Aqueous solutions –

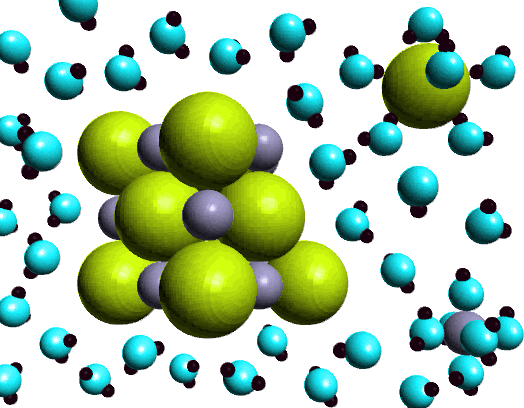
A solution has 2 parts:

1. Solvent –

2. Solute –

Solvation –

*Prediction of whether solubility will occur*: “like dissolves like” which means:

* Polar solvents dissolve:
* Nonpolar solvents dissolve:

**Example** of a common solution – NaCl crystals dissolve in water.

* Water is polar. NaCl is ionic, so it ionizes, becomes ions, in water.
* Oxygen’s pull on H (due to EN) makes the **H** atoms **partially +.**
* Unshared e— pairs on the **O** atom make it **partially** —.

Electrolyte – compound that conducts an electric current when

|  |  |  |  |
| --- | --- | --- | --- |
| **Solute** |  |  |  |
| **Properties** |  |  |  |

Solubility — the number of grams of solute that dissolve in a given quantity of a solvent (usually 100 g – same as mL) at a given temperature to produce a *saturated* solution.

Factors affecting **SOLUBILITY** (how much solute dissolves)



Factors affecting **RATE of solubility** (how fast solute dissolves)



**?** What happens to gas solubility as you increase the temperature of a solution?

**C:\Documents and Settings\c0901674\Local Settings\Temporary Internet Files\Content.IE5\I2098W1R\MCj04413890000[1].wmfExample** – *an increase in water temperature of a lake can kill entire fish populations because the increase in temperature decreases the solubility of dissolved gases in the water (like oxygen). So, the wildlife depending on that gas for respiration can die.*

miscible –

immiscible –

* As Temperature increases,

1) saturated solution –

2) unsaturated solution –

3) supersaturated solution –

1. How much KNO3 will dissolve in **500** mL of water that is at 40 °C?
2. If you stir 205 grams of KNO3 in 100 mL of water that is at 50 °C, approximately how many grams will NOT dissolve?
3. A solution that contains 60 grams of MgSO4 in 100 mL of water at 80 °C would be saturated, unsatured, or super-saturated?

* Dilute solution –
* Concentrated solution –

We use **MOLARITY** to express concentration of solutions

* Molarity (**M**) –

Must use \_\_\_\_\_\_\_!!

**M =**

* When diluting,
* A solution is diluted by

May use mL or L, but must use the same unit on both sides of equation!

**=**

M1 = molarity (mols/L) of initial solution

V1 = volume (mL or L) of initial solution

M2 = molarity (mols/L) of new solution

V2 = volume (mL or L) of new solution

COLLIGATIVE PROPERTY -

Change in any colligative property is **proportional to the number of particles of solute**:

Sucrose

NaCl

CaBr2



There are fewer water molecules at the surface to change into a gas



There is less H2Oexposed to the surface of the solution



The solute obstructs water from forming 3D hexagonal crystals

* – scattering of visible light in all directions

|  |  |  |  |
| --- | --- | --- | --- |
| **Property** | **Solution** | **Colloid** | **Suspension** |
| **Uniformity** |  |  |  |
| **Solute particle type** |  |  |  |
| **Particle size** |  |  |  |
| **Effect of light** |  |  |  |
| **Effect of gravity** |  |  |  |
| **Filtration** |  |  |  |

**Molarity and Dilution calculations – show your work and answer the questions**

1. What is the molarity of .35 L of solution in which 1.40 moles of LiCl is dissolved?

What formula did you use? *(check box)* □Molarity □Molarity with stoich □Dilution

1. Calculate the molarity of a solution containing 77 grams of Li2SO4 in 235.0 mL of water.

What formula did you use? *(check box)* □Molarity □Molarity with stoich □Dilution

1. Calculate the mass of RbCl needed to make 1.4L of a 6.00 M solution.

What formula did you use? *(check box)* □Molarity □Molarity with stoich □Dilution

1. What volume of 2.0 M NaCl is needed to make 600.0 mL of 0.500 M NaCl?

What formula did you use? *(check box)* □Molarity □Molarity with stoich □Dilution

1. If 46.0 mL of a 9.0 M H2SO4 solution is used to make a 2000.0 mL aqueous solution, what is the molarity of the new dilute solution?

What formula did you use? *(check box)* □Molarity □Molarity with stoich □Dilution