



KAPITAŁ LUDZKI
NARODOWA STRATEGIA SPÓJNOŚCI

UNIA EUROPEJSKA
EUROPEJSKI
FUNDUSZ SPOŁECZNY



Crystallography and Structural Solid State Chemistry

Visiting professor: Prof. Robert J. Cava (Princeton University, USA)

Course description:

In order to discover new inorganic materials with specific physical functionality, e.g. desired magnetic, electronic, mechanical or optical properties, researchers must first understand the structure of solids. This course will teach students how the structures of solids are determined through an in-depth look at crystallography and diffraction, and also teach them the structures of the predominant families of inorganic solids that display important properties. The topics presented will be useful to students who hope to pursue careers in materials science, materials physics, or materials chemistry, where structure-property correlations are of interest, in both academic and industrial environments.

Further Details:

Part 1: Introduction to crystallography: point groups, glide planes and screw axes, plane lattices, plane groups, Bravais lattices, space groups, use of space group tables.

Part 2: X-ray diffraction, neutron diffraction, electron diffraction and high resolution electron microscopy.

Part 3: The crystal structures of oxides, intermetallic compounds, quasicrystals, and chalcogenides; modulated structures and homologous series; introduction to defect chemistry.

Syllabus of the lecture subjects (enlisted):

1. The crystallographic symmetries around a point, point groups
2. The plane lattices and plane groups
3. The Bravais lattices and space groups
4. The reciprocal lattice, X-ray and neutron diffraction
5. Structures of oxides, Pauling's rules
6. Solid solutions, nonstoichiometry, defect chemistry
7. Homologous series, infinitely adaptive structures, modulated structures
8. Structures of intermetallics and quasicrystals
9. Structures of chalcogenides and intercalation compound.

Recommended texts:

- Christopher Hammond, The basics of crystallography and diffraction, third edition; ISBN 978-0-19-954645-9
- Ulrich Muller, Inorganic Structural Chemistry, second edition; ISBN 978-0-470-01865-1



TERMINY ZAJĘĆ			
Data	Dzień tyg.	Godz.	Sala
8 Czerwca 2015	Pn	11-13	3/11
		14-16	3/06
9 Czerwca 2015	Wt	11-13	3/07
		14-16	3/06
10 Czerwca 2015	Śr	11-13	3/11
		15-17	3/11
11 Czerwca 2015	Cz	13-16	3/07

Wszystkie wykłady odbywają się w budynku Centrum Nanotechnologii PG.