Level: master

Course title: Technology of obtaining materials

Status: elective

ECTS:9

Requirements:

Learning objectives

Introducing students to methods and processes of materials obtaining.

Learning outcomes

Student should possess:

- Knowledge in processes and technologies of materials obtaining.
- Ability of using scientific literature and preparation of scientific presentations.
- Ability of conducting the individual experiments with the aim of materials obtaining.
- Ability of realization of certain technical solutions.

Syllabus

Theoretical instruction

Bond energy and parameters of phase transformations. Principles of structural ordering.

The processes and methods of crystallization. Defects in crystals.

Systems that deviate from periodicity. Phase diagrams and methods of obtaining amorphous materials.

Methods for preparation of thin solid films: cathode dispersion, deposition from vapours phase by electric glow discharge; chemical vapour deposition, electrolytic (galvanic) deposition at high current densities, thermal or laser evaporation and condensation in vacuum.

Obtaining of quasicrystals.

Obtaining of nanomaterials (nanoparticles) by colloidal techniques, chemical and electrochemical methods; evaporation and condensation; plasma synthesis. Functionalization of nanoparticles. Mechanochemical obtaining of materials, mechanical grinding and mechanical alloying. Methods for obtaining the polycrystalline bulk materials, obtaining of glass-ceramics, methods of fibres extrusion.

Practical instruction

Experimental exercises in accordance to theoretical lectures; preparation and presentation of seminar papers.

Weekly teaching load				Other:
Lectures: 3	Exercises: 1	Other forms of teaching: 1	Student research:	