

SUBJECT - CHEMISTRY

CLASS - BSc (Hons) PART - II

PAPER - III

GROUP - B

TOPIC - The Trioxides

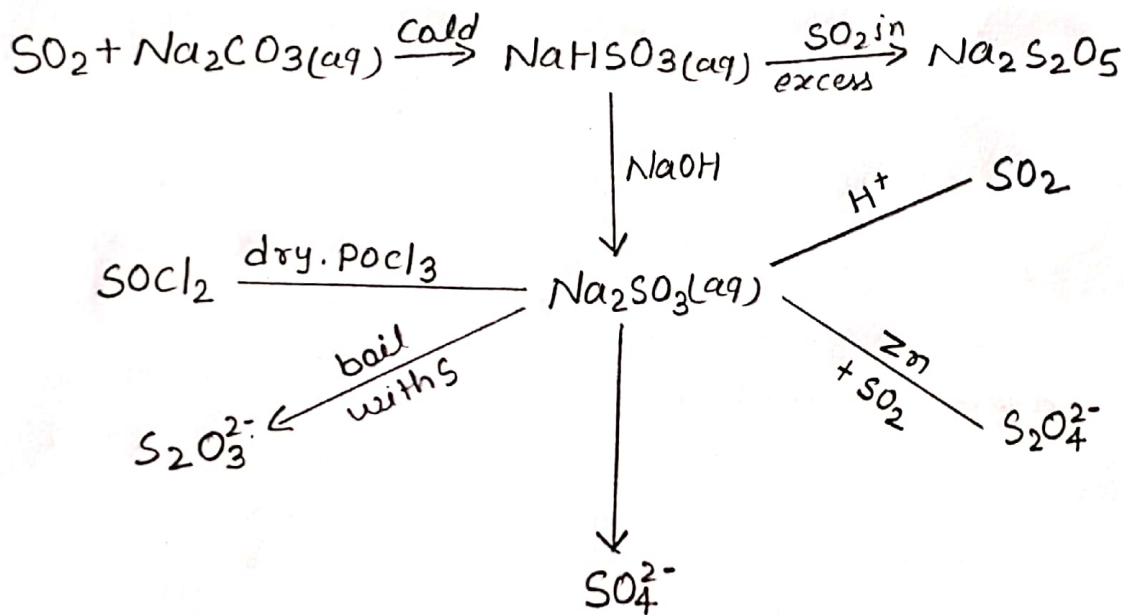
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Sulfur trioxide is obtained by reaction of  $\text{SO}_2$  with  $\text{O}_2$ , a reaction that is thermodynamically very favorable but extremely slow in the absence of a catalyst such as platinum sponge,  $\text{V}_2\text{O}_5$  or  $\text{NO}$ . Sulfur trioxide reacts vigorously with water to form sulfuric acid industrially.  $\text{SO}_3$  is absorbed in concentrated  $\text{H}_2\text{SO}_4$  to give oleum which is then diluted. Sulfur trioxide is used as such for



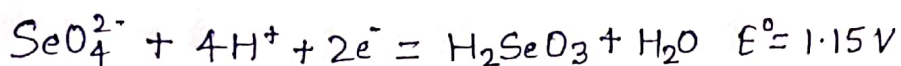
Some reactions of sulfites

preparing sulfonated oils and alkyl arenesulfonate detergents. It is also a powerful, but generally indiscriminate oxidizing agent.

The  $\text{SO}_3$  molecule, in the gas phase, has a planar, triangular structure involving both  $\text{p}\pi\text{-p}\pi$  and  $\text{p}\pi\text{-d}\pi$   $\text{S-O}$  bonding and forms polymers in the solid state.

## Selenic, and Telluric Acids

Selenic acid is similar to  $H_2SO_4$ , including the isomorphism of the hydrates and salts. It differs in being less stable, evolving oxygen above  $200^\circ C$  and being a strong but usually not kinetically fast oxidizing agent.



Telluric acid, which is obtained by oxidation of Te or  $TeO_2$  with  $H_2O_2$  or other powerful oxidants, is very different in structure, being  $Te(OH)_6$  in the crystalline form. It is a very weak dibasic acid ( $K_1 \approx 10^{-7}$ ) and is also an oxidant. Most tellurates contain  $TeO_6$  octahedra as in  $K_2[TeO(OH)_5]$  or  $Hg_3TeO_6$ .

## Thiosulfates

Thiosulfates are readily obtained by boiling solutions of sulfites with sulfur. The acid is unstable in aqueous solution. The alkali thiosulfates are manufactured for use in photography, where they are used to dissolve unreacted silver bromide from emulsions, by formation of the complexes  $[AgS_2O_3]^-$  and  $[Ag(S_2O_3)_2]^{3-}$ . The thiosulfate ion also forms complexes with other metal ions.

The thiosulfate ion has the structure  $S-SO_3^{2-}$ , structure 11

