IM2658 Experimentella metoder - Bulk 6,0 hp

Experimental Techniques - Bulk

Fastställande

Kursplan för IM2658 gäller från och med HT08

Betygsskala

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

Utbildningsnivå

Avancerad nivå

Huvudområden

Fysik

Särskild behörighet

Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

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

- Describe techniques used for the evaluation of surface properties of materials.
- Explain the underlying principle of means of detection/signal generation for surface analysis techniques.
- Name and describe techniques used for structural characterization of materials.
- Name and describe techniques used for investigation of thermal properties of materials.
- Name and describe techniques used for microstructure investigation of materials.
- Name and describe techniques used for magnetic characterization of materials.
- Name and describe techniques used for investigation of optical properties of materials.
- Name and describe techniques used for investigation of magnetic properties of materials.
- Interpret analysis results from an FT-IR spectrum.
- Interpret XRD results and relate it to homogeneity of material.
- Interpret TGA thermogram, indicating corresponding physical/chemical changes.
- Interpret DSC thermogram, indicating corresponding physical/chemical changes.
- Interpret magnetic behavior of the material from VSM measurement.

Kursinnehåll

An introduction to bulk nanostructured materials and nanocomposites will be presented. This course aims at teaching the students underlying principles of analytical techniques that are commonly used for the evaluation of bulk properties of materials. These include surface analysis technique FTIR spectroscopy; optical properties evaluation by UV-Vis spectroscopy; crystallographic phase identification by XRD; thermal properties evaluation using TGA and DSC; microstructure investigation by Electron microscopy (SEM and HRTEM); surface area analysis by BET surface area analyzer; electrical property measurement using four-probe technique; magnetic properties by VSM and mechanical properties using indenters.

Kurslitteratur

Lecture notes and handouts.

Examination

- TUT1 - Inlämningsuppgift, 2,0 hp, betygsskala: P, F
- TEN1 - Tentamen, 2,0 hp, betygsskala: P, F
- LAB1 - Laboration, 2,0 hp, betygsskala: P, F

Examinator beslutar, baserat på rekommendation från KTH:s handläggare av stöd till studenter med funktionsnedsättning, om eventuell anpassad examination för studenter med dokumenterad, varaktig funktionsnedsättning.

Examinator får medge annan examinationsform vid omexamination av enstaka studenter.

När kurs inte längre ges har student möjlighet att examineras under ytterligare två läsår.

Evaluation of the course will be based on two assignments, two lab exercises and a final exam. Details of grading are as follows:

2 Assignments x 1 hp: 2 hp

2 Lab Exercises x 1 hp: 2 hp

Final Exam: 2 hp

Further instructions will be given at the course start.

Etiskt förhållningssätt

- Vid grupparbete har alla i gruppen ansvar för gruppens arbete.
- Vid examination ska varje student ärligt redovisa hjälp som erhållits och källor som använts.
- Vid muntlig examination ska varje student kunna redogöra för hela uppgiften och hela lösningen.