19th oct notes

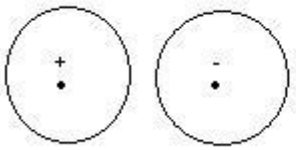
# Polarization:

Polarization has to do with how the electrons are being shared in a covalent bond. When two atoms with different electronegativities bond together, the valence electrons are unevenly shared between them. The more electronegative atom will pull the electrons of the bond closer to itslef because it has a strong "desire" for those electrons, thus making the bond polar.

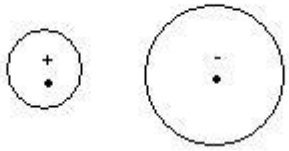
Thus we can say that when a cation approaches an anion the electronic cloud of anion get distorted.

The power of a cation to distort an anion is called polarizing power or polarisibility

The tendency of an anion to get distorted is called polarization.

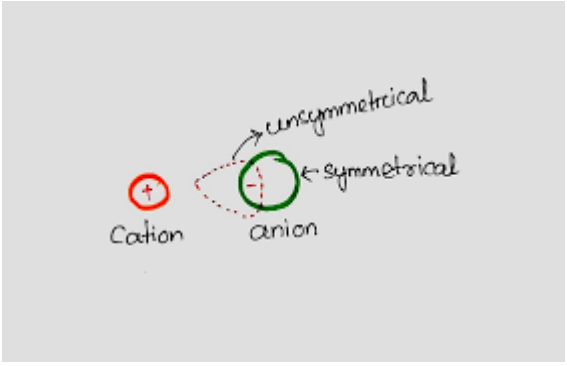


(a) No Polarization

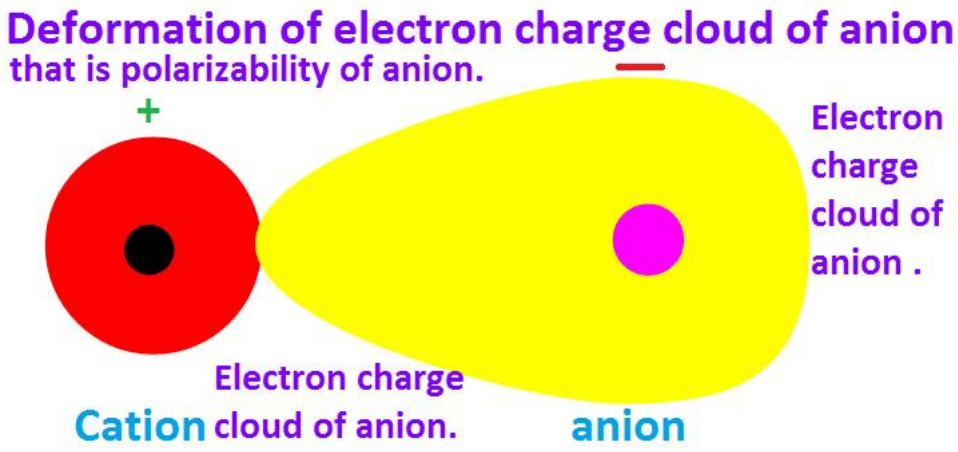


(b) Polarized anion

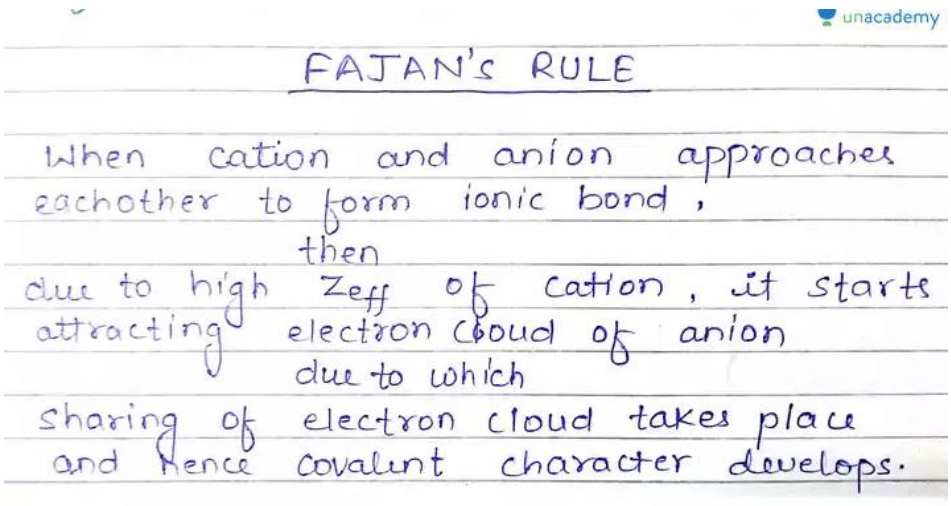
(c) Polarization feading to a covalent bond




Polarising power is denoted by alpha which is the ratio of induced dipole and electric field.




**Fazan Rule**: These rules were made to show the covalent behavior.




The rule can be stated on the basis of 3 factors, which are:

1. **Size of the ion:** Smaller the size of cation, the larger the size of the anion, greater is the covalent character of the ionic bond.

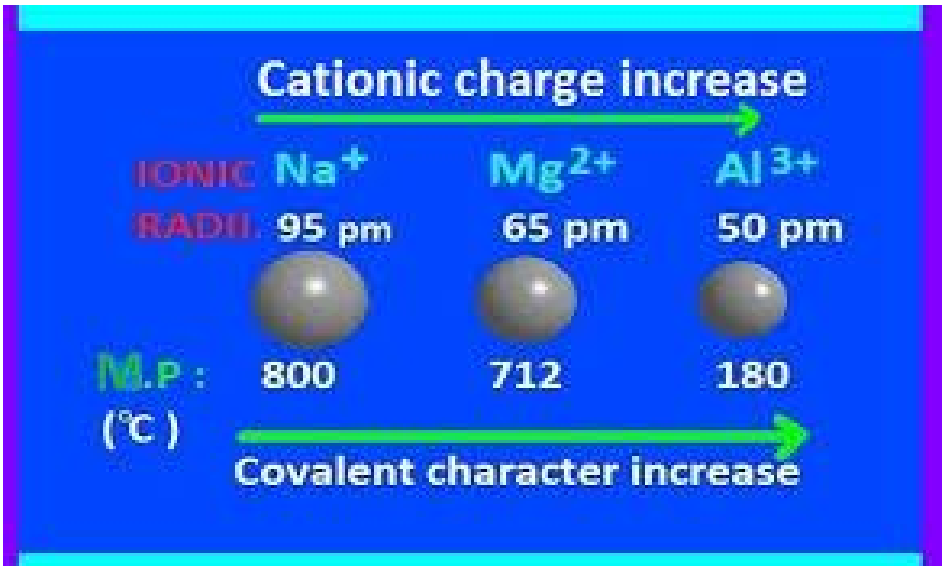
   **LiCl NaCl KCl RbCl CsCl**

   **Size of cation increases from lithium cation to Cesium cation and covalent character decreases.**

**LiF LiCl LiBr LiI**

**Size of anion increases from Floride to iodide and covalent character increases**


2. **The charge of ion:cation:** Greater the charge of cation, greater is the covalent character of the ionic bond.

3. 


4. **Electronic configuration:** For cations with same charge and size, the one,

with $(n-1)d^n ns^o$ which is found in transition elements have greater covalent character than the cation with $ns^2 np^6$ electronic configuration, which is commonly found in alkali or alkaline earth metals.

| Ionic | Covalent |
| --- | --- |
| Low positive charge | High positive charge |
| Large cation | Small cation |
| Small anion | Large anion |