



## Chemistry

Class-10

Chapter-12

### Chemistry in our lives

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Lecture sheet with worksheet-3

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#### Unit-1: Toilet cleaner

Toilet cleaner is the combination of many ingredients. But the main ingredients are sodium hydroxide (NaOH) and sodium hypochlorite (NaOCl).

Not only the dirt particles are present in the toilet, lots of germs are present in the toilet. So, for proper cleaning we have to remove the dirt as well as kill the germs also. The dirt substances are mainly oily materials, protein molecules and many coloured substances.

When toilet cleaner is applied on basin, commode and floor of the toilet, sodium hydroxide (NaOH) works for removing oily, fatty substances and protein molecules and sodium hypochlorite (NaOCl) works for removing coloured spots and killing germs like bacteria, fungus and virus.

Sodium hydroxide is a strong alkali and it can react with oil and fat and produce substances which can be easily removed by washing with water. It also can hydrolyse protein molecules. Sodium hypochlorite (NaOCl) reacts with water and produces sodium hydroxide and hypochlorous acid.

Hypochlorous acid is a very unstable acid and starts readily to decompose into hydrochloric acid and nascent oxygen. This nascent oxygen is very active oxygen and oxidizes the coloured substances into colourless substances and also kills germs.

#### Exercise-1:

1. Why is strong alkali used as the main ingredient of toilet cleaner?
2. Discuss the technique of cleaning toilet with toilet cleaner.

#### Unit-2: Bleaching powder

Bleaching powder is a very popular disinfectant. It is used to floor, basins, commodes of our house, hospitals and even used to wash the cloths. If there are coloured spots on cloths or anywhere, we often use bleaching powder to make them spotless. That is why bleaching powder is known as anti-pigment. That means it can work against colour or pigment.

The Chemical formula of bleaching powder is  $\text{Ca}(\text{OCl})\text{Cl}$  and chemical name is calcium chloro hypochlorite.

When chlorine gas is passed through calcium hydroxide (slaked lime) at 40<sup>0</sup> C temperature bleaching powder is produced.

When bleaching powder is applied with water on dirt spots of cloths or anywhere, it reacts with water to produce calcium chloride (CaCl<sub>2</sub>) and hypochlorous acid (HOCl).

HOCl decomposes to produce HCl and very active nascent oxygen [O]. This nascent oxygen reacts with the coloured substances and make these colourless. This [O] also oxidizes germs to kill the germs.

### **Exercise-2:**

1. Write down the preparation of bleaching powder with reaction.
2. Explain the spot removing and germ killing technique of bleaching powder.

### **Unit-3: Glass cleaner**

To clean glass is very special because glass displays very clearly dirt, grease and even fingerprint and cleaning the glass often leaves un-attractive marks on it. Glass itself is a mixture of chemical substances. The main component of glass is sodium silicate (Na<sub>2</sub>SiO<sub>3</sub>) or calcium silicate (CaSiO<sub>3</sub>). As a glass cleaner such a material is used which does not react with glass materials but reacts and cleans the dirt, oil, fat and grease.

Glass cleaner is usually the mixture of iso propyl alcohol [ CH<sub>3</sub>CH(OH)CH<sub>3</sub>] and ammonium hydroxide (NH<sub>4</sub>OH). Ammonium hydroxide is prepared by dissolving ammonia gas in water.

Iso propyl alcohol and ammonia both have low boiling point. These two can evaporate very fast. After cleaning glass these two chemicals leave glass surface streakless and markless.

Since NH<sub>4</sub>OH is basic in nature, it reacts with oil, fat and grease on the glass and removes the from the glass surfaces. Iso propyl alcohol is very good solvent. It can dissolve organic compounds from the glass surfaces.

### **Exercise-3:**

1. Why are volatile chemicals used for making glass cleaner?
2. Write down the principle of laboratory preparation and industrial production of the main component of glass cleaner.
3. Discuss the technique of cleaning glass with glass cleaner.