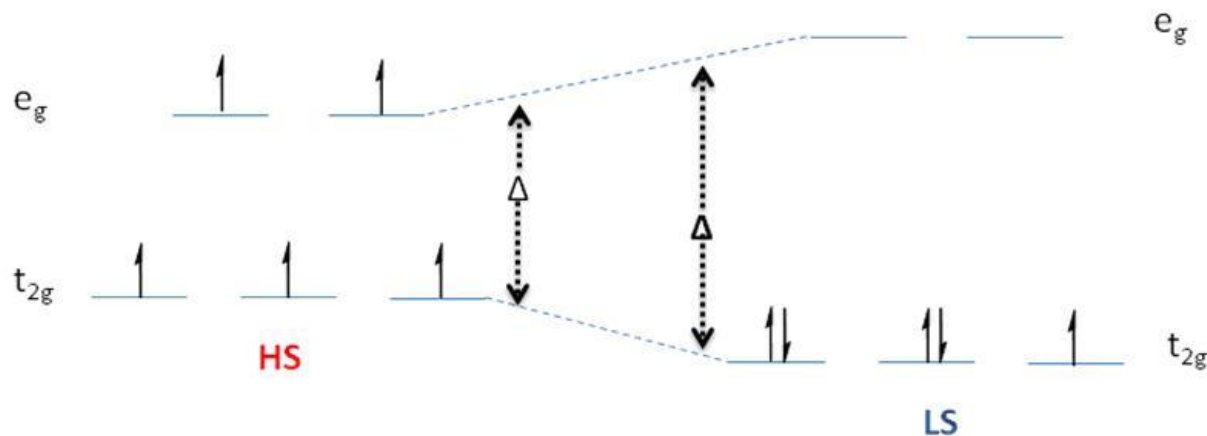

Two states in Spin crossover

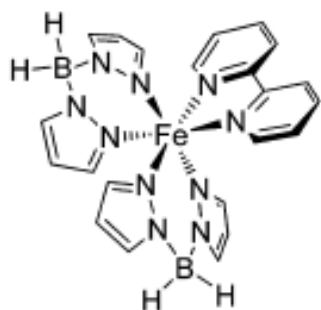
Xuanyuan Jiang
02-05-2016

Introduction to SCO

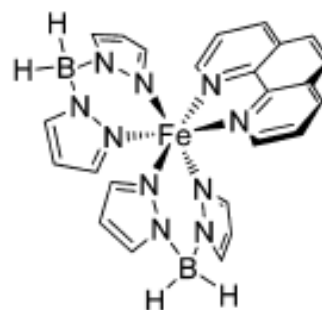
- **Spin Crossover (SCO)**, sometimes referred to as **spin transition** or **spin equilibrium** behavior, is a phenomenon that occurs in some metal complexes wherein the spin state of the complex changes due to external stimuli such as a variation of temperature, pressure, light irradiation or an influence of a magnetic field.



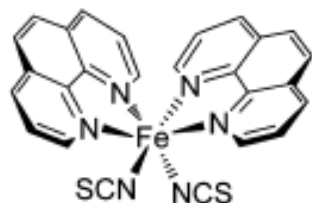
Spin crossover materials from Xin Zhang



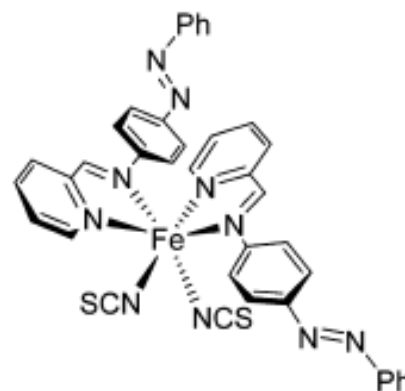
[Fe(H₂B(pz)₂)₂(bipy)]



[Fe(H₂B(pz)₂)₂(phen)]



[Fe(phen)₂(NCS)₂]

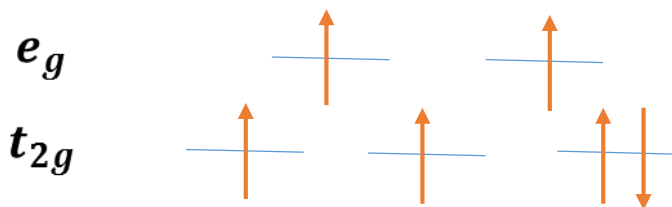


[Fe(PM-AzA)₂(NCS)₂]

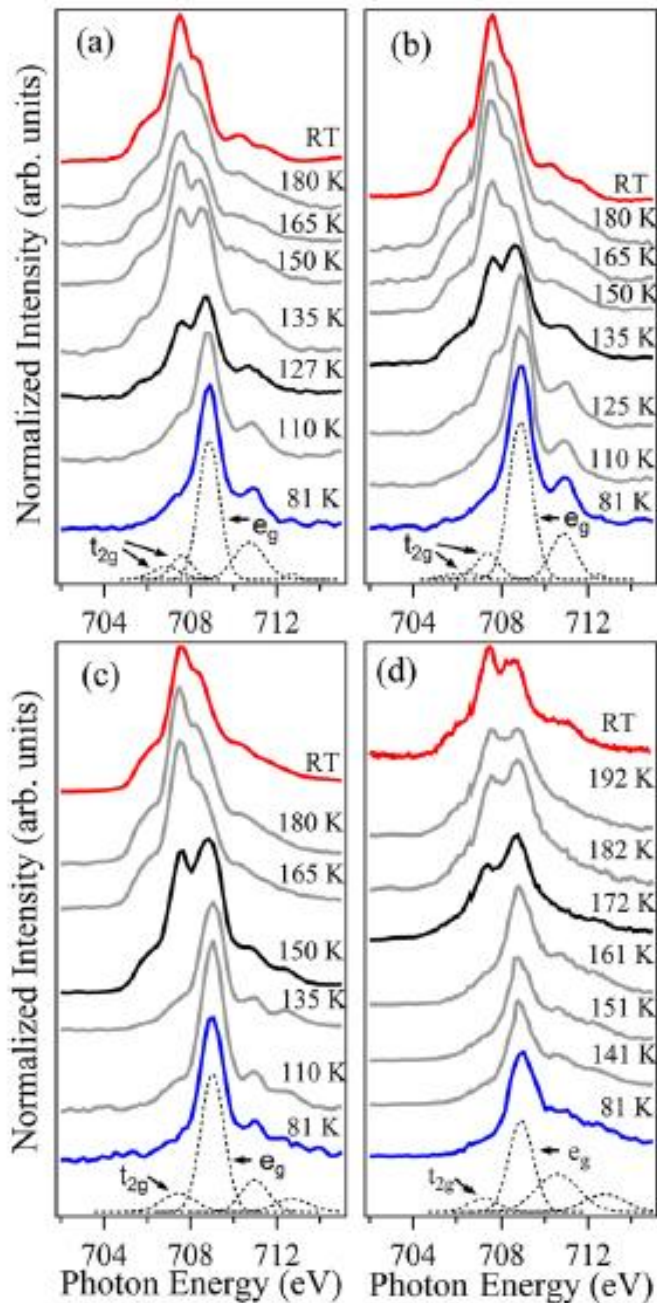
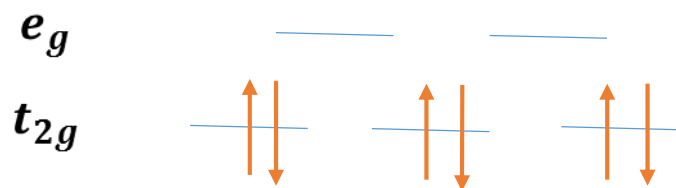
Figure 1. Schematics of Fe(II) spin crossover complexes [Fe(H₂B(pz)₂)₂(bipy)] (bipy = 2,2'-bipyridine), [Fe(H₂B(pz)₂)₂(phen)], [Fe(phen)₂(NCS)₂], and [Fe(PM-AzA)₂(NCS)₂] (PM-AzA = 4-phenyldiazanyl-N-(pyridin-2-ylmethylene)aniline). For clarity, some hydrogens are not shown.

XAS @ different temperature

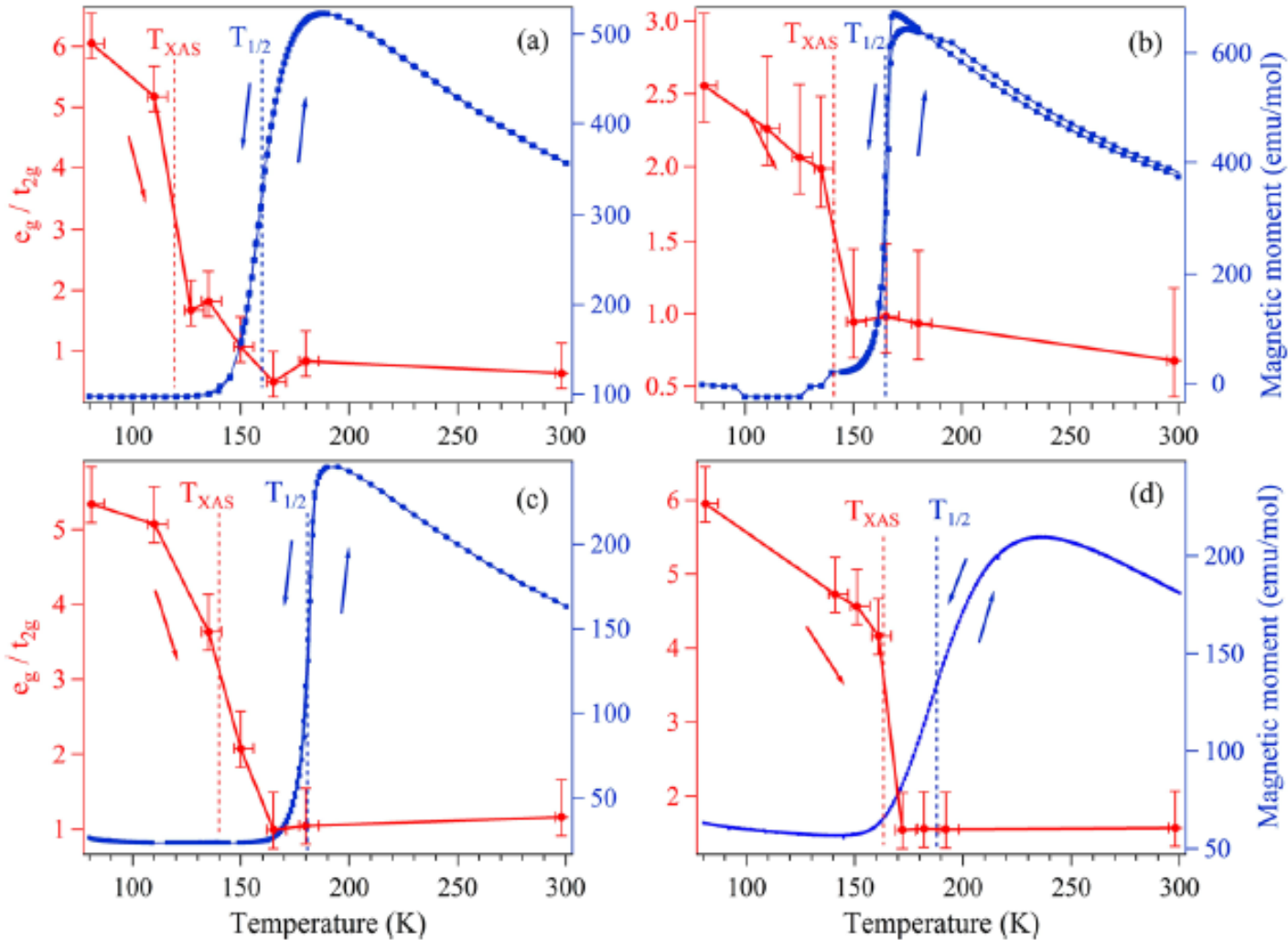
High spin:



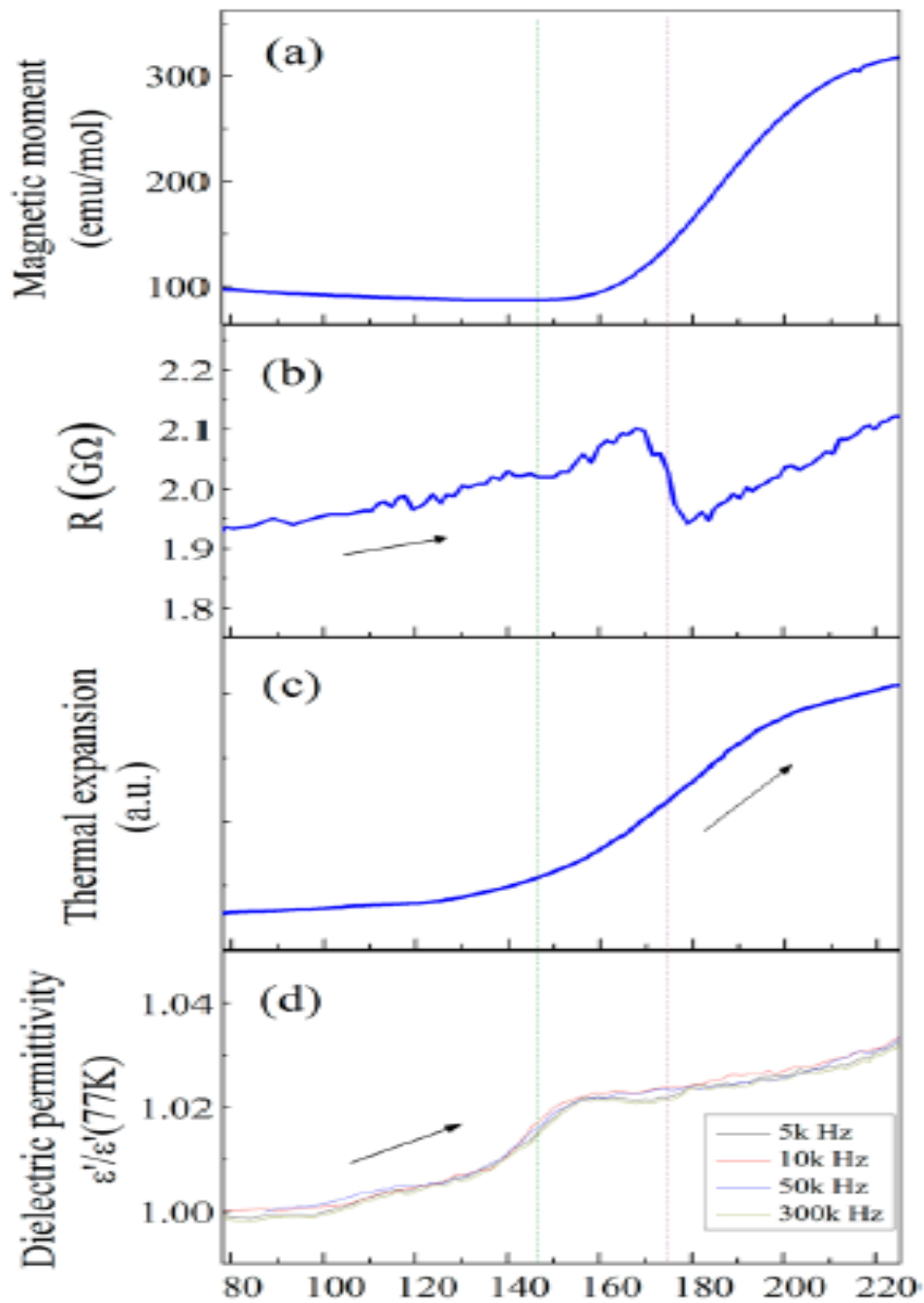
Low spin:



Orbitals vs spin states



Transition temperature



Conclusion

- The transition probed by different measurements would indicate several different spin crossover temperatures, distinct from the benchmark spin crossover transition temperature $T_{1/2}$ indicated by magneto- metry and Mössbauer. Thus, caution in determining the spin crossover transition must be taken when applying final state spectroscopies as an accurate indicator of the spin crossover transition this may not always be true. The possibility that a transient excited state, involving unoccupied electronic structure, might resemble the signatures of the high-spin state is consistent with the observation that the spin crossover transition is influenced by the electric field and current. In some respects, these results for the molecular spin crossover transition resemble the separation of the charge-ordering transition from the ferromagnetic transition in the manganites.

Related to us

- 1. photo-induced Xrd, problem: at high temperature, low spin states are limit.
- 2. thin film would make excitation easier.
- 3. spin orbital layer by layer organic film.