

Subject card

Subject name and code	Physical chemistry of solid, PG_00081932						
Field of study	Chemistry						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2027/2028		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study Optional subject group Subject group related to scientific research in the field of study		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		1.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Laboratory of Crystallochemistry -> Department of Physical Chemistry -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Artur Sikorski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	15		2.0		8.0	25
Subject objectives	The aim of the course is to familiarize students with the definition and structure of solids, the basic physicochemical properties of solids and the laws describing them, the classification of solids based on various criteria and the relationships between structure and physicochemical properties of compounds.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[CHEML3_W05] Has basic knowledge of the chemical specialisation studied.	Student: knows the role of physicochemistry of solid in modern chemistry, knows definition of solid, characterizes crystallographic systems, knows different types of unit cells, distinguishes the crystal lattice from the space lattice, characterizes the various elements of the space lattice (directions, planes), lists and describes the elements of point and translational symmetry, describes different types of crystal packing of atoms, ions and molecules in crystal lattice, describes various criteria of classifications of solids, characterizes the structure of selected elements and chemical compounds, determines the relation	[SW1] oral statement/ conversation/discussion [SW3] text preparation/written work [SW5] implementation of a problem task
	[CHEML3_W07] Understands and describes physicochemical patterns, phenomena and processes using the language of mathematics.	The student knows and understands the theoretical foundations of crystallography, is able to derive symmetry classes, can calculate interstitial distances, indices of lattice lines and lattice planes	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report [SW5] implementation of a problem task
	[CHEML3_U09] Is able to learn independently.	The student understands the need and knows the possibilities of continuous education and improvement of professional, personal and social competences; is critical in using the Internet; complies with the principles of ethics and copyright	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU8] observation of student's independent or team work
Subject contents	The role of physicochemistry of solid in modern chemistry. Definition of solids. Solid amorphous substances, crystals and quasicrystals. Unit cell. Crystallographic systems. Crystal lattice. Space lattice. Symmetry in crystal morphology. Classes of symmetry and their symbolism. Space groups and their symbolism. Classification of crystals based on chemical structure and stoichiometric ratios. Structures of selected elements and chemical compounds. Techniques used for determining the structure and properties of solids. Relationships between structure and selected physicochemical properties of solids		
Prerequisites and co-requisites	General Chemistry course		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written exam with open questions (tasks) and a test	50.1%	100.0%
Recommended reading	Basic literature	1. Bojarski Z., Gigla M., Stróż K., Surowiec M., Krystalografia, PWN, 2008. 2. Trzaska Durski Z., Trzaska Durska H., Podstawy krystalografii strukturalnej i rentgenografii, Oficyna Wydawnicza. Politechniki Warszawskiej, 2003. 3. Atkins P. Chemia fizyczna, PWN, 2016.	
	Supplementary literature	1. Penkala, T., Zarys Krystalografii, PWN, 1983. 2. Luger, P., Rentgenografia strukturalna monokryształów, PWN, 1989. 3. Wells, A. F., Strukturalna chemia nieorganiczna, WNT, 1993.	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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