Information sheet for the course
Corrosion of glass and inorganic materials

University: *Alexander Dubček University of Trenčín*	
Faculty: *VILA – Joint Glass Centre*	
Course unit code: *KSAM*	**Course unit title:** *Corrosion of glass and inorganic materials*
Type of course unit:	
Planned types, learning activities and teaching methods: *Lecture:3 hours weekly; face to face*	
Number of credits: *5*	
Recommended semester: *3. semester*	
Degree of study: *II. (engineer, magister)*	
Course prerequisites: *Chemistry of glass and inorganic materials II, Physical chemistry of glass and inorganic materials II*	
Assessment methods: *Written and oral exam*	
Learning outcomes of the course unit: *Student knows kinetic and thermodynamic aspects of inorganic materials corrosion, especially glasses and ceramic materials, by liquid corrosion media in the first place, but also the corrosion of refractory materials by melts and the corrosion caused by air humidity. Student has a knowledge of common laboratory processes of corrosion monitoring (flow and static tests, autoclave tests, tests in climatic chamber) and of their evaluation methods by empiric and semi-empiric kinetic models and thermodynamic models. Student has knowledge of corroded inorganic materials surfaces examination by spectral and diffractive methods.*	
Course contents: 1. *Corrosion of inorganic materials by liquid media* 2. *Corrosion of refractory materials by melts.* 3. *Laboratory examining of corrosion kinetics: Static tests, flow tests, autoclave tests, tests in climatic chamber.* 4. *ICP OES analysis of corrosive solutions.* 5. *Processing of results from corrosion tests – normalized quantities used for evaluation of corrosion kinetics. Influence of tested materials morphology – volume samples, chippings, fibers.* 6. *Empirical kinetic models. – Helebrant´s model. Kinetic-thermodynamic models – Aagard Helgeson model. Thermodynamic models.*	

7. *Examining of corroded surfaces, SEM-EDS method for examining the elemental composition of corroded layer. Identification of crystalline phases by RTG microdifraction and spectral methods.*
8. *Examining of thermodynamics and kinetics of corrosion using a PHREEQC software.*

Recommended of required reading:

P.W.Atkins: Physical Chemistry. 6.vyd., Oxford Uni. Press, Oxford 1998, 1014 s.
J.Hlaváč: Základy technologie silikátů. SNTL, Praha 1988, 516 s.
V.Šatava: Úvod do fyzikální chemie silikátů. SNTL, Praha 1965, 408 s
M.B.Volf: Chemie skla. SNTL, Praha 1978, 470s.
I.Fanderlik: Vlastnosti skel. Informatórium, Praha 1996, 313 s.
Kutzendörfer J.: Žárovzdorné materiály I a II, skripta, VŠChT Praha, 1993, 1995.
McCauley R.A.: Corrosion of Ceramics. Marcel Dekker, Inc. New York 1995
Clark D.E., Zoitos B.K. (eds.): Corrosion of Glass, Ceramics and Ceramic Superconductors. Noyes Publications, Park Ridge, New Jersey, 1992
Doremus, R.H.: Chemical durability of glass. In: Tomozawa, M;, Doremus, R.H. (eds.): Treatise on Materials Science and Technology 17, Academic Press 1979, pp. 41-67
Helebrant A.: Kinetics of corrosion of silicate glasses in aqueous solutions. Ceramics-Silikáty 41, 147-151 (1997)
Helebrant A., Jiřička A., Jiřičková J.: Corrosion of glass. Glass Sci. Tech. 77C, 85-94 (2004)

Language: *Slovak, English (studying of literature)*

Remarks:

Evaluation history:

A	B	C	D	E	FX

Lectures: *Ing. Mária Chromčíková, PhD.*

Last modification: *31. 1. 2014*

Supervisor: *prof. Ing. Marek Liška, DrSc.*