

FOREWORD

The Faculty of Chemical Technology of the Slovak University of Technology is one of the six faculties, which in 2000 celebrated the 60th anniversary of its establishment. The history of the Faculty dates back to 1940/41 when the Branch of Chemical Engineering started with education. The Higher Education Act from 1950 changed this branch to the individual Faculty of Chemistry of the Slovak College of Technology in Bratislava.

The Slovak higher education has its rich history. Our Faculty follows in the footsteps of its famous predecessor in the education of technical chemistry, i.e., the famous Mining Academy in Banská Štiavnica, which ceased to exist in 1919. The establishment of the Dr. M. R. Štefánik College of Technology in 1937 and subsequently, that of the Slovak College of Technology in 1939 succeeded in keeping the high standard of technical education in Slovakia.

Within the time of its existence, the Faculty has educated more than 16,000 graduates (more than 3,000 graduates in food engineering). The Faculty has trained more than 1,200 graduates in postgraduate doctorate courses granting the title PhD in chemical and technical sciences. Thus, the Faculty has helped considerably to increase scientific knowledge in industry, education system, scientific and research institutes, and administrative services.

The Faculty occupies a very specific position within the Slovak Republic and relates to the whole spectrum of chemical, food, pharmaceutical and consumer industries, and ecology. At present, some 2,200 students study at the Faculty and they are trained by a qualified pedagogical and research staff. Out of the total number of 273 teachers, there are 28 full professors, 106 associate professors, and 139 assistant professors. Out of 85 research workers, 2 hold the title DSc., 45 hold the title PhD. Both the teaching process and research activities are centred within 24 Departments and Central Laboratories.

The Faculty currently offers study in BSc. courses, MSc. courses, and PhD study. The undergraduate form of study is organized at two levels: Bachelor-of-Science and Master-of-Science programmes. The first level BSc. course for all students lasts three years, and is run in two branches: Chemical Technology and Food Biochemistry. This first level of the study ends by a state examination and a project granting the student the title Bachelor of Science (BSc). The nominal span of the study in the BSc. course is 3 years. The second level MSc. course is run in 9 majors with several possible specializations over two years. The MSc. course ends by a state examination and by defending a diploma thesis. The graduate obtains the title Master of Science (MSc.). In addition to the natural-science basis, students of all branches study basic engineering subjects, e.g. Chemical Engineering, Processes Control, Basics of Chemical and Food Processing Technology, as well as subjects on Economy, Law and Ecology.

The highest form of university education is currently the doctorate study, which in the past was run as a form of preparation for scientific work. In 1997 the Ministry of Education of the Slovak Republic approved the right of the Faculty to train and to administer examinations in PhD. Courses. The Faculty has conferred the title PhD in 15 branches of the doctoral study. (Chemical Physics, Inorganic Chemistry, Organic Chemistry, Analytical Chemistry, Physical Chemistry, Macromolecular Chemistry, Biochemistry, Microbiology, Inorganic Technology and Materials, Organic Technology and Technology of Fuels, Technology of Macromolecular Materials, Chemical Engineering and Control of Processes, Chemistry and Technology of Environment, Chemistry and Food Technology, Biotechnology). In 2000 the Faculty obtained the accreditation for the branch of Applied Informatics.

The Faculty has a widely oriented programme, leading to the development of basic scientific fields in chemistry, chemical technology and food processing. This wide scientific orientation of Departments at the Faculty allows goal-oriented training of undergraduates and thereby their quicker transition to industry. There are several scientific schools at the Faculty which are successful at winning grants from domestic and international sources and at organising scientific meetings. The Faculty generally maintains an important international position. In addition to basic research, the Faculty participates in widely applied research for practice. The cooperation with many factories and companies allows for a swift application of research results in practice. At the same time the Faculty obtains considerable financial support.

The Faculty participates in issuing the specialized scientific journals: *Fibres and Textile*, *Plastics and Rubber*, *Journal of Radioanalytical and Nuclear Chemistry*, *Biology*, *Folia Microbiologica*, *Vinohrad/Víno* (Vineyard/Wine).

The scope and quality of the scientific activity keep the Faculty at a level, which is comparable with other top research and university centres in the world. This can be proved by the above mentioned number of grants, staff invitations to participate in conferences abroad, wide cooperation with foreign universities and institutions, and memberships in international organizations.

Any further details about the activities of the Faculty of Chemical Technology of the Slovak University of Technology in Bratislava can be found in the Annual Report 2000.

February 2001

Prof. Vladimír Bálež, PhD, DSc
Dean

PRESIDIUM OF THE FACULTY

Dean: Prof. Vladimír Bálež, PhD, DSc

Vice-deans: Prof. Dušan Bakoš, PhD, DSc
 Assoc. Prof. Pavel Kovačák, PhD
 Assoc. Prof. Ján Šajbidor, PhD, DSc
 Assoc. Prof. Zdenek Židek, PhD

SCIENTIFIC COUNCIL

Chairman: Prof. Vladimír Bálež, PhD, DSc

Vice-chairman: Prof. Dušan Bakoš, PhD, DSc

Members: Prof. Stanislav Biskupiè, PhD, DSc
 Prof. Dušan Bustin, PhD, DSc
 Assoc. Prof. Gabriel Éík, PhD
 Prof. Pavel Fellner, PhD, DSc
 Prof. Ľubor Fišera, PhD, DSc
 Prof. Milan Hronec, PhD, DSc
 Assoc. Prof. Pavel Kovačák, PhD
 Prof. Fedor Malík, PhD, DSc
 Prof. Milan Melník, PhD, DSc
 Prof. Ján Mikleš, PhD, DSc
 Assoc. Prof. Štefan Schmidt, PhD
 Assoc. Prof. Zdenek Židek, PhD
 Assoc. Prof. Tomáš Bleha, PhD, DSc
 Miroslav Havlík
 Assoc. Prof. Karel Kadlec, PhD
 Milan Kováè, PhD
 Ján Líška
 Prof. Anton Osvald, PhD
 Jozef Šimúth, PhD, DSc

Honorary Members: Milan Baláž
 Tibor Doboly
 Ondrej Gattnar, PhD
 Jozef Kollár
 Ján Maš
 Prof. Stanislav Miertuš, PhD, DSc

ACADEMIC SENATE

Chairman: Assoc. Prof. Ján Dvoran, PhD

Vice-chairmen: Assoc. Prof. Pavol Hudec, PhD
 Boris Šuhajda, student

Members:

Assoc. Prof. Jozef Augustín, PhD Prof. Eberhard Borsig, PhD, DSc Assoc. Prof. Gabriel Éík, PhD Assoc. Prof. Jana Gabèová, PhD Assoc. Prof. Anton Gatíal, PhD Assoc. Prof. Ivan Hudec, PhD Tibor Jakubík, PhD Assoc. Prof. Marián Koman, PhD, DSc Assoc. Prof. Jaroslav Longauer, PhD Assoc. Prof. Peter Lukáè, PhD Assoc. Prof. Milan Mikula, PhD Assoc. Prof. Dušan Mravec, PhD Ladislav Pach, PhD Veronika Polóniová Assoc. Prof. Jozef Polonský, PhD Viera Ponièanová	Assoc. Prof. František Považanec, PhD Assoc. Prof. Marta Šostroneková, PhD Assoc. Prof. Ernest Šturdík, PhD Igor Šurina, PhD Assoc. Prof. Mária Takácsová, PhD Assoc. Prof. Ľudovít Vareèka, PhD Assoc. Prof. Štefan Varga, PhD Andrea Baránková, student Ondrej Dolgoš, PhD-student Petra Filipovièová, student Marek Krásny, student Pavol Lukáè, student Anikó Molnárová, student Rastislav Spišák, student Monika Trokanová, student
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DEPARTMENT OF ANALYTICAL CHEMISTRY

Head of Department
Prof. Jozef Lehotay, PhD DSc

Telephone: ++42-7-52926043
Fax: ++42-7-52926043
E-mail: lehotay@cvt.stuba.sk

Full Professors :

Dušan Bustin PhD, DSc; Ján Krupčík, PhD, DSc, Jozef Lehotay, PhD, DSc, Ján Mocák, PhD, DSc

Associate Professors :

Ernest Beinrohr, PhD, Eva Brandšteterová, PhD, Miroslav Ďakrt, PhD, Ján Labuda, PhD, Eva Matisová, PhD, DSc, Drahomír Oktavec, PhD, Miroslav Rievaj, PhD, Jozef Polonský, PhD, Viktor Vrábel, PhD

Assistant Professors :

Eva Benická, PhD, Tatiana Buzinkaiová, PhD, Andrea Hercegová, Elena Korgová, PhD, Jarmila Laštincová, Pavol Májek, PhD, Alena Manová, PhD, Pavol Tarapčík PhD, Mária Vaníèková, PhD

Reader :

RNDr. Magdaléna Valachovièová

Research Fellows::

Miriám Buèková, PhD, Ján Dzurov, Adriana Ferancová (from 1.10.2000), Katarína Hroboòová, PhD, Pavol Kubalec, PhD, Jana Sádecká, PhD, Ivan Skaèáni, PhD, Ivan Špánik, PhD, Peter Tomèík, PhD

PhD Students:

Branko Balla, Alica Èaniová, Jana Ľ ungelová (from 1.10.2000), Peter Korytár, Petra Kotianová (from 1.10.2000), Peter Oswald

Technical staff :

Ladislav Bartalos, Danuša Bartalosoová, Marta Benešová, Zuzana Cifrová, Ing. Jana Otrubová

II. TEACHING AND RESEARCH LABORATORIES

Laboratory of capillary gas chromatography
Laboratory of high performance liquid chromatography
Laboratory of electroanalytical methods
Laboratory of molecular spectrometry
Clean laboratory for trace analysis with atomic spectrometry (AAS, OES-ICP)
Laboratory of organic elemental analysis
Laboratory of organic synthesis
Laboratory of fluorescence analysis
Laboratory of capillary isotachophoresis
Laboratory of electrochemical pre-concentration for atomic spectroscopy
Laboratory of chemometry
Laboratory of bioanalytical chemistry

III. TEACHING

A. Undergraduate Study

4th sSemester

Analytical Chemistry I.	(2-2 h)	Labuda, Polonský, Vrábel
Laboratory Practice AC I.	(0-4 h)	Valachovièová

5th semester

Analytical Chemistry II.	(2-2 h)	Bustin, Ďakrt, Lehotay, Polonský
Laboratory Practice AC II.	(0-4 h)	Korgová
Testing and Quality Control	(1-1 h)	Ďakrt

6th semester

Semestral Project

7th semester

Atomic Spectrometry	(2-0 h)	Beinrohr
Anal.Chem.of Complex Inorg. Mixtures	(2-0 h)	Oktavec
Anal.Chem. of Complex Org. and Biological Mixtures	(2-0 h)	Brandšteterová
Lab.Practice I.	(0-10 h)	Matisová
Biosensors	(2-1 h)	Labuda
Computer evaluation of anal. measurement	(2-0 h)	Májek, Mocák

8th semester

Electrochemistry and Electro-analytical Chemistry	(2-1 h)	Bustin
Techniques of Mixtures Separation	(2-2 h)	Matisová, Valigura
Analytical Separation of Compounds	(2-1 h)	Krupčík

Lab.Practice II	(0-6 h)	Matisová
Trace Analysis and Microanalysis Methods	(2-0 h)	Beinrohr, Ěakrt
9th semester		
Bioanalytical Chemistry	(2-1 h)	Labuda, Mocák
Identification of Chemical Substances	(2-1 h)	Lehotay, Liptaj
Lab.Practice V.	(0-10 h)	Matisová
Automatisation of Analytical Chemistry	(2-0 h)	Rievaj
Nuclear Analytical Chemistry	(2-0 h)	Tarapeík
Environmental Analytical Chemistry	(2-0 h)	Benická, Buzinkaiová
10th semester		
Laboratory of Diploma Work	(0-30 h)	
Selected Subjects		

IV. CURRENT RESEARCH PROJECTS

A. Development and Application of Direct Injection Assays for HPLC Analysis of Some Drugs and Toxic Compounds in Biological Samples (Eva Brandšteterová)

The aim of the project is the development and application of new automated assays with the possibility of direct injection of biological samples into the HPLC system. New sorbents, especially with restricted access for macromolecules (Restricted Access Materials- RAM) and high retention and preconcentration ability for analyzed compounds are tested for the preseparation step.

RAM precolumns with the recommended material have been integrated directly into the HPLC system what improves validation parameter values and minimizes the personal contact with biofluids. Direct sample injection of biological samples (hemolyzed blood, plasma, serum, urine, homogenates of tissue, supernatants of cell cultures, extracts of plants and milk) with the application of RAM materials has not been widely applied till now and the study of optimal extraction and retention conditions, interactions of analytes and matrix biopolymers with the sorbent enable to integrate the RAM extraction precolumn into the HPLC equipment.

The results obtained during the project research works:

- Some new assays have been developed for the direct achiral and chiral HPLC analysis of chosen drugs and their metabolites with the applications of various new sorbents in preseparation columns integrated on-line into the HPLC system and results have been compared with techniques, commonly used in biological sample handling. Column-switching system was applied for the development of new procedures in drug monitoring in clinical material and the HPLC analysis of biological compounds in food and plant samples.
- RAM sorbents have been chosen with acceptable hydrophobic behaviour for the analyzed compounds and elution parameters have been determined with the aim to achieve the sufficient preconcentration of analytes in biological matrices.
- The results of HPLC and electromigration methods (CE) have been compared for chiral separation of some drugs and their metabolites in clinical samples and some new methods have also been developed for direct ITP analysis of the group of drugs in biological material and organic acids in food samples.

The study of interactions with the influence on selectivity of chiral drug separation has been realized, the possible steric influence, the effect of separated molecules caused by mobile and stationary phases have been studied and the separation mechanism for applied chromatographic system has been explained.

B. New Electroanalytical and Spectroscopic Systems for Ultra-trace and Speciation Analysis with Special Emphasis to Environmental and Clinical Problems. Optimization of analytical procedures (Dušan Bustin)

The aim of the project is the development of analytical methods for trace and ultratrace analysis of complex clinical and environmental samples. The results achieved during recent stage of research can be summarized as follows:

- Analytical methods for determination of Se and dithiocarbamates in environmental samples were developed and characterized metrologically. The methods apply Interdigitated Microelectrode Array in dual polarization mode.
- Metrological characterization and validation was accomplished for AAS determination of As and Se using electrochemical generation of corresponding hydrides.
- Analytical method for simultaneous determination of Zn, Cd, Pb and Cu using flow galvanostatic stripping coulometry was developed.
- A new method for determination of electroactive species using total electrolysis inside porous electrode was developed. The method was tested for determination of some metals (Fe, Cr) and non-metals (halogenides, oxygen, nitrates, organic species) in aquatic samples.
- A new method of determination of limit of detection was applied in different regions of trace analysis.
- Interfering signals in voltammetry were deconvoluted using their transformation by semidifferentiation.

C. Trace analysis of selected analytes in complex organic systems by combination of preconcentration techniques and capillary gas chromatography (Eva Matisová)

The project is oriented to the development of methods for the trace analysis of selected, particularly volatile and semivolatile compounds in complex organic systems - in environmental matrix (predominantly water) utilising preconcentration techniques in combination with capillary GC. A part of the project is devoted to the miniaturisation in analytical chemistry - to the development of microextraction methods for the sample preparation, large volume injection (small sample size necessary) in capillary GC. A part of the project is connected with the development of high speed GC and combination with preconcentration techniques for the analysis of semivolatiles polarity thermolabile compounds. High speed gas chromatography allows the shortening of the time of analysis have evaluated the present state of the theory of high speed capillary GC, fa. influencing the speed of analysis and instrumentation which could be utilized for

GC – conventional and ultra high speed GC utilising specially development Instrumentation. For the aims of trace analysis we have used high speed GC with own column injection. We have shown the necessity of the combination of conventional dimensions precolumn with the narrow bore analytical capillary column, which allows a sample introduction without the peaks broadening. The influence of experimental parameters, as column head pressure, injection volume, initiation temperature of the temperature programme and temperaturegradient on peaks focusing was searched.

D. CEEPUS Project PL-0110-00/01 (Ján Mocák)

The Project, planned for the schoolyear 2000/2001, concerns 5 cooperating Universities: (1) Faculty of Material Science and Ceramics, University of Mining and Metallurgy, Kraków, Poland, (2) Institute für Analytische Chemie, Karl-Franzens-Universität, Graz, Austria, (3) Faculty of Chemistry & Chemical Technology, University of Ljubljana, Slovenia, (4) Department of Analytical Chemistry, Slovak University of Technology, Bratislava, Slovak Republic, and Institute of Analytical Chemistry, Faculty of Chemical Technology, University of Pardubice, Czech Republic.

The collaboration is focused on education and research in analytical chemistry, especially at the postgraduate and graduate level, mainly in the following areas: development and improvement of contemporary analytical methods and procedures, monitoring the environmental pollution, application of the quality systems and accreditation requirements to the research and routine analytical laboratories. The following key activities have been planned for the Project:

- 1) Mobility of the PhD and Master degree students to improve their educational level and language skills.
- 2) Mobility of the teaching staff to increase their teaching performance.
- 3) Utilization of unique or rarely available instruments and experience of their operation by the cooperating partners - the students as well as academic staff.
- 4) Preparation of joint scientific outputs.

E. Development of new analytical methods in environment and pharmaceutical drugs in biological systems (Drahomír Oktavec)

1. The aim of this Project is:

a) to develop methods for the determination of trace and ultra trace amounts of chosen toxic elements and compounds in the air, soils and waste products of industrial factories which would also allow to monitor their transition into the food chain of mammals,

b) on the base of chromatographic methods to model conditions in biological materials and develop methods both for the determination of pharmaceutical drugs and their degradation products in biological systems as well as for the separation of enantiomers of pharmacologically active compounds,

c) to study crystal and molecular structure of biologically active compounds by X-ray structure methods, which results are obliged as qualitative criteria for drugs.

2. In the frame of the project the very good results were achieved in the field of the study of some drugs by HPLC and structural analysis. Also, the some pollutants in environmental were studied. The students were included in the study and so the project had the very good education efficiency (diploma and projekt works). Some results of the study were used into education process in the field of practical student training. Besides of diplom and projekt works 7 lectures were presented on the international symposia and local conferences.

F. The development of modern method for teaching analytical chemistry supported by PC (Pavol Tarapčík)

This project is directed to overcome drawbacks of traditional teaching method by applying relatively individual work methods in front of PC in the field of analytical chemistry. Chemical equilibria as applied in analytical chemistry represents for students relatively complex problem both in chemical and mathematical description. The last one is often crucial in the classroom work but represents only the tool, not the content analytical chemistry. The principal aim of the project is: by minimising time consuming calculation in classroom open new possibilities to recognise chemical principles of analytical methods.

The main goals of this project are:

- to make simulating software for various analytical methods, mainly in the area of chemical equilibria in analytical chemistry,

- to make teaching procedures supported by simulating software, combining work methods in whole group by traditional method and in small groups (two-three students) with PC.

- to make templates for solving typical problems of analytical chemistry.

We have prepared new teaching software supports based on spreadsheet „EXCEL“. These products include:

software intended to assist teaching acid-base equilibria,

application software of chemical equilibria in analytical methods,

solved templates of typical analytical and equilibrium problems (on PC)

The textbook containing typical solutions of analytical problems was prepared as well.

V. COOPERATION

A. Cooperation in Slovakia

Department of Analytical Chemistry PrF UK Bratislava
Faculty of Natural Sciences, Comenius University, Bratislava
Faculty of Medicine, Comenius University, Bratislava
Faculty of Pharmacy, Comenius University, Bratislava
Food Research Institute, Bratislava
Institute of Veterinary Hygiene and Ecology, Trnava
National Institute of Oncology, Bratislava
Slovak Academy of Sciences, Bratislava

B. International Cooperation

Department of Analytical Chemistry, Palacky University, Czech Republic
 Department of Chemistry, Gilman Hall, Iowa State University, Ames, IA 50011-3111, USA
 Chiral separation of optical active compounds by GC and SFC
 Department of Organic Chemistry, Gent University, Gent, Belgium
 Chiral separation of optical active compounds by GC and SFC
 Department of Oncology, University of California, San Diego, U. S. A.
 Department of Pharmacology, McGill University, Montreal, Canada
 Faculty of Material Science and Ceramics, University of Mining and Metallurgy, Kraków, Poland
 Electrochemical trace analysis
 Advanced chemometric evaluation of analytical data
 Institute of Analytical Chemistry, University of Leipzig, Germany
 Electrochemical methods in atomic spectroscopy
 Institute of Pharmaceutical Chemistry, University of Muenster, Germany
 Institute of Pharmacy, University of Liege, Belgium
 National Research Institute of Health Science, Tokyo, Japan
 Organic Compounds in Aerosols
 Technical University Vienna, Institute of Analytical Chemistry, Vienna, Austria
 Utilization of Capillary GC in Combination with reconcentration Techniques for the Analysis

C. Membership in Domestic Organizations and Societies

Editorial Board of the Slovak scientific journal Laboratory Diagnosis	(J. Mocák)
Slovak Chemical Society at Academy of Science, Group of Analytical Chemistry	(J. Krupčík)
Slovak Chemical Society, Chromatographic group	(E. Brandšteterová)
Slovak Chemical Society, Bratislava	(J. Labuda)
Slovak Research Technical Society	(E. Brandšteterová)
Slovak Society of Industrial Chemistry, Bratislava	(J. Labuda, M. Bučková, M. Vanířková)
Slovak Spectroscopic Society Bratislava	(E. Beinrohr, A. Manová, J. Laštincová)

D. Membership in International Organisations and Societies

Advisory board member of the Fresenius Journal of Analytical Chemistry	(E. Beinrohr)
Federation of European Chemical Societies- delegate of the Slovak Chemical Society in the Division of Analytical Chemistry	(J. Labuda)
Gesellschaft Deutscher Chemiker, Frankfurt	(E. Beinrohr)
International Union Against Cancer, Switzerland	(E. Brandšteterová)

E. Tempus Programme :**F. International Scientific Programmes :**

1. Biosensors for Direct Monitoring of Environmental Pollutants in the Field, INCO-COPERNICUS PROJECT ERBIC 15CT960804, Labuda J., project manager, University of Athens, January 1997 – January 2001

2. SLOVAK – US UNIVERSITIES CO-OPERATION Project Title: Mechanistic study of chiral recognition in HPLC and HRGC, J. Krupčík

The main objective of the project is to study some mechanistic aspects of chiral recognition in the direct separation of enantiomers by HPLC and HRGC. The project consists of following parts:

- 1 An influence of structure and polarity differences in substituents bonded to the asymmetric carbon atom in enantiomers, and selectivity of a chiral selector in HPLC and HRGC shall be studied in detail. Modified α -, β - and γ -cyclodextrins and macrocyclic antibiotics shall be used in gas and/or liquid chromatography as chiral selectors.
- 2 Thermodynamic data which characterize overall and enantioselective interactions of the enantiomers with chiral selectors shall be collected to gain more insight into the mechanistic aspects of enantioselective separation on modified cyclodextrins.
- 3 A dependence of selectivity of a chiral column on the concentration of a chiral selector in polysiloxane solvent (a column coated with a mixed chiral phase and achiral phases) shall be compared with the overall selectivity of two columns coupled in series. In the column series, stationary phases in the individual chiral and achiral columns shall be identical with those used in column coated with the mixed chiral and polysiloxane phases.
- 4 Reasons responsible for the temperature dependence of retention order shall be studied by the GC separation of enantiomers on modified α -, β - and γ -cyclodextrins.
- 5 For mechanistic studies of enantiomers separated by chiral HPLC on macrocyclic antibiotics indirect detection techniques shall be introduced.
- 6 Selectivity of two chiral columns coupled in series for the direct separation of enantiomers by HRGC and RP HPLC shall be tuned by the change of mobile phase flow rate in individual columns. Elaborated optimum separation system shall be used for two dimensional separation of optically active compounds in natural samples.

Slovak Principal Investigator: Prof. Ján Krupčík, PhD DSc, Department of Analytical Chemistry, CHTF STU in Bratislava, Slovak Republic

Main American Investigator: Prof. Daniel W. Armstrong, Department of Chemistry, Gilman Hall, Iowa State University, Ames, IA 50011-3111, USA

3. NATO Project 621: Development of methods for determination biodegradation explosive pollutants. J. Lehotay, project manager.

The main aim of the project is the development of new analytical methods for ultratrace determination of some nitroaromatic in ground water and contaminated soil by a combination of a phase extraction and HPLC using diode array and electrode detection. In this year the determination of some nitroaromatic compounds in

contaminated soil samples was developed. The determination limit (1 ppb) was achieved. The extraction red also included in the study.

G. Visitors from Abroad

Prof. H. J. Vander Linde Pretoria, South Africa, March 1999 (1 day)
 Profesor Jose Antonio Garcia Institute of Physical Chemistry Rocasolano v Dominguez Madrid, Spain (2 days)

H. Visits of Staff Members and Postgraduate Students in Foreign Institutions

B. Balla	Graz, Austria, July 2-7 2000 (4 days)
E. Beinrohr	Bonn, Deutschland, conference, June 12-16 2000 (5 days)
E. Beinrohr	Bologna, Poland, June 19-21 2000 (3 days)
E. Beinrohr	Warsaw, Poland, conference, June 26-30 2000 (5days)
E. Beinrohr	Klívce, Poland, conference, July 9-13 2000 (5 days)
E. Beinrohr	USA, conference, August 2-15 2000 (14 days)
E. Beinrohr	Czech Republic, conference, August 30-31 2000 (3 days)
E. Beinrohr	Czech Republic, symposium, September 12-14 2000 (3 days)
E. Beinrohr	Deutschland, conference, 5-7 October 2000 (3 days)
E. Beinrohr	Czech Republic, November 7-8 2000 (2 days)
E. Beinrohr	Czech Republic, November 16 2000 (1 day)
E. Benická	Italy, conference, June 5-10 2000 (6 days)
E. Brandšteterová	Turkey, June 2000 2-16 (15 days)
E. Brandšteterová	Czech Republic, conference, September 4-6 2000 (3 days)
M. Buèková	Czech Republic, July 19–23 2000 (4 days)
A. Èaniová	Czech Republic, conference, August 21-25 2000 (5 days)
J. Dzurov	Czech Republic, conference, May 30–June 1 2000 (3 days)
A. Ferancová	Poland, May – June 2000 (1 month)
A. Ferancová	Czech Republic, conference, September 17–20 2000 (4 days)
A. Hercegová	Czech Republic, conference, August 28–Sept. 1 2000 (5 days)
K. Hroboòová	Italy, conference, June 5–10 2000 (6 days)
K. Hroboòová	Czech Republic, conference, September 4–6 2000 (3 days)
K. Hroboòová	Czech Republic, conference, September 17–20 2000 (4 days)
K. Hroboòová	Czech Republic, conference, October 19–21 2000 (3 days)
P. Korytár	Wien, Austria, March 30 2000 (1 day)
P. Korytár	Italy, conference, June 5–10 2000 (6 days)
P. Kotianová	Wien, Austria, November 6 2000 (1 day)
P. Kotianová	Wien, Austria, December 7–9 2000 (3 days)
J. Krupèik	Wien, Austria, January 18 2000 (1 day)
J. Krupèik	Deutschland, symposium, April 16–20 2000 (5 days)
J. Krupèik	Italy, conference, June 5–10 2000 (6 days)
J. Krupèik	Czech Republic, conference, September 4–6 2000 (3 days)
J. Krupèik	Croatia, October 9–13 2000 (5 days)
P. Kubalec	Deutschland, May 2000–April 2001 (12 months)
J. Labuda	Greece, May 11–14 2000 (5 days)
J. Labuda	Deutschland, June 10–16 2000 (6 days)
J. Labuda	Poland, May 31–June 2 2000 (3 days)
J. Labuda	Portugal, September 2–7 2000 (6 days)
J. Labuda	Deutschland, September 19–November 19 2000 (2 months)
J. Lehotay	Wien, Austria, January 18 2000 (1 day)
J. Lehotay	Deutschland, symposium, April 16–20 2000 (5 days)
J. Lehotay,	Italy, conference, June 5–10 2000 (6 days)
J. Lehotay	Czech Republic, conference, September 4–6 2000 (3 days)
J. Lehotay	Czech Republic, conference, October 19–21 2000 (3 days)
P. Májek	Italy, conference, June 5–10 2000 (6 days)
E. Matisová	Wien, Austria, January 18–19 2000 (2 days)
E. Matisová	Wien, Austria, March 30 2000 (1 day)
E. Matisová	Greece, May 10–17 2000 (8 days)
E. Matisová	Italy, conference, June 5–10 2000 (6 days)
E. Matisová	Wien, Austria, November 6 2000 (1 day)
J. Mocák	Pardubice, Czech Republic 2–3 May 2000 (2 days)
J. Mocák	Graz, Austria, July 2–5 2000 (4 days)
J. Mocák	Czech Republic, November 21–24 2000 (4 days)
P. Oswald	Belgium, April–June 2000 (1 month)
P. Oswald	Italy, conference, June 5–10 2000 (6days)
I. Špánik	Italy, conference, June 5–10 2000 (6 days)
I. Špánik	Deutschland, July 10–August 8 2000 (1 month)

VI. THESES AND DISSERTATIONS

A. Graduate Theses (MS Degree) for state examinations after five years of study in Analytical Chemistry (Supervisors are written in brackets)

Árendáriková S.: In - electrode coulometric titrations (E. Beinrohr)

Bajdichová M.:	Calculation of enantiomerization energy barrier of thermal labile optical active compound separated by gas chromatography on chiral phases (J. Krupčík)
Bindzárová I.:	The determination of sorbic acid in food products (T. Buzinkaiová)
Ľungelová J.:	Separations of some enantiomers of phenylcarbanic derivates by HPLC (J. Lehotay)
Fedorčáková A.:	Speciation of phosphate salts in aqueous solutions (P. Tarapčík)
Fuknová M.:	Analysis with DNA biosensor (J. Labuda)
Heilerová Ľ.:	Ninhydrin as a luminescence reagent (M. Ěakrt)
Husáková G.:	Electrochemical generation of hydrides for atomic spectroscopy (A. Manová)
Javorová S.:	The study of Possibilities of RAM sorbents in HPLC of clinical sorbents (E. Brandšteterová)
Kotianová P.:	Capillary gas chromatography and its utilisation in the analysis of mixtures of organic compounds (E. Matisová)
Miěě S.:	Creation and adaption of Chemometrically and metrologically oriented Software (J. Mocák)
Nyúlová K.:	Study of Spectral Propeties and Separation of some Toxic Metal Ditiocarbamates (D. Oktavec)
Orošová K.:	Isotachophoretic study of some drugs. (J. Sádecká)
Podhradská I.:	HPLC analysis of phenolic acids in <i>Melissa officinalis</i> (E. Brandšteterová)
Rosincová D.:	Determination of drugs using electrode modified with β -cyclodextrin (E. Korgová)
Vývleková Z.:	Application of voltammetric microelectrodes in ultratrace analysis (M. Rievaj)
Zajčková Z.:	Use of gas chromatography and derivatization in analysis of selected compounds from environmental matrices (E. Benická)

B. Dissertations (PhD)

Špánik I.:	The study of mechanistic aspects of chiral separation in capillary gas chromatography on cyclodextrin stationary phases (J. Krupčík)
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VII. PUBLICATIONS

A. Journals (* registered in Current Contents)

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C. Books and Textbooks

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D. Patents

E. PC Programmes

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- [3] Tarapčík P., Beinrohr E.: distrib - Distribution diagrams for acid-base and complex equilibria
- [4] Tarapčík P.: Set of solved analytical and chemical equilibria problems using the ECXEL spreadsheet

DEPARTMENT OF BIOCHEMICAL TECHNOLOGY

Head of the Department:
Prof. Fedor Malík, PhD, DSc

Telephone: +421-7-52967 085
Fax: +421-7-52967 085
E-mail: cheval@cht.stuba.sk

I. STAFF

Full Professors:
Jozef Augustín, PhD, DSc

Associate Professors:
Michal Rosenberg, PhD; Ján Šajbidor, DSc; Daniela Šmogrovièová, PhD; Ernest Šturdík, PhD;

Assistant Professors:
Katarína Dercová, PhD; Zoltán Dömény, PhD; Helena Miková, PhD; Mária Šturdíková, PhD

Research Fellows:
Zuzana Antalová; Petra Bafrncová; Milan Ěertík, PhD; Ľudmila Krištofíková; Dušan Slugeò, PhD; Valter Vollek; Jana Zigová, PhD

PhD students:
Sathi Greta Bugan; Vladimír Hronský; Marián Navrátil; Katarína Mináriková; Jaroslava Pátková; Lucia Sláviková; Roman Tandlich; Ján Tkàè; Igor Voštiar.

Technical Staff:
Vlasta Sládková; Jaroslava Telgárska

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Laboratory for the design of bioactive compounds
Laboratory for biotechnological production of organic acids and fine chemicals
Laboratory for study, isolation and transformation of microbial lipids
Laboratory of secondary metabolites
Laboratory of wine microbiology and oenology
Laboratory of bioengineering
Laboratory for solid-state fermentations
Laboratory of yeast biotechnology
Laboratory for microbial degradation of xenobiotics
Laboratory of brewery technology

III. TEACHING

A. Undergraduate Study

3rd semester (autumn)		
Biochemistry and Microbiology	(2-1-0 h)	Šmogrovièová, Ěertík
5th semester (autumn)		
Principles in Biotechnology	(2-0-0 h)	Šturdík
Xenobiochemistry	(2-0-0 h)	Augustín, Dercová
6th semester (spring)		
Biophysical Chemistry	(2-2-0 h)	Valko, Zigová
Semestral Work	(0-0-4 h)	Miková, Navrátil, Šajbidor, Šmogrovièová, Šturdík, Šturdíková, Zigová
7th semester (autumn)		
Enzymology and Enzyme Engineering	(2-2-0 h)	Augustín, Miková
Biochemical and Biotechnological Informations	(1-2-0 h)	Šmogrovièová, Dömény, Navrátil
Technical Microbiology	(2-0-0 h)	Šturdík
Biosynthesis and Transformation of Metabolites	(2-0-0 h)	Rosenberg
Special Laboratory	(0-0-3-4 h)	Antalová, Ěertík, Dömény, Hronská, Rosenberg, Šmogrovièová, Šturdík, Šturdíková
8th semester (spring)		
Bioanalytical Methods	(2-1-0 h)	Šajbidor
Laboratory of Bioanalytical Methods	(0-0-2 h)	Miková, Sláviková, Navrátil, Tkàè, Zigová
Bioengineering	(2-2-0 h)	Báleš, Polakoviè, Slugeò
Pharmaceutical Biotechnologies	(2-0-1 h)	Šturdíková, Mináriková
Ecochemical Biotechnologies	(2-0-1 h)	Rosenberg, Dercová
Special Laboratory	(0-0-6 h)	Augustín, Dercová, Krištofíková, Malík, Navrátil,

9th semester (autumn)		Rosenberg, Slugeò, Šajbidor, Šmogrovièová, Šturdík, Šturdíková, Tkáè, Zigová
Food Biotechnology	(2-0-1 h)	Malík, Slugeò
Malting and Brewing	(2-0-1 h)	Šmogrovièová, Dömény
Chemistry and Microbiology of Wine	(2-0-1 h)	Malík, Slugeò, Vollek
Microbial Biomass and Distillery	(2-0-1 h)	Augustín, Šmogrovièová, Dömény
Biochemical and Genetical Regulations	(2-0-1 h)	Šturdík, Antalová
Special Laboratory	(0-0-6 h)	Augustín, Ěertík, Dercová, Dömény, Krištofíková, Malík, Navrátil, Rosenberg, Slugeò, Šmogrovièová, Šturdík, Šturdíková

10th semester (spring)

Diploma Work

B. PhD Study

Biochemical Technology	(3 h)	Augustín
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IV. CURRENT RESEARCH PROJECTS**A. Application of microorganisms in food industry and agriculture – biotechnological aspects. (Ján Šajbidor)**

1. We have isolated the ethanol-tolerant and chemoresistant yeast strains that can be utilize in the wine and spirit technologies. Morphological, biochemical and technological characteristic of the isolates were characterized.

2. Osmotolerant strains of the brewers yeasts suitable to ferment highly concentrated worth was isolated and tested in laboratory conditions and in the real technological process.

3. The microorganisms from contaminated environment suitable for the bioremediation technologies were isolated. We developed an empirical model expressing distribution of hydrophobic pollutants, With the use of QSBR methods, we will try to predict their degradation degradability.

4. Based on the study of the homeoviscous adaptation mechanism of the cell membrane, we have tested the technologically useful substances that protect the cell during the technological processes (high level of ethanol, temperature and osmotic changes, dehydration and anabiosis, etc.). By activation of the own adaptation mechanism of the cell, we will try to increase survival of the cells in the extreme conditions.

B. Immobilized technologies: Implementation of new immobilization techniques/technologies into microbial and plant fermentations and biotransformations and their industrial applications (E. Šturdík)

The project aims to integrate up-to-date knowledge of material engineering of supports (new hydrogels and composite materials for capsule cell immobilization, new methods of exact measuring of mechanical properties of hydrogel supports), immobilization methods (new gelation techniques), methods of preparation of immobilized cells with uniform size and shape in volumes needed for industrial application, knowledge of effect of immobilization process to physiological state and metabolism of cells and microbial and plant fermentation biotechnologies, biotransformations and xenobiotics biodegradations. It should result into rational introduction of immobilization processes into biotechnological productions, which research and development in traditional version have already been in the advanced research phase of. The most perspective are: fermentation of starch hydrolysates to ethanol, primary and secondary beer fermentation, tensid-like xenobiotics degradation. The project is oriented to solve all aspects of the problem during scaling-up within 3 years: selection of support and immobilization method, investigation of properties of immobilizates, design of appropriate bioreactor and quantitative definition of fermentation behavior.

V. COOPERATION**A. Cooperation in Slovakia:**

VÚL Modra

Institute of Drug Research, Modra

Soil Fertility Research Institute, Bratislava

Institute of Preventive and Clinical Medicine, Bratislava

Faculty of Pharmacy, Comenius University, Bratislava

Institute of Experimental Pharmacology, Slovak Academy of Science, Bratislava

Institute of Ecobiology, Slovak Academy of Science, Bratislava

Institute of Chemistry, Slovak Academy of Science, Bratislava

Likospol, Bratislava

Allcop, Bratislava

Research Institute of Viticulture and Oenology, Bratislava

Brewery, S.t.e.i.n., a.s., Bratislava

Brewery, Codecon, Svätý Jur

Wine Establishments in Bratislava-Raèa, Pezinok, Sereï , Nitra, Tibava

Slovakofarma, Hlohovec

Material Technology, Bratislava

Slovnaft, Bratislava

Biotika, Slovenská Ľupèa

Ekopol, Bratislava

Topvar Brewery, Topoľany

Codecon, Sv.Jur
 Biopo, Leopoldov
 Research Institute of Rheumatic Diseases, Piešťany
 Piešťany spa
 Istrochem, Bratislava
 Alfa Bio, Banská Bystrica
 Geopol Prešov
 VÚPOP Bratislava

B. International Cooperation:

- North Dakota State University, College of Pharmacy, Department of Pharmaceutical Sciences, Fargo, North Dakota, USA
- Subcellular pharmacokinetics; Prediction of the fate of xenobiotics in the environment
- UFZ Centre for Environmental Research, Department of Chemical Ecotoxicology, Leipzig, Germany
- Degradation of pollutants in sediments
- BCS Engineering, Brno, Czech Republic
- Bioconversion of malein anhydride to organic acids
- Office International de la Vigne et du Vin, Paris, France
- Evaluation of wine
- Agricultural University, Brno, Czech Republic
- Microbiology of wine fermentation
- Wine Establishment, Znojmo - Šatov, Czech Republic
- Chemistry of red wine
- European Organization for Research and Treatment of Cancer, Biological Station Roscoff, France
- New enzyme inhibitors
- Institute of Microbiology, Academy of Sciences of Czech Republic, Praha, Czech Republic
- Overproduction of polyunsaturated fatty acids
- Institute of Microbiology, Academy of Sciences of Czech Republic, Praha, Czech Republic and Kyoto University, Department of Agricultural Chemistry, Kyoto, Japan
- Immunomodulating compounds
- University Claude Bernard, Lyon, France
- New enzyme inhibitors
- Office International de la Vigne et du Vin, Paris, France
- in Wine Tasting Commission
- Pure and Applied Biochemistry, University of Lund, Sweden
- Enzyme thermistor applications in analysis

C. Membership in Domestic Organizations and Societies:

Slovak Society of Biotechnology, Bratislava (J.Augustín, K.Dercová, D.Slugeò)
 Slovak Society for Biochemistry and Molecular Biology, Bratislava (J.Augustín)
 Slovak Society for Agriculture, Forestry, Food and Veterinary Sciences, Bratislava (J.Šajbidor, D.Slugeò)

D. Membership in International Organizations and Societies:

Editorial boards of the journal Kvasný průmysl, Prague, Czech Republic (F.Malík, D.Šmogrovièová)
 ECE Governments on Science and Technology of The United Nations, Geneva, Switzerland (J.Augustín)
 Member of the EBC Brewing Science Group, Zoeterwoude, The Netherlands (D.Šmogrovièová)
 Czecho-Slovak Society of Microbiology, Bratislava (J.Augustín, K.Dercová, D.Hažama, D.Šmogrovièová, M.Šturdíková)
 SETAC-Society for environmental Toxicology and Chemistry (R.Tandlich)

E. CEEPUS PROGRAMME

Number H-0115, Green Network in Central Europe (Šmogrovièová D., Dömény Z.) Coordinator: Szent Istvan University, Buda Campus (University of Horticulture and Food Industry)
 University of Agriculture, Forestry and Renewable Natural Resources, Vienna

Mendel University of Agriculture and Forestry, Brno

University of Agriculture in Wroclaw

University of Agriculture in Nitra

Josip Juraj Strossmayer University of Osijek

Slovak University of Technology in Bratislava

University of Ljubljana

G. Visitors from Abroad:

Assoc.Prof.J.Ěepièka

University of Chemical Technology, Prague, Czech Republic,
 December 2000 (2 days)

H. Visits of Staff Members and PhD Students to Foreign Institutions:

K. Dercová

ISEB4, 4th International Symposium on
 Biotechnology, Noordwijkerhout, The Netherlands, April 10-12

Dercová

NATO Advanced Research Workshop, Liblice, Czech Rep/, June 14-19

Dercová

WCB, The World Congress on Biotechnology, Berlin, Germany,
 September 3-8

H. Hronská	University of Minho, Braga, Portugal January 2000 (3 months)
H. Hronská	Tomáška s' days, Brno, Czech Republic, June 7-9
F. Malík	Bacchus-Int.Wine Conference, Madrid, Spain , February 4-8
F. Malík	Vinalies 2000, Paris, France, February 10-16
F. Malík	Sélection Mondiales Montréal, Montréal, Canada, March 12-17
F. Malík	International Wine Concours, Bruxelles, Belgium, April 7-11
F. Malík	Vino Zagreb, Zagreb, Croatie, April 12-16
F. Malík	International Wine Concours, Sofia, Bulgaria, May 1-6
F. Malík	Vino Ljubljana , Ljubljana, Slovenia, May 25-29
F. Malík	Vinoforum 2000, Krk, Croatie, June 8-11
F. Malík	International Concurso do Vinhos, Porto, Portugal, July 2-9
F. Malík	International Wine Competition, Ürgüp, Turken, October 10-15
F. Malík	International Wine Conference, Zagreb, Croatie, November 22-24
F. Malík	Vin Agora, Budapest, Hungary, November 25-27
M. Navrátil	COST-TMR Joint Meeting, Vienna, Austria, May 18-20
D. Šmogrovičová	EBC-European Brewing Convention Congress, Plzeň, Czech Republic, September 26-29
R. Tandlich	North Dakota State University, North Dakota, USA, september 2000 (1 year)
R. Tandlich	NATO Advanced Research Workshop, Liblice, Czech Rep., June 14-19
J. Zígová	EPFL, Technical University, Lausanne, Switzerland, July 2000 (1 year)

VI. THESES AND DISSERTATIONS

A. Graduate Thesis (MS Degree) for state examinations after five years of study (supervisors are written in brackets):

Antalová Z.:	New yeast strains for ethanol fermentation. (J. Zígová)
Bednár M.:	Verification of semi-pilot plant continuous system for wort fermentation. (D. Šmogrovičová)
Bečová P.:	Biodegradation activity of actinomycetes. (J. Augustín)
Cečková K.:	The possibility of exact tasting of wine. (F. Malík)
Cehelníková Ž.:	Microbial production of L(-)-malic acid. (M. Rosenberg)
Deměáková E.:	Determination of neutral lipids in tissues, plasma and serum of rats undergoing special diet (E. Šeböková)
Farkašová J.:	Radioisotopic methods application in the monitoring of new synthesizing inzuline analogues. (Š. Zorád)
Foltánová M.:	Preparation of new products of erythritol. (¼ Křištofíková)
Jiroušová B.:	Production of low-alcoholic fermented beverages. (D. Šmogrovičová)
Kolenová K.:	Semicontinuous bioconversion cis-epoxysuccinate- tartrate by <i>Nocardia tartaricans</i> . (M. Rosenberg)
Kováčová S.:	Biodegradation activity of streptomycetes. (J. Augustín)
Kyšeřová Z.:	Biodegradation of pentachlorophenols in soil. (K. Dercová)
Martišková M.:	Chlorobenzoates as the intermediates and biphenyl as the inductor of PCB biodegradation. (K. Dercová)
Mašlanková A.:	Conversion of glycerol to dehydroxyacetone by free and immobilised cells of <i>Gluconobacter oxydans</i> . (E. Šturdík)
Turic M.:	Brewing yeast separation using cross-flow microfiltration. (D. Šmogrovičová)
Nováková S.:	Optimisation of ethanol fermentation using immobilised cells. (J. Zígová)
Vajčziková I.:	The influence of environmental stress on yeast lipids. (J. Šajbidor)
Voštiar I.:	Applications of sol-gel composites in construction of amperometric biosensors. (E. Šturdík)

B. Dissertations (PhD):

Bafrncová P.:	Ethanol production using very high gravity substrates.
Bugan S.G.:	Beer recovery by cross-flow membrane filtration.
Mináriková K.:	Bioactive Secondary Metabolites of the Strains <i>Pyrenochaeta</i> species and <i>Penicillium funiculosum</i> .
Pátková J.:	Very high gravity wort fermentation.
Tkáč J.:	Biosensors with use of <i>Gluconobacter oxydans</i> and galactose oxidase.

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

[1]* Bafrncová P., Šmogrovičová D., Foltin T., Sláviková I., Pátková J.: Screening kmeňov *Saccharomyces cerevisiae* pre etanolovú fermentáciu vysoko koncentrovaných substrátov. Screening of *Saccharomyces cerevisiae* strains for very

- high gravity ethanol fermentation (in Slovak). Czech Journal of Food Sciences 18 (4), 129-136 (2000)
- [2] Bafrncová, P., Šmogrovičová, D., Pátková, J.: Surovinu na fermentačnú výrobu etanolu. Feedstocks for fermentation production of ethanol (in Slovak). Bulletin potrav. výskumu (Bull. Food Res.) 39 (1), 1-10 (2000)
- [3] Bafrncová P., Šmogrovičová D., Pátková J., Bednár M.: Inhibícia etanolovej fermentácie pri vysokom osmotickom tlaku. The inhibition of ethanol fermentation by high osmotic pressure (in Slovak). Kvasny průmysl 46 (3), 74-77 (2000)
- [4]* Bugan G.S., Dömény Z., Šmogrovičová D., Švitel J., Schlosser Š., Stopka J.: Ceramic membrane cross-flow microfiltration for beer recovery from tank bottoms. Monatsschrift für Brauwissenschaft 53 (11/12), 119-122 (2000)
- [5] Bugan G., Turic M., Dömény Z., Šmogrovičová D., Stopka J., Schlosser Š.: Aplikácia mikrofiltrácie pri odhoréovaní odpadových pivovarských kvasiniek pre potravinárske účely. Application of microfiltration a-t bitterness reduction of waste brewery yeasts for use in foods (in Slovak). Bulletin potrav. výskumu (Bull. Food Res.) 39 (3), 203-211 (2000)
- [6]* ěertík M., Shimizu S.: Kinetic analysis of oil biosynthesis by arachidonic acid-producing fungus, *Mortierella alpina* 1S-4. Appl. Microbiol. 54, 224-230 (2000)
- [7] Horváthová V., Janeček Š., Šturdík E.: Amyolytic enzymes molecular aspects of their utility properties. Gen.Physiol.Biophys.19, 338-348 (2000)
- [8] Horváthová V., Janeček Š., Šturdík E.: Amyolytic enzymes: their specificities, origins and properties. Biologia 55, 603-613 (2000)
- [9]* Kurrilová Ľ, Gemeiner P., Vikartovská A., Miková H., Rosenberg M., Ilavský M.: Calcium pectate gel beads for cell entrapment. Journal of Microencapsulation 17(3), 279-296 (2000)
- [10]* Lešová K., Šturdíková M., Rosenberg M.: Factors affecting the production of (-)-mitorubrinic acid by *Penicillium funiculosum*. Journal of Basic Microbiology 40 (5-6), 369-375 (2000)
- [11]* Lešová K., Šturdíková M., Proksa B., Pigos M., Liptaj T.: OR-1 – a Mixture of Esters of Glyceric Acis produced by *Penicillium funiculosum* and Its Antitrypsin Activity. Folia Microbiol. IX/X, 000-000 (2000)
- [12]* Lešová K., Šturdíková M.: Antifungálne metabolity produkované mikromycétami. Antifungal Metabolites produced by *Micromycetes* (in Slovak). Chem. Listy 94 (1), 21-27 (2000)
- [13] Lešová K., Šturdíková M., Proksa B.: Factors affecting the production of Pyrenocine A by *Pyrenochaeta* sp. Biológia 55 (3), 243-247 (2000)
- [14] Lešová K., Šturdíková M., Tybitanclová K.: Selection of mutant strain of *Penicillium funiculosum* for (-)-mitorubrinic acid production. Biologia 55 (6), 631-634 (2000)
- [15] Malík F.: Fenomén modernej enológie – čisté kultúry vínnych kvasiniek. Phenomena of modern enology – pure wine yeast cultures (in Slovak). Vinohrad 38 No 2, 30-33 (2000)
- [16] Malík F.: Aktívne suché vínne kvasinky I. Active dry wine yeasts I (in Slovak). Vinohrad 38 No 4, 5-7 (2000)
- [17] Malík F.: Aktívne suché vínne kvasinky II. Active dry wine yeasts II (in Slovak). Vinohrad 38 No 5, 2-3 (2000)
- [18] Malík F.: Dobré vína nedávnych konkurzov. Good wines of recently concours (in Slovak). Vin. Obzor 93 No 7-8, 270-271 (2000)
- [19] Malík F.: Dobré vína nedávnych konkurzov II. Good wines of recently concours II (in Slovak). Vin.Obzor 93 No 9, 326-327 (2000)
- [20] Malík F.: Argentínske víno, brazílske pivo. Argentinian wine, brasilian beer (in Slovak). Kvas.prům.46 No9, 261 (2000)
- [21] Malík F.: Viniè a víno v Portugalsku. Vine and wine in Portugal (in Slovak). Kvas.prům.46 No10, 299-300 (2000)
- [22] Malík F.: Európa plná vína. Europe full of wine (in Slovak). Vinohrad 38 No1, 7-8 (2000)
- [23] Malík F.: Mendoza, kraj vinièa a vína. Mendoza, country of vine and wine (in Slovak). Vinohrad 38 No2, 35-36 (2000)
- [24] Malík F.: Bacchus v Madride. Bacchus in Madrid (in Slovak). Vinohrad 38 No3, 1-2 (2000)
- [25] Malík F.: Vinica na letisku . Vineyard on the airport (in Slovak). Gastro No7-8, 26-28 (2000)
- [26] Malík F.: Bulharské reminiscencie. Bulgarian reminiscence (in Slovak). Vinohrad 38 No4, 2-3 (2000)
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- [28] Malík F.: Ekim, èas obraèiek. Ekim, time of vintage (in Slovak). Vinohrad 38 No6, 132-133 (2000)
- [29]* Navrátil M., Šturdík E.: Chemické aspekty imobilizovaných systémov v biotechnológiách. Chemical aspects of immobilized systems in biotechnologies (in Slovak). Chemické listy 94, 380-388 (2000)
- [30]* Navrátil M., Dömény Z., Hronský V., Šturdík E., Šmogrovičová D., Gemeiner P.: Use of bioluminimetry for determination of active yeast biomass immobilized in ionotropic hydrogels. Analytical Biochemistry 284, 396-400 (2000)
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- [32]* Pátková J., Šmogrovičová D., Dömény Z., Bafrncová P.: Kmene pre kvasenie vysokoextraktívnych mladín. Strains for very high gravity wort fermentation (in Slovak). Czech Journal of Food Sciences 18, 75-80 (2000)
- [33]* Pátková J., Šmogrovičová D., Dömény Z., Bafrncová P.: Very high gravity wort fermentation by immobilised yeast. Biotechnology Letters 22, 1173-1177 (2000)
- [34] Pátková J., Šmogrovičová D., Dömény Z., Bafrncová P.: Adaptácia voľných a imobilizovaných pivovarských kvasiniek pri skvasovaní vysoko koncentrovaných mladín. Free and immobilised yeast adaptation by very high gravity wort fermentation (in Slovak). Kvasny průmysl 46, 000-000, (2000)
- [35]* Pátková J., Šmogrovičová D., Bafrncová P., Dömény Z.: Changes in the yeast metabolism at very high gravity wort fermentation. Folia Microbiologica 45, 000-000 (2000)
- [36] Slugeò D., Malík F.: Medovina a medové vína. I. Mead and mead wines. I. (in Slovak). Vinohrad 38 (1), 19–20 (2000)
- [37] Slugeò D., Malík F.: Medovina a medové vína. II. Mead and mead wines II. (in Slovak). Vinohrad 38 (2), 43 – 44 (2000)
- [38] Slugeò D., Malík F.: Francúzsky paradox kritickými oèami. French paradox from the nutraceutic view (in Slovak). Vinohrad 38 (5), 115 – 118 (2000)
- [39] Slugeò D.: Medovina - nápoj našich predkov. Mead – the brew of our ancestors (in Slovak). Slovenský výber 4, 10-16 (2000)
- [40] Slugeò D.: Zaslúži si naše víno korkové zátky? Deserve our wine corks ? (in Slovak). Vinohrad 38, 6, 135 – 137 (2000)
- [41]* Staško A., Rapta P., Malík F.: Charakterisierung der Bierstabilität mit Hilfe von Radikalfängen (eine EPR-Studie).

- Monatschrift für Brauwissenschaft 53, 4-7 (2000)
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- [43] Šmogrovičová D., Dömény Z., Pátková J., Bafrcnová P.: Možnosti využitia glukózo-maltózových sirupov na náhradu extraktu mladiny. Exploitation possibilities of glucose-maltose syrups in substitution of wort extract (in Slovak). Kvasny průmysl 46 (5), 133-136 (2000)
- [44]* Šmogrovičová D., Pátková J., Dömény Z., Navrátil M.: Improvement in beer fermentation under very high gravity conditions by entrapped yeast. *Minerva Biotechnologica* 12, 000-000 (2000)
- [45]* Šturdík M., Slugeò D., Lešová K., Rosenberg M.: Mikrobiálna produkcia farebných azafilónových metabolitov. Microbial production of coloured azaphilone metabolites (in Slovak). *Chemické listy* 94, 105-110 (2000)
- [46]* Tandlich R., Brežná B., Dercová K.: The effect of terpenes on the biodegradation of polychlorinated biphenyls by *Pseudomonas stutzeri*. *Chemosphere*, 000-000 (2000)
- [47]* Tkàè J., Šturdík E., Gemeiner P.: Novel glucose non-interference biosensor for lactose detection based on galactose oxidase-peroxidase with and without co-immobilized β -galactosidase. *Analyst* 125, 1285-1289 (2000)
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- [52]* Žigová J., Šturdík E.: Advances in biotechnological production of butyric acid. *J. Industr. Microbiol. Biotechnol.* 27, 153-160 (2000)

B. Conferences (*International conferences)

- [1]* Bugan G.S., Šmogrovičová D., Dömény Z., Stopka J., Schlosser S.: Izolácia a odhorèovanie pivovarských kvasníc "cross-flow" filtráciou. Waste brewing yeast isolation and removing of its bitternes using "cross-flow" filtration (in Slovak). 2nd International Beer and Malt Conference, Bratislava, May 3-5th 2000, p. 41
- [2]* Burišová A., Slugeò D., Dodok L., Vršanská S.: Sledovanie α - a β -amylázovej aktivity vo vybraných cereáliách a pseudocereáliách. Monitoring of α - a β - amylase activity in the selected cereals and pseudocereals (in Slovak). Congress book of XXXI. New trends in food production and evaluation symposium, Sklaský Dvùr, May 22.-24. 2000, p. 7
- [3] Burišová A., Slugeò D., Pøbišová M., Dodok L.: Sledovanie lipázovej aktivity vo vybraných cereáliách a pseudocereáliách. Lipase activity monitoring in the selected cereal and pseudocereals (in Slovak). Zborník prenášok zo VI. zjazdu Slovenskej spoločnosti pre poľnohospodárske, lesnícke, potravinárske a veterinárne vedy pri SAV, Zvolen, September 6 - 7. 2000, p. 76-80
- [4]* Èertík, M.: Regulation of polyunsaturated fatty acids biosynthesis by desaturase-defective fungal mutants. Proceedings of International Conference "Application of Biotechnology in Agriculture and Food Production", Nitra, October 3.-5. 2000, L6
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- [6]* Dercová K., Baláž Š., Vrana B., Tandlich R.: Biodegradation of PCBs: metabolic pathway, distribution, kinetics and enhancement of efficacy. In: Proceedings of NATO Advanced Research Workshop "Utilization of Bioremediation to Reduce Soil Contamination: Problems and Solutions", Liblice, Czech Republik, June 14-19. 2000, p.7 L7
- [7]* Dercová K., Tandlich R., Brežná B.: Terpenes and biodegradation of PCBs In: Book of Abstracts of The World Congress on Biotechnology, Berlin, Germany, September 3.-8. 2000, Vol. 3, Section VI, p. 449.
- [8]* Dercová K., Vrana B., Baláž Š., Tandlich R.: Biodegradation of PCBs: distribution model, kinetics and enhancement of efficacy. In: Proceeding of 4th International Symposium on Environmental Biotechnology (S. Hartmans, P. Lens, eds.), Noordwijkerhout, The Netherlands, April 10.-12. 2000, p. 349-351
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- [10]* Malík F.: Quo vadis modern enology ? Int.Conference „Prospects for viticulture and enology“, Zagreb, November 22.-24. 2000, p. 101-104
- [11] Malík F.: Trend výroby vína v roku 2000. Trends in winemaking in year 2000 (in Slovak). Den vína, Státní zámek Buchlovice, March 4. 2000
- [12] Malík F.: Barikové vína. Barriques wines (in Slovak). Vinotéka Archa Brno, June 27. 2000
- [13] Malík F.: Technologie výroby vína ve středoevropském regionu. Kurz „Sommelier 2000/ 2001“, I. èást, Winemaking in regions of Middle Europe. Course „Somelier“ 2000/2001, I. (in Slovak). Wine Academy Valtice, September 28. 2000
- [14] Malík F.: Posudzovanie vín a svetové výstavy vín. Tasting of wines and world wine concours (in Slovak). Hotel Zlatá štika Pardubice, October 20. 2000
- [15] Malík F.: Víno v gastronomii. Wine in gastronomy (in Slovak). Hotel LUX B.Bystrica, March 23. 2000
- [16] Malík F.: Víno a jeho poslanie v spoločnosti. Wine and its mission in society (in Slovak). STU Bratislava, March 24., 31. 2000
- [17] Malík F.: Zásady senzorickeho hodnotenia vína. Organoleptic evaluation of wine (in Slovak). CHTF STU Bratislava, May 31. 2000
- [18] Malík F.: Praktické poznatky z oblasti senzorickeho hodnotenia vína. Practical knowledges in organoleptic evaluation of wines (in Slovak). CHTF STU Bratislava, June 1. 2000
- [19] Malík F.: Technologické vs. marketingové aspekty enológie. Odborné fórum projektu PHARE, Technological versus

- marketing aspects of enology. Phare Conference (in Slovak). Dunajská Streda, Juny 30. 2000
- [20] Malík F.: Chémia a mikrobiológia vína. Chemistry and microbiology of wine (in Slovak). CHTF STU Bratislava, August 31. 2000
- [21] Malík F.: Vôňa a chuť slovenských vín. Smell and taste of Slovakian wines (in Slovak). French Institute, September 19. 2000
- [22] Malík F.: Víno tretieho tisícročia. Wine of 3th millenium (in Slovak). Vedecká rada STU, Rektorát STU, Bratislava, December 4. 2000
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D. Patents

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E.

- [1] Malík R.: Joseph R. Francúzske vína. French wines (in Slovak). Ikar a.s. Bratislava. Odborná revízia slovenského prekladu. (Professional revision of slovakien translation.)

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DEPARTMENT OF BIOCHEMISTRY AND MICROBIOLOGY

Head of the Department:
Prof. Milan Miko, PhD, DSc

Telephone: ++421-7-326040
++421-7-5932 5514
Fax: ++421-7-52493198
E-mail: miko@checdek.chtf.stuba.sk

I. STAFF

Full Professors:

Katarína Horáková, PhD, DSc;

Associate Professors:

Daniela Hudecová, PhD; Soňa Jantová, PhD; Ľudovít Varečka, PhD;

Assistant Professors:

Barbora Dudová; Mária Mikulášová, PhD; Helena Paulíková, PhD

PhD Students:

Peter Chovanec; Boris Lakatoš; Karin Kaiserová; Jana Kubíková; Richard Pokorný; Zuzana Seemanová; Jana Strigáčová; Andrea Šovčíková;

Technical Staff:

Oľga Willantová-Secretary; Dagmar Adamíková; Gabriela Chytilová; Ľubica Jakubcová; Margita Kosárová; Hilda Némethová; Ján Škvara;

II. TEACHING AND RESEARCH LABORATORIES

Laboratory of Animal Cell Cultures
Laboratory of Biochemistry of Cancer Cells
Laboratory of Fungal Biochemistry and Physiology
Laboratory of Immunochemistry
Laboratory of Microbiology

III. TEACHING

A. Undergraduate Study

1st semester (autumn)

Biology	(2-0 h)	Jantová, Horáková, Mikulášová, Šovčíková, Paulíková
Laboratory Practice in Biology	(0-1 h)	Jantová, Dudová, Šovčíková, Oravcová

3rd semester (autumn)

Microbiology I	(2-0 h)	Hudecová
Laboratory Practice in Microbiology I	(0-2 h)	Hudecová, Majtán*, Mikulášová, Dudová, Pokorný

4th semester (spring)

Biochemistry I	(2-0 h)	Varečka
Laboratory Practice in Biochemistry I	(0-2 h)	Varečka, Paulíková, Chovanec, Lakatoš, Kaiserová, Pokorný

5th semester (autumn)

Principles of Human Nutrition	(2-0 h)	Miko
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6th semester (spring)

Laboratory Project	(0-4)	Miko, Horáková, Varečka, Hudecová, Jantová, Mikulášová, Majtán*, Dudová, Pokorný, Seemannová
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7th semester (autumn)

Biochemistry II	(2-0 h)	Varečka
Laboratory Practice in Biochemistry II	(0-2 h)	Varečka, Paulíková, Chovanec, Lakatoš, Kaiserová, Pokorný
Microbiology II	(2-0 h)	Mikulášová, Hudecová
Laboratory Practice in Microbiology II	(0-2 h)	Hudecová, Majtán*, Mikulášová, Dudová, Seemannová
Immunochemistry	(2-0 h)	Ferenčík*
Seminar in Immunochemistry	(0-1 h)	Ferenčík*
Laboratory Practice in Immunochemistry	(0-2 h)	Daussant*, Šovčíková, Seemannová, Kaiserová
Biosensors	(2-0 h)	Labuda*
Biosensor Seminar	(0-1 h)	Labuda*

Biosensors Laboratory Practice	(0-2 h)	Labuda*
8th semester (spring)		
Molecular Biology and Genetics	(2-0 h)	Mikulášová, Paulíková
Applied Microbiology	(2-0 h)	Hudecová, Majtán*
Bioenergetics	(2-0 h)	Miko
Laboratory Practice in Bioenergetics	(0-2 h)	Miko
Mechanisms of Action of Natural Compounds	(2-0 h)	Vareèka
Mechanisms of Action of Natural Compounds -Laboratory Practice	(0-2 h)	Dudová, Pokorný
Laboratory Practice of the branch Biomedical Engineering, Biochemistry and Microbiology	(0-4 h)	Miko, Horáková, Vareèka, Hudecová, Jantová, Mikulášová, Majtán*
9th semester (autumn)		
Genetic Manipulations	(2-0-2 h)	Kormanec*
Clinical Biochemistry	(2-0 h)	Chandoga*
Clinical Biochemistry-Laboratory Practice	(0-2 h)	Chandoga*
Cell cultures	(2-0 h)	Jantová, Horáková
Laboratory Practice of the branch Biomedical Engineering, Biochemistry and Microbiology	(0-6 h)	Horáková, Hudecová, Jantová, Miko, Mikulášová, Vareèka, Majtán*
10th semester (spring)		
Diploma Thesis Seminar	(3-0 h)	Miko, Horáková, Vareèka, Hudecová, Majtán*
Diploma Thesis	(0-27 h)	Miko, Horáková, Vareèka, Hudecová, Majtán*
B. PhD Study		
Biochemistry		Miko, Vareèka
Microbiology		Horáková, Hudecová
*-external teacher		

VI. CURRENT RESEARCH PROJECTS

A. Cytotoxicity of novel xenobiotics and their mode of action (Milan Miko)

The primary aim of our group is the identification and evaluation of potential anti-cancer agents. The main results are as follows:

1. Therefore cytotoxicity and mode of action of 14 novel derivatives of N(2-alkanoyloxy-ethyl)trimethylammonium bromides (ATAB) have been investigated using Ehrlich ascites carcinoma (EAC) cells. From a homologous series of ATAB one of the most effective compounds (primary screening) with the alkyl chain containing octadecanoyl (C=18) was chosen for further biochemical studies to establish the primary site(s) of the action of compound. The compound inhibited biosynthesis of macromolecules (DNA, RNA, proteins), aerobic glycolysis of EAC cells and endogenous respiration proportional to the tested concentration. We assumed that the inhibitory effects could be the consequence of membrane effect of amphiphilic compound. Further, the effect of novel anticancer agent of oracine, which is at the present in the 2nd phase of clinical trials, on activities of topoisomerases I and II, which were isolated from nuclei of EAC cells and mouse liver, has been studied. Oracine at concentration of 5 $\mu\text{mol/l}$ inhibited activity of topoisomerase II by 100 %.

2. In the frame of mode of action of 8 novel isotiocyanate derivatives (ITCs) was found out, that two carcinoma cell lines (A2780, A431) appeared extremely sensitive to the majority of the tested ITCs ($\text{ID}_{50} = 2.2\text{-}8.0 \mu\text{mol/l}$). The tested ITCs modified the cell cycle of carcinoma cell lines (A2780, A2780/ADR, A431) and sarcoma cell lines (B-5GT, BP6-TU2), as well as leukemic cell line (JURKAT), mainly at 10 $\mu\text{mol/l}$ and 5 $\mu\text{mol/l}$. The gradual inhibition of cell proliferation was observed, characterised by decreasing of percentage of cells in G0/G1 phase and accumulation of cells in S and G2/M phases of the cell cycle. Four from the five tested ITC derivatives showed the ability of strong induction of apoptosis (34-27%) in A2780 carcinoma cells.

3. Four trisubstituted quinazoline derivatives exerted a significant effect on *E. coli*, *P. aeruginosa*, *S. aureus* and *B. subtilis* ($\text{IC}_{50} < 100 \text{ mg/l}$) and influenced the specific growth rate. The results of primary screening for cytotoxicity of eighteen plant extracts showed that the extracts which have manifested 100% toxicity on HeLa cells come from the family Fabaceae, Rosaceae, Oleaceae and Staphyleaceae. The cytotoxically effective extracts represent three different types of cytotoxic effect – acute, delayed and combined effect. The effect of Cu tetraaza macrocyclic complex on the glutathione status was examined and the possible mechanism of this anticancer-membrane targeting drug was studied. In the frame of genotoxic effects of Cu(II) complexes of mephenamate, flufenamate, acetylsalicylate was found that these compounds statistically significantly decreased the number of revertants induced by 2-aminoanthracene and 2-aminofluorene. This antimutagenic activity is associated with the copper properties to participate in a number of different biological processes and its interaction with DNA. The genotoxic effects of lignin and selected degradation products of lignin were studied.

B. Biochemical processes underlying fungal differentiation and secondary metabolism (Ľudovít Vareèka)

Several aspects of *Trichoderma viride* physiology were studied during the project. Effects of azalomycin F on the Ca^{2+} homeostasis were described in detail and was shown that this compound influences Ca^{2+} fluxes across all but mitochondrial and vacuolar membranes and, as a consequence, increases the cytoplasmic Ca^{2+} concentration. This novel effect is even more pronounced in *S. cerevisiae* and suggests that azalomycin F could serve as a method for emptying the fungal Ca^{2+} stores. Furthermore, the effort has been made to characterize the metabolism of *T. viride* mycelia. It was

found that the development of submerged mycelia is accompanied with the burst of respiratory activity between 24-48 h of cultivation. The respiratory quotients indicate the oxidative character of metabolism. However, upon transferring submerged mycelia to anaerobic environment, ethanol appeared in the medium. Surprisingly, ethanol appeared in the medium also during the surface cultivation. These evidence which were complemented by independent approaches indicate that *T. viride* is able also of fermentative metabolism under certain conditions. Other products of fermentative metabolism are currently being studied. The study of the glutamate decarboxylase (GAD) activity in *T. viride* was continued. It was found that this activity was sensitive to cyclosporin A in an allotopical manner suggesting that GAD can be regulated by cyclin and/or calcineurin. Furthermore, several mutants of *T. viride* with the defect in the life cycle were isolated. Two of them were found to have also defect in the activation of GAD by light. The antimicrobial effects of newly synthesized complexes of Cu(II) with N-donor ligands such as nicotinamide, as well as Cu(II) complexes containing 2-methylthionicotinate, and isonicotinamide and novel Schiff's bases (derivatives of quinolines and pyrimidines) were studied. They exerted an appreciable antibacterial and antifungal activity which affected also the mycelial morphology of fungi.

V. COOPERATION

A. Cooperation in Slovakia

Institute of Chemistry, Slovak Academy of Sciences, Bratislava
 Institute of Animal Physiology and Biochemistry, Slovak Academy of Sciences, Bratislava
 Institute of Molecular Physiology, Slovak Academy of Sciences, Bratislava
 Institute of Animal Biochemistry and Genetics, Slovak Academy of Sciences, Ivánka pã Dunaji
 Cancer Research Institute, Slovak Academy of Sciences, Bratislava
 Faculty of Pharmacy, Comenius University, Bratislava
 Institute of Preventive and Clinical Medicine, Bratislava
 Institute of Virology, Slovak Academy of Sciences, Bratislava
 Dairy Research Institute, Žilina
 Department of Chemistry, Paedagogical Faculty, University, Trnava
 Department of Medical Chemistry, Biochemistry and Clinical Biochemistry, Faculty of Medicine, Comenius University, Bratislava
 Department of Molecular Biology, Faculty of Natural Sciences, Comenius University, Bratislava
 Institute of Immunology, Faculty of Medicine, Comenius University, Bratislava

B. International Cooperation:

Laboratoire du Signalisation et Messagers Cellulaire, Université du Paris XI, Orsay, France (Dr. Françoise Giraud)
 Laboratory of Cell Signalling, Nagoya University Bioscience Center, Nagoya, Japan (Prof. Dr. Shoshi Toriyama)
 Institut für Mikrobiologie, Universität zu Innsbruck, Innsbruck, Rakúsko (Prof. Dr. Wolfgang Burgstaller)
 ReaD VUFB, a.s. Prague, Czech Republic
 Liverpool John Moores University, Liverpool, UK
 -Electron microscopy of photo-induced conidiation and dimorphism in Fungi.
 Université de Genève, Genève, Suisse
 -Biochemistry and molecular biology of photo-induced conidiation in Fungi.
 European Organisation on Research and Treatment of Cancer, Screening and Pharmacology Group, University of Tokushima, Japan
 -Uncouplers of oxidative phosphorylation.
 Institute of Food Research, Norwich, UK
 -Rapid, specific detection of *Listeria monocytogenes* by antibody-based techniques and on-line sensor technology.
 Institute of Chemical Technology, Prague, Czech Republic
 - Rapid, specific detection of *Listeria monocytogenes* by antibody-based techniques and on-line sensor technology.
 MILCOM a.s., Dairy Research Institute, Prague, Czech Republic
 - Rapid, specific detection of *Listeria monocytogenes* by antibody-based techniques and on-line sensor technology.
 Dublin City University, Dublin, Ireland
 - Rapid, specific detection of *Listeria monocytogenes* by antibody-based techniques and on-line sensor technology.

C. Membership in Domestic Organizations and Societies:

Slovak Society for Biochemistry and Molecular Biology, Bratislava	(M. Miko, ¼ Vareěka)
Slovak Medical Society, Bratislava	(S. Jantová)
Czecho-Slovak Society for Biochemistry, Bratislava	(S. Jantová)
Czecho-Slovak Society for Microbiology, Bratislava	(K. Horáková, D. Hudecová, M. Mikulášová)
Czecho-Slovak Society for Biology, Brno	(K. Horáková, S. Jantová, M. Mikulášová)
Oncological Society of the Slovak Medical Society, Bratislava	(K. Horáková)

D. Membership in International Organizations and Societies:

International Society for the Study of Xenobiotics, Bethesda, MD, U.S.A.	(M. Miko)
European Association for Cancer Research, Nottingham, U.K.	(M. Miko)
European Organisation on Research and Treatment of Cancer, Moerkapelle, Netherland	(M. Miko)
European Tissue Culture Society	(K. Horáková)
EUROTOX-European Societies of Toxicology, Turku, Finland	(K. Horáková, S. Jantová, M. Mikulášová, A. Sověiková)

F. International Scientific Programmes:

1. INCO COPERNICUS

a) project PL 979012, „Rapid, specific detection of *Listeria monocytogenes* by antibody-based techniques and on-line

sensor technology., (K. Horáková)
contract No. ERB IC15-CT98-0902 (1999-2001)
Participating organizations:

Institute of Chemical Technology, Prague (CZ)
Institute of Food Research, Norwich (UK)
Slovak University of Technology, Bratislava (SK)
Dublin City University, Dublin (I)
MILCOM a.s., Dairy Research Institute, Prague (CZ)
Dairy Research Institute, Žilina (SK)

G. Visitors from Abroad:

Prof. Dr. Hiroshi Terada, University of Tokushima, Japan, September 2000 (3 days)
Prof. Dr. Jean Daussant, C.N.R.S., Meudon, France, November 1999 (10 days)
Prof. Dr. Wolfgang Burgstaller, University of Innsbruck, Department of Microbiology, Austria, January 2000 (2 days)
MSc. Ludmila Karasová, Institute of Chemical Technology, Prague, Czech Republic, September-October 2000 (38 days)
Prof. Dr. Pavel Rauch, Institute of Chemical Technology, Prague, Czech Republic, November 2000, (4 days)
MSc. Ludmila Karasová, Institute of Chemical Technology, Prague, Czech Republic, November 2000 (4 days)
Dr. Petr Roubal, MILCOM a.s., Dairy Research Institute, Prague, Czech Republic, November 2000 (2 days)
MSc. Stephen Hearty, Dublin City University, Dublin, Ireland, November 2000 (4 days)
Dr. Mike Morgan, University of Leeds, Leeds, UK, November 2000 (3 days)
Dr. Gary Wyatt, Institute of Food Research, Norwich, UK, November 2000 (4 days)

H. Visits of Staff Members and PhD Students to Foreign Institutions:

K. Horáková	4th INCOCOPERNICUS meeting, Dublin City University, Dublin, Ireland, May 2000 (7 days)
D. Hudecová	XVth Czech and Slovak Plant Protection Conference, Brno, Czech Republic, September 2000 (3 days)
B. Lakatoš	Université du Paris XI, Orsay, France, February-April 2000 (60 days)
M. Miko	XVII biochemický sjezd, Prague, Czech Republic, August 2000 (5 days)
M. Miko	12th Mediterranean Congress of Chemotherapy, Marrakesh, Morocco, November 2000 (7 days)
A. Šovčíková	Dublin City University, Dublin, Ireland, May-July 2000 (66 days)

VI THESES AND DISSERTATIONS

A. Graduate These (MS Degree) for state examinations after five years of study (supervisors are written in brackets external supervisors):

Csókóvá N.:	Evaluation of biologically active natural plant compounds. (M. Múčková*)
Ěuboňová Ā:	Study of secondary metabolite production in <i>Trichoderma viride</i> mutants with the defect in the life cycle. (Ā Varečka)
Dvorčákóvá M.:	Role of ovaria in adjuvant arthritis development of Long Evans female rats. (J. Jurkovičová*)
Gondová B.:	Study of environmental effects on <i>Listeria</i> species growth. (K. Horáková)
Háziová G.:	Utilisation of non-saccharide substrates by filamentous fungi <i>Trichoderma viride</i> . (Ā Varečka)
Hermanová Z.:	Effect of disinfect compounds on <i>Serratia marcescens</i> growth and metabolism. (V. Majtán*)
Koštekóvá K.:	Effect of salivary glands extract of chosen gad-flies on kinetic parameters of Na,K-ATPases. Possibility of relaxation influence through the induced changes on Na,K-ATPase molecule. (N. Vrbjar*)
Králová K.:	Cytotoxicity and the mode of action of novel bis-ammonium salts derived from succinate acid in vitro. (M. Miko)
Kuboškóvá K.:	Protective effect of rosmarine on DNA of hamster cells V79. (D. Slameňová*)
Likavčanóvá K.:	Virulence influence of <i>Salmonella typhimurium</i> DT 104 by disinfect compounds. (V. Majtán*)
Maníková M.:	<i>Fusarium moniliforme</i> , <i>Fusarium subglutinans</i> and <i>Aspergillus flavus</i> in maize corns and maize products and their relation to user's health. (E. Piecková*)
Miěková M.:	Antimicrobial activity of new copper complexes with bio-active ligands. (D. Hudecová)
Miklošíková J.:	Endocrine characterisation of Long Evans rats with adjuvant arthritis. (J. Jurkovičová*)
Minárikóvá M.:	Antigen cross reactions in allergies. (E. Paulovičová*)
Muchová S.:	Biochemical markers of cell and tissue oxidative damage induced by phenytoin. (K. Horáková)
Oravcová M.:	Molecular-genetic analysis of multiple endocrine neoplasia type 2A. (V. Altanerová*)

Paulovičová A.: Optimalisation of filamentous fungi mycelium homogenate appropriate for isolation of intact organelles. (¼ Vareška)

-*external teacher

B. Dissertations (PhD):

Chovanec P.: Metabolic aspect of vegetative growth and conidiation of *Trichoderma viride*. (¼ Vareška)

Strigáčová J.: Antimicrobial (biological) activity of selected synthetic or natural compounds. (D. Hudecová)

Šimkovič M.: Transport processes in fungi and their regulation. (¼ Vareška)

Šovčíková A.: Antimicrobial activity and the mode of action of isothiocyanate derivatives. (K. Horáková)

D. Habilitation Theses:

Jantová S.: Cytotoxicity, antimicrobial activity and the mechanism of effect of the natural and synthetic compounds.

VII PUBLICATIONS

A. Journals (*registered in Current Contents)

- [1] Augustín J., Hudecová D., Mikulášová M.: Oyster mushroom (*Pleurotus ostreatus*) – its occurrence, composition, active substances and some of its physiological properties. *Czech. Mycol.* 52, 155-156, (2000)
- [2] Greifová M., Melišová D., Horáková K.: Výskyt a prežívání *Listeria monocytogenes* v mlieku a mliečnych výrobkoch. Occurrence and survival of *Listeria monocytogenes* in milk and milk products (in Slovak). *Mliekarenstvo* 2 (31), 40-43 (2000)
- [3] Horáková K.: Prijemné s užitočným. Enjoyable with profitable (in Slovak). *Mliekarenstvo* 2 (31), 36 (2000)
- [4] Hudecová D., Dudová B., Augustín J., Melník M.: Antifungal activity of new Cu (II) compounds with some bio-active ligands. *Czech. Mycol.* 52, 168, (2000)
- [5]* Jantová S., Greif G., Špírková K., Stankovský Š., Oravcová M.: Antibacterial effects of trisubstituted quinazoline derivatives. *Folia Microbiol.* 45 (2), 133-137 (2000)
- [6] Jantová S., Hazuchová M., Stankovský Š., Špírková K.: Antibakteriálna a protinádorová aktivita 2,4-disubstituovaných 6H-5,1,3-benzothiadiazocínov. Antimicrobial and anticancer activity of 2,4-disubstituted 6H-5,1,3-benzothiadocines (in Slovak). *Ěeská a Slov. Farmacie* 1, 32-36 (2000)
- [7]* Jantová S., Nagy M., Ružeková ¼, Granèai D.: Antibacterial activity of and plant extracts from the family Fabaceae, Oleaceae, Philadelphaceae, Rosaceae and Staphyleaceae. *Phytotherapy Research.* 14, 601-603 (2000)
- [8]* Jantová S., Nagy M., Ružeková ¼, Granèai D.: Cytotoxic effects of plant extracts from the family Fabaceae, Oleaceae, Philadelphaceae, Rosaceae and Staphyleaceae. *Phytotherapy Research* 14, 1-4 (2000)
- [9]* Labuda J., Buèková M., Jantová S., Štěpánek I., Surugiu I., Danielsson B., Mascini M.: Modified screen-printed electrodes for the investigation of the interaction of non-electroactive quinazoline derivatives with DNA. *Fresenius J. Anal. Chem.* 367, 364-368 (2000)
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- [11]* Mikulášová M., Bohovicová I.: Genotoxic effect of vanillin derivatives. *Biologia* 55 (3), 229-234 (2000)
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B. Conferences (*International conferences)

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- [18] Szabovã E., Mikulãřovã M., Ěerný J.: Antimutagenic effect of copper (II) complexes with mephanic and flufenamic acids. In: 5th Interdisciplinary Slovak-Czech Toxicological Conference. Treněianske Teplice, Slovakia, June 1.-3. 2000, p. P33
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C. Books and Textbooks

- [1] Paulíkovã H.: Alkoholdehydrogenãza – řtruktúra, stabilita a mechanizmus pôsobenia. Alcoholdehydrogenase – structure, stability and mode of action (in Slovak). In: řtruktúra a stabilita proteínov. Protein structure and stability (in Slovak). Edited by Antalík, Podhradský, Kořice, p. 66-76 (2000), ISBN-80-7097-382-X

D. Patents

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DEPARTMENT OF CERAMICS, GLASS AND CEMENT

Head of the Department:

Assoc. Prof. Miroslav Jamnický, PhD

Telephone: ++421-7-52 92 60 48

Fax: ++421-7-52 49 31 98

E-mail: jamnický@checdek1.chtf.stuba.sk

I. STAFF

Full Professor:

Viktor Jesenák, PhD

Associate Professors:

Miroslav Jamnický, PhD; Jozef Laèek, PhD; Ján Majling, PhD

Assistant Professors:

Jozef Kákoš, PhD; Vladimír Kovár, PhD; Martin T. Palou, PhD; Eva Smrèková, PhD

Research Fellows:

Zdenek Hrabì , PhD; Jana Kozánková; Ladislav Pach, PhD; Štefan Svetík

PhD Students:

Ľuboš Baèa; Zuzana Holková; Marián Rebroš; Jaroslav Sedláèek

Technical Staff:

Ľudmila Illášová; Helena Jablonková; Pavol Krutý; Mária Pelíšková; Iveta Zezulová

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Teaching laboratory I

Teaching laboratory II

B. Research Laboratories:

Laboratory of ceramics

Laboratory of glass

Laboratory of inorganic binders

Laboratory of sol/gel

Laboratory of inorganic powders synthesis

Laboratory of thermal analysis

Laboratory of calorimetry

Scanning electron microscopy laboratory

X-ray diffractometer laboratory

III. TEACHING

A. Undergraduate Study

1. Introductory Courses

6th semester (spring)

Materials technology

(2-0 h)

Majling

Semestral project

(0-4 h)

Jamnický, Kákoš, Kovár, Kozánková, Laèek, Sedláèek

2. Advanced Courses

7th semester (autumn)

Inorganic chemistry III

(2-2 h)

Jamnický

Solid state physics

(2-0 h)

Smrèková

Technical mineralogy

(1-1 h)

Svetík

Applied thermodynamics

(2-2 h)

Pach

Raw materials and mechanical operations

(3-0 h)

Laèek, Svetík

Specialised laboratory I

(8 h)

Kákoš, Kovár, Palou, Sedláèek, Smrèková, Svetík

8th semester (spring)

High temperature processes

(2-1 h)

Jesenák, Kovár

Applied heat technique

(2-1 h)

Kovár

Specialised laboratory II

(8 h)

Holková, Jamnický, Kákoš, Kozánková, Smrèková

Factory praxis

Jamnický, Smrèková

9th semester (autumn)

Technology of spec. inorg. materials

(2-0 h)

Majling, Kákoš

Inorganic binders technology

(2-0 h)

Laèek, Palou

Technology of ceramics

(2-0 h)

Hrabì , Majling, Smrèková

Technology of glass	(2-0 h)	Jamnický, Pach
Specialised laboratory III	(10 h)	Majling, Palou, Rebros, Sedláček, Smrèková
10th semester (spring)		
Diploma work laboratory	(30 h)	Hrabì , Jamnický, Pach, Palou, Smrèková

IV. CURRENT RESEARCH PROJECTS

A. Chemical and structural assumption for immobilization of toxic materials by cementing, vitrification and ionic-exchange methods (Ján Majling)

The samples of hydroxyapatite - $\text{Ca}_5(\text{PO}_4)_3\text{OH}$ were prepared in a form of the granular dried and sintered material, in a form of beads and thin fibres as well as in a form of the cylindrical extrudates of different diameters. The substrates serve to study ionic exchange of $\text{Pb}^{2+}/\text{Ca}^{2+}$ from liquid media.

By drying of colloidal solution of hydroxyapatite thin transparent layer xerogels have been prepared with subsequent measurement of their optical transmittance with temperature. The expansion of the hydroxyapatite pellets has been confirmed by this method at temperatures above 1200 °C.

By hydration of especially prepared clinker phases (C_2S , $\text{C}_4\text{A}_3\text{S}$, CS) ettringite has been prepared to investigate the immobilization of Cr^{6+} ions. Separately a sample of ettringite has been prepared by its in situ precipitation in solutions containing Cr^{6+} ions.

B. Electrically conductive oxide glasses containing copper cations. Preparation, structure and physical properties (Miroslav Jamnický)

Glass electrolytes or superionic conducting glasses are promising materials for their technological application to microelectrochemical devices such as sensors, batteries and electrochemical displays. A wide variation in composition, configurational flexibility and chemical durability has been a motivation for their studies and developing the new systems and compositions.

The Cu^+ ion conducting glasses are known for very limited glass-forming compositions in contrast to the Ag^+ ion conducting glasses which have been obtained in many systems. The Cu^+ ion conducting glasses are mainly restricted to the system containing P_2O_5 , MoO_3 and WO_3 .

The possibility to achieve the high ionic conductivity in a new Cu^+ glass system was studied. The main scientific results were obtained as follows:

- determination of optimum procedures for preparing Cu^+ ion conducting glasses in the systems $\text{CuI-Cu}_2\text{O-P}_2\text{O}_5$, $\text{CuI-Cu}_2\text{O-P}_2\text{O}_5\text{-MoO}_3$ and $\text{CuI-Cu}_2\text{O-P}_2\text{O}_5\text{-WO}_3$,

- determination of the arrangement of main structural units in these glasses and characterization of their thermal and electrical properties,

determination of new relationships among the composition, the structure and the conductivity of glasses under study.

C. Design of microstructure and properties of oxide sol-gel materials by seeding of sols and by polymer additives (Ladislav Pach)

The aim of the research was to study the effect of seeding (by $\alpha\text{-Al}_2\text{O}_3$, $\alpha\text{-Fe}_2\text{O}_3$, and $\text{Fe}(\text{NO}_3)_3$) on crystallisation of $\alpha\text{-Al}_2\text{O}_3$ in boehmite derived gels. Original results were obtained for gels seeded with $\text{Fe}(\text{NO}_3)_3$. By several methods (Mossbauer and luminescent spectroscopy, on-line optical transmittance, DTA, GTA and the surface and pores measurements) was proved that seeding of boehmite gels with $\text{Fe}(\text{NO}_3)_3$ has dominantly the ion (Fe^{3+}), or solution effect on the crystallisation of $\alpha\text{-Al}_2\text{O}_3$. Process of crystallisation is similar to that of unseeded gels and not to gels seeded with particulate $\alpha\text{-Al}_2\text{O}_3$ and $\alpha\text{-Fe}_2\text{O}_3$ seeds, mechanism of which are attributed as crystallographic. Transparent ceramics were obtained already at ~ 1300°C by seeding of boehmite gel with $\text{Fe}(\text{NO}_3)_3$.

V. COOPERATION

A. Cooperation in Slovakia:

Faculty of Electrical Engineering and Information Technology, Slovak University of Technology, Bratislava

Faculty of Mechanical Engineering, Slovak University of Technology, Trnava

Institute of Inorganic Chemistry, Slovak Academy of Sciences, Bratislava

Research Institute of Building Materials, Slovak Academy of Sciences, Bratislava

Institute of Control Theory and Robotics, Slovak Academy of Sciences, Banská Bystrica

Research Institute of Refractory Materials, Bratislava

Cementáreò Turòa, a.s., Turòa nad Bodvou (Cement Producer)

Považská cementáreò, a.s., Ladce (Cement Producer)

Hirocem, a.s., Rohožník (Cement Producer)

Eurodom, s.r.o., Luèenec (Constructional System)

Novoker, a.s., Luèenec (Wall Tiles Producer)

CERAM Éáb, a.s., Nové Sady (Electroceramics Producer)

TS, a.s., Bratislava (Technical Glass Work)

SMZ, a.s., závod Jelšava (Magnesite Clinker Plant)

Izomat, a.s., Nová Baòa (Mineral Fibre Insulation Materials Producer)

Ekogeos, s.r.o., Bratislava (Ecological and Geological Service)

ESTAP, s.r.o., Bratislava (Enameled Ware Plant)

B. International Cooperation:

Fachhochschule Münster, Steinfurt, Germany

- Crystallisation of $\alpha\text{-Al}_2\text{O}_3$ from boehmite gels

Intercollege Materials Research Laboratory, The Pennsylvania State University, University Park, PA, USA

- Synthesis of Inorganic Materials

Department of Chemistry, Materials and Forensic Science, Faculty of Science, University of Technology, Sydney, Australia

- Light transmittance thermal analysis of hydroxyapatite xerogels

Hamamatsu Corporation, Bridgewater, New Jersey, USA

- Translucent ceramic plates

C. Membership in Domestic Organisations and Societies:

Slovak Silicate Society, Bratislava

Union of Glass Industry, Bratislava

Slovak Glass Society, Lednické Rovne

Association of Science Technical Societies, Bratislava

D. Membership in International Organisations and Societies:

Crystallographic Society, Bratislava

Silicate Society, Prague, Czech Republic (Z. Hrabí)

American Ceramic Society, USA (L. Pach)

The International Society for the Environmental and Technical Implications of Construction with Alternative Materials (ISCOWA), Netherlands (J. Majling)

Institute of Materials, U.K. (J. Majling, J. Strigáè)

G. Visitors from Abroad:

Ing. J. Kni zek, CSc., Ing. M. Sedláková

Ing. V. Žák

Ing. V. Ti hník, Ing. Radovan Neèas

Prof. A. S. Ray

VÚSH, a.s. Brno, Czech Republic, April 2000 (1 day)

V.&R. Consulting P/L, Heatcote, Australia, June 2000 (2 days)

VÚSH, a.s. Brno, Czech Republic, June 2000 (1 day)

Department of Chemistry, Materials and Forensic Science, Faculty of Science, University of Technology, Sydney, Australia, September 2000 (3 days)

Dr. A. Azzedine

Department of Engineering Materials, Faculty of Engineer Science, University of Boumerdes, Algeria, September 2000 (7 days)

H. Visits of Staff Members and PhD Students to Foreign Institutions:

¼ Baèa

Fachhochschule Múnster, Steinfurt, Germany, March-June 2000 (3 months)

J. Sedláèek

XIIIth International Conference on Refractory Materials, Praha, Czech Republic, March 27-29

¼ Baèa, Z. Holková, M. Palou

International Conference Solid State Chemistry 2000, Praha, Czech Republic, September 3-8

Z. Holková

52nd Congress of Chemical Societes, Èeské Budì jovice, Czech Republic, September 16-20

Z. Hrabí , M. Jamnický, J. Majling, L. Pach,

E. Smrèková

International exhibition CERAMITEC 2000, Múnchen, Germany, October 17-19

J. Sedláèek

ICS Workshop Process Simulation in Composite Materials, Trieste, Italy, November 19-26

VI. THESES AND DISSERTATIONS

A. Graduate Theses (MS Degree) for state examinations after five years of study (supervisors are written in brackets):

Arkosiová M.: Preparation, structure and properties of Cu⁺ - ionic conductive oxide glasses (M. Jamnický)

Barusová L.: The influence of raw material properties on the quality of frits and white glossy glazes (M. Jamnický)

Bodáková M.: The influence of brick raw material from locality of Staròa on quality of ceramic body in brick plant of Tornaža (Smrèková)

Filo D.: Comparison of physico - chemical properties of solder glasses for bulb production (J. Chocholoušek)

Gašparoviè I.: Substitution of alumina cements in dry plaster mixtures (Z. Hrabí)

Koòariková L.: Biodegradability of mineral fibres in model solutions (L. Pach)

Pagáèová J.: The study of limestone admixture influence on portland cement properties (M. Palou)

Petrušková V.: The study of the influence of storage conditions on corrosion of commercial glasses (M. Jamnický)

Piatriková G.: The cause of formation and increase of inhomogenities in glass melts for container glass production (M. Jamnický)

Rebroš M.: The surface corrosion of commercial glass in automatic washers (L. Pach)

Štaòová I.: The kinetics of barium crystal leaching by liquid media (M. Liška)

Štefanovie M.: The possibilities to prepare low energy cements including portland raw meal, fly ashes and gypsums (M. Palou)

Pritula O.: Immobilization of liquid radioactive wastes by cementing procedures (E. Smrèková)

B. Dissertations (PhD):

Štulajterová-Ā urovèiková R.: Preparation and sintering of hydroxyapatite gels (J. Majling)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

- [1]* Ľurovčíková R., Majling J.: Príprava a spekanie gélov hydroxyapatitu. Preparation and sintering of hydroxyapatite gels (in Slovak). Chem. Listy 94 (9) 808-809 (2000)
- [2]* Holková Z., Pach L.: Transparentné mullitové vrstvy. Transparent mullite layers (in Slovak). Chem. Listy 94 (9) 806 (2000)
- [3]* Koman M., Segžák P., Jamnický M., Glowiak T.: Chlorobis[4,4-bis(hydroxymethyl)-2-(2-pyridyl)-4,5-dihydrooxazole-N,N']copper(II) chloride hemihydrate. Acta Cryst. C56 (9) 554-555 (2000)
- [4] Majling J., Svetík Š., Pach L.: Thermo-optical investigations at sintering of boehmite gels. Key Engineering Materials 175-176 (9) 91-96 (2000)
- [5]* Pach L., Bača Ľ., Majling J.: Optical transmittance changes of solid preforms with temperature. II. Transparency of α - Al_2O_3 ceramics after sintering at 1250°C. Chem. Papers 54 (5) 265-271 (2000)
- [6]* Pach L., Komarneni S.: Precipitation of hydroxyapatite film under dynamic conditions. Mat. Res. Bull. 34 (12/13) 1859-1865 (1999)
- [7]* Pach L., Majling J., S. Komarneni: Optical transmittance of $\text{AlOOH}/\text{Al}_2\text{O}_3$ porous gel preforms. J. Sol-Gel Sci. Technol. 18 (9) 99-103 (2000)
- [8] Sedláček J., Jamnický M.: Korózia AZS žiaruvzdorných materiálov olovnatou sklovinou. Corrosion of AZS refractory materials by lead glass melts (in Slovak). Silika 10 (1) 48-52 (2000)
- [9]* Strigàè J., Palou M. T., Krištin J., Majling J.: Morphology and chemical composition of minerals inside the phase assemblage $\text{C-C}_2\text{S-C}_4\text{A}_3\text{S}^n\text{-C}_4\text{AF-CS}^n$ relevant to sulphoaluminate belite cements. Ceramics-Silikáty 44 (1) 26-34 (2000)

B. Conferences (*International conferences)

- [1]* Bohàè V., Kubièár L., Hrabì Z., Kozánková J.: The study of sintering process of borosilicate glass by transient pulse method. In: Proc. Seminar Arbeitskreis Thermophysik in der GEFTA. Dresden (Germany), March 9-10, 2000. Ed. Fraunhofer Institut für Keramische Technologien und Sinterwerkstoffe, Dresden, p. 9-10 (2000)
- [2] Földesová M, Dillinger P, Svetík Š, Lukàè P.: Vplyv spolupôsobenia chemickej a termickej úpravy zeolitov na sorpciu ortuti. The influence of co-effect of chemical and thermal treatment of zeolites on mercury sorption (in Slovak). In: Proc. XV-th Conf. on Thermal Analysis and Calorimetry TERMANAL 2000, Stará Lesná, Sept. 11-13, 2000. Ed. CHTF STU Bratislava, Sept. 2000, p. 191-192
- [3] Galusek D., Majling J., Lichvár P., Gerši P., Chromèíková M.: Crystallisation and thermal expansion of high-alumina $\text{CaO-Al}_2\text{O}_3\text{-SiO}_2$ glasses. In: Proc. XV-th Int. Conf. on Thermal Analysis and Calorimetry TERMANAL 2000, Stará Lesná, Sept. 11-13, 2000. Ed. CHTF STU Bratislava, Sept. 2000, p. 75-78
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C. Book and textbooks

- [1] Kákoš J.: Ramanova spektroskopie polovodičových vrstiev. Raman spectroscopy of semiconductive films (in Slovak). In: Pinčík E. a coll.: Výskum aktívnych zložiek slnečných článkov pripravovaných na báze amorfného kremíka a uplatnenie výsledkov v praxi v laboratórnych podmienkach Slovenska (Research of the active parts of solar cells prepared on an amorphous silicon basis and application of results in the Slovak laboratory practice). Ed. Fyzikálny ústav SAV Bratislava, p. 276-295 (2000)

DEPARTMENT OF CHEMICAL AND BIOCHEMICAL ENGINEERING

Head of the Department :

Assoc. Prof. Ing. Ľudovít Jelemenský, PhD

Telephone: +421-7-52496920

Fax: +421-7-52496743

E-mail: jelemen@cvtstu.cvt.stuba.sk

I. STAFF

Full Professors:

Vladimír Bálež, PhD, DSc

Associate Professors:

Daniel Bobok, PhD; Ján Dojčanský, PhD; Jelemenský Ľudovít, PhD; Jaroslav Longauer, PhD; Markoš Jozef, PhD; Polakovič Milan, PhD; Štefuca Vladimír, PhD

Assistant Professors:

Aèai Pavel, PhD; Bafrnec Milan, PhD; Bafrncová Soòà, PhD; Fecková Viera, PhD; Graczová Elena, PhD; Havalda Ivan; Mierka Otto, PhD; Stopka Ján, PhD; Šefčík Jaroslav; Šefčíková Milica, PhD; Sokolovská Ivana, PhD; Timár Pavel, PhD; Vajda Milan, PhD

Research Fellows:

Antošová Monika, Besedová Eva, PhD; Godó Štefan, PhD; Hroncová Viera, Illeová Viera; Juma Mohammad, PhD; Marták Ján; Remiárová Bibiana, PhD; Sabolová Erika; Schlosser Štefan, PhD; Steltenpohl Pavol, PhD; Šoóš Miroslav, Žajdlík Róbert

PhD students:

Blažej Michal; Dolgoš Ondrej; Grznárová Gabriela; Kertesz Robert; Klein Jaroslav; Madlová Alexandra; Molnár Attila;

Technical Staff:

Dobrovodská Mária; Drahošová Anna; Gering Tomáš; Herzán Ľubomír; Hinca Miloš; Chocholová Mária; Luknár Karol; Marenčíková Miroslava; Ördögová Marta; Rizman Viliam;

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories

Laboratory of Chemical Engineering
 Laboratory of Unit Operations
 Laboratory of Reaction Engineering
 Laboratory of Membrane Processes
 Laboratory of Chemical Engineering Thermodynamics

B. Research Laboratories

Laboratory of Chemical Reaction Kinetics and Reaction Engineering
 Laboratory of Heat Transfer
 Laboratory of Hydrodynamics and LDA
 Laboratory of Fluid - Particle Dynamics
 Laboratory of Membrane Processes and Membrane Reactors
 Laboratory of Adsorption
 Laboratory of Bioreaction Engineering
 Laboratory of Enzyme Engineering
 Laboratory of Phase Equilibria

III. TEACHING

A. Undergraduate Study (Bachelor of Chemical Technology)

1. Introductory Courses

1st semester

Material Balances of Technological Processes (2 h)

M. Šefčíková, P. Aèai, S. Bafrncová, E. Besedová, M. Blažej, O. Dolgoš, J. Markoš, O. Mierka, V. Illeová, B. Remiárová, P. Steltenpohl, M. Polakovič, V. Štefuca, P. Timár, M. Vajda, R. Žajdlík

5th semester

Chemical Engineering I

Lectures (2 h)

Exercises (3 h)

V. Bálež, Ľ. Jelemenský
 P. Aèai, M. Antošová, S. Bafrncová, D. Bobok, E. Graczová, I. Havalda, O. Mierka, J. Stopka, J. Šefčík, M. Šefčíková, P. Timár, M. Vajda
 P. Aèai, M. Antošová, M. Bafrnec, S. Bafrncová, D. Bobok, E. Graczová,

Chemical Engineering Laboratory I (1 h)

G.Grznárová, I.Havalda, M.Juma,
R.Kertesz, O.Mierka, J.Longauer, J.Šefčík,
M.Šefčíková, P.Timár, M.Vajda

6th semester

Chemical Engineering II

Lectures (2 h)
Exercise (3 h)

J.Doječanský, V.Štefuca, M.Polakoviè,
P.Aèai, S.Bafrncová, F.Besedová, J.Doječanský,
E.Graczová, I.Havalda, O.Mierka, J.Stopka,
V.Štefuca, Š.Schlosser, J.Šefčík
P.Aèai, M.Antošová, D.Bobok, O.Dolgoš,
E.Graczová, G.Grznárová, I.Havalda, J.Klein,
A.Madlová, M.Juma, B.Remiarová, E.Sabolová,
J.Stopka, J.Šefčík, R.Žajdlík

Chemical Engineering Laboratory II. (3 h)

Engineering Thermodynamics

Lectures (2 h)
Exercises (2 h)
Technological Projects (4 h)

M.Šefčíková, P.Timár
M.Šefčíková, P.Timár, O.Mierka
I.Havalda, ¼Jelemenský, J.Longauer,
Langfelder, J.Markoš, O.Mierka, M.Polakoviè,
V.Štefuca, M.Šoóš, P.Timár, M.Vajda
M.Vajda

Equipment of Chemical and Food Technology (2-2 h)

B. Graduate Study (Master of Chemical Technology)

1. Advanced Courses

7th semester

Chemical Engineering

Chemical Engineering Thermodynamics

Lectures (2h)
Exercises (2 h)
Diffusional Separation Processes (2 -2 h)

E.Graczová
E.Graczová
J.Doječanský

Hydrodynamics and Heat Transfer

Lectures (2 h)
Exercises (2 h)
Laboratory (1 h)

J.Stopka
I.Havalda
J.Stopka

Mass Transfer Theory (2-1 h)

D.Bobok

Computer Chemical Engineering Calculations (3 h)

M.Šoóš, A.Molnár, S.Bafrncová

Mathematical Methods in Chemical Engineering (4 h)

I.Havalda

Safety Engineering

Chemical Engineering Thermodynamics

Lectures (2h)
Exercises (2 h)

E.Graczová
P. Steltenpohl

Hydrodynamics and Heat Transfer

Lectures (3 h)
Exercises (2 h)
Laboratory (1 h)

J.Stopka
I. Havalda
J.Stopka

Mass Transfer Theory (2-1 h)

D.Bobok

Fire Engineering (2 -2 h)

K. Balogh

Computer Chemical Engineering Calculations (3 h)

M.Šoóš, ¼Jelemenský, S.Bafrncová

Mathematical Methods in Chemical Engineering (4 h)

I.Havalda

8th semester

Chemical Engineering

Chemical Reaction Engineering I

Lectures (2 h)
Exercises (2 h)
Laboratory (2 h)

J. Markoš
M. Vajda
J.Markoš
¼Jelemenský

Safety Engineering (2-2 h)

Bioprocess Engineering I

Lectures (2 h)
Exercises (1 h)
Selected Unit Operation (2 h)

V.Báleš
M.Polakoviè
D.Bobok, Š.Schlosser

Project of Equipment of Chemical and Food Technology (3h)

M.Bafrnec, I.Langfelder

Advanced Laboratory of Chemical Engineering I (3 h)

J.Šefčík, D.Bobok, E.Graczová, J.Markoš,
O.Mierka, J.Stopka, V.Štefuca, Š. Schlosser,
P.Timár

Safety Engineering

Chemical Reaction Engineering I

Lectures (2 h)
Exercises (2 h)

J. Markoš
M. Vajda

Safety Engineering	(2-2 h)	V. Fecková
Explosion Prevention	(2-2h)	D. Skarba
Process Systems Engineering	(2 h)	L. Jelemenský
Laboratory of Process Systems Engineering	(2 h)	M. Šooš
Project of Equipment of Chemical and Food Technology	(3h)	M.Vajda, J. Longauer
9th semester		
Chemical Engineering		
Chemical Reaction Engineering II		
Lectures	(2 h)	J. Markoš
Exercises	(1 h)	B.Remiarová
Process Systems Engineering		
Lectures	(1 h)	L. Jelemenský
Laboratory of Process Systems Engineering	(2 h)	M. Šooš
Bioprocess Engineering II	(2 h)	V.Báleš
Membrane Operations	(2 h)	Š. Schlosser
Design Project	(1-1 h)	J. Dojčanský
Solid Particles in Technology and Environment	(2 h)	P.Timár
Cost Engineering of Industrial Enterprises	(2 h)	M.Bafrnec
Advanced Laboratory of Chemical Engineering II	(6 h)	I.Langfelder, J.Markoš, O.Mierka, M.Polakoviè, J.Stopka, V.Stefuca
Safety Engineering		
Safety Engineering II	(2-2 h)	V. Fecková
Laboratory of Process Plant Safety	(3 h)	L. Jelemenský, B. Remiarová, M.Vajda
Laboratory of Safety Engineering	(3 h)	V.Fecková, E.Graczová, L.Jelemenský, J.Markoš, A.Molnár, J.Stopka, M.Šooš, R.Žajdlík
Electrical Safety for Chemical Process Plants	(1-1 h)	D. Perniš
Solid Particles in Technology and Environment	(2 h)	P. Timár
Cost Engineering of Industrial Projects	(2 h)	M. Bafrnec
7th semester		
Organic Technology		
Chemical Engineering Thermodynamics		
Lectures	(2h)	E.Graczová
Exercises		
8th semester		
Biochemical Engineering		
Lectures	(2 h)	M.Polakoviè (2 h) E.Graczová,
9th semester		
Safety Engineering	(2 h)	¼Jelemenský
Biochemical Technology		

C. Postgraduate study

Chemical Engineering	
1st year:	3 students
2nd year :	2 student
3rd year:	2,5 students
Obligatory	
English	
Mathematics I.,II.	
Chemical Reactor Engineering	
Theory of Mass Transfer	
Hydrodynamics and Heat Transferr	
Optional	
Engineering Bioreactor	
Systems Engineering	

IV. CURRENT RESEARCH PROJECT

A. Engineering approaches to the investigation of properties of ligand-enzyme-carrier systems in biocatalysis and bioseparations (Milan Polakoviè)

The project incorporates several different problems related to the heterogeneous liquid-solid systems employed in biotechnology. The main areas covered by the project include the optimization of flow microcalorimetry using mathematical modelling for the analytical applications of the biocatalytic systems under study, investigation of enzyme systems with complex kinetics and characterisation of morphological and diffusional properties of carriers used in biocatalysis and biotransformation. The particular goals include the development of methodologies for the identification of mechanisms of enzyme inactivation using the integration of experimental techniques at the quantitative level; the development of chemical engineering data for the optimization of the design of the fructooligosaccharide production

process and for the improvement of biocatalyst properties; the formation of the kinetic equation of triacylglycerols hydrolysis by yeast lipase and its implementation for the description of fermentation production of lipase; modelling of kinetics of potato starch hydrolysis by glucoamylase; the determination of the degree of instability of casein micelles in relation to the degree of hydrolysis of kappa-casein using an experimental procedure of the separation of unstable aggregated micelles and investigation of kinetics of destabilisation of micelles via mathematical modelling of sequential processes; study of the kinetics of glycoprotein sorption at lectin ligands.

B. Immobilized biotechnologies: Implementation of new immobilization methods into microbial and plant fermentations and biotransformations, and their industrial applications (Vladimír Štefuca)

The aim of the project is a systematic development of immobilized biotechnologies. This can be achieved most probably in case of biotechnological processes where the state of the knowledge or the process optimization has reached maximum level and the further increase of the process effectiveness requires the development of new unconventional ways. This evolution should bring more extensive use of continuous processes. The increase of the processes in biotechnology will accelerate their introduction in the industrial use. The project outputs will be information about biochemistry, bioengineering and process parameters that will be used in practical application of investigated processes. The study is oriented toward implementation of immobilization techniques into following processes:

- i) ethanol production by fermentation of starch hydrolysates,
- ii) primary and secondary wort fermentation,
- iii) butyric acid production by transformation of butanol,
- iv) biotransformation/biodegradation of xenobiotics,
- v) secondary metabolite production by plant fermentation.
- vi) dextrose sirup production by maltodextrin hydrolysis.

C. Thermal diffusivities of orthogonal anisotropic materials (Milan Bafrnec)

Elaboration of a model of heat transfer in orthogonal anisotropic composite materials with a course oriented structure. This model will be used for the proposal of a method for measuring thermal diffusivities of such materials. In addition, this method will enable the measurement of the difference in thermal diffusivities in particular directions.

In this year, a suitable mathematical model describing the nonstationary heat transfer in composite materials with a course fiber structure has been proposed. In the choice of parameters and the model of material structure the feasibility solution of the mathematical model was taken into account. Various samples of such composite materials were prepared and their measurement confirmed that there is a great difference between the thermal diffusivity in the direction perpendicular to the fiber layer and in the direction along the composite material fibers. Models of industrial processes of tire vulcanisation were derived and solved.

D. Mathematical and experimental modelling of coal combustion (Jozef Markoš)

Mathematical and experimental modelling of coal combustion with the aim of its maximal energetic utilization and decreasing of sulphur dioxide emissions.

E. Modelling of mass-transfer through membranes and immobilized interfaces directed to formation and modelling of hybrid systems with biochemical or chemical reactions and membrane separation (Štefan Schlosser)

The possibility of permeate flux enhancement based on the surface modification of a ceramic membrane was investigated in crossflow microfiltration of pure beer yeast suspensions. The stamped membrane had a helical reversed thread to increase turbulence in the feed flow. A stamped membrane has several advantages comparing with a smooth one: flux, as well as limiting flux are higher at the same velocity of the feed, power consumption per unit volume of permeate is lower for the stamped membrane and increases with increasing crossflow velocity of the feed. Modelling of the flux decline indicates different mechanisms of fouling for smooth and stamped membranes.

The mechanism of transport of Ag, phenylalanine (Phe) and other acids through liquid membranes has been studied in a two compartment cell. As carriers for Ag octylphenylmethanesulfide (MF18, novel carrier) and triisobutylphosphinesulfide (Cyanex 471X) were used. The advantage of the carrier MF18 is better kinetics of stripping resulting in the same rate of transport or higher in comparison with Cyanex 471X, despite the much lower distribution coefficient of Ag with MF18. The dependence of the transport rate of Phe vs. carrier (DEHPA) concentration goes through a maximum indicating probably aggregation in the membrane phase at higher concentrations of carrier and/or complex. In all systems studied it has been found that the initial flux of permeant through extraction interface is higher than the maximum flux through the strip interface. In some systems this fact leads to a conclusion about the decisive role of kinetics of the processes on stripping interface for the overall transfer rate.

Equilibrium data for butyric acid and dimethylcyclopropanecarboxylic acid with tri-n-octylamine as an extractant have been completed and modelled. These data were interpreted by a chemical reaction mechanism, a related model was tested and the equilibrium constants were estimated. New equilibrium data have been estimated for Phe, silver and HCA.

V. COOPERATION

A. Cooperation in Slovakia

Institute of Chemistry, Slovak Academy of Sciences, Bratislava
Institute of Experimental Physics, Slovak Academy of Sciences, Košice
Slovak Agricultural University, Nitra
LikoSpol, Bratislava
Fermas, Slovenská Ľupča
SKY Life, s.r.o., Malacky
KINEX, a. s.
SCP, a.s. Ružomberok
PETROCHEMA, a. s. Dubová

RHODIA Industrial Yarns Slovakia, a. s. Humenné
 Chemical Enterprise Nováky
 Lhodol, lim. Rajec
 Combin, lim. Tisovec
 Research Institute for Milk Products, Žilina
 Slovakofarma, a.s. Hlohovec

B. International Cooperation:

CIBA, Swiss

- synthesis of IRGANOX L67

Wroclaw Institute of Technology, Wroclaw, Poland

- starch hydrolysis and starch enzyme inactivation

Laboratoire Environnement et Minéralurgie, UMR INPL et CNRS N° 7569, Nancy, France

- organic pollutants removal from drinking water by activated coal adsorption

University of Lund, Lund, Sweden

- flow microcalorimetry

Oakland University, Rochester, USA

- amperometric sensors for the determination of NO
- monitoring of new anticancer drugs by HPLC

University of Perugia, Perugia, Italy

- study of cyanocomplexes of Cr
- development of thermometric sensors for investigation of enzyme properties

Institute für Technische Chemie der Universität Hannover, Hannover, Germany

- immobilized enzymes applications

Bundesforschungsanstalt f. Landwirtschaft (FAL), Braunschweig, Germany

- immobilized enzymes applications

Consejo superior de investigaciones científicas, Madrid, Spain

- investigation of immobilized enzyme stability and inactivation

Academy of Sciences of Czech Republic, Prague, Czech Republic

- study of properties of immobilized lipases

Lab. Membrane Mater. Proc. ENSCM, Montpellier, France

- joint project INCO Copernicus

ICMAB, Barcelona, Spain

- joint project INCO Copernicus

Amino GmbH, Hannover, Germany

- joint project INCO Copernicus

BCS Engineering, Brno Czech Republic

- joint project INCO Copernicus

Technical University of Bucharest, Romania

- joint project INCO Copernicus

Res. Centre Macromolecular Materials and Membranes, Bucharest, Romania

- joint project INCO Copernicus

Technical University of Warsaw, Poland

- joint project INCO Copernicus

Aston University, Birmingham, UK

- joint project INCO Copernicus

Universidade do Minho, Braga, Portugal

- joint project INCO Copernicus

University College London, United Kingdom

- Grant British Council/STU Bratislava

Acetec, Vienna, Austria

- EUREKA

Scheidl Umweltanalytic, Vienna, Austria

- EUREKA

VUOS Pardubice, Czech Republic

- research cooperation in the EUREKA programme

C. Membership in Domestic Organisations and Societies:

Slovak Society of Chemical Engineering

(chairman: V. Bálež, member of the general committee: Š. Schlosser)

Slovak Society of Biotechnology

(chairman: V. Bálež)

D. Membership in International Organisations and Societies:

European Membrane Society, Toulouse, France

(Š. Schlosser, member of the Council)

European Federation of Chemical Engineering

(Š. Schlosser, Slovak delegate of the Working Party for Membranes)

European Federation of Chemical Engineering

(V. Bálež, member of the Executive Board)

European Federation for Biotechnology

(M. Polakovič, member of the Working Party for Applied Biocatalysis)

European Federation for Biotechnology

(V. Bálež, member of the Working Party for Bioreactor Performance and Slovak delegate in the General Assembly)

American Chemical Society

(V. Bálež, member)

E. International Scientific Programs:

1. COPERNICUS

a/ Inco-Copernicus ERBIC15 CT98 0809." Novel techniques for implementation of immobilized biocatalysts in industrial

processes”

Scientific partner at STU: Dr. Vladimír Štefuca

Coordinator: Dr. Bengt Danielsson (Lund University, Sweden)

Other partner institutions: FAL Braunschweig (D), Technical University of Hannover (D), Amino GmbH, Hannover (D), CSIC, Madrid (E), SAS, Bratislava (SK), AS CR, Prague (CR), BCS Engineering, Brno (CR).

The project started: 1.9.1998

Duration of the project: 3 years

A research project of 7 partners from EU countries, 2 from the Czech Republic, and 2 from Bratislava. It is a Concerted Action project aimed at creating links among partners, research coordination and preparing possible future actions. No money for the research support is available if not the financial support provided by the EU for this project. The main objective of the project is to facilitate the implementation of new materials and techniques into industrial biocatalytic processes. The project involves interdisciplinary trans-national teams to integrate expertise on immobilized biocatalysts. Expertise of partners covers, in particular, the development of the carriers for immobilization, immobilization techniques, methods of characterisation of immobilized biocatalysts, novel approaches for biotransformations, development of bioreactors with immobilized biocatalysts, process monitoring and control, and scaling up processes.

b/ Inco-Copernicus IC15-CT98-0904: “Modelling and design of multiphase bubble bed reactors for advanced food industries”

Responsible at STU: Jozef Markoš

Coordination institution: Aston University, Birmingham, UK

Other partner institutions: Universidade do Minho, Braga, P, Institute of Chemical Processes, Czech Academy of Sciences, Prague CZ.

Duration of the project: November 1998 - October 2001

2. Grant STU/British Council: “Process simulation for environmental and safety assessment”

Responsible at STU: Ľudovít Jelemenský

Coordination institution: University College London.

Duration of the project: 1999 - 2001

3. EUREKA

EUREKA EU 1574: “Lowering Occurrence and Diminishing Effluents/ Pollution at Source - Treatment and Recovery” (acronym: LODE (P) STAR)

Responsible at STU: Štefan Schlosser

Coordinated by VÚOS, Pardubice, Ing. Josef Kotlán

Other partners: Acetec, Vienna (A), Scheidl Umweltanalytic, Vienna (A).

Duration of the project: 1998-2000.

4. INCO Copernicus Programme

IC15-CT98-0147: “Recycling heavy metal ions and organics of biological interest by innovative separation membranes”

Responsible at: STU Štefan Schlosser

Coordinated by Lab. Membrane Mater. Proc. ENSCM, Montpellier (F)

Other partners Technical University of Bucharest (RO), Res. Centre Macromol. Materials Membranes, Bucharest (RO), Warsaw University of Technology (PL), Inst. of Material Science of Barcelona (E).

Duration of the project: January 1999 – 2001

F Visitors from Abroad:

Dr. J. Bryjak

Wroclaw Institute of Technology, P, August 2000, 5 days

Dr. B. Danielsson

Lund University, S, October 2000, 3 days

Prof. David Bogle

UCL London, UK, January 2000 (4 days)

Prof. Eric Fraga

UCL London, UK, January 2000 (4 days)

Prof. Jose Luis Rico Cerda

Universidad Michoacana, Morelia, Mexico, July 2000, (2 days)

Ing. Quido Smejkal, PhD

VŠCHT Praha, CZ, November 2000 (2 days)

J. Kotlán, M. Havlík

VÚOS, a.s., Pardubice, CZ, January, May and December 2000 (3 days)

G. and A. Vladisavljević

Inst. Food Technol. Biochem., Univ. Belgrade, YU, June 2000 (3 days)

J-A. Jonsson, Dept. Analyt. Chem.

Lund Univ., Lund, S, September 2000, (2 days)

P. Uchytíl

Inst. Chem. Proc. ASCR, Praha, CZ, November 2000 (3 days)

G. Visits of Staff Members and PhD Students to Foreign Institutions:

D. Bobok

Technische Universität, Munich, Germany, January 2000 (3 days)

M. Polakovič

2nd International Conference on Protein Stabilisation/Biomolecule Stabilisation, Lisbon, Portugal, April 9-12, 2000.

V. Štefuca

2nd International Conference on Protein Stabilisation/Biomolecule Stabilisation, Lisbon, Portugal, April 9-12, 2000.

M. Polakovič

ISCRE 16 – 16th International Symposium on Chemical Reaction Engineering, Cracow, Poland, September 10-13, 2000.

¼ Jelemenský

Ljubljana, Slovenia, September 2000, (3 days)

D. Bobok

14th International Congress CHISA, Prague, CZ, August 2000, (4 days)

¼ Jelemenský

14th International Congress CHISA, Prague, CZ, August 2000, (4 days)

J. Markoš

14th International Congress CHISA, Prague, CZ, August 2000, (4 days)

B. Remiarová

14th International Congress CHISA, Prague, CZ, August 2000, (4 days)

M. Šoóš

14th International Congress CHISA, Prague, CZ, August 2000, (4 days)

O. Dolgoš	days) 14 th International Congress CHISA, Prague, CZ, August 2000, (4 days)
J. Klein	14 th International Congress CHISA, Prague, CZ, August 2000, (4 days)
Š. Schlosser, E. Sabolová	14 th International Congress CHISA, Prague, CZ, August 2000, (4 days)
¼ Jelemenský	International Symposium on Chemical Reactor Engineering, Krakow, PL, September 2000, (3 days)
J. Markoš	International Symposium on Chemical Reactor Engineering, Krakow, PL, September 2000, (3 days)
J. Markoš	UCL London, UK, October 2000, (1 week)
M. Šoóš	UCL London, UK, October 2000, (1 week)
J. Markoš	Universidade do Minho, Braga, P, April 2000, (4 days)
J. Markoš	ETH Zurich, Zurich, Switzerland, April 2000, (1 day)
Š. Schlosser	Meeting of the EMS Council at CNRS Paris, January 2000 (4 days)
Š. Schlosser	EIDOS, a.s., Zlín, CZ, April 2000, (1 day)
Š. Schlosser	meeting of the INCO Copernicus project, Bucharest, RO, June 2000 (3 days)
R. Kertész	Young Membrains, Aachen, D, June 2000, (4 days)
J. Stopka, Š. Schlosser	ICIM2000, Montpellier, F, June 2000 1999 (8 days)
Š. Schlosser	Euromembrane 2000, Maale Hachamisha, Israel, September 2000 (7 days)
M. Bafnec	Conference New Trends in Rubber Industry, Zlín, CZ, November 2000

VI. THESES AND DISSERTATIONS

A. Graduate Theses (MS Degree) for state examinations after five years of study (supervisors are written in brackets):

Báleš, J.:	Complex design of a tube heat exchanger considering possible phase transfers in both media (I. Langfelder)
Baláž, P.:	Evaluation of the influence of rheological properties and conditions of the application of a starch solution on final paper drying (P. Timár)
Blažej, M.:	Fermentation in an airlift reactor (J. Markoš)
Bořanský, B.:	Investigation of structural properties of a single coal particle in the combustion process. (B. Remiarová)
Hubinová, M.:	Safety analysis by the aid of the HYSYS program (M. Šoóš)
Hudecová, M.:	Kinetics of coal combustion (¼ Jelemenský)
Józsa, K.:	Energy audit at real conditions of a production plant (O. Mierka)
Kertesz, R.:	Pertraction of organic acids from model and fermentation solution in a fiber contactor (Š. Schlosser)
Kováčková, K.:	Pertraction of metals – mass transfer. (M. Vajda)
Krošlák, M.:	Fermentation in an airlift reactor (J. Markoš)
Kvinta, F.:	Safety assessment of the reactive distillation by the aid of the HYSYS program. (¼ Jelemenský)
Laurinc, T.:	Safety analysis of chemical reactors. (J. Markoš)
Mikulová, E.:	Mass transfer in a fiber contactor. (M. Vajda)
Petergáňová, Z.:	The influence of model substances on the decrease of flux of permeate in microfiltration through ceramic membranes. (J. Stopka)
Porubská, I.:	Modelling of chromatographic processes of removal of organic impurities from potable water. (M. Polakoviè)
Přistýáková, Z.:	Design of a high temperature heat pump operating with a solution LiBr-H ₂ O (I. Langfelder)
Pšenák, M.:	Experimental investigation of diffusion of water in silicagel particles (D. Bobok)
Raèko, D.:	Mathematical modelling of controlled drug release (M. Polakoviè)
Sirková, Ž.:	Removal of heavy metals from waste waters by sorption on microbial biomass (M. Polakoviè)
Skokan, S.:	Spread of pollutants in the air (J. Stopka)
Zavadil, V.:	Kinetics of coal combustion in the atmosphere of carbon dioxide (¼ Jelemenský)
Zuber, J.:	Possibilities of utilisation of the software CAMEO for the creation and assessment of realistic scenarios of accidents (V. Fecková)

B. Dissertations (PhD):

Klein, J.:	Study of transport processes in airlift reactors with model and fermentation processes
Juma, M.:	Nonstationary heat transfer and thermal diffusivity of composite materials.

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

- [1] Bobok D., Besedová E.: Error in the Estimation of Effective Diffusion Coefficients from Sorption Measurement. *Chem. Papers* 54 (6b), 482-488 (2000)
- [2] Bugan, G. S., Dömény, Z., Šmogrovičová, Stopka, J., Schlosser, Š.: Aplikácia mikrofiltrácie pri odhoréovaní odpadových pivovarských kvasiniek pre potravinárske účely. *Bulletin potravinárskeho výskumu (Application of microfiltration in debittering of waste beer yeast for foostaff purposes (in Slovak))* 39 203-211 (2000)
- [3] Bugan, G. S., Dömény, Z., Šmogrovičová, D., Švitel, J., Šturdík, E., Stopka, J., Schlosser, Š.: Ceramic membrane cross-flow microfiltration for beer recovery from tank bottoms. *Monatsschrift fur Brauwissenschaft* 53, 229-233 (2000)
- [4] Jelemenský Ľ., Markoš J., Žajdlík R., Remiarová B.: Modelling of non-linear behaviour during combustion of single coal particle. *Chem. Papers* 54, (6b) 473-481 (2000)
- [5] Juma M., Bafrnec M.: Method of Measuring Thermal Diffusivity of Composites with Thick Fillers and Reinforced Rubbers. *Journal of Reinforced Plastics and Composites* 19, 1024-1031(2000)
- [6] González-Velasco, J.R., López-Fonseca, R., Aranzabal, A., Gutiérrez-Ortiz, J.I., Steltenpohl, P.: Evaluation of H-Y type Zeolites in the Destructive Oxidation of Chlorinated Volatile Organic Compounds. *Appl. Catal. B: Environmental* 24, 233-242 (2000)
- [7] Klein, J., Dolgoš, O., Blažej, M., Markoš, J., Godó, Š.: Application of a magnetic tracer method for the characterisation of hydrodynamics in internal – loop airlift bioreactors. *Chemical Papers* 54, (6b) 456-466 (2000)
- [8] López-Fonseca, R., Aranzabal, A., Steltenpohl, P., Gutiérrez-Ortiz, J.I., González-Velasco, J.R.: Performance of Zeolites and Product Selectivity in the Gas-Phase Oxidation of 1,2-Dichloroethane. *Catal. Today* 62, 367-377 (2000)
- [9] Madlová, A., Antošová, M., Polakovič, M., Bálež, V. Thermal stability of fructosyltransferase from *Aureobasidium pullulans*. *Chemical Papers* 54 (6a), 339-344 (2000)
- [10] Madlová, A., Antošová, M., Baráthová, M., Polakovič, M., Štefuca, V., Bálež, V. Biotransformation of sucrose to fructooligo-saccharides: the choice of microorganisms and optimization of process conditions. *Food Biotechnology (Bielecki, S., Tramper, J., Polak, J. eds)* Progress in Biotechnology, Vol. 17, Elsevier, Amsterdam, 151-155 (2000)
- [11] Markoš, J., Jelemenský, Ľ.: Bezpečnostné inžinierstvo na Katedre chemického a biochemického inžinierstva STU v Bratislave. Safety engineering at the Department of Chemical and Biochemical Engineering of the STU in Bratislava (in Slovak). *Ropa, uhlie, plyn a petrochémia* (42) 17-20 (2000)
- [12] Marták, J., Schlosser, Š.: L/L Equilibria of Dimethylcyclopropanecarboxylic Acid in Water - Solvent Systems with Trioctylamine as an Extractant. *Chem. Papers* 54, 413-422 (2000)
- [13] Mierka O., Timár P.: Critical Equation of Pressure Losses by Vertical Pneumatic Transport. *Powder Handling and Processing* 4 (2000)
- [14] Sokolovská, I., Polakovič, M., Bálež, V.: Kinetics of olive oil hydrolysis by *Candida cylindracea* lipase. *Food Biotechnology (Bielecki, S., Tramper, J., Polak, J. eds)* Progress in Biotechnology, Vol. 17, Elsevier, Amsterdam, 209-214 (2000)
- [15] Stopka, J., Schlosser, Š., Dömény, Z., Šmogrovičová, D.: Flux Decline in Microfiltration of Beer and Related Solutions of Model Foulants through Ceramic Membranes. *Polish Journal of Environmental Studies* 9, 65-69 (2000)
- [16] Šefčíková M., Šefčík J., Bálež V.: Kinetic parameters of casein protein coagulation. *Chemical Papers* 53, 370-373 (1999)
- [17] Šefčíková M., Šefčík J., Šefčík J., Bálež V.: Kinetics of casein micelle destabilization. *Chemical Papers* 54, 345-350 (2000)
- [18] Šoóš, M., Rajniak, P.: Mathematical and experimental modelling of sorption processes in a fixed bed adsorber. *Chem. Papers* 54, (6b) 489-495 (2000)
- [19] Štefuca, V., Polakovič, M.: The use of enzyme flow microcalorimetry for determination of soluble enzyme activity. *Food Biotechnology (Bielecki, S., Tramper, J., Polak, J. eds)* Progress in Biotechnology, Vol. 17, Elsevier, Amsterdam, 353-358 (2000).
- [20] Štěpánek, F., Kubicek, M., Marek, M., Rajniak, P., Soos, P., Yang, R.T.: On the modelling of PSA cycles with hysteresis-dependent isotherms. *Chemical Engineering Science* 55, 431-440 (2000)
- [21] Vajda, M., Schlosser, Š., Kováčová, K.: Pertraction of Silver through Bulk Liquid Membranes. *Chem. Papers* 54, 423-429 (2000)
- [22] Žajdlík, R., Markoš, J., Jelemenský, Ľ., Remiarová, B.: Single Coal particle Combustion in Different Oxygen Atmosphere. *Chem. Papers* 54, (6b) 467-472 (2000)
- [23] Žajdlík, R., Markoš, J., Remiarová, B., Jelemenský, Ľ.: Mathematical and Experimental Modelling of Coal Combustion (Review). *Petroleum and Coal* 42, 71 - 87 (2000)

B. Conferences (*International conferences)

- [1] Aèai, P., Micháľková E., Bálež, V.: Mathematical modelling of a packed bed bioreactor with immobilized permeabilized cells of *Trigonopsis variabilis*. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, Tatranské Matliare, Slovakia, May 22.-26. 2000, B5 (CD ROM), 19 pp.
- [2] Aèai, P., Micháľková E., Bálež, V. : Mathematical analysis of the performance of a packed bed bioreactor with immobilized permeabilized cells. In: Proceedings of the 14th International Congress CHISA, Praha, Czech Republic, August 27.-31. 2000, P5.79 (CD ROM), 18 pp.
- [3] Bafrncová S., Havalda I., Graciová E: Calculation of VOC Emission from Industrial Wastewater Treatment. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, Tatranské Matliare, Slovakia, May 22.-26. 2000, B5, p.74
- [4] Bafrnec M., Juma M. : Chemical engineering aspects of tyre vulcanisation. In: Proceedings of the Slovak Rubber Conference 2000, Púchov, Slovakia, 23.-24. May 2000
- [5] Bafrnec M., Juma M.: Analysis of the Tyre Curing Process in a Press with Diaphragm Heated by Steam and Nitrogen. In. Proceedings of the 27th International Conference of Slovak Society of Chemical Engineering,

- Tatranské Matliare, Slovakia, May 22.-2. 2000, p. 70
- [6] Bafnec M.*, Juma M. : Tire Curing Engineering. In: Proceedings New Trends in Rubber Industry 2000, Zlín, Czech Republic , November 7.-8. 2000, p. 137
- [7] Bálaš, V. Aèai, P.: Strategy for the application of Immobilized biocatalyst. In: Proceedings of the 14th International Congress of Chemical and Process Engineering. Praha, Czech Republic, August 27.-31. 2000, A5,1(CD ROM), 4 pp.
- [8] Bobok D., Besedová E.: Diffusional Mass Transfer in Porous Solids. In: Proceedings of the 27-th International Conference of the Slovak Society of Chemical Engineering. Tatranské Matliare, Slovakia, May 22.-26. 2000, 14pp. (CD ROM), ISBN 1 80-227-1350-3
- [9] Bobok D., Besedová E.: Error in the Estimation of Effective Diffusion Coefficients from Sorption Measurements. *ibid*, 12pp.
- [10] Bobok D., Bodnár Z., Besedová E.: Diffusion of Water in Particles of Silicagel. In: Book of Abstracts of the 14th International Congress CHISA 2000. Praha, Czech Republic, August 27.-31. 2000, D6.5
- [11] Besedová E., Bobok D.: Evaluation of Isotheric Heats from Adsorption Equilibrium Measurements. In: Proceedings of the 27-th International Conference of the Slovak Society of Chemical Engineering. Tatranské Matliare, Slovakia, May 22.-26. 2000, (CD ROM), ISBN 1 80-227-1350-3, P 213, 6pp.
- [12] Besedová E., Bobok D.: Isotheric Heat as a Part of Adsorption Equilibrium. In: Book of Abstracts of the 14th International Congress CHISA 2000, Praha, Czech Republic, August 27.-31. 2000, P3.140
- [13] Bugan, G.S., Stopka, J., Broussous, L., Schlosser, Š., Larbot, A.: Vplyv tvarovaného povrchu keramickej membrány na tok permeátu. The influence of the stamped surface of a ceramic membrane on the flux of permeate (in Slovak). In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, full texts on CD ROM, Tatranské Matliare, Slovak Republic, May 22. – 26. 2000, 4 pp.
- [14] Dolgoš, O., Klein, J., Blažej, M., Polák, Š., Annus, J., Markoš, J.: Measurements of circulation velocity in internal-loop airlift bioreactors using a new magnetic – tracer method. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, Tatranské Matliare, SK, May 22.– 26. 2000, p. 52
- [15] Dolgoš, O., Klein, J., Krošlák, M., Markoš, J.: Study of transport phenomena during gluconic acid fermentation in an airlift bioreactor. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, Tatranské Matliare, SK, May 22. – 26. 2000, p. 176
- [16] Graczová E., Bafnecová S.: Prediction of Extraction Behavior of Mixed Solvent NMP/ DEG. *ibid.*, p. 122
- [17] Grznárová, G., Polakoviè, M.: Transport properties of chromatography beds used for separation of biological macromolecules. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering. Tatranské Matliare, Slovakia, May 22.-26. 2000, P303 (CD ROM), 5 pp.
- [18] Hajduèiková, L., Koniarová, D., Polakoviè, M., Rehák, Ľ, Bakoš, D.: The mechanism and kinetics of drug release from biodegradable membranes. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, Tatranské Matliare, Slovakia, May 22.-26. 2000, P309 (CD ROM), 5 pp.
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- [20] Illeová, V., Štefuca, V., Polakoviè, M.: Investigation of enzyme inactivation by flow calorimetry. In: Conference Application of Biotechnology in Agriculture and Food Production. Nitra, Slovakia, October 3.-5. 2000, S23 (poster)
- [21] Jelemenský, Ľ, Markoš, J., Žajdlík, R., Remiarová, B.: Modelling of non-linear behaviour during combustion of single coal particle. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, (CD), Tatranské Matliare, SK, May 22. – 26. 2000
- [22] Jelemenský, Ľ, Markoš, J., Žajdlík, R., Remiarová, B.: Kinetic modelling of single coal particle combustion. In: Book of Abstracts of the 14th International Congress of CHISA. Praha, CZ, August 27. –31.2000
- [23] Jelemenský, Ľ, Šoòš, M., Markoš, J.: Dynamical simulation of safe control of MTBE reactive distillation. In: Book of Abstracts of the 14th International Congress CHISA. Praha, CZ, August 27. –31. 2000
- [24] Juma M., Bafnec M. : Nonstationary heat transfer in reinforced rubber products. Proceedings of the Slovak Rubber Conference 2000, Púchov, Slovakia, 23.-24. May 2000
- [25] Juma M., Bafnec M.: Unsteady Heat Conduction in the Steel-cord Rubber Composites. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, Tatranské Matliare, Slovakia, May 22-26. May 2000, p. 69
- [26] Kertész, R.: Transport of Phenylalanine Through Bulk Liquid Membranes. In: Proceedings of the Network Young Membrane, Aachen, Germany, September 7.- 8. 2000, 1 pp.
- [27] Klein, J., Dolgoš, O., Pollák, Š., Annus, J., Blažej, M., Markoš, J.: Application of a magnetic tracer method for the characterisation of hydrodynamics in internal – loop airlift bioreactors. In: Proceedings of the 14th International Congress CHISA, (CD), Praha, CZ, August 27. –31. 2000
- [28] Klein, J., Godó, Š., Bálaš, V.: Pneumatically mixed bioreactors – alternatives of their application to fungal fermentation of citric acid. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, , Tatranské Matliare, Slovakia, May 22.-26. 2000, p.51
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- [36] Mierka O, Timár P.: Cogeneration in Industrial units of Middle Spread. In: Proceedings of the 27-th International Conference of the Slovak Society of Chemical Engineering, Tatranské Matliare, May 2000, p. 177
- [37] Molnár, A.: The run-away phenomena in plug flow reactors. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, (CD), Tatranské Matliare, SK, May 22. – 26. 2000, p. 94
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- [46] Schlosser, Š.: Možnosti využitia membránových separácií v analytickej chémii. The possibilities of application of membrane separations in analytical chemistry (in Slovak). In: Proceedings of the „Summer School HPLC 2000“, Bratislava, June 20. - 23. 2000, p. 113-127
- [47] Schlosser, Š.: Pertraction of organic acids and silver through liquid membranes, invited lecture at the Technical University of Bucharest, Romania. (June 8, 2000)
- [48] Schlosser, Š., Kertész, R., Sabolová, E.: Transport of phenylalanine through bulk liquid membranes. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, (CD ROM), Tatranské Matliare, Slovak Republic, May 22 - 26, 2000, 11 pp.
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- [56] Šefčíková M., Šefčík J., Báleš V.: Three step model of casein micelles destabilisation. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, (CD) Tatranské Matliare, Slovakia, May 22.-26. 2000, 5 pp.
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- [61] Vajda, M., Schlosser, Š., Kováčová, K., Teixidor, F.: Pertraction of silver through bulk liquid membranes. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, (CD ROM), Tatranské Matliare, Slovak Republic, May 22. – 26. 2000, 8 pp..
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- [63] Vajda, M., Schlosser, Š. *, Kováčová, K., Teixidor, F.: Pertraction of silver through bulk liquid membranes. In: Procédés á membrane dans la protection de l'environnement, Bucurest , 2000 RO
- [64] Žajdlík, R., Markoš, J., Jelemenský, Ľ, Remiarová, B., Zavadil, V.: Single coal particle combustion in CO₂ atmosphere. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, (CD), Tatranské Matliare, SK, May 22. – 26. 2000, p. 18
- [65] Žajdlík, R., Markoš, J., Jelemenský, Ľ, Remiarová, B., Hudecová, M.: Single Coal Particle Combustion in Different Oxygen Atmosphere. In: Proceedings of the 27th International Conference of the Slovak Society of Chemical Engineering, Tatranské Matliare, SK, May 22. – 26. 2000, p. 168
- [66] Žajdlík, R., Jelemenský, Ľ, Remiarová, B., Markoš, J.: Experimental and modelling investigation of single coal particle combustion. In: Book of abstracts ISCRE 16, Krakow, Poland, September 10. – 13. 2000

C. Books and Textbooks

- [1] Bafrncová S., Šefčíková M., Vajda M.: Chemické inžinierstvo, Tabuľky a grafy. Chemical Engineering. Tables and Graphs (in Slovak). STU Bratislava, 2000, ISBN 80-227-1304-X
- [2] Dojčanský J., Longauer J.: Chemické inžinierstvo II. Chemical Engineering II (in Slovak). Malé centrum 2000, ISBN 80-967064-8-9
- [3] Schlosser, Š.: Membrane Based Processes with Immobilized Interface. In: Integration of Membrane Processes into Bioconversions. Kluwer Academic, p. 55-72 (2000)
- [4] Schlosser, Š.: Pertraction Through Liquid and Polymeric Membranes. In: Integration of Membrane Processes into Bioconversions. Kluwer Academic, p. 73-100 (2000)
- [5] Schlosser, Š.: Membránové procesy. Membrane processes (in Slovak). In: Chemické inžinierstvo II. (Chemical Engineering II (in Slovak). J. Dojčanský, J. Longauer, Malé centrum, Bratislava, p. 333-374 (2000)

D. Reports and Invited Lectures

- [1] Bafrnec, M : Course: „Engineering aspects of new rubber technologies“. Barum-Continental, April 27.-28. 2000, Luhačovice, CZ
- [2] Bafrnec M, Havalda, i., Langfelder I., Mierka O., Timár P.: Course: „Management in the production of paper“. Course for SCP Ružomberok, January-March, 2000
- [3] Bafrnec M.: Engineering of rubber productions. 9th semester 2000/2001 lectures 4h/week, Faculty of Industrial Technologies in Púchov, University of Trenčín
- [4] Bafrnec M.: Method for estimation of the vulcanisation degree. Research report for Matador a. s. Púchov, Slovakia
- [5] Bafrnec M. Juma M.: Reduction of the energy consumption in the rubber production. Research report for Matador a. s. Púchov, Slovakia
- [6] Bobok D.: Diffusion of Water in Particles of Silicagel. Thermodynamikseminar, TU München, 28.1.2000, pp.11 (invited lecture)
- [7] Hudec I. Alexy P. Bafrnec M. Juma M. et al.: Dynamico-mechanical properties and thermal diffusivity of components used for the production of tires. Research report for Matador a. s. Púchov, Slovakia
- [8] Jelemenský Ľ, Šoóš M., Markoš J.: Chemical-engineering calculations and modification of the rectification column for the mixture DFA, nonene and additives. Research report for CIBA, Swiss (2000)
- [9] Jelemenský, Ľ, Markoš, J.: Safety engineering, lectures within the frame of the education of the staff in SCP, a.s., Ružomberok, November – December, 2000
- [10] Markoš M., Jelemenský Ľ, Šoóš M: Chemical-engineering calculations of a reactor and absorber for the production of chloroethanol Research report for Novácke Chemické Závody, a.s., Nováky (2000)
- [11] Markoš J., Jelemenský Ľ, Šoóš M.: Kinetics of synthesis of IRGANOX L67. Research report for CIBA, Swiss (2000)
- [12] Markoš J., Jelemenský Ľ, Šoóš M.: Estimation of basic physical properties of porous materials (surface area, mean radius of pores, specific volume of pores distribution of pores according to size, porosity) by the apparatuses SORPTOMATIC 1900 a POROSIMETER 2000 for:
Lhodol, s.r.o, Rajec,
Combin, s.r.o., Tisovec,
SCP a.s. Ružomberok,
Novácke chemické závody, a.s. Nováky
- [13] Markoš J., Klein J.: Rheological measurement of samples of milk products by VISKOTESTER VT 550. Research report for the Research Milk Institute, Žilina (2000)
- [14] Markoš J.: Chemical substances and environment, invited lecture for the advanced education of managers in SLOVAKOFARMA, a.s., Hlohovec, November 2000
- [15] Markoš, J.: Experimental and mathematical modelling of single coal particle combustion. ETH Zurich, Switzerland, April 2000 (invited lecture)
- [16] Mierka O., Timár P.: Material and energy balance of an evaporator for black liquor after its reconstruction. Research Report for SCP, a.s. Ružomberok
- [17] Mierka O., Timár P, Langfelder I.: Elaboration of an energy audit for the regeneration of caprolactam. Research Report for RHODIA Industrial Yarns Slovakia, a. s. Humenné
- [18] Schlosser, Š.: Pertraction of organic acids and silver through liquid membranes, Technical University of Bucharest, Bucharest, RO, June 8, 2000. (invited lecture)

- [19] Šoóš M.: Applicability of the software HYSYS for safety analysis. University College London, London, UK, October, 2000 (invited lecture)
- [20] Timár P., Mierka O., Bálež V.: Decrease of energy, and consumption of heat and pressurised air. Research Report for SKY Life, lim., Malacky
- [21] Timár P., Mierka O., Bálež V. : Decrease of energy in the production of pressurized air. Research report for KINEX, a. s.
- [22] Timár P., Mierka O., Bálež V.: Analysis of the efficiency of heat consumption in Petrochema Dubová. Research Report for PETROCHEMA, a. s. Dubová
- [23] Timár P., Mierka O. : Course aimed at special problems of energy in industrial enterprises, for FERMAS s. r. o. Slovenská Ľupča (2000)

DEPARTMENT OF CHEMICAL PHYSICS

Head of the Department:
Assoc. Prof. Viliam Laurinc, PhD

Telephone: ++421-7-52 96 34 20
Fax: ++421-7-52 49 31 98
E-mail: laurinc@cvt.stuba.sk

I. STAFF

Full Professors:
Fedor Valach, DSc

Associate Professors:
Pavol Fedorko, PhD; Oľga Holá, PhD; Viliam Laurinc, PhD; Peter Lukáè, PhD; Teodor Obert, PhD (part-time); Viera Skákalová, PhD (till 31.8.2000)

Assistant Professors:
Július Annus; Peter Benco, PhD (part-time); Ladislav Bušovský; Eva Griaèová (part-time); Juraj Griaè, PhD (part-time); Soňa Halúsková (part-time); Vladimír Lukeš, PhD; Soňa Macková, PhD; Miroslav Tokarèik, PhD; Daniela Žilinská

Technical Staff:
Anton Adamko; Marián Babniè; Zdenka Halaburková

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories :

Laboratory of Physics I. (Mechanics, Deformations, Fluids, Heat)
Laboratory of Physics II. (Electrical measurements, DC and AC circuits, Waves, Black body radiation)

B. Research Laboratories:

Laboratory of X-ray Diffraction
Laboratory of Electrical Properties of Conducting Polymers
Laboratory of Gamma Radiation Source

III. TEACHING

A. Undergraduate Study

1. Introductory Courses

1st semester (autumn)		
Seminar in Basic Physics	(0-2h)	Bušovský, Griaèová, Holá, Laurinc, Lukáè, Lukeš, Macková, Obert, Tokarèik, Žilinská
Physics I.	(2-2h)	Lukáè, Lukeš
2nd semester (spring)		
Physics I.	(2-2h)	Bušovský, Holá, Laurinc, Lukáè, Macková, Tokarèik, Valach, Žilinská
Physics Laboratory I.	(0-2h)	Annus, Benco, Bušovský, Griaèová, Griaè, Halúsková, Lukáè, Lukeš, Macková, Žilinská
3rd semester (autumn)		
Physics II.	(2-2h)	Bušovský, Holá, Laurinc, Macková, Obert, Tokarèik, Žilinská
Physics Laboratory II.	(0-2h)	Annus, Benco, Griaè, Griaèová, Halúsková, Macková, Tokarèik
2. Advanced Courses		
8th semester (spring)		
Statistical Thermodynamics	(2-1h)	Laurinc

IV. CURRENT RESEARCH PROJECTS

A. Effect of gamma- and/or laser irradiation on the structure and critical temperature of copper-oxygen and fulleroid high-temperature superconductors as single crystals (Fedor Valach)

1. X-ray structure investigation of gamma- and/or laser irradiated single crystals of $\text{La}_x\text{Sr}_{1-x}\text{CuO}_{2+\delta}$ and C_{60}
2. Evaluation of the correlations of structural parameters versus critical temperature for high-temperature superconductors
3. Bond-valence approach to the copper-copper and copper-oxygen bonding in binuclear copper(II) complexes
4. X-ray crystallographic investigation of the temperature induced copper-oxygen isomers as single crystals

B. Theoretical study of thermo- and photochromism of thiophene based polymers (Viliam Laurinc)

Common project with partners from the Dept. of Organic Chemistry, Slovak Academy of Sciences, and Institute

of Chemistry at the Comenius University. The main goal of the project is the analysis of optical absorption and luminescence data obtained for variety of synthesised new thiophene oligomers and polymers. The quantitative trends of changes in optical properties are analysed by using the methods of quantum chemistry and theoretical simulations.

C. Optimization of didactic methods in physics (Oľga Holá)

1. Formation of examination tests, use of microcomputer sets in the physical laboratory and introduction of interactive educational computer programmes
2. Pedagogico-psychologico-sociologic investigation of the motivation and social conditions of university students

V. COOPERATION

A. Cooperation in Slovakia:

Faculty of Electrical Engineering and Information Technology, Slovak University of Technology, Bratislava
 Faculty of Mathematics and Physics, Comenius University, Bratislava
 Faculty of Civil Engineering, Slovak University of Technology, Bratislava
 Institute of Physics, Slovak Academy of Sciences, Bratislava
 Institute of Polymers, Slovak Academy of Sciences, Bratislava
 Institute of Inorganic Chemistry, Slovak Academy of Sciences, Bratislava
 Faculty of Natural Science, Comenius University, Bratislava
 VÚJE a.s., Trnava

B. International Cooperation:

Institut für Festkörperphysik, Universität Wien, Vienna, Austria
 - Fullere and conducting polymer research
 Institut für Physikalische Chemie, Universität Wien, Vienna, Austria
 - Electronic excitation transport in polymers
 Institute of Physics, Czech Academy of Sciences, Prague, Czech Republic
 - Magnetic properties of amorphous alloys
 Department of Inorganic Chemistry, Charles University, Prague, Czech Republic
 - Synthesis of Co complexes
 Institute of Chemistry, University of Wrocław, Wrocław, Poland
 - X-ray crystallographic research
 Laboratorium für Chemische und Mineralogische Kristallographie, Universität Bern, Bern, Switzerland
 - X-ray crystallographic research
 Department of Materials Science and Metallurgy, University of Cambridge, Cambridge, UK
 - Electron diffraction research
 Universidad de la Laguna, Tenerife, Spain
 - Structural crystallophysics
 Institut für Mineralogie, Technische Universität Wien, Vienna, Austria
 - Crystallographic and structural chemistry
 School of Natural and Environmental Sciences, Coventry University, Coventry, UK
 - Synthesis of conducting polymers
 Chemical Crystallography Laboratory, Oxford University, Oxford, UK
 - X-ray crystallographic research at low temperatures, crystallographic statistics
 Nuclear Research Institut, Řež u Prahy, Czech Republic
 - Emanation thermal analysis
 Aristotle University, Thessaloniki, Greece
 - Natural sorbents - zeolites
 Département de Recherche Fondamentale sur la Matière Condensée, Commissariat à l'Energie Atomique, Grenoble, France
 - Conducting polymers

C. Membership in Domestic Organizations and Societies

Union of Slovak Mathematicians and Physicists, Bratislava	(V. Bušovský, P. Fedorko, O. Holá, V. Laurinc, S. Macková, T. Obert, V. Skákalová)
Slovak Physical Society, Bratislava	(V. Bušovský, P. Fedorko, O. Holá, V. Laurinc, S. Macková, T. Obert, V. Skákalová, F. Valach)
Slovak Chemical Society, Bratislava	(F. Valach)

D. Membership in International Organizations and Societies

International Society for Theoretical Chemical Physics, Erlangen, Germany	(V. Laurinc)
European Synchrotron Radiation Society, Paris, France	(F. Valach)
European Physical Society, Budapest, Hungary	(P. Fedorko, O. Holá, T. Obert, V. Skákalová, F. Valach)

H. Visits of Staff Members and Postgraduate Students in Foreign Institutions

P. Fedorko	Département de Recherche Fondamentale sur la Matière Condensée, Commissariat à l'Energie Atomique, Grenoble, France (since 8.11.1999)
V. Skákalová	Max Planck Institute, Stuttgart, Germany (since

V. Laurinc

7.12.1999 till 31.8.2000)

CRE Centre, Paris, France (26.6.-29.6.2000)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

- [1]* Valach F., Tokarčík M., Maris T., Watkin D. J., Prout C. K.: Bond-valence approach to the copper-copper and copper-oxygen bonding in binuclear copper(II) complexes: Structure of tetrakis(2-fluoro-benzoato-O,O')-bis(2-fluorobenzoate-O) dicopper(II). *Zeitschrift für Kristallographie*. 215, 56-60 (2000)
- [2]* Vrábek I., Lukeš V., Laurinc V., Biskupič S.: Ab initio Study of the $\text{Ne}(^1\text{S})\text{-CN}(^2\Sigma^+)$ van der Waals Complex. *J. Phys. Chem.* 104, 96-101 (2000)
- [3]* Lukeš V., Bittererová M., Laurinc V., Biskupič S.: Ab initio study of the $\text{F}_2(\text{X}^1\Sigma_g^+)-\text{H}(^2\text{S})$ van der Waals complex. *Chem. Phys.* 257, 157-165 (2000)
- [4]* Földesová M., Dillinger P., Lukáč P.: Adsorption and desorption of Cr(III) on natural and chemically modified Slovak zeolites. *Journal of Radioanalytical and Nuclear Chemistry* 245(2), 435-439 (2000)

B. Conferences (*International conferences)

- [1]* Valach F.: Bond-valence sum model in solid-state chemistry of coordination compounds, In Programme Abstracts of XIIth Winter School on Coordination Chemistry, Wrocław, Poland, 4-8 December 2000, p. 48-49
- [2]* Földesová M., Dillinger P., Svetík Š., Lukáč P.: Vplyv spolupôsobenia chemickej a termickej úpravy zeolitov na sorpciu ortuti. The influence of chemical and thermal treatments of zeolites on sorption of mercury. Proceedings of XV-th Conference of Thermal Analysis and Calorimetry, TERMANAL 2000. High Tatras - Stará Lesná, Sept. 11-13, 2000, Slovak Republic. Eds. Fajniar V. Š., Šimon, P., Smrčková E., CHTF STU Bratislava, 2000, p. 191-192
- [3]* Lukeš V., Breza M., Laurinc V., Vrábek I.: First and Second Hyperpolarizability and Conformation of Thiophene-Based Oligomers. 36th Symposium for Theoretical Chemistry, Litschau, Lower Austria, September 10-14, 2000, p. 49
- [4]* Fedorko P., Fraysee J., Dufresne A., Planes J., Travers J.P., Olinga T., Kramer C., Pron A.: New counterion-plasticized polyaniline: preparation, mechanical and electrical transport properties. International Conference on Science and Technology of Synthetic Metals. Gasein, Austria, July 15-21, 2000, In: Book of Abstracts, Elsevier, Amsterdam, p.155
- [5]* Lukeš V., Bittererová M., Laurinc V., Biskupič S.: Ab initio study of the $\text{F}_2(\text{X}^1\Sigma_g^+)-\text{H}(^2\text{S})$ van der Waals complex. 10th Triangle Meeting Bratislava – Prague – Vienna, Gabčíkovo, Slovakia, October 26-28, 2000
- [6]* Lukeš V., Laurinc V.: Ab initio study of van der Waals complexes. 10th Triangle Meeting Bratislava – Prague – Vienna, Gabčíkovo, Slovakia, October 26-28, 2000
- [7] Holý K., Bošá I., Stanys T., Polášková A., Holá O.: Využitie radónu ^{222}Rn pre urèovanie exhalácie CO_2 z pôdy. The use of radon ^{222}Rn for the determination of the CO_2 exhalations from the soil. (in Slovak). Súpis došlých anotácií, II. Štiavnické dni 2000, Banská Štiavnica, October 6-7, 2000, p.6
- [8]* Vial J.C., Pepin-Donat B., Viallat A., Fedorko P.: Carrier dynamics into poly(octylthiophene) gels. In: 2000 MRS Fall Meeting, Boston, USA, Nov.27 – Dec.1, 2000.
- [9]* Hirscher M., Becher M., Quintel A., Skákalová V., Roth S.: Hydrogen Desorption Measurements on Carbon Nanotubes and Graphite, XIV-th International Winterschool Euroconference on Electronic Properties of Novel Materials, Molecular Nanostructures, Kirchberg, Austria, March 4-11, 2000
- [10]* Quintel A., Skákalová V., Roth S., Becher M., Hirscher M.: Hydrogen Storage in Carbon Materials, XIV-th International Winterschool Euroconference on Electronic Properties of Novel Materials, Molecular Nanostructures, Kirchberg, Austria, March 4-11, 2000
- [11]* Quintel A., Skákalová V., Roth S., Becher M., Hirscher M.: Carbon Nanotubes for Hydrogen Storage, Verhandlungen der Deutschen Physikalischen Gesellschaft, Frühjahrstagung 2000, Regensburg, Germany, March 27-31, 2000
- [12]* Hirscher M., Becher M., Quintel A., Skákalová V., Choi Y.-M., Roth S., Stepanek I., Bernier P., Leonhardt A., Fink J.: Hydrogen Desorption Measurements on Carbon Nanotubes and Graphite, Eurocarbon 2000, Berlin, Germany, July 9-13, 2000
- [13]* Hirscher M., Becher M., Detlaff-Weglikowska U., Quintel A., Skákalová V., Choi Y.-M., Roth S., Stepanek I., Bernier P., Leonhardt A., Fink J.: Hydrogen Storage in Carbon Nanostructures International Symposium on Metal-Hydrogen Systems 2000, Noosa, Australia, October 1-6, 2000
- [14]* Hirscher M., Becher M., Detlaff-Weglikowska U., Quintel A., Skákalová V., Choi Y.-M., Haluska M., Roth S., Stepanek I., Bernier P.: Hydrogen Desorption Measurements on Carbon Nanostructures, Fall Meeting MRS, Symposium A, Nanotubes and Related Materials, Boston, USA, Oct. 27 – Dec. 1, 2000
- [15]* Skákalová V., Quintel A., Roth S., Becher M., Hirscher M.: Contribution to the Study of Hydrogen Storage in Carbon Materials, XIV-th International Winterschool Euroconference on Electronic Properties of Novel Materials, Molecular Nanostructures, Kirchberg, Austria, March 4-11, 2000
- [16] Kaszonyi A., Hronec M., Annus J.: Automatizovaný mikroreaktorový komplex na štúdium heterogénne katalyzovaných reakcií (in Slovak). In: Prí•ažlivé chemické technológie a materiály, Púchov, Slovak Republic, June 14, 2000, p. 13-15

C. Books and Textbooks

- [1] Pálszegi T., Szöcs F., Breza M., Lukeš V.: Modelling of Bithiophene ultrafast photophysics: Electronic oscillator and molecular geometry evolution. In: Multiphoton and Light Driven Multielectron Processes in Organics: New Phenomena, Materials and Applications. Edited by Kajzar F. and Agranovich M.V., Kluwer Academic Publishers, Netherlands, p. 135-150 (2000)
- [2] Laurinc V. a kol.: Fyzika I. Zbierka príkladov a úloh. (Physics I. Exercises and Problems). CHTF STU, Bratislava, 156 pp. (2000)

DEPARTMENT OF CHEMICAL TECHNOLOGY OF WOOD, PULP AND PAPER

Head of the Department:
Assoc. Prof. Pavel Krkoška, PhD

Telephone: ++ 421-7-5249 6359 or 5932 5215
Fax: ++ 421-7-5249 3198
E-mail: kdcp@chtf.stuba.sk

http://www.chtf.stuba.sk/kdcp/dcp_index_sk.html

Secretary

Valéria Töröková

Tel: ++ 421-7-396 359 or 5932 5213

I. STAFF

Associate Professors:

Pavel Krkoška, PhD
Ladislav Šutý, PhD

Assistant Professors:

Emil Golis, PhD
Vlasta Lužáková, PhD
Pavel Mjšovec, PhD
Štefan Šutý, PhD

Research Fellows:

Tatiana Marciněinová
Lujza Mozožová
Igor Šurina, PhD
Katarína Vizárová, PhD
Milan Vrška, PhD

PhD Students:

František Bednár
Rudolf Dorko
Radovan Tišo
Lívia Krištofová
Eva Gemzická
Peter Scholtz

Technical Staff:

Jozefína Karabová
Jozef Mihál
Ivan Vajanský
Zuzana Žaškovská

II. TEACHING AND RESEARCH LABORATORIES

Laboratory of Papermaking Fibres and Additives
Laboratory of Pulping Technology
Laboratory of Structure and Analysis of Wood
Laboratory of Structure and Properties of Paper
Laboratory of Natural Polymers

Laboratory of Wood Chemistry
Laboratory of Chemical Treatment of Wood
Laboratory of Biotechnology
Laboratory of Thermoanalytical Methods
GC-MS Laboratory

III. TEACHING

A. UNDERGRADUATE STUDY

6th Semester

Project	0-4 h	members of department
Paper and Printing	2-2 h	P. Krkoška, J. Panák

B. GRADUATE STUDY

7th Semester

Physics of Polymers and Paper	2-2 h	M. Krištofiè, Š. Šutý
Chemistry and Analysis of Wood	2-0 h	E. Golis, L. Šutý
Pulping Technology	3-1 h	L. Šutý, M. Vrška
Laboratory	0-8 h	E. Golis, K. Vizárová
Natural Polymers	2-1 h	V. Lužáková, D. Bakoš
Environmental Management in Pulp and Paper Industry	2-0 h	E. Golis, K. Vizárová

8th Semester

Paper Technology I.	3-0 h	P. Krkoška, Š. Šutý
Paper Machines	2-2 h	A. ěeròanský
Engineering of Pulp Production	1-1 h	L. Šutý, M. Vrška
Chemical Treatment of Wood I.	3-0 h	I. Šurina, M. Vrška
Laboratory	0-8 h	M. Vrška, E. Golis
Visiting of Pulp and Paper Mills	1 week	
Practical Training Course	3 weeks	

9th Semester

Chemical Treatment of Wood II.	2-0 h	I. Šurina, Š. Šutý
Paper Technology II.	3-0 h	P. Krkoška, P. Mišovec
Packaging Materials	2-0 h	P. Mišovec
Laboratory	0-9 h	P. Mišovec, Š. Šutý, I. Šurina
Chemical Aids in Pulp and Paper Industry	1-1 h	V. Lužáková, K. Vizárová
10th Semester		
Thesis	0-27 h	

C. PhD STUDY

1. class	Foreign language (English, German)	6 months	Department of languages
1. class	Macromolecular chemistry	12 months	V. Chrátová
1. class	Technology of polymeric materials	12 months	P. Krkoška
1. class	Physics of polymers	12 months	M. Krištofiè
2-3. class	Preparation of dissertation	24 months	Department (instructor)

IV. CURRENT RESEARCH PROJECTS**A. Papermaking fibres-new process of isolation, modification, recycling and preparing of paper**

(Assoc. Prof. Pavel Krkoška, PhD)

The project respects the request of Slovak industry of chemical treatment of wood, and chemical technology of pulp and paper. Definition and mathematical description of pulp fibres properties by new delignification and bleaching processes in laboratory and industrial conditions, definition of their permanence and durability was studied. The database of monitoring of emission from pulp and paper industry of Slovak Republic was verified. The analysis of wood raw materials with regard to the content of calcium was studied. With growing demand for deinking at conditions near to neutral pH value, new deinking chemicals become increasingly important. We have formulated three different blends of surfactants and examined their deinking efficiency as flotation aids in a conventional process using also other chemicals as well as in an alternative process without any other chemicals. Their deinking effectiveness was higher compared to traditionally used commercial deinking chemicals.

B. Thermal degradation of plant cell wall polysaccharides

(Ivan Šimkovic, PhD, Igor Šurina, PhD)

Study of the thermal degradation of wood cell wall polysaccharides was used for clarification and possible slowdown of this process. The aspects will be set on protection of wood material against burning, on environmental problems, as well as, on the possible effect on the health of human being. This will be achieved by impregnation of wood materials with water solutions of boric acid, water glass, sodium hydroxide and their mixed solutions and by subsequent precipitation of the formed products in the cell wall by acidification. The effect of ion-exchanging groups on thermolysis will be also studied. The identification of possible cancerogenic compounds formed by thermolysis of starch and their derivatives was also part of the project.

V. COOPERATION**A. COOPERATION IN SLOVAKIA**

1. North Slovakian Pulp and Paper Company, Ružomberok
2. Pulp and Paper Research Institute, Bratislava
3. State Forest Products Research Institute, Bratislava
4. Institute of Wood Ecology, Nitra
5. Technical University, Zvolen
6. Slovak National Archives, Bratislava
7. Institute of Chemistry of Slovak Academy of Sciences, Bratislava
8. Bukóza Co., Vranov
9. AssiDomän Packaging, Štúrovo
10. Union of Pulp and Paper Industry of Slovak Republic, Banská Bystrica
11. Institute of Forest Ecology, Zvolen

B. INTERNATIONAL COOPERATION

1. Department of Chemical Technology of Wood, Pulp and Paper, Technical University, Pardubice, Czech Republic (Pulp and Paper Chemistry and Technology)

2. Czech State Central Archives, Praha, Czech Republic (Permanence and Durability of Paper)
3. Leopold-Franzens University, Innsbruck, Austria (Prof. Bobleter) (Properties of Fibers from TMP)
4. Institute of Papermaking and Paper Machines, Technical University of Lodz, Poland (Prof. Kawka),
(Cooperation in Pedagogical and Research Activities)
5. University of Quebec - Trois Rivières, Canada (Prof. B. V. Kokta) (Process of Explosion Pulp)
6. Pulp and Paper Research Centre, McGill University, Montreal, Canada (Prof. B. Alince)
(Filling of Paper)
7. Agricultural University, Faculty of Wood Technology, Poznan, Poland (Prof. W. Pradzinski) (Chemical Techn. of
Wood and Plant Raw Materials)
8. University of Provence, Marseille, France (Prof. Perichaud) (Combustion)
9. French Institute of Papermaking and Graphics Industry, Grenoble, France (Prof. J. Voilot)
(Pulp and Paper Chemistry and Technology)
10. Universidade da Beira Interior, Covilhã, Portugal (Prof. A. P. Duarte) (Program Socrates)

C. MEMBERSHIP IN DOMESTIC ORGANIZATIONS AND SOCIETIES

1. Slovak Chemical Society, Bratislava (E. Golis, P. Krkoška, I. Šurina, L. Šutý)
2. Slovak Society of Industrial Chemistry, Bratislava
(E. Golis, P. Krkoška, V. Lužáková, P. Mišovec, I. Šurina)
3. SK-Biom, Bratislava (I. Šurina)
4. Union of Pulp and Paper Industry of Slovak Republic, Banská Bystrica
(E. Golis, P. Krkoška, L. Šutý, Š. Šutý)

D. MEMBERSHIP IN INTERNATIONAL ORGANIZATION AND SOCIETIES

1. TAPPI - Technical Association of the Pulp and Paper Industry, Atlanta, USA (P. Krkoška)
2. Society of the Pulp and Paper Industry, Prague - Bratislava, Czech and Slovak Republics
(I. Šurina)

E. TEMPUS PROGRAM

F. INTERNATIONAL SCIENTIFIC PROGRAMS

G. VISITORS FROM ABROAD

Prof. M. Milichovský: Technical University, Pardubice, Czech Republic, 7. 6. 2000

H. VISITS OF STAFF MEMBERS AND POSTGRADUATE STUDENTS IN FOREIGN INSTITUTIONS

VI. THESIS AND DISSERTATIONS

A. UNDERGRADUATE THESIS (B.Sc. Degree)

for state examinations after three years of study (supervisors are written in brackets):

Almássyová P.:	Study of lignin structure (L. Šutý)
Ciglanová K.:	Influence of additives on paper quality (R. Dorko, I. Šurina)
Ferko M.:	Investigation of stability of hydrogenperoxide (E. Golis)
Frimová A.:	Evaluation of volatile organic compounds (I. Šurina)
Galbavá M.:	Papermaking characterization of pulps fibres (P. Krkoška)
Gavlas J.:	Deinking of waste paper by surfactants (V. Lužáková)
Hájková H.:	Impurities of paper products and their effect on environment (I. Šurina)
Hladová M.:	Technology of delignification versus bleachability of pulps by chlorine free technologies (M. Vrška)
Jantošíková G.:	Investigation of cellulose viscosity in connection of paper ageing (K. Vizárová)
Kasáková K.:	Influence of surfactants on kraft black liquor viscosity (V. Lužáková)
Kašjaková T.:	Influence of pulp production on environment (M. Vrška)
Klottonová M.:	Effect of additives on paper strength (P. Mišovec)
Martinová L.:	Permanence and durability of paper (P. Krkoška)
Matajová M.:	Using of oxygen at delignification and bleaching of pulps (E. Golis)
Miháliková P.:	Strength properties of paper from pulp mixtures (P. Mišovec)
Szombethová A.:	Study of using of natural zeolite as paper filler (Š. Šutý)
Šavrtková S.:	Modern technologies in pulp and paper industry (E. Golis)
Štechová K.:	Study of changes of paper colouring at accelerated ageing (K. Vizárová)

Vrièan Marek.: Isolation of extractives from black liquor (L. Mozožová)

B. GRADUATE THESIS (M.Sc. Degree)

for state examinations after five years of study (supervisors are written in brackets):

Buchtová A.: Environmental quality of lignocellulosic materials (S. Katušák)
 Ěermanová S.: Study of changes of papercolouring from bleached kraft pulp after accelerated ageing (K. Vizárová)
 Hlavna D.: Environmental evaluation of wood products (O. Bešinová)
 Královièová M.: Perceptual evaluation of paper formation and print quality (J. Gigac)
 Majlenderová Z.: Study of filler deposition onto pulp fibre (Š. Šutý)
 Némethová K.: Wood extractives and additives at delignification (V. Lužáková)
 Potocká S.: Influence of additives on bonding ability of pulp fibres (P. Mišovec)
 Szabová M.: Bonding of calcium on inorganic and organic omponents of black liquors (M. Vrška)
 Szabová Z.: Influence of resin sediments on mechanical properties of paper (M. Vrška)
 Švento Š.: Strength properties of paper from pulp mixtures (P. Mišovec)
 Tupanová K.: Pressing of model fiber blends (A. Ěeròanský)
 Turanská J.: Preparation and characterization of additives for TCF bleaching (E. Golis)

C. DISSERTATIONS (PhD Degree)

(supervisors are written in brackets):

Bednár F.: Microparticulate retention systems (P. Krkoška)
 Gemzická E.: Dosing optimisation of chemicals and decreasing of pitch during pulp bleaching (P. Krkoška)
 Krištofová L.: Polymeric furane compounds (P. Krkoška)
 Scholtz P.: Influence of liquor calcium content on evaporator deposits formation (P. Krkoška)
 Tiò R.: Papermaking properties of pulp fibers (P. Krkoška)
 Dorko R.: Impurities formation in paper production (M. Ěeppan, I. Šurina)

VII. PUBLICATIONS

A. JOURNALS (*registered in Current Contents, CA and in ABIPST)

- [1]* Bednár F.: Effect of cationic polyacrylamide (CPAM) on interaction between precipitated CaCO₃ (PCC) and pulp fibers. *Chemické listy* 94(9) 761 (2000)
- [2]* Fišerová M., Lužáková V.: Aplicacao de Surfactantes como Aditivos na Polpacao Kraft. *O`Papel* 59, 11, 96-103 (2000)
- [3]* Krkoška P., Vizárová K. : Permanence and durability of sulphate pulps with ECF sequences and of common paper produced. *Chemické listy* 94 (9) 881-882 (2000)
- [4]* Krkoška P., Šutý L., Golis E., Šutý Š.: Program výuky chemickej technológie dreva, celulózy a papiera v porovnaní s niektorými vysokými školami v zahranièí. *Papír a celulóza* 55 (4), 116-117 (2000)
- [5]* Lužáková V., Marcinèinová T., Vrška M.: Pitch Formation Precursors in Domestic Wood Species. *Chemické Listy* 94, 9, 880-881 (2000)

B. CONFERENCES (*International Conferences)

- [1]* Bednár F.: Effect of cationic polyacrylamide (CPAM) on interaction between precipitated CaCO₃ (PCC) and pulp fibers. 52.Sjezd chemických spoleèností 17.-20.9.2000 Ěeské Budì jovice ĚR
- [2]* Gigac J., Královièová M., Krkoška P.: Vnemové hodnotenie akosti tlaèe. In.: *Polygrafia Academica* 2000. Bratislava 7.-8.septembra 2000. Zborník príspevkov s.138-144
- [3] Krkoška P., Vizárová K.: Permanence and durability of sulphate pulps bleached with ECF sequences and of common paper produces. 52.Sjezd chemických spoleèností 17.-20.9.2000 Ěeské Budì jovice ĚR
- [4]* Lužáková V., Marcinèinová T., Tomèík J.: Lipophilic components in domestic wood species. In.: *III.Medzinár. Symp. Vybrané procesy pri spracovaní dreva*, 6.-7.9.2000, TU Zvolen, s.175-177, ISBN 80-228-0932-2.
- [5]* Lužáková V., Marcinèinová T., Vrška M. : Pitch Formation Precursors in Domestic Wood Species. 52.Sjezd chemických spoleèností 17.- 20.9.2000 Ěeské Budì jovice ĚR
- [6]* Marcinèin A., Ujhelyiová A., Marcinèinová T.: Fiber- forming blends of propylene and polyethylene terephthalate. *MODEST 2000, Conference Palermo, September 4.-7.2000. Poster. Zborník na internete: www.dicpm.unipa.it/modest*
- [7]* van de Ven T. G., Alince B., Bednár F., Kinkal J.: Removal of ionic impurities in latex dispersion with the use of pulp fibers. 74th Colloid and Surface Science Symposium, Betlehem, Pennsylvania, USA 18.-21.June 2000
- [8]* Vizárová K.: Zmeny zafarbenia papiera vplyvom stárnutia. XI. Seminár restaurátoru a historikù, Litomi áce 13.-16.9.2000

C. BOOKS AND TEXTBOOKS

- [1] Bednár F.: Vplyv vybraných retenèných systémov na plnenie papiera uhlèitanom vápenatým – doktorandská dizertaèná práca. STU Bratislava 2000, 110 p.

D. PATENTS

E. OTHERS

- [1] Vrška M.: ChtF Project # 55/00, SCP Ružomberok, (2000)
- [2] Lužáková V.: ChtF Project # 61/00, SCP Ružomberok, (2000)
- [3] Lužáková V.: ChtF Project # 88/00, Petrochema Dubová, (2000)
- [4] Šurina I.: ChtF Project # 80/00, ŠDVÚ, (2000)
- [5] Šurina I.: ChtF Project # 98/00, Hirocem a.s., (2000)
- [6] Šurina I.: ChtF Project # 127/00, VÚSAPL a.s., (2000)
- [7] Šurina I.: ChtF Project # 23/00, Slovnaft a.s., (2000)
- [8] Šurina I.: ChtF Project # 173/00, Hirocem a.s., (2000)

DEPARTMENT OF ENVIRONMENTAL SCIENCES

Head of the Department:
Prof. Vasil Koprda, PhD, DSc

Telephone: ++421-7- 52 495 243, 59 325 220
Fax: ++421-7-52 493 198
E-mail: koprda@chtf.stuba.sk

I. STAFF

Full Professors:

Vasil Koprda, PhD, DSc; Juraj Tölgyessy, PhD, DSc;

Associate Professors:

Marta Ěerakov, PhD; Gabriel Ěik, PhD; Jn Derco, PhD; Pavel Dillinger, PhD; Agta Fargašov, PhD; Margita Harangoz, PhD, DSc; Juraj Lesn, PhD; Aneška Moncmanov, PhD; Milan Piatrik, PhD; Josef Prousek, PhD;

Assistant Professors:

Miloslav Drtil, PhD;

Research Fellows:

Igor Bodk, PhD; Mria Fldesov; Miroslav Hutan, PhD;

PhD Students:

Juraj Buday; Angelika Gulyasov; Bronislava Herdov; Milada Hubinov; Angelika Kassai; Zoltn Kassai; Lea Mrafkov; Andrea Plinksov-Bujnov; Marek Hork; external form: Alžbeta Ī urecov; Ladislav Halsz; Alexander Kovcs; Rastislav Kuffa; Ladislav Maro; Jana Marov; Eva Mihalikov; Alena Popoviev-Urbanovsk; Salima Shansab; Jana Źelinsk; Jana Vanekov-Plchov;

Technical Staff

Eleonra Hornekov; †Gabriela Maxianov; Marta Onderov;

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Laboratory of Water Chemistry

B. Research Laboratories:

Laboratory of Air Protection Technology

Laboratory of Microbiology and Ecotoxicology

Laboratory of Organic Chemistry

Laboratory of Radioecology

Laboratory of Water and Wastewater Technology

Laboratory of Computer Modelling

III. TEACHING

A. Undergraduate Study

5th semester (autumn)

Nuclear Chemistry and Technology I.	(1-1)	Koprda, Dillinger
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6th semester (spring)

Environmental Technology	(2-0)	Piatrik, Ěik, Koprda,
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7th semester (autumn)

Biology of Water, Soil and Air	(2-0)	Ěernkov, Fargašov
Atmospheric and Water Chemistry	(4-0)	Prousek, Lesn, Bodk
Hydrology, Meteorology and Pedology	(2-0)	Fargašov, Lesn
Laboratory Practice I.	(0-8)	Harangoz, Bodk, Fargašov, Fldesov
Nuclear Chemistry and Technology II.	(2-0)	Koprda, Dillinger

8th semester (spring)

Air Protection Technology	(2-0)	Moncmanov, Ěik
Laboratory Practice II.	(0-8)	Derco, Dillinger, Ěik
Radioecology	(2-0)	Harangoz, Dillinger
Wastewater Treatment Processes	(2-2)	Derco, Drtil

9th semester (autumn)

Branch - Technology of Environment	(2-0)	Prousek, Ěernkov
Risk Properties of Substances	(0-10)	Drtil, Harangoz, Ěik
Laboratory Practice III.	(2-0)	Piatrik, Koprda
Liquidation and Utilization of Solid Wastes	(3-0)	Drtil
Environmental Technological Project	(2-0)	Koprda, Piatrik
Environmental Impact Assessment	(2-0)	Lesn, Tlgyessy
Control of Environmental Pollution	(2-0)	Fargašov, Prousek
Special Ecology and Ecotoxicology	(2-0)	

Processes and Technology of Water Treatment	(3-0)	Hutòan, Bodík
Air Protection Technology and Air Treatment	(3-0)	Ěík, Prousek
10th semester (spring)		
Diploma Work	(0-30)	All members of the staff

B. PhD Study

1. Environmental Chemistry and Technology

Anaerobic Wastewater Treatment Processes	Derco, Hutòan
Progressive Methods of Wastewater Treatment	Derco, Drtil
Psychrophilic Anaerobic Wastewater Treatment	Koprda, Bodík
Simulation of Biological Processes of Wastewater Treatment	Derco
Utilization of Ozone for Wastewater Treatment	Derco

2. Nuclear Chemistry and Radioecology

Penetration of Radionuclide across Skin Barriers	Koprda, Harangozó
Study of Metal Transport from Abiotic to Biotic Systems	Koprda, Lesný
Effect of Aerosol Size Fractions on Health Risk Assessment	Koprda
The Use of Fenton Reaction to Wastewater Treatment	Koprda, Prousek

IV. CURRENT RESEARCH PROJECTS

A. Progressive Methods of Water, Wastewater and Activated Sludge Treatment (Ján Derco)

1. Utilisation of ozone for an industrial wastewater treatment (J. Derco, A. Gulyášová)

The availability of ozone treatment technology of the industrial wastewater produced by manufacture of 2-Mercaptobenzothiazole was studied. The combination of ozonation and the Fenton reaction offers an effective process for the treatment/ pre-treatment of the wastewater. Iron/hydrogen peroxide ratio has to be greater than 0,0047 in order to have a volumetric removal rate of COD about 15 times higher in comparison to dosing hydrogen peroxide alone.

2. Municipal wastewater treatment in anaerobic reactors at low temperature (I. Bodík, B. Herdová)

The low temperature influence (5-25 °C) on the municipal wastewater treatment processes under anaerobic conditions has been studied. The reduction of the reactor volume and operational costs and determination of optimum combination of anaerobic and aerobic reactors for municipal wastewater treatment plants were the aim of project. The experiments with the real wastewater on the pilot-scale reactor on the wastewater treatment plants in Bratislava were realised.

3. Sludge digestion under thermophilic aerobic conditions (M. Drtil, M. Hutòan)

Laboratory and pilot scale experiments with thermophilic aerobic sludge digestion were realised. The process was compared with other sludge digestion processes.

4. Toxicity, accumulation and interactions of metals in water and terrestrial organisms (A. Fargašová)

During the tests the attention was dedicated to the risk assessment of the chronic and acute effects, bioaccumulation and interactions of metals in pair combinations. As tested organisms were selected freshwater benthic organisms (*Tubifex tubifex*, *Chironomus plumosus*), plankton algae (*Scenedesmus quadricauda*, *Chlorella vulgaris*) and terrestrial plant (*Sinapis alba*). Interactions between metals were statistically evaluated. Comparison was done to both metal used in combinations. For algae also mathematical model for reciprocal interactions was applied. Interactions were interpreted as antagonism, synergism or additivity.

5. Anaerobic waste and wastewater treatment in high-rate reactors (M. Hutòan, M. Drtil, L. Mrafková)

Laboratory experiments with anaerobic high-rate reactors have been realised. Performance of the anaerobic baffled reactor (ABR) and process of the anaerobic sludge granulation were observed. Experiments were carried out with various types of synthetic wastewaters (containing sucrose, starch, peptone, hexamethylenetetramine etc.) and the results obtained in ABR and in other type of anaerobic high-rate reactor (UASB reactor) were compared. During the reactors operation, tests of methanogenic and nonmethanogenic activity of anaerobic sludge were realised. Start-up of full scale high-rate reactor for treating of dairy wastewater was realised too. This wastewater treatment plant consists of first – acidogenic stage (volume 100 m³) and second - methanogenic stage (UASB reactor - 200 m³). Conditions for start-up and optimal reactors performance were determined.

6. Photo-Fenton reaction (J. Prousek)

Photo-Fenton reaction has been utilized for the degradation of coloured wastewaters and polyethyleneglycols solutions. Similarly, the photocatalytic degradation of coloured wastewater has been tested with the ZnO utilization as photocatalyst. Better results have been obtained by the application of photo-Fenton reaction. On the other hand, Fenton-like reaction system such as H₂O₂/HOONO/Fe²⁺ has been also tested for colour removal in model coloured wastewater. This system gives better results in relation to classical Fenton reaction (H₂O₂/Fe²⁺).

7. Investigation of the effect of selected Cu-complexes on microorganisms (M. Ěeròáková)

The effect of the complexes of CuX₂L₂ (where X = CH₃CHCICOO⁻, CH₃CCl₂COO⁻ or ClCH₂COO⁻) as well as the value of L = nicotinamide (na), isonicotinamide (ina) or methyl-3-pyridylcarbamate (mpc) were studied.

8. Study of the apoptosis effect of berberine on various cellular effects (M. Ěeròáková)

The effect of berberine on various cellular models was examined. It was isolated from the plant of the family Berberidaceae, genus of *Berberis*, *Mahonia*. By the interaction into DNA the berberine inhibits the system of nucleic acids and the synthesis of proteins, gives rise to apoptosis, i.e. the programmatic cell death, and exhibits the antitumoral activity. Several works have been prepared for publication.

B. Design of Novel Synthetic Routs to Heterocyclic Compounds, their Oligomers and Polymers as Models of Extended p-Systems with Metal-Complexing, Optoelectronic Properties and Bioactivity (Gabriel Ěík)

The EPR spectroscopy and the measurement of AC magnetic susceptibility have been used to study of the magnetic properties of poly(3-dodecylthiophene) doped with FeCl₃. The homogenous doping (at a low level of the dopant leads to

the high degree of diamagnetism, the extent of which depends on conformational temperature changes and the amount of the dopant in a polymer. The study has shown that doping with FeCl_3 offers the possibility of achieving a high degree interacting paramagnetic polarons. The number of interacting polarons depend, among others, on conformational temperature changes on the polymer chains which disturb the homogenous dopant distribution.

C. Penetration of Ionic Species across Skin, (Vasil Koprda, Margita Harangozó, Zoltán Kassai, Andrea Pálincásová), part of the VEGA project No. 2/6027/99 (L.Soltés, UEF SAV)

Radionuclides ^{137}Cs , ^{60}Co , ^{90}Sr , ^{59}Fe , ^{147}Pm and other actinides belong to frequent contaminants of human body at accidental radioactive contamination. Damage of an organism after body contamination is proportional to the extent of penetrated amounts of radionuclides across the skin. Using radioactive isotopes, evaluation of kinetics of transdermal permeation of ionic species and effects of physico-chemical factors on this process were studied, and the effect of ionic charge and the concentration of ions on permeation velocity across the intact, stripped and splitted skin of biologic animal models were determined. The biologic structure mostly responsible for the barrier effect was selected and proved. The new biological models of 5 days rat abdominal skin (transepidermal) and 9 days rat skin (transfollicular) were studied and standardized for the study of transdermal permeation. Effect of Cs^+ , Sr^{2+} , Co^{2+} concentration on their permeation rate through different skin models was evaluated. The relative importance of the main diffusion pathways, across the intact skin and through the hair channels was assessed.

D.: Agricultural Reutilization of Non-Ferrous Metal Containing Waste From Microelectronic and Surface Treating Industry (INCO-COPERNICUS – METAGREC) (Gabriel Éik, Juraj Lesný, Juraj Tölgyessy)

By sorption from the solution and by ion-exchange of Cu^{2+} for Na^+ and K^+ it is possible to prepare the natural clinoptilolite enriched with copper. The zeolite modified in this way "slowly" releases Cu ions into the surrounding medium. The rate of releasing of Cu can be "decelerated" by closing of Cu ions into complexes with a polythiophene as an "ecologically pure polymer" in zeolite cavities and channels. After testing the enriched zeolite with copper it has been found that the amount of the released copper into the medium depends on the mode of treating the clinoptilolite (CL). The released amount of Cu decreases in the following order: CLCu > CLCu thermally activated > CLCu-polythiophene. By testing the influence of the prepared (modified) zeolites it has been ascertained that the CLCu-polythiophene "creates" long-term conditions for the "optimum" Cu concentration in the nutrient medium necessary for the growth of maize.

The desorption study was carried out for Na-Zn-clinoptilolite using two different desorption inhibitors. The first Na-Zn-clinoptilolite modification was based on the application of polyvinylacetate. The second modification was based on the application of pyrrole. The incorporation of pyrrole (oligopyrrole, polypyrrole) to the structure of the non acidic Na-Zn-clinoptilolite causes the creation of a coordination complex. More effective desorption inhibition was achieved by the application of PVAC.

E. The Study of Separation and Immobilisation of Radionuclides from Nuclear Power Cycle by Natural Adsorbers (Pavel Dillinger, Mária Földesová, Margita Harangozó, Oĝa Holá, Peter Lukáè, Milan Piatrik)

Porous materials as zeolites, were transformed into a monocation form, e.g. Na^+ , NH_4^+ , etc. by the treatment with solutions of various salts. This modification considerably extends their application, increases their effectiveness and selectivity mainly for the sorption of multivalent and hydrated cations.

Sorption capacity of chemically modified sorbents towards Zn(II) and Hg(II) cations was studied by static radioexchange and AAS methods. The dependence of structure, sorption capacity and the desorption of natural and chemically modified zeolites for individual cations on pH, temperature and competitive cations (Cs, Cd, Ca, Co, Fe) were studied on model solutions labelled by Zn^{65} and Hg^{203} radionuclides. The sorption of Hg from two chemical different solutions (dissociated and undissociated) was studied. The common influence of chemical treatment and calcination of zeolites on the sorption of Hg was studied as well. We demonstrated that the sorption capacity of natural and chemically modified zeolites depends not only on these materials but also on the chemical properties of studied solutions. The structural changes of chemically modified zeolites were studied by X-ray structural analysis, DTA, TG and ETA methods, IR spectrometry and SEM method. The leachability of cations from loaded zeolites into different types of solutions was studied by static radioexchange and AAS methods.

The results are aimed to very sensitive area of the treatment of radioactive wastes using cheap domestic materials.

The toxic effects of copper, cesium, selenium and other heavy metals on some environmental components (mushrooms, Colorado potato beetle adults) were studied by radionuclide X-ray fluorescence technique that showed to be an appropriate method for the determination of these cations in the body of insects and mushrooms.

Also the use of radon ^{222}Rn for the determination of the CO_2 exhalations from the soil was studied, as well as the treatment of dangerous wastes contained different heavy metals by chemical and physical methods. The toxic aspects of dangerous wastes from automobile industry were studied as well.

V. COOPERATION

A. Cooperation in Slovakia

Amylum Slovakia s.r.o., Boleráz

ASIO-SK s.r.o., Bytča

Association of Wastewater Treatment Experts in Slovak Republic, Bratislava

ÈOVSPOL s.r.o. Bratislava

Department of Analytical Chemistry, Faculty of Pharmacy, Comenius University, Bratislava

Department of Chemistry, Faculty of Natural Science, Matej Bel University, Banská Bystrica

Department of Inorganic Chemistry, ChFT, SUT, Bratislava

(M. Hutòan, M. Drtil, M. Onderová, M. Horòák)
(I. Bodík, A. Moncmanová)

(I. Bodík, J. Derco, M. Drtil, A. Fargašová, M. Hutòan)
(M. Drtil)

(M. Harangozó, A. Fargašová)

(M. Harangozó)
(M. Èeròáková)

Department of Physics, Faculty of Electrical Engineering and Information Technology, SUT, Bratislava	(G. Ěík)
Department of Plant Physiology, Faculty of Natural Sciences, Comenius University, Bratislava	(A. Fargašová)
EKOPROGRES v.d. Treněin	(M. Hutòan, M. Drtil, L. Mrafková, M. Onderová)
Faculty of Natural Sciences, Comenius University, Bratislava	(P. Dillinger, M. Fòldesová, V. Koprda)
Faculty of Pharmacy, Comenius University, Bratislava	(M. Ěeroáková)
Faculty of Pharmacy, Dept. Galenic Pharmacy, Comenius University, Bratislava	(V. Koprda)
Hydrocoop a.s, Bratislava	(J. Derco)
Institute of Experimental Phytopathology and Entomology of the Slovak Academy of Science, Ivanka pri Dunaji	(M. Harangozó)
Institute of Chemistry, Faculty of Natural Sciences, Comenius University, Bratislava	(G. Ěík, A. Fargašová)
Institute for Education of Slovnaft Co., Bratislava	(V. Koprda)
Institute of Computer Systems, Slovak Academy of Science, Bratislava	(G. Ěík)
Institute of Experimental Pharmacology, Slovak Academy of Sciences, Bratislava	(V. Koprda).
Communal Office, Tomášov	(I. Bodík)
Physical Institute, Slovak Academy of Sciences, Bratislava	(V. Koprda)
Research Institute of Nuclear Power Stations, Jaslovske Bohunice	(V. Koprda)
ROSLO s.r.o., Bratislava	(V. Koprda, Z. Kassai, A. Palinkasová)
North Slovakian Cellulose and Paper, a.s. Ružomberok	(J. Derco)
Slovak Society for Industrial Chemistry of Slovnaft Co., Bratislava	(V. Koprda)
Slovak Agricultural University, Nitra	(J. Derco)
Slovak energetic machinery a.s., t.v.p. Tlmaèe	(I. Bodík)
Technical University Union of Smelting, Mining and Geology of Slovak Republic	(A. Moncmanová)
Toxicological Chemistry Section of SCS at Slovak Acad. of Sci., Bratislava	(V. Koprda)
Toxicological Section of Slovak Society for Industrial Chemistry, Bratislava	(V. Koprda)
U.S. Steel s.r.o., Košice	(M. Hutòan, M. Drtil, M. Onderová)
ÚJD SR, Bratislava	(V. Koprda)
VÚJE Trnava a.s., Trnava	(P. Dillinger., M. Fòldesová, V. Koprda)
Water Research Institute, Bratislava	(I. Bodík, M. Drtil, M. Hutòan, V. Koprda)
Zváz hutnictva, ŕažobného priemyslu a geológie SR	(A. Moncmanová)

B. International Cooperation

ASIO s.r.o., Brno, Czech Republic, - Waste water treatment processes (I. Bodík, M. Drtil)	
Dong-A University, Pusan, South Korea, - Wastewater treatment processes (I. Bodík)	
École Supérieure d'Ingenieurs de Chambéry, Departement Genie de L'Environment, Cambéry, France, - Decomposition of toxic substances. (V. Koprda)	
Rheinisch-Westfalische Technische Universität, Aachen, Germany, - Anaerobic wastewater treatment by low temperature (I. Bodík)	
School of Pharmacy, Department of Pharmaceutical Chem., Cardiff, United Kingdom, - Transcutaneous penetration of xenobiotics (V. Koprda)	
Univ. Claude Bernard Lyon-1, ISPB, Department of Galenic Pharmacie, Lyon, France, - Transcutaneous penetration of xenobiotics. (V. Koprda)	
VŠCHT Praha, Czech Republic, - Waste water treatment processes (I. Bodík, M. Drtil)	
School of Pharmacy "Carol Davila", University of Bucuresti, Romania, - Transcutaneous penetration of xenobiotics. (V. Koprda)	
Consiglio Nazionale delle Ricerche, Istituto di Chimica delle Macromolecole, - Molecular materials and functional polymers (G. Ěík)	
Austrian Research Centre Seibersdorf GmbH, Seibersdorf, Austria, - Agricultural reutilization of non-ferrous metal containing waste from microelectronic and surface treating industry (G. Ěík)	
Royal Veterinary and Agricultural University, Copenhagen, Denmark, - Agricultural reutilization of non-ferrous metal containing waste from microelectronic and surface treating industry (G. Ěík)	
Pannon Agricultural University, Mosonmagyarovar, Hungary, - Agricultural reutilization of non-ferrous metal containing waste from microelectronic and surface treating industry (G. Ěík)	
Faculty of Chemistry, VUT Brno, Brno, Czech Republic, - Wastewater treatment technology (J. Derco) - Air protection technology (A. Moncmanová)	
Nuclear Research Institut, Őež u Prahy, Czech Republic, - Emanation thermal analysis (P. Dillinger, M. Fòldesová)	
Department of Chemistry and Physics, University of Agriculture, Cracow, Poland, - Metal-metal interactions (A. Fargašová)	
Department of Inorganic and Organic Chemistry, Faculty of Pharmacy, Charles University, Hradec Králové, Czech	

Republic,

- Antialgal activity of organic compounds (A. Fargašová)

Faculty of Chemistry, VUT Brno, Brno, Czech Republic,

- Risk assessment of wood preservative compounds (A. Fargašová)

Fridrich-Schiller-Universität, Biologische-Pharmazeutische Fakultät, Institute für Ernährung und Umwelt,

Lehrbereich Lebensmittel- und Umwelttoxikologie, Jena, Germany,

- Risk assessment of trace metals (A. Fargašová)

Forschungszentrum für Medizintechnik und Biotechnologie e. V., Bad Langensalza, Germany,

- Metal-metal interactions (A. Fargašová)

GSF- Forschungszentrum für Umwelt und Gesundheit GmbH, Neuherberg, Germany,

- Risk of estradiol-like compounds (A. Fargašová)

Department of Chemistry, Yangon University, Yangon, Myanmar,

- Radiometric Flow Injection Analysis (M. Harangozó)

Universita degli Studi, Bari, Italy,

- TEMPUS Project (A. Moncmanová)

Vienna University of Technology, Vienna, Austria,

- TEMPUS Project (A. Moncmanová)

- Wastewater treatment technology (I. Bodík)

Institut für Ökologie, St. Pölten, Austria,

- TEMPUS Project (A. Moncmanová)

NOWATECH, Ass., Bari, Italy,

- TEMPUS Project (A. Moncmanová)

ENEA, Rome, Italy,

- TEMPUS Project (A. Moncmanová)

C. Membership in Domestic Organizations and Societies

Association of Wastewater Treatment Experts in Slovak Republic,

Bratislava

(I. Bodík, J. Derco, M. Drtil, A. Fargašová,
M. Hutòan)

(M. Ěeròáková)

Biotechnological Society, Bratislava, Slovak Republic

Czechoslovak Limnological Society, Prague-Bratislava, Czech Republic
and Slovak Republic

(M. Ěeròáková)

Czechoslovak Microbiological Society, Prague-Bratislava, Czech Republic
and Slovak Republic

(M. Ěeròáková)

Environmental Committee for Valuation and Identification of Products at
the Ministry of the Environment SR

(A. Fargašová)

Expert Group of State Office for Nuclear Safety

(V. Koprda)

National Coordinating Team for Pollution Release and Transfer Register,
Bratislava

(A. Fargašová)

Slovak Chemical Society, Bratislava

(G. Ěík, J. Derco, P. Dillinger A. Fargašová, M.
Harangozó, V. Koprda, J. Prousek)

(V. Koprda)

Slovak Nuclear Society, Bratislava

Slovak Pharmaceutical Society at SMS Bratislava

(A. Fargašová, M. Harangozó, V. Koprda)

Slovak Society of Chemical Engineering, Bratislava

(J. Derco, M. Hutòan)

Slovak Society of Industrial Chemistry, ZSVTS, Bratislava

(I. Bodík, J. Derco, M. Drtil, P. Dillinger, A.
Fargašová, M. Földesová, M. Hutòan)

Slovak Society of Limnology at SAS Bratislava

(M. Ěeròáková, A. Fargašová)

Society of Nuclear Medicine and Radiation Hygiene of SMS, Bratislava

(V. Koprda)

D. Membership in International Organizations and Societies

Association of Wastewater Treatment Experts, Brno, Czech Republic

(I. Bodík, J. Derco, M. Drtil, A. Fargašová, M.
Hutòan)

Bulletin of Environmental Contamination and Toxicology (U.S.A.) –

Member of Editorial Board

(A. Fargašová)

Czech Chemical Society, Prague, Czech Republic

(V. Koprda, J. Prousek)

International Association on Water Quality, London, UK

(I. Bodík, J. Derco)

European Photochemistry Association, Mülheim, Germany

(J. Prousek)

EUROTOX – Madrid, Spain

(A. Fargašová)

FECS Division on Chemistry and the Environment

(V. Koprda)

Journal of Trace and Microprobe Techniques (U.S.A.) –

Member of International Group of Correspondents

(A. Fargašová)

SECOTOX – International Society of Ecotoxicology and Environmental
Safety, Munich, Germany

(A. Fargašová)

E. TEMPUS Programme

1.No.: TEMPUS JEP-IB 13123/98

Coordinator: Ass. Prof. Ing. Anežka Moncmanová, PhD

Coordinating institution: STU, Bratislava

Title: Continuing Education in European Directives and Environmental Standards

Partners:

Universita degli Studi, Bari, Italy, TEMPUS Project

Vienna University of Technology, Vienna, Austria, TEMPUS Project

Institut für Ökologie, St. Pölten, Austria, TEMPUS Project
 NOWATECH, Ass., Bari, Italy, TEMPUS Project
 ENEA, Rome, Italy, TEMPUS Project
 Zväz hutníctva, *ažobného priemyslu a geológie SR, Bratislava
 ASIO s.r.o., Bytča
 Technická univerzita Zvolen, Fakulta ekológie a environmentalistiky, Zvolen
 Duration: December 1998 to March 2001

F. International Scientific Programmes

1. INCO-COPERNICUS Project-METAGREC: IC 15-CT 97-0703

Title: Agricultural reutilization of non-ferrous metal containing waste from microelectronic and surface treating industry
 Prof. Ing. Juraj Tölgyessy DrSc., Doc. Ing. Gabriel Éík, PhD
 Coordinator: Austrian Research Centre Seibersdorf GmbH, Div. of Life Sciences, Seibersdorf, Austria
 Partners:

Royal Veterinary and Agricultural University, Department of Agricultural Science, Plant Nutrition and Soil Fertility Laboratory, Copenhagen, Denmark

Pannon Agricultural University, Department of Chemistry, Department of Soil Management, Mosonmagyaróvár, Hungary

Period: June 15, 1997 to December 31, 2000

2. COST Action 837 „Plant biotechnology for the removal of organic pollutants and toxic metals from wastewaters and contaminated sites“ (A. Fargašová)

Working Group 2 (WG2) – Toxic metals: screening and uptake studies

Working Group 4 (WG4) – Cultivation and utilization of plants

Coordinator: Dr. J. P. Schwitzguebel, Lausanne, Switzerland

Coordinators for Slovak Republic: Assoc Prof. A. Lux, Faculty of Natural Science, Comenius University, Bratislava; RNDr. D. Lišková, PhD, Institute of Chemistry SAS, Bratislava; Partners: On the project participate 21 countries (the list of participants can be found on <http://lbwww.epfl.ch/COST837>)

Period: April 1998 to April 2002

G. Visitors from Abroad

Prof. Michele

Aresta, Università degli Studi, Bari, Italy, January; February, April, November 2000 (always 3 days)

Dr. Immacolata Tommasi

Università degli Studi, Bari, Italy; February, April 2000 (3 days)

Ing. Peter Gabko

VUT, Vienna, Austria; June 2000 (1 day)

Assoc. Prof. Andreas Windsperger

VUT, Vienna, Austria; January, May 2000 (1 day)

Dr. Arthur Kanonier

VUT, Vienna, Austria; September 2000 (2 days)

Dr. Lorenz Riegler

LL.M., Vienna, Austria; September 2000 (2 days)

Dr. Volker Mauerhofer

Vienna, Austria; September 2000 (2 days)

Prof. Michal Dohanyos

VŠCHT Praha, Czech Republic, May 2000 (1 day)

H. Visits of Staff Members and Postgraduate Students in Foreign Institutions

Bodík I.

International Trade Fair “ENVI Brno“, Brno, Czech Republic, October 2000 (1 day)

Bodík I.

Institut of Water Technology VŠCHT Prague, Czech Republic, December 2000 (2 days)

Derco J.

14th International Congress of Chemical and Process Engineering, Prague, Czech Republic, August 27-31, 2000

Derco J.

SAICHE 2000, Innovation-Nourishment for Growth, Secunda, Mpumalanga, South Africa, October 9-12, 2000

Drtíl M.

Conference “Industrial Wastewater Treatment“, Kyjov, Czech Republic, October 12-13, 2000

Fargašová A.

5th International Sci. Conf. “Metal Ions in the Environment“, Cracow, Poland, May 14-16, 2000

Fargašová A.

52nd Congress of Chem. Society, Èeské Budejovice, Czech Republic, September 17-20, 2000

Hutòan M.

4th International Symposium on Biotechnology, Noordwijkerhout, The Netherlands April 10-12, 2000

Hutòan M.

Prague Institute of Chemical Technology, Prague, Czech Republic, June 2000, 1 day

Hutòan M.

14th International Congress of Chemical and Process Engineering, Prague, Czech Republic, August 27-31, 2000

Hutòan M.

Conference “Industrial Wastewater Treatment“, Kyjov, Czech Republic, October 12.-13.10. 2000

Hutòan M.

International Trade Fair “ENVI Brno“, Brno, Czech Republic, October 2000, 1 day

Koprda V.,

FJFI ÈVUT, kat.jadr.chemie; PrIF UK, Kat.anal.chem., Praha, Czech Republic June (2 days)

Koprda V.,

Res.Inst.Rad.Biol.and Med., Hiroshima Univ., Hiroshima, Japan, May 15, 2000

Koprda V.,

Babcock-Hitachi Ltd., Kure, Japan, May 17, 2000

Koprda V.,

Staatliche Zentrale fuer Strahlenschutz, Berlin, Germany, June 13, 2000

Moncmanová A.

ENEA Rome-Casaccia, Italy, March 2000 (1 week)

Moncmanová A.

Vienna University of Technology, Austria, January, December (8

Moncmanová A. days)
 Mrafková L. VSCHT Prague, Czech Republic, December 2000 (1 day)
 ENEA Rome-Casaccia, Italy, March 2000 (1 week)

VI. THESES AND DISSERTATIONS

A. Graduate Theses

Cvičelová B.: The influence of the competitive ions on the sorption of Hg on zeolites. (P. Dillinger)

Cséfalvayová H.: Utilization of photocatalytic reactions for environmental pollutants degradation. (J. Prousek)

Drugdová L.: Effect of Cd(II) and Zn(II) complexes on biological processes in alga *Scenedesmus quadricauda*. (A. Fargašová)

Chudicová I.: The study of the sorption capacity of zeolite towards Hg(II) by the radioexchange method in the dependence of pH. (P. Dillinger)

Frlíková S.: Controlled inhibition of nitrification. (M. Drtil)

Holiová K.: The study of sorption and desorption properties of zeolite tuff towards Hg by radioexchange method. (M. Földesová)

Horóák M.: Comparison of nonacidified wastewater treatment in ABR and UASB reactor. (M. Hutóan)

Kucejová E.: Treatment of wastewater with high concentration of nitrogen. (M. Drtil)

Kučerová I.: Biological treatment of landfill leachate. (J. Derco)

Lengyel J.: Interaction effects of heavy metals on *Sinapis alba* seedlings. (A. Fargašová)

Lihanová Ž.: Determination of toxic metals in technical web used in rubber industry. (M. Harangozó)

Palacková E.: Utilization of modified Fenton and photo-Fenton reactions for water pollutants degradation. (J. Prousek)

Rojková J.: The effect of agricultural techniques on the content of heavy metals in wheat. (M. Harangozó)

Štofková, L.: Anaerobic baffled filter in real conditions. (I. Bodík)

Weigeltová S.: Wastewater treatment in SLOVAKOFARMA, a.s. Hlohovec. (M. Hutóan)

Zimanová M.: Treatment of landfill leachate in fluidised bed reactor. (J. Derco)

B. Dissertations (PhD)

Herdová B.: The Anaerobic Treatment of Municipal Wastewater at Psychophilic Conditions (V. Koprda, I. Bodík)

VII. PUBLICATIONS

Journals (*Registered in Current Contents)

- [1]* Bauerová K., Kassai Z., Koprda V., Harangozó M.: Contribution to the penetration of radionuclides across the skin. Concentration dependence of Sr through the skin vitro. *J. Appl. Toxicol.*, MSPH 00-01
- [2]* Bauerová K., Mihalová D., Bujnová D., Kassai Z., Koprda V.: Experimental optimization of stobadine dipalmitate penetration across the skin. *ĚS Fyziologie* 49 (4), 163-164 (2000)
- [3]* Bodík I., Herdová B., Drtil M.: Anaerobic treatment of the municipal wastewater under psychophilic conditions. *Bioprocess Engineering* 22 (5), 385-390 (2000)
- [4]* Bodík I., Herdová B., Kratochvíl K.: The application of anaerobic filter for municipal wastewater treatment. *Chemical papers* 54 (3), 159-164 (2000)
- [5] Bodík I., Drtil M.: Súčasný stav èistenia priemyselných odpadových vôd na Slovensku. Current state of the industrial wastewater treatment in the Slovak Republic (in Slovak). *Ropa, uhlie, plyn a petrochémiá* 42 (4), 30-33 (2000)
- [6] Bodík I., Herdová B., Kratochvíl K.: Možnosti využitia anaeróbných reaktorov na èistenie komunálnych odpadových vôd. The possibilities of anaerobic reactors use for municipal wastewater treatment (in Slovak). *Vodohospodársky spravodajca* 43 (11), 16-17 (2000)
- [7] Bokroš M., Piatrik M., Tolgyessy, J.: Automobilová doprava a životné prostredia v SR. Automobil traffic and its influence to the environment in Slovak Republic (in Slovak). *Acta Universitatis Matthiae Bellii, Ser. chem.* No. 4 (2000)
- [8]* Buday J., Halász L., Drtil M., Bodík I., Németh P. and Buday M.: Nitrogen removal from wastewater of the chemical company DUSLO. *Water Science and Technology* 41 (9), 259-264 (2000)
- [9]* Éróáková M., Ferienèik B.: Application of a biological tracer in transporting water volumes during eutrophication of Mondsee (1). *Folia Microbiol.* 44 (5), 535-543 (1999)
- [10]* Éróáková M., Ferienèik B.M.: Eutrophication in natural fresh-water ecosystems of the Neusiedler See (2). *Folia Microbiol.* 44 (5), 545-552 (1999)
- [11]* Èík G., Šeršèò F., Dlháò L.: Diamagnetism of poly(3-dodecylthiophene) doped with FeCl₃, *J. Magn. Magn. Mat.* 208 78-84 (2000)
- [12] Derco J., Shansab S., Kovács A.: Urèovanie biokinetických parametrov pre simulaènè programy. Determination of biokinetic parameters for simulation programmes (in Slovak) *Vodohospodársky spravodajca* 43 (4) 16-17 (2000)
- [13]* Fargašová A.: Trace metal interactions expressed through photosynthetic pigment contents in *Sinapis alba* seedlings. *Rostl. Vyr.* 46 (8), 337-342 (2000)

- [14]* Fargašová A.: Winter fourth instar larvae of *Chironomus plumosus* as bioassay tools for assessment of acute toxicity of metals and their binary combinations. *Ecotoxicol. Environ. Saf.* 47 (3), 1980-1984 (2000)
- [15]* Fargašová A.: Biological efficiency of Cd(II) complexes with nicotinamide on freshwater algae. *Chem. Listy* 94 (9), 835-836 (2000)
- [16] Fargašová, A.: Combined effects of Mn(II), Mo(VI), Ni(II), Cu(I), Cu(II) and V(V) on freshwater algae *Scenedesmus quadricauda* (Turp.) Bréb. strain Greifswald 15 and benthic larvae of *Chironomus plumosus*. *Chemia i Inżynieria Ekologiczna* 7 (10), 185-195 (2000)
- [17]* Fargašová A., Beinrohr E.: Cadmium – metal interactions determined through root elongation and metal accumulation in *Sinapis alba* seedlings. *Chem. Listy* 94 (9), 833-834 (2000)
- [18]* Fargašová A., Derco J., Ondrejkošová I., Havránek E.: Effect of Fe(III) complexes with heterocyclic N-donor ligand on iron accumulation and oxygen production by the alga *Scenedesmus quadricauda*. *J. Trace Microprobe Techn.* 18 (2), 245-249 (2000)
- [19]* Földesová M., Dillinger P., Lukáč P.: Adsorption and desorption of Cr(III) on natural and chemically modified Slovak zeolites. *J. Radioanal. Nucl. Chem.* 245(2), 435-439 (2000)
- [20]* Habušťová O., Weismann L., Harangozó M., Bumbálová A.: Influence of copper from the Kuprikol 50 fungicide on Colorado potato beetle adults studied by radionuclide X-ray fluorescence analysis. *J. Radioanal. Nucl. Chem.*, 243, No. 3, 825-826 (2000)
- [21] Kassai Z., Bauerová K., Koprda V., Bujnová D.: Zeolites as possible inhibitor of permeation of some metals across the skin. *Biologia* 55 (8), 55-58 (2000)
- [22]* Kassai Z., Bauerová K., Koprda V., Šandula P., Harangozó M.: Penetration of radionuclides across the skin. Glucans as possible inhibitors of metal permeation. *J. Radioanal. Nucl. Chem.*, Oct 27, 2000, R. Nom.: 537
- [23]* Koprda V., Kassai Z., Palinkášová A.: Penetračný urýchlovač: monoetyléter diethylénglykolu. The penetration enhancer monoethylene glycol (in Slovak). *ĽS Fyziologia* 48 (4), 152 (1999)
- [24]* Koprda V., Harangozó M., Kassai Z.: Transfer of radionuclides across skin barriers of animal skin models in vitro. *J. Radioanal. Nucl. Chem.*, 246 (3) 505-509 (2000)
- [25]* Kubicová L., Kráľová K., Fargašová A., Šustr M.: Thiosalocyanilidy s antialgálnou aktivitou. Thiosalocyanilids with antialgal activity (in Slovak). *Chem. Listy*, 94 (11), 1065 (2000)
- [26] Macho V., Králik M., ěík G., Balážová J.: Oxid uhlíkový ako recentný zdroj uhlíka. Carbon dioxide as a recent source of carbon (in Slovak). *Ropa, uhlie, plyn a petrochémia*, 42(1) 21-25 (2000)
- [27]* Moncol J., Koman M., Melník M., ěeróáková M., Glowiak T.: Study of copper (II), chloro- and dichloropropionates, crystal and molecular structure of trans-bis(methyl-3-pyridylcarbamate)bis(α,α -dichloropropionato)copper (II) (3). *Polyhedron* 19, 3-7 (2000)
- [28]* Mrafková L., Hutóan M., Drtil M.: Behaviour of anaerobic baffled reactor treating nonacidified wastewater. *Chem. Papers* 54 (6b), 448-455 (2000)
- [29]* Ondrejkošová I., Fargašová A., Havránek E.: Detection of biological efficiency of Fe(III) complexes with heterocyclic N-donor ligand nicotinamide (nia) using algal assay. *Bull. Environ. Contam. Toxicol.* 65 (4), 451-458 (2000)
- [30] Piatrik M., Bokroš M., Tölgyessy J.: Možnosti zužitkovania a zneškodnenia odpadov z automobilovej dopravy v SR. The possibility of using and liquidation of wastes from automobile traffic in Slovak Republic (in Slovak). *Acta Universitatis Matthiae Bellii, Ser. chem. No. 4* (2000)
- [31]* Prousek J., Dömötörövá J.: Využití systémů NaOCI/Fe²⁺, HOCl/Fe²⁺ a H₂O₂/HOCl/Fe²⁺ na oxidační degradaci vodných roztoků barviv. Utilization of NaOCI/Fe²⁺, HOCl/Fe²⁺, and H₂O₂/HOCl/Fe²⁺ systems for oxidative degradation of water solutions of dyes (in Czech). *Chem. Listy* 94, 331-333 (2000)
- [32]* Rácz L., Bumbálová A., Harangozó M., Tölgyessy J., Tomeček O.: Determination of cesium and selenium in cultivated mushrooms using radionuclide X-ray fluorescence technique. *J. Radioanal. Nucl. Chem.*, 245 (3), 611-614 (2000)
- [33] Risse H., Bodík I., Herdová B.: Anaerobe Vorbehandlung kommunaler Abwässer. Anaerobic pre-treatment of municipal wastewater (in German). *Wasserwirtschaft Wassertechnik* 5/2000, 27-29 (2000)
- [34] Tölgyessy J., Dillinger P., Harangozó M., Samešová D.: Elektrochemický rozklad organických a dusíkatých látok v priekakových odpadových vodách. Electrochemical degradation of organic matter and nitrogen compounds in leachate wastewaters (in Slovak). *Acta Universitatis Matthiae Bellii, Ser. Chem.*, No. 4 (2000)
- [35] Tölgyessy J., Harangozó M., Tomeček O.: Applicability and limitations of chemical, biological and thermal treatment of waste. Proceedings of scientific works of the Faculty of Ecology Technical University Zvolen. pp.65-84 (2000)
- [36] Tölgyessy J., Harangozó M.: Radiochemical analysis of food and environmental samples. *Acta Universitatis Matthiae Bellii, Ser. Chem.*, No. 4 (2000)
- [37] Tölgyessy J., Harangozó M.: ěo je rádioekológia? What is radioecology? (in Slovak). *Enviromagazín* 5 (1), 26-27 (2000)

B. Conferences (*International conferences)

- [1] Belica P., Drtil M., Brěiak B., Michniaková B.: Vplyv škodlivín na biologický proces ěistenia, vyěistené vody a kal. Influence of pollutants on biological wastewater treatment process, treated wastewater and sludge (in Slovak). In: Proceedings of Conference "Actual problems of municipal sewerage and wastewater treatment plants", Rajecké Teplice, Slovakia, February 22 – 23, 2000, p. 41 – 56
- [2]* Bodík I., Herdová B., Kratochvíl K.: Treatment of domestic wastewater using the anaerobic filter at ambient temperature. Proc. from 1st World Water Congress of the IWA, Paris, July 3-7, 2000, CD-ROM - I52.pdf, ISBN: 2-9515416-0-0
- [3] Bodík I., Herdová B., Kratochvíl K.: Roěná prevádzka anaeróbnej ěOV pre komunálne odpadové vody. One-year operation of the anaerobic wastewater treatment plant for municipal wastewater (in Slovak). Proc. from Odpadové vody 2000, Tatranské Zruby, April 26-28, 2000, pp.142-149
- [4] Bodík I.: CHSK a H₂O v Y2K. COD and H₂O in Y2Y (in Slovak). Proc. from Odpadové vody 2000, Tatranské Zruby, April 26-28, 2000, pp.227-231
- [5] Bodík I.: Stanovenie vybraných parametrov procesov odstraňovania nutričov - využitie laboratorných testov. Estimation of some nutrient removal process parameters - use of laboratory tests (in Slovak). In: MII ěinnosť pre podniky VaK "Inhibičné a toxické vplyvy na proces ěistenia OV a testy ich stanovenia. Informačný list ě.2/2000. IKAR

- Ružom berok, 26.-27.jún 2000. Vydal MP SR, VÚVH s.18-25
- [6] Bodík I.: Stanovenie vybraných parametrov procesov odstraňovania nutričov - využitie laboratórných testov. Estimation of some nutrient removal process parameters - use of laboratory tests (in Slovak). In: MII éinnosť pre podniky VaK "Inhibičné a toxické vplyvy na proces éistenia OV a testy ich stanovenia. Informačný list é.2/2000 - Príloha. IKAR Ružomberok, June 26 -27, 2000. Vydal MP SR, VÚVH s.31-47
- [7]* Cirák J., Tomèik P., Vanèo M., Èerveò I., Baranèok D., Èik G., Bolognesi A.: Physical properties of amphiphilic polythiophene Langmuir-Bodgett films. In: Proceedings of the WG3 Meeting-Functional Polymers, Milano, Febr.19, 2000, Italy, p. 98
- [8]* Èik G., Seršeo F., Dlhò L.: Unexpected electric and magnetic properties of poly(3-dodecylthiophene) doped with FeCl₃. In: Proceedings Chemické Listy (zvláštne éislo) CHLSAC 94(9) 761 (2000), 52. Zjazd chemických spoločností, September 17-20, 2000, Èeské Budejovice, p. 858, ISSN 0009-2770
- [9]* Èik G.: Preparation and properties of zeolite fertilizers able to release copper slowly. In: Proceedings of the Analytical and Environmental Conference, Mosonmagyaróvár, October 26-27, 2000. University of West Hungary, Faculty of Agriculture, Hungary, p. 127-136
- [10]* Derco J., Dudáš J. Kassai A., Kratochvíl K.: Biological denitrification of drinking water in fluidised bed reactor. 14th International Congress of Chemical and Process Engineering. Praha, August 27-31, 2000, Czech Republic. I3.2, CD ROM, ISBN 80-86059-30-8
- [11]* Derco J., Králik M., Kovács A.: Modelling of Nutrient Removal Processes in an Intermittently Aerated. Bioreactor. SAICHe 2000 9th National Meeting – Innovation – Nourishment for Growth. Secunda, Mpumalanga, South Africa. October 9-12, 2000, p.176 – 177, CD ROM
- [12] Derco J., Mrafková L., Kovács A., Gulyasová A.: Éistenie priesakových vôd zo skládok tuhých odpadov. Treatment of solid waste landfill leachate (in Slovak). 8. konferencia EKOTECH 2000, June 7-9, 2000, Bratislava, 75-79, ISBN 80-233-0452-6
- [13] Derco J.: Technológia éistenia odpadových vôd a ich praktická aplikácia. Wastewater treatment technologies and their practical realisations (in Slovak). Celoštátna konferencia Ekológia-Energetika- Ekonomía 2000. Bratislava, Sept. 27-28, 2000, s. 30-35.
- [14] Derco J., Gulyasová A., Mrafková L.: Treatment of an industrial wastewater by ozonation. Proceedings of the 27th International Conference of Slovak Society of Chemical Engineering. May 22-26, 2000, Tatranské Matliare, Slovakia, p. 13, ISBN 1 80-227-1350-3.
- [15] Derco J.: Bioreaktory v éistení odpadových vôd. Bioreactors in wastewater treatment (in Slovak). In: Fermantaéné technológia a biochemické inžinierstvo. Koliòany pri Nitre, May 15 -19, 2000, s.1-11.
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- [17] Derco J.: Technológia éistenia odpadových vôd. Wastewater treatment technologies (in Slovak). Dni vody WTW. Demänovská dolina, November 21-23, 2000 s. I/1-1/7.
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C. Books and Textbooks

Chapters in books

- [1] Koprda V.: Vplyv jadrových a nejadrových energetických zdrojov na životné prostredie, The effect of nuclear and non-nuclear energetic sources on environment (In Slovak), p.174-184, In: Aktuálne problémy kontaminácie životného prostredia z hľadiska toxikológie a ekotoxikológie (I.Beseda a kol.), Fakulta ekológie a environmentalistiky TU, Zvolen 2000, pp.198, ISBN 80-228-0980-2.
- [2] Piatrik, M.: Riešenie problematiky nebezpečných odpadov ich fyzikálno-chemickou úpravou a vhodným zneškodnením v podmienkach SR. The solution of the problems of dangerous solid wastes using of physico-chemical treatment in the conditions of Slovak republic (in Slovak) In: Beseda I. a kol.: "Aktuálne problémy kontaminácie životného prostredia z hľadiska toxikológie a ekotoxikológie" ..(Actual problems of the contaminations of the environment from the view points of toxicology and ecotoxicology). FEE-TU Zvolen, Zvolen 2000, pp. 57-64
- [3] Tölgyessy J., Harangozó J. : Chémia bežného života a životné prostredie. The everyday chemistry and the environment. (in Slovak). Chapters 4.2 (p.56-60), 3.6 (p. 43-50). Metodické centrum, Banská Bystrica (2000).

Textbooks

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- [2] Tölgyessy J., Harangozó M., Daxnerová O.: Monitoring životného prostredia, FPV UMB, Banská Bystrica, 2000, pp.175
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DEPARTMENT OF FIBRES AND TEXTILE CHEMISTRY

Head of the Department:

Assoc. Prof. Anton Marcinèin, PhD

Telephone: ++421-7-368 598

Fax: ++421-7-393 198

E-mail: tmarcin@chtf.stuba.sk

I. STAFF

Full Professor:

Eberhard Borsig, DSc;

Associate Professors:

Pavol Hodul, PhD; Krištofiè Michal, PhD; Anton Marcinèin, PhD;

Assistant Professors:

Jaroslav Legèò, PhD; Anna Ujhelyiová, PhD;

Research Fellows:

Marcela Hricová; Anna Murárová, PhD; Elena Zemanová, PhD;

PhD Students:

Eva Kòrmendyová; Zita Mlynarèiková; Silvia Pavlíková;

Technical Staff:

Alžbeta Ferenèáková; Gabriel Kužel; Albína Pokorná; Edita Štábelová;

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Laboratory of Macromolecular Chemistry

Laboratory of Computer Modeling of Structure and Properties of Polymers

Laboratory of Textile Auxiliaries

Laboratory of Polymer Fiber and Fibrous Material Structure

DSC, TMA, SALS, Zeta Potential, Surface Properties

Laboratory of Fiber Technology

Laboratory of Textile Chemistry, Bleaching, Dyeing and Finishing

Laboratory of Fiber and Textile Testing

Laboratory for fibre spinning, drawing and texturing, extruders 16 and 30 mm

Laboratory for dyeing and finishing of fibres and textile materials (Ahiba, Pretema, Multicolor)

B. Research Laboratories:

DSC-Perkin Elmer and DTA (Derivatograph Q 1500 D)

TMA-50 M and TA (Thermomechanical measurement)

Gas Chromatography CHROM-5

Instron, model 1112 and Uster for Mechanical Properties

Dynamic Viscoelastomer model Rheo-200

Alambeta for Measurement of Thermo - Properties of Textiles

Integral electrometer Polystat PS-1

Capillary viscosimeter

Computers PC-AT and XT

Unimode semiconductive Laser 25mW 690nm with universal optical set

Microscope Olympus Model BHT

Laboratory equipments for light degradation of fibrous materials Xenotest

III. TEACHING

A. Undergraduate Study

5th Semester (autumn)

Macromolecular Chemistry	(2-0 h)	Borsig
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6th Semester (spring)

Material Technology	(2-0 h)	Marcinèin
Cosmetic and indoor chemistry	(2-0 h)	Hodul

7th Semester (autumn)

Macromolecular Chemistry II	(2-1 h)	Borsig
Physics of Polymers and Paper	(2-2 h)	Krištofiè
Fiber Sci. and Technology	(3-0 h)	Marcinèin
Seminary Fiber Sci. and Technology	(0-2 h)	Marcinèin
Structure of Fibrous Materials	(2-1 h)	Ujhelyiová
Modeling of Polymer Structure and Properties	(2-1 h)	Rýchly
Laboratory of Fiber Sci. and Technology	(0-0-8)	Krištofiè, Legèò

8th Semester (spring)

Coloristics and Textile Auxiliaries	(2-0 h)	Hodul
Fibrous Composites	(2-0 h)	Krištofiè
Textile Engineering	(2-0 h)	Ujhelyiová, Murárová
Seminary Textile Engineering	(0-2 h)	Ujhelyiová, Murárová
Laboratory II.	(0-0-10)	Legéò, Hodul
Excursion and Technical Experience		Marcinèin, Demianová

9th Semester (autumn)

Textile Chemistry and Technology	(3-1 h)	Hodul
Technology of Polym. Films	(2-0 h)	Marcinèin
Laboratory of Textile Chemistry and Technology	(0-0-10)	Hodul
Fiber and Textile Testing	(2-0 h)	Legéò

10th Semester (spring)

Seminary	(0-3-0)	
Diploma work	(0-0-27)	

B. PhD study:

Physics of Polymers
 Macromolecular Chemistry
 Technology of Polymeric Materials
 Organic Chemistry
 Physical Chemistry

C. An advanced course for Rhodia company employees

Macromolecular chemistry	(20 h)	Borsig, Krištofiè
Fiber Science and Technology	(30 h)	Marcinèin
Structure and Properties of Fibres	(20 h)	Ujhelyiová
Fibre Testing	(20 h)	Legéò

D. Seminars

Dispersion mechanism in polymer blends.

(Fortelný I., Macromolecular Institute ÈAV,
Czech Republik)

Hierarchy structure of polymers and mechanical properties.

(Raab M., Macromolecular Institute ÈAV Czech
Republik)

Technology in Search of markets: Airlaid nonwovens for a new millenium.
 Jet ink printing.

(Pivko I. B., Notabene Associates Inc., USA)
 (Hodul P., ChTFF, STU Slovakia)

IV. CURRENT RESEARCH PROJECTS**Fiber-forming polypropylene blends with polar polymers (Eberhard Borsig)**

The aim of the project is a solution of miscibility of polypropylene PP with polar polymers (PA, PET) and also with other additives with respect to achieve a spinning of these blends. A polymer blend consisting of PP, branched PE and PET was studied by the DSC method. If PE was present in the blend in a minority amount an increase of amorphous phase and on the contrary an increase of crystallinity position in PP component were observed. The results showed that a partial miscibility of PP and LDPE over melting point was observed. On the other hand an decrease of PET crystallinity portion, which forms a disperse phase, was observed it is proportional to its amount in the blend. These morphological changes influence the sorption of dispersion dyes of the blend fibers.

V. COOPERATION**A. Cooperation in Slovakia:**

Research Institute for Man-Made Fibres, Svit
 Research Institute of Textile Chemistry, Žilina
 Polymer Institute, Slovak Academy of Sciences, Bratislava
 Slovenský hodváb a.s., Senica
 Chemosvit a.s., Svit
 Rhodia a.s., Humenné
 Merina a.s., Trenèin
 Istrochem a.s., Bratislava

B. International Cooperation:

Chemical Fibre Institute, Lodž, Poland
 -Organisation of the 1st Central European Conference
 Technical University, Liberec, Czech Republic
 -Exchange of staff member and students
 CNR Arco Felice, Naples, Italy
 -Modified PP fibres
 Aquafil a.s., Italy
 Modifid PP fibres, concentrates of antibacterial additives
 PCD Polymere Linz, Austria

-Antibacterial treatment
 Institute of Polymer Research, Dresden, Germany
 -Additives for polymers
 University of Maribor, Faculty of Mechanical Engineering, Maribor, Slovenia
 -Cooperation in the CEEPUS project
 University of Zagreb, Faculty of Textile Technology, Croatia
 -Exchange of students

C. Membership in Domestic Organizations and Societies:

Slovak Chemical Society, Bratislava (E. Borsig, P. Hodul, M. Krištofiè, A. Murárová, J. Legèò, E. Zemanová)
 Advisory Board of Scientific Journal Autex Res. J. (A. Marcinèin)
 Advisory Board of Scientific Journal Vlákna a textil (Fibres and Textiles) (A. Marcinèin, P. Hodul)
 Commission of the Grant Agency VEGA of the Ministry of School & Science SR (A. Marcinèin)

D. Membership in International Organizations and Societies:

Association of Universities for Textiles (AUTEX) Belgium (A. Marcinèin)
 Committee for Slovak-Polish Conference (A. Marcinèin)
 Scientific council TU Liberec (A. Marcinèin)
 EPF, European Polymer Federation, (E. Borsig)
 Advisory Board of Scientific Journal Chemické listy (Chemical letters) Czech Republic (E. Borsig)
 Journal of Macromolecular Science, Pure and Applied Chemistry, USA, (E. Borsig)

E. Tempus Programme: -

F. International Scientific Programmes:

CEEPUS
 SI-007 Modelling of credits system in textile high education,
 M. Krištofiè
 Centre for International Academic Cooperation at the University
 of Maribor, Slovenia
 University of Zagreb, Croatia
 Technical University of Liberec, Czech Republic
 Technical University of Lodz, Poland
 Technical University of Budapest, Hungary
 Technical College for The Light Industry, Hungary
 Since 1996 permanently

G. Visitors from Abroad:

Dr. I. Fortelný Czech Academy of Sciences, Prague, Czech Republic, February 2000 (2 days)
 Prof. M. Raab Czech Academy of Sciences, Prague, Czech Republic, April 2000 (2 days)
 L. M. Pontarin, F. Voiglio, B. Bertamini Aquafil, Arco-Trento, Italy, July 2000 (1 day)
 J. Studnièková TU Liberec, Czech Republic, October 2000 (26 days)
 A. Horvat TU Zagreb, Croatia, June 2000 (30 days)
 Prof. Aneja Du Pont, USA, June 2000 (1 day)
 Prof. P. Kiekens TU Gent, Belgium, March 2000 (1 day)
 M. Budín Silon, Planá, Czech Republic, March 2000 (1 day)
 L. Hertl Textilana, Liberec, Czech Republic, March 2000 (1 day)

H. Visits of Staff Members and PhD Students to Foreign Institutions:

A. Marcinèin University of Gent, Belgium, February 2000 (3 days)
 A. Ujhelyiová TU Liberec, Czech Republic, February 2000 (4 days)
 A. Marcinèin TU Liberec, Czech Republic, March 2000 (3 days)
 A. Marcinèin, E. Zemanová Colorchem 2000, Pardubice, Czech Republic, May 14-18
 E. Borsig TU Freiburg, Germany, June-July 2000 (30 days)
 M. Krištofiè, J. Legèò, A. Marcinèin, A. Ujhelyiová Texsci 2000, Liberec, Czech Republic, June 12-14
 A. Marcinèin 5. Dresdner Textiltagung 2000, Dresden, Germany, June-July, 27-1
 A. Marcinèin Seminary Autex, Maribor, Slovenia, August 26-29
 A. Marcinèin Conference on Modification, Degradation and Stabilization, Palermo, Italy, September 3-9
 P. Hodul, M. Krištofiè, A. Marcinèin, A. Murárová 1st Central European Conference, Lodž, Poland, October 2-4
 A. Ujhelyiová TU Liberec, Czech Republic, October-November 2000 (3 weeks)
 A. Marcinèin TU Liberec, Czech Republic, November 2000 (2 days)

VI. THESES AND DISSERTATIONS

A. Graduate Theses (MS Degree) for state examinations after five years of study (supervisors are written in brackets):

Blaòarová R.: Evaluation of the unevenness of the geometry and the structure of

Broèková L.:	synthetic fibres. (A. Ujhelyiová) Evaluation of deformation properties of fibres by the method of TMA. (E. Zemanová)
Borguová A.:	Influence of Geometry of Fibres on Dyeing, (A. Murárová)
Gazdíková I.:	Fibre-forming blends of polypropylene-polyethyleneterephthalate. (A. Marcinèin)
Korcová D.:	Adsorption of surfactants by fibres. (P. Hodul)
Kuchárová A.:	Polymer blends for the preparation of fibres. (J. Iegéò)
Mlynarèiková Z.:	Preparation of polymer blend PP-PA6 for fibres. (E. Borsig)
Pavlátová Z.:	Modification of polypropylene fibres. (M. Krištofiè)

B.Dissertations (PhD):-**C.Dissertations (DSc):-****D.Habilitation Thesis:-****VII. PUBLICATIONS****A. Journals (*registered in Current Contents)**

- [1]* Greco R., Iavarone A., Fiedlerová A., Borsig E.: Optical properties of IPN-like networks. II. Polyethylene/poly-(butylmethacrylate -co-methylmethacrylate) copolymer systems. J. M. S.-Pure Appl. Chem A 37, 433-446, (2000)
- [2] Hodul P., Weberová M., Marcinèin A. Jedlovská M.: b-cyclodextrin as additive in crease resistant finishing. Vlákna a textil (Fibres and Textiles) 6 159-161(1999)
- [3] Hodul P.: Zosilovanie materiálov z elasthanových vlákien. Finishing of elastan fibre materials (in Slovak).Vlákna a textil (Fibres and Textiles) 7, 21-24 (2000)
- [4] Hodul P.: Efektívnejšie využite reaktívnych farbív. More effective use of reactive dyes (in Slovak).Vlákna a textil (Fibres &Textiles) 7, 209-214 (2000)
- [5] Jambrich M., Murárová A., Džubas F.: Aspects of the development of cellulose fibres.Vlákna a textil (Fibres &Textiles) 7, 200-205 (2000)
- [6]* Kettman V., Lokaj J., Krátky Ch., Milata V., Hodul P.: Dimetyl (1-metyl-1,3-benzimidazol-5yl) aminoethylene propanedioate monohydrate. Acta Crys. C 56, 1007-1008(2000)
- [7]* Krištofiè M., Marcinèin A., Ujhelyiová A.: The DSC study of polyamides and copolyamides. J. of Thermal Analysis and Calorimetry 60, 358-369(2000)
- [8]* Krištofiè M., Marcinèin A., Ujhelyiová A., Murárová A.: Modification of PA6 fibres with alkaline copolyamides. Chem. Papers 54, 53-58(2000)
- [9]* Lazar M., Hrèková ¼, Borsig E., Marcinèin A., Reichelt N., Rätzsch M.: Course of degradation and Built -Up Reactions Isotactic Polypropylene During Peroxide Decomposition. J. Appl. Polym. Sci 78, 886-893 (2000)
- [10]* Lazar M., Hrèková ¼, Fiedlerová A., Borsig E.: Crosslinking during radical polymerization of dodecyl methacrylate. Macromol. Mater. Eng. 283, 88-89 (2000)
- [11]* Pionteck J., Hu J., Pompe G., Albrecht V., Schulze U., Borsig E.: Characterisation of radiation behaviour of polyethylene/polymethacrylates interpenetrating polymer networks. Polymer 41, 7915-7923 (2000)
- [12] Ujhelyiová A., Marcinèin A: Unevenness of geometry and structure of synthetic fibres and methods of their estimation. Vlákna a textil (Fibres ana Textiles) 7,184-188 (2000)

B. Conferences (* International conferences)

- [1]* Borsig E., Fiedlerová A., Greco R., Iavarone M., Vogl O., Rhomann R.: IPN-Like System with Thermal Control of its Transparency. In: Proceedings of ACS National Meeting: Polymeric Materials: Science&Engineering 82, 3219(2000), San Francisco, USA, March 26.-30. 2000, p. 1
- [2]* Borsig E., Fiedlerová A., Hrèková ¼, Lazar M.: Mechanism and Efficiency of Polypropylene Grafting in the solid State. In: Book of Abstracts of the 1st International symposium on "Reactive polymers" in Inhomogeneous Systems, in melts, Dresden, Germany, July 16.-19. 2000, L 22
- [3]* Borsig E., Lazar M., Fiedlerová A., Hrèková ¼, Rätzsch M., Marcinèin A.: Solid state polypropylene grafting as an effective chemical method of modification. In: Proceedings (CD ROM) of the 1st International Modest 2000 Conference, Palermo, Italy, September 3.-5. 2000
- [4]* Borsig E., Lazar M., Fiedlerová A., Hrèková ¼: Grafting of Polypropylene in Solid state - an effective method of chemical modification of polymers. Tagungs band "Polymerwerkstoffe 2000", Halle, Germany, September 25.-27. 2000, p. 139-142
- [5]* Borsig E., Fiedlerová A., Greco R., Marcinèin A., Thomann R.:An Interpenetrating Polymer Network Exhibiting Temperature Dependent Transparency. In: Proceedings of World Polymer Congress IUPAC MACRO 2000, 38th Macromolecular IUPAC Symposium, Warsaw, Poland, July 9.-14. 2000
- [6]* Danko M., Hrdloviè P., Borsig E.: Spectral Characterisation of transparent IPN systems by fluorescence probes based on pyrene. In: Proceedings of the 14th Bratislava International Conference of Modified Polymers " Property Tailoring of Thermoplastics-Based Blends and Composites", Bratislava, Slovak Republic, October 1.-4. 2000, p. 131-132
- [7]* Danko M., Hrdloviè P., Borsig E.. Application of linked Fluorescence probes based of pyrene for spectral characterisation of transparent IPN system[polyethylene/poly(butyl methacrylate-co-styrene)] . In: Book of Abstracts of World Polymer Congress IUPAC MACRO 2000. 38th Macromolecular IUPAC Symposium, Warsaw, Poland, July 9.-14. 2000, p. 840
- [8]* Fiedlerová A., Borsig E., Greco R., Iavarone M.: IPN-like Systems with the Termal Control of ist Transparency. In: Proceedings of the 14th Bratislava International Conference of Modified Polymers " Property Tailoring of Thermoplastics-Based Blends and Composites", Bratislava, Slovak Republic, October 1.-4. 2000, p. 139-140
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- transparenciou. Interpenetrating polymer network with thermal controlled transparency (in Slovak). In: Proceedings of Slovak-Czech Meeting on Polymers, Smolenice, Slovak Republic, October 23.-25. 2000, p.48-50
- [10]* Hodul P.: Textilná výroba a trendy v technológii zšachovania. Textile industry and development in textile finishing (in Slovak). In: Proceedings of Internationale Conference "Textile in 2000", Žilina, Slovak Republic, April 13.-14. 2000, VIII-1-14
- [11]* Hodul P., Weberová M., Marcinèin A., Jedlíková M.: β -cyclodextrin in textile finishing. In: Book of Abstracts of the 1st Central European Conference on Fibre Grade Polymers, Chemical Fibres and Special Textiles. Lodž, Poland, October 3.-4. 2000, A4
- [12]* Hrèková Ľ, Lazar M., Borsig E.: Degradation and Build-Up Reaction in I-PP. In: Proceedings of the 14th Bratislava International Conference of Modified Polymers "Property Tailoring of Thermoplastics-Based Blends and Composites", Bratislava, Slovak Republic, October 1.-4. 2000, p. 154-155
- [13]* Jamrich M., Sroková I., Murárová A., Revús M.: Rozvoj vlákién pre separaènè membránové procesy. Development of fibres for membrane processes (in Slovak). In: Proceedings of the Slovak meeting "Atractive chemical technologies and materials", Púchov, Slovak Republic, July 14. 2000, p. 13-17
- [14]* Krištofiè M., Hricová M., Ujhélyiová A.: Modification of PP Fibres with alkaline Copolyamides. In: Proceedings of the 14th Bratislava International Conference of Modified Polymers "Property Tailoring of Thermoplastics-Based Blends and Composites", Bratislava, Slovak Republic, October 1.-4. 2000, p. 96-97
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- [16]* Marcinèin A., Ujhélyiová A., Marcinèinová T.: Fibre-forming Blends of Polypropylene and polyethylene Terephthalate. In: Proceedings (CD ROM) of the 1st International Modest 2000 Conference, Palermo, Italy, September 3.-5. 2000
- [17]* Marcinèin A., Brejka O., Zemanová E., Marcinèinová T.: Processing of Colour Concentrates for Polypropylene and Polyethylene Terephthalate Spun dyed Fibres. In: Proceedings of the 8th Internationale Conference of Dyes and Pigments. Colorchem 2000, Pardubice, Špindleruv Mlyn, Czech Republic 2000, p. 28
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- [19]* Murárová A., Hodul P., Jamrich M.: The influence of Geometrie modification of PET fibres on dyeing. In: Book of Abstracts of the 1st Central European Conference on Fibre Grade Polymers, Chemical Fibres and Special Textiles. Lodž, Poland, October 3. -4. 2000, B3
- [20]* Novák I., Borsig E., Hrèková Ľ, Fiedlerová A.: Adhèzne vlastnosti polypropylènu oèkovaného maleínanhydridom. Adhesive properties of maleinated polypropylene. In: Proceedings of Slovak-Czech Meeting on Polymers, Smolenice, Slovak Republic, October 23.-25. 2000, p. 30
- [21]* Pavlíková S., Reichert P., Mulhaupt R., Borsig E.: Polymèrové kompozity plnené anorganickým plnivom. Polymer composites with inorganic filler. In: Book of Abstracts Student's scientific conference, Faculty of natural sciences, Bratislava, Slovak Republic, April 11.-12. 2000, p. 111
- [22]* Pavlíková S., Borsig E.: The polypropylene composite containing inorganic fillir. In: Proceedings of the 14th Bratislava International Conference of Modified Polymers "Property Tailoring of Thermoplastics-Based Blends and Composites", Bratislava, Slovak Republic, October 1.-4. 2000, p.154-155
- [23]* Piontek J., Hu J., Schulze U., Borsig E.: Selective degradation of PE/polymethacrylate -IPN: a new approach to porous structure. In: Proceedings (CD ROM) of the 1st International Modest 2000 Conference, Palermo, Italy, September 3.-5. 2000

C. Books and Textbooks

D. Patents

E. Research Reports

DEPARTMENT OF GRAPHIC ARTS TECHNOLOGY AND APPLIED PHOTOCHEMISTRY

Head of the Department:
Assoc. Prof. Michal ěeppan, PhD

Telephone: ++421-7-52 49 52 76
Fax: ++421-7-52 49 31 98
E-mail: ceppan@cvt.stuba.sk
ceppan@chtf.stuba.sk

I. STAFF

Associate Professor:

Milan Mikula, PhD;

Assistant Professors:

Vladimír Dvonka; Bohuslava Havlínová, PhD; Viera Janěoviěová, PhD; Ján Panák, PhD; Milena Reháková, PhD;

Research Fellows:

Alžbeta Blažková, PhD; Maroš Soldán, PhD; František Bednár;

PhD Students:

Jozef Fedák; Ivana Karoviěová; Juraj Kindernay;

Technical Staff:

Mária Bardúnová; Alena Dušeková, Juraj Hamza; Martin Kovalěik;

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories

Laboratory of Printing Technology
Laboratory of Photochemistry and Photography
Laboratory of Optical Spectroscopy and Photometry
Laboratory of Thin Films and Plasma Technology
Laboratory of Rheology

III. TEACHING

A. Undergraduate Study

6th Semester (spring)

Paper and Print, Graphic Arts	(2-2 h)	Krkoška (Dept. Wood, Paper, Pulp), Panák
Term Project	(0-4 h)	Blažková, ěeppan, Havlínová, Janěoviěová, Mikula, Panák, Soldán; Reháková

7th Semester (autumn)

Colloids Systems and Interfaces	(2-1 h)	Bakoš (Dept. Plastics and Rubber), Soldán
Polymer and Paper Physic	(0-2 h)	Janěoviěová
Photochemistry and Photography I.	(2-1 h)	ěeppan, Reháková
Surface and Thin Film Technology	(2-0 h)	Mikula
Advanced Laboratory Course I.	(0-9 h)	Havlínová, Janěoviěová, Mikula, Reháková
Typography and Text Processing	(0-2 h)	Dvonka

8th Semester (spring)

Photochemistry and Photography II.	(2-0 h)	ěeppan
Printing Technology I.	(2-0 h)	Panák
Advanced Laboratory Course II.	(0-8 h)	ěeppan, Dvonka, Havlínová, Janěoviěová, Mikula
Planning for Printing Production	(0-2 h)	Dvonka, Panák

9th Semester (autumn)

Printing Technology II	(2-0 h)	Panák.
Repronc	(1-3 h)	Mikula, Fedák
Advanced Laboratory Course III.	(0-14 h)	Panák, Dvonka, Blažková, ěeppan, Havlínová, Janěoviěová, Mikula, Soldán

C. Industrial courses

Basis of Graphic Arts Technology Panák, ěeppan, Mikula, Krkoška (Dept. Wood, Paper, Pulp), Marciněin (Dept. Fibers and Textile), Sekretár (Dept. Milk, Fats and Food Hygiene)

IV CURRENT RESEARCH PROJECTS

A. The study of relations between physical and chemical properties of the constituents and structures of printed images and image information quality in graphic arts technologies for planar polymer

materials (Michal Ěeppan)

1. Study of physical and chemical properties of macromolecular systems in constituents and structure of colour images on planar polymer materials. Characterization of optical properties of multiplayer structures of images by methods of objective microphotometry, spectrophotometry and colorimetry.

2. Study of influence of surface and rheological parameters of macromolecular systems of printing inks on the course of their transfer on planar polymer materials in the process of printed image formation.

3. Study of photochemical reactions of selected photopolymerization systems and their relation to the stability and quality of printed images.

B. Coating thickness measurement of non-visible fluorescent UV colors (Contract with KASICO, a.s., printing house, Milan Mikula)

The effective layer thickness of a fluorescent UV sensitive color is not easy to control during a printing process. Classical densitometry cannot be applied because the fluorescent UV colors are non-visible. The problem was solved studying the fluorescent properties of the UV colors, their excitation and emission spectra. The prototype of a simple manual measuring system for technological application has been built up, based on appropriate excitation light source, detector, and applying the proper filtration of light. The prototype is now experimentally tested in the printing house.

V. COOPERATION**A. Cooperation in Slovakia:**

Chemosvit, Svit
 Concordia Printing House, Bratislava
 Inkflow-Ekotrading, Bratislava
 Printing House BB, Banská Bystrica
 Printing House Kasico, Bratislava
 Slovenská grafia, Bratislava

B. International Cooperation:

Technical University Brno, Faculty of Chemistry, Czech republic
 - Photochemical properties of light sensitive layers

C. Membership in Domestic Organization and Societies:

Slovak Union for Industrial Chemistry (M. Ěeppan, M. Mikula, J. Panák)

D. Membership in International Organization and Societies:

European Photochemistry Association, (M. Ěeppan)
 International Society of Imaging Science and Technology, Springfield, USA (M. Ěeppan)
 Graphic Arts Technical Foundation, Sewickley, USA (M. Ěeppan)

G. Visitors from abroad:

Prof. Lubomír Lapěik Faculty of Chemistry VUT Brno ĚR, June 2000 (2 days)

H. Visits of Staff Members and PhD Students to Foreign Institutions:

M. Ěeppan, J. Panák Word Fair DRUPA 2000, Düsseldorf, Germany, May 2000 (5 days)
 M. Ěeppan Faculty of Chemistry VUT Brno, ĚR, June 2000 (5 days)
 B. Havlínová 11th seminary of archivists and historians, Litoměice, ĚR, September 2000 (4 days)
 M. Ěeppan, B. Havlínová National Archives, Prague, ĚR, November 2000 (1 day)

VI. THESIS AND DISSERTATIONS**A. Graduate Theses (MS Degree) for state examinations after five years of study (supervisors are written in brackets)**

Prusáková Ě:	Fountain in offset lithography (J. Panák)
Gonová O.:	Influence of the properties of lithographic color inks on process and quality of printing (J. Panák)
Bednáriková A.:	Study of ageing of printed paper (B. Havlínová)
Szeiffová G.:	Ageing of paper as a archiving problem (B. Havlínová)
Kosorín M.:	Characterization of color printing on flexible packaging materials (M. Ěeppan)
Karoviěová I.:	Study of polymer light sensitive layer based on diazo-resins (M. Ěeppan)
Rábely K.:	Calibration of CCD camera for imaging photometry (M. Ěeppan)
Rudá J.:	Study of radical initiated photopolymerization reactions (A. Blažková)
Petríková S.:	UV curable compositions – preparation and properties (A. Blažková)
Vaško K.:	Influence of gloss on colorimetric properties of printed materials (M. Mikula)
Bermannová L.:	Printing with UV fluorescence inks and measurement of printed layer (M. Mikula)
Cibulková Z.:	Study of Photolysis of diazonium salts (V. Janěoviěová)
Kapeěková A.:	Study of the influence of initiator and curing properties on the course of cationic photopolymerization (V. Janěoviěová)

Altuchová P.:

Study of the monitoring of the thickness of fountain solution on form cylinder in offset lithography (M. Soldán)

Huèková M.:

Radical photopolymerization of selected acrylate monomers monitored by RTIR (M. Soldán)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

- [1]* Blažková A., Mezeiová B., Brezová V., ěppan M., Janèovièová V.: Photochemical transformation of sodium anthracene-1-sulphonate in oxygen-saturated aqueous titanium dioxide suspensions. *J. Mol. Catal. A-Chem.* 153, 129-137 (2000)
- [2] Brezová V., Blažková A., Karpinský Ľ: Súèasné trendy v èistení odpadových vôd - fotokatalytický rozklad fenolu na imobilizovanom oxide titanièitom. Recent trends in waste-water purification - photocatalytic phenol decomposition on immobilized titanium dioxide (in Slovak). *Ropa a uhlie* 42, 29-33 (2000)
- [3]* Havlínová B., Horòáková Ľ, Brezová V., Liptáková Z., Kindernay J., Janèovièová V.: Ink receptivity on paper - characterization of paper materials. *Colloids and Surfaces A: Physicochemical and Engineering Aspects* 168, 251-259 (2000)
- [4] Havlínová B., Brezová V., Liptáková Z., Horòáková Ľ, Kindernay, J. Janèovièová V.: Hodnotenie príjmu tlaèovej farby papierom. Characterization of ink receptivity on paper (in Slovak). *Papír a celulóza* 55, 46-50 (2000)
- [5]* Hrouzek J., Krupèík J., ěppan M., Hatrík Š., Leclercq P. A.: A Novel Method for Peak Number Estimation in Chromatographic Peak Clusters. *Chem. Papers* 54, 315-319 (2000)
- [6]* Janèovièová V., Brezová V., Cigánek M., Cibulková Z.: Photolysis of diaryliodonium salts (UV/Vis, EPR and GC/MS investigations). *J. Photochem. Photobiol. A: Chem.* 136, 195-202 (2000)
- [7]* Pinèík E., Jergel M., Gmucová K., Glesková H., Kuèera M., Müllerová J., Brunel M., Mikula M.: Low-energy Ar Ion Beam Treatment of α -Si:H/Si Structure. *Appl. Surf. Sci.* 166, 61-66 (2000)
- [8] Soldán M., Mikula M., Janèovièová V., Blažková A., Fedák J., Kindernay J.: Radical Polymerization of Acrylated Monomer Monitored by RTIR. *Petroleum and Coal* 42, 1-4 (2000)

B. Conferences (*International conferences)

- [1] Blažková A., Reháková M., Soldán M., Dvonka V.: UV vytvrdzovacie kompozície - príprava a hodnotenie vlastností. UV curable compositions - preparation and properties (in Slovak). In: *Proceedings of Polygrafia academica 2000*, Bratislava, September 7.-8. 2000, p. 262-266, ISBN 80-227-1387-2
- [2]* Èernák M., Rahel J., Hudec I., Mikula M.: Surface Treatment of Polyester Monofilaments by Atmospheric-pressure Nitrogen Plasma. In: *Proc. 7th Int. conf. on Plasma Surface Engineering*, Sept. 17.-21. 2000. Garmisch-Partenkirchen 2000, FRG, DGO Düsseldorf, p. 40.
- [3] Dvonka V., ěppan M., Fedák J.: Spektrodensitometria a denzitometria - porovnávací štúdiá. Spectrodensitometry and densitometry - comparative study (in Slovak). In: *Proceedings of Polygrafia academica 2000*, Bratislava, September 7.-8. 2000, p. 272-279, ISBN 80-227-1387-2
- [4] Fedák J., ěppan M., Dvonka V.: Využitie CCD zobrazovacej fotometrie pri hodnotení výtlaèkov. CCD imaging photometry in evaluation of prints (in Slovak). In: *Proceedings of Polygrafia academica 2000*, Bratislava, September 7.-8. 2000, p. 220-225, ISBN 80-227-1387-2
- [5] Havlínová B., Brezová V., Kindernay J., Horòáková Ľ: Príjem tlaèovej farby papierom. Ink receptivity on paper (in Slovak) In: *Proceedings of Polygrafia academica 2000*, Bratislava, September 7.-8. 2000, p. 226-232, ISBN 80-227-1387-2
- [6] Havlínová B., Kindernay J., Reháková M.: Vplyv starnutia na sfarbenie papiera. Influence of ageing on paper yellowing (in Slovak). In: *Proceedings of Polygrafia academica 2000*, Bratislava, September 7.-8. 2000, p. 233-238, ISBN 80-227-1387-2
- [7] Jakucewicz, S., Panák, J.: Kvalita novinovej tlaèe na papieroach s rôznym obsahom zberového papiera. Quality of newsprint using different waste paper content paper (in Slovak). In: *Proceedings of Polygrafia academica 2000*, Bratislava, September 7.-8. 2000, p.31-38, ISBN 80-227-1387-2
- [8] Janèovièová V., Soldán M., Fedák J.: Faktory ovplyvujúce proces vytvrdzovania komerèných UV lakov. Factors affecting the commercially produced UV resins curing process (in Slovak). In: *Proceedings of Polygrafia academica 2000*, Bratislava, September 7.-8. 2000, p. 246-250, ISBN 80-227-1387-2
- [9] Janèovièová V., Blažková A., Kindernay J., Kapeèková A.: Vplyv zlozenia kompozície a podmienok vytvrdzovania na priebeh fotopolymerizácie vinyléterov. Effect of UV curable systems compositions and their curing properties on the process of vinyl ethers polymerization (in Slovak). In: *Proceedings of Polygrafia academica 2000*, Bratislava, September 7.-8. 2000, p. 251-255, ISBN 80-227-1387-2
- [10] Kindernay J., Blažková A., Janèovièová V., Fedák J.: Vplyv intenzity a spektrálneho zlozenia zdrojov UV žiarenia na priebeh fotopolymerizaèných reakcií akrylátových monomérov. Influence of light intensity and spectral characterization of UV light source on the process of photopolymerization reactions (in Slovak). In: *Proceedings of Polygrafia academica 2000*, Bratislava, September 7.-8. 2000, p. 256-261, ISBN 80-227-1387-2
- [11]* Kopáni M., Mikula M., Tucoulou R., Jakubovký J., Pinèík E.: Properties of α -Si:H thin films treated by argon low energy ion beam. In: *Proc. Solid State Surface and Interface II*, June 20.-22. 2000, Bratislava, FÚ SAV Bratislava, p.42-43
- [12] Macura M., Mikula M.: Kombinované obalové fólie s kovovým efektom. Combined packaging foils with metallic effect (in Slovak). In: *Proceedings of Polygrafia academica 2000*, Bratislava, September 7.-8. 2000, p. 217-219, ISBN 80-227-1387-2
- [13]* Mikula M., Búc D., Pinèík E.: Electrical and Optical Properties of Copper Nitride Thin Films Prepared by Reactive DC Magnetron Sputtering. In: *Proc. Solid State Surface and Interface II*, June 20.-22. 2000, Bratislava, FÚ SAV Bratislava, p.48-49
- [14] Mikula M., Ferenèík V.: Kontrola tlaèe neviditeľných UV fluorescenèných farieb. Nonvisible fluorescent UV inks printing control (in Slovak). In: *Proceedings of Polygrafia academica 2000*, Bratislava, September 7.-8. 2000, p.150-

154, ISBN 80-227-1387-2

- [15] Mikula M., Ferenčík V.: Meranie nánosu neviditeľných UV fluorescenčných farieb. Measurement of nonvisible UV fluorescent inks thickness (in Slovak). In: Proceedings of Printing forum 2000, Bratislava, November 8, 2000, Bratislava 2000, p. 22-7
- [16] Panák, J., Gonová, O.: Reoviskozimetria hárkových ofsetových farieb. Rheoviskozimetry of sheetfed offset inks (in Slovak). In: Proceedings of Polygrafia academica 2000, Bratislava, September 7.-8. 2000, p. 107-118, ISBN 80-227-1387-2
- [17] Soldán M., Reháková M., Dvonka V., Fedák J.: Vplyv koncentrácie iniciátora a intenzity žiarenia na priebeh radikálových fotopolymerizačných reakcií niektorých akrylátových monomérov monitorovaný RTIR. Effect of initiator concentration and light intensity on radical polymerization of some acrylated monomers monitored by RTIR (in Slovak). In: Proceedings of Polygrafia academica 2000, Bratislava, September 7.-8. 2000, p. 267-271, ISBN 80-227-1387-2

C. Books and Textbooks

- [1] Panák J., Èeppan M., Dvonka V., Karpinský Ľ, Kordoš P., Mikula M., Jakucewicz S.: Polygrafické minimum. Basics of Graphic Arts Technology. TypoSet, Bratislava, ISBN 80-967811-2-X (First Issue), ISBN 80-967811-3-8 (Second Issue), 256 pp. (2000)

DEPARTMENT OF INORGANIC CHEMISTRY

Head of the Department:
Prof. Milan Melník, PhD, DSc

Telephone: ++421-7-52495257
Fax: ++421-7-52493198
E-mail: melnik@cvt.stuba.sk

I. STAFF

Full Professors:

Roman Boèa, PhD, DSc; Milan Melník, PhD, DSc; Gregor Ondrejoviè, PhD, DSc; Jozef Šima, PhD, DSc;

Associate Professors:

Michal Dunaj-Jureò, PhD; Mária Hvastijová, PhD, DSc; Mária Kabešová, PhD, DSc; Marian Koman, PhD, DSc; Adela Kotoèová, PhD; Anna Mašlejová, PhD; Ján Sýkora, PhD; Dušan Valigura, PhD;

Assistant Professors:

Zuzana Baloghová, PhD; Anna Broškovièová, PhD; Mário Izakoviè; Vladimír Jorík, PhD; Ľubov Macášková, PhD; Darina Makáòová, PhD; Iveta Ondrejковиèová, PhD; Blažena Papánková, PhD; Peter Segž, PhD; Anton Sirota, PhD; Miroslav Tatarko; Vlasta Vanèová, PhD;

Research Fellows:

Ľubor Dlháò; Dušan Mikloš, PhD; Milan Rùžieka;

PhD Students:

Miroslav Boèa; Milan Gembický; Adriana Kissová; Ján Moncož; Marcela Múdra; Martina Palicová; Martina Vrbová;

Technical Staff:

Viera Blažová; Andrea Boèová; Marta Danková; Valéria Habudová; Leonard Kováè; Silvia Markusová; Anna Maszticsová; Alžbeta Molèanová; Marta Polláková; Marta Sprušanská; Klára Valúchová;

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Laboratories of Practical Exercises

B. Research Laboratories:

Laboratory of Electrochemistry
Laboratory of Photochemistry
Laboratory of Magnetochemistry
Laboratory of Thermal Processing
Laboratory of Spectroscopy
Laboratory of X-ray Analysis
Laboratory of Powder Diffraction

III. TEACHING

A. Undergraduate Study

1st Semester (autumn)

Inorganic Chemistry I	(3-2 h)	R. Boèa, Kotoèová, Melník, Šima, Valigura
Inorganic Chemistry I (Laboratory)	(3 h)	Baloghová, M. Boèa, Broškovièová, Dlháò, Dunaj-Jureò, Gembický, Hvastijová, Izakoviè, Jorík, Macášková, Makáòová, Mašlejová, Mikloš, Moncož, Ondrejковиèová, Palicová, Papánková, Rùžieka, Segž, Sirota, Sýkora, Tatarko, Vanèová, Vrbová

2nd Semester (spring)

Inorganic Chemistry II	(2-2 h)	Hvastijová, Koman, Melník, Ondrejoviè, Sýkora
Inorganic Chemistry II (Laboratory)		Baloghová, M. Boèa, Broškovièová, Dlháò, Gembický, Izakoviè, Jorík, Macášková, Makáòová, Mašlejová, Mikloš, Ondrejковиèová, Palicová, Papánková, Rùžieka, Segž, Sirota, Sýkora, Tatarko, Vanèová, Vrbová

7th Semester (autumn)

Chemical Bond and Chemical Structure	(2-0 h)	R. Boèa
Chemistry of Coordination and Organometallic Compounds	(2-0 h)	Ondrejoviè
Inorganic Photochemistry	(2-0 h)	Sýkora
Inorganic Syntheses	(2-0 h)	Valigura
Laboratory Practice in the Major I	(0-10 h)	R. Boèa, Kotoèová, Ondrejковиèová, Ondrejoviè, Rùžieka, Segž, Sýkora, Valigura

8th Semester (spring)

Bioinorganic Chemistry	(2-1 h)	Melník
Crystallochemistry	(2-0 h)	Dunaj-Jurèò
Indirect Methods of Research Structural Studies of Inorganic Compounds	(2-2 h)	Mašlejová
Inorganic Materials	(2-0 h)	Koman
Laboratory of Speciality	(6 h)	
Laboratory Practice in the Major II	(0-6 h)	Jorík, Mašlejová, Mikloš
Reaction mechanisms of Inorganic Compounds	(2-0 h)	Šima
Spectral Methods of Control Technological Processes	(2-2 h)	Sega
Technics of a Mixture Separation	(2-2 h)	Valigura

9th Semester (autumn)

Bioinorganic Chemistry	(2-1 h)	Melník
Catalysis	(2-0 h)	Ondrejковиèová
Chemistry of Coordination and Organometallic Compounds	(2 h)	Ondrejoviè
Inorganic Materials	(2-1 h)	Koman
Laboratory of Speciality	(10 h)	Mikloš, Koman, Mašlejová, Ondrejковиèová, Rùžieka, Šima, Valigura, Papánková

B. PhD Study**1st Semester**

Structure of Inorganic Substances	(30 h)	R. Boèa, Ondrejoviè supervisors
Recent Coordination Chemistry*	(30 h)	

2nd Semester

Reaction Mechanisms of Inorganic Compounds	(30 h)	Šima supervisors
Recent Coordination Chemistry*	(30 h)	

* Studied and controlled individually in correspondence with the doctoral thesis.

IV. CURRENT RESEARCH PROJECTS**A. Preparation, structure, reactivity and properties of inorganic and coordination compounds and their applications (Milan Melník)**

A number of new Cu(II), Mg(II), Fe(II) and Fe(III) complexes with anions of the N-heterocyclic acids derivatives (antiphlogistic drugs) have been prepared and studied by thermal, spectral and magnetic methods, and some by X-ray analysis. All the compounds have been tested to examine their antimicrobial, antifungal and antiyeast effect. Some of the compounds have been accepted for a higher degree of testing.

Some relationships between the spectral and magnetic properties of the respective compounds and their stereochemistry was found and discussed. A database covering the bioactivity of copper, iron and magnesium complexes, has been created. The structure of thousands copper and iron complexes has been classified and analyzed. As a result the conclusions for synthesis of the complexes with a desired structural type have been formulated.

For design of new materials can be also applied some of the results concerning the synthesized clusters, coordination polymers, and 1D-, 2D- and 3D-multipolynuclear copper(II) complexes, including the modeling formulas which originally characterize their composition of structure.

It was found that cuprous-cupric photoredox cycle is effective in photodestruction of some pollutants in water. The results on photoredox properties of iron(III) complexes can be used for optimization of rate constants describing the excited state redox quenching of the complexes based on electrode potentials of the quenchers in the grounded state. For copper(II) complexes the thermodynamic and stereochemical conditions for the redox tuning of copper(II) have been found and formulated.

Continuing in investigation of photoreactivity parameters optimization, the wavelength dependences of quantum yields have been studied. It was been found that three kinds of such dependences exist and conditions for their origin are rationalized. Reasons leading to similarities and differences in electrochemical and photochemical electron transfer processes have been identified.

The central atom effect on in-coordination sphere transformation of various N-donor ligands has been observed and general conclusions allowing to prepare in a selective way of amines and oxazolines have been formulated.

B. Induced transformations in coordination compounds (Roman Boèa)

1. The conditions leading to the spin crossover in solids (the low-spin to high-spin state transition) have been determined. New iron(II) complexes based on the tridentate N-donor heterocyclic ligands were prepared and investigated: they show the spin transition above the room temperature and some of them possess a considerable hysteresis (the heating and the cooling regimes behave differently).

2. New data in the chemistry of non-linear pseudohalides have been obtained. In addition to usual complexes, new products of a nucleophilic addition initialized by the beta-carbon activation have been prepared. Some of them show interesting stereochemical properties (imidazolidine ring opening/closing).

3. An experimental X-ray determination of the electron density distribution in metal complexes has been progressed.

C. Development and applications of methods for picking out of talented students in small as well as in larger groups with respect to the needs of the Chemical Faculty of the Slovak Technical University (Anton Sirota)

1. A new version of a didactic creativity test in physical chemistry was tested in smaller groups of students. The test was proved to be sensitive and reliable enough for picking out talented students in higher courses of the Chemical Faculty.

2. The research team was appointed to elaborate new statute of the special club named "SOCRATES" that gathers teachers and talented students of the Chemical Faculty. When creating the club, the methods for picking out talented students proposed by the research team, were applied and those experience and methods were used which have proved to be successful at the secondary school level.

3. Some members of the research team prepared special examination and teaching texts and held lectures for students of the Summer School in Chemistry organized for talented secondary school students in July 2000. Moreover, several of them were involved into special training of the students who represented Slovakia at the 32nd International Chemistry Olympiad in July 2000 in Copenhagen and achieved the 5th place in the competition from among 52 countries of all over the world.

4. Results of the research team were gathered in 22 reviewed papers (in Slovak) and published in journals while 4 papers were published in special booklets devoted to chemistry olympiad in Slovakia.

V. COOPERATION

A. Cooperation in Slovakia:

Department of Physical Chemistry, Slovak Technical University, Bratislava
 Department of Organic Chemistry, Slovak Technical University, Bratislava
 Department of Chemical Physics, Slovak Technical University, Bratislava
 Department of Inorganic Technology, Slovak Technical University, Bratislava
 Department of Microbiology, Biochemistry and Biology, Slovak Technical University, Bratislava
 Department of Ceramics, Glass and Cement, Slovak Technical University, Bratislava
 Institute of Medical Chemistry, Medical Faculty, Komensky University, Bratislava
 Institute of Inorganic Chemistry, Slovak Academy of Science, Bratislava
 Institute of Rheumatic Diseases, Piešťany
 Department of Inorganic Chemistry, Faculty of Science UPJŠ, Košice

B. International Cooperation:

Technical University, Vienna, Austria
 - Magnetic properties in solids and solutions
 York University, Toronto, Canada
 - X-ray analysis of transitions and non-transitions metal atoms
 University of Helsinki, Finland
 - X-ray analysis of solid compounds
 University of Joensuu, Finland
 - X-ray analysis of copper(II) compounds
 Martin-Luther University, Halle-Wittenberg, Germany
 - Structure and physical properties of transition metal complexis with non-linear pseudohalides
 Technical University, Darmstadt, Germany
 - New magnetic materials
 University of Wroclaw, Poland
 - Magnetic and x-ray analysis

C. Membership in Domestic Organizations and Societies:

Slovak Chemical Society
 Czech and Slovak Society for Crystal Growth
 Czech and Slovak Crystallographic Association
 Regional Committee of Czech and Slovak Crystallographers
 Crystallographic Society
 EPA Slovakia National Group

D. Membership in International Organizations and Societies:

Czech and Slovak Crystallographic Association, Prague, Czech Republic (Dunaj-Jurèò, Jorík, Koman, Kožíšek, Mikloš)
 Member of International Union of Crystallography, IUCr (M.Dunaj-Jurèò)
 Member of European Crystallographic Committee, EEC (M.Dunaj-Jurèò)
 American Chemical Society, USA (M.Melník, J.Sýkora)
 European Photochemistry Association, Switzerland (J.Sýkora, M. Izakovìè, M. Tatarko)
 Member of EPA Standing Committee, Switzerland (J.Sýkora)
 EPA Local Treasurer, Switzerland (J.Sýkora)
 Finland Chemical Society (M.Melník)
 Member of MGMC Editorial Board, Brusel (M.Melník)
 International Information Center of International Chemistry Olympiads (A.Sirota)

E. Tempus Programme:

F. International Scientific Programmes:

Scientific & Technological Cooperation Between Germany (TU Darmstadt) and Slovakia (STU Bratislava): New magnetic materials - R. Boèa, H. Fuess

Scientific Cooperation Between Germany (MLU Halle) and Slovakia (STU Bratislava): Untersuchungen zur Struktur und Reaktivität von Übergangsmetallkomplexen nichtlinearer Pseudohalogenide - M. Hvastijová, L. Jäger
 Scientific Cooperation Between Poland (Wrocław University) and Slovakia (STU Bratislava) ESF Project: Molecular Magnets.- R. Boèa, M. Verdaguer, M. Melník, J. Mrozinski

G. Visitors from Abroad:

Dr. I. Svoboda	Technical University, Darmstadt, Germany, June 2000 (4 days)
Prof. T. Glowiak	University of Wrocław, Poland, June 2000 (9 days)
Prof. E. Horst	Technical University, Darmstadt, Germany, July 2000 (2 days)
Prof. J. Mrozinski	University of Wrocław, Poland, September 2000 (7 days)
Dr. M. Korabik	University of Wrocław, Poland, September 2000 (7 days)
Dr. A. Kochel	University of Wrocław, Poland, September 2000 (7 days)
Dr. I. Svoboda	Technical University, Darmstadt, Germany, November 2000 (6 days)
Dr. H. Ehrenberg	Technical University, Darmstadt, Germany, November 2000 (6 days)

H. Visits of Staff Members and PhD Students to Foreign Institutions:

M. Melník	Technical College, Vienna, Austria, February 2000 (1 day)
I. Ondrejkošová	University of Wrocław, Poland, February 2000 (6 days)
Z. Baloghová	University of Wrocław, Poland, February 2000 (7 days)
A. Broškovičová	University of Wrocław, Poland, February 2000 (7 days)
M. Palicová	University of Wrocław, Poland, February 2000 (7 days)
M. Melník	University of Helsinki, Finland, February 2000 (8 days)
M. Růžička	Physical Institut, Academy of Sciences of Czech Republic, Prague, Czech Republic, March 2000 (1 day)
J. Šima	Technical University, Vienna, Austria, May 2000 (1 day)
A. Sirota	University of Hradec Králové, Czech Republic, May 2000 (2 days)
R. Boèa	Technical University, Vienna, Austria, May 2000 (4 days)
M. Hvastijová	Martin-Luther University, Halle, Germany, May 2000 (7 days)
R. Boèa	Technical University, Darmstadt, Germany, May 2000 (23 days)
R. Boèa	Cyclotron Center, Dresden, Germany, June 2000 (1 day)
M. Melník	University Library, Vienna, Austria, June 2000 (1 day)
V. Jorík	Charles University, Prague, Czech Republic, June 2000 (2 days)
D. Mikloš	University of Wrocław, Poland, June 2000 (8 days)
J. Moncoř	University of Wrocław, Poland, June 2000 (8 days)
M. Hvastijová	Technical University, Darmstadt, Germany, June 2000 (10 days)
¼ Dlhá	Technical University, Darmstadt, Germany, June 2000 (15 days)
B. Papánková	Technical University, Darmstadt, Germany, June 2000 (15 days)
M. Vrbová	Technical University, Darmstadt, Germany, June 2000 (65 days)
A. Sirota	University of Copenhagen, Denmark, July 2000 (12 days)
M. Melník	York University, Toronto, Canada, July 2000 (20 days)
R. Boèa	Technical University, Darmstadt, Germany, July 2000 (28 days)
M. Boèa	Technical University, Darmstadt, Germany, July 2000 (30 days)
V. Jorík	University of Silesia, Katowice, Poland, September 2000 (3 days)
J. Šima	South-Czech University, Èeské Budì jovice, Czech Republic, September 2000 (4 days)
D. Mikloš	South-Czech University, Èeské Budì jovice, Czech Republic, September 2000 (4 days)
J. Moncoř	South-Czech University, Èeské Budì jovice, Czech Republic, September 2000 (4 days)
M. Palicová	South-Czech University, Èeské Budì jovice, Czech Republic, September 2000 (4 days)
P. Segř	South-Czech University, Èeské Budì jovice, Czech Republic, September 2000 (4 days)
¼ Dlhá	Zlenice, Czech Republic, September 2000 (5 days)
M. Koman	Zlenice, Czech Republic, September 2000 (5 days)
M. Růžička	Zlenice, Czech Republic, September 2000 (5 days)
B. Papánková	Zlenice, Czech Republic, September 2000 (5 days)
M. Gembický	DESX Hamburg, Germany, September 2000 (10 days)
M. Koman	University of Wrocław, Poland, October 2000 (10 days)
J. Šima	Technical University, Vienna, Austria, November 2000 (1 day)
A. Sirota	University of Groningen, Netherlands, November 2000 (4 days)
R. Boèa	Technical University, Vienna, Austria, November 2000 (6 days)
M. Melník	University of Wrocław, Poland, December 2000 (7 days)
P. Segř	University of Wrocław, Poland, December 2000 (7 days)
M. Koman	University of Wrocław, Poland, December 2000 (7 days)
I. Ondrejkošová	University of Wrocław, Poland, December 2000 (7 days)

VI. THESES AND DISSERTATIONS

A. Graduate Theses (MS Degree) for state examinations after five years of study (supervisors are written in brackets):

Csanakiová M.:	Condensation products of 2-aminotiphenol with aldehydes and
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Kissová A.:	their complexes. (D. Valigura)
Kopcová M.:	The characterization of some modifications of Hg(OH) ₂ . (M. Koman)
Lauková D.:	Preparation and structure of copper(II) complexes with N-heterocyclic carboxylic acids. (D. Mikloš)
Lelkesová G.:	Redox reactions of iodo iron(III) complexes with Schiff bases. (J. Šima)
Nevířanská L.:	Study of preparation of anhydrous lead(II) sulfate single crystals. (M. Růžička)
Žúrek R.:	Iron coordination compounds with biologically active N-donor ligands. (I. Ondrejková)
	Preparation and physical study of carboxylato nickel(II) complexes with imidazole derivatives. (A. Mašlejová)

B. Dissertations (PhD):**C. Dissertations (DSc):****D. Habilitation Theses:****VII. PUBLICATIONS****A. Journals (*registered in Current Contents)**

- [1]* Boèa M., Baran P., Boèa R., Fuess H., Kickelbick G., Linert W., Renz F., Svoboda I.: Selective Imidazolidine Ring-Opening During Complex Formation of Iron(III), Copper(II), and Zinc(II) with a Multidentate Ligand Obtained from 2-Pyridinecarboxaldehyde-N-oxide and Triethylenetetramine. *Inorg. Chem.* 39 (2000) 3205-3212
- [2]* Boèa M., Valigura D., Linert W.: NMR study of new ligands as products of condensation of 2-pyridinecarboxaldehyde-N-oxide with polyamines. *Tetrahedron* 56 (2000) 441-446
- [3]* Boèa M., Valigura D., Svoboda I., Fuess H., Linert W.: 2-(6-(1H-benzimidazol-yl)-2-pyridyl)* -1H-benzimidazol-3-ium perchlorate monohydrate. *Acta Crystallogr. C* 56 (2000) 838-839
- [4]* Boèa R., Fukuda Y., Gembický M., Herchel R., Jarošák R., Linert W., Renz F., Yuzurihara J.: Spin crossover in mononuclear and binuclear iron(III) complexes with pentadentate Schiff-base ligands. *Chem. Phys. Lett.* 325 (2000) 411-419
- [5]* Boèa R., Klein H. F., Schmidt A., Valko M., Linert W.: Magnetic properties of triangulo cobalt-hydride cluster [H₃Co₃(m₂-CO)₃(Pme₃)₆]*. *Chem. Phys. Lett.* 323 (2000) 243-248
- [6]* Boèa R., Nemečková M., Vrbová M., Baran P., Svoboda I., Fuess H.: Tetrahydropoxen: 2,2'-(1,2-ethanediylobis(iminomethylene))bis(pyridine N-oxide) and its complexes. X-ray structure of [Cu(H₄-poxen)H₂O]* (ClO₄)₂·H₂O and [Co(poxenH₂O)* (ClO₄)₂. *Polyhedron* 19 (2000) 835-839
- [7]* Boèa R., Vrbová M., Werner R., Haase W.: Spin crossover in iron(II) tris(2-(2-pyridyl)benzimidazole) complex monitored by the variable temperature EXAFS. *Chem. Phys. Lett.* 328 (2000) 188-196
- [8]* ěernák J., Mikloš D., Kappenstein C., Potočák I., Chomič J., Gérard F.: Copper/zinc oxide catalysts VIII. Crystal structure of zinc maleate dihydrate, Zn(C₄O₄H₂)(H₂O)₂ and its comparison with the structure of the Cu-Zn analogue Zn_{0.94}Cu_{0.06}(C₄O₄H₂)(H₂O)₂. *Chem. Papers*, 54, 282-288 (2000)
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- [10]* Dudová B., Moncoš, Hudecová D., Melník M.: Antimikrobiálna aktivita nových meř natých komplexov s bioaktívnymi ligandami. Antimicrobial activity of some new copper(II) complexes with bioactive ligands (in Slovak). *Chem. Listy*, 94, 787 (2000)
- [11]* Fargašová A., Derco J., Ondrejková I., Havránek E.: Effect of Fe(III) complexes with heterocyclic N-donor ligand on iron accumulation and oxygen production by the alga *Scenedesmus quadricauda* J. *Trace Microprobe Techniques*, 18, 245-249 (2000)
- [12]* Gembický M., Baran P., Boèa R., Fuess H., Svoboda I., Valko M.: Zinc(II) trinuclear complexes involving pyridine N-oxide ligands: Distortion isomerism, and magnetic properties of copper(II) analogues. *Inorg. Chim. Acta* 303 (2000) 75-82
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- [15]* Holloway C. E. and Melník M.: Tin organometallic compounds: classification and analysis of crystallographic and structural data. Part 1. Monomeric derivatives. *M. G. M. C.*, 23, 1-147 (2000)
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C. Books and Textbooks

- [1] Melník M., Ondrejkoš G., Kabešová M., Baloghová Z. and Broškovièová A.: Heterometallic coordination copper(II) compounds: classification and analysis crystallographic and structural data. Nova Science Publishers, Inc., Huntington, New York, 197 pp. (2000), ISBN 1-56072-747-0
- [2] Melník M., Ondrejkošová I., Vanèová V., Kabešová M. and Holloway C. E.: Crystallographic and structural analysis of iron carbonyls. Nova Science Publishers, Inc., Huntington, New York, 210pp. (2000), ISBN 1-56072-827-2
- [3] Šima J., Valigura D.: Všeobecná chémia (Uèebné texty) - Letná škola chemikov C. General Chemistry (Textbook) - Sommer School of Chemists C (in Slovak), Nováky, Iuventa, (2000)
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D. Patents

- [1] Košturiak A., Košturiaková E., Valko L., Melník M., Markoviè J., Karela C., Artim P., Polavka J., Macho V.: Biologicky úèinná kompozícia alebo zložka biologicky úèinných látok. Biologically efficient composition or component of biologically efficient substances (in Slovak). No. 2523 (23. 3. 2000), Slovak Republic

DEPARTMENT OF INORGANIC TECHNOLOGY

Head of Department:
Pavel Fellner, PhD DSc

Telephone: ++421-7-52 96 36 37
Fax : ++421-7-52 92 01 71
E-mail: fellner@chtf.stuba.sk

I. STAFF

Full Professors:

Prof. Pavel Fellner, PhD DSc;

Associate Professors:

Jana Gabèová, PhD; Marta Chovancová, PhD; Ján Valtýni, PhD;

Assistant Professors:

Vladimír Danielík, PhD; Ján Híveš, PhD; Anna Žúžiová, PhD;

Research Fellows:

Peter Adamčík; Vladimír Khandl; Matilda Zemanová, PhD;

PhD Student:

Žaneta Holická; Michal Korenko; Ivan Vrábek;

Technical Staff :

Viliam Cauner; Eva Dekanová; František Kollár;

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Molten Salt Chemistry Laboratories
Laboratories of Chemical Inorganic Syntheses and Industrial Inorganic Chemistry

B. Research Laboratories:

Molten Salt Chemistry and Electrochemistry Laboratories
Technical Electrochemistry Laboratories
Electroplating, Special Coatings and Corrosion Laboratories

III. TEACHING

A. Undergraduate Study

1. Introductory courses

3rd semester (autumn)

Fundamental Principles of Inorganic Technology	(2-2 h)	Fellner, Adamčík, Danielík, Gabèová, Chovancová, Korenko, Valtýni, Žúžiová
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5th semester (autumn)

Corrosion and Material Surface Treatment	(2-0 h)	Chovancová
Laboratories of Corrosion	(0-2 h)	Chovancová

2. Advanced courses

7th semester (autumn)

Phase Equilibria	(2-1 h)	Gabèová
Applied Thermodynamics	(2-2 h)	Fellner, Danielík
Corrosion and Material Protection	(2-2 h)	Chovancová
Laboratories I.	(0-4 h)	Adamčík, Gabèová, Híveš, Chovancová, Žúžiová

8th semester (spring)

Chemical Reaction Engineering	(2-2 h)	Valtýni, Híveš
Applied Electrochemistry	(2-1 h)	Híveš
Laboratories II.	(0-8 h)	Adamčík, Gabèová, Híveš, Chovancová, Žúžiová

9th semester (autumn)

Fertilizers	(2-0 h)	Žúžiová
Electrochemical Engineering	(2-0 h)	Híveš
Elements of System Engineering	(1-1 h)	Valtýni
Laboratories III.	(0-10 h)	Danielík, Gabèová, Híveš, Chovancová, Valtýni, Zemanová

B. PhD Study

Inorganic Technology and Materials Subjects	(4h)	Fellner
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IV. CURRENT RESEARCH PROJECTS

A. Thermodynamics and Kinetics of the Processes on the Phase Boundary Aluminium – Melt. (Pavel Fellner)

Aluminium is produced by the electrolysis of alumina dissolved in cryolite based melts. Under the electrolysis the content of sodium (and lithium) increases with increasing cathodic current density. This effect is related with the concentration cathodic overvoltage. We investigated the correlation between composition of the aluminium cathode (Al-Na-Li) and the cathodic overvoltage in the molten system NaF-AlF₃-LiF-Al₂O₃. The cathodic overvoltage was measured using the interruption technique. Both the concentration of sodium and lithium in aluminium and the cathodic overvoltage were investigated in a broad range of compositions, temperatures and current densities. Increasing concentration of AlF₃ results in an increase of the cathodic overvoltage while the addition of LiF decreases it. The theoretical relationship describing this correlation has been developed.

B. Preparation and Properties of Oxide Layers on Aluminium. (Marta Chovancová)

Composite oxide layers on aluminium substrate were prepared by anodic oxidation in acidic electrolyte and a layer of organic or inorganic materials. Their corrosion, optical and dielectric properties were studied. The influence of pretreatment operation of aluminium substrate was investigated as well. The growth of oxide layers were studied under galvanostatic regime. The morphology of prepared oxide layers were studied by advanced scanning microscopy.

V. COOPERATION

A. Cooperation in Slovakia

Institute of Inorganic Chemistry Slovak Academy of Science, Bratislava

Department of Electrotechnology, Faculty of Electrical Engineering and Information, Slovak University of Technology in Bratislava, Bratislava

Department of Chemical Machines and Equipment, Faculty of Mechanical Engineering, Slovak University of Technology in Bratislava, Bratislava

B. International Cooperation

Department of Applied Electrochemistry, Norwegian University of Science and Technology, Trondheim, Norway

- carbon consumption and current efficiency studies in aluminium cells
- mechanism of anodic reaction in aluminium electrolysis
- anodic overvoltage measurements in aluminium electrolysis
- cathodic overvoltage measurements in aluminium electrolysis
- contents of impurities in polarized aluminium in contact with cryolite-based melts
- solubility of FeS in cryolite-based melts

Technische Hochschule Darmstadt, Darmstadt, Germany

- ceramic materials based on Si-C-N amorphous powders
- preparation of superconductors

Department of Inorganic Technology, Institute of Chemical Technology, University of Pardubice, Pardubice, Czech Republic

- corrosion resistance for phosphatized steel substrates

Department of Metals and Corrosion Engineering, Faculty of Chemical Technology, Institute of Chemical Technology, Prague, Czech Republic

- corrosion resistance of pipelines

C. Membership in Domestic Organizations and Societies

Union of Slovak Scientific and Technological

Societies

Fellner, Híveš, Gabèová, Chovancová, Valtýni, Žúžiová

Slovak Chemical Society

Fellner, Híveš, Gabèová, Chovancová, Valtýni, Žúžiová, Danielik, Zemanová

Slovak Society for Surface Treatment & Technology

Fellner, Chovancová

Slovak Cleaner Production Center

Chovancová

D. Membership in International Organizations and Societies

E. Tempus Programs

1. SOCRATES Programme: Higher Education (ERASMUS)

Student mobility, cooperation with Fachhochschule Münster, Germany.

Four PhD Students worked in the laboratories of Material Science for three months.

F. International Scientific Programs

G. Visitors from Abroad

Prof. J. Thonstad

NTNU, Trondheim, Norway, May 2000 (1 week)

L. Sýkorová

University of Pardubice, Pardubice, Czech Republic, October 2000 (1 day)

L. Sýkorová

University of Pardubice, Pardubice, Czech Republic, November 2000 (2 days)

L. Sýkorová

University of Pardubice, Pardubice, Czech Republic, December 2000 (1 day)

H. Visits of Staff Members and Postgraduate Students in Foreign Institutions

P. Fellner	NTNU Trondheim, Norway, August 2000 (2 weeks)
J. Híveš	NTNU Trondheim, Norway, June 2000 (3 months)
M. Korenko	NTNU Trondheim, Norway, August 2000 (3 months)
M. Korenko	Technische Hochschule Darmstadt, Darmstadt, Germany, April 2000 (3 months)
Ž. Holická	Technische Hochschule Darmstadt, Darmstadt, Germany, April 2000 (3 months)
I. Vrábek	Technische Hochschule Darmstadt, Darmstadt, Germany, April 2000 (3 months)
M. Zemanová	Institute of Chemical Technology, Prague, Czech Republic, October 2000 (1 week)

VI. THESIS AND DISSERTATIONS

A. Graduate Thesis (MS Degree) for state examinations after five years of study (Supervisors are written in brackets):

Bilunková D.:	Phase Diagrams of the Molten Salt Systems containing Complex Compounds. (V. Danielik)
Drobilišová M.:	Investigation of the Content of Sodium in Polarized Aluminium. (J. Gaběová)
Karnajová A.:	SiC Sintering in Liquid Phase. (P. Šajgalík)
Líšky M.:	Combined Sealing of Anodic Oxide Aluminium Coatings. (M. Chovancová)
Marosz P.:	Phase Diagram and Density of the System $KF - K_2MoO_4 - SiO_2$. (M. Chrenková)
Neměková K.:	Sealing of Anodic Oxide Aluminium. (M. Zemanová)
Rajtárová S.:	Electroless Deposition of Copper. (J. Valtýni)
Vetráková Z.:	Electrolytic Deposition of Three-Components Layer Pb-Sn-Cu. (J. Híveš)
Widzisz R.:	Investigation of the Cathodic Overvoltage at Aluminium Electrowinning. (J. Híveš)

B. Dissertations (PhD):

C. Dissertations (DSc):

D. Habilitation Thesis:

VII. PUBLICATIONS

A. Journals (* registered in Current Contents)

- [1] Fellner P., Danielik V., Thonstad J.: Alkali and earth alkaline metal contents in the aluminium cathode in aluminium electrolysis. *Journal of Applied Electrochemistry* 30, 925 - 928 (2000)
- [2] Kiszka, A., Thonstad, J., Híveš J.: The Influence of CaF_2 and AlF_3 upon Mechanism and Kinetics of the Anodic Reaction in Cryolite-Alumina Melts. *High Temperature Material Processes* 3, 311 - 319 (1999)
- [3] Híveš J., Rolseth S., Gudbrandsen H.: Carbon consumption and current efficiency studies in a laboratory aluminium cell using the oxygen balance method. *Light Metals* 2000, 385 - 390 (2000)
- [4] Kiszka, A., Thonstad, J., Híveš J.: Mechanism and Kinetics of the Anodic Reaction in Cryolite Melts I. The Influence of CaF_2 (5 wt%) at Different Al_2O_3 Content. *Polish J. Chem.* 74, 549 - 558 (2000)
- [5] Kiszka, A., Thonstad, J., Híveš J.: Mechanism and Kinetics of the Anodic Reaction in Cryolite Melts I. The Influence of AlF_3 (11 wt%) at Different Al_2O_3 Content. *Polish J. Chem.* 74, 1003 - 1010 (2000)
- [6] Holická Ž., Chovancová M., Zemanová M.: Anodická oxidácia hliníka v kyslých elektrolytoch. Anodic Oxidation of Aluminium in Acid Electrolytes (in Slovak). *Chem. Listy* 94, 1081 - 1086 (2000)

B. Conferences (* International conferences)

- [1]* Zemanová M., Chovancová M., Kosturiaková M.: Aluminium Oxide Coating on Steel Substrate by the Sol-Gel Process with Zinc Phosphate Interlayer. In: *Proceedings of the 16th International Conference Corrosion in Power Industry 2000*, Košice, 4. - 5. 4. 2000, 110 - 113
- [2]* Thonstad J., Danielik V., Fellner P., Híveš J.: Cathodic overvoltage and the content of sodium in molten aluminium during electrolysis of cryolite-based melts. In: *Proceedings of EUCHEM 2000*, Karrebaeksmide, Denmark, August 20. - 25. 2000, 31
- [3]* Kiszka A., Thonstad J., Híveš J.: Capacitance of the graphite anode in cryolite melts. In: *Proceedings of EUCHEM 2000*, Karrebaeksmide, Denmark, August 20. - 25. 2000, 32
- [4]* Híveš J., Fellner P.: Ni-B, Ni-Si and Fe-Si composite electrolytic coatings. In: *Proceedings of the 14th International Congress of Chemical and Process Engineering CHISA 2000*, Praha Czech Republic, 27. - 31. August 2000, J6.2
- [5]* Zemanová M., Kosturiaková M., Chovancová M.: Aluminium Oxide Deposited on Carbon Steel for Improvement of Corrosion Properties. *Solid State Chemistry 2000*, In: *Book of Abstracts*, Praha, September 3. - 8. 2000, 201
- [6]* Zemanová M., Lecomte E., Riedel R., Šajgalík P.: Polysilazane Derived Micro/Nano Si_3N_4/SiC Composites. *Solid State Chemistry 2000*, In: *Book of Abstracts*, Praha, September 3. - 8. 2000, 202
- [7]* Kiszka A., Thonstad J., Híveš J.: The influence of CaF_2 and AlF_3 upon the mechanism and the kinetics the anodic reaction in cryolite - alumina melts. In: *Proceedings of the 51st ISE Meeting „Electrochemistry at the Turn of the Millennium“*, Warsaw, Poland, 3. - 8. September 2000,
- [8]* Fellner P., Khandl V.: Spracovanie odpadov vznikajúcich po získaní hliníka z hliníkových sterov. Treatment of the formed waste at obtaining aluminium from aluminium scraps (in Slovak). *Proceeding of the International Conference TOP 2000*, Ľastá - Papiernička, 15. - 16. 6. 2000, 51 - 54
- [9]* Gaběová J., Danielik V.: Termodynamická analýza sústavy $Na_3AlF_6 - NaF - Na_2SO_4$. Thermodynamic Analysis of the System $Na_3AlF_6 - NaF - Na_2SO_4$ (in Slovak). In: *Proceeding of the XV. International Conference of Thermal*

Analysis and Calorimetry TERMANAL 2000, Vysoké Tatry - Stará Lesná 11. - 13. 9. 2000, 181 - 182

- [10]* Danielik V., Fellner P., Gabèová J.: Termodynamika polarizovaného fázového rozhrania hliník - tavenina na báze kryolitu. Thermodynamics of the polarized phase boundary aluminium – cryolite-based melt (in Slovak). 52. Zjazd chemických spoločností, Ěeské Budejovice 17. - 20. 9. 2000, In: Chem. listy 9, 779 (2000)
- [11]* Gabèová J., Danielik V.: Termodynamická analýza sústavy Na₃AlF₆ - NaF - Na₂SO₄. Thermodynamic Analysis of the System Na₃AlF₆ - NaF - Na₂SO₄ (in Slovak). 52. Zjazd chemických spoločností, Ěeské Budejovice 17. - 20. 9. 2000, In: Chem. listy 9, 895 (2000)
- [12]* Zemanová M., Nemèeková K., Chovancová M.: Protikorózna ochrana kombinovaných povlakov na hliníkovom substráte. Anticorrosive Protection of the Combined Coatings on Aluminium Substrate (in Slovak). In: Proceedings of AKI 2000, Louèèò 10. - 11. 10. 2000, 22
- [13]* Chovancová M., Zemanová M.: Kombinovaný spôsob utesòovania anodicky oxidovaných povlakov. (Combined Sealing of Anodic Oxide Aluminium Coatings (in Slovak). In: Proceedings of the International Conference Ekológia a ekonomika povrchových úprav, Źilina 10. - 12. 2000, 95

C. Books and Textbooks

D. Patents

- [1] Fellner, P., Phuong, Ky Cong : Spòsob prípravy kompozitných elektrolytických povlakov. Method of Composite Electrolytic Coatings Preparation (in Slovak). SK 280 891 (17. 5. 2000)

DEPARTMENT OF LANGUAGES

Head of the Department:

Alžbeta Oreská

Telephone: ++421-7-52496708

Fax: ++421-7-52493198

E-mail: ORESKA@checdek1.cthf.stuba.sk

I. STAFF

Assistant Professors:

Marta Harmanová; Magdaléna Horáková; Katarína Karvašová; Milan Kozlík, PhD; Viera Kuželová, PhD; Veronika Polóniová; Zuzana Štefanovičová;

Foreign Lecturers:

Michael Sabo (Canadian SAIA volunteer);

Technical Staff:

Katarína Vépyová;

II. TEACHING AND RESEARCH LABORATORIES

English language classroom

German language classroom

Computer-operated Data Video Projector Room

III. TEACHING

A. Undergraduate Study

The English language represents a compulsory subject for each student of this faculty. In special cases, if a student has a better knowledge of a different world language, he may ask the dean to be given permission to take up one of the following languages: German, French, Spanish, Russian or Italian. A prerequisite of the latter case is the intermediate level in the chosen language. The programme is taught in two semesters in the first year of the study and ended with a 4-credit exam. The objective of the language study is not to teach the general language, but the language for specific – prospective professional purposes. It means the participants will be able to use the language in the study of their specialist area literature, to further develop all the language skills actively with the aim of mastering extensive reading and listening to texts, academic writing, poster and conference skills, etc. In the final exam students are expected to prepare a poster, present and support it with arguments in a discussion. The long-term aim is to finally enable all faculty graduates to present - at least - the essential part of their thesis in the state exams also in a foreign language.

In case of a student who does not speak any of the above languages, he may take up an elementary course in English first, and then study the compulsory technical language in the second, or possibly the third year of the study.

The students who have chosen a different language than English in the first year, will have to pursue English in three more terms after passing the exam in their first foreign language.

Foreign students have a 2-term course of the Slovak language.

Besides the above - mentioned compulsory courses there is a wide range of recommended subjects offered, such as English conversation, preparatory courses for beginners, remedial courses of various levels, German, Russian and so on, according to the interest of students in the current year; these are also available to SUT employees.

B. Postgraduate Study

Postgraduate students are offered optional seminars for technical English (2-4 hours per week) in which they are taught academic skills, such as presentation techniques, writing reports, abstracts, summaries, solving case studies, etc. Postgraduates are obliged to pass an examination in which they defend their scientific work results, prove their communication, discussion and other academic skills in English. The subject is taught by Alžbeta Oreská, Veronika Polóniová, PhD. and Magdaléna Horáková

IV. CURRENT RESEARCH PROJECTS

A. Aspects of Teaching a Foreign Language for Specific Purposes at the University of Technology

(Milan Kozlík, PhD)

The objective is to develop high quality course programmes tailored to the needs of our students.

Current results are:

- collection of new or adapted texts
- exploitation of our own reading materials from the department's material bank
- devising new, more challenging tasks for the newly acquired materials
- unit design
- discussion and evaluation of the newly adopted units
- implementing new forms of active and independent learning (e.g. Critical thinking in reading and writing in ESP)
- introduction of "Effective Presentation" and "Socializing" video programmes into teaching successful poster presentations for undergraduate and postgraduate students
- presenting more challenging topics from science and technology in the annual faculty competition "Student Research Activities"

- further continual teaching staff development in methodology and informatics.

V. COOPERATION

A. Cooperation in Slovakia:

(1) Language departments within the Slovak University of Technology, Bratislava, and those of the Technical University, Košice:

- joint project of preparing syllabuses for language state exam courses administered by SUT language departments which will - besides the general language- introduce also the area of scientific English;

- (2) Cooperation with IASTE: oral interviews with applicants for mobility abroad (A. Oreská, V. Polóniová)
- (3) Language section of the annual "ŠVOĚ" (Students' Scientific and Research Activity) competition (16 May 2000)
- (4) Evaluation of the Germaniac project (Kuželová, Trnava, 6 – 7 September 2000)
- (5) Workshop "Integrating Skills in ESP (Horáková, Štefanovièová, one-week British Council course, January 2000)

B. International Cooperation:

- (1) International seminar – presentation of the Germaniac project (Kuželová, Trnava, 22 May 2000)
- (2) International conference – dissemination of the new curriculum of German at tertiary level (Kuželová, Warsaw, 25 – 26 May 2000)
- (3) Workshop on the new curriculum of the German language (Kuželová, Germany, 21 July – 1 August 2000)

C. Membership in Domestic Organizations and Societies:

Slovak Association of Teachers of English, Bratislava (A. Oreská, Z. Štefanovièová, M. Horáková)

Slovak Association of Translators and Interpreters, Bratislava (V. Polóniová)

D. Membership in International Organizations and Societies:

British Council - Resource Centre, Bratislava (A. Oreská, M. Horáková, V. Polóniová)

F. International Scientific Programmes:

(1) A New Curriculum for Teaching German at Tertiary Level (Viera Kuželová, PhD, May 1997 – January 2000)

Project promoters: University Constanze in Germany, Goethe Institutes in Bratislava, Prague, Warsaw and Nancy (France)

The aim of the project is to design a curriculum enabling a certain unification and compatibility of the foreign language tuition in the EU while meeting specific needs of different faculties. It will further promote students' mobility as well as a concept of a multilingual Europe.

Currently the curriculum is in the piloting and monitoring stage at several chosen universities with the aim to create more effective teaching materials corresponding with students' real-life and professional needs.

(2) GERMANIAC – German Modular and Integrated Accredited Courses for Engineers 2642-MG2-1-96-1-BE-ERASMUS-EILC “ (Viera Kuželová, CSc., team member, 1 July 1999 – 30 June 2000)

The aim of this Socrates international project is to disseminate the designed course of technical German within the countries of the EU as well as in associated countries.

Current results are:

- modular course design specialized in mechanical engineering, electronics and chemistry
- information web-site and on-line courses (<http://intra.mtf.stuba.sk/Germaniac/index.htm>)
- translation of related vocabulary (chemistry – Kuželová)

VII. PUBLICATIONS

A. Journals

- [1] Štefanovièová Z.: Humour – the Spice of ELT. English Teaching Forum , Volume, 38 Washington D. C. 20520
- [2] Horáková M., Štefanovièová Z.: Integrating Skills – ESP Course. ESP Spectrum Slovakia 20, ISN 1335-2792 (autumn 2000, p. 20)

B. Conferences

- * Kuželová V.: Rahmencurriculum des Studienbegleitenden Deutschunterrichts an Slowakischen und Tschechischen Hochschulen und Universitäten . In: Proceedings of the International Seminar, Stuttgart, Germany, 21 July – 1 August 2000

DEPARTMENT OF MANAGEMENT

Head of the Department:

Assoc. Prof. Agnesa Ľurkovičová, PhD

Telephone: ++421-7-52495246

Fax: 00421-7-52493198

E-mail: durkovicova@checdek1.chtf.stuba.sk

I. STAFF

Associate Professors:

Marta Šostroneková, PhD

Assistant Professors:

Dušan Baran, PhD; Štefan György, PhD; Pavel Herzka, PhD; Dušan Heseck, PhD; Dušan Špirko, PhD; Peter Velický, PhD

Assistant Lecturers:

Martin Jozefček, Jana Kajanová, Monika Zatrochová

Technical Staff:

Martin Mikloš, Lýdia Hadrbulcová, Katarína Macušková

II. TEACHING AND RESEARCH LABORATORIES

A. TEACHING LABORATORIES:

Laboratory of Computerized Technique

III. TEACHING

A. Undergraduate Study

1st semester

Economics	(2-0 h)	Velický
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2nd semester

Fundamentals of Environmental Philosophy	(2-0 h)	Špirko
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5th semester

Fundamentals of Management of Chemical and Food-Processing Companies	(2-2 h)	Šostroneková Ľurkovičová
Marketing	(2-2 h)	

6th semester

Introduction to Law	(2-0 h)	György
Semestral Project	(0-4 h)	Ľurkovičová
Accounting	(2-2 h)	Šostroneková

7th semester

Firm's economy	(2-2 h)	Herzka
Operations Research	(3-2 h)	Heseck
Strategic Management	(3-2 h)	Jozefček
Calculations and Prices	(2-2h)	Kajanová

8th semester

Capital Market and Firm's Finances	(2-0 h)	Baran
Marketing	(2-0 h)	Ľurkovičová
Decision-Making in Enterprising	(2-3 h)	Heseck
Personnel Management	(2-2 h)	Herzka
Production Management	(2-3 h)	Zatrochová

9th semester

Financial Management	(3-2 h)	Šostroneková
Analysis of Firm's Economizing Policy	(3-2 h)	Baran
Logistics	(2-2 h)	Jozefček
Fundamentals of Commercial and Financial Law	(2-0 h)	György
International Marketing	(2-2 h)	Ľurkovičová
Annual student's Project	(0-4 h)	Ľurkovičová
Diploma work	(0-27h)	

IV. CURRENT RESEARCH PROJECTS

Research activity of the Department of Management was directed at "Modern conceptions of the basic orientation of the firm's strategic management.

A. Conception of the firm's strategic management (Ján Šimkovic)

Project participants: Gabriel Karas, Pavel Herzka, Dušan Heseck

The outputs of this part of research involve the knowledge:

- gained by the analysis of the basic goal of strategic planning explicitly oriented to market strategy determined by the firm's potential sources and competence,
- required for inevitable changes proceeding in our conditions in the environmental policy of the chemical and food-processing companies and for a support to the company management considering future potential environmental damages; applied also to basic strategic management conceptions integrated into the whole firm's system.

The first part of the work is devoted to determinants of the modern conceptions of the strategic restructuring in large-scale companies. The closer attention is paid to objectives, organizational questions and to technocratic as well as procedural means of the management of the above-indicated companies.

In the second part, a range of problems concerned with a general updating of the project-oriented activities in large-scale companies is solved. They make the knowledge related to the project management accessible.

The third part contains the personal management knowledge relevant from the aspect of increasing the company culture in decision-making processes on exploiting the divisional, project-oriented organization.

In the fourth part, the knowledge associated with introducing of up-to-date information-communication technics into the strategic decision-making system in large-scale companies is developed. It elucidates the new data summarized under the term "Management information system" (MIS). The basic goal of information technologies is the support to an entrepreneurial sphere on achieving competitive advantages. For this reason their introduction implemented on the basis of the strategic plan in accord with the entrepreneurial strategy is necessary.

B. Philosophical-social aspects of macroeconomic theories, the environmental, ethical and legal dimensions of engineering-technological and economic activities with regard to their specificities in the chemical and food-processing industry (Dušan Spirko)

Project participants: Štefan György, Peter Velický

In accordance with scientific objectives a factual keystone of the first-stage research work was the analysis of terms "nature and culture" as basic concepts of the environmental philosophy and ethics, and the investigation of the genesis, changes and development of ideas about the relationship between man and nature in the European cultural tradition (in this part it is the period of antiquity and Middle Ages), which is important to perceive the environmental crisis as a crisis of values. Furthermore, the research work was aimed at some ethical aspects of business and legal relationships, the question of enhancing the legal conscience as an inevitable assumption of environmental humanization and at the analysis of the term "technics". The analysis of results and opinions on the social and environmental aspects of macroeconomic theories will continue at the next stage of research.

The final knowledge suggests a positive contribution of the effort spared within the basic project orientation to: the research development from the aspect of the philosophical-social analysis of macroeconomic theories, principles of the environmental and entrepreneurial ethics, ethical aspects of engineering-technological activities, and to the further specification of the legal aspects of engineering-technological and economic-entrepreneurial activities with regard to their specificities in the field of the chemical and food-processing industry.

In particular, the following range of problems was solved:

1. Analysis of results and opinions on the social-economic aspects of macroeconomic theories.
2. Analysis of terms "nature and culture" as basic structural concepts of the environmental philosophy and ethics; the genesis and development of ideas about the relationship between nature and culture in the European tradition.
3. Analysis of specificities of the commercial and financial law in the sphere of the chemical and food-processing industry in Slovakia.

V. COOPERATION

A. Cooperation in Slovakia

Economic University, Bratislava – Department of Marketing
 Technical University, Zvolen – Department of Firm's Economy
 University of Transport and Communication, Žilina – Faculty of Management
 Technical University, Košice
 Philosophical Institute of the Slovak Academy of Sciences, Bratislava

B. International cooperation

Technical University, Vienna, Austria
 University of Chemistry and Technology, Prague, Czech Republic
 Economic University, Prague, Czech Republic
 Masaryk University, Brno, Czech Republic
 Technical University, Ostrava, Czech Republic
 University of Pardubice, Czech Republic
 Technical University, Darmstadt, FRG
 St. Thomas University, Minnesota, U.S.A.

C. Visitors from Abroad

October 15: Dr. Iveta Merlinová, Milano, Italy
 November 11: Prof. Eduard Stehlík, PhD, Economic University, Prague, Czech Republic

VI. THESES AND DISSERTATIONS

A. Graduate Theses (MS Degree)

Baricová ¼:

Marketing strategy in Mraziarne Inc., Žilina (A. Ľurkovičová)

Bartová L.:	Analysis of the management system (P. Herzka)
Bižák M.:	Chemical industry in Slovakia in the enterprising environment after the year 2000 (G. Karas)
Bohunický P.:	Production management in the food-processing company (J.Kajanová)
Cifričková A.:	Technical and economic study of the plant for coal circular saws (M. Zatrochová)
Dóša P.:	Application of intradepartmental controlling on the level of small & medium-size companies
Dubravíková E.:	Significance of the supplementary retirement ensurance in conditions of the Slovak chemical industry (M. Šostroneková)
Flajžík J.:	Analysis of liquidity in the firm's conditions (D. Baran)
Frank M.:	Strategy of the development of the small and medium-size enterprising activity (M. Jozefček)
Garček P.:	Human agencies and significance of personal leasing (P. Herzka)
Holénia A.:	Commercial and commitment relations in the Slovak economy (Š. György)
Iváncsai R.:	Position of the limited partnership in the trading partnership system (Š. György)
Klobučníková A.:	Assignments of the bank and entrepreneur in decision-making about granting a credit (M. Šostroneková)
Koniarová S.:	Trends and development in the sphere of offset papers (A. Ľurkovičová)
Korduliaková A.:	Financial and investment controlling in the firm's experience (D. Baran)
Lörinz M.:	Modern trends in the stock economy from the aspect of needs of Chemosvit Inc., Svit (J. Šimkovic)
Májek M.:	Information systems in a firm (D. Heseč)
Mikloš T.:	Procedures of the implementation of the firm's culture in the holding-type organization (P. Herzka)
Mrázová K.:	Market research of housing and office areas in the Zámocká street in Bratislava (D. Baran)
Panáčeková K.:	Advertising as part of the marketing communication in a firm (D. Špirko)
Tóthová M.:	Pricing strategy in conditions of Slovalco Inc., Žiar nad Hronom (T. Farkašovská)
Turánková S.:	Firm's financing by means of leasing in Slovakia (P. Velický)

VII. PUBLICATIONS

A. Journals

- [1] Baran D.: Použitie informačnej technológie v marketingu. Application of information technology in marketing (in Slovak). Marketing a komunikace 1, 18-21 (2000)
- [2] Heseč D.: Aké možnosti realizácie poskytuje mladým ľuďom štúdium chémie. What possibilities of the implementation offers the study of chemistry to young people (in Slovak).
- [3] Heseč D.: Etika, Morálka a dobré mravy nie sú upravené žiadnym zákonom. Ethics, morality and good manners are not regulated by any law (in Slovak). Economic newspapers 104, June 1, 2000
- [4] Špirko D.: Morálka ako ešte navyše. Morality as something additional (in Slovak). Recenzia knihy D. Smrekovej a Z. Palovičovej "Podnikateľská a environmentálna etika". Review of the book "Enterprising and environmental ethics" by D. Smreková and Z. Palovičová (in Slovak). Filozofia 55 (6) 518-520 (2000)
- [5] Špirko D.: Podnikateľská a environmentálna etika. Enterprising and environmental ethics (in Slovak). Recenzia rovnomennej knihy D. Smrekovej a Z. Palovičovej. Review of the book written by D. Smreková a Z. Palovičová. Koruna – economic supplement to the newspapers Národná obroda 67, 14 (1999)

B. Conferences with Proceedings (*International conferences)

- [1]* Baran D.: Vplyv globalizácie na malé a stredné podniky. Influence of globalization on small and medium-size companies (in Slovak). In: Proceedings of the International Conference on Business in 2000. South-Czech University, Faculty of Agriculture, ěeské Budějovice, Czech Republic, November 1999, p.93-99
- [2]* Baran D.: Výuka a výskum v oblasti financovania podniku a analýzy jeho hospodárenia. Instruction and research in the sphere of financing and analysis of the firm's economy (in Slovak). In: Proceedings of the International Pedagogical Conference on the Instruction and Research in the Branch Economics and in the Firm's Management at Technical Universities. University of Pardubice, Czech Republic, September 2000, p. 223-225
- [3] Baran D.: Problematika vymáhania práva v SR. Problem of the exaction of law in the Slovak Republic (in Slovak). In: Proceedings of the Scientific Conference on the Enterprising Environment in the Slovak Republic – Present Situation and Perspectives II. Economic University, Bratislava, Slovak Republic, May 2000, p. 13-17.
- [4]* Ľurkovičová A.: Použitie intranetu a medzifunkčná koordinácia. Application of intranet and the interfunctional coordination (in Slovak). In: Proceedings of the International Pedagogical Conference on the Instruction and Research in Branch Economics and in the Firm's Management at Technical Universities. University of Pardubice, Czech Republic, September 2000, p. 65-67
- [5]* Ľurkovičová A.: Nákup tovaru pomocou internetu. Purchase of goods by means of internet (in Slovak). Proceedings of the International Scientific Conference on Marketing and Electronic Business. Faculty of Commerce, Economic University, Bratislava, Slovak Republic, May 2000, p. 55-59

- [6]* György Š.: Zvýšenie právneho vedomia – krok k humanizácii životného prostredia. Increase of the legal conscience - a step to humanization of the environment (in Slovak). In: Proceedings of the Scientific International Seminar on the Humanization of the Environment and Education at Technical Universities. Faculty of Civil Engineering, Slovak University of Technology, Bratislava, Slovak Republic, September 2000, p. 39-42
- [7] Herzka P.: Formulácia hodnôt chemického podniku z aspektu podnikovej kultúry. Formulation of values of the chemical company from the aspect of its culture (in Slovak). In: Proceedings of the Scientific Conference on the Enterprising Environment in the Slovak Republic – Present Situation and Perspectives II, Economic University, Bratislava, Slovak Republic, May 2000, p. 60-63
- [8] Hesek D.: K vybraným otázkam dane z príjmov právnických osôb a jej správy. Choice of problems related to the legal entity income tax and its administration. In: Proceedings of the Scientific Conference on the Enterprising Environment in the Slovak Republic – Present Situation and Perspectives II, Economic University, Bratislava, Slovak Republic, May 2000, p. 63-66
- [9] Jozefček M.: Vývoj prostredia pre rozvoj MSP a jeho legislatívny a regulačný rámec. Environmental development for expansion of the small and medium-size enterprising and its legislative and regulatory framework (in Slovak). In: Proceedings of the Scientific Conference on the Enterprising Environment in the Slovak Republic – Present Situation and Perspectives II. Economic University, Bratislava, Slovak Republic, May 2000, p. 97-100
- [10] Kajánová J.: Daň z príjmov – výdavky neovplyvňujúce základ dane. Income tax – expenses non-influencing the tax base (in Slovak). In: Proceedings of the Scientific Conference on the Enterprising Environment in the Slovak Republic – Present Situation and Perspectives II. Economic University, Bratislava, Slovak Republic, May 2000, p. 100-102
- [11]* Šostroneková M.: Výučba účtovníctva na Chemickotechnologickej fakulte STU v Bratislave. Instruction of accounting at the Faculty of Chemical Technology, Slovak University of Technology in Bratislava (in Slovak). In: Proceedings of the International Pedagogical Conference on the Instruction and Research in Branch Economies and in the Firm's Management at Technical Universities. University of Pardubice, Czech Republic, September 2000, p. 314-318
- [12] Šostroneková M.: Úloha banky a podnikateľského subjektu pri rozhodovaní o poskytnutí úveru. Task of the bank and entrepreneurial subject in decision-making and granting a credit (in Slovak). In: Proceedings of the Scientific Conference on the Enterprising Environment in the Slovak Republic – Present Situation and Perspectives II. Economic University, Bratislava, Slovak Republic, May 2000, p. 154-156
- [13] Špirko D.: Európske tradície a environmentálna kríza. European traditions and environmental crisis (in Slovak). In: Proceedings of the XXXIInd Scientific Conference on the System's Engineering „SI 2000“. Gaudeamus, Hradec Králové, Czech Republic, April 2000, p.219–216
- [14]* Špirko D.: Prebúdzanie svedomia (?) Rousing of conscience (?) (in Slovak) In: Odumieranie ľudskosti (?) Gradual extinction of humanity (?). In: Proceedings of the International Symposium. Faculty of Ecology and Environmental Science. Technical University, Zvolen, May 1998. Published in 2000, p. 192-198
- [15]* Špirko D.: O zmysle humanizácie. Sence of humanization (in Slovak). In: Humanization of the University Education at the Beginning of the 21-st Century. In: Proceedings of the 4th International Scientific Seminar, Bliss, Trnava , 2000, p. 16-24
- [16]* Špirko D.: Environmentálna a sociálna zodpovednosť inžiniera. Engineer's environmental and social responsibility (in Slovak). In: Humanization of the University Education at the Beginning of the 21st Century. In: Proceedings of the 4th International Seminar, EDIS Žilina, June 15 2000, p. 130-133
- [17] Špirko D.: Nie je humanizácia ako humanizácia. Humanization is not always humanization (in Slovak). In: Humanization of the University Education at the Beginning of the 21st Century. In: Proceedings of the 4th International Seminar, Faculty of Civil Engineering, Slovak University of Technology, Bratislava, Slovak Republic, September 12, 2000, p. 129-134

C. Conferences without Proceedings

- [1]* Baran D.: Ako nájsť marketingových špecialistov. How to search for marketing specialists. International Conference of Marketing Specialists. Prague, Czech Republic, April 2000
- [2]* Baran D.: Budúcnosť slovenského kapitálového trhu. Future of the Slovak capital market. International Conference on the Association of Businessmen with the Paper Stock and Stock Exchanges, Bratislava, Slovak Republic, 2000
- [3]* Baran D.: Ekonomické aspekty využitia technických plynov. Economic aspects of exploiting technical gas es. International Symposium on the Application of Technical Gases in the Technology of Treatment and Purification of Wastewaters. Tatragas Ltd., Bratislava, Slovak Republic, March 2000
- [4]* Baran D.: Marketingová komunikácia samosprávy s verejnosťou. Marketing communication of the self-administration with the public. International Symposium on the Communication of Self-administrations with the Public. IROMAR, Banská Bystrica, Slovak Republic, April 2000
- [5]* Baran D.: Využitie internetu v marketingových aktivitách. Utilization of internet in marketing activities. International Conference of Marketing Specialists, Prague, Czech Republic, October 2000
- [6]* Ľurkovičová A.: Osobnosť marketingového špecialistu. Personality of the marketing specialist. International Conference of Marketing Specialists, Prague, Czech Republic, October 2000
- [7]* Ľurkovičová A.: Politický marketing. Political marketing. International Symposium on the Communication of Self-administrations with the Public. IROMAR, Banská Bystrica, Slovak Republic, April 2000
- [8]* Ľurkovičová A.: Súčasný stav existencie odpadových vôd na Slovensku. Present situation in the purification of wastewaters in Slovakia. International Symposium on the Application of Technical Gases in the Technology of Treatment and Purification of Wastewaters, Tatragas Ltd., Bratislava, Slovak Republic, March 2000
- [9] György Š.: Niektoré aspekty dobrých mravov v obchodno-právnych vzťahoch. Some aspects of good manners in business and legal relations. International Scientific Seminar on the Task of Methodology in the Systematic Recognition of the Slovak Society of the year 2000. Economic University, Bratislava, Slovak Republic, June 7, 2000
- [10]* Šostroneková M.: Priama komunikácia. Direct communication. International Symposium on the Communication of Self-administrations with the Public, IROMAR, Banská Bystrica, Slovak Republic, April 2000
- [11]* Šostroneková M.: Požiadavky EU na čistenie vôd na Slovensku. Requirements of EU for the purification of

- wastewaters in Slovakia. International Symposium on the Application of Technical Gases in the Technology of Treatment and Purification of Wastewaters, Tatragas Ltd, Bratislava, Slovak Republic, March 2000
- [12]* Šostroneková M.: Požiadavky praxe na profil marketingového špecialistu. Requirements of the practice for a profile of the marketing specialist. International Conference of Marketing Specialists, Prague, Czech Republic, April 2000
- [13]* Špirko D.: Vývojové zmeny hodnoty prírody, kríza tradičného hodnotového konceptu modernej kultúry a koncepcia trvalo udržateľného rozvoja. Evolutionary changes in values of the nature, crisis of the traditional concept of modern culture, and conception of the permanently tenable development. International Seminar on the Task of Methodology in the Systematic Recognition of the Slovak Society of the Year 2000, Economic University, Bratislava, Slovak Republic, June 7, 2000
- [14] Špirko D.: • a živé bremeno zodpovednosti za svet. Oppressive burden of the responsibility for the world. 2nd Slovak Philosophical Congress, Bratislava, Slovak Republic, October 26-28, 2000
- [15] Velický P.: Koncepcia univerzálnej skutočnosti. Conception of the universal reality. International Scientific Seminar on the Task of Methodology in the Systematic Recognition of the Slovak Society of the Year 2000. Economic University, Bratislava, Slovak Republic, June 7, 2000
- [16] Velický P.: Pojem techniky. Concept of technics. International Scientific Seminar on Humanization of the Environment and Education at Technical Universities. Faculty of Civil Engineering, Slovak University of Technology, Bratislava, Slovak Republic, September 12, 2000

DEPARTMENT OF MATHEMATICS

Head of Department:
Prof. Vladimír Kvasnička, PhD, DSc

Telephone: ++421 7 52495177
Fax: ++421 7 52493198
E-mail: kvasnic@cvt.stuba.sk

I. STAFF

Full Professors:
Vladimír Kvasnička, PhD, DSc

Associate Professors:
Imrich Fabrici, PhD, Anna Kolesárová, PhD, Jiří Pospíchal, PhD, Michal Šabo, PhD, Štefan Varga, PhD

Assistant Professors:
Jozef Antoni, PhD, Vladimír Baláž, PhD, Július Bánki, PhD, Štefan Boor, M.Sc., Ivan Garaj, PhD, Viera Grusková, PhD, Eva Hainzlová, M.Sc., Vladimír Haluška, PhD, Ľubomíra Horanská, M.Sc., Milan Jasem, PhD, Eva Rovderová, PhD, Soňa Sladká, M.Sc.

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Laboratory equipped by personal computers for the Basics of Computer Science

III. TEACHING

A. Undergraduate study

1st semester (autumn)

Calculus I.	(3-3 h)	Baláž, Fabrici, Grusková, Jasem, Kolesárová, Kvasnička, Šabo
Basics of Computer Science	(1-2 h)	Antoni, Bánki, Hainzlová, Pospíchal

2nd semester (spring)

Calculus II.	(4-4 h)	Baláž, Fabrici, Grusková, Jasem, Kolesárová, Kvasnička, Šabo
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7th semester (autumn)

Calculus III.	(2-2 h)	Antoni, Garaj, Varga
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B. PhD Study

1st semester (autumn)

Optimisation Methods	(2 h)	Kvasnička
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2nd Semester (spring)

Advanced Mathematical Statistics	(2 h)	Varga
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C. Extracurricular lectures

Evolutionary Algorithms	(2-0 h)	Kvasnička, Pospíchal (see web address http://math.chtf.stuba.sk/evol/prednaska.htm , this lecture is presented for computer-science students of Faculty of Mathematics and Physics, Comenius University)
Introduction to Cognitive Sciences	(2-0)	Kvasnička, Pospíchal (see web address http://math.chtf.stuba.sk/kog_vedy.htm , this lecture is presented for students of Comenius University)
Theory of Fuzzy Systems	(3-1 h)	Kolesárová (this lecture is presented for computer-science students of Faculty of Electrical Engineering and Computer Technology)

IV. CURRENT RESEARCH PROJECTS

A. Artificial neural networks (supervised by Vladimír Kvasnička).

The core of the project is the study of artificial neural networks, which are able to accept directly a structural information represented by acyclic rooted graphs. Such a generalization of neural networks is very important not only for chemical application of neural networks, where structural formulas are used as an input of molecules, but also for computer science in general, where the processing of a structural information belongs to its basic problems. An architecture of a neural network will be divided into two parts. In the first part the structural formula will be directly numerically processed, and the output will serve as an input for a standard neural network. The adaptation process, which optimizes the

parameters of the neural network to achieve such an output of the neural network, that would be as close as possible to the required output, is applied to both parts of the neural network. The method will be tested for various classes of molecular properties and structural formulas. Our further activities are concentrated on an application of recurrent neural networks as cognitive devices for multi agent simulation calculations of an emergence of coordinated communication between agents. It was demonstrated, that if an analogue of Dawkins' memes is used, then a coordinated communication spontaneously emerges. On the other hand, if Dawkins' memes are ignored, then an emergence of coordinated communication between agents does not emerge.

B. Evolutionary algorithms (supervised by Jiř Pospıchal)

This project is concentrated on a development of various evolutionary optimisation algorithms (genetic algorithms, simulated annealing, evolution strategies and tabu search) and their applications for solution of combinatorial NP-complete problems, graph theory problems and for adaptation of neural networks, as well as for optimisation of highly multimodal and deceptive functions. Theoretical study of fuzzy systems and implementation of a learning procedure of fuzzy neural networks by evolutionary algorithms. Artificial life studies are performed by making use of evolutionary algorithms as simulators of Darwinian evolution. An emergence of cooperation and altruism in multiagent systems is simulated.

C. Theory of fuzzy systems (supervised by Anna Kolesárov and Michal řabo).

The main goals of this project are the modeling of vagueness and the inference process from imprecise or vague premises. These topics are very important for knowledge-based systems, especially for fuzzy expert systems and the aggregation of vague data. In the area of approximate reasoning there are studied various types of inference rules dealing with the problem of deduction of conclusions in an imprecise setting. Namely, a compositional rule of inference based on various types of triangular norms (or other approximate operators) is studied. The methods which effectively simplify the computational complexity of an inference process are investigated. Since the aggregation of input data into a single output is a background of many theoretical and practical problems, we study various types of aggregation operators that can be successfully used in many valued logic, in the theory of approximate reasoning and decision making. Main attention is paid to the aggregation operators based on triangular norms to the construction methods of new aggregations operators and to the conditional aggregation of data.

D. Estimations of unknown parameters in statistical models of direct and indirect measurements (supervised by řtefan Varga).

Our specific field of interest has been estimations and predictions in regression models. Special regression models are models with unknown variance and covariance components called mixed regression models. Estimability and different types of estimations of these components and their applications are topics of our publishing activities.

E. Periodic weekly seminar on fuzzy sets and fuzzy logic (supervised by Michal řabo)

Organised for staff of Department of Mathematics and students of our Faculty.

F. Periodic yearly workshop on cognitive science (supervised by Vladimır Kvasnička and Jiř Pospıchal).

An interdisciplinary approach to artificial intelligence, neuroscience and cognitive science, sponsored by Open Society Foundation.

V. COOPERATION

A. Cooperation in Slovakia:

Department of Mathematics and Descriptive Geometry, Faculty of Civil Engineering, Slovak Technical University, Bratislava

Department of Computer Science and Engineering, Faculty of Engineering and Information Technology, Slovak Technical University, Bratislava

Department of Cybernetics and Artificial Intelligence, Technical University of Kořice

B. International Cooperation:

Department of Mathematics, University of Bayreuth

Institute of Mathematics, Johannes Kepler University, LINZ, AUSTRIA

Computer Chemistry Laboratory, Masaryk University, Brno, Czech Republic

Department of Organic Chemistry, University of Pardubice, Czech Republic

Faculty of Informatics, Masaryk University, Brno, Czech Republic

C. Membership in Domestic Organisations and Societies

Slovak Academic Society (Kvasnička)

Slovak Artificial Intelligence Society

Slovak Society of Mathematicians and Physicists

Slovak Chemical Society

Slovak Society of Chemical Engineers

Slovak Computer Science Society

Slovak Mathematical Society

D. Membership in International Organisations and Societies

WATOC - World Association of Theoretical Organic Chemists

International Society of Theoretical Chemical Physics

American Mathematical Society

European Mathematical Society

The EURO Working Group on Fuzzy Sets

European Society for Fuzzy Logic and Technology

G. Visitors from Abroad

H. Visits of Staff Members to Foreign Institutions

A. Kolesárová, Université P. et M. Curie, LIP6 (1 week)

A. Kolesárová, Johannes Kepler Universität, Linz, Austria (1 month)

M. Šabo and S. Varga, Workshop : Partial knowledge and uncertainty : Independence, conditioning, inference. Rome, Italy (1 week)

J. Pospíchal, Lecture at University of Teesside, Royal Society meeting 'Applications of AI in the Sciences', Middlesbrough, UK (1 week)

V. Kvasnička and Š. Boor, Conference Mendel '2000, Brno, Czech Republic (5 days)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

- [1] Fabrici I.: A Note on principal ideals and \mathcal{J} -classes in the direct product of two semigroups. Czechoslovak Mathematical Journal, 50 (125) 91-98 (2000).
- [2]* Kolesárová A.: Aggregation of k -order maxitive fuzzy measures. International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems, 7(6) 569-576 (1999) (printed in April 2000).
- [3]* Kvasnička V., Pospíchal J.: An Emergence of Coordinated Communication in Populations of Agents. Artificial Life 5, 319-342 (2000).
- [4]* Kvasnička V., Pospíchal J.: Evolutionary study of interethnic cooperation. Adv. Complex Systems 2 (1999, printed in December 2000) 395-421.
- [5]* Kvasnička V.: About selfish memes and genes (in Slovak). Kritika & kontext. Ďasopis kritického myslenia, 5, 100-104 (2000).
- [6]* Rovderová E.: On the number of solutions of a fourth-order boundary value problem. Nonlinear Analysis 14, 117-131 (2000)

B. Conferences (*International conferences)

- [1]* Boor Š., Kvasnička V., Pospíchal, J.: Feature subset selection by GA combined with KNN method. Mendel 2000, PC-DIR, Brno, 2000, pp. 407-412. ISBN 80-214-1609-2
- [2]* Garaj I.: Extremal tasks and estimations in S-plus (in Slovak). Proceedings of conference Slovenská štatistika – súčasnosť a perspektívy. Smolenice 10 -12.5.2000, pp. 220-225, ISBN 80-88946-06-9
- [3]* Kolesárová A.: Integrals with respect to k -order maxitive fuzzy measures. Proceedings IPMU '2000, Madrid 2000, vol. I, pp. 418-421. ISBN 84-95479-03-6
- [4]* Kolesárová A.: Conditional Aggregation Operators. The Fifth International Conference FSTA 2000 On Fuzzy Sets Theory And Its Applications, Jan. 31 - Feb.4, 2000, Lipt. Ján, Slovak Republic, p. 116.
- [5]* Kolesárová A.: Aggregation of k -order additive and maxitive fuzzy measures. Abstracts: 16th Summer School on Real Function Theory 2000, Lipt. Ján, Slovak Republic, pp. 38-39.
- [6]* Kvasnička V.: An evolutionary model of symbiosis. In: P. Siněák, J. Vašěák (eds.): Quo Vadis Computational Intelligence? Physica-Verlag, Heidelberg, 2000, pp. 293-304, ISBN 3-7908-1324-9.
- [7]* Kvasnička V. : An emergence of coordinated communication in populations of agents with evolution simulated by genetic algorithm. In Suzuki, Y., Ovaska, S.J., Furuhashi, T., Roy, R., Dote, Y. (Eds.): Soft Computing in Industrial Applications, Springer Verlag, Berlin. 2000, XV. 1-85233-293-X
- [8]* Kvasnička V., Pospíchal J. : Genetic Algorithms. In G. Andrejkova, J. Vinar (eds.): WSCS '2000 1st Workshop on Theory and Practice of Informatics, Košice, Slovakia, June 2000, Editorial center UPJS Košice, pp. 39-44, ISBN: 80-7097-398-6
- [9]* Kvasnička V. : Artificial evolution (in Slovak), Conference Cognitive Sciences III, 22. Marc 2000, CHTF STU, in collaboration with Institute of philosophy SAV, pp. 90-108.
- [10]* Omachelová M., Kolesárová A.: A new approach to the constrained aggregation operators. Proceedings Mechanical Engineering '2000, Bratislava 2000, Vol. II, pp. 68-73. ISBN 80-227-1436-4
- [11]* Pospíchal J.: Migration and population dynamics in a distributed coevolutionary algorithm. In Suzuki, Y., Ovaska, S.J., Furuhashi, T., Roy, R., Dote, Y. (Eds.): Soft Computing in Industrial Applications, Springer Verlag, Berlin. 2000, XV. 1-85233-293-X
- [12]* Pospíchal J.: Optimization as a Multistage Decision Making. In: P. Siněák, J. Vašěák, V. Kvasnička, R. Mesiar: The State of the Art in Computational Intelligence. Physica Verlag, Heidelberg, 2000, pp. 175-181. ISBN 3-7908-1322-2
- [13]* Pospíchal, J. Kvasnička V.: Interethnic cooperation by evolutionary algorithms. Mendel 2000, PC-DIR, Brno, 2000, pp. 133-138. ISBN 80-214-1609-2.
- [14] Pospíchal J.: Evolutionary study of interethnic cooperation (in Slovak), Conference Cognitive Sciences III, 22. Marc 2000, CHTF STU, in collaboration with Institute of philosophy SAV, pp. 25-39.
- [15]* Pospíchal J.: Multistage Decision Making For An Automaton By Simulated Annealing. The Fifth International Conference FSTA 2000 On Fuzzy Sets Theory And Its Applications, Jan. 31 - Feb.4, 2000, Lipt. Ján, Slovak Republic, p. 148.
- [16]* Pospíchal J.: Evolutionary optimization algorithms: A survey and new trends. "Proceedings of the 4th Japan-Central Europe Joint Workshop on Energy and Information in Non-linear Systems", A. Gottvald and M. Uesaka (Editors), ĆSAEM, Brno (CR), Nov. 10-12, 2000, p. 6.
- [17]* Šabo, M., Varga, S.: T – Norms in fuzzy regression models II. Dependence fuzzy regression on choice T – norm. Workshop : Partial knowledge and uncertainty : Independence, conditioning, inference. Rome, Italy 2000, pp. 115 – 117.
- [18]* Šabo M.: T-norm Generated Relevancy Transformation Operator. The Fifth International Conference FSTA 2000 On Fuzzy Sets Theory And Its Applications, Jan. 31 - Feb.4, 2000, Lipt. Ján, Slovak Republic, p. 161-162.
- [19]* Varga Š.: Robust estimations in fuzzy linear regression models. In: P. Siněák, J. Vašěák (eds.): Quo Vadis

Computational Intelligence? Physica-Verlag, Heidelberg, 2000, pp. 239-246, ISBN 3-7908-1324-9.

- [20]* Varga Š., Šabo M.: Linear regression with fuzzy variables. In: P. Siněák, J. Vašěák, V. Kvasniěka, R. Mesiar: The State of the Art in Computational Intelligence. Physica Verlag, Heidelberg, 2000, pp. 99-103. ISBN 3-7908-1322-2
- [21]* Varga, Š., Šabo, M.: T – Norms in fuzzy regression models I. Estimations in fuzzy regression models. Workshop : Partial knowledge and uncertainty : Independence, conditioning, inference. Rome, Italy 2000, pp. 133– 136.

C. Books and Textbooks

- [1] Kvasniěka V., Pospíchal J. and Tiòo P.: Evolutionary algorithms (in Slovak). Publishing House of STU, Bratislava 2000, ISBN 80-227-1377-5
- [2] Kvasniěka V., Pospíchal J.: Paradigms of living nature in computer science (in Slovak). In: Beòušková ¼, Kvas niěka V., Pospíchal J. (editors): Search for common language in cognitive sciences, IRIS, Bratislava 2000, ISBN 80-88778-13-1
- [3] Siněák P., Vašěák J., Kvasniěka V., Mesiar R. (editors): The State of the Art in Computational Intelligence, Physica Verlag, Heidelberg, 2000, ISBN 3-7908-1322-2
- [4] Kolesárová A., Kerre E.E.: Compositional rule of inference based on triangular norms. In: Fuzzy If-Then Rules in Computational Intelligence. Ruan, Da, and Kerre, E.E., eds., Kluwer Academic Publishers, Dordrecht, 2000, pp. 61-80, ISBN 0-7923-7820-2
- [5] Antoni, J., Bánki, J., Hainzlová E., Pospíchal J.: Basics of Computer Science (in Slovak). Publishing House of STU, Bratislava 2000, ISBN 80-227-1313-9

DEPARTMENT OF MILK, FATS AND FOOD HYGIENE

Head of Department:
Assoc.Prof. Vladimír Frank, PhD

Telephone: ++42-7-52495260
Fax: ++42-7-52493198

I. STAFF

Associate Professors:

Jozef Augustín, PhD; Vladimír Palo, PhD; Štefan Schmidt, PhD;

Assistant Professors:

Mária Greifová, PhD; Jarmila Hojerová, PhD; Vladimír Mastihuba, PhD; Stanislav Sekretár, PhD; Ľubomír Valík, PhD; Jaroslav Zemanoviè, PhD;

Research Fellows:

Bernadette Hozová, PhD; Ľudovít Kuniak, PhD; Vlasta Kuklišová, MSc.;

PhD students:

Martina Hrková, MSc.; Denisa Lauková, MSc.; Iveta Lenkeyová, MSc.; Terézia Machalcová, MSc.; Ivana Niklová, MSc;

Technical Staff:

Vilma Grmanová; Anna Horvátová; Edita Kovaèièová; Eva Nováková; Margita Piatriková;

II. TEACHING AND RESEARCH LABORATORIES

Laboratory of Milk Chemistry and Technology
Laboratory of Fat Chemistry and Technology
Laboratory of Food Microbiology
Laboratory of Cosmetology
Laboratory of Applied Biotechnology

III. TEACHING

A. Undergraduate Study

1st semester (autumn)

Laboratory exercise Biology	(0-1 h)	Augustín
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5th semester (autumn)

Fundamentals of Hygiene and Sanitation	(1-1 h)	Hojerová
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6th semester (spring)

Cosmetic and Household Chemistry	(1-1 h)	Hojerová
Packaging and Packaging Materials	(1-1 h)	Sekretár
Fats Chemistry and oleochemistry	(1-1 h)	Sekretár, Schmidt
Semestral Project	(0-4 h)	All Department Staff

7th semester (spring)

Laboratory exercise Special Food Analysis	(2-2 h)	Augustín, Hojeorvá, Sekretár
Food Microbiology	(2-0 h)	Frank
Laboratory exercise Food Microbiology	(0-4 h)	Frank, Hozová, Valík
Food Unit Operations	(2-2 h)	Schmidt
Special exercise Food Unit Operations	(0-2 h)	Schmidt

8th semester (spring)

Laboratory exercise Dairy Chemistry and Technology	(0-3 h)	Greifová, Kuklišová, Palo
Fats, Detergents and Cosmetics	(4-0 h)	Schmidt, Sekretár, Hojerová, Zemanoviè
Laboratory exercise Fats, Detergents and Cosmetics	(0-3 h)	Schmidt, Sekretár, Hojerová, Zemanoviè
Microbiology of Milk, Fats and Cosmetics	(2-0 h)	Valík
Laboratory exercise Microbiology of Milk, Fats and Cosmetics	(0-2 h)	Hozová, Valík

9th semester (autumn)

Special Food Microbiology	(2-0 h)	Valík
Laboratory exercise Special Food Microbiology	(0-2 h)	Valík
Food Ecohygiene	(2-0 h)	Frank
Laboratory exercise Food Ecohygiene	(0-2 h)	Augustín
Special Dairy and Fat Technologies	(2-0 h)	Palo, Sekretár, Schmidt
Laboratory exercise Special Dairy and Fat Technologies	(0-4 h)	Palo, Sekretár, Schmidt, Greifová
Side effluents in Food Industry	(2-0 h)	Augustín
Laboratory exercise Side Effluents in Food Industry	(0-2 h)	Augustín

10th semester (spring)

Diploma Project	(0-27 h)	All Department staff
Seminar Diploma Project	(0-3 h)	All Department staff

B. PhD Study**IV. CURRENT RESEARCH PROJECTS****A. Rapid, specific detection of *Listeria monocytogenes* by antibody-based techniques and on line sensor technology; development of improved control of food safety for industry and the consumer (Katarína Horáková)**

Food as a vehicle of infection for *Listeria monocytogenes* was not recognised until 1980s. Prior to this the disease, which can cause central nervous system infection and septicemia, was either from an unknown source or was known to be transmitted direct from an animal reservoir or via hospital cross-infection. At particular risk are compromised individuals such as pregnant women and those with underlying disease. The overall objective of the project is to develop rapid, specific test methods for the detection of *Listeria* in foods, with the aim of introducing appropriate quality control into food production processes of the CCE partners. The method will be used both to assess the quality of raw material and the final food product, including where possible on line sensor technology. Partial objectives: to raise novel antibodies; optimise the laboratory technology; validation of the method; to introduce the method for routine detection; to disseminate the results.

Improving of the functional and biological values of foods and cosmetic products.

B. Stabilisation of foods containing fats by application of new types of natural antioxidants (Štefan Schmidt)

Most of the studies during this period have focused on further testing of antioxidant activity of extracts from rosemary and evening primrose seeds.

C. Improvement of nutrition and sensory quality of foods via optimising of physico-chemical and biological factors (Vladimír Frank)

The project analyses factors, which affect the selected technically relevant microorganisms, i.e. those microbes causing fermentation, spoiling and/or health risks of foods. Application of isolation and separation methods for determination of volatile compounds in investigated foods and sensory profiling of flavour alterations initiated by chemical and microbial changes of food are under intensive search as well. Other branch of project deals with improvement of technical properties of fats via randomization process, which concurrently saves the biological value of fat products considering, that essential fatty acids content remains unchanged after the process.

V. COOPERATION**A. Cooperation in Slovakia**

Central Laboratory Milex - Progres, a.s., Bratislava
 Dairy Plant Levice
 De MICLEŇ, a.s, Levice
 Dimenzia, s.r.o., Kežmarok
 Institute of Dairy Research, Žilina
 Institute of Human Nutrition, Bratislava
 Institute of Preventive and Clinical Medicine, Bratislava
 Milex, Nové Mesto nad Váhom
 Nuclear Powerplant Jaslovské Bohunice
 Palma - Henkel, a.s., Nové Mesto nad Váhom
 Palma - Tumys, a.s., Bratislava
 PHARMASUN, Bratislava
 Rajo, a.s. Bratislava
 Ress, s.r.o., Senica
 Slovak Academy of Sciences, Institute of Chemistry, Bratislava
 Slovak Academy of Sciences, Institute of Molecular Biology, Bratislava
 Slovak Academy of Sciences, Institute of Pharmacology, Bratislava
 Slovak Agricultural University, Nitra
 Natural Institute of Health, Bratislava

B. International Cooperation:

(pozn.: uviesť názov organizácie, miesto, štát, stručný názov, resp. oblasť spolupráce)

Aluso sro, Prague, Czech Republic
 - development of cosmetic products
 BBSRC Institute of Food Research, Norwich, Great Britain
 - detection of *Listeria monocytogenes*
 BRDC (Biotechnology Research and Development Corporation) Peoria, IL, USA
 - Enzymatic modification of natural polymers
 Dublin City University, Biomedical and Environmental Sensor Technology Centre
 - Development of improved control of food safety for industry
 Faculty of Food Technology and Biochemistry, Institute of Food Chemistry and Analysis, Prague, Czech Republic
 - Dairy education
 - Natural antioxidants

- Development of improved control of food safety for industry
Gimex, sro, Zlín, Czech Republic
- Household Chemistry
Milcom-Dairy Research Institute, Prague
- Development of improved control of food safety for industry
NCAUR (National Center for Agricultural Utilization Research), ARS, USDA, Peoria, IL, USA
- Enzymatic modification of natural polymers
Technical University Vienna, Department of Biotechnology, Austria
- Proteolytic Enzymes of *Brevibacterium linens*

C. Membership in Domestic Organizations and Societies:

- Certification Commission of Slovak Trade Inspection - SKTC (J. Hojerová)
- Commission for Technical Standards no 79 (cosmetics) of Slovak Institute for Technical Standards (J. Hojerová)
- Cosmetological Society (J. Hojerová)
- Editorial board of Bulletin of Food Research (Š. Schmidt)
- Expert of the Slovak National Accreditation Service – Technical Commission TVA-L4 (B. Hozová)
- Incheba, Joint Stock Company - Technical Committee (J. Hojerová)
- Members of Committee of the Slovak Chemical Society (Š. Schmidt)
- Member of Committee of the Food Section SCHS (J. Zemanovič, B. Hozová, Š. Schmidt)
- Slovak Academy of Agriculture (V. Palo)
- Science - Technical Society (B. Hozová)
- Slovak Chemical Society (M. Greifová, I. Niklová, V. Frank, ¼ Kuniak, V. Palo, Sekretár S.)
- Slovak National Committee of International Dairy Federation (V. Palo)
- Slovak Gold (J. Hojerová)
- Slovak Society of Agricultural, Food and Forestry Science (V. Palo, J. Augustín)
- Top Council of Slovak Dairy Union (V. Palo)

D. Membership in International Organizations and Societies

- Federation of European Chemical Societies, Division of Food Chemistry (Schmidt)
- Czechoslovak Microbiology Society (B. Hozová, J. Augustín, M. Greifová, ¼ Valík)
- Austrian Chemical Society, Austria (J. Zemanovič)
- International Federation Society of Cosmetic Chemists (IFSCC), USA (J. Hojerová)

E. Tempus Programme:

F. International Scientific Programmes:

- Copernicus project PL 979012 "Rapid, specific detection of *Listeria monocytogenes* by antibody-based techniques and on-line sensor technology".

G. Visitors from Abroad:

- | | |
|-------------------|---|
| Ing. A. Štöfiková | Aluso sro, Prague, Czech Republic, November 2000 (2 days) |
| Ing. J. Galeèka | Gimex, sro, Zlín, Czech Republic, July 2000 (2 days) |
| Prof. V. Filip | University of Chemical Technology, Prague (1 day) |

H. Visits of Staff Members and PhD Students to Foreign Institutions:

VI. THESES AND DISSERTATIONS

A. Graduate Theses (MS Degree) for state examinations after five years of study (supervisors are written in brackets):

- | | |
|---------------------|---|
| Bouma J.: | Nutrition of milking cows and milk quality. (Rusová M.) |
| Baèeková M.: | Influence of polyene fatty acids in nutrition on lipid parameters in blood. (Š. Schmidt) |
| Borjá A.: | Enhancing of reproducibility of milk testing for inhibitors. (V. Palo) |
| Csefalvayová L.: | Special feeding fats for industrial purposes. (Š. Schmidt) |
| Cyprichová D.: | Selection of application possibilities of water soluble glucan in dairy products. (¼ Kuniak) |
| Cviková Petronela.: | Study of brine properties in production of Akawi cheese. (V. Palo) |
| Deanková E.: | Changes in microbial contamination of homogenates from fructification bodies of oyster mushrooms. (V. Frank) |
| Habalová K.: | Fractionation of extract from evening primrose meal. (I. Niklová) |
| Hanusová B.: | Influence of polyenic fatty acids in nutrition on lipidic parameters in blood. (J. Hojerová) |
| Lauková D.: | <i>Bacillus cereus</i> and total count of microorganisms in pasteurised cream. (¼ Valík) |
| Lenkeyová I.: | Creation of histamine and cadaverine by <i>Enterobacter aerogenes</i> under various conditions. (M. Greifová) |
| Malíková M.: | Reaction mechanism of plant xyloglucanases. (J. Augustín) |
| Marèeková M.: | Quantitative analysis of growth of <i>Bacillus cereus</i> in pasteurised milk. (¼ Valík) |
| Minarovièová ¼: | Evaluation of selected parameters of microbial quality of goat milk. (B. Hozová) |
| Neradová B.: | Luminometric measurement of sanitation efficiency in dairy |

Pastorová J.: industry. (¼ Valík)
Production of polysaccharide hydrolases by *Rhizopus* genera. (J. Augustín)

B. Dissertations (PhD):

C. Dissertations (DSc):

D. Habilitation Theses:

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

- [1]* Augustín J.: Polysaccharide hydrolases of *Aureobasidium pullulans*. *Folia Microbiol.* 45 (2), 143-146 (2000). (1)
- [2] Augustín J.: *Coffea arabica* – produkcia, botanické zaradenie, nové obsahové a účinné látky a ich niektoré farmakologické účinky. *Coffea arabica* – production, botanic classification, new active substances and their pharmacology properties (in Slovak). *Ěeská a Slovenská farmacie*, 49 (3), 107–112 (2000). (1)
- [3] Augustín J., Hudecová D., Mikulášová M.: Oyster mushroom (*Pleurotus ostreatus*) – its occurrence, composition, active substances, and some of its physiological properties. *Czech. Mycol.* 52 (2), 155-156 (2000). (0,9)
- [4] Görner F., Valík ¼ *Bacillus cereus* v pasterizovanom mlieku a jeho trvanlivosť. *Bacillus cereus* in pasteurised milk and its shelf-life (in Slovak). *Výživa a zdravie*, 45 (4), 75-76 (2000). (1)
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B. Conferences (*International conferences)

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C. Books and Textbooks

D. Patents

DEPARTMENT OF ORGANIC CHEMISTRY

Head of the Department:
Prof. Ľubor Fišera, PhD, DSc

Telephone: ++421-7-529 68560
++421-7-524 95410
Fax: ++421-7-529 68560
E-mail: fishera@cvt.stuba.sk

I. STAFF

Full Professors:

Ľubor Fišera, PhD, DSc; Alžbeta Krutošíková, PhD, DSc; Michal Uher, PhD, DSc;

Associate Professors:

Ľubomír Floch, PhD; Tibor Gracza, PhD; Rudolf Kada, PhD; Štefan Marchalín, PhD; Viktor Milata, PhD; František Považanec, PhD; Štefan Stankovský, PhD; Katarína Špirková, PhD; Ladislav Štibrányi, PhD;

Assistant Professors:

Mária Bobošíková, PhD; Dušan Berkeš, PhD; Eva Jedlovská, PhD; Anna Koreňová, PhD; Angelika Lásiková; Vladimír Ondruš, PhD; Oľga Rajniaková, PhD; Peter Šafař, PhD; Jarmila Štetinová, PhD;

Research Fellows:

Matej Babjak; Miloslava Dandárová, PhD; Katarína Kadlečíková; Peter Mièúch, PhD; Peter Szolcsányi, PhD; Daniel Végh, PhD, DrSc.; Peter Zálupský, PhD; Jozefína Žúžiová, PhD;

PhD Students:

Iva Blanáriková; Katarína Cvopová; Branislav Dugoviè; Róbert Fischer; Andrea Gogová; Katarína Hrnčáriková; Andrej Kolaroviè; Martin Kováè; Jozef Saloò; Jana Sikoraiová; Fridrich Szemes;

Technical Staff:

Augustín Jurkoviè; Eva Kaisová; Jana Lehká; Lila Livaová; Mária Nemcová; Mária Somorovská; Eva Tobiašová; Stanislav Tomek; Iva Viskupièová;

II. TEACHING AND RESEARCH LABORATORIES

Laboratory practice:

Basic Skills in Organic Chemistry Laboratory I, II.

Organic Synthesis Laboratory Projects I, II.

Research laboratories:

Laboratory of Organic Synthesis

Laboratory of Chiral Cycloaddition Reactions

Laboratory of Heterocyclic Chemistry

Laboratory of Stereoselective Synthesis

Laboratory of Applied Organic Synthesis

Laboratory of Natural Compounds

Laboratory of Nuclear Magnetic Resonance Spectroscopy

Laboratory of IR and UV Spectroscopy

Laboratory of Gas Chromatography

III. TEACHING

A. Undergraduate Study

3rd semester

Organic Chemistry	(2-2h)	Marchalín, Gracza
Organic Chemistry Laboratory	(0-4h)	all teachers and research workers

4th semester

Organic Chemistry	(2-2h)	Fišera, Považanec, Uher
Organic Chemistry Laboratory	(0-5h)	all teachers and research workers

5th semester

Chemical Information	(1-1h)	Uher
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6th semester

Chemical Specialities	(2-2h)	Mravec, Štibrányi
Semestral Project	(0-4h)	Fišera, Gracza, Považanec, Šafař, Štetinová, Štibrányi, Végh

7th semester

Organometallic Compounds	(1-1h)	Gracza
Mechanisms of Organic Reactions I	(3-1h)	Fišera
Bioorganic Chemistry	(2-0h)	Uher
Laboratory Project I	(0-10h)	Šafař, Koreňová
Organic Chemistry III	(1-1h)	Považanec

8th semester

Organic Synthesis	(2-1h)	Floch
Asymmetric Synthesis	(2-1h)	Gracza
Stereochemistry	(0-2h)	Štibrányi
Spectroscopic Methods in the Control of Technological Processes	(2-2h)	Stankovský, Segza
Laboratory Project II	(0-6h)	Šafař Štibrányi,
Training at Industrial Production Floor	15 days	Berkeš, Fišera, Gracza, Marchalín, Milata, Špírková, Považanec

9th semester

Mechanisms of Organic Reactions II	(1-1h)	Marchalín
Applied Organic Synthesis	(1-1h)	Považanec
Chemistry of Heterocyclic Compounds	(2-0h)	Stankovský
Physical Organic Chemistry I	(0-2h)	Milata
Chemistry of Natural Compounds	(2-0h)	Berkeš
Laboratory Project	(0-10h)	Berkeš, Fišera, Gracza, Marchalín, Milata, Špírková, Považanec,

10th semester

Diploma Seminar		Považanec
Diploma Thesis Project		Bobošíková, Fišera, Koreňová, Šafař Špírková, Považanec, Štibrányi, Végh

IV. CURRENT RESEARCH PROJECTS**A. Stereoselective cycloadditions of heterocyclic compounds (Ľubor FIŠERA)**

The primary aim of Prof. Fišera's research is devoted to the search of the stereoselective and regioselective cycloaddition reactions of chiral or achiral 1,3-dipoles to achiral or chiral alkenes and heterocyclic compounds possessing an endo- or exocyclic C=C double bond with the subsequent transformations of so prepared adducts to the bioactive iminopolyols, * - amino acids, lactones, lactams as well as to the new heterocyclic compounds, hardly accessible by another way and which can have a potential biological activity (pharmaca, agrochemicals).

In the past several years, considerable success has been achieved in this group in the utilization of heterocyclic compounds as dipolarophile components in the 1,3-dipolar cycloaddition (some 60 papers published in this field). The last papers have been devoted to the stereo- and regioselectivity of nitrile oxide and nitrene cycloadditions to heterocyclic derivatives having exo- and endocyclic C=C double bond. The syntheses of chiral dipoles and dipolarophiles from the natural materials such as sugars, *-aminoacids are included. Finally, the utilization of so prepared adducts as the synthetic equivalents by means of photochemical and reductive transformations are used for the synthesis of products of diverse biological activities.

B. Fused O, N-containing heterocyclic compounds (Alžbeta KRUTOŠÍKOVÁ)

The research concerns the synthesis and characterization of new condensed heterocyclic compounds of the type furo[3,2-b]pyrroles, furo[2,3-b] pyrroles, furo[3,2-c] pyridines, furo[3,2-b:4,5-b'] dipyrroles and pyrrolo[2',3':4,5] furo[3,2-c] pyridines, prepared from reactive substituted vinylazides. By the solution of optimal conditions for the introduction of new reaction centres into molecules of the observed systems were gained new suitable starting compounds for synthesis of more complex systems. On the basis of results obtained by the study of electrophilic reactions, the rules became more common for the input of electrophilic reagents to furo[3,2-b] pyrrole skelet and it was proved that the validity is in agreement with the calculations gained by MNDO method. In studying the reactions with dienophiles was confirmed the dual character of furo[3,2-b] pyrrole skelet and benzo[b] condensed system, which in dependence on the attached substituents give addition and cycloaddition products. During the remaining reactions take place interesting transformations of furo[3,2-b] pyrrole or furo[2,3-b] pyrrole skelet leading to the substituted benzo[b] furans, indoles, benzo[b] furo[3,2-b]indoles and their condensed derivatives which led to the opening of a new way to inaccessible O-N-containing variously substituted heterocycles.

C. Synthesis, reactions and biological activity of 2H-2-pyranones and 2H-1-benzopyran-2-ones. (Ľubomír FLOCH)

The title α -pyrones have found applications in medicine and as agrochemicals. The research project aims at preparation of designed α -pyrones in order to build them into more complex molecules with expected pesticidal and antiproliferation activity. Novel sulfonyl- α -pyrones built in sulfonylureas have been synthesized, the target molecules having molecular formula α -pyrone (or benzopyrone)-SO₂-NH-CO-NH-heterocycle. The testing of biological activity is carried out in cooperation with the Department of Microbiology, Biochemistry, and Biology (Prof.K.Horáková).

D. Stereoselective reactions in natural product synthesis (Tibor GRACZA)

The study of stereoselective reactions and their applications for the syntheses of naturally occurring compounds, or optically pure building blocks, represents the principal research area of Dr. Gracza's group. A new, general approach to optically active anhydroalditols have been developed, using the stereocontrolled palladium(II)-catalyzed oxycarbonylation of enitols as a key step. This strategy have been applied in the total syntheses of some cytotoxic natural dihydroxystyryl lactones like (+)-goniofufurone and its 7-epimer, as well as their enantiomers. Extension of Pd(II)-promoted bicyclization to optically pure unsaturated aminopolyols offered a very potent way to polyhydroxylated saturated nitrogen heterocycles, many of which are glycosidase inhibitors (related to deoxynojirromycin, DMDP, castanospermine, swainsonine).

E. Azole activated methylene group in condensation reaction with heterocyclic aldehydes (Rudolf KADA)

Synthesis of new heterocyclic compounds with assumed biological efficacy. Utilization of 3-heteroaryl-2-X-propenoic acids with the aim of synthesizing especially new types of substituted benzothiazoles, benzoxazoles and benzimidazoles. From the theoretical viewpoint, the research brings the synthesis of new heterocycles and reexamination of their chemical behaviour, spectral characteristics and from the practical point of view it is possible to investigate their properties as potential medicaments. In previous papers dealing with furan derivatives on reaction with nucleophiles it was found that 5-X-2-furylethylene derivatives undergo either a nucleophilic replacement of X or an addition of the nucleophile to the C=C double bond depending on the character of the electronwithdrawing group at C-2 of the furan ring.

F. Synthesis of 1,4-dihydropyridines and new tricyclic diazepines (Štefan MARCHALÍN)

Deals with the chemistry of 1,4-dihydropyridines and 4H-pyrans. Activated, α,β -unsaturated ketones serve as synthons for the synthesis of substituted 4-aryl (heteroaryl)-1,4-dihydropyridines and 4-aryl(heteroaryl)-2-amino-3-cyano-4H-pyrans.

In the area of 1,4-dihydropyridines are investigated the reactions of 4-aryl(heteroaryl)-2-formyl-1,4-dihydropyridines. The splitting of racemic 4-aryl-1,4-dihydropyridine-3-monocarboxylic acids through diastereoisomeric salts is used as a method for the preparation of new chiral 1,4-dihydropyridines.

Further research is oriented to thiophene analogues of natural alkaloids where the preparation and reactivity of thieno[b]quinolizidinones and thienoindolizidinones has been studied.

G. Synthesis and spectral properties of fused heterocycles (Viktor MILATA)

In last years rich experience in the synthesis of substituted push - pull ethylenes, which are remarkable for their significantly polarised multiple bond, has been collected. Reactions of various types (hetero)arylamines (substituted anilines, aminobenzimidazoles, aminobenzotriazoles, quinoxalines etc.) with activated alkoxyethylenes (alkoxymethylene derivatives of propanedinitrile, dialkyl propanedioates, 2,4-pentanedione, alkyl 3-oxobutanoates, 3-oxobutanenitrile or alkyl cyanoacetates), structure of products and their synthetic utilisation in thermal cyclisation (Gould - Jacobs reaction) - which produce the nalidixic acid type quinolones, imidazoquinolones, triazoloquinolones, pyrazinoquinolones were studied. Also research on dihydropyridines and reactions of 1-hydroxymethylbenzotriazole, 1-hydroxymethylbenzimidazole is being carried out.

H. Synthesis of analogues natural products (František POVAŽANEC)

The principal research area of Dr. Považanec concerns the study of preparation and reactions of heterocyclic compounds, the emphasis being on polycyclic heterocyclic compounds with built-in 1,4-diazepine skeleton. Dr. Považanec is interested mainly in the cyclization and cyclocondensation reactions, which are expected to furnish polycyclic heterocycles possessing bioactivity.

Recently, chiral substrates aroused his interest in that they allow one to prepare polycyclic heterocycles carrying one or more chiral centres. The presence and appropriate configuration of chiral centres has been recognized as pivotal factor in influencing the range of bioactivity of the diazepine-type substrates.

I. Imidoyl chlorides and imidoisothiocyanates in the synthesis of new condensed ring's systems (Stefan STANKOVSKY)

In series of quinazoline compounds was found a new synthetic method on the basis of imidoyl or amidinoyl isothiocyanates that enables to avoid the complicated processes starting from anthranilic acid. The obtained quinazoline-4-thiones were used for the synthesis of fused 1,2,4-triazolo-, dihydroimidazo-, trihydropyrimido-, and tetrazolo-quinazolines. Quinazoline fused benzotriazepines and benzotetrazepines were prepared by the suitable functionalization of quinazoline skeleton.

J. Synthesis of fused quinazoline derivatives (Katarína ŠPIRKOVÁ)

The research activity of Dr. Špírková concentrates on condensed quinazolines, aiming at preparation of tricyclic, potentially bioactive structures, such as 1,2,4-triazolo[4,3-c]quinazolines, 2H-imidazo- and 2,3-dihydropyrimido[1,2-c]quinazolines. The annelation of further rings takes place across the thione bond of 3H-quinazoline-4-thiones by cyclisation and cyclocondensation reactions.

The quinazolines are also the cornerstone of research into synthesis and properties of structural analogues of folic acid. The target molecules are both classical and non-classical antifolates, based on the 3H-quinazoline-4-thione skeleton.

K. Synthesis of nitrogen, phosphorous heterocycles (Ladislav ŠTIBRÁNYI)

Synthesis of 5- and 6-membered nitrogen heterocycles. Preparation and study of substituted triazacyclotriphosphazenes carrying nitrogen, sulphur, or oxygen-containing heteroaromatic ligands. Study of nucleophilic reactions on the hexachlorotriazacyclotriphosphazene with ligands capable of metal-complexing. Computer modelling of structure and reactivity. Preparation of derivatives substituted by 1,3-dithiane and their transformation into carbonyl derivatives.

L. Transformation of g-pyranone derivatives to the analogues of naturally occurring bioactive compounds (Michal UHER)

Project is geared at the preparation of the derivatives with possible biological activity with the perspective to use in pharmacology, cosmetics, agriculture and food industry. As main substrate for the transformation serves multifunctional g-pyranone derivative 5-hydroxy-2-hydroxymethyl-4H-pyran-4-one (kojic acid). Its manufacture by fermentation is patented in Slovakia. Its decomposition leads to non-toxic products which can enter the circulation of biogenic elements in the nature.

M. Synthesis of oligomers and polymers, based on novel five-membered heterocycles, aiming at study and utilization of their conductivity and opto-electronic properties (Daniel VĚGH)

Basic research in the field of novel five-membered heterocycles their oligomers and polymers. Search for simple, high-yield synthetic routes leading to heterocycles the oligomers of which will serve as model for polyheterocycles. The latter

are expected to possess electric, opto-electric and electroluminescent properties, qualifying such materials as optical storage media, antistatic coatings, electronic membranes for microelectronics. Also, they can be used in designing electrochemical energy sources, for instance as polymeric electrolytes, novel batteries, as well as in optical sensors and biosensors for monitoring the environment. We intend to design such novel compounds, capitalizing on the relationships between structure and physical properties, solubility, polymer workability. Based on theoretical consideration and calculated predictions we synthesized novel 2,3-substituted thieno[3,4] pyrazine and new pentacyclic dipyrido[3,2-a, 2',3'-c] -thieno-[3,4] azine derivatives, systems with lowest bandgap (0,7 eV). In order to study the effect of the substituent on the chemical and physical properties (also electrical conductivity) twelve new 3-(3-thienyl)glutaric acid derivatives were prepared by easy, novel one step procedure in multigram quantities. Homo or hetero oligo- and polymerization of derivatives was achieved by chemical and electrochemical polymerisation.

V. COOPERATION

A. Cooperation in Slovakia

Slovakofarma, Hlohovec
 Synkola, Bratislava
 Duslo, Šaľa
 Slovak Academy of Sciences, Bratislava
 Institute of Chemical Technology, Bratislava
 Institute of Food Research, Bratislava
 Tau-Chem, Bratislava
 Chemko, Strážske
 Institute of Drugs Research, Modra
 Tatra Trade, Prievidza
 Institute of Preventive Medicines, Bratislava
 National Center of Onkology, Bratislava
 Georganics, Bratislava
 Q-Chem, Bratislava

B. International Cooperation:

Inst. für Organische Chemie TU Vienna, Austria
 -The synthesis of heterocyclic compounds, organization of Blue Danube Symposium on Heterocyclic Chemistry.
 Inst. für Organische Chemie Univ. Stuttgart, Germany
 -Stereoselective dipolar cycloaddition and oxycarbonylation reactions
 Inst. für Organische Chemie Univ. Berlin, Germany
 -Stereoselective reactions of chiral nitrones
 Inst. de Chimie Moleculaire d'Orsay, France
 -Resau formation recherche.
 Institute de Chimie Moleculaire, Orsay, Univ. Paris-Sud, France
 -NMR study of chiral compounds and cooperation in exchange of students.
 Lab. de Chimie, Univ. Le Havre, France
 -The synthesis of condensed heterocyclic compounds.
 Inst. für Festkörperphysik der Uni Vienna, Austria
 -New materials for microelectronics.
 Cambridge University, Cambridge, Great Britain
 -The synthesis of natural polytetramic compounds.
 Keele University, Staffordshire, Great Britain
 -The synthesis of heterocyclic compounds.
 Institute of Organic Chemistry, Univ. Debrecen, Hungary
 -The synthesis of heterocyclic compounds.
 Institute of Organic Chemistry, TU Wroclaw, Poland
 -The synthesis of heterocyclic compounds.
 Institute of Organic Chemistry, U Warsaw, Poland
 -The synthesis of heterocyclic compounds.
 Institute of Organic Chemistry, AU Krakow, Poland
 -The synthesis of heterocyclic compounds.
 UNED, Madrid, Spain
 -The synthesis of heterocyclic compounds, NMR spectroscopy.
 NOVARTIS, Basel, Switzerland
 -The synthesis of heterocyclic compounds.
 AGREWO, Germany
 -The synthesis of heterocyclic compounds.
 BAEYER, Germany
 -The synthesis of heterocyclic compounds.
 ALDRICH, German
 -The custom synthesis of heterocyclic compounds.
 RHONE-POULENC, France
 -The synthesis of heterocyclic compounds.
 MAYBRIDGE, Great Britain
 -The synthesis of heterocyclic compounds.
 MERCK, USA

-The synthesis of heterocyclic compounds.
SPECS & BioSPECS, Netherlands

-The synthesis of heterocyclic compounds.
VŠCHT Praha

-The synthesis of heterocyclic compounds.
Univerzita, Pardubice

-The synthesis of heterocyclic compounds.

C. Membership in Domestic Organizations and Societies

Slovak Chemical Society (Scientific Committee Member Prof. M Uher, Head of Group of Organic Chemistry Prof. ¼ Fišera and 30 Members)

D. Membership in International Organizations and Societies

American Chemical Society (Prof. ¼ Fišera)

German Chemical Society (Prof. ¼ Fišera, Dr. T. Gracza)

Czech Chemical Society (Prof. ¼ Fišera, Dr. T. Gracza, Dr. Š. Marchalín)

E. TEMPUS Programme

F. International Scientific Programmes

Agricultural Reutilization of Non-Ferrous Metal Containing Waste From Microelectronic and Surface Treating Industry. INCO-COPERNICUS PROJECT, METAGREC. Departments of Organic Chemistry and Environmental Science STU, Austrian Research Center, Seibersdorf GmbH, Div. of Life Sciences, Royal Veterinary and Agricultural University, Copenhagen Denmark, Pannon Agricultural University, Mosonmagyaróvár, Hungary.

G. Visitors from Abroad

Dr. C. Schröder	Beilstein, Frankfurt, Germany, March 2000 (2 days)
B. Auzou Connes	Univ. Paris-Sud, France, May-June 2000 (60 days)
N. Lounnas	Univ. Paris-Sud, France, May-June 2000 (60 days)
J. Deschamps	Univ. Paris-Sud, France, May-June 2000 (60 days)
S. Legros	Univ. Paris-Sud, France, May-June 2000 (60 days)
Prof. A. Gossauer	Univ. Fribourg, Switzerland, Mai, 2000 (2 days)
A. M. Passinieni	Univ. Helsinki, Finland, June-July, 2000 (56 days)
S. Argeitakou	Univ. Athen, Greece, June-July, 2000 (42 days)
Prof. E. Varella	Univ. Thessaloniki, Greece, 2000 (2 days)
Prof. F. Sauter	T. Univ. Vienna, Austria, June 2000 (6 days)
Prof. P. Stanetty	T. Univ. Vienna, Austria, June 2000 (1 day)
Prof. J. Mlochowski	Univ. Wroclaw, Poland, June 1999 (3 days)
Prof. H. Fröhlich	T. Univ. Vienna, Austria, June 1999 (2 days)
Prof. M. Koëever	Univ. Ljubljana, Slovenia, June 2000 (4 days)
Prof. A. Petriè	Univ. Ljubljana, Slovenia, June 2000 (4 days)
Prof. S. Polanc	Univ. Ljubljana, Slovenia, June 2000 (4 days)
Prof. B. Stanovnik	Univ. Ljubljana, Slovenia, June 2000 (4 days)
Prof. M. Cyranski	Univ. Warsaw, Poland, December 2000 (3 days)
Dr. I. McRobbie	AHMarks, Great Britain, March, December, 2000 (2 days)

H. Visits of Staff Members and Postgraduate Students to Foreign Institutions

M. Babjak	Ljubljana, Slovenia, 5 days, Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days, Boehring, Germany, 80 days
D. Berkeš	Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days
M. Bobošíková	Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days
I. Blanáriková	Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days, Univ. Warsaw, 28 days, Poland
B. Dugoviè	Trieste, Italy, 4 days
R. Fischer	Bressanone, Italy, 9 days, Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days, Boehring, Germany, 80 days
¼ Fišera	Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days, Univ. Vienna, Austria, 5 days, Univ. Lodz, Poland, 5 days, Irbid, Jordan 6 days, Athen, Thessaloniki, Greece 6 days, Brno, ÈR, 3 days
T. Gracza	Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days
E. Jedlovská	Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days
K. Kadleèíková	Univ. Le Havre, Francúzko, 90 days
A. Kolaroviè	Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days
A. Koreòová	Univ. Lodz, Poland, 4 days, Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days
A. Krutošíková	Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days

A. Lásiková Š. Marchalín	Trieste, Italy, 4 days Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days Univ. Le Havre, Francúzko, 7 days
P. Mièúch	Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days
V. Milata	Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days, Univ. Madrid, Spain, 265 days, Univ. Vienna, Austria, 6 days, Univ. Aveiro, Portugal, 5 days
V. Ondruš L. Remeò J. Saloò	Univ Stuttgart, Germany, 300 days ETH Zürich, Switzerland, 300 days Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days
J. Sikoraiová	Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days
Š. Stankovský	Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days, Ěeské Budejovice, ĚR, 3 days
F. Szemes	Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days
P. Šafaø K. Špírková	Ěeské Budejovice, ĚR, 3 days Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days, Ěeské Budejovice, ĚR, 3 days
J. Štetinová M. Uher	Ěeské Budejovice, ĚR, 3 days Univ. Krakow, Poland, 5 days, Univ Lodz, Poland, 5 days, Univ Wroclaw, Poland, 3 days
D. Végh	Univ. Vienna, Austria, 8 days, Univ. Györ, 24 days, Hungary, Univ. Mosonmagyaróvár, 10 days, Hungary, Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, 4 days, Ěeské Budejovice, ĚR, 3 days

VI. THESES AND DISSERTATIONS

A. Graduate Theses (MS Degree) for state examinations after five years of study (supervisors are written in brackets):

Bakardžiev N.:	Schiff reagents in synthesis of heterocyclic compounds (F. Považanec)
Czibulová Ž.:	2-Bromomethyl-3H-quinazolin-4-one. Precursor of linearly annelated quinazolines (K. Špírková)
Dugoviè B.:	The preparation and 1,3-dipolar cycloadditions of chiral nitrones. (¼ Fišera)
Galoviè J.:	Furan analogues of the isatoic anhydride in the synthesis of diazepines (P. Šafaø)
Hrnèariková K.:	Utilization of hexafluorobenzene and substituted pentafluorobenzenes for the preparation of substituted phenyl-1-pyrroles as bioactive compounds and novel materials (D. Végh)
Kaòa R.:	Pictet-Spengler reaction in synthesis of polycyclic compounds (A. Koreòová)
Kadlecová L.:	Preparation of lithiated diazines and study of their reactions (L. Štibrányi)
Kiss T.:	Synthesis and reactions of stable aminofuran derivatives (M. Bobošíková)

B. Dissertations (PhD):

Chudík M.:	Preparation and reactions of 2-substituted 1,4-dihydropyridines (Š. Marchalín)
Mièúch P.:	The influence of Lewis acids on the stereoselectivity of 1,3-dipolar cycloadditions. (¼ Fišera)

VII. PUBLICATIONS

A. Journals (* registered in Current Contents)

- [1]* Berkeš D., Kolaroviè A., Považanec F.: Stereoselective sodium borohydride reduction, catalyzed by manganese(II) chloride, of g-oxo-a-amino acids. A practical approach to syn-g-hydroxy-a-amino acids. *Tetrahedron Lett.* 41, 5257-5260 (2000)
- [2]* Boduszek B., Uher M.: Synthesis of novel pyrone, chromone and coumarin derivatives of aminomethanephosphonic acid. *Synth. Commun.* 30, 1749-1754 (2000)
- [3]* Chudík M., Marchalín Š., Knesl P., Daich A., Decroix B.: Facile access to 6-substituted 1,4,5,7-tetrahydropyrrolo[3,4-b]-pyridines via Hantsch type dimethyl 4-aryl-2-formyl-6-methyl-1,4-dihydropyridine-3,5-dicarboxylates *J. Heterocyclic Chem.* 37, 1549-1554 (2000)
- [4]* Fišera L., Ondruš V., Kubáò J., Mièúch P., Blanáriková I., Jáger V.: Stereoselective 1,3-dipolar cycloadditions to heterocyclic compounds. *J. Heterocyclic Chem.* 37, 551-566 (2000)
- [5]* Fröhlich J., Sauter F., Milata V.: Influence of some thia or azasubstituted butyric acid derivatives on chemical shift of

- carbon atom of benzene ring. *Molecules* 5, 616-619 (2000)
- [6]* Gracza T., Szolcsányi P.: Study of stereoselectivity in organometallic additions to 1,2-O-isopropylidene-O-R-a-D-xylopentodialdo-1,4-furanose. *Molecules* 5, 1386-1398 (2000)
- [7]* Jantová S., Greif G., Špírková K., Stankovský Š., Oravcová M.: Antibacterial effects of trisubstituted quinazoline derivatives. *Folia Microbiol.* 45, 133-137 (2000)
- [8]* Jantová S., Hazuchová M., Stankovský Š., Špírková K.: Antibakteriálna a protinádorová aktivita 2,4-disubstituovaných 6H-5,1,3-benzotiadiazocínov. Antibacterial and anticancer activity of 2,4-disubstituted 6H-5,1,3-benzothiadiazocines (in Slovak). *Ěes. a Slov. Farm.* 49, 32-36 (2000)
- [9]* Jedlovská E., Fišera L., Lévai A.: Preparation of heterocyclic spirocompounds via 1,3-dipolar cycloaddition reactions. *Chem. Listy* 94, 922 (2000)
- [10]* Kettmann V., Lokaj J., Kratky C., Milata V., Hodul P.: Dimethyl(1-methylbenzimidazol-5-yl)aminomethylene-propanedioate monohydrate, *Acta Cryst. C*, C56, 1007-1008 (2000)
- [11]* Koman M., Szolcsányi P., Gracza T.: (2R,3R,4R,5S)-3,4,5-Trihydroxy-2-(2-hydroxyethyl)piperidinium chloride. *Acta Cryst. C* 56, e138, (2000)
- [12]* Krajčovič J., Végh D., Pálszegi T., Éik G.: Selective synthesis of α -substituted oligothiophenes with 3,4-bis-dodecylthiophene group. *Chem. Listy* 94, 927-928 (2000)
- [13]* Krutošíková A., Lácová M., Dandárová M., Chovancová J.: Effect of microwave irradiation on reaction of furo[3,2-b]pyrrole and furo[3,2-b]pyrrole-2-carbaldehydes with some active methylene compounds. *Arkivoc* 1, 409-420 (2000)
- [14]* Leško J., Lásiková A.: Mass spectra of some 2-substituted derivatives of quinoline-4-carboxylic acids and their amides. *Chem. Papers* 54, 75-77 (2000)
- [15]* Leško J., Milata V., Schultz M.: Mass spectra of some 4- and 5-substituted derivatives of benzoselenadiazoles. *Molecules* 5, 937-940 (2000)
- [16]* Milata V.: Chemická štruktúra chinolónov a ich antibakteriálna aktivita. II. 4-Chinolóny – ich výskyt v prírode a biologické vlastnosti. Chemical structure of quinolones and their antibacterial activity. II. 4-Quinolones – their presence in nature and biological properties (in Slovak). *Ěes. a Slov. Farm.* 49, 68 (2000)
- [17]* Mièúch P., Fišera L., Cyraňski M.K., Krygowski T.M., Krajčik J.: Reversal of diastereoselectivity of nitrile oxide cycloaddition by Mg(II). Acceleration of cycloaddition by microwave irradiation. *Tetrahedron* 56, 5465-5472 (2000)
- [18]* Saloö J., Milata V., Prónayová N., Leško J.: The Gould-Jacobs reaction of 5-aminoquinoxaline. *Monatsh. Chem.* 131, 293-299 (2000)
- [19]* Stankovský Š., Špírková K.: Reaction of imidoyl and amidinoyl isothiocyanates with some CH acide salts. *Chem. Papers* 54, 36-38 (2000)
- [20]* Stankovský Š., Špírková K., Zahradná Z.: Preparation of some[(4-oxoquinazolin-3(4H)-yl)alkanoyl resp. aroyl] glutamates. *Chem. Listy* 94, 938 (2000)
- [21]* Szolcsányi P., Gracza T., Koman M., Prónayová N., Liptaj T.: Pd(II)-catalysed aminocarbonylation as a key step in the total synthesis of C-6 homologues of 1-deoxynojirimycin and 1-deoxy-L-idonojirimycin. *Tetrahedron: Asymmetry* 11, 2579-2597 (2000)
- [22]* Szolcsányi P., Gracza T., Koman M., Prónayová N., Liptaj T.: Total synthesis of new C-6 homologues of 1-deoxynojirimycin and 1-deoxy-L-idonojirimycin. *Chem. Commun.* 471-472 (2000)
- [23]* ŠafaøP., Považanec F., Koreòová A., Prónayová N.: Some transformation of activated furan derivatives. *Chem. Listy* 94, 919-920 (2000)
- [24]* Špírková K., Stankovský Š.: Annulation to the quinazoline ring. Preparation of some substituted 1,2,4-triazinoquinazolines. *Chem. Listy* 94, 939 (2000)
- [25]* Štetinová J., Kada R., Leško J.: Benzothiazolylcianoacetamides as building blocks in the synthesis of heterocycles. *Chem. Listy* 94, 794-795 (2000)
- [26]* Uher M., Chalabala M., Èižmárik J.: Kyselina kojová a jej deriváty ako potenciálne lieèivá. Kojic acid and their derivatives as potential drugs (in Slovak). *Ěes. a Slov. Farm.* XLIX, 6, 288-298 (2000)
- [27]* Uher M., Szymonska J., Koreòová A., Tomasik P.: Reexamination of nucleophilic substitution in chlorokojic acid. *Monatshefte fur Chemie* 131, 301-307 (2000)
- [28]* Végh D., Hrnáriková K., Zálupský P., Éik G.: Synthesis and reactivity of new N-pentafluorophenylpyrrole derivatives. *Chem. Listy* 94, 926-927 (2000)
- [29]* Végh Zs., Végh D.: The novel stepwise synthesis of thiophene oligomers with repeating 3,4-substituted thiophene building blocks. *Chem. Listy* 94, 928-929 (2000)

B. Conferences (* International Conferences)

- [1]* Ambrozak A., Brzasczcz, Giurg M., Mlochowski J., Uher M., Wojtowicz H.: Bisaryl diselenides and benzoselenazolones as catalyst for oxidation of aromatic aldehydes, their derivatives and cycloalkanes with hydroperoxides. *Materialy zjazdowe Jubileuszowy Zjazd Naukowy PTCh i SITPCh, Lodz, PolskoWydawnictwo Uniwersytetu Lodzkiego, ISBN 83-7171-381-9. 2000, p. 91*
- [2]* Babjak M., Gracza T.: Pd(II)-Catalysed cyclizations of unsaturated polyols. In: 8th Blue Danube Symposium on Heterocyclic Chemistry, Bled, September 24-27, 2000. Slovenia. ISBN 108817152. Edited by Stanovnik B. and Svete J. 2000, p. 57
- [3]* Berkeš D., Kolarovič A., Považanec F.: CIDR in the synthesis of enantiomerically pure aminoacid derivatives. Preparation of (2R,4R,1'S)-4-aryl-2-91'-phenylethylamino)butane-1,4-diols. In: Proceeding of the XXIVth Conference of Organic Chemists on Advances in Organic Chemistry, June 28 – 30, 2000. ISBN 80-227-1361-9. Edited by Fišera L., Špírková K. and Zálupský P. 2000, p. 85-86
- [4]* Blanáriková I., Dugovič B., Fišera L., Hammetner Ch.: Stereoselectivity in 1,3-dipolar cycloaddition of D-erythro and D-threo derived nitrones to N-substituted maleimides. In: 8th Blue Danube Symposium on Heterocyclic Chemistry, Bled, September 24-27, 2000. Slovenia ISBN 108817152. Edited by Stanovnik B. and Svete J. 2000, p. 60
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- [6]* Bobošíková M., Krutošíková A.: Preparation of 2-amido substituted furan and furo[3,2-b] pyrrole derivatives In: 8th

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- [8]* Brtko J., Hudecová D., Bransová J., Novotný L., Eybl V., Uher M.: Kojic acid: An excellent source for preparation of biologically active compounds. Biomarkers and Environment 2000 ISSN 1211-8869
- [9]* Babjak M., Gracza T.: Pd(II)-Catalysed cyclizations of unsaturated polyols. In: Proceedings of the XXIVth Conference of Organic Chemists on Advances in Organic Chemistry, Piešany, June 28 - 30, 2000. ISBN 80-227-1361-9. Edited by Fišera L., Špírková K. and Zálupský P. 2000, p. 81-82
- [10]* Fischer R., Fišera L., Rybár A.: Modified nucleosides via 1,3-dipolar cycloaddition of chiral nitrones with N-vinylated bases. In: Proceedings of the XXIVth Conference of Organic Chemists on Advances in Organic Chemistry, Piešany, June 28 - 30, 2000. ISBN 80-227-1361-9. Edited by Fišera L., Špírková K. and Zálupský P. 2000, p. 108-109
- [11]* Fischer R., Fišera L., Rybár A.: Modified nucleosides via 1,3-dipolar cycloaddition of chiral nitrones with N-vinylated bases. In: 8th Blue Danube Symposium on Heterocyclic Chemistry, Bled, September 24-27, 2000. Slovenia. ISBN 108817152. Edited by Stanovnik B. and Svete J. 2000, p. 77
- [12]* Fischer R., Jedlovská E., Solěániová E.: 1,3-Dipolar cycloaddition of mesityl nitrile oxide with α,β -unsaturated ketones in the presence of Lewis acids. In: Proceedings of Postgraduate Winter School on Organic Reactivity – WISOR IX, January 7-15, 2000, Bressanone, Italy
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- [14]* Fišera L.: 1,3-Dipolar cycloadditions of sugar derived nitrones. In: Jubileuszowy Zjazd Naukowy Polskiego Towarzystwa Chemicznego, Łódź, September, 10. -15. 2000. Poland, ISBN 83-7171-381-9. 2000, p. 278
- [15]* Gracza T.: Stereocontrolled cyclofunctionalizations of double bonds via organometallic intermediates. In: 8th Blue Danube Symposium on Heterocyclic Chemistry, Bled, September 24-27, 2000. Slovenia. ISBN 108817152. Edited by Stanovnik B. and Svete J. 2000, p. 17
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- [17]* Jedlovská E., Solěániová E., Rybár A.: Simple synthesis of β -fused theophyllines. In: Proceedings of the XXIVth Conference of Organic Chemists on Advances in Organic Chemistry, Piešany, June 28 - 30, 2000. ISBN 80-227-1361-9. Edited by Fišera L., Špírková K. and Zálupský P. 2000, p. 117-118
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- [19]* Kada R., Milata V., Zalibera J., Belicová A.: Simple and convenient preparation of 1-((R-aryl)aminomethyl)benzotriazoles and benzimidazoles. In: Proceedings of the XXIVth Conference of Organic Chemists on Advances in Organic Chemistry, Piešany, June 28 - 30, 2000. ISBN 80-227-1361-9. Edited by Fišera L., Špírková K. and Zálupský P. 2000, p. 119-120
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- D. Patents**
- [1] Uher M., Bransová J., Rajniaková O., Hudecová D., Brtko J.: 5-Hydroxy-2-(R-tiometyl)-4H-pyran-4-óny a spôsob ich prípravy. 5-Hydroxy-2-(R-thiomethyl)-4H-pyran-4-one and its preparation (in Slovak). SR pat. 281 408 (08.10. 2000), Slovak Republic

DEPARTMENT OF ORGANIC TECHNOLOGY

Head of Department:
Assoc.Prof. Milan Králík, PhD

Telephone: +421-7-52495242
Fax: +421-7-52493198
E-mail: kralik@chtf.stuba.sk

I. STAFF

Full Professors:
Milan Hronec, PhD, DSc;

Associate Professors:
Alexander Kaszonyi, PhD; Dušan Mravec, PhD; Ján Vojtko, PhD

Research Fellows:
Zuzana Cvengrošová, PhD; Magdaléna Štolcová, PhD; Dana Gašparovičová; Katarína Fulajtárová;

PhD students:
Michal Báhidský; Dana Grošková; Jana Horniaková; Vierošlav Krátky;

Technical Staff:
Eva Šuleková; Jozef Tánczos; Ľudmila Tvarožková;

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Technological laboratory 1, 2, 3, 4
Computer seminar room

B. Research Laboratories:

Laboratory of catalytic processes
Laboratory of reactor technique
Laboratory of spectroscopic methods

III. TEACHING

A. Undergraduate study

1. Introductory courses

4th semester (spring) Organic Technology and Petrochemistry	(3-1 h)	Hronec, Králík, Kaszonyi
6th semester (spring) Fine Chemicals	(2-2 h)	Mravec
Semestral Project I	(0-4 h)	Cvengrošová, Kaszonyi, Králík, Mravec, Štolcová, Vojtko
2. Advanced Courses		
7th semester (autumn) Chemical-Engineering Thermodynamics	(0-2 h)	Vojtko
Catalysis	(2-0 h)	Hronec
Engineering Calculations on a Computer	(1-2 h)	Kaszonyi
Processes of Organic Technology	(2-1 h)	Králík
Laboratory Practise I.	(0-8)	Vojtko, Mravec
8th semester (spring) Kinetics and Reactors	(0-2 h)	Kaszonyi
Design of Chemical Processes	(2-1 h)	Hronec, Králík
Technology of monomers and polymers	(2-0)	Vojtko
Special Organic Products	(2-0 h)	Mravec
Analysis of Complex Organic Systems	(0-2 h)	Štolcová, Cvengrošová
Laboratory Practise II.	(0-7 h)	Cvengrošová, Hronec, Kaszonyi, Králík, Mravec, Štolcová
9th semester (autumn) Coating materials	(2-0)	Kramár, Lapeš
Manufacturing of Pharmaceuticals	(2-1 h)	Mravec
Laboratory Practise III.	(0-14 h)	Cvengrošová, Hronec, Kaszonyi, Králík, Mravec, Štolcová, Vojtko
10th semester (spring) Seminar to Theses	(0-3 h)	Cvengrošová, Hronec, Kaszonyi, Králík, Macho, Mravec, Vojtko, Štolcová

B. Postgraduate study

Catalysis (2-0) Hronec

IV. CURRENT RESEARCH PROJECTS**A. Catalysts for industrial applications (Milan Hronec)**

1. Synthesis of new inorganic catalysts and their application

Over hydroxyapatite catalysts, a direct synthesis of phenol from benzene in the gas phase was studied. The reaction proceeds at atmospheric pressure at 400-500 °C in the presence of ammonia. The selectivity of phenol formation of about 97 % was achieved over catalysts containing calcium and copper ions in the cation part of hydroxyapatite.

2. Catalysis over zeolites

The comparative study of biphenyl tert-butylation and isopropylation over shape selective catalysts in the liquid phase was carried out. Catalysts were characterised by the TPDA, SEM, X-ray diffraction and acidity measurements. Formation of cerium dioxide was proved in the catalysts modified with cerium. Increase in the selectivity to linear alkyl derivatives at increased content of cerium was found.

3. Microporous organic materials

Palladium catalysts dispersed on microporous sulphonated poly(styrene-divinylbenzene) were investigated in the hydrogenation of substituted aromatic nitro compounds. Comparison with palladium catalysts supported on carbon showed on a significant influence of the support, as well as used solvents, on the catalytic activity and selectivity in the preparation of chloro-anilines from the chloro-nitrobenzene precursors.

V. COOPERATION**A. Cooperation in Slovakia:**

Slovnaft, Bratislava
VUP, Prievidza
DUSLO, Šaľa
AQUACHEMIA Ltd. Žilina

B. International Cooperation:

ENSCM, Montpellier, France:

- zeolite catalysts
- physico-chemical characterisation of solid catalysts

Universita di Padova, Italy:

- polymer supported catalysts, characterisation

Italian National Centre of Research, Padova - Legnaro, Italy:

- preparation of organic supports for catalysts

Universita di L'Aquila, Italy:

- heterogeneous catalysis
- characterisation of microporous polymer supports

Czech Academy of Science, Prague:

- characterisation of polymeric materials as supports for catalysts

C. Membership in Domestic Organisations and Societies:

Editorial Board of Journal: Petroleum and Coal, (M. Hronec, M. Králik)

Editorial Board of Journal: Vlákna a textil (Fibers and Textile) (M. Hronec)

SCHS (Slovak chemical Society) (Hronec, Kaszonyi, Králik, Mravec)

SPCH (Slovak Society for Industrial Chemistry), Chairman of the Catalysis Society (M. Hronec)

GAT pre petrochemickú, organickú a anorganickú chémiu (grant committee for petrochemistry, organic and inorganic chemistry) (M. Králik)

D. Membership in International Organisation and Societies:

National representative of the European Federation of Catalysis Societies (EFCATS) (M. Hronec)

Member of the European Academy of Sciences and Arts (M. Hronec)

F. International Scientific Programmes

1. project No. 8217: Alkylation of polynuclear aromatics for the selective synthesis of dialkylated monomers, precursors of advanced polymers: activity and selectivity of zeolitic catalysts and computational analysis of the experimental results (D. Mravec):

- ENSCM-CNRS (UMR 5618), Montpellier, France
- Institute of Polymers, Slovak Academy of Sciences, Bratislava
- Department of Organic Technology, Slovak University of technology, Bratislava

2. Optimisation of the catalytic properties of synthetic organic matrices through chromatographic and spectrometric analysis ("at hoc" project without an official registration number, financed individually by participants involved) (M. Králik):

- Department of Chemistry, University of L'Aquila, Italy (co-ordinator)
- Department of Inorganic, Metallorganic and Analytical Chemistry, University of Padova, Italy
- Department of Physical Chemistry, University of Padova, Italy
- Italian National Centre of Research, Padova - Legnaro, Italy
- Czech Academy of Science, Prague
- Department of Organic Technology, Slovak University of Technology, Bratislava

period of co-operation: January 1997-December 2000

G. Visitors from Abroad

Dr. K. Ježábek
 Professor B. Corain
 Dr. J. Joffre
 Dr A. Biffis, Dr. G. Zanmarchi
 Dr. P. Graffin
 Dr. P. Moreau
 Dr. J. Joffre

UTZCHT Czech Academy of Sciences, Prague January 12 - 14
 University of Padova, Italy, January 12 - 15
 ENSCM-CNRS of Montpellier, France, April 20 - 28
 University of Padova, Italy, April 25 - 30
 ENSCM-CNRS of Montpellier, France, September 26 - 29
 ENSCM-CNRS of Montpellier, France, November 7 - 10
 ENSCM-CNRS of Montpellier, France, November 21 - 23

H. Visits of Staff Members and PhD Students to Foreign Institutes:

M. Králik M., D. Gašparovičová, M. Báhidský
 M. Hronec
 M. Králik
 M. Hronec, A. Kaszonyi, D. Grošková
 J. Horniaková, B. Liptáková

M. Hronec
 M. Hronec
 Hronec M.
 M. Králik
 D. Mravec

M. Hronec, A. Kaszonyi, M. Štolcová

M. Štolcová

M. Hronec
 D. Grošková
 M. Hronec, M. Králik, V. Krátky
 M. Hronec

TU Viedeň, January 21, 2000
 Viedeň, meeting of the European Academy of Sciences, March 3, 2000
 University of Padova, May 11 - 16, 2000

Krakow-Kazimierz, 5th Pannonian International Symposium on Catalysis, May 30 - June 4, 2000
 ICHT Praha, June, 2 days
 Praha, NATO projects meeting, July 4 - 7, 2000
 Granada, Spain, 12th ICC, July 9 - 16, 2000
 CHISA 2000, Praha, August 27 - September 1, 2000
 ENSCM-CNRS Montpellier, France, August 28 - September 11, 2000
 Rožnov p/R, Czech Republic, APROCHEM, September 25. - 27, 2000
 London, Great Britain, 23rd International Symposium on chromatography, October 1 - 7, 2000
 Paris, France, meeting EFCAT, October 20 - 22, 2000
 Sofia, Bulgaria, UNIDO, November 3-6, 2000
 Prague, Symposium on catalysis, November 5-7, 2000
 Valašské Meziříčí, November 27, 2000

VI. THESES AND DISSERTATIONS**A. Graduate Thesis (MS Degree)**

Abbasová H.
 Brežný B.
 Bírová A.
 Dembický M.
 Hanúsek R.
 Kellerová J.
 Živěáková M.

Study of the reaction of 1-chloromethylnaphtalene with methylamine (Mravec D.)
 The amination of benzene with ammonia (Kaszonyi A.)
 The oxidation of cyclohexylamine over heterogeneous catalyts containing tungsten (Kaszonyi A.)
 Transformation of methane on hydroxyapatite catalyts (Štolcová M.)
 The preparation of N-phenylcarbamates (Králik M.)
 Study of the biphenyl alkylation with isopropanol over zeolites (Mravec D.)
 Study of the catalyst properties for the preparation of substituted aromatic amine precursors (Štolcová M.)

B. Dissertation (PhD)

Grošková D. Reactivity of N-phenylhydroxylamine (Hronec M.)

VII. PUBLICATIONS**A. Journals (* registered in Current Contents)**

- [1]* Štolcová M., Kaszonyi A., Liptaj T., Hronec M.: Determination of the products of the reaction of N-alkyl-2-benzothiazolsulfenamide with acetone by high performance liquid chromatography. *J. Chromatography A*, 847, p. 351 - 358 (1999)
- [2]* Liptáková B., Hronec M., Cvengrošová Z.: Direct synthesis of phenol from benzene over hydroxyapatite catalyts. *Catal. Today* 61, 142 - 7 (2000)
- [3]* Horniaková J., Mravec D., Faboková S., Hronec M., Moreau P.: Selective alkylation of biphenyl with t-butanol over large pore zeolites. *Applied Catalysis A: General* 203, 47 - 53 (2000)
- [4]* Zecca M., Fišera R., Palma G., Lora S., Hronec M., Králik M.: Activity enhancement by the support in the hydrogenation of C=C bonds over polymer-supported palladium catalyts. *Chem. Eur. J.*, 11, 1980 - 1986 (2000) (0.8)
- [5]* Corain B., Králik M.: Dispersing metal nanoclusters inside functional synthetic resins: scope and catalytic prospects. *J. Mol. Catal. A: Chemical* 159, 153 - 162 (2000)
- [6]* Macho V., Králik M., Jureček J., Jurečková E., Balážová J.: Skeletal isomerisation of n-butenes present in C4 pyrolysis residue fraction. *Appl. Catal. A: General* 203, 5 - 14 (2000)
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B. Conferences (* International conferences)

- [1]* Grošková D., Štolcová M., Hronec M.: The condensation reaction of N-phenylhydroxylamine with aniline. 5th Pannonian International Symposium on Catalysis, Kazimierz Dolny, Poland, O-12 (2000) L
- [2]* Horniaková J., Mravec D., Moreau P.: Shape-selective tert.butylation of biphenyl over large pore zeolite catalysts. 5th Pannonian International Symposium on Catalysis, Kazimierz Dolny, Poland, O-3 (2000) L
- [3]* Gašparovičová G., Králik M., Hronec M., Jorík V., Zecca M.: Liquid phase reduction of nitrates over Pd-Cu catalysts supported on cationic resins. 5th Pannonian International Symposium on Catalysis, Kazimierz Dolny, Poland, P-45 (2000) Po (0.8)
- [4]* Kaszonyi A., Hronec M., Cvengrošová Z.: Polyoxometalates-catalyst for preparation of fine chemicals. 5th Pannonian International Symposium on Catalysis, Kazimierz Dolny, Poland, KN-9 (2000) KL
- [5]* Krátky V., Králik M.: Effect of substituents on the deactivation in the hydrogenation of aromatic nitrocompounds over Pd catalysts. 5th Pannonian International Symposium on Catalysis, Kazimierz Dolny, Poland, P-34 (2000) Po
- [6]* Liptáková B., Hronec M., Cvengrošová Z.: The direct hydroxylation of benzene to phenol. 5th Pannonian International Symposium on Catalysis, Kazimierz Dolny, Poland, O-10 (2000) L
- [7]* Mravec D., Horniaková J., Králik M., Hronec M.: Main and side reactions in the alkylation of polyaromatics. 5th Pannonian International Symposium on Catalysis, Kazimierz Dolny, Poland, P-46 (2000)
- [8]* Štolcová M., Hronec M.: MgO-Supported vanadium oxide catalysts for 2-methylnaphthalene oxidation. 5th Pannonian International Symposium on Catalysis, Kazimierz Dolny, Poland, P-26 (2000) Po
- [9]* Králik M., Krátky V., Hronec M., Zecca M., Corain B.: Deactivation of palladium catalysts supported on functionalised resins in the reduction of aromatic nitrocompounds. 12th International Congress on catalysis, Granada, Spain, July 9 - 14, 2000, p. 2321 - 2326, Po
- [10]* Macho V., Králik M.: A sulfur based catalytic system for the carbonylative reduction and the reductive carbonylation. 12th International Congress on catalysis, Granada, Spain, July 9 - 14, 2000, p. 3489 - 3494, Po
- [11]* Králik M., Gašparovičová D.: Catalytic removal of nitrates present in drinking water - the state of art. CHISA'2000, Prague, 27 - 31 August, Prague, CR, Lecture J2.5, p. 132 - 145, ISBN 80-86059-30-8
- [12]* Králik M., Gašparovičová D.: Modelling of the pollution of air by methyl-tert.butyl ether present in reformulated gasolines. *Ibid*, P7.50, ISBN 80-86059-30-8
- [13]* Štolcová M., Grošková D., Hronec M.: Novel reversed-phase liquid chromatographic determination of N-phenyl hydroxylamine and its analogous compounds 23rd International Symposium on Chromatography, Olympia, London, 1st - 5th October 2000, p. 247, Po
- [13]* Králik M., Jorík V., Gašparovičová D., Krátky V.: Preparation, storage and catalytic activity of metals dispersed on anionic resins. XXXII. Symposium on Catalysis, Prague, Nov. 6 - 7, 2000, Op 6
- [14]* Krátky V., Králik M., Hronec M.: Hydrogenation of chloronitrobenzenes. *Ibid*, Op 11
- [15]* Králik M., Zecca M., Biffis A., Jezábek K., Corain B.: Generating palladium nanoclusters inside functional polymer networks: catalytic prospects. *Ibid*, Po11
- [16]* Králik M., Mravec D.: Estimation of micropores by the modified BET isotherm and a combination of Dubinin-Radushkevich and BET isotherms *Ibid*, Po18
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- [18] Štolcová M., Hronec M., Liptáková B.: Parciálna oxidácia metánu na hydroxyapatitových katalyzátoroch. The partial oxidation of methane over hydroxyapatite catalysts. *Ibid*, p. 150 - 153
- [19] Macho V., Králik M.: Karbonylačná redukcia a redukčná karbonylácia nitrózo- a nitroaromátov na organické medziprodukty a produkty. The carbonylative reduction and the reductive carbonylation of nitroaromatics to organic products and intermediates. *Ibid*, p. 155 - 160
- [20] Macho V., Králik M., Cingelová J., Vajdová J.: Alkoholýza a glykolýza v príprave a recyklácii polyuretánov. Alcoholysis and glycolysis in the preparation and recycling of polyurethanes. *Ibid*, p. 161 - 165 ((0.3)
- [21] Kaszonyi A., Hronec M., Annus J.: Automatizovaný mikroreaktorový komplex na štúdium heterogénne katalyzovaných reakcií. Automatic microreactor equipment for the investigation of heterogeneous catalytic reactions. Zborník z celoštátneho seminára: Príťažlivé chemické technológie a materiál. Proceedings from the State -wide seminar: Attractive chemical technologies and materials. Púchov, 14. 6. 2000, p. 13 - 14 (1.0)
- [22] Mravec D., Horniaková J.: Zeolity ako významné katalyzátory pri príprave organických medziproduktov. Zeolites as remarkable catalysts for the preparation of organic intermediates. *Ibid*, p. 18 - 19
- [23] Králik M., Gašparovičová D.: Redukcia dusičnanov v pitnej vode na Pd-Cu katalyzátoroch, nanosených na kationových polyméroch. Reduction of nitrates in drinking water over Pd-Cu catalysts supported on cationic polymers. *Ibid*, p. 22 - 23
- [24] Vojtko J.: Dekarboxylácia organických kyselín - jednoduchá príprava inak ťažko dostupných vyšších ketónov. Dexarboxylation of organic acids - a simple preparation otherwise difficult available higher ketones. *Ibid*, p. 32 - 33
- [25] Macho V., Králik M., Komora L., Cingelová J., Vajdová J.: Využitie nových výsledkov, chemickotechnologické procesy a materiály. Utilisable new results, chemical-technological processes and materials. *Ibid*, p. 34 - 35

D. Patents

- [1] Macho V., Vojček L., Schmidtová M., Terlandová J., Kaszonyi A.: Spôsob výroby arylmočoviny. Methods for the preparation of arylureas. SK 280 359 (10. 12. 1999)
- [2] Vojtko J., Macho V., Mravec D.: Spôsob výroby ketónov alicyklických C5 až C11 a/alebo alifatických C3 až

C13. Methods for the production of alicyclic ketones C5 až C11 and/or aliphatic ketones C3 až C13. SK 280 688 (12. 6. 2000)

DEPARTMENT OF PETROLEUM TECHNOLOGY AND PETROCHEMISTRY

Head of Department:
Assoc. Prof. Zdenek Židek, PhD

Telephone ++421-7-52 92 60 37
Fax: ++421-7-52 49 31 98
E-mail: zidek@chtf.stuba.sk

I. STAFF

Full Professors:

Martin Bajus, PhD, DrSc; Jozef Baxa, PhD;

Associate Professors:

Pavol Daučík, PhD; Pavol Hudec, PhD; Agáta Smiešková, PhD;

Assistant Professors:

Elena Hájeková, PhD; Karol Trubač

Research Fellows:

Pavol Kaláb; Beata Liptáková;

PhD Students:

Jozef Ambro; Jozef Ilkovič; Roman Svitač; Ľuboš Šabo;

Technical Staff:

Marcela Hadvinová; Dagmar Machatová; Marta Olleová; Ernest Patzelt; Emil Pribiš; Helena Šušalová;

II. TEACHING AND RESEARCH LABORATORIES

Laboratory of Catalysts Characterization
Laboratory of High Pressure Reactors
Laboratory of Gas and Liquid Chromatography
Laboratory of Chemistry and Analysis of Fuels
Laboratory of Pyrolysis
Laboratory of Rheology of Lubricants
Laboratory of Infra-Red Spectroscopy
Laboratory of Natural Gas Conversion
Wiped-film Molecular Evaporator

III. TEACHING

A. Undergraduate study

4th Semester (spring)

Organic Technology and Petrochemistry	(3-1 h)	Bajus, Smiešková, Daučík
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7th Semester (autumn)

Catalysis	(0-1 h)	Hudec
Analysis of Petroleum Products	(2-0h)	Daučík
Technology of Crude Oil	(3-0 h)	Židek, Smiešková
Combustion Processes	(1-2 h)	Smiešková
Engineering Calculations on Computer	(0-2)	Ambro
Laboratory exercise 1	(0-8 h)	Daučík

8th Semester (spring)

Alternative Fuels	(2-1 h)	Bajus
Catalytic and Thermal Processes in Crude Oil Treatment	(3-0 h)	Židek
Tribology	(2-0 h)	Hájeková
Kinetic and Reactors	(0-2 h)	Hudec
Laboratory exercise II	(0-8 h)	Hudec

9th Semester (autumn)

Petrochemistry	(3-0 h)	Bajus
Refinery and Petrochemical Plants	(1-1 h)	Daučík
Laboratory exercise III	(0-10 h)	Hudec

IV. CURRENT RESEARCH PROJECTS

A. New catalysts for industrial applications (Milan Hronec)

In petroleum industry and petrochemistry, still growing applications find a catalytic materials with precisely defined structure and acido-basic properties. Among such suitable catalysts, zeolites and ordered mesoporous materials play role as basic components. The project is oriented to development of knowledge of the role of heterogeneous catalysts in selected refinery and petrochemical processes, to develop the relation between composition, structure and method of the catalysts preparation and their catalytic properties. The research is oriented into following subjects:

1. Characterization of influence of extraframework aluminum on acid and catalytic properties of zeolites USY and steamed ZSM-5 (measured by XRD, IR, TPDA, surface area, pore size distribution, distribution of Brønsted and Lewis acid sites and their common induction effect). Influence of the stabilization conditions and method of following acid modification are studied.

2. Study of method of the incorporation and quantity of zinc and its influence on the activity of Zn-ZSM-5 zeolites in aromatization of light hydrocarbons - examination of liquid ion exchange as well as solid state ion exchange, characterization of samples by TPDA, IR and by catalytic tests.

3. Preparation of materials with ordered mesoporous structure as MCM-41. Such materials are potential suitable components of the new generation of FCC, HC and HR catalysts in relation to their wide mesoporous structure with the pore diameter of 4 - 10 nm.

4. Hydrorefining (HDS, HDN) of middle petroleum distillates with the aim to explain the reason of lower color stability of gasoline, kerosene and gas oil from hydrocracking of heavy residues. Studies are carried out in a laboratory pressure reactors using commercial hydrorefining catalysts under conditions used in refineries.

B. Interactions between composition and properties of fuels, lubricants and heavy oil products (Pavol Daučík)

Oil products quality improvement is a general trend to utilize more effectively the expensive raw material, to prolong the lifetime of machines and equipment where oil products are used. Nowadays it is an obvious requirement to minimize the negative effects of oil products on the environment. Fuels, lubricants and heavy oil products form the major part of products which are actually used in all fields of industry and common consumption. Functional properties are the deciding factors for the product choice in certain use in practice. At comparable qualitative parameters, the economic standpoint is the decisive factor in the choice from the appropriate supply. Then, the price regarding the consumption and qualitative properties is the deciding criteria in the product choice. Nowadays the product choice is expressively influenced by ecological standpoint. It is unequivocal that ecological and economic standpoints contradictory effect on the product choice. Hence, the ecological criteria is influenced only by legislation stated rules. Ecological viewpoint gets then its priority and in some countries the maximum content of aromatics, sulfur and metals are determined by law.

Project is aimed at the interactions between the composition and the properties of oil products and additives. The main target is the evaluation of oxidative stability, rheological properties, effects of additives on functional properties of fuels, lubricants and heavy oil products. Project's intention is to utilize correlation between composition and properties of the product to evaluate the quality and the optimal composition of the given product. From the ecological standpoint the determination of aromatic hydrocarbons content, sulfur and metal content is significant, with the goal to evaluate the effect of minimization of the content of these compounds on the functional properties of products.

C. Thermal and catalytic conversion of petroleum and alternative feedstock to refinery products and petrochemical and their biodegradability (Martin Bajus)

Most intermediates and monomers in the petrochemical industry are currently produced starting from alkenes and aromatics as building blocks. Alkenes are obtained mainly by steam cracking (pyrolysis) of hydrocarbon from petroleum and natural gas. The original aim of the research project is based on copyrolysis of high and low molecular hydrocarbons, for example: hexadecane and heptane. Under conditions of copyrolysis of hydrocarbons of paraffinic character to low molecular alkenes and aromatics, there occurs a minimal process of secondary reactions and as a result of which are formed highly molecular sediments, pitches and coke in the reactor and heat exchange apparatus in the pyrolysis system and carbon oxides. A significant theoretical contribution is expected in the clarification of the interaction taking place in the copyrolysis between different hydrocarbons, in the determination of how, in the interaction, the overall kinetics of pyrolysis and the composition of products change.

Research is now being aimed at the replacement of some of raw materials with alkanes, which are more economical than the corresponding olefins, readily available and with low toxicity as compared to aromatics. The challenge of methane transformation to liquid fuels has directed research first towards i) the oxidative coupling to ethane and ethylene and ii) oxidation to methanol as one of the most promising routes for valorization of methane. Particular reactor based on porous ceramic membranes, both inert and catalytic.

Pollution of environment by refinery products and petrochemicals represents a serious problem. This is reason why selection, physiological and biochemical studies microorganisms with ability to biodegrade selected pollutants, is a part of research program. Recognition of key biochemical intermediates enable us a design of metabolic pathways and biodegradation kinetics for model substances under given conditions.

V. COOPERATION

A. Cooperation in Slovakia

SLOVNAFT, j.s.co., Bratislava

SLOVNAFT-VURUP, Bratislava

NAFTA, Gbely, j.s.co.

PETROCHEMIA Dubová, j.s.co.

SPP (Slovak Gas Industry), Bratislava

Institute of Chemistry, Faculty of Natural Sciences, Comenius University, Bratislava

Department of Nuclear Physics and Technology, Faculty of Electrical Engineering, Bratislava

EKOIL, j.s.co., Bratislava

B. International cooperation

Spolana, j.s.co., Neratovice, Czech Republic

- utilization of alfa-olefins

Ecole Nationale Superieure de Chimie, Montpellier, France

-Xe-NMR-characterization of dealuminated zeolites

Institute of Physico-Chemistry and Electrochemistry, Academy of Sciences, Prague, Czech Republic

-Evaluation of zeolites by infra-red spectroscopy

-Determination of adsorption properties of ZSM-5 zeolites

C. Membership in Domestic Organizations and Societies

Slovak Society of Industrial Chemistry, Bratislava (E.Barteková, M.Bajus, P.Dauěík, P.Hudec, E.Rojasová, A.Smiešková, Z.Židek)

Slovak Society of Chemical Engineering, Bratislava (P.Hudec, A.Smiešková, Z.Židek)

Slovak Zeolite Association (P.Hudec - chairman, A.Smiešková, ¼Šabo, Z.Židek)

G. Visitors from Abroad

Prof.L.Zanzotto

University of Calgary, Calgary, Canada, (7 days)

H. Visits of Staff Members and Postgraduate Students in Foreign Institution

K.Trubaè

University of Calgary, Calgary, Canada, September-November 2000 (90 days)

VI. THESIS AND DISSERTATIONS

A. Graduate Theses (MS Degree) for state examinations after five years of study (supervisors are written in brackets)

Balážová K.:	Synthesis and characterization of mesoporous materials (¼Šabo)
Biskupièová E.:	Composition of methylesters of colza oil (E. Hájeková)
Kasalovský A.:	Influence of additives on low-temperature properties of diesel fuels (J. Ambro)
Labaj M.:	Alkylation of naphthalene with olefins C16 on zeolite catalysts (A. Smiešková)
Letovancová Z.:	Physico-chemical and catalytic properties of Zn-modified zeolites (E. Rojasová)
Mellová M.:	Determination of the stability of motor oils by oxidation test IP 48/49 (J. Ambro)
Ondréšiková A.:	Influence of extraframework aluminium on aromatization activity of zeolites (A. Smiešková)
Popálený P.:	Microactivity test of FCC catalysts (P. Hudec)
Sárkoziová A.:	Reological properties of viscous petroleum fractions (J. Ambro)
Stancl F.:	Oxidative dimerization of methane (M. Bajus)
Stefankovicsová G.:	Hydrorefining of middle distillates of petroleum (P. Hudec)
Stolárik A.:	Copyrolysis of hydrocarbons (E. Hájeková)
Súdny M.:	Evaluation of efficiency of clearing and degreasing properties of new clearing liquids (P. Dauěík)
Vojtek J.:	Study of properties of high-basic detergents for engine oils (K. Trubaè)

D. Habilitation Theses

Dauěík P.:	Analysis of the composition of middle and heavy petroleum products
Smiešková A.:	Properties of zeolites and the application of zeolite catalysts in treatment of petroleum feeds

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

- [1] Bajus M.: Ropa a alternatívne energetické zdroje. Petroleum and Alternative Energetic Sources (in Slovak). Ropa, uhlie, plyn a petrochémia 42 (2), 24-28 (2000)
- [2] Dauěík P., Ambro J., Židek Z., Horák A.: Evaluation of Additives Improving Low-Temperature Properties of Middle Distillates. Petroleum and Coal 42 (2), 37-40 (2000)
- [3] Hájeková E., Bajus M.: Hexadecane-Cyclohexane Copyrolysis. Petroleum and Coal 42 (1), 9-16 (2000)
- [4] Hájeková E., Bajus M., Svitaò R., Ladický M.: Copyrolysis of Hydrocarbons. Petroleum and Coal 42 (3-4), (2000)
- [5] Hudec P., Smiešková A., Židek Z., Rojasová E.: Evidence of the supermicropores creation in zeolites. Dealumination of narrow-pore zeolites. Studies in Surface Science and Catalysis 130, A.Corma, F.V.Melo, S.Mendioroz and J.L.Fierro (Editors), Elsevier Science B.V., 2903-2908 (2000), ISBN 0 444 50480 X
- [6] Mravec D., Zedníková M., Michvocík M., Hudec P., Smiešková A., Hronec M.: Shape-selective Isopropylation of Biphenyl over Mordenite Catalysts. Petroleum and Coal, 42 (1), 34-36 (2000)
- [7]* Rojasová E., Smiešková A., Hudec P., Židek Z.: Interaction of ZnO with ZSM-5 zeolites, Collect. Czech. Chem. Commun. 65, 1506-1514 (2000)

B. Conferences (*International conferences)

- [1]* Bajus M., Hóka Cs.: Reformulované a alternatívne palivá- súčasnosť a budúcnosť. Reformulated and alternative fuels - (in Slovak). In: Proceedings of Motor Fuels 2000, International Symposium, Vyhne, Sept.25.-28.2000, Slovenská spoločnosť priemyselnej chémie, pobočka pri Slovnaft, a.s., Bratislava, p.143 -159 (2000), ISBN-968011-3-9
- [2] Daučík P., Ambro J., Židek Z.: Porovnanie stanovení arómátov v dieselových palivách. Comparison of the determination of aromatics in diesel fuels (in Slovak). In: Proceedings from VIII. Conference " Súčasný stav a perspektívy Analytickej chémie v praxi". Bratislava September 18-21 2000, 79-82
- [3] Daučík P., Ambro J., Židek Z.: Hodnotenie čistiackej účinnosti netoxických uhľovodíkových rozpúšťadiel. Evaluation of clearing efficiency of non-toxic hydrocarbon's solvents (in Slovak) . In: Proceedings of the 9th. Conference of Chemical Technology APROCHEM 2000, September , Rožnov pod Radhoštěm, Czech Republic, p.54 -59. ISBN 80-02-01368-9
- [4] Hájeková E., Bajus M., Stolárik A.: Tvorba koksu pri kopyrolýze uhľovodíkov. The Creation of Coke at Copyrolysis of Hydrocarbons (in Slovak). In: Proceedings of the 9th. Conference of Chemical Technology APROCHEM 2000, September , Rožnov pod Radhoštěm, Czech Republic, p.92 -95 (2000), ISBN:80-02-01368-9
- [5]* Hájeková E., Bajus M., Svitáček R.: Copyrolysis of Hydrocarbons. In: Abstracts of 14th International Symposium on Analytical and Applied Pyrolysis, April 2-6, 2000 Seville-Spain, Consejo Superior de Investigaciones Científicas, p.168 (2000), ISBN 84-699-2222-x
- [6]* Hudec P., Smiešková A., Židek Z., Schneider P.: Text ure analysis of zeolites by t-plot method. In: Proceedings of the 14th Int. Congress of Chem. and Proc. Engineering, Prague, Czech Republic 27-31 August 2000, Symp. on sorption, mass transport and catalytic phenomena in micropor. membranes and related materials, D6.3, Summaries 2 (Separation, Processes and Equipment), p.130, ISBN 80-86059-30-8
- [7]* Hudec P., Daučík P., Ambro J., Židek Z.: Stanovenie zloženia motorových palív zmiešaných pri chybnnej manipulácii na čerpacích staniciach. Determination of the Composition of Motor Fuels Mixed During Inaccurate Manipulation at Filling Stations (In Slovak). In: Proceedings of the International Symposium MOTOR FUELS 2000, September 25. - 28., 2000, Vyhne, p. 273-280, ISBN 80-968011-3-9
- [8]* Hudec P., Smiešková A., Židek Z., Rojasová E.: Formation of secondary micropores in narrow-pore zeolites after dealumination. In: Proceedings of the 5th Pannonian Symposium on Catalysis, Kazymierz Dolny nad Wisla, Poland, May 31 - June 3rd, 2000, O-8
- [9]* Hudec P., Šabo ¼, Smiešková A., Židek Z., : Influence of the way of Fe incorporation into USY zeolite on some physico-chemical properties. In: Proceedings of the 5th Pannonian Symposium on Catalysis, Kazymierz Dolny nad Wisla, Poland, May 31 - June 3rd, 2000, P-11
- [10]* Hudec P., Smiešková A., Židek Z., Šabo ¼: Factors influencing the conversion of gas -oil and product distribution in micro-activity test (MAT) of FCC catalyst. In: Proceedings of the XXXII Symposium on Catalysis, Prague, Czech Republic, November 6-7, 2000, Op1
- [11]* Rojasová E., Smiešková A., Hudec P., Židek Z.: Contribution to the mechanism of light alkanes aromatization over Zn-modified ZSM-5 zeolites. In: Proceedings of the 5th Pannonian Symposium on Catalysis, Kazymierz Dolny nad Wisla, Poland, May 31 - June 3rd, 2000, O-1
- [12]* Smiešková A., Hudec P., Židek Z., Rojasová E., ¼Šabo: Investigation of the conditions of selfsteamed Y zeolite preparation on acid sites activity. In: Proceedings of the 5th Pannonian Symposium on Catalysis, Kazymierz Dolny nad Wisla, Poland, May 31 - June 3rd, 2000, P-12
- [13]* Šabo ¼, Hudec P., Smiešková A., Balážová K., Židek Z.: Comparison of hydrogenation catalysts based on nickel supported mesoporous materials. In: Proceedings of the XXXII Symposium on Catalysis, Prague, Czech Republic, November 6-7, 2000, Po10

D. Patents

- [1] Hudec P., Hložek P., Úradníček L., Morávek Š. , Židek Z.: Spůsob výroby uhľovodíkových frakcií s počtem uhlíků 2 až 12. Method of the production of hydrocarbon fraction with C2-C12 (in Slovak). SK 280 676 (15.3.2000)
- [2] Prandová K., Hudec P., Židek Z.: Spůsob metatézny alkénů. Method of alkenes meta thesis (in Slovak). SK 280 658 (23.5.2000)

DEPARTMENT OF PHYSICAL CHEMISTRY

Head of Department:
Prof. Stanislav Biskupiè, PhD, DSc

Telephone: ++ 421-7-5292 6032
Fax: ++ 421-7-5249 3198
E-mail: biskupic@cvt.stuba.sk

I. STAFF

Full Professors:

Stanislav Biskupiè, PhD, DSc; Peter Pelikán, PhD, DSc; Andrej Staško PhD, DSc.

Associate Professors:

Jozef Antalík, PhD; Martin Breza, PhD; Vlasta Brezová, PhD; Ján Cvengroš, PhD, DSc; Anton Gatíal, PhD; Pavel Kovačik, PhD; Jiří Polavka, PhD; Peter Šimon, PhD, Marián Valko, PhD

Assistant Professors:

Vladimír Adamčík, PhD; Martina Bittererová, PhD; Róbert Klement, PhD; Jozef Polakoviè, PhD; Štefan Pollák, PhD; Peter Rapta, PhD; Ján Regulí, PhD; Imrich Vrábek, PhD; Ľubomír Zalibera, PhD

Research Fellows:

Andrea Bírová; Erik Klein; Milan Mazúr, PhD; Ján Micanko, PhD; Anna Pavlovièová.

PhD Students:

Rastislav Jaruševák; Jozef Pauloviè; Dana Dvoranová.

Technical Staff:

Alojz Budoš, Imrich Čsonka, Augustín Jurkoviè, Katarína Labudová, Marta Lintnerová, Miroslav Minarových, Štefan Miksai, Milan Štefunko, Mária Šuleková, Štefan Šurman.

Emeritus Fellows:

Ján Mikuláš Lisý, PhD; Alexander Tkáč, PhD, DSc, Ladislav Valko PhD, DSc

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories

Laboratory for the Basic Course of Physical Chemistry
Laboratory for the Advanced Course of Physical Chemistry
Laboratory of Electronics
Laboratory of UV-VIS and IR Spectroscopy

B. Research Laboratories

Laboratory of Differential Scanning Calorimetry
Laboratory of EPR Spectroscopy
Laboratory of Material Study and Light Scattering
Laboratory of Molecular Distillation

C. Special Measuring Instruments

Electron Paramagnetic Resonance Spectrometer BRUKER ER 200D-SRC
Differential Scanning Calorimeter DSC-7 Perkin-Elmer with an accessory for dynamic DSC

III. TEACHING

A. Undergraduate study

1. Introductory courses

3rd semester (autumn)

Physical Chemistry I	(3-2 h)	S. Biskupiè, A. Gatíal
Laboratory of Physical Chemistry	(0-3 h)	P. Šimon

4th semester (spring)

Physical Chemistry II	(3-2 h)	S. Biskupiè, P. Kovačik, A. Gatíal,
Laboratory of Physical Chemistry II	(0-3 h)	P. Šimon

2. Advanced courses

5th semester (autumn)

Physical Bases of Molecular Spectroscopy	(2-2 h)	A. Staško, V. Brezová
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6th semester (spring)

Biophysical Chemistry	(2-2 h)	M. Valko
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7th semester (autumn)

Chemical Physics I	(2-1 h)	P. Pelikán
Thermodynamics	(2-1 h)	P. Šimon
Kinetics and Catalysis	(2-1 h)	P. Kovačik

Colloid Chemistry	(2-0 h)	J. Antalík
Statistical Treatment and Evaluation of Experimental Data	(2-0 h)	M. Breza
Groups Theory and Symmetry	(2-0 h)	M. Breza, V. Kvasnička
Laboratory of Advanced Phys. Chem. I	(0-8 h)	V. Adaměik
8th semester (spring)		
Chemical Physics II	(2-1 h)	S. Biskupič
Physics of Solid Phase	(2-0 h)	M. Breza
Laboratory of Advanced Phys. Chem. II	(0-6 h)	P. Raptá
Traineeship		
Excursion		
9th semester (autumn)		
Molecular Spectroscopy	(2-1 h)	A. Staško
Chemical Physics III	(2-0 h)	A. Gašal
Laboratory of Advanced Phys. Chem. III	(0-10 h)	V. Adaměik

IV. CURRENT RESEARCH PROJECTS

A. Structure and Reactivity in Chemical and Biological Systems (Andrej Staško)

The research activity of our group is focused on the intermediates formed in various systems using electrochemical techniques (cyclic voltammetry) and spectroscopic methods (EPR, UV, Vis, and NIR). One of the most investigated systems remains C60 fullerene, where the formation of anion radicals is followed in the cathodic or photochemical reduction with Et3N, TiO2 or other donors. Lately we expanded such studies also to C70 and C120 fullerene. The results obtained bring new aspects in the interpretation of the EPR spectra of fullerene anions.

To obtain a new quality of information we are developing in situ spectroelectrochemical techniques under a simultaneous exploitation of EPR, UV, Vis, NIR spectroscopy and cyclic voltammetry. This enables an unambiguous assignment of the spectral data to the species generated in the electron transfer reactions, what is frequently not possible if the experiments as cyclic voltammetry, NIR or EPR measurements are carried out separately, especially if more unstable intermediates are expected. The technique developed was successfully applied in the fullerene investigations, in the description of unstable dimers on the conducting films from polymers, in the redox processes of conducting polypyrrols and also in the investigations of components used in the preparation of light diodes.

The quantitative EPR spectroscopy remains a permanent problem due to the very limited reproducibility, as various parameters (position of the sample in the cavity, its shape, changing parameters of spectrometer and others) are very sensitively reflected in the integral intensity of EPR signals. To map and to eliminate these error sources an intensive research is carried out in numerous laboratories. Systematic investigations and a valuable contribution to this field was lately published from our laboratory, where the influence of the probe position, its size and other parameters were described enabling the elimination of many errors frequently neglected so far. The results obtained allow to predict the change of EPR amplitude on the position and the shape of the sample.

The role of the radical processes is increasingly recognised not only in the living organisms but also in the foods, where the radical mechanisms are frequently responsible for their losing quality. Based on this assumption, various methods to test the quality of foods were elaborated. We also started research in this field applying EPR spin trapping in the investigations of stability of beer probes from the Slovak and Czech market and then also from the German market and suggested a procedure enabling to compare and to predict the beer stability of various probes. Similarly we suggested and tested by now some procedures to evaluate the antioxidant - scavenging activity of wine probes.

B. Development and application of computational methods to the study of structure, dynamics and properties of molecular systems (Stanislav Biskupič)

1. A new method for generation of the relativistic Gaussian basis sets has been elaborated and implemented. The optimization method is based on the stochastic two-step procedure.

2. Theoretical treatment for calculation of the interaction energy of two closed shell systems and the molecular complex containing one open and one closed shell system has been formulated and applied in order to test the reliability of the proposed theory. New method is based on the 3rd order many body perturbation theory. The superposition error elimination was the subject of our investigations, too.

3. Precise calculations based on the MR SDCI method has been applied in order to obtain a good estimation of the potential hypersurface for HFF open shell molecular system with the aim to use it as a basic input for the future molecular dynamics studies. Sufficiently large active space has been used in all calculations.

4. Quantum chemical study of the azomethane decomposition has been done. Several kinetic parameters of the reactions under study were calculated.

5. Infrared spectra of selected organic compounds have been registered. Their interpretation and conformational analysis is based on the ab initio method with inclusion of the correlation energy.

6. Based on the newly developed theoretical treatment the calculation of the adiabatic and/or nonadiabatic corrections to the energy and vibrational frequencies has been done.

7. Periodic solid state systems have been studied within the originally reformulated theoretical treatments on the basis of the INDO type semiempirical hamiltonian.

8. The mutual influence between perturbation of the electronic structure of molecules and perturbations of regular geometric arrangement of atoms in molecules has been studied. In systems with degenerate electronic states, the perturbations are due to vibronic interactions, whereas in cis-trans phosphazenes the perturbations are a consequence of non-equivalence of interatomic interactions.

C. MATERIALS – physico-chemical methods of their study and their preparation (Peter Šimon)

The method for the evaluation of kinetic parameters of induction periods has been elaborated. The method enables to estimate the length of nonisothermal induction periods in the processes such as rubber curing, polymer and oil

oxidation, freezing of undercooled liquids etc. The method is expected to be applied in the quality management and risk assessment in technological processes.

Degradation and stabilisation of PVC is studied both experimentally and theoretically. The attention is paid to the non-hazardous stabilizer mixtures based on tocoferyl acetate.

The thermochemical behaviour of selected complex compounds of Ni, Cu and Co has been studied from the point of view of their application as adhesion promoters in rubber curing.

The influence of glass transition and nonisothermal treatment of amorphous metal metals Fe_{100-x}B_x (13 < x < 21) on the relative permeability, core-losses and magnetic induction has been investigated.

The processes occurring in foods are modelled with the aim of hazard assessment in critical control points.

A method for the parameter evaluation in implicit and nonlinear models without the necessity of using any linearisation is suggested.

D. Separation in molecular evaporator (Ján Cvengroš)

The research project is focused on the theory of molecular distillation, the development of the short-path evaporators with wiped film and on the applications of molecular distillation. The main results in 2000 are as follows:

1. Further development of the mathematical model of the molecular distillation comprising all till now known factors which influence the process. The model allows to evaluate the influence both process and construct parameters on the output and separation, to render the information about the unmeasurable parameters, to simulate different situations in the evaporator and to optimise the process. Using the model, the effect of entrainment separator was studied, as well as the feed temperature influence on the evaporator efficiency, the influence of the evaporating film hydrodynamics and the possibilities of divided condenser. Good agreement was achieved by comparison between experimental and model results.

2. The shape of RTD-curves from the study of profiled wipers with passage channels indicates that there are three different regimes in the liquid flow on the evaporating cylinder according the liquid load, peripheral speed of wiper, its construction and its sense of movement. The strand regime with the liquid flow downward along the screw tread at prolonged residence time is considered favourable for molecular distillation to perform efficient evaporation under gentle conditions at a lowered temperature.

3. Some interesting applications of molecular evaporators were developed (regeneration of used mineral oils, purification of K1 vitamin, PCB contaminated oils treatment, preparation of neutral methyl esters of vegetable oils, preparation of methyl esters with low phosphorus content and others).

E. Band structure calculations and synthesis of new type of semi-conducting materials (Peter Pelikán)

Recently, the interest of scientists working in the synthesis of solid state materials has been focused on new type of semiconductors with wide possibilities of technical applications. Current knowledge in theoretical field is not sufficient to define the structure and properties directly but it is in the level allowing predictions of trends leading to the rational synthesis. In this way, a good co-operation of theoreticians and synthesizers, makes it possible to reduce the number of infinite synthetic possibilities down, to rationale number of synthesis of compounds with previously calculated physical and chemical properties.

The goal of proposed project in the computation of band structure of potential semi-conductive materials and, on the basis of such calculations, the synthesis of new types of materials with required properties. To achieve aforementioned goal, a method for computation of electron structure and properties of new type of materials with translation symmetry was proposed.

For this purpose we elaborate the Cluster Crystal Orbital (CCO) method for calculation of electron structure of solid state systems with translation periodicity. Within this method extremely large finite clusters containing tens of thousands of atoms are considered. This lead to inclusion of the long-range interactions which, in general have important influence on the electron properties of a solid state system. Within this method the modulo-periodic boundary conditions ensure the periodicity of the wave functions, eliminate the so-called boundary effects (the fact that bonds on the boundaries of a given cluster are unsaturated), and allow the use of the transformation to the Bloch orbital basis. Calculation of electron density based on several thousands of points of the Brillouin zone gives the values of the density matrix close to its bulk limit values. These are further used for band structure calculation.

F. Camptothecin and metal chelate – albumin interactions: The high affinity binding site in serum albumins (Marián Valko)

The anticancer drug camptothecin (CPT) is a plant alkaloid that has recently gained US approval for clinical trials as a treatment of gastric, rectal, and bladder tumors. Camptothecin contains an α -hydroxy- α -lactone ring moiety, which is critical for effective drug action. Under basic conditions (at pH > 7) the lactone is readily hydrolysed to yield the biologically inactive carboxylate form of the drug. The drug also converts to the biologically inactive form in the presence of human serum albumin (HSA) consequently in vivo stabilization of the lactone form is therefore of primary importance for it to be effective. We believe that liposomal stabilisation of camptothecin would both protect the lactone ring and be medically acceptable, thus a high resolution NMR study is planned to assess the stabilization of the lactone form and the nature of the of binding to HSA.

A second objective is to investigate the mechanism of drug action. It has previously been reported that many photoactivated drugs react through free radical mechanisms and CPT is known to be a photoactive molecule. In addition radical processes are often enhanced by the presence of paramagnetic metal ions. It has therefore been proposed that CPT activity might (a) require the presence of trace metals and (b) occur through a free radical mechanism. Our preliminary results, based on Electron Paramagnetic Resonance (EPR) experiments, show that, upon irradiation at 365 nm, the Cu(II)-CPT complex does generate a combination of free radicals which in turn may cause DNA damage to cancer cells. This project will investigate further the radical mechanism of CPT action using both spin trapping experiments and biochemical tests for DNA damage.

G. Non-formal education in chemistry (Ján Reguli)

Several educational materials for secondary school teachers and for gifted students interested in chemistry were published (including the tasks for Chemistry Olympiad). The travelling interactive exhibition SCHOLA LUDUS – LIQUIDS, with 75 interactive exhibits, devoted to dynamic processes in liquids and physical properties of liquids, created in 1999,

was in 2000 installed at several places.

V. COOPERATION

A. Co-operation in Slovakia

Department of Histology, Faculty of Medicine, Comenius University, Bratislava
 Department of Chemistry, Faculty of Pedagogy, University of Trnava, Trnava
 Faculty of Natural Sciences, Comenius University, Bratislava
 Institute of Inorganic Chemistry, Slovak Academy of Sciences, Bratislava
 Faculty of Natural Sciences, University P. J. Šafárik, Košice
 Department of Chemistry, Faculty of Industrial Technologies Púchov, University of Trenčín
 Institute of Experimental Pharmacology, Slovak Academy of Sciences, Bratislava
 Research Institute of Drugs Modra
 EKOIL Bratislava
 EKOTIPS Bratislava
 DETOX Banská Bystrica
 OMV Slovensko Bratislava
 Slovakofarma Hlohovec
 Herbaton Klàov
 KLIMAŤI Hlohovec
 Duslo Šaã¼
 Q-CHEM Modra
 DAMT-MDT Martin
 LikoSpol Bratislava

B. International Co-operation

Institut für Theoretische Chemie und Strahlenchemie, Universität Wien, Austria: Ab initio calculations of potential energy surfaces of small molecules using multiconfiguration methods
 Institut für Analytische Chemie, TU Dresden, Germany, Department of Chemistry, University of Oslo, Norway: Measurement, interpretation and theoretical calculation of vibrational IR and Raman spectra of some organic molecules.
 TU-Darmstadt, Darmstadt, SRN, Röntgen structure research of crystalline compounds
 Royal Institute of Technology, Stockholm, Sweden: Molecular dynamics of N₄
 Max-Planck-Institut für Strömungsforschung, Göttingen, Germany: Photodissociation of HNCO
 University of Veszprém, Veszprém, Hungary: Emission spectra calculations
 State University of New York, Buffalo, USA: DFT calculations of blue proteins model compounds
 School of Pharmacy and Chemistry, Liverpool John Moores University, Liverpool, United Kingdom (Dr H. Morris): Spectroscopy of transition metal compounds.
 Department of Chemistry, University of Manchester, Manchester, United Kingdom (Dr F. Mabbs): Multiple-frequency EPR measurements.
 Department of Instrumental and Analytical Science, UMIST, Manchester, UK (Dr. Kvasnik): Development of fibreoptic distributed sensors for ammonia.
 Chemical Industry Education Centre, Department of Chemistry, University of York, York, United Kingdom
 University of Technology, Sydney, Australia
 University of Poznan, Poland
 VŠCHT, Institute of Polymers, Czech Republic
 IFW Dresden e. V., Dresden, Germany: Novel EPR techniques, intermediates in electrochemical reactions
 Institut für Makromol. Chemie, TU München, Germany: Material for light diodes
 Institute of Physical and Theoretical Chemistry, Technical University, Graz, Austria: EPR spectroscopy, education
 Faculty of Chemistry, Technical University, Brno, Czech Republic
 LUKAS Research, Prague, Czech Republic
 Faculty of Chemical Technology, University of Pardubice, Czech Republic.
 Faculty of Natural Sciences, University of Michigan, Ann Arbor, Michigan, USA
 SPOFA Prague, Czech Republic - refining of castor oil

C. Membership in Domestic Organisations and Societies

Slovak Chemical Society
 Institute of Inorganic Chemistry, Slovak Academy of Sciences - member of Scientific Board (P. Pelikán)
 Chemical Papers - member of Editorial board (P. Pelikán)
 Slovak Academic Society, Bratislava (P. Pelikán)
 Slovak Society of Chemical Engineers (J. Cvengroš)
 Slovak Vacuum Society (J. Cvengroš)
 Slovak Group for Thermal Analysis and Calorimetry (P. Šimon)

D. Membership in International Organisations and Societies

International Society for Theoretical Chemical Physics, Germany (S. Biskupiè)
 International ESR Society, USA (S. Biskupiè)
 American Chemical Society, USA (A. Staško)
 American Oil Chemist's Society, USA (J. Cvengroš)
 American Chemical Society, USA (J. Cvengroš)

International Confederation for Thermal Analysis and Calorimetry

(P. Šimon)

F. International Scientific Programmes

1. NATO program for thermo-electric materials (P. Pelikán)

2. CEEPUS program – co-operation with University Graz (Austria), University Poznan (Poland), University Veszprém (Hungary), University Sofia (Bulgaria), Masaryk University Brno (Czech Republic), University Maribor (Slovenia), Bulgarian Academy of Sciences (Bulgaria), Pedagogical University Zielona Gora (Poland), Babes-Bolyai University Cluj (Romania). (A. Staško)

3. Charge Density Analysis of Transition Metal Complexes by Accurate XRay Diffractions Methods, NSF-CHE96155, SUNY Buffalo, USA, 1999-2002 (Jozef Kožíšek).

G. Visitors from abroad

Prof. G. Grampp, Institute of Physical and Theoretical Chemistry, Technical University Graz, Austria (10 days)

Dr H. Morris, School of Pharmacy and Chemistry, Liverpool John Moores University, Liverpool, United Kingdom, June 2000, 3 weeks

Prof. J. Telser, School of Chemistry, Roosevelt University, Chicago, USA, August 2000, 5 days

Dr. Abhi Ray, University of Sydney, Australia, sabbatical semester, august-september 2000.

H. Visits of Staff Members and Postgraduate Students to Foreign Institutions

M. Bittererová	Royal Institute of Technology, Stockholm, Sweden, May-December 2000 (8 months)
M. Bittererová	Emory University, Atlanta, USA, January-April 2000 (4 months)
M. Breza	State University of New York, Buffalo, USA, September 2000 (19 days)
V. Brezová	Institute of Theoretical and Physical Chemistry, Masaryk University Brno, Czech Republic (10 days)
J. Kožíšek,	TU-Darmstadt, Germany, July-August 2000 (40 days)
J. Kožíšek	ECM-19 Conference, Germany, August 2000 (6 days).
M. Mazúr	14th NMR Valtice, Central European NMR Discussion Groups, Valtice, Czech Republic, April 2000 (3 days).
P. Rapta	IFW Dresden, Germany (15 months)
J. Reguli	Chemical Industry Education Centre, Department of Chemistry, University of York, UK, January 2000, 9 days.
J. Reguli	52 Congress of Chemical Societies, Eeské Budi jovice, Czech Rep., September 2000, 4 days
A. Staško	Discussion Meeting Progress in the Magnetic Resonance of Bioactive Compounds and New Materials, Gesellschaft Deutscher Chemiker, Fachgruppe Magnetische Resonanzspektroskopie, Regensburg, Germany
I. Vrábel	University of Vienna, Austria, September-December 2000 (4 months)
P. Šimon	DIAS UMIST, Manchester, UK (5 days)
P. Šimon	12th ICTAC conference, Copenhagen, 14.-18. August 2000

VI. THESES AND DISSERTATIONS

A. Graduate Thesis (MS degree) for state examinations after five years of study (supervisors are written in brackets)

Dvoranová D.:	Photoinduced reduction of fullerenes (EPR study). (V. Brezová)
Milko M:	Time-dependent quantum dynamics of chemical reactions. (I. Vrábel)
Zemanová M.:	Model study of non-aditivity of intramolecular interactions. (V. Laurinc, V. Lukeš)

B. Dissertations (PhD)

Klement R.:	Study of the square-planar Cu(II) and Co(II) complexes with derivatives of the Schiff base type ligands „Salen“ and „Tetrahydrosalen“.
Micanko J.:	Relativistic and correlation effects in small molecules.

C. Dissertations (DSc)

Cvengroš J.:	Molecular distillation – modelling of the process, design and development of the evaporators and their applications.
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VII. PUBLICATIONS

A. Journals (* registered in Current Contents)

- [1]* Bittererová M., Biskupiè S., Lischka H., Jakubetz W.: The barrier topography of the H+F₂ potential energy surface. Phys. Chem. Chem. Phys. 2, 513-521 (2000).
- [2]* Bittererová M., Bowman J.M.: A wavepacket calculation of the effect of reactant rotation and alignment on product branching in the O(1D)+HCl * ClO+H, OH+Cl reactions. Communication. J. Chem. Phys. 113, 1-3 (2000).

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C. Books and Textbooks

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D. Patents

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E. Other Publications

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- [2] Klein E.: MacGyverov nožík. MacGyver's Knife (in Slovak). Quark 11/2000, p.38 – 39.
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DEPARTMENT OF PHYSICAL EDUCATION

Head of the Department

Assoc. Prof. Miroslav Bobřík, PhD

Telephone: ++421-7-52495198

++421-7-59325639

Fax: ++421-7-52493198

E-mail: bobrik@chtf.stuba.sk

I. STAFF

Assistant Professors:

Peter Bartok, Július Fehér, Viliam Lendel, PhD, Jiřana Moravcová, Dalma Sochorová, Ivan Turéani;

Technical Staff:

Gabriela Boršányiová;

II. TEACHING AND RESEARCH LABORATORIES:

Gym 14x21 m – ground /volleybal, basketball, football/

Two Body Building rooms 15x5 m and 10x5 m

III. TEACHING:

Aerobic	(2 h)	D. Sochorová
Kalanethics	(2 h)	D. Sochorová
Harmonic gymnastics	(2 h)	D. Sochorová
Healing gymnastic	(2 h)	D. Sochorová
Aquagymnastic	(2 h)	D. Sochorová
Athletic sport	(2 h)	V. Lendel
Basketball	(2 h)	P. Bartok
Football	(2 h)	P. Bartok
Handball	(2 h)	M. Bobřík
Body building	(6 h)	M. Bobřík, P. Bartok, V. Lendel, J. Moravcová
Swimming	(2 h)	J. Fehér, I. Turéani
Canoeing and kayak	(4 h)	M. Bobřík
Volleyball	(2 h)	J. Moravcová
Winter sports camp /skiing/		M. Bobřík, J. Fehér
Summer sports camp /		M. Bobřík, J. Fehér

IV. RESEARCH PROJECTS:

State of Physical and Motor Development of Undergraduates of CHTF STU in Bratislava (Viliam Lendel)

V. COOPERATION IN SLOVAKIA:

Faculty Physical Education and Sport of the Comenius University, Bratislava; Research Institute of Physical Culture, Bratislava; Institute of History, Slovak Academy of Sciences, Bratislava.

VI. PUBLICATIONS:

A. Journals

- [1] Bobřík, M.: Ěinnos•nemeckého telocviěného a řportovéhó zväzu DTSV v období Slovenského řtátu (1939 - 1945). Activities of the Deutscher Turn – und Sportverband (DTSV) during the Slovak State (1939 – 1945). Historický časopis, 48, 3, 2000, s. 505-516. Bratislava.
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B. Conferences

- [1] Bobřík, M., Lendel, V., Bartok, P., Moravcová, J.: Stav telesného, funkěného a pohybového rozvoja poslucháčöv CHTF STU v Bratislave. State of Physical, Functional and Motor Development of Undergraduates of CHTF STU in Bratislava. In: Vývojové tendencie v telesnej výchove a řporte na vysokých školách. Zborník z vedeckej konferencie k 20. výročiu vzniku Matematicko-fyzikálnej fakulty UK v Bratislave, Bratislava, september 2000, s. 1-8. ISBN 80-223-155-0
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- s. 16 – 21. ISBN – 80 – 88914 – 27 – 2.
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DEPARTMENT OF PLASTICS AND RUBBER

Head of Department:
Assoc. Prof. Eugen Špírk, PhD

Telephone: + 421-7-52926 053
+ 421-7-59325 589
Fax: + 421-7-524 93 198

I. STAFF

Full Professor:

Dušan Bakoš, PhD, DSc

Associate Professors:

Ivan Hudec, PhD; Viera Chrástová, PhD; Gabriela Kyselá, PhD; Eugen Špírk, PhD

Assistant Professors:

Pavol Alexy, PhD

Senior Research Fellows:

Viera Khunová, PhD

Research Fellows:

Ľudmila Ěernáková, PhD

PhD Students:

Igor Bielik; Gabriela Crkošová; Lenka Hajduěková; Miroslav Kršiak; Henrich Krump; Juraj Mrenica; Denisa Koniarová; Martin Viselka; Petra Volfová

Technical Staff:

Mária Došolomanská, Viera Godályová, Božena Lebočová, Mária Pekaroviěová, Anna Tatarková

II. TEACHING AND RESEARCH LABORATORIES

Laboratory of Polymer Synthesis
Laboratory of Polymer Solutions
Laboratory of Polymer Modification
Laboratory of Thermal Analysis
Laboratory of Polymer Rheology
Laboratory of Electron Microscopy
Laboratory of Polymer Processing and Estimation of its Mechanical and Physical Properties
Laboratory of Biomaterials

III. TEACHING

A. Bacalarate Study

5th semester (autumn)

Macromolecular Chemistry	(2-0 h)	Chrástová
Corrosion and Material Surface Treatment	(2-2 h)	Chovancová, Špírk

6th semester (spring)

Technology of Materials	(2-0 h)	Hudec, Marciněin, Majling
Technological Project	(0-4 h)	

B. Graduate Study

7th semester

Polymer Physics	(2-2 h)	Cífra, Krištofiě, Šutý
Colloids and Interfaces	(2-1 h)	Bakoš, Mikula
Laboratory from Macromolecular Chemistry	(0-8 h)	Ěernáková, Volfová, Crkošová
Macromolecular Chemistry II	(2-1 h)	Chrástová
Production and Processing of Plastics I	(3-0 h)	Hudec
Production and Processing of Rubber	(3-2 h)	Kyselá
Production and Properties of Plastics	(2-2 h)	Hudec (for students of Faculty of Mechanical Engineering)

8th semester

Production and Processing of Plastics II	(2-0 h)	Hudec
Modification of Polymers	(2-0 h)	Kyselá
Methods of Polymer Characterisation	(2-0 h)	Ěernáková
Methods of Experimental Design	(1-1 h)	Alexy
Laboratory from Production of Polymers	(0-8 h)	Alexy, Kyselá, Volfová Hajduěková,
Production, Properties and Processing of Plastic	(2-0 h)	Hudec (for students of Faculty of Architecture)

9th semester

Polymer Processing	(3-1 h)	Špírk
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Polymer Blends and Composites	(2-0 h)	Khunová
Polymer Recycling and Waste Disposal	(2-0 h)	Špírk, Hudec, Khunová
Polymer Testing	(0-2 h)	Alexy
Laboratory from Processing of Polymers	(0-10h)	Alexy, Hudec, Kršiak, Krump
10th semester		
Diploma work	(0-27 h)	

IV. CURRENT RESEARCH PROJECTS

A. Study of Synthesis of Crosslinked Polymers and their Properties (Viera Chrástová)

Synthesis of polymer dispersions of styrene - butyl acrylate or other acrylic monomer was performed as the seed or multi-stage continual process in the presence of crosslinking and/or multifunctional agents in the various step of the polymerisation. The purpose of the preparation of partially crosslinked styrene-acrylate dispersion was to obtain dispersion with application properties suitable for the formulation of ecological paints. The influence of acrylic monomer type (which is fellow monomer to styrene) and the mode of such monomer addition to the polymerisation system on the film forming properties of dispersion and on the minimum filming temperature was studied. The goal was to obtain a new knowledge deals with strategy of the emulsion polymerisation and crosslinking reaction which enables to predict suitable application properties of studied dispersion. The influence of zinc salts of dialkyldithiophosphate acids with different alkyl substituents, eventually their combinations by thiazoles, on kinetic behaviour of the curing of elastomers and on the resultant properties of cured materials was investigated, too. The study was primarily concerned with the research of the optimal compositions of the crosslinking systems applicable at the curing of the real rubber mixture. The eventual antidegradation effect of the chosen organophosphate compounds in model elastomer systems was investigated at the conditions of the accelerated ageing. It was evaluated on the base of the changes of the primary properties of cured materials and the changes of the arrangement of the network.

The studies of the amine-free accelerators on the sulphur vulcanisation of unsaturated elastomers indicate, that the activity of zinc dithiophosphates in the crosslinking process is resemble to the fast accelerators. In combination with thiazoles they generate the synergistic crosslinking systems. In their presence the rate of vulcanisation and the strength characteristics of final materials are increasing. The effective rate constants of the sulphur vulcanisation of the natural rubber mixtures are in the presence of the dithiophosphate and thiazole combinations higher than in the presence of individual accelerators forming the responsible combination. Together the effective activation energy of the vulcanisation is decreasing. The combination of dithiophosphates and thiazoles do not form carcinogenic N - nitrosamines.

B. Polymer Mixtures, Composites and Recycling (Eugen Špírk)

The aim of the research project is the study of correlation between the structure, physical - mechanical, rheological and thermal properties of composites with a high content of soft and hard magnetic fillers based on thermoplastic, thermoelastoplastic and elastomeric matrix.

In the region of rubber blends the attention is oriented on following environmental problems:

- the formulation of rubber blends recipes from the viewpoint of nitrosoamine free cured system
- the applications of grinding rubber in polymer blends.

Further the research works are oriented on the particulate polymer composites based on the inorganic fillers and thermoplastic polymer matrix.

The objective of this part is to identify:

1. Suitable surface treatments for the inorganic fillers enable moulding of the composite with improved performance properties.
2. The nature of the interphase between the filler particle and polymer matrix
3. The type and level of bonding between filler surface and the matrix, and the amount of polymer physically or chemically bound to filler particles.

The main research effort in the field of polymer recycling is aimed to the development of an environmentally viable and economically effective mode of improving mechanical and rheological properties of recycled thermoplastic waste.

The project involves also development of new biodegradable polymers on the base of Polyvinylalcohol. Research is oriented forward to optimisation of processing temperature as well as biodegradability of studied polymers.

C. The Definitive Biosynthetic Skin Substitute (Dušan Bakoš)

The scientific aims of the project are in developing the biosynthetic skin substitute, which is able to be definitely incorporated in body. The study results of the basic properties of biopolymers of extracellular matrix, collagen and hyaluronic acid. The developed membranes with excellent biological and mechanical properties are chemically modified to synchronise biodegradation and wound healing.

The membranes can be widely applied in different fields of medicine. The project is supported in the frame of the Transplantation Program granted by Health Office of SR in co-operation with the Burn Department of Ružinov Hospital in Bratislava.

D. The Development of Ecologically Acceptable Flame Retardant Magnesium Hydroxide Based Polymer Composites (Viera Khunová)

The project aims to develop application specific halogen free flame retardant composites based on magnesium hydroxide and thermoplastics materials. This is being achieved via reactive processing that results in modification of the interfacial region between the filler particle surface and the polymer matrix. Modification of the interfacial region offsets the usual loss in mechanical properties resulting from the high levels of magnesium hydroxide incorporation necessary for the required flame retardant and smoke suppressant effects.

The main research and experimental effort of the project is focused on optimisation of reactive processing conditions of modified polyolefine/magnesium hydroxide composites and their evaluation in relation to end-use properties. The results achieved by the proposed mode of reactive processing have yielded remarkably positive effects, with

improvements in mechanical properties being greater than 100%, relative to an unmodified composite. This has been achieved without sacrificing the processing characteristics of the composites.

Our most recent study shows that proposed mode of reactive processing also shows great potential for the compatibilisation of post-consumer co-mingled polyolefin waste.

The project is supported by British Council in Bratislava and the collaborative partner is the Manchester Metropolitan University, Manchester, UK.

E. New generation of inks for rotogravure printing (Viera Khunová)

The project is focused on formulation of new generation of hot melt ink with extremely specific demand on their physical stage - solid at the ambient temperature and the liquid in the moment of printing. The significance of hot melt ink is based on the fact that will neither produce liquid nor volatile waste to pollute the environment. Further benefit when compared to current toluene based ink is that hot melt ink dries by solidification. Methodology is based on knowledge of polymer-polymer interactions, compatibility, and rheological calculations and measurements.

On going first phase of the project research is focused on hot melt ink rheological behavior and interactions of polymer/monomer/pigment calculations, as well as on their formulations, kinetics of melting and solidification.

The project is supported by NATO science program and the collaborative partner is the Western Michigan University, MI, USA.

V. COOPERATION

A. Co-operation in Slovakia:

Chemolak, a.s. Smolenice

Rubber Research Institute, Matador, a.s. Púchov

Research Institute of Processing and Application of Plastics, a.s. Nitra

Polymer Institute, Slovak Academy of Sciences, Bratislava

Research Institute of Chemical Technology, a.s. Bratislava

Matador, a.s. Púchov

Vegum, a.s. Dolné Vestenice

Plastika, a.s. Nitra

Slovnaft, a.s., Bratislava

NCHZ, a.s., Nováky

Orthopedical Clinic, School of Medicine, Comenius University, Bratislava

Burn Department and Skin Bank, Ružino v Hospital, Bratislava

Institute of Medical Biology, Faculty of Medicine, UK, Bratislava

B. International Cooperation:

Martin Luther University of Halle - Wittenberg, Institute of Materials Science, Merseburg, Germany

- Modification of Polymers and Polymer Processing

Technical University of Szczecin, Institute of Material Engineering, Szczecin, Poland

- Chemical and Physical Modification of Polymers

Western Michigan University, Kalamazoo, USA

- The development of new generation of hot-melt inks for rotogravure printing

The Manchester Metropolitan University, Faculty of Science and Engineering, Manchester, U. K.

- Reactive Processing of Particulate Polymer Composites

University of Minho, Department of Polymer Engineering, Guimarães, Portugal

- Development of biomaterials

- University of Pisa, Department of chemistry and Industrial Chemistry, Pisa, Italy

- Biodegradable Plastics

Clinica Puerta de Hierro, Cirugia Experimental, Madrid, Spain

- Chemical Modification and Biocompatibility, Testing of Collagen Membranes

C. Membership in International Organisations and Societies:

European Biomaterial Society, Bourdeaux, France (D. Bakoš)

G. Visitors from Abroad:

Dr. C. M. Liauw

Manchester Metropolitan University, Manchester, May 2000, (8 days)

Dr. H.J. Radusch

Martin Luther University of Halle – Wittenberg, October 2000, (4 days)

Dr. Zenon Tartakowski

Politechnika Szczecinska, Szczecin, Poland, July 2000, (4 days)

Prof. V.N. Kuleznev

MITCHT, Moskva, Russia, October 2000, (2 days)

H. Visits of Staff Members and Postgraduate Students to Foreign Institutions:

D. Bakoš

ICS-UNIDO Trieste, Italy, February 2000 (2 days)

IRC Paris, France, June 2000 (6 days)

UNIDO Workshop Seoul, Korea, September (12 days)

Conference Halle, Germany, September (4 days)

D. Koniarová

Martin Luther University of Halle - Wittenberg, Institute of Materials

Science, Merseburg, Germany, June 2000 (2 weeks)

V. Khunová

DSM Research, Geleen, The Netherlands, April 2000 (4 days)

RTS-2000, CEEPUS, Jeseník, Czech Republic, September 2000, (4 days)

UCHT Pardubice, CUT Praha, IMCH Praha, Czech Republic, November 2000, (3 days)

J. Mrenica	Technical University of Pardubice, Czech Republic, February 2000 (6 weeks)
P Alexy, I. Hudec, E. Špírk	Martin Luther University of Halle - Wittenberg, Institute of Materials Science, Merseburg, Germany, June 2000 (6 days)
P. Alexy, I. Hudec, E. Špírk	Martin Luther University of Halle - Wittenberg, Institute of Materials Science, Merseburg, Germany, September 2000 (6 days)
I. Hudec, P. Alexy	Politechnika Szczecinska Szczecin, Poland, November 2000 (5 days)

VI. THESES AND DISSERTATIONS

A. Graduate Theses (MS Degree) for state examinations after five years of study (supervisors are written in brackets):

Hrajková M.:	The modification of physical-mechanical properties of recycled granulates from polyolefin blends (E. Špírk)
Jelëic P.:	Modification of dynamic mechanical properties of vulcanisates with dual fillers (E. Špírk)
Kolozsváryová L.:	The influence of monomers with reactive groups on properties of poly(styrene)/poly(butyl acrylate) dispersions (V. Chrástová)
Kršíak M.:	Preparation of PVA blends for films with better solubility and biodegradability (P. Alexy)
Krump H.:	The reinforcing materials for tire construction (I. Hudec)
Matej M.:	The study of effect of collagen hydrolysate on properties of PVA films (D. Bakoš)
Šnauko M.:	Reactive processing of commingled plastic waste (V. Khunová)
Závodská V.:	The influence of additives on properties of waterborne poly(styrene)/poly(butyl acrylate) dispersions (¼ ěrnáková)

B. Dissertations (PhD)

Bielik I.:	Cross-linking of Rubbers with Ecological Systems (G. Kyselá)
Crkořová G.:	The Study of Environmentally Degradable Blends of Plastics with Biopolymers (D. Bakoš)
Hajduëiková L.:	The Study of Transport Processes of Biologically Active Compounds in Complex Biopolymer Membrane (D. Bakoš)
Koniarová D.:	The Study of Macromolecular Compositions Based on Biopolymers for Biomaterials Application (D. Bakoš)
Kršíak M.:	Utilisation of collagen hydrolysate in polymer blends (D. Bakoš)
Krump H.:	Surface treatment of reinforcing materials for tire construction (I. Hudec)
Mrenica J.:	The Study of Styrene-Butylacrylate Dispersions (V. Chrástová)
Viselka M.:	The Study of Dynamic-mechanical Properties of Rubber Blends (E. Špírk)
Volfová P.:	The Effect of Synthesis and Formulation Additives on the Properties of Polymer-Styrene-Acrylate Dispersion (V. Chrástová)

VII. PUBLICATIONS

A. Journals (* registered in Current Contents)

- [1]* Alexy P., Košíková B., Podstránska G., : The effect of blending lignin with polyethylene and polypropylene on physical properties, *Polymer*, 41(13), 4901-4908 (2000)
- [2]* Bakoš D., Jorge-Herrero E., Koller J.: Resorption and calcification of chemically modified collagen/hyalurona hybrid membranes, *Polymers in Medicine*, 30 (3-4), xxx (2000)
- [3] Hudec I., Krump H., Janyпка P., Reksová V., ěrnák M., Simor M.: Hodnotenie povrchových vlastností výstužných materiálův pre koňštrukciu pláňov, *Evaluation of surface properties of reinforced materials for tire const ruction*, *Plasty a kauëuk* 37 (9), 260-263 (2000)
- [4]* Khunová, V., Liauw, C. M.: Advances in the Reactive Processing of polymer composites based on magnesium hydroxide, *Chemical papers* 54 (3), 177-182 (2000)
- [5]* Koller J., Bakoš D., Sadlořová I.: Biocompatibility studies of a new biosynthetic dermal substitute based on collagen/hyaluronan conjugate, *J. Cell. Tissue Baking*, 1, 75-80 (2000)
- [6] Kováëiková S., Vicen R., Grusková A., Hudec I.: Kompozitné materiály na báze polymérnej matrice a magnetického plniva, *ekt* 53 (1-2), 43-48 (2000)
- [7]* Liauw, C. M., Khunová, V.: The role of m-phenylene bismaleimide (BMI) in Reactive Processing of Polypropylene/Magnesium Hydroxide Composites 3: Analyses of interphase strucure development, *Macromol. Mater. Eng.* 279, 34-41 (2000)
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B. Conferences (* International Conferences)

- [1]* Alexy, P., Bakoš, D., Lacík, I., Chodák, I.: Biodegradable thermoplastics – importance and R&D in Slovakia, in : IV. Seminarium Naukowo-Techniczne Recykling Tworzyw Sztucznych, Szczecin, 23-24. november 2000, p. 128-130, ISBN 83-87423-54-8
- [2]* Alexy, P., Košíková, B., Radusch, H.-J., Lupke, Th., Špírk, E., Podstránska, G. : Modification of polyethylene-lignin blends with EVA copolymers, in: Polymerwerkstoffe 2000, Halle/Saale 25-27. September 2000, p.97-100, ISBN 3-86010-605-8
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- [4]* Alexy P., Bakoš, D., Crkošová, G., Kolomazník, K., Kršiak, M.: Modification of PVA with collagen hydrolysate – effect on thermal degradation and processing properties, in: 14th Bratislava international conference on modified polymers „Property tailoring of thermoplastics – based blends and composites“, Bratislava, October 1-4, 2000, p. 63, ISBN 80-968433-0-3
- [5]* Bakoš D., Plastic waste management and environmentally degradable plastics in Slovakia: Industrial Development and Application, Hanyang Univ., Seoul, Korea, Sept. 19-22, 2000
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- [7]* Bakoš D: Education in polymer technology in Slovakia, East-West Meeting (European Polymer Society, ICS-UNIDO), Smolenice, October 5-7, 2000
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DEPARTMENT OF PROCESS CONTROL

Head of the Department:
Prof. Ján Mikleš, PhD, DSc

Telephone: ++ 421 – 7 – 52 49 52 69
Fax: ++ 421 – 7 – 52 49 64 69
E-mail: mikles@cvt.stuba.sk

I. STAFF

Full Professor:
Ján Mikleš, PhD, DSc;

Associate Professors:
Monika Bakošová, PhD; Ján Danko, PhD; Ján Dvoran, PhD; Miroslav Fikar, PhD; Alojz Mészáros, PhD;

Assistant Professors:
Ľuboš ěirka; Mária Karšaiová, PhD; Magdaléna Ondrovičová; Andrej Seè; Anna Vasièkaninová; Anna Zemanovičová, PhD;

PhD students:
Anton Andrášik; Jozef Dzivák; František Jelenèiak; Štefan Kožka; Michal Kvasnica;

Technical staff:
Eva Fuseková; Andrea Kalmárová; Diana Láznièková; Anna Širicová;

II. TEACHING AND RESEARCH LABORATORIES

A. Teaching Laboratories:

Laboratory of Measuring Instruments and Techniques
Laboratory of Process Control
Laboratory of Gas Analysis
Computer Laboratory (PC 486, Pentium)
Computer Laboratory (LINUX)

B. Research Laboratories:
Laboratory of Chemical Reactor Analysis and Control
Laboratory of Biochemical Process Analysis and Control
Laboratory of Distillation Column Analysis and Control
Laboratory of Modelling and Simulation
Laboratory of Computer Aided Design

III. TEACHING

A. Undergraduate Study

2nd semester (spring)

Informatics	(1-2 h)	Ondrovičová, Vasièkaninová
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5th semester (autumn)

Computer Based Data Processing	(0-2 h)	ěirka, Dzivák, Fikar, Jelenèiak, Karšaiová, Kožka, Ondrovičová, Seè, Vasièkaninová
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6th semester (spring)

Automatic Control Fundamentals	(2-0 h)	Danko, Mészáros
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Laboratory Exercises of Automatic Control Fundamentals	(0-2 h)	Andrášik, Bakošová, ěirka, Danko, Dzivák, Jelenèiak, Karšaiová, Ondrovičová, Seè, Vasièkaninová, Zemanovičová
Bachelor projects	(0-4 h)	Bakošová, Dvoran, Karšaiová, Mészáros, Mikleš, Ondrovičová, Seè, Vasièkaninová, Zemanovičová

7th semester (autumn)

Process Control	(1-2 h)	Mészáros
Process Dynamics	(2-0 h)	Bakošová
Operating Systems	(1-1 h)	Seè
Control Devices and Systems	(2-1 h)	Danko
Computer Programs	(1-2 h)	Fikar
Laboratory Projects	(0-8 h)	Fikar, Karšaiová, Mikleš, Seè, Vasièkaninová

8th semester (spring)

Optimisation	(2-1 h)	Dvoran
Control Theory I	(2-2 h)	Mikleš, ěirka, Kožka
Laboratory Exercises of Control Theory I	(0-2 h)	ěirka, Kožka
Experimental Identification	(2-0 h)	Mikleš

Laboratory Project II	(0-6 h)	Ěirka, Dvoran, Mészáros, Mikleš
Modelling and Control of Polymerisation Processes	(2-2 h)	Dvoran
Process Dynamics	(2-0 h)	Bakošová
Laboratory Exercises of Process Dynamics	(0-1 h)	Bakošová
9th semester (autumn)		
Control Theory II	(2-0 h)	Mészáros
Laboratory Exercises of Control Theory II	(0-2 h)	Mészáros
Intelligent Control Systems	(2-0 h)	Dvoran
Semestral Project	(0-10 h)	Dvoran, Karšaiová, Mészáros, Mikleš, Ondrovičová
CAD Systems	(2-0 h)	Karšaiová
Industrial Applications of Process Control	(2-0 h)	Mikleš
Control of Technological Processes	(1-2 h)	Bakošová
10th semester (spring)		
Diploma Theses		Bakošová, Dvoran, Karšaiová, Mészáros, Mikleš, Seè, Zemanovičová

B. PhD Study

Topics in Control Theory	(2 h)	Mikleš
Software and Hardware of Control Systems	(2 h)	Danko
Intelligent Control Systems	(2 h)	Dvoran
Modelling and Simulation of Processes	(2 h)	Mészáros

IV. CURRENT RESEARCH PROJECTS

A. Development of advanced control methods for chemical reactors, distillation columns and other plants in chemical and food technology (Ján Mikleš)

The main goals of the project can be formulated in the following items:

- To derive mathematical models of chemical and biochemical processes: an exothermic reactor for decomposition of H_2O_2 , a tray distillation column and a stuffed distillation column for separation of binary mixtures, a warm-air drying chamber, a biochemical reactor.
- To develop methods and algorithms for system identification: closed-loop identification, identification based on artificial neural network, identification of physical system parameters from measured data.
- To investigate modern optimisation methods and algorithms especially for distillation columns and biochemical reactors, which are usually nonlinear high-order systems.
- To investigate robust stabilisation and robust feedback control of multivariable systems.
- To develop adaptive control methods and to create a program package of adaptive control algorithms for control of systems of the chemical and food technology.
- To include principles of artificial intelligence (expert systems, fuzzy control, neuro-fuzzy control, artificial neural networks) into control structures for chemical processes.
- To investigate the predictive control method and to create control algorithms based on the Youla-Kuèera parameterisation for solving unconstrained or constrained control problems.
- To verify all theoretical results on laboratory models chemical processes.
- To transform theoretical and experimental results into industrial conditions and to demonstrate benefits and advantages of advanced process control in chemical and food industry.

The most important results of the project are following: open-loop and closed-loop formulation of the control law, which gives the control signal as a finite sequence of minimum length, design of CVP based optimal control of an industrial depropanizer column, solving of a two step pole placement control design problem, where the pole placement method is combined with Youla-Kuèera parameterisation, application of the adaptive λ -tracking method for control of nonlinear chemical processes, application of closed-loop identification method for identification of a laboratory chemical reactor, design of a PI LQ controller using static feed-back.

B. Adaptive and Intelligent Control of Biochemical and Chemical Processes (Alojz Mészáros)

The main goals of the project can be listed as follows:

- Analysis of methods and algorithms for recursive identification of simplified experimental and analytical models of biochemical processes for simulation and control purposes.
- Design, testing and comparison of intelligent and robust controllers.
- Development and verification of modern integrated optimising algorithms, suitable for the optimising layer of the hierarchical multilayer control structure.
- Development of software package based on artificial neural networks for modelling and control strategies.
- Implementation of principles of fuzzy control, neuro-fuzzy control and decentralised control to control structures for biochemical and chemical processes.
- Accomplishment of computer based control system for a laboratory fermenter LF-3.
- Data acquisition and processing utilising software filters on the fermenter LF-3, estimation of state variables in the on the basis of neural network approach.
- Implementation of the developed identification algorithms and control structures in control of the laboratory fermenter.
- Transfer and adaptation of the results and experience, gained through simulation and laboratory experiments to industrial circumstances, especially those ones involved in citric acid and Baker's yeast production as well as in alcoholic fermentation processes.

Original results obtained in the frame of the project are: training of artificial neural networks in the role of controllers using stochastic approximation method, adaptive neural PID controller, iterative dynamic programming method using

artificial neural networks for solving unconstrained and constrained dynamic optimisation problems, where an artificial neural network is used as a predictor, predictive control algorithms based on artificial neural networks, where both a recurrent artificial neural network and a feedforward artificial neural network are used; determination of optimal feed rate profile in fed-batch fermenters, data-based system of equipment for global using.

V. COOPERATION

A. Cooperation in Slovakia

Department of Automatic Control Systems, Faculty of Electrical Engineering and Informatics, Slovak University of Technology, Bratislava

Department of Automation and Control, Faculty of Electrical Engineering and Informatics, Slovak University of Technology, Bratislava

Department of Automation and Measurement, Faculty of Mechanical Engineering, Slovak University of Technology, Bratislava

Institute of Control Theory and Robotics, Slovak Academy of Sciences, Bratislava

Department of Technical Cybernetics and Artificial Intelligence, Technical University of Košice, Košice

Department of Management and Control Engineering, BERG Faculty, Technical University of Košice, Košice

Slovnaft, Inc., Bratislava

NCHZ, Inc., Nováky

ProCS, Ltd., Šaľa

B. International Cooperation

Department of Process Control and Computer Techniques, University of Pardubice, Pardubice, Czech Republic

- Control system design

Department of Computing and Control Engineering, Prague Institute of Chemical Technology, Prague, Czech Republic

- Control system design

Department of Automatic Control, Faculty of Technology Zlín, Technical University Brno, Zlín, Czech Republic

- Adaptive control

- Robust control

Institute of Information Theory and Automation of the Academy of Sciences of the Czech Republic, Prague, Czech Republic

- Polynomial synthesis

- Predictive control

Trnka Laboratory for Automatic Control, Faculty of Electrical Engineering, Czech Technical University, Prague, Czech Republic

- Adaptive control

- Predictive control

LSGC-CNRS, Ecole Nationale Supérieure des Industries Chimiques (ENSIC), Nancy, France

- Dynamic optimisation of distillation columns

- Control of distillation columns

Ecole Nationale Supérieure des Ingénieurs de Génie Chimique-Chemin de la Loge (ENSIGC), Toulouse, France

- Neural networks

- Predictive control

Ruhr University, Bochum, Germany

- Closed-loop identification

- Predictive control

University of Dortmund, Dortmund, Germany

- Predictive control

Technical University of Budapest, Budapest, Hungary

- Modelling of chemical processes

University of Veszprem, Hungary

- Environmental engineering

- Bioengineering projects

C. Membership in Domestic Organisations and Societies

Slovak Society of Cybernetics and Informatics,
Bratislava

(A. Mészáros, J. Mikleš)

Slovak Society of Chemical Engineering, Bratislava

(M. Bakošová, J. Danko, J. Dvoran, M. Fikar, M. Karšaiová, A. Mészáros, J. Mikleš, M. Ondrovičová, A. Zemanovičová)

Slovak Union of Industrial Chemistry,
Science-Technical Society, Bratislava

(M. Bakošová, J. Ďirka, J. Danko, J. Dvoran, M. Fikar, M. Karšaiová, D. Lázníková, A. Mészáros, J. Mikleš, M. Ondrovičová, A. Seè, A. Vasièkaninová, A. Zemanovičová, J. Dzivák, F. Jelenèiak, Š. Kožka)

D. Membership in International Organisations and Societies

International Federation of Automatic Control, Laxenburg, Austria

(J. Mikleš)

European Federation of Biotechnology, Brussels, Belgium

(A. Mészáros)

The New York Academy of Sciences, New York, USA

(A. Mészáros)

E. International Scientific Programmes

1. INCO COPERNICUS

a) No. CP97:7010, The European Network for Industrial Application of Polynomial Design Methods – EUROPOLY
Coordinator at the FCT STU: J. Mikleš

Participants: Institute of Information Theory and Automation of the Academy of Sciences of the Czech Republic, Prague, Czech Republic; University of Twente, Twente, Netherlands; University of Glasgow, Glasgow, Great Britain; Uppsala University, Uppsala, Sweden; University of Strathclyde, Strathclyde, Great Britain; Politecnico di Milano, Milan, Italy; CNRS – LAAS, Toulouse, France; Czech University of Technology, Prague, Czech Republic; Technical University of Brno, Brno, Czech Republic; Department of Process Control, Faculty of Chemical Technology, Slovak University of Technology, Bratislava, Slovakia; Warsaw University of Technology, Warsaw, Poland; Swiss Federal Institute of Technology, Zurich, Switzerland; ProCS, Ltd., Šaľa, Slovakia; Compureg Plzeň, Plzeň, Czech Republic;
 Period: January 1998 – December 2000

2. Project of Austrian - Slovak Scientific Cooperation: Aktion Österreich - Slowakei

a) No. 26s12, Optimierung des Verbrennungsprocess von dem Standpunkt des Umweltschutzes (Optimisation of a Combustion Process from the Environmental Point of View)

Coordinator at the FCT STU: A. Zemanovičová

Participants: Faculty of Chemical Technology, Slovak University of technology, Bratislava, Slovakia; Technical University of Vienna, Vienna, Austria

Period: April 1999 – December 2000

3. Project of Slovak – Czech Scientific Cooperation

a) No. 112/344 Rozvoj metód moderného riadenia procesov chemickej a potravinárskej technológie (Development of Advanced Control Methods for Processes of Chemical and Food Technology)

Coordinator at the FCT STU: J. Mikleš

Participants: Department of Process Control, Faculty of Chemical Technology, Slovak University of Technology, Bratislava, Slovakia; Department of Process Control and Computer Techniques, University of Pardubice, Pardubice, Czech Republic

Period: January 2000 – December 2001

F. Visitors from Abroad

Prof. G. Bachmann	Technical University of Vienna, Vienna, Austria, September 2000 (1 day)
Prof. P. Dostál	Faculty of Technology Zlín, Technical University of Brno, Zlín, Czech Republic, April 2000 (1 day)
F. Dušek, PhD	University of Pardubice, Pardubice, Czech Republic, September 2000 (2 days)
Prof. H. Hofbauer	Technical University of Vienna, Vienna, Austria, September 2000 (1 day)
D. Honc	University of Pardubice, Pardubice, Czech Republic, September 2000 (2 days)
S. Krejčí, PhD	University of Pardubice, Pardubice, Czech Republic, November 2000 (2 days)
J. Macháček, PhD	University of Pardubice, Pardubice, Czech Republic, September 2000 (2 days)
Prof. E. Padouvas	Technical University of Vienna, Vienna, Austria, September 2000 (1 day)
R. Prokop, PhD	Faculty of Technology Zlín, Technical University of Brno, Zlín, Czech Republic, June 2000 (1 day)
Prof. I. Taufer	University of Pardubice, Pardubice, Czech Republic, September 2000 (4 days)
Prof. I. Taufer	University of Pardubice, Pardubice, Czech Republic, October 2000 (2 days)
Prof. I. Taufer	University of Pardubice, Pardubice, Czech Republic, November 2000 (5 days)

G. Visits of Staff Members and PhD Students to Foreign Institutions

A. Andrášik	Institute of Microbiology of the Academy of Sciences of the Czech Republic, Prague, Czech Republic, September 2000 (5 days)
A. Andrášik	Scientific - Technical Conference Process Control 2000, Kouty nad Desnou, Czech Republic, June 11. – 14. 2000
M. Bakošová	Scientific - Technical Conference Process Control 2000, Kouty nad Desnou, Czech Republic, June 11. – 14. 2000
M. Bakošová	International Congress of Chemical and Process Engineering CHISA 2000, Prague, Czech Republic, August 27. – 31. 2000
M Bakošová	University of Pardubice, Pardubice, Czech Republic, November 2000 (2 days)
¼ ěirka	Scientific - Technical Conference Process Control 2000, Kouty nad Desnou, Czech Republic, June 11. – 14. 2000
J. Dvoran	University of Pardubice, Pardubice, Czech Republic, February 2000 (2 days)
J. Dvoran	Scientific - Technical Conference Process Control 2000, Kouty nad Desnou, Czech Republic, June 11. – 14. 2000
J. Dvoran	Hanover, Germany, September 2000 (7 days)
J. Dvoran	Srní, Czech Republic, September 2000 (3 days)
J. Dzivák	Scientific - Technical Conference Process Control 2000, Kouty nad Desnou, Czech Republic, June 11. – 14. 2000
M. Fikar	Ruhr University, Bochum, Germany, January - September 2000 (9

	months)
M. Fikar	Europoly Steering Committee Meeting, Milano, Italy, November 2000 (4 days)
F. Jelenèiak	Scientific - Technical Conference Process Control 2000, Kouty nad Desnou, Czech Republic, June 11. – 14. 2000
F. Jelenèiak	Technical University of Vienna, Vienna, Austria, September 2000 (6 days)
M. Karšaiová	Scientific - Technical Conference Process Control 2000, Kouty nad Desnou, Czech Republic, June 11. – 14. 2000
M. Karšaiová	International Congress of Chemical and Process Engineering CHISA 2000, Prague, Czech Republic, August 27. – 31. 2000
Š. Kožka	Symposium on Mathematical Modelling, Vienna, Austria, Feb 2. – 4. 2000
Š. Kožka	Scientific - Technical Conference Process Control 2000, Kouty nad Desnou, Czech Republic, June 11. – 14. 2000
Š. Kožka	IFAC Symposium on Robust Control Design, Prague, Czech Republic, June 21. – 23. 2000.
A. Mészáros	Technical University of Budapest, Budapest, Hungary, April, 2000 (2 days)
A. Mészáros	Scientific - Technical Conference Process Control 2000, Kouty nad Desnou, Czech Republic, June 11. – 14. 2000
A. Mészáros	University of Veszprem, Veszprem, Hungary, September 2000 (2 days)
A. Mészáros	European Federation of Biotechnology, Copenhagen, Denmark, September 2000 (5 days)
A. Mészáros	Technical University of Budapest, Budapest, Hungary, October, 2000 (1 day)
A. Mészáros	Faculty of Technology Zlín, Technical University of Brno, Zlín, Czech Republic, November 2000 (1 day)
J. Mikleš	IFAC Workshop on Digital Control, Terrassa, Spain, April 5. – 7. 2000
J. Mikleš	Scientific - Technical Conference Process Control 2000, Kouty nad Desnou, Czech Republic, June 11. – 14. 2000
J. Mikleš	Institute of Information Theory and Automation of the Academy of Sciences of the Czech Republic, Prague, Czech Republic, June 2000 (3 days)
J. Mikleš	Greece NMO of IFAC, Athens, Greece, July 2000 (4 days)
J. Mikleš	Srní, Czech Republic, September 2000 (3 days)
J. Mikleš	Technical University of Vienna, Vienna, Austria, September 2000 (5 days)
J. Mikleš	Technical University of Vienna, Vienna, Austria, October 2000 (1 day)
J. Mikleš	Europoly Steering Committee Meeting, Milan, Italy, November 2000 (4 days)
M. Ondrovièová	University of Pardubice, Pardubice, Czech Republic, November 2000 (2 days)
A. Seè	Scientific - Technical Conference Process Control 2000, Kouty nad Desnou, Czech Republic, June 11. – 14. 2000
A. Vasièkaninová	Technical University of Vienna, Vienna, Austria, May 2000 (3 days)
A. Zemanovièová	Technical University of Vienna, Vienna, Austria, February 2000 (1 day)
A. Zemanovièová	Technical University of Vienna, Vienna, Austria, May 2000 (1 month)
A. Zemanovièová	Technical University of Vienna, Vienna, Austria, September 2000 (1 day)
A. Zemanovièová	Technical University of Vienna, Vienna, Austria, October 2000 (2 days)
A. Zemanovièová	Technical University of Vienna, Vienna, Austria, November 2000 (1 day)

VI. THESES AND DISSERTATIONS

A. Graduate Theses (MS Degree) for state examinations after five years of study (supervisors are written in brackets)

Benyová E.:	Optimisation and control of a chemical reactor. (M. Karšaiová)
Debnárová L.:	Control of a tray distillation column for separation of a binary mixture methanol – water. (M. Bakošová)
Domonji M.:	Control design for liquid tanks. (M. Karšaiová)
Hudáèek P.:	Design of a neuro-fuzzy control system. (J. Dvoran)
Huseríková M.:	Computer control of a laboratory model of liquid tanks. (A. Mészáros)
Kvasnica M.:	Optimal feedback control of a laboratory chemical reactor with an exothermic reaction. (J. Mikleš)

Mikulíková J.:	Adaptive λ -tracking of nonlinear chemical processes . (M. Bakošová)
Nemec J.:	Control of a real process with time-delay. (A. Zemanovičová)
Szanyiová A.:	Adaptive control of a biochemical process. (A. Mészáros)
Veliký O.:	Control design for a mathematical and real model of a stuffed distillation column. (A. Seè)
Ziman Ľ.:	Identification of a chemical reactor with an exothermic reaction. (J. Mikleš)

VII. PUBLICATIONS

A. Journals (* registered in Current Contents)

- [1] Bakošová M., Ondrovičová M., Karšaiová M.: Riadenie rektifikačných kolón metódou adaptívneho sledovania. Control of distillation columns via adaptive I-tracking method (in Slovak). AT&P Journal 7 (4), 76 – 77 (2000).
- [2]* Danko J., Ondrovičová M.: Adaptive control of a laboratory tank reactor. Chem. Papers 54 (3), 155 – 158 (2000).
- [3]* Fikar M., Kuèera V.: On minimum finite length control problem. Int. J. Control 73 (2), 152 – 158 (2000).
- [4]* Fikar M., Latifi M. A., Corriou J. P., Creff Y.: CVP-based optimal control of an industrial depropanizer column. Computers and Chemical Engineering 24, 909 – 915 (2000).
- [5] Fikar M., Unbehauen H.: Two step pole placement control design. Journal of Electrical Engineering 51 (9 – 10), 235 – 239 (2000).
- [6] Fikar M.: Použitie lineárnych maticových nerovností v riadení. Using of linear matrix inequalities in control (in Slovak). AT&P Journal 7 (4), 78 – 79 (2000).
- [7] Fikar M.: Prediktívne riadenie s nominálnym regulátorom. Predictive control with a nominal controller (in Slovak). AT&P Journal 7 (11), 49 – 51 (2000).
- [8] Kožka Š., Mikleš J.: Identifikácia laboratórneho chemického reaktora v uzavretom regulačnom obvode. Closed-loop identification of a chemical reactor (in Slovak). AT&P Journal 7 (10), 52 – 53 (2000).
- [9] Mészáros A., Andrášik A., Rusnák A.: Vlastnosti adaptívneho neuronového PID regulátora. Properties of an adaptive neural PID controller (in Slovak). AT&P Journal 7 (4), 69 – 71 (2000).
- [10] Mészáros A.: Matematické modelovanie rúrkového chemického reaktora pre účely simulácie a riadenia. Mathematical modelling of a tubular chemical reactor for simulation and control purposes (in Slovak). AT&P Journal 7 (10), 59 – 63 (2000).
- [11] Mészáros A.: Modelovanie biochemických reaktorov. Modelling of biochemical reactors (in Slovak). AT&P Journal 7 (9), 66 – 69 (2000).
- [12] Mikleš J., ěirka Ľ., Kvasnica M.: Návrh PI LQ regulátora pomocou statickej spätnej väzby. Design of a PI LQ controller via static feedback (in Slovak). AT&P Journal 7 (10), 54 – 55 (2000).
- [13] Mikleš J., Dzivák J., Jeleněiak F., Kožka Š., Fikar M., Mészáros A.: Polynomial design methods applied to feedback control of a continuous stirred tank reactor. EUROPOLY Newsletter (1), 8 – 10 (2000).

B. Conferences (*International conferences)

- [1]* Andrášik A., Rusnák A., Mészáros A.: Dynamic performance of adaptive neural PID control. In: Proceedings of the 4th Scientific - Technical Conference Process Control 2000. Kouty nad Desnou, Czech Republic, June 11. – 14. 2000, CD ROM RIP203.
- [2]* Bakošová M., Karšaiová M., Ondrovičová M., Danko J.: Adaptive I-tracking for nonlinear chemical processes. In: Proceedings of the 4th Scientific - Technical Conference Process Control 2000. Kouty nad Desnou, Czech Republic, June 11. – 14. 2000, CD ROM RIP112.
- [3]* Bakošová M., Karšaiová M., Ondrovičová M.: Application of high-gain adaptive I-tracking for nonlinear chemical processes. In: CD-ROM of full texts of the 14th International Congress of Chemical and Process Engineering CHISA 2000. Prague, Czech Republic, August 27. – 31. 2000, CD-ROM 0099.
- [4]* Bakošová M., Mészáros A., Ondrovičová M., Karšaiová M.: Control of distillation columns via adaptive I-tracking method. In: CD-ROM of full texts of the 27th International Conference of SSCHI. Tatranské Matliare, Slovak Republic, May 22. – 26. 2000, CD ROM P201.
- [5]* ěirka Ľ., Fikar M.: IDTOOL – A dynamical system identification toolbox for Matlab. In: Proceedings of the 4th Scientific - Technical Conference Process Control 2000. Kouty nad Desnou, Czech Republic, June 11. – 14. 2000, CD ROM RIP149.2.
- [6]* Danko J., Ondrovičová M.: Computer control of a drying chamber. In: Proceedings of the 4th Scientific - Technical Conference Process Control 2000. Kouty nad Desnou, Czech Republic, June 11. – 14. 2000, CD ROM RIP151.
- [7]* Dzivák J., Mikleš J., Jeleněiak F., Kožka Š.: Control of a stirred tank reactor. In: Proceedings of the 4th Scientific - Technical Conference Process Control 2000. Kouty nad Desnou, Czech Republic, June 11. – 14. 2000, CD ROM RIP156.
- [8]* Fikar M., Unbehauen H., Mikleš J.: Polynomial approach to stable predictive control. In: Preprints of the 3rd IFAC Symposium on Robust Control Design. Prague, Czech Republic, June 21. – 23. 2000, CD ROM EUR-07.
- [9]* Fikar M., Unbehauen H.: Polynomial approach to constrained receding horizon predictive control. In: Preprints of the IFAC Conference Control System Design. Bratislava, Slovak Republic, June 18. – 20. 2000, p. 247 – 252.
- [10]* Jeleněiak F., Mikleš J., Dzivák J., Dvoran J.: Stability analysis of a chemical reactor using Ljapunov indirect method. In: Proceedings of International Carpathian Control Conference. High Tatras – Podbanské, Slovak Republic, May 23. – 26. 2000, p. 431 – 434.
- [11]* Jeleněiak F., Mikleš J., Dzivák J., Kožka Š.: Ljapunov stability analysis of a chemical reactor. In: CD -ROM of full texts of the 27th International Conference of SSCHI. Tatranské Matliare, Slovak Republic, May 22. – 26. 2000, CD ROM P335.
- [12]* Jeleněiak F., Mikleš J., Dzivák J., Kožka Š.: Stability analysis of a chemical reactor using Ljapunov indirect method. In: Proceedings of the 4th Scientific - Technical Conference Process Control 2000. Kouty nad Desnou, Czech Republic, June 11. – 14. 2000, CD ROM RIP157.
- [13]* Karšaiová M., Bakošová M., Ondrovičová M., Mészáros A.: Design of control method for distillation columns. In: CD-

- ROM of full texts of the 27th International Conference of SSCHI. Tatranské Matliare, Slovak Republic, May 22. – 26. 2000, CD ROM P119.
- [14]* Karšaiová M., Bakošová M., Ondrovičová M.: Decentralised control of nonlinear chemical processes. In: CD-ROM of full texts of the 14th International Congress of Chemical and Process Engineering CHISA 2000. Prague, Czech Republic, August 27. – 31. 2000, CD-ROM 1025.
- [15]* Karšaiová M., Danko J., Bakošová M., Ondrovičová M.: Control design of real object. In: Proceedings of the 4th Scientific - Technical Conference Process Control 2000. Kouty nad Desnou, Czech Republic, June 11. – 14. 2000, CD ROM RIP153.
- [16]* Kožka Š., Mikleš J., Fikar M., Jeleniak F., Dzivák J.: Closed-loop identification of a laboratory chemical reactor. In: Preprints of the 3rd IFAC Symposium on Robust Control Design. Prague, Czech Republic, June 21. – 23. 2000, CD ROMEUR-03.
- [17]* Kožka Š., Mikleš J., Jeleniak F., Dzivák J.: Identification of laboratory chemical reactor in closed-loop via Youla-Kučera parameterisation. In: Proceedings of the 3rd IMACS Symposium on Mathematical Modelling. Vienna, Austria, February 2. – 4. 2000, vol.2, p. 705 – 708.
- [18]* Lázníková D., Dvoran J.: Control of through-flow reactor. In: Proceedings of the 4th Scientific - Technical Conference Process Control 2000. Kouty nad Desnou, Czech Republic, June 11. – 14. 2000, CD ROM RIP149.1.
- [19]* Mészáros A., Szanyiová J., Andrášik A.: MRAS based control of a fermentation process. In: Proceedings of the 4th Scientific - Technical Conference Process Control 2000. Kouty nad Desnou, Czech Republic, June 11. – 14. 2000, CD ROM RIP202.1.
- [20]* Mészáros A., Andrášik A., Rusnák A.: Application of artificial neural network strategies in process control. In: Preprints of the Euro-International Symposium on Computational Intelligence. Košice, Slovak Republic, August 30. – September 1. 2000, p. 268 – 275.
- [21]* Mészáros A., Andrášik A., Szanyiová J.: Počítačové riadenie laboratórneho fermentora. Computer control of a laboratory fermenter. In: CD-ROM of full texts of the 27th International Conference of SSCHI. Tatranské Matliare, Slovak Republic, May 22. – 26. 2000, CD ROM P204.
- [22]* Mikleš J., ěirka Ľ., Kvasnica M.: Design of a controller by static output feedback. In: Proceedings of International Carpathian Control Conference. High Tatras – Podbanské, Slovak Republic, May 23. – 26. 2000, p. 459 – 462.
- [23]* Mikleš J., Kožka Š., ěirka Ľ.: PID controller and LQ control design. In: Preprints of the IFAC Workshop on Digital Control. Past, present and future of PID Control. Terrassa, Spain, April 5. – 7. 2000, p. 315 – 319.
- [24]* Ondrovičová M., Bakošová M., Karšaiová M., Jeleniak F.: Identification and control of a laboratory distillation column. In: CD-ROM of full texts of the 27th International Conference of SSCHI. Tatranské Matliare, Slovak Republic, May 22. – 26. 2000, CD ROM P118.
- [25]* Ondrovičová M., Bakošová M., Karšaiová M.: Laboratory distillation column control with closed-loop identification. In: Proceedings of the 4th Scientific - Technical Conference Process Control 2000. Kouty nad Desnou, Czech Republic, June 11. – 14. 2000, CD ROM RIP152.
- [26]* Prokop R., Bakošová M., Prokopová Z.: PID control of unstable time-delay systems: tuning and robustness. In: Preprints of the IFAC Conference Control System Design. Bratislava, Slovak Republic, June 18. – 20. 2000, p. 420 – 425.
- [27]* Rusnák A., Mészáros A., Andrášik A.: Control system for a laboratory fermenter. In: Proceedings of the 4th Scientific - Technical Conference Process Control 2000. Kouty nad Desnou, Czech Republic, June 11. – 14. 2000, CD ROM RIP202.2.
- [28]* Seě A., ěirka Ľ.: Batch filled distillation column. In: Proceedings of the 4th Scientific - Technical Conference Process Control 2000. Kouty nad Desnou, Czech Republic, June 11. – 14. 2000, CD ROM RIP222.
- [29]* Vasiěkaninová A., Zemanovičová A.: Fuzzy controller design for concentration system. In: Proceedings of the 4th Scientific - Technical Conference Process Control 2000. Kouty nad Desnou, Czech Republic, June 11. – 14. 2000, CD ROM RIP154.
- [30]* Vasiěkaninová A., Zemanovičová A.: Neuro-fuzzy controller design for concentration systems. In: Proceedings of International Carpathian Control Conference. High Tatras – Podbanské, Slovak Republic, May 23. – 26. 2000, p. 527 – 530.
- [31]* Zemanovičová A., Vasiěkaninová A., Hofbauer H.: Control of time-delay systems. In: Proceedings of the 4th Scientific - Technical Conference Process Control 2000. Kouty nad Desnou, Czech Republic, June 11. – 14. 2000, CD ROM RIP155.

C. Books and Textbooks

- [1] Mikleš J., Fikar M.: Process modelling, identification and control I. Models and dynamic characteristics of continuous processes. STU Press, Bratislava, 170 pp. (2000).

DEPARTMENT OF SACCHARIDES AND FOOD PRESERVATION

Head of the Department:

Prof. Alexander Dandár, PhD, DSc

Telephone: ++421-7-52 92 60 55

Fax: ++421-7-52 49 31 98

E-mail: dandar@chtf.stuba.sk

I. STAFF

Full Professors:

Alexander Dandár, PhD, DSc; Alexander Príbela, PhD, DSc

Associate Professors:

Ladislav Dodok, PhD; Jolana Karovièová PhD; Mária Takácsová, PhD;

Assistant Professors:

Alica Burisová; Gabriel Greif; Eva Hybenová, PhD; Ladislav Staruch, PhD; Soòà Škrovánková

Research Fellows:

Viola Buchtová; Mária Kováèová, PhD; Zuzana Smelíková, PhD; Anna Stahelová

PhD Students:

Dang Minh Nhat; Zlatica Kohajdová; Kitti Kristiánová; Nguyen Dac Vinh

Technical Staff:

Žofia Fórová; Katarína Halasová; Margita Hrivnáková; Jarmila Mikletiová; Ľudmila Mináriková; Helena Morávková; Gabriela Sisáková; Eva Vosátková

II. TEACHING AND RESEARCH LABORATORIES

Laboratory of Sugar Technology
 Laboratory of Starch Chemistry and Technology
 Laboratory of Cereal Technology
 Laboratory of Canned Products
 Laboratory of Meat and Meat Products
 Laboratory of Microbiology
 Sensory Laboratory
 Laboratory of Food Chemistry and Analysis
 Laboratory of Food Preservation
 Laboratory of Separation Methods

III. TEACHING

A. Undergraduate Study

5th semester (autumn)

Food Chemistry	(2-0-0 h)	Takácsová
Fundamentals of Food Technology	(2-0-0 h)	Karovièová

6th semester (spring)

Food Analysis	(2-0-0 h)	Kováèová, Príbela
Laboratory of Food Analysis	(0-0-4 h)	Kováèová, Hybenová, Buchtová, Burisová, Škrovánková, Kohajdová, Németh
Semestral Project	(0-0-4 h)	all members of the staff

7th semester (autumn)

Food Special Analysis	(2-0-0 h)	Prachar
Laboratory of Food Special Analysis	(0-0-4 h)	Hybenová, Dodok, Kováèová, Buchtová, Burisová
Cereal Chemistry and Technology	(4-1-0 h)	Dodok
Chemistry and Technology of Saccharides	(2-1-0 h)	Burisová
Theory of Food Preservation	(4-2-0 h)	Greif, Príbela
Raw Materials for Canning Industry	(2-0-0 h)	Karovièová, Hybenová
Food Legislation	(2-2-0 h)	Staruch

8th semester (spring)

Sugar Technology	(4-0-0 h)	Dandár
Chemical Engineering Processes in Saccharide Technology	(2-0-0 h)	Dandár
Laboratory of the Specialization I.	(0-0-8 h)	Dodok, Burisová, Korèeková, Greif, Karovièová, Staruch
Preserved and Frozen Food Technology	(3-0-0 h)	Karovièová, Greif
Meat and Poultry Technology	(3-0-0 h)	Staruch
Reaction Mechanism	(2-1-0 h)	Takácsová

9 th semester (autumn)

Food Evaluation	(2-0-2 h)	Škrovánková
Laboratory of the Specialization II.	(0-0-4 h)	Burisová, Greif, Karovièová, Staruch
Electives:		
Foreign Substances	(2-0-0 h)	Hybenová
Optimizing of Sugar Technology	(2-0-2 h)	Dandár
Technology Optimizing in Canning Industry	(2-0-2 h)	Greif, Pribela

10th semester (spring)

Diploma Thesis	(0-0-27 h)	all members of the staff
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IV. CURRENT RESEARCH PROJECTS**A. Optimizing of physicochemical and biological effects with respect to increase of nutritive and sensory value of foodstuffs (Alexander Dandár)**

Physicochemical properties of amaranth starches were studied. On the basis of our results the starches mentioned above will be used in pharmaceutical industry too. Technological proposal for production of new cereal products (cereal mixtures) with higher nutritive value was submitted.

The data for production of food supplements with glucan of the highest quality were worked out. Clinical tests with oncological patients were made. Natural food additives (cereal and pseudocereal starches and legume starch) were added into selected food products to increase their nutritive value, sensory properties and durability.

Suitable methods for determination of antioxidative effects of natural substances were tested. The kinetics of colorant formation in the process of liming of raw juice was evaluated. Effect of temperature, amount of lime milk, amino acids and reducing sugars concentration on colorants formation was analysed.

Natural additives (ascorbic acid, alfa-tocopherol acetate, bacteriocins, starters combined with mould) into fermented meat products to increase their durability and sensory properties were tested.

B. Bioconservation of plant and animal raw materials using probiotic bacteria of human health promoters to eliminate the food contaminants and to increase the nutritive value of food products (Jolana Karovièová)

Isolation and identification of lactic acid bacteria and their selection on the basis of lactic and acetic acids production were studied. The changes of nitrates and nitrites concentration and the production of free amino acids and biogenic amines in selected plant substrates were analysed. Probiotic properties of selected strains of Lactobacillus for example survival at low pH value and the production of bacteriocins and their growth in selected substrates were studied. Sensory evaluation of lactic fermented vegetables as well as vegetable juices was made. This evaluation was realized by group of specialists using the profile method. The results of sensory and analytical methods were evaluated by PCA method. Lactic bacteria of Enterobacter aerogenes were analysed under different conditions (different concentration of glucose, potassium sorbate, sodium benzoate, NaCl) Their growth and production of metabolite on synthetic substrates (MPB, GTK) and on natural one (cabbage juice) at different temperature were observed. Validative parameters of organic acids by capillary ITP were defined.

V. COOPERATION**A. Cooperation in Slovakia**

Ministry of Agriculture of Slovak Republic, Bratislava
 Institute of Food Research, Bratislava
 Slovak Academy of Sciences, Bratislava
 Považský cukrovar Co, Trenèianska Teplá
 Slovak Sugar Technology Association, Bratislava
 OLD HEROLD Co, Trenèin
 SLOVAMYL Ltd, Bratislava
 Mäsozávod, Bratislava
 University of Agriculture, Nitra
 ADIPO Ltd, Nitra

B. International Cooperation

Institute of Food Research, Prague, Czech Republic
 College of Agriculture, Brno, Czech Republic
 Škrobárny Co, Brno, Czech Republic
 Institute of Chemical Technology, Prague, Czech Republic
 Institute of Food Research, Manchester, UK
 Akademia Ekonomiczna, Wroclaw, Poland
 Technical University, Berlin, Germany
 Technical University, Lodž, Poland

C. Membership in Domestic Organizations and Societies

Slovak Society of Agricultural, Food and Forestry Sciences, Bratislava (A. Dandár, M. Takácsová, L. Staruch)
 ICC National Association Council in Slovakia (L. Dodok)
 Slovak Academy of Agricultural Sciences, Bratislava (A. Dandár, L. Dodok)
 Slovak Academy of Technical Sciences, Bratislava (A. Dandár)
 Foundation "SLOVAK GOLD", Bratislava (L. Staruch)

Slovak Institute of Technical Normalization, Bratislava	(L.Dodok, L.Staruch)
The Union of Slovak Butchers, Bratislava	(L. Staruch)
Slovak National Committee of International Commission for Uniform Methods of Sugar Analysis - ICUMSA	(A. Dandár)
Slovak Agricultural Academy, Nitra	(A. Pribela, A. Dandár. L. Dodok)

D. Membership in International Organizations and Societies:

International Commission for Uniform Methods of Sugar Analysis - ICUMSA, Italy	(A. Dandár)
American Chemical Society	(A.Dandár)
Commission International Technique de Sucrierie – CITS, Brussels, Belgic	(A.Dandár)
Verein der Zuckerfabriken Österreichs, Austria	(A. Dandár)
Stowarzyszenie Technikow Cukrownikow, Wroclaw, Poland	(A. Dandár)
International Association for Cereal Science and Technology, Vienna, Austria	(L.Dodok)
WEPSA – World Poultry Scientific Association, Israel	(L.Staruch)

F. International Scientific Programmes:

1. SOCRATES/ERASMUS
a/ 55792-CP-1-98-FR-ERASMUS-ETN, /FOODNET-Food Studies in Europe
A. Dandár – CHTF STU, ENSIA, Massy Cedex, France

H. Visits of Staff Members and PhD Students to Foreign Institutions

A. Dandár	International Commission of Technique de Sucrierie,Brussel, Belgium, July (4 days)
A.Dandár	CITS, Mannheim, Germany, February 17–19 (3 days)
A.Dandár	VŠCHT Praha, Czech Republic, February (4 days)
A.Dandár, K.Kristiánová	5th Food Net Meeting, Vienna, Austria, March 9 (1 day)
K.Kristiánová	International Conference of Young Hungarian Scientists and PhD Students, Gödöllő, Hungary, April 14.-16. (3 days)
K.Kristiánová	University of Horticulture, Budapest, Hungary, May (2 days)
K.Kristiánová	Chemical Reactions in Foods IV, Prague, Czech Republic, September 20.-22. (3 days)
K.Németh	6th Food Net Meeting, Gargnano, Italy, June 17.-19. (3 days)
K.Németh	7th Food Net Meeting, Ghent, Belgium, December 10.-12. (3 days)

VI. THESES AND DISSERTATIONS

A. Graduate Theses (MS Degree) for state examinations after 5 years of study (supervisors are written in brackets)

Csizmadiová E.:	The influence of additives on the dough fermentation. (L.Dodok)
Filkorová J.:	The influence of invert sugar on the colour of thin and thick juices. (A.Dandár)
Gajdoštinová N.:	The stability of flavonoids. (M.Kováčová)
Gáliková S.:	Study of total amino acids concentration in fermented meat product with addition of fructose. (V.Buchtová)
Gruntová R.:	Changes of packaged meat products in vacuum and in modified atmosphere (L.Staruch)
Holasová Ž.:	The influence of some food components on the stability of lipids. (K.Kristiánová)
Hubka P.:	The effect of amount of fructose on the properties of fermented meat products. (L.Staruch)
Kleinová R.:	Study of fermentation in flour mixtures with different amount of saccharose (A.Burisová)
Kozinková K.:	Effect of improvers on rheological properties of the dough. (L.Dodok)
Kozliková K.:	Purification of sugar beet juice in the presence of CaCO ₃ . (A.Dandár)
Kratmüllerová – Greitáková M.:	Detection of antibiotics residues in milk and the comparison of different analytical methods. (B.Hozová)
Lapšanská M.:	Non-sugars coagulation in sugar beet juice. (A.Dandár)
Lisá E.:	Study of free amino acids concentration in fermented meat products with addition of fructose. (V.Buchtová)
Longauerová Z.:	Study of antioxidative properties of flavonoids, (M.Kováčová)
Magdolenová C.:	Sensory evaluation of colour and bitter taste in red wine. (S.Škrovánková)
Machatová D.:	Production of organic acids by microorganisms in model conditions. (J.Karovičová)
Martinovičová Z.:	Effect of betaine on the production of colour substances in sugar

Miklošovièová D.:	solutions. (S.Matula) The influence of some plant compounds on the stability of lipids. (M.Takácsová)
Nagyová D.:	Decolorization of sugar solutions by ionexchangers. (S. Matula)
Pôbišová M.:	Activity analysis of selected enzymes in cereals and pseudocereals. (A.Burisová)
Rybárová – Vachová Z.:	Determination of organic acids by isotachopheresis. (E.Hybenová)
Sádecká Ž.:	Effect of substrate on the growth of <i>Enterobacter aerogenes</i> and on the production of amines. (G. Greif)
Slanická K.:	Study of the methods of sensory analysis in foods. (J.Karovièová)
Staòková A.:	The influence of preserving agents on the growth of <i>Enterobacter aerogenes</i> and on the production of amines. (G. Greif)
Tomášková B.:	Isolation and characterization of non – starch polysaccharides from pseudocereals. (A. Burisová)
Trúchla Ľ.:	Bioconservation of vegetable juices. (E. Hybenová)
Ursínyová A.:	Effect of some natural substances on the stability of lipids. (M. Takácsová)
Vršanská M.:	Role of improvers in production of cookies. (L.Dodok)
Vršanská S.:	Analysis of amylase and protease activity in selected cereals and pseudocereals. (A. Burisová)

B. Dissertations (PhD):

Dang Minh Nhat	Composition and use of essential oils isolated from some spices. (M. Takácsová)
Hybenová E.:	Isolation, identification and properties of lactic bacteria. (M. Drdák)
Kováèová M.:	Isolation and utilization of colorants from <i>Sambucus ebulus</i> L. (A. Príbela)
Nguyen Dac Vinh:	Study of the effects of some natural antioxidants (M. Takácsová)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

- [1] Dang, M.N., Takácsová, M., Nguyen, D. V., Kristiánová, K.: The influence of extracts and essential oils from various spices on the oxidation stability of lard. *Czech J. Food Sci.* 18 (sp. is.), 153-154 (2000)
- [2] Dodok, L.: Vznik, vývoj a súèasný stav Katedry sacharidov a konzervácie potravín na CHTF STU. Inception, development and present time at the Department of saccharides and food preservation (in Slovak). *Pekárstvo, cukrárstvo* 1(2), 4 (2000)
- [3]* Hozová, B., Buchtová, V., Dodok, L.: Microbiological, nutritional and sensory evaluation of long time stored amaranth biscuits produced from irradiation-treated amaranth grain. *Nahrung* 44 (1), 13-18 (2000)
- [4]* Jantová, S., Greif, G., Šipková, K., Stankovský, Š., Oravcová, M.: Antibacterial effects of trisubstituted quinazoline derivatives. *Folia Microbiologica* 45 (2), 133-137 (2000)
- [5] Kajaba, I., Snišèák, F., Staruch, L.: Uplatnenie nových odporúèaných výživových dávok, (OVD) v SR v rôznych systémoch spoločenského stravovania. *Výživa a zdravie*, 45 (4), 73 -75, (2000)
- [6]* Karovièová, J., Šimko, P.: Determination of synthetic phenolic antioxidants in food by high-performance liquid chromatography. *Journal of Chromatography A* 882, 271-281 (2000)
- [7] Nguyen, D. V., Takácsová, M., Dang, M. N., Kristiánová, K.: Antioxidants activities of allspice extracts in rapeseed oil. *Czech J. Food Sci.* 18 (2), 49-51 (2000)
- [8]* Nguyen, D. V., Takácsová, M., Dang, M. N., Kristiánová, K.: Stabilization of rapeseed oil with allspice, clove and nutmeg extracts. *Nahrung* 44 (4), 281-282 (2000)
- [9]* Nguyen, D. V., Takácsová, M., Jakubík, T., Dang, M. N., Kristiánová, K.: Antioxidative effects of thyme in rapeseed oil. *Biologia* 55 (3) 277-281 (2000)
- [10] Nguyen, D. V., Takácsová, M., Jakubík, T., Dang, M. N., Kristiánová, K.: Antioxidative effects and composition of allspice in rapeseed oil. *Czech J. Food Sci.* 18 (sp. is.), 150-152 (2000)
- [11] Takácsová, M., Kristiánová, K., Nguyen, D. V., Dang, M. N.: Antioxidant activity of ginger extract in ground pork patties. *Czech J. Food Sci.* 18 (sp. is.), 155-156 (2000)

B. Conferences (*International conferences)

- [1] Buchtová V., Staruch, L.: Štúdium aminokyselinového zloženia materského mlieka. Study of amino acids composition in human milk (in Slovak). In: Proceedings of the 31st Symposia „New Trends of Food Production and Evaluation“, Skalský dvùr, Czech Republic, May 22. - 24. 2000, p. 20
- [2] Buchtová, V., Staruch, L., Dudášová, M.: Sledovanie koncentrácie aminokyselín v rôznych druhoch mlieka. Study of amino acids concentration in different types of milk (in Slovak). In: Proceedings of the Conference „Nutrition – Foods – Legislation“, Detva, Slovak Republic, June 13.-15. 2000, p.195-197
- [3] Burisová A., Dodok L., Kleinová, R.: Vplyv množstva sacharózy na kvalitu chlebkov z pšenièenej a lúskavcovej múky. Effect of saccharose amount on the quality of bread made from wheat and amaranthus flours (in Slovak). In: Proceedings of the Conference „Nutrition – Foods – Legislation“, Detva, Slovak Republic, June 13. – 15. 2000, p. 170-173
- [4] Burisová A., Dodok L., Škrovánková S. : Vplyv prídavku lúskavcovej múky na produkciu kvasného plynu v ceste. The effect of the addition of amaranth flour on the production of CO₂ in dough (in Slovak). In : Proceedings of the 9th Conference „Additives in Foods“, Modra, Slovak Republic, October 4.-5. 2000. p. 58-60
- [5] Burisová A., Sedláèková B., Šilhárová K.: PGRC metóda na stanovenie kovov vo víne. Determination of metals in wine by PGRC method (in Slovak). In: Proceedings of the VIII.th Conference „Analytical Chemistry in Practice“,

- Bratislava, Slovak Republic, September 18.-21. 2000, p. 120
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- [9] Burisová A., Slugeò D., Starùch L., Pòbišová M., Németh K.: Sledovanie lipázovej a lipoxigenázovej aktivity vo vybraných cereáliách a pseudocereáliách. Study of lipase and lipoxigenase activity in selected cereals and pseudocereals (in Slovak). In: Proceedings of the 6th Congress of the Slovak Society of Agricultural, Food and Forestry Sciences, section C: Food, Zvolen, Slovak Republic, September 6.-7. 2000, p. 76-80
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- [12] Dandár, R., Pollach, G., Dandár, A.*: Porovnanie metód stanovenia sušiny v technických cukorných roztokoch. Comparison of methods for dry matter determination in technical sugar solutions (in Slovak). In: Proceedings of the 6th Congress of the Slovak Society of Agricultural, Food and Forestry Sciences, section C: Food, Zvolen, Slovak Republic, September 6.-7. 2000, p.86-90
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- [25] Karovièová, J., Greif, G., Hybenová, E., Kohajdová, Slanická, K.: Využitie štatistických metód multivariaèenej analýzy pri hodnotení mlieèene fermentovaných zeleninových štiav. Statistical methods of multivariate anlysis applied for the evaluation of lactic acid fermented vegetable juices (in Slovak). In: Proceedings of the 6th Congress of the Slovak Society of Agricultural, Food and Forestry Sciences, section C: Food, Zvolen, Slovak Republic, September 6.-7. 2000, p. 149-152
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C.Books and Textbooks

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CENTRAL LABORATORIES

Head of the Department:
Assoc.Prof. Ján Leško, PhD

Telephone: +421-7-593 254 17
+421-7-529 260 18
Fax: +421-7-529 260 18
E-mail: lesko@chelin.chtf.stuba.sk

I. STAFF

Associate Professors:

Ján Leško, PhD; Ján Lokaj, PhD;

Research Fellows:

Štefan Holotík, PhD; Tibor Jakubík, PhD; Tibor Liptaj, PhD;

PhD Student:

Juraj Bella; Svatava Kašparová; Pham Tran Nghia;

Technical Staff:

Marta Dunajová; Svatava Kašparová; Peter Kottaš; Mária Mravcová; Eva Pappová; Naï a Prónayová; Walter Weis

II. TEACHING AND RESEARCH LABORATORIES

B. Research Laboratory

Laboratory of NMR Spectroscopy (NMR)

Laboratory of Mass Spectrometry (MS)

Laboratory of X-Ray Microanalysis

IV. CURRENT RESEARCH PROJECTS

A. Development of NMR techniques for the structure determination of modular molecules (Tibor Liptaj)

The main goals of the project are:

a/ development of the NMR techniques which provide long-range structural information on the studied molecules. These methods rely on measurement and interpretation of residual dipolar coupling constants which appear in high resolution spectra because of partial orientation of molecules.

The main results are:

- a/ development of the methods for the precise determination of the value of coupling constants
- b/ determination of the dipolar $1J(C-H)$ coupling constants in the model oligosaccharide.

Direct participation on other projects:

NMR laboratory cooperates mainly with:

- Department of organic chemistry
- Department of organic technology
- Department of petroleum technology and petrochemistry
- Department of physical chemistry
- Department of anorganic chemistry
- Department of analytical chemistry
- Department of biochemical technology
- Department of biochemistry and microbiology

MS Laboratory cooperates mainly with:

- Department of organic chemistry
- Department of organic technology
- Department of petroleum technology and petrochemistry
- Department of analytical chemistry
- Department of biochemistry and microbiology

Laboratory of Microanalysis cooperates with:

- Department of organic chemistry
- Department of ceramics, glass and cement

V. COOPERATION

A. Cooperation in Slovakia

Faculty of Medicine, Jesenius University, Martin

Institute of preventive and clinical medicine, Bratislava

Derer Hospital, Bratislava

Drug Research Institute, Modra

Slovak Academy of Sciences, Institute of Inorganic Chemistry, Bratislava

Slovak Academy of Sciences, Chemical Institute, Bratislava

Viticultural and Enological Research Institute, Senkvice

Comenius University, Faculty of Natural Sciences, Bratislava
 Comenius University, Faculty of Pharmacy, Bratislava
 Soil Fertility Research Institute, Bratislava
 Research Institute of Animal Production, Nitra
 Institute of Petrochemistry, Prievidza
 Chemical Factory, Nováky
 Biotika, Slovenská Ľupča
 Slovnaft, Bratislava
 Duslo, Šaľa
 Slovakofarma, Hlohovec
 Glass Factory, Nemšová
 Ceramics Factory, Ľáb
 Technical Glass Factory, Bratislava

B. International Cooperation:

The University of Edinburgh, Chemistry Department, The King's Buildings, Edinburgh, England
 - Development of NMR techniques for structure determination of multi-modular proteins
 Université Blaise Pascal, Department of Organic and Bioorganic Chemistry, Clermont-Ferrand, France
 - The NMR study of the cellular metabolism of the *Fibrobacter succinogenes* using C-13 labelled substrate
 Università di Bari, Facoltà di Medicina Veterinaria, Istituto di Clinica Chirurgica, Italy
 - Study of the ischemia and reperfusion on the metabolic map of rabbit CNS.
 Department of Fine Organic Chemistry, ECPM/ University L. Pasteur, Strasbourg, France
 - NMR characterization of chiral compounds
 Bruckner Maschinenbau GmbH., Siegsdorf, Germany
 - ¹³C NMR analysis of the polypropylenes.

C. Membership in Domestic Organizations and Society:

Slovak Spectroscopic Society, Bratislava (T.Liptaj)

D. Membership in International Organizations and Societies:

22nd Discussion Meeting: Progress in the Magnetic Resonance of Bioactive Compounds and New Material.
 Regensburg, September 27.-30., 2000, Germany (T.Liptaj)

G. Visitors from Abroad:

Prof. Dušan Uhrín The University of Edinburgh, England, September-October 2000 (14 days)

H. Visits of Staff Members and PhD Students to Foreign Institutions:

Pham Tran-Nghia	The University of Edinburgh, England, February-March 2000, (27 days)
T. Liptaj	Meeting 15th NMR Valtice, Czech republic, April 2000, (3 days)
N.Prónayová	Meeting 15th NMR Valtice, Czech republic, April 2000, (3 days)
T. Liptaj	ECPM/ University L. Pasteur, Strasbourg, France, May 2000, (30 days)
S.Kašparová	XVIIth Biochemical Congress, Praha, Czech republic, September 2000,(4 days)
T.Liptaj	52th Congress Chemical Society, Ěeské Budì jovice, Czech republic, September 2000, (5 days)
T. Liptaj	The University of Edinburgh, England, Nov.-Dec. 2000, (14 days)

VII. PUBLICATIONS

A. Journals (*registered in Current Contents)

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- [12]* Szolcsányi P., Gracza T., Koman M., Prónayová N., Liptaj T.: Pd(II)-catalysed aminocarbonylation as a key step in the total synthesis of C-6 homologues of 1-deoxyojirimycin and 1-deoxy-L-idonojirimycin. *Tetrahedron: Asymmetry* 11, 2579-2597 (2000).
- [13]* Szolcsányi P., Gracza T., Koman M., Prónayová N., Liptaj T.: Total synthesis of new C-6 homologues of 1-deoxyojirimycin and 1-deoxy-1-idonojirimycin. *Chem.Commun.* 6, 471-472 (2000).
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B. Conferences (* International conferences)

- [1]* Kašparová S., Dobrota D., Mlynárik V., Pham T.N., Liptaj T., Horecký J., Braunová Z., Gvozdjaková A.: Creatine kinase reaction in rat brain during chronic ischemia and ethanol intoxication – 31P magnetic resonance study. XVIIth Biochemical Congress, Praha, Czech republic, September 7.-10. 2000.
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- [3]* Korešová A., Šafář P., Považanec F., Prónayová N.: Heterocyclic analogues of isatoic anhydride in the synthesis of polycyclic compounds. In: Book of Abstracts 8th Blue Danube Symposium on heterocyclic Chemistry, Bled, Slovenia, September 24-27, 2000, p. 43.
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- [5]* Liptaj T., Pham T.Nghia, Burnside-Bromek K., Uhrín D.: Determination of residual spin-spin coupling constants in small molecules. In: Book of Abstract of the 15th NMR Valtice, Central European NMR Discussion Group, Avril 26.-28. 2000, Valtice, Czech republic, p. 21.
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- [7]* Matheron C., Delort A.-M., Gaudet G., Liptaj T., Forano E.: Interactions entre le metabolisme carbone et azote chez *Fibrobacter succinogenes*, bacterie anaerobie stricte du rumen: Edute par RMN 1H et 13C. Interaction between the carbon and nitrogen metabolism of *Fibrobacter succinogenes* strictly anaerobic bacterium of rumen. !H and !#C NMR study (in frenche). *Microbiologie Anaerobie, Societé Francaise de Microbiologie, Avril 5.-6. 2000, Villeurbanne, France.*
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- [9]* Saloò J., Milata V., Prónayová N., Zalibera L., Leško J., Lokaj J., Belicová A., Seman M.: Synthesis of fused heterocycles based on 2,3-diphenyl-6-nitroquinoxaline. In: Book of Abstracts. In: Book of Abstracts 8th Blue Danube Symposium on Heterocyclic Chemistry, Bled, Slovenia, September 24-27, 2000, p. 130.
- [10] Štetinová J., Kada R., Leško J., Miěová J.: Synthesis and reactions of chlorosubstituted benzothiazolyl cyanoacetamides. In: XXIVth Conference Chemists on Advances in Organic Chemistry, Piešany, June 28 -30, 2000, p. 187-188

FACULTY ADMINISTRATION SERVICES

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