

60627 - Asymmetric synthesis and properties of organic biomolecules

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	542 - Master's in Chemical Research
ECTS	3.0
Course	1
Period	Second semester
Subject Type	Optional
Module	---

1. Basic info

1.1. Recommendations to take this course

1.2. Activities and key dates for the course

2. Initiation

2.1. Learning outcomes that define the subject

2.2. Introduction

3. Context and competences

3.1. Goals

3.2. Context and meaning of the subject in the degree

3.3. Competences

3.4. Importance of learning outcomes

4. Evaluation

5. Activities and resources

5.1. General methodological presentation

5.2. Learning activities

5.3. Program

1. **Asymmetric synthesis.** Basic concepts. Definition of a stereoselective reaction (diastereoselectivity, enantiomeric excess). Atoms/faces *topicity* relationships. Stereoselective and stereospecific reactions.
2. **Stereoselective synthesis.** Methodologies for asymmetric induction in organic synthesis. Substrate- and reagent-controlled asymmetric syntheses. Chiral auxiliaries. Asymmetric catalysis.
- 3.

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Kinetic resolution. Basic concepts. Kinetic resolution (KR). Parallel kinetic resolution (PKR). Dynamic kinetic resolution (DKR). Dynamic kinetic asymmetric transformation (DYKAT): type I, II, III and IV.

4. **Asymmetric catalysis in organic synthesis.** Chiral Lewis acids. Uses of chiral ligands in metal-catalyzed reactions. Asymmetric organocatalysis.
5. **Bioorganic chemistry.** Biomolecules. Carbohydrates, amino acids, nucleosides and their oligomers. Asymmetric synthesis of structural analogues of organic biomolecules.
6. **Enzymatic catalysis.** Biotransformations in organic synthesis. Uses of enzymes in organic asymmetric synthesis.

5.4.Planning and scheduling

5.5.Bibliography and recommended resources

BIBLIOGRAPHY

- Stereoselective Synthesis. 3 Volume set. Science of Synthesis. Ed. Thieme, 2011

Vol.1, Stereoselective Reactions of Carbon-Carbon Double Bonds

Vol.2, Stereoselective Reactions of Carbonyl and Imino Groups

Vol.3, Stereoselective Pericyclic Reactions, Cross Coupling, C-H and C-X Activation

- Asymmetric organic synthesis with enzymes. V. Gotor, I. Alfonso, E. García-Urdiales. Eds. Weinheim : Wiley-VCH, 2008.

- Catalytic asymmetric synthesis. I. Ojima. Ed. Wiley-VCH, 2000.

SPECIALISED BIBLIOGRAPHY

- Asymmetric organocatalysis : from biomimetic concepts to applications in asymmetric synthesis. A. Berkessel, H. Gröger. Eds. Weinheim: Wiley-VCH, 2005.

- Handbook of reagents for organic synthesis. Chiral reagents for asymmetric synthesis. L. A. Paquette. Ed. John Wiley & Sons, 2003.

- Chemical synthesis of nucleoside analogues. P. Merino. Ed. John Wiley & sons. 2013

- Protective groups in organic synthesis (4th edition). P. G. M. Wuts, T. W. Greene. Ed. John Wiley & sons, 2006.

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- Stereoselective organocatalysis: Bond formation methodologies and activation modes. R. Rios Torres. Ed. Wiley-VCH, 2013.
- Modern tools for the synthesis of complex bioactive molecules. J. Cossy, S. Arseniyadis. Eds. Wiley-VCH, 2012.
- Nucleic acids in chemistry and biology (3rd edition). G. M. Blackburn, M. J. Gait, D. Loakes, D. M. Williams. Eds. The Royal Society of Chemistry, 2006.
- Dynamic stereochemistry of chiral compounds. Principles and applications. C. Wolf Ed. The Royal Society of Chemistry, 2007.