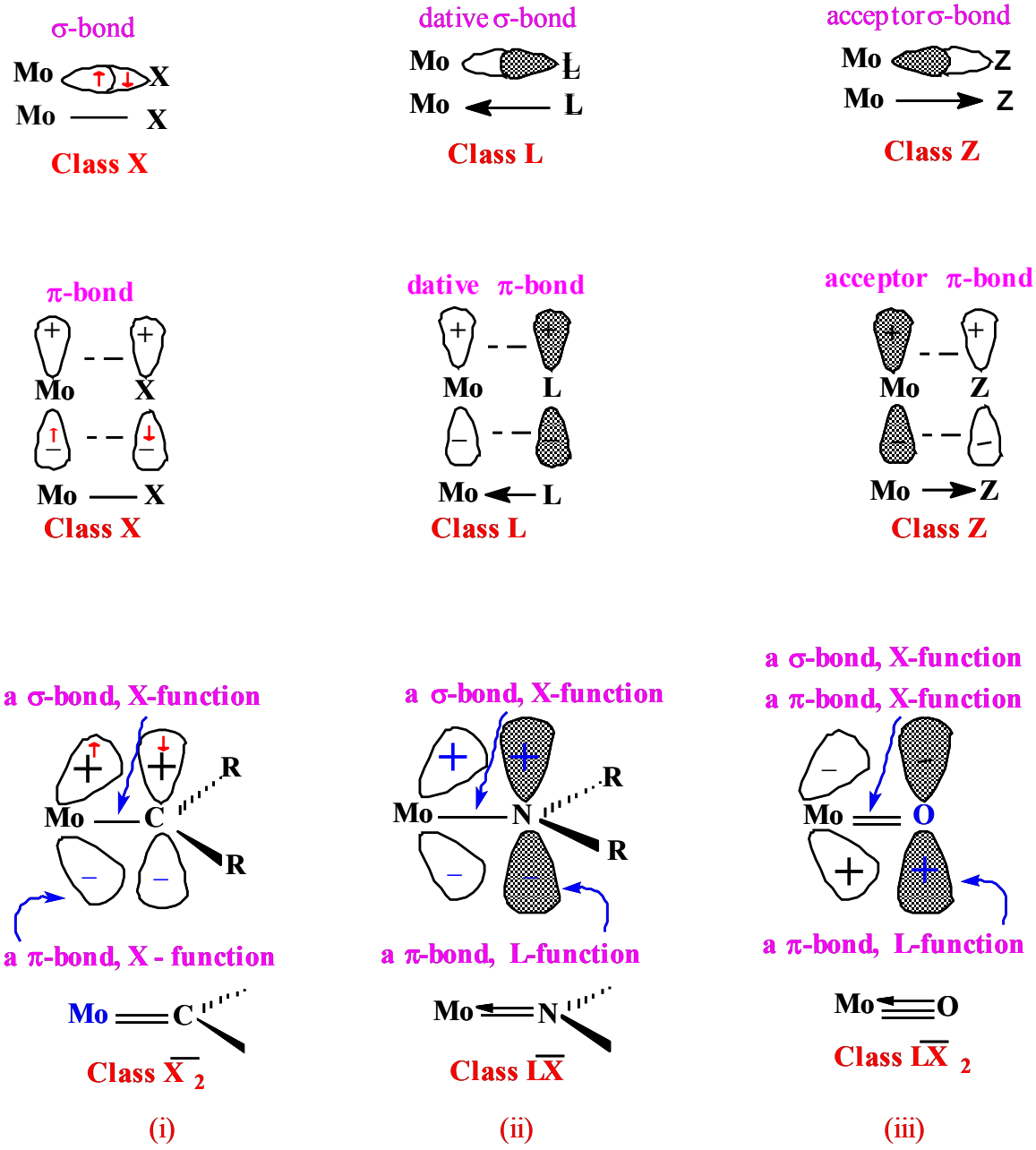
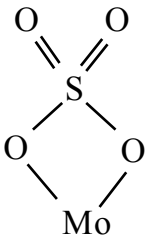
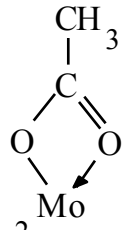

σ-bond
Mo X
Mo — X
Class X
dative σ-bond
Mo L
Mo ← L
Class L
acceptor σ-bond
Mo Z
Mo → Z
Class Z
π-bond
Mo X
Mo — X
Class X
dative π-bond
Mo L
Mo ← L
Class L
acceptor π-bond
Mo Z
Mo → Z
Class Z
a σ-bond, X-function
Mo C R R
a π-bond, X - function
Mo C
Class X 2
(i)
a σ-bond, X-function
Mo N R R
a π-bond, L-function
Mo N
Class LX
(ii)
a σ-bond, X-function
a π-bond, X-function
Mo O
a π-bond, L-function
Mo O
Class LX 2
(iii)

Figure 2



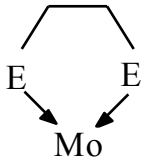
η^2-sulphato

Class X_2



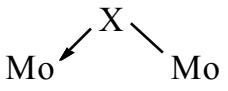
η^2-acetato

Class LX



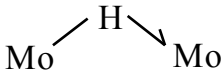
E = PR_2, NR_2 , SR, OR

Class L_2



X = Cl, Br, I, SR, NR_2

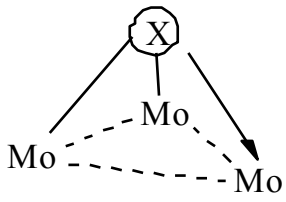
Class X-μ -L



μ-hydrido

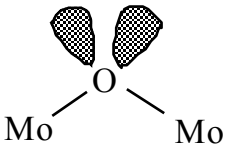
Class X -μ - L

(i)



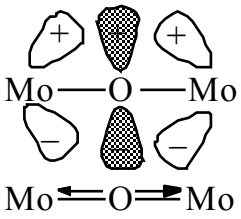
X = O, S, Se

Class X_2- μ^2- L



Class X-μ-X

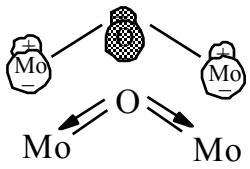
(ii)



linear

Class LX--μ-LX

(iii)



bent

Class LX--μ-LX

Figure 3. Examples of polydentate and bridging ligands

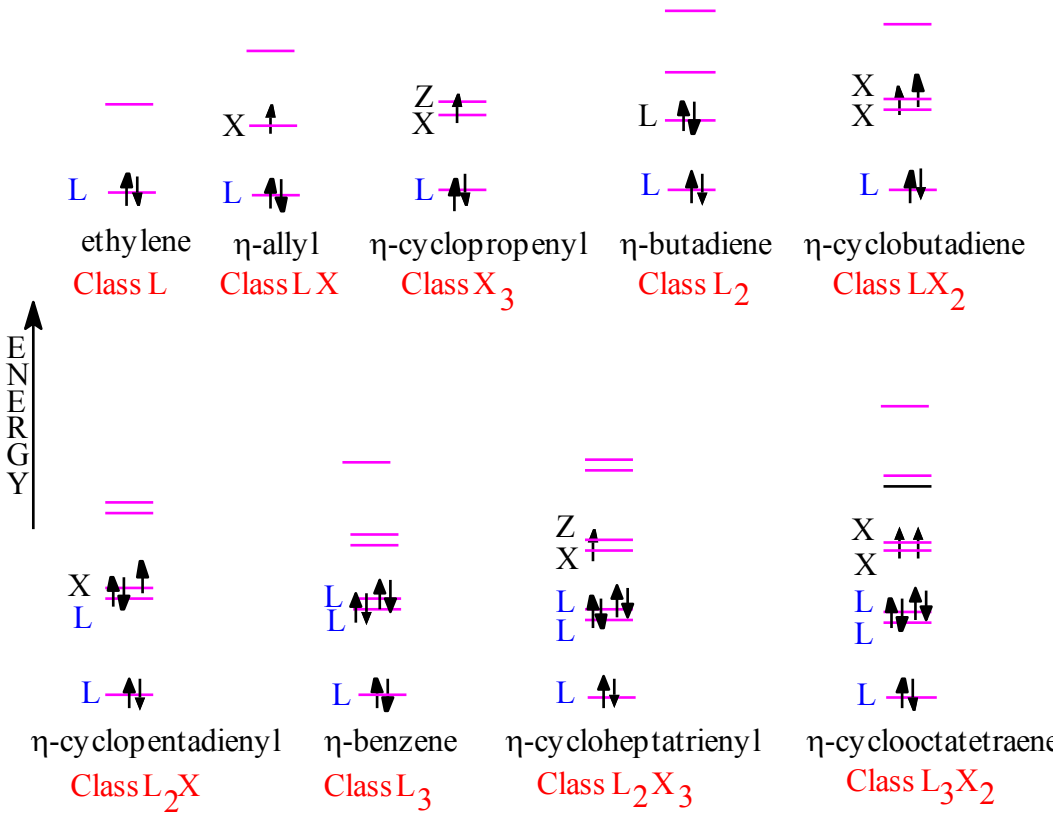
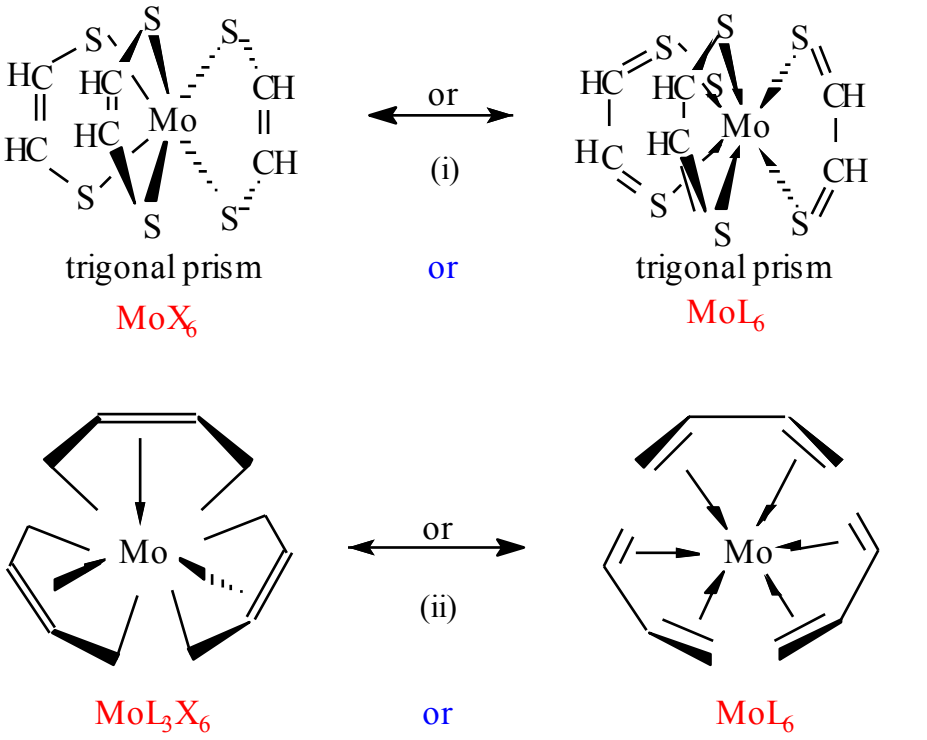
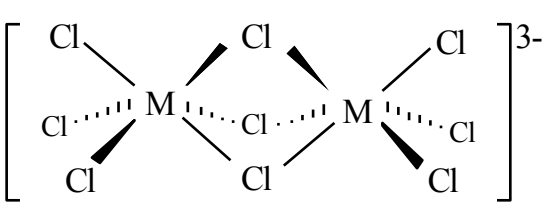
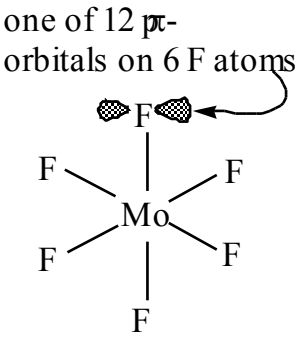

ENERGY
L
ethylene
Class L
X
L
η-allyl
Class L X
Z
X
L
η-cyclopropenyl
Class X3
L
L
η-butadiene
Class L2
X
X
L
η-cyclobutadiene
Class LX2
X
L
η-cyclopentadienyl
Class L2X
L
L
L
η-benzene
Class L3
Z
X
L
L
L
η-cycloheptatrienyl
Class L2X3
X
X
L
L
L
η-cyclooctatetraene
Class L3X2

Figure 4

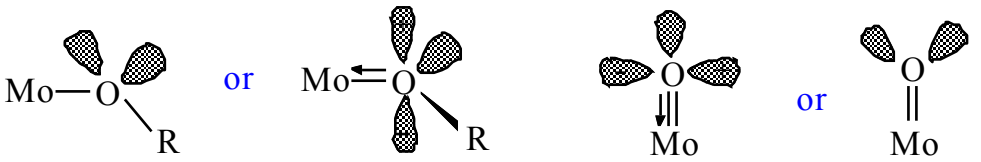




(iii)



(iv)



(v) (vi)

Figure 5. Non-innocent ligand systems.

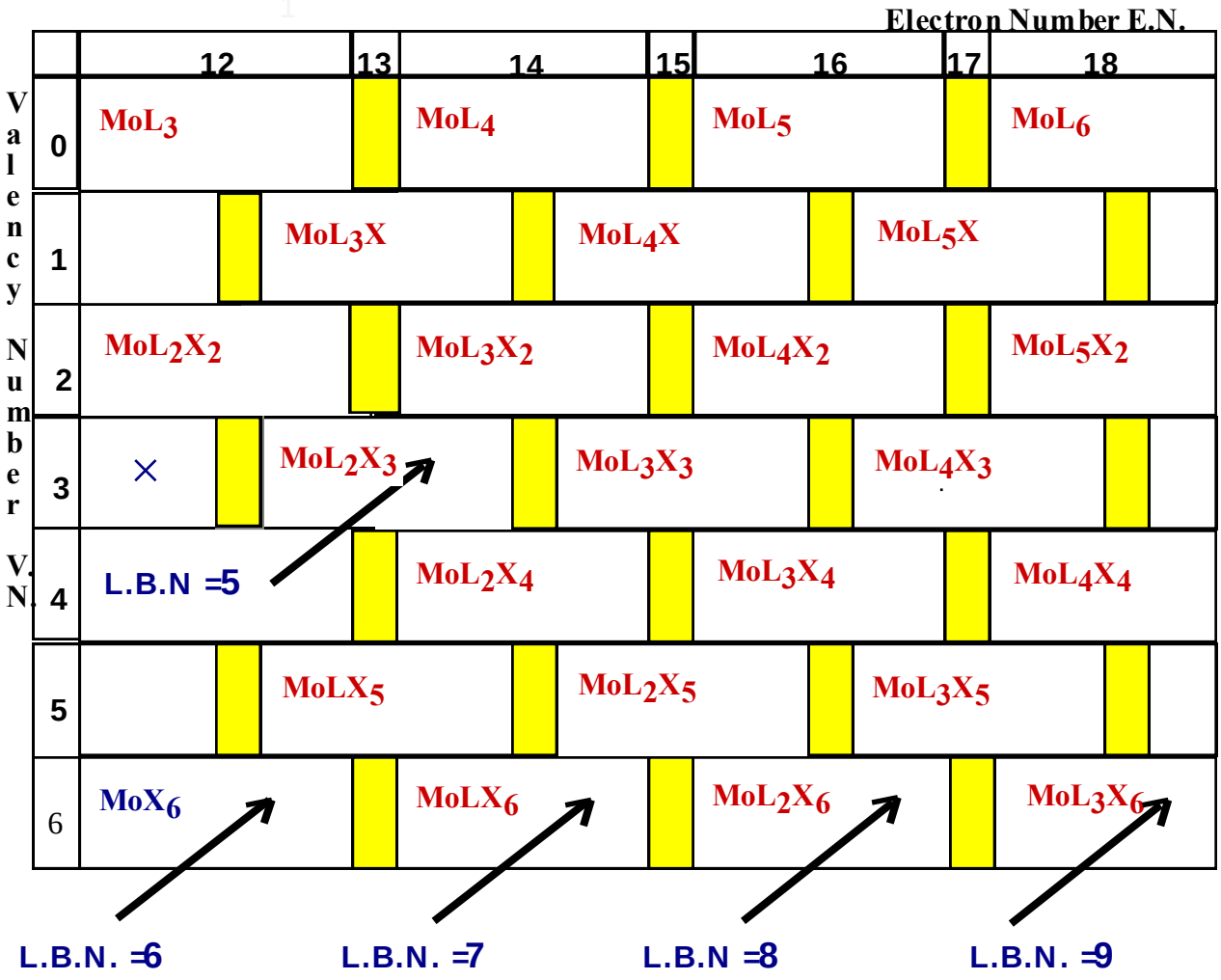

Electron Number E.N.
12
13
14
15
16
17
18
Valency Number V.N.
0
1
2
3
4
5
6
MoL3
MoL4
MoL5
MoL6
MoL3X
MoL4X
MoL5X
MoL2X2
MoL3X2
MoL4X2
MoL5X2
MoL2X3
MoL3X3
MoL4X3
L.B.N =5
MoL2X4
MoL3X4
MoL4X4
MoLX5
MoL2X5
MoL3X5
MoX6
MoLX6
MoL2X6
MoL3X6
L.B.N. =6
L.B.N. =7
L.B.N =8
L.B.N. =9

Figure 6.

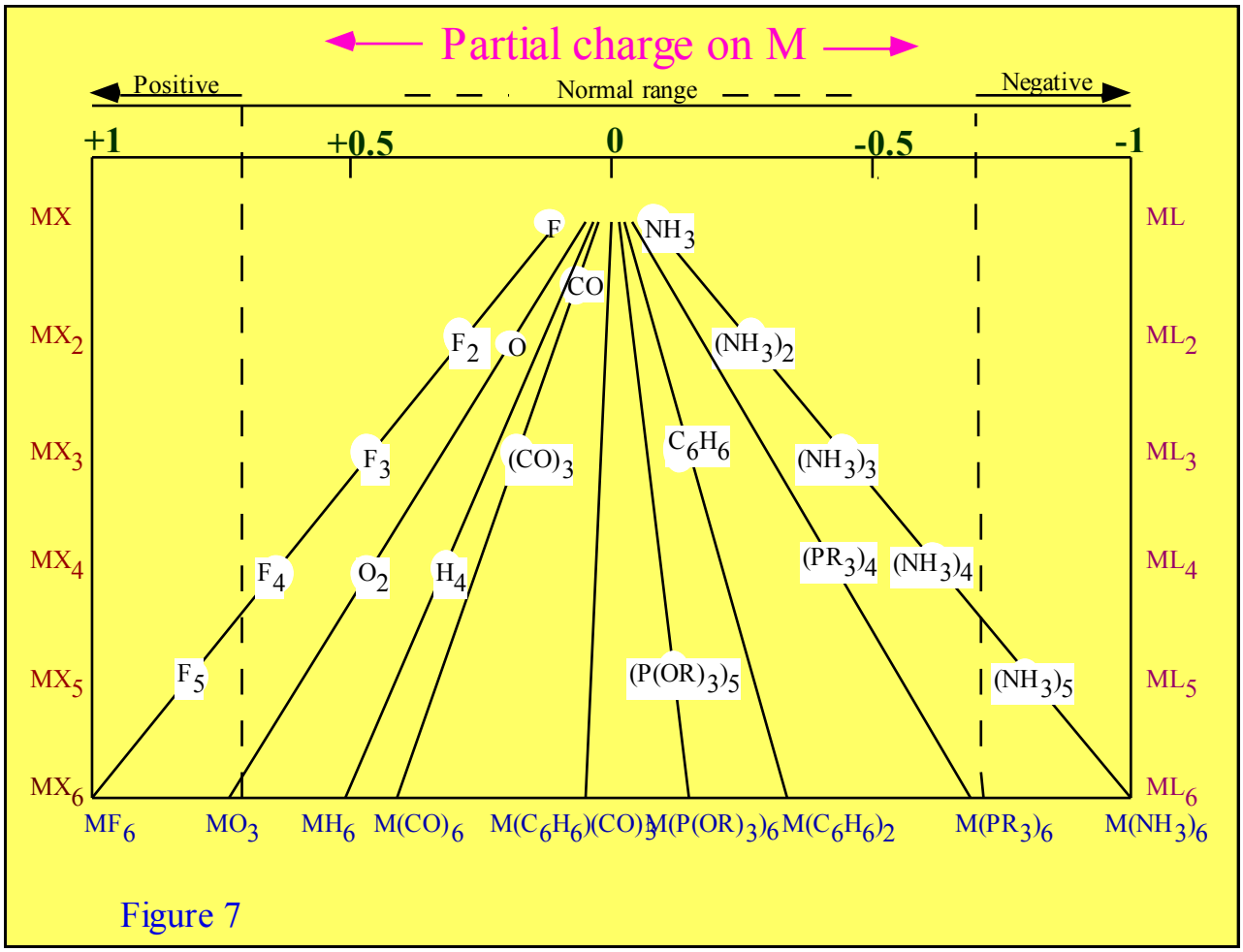

Partial charge on M
Positive
Normal range
Negative
+1
+0.5
0
-0.5
-1
MX
MX2
MX3
MX4
MX5
MX6
ML
ML2
ML3
ML4
ML5
ML6
F
NH3
CO
F2
O
(NH3)2
F3
(CO)3
C6H6
(NH3)3
F4
O2
H4
(PR3)4
(NH3)4
F5
(P(OR)3)5
(NH3)5
MF6
MO3
MH6
M(CO)6
M(C6H6)(CO)3
M(P(OR)3)6
M(C6H6)2
M(PR3)6
M(NH3)6

Figure 7

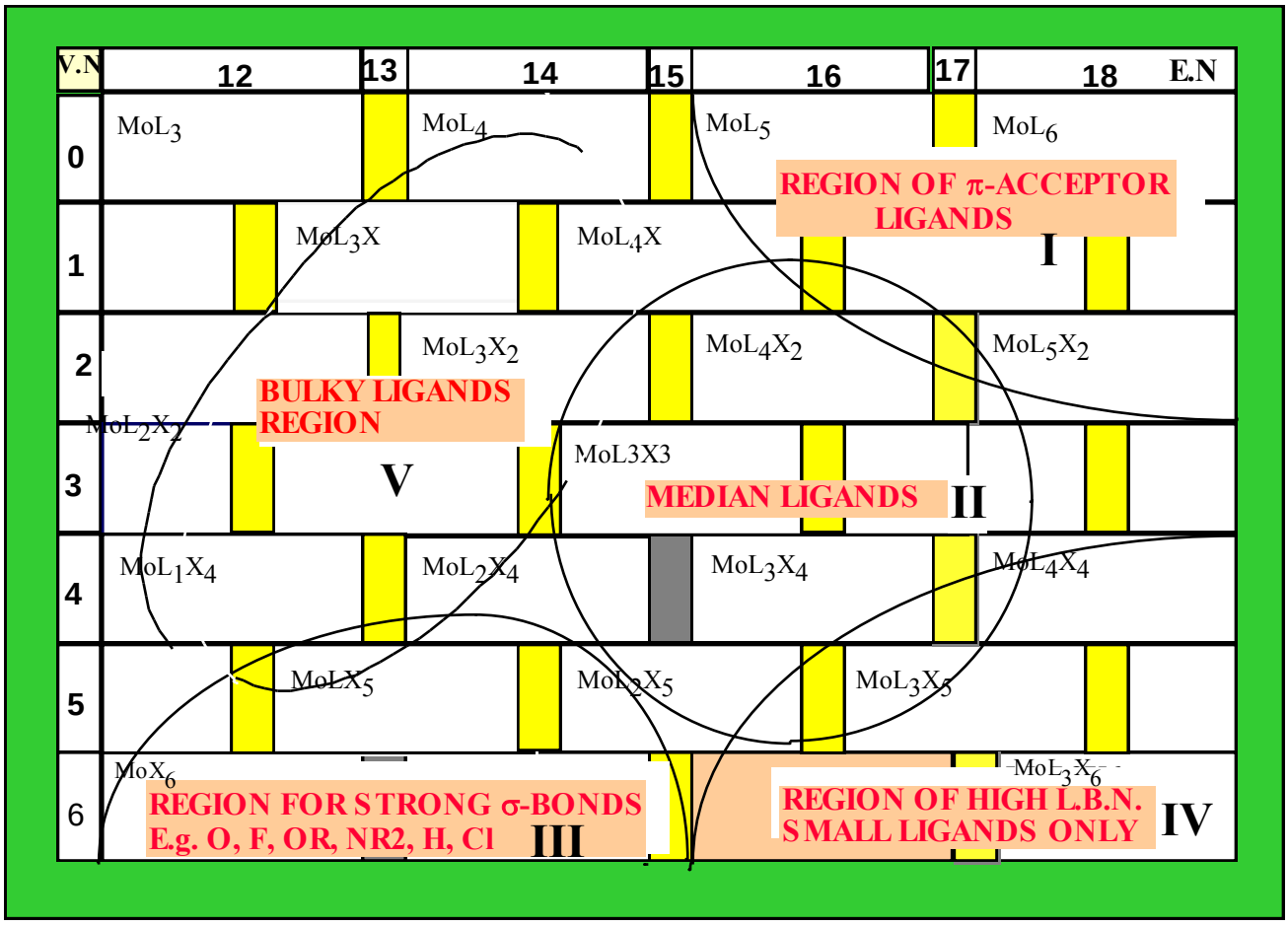

V.N
12
13
14
15
16
17
18
E.N
0
1
2
3
4
5
6
MoL3
MoL4
MoL5
MoL6
MoL3X
MoL4X
MoL3X2
MoL4X2
MoL5X2
MoL2X2
MoL3X3
MoL1X4
MoL2X4
MoL3X4
MoL4X4
MoLX5
MoL2X5
MoL3X5
MoX6
MoL3X6
REGION OF π-ACCEPTOR LIGANDS
I
BULKY LIGANDS REGION
V
MEDIAN LIGANDS
II
REGION FOR STRONG σ-BONDS
E.g. O, F, OR, NR2, H, Cl
III
REGION OF HIGH L.B.N.
SMALL LIGANDS ONLY
IV

Figure 8.

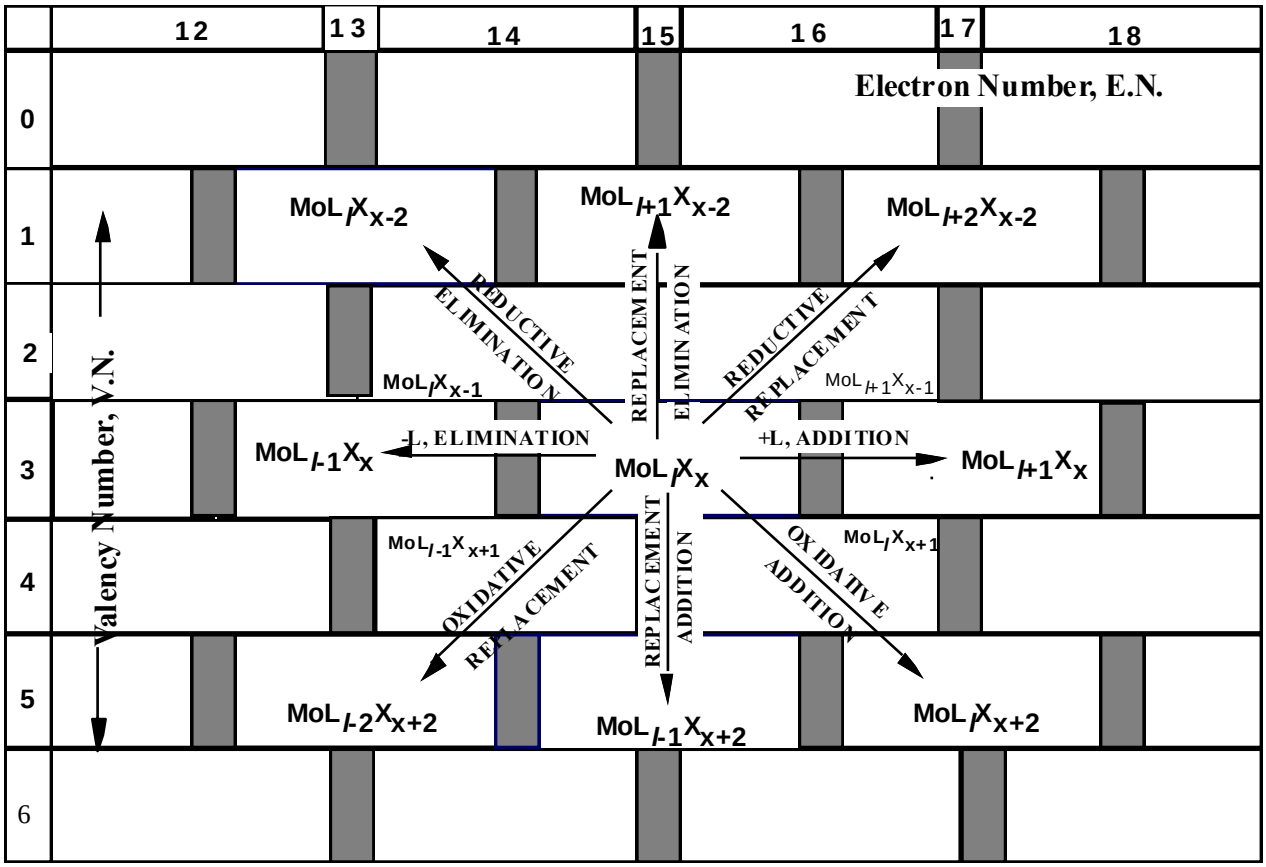


Figure 2.9 Classification of reactions by MLX class

ELECTRON NUMBER E.N.

VALENCY NUMBER V.N.	12	13	14	15	16	17	18
0	ML_3		ML_4		ML_5		ML_6
1		ML_3X		ML_4X		ML_5X	
2	ML_2X_2		ML_3X_2		ML_4X_2		ML_5X_2
3		ML_2X_3		ML_3X_3		ML_4X_3	
4	MLX_4		ML_2X_4		ML_3X_4		ML_4X_4
5		MLX_5		ML_2X_5		ML_3X_5	
6	MX_6		MLX_6		ML_2X_6		ML_3X_6

Figure 11

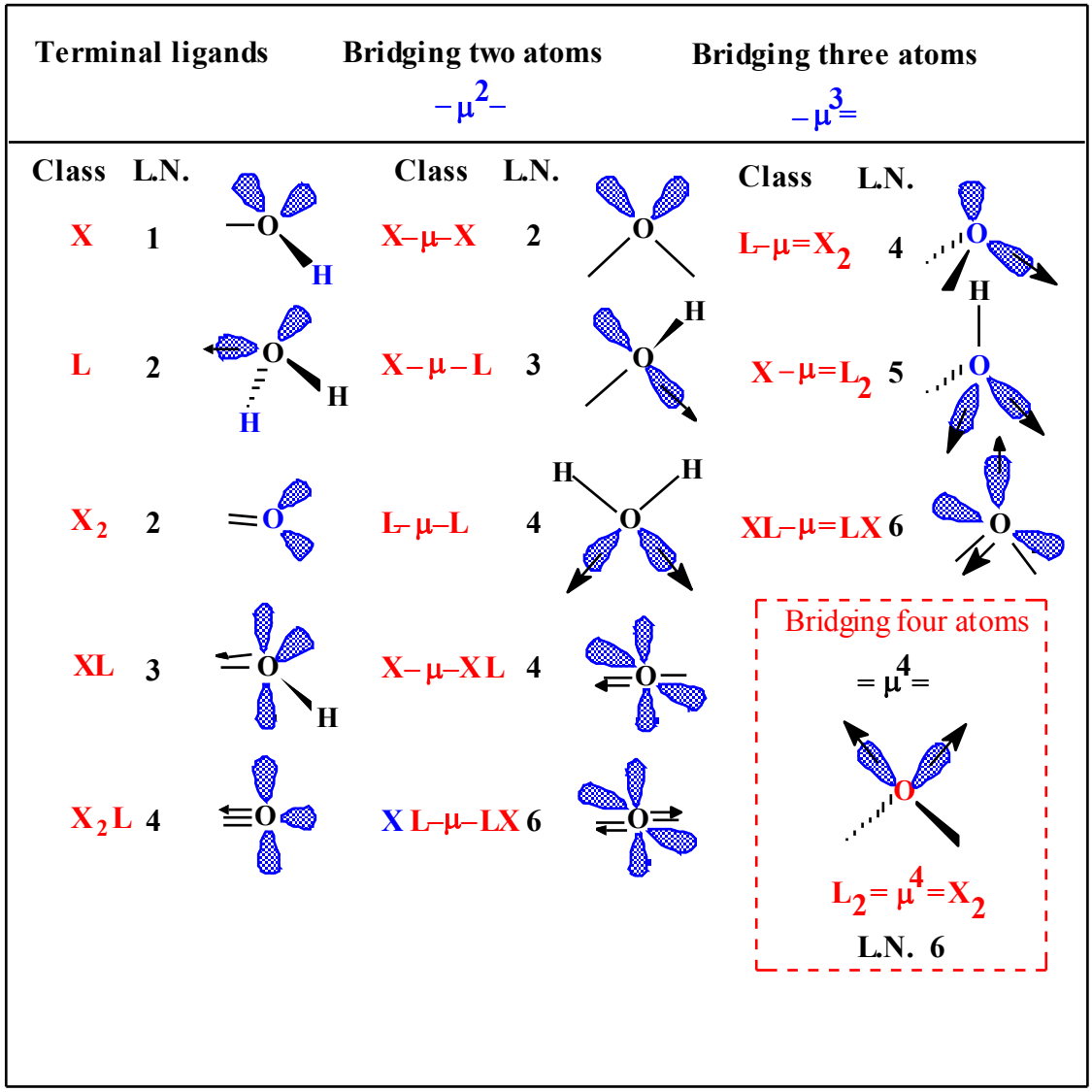


Figure 12. Classification of ligands found in aqueous systems

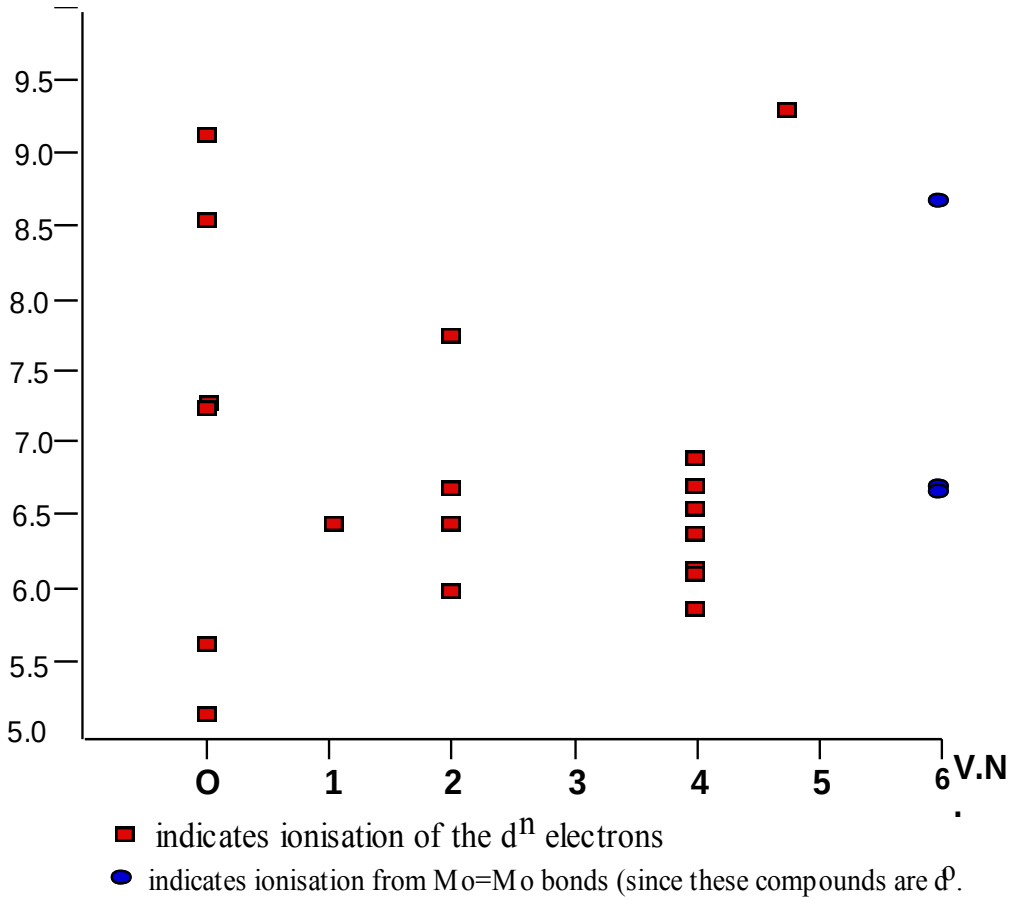

9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
O
1
2
3
4
5
6
V.N
.
indicates ionisation of the d^n electrons
indicates ionisation from Mo=Mo bonds (since these compounds are d^0.

Figure 13