

CHEMISTRY STUDY MATERIALS FOR CLASS 9

(NCERT based Revision of Chapter - 2)

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Is Matter Around Us Pure

TYPES OF SOLUTION

Solid - solid solution – Solution of two or more solids are generally known as solid-solid solution. For example – alloys. Alloy is a homogeneous mixture of two or more metals and non metals or two metals or two non-metals. The components of an alloy cannot be separated by physical methods, their boundaries are not distinct and they can have variable compositions, thus alloy is considered as solution.

Solid – Liquid solution – Solution of solid and liquid is called solid-liquid solution. For example - solution of salt and water.

Liquid – liquid solution – Solution of two miscible liquids are called liquid-liquid solution, such as solution of water and acetic acid. The solution of acetic acid in water is known as vinegar.

Gas - liquid solution – Solution of gas into liquid is called gas-liquid solution. For example – Soft drink. In soft drink, carbon dioxide is usually dissolved in liquid, because of which a hiss sound comes while opening the cap of the bottle.

Gas-gas solution – Solution of two or more gas is called gas-gas solution. For example – air, which is the solution of many gases, such as hydrogen, oxygen, carbon dioxide, etc.

State of Solvent	State of Solute	State of Solution	Examples
Gas	Gas	Gas	Air, natural gas
Liquid	Liquid	Liquid	Alcoholic beverages, Antifreeze solution;
Liquid	Solid	Liquid	Seawater, sugar solution
Liquid	Gas	Liquid	Carbonated water (soda) Ammonia solution;
Solid	Solid	Solid	Metal alloys: brass, bronze,..
Solid	Gas	Solid	Hydrogen in platinum

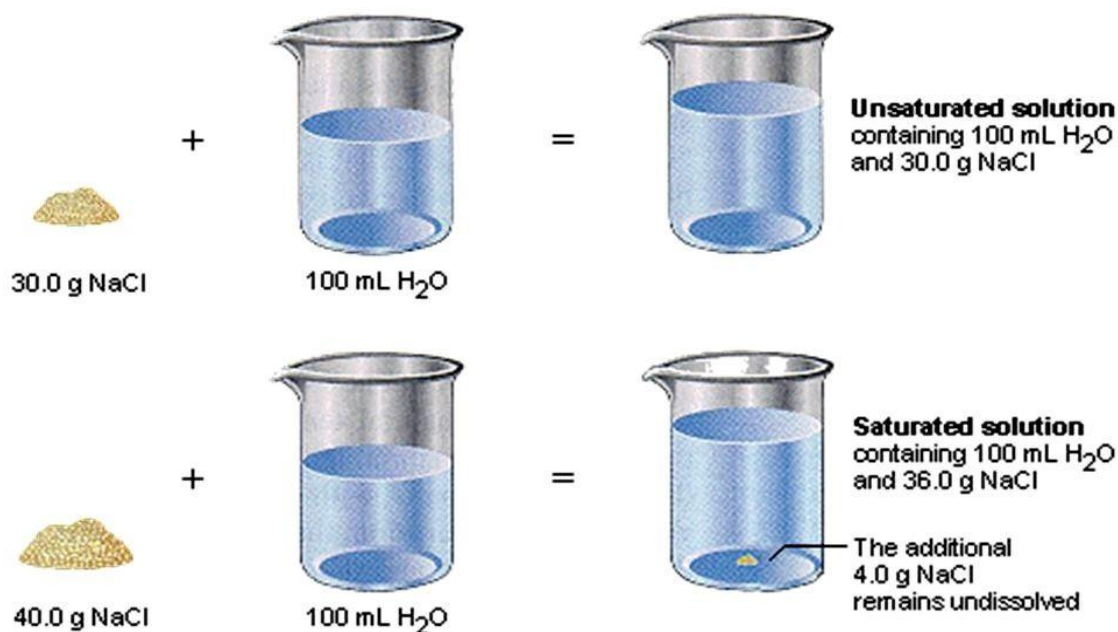
General Characteristics of Solution:

- Solutions are homogeneous mixture of two or more substances.
- Constituent particles of a solution are mixed evenly throughout.
- There is only one phase in a solution.
- Boundaries of constituent particles cannot be distinguished.
- The size of particles of solution is smaller than one nanometer.
- Solutions do not show Tyndall effect, because, small particles of solution do not scatter the ray of light.
- Solute cannot be separated by using filtration or decantation.
- Solutions are stable, since when left undisturbed the particles do not settle in bottom.

SATURATED AND UNSATURATED SOLUTIONS

Saturated Solution: When a solution cannot dissolve more solute at a given temperature, the point is called saturation point of the solution and solution is called saturated solution. This means, no more solute can be dissolved in a saturated solution at a given temperature.

Unsaturated Solution: Solution in which more solution can dissolved at a given temperature, is called unsaturated solution.



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.
