Porous Materials, VT2017 (KZ8011, 7.5 credits)
Projects: written and oral presentations.
Teachers: Andrew-Kentaro Inge (AKI), Zoltan Bacsik (ZB), Niklas Hedin (NH), Jekabs Grins (JG)
Book: Introduction to Zeolite Science and Practice, 3rd revised edition, (eds) J. Cejka, H. Van Bekkum, A. Corma, and F. Schüth, Elsevier, 2007
Additional material will be handed out about activated carbons
Chapters: 1, 13, 15, 17, and 22 (ZB); 2, 3, 10, 11 and 14 (AKI); 8, 12 (NH)

Lecture room: C516 North

DATE, Chapter (Teacher)	9.15-12.00, Lectures, theory	13.00-16.30, Labs
Mon 20 /2, Ch1 p1-12 (ZB)	Introduction to porous materials, an overview	Project group and project assignment (ZB)
Wed 22/2, Ch2, p13-37 (AKI)	Zeolite structures	Planning and literature search
Thu 23/2, Additional material (NH)	Activated carbons - synthesis, structure, and applications	Introduction to database of zeolite structures and literature search (AKI)
Fri 24/2, Ch3 p39-104 (AKI)	Synthesis of zeolite and other related materials	Project: Synthesis starts
Mon 27/2	Synthesis	Introduction to X-ray diffractometers (JG)
Tue 28/3, Ch11, p375-402, Ch14, p477-494 (AKI)	Structure determination by diffraction and EM	Synthesis
Wed 1/3, Ch10, p327-374 (AKI)	Hybrid porous solids – Metal-organic frameworks	Synthesis
Thu 2/3, Ch12, p403-422, Ch13, p435-476 (ZB/NH)	Local structure and dynamics in zeolites: NMR and vibrational spectroscopies	Synthesis
Fri 3/3, Ch8 p241-300 (NH)	The synthesis of mesoporous molecular sieves	Synthesis
Mon 6/3, Ch17, p555-590 Ch15, p495-513 (ZB)	Gas adsorption in porous materials, textural analysis	Synthesis
Tue 7/3	Synthesis	Project report – synthesis part ready; Sample characterization and analysis
Wed 8/3, Ch22, p787-836 (ZB)	Applications of molecular sieves in catalysis and separation	Sample characterization and analysis
Thu 9/3	Sample characterization and analysis	Preparation of project reports
Fri 10/3	Sample characterization and analysis	Project report – characterization part ready
Mon 13/3	Preparation of project reports	Final project report ready
Tue 14/3 (ZB)	Exercise	Preparation of oral presentations
Wed 15 /3	Oral presentations	Self-study
Thu 16/3	Self-study	Self-study
Fri 17/3	Exam 9.15 – 13.15	

Proposed projects and coordinators:
1. Zeolite X (XRD, adsorption, SEM, EDS)
2. Metal-organic frameworks MOF, ZIFs (XRD; in situ XRD, TGA)
3. Surface modification of mesoporous silica (Adsorption, TGA, IR/ NMR)
4. Activated carbon (Raman, adsorption)

Project responsible persons: 1-2: AKI, 3-4: ZB

Characterization responsible persons:
XRD:
Adsorption:
SEM/EDS:
IR:
TGA:
Calcination: