



electrons within its sphere of influence is known as metallic bond"

१४ माघ शुक्ल, शनिवार, सं० २०१९

* Theories of Metallic Bond *

The following theories have been proposed to explain the different properties of metals

1. Drude-Lorentz theory or electron sea theory
2. Resonance or valence bond theory
3. Molecular orbital theory or Band theory

1. Drude-Lorentz theory or electron sea theory

This theory was proposed by Drude in 1900 and later on developed by Lorentz in 1916.

According to this theory, metals have low ionisation energies. It indicates that valence electrons of each atom are loosely bound to the core in metals. Thus each atom in a atom crystal loses all its valence electrons

which move freely from one core to another.

The electrons thus obtained form an electron pool and the positively charged metal ions are held together by this electron pool. The positively charged metal ions do not float in the sea of electrons but have definite positions in the crystal lattice. Thus, according to this theory, metallic solids may be regarded as a collection of positively charged atomic cores immersed in a sea

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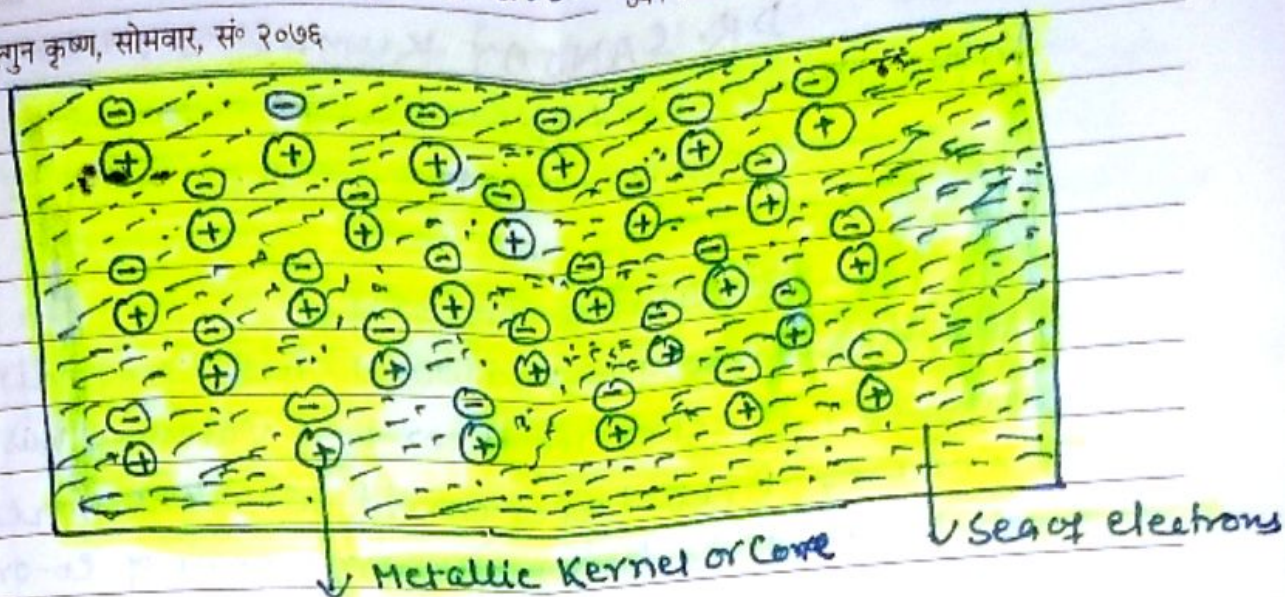
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[The electron sea model for metals]

The electron sea theory explains different metallic properties viz metallic lustre, electrical conductivity, thermal conductivity, malleability, ductility and elasticity.

Limitation: -

Electron sea theory does not explain the properties of certain metals, for example

- (a) Mercury melts at -39°C while tungsten melts at 3300°C
- (b) Electrical conductivity of metals varies largely e.g copper is more than 50 times better conductor than bismuth.
- (c) Metals like Na and K are so soft that they can be cut with a knife while osmium is so hard that it can scratch the glass.

Notes

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-	-	-	-	-	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	-
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