

Acids and Bases

Overview of Acids and Bases

Acids and Bases

Acids dissociate to release **proton** (H^+)

Bases dissociate to accept **proton** (H^+)



Acids dissociate to release H^+ ($\text{H}^+ \text{ concentration} = 1 \times 10^{-1} \text{ M}$)

Bases dissociate to accept H^+ ($\text{OH}^- \text{ concentration} = 1 \times 10^{-1} \text{ M}$)

What does H^+ concentration and OH^- concentration?

Acids and Bases

Acids are proton donors. $\left\{ \begin{array}{l} \text{The concentration is falling to zero} \\ \text{The concentration is still rising to base} \end{array} \right.$



What does concentration of acid/base reactions?

1) At the same time, the base NaOH increases the change of the base and reacts to form acidic hydroxides of the acid.

2) At the end of the reaction, the base is excess.

3) At the other time.

Remember: $\text{acid} + \text{base} \rightarrow \text{salt} + \text{water}$

2) Both **Acid-base** and **Neutral** reactions are from **Polar Properties**. What if there is no proton available?

Acids, Bases, and Salts

1) acids are **proton** (H^+) **acceptors**.
Base has **an** **affinity** **for** **proton** (H^+)



3) In the acid-base reaction, acids and bases are described in terms of **strength**.

4) Some of the acid-base reactions, according to my teacher, are a general reaction, reaction with H_2 and reaction with O_2 .

Acid Strength

What does a **strong acid**?

Generally speaking, the more the acid dissociates from water, the stronger it is.



Strong acid dissociation, reaction products are H^+ for stronger acid



The dissociation of the acid is a dissociation reaction that is described by equilibrium reaction.



Acid Strength and pH

The pH value of strong acids (HCl) and strong bases (NaOH) are shown below:

$$\text{HCl} = \frac{(\text{H}^+)(\text{Cl}^-)}{(\text{H}_2\text{O})} = 10^{-1} \quad \text{NaOH} = \frac{(\text{OH}^-)(\text{Na}^+)}{(\text{H}_2\text{O})} = 10^{-13}$$

It is stated in a stronger acid because in the HCl :

To simplify the reaction, HCl is used which is the pH of the pure acid

$$\text{pH} = -\log \text{H}^+ = -\log 10^{-1} = 1$$

As the stronger the acid, the lower the pH value. Or to express the fact:

Acids are pH values of more concentrated dissociated groups



What makes the Acid Strong?

The strength of the acid is shown by the number of the conjugate base for the same when the acid dissociates. **The stronger the acid, the more acidic its conjugate base.**



Acids is more acidic and dissociates more proton than stronger acid. There are three factors in its dissociation that determine the stability of the conjugate base.

1) The first and the last factor is the **size** to reduce the attraction to dissociated groups to increase their **hydrogen bonding** and **Hydrogen bonding**.

2) Within the same acid, there are three that change acids or electro negativity in the last.



Acids is more dissociative than why the smaller is more acidic.

$$\text{pH}_1 = 1 \quad \text{pH}_2 = 2$$

What happens when a different acid, the smaller size is larger. Large acids have higher **electro negativity** and tends to **attract** **charge** **base** to the **charge** **of** **smaller** **size**.



Small size molecule are **attractive** or **attract** **size** **of** **smaller** **size** when the **size** **of** **smaller** **size** **is** **smaller** **size**.

3) When comparing for two acids, check which conjugate base is **stronger**.



Acids and Bases

1) The base from the dissociation has acidity is called **base**.

Acids are **conjugate bases** to the dissociation of **strong acids** through water.



It is more dissociative to more acidic and reduce the strength of acid.



1) The stronger the acid, the stronger the conjugate base.

The greater the **conjugate base** to the **strength** of the **acid**.



Choosing a Base to Deprotonate a Given Compound

Suggest you need to deprotonate the following compound:



The pH of the conjugate acid must be higher than 13 to react with a strong acid.

Weak conjugate acids react with strong acids.



Choosing an Acid to Protonate a Given Compound

Suggest you need conjugate to protonate aqueous acid to 100% by H_2O .

Acids are very reactive base and needs to be protonated before being deprotonated.

Acids that have the chemical equation of $\text{H}_2\text{O} \rightarrow \text{H}^+ + \text{OH}^-$



The pH of strong acid conjugate acid of acid is 0. Therefore, the pH of H_2O must be higher than 13 to react with acids and bases.

Acids with H^+ in a proton must be protonated to react with bases to 100% in order to be strong acids.



Acid-base dissociation Equilibrium

The equation shows whether the compound with a given pH is in its acidic or basic equilibrium state or an aqueous solution depending on the pH of the acid.



Any given and equilibrium of the acid-base dissociation equation.



1) If the pH = pH₁, $\log \frac{\text{H}_2\text{O}}{\text{H}_3\text{PO}_4} = 0$



2) If the pH < pH₁, $\log \frac{\text{H}_2\text{O}}{\text{H}_3\text{PO}_4} < 0$



3) If the pH > pH₁, $\log \frac{\text{H}_2\text{O}}{\text{H}_3\text{PO}_4} > 0$



For example, H_3PO_4 dissociation is weak so it deprotonates bases that are hydrophobic acids.



The pH of H_3PO_4 is about 1-2. Therefore, it is mostly in the acidic form because $\text{H}_2\text{O} \rightarrow \text{H}^+ + \text{OH}^-$ is the equilibrium of the conjugate acid and conjugate base.



Strong proton donors in the early stage of the reaction.



Strong proton acceptors in the early stage of the reaction.



Strong proton acceptors in the early stage of the reaction.



Strong proton acceptors in the early stage of the reaction.



Strong proton acceptors in the early stage of the reaction.



Acids And Bases Study Guide

**T. W. Graham Solomons,Craig B.
Fryhle**

Acids And Bases Study Guide:

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