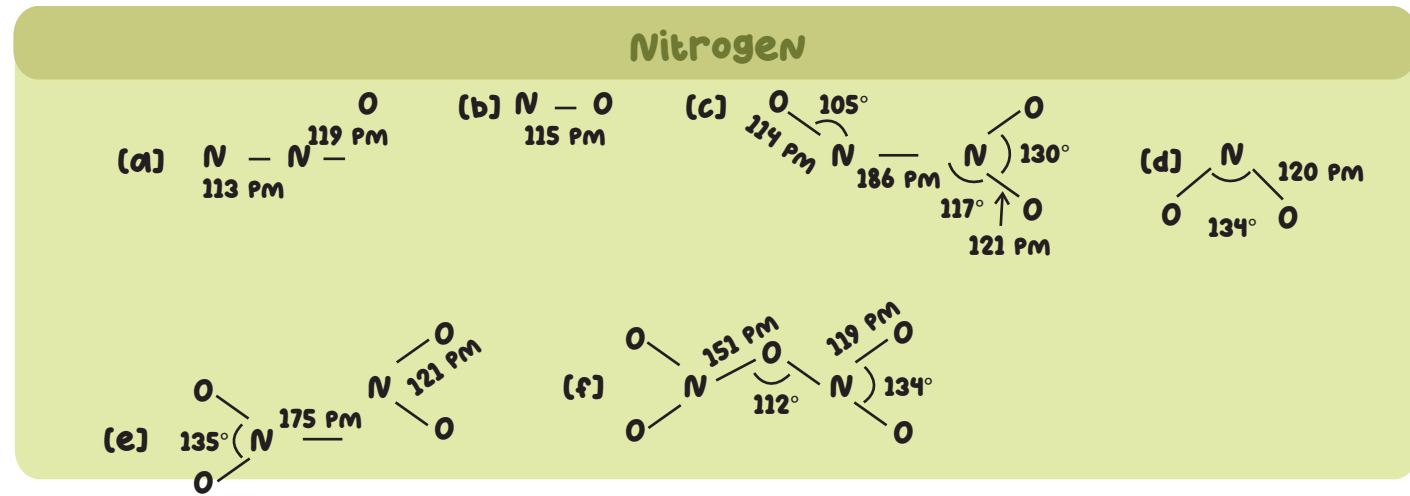


Basic character: $\text{NH}_3 > \text{PH}_3$
 Melting point: $\text{PH}_3 < \text{AsH}_3 < \text{SbH}_3 < \text{NH}_3$
 Boiling point: $\text{PH}_3 < \text{AsH}_3 < \text{NH}_3 < \text{SbH}_3 < \text{BiH}_3$
 Reducing character: $\text{NH}_3 < \text{PH}_3 < \text{AsH}_3 < \text{SbH}_3 < \text{BiH}_3$

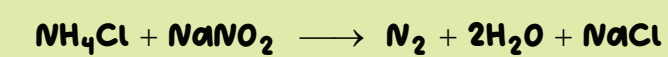
Physical Properties

- **Melting:** $\text{N} < \text{P} < \text{Bi} < \text{Sb} < \text{As}$ point
- **Oxidation:** Common oxidation State States -3, +3 & +5
- **Hydrides:** MH_3 (M=N, P, As, Bi, Sb)
- **Oxides:** They form M_2O_3 , M_2O_4 & M_2O_5 (acidic character of oxides decreases down the group)
- **Halides:** They form EX_3 & EX_5
- **Reactivity towards metals:** All form primary compound i.e. -3 oxidation state.

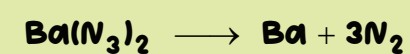
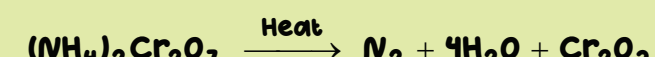


Dinitrogen preparation (N_2)

(a) In Laboratory

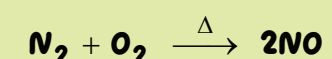
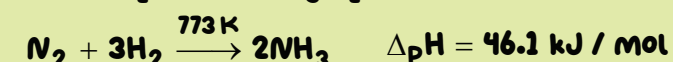
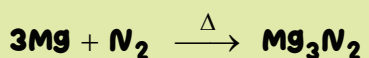
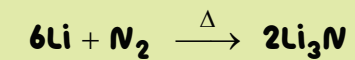


(b) Thermal decomposition



Properties

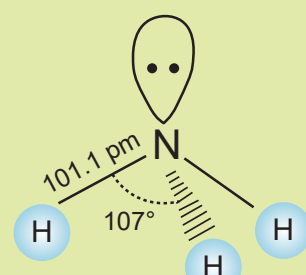
colourless, odourless, tasteless & non toxic gas



Occurrence: All except radon occur in atmosphere.
Electronic configuration: ns^2np^4 except the configuration.
Atomic radii: Increases down the group.
Physical properties: Mono atomic, colourless, odourless and tasteless.
M.P. & B.P.: Low

Ammonia

Colourless with pungent odour, Soluble in water.



Chemical Properties

- **Oxidation States**
 $\text{O} \rightarrow -2, -1, 1, 2$
 $\text{S, Se, Te} \rightarrow 2, 4, 6$
 $\text{Po} \rightarrow 2, 4$
 Oxides: EO_2 & EO_3
 Both type of oxides are acidic in nature.

Halides: EX_3 , EX_4 ,
 EX_2 & E_2X_2

- **Stability of halides** decreases in order
 $\text{F} > \text{Cl} > \text{Br} > \text{I}$

Hydrides forms H_2E

B.P $\text{H}_2\text{S} < \text{H}_2\text{Se} < \text{H}_2\text{Te} < \text{H}_2\text{O}$

Reducing power: $\text{H}_2\text{Te} > \text{H}_2\text{Se} > \text{H}_2\text{S} > \text{H}_2\text{O}$

Acidic character:

$\text{H}_2\text{O} < \text{H}_2\text{S} < \text{H}_2\text{Se} < \text{H}_2\text{Te}$

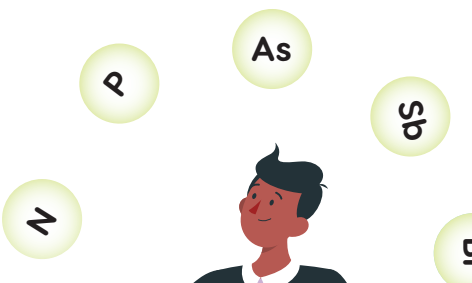
Physical Properties

O & S are non metals. Se & Te metalloids whereas Po is a metal

M.P & B.P Increases down the group

Decreases with increase in atomic number

GROUP 15 ELEMENTS



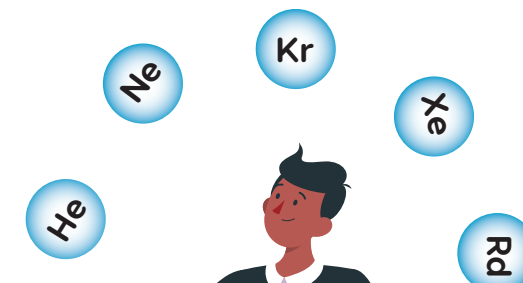
Electronic Configuration ns^2np^3

Atomic/Ionic Radii
Increases in size down the group

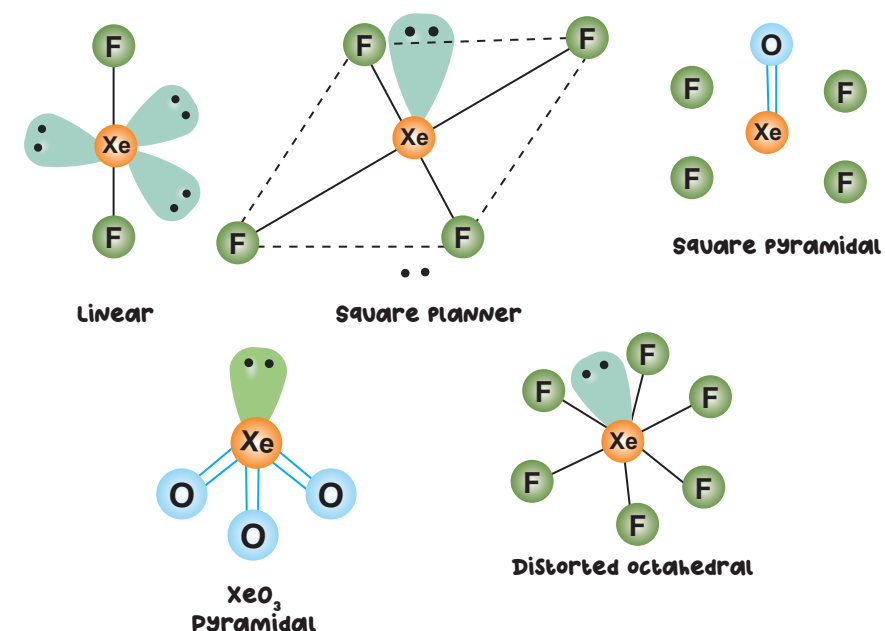
Ionization Enthalpy
Decreases down the group due to gradual increase in atomic size.

The P-Block Elements

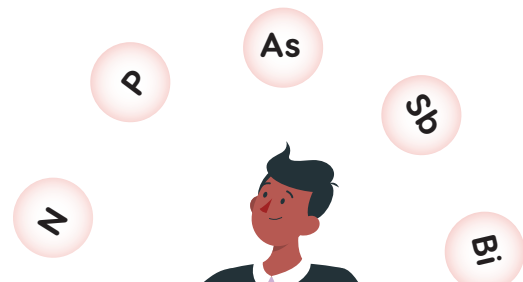
GROUP 18 ELEMENTS



Compounds of Xenon



GROUP 16 ELEMENTS

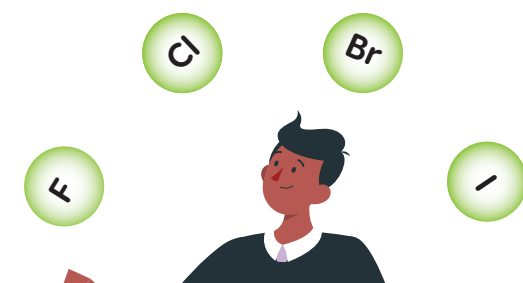


Electronic Configuration ns^2np^4

Atomic/Ionic Radii
Increases down the group

Ionization Energy
Decreases down the group

GROUP 17 ELEMENTS



Electronic Configuration ns^2np^5

Atomic/Ionic radii

Decreases down the group.

IE

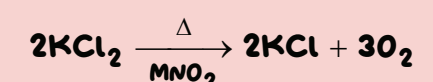
Smallest in periods but increases from F to I.

Preparation: $\text{MnO}_2 + 4\text{HCl} \longrightarrow \text{MnCl}_2 + \text{Cl}_2 + 2\text{H}_2\text{O}$
Decon's process: $4\text{HCl} + \text{O}_2 \xrightarrow{\text{CuCl}_2} 2\text{Cl}_2 + 2\text{H}_2\text{O}$

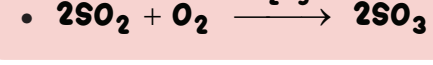
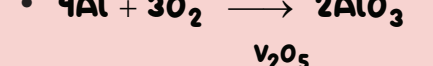
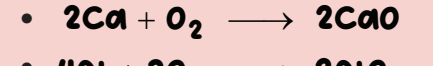
Physical Properties: Green yellow gas with pungent & suffocating odour.

- **Oxidation State:** F show -1 O.S. Cl, Br, I exhibit +1 to +7 O.S
- **Reactivity towards hydrogen:** $\text{H-F} > \text{H-Cl} > \text{H-Br} > \text{H-I}$
- **Reactivity towards metals:** $\text{MF} > \text{MCl} > \text{MBR} > \text{MI}$

Preparation



Properties



Oxo-acids of Sulphur

