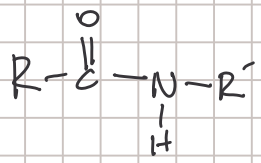
Ch 12

Note Title 10/14/2005

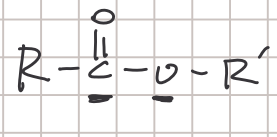
C=O stretching frequencies

C=O isolated : ~1710

conjugated : ~1685



amide : 1640-1680



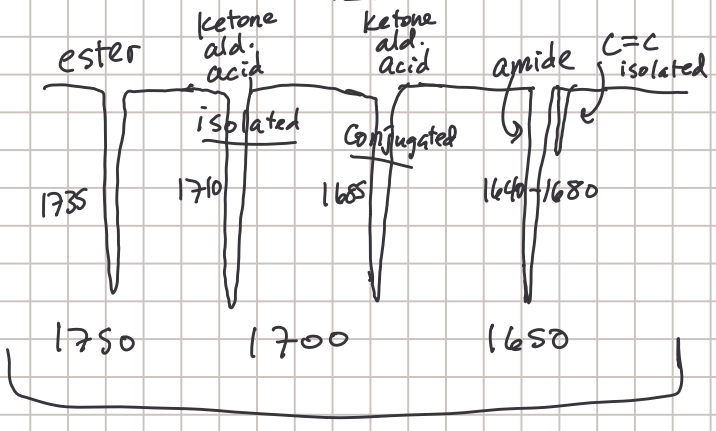
ester : 1735 (higher!)

even less C=O π e⁻ density b/c of important resonance structure

Compare w/ isolated C=C 1640-1660 cm^{-1} → very weak

amide C=O 1640-1680 cm^{-1} → very strong

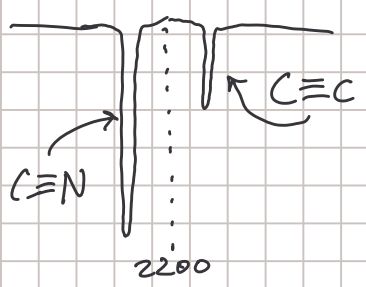
Know carbonyl stretches



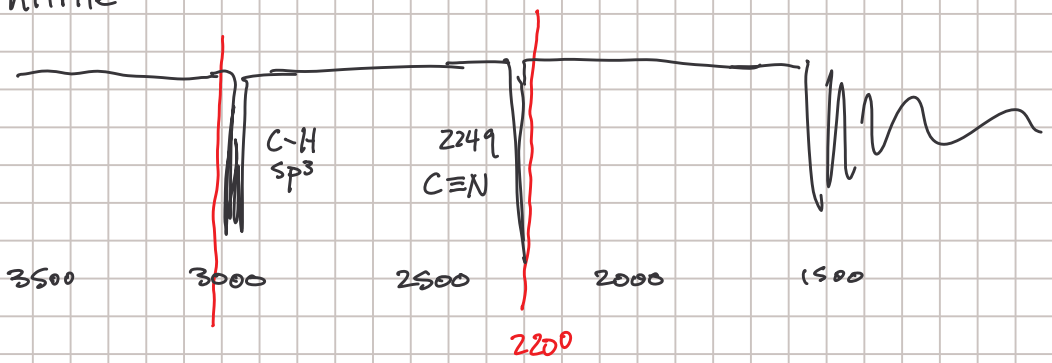
$C\equiv C$ $< 2200\ cm^{-1}$ (usu. weak)

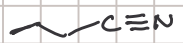
$C\equiv N$ $> 2200\ cm^{-1}$ usu. strong

nitrile



know



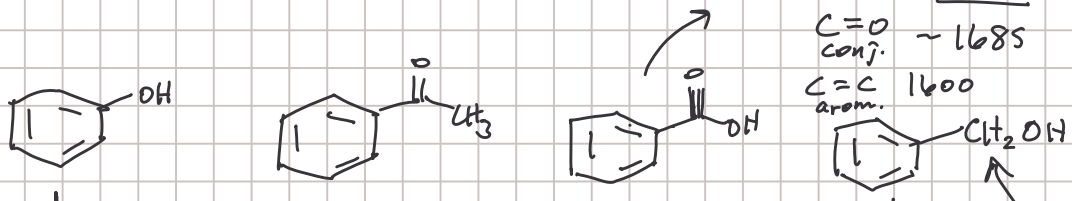
example : 

sp^2 C–H

O–H ~ 3000 broad

C=O conj. ~ 1685

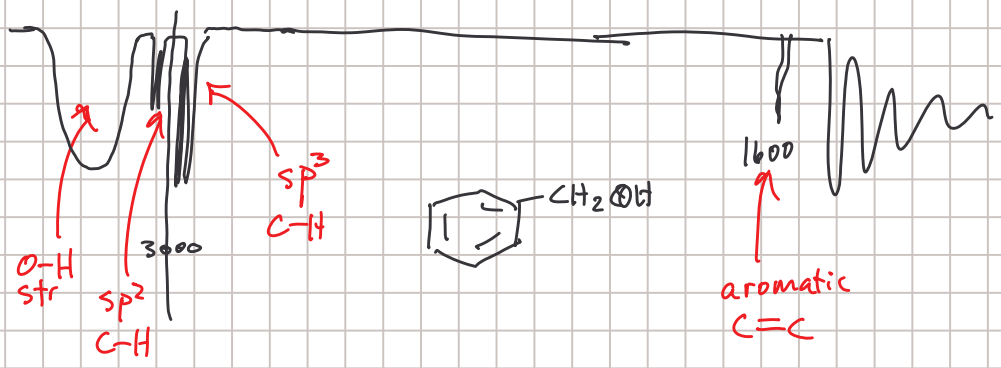
C=C arom. 1600

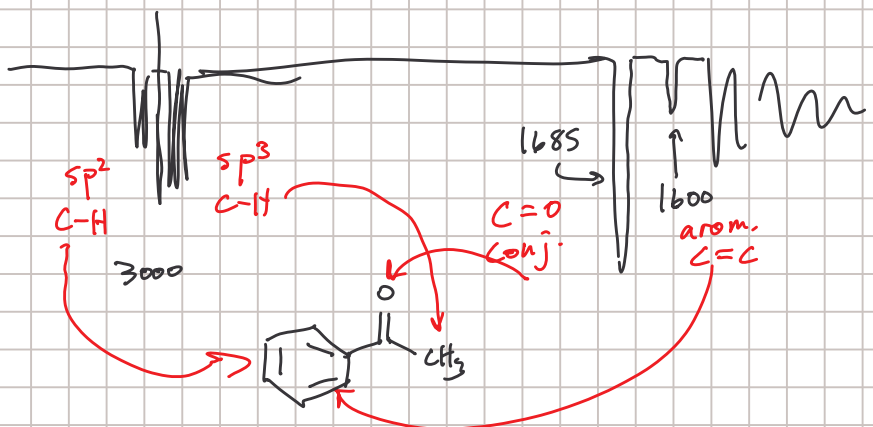


alcohol aromatic ⟶ ketone aromatic ⟷ carbox. acid aromatic ⟷ alcohol aromatic

identify functional groups

sp^3 C–H





- ★ general areas
- ★ C=O stretches
- ★ 3000 area ← →
- ★ 2200 area ← →

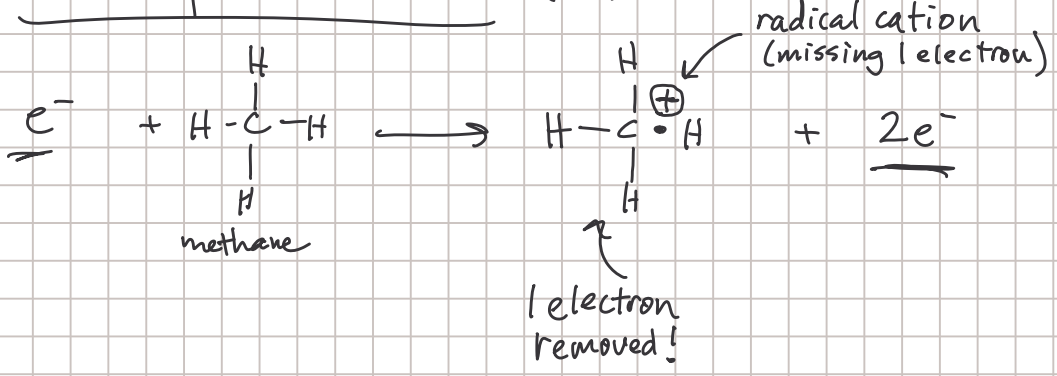
- ★ conjugation lowers frequency
- ★ C=C / C≡C usu weak
- ★ N-H / O-H broad
- ★ C=O strong

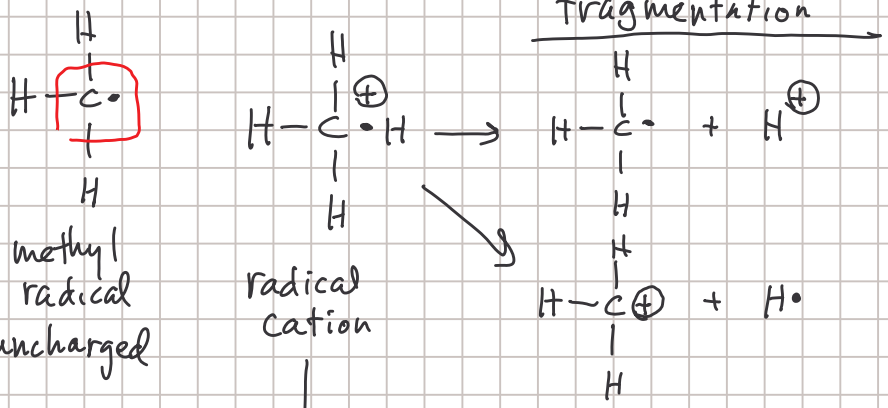
Mass Spectrometry (measurement) vs. IR spectroscopy (light/radiation)

- mass
- structure
- heteroatoms (non C/H atoms)

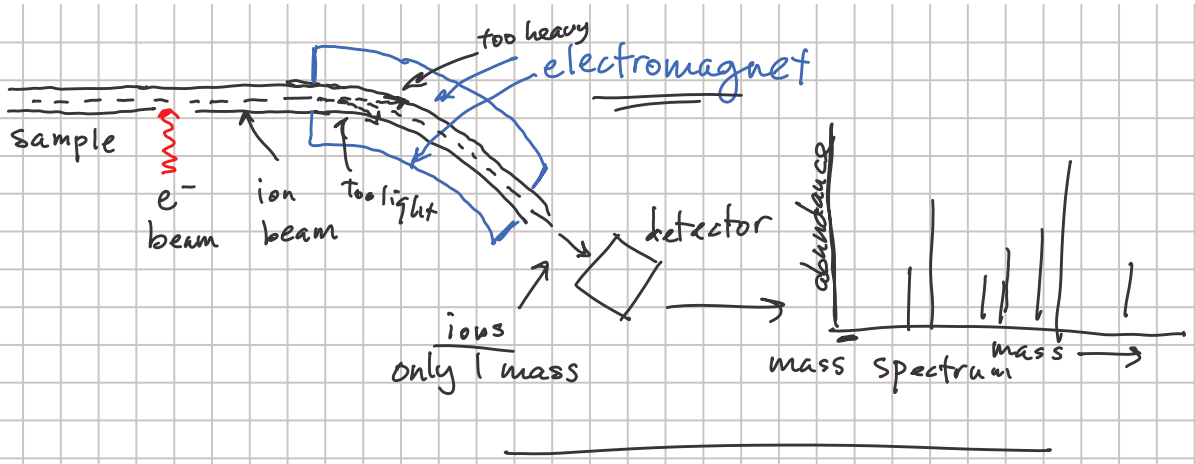
- functional groups & bonds

Electron impact ionization (EI)





the molecular ion (original molecule missing 1 e^-)



electromagnet changes force
to detect ions of different mass