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Editorial

Magnetochemistry: An Old Discipline with New Opportunities

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Even if the moment is not featured in "Youtube" and the story might have not been exactly as we have been told, we can easily imagine the surprise of the Cretan shepherd named Magnes when he observed for the first time that a black stone in the region of Magnesia (in northern Greece) attracted the iron tip of his crook almost 4000 years ago. This mysterious property happened to be almost simultaneously used by the Chinese people to create the compass and since then, key applications of this "magical" phenomenon have not ceased to upspring until today, ranging from the generation of electrical current to hard disks and spin valves. Magnetic materials attracted not only iron but also the attention of many researchers from many different scientific areas. In fact, magnetism is a very interdisciplinary field that has been studied, developed and explained by Physicists, Biologists, Mathematicians and, of course, by Chemists. Magnetochemistry refers to this last perspective. Although commonly defined as the study of the magnetic properties of chemical compounds, magnetochemistry is much more than that. May be, in its infancy it was simply that, but nowadays it constitutes a multidisciplinary field where chemists not only study the magnetic properties but design and synthesize chemical compounds with the desired magnetic properties. This aspect constitutes, in fact, the most important revolution in magnetochemistry. Of course, the initial study and understanding of magnetic properties was a necessary fist step. This study allowed chemists four to five decades ago to establish the models and mechanisms explaining the magnetic behavior of such kind of compounds. Once these mechanisms where understood, the use of crystal engineering and our knowledge of coordination chemistry rules (how ligands coordinate and connect metal centers) has led to the synthesis of thousands of new chemical compounds with interesting magnetic properties often leading to new phenomena. Thus, in about half a century we have passed from the study of paramagnetic compounds to describe the magnetic interactions in polynuclear complexes, magnetic chains and more complex 2D and 3D magnetic networks. These studies led to empirical and theoretical magneto-structural correlations that have allowed the synthesis of new classes of magnetic materials with very promising properties, such as molecular magnets, spin crossover complexes, single molecule magnets, single chain magnets, spin valves, magnetocaloric materials, magnetic nanostructures (including superparamagnetic nanoparticles), spin-based qubits, *etc.*

Of course, the study of all these new materials has pushed Chemists and Physicist to develop new theoretical models to understand and predict their properties. These models are now able to predict the behavior of magnetic materials and provide important clues and hints to guide synthetic Chemist to design and synthesize better and more interesting new systems. This has indeed allowed new challenges to become conceivable. The fascinating properties of magnetic materials at nanometric scales or at the molecular level renders this area a promising platform in the design and exploitation of functional devices for their applications in Nanotechnology. Additionally, scientists are now able to implement additional functionalities to magnetic materials, such as photoactivity, electric responses, catalytic behavior, sensing capacities, *etc.* This is giving place to new generations of compounds capable of integrating magnetism with other properties in a synergic manner, offering new functional opportunities.

The field of magnetochemistry has, thus, attained maturity and at this moment has become an important source of materials with interesting applications. This privileged status renders Magnetochemistry a very appealing and challenging interdisciplinary field where many different researchers are and will be producing paramount contributions.

The new open access journal "Magnetochemistry" is addressed to all these researchers. Magnetochemistry is a new open access journal devoted to cover all aspects of magnetochemistry, from basic magnetism, including theoretical calculations and models, to applied magnetism, including magnetic materials and devices. The aim of this journal is to provide a rapid publication channel in an open access basis for researchers working in any field related to magnetochemistry. Some of the topics to be covered include: theoretical models and calculations in magnetism, crystal engineering of magnetic materials, molecular magnetism, single molecule, ions and chains magnets (SMM, SIM and SCM), spin crossover (SCO) materials, magnetic nanostructures, magnetic porous coordination polymers or metal-organic frameworks (magnetic MOFs), magnetic recording, quantum manipulation of the spin, magnetic multifunctional devices, *etc.*

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