

Chemistry 30 IB

Acids & Bases

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Unfinished!

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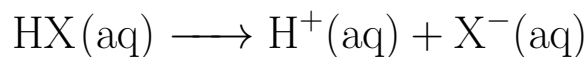
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1 Theories

The following two equations mean the same thing.

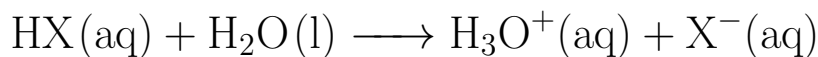
$\text{H}^+(\text{aq})$ and $\text{H}_3\text{O}^+(\text{aq})$ are interchangeable.

1.1 Arrhenius



- doesn't specifically state water is present (aq)
- uses hydrogen ions, $\text{H}^+(\text{aq})$
- cannot determine strong or weak

1.2 Brønsted-Lowry (aka. Modified Arrhenius)



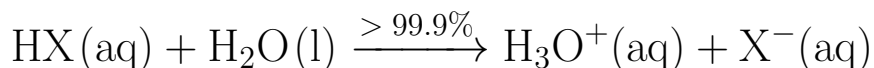
- specifically states water is present
- uses hydronium ions, $\text{H}_3\text{O}^+(\text{aq})$
- can determine strong or weak

2 General Equations

2.1 Ionization of Acids

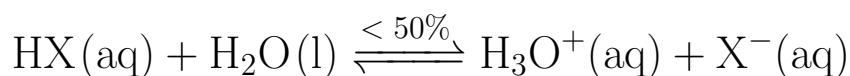
Forming ions from molecular compounds.

2.1.1 Strong



- ionize completely ($> 99.9\%$ of the reaction completes)
- irreversible (\longrightarrow)
- high K value ($K > 1$)

2.1.2 Weak



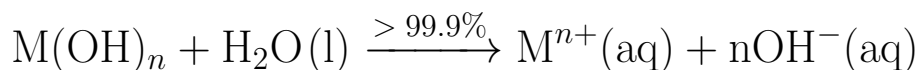
- do not ionize completely ($< 50\%$ of the reaction completes)
- reversible (\rightleftharpoons)

- ionize at equilibrium
- low K value ($K < 1$)

2.2 Dissociation of Bases

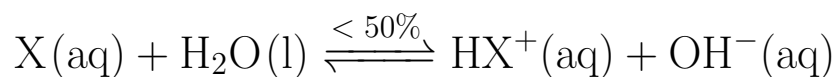
Separation of existing ions in solution.

2.2.1 Strong



- M is a metal, $\text{M}(\text{OH})_n$ is highly soluble
- dissociate quantitatively

2.2.2 Weak



- dissociate at equilibrium

3 pH & pOH

3.1 K_w

The equilibrium constant of water can be used to solve for hydrogen ion concentration or hydronium ion concentration when you have the other.

$$K_w = [\text{H}_3\text{O}^{+}][\text{OH}^{-}]$$

$$K_w = 1.00 \times 10^{-14} \text{ mol L}^{-1}$$

$$1.00 \times 10^{-14} \text{ mol L}^{-1} = [\text{H}_3\text{O}^{+}][\text{OH}^{-}]$$