KJM-MENA 5110/9110 Inorganic Structural Chemistry, fall 2019

Monday 10:15–12 (lecture) and Wednesday 14:15–16 (seminar) in the computer room Ø186. The course begins August 26 (Monday) and ends November 27 (Wednesday).

The "pensum" below:

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

The week plan:

By	*Day*	*Content*	*"Pensum"*
	26.08.2019 Pavel Karen Helmer Fjellvåg	Introduction to the course **Visualization,** structure-drawing program **Symmetry** intro	
	28.08.2019 Helmer Fjellvåg	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	02.09.2019 04.09.2019	Matrix transformations of atomic coordinates and of unit-cell vectors.	
Pavel Karen	09.09.2019 11.09.2019	Crystallography links **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	16.09.2019 18.09.2019	**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	23.09.2019 25.09.2019	**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) Parthé chapter IV and V (p.16–36)
Pavel Karen	30.09.2019 02.10.2019	**Tetrahedral networks** **Clusters**	
Pavel Karen	07.10.2019 09.10.2019	**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	14.10.2019 16.10.2019	Occupied holes in packing of equal spheres	Müller chapter 17 (p.195–201, 206–211, that is all except subchapter 17.4)
Pavel Karen	21.10.2019 23.10.2019	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	28.10.2019 30.10.2019	Linked polyhedra	Müller chapter 12 p.124–127 (repeated), chapter 16 p.166–180 (except silicates)
Pavel Karen	04.11.2019 06.11.2019	**Bonding** Ionic radii	Müller chapter 6 (p.48–50) Shannon ACr.A32(1976)751–767
Pavel Karen	11.11.2019 13.11.2019	Bond valence	O'Keeffe p.163–175 O'Keeffe, Brese JACS113(1991)3226–7
Pavel Karen	18.11.2019 20.11.2019	**Selected examples** Perovskites	Müller subchapter 17.4, p.202–205 Woodward, ACr.B53(1997)32–34
Pavel Karen	25.11.2019 27.11.2019	Silicates	P.Karen: "Silicates and Zeolites"

Days for oral exam are December 3,4,5,6, 2019, to be decided later. You can cancel your exam registration with no reason up 14 days prior exam at the Study Administration in the Department of Chemistry (Lieu). The hours are to be agreed upon. Duration per student will be decided later. 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.