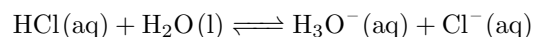


7.1 Calculations Involving Acidic Solutions

Since strong acids almost completely ionize in water, we can assume that the concentration of hydrogen ions is equal to the concentration of the acid.

Ex: A solution of hydrochloric acid has a concentration of 0.1M.

Calculate:



$$[\text{H}^+] = 0.1M$$

$$[\text{OH}^-] = 1 \cdot 10^{-13}M$$

$$\text{pH} = 1$$

$$\text{pOH} = 13$$

Percentage ionization is the percentage of a solute that ionizes when it dissolves in a solvent.

$$\% \text{ ionization} = \frac{[\text{ Ionized Acid }]}{[\text{ Initial Acid }]}$$

7.2 Monoprotic and Polyprotic acids

Monoprotic acid is an acid that possess only one ionizable hydrogen acid.

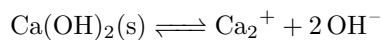
Polyprotic acid is an acid that possess more than one ionizable.

K_{a1} is larger than the other K_{an} values:

$$K_{a1} > K_{a2} > K_{a3}$$

If the 5 percent rule is does not work the pH is zero

7.3 Calculations involving basic solutions



Metal oxides dissolve in water to produce a basic solution

Non-metallic oxides dissolve in water to produce acidic

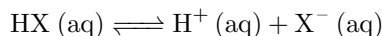
7.4 Acid-Base Titration

- Titration is to determine the pH of a solution by neutralization.
- Titrations are used to determine the concentration of an acid or base.
- The equivalence point is the point of the titration when the acid and base completely react with each other.
- If you know the volumes of both solutions at the equivalence point, and the concentrations of one of them, you can calculate the unknown concentration.

7.5 Buffers and the Common Ion Effect

The solubility of a partially soluble salt is decreased with the addition of a common ion.

A buffered solution consists of a mixture of a weak acid and its conjugate base X^- :



$$K_a = \frac{[H^+][X^-]}{[HX]}$$

Buffer Capacity and pH

- Buffer capacity is the amount of acid or base neutralized by the buffer before there is a significant change in pH.
- Buffer capacity depends on the composition of the buffer.
- The greater the amounts of the conjugate acid-base pair, the greater the buffer capacity.
- The pH of the buffer depends on K_a .