

Luminescenza

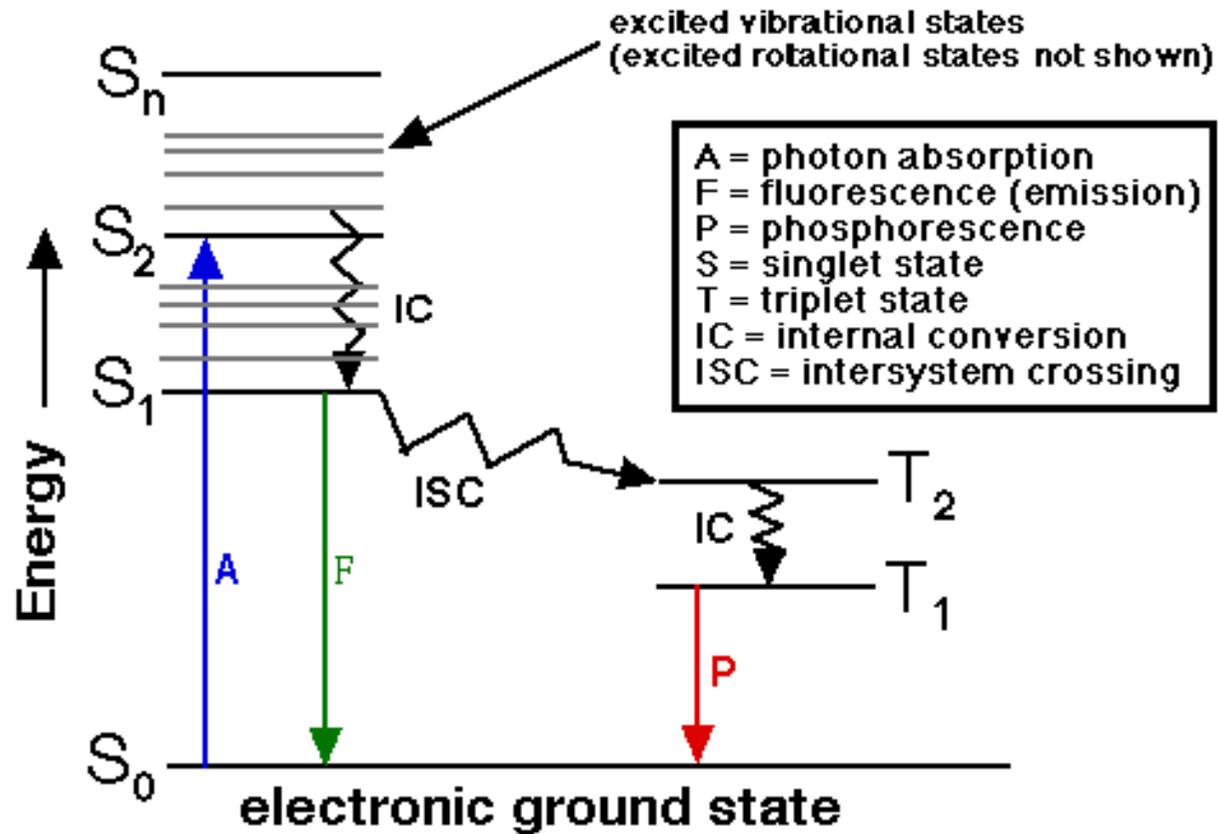
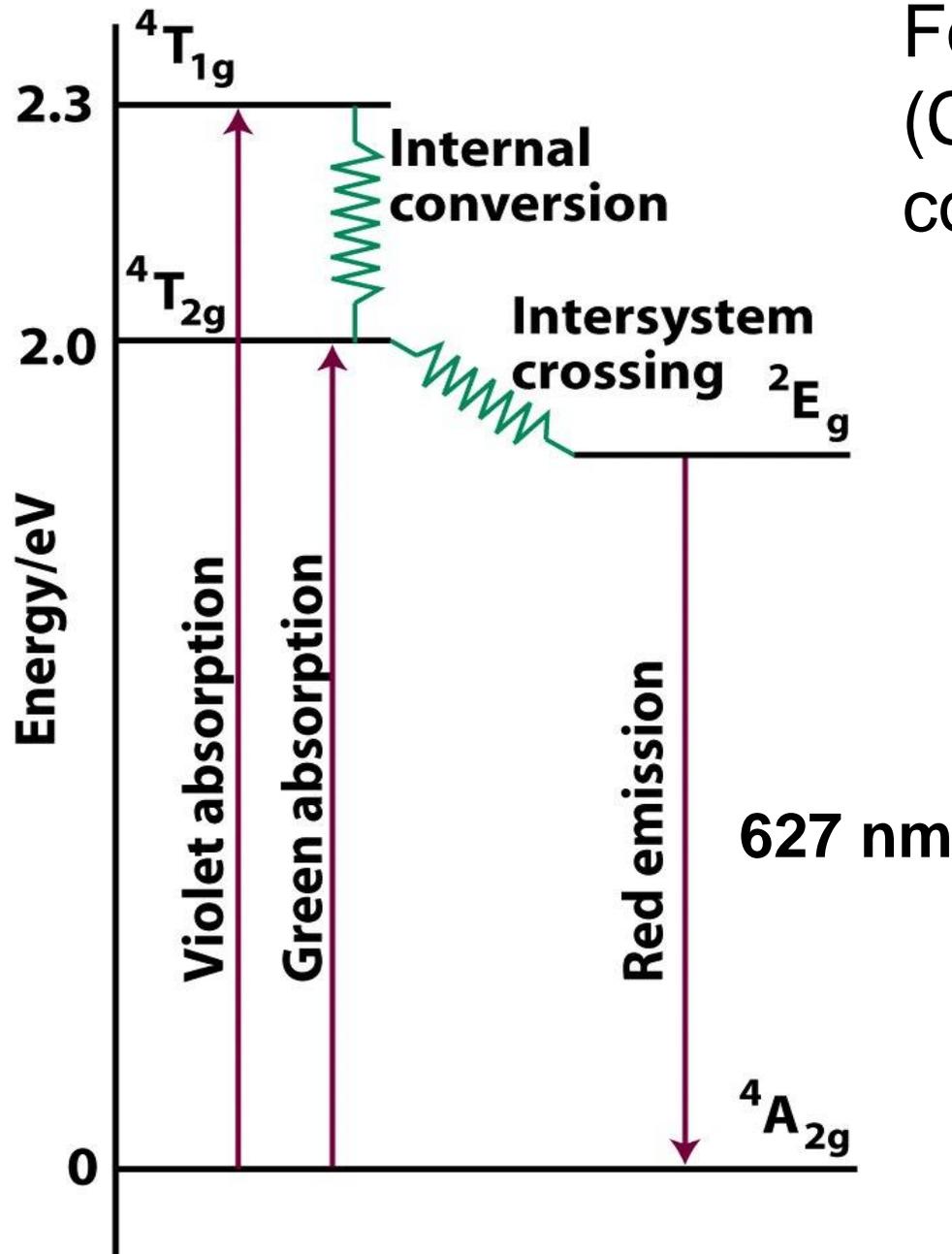
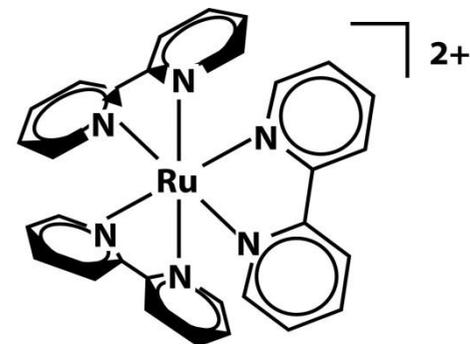
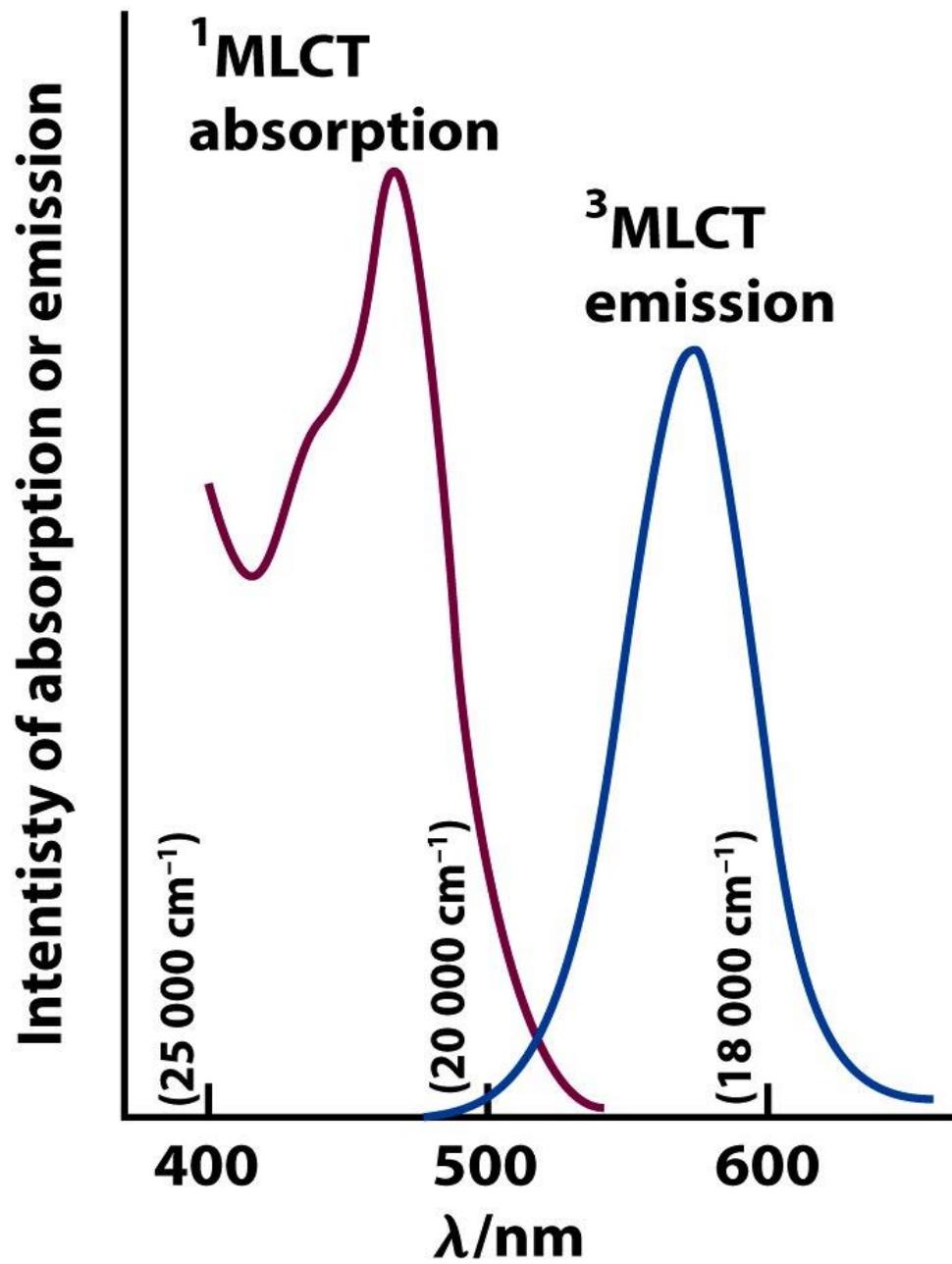
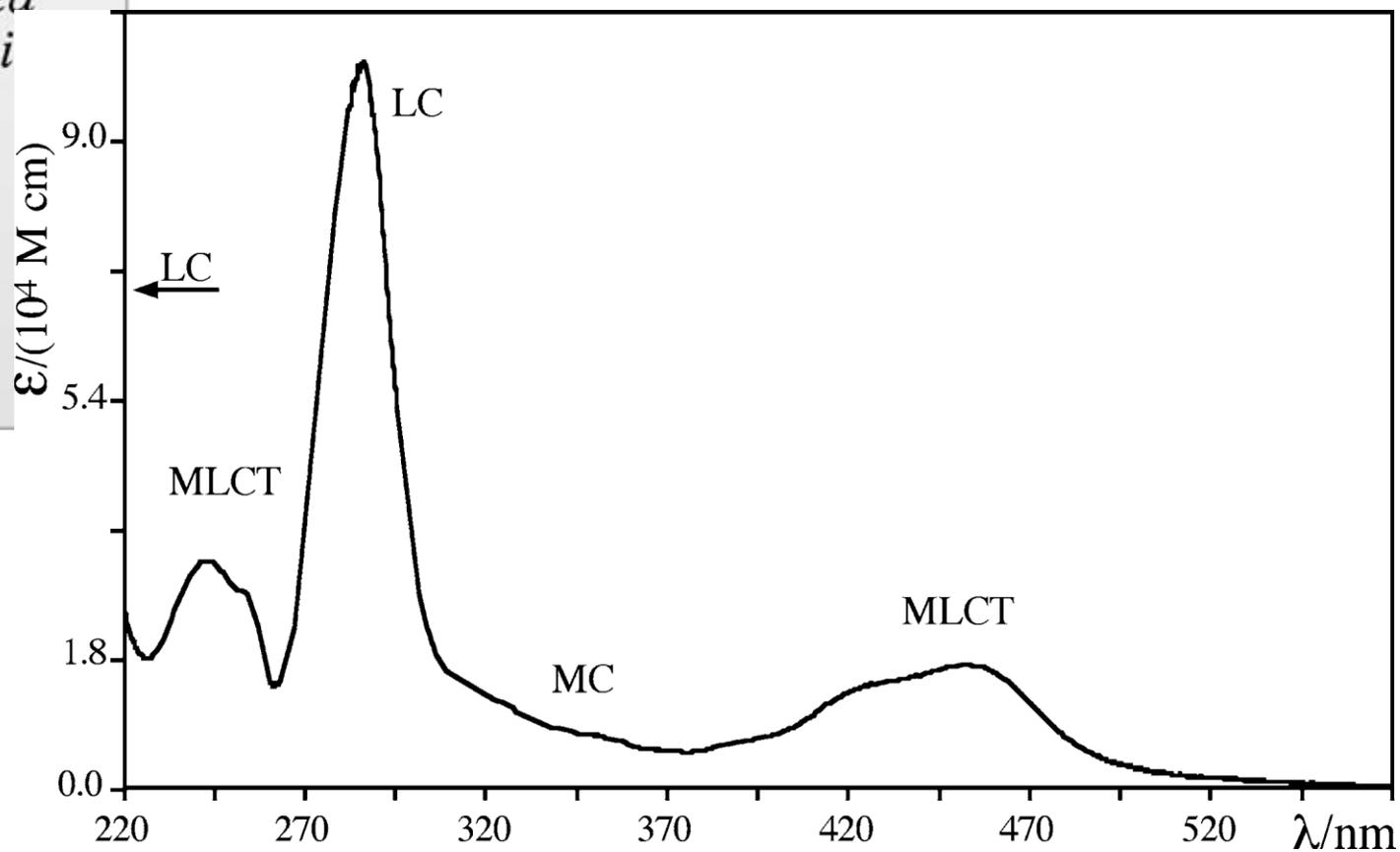
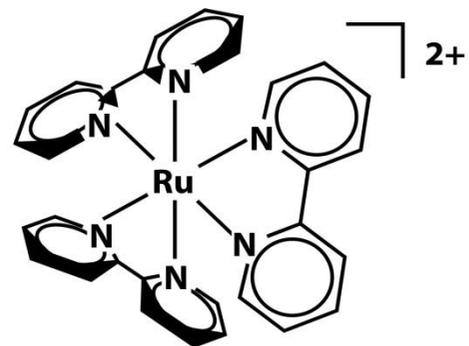
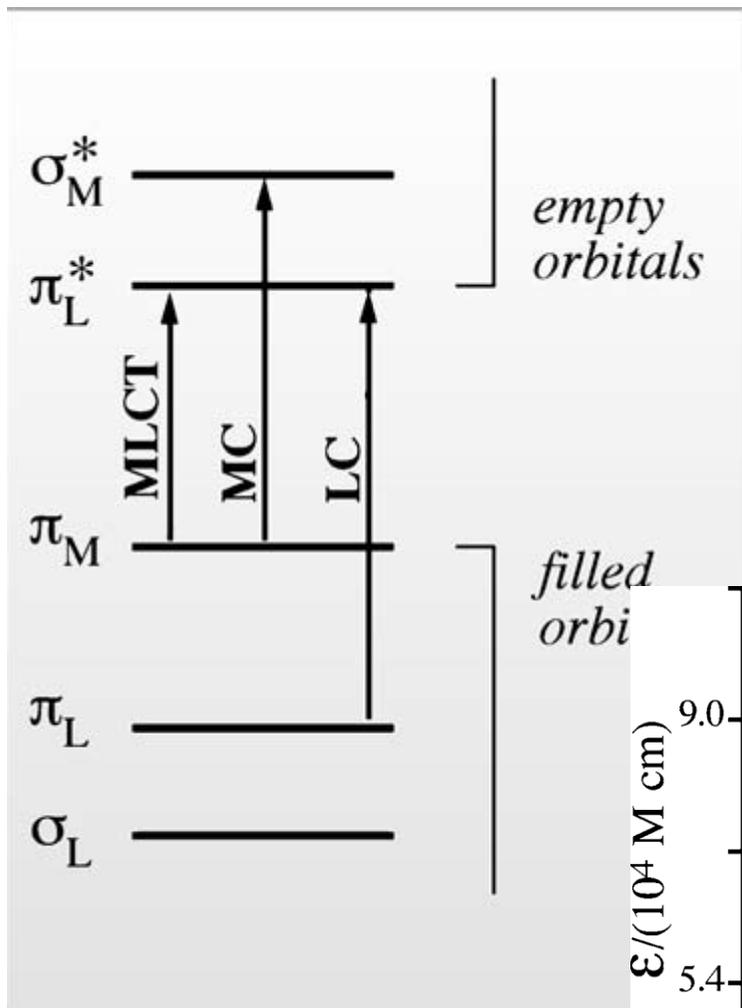


Diagramma di Jablonski

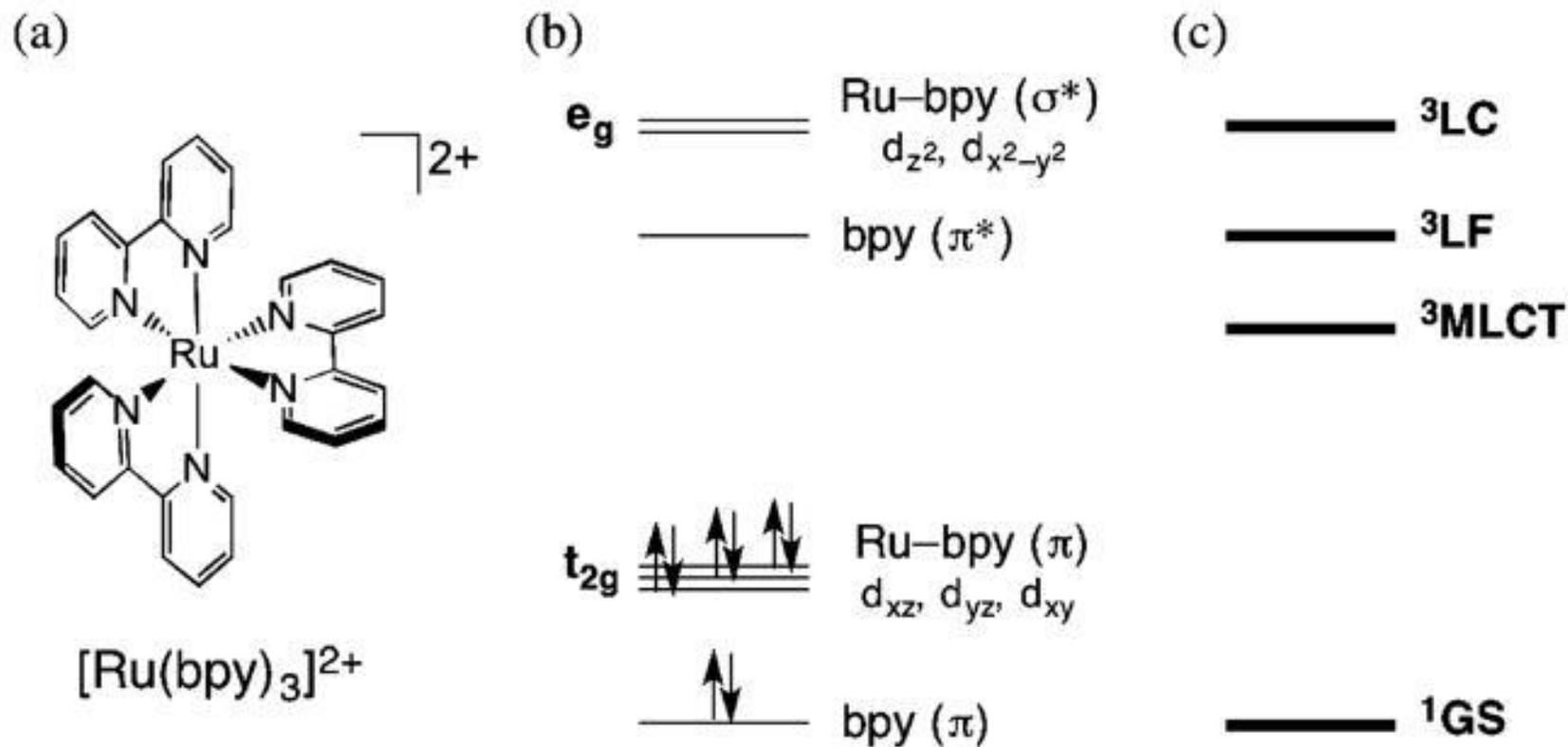
Fosforescenza del rubino
(Corindone, Al_2O_3 , drogato
con $\text{Cr}^{3+}(\text{d}^3)$)



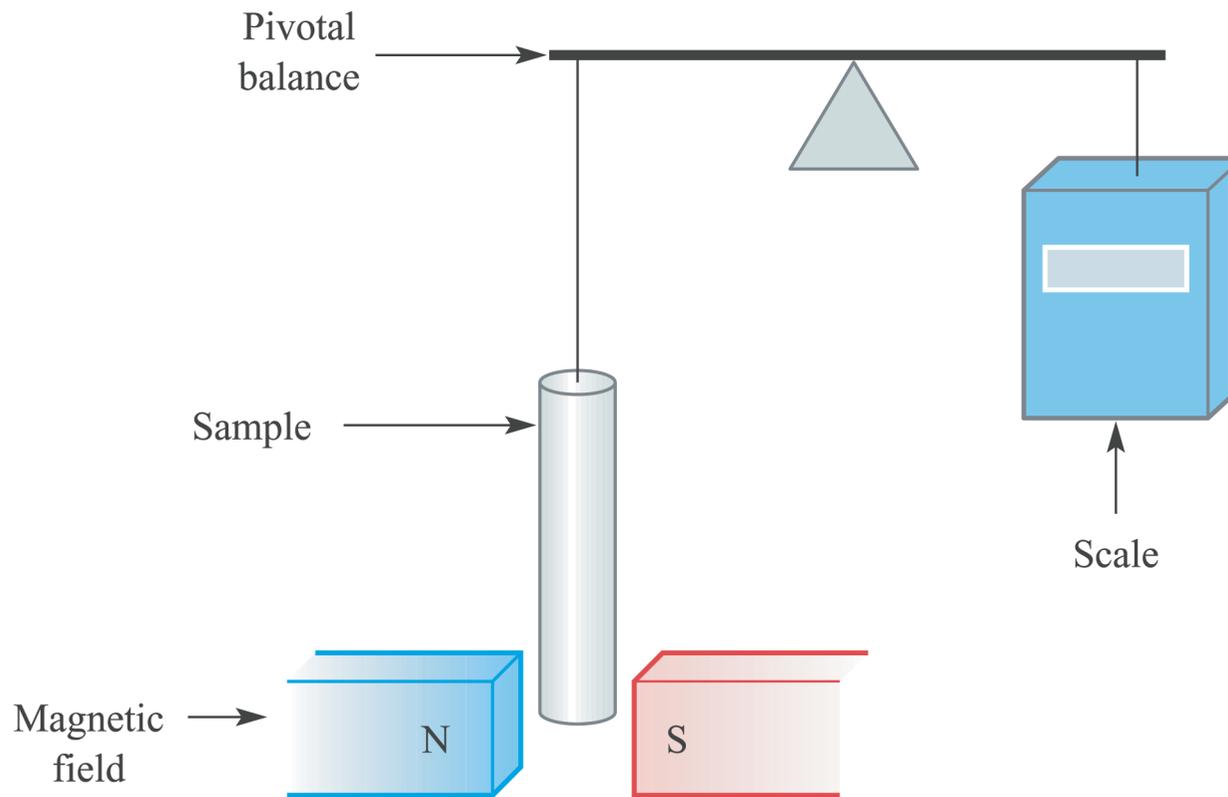




Diagrammi semplificati degli MO di frontiera e degli stati di $[\text{Ru}(\text{bpy})_3]^{2+}$



Schema di una bilancia di Gouy



La distinzione fra complessi ad alto o basso spin è basata, sperimentalmente, sulla determinazione delle loro proprietà magnetiche

Approssimazione *spin-only*

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

$$\mu = \sqrt{n(n+2)}$$

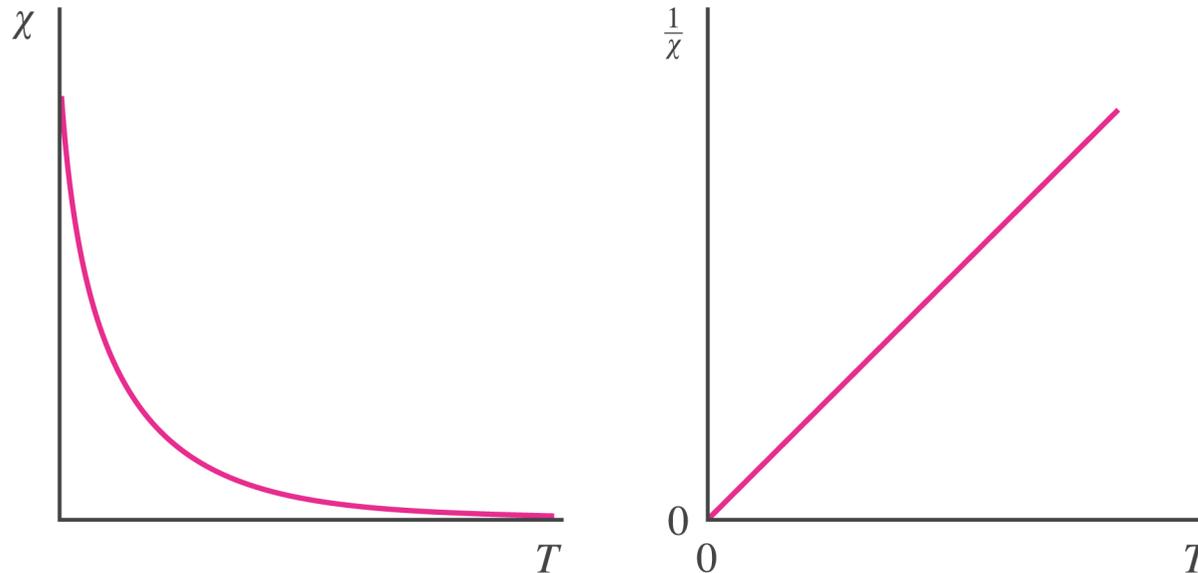
$$1 \text{ BM (o } \mu_B) = 9.274 \times 10^{-24} \text{ J T}^{-1}$$

Metal ion	d^n configuration	S	$\mu_{\text{eff}}(\text{spin-only}) / \mu_B$	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

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

χ_m = suscettività magnetica molare

Materiale paramagnetico

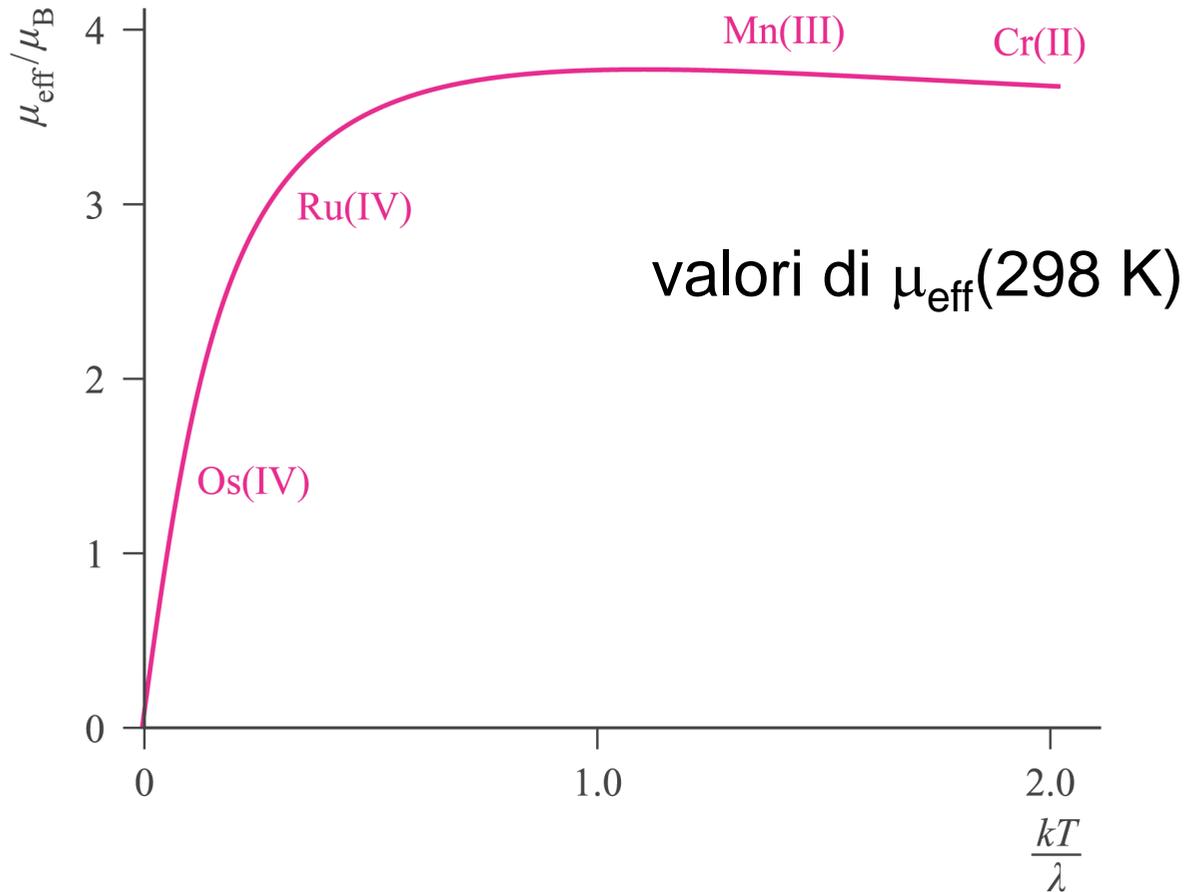


$$\chi = C/T$$

Legge di Curie

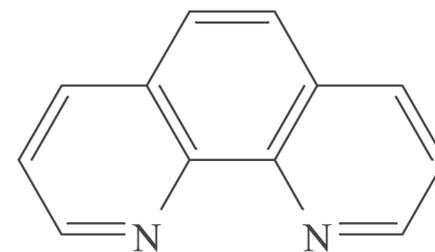
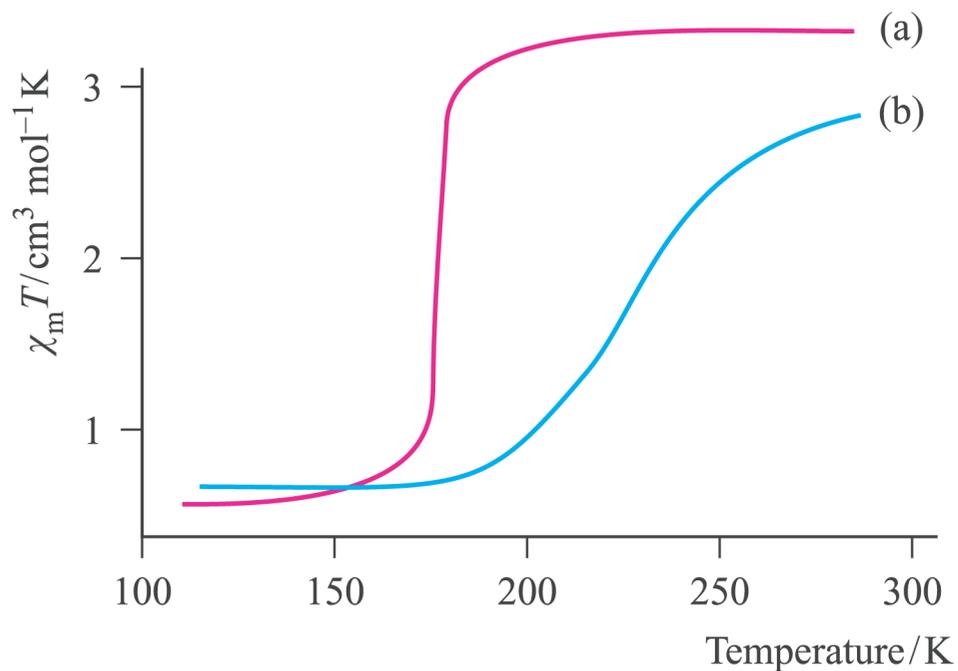
Se il materiale rispetta la legge di Curie, μ_{eff}
non dipende dalla temperatura

Diagramma di Kotani: dipendenza di μ_{eff} dalla temperatura, caso della configurazione d^4

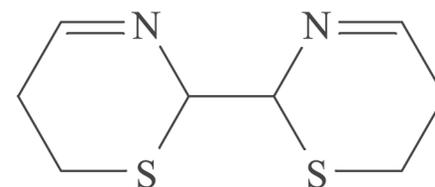


λ = costante di accoppiamento spin-orbita

Spin crossover in complexes of Fe(II)



phen = 1,10-phenanthroline



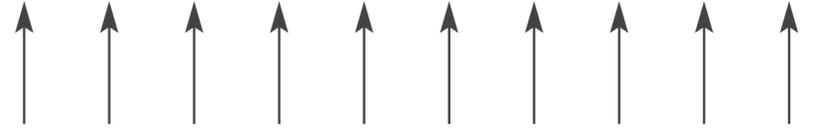
btz = 2,2'-bi-4,5-dihydrothiazine



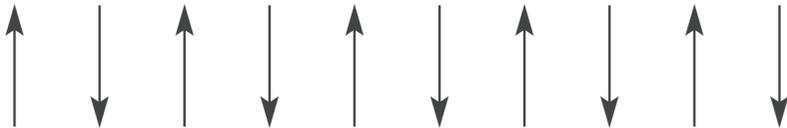
paramagnetismo



ferromagnetismo



antiferromagnetismo



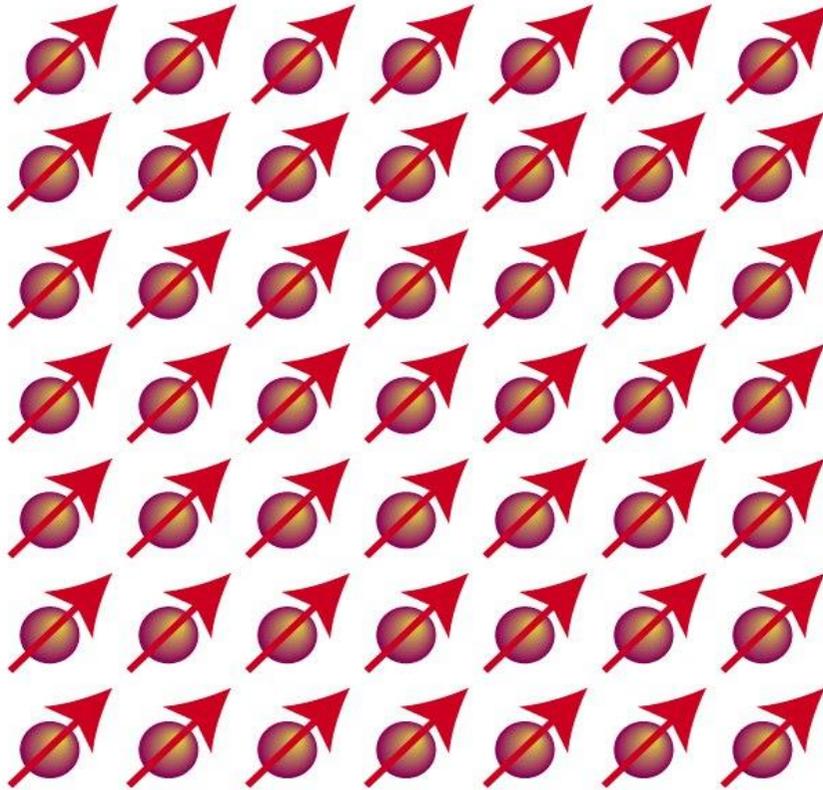
*quando i centri paramagnetici sono molto vicini gli uni agli altri o sono connessi tramite altre specie che possono trasmettere interazioni magnetiche (e.g. ossidi o alogenuri di metalli del blocco d) i momenti magnetici possono interagire fra loro (**accoppiarsi**)*

Domini

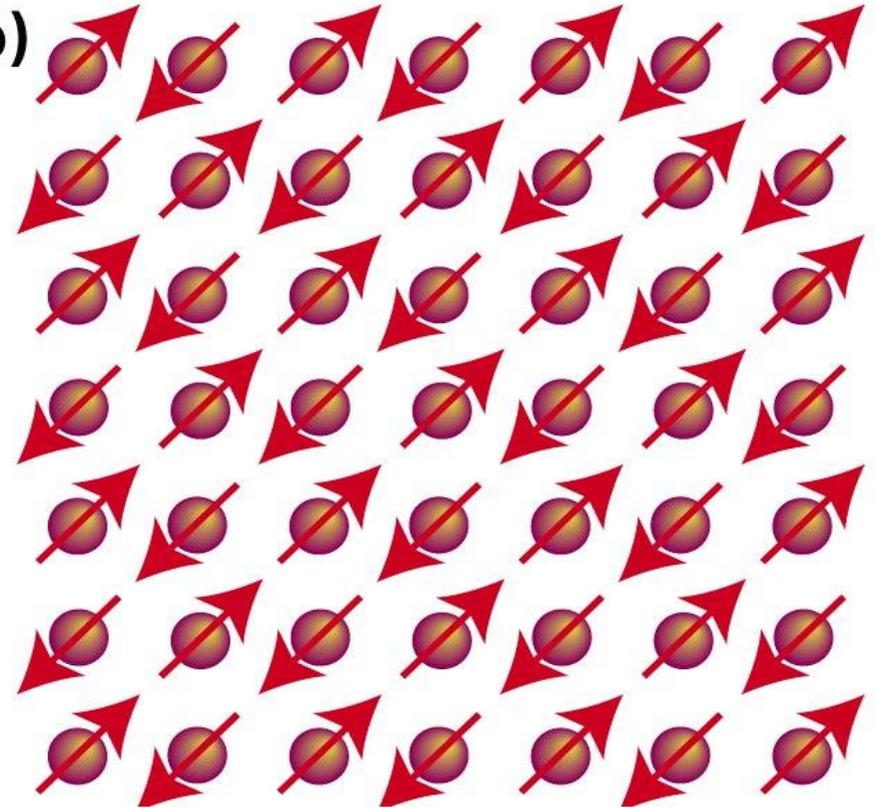
ferromagnetismo

antiferromagnetismo

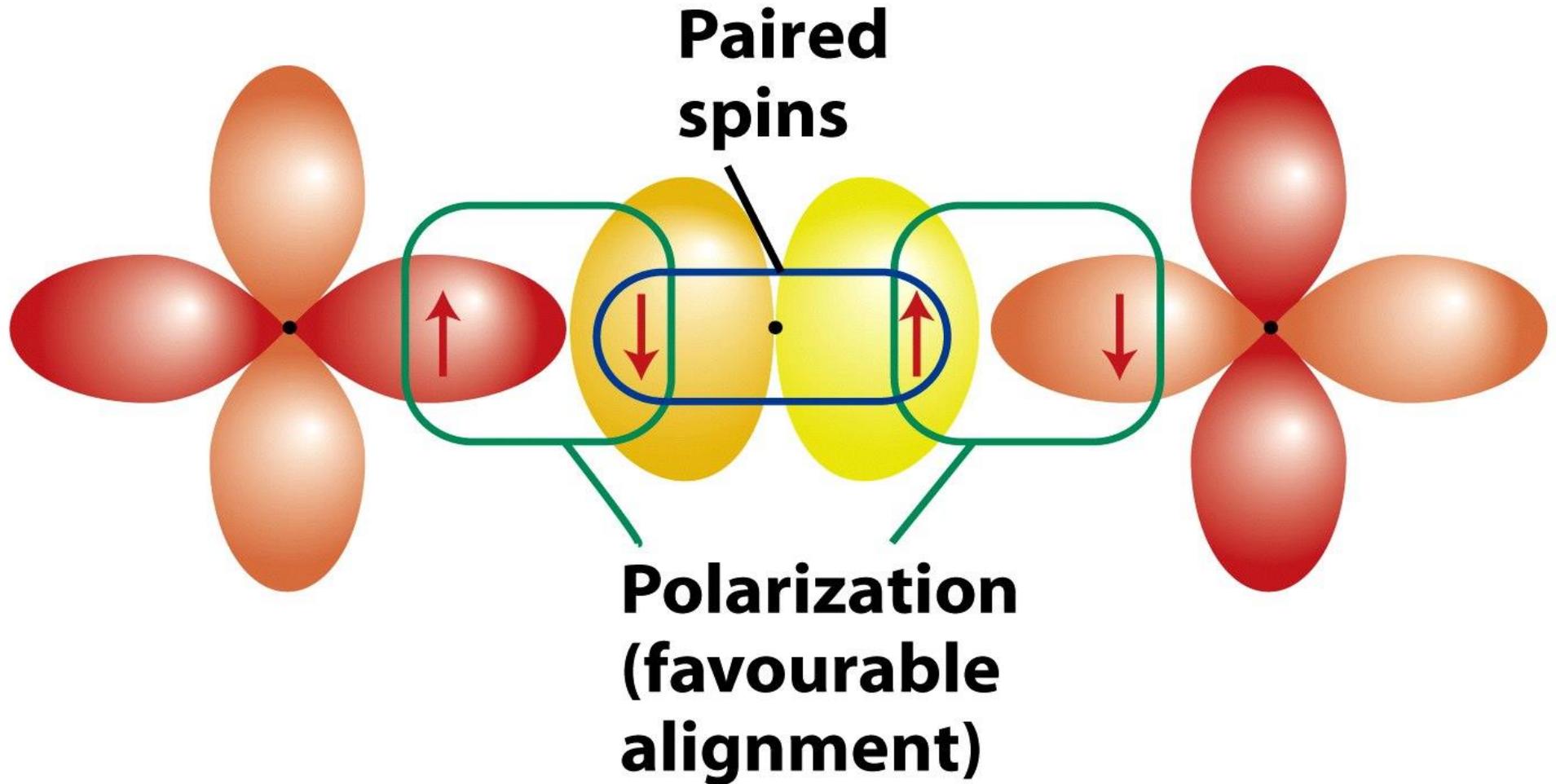
(a)



(b)

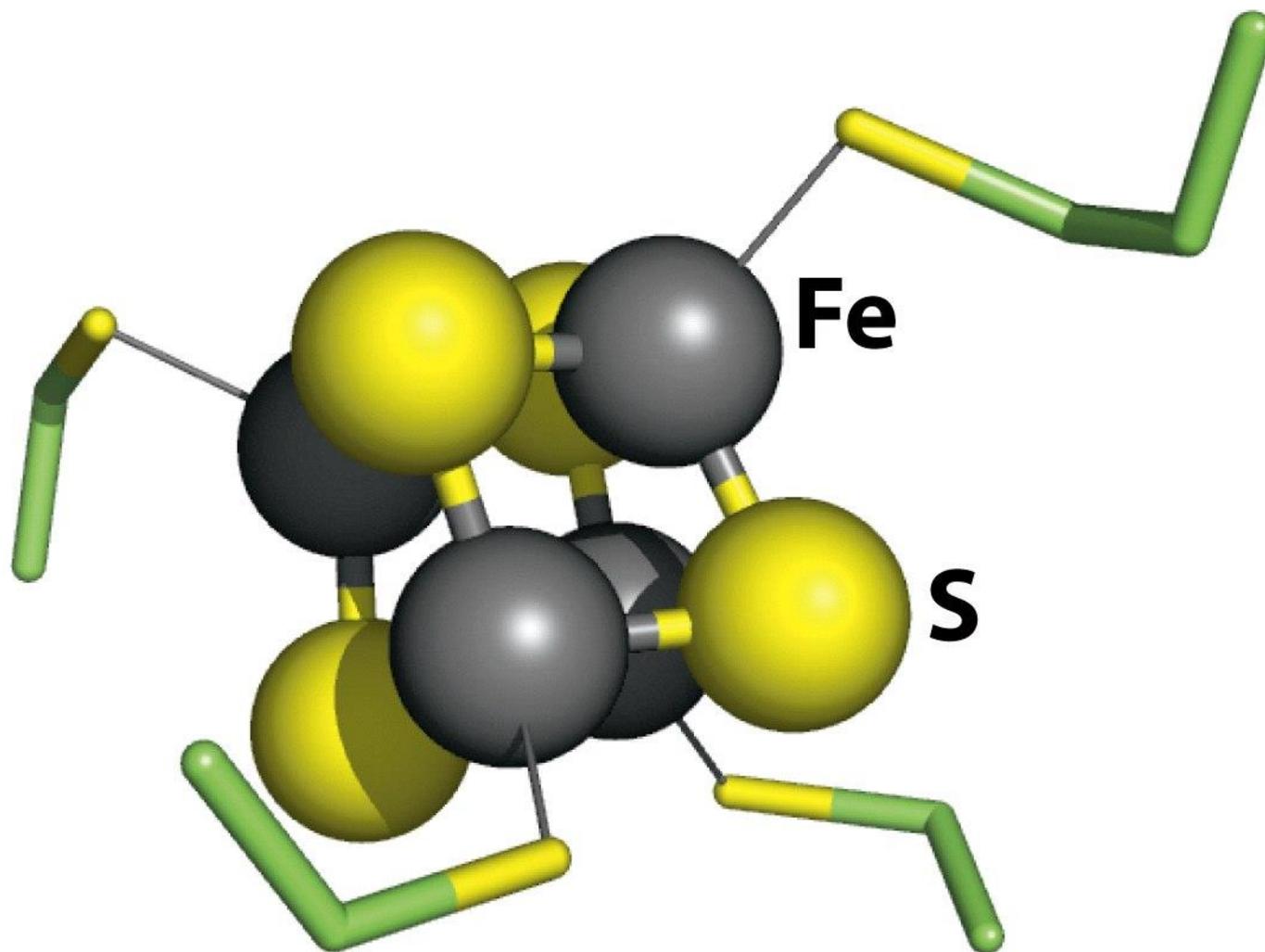


Accoppiamento antiferromagnetico fra due centri metallici mediato dalla polarizzazione di spin di un legante a ponte

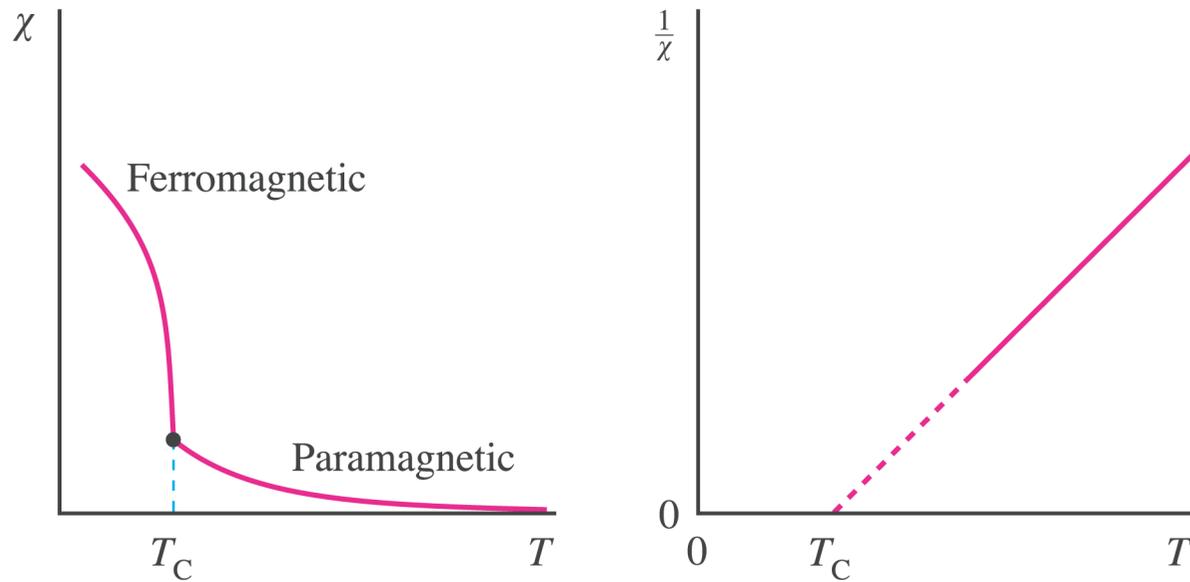


Meccanismo di superscambio

Cluster [4Fe – 4S]

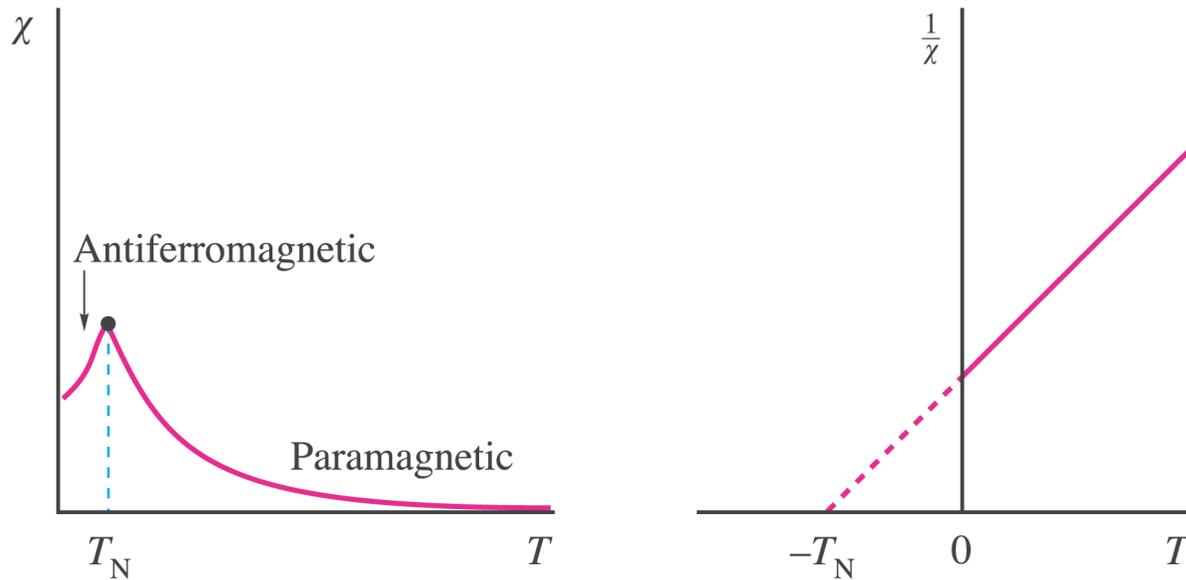


Materiali ferromagnetici



Temperatura di Curie, T_C

Materiali anti-ferromagnetici



Temperatura di Néel, T_N

