Title:	Scintillation and dosimetry materials
Lecture hours:	30
Study period: (summer/winter)	winter
Number of credits:	3
Assessment methods:	Preparation and presentation of the student talk related to the chosen course topic
Language of instruction:	English
Prerequisites:	K_W02 - has knowledge of the latest physical discoveries and contemporary trends in the development of physics; K_ W04_knows methods of basic mathematical models in physics; can independently reproduce basic laws and theorems and their determination K_W07 has knowledge of experimental and observational techniques used in physics K_W08 knows the theoretical foundations of the construction and operation of research and measurement equipment in physics K_U01 is able to derive physical formulas based on mathematical models of physics and formulate critical conclusions based on theoretical results obtained from these models K_U02 is able to plan and conduct experimental research in the field of physics and develop the results of these research and draw critical conclusions on this basis K_U04 - is able to apply the acquired knowledge and skills in the field of physics to other fields; K_U05 - knows basic English-language journals in the field of physics included in the list of rated journals and is able to find the necessary information there, and is also able to use scientific databases K_U08 - is able to determine the directions of further learning and implement the self-education process K_K01 - knows the limitations of one's own knowledge and understands the need for further education, is able to inspire and organize the learning process of oneself and others K_K02 - has the ability to work in a group, playing various roles in it
Course content:	1. Introduction. Luminescence. 2. Luminescence in solids: types of luminescence centers, mechanisms of luminescence and energy transfer processes 2.1. Types of luminescence centers 2.2. Transfer and migration of excitation energy in luminescent materials 3. Scintillators: history, basics of operation, characteristics and applications. 3.1 Materials for scintillators. 3.2. Scintillators: research strategy and optimization of material properties. 4. Dosimeters. Materials for dosimetry 4.1 Active and passive dosimetry. 4.2 Technological methods of producing materials for dosimetry 5. Storage phosphors and micro-tomography screens 6. Technological methods of producing scintillators and dosimetric materials. 6.1 Czochralski method. 6.2. Bridgman-Stokbarger method. 6.3. Micro-pulling down (MPD) method. 6.4. Other methods of crystal production. 7. Modern technologies for obtaining scintillators and dosimetric materials in the film form 7.1 Liquid phase epitaxy (LPE) method. 7.2 Growth of films from the gas phase. 7.3 Vacuum evaporation. Morphology of films. 8. Ceramic technologies for the synthesis of scintillators and detectors: micro- and nanopowders and transparent ceramics

	9. Optical methods for the characterization of scintillation materials 10. Spectroscopy of phosphors in various crystalline forms. 11. Applications of scintillation materials. 12. Applications of dosimetric materials (TL and OSL).
Learning outcomes:	Evaluation of the student's presentation (30%) Pass with grade: average grade from 5 questions regarding different parts of course (70%)
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