NEED FOR THE SEPARATION OF COMPONENTS OF MIXTURES

We need many substances for purposeful uses in our daily life. But most of these substances are available in the form of mixtures. These mixtures contain unwanted subsances which degrade their properties.

Examples : (1) Cereals like rice, wheat or pulses often contain small stones, husk etc. as impurities. Before cooking, these impurities need to be removed since they are harmful.

(2) Common salt is an important substance used in our food to add taste and nutrients. It is present in sea water in plenty, in the form of a mixture. Therefore it is necessary to separate common salt from sea water for its purposeful uses.

The purpose of separating the constituents of a mixture are to,

(i) remove undesirable and harmful substances.

(ii) get useful substances and

(iii) get completely pure substances for preparing other useful substances. *e.g.* Water is required in its purest form to prepare medicines, in laboratories for preparing solutions, in car batteries etc. Therefore all the impurities present in water need to be removed.

METHOD OF SEPARATION

The process by which constituents of a mixture are set apart from one another to get pure substances is called separation.

The principle of separation depends upon the

- type of mixture
- characteristic properties of mixture, such as size, shape, colour, density, melting point, boiling point, solubility, ability to sublime, volatality, magnetic nature, etc.

Thus for different types of mixtures different methods are applied to separate the components.

(A) Separation of solid-solid mixtures

Hand-picking : This method of separation can be used when the quantity of a mixture is small and the substance to be separated forms a small portion of the mixture. The substance should be large enough in size to be recognized by naked eyes and picked out by hand. Small stones are picked out from rice, pulses and spices by this method.

Winnowing : The process of separation of grain from husk and hay with the help of wind is called winnowing. This method is used to separate light solids from heavier ones. This technique is generally used by farmers.

Example : Take a mixture of rice and husk. When it is allowed to fall from a height, rice grains, being heavier, fall vertically while husk gets blown away by air and forms a heap at a small distance away from the heap of rice. In this way, rice is separated from husk.

Magnetic separation : This method is used when one of the components of the mixture is magnetic in nature *i.e.* gets attracted towards a magnet. Iron gets attracted

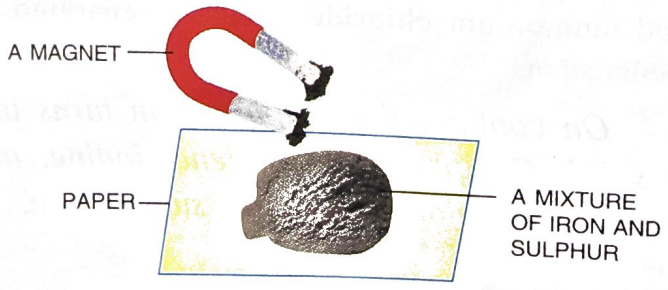


Fig. 3.2 Separation by a magnet

towards a magnet and hence can be separated by this method.

Example : Mixtures of iron and sulphur, iron and sand, *etc.*, can be separated by moving a magnet over them. Iron gets attached to the magnet and is separated.

Gravitational method : This method is used only when one of the components is much heavier than water and the other component is much lighter than water.

Example : If a mixture of sand and saw-dust is put in water, saw dust being lighter floats while sand settles down. Now saw-dust with water is slowly decanted and transferred to another container and then filtered to separate the saw-dust.

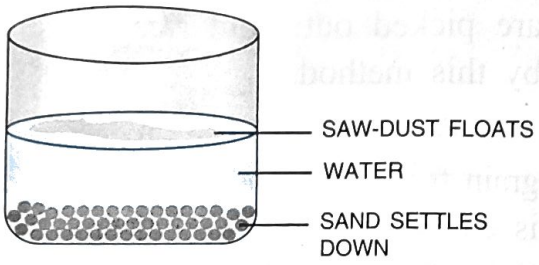


Fig. 3.3

Sublimation : *The process in which a solid changes directly into its vapours on heating is called* ***sublimation***. This method is used for solid mixtures in which one of the components can *sublime* on heating. The solid which sublimes escapes as vapours, while the other one is left behind.

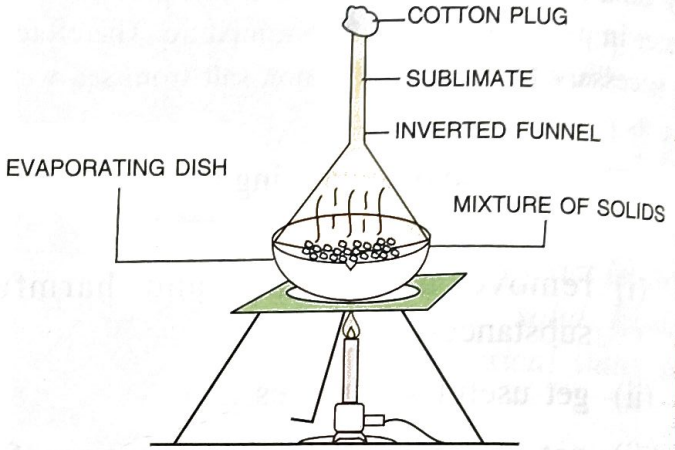
Example : Mixture of sand and iodine, common salt and ammonium chloride, *etc.* are separated by sublimation.

On cooling, the vapour again turns into a solid. Camphor, naphthalene, iodine, and ammonium chloride undergo sublimation.

Activity 9

To separate common salt and ammonium chloride

Take a mixture of common salt and ammonium chloride and place it in a dish and cover with an inverted funnel. and heat it. On heating, ammonium chloride changes into vapour, which condenses into a solid in the neck of the funnel (from where it may be scraped off), whereas common salt is left behind in the dish.



Sublimation : Separating a mixture of common salt and ammonium chloride

Solvent Extraction Method : This method is used when one of the solid components is soluble in a liquid.

Example : A mixture of sand and salt can be separated by this method. Salt gets dissolved in water while sand settles down in the container. The salt solution is then filtered. Salt is separated from the solution by evaporation. In this way, they can be separated.

(B) Separation of solid-liquid mixtures

These mixtures can be homogeneous (a sugar solution) or heterogeneous (a mixture

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2020 JULY

DAY 203 - 163 WEEK 30

TUESDAY

07 July 2020

Wk	M	T	W	T	F	S	S
27			1	2	3	4	5
28	6	7	8	9	10	11	12
29	13	14	15	16	17	18	19
30	20	21	22	23	24	25	26
31	27	28	29	30	31		

APPOINTMENT / MEETING

Class VII

Chapter-3 Element, Compound, mixture part-3

Date-09.6.20 Subject- Chemistry

(1) Mention the factors on which the principle of separation depends.

(2) What is the principal of handpicking?

(3) Give one eg. of handpicking.

(4) What is the principal of winnowing?

(5) Give one eg. of winnowing.

(6) What is magnetic separation?

(7) Give one eg. of magnetic separation.

(8) What is Gravitational Method?

(9) Give an eg. of Gravitational method and explain it.

(10) What is sublimation? How can you use it as a separation method?

P. Sahu
9.6.20

NOTES