

BIOLOGY

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 - ST050 Paramoecium
 - ST051 Life Cycle of Fern
 - ST052 Fruits
 - ST053 Dispersal of Fruits and Seeds
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CHEMISTRY

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Separation of Substances

Separation of substances is required to get a pure and clean substance for our use. Substances can be purified through various means. Some of them have been incorporated below.

Distillation

Distillation is used to separate a liquid mixture from a solid mixture.

Fractional Distillation

Fractional distillation is used to separate a mixture of two or more liquids having different boiling points.

Leaching

Leaching is used to separate a solid mixture from a liquid mixture.

Filtration

Filtration is used to separate a solid mixture from a liquid mixture.

Evaporation and Crystallization

Evaporation is used to separate a solid mixture from a liquid mixture.

Churning

Churning is used to separate a solid mixture from a liquid mixture.

Magnetic Separation

Magnetic separation is used to separate a solid mixture from a liquid mixture.

Sublimation and Drying

Sublimation is used to separate a solid mixture from a liquid mixture.

Sieving

Sieving is used to separate a solid mixture from a liquid mixture.

Winnowing

Winnowing is used to separate a solid mixture from a liquid mixture.

Solubility

Solubility is used to separate a solid mixture from a liquid mixture.

Carbonates and Bicarbonates

Carbonates and bicarbonates are the salts of carbonic acid.

CARBONATES

Sodium Carbonate (Na₂CO₃)

Sodium carbonate is commonly known as the soda ash. It is used in the manufacture of glass, paper, soap, and many other products.

Calcium Carbonate (CaCO₃)

Calcium carbonate is found in nature as limestone, marble, and chalk. It is used in the manufacture of cement, paper, and many other products.

BICARBONATES

SODIUM BICARBONATE (NaHCO₃)

Sodium bicarbonate is commonly known as baking soda. It is used in the manufacture of glass, paper, soap, and many other products.

Calcium Bicarbonate (CaHCO₃)

Calcium bicarbonate is found in nature as limestone, marble, and chalk. It is used in the manufacture of cement, paper, and many other products.

Classification of Chemical Reactions

Combination Reaction

In a combination reaction, two or more substances combine to form a single product.

$$A + B \rightarrow AB$$

Decomposition Reaction

In a decomposition reaction, a single substance breaks down into two or more products.

$$AB \rightarrow A + B$$

Displacement Reaction

In a displacement reaction, a more reactive element displaces a less reactive element from its compound.

$$A + BC \rightarrow AC + B$$

Double Displacement Reaction

In a double displacement reaction, two compounds exchange their ions to form two new compounds.

$$AB + CD \rightarrow AD + CB$$

Redox Reaction

Redox reactions involve the transfer of electrons between two species.

Neutralization Reaction

Neutralization reactions occur between an acid and a base to form a salt and water.

$$HCl + NaOH \rightarrow NaCl + H_2O$$

Exothermic Reaction

Exothermic reactions release heat to the surroundings.

Endothermic Reaction

Endothermic reactions absorb heat from the surroundings.

BLAST FURNACE

EXTRACTION OF IRON

The blast furnace is used to extract iron from its ores. It is a tall, cylindrical structure where iron ore, coke, and limestone are fed from the top. The iron ore is reduced to iron by the action of coke. The iron is then cast into pig iron.

MANUFACTURE OF STEEL

The iron produced by the blast furnace is known as pig iron. It is refined in a converter to produce steel. The process involves the removal of impurities and the addition of carbon.

Mole Concept

The mole is a unit used to measure the amount of a substance. It is defined as the amount of a substance that contains as many particles as there are atoms in 12 grams of carbon-12.

$1 \text{ mole} = 6.023 \times 10^{23} \text{ particles}$

ELEMENT	ATOMIC MASS (u)	MOLECULAR MASS (u)
H	1	2
C	12	12
O	16	32
N	14	28
Cl	35.5	71
Na	23	46

The number of units represented by the Avogadro Number, $n = 6.023 \times 10^{23}$

One mole of an element is a gram-molar mass of the element. It contains 6.023×10^{23} atoms.

Equal volumes of all gases, under the same conditions of temperature and pressure, contain the same number of molecules.

CHARGE ON AN ELECTRON

$e = 1.6 \times 10^{-19} \text{ coulomb}$

1 mole of electrons = $9.65 \times 10^4 \text{ coulomb}$

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