Cation Mediated Cooperative Spin Crossover Behaviour in Fe(III) Complex

Bijoy Dey, Suman Pradhan and Sanjit Konar*
Department of chemistry, IISER Bhopal, Madhya Pradesh, INDIA
(E-mail: bijoy@iiserb.ac.in)

Abstract:
Magnetic bi-stable molecules has attracted scientist to investigate their properties due to their potentiality to be used in practical memory devices. In these aspect Spin crossover complexes has been highly investigated as they show distinguishable magnetic property changes upon application of external stimuli such as temperature, pressure, light. Transition metals having d^4-d^7 configuration generally shows SCO behaviour. Behaviour towards magnetic property changes of a spin crossover complex is very much dependent on its coordination environment and its supra-molecular aggregation. Fe(II) complexes are by far most studied system in SCO phenomena mainly due to its transition from a diamagnetic state(Low Spin) to a paramagnetic state(High Spin) but with Fe(II) coordination environment is restricted to N_6 donor sets. Whereas with Fe(III) coordination environment can be varied such as N_4O_2, N_3O_3, $N_2S_2O_2$ etc. therefore in case of Fe(III) complexes chance of ligand modification is much higher. So we choose Fe (III) as our choice of metal and we designed the ligand by incorporating phenyl azo group to increase $\pi - \pi$ stacking interaction so that it can help in cooperativity of the spin transition. In this work we have modulated the spin crossover behaviour of Fe (III) complex by changing the counter cation and tried to rationalize how a counter cation can effect the spin transition. Modulation of spin crossover by changing the counter anion is very much known in literature but by so far there is no correlative study on the effect of counter cation.

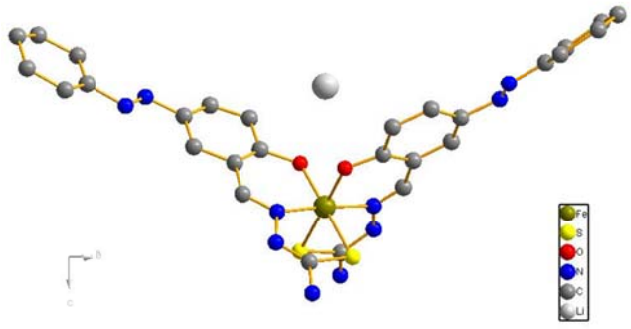

Figure-1 : Molecular structure of Fe(III) complex

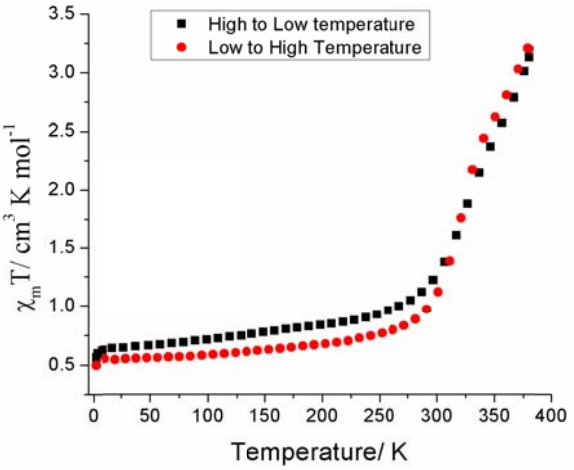

Figure-2 : Magnetic data of the complex

References and Notes:

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