

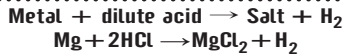
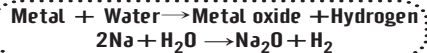
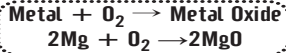
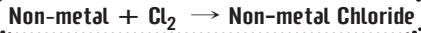
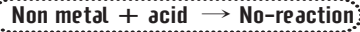
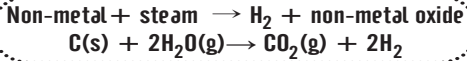
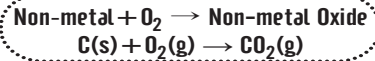
# Chapter : 3 metals and non-metals

Property	Metals	Non-Metals
1. Lustre	Metals have shining surface.	They do not have shining surface. • <b>Except:</b> I <sub>2</sub> & graphite possess metallic lustre.
2. Hardness	They are generally hard. • Except Sodium, Lithium and Potassium which are soft and can be cut with knife.	Generally soft. • Except Diamond, a form of carbon which is the hardest natural substance.
3. State	Exist as solids. • Except Mercury.	Exist as solids or gaseous. • Except Br <sub>2</sub>
4. Malleability	Metals can be beaten into thin sheets. • Gold & Silver are the most malleable metals.	Non-metals are non-malleable.
5. Ductility	Metals can be drawn into thin wires.	They are non-ductile.
6. Conductor of heat & electricity	Metals are good conductors of heat & electricity • Silver (Ag) & Copper (Cu): Best conductors of heat. • Lead (Pb), Mercury (Hg): poor conductor of heat.	Non-metals are poor conductor of heat and electricity. • <b>Except</b> Graphite.
7. Density	Generally, have high density & high melting point. • Except Sodium and Potassium.	Have low density & low melting point.
8. Sonorous	Metals produce a sound on striking a hard surface.	They are not sonorous.
9. Oxides	Metallic oxides are basic in nature.	Non-metallic oxide are acidic in nature
10. Bonding	Ionic bonding is present	Covalent/Hydrogen bonding is present

## Metalloids

The elements which possess the properties of metals and non-metals are called metalloids.  
B, Si, Ge, Te, Po, As, Sb

## Chemical Properties

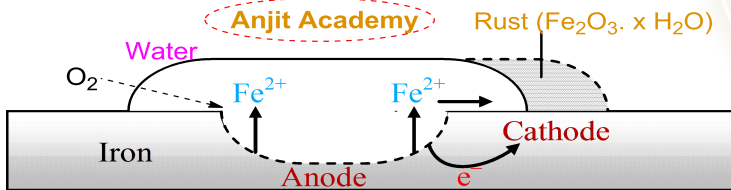


## Physical Properties

**MIND MAPS**  
ANJIT ACADEMY

## Corrosion

Corrosion is the process of eating up of metal surface by air, moisture or a chemical.

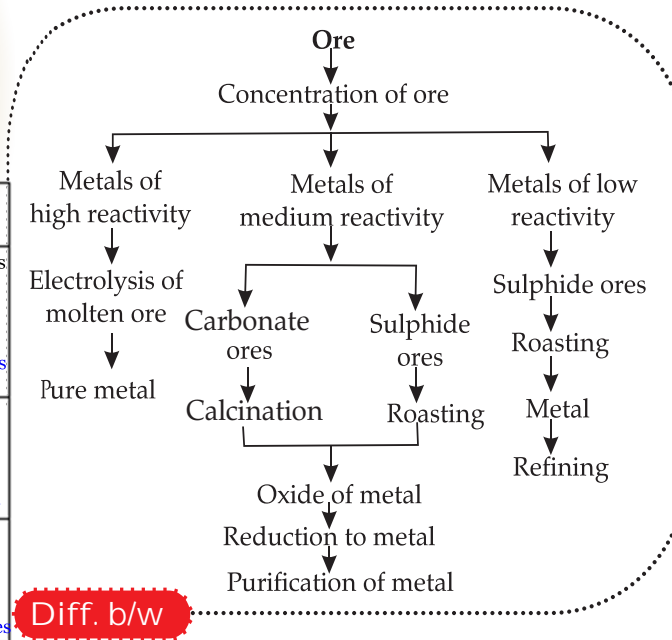


- **At Anode:** Iron is Oxidised to Fe<sup>2+</sup>  
Oxidation:  $\text{Fe(s)} \rightarrow \text{Fe}^{2+}(\text{aq.}) + 2\text{e}^-$
- **At Cathode:** Oxygen is reduced to H<sub>2</sub>O  
Reduction:  $\text{O}_2(\text{g}) + 4\text{H}^+(\text{aq.}) + 4\text{e}^- \rightarrow 2\text{H}_2\text{O(l)}$
- **Overall:**  $2\text{Fe(s)} + \text{O}_2(\text{g}) + 4\text{H}^+(\text{aq.}) \rightarrow 2\text{Fe}^{2+}(\text{aq.}) + 2\text{H}_2\text{O(l)}$
- Ferrous ion react with dissolved O<sub>2</sub> to form ferric oxide with production of H<sup>+</sup> ion.  
 $4\text{Fe}^{2+}(\text{aq.}) + \text{H}_2\text{O(l)} + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3(\text{s}) + 8\text{H}^+(\text{aq.})$
- Ferric oxide then undergoes hydration to form Rust as-  
 $\text{Fe}_2\text{O}_3(\text{s}) + \text{x H}_2\text{O} \rightarrow \text{Fe}_2\text{O}_3 \cdot \text{xH}_2\text{O}$   
Hydrated Ferric Oxide

## Activity series of metals

Metals	Method of extraction	Nature
K Na Ca Mg Al	Electrolysis or Molten ore	Highly Reactive metals • Never found in the free state • Top of the Activity Series
Zn Fe Pb Cu	Reduction using carbon	Moderately Reactive metals • Found in Combined state • Middle of Activity Series
Ag Au Hg Pt	(i) Heating sulphide in Air. (ii) Found in free state as metals	Low reactive metals • Found in Free state • Bottom of Activity Series

## Extraction of metals



## Diff. b/w

Calcination	Roasting
(i) It is done for carbonate ores.	(i) It is done for sulphide ores.
(ii) Carbonates ores heated in the absence of oxygen (air)	(ii) Sulphide ores are heated in the Presence of oxy.
(iii) The CO <sub>2</sub> gas is released and Metal oxide is obtained.	(iii) SO <sub>2</sub> gas is released and Metal oxide is obtained.
$\text{ZnCO}_3(\text{s}) \xrightarrow{\Delta} \text{ZnO}(\text{s}) + \text{CO}_2(\text{g})$	$2\text{ZnS}(\text{s}) + 3\text{O}_2(\text{g}) \xrightarrow{\Delta} 2\text{ZnO}(\text{s}) + 2\text{SO}_2(\text{g})$