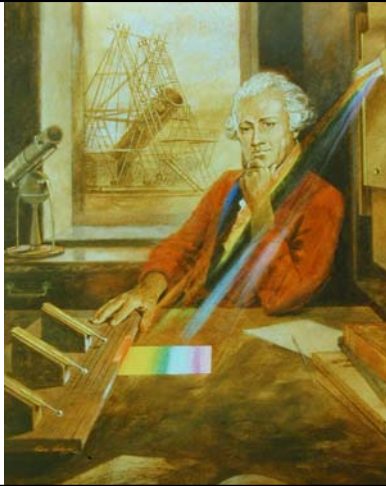
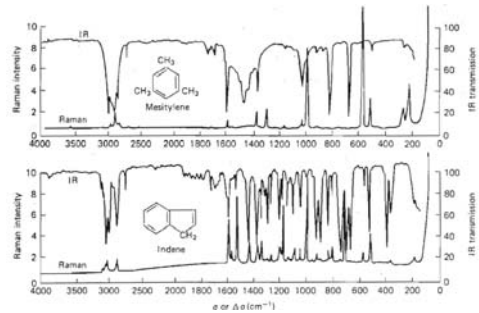


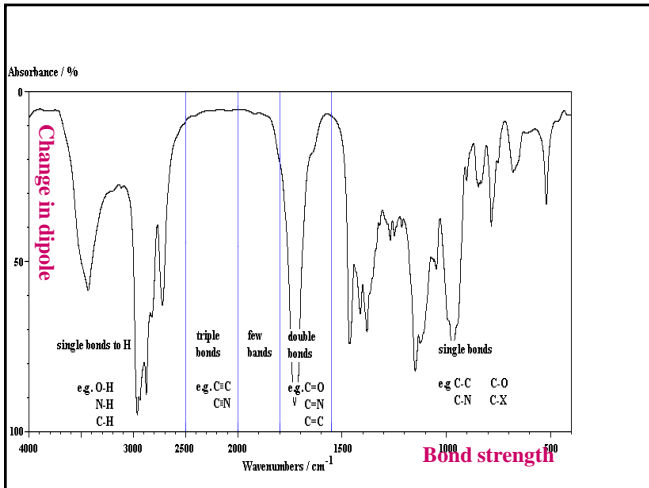
Friedrich Wilhelm Herschel was born in Hannover in 1738



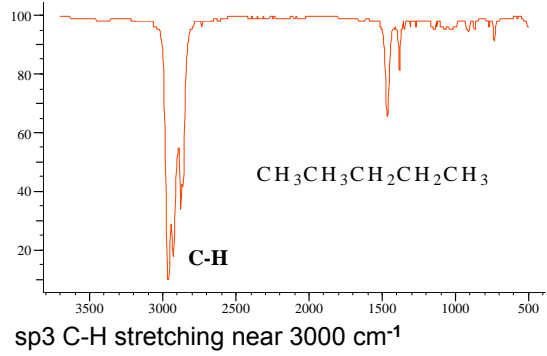
- IR and Raman are both useful for Fingerprinting



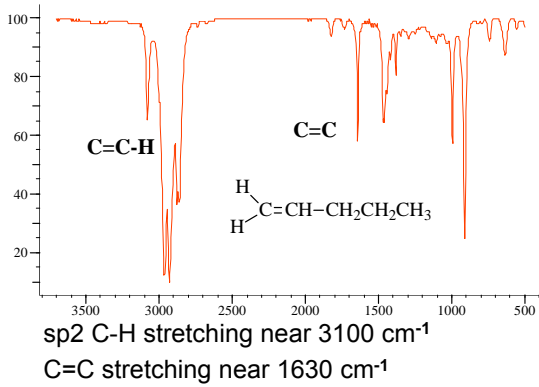
- Symmetry dictates which are active in Raman and IR



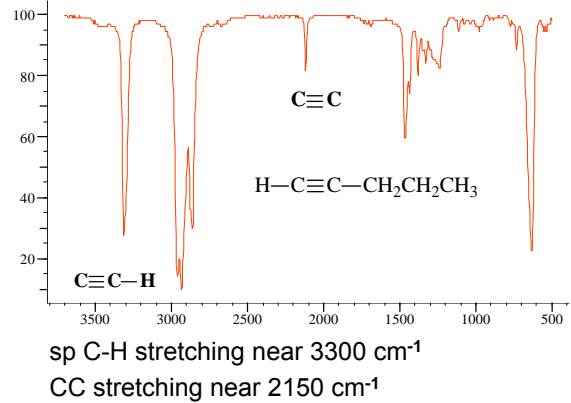
Functional Groups: Alkane

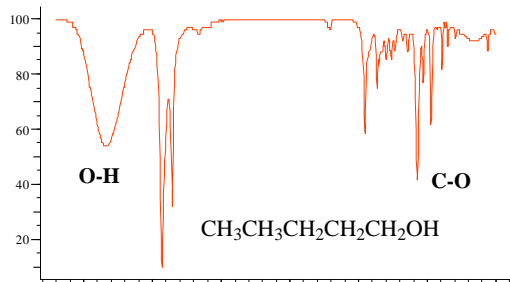


Functional Groups: Alkene

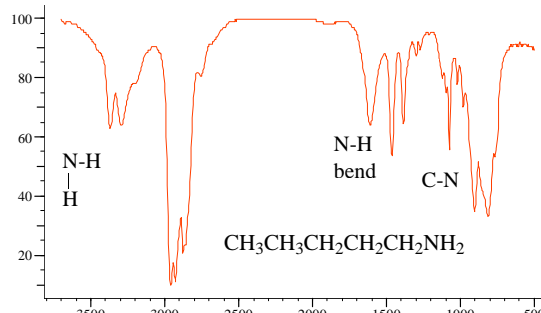


Functional Groups: Alkyne

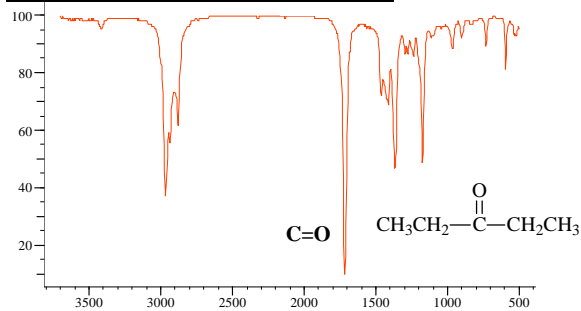


Functional Group: Alcohols

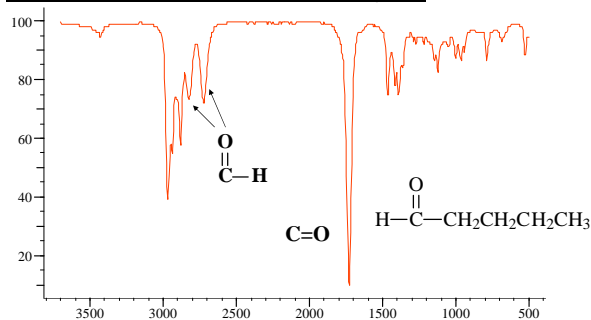
- 3650-3200 cm^{-1} , broad usually due to hydrogen-bonding
- in dilute solution, can have sharp small peak due to "free" OH (not hydrogen bonded)

Functional Groups: Amine

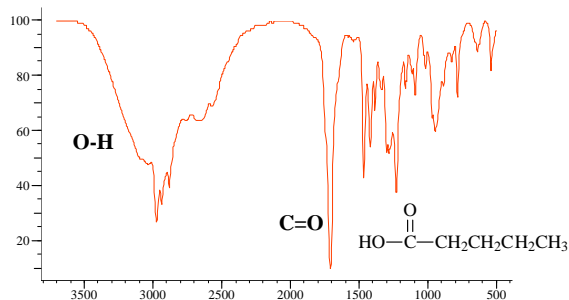
N-H stretching near 3400 cm^{-1}
 N-H bending near 1600 cm^{-1}
 CN stretching near 1250-1000 cm^{-1}

Functional Groups: Ketone

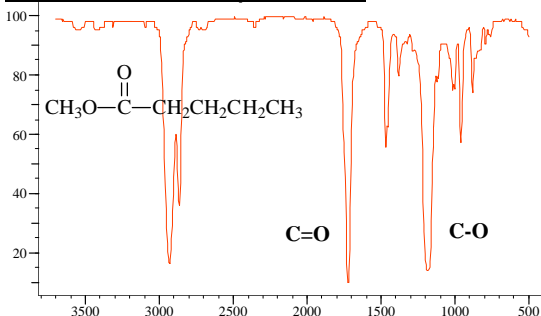
C=O stretching near 1715 cm^{-1}

Functional Groups: Aldehyde

CHO stretching at 2850 and 2750 cm^{-1} (weak)
 C=O stretching near 1725 cm^{-1}

Functional Groups: Carboxylic Acid

O-H stretching near 3300-2400 cm^{-1} (broad)
 C=O stretching near 1715 cm^{-1}

Functional Groups: Ester

C-O stretching at 1300-1000 cm^{-1} (strong)
 C=O stretching near 1735 cm^{-1}

