

Carbon-13 NMR vs. ^1H NMR

- Abundance $\sim 1\%$, Frequency $\sim \frac{1}{4}$ of ^1H
Sensitivity = 1.76×10^{-4} of ^1H
- No ^{13}C to ^{13}C Splitting Due to Low Abundance (“Dilute Nucleus”)
- Strong ^1H to ^{13}C Splitting (~ 150 Hz One-Bond, 0-10 Hz Two- or Three-Bond)
- Complexity of ^1H to ^{13}C Splitting Requires “Decoupling” of Protons
- This is Accomplished by Continuous RF Irradiation of Protons During the Acquisition of the ^{13}C FID
- Carbon-13 is Relaxed by Nearby Protons, So Quaternary Carbons are Very Slow to Relax
- Peak Height (Intensity) is Dominated by Differences in Relaxation, so ^{13}C Spectra Are Not Integrated