UNIVERSITY OF PANNONIA

SUBJECT DATASHEET

Semester:	2009/10/1
Subject:	Program Solving Practice In Physical Chemistry II.
Code:	VEMKFK2221A
Responsible department:	Department of Physical Chemistry
Responsible department code:	MKFK
Responsible lecturer:	dr. Tamás Kristóf

Educational objectives:

Teach physical chemistry via numerical examples.

Detailed content of the subject:

Crytal energy from the Born-Haber cycle. Calculation of thermodynamic properties of crystals. Hagen-Poiseuille law. Mixtures, gas mixtures. Partial molar quantities. Ideal mixtures. Activity. Real mixtures, thermodynamic excess quantities. Electrolyte solutions. Conductive transport equations. Diffusion in condensed matter. Conduction in electrolytes, ionic mobility, dissociation. Phase rule for one component systems. Vapour-liquid equilibrium. Saturated vapour and liquid. Clausius-Clapeyron equation. Solid-liquid and solid-vapour equilibria. Phase rule for multicomponent systems. Vapour-liquid equilibria of binary mixtures. Raoult-law. Henry's law. Colligative properties, increase of boiling point, decrease of freezing point. Calculation of osmotic pressure. Surface tension. Young-Laplace equation. Surface work,minimum of free energy. Gibbs adsorption isotherm. Surface active materials. Langmuir-equation. Chemisorption. Heat of adsorption,multilayer adsorption,types of isoterms.The BET-equation. Thermodynamic condition of chemical equilibrium. Standard Gibbs energy change of the reaction. Mass action law.Heterogeneous equilibria. Dissociation equilibria in electrolyte solutions. Electrode potential. Electrode of first, second kind, reference electrodes, gas electrodes,redox electrodes. Concentration cell. Thermodynamics of galvanic cells. Reaction kinetics. The rate of the reaction, the order of the reaction, rate equations. Simple reactions, the first order rate law, the second order rate law. Equilibrium reactions. Temperature-dependence of reaction rate: Arrhenius-equation. Ion-reactions in solutions. Kinetics of electrode reactions. Tafel-equations. Diffusion polarisation. Entropy production of chemical reactions. Test.

Requirements:

The attendance of the practices and the solution of a test at the end of the semester are obligatory.

Required and suggested references:

1. Liszi, J.: Fizikai kémia, Veszprém, 1993. Kézirat. 2. Liszi, J., Ruff, I., Schiller, R., Varsányi, Gy.: Bevezetés a fizikai kémiába, Műszaki Könyvkiadó, Budapest, 1993. 3. Atkins,W.,P.: Fizikai Kémia I-III.,

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Required and suggested references:

Tankönyvkiadó, Budapest, 1990. 4. Tanszéki munkaközösség: Fizikai kémiai példatár I-II. Veszprém, 1995.