Luminescenza

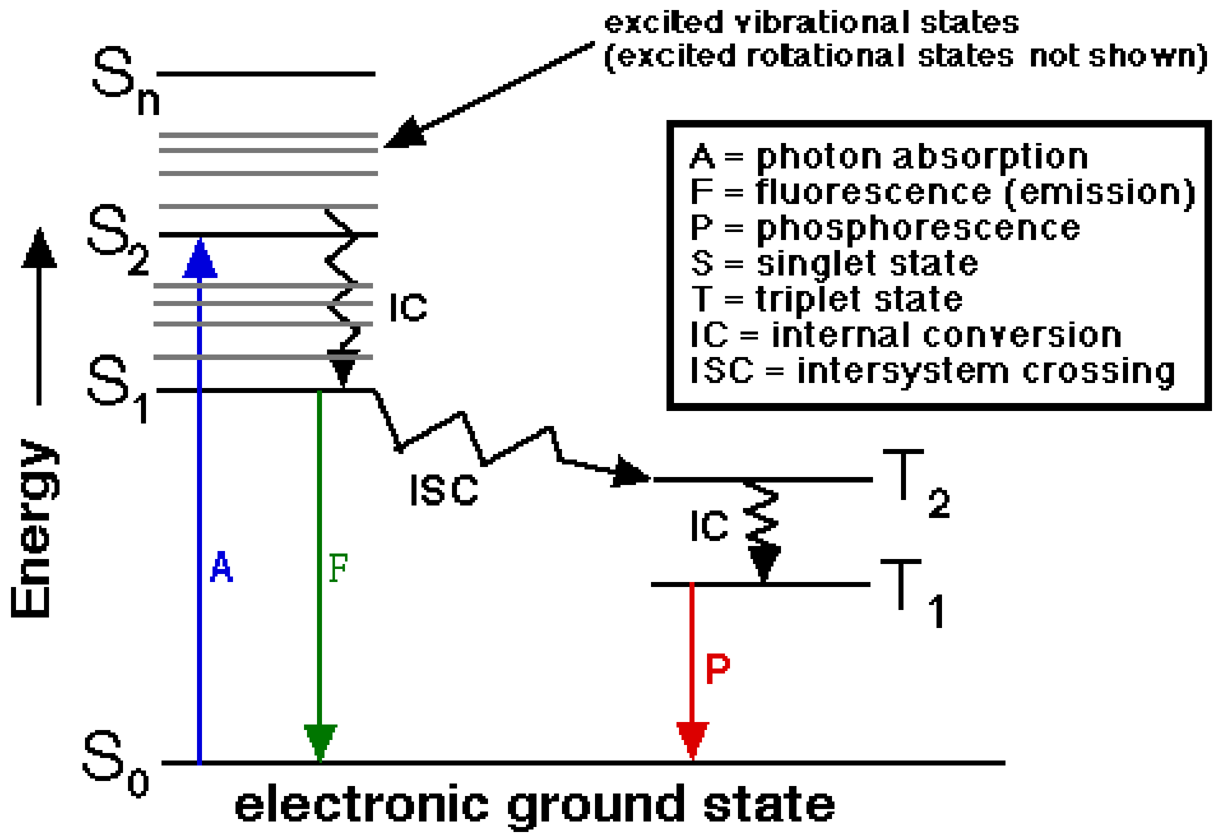
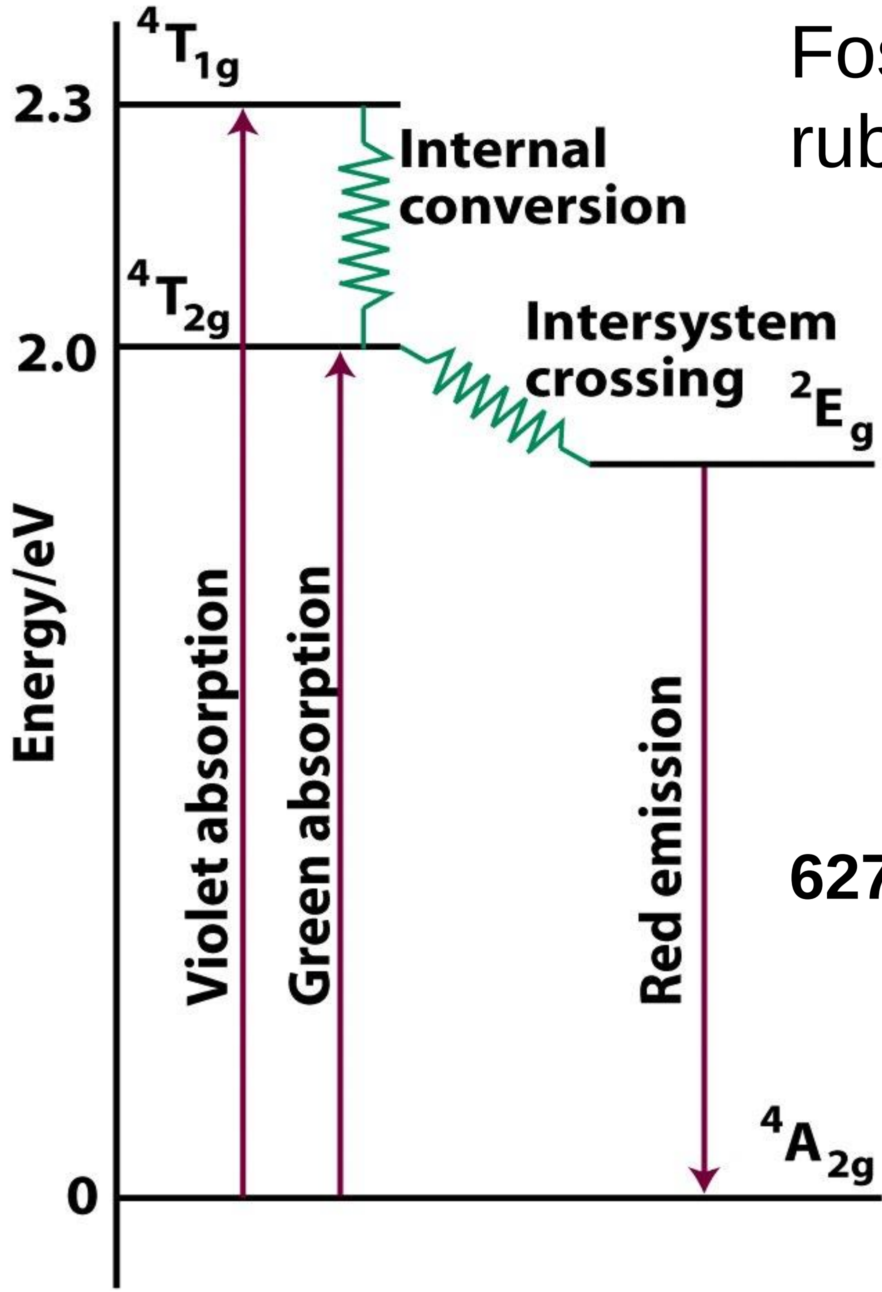
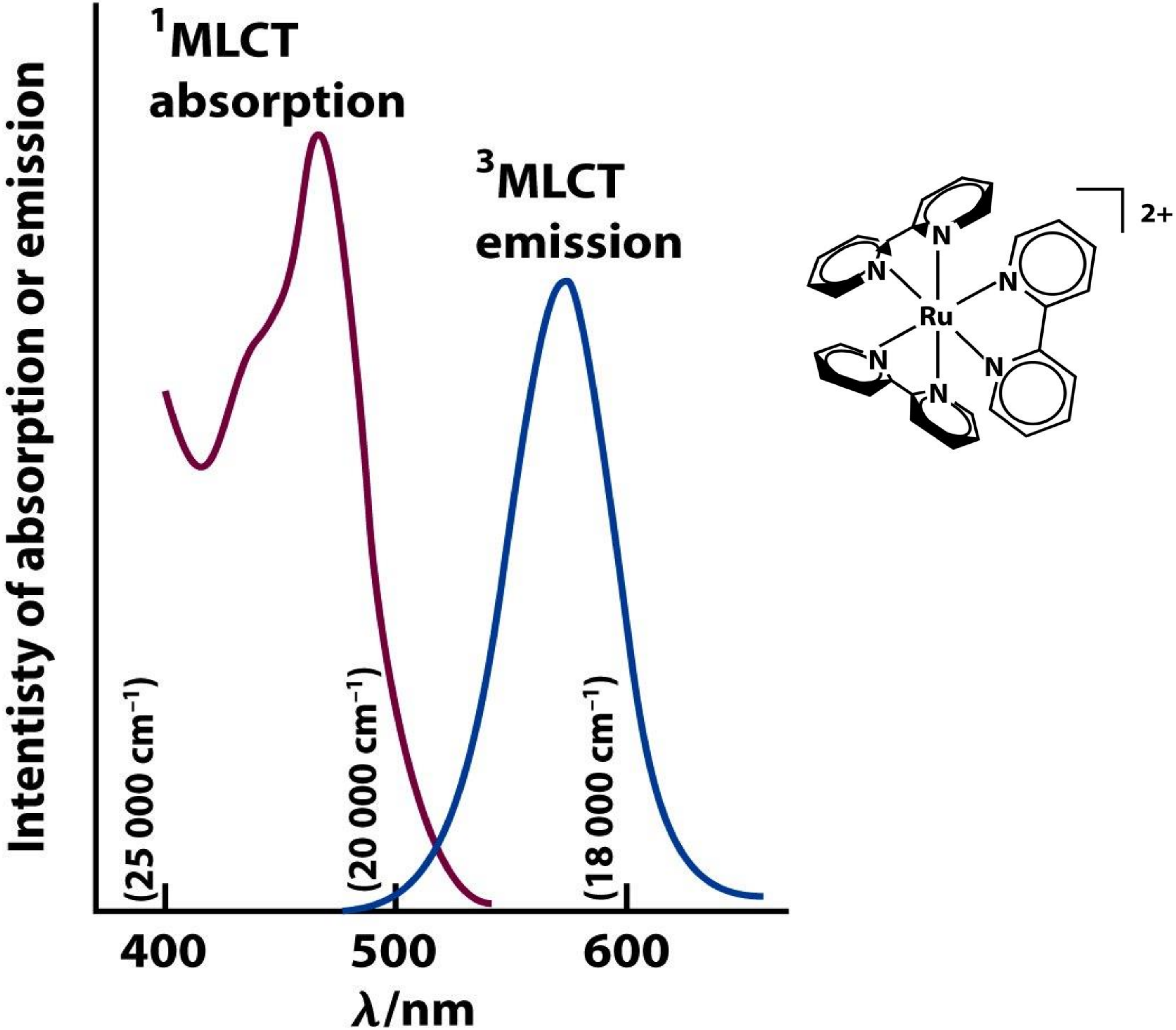


Diagramma di Jablonski

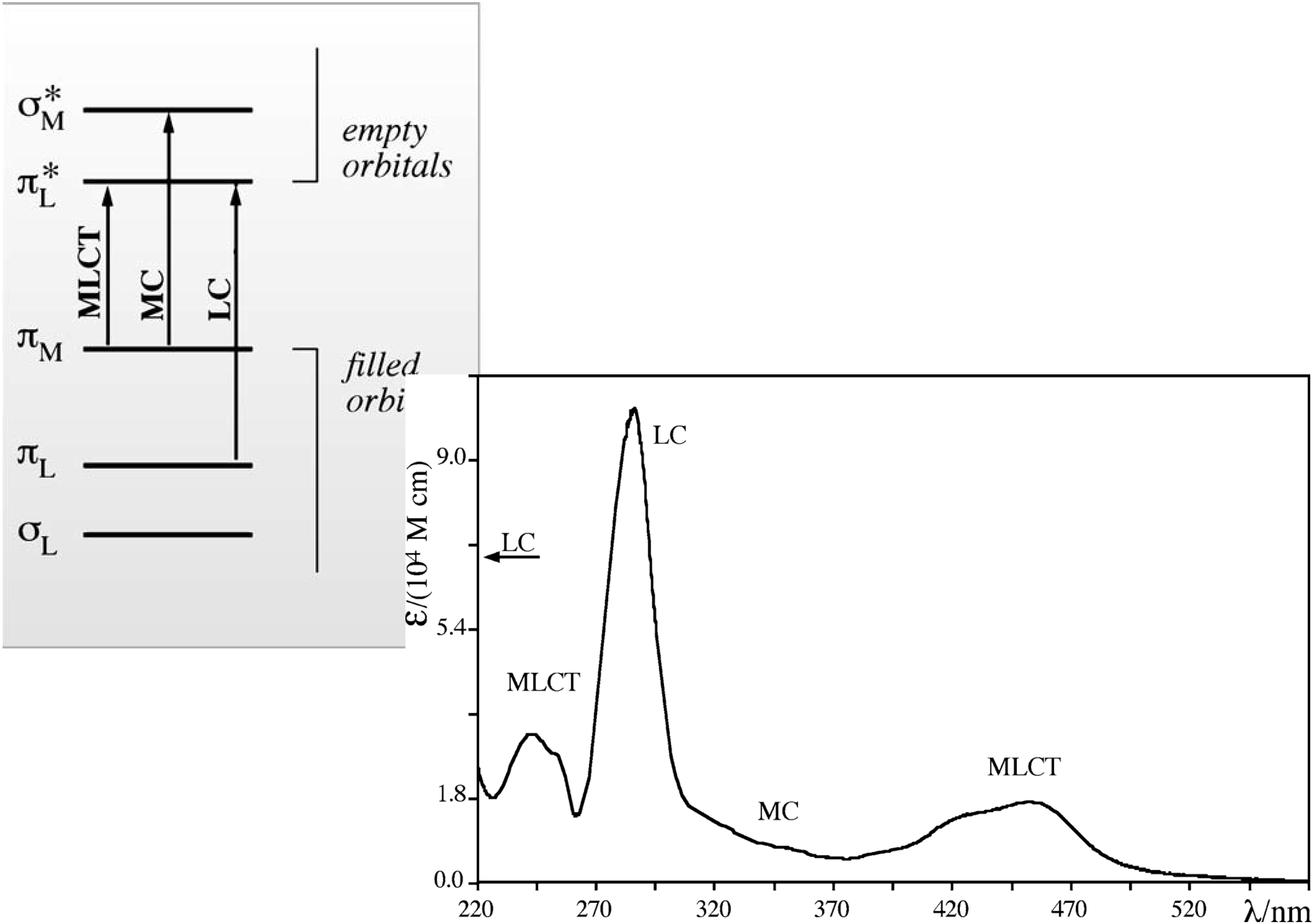
Fosforescenza del rubino (Cr^{3+}(d^3))



627 nm

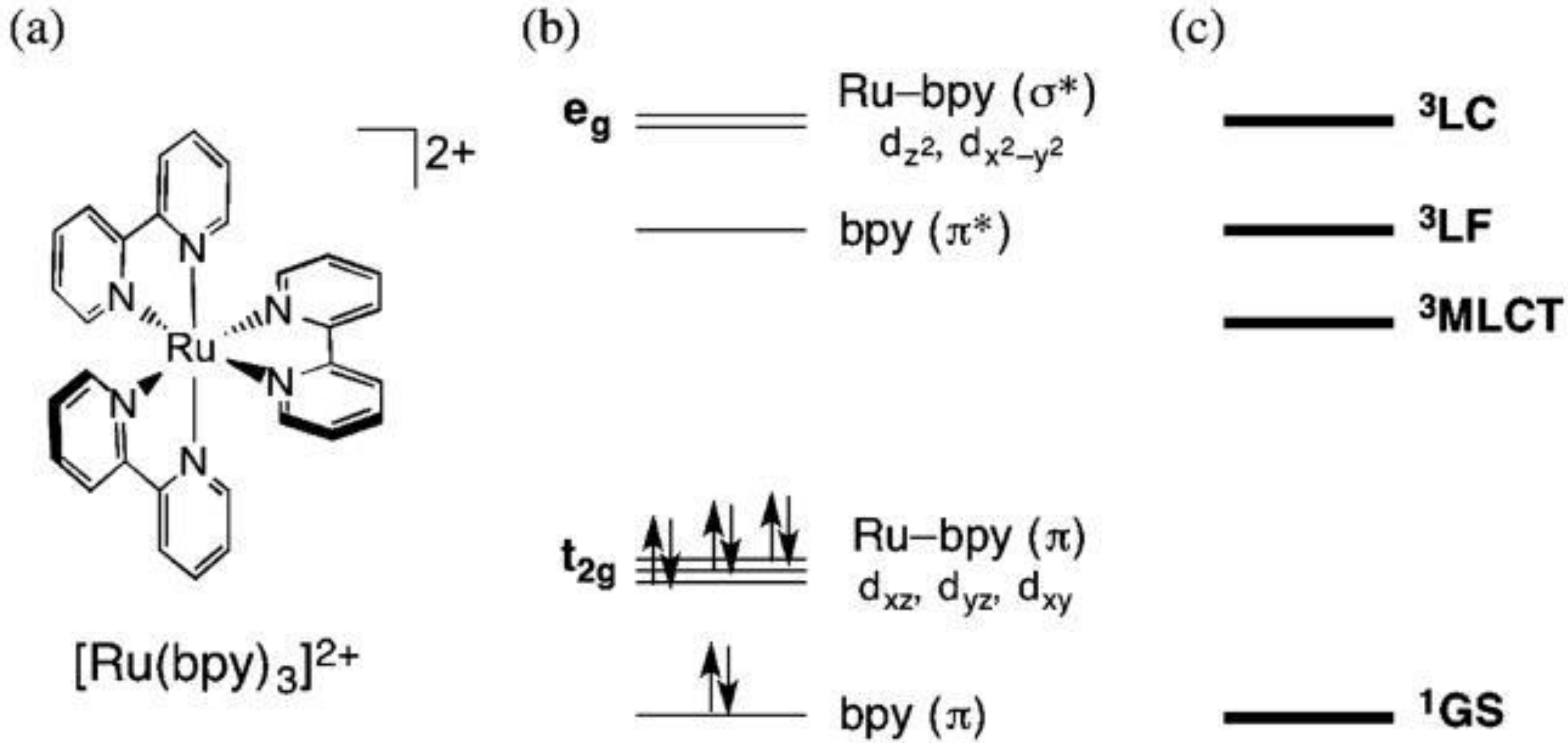


1MLCT absorption
3MLCT emission
Intentisty of absorption or emission
(25 000 cm−1)
(20 000 cm−1)
(18 000 cm−1)
400
500
600
λ/nm
Ru
N
2+

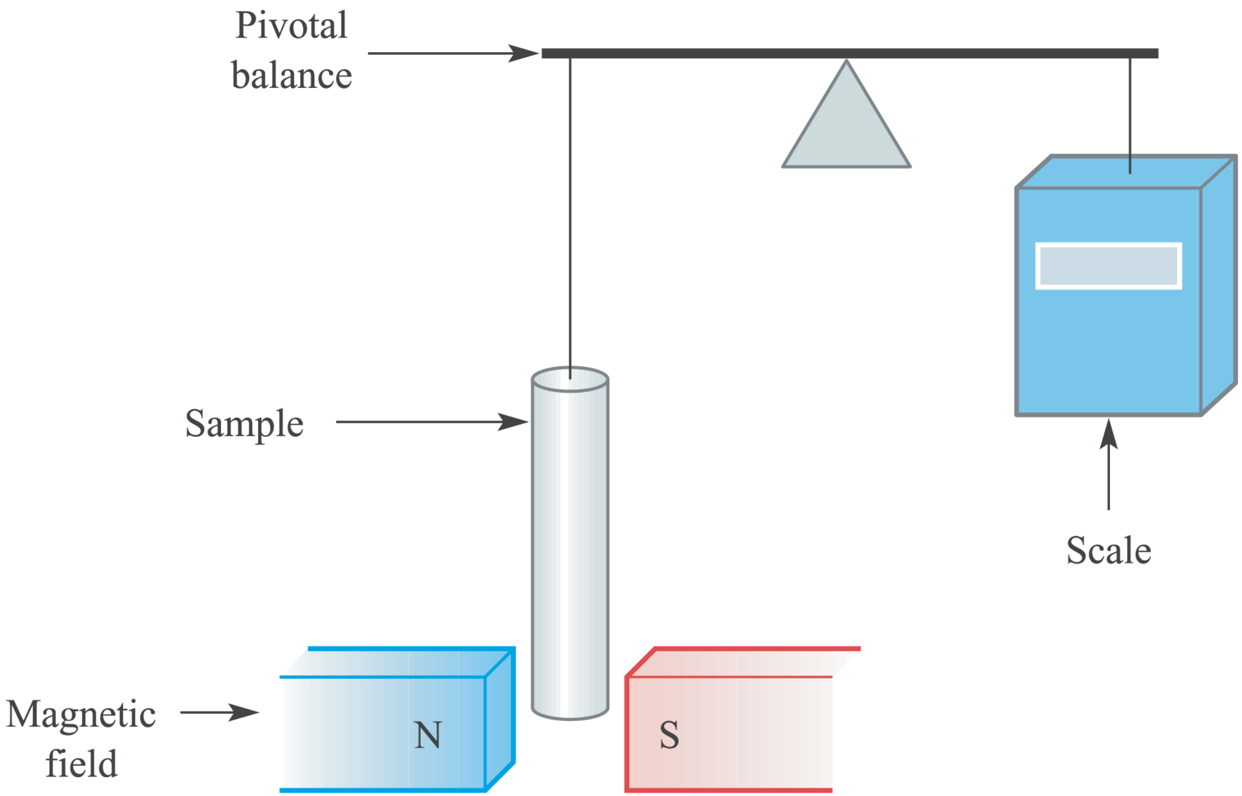


σ_M^*
π_L^*
empty orbitals
MLCT
MC
LC
π_M
filled
orbi
π_L
σ_L
LC
9.0
LC
$\varepsilon/(10^4$ M cm)
5.4
MLCT
1.8
MC
MLCT
0.0
220
270
320
370
420
470
520
λ/nm

Diagrammi semplificati degli MO di frontiera e degli stati di $[Ru(bpy)_3]^{2+}$



Schema di una bilancia di Gouy



Approssimazione *spin-only*

$\mu = 2\sqrt{S(S+1)}$ $\qquad$ $S = n/2$ $\qquad$ $\mu = \sqrt{n(n+2)}$

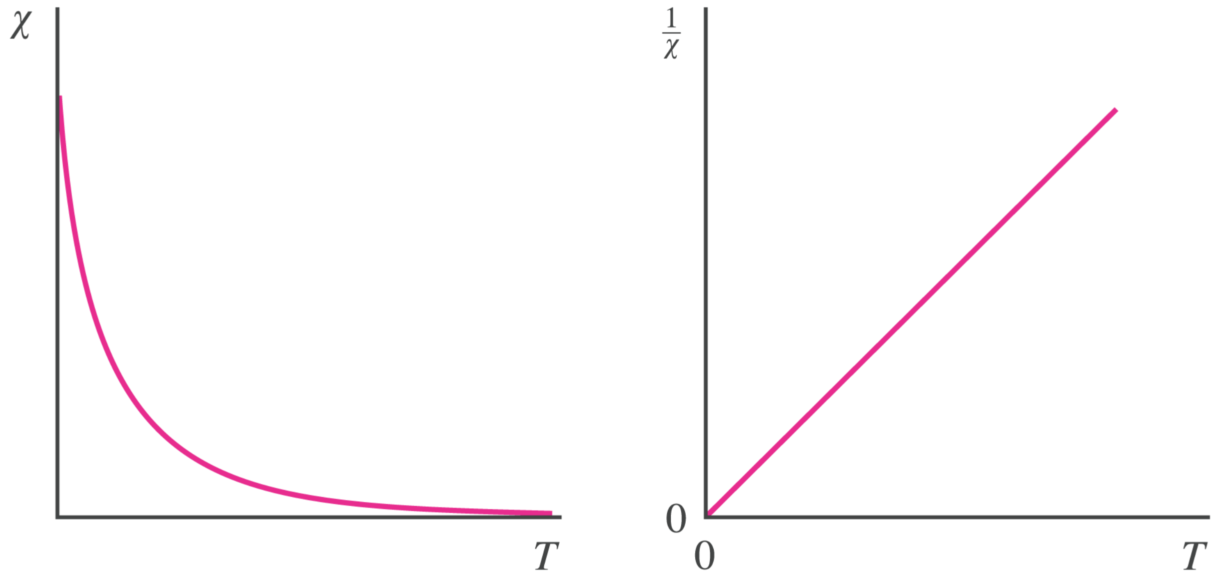
1 BM (o μ_B) = 9.274×10^{-24} J T^{-1}

Metal ion	d^n configuration	S	μ_{eff}(spin-only) / μ_B	Observed values of μ_{eff} / μ_B
Sc^{3+}, Ti^{4+}	d^0	0	0	0
Ti^{3+}	d^1	$\frac{1}{2}$	1.73	1.7–1.8
V^{3+}	d^2	1	2.83	2.8–3.1
V^{2+}, Cr^{3+}	d^3	$\frac{3}{2}$	3.87	3.7–3.9
Cr^{2+}, Mn^{3+}	d^4	2	4.90	4.8–4.9
Mn^{2+}, Fe^{3+}	d^5	$\frac{5}{2}$	5.92	5.7–6.0
Fe^{2+}, Co^{3+}	d^6	2	4.90	5.0–5.6
Co^{2+}	d^7	$\frac{3}{2}$	3.87	4.3–5.2
Ni^{2+}	d^8	1	2.83	2.9–3.9
Cu^{2+}	d^9	$\frac{1}{2}$	1.73	1.9–2.1
Zn^{2+}	d^{10}	0	0	0

$$\mu_{eff} = 2.83\sqrt{\chi_m T}$$

χ_m = suscettività magnetica molare

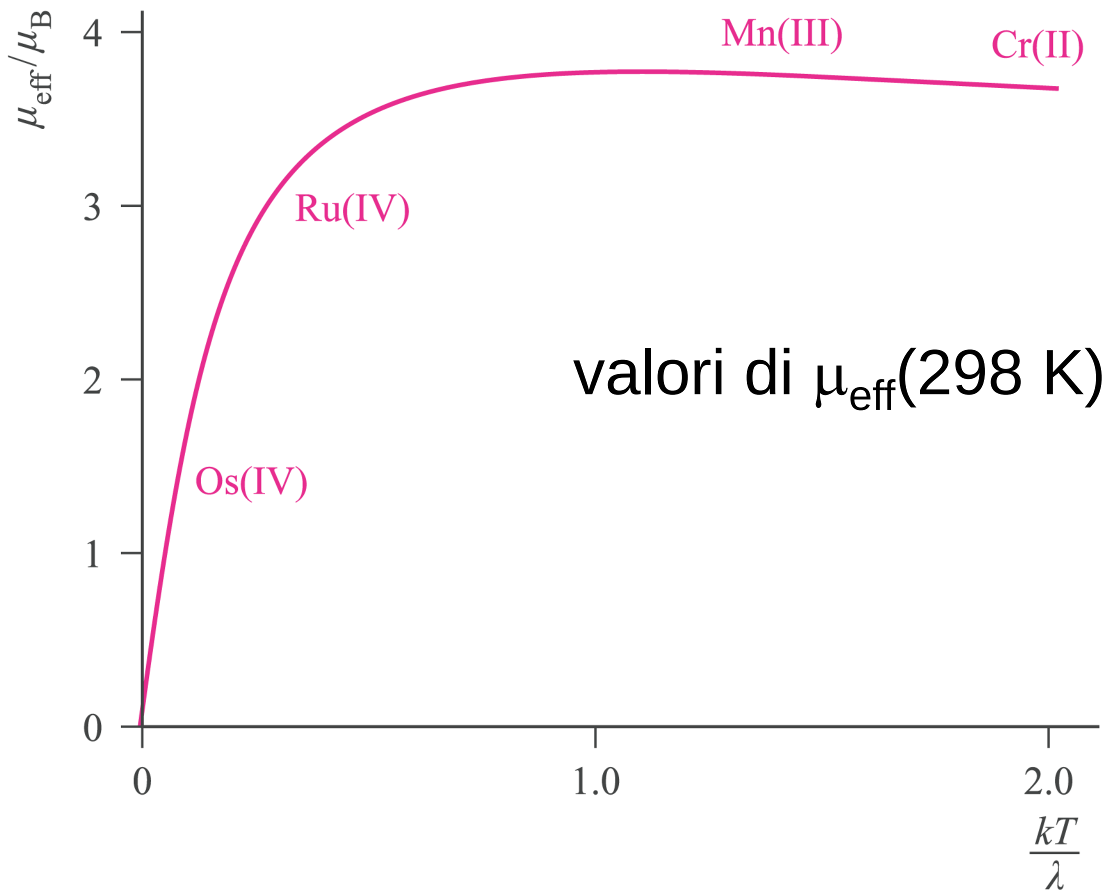
Materiale paramagnetico



χ = C/T

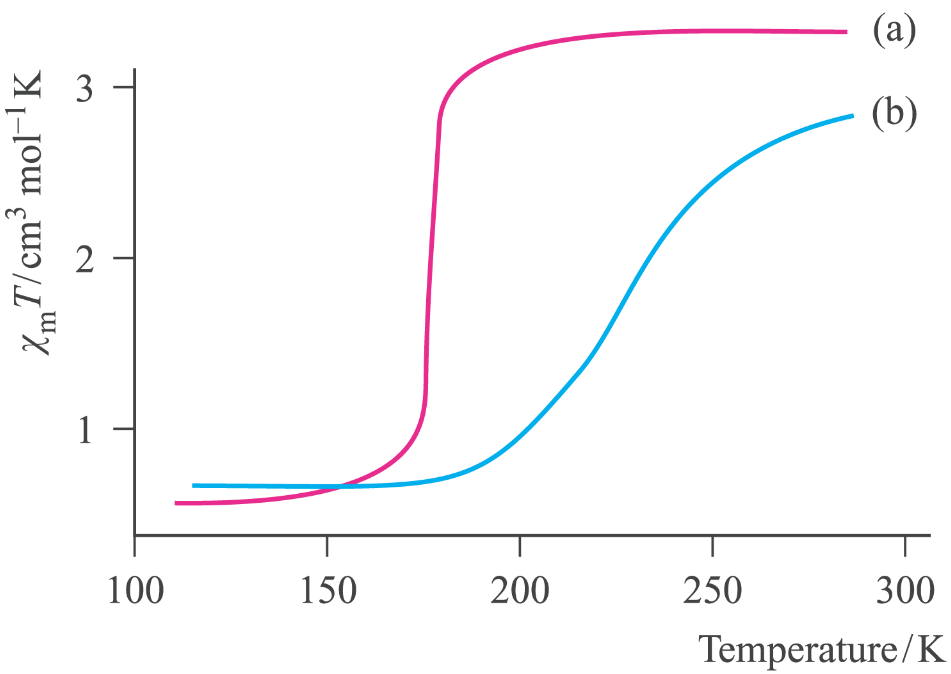
Legge di Curie

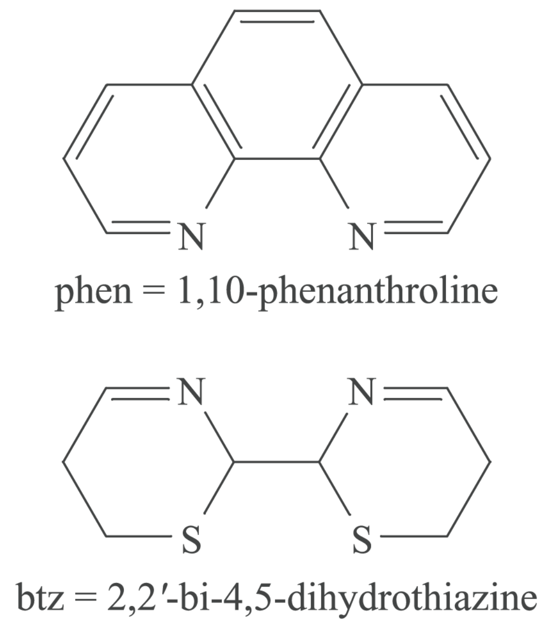
Diagramma di Kotani per la configurazione t_{2g}^4



λ = costante di accoppiamento spin-orbita

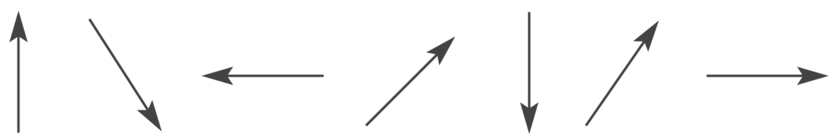
Spin crossover in complessi di Fe(II)



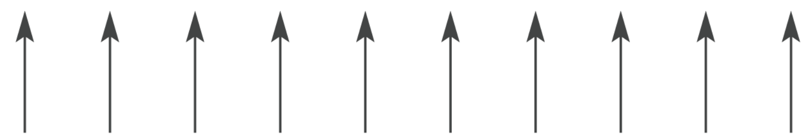


$[Fe(phen)_2(NCS\text{-}\kappa N)_2]$ $[Fe(btz)_2(NCS\text{-}\kappa N)_2]$

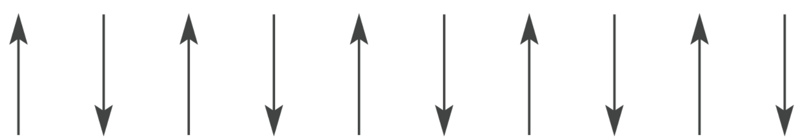
paramagnetismo



ferromagnetismo



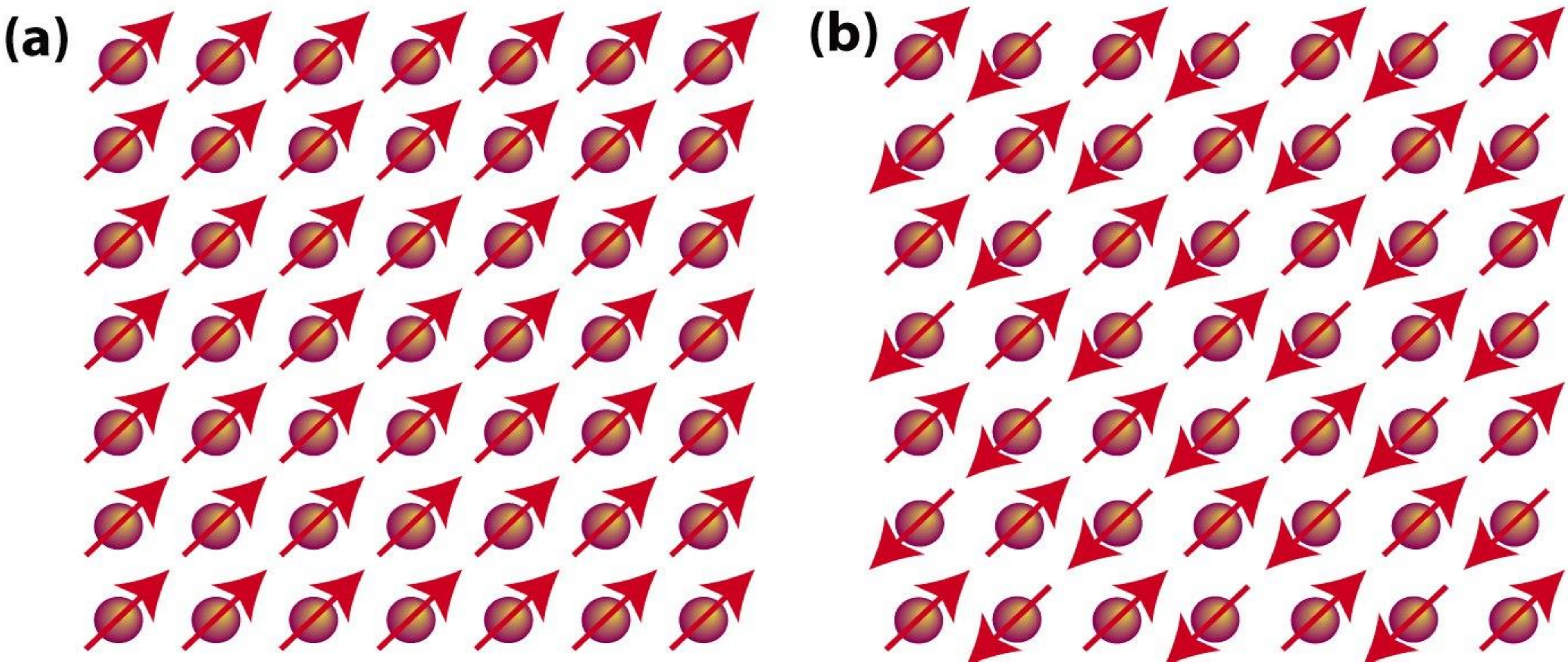
antiferromagnetismo



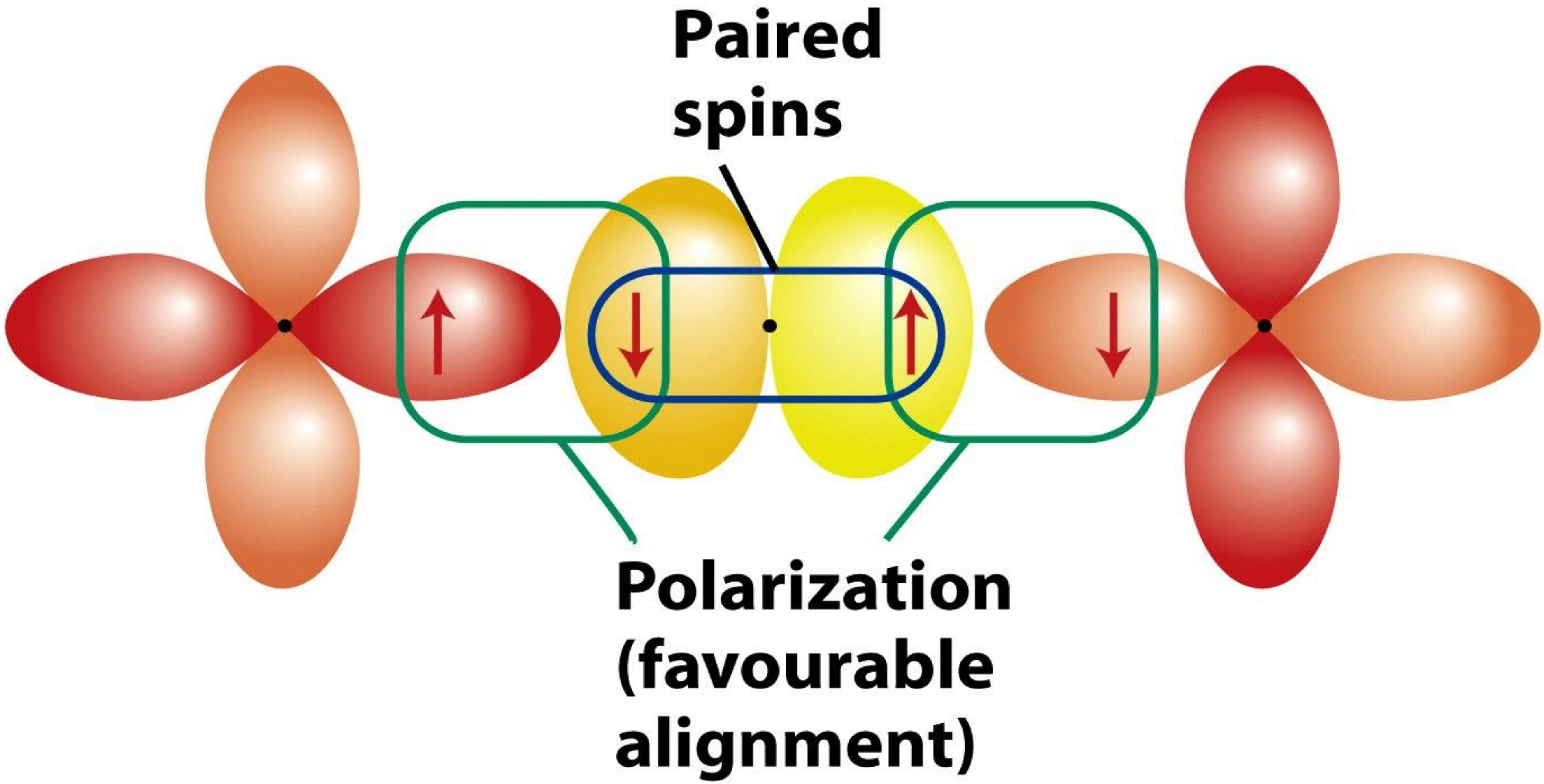
Domìni

ferromagnetismo

antiferromagnetismo

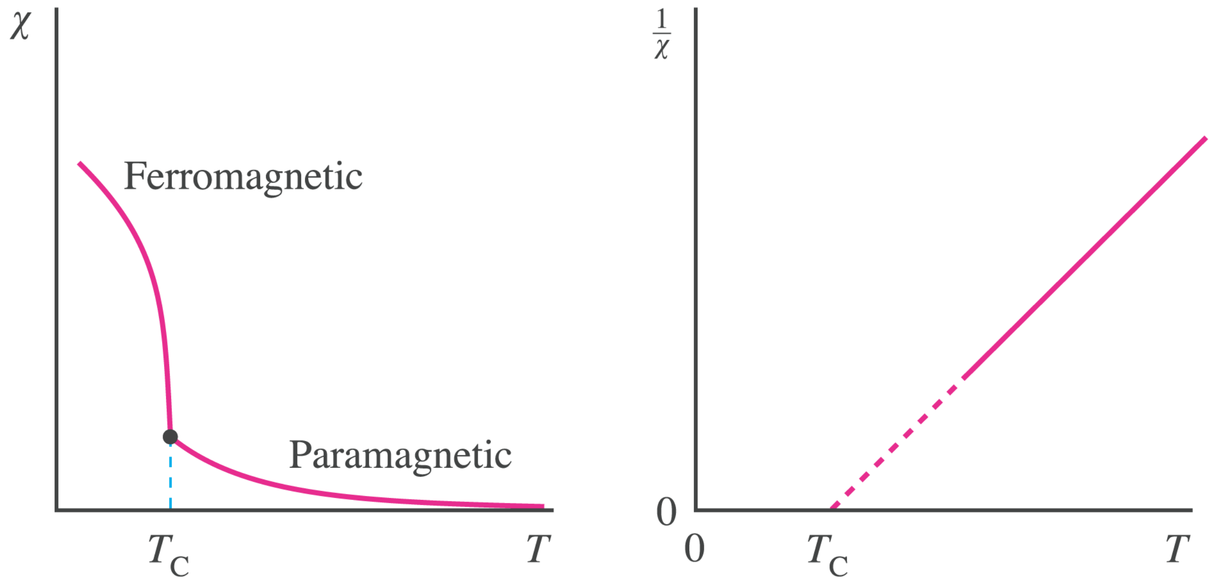


Accoppiamento antiferromagnetico fra due centri metallici mediato dalla polarizzazione di spin di un legante a ponte



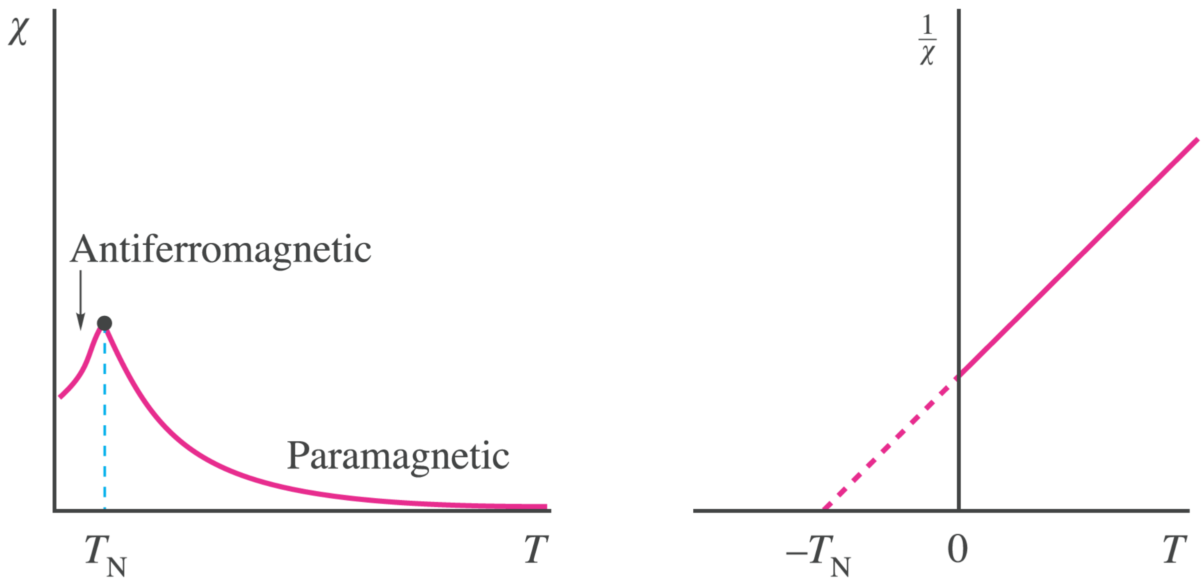
Meccanismo di superscambio

Materiali ferromagnetici

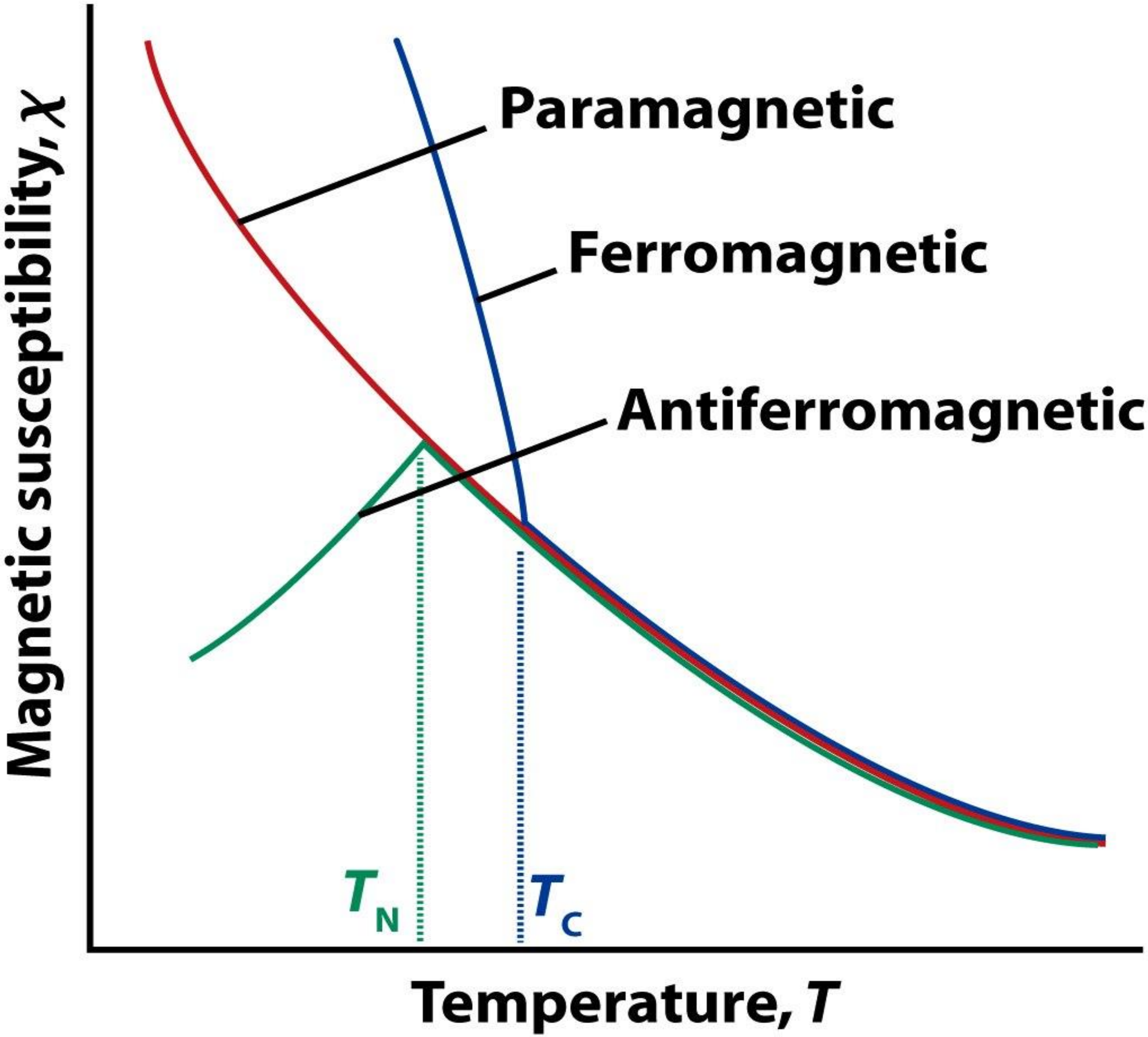


Temperatura di Curie, T_C

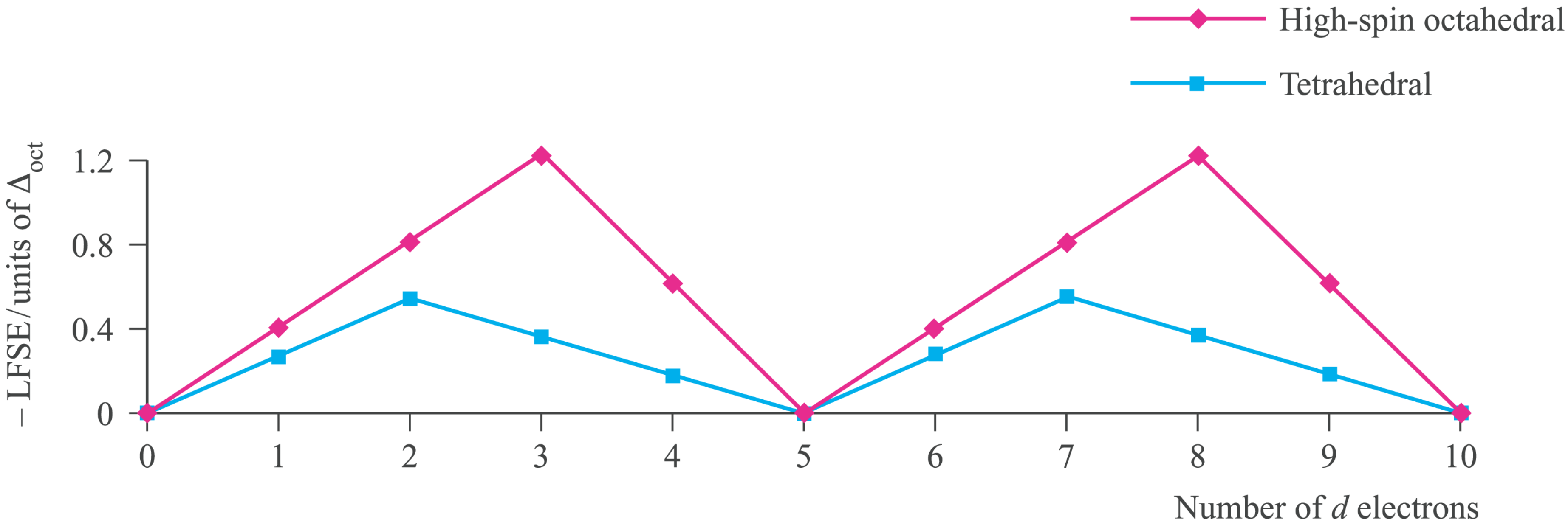
Materiali anti-ferromagnetici



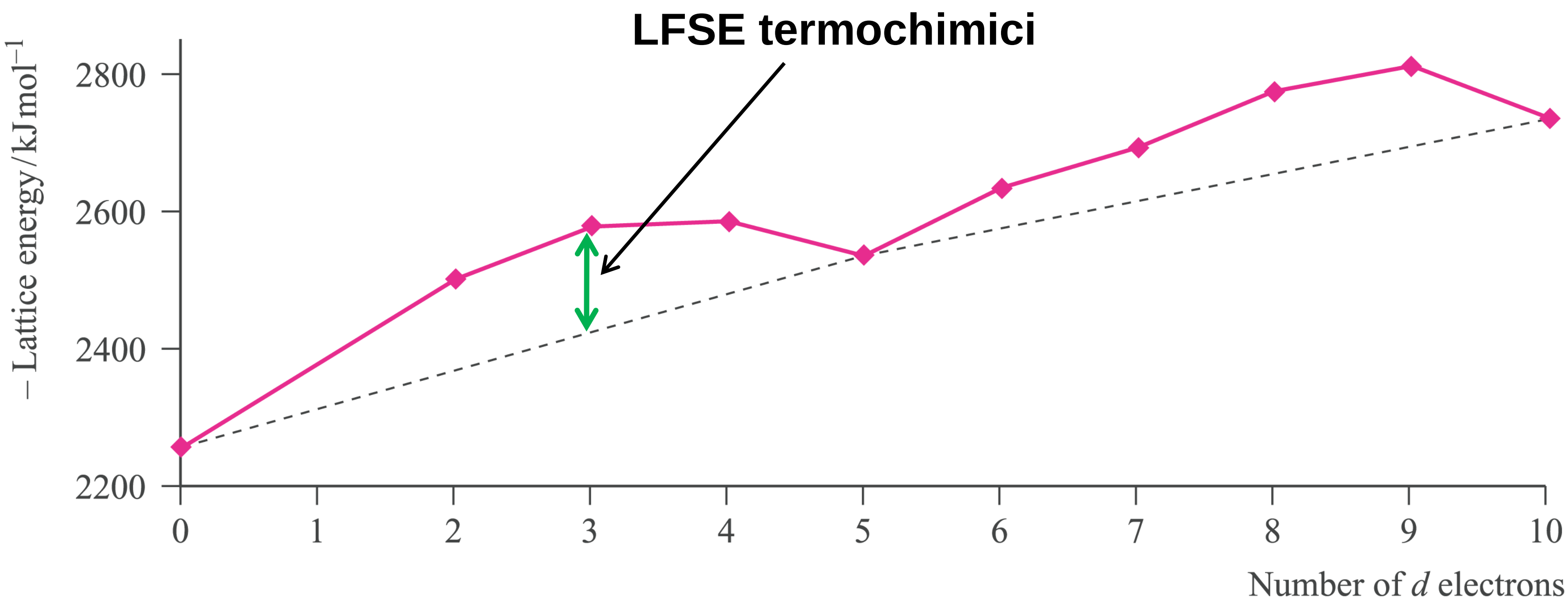
Temperatura di Néel, T_N


Paramagnetic
Ferromagnetic
Antiferromagnetic
Magnetic susceptibility, χ
Temperature, T
T_N
T_C

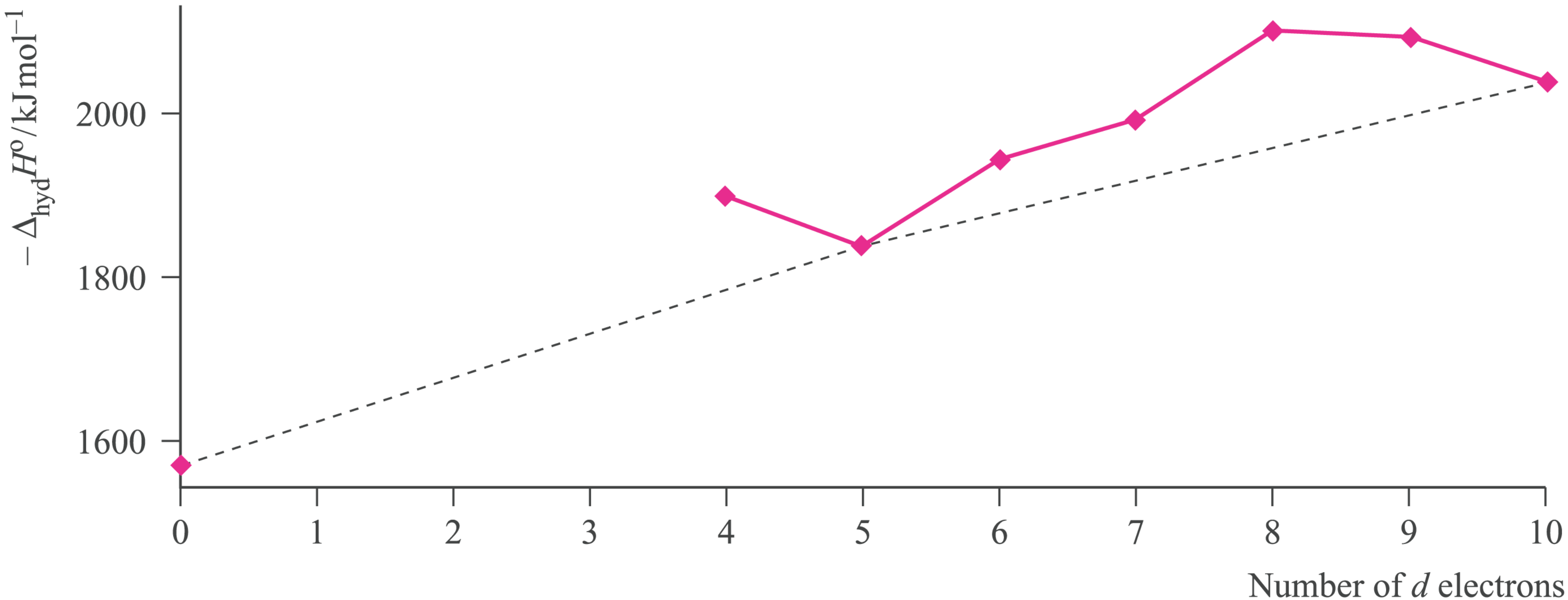
LFSE in funzione di Δ_O



Energie reticolari per MCl_2



Entalpie di idratazione per ioni M^{2+}



Costanti di stabilità per complessi ottaedrici alto spin

	d^5	d^6	d^7	d^8	d^9	d^{10}
Metal ion	Mn^{2+}	Fe^{2+}	Co^{2+}	Ni^{2+}	Cu^{2+}	Zn^{2+}
$\log \beta_3$ for $[M(en)_3]^{2+}$	5.7	9.5	13.8	18.6	18.7	12.1
$\log \beta$ for $[M(EDTA)]^{2-}$	13.8	14.3	16.3	18.6	18.7	16.1

Serie di Irving – Williams

$Mn^{2+} < Fe^{2+} < Co^{2+} < Ni^{2+} < Cu^{2+} > Zn^{2+}$

Raggi ionici: $Mn^{2+} > Fe^{2+} > Co^{2+} > Ni^{2+} < Cu^{2+} < Zn^{2+}$

Costanti di stabilità progressive per la sostituzione di H_2O con NH_3