

Chemistry Study Materials for Class 9 (NCERT Based notes of Chapter -02)

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IS MATTER AROUND US PURE

Solubility: Solubility is the amount of solute in a saturated solution at a given temperature. In other words, maximum capacity to dissolve a solute in a solution at a given temperature is called solubility.

Different solvents can dissolve different amount of solute. This means different solvents have different solubility

Solubility increases with increase in temperature.

Concentration: Concentration is the amount of solute present in a given amount of solvent or solution.

$$\text{This means Concentration} = \frac{\text{Amount of solute}}{\text{Amount of Solvent}} \text{ or } \frac{\text{Amount of solute}}{\text{Amount of Solution}}$$

Thus, concentration is the ratio of amount of solute and amount of solvent.

Concentration can be expressed in mass percentage or volume percentage of a solution.

(a) Mass percentage of a solution

$$\text{Concentration} = \frac{\text{Mass of solute}}{\text{Mass of solution}} \times 100$$

This means when concentration is expressed in mass percentage, it is called concentration by mass percentage.

(b) Volume percentage of a solution

$$\text{Concentration} = \frac{\text{Volume of solute}}{\text{Volume of solution}} \times 100$$

This means when concentration is expressed in volume percentage, it is called concentration by volume percentage.

SUSPENSION

A suspension is a heterogeneous mixture in which the solute particles do not dissolve but remain suspended throughout the bulk of the medium. Particles of a suspension are visible to the naked eye. Properties of a Suspension

- Suspension is a heterogeneous mixture.
- The particles of a suspension can be seen by the naked eye.
- The particles of a suspension scatter a beam of light passing through it and make its path visible.
- The solute particles settle down when a suspension is left undisturbed, that is, a suspension is unstable. They can be separated from the mixture by the process of filtration.

COLLOIDAL SOLUTIONS

A colloidal solution, occasionally identified as a colloidal suspension, is a mixture in which 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 |

INTEXT QUESTIONS PAGE NO. 18

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
