

Hybridization:-

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✓ (6) (6)

In the formation of polyatomic covalent compounds, the orbitals present around the central atoms are assumed to undergo hybridization before they enter into covalent bond formation with other atoms.

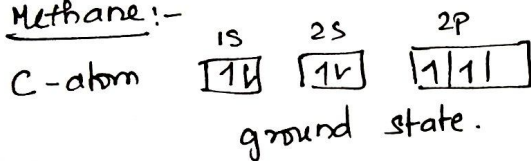
The redistribution of energy by mixing different orbitals of an atom to give new orbitals of equivalent energy is called hybridization.

The hybrid orbitals will have definite orientation in space so as to minimize electron-electron repulsions. This will decide the geometry

Examples of a molecule.

Examples

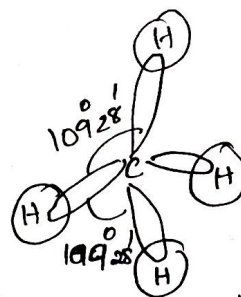
(1) Methane:-



C-atom
excited state

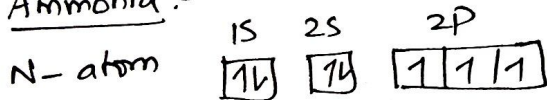


sp^3 hybridization

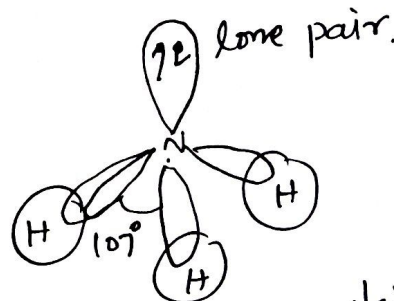


Tetrahedral geometry.

(2) Ammonia:-

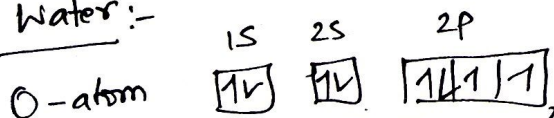


sp^3 hybridization

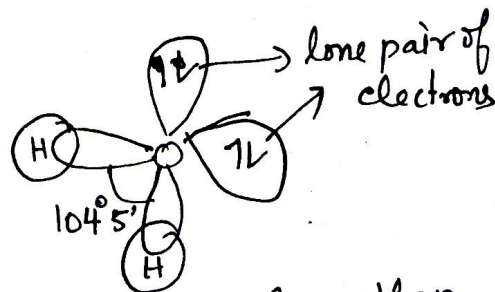


NH_3 is pyramidal because of the greater repulsion between lone pair electrons and bond pair electrons. The bond angle is less than the tetrahedral bond angle.

(3) Water:-



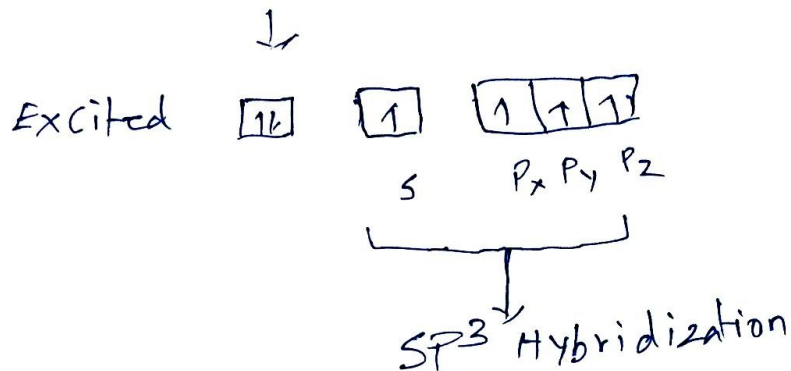
sp^3 hybridization



lone pair - lone pair repulsion is higher than lone pair - bond pair repulsion. Hence the bond angle is less than tetrahedral.

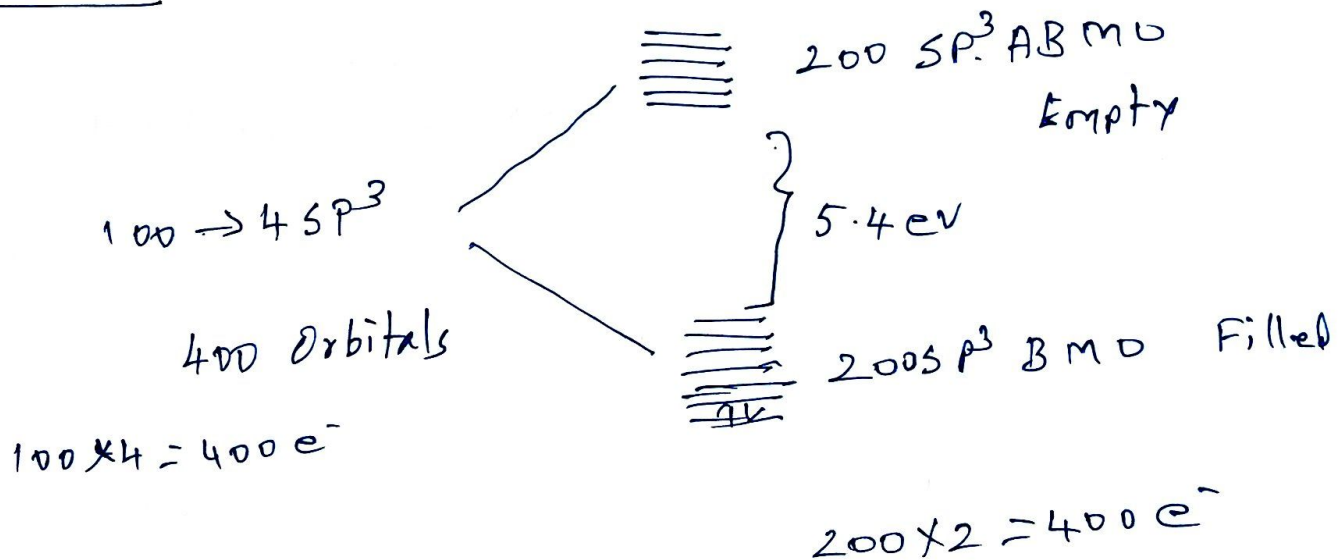
Insulator

Diamond - carbon

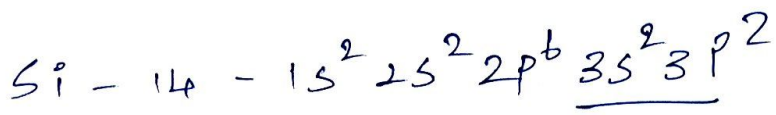


valence cell 4 - sp^3 Orbital

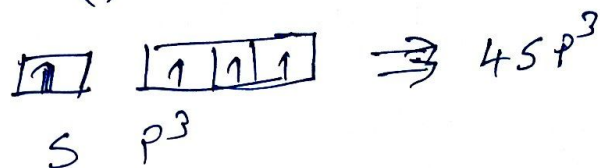
100 Atoms - E



Semi conductor - Si



\Downarrow

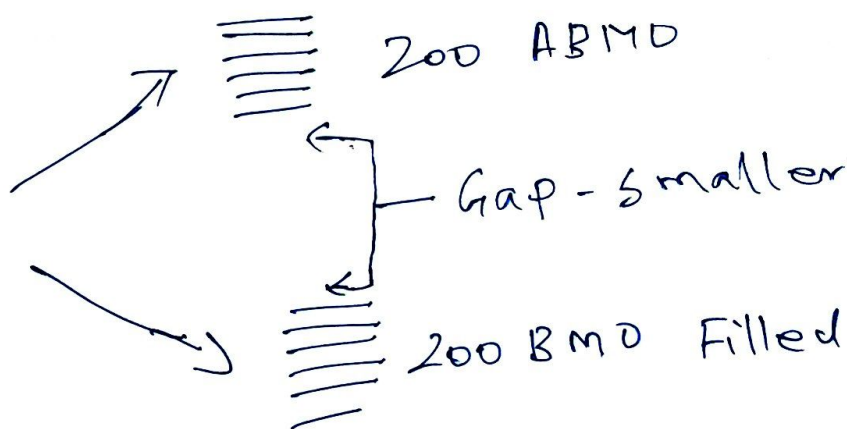


III	IV	V
B	C	N
Al	Si	P
	Ge	As
	Ga	

Similar to 'C'

100 - Si atoms

400 - sp^3 orbital
 400 e



Size of the Atom

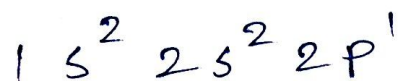
C - smaller -

Si - larger



Greater the overlapping
 larger the band Gap

Boron - 5



↓

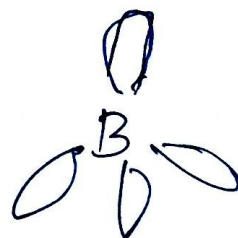


s

p



4 sp^3 orbitals



100 - B' atoms

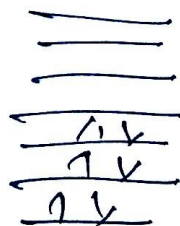
200 AB - sp^3 MO

400 sp^3

200 B - sp^3 MO

Only $3e^-$

$100 \times 3 = 300 e^-$



unfilled

V.B

Non-Condensing