

## Representative $^1\text{H}$ Chemical Shifts

Characteristic Proton Chemical Shifts		
Type of Proton	Chemical structure	Chemical shift in ppm ( $\delta$ )
Primary Alkyl	$\text{RCH}_3$	0.8-1.2
Secondary Alkyl	$\text{R}_2\text{CH}_2$	1.2-1.5
Tertiary Alkyl	$\text{R}_3\text{CH}$	1.4-1.8
Vinylic	$\text{R}_2\text{C}=\text{C}-\text{H}_2$	4.6-5.0
Acetylenic	$\text{C}\equiv\text{C}-\text{H}$	2.5-3.1
Aromatic	$\text{Ar}-\text{H}$	6.0-8.5
Benzylic	$\text{Ar}-\text{C}-\text{H}$	2.2-2.5
Allylic	$\text{C}=\text{C}-\text{CH}$	1.6-1.9
Alkyl Chloride	$\text{RCH}_2\text{Cl}$	3.6-3.8
Alkyl Bromide	$\text{RCH}_2\text{Br}$	3.4-3.6
Alcohol	$\text{HC}-\text{OH}$	3.3-4
Ether	$\text{HC}-\text{OR}$	3.3-3.9
Ester	$\text{RCOO}-\text{CH}$	3.7-4.1
Ester	$\text{HC}-\text{COOR}$	2-2.2
Ketone	$\text{HC}-\text{C}=\text{O}$	2.1-2.7
Aldehydic	$\text{RCHO}$	9-10
Alcohol Hydroxyl	$\text{ROH}$	0.5-6.0*
Phenolic	$\text{ArOH}$	4.5-7.7*
Vinylic	$\text{R}_2\text{C}=\text{CHR}$	5.2-5.7
Amino	$\text{RNH}_2$	1.0-5.0*
Aldehyde	$\text{RCHO}$	9.5-10.5
Carboxylic acid	$\text{RCOOH}$	10-13*

\* = proton exchanges with  $\text{D}_2\text{O}$