UNIVERSITÉ DU LUXEMBOURG

Physics Seminar

Tuesday, 8th of November at 16h15
(coffee at 16h00)

Campus Limpertsberg
Room BS104

Talk by Prof. Claude Lecomte
Université Henri Poincaré - Nancy 1

High resolution thermo and photo diffraction studies on molecular magnetic compounds

Upon variation of external conditions (T, P, hν), some transition metals ($3d^4$-$3d^7$) in octahedral surrounding may undergo high spin (HS) –low spin (LS) reversible phase transition depending when the ligands force field at the metal centre is of the order of magnitude of the electron pairing energy [1,2]. The talk will focus on iron II complexes. These spin transitions have been followed by single crystal and powder accurate Xray diffraction. First the crystal structures and their electron densities in both HS and LS states will be described. This atomic approach will be completed at the mesoscopic scale by discussing the role of like spin domains which kinetics will be analysed through a nucleation growing mechanism (Kolgomorov-Johnson Mehl Avrami model)
These materials can also be obtained as nanocrystals; our first results will be discussed in the conclusion.

References

Single crystal diffraction analysis of the thermal spin conversion in $[Fe(btr)_2(NCS)_2](H_2O)$: evidence for spin-like domain formation
par PILLET S., HUBSCH J. & LECOMTE C.
Eur. J. Phys. B, 2004, 38, 541-552.

Kinetics of light induced phase transformation in molecular solids: Fe(btr)2(NCS)2.H2O
par PILLET S., LEGRAND V., SOUHASSOU M. & LECOMTE C.
Phys. Rev. B, 2006, 74, 140101.

Two-variable anharmonic model for spin-crossover solids: interpretation of like-spin domains
par Nicolazzi W., Pillet S. & Lecomte C.
Phys. Rev., 2008, B78, 174401

Photoinduced phase separation in spin-crossover materials: Numerical simulation of a dynamic photocrystallographic experiment
par NICOLAZZI W., PILLET S. & LECOMTE C.
Phys Rev B 2009, 80, 132102

Next Physics Seminars

- Tuesday, 22nd November 2011, Belval, 16h15 — Dr. Elisabeth Chassaing — *Challenges in electrodeposition for photovoltaic applications*
- Tuesday, 13th December 2011, Belval, 16h15 — Prof. Christian Wagner — *The blistering of viscoelastic filaments and the formation of nano-fibers*