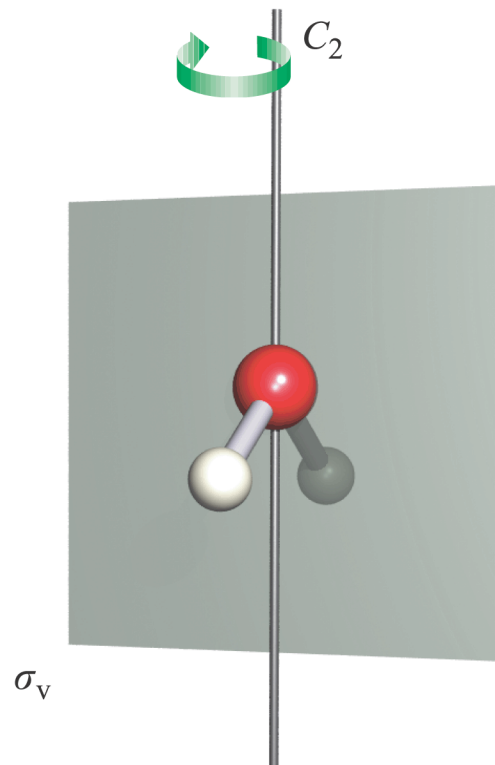
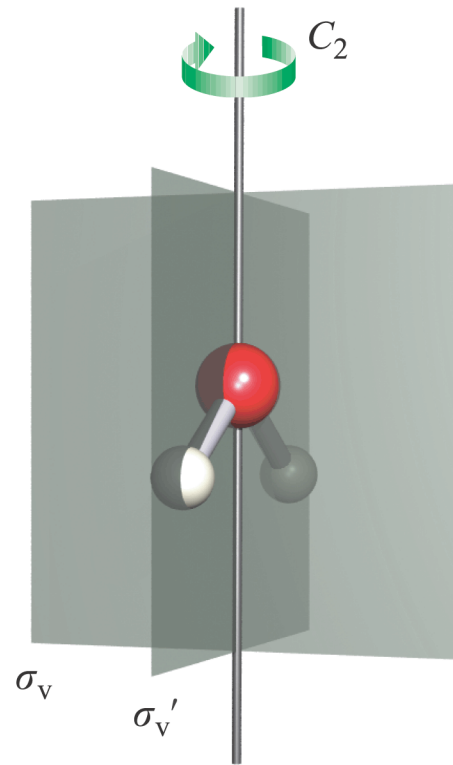


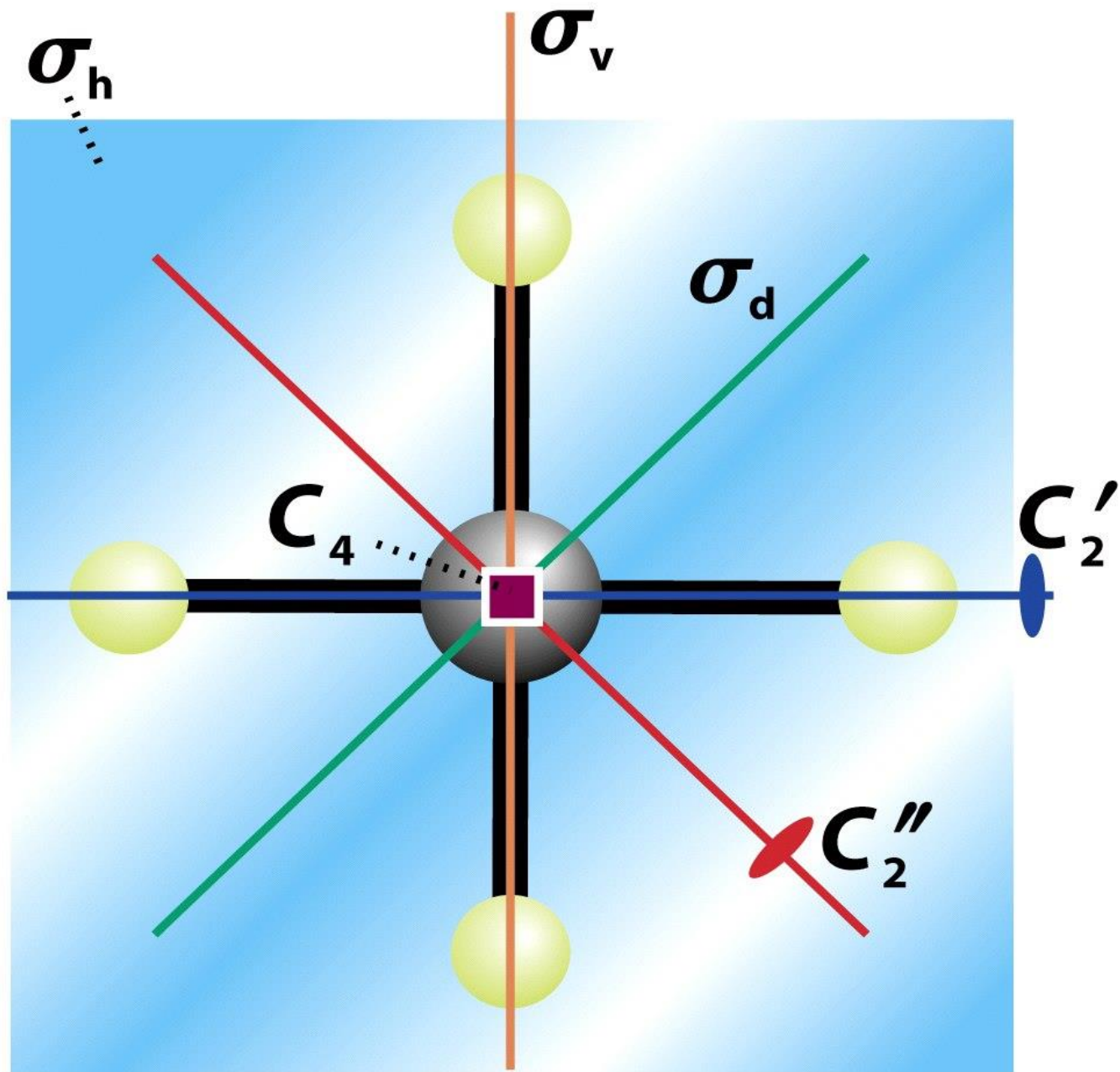
(a)

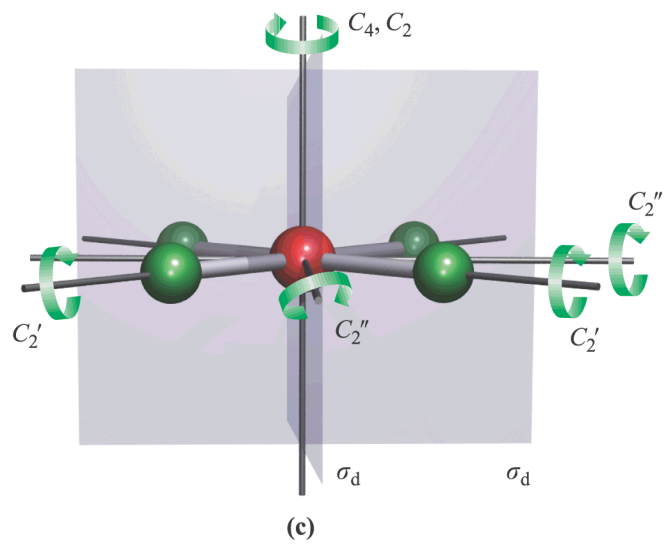
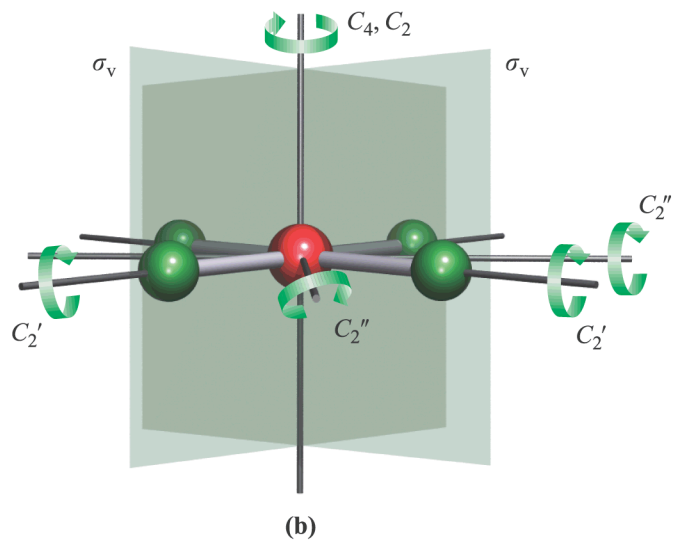
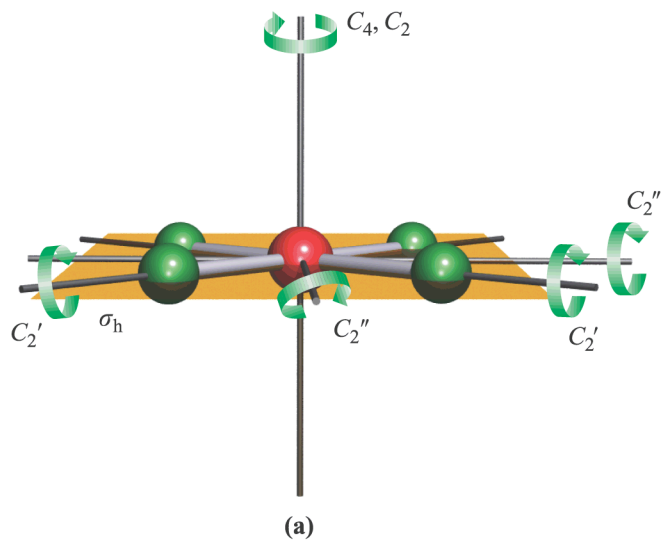


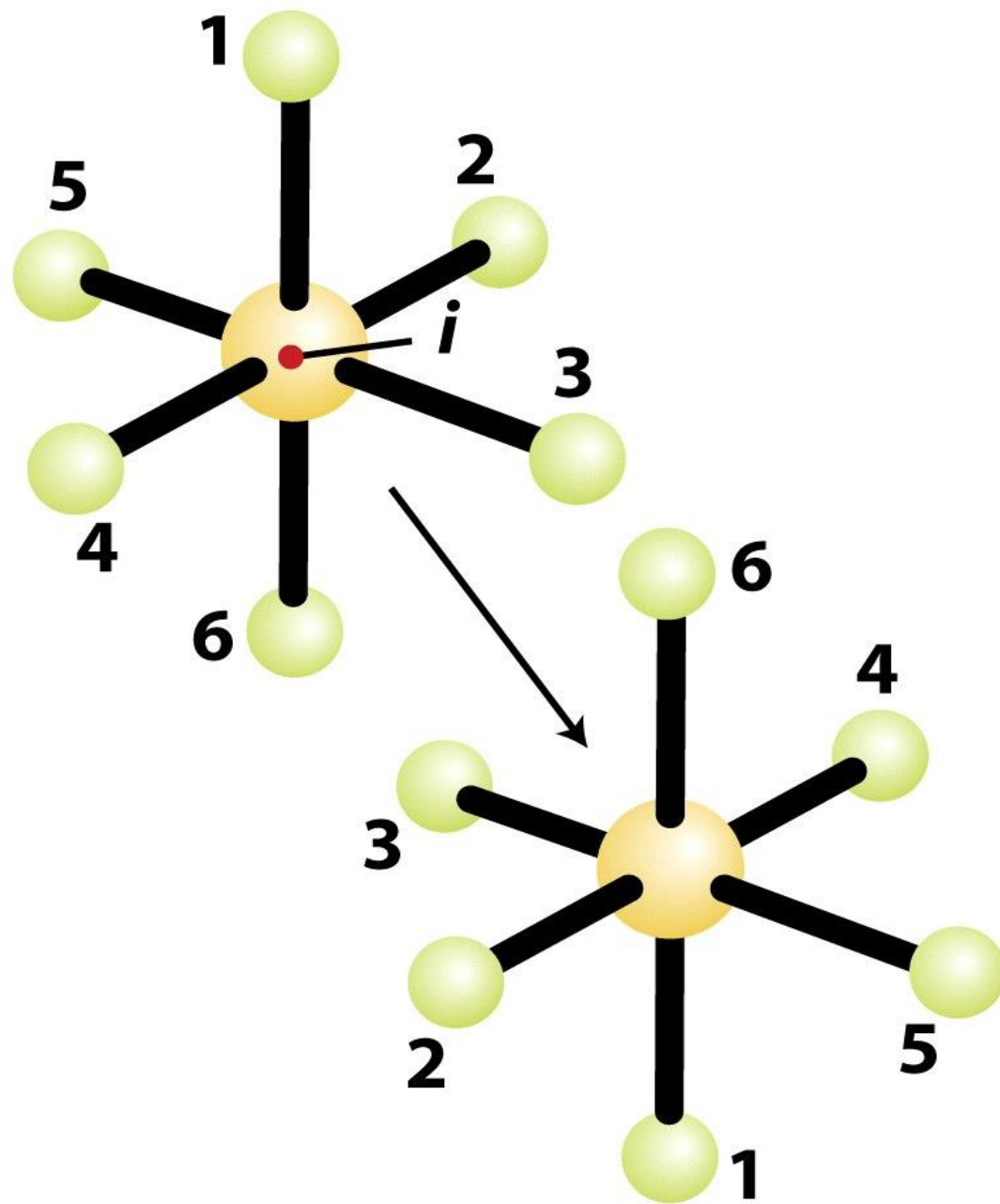
(b)



(c)

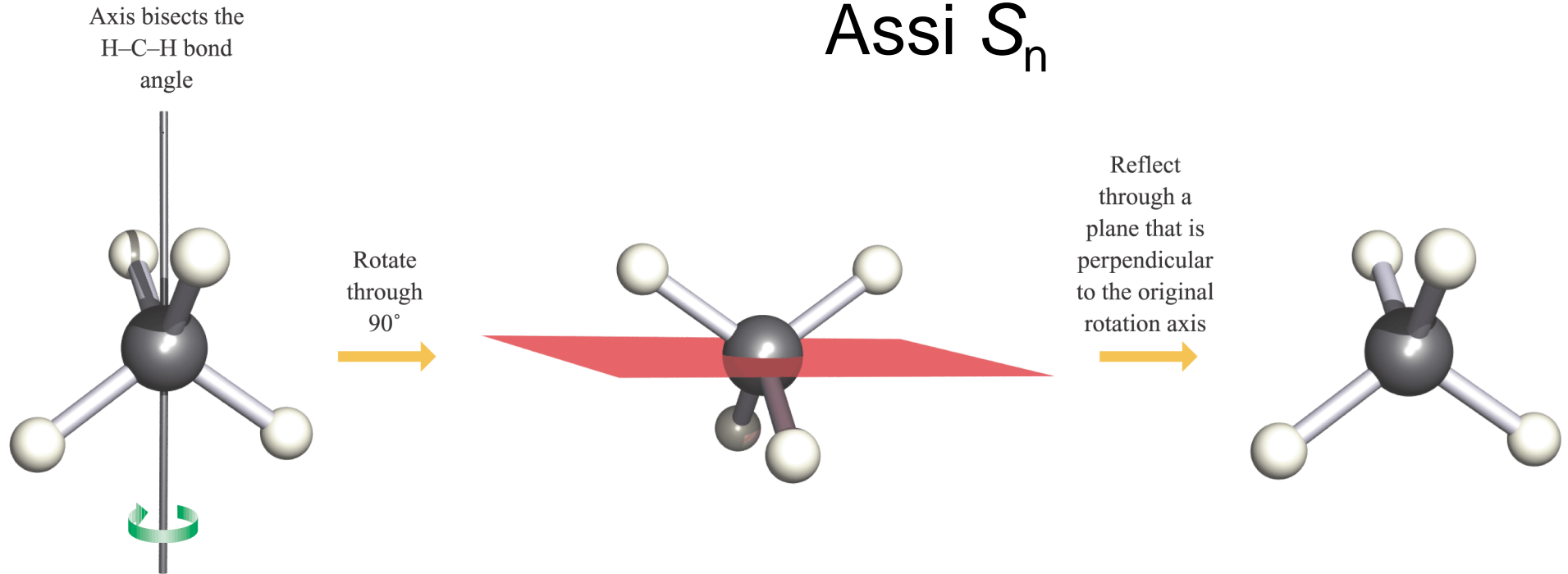






Rotazione impropria o roto-riflessione

Assi S_n



$$S_1 = \sigma \quad S_2 = i$$

cis-N₂F₂

trans-N₂F₂

BCl₃ vs PCl₃

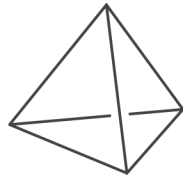
Etano:

conformazione eclissata (C₃, C₂, σ_h, σ_v, S₃)

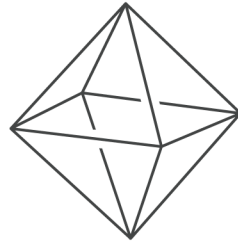
conformazione sfalsata (C₃, C₂, σ_d, *i*, S₆)

Simboli di Schoenflies

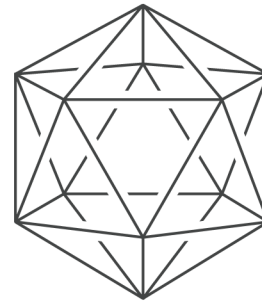
Point group	Characteristic symmetry elements	Comments
C_s	E , one σ plane	
C_i	E , inversion centre	
C_n	E , one (principal) n -fold axis	
C_{nv}	E , one (principal) n -fold axis, n σ_v planes	
C_{nh}	E , one (principal) n -fold axis, one σ_h plane, one S_n -fold axis which is coincident with the C_n axis	The S_n axis necessarily follows from the C_n axis and σ_h plane For $n = 2, 4$ or 6 , there is also an inversion centre
D_{nh}	E , one (principal) n -fold axis, n C_2 axes, one σ_h plane, n σ_v planes, one S_n -fold axis	The S_n axis necessarily follows from the C_n axis and σ_h plane For $n = 2, 4$ or 6 , there is also an inversion centre
D_{nd}	E , one (principal) n -fold axis, n C_2 axes, n σ_v planes, one S_{2n} -fold axis	For $n = 3$ or 5 , there is also an inversion centre
T_d		Tetrahedral
O_h		Octahedral
I_h		Icosahedral



Tetrahedron

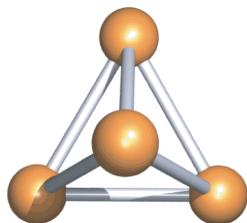


Octahedron

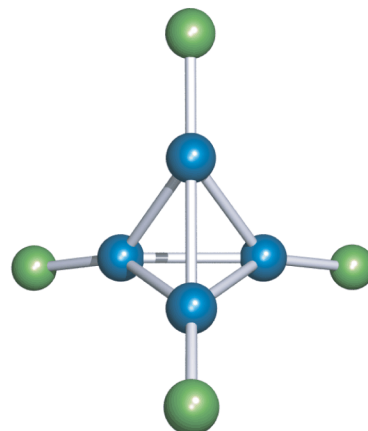


Icosahedron

P_4



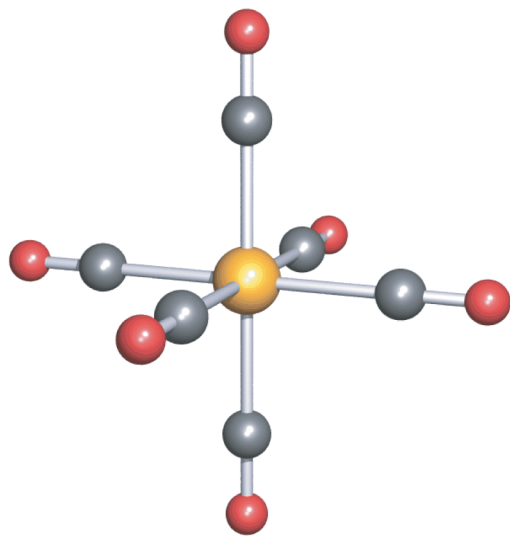
(a)



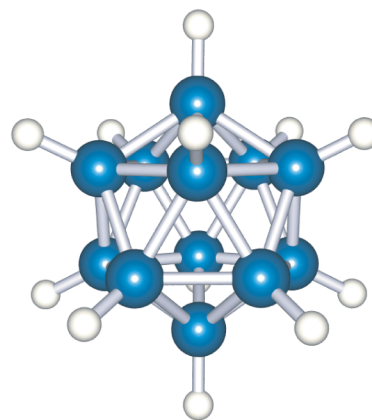
(b)

B_4Cl_4

$W(CO)_6$

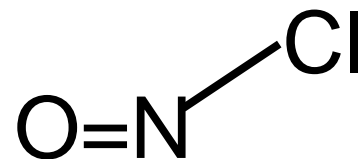


(c)



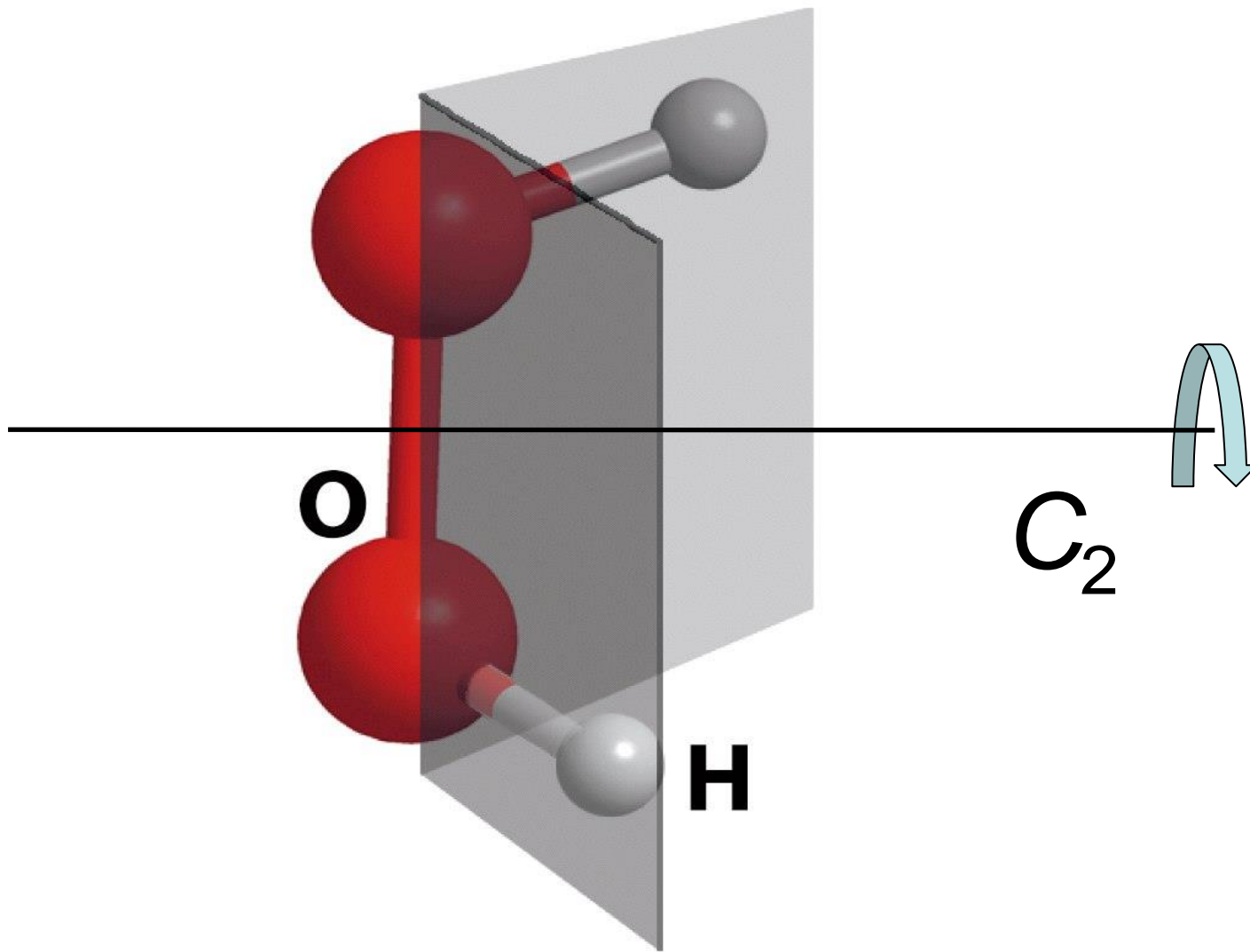
(d)

$[B_{12}H_{12}]^{2-}$

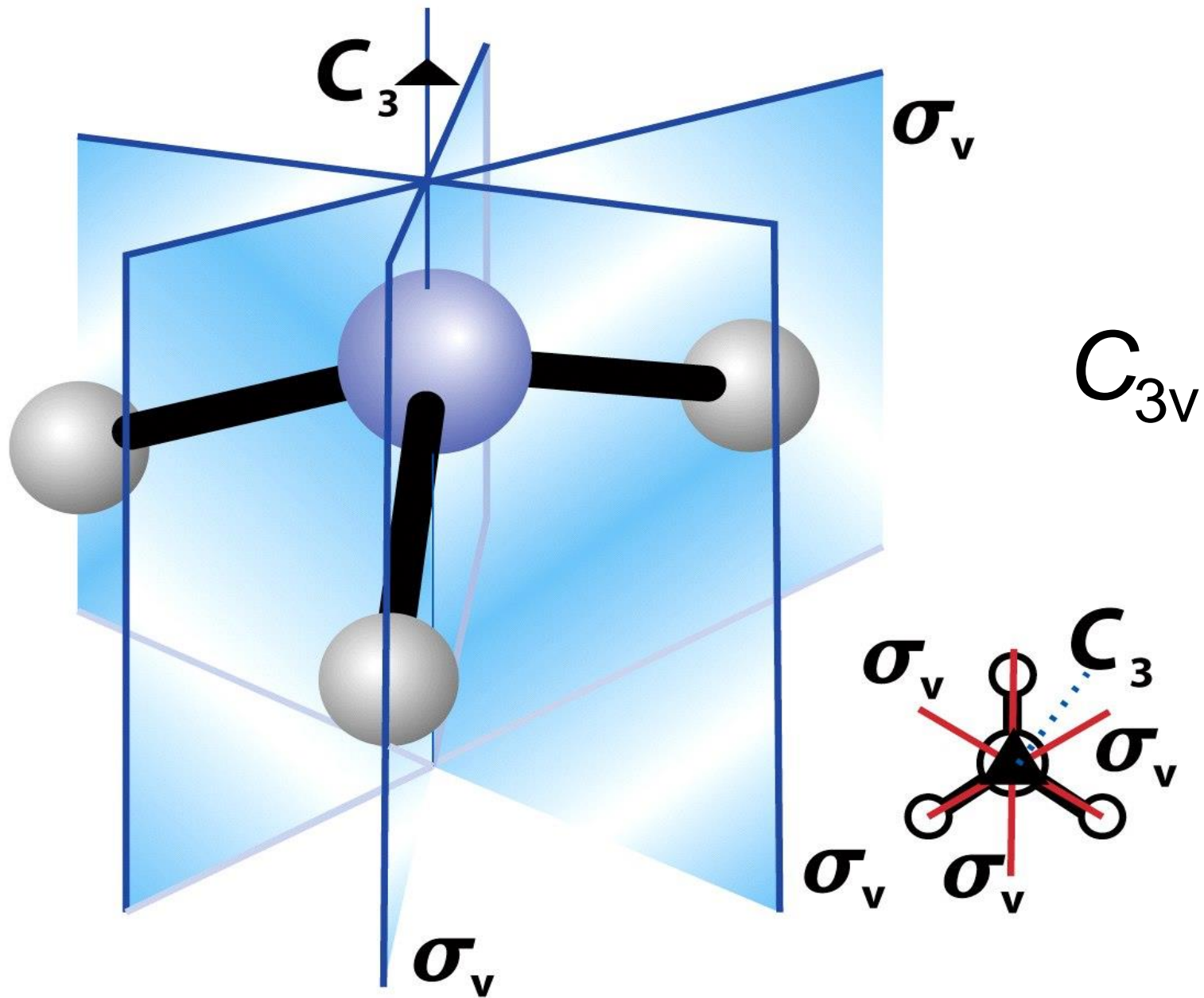


Point group	Characteristic symmetry elements	Comments
C_s	E , one σ plane	
C_i	E , inversion centre	
C_n	E , one (principal) n -fold axis	
C_{nv}	E , one (principal) n -fold axis, n σ_v planes	
C_{nh}	E , one (principal) n -fold axis, one σ_h plane, one S_n -fold axis which is coincident with the C_n axis	The S_n axis necessarily follows from the C_n axis and σ_h plane For $n = 2, 4$ or 6 , there is also an inversion centre
D_{nh}	E , one (principal) n -fold axis, n C_2 axes, one σ_h plane, n σ_v planes, one S_n -fold axis	The S_n axis necessarily follows from the C_n axis and σ_h plane For $n = 2, 4$ or 6 , there is also an inversion centre
D_{nd}	E , one (principal) n -fold axis, n C_2 axes, n σ_v planes, one S_{2n} -fold axis	For $n = 3$ or 5 , there is also an inversion centre
T_d		Tetrahedral
O_h		Octahedral
I_h		Icosahedral

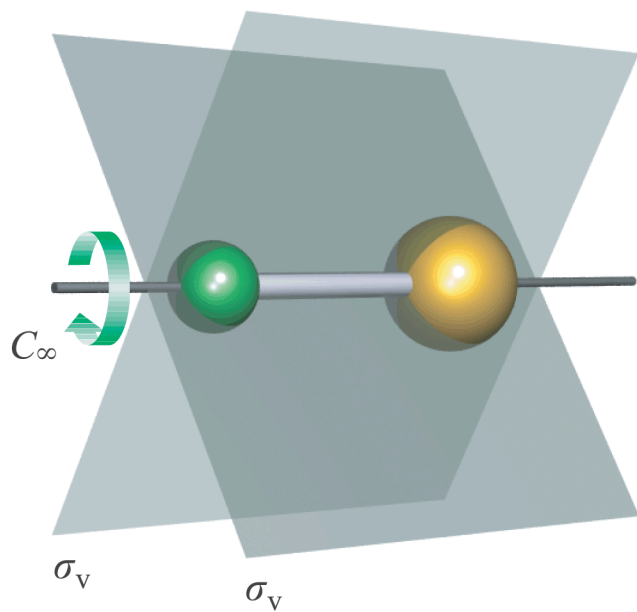
Point group	Characteristic symmetry elements	Comments
C_s	E , one σ plane	
C_i	E , inversion centre	
C_n	E , one (principal) n -fold axis	
C_{nv}	E , one (principal) n -fold axis, n σ_v planes	
C_{nh}	E , one (principal) n -fold axis, one σ_h plane, one S_n -fold axis which is coincident with the C_n axis	The S_n axis necessarily follows from the C_n axis and σ_h plane For $n = 2, 4$ or 6 , there is also an inversion centre
D_{nh}	E , one (principal) n -fold axis, n C_2 axes, one σ_h plane, n σ_v planes, one S_n -fold axis	The S_n axis necessarily follows from the C_n axis and σ_h plane For $n = 2, 4$ or 6 , there is also an inversion centre
D_{nd}	E , one (principal) n -fold axis, n C_2 axes, n σ_v planes, one S_{2n} -fold axis	For $n = 3$ or 5 , there is also an inversion centre
T_d		Tetrahedral
O_h		Octahedral
I_h		Icosahedral



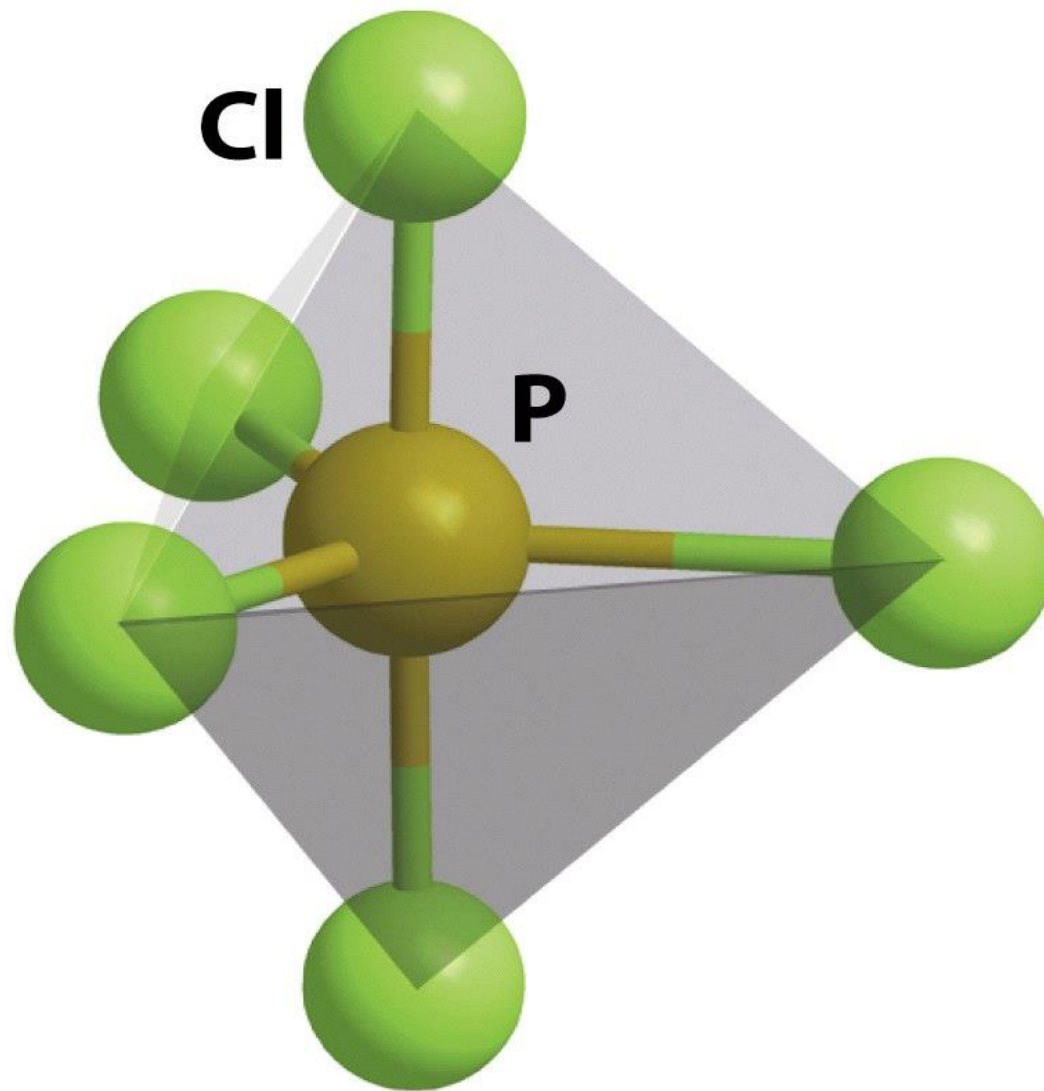
Point group	Characteristic symmetry elements	Comments
C_s	E , one σ plane	
C_i	E , inversion centre	
C_n	E , one (principal) n -fold axis	
C_{nv}	E , one (principal) n -fold axis, n σ_v planes	
C_{nh}	E , one (principal) n -fold axis, one σ_h plane, one S_n -fold axis which is coincident with the C_n axis	The S_n axis necessarily follows from the C_n axis and σ_h plane For $n = 2, 4$ or 6 , there is also an inversion centre
D_{nh}	E , one (principal) n -fold axis, n C_2 axes, one σ_h plane, n σ_v planes, one S_n -fold axis	The S_n axis necessarily follows from the C_n axis and σ_h plane For $n = 2, 4$ or 6 , there is also an inversion centre
D_{nd}	E , one (principal) n -fold axis, n C_2 axes, n σ_v planes, one S_{2n} -fold axis	For $n = 3$ or 5 , there is also an inversion centre
T_d		Tetrahedral
O_h		Octahedral
I_h		Icosahedral



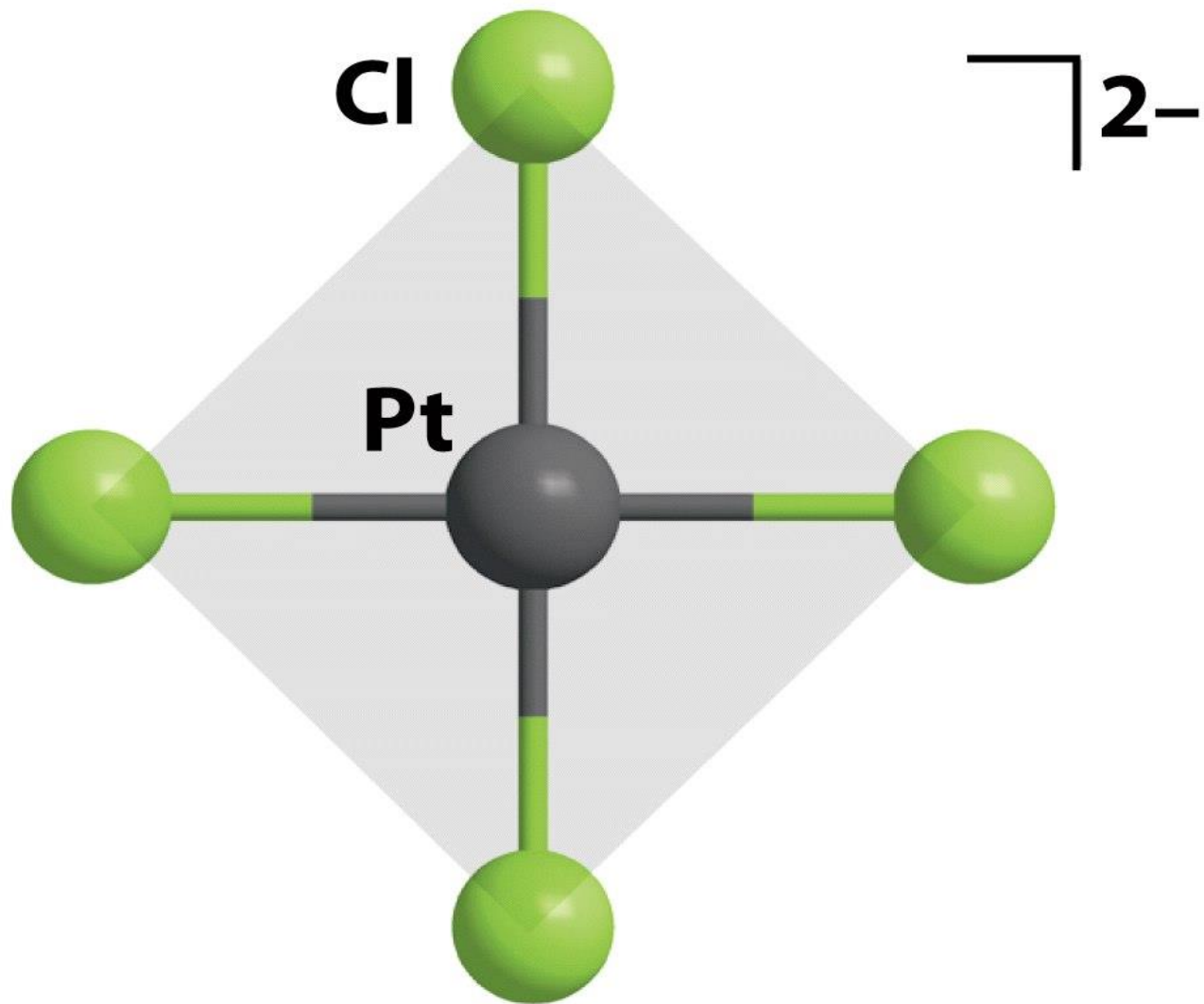
$C_{\infty v}$

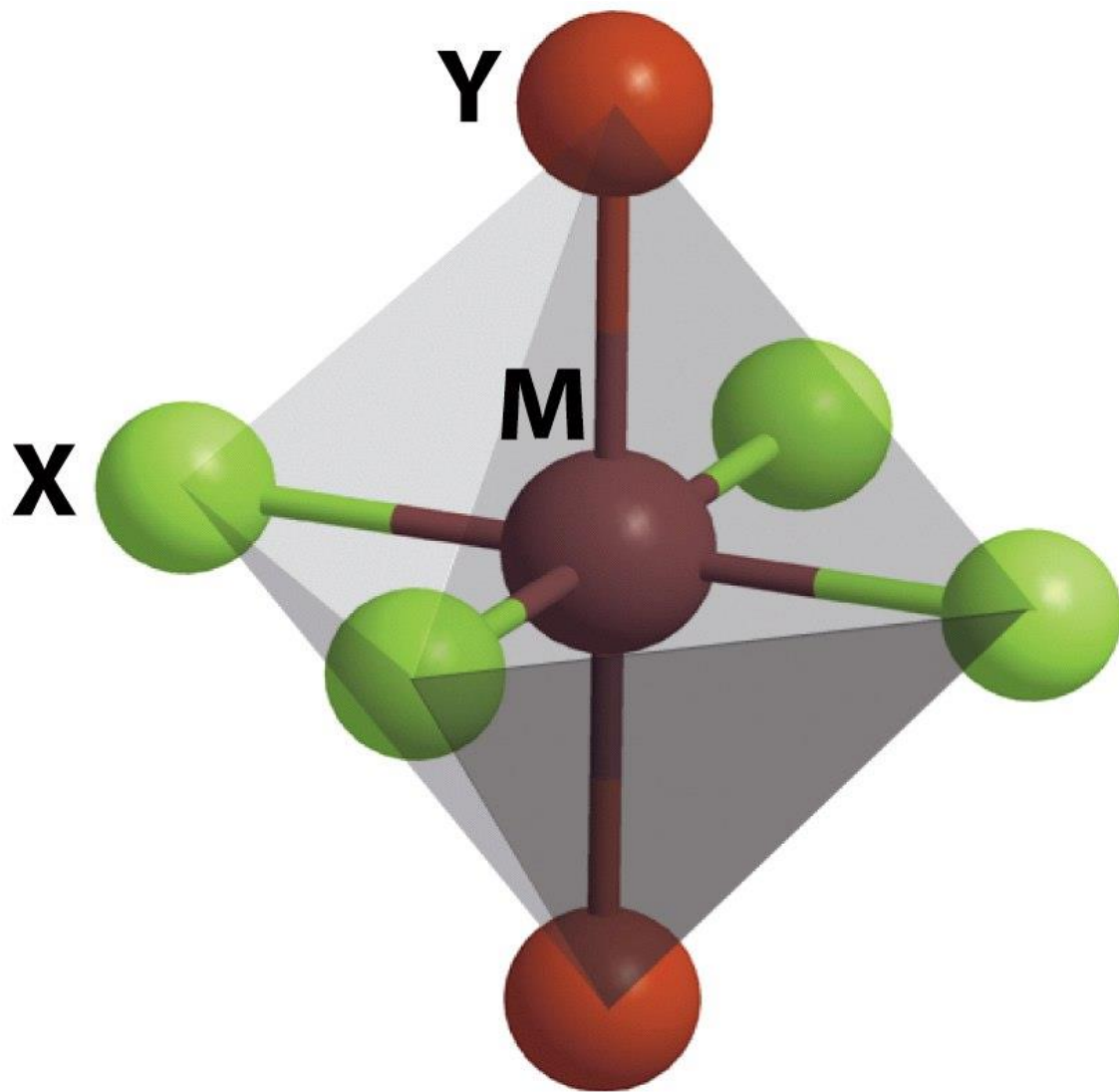


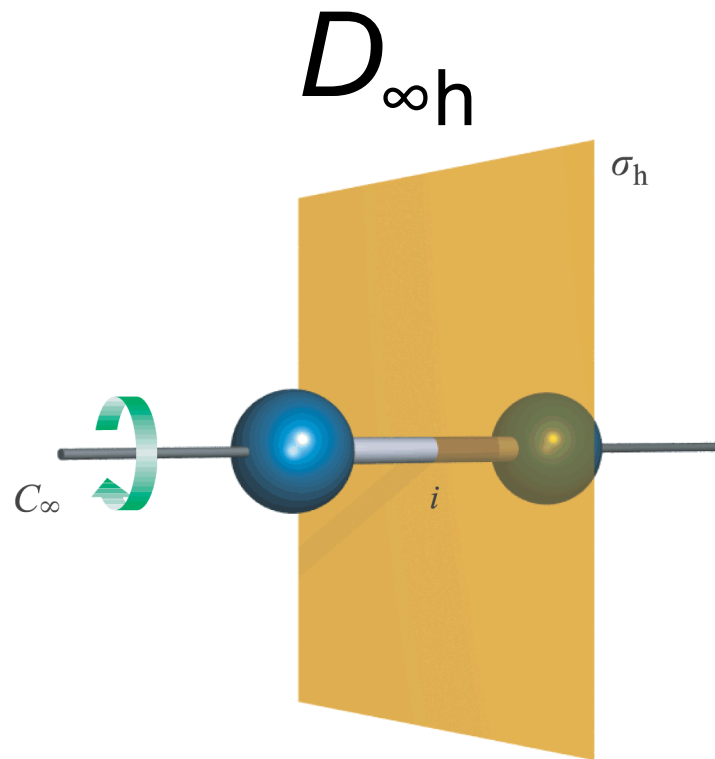
Point group	Characteristic symmetry elements	Comments
C_s	E , one σ plane	
C_i	E , inversion centre	
C_n	E , one (principal) n -fold axis	
C_{nv}	E , one (principal) n -fold axis, n σ_v planes	
C_{nh}	E , one (principal) n -fold axis, one σ_h plane, one S_n -fold axis which is coincident with the C_n axis	The S_n axis necessarily follows from the C_n axis and σ_h plane For $n = 2, 4$ or 6 , there is also an inversion centre
D_{nh}	E , one (principal) n -fold axis, n C_2 axes, one σ_h plane, n σ_v planes, one S_n -fold axis	The S_n axis necessarily follows from the C_n axis and σ_h plane For $n = 2, 4$ or 6 , there is also an inversion centre
D_{nd}	E , one (principal) n -fold axis, n C_2 axes, n σ_v planes, one S_{2n} -fold axis	For $n = 3$ or 5 , there is also an inversion centre
T_d		Tetrahedral
O_h		Octahedral
I_h		Icosahedral

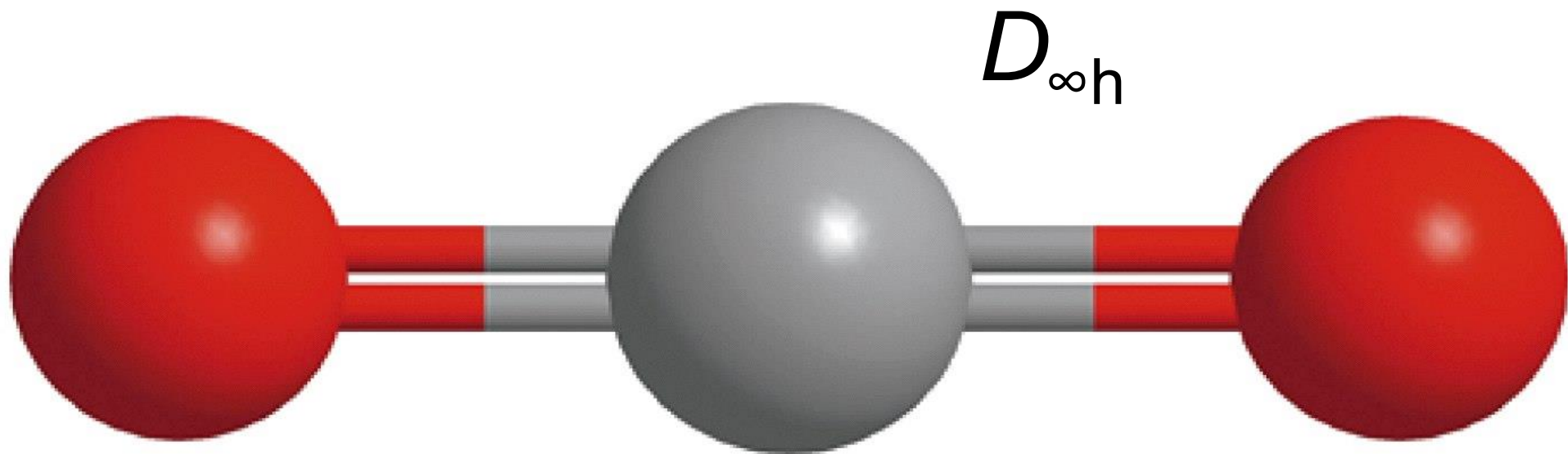


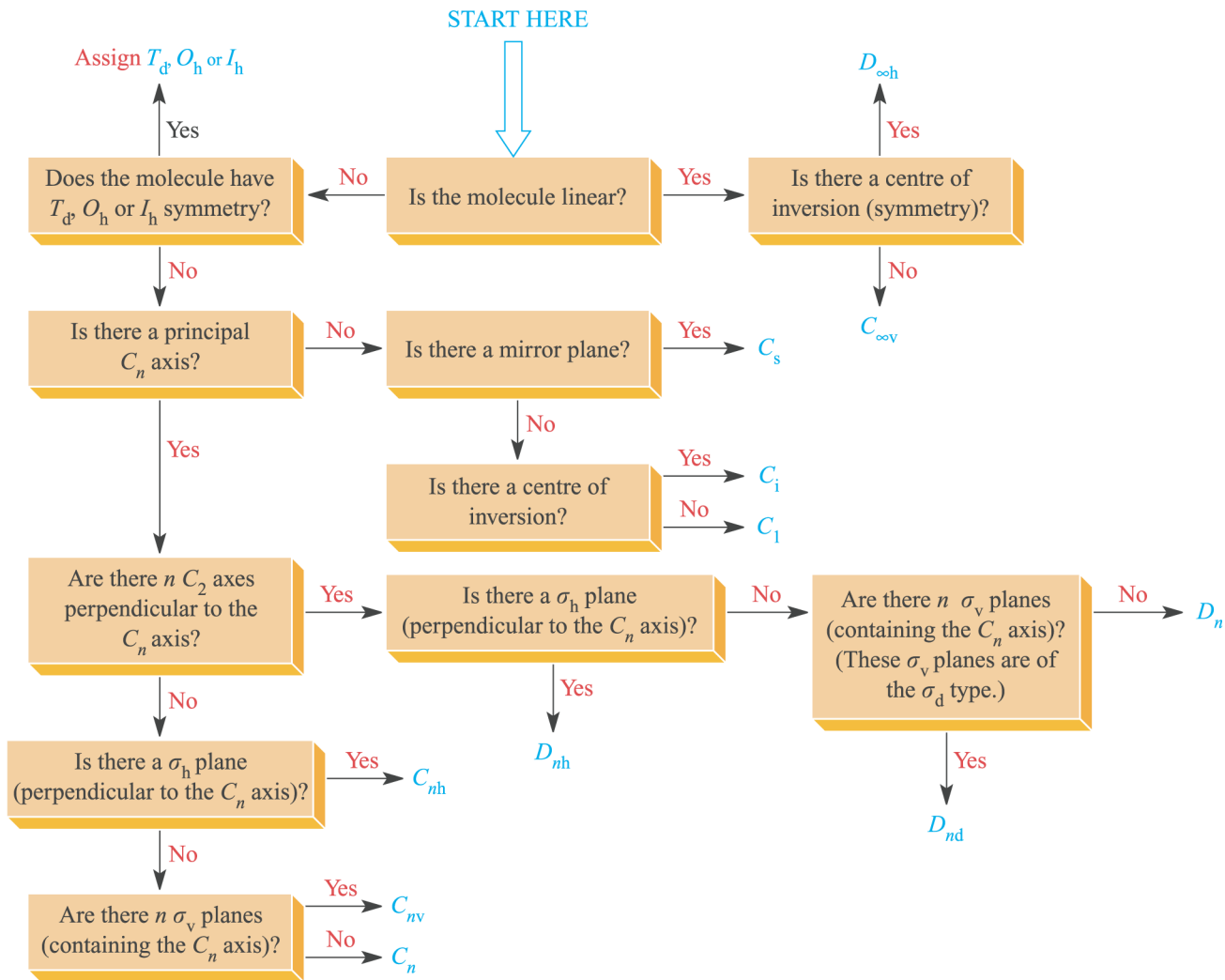
PCl_5, D_{3h}

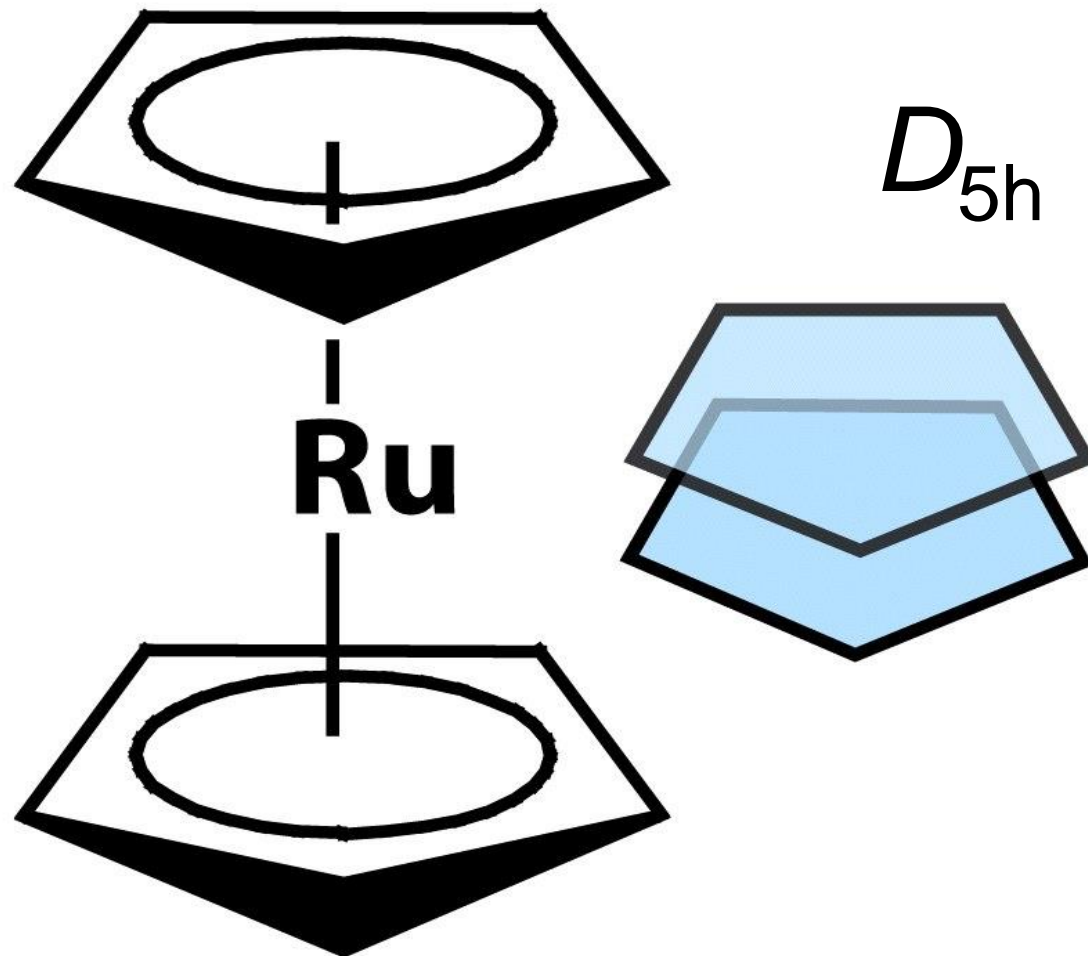












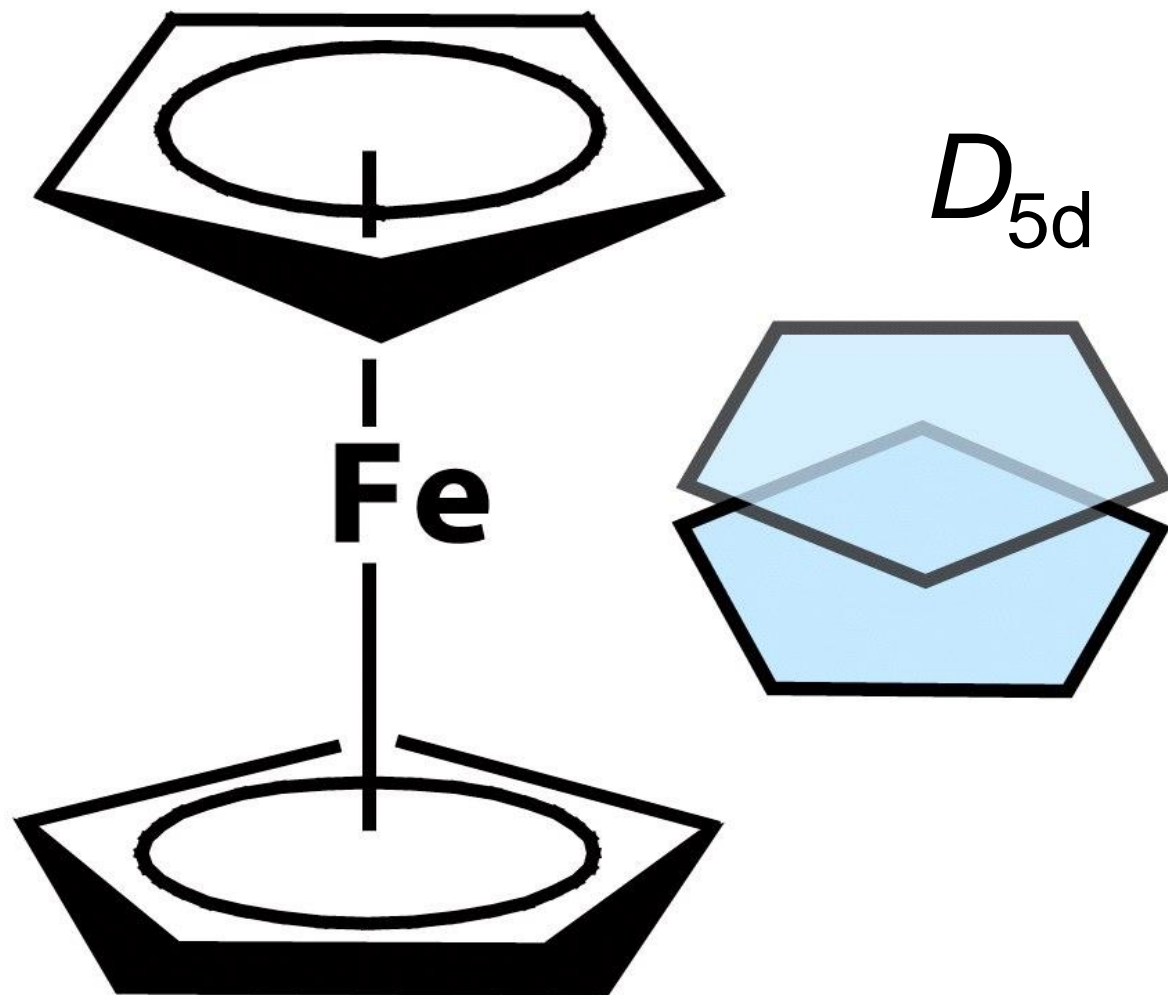


Tabella dei caratteri per il gruppo puntuale C_{2v}

SIMBOLO DI SCHOENFLIES

OPERAZIONI DI SIMMETRIA

C_{2v}	E	C_2	$\sigma_v(xz)$	$\sigma_v'(yz)$		
A_1	1	1	1	1	z	x^2, y^2, z^2
A_2	1	1	-1	-1	R_z	xy
B_1	1	-1	1	-1	x, R_y	xz
B_2	1	-1	-1	1	y, R_x	yz

SIMBOLI DI MULLIKEN

FUNZIONI DI BASE

PRODOTTI BINARI DI FUNZIONI

RAPPRESENTAZIONI IRRIDUCIBILI

Tabella dei caratteri per il gruppo puntuale C_{3v}

Gruppi puntuali che possiedono assi di rotazione di ordine 3 o maggiore possono avere rappresentazioni irriducibili di dimensione 2 (indicata con E) o 3 (T)

C_{3v}	E	$2C_3$	$3\sigma_v$		
A_1	1	1	1	z	$x^2 + y^2, z^2$
A_2	1	1	-1	R_z	
E	2	-1	0	$(x, y) (R_x, R_y)$	$(x^2 - y^2, xy) (xz, yz)$

DIMENSIONE 2

COPPIE DI FUNZIONI DI BASE

Tabella dei caratteri per il gruppo puntuale D_{4h}

	E	$2C_4(z)$	C_2	$2C'_2$	$2C''_2$	i	$2S_4$	σ_h	$2\sigma_v$	$2\sigma_d$	linears, rotations	quadratic
A_{1g}	1	1	1	1	1	1	1	1	1	1		x^2+y^2, z^2
A_{2g}	1	1	1	-1	-1	1	1	1	-1	-1	R_z	
B_{1g}	1	-1	1	1	-1	1	-1	1	1	-1		x^2-y^2
B_{2g}	1	-1	1	-1	1	1	-1	1	-1	1		xy
E_g	2	0	-2	0	0	2	0	-2	0	0	(R_x, R_y)	(xz, yz)
A_{1u}	1	1	1	1	1	-1	-1	-1	-1	-1		
A_{2u}	1	1	1	-1	-1	-1	-1	-1	1	1	z	
B_{1u}	1	-1	1	1	-1	-1	1	-1	-1	1		
B_{2u}	1	-1	1	-1	1	-1	1	-1	1	-1		
E_u	2	0	-2	0	0	-2	0	2	0	0	(x, y)	

