Metal- and Chloride Reagent-Free Synthesis of Mixed Thiophosphates

Jeffrey Ash,[a] Hai Huang,[a,b] and Jun Yong Kang*,[a]

[a] Department of Chemistry and Biochemistry, University of Nevada Las Vegas, 4505 S. Maryland Parkway, Las Vegas, Nevada, 89154-4003, United States

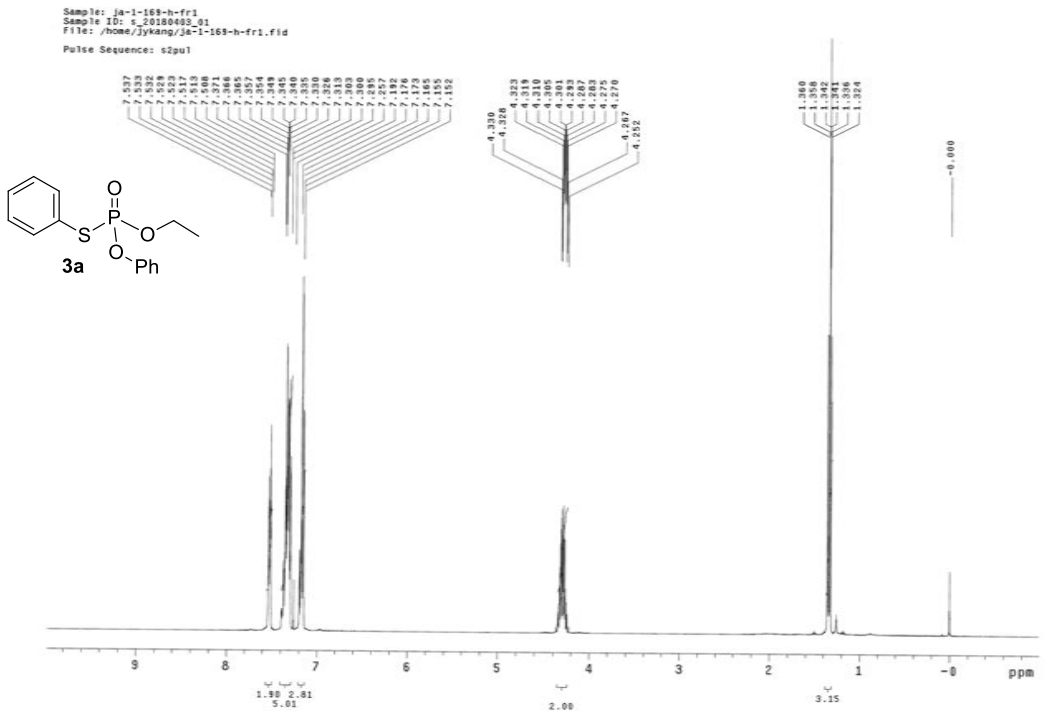
[b] Department of Applied Chemistry, College of Chemistry and Molecular Engineering, Nanjing Tech University, No. 30 Puzhu Road (S), Nanjing 211816, People's Republic of China

E-mail: junyong.kang@unlv.edu.

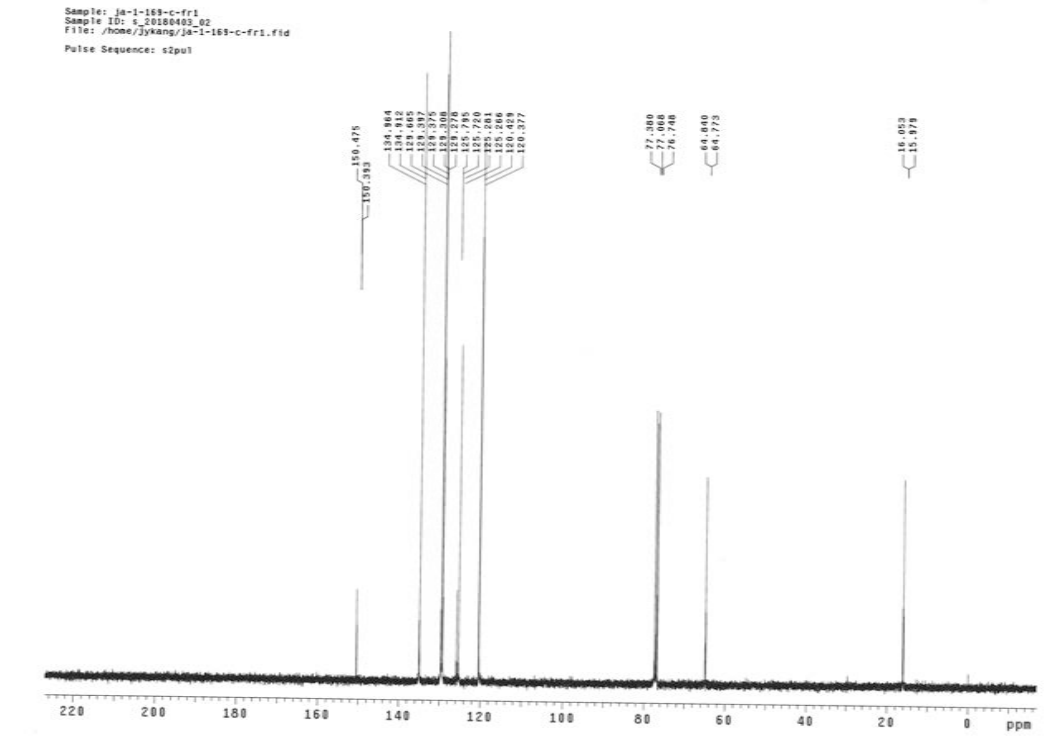
Supporting Information

^{1}H,^{13}C, and ^{31}P NMR Spectra……..S2-S45
Figure S1……S46

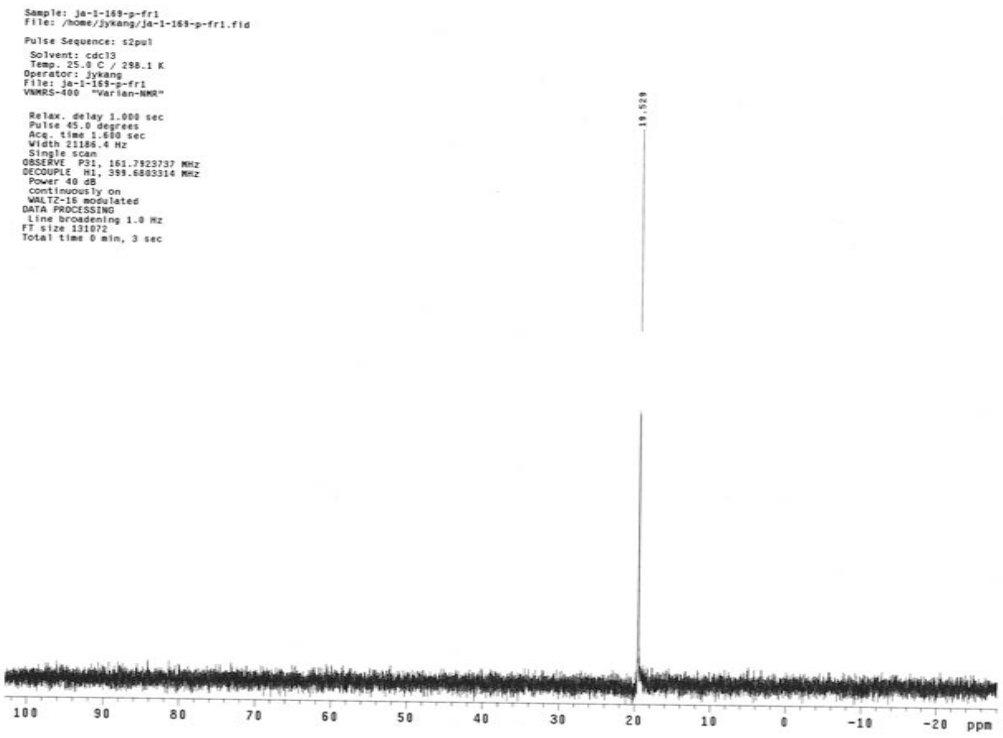
^{1}H NMR (400 MHz) in $CDCl_3$



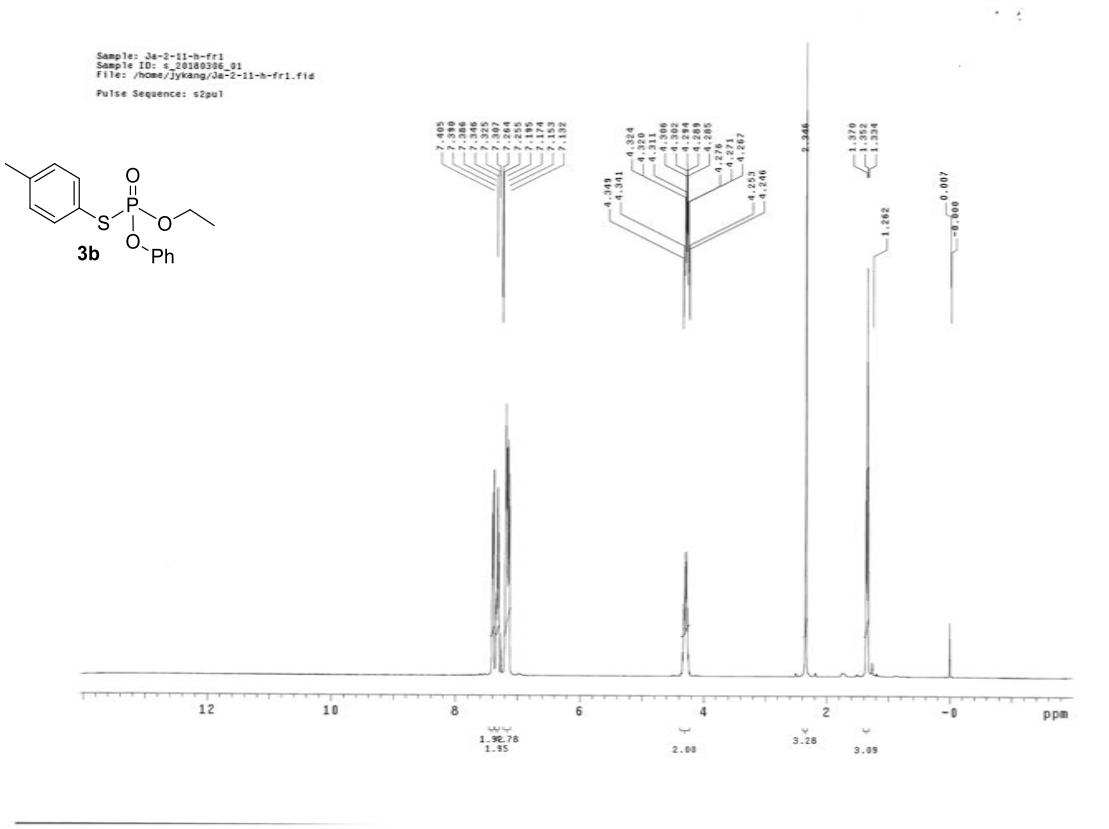
^{13}C NMR (100.5 MHz) in $CDCl_3$



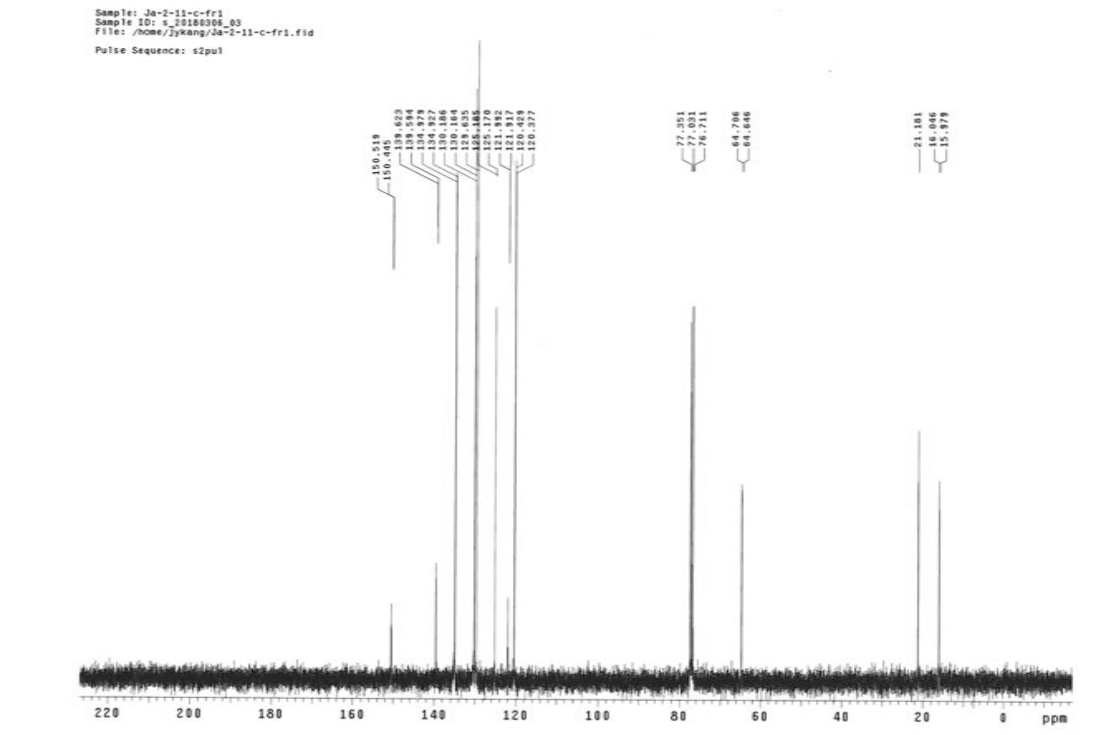
^{31}P NMR (162 MHz) in $CDCl_3$



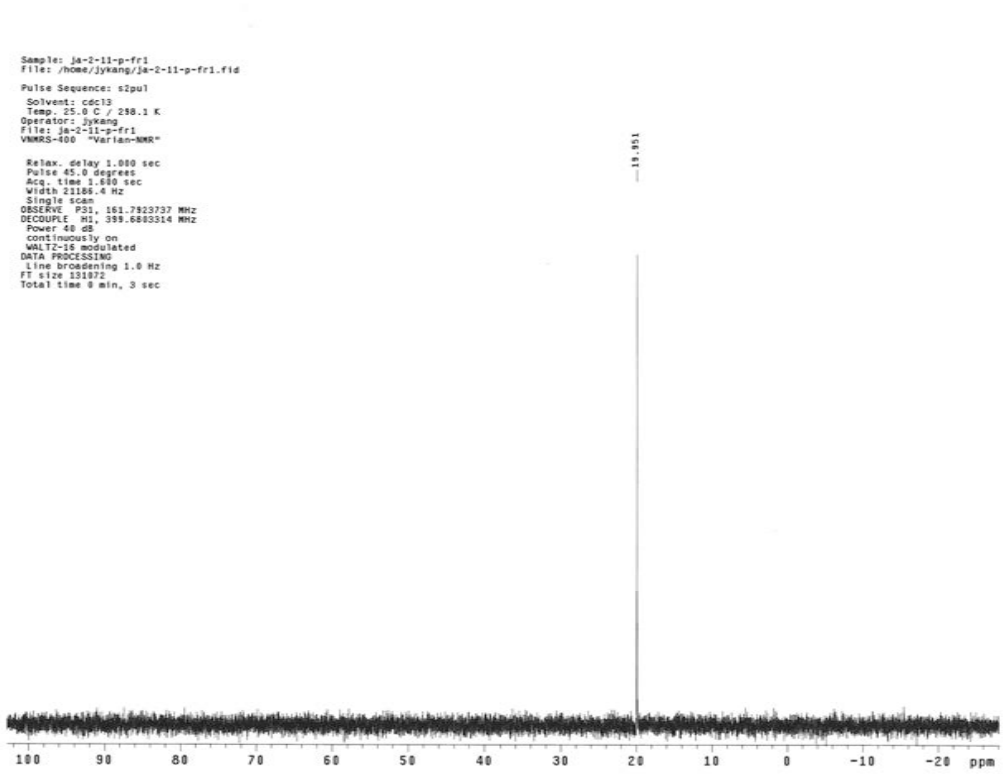
^{1}H NMR (400 MHz) in $CDCl_3$



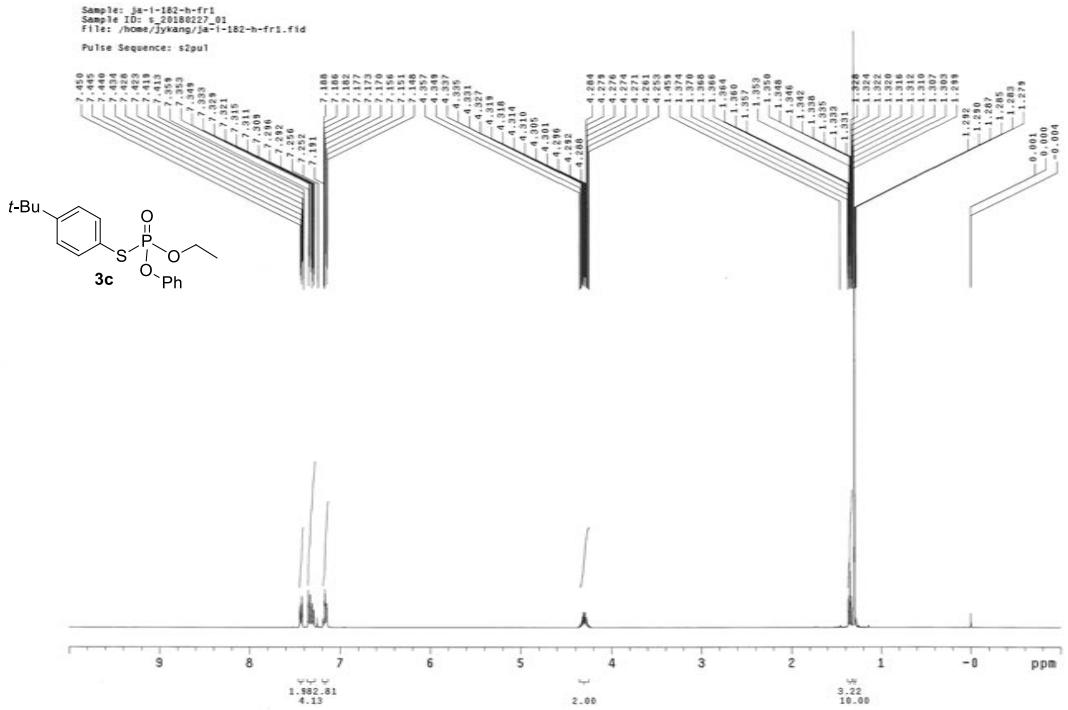
^{13}C NMR (100.5 MHz) in $CDCl_3$



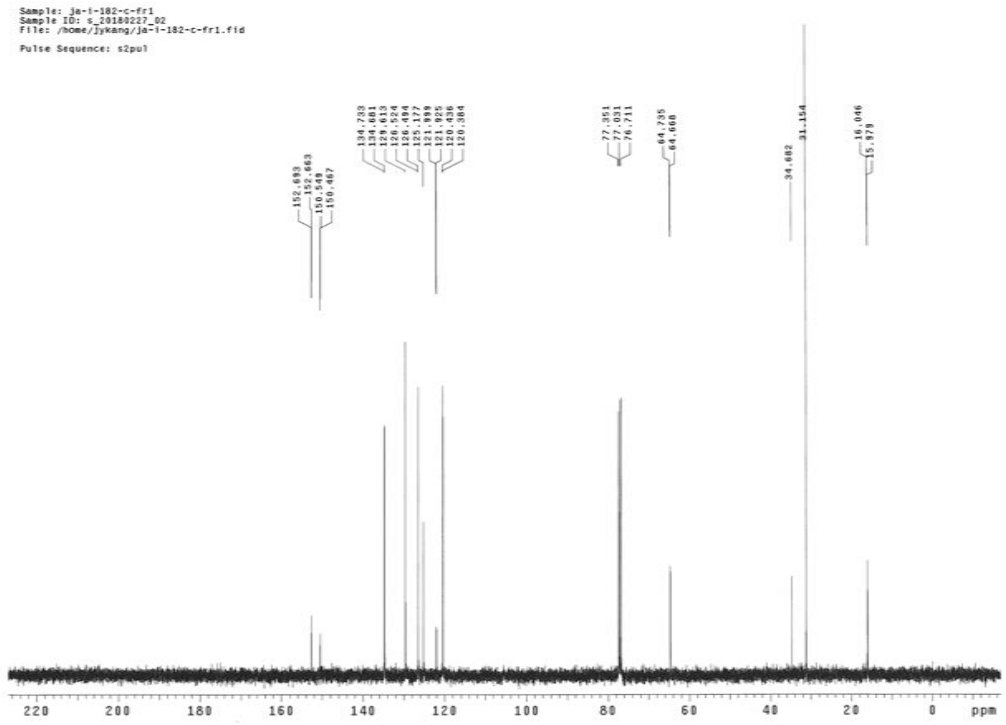
^{31}P NMR (162 MHz) in $CDCl_3$



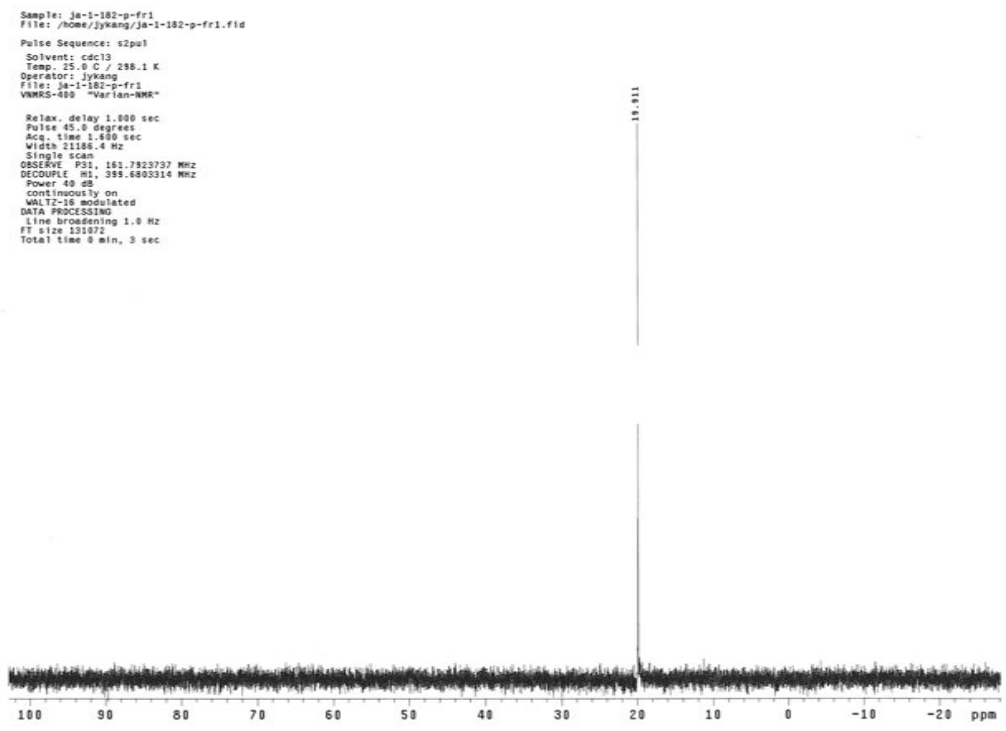
^{1}H NMR (400 MHz) in $CDCl_3$



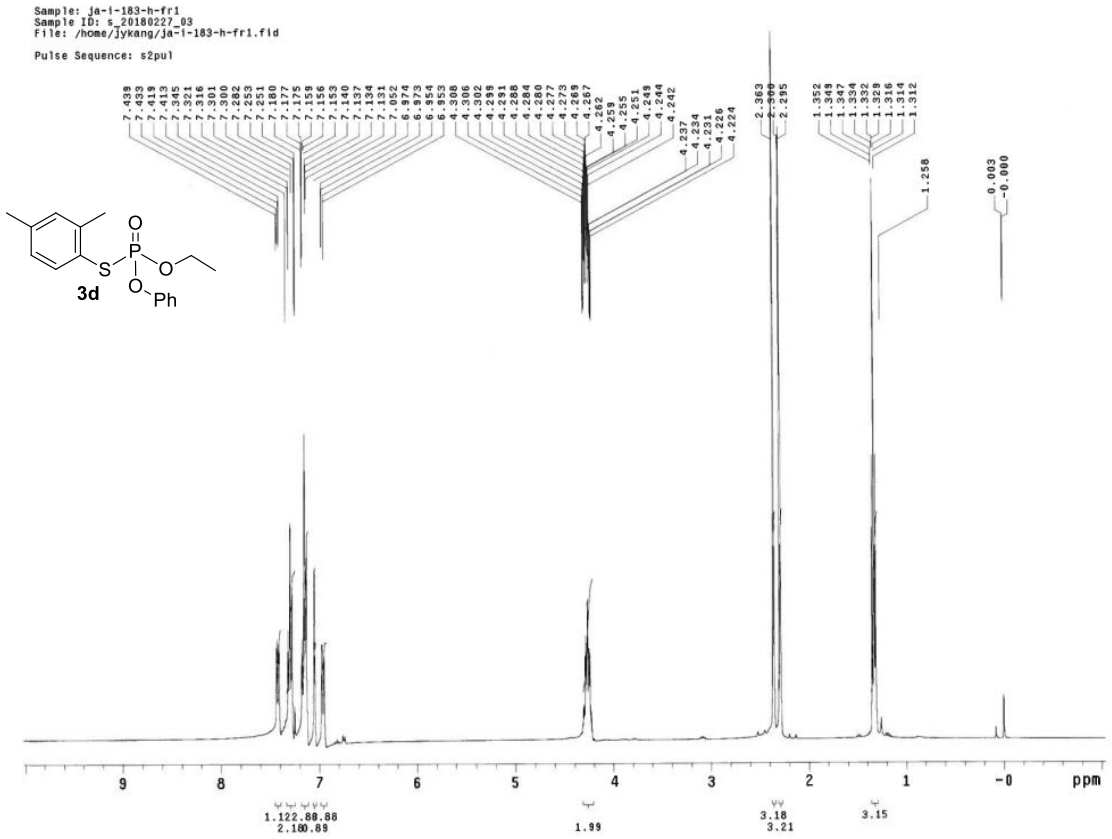
^{13}C NMR (100.5 MHz) in $CDCl_3$



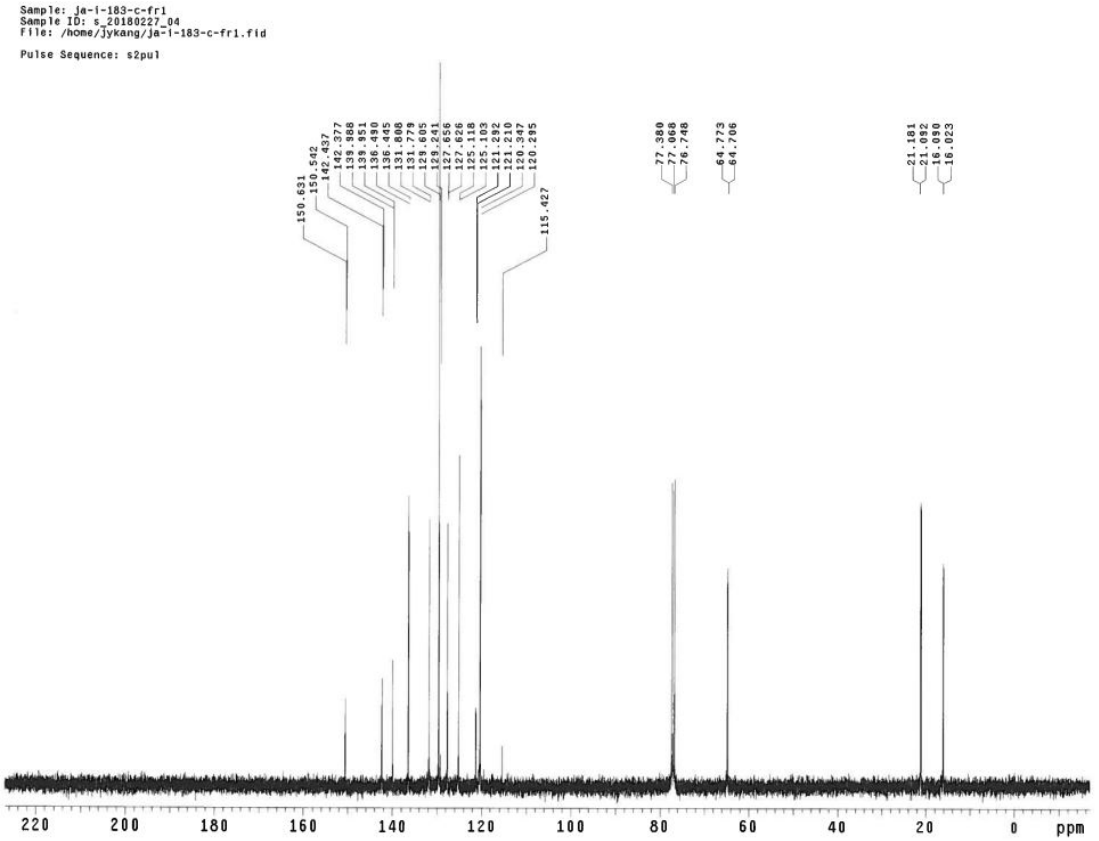
^{31}P NMR (162 MHz) in $CDCl_3$



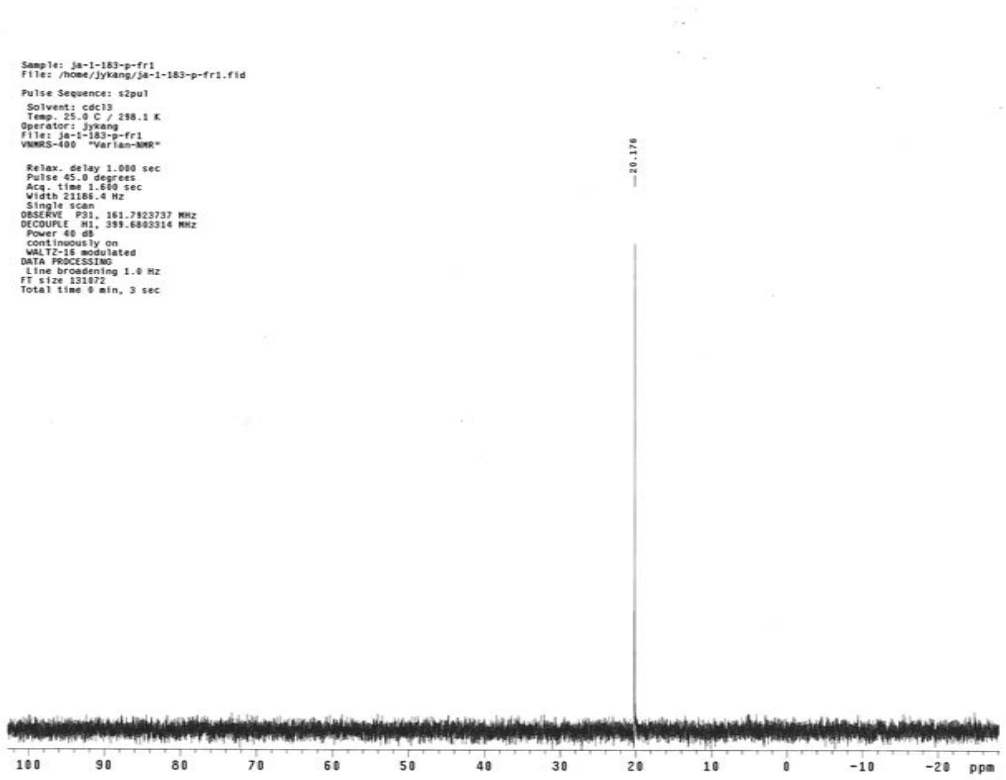
^{1}H NMR (400 MHz) in $CDCl_3$



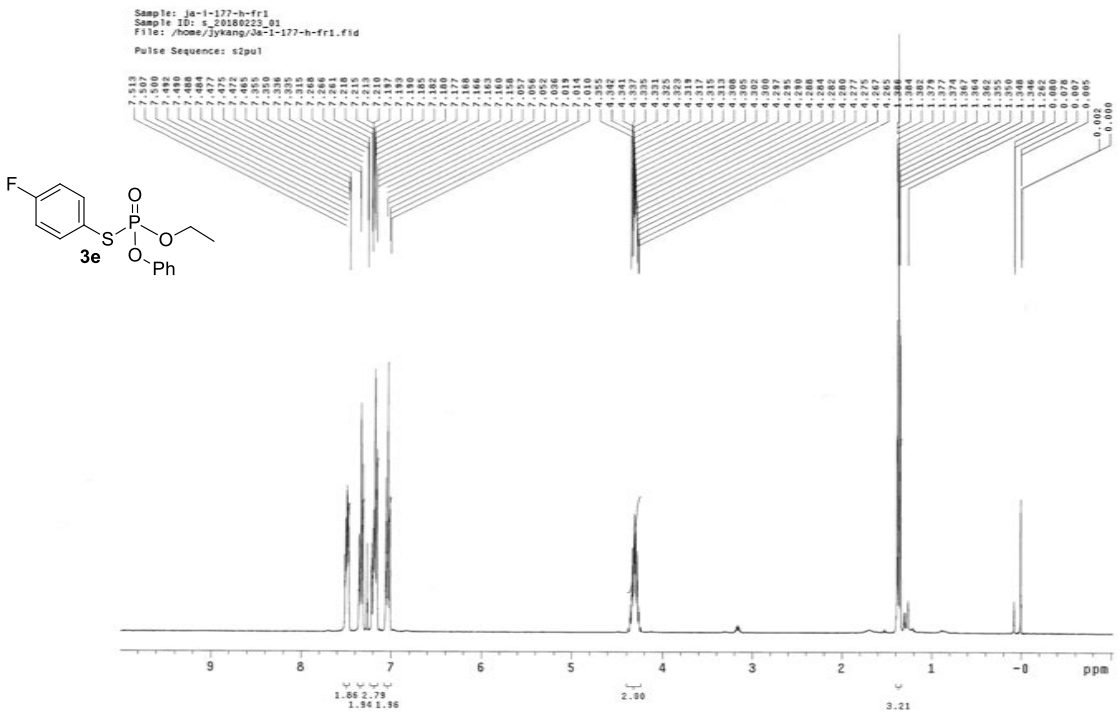
^{13}C NMR (100.5 MHz) in $CDCl_3$



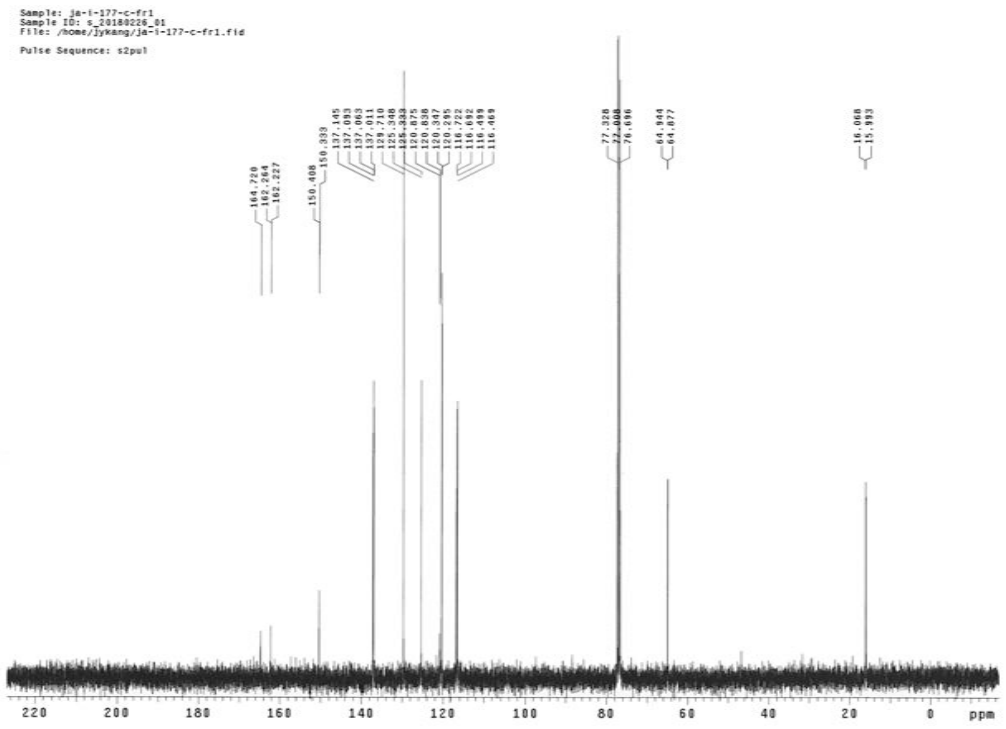
^{31}P NMR (162 MHz) in $CDCl_3$



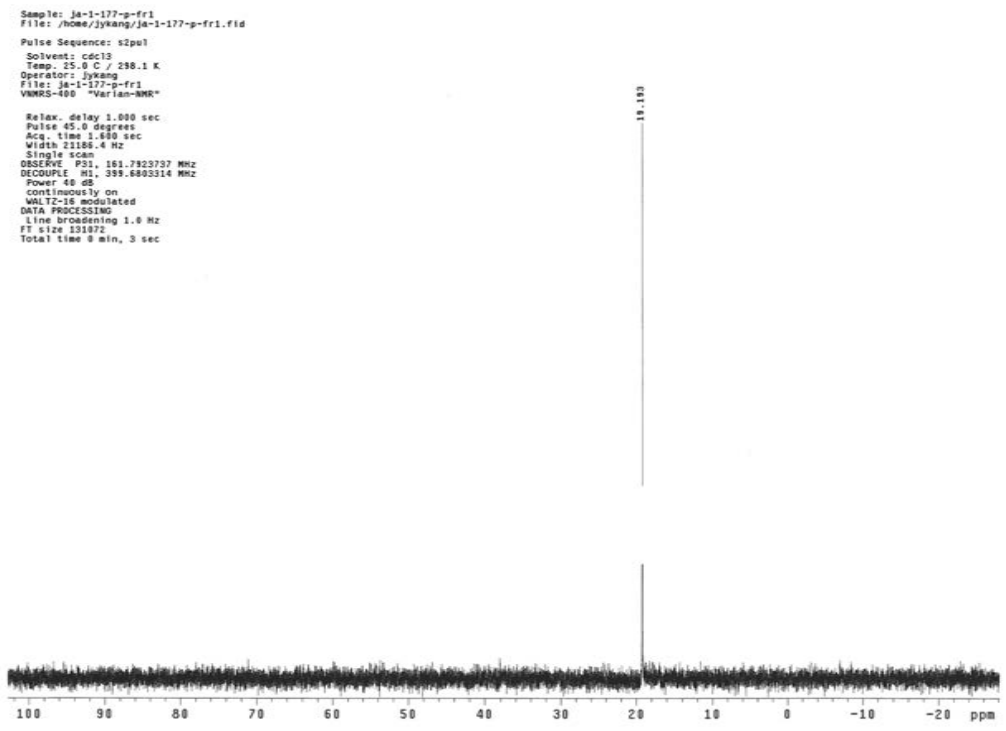
^{1}H NMR (400 MHz) in $CDCl_3$



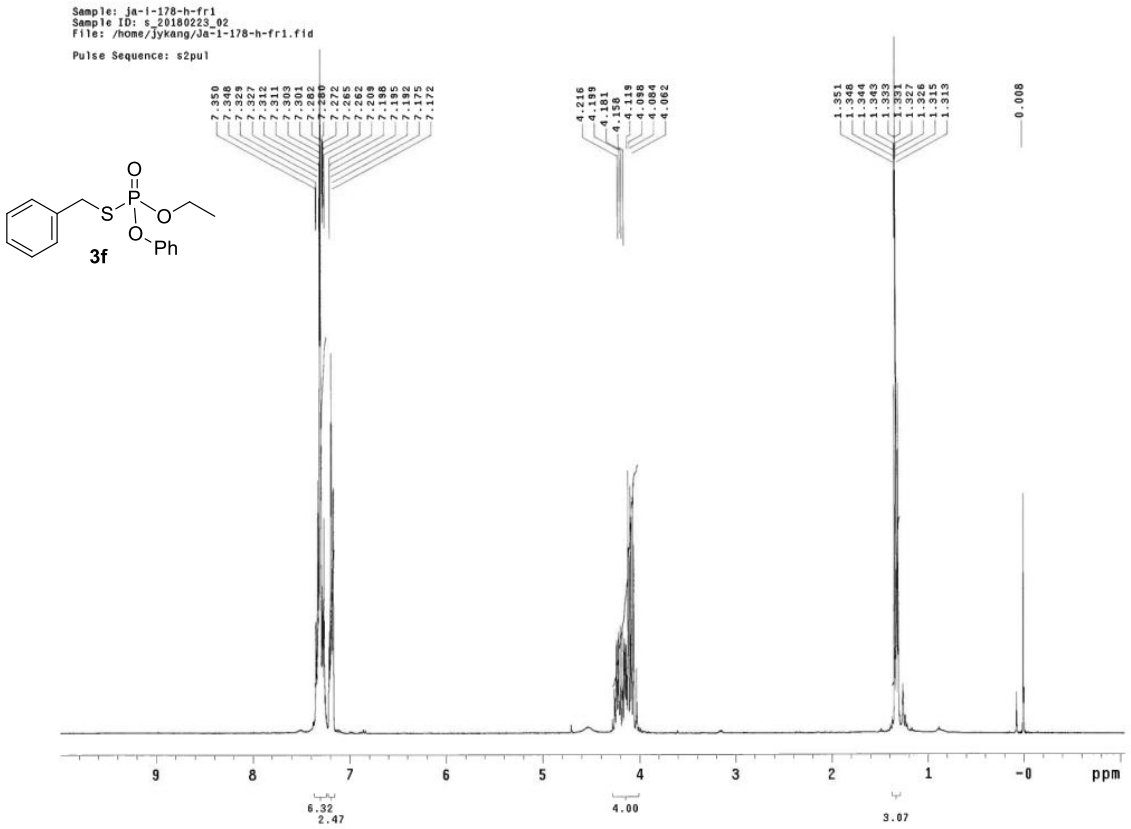
^{13}C NMR (100.5 MHz) in $CDCl_3$



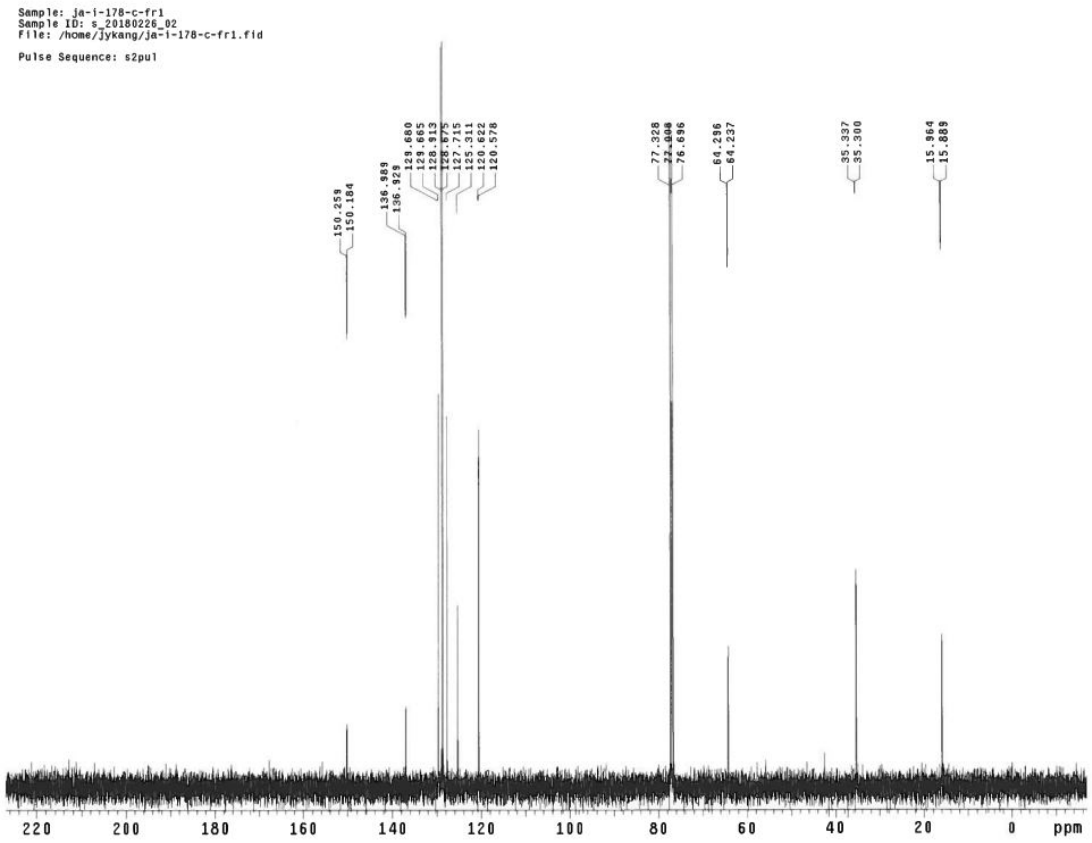
^{31}P NMR (162 MHz) in $CDCl_3$



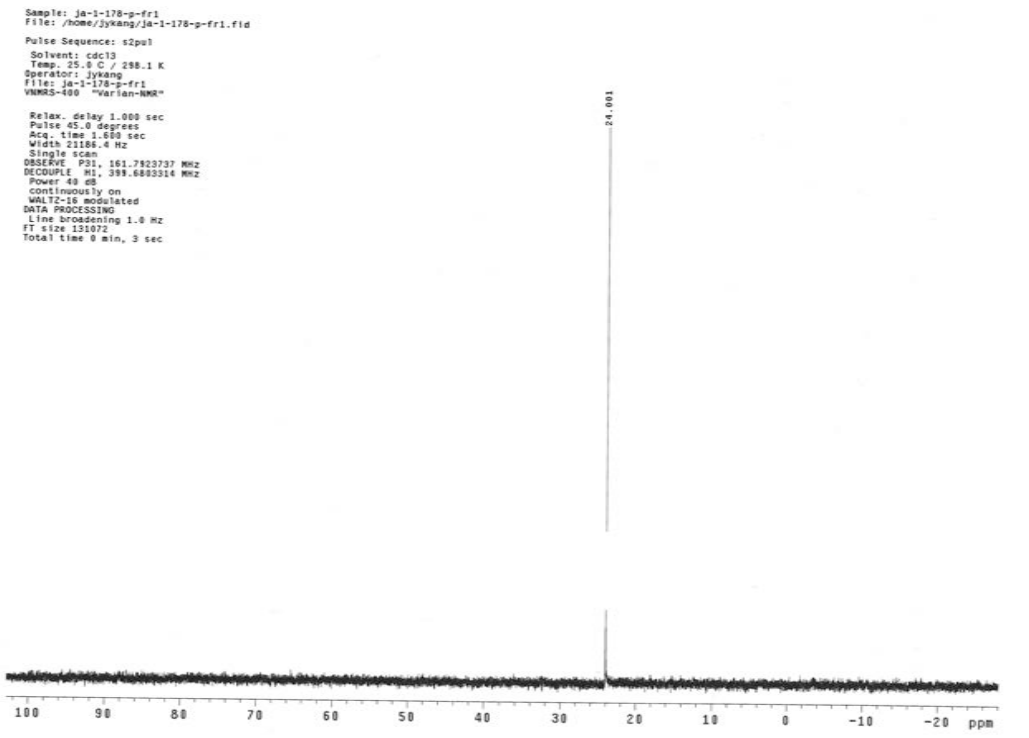
^{1}H NMR (400 MHz) in $CDCl_3$



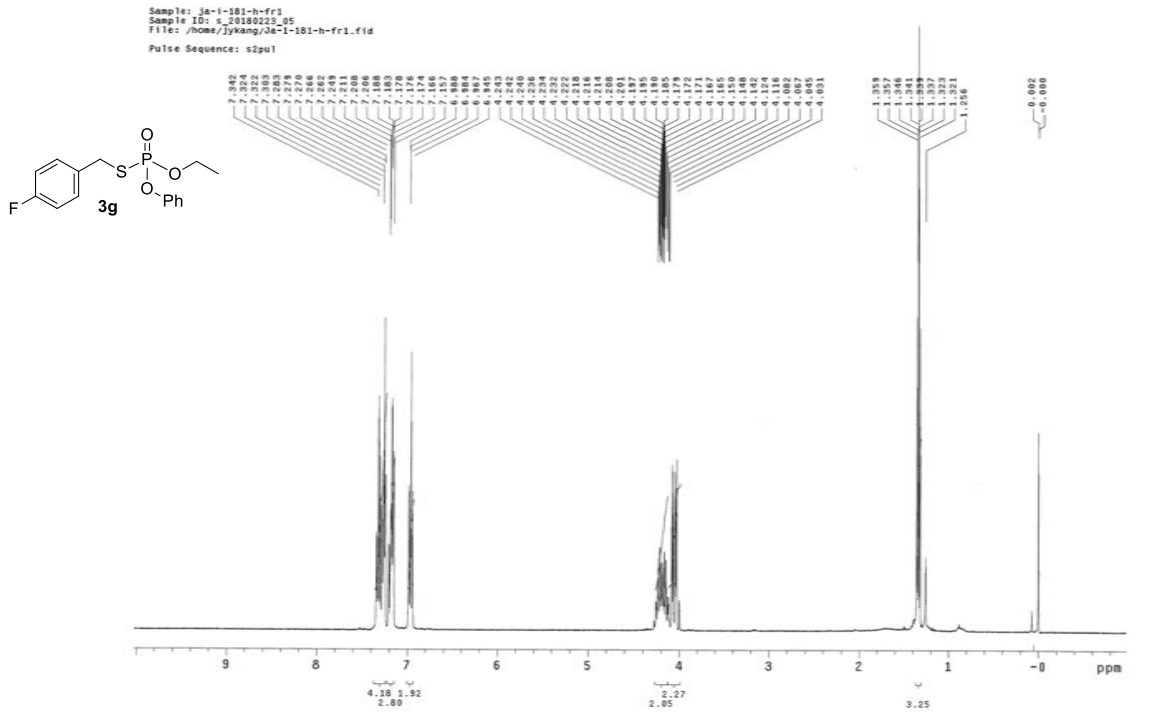
^{13}C NMR (100.5 MHz) in $CDCl_3$



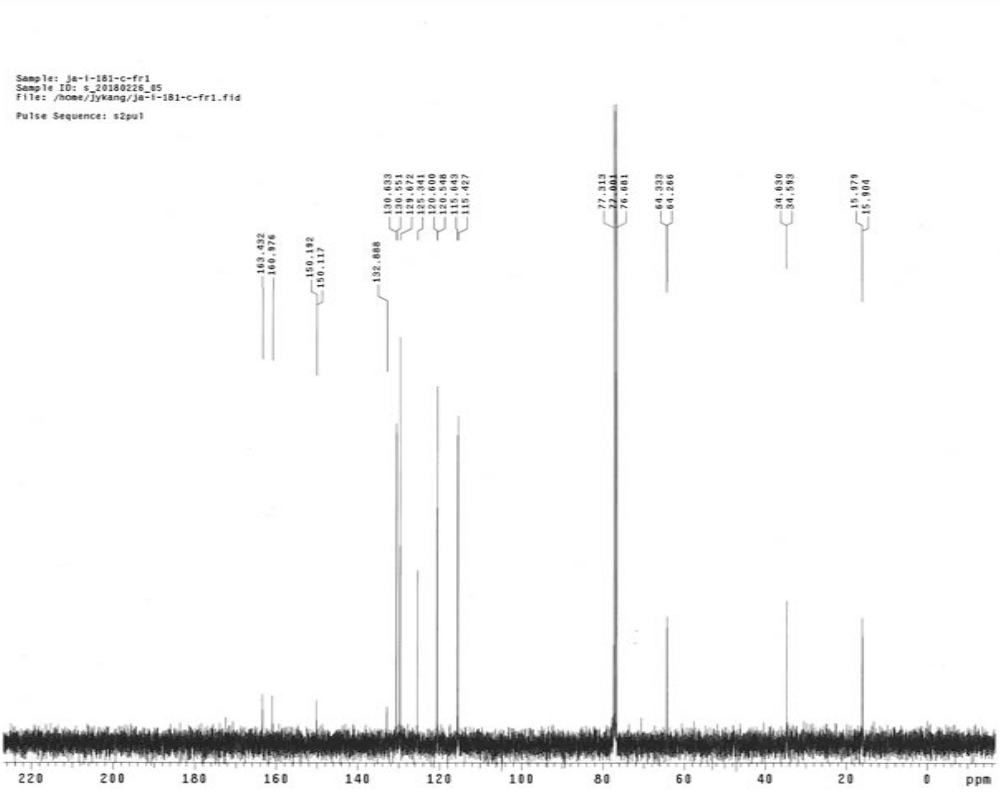
^{31}P NMR (162 MHz) in $CDCl_3$



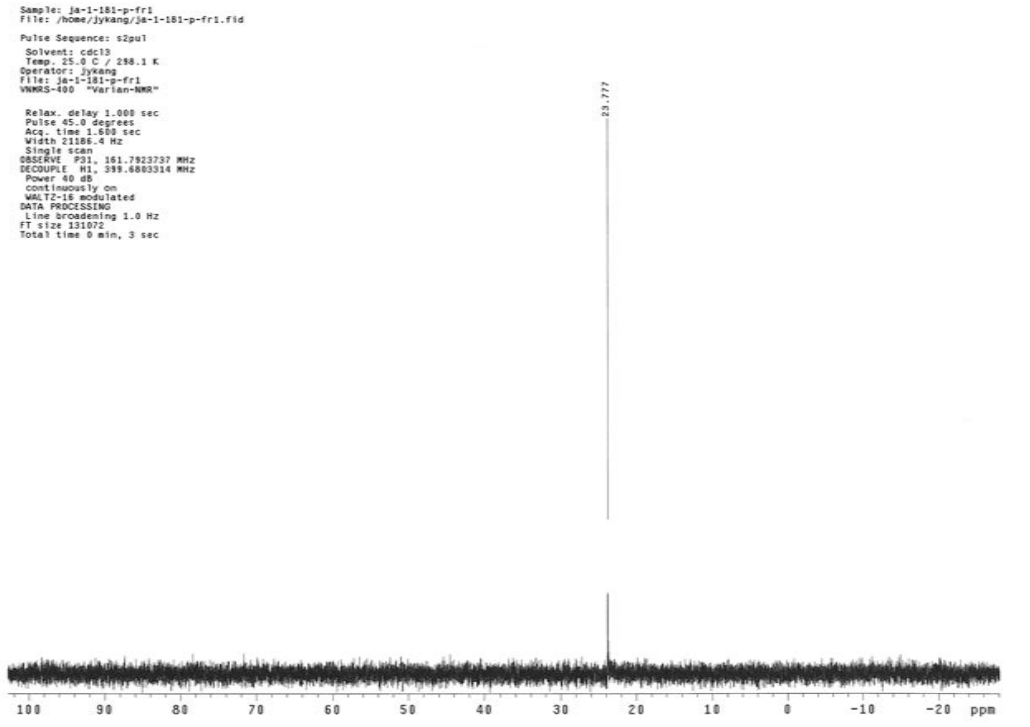
^{1}H NMR (400 MHz) in $CDCl_3$



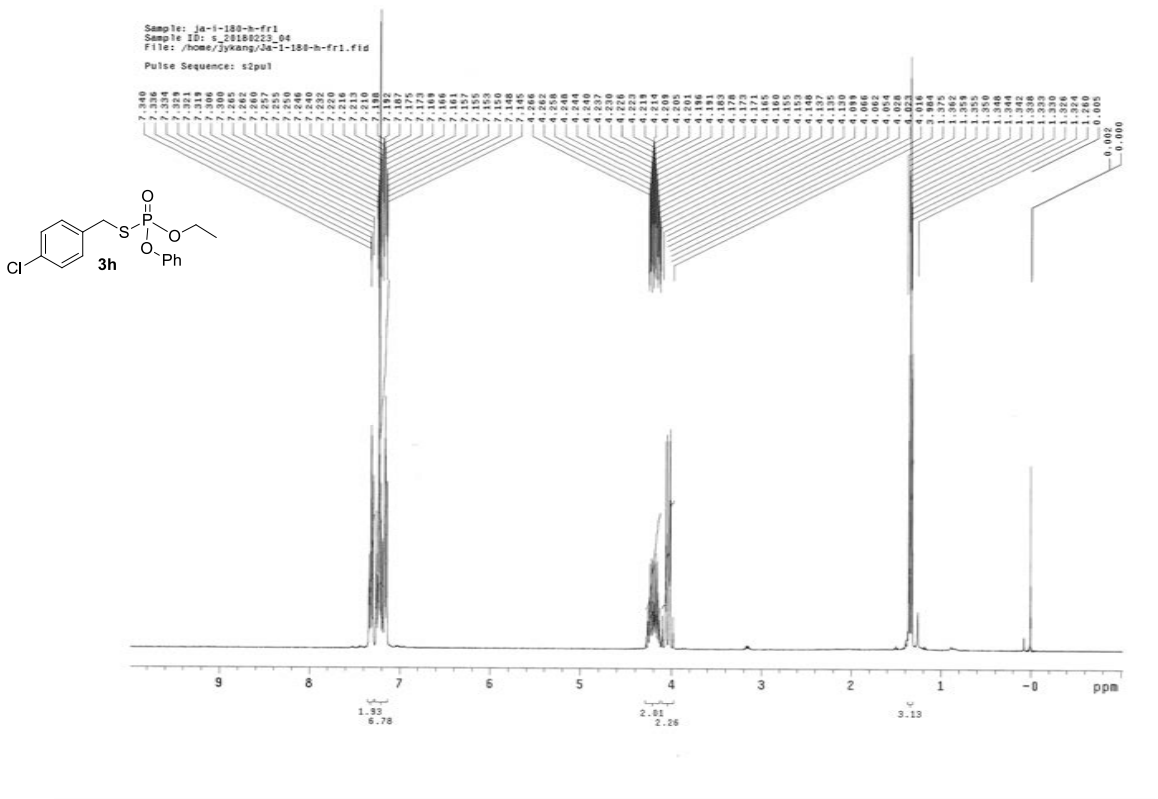
^{13}C NMR (100.5 MHz) in $CDCl_3$



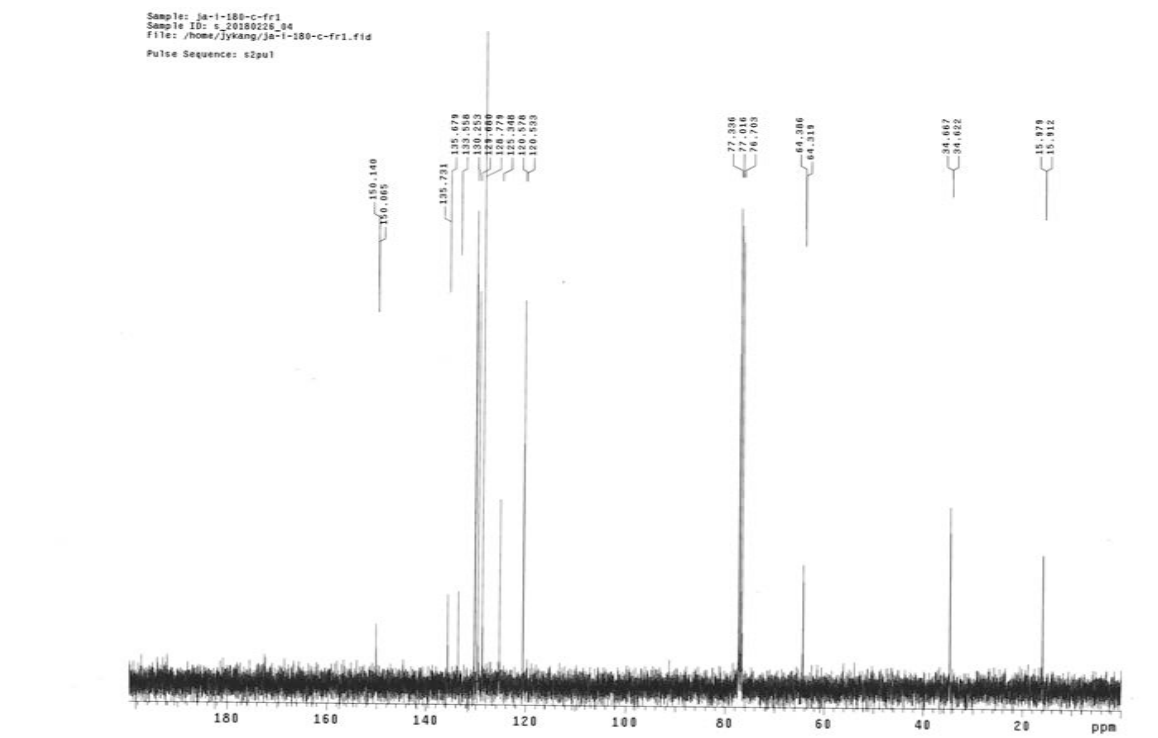
^{31}P NMR (162 MHz) in $CDCl_3$



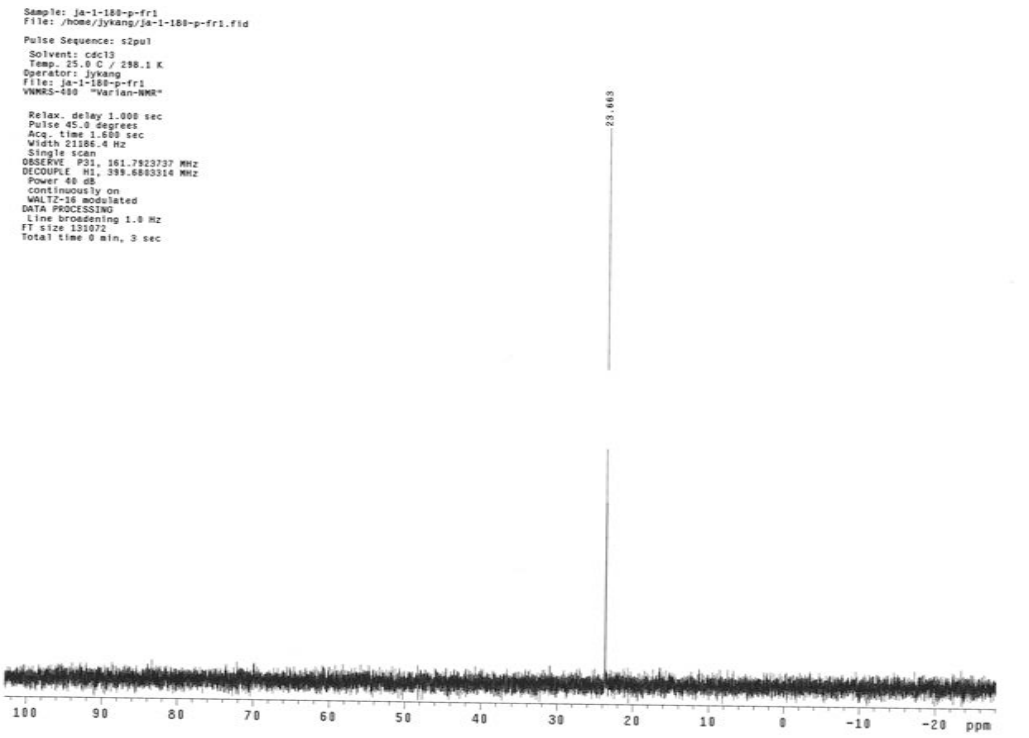
^{1}H NMR (400 MHz) in $CDCl_3$



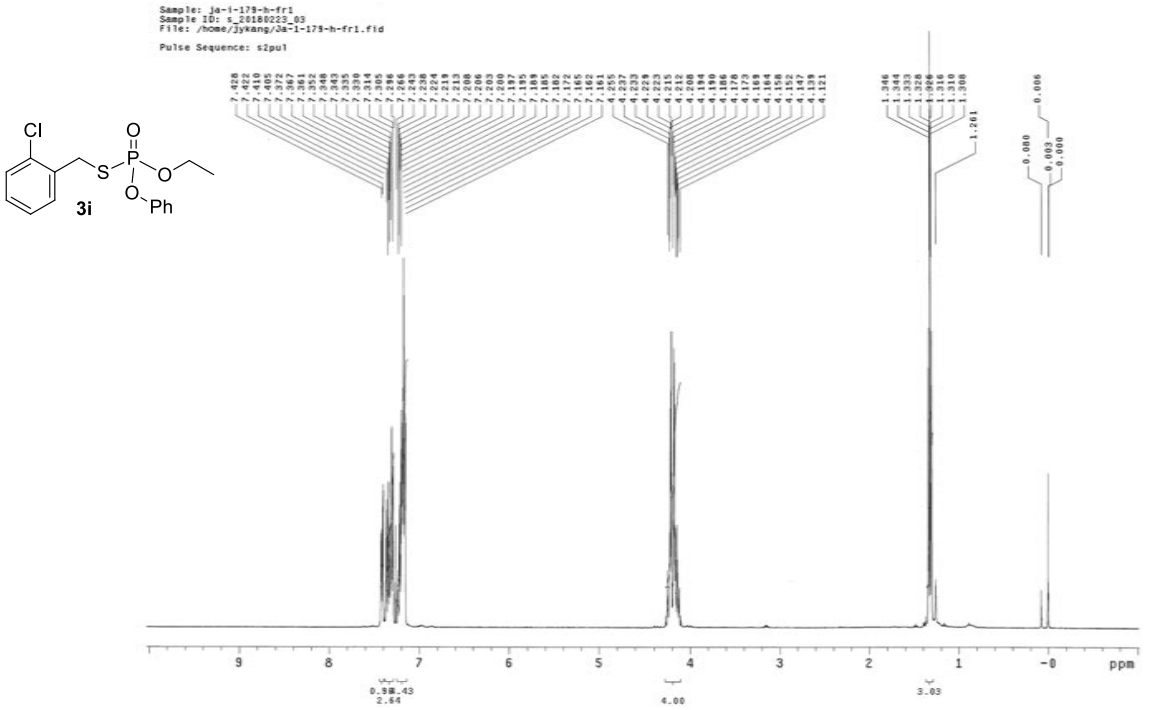
^{13}C NMR (100.5 MHz) in $CDCl_3$



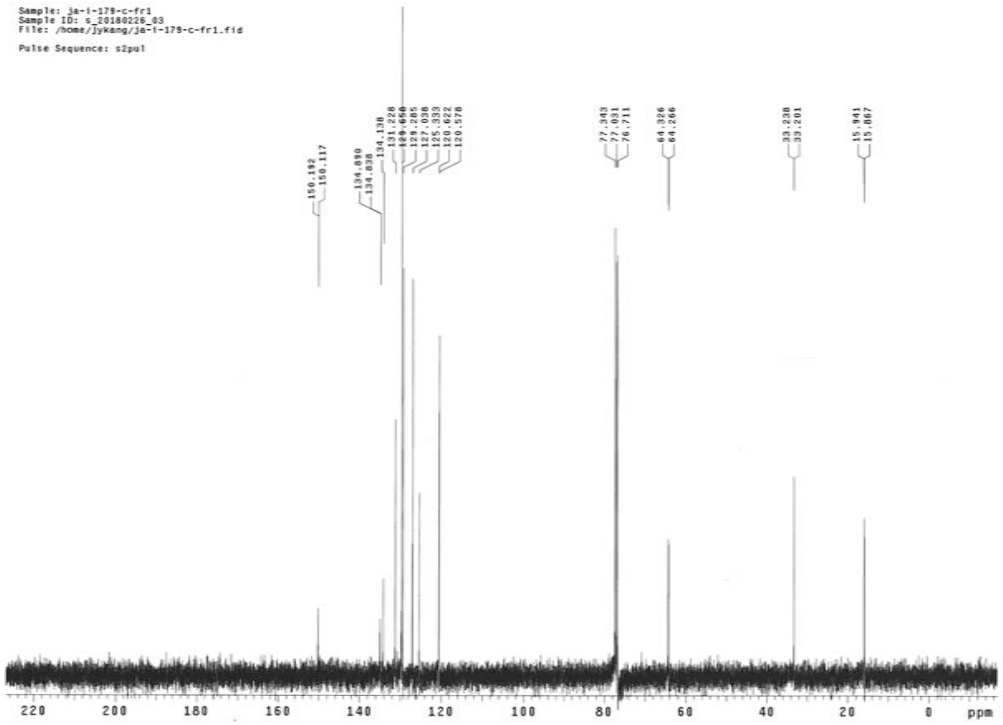
^{31}P NMR (162 MHz) in $CDCl_3$



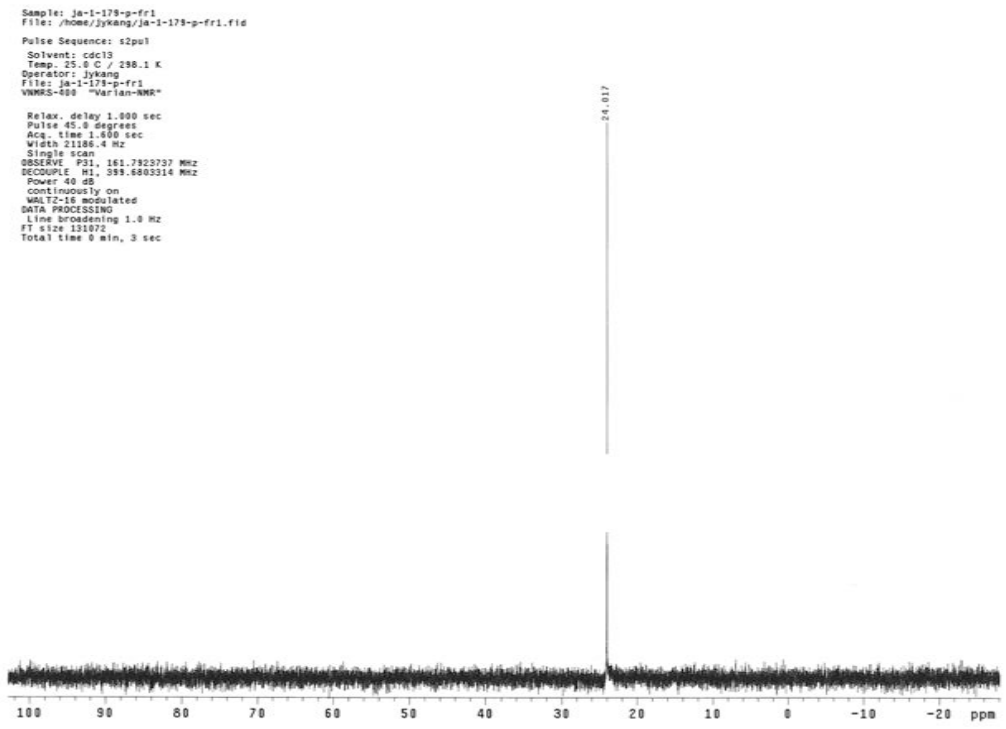
^{1}H NMR (400 MHz) in $CDCl_3$



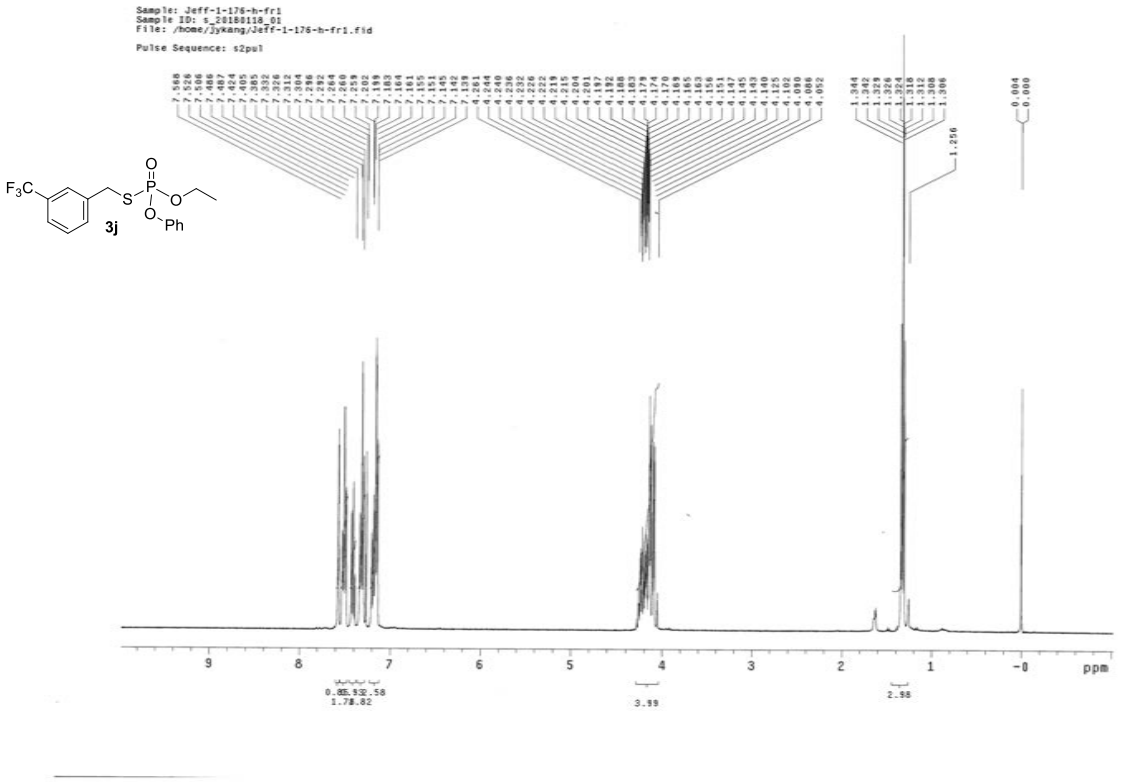
^{13}C NMR (100.5 MHz) in $CDCl_3$



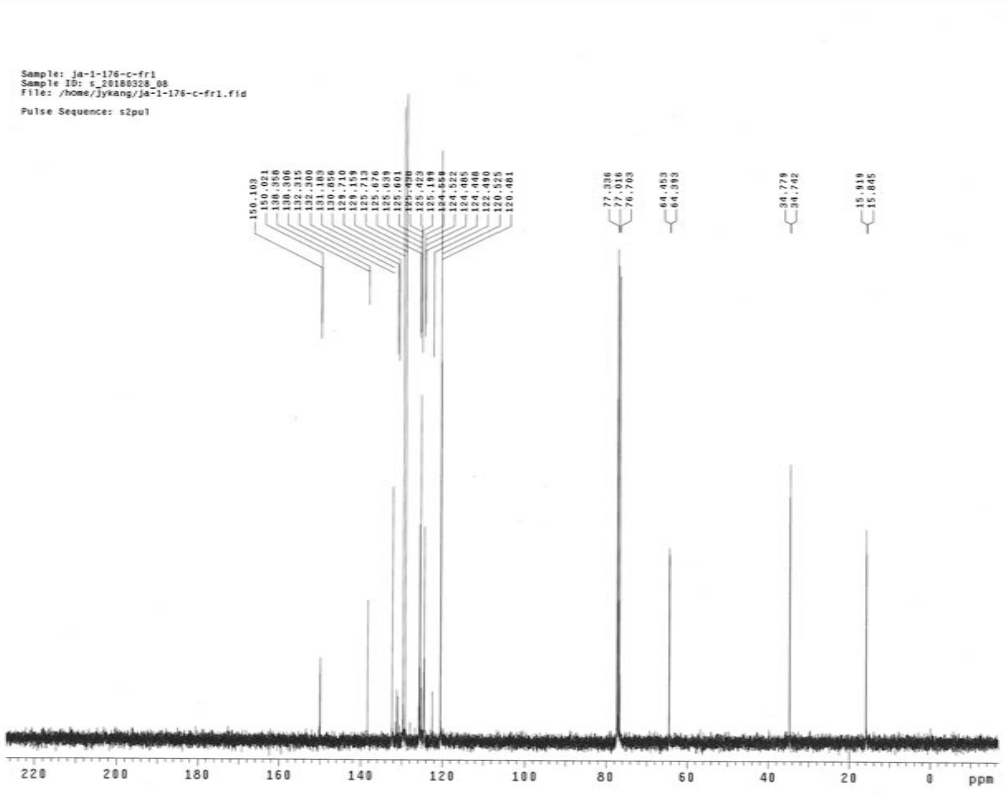
^{31}P NMR (162 MHz) in $CDCl_3$



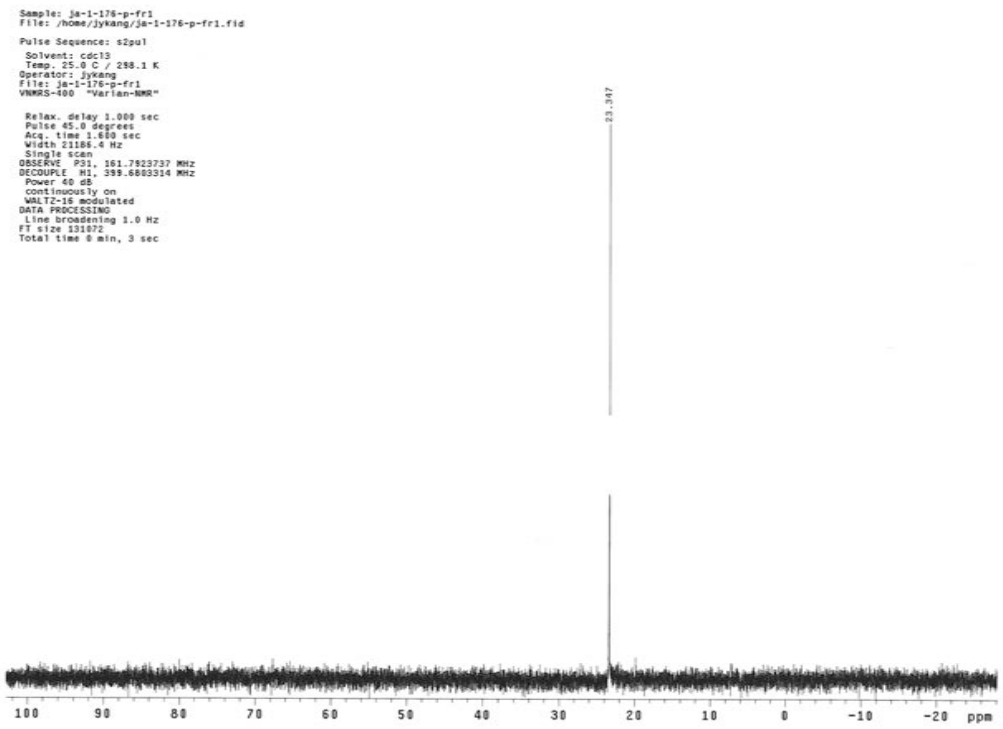
^{1}H NMR (400 MHz) in $CDCl_3$



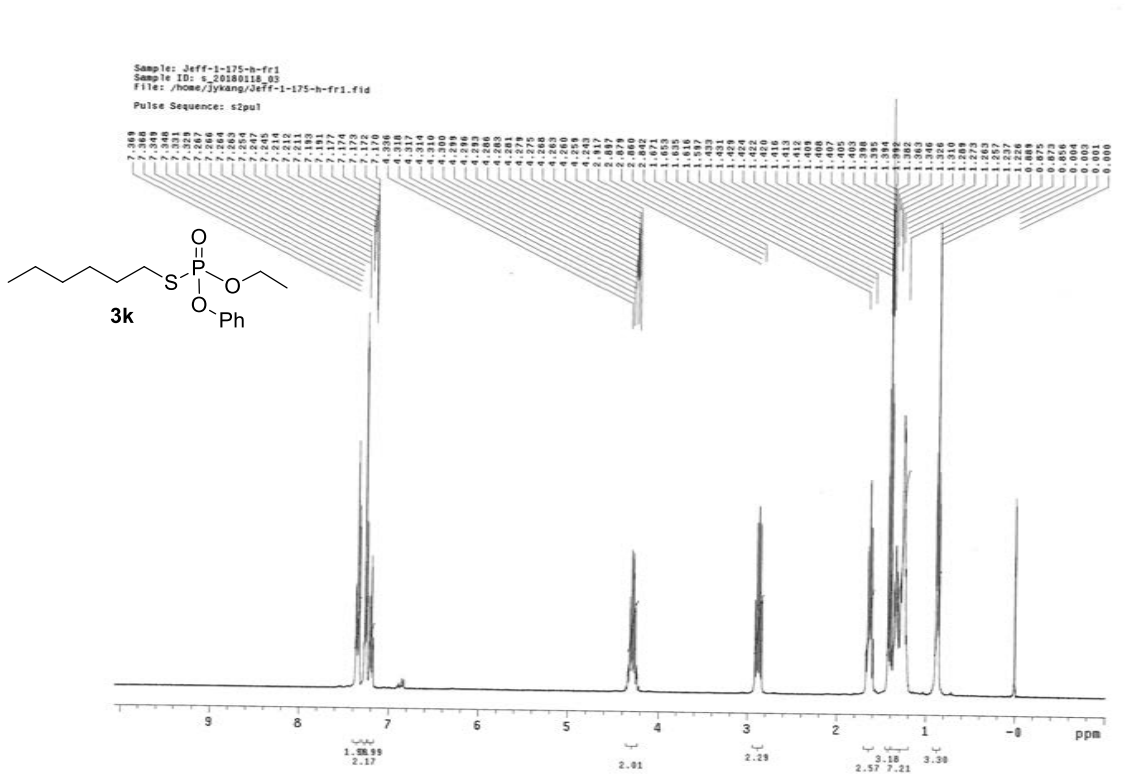
^{13}C NMR (100.5 MHz) in $CDCl_3$



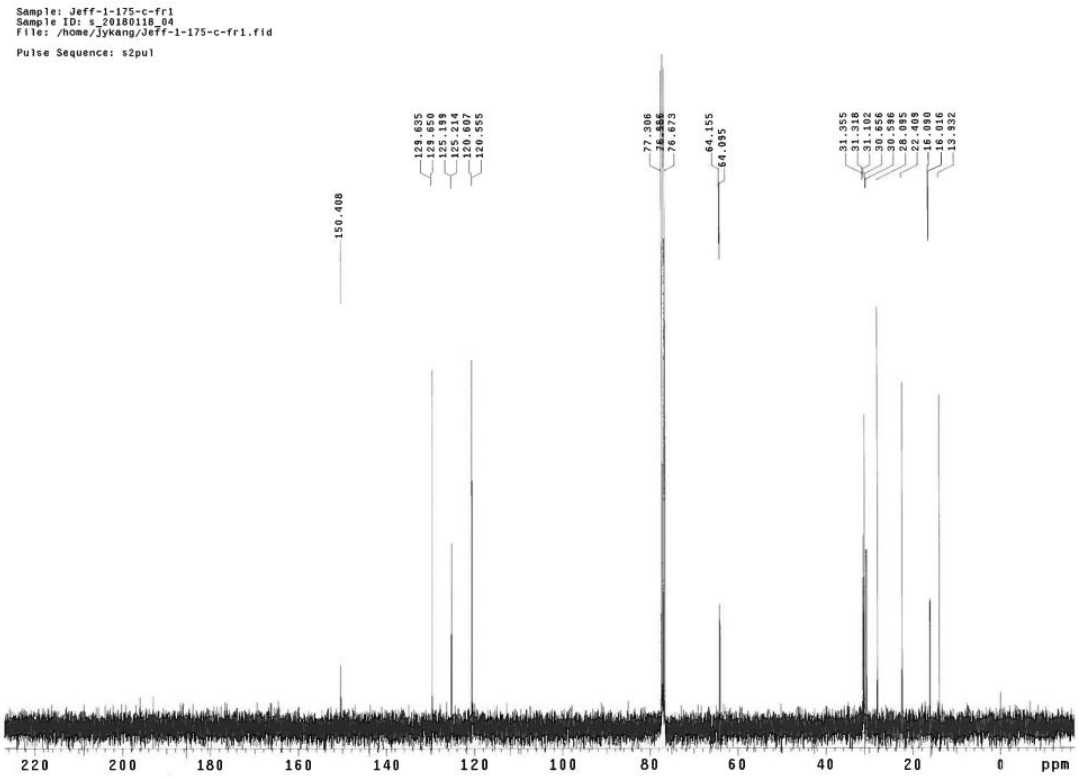
^{31}P NMR (162 MHz) in $CDCl_3$



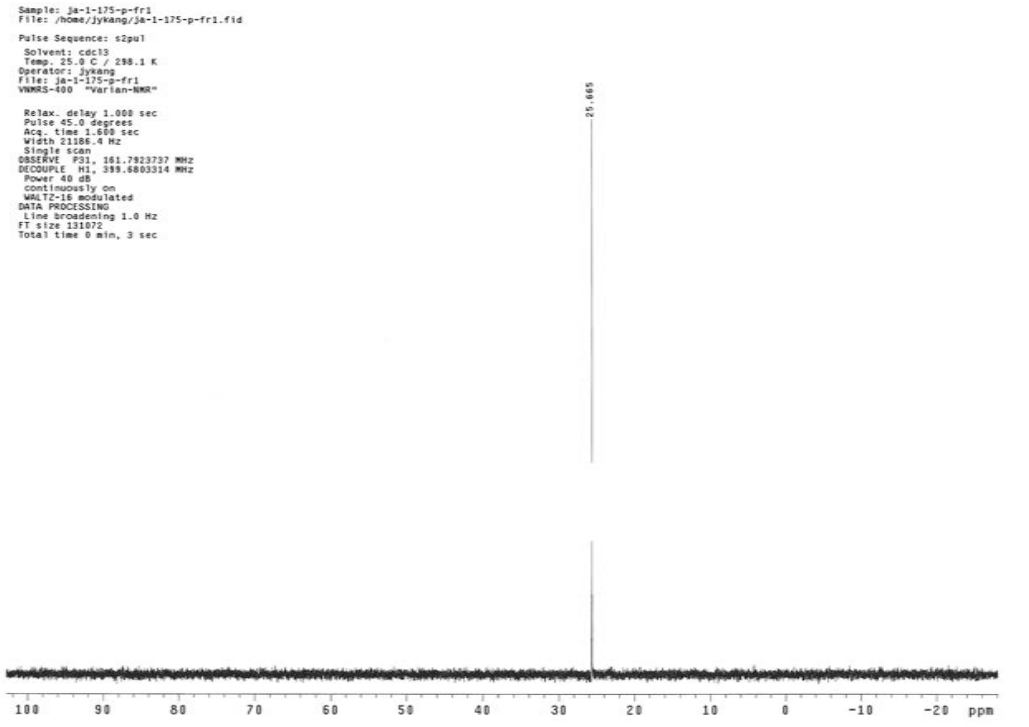
^{1}H NMR (400 MHz) in $CDCl_3$



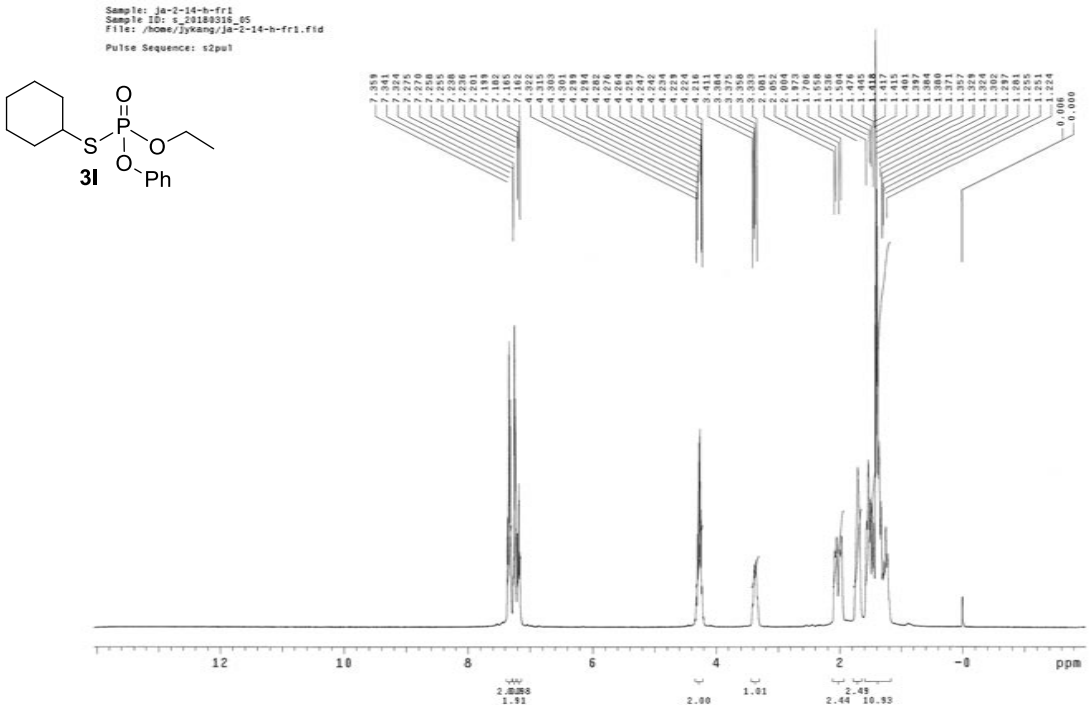
^{13}C NMR (100.5 MHz) in $CDCl_3$



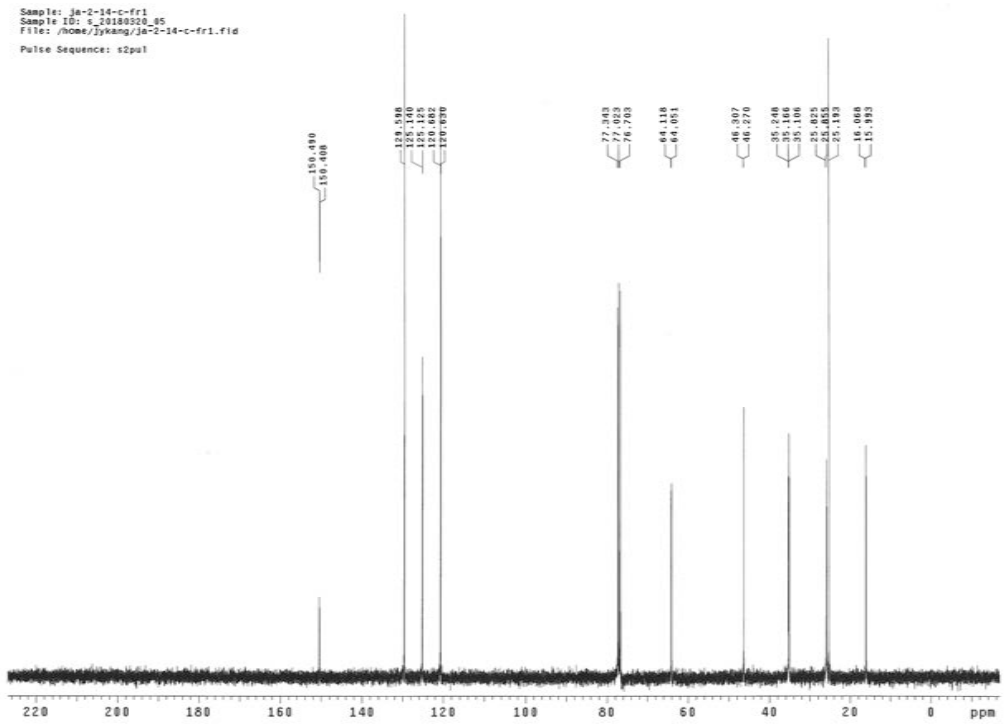
^{31}P NMR (162 MHz) in $CDCl_3$



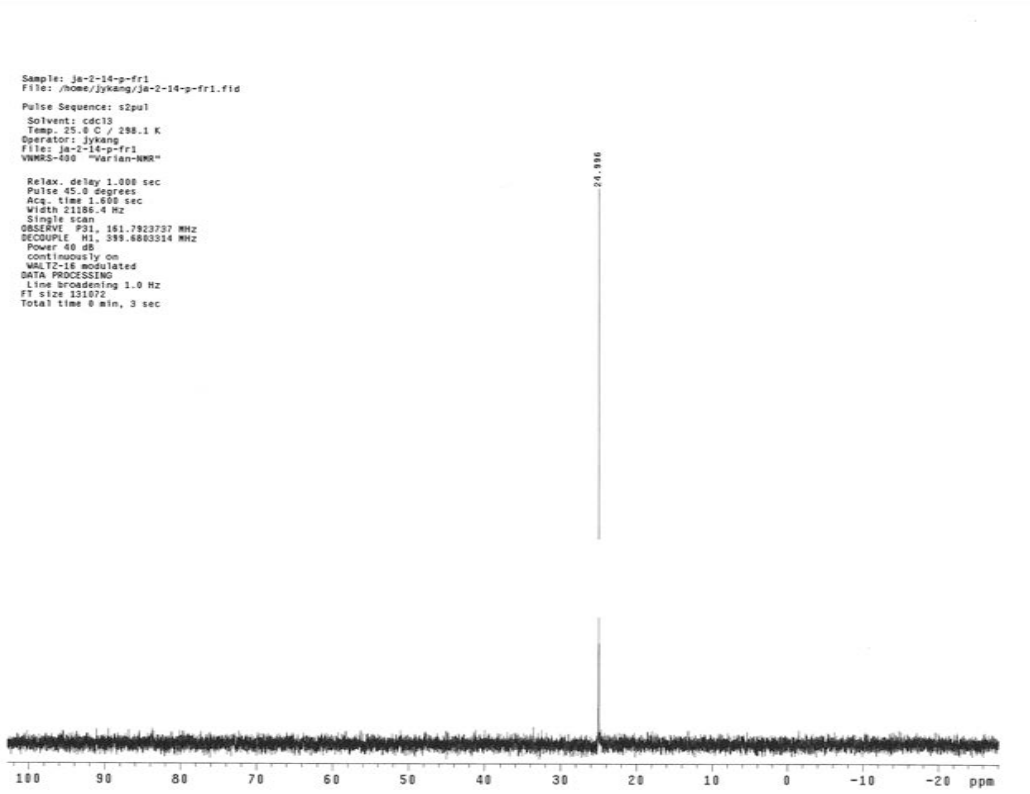
^{1}H NMR (400 MHz) in $CDCl_3$



^{13}C NMR (100.5 MHz) in $CDCl_3$

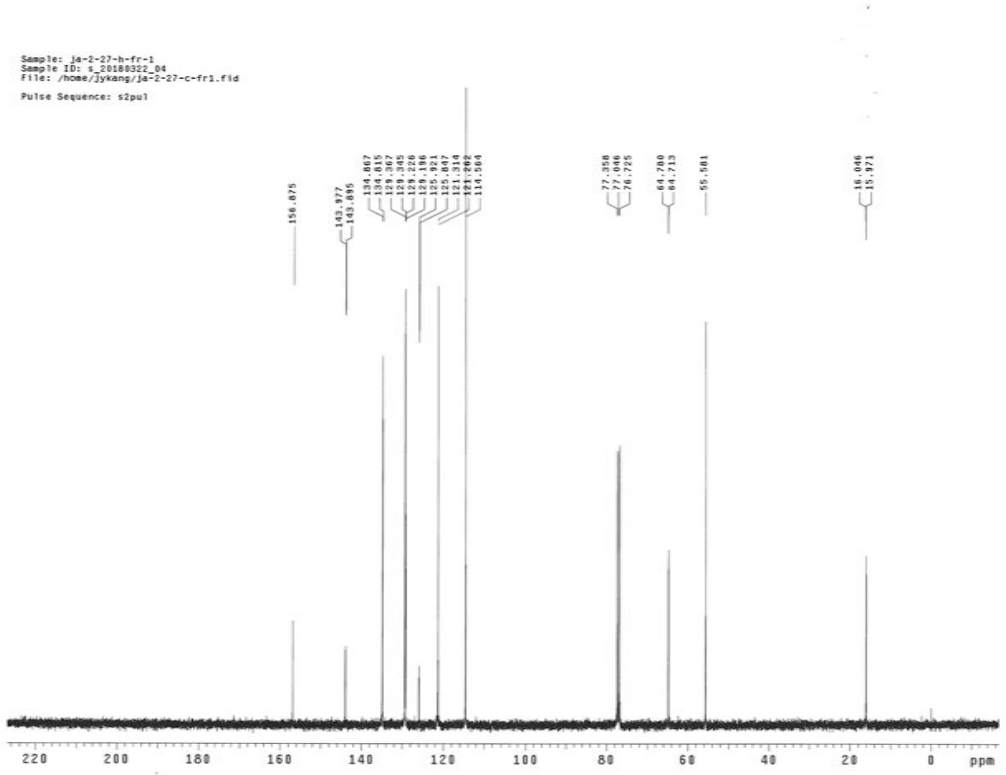


^{31}P NMR (162 MHz) in $CDCl_3$

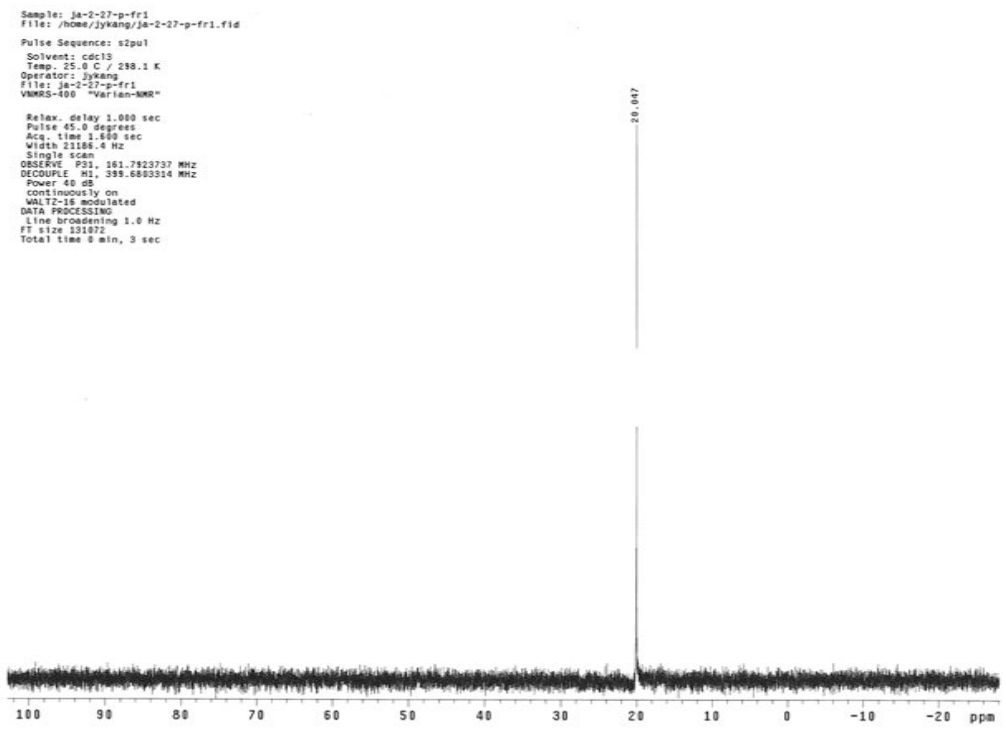


^{1}H NMR (400 MHz) in $CDCl_3$

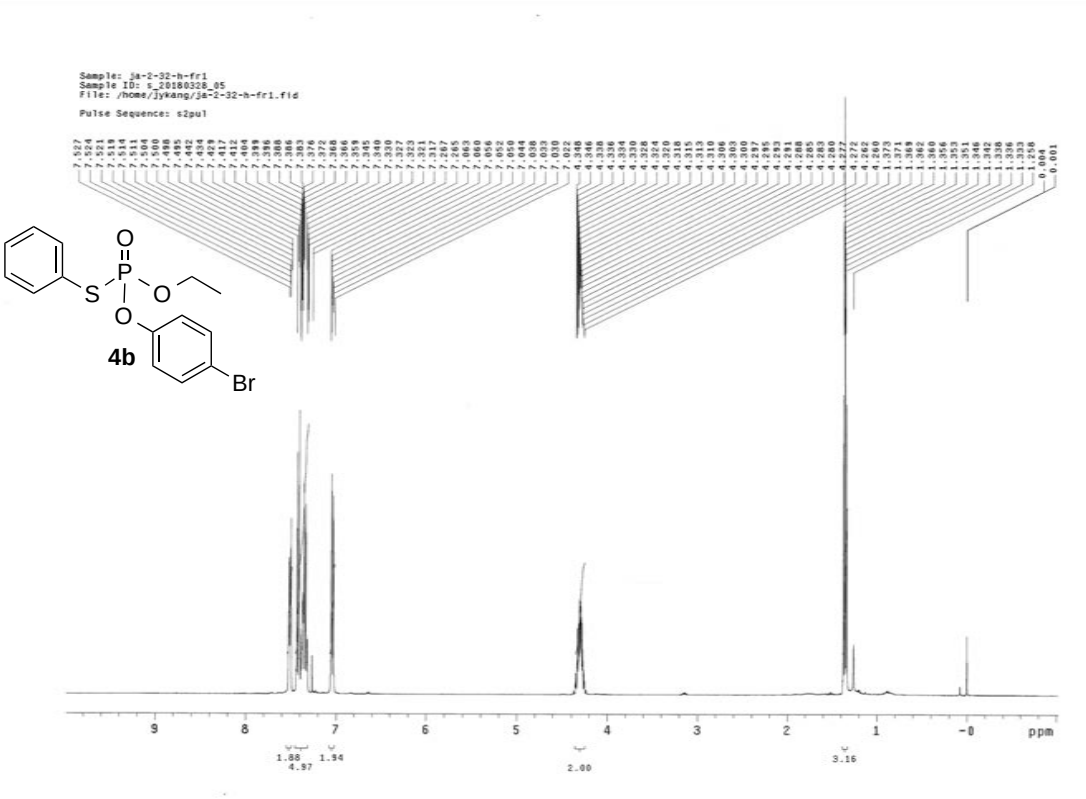
^{13}C NMR (100.5 MHz) in $CDCl_3$



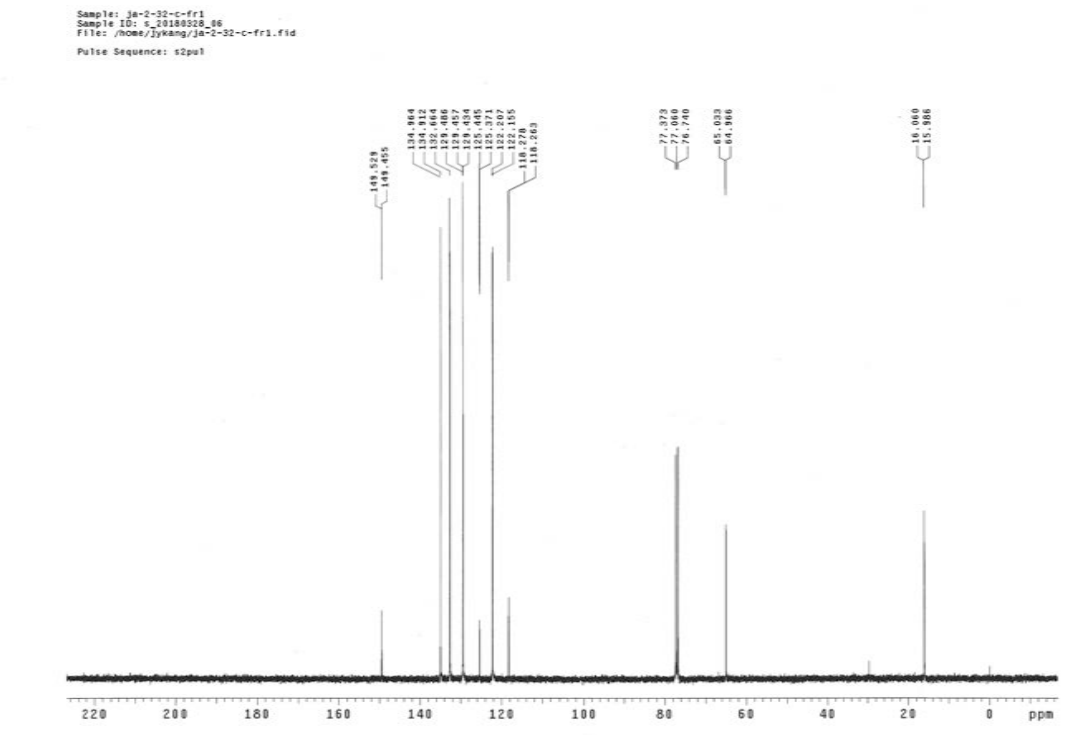
^{31}P NMR (162 MHz) in $CDCl_3$



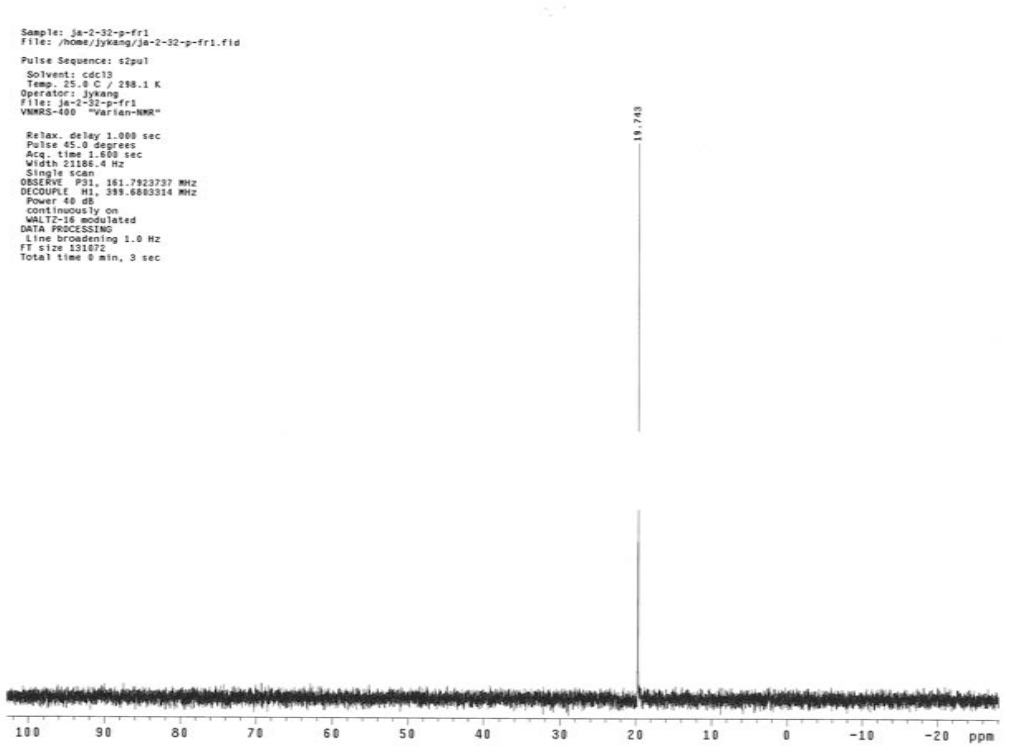
^{1}H NMR (400 MHz) in $CDCl_3$



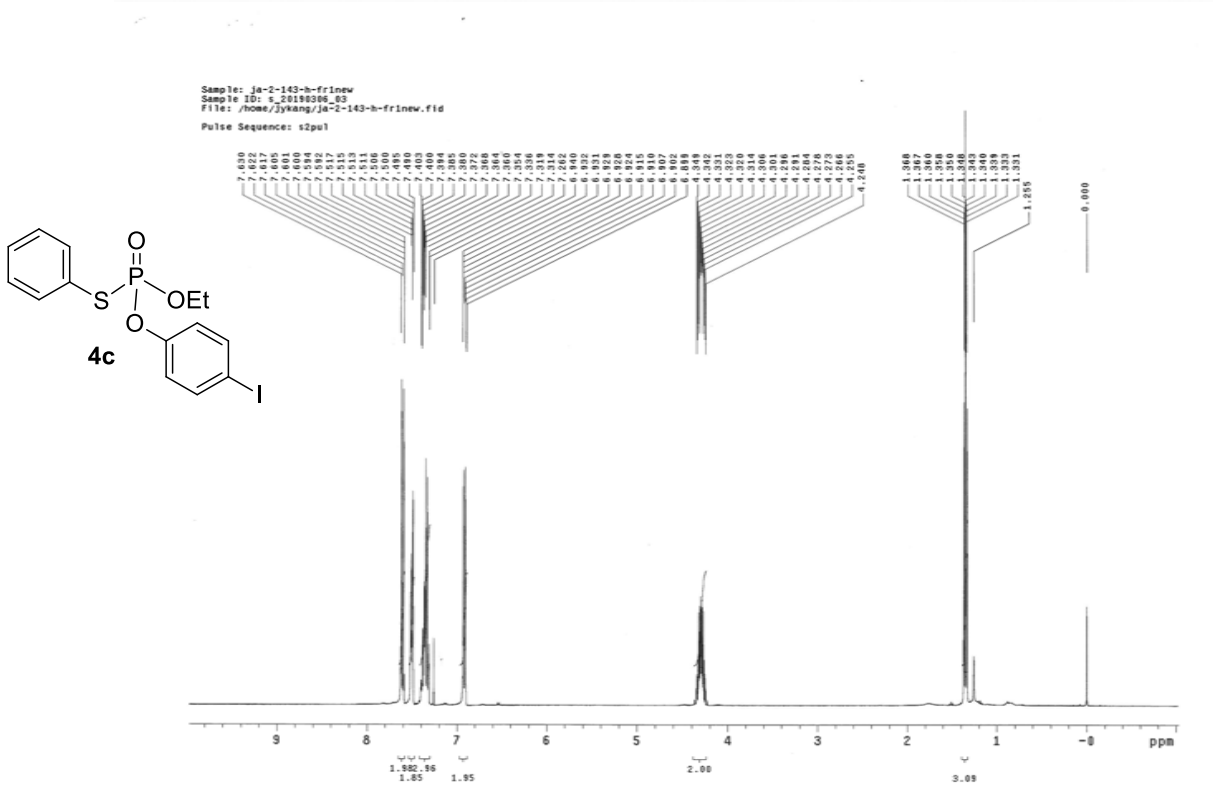
^{13}C NMR (100.5 MHz) in $CDCl_3$



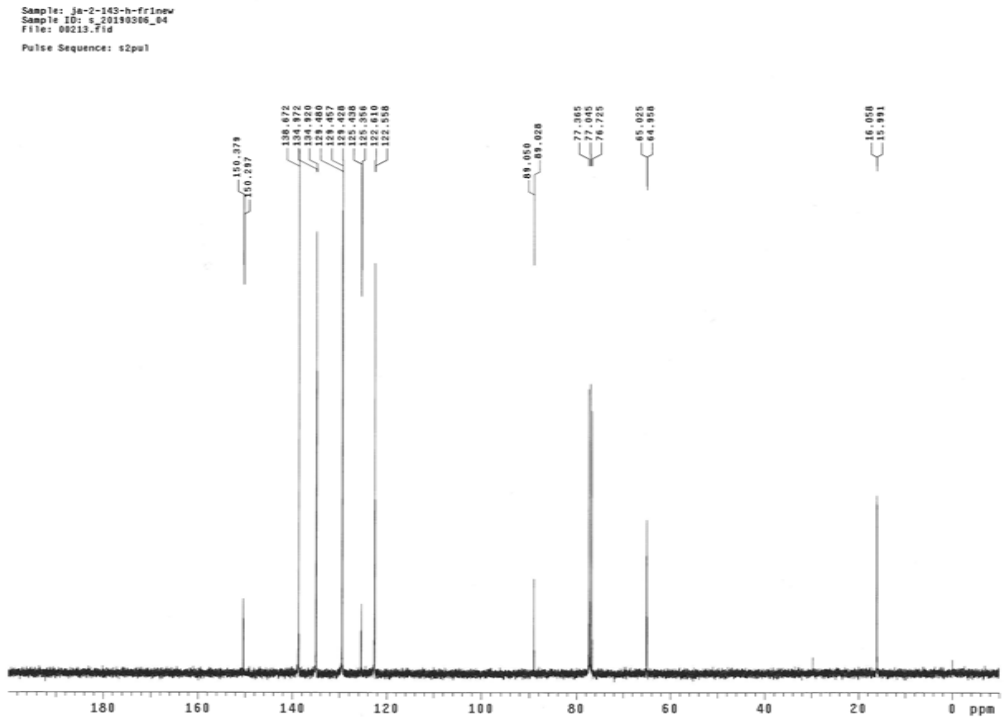
^{31}P NMR (162 MHz) in $CDCl_3$



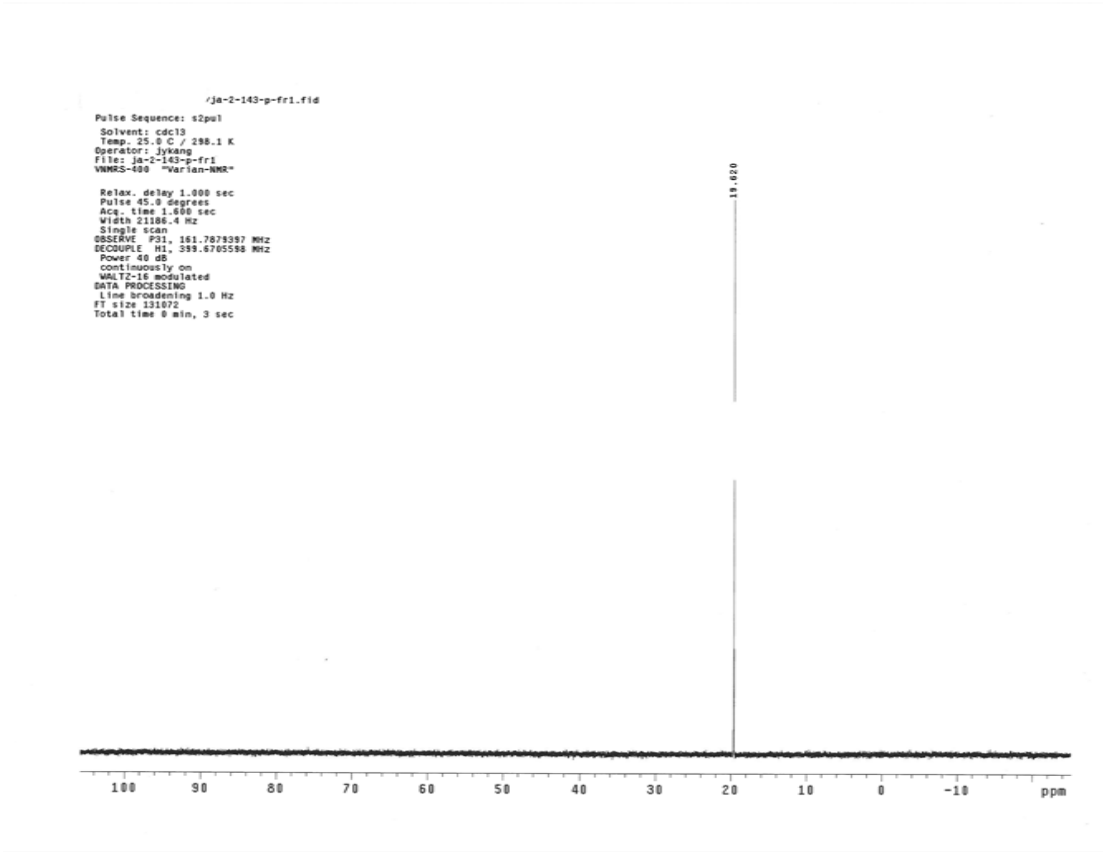
^{1}H NMR (400 MHz) in $CDCl_3$



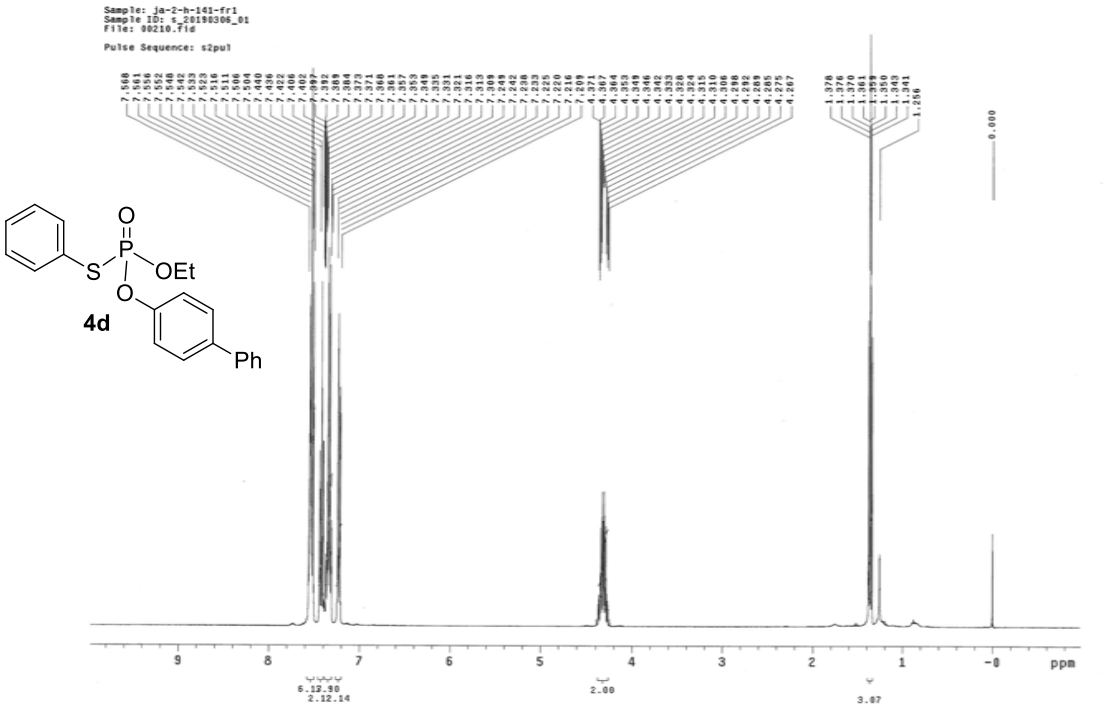
^{13}C NMR (100.5 MHz) in $CDCl_3$



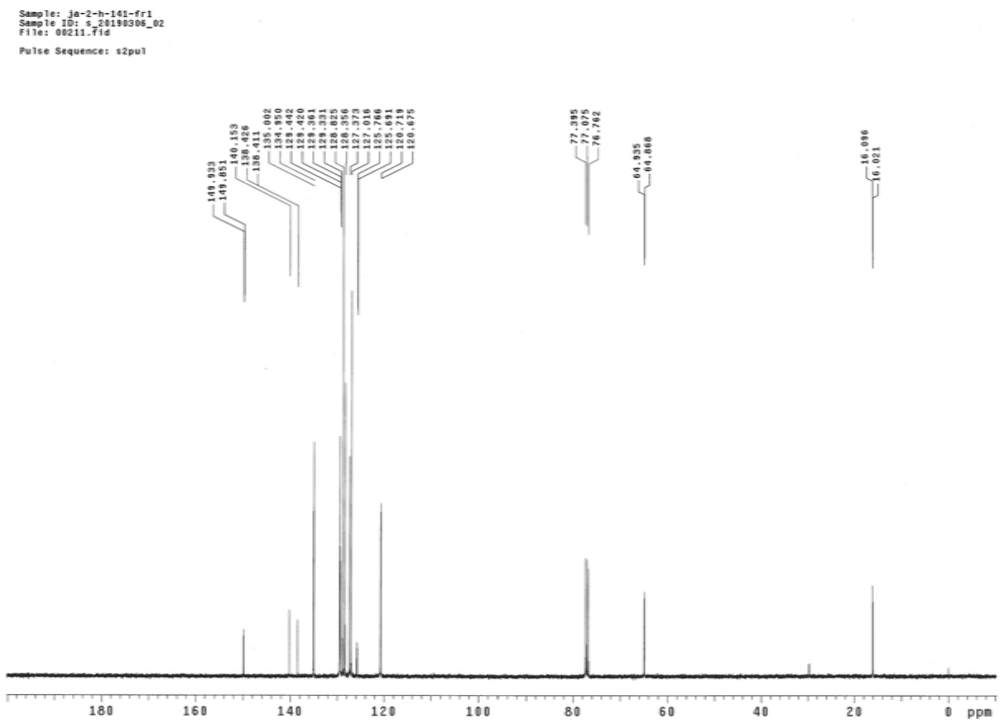
^{31}P NMR (162 MHz) in $CDCl_3$



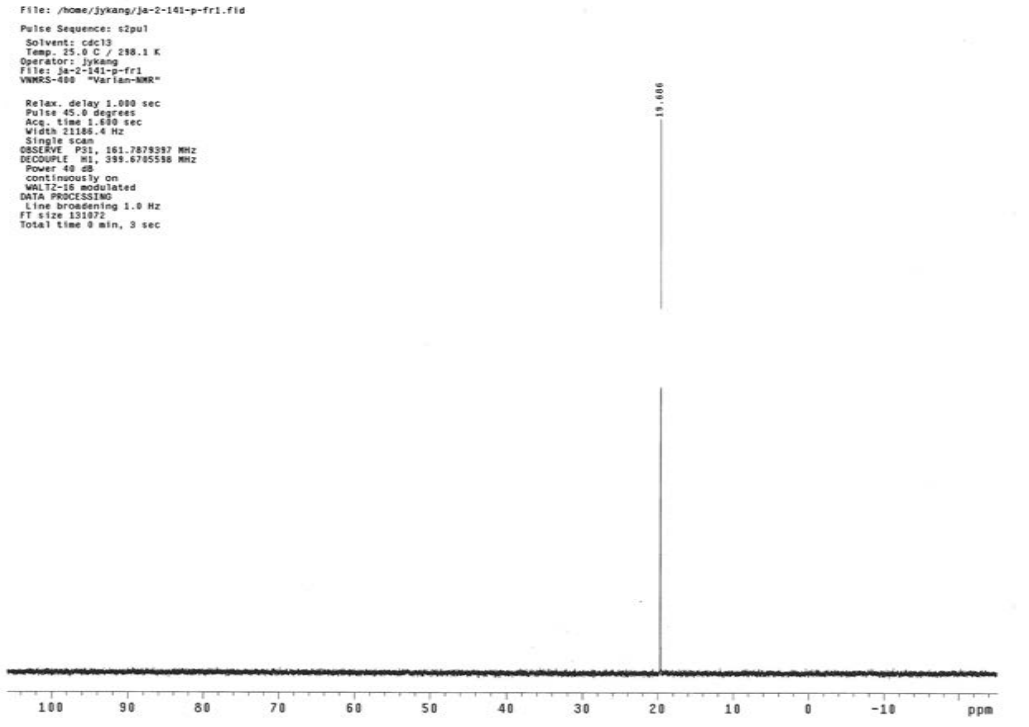
^{1}H NMR (400 MHz) in $CDCl_3$



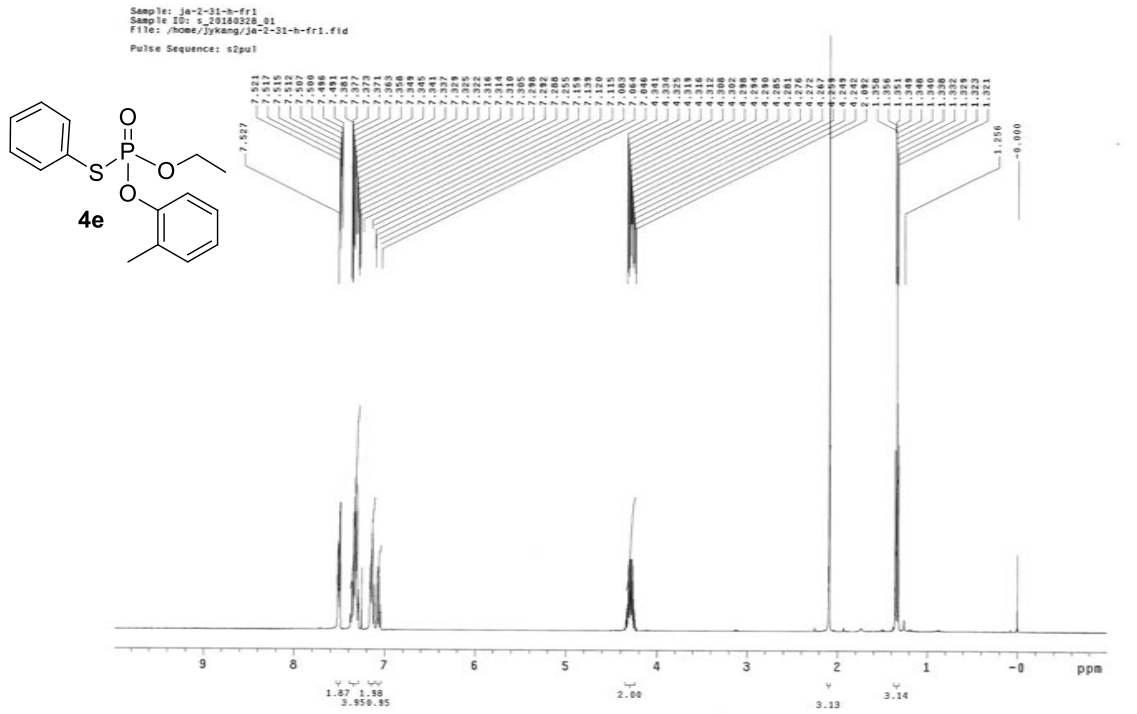
^{13}C NMR (100.5 MHz) in $CDCl_3$



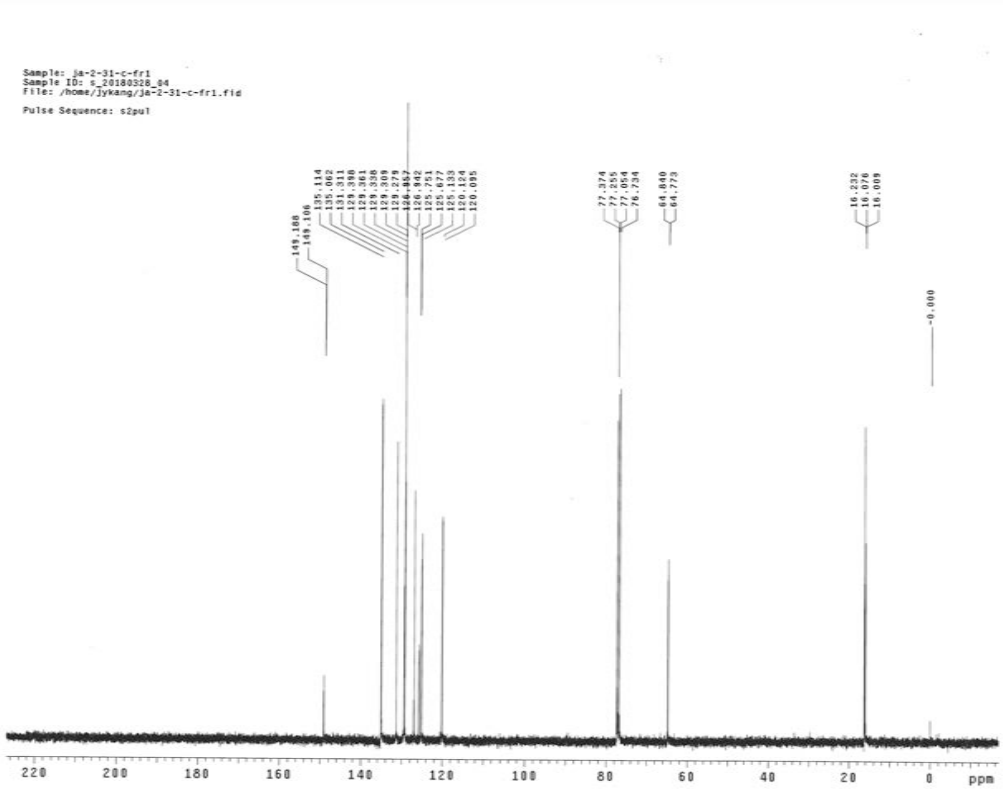
^{31}P NMR (162 MHz) in $CDCl_3$



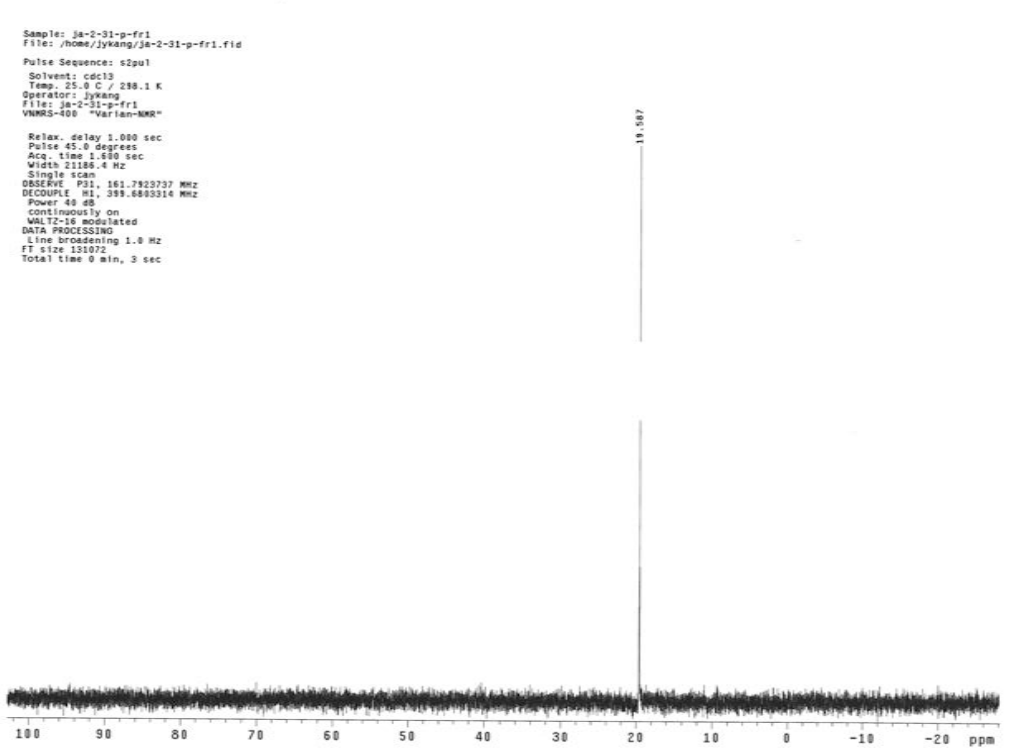
^{1}H NMR (400 MHz) in $CDCl_3$



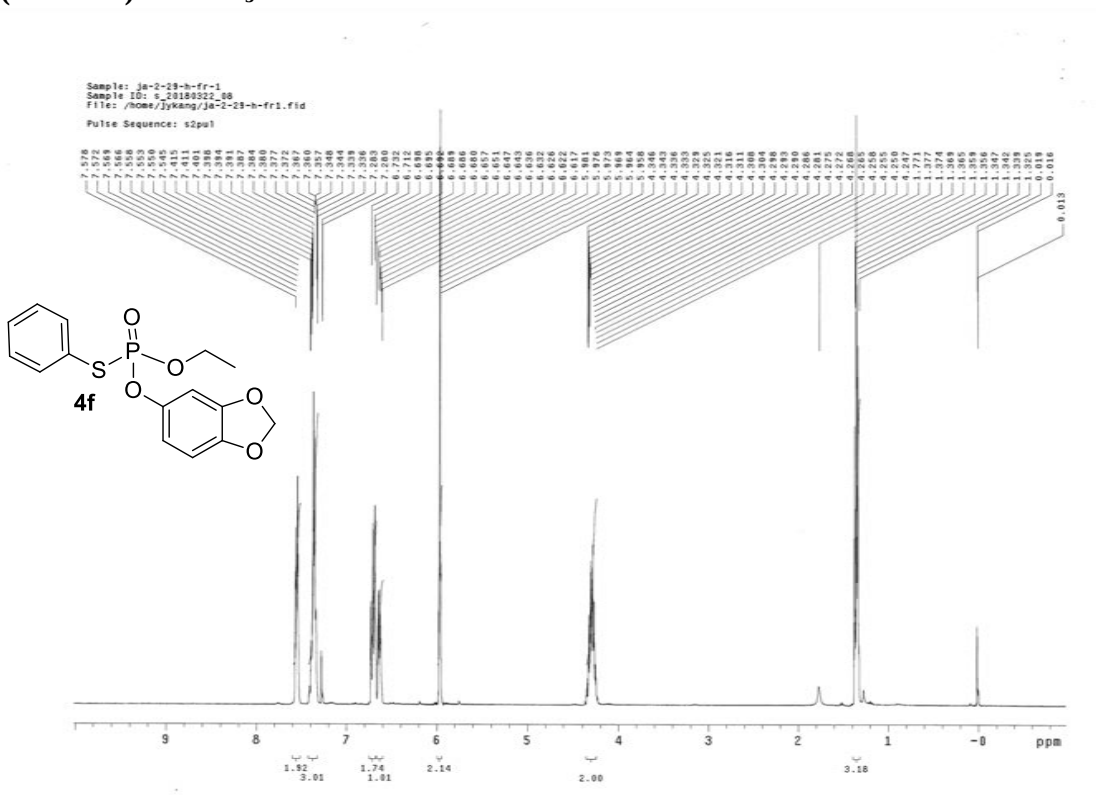
^{13}C NMR (100.5 MHz) in $CDCl_3$



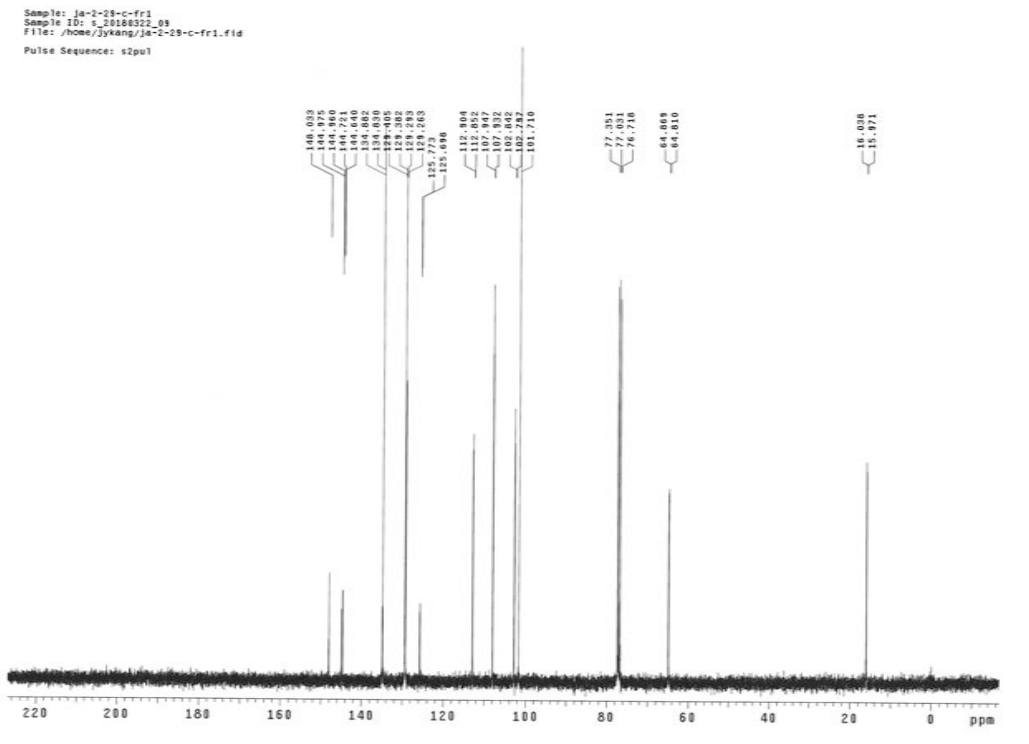
^{31}P NMR (162 MHz) in $CDCl_3$



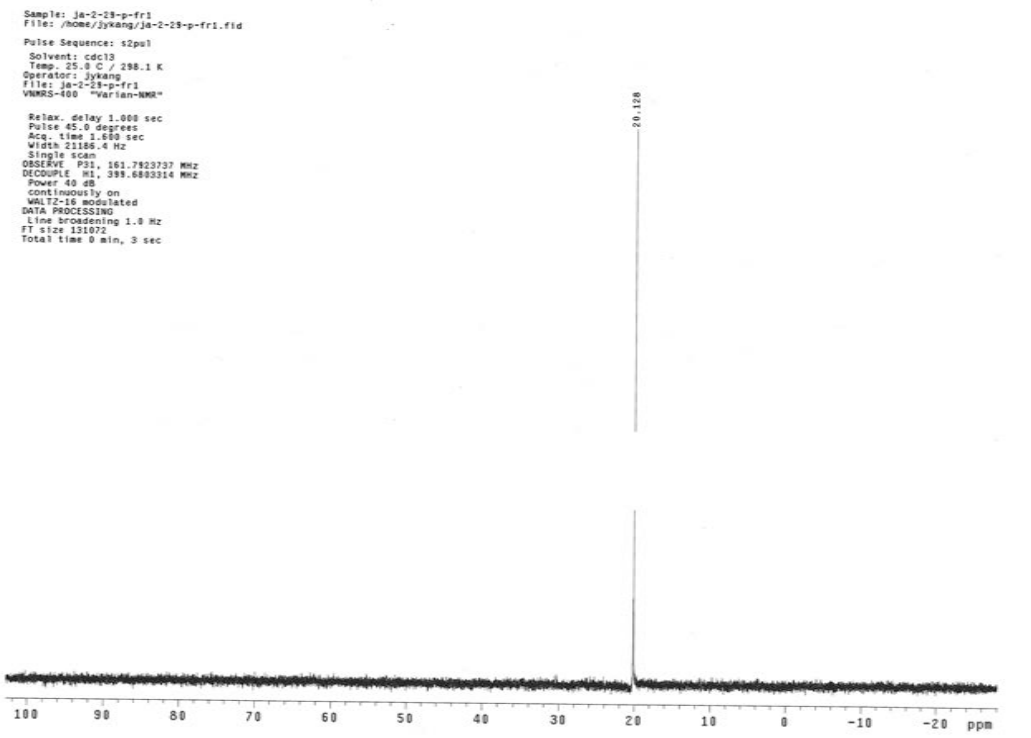
^{1}H NMR (400 MHz) in $CDCl_3$



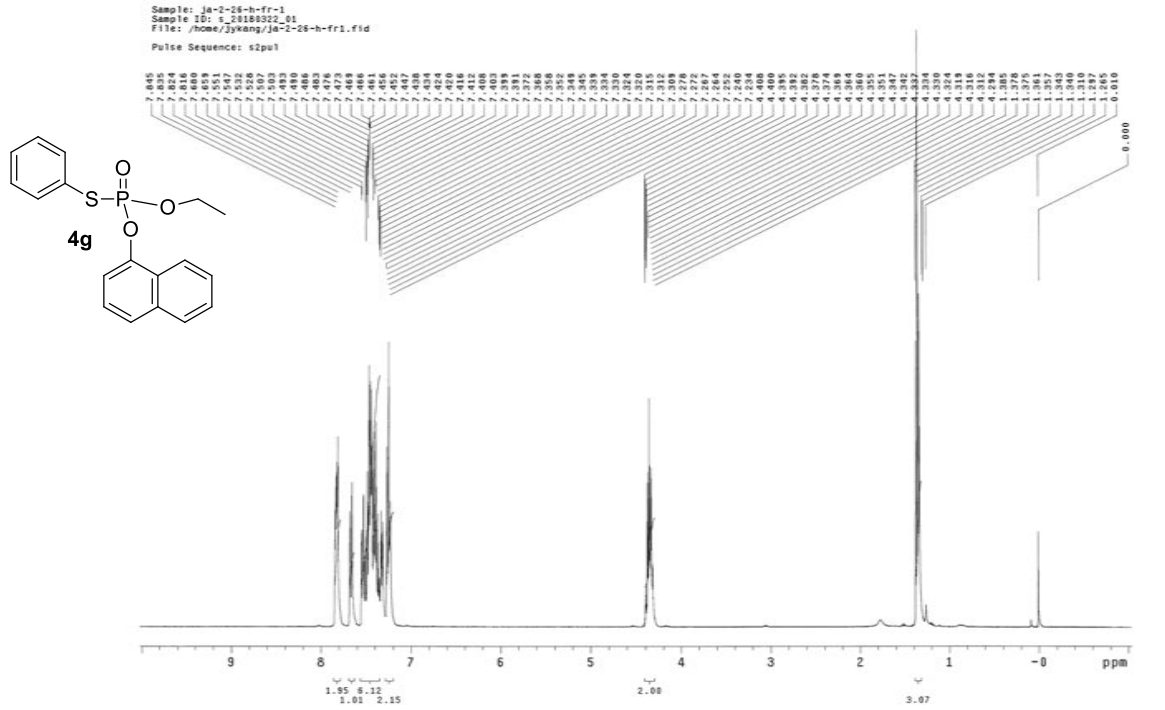
^{13}C NMR (100.5 MHz) in $CDCl_3$



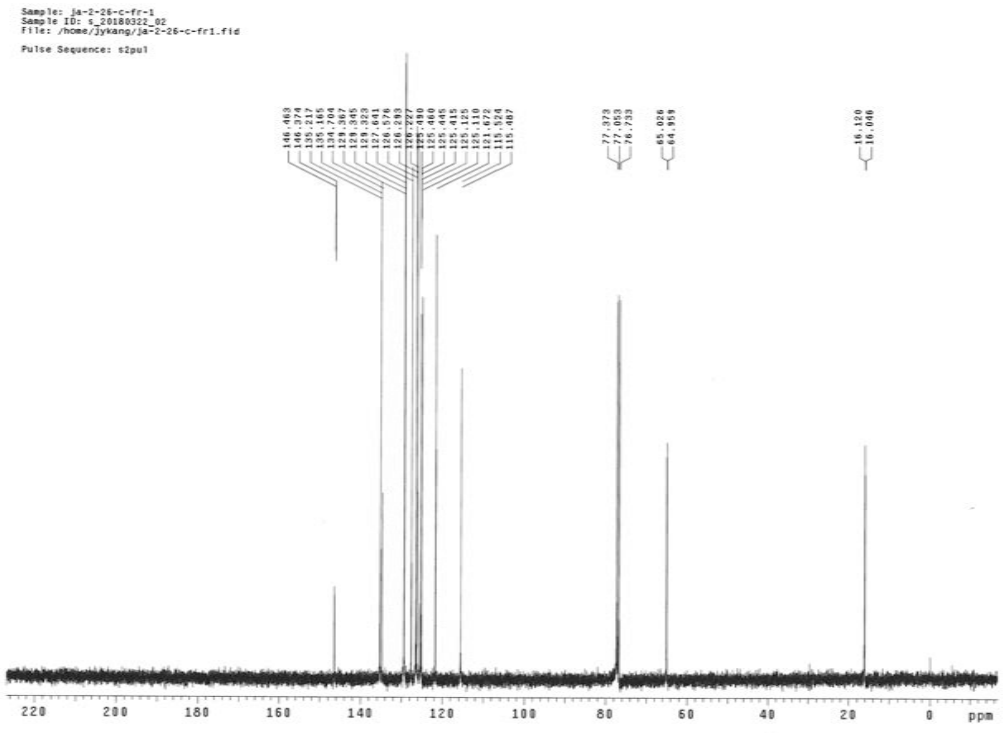
^{31}P NMR (162 MHz) in $CDCl_3$



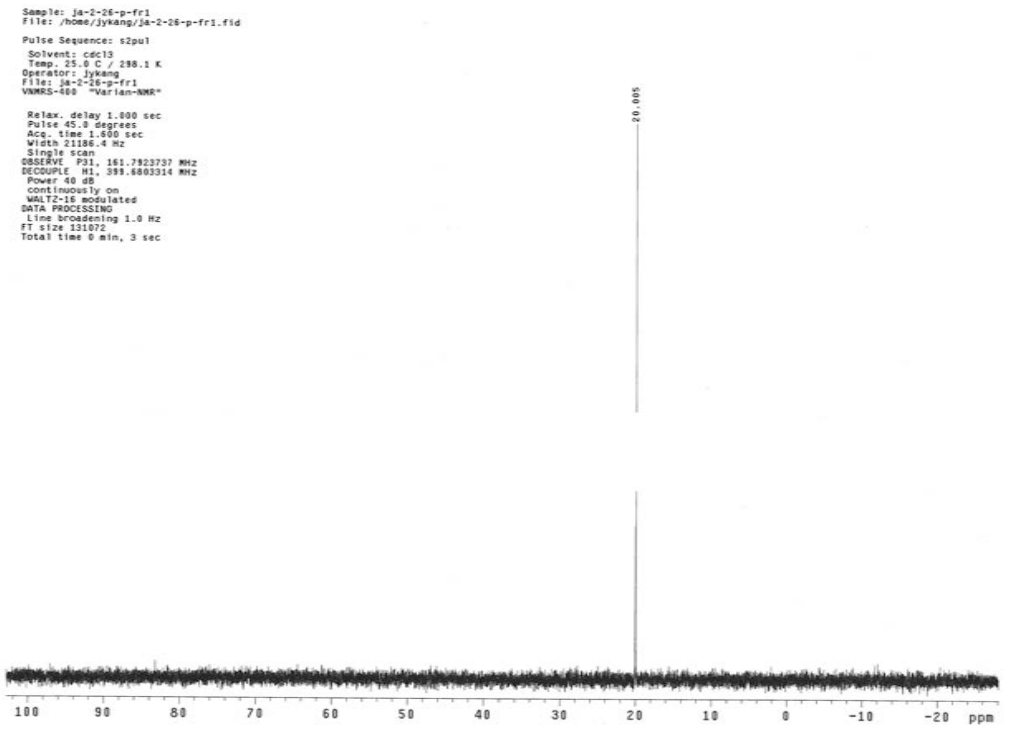
^{1}H NMR (400 MHz) in $CDCl_3$



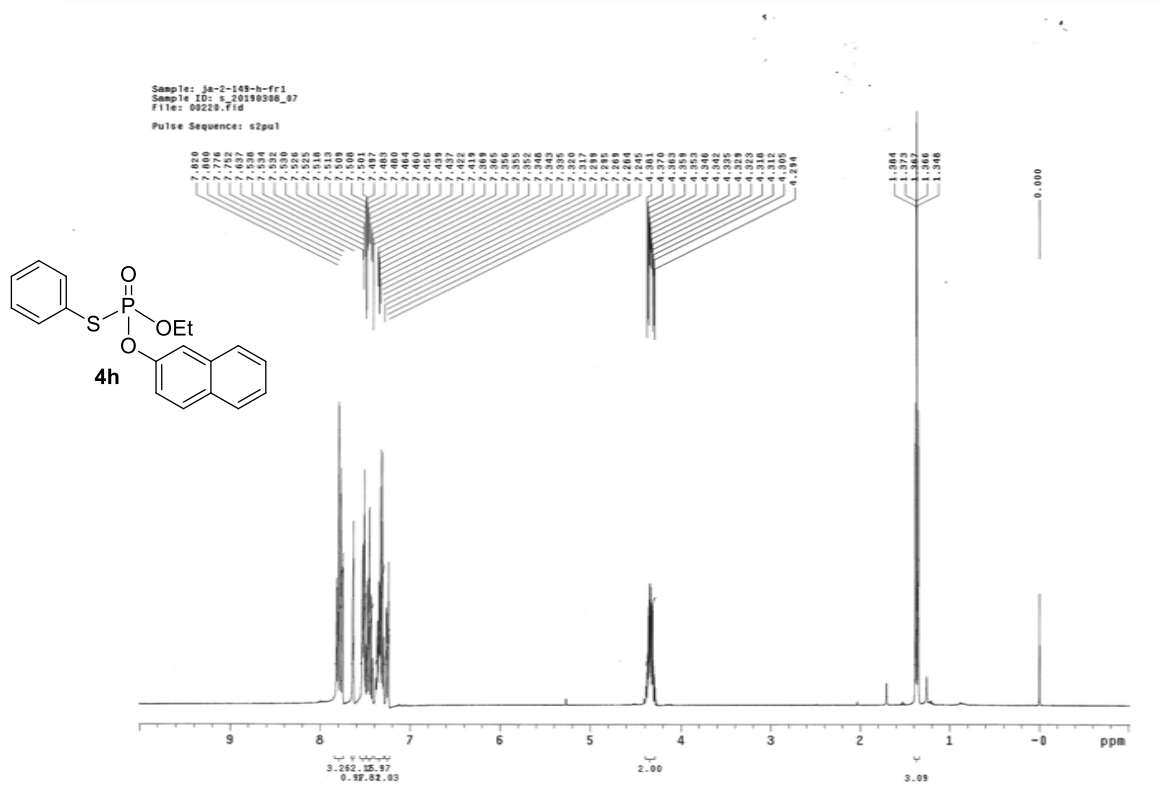
^{13}C NMR (100.5 MHz) in $CDCl_3$



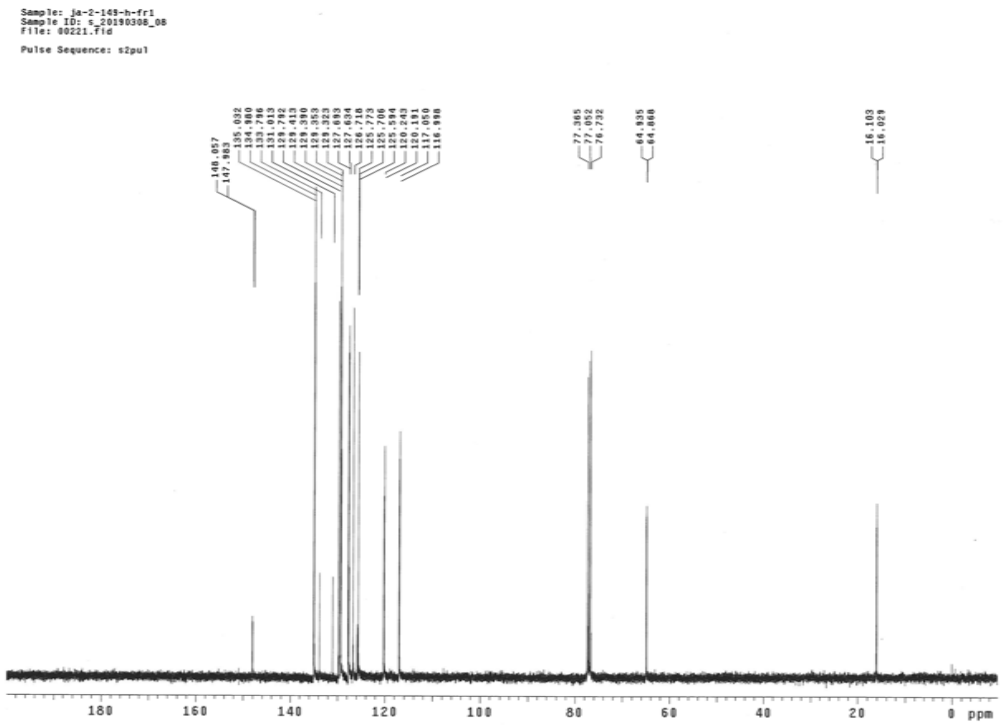
^{31}P NMR (162 MHz) in $CDCl_3$



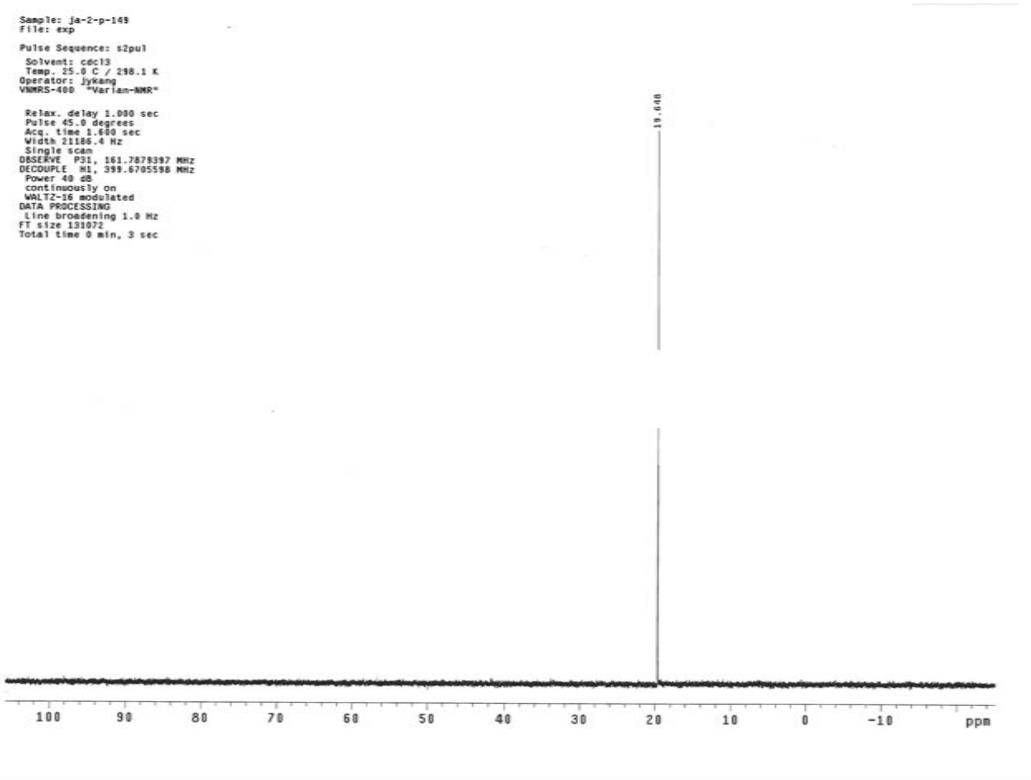
^{1}H NMR (400 MHz) in $CDCl_3$



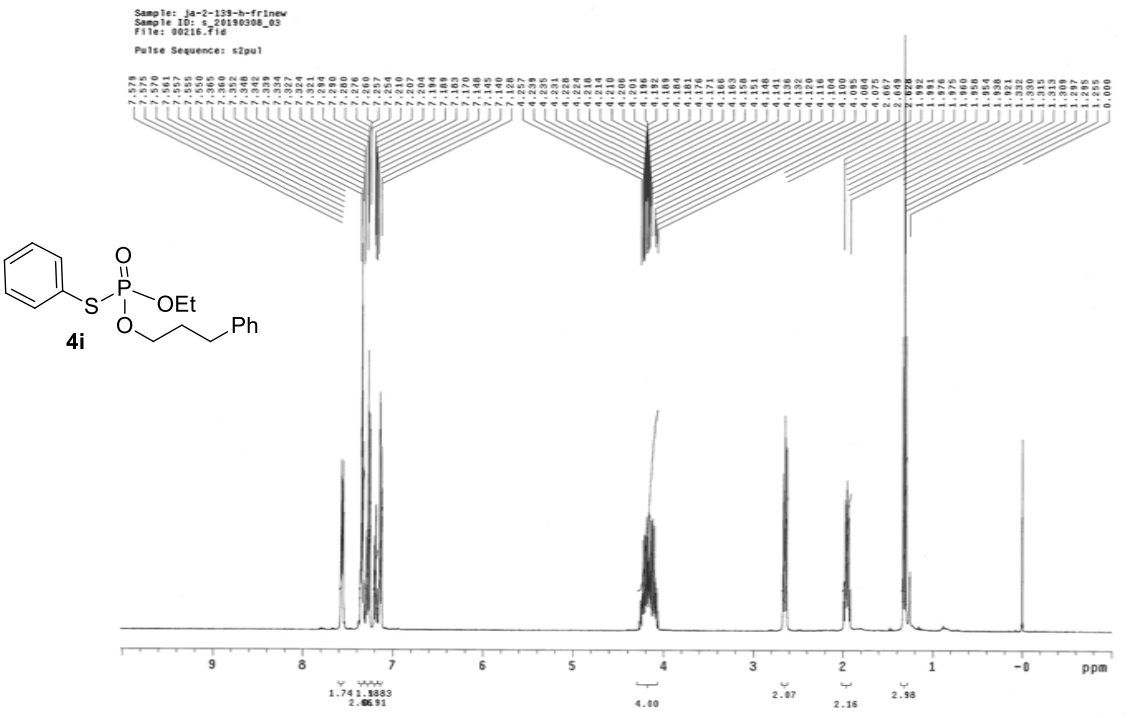
^{13}C NMR (100.5 MHz) in $CDCl_3$



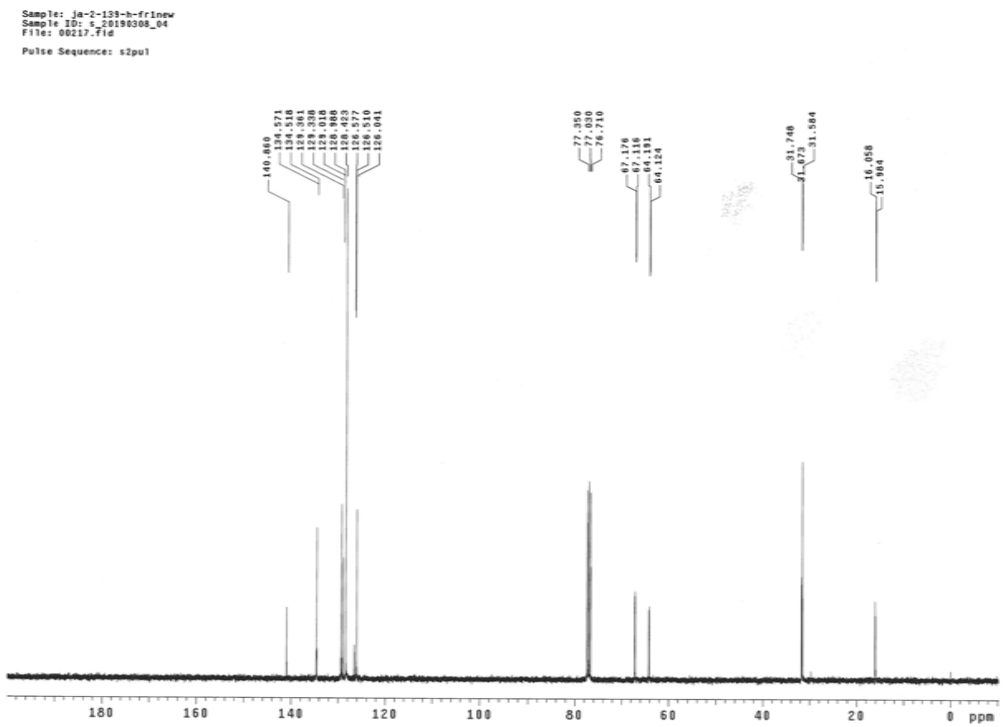
^{31}P NMR (162 MHz) in $CDCl_3$



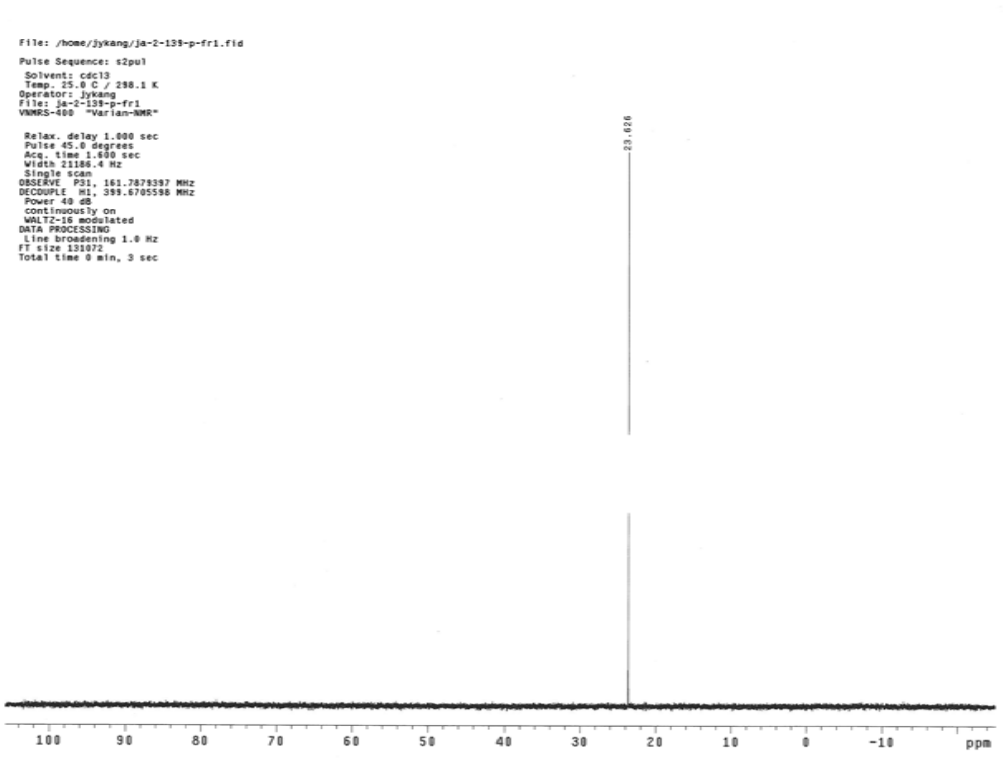
^{1}H NMR (400 MHz) in $CDCl_3$



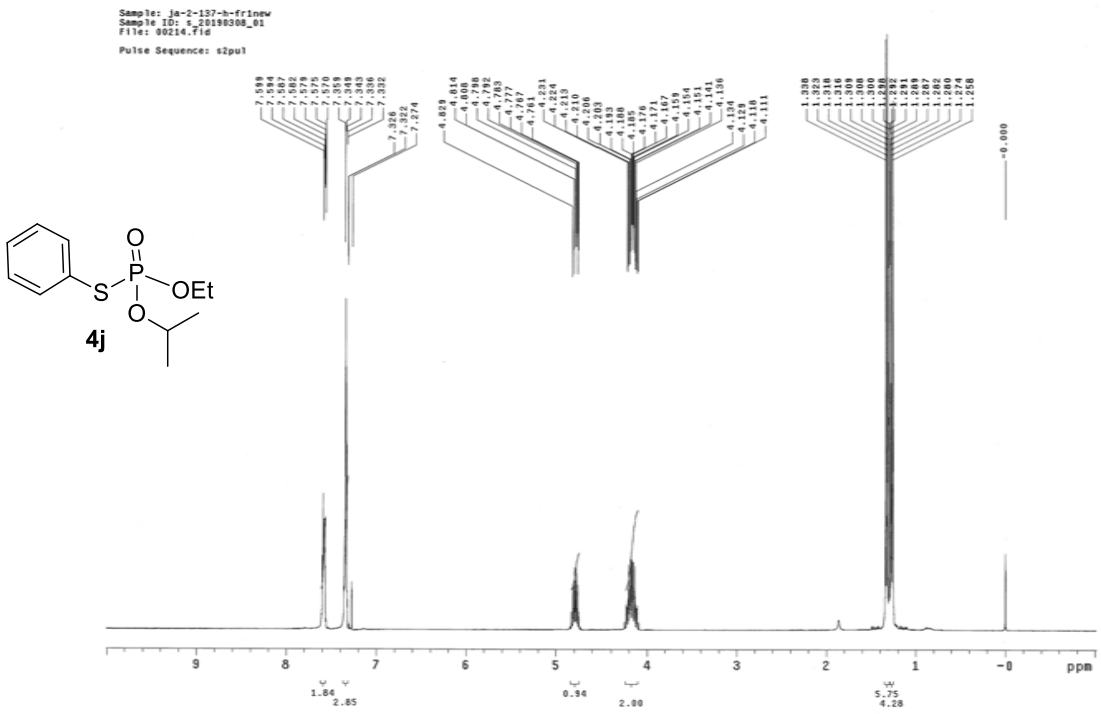
^{13}C NMR (100.5 MHz) in $CDCl_3$



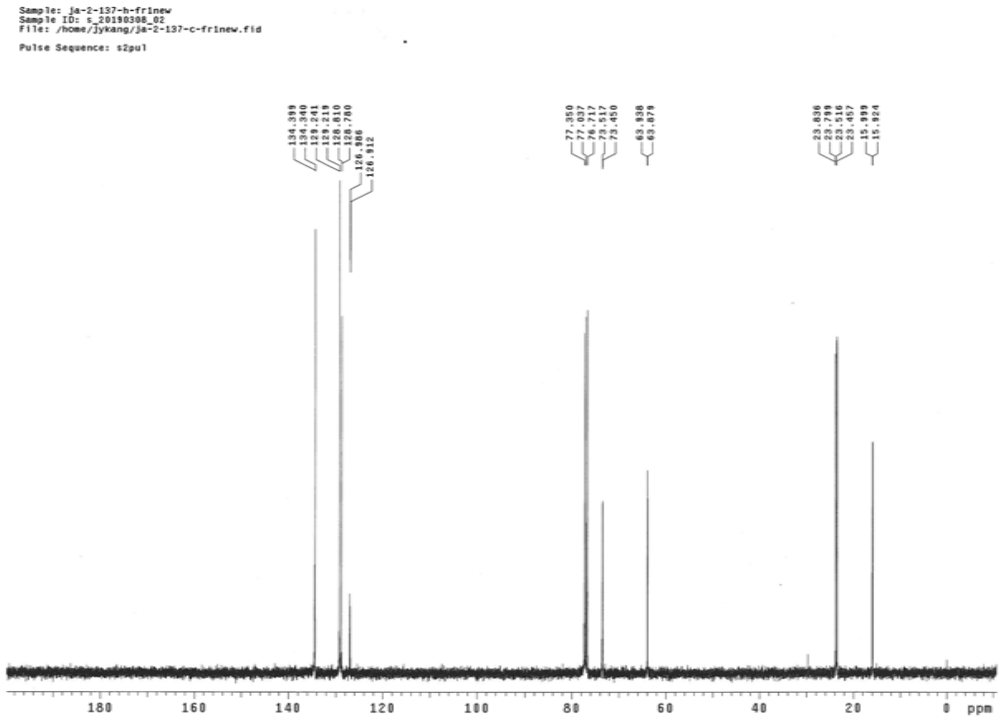
^{31}P NMR (162 MHz) in $CDCl_3$



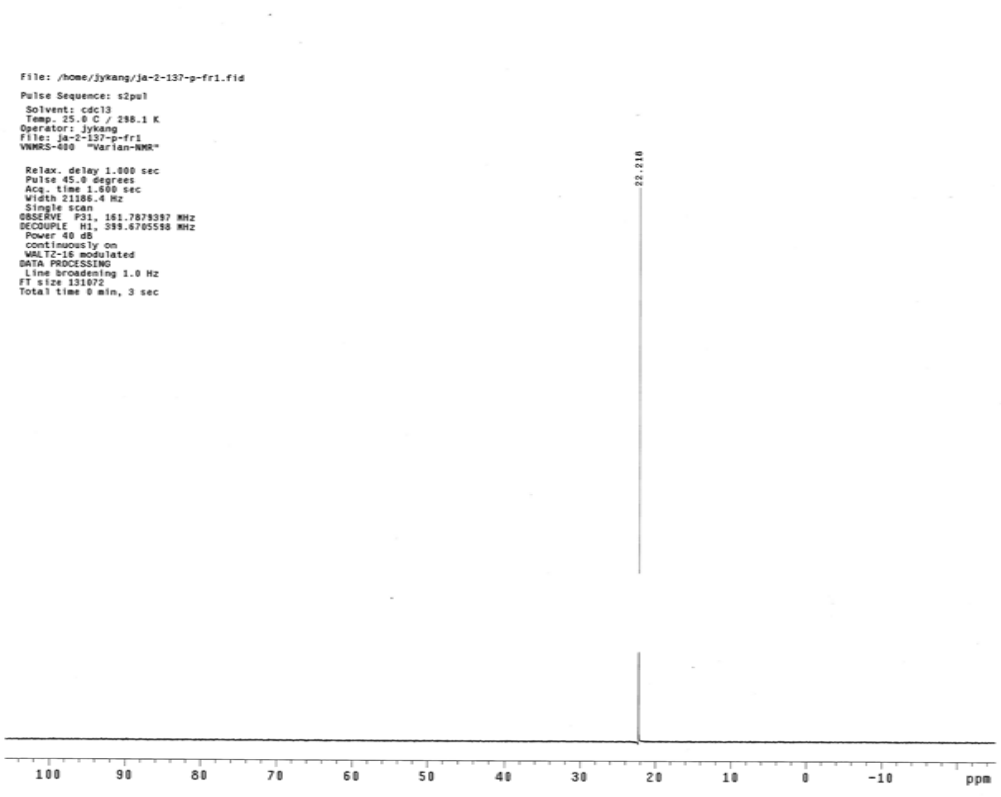
^{1}H NMR (400 MHz) in $CDCl_3$



^{13}C NMR (100.5 MHz) in $CDCl_3$



^{31}P NMR (162 MHz) in $CDCl_3$



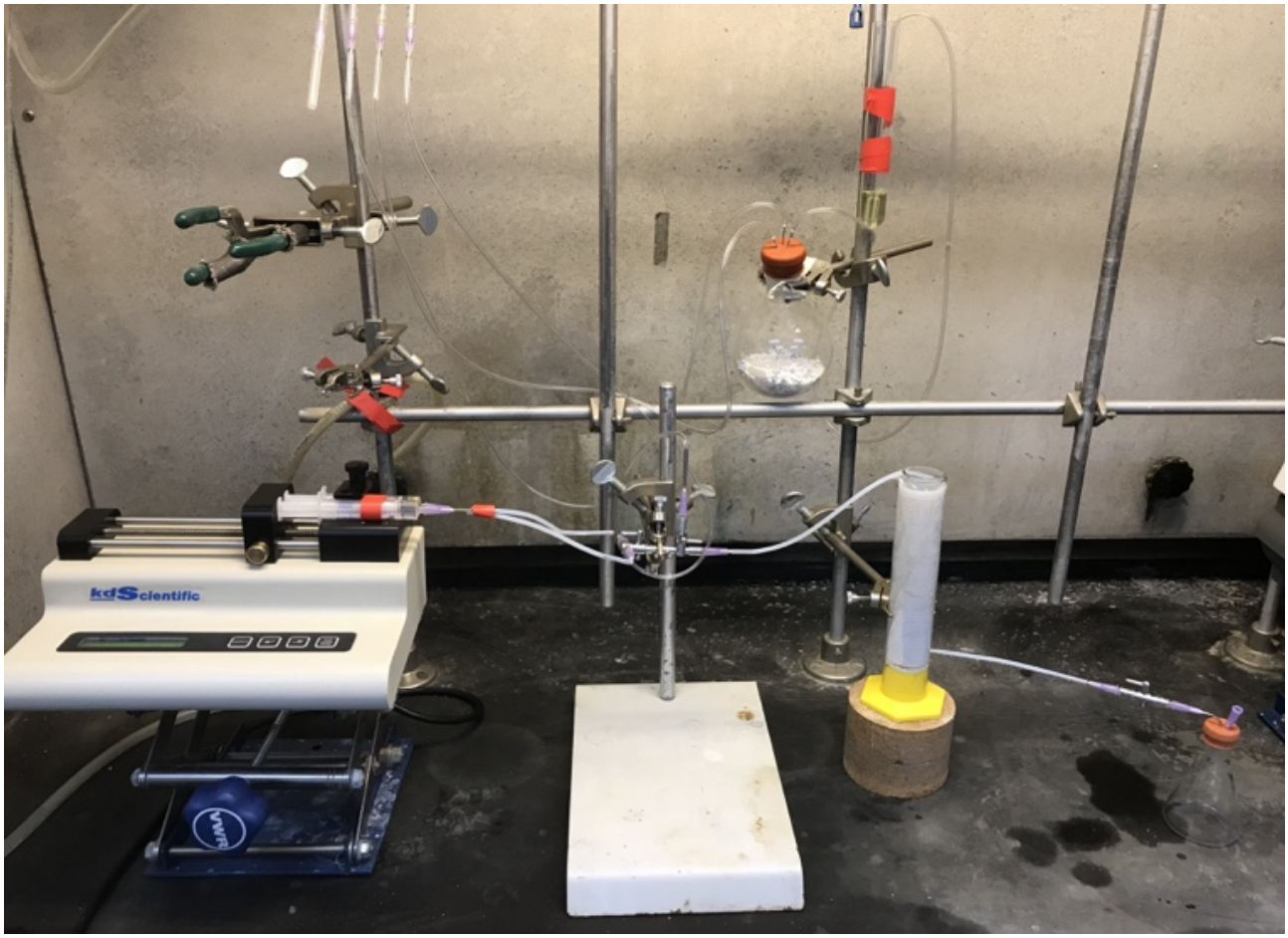


Figure S1. Flow setup for the synthesis of **3**, **4**