CHIMIE

CHEMISTRY

Lecturers: Virginie MONNIER-VILLAUME, Naoufel HADDOUR

| Lecturers : 8.0 | TC : 12.0 | PW : 0.0 | Autonomy : 5.0 | Study : 0.0 | Project : 0.0 | Language : FR

Objectives

This lecture aims to provide bases in chemistry and physico-chemistry of materials necessary to understand properties of materials at the microscopic scale (kinetics, reactivity, thermodynamics, weak bonds, electrochemistry). Applications such as new materials to produce energy (organic solar cells), power plants or vehicles working with renewable fuels, will be used to illustrate quantum chemistry and molecular interactions notions.

Keywords : Chemistry, materials, molecular orbitals, statistical thermodynamics, weak bonds, kinetics, electron transfer

Programme

- Quantum model of the chemical bond.
- Introduction to statistical thermodynamics.
- Chemical reactivity and elements of chemical kinetics.
- Electron transfer at interfaces.
- Weak bonds.

Learning outcomes

- Build and use a diagram of molecular orbitals for a molecular structure.
- Make the link between physico-chemical properties at the macroscopic and at the microscopic scale of the matter.
- Identify molecular interactions and binding energies involved in a molecule.
- Select adapted theoretical knowledge to be applied to concrete new problems in chemistry.

Independent study

Objectifs : Learn and digest basic notions before each lecture, to use them between lectures and tutorials. Understand the links between the different notions of the lecture. Remobilize lecture concepts in concrete new situations.

Méhodes : Reading of the duplicated lecture notes and self-evaluation with the corrected exercises on Moodle platform.

Core texts

Michel GUYMONT, *STRUCTURE DE LA MATIÈRE. ATOMES, LIAISONS CHIMIQUES ET CRISTALLOGRAPHIE*, Belin, 2003
P. W. ATKINS, J. DE PAULA *CHIMIE PHYSIQUE*, De Boeck, 2013
J. P. PEREZ, A. M. ROMULUS*THERMODYNAMIQUE. FONDEMENTS ET APPLICATIONS.*, Masson, 2001

Assessment

Mark = 100% knowledge. Knowledge mark = 70% final exam + 30% continuous assessment.