

# Correlations between structure and magnetic behaviour in Iron(III) SCO materials

Bruno J.C. Vieira\*, João C. Waerenborgh, Vasco Gama, Laura C.J. Pereira, Isabel C. Santos

\* Email of corresponding author: [brunovieira@ctn.tecnico.ulisboa.pt](mailto:brunovieira@ctn.tecnico.ulisboa.pt)

For the last 30 years the Solid State group at C2TN has focused its research in the development of new multifunctional and nanostructured materials with unconventional electrical and magnetic properties. One example of this research is Spin Crossover (SCO) materials. The SCO phenomenon can be found in a variety of 3d<sup>4</sup>–3d<sup>7</sup> transition metal complexes and has been extensively studied in past decades. In these complexes, the spin state of the transition metal can be reversibly switched between the low-spin (LS) and high-spin (HS) states by the application of an external perturbation (such as temperature, pressure, magnetic field, light irradiation). The bistability between the HS and LS states is quite promising for the application as molecular memories and switches, as it is associated with changes in the physical properties (crystal structure, magnetism, colour, etc.). The complete characterization of these materials involves a variety of techniques from structural (single crystal and powder X-ray diffraction) and magnetic characterization (Mössbauer spectroscopy and magnetization measurements).

In recent years, our research has focused on the identification of correlation between structural features and specific magnetic behaviours. These studies are expected to allow for the intelligent design of these type of materials which would enable for an easier integration in applications of technologic interest.

## Acknowledgements

Fundação para a Ciência e Tecnologia, Portugal, projects UID/Multi/04349/2013 and PTDC/QUI-QIN/32240/2017.