

## IR Correlation Chart

Frequencies are approximate and given in  $\text{cm}^{-1}$  (wavenumbers).

Group	Peaks	Comments
alkanes	C-H stretch below 3000	present in virtually all molecules
alkenes	C-H stretch above 3000 C=C stretch 1600-1675 =C-H oop bend 650-1000	see separate chart for details
alkynes	$\equiv$ C-H stretch 3300 C $\equiv$ C stretch 2150	infrequent sharp, moderate intensity (doesn't generally overlap with C $\equiv$ N)
aromatics	=C-H stretch above 3000 C=C stretch 1600 & 1450 =C-H oop bend 690-900 overtones 1667-2000	see handout for details see handout for details
alcohols	O-H stretch above 3000 3200-3500  C-O stretch 1000-1300	v strong, broad if hydrogen bonded, higher frequency & sharp if not use as backup info only; also present in ethers, esters
amines	N-H stretch 3200-3500	1° amines have two peaks; 2° weak
nitriles	C $\equiv$ N stretch 2250	v sharp, moderate intensity (doesn't generally overlap with C $\equiv$ C)
nitro	N-O stretch 1500-1600 & 1300-1390	v strong
carbonyls (values $\pm$ 5-10)*	anhydrides 1810 & 1760 ester 1735 aldehyde 1725 ketones 1715 acids 1710 amides 1690	all carbonyls are STRONG check also for C-O check also for C-H 2750  v broad; also has O-H and C-O might have N-H

\*Conjugation shifts carbonyls lower by 10-40  $\text{cm}^{-1}$ . Ring strain shifts them up. Esters of phenol are also shifted to higher values.

Listed by Region:

O-H, N-H	above 3200
C-H	$\sim$ 3000
C $\equiv$ C, C $\equiv$ N	$\sim$ 2200
C=O, C=C	1600-1800
C-H oop bending	below 1000