

Hydrogen and Fuel Cells

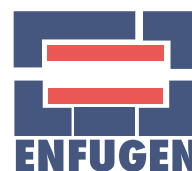
R&D Expertise Catalogue

Profiles of Potential Partners from:

Bulgaria
Czech Republic
Poland
Romania
Russia
Slovakia



Enfugen is Supported by the European Commission under
the specific Thematic Priority 6.1 "Sustainable Energy Systems"
of the Sixth Framework Programme"





Foreword

The present R&D Expertise Catalogue has been created within the framework of the ENFUGEN project: a Specific Support Action funded by the European Union through the Sixth Framework Programme for Research and Technological Development under the specific Thematic Priority 6.1 "Sustainable Energy Systems".

The ENFUGEN action was meant to contribute to strengthen the European Research Area (ERA) by increasing the collaboration between the scientific communities of "old" Member States and the New Member States, facilitating the accession of the latter to the funds made available by the European Commission and therefore creating the critical mass of resources necessary to boost the European Research in the specific Hydrogen and Fuel cells sector.

To achieve its objectives ENFUGEN project implemented a set of actions to first identify and then favor the overcoming of the barriers impeding. In this framework the present publication, can be considered one of the most important results of the ENFUGEN project. The R&D Expertise Catalogue will improve the visibility of the know how and capacities resident in Poland, Slovakia, Czech Republic, Bulgaria, Romania and Russia in the international scenario and we are fully confident that this "desk" partner search tool, once available to the major European player of the Fuel Cells and Hydrogen sector, will be used for the identification and selection of R&D partners in the consortium building phase of FP7 project proposals.

To assure the maximum impact the catalogue will both be distributed in its paper version to a highly targeted list of stakeholder and massively made available electronically in Pdf version on the project platform www.enfugen.it and on other relevant web sites and portal. The diversity of know-how and expertise provided by the 36 R&D organization listed in this catalogue reflects the different areas where nowadays the Hydrogen and Fuel Cells perspectives are calling for research and having an impact on. More in-depth information can be found directly from the contact persons indicated and by visiting the respective web-sites. These organizations were chosen taking into account not only the performances they were able to demonstrate in the past, but also their potential for future developments and their motivation to get involved in research networks and collaborative research projects.

The catalogue has been created thanks to the contribution of the 9 project partners hereby listed and it is the product of a set of activities carried out throughout the 2 years of the ENFUGEN project run.



Foreword

ENFUGEN Project numbers

- o ENFUGEN project started on 1st April 2005 and ended, 2 years later, on 31 March 2007.
- o 9 partners from 5 different countries: Poland, Czech Republic, Slovakia, Italy and Belgium
- o 3 the workshops organized
- o 3 the training sessions performed
- o About 200 the researchers contacted
- o 15 the FP7 partner searches collected
- o 36 the profiles collected
- o 500 is the number of relevant stakeholders receiving the catalogue on their desktop

ENFUGEN Studies and Report

The project produced the following works which can be downloaded from the project website www.enfugen.net or requested via email to the project coordinator: Cristina Torrisi c.torrisi@labor-roma.it



















- o Barriers and Needs analysis
- o New member state FC&H competences mapping report
- o Guidelines towards entrepreneurial university

ENFUGEN Consortium

Organization	Country	Website
Labor Srl (Coordinator)	Italy	www.labor-roma.it
The Faculty of Electrical Engineering, the Czech Technical University in Prague	Czech Republic	www.feld.cvut.cz
BIC Bratislava Ltd	Slovakia	www.bic.sk
Institute of Power Engineering	Poland	www.iem.com.pl
Energy Center Bratislava	Slovakia	www.ecb.sk
ENVIROS s.r.o.	Czech Republic	www.enviros.cz
TESEO	Belgium	www.teseo.be
University of Tor Vergata – Department of Business Engineering	Italy	www.ing.uniroma2.it
Institute of Fundamental Technological Research, Polish Academy of Sciences.	Poland	www.kpk.gov.pl



















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Organization Name

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Organization description

Organization description

The All-Russian (former All-Union) Thermal Engineering Institute - VTI - has been working throughout its over than 80-year history to meet the demands of the power industry.

VTI is a pioneer in scientific research and practical applications relating to increased and later supercritical and ultra supercritical steam parameters, combined heat and power generation, combustion of lowest grade domestic fuels, water treatment and chemistry, electronic-based automation and many other well known engineering ideas widely used in domestic and world practice. Our objectives are to conduct R&D to provide for reliable and efficient operation of power equipment at maximum service life and minimal environmental impact, implementation of efficient electricity and heat generating technologies and equipment, ensure scientific and technical progress in power engineering.

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Country



R&D activities

R&D activities

- Investigation of the long operated metals to determine properties and to extend the service life of equipment;
- Development and perfection of new technologies with high efficiency and low pollution: combined cycle plants firing natural gas with 53-58% efficiency, 300-600 MW coal-fired ultra supercritical steam units with 43-47% efficiency, circulating fluidized bed boilers;
- Development of environmental friendly technologies to reduce NOx emissions (gas and solid-fuel low-NOx burners, two stage combustion and reburning, preheating of coal for conversion of fixed nitrogen to molecular nitrogen; catalytic and non-catalytic NOx reduction, SOx capture, fly ash electrostatic precipitator;
- Investigation of advanced IGCC technologies, pressurized coal combustion, and fuel cells;

Expertise

Expertise

VTI has at its disposal a large laboratory complex enabling the conduct of standardized tests of metal, water, fuels and lubricants. The ability to offer experimentally proven results is one of the VTI strong features. To this end, VTI has its own experimental power plant equipped with boilers generating ultrasupercritical steam (up to 30-35 MPa, 600-650° C) which is used for tests and expands in conventional steam turbines (6 and 12 MW) to produce electricity. The plant has a large centrifugal compressor for air supply and a water-cooled blade gas-turbine units. The experimental power plant locates about 100 facilities and test rigs at which various investigations are being carried out at close-to-real conditions.

Projects, Patents & Publications

Projects, Patents & Publications

VTI closely cooperates with research, design and operational organisations and power equipment manufacturers. VTI successfully cooperates with leading foreign organisations, firms and companies, such as the World Energy Council (WEC), the International Energy Agency (IEA), the International Organisation for Standardization (ISO), the International Institute of Coal, EPRI, EPA and the National Energy Technology Laboratory (USA). VTI is a member of VGB. Scientific and technical relations and exchange of information has been established between the well known corporations of the USA, Germany, United Kingdom, Japan, China, Finland,

Key words

Key words

Fuel cell electrochemistry	Hydrogen distribution
Fuel cell integration	Hydrogen fuelling infrastructure
Fuel cell system components	Hydrogen production
Fuel processors	Hydrogen safety
High temperature fuel cells	Hydrogen storage
Low temperature fuel cells	

Organization description

Organization description

The research group was formed in 1998. In view of the problem complexity scientists and specialists from a number of different fields of knowledge and activity are involved for the project implementation including as the principal personnel:

Prof. L. Kvasnikov – thermodynamic balance and efficiency;

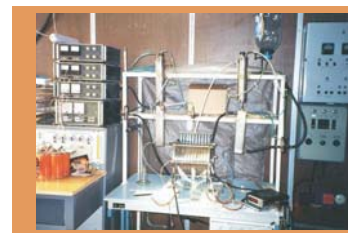
Dr. V. Belokopitov – electrochemical investigations of sea water electrolysis;

Prof. R. Tazetdinov – electrochemical investigations, kinetic analysis;

Assoc. Prof. E. Ivkin - analysis of process and materials properties;

Mrs. N. Kourtina – study of sea water electrolysis;

Mr. V. Poliakov – designing of devices;



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R&D activities

R&D activities

Were devoted to the development of adequate model of direct seawater electrolysis. The theoretical and experimental simulation has shown that the procedure is effective for production of hydrogen as well as other by-products possessing self commercial values.

ATC collaborated with Centre for Renewable Energy Sources (Greece) and MVV Consultants & Engineers GmbH (Germany) while Contract № ICA2-CT-2000-10049 implementation under 5th Research Framework Programme of European Union.

Expertise

Expertise

Along with theory, a model of the electrolyzer was made and laboratory – scale experimental study of seawater electrolysis was performed. The experiments indicated that the hydrogen production proceeds with tentative power effectiveness about 48%. There are strong groundings for believing that this index should be increased.

The technology promises efficient, reliable, cost-effective and ecologically safe electrochemical process of hydrogen production. Apart from hydrogen and oxygen, in the course of seawater electrolysis one can produce by-products possessing self commercial values.

Projects, Patents & Publications

Projects, Patents & Publications

Temeev A. et al. Features of Sea Water Electrolysis for Hydrogen Production. Proceedings of the World Renewable Energy Congress VII, 2002. Cologne, Germany.

Key words

Key words

Fuel cell electrochemistry	Hydrogen distribution
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Low temperature fuel cells	

Organization description

The centre was formed in 2004, considering the identified needs in the field of sustainable development, and the specific experience of two groups, Product Design and Materials Chemistry. The joint research aims to develop systems and products for solar energy conversion and recycling, in an integrated line: Materials Development – Product design – Product prototyping.

The center coordinates two B.Sc. courses (Engineering of Renewable Energy Sources and Waste Management) and two M.Sc. courses (Engineering Design and Management of Renewable Energy Systems and Applied Chemistry in Environment and Industry).

Staff: 43 members including 6 Ph.D. supervisors, 19 full time Ph.D. students and two technicians.

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R&D activities

in Solar Energy Conversion, Photochemical conversion: photoelectrodes in a photo-electrochemical cell (PEC) for:

- Hydrogen production via water photolysis;
- Pollutants photodegradation

Solar – Thermal systems:

- New IR absorbing materials;
- Tracking systems.

Photovoltaic systems:

- Solid State Solar Cells;
- Solutions for increasing the conversion efficiency:

Tracking systems;

- Design solutions for the mountain area;

Expertise

The Center has facilities for:

- Thin layers deposition of ceramic, nanostructured materials based on CVD, SPD and dr. blade techniques. The up-scaling is possible in a pilot, automatic SPD installation and using a robot with six axes for depositions on various geometries and shapes.
- Characterisation of the thin layers (AFM/STM, UV-VIS, FTIR, Contact angle measurements, potentiometry, impedance spectroscopy)
- Modelling and simulation based on state-of art software
- Testing the layers in PEC, under controlled illumination (in the spectral range UV-VIS). A laboratory photo-electrolyser is under development.

Projects, Patents & Publications

Projects:

- Integrated system for energy conversion, from renewable energy sources, grant supported by the Romanian Ministry of Research, M1-C2-4286
- New Nanostructured Materials for Hydrogen Production in water photolysis, grant supported by the Romanian Research Agency, TD/291/2005
- Improved photo-electrolysis technology based on novel nanocomposites for the production of sustainable hydrogen, INTAS project 05-102-2793

Publications:

- A.Enesca, A. Duta, Study of Photoactivity of WO₃ for Water Splitting, Thin Solid Films, 2007 (in print)
- L. Andronic, A. Duta, TiO₂ thin films for dyes photodegradation, Thin Solid Films, 2007 (in print)

Key words



www.enfugen.net

Fuel cell electrochemistry
Fuel cell integration
Fuel cell system components
Fuel processors
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Hydrogen storage

Organization description

Organization description

The Central Mining Institute in Katowice, created in 1945, is a governmental scientific-research unit engaged in problems of geoengineering, safety in mines and environmental protection. The multidirectional activities of the Institute comprise the following fields:

- mining and geoengineering,
- combating of natural and technical hazards in mining and industry,
- upgrading and utilisation of minerals,
- technologies of sustainable development in the area of environment protection,
- certification of equipment and materials
- education

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R&D activities

R&D activities

The Central Mining Institute concentrates it self on the following of the new and renewable technologies:

- Methods of co-combustion of mineral fuels and biomass
- Optimisation of quality of energy mixtures with biomass from the viewpoint of environmental protection and improvement of watt-hour efficiency of devices used for their utilisation
- Assessment of physico-chemical properties of complementary fuels, alternative from renewable and waste energy carriers and product of their combustion

- New and safe technologies of hydrogen fuel production
- CO₂ sequestration in geological structures
- Utilisation of mine gas in power engineering

Expertise

Expertise

Laboratory of Explosion-Proof Protection Assessment.

Laboratory of Explosion-Proof Systems and protections and Explosimetry.

Projects, Patents & Publications

Projects, Patents & Publications

Since December 1998 when the European Commission finally approved the Fifth Framework Programme the Central Mining Institute has begun the preparations towards taking part in this Programme.

In 2001 and in the first quarter of 2002 Central Mining Institute signed 9 contracts for the realisation of the following projects and for the participation in the following nets: RECOPO - ARAMIS - RESCUE - MASURIN - TENORMHARM - AIRPIPE - NESMI - ERRICCA2 - METROPOLIS

Within the Sixth Framework Programme, Central Mining Institute took part in the following projects: ISCC and Shape Risk

Key words

Key words

Fuel cell electrochemistry	Hydrogen distribution
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Low temperature fuel cells	



Organization description

Organization description

The Division of Environmental Physics represents a part of the Department of Astronomy, Physics of the Earth and Meteorology at Faculty of Mathematics, Physics and Computer Sciences, University of Comenius Bratislava, Slovakia. The main subject of work of the division is in the area of environmental engineering and protection as well as study of alternative energy sources incl. hydrogen production, storage and use. The division contains following group of 8 researcher and teacher: doc. RNDr. Marcela Morvová, PhD. Prof. RNDr. Viktor Martišovits, DrSc., doc. RNDr. Rudolf Hajossy, CSc., RNDr. Imrich Morva, PhD., RNDr. Ivan Košinár, PhD., RNDr. Karol Hensel, PhD., RNDr. Zdenko Machala, PhD., RNDr. Mário Janda, PhD., 3 PhD students and 1 technician

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Department of Environmental Physics
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Country



R&D activities & Expertise

R&D activities & Expertise

Thermo-chemical decomposition process (pyrolysis and hydro-pyrolysis) for utilizing heat, liquid chemicals and fuel, energy-gas first of all hydrogen and residual carbon char in pilot system (16kg of biomass per working day, 250 Nm³ of outputs gases per hour) is the experimental facility situated in the described organization. On-line non-thermal plasma based system is used for exhaust gas cleaning. The gas cleaning system has large efficiency in removal of carbon dioxide by producing solid proteinoid product. We use on-line as well as ex-post analysis of chemical components and physical parameters. As raw material, selected municipal waste, dirty PET bottles, waste wood, biomass from reclamation, excrements, sludge from water remediation plants, water biomass (algae, water vegetation, cyanobacteria) are used. Inside pyrolysis system important amounts of hydrogen is formed. According to preliminary tests it is possible to store produced hydrogen inside own produced nano-sized carbon on-line. The system comprises also photovoltaic solar collector situated on the roof of faculty, alternative electrolytic source of hydrogen, PEM fuel cell Ballard Nexa RM with power output 1,2kW, accumulators system, power converter from dc to alternate 220V, 50Hz.

Projects, Patents & Publications

Projects, Patents & Publications

- Morvová, Marcela - Morva, Imrich - Hanic, František : The model for origin of life precursors based on exhaust utilisation in the electric discharge, Plasma Processes and Polymers : Selected conference papers. - Weinheim : Wiley-VCH, 2005. - S. 403-412. - ISBN 3-527-40487-2
- Morvová, Marcela - Morva, Imrich - Janda, Mário - Hanic, František - Lukáč, Peter : Combustion and carbonisation exhaust utilisation in electric discharge and its relation to prebiotic chemistry, International Journal of Mass Spectrometry. - Vol. 223-224, No. 1-3 (2003), s. 613-625
- Svetková, Katarína - Henselová, Mária - Morvová, Marcela : Effects of a carbonization product as additive on the germination, growth and yield parameters of agricultural crops, Acta Agronomica Hungarica. - Vol. 53, No. 3 (2005), s. 241-250

Key words

Key words

Fuel cell electrochemistry
Fuel cell integration
Fuel cell system components
Fuel processors
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Low temperature fuel cells
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Organization description

Organization description

The Division of Technology and Material Sciences in Wrocław (IEL/OW) of Electrotechnical Institute was founded in 1948 by Prof. J. I. Skowronski, outstanding expert and scientist in high-voltage technology. Now, it is the only Polish R&D centre that is entirely engaged in technology and electrotechnical materials science. Professional qualifications of scientific and technical staff, over 55 years of experience, dedicated instrumentation for research and measurements, modern machine park assure the high quality of works.

The Division has strongly invested in refurbishing its testing laboratory with the most advanced equipment. The Institute offers a wide variety of high quality services ranging from expert opinions through technological works and experimental productions to testing services according to Polish, European and international standards.

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Division of Electrotechnology and Materials Science

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R&D activities

R&D activities

Research and development works carries out R&D in all fields of electrotechnology. The domains of primary concerns are:

- electroinsulating and constructional materials based on glass and resin composites,
- powder technologies of electroceramics,
- methodology of material research,
- novel piezoelectric materials,
- fuel cells,
- electroinsulating compounds for special applications,

Projects, Patents & Publications

Projects, Patents & Publications

5FP: 1) "Centre of Excellence for Materials for Low-Energy Consuming Technologies in Electrotechnics" (MALET) – Coordinator of the project, 2) "A novel miniaturized high voltage surge arrester" – CRAFT project, RTD – Performer.

6FP: 1) Scientific Network – "Surfactants and Dispersed Systems in Theory and Practise", SSA, Participant, 2) Expression of Interest "Renewable Energies Powered System for Domestic Applications" 3) 16 Proposals (Fuel Cells, Nanotechnologies)

Bilateral Projects: 1) Polish – German "Solid Oxide Fuel Cells for small systems" 2) Polish – Slovenian "New varistor technologies"

Expertise

Expertise

The Institute Testing Laboratory received the accreditation No. AB 67 through the Polish Certificate Institution PCA for testing technologies and manufacturing components of the following electrotechnical products and devices:

- composite insulators - design and type tests,
 - cables and wires (bare and insulated), electric cables and optical fibers - full and type tests,
 - safety equipment (insulating sticks, pliers, catchers, insulating platforms etc).
- and for the testing of physical, mechanical and electrical properties of the following materials:
- thermoplastics, thermosetting casting elastomers, thermo- and chemohardening resins, electro- and building ceramics.
 - soft magnetic materials,
 - bioceramics,

Key words

Key words

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Organization description

Organization description

ELEKTROKARBON a.s. was established on the 1st of May 1992.

The company main entrepreneurial activity is the manufacturing and sale of final and semi-finished products made from carbon materials. The supplementary production programme is aimed at products based on thermosetting plastic material with carbon fillers. The beginning of the production of carbon materials is dated back to the year 1950 when the enterprise was founded. Since then the company has gone through various structural and organizational forms. The company principal shareholder is HTC Holding a.s., Bratislava.

ELEKTROKARBON a.s. has its own research & development facilities including material and testing laboratories of carbon products.

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R&D activities

R&D activities

ELEKTROKARBON a.s. has developed new technologies for the production of bipolar plates for the growing PEM Fuel Cell market.

These plates can be machined on both sides to be used as bipolar plates.

The material used in production allows very high fuel cell performance.

Continuous compound production permits homogeneity and high material quality.

These bipolar plates allow fuel cells to operate at high temperatures and have excellent electrical and thermal conductivity.

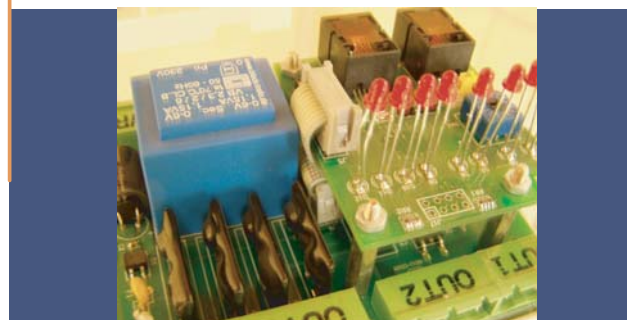
Sectors of application:

Automobiles, buses, trucks, locomotives, and motor cycles, home power supply, commercial power stations, laptop computers, cellular telephones

Expertise

Expertise

- thermogravimetric analysis
- IR spectroscopy
- metallography
- spectrally analysis
- porosity analysis
- measuring of electrical resistivity, hardness, strength properties
- test benches for determination of carbon wear for wide application range layers.



Key words

Key words

Fuel cell electrochemistry
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Low temperature fuel cells

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Hydrogen safety
Hydrogen storage

Organization description

ELTECO, a.s. devotes to its own research and development activities with the subsequent production, installation and service of equipment. The wide range of production and assortment of manufactured products enables the company to supply and install complete power and turnkey reserve systems, with the possibility of complex control and monitoring parameters by all common communication technologies.

Other complex deliveries, which are subject of our activity, are systems of combined production of electrical energy and heat in combustion engines on natural gas or biogas (cogeneration units systems). Important service for our customers is software program support of power and energetic systems (possibility of their monitoring and control), which enables to increase reliability of systems by fast localization of non-standard statuses.

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R&D activities

- Systems of electric energy power supply and back-up
- Systems of energy production – Cogeneration units also on the base of renewable resources
- Development task for SPP
- Application of fuel elements in energetics
- Development of DC/AC convertors
- Development of systems of the electric energy conversion
- Literary and patent search concerning the development of hydrogen and fuel elements.
- Development of control unit for motor generators and cogeneration units.
- Control of power circuits on the basis of circuit boards.

Expertise

General instrumentation for displaying and measuring of electrotechnical parameters (oscilloscope, LeCroy), CAD system for the design and simulation of electric circuit OrCAD, CAD system for the design of mechanical parts Pro Engineer



Projects, Patents & Publications

Development task for SPP concerning the area of development of fuel elements and hydrogen energy.

Key words



Organization description

Organization description

Energy and Environmental Policy Division of Mineral and Energy Economy Research Institute works in the area of energy economics, mainly systems analysis and modeling of fuels and energy systems. Most experiences are on modeling coal industry in Poland. Other relevant research comprises: instruments for environment and energy policy, technologies development, external costs of energy and liberalization of energy markets.

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R&D activities

R&D activities

The main work of the Energy and Environmental Policy Division is concerned with modeling economic, environmental and technological relations in fuels and energy industries. The scope of our activities includes various topics of energy economics:

- Policy instruments,
- Fuels and energy markets: forms, performance,
- Fuel costs and the formation of price structures,
- External costs of energy,
- Economic instruments for environmental protection,
- Product taxes and deposits for environmental protection,
- Power sector emissions, including greenhouse gases

The team is especially experienced in modeling, and typical models, which we have developed, simulate coal-market equilibriums, analyze the efficiency of economic environmental instruments or optimize coal supplies to power stations. We have also started activities in modeling the electricity markets in Poland. The GAMS modeling system has been our main tool for more than ten years.

Expertise

Expertise

The major research tools are data bases (ORACLE) and computer patterns (GAMS system).

Projects, Patents & Publications

Projects, Patents & Publications

The team is a leader in projects of coal industry modeling in Poland, projects for World Bank and consultant on coal mining restructuring and privatization, contractor and work package leader in Cleaner Fossil Fuels OPET FP5 project, contractor in ExternE-POL FP5 project, contractor in WETO H2 (World Energy Technology Outlook) and NEEDS (external costs of energy) FP6 projects. The Division has well established contacts with different types of Polish institutions from academic, governmental and business sectors.

Key words

Key words

Fuel cell electrochemistry	Hydrogen distribution
Fuel cell integration	Hydrogen fuelling infrastructure
Fuel cell system components	Hydrogen production
Fuel processors	Hydrogen safety
High temperature fuel cells	Hydrogen storage
Low temperature fuel cells	



Organization description

Organization description

The Faculty of Electrical Engineering, the Czech Technical University in Prague educates new experts in the fields of electrical engineering, telecommunications, automation, informatics and computer science. It provides conditions for scientific work and functions as a centre for scientific and educational activities in all above mentioned areas.

The fuel cell laboratory (established on April 14th 2005) is located at The Department of Electrical Power Engineering of The Faculty of Electrical Engineering (FEE). The aim is to verify its utilization possibilities in electrical power engineering. The laboratory is used for educational and scientific research activities. In the research program participate 3 Masters and 2 Doctoral students, 1 professor, 2 assistant professors and 1 associate professor.

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R&D activities

R&D activities

The department is focused on the topics concerning the theoretical and application problems of the production, transmission, distribution and utilization of electric energy in areas such as:

- development, control and optimization in power engineering systems and distributed generation of electric energy in distribution systems
- electrical power systems in industrial plants, faulted and protective systems
- laboratory testing of protective devices and systems, voltage quality, power-disturbance elimination
- mathematical and computer modelling of coupled problems in the area of heavy current electrical engineering and electrical power engineering

- selected energy-demanding technologies (induction heating and associated physical processes in solid and liquid metals)
- high-voltage engineering including a high-voltage laboratory hall, totally shielded and equipped with sources of DC (up to 200kV), AC (up to 500 kV) and PC (up to 1,5 MV)

Expertise

Expertise

In the laboratory is installed the fuel cell ReliOn 2 kW. The hydrogen fuel cell workplace is equipped with a PC control unit which enables to monitor the whole energy conversion process and to control its performance. The laboratory main aim is to research the fuel cell operational characteristics while connecting to the electric system and while loaded with an intelligent load controlled by software Matlab.

Projects, Patents & Publications

Projects, Patents & Publications

Projects: • Pilot project of fuel cell application in the Czech Republic (supported by Czech Energy Agency) - 11/2004 – 3/2005 • Co-ordination Action to Establish a Hydrogen and Fuel Cell ERA-Net (consortia agreement no.. ERAC-CT-2004-011744) • Enlarging fuel cells and hydrogen research co-operation (510435 ENFUGEN).

Publications: • Andrlik, Z. - Fialka, M. - Litricin, D. - Sykora, T. - Tuma, J.: Using Fuel Cells in Power Systems. In *The 8th Regional Energy Forum - FOREN 2006*; „Towards a Regional Partnership in Energy for Sustainable Development” [CD-ROM]. Bucurest: WEC - Romanian National Committee, 2006, p. 1-5. • Litricin, D.: Fuel Cells in Power System and their Impact on Environment. In *Proceedings of the 7th International Scientific Conference Electric Power Engineering 2006*. Brno: Brno University of Technology, 2006, p. 1-7.

• Litricin, D. - Tuma, J.: Using Solar Energy in Hydrogen Economy. In *ELEN 2006 (Elektroenergetika)* [CD-ROM]. Prague: CTU, 2006, p. 1-8.

Key words

Key words

Fuel cell electrochemistry	Hydrogen distribution
Fuel cell integration	Hydrogen fuelling infrastructure
Fuel cell system components	Hydrogen production
Fuel processors	Hydrogen safety
High temperature fuel cells	Hydrogen storage
Low temperature fuel cells	



www.enfugen.net

Organization description

Organization description

Faculty of Electrical Engineering and Information Technology (FEI) was established in 1942. It is part of Slovak University of Technology in Bratislava, Slovakia. FEI is the technical faculty aimed at electrical engineering, information and communication technologies. Faculty is participating in alternative energy research, fuel cells and renewable energy. Main interest is currently in integration of biogas station and stationary fuel cell. Department of power engineering is working on fuel cells development and utilization. Department also coordinates research work, appoints diploma thesis to graduate students and works on outreach to public. There is also research on hydrogen storage in carbon nano-tubes at the department of microelectronics.

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R&D activities

R&D activities

Some of the projects at FEI address renewable sources of energy. Technology of fuel cells was represented in any of supported projects. The target is to implement these projects in order to lower the energy demand coming from manufacturing and technological processes and to increase utilization of regional energy sources. The faculty co-operates with other Slovak universities and also abroad, with public institutions and private companies that have competence or interests in development and spreading of fuel cells and hydrogen technologies (e.g. VUPEX, a. s., VÚJE, Trnava).

Expertise

Expertise

Faculty of Electrical Engineering and Information Technology has utilizable capacity in laboratories of power engineering, electrical machines, automation and other. Cooperation is established with field experimental station of Slovak Agricultural University in Nitra, as well as with private companies developing technologies for renewable energy and hydrogen technologies.

Projects, Patents & Publications

Projects, Patents & Publications

The solution of energy supply system through available renewable energy sources as combination of biogas station and fuel cell for selected agricultural farm.

The national strategy for implementation of alternative sources of energy in Slovak Republic by the means of technology foresight.

Key words

Key words

Fuel cell electrochemistry
Fuel cell integration
Fuel cell system components
Fuel processors
High temperature fuel cells
Low temperature fuel cells
Hydrogen distribution
Hydrogen fuelling infrastructure
Hydrogen production
Hydrogen safety
Hydrogen storage



Organization description

Organization description

The Department of Furnaces and Thermal Technology was established in 1954 as part of the Faculty of Metallurgy of the Technical University of Kosice, Slovakia. The Department offers two programs of study for:

- undergraduate students, in the field of Thermal Power Engineering and the Gas Distribution and Utilization;
- post graduate students, in the field of Thermal Power Engineering

The department consists of: two full professors, one associated professor, five senior lecturers (holding the PhD degree), six PhD students, fifty undergraduate students, two technicians.

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R&D activities

R&D activities

Fossil fuel combustion, primary deNO_x methods (reburning, OFA, FGR), energogas (wood-gas) in primary denitrification, hot gas cleaning after biomass gasification, biomass gasification in the updraft gasification reactor and FBC reactor, biomass in co-generation.

Important Achievements:

- in the Center of Excellence (Optimization, Simulation and Environment Impact of Energy Systems and Processes) with the Institute of Thermal Techniques in PS Gliwice, Poland.
- in the applied research, the Departments team solved optimization of combustion and heat transfer for US Steel Kosice, predominantly.

Projects, Patents & Publications

Projects, Patents & Publications

1. Holoubek, D. et al.: Hot Filter for Gas Cleaning, Final Report for 2003 – 2005.
2. Holoubek D.: Combustion Equipment and Heat Exchangers. ISBN 80-7099-832-6, 2002,
3. Varga, A. et al.: An experimental and numerical study of the influence of FGR on NO_x formation. In: Materiali in tehnologije. vol. 38, no. 5 (2004), p. 269-274. ISSN 1580-2949.

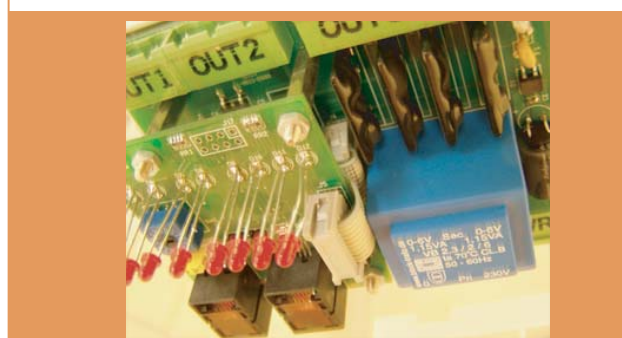
International projects:

- EUREKA EI2991 ENVIRONMENT HOGLIF Hot filter on gas cleaning which is generated gasifying of solid alternative fuel from highmolecular pyrolysis products, combination of sulphur, chlorine and fluorine, 2003 – 2005,
- JOULE II – INFLECT (JOU2 – CT92 – 107) Improvement of energy efficiency in glass- melting furnaces, cement kiln and baking ovens, 1993 – 1996.

Expertise

Expertise

Gasifiers (up-draft, CFB), hot-filter, models for reburning, re-circulation, measuring and control equipment



Key words

Key words

Fuel cell electrochemistry
Fuel cell integration
Fuel cell system components
Fuel processors
High temperature fuel cells
Low temperature fuel cells

Hydrogen distribution
Hydrogen fuelling infrastructure
Hydrogen production
Hydrogen safety
Hydrogen storage

Organization description

Organization description

FC Electric is a newly founded high-tech company that aims at developing fuel cell systems. Our ultimate goal is to cover the research stage as well as the production/marketing stage.

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R&D activities

R&D activities

Our current interest is to develop:

- Sub-50W, transportable direct methanol fuel cell systems for remote applications (military, tourism, etc.) based on state-of-the-art technology
- Sub-10W direct methanol fuel cell systems for portable electronics (PDAs, entertainment consoles, navigational systems, etc.) based on state-of-the-art technology
- Improved direct methanol fuel cell technology

Our personnel has:

- Hands-on experience in development of direct methanol fuel cells and stacks (from renowned Los Alamos National Laboratory, NM, USA)
- To-the-core understanding of current fuel cell challenges and opportunities (please reference *The Fuel Cell Review*, 1[2], 17 and 25, 2004)



Projects, Patents & Publications

Projects, Patents & Publications

FC Electric is looking forward to participating in European and national projects

Key words

Key words

Fuel cell electrochemistry
Fuel cell integration
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Low temperature fuel cells
Hydrogen distribution
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Hydrogen safety
Hydrogen storage

Organization description

Organization description

PBG is a state owned SME, founded in 1950. It has offered services on geophysical investigations to petroleum and structural geology, mineral and rocky raw material exploration, engineering geology, hydrogeology and environment protection in Poland and abroad (in 15 countries). PBG's over 50-year activities contributed to geological recognition of Poland and findings of metal ores, oil and gas, rocky and chemical raw material deposits as well groundwater resources (completed as reports, studies and databases). It has headquarters in Warsaw, two regional divisions (Kraków and Wrocław) and one division abroad. Its staff is of 90 specialists, including 7 of PhD degree or above. The company's research partners on recently completed or ongoing projects are: PGI, AGH, MEERI PAS, UW (PL), GII SAS (SK), BGR (DE), GEUS (DK), Univ. Of Berkeley (US), Russian and Ukrainian research institutes. PBG is involved in EC Framework Programmes since 2000.

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R&D activities

R&D activities

Our area of interest in the renewable energy technologies includes, in principle, geothermal energy issues, as improved exploration and assessment methods for geothermal resources. We have implemented the use of a detailed, digital magnetotelluric method for exploration and assessment of geothermal resources for two sites in Western Sudeten area (first in Poland).

PBG is also interested in application of modern geophysical methods for CO₂ sequestration issues. This area of interest refers to geophysical monitoring of underground CO₂ storages.

The last topic is on possibilities of the use of geothermal and local hydrocarbon resources.



Projects, Patents & Publications

Projects, Patents & Publications

PBG's research activities on geo-energy include elaborating a concept and proposal for FP5 – CARTA (mapping possibilities on the use of geothermal and gas resources in Carpathians) and for FP6 – THERMA (the use of abandoned hydrocarbon wells for geothermal purposes in Polish and Slovakian Carpathians). It took part in a national project on thermal characteristics of salt domes for low enthalpy geothermal purposes led by MEERI PAS. Now it takes part in ENERG network activities and, through the network, in CASTOR project.

Key words

Key words

Fuel cell electrochemistry
Fuel cell integration
Fuel cell system components
Fuel processors
High temperature fuel cells
Low temperature fuel cells

Hydrogen distribution
Hydrogen fuelling infrastructure
Hydrogen production
Hydrogen safety
Hydrogen storage

Organization description

Organization description

H2Energy is a small private company, developing PEM fuel cells, energy and environmental projects and Solar units. H2Energy was established in the year 2000.

Our laboratory is located at the Faculty of Chemical and Food Technology of the Slovak Technical University in Bratislava, Slovak Republic, established in 1940. Personnels involved in the staff are research scientists - graduates of this Faculty.

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R&D activities

R&D activities

Nanotechnologies, Fuel Cells, Hydrogen Storage, Solar Energy

The main areas are:

- Production of Carbon Adsorbent for chemical and oil spill cleaning, filtration of gases, liquids, toxic and radioactive waste
- Development of Carbon Nanomaterials, Thermo-solar units
- Development/Production of Hydrogen Fuel Cells, Solar panels
- Development of Energy Independent Solar House

Expertise

Expertise

The laboratory is equipped with standard lab facilities, upgraded recently with a nanometer range SEM microscope and IR, GC, AAS, TOC analyzers.



Projects, Patents & Publications

Projects, Patents & Publications

International Patent for SORBEUM®, Carbon Adsorbent for chemicals and oil spills

Key words

Key words

Fuel cell electrochemistry Hydrogen distribution
Fuel cell integration Hydrogen fuelling infrastructure
Fuel cell system components Hydrogen production
Fuel processors Hydrogen safety
High temperature fuel cells Hydrogen storage
Low temperature fuel cells



Organization description

Organization description

The Industrial Chemistry Research Institute (ICRI) exists since May 1922 when, at Professor Ignacy Mościcki initiative, the first research unit called the Chemical Research Institute was founded in Lvov. The Institute was associated with Poland's chemical industry. A few years later, in 1926, the Institute was moved to Warsaw and in 1951 was transformed into the Institute for General Chemistry. In 1971, a merger of the Institute for General Chemistry with the Institute for Plastics paved the way to the ICRI. The staff of the Institute consists of 322 employees, including 173 college graduates (41 with Doctoral degree), 9 full professors and 4 associated professors.

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R&D activities

R&D activities

Fuel cell group of the ELECTROCHEMISTRY DEPARTMENT focuses on the construction and characterization of polymer electrolyte fuel cells (PEFCs), fueled directly by gaseous hydrogen or light organic molecules.

The group also builds and tests energy-efficient fuel cell-type electrochemical reactors, which can generate useful chemical compounds and electrical energy simultaneously and works on search for efficient electrocatalysts for low-temperature fuel cells.

Projects, Patents & Publications

Projects, Patents & Publications

Patents granted:

- Czerwiński, M. Żelazowska: "A lead battery", Polish pat. no 180939, 2001.
- Czerwiński, M. Grdeń: "A hydrogen-storing material", Polish pat. no 184549, 2002.
- Czerwiński, M. Dmochowska, M. Grdeń, G. Wójcik, G. Młynarek, M. Kopczyk, J.M. Skowroński: "A nickel electrode for electrochemical cells", Polish pat. no 185542, 2003.

Expertise

Expertise

Construction of high-performance DMFC (direct methanol fuel cell) and H₂-PEFC (hydrogen-fueled polymer electrolyte fuel cell) fuel cells. Construction of fuel cell-type reactors for making hydrogen peroxide and hydroxylamine sulfate. Mathematical modeling of electrochemical reactors. Building and programming custom electrochemical test stations. Successful demonstration of a 3 - 7% wt. alkaline hydrogen peroxide production in a fuel cell-type generator from gaseous hydrogen and oxygen with >90% current efficiency. Construction of a computerized test station for fuel cells and electrochemical reactors up to 600W (120A DC).

Key words

Key words

Fuel cell electrochemistry	Hydrogen distribution
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Organization description

Organization description

The group exposes its experience in the research and scientific works for the military use as well as for the enterprise dealing with the modernization of vehicles and means of transport and exploitation and repair systems. The research is concerned with tracked and wheeled motor vehicles, fuels and lubricants, combustion engines, logistic.

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R&D activities

R&D activities

Researches of internal combustion engines on dynamometer stands with measures of fuel consumption, combustion parameters and emission of toxic factors in exhaust gases. Electronic diesel control. Energetic, economical and toxic aspects of use substitute fuels for diesel engines. Fuel cells in vehicle propulsion systems.

Expertise

Expertise

Laboratory of Motor Vehicles (directors: dr Piotr Rybak and dr Witold Luty). Within the laboratory there are three thematic sections:

- Climatic and Internal Combustion Engines Research Station
- Exploitation Liquids Research Station
- Motor Vehicles Research Station

The research scope of those stations refers to: resistance to mechanical and climatic exposure, physic-chemical properties, exploitation, and mechanics.

Projects, Patents & Publications

Projects, Patents & Publications

Single fuel concept elaboration and initiation for use in aviation turbine engines and diesel engines – F-34 fuel station and operational testing during extend military engineering operation, Military University of Technology, Warsaw 2002.
Cooling system with higher temperature of liquid for piston combustion engine, research program supported by RTO NATO
Choice of the substitute fuels for military vehicle engines, project financed by The State Committee for Scientific Research of Poland in 2000.

Key words

Key words

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Organization description

Organization description

Academia Metallurgia was founded in 1762 as a part of Charles University in Prague and is probably the oldest centre of the University education dealing with the technology of metals. The Department of Chemical Metallurgy and Metallography was founded in 1923 as a part of that newly established faculty, which was transformed into the independent Institute of Chemical Technology (ICT) in 1952. The present Department of Metals and Corrosion Engineering is a part of the Faculty of Chemical Technology (FCT), one of the four faculties of ICT. The heads of Department until now have been Professor Quadrat, Professor Koritta, Associate Professor Franz, Professor Kubířek and Professor Novák.

Study is divided into three specializations:

- Metallic materials - involves the study of corrosion engineering and corrosion protection, theory of materials, technology of production and processing of metals and alloys, recycling of metal-bearing wastes
- Restoration and Conservation of Metal Monuments - involves the study of restoration of memorable metal objects
- Special Inorganic Materials (the courses are held by the Department of Inorganic Chemistry) - involves methods of studying inorganic material properties.

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R&D activities

R&D activities

The research on reversible hydrogen-storage magnesium alloys is carried out as a part of the MSM 6046137302 research project (Preparation and research of functional materials and material technologies using micro- and nanoscopic methods).

Projects, Patents & Publications

Projects, Patents & Publications

D. Vojtěch, P. Novák et.al.: Properties of Mg-based materials for hydrogen storage, Journal of Solid State Chemistry, under review.

P. Novák, D. Vojtěch, V. Knotek, J. Čížkovský, F. Průša, J. Šerák: Optimalizace podmínek uchovávání vodíku ve slitinách Mg-Ni, HT-FCA 2006 workshop, 3.-4.10. 2006, Ostrava, Czech Republic, In Czech.

Expertise

Expertise

Laboratories enable to carry out the metallographic preparation of samples, microscopic observation, chemical microanalysis, mechanical testing of materials and electrochemistry (corrosion engineering research group). The equipment of the laboratories concern vacuum induction furnace, light microscope with image analysis software, scanning electron microscope with EDS detector, hardness testers and universal tensile testing machine.

Key words

Key words

Fuel cell electrochemistry	Hydrogen distribution
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Low temperature fuel cells	



Organization description

Organization description

The research group deals with materials science and engineering, nanomaterials technology, applied mechanics. It also conducts the development and manufacturing of hydrogen storage materials for PEM fuel cells.

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R&D activities

R&D activities

The research efforts are currently organized around three areas: modeling, processing and characterization of structure and properties of nanostructured magnesium-related hydrogen storage materials. Modeling is the growing area of interest, and the recent developments here are modeling of catalytic effect of different transition metals and, more recently, modeling of functionally graded powders. The applied processing techniques are mechanical alloying and mechanical (ball) milling under controlled shearing/impact mode.

The total number of papers published by the members of staff working in this area in the years 2000-2004 was over 30, published in worldwide-recognized scientific journals.

The State Committee for Scientific Research of Poland finances the research projects.

Projects, Patents & Publications

Projects, Patents & Publications

National research projects in the area of hydrogen storage materials currently run in the Institute:

- "Hydrogen storage nanomaterials for fuel cells – alternative source of electrical energy in the military applications", duration from 2001 till 2004;
- "Nanomaterials for hydrogen storage", duration from 2003 till 2004;
- "Modification of structure and properties of hydrogen storage nanomaterials for fuel cells", duration from 2004 till 2006.

The State Committee for Scientific Research of Poland finances all the research projects.

National research projects in the area of iron aluminides currently run in the Institute:

- "Structural intermetallics – processing, structure, properties and applications", duration from 2001 till 2004;
- "Effect of sintering parameters on the structure and properties of FeAl sinters", duration from 2004 till 2005;

The institute plays a function of co-ordinator of the large national research program "Structural inter-metallics" comprising 13 tasks carried out by 8 research centers in Poland.

The forms of co-operation expected is the research collaboration with partner from engineering/research company specializing in development and manufacturing of hydrogen storage materials for PEM fuel cells.

Expertise

Expertise

Structure of nanomaterials is investigated with many experimental techniques, including X-ray diffractometry, scanning and transmission electron microscopy, X-ray microanalysis and thermal analysis. The hydrogen sorption properties are evaluated by the volumetric method using an automated Sievert's apparatus.

Key words

Key words

Fuel cell electrochemistry	Hydrogen distribution
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www.enfugen.net

Organization description

Organization description

The polymer research at the Bulgarian Academy of Sciences (BAS) has started in 1960 - Department of Chemistry of High Molecular Compounds, Institute of Organic Chemistry. In 1973 it was transformed to Central Laboratory of Polymers, in 1990 it became Institute of Polymers. The staff of the Institute consists of 69 employees, including 16 professors and associated professors, 17 research associates with a PhD degrees, 14 PhD students working in chemistry or physics of polymers, 4 undergraduate students and 20 technical staff.

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Project leader
Membrane Development: Dr. Vesselin Sinigersky
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R&D activities

R&D activities

Since 2000 the group of Dr. Sinigersky is active in the development of new polymer materials applicable as membranes in polymer electrolyte membrane fuel cells (PEMFCs). Process- ability, chemical and thermal stability and proton conductivity of these materials are studied. The research in this field is carried out in close collaboration with the Max-Planck Institute for Polymer Research in Mainz, Germany and BASF Fuel Cells GmbH (former PEMEAS GmbH).

Expertise

Expertise

The Membrane Development group is specialized in the synthesis of new ionomers (cross-linked polyvinylphosphonic acid (CrPVPhA), water insoluble copolymers of vinylphosphonic acid) and preparation of polybenzimidazole (PBI) based materials for membranes in PEMFCs: modified PBIs, containing phosphonic acid groups, PBIs with grafted polyvinylphosphonic acid chains, PBI/ CrPVPhA blends, PBI/ CrPVPhA semi- interpenetrating networks. Improving the mechanical properties of phosphoric acid doped PBI membranes – cross-linking of PBI.

Projects, Patents & Publications

Projects, Patents & Publications

Projects, funded under the 6th framework programme of the European Community:

1. Automotive High Temperature Fuel Cell Membranes (AUTOBRANE)
2. The Next Generation of Stationary microCHP Fuel Cells (NextGenCell)
3. Coordinated Action of Research on Intermediate and high temperature Specialized Membrane electrode Assemblies (CARISMA)

Patents:

1. Functionalized polyazoles, method for the production thereof, and use thereof. WO200405373, 2004.
2. Funktionalisierte polyazole, Phosphons-äuregruppen aufweisende polzayole, Polymembranen sowie Verfahren zur Herstellung. DE 10 2005 057644, 2006.

Key words

Key words

Fuel cell electrochemistry
Fuel cell integration
Fuel cell system components
Fuel processors
High temperature fuel cells
Low temperature fuel cells
Hydrogen distribution
Hydrogen fuelling infrastructure
Hydrogen production
Hydrogen safety
Hydrogen storage

Organization description

Organization description

Our main activities are:

research and optimization of boiler combustion process of solid fuels, especially in the area of:

- o Measurement and diagnostic works
- o Mathematical modeling (FLUENT license)
- o Laboratory research (several laboratory facilities in the area of solid fuel combustion)

research in the field of new sources of energy:

- o biomass gasification – new laboratory gasificator in the stage of manufacturing, planar solid oxide fuel cells (SOFC)
- o laboratory test set-up in the development, hydrogen energy etc).

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R&D activities

R&D activities

New technologies of pulverized solid fuel combustion (biomass co-firing and ultra low NO_x burners and combustion systems to meet future restriction of NO_x emission).

Research in the area of renewable sources of energy, especially biomass gasification and combustion, planar solid oxide fuel cells and stacks for stationary applications, energy from hydrogen.

Projects, Patents & Publications

Projects, Patents & Publications

We closely cooperate with foreign research establishment, which are engaged in solving the same or similar issues. There are many European research projects, i.e. **BioFlam** (combustion behaviour of clean fuels in power generation), **PowerFlam2** (wide studies of fuel blend properties in boilers), **BIOPRO** (new burner technologies for low grade biofuels), **BIOASH** (ash and aerosol related problems in biomass combustion and co-firing), **BIOFUCEL** (development of planar solid oxide fuel cells technology based on biomass gasification and natural gas), **ENFUGEN** (enlarging fuel cells and hydrogen research co-operation), FETEU (future energy technologies for enlarged European Union) and foundation of Center of Excellence - **CENERG**, which is concerned with the integration of scientific research for energy sector (fossil and renewable sources) in the Central and Eastern Europe.



Key words

Key words

Fuel cell electrochemistry	Hydrogen distribution
Fuel cell integration	Hydrogen fuelling infrastructure
Fuel cell system components	Hydrogen production
Fuel processors	Hydrogen safety
High temperature fuel cells	Hydrogen storage
Low temperature fuel cells	

Organization description

Organization description

The institute is pursuing basic, target-oriented, and applied research in chemistry and physics of polymers. The research comprises biomacromolecular systems, dynamics and self-assembling of molecular and supramolecular polymer structures, preparation, characterization and use of new polymeric systems with controlled structure and properties.

An important part of the Institute activity is the Ph.D. program in polymer science carried out in cooperation with universities, postdoctoral program as well as teaching and practical laboratory training of undergraduate students.

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R&D activities

R&D activities

Proton exchange membranes for fuel cells are prepared and characterized.

Homogeneous, heterogeneous and composite membranes are investigated.

Important are ion exchange capacity, three dimensional swelling, electrical conductivity, concentration potential.

Performance of completed fuel cells is measured as polarization curve.

Expertise

Expertise

Laboratories are equipped with reactors and all necessary devices for polymer synthesis and membrane preparation. Membranes can be characterized using electrochemical apparatus, sorption balance, permeation cells.



Projects, Patents & Publications

Projects, Patents & Publications

- J. Schauer, L. Brožová, Heterogeneous ion-exchange membranes based on sulfonated poly(1,4-phenylene sulfide) and linear polyethylene: preparation, oxidative stability, methanol permeability and electrochemical properties, J. Membr. Sci. 250 (2005) 151-157.
 - J. Schauer, V. Kůdela, K. Richau, R. Mohr, Heterogeneous ion-exchange membranes based on sulfonated poly(1,4 phenylene sulfide), Desalination, 198 (2006) 256-264.
 - K. Bouzek, S. Moravcová, Z. Samec a J. Schauer: H⁺ and Na⁺ Ion Transport Properties of Sulphonated Poly(2,6-dimethyl-1,4-phenylenoxide) Membranes, J. Electrochem. Soc. 150 (2003) E329-E336.
 - Belafi-Bako.K., Búcsú D., Pientka Z., Bálint B., Herbel Z., Kovacs, K.L., Wessling, M.
- Integration of biohydrogen fermentation and gas separation processes to recover and enrich hydrogen, International Journal of Hydrogen Energy 31 (2006) 1490 – 1495

Key words

Key words

Fuel cell electrochemistry
Fuel cell integration
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Fuel processors
High temperature fuel cells
Low temperature fuel cells

Hydrogen distribution
Hydrogen fuelling infrastructure
Hydrogen production
Hydrogen safety
Hydrogen storage



Organization description

Organization description

The Josef Božek Research Centre based at the Czech Technical University in Prague has acquired high international reputation as the country's leading research body focused on automotive technology. The Centre links research workers and postgraduate students of the following institutions: Faculty of Mechanical Engineering & Faculty of Electrical Engineering, Czech Technical University in Prague, Faculty of Mechanical Engineering, Technical University in Liberec, Faculty of Mechanical Engineering, Technical University in Brno, Faculty of Mechanical Engineering, Mining School - Technical University in Ostrava, Ricardo Prague, TÜV – UVMV.

A staff of 25 research is presently involved in hydrogen engines and electric drive activities, 3 professors, 5 Assoc. prof., 5 Ph.D., 10 Ph.D. students.

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R&D activities

R&D activities

The centre provides research and development of spark ignition engines and diesel engines. The engine research is focussed on thermodynamics, internal flow aerodynamics, turbocharging and supercharging of engines, emission reduction and after treatment, engine management by intelligent controllers, engine dynamics and structural strength of components applied to the design optimisation.

It supplies R&D for vehicle transmission design and powertrain optimisation, vehicle suspension design, body aerodynamics and passive safety issues.

Projects, Patents & Publications

Projects, Patents & Publications

Projects: The Centre is involved as a partner in several European integrated projects of EU FP 6 (NICE, GREEN and Roads2HYCOM) under co-ordinators from west-European countries. It is a member of European Automotive Research Partners Association (EARPA). Official partner of GAMMA Technologies Inc., USA (GT x – GT Power. GT Drive, software products)

Publications: • VÍTEK, O., MACEK, J., POLÁŠEK, M.: New Approach to Turbocharger Optimization using 1-D Simulation Tools. SAE Paper 2006-01-0438, SAE Int. Warrendale 2006, 15 pp.

• MACEK, J., POLÁŠEK, M., ŠIKA, Z., VALÁŠEK, M., FLORIÁN, M., VÍTEK, O.: Transient Engine Model as a Tool for Predictive Control. SAE Paper 2006-01-0659, SAE Int. Warrendale 2006, 20 pp.

• POHOŘELSKÝ, L. - MACEK, J. - POLÁŠEK, M. - VÍTEK, O.: Simulation of a COMPREX Pressure Exchanger in a 1-D Code. In Modelling of Spark Ignition Engines. Warrendale, PA 15096: SAE International, 2004, vol. 1, s. 6-18. ISBN 0-7680-1366-6.

Hydrogen activities concern H₂ engines (combustion, ignition, turbocharging), electric&hybrid powertrain, super/turbocharging equipment suitable for PEM FCs, vehicle integrated control systems.

Expertise

Expertise

5 engine testbeds from 20 to 300 kW, hydrogen and gas equipment, exhaust emission and special thermodynamic/aerodynamic measurements (PIV, transparent engine), chassis dyno up to 100 kW and 150 km/h at FME CVUT; electric laboratory for hybrid powertrains (electric model of 5 kW powertrain, ultracapacitor, frequency converters), linear engine/motor/alternator prototype etc. at FEE CVUT.

Key words

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Organization description

Organization description

The scope of work performed by the eight research departments covers: monitoring and prevention of hazards, monitoring of coastal erosion areas (coast protection issues), marine technologies, marine biology, transport management and maritime law. It includes studies for design of marine wind farms; marine telecommunication and power transmission cables; gas and oil pipelines; harbors and coastal protection structures; exploration and inspection of mining aggregate resources in the Polish Exclusive Economic Zone of the Baltic Sea strategy of sea shore protection; maintenance of autonomous buoy system, monitoring marine state for the navigation safety and rescue activities support, monitoring of wrecks sites in view of their environmental impact, etc.

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R&D activities

R&D activities

We are interested in the problems of wind power engineering in marine conditions – investigations of offshore subsurface ground infrastructure, hydro-meteorological conditions, environmental impact, problems of marine wind farms connection to power network, wind farms maintenance, production and storage of hydrogen.

The Maritime Institute in Gdańsk has performed feasibility studies for the planned wind farms in the Polish EEZ of the Baltic Sea, studies of impact on environment. Also, has investigated geological, geophysical and hydro-meteorological conditions at sites of planned wind farms.

Projects, Patents & Publications

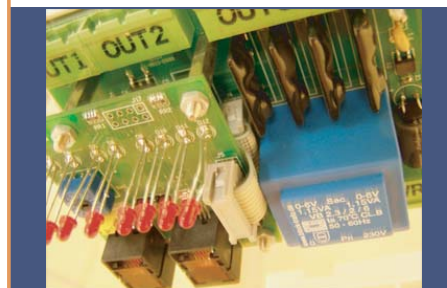
Projects, Patents & Publications

- Geological and geophysical investigations in the area of Jastrzębia Góra and Dębki for the needs of the planned wind farm (2002)
- Identification of objects at the seabed in the area of the planned wind farm in the Dębki area (2002)
- Hydro-meteorological conditions for the needs of construction and exploitation of wind farms along the Polish Baltic coast (2003)
- Examination of the shallow waters and coast zones at Greifswalder Bodden (2004) – at request of BEC Energie Consult, Berlin, Germany
- Assessment of wind forecast at sea from the numerical models of atmosphere (2004)

Expertise

Expertise

Well equipped laboratory of bio-scanning and high quality computer service and programs. Moreover the use of measures form research and measure ship" Doktor Lubecki ".



Key words

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Organization description

Organization description

National Institute for R&D in Electrical Engineering (INCDIE ICPE-CA) was founded in 2001 and became a public institute in 2004. INCDIE ICPE-CA is derived from a big research institute specialized in electrical engineering and active from the '50s, so, its background is an extensive experiences over 50 years. The institute has high scientific and professional reputation, both at national and international level, and the competence and the authority to address the electrical engineering community with the full support of the Romanian Research Authority.

The institute has 170 employees, 80% of them having high and medium education, from which 8 professors, 30 PhD and 28 are PhD students in different domains (physics, chemistry, electrical engineering, metallurgy, mechanics and biology).

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R&D activities

R&D activities

The main activities focused on electrical engineering technologies and materials include research in the EU priority area like: Fuel Cells & Hydrogen Storage; Carbon Materials; Conducting Materials; Soft and Hard Magnetic Materials; Ceramic Materials; Composite Materials; Radiochemistry; Non-conventional Engineering; Electrochemical Technologies; Acoustic and Vibrations Control and also various services for SMEs: technology transfer, building of strategies, technical assistance, consulting, information, documentation and personal training in the electric engineering field.

Expertise

Expertise

- DMFC & PEMFC: components manufacture; performance testing; catalysts screening by cyclic voltammetry, MOR, ORR and COR
- SOFC: functional materials development, characterization and testing
- Hydrogen Storage: nanofibrillar polymer structures; carbon aerogels and intermetallic compounds like Fe-Ti, Zr-Ni, La-Ni, Mg-Ni and their hydrides obtained by conventional melting, melt spinning, mechanical alloying and thin films deposition
- Materials characterization: X-ray Diffraction; UV-VIS Spectrometry; Atomic Absorption Spectroscopy; Coupled TG-DTA-DSC-FTIR; AFM; Thermal Conductivity; Particle Size Distribution; Dilatometry; Mechanical Testing; Porosimetry; Specific Surface Area; Sievert Apparatus

Projects, Patents & Publications

Projects, Patents & Publications

1. CEEEX 88/2005-“Low cost alternative multifunctional materials for high temperature PEMFC”
2. CEEEX 195/2006, “PV/FC hybrid system for energetic autonomy”
3. NATO EAP.RIG 981428/2005, “Development of new proton conducting membranes for HT-PEMFC”
4. CEEEX 86/2006, “Hydrogen storage nanocrystalline materials with high functional performances”
5. PN 102/2005, “Materials for hydrogen storage systems, the energy source of the future”

Key words

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Organization description

Organization description

The present National R&D Institute for Cryogenics and Isotopic Technologies (ICIT) was established in 1971 at Ramnicu Valcea as "G Plant" with the aim to solve a specific problem of the Romanian nuclear research program, the elaboration of the GS technology for heavy water production.

Over the past 30 years of changing circumstances the ICIT has continued to develop, building on its policy of scientific excellence, national involvement and international collaboration. Today ICIT is one of the national institutes from Romania that carried out its activity under the Ministry of Education and Research – The National Authority for Scientific Research.

Department National Research & Development Institute
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R&D activities

R&D activities

The research activity at ICIT Rm. Valcea is attempting to contribute to meet the current social and economic requirements by focusing its efforts on a range of R&D directions of national and international interest, namely: *isotopic separations, new solutions for energy production by employing fuel cells using hydrogen, cryogenics and vacuum physic, advanced materials*, a direction which considered the development of some products and new or refurbished technologies, such as selective adsorbents, specific catalysts and nanostructure carbon ribbons, *the environment and life quality improvement*.

Projects, Patents & Publications

Projects, Patents & Publications

National Projects: • "Producing Energy from Fuel Cells Using Renewable Sources"- The project aims at developing an integrated system of energy conversion from renewable sources, based on PEM fuel cells supplied by solar energy produced hydrogen, with a generated power of max 5kW.

• "Heat and Water Management for PEM fuel cell systems" acronym OPTIM-PEMFC

Publications: • "Flow field design optimisation of PEM Fuel Cells", authors: E. Carcadea, I. Stefanescu, H. Ene, D. B. Ingham, R. Lazar published in the proceeding of „Fluent - USER GROUP MEETING" conference, September 2006, Nottingham, Anglia. • "A computational fluid dynamics analysis of a PEM fuel cell system for power generation", authors: E. Carcadea, H. Ene, D. B. Ingham, R. Lazar, L. Ma, M. Pourkashanian, I. Stefanescu, published in International Journal of Numerical Methods for Heat & Fluid Flow, vol. 17. No. 3, 2007

Expertise

Expertise

ICIT has developed at national level the first experimental pilot plant for energy production using proton exchange membrane fuel cells, being in the same time the promoter of the Romanian Platform for Hydrogen and Fuel Cell.

Due to the interdisciplinary team, ICIT Rm. Valcea has competency both in domain of conductive and stable polymers, chemical and electrochemical synthesis and polymeric membranes, catalysts chemical synthesis, design and also computation. Additionally, ICIT Rm. Valcea has developed a good infrastructure materialized by physical-chemical investigation and characterization equipments like FTIR spectrometer, potentiostat/galvanostat, GC-MS spectrometer and polymers synthesis laboratory.

Key words

Key words

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Low temperature fuel cells

Organization description

Organization description

The working group for hydrogen technology and fuel cells was established at 2004 with the aim to develop the activities in the hydrogen technologies area. Mainly it concerns with the research of hydrogen production and usage of nuclear sources (thermo-chemical fission of water, electrolysis). Further it engages in hydrogen technologies development in the Czech Republic, problems of ecological transport and safety and legislative aspects related to hydrogen usage. The group is the founder member of the Czech hydrogen technological platform.

Staff: 2 PhD. students. Ing. Luděk Janík, Ing. Markéta Somolová, Ing. Petr Dlouhý

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R&D activities

R&D activities

Hydrogen technologies for transport and energy utilization – The project content is to collect the information from the area of the hydrogen production and chemical production inclusive the reserve capacities in the Czech Republic and their possible usage in the fuel cells.

FCZ-H2Bus I. a II. – The aim of this project is the development and operation of the fuel cell bus in the range of city transport at the region of the city Neratovice.

ZEMSHIP – Partner of the ZEMSHIP Hamburg project.

Expertise

Expertise

- Two nuclear reactors
- Cyclotron



Projects, Patents & Publications

Projects, Patents & Publications

- Study of the technical and organization measures for the support of the hydrogen technologies development in the Czech Republic conditions.
- Safety aspects of energy usage of hydrogen

Key words

Key words

Fuel cell electrochemistry
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Low temperature fuel cells
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Hydrogen fuelling infrastructure
Hydrogen production
Hydrogen safety
Hydrogen storage

Organization description

Organization description

The Oil and Gas Institute (INiG) specialized in services which are related to the following: survey for oil and natural gas, geology, geochemistry, geophysics, exploration, development and production of oil and gas reservoirs, production of gas fuels and its processing, cleaning, storage, gas transmission and distribution, measurement and information systems in gas industry, control and automation of technological processes, gas-fuel utilization problems, construction and use of gas appliances, quality assessment of gas-fuels, evaluation of gas industry installations, protection of environment, renewable energy technologies.

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R&D activities

R&D activities

- natural gas fuel cells
- biogases from dumping grounds and purification plants
- solar energy
- heat pumps
- biomass

Projects, Patents & Publications

Projects, Patents & Publications

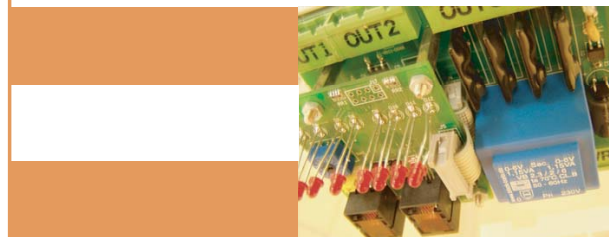
- Contribution to European Union 5th and 6th Framework Program
- Cooperation with DBI Institute (Germany) within renewable energy technologies project for German consortium
- Coordination of R&D consortium – The Advanced Technologies Centre – assembling AGH – University of Science and Technology, Cracow University of Technology, Institute of Energy and Polish Oil and Gas Company.

The Oil and Gas Institute has been the European Centre of Excellence „Hydrocarbon Resource and Fuel Research and Competence Centre” (HERCULES) since 2002.

Expertise

Expertise

Highly qualified staff, adoption of self-improving system of education and modern, well-equipped laboratories that guarantee the high level of services and reliability of results.



Key words

Key words

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Organization description

Organization description

Slovak University of Agriculture in Nitra was established in 1946 as an agricultural type of institution but during its almost 60-year-long existence it has broaden its education and research activities also towards economics, technology, landscape creation, environmental issues and other areas. Currently the university consists of six faculties and one of them is Faculty of Agricultural Engineering (established in 1969).

In 1996 at the Faculty of Agricultural Engineering there was formed a small research group dealing with renewable energy sources consisting of 2 associated professors, 2 senior lecturers and 2 technicians. Consequently also students (both the undergraduate and post-graduate ones) started to be involved into the research work of this group.

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R&D activities

R&D activities

Main research activities of the research group are related to the use of agricultural animal and vegetable biomass for power purposes through its conversion in biogas. Further activities are focused on monitoring influence of input substrate composition on produced biogas quantity and quality, biogas utilization in electric power and heat production (e.g. in biogas powered fuel cells), possible treatment and cleaning of the biogas.

Expertise

Expertise

All the mentioned research activities are carried out in real conditions of a large scaled biogas plant, which is located at the University Agricultural Farm in Kolinany near Nitra and is operated by the university for research and demonstration purposes. The facilities of the biogas plant involve one operational fermentor (100 m³) and one pilot fermentor (5 m³), a laboratory for substrate chemical analyses and a laboratory for biogas analyses and fuel cell tests, final storage with a gasholder and a combined heat and power unit with 22 kW electric power and 45 kW heat power.

Projects, Patents & Publications

Projects, Patents & Publications

Projects:

The research group took part in 4 already finished projects funded by EC (INCO-COPERNICUS programme – project REGENERATE; 5th FP programme – projects EFFECTIVE, AMONCO, POLAR) and currently is involved in 2 projects of the 6th FP programme (Micro CheaP, Bio-Hydrogen).

Publication:

Trogisch, S. – Baaske, W. E. (ed.): Biogas Powered Fuel Cells - Case Studies for their Implementation 208 p. Linz: Trauner Verlag, 2004. ISBN 3-85487-626-2

Key words

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Organization description

Organization description

Slovak University of Technology in Bratislava Faculty of Chemical and Food Technology
Institute of Chemistry, Technology and Materials DEPARTMENT OF INORGANIC TECHNOLOGY
has been established in 1942 by professor Gregor. This is one of the oldest departments of the faculty.
Full Professors: Prof. Pavel Fellner, PhD, DrSc.
Associate Professors: Jana Gabčová, Ján Híveš, Marta Chovancová, Vladimír Danielik,
Assistant Professors: Anna Žúžiová.
Research Fellows: Marta Ambrová, Vladimír Khandl, Matilda Zemanová,
PhD Students: M. Benová, Z. Gáliková, J. Jurišová, A. Sýkorová, D. Uher, P. Mrkva, P. Čopan
Technical staff: D. Dančová

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R&D activities

R&D activities

Scientific work at our group is focused on industrial inorganic chemistry and technical electrochemistry. Current scientific activities can be summarized in 4 areas of interest:

1. Chemistry of molten salts and problems connected with electrolytes for electrowinning of aluminium.
2. Corrosion and anti-corrosive protection. Modern technologies of the surface treatment including composite coatings with metal matrix and application of sol-gel method.
3. Development and application of low-waste technologies. Waste treatment.
4. Preparation of inorganic polymer fillings.

Expertise

Expertise

The group is well equipped with basic instruments:

- stabilised power sources
- potentiostats with current booster up to 10A
- frequency analyser FRA2
- pulse power sources
- multimeters 6 1/2 digits
- data logger, 20 channels
- high temperature closed furnaces
- corrosion chamber
- optical and scanning electron microscopy
- X ray diffraction

Projects, Patents & Publications

Projects, Patents & Publications

- Environmentally Friendly Oxidant Iron(VI): Synthesis and Applications in Water Quality Security (project NATO EST.CLG.979931, Híveš)
- The Use of the Pulse Technique on the Preparation of the Composite and Alloy Layers on the Metal Substrates (VEGA 1/2109/05, Chovancová)
- The Chemical and Electrochemical Reactions of Sulphur Species at Aluminium Electrolysis (VEGA 1/2108/05, Fellner)
- Concept of nuclear fuel and fuel cycle treatment (State project 02 Nuclear Fuel, part E 02.02.02, Fellner)

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www.enfugen.net

Organization description

The VŠB-Technical University of Ostrava is one of the greatest educational, scientific and research institution in the Czech Republic. It has the active approach to teaching, research and development and applications of alternative and renewable energy sources. Within the bounds of organization constitution are incorporated the laboratory of Research energy center, Fuel cell laboratory, Photovoltaic solar systems laboratory, Pilot system of thermal pump with depth thermal earth exchanger etc. It counts a staff of 27 people :3 Professors, 6 research workers, 6 PhD students, 12 and students. Main fields of education are: Energy sources with the fuel cells, Control of energy sources with fuel cells and Hydrogen safety. The University is involved in the organization of the national workshop organized every year: "Hydrogen technologies and fuel cell application".

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R&D activities

Applied research is aimed on the future usage of technological and technical potential of the Ostrava industrial region. The activities correspond with the trends of propagation of alternative energy sources and sustainable development. Among the organization aims: the creation of the research, development and realization working place in the range of FEI and FS VŠB-TUO which allows applied research and development and future enlarge of stationary and mobile applications of fuel cells working on hydrogen and hydrocarbon fuels; to bring the fuel cell problematic into the teaching on the theoretical and laboratory practical level and motivation of students and specialists, wide expert and technical public to involve in the problematic of alternative energy sources.

Projects, Patents & Publications

Projects: • Project TARP 574 „Initiation and development of fuel cell laboratory “ • Project “Hydrogenix” (supported by ČEA, Siemens, COMPLET, Linde, BC MCHZ, Remerx, a others.)

Publications: • Kopřiva, M., Koziolek, J., Goňo, R.: Projekt HydrogenIX - Okruh palivového článku. In Sborník 2. ročníku Workshopu Hydrogen Technologies, Fuel Cells and Applications, HT-FCA 2006. Ed. Bohumil Horák, Ostrava:VŠB-TU Ostrava, 2006, VŠB-TUO, FEI, kat.455 a kat.451, s. 41-46, ISBN 80-248-1179-0.

• Slanina, Z., Hájovský, R., Koziolek, J.: Control system for second generation of hydrogen powered car. In sborníku, Pardubice:Univerzita Pardubice, 2006, 255, ISBN 80-7194-860-8.

Expertise

Fuel cell laboratory will be finalized in 2007. It will be equipped with generators with fuel cells NEXA (Ballard) (5x), fuel cell FYD (1x), DC/AC converters (4x) with total output 5kW, hydrogen generator HOGAN with the demineralization unit DEMIWA. Hydrogen is stored in two stationary tanks 108Nm3 gaseous hydrogen under the pressure 200Bar. For the laboratory application hydrogen is stored in tanks with metalhydrids under the pressure 15Bar. The laboratory experimental devices: combustion motor with ignition control and inject process, electromagnetic brake and exhaust fumes analyzer Horiba, experimental chassis (2x) for Eco Marathon category prototype, experimental chssis ERAD a City El for regular intercity traffic.

Key words



www.enfugen.net

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Organization description

Organization description

The Department of Silicate Technology has the mission to disseminate knowledge in the field of Materials Science and Engineering developing fundamental understanding of the nature of inorganic matter; to create possibilities for the students and young researchers for their integration in the industry, scientific centers, laboratories and government organizations. Teaching staff of the Faculty of Metallurgy and Material Sciences at the UNIVERSITY OF CHEMICAL TECHNOLOGY AND METALLURGY consists of 3 Professors, 36 Associated Professors, including 3 of D.Sc and 31 Ph.D. Department of "Silicate Technology" was founded in 1953 and inherited the best traditions of the Bulgarian Chemical Higher Education, with academic staff consisting of about 20 full, associated and assistant professors and about 15 PhD students. Up to now, about 2000 bachelor and masters graduated from department specializing in both scientific areas: "Technology of Silicates" and "Silicate Materials".

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**Head of LABORATORY FOR
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Web sites

www.uctm.edu/departments/silicates

R&D activities

R&D activities

Laboratory for Advanced Materials Research (LAMAR) has essential experience in preparation, properties and structure investigations of special ceramic materials, advanced methods of characterization (including corrosion research), development and characterization of ceramic cells and materials for SOFC. Thermodynamic characterization of the synthesized materials and kinetics of Cr evaporation from the metallic interconnects as well as standardization procedures are tasks in the REALSOFC project.

Expertise

Expertise

- Performing of short and long- term tests of single anode supported planar SOFC under different conditions.
- Control the aging phenomenon for different fuels, humidity conditions.
- Technologies for development of coatings and samples in dependence on the end-user needs synthesis from liquid (including sol- gel route) and solid state.
- EIS measurements in function of temperature, flow
- Physical, chemical, thermodynamical analysis and phase diagram interpretation for optimization of composition and the technological parameters of synthesis procedures

Projects, Patents & Publications

Projects, Patents & Publications

Project: REALSOFC (IP) 2004-2008- Realising Reliable, Durable Energy Efficient and Cost Effective SOFC Systems

Conference Poster Presentation: Characteristics of Perovskite- like La-Ni-M-O (M=Co, Cu) Materials for SOFC Application (7th EUROPEAN SOFC FORUM Lucerne 2006)

Key words

Key words

Fuel cell electrochemistry
Fuel cell integration
Fuel cell system components
Fuel processors
High temperature fuel cells
Low temperature fuel cells
Hydrogen distribution
Hydrogen fuelling infrastructure
Hydrogen production
Hydrogen safety
Hydrogen storage



www.enfugen.net



Organization description

Organization description

The AGH University of Science and Technology in Cracow consists of 15 Faculties that provide a high level of preparation to about 30 000 students. The University is recognized as one of the leading Technical Universities in Poland. Research and educational activities of the Faculty of Material Science and Ceramics cover two fields: Chemical Technology and Materials Engineering. The Chemical Technology field comprises the processing of mineral raw materials for both traditional and modern ceramic applications: construction, insulation and binding materials concretes, whitewares, refractories, glass and enamels. The Materials Science involves investigation and design of advanced materials for solid oxide fuel cells, sensors, lithium batteries, bioceramics, high-temperature corrosion, polymers, and intermetallics. The staff of the Department of Solid State Chemistry is a multi-disciplinary group of 25 employees, including 5 professors: Prof. Molenda (electrochemistry of solids, energy storage systems, solid oxide fuel cells, lithium ion batteries), Prof. Danielewski (diffusion, high-temperature corrosion), Prof. Przybylski (corrosion), Prof. Mrowec (defect structure, reactions in solid state), Prof. Gil (corrosion, alloys).

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Web sites http://www.agh.edu.pl/index_e.php

R&D activities

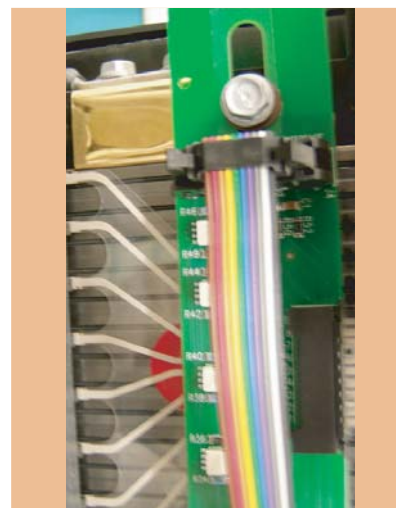
R&D activities

Our area of scientific interest deals with an important group of materials, namely ionic and ionic-electronic conductors (nonstoichiometric transition metal compounds). Key components of devices for strategic applications as energy conversion, environmental monitoring, fuel cells, batteries, permeation membranes and sensors, originate from this group materials. The understanding and modeling of micro scopic transport phenomena, on atomic scale, in these materials can source a real breakthrough in performance and efficiency of many solid state electrochemical devices.

Projects, Patents & Publications

Projects, Patents & Publications

A long and rich experience in National Projects in the field of secondary lithium batteries, solid oxide fuel cells (SOFC) and modeling of transport phenomena in solids. The University was also involved in European Projects.



Key words

Key words

Fuel cell electrochemistry	Hydrogen distribution
Fuel cell integration	Hydrogen fuelling infrastructure
Fuel cell system components	Hydrogen production
Fuel processors	Hydrogen safety
High temperature fuel cells	Hydrogen storage
Low temperature fuel cells	



www.enfugen.net

Organization description

Organization description

VÚEZ is a joint stock company involved in research, engineering, design, experiments, measurements and diagnostics, manufacture and implementation of supplies in the field of machine engineering, conventional and nuclear power engineering and industry.

The Company is focused on specialised and superior-standard operations such as:

- Experimental research at the testing benches and "in situ"
- Design, project, manufacture and operation of the exp. facilities
- Operation of exp. equipment
- Guarantee tests of energy equipment and plants
- Manufacture and installation of electric and pressure equipment
- Process automation
- Safety enhancement of nuclear power plants

It was formed in 1974 and it involves 23 researchers, 39 technicians, 52 university workers and 1 PhD student.

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Diagnostics and Automation Department
Manufacture and Installation Department

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Economics and Commerce Department

Country



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R&D activities

R&D activities

On the home market, VÚEZ main business partner are energy producers and industry.

On the foreign market, VÚEZ carries out ongoing projects of preparation for the Bohunice V1 NPP decommissioning, leak-tightness improvements in nuclear power plants such as the Dukovany NPP, CR and the Paks NPP, Hungary.

In the field of experimental research, projects were executed in co-operation with IRSN and Framatome, France, Fortum Engineering Ltd., Finland, Siemens, Germany, Empresarios Agrupados, Spain, etc.

Expertise

Expertise

VÚEZ conducts experimental research of parameters and functional properties of equipment and structures through measurements of the following quantities:

- thermal engineering (temperature, temperature fields, heat transfer, efficiency, heat losses)
- mechanics (forces, torsional moments, mechanical stresses, deformations)
- hydrodynamics (pressure, liquid & gas flow, velocity fields, level, leakage of gases & liquids)
- acoustics (noise, vibrations)
- ecology (gaseous & particulate emissions)

For projects with IRSN, experimental facilities were designed:

- LOT 1 (Elisa)
- LOT 2 (Ivana)
- LOT 4 (Manon)

Projects, Patents & Publications

Projects, Patents & Publications

1. Vicena, Armand: *Experimental Activities Related to Safety Systems of PWR NPPs (900 MWe)*
2. Žmindák, Grajciar, Nozdrovický: *Modelling & calculations in the FEM*

Key words

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Low temperature fuel cells	

Organization description

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VUJE, Inc. is an engineering company that performs design, supply, implementation, research and training activities, particularly in the field of nuclear and conventional power generation.

The culture of nuclear safety is a particular aspect of our efforts at finding solutions that shall guarantee permanent development toward higher life quality. Our competences cover the problems of nuclear power engineering from the projection of a new nuclear power plant through its realisation, operation and maintenance, to its dismantling. This enables us to have a wholesome view, awareness of connections and possibility for complete control. We want to provide the best services to our customers whose quality shall be part of his and our business identity.

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R&D activities

R&D activities

Research, development and engineering activities in the area of: assessment of security, reliability and efficiency of operations in the phases of launch of own operations and closure of energy and heat sources; Research and development, consulting and expert activities in the area of wind-up of energy and heat sources, waste storage facilities and equipment for transport of harmful and dangerous substances; Development and use of information, radiation and support systems to increase the safety and reliability of the operation of industrial objects and reliability of the human factor in the control rooms and dispatch centres of technological processing facilities; Preparation of complex energy utilisation balances, analysis of the management of energy and technical economic evaluation of possible measures for attainment of efficient utilisation of energy.

Projects, Patents & Publications

Projects, Patents & Publications

Projects: One of our actions in the field of fuel cells and hydrogen production was project "Evaluation of energy utilization of fuel elements in condition of Slovak Republic". This project was assigned and financed by national fund and it was prepared and solved in cooperation with Mechanic Faculty of Slovak Technical University in Bratislava.

Publications: Gajarská M., Polakovič O., Kaba V.: Evaluation of energy utilization of fuel elements in condition of Slovak Republic, research report, Trnava 2004

Expertise

Expertise

VUJE designs, develops and delivers special methods and single-purpose equipment for use by operators of power installations, and provides services in the field of inspections of material integrity, diagnostic of machinery, it evaluates material degradation.

Our company has established chemical and electro technical laboratories. Some of them are situated in nuclear power plant area. VUJE performs and evaluates measurements of electrical parameters of produced electricity and electricity supplied into the grid. For the evaluation of measured parameters is used our own product, which provides electro diagnostic and monitoring of electric systems.

Key words

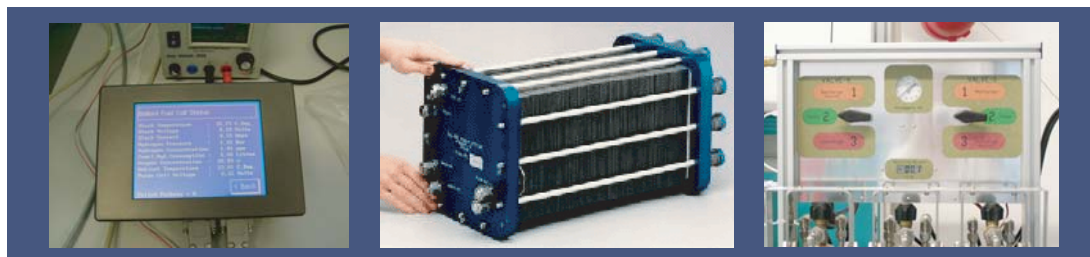
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Organization description

Organization description

Research group on theoretical and experimental projects. Education.



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R&D activities

R&D activities

Research on hydrogen-fuelled power systems;
Investigation on SOFC systems;
Mathematical modelling and analysis of energy and technology systems (incl. nuclear power);
Energy audits;
Numerical simulation of performance under design, off-design and transient conditions;
New applications of DCS;
Optimisation of load distribution in CHP plants;
Boiler and turbine modernisation;
Clean coal technologies.

Projects, Patents & Publications

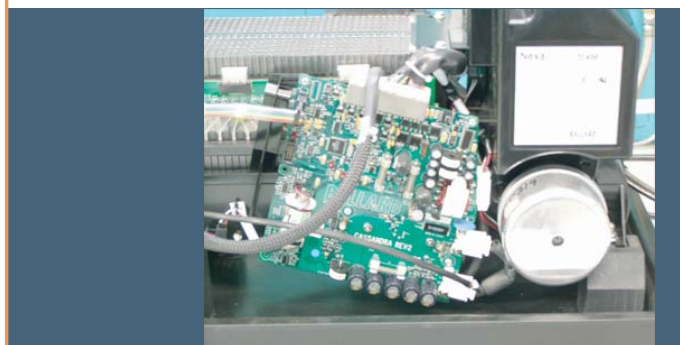
Projects, Patents & Publications

On-line optimisation of the load distribution in the largest captive CHP plant in Poland;
Co-operation in implementation of new computer technologies in power plant engineering;
Energy audits;
Modernisation (increase of output and efficiency) of extraction district heating turbines;
Modification and modernisation (increase of output and efficiency) of boilers;
Erection of the first experimental PFBC installation in Eastern Europe;
Elaboration of National Emission Reduction Plan.

Expertise

Expertise

Atmospheric fluid boiler, gas turbine.



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SIXTH FRAMEWORK PROGRAMME