

SOLUTIONS



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**#Substances
DISSOLVED in water
are aqueous solutions.**

NATURE OF SOLUTIONS


1. **HOMOGENEOUS** and stable

NATURE OF SOLUTIONS

2. Both **SOLUTE** and **SOLVENT** particles pass through **FILTER** paper and do **NOT** settle with time

NATURE OF SOLUTIONS

3. Solvents and solutes may be gases, liquid or solids



4. Substances that **DISSOLVE** most readily in water are **IONIC** compounds and **POLAR** covalent molecules forming ionic solutions

NATURE OF SOLUTIONS

5. NONPOLAR covalent molecules do not dissolve in water

The Golden Rule of Solutions

#Like
Dissolves
Like!!




#Miscible – When **TWO** liquids can **DISSOLVE** in each other


#Immiscible – When two **LIQUIDS** can't **DISSOLVE** in each other

Solubility of Solids


A. When an excess amount of **SOLUTE** is added to a given **VOLUME** of solvent at a given **TEMPERATURE**, the dissolving **PROCESS** will take place until **NO** more solute can dissolve in the solvent




#SOLUBILITY- the **AMOUNT**
of substance that **DISSOLVES**
in a given quantity of
SOLVENT at a given
temperature to produce a
SATURATED solution.




Condition of **EQUILIBRIUM** will be reached.



There is NO net
CHANGE in the
overall system.



#Particles of SOLUTE
move from the SOLID
to the DISSOLVED
state and back to the
solid state.



#This SOLID <----->
DISSOLVED process
happens at the SAME
rate producing a
dynamic equilibrium.

C. Definitions

#SATURATED solution-
holds the **MAXIMUM**
amount of **SOLUTE** for a
given amount of **SOLVENT**
at a constant
TEMPERATURE.



#UNSATURATED

solution- holds **LESS**
solute than a

SATURATED solution.



#SUPERSATURATED

solution - holds **MORE**

solute than it **SHOULD**

hold at a given

TEMPERATURE

This is accomplished by **INCREASING** the temperature of a **SATURATED** solution, having the **EXCESS** solid dissolve and then letting the system slowly **COOL** undisturbed.

Solubility of Gases

#The solubility of gases behaves OPPOSITE of solids.




#AGITATION and
INCREASED

temperature decreases
the solubility of a **GAS**.


HENRY'S law - at a given temperature the **SOLUBILITY** of a gas in a liquid is **DIRECTLY** proportional to the **PRESSURE** of the gas **ABOVE** the liquid.

Colligative Properties Of Solutions


#The **PHYSICAL** properties of a solution are **DIFFERENT** from those of the **PURE** solvent.




Colligative properties are **PHYSICAL** properties that depend on the **NUMBER** of **PARTICLES** in a given mass of solvent.



- **BOILING** point is
ELEVATED, it is higher
than the boiling point of
the pure solvent.




#- Freezing point is **DEPRESSED**, it is lower than the freezing point of the pure solvent.



The magnitude of the change is **DIRECTLY** proportional to the **CONCENTRATION** of the solutes.

$\Delta T = k m$



#A **SOLUTE** that dissociates into **SEVERAL** particles, like sodium chloride, has an even **GREATER** effect on colligative properties.
