Chemical Shifts
^{1}H-NMR

Type of Hydrogen	Chemical Shift (δ)	Type of Hydrogen	Chemical Shift (δ)
$(CH_3)_4Si$	0 (by definition)	$RCOCH_3$	3.7-3.9
RCH_3	0.8-1.0	$RCOCH_2R$	4.1-4.7
RCH_2R	1.2-1.4	RCH_2I	3.1-3.3
R_3CH	1.4-1.7	RCH_2Br	3.4-3.6
$R_2C=CRCHR_2$	1.6-2.6	RCH_2Cl	3.6-3.8
$RC\equiv CH$	2.0-3.0	RCH_2F	4.4-4.5
$ArCH_3$	2.2-2.5	$ArOH$	4.5-4.7
$ArCH_2R$	2.3-2.8	$R_2C=CH_2$	4.6-5.0
ROH	0.5-6.0	$R_2C=CHR$	5.0-5.7
RCH_2OH	3.4-4.0	ArH	6.5-8.5
RCH_2OR	3.3-4.0	RCH	9.5-10.1
R_2NH	0.5-5.0	$RCOH$	10-13
$RCCH_3$	2.1-2.3		
$RCCH_2R$	2.2-2.6		

B. Characteristic Absorptions for various Functional Groups in IR Spectra

Functional Group	***Absorption(s) (cm-1)***	***Comments***
Alkyl C-H Stretch	2950 - 2850 (m or s)	Alkane C-H bonds are common and are not usually diagnostic; however, the demarkation of 3000 cm^{-1} should be noted: aliphatic C--H are below this value.
Alkenyl C-H Stretch Alkenyl C=C Stretch	3100 - 3010 (m) 1680 - 1620 (v)	Absorption peaks above 3000 cm^{-1} are frequently diagnostic of unsaturation
Alkynyl C-H Stretch Alkynyl C≡C Stretch	~3300 (s) 2260 - 2100 (v)	
Aromatic C-H Stretch Aromatic C-H Bending Aromatic C=C Bending	~3030 (v) 860 - 680 (s) 1700 - 1500 (m,m)	Absorption peaks above 3000 cm^{-1}
Alcohol/Phenol O-H Stretch	3550 - 3200 (broad, s)	Hydrogen-Bonded Hydroxyl display an intese, broad "U" shaped appearance.
Carboxylic Acid O-H Stretch	3000 - 2500 (broad, v)	This OH stretch paired with a C=O ~ 1780-1710 cm^{-1}
Amine N-H Stretch	3500 - 3300 (m)	Primary amines produce two N-H stretch absorptions, secondary amides only one, and tetriary none.
Ether C—O Stretch	1250-1000 (s)	For ethers, alcohols and esters
Nitrile C≡N Stretch	2260 - 2220 (m)	
Aldehyde C=O Stretch Ketone C=O Stretch Ester C=O Stretch Carboxylic Acid C=O Stretch Amide C=O Stretch	1740 - 1690 (s) 1750 - 1680 (s) 1750 - 1735 (s) 1780 - 1710 (s) 1690 - 1630 (s)	The carbonyl stretching absorption is usually one of the strongest in the spectrum. It is also one of the most common.
Amide N-H Stretch	3700 - 3500 (m)	As with amines, an amide produces zero to two N-H absorptions depending on its type.