

Schedule: Solid State Chemistry, KZ7003 (15hp)

29 August – 28 October 2016

Lectures in room **K2XX** (KÖL) except for the first day when we are in C516

Lectures:

JG – Jekabs Grins

tel: 16 12 54 jekabs.grins@mmk.su.se

MJ – Mats Johnsson

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CWT – Cheuk-Wai Tai

tel: 16 23 71 cheuk-wai.tai@mmk.su.se

Lab work:

DO - Dickson Ojwang

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Literature: A. R. West: "Solid State Chemistry", John Wiley&Sons, 2nd Ed, 2014
Laboratory compendium
Additional material provided by the lecturers

L = Lecture, Lab = lab work

Parts

Theory: 8hp

Lab course: 4hp

Computer exercises and hand-in assignments: 3hp

Lab course (4 hp)

Synthesis

Thermal gravimetry (TG)

Differential thermal analysis (DTA)

Differential scanning calorimetry (DSC)

Powder X-ray diffraction (PXRD)

Scanning Electron Microscopy (SEM)

IR + UV

The lab reports must be handed in one week after each lab.

The computer exercises must be handed in to MJ at latest 13 October and must be corrected and finished at latest 24 October.

Hand-in assignments should be completed one week after they are handed out.

		09:15 – 12:00	13:00 – 17:00
29 Aug	Mon	Course start (10.00 in C516) Information about the course and general introduction of the master program in materials chemistry (MJ)	
30 Aug	Tue	Lecture Introduction: What is solid state chemistry; some synthesis- and characterization methods, chapter 4 (MJ)	
31 Aug	Wed	Lecture Phase diagrams, chapter 7 (MJ)	
1 Sep	Thu	Lecture solid solutions, lattice defects, phase transitions, chapters 2 and 4 (MJ)	
2 Sep	Fri	Lab synthesis	Lab synthesis
5 Sep	Mon	Lecture Thermal analysis, chapter 6.4 + additional material (JG)	
6 Sep	Tue	Lab TG	Lab TG
7 Sep	Wed	Lecture Thermal analysis, chapter 6.4 + additional material (JG)	
8 Sep	Thu	Lab DTA	Lab DTA
9 Sep	Fri	Lab DSC	Lab DSC
12 Sep	Mon	Lecture Introduction to crystallography and diffraction techniques, chapter 1.1-1.14 (JG)	
13 Sep	Tue	Lecture Powder X-ray diffraction, chapter 5 (JG)	
14 Sep	Wed	Lecture Powder X-ray diffraction, chapter 5 (JG)	
15 Sep	Thu	Lab Powder X-ray diffraction	Lab Powder X-ray diffraction
16 Sep	Fri		
19 Sep	Mon	Lecture SEM, chapter 6.1-6.2 + additional material (JG)	
20 Sep	Tue	Lecture SEM, chapter 6.1-6.2 + additional material (JG)	
21 Sep	Wed	Lab SEM	Lab SEM
22 Sep	Thu	Lab SEM	Lab SEM
23 Sep	Fri		

26 Sep	Mon	Lecture SEM, chapter 6.1-6.2 + additional material (JG)	
27 Sep	Tue	Lecture Bonding in solid materials, crystal structures of the elements, chapter 3 (MJ)	
28 Sept	Wed	Lecture Close packed structures, oxides, chapter 1.15-1.17 (MJ)	
29 Sep	Thu	Computer exercise Crystal structures (MJ)	Computer exercise Crystal structures (MJ)
30 Sep	Fri		
3 Oct	Mon	Lecture Intermetallic compounds, covalent network structures, molecular structures, chapter 1.15-1.17 (MJ)	
4 Oct	Tue	Computer exercise Crystal structures (MJ)	Computer exercise Crystal structures (MJ)
5 Oct	Wed	Lecture Factors affecting crystal structures: radius ratios, lattice energies, Jahn-Teller distortions etc., chapter 3 (MJ)	
6 Oct	Thu	Lecture Optical properties, chapter 10 (MJ)	
7 Oct	Fri		
10 Oct	Mon	Lecture Spectroscopic techniques, chapter 6.3 (CWT)	
11 Oct	Tue		
12 Oct	Wed	Lecture Spectroscopic techniques, chapter 6.3 (CWT)	
13 Oct	Thu	Lab IR and UV spectroscopy	Lab IR and UV spectroscopy
14 Oct	Fri		
17 Oct	Mon	Lecture Electrical properties, chapter 8 (CWT)	
18 Oct	Tue	Lecture Electrical properties, chapter 8 (CWT)	
19 Oct	Wed		
20 Oct	Thu	Lecture Magnetic properties, chapter 9 (CWT)	
21 Oct	Fri		

Schedule 2016-06-07

24 Oct	Mon	Lecture Magnetic properties, chapter 9 (CWT)	
25 Oct	Tue		
26 Oct	Wed		
27 Oct	Thu		
28 Oct	Fri	EXAM (9.00 – 14.00)	
<input checked="" type="checkbox"/> Nov		Reexam (9.00 – 14.00)	