New Synthetic Approaches Towards Supramolecular Multimetallic Systems with Interesting Magnetic Properties

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The search for new synthetic routes leading to solid-state architectures with pre-established functions and properties is the heart of crystal engineering. In the last 15 years or so, chemists learned a lot in manipulating the intermolecular forces, in order to design crystalline compounds with useful properties

We are currently developing a synthetic approach aiming at obtaining multimetallic complexes, which is based on the employment of homo- and heterobinuclear complexes as nodes. The following types of cationic species are used: (i) binuclear copper(II) species with end-off compartmental Schiff-base ligands; (ii) alkoxo-bridged copper(II) species; (iii) heterobinuclear 3d-3d' species with macrocyclic compartmental ligands;(iv) heterobinuclear 3d-4f species with side-off compartmental Schiff-base ligands. When the metallic ions are different and paramagnetic, the intra-node exchange interactions, as well as those between the resulting spins may lead to interesting magnetic properties. A particular case is the one concerning the 3d-4f binuclear nodes. The building principle is based on the employment of symmetrical (dicarboxylato anions, bis(4-pyridyl) derivatives) or of unsymmetrical spacers (e. g. the isonicotinate anion), which act selectively with the different (3d, 4f) metal ions.

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