KJM-MENA 5110/9110 Inorganic Structural Chemistry, fall 2018

Monday 10:15–12 (lecture) and Friday 9:15–11 (seminar) in the computer room Ø186. The course begins August 27 (Monday) and ends November 30 (Friday).

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"*
	27.08.2018 Pavel Karen Helmer Fjellvåg	Introduction to the course **Visualization,** structure-drawing program **Symmetry** intro	
	31.08.2018 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	03.09.2018 07.09.2018	Matrix transformations of atomic coordinates and of unit-cell vectors.	
Pavel Karen	10.09.2018 14.09.2018	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	17.09.2018 21.09.2018	**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	25.09.2018 28.09.2018	**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	01.10.2018 05.10.2018	**Tetrahedral networks** **Clusters**	
Pavel Karen	08.10.2018 12.10.2018	**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	15.10.2018 19.10.2018	Occupied holes in packing of equal spheres	Müller chapter 17 (p.195–201, 206–211, that is all except subchapter 17.4)
Pavel Karen	22.10.2018 26.10.2018	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	29.10.2018 02.11.2018	Linked polyhedra	Müller chapter 12 p.124–127 (repeated), chapter 16 p.166–180 (except silicates)
Pavel Karen	05.11.2018 09.11.2018	**Bonding** Ionic radii	Müller chapter 6 (p.48–50) Shannon ACr.A32(1976)751–767
Pavel Karen	12.11.2018 16.11.2018	Bond valence	O'Keeffe p.163–175 O'Keeffe, Brese JACS113(1991)3226–7
Pavel Karen	19.11.2018 23.11.2018	**Selected examples** Perovskites	Müller subchapter 17.4, p.202–205 Woodward, ACr.B53(1997)32–34
Pavel Karen	26.11.2018 30.11.2018	Silicates	P.Karen: "Silicates and Zeolites"

Days for oral exam are December 3,4,5,6,7, 2018, 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.