

Schedule: Solid State Chemistry, KZ7003 (15hp)

2 September – 31 October 2019

Lectures in room K233-K239 (KÖL) except for the first day when we are in C516 (MMK)

Lectures:

AS – Adam Slabon	tel: 08-16 12 36	adam.slabon@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

IT – Irina Terekhina

TB- Tetyana Budnyak

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 17 October and must be corrected at latest 24 October.

		09:15 – 12:00	13:00 – 17:00
2 Sep	Mon	Course start (10.00 in C516) Information about the course and general introduction of the master program in materials chemistry (MJ)	
3 Sep	Tue	Lecture Introduction: What is solid state chemistry; some synthesis methods, chapter 4 (MJ)	
4 Sep	Wed	Lecture Phase diagrams, chapter 7 (MJ)	
5 Sep	Thu	Lab Synthesis (group D) (IT)	Lab synthesis (group A) (IT)
6 Sep	Fri	Lab Synthesis (group B) (IT)	Lab synthesis (group C) (IT)
9 Sep	Mon		
10 Sep	Tue	Lecture solid solutions, lattice defects, phase transitions, chapters 2 and 4 (MJ)	
11 Sep	Wed	Lecture Thermal analysis, chapter 6.4 + additional material (MJ)	
12 Sep	Thu	Lab TG (group B) (EMV)	Lab TG (group C) (EMV)
13 Sep	Fri	Lab TG (group D) (EMV)	Lab TG (group A) (EMV)
16 Sep	Mon	Lecture Introduction to crystallography and diffraction techniques, chapter 1.1-1.14 (AS)	Lab DTA (group D) (EMV)
17 Sep	Tue	Lab DTA (group B) (EMV)	Lab DTA (group C) (EMV)
18 Sep	Wed	Lecture Powder X-ray diffraction, chapter 5 (AS)	Lab DTA (group A) (EMV)
19 Sep	Thu		
20 Sep	Fri	Lecture Powder X-ray diffraction, chapter 5 (AS)	Lab Powder X-ray diffraction (group A) (IT)
23 Sep	Mon		Lab Powder X-ray diffraction (group C) (IT)
24 Sep	Tue	Lecture SEM, chapter 6.1-6.2 + additional material (MJ)	Lab Powder X-ray diffraction (group D) (IT)
25 Sep	Wed	Lecture SEM, chapter 6.1-6.2 + additional material (MJ)	
26 Sep	Thu	Lab Powder X-ray diffraction (group B) (IT)	
27 Sep	Fri		

30 Sep	Mon	Lecture Bonding in solid materials, crystal structures of the elements, chapter3 (MJ)	Lab SEM (group B) (EMV)
1 Oct	Tue	Lecture Close packed structures, oxides, chapter 1.15-1.17 (MJ)	Lab SEM (group C) (EMV)
2 Oct	Wed	Lecture Intermetallic compounds, covalent network structures, molecular structures, chapter 1.15-1.17 (AS)	Lab SEM (group D) (EMV)
3 Oct	Thu	Computer exercise Crystal structures (Group C-D) (MJ, EMV)	Computer exercise Crystal structures (Group C-D) (MJ, EMV)
4 Oct	Fri	Lecture Lattice energies, Jahn-Teller distortions, crystal field stabilization energies, chapter 3 (AS)	Lab SEM (group A) (EMV)
7 Oct	Mon	Lecture Optical properties, chapter 10 (AS)	
8 Oct	Tue	Computer exercise Crystal structures (Group A-B) (MJ, EMV)	Computer exercise Crystal structures (Group A-B) (MJ, EMV)
9 Oct	Wed	Lecture Spectroscopic techniques, chapter 6.3 (CWT)	
10 Oct	Thu	Lecture Spectroscopic techniques, chapter 6.3 (CWT)	
11 Oct	Fri	Lab IR, UV, Raman spectroscopy (group A) (IT)	Lab IR, UV, Raman spectroscopy (group B) (IT)
14 Oct	Mon	Lab IR, UV, Raman spectroscopy (group C) (IT)	Lab IR, UV, Raman spectroscopy (group D) (IT)
15 Oct	Tue		
16 Oct	Wed	Lecture Electrical properties, chapter 8 (CWT)	Lab Inorganic nanostructures (group C-D) (TB)
17 Oct	Thu	Lecture Electrical properties, chapter 8 (CWT)	Lab Inorganic nanostructures (group A-B) (TB)
18 Oct	Fri		
21 Oct	Mon	Lecture Magnetic properties, chapter 9 (CWT)	
22 Oct	Tue	Lecture Magnetic properties, chapter 9 (CWT)	
23 Oct	Wed		
24 Oct	Thu	Presentation: lab results	
25 Oct	Fri		

Schedule 2019-06-28

28 Oct	Mon		
29 Oct	Tue		
30 Oct	Wed		
31 Oct	Thu	EXAM (9.00 – 14.00)	
1 Nov	Fri		
<input checked="" type="checkbox"/> Nov		Reexam (9.00 – 14.00)	