

Title: Synthesis of chiral coordination compounds with 3d and/or 4f metals. Multiproperty studies.

Student: Joan Serra Castelló

Date: 01/2020

Supervisor/s: Dra. Júlia Mayans Ayats

Departament Química Inorgànica i Orgànica (Secció de Q. Inorgànica)

In recent years, coordination compounds with 3d and 4f metals have gained much interest due to their magnetic properties. These compounds can exhibit Single-Molecule Magnet (SMMs) behavior and can be very useful in a wide variety of fields, such as quantum computing^[1], sensors^[2] or molecular switches^[3]

This project is focused on the search of new mono- and dinuclear chiral coordination compounds, using first row transition block metals and lanthanides. Different chiral Schiff bases have been used as ligands (**H₂L1**, **H₂L2**, **H₂L3** and **H₂L4**) (Figure 1), for the synthesis of these coordination compounds. These ligands react with metallic cations (Cu²⁺, Ni²⁺, VO²⁺ and Zn²⁺) to obtain the metal complexes that can react with Gd³⁺ to obtain the dinuclear complexes.

One of the products has been crystallized to obtain single crystals to characterize the system by X-ray diffraction. In addition, the products have also been characterized by different techniques such as infrared spectroscopy (IR), nuclear magnetic resonance (NMR), electronic paramagnetic resonance (EPR) and electronic circular dichroism (ECD). Referring to magnetism, static and dynamic measurements have been performed.

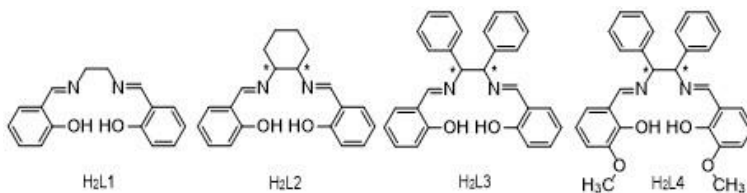


Figure 1. Structure of synthesized ligands. Asterisk denotes the C-chiral atoms.

Keywords: Molecular magnet, lanthanide, 3d metal, Schiff base, magnetism.