MATS7AC ATOM and MOLECULE STACKING

MATS7AC Atom and molecule stacking	ECTS Credits : 2 Duration : 21 hours	Semester : S7

Person(s) in charge:

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Keywords: Atoms - bonds - crystallines structures - Technique of characterization

Prerequisites: None

Objective: Be able to know and imagine the constitution of materials

- Basic constituents of materials: atoms and atomic bonds
- Notions of crystallography: direct and reciprocal spaces
- Assemblies of atoms and molecules: from crystalline to amorphous state
- Characterization of the crystalline state by diffraction
- Defects in crystal structure
- Characterization of defects by different microscopies

The diversity and performance of materials are due to an increasing understanding and control of their chemical and structural constitution. Using a fundamental approach based on crystallography and an experimental approach based on the various characterization techniques of materials, this course provides an opportunity to discover and to describe the formation of a material through scales ranging from atomic architecture to micro-structure. It gives the basic concepts to imagine or predict the constitution that will best respond to the conditions of use of a material. Examples will be chosen among the different types of materials.

We will do demonstrations and/or we will use laboratory devices and cristallography software.

References

Chapters I to V and chapter VII volume I : Introduction à la Science des Matériaux- Traité des Matériaux PPUR; Handout on crystalline structure of materials and on diffraction by different radiations; cristallography software CaRine users guide.

Abilities:

Levels	Description and operational verbs
Know	Principals structures of materials
Understand	Atomic arrangement in materials
Apply	Structural identification of materials
Analyse	Constitution of a material for scales from atomic architecture to micro-structure
Summarise	Materials ranking according to their structure
Assess	Relation Elaboration - Structures - Properties

Assessments:

☑ Written Test	☐ Continuous Control	☐ Oral report	☐ Project	☐ Written Report