

# **TDC Part I**

## **Inorganic Chemistry**



**Department of Chemistry**

**L.S COLLEGE MUZAFFARPUR**

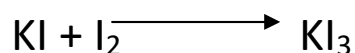
**B. R. A. BIHAR UNIVERSITY**

**Dr. Priyanka**

**TOPIC:- Polyhalides and polyhaloniumions**

## Polyhalides and polyhalonium ions

Halide ions associate with molecules of halogens or interhalogens to form polyhalides. The solubility of iodine is enhanced in potassium iodide due to formation of triiodide ion,  $I_3^-$ .



More complex ions like  $I_5^-$ ,  $I_7^-$  are known. Polyhalides containing two or three different halogens are known eg  $[ICl_2]^-$ ,  $[BrF_4]^-$ ,  $[BrICl]^-$  etc. polyhalonium cations eg.  $[ICl_2]^+$ ,  $[BrF_2]^+$  are obtained as a result of auto ionization of  $ICl_3$  and  $BrF_3$ . Other cations e.g.  $Br_3^+$ ,  $I_3^+$   $[ClF_6]^+$  etc. are also known.

### **Pseudohalogens**

Parallels have been observed between the chemistry of the halogens and other dimeric species. Such molecules are called pseudohalogens eg. Cyanogens  $(CN)_2$ , thiocyanogen  $(SCN)_2$  and selenocyanogen  $(SeCN)_2$ . A pseudohalogen is a univalent chemical aggregate, comprising of two or more electronegative atoms, which in the free state show properties similar to halogens. They combine with hydrogen to form an acid and with silver, a salt insoluble in water. The anions of pseudohalogens are called pseudohalides. The most important pseudohalide is  $CN^-$  and its similarity with  $Cl^-$  is shown in Table 30

**Table 30: Comparison of a Pseudohalogen with a Halogen**

Characteristics	Examples	
	Halogen	Pseudohalogen
Neutral diatomic species	Cl <sub>2</sub>	(CN) <sub>2</sub>
Anion	Cl <sup>-</sup>	CN <sup>-</sup>
Acid with hydrogen	HCl	HCN
Insoluble Salts	AgCl	AgCN
Interhalogen compound	ICl, BrCl	CICN, BrCN, ICN
Anionic Complexes	[CoCl <sub>6</sub> ] <sup>3-</sup> [CuCl <sub>4</sub> ] <sup>2-</sup>	[Co (CN) <sub>6</sub> ] <sup>3-</sup> [Cu (CN) <sub>4</sub> ] <sup>2-</sup>