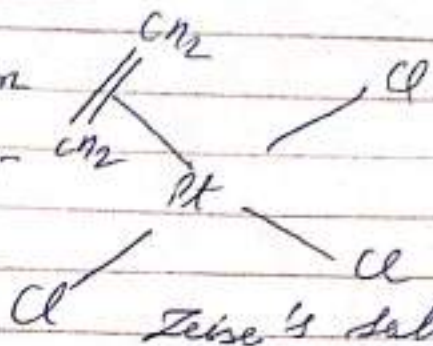


## Zeise's Salt $[Pt(\eta^2-C_2H_4)Cl_2]^-$

→ It forms yellow crystals & has been known since 1828.

→ In Zeise salt the  $[Pt(\eta^2-C_2H_4)Cl_2]^-$  ion is essentially square planar with Cl at three corners &  $C_2H_4$  at the other corner.



→ The  $H_2C=CH_2$  molecule is perpendicular to the  $PtCl_2$  plane, & the two C atoms are almost equidistant from the Pt.

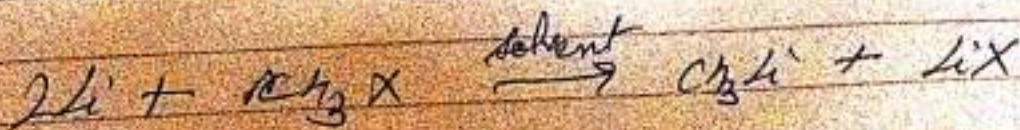
→ The double bond occupies the coordination position rather than a single C-atom &  $C_2H_4$  act as a dihapto ligand.

→ Thus, the complex should be written as  $K [Pt(\eta^2-C_2H_4)Cl_2] \cdot nH_2O$

## Methyl Lithium $(MeLi)$

→ Methyl lithium is the most important group 1 organometallic compound of periodic table

→ Methyl lithium can be prepared by the reaction of lithium metal with methyl halide in ether, cyclohexane or benzene as solvent





→ The crystal lattice structure of  $\text{MgLi}$  is body centred cubic with the  $\text{Li}_4(\text{CH}_3)_4$  units at each lattice site.

→ Each unit is a tetramer in which the four lithium reside at the

corners of the tetrahedron

to the bridge bridging

Methyl groups are located above the centres of the triangular faces.

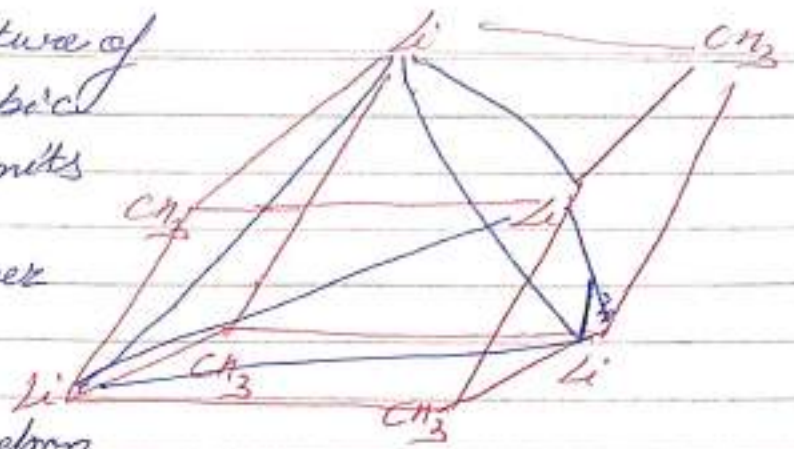
→ Each carbon atom is essentially a six coordinate (3 H-atom of methyl & 3  $\text{Li}$  atoms)

→ Bonding of the methyl group to 3  $\text{Li}$  atoms involves as  $sp^3$  orbitals on the methyl group simultaneously overlapping three orbitals on the  $\text{Li}$  atoms.

→ Therefore, the bridging bond is a four centre - two electron ( $4c - 2e^-$ ) bond.

→ Since Carbon is more electronegative than lithium, the lowest energy orbital has more contribution from  $sp^3$  orbital of Carbon.

→ Thus  $\text{Li-C}$  bond is mainly ionic.





## Ferrocene

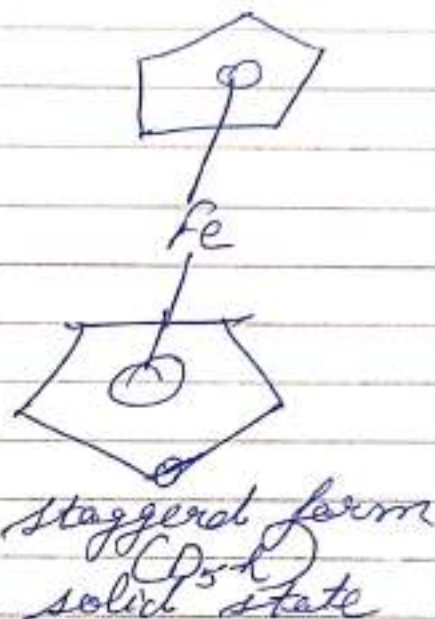
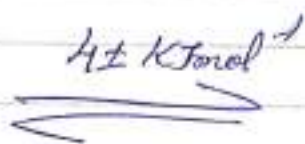
- Ferrocene is the first sandwich compound & was first synthesized by P. L. Pauson & Kealy in 1951. Its structure was determined a few years later by G. Wilkinson & E. O. Fisher.
- It is prepared by the reaction of aqueous solution of  $FeCl_2$  with alkaline solution of cyclopentadiene



- Ferrocene is a diamagnetic crystalline solid having m.p of  $174^\circ C$  & b.p  $249^\circ C$  & it sublimes at  $100^\circ C$ .
- Ferrocene is the most stable of all the metallocenes & it is exceptionally stable & does not decompose upto  $500^\circ C$ .
- It is insoluble in water but dissolves in most organic solvents.
- It is unaffected by air i.e. not easily oxidized by the air. It is also stable towards hydrolysis due to absence of ionic bonding.



→ In solid state ferrocene has the two parallel cyclopentadienyl rings, originally were thought to be staggered ( $D_{5d}$ ) on the other hand, suggests that the cyclopentadienyl rings are eclipsed ( $D_{5h}$ )



→ The rotation angle between two rings is  $9^\circ$   
 → Hence, the energy of barrier to internal rotation is very small. & the rotational angle between two rings is  $\sim 9^\circ$  rather than  $0^\circ$  for precisely eclipsed; therefore ferrocene exists as nearly eclipsed in the solid phase