D. B. College (Joynagar) Lect - 2
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ALCOHOL, PHENOL & ETHER

ALCOHOL

Hydroxy derivatives

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Aliphatic hydroxy derivatives Aromatic hydroxy derivatives

(I) Aliphatic hydroxy derivatives:
Hydroxy derivatives in which -OH is directly attached to sp^3 C (Alcoholic compounds).

(II) Aromatic hydroxy derivatives:
Hydroxy derivatives in which -OH is directly attached to sp^2 C of benzene ring (Phenolic Compounds).

- Aliphatic hydroxy derivatives:

(a) Classification according to number of -OH groups:

(i) Monohydric [one -OH] ⟶ CH_3CH_2-OH

(ii) Dihydric [two -OH] ⟶ $CH_2(OH)-CH_2(OH)$

(iii) Trihydric [three -OH] ⟶ $CH_2(OH)-CH(OH)-CH_2(OH)$

(iv) Polyhydric [n -OH] ⟶ $CH_2(OH)-CH(OH)-CH_2(OH)$

(b) Classification according to nature of carbon:

(i) P or 1 -alcohol ⟶ CH_3CH_2-OH

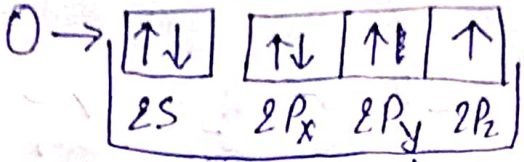
(ii) S or 2 -alcohol ⟶ $(CH_3)_2CH-OH$

(iii) t or 3 -alcohol ⟶ $(CH_3)_3C-OH$

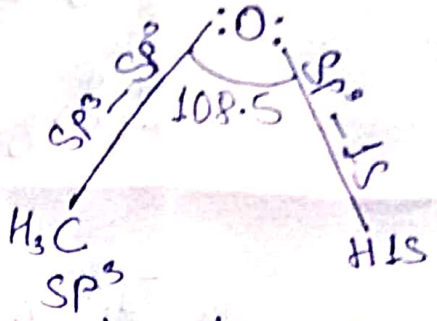
Structure of alcohol:

Alcohols are bent molecules. The carbon atom (linked with 'O' atom of -OH group) is sp^3 hybridised. The central 'O' atom is also in sp^3 state of hybridisation. The bond angle is 108.5°. In sp^3 hybridisation of

O – $2s^2$, $2p_x^2$ $2p_y^1$ $2p_z^1$ Orbitals hybridisation to form sp^3 orbitals

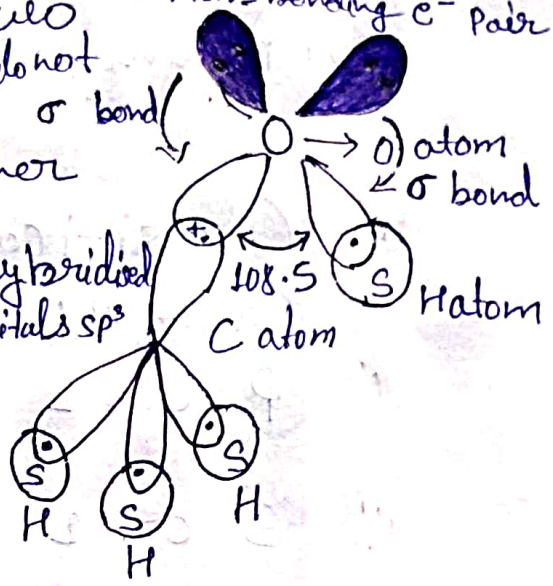


sp^3 hybridisation



structure of CH_3OH

In these four orbitals two containing one electron each and two containing two electrons do not take part in bonding. other two half-filled orbitals hybridised from σ bond with S-Orbitals of H-atom and hybridised orbital of C-atom (O-C)



Due to lone pair effect the bond angle of tetrahedral oxygen atom is lesser than normal tetrahedral structure (109°28').