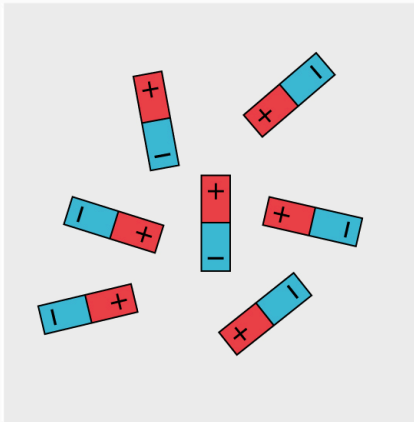


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In the absence of an applied magnetic field



In the presence of an applied magnetic field,  $B_0$

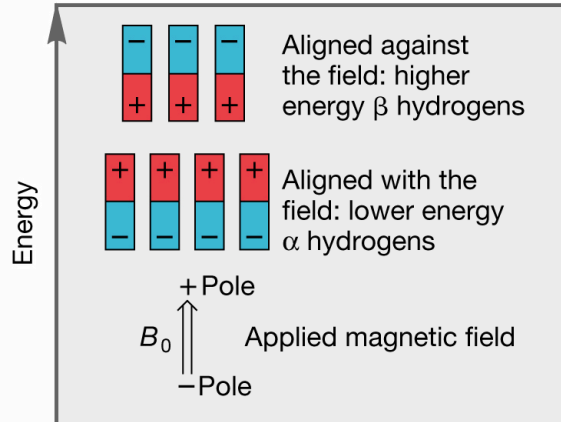
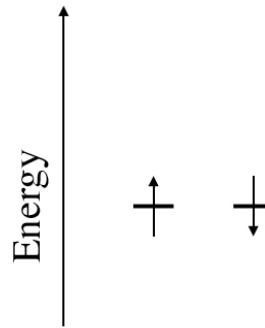
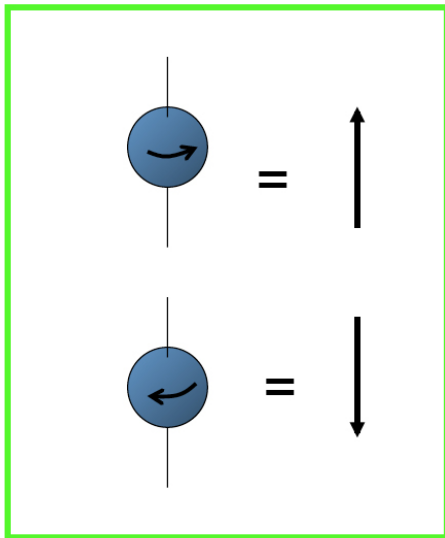
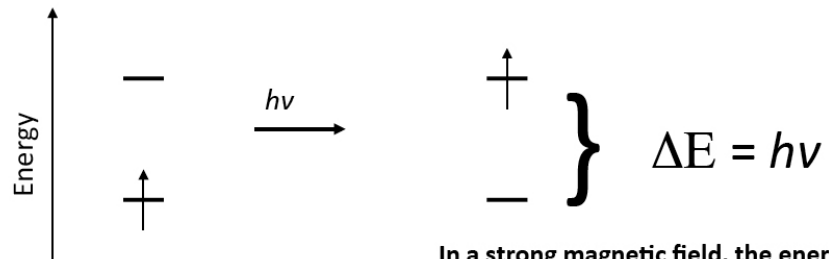
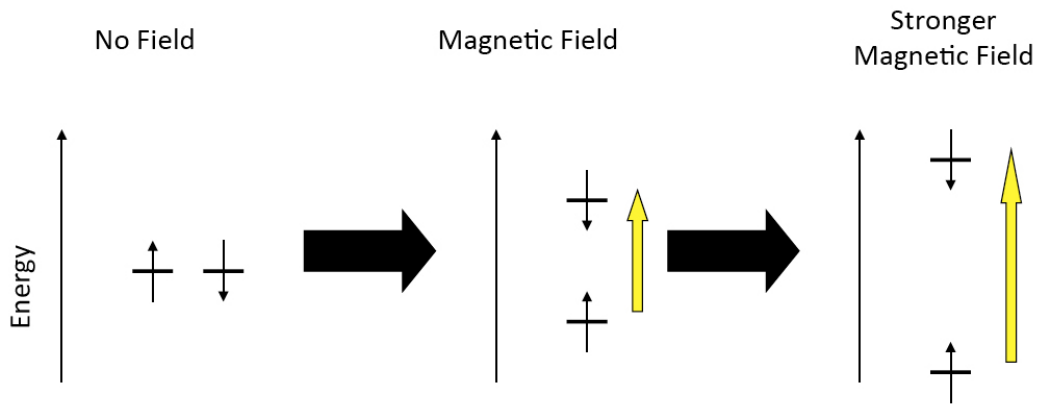


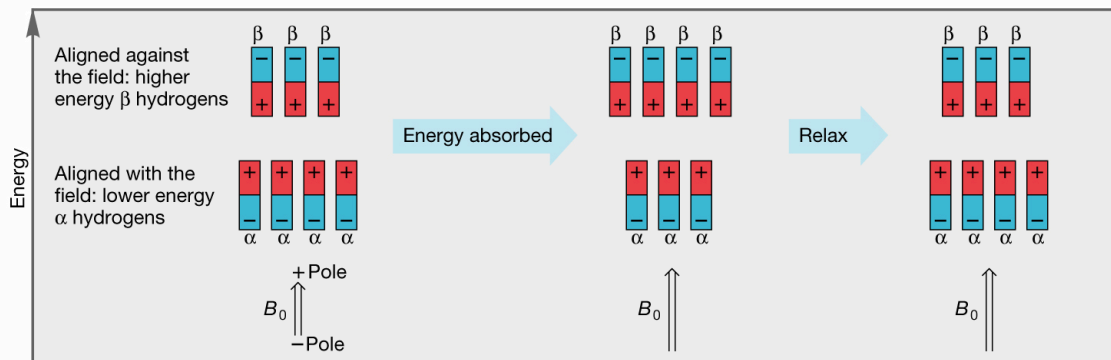
Figure 15.18  
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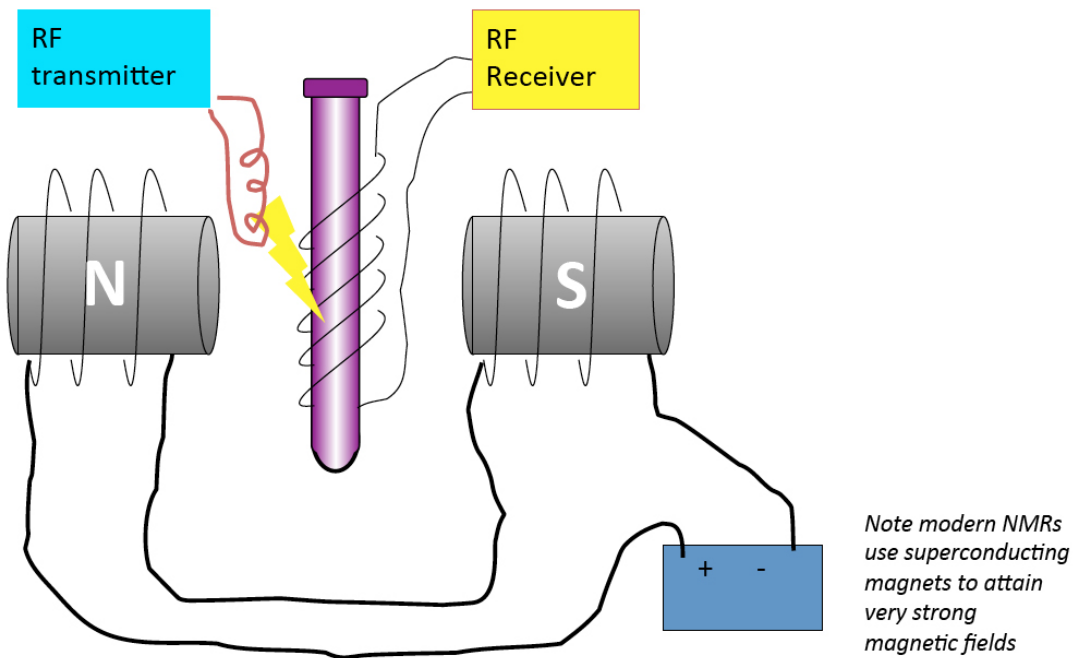
In the absence of a magnetic field, both spin states have equal energy

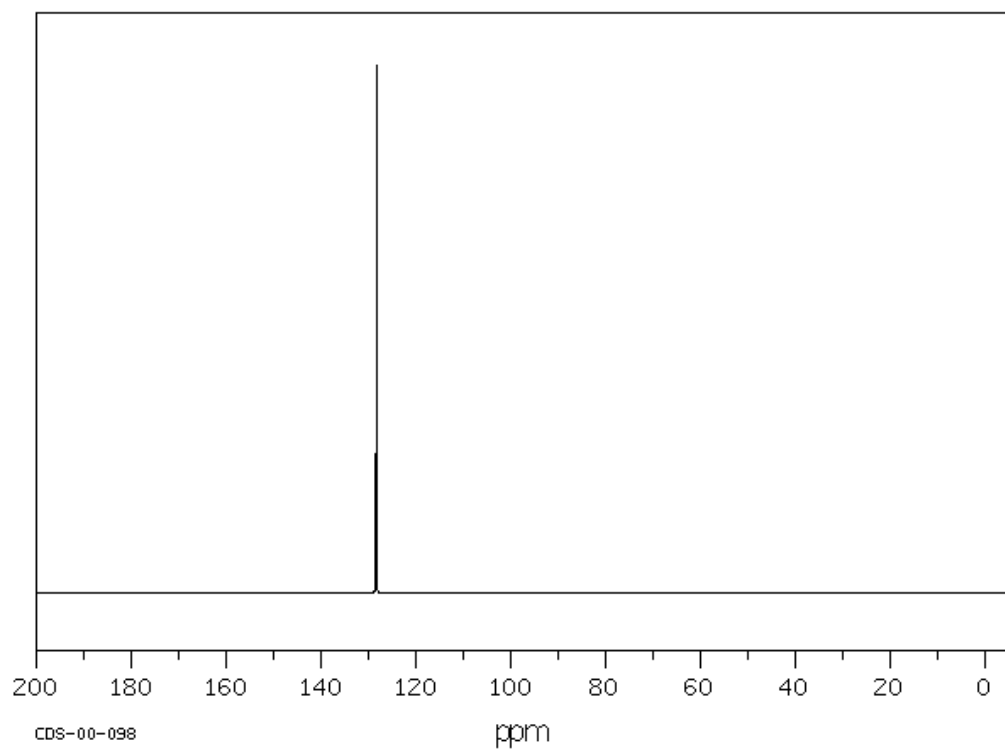
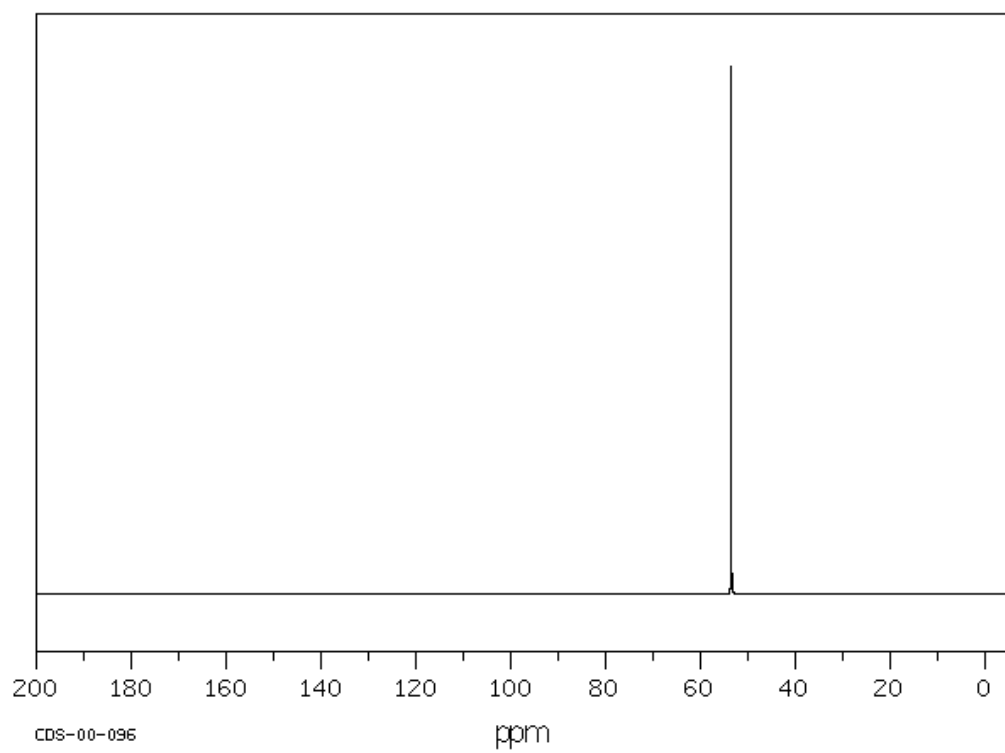


In a strong magnetic field, the energy level difference corresponds to the energy of radio waves

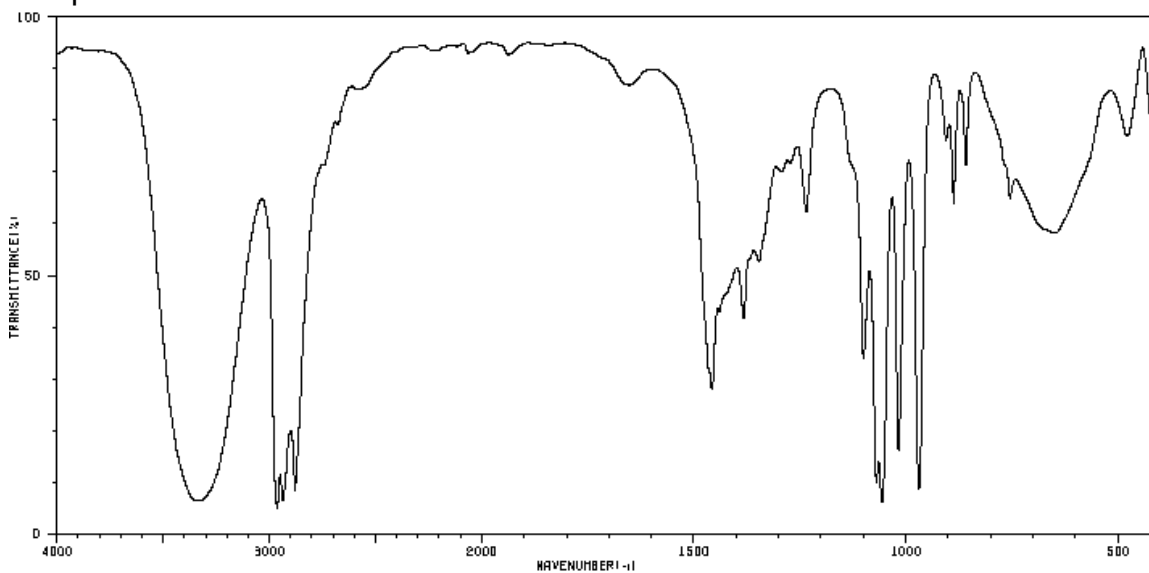


**Figure 15.19**  
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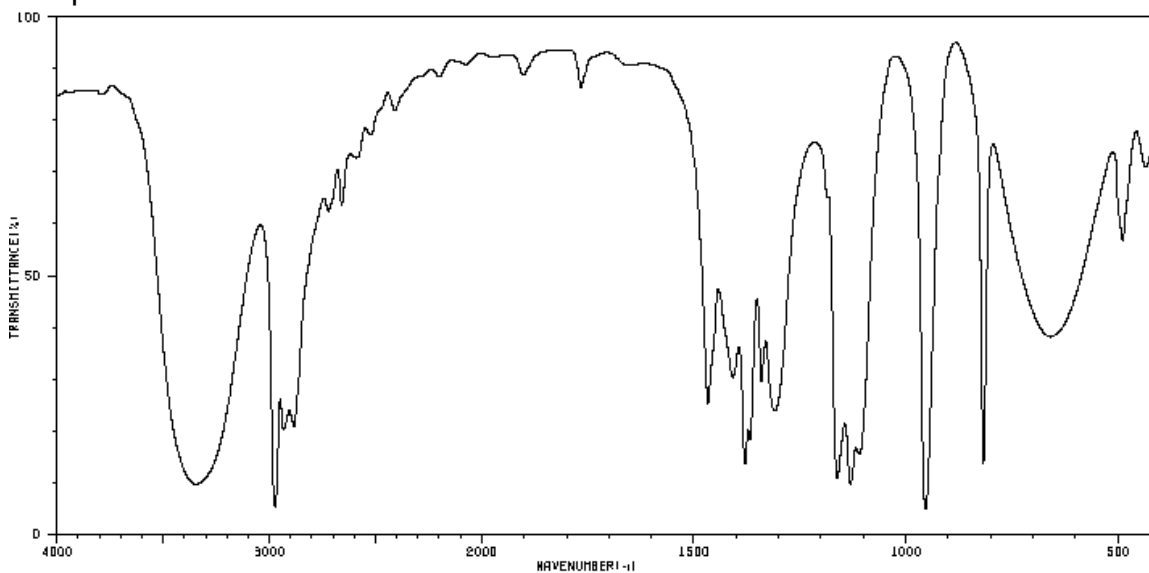




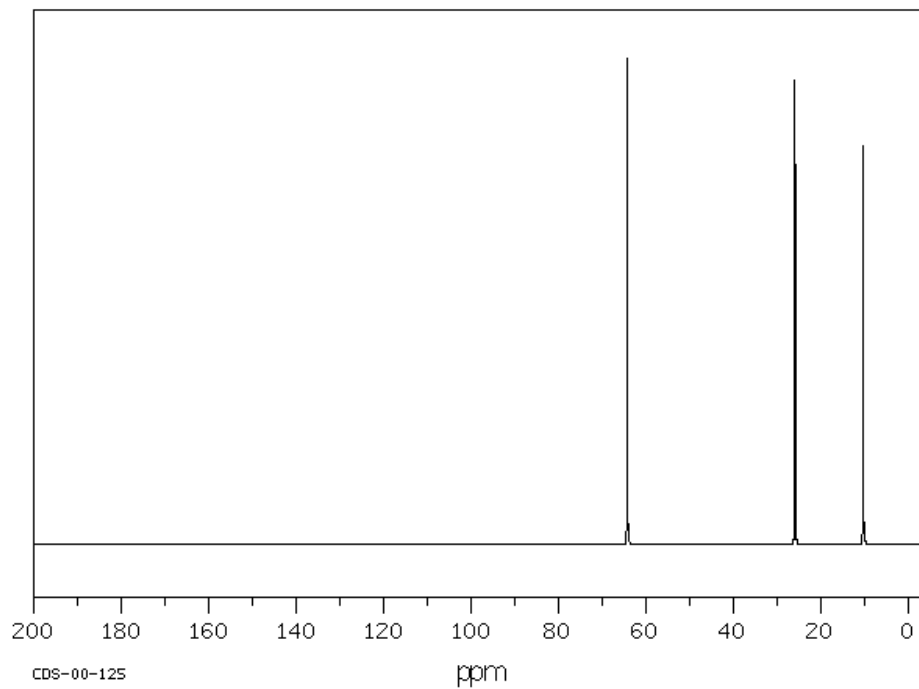
IR Spectrum of Unknown 1



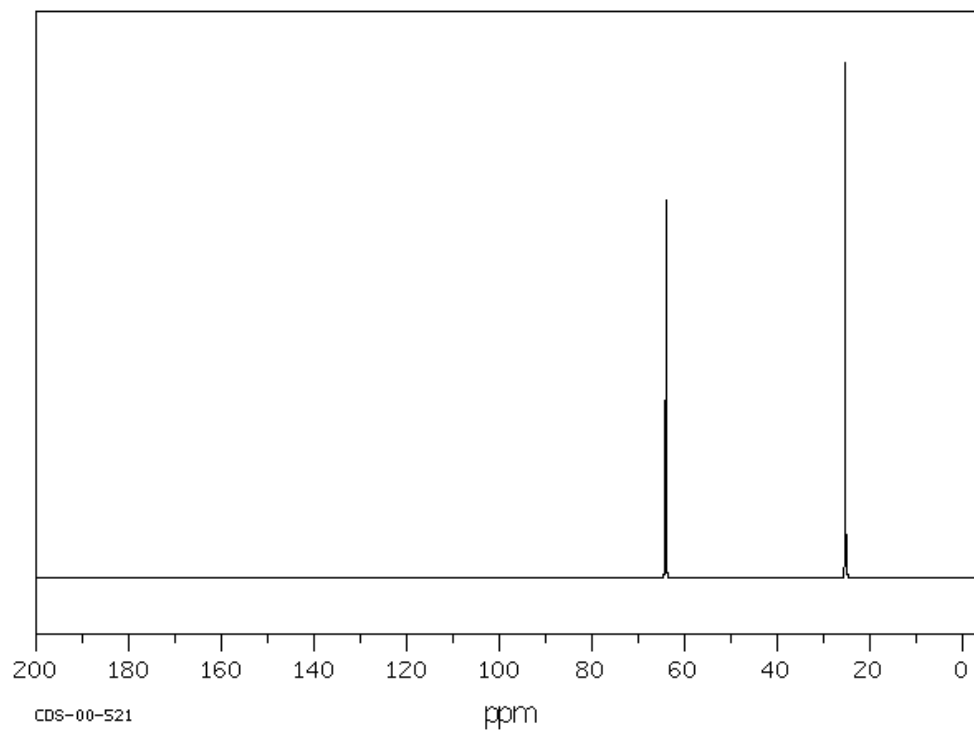
IR Spectrum of Unknown 2



$^{13}\text{C}$  NMR Spectrum of Unknown 1



$^{13}\text{C}$  NMR Spectrum of Unknown 2



# Table of $^{13}\text{C}$ NMR Shifts

