

PHARMACEUTICAL INORGANIC CHEMISTRY- BP104T

UNIT: 2 (ACIDS, BASES AND BUFFERS)

CLASS: 6

TOPIC: **SODIUM FLUORIDE & ZINC EUGENOL CEMENT****SODIUM FLUORIDE****Molecular Formula:** NaF**Molecular weight:** 41.99 g/mol**Standards:** Sodium fluoride contains not less than 98% and not more than 102% of sodium fluoride, calculated with reference to the dried substance**Method of Preparation:**

1. It may be prepared by neutralizing hydrofluoric acid with sodium carbonate.



2. Another method includes the double decomposition of calcium fluoride with sodium carbonate wherein insoluble calcium carbonate can be removed by filtration.

**Properties:** A white powder or colorless crystals. Soluble in water practically, insoluble in ethanol (95 %)**Identification Tests:**

1 gm of sodium fluoride is placed in a platinum crucible in a well- ventilated hood. To this, 15 ml of sulfuric acid is added and covered with a piece of clean polished glass. The crucible is heated on a water bath for an hour. After an hour the glass covered is removed and rinsed with water and wiped dry. It will be observed that the surface of glass has been etched.

Uses:

1. Sodium fluoride due to its fluoride ion is an important agent in dental practice for retarding or preventing dental caries. Fluoridised teeth have been resistant to microorganisms causing dental caries. It also decreases microbial acid production.
2. Sodium fluoride in 2 % aqueous solution is widely used topically.

Application:

3 ppm (equivalent to 0.7 to 1.3 ppm of fluoride ion) in drinking water; topically as a 2% solution to the teeth

Caution: When consumed in larger doses, sodium fluoride is poisonous. High fluoride water greater than 3 ppm) brings about mottling of teeth, gastric disturbances, etc. Still larger doses may lead to systemic toxicities effecting central nervous, cardiovascular, musculo-skeletal and respiratory systems.

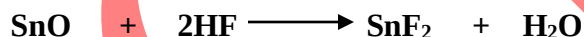
STANNOUS FLUORIDE

Molecular Formula: SnF_2

Molecular weight: 56.7 g/mol

Standards: It contains not less than 71.2% of stannous ion and not less than 22.3% and not more than 25.5% of fluoride, calculated on dries basis.

Method of Preparation: It may be prepared by evaporating a solution of stannous oxide in hydrofluoric acid in the absence of oxygen.



Properties:

1. Its white crystalline powder having astringent salty taste.
2. It is soluble in water but insoluble in alcohol
3. An aqueous solution of stannous fluoride on standing, white ppt of stannous hydroxide will be developed.



4. It should be kept in air tight closed container because of its tendency to get oxidised to stannous tetra-fluoride.

Identification Tests:

1. To 5 ml of 10% w/v solution in a test tube, when 2ml of calcium chloride is added, a white precipitate of calcium fluoride is obtained.
2. When 2 drops of 10% w/v solution of stannous fluoride and 2 drops of silver nitrate is mixed, a brown precipitate is formed.

Uses: It is used to prevent dental caries in the form of solutions, gels, mouth washes or dentifrices but it has an unpleasant taste and may cause discoloration of teeth on over usage.

CEMENT AND FILLERS

e.g. Zinc oxide eugenol cement.

Dental cement is used to temporarily or permanently cover protects areas that have undergone operation as in dental surgery. The cementing material is applied as a paste, which gets hardened a short while forming a protective layer. After healing the operated tissue, the hardened cement can be removed by the dentist.

The temporary cement is also medicated, usually with eugenol, which is antiseptic and local anesthetic.

ZINC OXIDE EUGENOL CEMENT

Zinc oxide eugenol (ZOE) is a material formed by the combination of zinc oxide and eugenol contained in oil of cloves.

They are cements of low strength. Also, they are the least irritating of all dental cements and are known to have an obtundent effect on exposed dentin.

Classification:

Type I ZOE: For temporary cementation

Type II ZOE: Permanent Cementation

Type III ZOE: Temporary filling and thermal base

Type IV ZOE: Cavity Liners

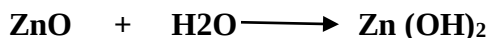
ZOE cement is available as:

1. Powder and liquid

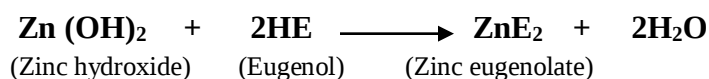
2. Paste system

Method of Preparation:

- In the First Step Hydrolysis of Zinc Oxide to its hydroxide takes place. Water is essential for the reaction (dehydrated zinc oxide will not react with dehydrated eugenol)



- The reaction proceeds as a typical acid – base reaction



- The Chelate formed is an amorphous gel that tends to crystallize imparting strength to • the set mass

Structure of set cement:

The set cement consists of particles of zinc oxide embedded in a matrix of zinc eugenolate.

Setting time is around 4-10min.

Uses:

1. Zinc oxide eugenol is used in temporary and permanent cementation and also used as pulp capping agent.
2. It is used to reduce pain sensation in teeth and also has anesthetic and anti bacterial activity

2 MARKS QUESTION

1. Write about zinc eugenol cement
2. Write the applications and composition of zinc eugenol cement

5 MARKS QUESTIONS

1. Write a note on Zinc eugenol cement
2. Write a note on cement and fillers

10 MARKS QUESTIONS

1. Describe the method of preparation and uses of any two dental products.
2. Write the preparation and medicinal uses of calcium carbonate and sodium fluoride?