

16th group.

O
S
Se
Te
*Po

① Chalcogen family
one forming family

$$\text{Conf} = n s^2 n p^4$$

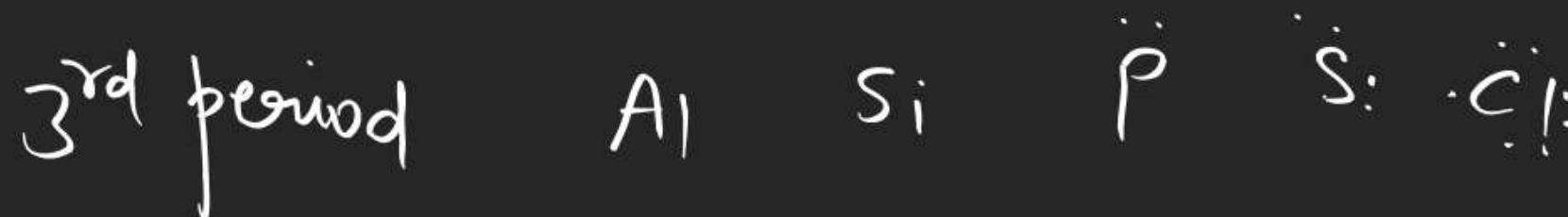
Atomic size



I.E

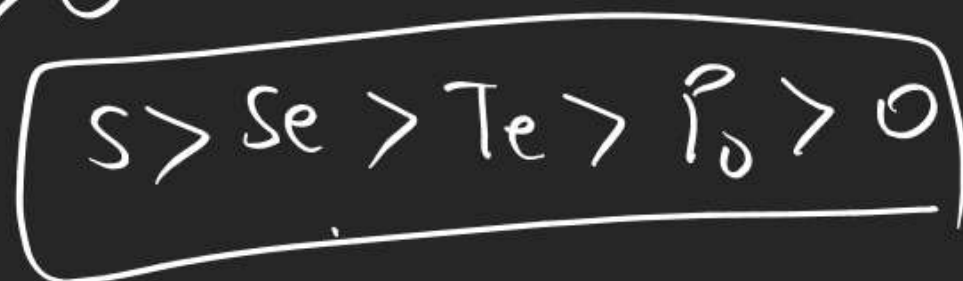


ΔH_{eg}
= d



$S > O$

order



$$\begin{Bmatrix} 0 \\ S \end{Bmatrix}$$

$$S_e$$

$$T_e$$

$$P_0$$

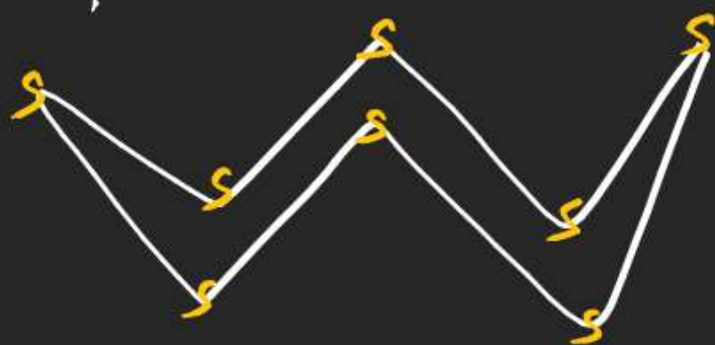
Catenation



Ques $O=O$ exist but $S=S$ does not exist

due to large size $3p_{\pi}-3p_{\pi}$ bond does not
exist

but $S_2(\text{vap})$ acc. to MOT and it is paramag.



S_6 = engel's sulphur



Chair shape

O } non metal
S }

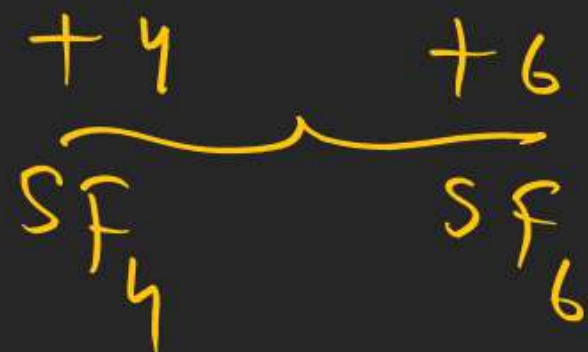
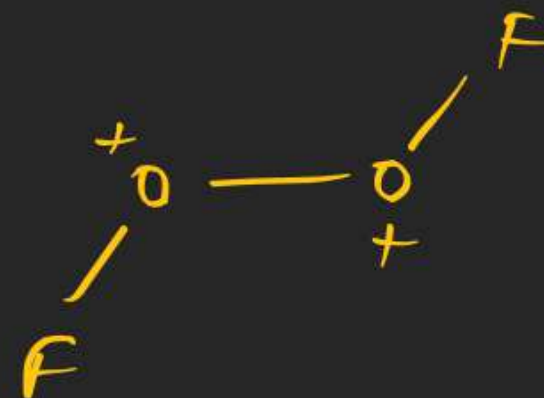
Se } metalloids
Te }

Po — metal

Note \Rightarrow Po radioactive

Oxidation State

$$O = -2$$



down the group - inc o.s ↓
metallic ch. ↑

① Reactivity H_2



order of acidic character

order of thermal stability

order of B.P



due to H-Bonding \leftarrow $H_2O > H_2Te > H_2Se > H_2S$

least thermal stable

Reaction with Halogen

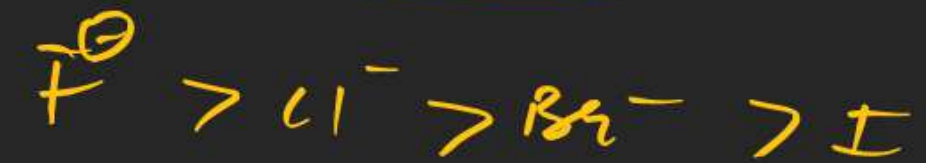


Note = Hexahalides SCl_6
 SBr_6
 SI_6 } do not exist
due to steric

$SF_4 \Rightarrow$ gas $SeF_4 =$ liq. TeF_4 solid

rep.

order of reactivity



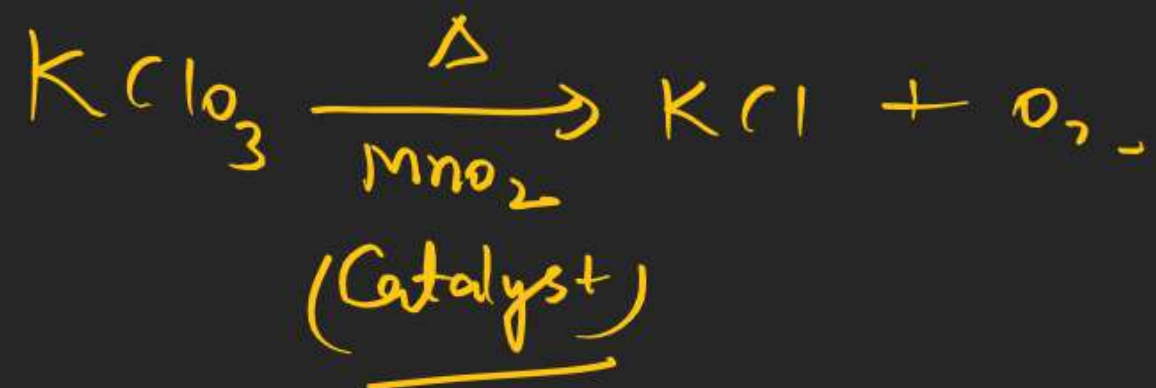
Reaction with oxygen



Reducing prop. ↓ down the group



Oxygen
Prep. air



~~★~~ O_3

① allotrop of oxygen

②



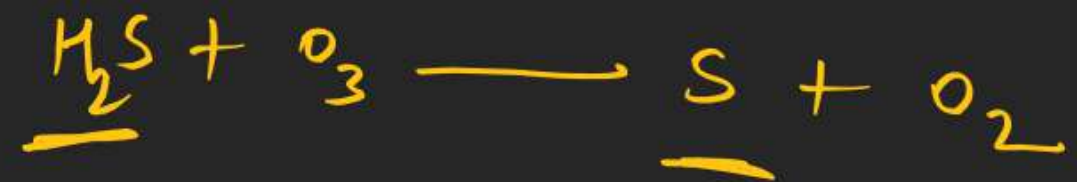
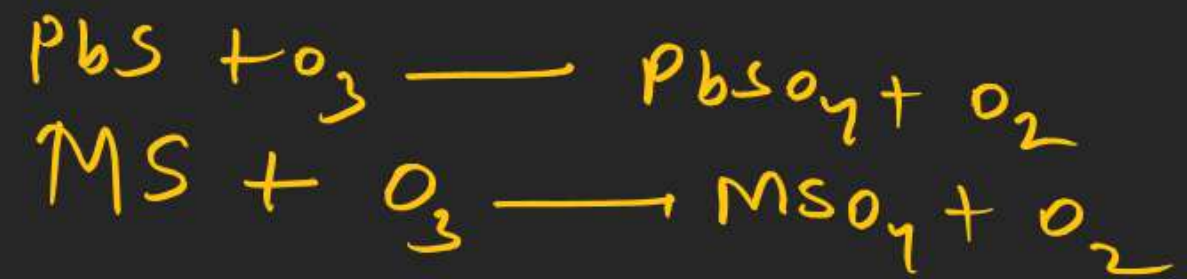
depletion of O_3 layer

Prop.

- ① Pale blue gas, dark blue liq. and violet black solid
- ② fishy smell
- ③ toxic enough [more than KCN]
- ④ oxidising agent



O_3 is strong oxidising agent next to F



sp^2
Planar

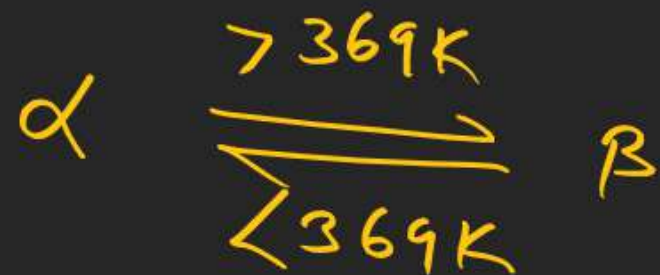
$\mu \neq 0$

Polar

$\text{B-O} = 1.5$

Diamagnetic

allotropes of sulphur



at 369 K both allotropes stable
and it is called transition temp.

① α (Rhombic sulphur)

① yellow col.

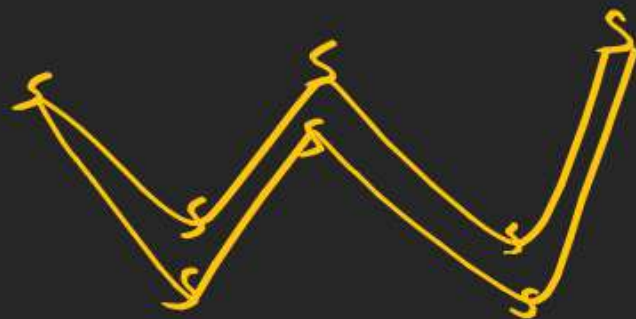
② it is prep. by evaporation of solution

of Rhombic sulphur
③ It is insoluble in water but soluble in Carbon
disulphide (CS_2)

(β) Monoclinic Sulphur

- ① Colourless
- ② Insoluble in water and Soluble in CS_2

both have S_8 [Crown shape]

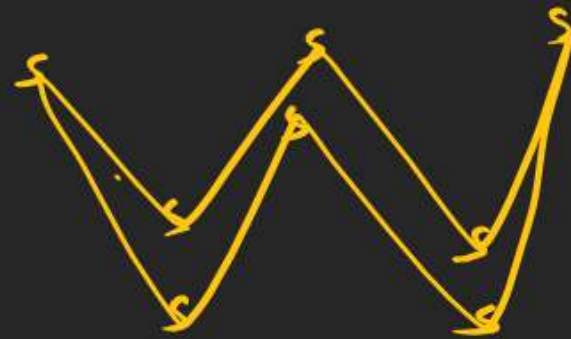


Viscosity of S

M.P of S = 112.8

>112.8 to 160 Viscosity \downarrow

but >160 Viscosity \uparrow



Amorphous form

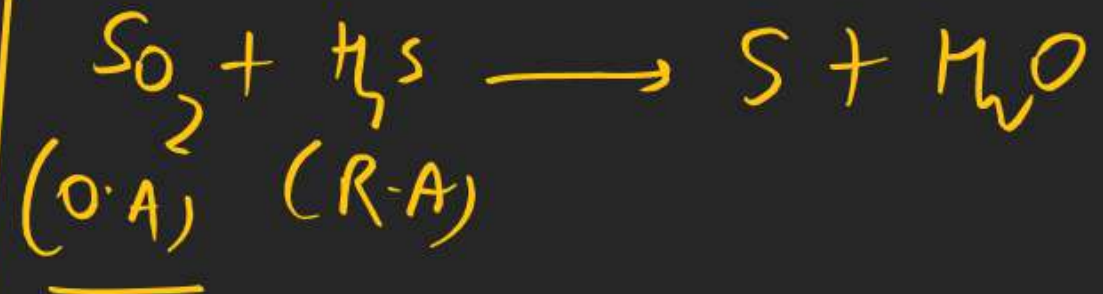
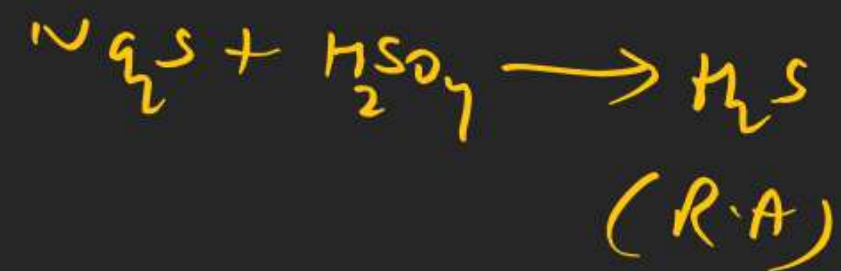
① milk Sulphur

② plastic Sulphur

③ Colloidal Sulphur



Rotten egg smell

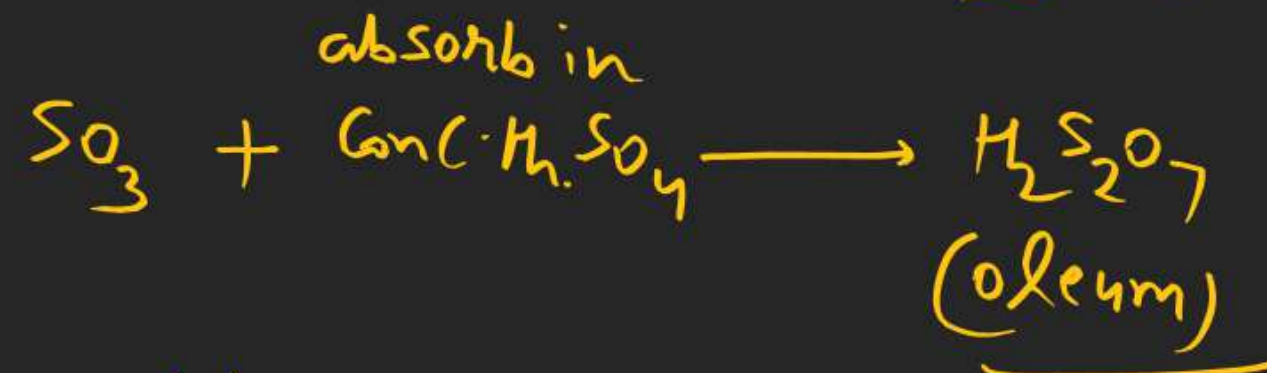
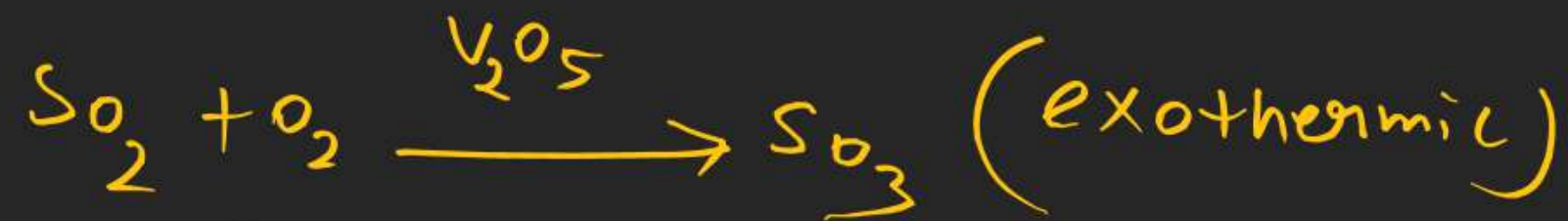
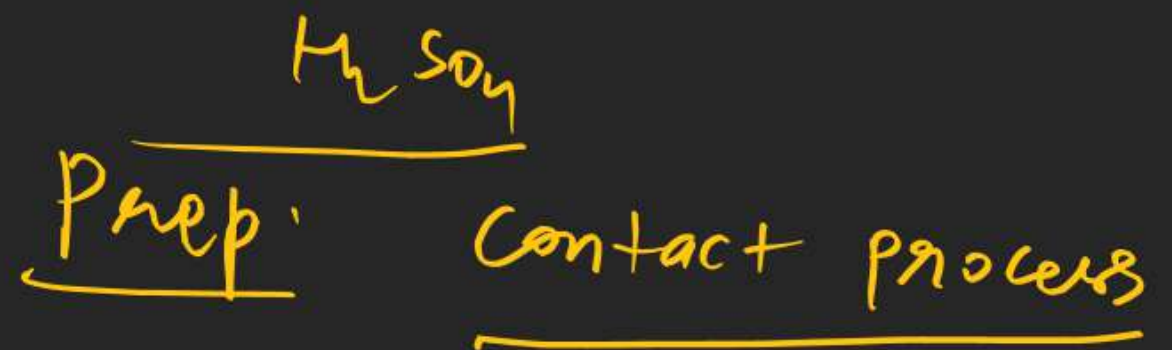


Note = Drying agent

fused CaCl_2 , Al_2O_3 [dehydrated] P_2O_5

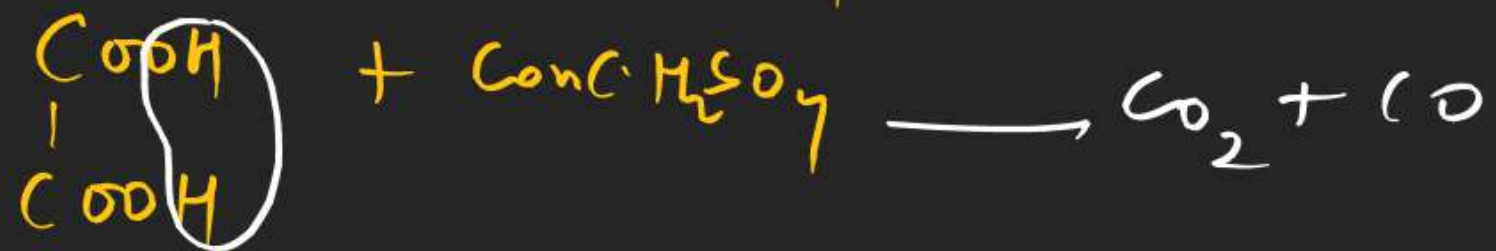
but not H_2SO_4





on dilution of oleum we get desired
conc of H₂SO₄

Conc. H_2SO_4 is good dehydrating agent



Note \Rightarrow P_2O_5 is a better dehydrating agent than H_2SO_4

