General Chemistry with Dr. Mattson.
Wednesday 10/7/15

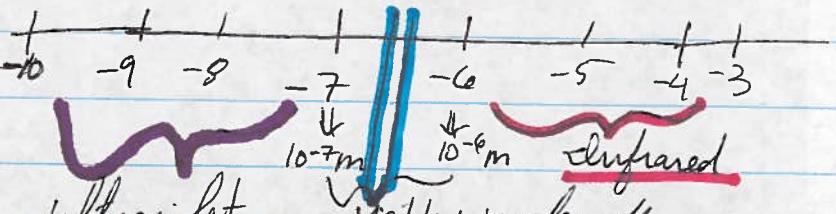
Today: Sect 5.1-5.4 (CK4)
Nomenclature Quiz

Thursday: Review @ 7pm, Eppley 110 with Monika!

Friday: Celebration of Knowledge 3
Doors open @ 9:15

Wavelength

Log(λ) scale



4×10^{-7} m to 7×10^{-7} m
400 nm to 700 nm

V I B G Y O R

Shortest λ
highest energy (E)

Longest λ
lowest energy

Frequency
ν ⇒ "nu"
waves/second

$\nu = 1.6 \times 10^{1} s^{-1}$
$1/s$ = hertz = Hz

$E \propto 1/\lambda$

$$\lambda \nu = c = 3.0 \times 10^{8} \text{ m/s}$$

$$E = h\nu = \frac{hc}{\lambda}$$

h = planck's constant
$= 6.626 \times 10^{-34}\ J \cdot s$

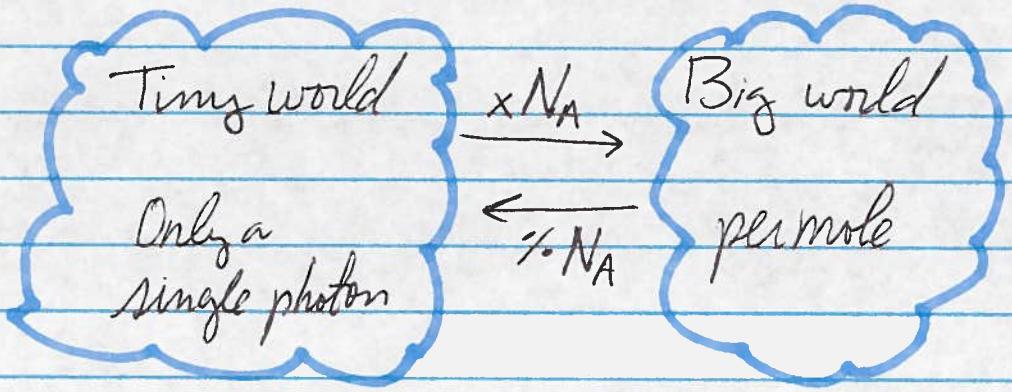
64/ $\lambda = 656\ nm$ (red)

convert to meters because $c = m/s$

$$656\ nm \times \frac{10^{-9}\ m}{1\ nm} = 6.56 \times 10^{-7}\ m = \lambda$$

$$E = \frac{hc}{\lambda} = \frac{6.626 \times 10^{-34}\ J \cdot s \times 3.0 \times 10^{8}\ m/s}{6.56 \times 10^{-7}\ m} = 3.03 \times 10^{-19}\ J$$

(Tiny world)



$$E = \frac{3.03 \times 10^{-19}\ J}{1\ photon} \times \frac{6.022 \times 10^{23}\ photons}{1\ mol} = 1.824 \times 10^{5}\ J/mol$$

$$E = \frac{1.824 \times 10^{5}\ J}{1\ mol} \times \frac{1\ kJ}{1000\ J} = 182.4\ kJ/mol$$

Red — 656 nm

green — 486 nm

blue — 434 nm

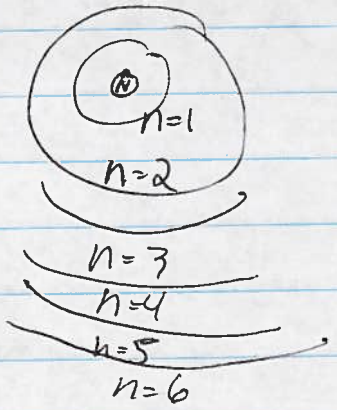
purple — 410 nm

$$\frac{1}{\lambda} = R\left(\frac{1}{m^2} - \frac{1}{n^2}\right)$$

$m = 1, 2, 3 \ldots$ } integers

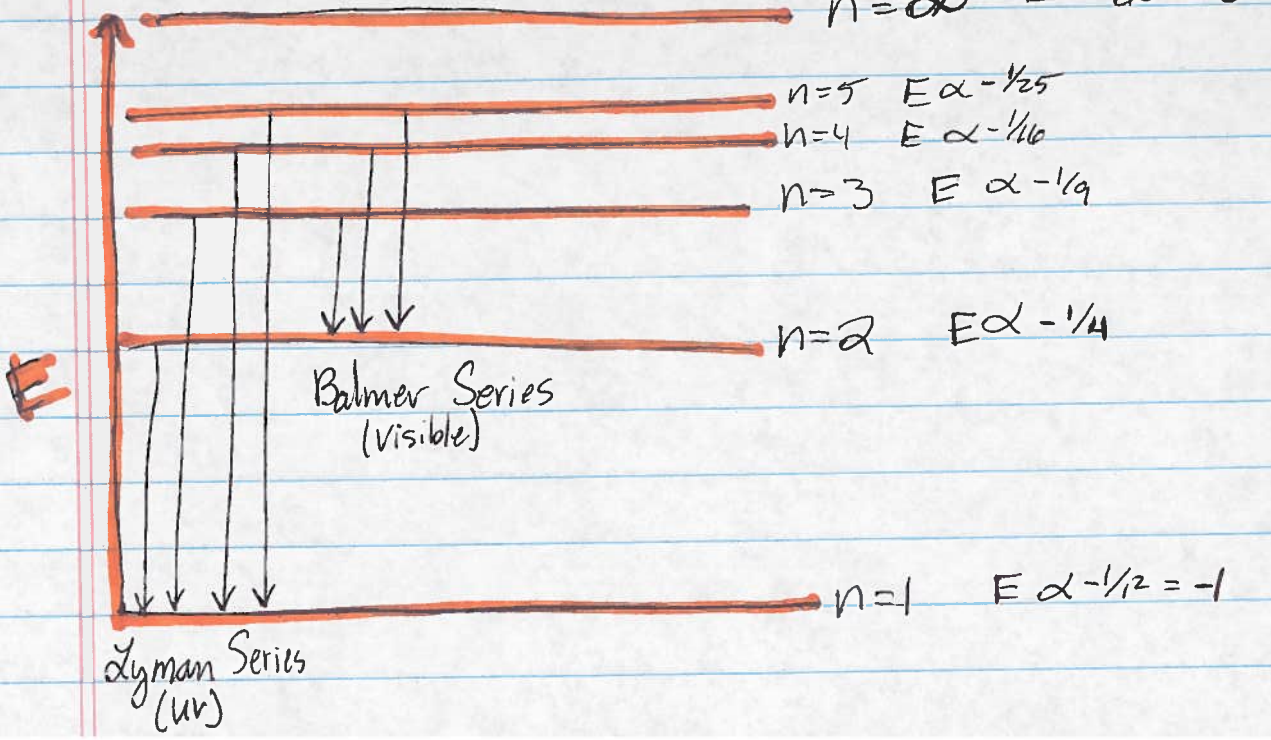
$n = 1, 2, 3 \ldots$ }

$n > m$



$E \propto \frac{1}{n^2}$

Energy diagram



$H_2(g) \xrightarrow{+\text{energy}} 2H(g)$ (atomic)

H atoms → electrons excited to lots of high energy states

Larger jump = [redacted] smaller E

Red — Green — blue — purple

$n=3 \rightarrow n=2$ $n=4 \rightarrow n=2$ $n=5 \rightarrow n=2$

$$\Delta E = E_f - E_i = -2.178 \times 10^{-18}\ J \left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$$

tiny world answer!