Supporting Information – Part A

The study of *cis–trans* isomerization preference of *N*–alkylated peptides containing phosphorus in the side chain and backbone.

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Spectra's of compounds

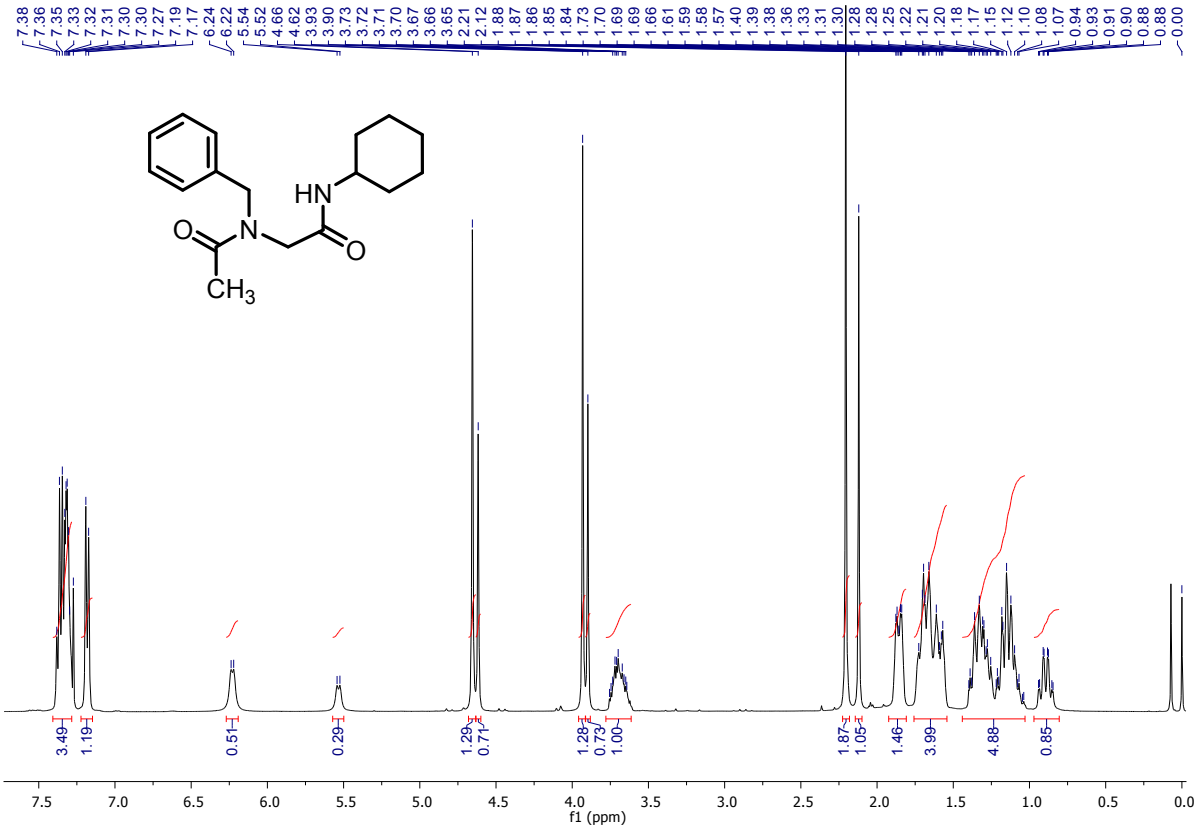

FIGURE 1. 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **1**.

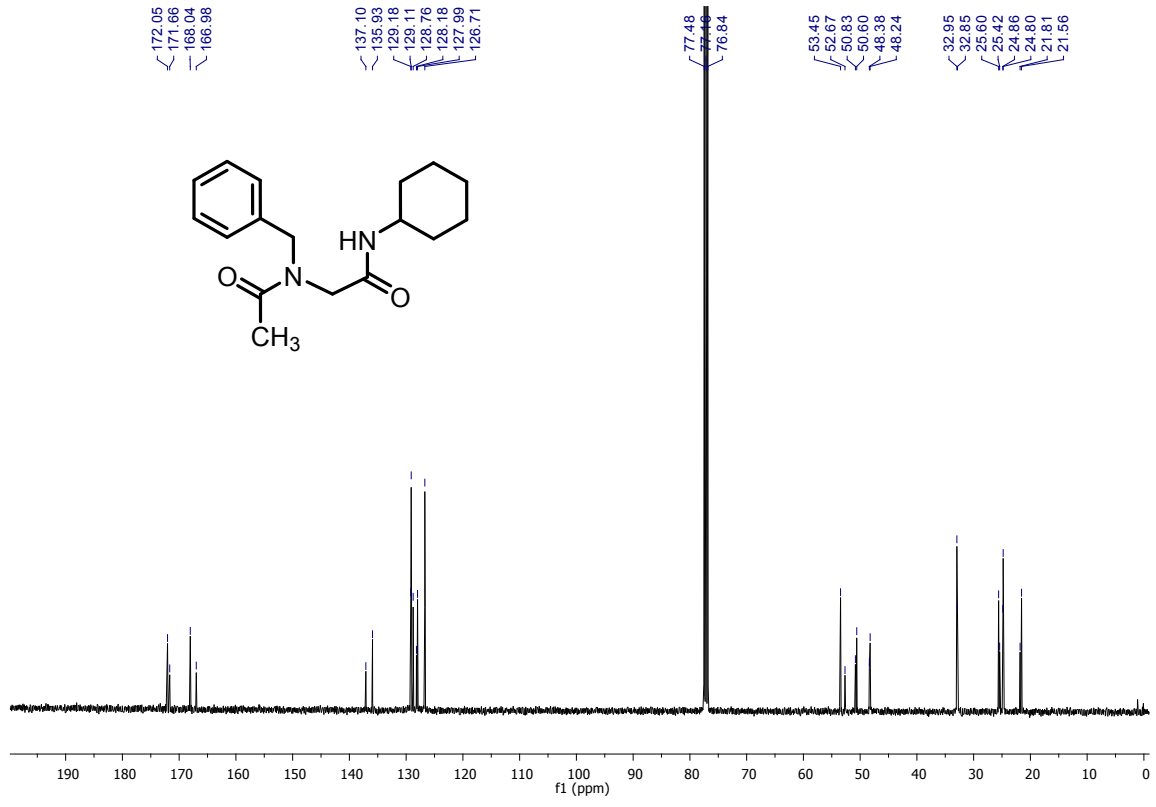

FIGURE 2: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **1**.

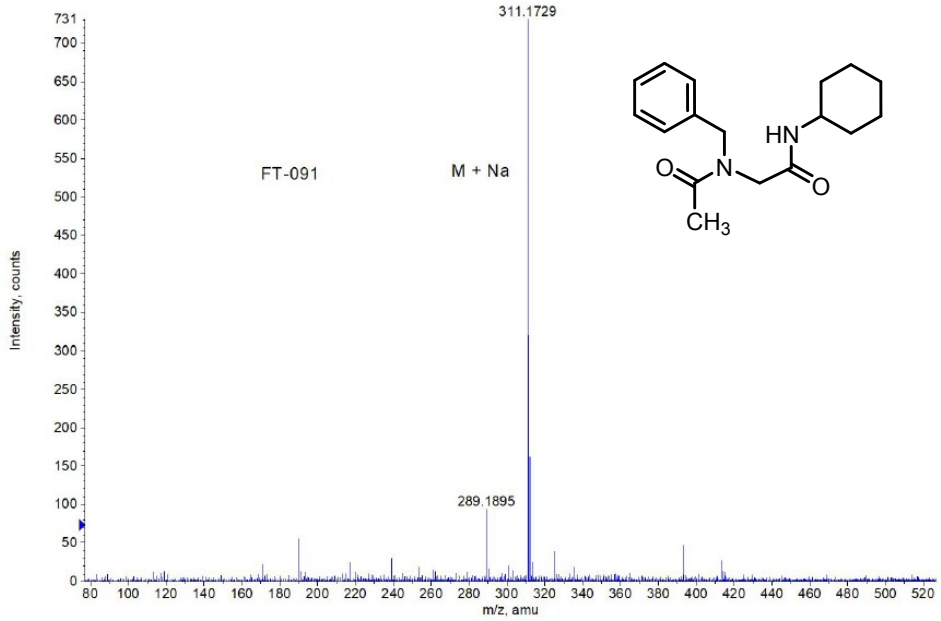

FIGURE 3- HRMS (ESI-FT-ICR) m/z spectrum of **1**.

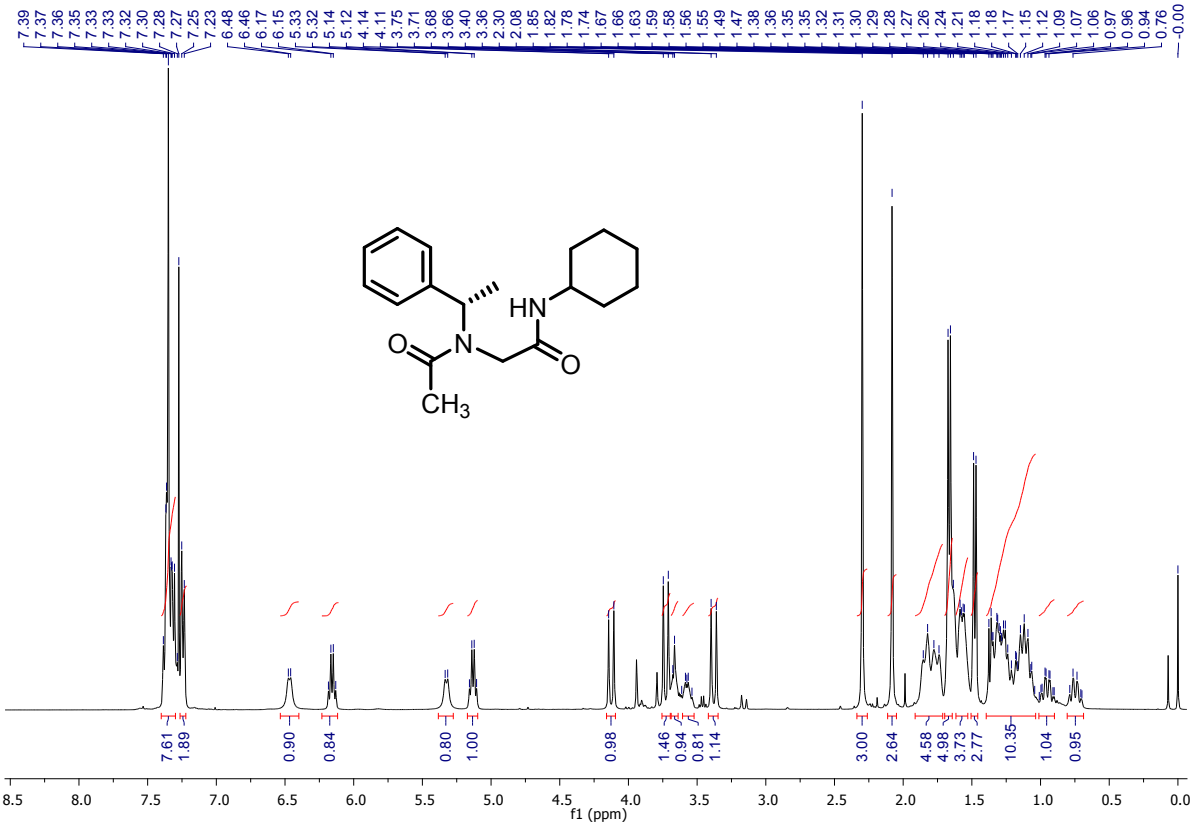

FIGURE 4: 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **2**.

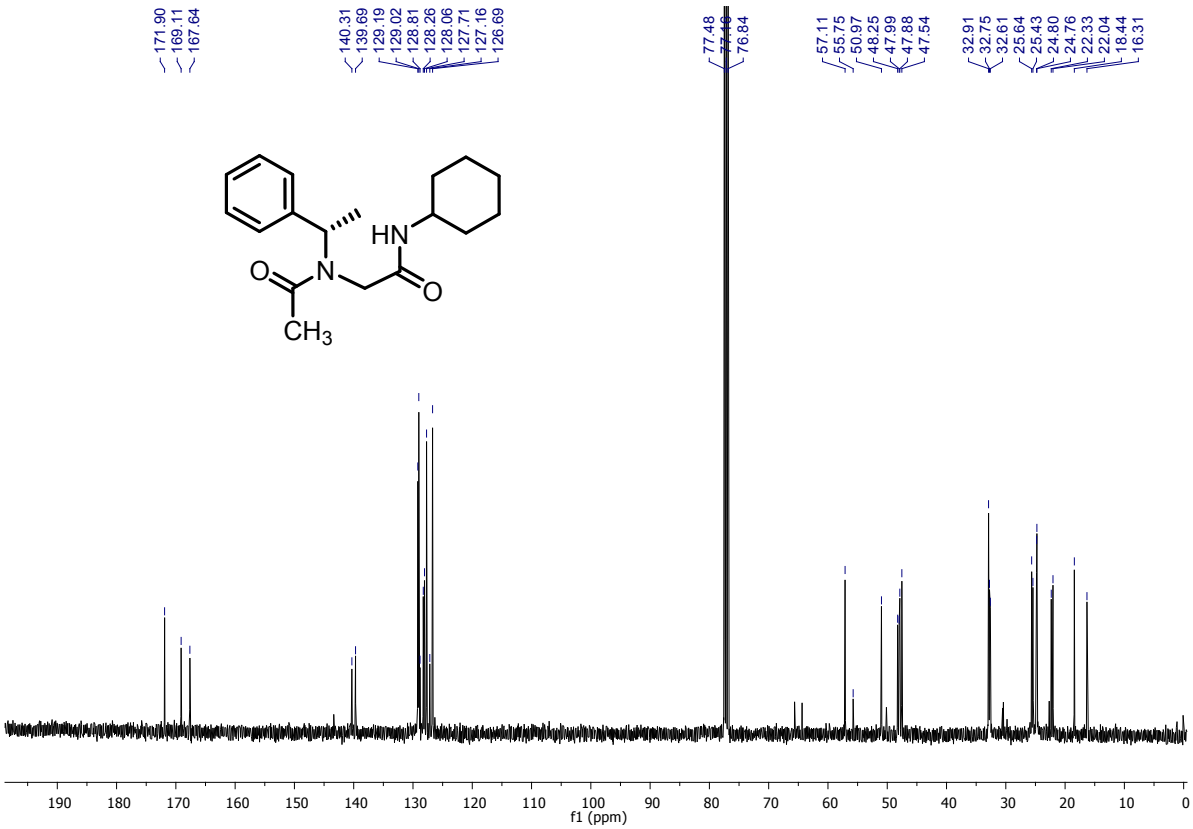

FIGURE 5: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **2**.

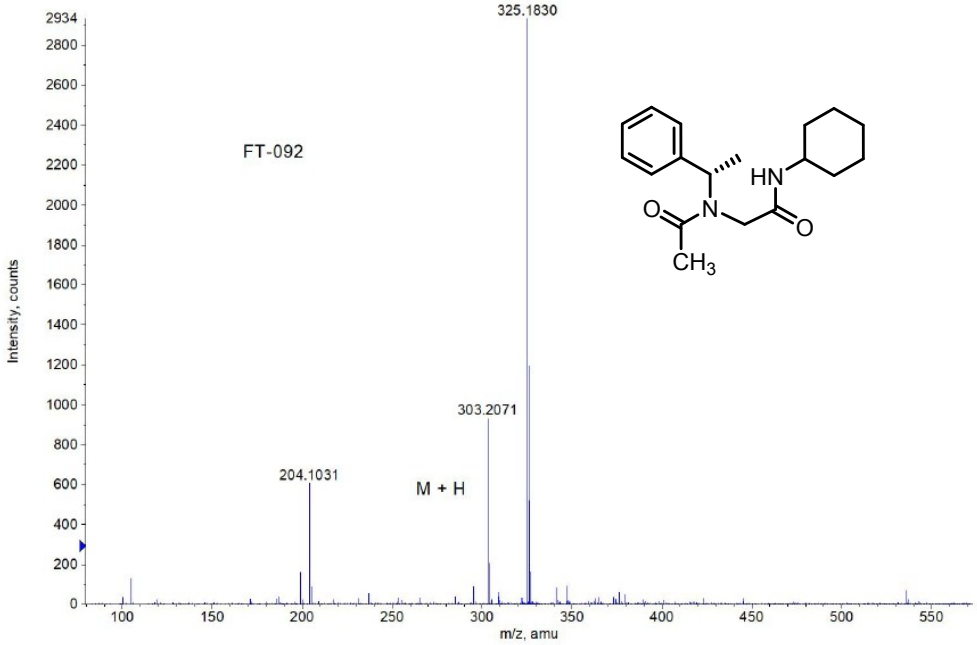

FIGURE 6- HRMS (ESI-FT-ICR) m/z spectrum of **2**.

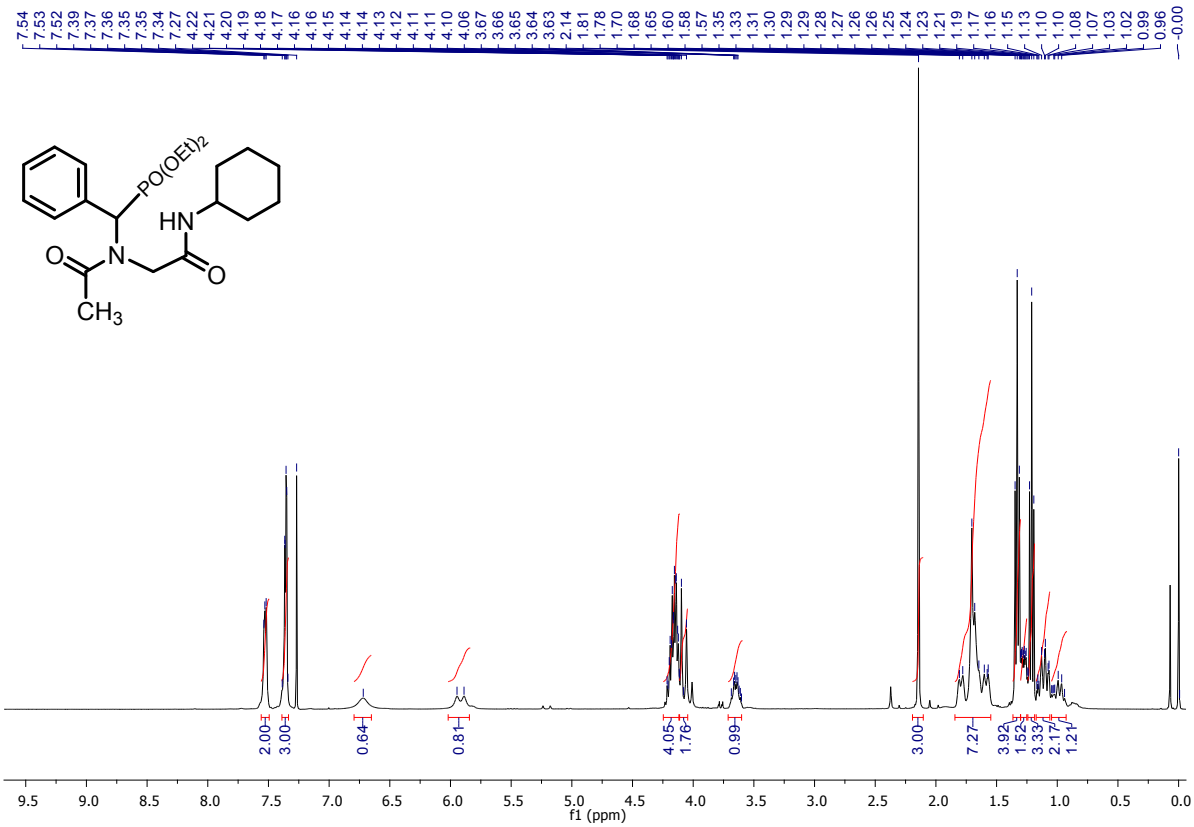

FIGURE 7: 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **3**.

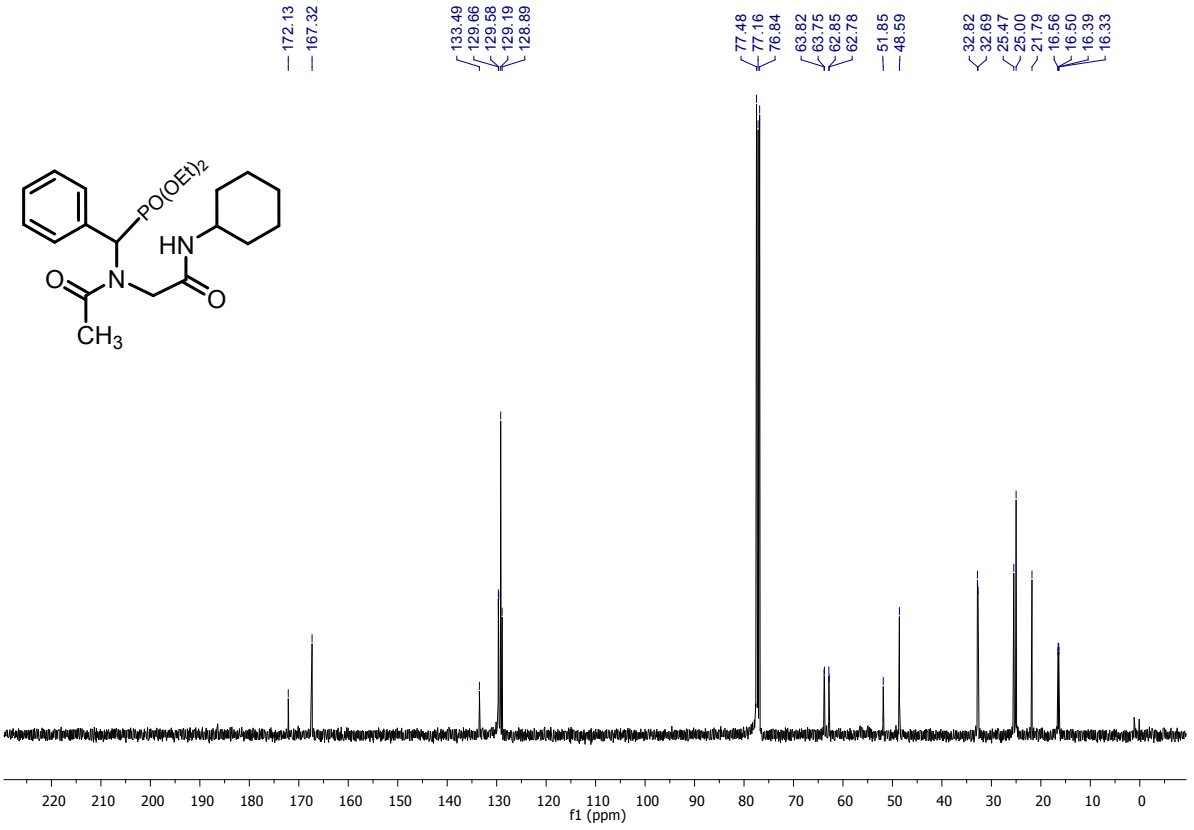

FIGURE 8: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **3**.

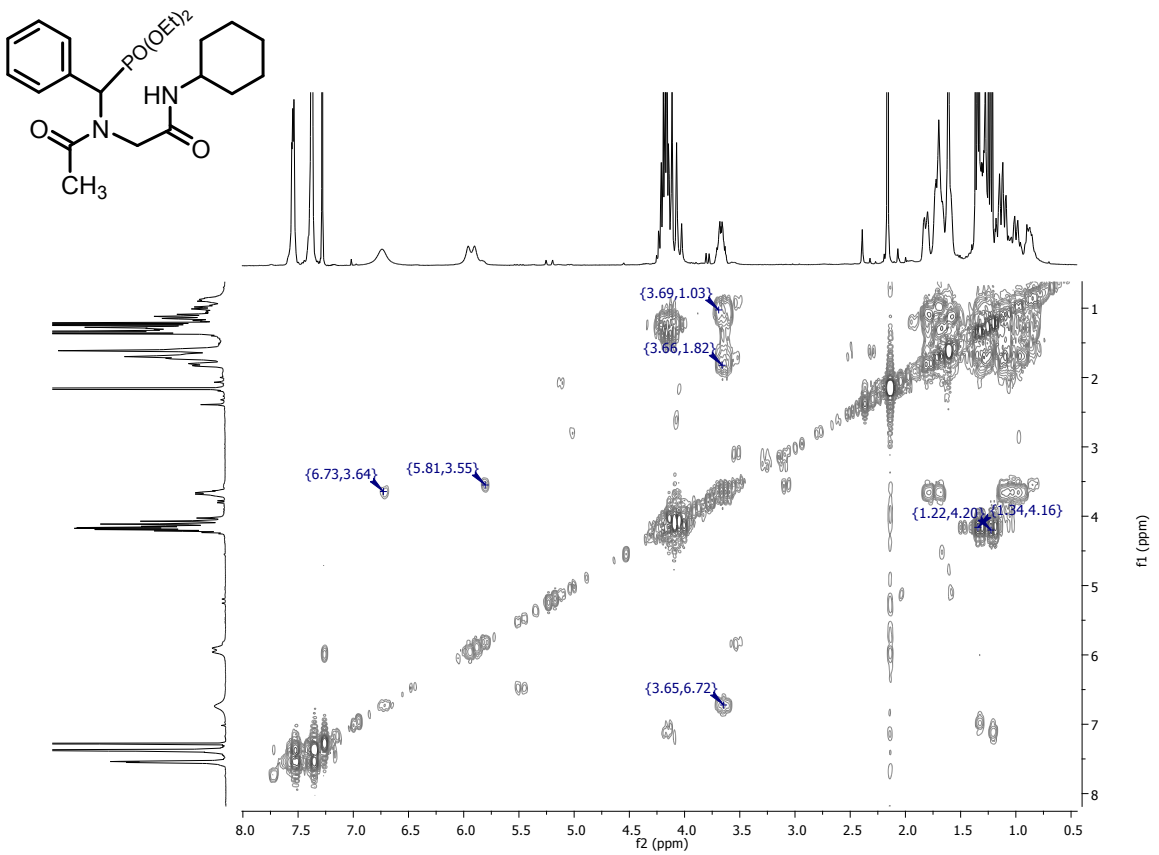

FIGURE 9: COSY spectrum in $CDCl_3$ of **3**.

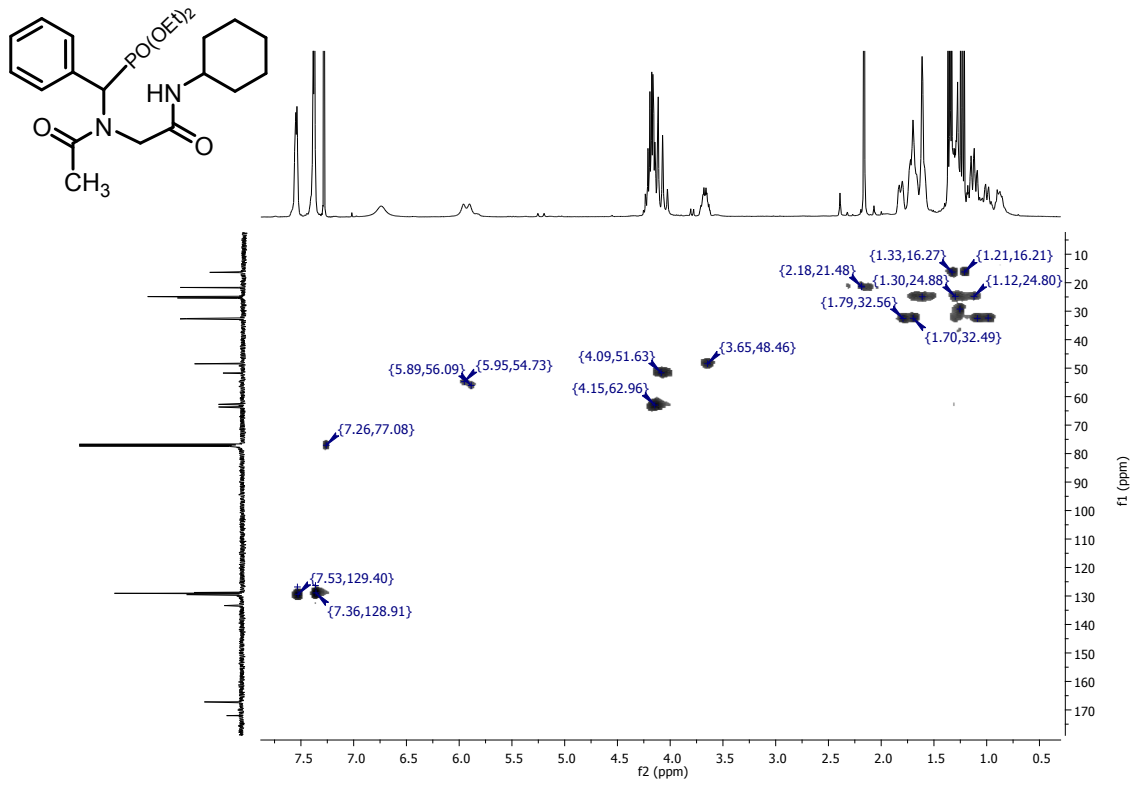

FIGURE 10: HSQC spectrum in $CDCl_3$ of **3**.

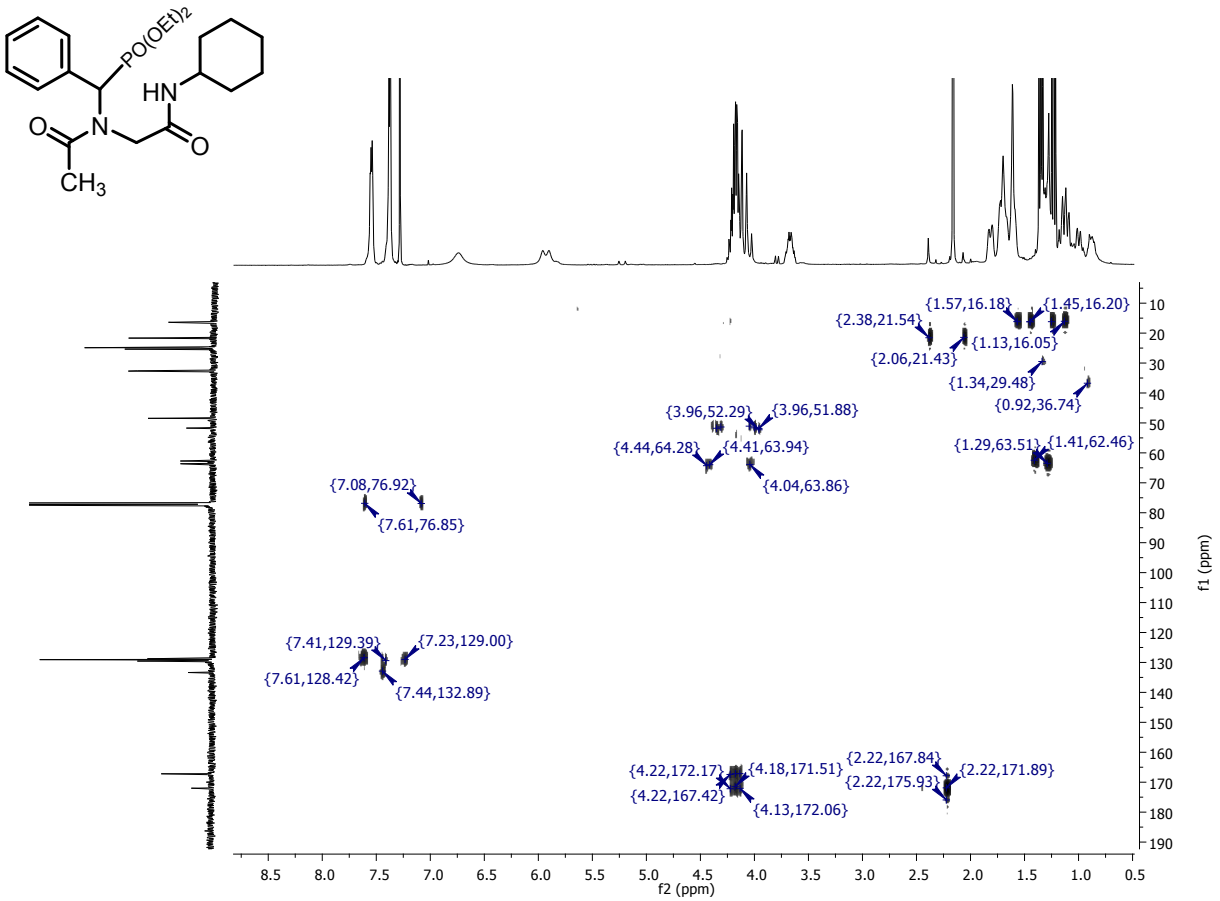

FIGURE 11: HMBC spectrum in $CDCl_3$ of **3**.

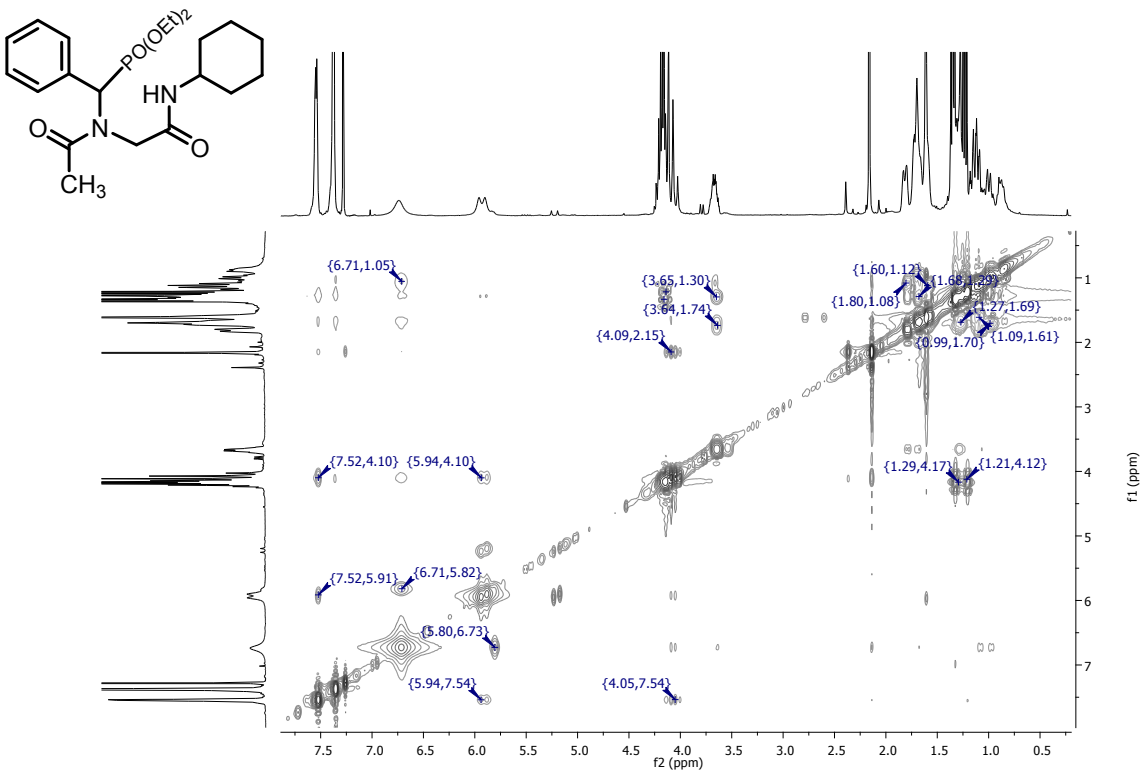

FIGURE 12: NOESY spectrum in $CDCl_3$ of **3**.

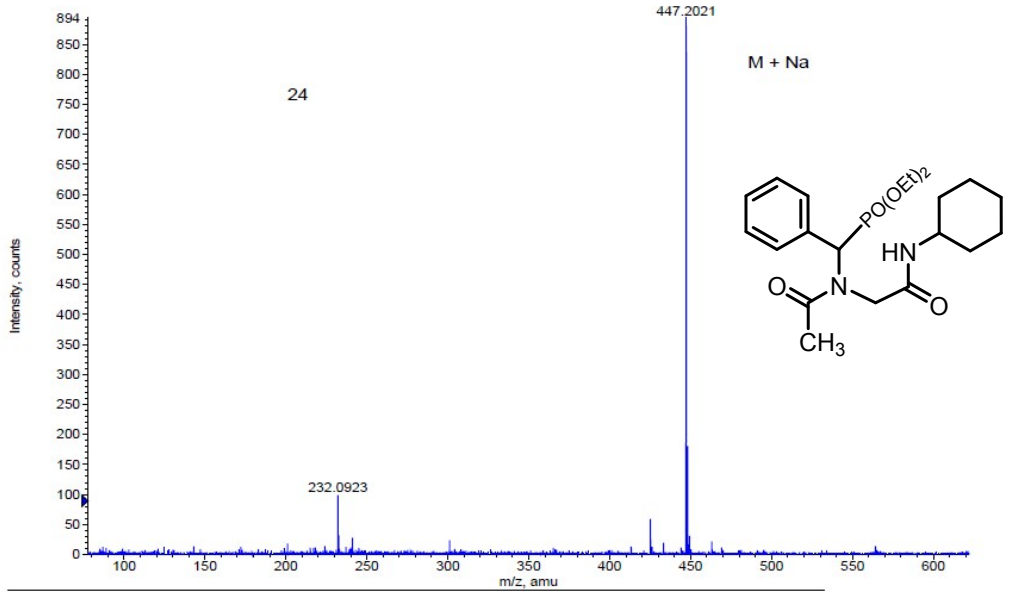

FIGURE 13- HRMS (ESI-FT-ICR) m/z spectrum of **3**.

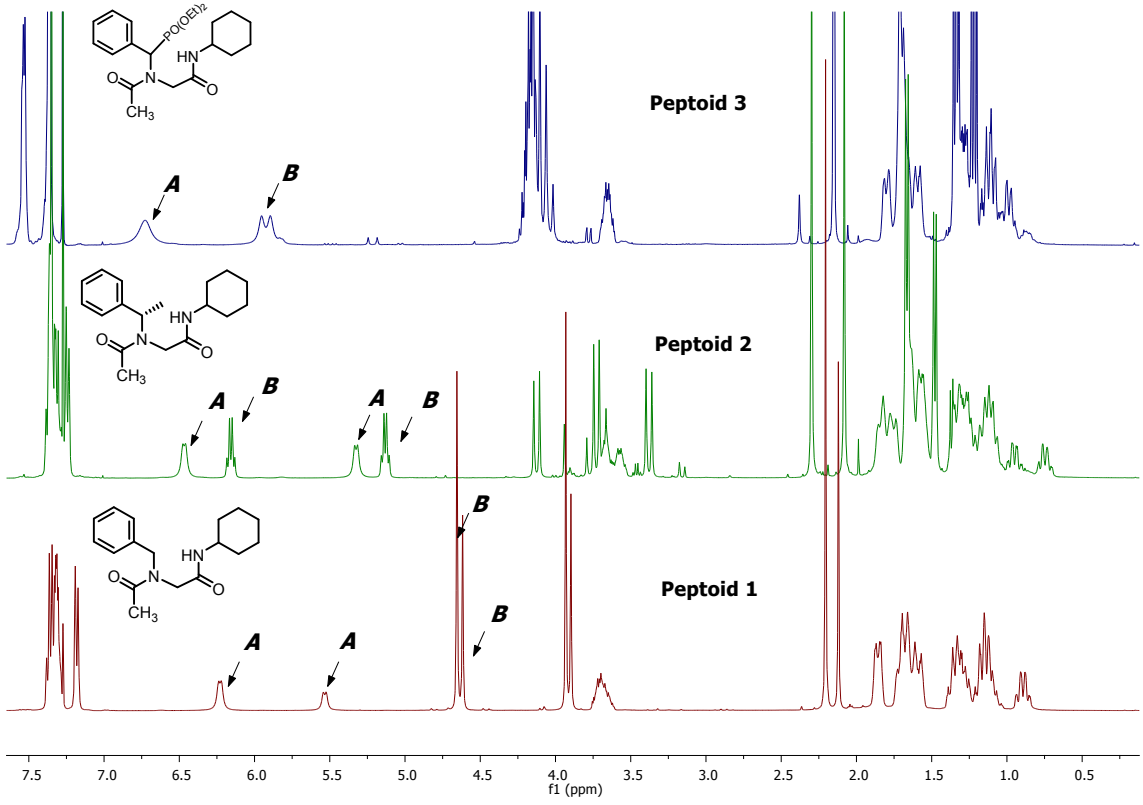

FIGURE 14- 400 MHz ^{1}H NMR spectra in $CDCl_3$ of compounds 1 (redline), 2 (greenline) and 3 (blueline). (A) correspond to *N*H of secondary amide and (B) correspond to protons of CH groups that support R^2 substitutions.

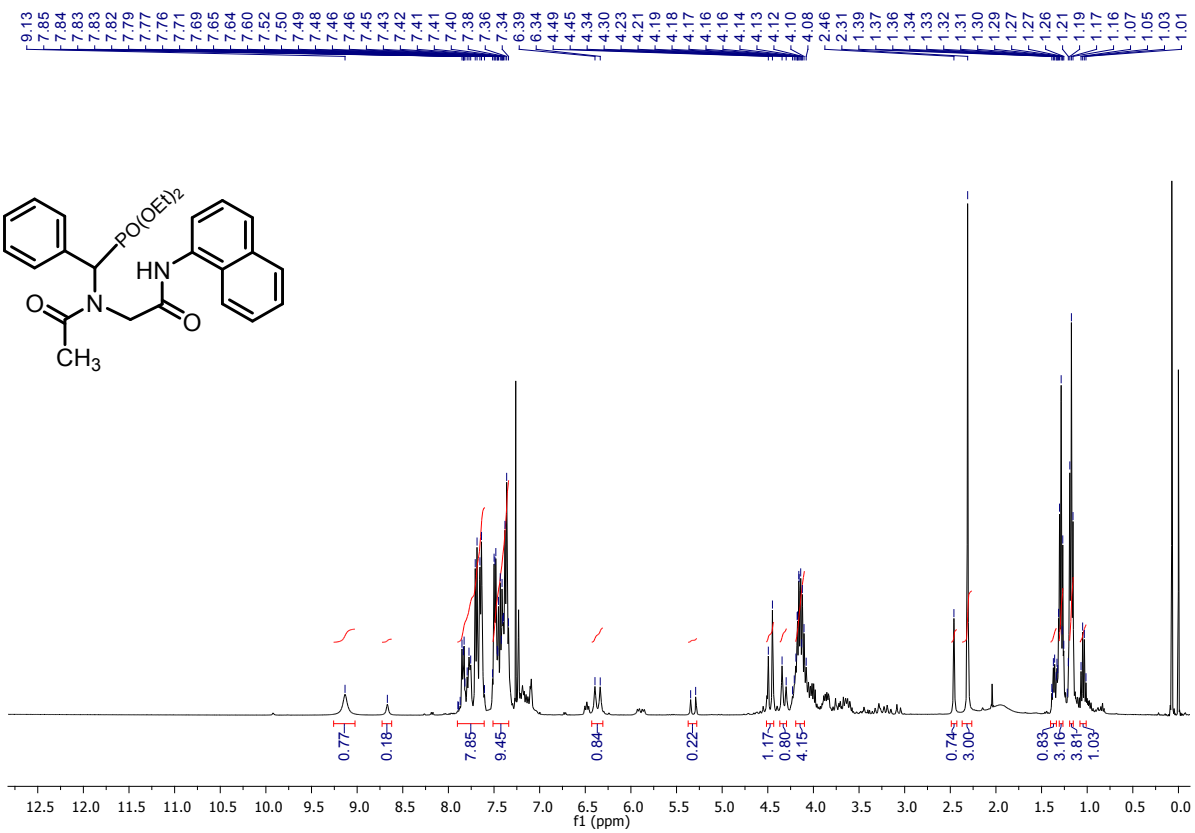

FIGURE 15: 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **4**.

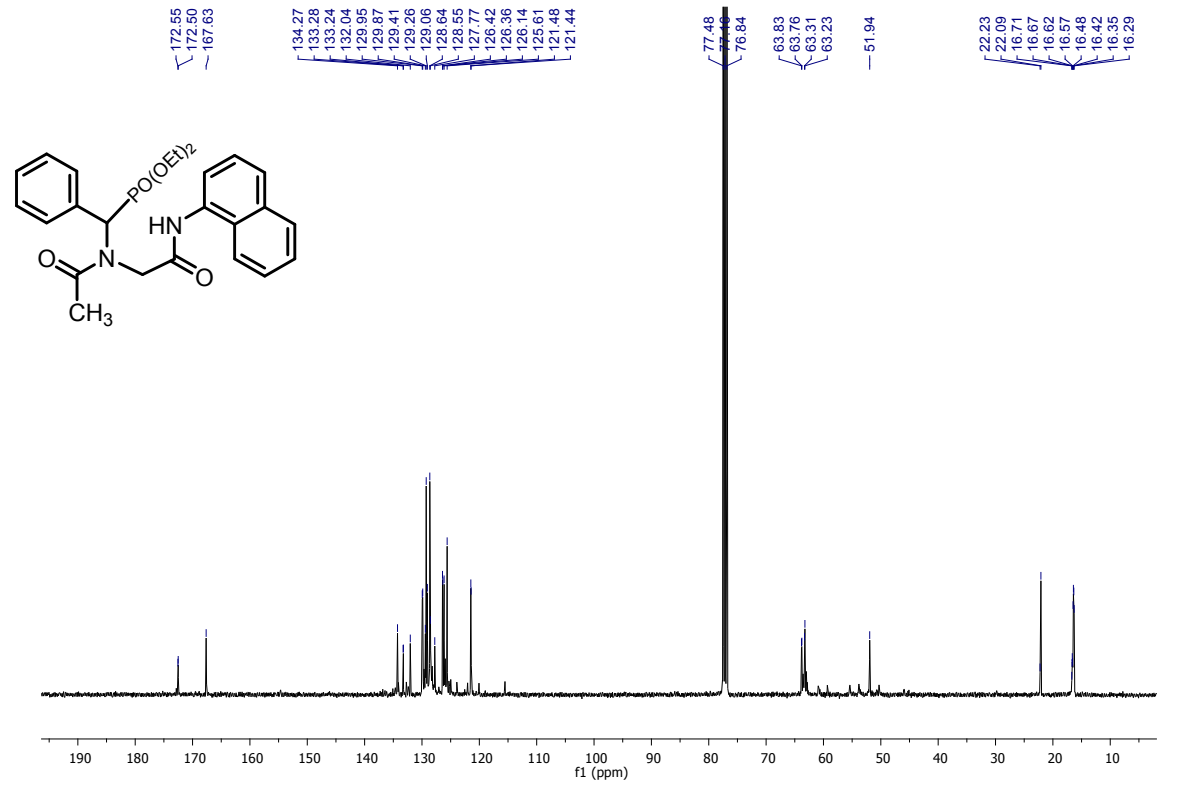

FIGURE 16: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **4**.

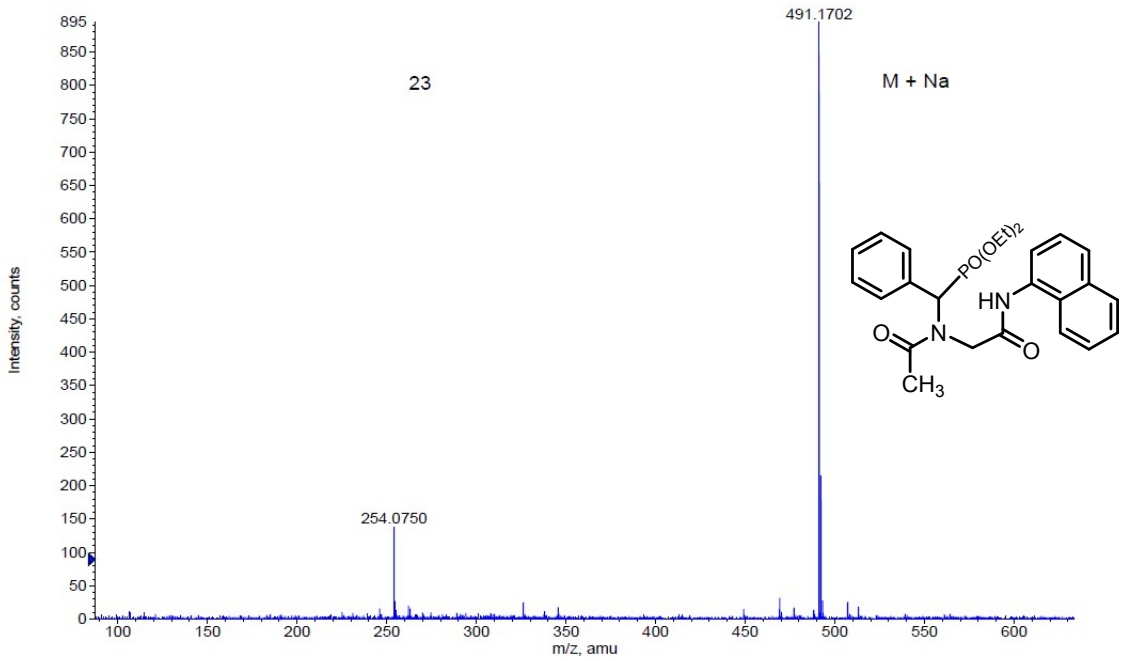

FIGURE 17- HRMS (ESI-FT-ICR) m/z spectrum of **4**.

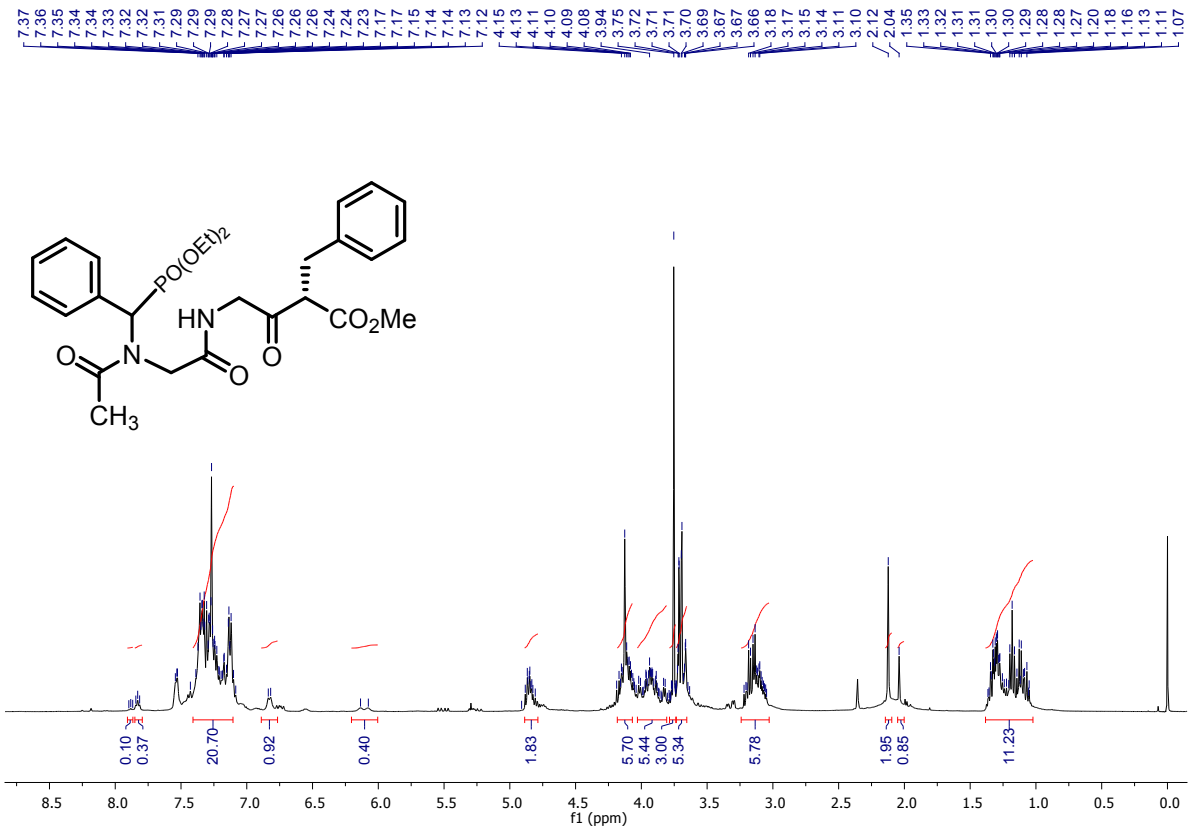

FIGURE 18: 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **5**.

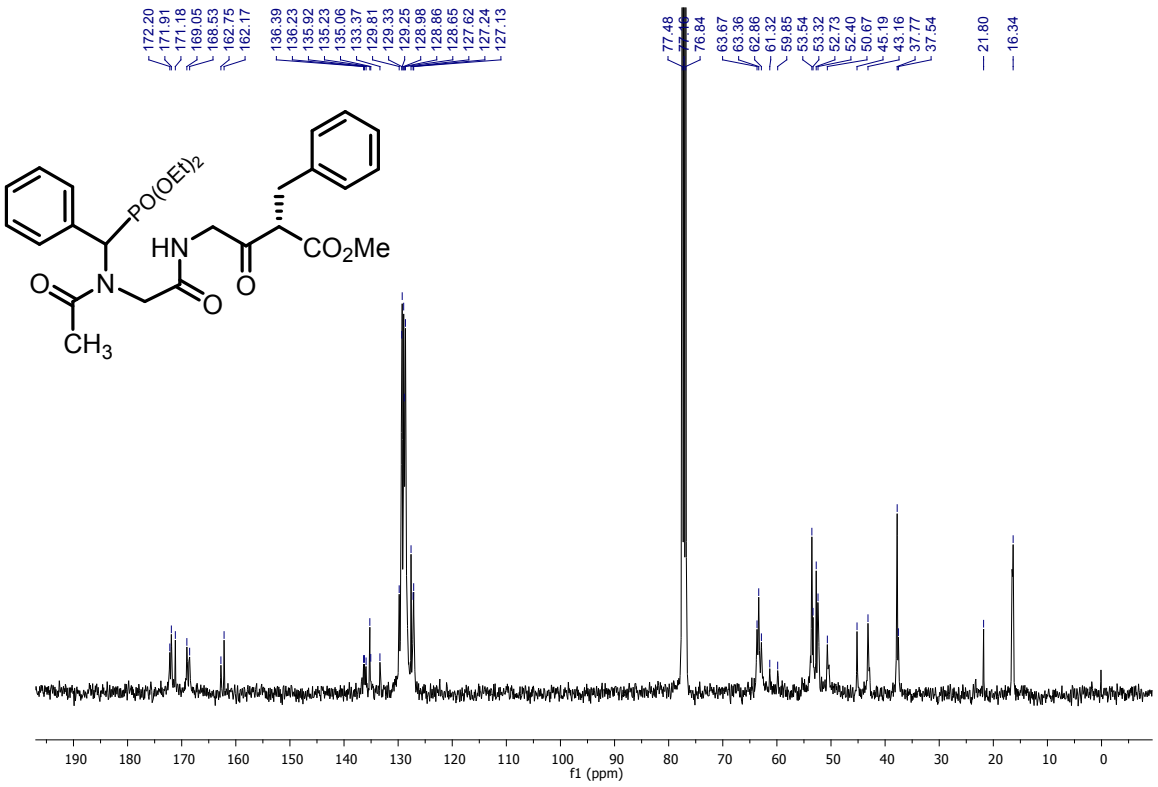

FIGURE 19: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **5**.

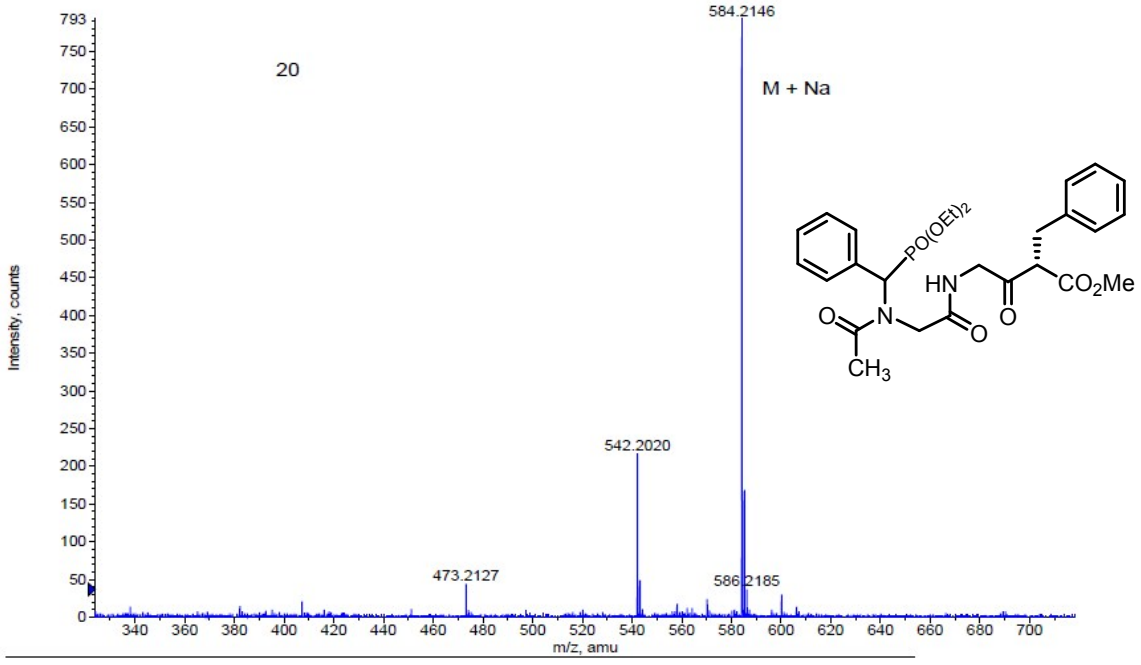

FIGURE 20- HRMS (ESI-FT-ICR) m/z spectrum of **5**.

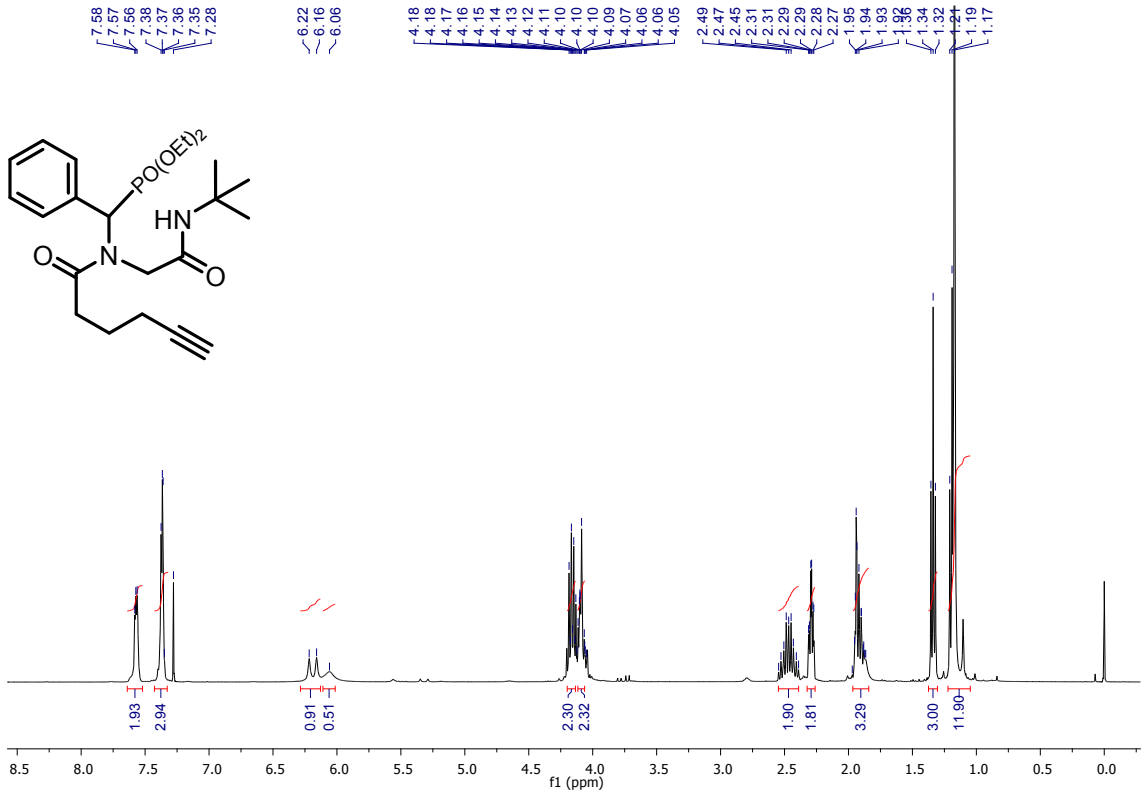

FIGURE 21: 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **6**.

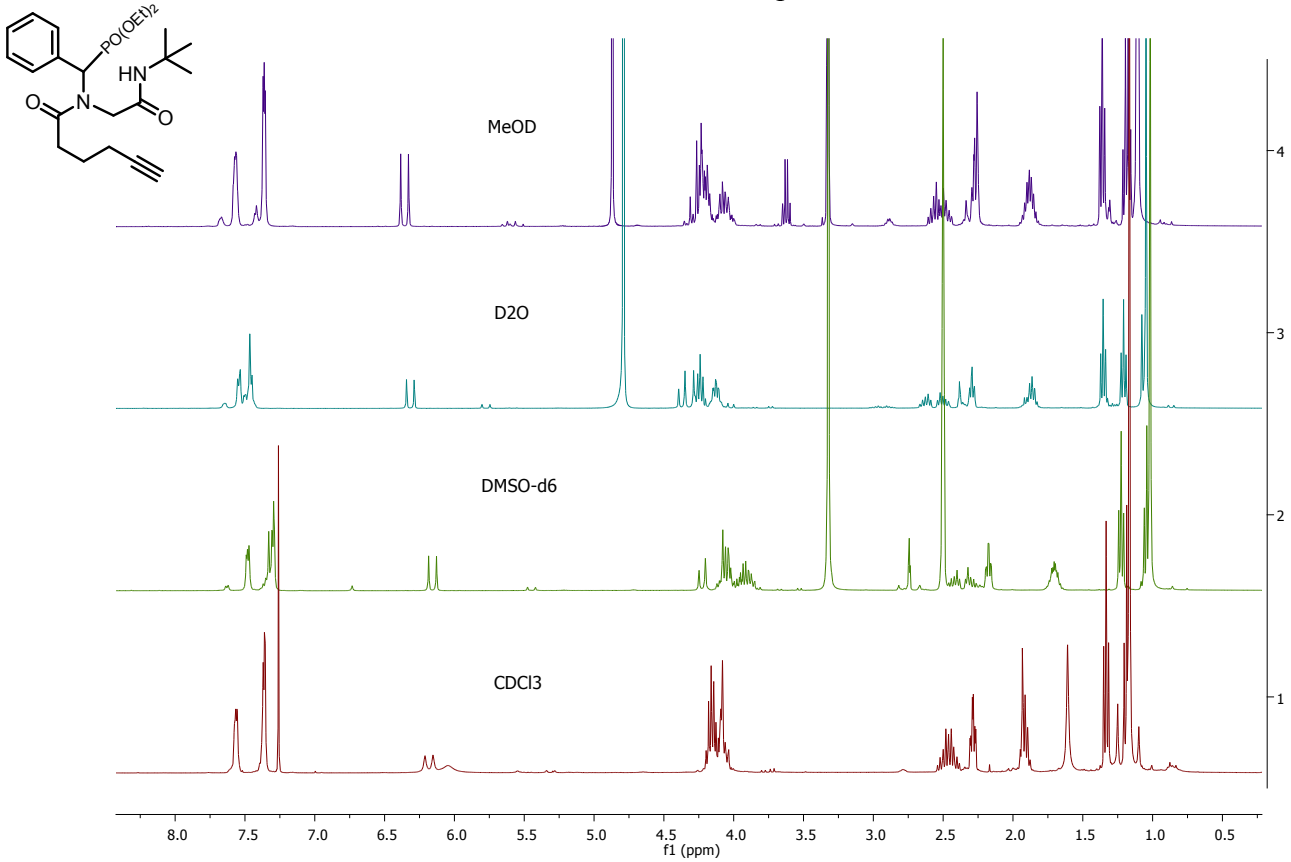

FIGURE 22: 400 MHz ^{1}H NMR spectra of **6** in different deuterated solvents at 15 mM.

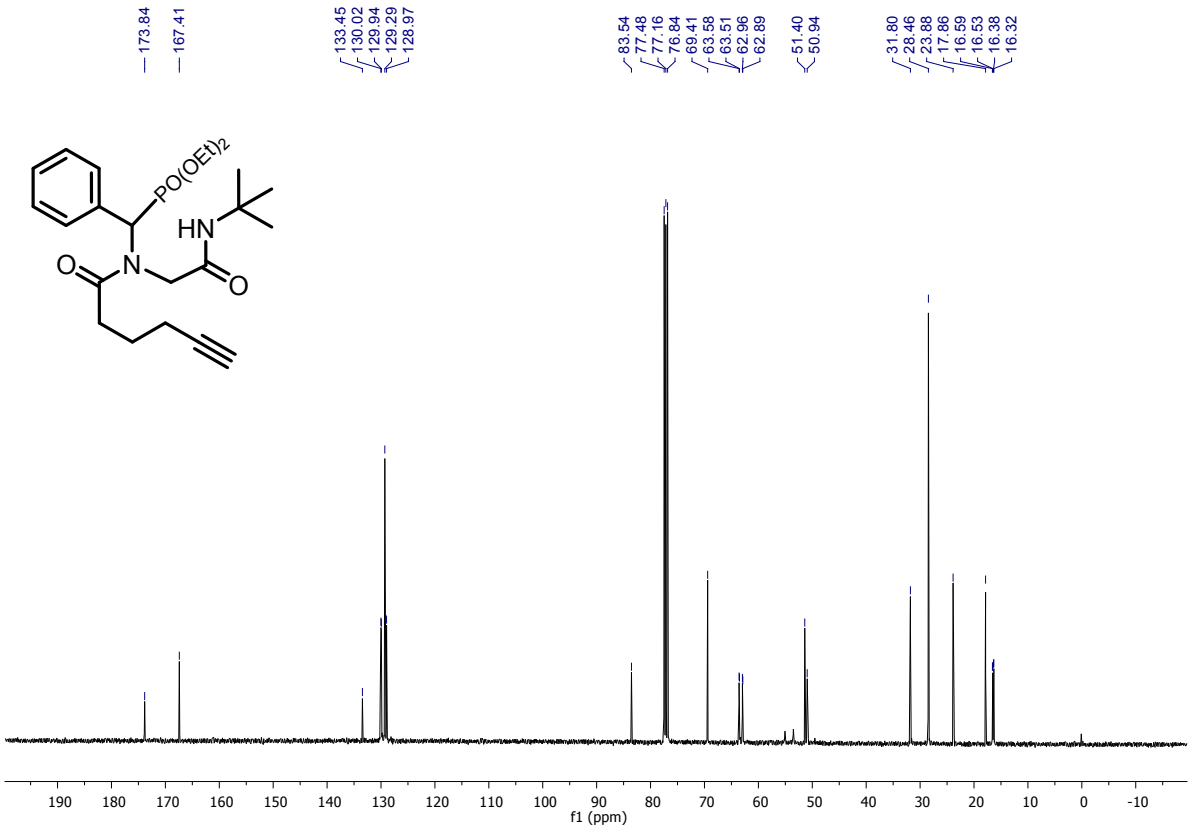

FIGURE 23: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **6**.

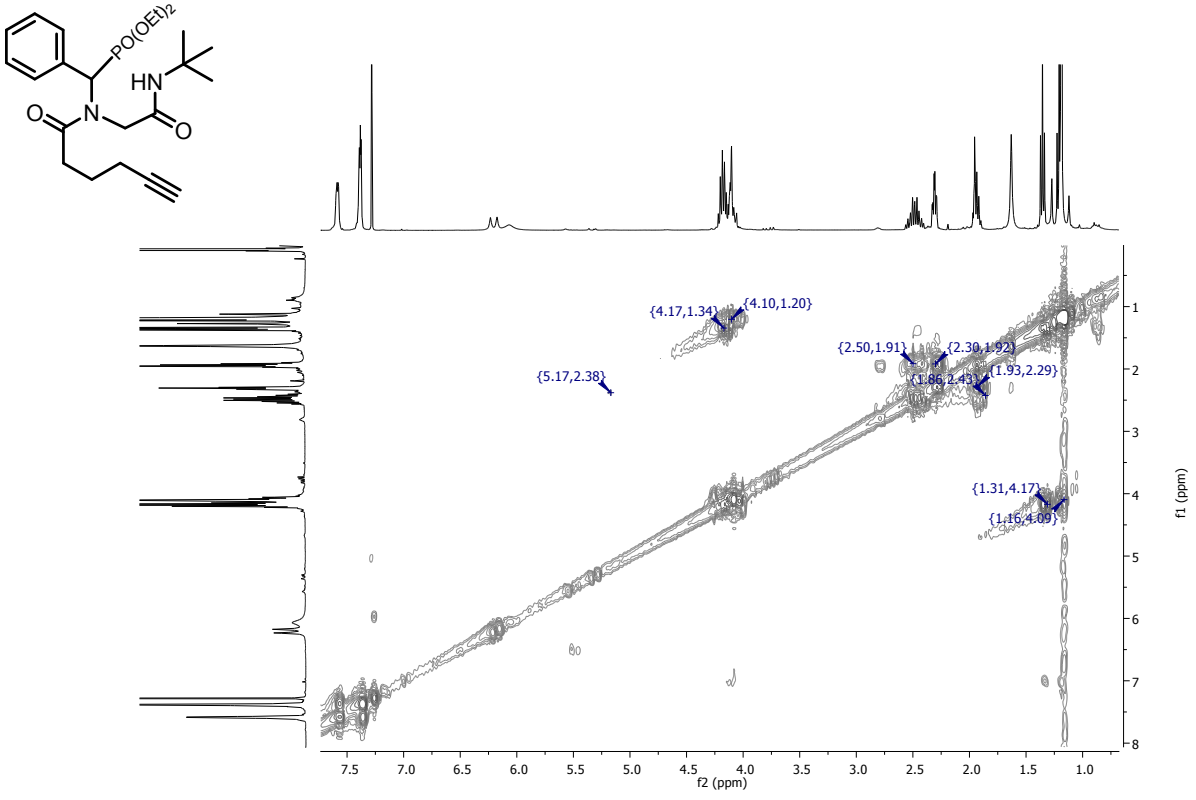

FIGURE 24: 400 MHz COSY spectrum in $CDCl_3$ of **6**.

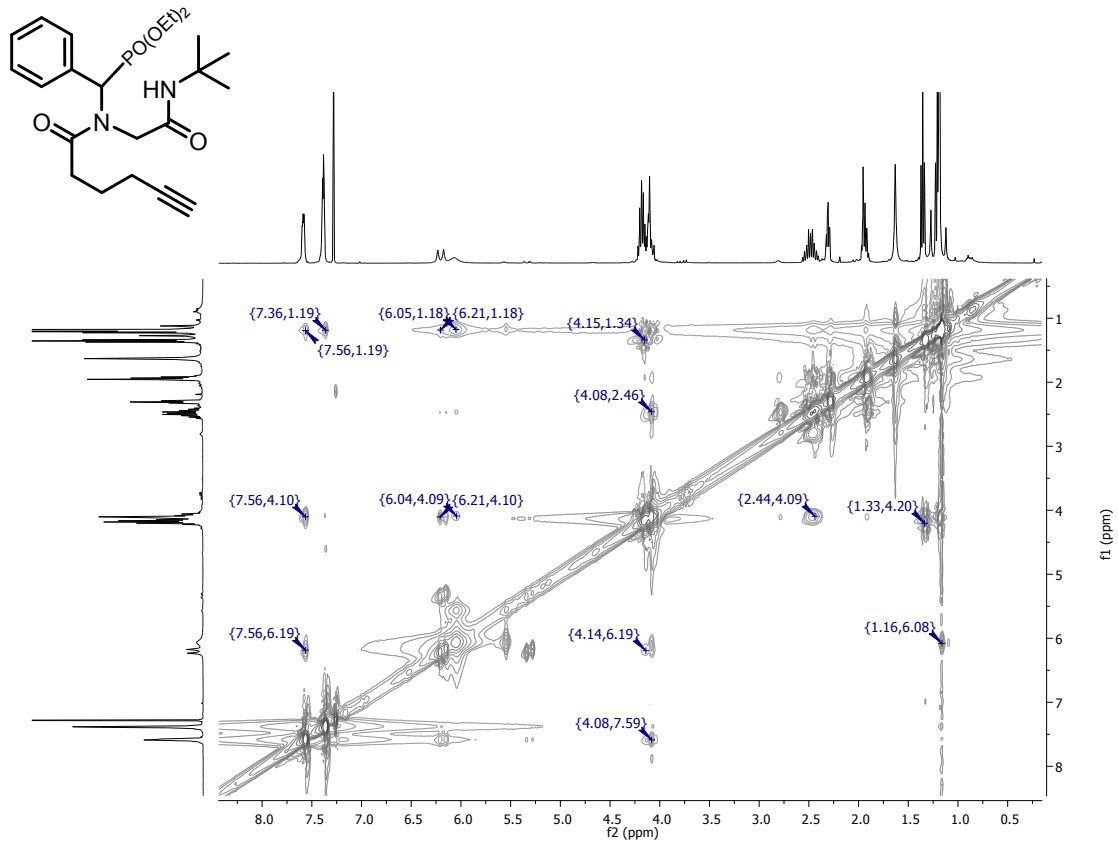

FIGURE 25: 400 MHz NOESY spectrum in $CDCl_3$ of **6**.

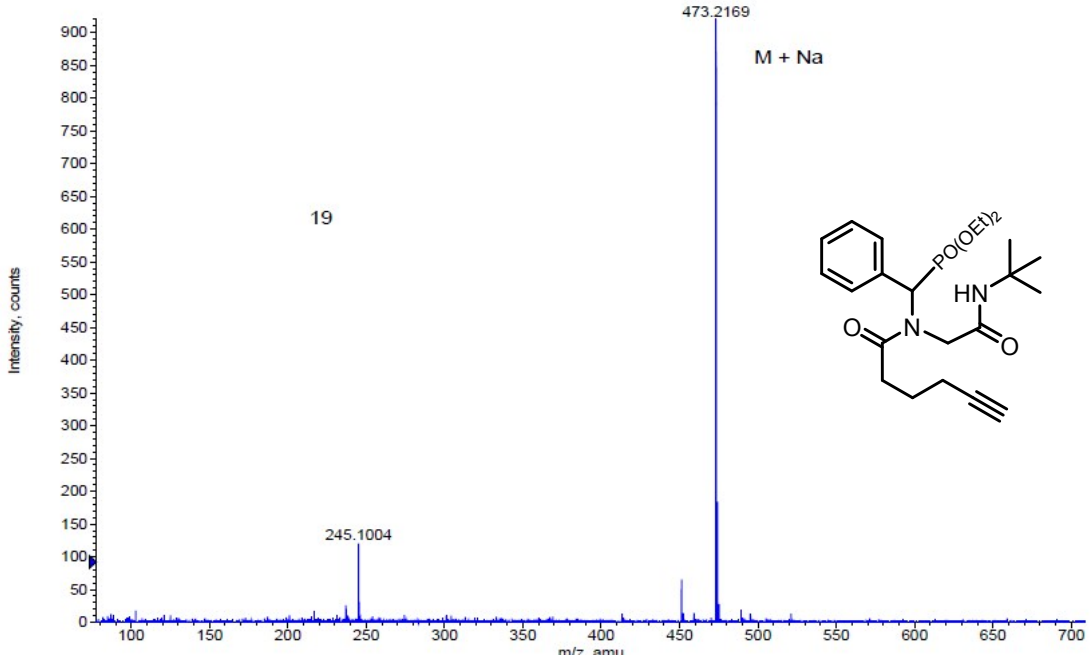

FIGURE 26- HRMS (ESI-FT-ICR) m/z spectrum of **6**.

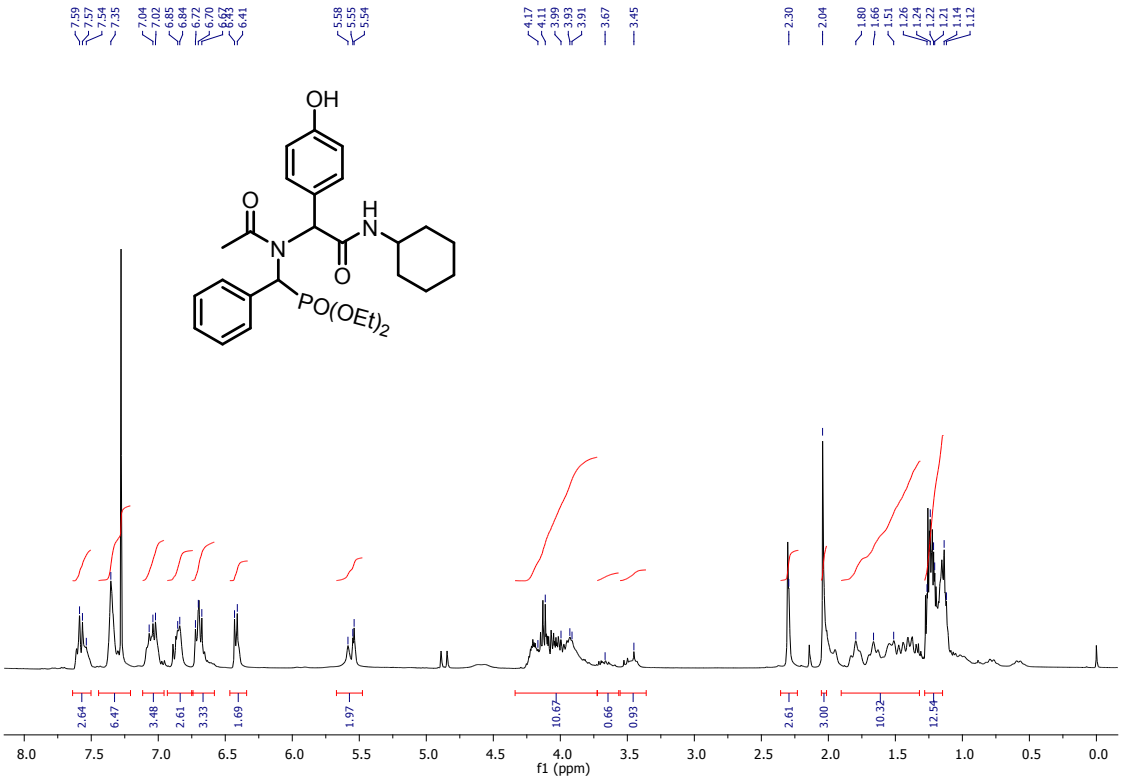

FIGURE 27: 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **7**.

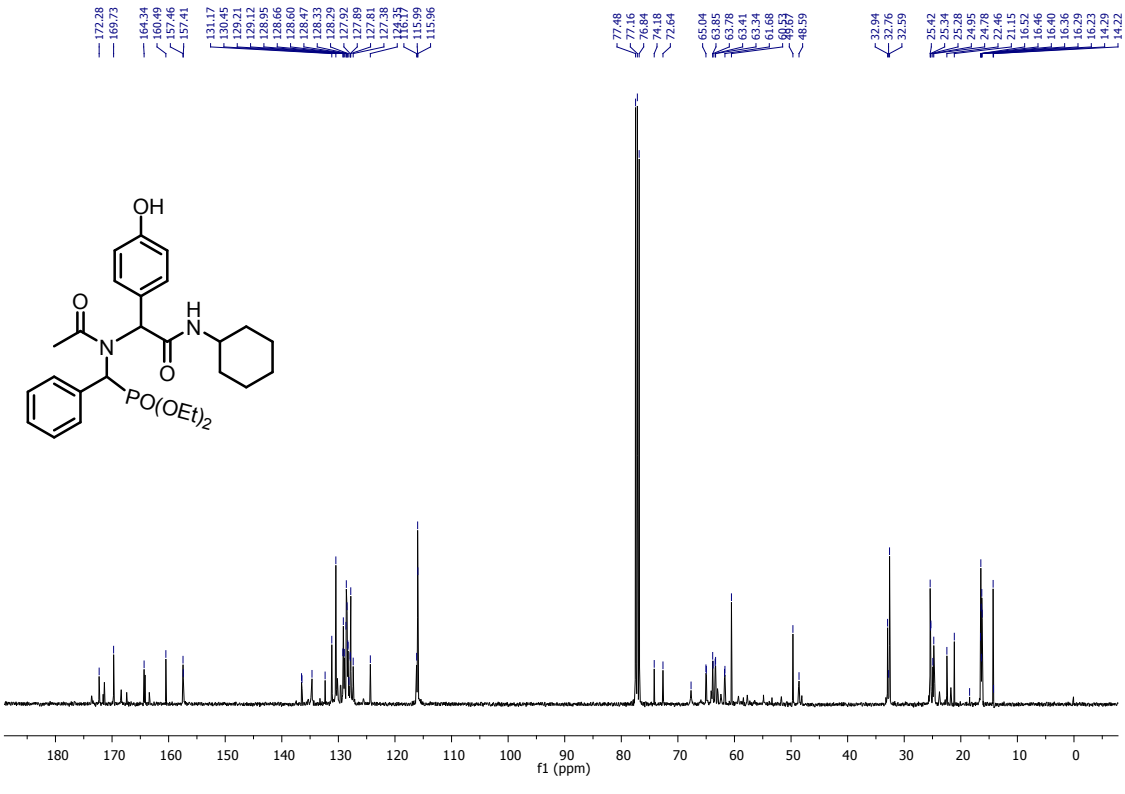

FIGURE 28: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **7**.

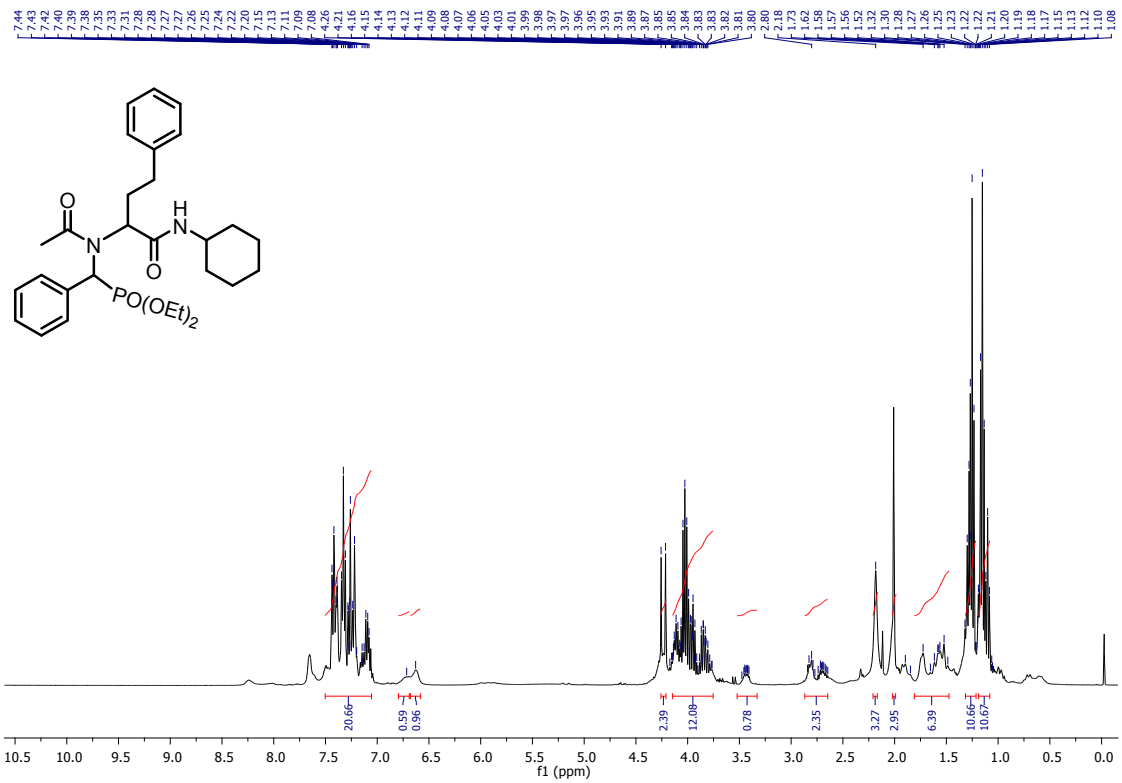

FIGURE 29: 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **8**.

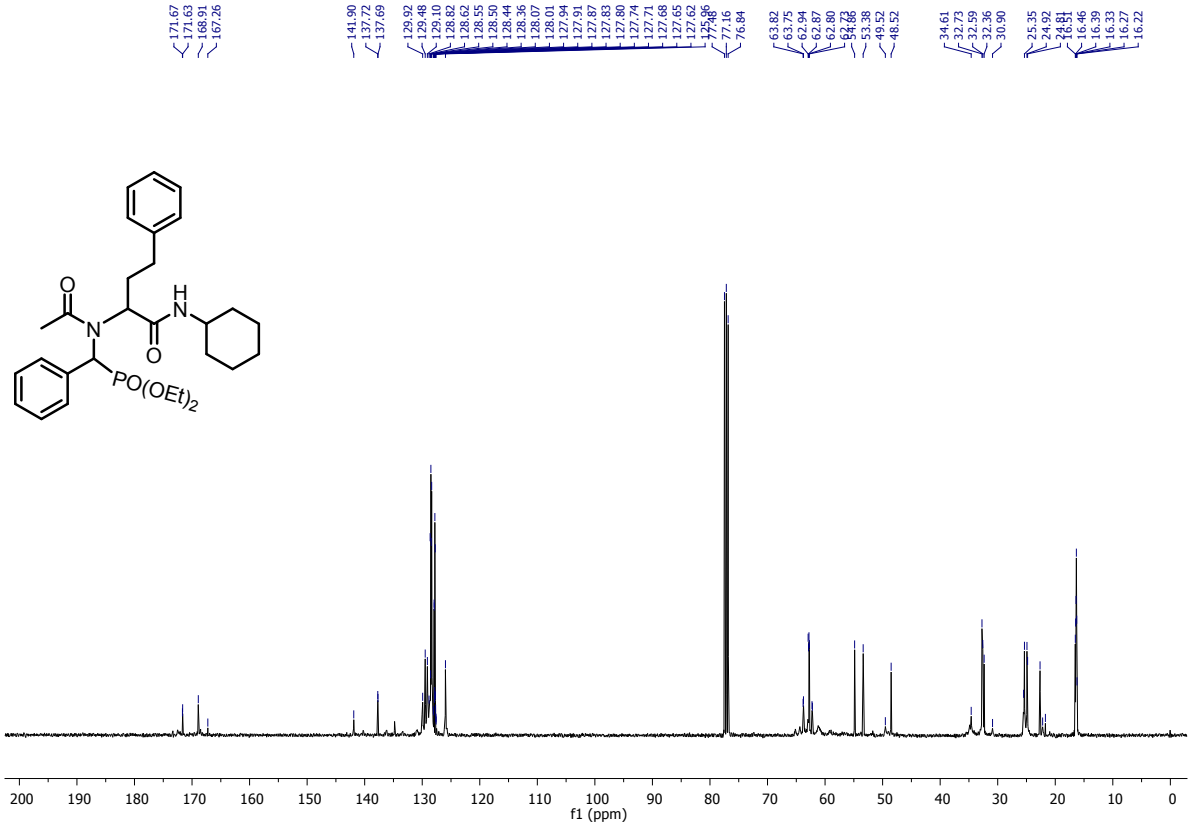

FIGURE 30: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **8**.

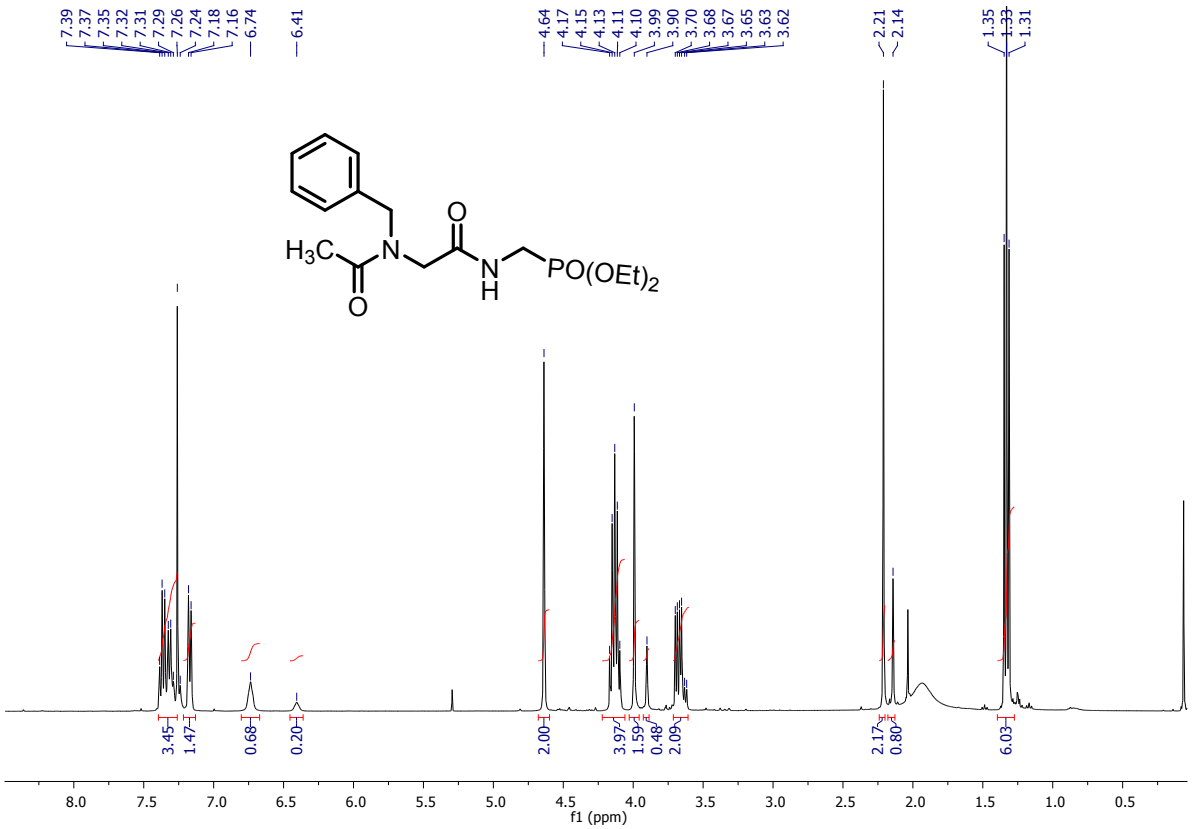

FIGURE 31: 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **9**.

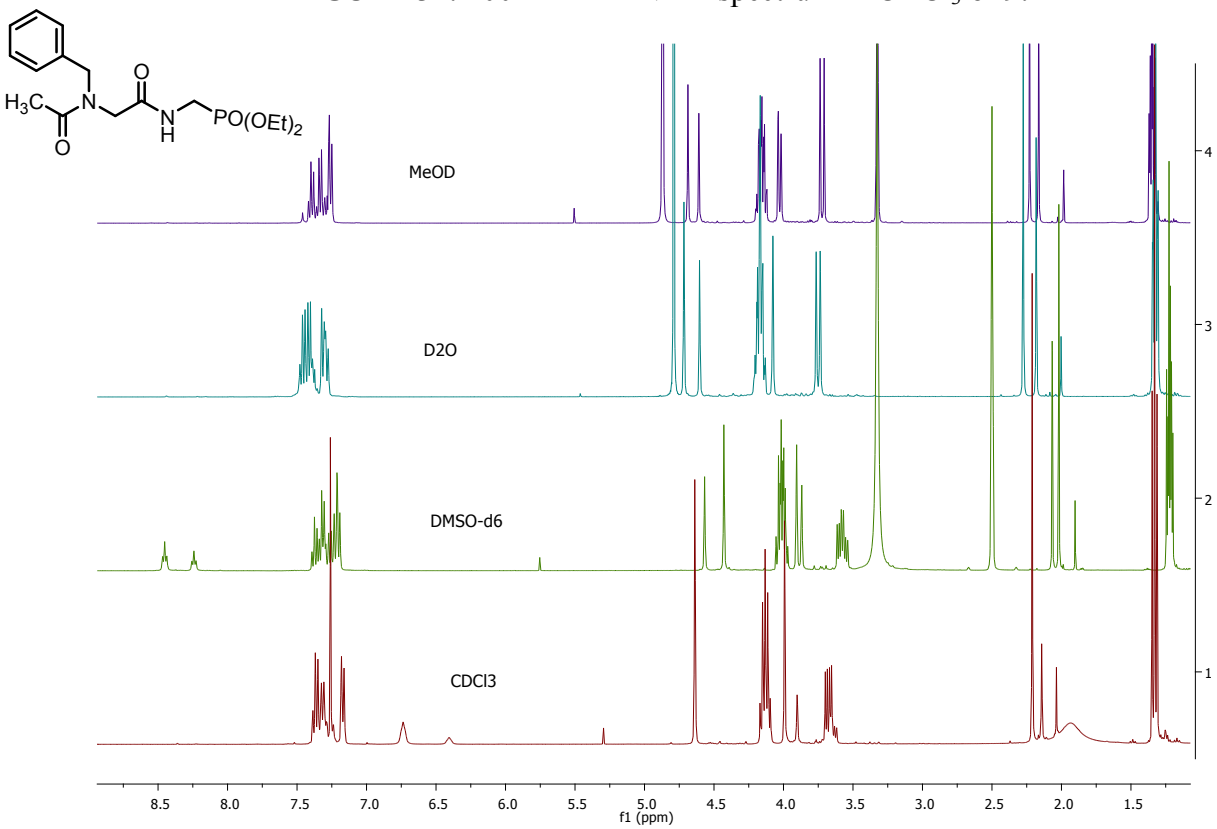

FIGURE 32: 400 MHz ^{1}H NMR spectrum of **9** in different deuterated solvents at 15 mM.

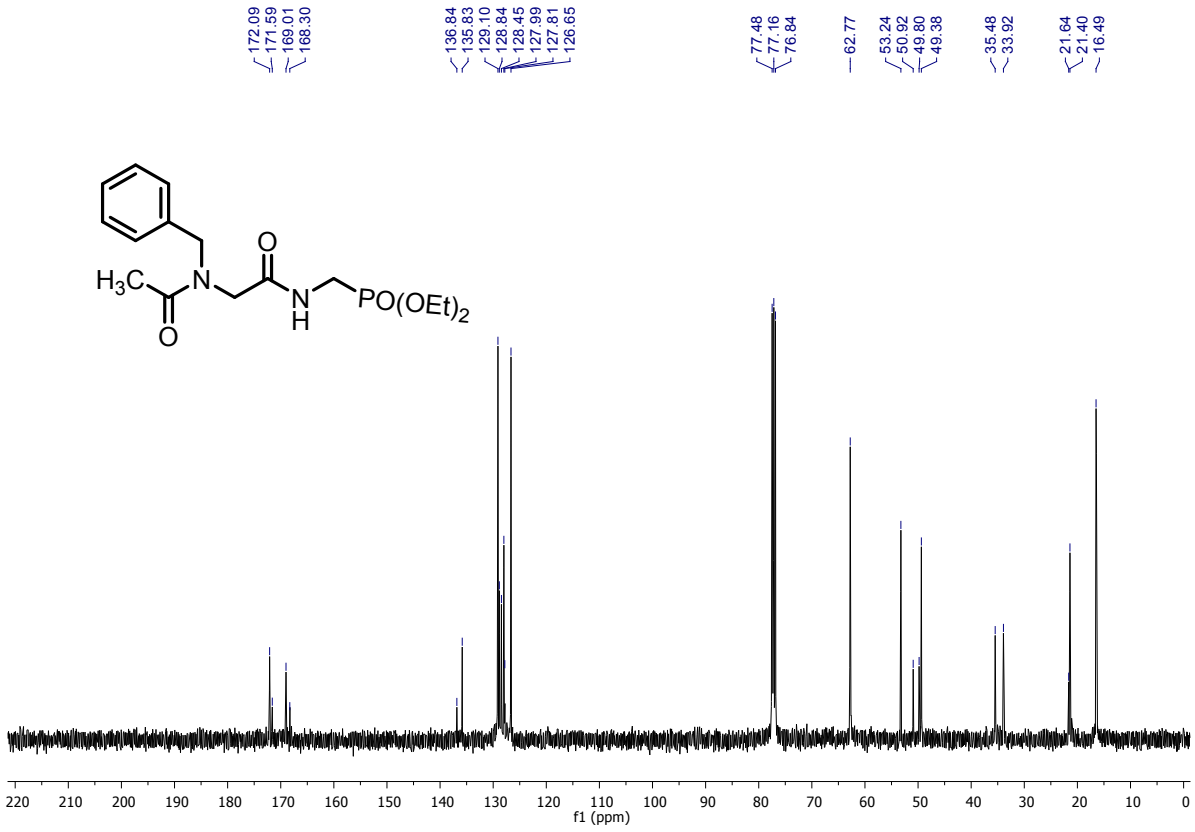

FIGURE 33: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **9**.

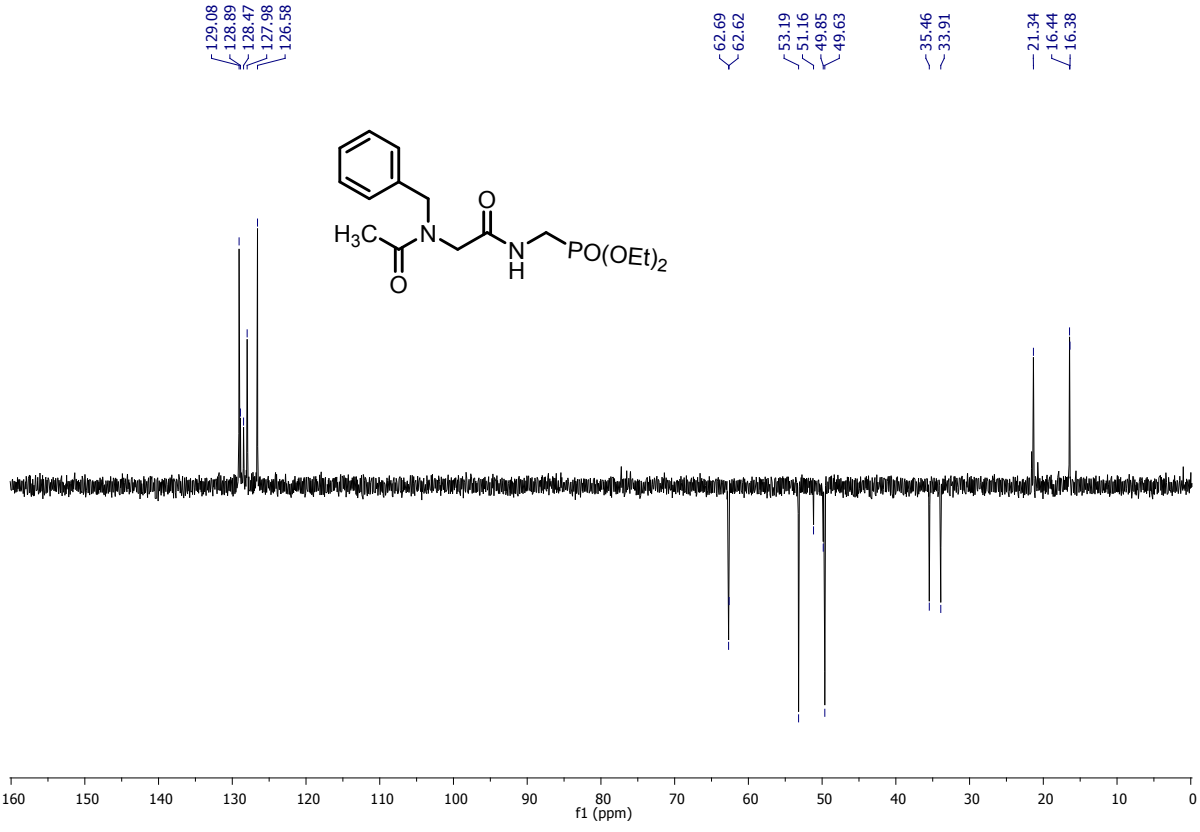

FIGURE 34: DEPT-135° spectrum in $CDCl_3$ of **9**.

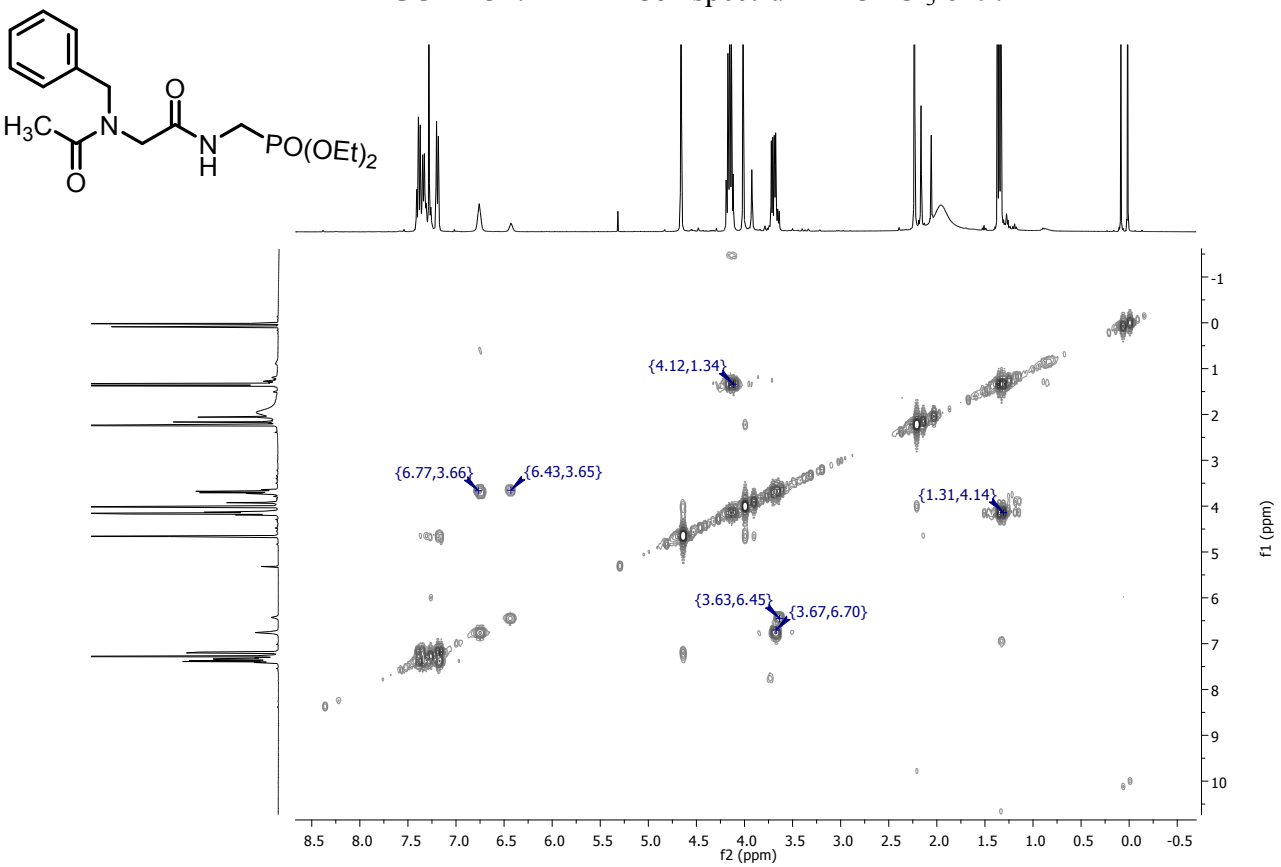

FIGURE 35: COSY spectrum in $CDCl_3$ of **9**.

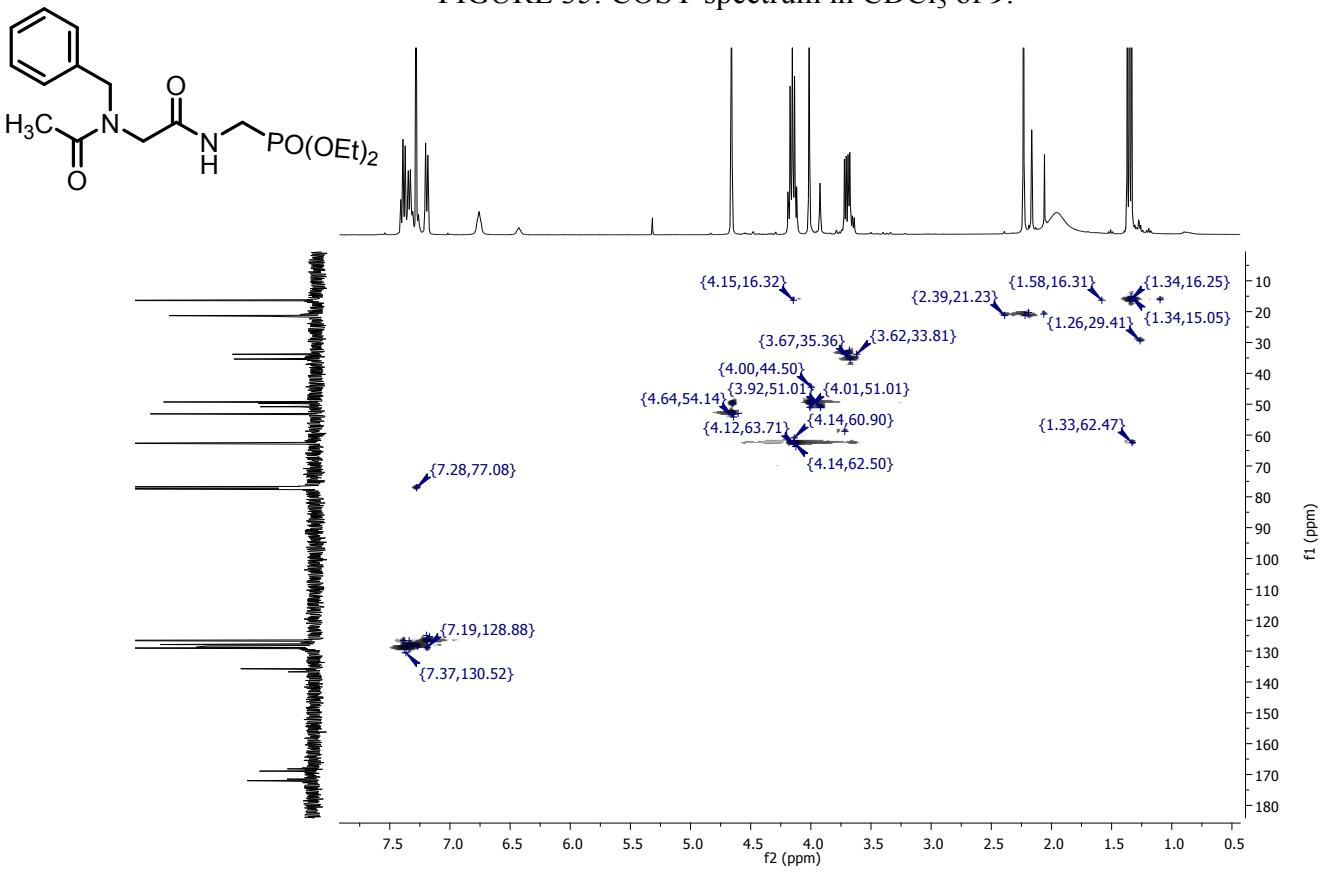

FIGURE 36: HSQC spectrum in $CDCl_3$ of **9**.

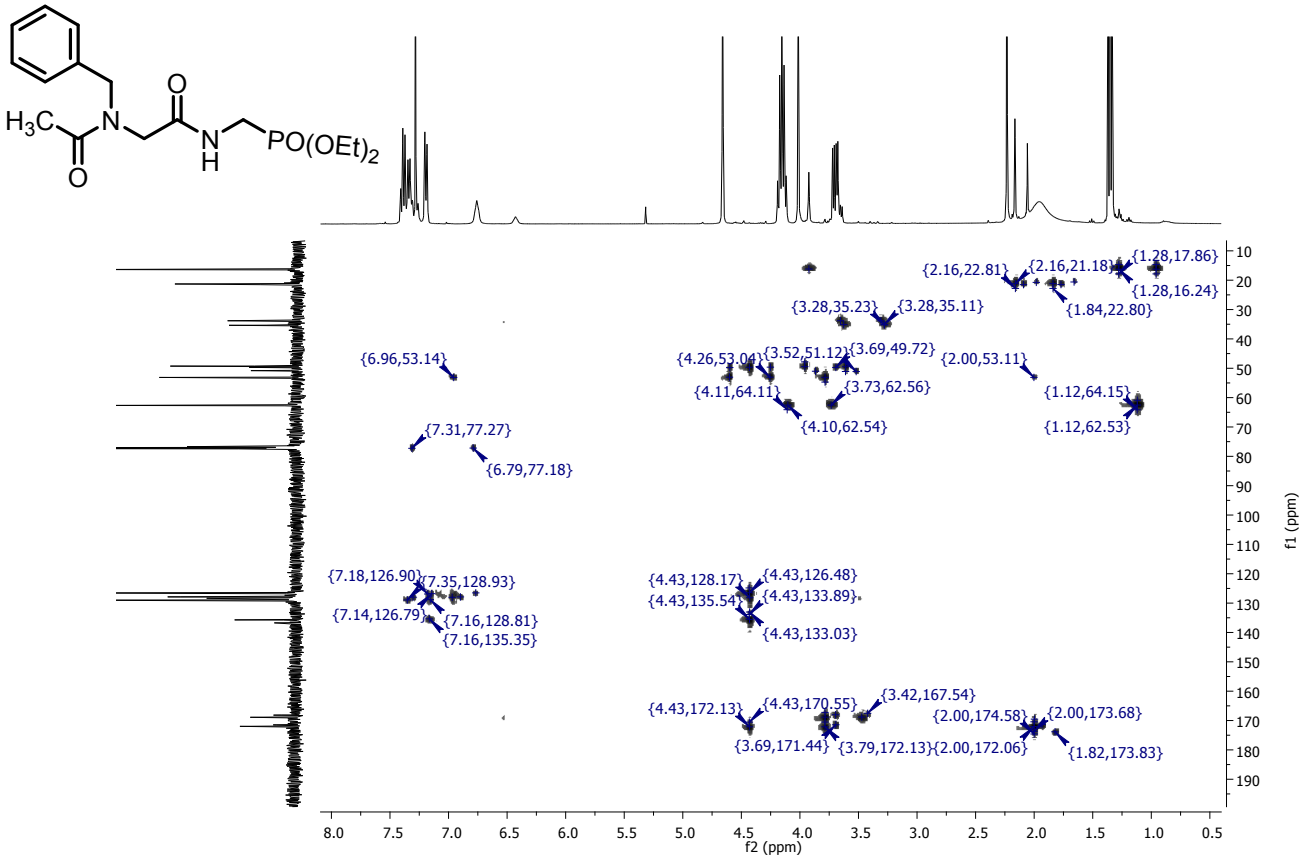

FIGURE 37: HMBC spectrum in $CDCl_3$ of **9**.

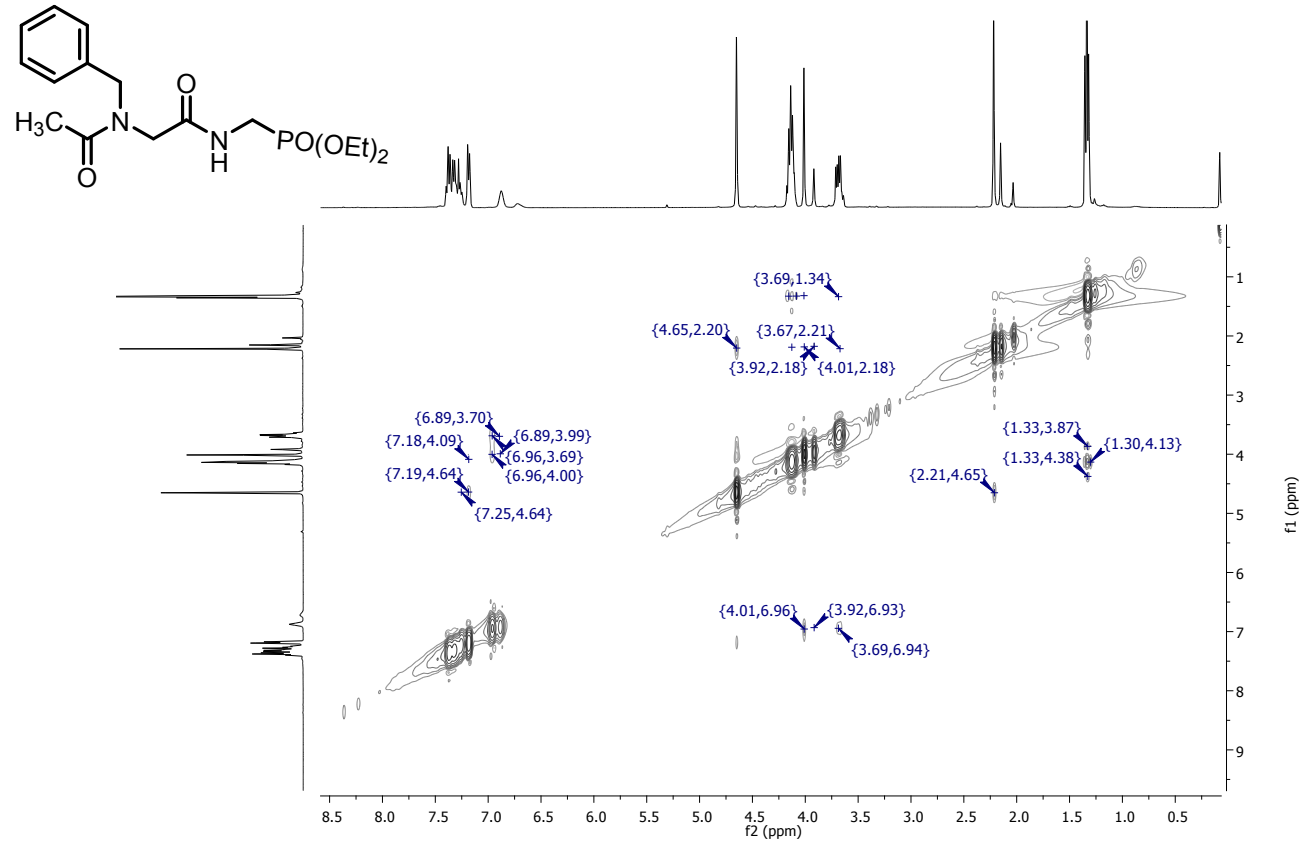

FIGURE 38: NOESY spectrum in $CDCl_3$ of **9**.

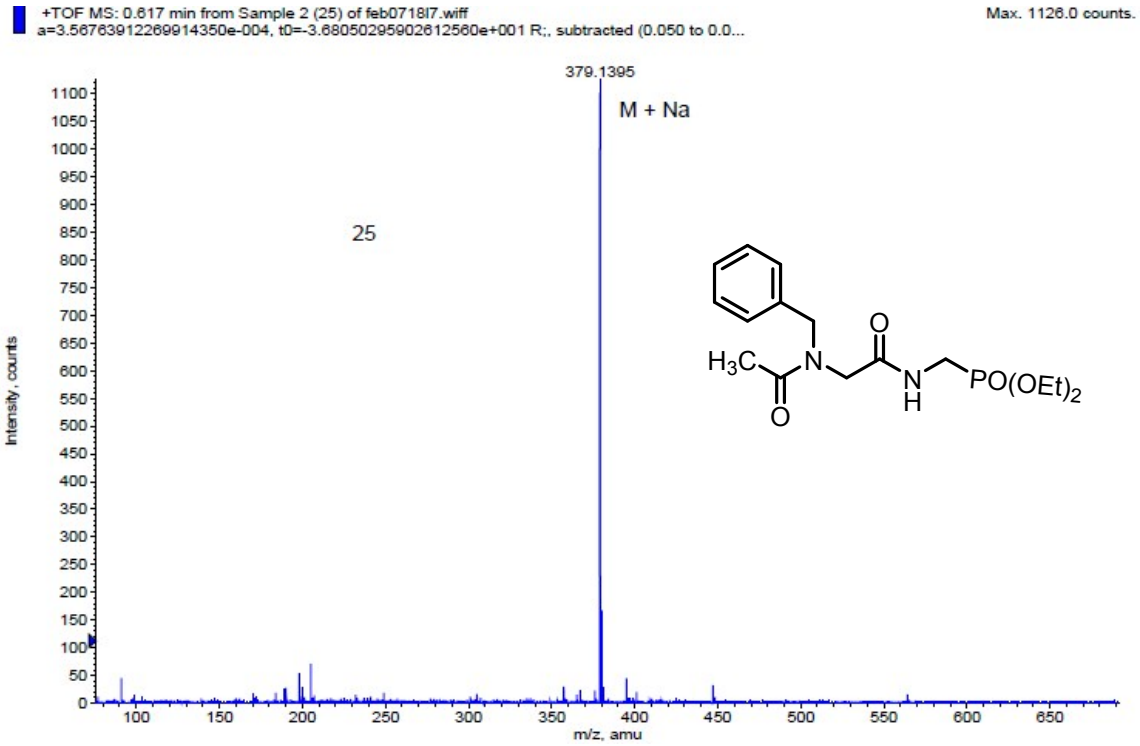

FIGURE 39- HRMS (ESI-FT-ICR) m/z spectrum of **9**.

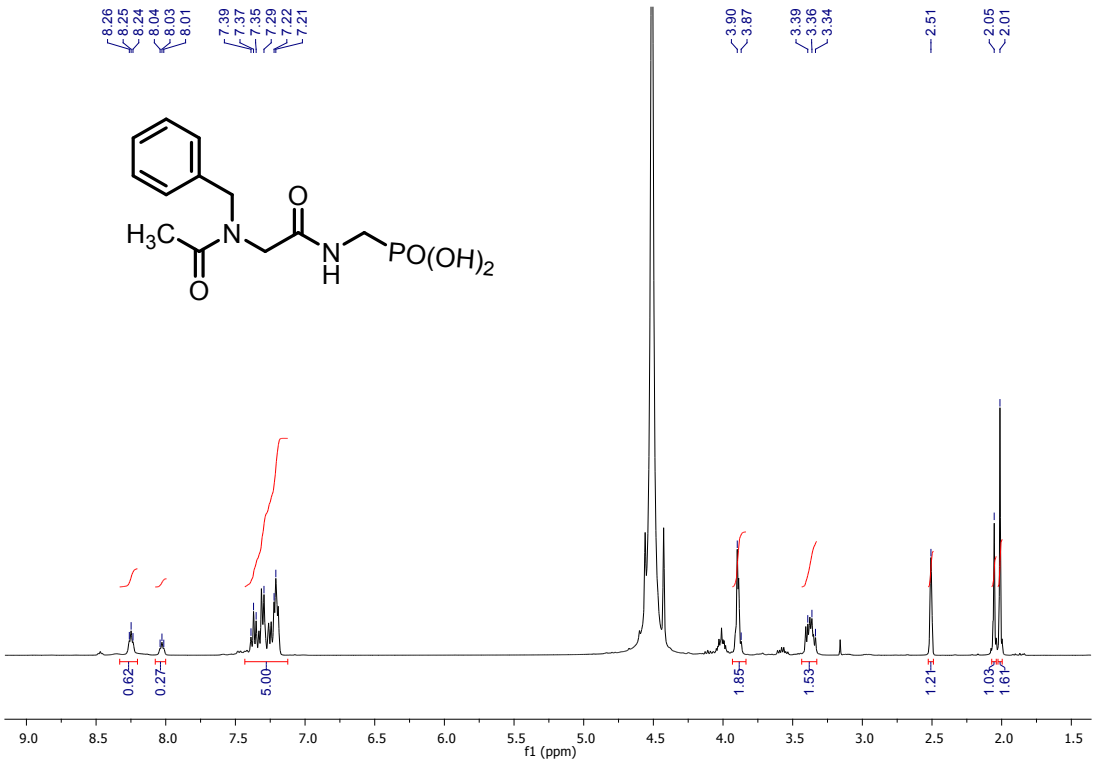

FIGURE 40: 400 MHz ^{1}H NMR spectrum in DMSO-d6 of **10**.

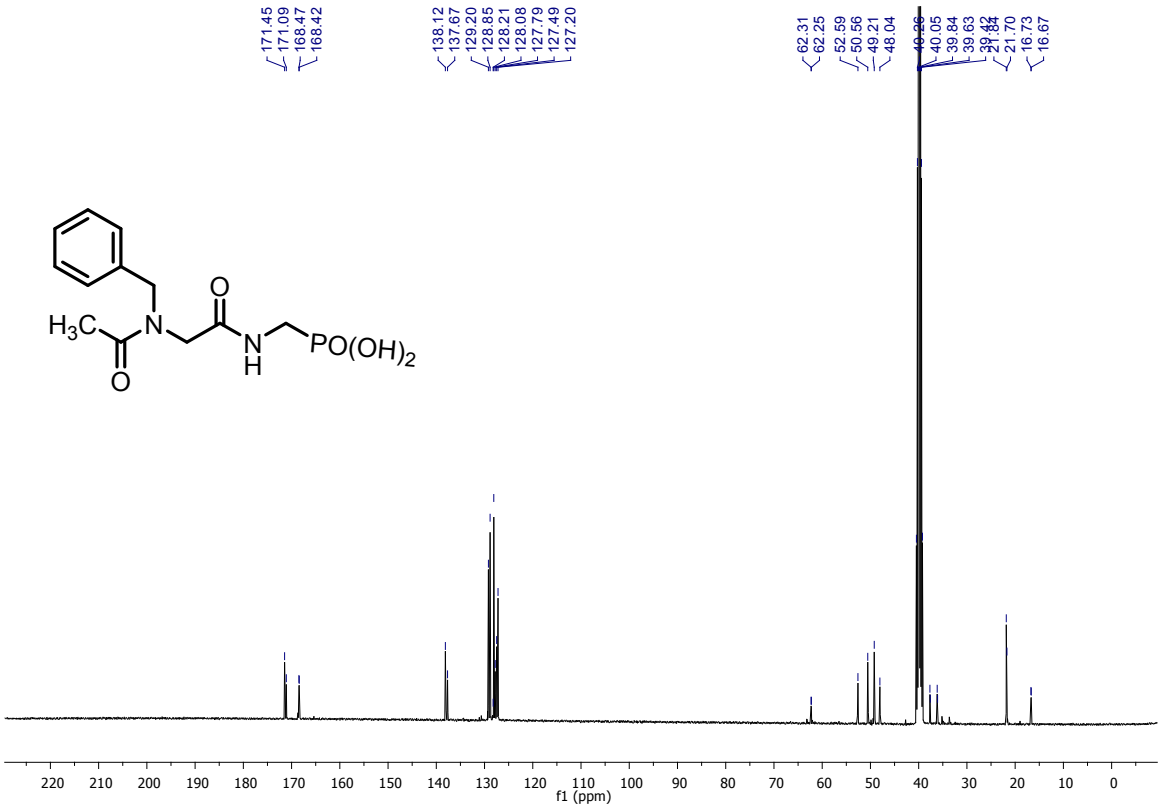

FIGURE 41: 100 MHz ^{13}C NMR spectrum in DMSO-d6 of **10**.

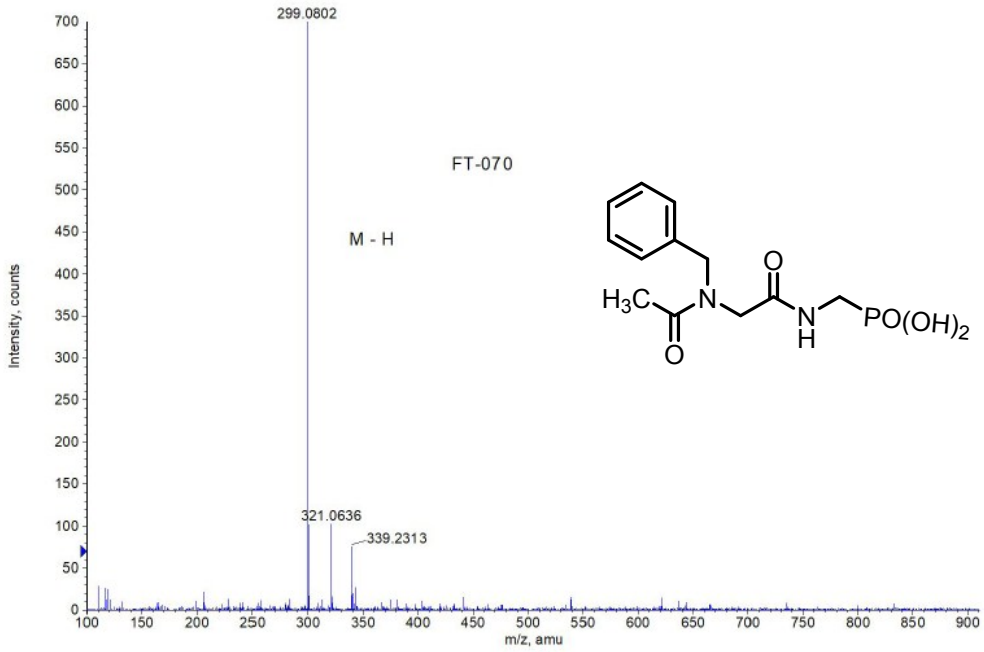

FIGURE 42: HRMS (ESI-FT-ICR) m/z spectrum of **10**.

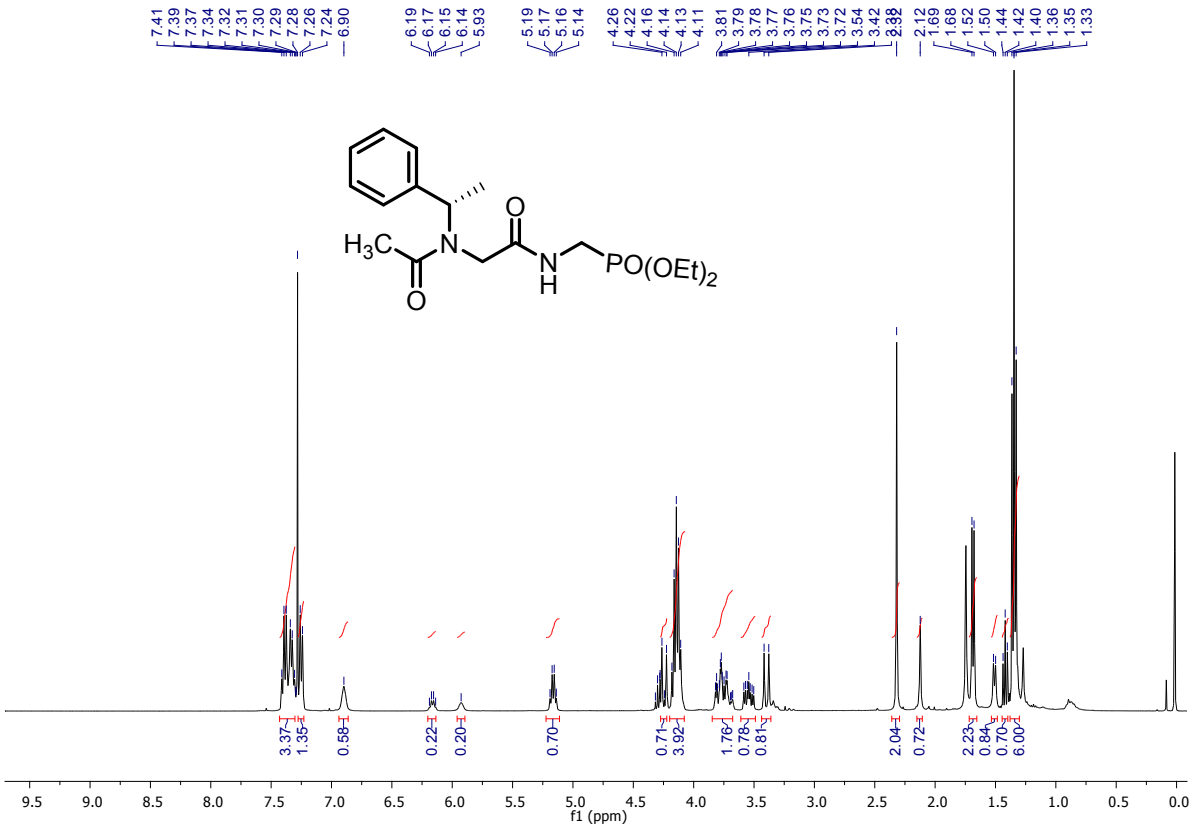

FIGURE 43: 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **11**.

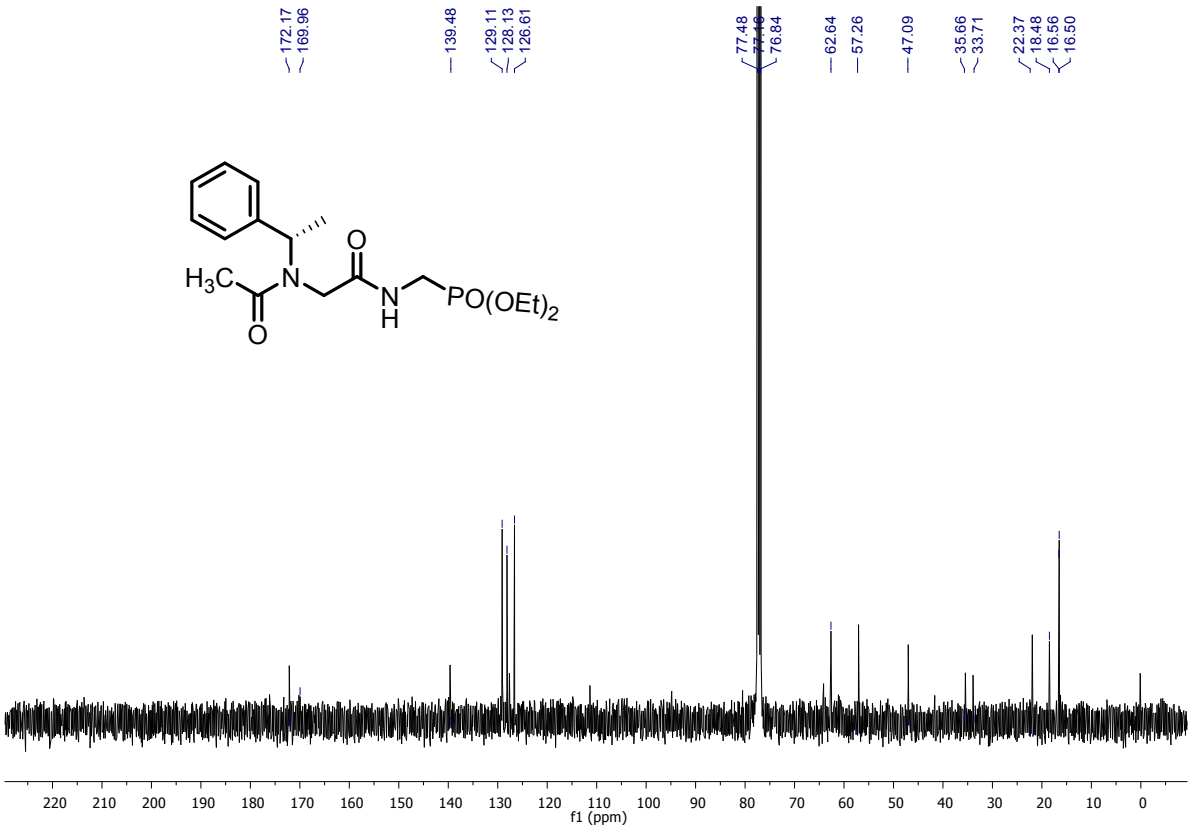

FIGURE 44: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **11**.

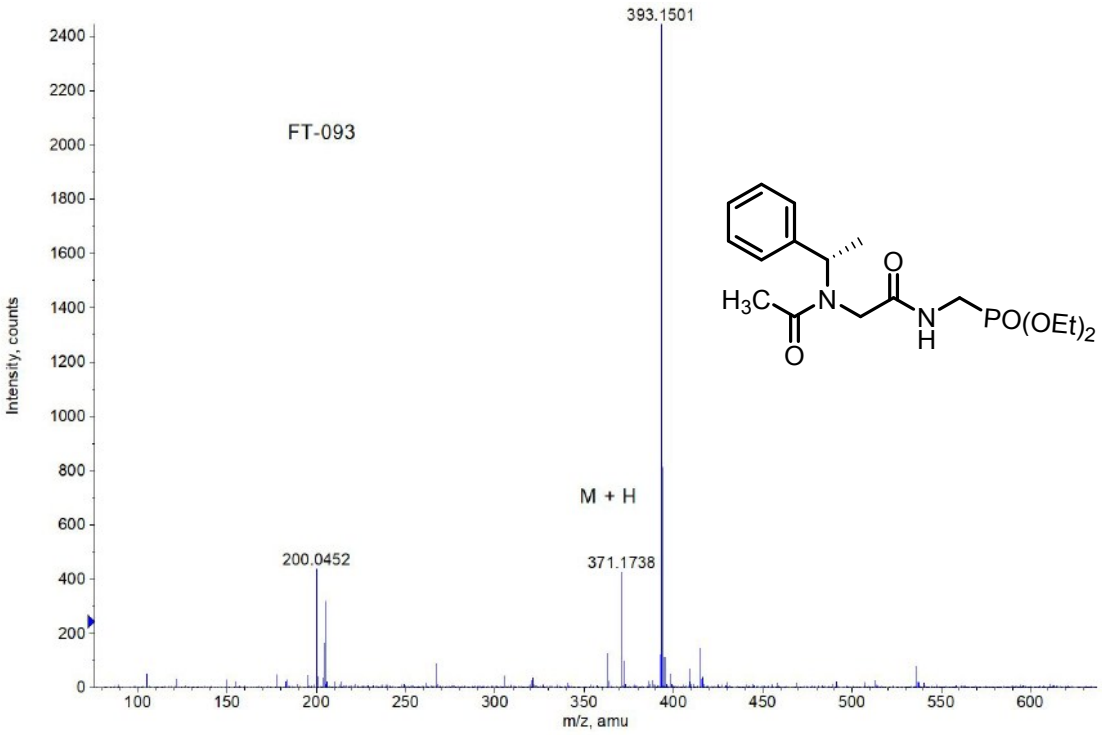

FIGURE 45: HRMS (ESI-FT-ICR) m/z spectrum of **11**.

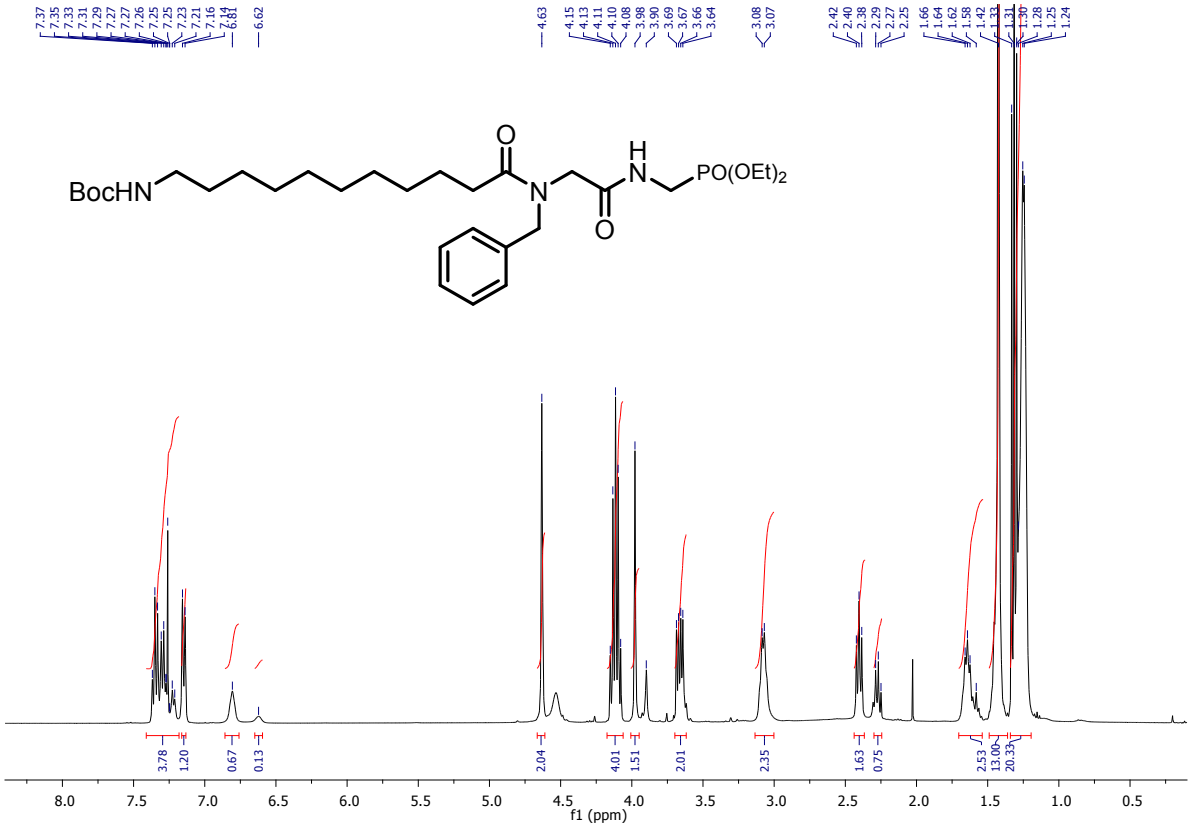

FIGURE 46: 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **12**.

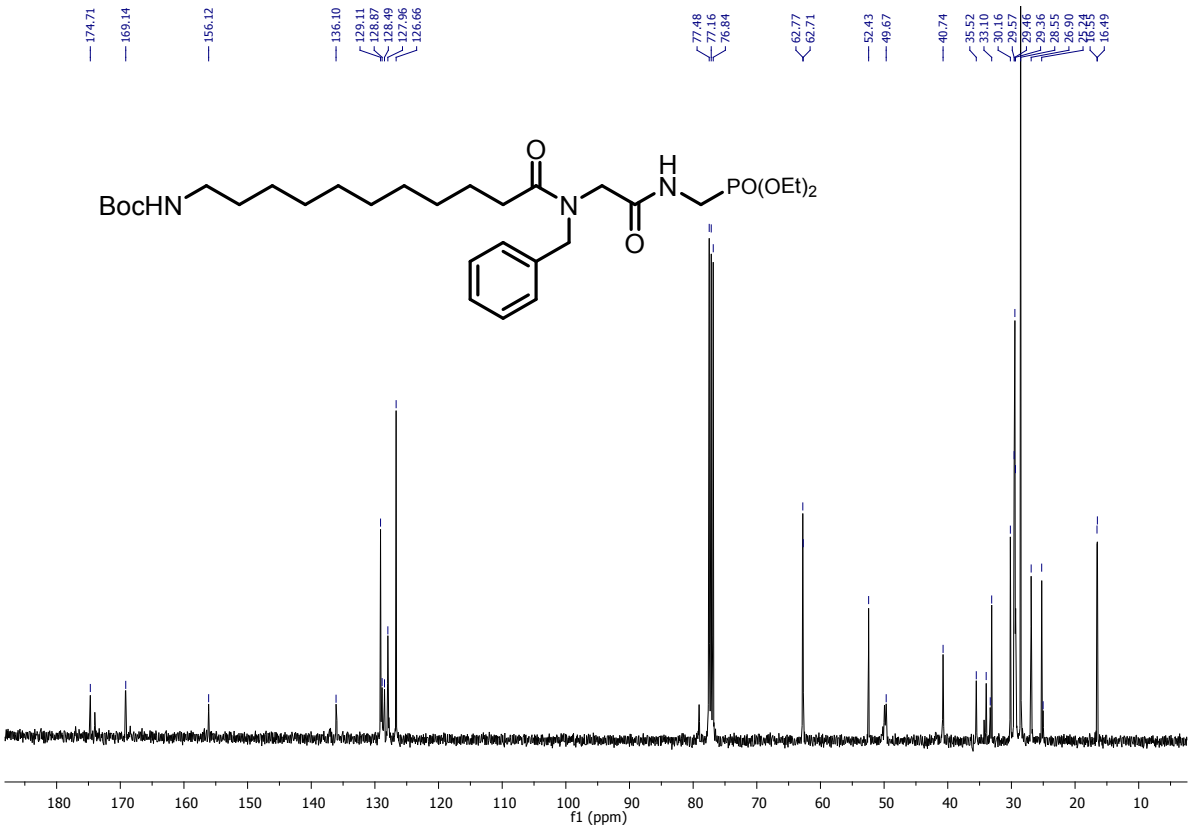

FIGURE 47: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **12**.

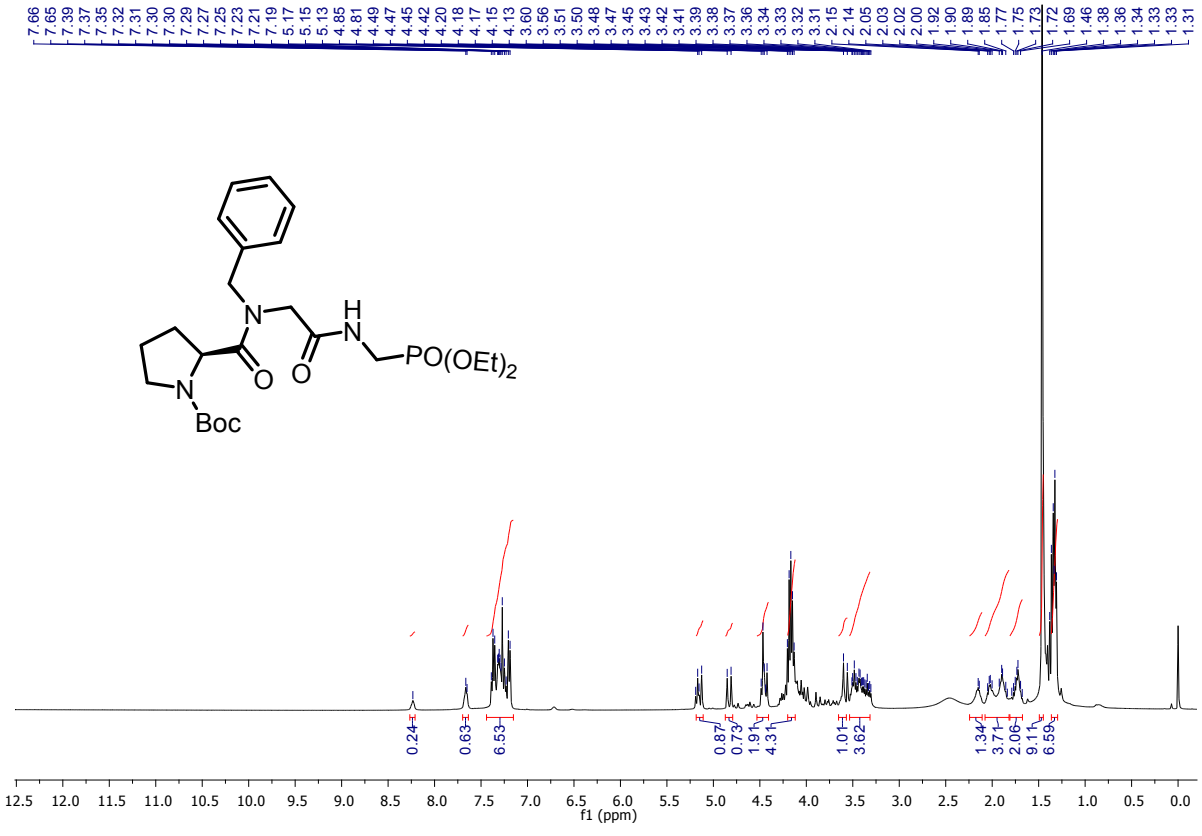

FIGURE 48: 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **13**.

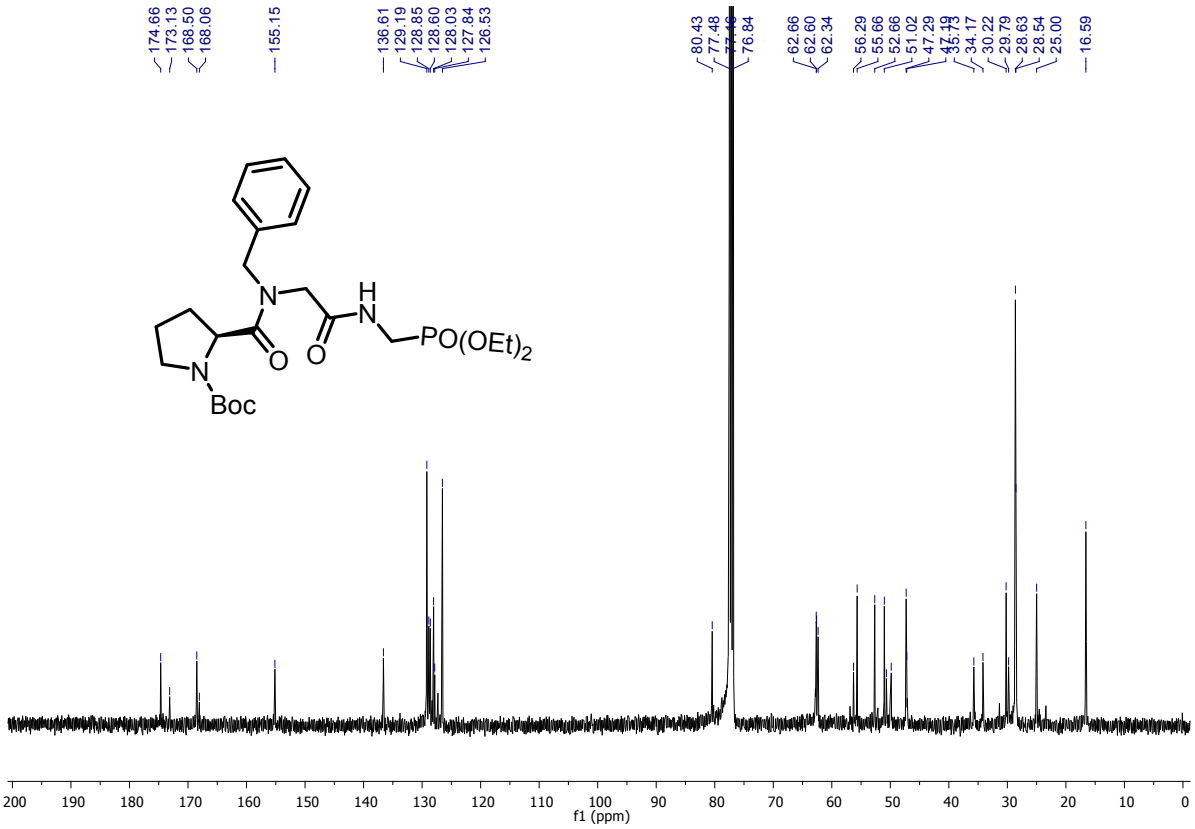

FIGURE 49: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **13**.

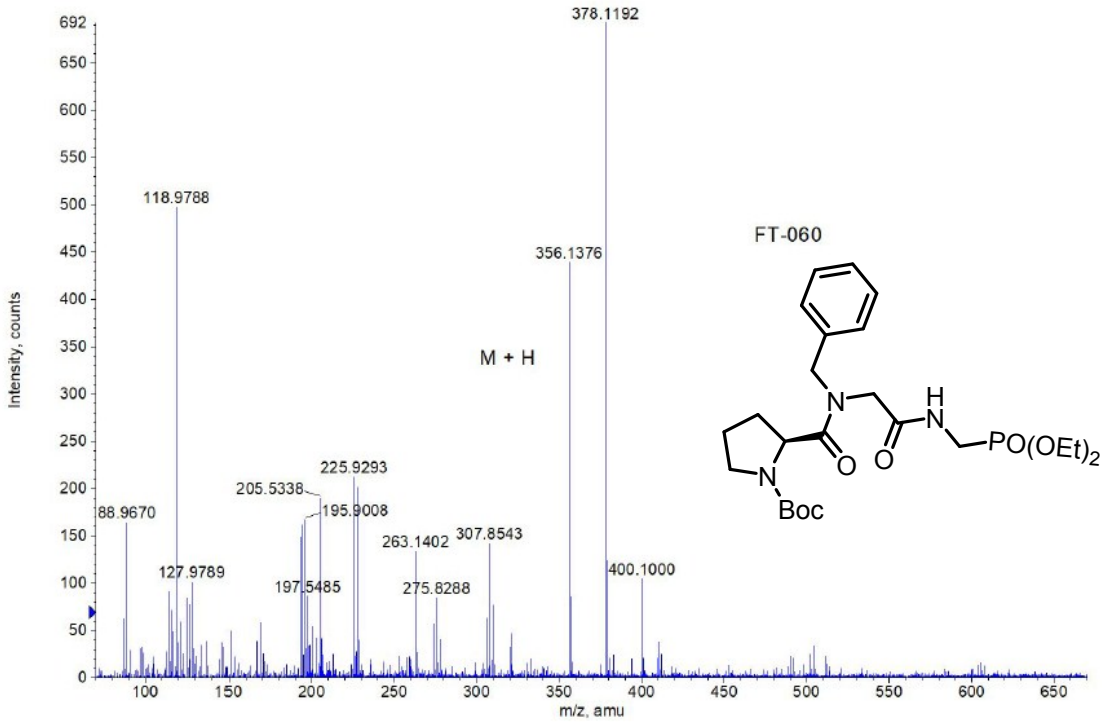

FIGURE 50: HRMS (ESI-FT-ICR) m/z spectrum of **13**.

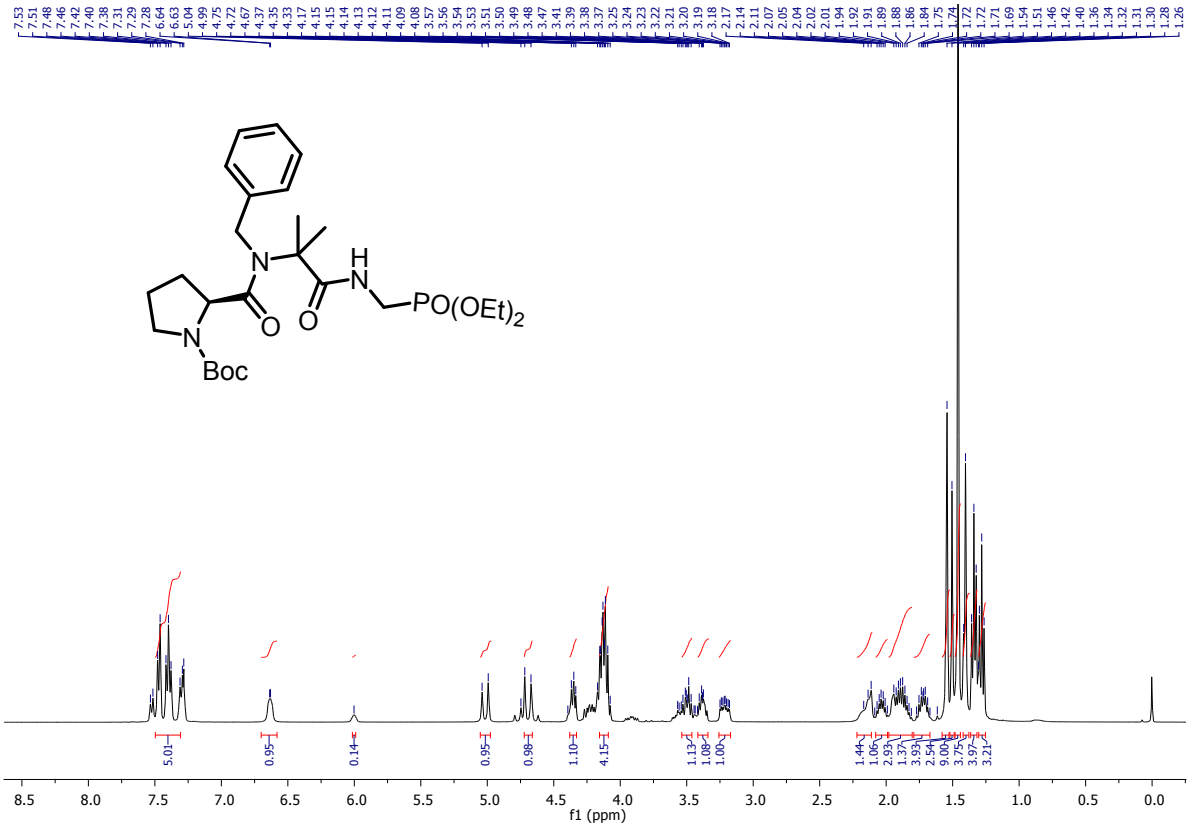

FIGURE 51: 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **14**.

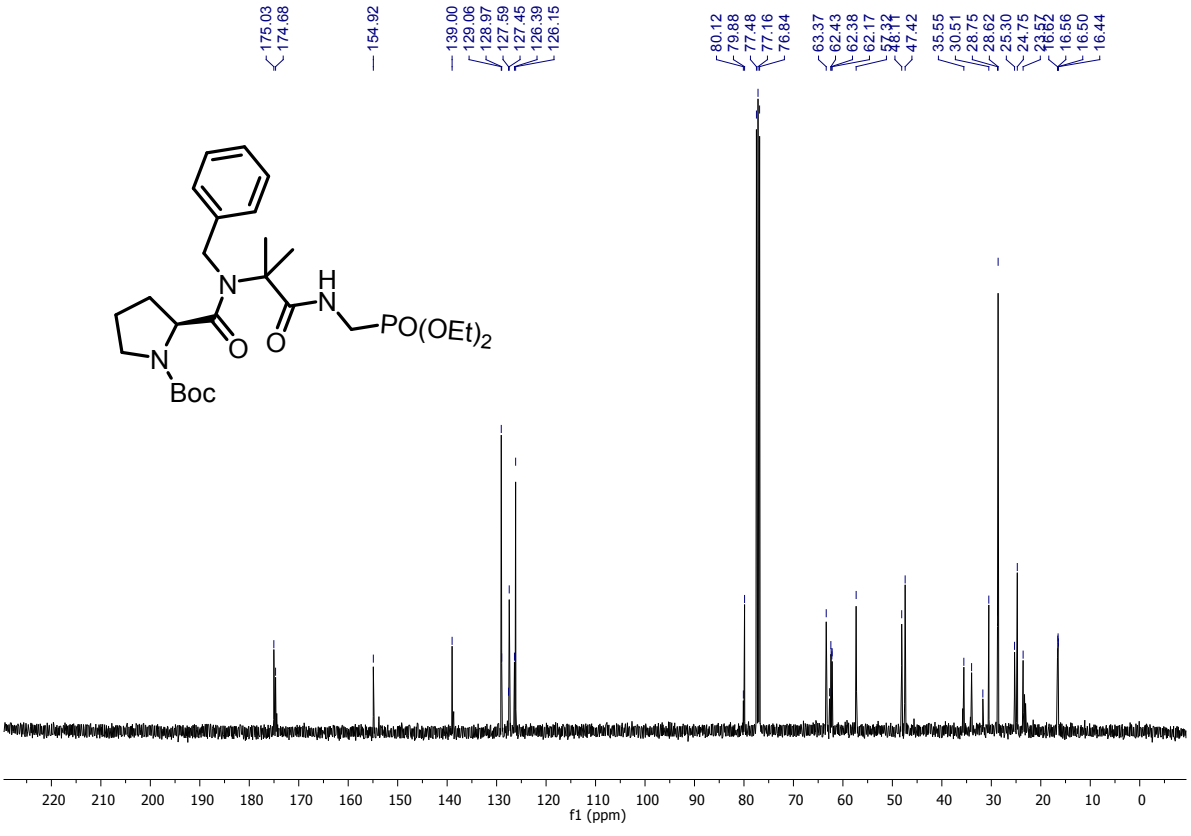

FIGURE 52: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **14**.

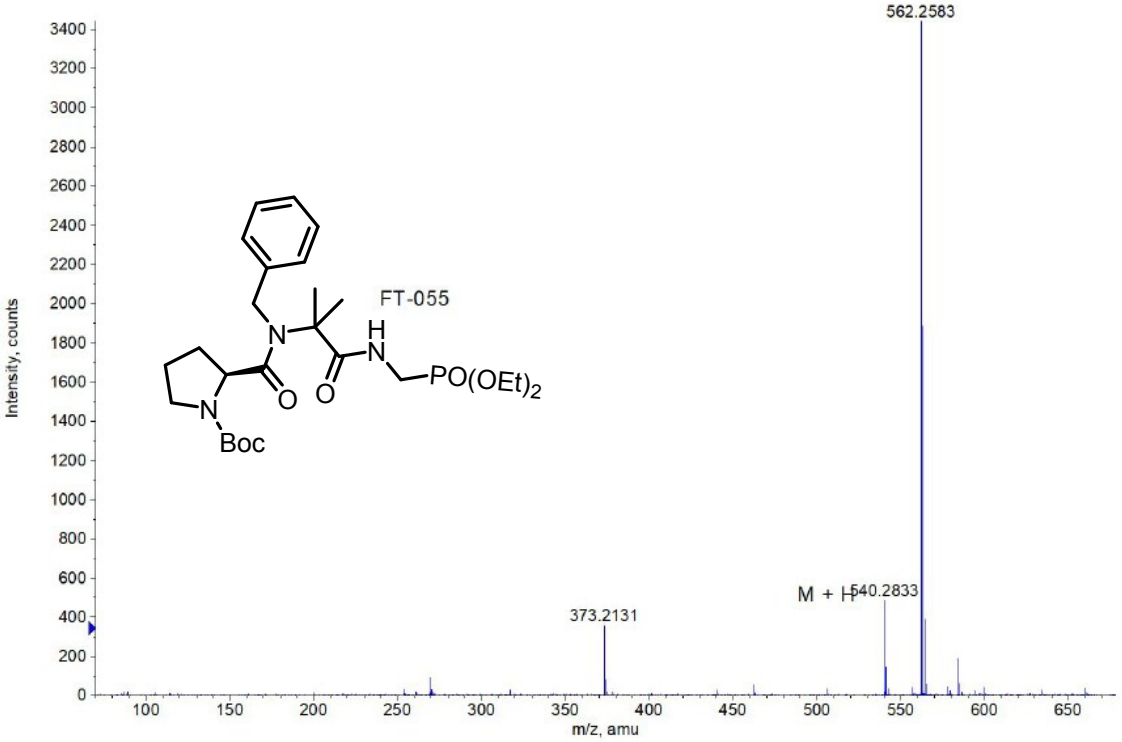

FIGURE 53: HRMS (ESI-FT-ICR) m/z spectrum of **14**.

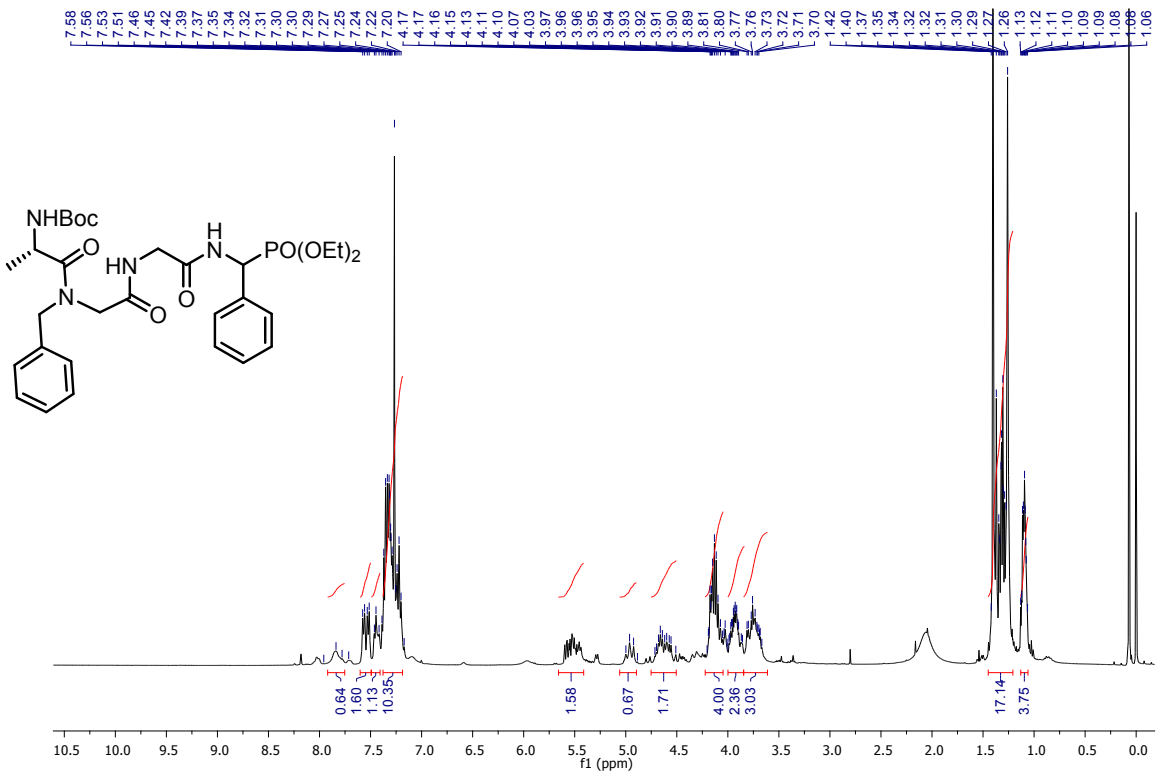

FIGURE 54: 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **15**.

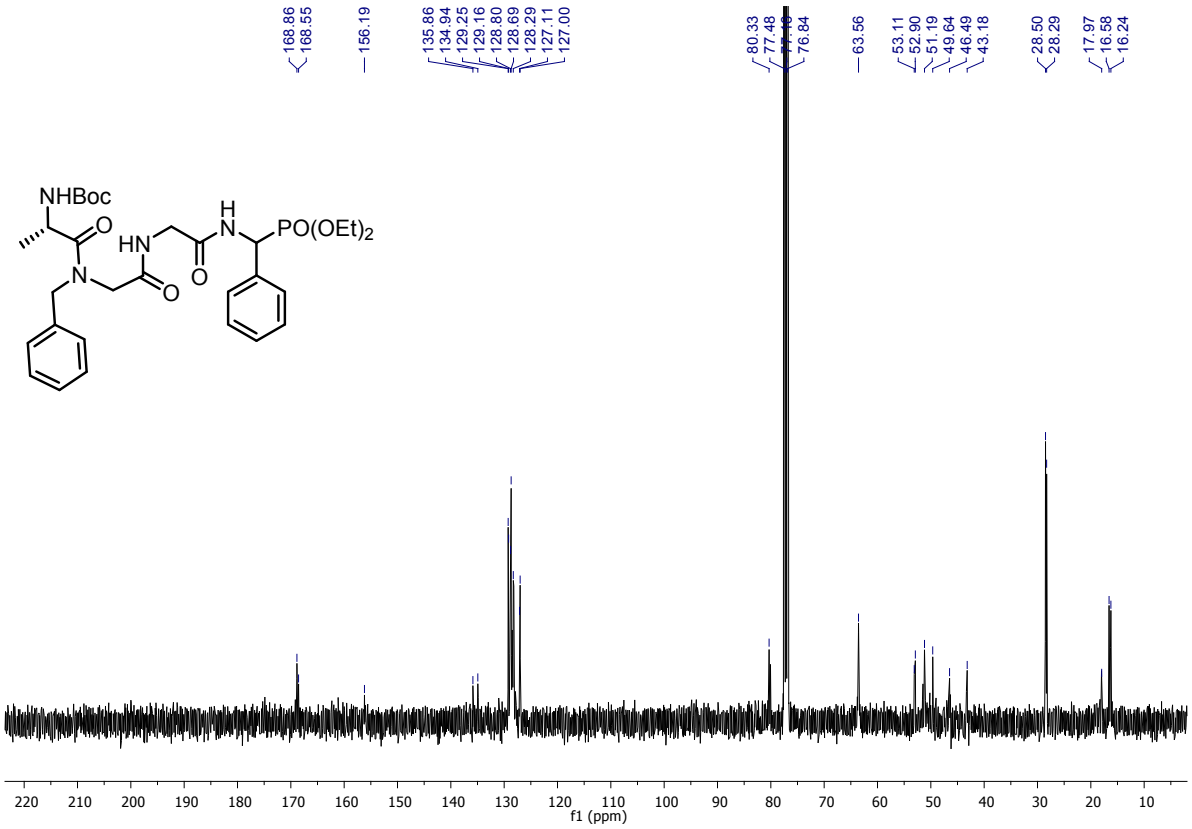

FIGURE 55: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **15**.

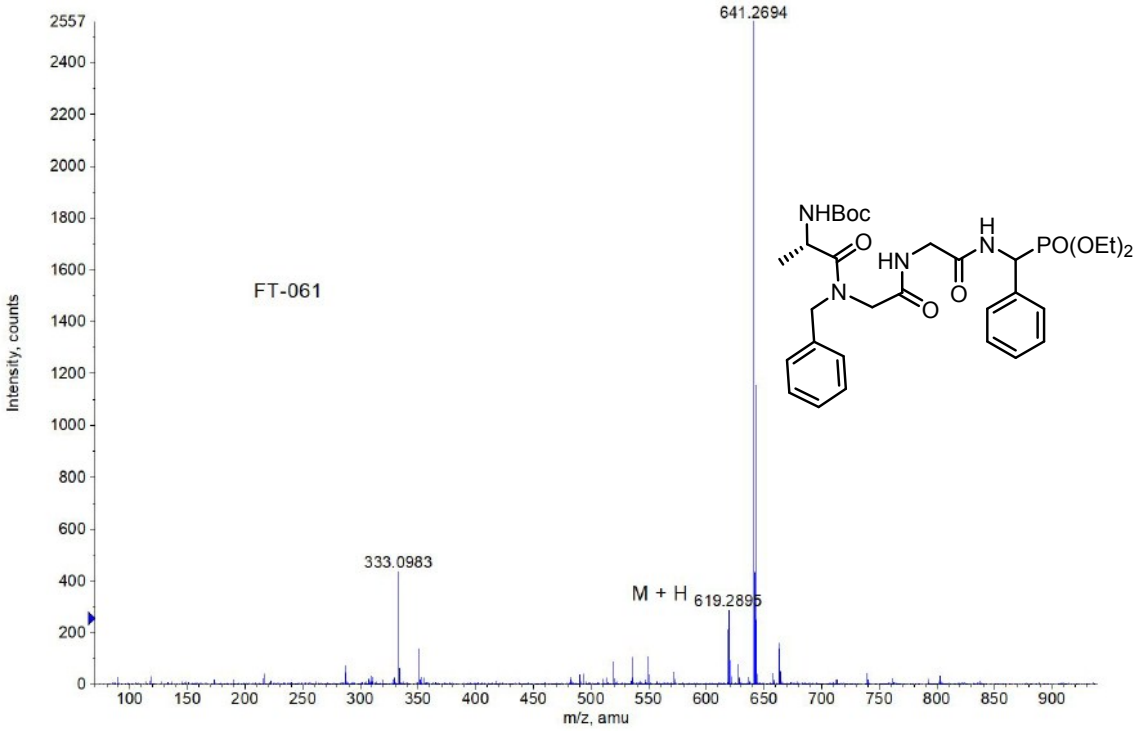

FIGURE 56: HRMS (ESI-FT-ICR) m/z spectrum of **15**.

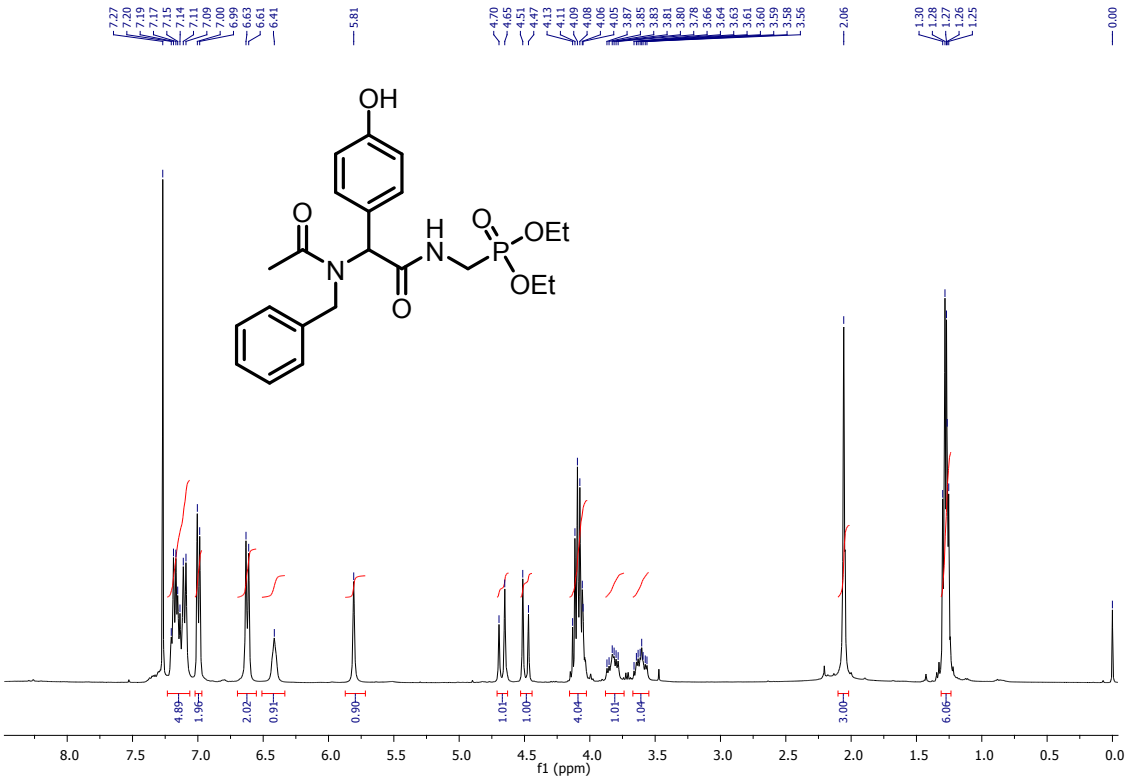

FIGURE 57: 400 MHz ^{1}H NMR spectrum in $CDCl_3$ of **16**.

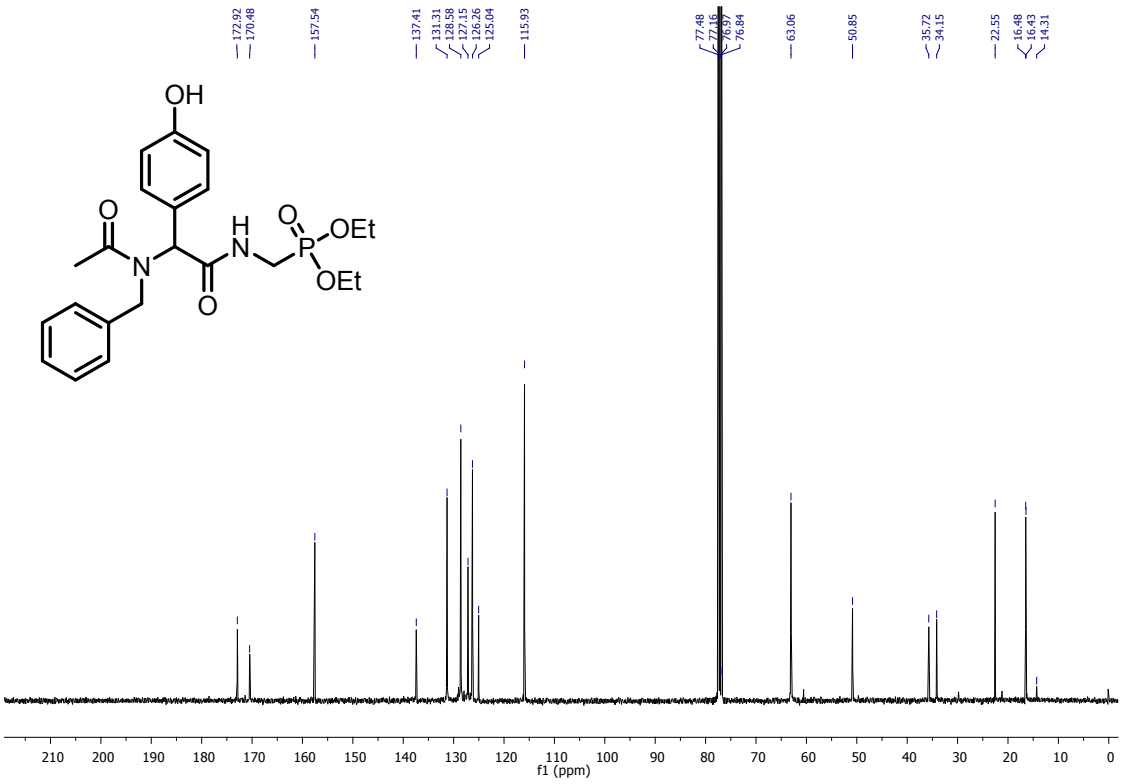

FIGURE 58: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **16**.

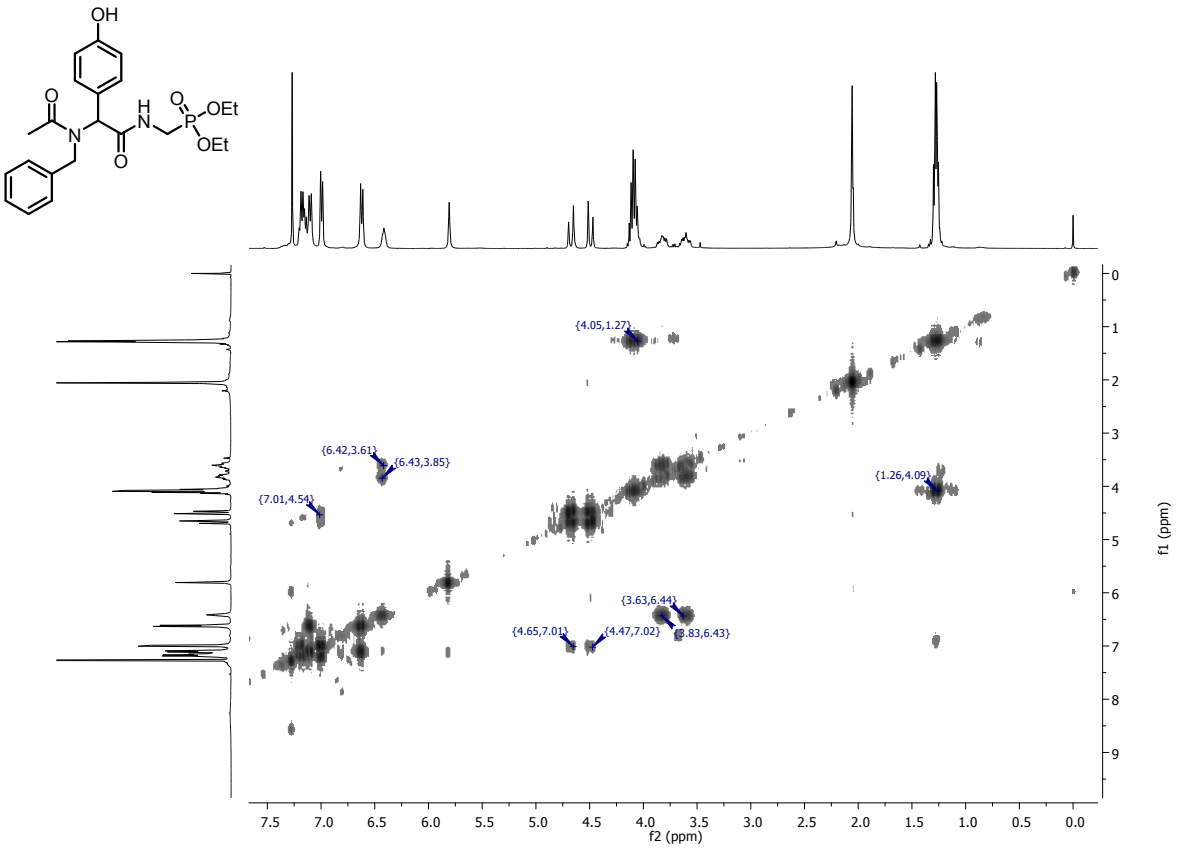

FIGURE 59: COSY spectrum in $CDCl_3$ of **16**.

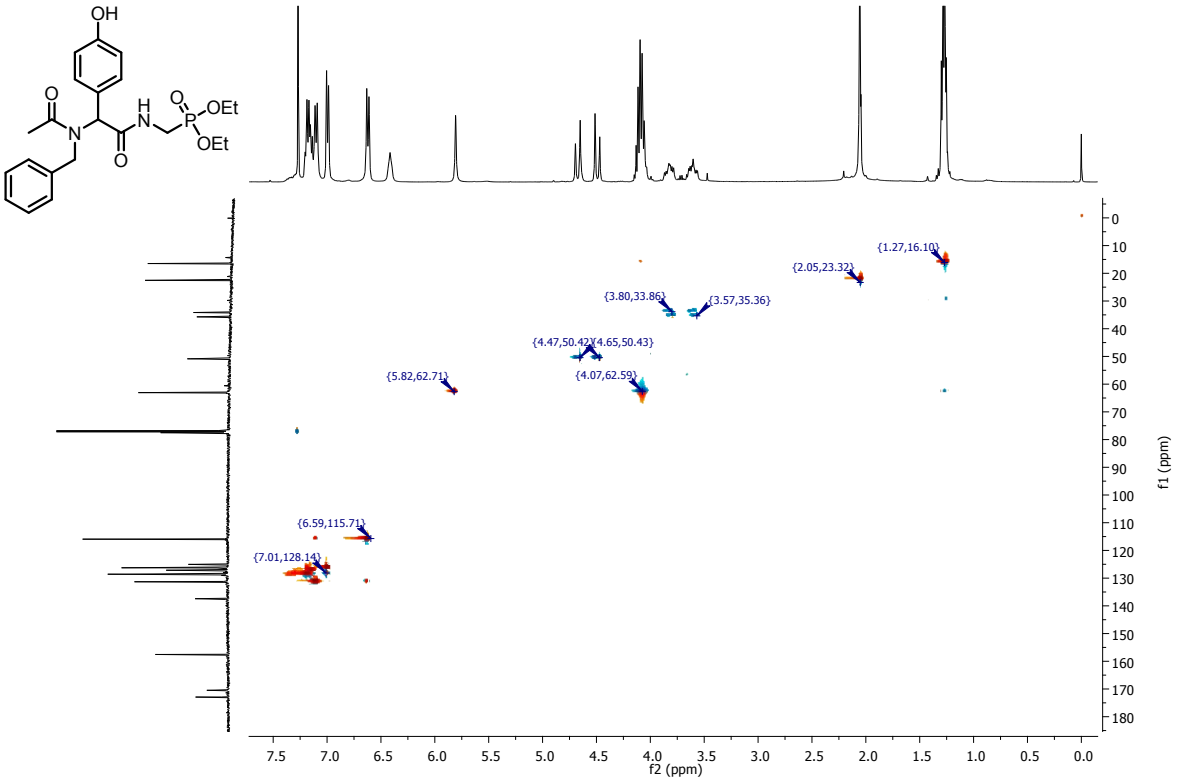

FIGURE 60: Multiplicity-edited HSQC spectrum of 16. (In the 2D spectrum shown above the red peaks denote CH_3 or CH signals, while the blue signal denote CH_2 signals)

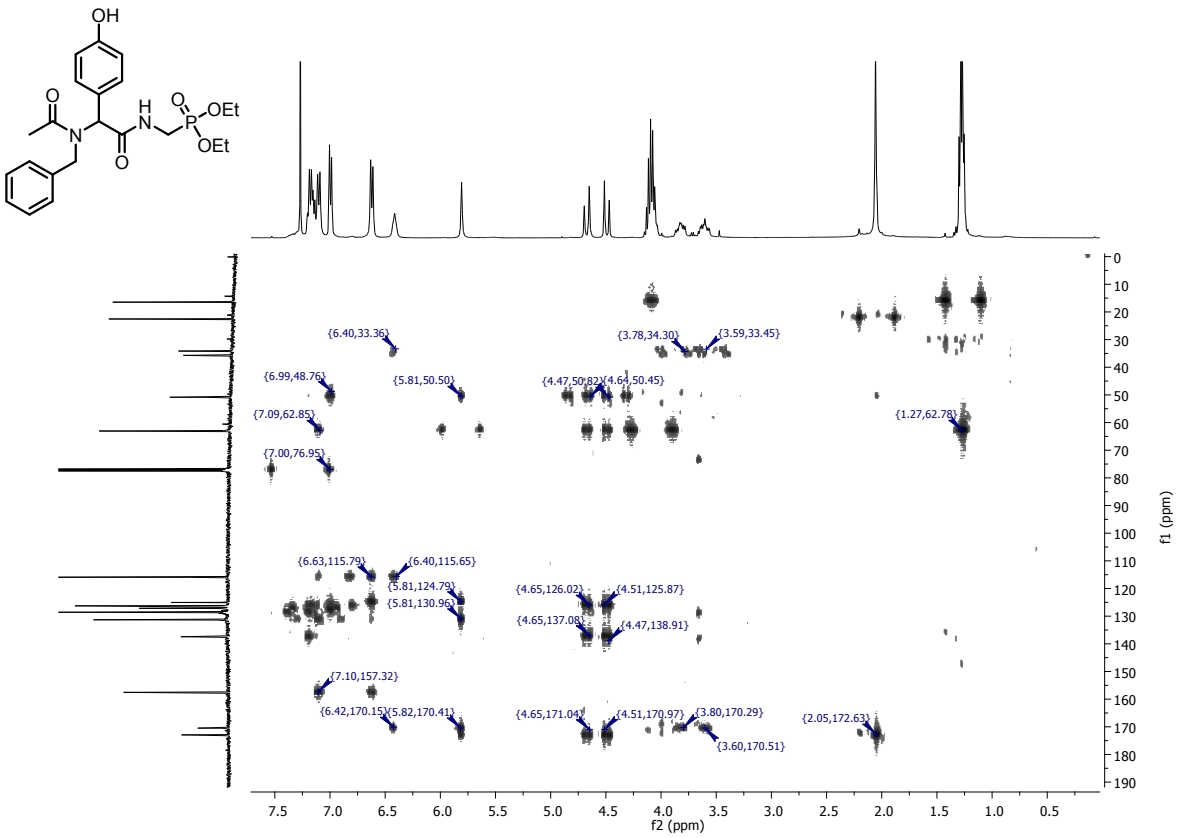

FIGURE 61: HMBC spectrum in $CDCl_3$ of **16**.

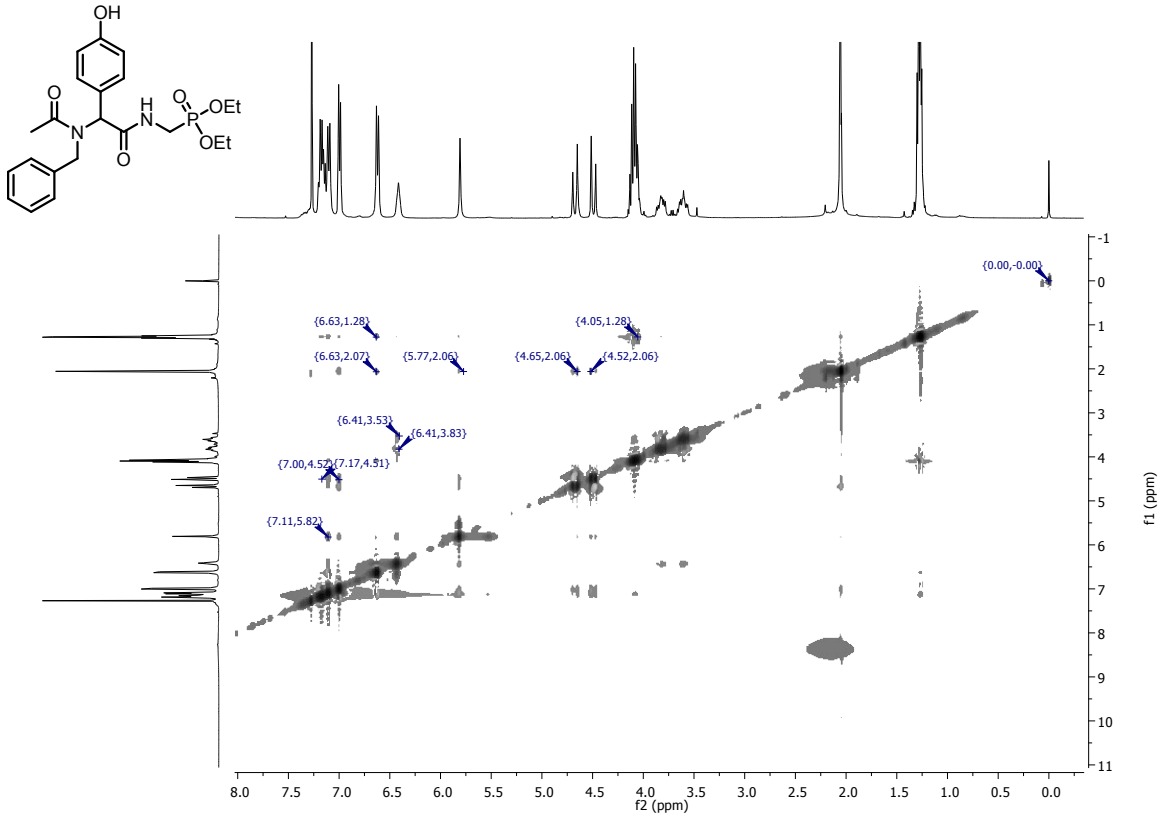

FIGURE 62: NOESY spectrum in $CDCl_3$ of **16**.

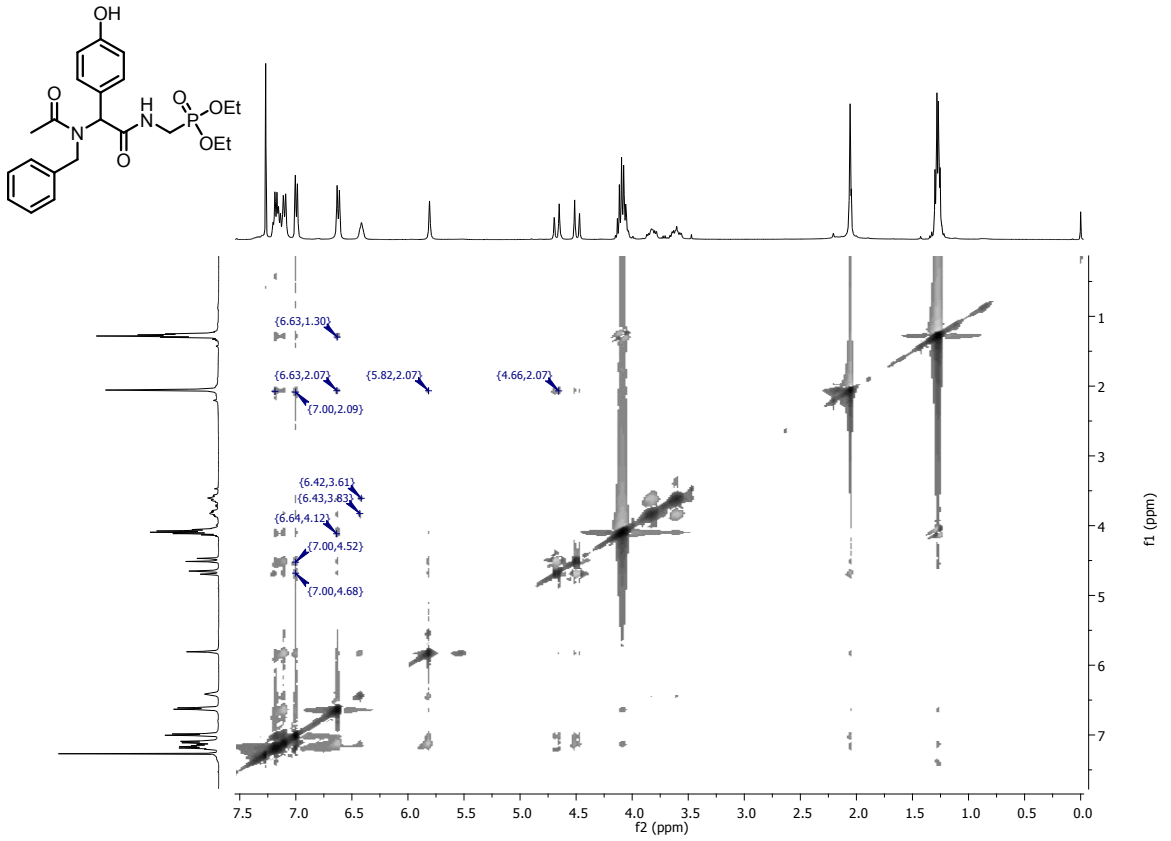

FIGURE 63: ROESY spectrum in $CDCl_3$ of **16**.

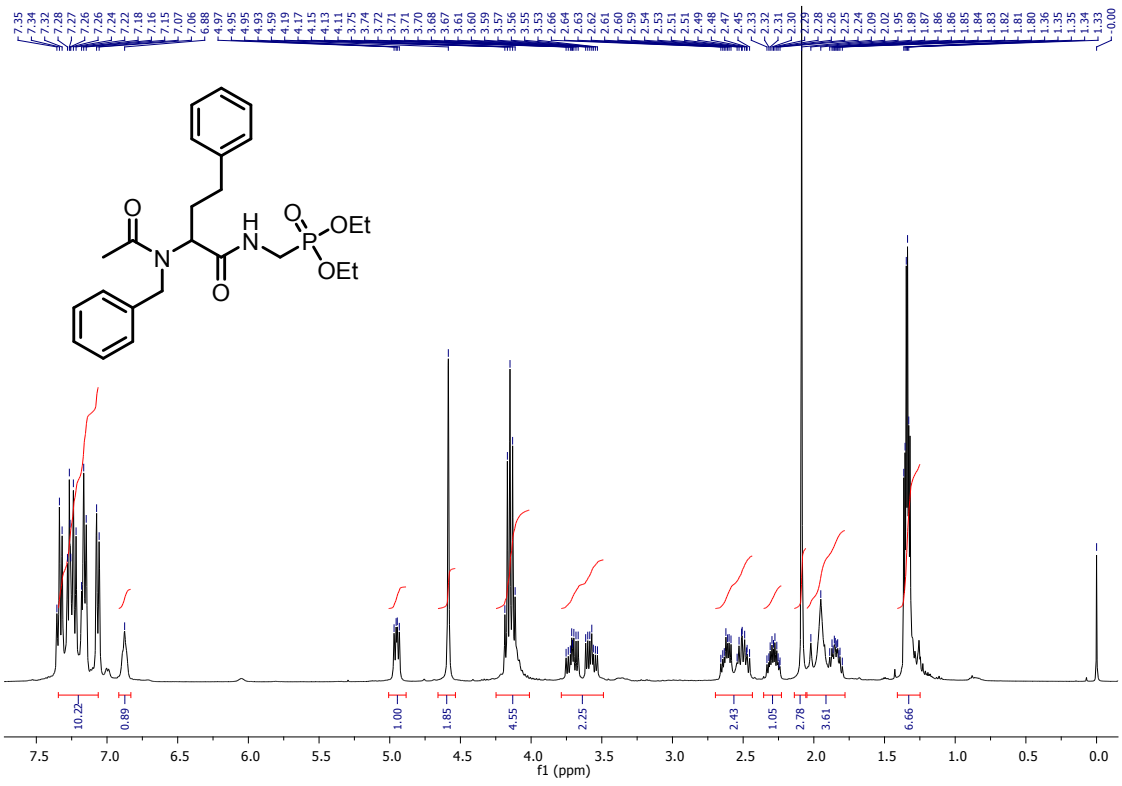

FIGURE 64: 400 MHz ^1H NMR spectrum in $CDCl_3$ of **17**.

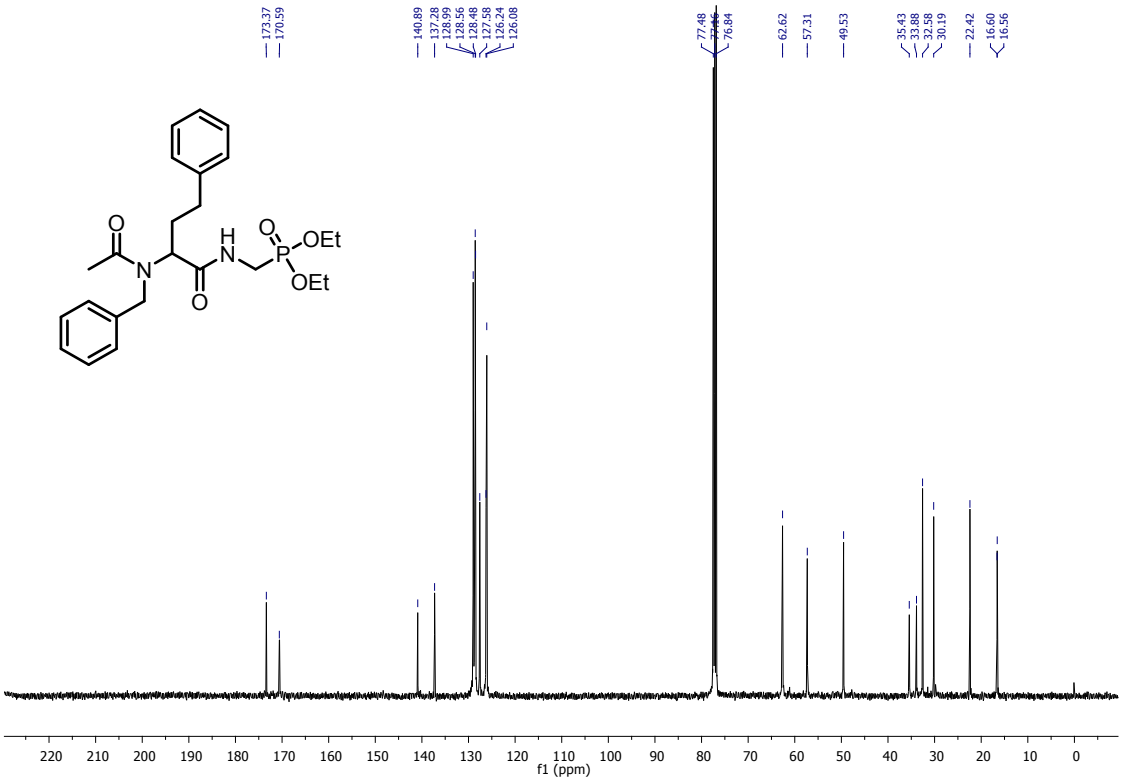

FIGURE 65: 100 MHz ^{13}C NMR spectrum in $CDCl_3$ of **17**.