Universidad Zaragoza

Academic Year/course: 2024/25

60460 - Supramolecular chemistry

Syllabus Information

Academic year: 2024/25
Subject: 60460 - Supramolecular chemistry
Faculty / School: 100 - Facultad de Ciencias
Degree: 543 - Master's in Molecular Chemistry and Homogeneous Catalysis
ECTS: 2.0
Year: 1
Semester: Second semester
Subject type: Optional
Module:

1. General information

This subject aims to provide an overview and basic knowledge of supramolecular chemistry, based on non-covalent interactions. This chemistry is a versatile and effective tool for the construction of complex systems from perfectly defined units, and can be applied in different areas of work and research.
The subject is key to know, understand and apply the wide variety of non-covalent interactions in different areas of chemistry, with special emphasis on catalytic processes, materials development and treatment of biological and biomimetic processes. This subject is directly connected to the subjects Molecular Chemistry and Catalysis, and it is fundamental to contextualize subjects such as Chemistry of Advanced Materials, Chemistry at the Frontier with Biology and Sustainable Chemistry and Catalysis.

2. Learning results

1. To know and apply the fundamental concepts and identify the basic interactions of supramolecular chemistry.
2- To understand the basic types and processes of formation of supramolecular systems.
3- To know the main types of supramolecular systems.
4- To know and apply the most common methodologies for the preparation of supramolecular systems. To apply the most appropriate techniques for the characterization of supramolecular systems.
5- To know the applications of supramolecular chemistry and supramolecular systems in catalysis, biomimetic systems and materials.

3. Syllabus

Topic 1. Introduction to supramolecular chemistry.
Topic 2 Molecular recognition**.** Host-host systems.
Topic 3 Principles of self-assembly**.** Self-assembled coordinating compounds. Intercalated molecules.
Topic 4 Molecular self-assemblies**.** Supramolecular crystals.
Topic 5 Supramolecular aggregates (micelles, vesicles and others)**.** Liquid crystals.
Topic 6. Gels. Self-assembled systems at interfaces (SAM, LB and LbL).
Topic 7 Learning from nature: biosupermolecules**.**
Topic 8 Applications of supramolecular chemistry**.** Molecular devices, molecular machines and other supramolecular systems.

4. Academic activities

The subject includes the following learning activities:
Expository-participative classes (1.2 ECTS)
Questionnaires and problems (0.4 ECTS)
Analysis and discussion of scientific publications (0.4 ECTS)

5. Assessment system

The assessment of the subject is based on the following activities with the weighting indicated:
A1: Discussion and solving of theoretical-practical issues and related activities (15 %)
A2: Analysis and discussion of scientific publications related to the contents of the subject (35 %)
A3: Global written test, during the assessment period, consisting of the solving of problems and questions (50 %).

The final grade will be the best of the following grades:
GRADE 1 = (0.15 x grade A1) + (0.35 x grade A2) + (0.50 x grade A3).
GRADE 2 = global written test grade.

The global written test will be an exam on all the contents covered in the subject, including the different activities developed. The subject will be considered as passed if the weighted average according to the percentages indicated is equal to or higher than 5 points out of a maximum grade of 10.
The enrolment in the subject entitles the student to 2 official exam calls per enrolment. The performance of the exams and the number of official calls will be in accordance with the Rules of Permanence in Master Studies and the Rules of Learning Assessment Standards of the University of Zaragoza (https://ciencias.unizar.es/normativas-asuntos-academicos).

6. Sustainable Development Goals

3 - Good Health & Well-Being
4 - Quality Education
9 - Industry, Innovation and Infrastructure