Name:_____
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Chemistry 12
Solubililty Lesson #1
A Review of SOLUBILITY

THE SOLUBILITY OF SALTS:

A salt is defined as an ionic compound which can not be classified as an ARRHENIUS acid (compounds that begin with "H") or an ARRHENIUS base (compounds that end with "OH").

An IONIC compound is one that is made up of a metal and a nonmetal, whereas a MOLECULAR compound is one that is made up of non-metal.

GENERAL RULES FOR DISTINGUISHING BETWEEN AN IONIC AND MOLECULAR COMPOUND:

1. **"IONIC"** – a. metal (cation) + non-metal (anion)
   b. polyatomic metal + non-metal
   c. metal + polyatomic non – metal
   d. polyatomic metal + polyatomic non-metal
   Ex. $NaCl$, NH_4Cl, Na_3PO_4, NH_4NO_3 (not acid or base)

2. **"MOLECULAR"** - a. non-metal + non-metal
   b. ORGANIC compounds
   Ex. CO_2, SO_2, C_3H_8

3. An ionic compound will undergo 100 % DISSOCIATION when placed in water, whereas a molecular compound will not. (+/-)

IONIC: $NaCl(s) \xrightarrow{H_2O(\ell)} Na^+(aq) + Cl^-(aq)$

MOLECULAR: $C_{12}H_{22}O_{11}(s) \xrightarrow{H_2O(\ell)} C_{12}H_{22}O_{11}(aq)$ (Ø)

4. Ionic compounds are therefore classified as electrolytes (as they can conduct an electric current. While molecular compounds are classified as non-electrolytes (as they DO NOT conduct an electric current).

THE FOLLOWING ARE A LIST OF IMPORTANT TERMS USED IN THIS UNIT:

SOLUBILITY is defined as the maximum amount of a substance that can dissolve in a given volume of a solvent @ a given temperature.

SATURATED SOLUTION is formed when the dissolved substance is in equilibrium with some undissolved substance.
(must have some solid present)

MOLAR SOLUBILITY is used to express the solubility of a substance in terms of mol/L.

SOLUBILITY can also be expressed in the terms of grams/L.

IN ORDER FOR A SOLUTION TO BE CONSIDERED **SATURATED**:

1. Some undissolved solute is present
2. an equilibrium exists between what is dissolved and undissolved in solution

A Saturated solution is expressed as an EQUILIBRIUM between the undissolved solid and it's component ions:

$$AgBrO_3(s) \rightleftharpoons Ag^+(aq) + BrO_3^-(aq)$$

You can break down the above **EQUILIBRIUM EQUATION** to show the two individual reactions:

1. THE FORWARD REACTION (**THE DISSOLVING REACTION**) DISSOCIATING R → P

$$AgBrO_3(s) \longrightarrow Ag^+(aq) + BrO_3^-(aq)$$

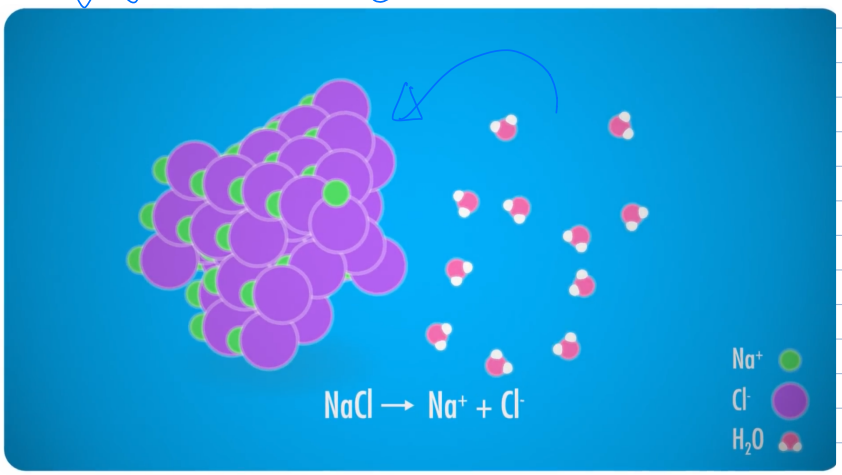
2. THE REVERSE REACTION (**THE CRYSTALLLIZATION REACTION**) re-crystallizing R ← P

$$Ag^+(aq) + BrO_3^-(aq) \longrightarrow AgBrO_3(s)$$

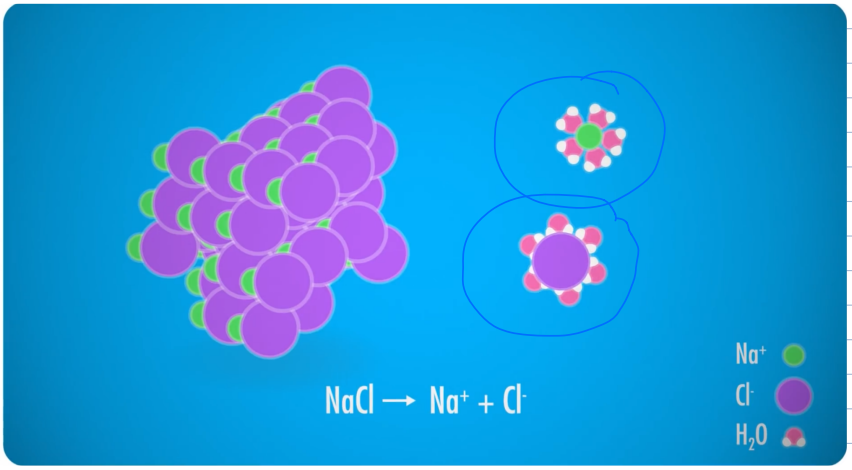
SEATWORK/HOMEWORK: Exercises 1 – 7 pgs 74 + 76 in HEBDEN
PLO's : G1- G4 + G6

Watch the crash course #7

Images taken from Crash Course Chemistry #7 Water & Solutions



NaCl (ionic)

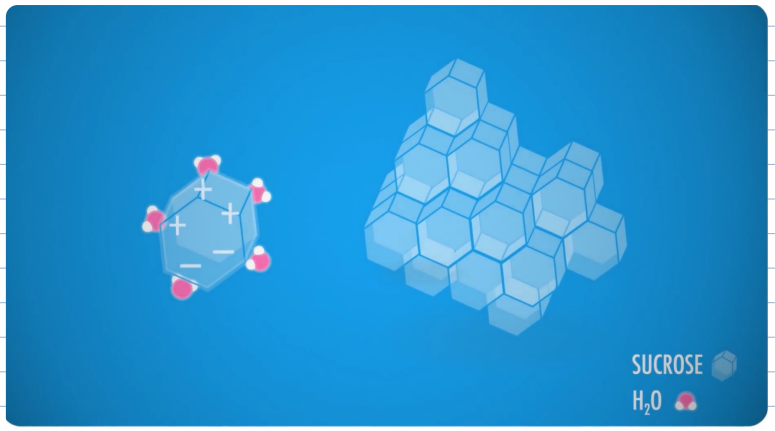


$NaCl_{(s)} \rightarrow Na^{+}_{(aq)} + Cl^{-}_{(aq)}$

(dissolves & dissociates)

conduct electricity

$C_{12}H_{22}O_{11}(s)$



$C_{12}H_{22}O_{11}(s) \longrightarrow C_{12}H_{22}O_{11}(aq)$

(dissolves, does not dissociate)

non-conductive