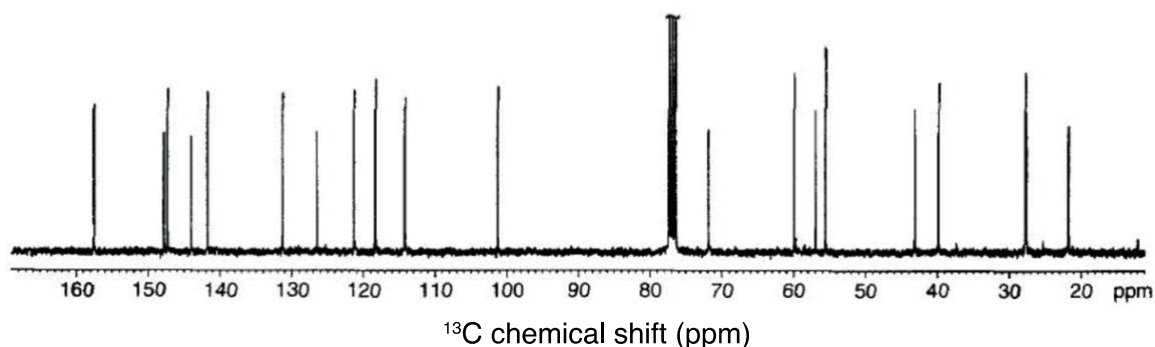
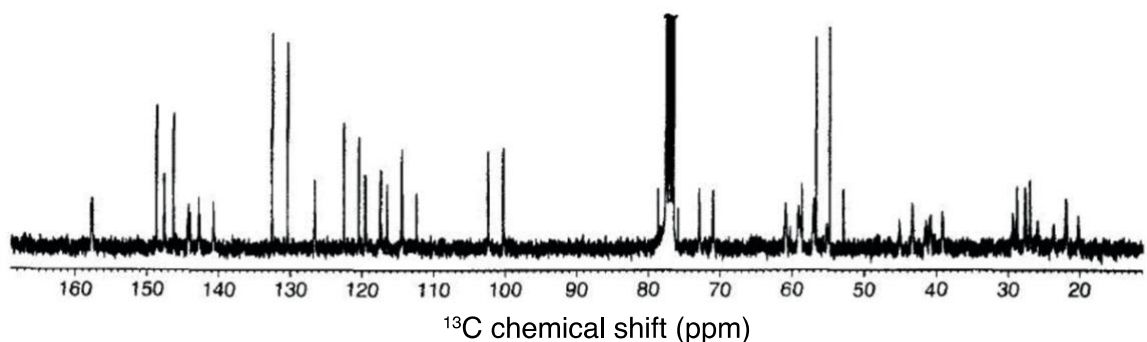


Jigsaw 1B

Introduction to Nuclear Magnetic Resonance

1. * [Keeler Section 2.4] In a ^1H NMR spectrum of CHCl_3 at natural abundance, can we observe the heteronuclear ^1H - ^{13}C J-coupling? *See also: Jigsaw 1C.1*
2. [Keeler Section 2.4] When we acquire an NMR spectrum for a given amount of sample, what can we do to improve the signal to noise ratio.
3. [Keeler Section 2.4] Below, we have two ^{13}C NMR spectra of quinine.



- a. Why are the two spectra different? In other words, what was changed in the pulse sequence between the first and second spectra?
- b. Why did this change eliminate the multiplets?

4. [Keeler Section 2.5] Make a sketch graph of the x and y components of a rotating vector as a function of time for each of the given starting phases. Assume the vector starts along the positive x-axis. In each case, comment on the form of your graphs, noting particularly whether they are simple sine or cosine functions.

a. 90°

b. 0.7854 radians

c. 495°

d. $7\pi/4$ radians

e. 0°