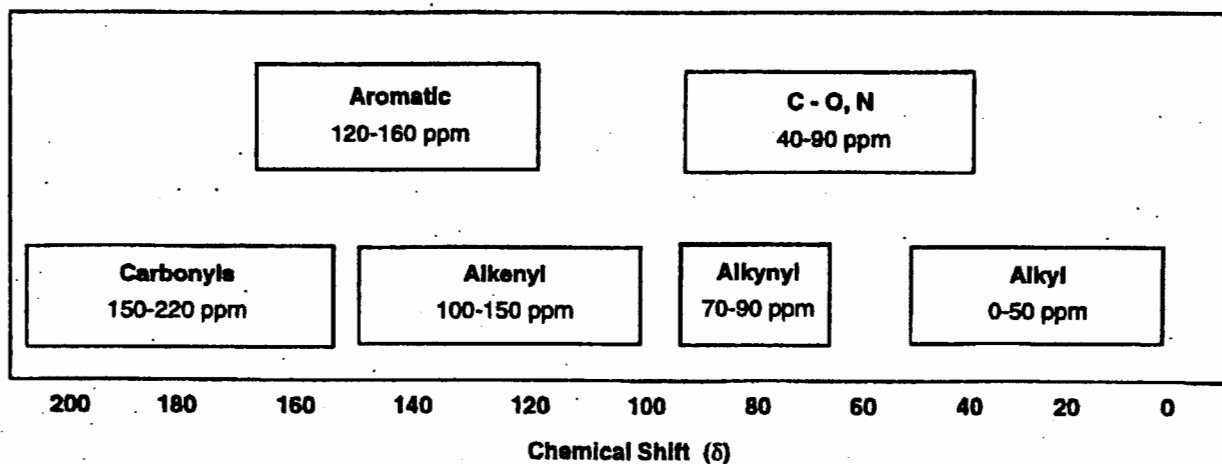


Regions of the ^{13}C NMR Spectrum



Characteristic Functional Group Chemical Shifts in ^{13}C NMR (ppm)

Alkanes		Organohalogen	
Methyl (RCH_3)	0-30	C-F	70-80
Methylene ($\text{RCH}_2\text{R}'$)	15-55	C-Cl	25-50
Methine ($\text{RCH}(\text{R}')(\text{R}'')$)	25-55	C-Br	10-40
Quaternary ($\text{RC}(\text{R}')(\text{R}'')(\text{R}''')$)	30-40	C-I	-20-10
Alkenes	100-150	Ketones, Aldehydes	185-220
Aromatic	120-160	Carboxyl Derivatives	
Alkynes	70-90	Acids	150-185
Nitriles	110-125	Esters	155-180
Alcohols, Ethers	50-90	Amides	150-180
Amines	40-60	Carbamates	150-160