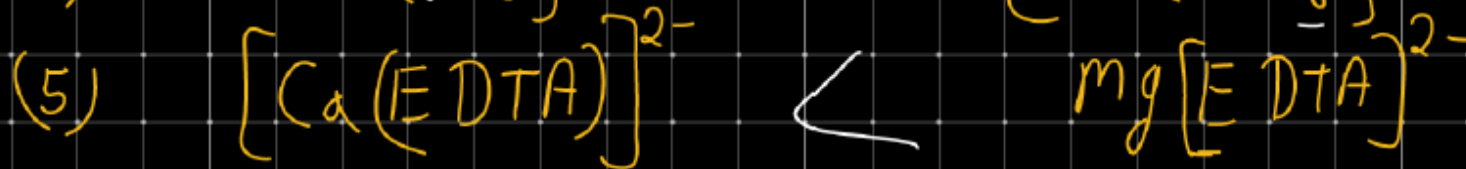
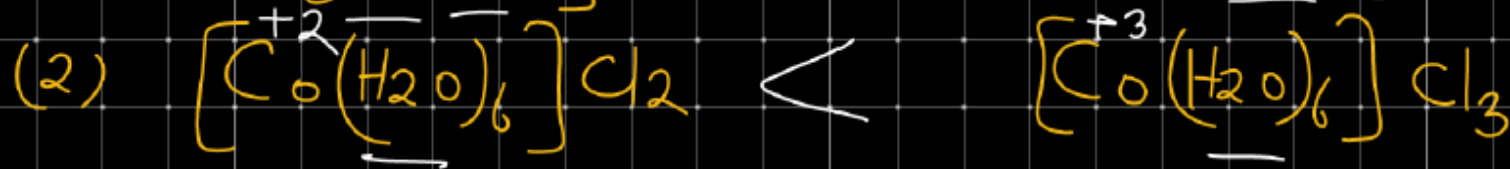


## Factors of Stability of Complex:-

A Complex is stable then

- (1) Ligand is strong
- (2) Ligand has chelation property
- (3) metal has high charge.

Ques:- Compare the stability of following complex.



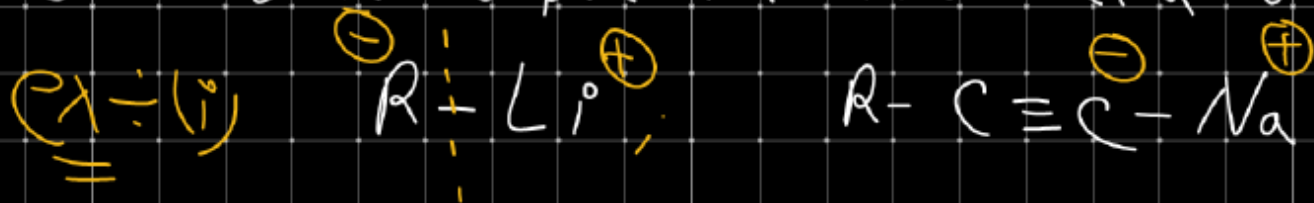
# Organometallic Compound :-

The Compound in which metal is directly bonded with the Carbon.

Types :-

(1) Ionic organometallic Compound -

Ionic bond is present b/w metal & Carbon.



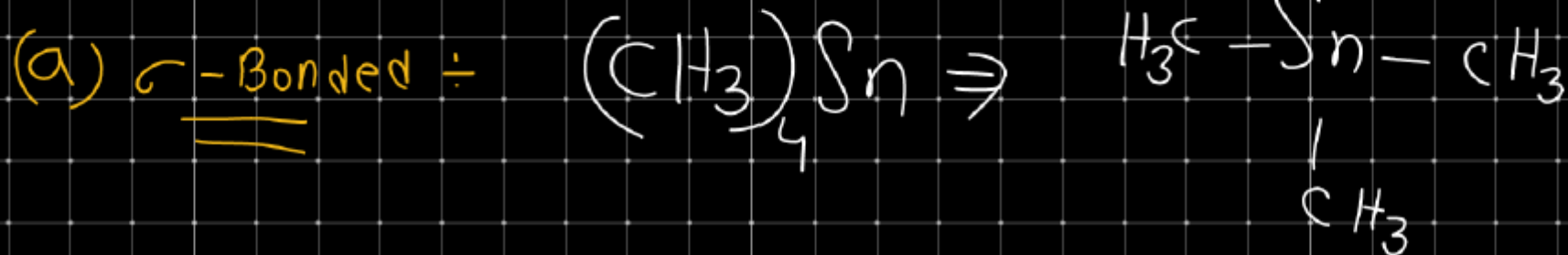
(2) Covalent organometallic Compound :-

Covalent bond is present b/w metal & Carbon.

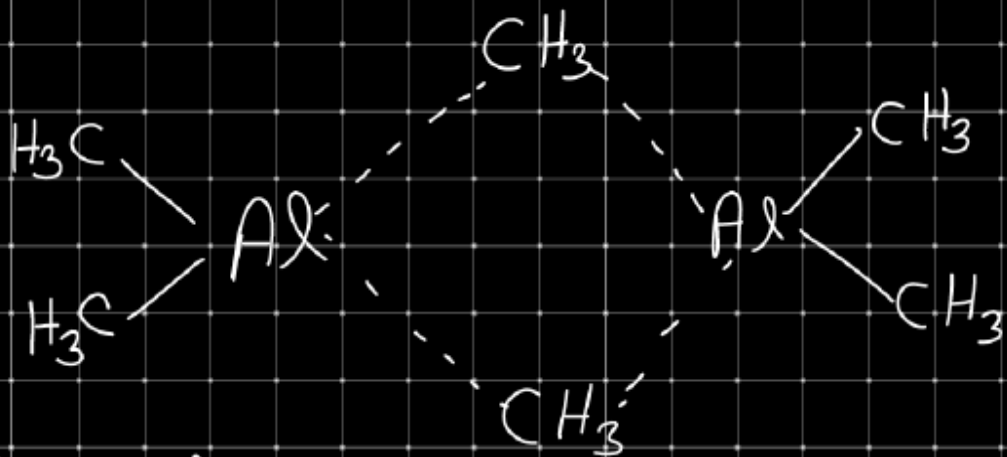
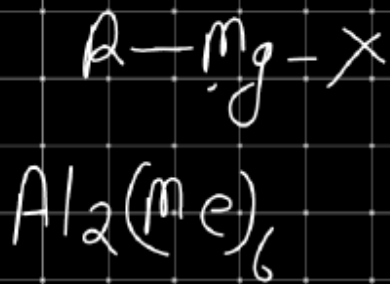
(a)  $\sigma$  - Bonded

(b)  $\pi$  - Bonded

(c)  $\sigma$  &  $\pi$  Both Bonded.



Ex:-



Ex:-  $R-Zn-R \Rightarrow$  Frankland reagent

$(C_2H_5)_4Pb \Rightarrow$  Tetra ethyl lead (TEL)

$(C_2H_5)_3-Al + AlCl_3 \Rightarrow$  Ziegler natta catalyst.

(2)  $\pi$ -Bonded

ex: (i) Ferrocene

(ii) Di-benzene Chromium

(iii) Ziegler salt

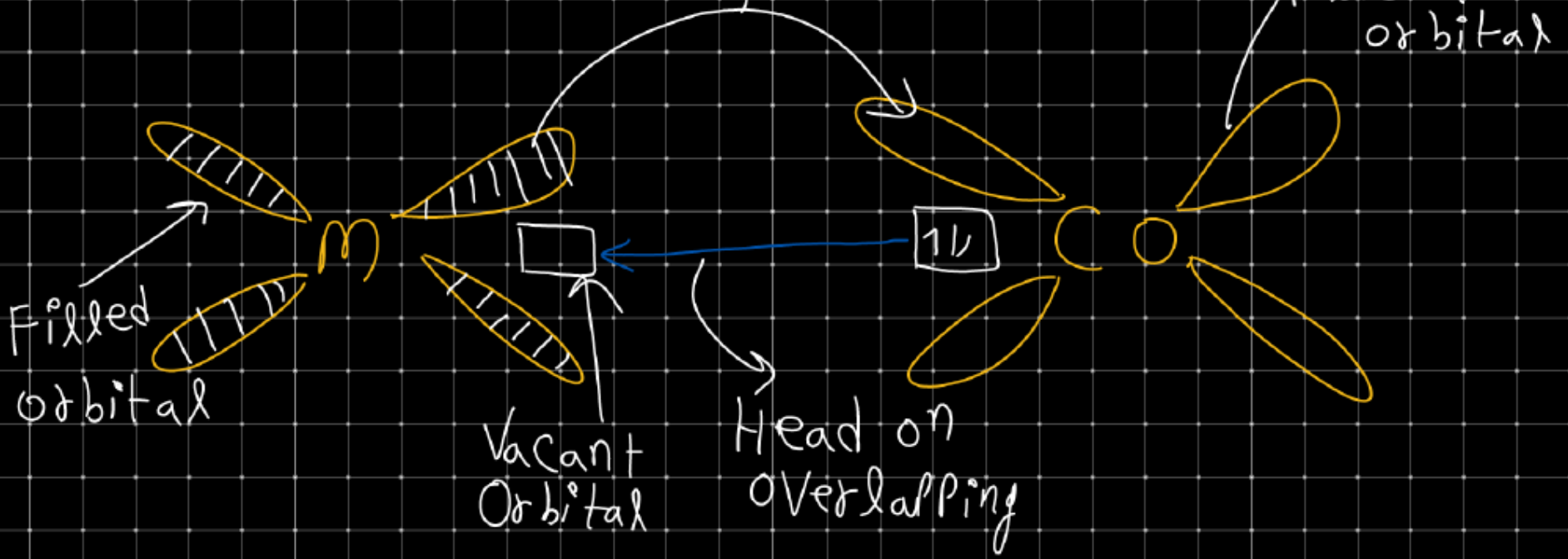
(3)  $\sigma$  &  $\pi$  Bonded ex: metal Carbonyl



$sp^3$

Tetrahedral

Bonding in metal Carbonyl  $\rightleftharpoons$



# Metal & Carbon  $\sigma$ -bond is formed by donation of Carbonyl Carbon in vacant orbital of M (metal)

# Metal & Carbon  $\pi$ -bond is formed by side wise overlapping of metal & Carbonyl Carbon.

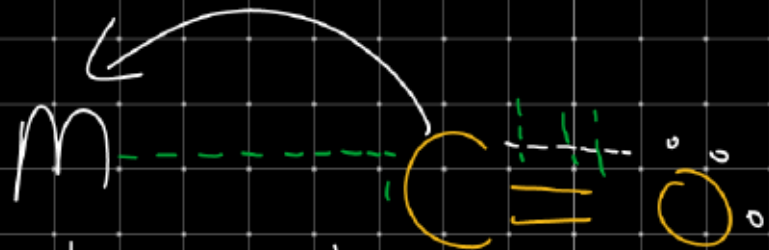
# This effect is called synergic effect and bonding is known as synergic bonding

# Ligands are known as  $\pi$ -acid ligand.  
(CO,  $CN^-$ )



# Due to Synergetic Bonding

- (1) metal & Carbon  $\Rightarrow$  Bond order  $\uparrow$  B.E.T B.L.  $\downarrow\downarrow$   
Carbon & oxygen  $\Rightarrow$  B.O.  $\downarrow\downarrow$  B.E.  $\downarrow\downarrow$  B.L.T



- (2) Charge density of Metal  $\uparrow$   
M & C  $\Rightarrow$  B.E.T B.O.T B.L  $\downarrow$   
C & O  $\Rightarrow$  B.E  $\downarrow$  B.O  $\downarrow$  B.L  $\uparrow$