KF2130 Polymer Chemistry 7.5 credits

Polymerkemi

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for KF2130 valid from Autumn 2017

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Chemical Science and Engineering, Chemistry and Chemical Engineering

Specific prerequisites

_Admission requirements for programme students at KTH:
_At least 150 credits from grades 1, 2 and 3 of which at least 110 credits from years 1 and 2, and bachelor's work must be completed, within a programme that includes:
75 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and 6 university credits (hp) in computer science or corresponding.

_Admission requirements for independent students:
_50 university credits (hp) in chemistry or chemical engineering, 20 university credits (hp) in mathematics and in computer science or corresponding. Documented proficiency in English corresponding to English B.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After completing the course the student should

to pass the course be able to

- Explain the general reaction course and reaction mechanism for step growth polymerization, chain polymerization including radical-, ion-, and copolymerization
- Describe and compare the principals of bulk, solution and interface polymerization
- Calculate the degree of polymerization, average molecular weight, average functionality, gel point, kinetic chain length, copolymerization composition etc.
- Suggest measures to control the molecular weight and the rate of polymerization
- Suggest characterization methods to identify polymer composition, polymer architecture, molecular weight etc.
- Practically perform different types of polymerizations
- Present and evaluate a laboratory assignment orally and in writing

to achieve higher grades than D be able to

- Explain the general reaction course for ring-opening, coordination, suspension and emulsion polymerization
- Suggest and motivate choices of a polymerization technique considering the monomer structure and describe properties of the manufactured product.
- Compare and value different polymerization techniques
- Compare green polymerization methods- from renewable materials to waste reduction and from biocatalysis to solvent-free methods.

Course contents

The lectures, exercises and laborations discuss polymerization mechanisms, kinetics and thermodynamics, polymerization techniques such as gas phase, bulk, solution, emulsion- and suspension polymerization. In connection with this, the use and effects of homogenous and heterogeneous catalysis, different initiation-, chain transfer- and termination reactions and polymer modification reactions are in focus. The lectures are closely related to the laboratory work and to class exercises.

Course literature

"Introduction to Polymer Science and Chemistry: A Problem Solving Approach"av Manas Chanda

Examination

- TEN2 - Written exam, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB2 - Laboratory Course, 3.0 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Other requirements for final grade

Passed examination (TEN2) - 4,5 credits
Completed laboratory course (LAB2) - 3,0 credits

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.