

# **Practical Epoxidation of Olefins using Air and Ubiquitous Iron-based Fluorous Salen Complex**

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and Masato Matsugi\***

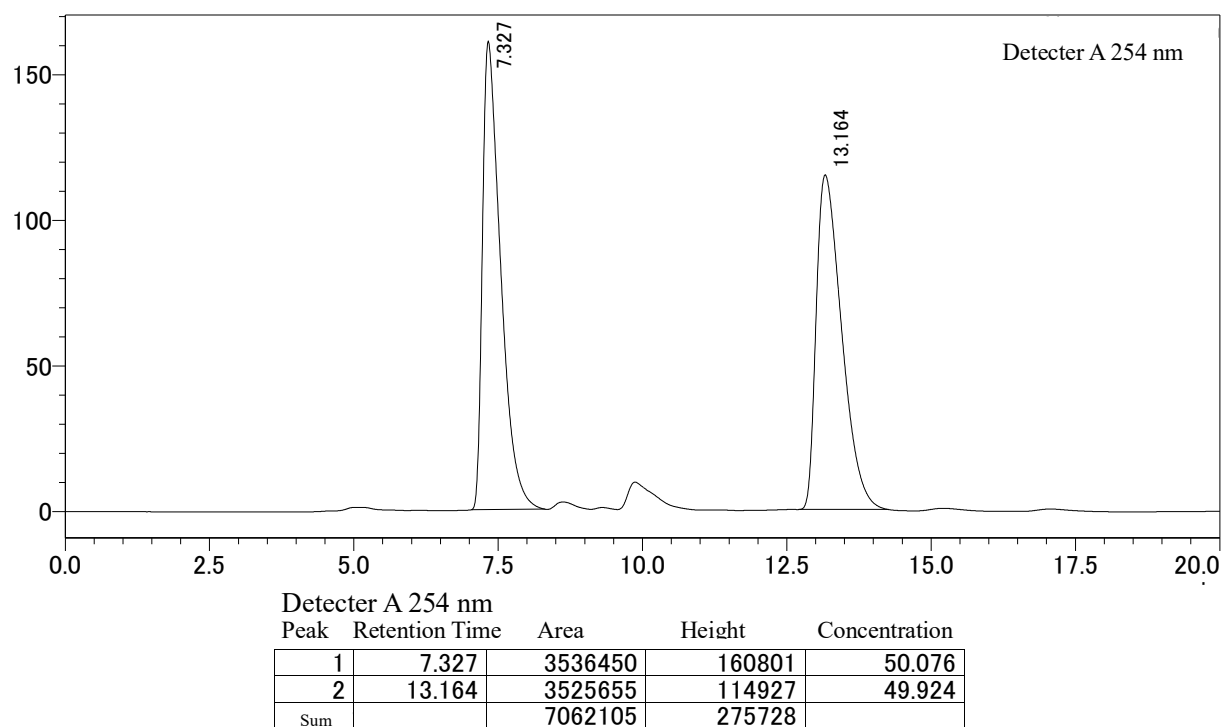
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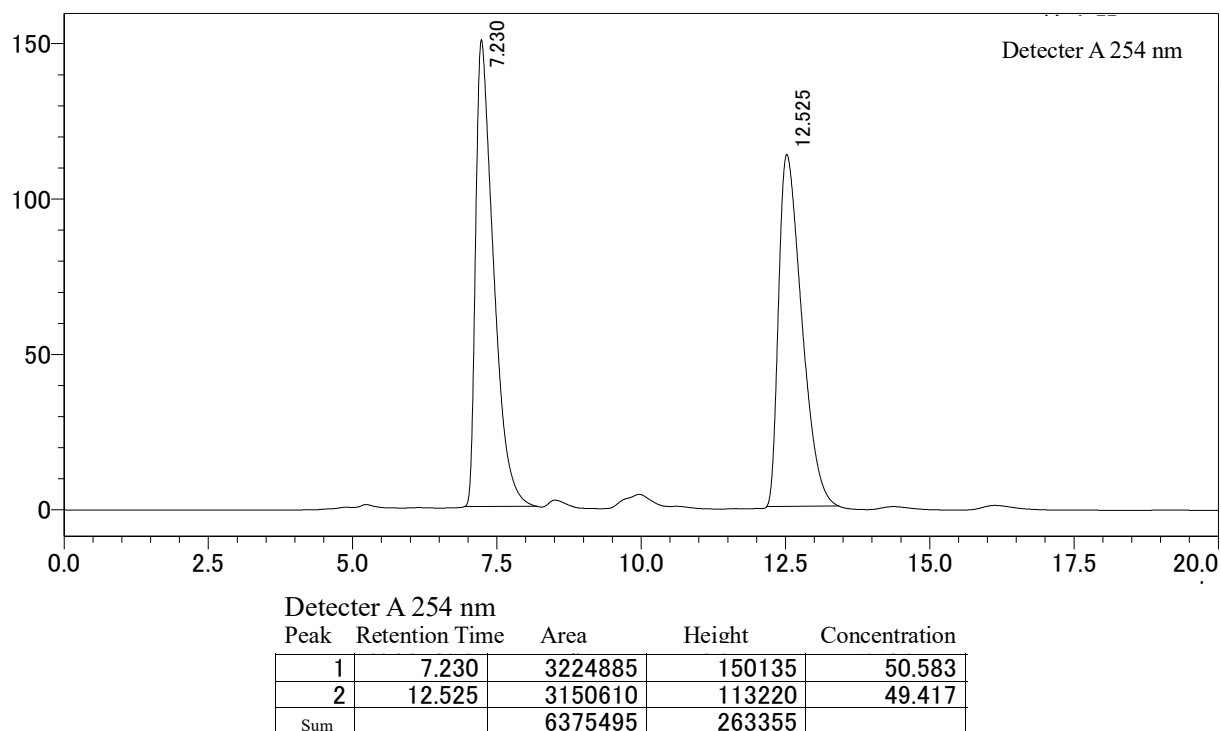
## 1. HPLC chromatograms of epoxidation reaction

HPLC analysis of Air-epoxidation reaction with  $C_4F_9$  Fe(III) salen complex



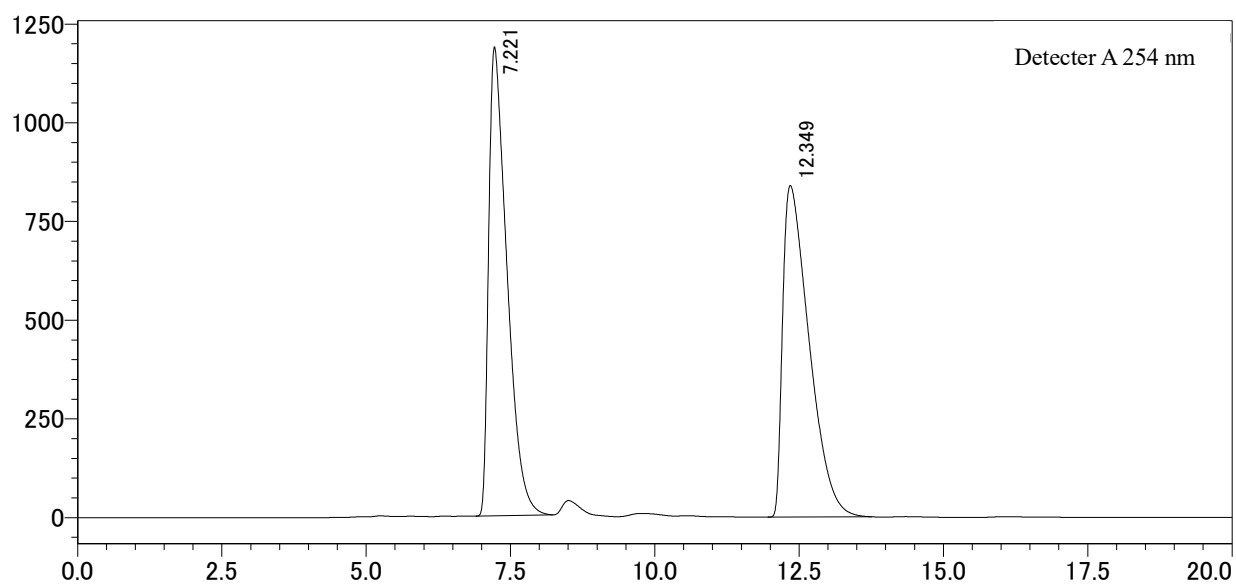
The *ee* of product was determined by HPLC. [254 nm, DAICEL CHIRALCEL OD-3 column, hexane/*i*-PrOH = 9:1, flow rate 0.4 mL/min,  $t_R$  = 7.33 min,  $t_R$  = 13.16 min]

HPLC analysis of Air-epoxidation reaction with  $C_{12}F_{25}$  Fe(III) salen complex



The *ee* of product was determined by HPLC. [254 nm, DAICEL CHIRALCEL OD-3 column, hexane/*i*-PrOH = 9:1, flow rate 0.4 mL/min,  $t_R$  = 7.23 min,  $t_R$  = 12.53 min]

# HPLC analysis of racemic compound

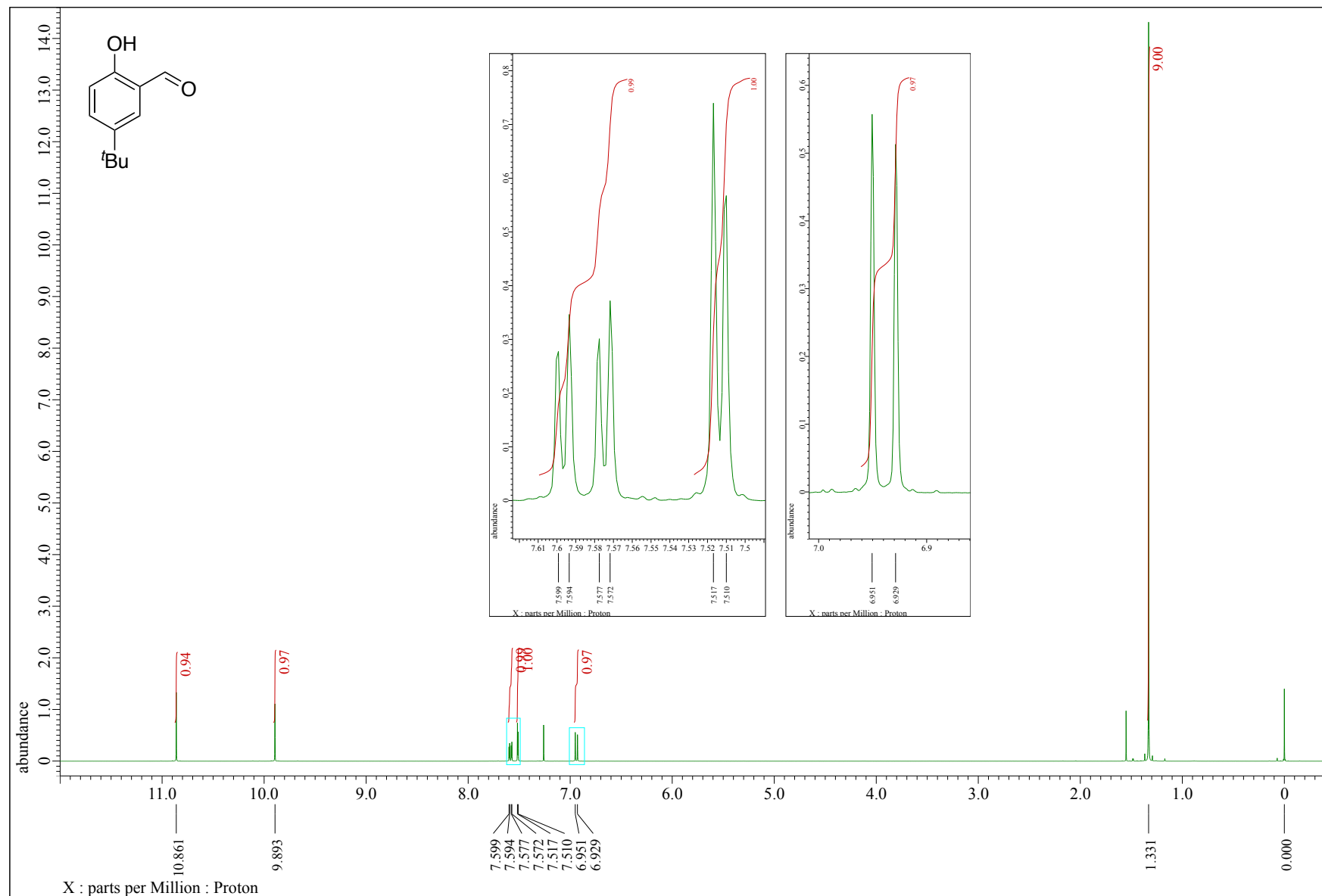


Detector A 254 nm				
Peak	Retention Time	Area	Height	Concentration
1	7.221	26125258	1187330	49.401
2	12.349	26758401	839992	50.599
Sum		52883659	2027322	

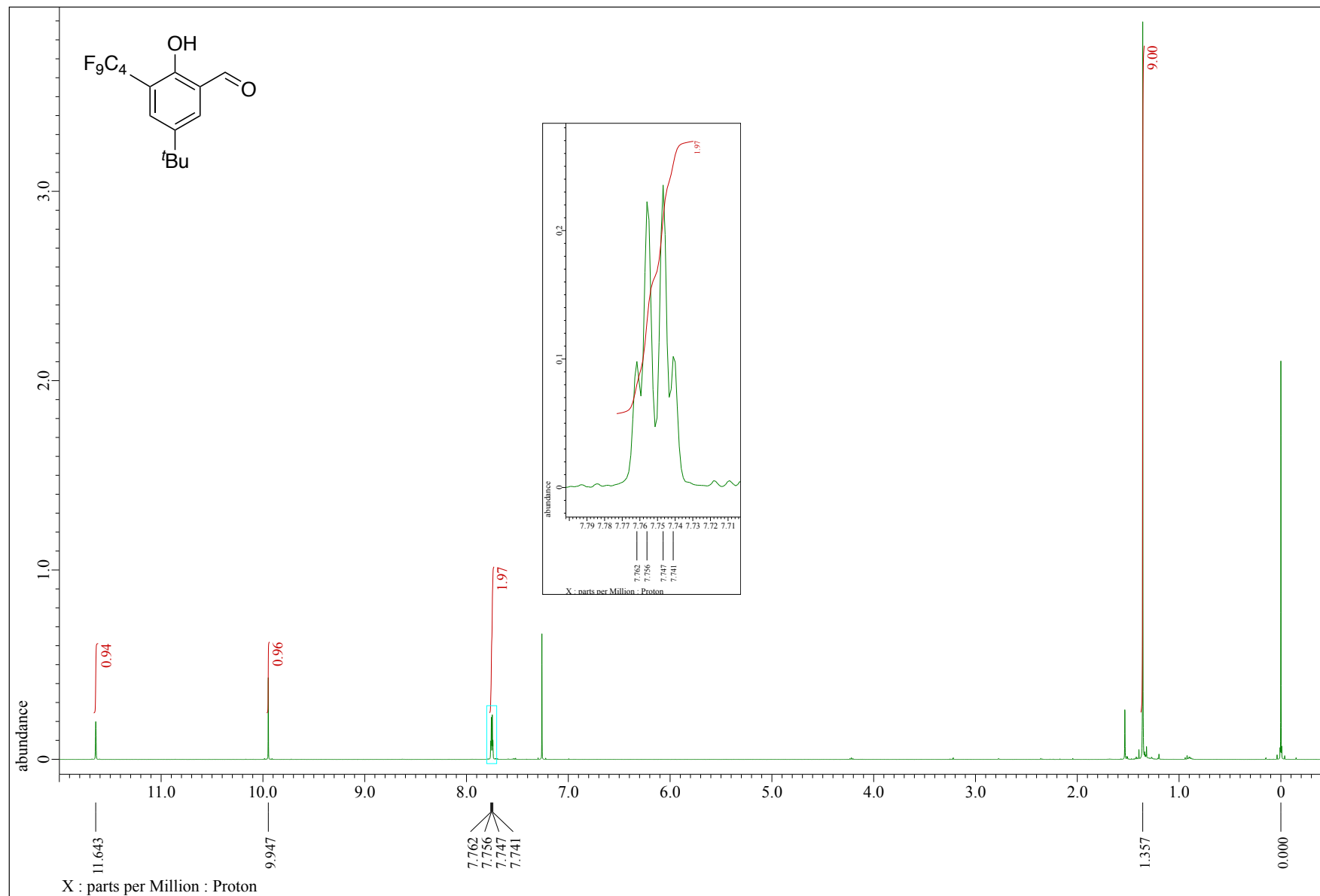
The *ee* of product was determined by HPLC. [254 nm, DAICEL CHIRALCEL OD-3 column, hexane/*i*-PrOH = 9:1, flow rate 0.4 mL/min,  $t_R$  = 7.22 min,  $t_R$  = 12.35 min]

## 2. $^1\text{H}$ NMR, $^{13}\text{C}$ NMR, $^{19}\text{F}$ NMR spectra

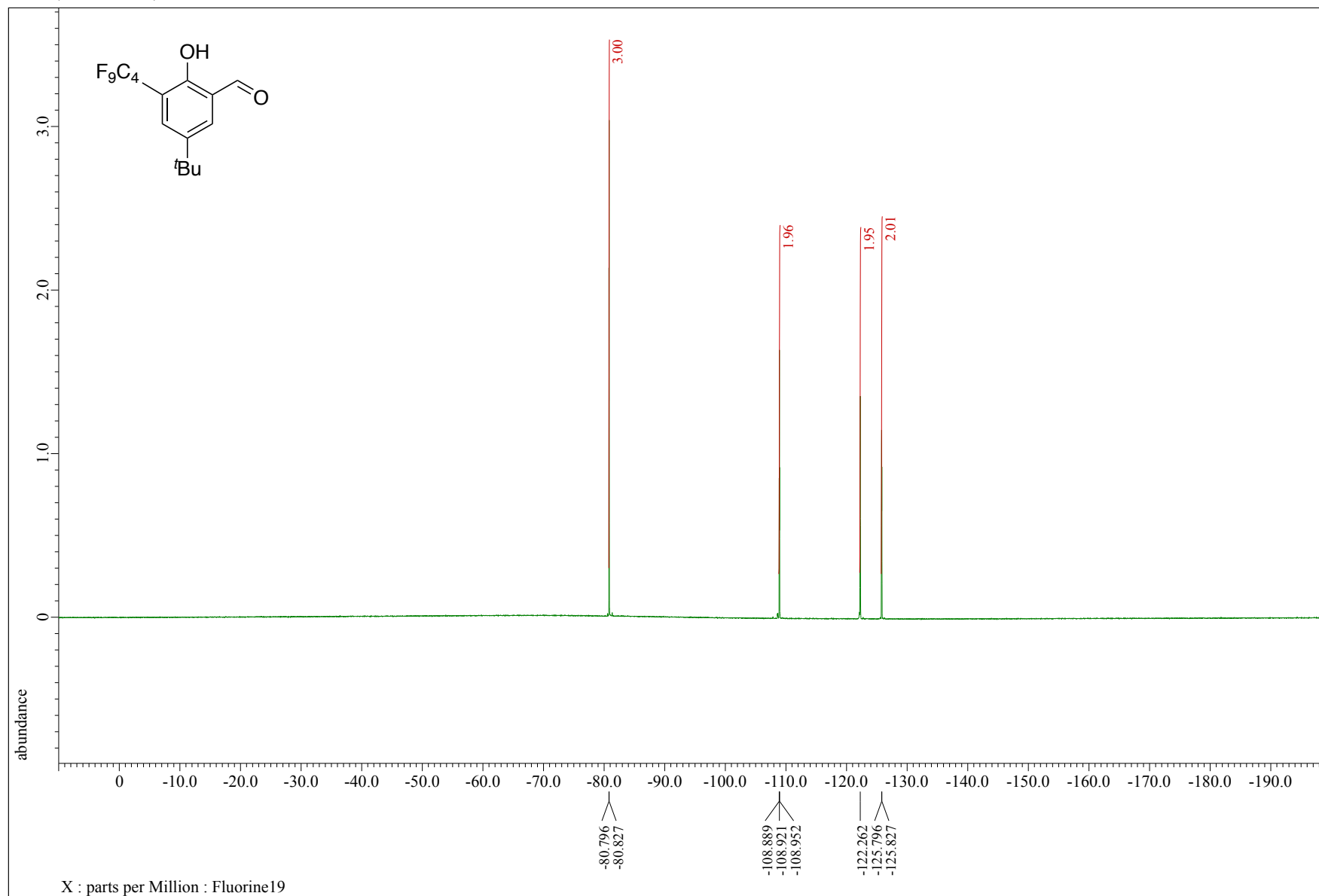
(2)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



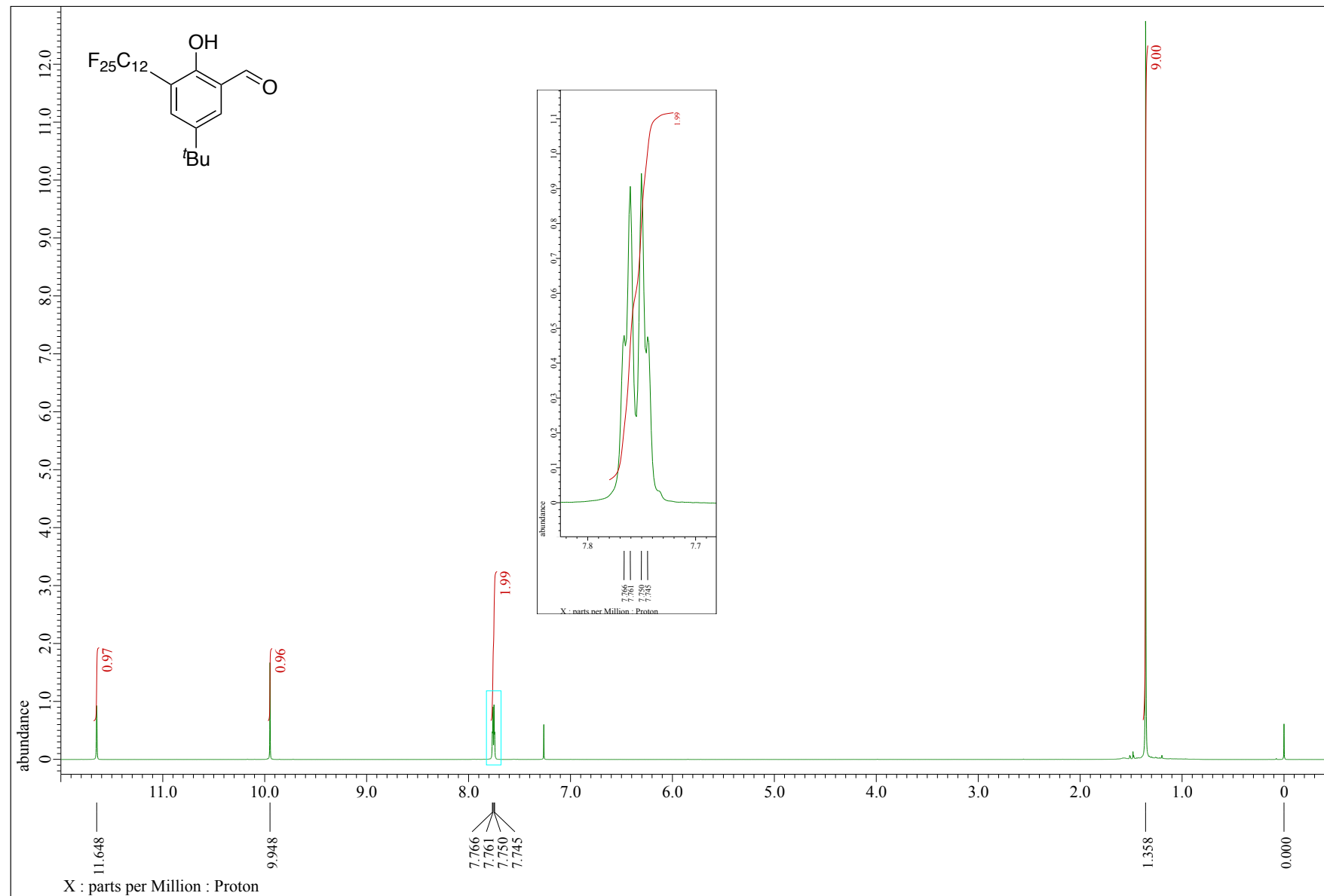
(3a)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



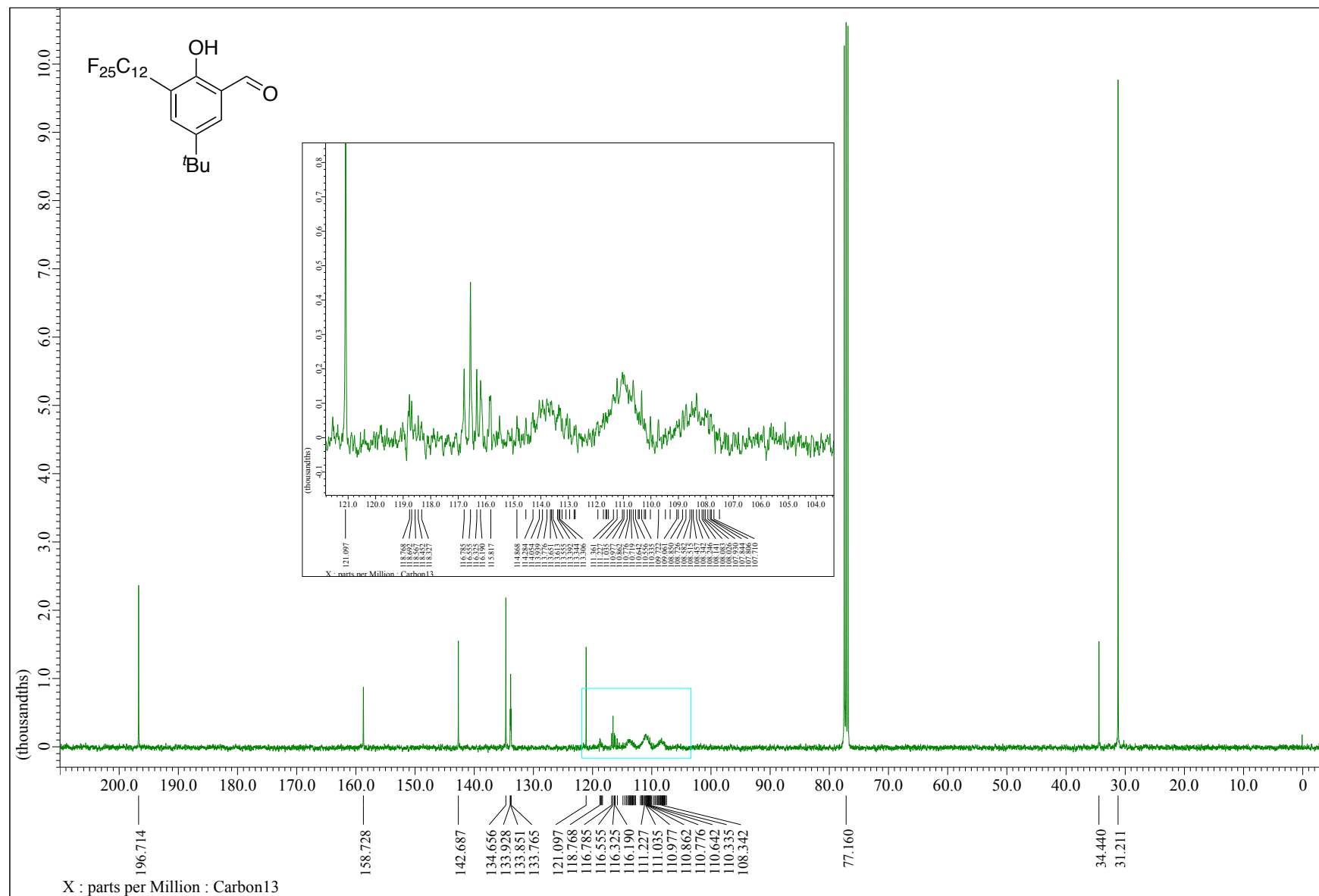
(3a)  $^{19}\text{F}$  NMR, 376 MHz,  $\text{CDCl}_3$



(3b)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$

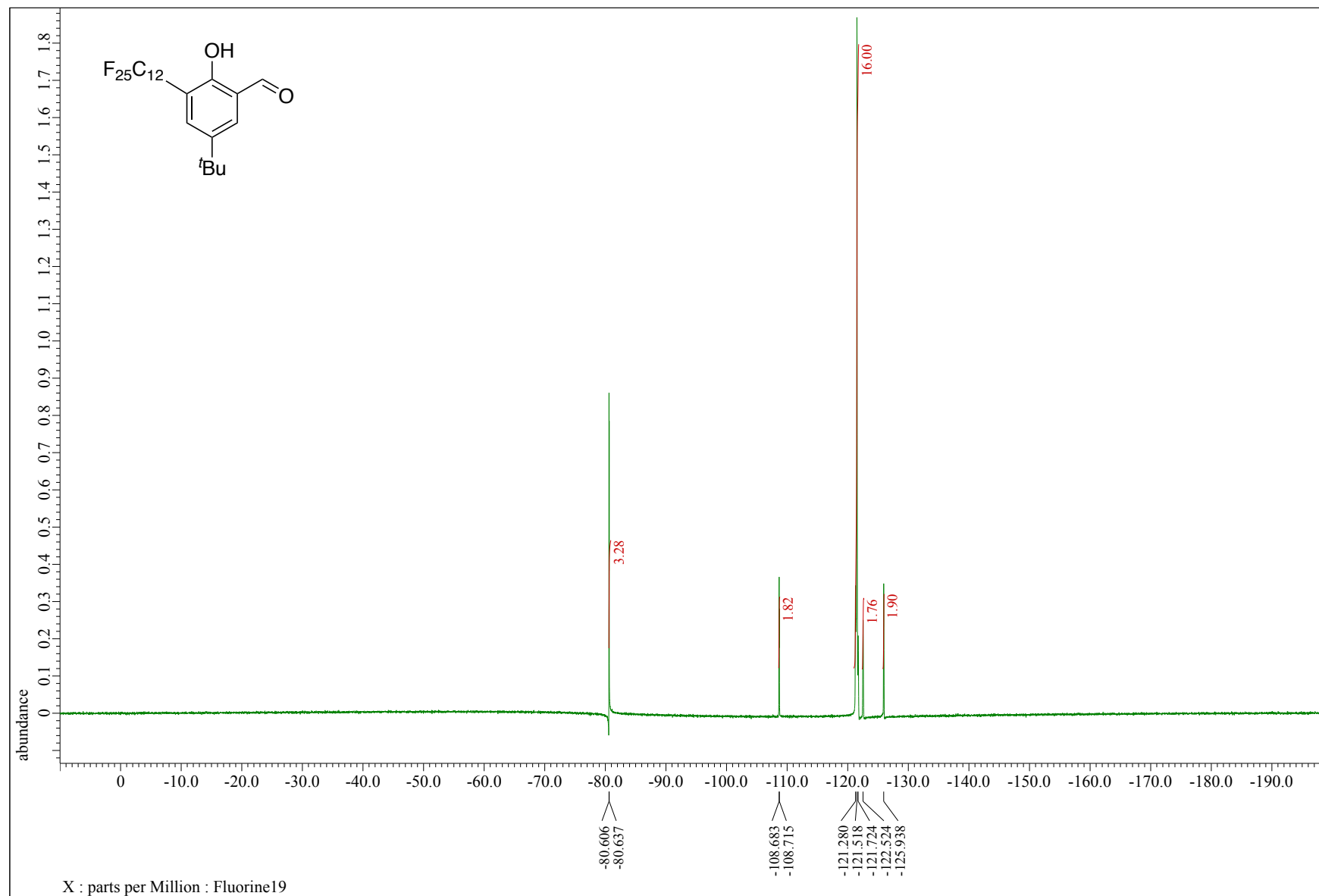


(3b)  $^{13}\text{C}$  NMR, 101 MHz,  $\text{CDCl}_3$

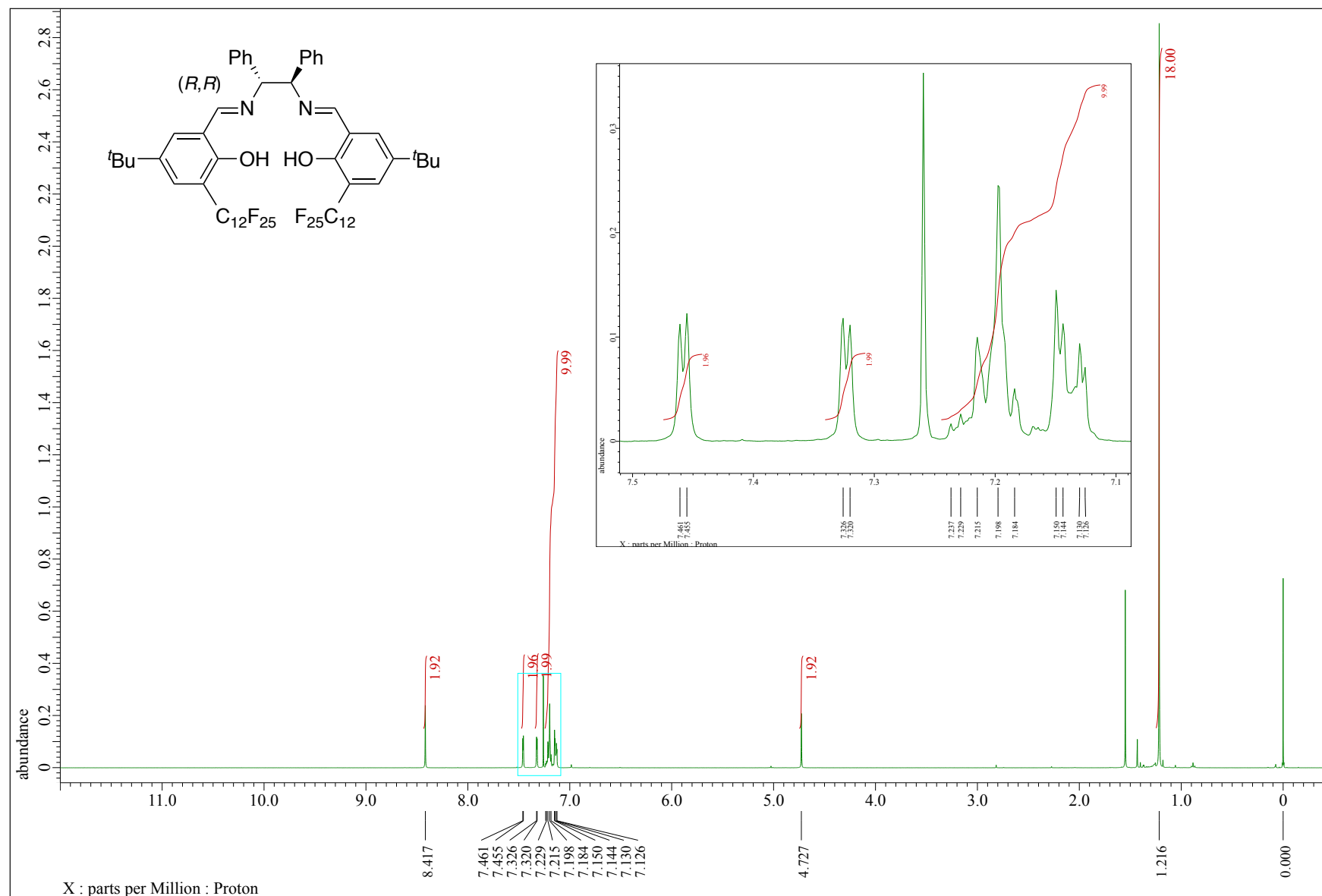




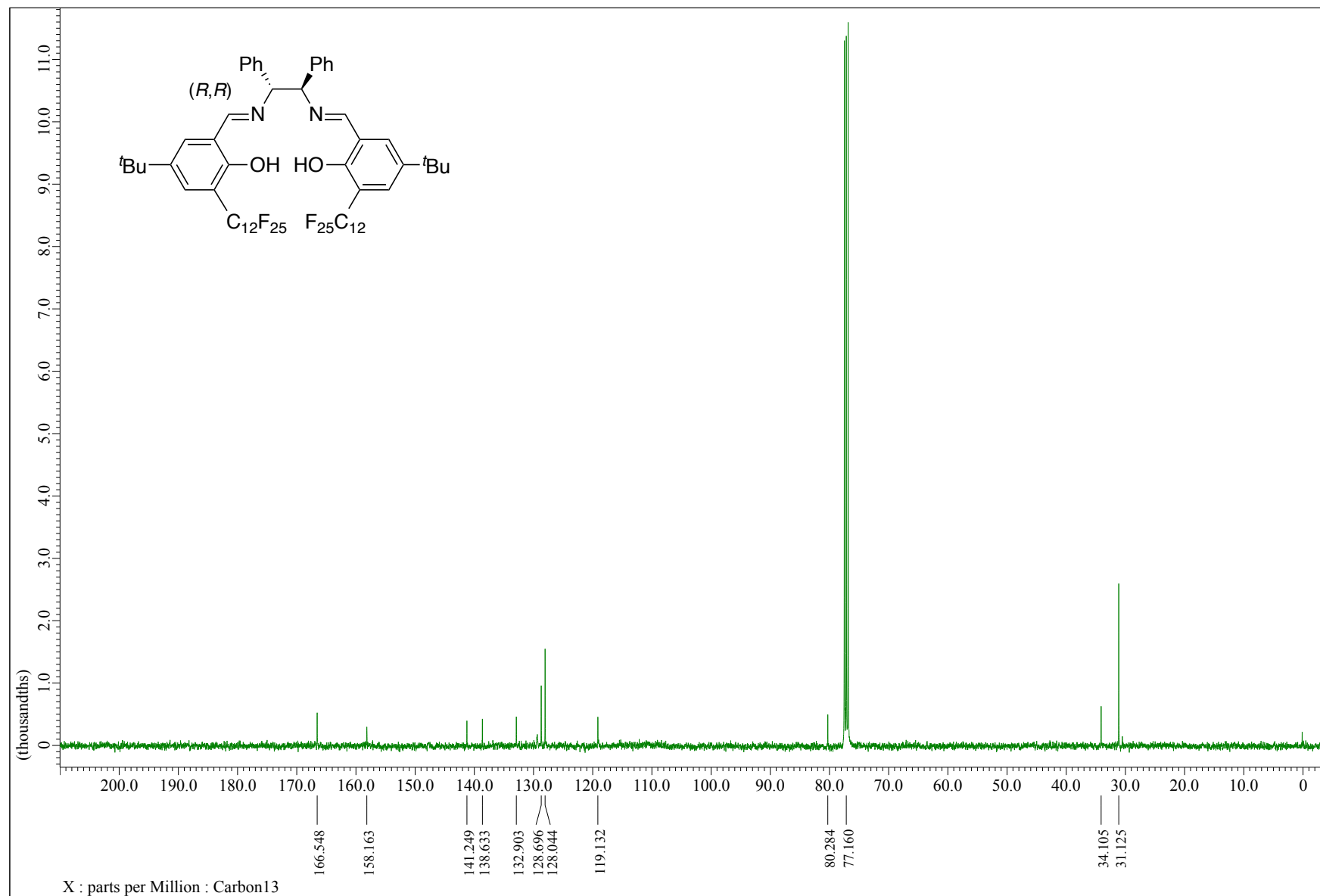
(3b)  $^{19}\text{F}$  NMR, 376 MHz,  $\text{CDCl}_3$



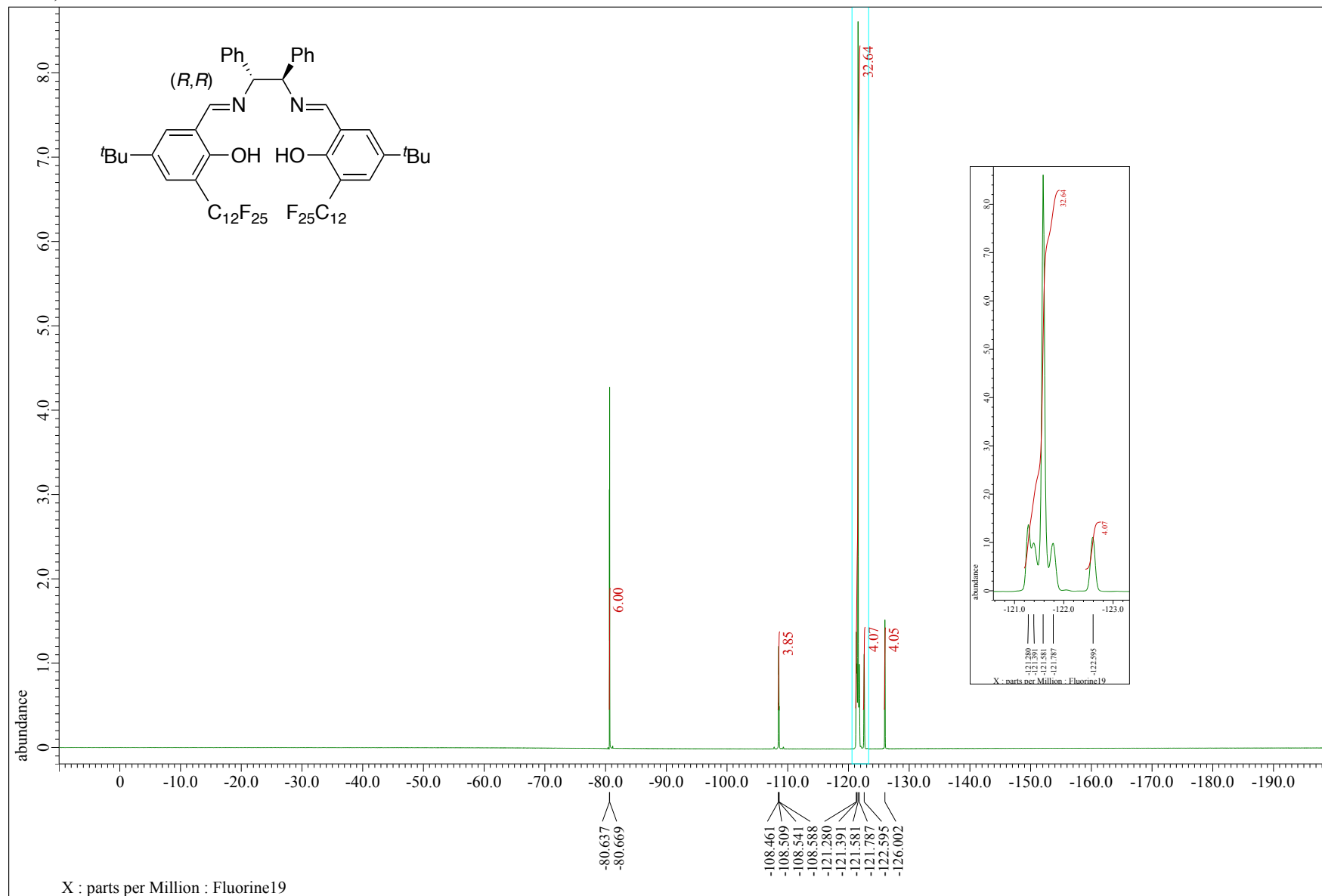
(Ligand of **1b**)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



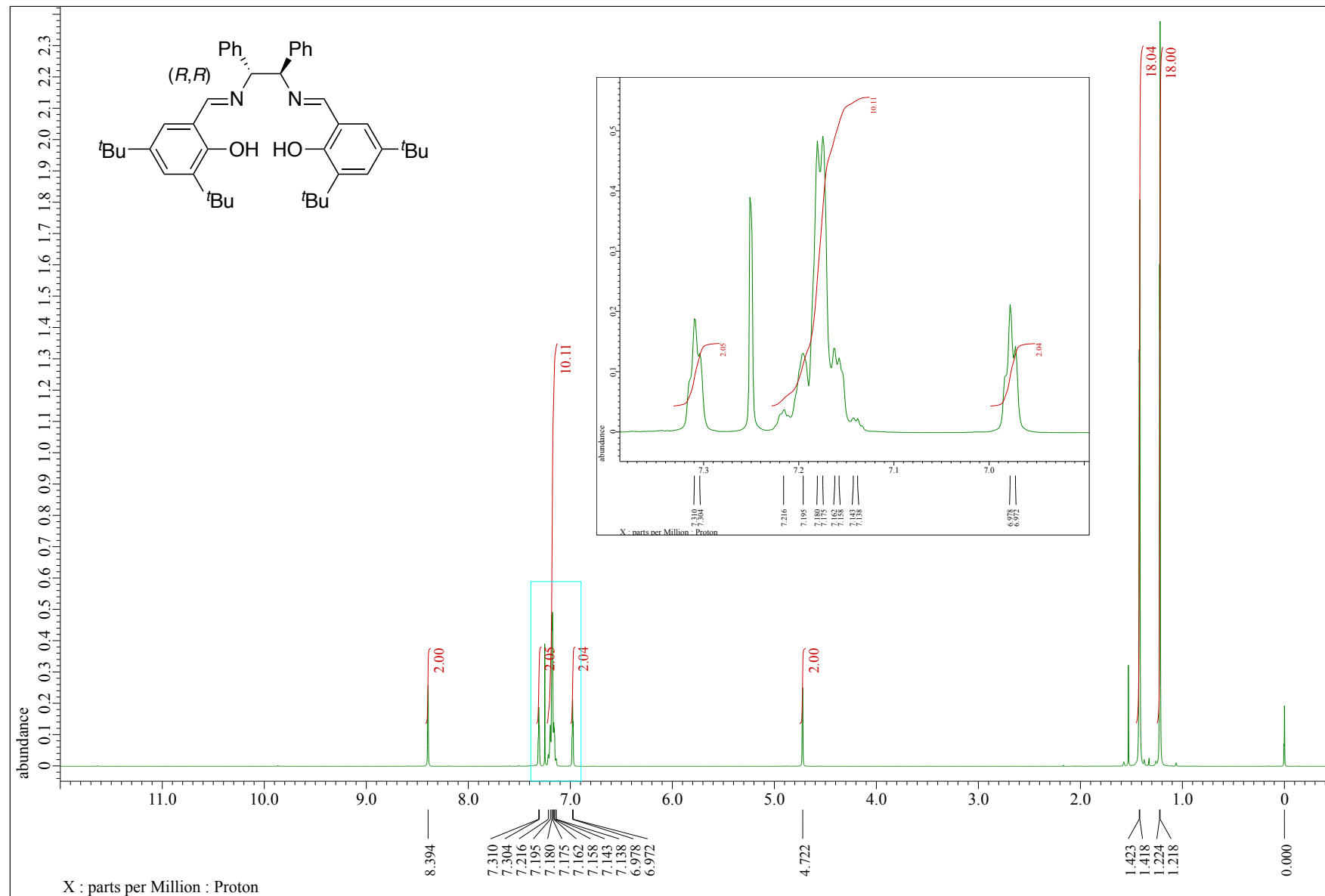
(Ligand of **1b**)  $^{13}\text{C}$  NMR, 101 MHz,  $\text{CDCl}_3$



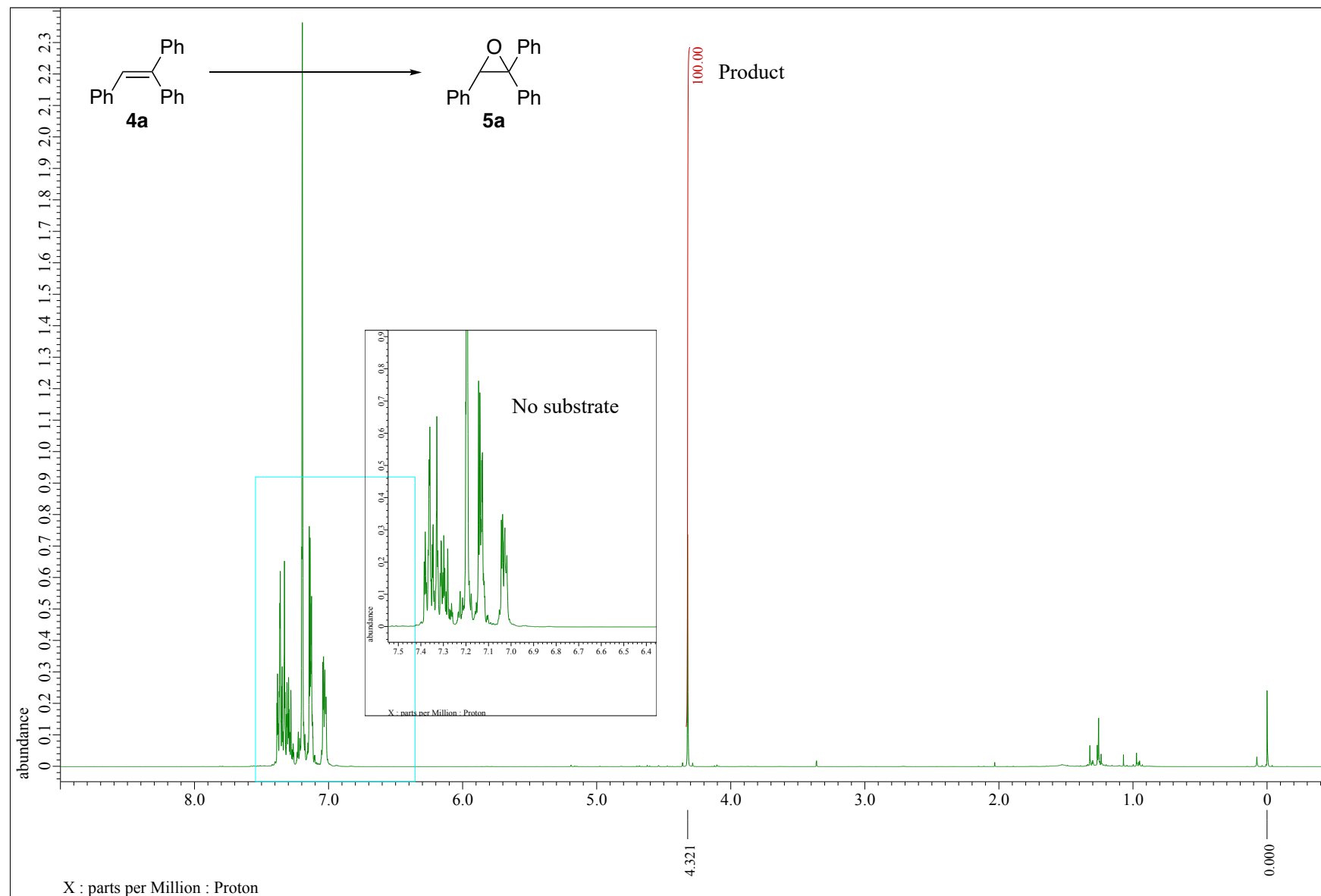
(Ligand of **1b**)  $^{19}\text{F}$  NMR, 376 MHz,  $\text{CDCl}_3$



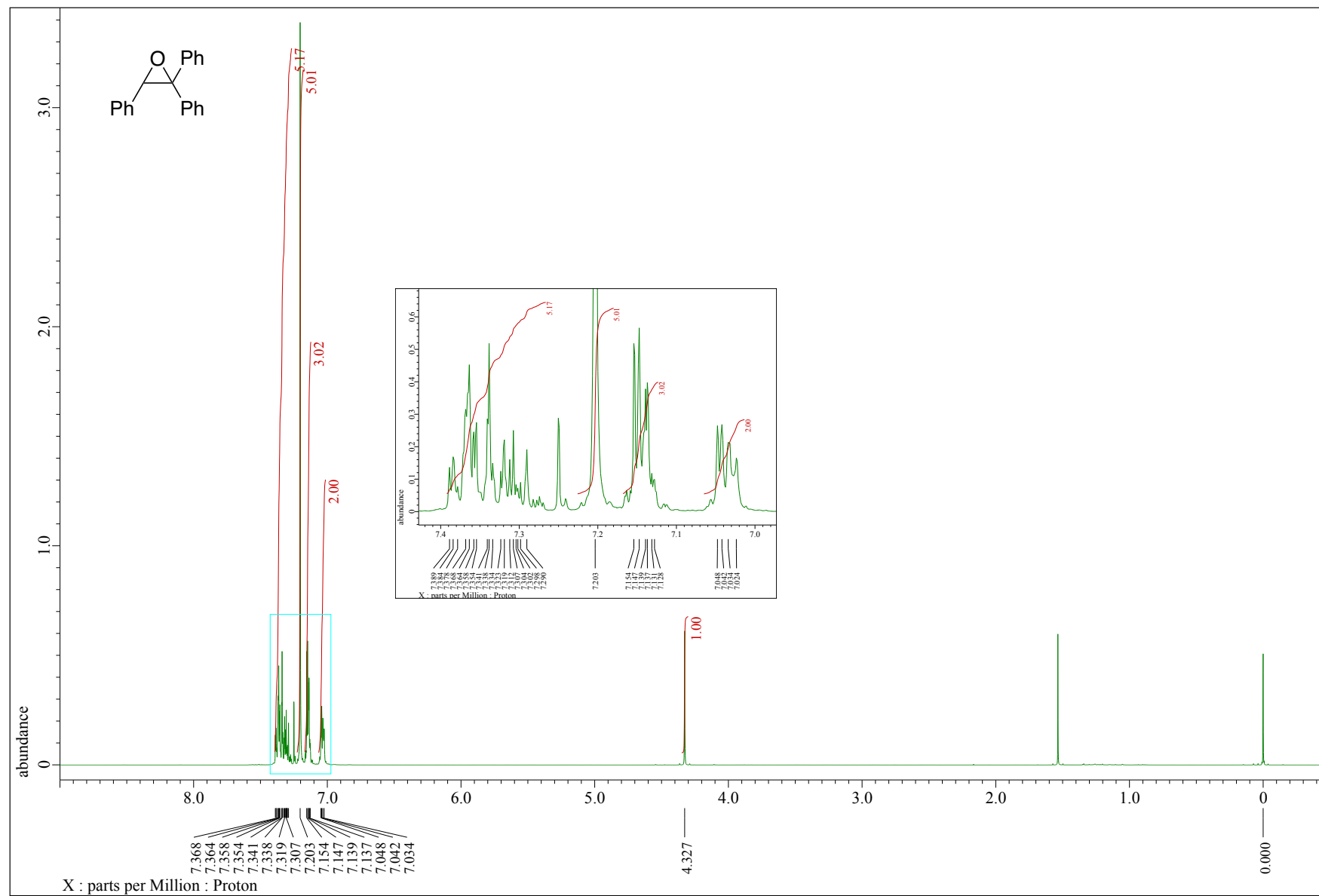
(Ligand of **1c**)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



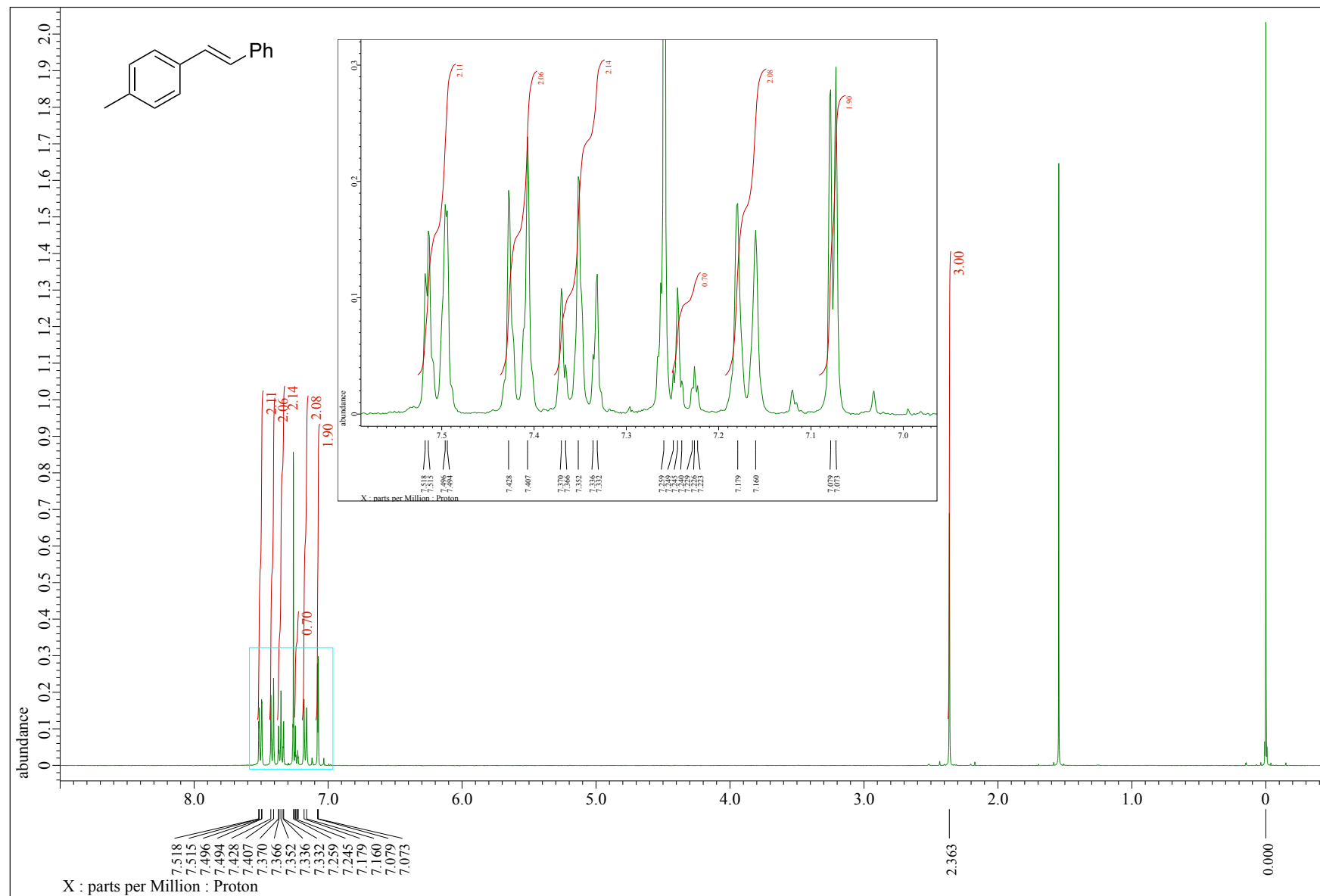
**Table 1, entry 2**  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



(5a)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$

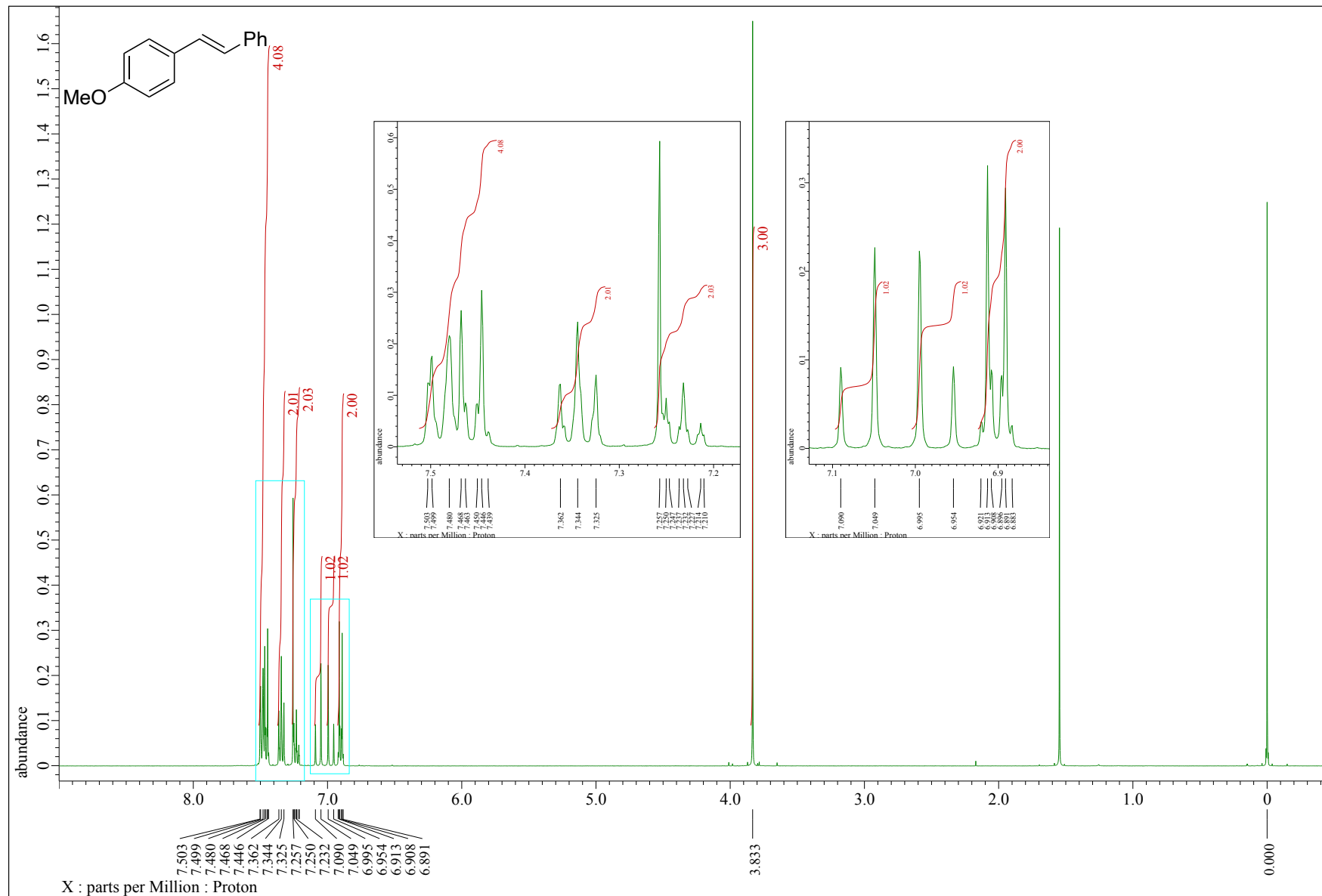


(4e)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$

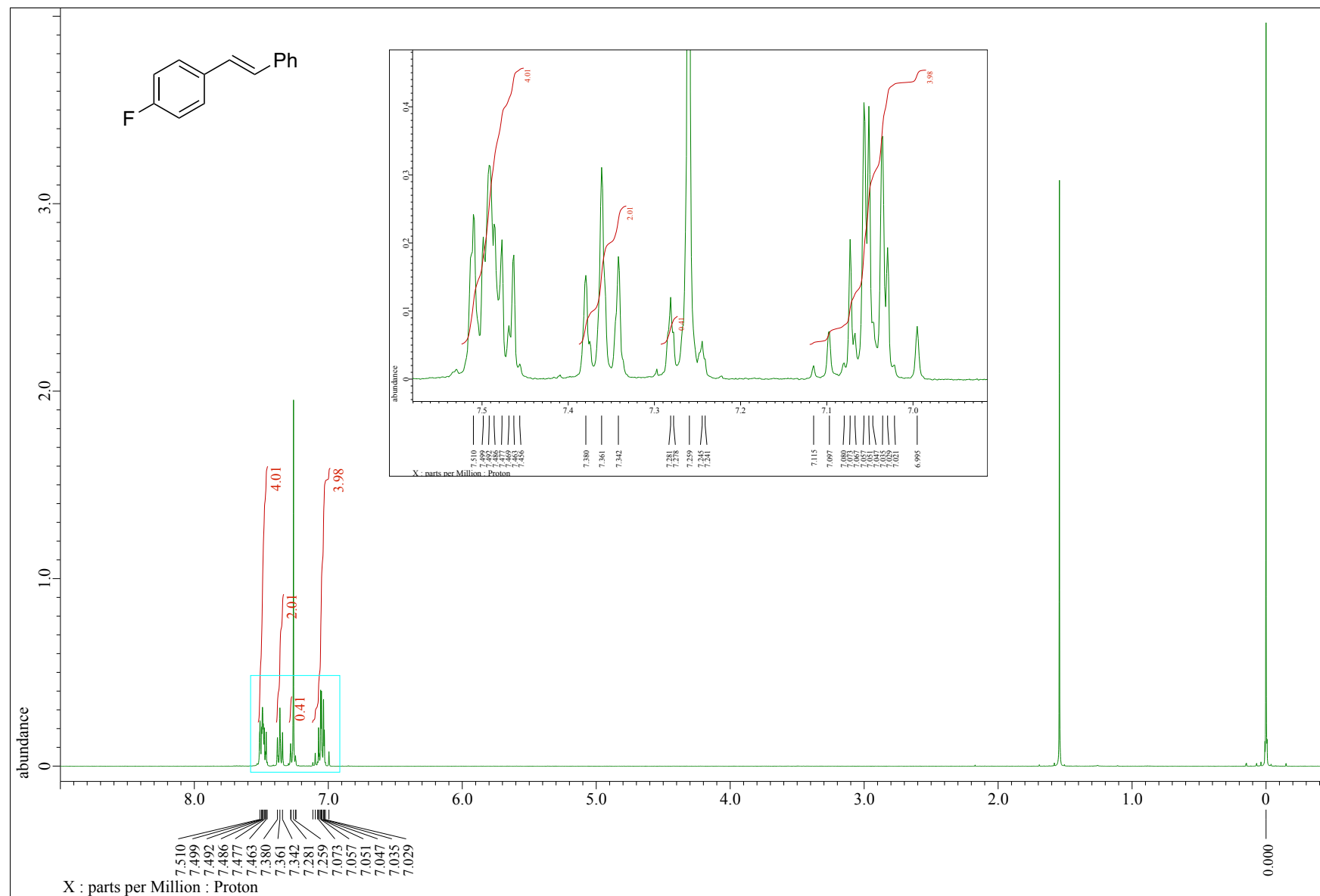




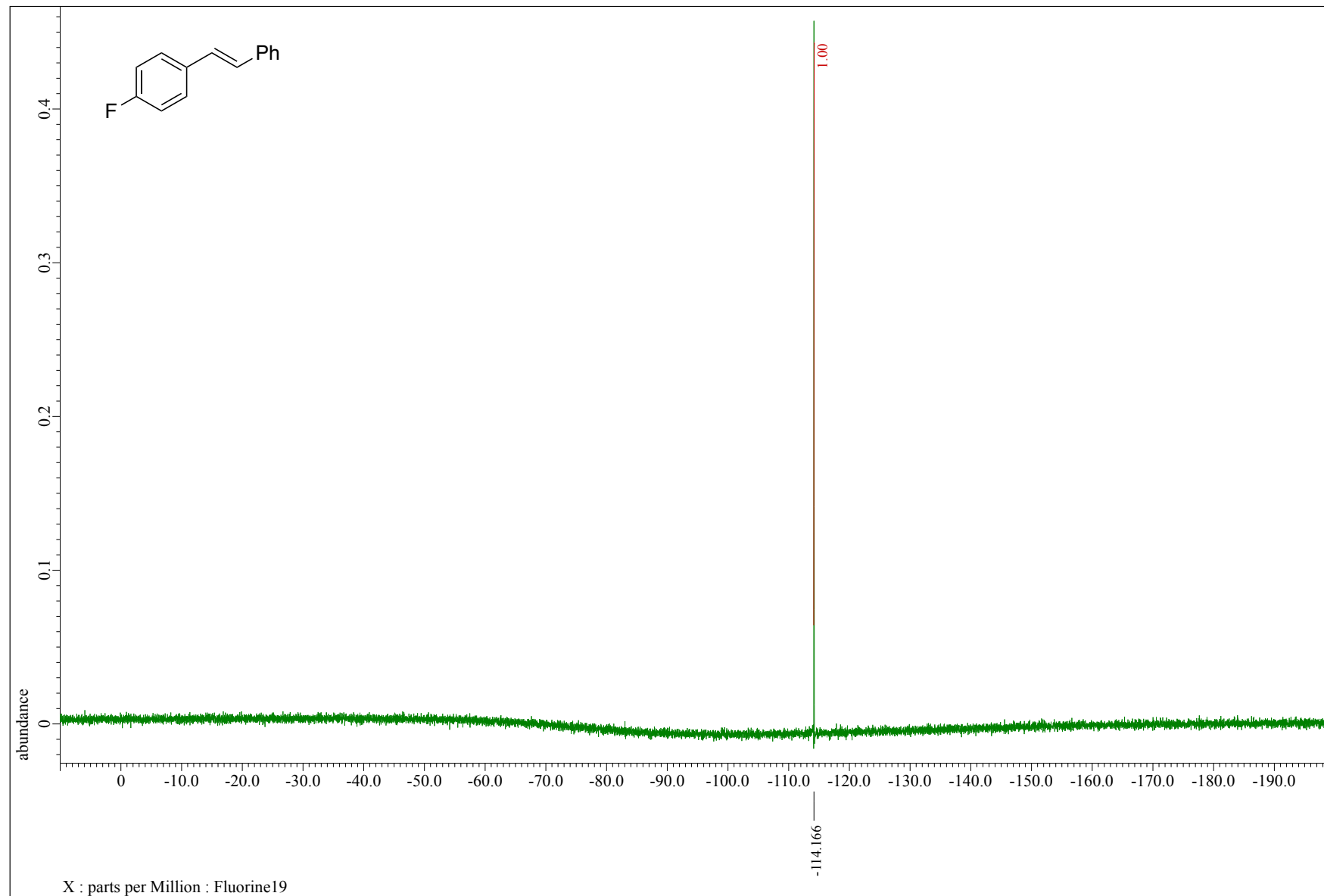
(4f)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



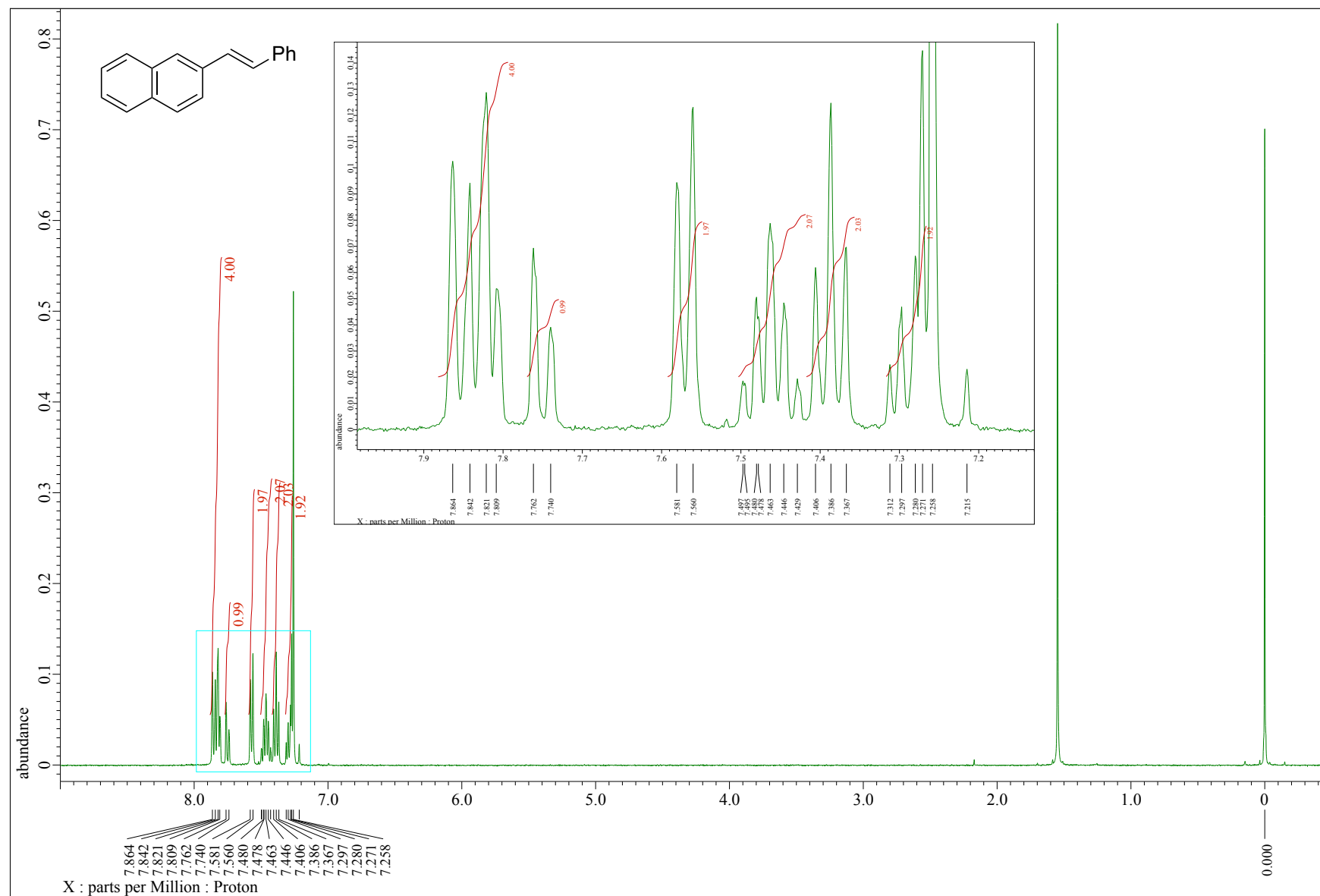
(4g)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



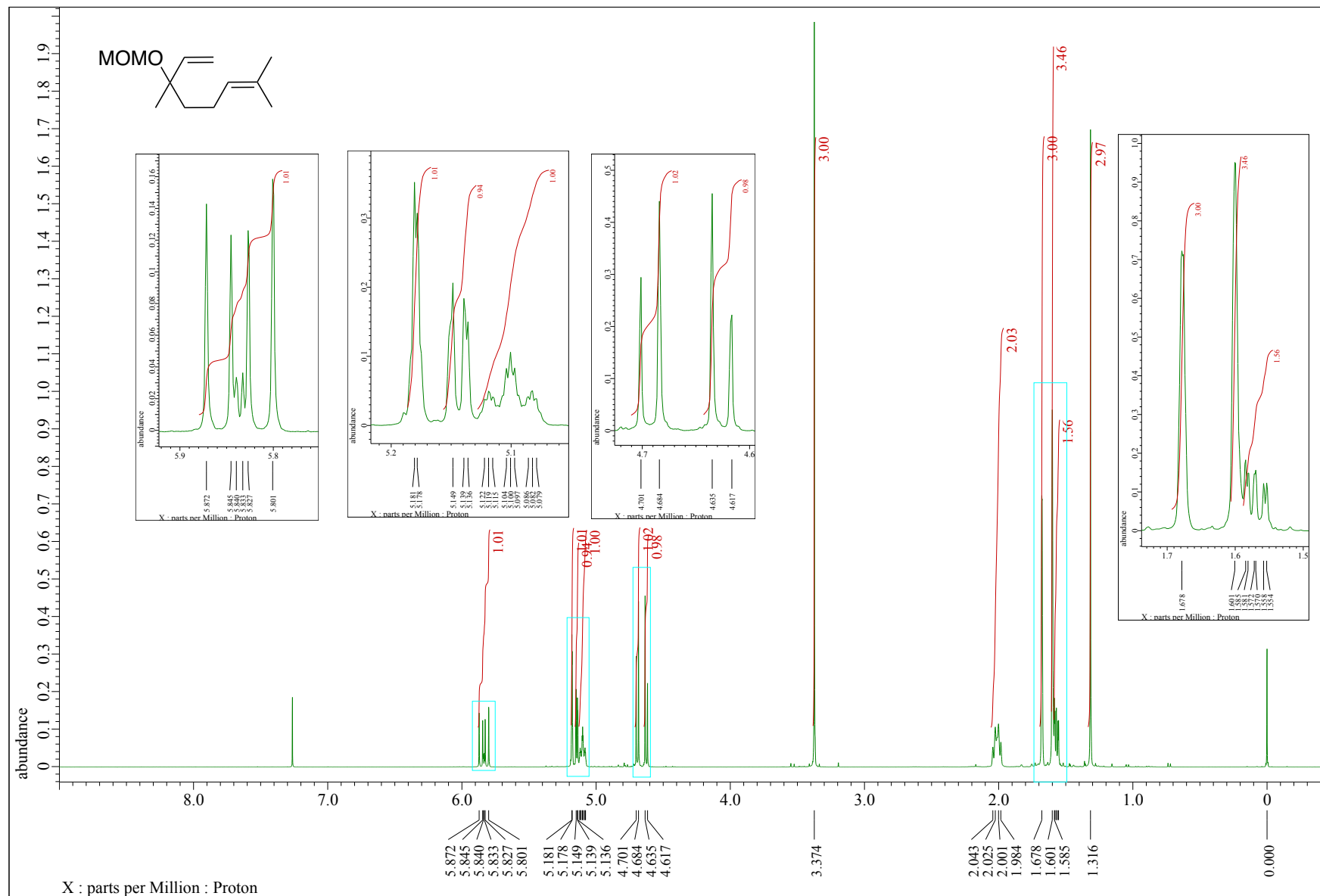
(4g)  $^{19}\text{F}$  NMR, 376 MHz,  $\text{CDCl}_3$



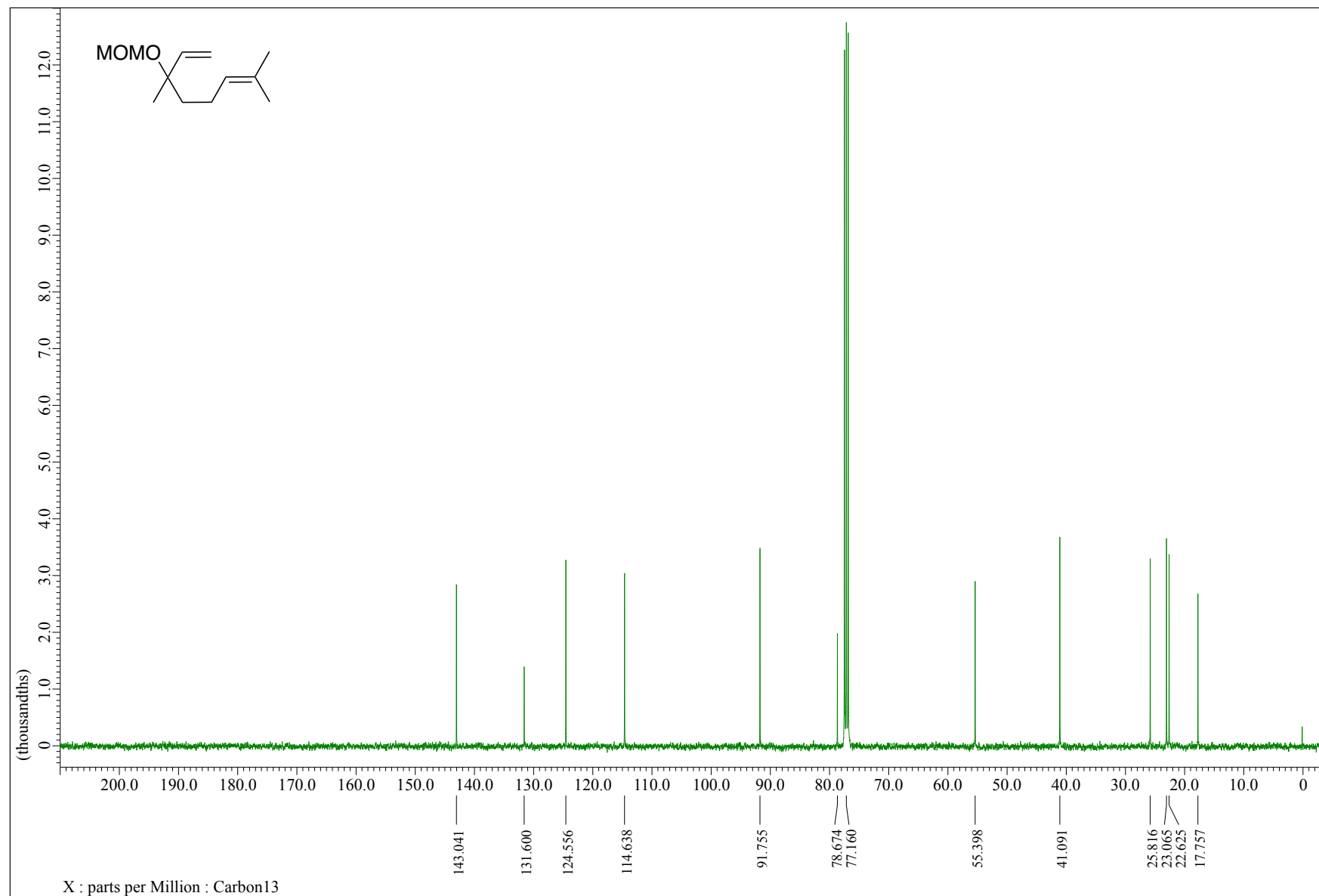
(4h)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



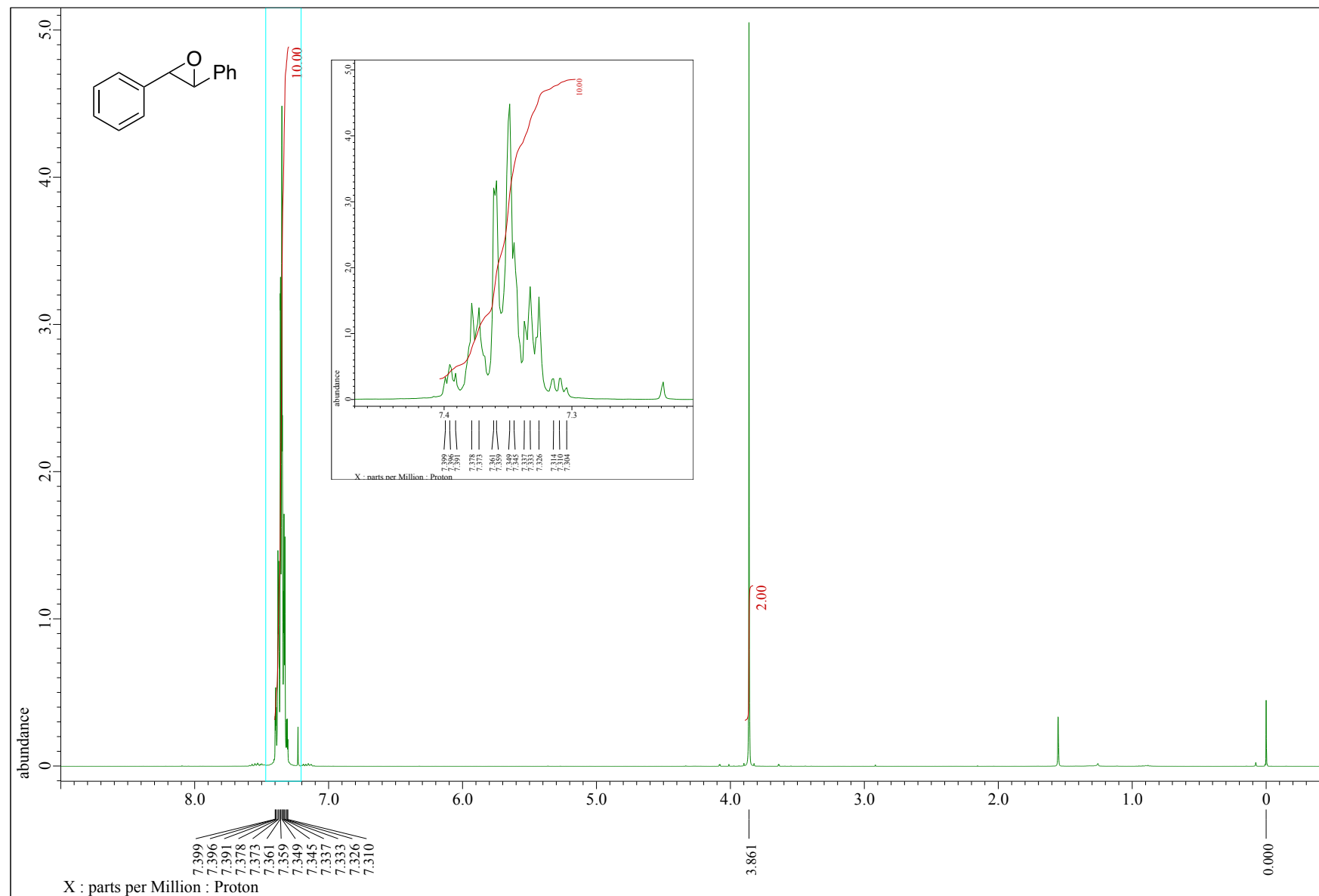
(4i)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



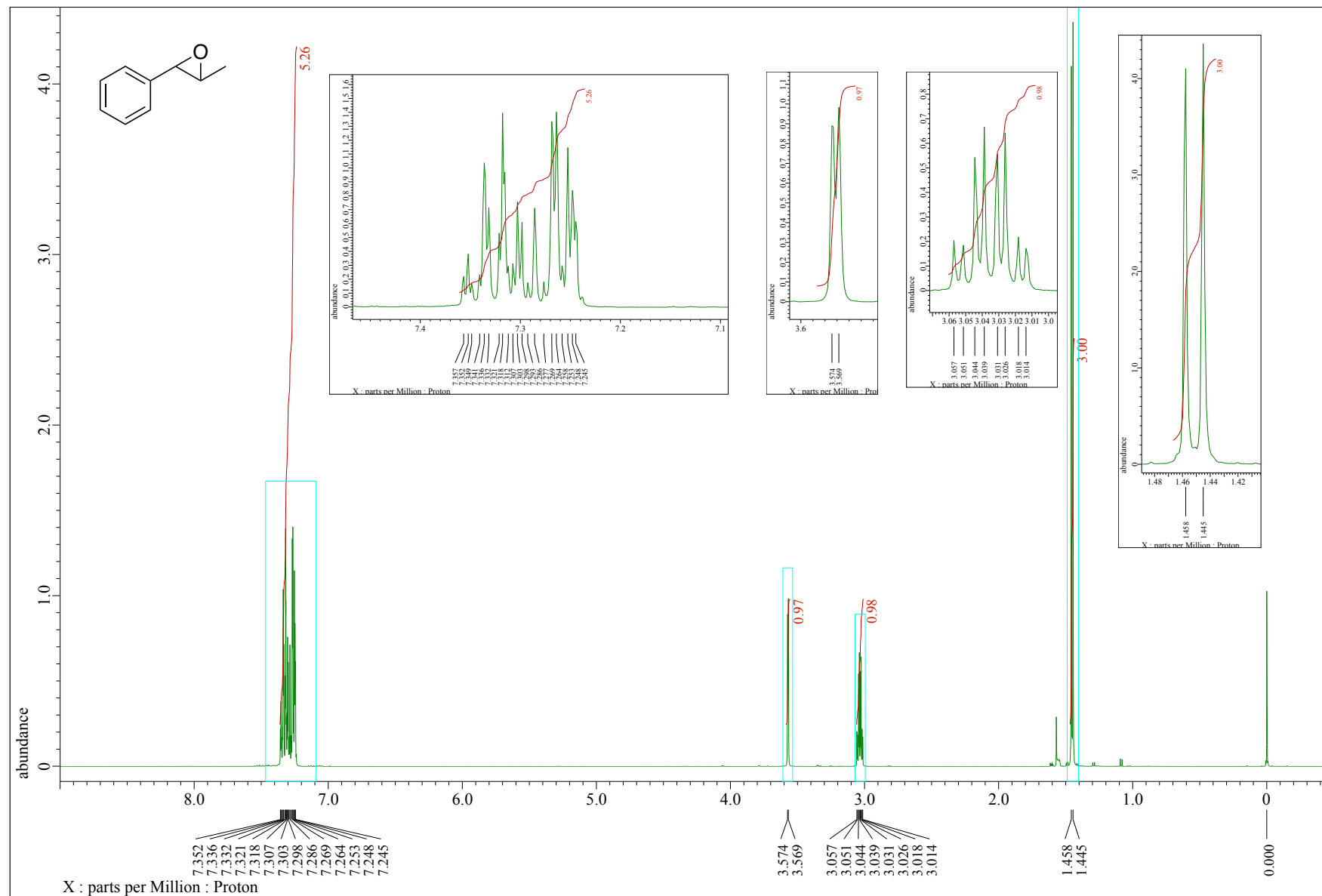
(4i)  $^{13}\text{C}$  NMR, 101 MHz,  $\text{CDCl}_3$



(5b)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$

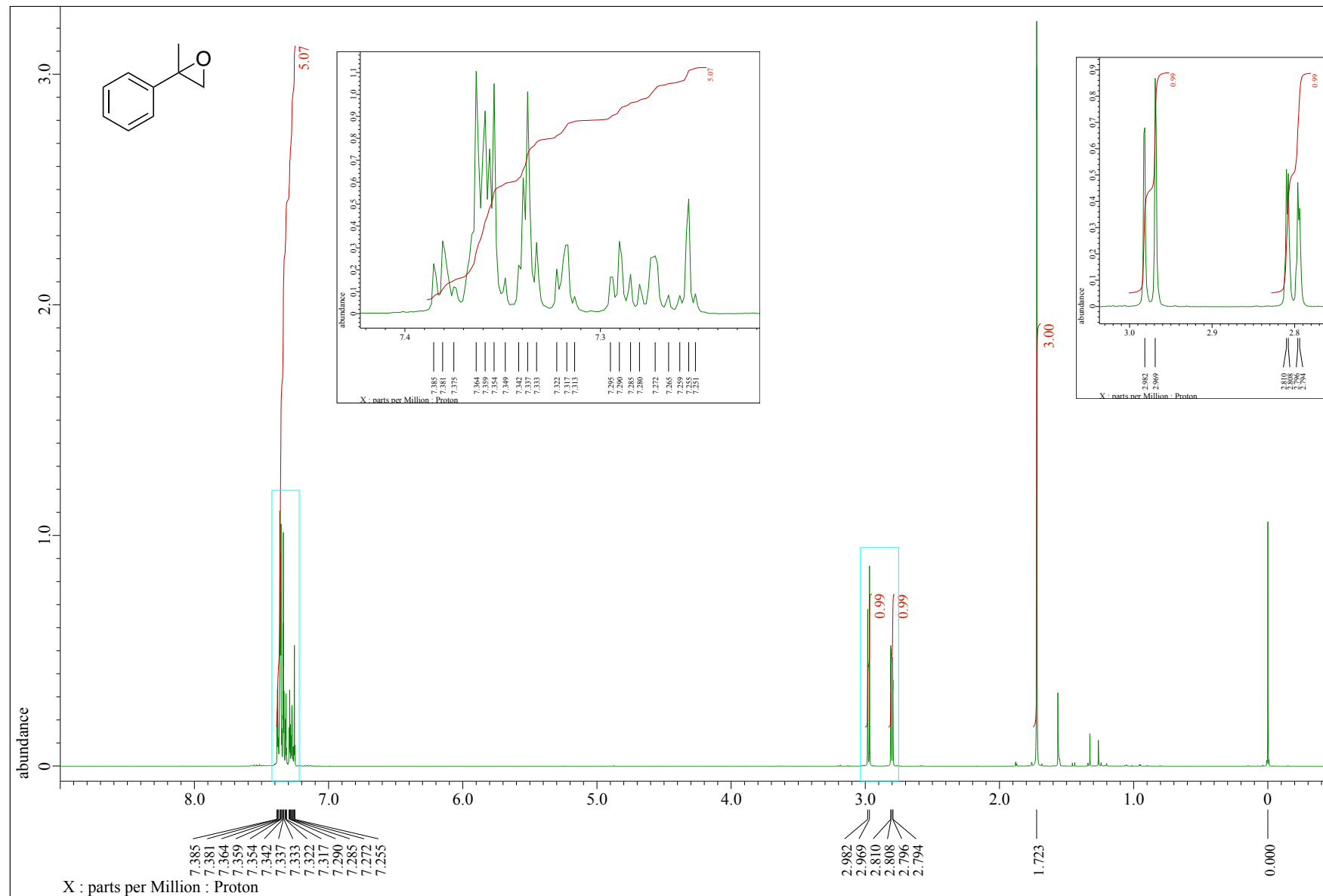


(5c)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$

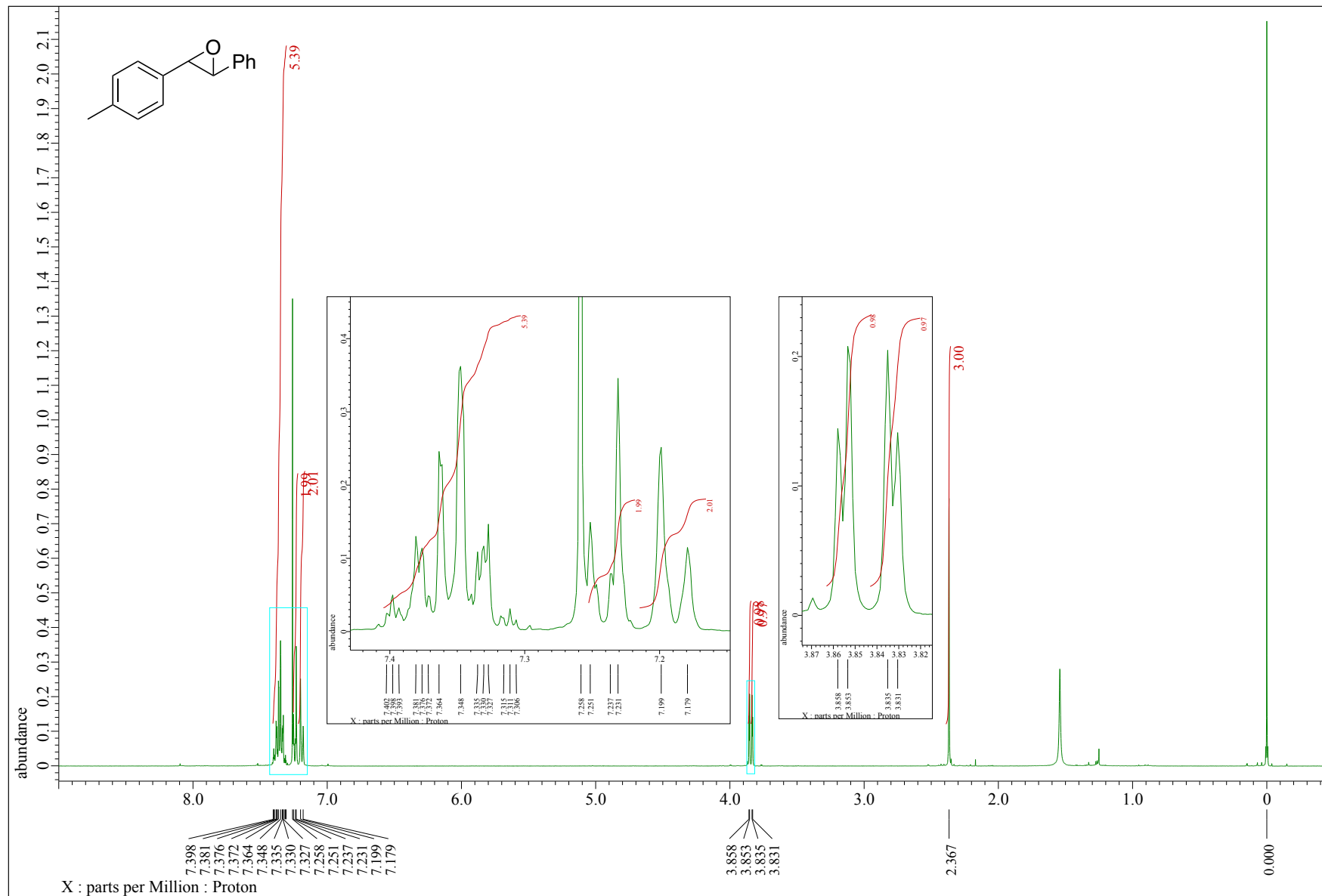




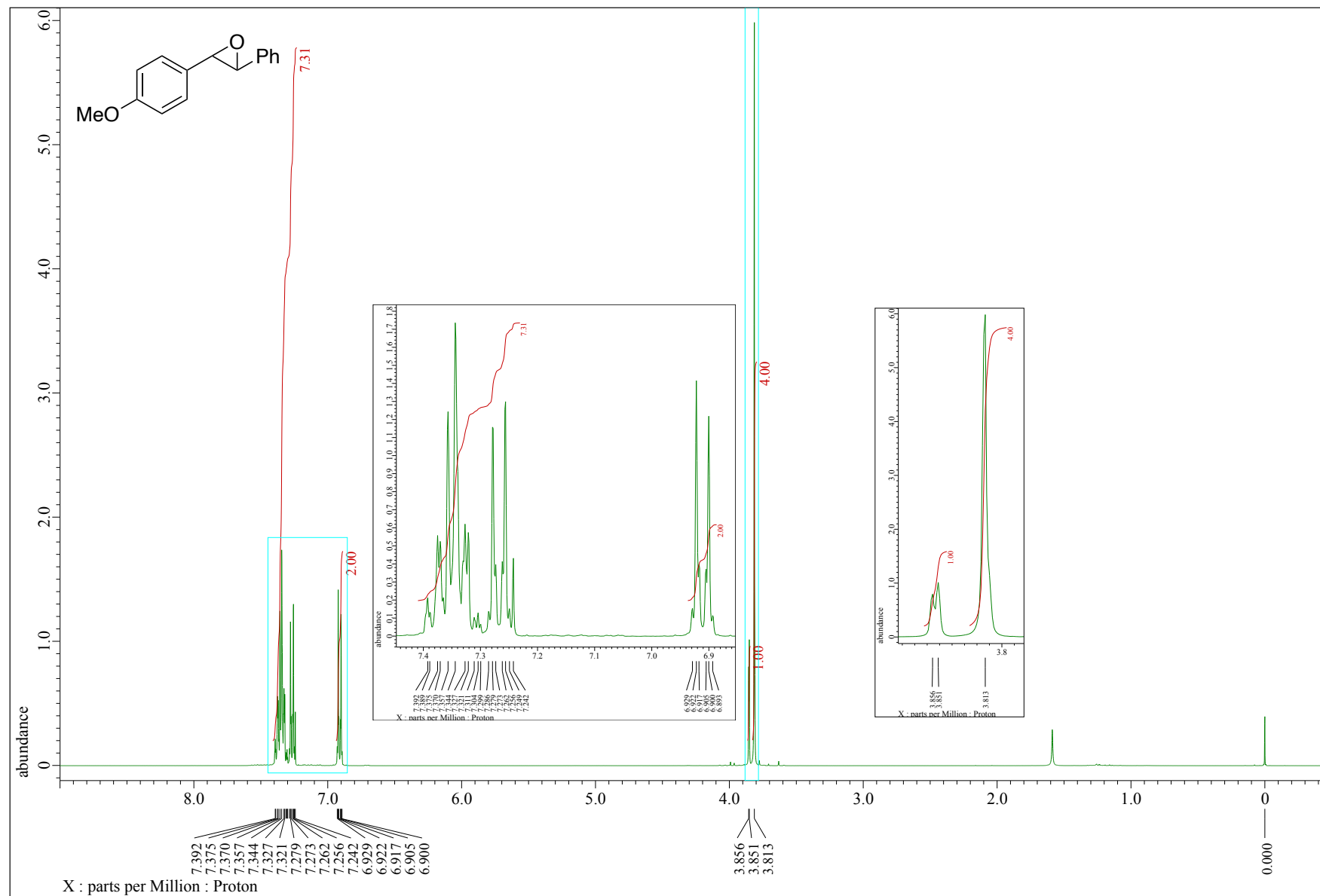
(5d)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



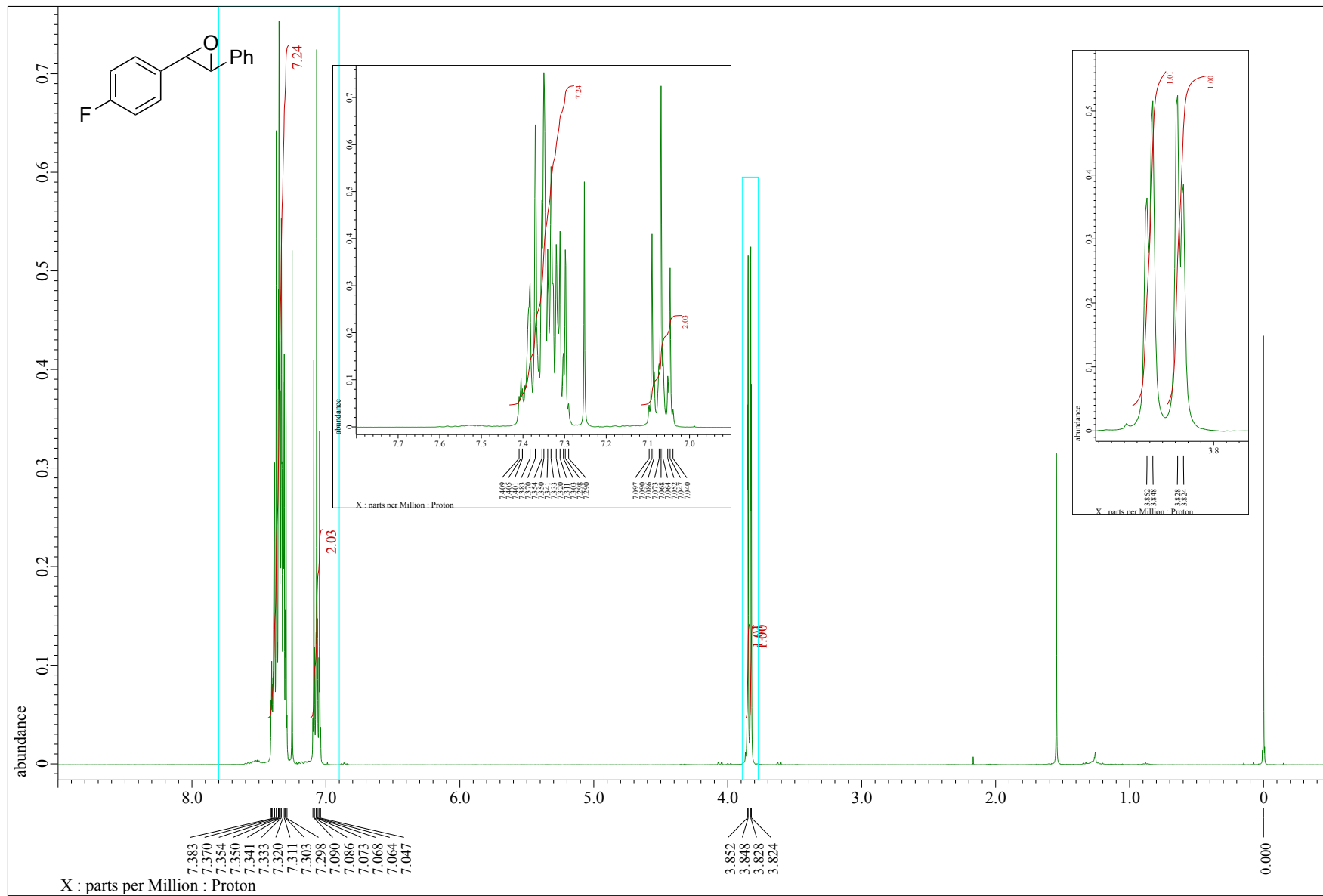
(5e)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



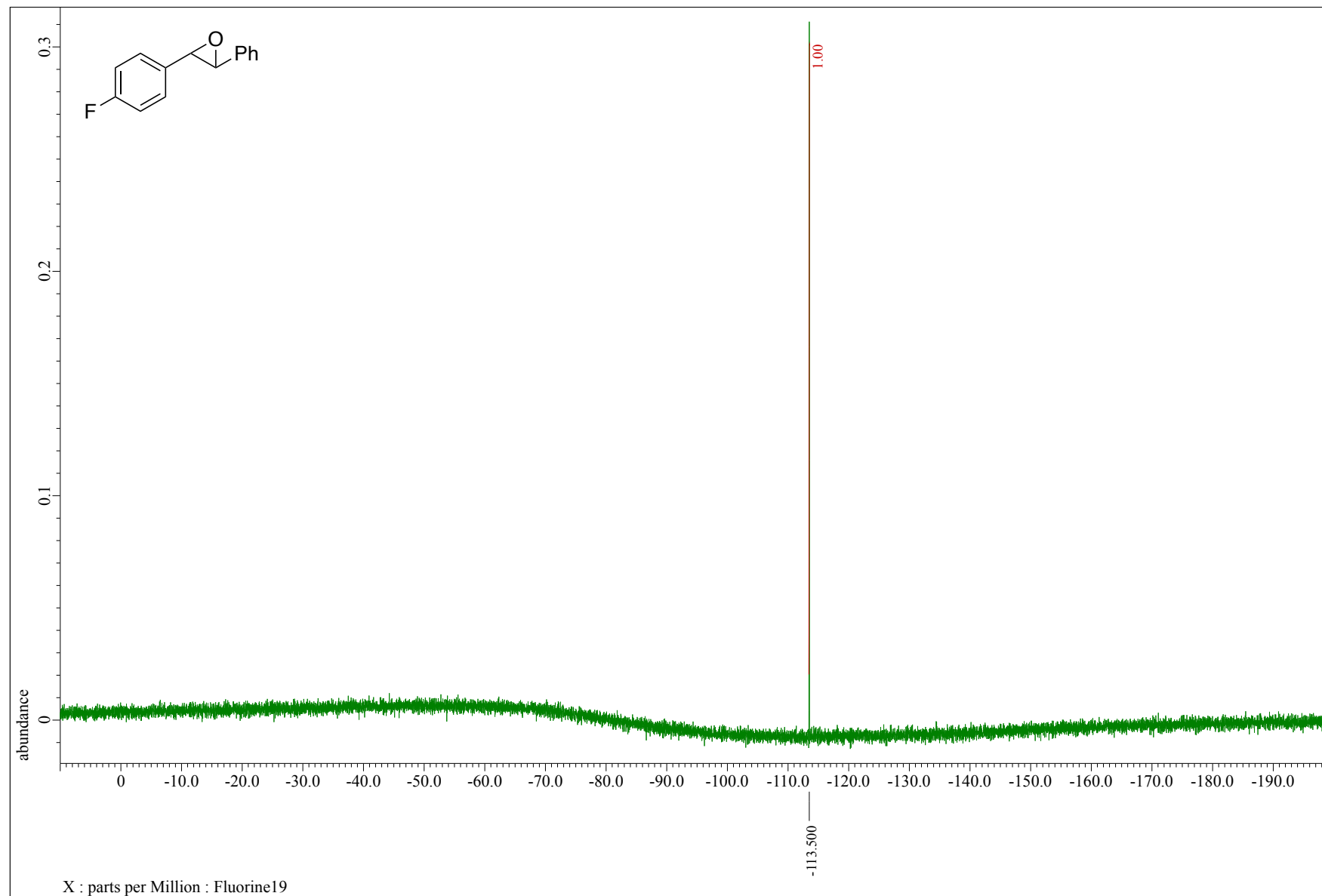
(5f)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



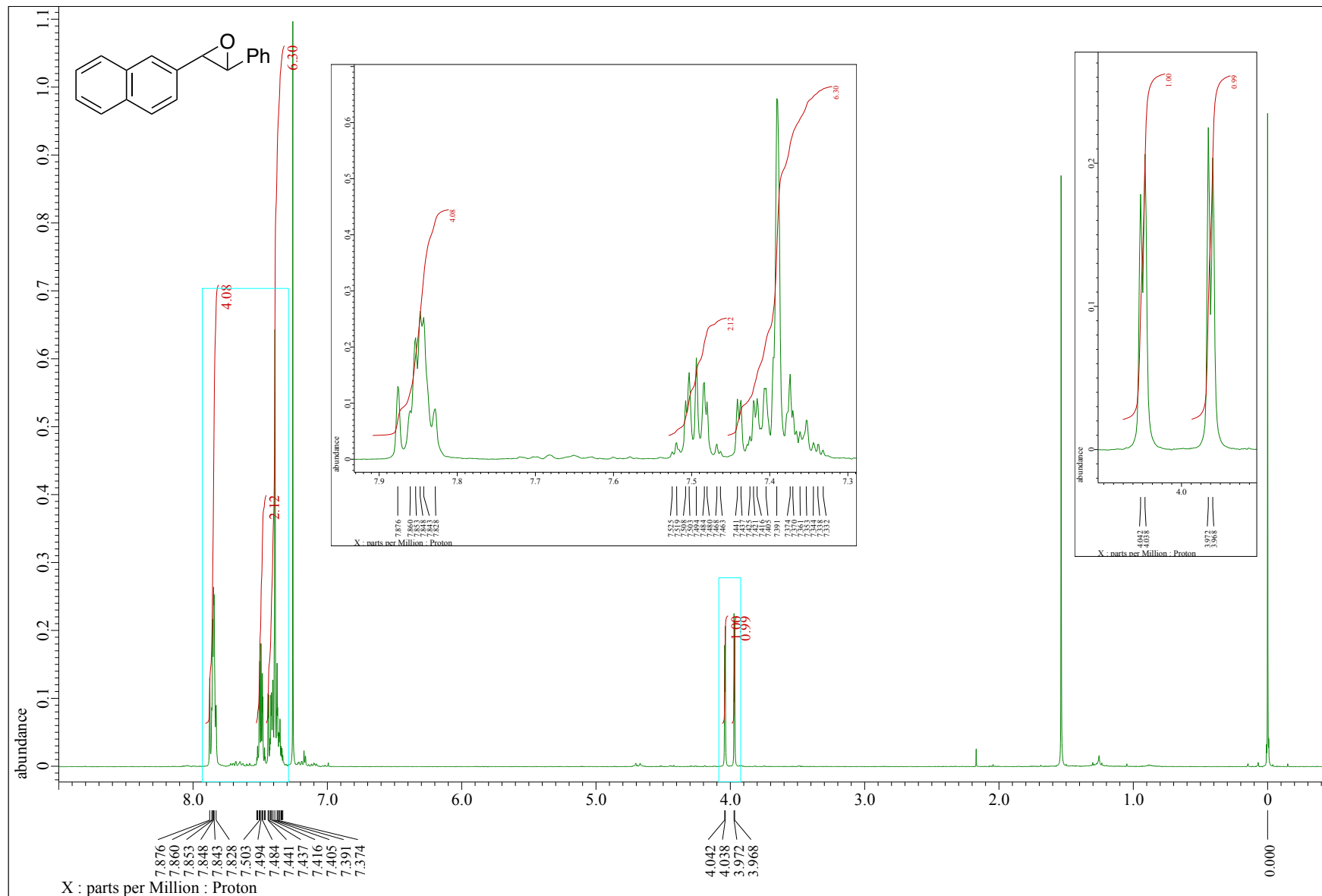
(5g)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



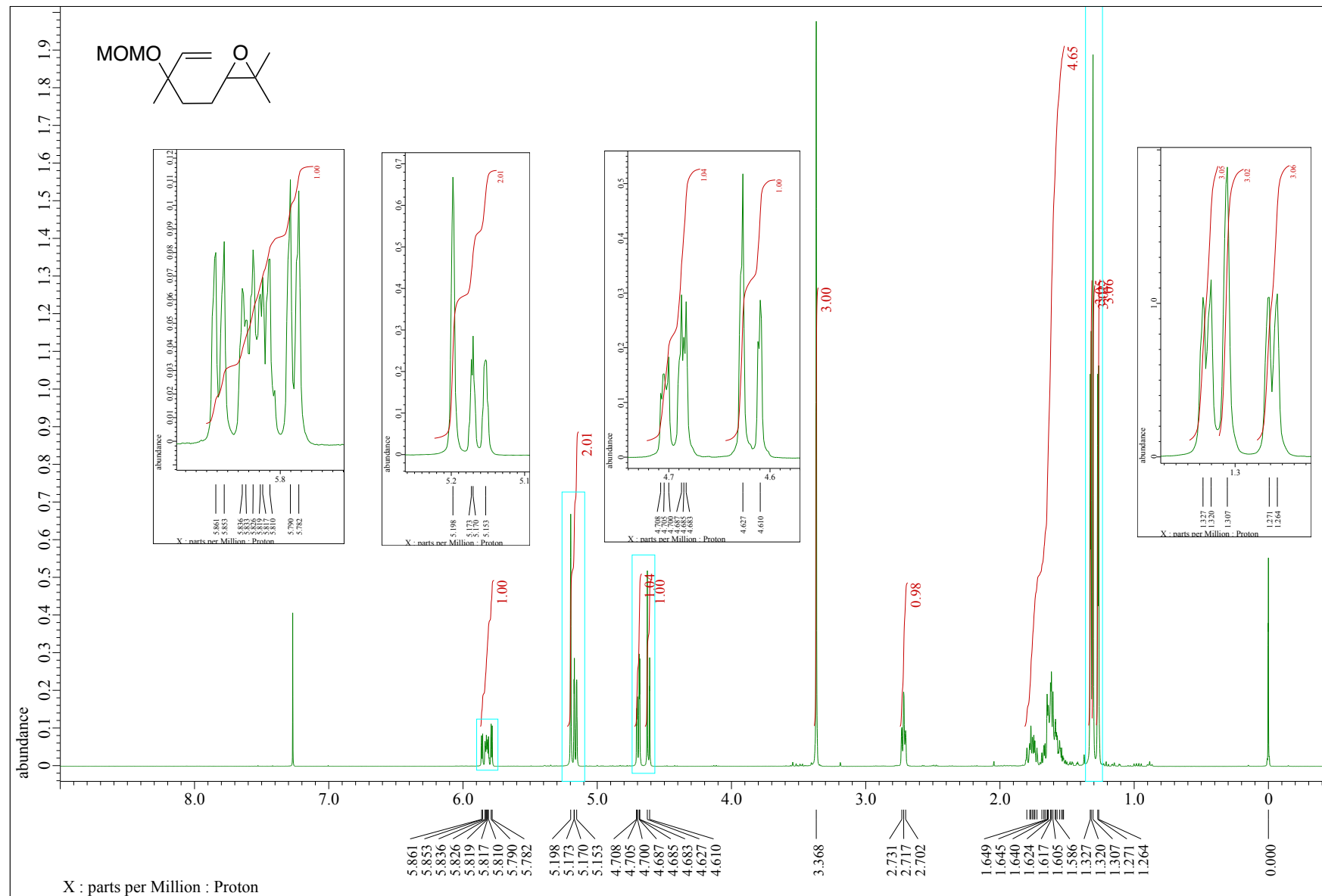
(5g)  $^{19}\text{F}$  NMR, 376 MHz,  $\text{CDCl}_3$



(5h)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



(5i)  $^1\text{H}$  NMR, 400 MHz,  $\text{CDCl}_3$



(5i)  $^{13}\text{C}$  NMR, 101 MHz,  $\text{CDCl}_3$

