# TDC Part I
# Paper I, Group B
# Inorganic Chemistry

## Department of Chemistry

## L.S COLLEGE MUZAFFARPUR

## B. R. A. BIHAR UNIVERSITY

**Dr. Priyanka**

**TOPIC:- Halides(**Group 16**)**

# Halides

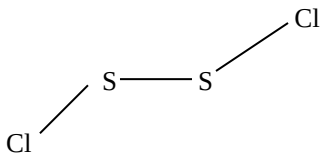
The elements form a number of compounds with halogens (Table 19)

**Table 19: Binary Halides of Group 16 Elements**

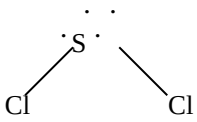
| | **Fluorides** | **Chlorides *** | **Bromides *** | **Iodides *** |
|---|---|---|---|---|
| O | $OF_2$, $O_2F_2$ | $Cl_2O$, $ClO_2$ $Cl_2O_6$ $Cl_2O_7$ | $Br_2O$, $BrO_2$ BrO3 | $I_2O_4$, $I_2O_5$ $I_4O_9$ |
| S | $S_2F_2$, $SF_2$, $SF_4$, $SF_6$, S2F10 | $S_2Cl_2$, $SCl_2$ $SCl_4$ | $S_2Br_2$ | - |
| Se | $Se_2f_2$, $SeF_4$ $SeF_6$ | $Se_2Cl_2$, $SeCl_2$ $SeCl_4$ | $Se_2Br_2$, $SeBr_2$ $SeBr_4$ | - |
| Te | $TeF_4$, $TeF_6$ | $TeCl_2$, $TeCl_4$ | $TeBr_2$, $TeBr_4$ | $TeI_2$, $TeI_4$ |
| Po | - | $PoCl_2$, $PoCl_4$ | $PoBr_2$, $PoBr_4$ | $PoI_4$ |

* in case of oxygen, oxides

The binary compounds of oxygen with halogens are covalent. The structures of some halides are shown in Fig 25.




(a)




(b)

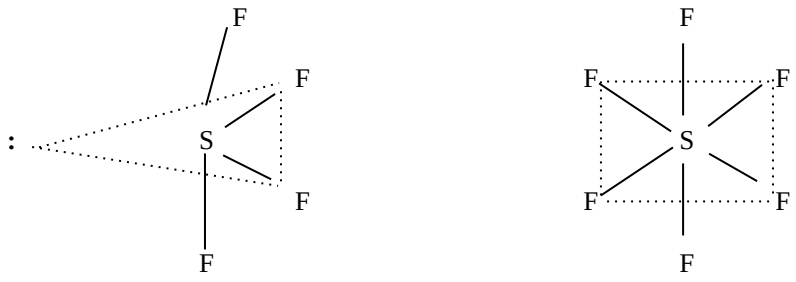



Fig. 25: The structures of some sulphur halides

The highest oxidation state of +6 is realized only with fluorine, $SF_6$ is inert due to a sterically hindered sulphur atom in an octahedral structure ($sp^3d^2$ hybridization). It is unaffected by water as the protected sulphur atom does not allow hydrolysis, a thermodynamically favoured reaction. On the other hand $SeF_6$ and $TeF_6$ are more reactive and $TeF_6$ is hydrolyzed due to large size of Te. This allows the formation of an intermediate with higher coordination number.