Tuning the magnetic properties of dinuclear iron(II) complexes of bis-tetradentate triazole-based ligands

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Spin crossover (SCO) between low-spin and high-spin states in octahedral d^4-d^7 first row transition metal ions is an important phenomenon due to its possible applications in molecular switches, data storage and other devices.[1] Some iron(II) complexes of triazole and triazolate-based ligands are SCO active.[2] To try to probe the possible interplay of exchange interaction between two metal centers and SCO, our research group synthesised the dinuclear *doubly*-triazole-bridged complex $[Fe_2(PMAT)_2](BF_4)_4$·DMF (Fig. 1), which undergoes an abrupt and complete 'half' SCO from [HS-HS] to [LS-HS] ($T_{½}$ = 240 K).[3] In the present work we have modified the basic structure of *bis-terdentate* PMAT, moving to *bis-tetradentate* analogues L_n^R (Fig. 1). The electronic and steric properties of this new class of ligands can be tuned by changing the substituent at the *N*[4] position and the arm length (Fig. 1). The iron(II) centres in the resulting dinuclear complexes are *singly*-bridged by the central triazole ring and both centres are coordinated to two nitrogen donor *anions* of the type NCE (E = S or Se). We present the synthesis and structural properties of these new dinuclear iron(II) complexes along with their interesting magnetic properties.

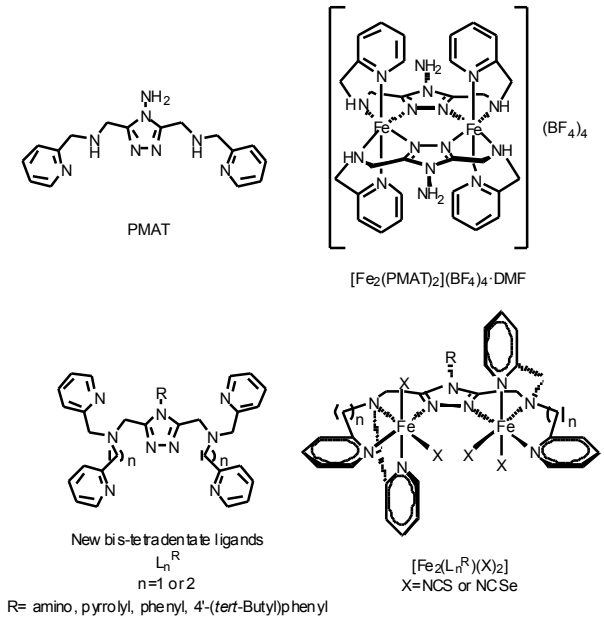

Figure 1

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