

CH971-10 Polymer Laboratories

26/27

Department

Chemistry

Level

Taught Postgraduate Level

Module leader

Rachel Hand

Credit value

10

Module duration

10 weeks

Assessment

100% coursework

Study location

University of Warwick main campus, Coventry

Description

Introductory description

Polymer Laboratories

[Module web page](#)

Module aims

This module aims to provide advanced level laboratory experience to the students in the polymer chemistry field. Students will be practically performing polymerization as a part of other modules of the Polymer Chemistry MSc program. Here, more advanced aspects are encountered and particular emphasis is placed on creative experimental design. Since, the students have (at least indirect) access to research-quality analytical equipment, evaluation and interpretation of original data is highlighted. The students will be able to implement some aspects of good practice in measurement science in a research context. The chemical systems and molecules that will be characterised will be generally of an unknown nature. Safety aspects of laboratory work will also take a step closer to the research context since some of the associated hazards will vary considerably between one student's work and the next.

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.

Laboratories: Students will be asked to synthesize monomer, initiator, and catalyst where necessary and use these compounds for the polymerization of selected monomers. This module will allow students to combine their advanced polymer knowledge and practical hands-on polymer synthesis and characterization experience, which they should have obtained throughout the Polymer MSc programmes.

The experiments will be focused on fundamental and real world problems in polymer science. While the experiments will be well structured, an element of research at the latter stages (i.e. structure property relationships, catalytic activity/selectivity etc.) will be introduced to combine different elements of the taught material. Representative extended experiments might include:

- Free radical polymerisation
- Cationic ring opening polymerisation,
- Reversible addition fragmentation chain transfer polymerisation
- Single electron transfer living radical polymerisation
- Bioconjugation of polymers onto proteins
- Ring opening metathesis polymerisation
- Polycondensation reaction
- Emulsion polymerisation

Learning outcomes

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

- Critically search literature prior to the lab work.
- Perform organic reactions for the initiator, monomer or catalyst synthesis.
- Display an advanced level of synthetic skill in handling polymerization reactions under inert atmosphere.
- Understand the advanced techniques to synthesize and characterize polymers.
- Understand how to report experimental findings in international journals.

Indicative reading list

[Reading lists can be found in Talis](#)

Subject specific skills

Key Skills:

Communicate verbally and in writing

Demonstrate polymer characterization skills

Demonstrate understanding of different polymer characterization techniques

Demonstrate the ability to literature search and report experiments

Manage time effectively

Cognitive Skills:

Critically analyse data

Comprehensively assess errors in data
Test hypotheses using experimental data
Interpret results using information from literature.

Subject-Specific/Professional Skills:

Follow good and safe practice in the laboratory.
Demonstrate polymer synthesis and characterisation laboratory skills.
Produce clearly written and original scientific reports.
Research and reference relevant literature.

Transferable skills

2 Problem solving

- Use rational and logical reasoning to deduce appropriate and well-reasoned conclusions.
- Retain an open mind, optimistic of finding solutions, thinking laterally and creatively to look beyond the obvious.
- Knows how to learn from failure.

3 Self-awareness

- Actively seek opportunities for personal development in the context of employment and life.
- Aware of personal strengths and emotional intelligence
- Reflect on learning, seeking feedback on and evaluating personal practices, strengths and opportunities for personal growth.

4 Communication

- Communicate orally in a clear and sensitive manner which is appropriately varied according to different audiences.
- Written: Present arguments, knowledge and ideas, in a range of formats. Active listening: questioning, reflecting, summarising.

5 Teamwork and working effectively with others

- Operate within, and contribute to, a respectful, supportive and cooperative group climate.
- Sensitive to the impact of actions on others.

6 Information literacy (research skills)

- Critical awareness of how information is gathered, used, managed and synthesised.
- Understanding of the relative value of different sources and the importance of provenance.
- The systematic collection, analysis and evaluation of information in the investigation of a topic.

Study

Study time

Type	Required
Practical classes	8 sessions of 6 hours (48%)
Private study	52 hours (52%)
Total	100 hours

Private study description

Self study (extended reading, preparation of assessed work/lab report, tutorial work etc.)

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group A3

	Weighting	Study time	Eligible for self-certification
Assessment component			
Assessed Workshops/Labs	100%		Yes (extension)
Assessed workshops/labs.			
Reassessment component is the same			

Feedback on assessment

Annotation on student work, plus itemised mark sheet with formative feedback.

Availability

Courses

This module is Core for:

- Year 1 of TCHS-F1PK Postgraduate Taught Polymer Chemistry
- TCHA-F1PW Postgraduate Taught Polymer Science
 - Year 1 of F1PW Polymer Science
 - Year 2 of F1PW Polymer Science

This module is Option list A for:

- Year 1 of TCHA-F1PW Postgraduate Taught Polymer Science