Periodic Table

Totally 118 elements.

Periodic table Classification

Periods => Left to Right (horizontal rows)

Groups => top to bottom (Vertical Columns)

Blocks => a Set of elements unified by the Orbitals their valence e^-, (or) valancies lie in.

(based on e^- configuration, the Periodic table can be divided into blocks denoting which Sublevel is in the Process of being filled. (The S, P, d, f block

— x — x —

Ionization energy :- is the minimum energy required to remove an e^- from an atom or ion in the gas Phase kJ/mol or (eV).

↑ Left to right across an element Pe... bcz atomic radius decreases, So e^- are more attracted to the (closer) nucleus.

↓ from top to bottom, moving down a group a valence shell is added. The outer most e^- are further from the +ve charged nucleus, So they are easier to remove.

The higher the I.E the more difficult is to remove an e^-.

increases Left to right (Period) → (Row)
bcz atomic radius generally decreases moving across a period, so there is a greater effective attraction b/w the negatively charged e⁻ & positively charge nucleus.

top to bottom I.E ↓,
valence e⁻ added into the new shell.
nucleus – valence shell e⁻ distance ↑,
so attractive force of the nucleus on the valence shell is decreased, so,

1 I.E < 2 I.E
1st, 2nd and subsequent I.E
I.E = definition
2 I.E is that requires to remove the next e⁻ and so on. The 2nd I.E is always greater.
* Removing the first e⁻ is relatively easy bcz its loss gives the atom a stable e⁻ shell.
* Removing the 2 e⁻ involves a new electron shell that is closer and more tightly bound to the atomic nucleus

Exception.
1 I.E of B is less than that of Be
1 I.E of O is " N.

The reason for the discrepancy is due to the e^- configuration of these elements and Hund's rule.

For Be 1. I.E e^- comes from the 2S orbital, although ionization of boron involves a 2p e^-

for both 'N' & 'O' the e^- comes from the 2p orbital

$Be = 1s^2 2s^2$

$B = 1s^2 2s^2 2p^1$

I.E ↑

$N = 1s^2 2s^2 2p^3$ more stable

$O_2 = 1s^2 2s^2 2p^4$

I.E ↓

Electron affinity:- of a neutral atom or molecule is defined as the amount of energy released when an e^- is added to it to form a -ve ion.