

CHEMISTRY STUDY MATERIALS FOR CLASS 9

(NCERT based Revision Notes on Chapter - 2)

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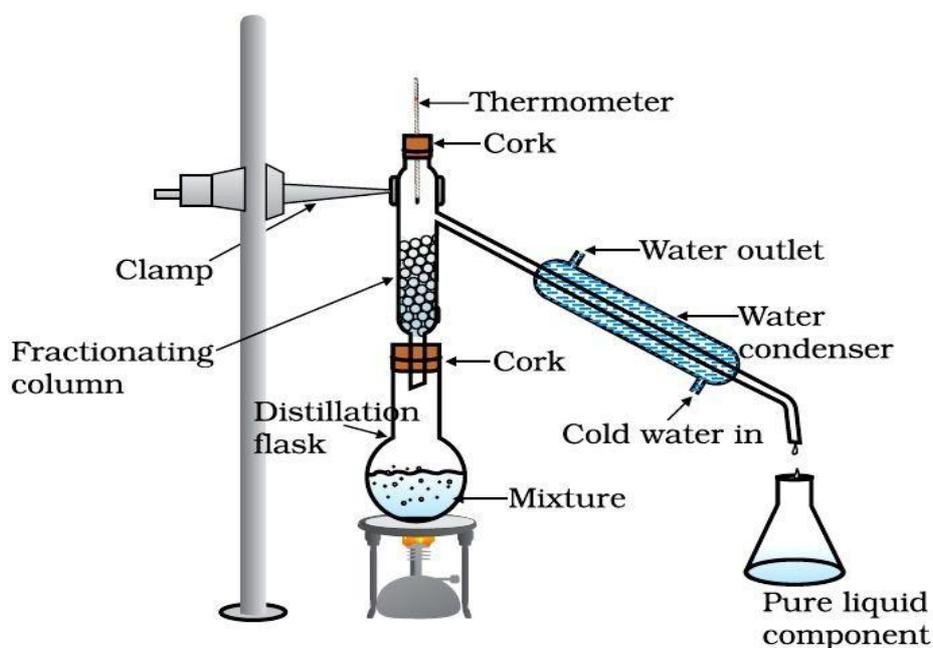
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Is Matter Around Us Pure

FRACTIONAL DISTILLATION

Fractional Distillation is the separation of a mixture into its component parts or fractions by their boiling points.

- This is the process of separation of chemical compounds by their **boiling point**.
- The mixture is heated to a temperature at which one or more fractions will vaporize.



Fractional distillation is the process of separation of components of mixture into parts or fraction on the basis of fractional differences in their boiling points.

Fractional distillation is done when the difference in boiling points of the components of miscible liquids is less than 25°C . In the process of fractional distillation, a fractional column is used along with retort or distillation flask.

Fractional column is a tube which contains glass beads, which facilitate surface for the vapour to cool and condense repeatedly.

Example – Ethanol and water are separated from their mixture using fractional distillation. The boiling point of water is 100°C while the boiling point of ethanol is 78.4°C . Since the difference of their boiling point is less than 25°C , thus they are separated using fractional distillation.

Some of the Applications of Fractional Distillation:

- In petroleum refineries, petrochemical and chemical plants, natural gas processing and cryogenic air separation plants.
- In oil refineries to separate crude oil into useful substances (or fractions).
- In the process of organic juice.
- In the separation of oxygen, liquid nitrogen and argon from air.

CRYSTALLIZATION

Crystallisation is a process that separates a pure solid in the form of its crystals from a solution. The crystallisation method is used to purify solids. For example, the salt we get from sea water can have many impurities in it. To remove these impurities, the process of crystallisation is used.

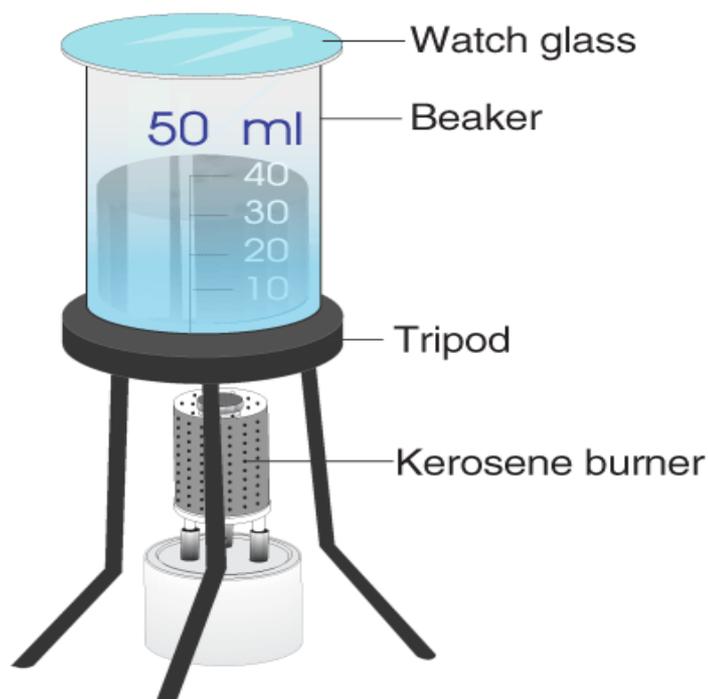
Crystallisation technique is better than simple evaporation technique as –

- some solids decompose or some, like sugar, may get charred on heating to dryness.
- some impurities may remain dissolved in the solution even after filtration. On evaporation these contaminate the solid.

Applications of crystallisation

- Purification of salt that we get from sea water.
- Separation of crystals of alum (*phitkari*) from impure samples.

Thus, by choosing one of the above methods according to the nature of the components of a mixture, we get a pure substance. With advancements in technology many more methods of separation techniques have been devised.



Elements

- **Elements** are species of atoms which have the same number of protons in their atomic nuclei.
- Elements are represented by **symbols** e.g. Hydrogen (H), Boron (B), Carbon (C), Silicon (Si) etc.

Metals

- **Metal** is a solid material which is typically hard, shiny, malleable, fusible, and ductile, with good electrical and thermal conductivity.
- **Examples:** Aluminium, Copper, Iron, Tin, Gold

Metalloids

- **Metalloids** exhibit some properties of metals as well as of non-metals.
- **Examples:** Boron, silicon, germanium, arsenic, antimony, and tellurium

Compounds

Nonmetals

- **Non-metals** are brittle and are not malleable or ductile.
- They are poor conductors of heat and electricity.
- **Examples:** Carbon, Boron etc.

Compounds

Compounds are the substances consisting of two or more different types of elements in a fixed ratio of its atoms.

Difference between mixtures and compounds

- **Mixtures** are constituted by more than one kind of pure form of matter, known as a substance.
- **Types:** Homogeneous Mixtures, Heterogeneous Mixtures
- When two or more elements chemically combine in a fixed ratio by mass, the obtained product is known as a **compound**.
