Proton Transfer:

Strong Acid + Strong Base ⇌ Weak Acid + Weak Base

Examples:

$Na^+ :NH_2^-$ + $H\text{-}CH_3$ ⇌ $Na^+ :CH_3^-$ + $H\text{-}NH_2$

Weaker Base - N better than C at stabilizing negative charge	Weaker Acid	Stronger Base	Stronger Acid

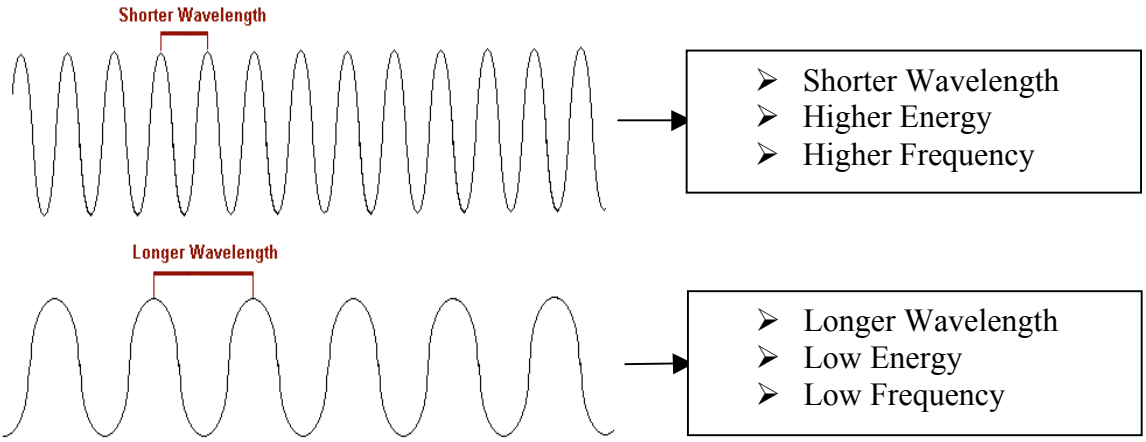
$Na^+ :NH_2^-$ + $H\text{-}OH$ ⇌ $NaOH$ + $H\text{-}NH_2$

Stronger Base	Stronger Acid $pK_a = 16$	Weaker Base	Weaker Acid $pK_a = 36$

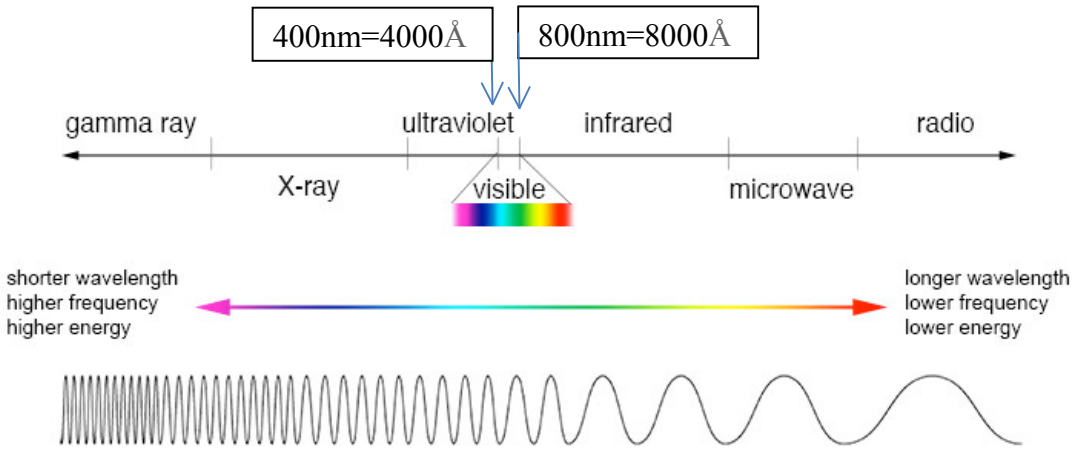
Infrared (IR) Spectroscopy

$E = hc/\lambda = h\nu$

E = Energy
h = Planck's Constant= 6.6 x 10^{-34} joules/sec
ν = Frequency
λ = Wavelength
c = Speed of light = 3.0 X 10^{10} cm/sec

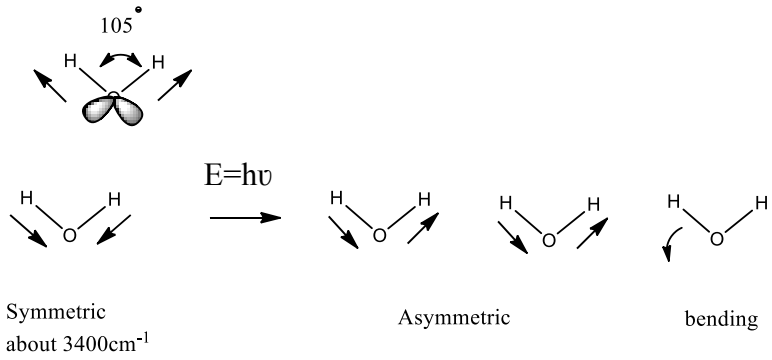


Electromagnetic Spectrum:



uv and visible light: conjugated double bond systems
infrared radiation: bond stretching and bending

Some types of bond movement are active in the IR region of the electromagnetic spectrum:



NEXT SECTION: Lecture Outline 2: ALKANES

<u>Hydrocarbons</u> – Compounds that contain only C and H

- Alkanes contain only single bonds (C-H, C-C)
- Alkenes = Olefins (C=C)
- Alkynes =Acetylenes (C≡C)

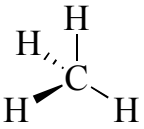
<u>Alkanes</u>

- All carbons are sp^3 hybridized (bond angle of 109^o)
- Single bonds (σ bonds).
- Tetrahedral geometry at every carbon
- Held together by London (dispersion) forces

<u>Nomenclature</u>

Learn Names of First 20 Straight Chain Alkanes

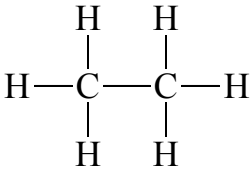
Ex #1) CH_4, methane



Bp = -161°C

CH_4 H_4C CH_3-H

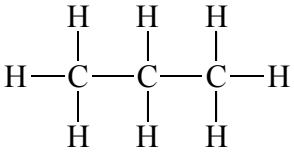
Ex #2) C_2H_6, ethane



Bp = -88°C

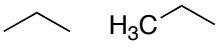
C_2H_6 CH_3-CH_3 H_3C-CH_3

Ex #3) C_3H_8, propane

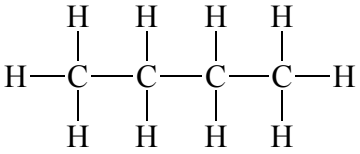


Bp = -42°C

C_3H_8 $CH_3CH_2CH_3$



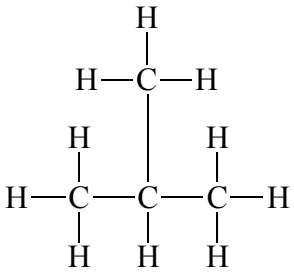
Ex #4) C_4H_{10}, butane



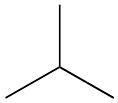
C_4H_{10}, $CH_3CH_2CH_2CH_3$

n-Butane: normal straight chain butane

Ex #5) C_4H_{10} , isobutane



- Isomers (structural or constitutional) are different compounds that have the same molecular formula and different structure. They have different physical properties (e.g. mp, bp, odour, biological effects)
- iso - meros
  same - parts

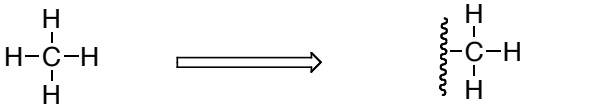


structural isomer = constitutional isomer

Groups (part of an alkane structure)

- In naming the particular group, drop the "ane" part and add "yl" to the name
- For example, methane → methyl

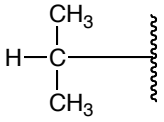
(i) Methane – CH_4



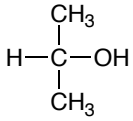
methane methyl group

(ii) Ethyl group $-CH_2CH_3$

(iii)

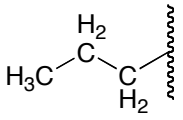


iso-propyl group

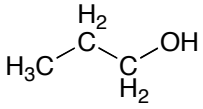


iso-propyl alcohol

(iv)



n-propyl chain

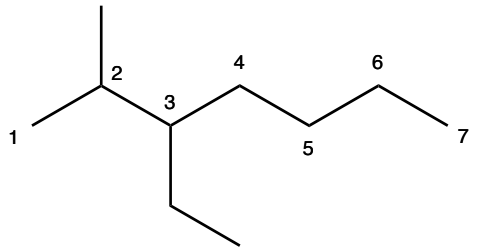


n-propyl alcohol

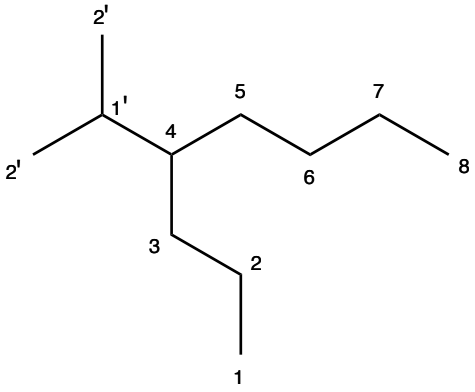
Systematic Nomenclature

RULES:

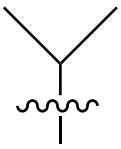
1. Find the longest chain
2. Number from end of the chain, so that the 1st branch point has the lowest number
3. Name the chain, then add prefixes (for the groups attached) with number and name the groups attached
4. Separate numbers and names by dash



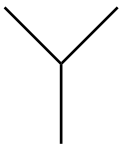
3-ethyl-2-methylheptane



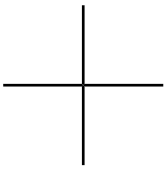
4-(1-methylethyl)octane



isopropyl



isobutane
2-methylpropane



neopentane
2,2-dimethylpropane