3.12: Appendix

Table of IR Absorptions Common in Organic Compounds

Note: strong, medium, weak refers to the length of the peak (in the y axis direction).

Note: spectra taken by ATR method (used at CSB/SJU) have weaker peaks between 4000-2500 cm^{-1} compared to reference spectra taken by transmittance methods (typical on SDBS and other sites).

Approximate Frequency (cm^{-1})	Description	Bond Vibration	Notes
3500 - 3200	broad, round	O-H	much broader, lower frequency (3200-2500) if next to C=O
3400-3300	weak, triangular	N-H	stronger if next to C=O
3300	medium-strong	≡C-H (sp C-H)	
3100-3000	weak-medium	=C-H (sp^2 C-H)	can get bigger if lots of bonds present
3000-2900	weak-medium	-C-H (sp^3 C-H)	can get bigger if lots of bonds present
2800 and 2700	medium	C-H in O=C-H	two peaks; "alligator jaws"
2250	medium	C≡N	
2250-2100	weak-medium	C≡C	stronger if near electronegative atoms
1800-1600	strong	C=O	lower frequency (1650-1550) if attached to O or N middle frequency if attached to C, H higher frequency (1800) if attached to Cl
1650-1450	weak-medium	C=C	lower frequency (1600-1450) if conjugated (i.e. C=C-C=C) often several if benzene present
1600-1450	medium	H-N-H bend	often broad
1530 and 1360	strong	N=O in $-NO_2$	two peaks
1450	weak-medium	H-C-H bend	
1300 and 1200	strong	S=O in sulfonate	two peaks
1300-1200	strong	P=O in phosphate	often double peak
1300 - 1000	medium-strong	C-O	higher frequency (1200-1300) if conjugated (i.e. O=C-O or C=C-O)
1300-1100	strong	C-F	C-F is much less common than C-O
1250-1000	medium	C-N	

1000-650	strong	C=C-H bend	often several if benzene present
800	strong	N-O	
800-600	strong	C-Cl	C-Br and C-I are below 600