Selected Infrared Correlations

Hydrocarbons		
Alkyl C–H stretch	3000–2840 cm^{-1}	medium–strong
Aromatic C–H stretch	3080–3030 cm^{-1}	variable
Alkenyl C–H stretch	3100–3010 cm^{-1}	medium
Alkynyl C–H stretch	3340–3250 cm^{-1}	strong
Alkyl C–C stretch	~ 1200 cm^{-1}	weak
Aromatic C–C stretch	1625–1575, 1525–1450 cm^{-1}	variable
Isolated Alkenyl C=C stretch	1680–1640 cm^{-1}	medium
Conjugated Alkenyl C=C stretch	1640–1620 cm^{-1}	weak
Internal Alkynyl C≡C stretch	2260–2190 cm^{-1}	weak
Terminal Alkynyl C≡C stretch	2140–2100 cm^{-1}	medium
Alkyl Halides		
C–F stretch	1400–1000 cm^{-1}	strong
C–Cl stretch	800–600 cm^{-1}	strong
C–Br stretch	600–500 cm^{-1}	strong
C–I stretch	~ 500 cm^{-1}	strong
Alcohols		
O–H stretch	3650–3200 cm^{-1}	strong, broad
C–O stretch	1210–1000 cm^{-1}	strong
Ethers		
C–O stretch	1275–1085, 1125–870 cm^{-1}	strong
Amines		
N–H stretch (1º amine)	3500, 3400 cm^{-1}	medium
N–H stretch (2º amine)	3500–3310 cm^{-1}	medium
Aromatic C–N stretch	1360–1250 cm^{-1}	strong
Aliphatic C–N stretch	1410, 1220–1020 cm^{-1}	weak–medium

Imines		
C=N stretch	1690–1630 cm^{-1}	variable
Nitriles		
C≡N stretch	2260–2220 cm^{-1}	medium
Carbonyl Compounds		
C=O stretch	1870–1630 cm^{-1}	strong
ketone	1750–1660 cm^{-1}	
aldehyde	1740–1660 cm^{-1}	
ester	1800–1720 cm^{-1}	
lactone	1820–1730 cm^{-1}	
carboxylic acid	1730–1680 cm^{-1}	
acid anhydride	1870–1780, 1830–1720 cm^{-1}	
acid chloride	1800–1720 cm^{-1}	
amide	1700–1630 cm^{-1}	
lactam	1780–1680 cm^{-1}	
C–H stretch (aldehyde)	2900–2820, 2780–2700 cm^{-1}	weak
O–H stretch (carboxylic acid)	~ 3000 cm^{-1}	very broad
N–H stretch (1º amide)	3500–3350, 3400–3180 cm^{-1}	medium
N–H stretch (2º amide)	3430–3140 cm^{-1}	medium

Notes:

1. The effect of conjugation is to decrease a functional group's absorption maximum to a lower wavenumber. The effect of angle strain is to increase a functional group's absorption maximum to a higher wavenumber.

2. See Appendices 2A and 2B of Wade, *Organic Chemistry*, for much more detailed infrared correlation tables.