SK2757 Project on Nanomaterials 7.5 credits

Projekt i nanomaterial

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

Establishment

Grading scale

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

Education cycle

Second cycle

Main field of study

Engineering Physics

Specific prerequisites

English B / English 6

Good knowledge about the physics and chemistry courses according to the study plan or corresponding background

Language of instruction

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

Intended learning outcomes

This course will give hands on experience on bottom-up, solution based, synthesis techniques of nanomaterials and use of standard analytical tools for materials' property evaluation.

After a successful completion of the course, students should be able to:

- Perform an extensive literature survey on the synthesis topic/material of choice.
- Prepare a detailed report on the topic of synthesis/material.
- Design their synthesis experiments for the targeted material of choice.
- Explain the underlying chemical and physical principles of the selected/designed synthesis scheme.
- Perform chemical stoichiometric calculation for the preparation of solutions.
- Apply chemistry lab practices properly
- Prepare a set-up for planned synthesis experiment.
- Perform XRD analysis on the fabricated nanopowder.
- Interpret XRD results and relate it to homogeneity of material.
- Perform microstructure analysis on the fabricated nanopowder.
- Perform thermal analysis on the fabricated nanopowder.
- Interpret TGA thermogram, indicating corresponding physical changes.
- Interpret DSC thermogram, indicating corresponding physical/chemical changes.
- Perform UV-Vis measurements on the fabricated nanopowder (whenever relevant to the project).
- Perform FTIR analysis on the fabricated nanopowder.
- Interpret analysis results from an FT-IR spectrum.

Course contents

This course aims at giving students hands-on experience and chemistry lab practice on solution based chemical fabrication techniques for nanomaterials. Students (in teams of 2-3) will choose a topic among the available list of projects. This project begins with a comprehensive literature search on the fabrication and characterization of the selected material by conventional routes and advantages vs. disadvantages of the used methodologies: to be presented in the form of a written report.

Examination

- PRO1 - Project Report, 2.0 credits, grading scale: P, F
- LAB1 - Laboratory Work, 3.0 credits, grading scale: P, F
- PRE1 - Final Presentation, 2.5 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

All parts are COMPULSORY to attend to receive a final grade.

Project Report, Lab Work and Final presentation

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.