

1. General Concepts of Hybridisation

Degree-I (Sub.) , Date 16/12/2020

Chapter-1, Group-C , Lecture-9 , 2020-2023

Shape & Structure of Simple Organic Compounds

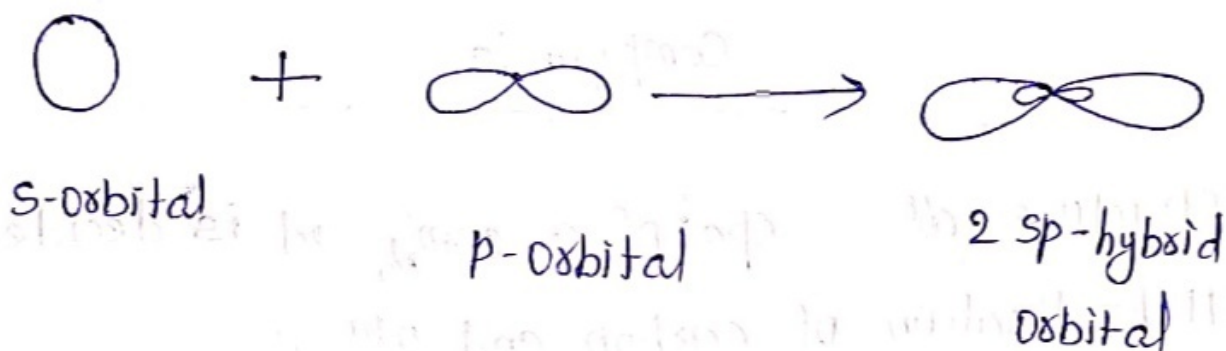
- * Structure and shape of a compound is decided by Hybridisation of carbon and other atoms if present in molecule.
- * Orbitals of nearly equal energy mix up their energy and redistributed into equal no. of orbital, this phenomena is called hybridisation and new orbitals having equal energy is called Hybrid orbital.

Types of Hybridisation

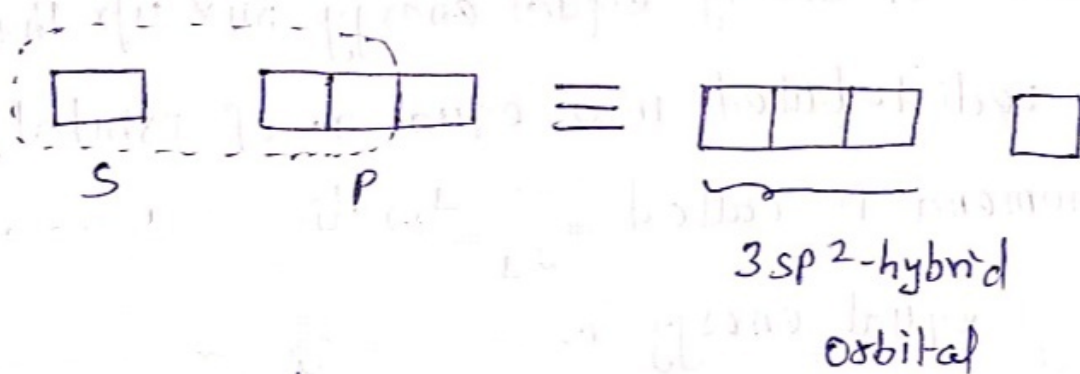
sp , sp^2 , sp^3 , sp^2d , sp^3d , sp^3d^2 and sp^3d^3 are different types of hybridisation.

Formation of sp -hybrid orbital

- * one s-orbital and one p-orbital forms 2 sp -hybrid orbitals, which are arranged in linear structure.



Formation of sp^2 -hybrid orbital



- * one s-orbital and two p-orbitals mix up their energy and redistributed into three new sp^2 -hybrid orbitals.
- * 3- sp^2 hybrid orbitals are arranged in trigonal planar structure.

3.



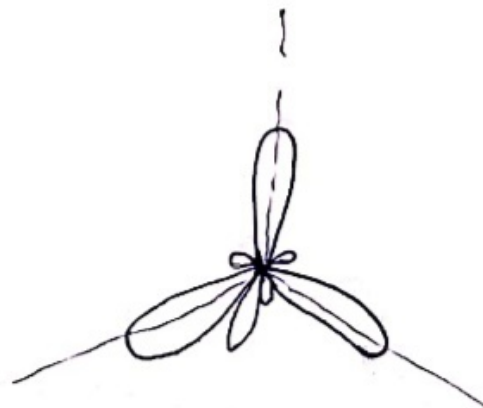
3- sp^2 hybrid orbitals

Structure :- Trigonal planar

Bond Angle: 120°

Formation of sp^3 -hybrid orbital

- * One s-orbital and 3-p-orbitals mix up their energy and redistributed into equal no. of 4 new sp^3 hybrid orbital.



Tetrahedral structure

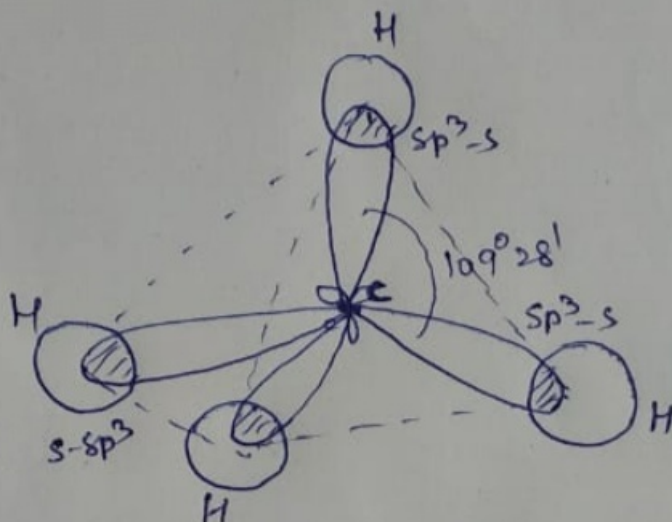
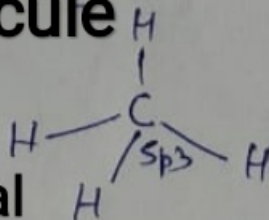
Bond angle : $109^\circ 28' \approx 109.5^\circ$

sp, sp² & sp³ Hybridisation

Structure of Methane molecule



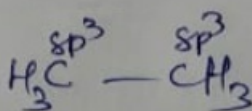
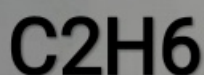
Carbon of CH₄ use sp³ hybrid orbital



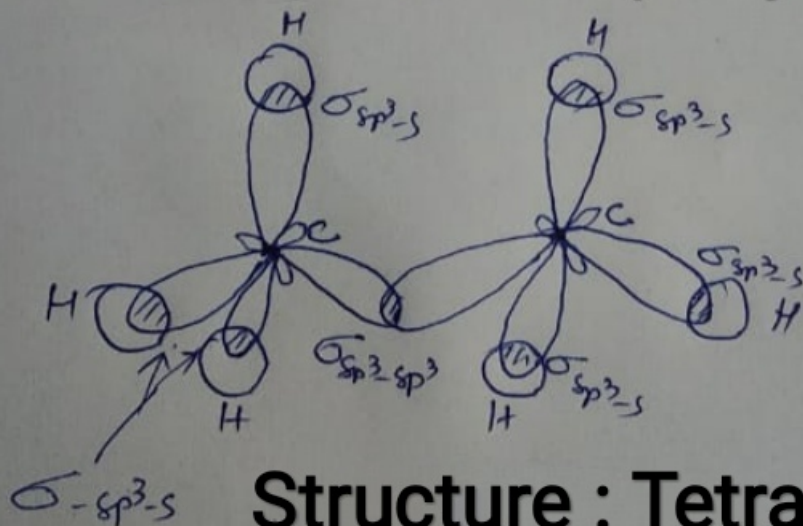
Structure of CH₄ : Tetrahedral

H-C-H bond angle : 109° 28'

Structure of Ethane molecule



Each Carbon of Ethane has sp³-hybrid orbital.



Structure : Tetrahedral

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