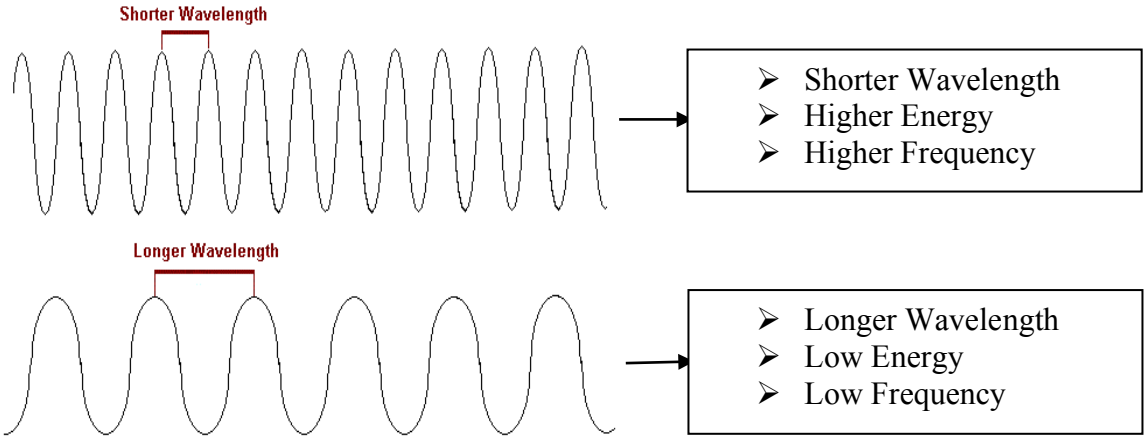
Electromagnetic Radiation:

Infrared (IR) Spectroscopy – Background only:

$E = hc/\lambda = h\nu$, energy is quantized

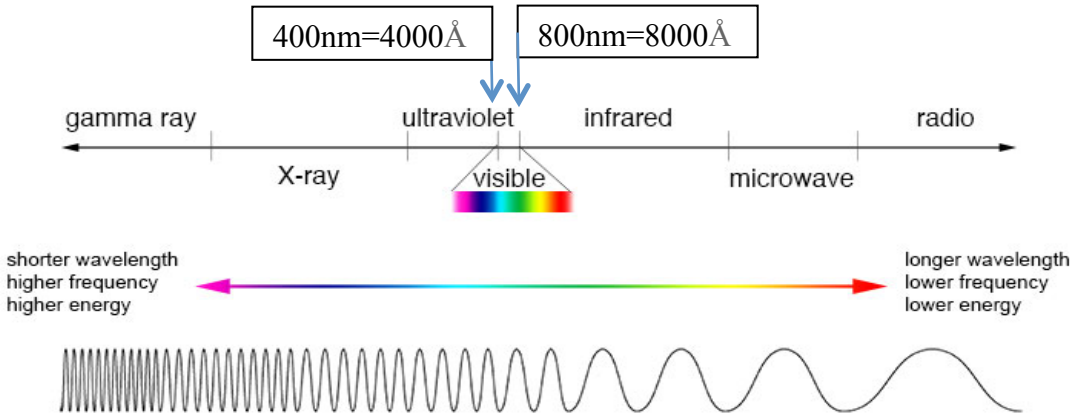
E = Energy
h = Planck's Constant= 6.6×10^{-34} joules/sec
ν = Frequency
λ = Wavelength
c = Speed of light = 3.0×10^{10} cm/sec



NB: There is an inverse relationship between wavelength and frequency.

Electromagnetic Spectrum:

NB: 1nm = 10 angstrom



UV and visible light: conjugated double bond systems

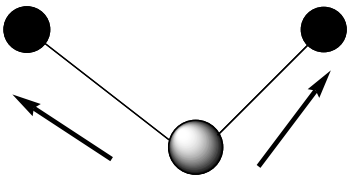
e.g. C=C bonds absorb UV light and some visible light

Infrared Radiation: bond stretching and bending modes

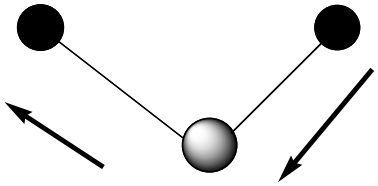
-Measured in wavenumbers (cm^{-1})

- Defined as cycles/second

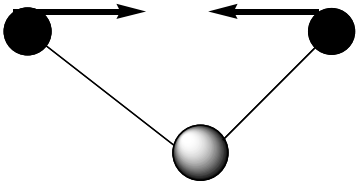
e.g. O-H bond can be seen around ~3400cm^{-1} in an IR spectrum



SYMMETRIC STRETCHING

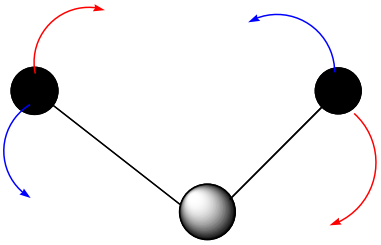


ASYMMETRIC STRETCHING



IN PLANE BENDING

(SCISSORING)



OUT OF PLANE BENDING

(TWISTING)