FSAB1309 Chimie

[30h+20h exercises] 4.5 credits

This course is not taught in 2005-2006
This course is taught in the 2nd semester

Teacher(s): Christian Bailly, Jacques Devaux, Pierre Godard (coord.)
Language: French
Level: First cycle

Aims

-Develop and understand the basic concepts in chemistry: atoms, molecules, chemical and electrochemical reactions from pertinent examples to illustrate the concepts.
-Develop and understand the basic concepts governing chemical reactions : in equilibrium or spontaneous reactions.
-Learn to go from the concrete reality to the abstractness, from the individual case to the general laws, from the qualitative aspect to the quantitative one.

Main themes

Activity matter (main themes)
First theme:
Atom, chemical bonds and reactions (1,5 ECTS)
The goal is to understand the ionic bond and its influence on the structure, the covalent bond, the electronegativity notion and the acid-base concept.
Second theme:
Thermodynamics: first and second principles (1,5 ECTS) - in view to develop rigorously and mathematically the order-disorder notions, free energy and the relationship with reactions equilibrium. The concepts of ideal and real gas and the equilibria in gaseous phase will be also developed.
Third theme:
Equilibria in aqueous phase (2 ECTS) will be studied, more deeply the quantitative aspects of the acid-base reactions, the solubility and precipitation equilibria and mainly the concepts in electrochemistry in view to understand the corrosion phenomena and the methods to protect the materials.
Content and teaching methods
The content of the teaching is summarized as following: atom structure; ionic bond and ionic compound; influence of ionic bond on the structure; acid-base concepts; covalent bond and electronegativity; entropy and absolute temperature; entropy change in chemical reactions; free energy and its relationship with reaction equilibrium; ideal and real gas; solubility-precipitation-redox reactions; corrosion and protection against corrosion.
The teaching will be organized with ex-cathedra courses and problems and exercises works in groups with the aid of tutors in view to induce reflection by the student. Some experiments will be realized to demonstrate the experimental character of the chemistry especially for the corrosion aspects of metallic and non metallic materials.
Other information (perequisite, course material, evaluation, #)
Evaluation: written (or oral) examination based on open questions in view to evaluate the understanding of the phenomena developed during the teaching.
Course material: copies of didactical support will be provided and a reference book will be proposed.