

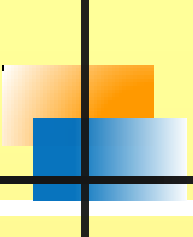


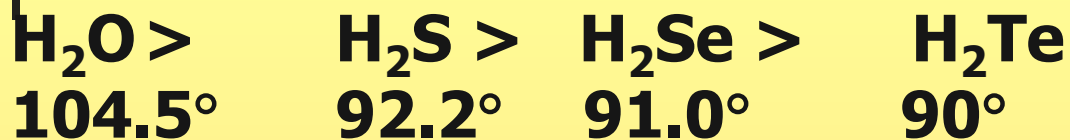
OXYGEN FAMILY



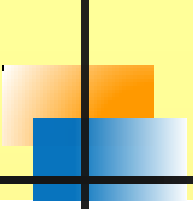
Oxygen Family

- **16 group is comprised of O, S, Se, Te and Po. These elements are known as Chalcogens or ore forming elements. They are p-block elements characterised by general electronic configuration ns^2np^4 .**
- **In this group only sulphur has tendency of catenation.**
- **Oxidation state –**
- **Oxygen commonly shows -2 oxidation state in oxides. It also exhibits -1 state in H_2O_2 , zero in O_2 , +2 in OF_2 and +1 in O_2F_2 .**

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- Unlike oxygen other elements besides exhibiting -2 oxidation state have tendency to show +2, +4 and +6 oxidation states. These elements show coordination number 4 and 6 in their compounds.
 - Sulphur and selenium have molecular composition S_8 and Se_8 .
 - **Hydrides** – All of these form hydrides of general formula H_2R . Order of acidic character of hydrides is $H_2O < H_2S < H_2Se < H_2Te$.
 - They have V- shape structure. Bond angle in hydrides shows the order.

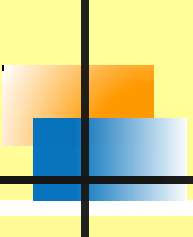


- Reducing nature of hydrides has the order:
 $\text{H}_2\text{O} < \text{H}_2\text{S} < \text{H}_2\text{Se} < \text{H}_2\text{Te}$
- **Ozone** – All allotrope of oxygen.
- Ozone is a pale blue gas, heavier than air, slightly soluble in water.
- Ozone acts as an oxidizing agent as well as a reducing agent.
- **Sulphur** – Occurs in nature, soluble in CS_2 . Its allotropes are rhombic, monoclinic, plastic, colloidal and milk of sulphur.

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- **H₂S is a reducing agent.**
 - **Sulphur dioxide(SO₂)-It is prepared by burning sulphur or roasting sulphides or by reduction of H₂SO₄.**
 - **SO₂ is acidic in nature and give sulphurous acid(H₂SO₃) with water.**
 - **SO₂ acts both as an oxidizing agent as well as reducing agent.**
 - **The bleaching action of SO₂ is due to its reducing property.**



Bleaching action of SO₂ is not permanent because reduced colourless material is oxidized by air to coloured compound.

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- **Sulphurous acid (H_2SO_3) is known only in solution and is unstable.**
 - **When SO_3 gas is passed through Conc. H_2SO_4 , the fuming H_2SO_4 or oleum($\text{H}_2\text{S}_2\text{O}_7$) is obtained.**



Check Your Knowledge

Q. The number of S-S bonds in sulphur trioxide trimer (S_3O_9) is

(a) Three

(b) Two

(c) One

(d) zero

Ans. (d)

Q. Which of the following species is basic and reducing?

(a) SO_3^{2-}

(b) SO_4^{2-}

(c) $S_2O_4^{2-}$

(d) HSO_4^-

Ans. (a)



Q. In S_8 each sulphur atom is:

(a) sp -hybridised with a planar ring

(b) sp^2 - hybridised with a non-planar ring

(c) sp^3 —hybridised with a non-planar ring

(d) sp^3 - hybridised with a planar ring

Ans. (c)

Q. Which of the following is not oxidised by O_3 ?

(a) KI

(b) $FeSO_4$

(c) $KMnO_4$

(d) K_2MnO_4

Ans. (c)



Q. Among the following, the paramagnetic compound is

(a) Na_2O_2

(b) O_3

(c) N_2O

(d) KO_2

Ans(d)

Q. Oxygen was discovered by

(a) Priestley

(b) Boyle

(c) Scheele

(d) Cavendish

Ans (a)



Thank you .