UNIVERSITY OF PANNONIA

SUBJECT DATASHEET

Semester:	2010/11/1
Subject:	Solid State Chemistry III.
Code:	VEMKSIB144T
Responsible department:	Institute of Materials Engineering
Responsible department code:	MKSI
Responsible lecturer:	dr. Éva Makó Kristófné Dr.

Educational objectives:

Structure of crystalline phase of raw materials and products used in silicate technology. Correlation between the crystal structure and physical properties. Colloid chemical foundation of silicate technological processes.

Detailed content of the subject:

Classification of silicates (Liebau's, Strunz's, Kostov's and Zoltai's classifications). Structure and properties of nesosilicates (C3S, ßC2S, garnets). Application of garnets in colouring materials based on ZrSiO4. Structure and physical properties of soro- and cyclosilicates (Sorosilicates formed during the Cement hydratation, cyclowollastonite, cordierite), production and applications of cordierite. The structure and physical properties of ino- and phyllosilicates (diopside, enstatite, mullite). Classification of clay minerals according to Stevens and Nemecz. Thermal decomposition of clay minerals. Structure and physical properties of tectosilicates. Modifications of SiO2 at normal and high pressure. Stabilization of the modifications, correlation between the structure and physical properties of SiO2 based glass-ceramics. Feldspars, zeolites, isomorphous substitutions in the feldspars, melting behaviour of feldspars, structure physical properties and applications of zeolites. Correlation between the crystal structure and physical (mechanical, electric, thermal, optical) and chemical properties of silicates. History of colloid chemistry. Definition, formation and breakdown of colloidal state. Definition and classification of colloidal difform and disperse system. Macromolecular and association colloids. Gels. Boundary phenomena. Adsorption at gas-liquid, liquid-solid, and gas-solid interface. Formation of colloidal dispersions by condensation and dispergation. Mechanochemistry. Aggregative, dissolution, and sedimentation stability of disperse systems. Capillary phenomena of porous systems. Rheology and optical properties of colloids. Emulsions, sols, and suspensions. Flotation. Breakdown of aerodisperse systems. Purification.

Requirements:

Attendance of lectures and practices

Required and suggested references:

Smith, W.F.: Foundations of Materials Science and Engineering, Mc Graw-Hill, Inc., 1993 Flinn, R.A., Trojan, P.K.: Engineering Materials, Honghton Mcfflin Company, 1990 Lee, W.E., Rainforth, W.M.: Ceramic

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Required and suggested references:

Microstructures Chapman ? Hall, 1994 Hinz, W.: Silikate I, II. VEB Verlag für Bauwessen, Berlin, 1970 Nemecz E.: Agyagásványok, Akadémiai Kiadó, Budapest, 1973 Juhász A. Z.: Általános és szilikátkémiai kolloidika I.-III Buzágh A.: Kolloidika I., II.