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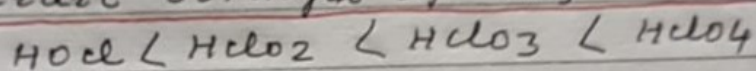
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Deg II Chem Hons, Paper-III (Study material)

Oxy acids of chlorine

- (1) $\text{HOCl} \rightarrow$ Hypochlorous acid
- (2) $\text{HClO}_2 \rightarrow$ chlorous acid
- (3) $\text{HClO}_3 \rightarrow$ chloric acid
- (4) $\text{HClO}_4 \rightarrow$ Perchloric acid

Acidic strength of Oxy acid



The acidic strength is predicted on the basis of effective charge of Oxygen atom in the Oxy anion.

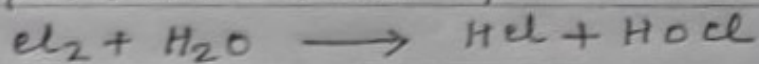
Effective charge $\equiv \frac{\text{charge of anion}}{\text{number of Oxygen atom.}}$

<u>Acid</u>	<u>Anion</u>	<u>Effective charge</u>
HClO	ClO^-	$-\frac{1}{1} = -1$
HClO_2	ClO_2^-	$-\frac{1}{2} = -0.5$
HClO_3	ClO_3^-	$-\frac{1}{3} = -0.33$
HClO_4	ClO_4^-	$-\frac{1}{4} = -0.25$

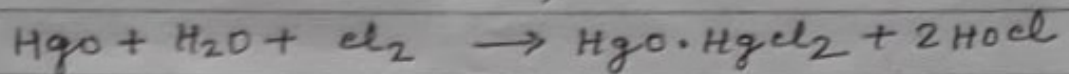
Greater the ^{negative} value of effective charge, more strongly is H^+ bonded with the Oxy anion and lower is the acidic strength. Hence the above mentioned order of the acidic strength is correct.

Hypochlorous acid :-

When Cl_2 is passed into water, $HOCl$ along with HCl is formed due to disproportionation of chlorine



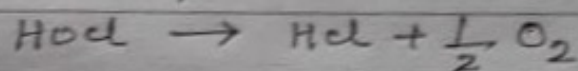
When suspension of HgO is treated with Cl_2 , $HOCl$ is formed



Properties :-

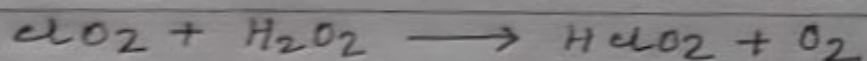
(1) $HOCl$ is unstable and exists in solution only.

(2) It decomposes to HCl and O_2

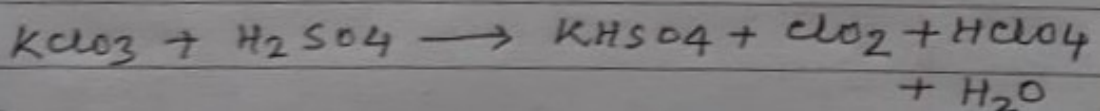


Chlorous acid :-

When ClO_2 is treated with H_2O_2



ClO_2 is obtained by heating $KClO_3$ with conc H_2SO_4 .

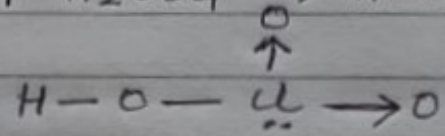
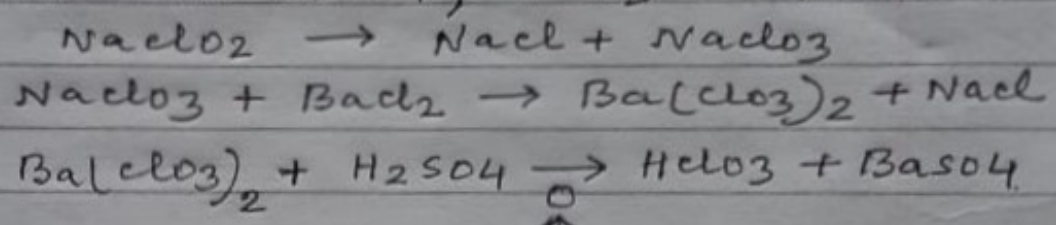


The acid is unstable and exists in solution only.

Chloric acid:-

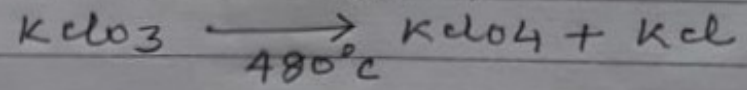
When sodium chlorite (NaClO_2) is heated NaCl and NaClO_3 is formed. When this solution is heated with BaCl_2 soln $\text{Ba}(\text{ClO}_3)_2$ is obtained as a white crystal

When $\text{Ba}(\text{ClO}_3)_2$ is treated with conc H_2SO_4 , HClO_3 is formed.

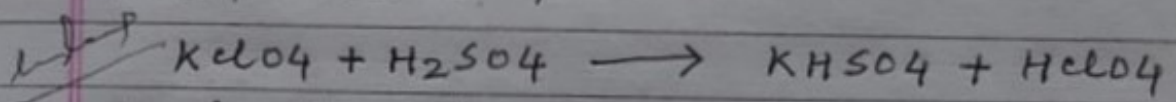


Perchloric acid:-

On heating KClO_3 under controlled condition at 480°C , KClO_4 is formed.



When KClO_4 is treated with H_2SO_4 , HClO_4 acid is formed.



It is liquid soluble in water. It is strongest monobasic acid

Structure:-

