

Chemistry 30
Unit 4: Solutions
Assignment 1

Solution Terminology

Understanding and using proper terminology in a subject is always important, and there are a number of key terms used in association with solutions. Many of these you will already know and be familiar with; other terms are new but important. A few of the terms listed below won't be used extensively in this unit but are helpful to know nonetheless.

Find definitions for the following terms. Some terms also include questions to be answered. When pairs of terms are given, define both and be sure to clearly distinguish between the two terms.

mixture / compound

define both terms and list the key differences between a mixture and a compound.

give an example of each

A compound is a chemical combination of two or more pure substances. Example: H₂O. Compounds have definite proportions and the elements making up the compound can only be separated by chemical means.

A mixture is a physical combination of two or more substances. Salt water, for example. Physical means can be used to separate the component parts. Proportions may vary.

homogeneous / heterogeneous mixtures

solutions are which type of mixture?

Solutions are examples of homogeneous mixtures. They have a uniform composition and would look the same throughout.

Heterogeneous mixtures do not have a uniform composition. The parts are visually distinct. Oil and water and a pepperoni pizza are examples.

solution

A homogeneous mixture.

aqueous solutions / tinctures

In an aqueous solution, water acts as the solvent. Alcohol is the solvent in a tincture.

solute / solvent

Solute – the substance that gets dissolved in the solvent. For example salt in a salt-water solution. The solute will be present in smaller amounts.

Solvent – the substance in which the solute is dissolved. Water is the solvent in aqueous solutions.

Examples:

a gas dissolved in a gas: air.

liquids dissolved in liquids: oil and water

solids dissolved in liquids: salt water

solids dissolved in solids: metal alloys (e.g. brass)

soluble / insoluble

*Soluble – capable of dissolving in a solvent
Insoluble – does not dissolve to any appreciable extent*

In general, a substance is considered soluble if it will form a solution with a concentration of 0.1M or greater, and is insoluble if it forms a solution with a concentration of 0.001 M or less.

solubility

A measure of how much solute can dissolve in a unit volume of solution.

miscible / immiscible

*Miscible – two liquids that are soluble in one another. Example – ethyl alcohol and water
Immiscible – two liquids that are insoluble in one another. Example – oil and water*

dilute / concentrated

*Dilute – contains a relatively small amount of solute in the solution
Concentration – contains a relatively large amount of dissolved solvent*

unsaturated / saturated / supersaturated

*Unsaturated – a solution that is holding less solute than can be dissolved at a given temperature.
Saturated – a solution that has dissolved the maximum amount of solute possible at a given temperature. Saturated solutions are at equilibrium.
Supersaturated – a solution that is holding more dissolved solute than can normally be held at that temperature. Supersaturated solutions may be prepared by heating the solution in order to dissolve additional solute, then cooling the solution slowly. Supersaturated solutions are unstable solutions.*

electrolyte / nonelectrolyte (or electrolytic solution / nonelectrolytic solution)

*Electrolytic solutions can conduct an electrical current due to the presence of ions in solution. Ionic compounds and acids typically produce electrolytic solutions.
Nonelectrolytic solutions do not conduct electric currents due to the absence of ions.*

precipitate (precipitation reaction)

A precipitate is a solid that forms when aqueous solutions are combined and produce an insoluble compound.

ionization / dissociation

Definitions may vary slightly, but both ionization and dissociation refer to the breakdown of a substance to produce ions. Some textbooks distinguish them according to whether the compound is an ionic compound (dissociation) or molecular compound (ionization).

alloy / amalgam

*Alloy – a mixture of two or more metals. Brass, for example, is an alloy of zinc and copper
Amalgam – an alloy in which one of the metals is mercury.*