

Course unit : CRYSTAL STRUCTURE & ORGANIZATION OF FINELY DIVIDED SOLIDS (56h – 6 ECTS – compulsory)

Content

Crystal chemistry of phyllosilicates and other lamellar structures : Basics.

Physical principles of interactions between a particle beam and solids.

Theoretical basis of diffractions (X-rays, electrons and neutrons) and common uses.

Structural characterization of lamellar structures : Application of electron and neutron diffractions.

Structural characterization of lamellar structures : Application of X-ray diffraction.

Quantitative phase analysis using X-ray diffraction.

Practicals : Common uses of X-ray diffraction + specific to lamellar systems.

Horary

Lecture : **27h**

Supervised works : **24h**

Practical works : **9h**

Learning outcomes

The objective of this course is to provide the students with :

i) a theoretical background to understand the physics of interactions between photon and particle beams and solid matter involved in the investigation of crystal structure using diffraction techniques

ii) a thorough understanding of the specificity/defective character of finely divided lamellar systems, and of the associated capabilities and limitations of “usual” crystallographic approaches for their investigation

iii) an updated view of recent enhancements allowing the detailed structural characterization of defective structures in complex natural samples.

iv) hands-on experience of these modern techniques.

Evaluation

Final examination : 50% of the mark

Evaluation during the teaching period : 50% of the mark.

Teaching staff

Alain Meunier (University of Poitiers)

Alexandre Simionovici (UJF – University of Grenoble)

Anne-Claire Gaillot (IMN, University of Nantes)

Eric Ferrage (CNRS, Poitiers)

Bruno Lanson (CNRS, Grenoble)

Reinhard Kleeberg (Technical University of Freiberg)