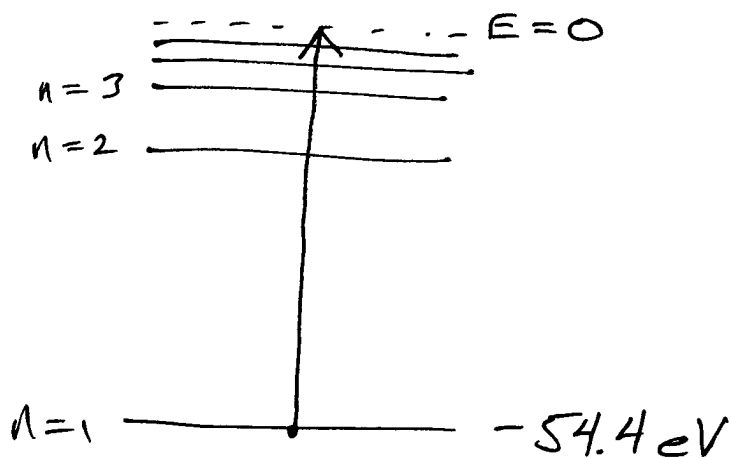


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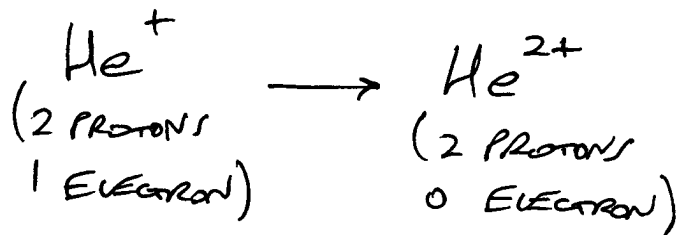
1

EXAMPLE 27-15

(a)



$$E_n = (-13.6 \text{ eV}) \frac{Z^2}{n^2}$$



$$\begin{aligned} \text{IONIZATION ENERGY} &= 0 - E_1 \\ &= 0 - (-13.6 \text{ eV}) \frac{2^2}{1^2} = 54.4 \text{ eV} \end{aligned}$$

(b)

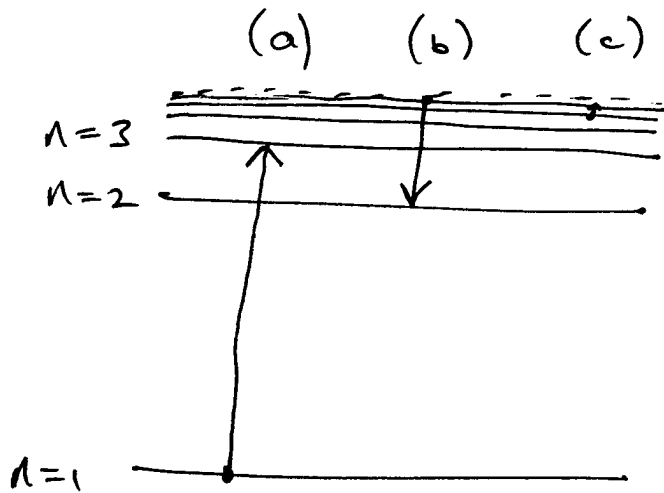
$$hf = 54.4 \text{ eV}$$

$$\frac{hc}{\lambda} = 54.4 \text{ eV}$$

$$\begin{aligned} \lambda &= \frac{hc}{54.4 \text{ eV}} = \frac{(6.63 \times 10^{-34} \text{ J}\cdot\text{s})(3 \times 10^8 \text{ m/s})}{54.4 \text{ eV} \times \left(\frac{1.602 \times 10^{-19} \text{ J}}{1 \text{ eV}} \right)} \\ &= 23 \text{ nm} \end{aligned}$$

(GG, Ch 27, P 48)

2

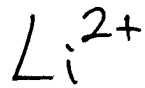


- (a) ABSORPTION
FINAL
- (b) EMISSION
INITIAL
- (c) ABSORPTION
FINAL

LARGEST ENERGY PHOTON: (a)

(66, Ch 27, P 58)

3



$$Z = 3$$

IS THIS A BOHR ATOM?

YES

NO

GOOD

WE'RE
OUT OF LUCK

$$\begin{array}{l} n=3 \\ n=2 \end{array} \begin{array}{l} \text{=====} \\ \text{=====} \\ \text{=====} \\ \text{=====} \\ \text{=====} \end{array} \begin{array}{l} E_3 = (-13.6\text{eV}) \frac{3^2}{3^2} = -13.6\text{eV} \\ E_2 = (-13.6\text{eV}) \frac{3^2}{2^2} = -50.6\text{eV} \end{array}$$

$$n=1 \text{ ----- } E_1 = (-13.6\text{eV}) \frac{3^2}{1^2} = -122.4\text{eV}$$