Ionic bond :-

It is formed by Complete transfer of electron from one atom (more electropositive atom) to another atom (more electro negative atom).

(1) $M_{(g)} \longrightarrow M_g^{+} + e^{-}$

(2) $X_{(g)} + e^{-} \longrightarrow X^{-}_{(g)}$

(3) $M^{+}_{(g)} + X^{-}_{(g)} \longrightarrow MX_{(s)}$

Ex (i) Na Cl

(2, 8, 1) (2, 8, 7)

$Na^+ + e^-$ $+e^-$ Cl^-

$Na^+ + Cl^- \longrightarrow NaCl_{(s)}$

F Mg F

(2,7) (2,8,2) (2,7)

F^- Mg^{2+} F^-

MgF_2

Electrovalency :- The number of e^-s transfered during ioni bond formation

Ex- (i) Electrovalency of NaCl = 1

(ii) — 11 — MgF_2 = 2

Favourable Condition for ionic bond formation.

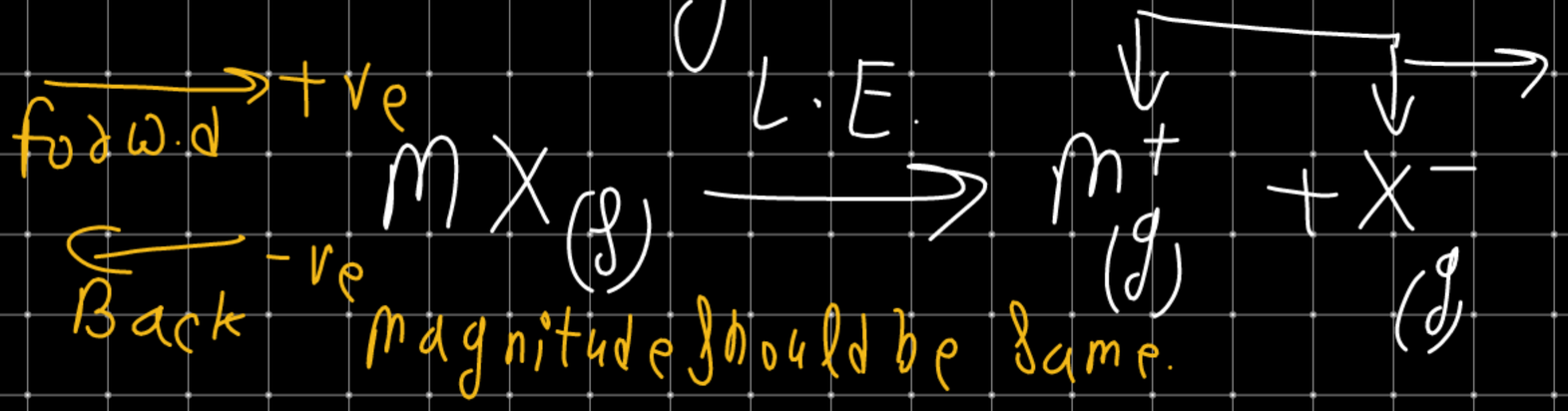
(1) Ionisation energy/potential (I.E./I.P.) should be low.

(2) Electron affinity (E.A.) should be high

(3) Overall lattice energy should be high.

Lattice energy:
(L.E.)

The energy required to seperate ions in isolated gaseous form of ionic Compound.

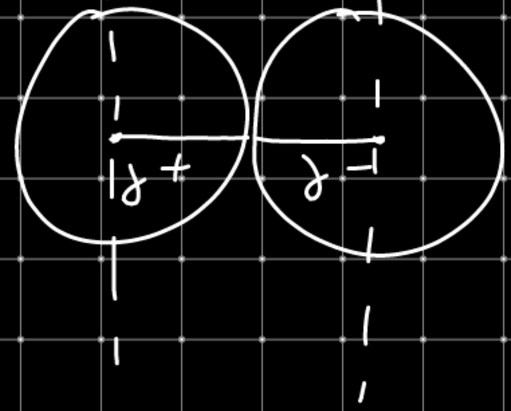


Factors affecting lattice energy.

$$L.E \propto \frac{q_1 q_2}{r}$$

$$L.E. \propto \frac{\text{Charge}}{\text{radius}}$$

$r = r^+ + r^-$



Size of anions :-

Small anions

H^-, OH^-, F^-, Cl^-, O^{2-}

(Gareeb)

Large anions

SO_4^{2-}, NO_3^-, ClO_4^-, HSO_3^-, HCO_3^-, CO_3^{2-}, SO_3^{2-}, ClO_4^-, Br^-, I^-

(Ameer)

(2) Ques. Compare L.E. in following -

$\left(L.E. \propto \frac{\text{Charge}}{\text{radius}}\right)$

(i) $Li^+F^- > NaF > KF > RbF > CsF$

$r \downarrow$ (g → g) ; (a → g) $r \uparrow$

(ii) $Be^{2+}SO_4^{2-} < MgSO_4 < CaSO_4 < SrSO_4 < BaSO_4$; $r \downarrow$

$(r \uparrow)$ g ← Be, Ba → a

(iii) $NaCl < MgCl_2 < AlCl_3$

In charge & size always charge dominant

(iv) $\overset{+1}{Na}Cl < \overset{+2}{Mg}O$

(v) $\overset{+1}{Na_2}\overset{2-}{O} > \overset{+1}{Na_2}\overset{2-}{S}$

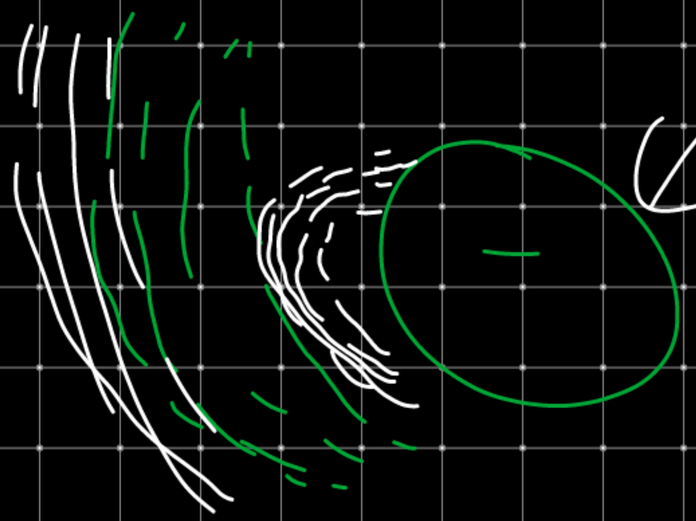
(vi) $\overset{+1}{K}F > \overset{+1}{Rb}Cl$

** Fajan's rule :- (Covalent Character in ionic Compound)

Polarisation :-

The attraction or distortion of e⁻ cloud of anion toward cation is called polarisation

Polarising Power
(Cation की distort करने की Power)



Polarisability
(anion की distort होने की ability)

Rule :- Smaller Cation, bigger anion and high charge on cation or anion form better Covalent bond

	Cation	anion
Size	small	large
Charge	high	high

Q. Compare Polarising Power in following -

(i) $Li^+ > Na^+ > K^+ > Rb^+ > Cs^+$

(ii) $Be^{2+} > Mg^{2+} > Ca^{2+} > Sr^{2+} > Ba^{2+}$

(iii) $Li^+ < Be^{2+} < Al^{+3}$

Q.2. Compare Polarisability –

(i) $F^- < Cl^- < Br^- < I^-$

(ii) $O^{2-} < S^{2-} < Se^{2-} < Te^{2-}$

(iii) $N^{3-} > O^{2-} > F^-$