Ch-3 Metals and Non-Metals

Metals

1. Physical Properties –
    a. Solid.
    b. Lustrous.
    c. Malleable and Ductile.
    d. Hard and have high density.
    e. Good conductors of heat and electricity.
    f. High melting and boiling points.
2. Chemical Properties –
    a. React with dilute acids to liberate H_2 gas.
    b. React with O_2 to form oxides.
    c. Do not combine with H_2.
    d. React with H_2O to form metal oxides or metal hydroxides.
    e. Electropositive, i.e., form positive ions by losing electrons.
    f. Reducing agents.

Non-Metals

1. Physical Properties –
    a. Solids, liquids, and gases.
    b. Non-lustrous.
    c. Non-malleable and non-ductile.
    d. Varying hardness and have low density.
    e. Poor conductors of heat and electricity.
    f. Low melting and boiling points.
2. Chemical Properties –
    a. Do not displace H_2 on reaction with dilute acids.
    b. React with O_2 to form acidic or neutral oxides.
    c. Combine with H_2 to form stable hydrides.
    d. Do not react with H_2O.
    e. Electronegative, i.e., form negative ions by gaining electrons.
    f. Oxidizing agents

Corrosion

1. The eating up of metals by the action of air and moisture or a chemical on their surface.
2. **Alloys –** it is a homogenous mixture of 2 or more metals (or a metal and a non-metal). E.g., Brass is an alloy of 2 metals – copper and zinc.

Rusting

1. The corrosion of iron is called as rusting. Rust is a hydrated iron (III) oxide, $Fe_2O_3.xH_2O$.
2. Presence of air and water are the 2 conditions necessary for rust. It can be prevented by painting, applying grease, by galvanization, and by alloying.

Compounds

1. Ionic –
    a. Usually crystalline solids.
    b. Have high melting and boiling points.
    c. Conduct electricity, when dissolved in water or melted.
    d. Usually soluble in water and insoluble in inorganic solvent.
2. Covalent –
    a. Usually liquids / gases, and few are solids.
    b. Have low melting and boiling points.
    c. Do not conduct electricity.
    d. Usually insoluble in water and soluble in inorganic solvent.

Extraction of Metals