

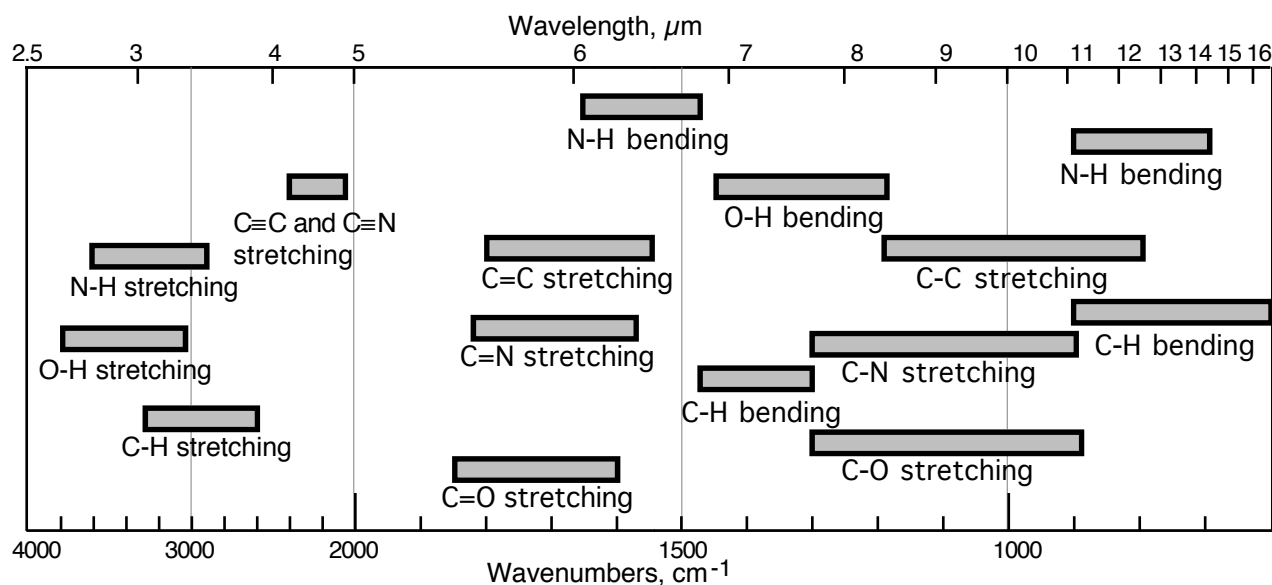
## Infrared Spectroscopy Peaks

*Weaker springs have slower vibrations.*

*Larger masses have slower vibrations.*

Springs	Observed stretching frequencies, $\text{cm}^{-1}$
single bond:	C-H, O-H, N-H 2700-3800 C-C, C-O, C-N 800-1300
double bond:	C=C, C=O, C=N 1500-1900
triple bond:	C≡C, C≡N, C≡O 2000-2300

Force constants for bending are about 1/10 that for stretching.



C-H Functional Group	Frequency, $\text{cm}^{-1}$	Remarks
Unsaturated CH	<b>&gt;3000</b>	C-H stretching.
	2000-1650(w)	Aromatic overtone bands.
	900-600(s)	Out-of-plane C-H bending.
-CH <sub>3</sub>	2962±10(s), $\nu_{\text{as}}$	Asymmetric C-H stretching.
	2872±10(s), $\nu_{\text{s}}$	Symmetric C-H stretching.
	1450±20(m), $\delta_{\text{as}}$	Asymmetric C-H bend.
	1375±5(s), $\delta_{\text{s}}$	Symmetric C-H bend.
-CH <sub>2</sub> -	2926±5(s), $\nu_{\text{as}}$	Asymmetric C-H stretching.
	2853±5(s), $\nu_{\text{s}}$	Symmetric C-H stretching.
	1465±15(m), $\delta_{\text{s}}$	C-H bend, sharp.
	1350-1150, $\omega, \tau$	C-H wag and twist.
	1100-700, $\rho$	C-H rock, intense.
	<b>725(m)</b>	-(CH <sub>2</sub> ) <sub>n</sub> , n ≥ 4
-CH-	2890±10(w), $\nu$	C-H stretch, usually very weak.
-C(CH <sub>3</sub> ) <sub>3</sub> <i>t</i> -butyl	<b>1390(m)</b>	C-H geminal dimethyl doublet,
	<b>1370(s)</b>	<i>unequal</i> intensity.
	1250 1208±6	C-C skeletal vibrations.
-CH(CH <sub>3</sub> ) <sub>2</sub> <i>i</i> -propyl	<b>1385(s)</b>	C-H geminal dimethyl doublet,
	<b>1370(s)</b>	<i>equal</i> intensity.
	1170 1145	Skeletal vibrations; C-C stretch and C-C-H bend.