HOST-GUEST CHEMISTRY IN SECOND GENERATION SPIN-SWITCHABLE HOFMANN TYPE NETWORKS: LARGER PORES FOR LARGER GUESTS

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A main goal of nowadays spin crossover (SCO) research is the development of materials suitable for technological applications. Multifunctional materials, combining the SCO effect with an additional property (*e.g.* luminescence, NLO, etc.) would notably broaden the scope of applicability.[1]

Currently we focus on the development of spin-switchable metal organic frameworks with extended pore-size. Such porous spin-switchable hosts could act as multifunctional materials by the mere incorporation of a functional guest. The most famous class of spin-switchable porous networks is the one of Hofmann-type networks, based on $\{Fe[M^{II}(CN)_4]\infty\}$ (M=Ni, Pd, Pt) layers stacked by symmetrical bifunctional N-ligands. The limited pore-size determined by the CN unit limits the scope of possible guests to small molecules (e.g. SO_2, CO_2). Therefore, an extension of the $[M^{II}(CN)_4]^{2-}$ fragment of the well-known Hofmann-type networks [2] was performed, elongating the CN fragment by addition of an acetylene unit in the M-CN bond, resulting in metallated tetrakis(cyanoacetylides) $[M^{II}(C_3N)_4]^{2-}$ as expanded building blocks. This led to second generation Hofmann-type networks with hysteretic SCO behavior beyond room-temperature (Figure 1) and extended pore size (Figure 2) thus broadening the spectrum of possible guest molecules.

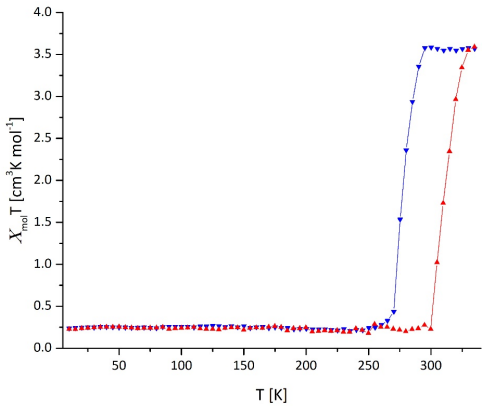

Figure 1: Magnetic behavior of $[Fe(pz)][(Pd(C_3N)_4]$

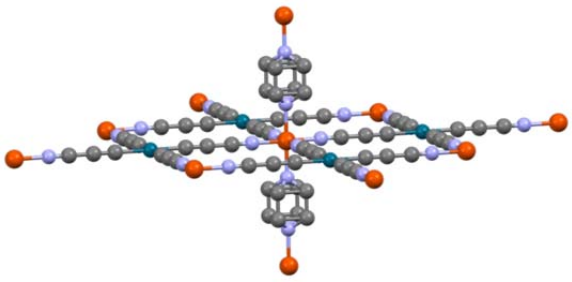

Figure 2 : Second generation Hofmann-type network $[Fe(pz)][(Pd(C_3N)_4]$, view along a-axis

[1] A. B. Gaspar, V. Ksenofontov, M. Seredyuk, P. Gütlich, *Coord. Chem. Rev.*, 2005, *249*, 2661.

[2] V. Niel, J. Mari, M.-Agudo, M. C. Munoz, A. B. Gaspar, J. A. Real, *Inorg. Chem.*, 2001, *40,* 3838.