

KJM-MENA 5110/9110 Inorganic Structural Chemistry, fall 2020

Monday 12:15–14 (lecture) and Friday 11:15–13 (seminar) in the computer room Ø186. The course begins August 24 (Monday) and ends November 27 (Friday).

The “pensum” below:

Selected parts from Ulrich Müller’s “Inorganic Structural Chemistry”, 2nd edition (campus bookstore Akademika) and portions of articles or compendia to be distributed by Pavel Karen (pavel.karen@kjemi.uio.no).

The week plan:

<i>By</i>	<i>Day</i>	<i>Content</i>	<i>“Pensum”</i>
Helmer Fjellvåg	24.08.2020 28.08.2020	Symmetry operations and their representation by matrices, translational and rotational symmetry of crystal structures, crystal systems	H.Fjellvåg: ”Symmetry, groups–subgroups, crystallography” (p. 1–33). The “pensum” from this is what actually has been lectured.
Helmer Fjellvåg	31.08.2020	Matrix transformations of atomic coordinates and of unit-cell vectors.	
Pavel Karen	04.09.2020	Introduction to this course that focuses on the ability to: Communicate: Seminar groups Visualize: Intro to structure-drawing program. Crystallography links	
Pavel Karen	07.09.2020 11.09.2020	Composition Databases: Overview, CIF, use Powder-diffraction primer: From structure data in CIF to calculated patterns	P.Karen: “Link from structure to X-ray powder diffraction”
Pavel Karen	14.09.2020 18.09.2020	Similarity Structure types Polyhedra. Crystal-chemical formulae	Müller chapter 2 (p. 2–10) Fornasini p.57–59 Parthé chapter II (p. 9–12)
Pavel Karen	21.09.2020 25.09.2020	Stoichiometry Normal and valence compounds: Predictions of composition and eventually structure from Generalized valence rule. General valence compounds. Exceptions to octet rule	Müller chapter 11 (p.103–111) chapter 12 (p.118–127) chapter 13 (p.128–149)
Pavel Karen	28.09.2020 02.10.2020	Tetrahedral networks Clusters	Parthé chapter IV and V (p.16–36)
Pavel Karen	05.10.2020 09.10.2020	Build up Densest packing of equal spheres Polytypes. Examples of hcp and ccp of identical spheres. Ordering of equal non-identical spheres	Parthé chapter I (p.1–8) Müller: chapter 14 (p.150–155) Müller: chapter 15 (p.157–165)
Pavel Karen	12.10.2020 16.10.2020	Occupied holes in packing of equal spheres	Müller chapter 17 (p.195–201, 206–211, that is all except subchapter 17.4)

Pavel Karen	19.10.2020 23.10.2020	Packing of molecules. Hydrogen bonding in crystals. Surface structures and monolayers. Nanostructures	Adams (p.169–219) (except organic examples) Müller: kap. 20 (s.241–245)
Pavel Karen	26.10.2020 30.10.2020	Linked polyhedra	Müller chapter 12 p.124–127 (repeated), chapter 16 p.166–180 (except silicates)
Pavel Karen	02.11.2020 06.11.2020	Bonding Ionic radii	Müller chapter 6 (p.48–50) Shannon ACr.A32(1976)751–767
Pavel Karen	09.11.2020 13.11.2020	Bond valence	O’Keeffe p.163–175 O’Keeffe, Brese JACS113(1991)3226–7
Pavel Karen	16.11.2020 20.11.2020	Selected examples Perovskites	Müller subchapter 17.4, p.202–205 Woodward, ACr.B53(1997)32–34
Pavel Karen	21.11.2020 27.11.2020	Silicates	P.Karen: “Silicates and Zeolites”

In this course, we learn and exercise to communicate the visual crystallographic information. The exam is oral (you answer in either English or Norwegian) right in the week that follows. Say, December 3,4, 2020. You can cancel your exam registration with no reason by 19.11.2020. The exam lasts 1 hour per student. Passing grades are A to E for Master students and **A** or **B** for doctor-grade students. Upon passing, 10 ECTS study points are credited.