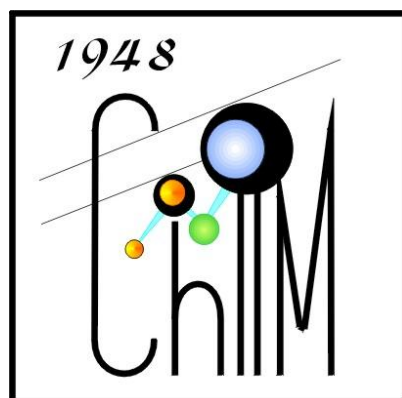


# FACULTY OF INDUSTRIAL CHEMISTRY AND ENVIRONMENTAL ENGINEERING



**Pta. Victoriei, nr. 2**  
**300006-Timișoara, Romania**  
**Tel: +40-256-403063**  
**Fax: +40-256-403060**

**E-mail: [secretar.sef@chim.upt.ro](mailto:secretar.sef@chim.upt.ro)**  
**Web: [www.chim.upt.ro](http://www.chim.upt.ro)**



**RESEARCH CENTRE  
PROTECTION AND DEPOLLUTION WATER ENGINEERING  
AND ENVIRONMENTAL ANALYSIS OF INDUSTRIAL  
PROCESS - P.D. W.E.E.A.I.P.**

**GENERAL PRESENTATION**

This research centre is a CNCSIS accredited, type C, research centre reapproved by CNCSIS in 12.09.2006, according to CNCSIS certificate nr. 28. The director of the Center is **Prof. dr. eng. Petru Negrea**.

**MAIN ACTIVITIES**

The Centre accomplishes research and design in the following topics:

- Environmental analysis of industrial processes
- Drinking and industrial water treatment
- Wastewater treatment
- Process control equipments for research plants in chemical industry
- Control systems using computers for researching plants and low tonnage plants in chemical industry
- Intensive methods for the exoneration of soil from radioactive minerals exploitation and processing areas in the condition of natural disasters or entropic accidents
- Mathematical modeling and numerical simulation of environmental pollution and depollution processes
- Modeling, simulation and process control
- Heat transfer organic agents
- Unit processes
- Magnetic Fluids: Preparation, Characterization and Applications
- The Intensification of Transfer Processes
- Rheological characterization of the substances
- Studies and projects for thermo-technical installations of the silicates industry
- Electrochemical processes
- Obtaining and characterization of oxide compounds

**CONTACT**

Faculty of Industrial Chemistry and Environmental Engineering  
Department of Applied Chemistry and Engineering of Inorganic Compounds and Environmental  
2, Victoriei Square  
RO-300006 Timișoara  
Tel: +40-256-403063  
Fax: +40-256-403060  
E-mail: petru.negrea@chim.upt.ro

**RESEARCH FIELDS**

- **Environmental analysis of industrial processes**

*Keywords:* environmental, pollution, waste

- **Drinking and industrial water treatment**

*Keywords:* water treatment, drinking water, industrial water

- **Wastewater Treatment**

*Keywords:* waste water treatment, pollution

- **Process control equipments for research plants in chemical industry**

*Keywords:* measuring, control devices

- **Control systems using computers for researching plants and low tonnage plants in chemical industry**

*Keywords:* process control, research and low tonnage plants

- **Intensive methods for the exoneration of soil from radioactive minerals exploitation and processing areas in the condition of natural disasters or entropic accidents**

*Keywords:* Climate changes, pollution, risk, sustainable chemistry, modeling

- **Mathematical modeling and numerical simulation of environmental pollution and depollution processes**

*Keywords:* modeling, simulation, environmental protection

- **Modeling, simulation and process control**

*Keywords:* modeling, simulation, optimization, process control, absorption-desorption with chemical reaction

- **Oily compounds extraction from waste waters using magnetic fluids**

*Keywords:* extraction, magnetic fluid

- **Coordinative compounds with organic ligands**

*Keywords:* coordinative compounds, heterocyclic compounds, hydroxycarboxylic acids, pharmaceutical substances, pigments, dyes

- **Synthesis of nanocomposites with controlled magnetic, optic and catalytic properties**

*Keywords:* nanoparticles, sol-gel, silica, magnetic, catalytic, polyols

➤ **Homo-and heteropolynuclear compounds with organic ligands**

*Keywords:* organic ligand, polinuclear compound, magnetic materials, catalysts, pigments, ferrites, chromites

➤ **Physical Chemistry. Chemically Active Species Grafted on Polymer-Supports**

*Keywords:* catalysis, homogeneous catalysts, heterogeneous catalysts, polymer-grafted catalysts, polymer-grafted reagents, polymer-support

➤ **Physical Chemistry. The obtaining and characterization of some oxide compounds**

*Keywords:* solid-state, oxide compounds, unconventional methods

➤ **Organic Electrochemistry**

*Keywords:* organic electro synthesis, organic electro reduction and oxidation

➤ **Electro catalysis**

*Keywords:* skeleton electrodes, thermal arc spraying, potentiometer sensors

➤ **Electroplating**

*Keywords:* copper, zinc, nickel electrodepositing, brighteners

➤ **Fuel Cells**

*Keywords:* fuel cells, skeleton electrodes, proton exchanges membrane, anion exchange membrane

➤ **Synthesis of ceramic materials through hydrosilicatic forerunners**

*Keywords:* ceramic, hydrosilicatic, synthesis

➤ **Semi conducting glasses. Fast ion-conducting glasses. Redox equilibrium in glasses. Low melting glasses for fusion type application**

*Keywords:* conducting, glasses, redox equilibrium, vitreous systems

➤ **Ceramic glazes. Synthesis and characterization of thermo resistant pigments**

*Keywords:* ceramic glazes, thermo resistant pigments, synthesis method

➤ **Chemistry and technology of building materials**

*Keywords:* cements, mineral binders

Mathematical modeling and numerical simulation of soil depollution processes.

**Researches in WATER TREATMENT AND PURIFICATION**

The activity intensifying and diversifying of the industrial processes leads to the quality degradation of water sources, with important implications for water supplies. In this context it is important to research and to elaborate some treatment and purification technologies, more efficient and at low costs. The research activity was concerning with the

majority of aspects involved by water chemistry and technology, as follows:

- physical and chemical characterization of water supplies and of wastewaters
- researches concerning water treatment for drinking and industrial purposes
- researches concerning the technologies of industrial and municipal wastewater treatment

Results of the research activity were published in journals of specialty and communicated at the national and international Symposia.

**RESEARCH TEAM**

Georgeta Burtica, Aurel Iovi, Petru Negrea, Rodica Pode, Ioan Ursoiu, Adina Negrea, Eugen Lungu, Marius Gheju, Florica Manea, Laura Cochei, Giannin Moșoarță, Lavinia Lupa, Mihaela Ciopec.

**Researches in INORGANIC CHEMICAL TECHNOLOGY**

Different processes for obtaining of the new products, with superior qualities have been studied (chemical fertilizers with microelements, inorganic salts, etc.), for turning to good account of the native raw materials, industrial wastes and for the recovery of the useful compounds from wastewaters.

Researches in:

- mineral fertilizers: urea, ammonium nitrite, NP, NPK, fertilizers with microelements
- improving and modernizing of the technological processes
- Turning to good account of some native minerals zeolites for wastewaters treatment and for the obtaining and conditioning of the fertilizers with microelements.

The results of researches were applied in industry.

**RESEARCH TEAM**

Petru Negrea, Georgeta Burtică, Rodica Pode, Laura Cochei, Lavinia Lupa, Mihaela Ciopec

**Researches in PROCESS CONTROL EQUIPMENTS FOR RESEARCH PLANTS IN CHEMICAL INDUSTRY**

Some specific control equipments for research plants from chemical industry (measurement and control of small and micro gas and liquid flows, gas and liquid compositions, pressure) using as information support low pressure signals (500-3000 N/m<sup>2</sup>).

Elaboration, design and realization of a high performance reference models.

*Keywords:* measuring, control devices

**RESEARCH TEAM**

Marcel Suta, Carmen Rusnac, Alina Brusturean

**Researches in CONTROL SYSTEMS USING COMPUTERS FOR RESEARCHING PLANTS AND LOW TONNAGE PLANTS IN CHEMICAL INDUSTRY**

Realization of some specific control equipments using computers and process interfaces for automation of laboratory, research and low tonnage plants from chemical industry.

Elaboration, projecting and realization of control equipments using computers, process interfaces and proper software programs.

**RESEARCH TEAM**

Marcel Suta, Carmen Rusnac, Alina Brusturean

**Researches in INTENSIVE METHODS FOR THE EXONERATION OF SOIL FROM RADIOACTIVE MINERALS EXPLOITATION AND PROCESSING AREAS IN THE CONDITION OF NATURAL DISASTERS OR ENTROPIC ACCIDENTS**

Chemical decontamination of soil in the presence of ultra-sounds

Mathematical models and methods regarding the transfer mechanism in solid-liquid heterogeneous systems for the selection of optimal hydrodynamic parameters

Implementation of interface equipment in measurement devices

*Keywords: Climate changes, pollution, risk, sustainable chemistry, modeling*

**RESEARCH TEAM**

Carmen Rusnac, Gabriela Alina Brusturean, Dana Silaghi – Perju

**Researches in MATHEMATICAL MODELING AND NUMERICAL SIMULATION OF ENVIRONMENTAL POLLUTION AND DEPOLLUTION PROCESSES**

Mathematical modeling and numerical simulation of soil depollution processes

Elaboration of analytical and statistical models of air pollution phenomenon

Waste recycling process control and optimization

*Keywords: modeling, simulation, environmental protection*

**RESEARCH TEAM**

Carmen Rusnac, Gabriela Alina Brusturean, Dana Silaghi Perju.

**Researches in MODELING, SIMULATION AND PROCESS CONTROL**

Modeling and simulation of chemical processes using programming languages and software in process engineering: MATLAB, HYSIS, Aspen Plus, Aspen Custom Modeler;

Apply chemical reactor analysis, process modeling, simulation and optimization to chemical and petrochemical plants and find out solutions for industrial problems;

Modeling, simulation and process control of absorption-desorption with chemical reaction processes.

**RESEARCH TEAM**

Teodor Todinca, Carmen Rusnac, Alina Brusturean

**Researches in OILY COMPOUNDS EXTRACTION FROM WASTE WATERS USING MAGNETIC FLUIDS**

It was studied the oily fraction recovery (especially oil products) from waste waters using magnetic fluids. The process is strongly influenced by the magnetic field presence; both the oily fraction and the magnetic phase could be recovered;

**RESEARCH TEAM**

Andra Tamas.

**Researches in THE PERFORMANCE OF THE COLUMNS WITH STRUCTURED PACKINGS**

The structured packing present a high efficiency by comparison with the random packing because of the very high specific surfaces. It was followed the knowledge of wettability degree influence in extraction or rectification processes. The aim of the future experiments is the increase of wettability degree through electrochemical or chemical activation

**RESEARCH TEAM**

Andra Tamas

**Researches in CONDITIONING MODELS OF SEWAGE SLUDGE**

The aim of this research consists in efficiency evaluation of chemical conditioning models by calculation of the sludge volume index (SVI), the specific resistance to filtration to improve sludge dewatering, as well as appropriation of a statistic mathematic model for the correlation of the obtained results.

**RESEARCH TEAM**

Vasile Pode, Andra Tamas

**Researches in NANOCOMPOSITES WITH CONTROLLED MAGNETIC, OPTIC AND CATALYTIC PROPERTIES**

Nanocomposites of type ferrite and ferrite/SiO<sub>2</sub> were synthesized through two original methods: the thermal decomposition of some heteropolynuclear complex compound (with hydroxocarboxylic anions as ligands) and a modified sol-gel methods.

The fine nature of the obtained nanoparticles gives to the synthesized nanocomposites special magnetic properties that can be used in potential applications. Studies have been made in order to establish the dependence between the synthesis conditions, the dimensions of nanoparticles and their properties.

Studies have been made for the synthesis of hybrid polyol-silica matrix, correlation between synthesis conditions and textural properties of the silica matrix, for its use as support for some catalysts.

Studies are going to be made for the synthesis of metallic nanoparticles in silica matrix, with special properties and for the use of these materials as thin films for biological and environmental applications.

**RESEARCH TEAM**

Mircea Ștefănescu, Marcela Stoia

**Researches in HOMO - AND HETEROPOLYNUCLEAR COMPOUNDS WITH ORGANIC LIGANDS**

Synthesis and characterization of some inorganic compounds in order to obtain simple and mixed oxides with catalytic, pigmental and magnetic properties

A new synthesis method has been carried out in order to obtain some homo - and heteropolynuclear compounds with hydroxocarboxylic acid anions as ligands. The simple and mixed oxides with special properties have been obtained by thermal conversion of some complex compounds

**RESEARCH TEAM**

Mircea Niculescu, Mircea Ștefănescu, Marcela Stoia, Raluca Dumitru, Ilie Julean

**Researches in PHYSICAL CHEMISTRY OF SOLIDS. OBTAINING AND CHARACTERISATION OF SOME OXIDE COMPOUNDS**

The properties of the oxide compounds formed by reactions in the solid state are significantly dependent on the synthesis method used, respectively on the initial state of the reactants.

For the obtaining of some oxide compounds, different synthesis methods have been used: a) the sol-gel method; b) thermal conversion of certain

complex combinations; c) combustion synthesis; d) hydroxide co precipitation; e) annealing of salts and/or oxides mixtures. The reactivity of the systems was studied comparatively for the different synthesis methods used.

**RESEARCH TEAM**

Cornelia Păcurariu, Dumitru Becherescu, Ioan Lazău, Radu Ioan Lazau, Robert Ianos, Marius Jurca

**Researches in ORGANIC ELECTROCHEMISTRY**

Electrochemistry represents today a very convenient method for the synthesis of a variety of important organic compounds, which in many cases have been extended to an industrial scale.

Since 1982 theoretical and practical investigations have been made upon electrode processes of organic electrochemistry. The synthesis of quinone, hydroquinone, and ethylene glycol has been analyzed, especially in undivided electrochemical reactors. Studies upon mediated reduction and oxidation of organic compounds have been undertaken.

**RESEARCH TEAM**

Nicolae Vaszilcsin, Andrea Kellenberger, Mircea Dan, Narcis Duțeanu

**Researches in ELECTROCATALYSIS**

Obtaining, characterization and application of the electrodes with catalytic activity.

Methods for the preparation of electrocatalytic films have been elaborated in our research team, based on the thermal decomposition of some complex compounds and through thermal arc spraying technique. These films have been characterized through scanning electron microscopy, X-ray diffraction and voltammetry. The practical applications refer to water electrolysis and to the synthesis of some organic compounds.

**RESEARCH TEAM**

Nicolae Vaszilcsin, Andrea Kellenberger, Mircea Dan, Narcis Duțeanu

**Researches in ELECTROPLATING**

Obtaining and characterization of metal coatings

Studies regarding the influence of the nature of the galvanic additives upon the quality of the metal deposition have been made. Metal layers have been characterized by X-Ray diffraction, scanning electron microscopy and energy dispersive X-ray microanalysis. The practical applications refer to the replacement of the cyanide galvanic baths with non-toxic ones.

**RESEARCH TEAM**

Nicolae Vaszilcsin, Andrea Kellenberger, Mircea Dan, Narcis Duțeanu, Radu Bănică

**Researches in FUEL CELLS**

The conventional energy systems are the main source of pollution on our planet. Considering the decreasing of the Earth's resources of hydrocarbons, it is necessary to improve an alternative energy conversion technology such as the fuel cells. This technology offers many attractive possibilities for reducing the air pollution, diminishing climate changes and preserving our natural resources. Widespread application of this technology is still prohibitive because materials used to make electrodes are expensive.

The aim of our research is the reducing of the H<sub>2</sub>-O<sub>2</sub> fuel cell costs by changing the Pt based electrodes with non-noble based electrode obtained using various methods (thermal decomposition, thermal spraying).

**RESEARCH TEAM**

Nicolae Vaszilcsin, Andrea Kellenberger, Mircea Dan, Narcis Duțeanu, Radu Bănică

**Researches in SYNTHESIS OF CERAMIC MATERIALS THROUGH HYDROSILICATE FORERUNNERS**

The use of hydrosilicatic forerunners from precipitate reactions to obtain at lower temperatures some high quality ceramic materials such as: wollastonite, enstatite, diopside, willemite, anortite, magnesium spinel and a multitude of oxidic pigments.

The studies in this field have been made at the "Politehnica" University of Timișoara since 1985. The researches have been materialized in a laboratory synthesis method of the materials involved. Verification of the behavior of some synthesized materials in industrial circumstances.

**RESEARCH TEAM**

Ioan Lazău, Dumitru Becherescu, Marius Jurca, Radu Ioan Lazău

**Researches in SEMICONDUCTING GLASSES. FAST ION CONDUCTING GLASSES. REDOX EQUILIBRIA IN GLASSES. LOW MELTING GLASSES FOR FUSION TYPE APPLICATION**

Studies regarding electrical conductivity in new molybdenum glass systems. Influence of different transitional ions upon conduction properties of glasses was studied. Synthesis and characterization of fast ion conducting glasses containing Ag<sup>+</sup>, Li<sup>+</sup> and Cu<sup>+</sup> ions. Glasses with optimal ion conductivity were design. New fast ion conducting glasses were obtained. The behavior of redox equilibrium Mn<sup>2+</sup>/Mn<sup>3+</sup> was studied in the following binary systems: SiO<sub>2</sub>-R<sub>2</sub>O, P<sub>2</sub>O<sub>5</sub>-R<sub>2</sub>O and B<sub>2</sub>O<sub>3</sub>-R<sub>2</sub>O.

The influence of melting conditions (reducing-oxidizing) upon the presence of Ti<sup>4+</sup> was studied, as well as its relationship with the iron present. The

reciprocal influence of Ti<sup>4+</sup> and other different ions usually present as impurities upon the color in industrial glasses was studied.

Design, synthesis and characterization of low melting glasses for fusion type applications was studied. The reciprocal influence fusion glass-support glass was investigated using microscopic techniques.

**RESEARCH TEAM**

Adina Lația, Cosmin Vancea

**Researches in CERAMIC GLAZES. SYNTHESIS AND CHARACTERIZATION OF THERMORESISTANT PIGMENTS**

The research field extends over the conventional and unconventional synthesis methods for thermoresistant pigments designed to the ceramic industry (ceramic glazes and enamels), characterization of the obtained pigments from the point of view of crystallochemical structure and color. At the same time, the behavior of the synthesized pigments in the glass generating melt is being pursued.

**RESEARCH TEAM**

Ioan Lazau, Cornelia Păcurariu, Dumitru Becherescu, Radu Ioan Lazau, Robert Ianos

**Researches in CHEMISTRY AND TECHNOLOGY OF BUILDING MATERIALS**

Local waste materials are analyzed in order to use their potential resources in the field of building materials. Ecological and economical implications of waste or natural deposits especially from Romanian's regions: Transylvania and Banat, containing minerals with possible interest for buildings materials products and technology are investigated.

**RESEARCH TEAM**

Aurel Ștefan Todinca

**RESEARCH PROJECTS**

- PN II ZEO-NANOSPP-56/2009:** *Synthesis of functionalized zeolite materials with doped titanium dioxide nanoparticules and testing in water potabilization pilot stations*

*Value:* 0,000 LEI

*Director:* Prof.dr.eng. Georgeta BURTICĂ

*Members:* Asist. Prof. dr. eng. Florica MANEA  
Eng. Cristina PROCA  
Eng. Rodica NEAGU

**FIELD DESCRIPTION**

Studies over the doped TiO<sub>2</sub> nanocrystals getting through alternative methods, processing to the efficient solutions to get the modified zeolitic materials with TiO<sub>2</sub> nanocrystals doped with metallic/nonmetallic

ions, like the characteristics of source and drinking water and drinking water decontamination

### ACTIVITIES AND RESULTS

Studies of concordance on the TiO<sub>2</sub> nano crystals doped with metallic/non-metallic ions through RX diffraction, Electronic microscopy (TEM, AFM, SEM) - UV-VIS spectrometry. Preliminary researches of synthesis of zeolitic materials functionalised with TiO<sub>2</sub> doped with non-metallic ions. Semination of the results on large scale, through national and international communication and publishing.

2. **IDEI - 927/2009:** *Integrated concept about depollution of waters with arsenic content, through adsorption on oxides materials, followed by immobilization of the resulted waste in crystalline matrices*

*Value:* 105.830 LEI

*Director:* Lect.dr.eng. Adina NEGREA

*Members:* Prof. dr. eng. Ioan LAZAU  
Assist. Dr. eng. Lavinia LUPA  
Lect.dr. eng. Radu LAZAU  
C.S. dr. eng. Mihaela CIOPEC  
PhD student eng. Suba Mariana

### FIELD DESCRIPTION

The project is connected to a main direction of the international researches, main field environment – sustainable development – global changing and brings fundamental elements in constitution of capable research teams for the competitions in european programs. As part of this project the depollution of waters with arsenic content is intended, through adsorption on synthetic oxides materials. As adsorbent materials sludge with iron oxides content resulted from other processes will also be studied. The absolute novelty of this project consists in using the waste resulted after arsenic adsorption as auxiliary raw material in glasses manufacturing; this procedure assures not only the pollutant immobilisation in the crystalline matrix, but even the substitution of a classical raw material As<sub>2</sub>O<sub>3</sub> and the concomitant capitalization of the components resulted from adsorbent – in full agreement with the principles of the sustainable development.

### ACTIVITIES AND RESULTS

The synthesis and characterisation of the oxide materials used as adsorbents (obtaining, chemical analysis, specific surface area, adsorption capacity, adsorption degree). There will be synthesized in laboratory a series of oxide materials based on iron or on silicates, which will be characterised together with the unconventional ones. Are anticipated new possibilities of the oxide composition and adsorbent structure optimisation, so that this can be used as auxiliary raw material in crystalline matrix obtaining.

Testing – experimental determination of adsorption, as well as kinetic study.

3. **PN II- 72-171/2009,** *Micro porous sensors with polianiline functionalised with pendant groups, innovative materials used in the identification and control of the Parkinson disease.*

*Value:* 0,000 LEI

*Director:* Assoc.prof.Ph.eng.Andrea KELLENBERGER

*Members:* Prof. Ph. eng. Nicolae VASZILCSIN  
Assist. Phd eng. Mircea Laurentiu DAN  
Assist. Ph. eng. Narcis DUTEANU  
Phd eng. Radu BANICA  
Student Anuta NASUI  
Student Raluca NITOI  
Student Diana MIHART

### FIELD DESCRIPTION

Electrochemical sensors based on polyaniline for the detection of dopamine in the Parkinson disease.

### ACTIVITIES AND RESULTS

Reference materials study regarding the obtaining of the micro porous sensors with polianiline functionalised with pendant groups.

4. **PN II- STEDIWAT- 32-125/2009:** *Technical-decisional support system for sustainable management of water.*

*Value:* 24.636 LEI

*Director:* Lecturer Ph eng. Florica MANEA

*Members:* Prof. Ph. eng. Georgeta BURTICA  
Phd eng. Aniela POP  
Phd eng. Cristina PROCA  
Phd eng. Adriana BEBESELEA

### FIELD DESCRIPTION

The development of some innovative technical support instruments, for monitoring, design and prediction which to be used for sustainable and incorporated management, at hydrographic basin level. Also, the development of the capacity of the collaboration, knowledge and communication transfer between universities and local / regional authorities of water resources management, users and other interest parts in the four studied basins (Prut., Banat, Arges-Vedea, Olt) with impact on the sustainable development at the local and regional level.

### ACTIVITIES AND RESULTS

Research base which contain studies about: evaluation of the infrastructure and of the institutional capacity, management performance, organiser structure and communication channels, sources of pollution and sloop of the waste waters specific for users, hidromorphologic pressure, evolution of the water supply and request, normative for the prevention and full control of pollution, protected areas. In this step will be study, also: the facilities of treatment and purification, water price and the settlement regarding the quality,



environment particularities (climate, geography, topography, water resources), field use, demographics data (actual state and tendency), ecological and hydro geological limited conditions. All these studies will be considered in the context of the national and international legislation.

5. PN II-72-156/2009, acronym- NANO-ZEOREZID: *The use of some zeolitic materials functionalised with TiO<sub>2</sub> nano crystals for waste water treatment in the view of their reuse.*

Value: 9.200 LEI

Director: Lecturer Ph. eng. Florica MANEA

Members: Prof. Ph. eng. Georgeta BURTICA

Phd eng. Aniela POP

Phd eng. Cristina PROCA

Phd eng. Adriana BEBESELEA

### FIELD DESCRIPTION

The use of some functionalized zeolitic materials with TiO<sub>2</sub> nano crystals for residual waters purification in the view of their reuse in the production process through the combination of the advanced catalytic oxidation process with the electro oxidation process, or the involve of the TiO<sub>2</sub> in the process of photochemical and photo electrolytic purification.

### ACTIVITIES AND RESULTS

Studies of scientifically reference material regarding the synthesis and applying of the zeolitic materials functionalised with TiO<sub>2</sub>/TiO<sub>2</sub> nano crystals doped with metallic and non metallic ions, electrochemical degradation and integration of those two processes in the waste waters treatment with the purpose of their reuse.

6. PN II -71-026, *Complex researches regarding the obtaining and the magnetic properties of the systems of ferromagnetic nanoparticles of surfactant/ un surfactant Co<sub>x</sub>Fe<sub>3-x</sub>O<sub>4</sub> and biocompatibility with potential applying in cancer therapy.*

Value: 0,000 RON

Director: Prof. Ph. Mircea STEFANESCU

Members: Assist. Ph. Eng. Marcela STOIA

Assist. Ph. Eng. Monika SIMON

Phd student eng. Thomas DIPPONG

### FIELD DESCRIPTION

The project has like objectives the obtaining of the oxides systems Co<sub>x</sub>Fe<sub>3-x</sub>O<sub>4</sub> under nano particles forms of various dimensions and their surfactation with biocompatible surfactants in the view of their use at the treatment of cancerous tumours. For the obtaining of the magnetic nano particles are used two unconventional methods of synthesis: the method of the thermal decay of the precursors of type carboxylic and the co precipitation method. It followed the establishment of the synthesis

conditions needed for the obtaining of the magnetic nanoparticles of various dimensions, and also the study of their magnetic properties function of the medium diameter of the nano particles. The magnetic nano particles which will present adequate magnetic properties will be synthesized and tested in the view of their use in the tumours treatment.

### ACTIVITIES AND RESULTS

2 ISI paper accepted for publishing in JTAC two papers presented at the International conference of Thermal Analyse and Calorimetric, Brasilia 2008.

A PhD thesis sustained public in December 2008 on the project them. Synthesis of the nano materials type Co<sub>x</sub>Fe<sub>(3-x)</sub>O<sub>4</sub> with controlled magnetic properties.

### PHD RESEARCH ACTIVITIES

#### 1. Prof.dr.eng. Aurel IOVI, PhD Supervisor in Chemical Engineering

PhD students:

- Eugen Lungu: *The use of activated oxidants in the waters treatment domain*
- Dalila Marşavina: *The studies of the equilibriums from the underground waters in the view of the use of these as drinkable waters*
- Dan Roşu: *The behavior of the complex combinations with microelements in the obtaining process of the fertilizers*
- Monica Ihoş: *Unconventional technologies of elimination from water of some specific pollutants*
- Cornel Bogatu: *Specific technologies in the water technology*
- Daniela Micu: *The study of the toxic compounds elimination processes from rural waters sources*
- Adrian Gheorghe Rus: *The study of the obtaining processes of the active principles from medicinal plants and their characterizations*
- Ioan Macarie: *Contribution to the synthesis of some amino – organic – phosphoric with biological applied*
- Valeria Rus: *Studies regarding the sludge treatment from the local purification plant in the view of put in good use or elimination*
- Mihaela Maria: *Studies regarding the control and effect of the exposure to hard metals in the professional and unprofessional medium*
- Florina Popa: *Contributions to obtaining and using antiseptic agents based on synergetic mixture*

#### 2. Prof.dr.eng. Georgeta BURTICĂ, PhD Supervisor in Chemical Engineering

PhD students:

- Amalia Corina Macarie: *Contributions at the eco-technologies elaboration for the metallic ions recovery from the used electrolyte*
- Petre Vili Furdui: *Studies regarding the monitoring and characterization of the drinking water resources from the Romania's west region*

- Nicoleta Luminița Jurj: *Contributions regarding improvement of the municipal wastewater treatment technology for fall in with the European Normative*
- Elena Gabriela Cical: *Studies concerning the improvement of drinking water quality results from accumulation lake*
- Mihaela Toader: *Considerations regarding municipal wastewater treatment processes improvement*
- Cristina Proca: *Water decontamination technologies used new composite materials based on inorganic salts*
- Ioana Maria Corb: *Studies regarding the production and the characterization of new alumina silicate materials with utilization in ecotechnologies*
- Daniela Ronamina Sonea: *Drinking water treatment technology improvement*
- PISOI Ilie: *Contributions regarding the improvements of the drinkable technologies of waters*
- Puiulet Mihaela: *Considerations regarding municipal wastewater treatment processes improvement*
- Remes Adriana: *Use of some zeolite materials functionalized with TiO<sub>2</sub> nano crystals doped/undoped with metals/non-metals ions for wastewater treatment*
- Damian Teodora: *Studies regarding unconventional technologies elaboration for water treatment.*
- Tudur Teodora: *Studies regarding nitrites/nitrates removal from underground water*
- BACIU Ana Maria: *Electromechanical methods for quantitative evaluation for water pollutants*
- Motoc Sorina: *Electro oxidation process application in water treatment technologies*
- Masu Smaranda: *Studies regarding applying of coagulation process for drinkable water obtaining.*

### 3. Prof.dr.eng. Dumitru BECHERESCU, PhD supervisor in Materials' Science and Engineering

*PhD students:*

- Adriana Calapod: *Concrete as an immobilization factor for some polluting materials*

### 4. Prof.dr.eng. Ioan LAZĂU, PhD Supervisor in Materials' Science and Engineering

*PhD students:*

- Alexandru Orban: *Technological parameters optimization for obtaining super-aluminous products*
- Mariana Suba: *The use of the unconventional methods in synthesis of some mineralogic compounds and solid solution for cement chemistry*

- Babuta Roxana: *Synthesis of oxide compounds via Pechini method*
- Ciobanu Cristina: *The role and action mechanism of additives in dry mortars*

### 5. Prof.dr.eng. Nicolae VASZILCSIN, PhD Supervisor in Chemical Engineering

*PhD students:*

- Mircea Dan: *Metal removal from residual water in electrochemical reactor with vibrating electrodes*
- Ana Maria Dabici: *Nano particles type TiO<sub>2</sub> with photocatalytic activity*
- Doru Buzatu: *Electro catalise based on niobium*
- Dan Rujan: *Applying of the technologies of fracture theory in Galvan technique.*
- Paula Sfirloagă: *Materials for solar cells*
- Ștefan Dănică Novaconi: *Solar cells with TiO<sub>2</sub> and dyes*
- Vaduva Constantin Claudiu: *Corelation between the electronic structure of lever agents and double layer capacity*
- Iorga Mirela Ioana: *Metals removal from dilute solutions*

### 6. Prof.dr.eng. Zeno GROPSIAN, PhD supervisor in Chemical Engineering

*PhD students:*

- Bors Nicu: *"The investigation of some chemical products influence on the improvement of liquids flow"*
- Ciobotaru Leopold: *"Contributions to the filtering technology"*
- Frigura (Panescu) Mihaela: *"Contributions to the study of the solid-liquid separation processes"*
- Pop Nadia: *"Advanced methods for gases purification"*

### 7. Prof.dr.eng. Delia Perju, PhD supervisor in Chemical Engineering

*PhD students:*

- Calisevici Mirela: *Quality Performances Improvement of a Food Process Line Using Advanced Optimal Process Control*
- David Ioana Elena: *Study Regarding the Process Control and Optimization Possibilities of Technological Processes Applied in Fibre Glass Technology*
- Manea Adela: *Contributions to the Quality Improvement of Cosmetics Products*
- Osiceanu Antoaneta: *Contributions to Optimisation of Asphaltic Cationic Emulsion Technology.*
- Lal Astrid: *Contributions to the Elimination Process Improvement of Pollutants Resulted from Railway Units Activity*
- Pamfiloiu Mirabela: *Contributions to the Improvement of an Electro thermal Gas Flow meter Performances Using Analogue-Numerical Systems*
- Cicoare Eugeniu: *Contributions to the Implementation Possibilities of Low Pressure Equipments in Physical-Mechanical Test-*

*Installations Used in the Chemical Technology of Leather*

- Firczak Monica: *Contributions to the Study of Neural Networks Applied in Chemical Engineering*
- Ordodi Valentin: *Designing of a micro reactor for the obtaining of the STEM cells*
- Draghici Loredana: *Contributions regarding the environment protection for the nocive effects of the hazardous substances resulted after the accidental technologies using the mathematical modelation and numeric simulation.*
- Clavac Bogdan: *Impact evaluation study on the environment induced by the refuse dumps derived from coke-chemical plants by means of mathematical modelling techniques*
- Crivineanu Marilena: *Study of heavy metal emission processes in running waters by mean of mathematical modelling methods*

#### 8. Prof. PhD Mircea ȘTEFĂNESCU, PhD Supervisor in Chemistry

*PhD students:*

- Vlăzan Paulina: *Oxides nano materials used as environment sensors*
- Barbu Mirela: *The preparation and characterisation of some nanocomposites based on transitional metal chromites*
- Tita Bogdan: *Contributions on the study of the compatibility and thermal stability of some drugs from NSAID class. Synthesis of their coordination compounds*

#### 9. Prof. PhD Rodica PODE, PhD supervisor in Chemical Engineering

*PhD students:*

- Ilinoiu Elida-Cristina: *Contributions to the development of hybrid advanced oxidation processes for the degradation of persistent organic pollutants*
- Colar Liliana Andreea: *Improvement of specific industrial effluents treatment technology by applying photocatalytic heterogenous processes*

#### 10. Prof. PhD Corneliu DAVIDESCU, PhD supervisor in Chemical Engineering

*PhD students:*

- Stefanescu Oana: *Metode noi de obtinere a nanomaterialelor pe baza de g-Fe<sub>2</sub>O<sub>3</sub>*
- Kakasi Zsurka Sandor; *Noi bioproduse prin valorificarea acizilor hidroxialcanoici*
- Croitoru Alina Ramona: *Utilizarea lipazelor imobilizate pentru sinteza esterilor de oligo-si polizaharide*
- Corici Livia Nicoleta: *Utilizarea alcalazei imobilizate in sinteza peptidelor*
- Rafaila Madian: *Studiul relatie structura-reactivitate chimica in chimia organica*
- Ardelean Radu: *Specii chimice heterogenizate prin grefare pe matrici polimere*

- Peli Beata Monika: *Protectia si depoluarea apelor utilizand specii chimice grefate pe suporturii macromoleculare*

#### PhD THESIS SUSTAINED

1. Eleonora Marian: *Complexes of transition elements with medicinal substances*, PhD supervisor: prof. dr. Ilie Julean
2. Claudia Morgovan: *The reuse of the metals ions from galvanic industry wastes under fertilizers with microelements*, PhD supervisor: prof. dr. eng. Aurel Iovi
3. Angela Magda: *Studies about some oxygenate compounds of boron with applied in fertilizers technologies with microelements*, PhD supervisor: prof. dr. eng. Aurel Iovi
4. Laura Cochechi: *Oxidative chemical processes for soil decontamination*, PhD supervisor: prof. dr. eng. Aurel Iovi
5. Carmen Lazau: *Studies regarding the characterizations and the use of some nano materials of type TiO<sub>2</sub> in the ambient environmental decontamination*, PhD supervisor: prof. dr. eng. Aurel Iovi
6. Cornelia Elena Ratiu: *New materials in drinking water treatment technology*, PhD supervisor: prof. dr. eng. Georgeta Burtică
7. Ianosev Silvana: *Using unconventional synthesis methods in the preparation of some oxide compounds in SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>-MxOy systems*, PhD supervisor: prof. dr. eng. Ioan Lazău
8. Radu Nicolae Bănică: *Solar cells based on CuInS<sub>2</sub>*, PhD supervisor: prof. dr. eng. Nicolae Vaszilcsin
9. Harieta Pîrlea: *Contribution to the simulation and modeling of chemical processis for reduction of nitrogen dioxide emissions*, PhD supervisor: prof. dr. eng. Delia Perju
10. Marinescu Sorin: *Contributions to the Optimization Possibilities of a Waste Incineration Plant*, PhD supervisor: prof. dr. eng. Delia Perju.

#### PUBLICATIONS

##### BOOKS

1. Lazau Radu, Lazau Ioan, *Integrated waste management in the building materials industry*, "Politehnica" Publishing House, Timișoara, ISBN 978-606-554-022-4, pp. 179.
2. Maria Nemes, Nicolae Vaszilcsin, Andrea Kellenberger, *Electrochemistry. Principles and applications*, "Politehnica" Publishing House, Timișoara, ISBN 978-973-625-995-1, pp. 143.
3. Duteanu Narcis, *Direct methanol fuel fells equip with solid polymer electrolyte*, "Politehnica" Publishing House, Timișoara, ISBN 978-973-625-780-3, pp. 162.
4. Nicolae Vaszilcsin, *Electrochemistry introduction*, "Politehnica" Publishing House, Timișoara, ISBN 978-973-625-978-4, pp. 270.

5. Nicolae Vaszilcsin, M. Nemes, *Introduction to Electrochemistry by Problems*, "Politehnica" Publishing House, Timișoara, ISBN 978-973-625-848-0, pp. 194.
6. Pode Rodica, *Environmental Protection in Sulphuric Acid Technology*, "Politehnica" Publishing House, Timișoara, ISBN 978-973-625-860-2, pp. 244.
7. Pode Rodica, Manea Florica, Burtica Georgeta, *Environmental Impact Assessment*, Ed. Tehnica a Academiei Romane, ISSN 1584-0506, pp.150.
8. Manea Florica, Pode Rodica, Burtica Georgeta, *Sustainable Production and Consumption*, Ed. Tehnica a Academiei Romane, ISSN 1584-0506, pp. 160.
9. Burtica Georgeta, Manea Florica, Pode Rodica, *Environmental Safety and Risk Assessment*, Ed. Tehnica a Academiei Romane, ISSN 1584-0506, pp. 170.
10. Cornelia Muntean, Adina Negrea, Lavinia Lupa, Mihaela Ciopec, *Chemical and fizico-chemical analyses with environmental applications*, "Politehnica" Publishing House, Timișoara, ISBN: ISBN 978-973-625-973-9, pp. 220.
11. Moșoarcă Giannin, *Residual aluminum from drinking water (second edition)*, "Politehnica" Publishing House, Timișoara, ISBN 973-625-152-7, pp. 152.
- 97(1), 2009, ISSN: 1388-6150 (Print), ISSN 1572-8943 (Online), pp. 209.
6. R. Ianos, I. Lazau, C. Pacurariu, *Solution combustion synthesis of alpha-cordierite*, Journal of Alloys and Compounds, 480, 2009, ISSN 0925-8388, pp. 702.
7. R. Ianos, I. Lazau C. Pacurariu, P. Barvinschi, *Fuel mixture approach for solution combustion synthesis of  $Ca_3Al_2O_6$  powders*, Cement and Concrete Research, 39(7), 2009, ISSN 0008-8846, pp. 566.
8. R. Ianos, I. Lazau, C. Pacurariu, *The influence of combustion synthesis conditions on the alpha- $Al_2O_3$  powder preparation*, Journal of Materials Science, 44(4), 2009, ISSN 0022-2461, pp. 1016.
9. Z. Ecsedi, I. Lazau, C. Pacurariu, *Microstructural analysis of the effects of polyvinyl alcohol content on the porosity of sol-gel derived alumina ceramics*, Microporous and Mesoporous Materials, 118(1-3), 2009, ISSN 1387-1811, pp. 453.
10. R. Ianoș, R. Lazău, *Combustion synthesis, characterization and sintering behavior of magnesium aluminate ( $MgAl_2O_4$ ) powders*, Materials Chemistry and Physics, 115(2-3), ISSN: 0254-0584, pp. 645.
11. R. Ianoș, *An efficient solution for the single-step synthesis of  $4CaO Al_2O_3 Fe_2O_3$  powders*, Journal of Materials Research, 24(1), 2009, ISSN 0884-2914, pp. 245.

#### PUBLISHED PAPERS

1. I. Lazau, M. Suba, C. Pacurariu, R. Ianos, R. Babuta, *Combustion synthesis of  $Ca_2(Fe_{1-x}Al_x)_2$  solid solutions*, Romanian Journal of Materials, 39(4), 2009, ISSN 1583-3186, pp. 315
2. S. Ianoșev, R. Lazau, M. Suba, C. Pacurariu, I. Lazau, *Synthesis and characterization of some thermoresistant pigments based on the Al-Cr substitution*, Studia Universitatis Babeș-Bolyai, Chemia, 1, 2009, ISSN 1224-7154, pp. 189
3. C. Pacurariu, R. Laza., I. Lazau, R. Ianos, B. Tita, *Non-isothermal crystallization kinetics of some basaltic glass-ceramics containing  $CaF_2$  as nucleation agent*, Journal of Thermal Analysis and Calorimetry, 97(2), 2009, ISSN 1388-6150 (Print), ISSN 1572-8943 (Online), pp. 507
4. C. Pacurariu, R. Lazau, I. Lazau, R. Ianos, T. Vlase, *Influence of the specific surface area on crystallization process kinetics of some silica gels*, Journal of Thermal Analysis and Calorimetry, 97(2), 2009, ISSN 1388-6150 (Print), ISSN 1572-8943 (Online), pp. 409
5. R. Ianos, I. Lazau, C. Pacurariu, *Metal nitrate/fuel mixture reactivity and its influence on the solution combustion synthesis of  $LiAlO_2$* , Journal of Thermal Analysis And Calorimetry, 97(1), 2009, ISSN: 1388-6150 (Print), ISSN 1572-8943 (Online), pp. 209.
6. R. Ianos, I. Lazau, C. Pacurariu, *Solution combustion synthesis of alpha-cordierite*, Journal of Alloys and Compounds, 480, 2009, ISSN 0925-8388, pp. 702.
7. R. Ianos, I. Lazau C. Pacurariu, P. Barvinschi, *Fuel mixture approach for solution combustion synthesis of  $Ca_3Al_2O_6$  powders*, Cement and Concrete Research, 39(7), 2009, ISSN 0008-8846, pp. 566.
8. R. Ianos, I. Lazau, C. Pacurariu, *The influence of combustion synthesis conditions on the alpha- $Al_2O_3$  powder preparation*, Journal of Materials Science, 44(4), 2009, ISSN 0022-2461, pp. 1016.
9. Z. Ecsedi, I. Lazau, C. Pacurariu, *Microstructural analysis of the effects of polyvinyl alcohol content on the porosity of sol-gel derived alumina ceramics*, Microporous and Mesoporous Materials, 118(1-3), 2009, ISSN 1387-1811, pp. 453.
10. R. Ianoș, R. Lazău, *Combustion synthesis, characterization and sintering behavior of magnesium aluminate ( $MgAl_2O_4$ ) powders*, Materials Chemistry and Physics, 115(2-3), ISSN: 0254-0584, pp. 645.
11. R. Ianoș, *An efficient solution for the single-step synthesis of  $4CaO Al_2O_3 Fe_2O_3$  powders*, Journal of Materials Research, 24(1), 2009, ISSN 0884-2914, pp. 245.
12. L. Chazaro-Ruiz, A. Kellenberger, E. Jähne, H.J. Adler, T.Khandelwal, L. Dunsch, *In situ ESR-UV-Vis-NIR spectroelectrochemical study of the p-doping of poly[2-(3-thienyl)ethyl acetate] and its hydrolyzed derivatives*, Physical Chemistry Chemical- Physics, 11(30), ISSN 1463-9076, pp. 6505.
13. L. Chazaro-Ruiz, A. Kellenberger, L. Dunsch, *In situ ESR-UV-Vis-NIR and ATR-FTIR spectroelectro-chemical studies on the p-doping of copolymers of 3-methylthiophene and 3-hexylthiophene*, Journal of Physical Chemistry, 113(8), ISSN 1520-6106, pp. 2310.
14. R. Banica, N. Vaszilcsin, T. Nyari, G. Bandur, *Study on the electrodeposition of molybdenum oxides on copper suport*, Studia Universitatis Babeș Bolyai Chemia, 54(2), ISSN 1224-7150, pp.87.
15. R. Banica, P. Barvinschi, N.Vaszilcsin, T. Nyari, *A comparative study of the electrochemical deposition of molibdenum oxides thin films on copper and platinum*, Journal of alloys and compounds, 483 (1-2), ISSN 0925-8388, pp. 402.
16. R. Banica, T. Nyari, P. Barvinschi, P. Negrea, N.Vaszilcsin, *Early stage formation of  $CuInS_2$  nanocrystals and microspheres by ambient pressure solution synthesis in glycerol*, Journal of Optoelectronics and advanced materials, 11 (7), ISSN 1454-4164, pp. 950.

17. B. Erable, N. Duteanu, S.M. Senthil Kumar, Y. Feng, Makarand, M. Ghangrekar, K. Scott, *Nitric acid activation of graphite granules to increase the performance of the non-catalyzed oxygen reduction reaction (ORR) for MFC applications*, *Electrochemistry Communications*, 11 (7), pp. 1547, ISSN 1388-2481
18. E. Dvininov, E. Popovici, R. Pode, L. Coheci, P. Barvinschi, V. Nica, *Synthesis and characterization of TiO<sub>2</sub>-pillared Romanian clay and their application for azoic dyes photodegradation*, *Journal of Hazardous Materials*, 167(1-3), pp. 1050, ISSN 0304-3894
19. L. Coheci, R. Pode, E. Popovici, E. Dvininov, A. Iovi, *Sorption removal of chromate in single batch systems by uncalcined and calcined Mg/Zn-Al-type hydrotalcites*, *Environmental Engineering and Management Journal*, 8(4), pp. 865, ISSN 1582-9596
20. R. Pode, E. Popovici, A. Vasile, L. Coheci, E. Dvininov, *Sorption and photocatalytic degradation of azoic dyes on TiO<sub>2</sub>-pillared montmorillonitic clay*, *Revue Roumaine de Chimie*, 54(4), pp. 315, ISSN 0035-3930
21. C. Ratiu, C. Orha, C. Lazau, P. Sfirloaga, A. Ioitescu, F. Manea, A. Grozescu, P. Barvinschi, P. Vlazan, I. Grozescu, *Synthesis and characterization of zeolite materials functionalized with undoped and N-doped TiO<sub>2</sub> nanocrystals*, *Moldavian Journal of the Physical Sciences*, 8(1), pp. 70, ISSN 1810-640x
22. M. Ihos, F. Manea, G. Bocea, M. Jitaru, *Electrochemical behaviour of modified SnO<sub>2</sub> anodes in the presence of phenolic pollutants*, *Revue Roumaine de Chimie*, 54(4), pp. 501, ISSN 0035-3930
23. A. Bebeselea, C. Proca, F. Manea, C. Radovan, G. Burtica, J. Schoonman, *Electrochemical degradation and determination of 2,4-dinitrophenol from water*, *Environmental Engineering and Management Journal*, 8(4), pp. 817, ISSN 1582-9596
24. C. Ratiu, C. Lazau, C. Orha, I. Grozescu, A. Pop, D. Sonea, F. Manea, G. Burtica, J. Schoonman, *Using zeolite-modified electrode for the electrochemical determination of 4-aminophenol from water*, *Environmental Engineering and Management Journal*, 8(4), pp. 825, ISSN 1582-9596
25. C. Ratiu, C. Lazau, P. Sfirloaga, C. Orha, D. Sonea, S. Novaconi, F. Manea, G. Burtica, I. Grozescu, *Decontaminate effect of the functionalized materials with undoped and doped (Ag) TiO<sub>2</sub> nanocrystals*, *Environmental Engineering and Management Journal*, 8(2), pp. 237, ISSN 1582-9596
26. C. Ratiu, C. Lazau, C. Orha, P. Sfirloaga, F. Manea, G. Burtica, A. Iovi, I. Grozescu, *Synthesis of hybrid zeolitic materials with TiO<sub>2</sub> nanocrystals using solid-solid method*, *J. Optoelectronics and Advanced Materials*, 11(6), pp. 838, ISSN 1582-9596
27. A. Bebeselea, F. Manea, G. Burtica, P. Malchev, S. Picken, J. Schoonman, *Electrochemical degradation and determination of 2,4-dinitrophenol at carbon-based composite electrodes*, *J. Optoelectronics and Advanced Mater.-Symp.*, 1(1), pp. 92, ISSN 2066-0596
28. A. Pop, F. Manea, P. Malchev, G. Burtica, C. Proca, S. Picken, J. Schoonman, *Voltammetric detection of 4-chlorophenol on copper zeolite - expanded graphite-epoxy composite electrode*, *Journal of Optoelectronics and Advanced Mater.-Symp.*, 1(1), pp. 96, ISSN 2066-0596
29. Lazau, C. Ratiu, P. Sfirloaga, I. Miron, P. Vlazan, C. Orha, A. Grozescu, F. Manea, P. Barvinschi, I. Grozescu, *Synthesis and characterization of zeolite materials functionalized with undoped and Ag-doped TiO<sub>2</sub> nanocrystals*, *J. Optoelectronics and Advanced Mater.-Symp.*, 1(1), pp. 14, ISSN 2066-0596
30. M. Stefanescu, M. Stoia, C. Caizer, T. Dippong, P. Barvinschi, *Preparation of CoxFe<sub>3</sub>XO<sub>4</sub> Nanoparticles by Thermal Decomposition of some Organo-Metallic Precursors*, *Journal of Thermal Analysis and Calorimetry*, 97(1), pp. 251, ISSN 1388-6150
31. O. Ștefănescu, M. Stoia, M. Ștefănescu, T. Vlase, *Study on the Influence of Teos-Diol Molar Ratio on their Chemical Interaction During the Gelation Process*, *Journal of Thermal Analysis and Calorimetry*, 97(1), pp. 203, ISSN 1388-6150
32. O. Ștefănescu, C. Davidescu, M. Ștefănescu, M. Stoia, *Preparation of FexOy/SiO<sub>2</sub> Nanocomposites by Thermal Decomposition of some Carboxylate Precursors Formed Inside the Silica Matrix*, *Journal of Thermal Analysis and Calorimetry*, 97(1), pp. 203, ISSN 1388-6150
33. M. Ștefănescu, M. Stoia, O. Stefanescu, C. Caizer, *Preparation of x(Ni<sub>0.65</sub>Zn<sub>0.35</sub>Fe<sub>2</sub>O<sub>4</sub>)/(100-x)SiO<sub>2</sub> nanocomposite powders by a modified sol-gel method*, *Material Chemistry and Physics*, 113(1), pp. 342, ISSN 0254-0584
34. M. Stefanescu, M. Stoia, T. Dipponga, O. Stefanescu, P. Barvinschi, *Preparation of CoxFe<sub>3</sub>.xO<sub>4</sub> oxydic system starting from metal nitrates and propanediol*, *Acta Chimica Slovenica*, 56(2), pp. 379, ISSN 1318-0207
35. M. Stoia, P. Barvinschi, I. Grozescu, M. Stefanescu, *Preparation of Ni<sub>0.65</sub>Zn<sub>0.35</sub>Fe<sub>2</sub>O<sub>4</sub> nanoparticles with homogenous dispersion in silica matrix*, *Journal of Optoelectronics and Advanced Materials -Symposia*, 1(1), pp. 29, ISSN Print: 2066-057X

36. M. Andoni, A. Dragomirescu, Au. Iovi, I. Ursoiu, A. Negrea, L. Lupa, P. Negrea, *Use of Ion Exchange Resin To Remove the Mercury from Contaminated Waters*, Revista de Chimie, 60(4), pp. 424, ISSN 0034-7752
37. M. Ciopec, C. Muntean, A. Negrea, L. Lupa, P. Negrea, P. Barvinschi, *Synthesis and thermal behavior of double copper and potassium pyrophosphate*, Thermochemica Acta, 488, pp. 10, ISSN 0040-6031
38. M. Ciopec, C. Muntean, A. Negrea, L. Lupa, P. Negrea, M. Motoc, C. Samuila, *Synthesis and Characterization of a PK Fertilizer containing Zinc as Micronutrient*, Revista de Chimie, 60, pp. 678, ISSN 0034-7752
39. Ghiga, A. Iovi, P. Negrea, L. Lupa, A. Negrea, M. Motoc, M. Ciopec, M. Anghel, E. Popovici, *Studies regarding the recovery possibilities of heavy metals from waste catalysts resulted from CO conversion*, Revista de Chimie, 60, pp. 68, ISSN 0034-7752
40. Magda, C. Muntean, A. Iovi, M. Jurca, L. Lupa, M. Simon, V. Pode, *Studies about Ammonium Phosphates Fertilizers with Boron Added as Boric Acid*, Revista de Chimie, 60, pp. 226, ISSN 0034-7752
41. C. Beinsan, G. Moșoarcă, R. Sumalan, D. Camen, P. Negrea, A. Negrea, *Studies Regarding Tailings Pond Seepage Water from Mining Activities over Avena sativa L. Germination Influence*, Notulae Botanicae Horti Agrobotanici Cluj Napoca, 37(1), pp. 187, ISSN (print) 0255-965X, ISSN (on line) 1824-4309
42. G. Moșoarcă, P. Negrea, M. Motoc, M. Craciunescu, M. Anghel, D. David, *Influence of Settling Tank Sludge Recycling on Aluminum Residual Form Distribution in Treated Water*, Revista de Chimie, 60(6), pp. 636, ISSN 0034-7752
43. G. Moșoarcă, V. Pode, *Studies regarding the improvement coagulation process of Bega river water suspensions*, Revista de Chimie, 60(8), pp. 836, ISSN 0034-7752
44. M. Niculescu, M. Birzescu, R. Dumitru, E. Sisu, P. Budrugaec, *Co(II)-Ni(II) heteropolynuclear coordination compound obtained through the reaction of 1,2-propanediol with metallic nitrates as precursor for mixed oxide of spinel type NiCo<sub>2</sub>O<sub>4</sub>*, Thermochemica Acta, 493(1-2), pp. 1, ISSN 0040-6031
45. M. Birzescu, M. Niculescu, R. Dumitru, O. Carp, E. Segal, *Synthesis, structural characterization and thermal analysis of the cobalt(II) oxalate obtained through the reaction of 1,2-ethanediol with Co(NO<sub>3</sub>)<sub>2</sub>·6H<sub>2</sub>O*, Journal of Thermal Analysis and Calorimetry, 96(3), pp. 979, ISSN 1388-6150
46. Silaghi-Perju Dana, Pirlea Harieta, Jinescu Gheorghita, Dumitrel Gabriela-Alina, Perju Delia, *NO<sub>2</sub> dispersion process simulation in urban areas by analytical - experimental methods*, Studia Universitatis Babeș-Bolyai, Chemia, LIV(1), pp. 165, 8, ISSN 1224-7154; ISSN 2065-9520
47. Glevitzky Mirel, Perju Delia, Dumitrel Gabriela-Alina, Popa Maria, Vica Mihaela Laura, *Water activity - indicator of food safety and the factors that influence the biochemical stability of soft drinks*, Studia Universitatis Babeș-Bolyai, Chemia, LIV(1), pp. 181, 8, ISSN 1224-7154; ISSN 2065-9520
48. A. Negrea, L. Lupa, M. Ciopec, R. Lazau, *The use of sludge with iron content as adsorbent material for arsenic removal from water*, Proceedings of 11th Conference on Environmental Science and Technology, 2009, ISBN 978-960-7475-46-6, pp. B-655
49. M. Gheju, L. Cocheci, R. Pode, I. Balcu, *Kinetic studies concerning Cr(VI) removal from wastewater by reduction with scrap iron and sorption on Mg-Al-type hydrotalcite*, Proceedings of 11th Conference on Environmental Science and Technology, 2009, ISBN 978-960-7475-46-6, pp. B336
50. Proca Cristina, Micu Daniela, Danielescu Cristian, Manea Florica, *Case study of the risk assessment of nitrates on human healths in the west side of Romania*, Proceedings of the NATO Advanced Study Institute on Exposure and Risk Assessment of Chemical Pollution - Contemporary Methodology, 460, pp.10, 2009, ISBN 978-90-481-2333-9
51. Manea Florica, Remes Adriana, Radovan Ciprian, Burtica Georgeta, Pode Rodica, Schoonman Joop, *Simultaneous electrochemical determination of nitrate and nitrite in aqueous solution using Ag-doped zeolite -expanded graphite-epoxy electrode*, 12th International Conference on Electroanalysis-Chemicke Listy, s132, 2009, ISSN 0009-2770
52. Manea Florica, Ihos Monica, Remes Adriana, Burtica Georgeta, Schoonman Joop, *Case study of the risk assessment of nitrates on human healths in the west side of Romania*, 12th International Conference on Electroanalysis-Chemicke Listy, s136, 2009, ISSN 0009-2770
53. L. Costea, V. Bercean, *Green Chemistry: Electrochemical properties and anodic cyclization of 1H-3-methyl-4-ethoxycarbonyl-5-(4-fluorobenzylidenehydrazino)-pyrazole in nonaqueous solvents*, International Conference on Sustainability in Science and Engineering, Timisoara, 2009, ISBN 369-23568-5659, pp.147
54. G. Gavris, M. St Stefanescu, M. Gavris, M. Stoia, A. Caraban, *Studies upon removal of lead cation from wastewater coming by spent acid solution of electroplating work (I)k*, Annals of the Oradea,

- University, Fascicle of Management and Technological Engineering, VIII(XVIII), 2009, pp. 1073, ISSN 1583-0691
55. G. Gavriș, M. Ștefănescu, O. Stănășel, M. Sebeșan, M. Gavriș, *Studies Upon Removal Of Lead Cation From Wastewater Coming By Spent Acid Solution Of Electroplating Work (II)*, Annals of the Oradea University. Fascicle of Management and Technological Engineering, VIII (XVIII), 2009, pp. 1079, ISSN 1583-0691
56. C. Muntean, A. Negrea, M. Ciopec, L. Lupa, P. Negrea, D. Rosu, *Studies regarding the arsenic removal from water*, Chem. Bull. "Politehnica" University of Timisoara, 54-68 (1), 2009, pp. 18, ISSN 1224-6018
57. A. Negrea, C. Muntean, M. Ciopec, L. Lupa, P. Negrea, *Removal of arsenic from underground water to obtain drinking water*, Chem. Bull. "Politehnica" University of Timisoara, 54-68(2), pp. 82, ISSN 1224-6018
58. Mirela-Nicoleta Calisevici, Delia Maria Perju, Gabriela Alina Dumitrel, Mirel Glevitzky, Raul-Ciprian Moldovan, *Determination of Anions and Cations Content in Romanian Drinking Waters by HPIC Method*, Chemical Bulletin of "Politehnica" University of Timisoara, 54(68), 1, pp. 26, ISSN 1224-6018
59. Mirel Glevitzky, Gabriela-Alina Dumitrel, Delia Perju, Maria Popa, *Studies Regarding the Use of Preservatives on Soft Drinks Stability*, Chemical Bulletin of "Politehnica" University of Timisoara, 54(68), 1, pp. 31, ISSN 1224-6018
60. Mihaela Vica, M. Glevitzky, Gabriela-Alina Dumitrel, Maria Popa, Simona Varvara, *Microbiological Role in Hazards Analysis of Natural Honey Processing*, Journal of Agroalimentary Processes and Technologies, 15(3), pp. 353, ISSN 1453-1399
61. Dana Silaghi-Perju, Delia Perju, Harieta Pîrlea, Gabriela Alina Dumitrel, Loredana Drăghic, *Dispersion Modelling of Nitrogen Dioxide Coming from Timișoara Thermal Power Plants*, Chemical Bulletin of "Politehnica" University of Timisoara, 54(68), 1, pp. 37, ISSN 1224-6018
62. Dana Silaghi-Perju, Delia Perju, Harieta Pîrlea, Gabriela Alina Dumitrel, Loredana Drăghic, *Dispersion Modelling of Nitrogen Dioxide Coming from Timișoara Thermal Power Plants*, Chemical Bulletin of "Politehnica" University of Timisoara, 54(68), 1, pp. 37, ISSN 1224-6018
63. M. Gheju, A. Iovi, I. Balcu, *Treatment of Cr(VI) polluted wastewater by use of scrap iron, a cheap and locally available alternative electron source*, Ovidius University Annals of Chemistry, 20(1), 2009, pp. 122, ISSN 1223-7221
64. M. Gheju, I. Balcu, M. Ciopec, *Analysis of hexavalent chromium uptake by plants in polluted soils*, Ovidius University Annals of Chemistry, 20(1), 2009, pp. 127, ISSN 1223-7221
65. M. Gheju, C. Bogatu, *Preliminary ecological risk assessment to aquatic environment of Bega River due to presence of ammonia in treated sewage effluent*, Chem. Bull. of "Politehnica" Univ., 54-68(2), 2009, pp. 77, ISSN 1224-6018
66. M. Ihos, F. Manea, A. Iovi, *Electrochemical degradation of aromatic compounds at modified SnO<sub>2</sub> anodes*, Chem. Bull. "Politehnica" Univ (Timisoara), 53-67(1-2), 2009, pp. 4, ISSN 1224-6018
67. A. Bebeselea, F. Manea, G. Burtica, S. Picken, J. Schoonman, *Electrochemical determination of 2, 4-Dinitrophenol from aqueous solution at expanded graphite-carbon nanofiber-epoxy composite electrode*, Chem. Bull."Politehnica" Univ (Timisoara), 54-68(2), 2009, pp. 615, ISSN 1224-6018
68. A. Remes, F. Manea, D. Sonea, G. Burtica Georgeta, S. Picken, J. Schoonman Joop, *Electrochemical determination of nitrate from aqueous solution using Ag-doped zeolite-expanded graphite-epoxy composite electrode*, Ovidius Univ. Annals of Chemistry (Constanta), 20(1), 2009, pp. 61, ISSN 1223-7221
69. C. Muntean, A. Negrea, L. Lupa, P. Negrea, M. Ciopec, *Underground water quality control*, Buletinul AGIR, 2-3, 2009, pp. 38, ISSN 1224-7928
70. A. Negrea, L. Lupa, P. Negrea, M. Ciopec, C. Muntean, *Unconventional materials used for arsenic adsorption from underground water*, Buletinul AGIR, 2-3, 2009, pp. 44, ISSN 1224-7928
71. A. Negrea, L. Lupa, M. Ciopec, R. Ghiga, *Reuse of wastes containing metallic ions as fertilizers with micronutrients*, Buletinul AGIR, 2-3, 2009, pp. 178, ISSN 1224-7928
72. A. Remes, F. Manea, C. Ratiu, G. Burtica, S. Picken, J. Schoonman Joop, *Amperometric detection of nitrite from water using zeolite-based composite electrodes*, Proceedings of 16th Symposium on analytical and environmental problems, Szeged, 2009, pp. 152, ISBN 978-963-482-975-1
73. I. Vlaicu, A. Pop, F. Manea, G. Burtica, *Electrochemical determination of organics from water using zeolite-modified electrodes*, Proceedings of 16th Symposium on analytical and environmental problems, Szeged, 2009, pp. 239, ISBN 978-963-482-975-1

74. D. Sonea, F. Manea, R. Pode, C. Lazau, C. Ratiu, I. Grozescu, G. Burtica, *Photocatalysis application using TiO<sub>2</sub> supported zeolite for the treatment of humic acid in water*, Proceedings of 16th Symposium on analytical and environmental problems, Szeged, 2009, pp. 156, ISBN 978-963-482-975-1
75. C. Ratiu, F. Manea, C. Lazau, I. Grozescu, G. Burtica, J. Schoonman, *Degradation of 4-AP from water by electrooxidation using GC and BDD electrodes*, Proceedings of 16th Symposium on analytical and Environmental problems, Szeged, 2009, pp. 207, ISBN 978-963-482-975-1
76. C. Lazau, C. Ratiu, C. Orha, C. Misca, A. Anghelina, F. Manea, I. Grozescu, *Effect of TiO<sub>2</sub>-Ag Synthesised by hydrothermal method for Colliform bacteria removal from water*, Proceedings of 16th Symposium on analytical and environmental problems, Szeged, 2009, pp. 203, ISBN 978-963-482-975-1
77. M. Ihos, F. Manea, D. Botau, A. Iovi, *Electrochemical behavior of DSA and BDD electrodes during diclofenac electrooxidation*, Proceedings of 16th Symposium on analytical and environmental problems, Szeged, 2009, pp. 264, ISBN 978-963-482-975-1
78. C. Danielescu, F. Manea, G. Burtica, C. Savii, D. Micu, *The treatment of wastewater proceeded from pulp and paper industry by physic-chemical processes*, Proceedings of 16th Symposium on analytical and environmental problems, Szeged, 2009, pp. 285, ISBN 978-963-482-975-1
79. A. Negrea, A. Teci, C. Muntean, L. Lupa, M. Ciopec, D. Rosu, *Studies regarding the establishment of the adsorption conditions of arsenic on an unconventional material*, Proceedings of the 16-th Symposium on Analytical and Environmental Problems, Szeged, Ungaria, 28 septembrie, 2009, pp. 412, ISBN 978-963-87720-0-8
80. C. Muntean, A. Negrea, M. Ciopec, L. Lupa, P. Negrea, *Studies regarding the stabilization of sterile dumps by bio-accumulation*, Proceedings of the 16-th Symposium on Analytical and Environmental Problems, Szeged, Ungaria, 28 septembrie, 2009, pp. 416, ISBN 978-963-87720-0-8
81. M. Ciopec, A. Negrea, C. Muntean, L. Lupa, P. Negrea, *Studies regarding the turning into account of incineration ash as copper and iron sulphate*, Proceedings of the 16-th Symposium on Analytical and Environmental Problems, Szeged, Ungaria, 28 septembrie, 2009, pp. 420, ISBN 978-963-87720-0-8
82. A. Taculescu, A. Popa, C. Pacurariu, L. Lupa, *Removal of divalent metals (Cu<sup>2+</sup>, Cd<sup>2+</sup>) from water after preconcentration on phosphonate St-DVB polymer/TiO<sub>2</sub> hybrid*, Proceedings of the 16-th Symposium on Analytical and Environmental Problems, Szeged, Ungaria, 28 septembrie, 2009, pp. 316, ISBN 978-963-87720-0-8
83. G. Moșoarcă, *Studies regarding the modelling of coagulation-settling process in the case of filters washing water and settling tank sludge recycling*, Research people and actual task on multidisciplinary sciences, Proceedings of the Second International Conference, Lozenec, Bulgaria, 10-12 iunie, 2009, 2, 2009, pp. 224, ISSN 1313-7735
84. M. Gheju, I. Balcu, *Use of scrap iron for the in situ treatment of Cr(VI) polluted groundwater*, Proceedings of the 8th International Conference on Soil, Sediments and Water, Intersol Paris, March 24-26, 2009, pp. 6
85. M. Gheju, I. Balcu, *Phytoremediation of Cr(VI) polluted soil*, Proceedings of the 8th International Conference on Soil, Sediments and Water, Intersol Paris, March 24-26, 2009, pp. 22
86. Gabriel Hegheduș-Mîndru, Ramona Cristina Biron, Delia Maria Perju, Lucian Mircea Rusnac, Teodor Ioan Trașcă, Petru Negrea, Ducu Sandu Ștef, *Microbiological analyzes for mineral waters from center region of Romania*, Research People and Actual Tasks on Multidisciplinary Sciences 10–12 June 2009, Lozenec, Bulgaria, 3, pp. 248, ISSN 1313-7735
87. Gabriel Hegheduș-Mîndru, Ramona Cristina Biron, Delia Maria Perju, Lucian Mircea Rusnac, Petru Negrea, Adrian Riviș, Ducu Sandu Ștef, *Microbiological analyzes for mineral waters from north region of Romania*, Research People and Actual Tasks on Multidisciplinary Sciences 10–12 June 2009, Lozenec, Bulgaria, 3, pp. 254, ISSN 1313-7735
88. E. Fagadar-Cosma, C. Enache, I. Armeanu, D. Dascalu, G. Fagadar-Cosma, M. Vasile, I. Grozescu, *The influence of pH over topography and spectroscopic properties of silica hybrid materials embedding meso-tetratolylporphyrin*, Materials Research Bulletin, 44(2) February 4, pp. 426, 2009, ISSN 0025-5408
89. Fagadar-Cosma E., Mirica M., Balcu I., Bucovicean C., Cretu C., Armeanu I., Fagadar-Cosma G., *Synthesis, Spectroscopic and AFM Characterization of Some Manganese Porphyrins and Their hybrid Silica Nanomaterials*, Molecules, 14(4), pp. 1370, 2009, Molecules ISSN 1420-3049 Published by Molecular Diversity Preservation International (MDPI)
90. E. Fagadar-Cosma, C. Enache, D. Vlascici, G. Fagadar-Cosma, M. Vasile, G. Bazylak, *Novel nanomaterials based on 5,10,15,20-tetrakis(3,4-dimethoxyphenyl)-21H,23H-porphyrin entrapped in silica matrices*, Materials Research Bulletin,



- 44(2009), pp. 2186, doi: 10.1016/j.materresbull.2009.08.010, ISSN 0025-5408
91. E. Fagadar-Cosma, C. Enache, D. Vlascici, G. Fagadar-Cosma, H. Stadler and G. Bazylak, *Nanostructured Glasses Based on Hybrid Silica Materials Incorporating a New Asymmetrical Phenyl-Substituted Porphyrin*, The Open Chemical and Biomedical Methods Journal 2, pp. 99, 2009, ISSN 1875-0389
92. E. Fagadar-Cosma, C. Enache, D. Vlascici, G. Fagadar-Cosma, R.van Staden, H. Stadler, J.van Staden, *Nanostructured glasses and powders based on hybrid silica materials incorporating 5,10,15-tris(3-hydroxy-phenyl)-20-(3,4-dimethoxy-phenyl)-porphyrin*, NanoTech Insight Conference, 28.03-03.04.2009, Barcelona, Book of abstracts, pp.137
93. G. Fagadar - Cosma, E. Fagadar - Cosma, *Electrochemical Studies on 5,10,15,20-Tetrakis(4-pyridyl)-21H,23H-porphine and its Zn(II) Complex*, Journées d'Electrochimie 2009, Sinaia, 6-10 July 2009, Resumes, Ed. Risoprint, Cluj-Napoca, pp. 308, ISBN 978-973-53-0092-0.

## RESEARCH CENTRE SYNTHESIS AND APPLICATIONS OF ORGANIC AND MACROMOLECULAR COMPOUNDS - S.A.O.M.C.

### GENERAL PRESENTATION

**Synthesis and Applications of Organic and Macromolecular Compounds (S.A.O.M.C.)** is a research centre, type C, which has been evaluated and approved by CNCISIS. The Centre was created in 2002, in accordance with the CNCISIS certificate, nr. 47/4.12.2003. The director of the Centre is **Assoc.prof.dr.eng. Mihai Medeleanu**.

### MAIN ACTIVITIES

The Center performs research activities in domains such as:

- BioNanoMaterials – obtaining, characterization and applications of the biocompounds and biosystems/cyclodextrins or liposomes nanoparticles
- Drug Design and Synthesis – molecular modeling, SAR, QSAR, virtual high throughput screening, docking, synthesis, analysis and applications of drugs
- Natural Food Flavours and Spices – isolation, purification, stabilization, conditioning, and characterization of natural extracts or compounds used as flavours and sipes
- Perfumes and Cosmetics – obtaining, stabilization, characterization of natural biosystems with applications in perfumery and cosmetic industry
- New methods in organic synthesis
- Studies on structure-properties relationship using the topological model of organic molecules
- Structured packings and their applications in systems with chemical reaction

- Synthesis and characterization of PVC plasticizers
- Oligomers with functional groups
- Chemistry and technology of drugs and pesticides
- Chemistry and technology of dyestuffs, and textile auxiliaries
- Process control equipments for research plants in chemical industry
- Control systems using computers for researching plants and low tonnage plants in chemical industry
- Intensive methods for the exoneration of soil from radioactive minerals exploitation and processing areas in the condition of natural disasters or entropic accidents
- Mathematical modeling and numerical simulation of environmental pollution and depollution processes
- Modeling, simulation and process control
- Magnetic Fluids: Preparation, Characterization and Applications
- Heat transfer organic agents
- Unit processes
- The Intensification of Transfer Processes
- Rheological characterization of the substances

### CONTACT

Department of Applied Chemistry and Engineering of Organic and Natural Compounds

6, Telbisz Street

RO-300001 Timisoara

Tel: +40-256-403063

Fax: +40-256-403060

E-mail: mihai.medeleanu@chim.upt.ro

## RESEARCH FIELDS

### ➤ **BioNanoMaterials**

*Keywords:* bioactive compounds, drugs, natural compounds, nanoparticles, nanocapsules, cyclodextrins, liposomes, scanning electron microscopy, transmission electron microscopy, thermogravimetry, differential scanning calorimetry, preparative liquid chromatography

### ➤ **Drug Design and Synthesis**

*Keywords:* drugs, drug design, total synthesis, semi-synthesis, biosynthesis, quantitative structure-activity relationships, virtual high throughput screening, docking, gas chromatography, preparative liquid chromatography, high pressure liquid chromatography

### ➤ **Natural Food Flavours and Spices**

*Keywords:* flavor, flavour, aroma, food, odorant, spice, biosynthesis, biotechnology, extraction, natural food additives, gas chromatography, GC, analytical high pressure liquid chromatography, HPLC, spectrometry, spectrofotometry, sensory analysis, statistical multivariate analysis, PCA, HCA

### ➤ **Perfumes and Cosmetics**

*Keywords:* perfumes, cosmetics, odorants, terpenoids, biosynthesis, biotechnology, extraction, toiletries, essential oils, volatile compounds, design of perfumes, gas chromatography, GC, analytical high pressure liquid chromatography, HPLC, spectrometry, spectrofotometry, olfactometry, statistical multivariate analysis, PCA

### ➤ **New methods in organic synthesis**

*Keywords:* synthesis of organic compounds, carbonic acid derivatives, sterically hindered phenols with antioxidant activity, structure determination by NMR, biocatalysis of organic reactions

### ➤ **Studies on structure-properties relationship using the topological model of organic molecules**

*Keywords:* topology, graphs, structure-properties relationship (SAR), size and shape of molecules, van der Waals volume and surface

### ➤ **Structured packings and their applications in systems with chemical reaction**

*Keywords:* static mixers, motionless mixers

### ➤ **Plasticizers for polymers**

*Keywords:* plasticizer, plasticizing

### ➤ **Synthesis and characterization of PVC plasticizers**

*Keywords:* PVC-plasticizer

### ➤ **Oligomers with functional groups**

*Keywords:* oligomer, functional group, reactive oligomers

### ➤ **Chemistry and technology of drugs and pesticides**

*Keywords:* drug, pesticides, chemistry, technology, semi synthesis, agriculture

### ➤ **Chemistry and technology of dyestuffs, and textile auxiliaries**

*Keywords:* dyes, dye accelerators, dispersants, textile auxiliaries

### ➤ **Process control equipments for research plants in chemical industry**

*Keywords:* measuring, control devices

### ➤ **Control systems using computers for researching plants and low tonnage plants in chemical industry**

*Keywords:* process control, research and low tonnage plants

### ➤ **Intensive methods for the exoneration of soil from radioactive minerals exploitation and processing areas in the condition of natural disasters or entropic accidents**

*Keywords:* Climate changes, pollution, risk, sustainable chemistry, modeling

### ➤ **Mathematical modeling and numerical simulation of environmental pollution and depollution processes**

*Keywords:* modeling, simulation, environmental protection

### ➤ **Oily compounds extraction from waste waters using magnetic fluids**

*Keywords:* extraction, magnetic fluid

### ➤ **The Performance of Columns with Structured Packings**

*Keywords:* wet ability, specific surface

## Researches in BIONANOMATERIALS

Obtaining and analyses methods on the bioactive compounds and systems/cyclodextrins and liposomes micro/nanoparticles. The bioactive compounds used for nanoencapsulation are: drugs, natural compounds with biological activity (*i.e.* alkaloids and flavonoids, volatile oils), perfumes and cosmetics, natural food additives (*i.e.* natural flavors, natural colorants). These products have excellent properties in comparison with the starting materials: oxidative, thermal stability, protective properties against radiations, controlled release of the bioactive compounds, hydrosolubilization of hydrophobic biocompounds, masking of the unpleasant taste and odors, easily handling of the powdery bionanomaterials.

The methods used for obtaining of the bionanomaterials are: crystalize from solution, spray-drying, spray-chilling, fluidized bed, by mixing or melting, by ultrasonication. The main methods of separation-purification and analyses are: preparative liquid chromatography (preparative HPLC), scanning electron microscopy (SEM), transmission electron microscopy (TEM),

thermogravimetry (TG), differential scanning calorimetry (DSC).

#### **RESEARCH TEAM**

Daniel Hădărușă, Geza Bandur, Gerlinde Rusu, Iulia Pînzaru, Volica Damșa

#### **Researches in DRUG DESIGN and SYNTHESIS**

Design of new compounds with potential drug properties and synthesis of hits. The methods used for drug design are: molecular modeling of the known compounds, qualitative and quantitative structure-activity relationship studies (SAR and QSAR), virtual high throughput screening (VHTS), molecular docking of the predicted drugs.

The hits selected by drug design are obtained by known methods (total synthesis, semi-synthesis, biosynthesis), separated and analyzed by modern methods (preparative liquid chromatography – preparative HPLC, liquid and gas chromatography – HPLC and GC, <sup>1</sup>H- and <sup>13</sup>C-NMR, X ray diffraction, UV-VIS, IR, MS spectroscopy) and further evaluated as drugs.

#### **RESEARCH TEAM**

Daniel Hădărușă, Mihai Medeleanu, Geza Bandur, Gerlinde Rusu, Iulia Pînzaru, Volica Damșa

#### **Researches in NATURAL FOOD FLAVOURS AND SPICES**

Developing new natural food flavours and spices with enhanced stability and bioactivity, more healthy and with functional properties. The obtaining of food flavours and spices (especially those from the Romanian tradition) are realized by classical methods (non-aggressive, like hydrodistillation, hydroalcoholic or supercritical fluid extraction etc.). The analysis of these biosystems are realized by chromatographic (GC, HPLC, GC-O, TLC), spectroscopic (FT-IR, UV-Vis, NMR), and sensorial methods. The protection and controlled release of the natural bioactive compounds are realized by micro/nanoencapsulation in natural bioavailable matrices (like cyclodextrins and liposomes), and the analysis of these nanoparticles are realized by microscopic and thermal analyses (like, SEM, TEM, TG, DSC).

#### **RESEARCH TEAM**

Francisc Peter, Daniel Hădărușă, Geza Bandur, Gerlinde Rusu, Iulia Pînzaru, Volica Damșa

#### **Researches in PERFUMES AND COSMETICS**

Design and evaluation of new perfume and cosmetic formulations. The main ingredients from perfume or cosmetic formulations are obtained from natural resources (especially from the traditional herbs) by classical methods (hydrodistillation, hydroalcoholic or supercritical fluid extraction etc.). The analysis of these

biosystems are realized by gas chromatography (GC-FID, GC-MS, GC-Sniffing etc.), liquid chromatography (RP – HPLC – UV – Vis / MS) spectroscopic methods for bioactive compounds (FT-IR, UV-Vis, NMR), and sensory analysis. The protection and controlled release of the natural odorant compounds from natural bioactive systems are realized by micro/nanoencapsulation in natural bioavailable matrices (like cyclodextrins and liposomes), and the analysis of these nanoparticles are realized by microscopic and thermal analyses (like, SEM, TEM, TG, DSC).

#### **RESEARCH TEAM**

Daniel Hădărușă, Mirabela Pădure, Gerlinde Rusu, Iulia Pînzaru, Volica Damșa

#### **Researches in NEW METHODS IN ORGANIC SYNTHESIS**

Synthesis of organic compounds (carbonic acid derivatives, phenolic antioxidants, amino acids and peptides) using new methods or reagents: single electron transfer reactions, triphosgene as a low toxic and easy to handle substitute of phosgene, isotiocyanides, enzymes obtained by biosynthesis or extraction (aminoacylase, protease, lipase).

The chemistry of organic derivatives of carbonic acid is the traditional field of our Department, pioneered by Professor Giorgio Ostrogovich. Studies in the field of synthesis of chlorocarbonates, carbonyl chlorides, carbamates, carbonates, ureas, aryl cyanates, isocyanides and heterocyclic as well as kinetics and mechanisms of reactions of carbonic acid derivatives were performed. Since 1980 synthesis of phenolic antioxidants, studies of biocatalytic processes in organic synthesis and structure determination of organic compounds by NMR spectroscopy were also investigated.

#### **RESEARCH TEAM**

Carol Csunderlik, Mihai Medeleanu, Marius Milea, Francisc Peter

#### **Researches in STUDIES ON STRUCTURE-PROPERTIES RELATIONSHIP USING THE TOPOLOGICAL MODEL OF ORGANIC MOLECULES**

The topological model, as an application of graph theory in chemistry is a useful tool for quantification of molecular structure and has been largely used in the last years, due to its simplicity and good correlation results in studies concerning the shape and size of molecules and structure-properties relationship for many classes of compounds.

By applying the topological model to organic molecules, information's like the number of atoms and the connectivity's are compressed in numbers named topological indices. These can be correlated with physical and chemical properties and biological

activities and are also used to describe the shape and size of molecules. Better correlation coefficients were obtained when certain heteroatom were included into topological model (halo derivatives, oxygen and sulphur derivatives and local anesthetics). Van der Waals surface and volume of organic molecules were also performed using the Monte Carlo algorithm.

#### **RESEARCH TEAM**

Mihai Medeleanu, Daniel Hădărugă

#### **Researches in STRUCTURED PACKINGS AND THEIR APPLICATIONS IN SYSTEMS WITH CHEMICAL REACTION**

The structured packings (former name: static mixers or motionless mixers) increase the mixing efficiency in all flow regime, but any other device does not equalize their performances in the laminar flow regime. Their application in all types of reactive systems (homogeneous or heterogeneous) has started several years ago and is in a continuous expansion. Recently, catalysts supported on static mixers are commercially available.

Since 1986, different applications were developed (e.g. reactor for hydrogenation of fatty oils, CO<sub>2</sub> absorption in monoethanolamine solutions). Theoretical studies include: investigations concerning the mixing mechanism in columns equipped with Sulzer SMV type static mixers; influences of main parameters on the size and distribution of the droplets formed in column fitted with structured packings; analysis of gas holdup and solid distribution in three phase gas-liquid-solid reactors equipped with different motionless mixers in order to grow the liquid phase conversion in slurry bubble columns.

#### **RESEARCH TEAM**

Lucian Rusnac, Sabina Nițu, Carmen Rusnac

#### **Researches in PLASTICIZERS FOR POLYMERS**

The undertaken research aims to correlate the structure and the plasticizing properties, both permanent and temporary of certain polymers, belonging to new series of chemical compounds.

More than 100 new substances have been synthesized, described and assessed. Within the same framework of activity, there has been a practical and theoretical concern for the problems of both permanent and temporary plasticizing of polar polymers, thus enabling the drawing of conclusions with a view to industrial applications and to new correlation of the structure and the plasticizing properties. The research is represented by more than 60 scientific papers and research agreements.

#### **RESEARCH TEAM**

Ionel Manovicu, Geza Bandur, Gerlinde Rusu

#### **Researches in SYNTHESIS AND CHARACTERIZATION OF PVC PLASTICIZERS**

Many high molecular weight materials, organic and inorganic, are benefited by plasticizers, yet our major emphasis is on organic plasticizers for synthetic organic polymers and particularly for PVC.

Since 1970 we are concerned with the synthesis and characterization of some new ester type PVC plasticizers, namely "direct" plasticizers derived from a diacid and "reversed" plasticizers derived from a diol esterifies with monoacid. Taking into account the fundamental technological and theoretical parameters (as the Flory-Huggins interaction parameter  $\chi$  and the Hildebrand solubility parameter  $\delta$ ) it becomes possible to correlate the structure of the models involved with their real effectiveness in PVC compounds.

#### **RESEARCH TEAM**

Liviu Mirci, Sorina Boran, Sergiu Curelea

#### **Researches in OLIGOMERS WITH FUNCTIONAL GROUPS**

Synthesis and characterization of some low-molecular polymers of different structure, containing two or several functional groups capable of undergoing some subsequent chemical transformations

Synthesis, characterization and application of dimethacrylates as reactive plasticizers for poly(vinyl-chloride). Synthesis and characterization of functional oligomers under non-stoichiometric conditions with a total conversion ( $\alpha,\omega$ -dihydroxy-polyesters). Chemical modification of polyethylene oligomers.

#### **RESEARCH TEAM**

Ionel Manovicu, Geza Bandur, Gerlinde Rusu

#### **Researches in CHEMISTRY AND TECHNOLOGY OF DRUGS AND PESTICIDES**

Synthesis, analysis and testing of total and semi synthetic drugs, odorants and pesticides for human use and agricultural applications

Studies in this field have been started since 1950 at the Faculty of Industrial Chemistry of Technical University Timisoara (former Polytechnic Institute of Timisoara). This activity was finalized in books, manuals, journal papers, patents and research programs for micro production and industry.

#### **RESEARCH TEAM**

Constantin Daescu, Alfa-Xenia Lupea, Daniel Hădărugă, Mirabela Padure, Zlatimir Stanoiev.

**Researches in CHEMISTRY AND  
TECHNOLOGY OF DYESTUFFS, AND  
TEXTILE AUXILIARIES**

Synthesis of organic dyestuffs, dyeing accelerators and dispersants.

The researches undertaken have been concerned with the study of separating components in organic dyes synthesis. Synthesis of some new substantive cationic dyes used in finishing natural and synthetic yarns and fibers has been studied. Syntheses of some key intermediates for organic dye technologies have also been performed.

**RESEARCH TEAM**

Simona Popa, Ioan Macarie

**Researches in PHYSICAL CHEMISTRY.  
CHEMICALLY ACTIVE SPECIES GRAFTED  
ON POLYMER-SUPPORTS**

Preparation and investigation of chemically active species (catalysts, reagents, substrates, enzymes, polycationic biocides) grafted on polymer-supports (styrene-divinylbenzene copolymers, polyethylene glycol) acting as "hybrid-phase" systems. Studies on the structure-activity relationship. Synthesis and testing of multifunctional or multistep recyclable and reusable catalysts.

Since 1982 the research program in the field was focused on the synthesis of the new types of polymer ligand homologous of Schiff bases, hydrazones, oximes and azines by polymer-analogous reactions, synthesis of polymer-grafted tertiary heterocyclic amines acting as "hybrid-phase" biomimetic catalysts similar to chemotripsine and studies of the kinetics, mechanism and structure-activity relationship in a test reaction of activated esters hydrolysis. A new kinetic model of the nucleophile bimolecular substitution using phosphonium and/or ammonium salts grafted on polymer-supports as phase-transfer catalysts was proposed.

**RESEARCH TEAM**

Corneliu Davidescu, Erika Reisz, Radu Ardelean

**RESEARCH PROJECTS**

1. CEECH CHIROMAR 2CEX06-11-30/25.07.2006: *Molecular Chirality: Determination of Enantiomeric Excess and Absolute Configuration by Nuclear Magnetic Resonance Spectroscopy (NMR) and Application to Bioactive Compounds and Intermediates in Fine Synthesis.*

*Value:* 92.000 RON

*Director:* Prof. dr. Carol CSUNDERLIK

*Members:* Lect. dr. Vasile BERCEAN  
Assoc. prof. dr. Francisc PETER  
Assist.dr. Valentin BADEA  
Assist. dr. Monika SIMON  
Ph.D student Ana Cristina ZARCULA

**FIELD DESCRIPTION**

Preparation and Characterisation of Molecular Chirality of Some Intermediates and Bioactive Compounds by Magnetic Resonance Spectroscopy (NMR).

**ACTIVITIES**

Stereoselective Synthesis of Some Chirals Beta-aminoacids. Chiral separations.

- enantioselective acylation of secondary alcohols by sol-gel trapped lipases
- determination of enantiomeric ratio of chiral esters obtained by gas chromatography using a chiral column
- obtaining of chiral oxazolidinone as precursors for beta-aminoacids synthesis.

2. CEECH RMNSTAR 2CEX06-11-41/25.07.2006: *Adaptation of Sequences of NMR Pulses, Elaboration of Multicentre-type Tests and On-line Interconnecting of the Superconductive NMR Spectrometers in Romania.*

*Value:* 60.000 RON

*Director:* Prof. dr. Carol CSUNDERLIK

*Members:* Prof. dr. Corneliu-Mircea DAVIDESCU  
Assoc. prof. dr. Mihai MEDELEANU  
Assoc. prof. dr. Petru NEGREA  
Assist.dr. Valentin BADEA  
Assist. dr. Monika SIMON  
Assist. Radu ARDELEAN  
Assist. Narcis DUTEAN

**ACTIVITIES**

Elaboration of multicentre-type tests and on-line interconnecting of the superconductive NMR spectrometers in Romania.

3. PN-II IDEI Grant 268/01.10.2007: *New bioproducts by valorization of microbial hydroxyalkanoic acids*

*Value:* 208.820 RON

*Director:* Prof.dr.eng. Francisc PETER

*Members:* Prof.dr.eng. Corneliu DAVIDESCU  
Prof.dr.eng. Carmen BOERIU  
PhD student eng. Cristina ZARCULA  
PhD student eng. Sandor Balazs  
KAKASI-ZSURKA

**FIELD DESCRIPTION**

Industrial biobased products have an increasing potential in the chemical and material industries. The diversity of biomass feedstocks like sugars, oils, proteins, or lignocellulosics, combined with the numerous biochemical and thermochemical conversion technologies, can provide a diversity of products as polymers, lubricants, solvents, adhesives, herbicides, and pharmaceuticals. Polyhydroxyalkanoates (PHAs) are polyesters of various hydroxyalkanoates that are synthesized by bacteria. These polymers are accumulated

intracellularly to levels as high as 90% of the cell dry weight and are stored as granules, to act as carbon and energy reserve.

The objectives pursued by the fulfilling of this project are based on the current stage of knowledge on PHA and their transformations. Considering the large interest for this field, it is presumable that a series of such products, obtained from either microorganisms or plants, will be available at reasonable prices and in large quantities. In these conditions, the development of knowledge on this field and the broadening of the area of applications by the manufacture of new bioproducts should have a strong impact on the development of new technologies based on renewable materials. This project has an interdisciplinary character, as it aims the investigation of biocatalytical processes, optimization of the functionality of enzymes, synthesis and physico-chemical characterization of organic bioproducts and biopolymers.

#### ACTIVITIES

In the year 2008 the activities were focused on the following research topics:

- Survey of the recent scientific literature concerning polyhydroxyalkanoate hydrolysis and synthesis of  $\beta$ -butyrolactone copolymers.
- Chemical and enzymatic hydrolysis of PHA's
- Biocatalytic synthesis of 3-hydroxybutyric acid esters using lipases, determination of optimal reaction conditions, identification and characterization of reaction products
- Immobilization study of microbial lipases
- Experimental protocol for  $\beta$ -butyrolactone copolymers synthesis and characterization of reaction intermediates and products.

4. PN2 21077/14.09.2007: *Biofuels obtained by valorization of cellulosic residues in an integrated chemo-enzymatic system.*

*Value:* 167.731 RON

*Director:* Prof.dr.eng. Francisc PETER

*Members:* Prof.dr.eng. Dumitru TUCU  
Prof.dr.eng. Dumitru MNERIE  
Lect.dr.eng. Marius GHEJU  
Assist.dr.eng. Cristina ZARCULA  
Lect.dr.eng. Titus SLAVICI  
Lect.dr.eng. Dinu GUBENCU

#### FIELD DESCRIPTION

Bioethanol manufacture is a very complex issue, resulting from the diversity of the raw material and difficulties of set up the optimal parameters for every process step.

This project is targeted on valorization of residual lignocellulosic biomass resources by conversion to bioethanol, using an optimal combination of chemical and biocatalytic steps.

The main objectives pursued by this project are: manufacture of laboratory equipments for

pretreatment of lignocellulosic materials, to ensure maximum efficiency of the following hydrolysis step; optimization of the pretreatment method based on the composition of cellulosic biomass; investigation of enzymatic hydrolysis of cellulose and cellulose-containing substrates, using the new generation of highly efficient cellulolytic enzymes commercially available (Genencor, Novozyme); evaluation of immobilization possibilities of cellulases, for possible multiple reuse; study of cellulosic sugars fermentation and optimization of bioreactor parameters for simultaneous fermentation of hexoses and pentoses, avoiding inhibitions; investigation of simultaneous saccharification and fermentation; isolation and characterization of the obtained bioethanol, and evaluation of biofuel properties.

#### ACTIVITIES

The main activities issued for 2008 have been:

- Physico-chemical characterization of the raw materials from cellulosic biomass
- Manufacture of a laboratory equipment for mechanical pretreatment by grinding of solid cellulosic residues
- Study of pretreatment methods of cellulosic biomass (acid, microwave) and analysis of the resulted products
- Enzymatic hydrolysis of cellulose and cellulose containing biomass hydrolyzates.

5. CEEEX MANANTECH 82/2006, *Organophosphoric-like hybrids with special properties*

*Value:* 20.000 RON

*Director:* Assoc.prof.dr.eng. Geza BANDUR

*Members:* Lect.dr.eng. Simona POPA  
Assist.dr.eng. Gerlinde RUSU

6. PN2 PC 72152/1.10.2008: *Synthesis and investigation of biodegradable polymers based on polylactic acid, with applications in medicine (BIOPLAST)*

*Value:* 0 RON

*Director:* Assoc.prof.dr.eng. Geza BANDUR

*Members:* Prof.dr.eng. Francisc PETER  
Assist.dr.eng. Gerlinde RUSU  
PhD Stud. eng.  
Sandor KAKASI-ZSURKA

#### FIELD DESCRIPTION

One of the main contemporary scientific challenges is discovery and manufacturing of new ecologically friendly, biodegradable and biocompatible polymers which could replace the existing polymeric materials.

Polylactic acid is such a material, extensively studied for industrial and biomedical applications. Its biocompatibility is owed to lactic acid, the degradation products which can be metabolized.

The main objectives of this project are the synthesis and characterization of polymeric structures with new properties, based on racemic and/or enantiomerically pure (L-form) lactic acid. Polycondensation reactions of lactic acid monomers will be investigated by non-catalyzed reactions at 100-300°C, or in microwave conditions. Inclusion of other monomers like as diphenyl-methyl isocyanate and/or ethyleneglycols in the polymer chain will be also studied to obtain new copolymers with improved properties and extended applications.

Oligomer mixtures and multibloc copolymers will be characterized by specific methods as size-exclusion chromatography, magnetic resonance spectrometry, mass spectrometry, infrared spectroscopy, thermal analysis. The mechanistic and elastic properties of the new biopolymers will be also evaluated, compared to well-known polymeric materials (polivinyll chloride, polyethylene, polyurethanes), as well as the degradation and biodegradation properties.

#### ACTIVITIES

- Survey of the recent scientific literature concerning biodegradable polymers holding ester linkages.

7. CEEEX 2-CEEEX06-11.57 (2006-2008), *Modern Technology for Pyrazin-2,3-dicarboxylic acid synthesis – an intermediate for drug synthesis*

*Value:* 205.000 RON

*Director:* Assoc. prof. dr. eng. Mihai MEDELEANU

*Members:* Prof. dr. eng. Nicolae VASZILCZIN  
Prof. dr. eng. Francisc PETER  
Assoc. prof. dr. eng. Andreea KELLENBERGER  
Asist. eng. Zlatimir STANOIEV  
Asist. Mircea DAN  
PhD Stud. eng. Oana Raluca POP

#### FIELD DESCRIPTION

Studies concerning new electrochemical methods for synthesis of pyrazine dicarboxylic acid.

#### ACTIVITIES

- Building a data base for electrochemical oxidative methods applied in organic chemistry.
- Mn<sup>7+</sup> based intermediate synthesis.
- Optimal reaction path analysis and kinetic studies.
- Stability of MnO<sub>4</sub><sup>-</sup>/MnO<sub>2</sub><sup>-4</sup> redox couple.
- Quinoxaline oxydation by the above intermediate.
- Methods for analysis. Technology setup.

8. P4 – Priority Domains Partnership, Research grant 52-145 (2008-2010), *Antioxidant and*

*Hypoglycemia Food Supplements with Anthocyanidin Structure (SAHASA)*

*Value:* 200.000 RON

*Director:* Assoc. prof. dr. eng. Mihai MEDELEANU

*Members:* Assist. dr. eng. Valentin BADEA  
Assist. dr. eng. Monika SIMON  
Asist. eng. Zlatimir STANOIEV  
Asist. eng. Mircea DAN  
PhD Stud. eng. Oana Raluca POP  
PhD Stud. eng. Benjamin PINTEA  
PhD Stud. eng. Ioana POPA

#### FIELD DESCRIPTION

This project is focused on the evaluation of potential antioxidant activity as well as hypoglycemia effects of compounds with anthocyanidin structure obtained from natural extracts.

#### ACTIVITIES

- Identification and dosage of possible antioxidant activity and hypoglycemia effects components from inland plant species.
- Technology setup for biological active components extraction
- Physico-chemical methods for exactly identification of structures and compositions of biological active mixtures.
- *In vitro* testing of biological activity.

9. PN2 PC-41070 / 18.09.2007, *Action and stressprotecting / immunostimulating effects of some new bioactive materials (IMUNO-NANOMAT)*

*Value:* 100.000 RON

*Director:* Lect.dr.eng. Daniel-Ioan HĂDĂRUGĂ

*Members:* Assoc.prof.dr.eng. Geza N. BANDUR  
Lect.dr.eng. Nicoleta G. HĂDĂRUGĂ  
Teach.assist.eng. Iulia A. PÎNZARU  
Tehn. Volica DAMȘA

#### FIELD DESCRIPTION

In this project, the obtaining, analysis and application of the titanium dioxide (undoped and doped with Au, Ag, Pt ions)/biocompatible matrices micro /nanoparticles and micro/nanocapsules will be studied. Cyclodextrins, liposomes and other similar natural compounds (systems) will be used as encapsulation matrices. The biocompatible nanoparticles will be obtained by spray-drying, spray-chilling, fluidized bed, or ultrasonic methods. The analysis of the micro/nanoparticles will be realized by microscopical methods (SEM, TEM), termoanalytical methods (thermogravimetry, differential scanning calorimetry), X ray diffraction etc. The bionanomaterials will be evaluated from the stress-protecting and/or immuno-stimulating effects point of view.

## ACTIVITIES

- Literature survey on the obtaining and characterization of micro/nanoparticles, especially containing metal oxides and metal ions;
- Experimental design of the micro/nanoencapsulation processes;
- Obtaining and characterization of the undoped TiO<sub>2</sub>/biocompatible matrices micro/nanoparticles;
- Obtaining and characterization of the Au, Ag, Pt doped TiO<sub>2</sub>/biocompatible matrices micro/nanoparticles;
- Optimization of the micro/nanoencapsulation processes.

10. PN2 PC-62072/ 1.10.2008, *Hepatoprotecting nanoparticles with enhanced bioavailability (Nano-HEPAT)*

*Value:* 326.750 RON

*Director:* Lect.dr.eng. Daniel-Ioan HĂDĂRUGĂ

*Members:* Assoc.prof.dr.eng. Geza N. BANDUR

Prof.dr.eng. Francisc PETER

Assoc.prof.dr.eng.M. MEDELEANU

Lect.dr.eng. Andra TAMAS

Teach.assist.eng. Gerlinde RUSU

Teach.assist.eng. Iulia A. PÎNZARU

PhD Stud. eng. Cristina ZARCULA

Tehn. Volica DAMȘA

MS Stud.eng. Radu PREJBAN

MS Stud.eng. Ionut TANASE

MS Stud.eng. Gabriel TOTH

## FIELD DESCRIPTION

In this project, the obtaining (separation, purification), semi-synthesis, nanoencapsulation, analysis, and hepatoprotective evaluation of natural or modified biosystems or biocompounds from *Chelidonium*, *Berberis*, *Matricaria* species will be studied.

The obtaining of the hepatoprotective biosystems from *Chelidonium*, *Berberis*, *Matricaria* species will be realized by classical ethanol-water extraction, the extracts will be fractionated by preparative liquid chromatography, and evaluated from the hepatoprotective point of view. The extracts/fractions/natural compounds with the best activity will be used for the obtaining of cyclodextrin-like nanoparticles (or other encapsulation matrices). Furthermore, some active compounds will be chemically modified in order to increase the hepatoprotective activity and these compounds will be used for the obtaining of nanoparticles with enhanced bioavailability.

The analysis of the extracts/fractions/natural or modified compounds will be realized by GC (after derivatizing), HPLC, MS, NMR, FT-IR etc. The analysis of nanoparticles will be realized by microscopical methods (SEM, TEM, AFM),

thermoanalytical methods (thermogravimetry, differential scanning calorimetry), X ray diffraction, EDAX etc.

## ACTIVITIES

- Literature survey on the obtaining and characterization of *Chelidonium*, *Berberis*, *Matricaria* extracts/main compounds, and on the obtaining and analysis of such bioactive compounds/cyclodextrin nanoparticles;
- Experimental design of the nanoencapsulation processes between bioactive compounds/cyclodextrins;
- Obtaining and characterization of the *Chelidonium*, *Berberis*, *Matricaria* extracts/fractions/bioactive compounds (with hepatoprotective activity);
- Obtaining and characterization of the bioactive compounds or extracts/cyclodextrin nanoparticles (with enhanced bioavailability on the hepatoprotection);
- Optimization of the nanoencapsulation processes.

## PhD RESEARCH ACTIVITIES

1. Prof.dr. Carol CSUNDERLIK, PhD supervisor

*PhD students:*

- Nitu Sabina Violeta: *Synthesis and Characterization of Some Pyrazole Derivatives*
- Szöcz-Biro Emese: *Synthesis of Functional Derivatives of Polyhydroxilic Compounds Using Biotransformation Reactions with Free or Immobilized Enzymes*
- Pop Oana - Raluca: *Synthesis and Reactivity of Some Carbonylic Derivatives of Aromatic Heterocycles*
- Șișu Ioana: *Studies of the Synthetic Methods for Obtaining of Functional Derivatives of Aldoses*
- Palani Adil: *Thermal Decomposition of N-Carbamoil Derivatives of Cyclic Imides*
- Ledeti Ionuț: *Synthesis of functionalized mercapto-triazoles and use as ligands or compounds with potential biological activity*
- Creangă Andreea Anda: *Synthesis of heterocyclic mercaptans from azol class*

2. Prof.dr.eng. Ionel MANOVICIU, PhD supervisor

*PhD students:*

- Homone Claudia-Gabriela: *Contributions to study of rubber compound's composition for rolling bands and hard tire's flank*
- Roșca Cristina: *Interaction characterization of rubber-filling*
- Mișcă Ruxanda Manuela: *Researches about improvement of physico-mechanic characteristics of synthetics elastomers's compounds*



- Uscătescu Maria Ramona: *Contribution at study of rubber mixture's adherence at transport band's base*

3. Prof. dr. eng. Alfa-Xenia LUPEA, PhD supervisor

*PhD students:*

- Lascu Anca: *Study on the reaction of anomeric center of monosaccharides*
- Condrat Dumitru: *Obtaining of some plant extracts with antioxidant activity*
- Grăvilă Corina: *Synthesis of substituted N-amides of aromates hydroxy-acids*
- Crăsmăreanu Eleonora Cornelia: *Synthesis and characterization of intermediates and colorants with amidic groups*
- Vancea Valentina: *Synthesis of some pyridine derivatives with potential biological activity*
- Taloș Ioan: *Synthesis and properties of some phosphonic acids and derivatives*
- Costescu Corina Iuliana: *Stabilizing of some bioactive principles from Compositae family plants by cyclodextrin nanoencapsulation*
- Pleșa Carmen Manuela: *Juniperus extracts: obtaining and uses in pharmaceuticals, cosmetics, and food fields*

4. Prof. dr. eng. Corneliu-Mircea DAVIDESCU, PhD supervisor

*PhD students:*

- Kakasi-Zsurka Sandor: *Obtaining of some new bioactive compounds by modification of polyhydroxyalkanoates*
- Corici Livia: *Biocatalytic processes with immobilized enzymes by sol-gel method*
- Croitoru Ramona: *Synthesis of carbon hydrates oligomers and polymers by enzymatic catalysis*
- Stefanescu Oana: *FexOy type oxidic nanomaterials undispersed and dispersed in anorganic-organic matrices: synthesis, characterization, application*
- Răfăilă Madian: *Doctoral School*
- Ardelean Radu Ovidiu: *Doctoral School*
- Peli Beata Monika (căs. Cioplea): *Doctoral School*

5. Prof.dr.eng. Lucian RUSNAC, PhD supervisor

*PhD students:*

- Bașa Ioana Adela: *Contributions on the obtain of the biodiesel*
- Sălăgean Ioana Ramona: *Contributions on carbohydrate based polymers synthesis and characterization*
- Udrescu Valentina Liliana: *Optimizing of modern ionization techniques by electrospray chip for expression determination of some glycoconjugates*
- Dobren Flavius: *Contribution regarding the modeling and simulation research of the CO<sub>2</sub> dispersion process in urban environment*

- Pascariu Mihai Cosmin: *Tensioactive agents based on saccharide derivatives*

- Paută Radu: *Polymers including carbohydrates*

- Chiș Ana-Maria (Pană): *Saccharide derivative-based polymers*

- Kiss Antonie Gabriel: *Contribution regarding the polyurethans*

- Mariș Ioan Dorel: *Doctoral School*

- Ștefan Liliana Marinela: *Doctoral School*

6. Prof.dr.eng. Constantin DĂESCU, PhD supervisor

*PhD students:*

- Pînzaru Iulia Andreea: *Naphtoxidine-nucleotides DNA-markers and inhibitors*

7. Prof.dr.eng Liviu MIRCI, PhD supervisor

*PhD students:*

- Boran Sorina: *The principle of polyfunctionality and asymmetry in the realization of new plasticizers and lubricants*

- Curelea Sergiu: *Polyfunctional derivatives esters for polymer processing and tribological applications*

- Ismană Lidia Anița: *Doctoral School*

8. Prof.dr.eng Francisc PETER, PhD supervisor

*PhD students:*

- Ungureanu Mihaela: *Bioethanol from lignocellulosic sources*

- Ursoiu Anca: *Optically active compounds obtained by enzymatic catalysis*

#### PhD THESIS SUSTAINED

1. Grad Maria Elena: *Synthesis of some non-benzidinic colorants*; February 2009; PhD supervisor: Prof. Dr. Eng. Lupea Alfa Xenia
2. Zarcu (Paul) Ana Cristina: *Biocatalytic Transformations Using Immobilized Hydrolytic Enzymes by the Sol-Gel Methods*; April 2009; PhD supervisor: Prof. Dr. Csunderlik Carol

#### PUBLICATIONS

##### BOOKS

1. Hădărugă, D. I., *Compuși odoranți-aromatizanți naturali și de sinteză*, Ed. ArtPress, Timișoara, 2009, ISBN 978-973-108-185-4 (published in Romanian)
2. Zarcu Ana Cristina, *Reactii biocatalitice mediate de enzime hidrolitice imobilizate prin metoda sol-gel*, Ed. Politehnica, Timisoara, 2009, ISBN 978-973-625-866-4 (published in Romanian)
3. Lupea Alfa Xenia, Milea Marius, *Metode spectrometrice aplicabile in analiza intermediarilor si produselor farmaceutice*, Ed. ArtPress, Timișoara, 2009, ISBN 978-973-108-249-3, (published in Romanian)

## PUBLISHED PAPERS

- Oana Ștefănescu, Corneliu Davidescu, Mircea Ștefănescu, Stoia Marcela Elena, Preparation of  $\text{Fe}_x\text{O}_y/\text{SiO}_2$  nanocomposites by thermal decomposition of some carboxylate precursors formed inside the silica matrix, *Journal of Thermal Analysis and Calorimetry* 2009, 97(1), 203-208, ISSN 1388-6150
- Lazau, C.; Sfirloaga, P.; Ratiu, C.; Orha, C.; Ioitescu, A.; Miron, I.; Novaconi, S.; Hadaruga, D.I.; Hadaruga, N.G.; Bandur, G.N.; Rusu, G.; Grozescu, I., Synthesis of Bioactive Materials Based on Undoped/Doped  $\text{TiO}_2$  and Their Nanocrystals with alpha- / beta-Cyclodextrins, *Journal of Optoelectronics and Advanced Materials* 2009, 11(7), pp. 981-987, ISSN 1454-4164
- I. R. Salagean, G. Bandur, P. Martin, V. Lequart, L. M. Rusnac, Synthesis and Characterisation of some carbohydrate based monomers, *Rev. Chim. (Bucharest)* 2009, 60 (9), pp. 905-908, ISSN 0034-7752
- Vasile-Nicolae Bercean, Mihaela- Lacramioara Turlea, Valentin Badea, Andreea -Anda Creanga, Mihai Medeleanu, New 5-substituted 2-mercapto-1,3,4-oxadiazoles, intermediates in the synthesis of 5-substituted 4H-4-amino-3-mercapto-1,3,4-oxadiazoles, *Rev. Chim. (Bucharest)* 2009, 60 (9), pp. 893-895, ISSN 0034-7752
- I. Sisu, V. Bercean, V. Badea, M. T. Caproiu, E. Sisu, Thioribofuranoside of mercapto triazole, *Rev. Chim. (Bucharest)* 2009, 60(9), pp. 884-886, ISSN 0034-7752
- I. M. C. Ienascu, A. X. Lupea, I. M. Popescu, M.A.Padure, A.D.Zamfir, The synthesis and characterization of some novel 5-chloro-2-(substituted alkoxy) – N - phenylbenzamide derivatives, *Journal of Serbian Chemical Society* 2009, 74(8-9), pp. 847-855, ISSN 0352-5139
- I. M. C. Ienascu, M. A. Padure, I. Balcu, N. Mirica, A. D. Zamfir, Chip-electrospray ionization multistage mass spectrometry of novel O-substituted salicylanilides, *Journal of Optoelectronics and Advanced Materials* 2009, 1(1), pp. 88-91, ISSN 2066-057
- Monika Simon, Andreea Micle, Valentin Badea, Carol Csunderlik, Bis(O-nitrophenyl) Carbonate as a New Reagent for the Synthesis of Chiral Oxazolidin-2-ones, *Synthetic Communications* 2009, 39(15), pp. 2633-2639, ISSN 0039-7911
- A. Tămaș, Z. Groșșian, R. Minea, Magnetic Fluids-Materials with Remarkable Applications, *Studia Universitatis Babeș-Bolyai, Chemia* 2009, 54(1), pp. 143-150, ISSN 1224-7154
- N. Borș, A. Tămaș, Z. Groșșian, The Construction and Calibration of a Rotating Viscometer, *Studia Universitatis Babeș-Bolyai, Chemia* 2009, 54(1), 55-62, ISSN 1224-7154
- Paul Cristina, Kiss Claudia, Corici Livia, Croitoru Ramona, Csunderlik Carol, Peter Francisc, Combined Sol-gel Entrapment and Adsorption Method to Obtain Solid-Phase Lipase Biocatalysts, *Revista de Chimie* 2009, 60, pp. 922-927, ISSN 0034-7752
- V. Vlaia, T. Olariu, Lavinia Vlaia, M. Butur, C. Ciubotariu, M. Medeleanu D. Ciubotariu, Quantitative Structure-Activity Relationship (QSAR). IV. Analysis of the Toxicity of Aliphatic Esters by Means of Weighted Holistic Invariant Molecular (WHIM) Descriptors, *Farmacia* 2009, 57(4), pp. 511-522, ISSN 0014-8237
- V. Vlaia, T. Olariu, C. Ciubotariu, M. Medeleanu, Lavinia Vlaia, D. Ciubotariu, Molecular Descriptors for Quantitative Structure-Toxicity Relationship (QSTR) I. Molecular compressibility descriptors in modeling the toxicity of aliphatic alcohols on *Tetrahymena pyriformis*, *Rev. Chim. (Bucuresti)* 2009, 60(6), pp. 605-609, ISSN 0034-7752
- A. E. Segneanu, I. Balcu, M. C. Mirica, M. I. Iorga, M. Milea, Z. Urmosi, Reactive organic carbonates with leaving group for biologically active dipeptides synthesis, *Environmental Engineering and Management Journal* 2009, 8(4), pp. 797-800, ISSN 1582-9596
- Condrat, D. Szabo, R. M. Crișan, F., Lupea, A.X, Antioxidant activity of some phaanerogam plant extracts, *Food Science and Technology Research (Japan)* 2009, 15(1), pp. 95-98, ISSN 1082-0132
- Condrat, D. Szabo, R. M., Radu D., Lupea, A.X, Plant species from the Angiospermatophyta and Spermatophyta genus with antiradical and antimicrobial activity, *Oxidations Communications (Bulgaria)* 2009, 32, pp. 924-929, ISSN 0209-4541
- Mosoarca Giannin Emanuel, Vasile Pode, Studies regarding the improvement coagulation process of Bega river suspensions, *Revista de Chimie* 2009, 60(8), pp. 836-838, ISSN 0034-7752
- Corneliu Bogatu, Vasile Pode, Ilie Vlaicu, Eliza Leonte, Dalila Marsavina, Municipal effluents treatment using chlorine dioxide and Chlorine, *Revista de Chimie* 2009, 60(7), pp. 735-740, ISSN 0034-7752
- Nicoleta Nemes, Oana Alina Costescu, Vasile Pode, Corneliu Podoleanu, Constantin Florescu, Determination of mobile phosphorus fraction in the soil variety taxonomy using ammonium lactate-acetate, *Revista de Chimie* 2009, 60(9), pp. 976-978, ISSN 0034-7752
- Adrian Carabet, Ion Mirel, Vasile Pode, Constantin Florescu, Corneliu Podoleanu,

- Monica Crisan, Modelling of depollution process in an aquifer through injection and extraction wells and treatment of polluted water at the ground surface, *Revista de Chimie* 2009, 60(4), pp. 427-431, ISSN 0034-7752
21. Gheorghe R. E. Maries, Ionel Manovicu, Geza Bandur, Gerlinde Rusu, Vasile Pode, Study by thermal methods of some physico-mechanical properties of polyamides used for high performance sport products, *Materiale Plastice* 2009, 46(1), pp. 58-61, ISSN 0025-5289
  22. Corneliu Bogatu, Vasile Pode, Ilie Vlaicu, Aurel Iovi, Formation and stability of mono-, di- and trichloramine in water solutions. I. Monochloramine, *Revista de Chimie* 2009, 60(2), pp. 189-193, ISSN 0034-7752
  23. Angela Magda, Cornelia Muntean, Aurel Iovi, Marius Jurca, Lavinia Lupa, Monika Simon, Vasile Pode, Studies about ammonium phosphates fertilizers with boron added as boric acid, *Revista de Chimie* 2009, 60(3), pp. 226-230, ISSN 0034-7752
  24. Maries Gheorghe, Manovicu Ionel, Bandur Geza - Nicolae, Rusu Gerlinde, Pode Vasile, Study by thermal methods of some physico-mechanical properties of polyamides used for high performance sport products, *Materiale Plastice* 2009, 46(1), pp. 58-61, ISSN 0025-5289
  25. Adriana Fulas, Bogdan Tita, Geza Bandur, Dumitru Tita, Thermal Decomposition of Some Benzodiazepines under Non-Isotermal Conditions, Kinetic Study, *Revista de Chimie* 2009, 60(10), pp. 1079-1083, ISSN 0034-7752
  26. I. M. C. Ienascu, M. A. Padure, I. Balcu, N. Mirica, A. D.Zamfir, Active flux based motion-sensorless vector control of dc-excited synchronous machines, *Proc. IEEE Energy Conversion Congress and Exposition, ECCE* 2009, San Jose, California, USA, pp. 2496-2503, ISBN 978-1-4244-2893-9
  27. Dumbrava, D. G.; Lupea, A. X.; Hadaruga, N. G.; Hadaruga, D. I.; Moldovan, C.; Ravis, A.; Druga, M., Determination by Atomic Absorption Spectrometry of Mineral Content from Maize (*Zea mays*) Hybrids and Their Carotenoidic Extracts, *Journal of Agroalimentary Processes and Technologies* 2009, 15(1), pp. 64-71, ISSN 1453-1399
  28. Hadaruga, N. G.; Hadaruga, D. I.; Tatu, C.; Gruia, A.; Moldovan, C.; Costescu, C.; Lupea, A.X., Multivariate Analysis (PCA) in Compositae Biocompounds Class, *Journal of Agroalimentary Processes and Technologies* 2009, 15(2), pp. 201-210, ISSN 1453-1399
  29. Hadaruga, D. I.; Hadaruga, N. G.; Ravis, A.; Parvu, D., Molecular Modeling and Docking Studies on Compositae Biocompounds-Cyclodextrin Interactions, *Journal of Agroalimentary Processes and Technologies* 2009, 15(2), pp. 273-282, ISSN 1453-1399
  30. Hădărugă, D. I.; Hădărugă, N. G., Antioxidant Activity of Hepatoprotective Silymarin and Silybum marianum L. Extract, *Chemical Bulletin of the "Politehnica" University of Timișoara* 2009, 54(2), pp. 104-107, ISSN 1224-6018
  31. Hădărugă, D. I.; Hădărugă, N. G., Antioxidant activity of Chelidonium majus L. extracts from the Banat county, *Journal of Agroalimentary Processes and Technologies* 2009, 15(3), pp. 396-402, ISSN 1453-1399
  32. Hădărugă, D. I.; Hădărugă, N. G.; Miclea, L. M.; Vlaia, L.; Mircioiu, C., Bioactive compounds (hepatoprotective or anti-inflammatory xenobiotics) / cyclodextrin nanoparticles: a comparative study, *Journal of Agroalimentary Processes and Technologies* 2009, 15(4), pp. 478-483, ISSN 1453-1399
  33. Hădărugă, D. I.; Balș, D.; Hădărugă, N. G., Insulin-Containing Amino Acids and Oligopeptides/ $\beta$ -Cyclodextrin Supramolecular Systems: Molecular Modeling and Docking Experiments, *Chemical Bulletin of the "Politehnica" University (Timișoara)* 2009, 54(2), pp. 108-113, ISSN 1224-6018
  34. Coneac, G.; Gafițanu, E.; Hădărugă, N. G.; Hădărugă, D. I.; Riviș, A.; Părvu, D., Quercetin and rutin / 2-hydroxypropyl- $\beta$ -cyclodextrin nanoparticles: obtaining, characterization and antioxidant activity, *Journal of Agroalimentary Processes and Technologies* 2009, 15(3), pp. 441-448, ISSN 1453-1399
  35. I. A. Ivanoiu, L. M. Rusnac, Influence of the reaction time and the catalyst amount on the properties of biodiesel from palm oil in comparison with biodiesel from soybean oil, *Chem. Bull (Politehnica) Timisoara* 2009, 54(68), pp. 89-93, ISSN 1224-6018
  36. A. M. Pana, M. C. Pascariu, G. Bandur, L. M. Rusnac, Thermal Properties of new glucose based copolymers, *Chem. Bull (Politehnica) Timisoara* 2009, 54(68), pp. 93-99, ISSN 1224-6018
  37. I.R. Salagean, M.C. Pascariu, G. Bandur, L.M. Rusnac, Thermal Properties of copolymers based on sugar, *Chem. Bull (Politehnica) Timisoara* 2009, 54(68), pp. 100-103, ISSN 1224-6018
  38. A. Tămaș, M. Pop, A. X. Lupea, A. Ardelean, Rheological Behavior of Some Food Solid Emulsions, *Studia Universitatis Vasile Goldiș, Seria Științele Vieții* 2009, 19(2), pp. 343-349, ISSN 1584-2363
  39. C. Zarcu, L. Corîci, R. Croitoru, C. Csunderlik, F. Péter, Improvement of lipase catalytic properties by immobilization in hybrid matrices, *Proceedings of World Academy of Science, Engineering and Technology* 2009, 52, pp. 179-184, ISSN 2070-3740

40. R. Banica, N. Vaszilcsin, T. Nyari, G. Bandur, Study on the Electrodeposition of Molybdenum Oxides on Copper Support, *Studia Universitatis Babeş-Bolyai, Chemia* 2009, 54(2), pp. 87-94, ISSN 1224-7154
41. Sandor Kakasi-Zsurka, Cristina Paul, Livia Corîci, Ramona Croitoru, Francisc Péter, Biopolymers from hydroxybutyric acid and carbohydrate derivatives, *Annals of West University of Timisoara, Series of Chemistry* 2009, 18(2), pp. 29-34, ISSN 1224-9513
42. Cristina Paul, Livia Corîci, Ramona Croitoru, Florin Balcu, Corina Macarie, Firuta Fiţigău, Raluca Martagiu, Francisc Péter, Hydrolysis of lignocellulosic biomass by cellulases from *Trichoderma reesei*, *Annals of West University of Timisoara, Series of Chemistry* 2009, 18(2), pp. 63-68, ISSN 1224-9513
43. A.M. Pana, L.M. Rusnac, G. Bandur, La synthese et la caracterisation des nouveaux polymeres a base de sucres et d'anhydride maleique, *IXeme Colloque Franco-Roumain sur les Polymeres* 2009, in press
44. I.R. Salagean, L.M. Rusnac, G. Bandur, Les proprietes thermiques des copolymeres a base de sucres, *IXeme Colloque Franco-Roumain sur les Polymeres* 2009, in press
45. A.G. Kiss, G. Bandur, L.M. Rusnac, Aspects moderned dans les polyurethanes flexibles pour protejer l'environnement, *IXeme Colloque Franco-Roumain sur les Polymeres* 2009, in press
46. G. Rusu, G. Bandur, L. Rusu, L.M. Rusnac, Mechanical properties of some modified polysaccharide, *IXeme Colloque Franco-Roumain sur les Polymeres* 2009, in press
47. COSTEA Liviu-Virgil, Vasile Nicolae Bercean, Green Chemistry: Electrochemical properties and anodic cyclization of 1H-3-methyl -4 -ethoxycarbonyl -5 -(4- fluoro-benzylidenehydrazino)-pyrazole in nonaqueous solvents, *International Conference on Sustainability in Science and Engineering*, Timisoara 2009, pp. 147-153
48. A.Lascu, I.Şişu, V. Bercean, E.Şişu, M. Penescu, A. X. Lupea, Environmentally friendly conditions for synthesis of glycosil sulfone with heterocyclic moiety, *16th International Symposium on Analytical and Environmental Problems*, 28 September 2009, Szeged, Hungary, pp. 247-252
49. Gabriel Hegheduş-Mîndru, Ramona Cristina Biron, Delia Maria Perju, Lucian Mircea Rusnac, Teodor Ioan Traşcă, Petru Negrea, Ducu Sandu Ştef, Microbiological analyzes for mineral waters from center region of Romania, *Research People and Actual Tasks on Multidisciplinary Sciences* 10-12 June 2009, Lozenec, Bulgaria, pp. 248-253
50. Gabriel Hegheduş-Mîndru, Ramona Cristina Biron, Delia Maria Perju, Lucian Mircea Rusnac, Petru Negrea, Adrian Riviş, Ducu Sandu Ştef, Microbiological analyzes for mineral waters from north region of Romania, *Research People and Actual Tasks on Multidisciplinary Sciences*, 10-12 June 2009, Lozenec, Bulgaria, pp. 254-259
51. Cristina Zarcu, Livia Corîci, Ramona Croitoru, Carol Csunderlik, Francisc Peter, Preparation and catalytic properties of xerogels obtained by ionic liquid incorporation during immobilization of lipase by the sol-gel method, *The 9th International Symposium on Biocatalysis and Biotransformations*, Bern, 5-9 Iulie 2009, Book of Abstracts, 76, 1
52. Francisc Péter, Cristina Zarcu, Livia Corîci, Ramona Croitoru, Optimization of lipase biocatalytic performances through sol-gel immobilization, *The 14th European Congress on Biotechnology*, Barcelona, 13-16 September 2009, New Biotechnology, Vol. 25S, S140, 1
53. Grad Maria Elena, Simu Georgeta Maria, Milea Marius, Padure Mirabela Aurora, Lupea Alfa Xenia, Synthesis, Physicochemical properties and colour assesment of some new stilbene azo dyes, *The 15th Symposium on Analytical and Environmental Problems*, Szeged, 22 September 2009, pp. 242-245
54. Segneanu A.E., Balcu I., Milea M., Mirica M.C., Iorga M., Comparative study of reactivity of some organic reactive carbonates with leaving groups used in peptide synthesis, *Sixth International of the Chemical Society of the South-Eastern European Countries* 10-14 September, Sofia, Bulgaria, 2009, 2-P13
55. M. Medeleanu, A.A. Matusz, V. Dumitrascu, D. Ciubotariu, A New Improved Version of MTD-Method (MVD - Method) and its Applications for QSAR Analysis in Carbonic Anhydrase - Heterocyclic Sulfonamide Interaction, *The 38th Annual Meeting of the American College of Clinical Pharmacology*, Sept. 13-15, 2009, San Antonio, Texas, SUA 2009, *J. Clinical Pharmacology* 2009, 1119, 1
56. Maria Mracec, Oana Raluca Popa, Mihai Medeleanu, Mircea Mracec, Comparison of  $(\lambda^3-x-\lambda^3-y)^3$  (x,y, = n, p, as, sb, bi) aromatic heterocycles stability through quantum chemical methods, *13th International Symposium on Novel Aromatic Compounds*, 19-24 July, 2009, Luxemburg 2009, *Book of Abstracts*, 248, 1
57. Maria Mracec, Oana Raluca Popa, Mihai Medeleanu, Mircea Mracec, Comparison of  $(\lambda^3-x-\lambda^5-yh^2)^3$  (x,y, = n, p, as, sb, bi) aromatic heterocycles stability through quantum chemical methods, *13th International Symposium on Novel Aromatic Compounds*,

- 19-24 July, 2009, Luxemburg 2009, *Book of Abstracts*, 252, 1
58. Condrat, D., Harja, F., Lupea, A. Xenia, Determinarea acidului ascorbic prin metoda 2-diclorfenol-indofenol din speciile *Alchemilla vulgaris*, *Allium ursinum*, *Acorus calamus*, *Solidago virga-aurea*, *2nd International Conference „Research People and Actual Tasks on Multidisciplinary Sciences”*, Lozenec, Bulgaria, 10-12 June 2009, *Book of Abstracts*, pp. 243-245, 3
59. Condrat, D., Harja, F., Lupea, A. Xenia, Determinarea conținutului total de antocianidine din speciile de *Agrimonia Eupatoria*, *Veronica officinalis*, *Viscum album*, *2nd International Conference „Research People and Actual Tasks on Multidisciplinary Sciences”*, Lozenec, Bulgaria, 10-12 June 2009, *Book of Abstracts*, pp. 246-248, 3
60. L. M. Rusnac, G. Bandur, A. M. Pana, I. R. Salagean, R. Pauta, Polimeri derivati de la hidrati de carbon, *Zilele Academice Iesene, 60 de ani de la infiintarea Institutului de chimie macromoleculara Petru Poni*, 8-10 October 2009
61. Ledeti, I. V., Bercean, V., Tănase, I., Creangă, A., Badea, V., Nițu, S., Csunderlik, C., Synthesis and characterisation of some new azomethine derivatives of 4H-4-Amino-3-aryl-5 - ethoxycarbonyl – methylsulfanyl - 1,2,4 - triazoles as potent antiinflammatory agents, *New trends and strategies in the chemistry of advanced materials*, 5-6 November 2009, Timisoara, Romania, Ed. Mirton, Timișoara, pp. 46-49.

