



MAPR1310 Thermodynamics of phase equilibrium

[30h+15h exercises] 4 credits

This course is taught in the 2nd semester

Teacher(s): Francis Delannay (coord.), Pascal Jacques
Language: French
Level: First cycle

Aims

This module aims at describing the thermodynamic properties of several equilibrium between phases, starting from ideal cases to real ones. Thermodynamic laws are applied to equilibrium between fluid phases (gas and liquid) (Part 1) as well as to processes involving condensed phases (liquid and solid) (Part 2). At the end of the module, the students will be able to describe the thermodynamic properties and chemical equilibrium in systems involving several phases.

Main themes

The course is divided into 2 parts. The first part (2.5 ECTS) deals with reminding some general concepts and describing thermodynamic functions and mixing properties of solutions. Equilibrium between fluid phases is also studied in this part. The second part deals with the analysis of systems involving a solid phase.

Content and teaching methods

Content :

Part 1 :

- The equations of state of ideal and real gases, kinetic theory of gases.
- Thermodynamic functions (enthalpy, entropy, Gibbs free energy).
- Thermodynamic Properties of solutions, chemical potential, equation of Gibbs-Duhem, laws of Raoult and Henry, excess quantities.
- Thermodynamic properties of non-ideal liquids.
- Equilibrium between fluid phases (liquid - gas, liquid - liquid).

Part 2 :

- Equilibrium between condensed phases (liquid - solid, solid - solid).

Methods :

Ex-cathedra courses and exercises.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

None.

Other credits in programs

FSA12BA	Deuxième année de bachelier en sciences de l'ingénieur, orientation ingénieur civil	(4 credits)
FSA13BA	Troisième année de bachelier en sciences de l'ingénieur, orientation ingénieur civil	(4 credits)
INCH22	Deuxième année du programme conduisant au grade d'ingénieur civil chimiste	(4 credits)