CHEMISTRY STUDY MATERIALS FOR CLASS 9

(NCERT based Revision of Chapter - 2)

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Is Matter Around Us Pure

COLLOIDAL SOLUTIONS

A colloidal solution, occasionally identified as a colloidal suspension, is a mixture in which a substances regularly suspended in a fluid. A colloid is a minutely small material that is regularly spread out all through another substance.

Properties of a colloid

- A colloid is a heterogeneous mixture.
- The size of particles of a colloid is too small to be individually seen by naked eyes.
- Colloids are big enough to scatter a beam of light passing through it and make its path visible.
- They do not settle down when left undisturbed, that is, a colloid is quite stable.
- They cannot be separated from the mixture by the process of filtration.

The components of a colloidal solution are the dispersed phase and the dispersion medium. The solute-like component or the dispersed particles in a colloid form the dispersed phase, and the component in which the dispersed phase is suspended is known as the dispersing medium. Colloids are classified according to the state (solid, liquid or gas) of the dispersing medium and the dispersed phase.

Colloidal solutions have three sub-classifications: **Foams, emulsions and sol. Foam** in this setting is created by ensnaring a gas in a liquid.

The substance being dispersed would be the gas, triggering the fluid to become frothy and foamy. A sample of this would be shaving cream. **An emulsion** is a combination of liquids; it's basically when one liquid is consistently dispersed all through another liquid. A sample of this would be mayonnaise or milk. The third form is called **a sol**, which is when a solid is evenly dispersed throughout a fluid. Samples of sols include paint, blood and silver aqua sols.

Common examples of colloids

Dispersed phase	Dispersing Medium	Type	Example
Liquid	Gas	Aerosol	Fog, clouds, mist
Solid	Gas	Aerosol	Smoke, automobile exhaust
Gas	Liquid	Foam	Shaving cream
Liquid	Liquid	Emulsion	Milk, face cream
Solid	Liquid	Sol	Milk of magnesia, mud
Gas	Solid	Foam	Foam, rubber, sponge, pumice
Liquid	Solid	Gel	Jelly, cheese, butter
Solid	Solid	Solid Sol	Coloured gemstone, milky glass

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Q1. Differentiate between homogeneous and heterogeneous mixtures with examples.

Answer:

- A homogeneous mixture is a mixture having a uniform composition throughout the mixture. For example, mixtures of salt in water, sugar in water, copper sulphate in water, iodine in alcohol, alloy, and air have uniform compositions throughout the mixtures.
- On the other hand, a heterogeneous mixture is a mixture having a non-uniform composition throughout the mixture. For example, composition of mixtures of sodium chloride and iron fillings, salt and sulphur, oil and water, chalk powder in water, wheat flour in water, milk and water are not uniform throughout the mixtures.

Q2. How are sol, solution and suspension different from each other?
Answer:

- **Sol** is a heterogeneous mixture. In this mixture, the solute particles are so small that they cannot be seen with the naked eye. Also, they seem to be spread uniformly throughout the mixture. The Tyndall effect is observed in this mixture. For example: milk of magnesia, mud
- **Solution** is a homogeneous mixture. In this mixture, the solute particles dissolve and spread uniformly throughout the mixture. The Tyndall effect is not observed in this mixture. For example: salt in water, sugar in water, iodine in alcohol, alloy
- **Suspensions** are heterogeneous mixtures. In this mixture, the solute particles are visible to the naked eye, and remain suspended throughout the bulk of the medium. The Tyndall effect is observed in this mixture. For example: chalk powder and water, wheat flour and water

Q3. To make a saturated solution, 36 g of sodium chloride is dissolved in 100 g of water at 293 K. Find its concentration at this temperature.

Answer:

Mass of solute (sodium chloride) = 36 g (Given)

Mass of solvent (water) = 100 g (Given)

Then, mass of solution = Mass of solute + Mass of solvent

= (36 + 100) g

= 136 g

Therefore, concentration (mass by mass percentage) of the solution =

$$= \frac{\text{Mass of solute}}{\text{Mass of solvent}} \times 100\% = \frac{36}{136} \times 100\%$$

$$= 26.47\%$$

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