Spin Crossover and Electrical Conductivity in Ni-bisdithiolene-based Complexes

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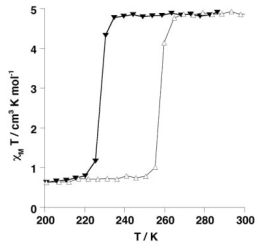
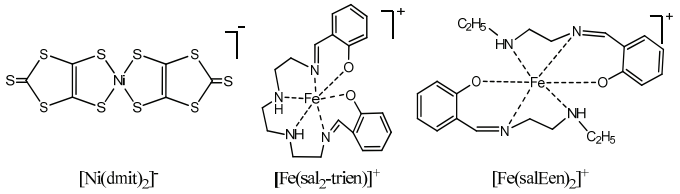
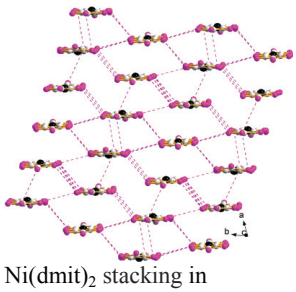
Combining different components with specific properties is of interest, not only for fundamental reasons, but also for application purposes. The possible synergy which might emerge from this combination can generate new functions such as regulation, amplification etc. [1] In this line, we have decided to combine the $Ni(dmit)_2$ anions with spin-crossover Fe-based cations: the former provide electrical properties whereas the latter the magnetic behaviour. We have chosen Fe(III) ions, such as $[Fe(salEen)_2]^+$ or $[Fe(sal_2\text{-trien})]^+$ [2, 3].



Magnetic behaviour for $[Ni(dmit)_2][Fe(sal_2\text{-trien})]$





$Ni(dmit)_2$ stacking in $[Fe(salEen)_2]_2[Ni(dmit)_2]_5$

Metathesis reaction between $[Fe(ligand)]^+$ salt and $[Ni(dmit)_2]^-$ affords complexes of type $[Fe(Ligand)]_x[Ni(dmit)_2]_y$, which might exhibit various behaviours such as hysteresis or abrupt spin transition, together with electrical properties, depending on the starting Fe complex.

In this presentation, relations between the physical properties and the structural features of these complexes will be discussed, with the help of theoretical calculations.

[1] J.-M. Lehn, Science 2002, 295, 2400.
[2] C. Faulmann, K. Jacob, S. Dorbes, S. Lampert, I. Malfant, M.-L. Doublet, L. Valade, J. A. Real, Inorg. Chem. 2007,**46**, 8548
[3] S. Dorbes, L. Valade, J. A. Real, C. Faulmann, Chem. Comm., 2005, 69.