

## Chemistry Chapter 7 – Chemical Reactions and the Periodic Table

When in a solvent, the solute is uniformly dissolved.

**Arrhenius – first explained electrolytes**

**Solvent** – stuff of largest proportion

**solute** – everything else.

Water always a solvent

**Equilibrium** – when neutral – ion and ion – neutral reaction happen at the same speed

**Shifted left/right of equilibrium** – the location of most of the stuff, dissolved or undissolved.

**Filtrate** – stuff passing through filter, liquid

**precipitate** – solid stuff left in filter

**AgNO<sub>3</sub> dissociates**

**Acids and Bases ARE electrolytes**

**Litmus** – blue in base, pink in acid, used as a indicator

**Neutralization** in aqueous solution – Acid + Base → salt + H<sub>2</sub>O

**acid salts** – result of partial neutralization of polyprotic acid. H in the middle can still react

**Arrhenius** – need protons, solution

**Bronsted** – only protons, no solution

**Lewis** – just electron pairs

Given acid, -1 acid for conj base, given base, +1 for acid.

**Amphiprotic/amphoteric** – both acid/base(H<sub>2</sub>O)

**Autoionization reaction** – reacts with itself to get ions (H<sub>2</sub>O, NH<sub>3</sub>, Acetic Acid)

Strong acids are really good proton donors. **Metal Oxide (basic anhydride) + H<sub>2</sub>O → Metal hydroxide**

**Non-metal oxide (acid anhydride) + H<sub>2</sub>O → Acid**

**Basic/Acid anhydride → Salt**

CO<sub>2</sub> is an acid in Lewis because it RECEIVES a pair of electrons.

**Reducing agent** – itself oxidized, causing other one to be reduced

**Oxidizing agent** – itself reduced, causing other one to be oxidized

**Metals are reducing agents, themselves being oxidized**

**Elemental nonmetals are oxidizing agents, strongest at top right.**

**Gain, reduce/oxidize, lose**

**Metal + HCl → H<sub>2</sub> + metal ionCl<sub>2</sub>**

**Metal + H<sub>2</sub>O → Metal ion + OH<sup>-</sup> + H<sub>2</sub>**

2 metals, exchange signs

Metal + H<sub>2</sub>O → metal ion + H<sub>2</sub> + OH<sup>-</sup>

**reacts with GROUP I**

**Non oxidizing acids** – the only effective oxidizing agent is H<sup>+</sup>(HCl, H<sub>2</sub>SO<sub>4</sub>), reacts with **GROUP II**

Metal + H<sup>+</sup> → metal ion + H<sub>2</sub>

**Oxidizing Acids** – stuff containing H<sup>+</sup> plus a stronger oxidizing agent (HNO<sub>3</sub>, Hot H<sub>2</sub>SO<sub>4</sub>) **GROUP III**

3Cu + 2 NO<sub>3</sub><sup>-</sup> + 8 H<sup>+</sup> → 3Cu<sup>2+</sup> + 2NO<sub>2/1</sub> + 4 H<sub>2</sub>O

HNO<sub>3</sub> → NO<sub>2/1</sub> H<sub>2</sub>O + metal ion

H<sub>2</sub>SO<sub>4</sub> → metalSO<sub>4</sub> + SO<sub>2</sub> + H<sub>2</sub>O

**Aqua Reiga is actually Cl<sub>2</sub>**

When metals react with O<sub>2</sub>, corrodes, few uses. O<sub>2</sub> is an oxidizing agent, combustion is a redox equation

When nonmetals react with O<sub>2</sub>, usually burns. CO<sub>2</sub>, CO, SO<sub>2</sub>, P<sub>4</sub>O<sub>10</sub> alcohol → CO<sub>2</sub> + H<sub>2</sub>O

**Combustion** – reaction with O<sub>2</sub> that gives off heat/light

**NH<sub>3</sub> + H<sub>2</sub>O → NH<sub>4</sub>OH is a WEAK BASE!!!!!!**

2 ionic substances will have double

replacement or metathesis, driven by formation of precipitate, gas, weak electrolyte, or ion

**The greater the atom radius, the stronger the acid.**

**Common indicators** – litmus paper, cabbage juice, berry juice, phenolphthalein.