FKD3240 Funktionella material och ytor, teori 5,5 hp

Functional Materials and Surfaces, Theory

Fastställande

Kursplan för FKD3240 gäller från och med VT11

Betygsskala

G

Utbildningsnivå

Forskarnivå

Särskild behörighet

M.Sc. in a natural or technical field of science

Undervisningsspråk

Undervisningsspråk anges i kurstillfällesinformationen i kurs- och programkatalogen.

Lärandemål

The overall aim of this course is to provide an overview of functional materials and surfaces. Primarily, the course deals with advanced materials and surfaces which have, or are expected to get, great industrial importance. In addition to an understanding of the material itself, a description of the synthesis or design of each material will be undertaken. Since the technology is fast evolving, the topics of interest may vary from year to year.

Kursinnehåll

After the course you should be able to

1. Explain the concepts of superhydrophobicity/superhydrophilicity, discuss manufacturing processes of such materials, and identify examples in nature and industrial applications.
2. Explain the principles and identify applications of conducting polymers.
3. Describe and discuss the properties, fabricating processes, and applications of Langmuir-Blodgett films, functionalized surfaces, and layer by layer assemblies.
4. Discuss various types of surface modification of cellulose and paper.
5. Describe responsive materials (polymers, drug delivery etc.), the behavior of colloidal systems, and explain the fundamental concepts, preparation methods, and applications of mesoporous materials.
6. Discuss biosurfaces, including model biomembranes and their interaction with other molecules, and anti-bacterial coatings. Exemplify surface treatments of biomedical materials, discuss interactions between the human body and implants.
7. Deduce the effect of surface contaminants and choose proper cleaning techniques.
8. Search information in the scientific literature and present the results in a written literature report.

Kursupplägg

Schema Functional materials and surfaces, Theory

Moment	**Antal föreläsningar**
Superhydrophobic/	2
Superhydrophilic surfaces	
Conducting polymers	1
Langmuir-Blodgett films/	1
biomimetic membranes	
Corrosion inhibition	1
Treatment of metals for biosystems	1
Surface modification of cellulose	1
Responsive polymers	1
Surface functionalization	1
Layer-by-layer assembly	1

Surface cleaning 1

Literature project, 1 hp

Kurslitteratur

The literature and will be found on the Bilda homepage.

Examination

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.

The course will be examined by a written report and an exam.

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.