University of Gdańsk

Subject card

Subject name and code	Physical chemistry of solid, PG_00081932		
Field of study	Chemistry		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	Bachelor's studies	Subject group	Obligatory subject group 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	dr hab. Artur Sikorski	

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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