STUDY PACK : 2.B

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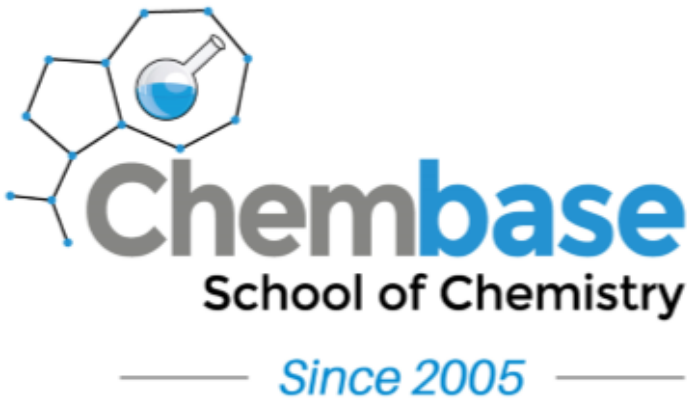
INORGANIC CHEMISTRY

Group 7 (Halogens)



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THE GROUP 7 ELEMENTS (Halogens)
(Chlorine, Bromine and Iodine)

1.

Element	Symbol	Atomic Number	Electronic Configuration
Fluorine	F	9	
Chlorine	Cl	17	
Bromine	Br	35	
Iodine	I	53	

2. Physical Characteristics of the halogens

Chlorine	Bromine	Iodine

3. Name a few common properties of halogens.

- They are all poisonous & have a similar strong smell.
- They are all non-metals
- They form diatomic molecules (Cl_2, Br_2, I_2)
- They show a valency of -1
- Their compounds with hydrogen are usually strong acids. (HCl, HBr, HI)

4. State the trends in the physical properties of halides down the group.

Physical property	Trend down the group
Atomic radius Boiling point Change of state Intensity of colour	

5. Uses of halogens.

Fluorine	Chlorine	Bromine	Iodine

6. Explain the inter-conversion of halogen and halide ion.

Halogens will accept an electron into its outer energy level hence undergo reduction. Thus they are good oxidizing agents

7. State the chemical properties of halogens.

- All halogens form uni negative anions by gaining a single electron to its outer energy level. Reactivity of the halogen is determined by how easily the electron is attracted by the atom.

- Reactivity decreases down the group with increasing atomic number. This is because the smaller the atom the grater the attraction to the nucleus. Florine is the most reactive & Iodine is the least.
- Reducing ability decreases with increasing atomic number. Florine is the strongest Oxidizing agent & the iodine is the weakest

8. **i)** Explain what is "**Displacement Reactions**" of halogens.

The more reactive halogen displaces a less reactive halogen from its salt. Displacement reactions of halogens are **redox** reactions. (Reactions where both reduction& oxidation takes place – discussed under the chapter reactivity series)

ii) Give examples of few displacement reactions.

iii) Which of the following reactions are correct?

- $2KCl + F_2 \longrightarrow 2KF + Cl_2$
- $2HF + Cl_2 \longrightarrow 2HCl + F_2$
- $2HBr + I_2 \longrightarrow 2HI + Br_2$
- $2KI + Br_2 \longrightarrow 2KBr + I_2$

9. _____ would be expected to displace all the other halogens from aqueous solutions of their salts while _____ would be expected not to displace any halogen.

10. How do you show in the laboratory that the reactivity of halogens decreases from Chlorine to iodine?

Carry out the below displacement reactions.

- $2KBr + Cl_2 \longrightarrow 2KCl + Br_2$
- $2KI + Br_2 \longrightarrow 2KBr + I_2$

In the first reaction Chlorine will displace bromine from potassium bromide colourless solution resulting brown solution of bromine.

Similarly, bromine will displace Iodine from potassium iodide colourless solution resulting yellow brown solution of Iodine. From these reactions we can conclude that Chlorine is more reactive than bromine & bromine is more reactive than Iodine.