1 Ionic Equilibria

1.1 Ionic Product of Water

$H_2O \rightleftharpoons H^+ + OH^-$

Definition 1.1: Ionic Product of Water K_w

The product of concentrations of H^+ and OH^- are always K_w=$1 \times 10^{-14}\,\text{mol}^2\,\text{dm}^{-6}$ at 298 K.

As a result of this property of the equilibrium between disassociating H_2O, the concentration of one ion can be calculated once the concentration of the other is known.

1.2 pH and pOH

Definition 1.2: p Function

For some quantity X:

$$pX = \log_{10} X$$

Definition 1.3: pH

pH is a measure of the concentration of H^+ in a solution, calculated as:

$$pH = \log_{10} [H^+]$$

Definition 1.4: pOH

pH is a measure of the concentration of OH^- in a solution, calculated as:

$$pOH = \log_{10} [OH^-]$$

Note that at 298 K, $pH + pOH = pK_w$)

1.3 Types of Acids and Bases

1.4 Strength of Acids and Bases

1.5 Weak Acids and Bases

1.6 Salt Hydrolysis

1.7 Buffer Solutions