

Group-17 elements



⇒ Physical properties of group 17.

→ As we go down the group the MP and BP increases

→ F_2 and Cl_2 are gases, Br_2 is liquid, I_2 is solid.

→ No. of e^- increases down the group $\therefore$ VDW forces increases
 $\therefore$ more energy required to break.

→ Size of molecules increase down the group, hence there are more surface contact points.

→ F_2 - Pale yellow

Cl_2 - yellow-green

Br_2 - red brown

I_2 - black

→ down the group reactivity decreases

→ halogens become less electronegative down the group.

→ halogens become ~~less~~ weaker oxidising agents down the group.

→ halogens become stronger reducing agents down the group.

⇒ Reactions of halogens with hydrogen

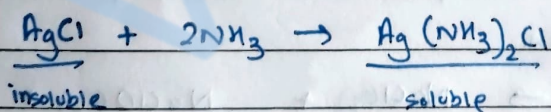
- AS we go down the group, the rate of reaction between X_2 and H_2 decreases and activation energy increases.
- as we go down the group, $H-X$ bonds become weaker
- reaction is less vigorous down the group.

⇒ Displacement Reaction

- A more reactive halogen displaces a less reactive halogen from its salt solution.

⇒ Testing for halide ions

- we add $AgNO_3$ to the solution, which forms a precipitate because AgX forms, which is insoluble.
- White ppt - Chlorine
- Cream ppt - Bromine
- Yellow ppt - Iodine
- It is difficult to distinguish between white and cream ppt so we add dilute ammonia to the ppt. Cl ions dissolve but Br ions don't. Iodine ions also don't dissolve.
- if it is conc ammonia, both $AgCl$ and $AgBr$ will dissolve AgI still does not dissolve.

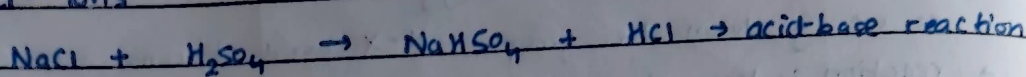


⇒ Uses of halogens

- Chlorine are used to kill bacteria in water
- $NaCl$ and $NaClO$ are used in bleach

⇒ halide ions + conc H_2SO_4

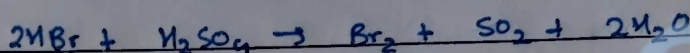
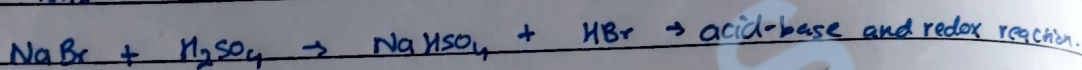
→ Cl^- ions



→ steamy fumes of HCl

→ HCl is not further decomposed.

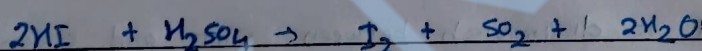
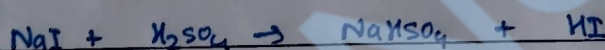
→ Br^- ions



→ red brown vapour

→ HBr is decomposed to Br_2

→ I^- ions



→ ~~pur~~ purple vapour

→ HI is decomposed to I_2

⇒ Disproportionation

→ oxidation and reduction takes place on the same species.

