UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Introduction to photochemistry

2526-1-124R022

Title

Introduction to photochemistry

Teacher(s)

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Language

English

Short description

The basic principles of Photophysics and photochemistry applied to photocatalisys

- Unimolecular and bimolecular excited state decay processes
- Dyad photosensitizer-catalist in pohotocatalysis
- Photoinduced Electron transfer: Markus theory and quantum approach
- Energy transfer: Förster and Dexter mechanism
- *All-in-one* example: [Ru(bpy)?]²? in electron-trasfer and energy transfer photocatalysis
- How to investigate photocatalytic processes: experimental tecniques (absorption and emission

spectroscopies, photochemical kinetic measurement within Stern-Volmer equation) and computational approches (Time-dependent DFT)

Photophysics:

- light-matter interaction and photostimulation processes

- Interactions between atoms and molecules and photographic processes

- Frank-Condon's Principle

- Dynamics and time scale for decaying an excited state (fluorescence, phosphorescence)

Photochemistry:

- Organic photochemistry and photochemical processes

- Organic photochemistry: Photostimulate organic reactions

- Radical or ionic dissociation

- Intrameloogic rearrangements and photoisomers

- Hydrogen atom abstraction

- Photodimerization, photoaddition, photoionisation reactions

- Photochemical activity of aromatic compounds

- photochemistry of diazo- and azide compounds

- Photo-removable protective groups

- Chemiluminescence

Technical and experimental aspects of organic photochemistry

- Inorganic photochemistry and coordination compounds

- Characterization of the inorganic and coordinated electron spectra

- Decay and Lifetime kinetics of an excited state

- Energy transfer: Förster and Dexter mechanism

- Electron transfer: Markus theory and quantum approach

- Proton-coupled electron transfer

- Redox properties of excited states of coordination compounds: the case of [Ru(bpy)3]2+;

Objective of the program: The mini-course of photochemistry is an introduction to a selection of general, organic, inorganic, biological, solid state and theoretical photochemical themes with the aim of providing to phd students knowledge in basic principles and application of photochemistry.

Final evaluation: Individual oral interview by which the level of knowledge acquired is verified in terms of autonomy of analysis and judgment and in terms of ability to critically evaluate the contents developed during the teaching

CFU / Hours

3 CFU - 24 Hours (Lecture)

Teaching period

II semester

Sustainable Development Goals