

PHARMACEUTICAL INORGANIC CHEMISTRY- BP104T

UNIT: 2 (ACIDS, BASES AND BUFFERS)

CLASS: 5

TOPIC: DESENSITIZING AGENTS, CALCIUM CARBONATE

Cleaning Agents (Dentifrices/ Polishing Agents)

e.g., Calcium carbonate, Dibasic calcium phosphate, calcium phosphate, sodium metaphosphate, calcium pyrophosphate

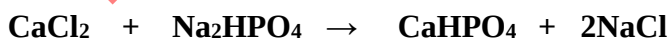
- Dentifrices contain agents for cleaning tooth surfaces and providing polishing effect on the cleaned teeth. These agents are abrasive in nature. They are responsible for physically removing plaque and debris. The overall effect provides whiteness to the teeth. Dentifrices are applied as powders or pastes.
- The main drawback is that it will not be able to clean surfaces inside cavities and crevices between teeth, even if the material reaches them during application. The cleaning action is dependent upon abrasive property and the rubbing force used. Pumice is too abrasive for daily use in a dentifrice.

Dibasic calcium phosphate/ Dicalcium Phosphate

- It is also known as Dicalcium phosphate or Dicalcium orthophosphate or calcium hydrogen phosphate. It occurs as a dihydrate ($\text{CaHPO}_4 \cdot 2\text{H}_2\text{O}$).
- When exposed to air, it effloresces losing water to form anhydrous dibasic calcium phosphate (CaHPO_4).
- In a very fine powder form, it finds use in dentifrices. It provides good flow properties and is odorless and tasteless.

Method of Preparation:

It may be prepared by reacting neutral solution of calcium chloride with disodium hydrogen phosphate



Uses:

1. This salt is having 1:1 ratio of calcium to phosphorus. It is most frequently recommended for oral administration as an electrolyte replenisher.
2. As a salt it is able to supply both calcium and phosphorus which is need for the growth in children and pregnant women's.

- Externally it finds use as Dentifrice having cleaning action. The moderate abrasive quality makes it suitable for toothpaste and tooth powders.

CALCIUM CARBONATE

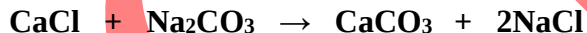
Molecular Formula: CaCO_3

Molecular weight: 100.1 g/mol

Synonym: Precipitated Chalk, Precipitated Calcium carbonate.

It has been regarded as one of the most abundant and widely distributed of calcium salts. In nature, it is found as chalk, marble, lime stone, aragonite and calcite and one of the main constituents of pearls and shells.

Preparation: On commercial scale, calcium carbonate is obtained by mixing the boiling solution of calcium chloride and sodium carbonate and allowing the resulting precipitate to settle down



The precipitate is collected on filter and washed with boiling water, until becomes free from chloride ions, finally the precipitate is dried.

Properties:

It occurs as fine, white, micro-crystalline powder. It is odorless and tasteless. It is stable in air. It is almost soluble in water and alcohol. Calcium carbonate neutralises acids with effervescence.



Uses:

- Precipitated chalk, which is having a fine powdery texture, is used in dentifrice, both powders and pastes.
- It furnishes both abrasive and antacid effect in the mouth. It forms a common ingredients of tooth powder and toothpaste.
- It is having a tendency to cause constipation and hence it is usually administered alternatively or along with magnesium salts.
- It is rapidly acting non-systemic antacid. It neutralizes gastric acid and forms calcium chloride.

DESENSITIZING AGENTS

Eg., Strontium Chloride and Zinc Chloride.

- Desensitizing agents reduce the pain in sensitive teeth caused by cold, heat or touch. These products should be non-abrasive and should not be used on a regular basis unless directed by a dentist.
- The exact mechanism of action of desensitizing agents is not known with certainty. However they act probably like local anesthetic.

STRONTIUM CHLORIDE

Molecular Formula: $\text{SrCl}_2 \cdot 6\text{H}_2\text{O}$

Molecular weight: 266.2 g/mol

Preparation: It is prepared by adding strontium carbonate to hydrochloric acid until effervescence gets ceased. The solution is filtered, concentrated and allowed to crystallize.



Properties:

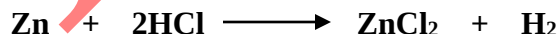
It is available in the form of white crystals or granules. It produces effervescences in dry air. Soluble in water and alcohol.

Uses: It acts desensitizing agent in dental remedies

ZINC CHLORIDE

Molecular Formula: ZnCl_2

Preparation: It is prepared by heating granulated zinc with hydrochloric acid. When evolution of hydrogen ceases, the solution is filtered and evaporated to dryness.



Uses:

1. It is used as an antiseptic astringent to the skin and mucous membrane as a 0.5–2.0% solution.
2. It is used as an active ingredient to prepare magnesia cements for dental fillings and certain mouthwashes.

3. It is also used as dentin desensitizer, topically as a 10% solution to the teeth. It is for topical use only and is administered as solution and mouthwash.

2 MARKS QUESTION

1. What are desensitizing agents? Give examples?
2. What are Dentifrices? Give examples

5 MARKS QUESTIONS

1. Write a note on Zinc chloride

10 MARKS QUESTIONS

1. What are dentifrices? Classify them with an example. Write a note on the role of fluoride as an Anti-caries agent
2. Write the method of preparation, properties and uses of strontium chloride and zinc chloride