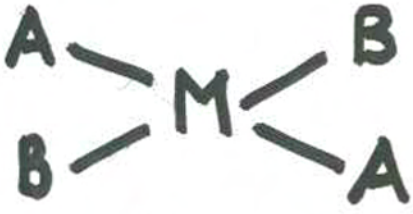
ΣΤΕΡΕΟΙΣΟΜΕΡΕΙΑ

1. Γεωμετρική Ισομέρεια

α. Επίπεδα τετραγωνικά MA_2B_2

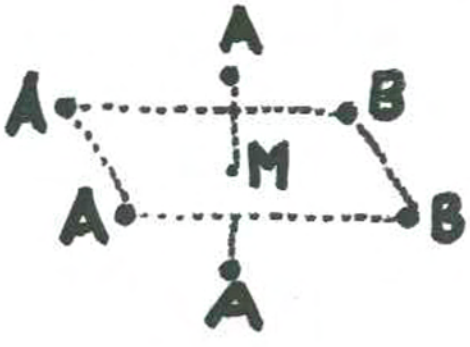
cis-



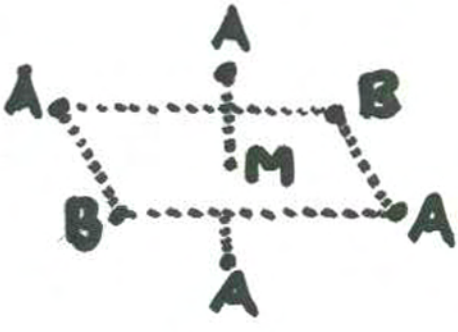
trans-

$Pt(NH_3)_2Cl_2$

β. Οκταεδρικά MA_4B_2

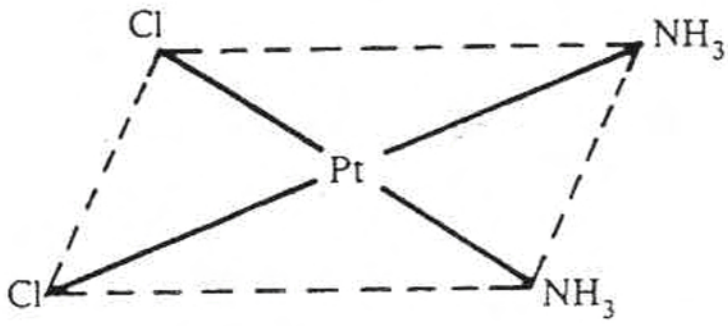


cis-

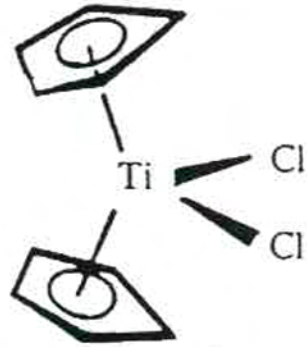


trans-

$[Co(NH_3)_4Cl_2]^+$, $[Cr(NH_3)_4Cl_2]^+$



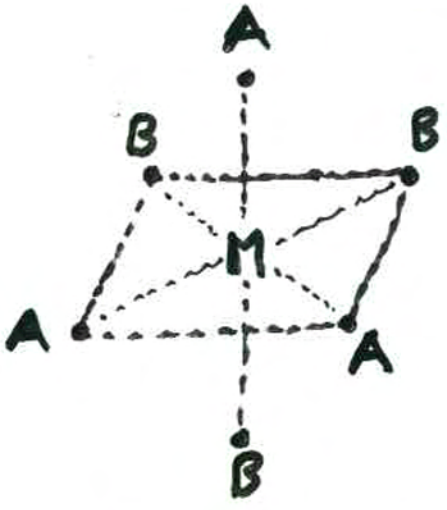
cisplatin



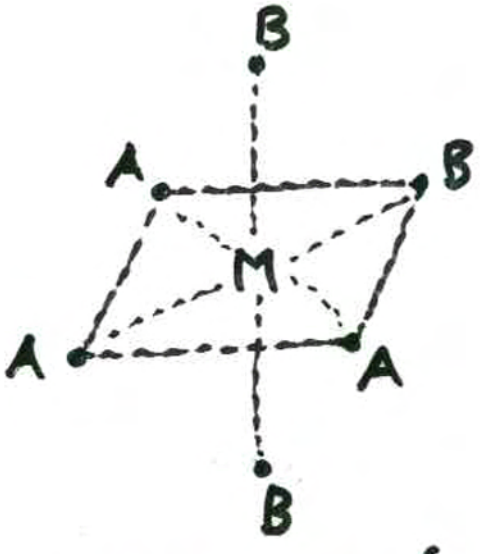
τιτανοκενοδιχλωρίδιο

γ. οκταεδρικοί

MA_3B_3

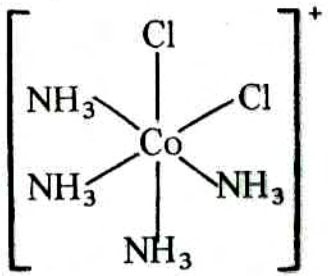


facial (fac)

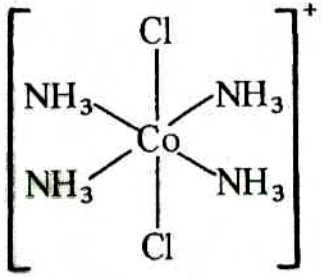


mezidian (mez)

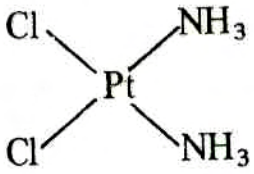
$[Pt(NH_3)_3Cl_3]^+$



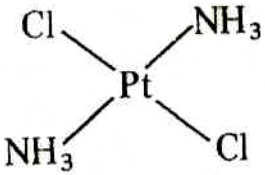
cis



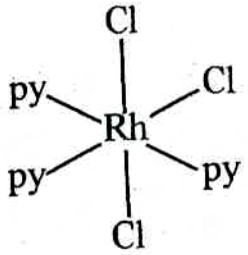
trans



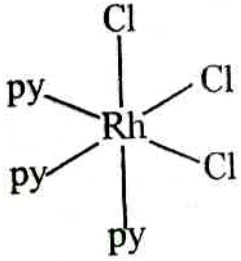
cis



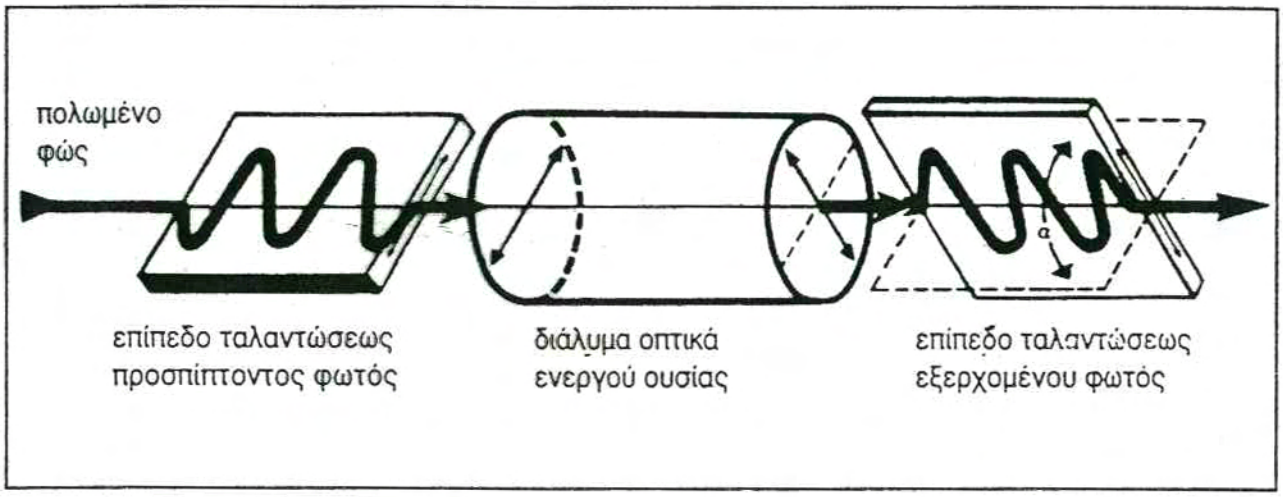
trans



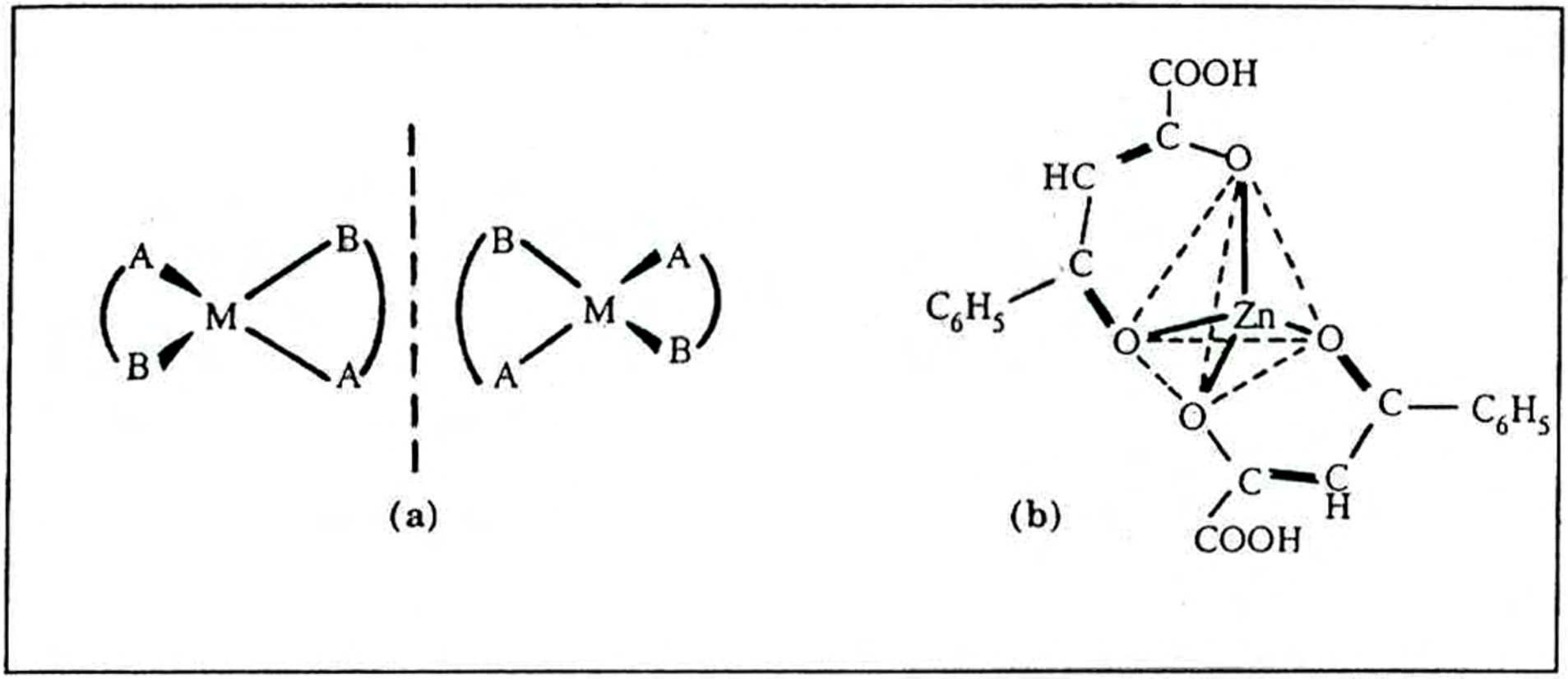
mer



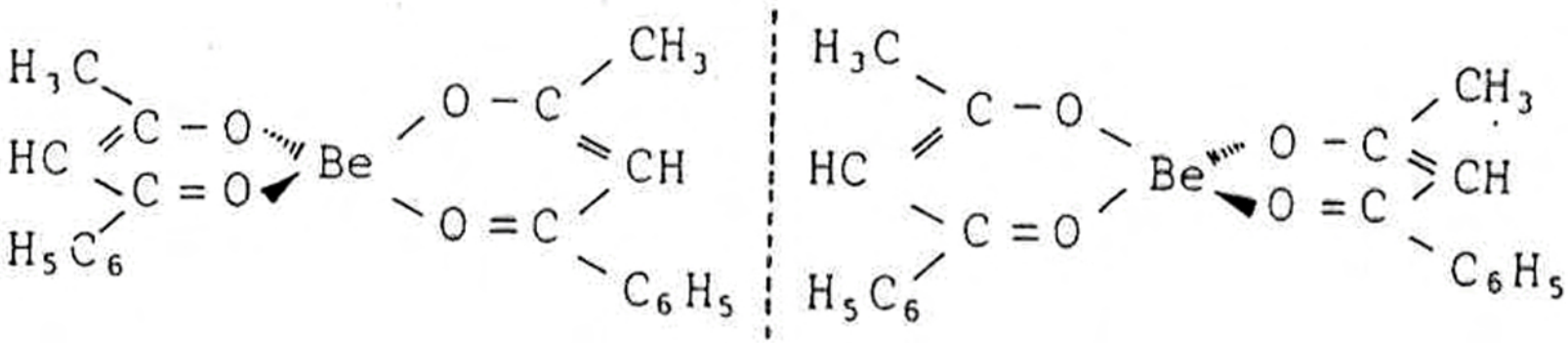
fac



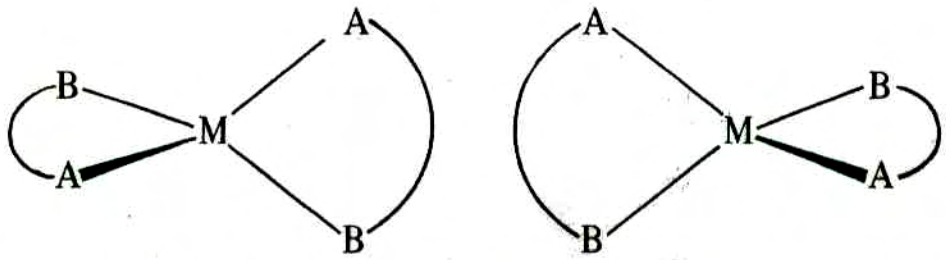
Σχηματική παράσταση τής στροφής τού επιπέδου ταλαντώσεως τού πολωμένου φωτός μετά την δίοδο του μέσω διαλύματος οπτικώς ενεργού ουσίας.



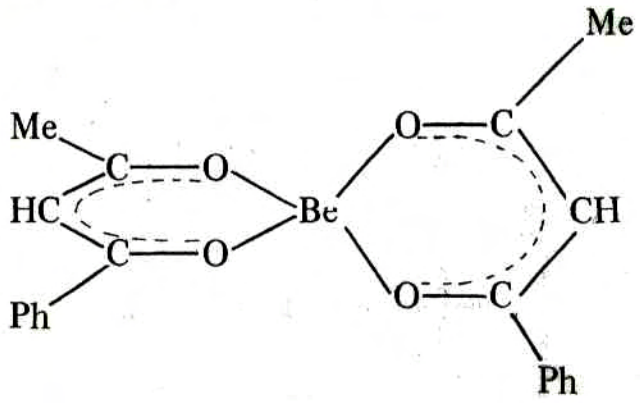
(a) Οπτικά ισομερή τετραεδρικά δις-χηλικά σύμπλοκα
(b) Δις (βενζοϋλοπυρουβατο) ψευδάργυρος (II) σαν παράδειγμα της κατηγορίας (a).



δις (βενζοϋλοακετυλοακετονάτο) βη·ρύλλιο (II)



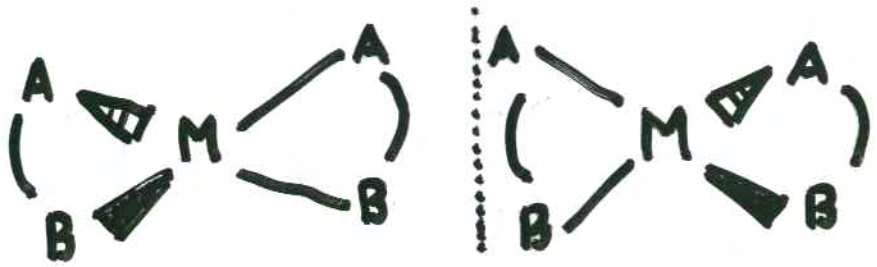
Beryllium(II), zinc(II), and boron(III) form resolvable chelates of this type. The letters A and B in the structures above do not represent necessarily different donor elements but rather the ends of unsymmetrical chelates. Thus a typical example is bis(benzoylacetonato)beryllium(II)



2. Οπτική ισομέρεια

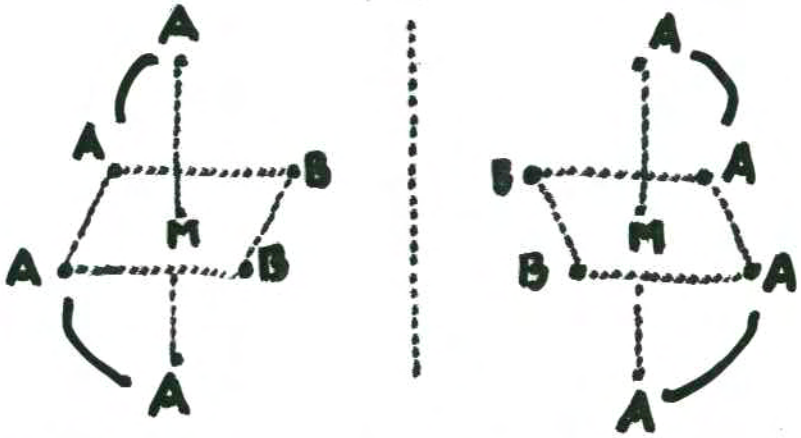
α. Δις-χηλικά Τετραεδρικά σύμπλοκα

$M(A\text{-}B)_2$



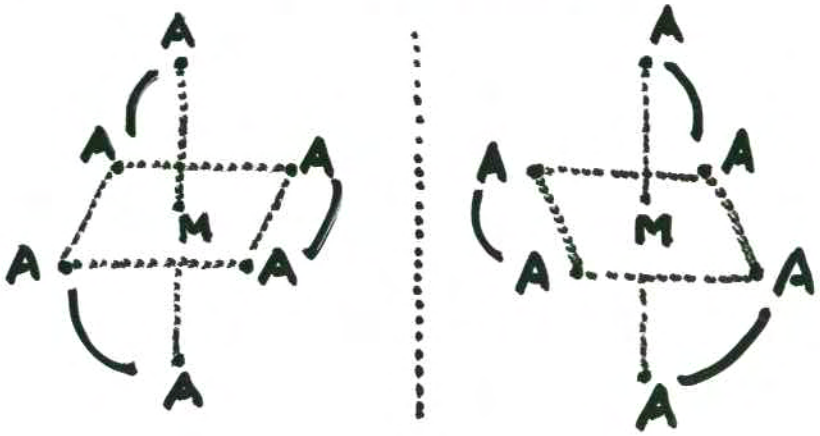
β. cis-δις-χηλικά Οκταεδρικά σύμπλοκα

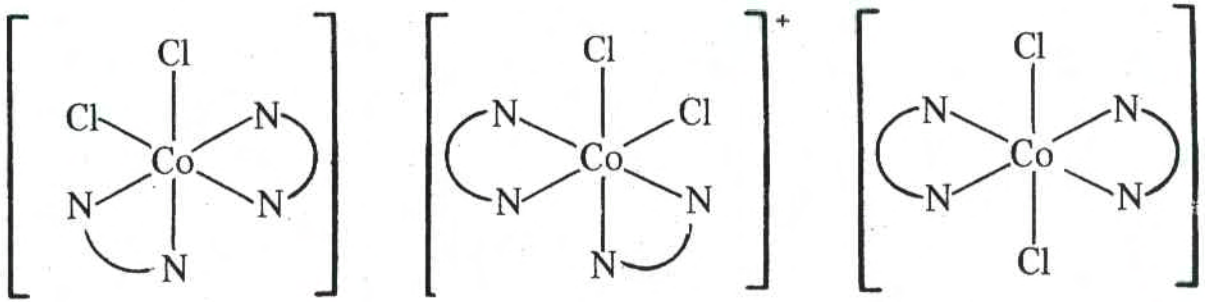
$M(A\text{-}A)_2B_2$



γ. τρις-χηλικά Οκταεδρικά σύμπλοκα

$M(A\text{-}A)_3$

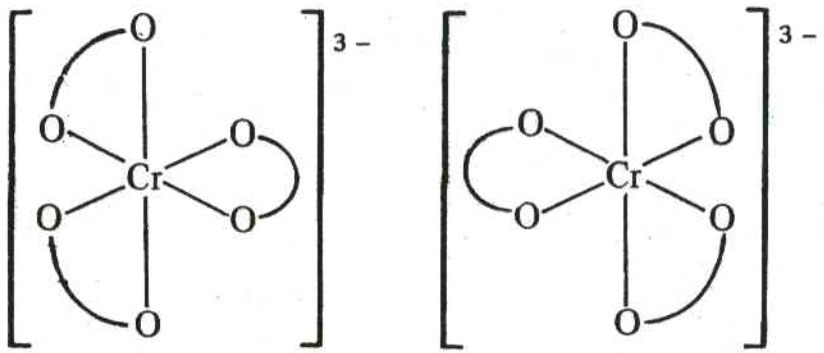




cis forms; active

trans form; inactive

Complexes of the type $M(L-L)_3$ can be exemplified by the tris(oxalato)chromate(III) anion



ΘΕΡΜΟΔΥΝΑΜΙΚΗ ΣΤΑΘΕΡΟΤΗΤΑ

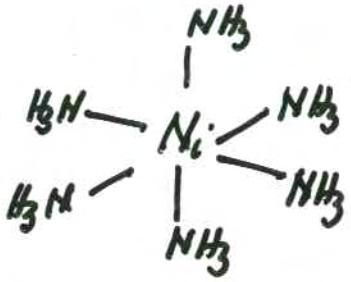
$M + B \rightleftarrows MB$ $\qquad K_1 = \dfrac{(MB)}{(M)(B)}$

$MB_{n-1} + B \rightleftarrows MB_n$ $\qquad K_n = \dfrac{(MB_n)}{(MB_{n-1})(B)}$

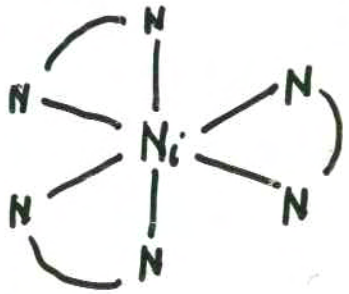
$M + B \rightleftarrows MB$ $\qquad \beta_1 = \dfrac{(MB)}{(M)(B)}$

$M + nB \rightleftarrows MB_n$ $\qquad \beta_2 = \dfrac{(MB_n)}{(M)(B)^n}$

$$K_{\alpha\sigma\tau} = \frac{1}{K_{\sigma\chi\eta\mu.}}$$

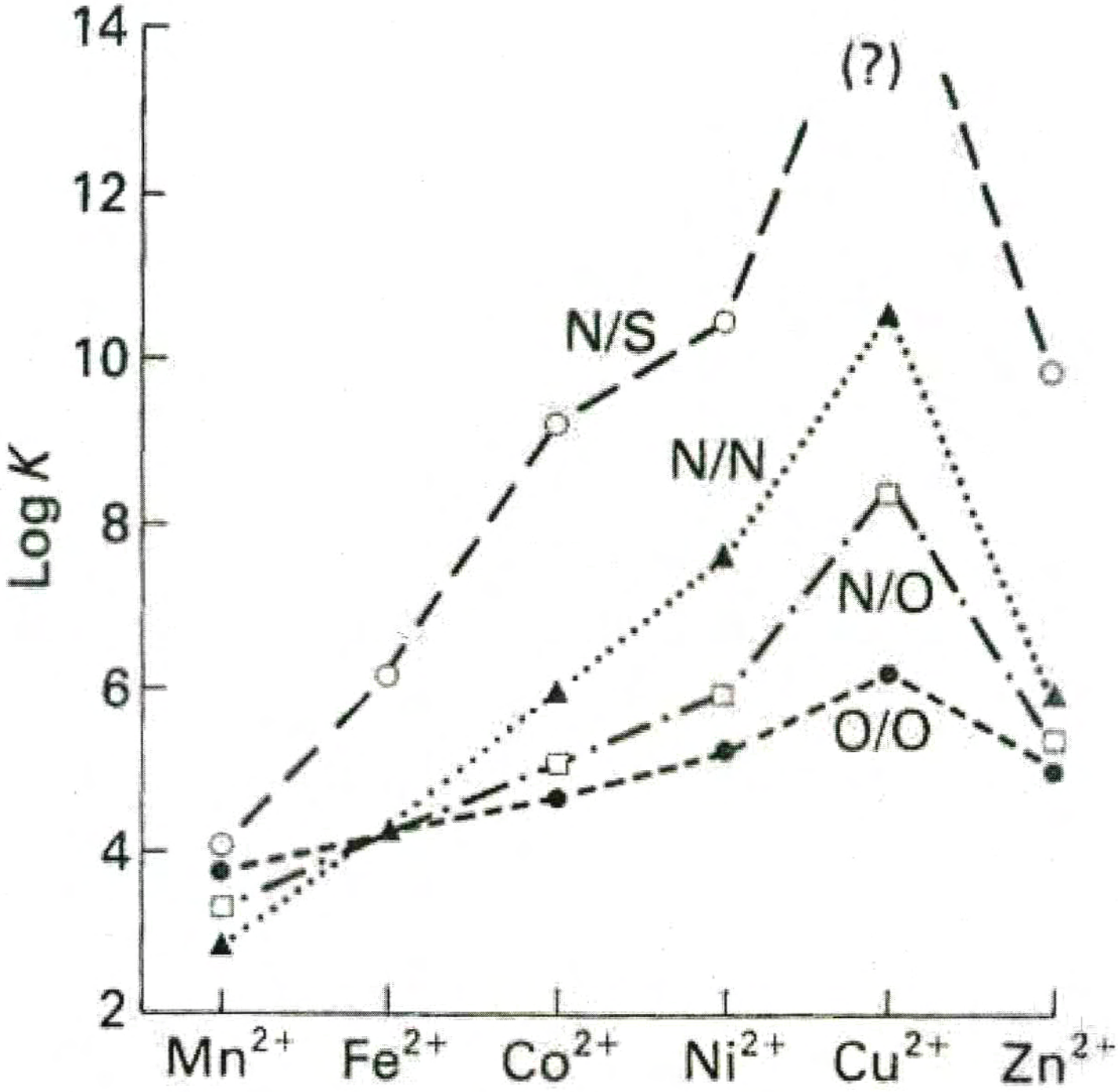
$Ni^{2+}_{(aq)} + 6\,NH_{3(aq)} \rightleftarrows$ 

$K = 3.98 \times 10^{8}$

$Ni^{2+}_{(aq)} + 3\,en_{(aq)} \rightleftarrows$ 

$K = 1.995 \times 10^{18}$

$en = H_2N\,CH_2\,CH_2\,NH_2$



A plot of binding constants, log K, for a series of single ligands with the divalent ions from Mn^{2+} to Zn^{2+}. The ligands are cystein (○); ethylenediamine (▲); glycine (□); and oxalate (●).

ΚΙΝΗΤΙΚΗ ΣΤΑΘΕΡΟΤΗΤΑ

$$Co(NH_3)_6^{3+} + 6H_2O \rightleftharpoons Co(H_2O)_6^{3+} + 6NH_3$$

$$K = 10^{25}$$

Κινητικά όμως είναι ΣΤΑΘΕΡΟ (αδρανές)
η ισορροπία αποκαθίσταται ΑΡΓΑ

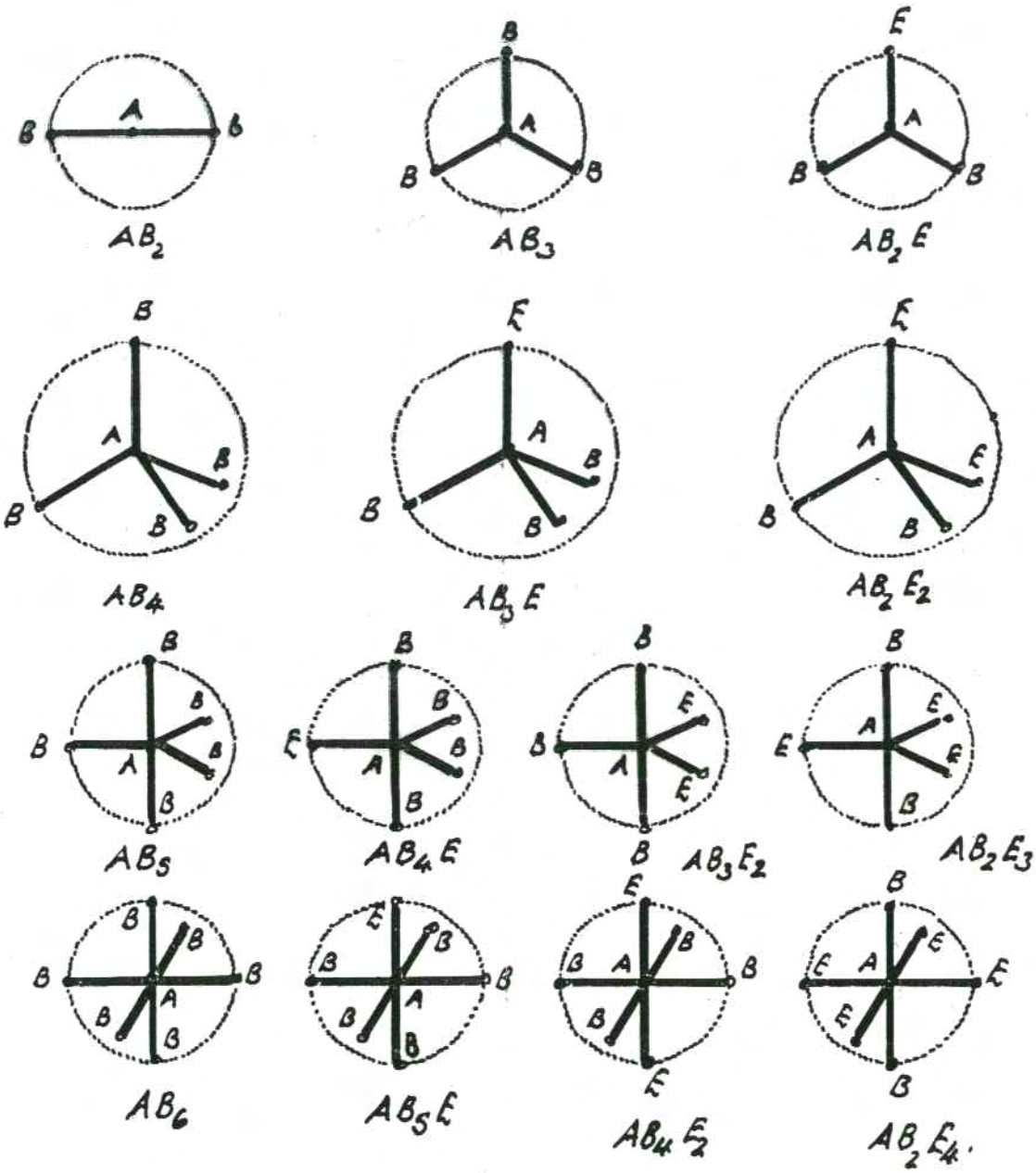
$$Ni(CN)_4^{2-} \rightleftharpoons Ni^{2+} + 4CN^-$$

$$K = 10^{-22}$$

η ταχύτητα αποκαταστάσεως της ισορροπίας
είναι πολύ μεγάλη.
Κινητικά είναι ΕΥΚΙΝΗΤΟ

$$[Ni(CN)_4]^{2-} + 4\,{}^{14}CN^- \rightleftharpoons [Ni({}^{14}CN)_4]^{2-} + 4CN^-$$

$$t_{1/2} = 30s$$



A = κεντρικό άτομο

B = περιφερειακά άτομα

E = μη δεσμικά ζεύγη ηλεκτρονίων επί κεντρικού ατόμου A.

$Be(H_2O)_4^{2+}$ $\quad Z_{Be} = 4 \quad (1s^2 2s^2)$

Be^{2+} $\quad$ 1s ⇅ $\quad$ [2s ⇅ $\quad$ 2p ⇅ ⇅ ⇅]

$H_2O \quad H_2O \quad H_2O \quad H_2O$

sp^3 υβριδισμός.

$Ti(H_2O)_6^{3+}$ $\quad Z_{Ti} = 22$

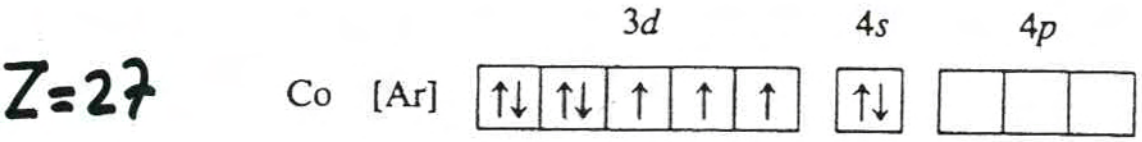
$Ti \Rightarrow (Ar)\, 3d^2\, 4s^2$

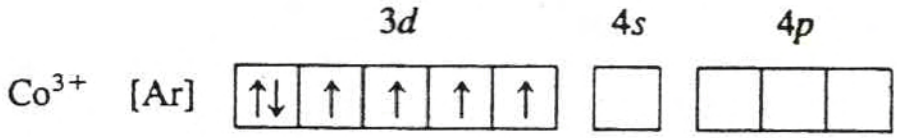
$Ti^{3+} \Rightarrow (Ar)\, 3d$

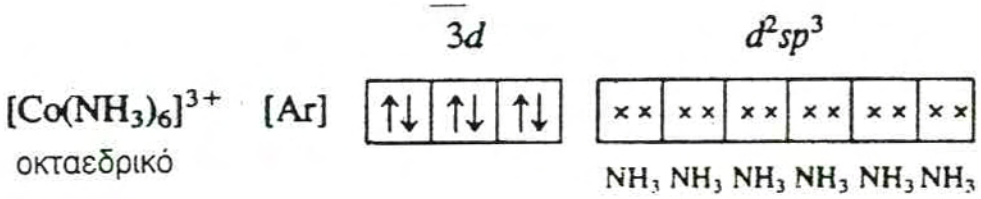
3d ↑ ○ ○ | 4s ⇅ | 4p ⇅ ⇅ ⇅

d^2sp^3 υβριδισμός

Z=27

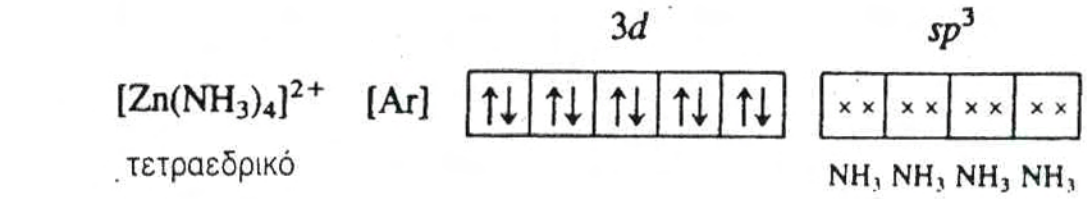

3d
4s
4p
Co [Ar]


3d
4s
4p
Co^{3+} [Ar]


3d
d^2sp^3
$[Co(NH_3)_6]^{3+}$ [Ar]
οκταεδρικό
NH_3 NH_3 NH_3 NH_3 NH_3 NH_3

$Z_{Zn} = 30$

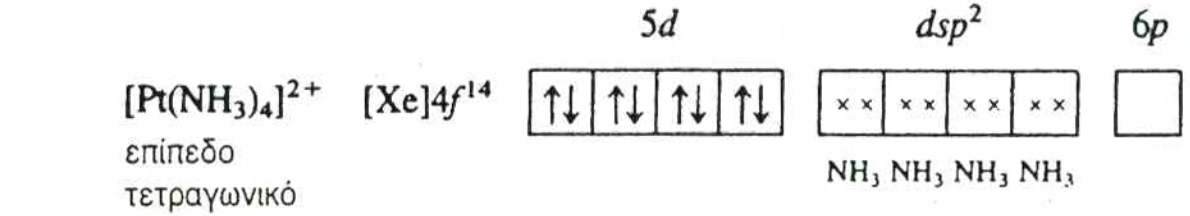
$[Zn(NH_3)_4]^{2+}$ τετραεδρικό



$Zn \Rightarrow (Ar)\, 3d^{10}\, 4s^{2}$

$Z_{Pt} = 78$

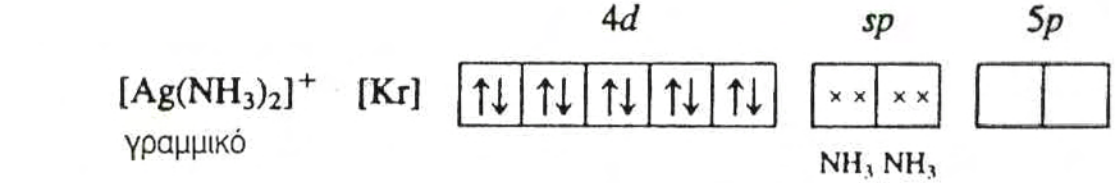
$[Pt(NH_3)_4]^{2+}$ επίπεδο τετραγωνικό



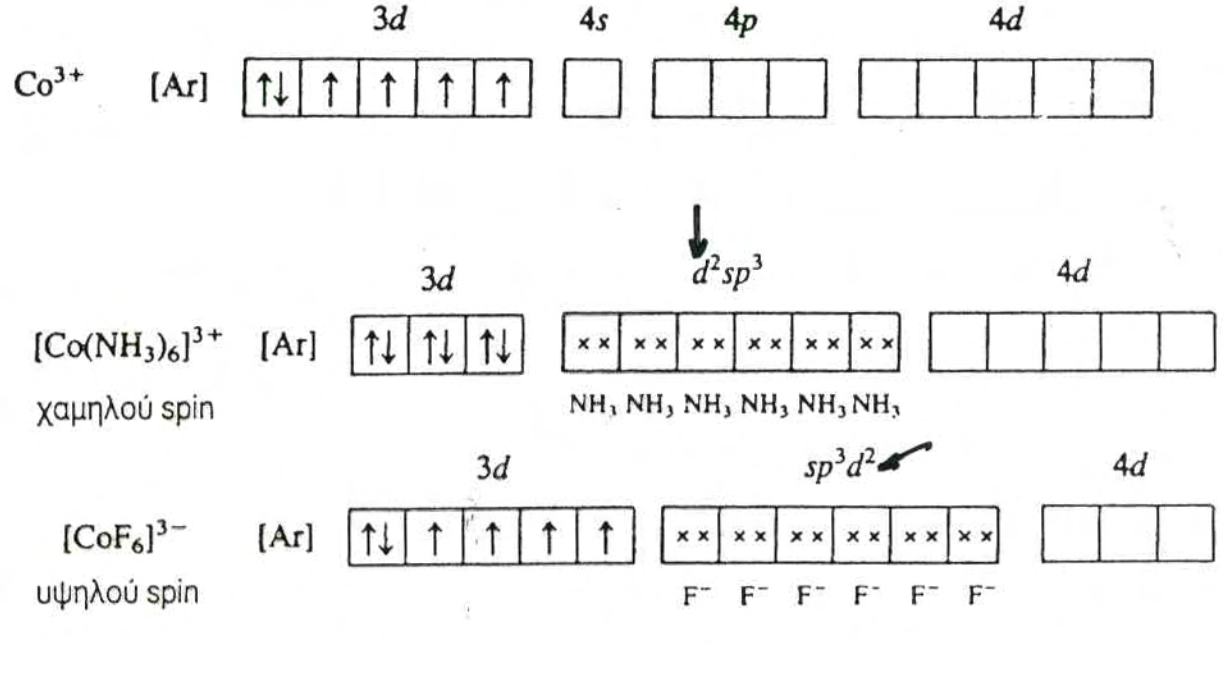
$Pt \Rightarrow (Xe)\, 4f^{14}\, 5d^{9}\, 6s$

$Z_{Ag} = 47$

$[Ag(NH_3)_2]^{+}$ γραμμικό

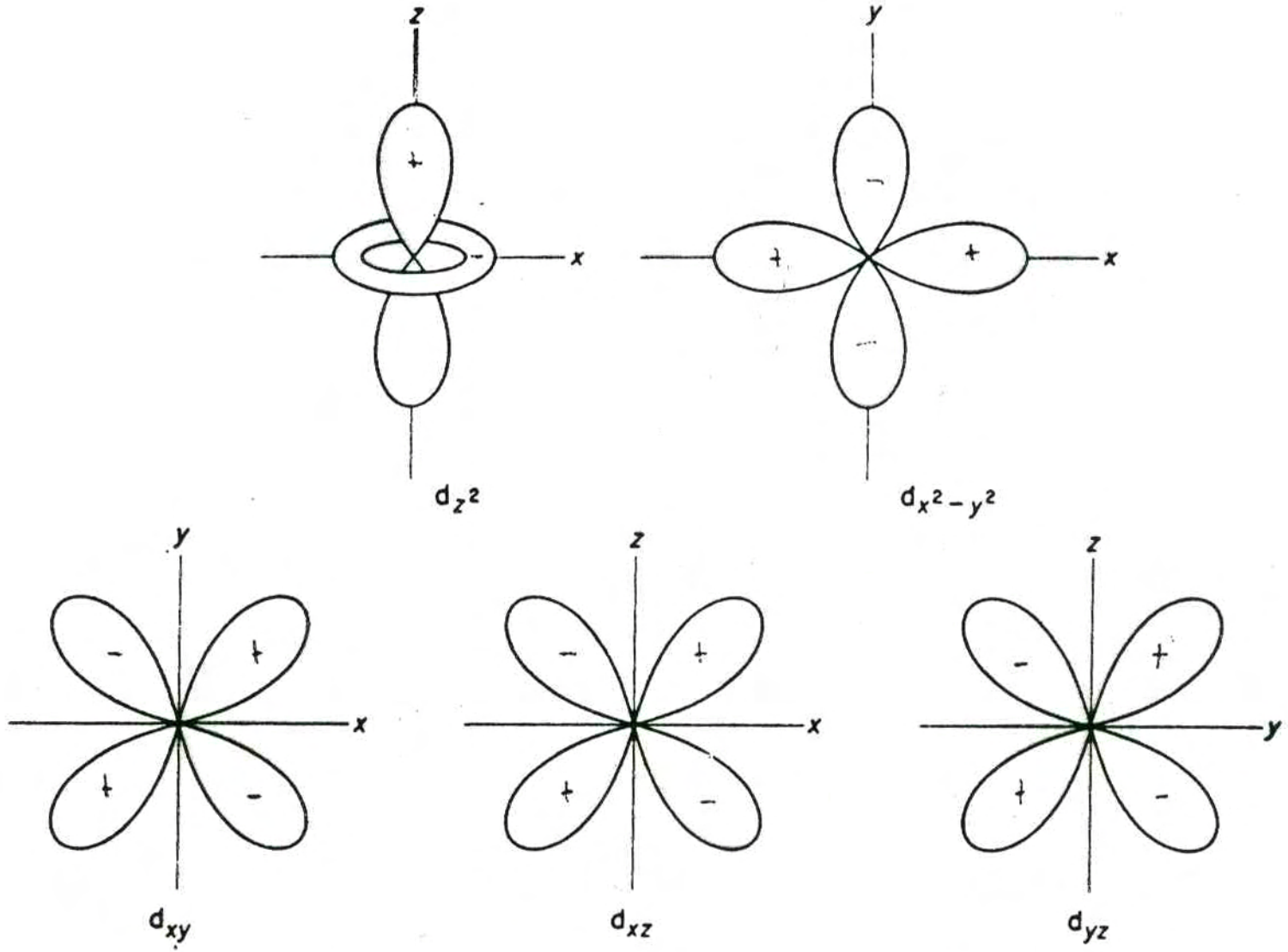


$Ag \Rightarrow (Kr)\, 4d^{10}\, 5s$



εύμπλοκα εξωτερικών τροχιακών

εωμπλοκά εξωτερικών τροχιακών



The electron-density distribution in the d orbitals