# Chem12 Solutions : Notes - 10

A <u>solution</u> is defined as a homogeneous mixture. (homogeneous means well mixed)

Solutions may be solid. <u>Alloys</u> are examples of metallic solutions. For grade 12 Chemistry, solutions are usually an ionic solid or polar molecular substance dissolved in water.

## Some Definitions

<u>Solute</u> - The solid that is dissolved in water.
<u>Solvent</u> - For this course water is the solvent.
<u>Saturated solution</u> - In this solution no more solute can be dissolved.
<u>Unsaturated solution</u> - More solute can be dissolved.
<u>Ionic substances</u> - These are substances composed of a metal and a non-metal. They break apart into positive and negative ions when dissolved in water. Hence, they conduct current when dissolved in water. (note : some ionic solids have a low solubility in water)
<u>Polar molecular substance</u> - This is a molecule that is positively charged at one end and negatively charged at the other end. It will not dissociate into positive and negative ions. Examples are sugar, alcohol and water. These will not conduct electricity as they do not form ions.
<u>Non-Polar molecular substance</u> - This is a molecule that is not charged at either end. These substances are insoluble in water. Examples are oils and carbon tetrachloride.

## Dissociation

If we have a saturated solution of $CaCl_2(s)$ and water. We have the following equilibrium : $CaCl_2(s) <-> Ca^{2+}(aq) + 2Cl^-(aq)$        This is called <u>dissociation</u>. Water molecules, being polar, will break apart any ionic substance. However the ionic substance will recrystallize at the same rate that it is dissolving at equilibrium.

## Molarity or Concentration

<u>Molarity</u> (M) is defined as : moles of solute (n) / liters of water (L) In calculations we use the equation : $M = n/L$. The molarity is indicated by square brackets, eg, $[Ca^{2+}]$ = 1.5 M, or the concentration of calcium ions is 1.5 mol/L.

**Solubility** is the maximum concentration. It is dependent on the temperature of the solution.