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## Bleaching powder (or) Chloride of lime, $\text{CaOCl}_2$ (or) $\text{Ca}(\text{OCl})\text{Cl}$ .

- It is a mixture of  $\text{CaCl}_2$  and  $\text{Ca}(\text{OCl})_2$  (calcium hypochlorite)
- It is also called calcium chloro hypochlorite or calcium oxychloride.

### **Manufacture :**

- It is manufactured in Bachmann's plant.
- $\text{Cl}_2$  gas is passed into dry slaked lime  
 $\text{Ca}(\text{OH})_2 + \text{Cl}_2 \rightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$
- The plant is a vertical cast iron tower
- It has two inlets, one for hot air just above the base, second inlet is for  $\text{Cl}_2$  just above the 1st inlet.
- Hopper is arranged at the top for sending slaked lime.
- Exit is arranged just below the hopper for the escape of unused  $\text{Cl}_2$  and air.
- Horizontal shelves with rotating rakes are arranged at regular heights.
- Dry slaked lime moves downwards with the help of rotating rakes and  $\text{Cl}_2$  moves up.
- $\text{CaOCl}_2$  is formed based on the "principle of counter currents".
- Principle of counter currents means reactants will react by moving.
- Hot air drives away unreacted chlorine.

### **Physical properties :**

- Yellowish white powder with smell of chlorine
- Most of it is soluble in water but a small amount of insoluble lime.

### **Chemical properties :**

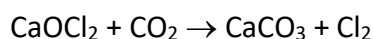
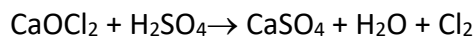
- Reactions of bleaching powder are
  - i) with insufficient and excess dilute acid
  - ii) auto oxidation
  - iii) catalytic decomposition
  - iv) with cold and hot water
  - v) oxidation of lead salts and ethyl alcohol

**(i) A. with insufficient dilute acid :** It first forms  $\text{HOCl}$  and finally releases  $\text{O}_2$ .



It is good oxidising agent as it liberates nascent oxygen.

### **B. with excess of dilute acid :**



The released  $\text{Cl}_2$  is called available chlorine.

A good sample releases 35 – 38% available  $\text{Cl}_2$ . Theoretically the amount of  $\text{Cl}_2$  in  $\text{CaOCl}_2$  is 56%.

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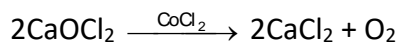
**(ii) Autoxidation (Reaction in air)**

On long standing in air, it decomposes



Because of this auto oxidation, it loses its available chlorine and bleaching property is affected.

**(iii) Catalytic decomposition :**



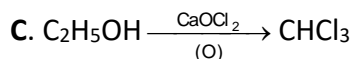
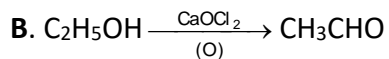
Cobalt chloride is the catalyst

**(iv) A. With cold water :  $\text{CaOCl}_2 \rightarrow \text{Ca}^{2+} + \text{Cl}^- + \text{ClO}^-$**

**B. with hot water :** It undergoes auto oxidation giving  $\text{Cl}^-$  and  $\text{ClO}_3^-$  ;  $3\text{OCl}^- \rightarrow \text{ClO}_3^- + 2\text{Cl}^-$ .

**Oxidising property :**

**A.** Lead salts  $\rightarrow \text{PbO}_2$



**Uses :**

- Oxidising agent, chlorinating agent
  - Bleaching agent for cotton and paper pulp
  - Disinfectant, germicide and sterilizes water
  - In the preparation of chloroform.
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