UCLouvain

lchm2281

2019

Photochemistry

In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

3 credits	22.5 h + 7.5 h	Q2

Teacher(s)	Elias Benjamin ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	The main topics to be covered are: the interaction between light and molecules and the laws of absorption - competitive kinetics and lifetimes which are controlling the course of photochemical reactions - electron and energy transfer reactions - basics of radiative emission processes, mainly fluorescence and its use as a tool to elucidate reaction mechanisms.
Aims	1 This course aims to afford the students with the basic principles of excited state generation under UV and visible irradiation. Viewed in the perspective of a physical organic chemistry course, it should allow the student to reasonably evaluate the reactivity of an excited state and to analyse its monomolecular fate (photophysics) as well as its bimolecular interactions. The student will be able, using the principles given in the course, to optimize a reaction in the laboratory. - - - - *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Content	The basic principles of absorption and the production of excited sates are considered following a kinetic and theoretical approach. Lifetime and decay of the excited states are also considered. The absorption and emission intensity factors are examined as well as the multiplicity of states. The photophysics, that is to say the evolution of excited states without considering reaction partners are then considered: possible decay (radiative or non radiative) of the energetic excess and Jablonski diagrammes. The intermolecular processes are then considered: excimeres, exciplexes and extinction of excited states through energy transfer reactions, electron or proton transfer reactions, and use of these processes in sensitization. The Marcus theory is also presented. The use of fluorescence, the Stern-Volmer approach as well as basics of fluorescence quantum yield are explained in view of helping to elucidate mechanisms. These mechanisms are considered in the light of the theory of orbital symmetry conservation. The final part of the course describes several organic photoreactions and some important applications of photochemistry in technological domains.
Bibliography	Livre de référence disponible à la BST : N. Turro, Modern Molecular Photochemistry, University Science Book.
Faculty or entity in charge	CHIM

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Chemistry	CHIM2M	3		