SUBJECT - CHEMISTRY
CLASS - B.Sc (Sub/HON) PART - I
GROUP - B
TOPIC - IONISATION POTENTIAL

Dr. Hasi Mohan prasad Singh
Department of Chemistry
Dr. L.K.V.D College Tajpur Samastipur

The I.P of an element is the amount of energy required to remove an electron to form Cation from an isolated gaseous atom of that element e.g.

$$Na(s) \xrightarrow[(\Delta H_s)]{\text{Sublimation energy}} Na(g)$$

$$Na(g)\ \text{atom} \xrightarrow[I.P]{\text{Ionisation potential}} Na^+(g) + e$$

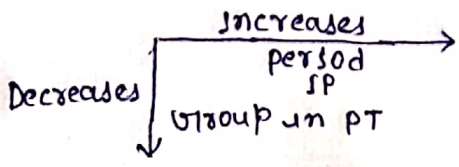
gaseous — gaseous cation

Ionisation potential is now called ionisation enthalpy. It is denoted by I.P or E.

Therefore, the I.P value tells us regarding the formation of cation from atom of the element. If I.P value is low, the cation formation is easy. But, when I.P value is high, the cation formation is difficult. Since I.P is an energy. hence it is expressed in Kilo Joule per mole or in short $KJ\ mol^{-1}$ When it is expressed in electron volt, then it is electron volt per atom or in short ev $atom^{-1}$

$$1\ ev = 97.5\ kJ$$

The I.P value increases in moving across a period of the periodic table from left to right, but decreases in moving down a group of the periodic table from top to bottom. We can express the trend of I.P in the periodic table as shown below.



Q Find out the unit of I.P

Ans I.P. is given as -

$$E = \frac{-2\pi^2 m k^2 e^4}{h^2} \times \frac{Z^2}{n^2} = \frac{m e^4 k^2}{h^2}$$

$$= \frac{Kg\, C^4 N^2 m^4 C^{-4}}{J^2 s^2} = \frac{Kg\,(Nm)^2 m^2}{J^2 s^2}$$

$$= \frac{Kg \cdot m^2}{s^2} = Kg \cdot m s^{-2} m = Nm = J$$