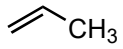
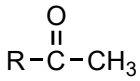
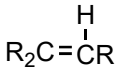
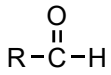
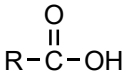
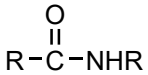
Cal Poly Pomona, Dr. L. S. Starkey

^{1}H and ^{13}C NMR - General Chemical Shifts

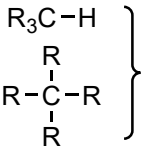
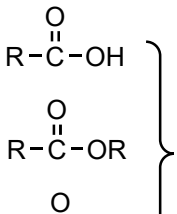
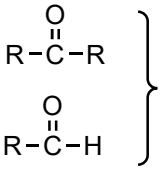
^{1}H NMR: Protons on Carbon

Type of C-H	δ (ppm)	Description
$R-CH_3$	0.9	alkyl (methyl)
$R-CH_2-R$	1.3	alkyl (methylene)
R_3C-H	1.5-2	alkyl (methine)
	1.8	allylic
	2-2.3	α to carbonyl
$Ar-CH_3$	2.3	benzylic
$RC\equiv C-H$	2.5	alkynyl
R_2N-CH_3	2-3	α to nitrogen
$R-CH_2-X$	3-3.5	α to halogen
$RO-CH_3$	3.8	α to oxygen
$R-CH_2-F$	4.5	α to fluorine
	5-5.3	vinylic
$Ar-H$	7.3	aromatic
	9.7	aldehyde

^{1}H NMR: Protons on Oxygen/Nitrogen

Type of H	δ (ppm)	Description
ROH	0.5-5	alcohol
ArOH	4-7	phenol
	10-13	carb. acid
RNH_2	0.5-5	amine
$ArNH_2$	3-5	aniline
	5-9	amide

^{13}C NMR: Carbons

Type of carbon	δ (ppm)	Description
$R-CH_3$	10-30	methyl
$R-CH_2-R$	15-55	methylene
	20-60	methine or quaternary
$C-I$	0-40	
$C-Br$	25-65	
$C-N$	40-60	
$C-Cl$	35-80	
$C-O$	40-80	
$RC\equiv CR$	65-90	alkynyl
$R_2C=CR_2$	100-150	alkenyl
	110-170	aromatic
	165-185	C=O, carboxylic acid, ester, amide
	185-220	C=O, ketone or aldehyde

R = alkyl group
Ar = aromatic ring, such as phenyl (Ph)