Table of characteristic proton NMR chemical shifts.

type of proton	*type of compound*	*chemical shift range, ppm*
R**H**$_3$	1˚ aliphatic	0.9
R$_2$C**H**$_2$	2˚ aliphatic	1.3
R$_3$C**H**	3˚ aliphatic	1.5
C=C–**H**	vinylic	4.6–5.9
C=C–**H**	vinylic, conjugated	5.5–7.5
C≡C–**H**	acetylenic	2–3
Ar–**H**	aromatic	6–8.5
Ar–C–**H**	benzylic	2.2–3
C=C–C**H**$_3$	allylic	1.7
HC–F	fluorides	4–4.5
HC–Cl	chlorides	3–4
HC–Br	bromides	2.5–4
HC–I	iodides	2–4
HC–OH	alcohols	3.4–4
HC–OR	ethers	3.3–4
RCOO–C**H**	esters	3.7–4.1
HC–COOR	esters	2–2.2
HC–COOH	acids	2–2.6
HC–C=O	carbonyl compounds	2–2.7
RC**H**O	aldehydic	9–10
RO**H**	hydroxylic	2–4
ArO**H**	phenolic	4-12
C=C–O**H**	enolic	15–17
RCOO**H**	carboxylic	10–13.2
HC–NHR	amine	1.5–2.0
RN**H**$_2$	amino	1–5
RN**H**C(=O)R’	amides	5-8.5

Table of characteristic IR absorptions.*

frequency, cm^{-1}	*bond*	*functional group*
3640–3610 (s, sh)	O–H stretch, free hydroxyl	alcohols, phenols
3500–3200 (s,b)	O–H stretch, H–bonded	alcohols, phenols
3400–3250 (m)	N–H stretch	1˚, 2˚ amines, amides
3300–2500 (m)	O–H stretch	carboxylic acids
3330–3270 (n, s)	–C≡C–H: C–H stretch	alkynes (terminal)
3100–3000 (s)	C–H stretch	aromatics
3100–3000 (m)	=C–H stretch	alkenes
3000–2850 (m)	C–H stretch	alkanes
2830–2695 (m)	H–C=O: C–H stretch	aldehydes
2260–2210 (v)	C≡N stretch	nitriles
2260–2100 (w)	–C≡C– stretch	alkynes
1760–1665 (s)	C=O stretch	carbonyls (general)
1760–1690 (s)	C=O stretch	carboxylic acids
1750–1735 (s)	C=O stretch	esters, saturated aliphatic
1740–1720 (s)	C=O stretch	aldehydes, saturated aliphatic
1730–1715 (s)	C=O stretch	α, β–unsaturated esters
1715 (s)	C=O stretch	ketones, saturated aliphatic
1710–1685 (s)	C=O stretch	α, β–unsaturated aldehydes
1685–1666 (s)	C=O stretch	α, β–unsaturated ketones
1680–1640 (m)	–C=C– stretch	alkenes
1650–1580 (m)	N–H bend	1˚ amines
1600–1585 (m)	C–C stretch (in–ring)	aromatics
1550–1475 (s)	N–O asymmetric stretch	nitro compounds
1500–1400 (m)	C–C stretch (in–ring)	aromatics
1470–1450 (m)	C–H bend	alkanes
1370–1350 (m)	C–H rock	alkanes
1360–1290 (m)	N–O symmetric stretch	nitro compounds
1335–1250 (s)	C–N stretch	aromatic amines
1320–1000 (s)	C–O stretch	alcohols, carboxylic acids, esters, ethers
1300–1150 (m)	C–H wag (–CH_2X)	alkyl halides
1250–1020 (m)	C–N stretch	aliphatic amines
1000–650 (s)	=C–H bend	alkenes
950–910 (m)	O–H bend	carboxylic acids
910–665 (s, b)	N–H wag	1˚, 2˚ amines
900–675 (s)	C–H “oop”	aromatics
850–550 (m)	C–Cl stretch	alkyl halides
725–720 (m)	C–H rock	alkanes
700–610 (b, s)	–C≡C–H: C–H bend	alkynes
690–515 (m)	C–Br stretch	alkyl halides

* m = medium, w = weak, s = strong, n = narrow, b = broad, s = sharp.