Check Homework - Worksheet

Na^+ CrO_4^{2-} Sr^{2+} NO_3^-

Sodium chromate and strontium nitrate

$$Na_2CrO_{4(aq)} + Sr(NO_3)_{2(aq)} \rightarrow 2NaNO_{3(aq)} + SrCrO_{4(s)}$$

Complete Ionic

$$2Na^+_{(aq)} + CrO_{4(aq)}^{2-} + Sr^{2+}_{(aq)} + 2NO_{3(aq)}^- \rightarrow 2Na^+_{(aq)} + 2NO_{3(aq)}^- + SrCrO_{4(s)}$$

Spectator Ion(s): $Na^+_{(aq)}$, $NO_{3(aq)}^-$

Net Ionic: $Sr^{2+}_{(aq)} + CrO_{4(aq)}^{2-} \rightarrow SrCrO_{4(s)}$

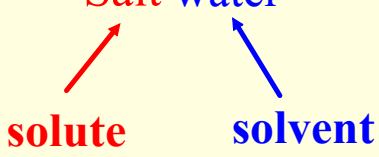
Solutions

Solution - homogeneous (uniform) mixture of a solute and a solvent.

⇒solute - substance dissolved

⇒solvent - substance doing dissolving (liquid)

Ex. Salt water



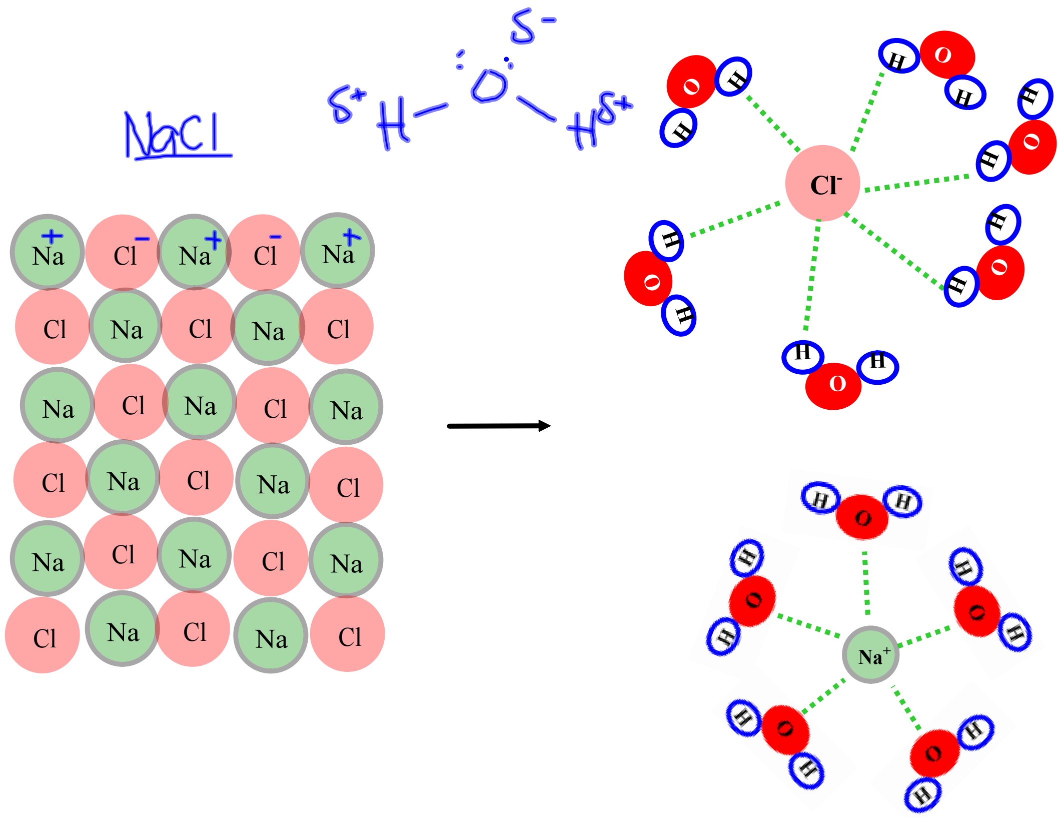
(aq)

If the amount of solute that can dissolve in a solvent is large, then the solute is said to have a *high solubility*.

If the amount of solute that can dissolve in a solvent is small, then the solute is said to have a *low solubility*.

Solid substances formed from reactions in solutions are known as **precipitates**.

What happens when an ionic compound dissolves??



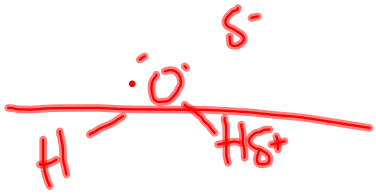
This process is called solvation.

Solubility Rules

- Polar solvents will dissolve ionic compounds and polar compounds
- Nonpolar solvent will dissolve nonpolar compounds

Ex. oil in gasoline

"Like dissolves like"



Solution Formation

There are three factors that affect how fast a substance will dissolve:
1) temperature
2) agitation (stirring)
3) surface area of dissolving particles

Solubility

33g/100 mL

solubility - concentration of a saturated solution at a room temperature (normally 20^{o}C).

saturated solution - solution at maximum concentration, in which no mor solute can be dissolved

supersaturated solution - solution contains more solute than it can theoretically hold at a given temperature

Solubility Generalizations

- solubility of solids increases with an increase in temperature
- solubility of gases decreases with an increase in temperature
- some liquids have no maximum limit of dissolving (**miscible liquids**)
- some liquids will not dissolve in other liquids (**immiscible liquids**)
- as the partial pressure of a gas increases, its solubility increases

Henry's Law

$$\frac{S_1}{P_1} = \frac{S_2}{P_2}$$

The solubility of a solution is 2.4 g/L at 1.0 atm at pressure. If the pressure of the solution is increased to 3.0 atm, what is the new solubility?

$$\frac{2.4\ g/L}{1.0\ atm} = \frac{S_2}{3.0\ atm}$$

$$S_2 = \frac{(2.4\ g/L)(3.0\ atm)}{(1.0\ atm)}$$

$$S_2 = 7.2\ g/L$$

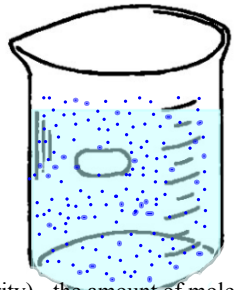
Concentration of a Solution

concentration - a numerical ratio comparing the quantity of solute to the quantity of solution.
⇒units: **g/L or g/mL** (solutes that are solids in pure form)

dilute - a solution that has a small amount of solute as compared to the amount of solvent

dilution - process of adding more solvent to cause a solution to become more dilute

concentrated - a solution that has a large amount of solute as compared to the amount of solvent



molar concentration (molarity) - the ~~amount~~ of moles of solute dissolved in one litre of solvent
⇒units: mol/L

Ex. An intravenous solution contains 0.90 g NaCl in 100.mL of solution. What is the molarity of this solution?

$m = 0.90\,g$ NaCl

$V = 0.100\,L$

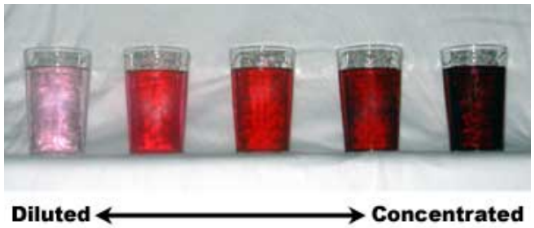
$C = ?$

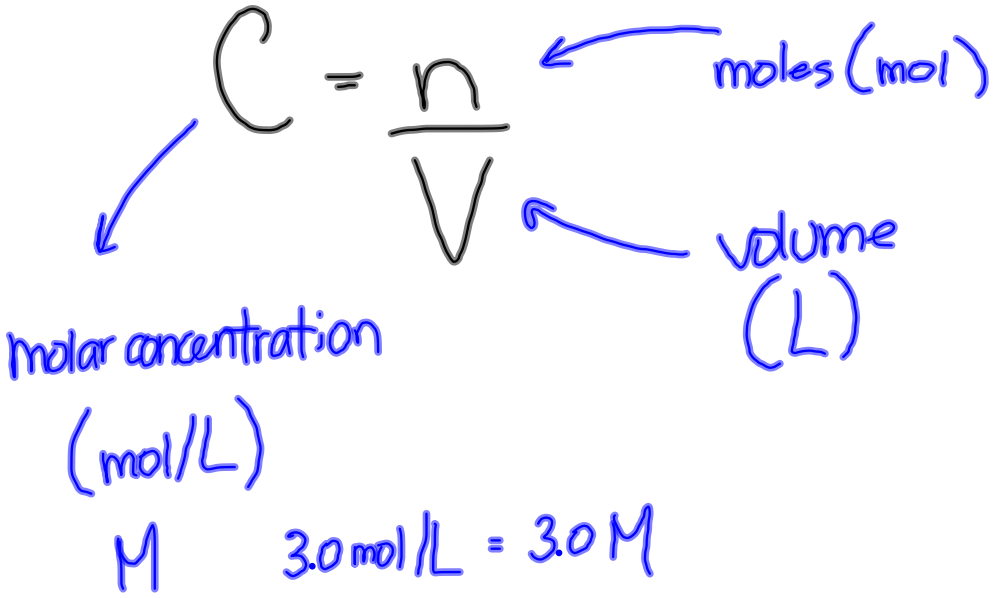
$C = \frac{n}{V}$

$C = \frac{0.0154\,mol}{0.100\,L}$

$C = 0.15\,mol/L$

$0.90\,g\,NaCl \times \frac{1\,mol\,NaCl}{58.44\,g\,NaCl} = 0.0154\,mol\,NaCl$




C = n / V
moles (mol)
volume (L)
molar concentration (mol/L)
M
3.0 mol/L = 3.0 M