

SUBJECT - CHEMISTRY

CLASS - BSc (Hons) PART - II

PAPER - III

GROUP - B

TOPIC - OXIDES AND OXO ACIDS

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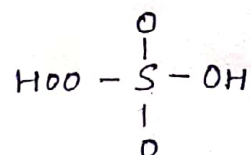
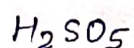
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Table 1 lists the formulas and structures of the principal oxo acids of sulfur. In each case the sulfur may be considered to be roughly sp^3 hybridized and falls.

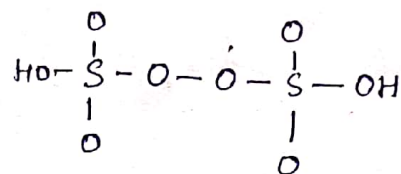
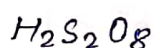
Table-1 The principal Oxo Acids of Sulfur

Name	Formula	Structure ^a
Sulfurous ^b	Acid Containing one Sulfur Atom H_2SO_3	SO_3^{2-} (in sulfites) $\begin{array}{c} O \\ \\ O - S - OH \\ \\ OH \end{array}$
Sulfuric	Acid Containing two Sulfur Atom H_2SO_4	$\begin{array}{c} O \\ \\ O - S - OH \\ \\ OH \end{array}$
Thiosulfuric	$H_2S_2O_3$	$\begin{array}{c} O \\ \\ O - S - SH \\ \\ OH \end{array}$
Dithionous	$H_2S_2O_4$	$\begin{array}{c} O \quad O \\ \quad \\ HO - S - S - OH \end{array}$
Disulfurous	$H_2S_2O_5$	$\begin{array}{c} O \quad O \\ \quad \\ HO - S - S - OH \\ \\ O \end{array}$
Dithionic	$H_2S_2O_6$	$\begin{array}{c} O \quad O \\ \quad \\ HO - S - S - OH \\ \quad \\ O \quad O \end{array}$
Disulfuric	$H_2S_2O_7$	$\begin{array}{c} O \quad O \\ \quad \\ HO - S - O - S - OH \\ \quad \\ O \quad O \end{array}$
Polythionic	Acid Containing Three or more Sulfur Atom $H_2S_{n+2}O_6$	$\begin{array}{c} O \quad O \\ \quad \\ HO - S - S_n - S - OH \\ \quad \\ O \quad O \end{array}$
	Peroxo Acids	

Peroxomonosulfuric



Peroxodisulfuric



In most cases the structure given is inferred from the structure of anions in salts of the acid

The acid is stable in the gas phase as $(\text{HO})_2\text{S}=\text{O}$

The free acid is unknown.

Into either classification AB_3E or AB_4 Extensive $d\pi-p\pi$ bonding between oxygen and sulfur is to be expected.

We approach the chemistry of the acids by considering that they are derived from hydration of the acidic anhydrides SO_2 or SO_3 , or by protonation of the corresponding anions (e.g., sulfates or sulfites).

The Dioxides

The dioxides are obtained by burning the element in air. Sulfur dioxide is produced when many sulfides are heated in air. Selenium and tellurium dioxides are also obtained by treating the elements with hot nitric acid to form H_2SeO_3 and $2 \text{TeO}_2 \cdot \text{HNO}_3$, respectively, and then heating these to drive off water or nitric acid.