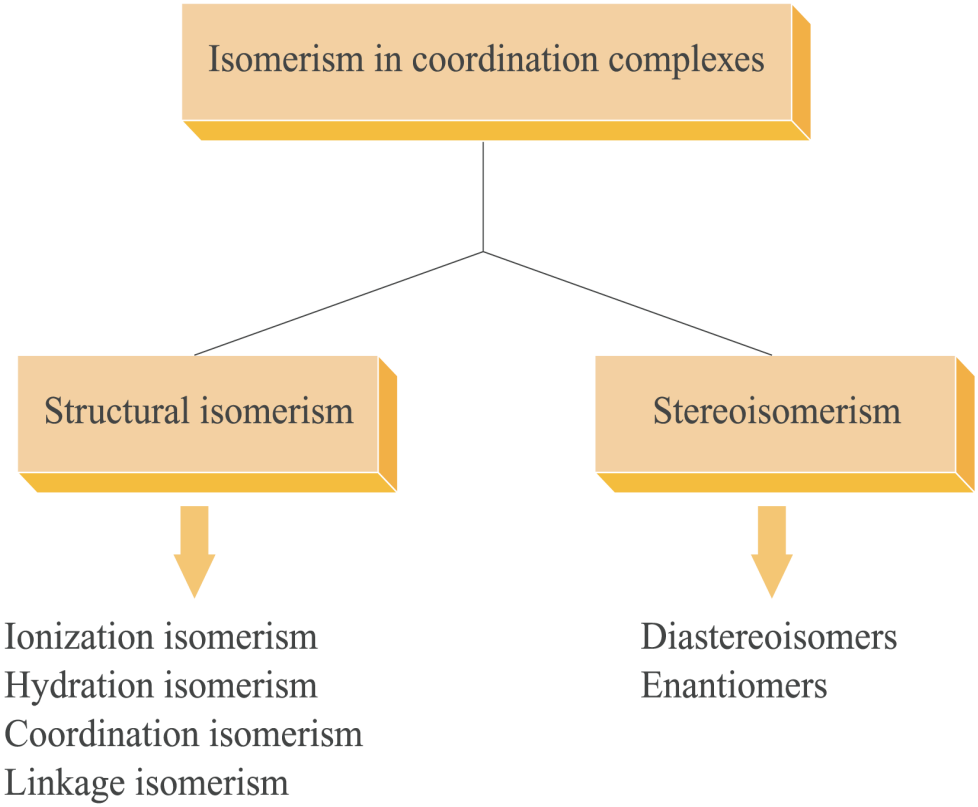

Isomerism in coordination complexes
Structural isomerism
Stereoisomerism
Ionization isomerism
Hydration isomerism
Coordination isomerism
Linkage isomerism
Diastereoisomers
Enantiomers

Isomeri di ionizzazione

$[CoCl_2(en)_2]NO_2$ (verde)
$[Co(NH_3)_5Br](SO_4)$ (violetto)

$[CoCl(NO_2)(en)_2]Cl$ (rosso)
$[Co(NH_3)_5(SO_4)]Br$ (rosso)

Isomeri di idratazione

$CrCl_3 \cdot 6H_2O$

$[CrCl_2(OH_2)_4]Cl \cdot 2H_2O$ (verde)
$[CrCl(OH_2)_5]Cl_2 \cdot H_2O$ (blu-verde)
$[Cr(OH_2)_6]Cl_3$ (violetto)

Isomeri di coordinazione

$[Co(NH_3)_6][Cr(CN)_6]$ $[Cr(NH_3)_6][Co(CN)_6]$

$[Cu(NH_3)_4][PtCl_4]$ (violetto) $[Pt(NH_3)_4][CuCl_4]$ (verde)

$[Co(en)_3][Cr(C_2O_4)_3]$ $[Co(en)_2(C_2O_4)][Cr(en)(C_2O_4)_2]$

$[Co(NH_3)_6][Co(NO_2)_6]$ $[Co(NH_3)_4(NO_2)_2][Co(NH_3)_2(NO_2)_4]$

$[Pt^{II}(NH_3)_4][Pt^{IV}Cl_6]$ $[Pt^{IV}(NH_3)_4Cl_2][Pt^{II}Cl_4]$

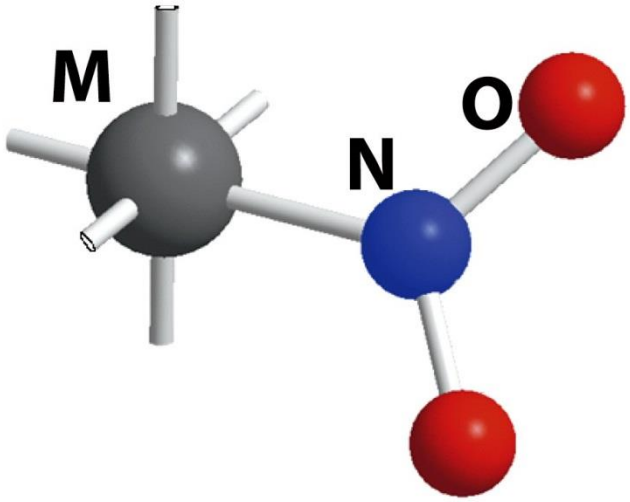
Isomeri di polimerizzazione

$[Pt(NH_3)_2Cl_2]$
$[Pt(NH_3)_4][PtCl_4]$
$[Pt(NH_3)_3Cl][Pt(NH_3)Cl_3]$
$[Pt(NH_3)_4][Pt(NH_3)Cl_3]_2$
$[Pt(NH_3)_3Cl]_2[PtCl_4]$

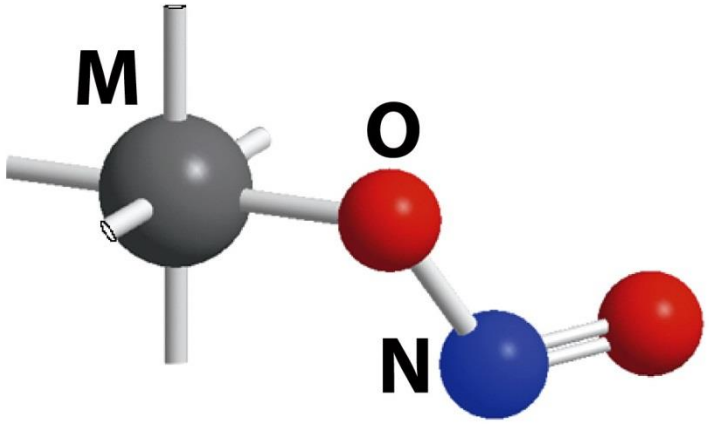
Isomeri di legame (leganti ambidentati)

–NO_2 (nitro)
–C≡N (nitrile)
–S–C≡N^- (tiocianato)

–O–NO (nitrito)
–N≡C (isonitrile)
–N=C=S^- (isotiocianato)



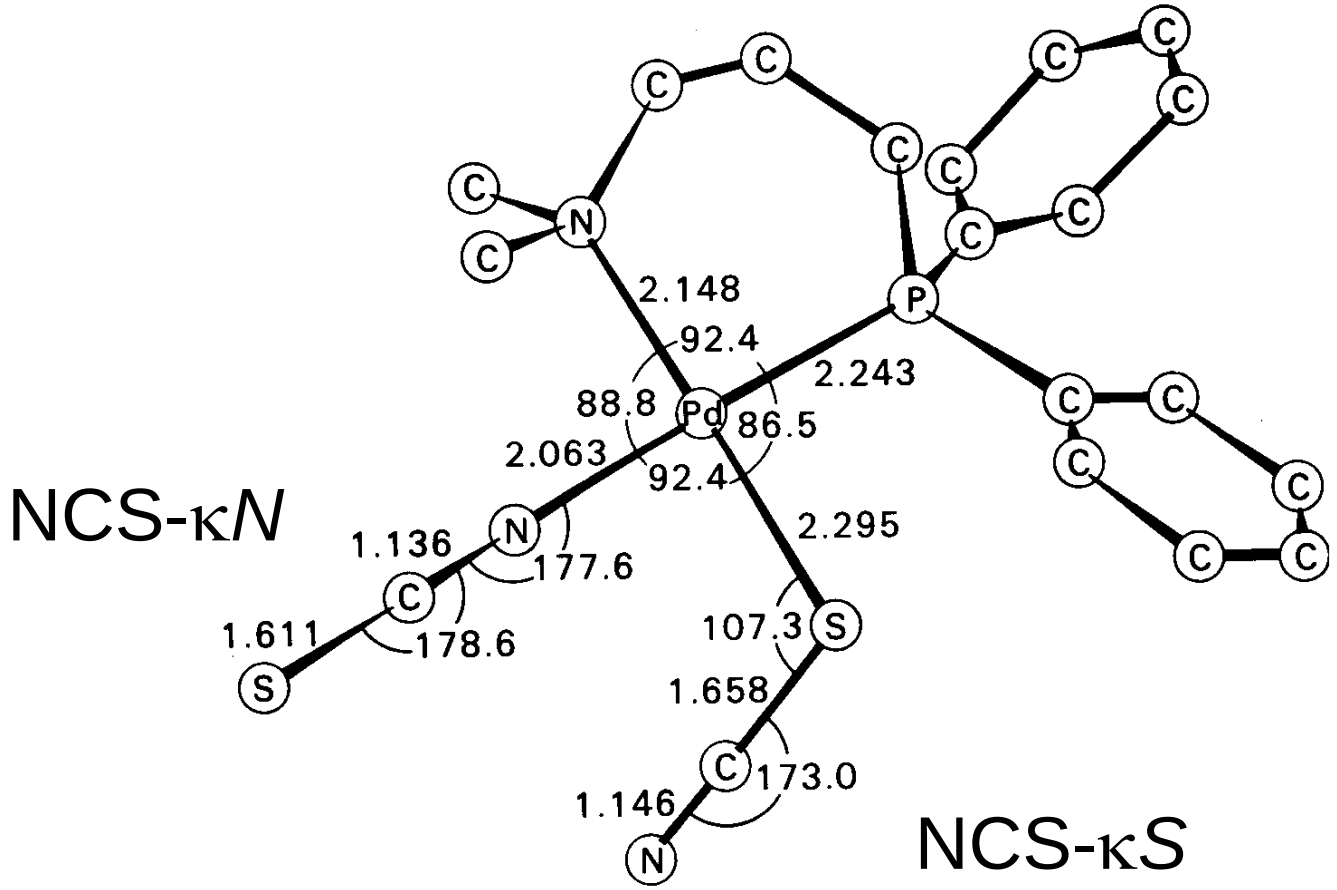
Nitro ligand

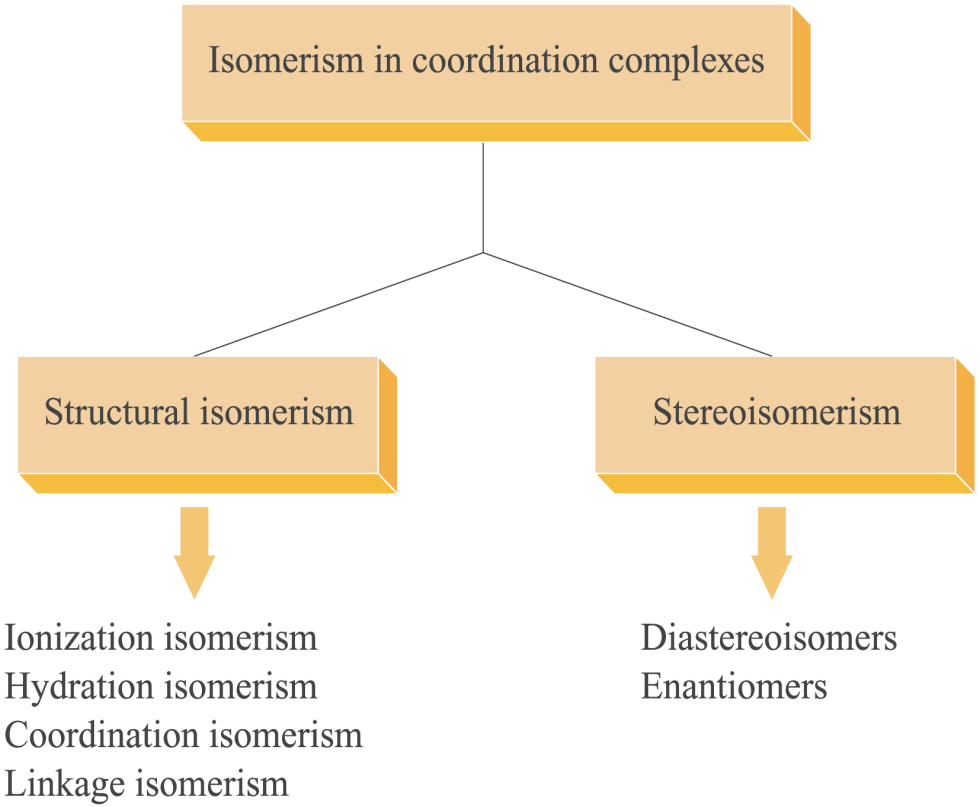


Nitrito ligand

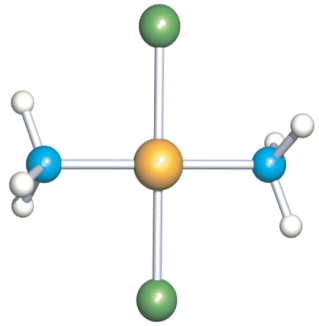
$[Co(NH_3)_5(NO_2\text{-}k\mathit{O})]^{2+}$ (rosso)

$[Co(NH_3)_5(NO_2\text{-}k\mathit{N})]^{2+}$ (giallo)

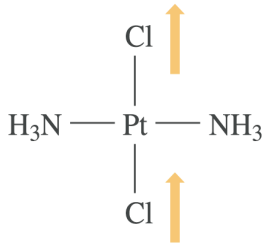

NCS-κN
NCS-κS
2.148
92.4
88.8
Pd
86.5
2.243
2.063
92.4
2.295
1.136
177.6
1.611
178.6
107.3
1.658
173.0
1.146
N
C
S
P



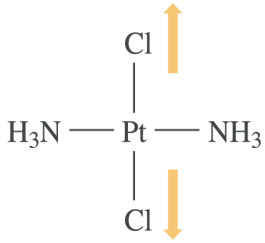
stereoisomeri che non siano enantiomeri sono diastereoisomeri



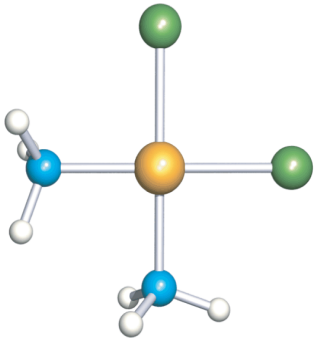
The *trans*-isomer is non-polar



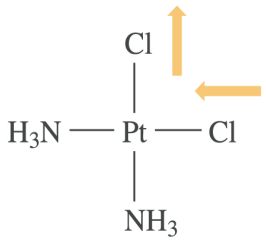
Asymmetric stretch:
IR active
365 cm^{-1}



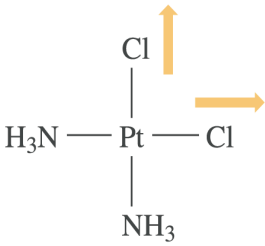
Symmetric stretch:
IR inactive



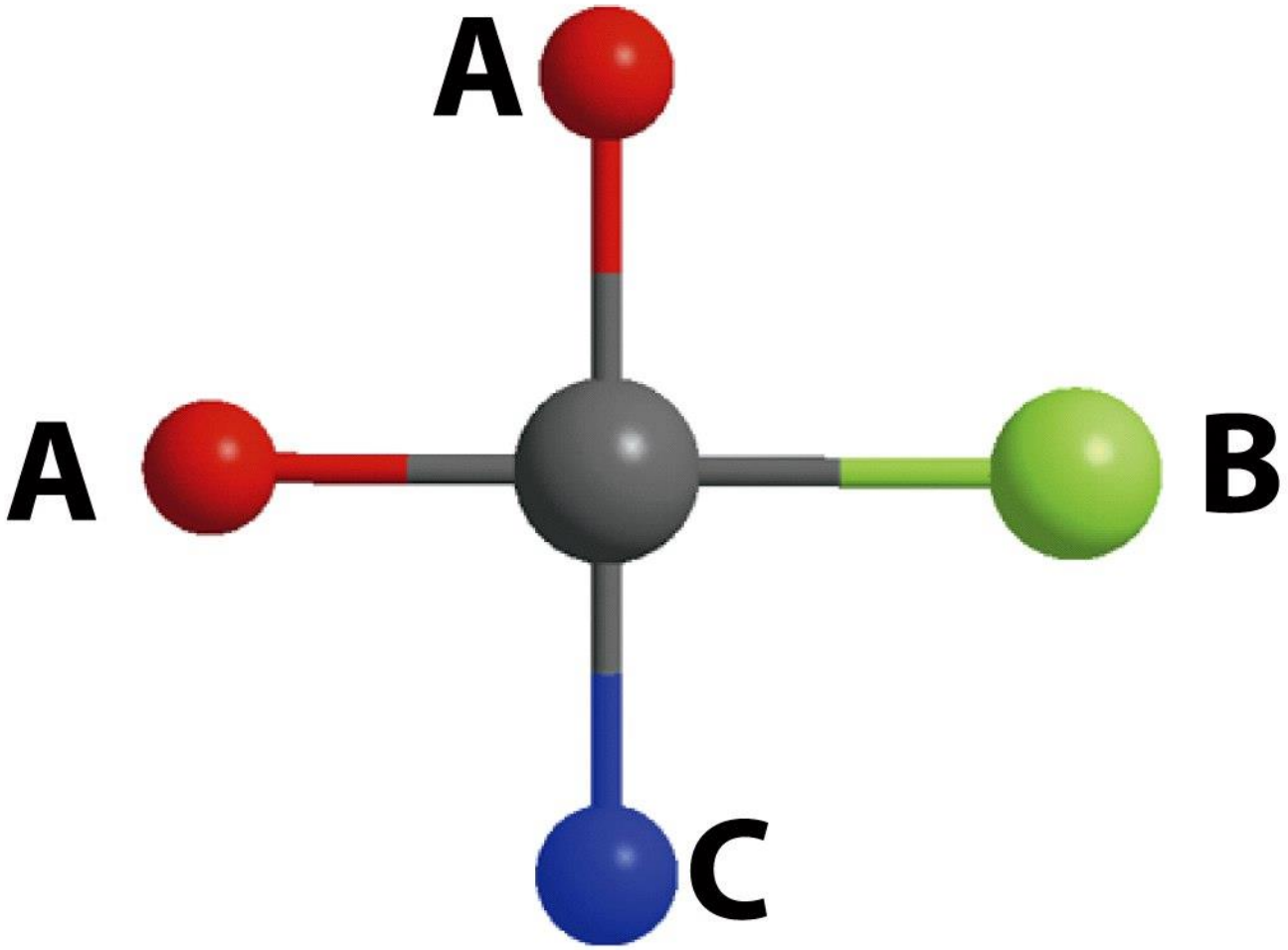
The *cis*-isomer is polar



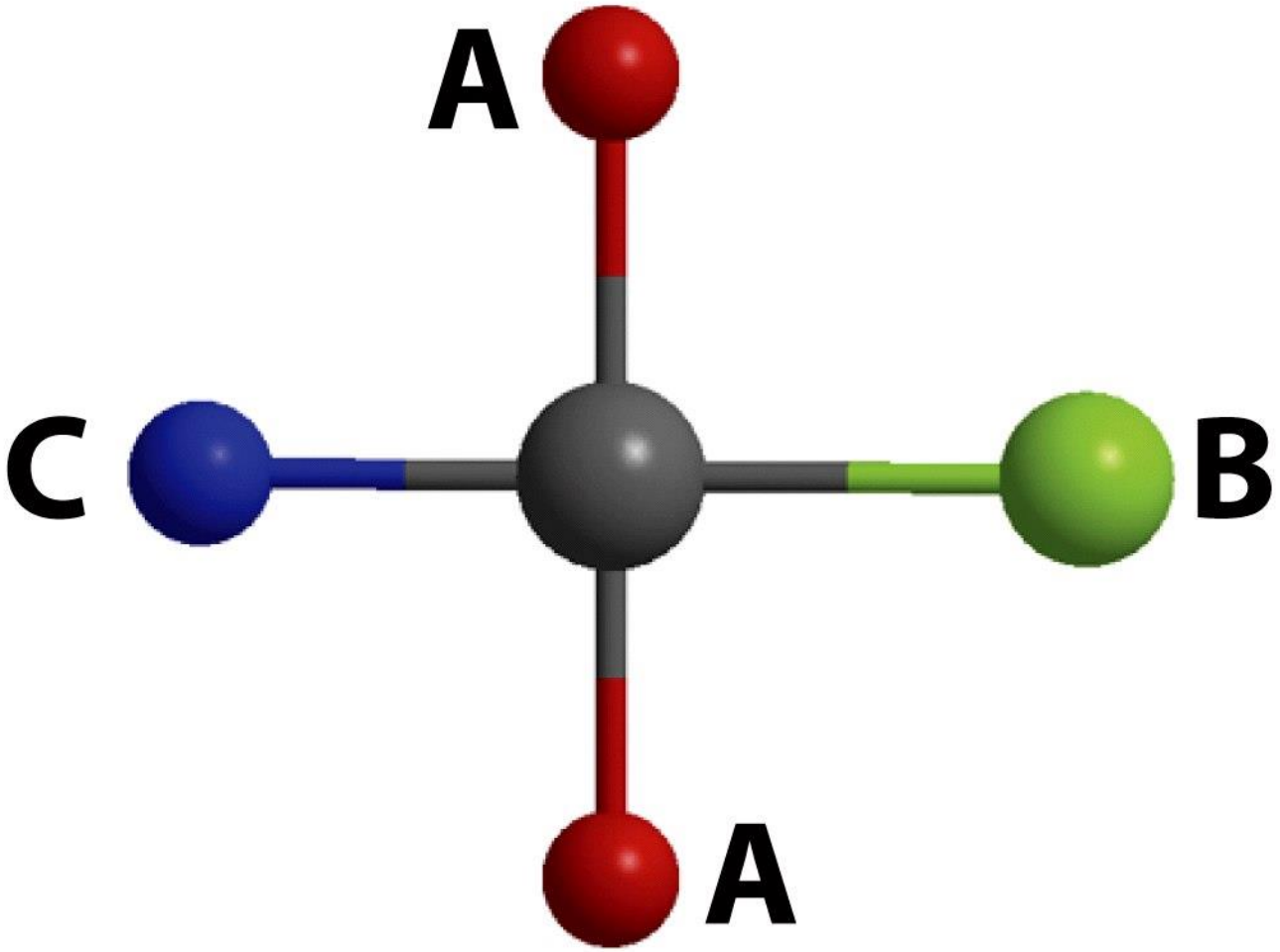
Asymmetric stretch:
IR active
330 cm^{-1}



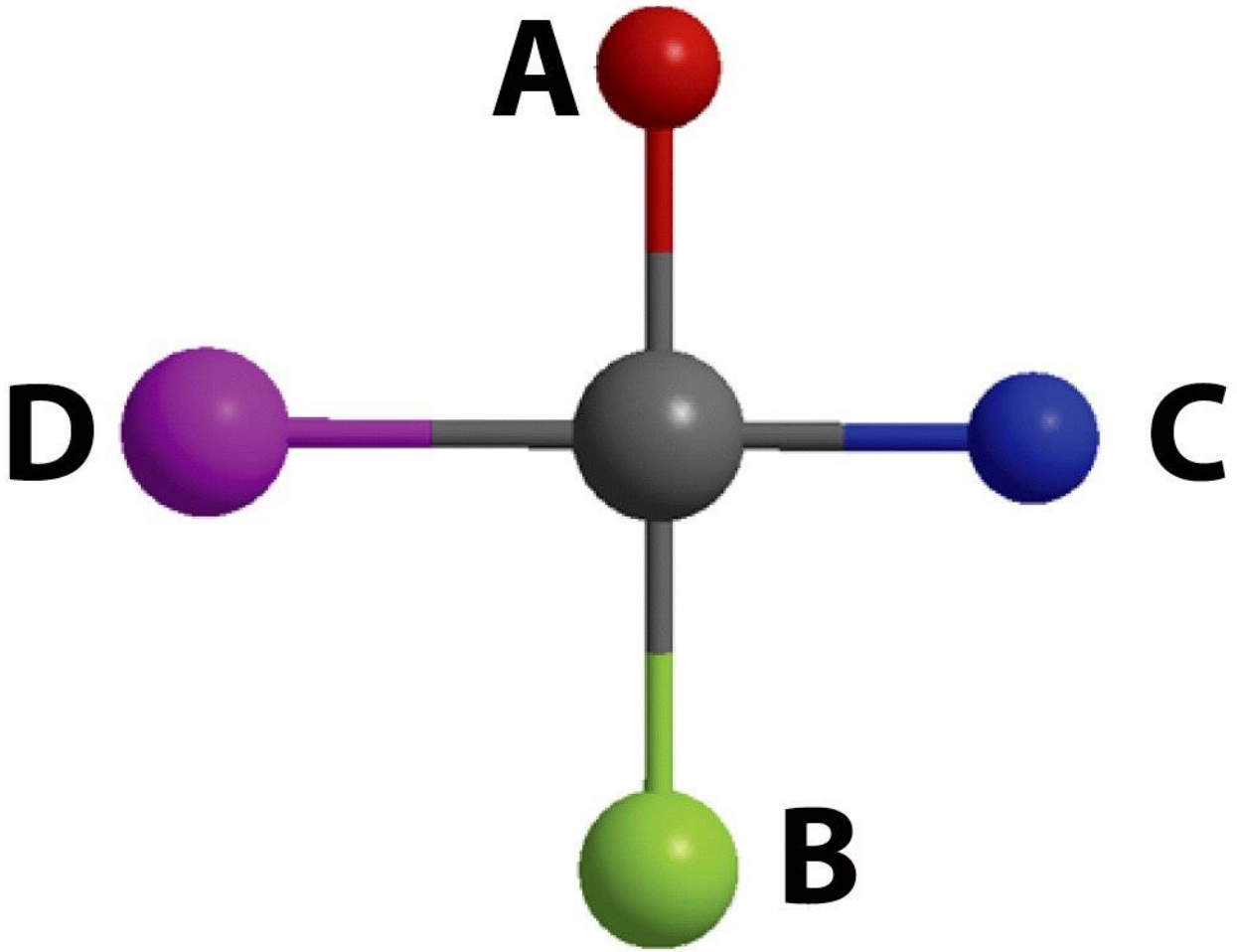
Symmetric stretch:
IR active
323 cm^{-1}



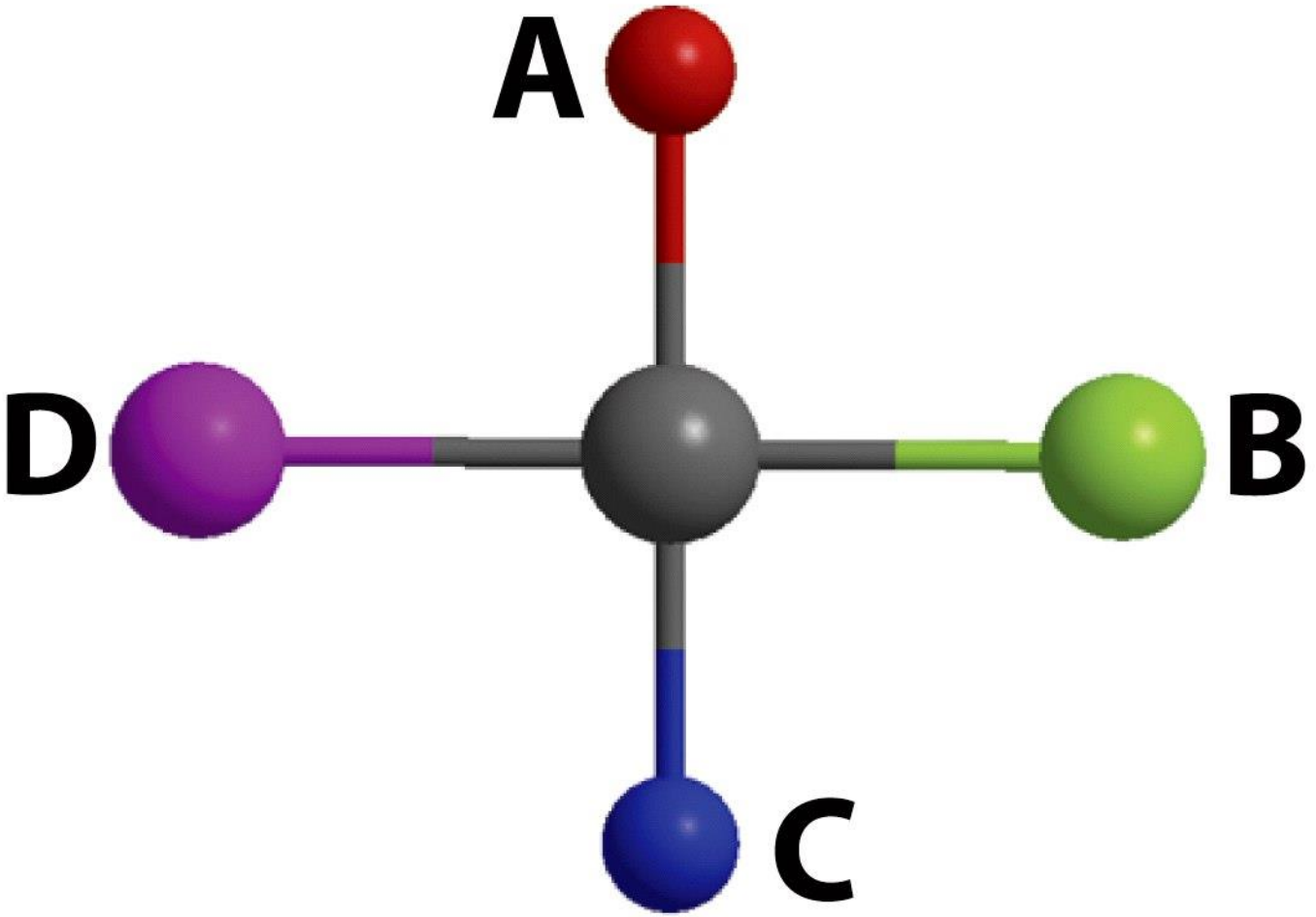
cis-[MA_2BC]



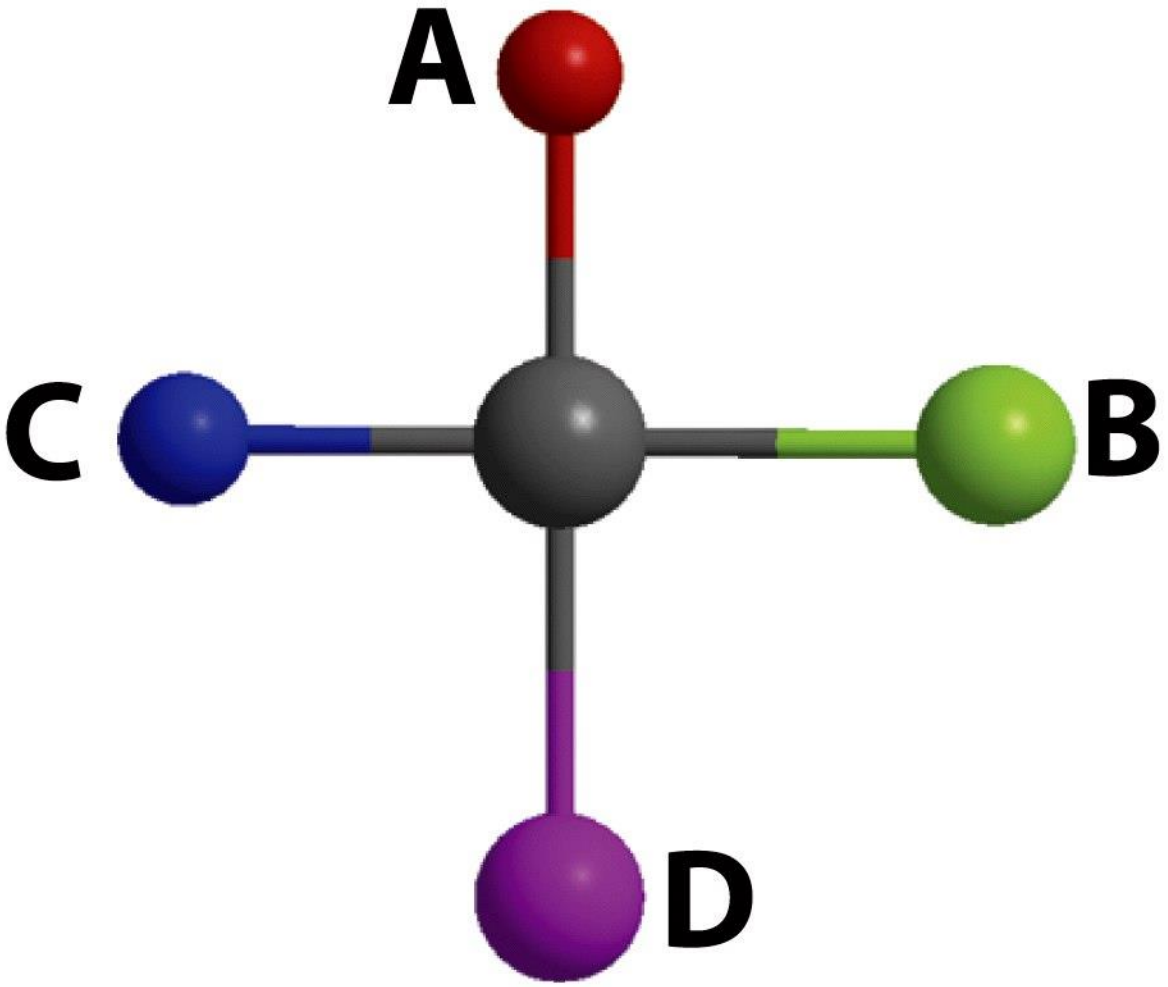
***trans*-[MA_2BC]**



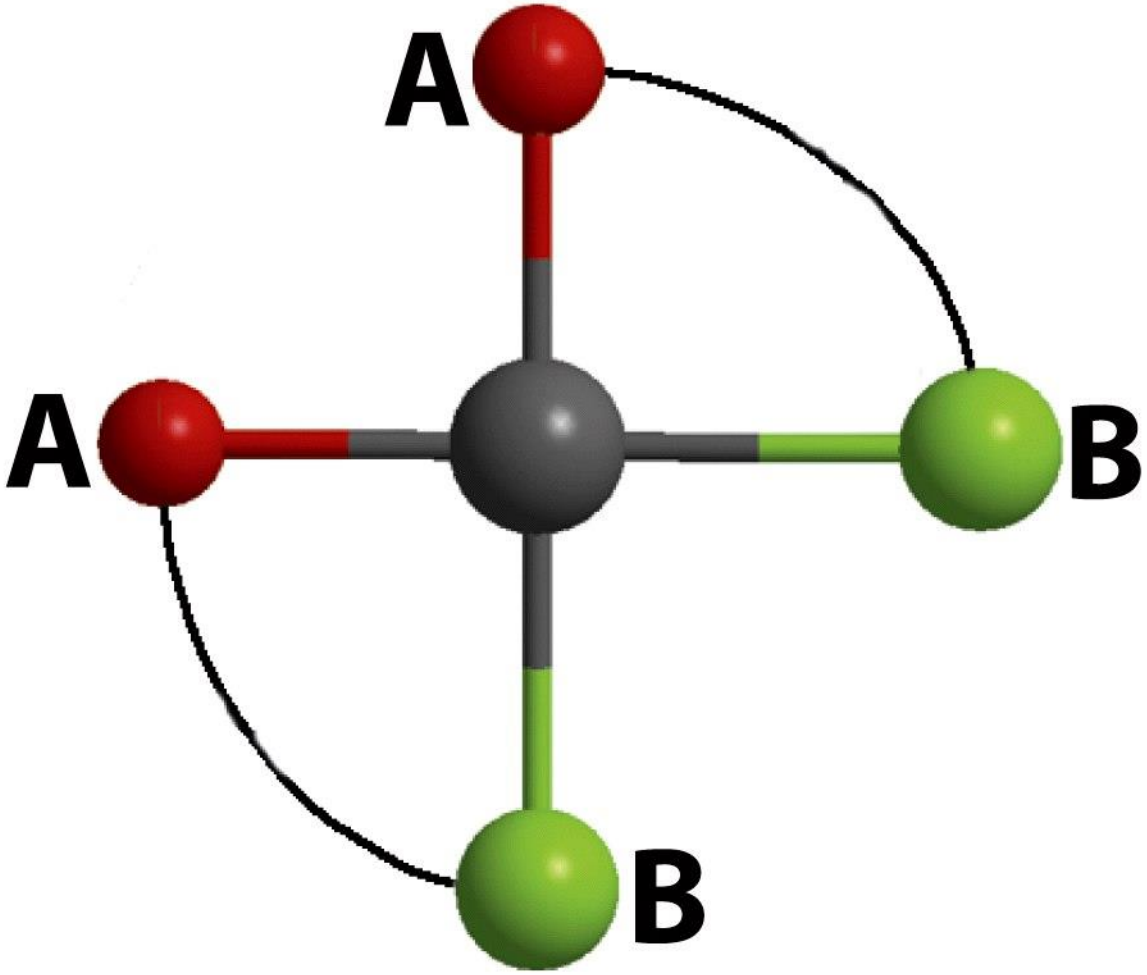
[MABCD], A *trans* to B



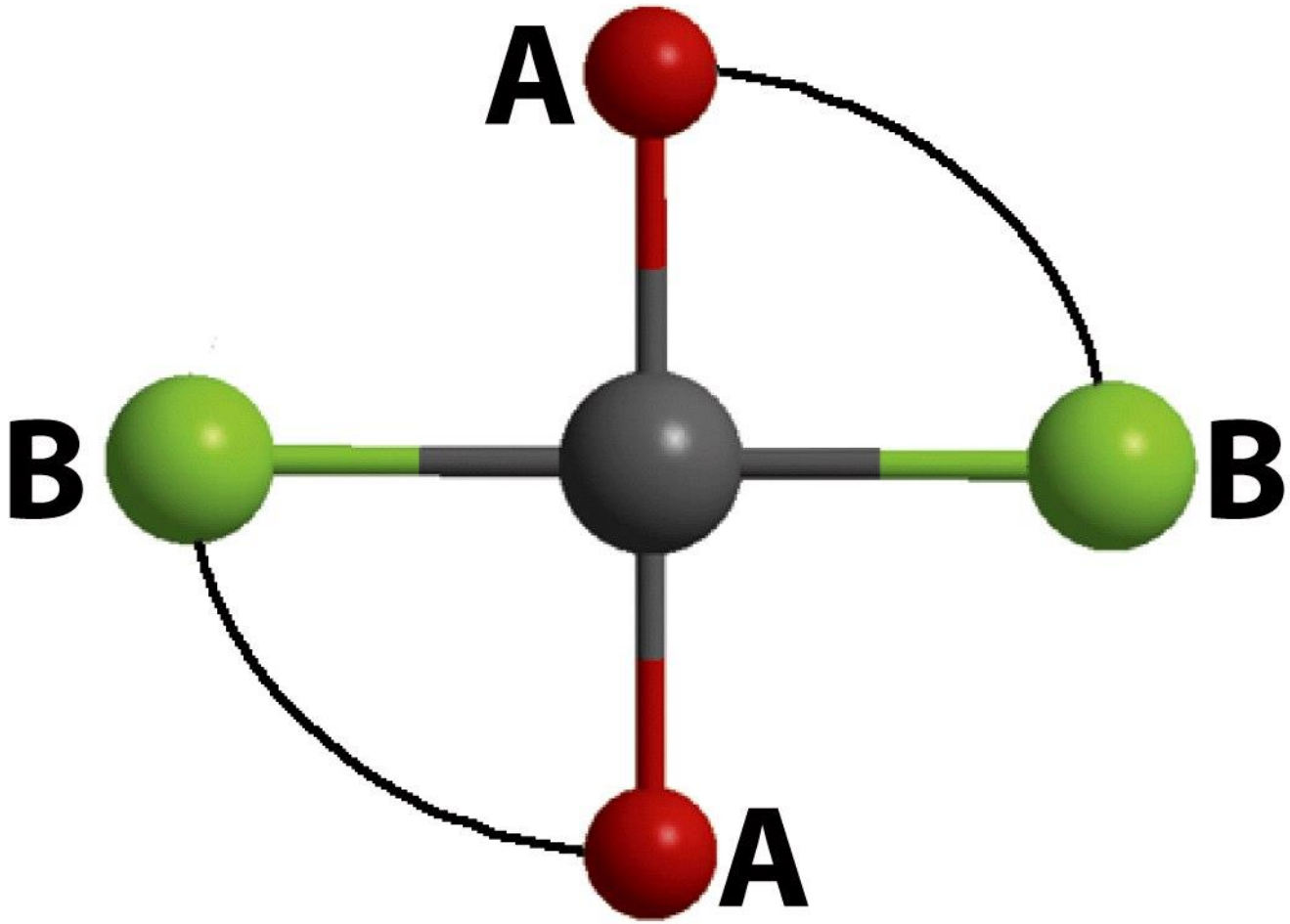
[MABCD], A *trans* to C



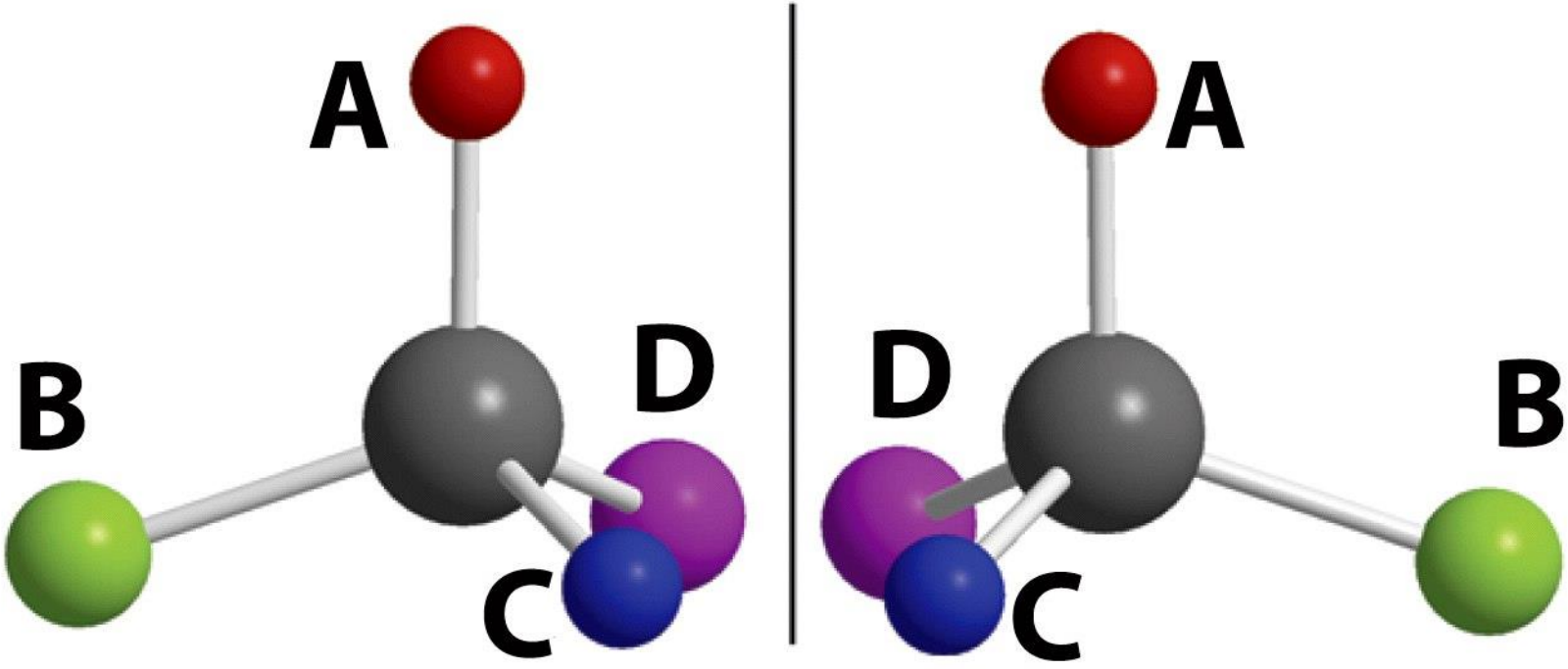
[MABCD], A *trans* to D



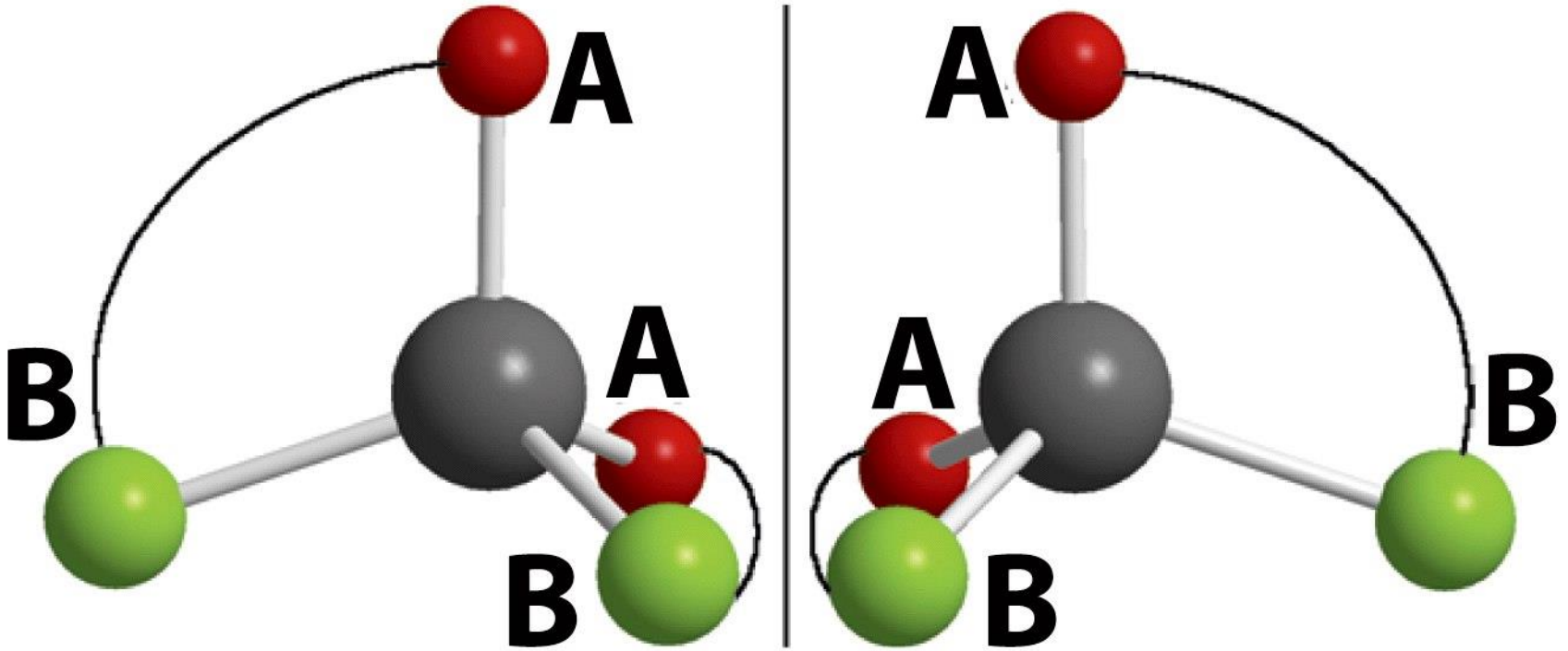
cis-[M(AB)$_2$]



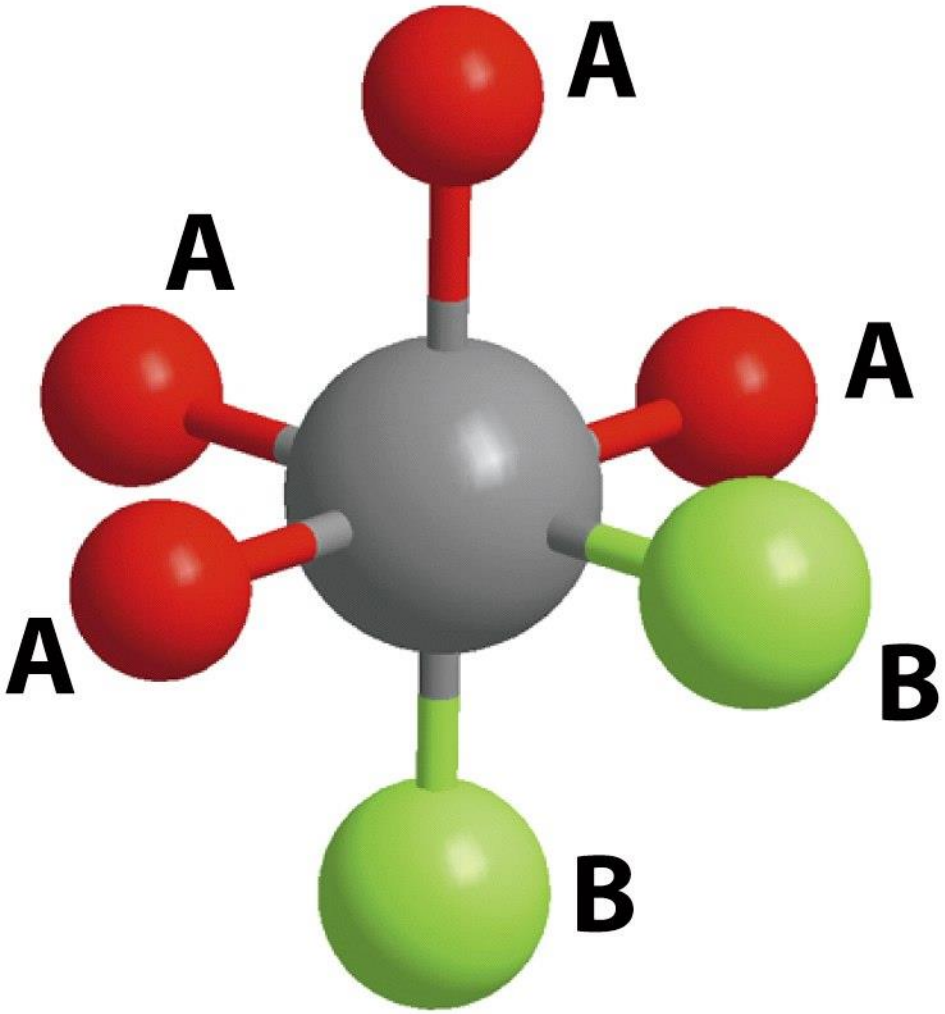
***trans*-[M(AB)$_2$]**



[MABCD] enantiomers

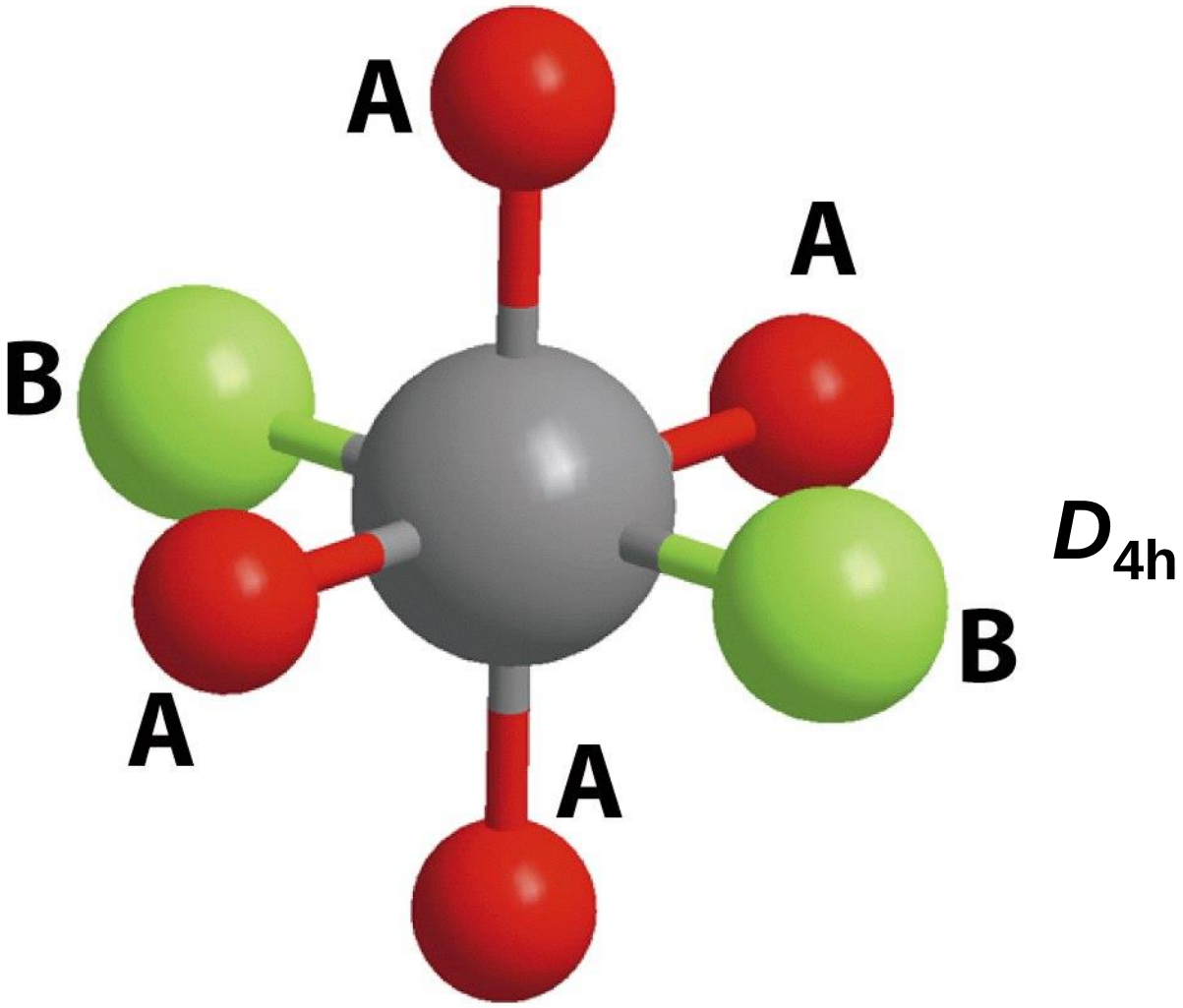


$[M(AB)_2]$ enantiomers

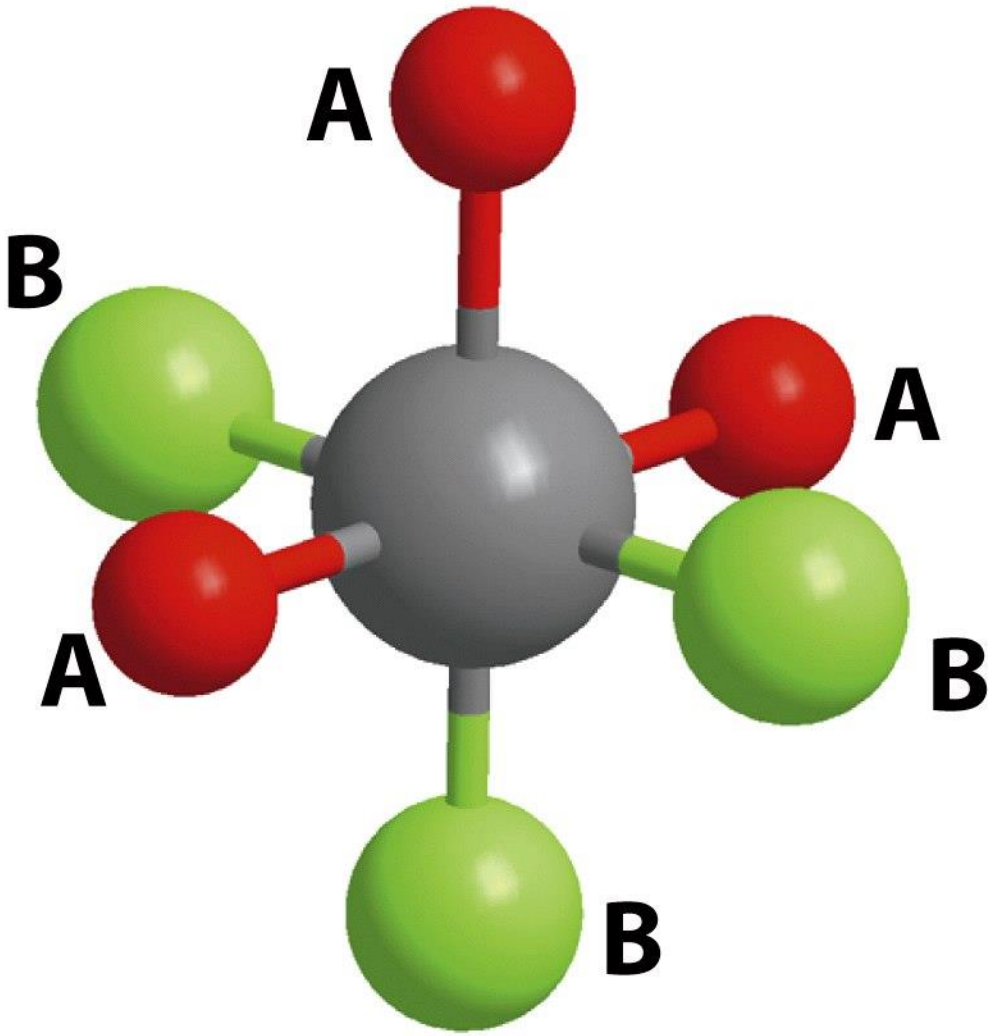


C_{2v}

***cis*-[MA_4B_2]**



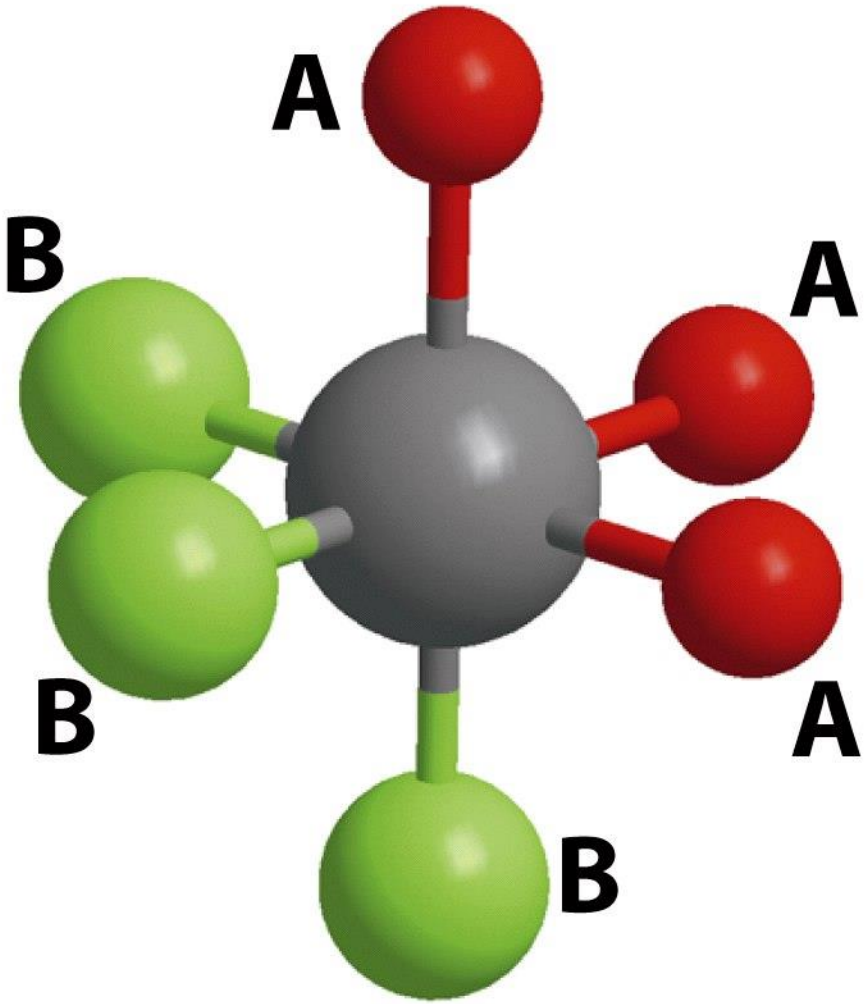
***trans*-[MA_4B_2]**



C_{2v}

***mer*-[MA_3B_3]**

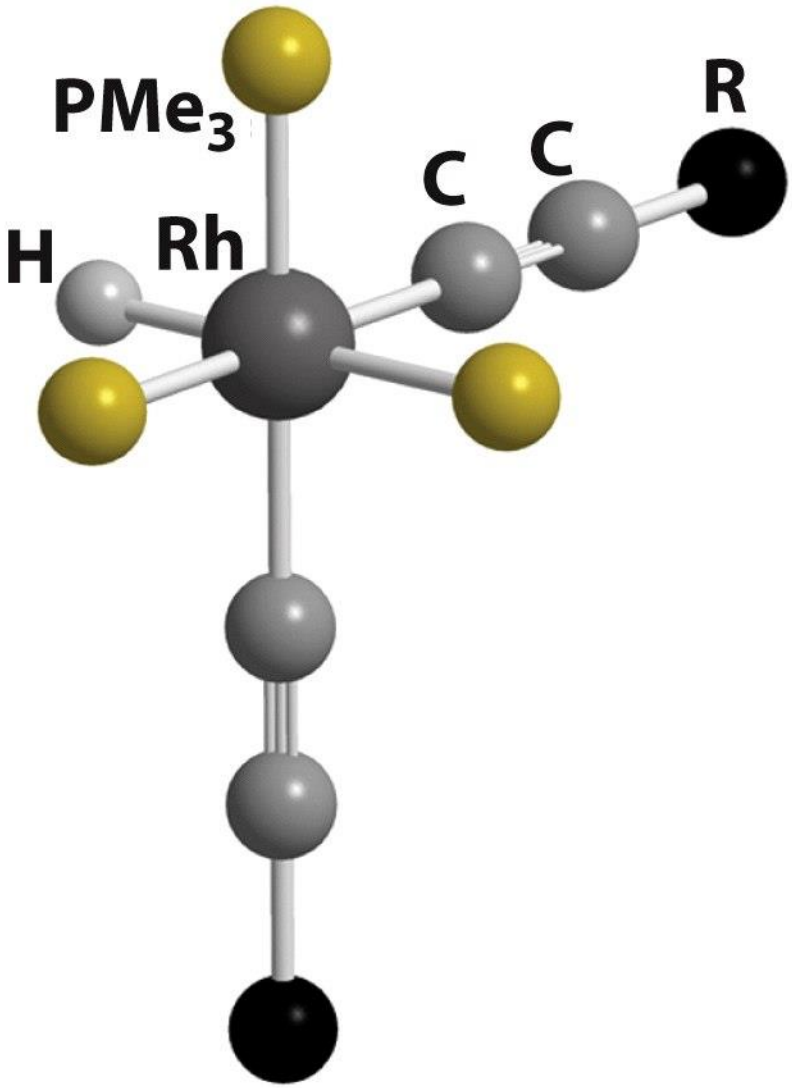
meridional



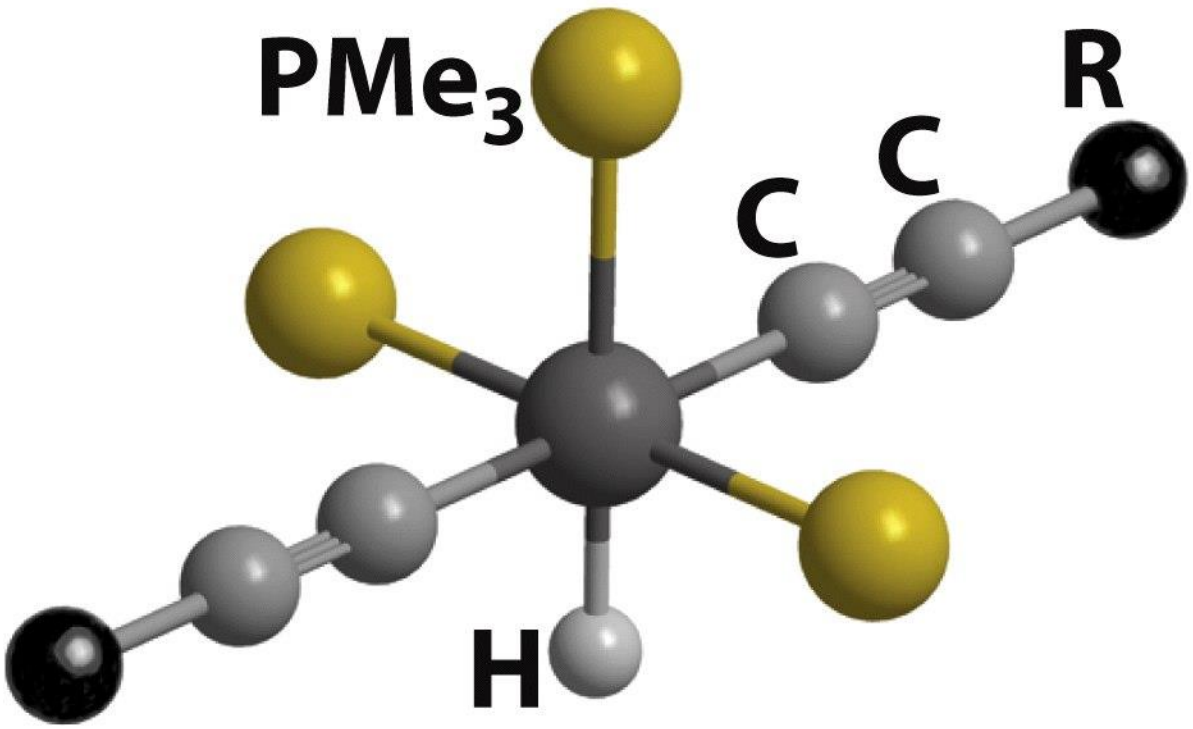
C_{3v}

***fac*-[MA_3B_3]**

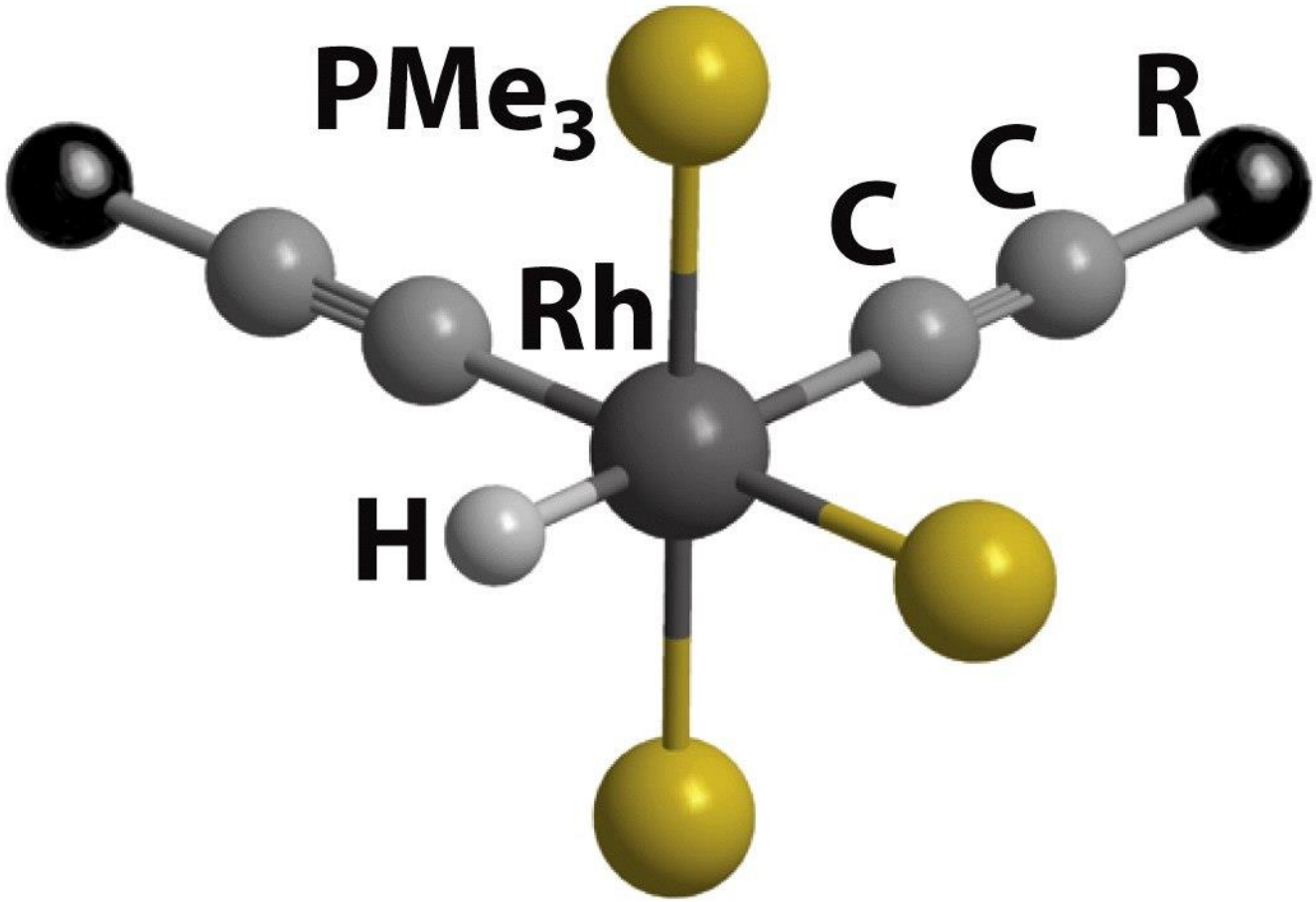
facial



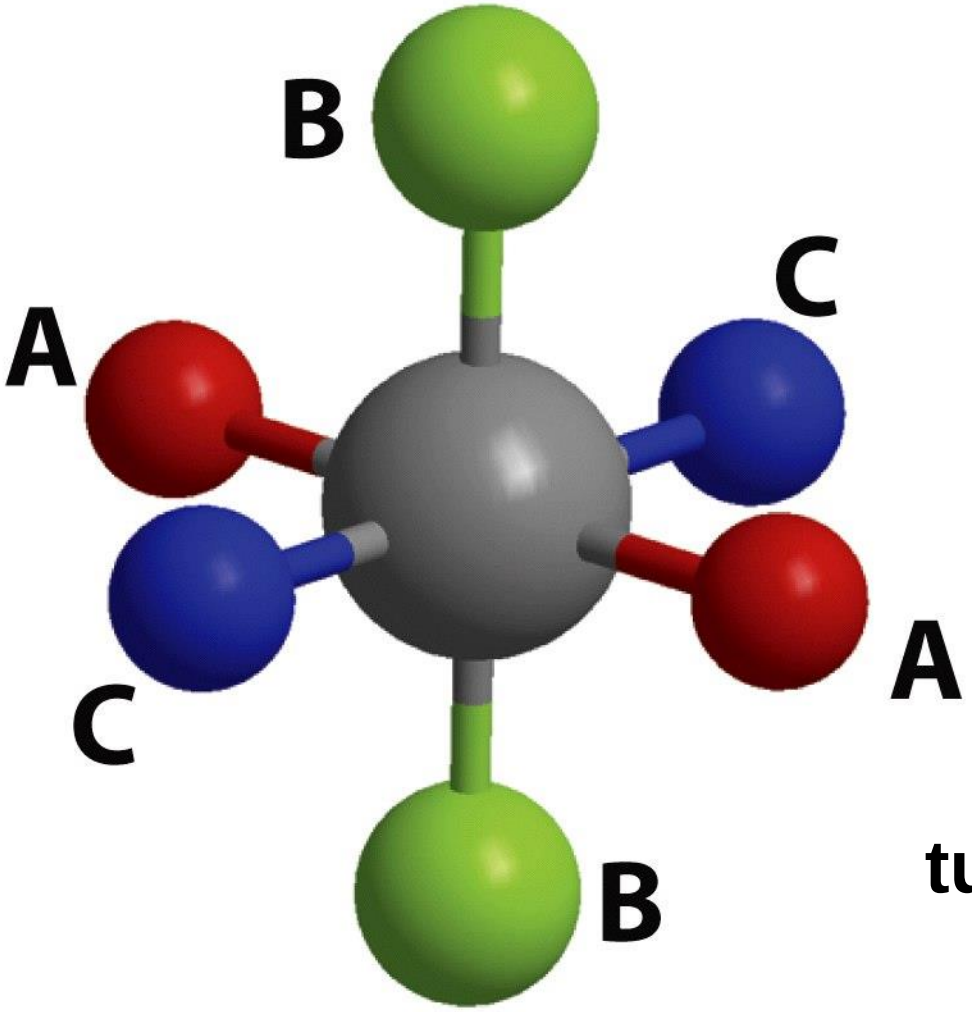
fac-[RhH(C≡CR)$_2$(PMe$_3$)$_3$]



***mer-trans*-[RhH(C≡CR)$_2$(PMe$_3$)$_3$]**

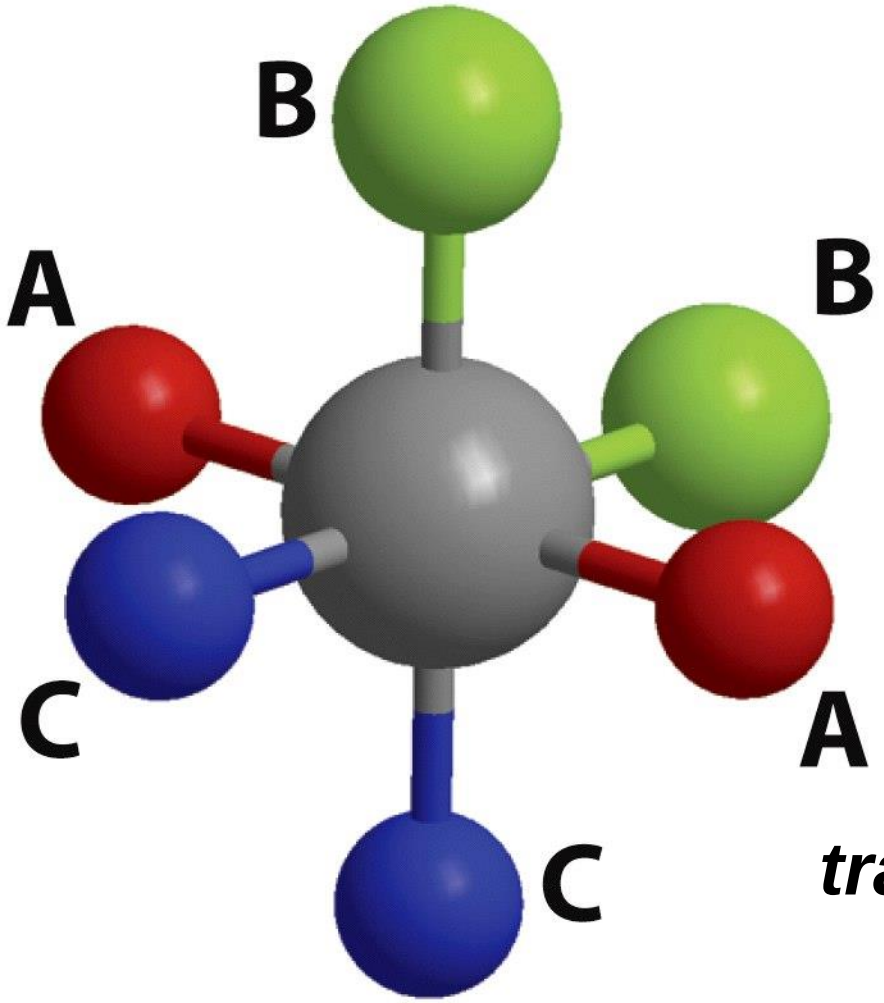


***mer-cis*-[RhH(C≡CR)$_2$(PMe$_3$)$_3$]**



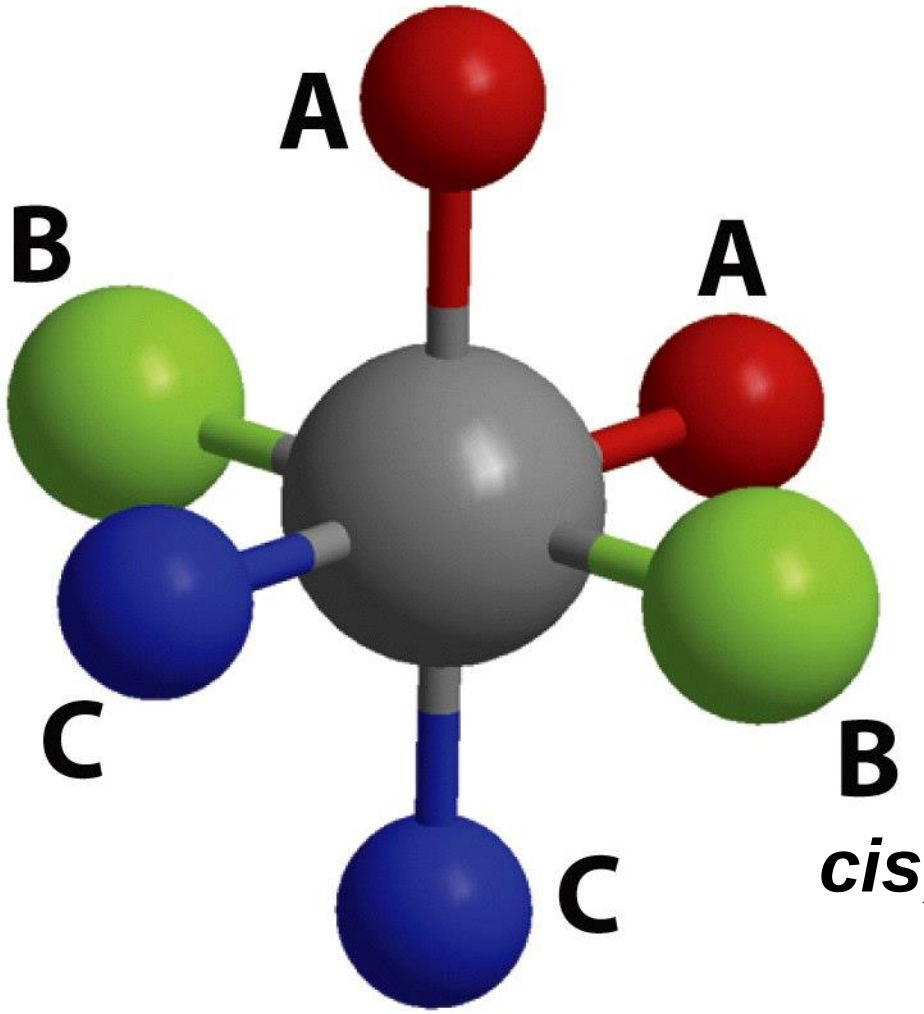
tutto-*trans*

$[MA_2B_2C_2]$



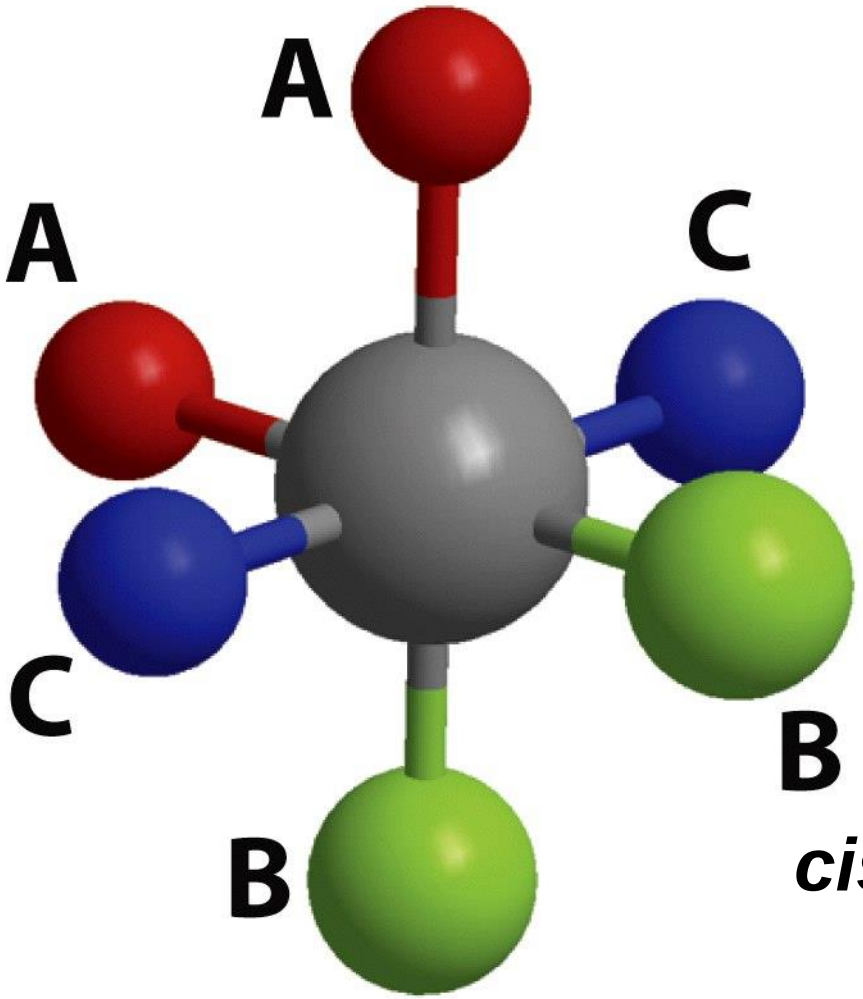
trans, cis, cis

$[MA_2B_2C_2]$



cis, trans, cis

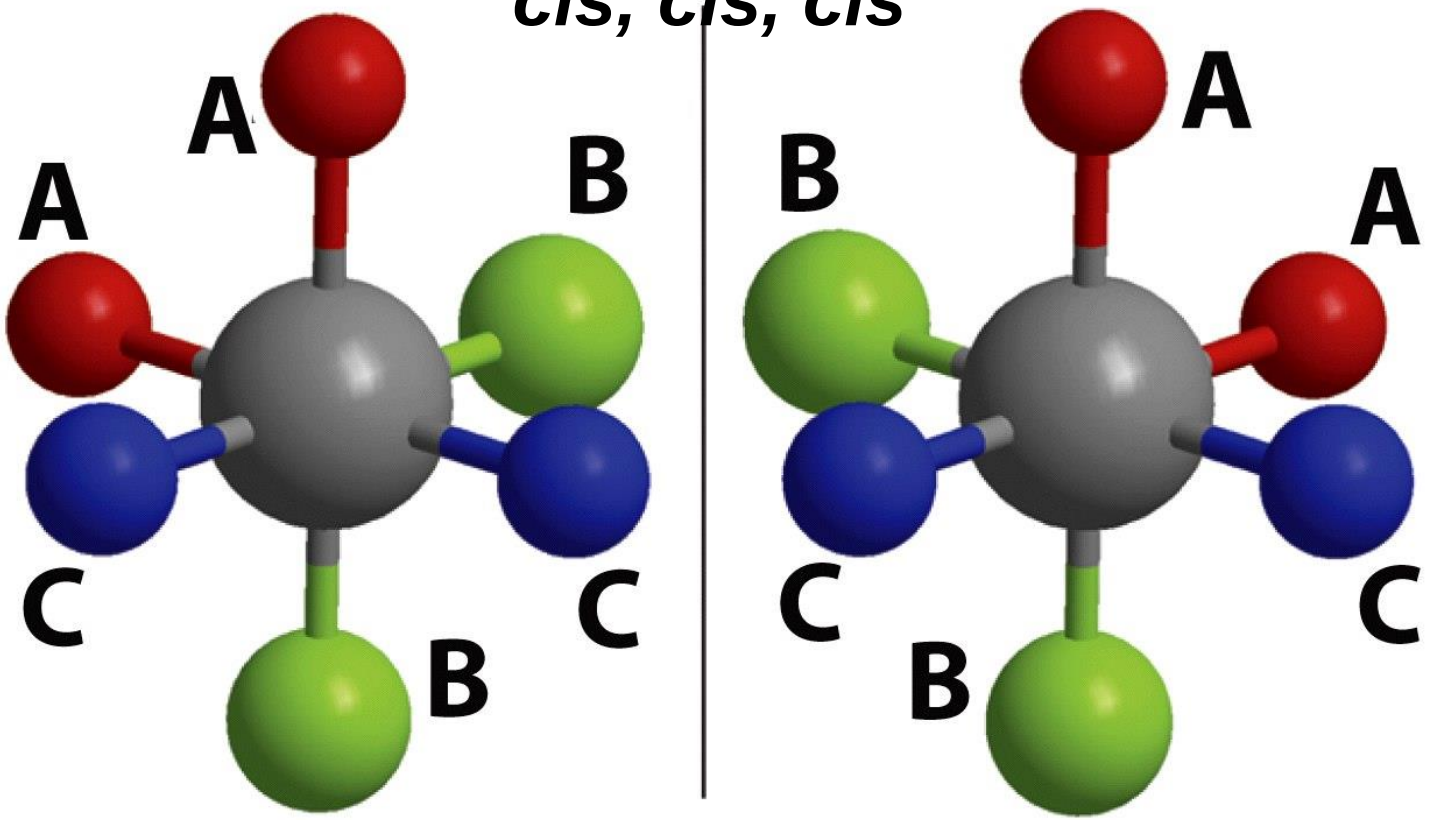
$[MA_2B_2C_2]$



cis, cis, trans

$$[MA_2B_2C_2]$$

cis, cis, cis

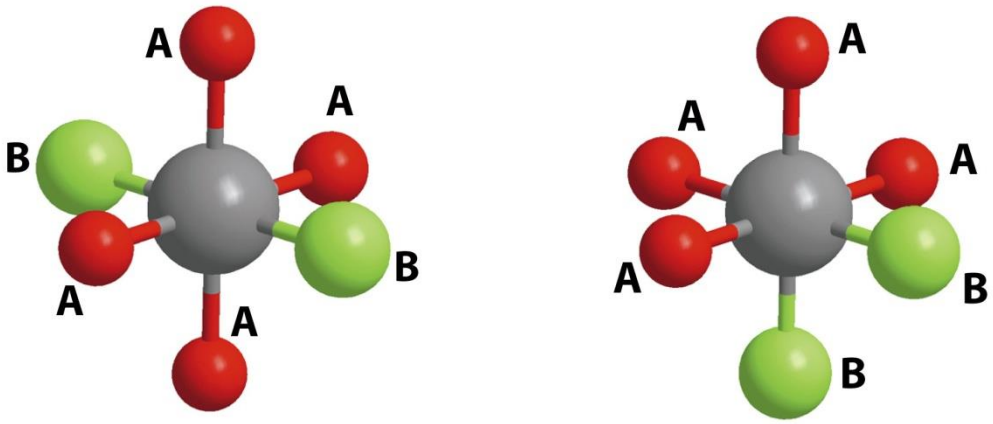


$[MA_2B_2C_2]$ enantiomers

M = centro stereogenico

Descrittori *A* e *C*

Un atomo di una molecola viene detto ***stereogenico*** *se uno scambio di due leganti porta ad uno stereoisomero della molecola di partenza*.

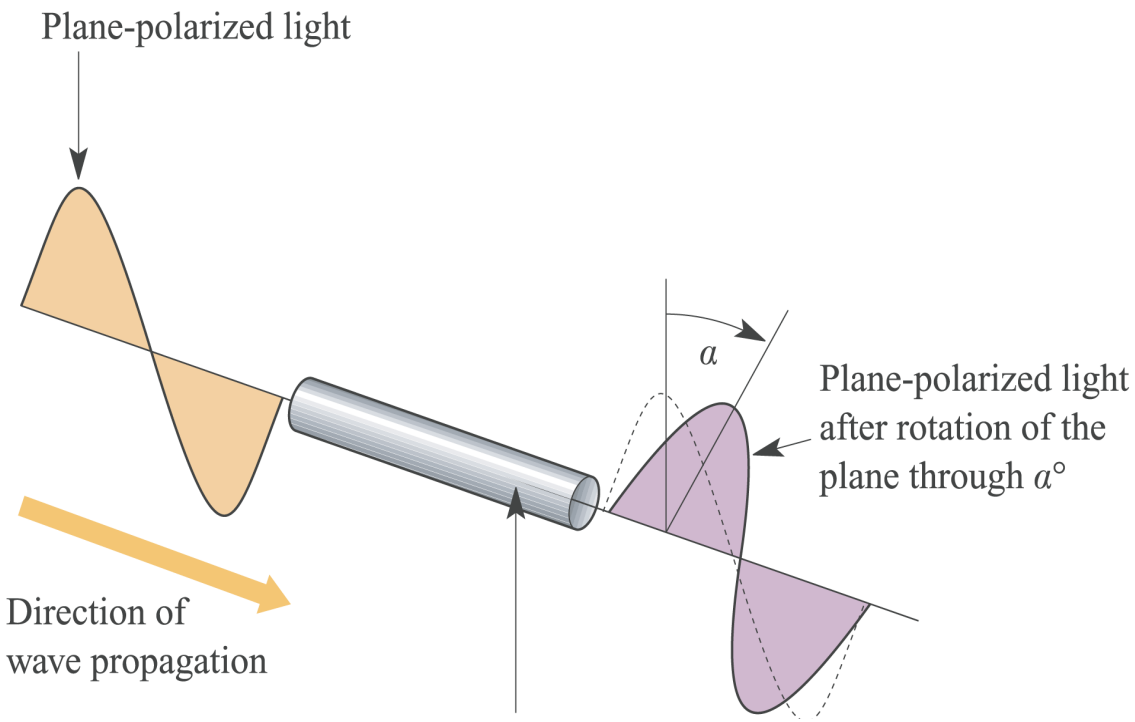


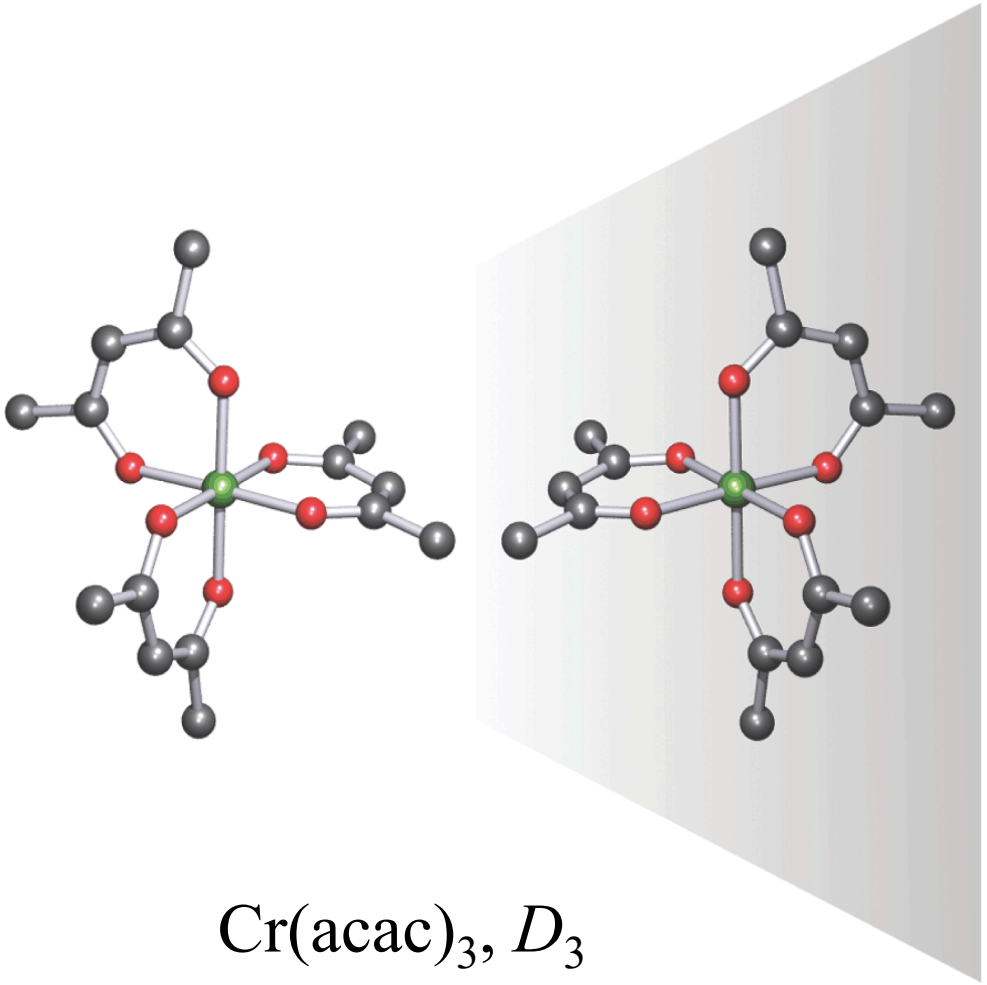
M = centro stereogenico non-chirale

Enantiomeri

- *in un ambiente achirale gli enantiomeri si comportano allo stesso modo;*
- *in un ambiente chirale non racemico (e.g. ambiente biologico) gli enantiomeri si comportano in modo diverso*

in un ambiente chirale ma racemico gli enantiomeri danno segno opposto per certe grandezze osservabili

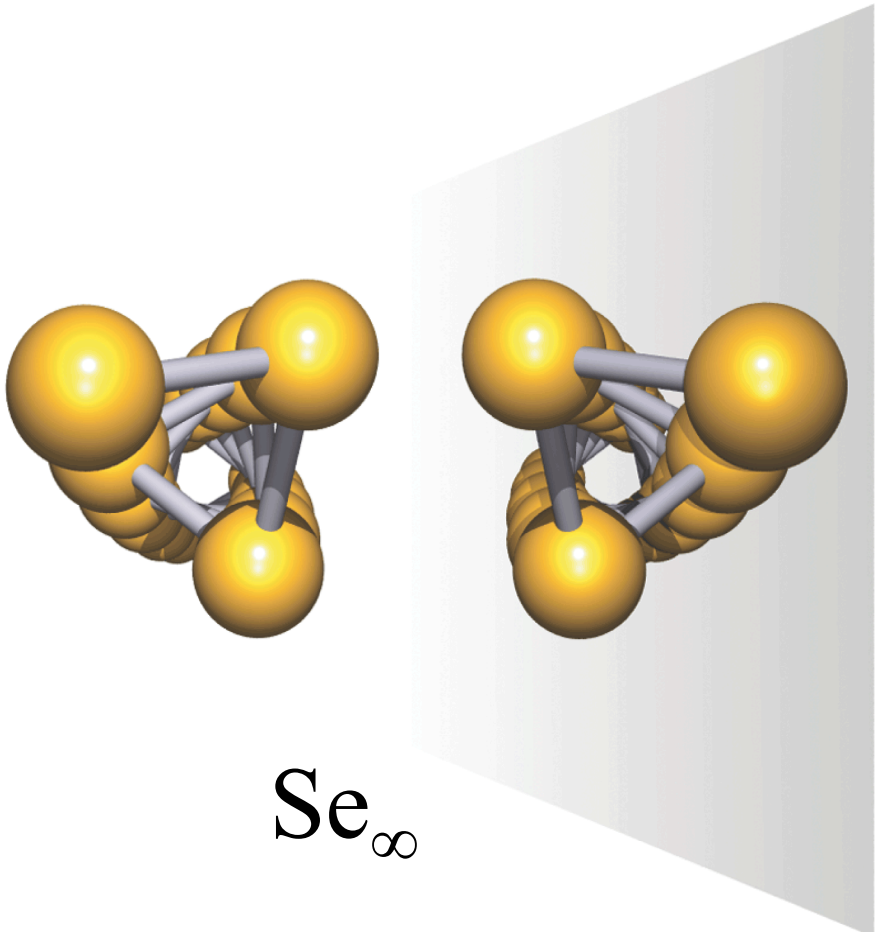




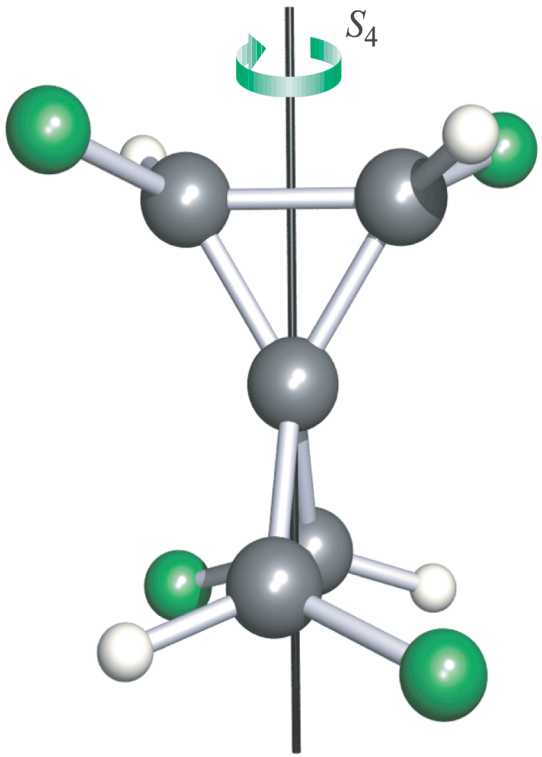
$Cr(acac)_3$, D_3

Λ-enantiomer Δ-enantiomer

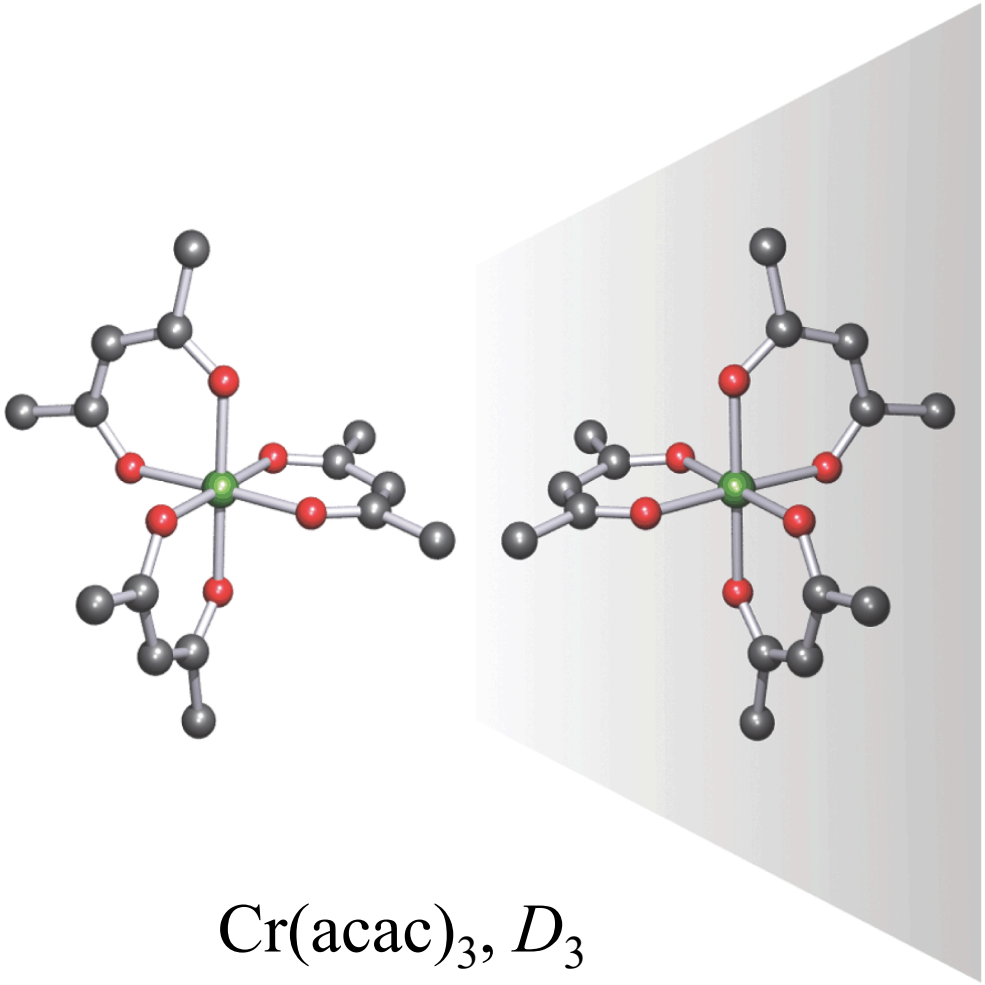
ogni molecola che non abbia S_n è chirale



Se_{∞}



Tetrafluoro-spiropentano, S_4, achirale



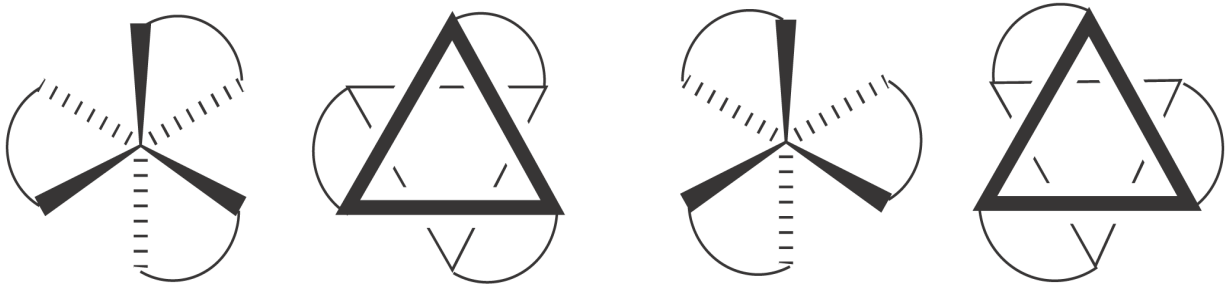
$Cr(acac)_3$, D_3

Λ-enantiomer

Δ-enantiomer

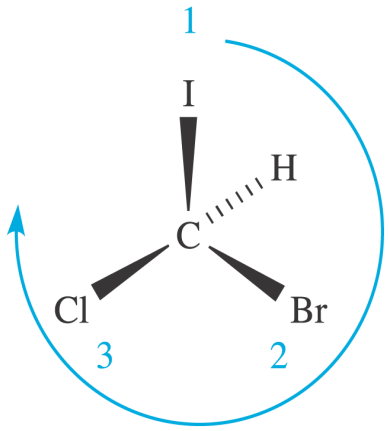
elica destrorsa

elica sinistrorsa

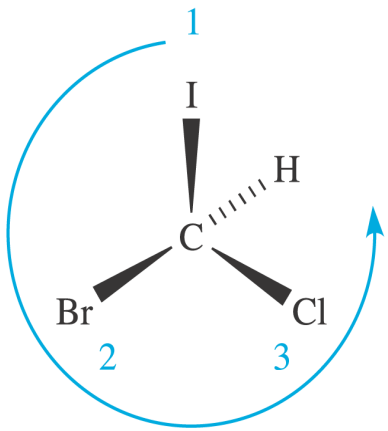


Δ

Λ

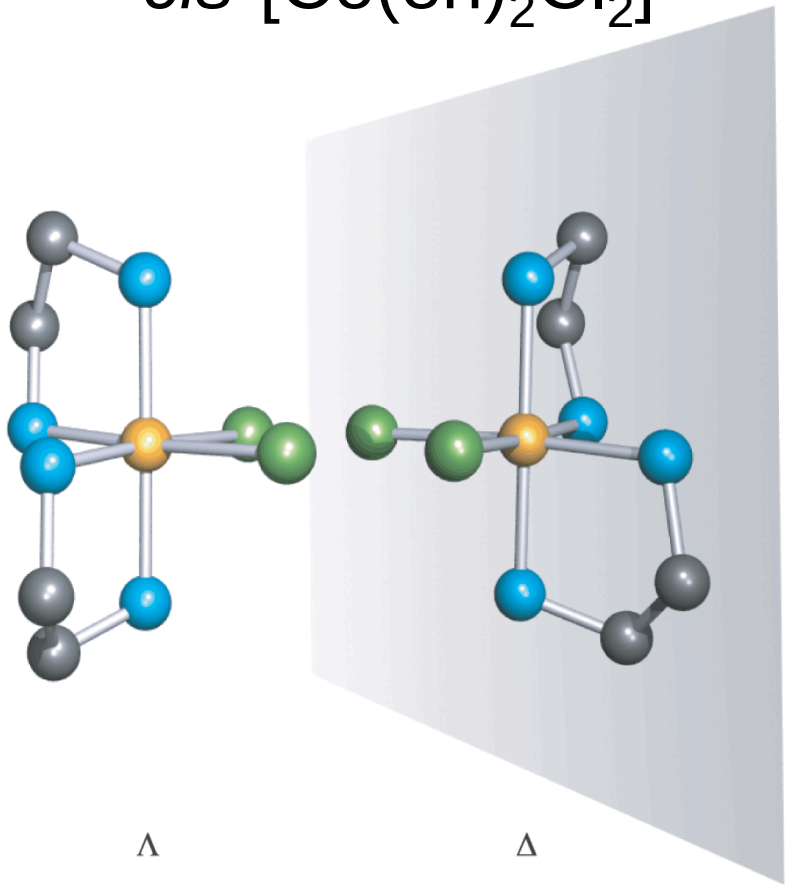


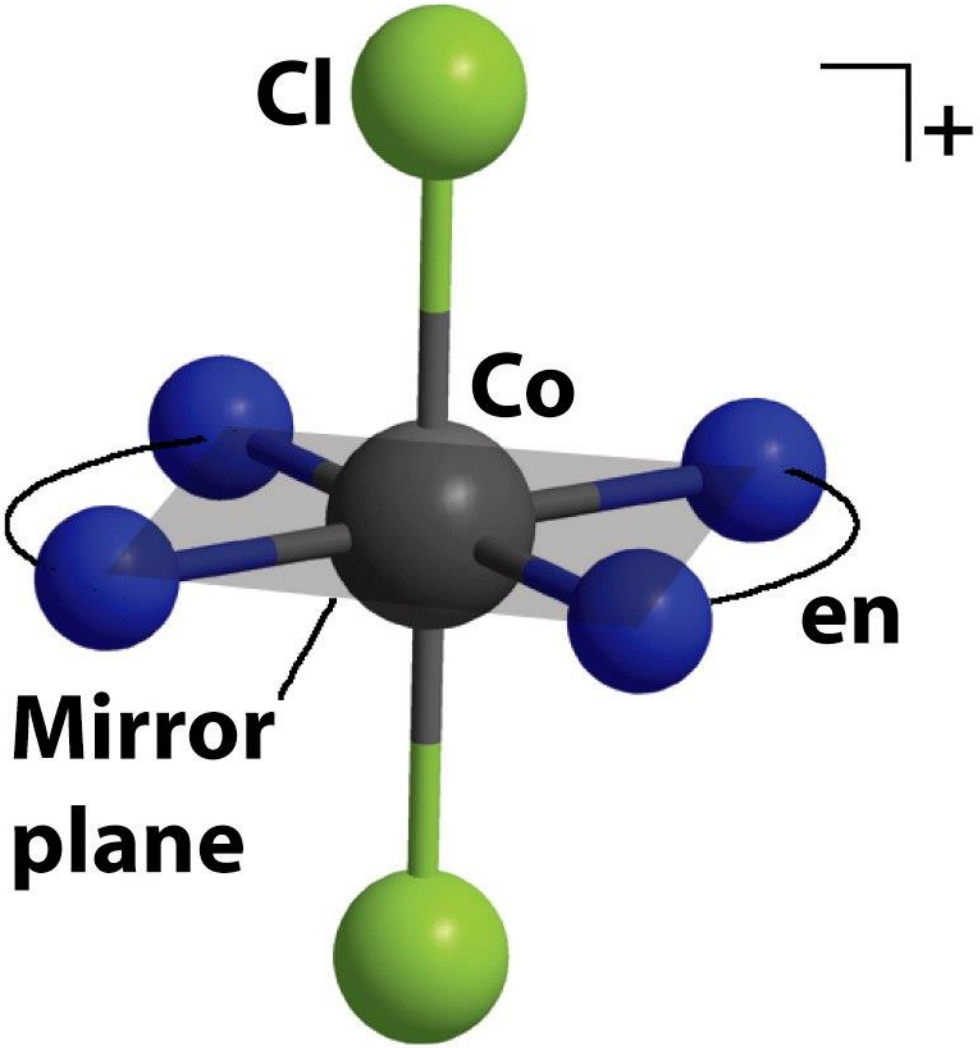
R



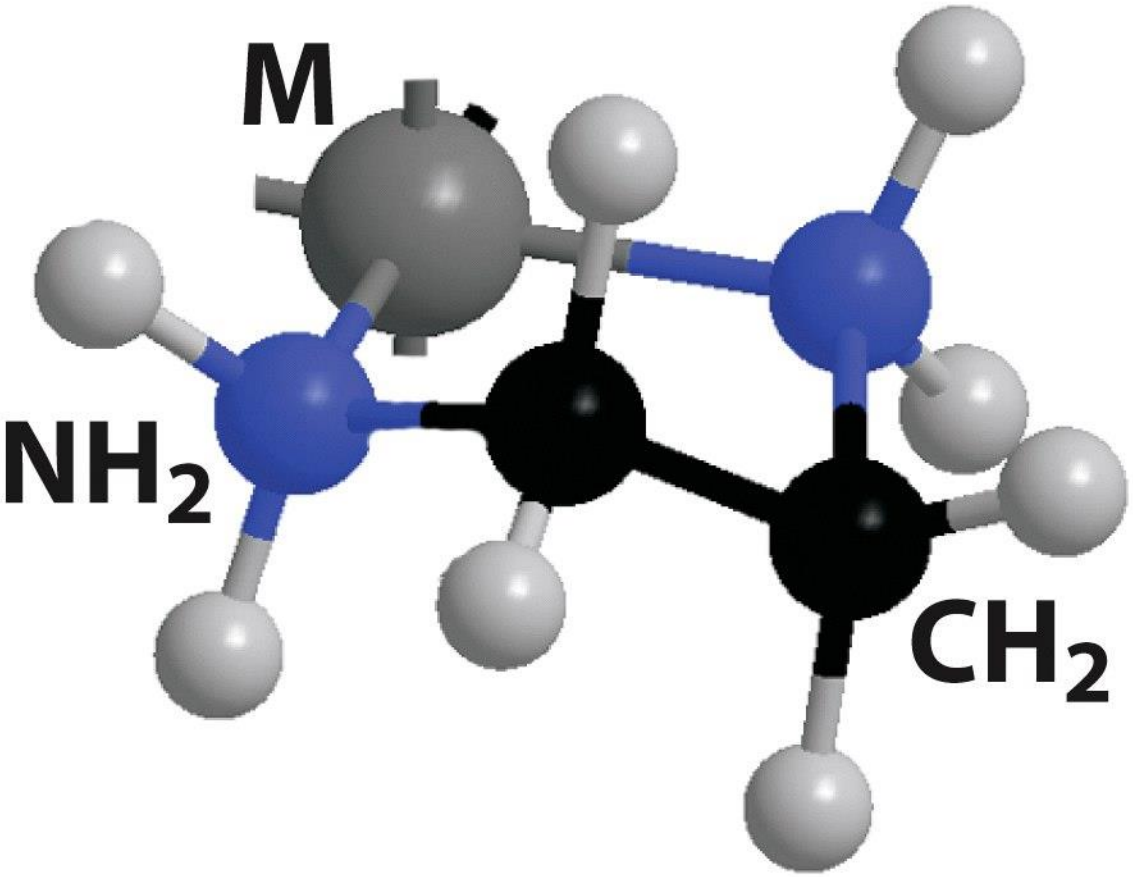
S

cis-$[Co(en)_2Cl_2]$

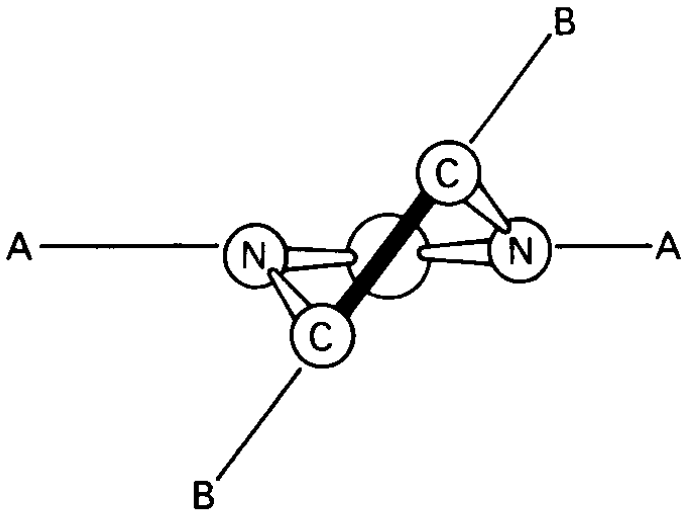




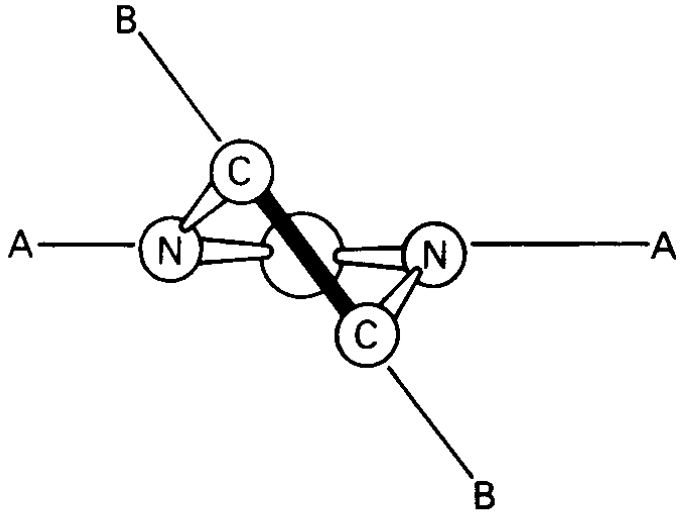
***trans*-$[Co(Cl)_2(en)_2]^+$**



Ethylenediamine (en) ligand attached to M



λ



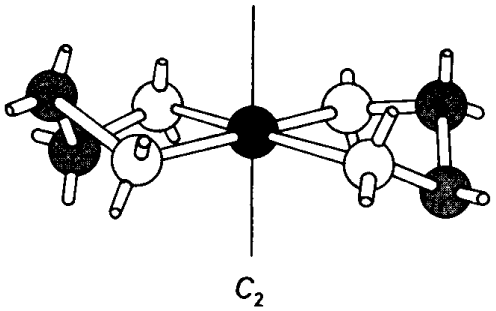
δ

δ

Mirror plane

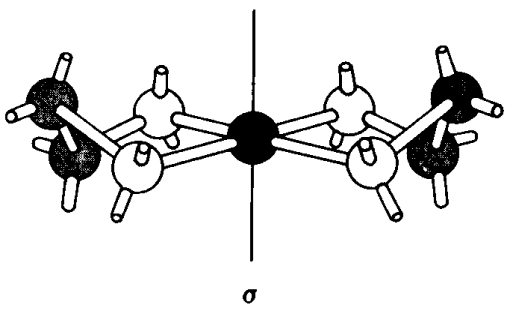
λ

(A) = λλ

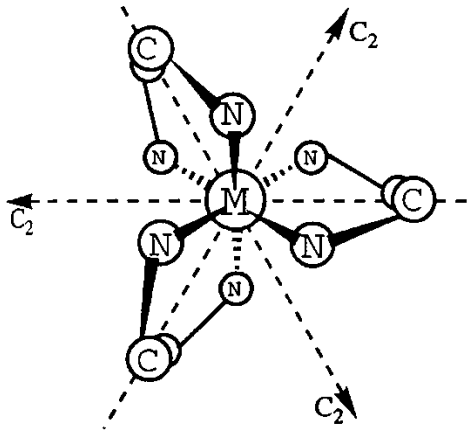


Rings related by C_2 axis
H's on adjacent N's are staggered

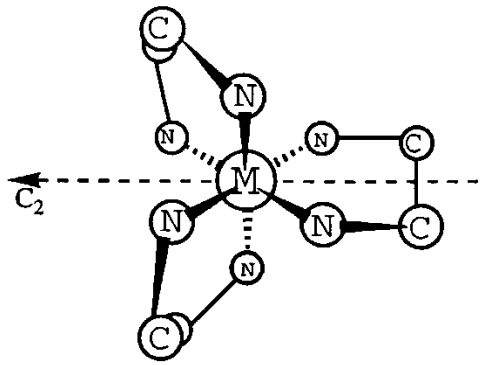
(B) = λδ



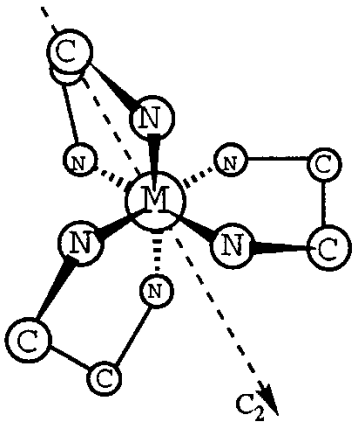
Rings related by mirror plane
H's on adjacent N's are eclipsed



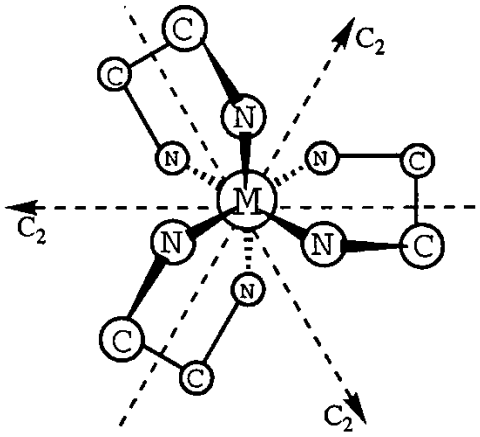
(a) Λ(δ,δ,δ)
D_3



(b) Λ(δ,δ,λ)
C_2



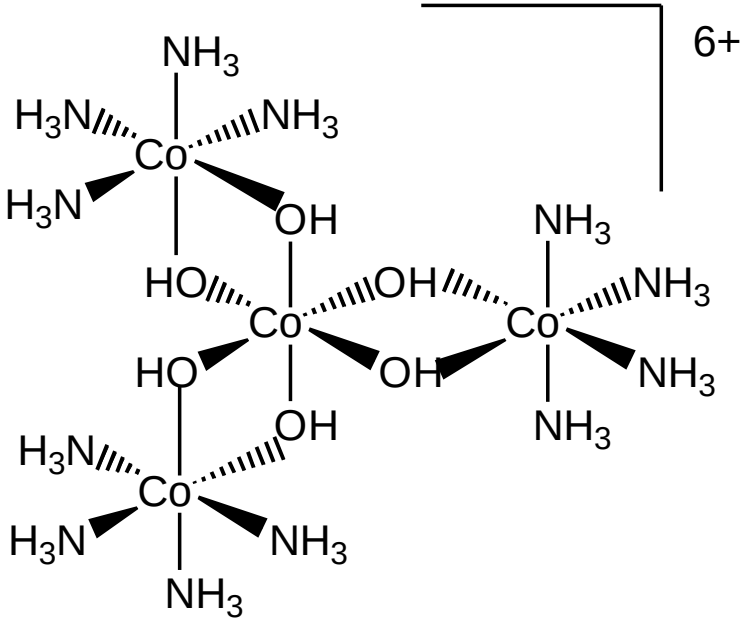
(c) Λ(δ,λ,λ)
C_2

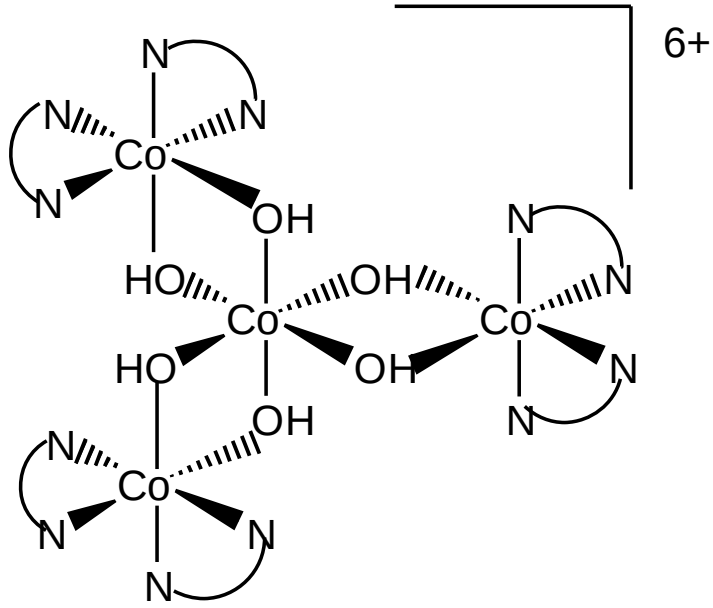


(d) Λ(λ,λ,λ)
D_3

208 (λ e δ)

2912 (*R* e *S*)



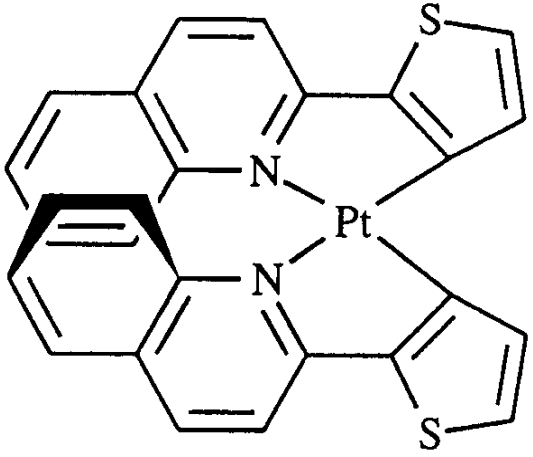


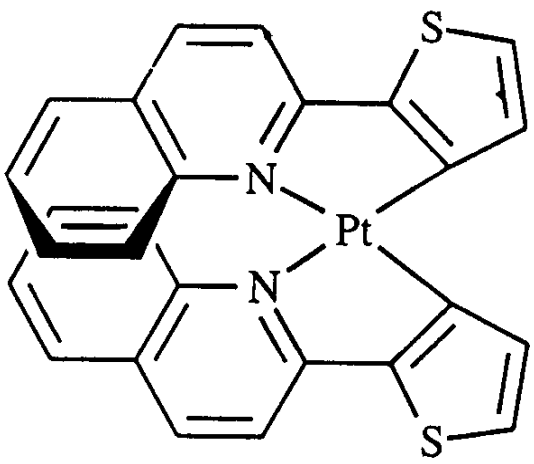
Λ e Δ

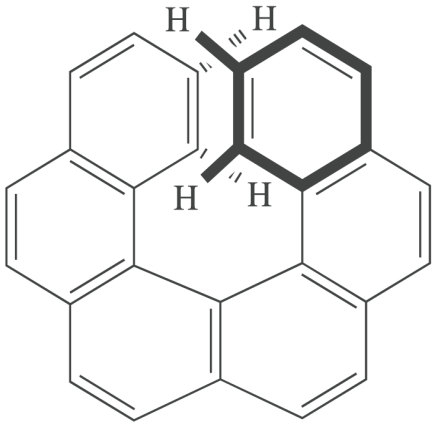
$\Delta(S)_6$, $\Delta(S)_5(R)$, $\Delta(S)_4(R)_2$, $\Delta(S)_3(R)_3$,....

$\Delta(\Delta)_3$	$\Lambda(\Lambda)_3$
$\Delta\{(\Delta)_2\Lambda\}$	$\Lambda\{(\Lambda)_2\Delta\}$
$\Delta\{\Delta(\Lambda)_2\}$	$\Lambda\{\Lambda(\Delta)_2\}$
$\Delta(\Lambda)_3$	$\Lambda(\Delta)_3$

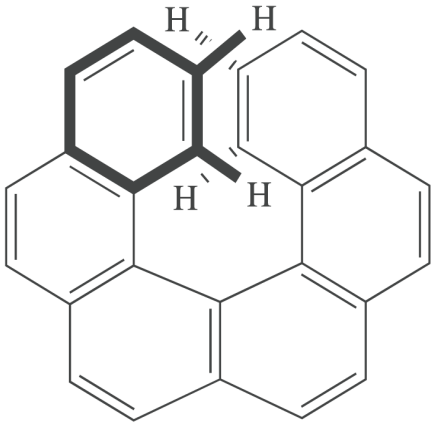
Chiralità nei complessi planari quadrati



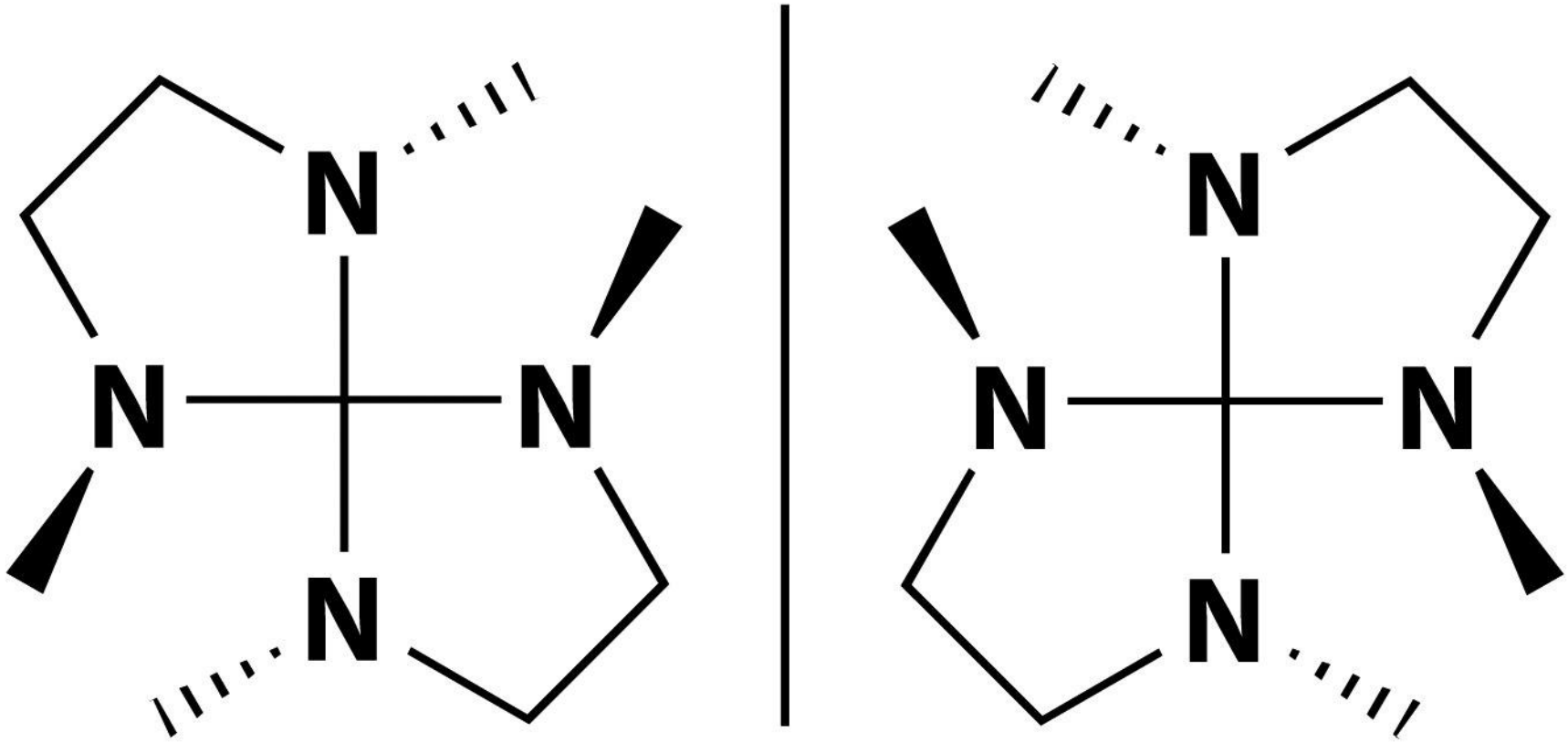


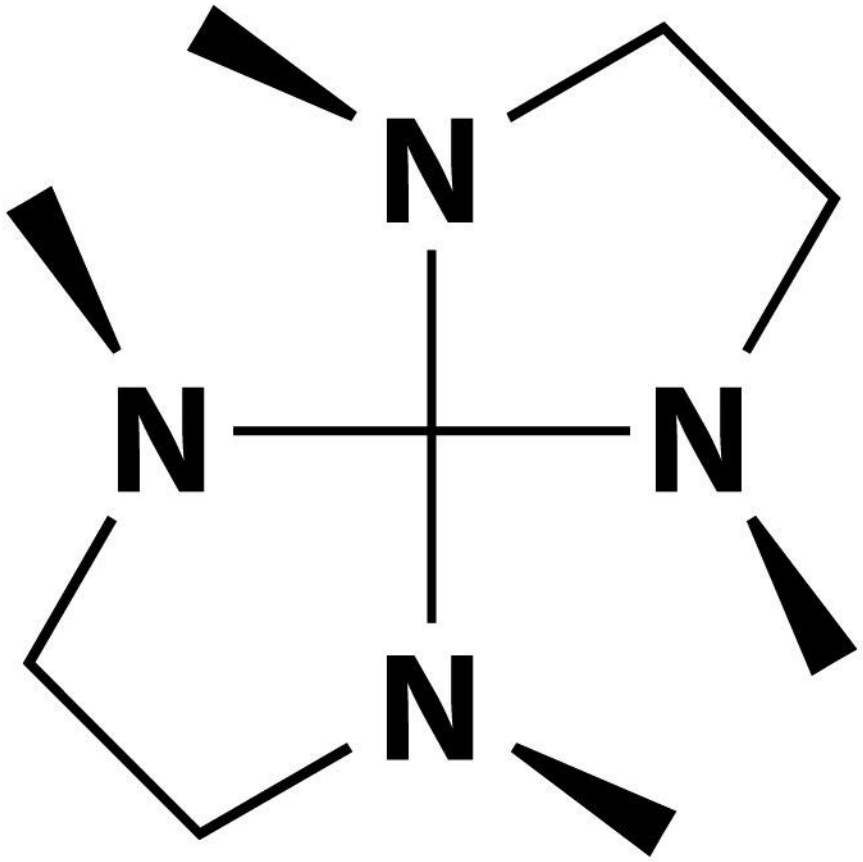


(*P*)-hexahelicene

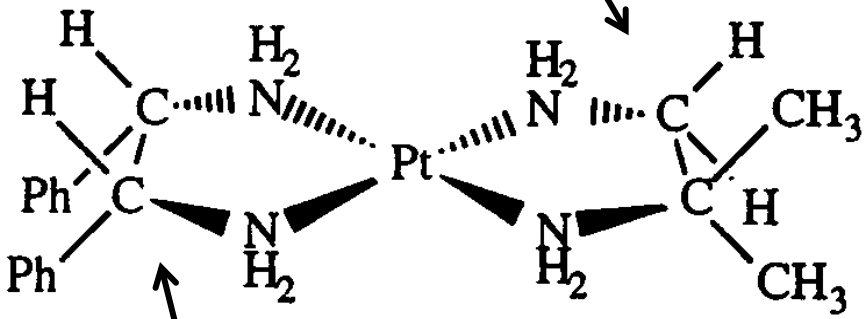


(*M*)-hexahelicene


N
N
N
N
N
N


N
N
N
N

isobutilene-diammina



meso-stilbenediammina