

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 as the solvent.

Gaseous solutions

If the solvent is a gas, only gases are dissolved under a given set of conditions. An example of a gaseous solution is 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.

Liquid solutions

If the solvent is a liquid, then almost all gases, liquids, and solids can be dissolved. Here are some examples:

- Gas in liquid:
 - Oxygen in water
 - 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 are not the dissolved gas, but only an effervescence 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 (table sugar) in water
 - Sodium chloride (NaCl) (table salt) or any other salt in water, which forms an electrolyte: When dissolving, salt dissociates into ions.
- Solutions in water are especially common.

Counterexamples are provided by liquid mixtures that are not homogeneous: colloids, suspensions, emulsions are not considered solutions.

Body fluids are examples for complex liquid solutions, containing many solutes. Many of these are electrolytes, since they contain solute ions, such as potassium. Furthermore, they contain solute molecules like sugar and urea. Oxygen and carbon dioxide are also essential components of blood chemistry, where significant changes in their concentrations may be a sign of severe illness or injury.

Solid solutions

If the solvent is a solid, then gases, liquids and solids can be dissolved.

- Gas in solids:
 - Hydrogen dissolves rather well in metals, especially in palladium; this is studied as a means of hydrogen storage.
- Liquid in solid:
 - Mercury in gold, forming an amalgam
 - Water in solid salt or sugar, forming moist solids
 - Hexane in paraffin wax
- Solid in solid:
 - Steel, basically a solution of carbon atoms in a crystalline matrix of iron atoms.
 - Alloys like bronze and many others.

Polymers containing plasticizers