UE Molecular nanomaterials

Level
Baccalaureate +5

ECTS
6 credits

Component
UFR PhITEM (physique, ingénierie, terre, environnement, mécanique)

Semester
Automne

- **Teaching language(s):** English
- **Open to exchange students:** Yes
- **Code d'export Apogée:** PAX9NCAA

Presentation

Description

The lecturers will browse the different aspects of the synthesis of bulk molecular materials and bottom-up strategies towards the corresponding molecular nanoobjects. This approach is based on the use of well-defined precursors and a good control of the conditions in which they react together in order to master the topology/dimensionality, size/nuclearity, shape and dispersity of the bulk materials and nanoobjects. A special attention will be paid to their characterization using single-crystal X-ray diffraction and to their magnetic and electrochemical properties.

Objectives

Molecular Magnetism

Prerequisites, a quick reminder…
Interacting spins: The Kahn's model
Multifunctional Molecule-based Magnets
Processing of Molecule-based Magnets Photoresponsive molecular systems

1. Based on photoinduced energy transfer
2. Based on charge separation state

3. Application in redox photocatalysis
4. Application in molecularsensor
5. Based on photochromic units
Single-Crystal X-Ray diffraction

1. Crystal
2. RX-materials Interactions
3. Diffracted intensity
4. Apllication: structure resolution

Course parts

UE Molecular nanomaterials - CMTD	Lectures (CM) & Teaching Unit (UE)	36h
UE Molecular nanomaterials - TP	Practical work (TP)	4h

Recommended prerequisites

Basically, the prerequisites are those of M1 Nanochemistry courses in particular Supramolecular and Coordination Chemistry and Molecular Photophysics:

- Synthesis: Basis in coordination and supramolecular chemistry including ligand design and synthesis, thermodynamic of complexes.
- Properties and techniques: oxido-reduction properties, optical properties of complexes (Tanabe-Sugano diagrams, luminescence properties), magnetic properties of the single ion (Van Vleck and Curie laws, Zero-Field Splitting, Spin Cross-Over), knowledge on powder X-ray diffraction

Period : Semester 9

Useful info

Place

Grenoble

Campus

Grenoble - University campus