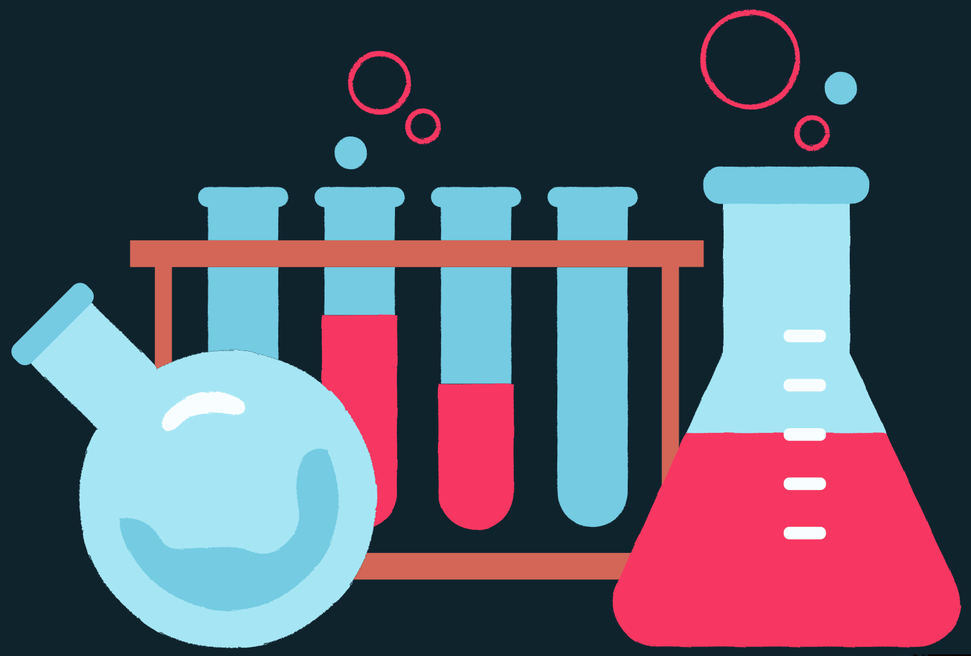
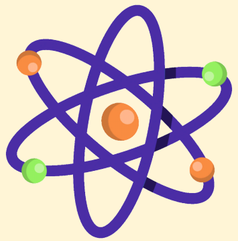


HOW ACID AND BASES ARE USED IN INDUSTRIAL PROCESS

Presented by: Nur Mohammad Junayed
2023-5-60-596

PRESENTATION OUTLINE



WHAT IS ACID BASE

ROLE OF ACID BASE IN METAL CLEANING

ROLE OF ACID BASE IN TEXTILE DYEING

ROLE OF ACID BASE IN CHEMICAL MANUFACTURING

WHAT IS ACID BASE

Acid

Any substance that dissolved in water increases the Concentration of hydronium ion is called Acid.
Thus acids are proton donors and electron acceptors.

Examples: sulfuric acid, hydrochloric acid.

Base

Any substance that dissolved in water increases the Concentration of hydroxide ion is called Acid

The Bases are proton acceptors and electron donors.

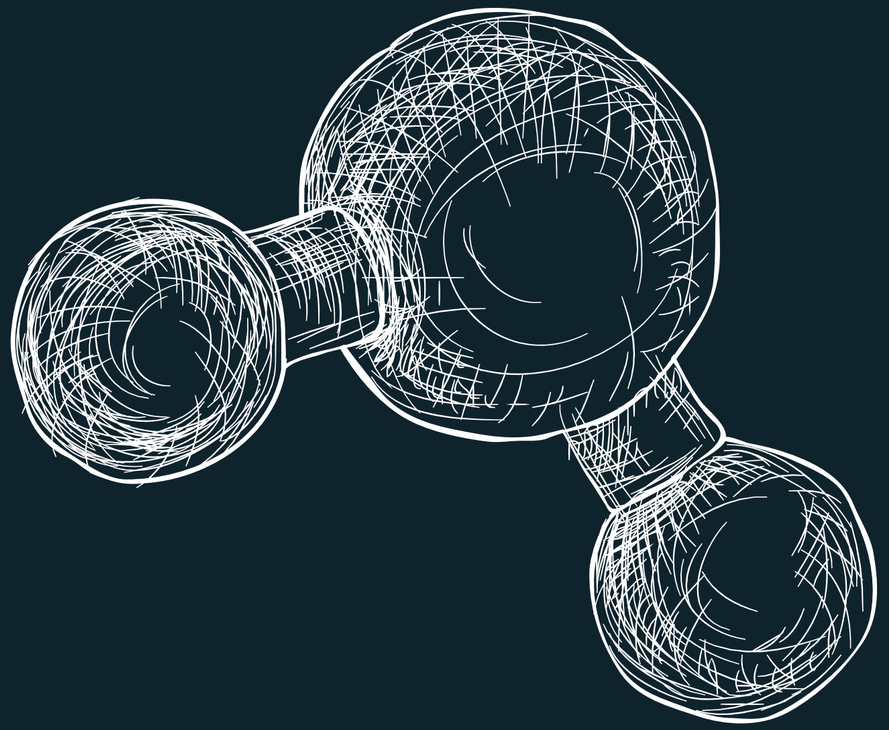
Examples: Soap, toothpaste, bleach, cleaning agents, limewater, ammonia water, sodium hydroxide.

ROLE OF ACID AND BASES IN METAL CLEANING

- Acids and bases play distinct but crucial roles in metal cleaning, targeting different types of criteria:

Dissolving Metal Oxides and Rust:
Acids, particularly sulfuric acid, hydrochloric acid, and phosphoric acid, are highly effective in removing metal oxides and rust. These oxides form when metals react with oxygen in the environment. Acids react with the metal oxides, converting them into water-soluble salts. For example, sulfuric acid reacts with iron oxide (rust) to form ferrous sulphate, which easily dissolves in water.

Degreasing:
Bases like sodium hydroxide (lye) or sodium carbonate (soda ash) are excellent for removing oil, grease, and other organic contaminants from metal surfaces. These bases react with the oils and fats, breaking them down into water-soluble components that can be rinsed away.



ROLE OF ACID AND BASES IN TEXTILE DYEING

Acids and bases play a vital role in textile dyeing, influencing everything from fabric preparation to colour fastness.

Scouring:
Before applying dye, fabrics need thorough cleaning to remove natural oils, waxes, and impurities that can hinder dye uptake. **Bases,** often sodium hydroxide (NaOH), are used in this process. The high pH of these solutions breaks down and convert the fatty materials to soap, allowing them to be washed away.

Dyeing:
Acids or bases can be used to adjust the pH of the dye bath, significantly impacting how the dye interacts with the fabric fibers.

- **Acidic Dyes:**

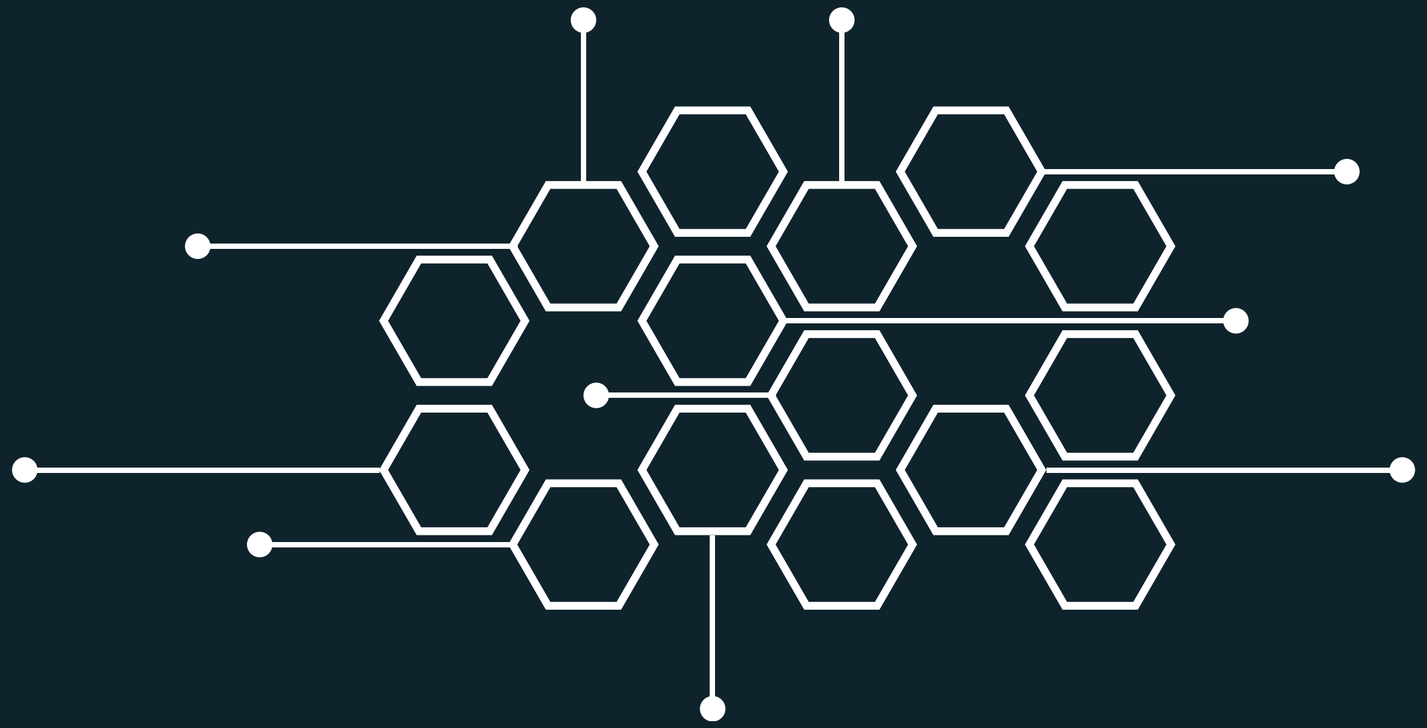
  These dyes work best in a slightly acidic environment (pH 5-6). Adding organic acids like acetic acid can enhance the brightness and colorfastness of the dye on protein fibres like wool or silk.

- Basic Dyes:

  Basic dyes favour a more basic environment (pH 8-10). Sodium carbonate or other bases can be used to promote dye uptake on cellulose fibres like cotton.

Setting the Dye

After dyeing, a setting treatment helps the dye mix better to the fabric, improving wash fastness. Depending on the dye type, acids or bases can be used in this stage. For example, a mild acid bath might be used for acid dyes on protein fibres, while a basic salt solution might be used for basic dyes on cellulosic fibres.



ROLE OF ACID AND BASES IN CHEMICAL MANUFACTURING

- **Catalysts**

Acids and bases can act as catalysts, accelerating chemical reactions without being consumed themselves. This significantly improves production efficiency.
Example: Sulfuric acid is a widely used catalyst in the production of fertilisers, polymers, and many other chemicals.

- **Neutrilization**

Acids and bases can be used to neutralize unwanted solutions or waste streams. This helps control the pH of these materials, preventing environmental harm from improper disposal.
Example: In some industrial processes, acidic or basic byproducts are neutralized before releasing them into the environment.

- **Reaction Medium**

Acids and bases can serve as the reaction medium itself, creating a specific environment for the desired chemical reaction to occur.
E**xample:** Nitric acid is used in the production of nylon, where it participates in the reaction and helps form the polymer chains.

- **Extraction and Purification**

Acids and bases are often used to separate or purify desired products from reaction mixtures. They can selectively dissolve or precipitate target compounds based on their chemical properties.

Example: In the production of pharmaceuticals, acidic or basic solutions may be used to extract the drug molecule from a complex reaction mixture.

CONCLUSION

It's important to note that the specific acids and bases used in these processes depend on various factors, including the type of metal, fabric, or chemical reaction involved. Safety is also paramount, as both acids and bases can be corrosive and require proper handling.

Thank you!