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Dept of Chemistry

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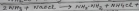
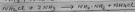
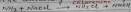
Exp II Chem. Reas, Paper II (Study material)

Hydrazine ( $N_2H_4$ )

Raschig Process :-

It is prepared by the oxidation of  $NH_3$  with  $NaOCl$  (sodium hypochlorite)

$NaOCl$  in the presence of glue or gelatine containing  $Cu^{2+}$  as catalyst



Hydrazine formed can react with  $NH_2Cl$  to give  $N_2$  and  $NH_4Cl$ .



but this reaction is prevented by  $Cu^{2+}$  in glue.

The reaction mixture contains  $N_2H_4$ ,  $NaOH$  and  $NH_2Cl$ . On fractional distillation 98%  $N_2H_4 \cdot H_2O$  (monohydrate of hydrazine) is obtained.

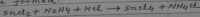
Anhydrous  $N_2H_4$  is obtained by refluxing the hydrate over  $CaO$  and distillation under reduced pressure.

Properties: -

- (1) It is colourless liquid which fumes in air.
- (2) It is soluble in water from which hydrazine hydrate may be crystallized  $N_2H_4 \cdot H_2O$ .
- (3) It forms monohydrate with water as  $N_2H_4 \cdot H_2O$ .
- (4) It acts both as oxidising and Reducing agent

Oxidising action of  $N_2H_4$ : -

When  $N_2H_4$  is passed into acidified solution of  $SnCl_2$ ,  $SnCl_4$  and  $NH_4Cl$  are formed.



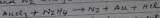
when it acts as an oxidising agent  $NH_4^+$  is formed.

Reducing action of  $N_2H_4$ : -

When  $N_2H_4$  is passed into acidified solution of  $FeCl_3$ ,  $FeCl_2$  and  $N_2$  are formed.  $FeCl_3 + N_2H_4 \rightarrow N_2 + FeCl_2 + HCl$

when  $N_2H_4$  is added to  $AuCl_3$

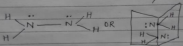
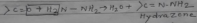
$Au$  and  $N_2$  are formed.



when it acts as reducing agent  $N_2$  is

Uses :-

- (1) It is used as rocket fuel with liquid  $O_2$
- (2) It is used as oxidising as well as reducing agent
- (3) It is used for the identification of  $>C=O$  group [Carbonyl group]



~~Hydrogens~~ Hydrogens atoms are not in one plane.

