

Acid/Base Reactions

Acid-Base Reactions

A Quick Review

- Aqueous Reactions
 - Occur between ions in solution
 - Types
 - Precipitation Reactions
 - Done
 - Acid-Base Reactions
 - Today
 - Redox Reactions
 - Next Time

Acid-Base Reactions

Acids

- Ionize in aqueous solution to form H^+ ions
- Increase the concentration of H^+ ions
- Monoprotic
 - Release 1 H^+ in solution
 - $HCl \Rightarrow H^+ + Cl^-$
- Polyprotic
 - Release more than 1 H^+ in solution
 - Protonizations get progressively weaker
 - H_2SO_4
 - $H_2SO_4 \Rightarrow H^+ + HSO_4^-$
 - $HSO_4^- \rightleftharpoons H^+ + SO_4^{2-}$
 - Solution contains H^+ , SO_4^{2-} , and HSO_4^-

Introduction to Aqueous Acids

Acid-Base Reactions

Bases

- Substances that accept H^+
- Increase the concentration of OH^- when added to water
- Types:
 - Metal Hydroxides - dissociate in solution to release OH^-
 - Strong Bases
 - Non-hydroxide bases - NH_3
 - React with water by accepting H^+
 - $NH_3 + H_2O \rightleftharpoons NH_4^+ + OH^-$
 - Weak Bases

Introduction to Aqueous Bases

Acid-Base Reactions

Neutralization Reactions

- An acid and a metal hydroxide base react to form a salt and water
- Salts
 - Cations from a base
 - Anions from an acid
- $\text{HBr}_{(\text{aq})} + \text{KOH}_{(\text{aq})} \implies$

Acid-Base Reactions

Reactions Involving Solid Reactants

- Just because a substance isn't a **strong** base, doesn't mean it isn't a **good** base...
- $\text{Mg(OH)}_{2(s)} + 2 \text{HCl}_{(aq)} \rightleftharpoons$

Acid-Base Reactions

Gas Forming Reactions

- Sulfides (S^{2-})
 - $2 \text{HCl}_{(aq)} + \text{Na}_2\text{S}_{(aq)} \implies$
- Carbonates (CO_3^{2-}) and Bicarbonates (HCO_3^-)
 - Produce carbonic acid as a first step
 - $\text{HCl}_{(aq)} + \text{NaHCO}_3_{(aq)} \implies \text{NaCl}_{(aq)} + \text{H}_2\text{CO}_3_{(aq)}$
 - The carbonic acid then decomposes into water and CO_2
 - $\text{H}_2\text{CO}_3_{(aq)} \implies \text{H}_2\text{O}_{(l)} + \text{CO}_2_{(g)}$
- Molecular Equation
 - $\text{HCl}_{(aq)} + \text{NaHCO}_3_{(aq)} \implies \text{NaCl}_{(aq)} + \text{H}_2\text{O}_{(l)} + \text{CO}_2_{(g)}$
 - Net ionic equation?

Acid-Base Reactions

Homework

- 4.31, 32, 35, 37, 39, 41