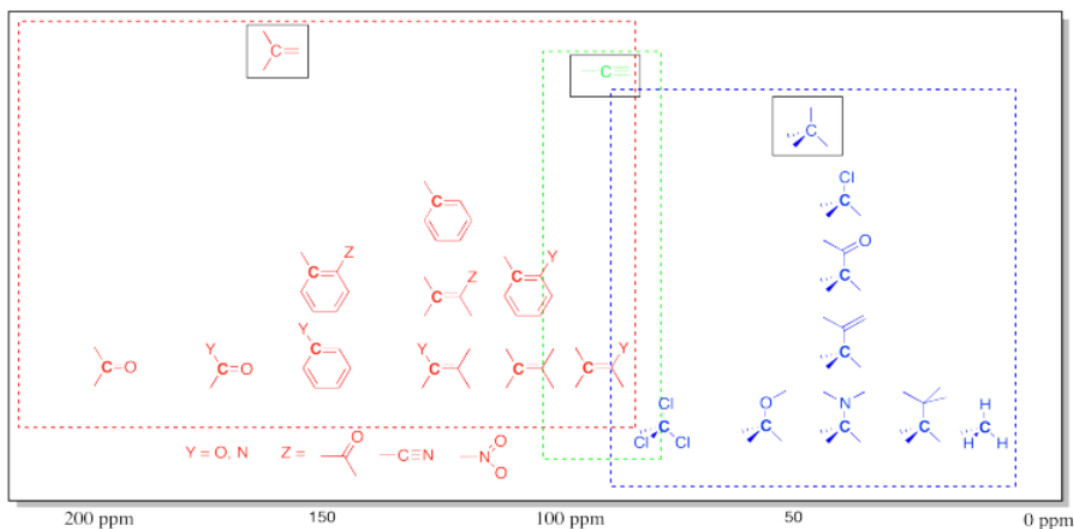


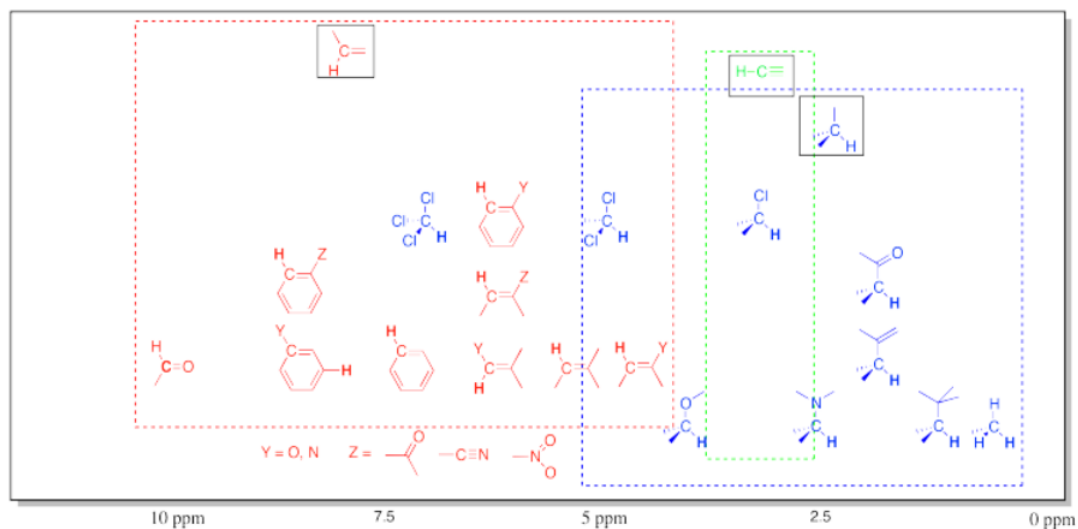
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Table of ^{13}C NMR Frequencies Common in Organic Compounds.



Note that effects are additive: two or more electron-withdrawing groups move the absorbance further to the left than just one group.

Table of ^1H NMR Frequencies Common in Organic Compounds.



This chart shows the frequencies of protons that are attached to carbons. In general, protons follow the trend seen in the carbon to which they are attached. Note again the additive effects of multiple attached groups.

This table does not include OH (or NH) protons. Protons attached to heteroatoms are more difficult to pinpoint because their locations in the spectrum are much less specific. Instead, they may be found across a very broad range.

Table of ^1H NMR Frequencies of OH Common in Organic Compounds.

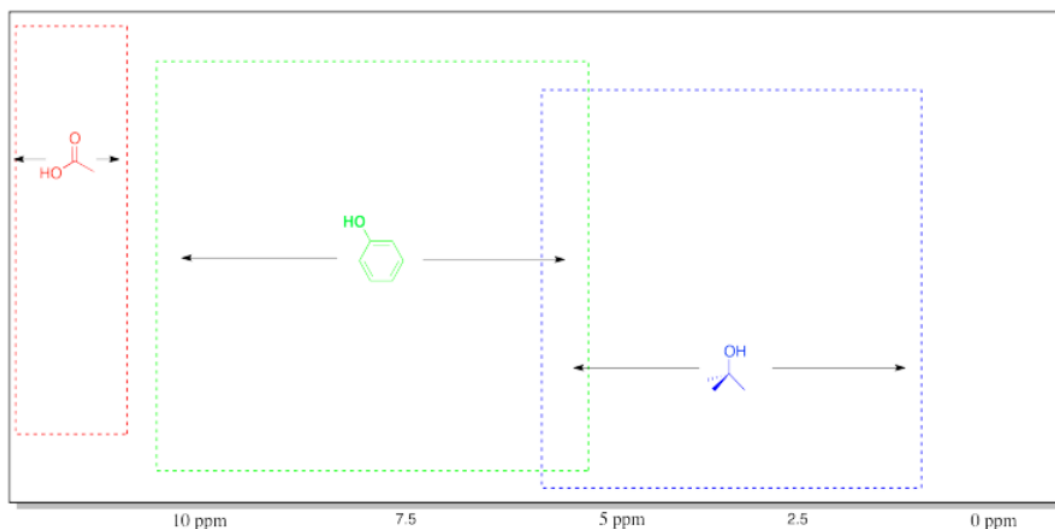


Table of Some Common Impurities in NMR Samples.

Minor impurities in the NMR spectrum are often the result of solvents used during a reaction or sample purification. A few examples are provided in the following table, showing the data you would see from common solvents in an NMR spectrum taken in chloroform.

solvent	number of peaks	shift	multiplicity	integral ratio	assignment
water	1	1.56	br. s	-	O-H
acetone	1	2.17	s	-	(C=O)CH ₃
chloroform	1	7.26	s	-	Cl ₃ C-H
t-butyl methyl ether	2	1.19	s	3	C(CH ₃) ₃
		3.22	s	1	O-CH ₃
ethyl acetate	3	1.26	t	3	CH ₂ CH ₃
		2.05	s	3	(C=O)CH ₃
		4.12	q	2	OCH ₂ CH ₃
grease or alkanes	2	0.86	m	varies; smaller	CH ₂ CH ₃
		1.26	m	varies; larger	CH ₂ CH ₂ CH ₂ / CH ₂ CH ₂ CH ₃

An excellent table, including shifts of a variety of impurities in different NMR solvents, can be found in the following article: Gottlieb, H. E.; Kotlyar, V.; Nudelman, A. *J. Org. Chem.* **1997**, 62, 7512-7515.

Table of Solvent

Residual Peaks

Because an NMR sample is mostly solvent (with a small amount of dissolved solute that you are really interested in), there is usually a peak in the spectrum that comes from atoms in the solvent. Usually the use of deuterated solvents (enriched in ²H instead of ¹H) minimizes the size of solvent peaks in ¹H NMR. However, there is always a trace of ¹H left in the solvent, which shows up as a small peak in the spectrum. ¹³C residual peaks are often much larger than the peaks arising from the solute.

Solvent	¹ H Shift	Multiplicity	¹³ C Shift	Multiplicity*
Acetone-d ₆	2.05	pent	206.68	sing

			29.92	sept
Acetonitrile- d_3	1.94	pent	118.69	sing
			1.39	sept
Benzene- d_6	7.16	sing	128.39	trip
Chloroform- d	7.27	sing	77.23	trip
D ₂ O	4.80		--	
Dichloromethane- d_2	5.32	trip	54.00	pent
DMF- d_7	8.03	sing	163.15	trip
	2.92	pent	34.89	sept
	2.75	pent	29.76	sept
DMSO- d_6	2.50	pent	39.51	sept
Methanol- d_4	4.87	sing	49.15	sept
	3.31	pent		
THF- d_8	3.58	sing	67.57	pent
	1.73	sing	25.37	sing

*Note that coupling to ^2H produces different patterns than coupling to ^1H .

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