

Course unit : INTERFACE BETWEEN CLAY MINERALS AND AQUEOUS SOLUTIONS (56h – 6 ECTS – compulsory)

Content

Introduction to colloid chemistry

The colloidal state
Size, shape, surface area of colloids
Surface energy

Adsorption processes

Electric charge and electric double-layer
Ion exchange
Surface complexation
Adsorption of organic molecules

Hydration and clay swelling

Crystalline swelling
Osmotic swelling

Colloidal behaviour

Colloidal stability
Phase behaviour

Learning outcomes

Theoretical knowledge in concepts and general laws of colloid and surface chemistry
Application of the theories to the understanding of the properties of the clay/water systems from the molecular- to the macroscopic scale

Practical methods for the characterization of the surface and colloidal properties.

Practical skills in studying clay-water systems : measurement of physical parameters, calculation of thermodynamic parameters, modeling of the surface properties.

Horary

Lecture : **18 h**
Supervised works : **13.5 h**
Practical works : **24.5 h**

Evaluation

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

Teaching staff

Fabien THOMAS (CNRS, Nancy)
Emmanuel TERTRE (University of Poitiers)
Erwan PAINEAU (University of Paris-Sud)