

## SALIENT FEATURES OF HYBRIDIZATION

The concept of hybridization was introduced by **Pauling** and **Slater**. It is defined as the intermixing of dissimilar orbitals of the same atom but having slightly different energies to form same number of new orbitals of equal energies and identical shapes. The new orbitals so formed are known as hybrid orbitals.

### Characteristics of hybridization

- (1) Only orbitals of almost similar energies and belonging to the same atom or ion undergoes hybridization.
- (2) Hybridization takes place only in orbitals, electrons are not involved in it.
- (3) The number of hybrid orbitals produced is equal to the number of pure orbitals, mixed during hybridization.
- (4) In the excited state, the number of unpaired electrons must correspond to the oxidation state of the central atom in the molecule.
- (5) Both half filled orbitals or fully filled orbitals of equivalent energy can involve in hybridization.
- (6) Hybrid orbitals form only sigma bonds.
- (7) Orbitals involved in p bond formation do not participate in hybridization.
- (8) Hybridization never takes place in an isolated atom but it occurs only at the time of bond formation.
- (9) The hybrid orbitals are distributed in space as apart as possible resulting in a definite geometry of molecule.
- (10) Hybridized orbitals provide efficient overlapping than overlapping by pure s, p and d-orbitals.
- (11) Hybridized orbitals possess lower energy.

Depending upon the type and number of orbitals involved in intermixing, the hybridization can be of various types namely  $sp$ ,  $sp^2$ ,  $sp^3$ ,  $sp^3d$ ,  $dsp^2$ ,  $sp^3d^2$ ,  $sp^3d^3$ .