''बेटी बचाओ, बेटी पढ़ाओ''

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

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Course - B. Pharm (1st sem)

Session - Pharmaceutical Inorganic Chemistry – (General Methods of Preparation 4)

Academic Day starts with –

- Greeting with saying **'Namaste'** by joining Hands together following by 2-3 Minutes Happy session, Celebrating birthday of any student of respective class and **NationalAnthem**

Pharmaceutical Inorganic chemistry

General methods of Preparation

Hydrogen Peroxide (H2O2) is a chemical compound with various applications, including medicinal uses. Here's a brief overview:

General Methods of Preparation:

1. **Auto-oxidation of 2-ethylanthraquinol:** This process involves the auto-oxidation of 2-ethylanthraquinol in the presence of air.

2. **Barium Peroxide Reaction:** Barium peroxide reacts with sulfuric acid to produce hydrogen peroxide.

Assay for Hydrogen Peroxide:

The assay for hydrogen peroxide often involves its reduction to oxygen, which can then be measured. One common method is using potassium permanganate as the oxidizing agent. The amount of oxygen evolved is proportional to the amount of hydrogen peroxide present.

Properties:

- **Chemical Formula:** H_2O_2
- **Physical State:** Colorless liquid
- **Odor:** Pungent and characteristic
- **Solubility:** Miscible with water
- **Stability:** Decomposes into water and oxygen upon exposure to light, heat, or catalytic substances.

Medicinal Uses:

Hydrogen peroxide has various medicinal applications, including:

- **Antiseptic:** Used to clean wounds and prevent infection.
- **Mouthwash:** Diluted hydrogen peroxide can be used as a mouthwash for oral hygiene.
- **Ear Cleaning:** Used to remove earwax when diluted and administered properly.
- **Skin Lightening:** Used in cosmetic products to lighten skin pigmentation.
- **Disinfectant:** Used to sanitize surfaces in medical settings.

General Methods of Preparation:

Chlorinated lime is typically prepared by treating calcium hydroxide (slaked lime) with chlorine gas. The reaction produces calcium hypochlorite, the active component of chlorinated lime. The reaction can be represented as follows:

$$Ca(OH)_2 + Cl_2 \rightarrow Ca(ClO)_2 + H_2O$$

Assay for Chlorinated Lime:

One common method to assay the available chlorine content in chlorinated lime is the "iodometric method." In this method, the chlorine in the sample reacts with potassium iodide to liberate iodine, which can then be titrated with a sodium thiosulfate solution.

Properties:

- Chlorinated lime is a white or pale yellowish solid with a strong chlorine odor.
- It's a strong oxidizing agent due to the presence of hypochlorite ions.
- It's highly soluble in water, and the resulting solution is often referred to as "chlorinated lime solution" or "bleach."

Medicinal Uses:

Chlorinated lime has historical use as a disinfectant and antiseptic. It was commonly used to treat wounds and prevent infections. However, its use has diminished over time due to the availability of more effective and safer alternatives. Chlorinated lime's strong chlorine odor and potential for skin irritation limited its medical applications.

Copper sulfate, also known as cupric sulfate or blue vitriol, is a chemical compound with various applications. Here's a brief overview of its general methods of preparation, assay, properties, and some medicinal uses:

General Methods of Preparation:

Copper sulfate can be prepared through the reaction of copper oxide or copper metal with sulfuric acid. The chemical equation for the reaction is:

$CuO + H_2SO_4 \rightarrow CuSO_4 + H_2O$

Assay for Copper Sulfate:

To determine the concentration or purity of copper sulfate in a sample, a common method is volumetric analysis, where a solution of known concentration reacts with the copper sulfate solution until a reaction endpoint is reached. This could involve titration with a standardized solution of a reagent that reacts specifically with copper ions.

Properties of Copper Sulfate:

- **Appearance:** Blue crystals or white powder (anhydrous form)
- **Solubility:** Highly soluble in water
- **Color:** Blue in hydrated form, white in anhydrous form
- **Odor:** Odorless
- **Toxicity:** Moderately toxic if ingested or inhaled, can cause skin and eye irritation
- **Uses:** Agriculture (fungicide, nutrient supplement), electroplating, leather industry, educational purposes, and more.

Medicinal Uses:

Copper sulfate has been used historically for various medicinal purposes, although many of these applications have fallen out of favor due to safety concerns. Some uses included:

- **Wound Treatment:** It was used as an antiseptic and astringent to prevent wound infection.

- **Eye Infections:** Dilute solutions were used for eye washes to treat eye infections.
- **Fungicide:** In some traditional medicines, it was used to treat fungal infections on the skin

Ferrous sulfate, also known as iron(II) sulfate, is a compound with various uses. Here's some information on its general methods of preparation, assay, properties, and medicinal uses:

General Methods of Preparation:

Ferrous sulfate can be prepared through the reaction of iron with sulfuric acid. Iron filings or iron oxide can react with dilute sulfuric acid to produce ferrous sulfate and hydrogen gas.

Assay:

The assay of ferrous sulfate often involves titration methods. One common method is the redox titration, where the iron in ferrous sulfate is oxidized to iron(III) using a standard solution of potassium dichromate, and the end point is determined using an indicator.

Properties:

- **Chemical Formula: $FeSO_4$**
- **Appearance:** Usually light green or pale blue crystalline solid
- **Solubility:** It is highly soluble in water.
- **Oxidation State:** Iron in ferrous sulfate is in the +2 oxidation state.
- **Odor and Taste:** It has a metallic taste and no distinct odor.

Medicinal Uses:

Ferrous sulfate is commonly used as a dietary supplement to treat or prevent iron-deficiency anemia, a condition where the body lacks sufficient iron to

produce hemoglobin. Hemoglobin is essential for carrying oxygen in the blood. Ferrous sulfate provides the body with the necessary iron to support red blood cell production and oxygen transport.

Sodium thiosulfate, Na2S2O3, is a compound used for various purposes, including in photography, as an antidote for cyanide poisoning, and in medical treatments. Here's some information about its general methods of preparation, assay, properties, and medicinal uses:

Preparation:

Sodium thiosulfate can be prepared through the reaction between sodium sulfite (Na2SO3) and elemental sulfur (S). The reaction proceeds as follows:

2 Na2SO3 + S → Na2S2O3 + Na2SO4

Assay:

Assaying sodium thiosulfate involves determining the concentration or purity of the compound. This can be done through various methods, such as titration with iodine solution, which oxidizes thiosulfate ions to form tetrathionate ions.

Properties:

- Sodium thiosulfate is a white crystalline solid.
- It is soluble in water.
- It has a faint odor of sulfur.
- It is a reducing agent and can react with strong acids, liberating sulfur dioxide gas.
- It forms complexes with various metals, making it useful in analytical chemistry.

Medicinal Uses:

- Sodium thiosulfate is used as an antidote for cyanide poisoning. It reacts with cyanide ions to form less toxic thiocyanate ions.
- It is used in some medical treatments, such as for calciphylaxis, a condition involving the formation of calcium deposits in the skin and blood vessels.
- In alternative medicine, sodium thiosulfate is sometimes used as a detoxifying agent or to treat certain skin conditions.
- It may have potential applications in chemotherapy to reduce the side effects of certain drugs.