PHOTOCHEMISTRY AND PHOTOCATALYSIS IN ORGANIC SYNTHESIS.

Objective

The aim of the course is to give the student the basic concept to understand a photochemical reaction, the methodology to study it and the synthetic possibilities of photoinduced reactions to applied them in the synthesis of a target compound.

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Date: 1-3.11.17 and 6-7.11.17

Contents

Topic 1: A crash course in photophysics and a classification of primary photoreactions. Photophysical processes. Energy transfer, electron transfer, quenching and sensitization. classification of photochemical reaction pathways. Photochemical reaction mechanisms and reaction intermediates. Problems.

Topic 2: Techniques and methods. Light sources, filters and detectors Preparative irradiation. Steady-state and Time-resolved Absorption and emission spectroscopy. Quantum yields.

Topic 3: Chemistry of excited molecules. Alkenes and alkynes. Aromatic compounds photosubstitution. Carbonyl compounds. Nitrogen compounds. Sulfur compounds. Organic halogen compounds. Molecular oxygen. Retrosynthetic photochemistry. Problems.

Topic 4: Photocatalysis in organic synthesis. Basic Concepts in Photocatalysis: Energy transfer and electron transfer mechanism. *Energy Transfer Photocatalysis:* Single Oxygen as Reagent in Organic Synthesis, enantioselective catalysis of photochemical reaction. *Electron Transfer Photocatalysis:* Photoredox Catalysis with visible light, homogeneous photocatalysis with transitions metal catalysts and organic dyes, heterogeneous

photocatalysis with semiconductors. Consecutive photoredox catalysis and photon-up conversions. Combination of Photoredox catalysis with other catalysis (dual or synergistic catalysis). Problems.

References

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