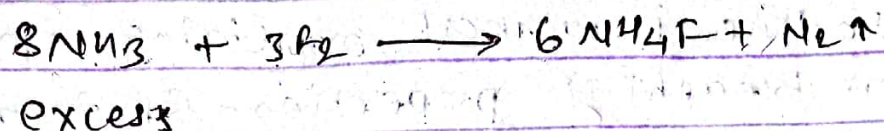


III Action with ~~halo~~

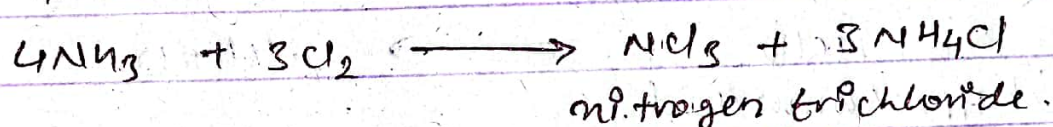
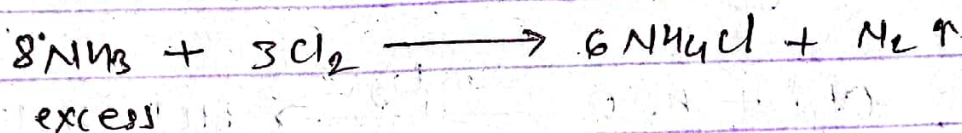
III> Action with Ammonia:-

Depending upon the amount of halogen and reaction conditions, ammonia gives different products.

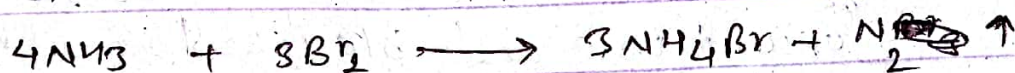
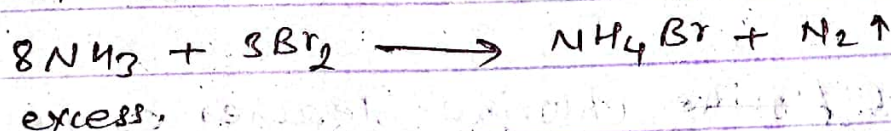
② With Fluorine



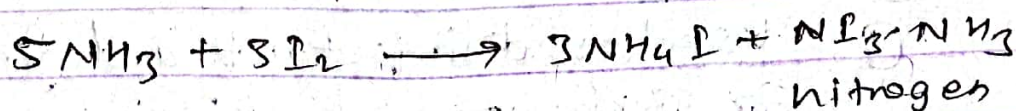
③ With chlorine



④ With bromine



⑤ With iodine, a brown ppt. is formed

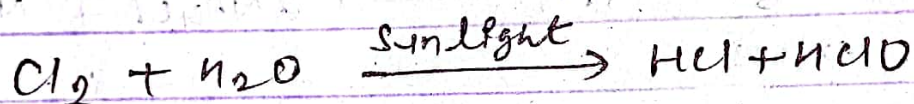


nitrogen
triiodide
monoammonate
(brown ppt).

IV) Bleaching action of halogen.

~~Fluorine~~ Fluorine does not bleach due to strong oxidizing action that destroys the substances in presence of moisture. So it cannot be used as bleaching agent.

Iodine is weakest oxidizing agent so no bleaching properties. Br_2 is mild bleaching agent. But chlorine and bromine is good bleaching agent in presence of moisture.



hypochlorous acid

coloured matter + O \longrightarrow colourless matter

~~Fluorine~~ Chlorine bleaches colour by oxidation. and bleached matter does not regain its original colour.

Uses of halogen.

(2) Chlorine.

(i) Used as disinfectant and germicide for sterilization of drinking water

(ii) Used for preparation of AgCl which is used in photographic film.

(iii) Used to manufacture insecticides such

- as DDT, bleaching powder (CaOCl_2) etc.
- iv) Used for preparation of poisonous gas.
eg. phosgene (COCl_2)
mustard gas ($\text{C}_4\text{H}_8\text{Cl}_2\text{S}$)
tear gas ($\text{C}_{10}\text{H}_5\text{ClIN}_2$)

(b) Bromine

- (i) Used to manufacture dyes, drugs, tear gas, benzyl bromides
- (ii) Bromides of Na, K, and Ca are used in medicine as nerve sedatives.
- (iii) Used to manufacture photographic film, paper etc.
- (iv) Detection of unsaturation in organic compounds.

(c) Iodine

- (i) used as antiseptic in the form of tincture of iodine (mixture of $\text{I}_2 + \text{KI}$)
- ii) used in manufacture of photographic film and paper
- iii) 0.025% KI is used in common salt
- iv) It is used in cloud seeding in artificial rain.

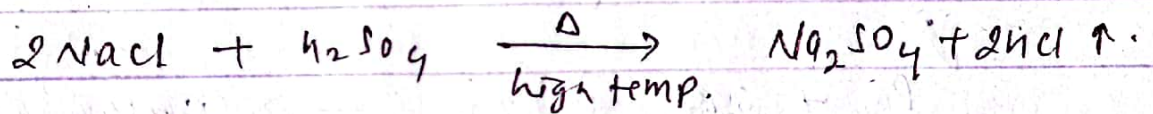
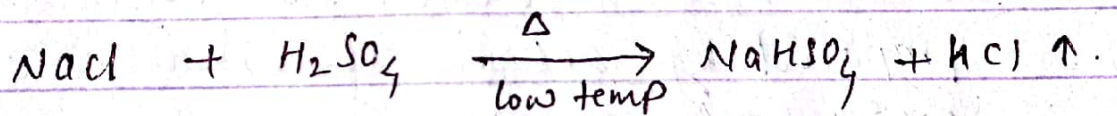
Preparation of haloacids.

HCl, HBr, and HI

HF, HCl, HBr, and HI are also called hydrogen halides.

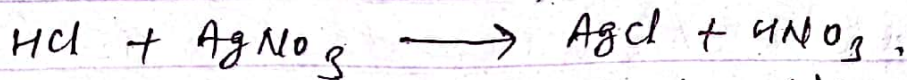
1. Laboratory preparation of Hydrogen chloride HCl

→ In lab, HCl gas is prepared by heating common salt (NaCl) with non-volatile concentrated sulphuric acid.



Test of HCl gas:-

1). When HCl gas is exposed to the rod dipped in AgNO_3 solution, a curdy white ppt is formed.



2). When HCl gas is exposed to the rod containing liquor ammonia, dense fumes are observed.



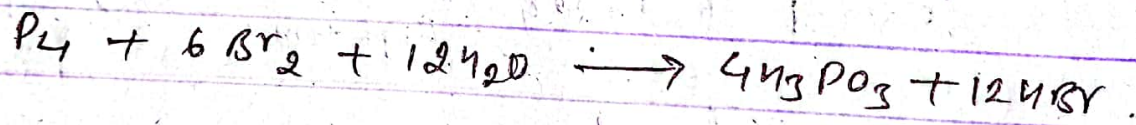
white dense fumes.

Preparation of aqueous HCl

HCl is highly water soluble, so aqueous HCl is prepared by dissolving HCl gas in water in an anti-suction device. Thus produced acid is conc. HCl, which is 36% by weight.

2. Laboratory preparation of HBr

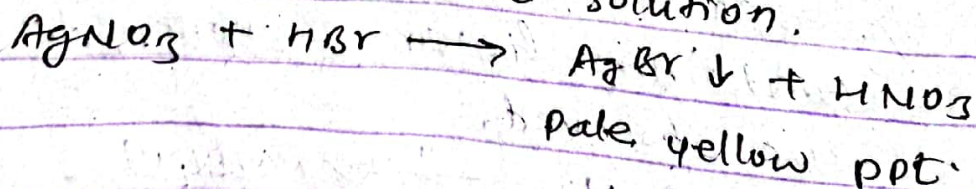
In lab Hydrogen Bromide (HBr) is prepared by action of bromine on moist red-phosphorus.



→ aqueous HBr is prepared by dissolving hydrogen bromide gas in water using the anti-suction device.

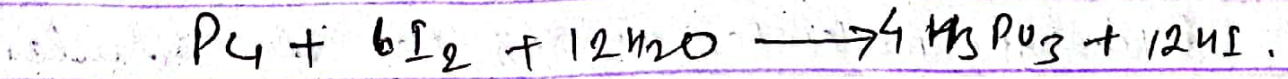
Test of HBr gas.

It gives pale yellow precipitate (ppt) with silver nitrate solution.



Laboratory preparation of hydrogen iodide (HI).

Hydrogen iodide is prepared by dropping water on moist red phosphorous and iodine.



aqueous hydriodic acid can be prepared by dissolving ~~the~~ HI gas in water using an anti suction device.

→ Test of iodine.

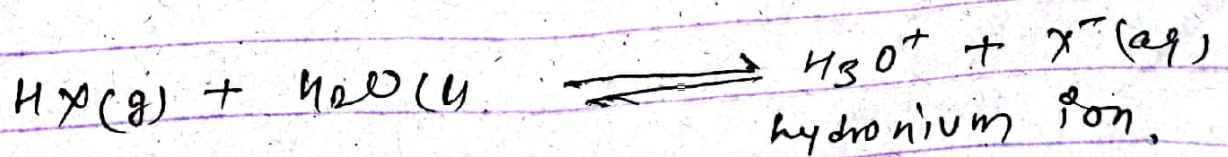
When few drops of H_2SO_4 is added violet vapour with pungent odour and produced yellow ppt on $AgNO_3$ solution.

Chemical properties of Hydrogen acids.

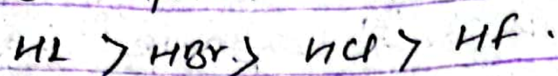
1). Acidic nature.

In dry state they are (HCl , HBr , HI) are covalent molecules. so they cannot turn blue litmus into red, but in aqueous solution they change blue litmus into red.

Halogen acid ionizes as.

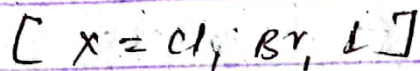
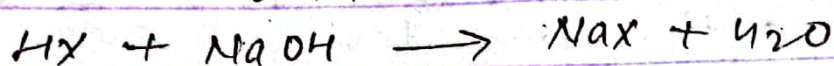


The acid strength of halogen acid decreases from HI to HF.

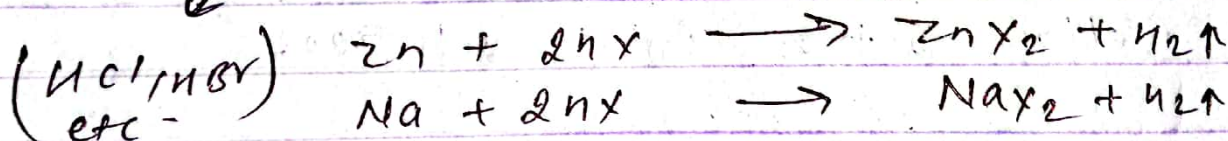


HI is strongest acid due to strong ionization and weak intermolecular hydrogen molecules among the HX molecules. i.e. HI ionizes in water easily than HBr, HCl and HF.

17. It reacts with base forms salt & water.

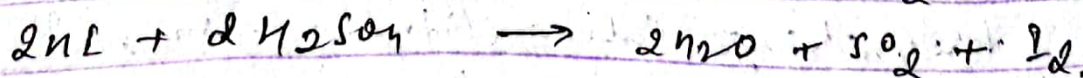
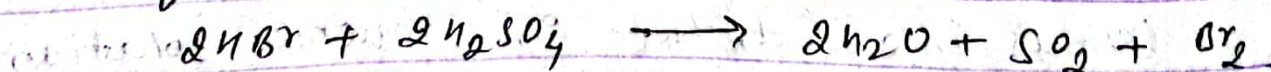


17. It reacts with metal like Zn, Na, Fe etc and liberate H_2 gas.



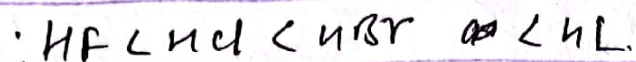
2) Action with conc H_2SO_4

Conc. H_2SO_4 oxidizes HBr, HI to give Br_2 and I_2 . but it cannot liberate Cl from HCl.



37. Reducing property.

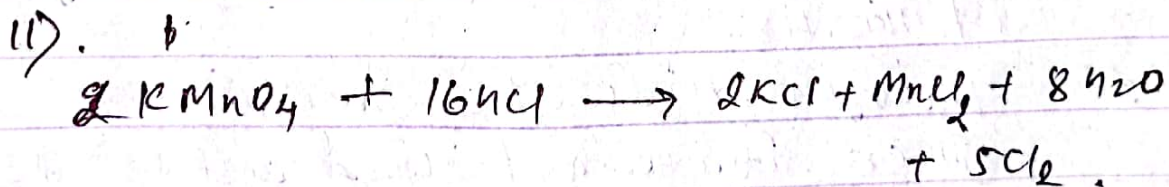
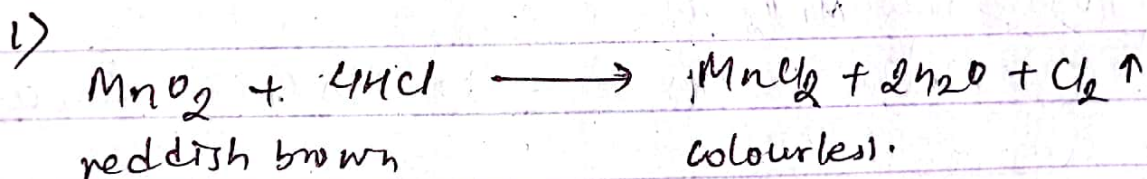
Reducing power of halogen acid increases on order as



HF is weakest because of greater the bond dissociation energy. than HCl & HBr & HI

② Reducing properties of HCl .

HCl reduces strong oxidizing agent like, MnO_2 , $K_2Cr_2O_7$, $KMnO_4$ etc and greenish yellow Cl_2 gas is evolved



⑥ Reducing properties of HBr & HI

HBr & HI reduces,

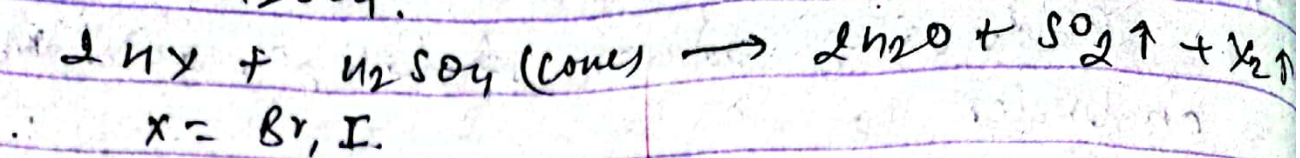
$$\text{MnO}_2 \text{ to } \text{Mn}^{2+}$$
$$H_2SO_4 \rightarrow SO_2$$

decolorize KMnO_4 solution,

decolourize acidified $K_2Cr_2O_7$ into green.

1), with the boy

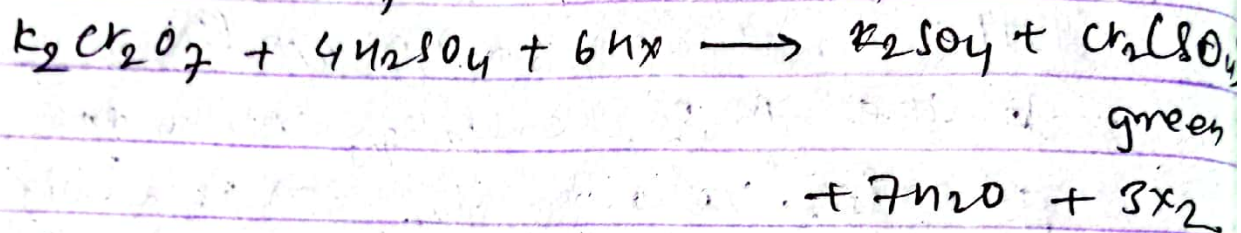
i) With H_2SO_4 .



ii) With HNO_3 .



iii) With $K_2Cr_2O_7$.



iv) With MnO_2 .

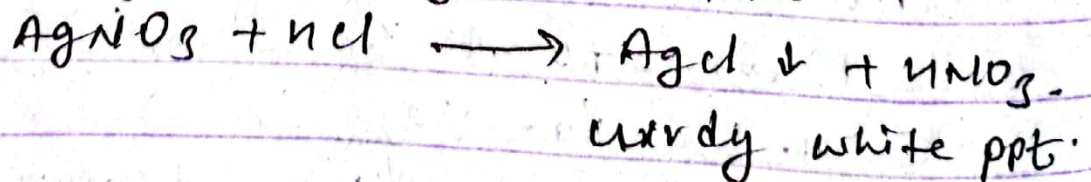


4. Precipitation reaction! (Solubility)
of ~~HBr~~ HX .

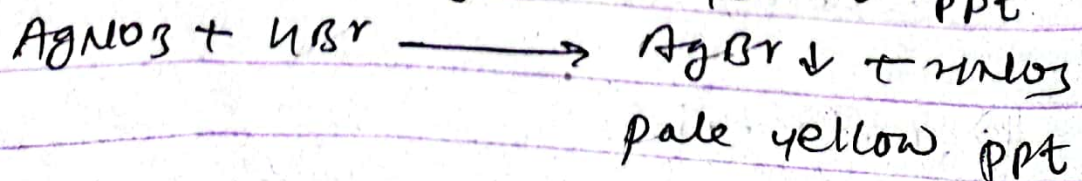
Halogen acids give precipitation with silver nitrate and lead acetate solution.

(a) With silver nitrate solution:-

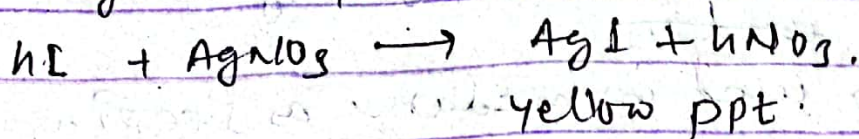
i). HCl gives curdy white ppt.



(b) HBr gives curdy pale yellow ppt.

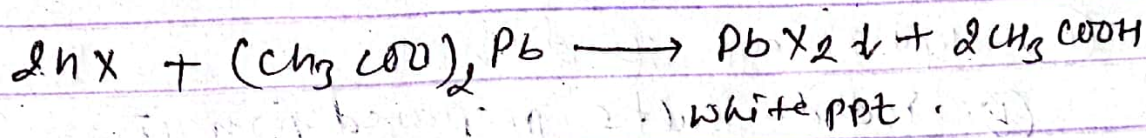


(a) HI gives a yellow ppt

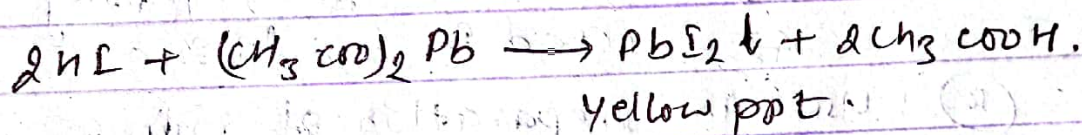


(b) with lead acetate solution.

i) HCl & HBr gives white ppt



ii) HI gives yellow ppt



Uses of Halacids.

(a) Hydrochloric acid (HCl).

i) \rightarrow used to prepare aquaregia to which is used to dissolve noble metals (gold, platinum).

ii) used to manufacture corn syrup.

iii) used in lab and industry next to H_2SO_4 .

iv) Gastric juice contain HCl in stomach used for digestion of food.

(b) (HBr & hydrogen bromide).

(High cost less use)

i) used in preparation of bromides like

Agar - used in photography

~~Agar~~ - used in

Agar - used in medicine as sleeping
pill

Agar - used as a binding agent

Agar - used as a binding agent

Agar - used as a binding agent

Agar - used as a binding agent