CH3H4-15 Advanced Polymers from Macromolecular Engineering

26/27

Department
Chemistry
Level
Undergraduate Level 3
Module leader
Hannes Houck
Credit value
15
Module duration
5 weeks
Assessment
Multiple
Study location
University of Warwick main campus, Coventry

Description

Introductory description

This module builds on concepts covered in Year 1 and Year 2 modules and laboratories, and expands knowledge and understanding of synthetic methods for designing and creating functional polymers, their macromolecular architectures and properties, and how this relates to real-world material applications. The lectures will be supported by workshop-style questions and case study examples of polymer-based materials.

Module aims

By the end of the module, students will develop their awareness of current problems and directions at the forefront of
macromolecular chemistry and polymer science.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

The module is taught in 4 parts, supported by a case study for each part:

1. Linear synthetic polymers with defined molecular weight and chain ends
2. Polymer properties: elasticity, viscosity, viscoelasticity
3. Supramolecular & covalent polymers and networks
4. Organic conducting polymers

Learning outcomes

By the end of the module, students should be able to:

- Understand how modern materials are inspired by nature or adapted from nature.
- Learn about the synthetic methods for designing and creating functional polymers.
- Understand how macromolecular architectures, functionalities and viscoelastic properties are critical for applications ranging from dental fillings and electronics to biomedicine,.
- Develop their awareness of current problems and directions in the forefront of Macromolecular chemistry and aspects of how Macromolecules are involved in nanomaterials via supramolecular assembly and aggregation.
- Evaluate critically selected current materials and research in this area, and under the wider concept of material sustainability.

Indicative reading list

Reading lists can be found in Talis

Subject specific skills

Bonding and Intermolecular interactions
Sustainability and Green Chemistry

Transferable skills

Critical Thinking
Communication
Scientific writing

Study

Study time

Type	Required
Lectures	23 sessions of 1 hour (15%)
Practical classes	2 sessions of 1 hour (1%)
Total	150 hours

Type	Required
Private study	125 hours (83%)
Total	150 hours

Private study description

N/A

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group D1

	Weighting	Study time	Eligible for self-certification
Sustainable Polymers Spotlight: Student Video & Peer Review Project - Part 1	10%		Yes (extension)

The first component of the individual assessment consists of creating a short TikTok-style social media video (2-3 min) that introduces and critically evaluates a commercial polymer material of their choice. The video should communicate, in a clear and engaging manner, and to a broad non-specialist audience, the key features, benefits, and challenges associated with the polymer—especially in relation to its sustainable production, environmental impact, and end-of-life considerations.

Sustainable Polymers Spotlight: Student Video & Peer Review Project - Part 2	10%		Yes (extension)

The second component of the individual assessment consists of an individual critical review. Following the video creation, individual students will be assigned a peer's submission to critically fact-check by a short written peer review. The written peer review should identify any scientific inaccuracies, oversimplifications, or missing context, and propose constructive improvements supported by scientific literature. This component consists of critical thinking, evidence-based reasoning, and the ability to assess how science is communicated to a non-specialist audience.

Centrally-timetabled examination (On-campus)	80%		No

	Weighting	Study time	Eligible for self-certification
Written examination			

- Students may use a calculator
- Periodic Tables
- Answerbook Pink (12 page)

Assessment group R1

	Weighting	Study time	Eligible for self-certification
Resit examination	100%		No

- Students may use a calculator
- Answerbook Pink (12 page)
- Periodic Tables

Feedback on assessment

Cohort level examination feedback provided via Moodle following the Exam Board.

Past exam papers for CH3H4

Availability

Courses

This module is Optional for:

- UCHA-4 Undergraduate Chemistry (with Intercalated Year) Variants
  - Year 4 of F101 Chemistry (with Intercalated Year)
  - Year 4 of F122 Chemistry with Medicinal Chemistry (with Intercalated Year)
- UCHA-3 Undergraduate Chemistry 3 Year Variants
  - Year 3 of F100 Chemistry
  - Year 3 of F121 Chemistry with Medicinal Chemistry
- Year 4 of UCHA-F107 Undergraduate Master of Chemistry (with Intercalated Year)
- UCHA-F109 Undergraduate Master of Chemistry (with International Placement)
  - Year 3 of F109 MChem Chemistry (with International Placement)
  - Year 3 of F111 MChem Chemistry with Medicinal Chemistry (with International Placement)
- UCHA-4M Undergraduate Master of Chemistry Variants
  - Year 3 of F105 Chemistry

    - Year 3 of F125 MChem Chemistry with Medicinal Chemistry
- Year 4 of UCHA-F127 Undergraduate Master of Chemistry with Medicinal Chemistry(with Intercalated Year)