

Number of orbitals & type of hybridisation

Acc to VBT the metal atom or ion under the influence of ligands can use its $(n-1)d$, ns , np or ns , np , nd orbitals for hybridization to yield a set of equivalent orbitals of definite geometry.

<u>C.No.</u>	<u>Type of hybridization</u>	<u>Geometry</u>
4	sp^3	tetrahedral.
4	dsp^2	Square planar.
5	sp^3d	trigonal bipyramidal.
6	sp^3d^2	Octahedral
6	d^2sp^3	Octahedral

Applications of VBT

1) The maximum overlap condition which is described by the valence bond theory can explain the formation of covalent bonds in several molecules.

2) This is one of the most important applications. For example the difference in length and strength of the chemical bonds in the $4F_2$ molecules can be explained by the difference in the overlapping orbitals in these molecules.

3) The covalent bond in an HF molecule is formed from the overlap of the $1s$ orbital of the hydrogen atom and a $2p$ orbital belonging to the fluorine atom, which is explained by the VBT.