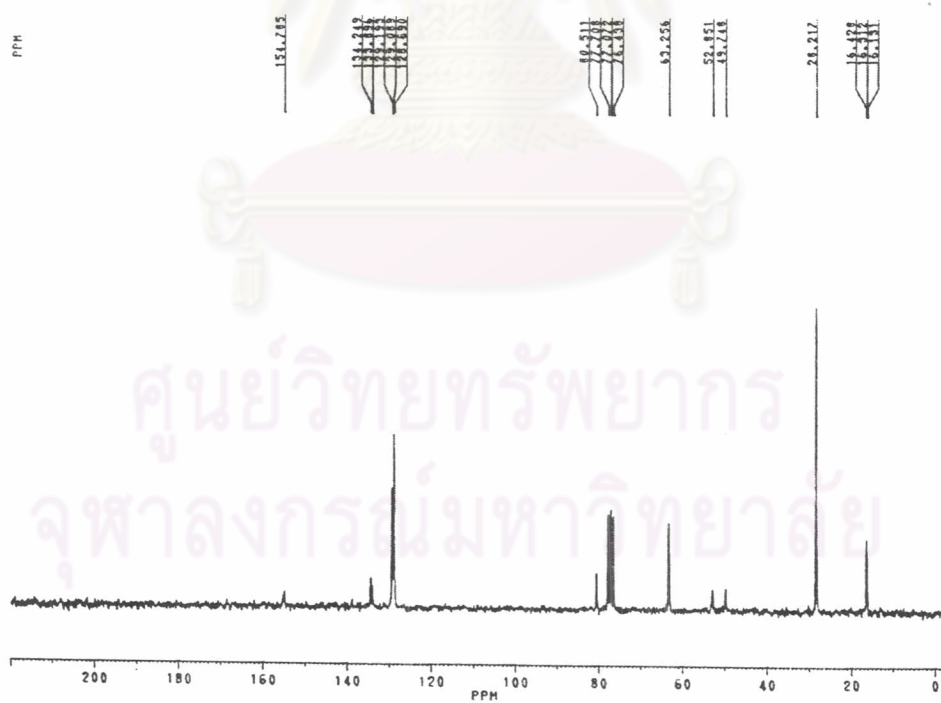
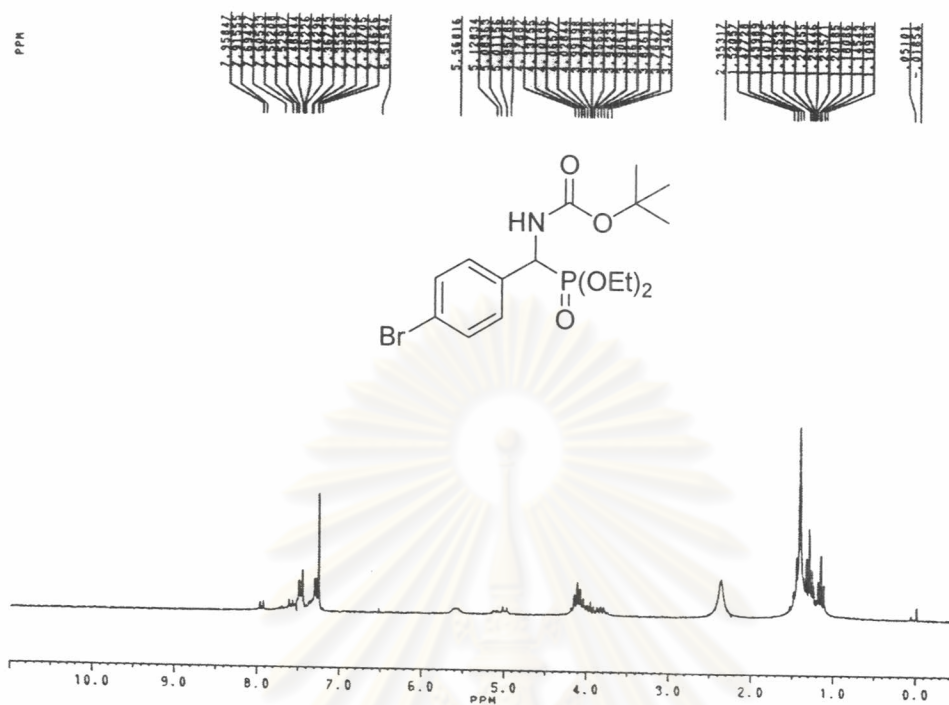
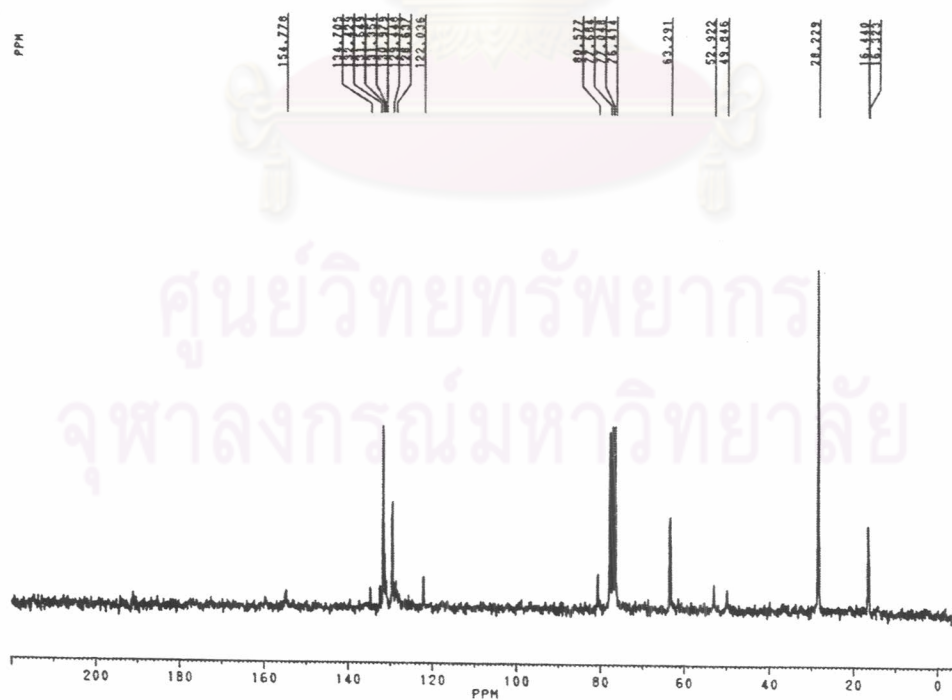


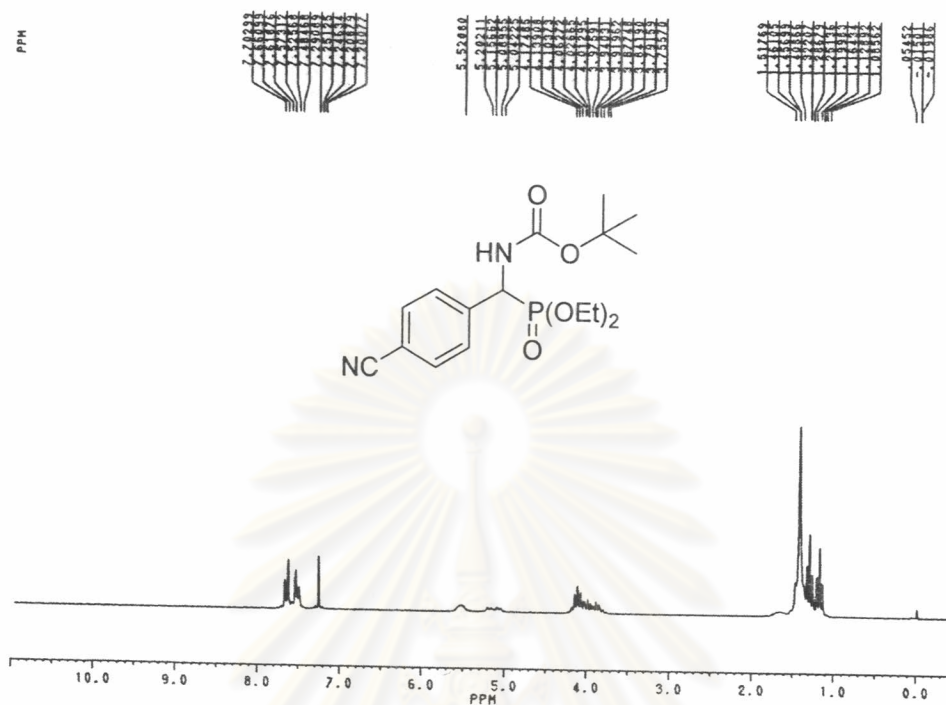
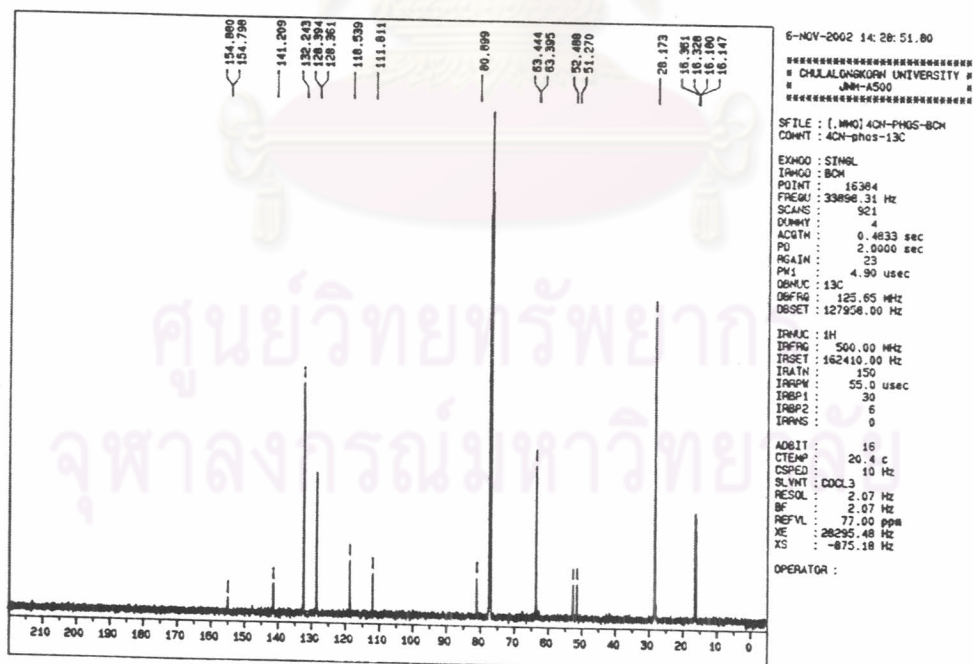
Figure 43 ¹H NMR spectrum of VII-4

Figure 44 ^1H NMR spectrum of VIII-1Figure 45 ^{13}C NMR spectrum of VIII-1

Figure 46 ^1H NMR spectrum of VIII-2Figure 47 ^{13}C NMR spectrum of VIII-2

Figure 48 ¹H NMR spectrum of VIII-3Figure 49 ¹³C NMR spectrum of VIII-3

Figure 50 ¹H NMR spectrum of VIII-4Figure 51 ¹³C NMR spectrum of VIII-4

Figure 52 ¹H NMR spectrum of VIII-5Figure 53 ¹³C NMR spectrum of VIII-5

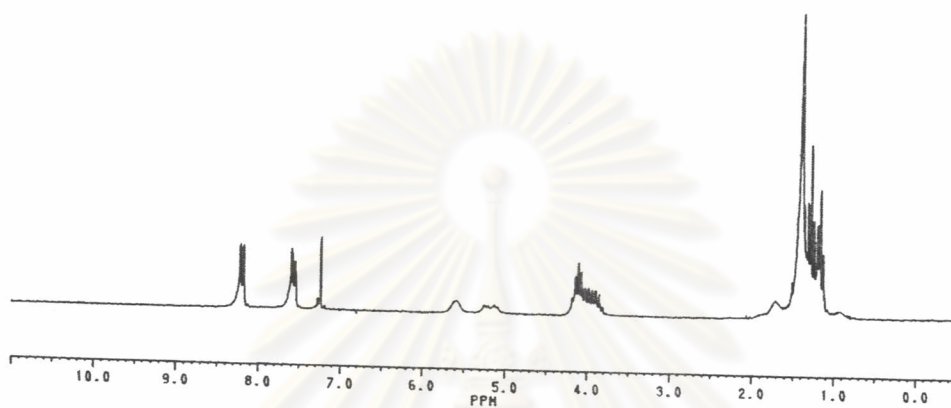
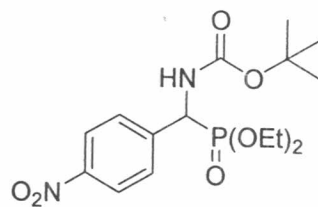


Figure 54 ^1H NMR spectrum of VIII-6

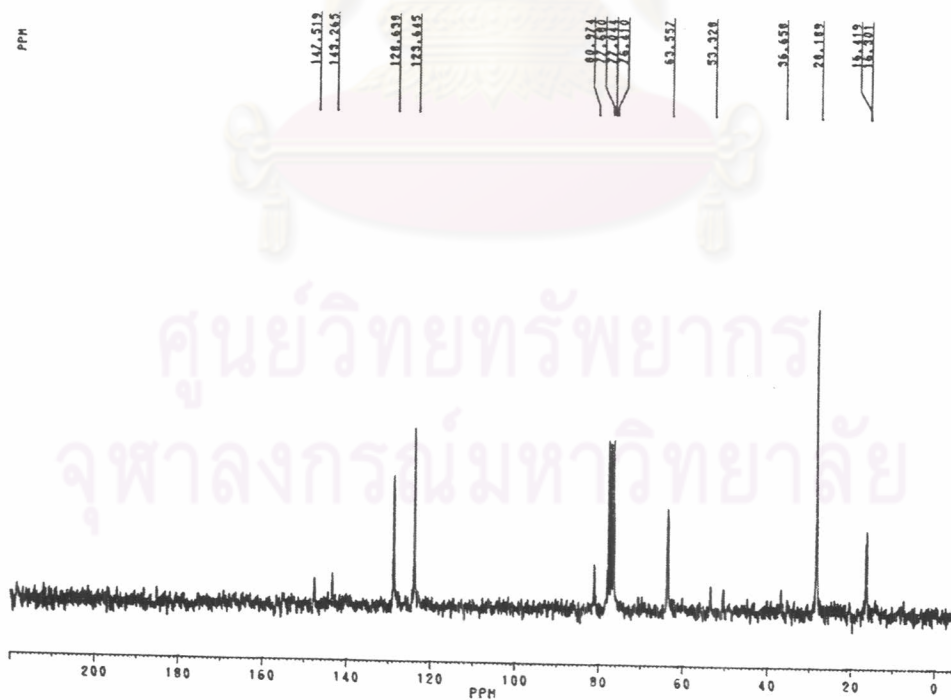
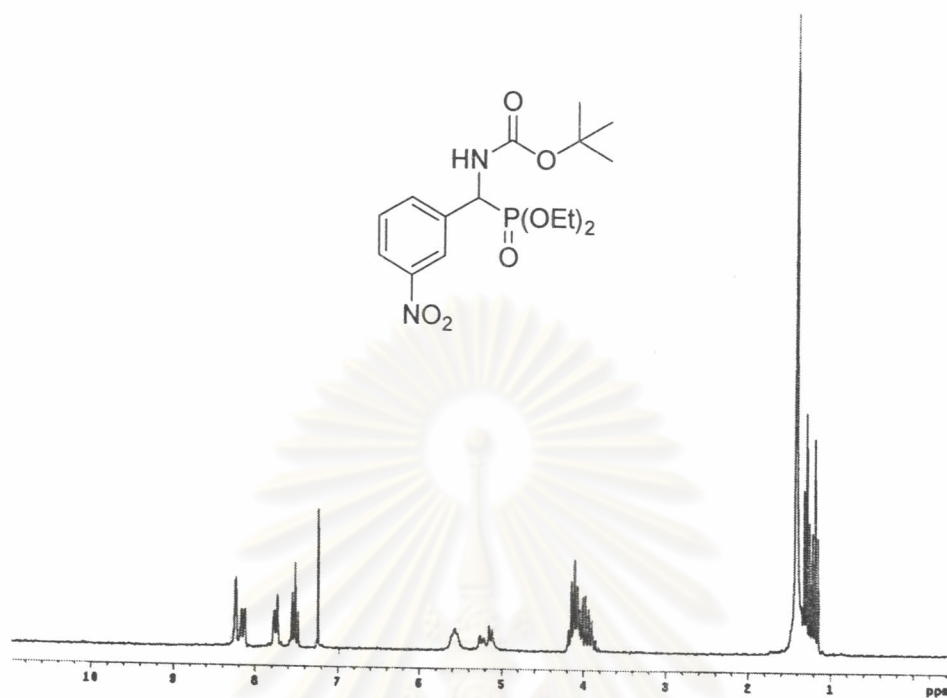
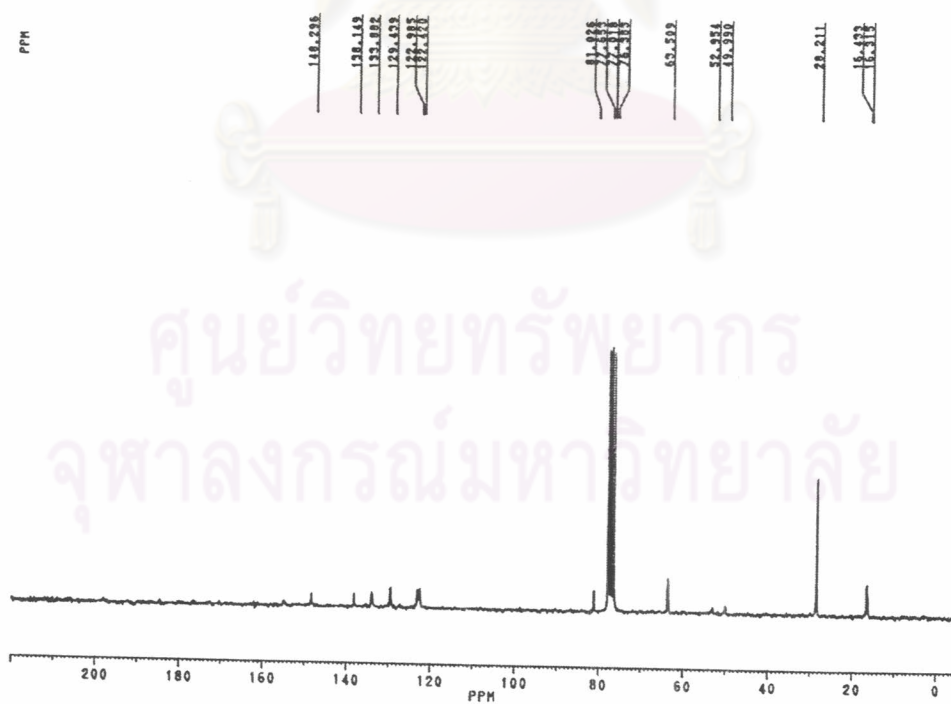
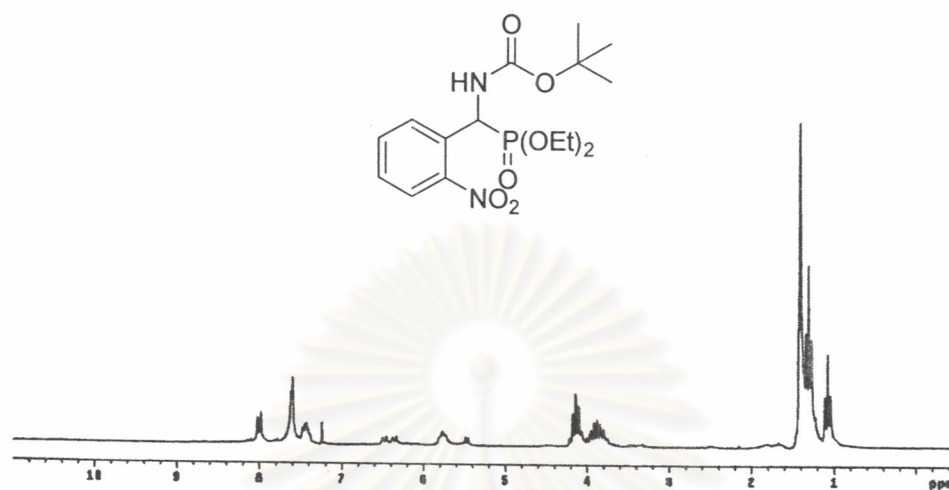
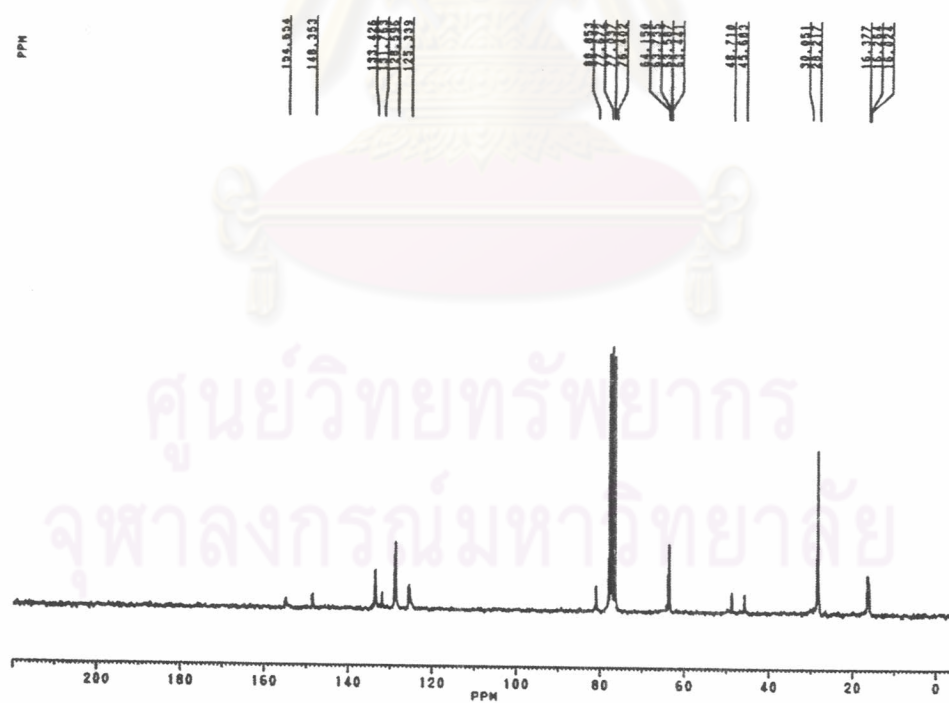
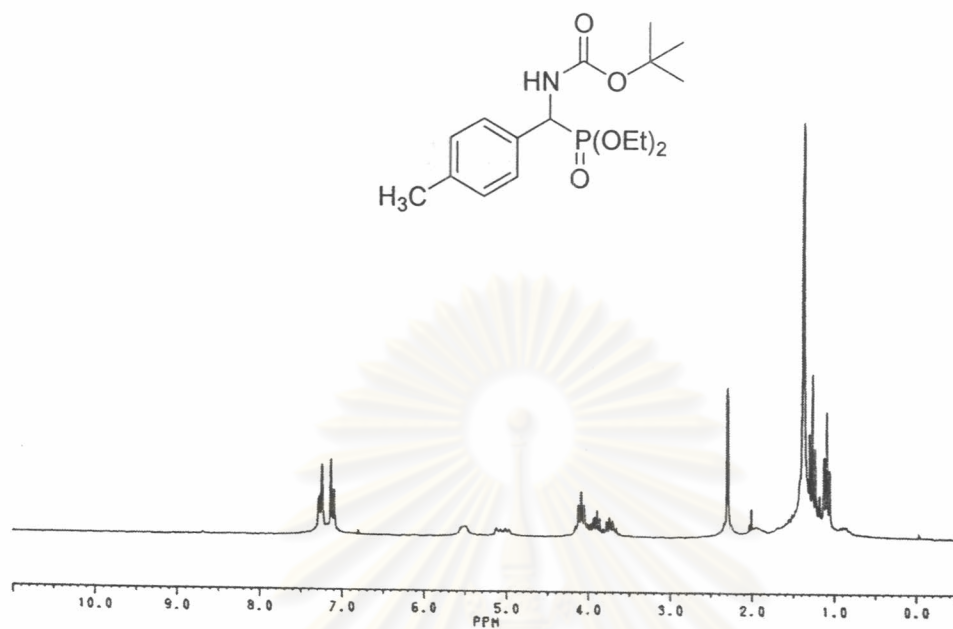
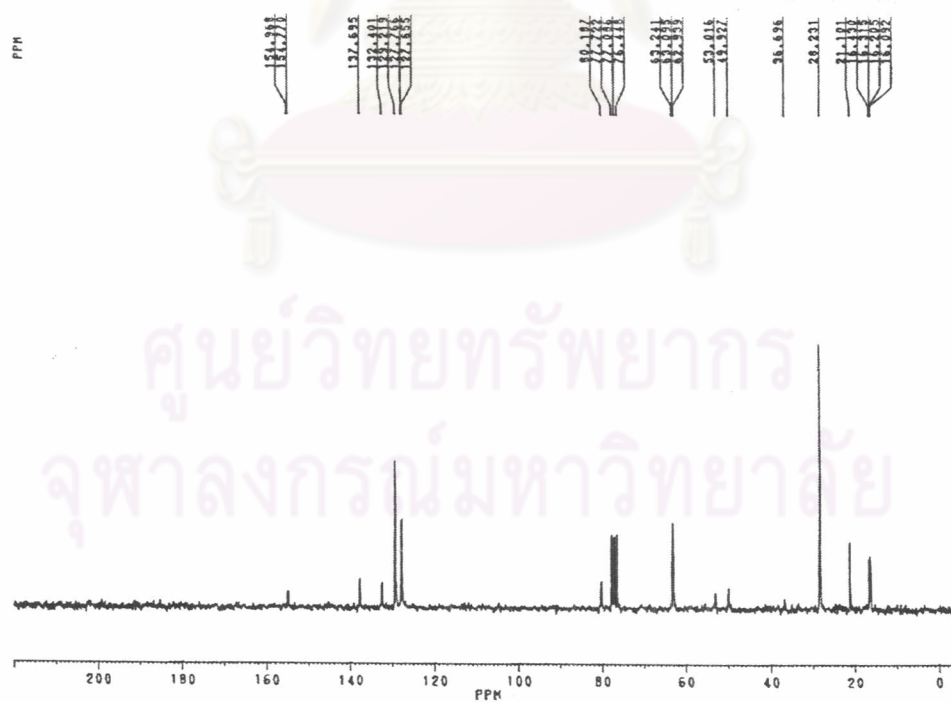
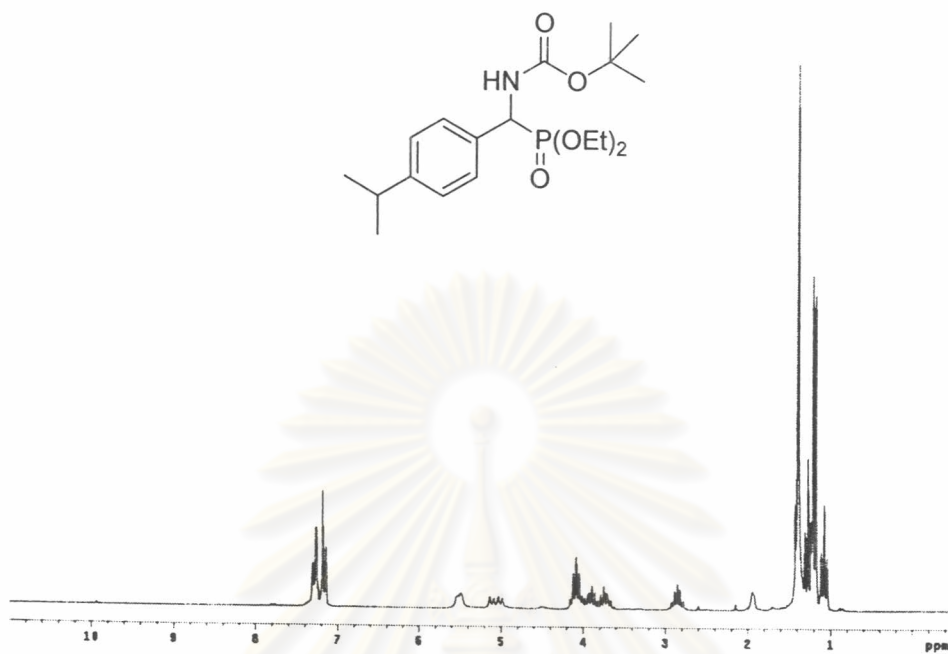
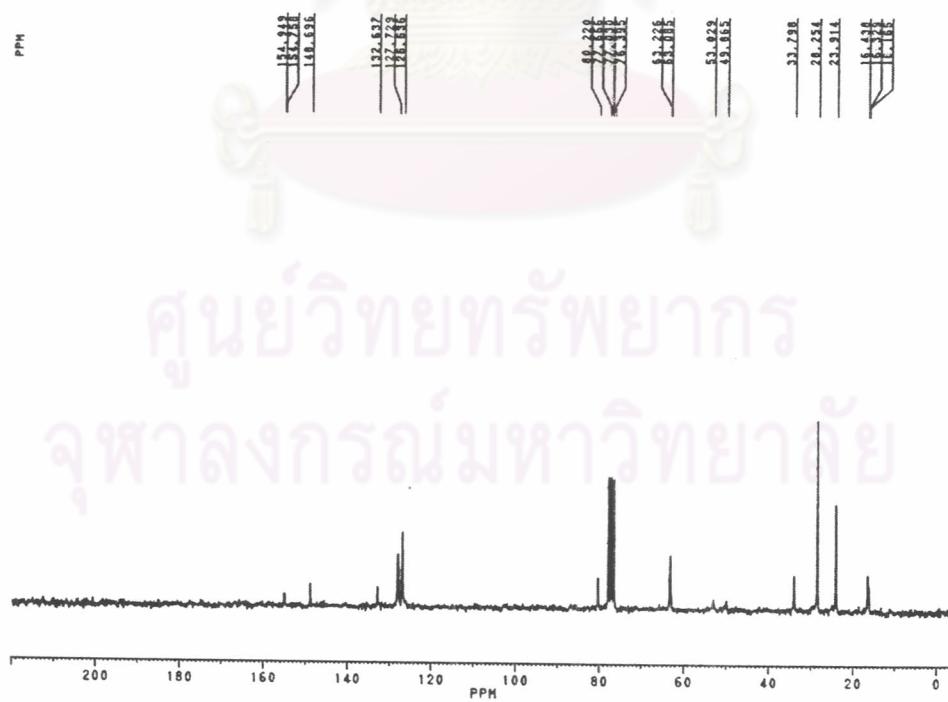


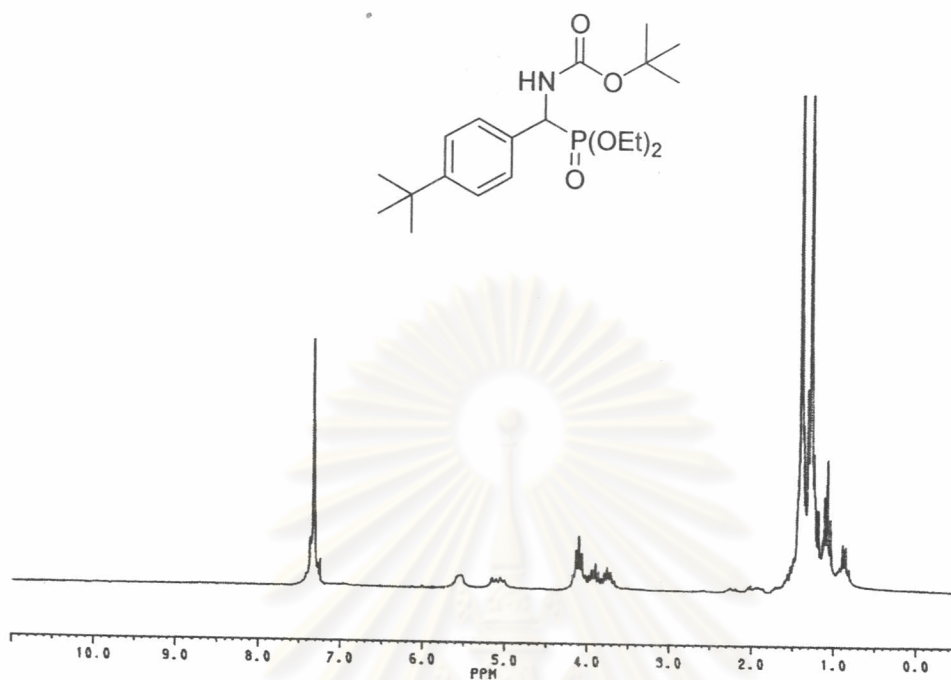
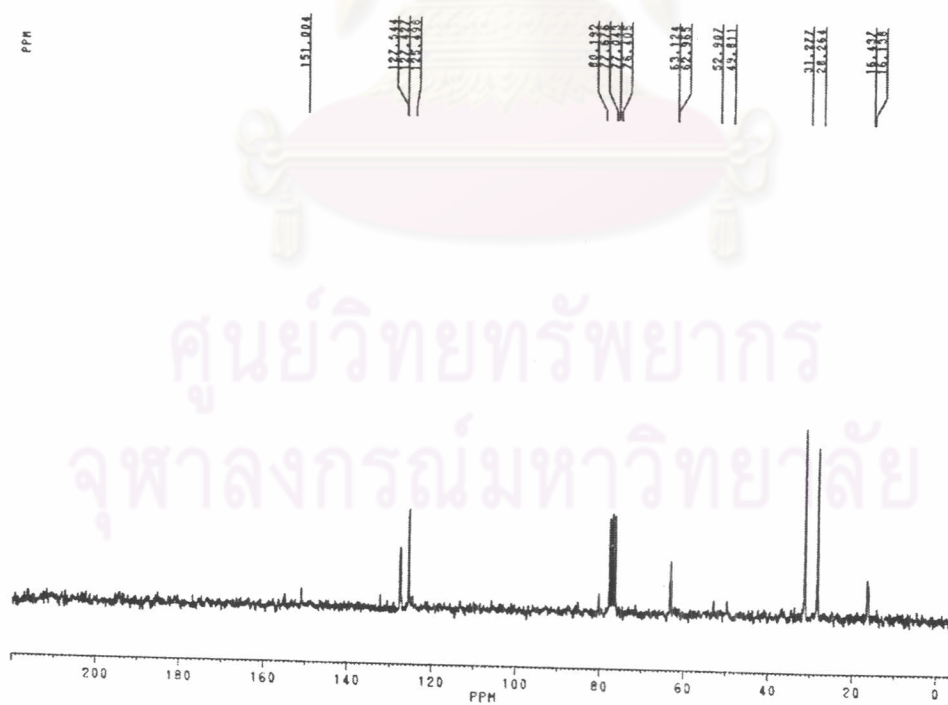
Figure 55 ^{13}C NMR spectrum of VIII-6

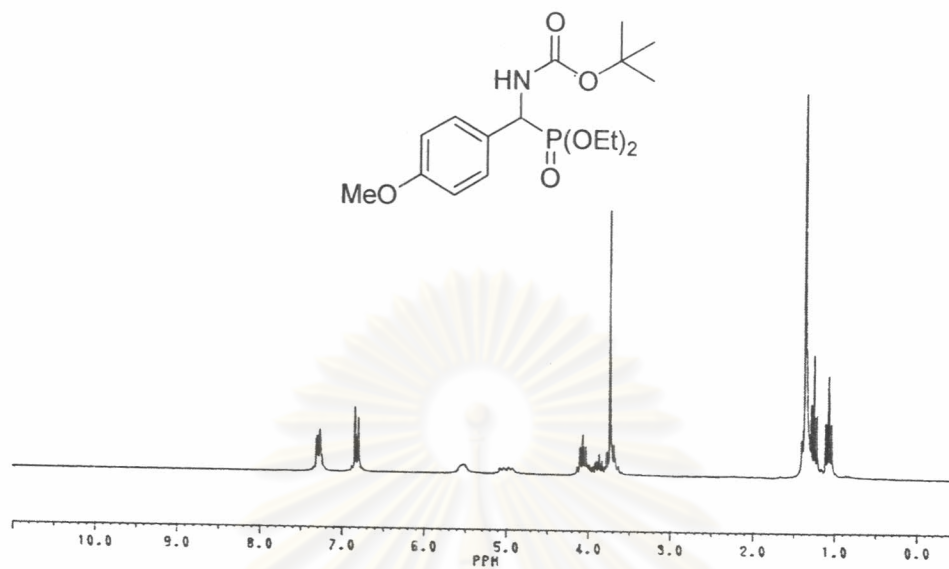
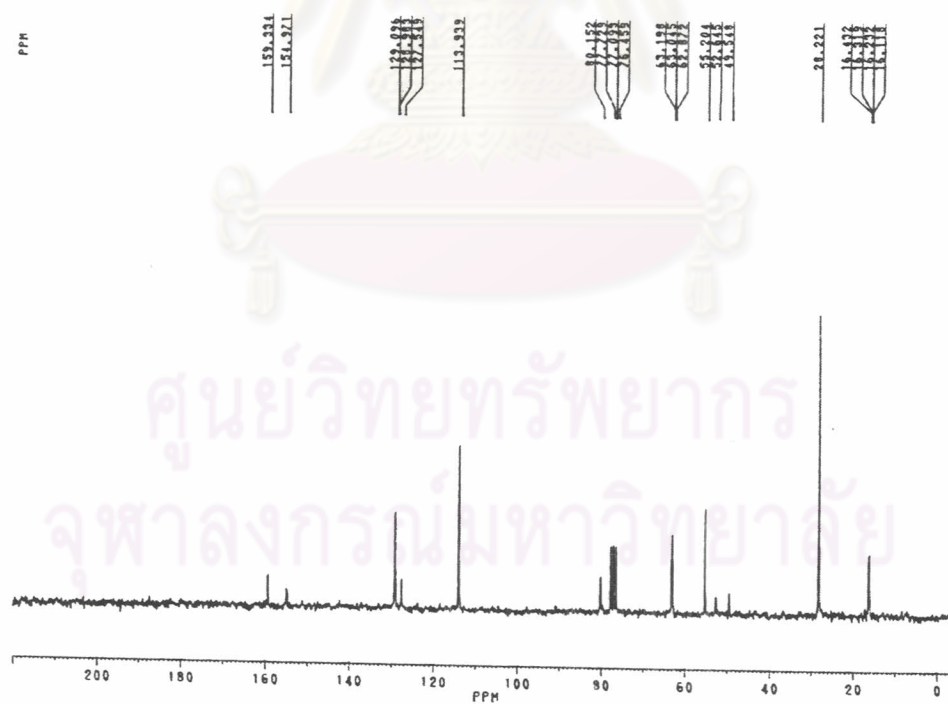
Figure 56 ¹H NMR spectrum of VIII-7Figure 57 ¹³C NMR spectrum of VIII-7

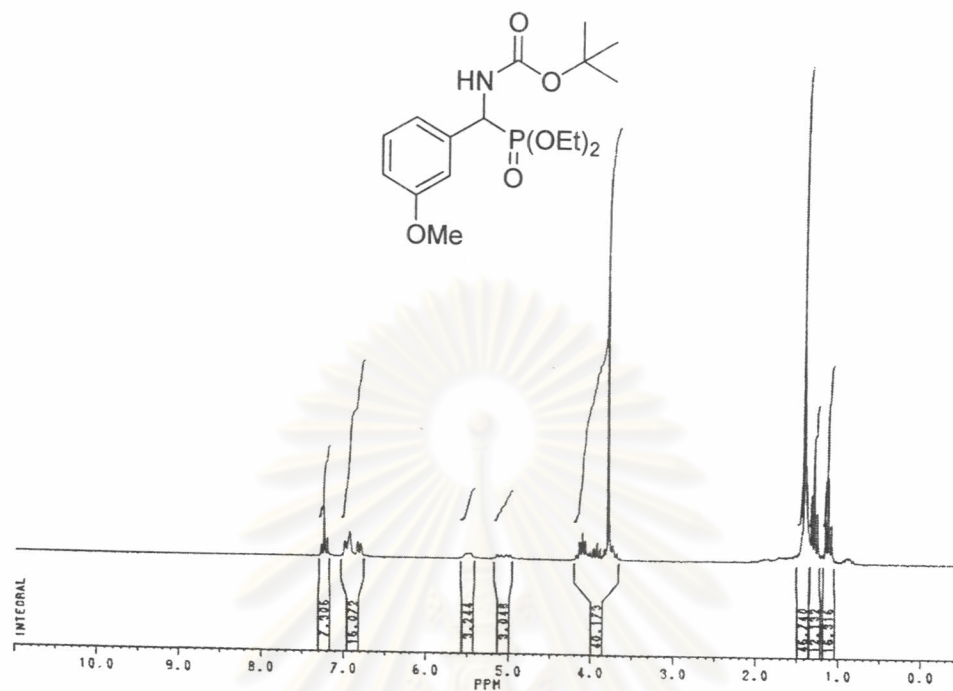
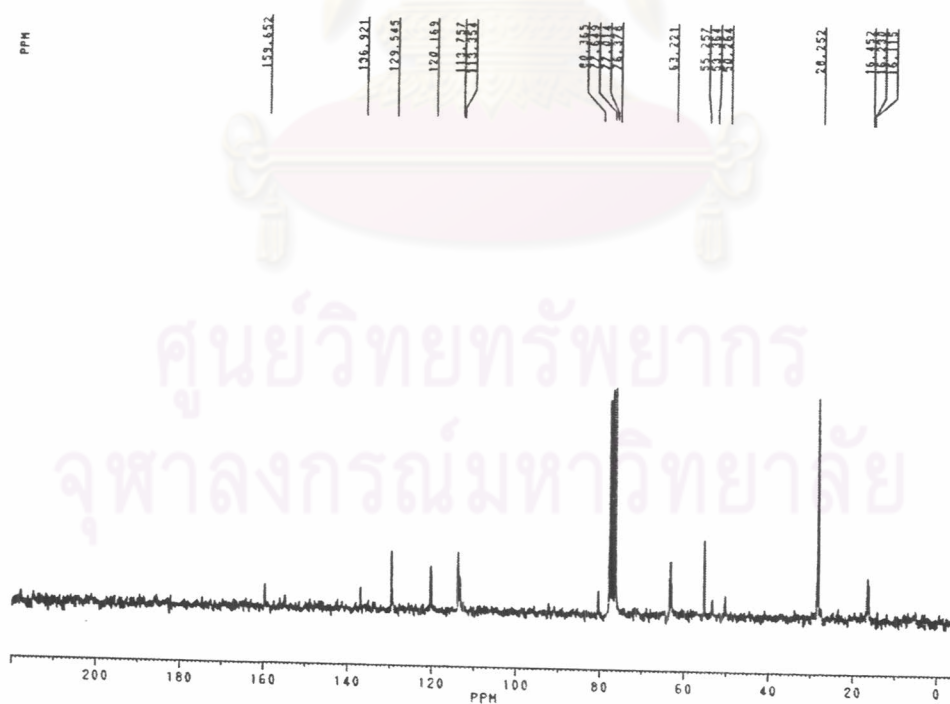
Figure 58 ^1H NMR spectrum of VIII-8Figure 59 ^{13}C NMR spectrum of VIII-8

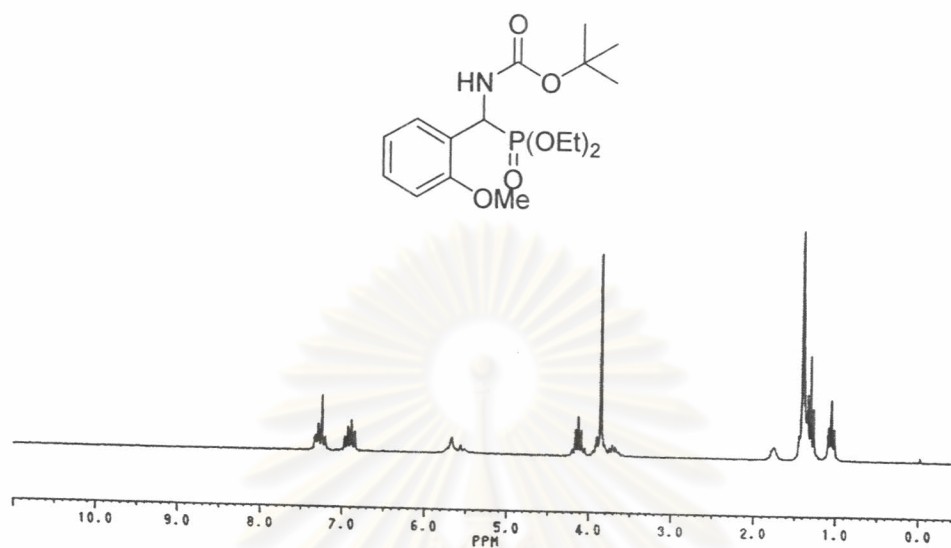
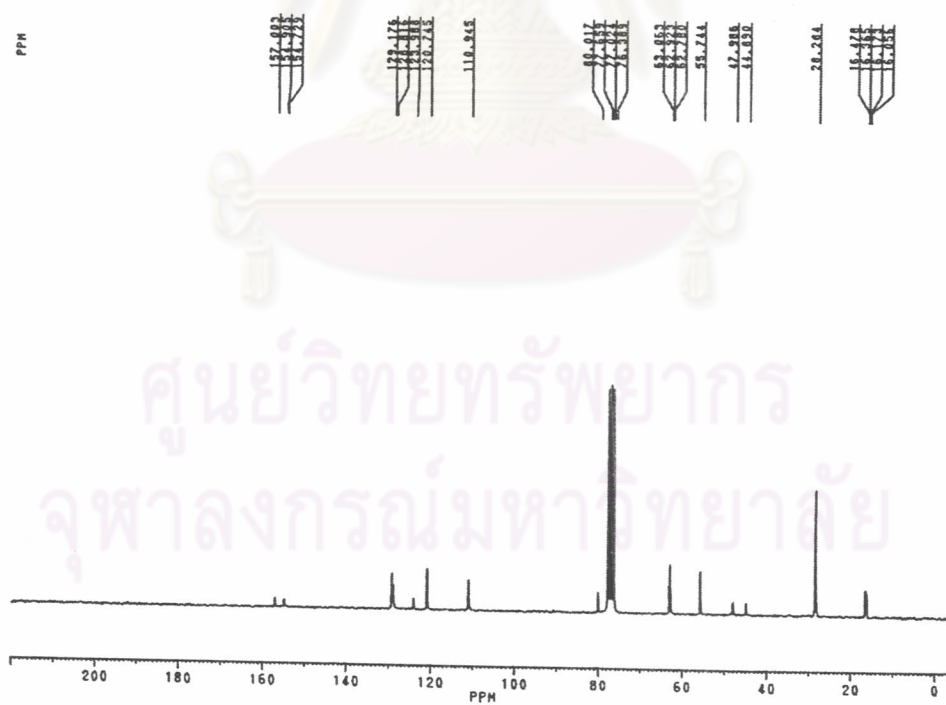
Figure 60 ¹H NMR spectrum of VIII-9Figure 61 ¹³C NMR spectrum of VIII-9

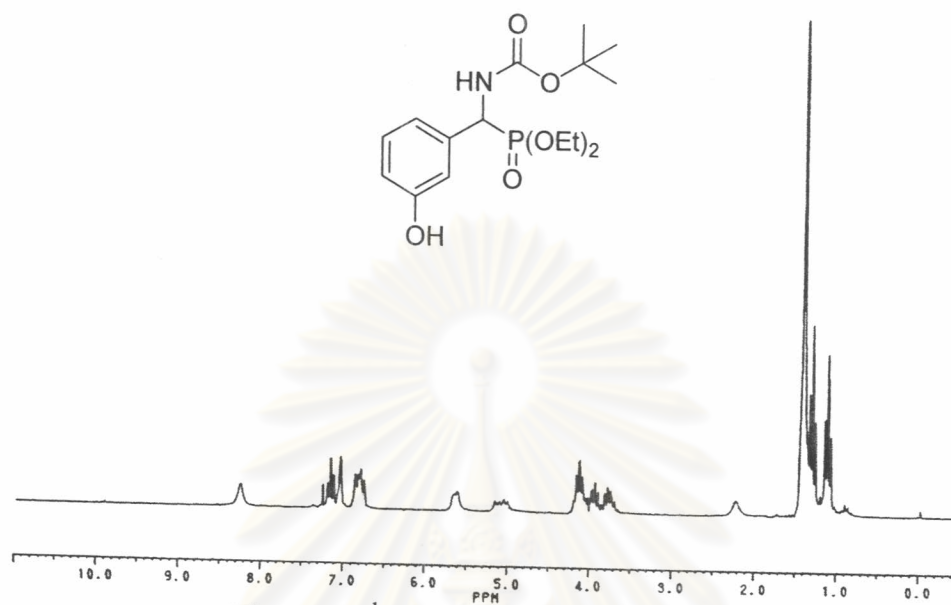
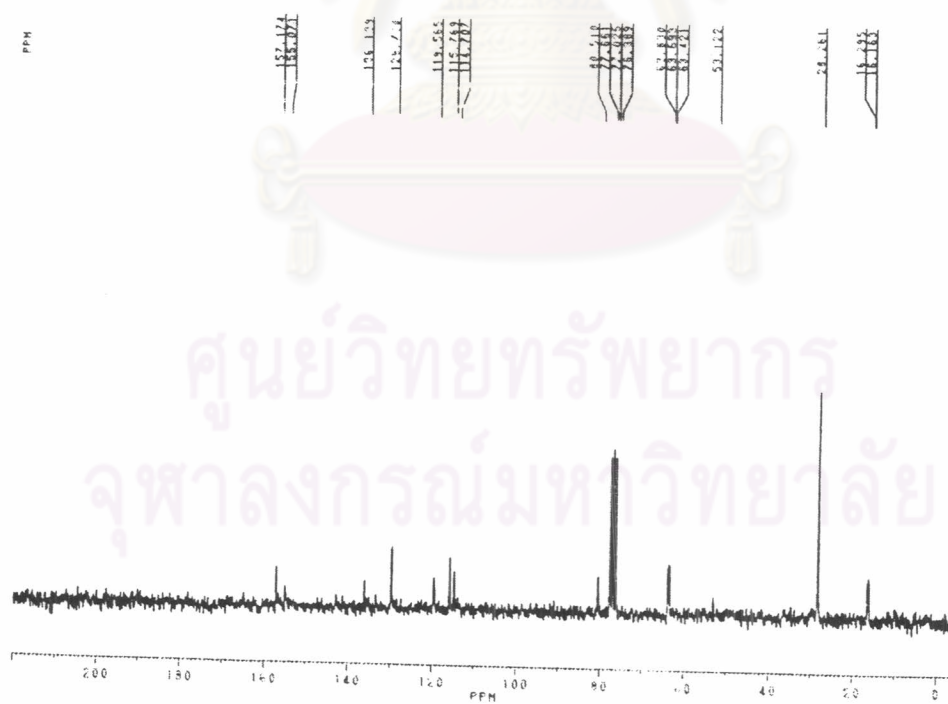
Figure 62 ^1H NMR spectrum of VIII-10Figure 63 ^{13}C NMR spectrum of VIII-10

Figure 64 ^1H NMR spectrum of VIII-11Figure 65 ^{13}C NMR spectrum of VIII-11

Figure 66 ¹H NMR spectrum of VIII-12Figure 67 ¹³C NMR spectrum of VIII-12

Figure 68 $^1\text{H NMR}$ spectrum of VIII-13Figure 69 $^{13}\text{C NMR}$ spectrum of VIII-13

Figure 70 $^1\text{H NMR}$ spectrum of VIII-14Figure 71 $^{13}\text{C NMR}$ spectrum of VIII-14

Figure 72 ¹H NMR spectrum of VIII-15Figure 73 ¹³C NMR spectrum of VIII-15

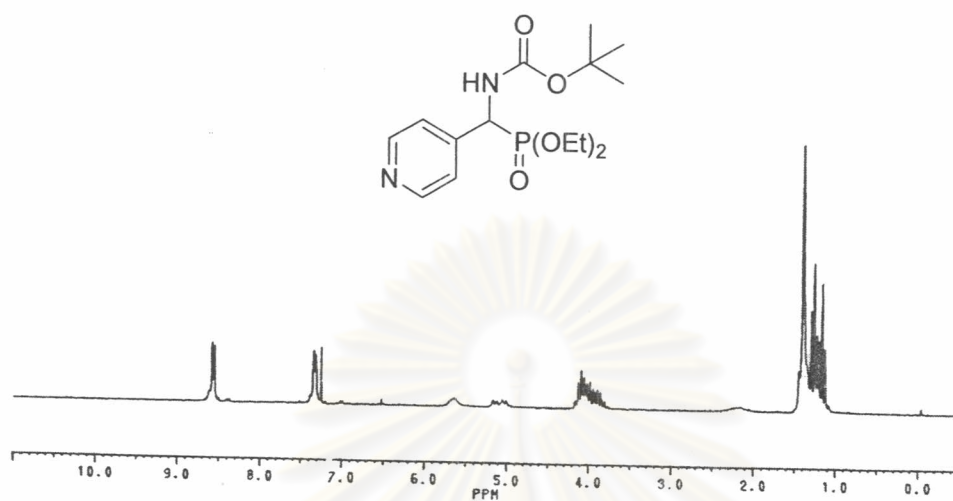


Figure 74 ¹H NMR spectrum of VIII-16

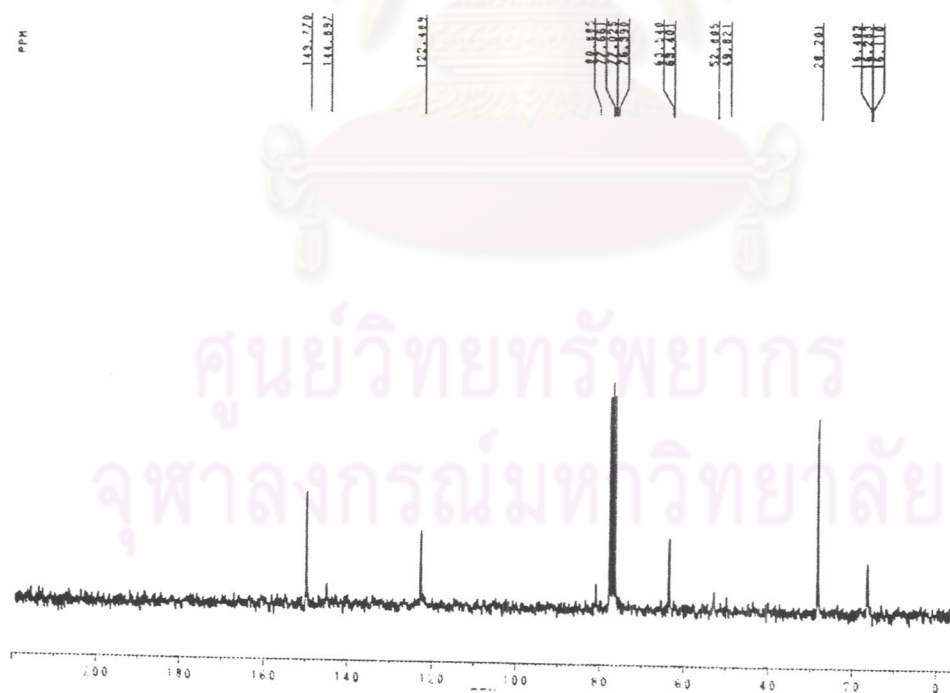
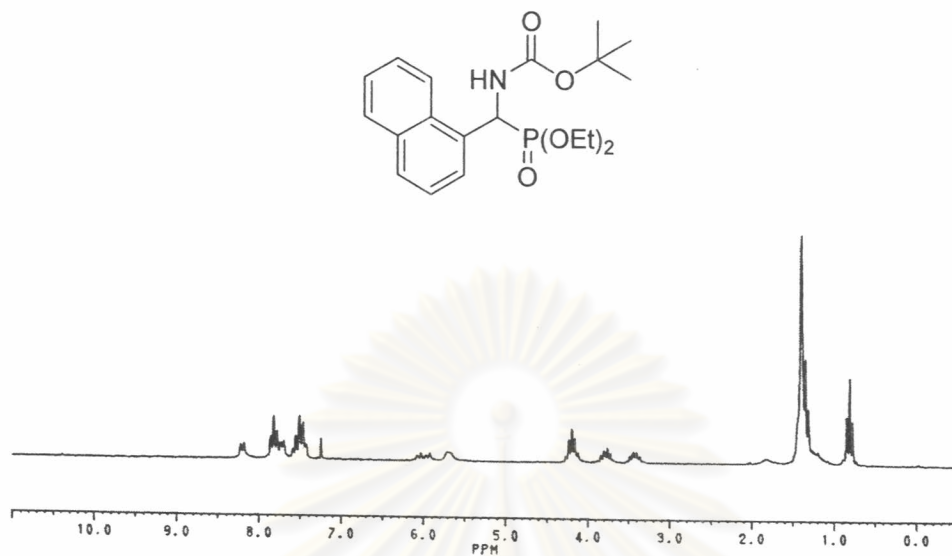
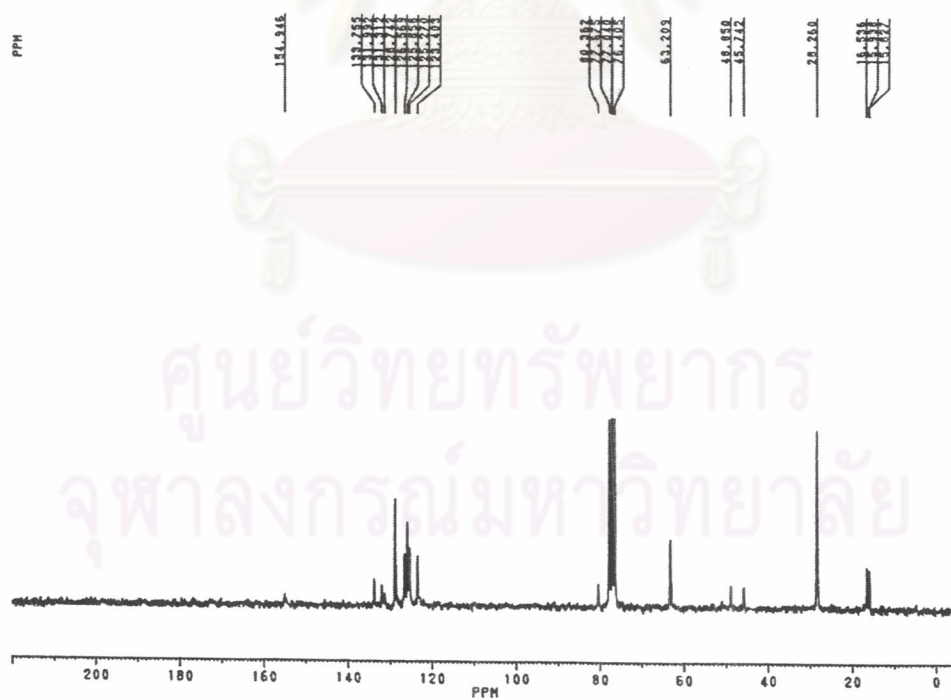
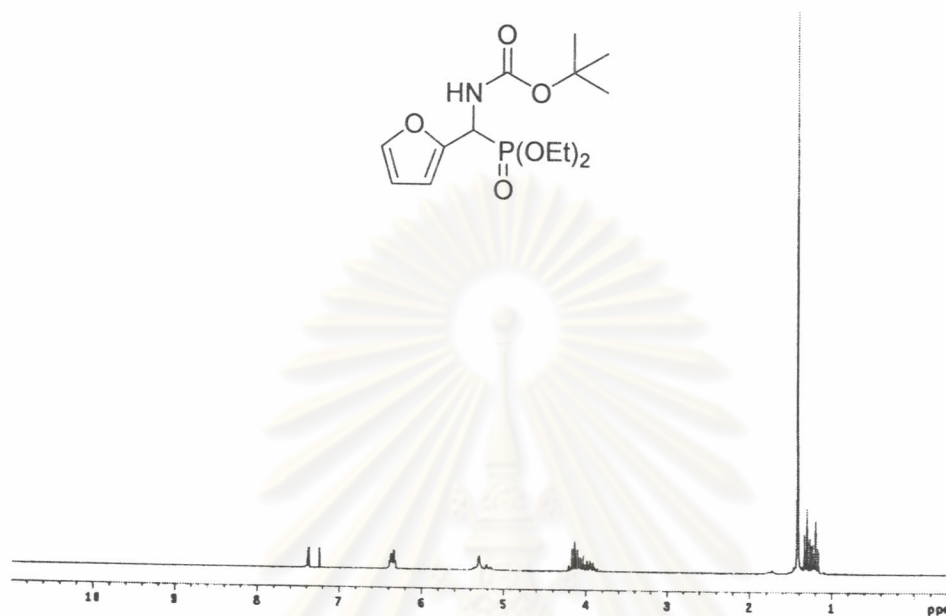
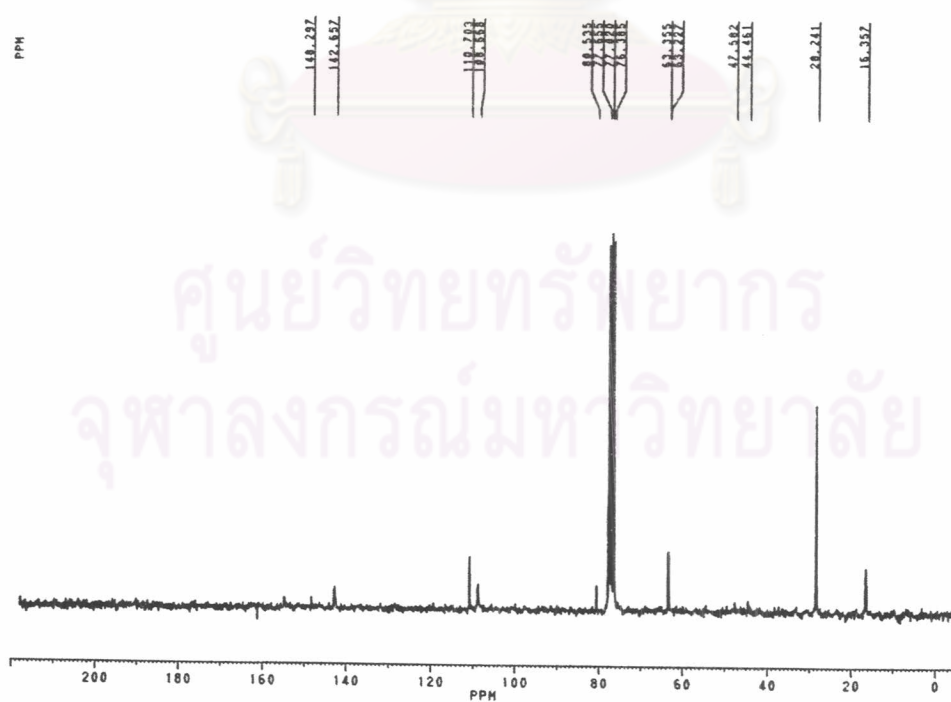


Figure 75 ¹³C NMR spectrum of VIII-16

Figure 78 ^1H NMR spectrum of VIII-18

Figure 80 ¹H NMR spectrum of VIII-19Figure 81 ¹³C NMR spectrum of VIII-19

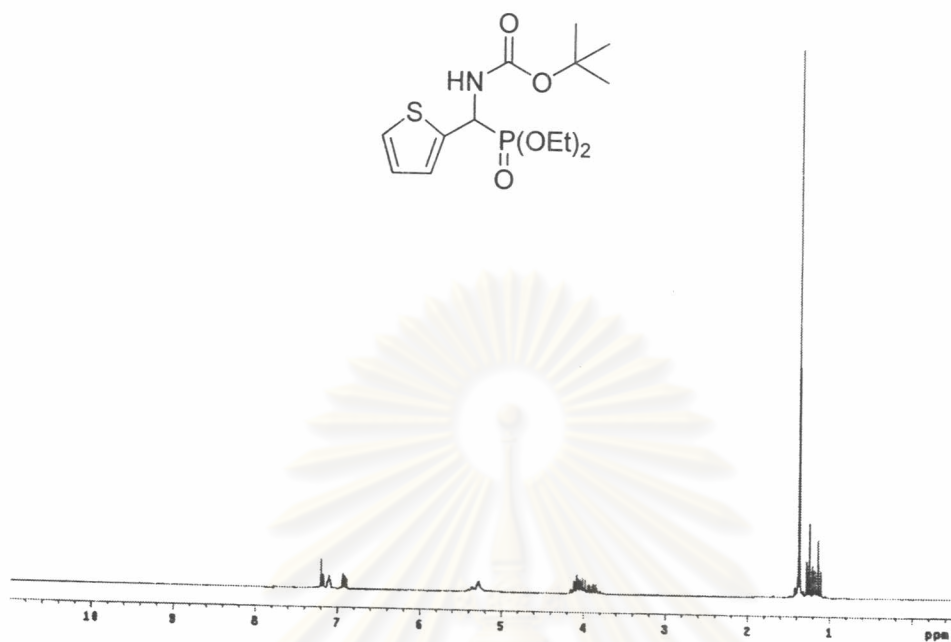


Figure 82 ^1H NMR spectrum of VIII-20

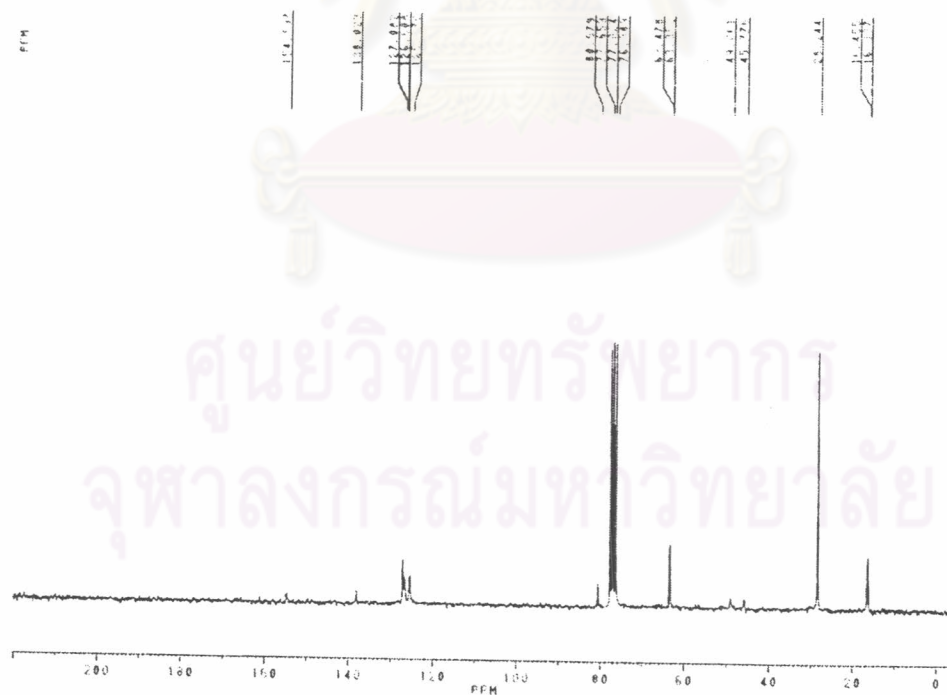
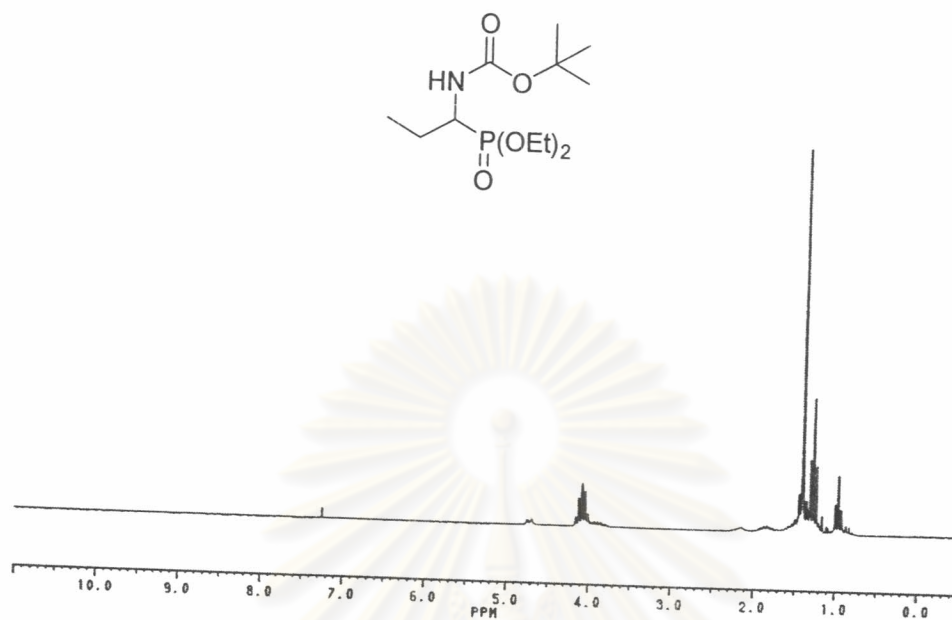
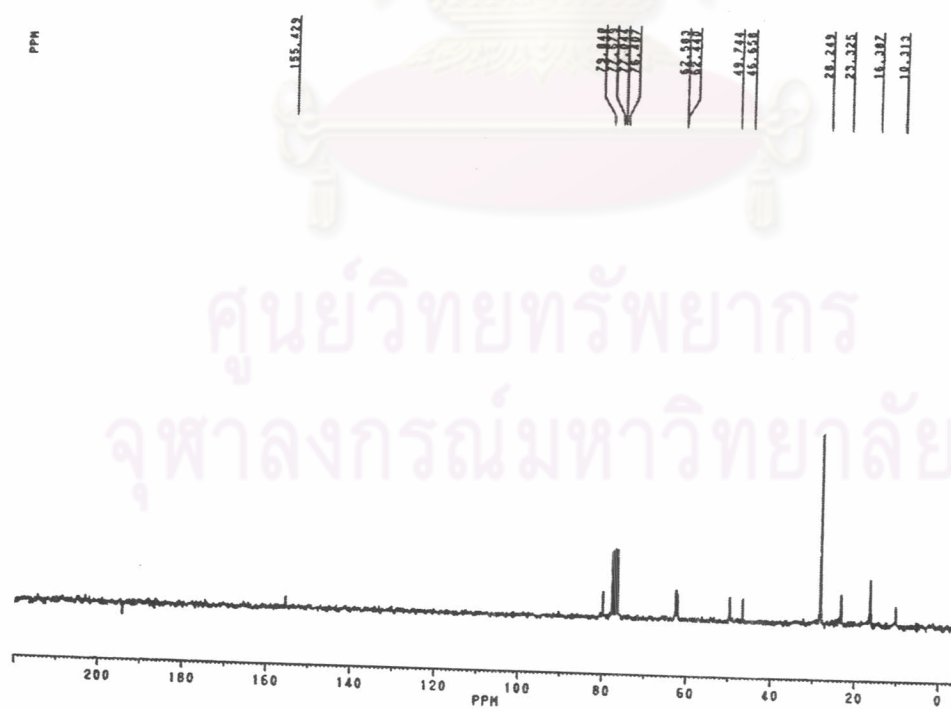


Figure 83 ^{13}C NMR spectrum of VIII-20

Figure 84 ^1H NMR spectrum of VIII-21Figure 85 ^{13}C NMR spectrum of VIII-21

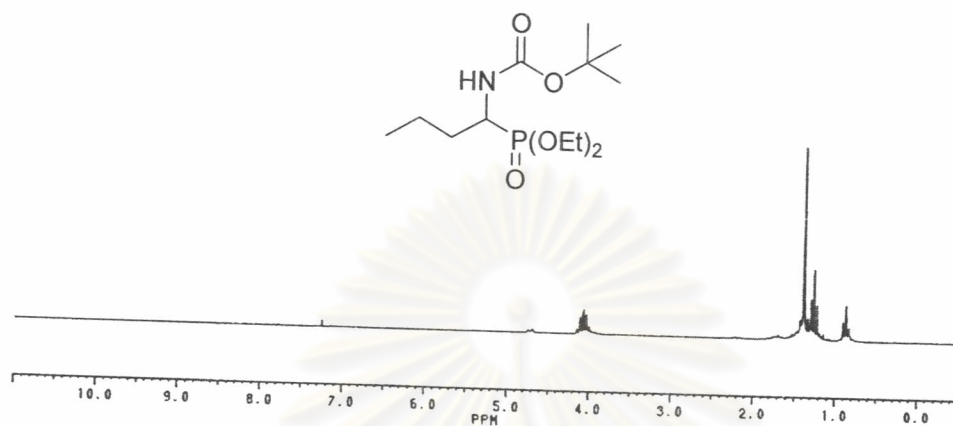


Figure 86 ¹H NMR spectrum of VIII-22

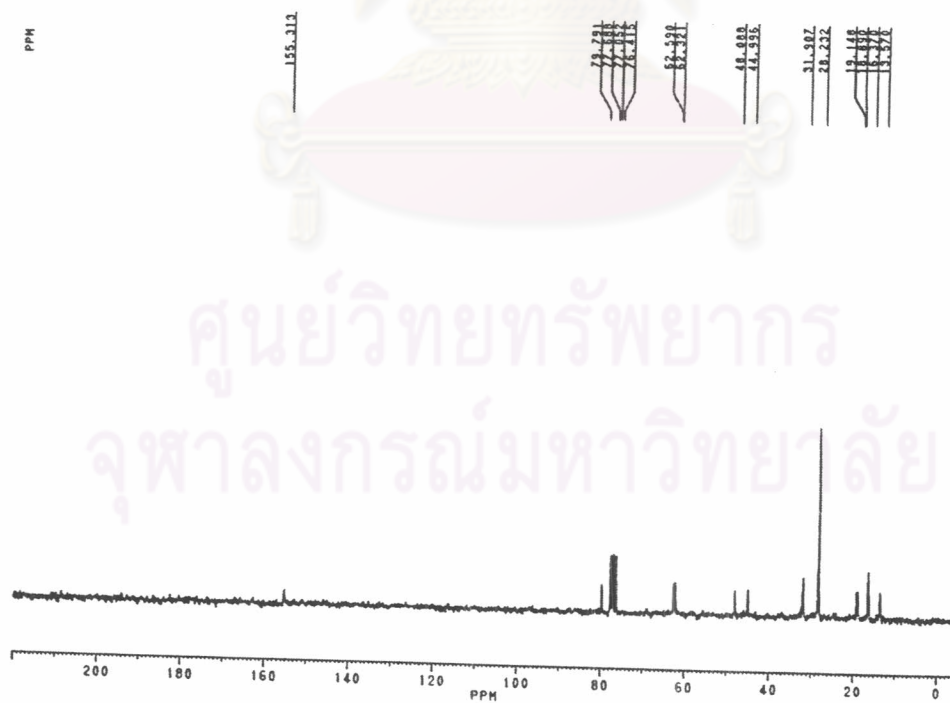
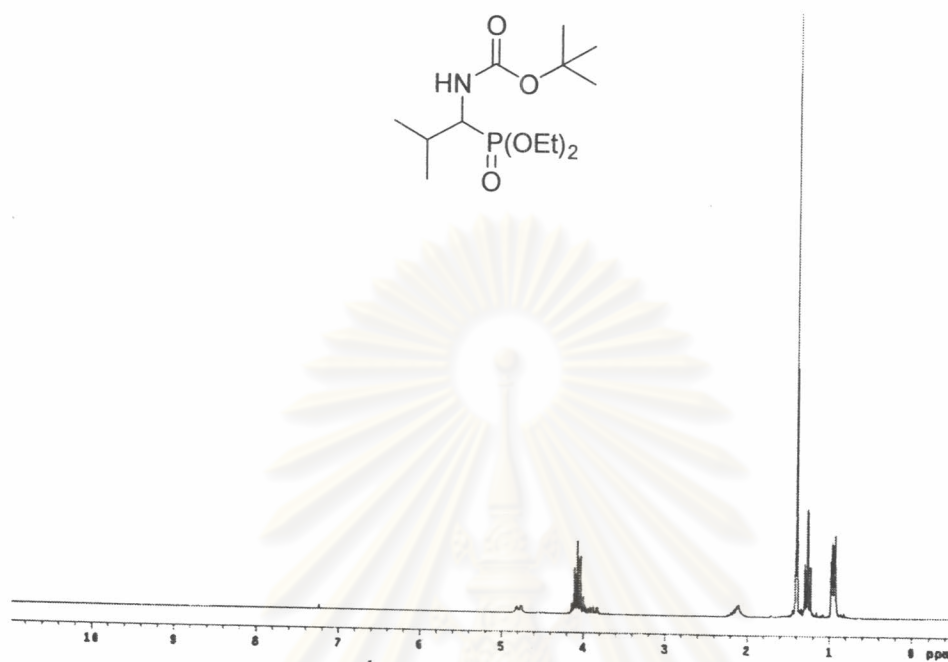
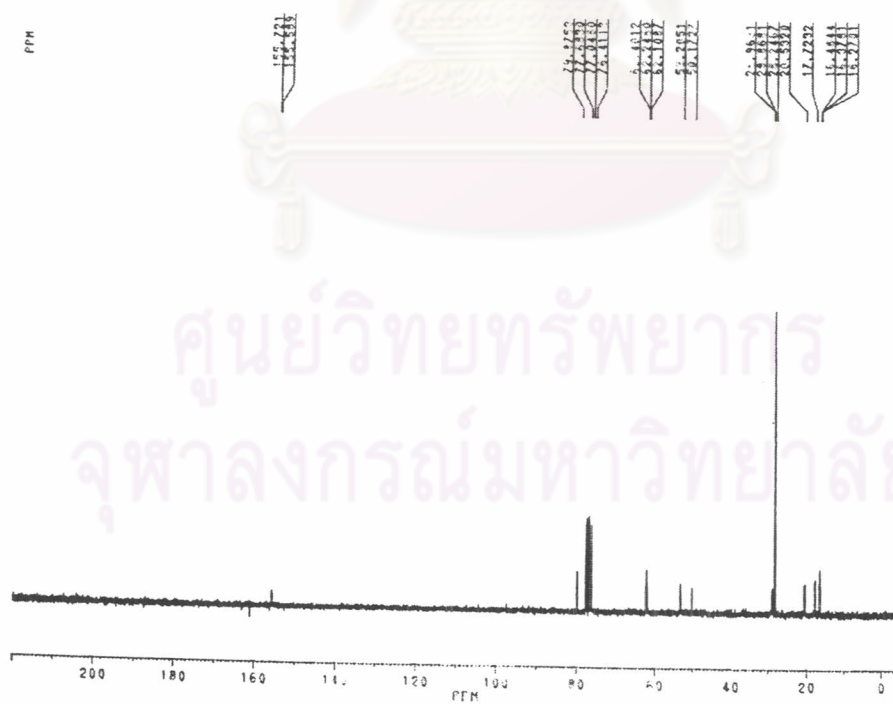
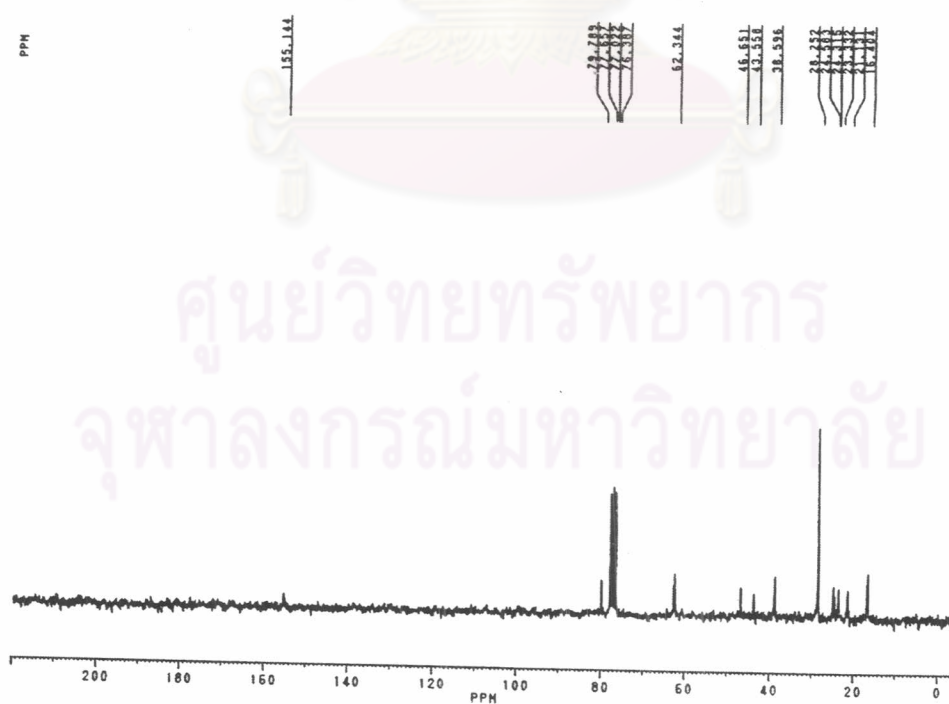
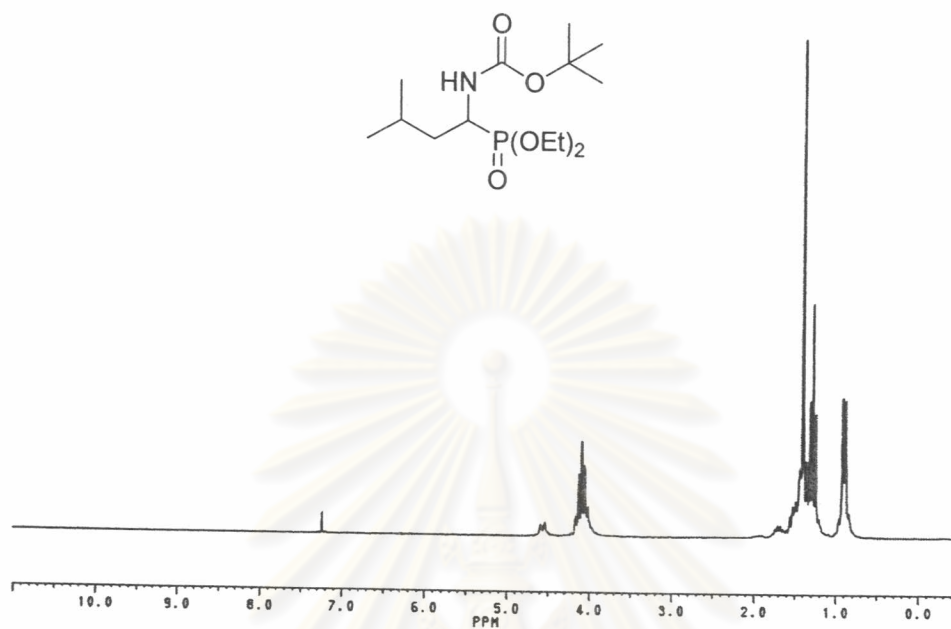
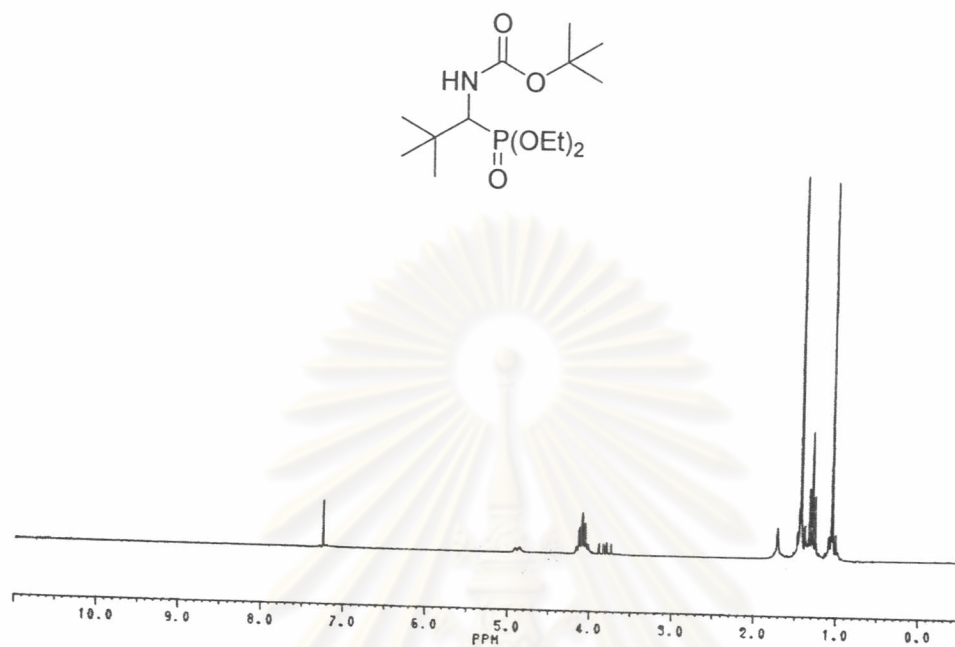
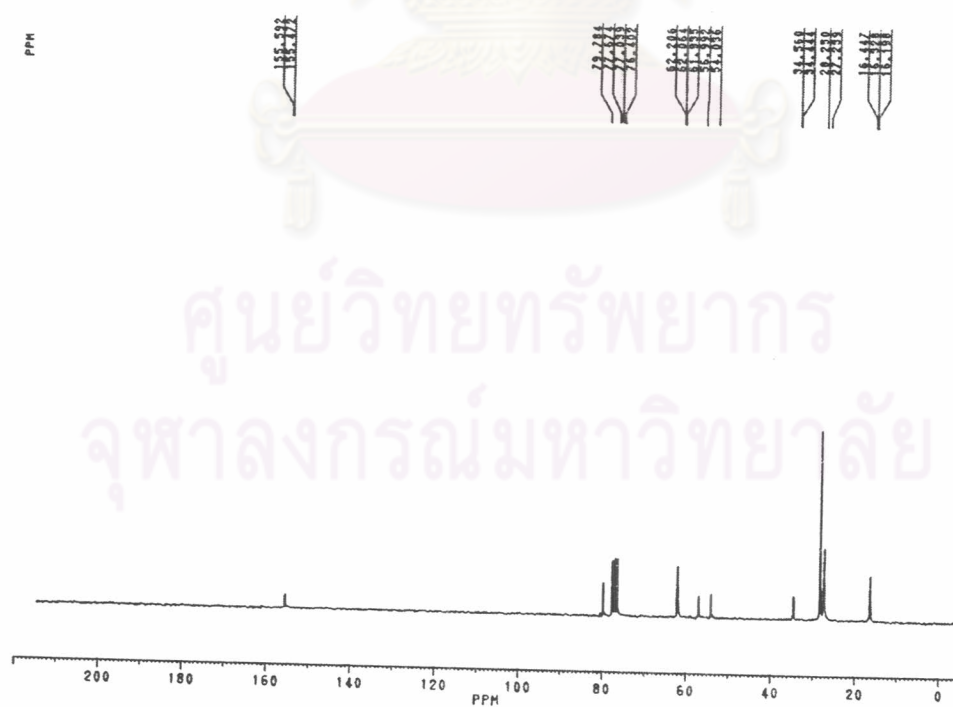


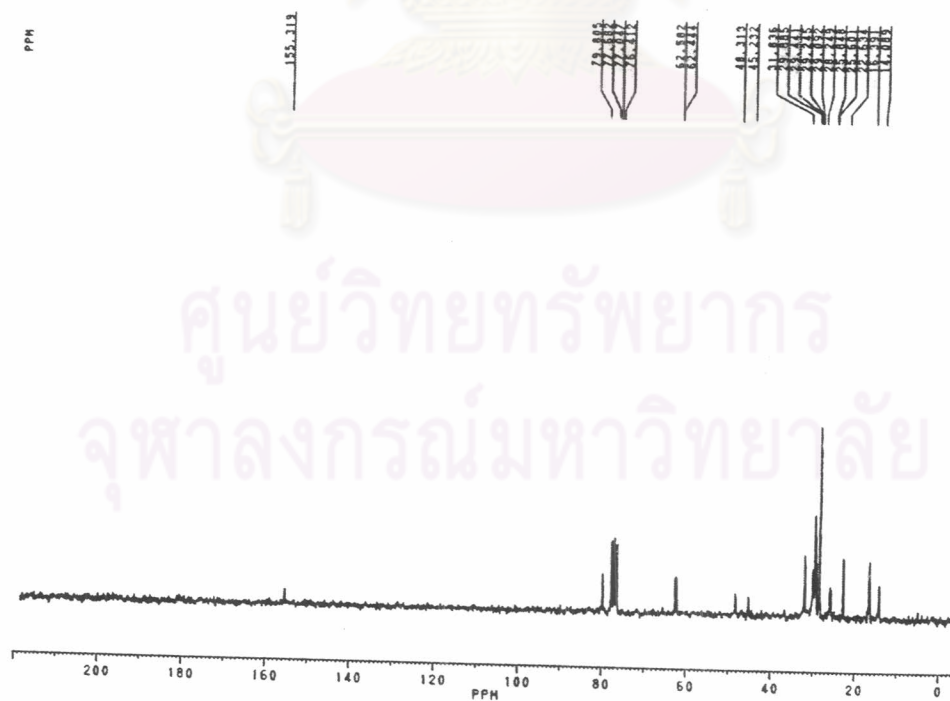
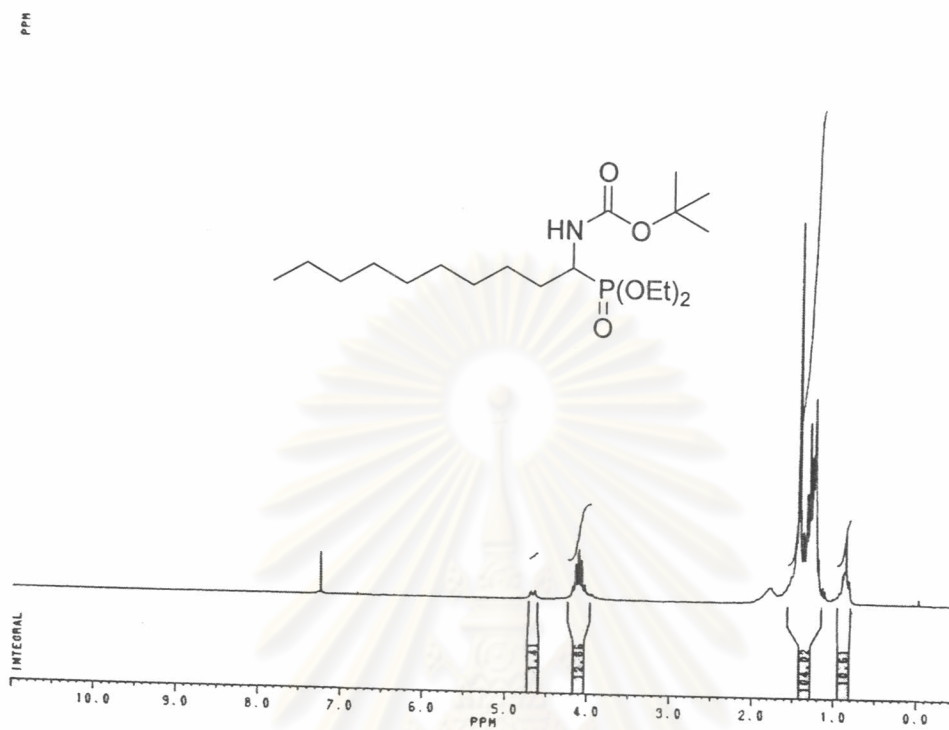
Figure 87 ¹³C NMR spectrum of VIII-22

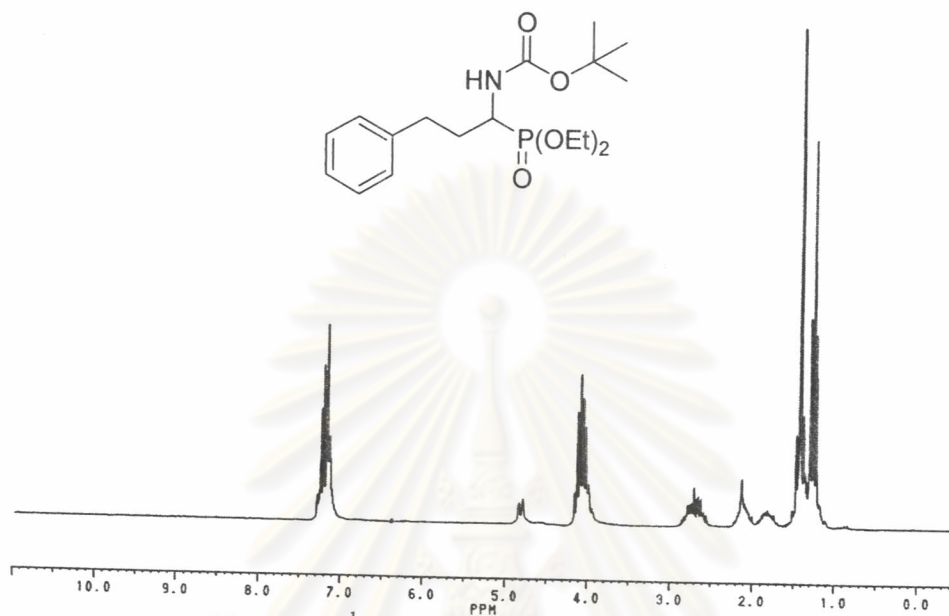
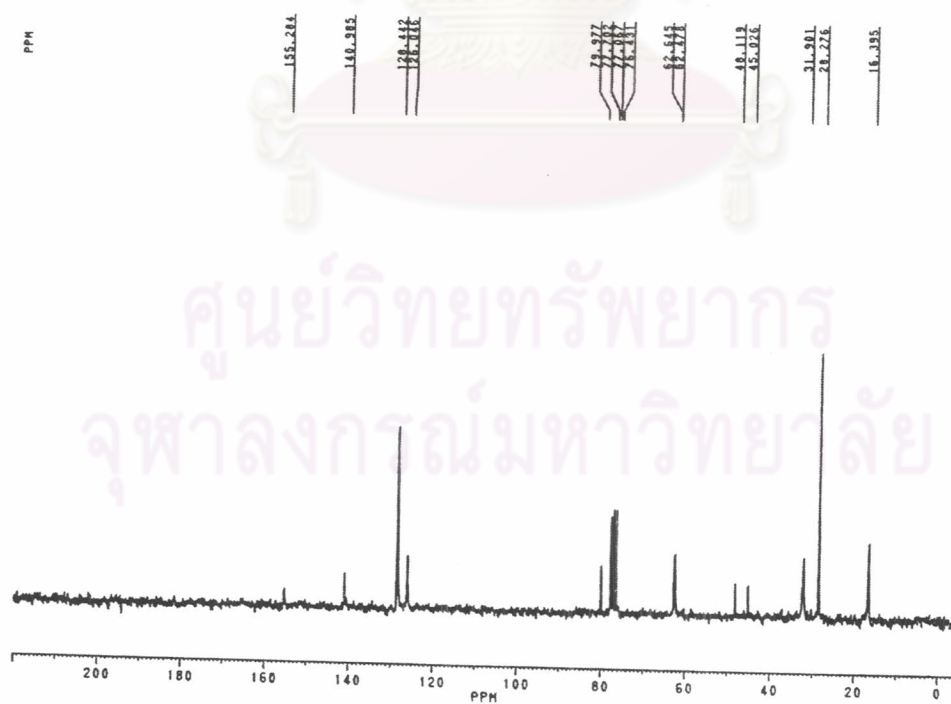
Figure 88 ¹H NMR spectrum of VIII-23

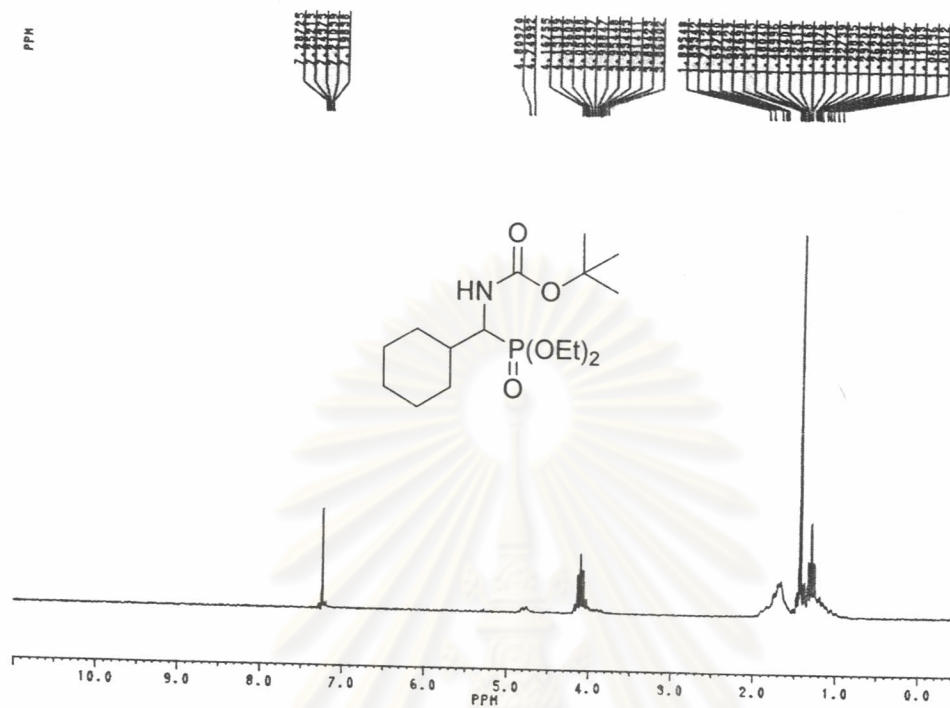
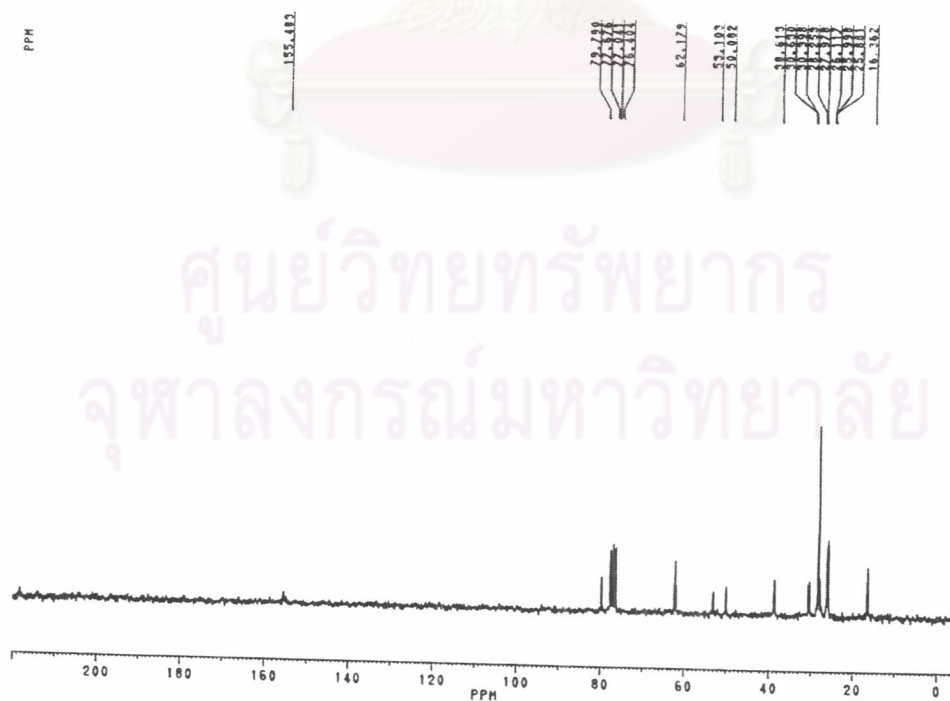


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Figure 94 ^1H NMR spectrum of VIII-26Figure 95 ^{13}C NMR spectrum of VIII-26



Figure 98 ^1H NMR spectrum of VIII-29Figure 99 ^{13}C NMR spectrum of VIII-29

Figure 100 ^1H NMR spectrum of VIII-30Figure 101 ^{13}C NMR spectrum of VIII-30

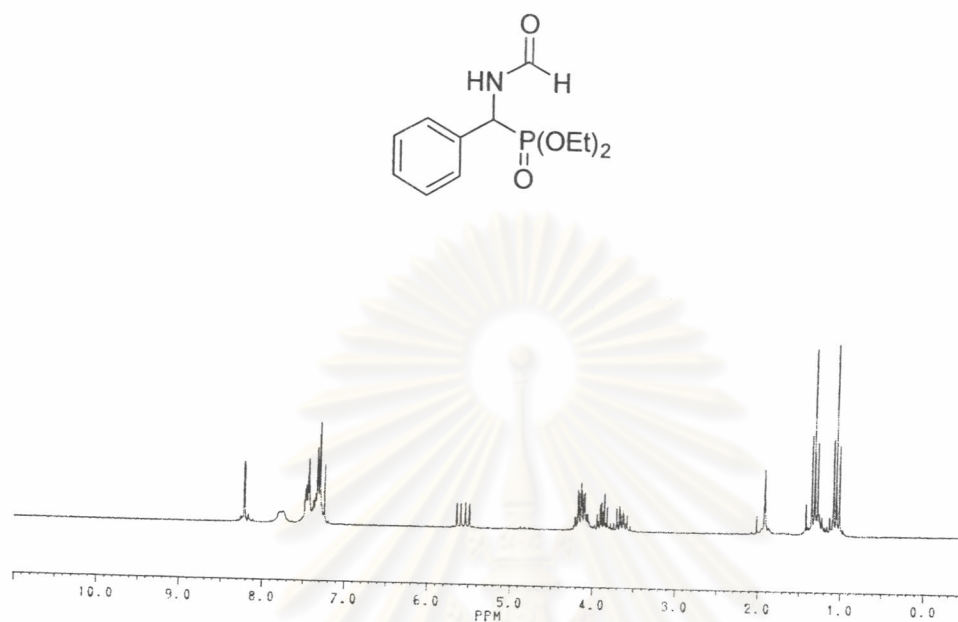


Figure 102 ¹H NMR spectrum of IX-1

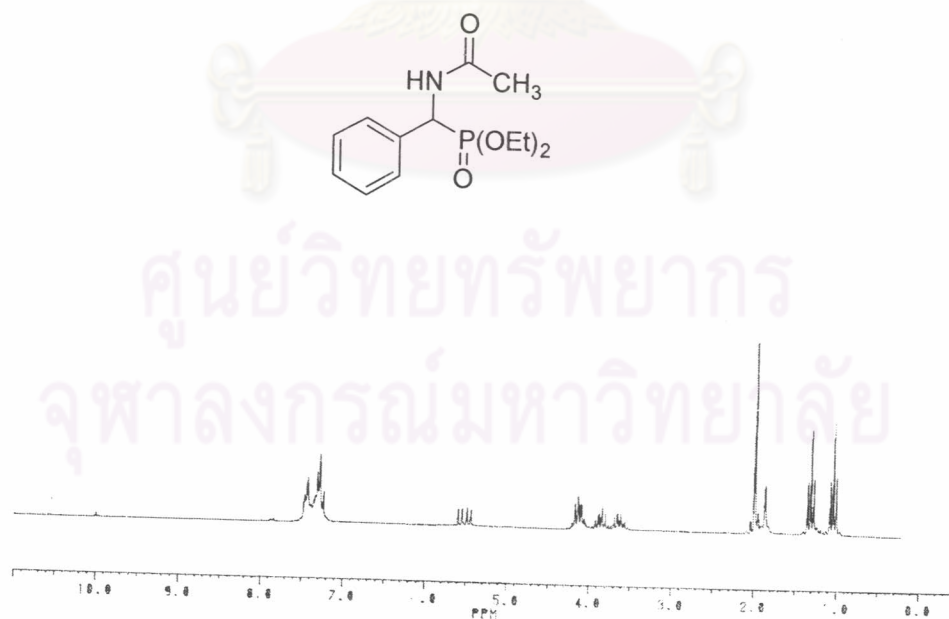
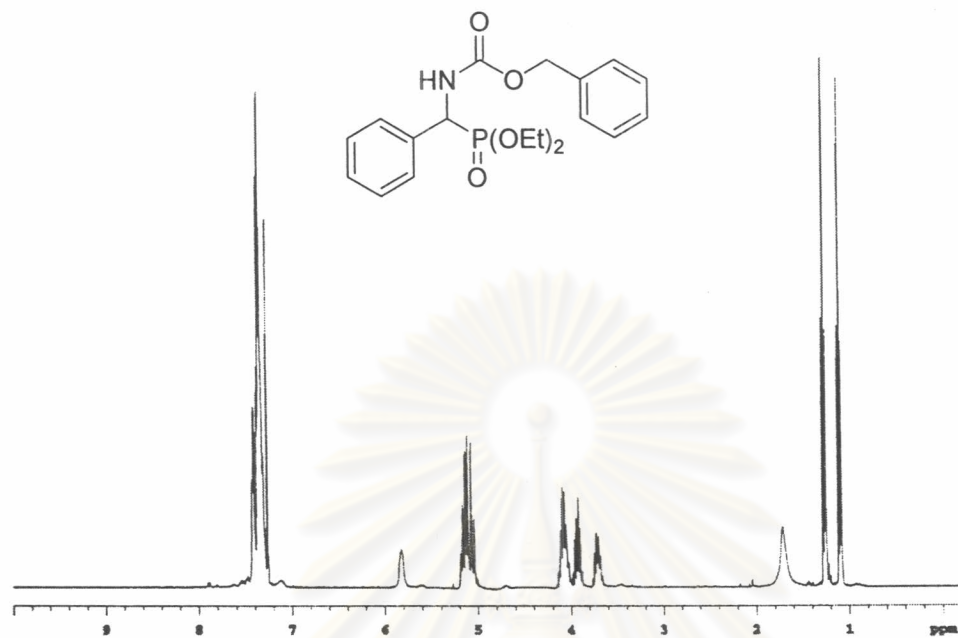
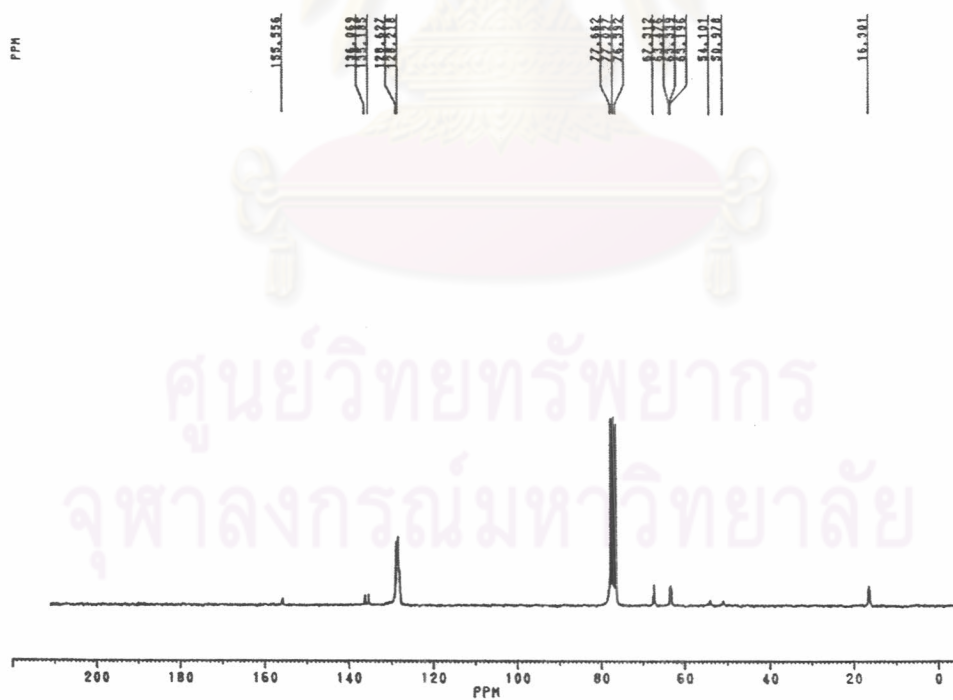
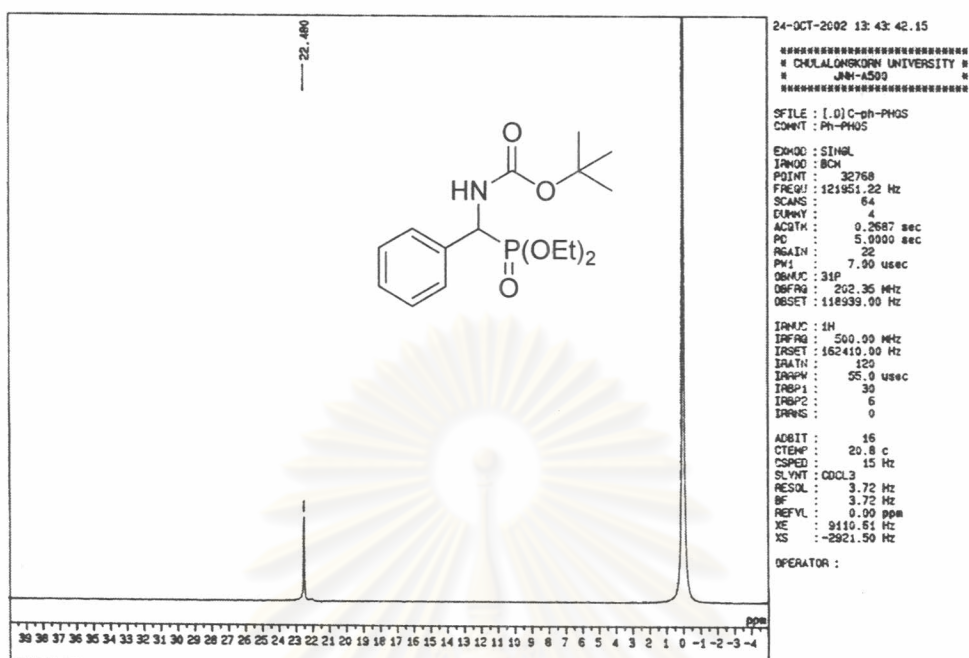
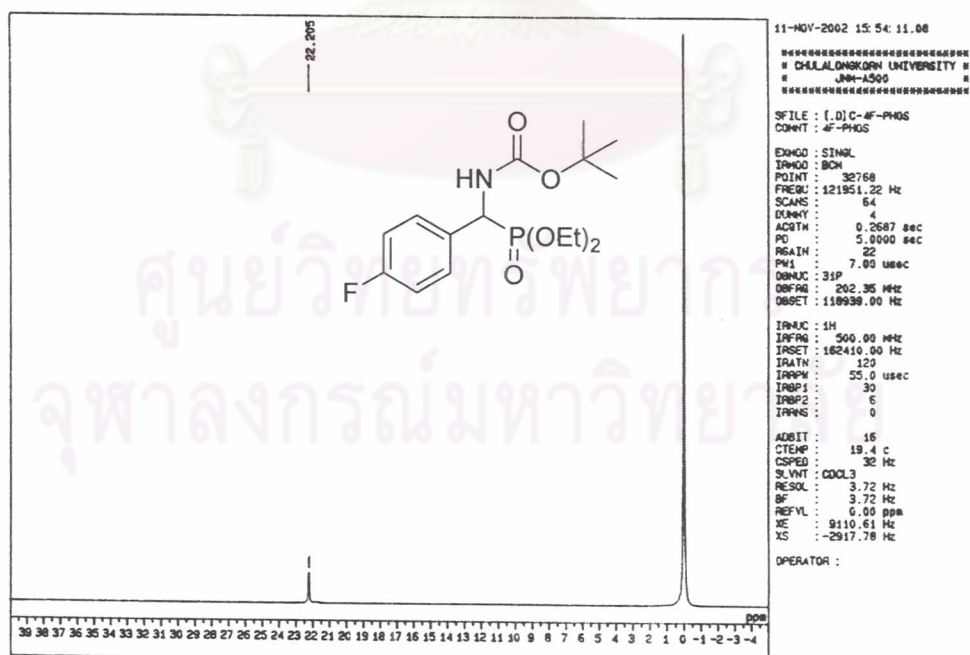
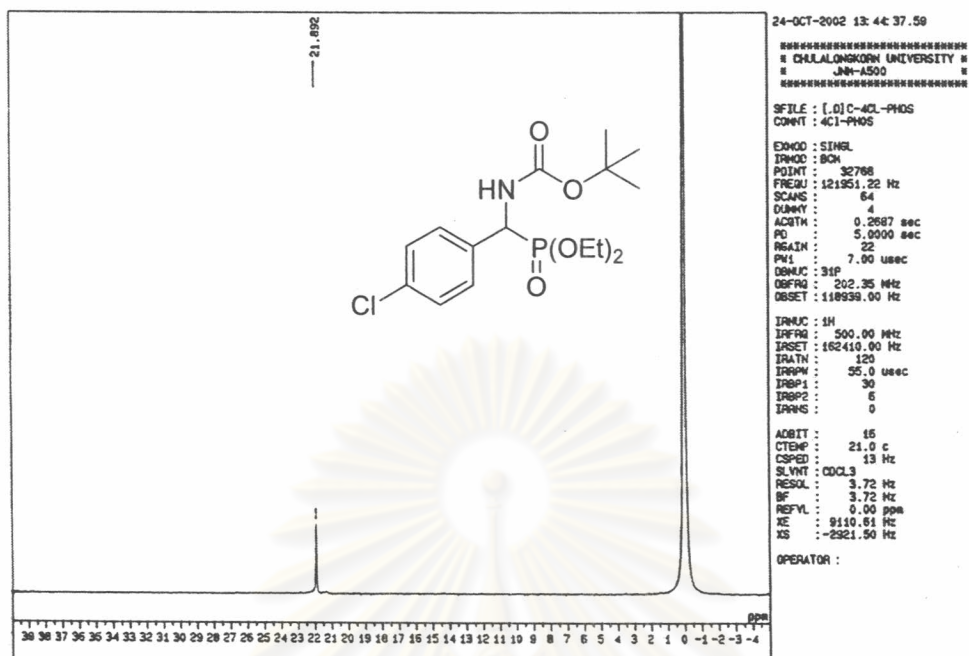
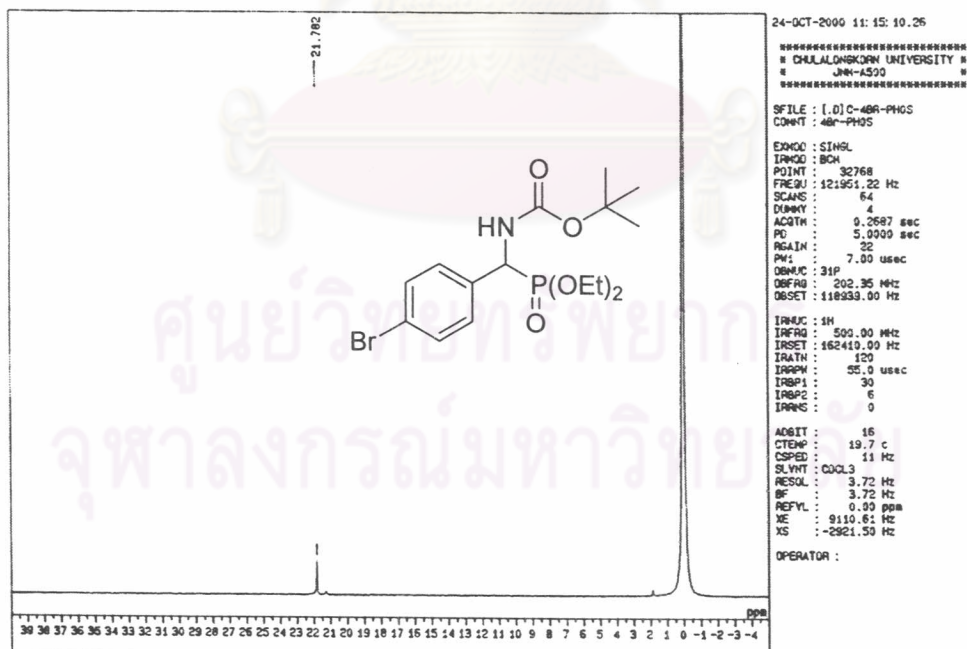
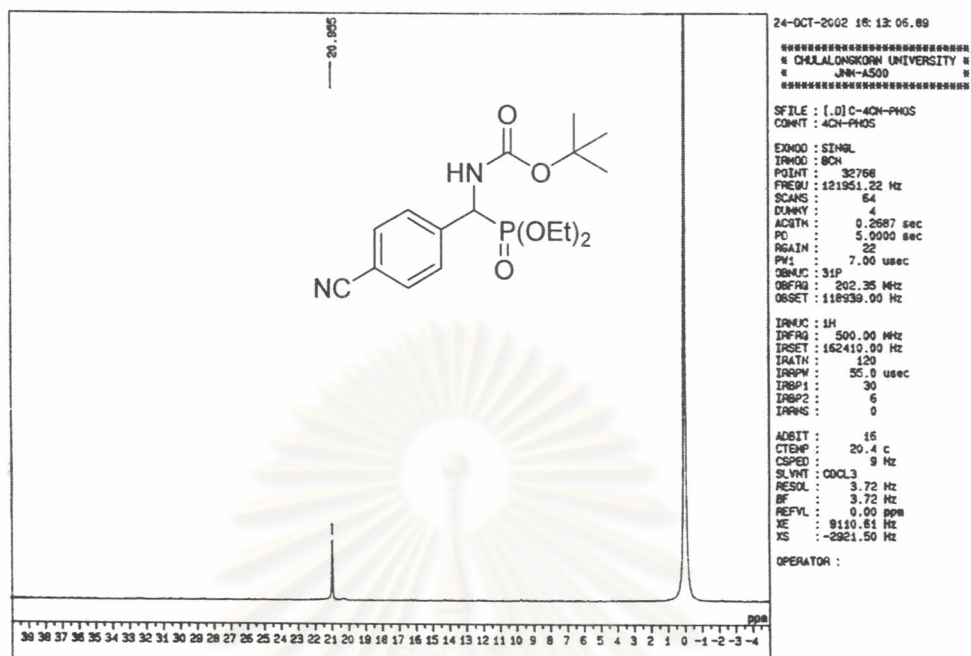
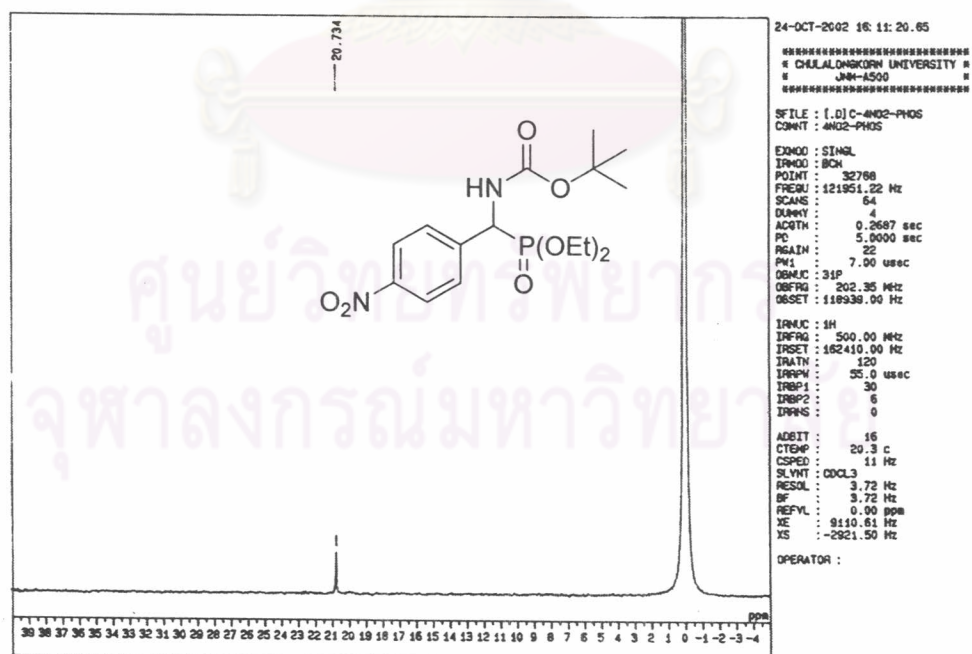


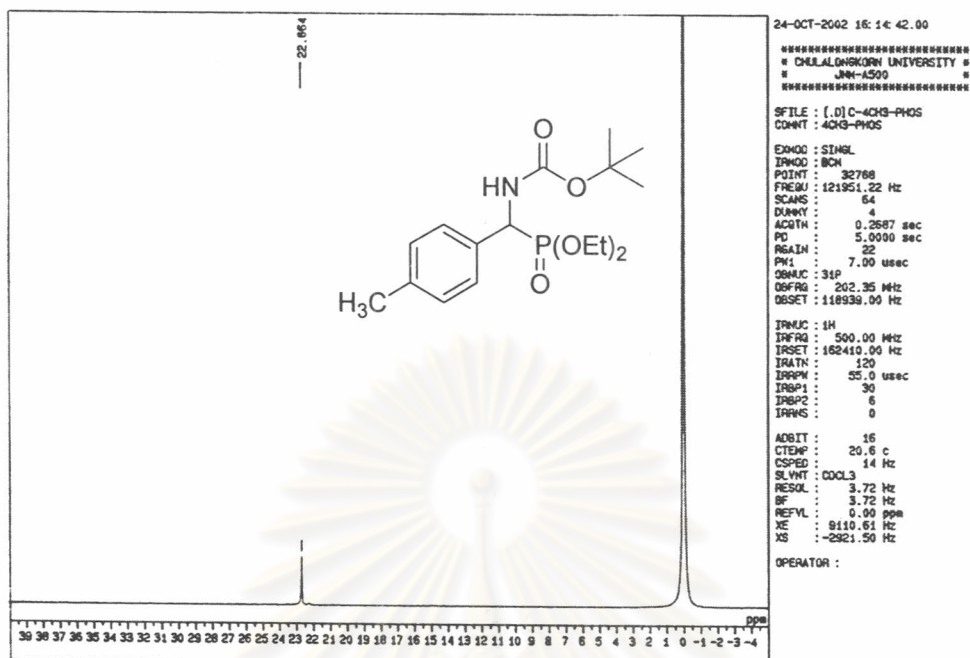
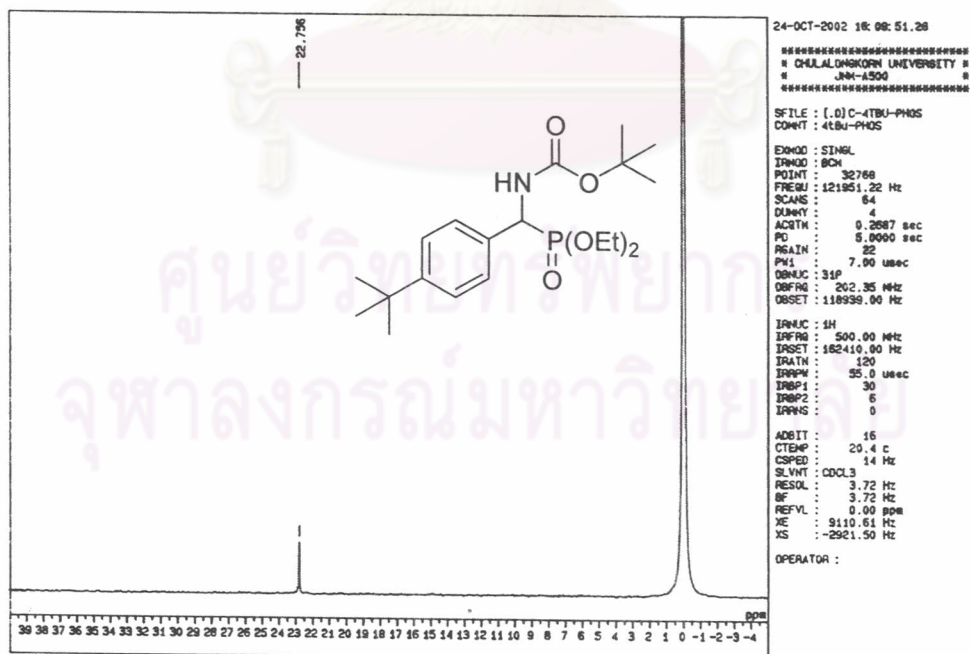
Figure 103 ¹H NMR spectrum of IX-2

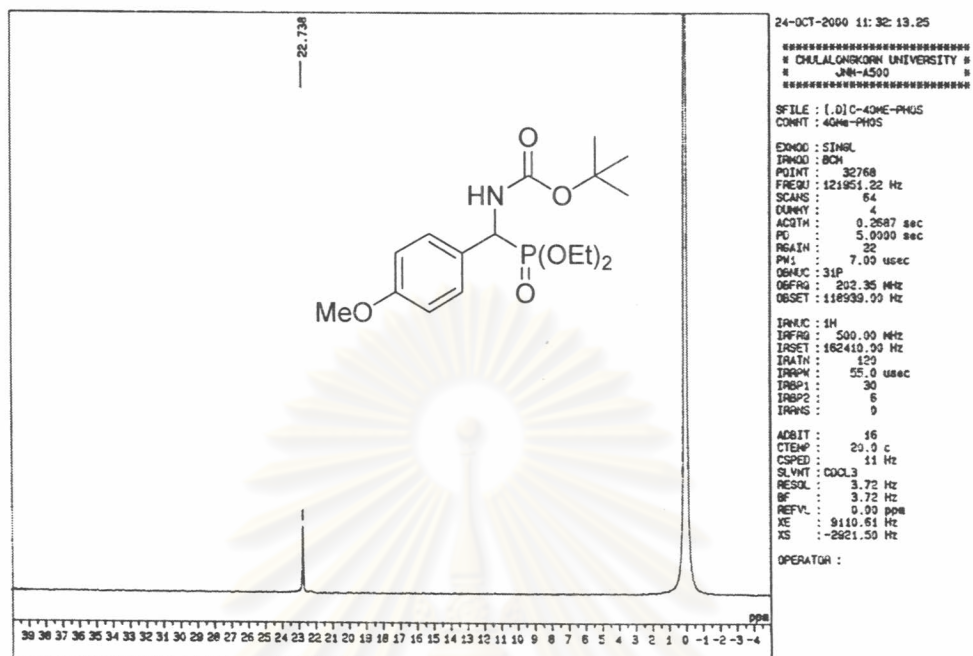
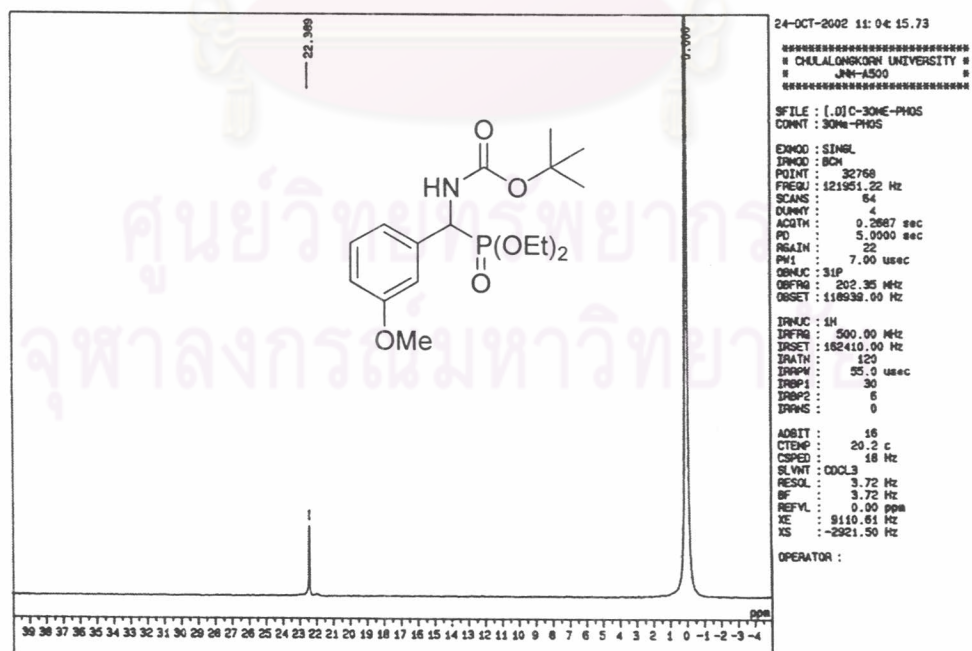
Figure 106 ¹H NMR spectrum of IX-4Figure 107 ¹³C NMR spectrum of IX-4

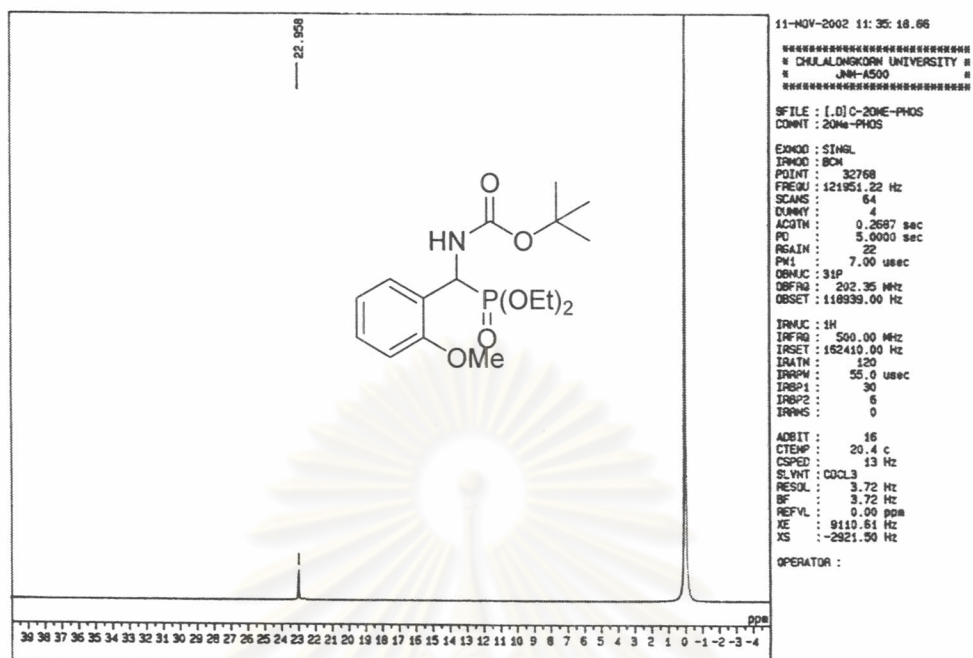
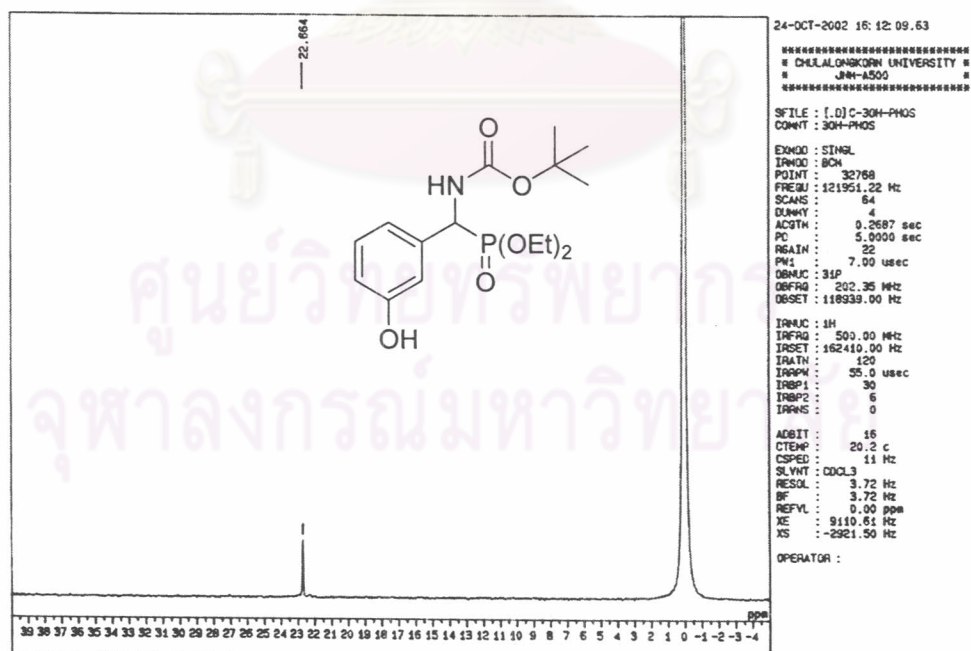
Figure 108 ^{31}P NMR spectrum of VIII-1Figure 109 ^{31}P NMR spectrum of VIII-2

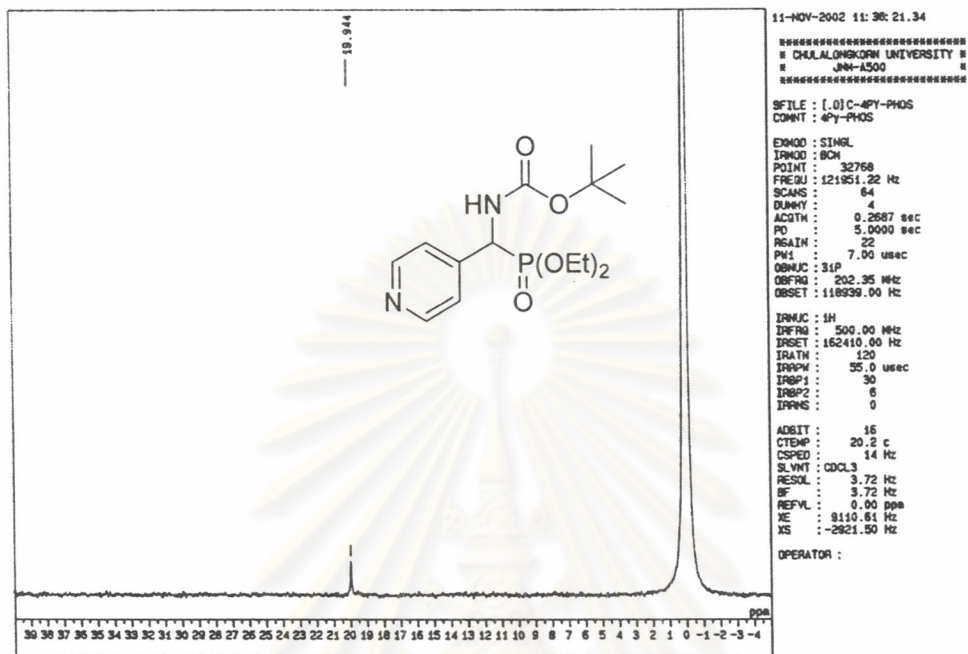
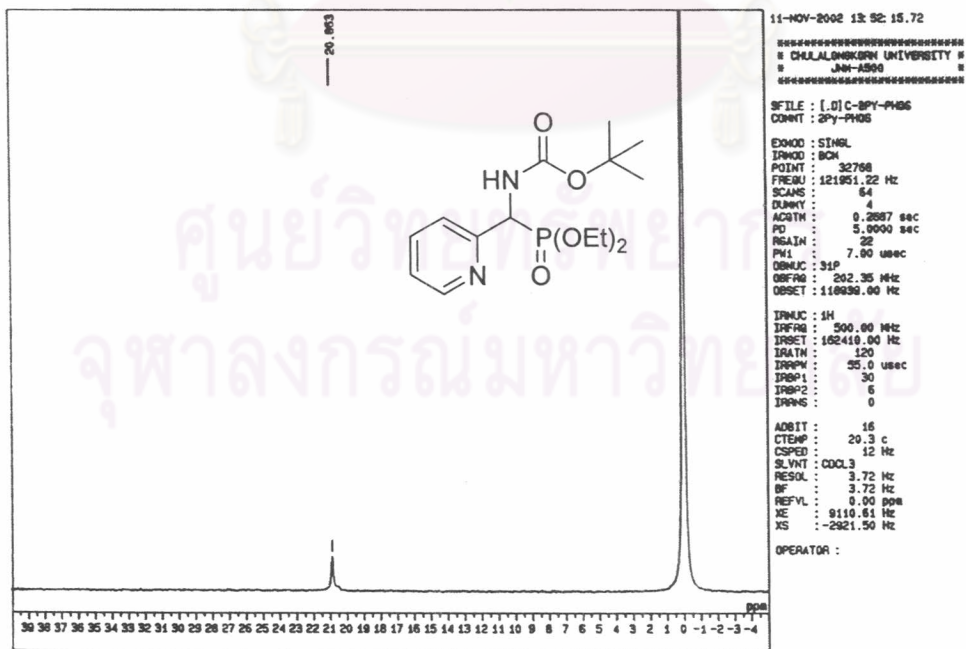
Figure 110 ^{31}P NMR spectrum of VIII-3Figure 111 ^{31}P NMR spectrum of VIII-4

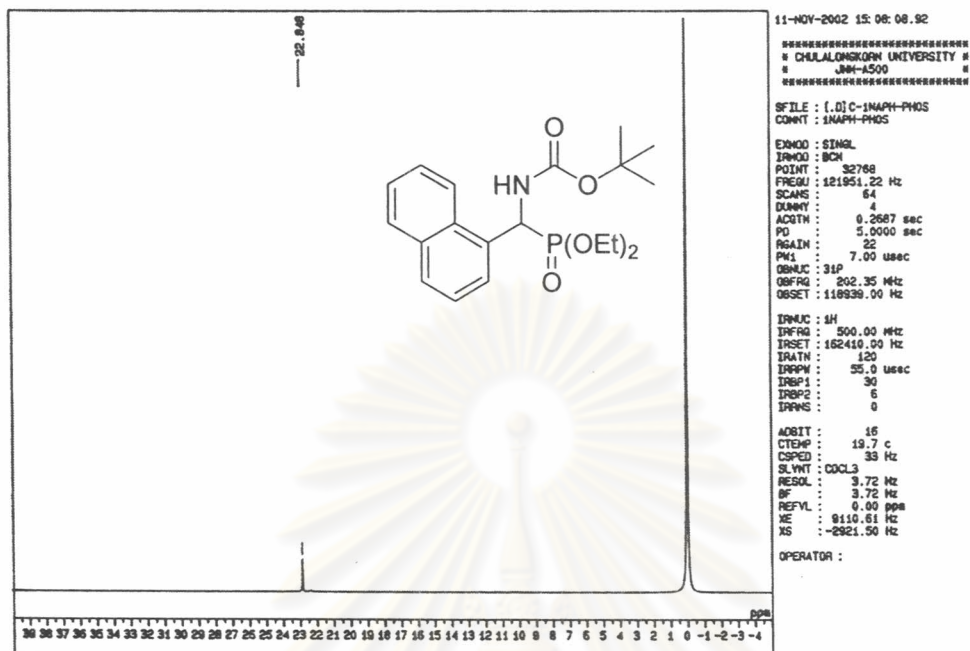
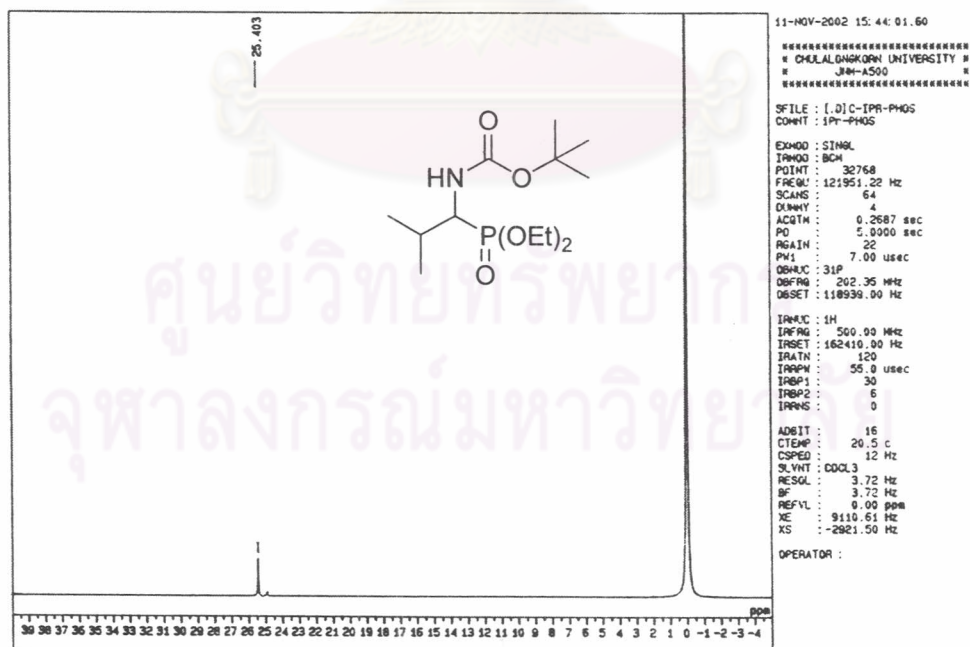
Figure 112 ^{31}P NMR spectrum of VIII-5Figure 113 ^{31}P NMR spectrum of VIII-6

Figure 114 ^{31}P NMR spectrum of VIII-9Figure 115 ^{31}P NMR spectrum of VIII-11

Figure 116 ^{31}P NMR spectrum of VIII-12Figure 117 ^{31}P NMR spectrum of VIII-13

Figure 118 ^{31}P NMR spectrum of VIII-14Figure 119 ^{31}P NMR spectrum of VIII-15

Figure 120 ^{31}P NMR spectrum of VIII-16Figure 121 ^{31}P NMR spectrum of VIII-17

Figure 122 ^{31}P NMR spectrum of VIII-18Figure 123 ^{31}P NMR spectrum of VIII-23

CURRICULUM VITAE

Miss Saowaluk Chaleawlertumpon was born on March 11th, 1978 in Nonthaburee, Thailand. She received a Bachelor's Degree of Science, majoring in chemistry from Chulalongkorn University in 1999. Since 1999, she has been a graduate student studying organic chemistry as her major course at Chulalongkorn University. During her studies toward the Master's degree, she was awarded a teaching assistant scholarship by The Faculty of Science in 1999-2000 and was supported by a research grant for her Master degree's thesis from the Graduate School, Chulalongkorn University.

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