

Schedule: Solid State Chemistry, KZ7003 (15hp)

28 August – 27 October 2017

Lectures in room K239 (KÖL) except for the first day when we are in C516

Lectures:

JG – Jekabs Grins	tel: 08-16 12 54	jekabs.grins@mmk.su.se
MJ – Mats Johnsson	tel: 08-16 21 69	mats.johnsson@mmk.su.se
CWT – Cheuk-Wai Tai	tel: 08-16 17 05	cheuk-wai.tai@mmk.su.se

Lab work:

EMV – Eleni Mitoudi-Vagourdi tel: 072-1474408 eleni.mitoudi-vagourdi@mmk.su.se

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

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 + Raman

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

The computer exercises must be handed in to MJ at latest 10 October and must be corrected at latest 16 October.

		09:15 – 12:00	13:00 – 17:00
28 Aug	Mon	Course start (10.00 in C516) Information about the course and general introduction of the master program in materials chemistry (MJ)	
29 Aug	Tue	Lecture Introduction: What is solid state chemistry; some synthesis methods, chapter 4 (MJ)	
30 Aug	Wed	Lecture Phase diagrams, chapter 7 (MJ)	
31 Aug	Thu		
1 Sep	Fri	Lecture solid solutions, lattice defects, phase transitions, chapters 2 and 4 (MJ)	
4 Sep	Mon	Lab synthesis (group A)	Lab synthesis (group B)
5 Sep	Tue	Lecture Thermal analysis, chapter 6.4 + additional material (JG)	Lab TG (group A)
6 Sep	Wed	Lecture Thermal analysis, chapter 6.4 + additional material (JG)	Lab TG (group B)
7 Sep	Thu	Lab DTA (group A)	Lab DTA (group B)
8 Sep	Fri	Lab DSC (group A)	Lab DSC (group B)
11 Sep	Mon	Lecture Introduction to crystallography and diffraction techniques, chapter 1.1-1.14 (JG)	
12 Sep	Tue	Lecture Powder X-ray diffraction, chapter 5 (JG)	
13 Sep	Wed	Lecture Powder X-ray diffraction, chapter 5 (JG)	
14 Sep	Thu	Lab Powder X-ray diffraction (group A)	Lab Powder X-ray diffraction (group B)
15 Sep	Fri		
18 Sep	Mon	Lecture Bonding in solid materials, crystal structures of the elements, chapter 3 (MJ)	
19 Sep	Tue	Lecture Close packed structures, oxides, chapter 1.15-1.17 (MJ)	
20 Sep	Wed		
21 Sep	Thu	Lecture SEM, chapter 6.1-6.2 + additional material (JG)	
22 Sep	Fri		

25 Sep	Mon	Lecture SEM, chapter 6.1-6.2 + additional material (JG)	
26 Sep	Tue	Lab SEM (group A)	Lab SEM (group A)
27 Sept	Wed	Lab SEM (group B)	Lab SEM (group B)
28 Sep	Thu		
29 Sep	Fri		
2 Oct	Mon	Lecture Intermetallic compounds, covalent network structures, molecular structures, chapter 1.15-1.17 (MJ)	Computer exercise Crystal structures (MJ)
3 Oct	Tue	Lecture Factors affecting crystal structures: radius ratios, lattice energies, Jahn-Teller distortions etc., chapter 3 (MJ)	Computer exercise Crystal structures (MJ)
4 Oct	Wed	Computer exercise Crystal structures (MJ)	
5 Oct	Thu		
6 Oct	Fri	Lecture Optical properties, chapter 10 (MJ)	
9 Oct	Mon	Lecture Spectroscopic techniques, chapter 6.3 (CWT)	
10 Oct	Tue		
11 Oct	Wed	Lecture Spectroscopic techniques, chapter 6.3 (CWT)	
12 Oct	Thu	Lab IR and UV spectroscopy (group A)	Lab IR and UV spectroscopy (group B)
13 Oct	Fri	Lab Raman (group A)	Lab Raman (group B)
16 Oct	Mon	Lecture Electrical properties, chapter 8 (CWT)	
17 Oct	Tue	Lecture Electrical properties, chapter 8 (CWT)	
18 Oct	Wed		
19 Oct	Thu	Lecture Magnetic properties, chapter 9 (CWT)	
20 Oct	Fri	Lecture Magnetic properties, chapter 9 (CWT)	

Schedule 2017-08-07

23 Oct	Mon		
24 Oct	Tue		
25 Oct	Wed		
26 Oct	Thu		
27 Oct	Fri	EXAM (9.00 – 14.00)	
<input checked="" type="checkbox"/> Nov		Reexam (9.00 – 14.00)	