**Dr.Manoj Kumar**

**Associate professor**

**Department of Chemistry**

**Raja Singh College,Siwan**

**DILUTE SOLUTION**

**Types of Solutions**

A solution is a special type of [homogeneous mixture](https://en.wikipedia.org/wiki/Homogeneous_and_heterogeneous_mixtures) composed of two or more substances. In such a mixture, a solute is a substance [dissolved](https://en.wikipedia.org/wiki/Dissolution_%28chemistry%29) in another substance, known as a [solvent](https://en.wikipedia.org/wiki/Solvent). The mixing process of a solution happens at a scale where the effects of [chemical polarity](https://en.wikipedia.org/wiki/Chemical_polarity) are involved, resulting in interactions that are specific to [solvation](https://en.wikipedia.org/wiki/Solvation%22%20%5Co%20%22Solvation). The solution assumes the phase of the solvent when the solvent is the larger fraction of the mixture, as is commonly the case. The [concentration](https://en.wikipedia.org/wiki/Concentration) of a solute in a solution is the [mass](https://en.wikipedia.org/wiki/Mass) of that solute expressed as a percentage of the mass of the whole solution. The term "[aqueous solution](https://en.wikipedia.org/wiki/Aqueous_solution)" is used when one of the solvents is water

*Homogeneous* means that the components of the mixture form a single phase. *Heterogeneous* means that the components of the mixture are of different phase. The properties of the mixture (such as concentration, temperature, and density) can be uniformly distributed through the volume but only in absence of diffusion phenomena or after their completion. Usually, the substance present in the greatest amount is considered the solvent. Solvents can be gases, liquids or solids. One or more components present in the solution other than the solvent are called solutes. The solution has the same [physical state](https://en.wikipedia.org/wiki/State_of_matter) as the solvent.

**Gaseous solutions**

If the solvent is a [gas](https://en.wikipedia.org/wiki/Gas), only gases are dissolved under a given set of conditions. An example of a gaseous solution is [air](https://en.wikipedia.org/wiki/Air) (oxygen and other gases dissolved in nitrogen). Since interactions between molecules play almost no role, dilute gases form rather trivial solutions. In part of the literature, they are not even classified as solutions, but addressed as [mixtures](https://en.wikipedia.org/wiki/Mixture).

**Liquid solutions**

If the solvent is a [liquid](https://en.wikipedia.org/wiki/Liquid), then almost all gases, liquids, and solids can be dissolved. Here are some examples:

* Gas in liquid:

[Oxygen](https://en.wikipedia.org/wiki/Oxygen) in water

[Carbon dioxide](https://en.wikipedia.org/wiki/Carbon_dioxide) in water – a less simple example, because the solution is accompanied by a chemical reaction (formation of ions). Note also that the visible bubbles in [carbonated water](https://en.wikipedia.org/wiki/Carbonated_water) are not the dissolved gas, but only an [effervescence](https://en.wikipedia.org/wiki/Effervescence_%28chemistry%29) of carbon dioxide that has come out of solution; the dissolved gas itself is not visible since it is dissolved on a molecular level.

* Liquid in liquid:

The mixing of two or more substances of the same chemistry but different concentrations to form a constant. (Homogenization of solutions)

Alcoholic beverages are basically solutions of ethanol in water.

* Solid in liquid:

[Sucrose](https://en.wikipedia.org/wiki/Sucrose) (table [sugar](https://en.wikipedia.org/wiki/Sugar)) in water

[Sodium chloride](https://en.wikipedia.org/wiki/Sodium_chloride) (NaCl) (table [salt](https://en.wikipedia.org/wiki/Salt)) or any other [salt](https://en.wikipedia.org/wiki/Salt_%28chemistry%29) in water, which forms an [electrolyte](https://en.wikipedia.org/wiki/Electrolyte): When dissolving, salt dissociates into [ions](https://en.wikipedia.org/wiki/Ion).

[Solutions in water](https://en.wikipedia.org/wiki/Aqueous_solution) are especially common, and are called [aqueous solutions](https://en.wikipedia.org/wiki/Aqueous_solutions).

Non-aqueous solutions are when the liquid solvent involved is not water.[[1]](https://en.wikipedia.org/wiki/Solution#cite_note-auto-1)

Counter examples are provided by liquid mixtures that are not [homogeneous](https://en.wikipedia.org/wiki/Homogeneous_and_heterogeneous_mixtures): [colloids](https://en.wikipedia.org/wiki/Colloid), [suspensions](https://en.wikipedia.org/wiki/Suspension_%28chemistry%29), [emulsions](https://en.wikipedia.org/wiki/Emulsion) are not considered solutions.

[Body fluids](https://en.wikipedia.org/wiki/Body_fluid) are examples for complex liquid solutions, containing many solutes. Many of these are electrolytes, since they contain solute ions, such as [potassium](https://en.wikipedia.org/wiki/Potassium). Furthermore, they contain solute molecules like sugar and [urea](https://en.wikipedia.org/wiki/Urea). Oxygen and carbon dioxide are also essential components of [blood chemistry](https://en.wikipedia.org/wiki/Blood_chemistry), where significant changes in their concentrations may be a sign of severe illness or injury.