

Chapters 4 → Chemical Reactions

Water

- Able to dissolve substances (numerous exceptions)
- H_2O has 105° angles between H_2
- OH bonds are covalent in nature
- Electrons are shared
- Oxygen has greater attraction for electrons

Polarity

- Water is polar
- Polar molecules have unequal distribution of charge
- Reason water is the *solvent*

Hydration

- Positive ends of H_2O are attached to negatively charged ions
- Salt splits when dissolved in water
 - Breaks into cations and anions

Solubility

- Varies on...
 - Attraction with ions
 - Attraction *for* water ions
- Polar and ionic substances are more soluble compared to nonpolar substances
- Ethanol *is soluble* in water

Electrical Conductivity

- Ability to conduct current in water
 - Electrolyte
- Solvent
 - Doing the dissolving
- Solute
 - Being dissolved

SOLUBLE	INSOLUBLE
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NO_3^-	OH^-
$C_3H_3O_2^-$	S^{2-}
ClO_3^-	CO_3^{2-}
ClO_4^-	CrO_4^{2-}
Group 1 ions with NH_4^+	PO_4^{3-}
SO_4^{2+} without Ca^{2+} Ba^{2+} Sr^{2+} Pb^{2+} Hg_2^{2+}	Br^- I^- Cl^- without... Ag^+ Pb^{2+} Hg_2^{2+}

Electrolytes

- Strong electrolytes
 - Efficient conductors
 - Completely ionize in water
 - Examples
 - Strong acids and strong bases
 - Soluble salts
- Weak electrolytes
 - Not as efficient; small current conductors
 - Small ionization in water
 - Examples
 - Weak acids and weak bases
- Nonelectrolytes
 - Do **not** conduct currents
 - Examples
 - Table sugar
 - Ethanol

Molarity (M)

- Concentration
- Unit
 - M
 - mol / L
 - $mol \cdot L^{-1}$

- Formula
 - $Molarity = \frac{\text{moles of solute}}{\text{liters of solution}}$
 - $M = \frac{\text{mol}}{L}$

Standard Solution

- Solution whose concentration is accurately known

Dilution

- Process of adding water to a stock solution
- Moles of solute before dilution is equal to moles of solute *after* dilution
 - $M_1V_1 = M_2V_2$

Types of Solutions

- Precipitate
 - Insoluble solid that forms at the bottom of a reaction/solution
- Acid-base
- Oxidation

Equations

- Formula
 - Describes overall reaction
- Complete ionic
 - All reactants and products
 - Strong electrolytes *only* as represented by ions
- Net ionic
 - Solution components that undergo no change
 - No spectator ions
- Spectator ions
 - Ions that do not provide much or any change