

Chemistry - Solutions and Concentration

Terms we will use:

Solution

Solute

Solvent

Concentrated and dilute

Saturated, Unsaturated, and Supersaturated

Soluble, insoluble, miscible, and immiscible

Process of solvation

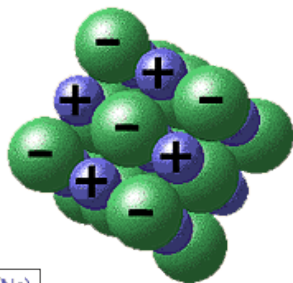
Types of Solutions

Solvent	Solute	Example
Gas	Gas	Mixture of gases, air
Gas	Liquid	Water vapour in air (humidity)
Gas	Solid	Sublimation of a solid into a gas, dust or smoke in air
Liquid	Gas	CO ₂ gas dissolved in water
Liquid	Liquid	Mixture of miscible liquids (alcohol in water)
Liquid	Solid	Salt in water
Solid	Gas	Phenomenon of adsorption of gases over metals: hydrogen over palladium
Solid	Liquid	Mercury in copper
Solid	Solid	Homogeneous mixture of two or more metals (alloys)

Solvation occurs due to polarity of the solvent (water in this case)

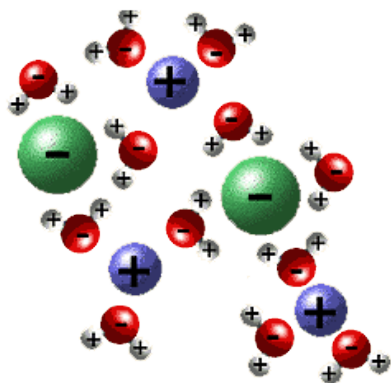
Water dissolves ionic compounds

NaCl crystal structure



sodium (Na)
chlorine (Cl)

NaCl in water



Solvation of Ionic vs. molecular compounds

Factors that affect rate of solvation:

Surface area, temperature, and stirring

Energy and solutions:

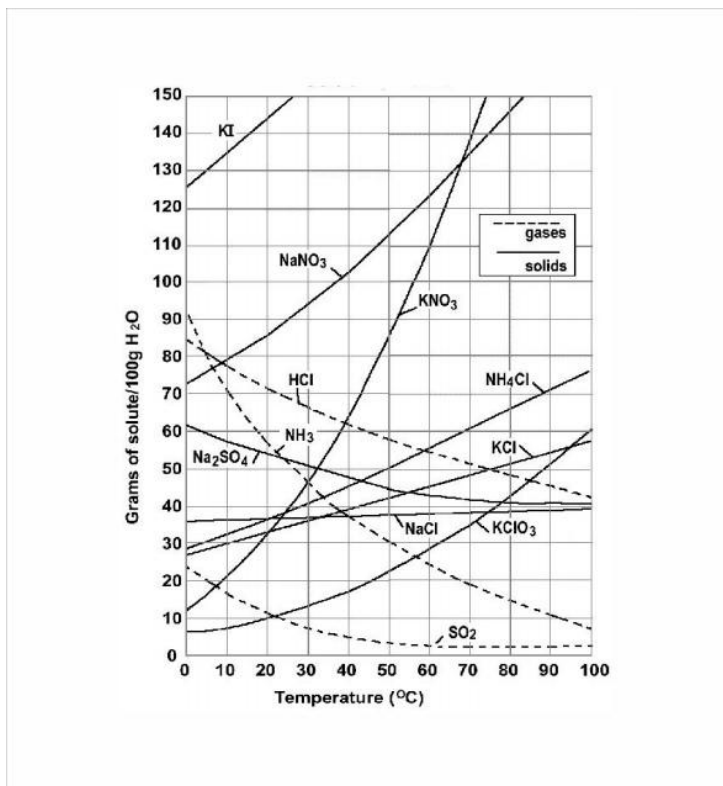
Endothermic and Exothermic

Heat of solution and the lattice

Solubility

Solids and gasses

Temperature affects overall solubility



Saturation and supersaturation

Gasses and Solubility

Henry's Law

States that the solubility, (S) of a gas in a liquid is proportional to the pressure (P) applied above the liquid.

$$\frac{S_1}{P_1} = \frac{S_2}{P_2} \quad \text{this can also be written as } S_1P_2 = P_2S_1$$

Example:

If 0.55 g of an unknown gas is dissolved in 1.0 L of water and the pressure is changed from 20.0 kPa to 110 kPa, what is the new solubility at the new pressure?

A gas has a solubility of 0.66 g/L at 10.0 atm of pressure. What is the pressure on a 1.0 L sample that contains 1.5 g of the gas?

Chemistry - Solutions

An outline for this video can be downloaded for print at

www.wildgooseco.com

Follow the links to Chemistry Chapter 15