

Course KJM5110 spring 2010

Begins January 19 and ends on May 7

Tuesday 10:15–12:00 and Friday 10:15–11:00

Location: Room V180 or Ø186 (will be specified later which of them)

The pensum:

Selected parts (see below) from Ulrich Muller's "Inorganic Structural Chemistry", 2nd Ed. (to be bought at the campus bookstore Akademika) and portions of various articles or compendia that will be distributed for free to the students by Pavel Karen.

The week plan:

Course week # Instructor	Week # in the calendar	Content (Divided typically into 2 h of lectures and 1 h of seminar, except for weeks 1–4.)	"Pensum" and repetition literature
1. Helmer Fjellvåg (Pavel Karen 5minutes)	3 19.01.2010 22.01.2010	Administrative introduction Symmetry Symmetry operations and their representation by matrices, translational and rotational symmetry of crystal structures, crystal systems. (lectures only)	H.Fjellvåg: "Symmetrioperasjoner, punktgrupper, romgrupper and krystallstrukturer"
2. Helmer Fjellvåg	4 25.01.2010 29.01.2010	Continued (lectures only)	H.Fjellvåg: "Symmetri, grupper undergrupper, krystallografi" (p. 1–34). The "pensum" from this is what actually has been lectured.
3. Helmer Fjellvåg	5 02.02.2010 05.02.2010	Matrix transformations of atomic coordinates and of unit-cell vectors. (lectures only)	
4. Pavel Karen	6 09.02.2010 12.02.2010	Pensum, software and links Visualization Structure-drawing program Composition Databases: Overview, CIF, use.	
5. Pavel Karen	7 16.02.2010 19.02.2010	Similarity Structure types. Polyhedra. Crystal-chemical formulae.	Müller chapter 2 (p.2–10) Fornasini p.57–59 Parthé chapter II (p.9–12)

6. Pavel Karen	8 23.02.2010 26.02.2010	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)
7. Pavel Karen	9 02.03.2010 05.03.2010	Tetrahedral networks. Clusters.	Parthé chapter IV and V (p.16–36)
8. Pavel Karen	10 09.03.2010 12.03.2010	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)
9. Pavel Karen	11 16.03.2010 19.03.2010	Packing of equal spheres with occupied interstices.	Müller chapter 17 (p.195– 201, 206–211, that is all except for subchapter 17.4)
10. Pavel Karen	12 23.03.2010 26.03.2010	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)
11. Pavel Karen	15 06.04.2010 09.04.2010	Networks Structures represented by joining identical polyhedra	Müller chapter 12 p.124–127 (repeated), chapter 16 p.166– 180 (except silicates)
12. Pavel Karen	16 13.04.2010 16.04.2010	Bonding Bond valence	O’Keeffe p.163–175 O’Keeffe, Brese JACS113(1991)3226–7
13. Pavel Karen	17 20.04.2010 23.04.2010	Ionic radii	Müller chapter 6 (p.48–50) Shannon ACr.A32(1976)751–767 (except the 5 pages of tables)
14. Pavel Karen	18 27.04.2010 30.04.2010	Selected examples Perovskites	Müller subchapter 17.4, p.202–205 Woodward, ACr.B53(1997)32–34
15. Pavel Karen	19 04.05.2010 07.05.2010	Silicates	P.Karen: “Silicates and Zeolites”

Exam: A final oral exam on XX and XX May or June 2010 (to be agreed early on) for those who have registered for KJM5110. Hour and room to be specified later. Duration 1 hour per student. Grades A to E for Master students whereas “passed/not passed” for doctor-grade students. Upon passing, 10 ECTS study points are credited.