Chemical and Physical Characterization of Macromolecules

Course coordinator: Alba González/Lourdes Irusta (alba.gonzalez@ehu.eus, lourdes.irusta@ehu.eus)

European credits ECTS: 6

Teaching Language: Spanish (English Friendly Course)

Supporting files: Spanish and English

	Number of course slots (1h)	Number of course slots (1h)
Magisterial	40	
Seminars	5	
Practical		15

Description

- The subject gives to the student the ability for macromolecular materials chemical (Infrared spectroscopy, Nuclear Magnetic Resonance) and physical (molecular weight and its distribution, thermal transitions and morphology) characterization.

Outline

Part 1: Identification and analysis methods.
General concepts for the macromolecular analysis.

Part 2: Use of the spectroscopic techniques in the polymer analysis.
Part 2.1 Infrared spectroscopy (FTIR)
Description of the infrared spectra of the main polymers
Part 2.2. 1H Nuclear Magnetic Resonance (NMR)
Qualitative and quantitative analysis of polymers and copolymers. Brief introduction to tacticity and microstructure analysis (13C-NMR).

Part 3: Molecular weight and dispersity.
Macromolecules in solution. Experimental methods to determine the molecular weight

Part 4: Thermal properties and their characterization
Amorphous and crystalline polymers. Glass transition. Melting and crystallization. Thermal analysis methods.

Part 5: Characterization of micro and nanostructures.
Brief description of the main microscopies. TEM, SEM, AFM, POM.

Experimental practical contents

Analysis of commercial samples by FTIR and NMR spectroscopy
Molecular weight calculation
Measurements of the thermal properties