

Bonding in Solids :-

In Solids, bonding b/w atoms is very strong. Generally, there are 2 type of bonding,

(i) primary bonding

(ii) Secondary "

{ bond length / equilibrium distance / nearest neighbour distance }

Under equilibrium distance, two atoms are fixed.

$$\text{Net force } \boxed{F = 0}$$



i.e. Attractive force balances the repulsive force.

$$\boxed{\text{Pot}^n \text{ Energy} = \text{Minimum}}$$

Condition of Stability $\rightarrow$ Net force must be zero & potⁿ energy must be minimum.

Force = -ve $\Rightarrow$ attractive

= +ve $\Rightarrow$ repulsive

so like charges $\rightarrow$ repal.

atom are at far distance then initially attraction b/w them when they are near then there will be repulsion (very large)

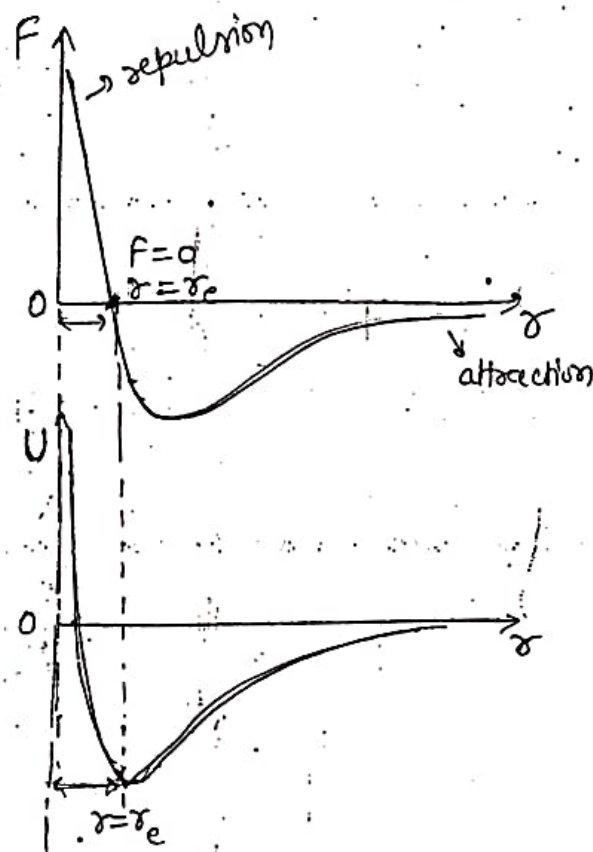
When $r = r_e$ then Attractive force balances the repulsive force.

Repulsive forces are short range forces.

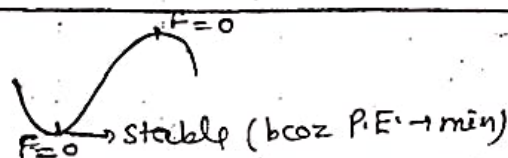
$$F = -\frac{dU}{dr}$$

$$\boxed{F|_{r=r_e} = -\frac{dU}{dr}|_{r=r_e} = 0}$$

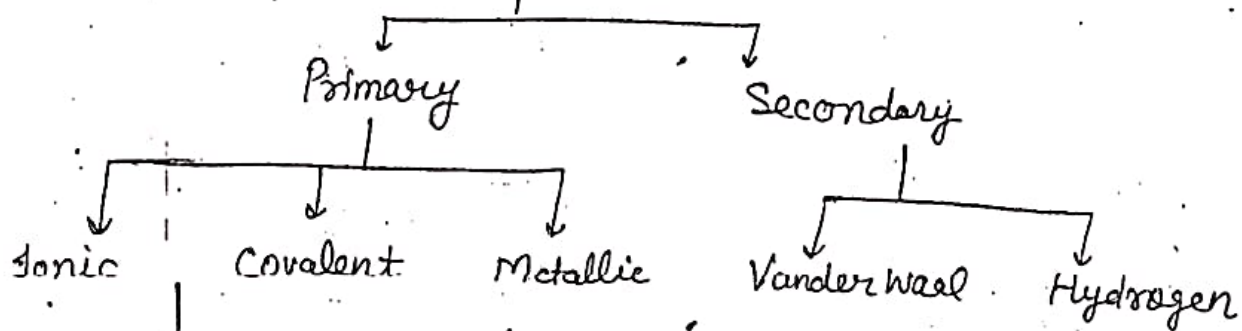
where $r = r_e \rightarrow$ Equilibrium point.



* For a stable system, P.E. should be minimum



Bonding



Secondary bonding generally takes place after primary bonding.

Properties	Ionic	Covalent	Metallic	Vanderwaal	Hydrogen
Type of bonding	Primary	Primary	Primary	Secondary	Secondary
Nature	transfer of e^- spherically symmetric (not directional)	sharing of e^- highly directional	sharing of e^- weakly directional	Induced dipole mom. least directional	Permanent dipole mom. directional