TDC Part I
Paper I, Group B
Inorganic Chemistry

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TOPIC:- Compounds Hydrides(Group 16**)**

Compounds Hydrides

Binary hydrides of general formula H_2X are known for all elements. They are angular in shape (sp^3 hybridization with two lone pairs) (Fig 24). The bond angles decrease down the group (Table 18).

Table 18: Some Properties of Group 16 Hydrides

	Boiling Point (^{0}C)	Enthalpy of formation (KJmol $^{-1}$)	Bond angle (H-M-H)
H_2O	100	-242	104.5^0
H_2S	-60	-20	92^0
H_2Se	-42	+81	91^0
H_2Te	-2.3	+154	90^0

The bond angle is lower than the tetrahedral bond angle (109.5^0) due to greater repulsion between the lone pairs. On moving down the group, the electro negativity of the Group 16 element decreases, the bond pair moves away from the central atom, the lone pair is more tightly held causing greater distortion. For lower hydrides, the bond angle approaches 90^0 suggesting that almost pure p-orbitals are used in bond formation. The thermal stability and bond enthalpy of the hydrides decreases down the group and the acidic nature increases. The abnormally high boiling point of water is due to intermolecular hydrogen bonding.

Oxygen forms another hydride, H_2O_2 (Fig 24)

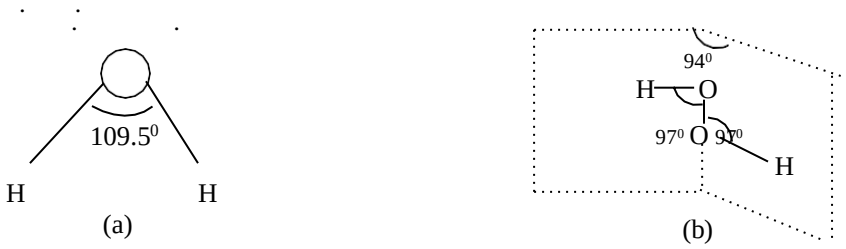

Fig. 24: The Structures of (a) H_2O (b) H_2O_2

It decomposes readily and is a strong oxidizing agent

$$H_2O_2 \longrightarrow 2H_2O + O_2$$