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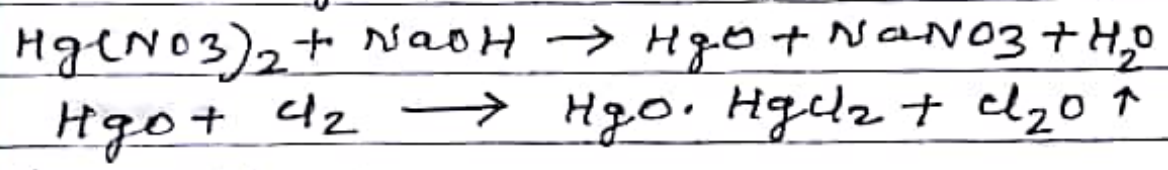
Deg II Chem HONS, Paper - III (Course material)
Session 2020 - 21

Oxides of Chlorine

- (1) Cl_2O - chlorine monoxide
- (2) ClO_2 - chlorine dioxide
- (3) Cl_2O_6 - chlorine hexaoxide
- (4) Cl_2O_7 - chlorine heptoxide

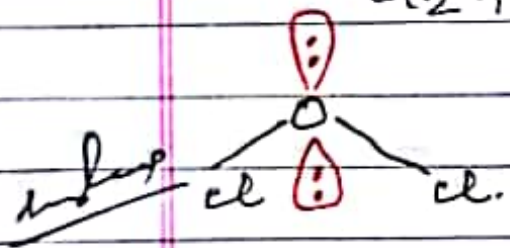
Chlorine monoxide: -

When freshly Prepared HgO is treated with Cl_2 gas, Cl_2O is formed.



Properties: -

- (1) It is yellowish red gas
- (2) It is unstable and explodes on heating $Cl_2O \rightarrow Cl_2 + \frac{1}{2} O_2$
- (3) It reacts with water to form $HClO$
 $Cl_2 + H_2O \rightarrow 2HClO$

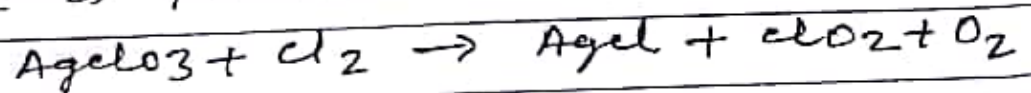


Structure - Tetrahedral
Shape - Angular
The bond angle is 111° .

Bond angle is more than tetrahedral angle ($109^\circ 28'$) due to lone pair-bond pair repulsion.

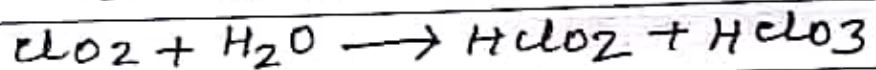
Chlorine dioxide :-

AgClO_3 when heated with Cl_2 gas, ClO_2 is formed.

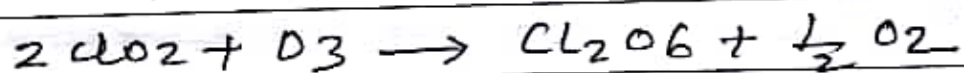


Properties :-

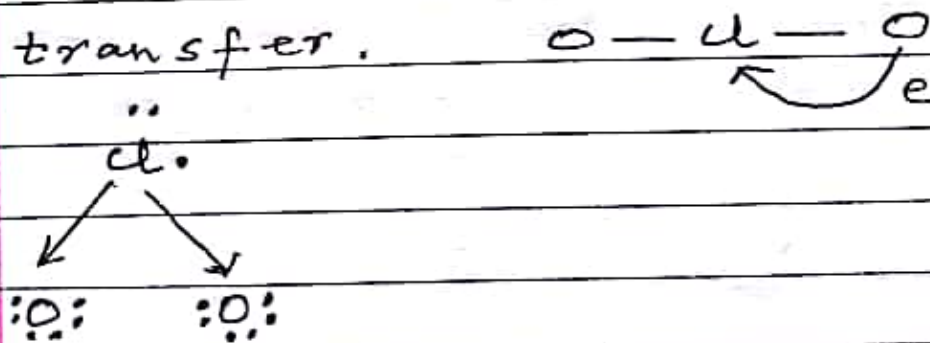
- (1) It is orange yellow gas
- (2) It is explosive and easily explodes in contact with organic matter.
- (3) It forms with water, a mixture of HClO_2 and HClO_3



- (4) It forms Cl_2O_6 with Ozone

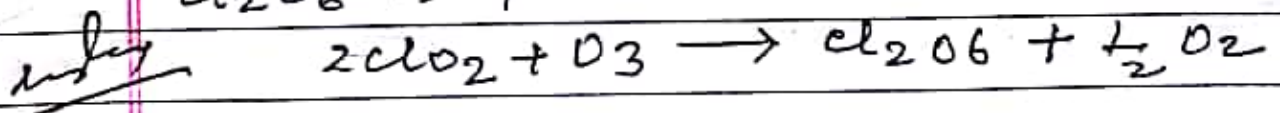


Colour is due to charge transfer.



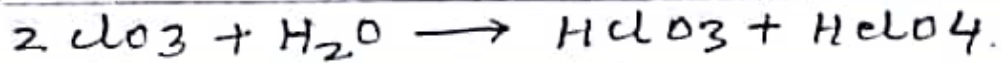
Chlorine hexoxide (Cl_2O_6) :-

When ClO_2 is treated with Ozone Cl_2O_6 is formed

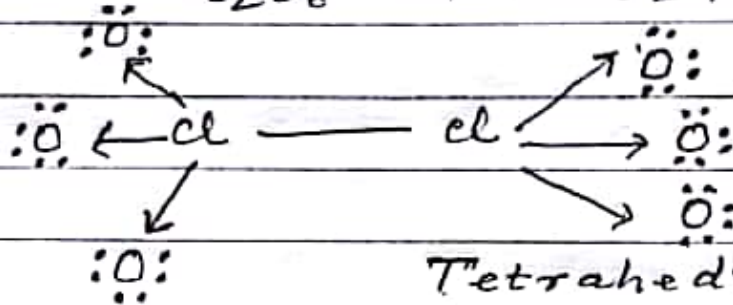
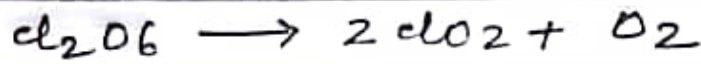


Properties :-

- (1) It is dark red liquid.
- (2) It is explosive.
- (3) It dissolves in water



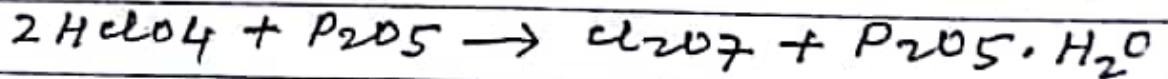
- (4) It decomposes to ClO_2 and O_2



Two tetrahedra are joined in Cl_2O_6
 $2 \text{ClO}_3 \rightleftharpoons \text{Cl}_2\text{O}_6$

Chlorine hepta oxide (Cl_2O_7) :-

When HClO_4 is dehydrated with P_2O_5 at low temperature (-10°C) Cl_2O_7 is formed.



Properties :-

- (1) It is colourless liquid (oily)
- (2) It is explosive but most stable oxide of chlorine
- (3) It dissolves in water and forms HClO_4 .

