Прикладные гибридные материалы

Lecturers:
Михаил Зюзин

Assistants:
Ирина Корякина
Павел Тальянов

Language:
English

Credit points:
6 з.е.

Monitoring type:
Exam

Educational Program:
Нанофотоника
1, 3 семестры
Гибридные материалы
1, 3 семестры
Компьютерное моделирование квантовых и нанофотонных систем
1, 3 семестры
Квантовые материалы
1, 3 семестры

Prerequisites:
Специальные разделы неорганической химии
Специальные разделы органической химии
Введение в клеточную биологию
Фотоника

Lectures (a.h)*	Practice (a.h)	Labs (a.h)
16	24	
*1 academic hour = 45 minutes		

This course is devoted to the current state of rapidly developing areas of nanotechnology, material science, biophysics and others. It discusses the modern techniques of nano- and microparticle synthesis and their stabilization via polymer coating. Moreover, the methods of nano- and microparticles characterization such as electron and optical microscopy, dynamic light scattering, laser Doppler anemometry and others will be presented. As a major part of this course, application of different discussed materials in biology, medicine, optics etc. will be reviewed. Additionally, the general introduction in a “Lab-on-a-chip” concept will be explained.

Course content

Plan of a course

Структура курса

1. Introduction in Applied hybrid materials
2. Synthesis of organic/inorganic nanoparticles
3. Polymer coating of nanoparticles with smart materials, application in optics and medicine
4. Methods of nanoparticles characterization
5. Interaction of nanoparticles with cells
6. Interaction of nanoparticles with animals
7. Microfluidics I: introduction, methods of microfluidics, general definitions
8. Microfluidics II: chip fabrication, application in biology, chemistry, catalysis and others

Recommended resources

- DOI: [10.1021/acs.chemmater.6b04738]

- DOI: [10.3762/bjnano.5.161]

- DOI: [10.1038/nmat2442]

- DOI: [10.1002/adma.201807061]

- ISBN 978–0–19–923508–7 (Hbk)

- ISBN 978–0–19–923509–4 (Pbk)

Grading Policy

Each student will need to present a scientific paper two times per semester. Based on these presentations, each student will receive a note.