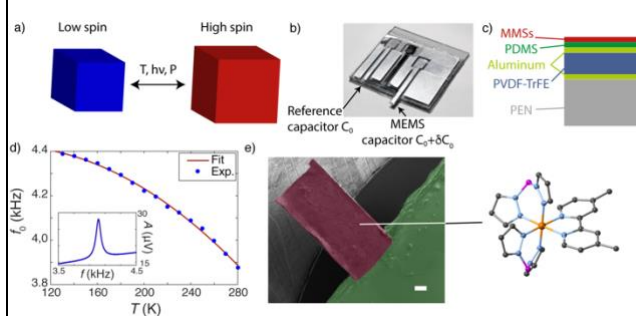


CHEMISTRY MASTER - M2 INTERNSHIP 2023-2024 (end of January – end of June)	
TITLE	Synthesis and Characterization of Molecule-based Magnetic hybrids
COMPETENCES / INTERESTS	Interests in general chemistry, coordination chemistry, characterization techniques (in particular correlation between chemical structure and physical properties) and material sciences. This internship will take place inside a multi-nationality team. Therefore, good knowledge in English will facilitate the communication with the other group members.
SUBJECT	<p>Some molecule-based materials based on transition metals could be used as potential systems to store information at a molecular level or as molecular units in optical or mechanical devices. Prototypes using the dual properties of spin-crossover and thermochromism have been developed by our team in the recent years (<i>Scientific Report</i> 2018, 8, 8016). One of the major problems being the shaping of these magneto-optic materials, our team has oriented a part of its researches to elaborate new hybrids of these unique systems (<i>J. Am. Chem. Soc.</i> 2018, 140, 98; <i>Inorg. Chem.</i> 2012, 51, 5417). In the frame of this project, the research work will be devoted to the synthesis and characterization of a new family of spin-crossover complexes obtained by chemical functionalization of the coordinating ligand in order to implement them into devices such as microelectromechanical systems (MEMS).</p>  <p>Figure (a) Scheme illustrating the spin-crossover and thermochromism phenomena with temperature, light or pressure. (b) View of a chip implemented with the organic piezoelectric MEMS. (c) Scheme of the cut view of the MEMS suspended part. (d) Temperature dependence of the resonance frequency, f_0, of the pristine structure. Inset: a typical resonance spectrum of the well-compensated piezoelectric resonator. (e) SEM micrograph of the molecule-based MEMS with the functionalized area in Bordeaux that contrasts with the uncovered area in green. Scale bar is 100 μm. Inset: molecular structure of a spin-crossover (SCO) complex.</p>
TECHNIQUES USED	Synthesis: Organic & coordination chemistry; crystallization if necessary. Characterizations: IR, UV, NMR spectroscopies; X-ray diffraction (single-crystal & powder); magnetic susceptibility, optical and photomagnetic, calorimetric measurements; optical microscopy...
HOST LABORATORY	Centre de Recherche Paul Pascal – UMR 5031
TEAM	Molecular Materials & Magnetism (M ₃ - CRPP) - http://m3.crpp.cnrs.fr/
SCIENTIFIC DIRECTOR	Name: Rodolphe Clérac Tel: 06 03 51 74 16 eMail: clerac@crpp-bordeaux.cnrs.fr Address: 115 avenue Dr. Albert Schweitzer, 33600 Pessac – France
<p>Possibility to pursue the internship until the end of August: YES <input type="checkbox"/> / NO <input checked="" type="checkbox"/></p> <p>Possibility to offer the internship to a M1 if not attributed to a M2: YES <input checked="" type="checkbox"/> / NO <input type="checkbox"/></p>	