

Thermodynamics of physical-chemical systems

Introducing

Description

Systems, quantities and properties of states
Energy description of systems
Macroscopic properties of pure components
Description of physicochemical systems
Reaction quantities
Chemical potential and fugacity
Real solutions
Characterization of phase equilibria
Chemical equilibrium

Objectives

At the end of this module, the student will have acquired systematic practice in the implementation of material and energy balances with chemical reactions, and analyzes in closed and open energy systems. He will understand the behavior of real fluids, the generalized formulation of these behaviors using equations of state, their behavior in saturation zones, the main associated thermodynamic diagrams and their application to various systems.

He will have acquired the basics of thermochemistry including reaction quantities as well as the influence of temperature on these quantities (Kirschhoff), the heat of reaction, and will apply this knowledge to reactive systems under various conditions both theoretically through supervised work and practically in TP.

He will also have acquired the bases for the description of physicochemical systems and solutions (ideal/non-

ideal) allowing the characterization and calculations of equilibrium between phases in the solutions. These bases are necessary for understanding and sizing unit operations in chemical and biochemical systems.

He will understand and apply the concepts associated with chemical equilibria: limitation of reaction progress, stability, instability and spontaneity of chemical reactions, chemical equilibrium constant, displacement of the equilibrium (Lechatelier's law).

He will apply this knowledge to homogeneous equilibria in the gas phase and in the condensed phase as well as to heterogeneous chemical equilibria.

Necessary prerequisites

UF « Thermodynamique Bases et applications » (code I1ANTH11) de la première année de l'INSA ou équivalent.

Évaluation

L'évaluation des acquis d'apprentissage est réalisée en continu tout le long du semestre. En fonction des enseignements, elle peut prendre différentes formes : examen écrit, oral, compte-rendu, rapport écrit, évaluation par les pairs...

Practical info

Location(s)

 Toulouse