

$$IE_1(\text{Li}) = \frac{1}{2} IE_1(\text{Be})$$

$$IE_2(\text{Li}) = 4 \times IE_2(\text{Be})$$

Li^+ ion is stable (filled 2s orbital). So it is easy to remove 2s electron from Li atom to form a stable Li^+ ion. In the case of Be, it is a stable atom due to its filled $2s^2$ orbital. So we require a lot of energy to remove an electron or to destroy a stable atom.

For the second ionization energy: Li^+ ion is a stable ion (filled 1s orbital). So to remove an electron from 1s orbital which is very close to the nucleus, we require a lot of energy to overcome the attractive forces between the nucleus (4 protons) and electron in 1s orbital. In the case of Be^+ , the Be^{2+} ion is stable (filled 1s orbital). So Be^{2+} ion is easily formed - less energy required to remove an electron from Be^+ ($1s^2 2s^1$).

$$Q_2(b) \quad E = h\nu = \frac{hc}{\lambda}$$

$$= \frac{(6.626 \times 10^{-34} \text{ Js})(2.998 \times 10^8 \text{ ms}^{-1})}{(510 \times 10^{-9} \text{ m})} \text{ J photon}^{-1}$$

$$E = 3.895 \times 10^{-19} \text{ J photon}^{-1}$$

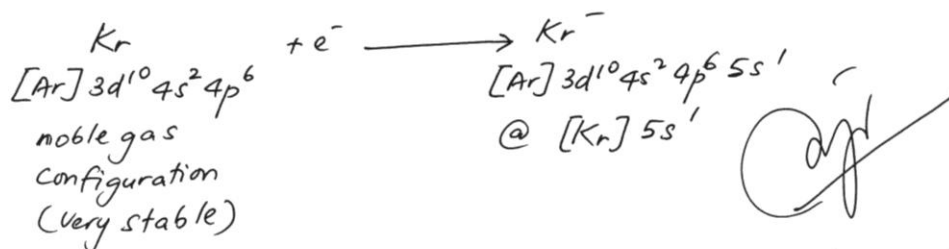
$$3.895 \times 10^{-19} \text{ J} \equiv 1 \text{ photon}$$

$$\therefore 2.35 \times 10^{-18} \text{ J} \equiv \left(\frac{2.35 \times 10^{-18}}{3.895 \times 10^{-19}} \right) \text{ photon}$$

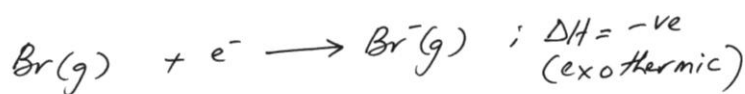
$$= 6 \text{ photons (Ans) //}$$

(1/2)

Q2(c) Electron affinity of Br = -ve value
 Electron affinity of Kr = +ve value.



When an electron is added to Br atom, it will be attracted to the Br atom's nuclear charge. So energy is released when the first electron is added (attractive force) to form a stable Br⁻ ion.



In the case of Kr (noble gas - very stable), energy must be absorbed in order to overcome electrostatic repulsions between the electrons in Kr atom and the newly added electron. So energy is required when an electron is added to a stable atom/. negative ion.

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