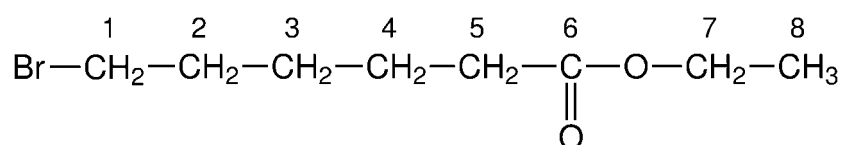


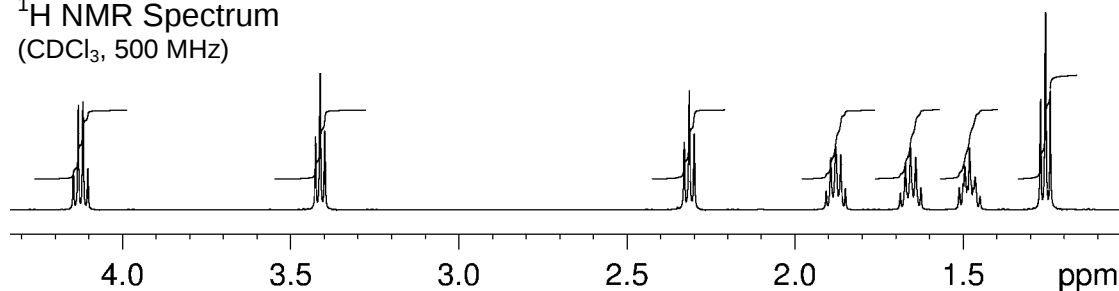
## Problem 28

The  $^1\text{H}$  and  $^{13}\text{C}\{^1\text{H}\}$  NMR spectra of ethyl 6-bromohexanoate ( $\text{C}_8\text{H}_{15}\text{BrO}_2$ ) recorded in  $\text{CDCl}_3$  solution at 298 K and 500 MHz are given below. The  $^1\text{H}$  NMR spectrum has signals at  $\delta$  1.25, 1.48, 1.65, 1.87, 2.31, 3.41 and 4.12 ppm. The  $^{13}\text{C}\{^1\text{H}\}$  NMR spectrum has signals at  $\delta$  14.3, 24.0, 27.6, 32.4, 33.5, 34.0, 60.2 and 173.3 ppm.

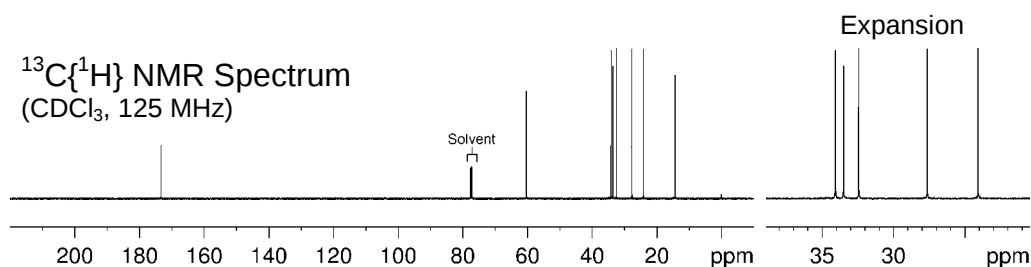
The 2D  $^1\text{H}$ - $^1\text{H}$  COSY and the multiplicity-edited  $^1\text{H}$ - $^{13}\text{C}$  HSQC spectra are given on the facing page. From the COSY spectrum, assign the proton spectrum, then use this information to assign the  $^{13}\text{C}\{^1\text{H}\}$  spectrum.



$^1\text{H}$  NMR Spectrum  
( $\text{CDCl}_3$ , 500 MHz)



$^{13}\text{C}\{^1\text{H}\}$  NMR Spectrum  
( $\text{CDCl}_3$ , 125 MHz)



Proton	Chemical Shift (ppm)	Carbon	Chemical Shift (ppm)
H <sub>1</sub>		C <sub>1</sub>	
H <sub>2</sub>		C <sub>2</sub>	
H <sub>3</sub>		C <sub>3</sub>	
H <sub>4</sub>		C <sub>4</sub>	
H <sub>5</sub>		C <sub>5</sub>	
		C <sub>6</sub>	
H <sub>7</sub>		C <sub>7</sub>	
H <sub>8</sub>		C <sub>8</sub>	

