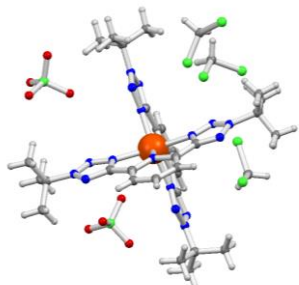
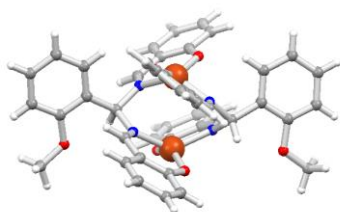
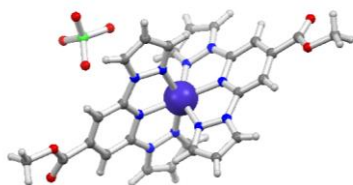


Molecular Inorganic Chemistry

Luca Rigamonti



$$[\text{Fe}(\text{tBu}_2\text{btp})_2](\text{ClO}_4)_2 \cdot 4\text{CH}_2\text{Cl}_2$$


$$[\text{Cu}_2(\text{sal}(\text{o}-\text{OMe})\text{ben})_2]$$


$$[\text{Co}(\text{bpp}-\text{COOMe})_2](\text{ClO}_4)_2$$

RESEARCH TOPICS

Aim of the research is the synthesis, spectroscopic and structural characterizations of molecular systems with metal ions coordinated by organic ligands, and the study of their reactivity and magnetic, optical and biological properties upon modulation of their electronic features.

1) Octahedral iron(II) complexes with nitrogen-rich ligands, such as R_2btp (*bis*(*R*-tetrazolyl)pyridine), with modulated spin crossover (SCO) properties through the use of different counter-anions (ClO_4 , PF_6 , BF_4 , etc.), substituents *R* with variable steric hindrance and electronic features (*Me*, *tBu*, *OPh*, etc.) and crystallization condition.

2) Metal complexes with polydentate Schiff base ligands able to force distorted coordination geometries around the metal ions, with the selective formation of oligonuclear compounds (di-, tri-, tetra-nuclear species or higher nuclearities). Ligands are usually obtained by condensation of salicylaldehyde with aryl-substituted methanediamines (H_3salmp , H_2salmen , $\text{H}_2\text{sal}(\text{X})\text{ben}$ *X* = *o*/*p*-substituents), while metal ions range all along the *3d* series.

3) Mononuclear cobalt(II) complexes in coordination environments able to promote slow relaxation of the magnetization, i.e. behaving as Single Molecule Magnets (SMMs), with nitrogen-rich ligands, such as *bpp-R* (*bis*(pyrazolyl)-4-*R*-pyridine), and magneto-structural correlation studies in series of related compounds.

4) Coordination compounds with Schiff base ligands and their nonlinear optical (NLO) properties, fine tuning of the electronic features by variation of the dipolar structure through the position and nature of the substituents along with the organic skeleton, introduction of chiral centers in order to promote the crystallization in non-centrosymmetric space groups and the occurrence of NLO response in the solid state.

5) Formation of propeller-shaped oligonuclear copper(II) complexes and effect on the supramolecular assembly by the presence and position of chiral carbon atoms on Schiff base ligands.

All projects are carried out with the help of National and International collaborations, like Università degli Studi di Milano, Università degli Studi di Bologna, Università degli Studi di Firenze, Istituto Nazionale delle Ricerche (CNR), Universitat de Barcelona (Spain), Jagellonian University (Krakow, Poland), etc., and also thanks to people at the Dipartimento here in Modena (Prof. Gianluca Malavasi, Dr. Erika Ferrari, Dr. Laura Pigani, etc.)

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