



*Wsparcie dla biznesu w zasięgu ręki*



**CATALOGUE  
OF  
TECHNOLOGY PROFILES  
FROM  
POLISH R+D SECTOR  
2008**

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**Nr PON/01/08**

**Title: Semi – permeable capillary membranes made of polysulphide and polyether sulphone**

**Abstract:**

A Polish research institute conducts research in biocybernetics and biomedical engineering. The Institute developed a method for obtaining semi-permeable capillary membranes made of polysulphide and polyether sulphone .The Institute developed also the technology of those membranes to produce filtration modules. Many fields of application for industry, science and medicine are possible. Partners interesting in implementing those technologies are being sought.

**Detailed description:**

A Polish research institute conducts research in biocybernetics and biomedical engineering. The Institute developed a method for obtaining semi-permeable capillary membranes made of polysulphide and polyether sulphone .The Institute developed also the technology of those membranes to produce filtration modules. Many fields of application for industry, science and medicine are possible, including water and sewage treatment, filtration and food manufacturing, regeneration of refrigerants, oil removal, etc.

The technology allows to produce capillary membranes with different cut off points, external diameter from, 0,3 to 2,8 mm, thickness from 0,5 to 0,9 mm. Membranes are biocompatible and can be used for filtration in industry , research and medicine. The Institute also offer a technology of producing filtration modules with polysulphopne and polyether membranes.

Partners interested in implementing those technologies are being sought.

**Innovative aspect and main advantages:**

The institute's laboratory is the only one in Poland and the one of few in the world that obtains semi- permeable capillary membranes made of polysulphone and polyether sulphone.

**Intellectual Property Right:**

Secret know – how

**Collaboration details:**

Licence agreement;  
Financial Resources;  
Joint further development;  
Testing of new applications;  
Adaptation to specific needs

**Nr PON/02/08**

**Title: An air field grating protecting aircraft engines against ingestion of foreign matter**

**Abstract:**

A Polish research institute develops solutions for aircraft industry. Institute elaborated an airfield protecting grating that protects inlets of aircraft turbine engines against the ingestion of foreign matter from airfield pavement. The invention significance improves safety of operating turbine engines. Partners interested in implementation of further development of the technology are being sought.

**Detailed description:**

The airfield protecting grating has been intended to protect inlets of aircraft turbine engines against the ingestion of foreign matter from airfield pavement. A special grating to cover taxi ways and places of aircraft tests has been designed, with walls about 4 cm high and with underneath slots to let air and water through. Aperture diameter is about 2 cm. Apart from stopping the foreign matter hazardous to the engine inlet, the grating lifts the stagnation point by increasing thickness of the air boundary layer, which dramatically reduces the speed of the air inflowing the vortex core. Technical simplicity and versatility make the grating effective also against lodgments of snow and rainwater.

**Innovative aspect and main advantages:**

The invention provides capability to eliminate effects of the inlet vortex hazardous to the ground running of aircraft turbine engines with no need to modify aircraft structures.

Advantages:

- significantly improves safety of operating aircraft turbine engines
- Technological simplicity and versatility

**Intellectual Property Right:**

Patent(s) applied for but not yet granted

**Collaboration details:**

Joint venture Agreement;  
Licence agreement;  
Financial Resources;  
Testing of new applications;  
Adaptation to specific needs;  
Technical consultancy;  
Quality control;  
Maintenance

**Nr PON/03/08**

**Title: Multifunctional ballistic protection**

**Abstract:**

A Polish research institute specializing in technical solutions protecting human life and health development a multifunctional ballistic protection. This solution can be used by police, border guards and other units as a flexible protective guard, car protection, building protection or protective barrier, allowing evacuation of people from a place of battle or immediate protection against the effects of explosion. Partners interested in commercial and technical co-operation are being sought.

**Detailed description:**

These solution can be used by police, border guards and other units as a flexible protective guard, car protection, building protection or protective barrier, allowing evacuation of people from a place of battle or immediate protection against the effects of explosion.

The protection consists of:

- Flexible ballistic coat made of aramid, ensuring very high ballistic resistance and low weight water resistant and durable
- Sight ensuring the same high level of ballistic protection
- Holder with protective shield
- Frame, making it possible to join several protections together
- Suction devices for fixing the protection on glass walls or windows

**Innovative aspect and main advantages:**

- Multifunctional
- Flexible
- very high ballistic resistance
- low weight
- possibility of joining several elements
- water resistant
- durable

**Intellectual Property Right:**

Secret know – how

**Collaboration details:**

Joint further development;  
Commercial and technical co-operation

**Nr PON/04/08**

**Title: Autonomous wind- and-sun power**

**Abstract:**

Polish research Institute offers a technology of power station using 2 sources of renewable energy- wind and sun- to provide energy to isolated buildings located out of the reach of the grid to produce energy without being depended on the weather conditions. Produced energy can be used directly or stored in the energy storehouse. The Institute is looking for partners interested in implementation of this technology

**Detailed description:**

Polish research Institute offers a technology of power station using 2 renewable sources of energy – wind and sun- to provide energy to isolated buildings. It allows households to and other buildings located out of the reach of the grid to produce energy without being depended on the weather conditions. Produces energy can be used directly or stored in the energy storehouse. The system consists of power station, solar battery, energy storehouse, transformation circuits and control circuits. The power plant can heat weather or air, produce energy to be stored and produce energy for recipients requiring stable periodicity of 50Hz. The system is looking for partners interested in implementation of this technology.

**Innovative aspect and main advantages:**

Use of two different sources of renewable energy allows households and other buildings located out of the reach of the grid to produce energy without being dependent on the weather conditions.

**Intellectual Property Right:**

Secret know-how

**Comments about market applications:**

Industry, research

**Collaboration details:**

License Agreement

Financial Resources

Joint further development

Testing of the new applications

Adaptation to specific needs

**Nr PON/05/08**

**Title: Unsaturated Polyester Resins Using PET (Polyethylene Terephthalate)**

**Abstract:**

A Polish research Institute is one of the leaders in the field of industrial chemistry. The Institute has developed a novel technology of production of unsaturated polyester resins using PET (polyethylene terephthalate) waste as one of the starting materials. As a result the costs of raw materials are considerably reduced whereas the quantity remains competitive. The Institute is looking for partners to license the technology. endangering

**Detailed description:**

A Polish research Institute, one of the leaders in the field of industrial chemistry, has developed a novel technology of production of unsaturated polyesters resins. The innovation consists of the use of the PET (polyethylene terephthalate) waste from used bottles as one of the starting materials. Incorporation of that polymer into polyester molecules delivers the polyester resins with enhanced heat and chemical resistance, which are complete to isophthalic polyester resins. The costs of raw materials are considerably reduced in competition with traditionally used starting materials.

**Innovative aspect and main advantages:**

- Use of PET (polyethylene terephthalate) waste as one of the starting materials for polyester resins production
- The chemical and heat resistance of obtained resins is one the level of chemical and heat resistant isophthalic polyester resins reduces costs of raw materials being used for production of polyester resins.

**Intellectual Property Right:**

Patent(s) granted

**Comments about market applications:**

Production of unsaturated polyesters resins and related activities

**Collaboration details:**

License Agreement

**Nr PON/06/08**

**Title: Ecological porous pipes irrigation systems using rubber waste.**

**Abstract:**

A Polish research institute has developed a new type of porous pipes (hoses) that allows controlled release of water, to be used in irrigation systems. The pipes are made of recycled raw materials: polyolefins and vulcanized rubber waste from tires. Developed solution is an ecological and money-saving irrigation and fertigation system that can be used in agriculture as well as in maintenance of recreational areas. The institute is looking for partners interested in implementing this technology

**Detailed description:**

The Institute has developed a new type of porous pipes (hoses) that allows controlled release of water, to be used in irrigation systems. The pipes are made of polymer compounds based on partly or entirely recycled materials: polyolefins and vulcanized rubber waste. Thanks to its porosity (open pores are space uniformly on the hose) the pipes assure homogenous distribution of water within the irrigation area and can be applied both for superficial and underground irrigation, as well as for fertigation (application of nutrients through irrigation systems).

The hoses are produced from compounds of primary or secondary polyethylene/polypropylene (10-60% of weight) and vulcanized rubber waste (40-90%) , with addition of porosity regulator. They are manufactured on extrusion line, for which a special head has been designed. Typical diameter of the hoses is 15 to 19mm.

Developed solution is anew, ecological and money saving irrigation and fertigation system that can be used in pomiculture, nurseries, gardening, in fields, greenhouses, tunnels and under agro fabrics. The system can be used also in maintenance of greens, golf- links etc.

**Innovative aspect and main advantages:**

- Controlled realize of water allows money- saving irrigation and fertigation system and homogenous distribution of water and nutrients
- Using recycled raw materials significantly reduces the costs of pipes and helps protect environment
- Saving of water (40-60% in comparison to traditional systems- installation of the systems under ground provides water directly to the plants roots)
- Possible application of nutrients through irrigation systems
- Easy to install and dismantle
- Low operational pressure (optimum is 0,2Ba)
- High range of water permeability (1-40l/h/m)
- Length of hose that assures uniform outflow of water- up to 100rm

**Intellectual Property Right:**

Patent(s) granted

**Comments about market applications:**

- Type of partner sought:  
Any
- Specific area of activity of the partner:  
Producers/developers of irrigation equipment for agriculture, gardening, pomiculture, nurseries as well as for playgrounds and green belts.
- Task to be performed: implementing elaborated technology, joint further development of the system, transfer of know- how, technical training and support.

**Collaboration details:**

License Agreement

**Nr PON/07/08**

**Title: Integrated Nan probe for hardness measurement in Micro- and Nan scale**

**Abstract:**

A Polish research Institute developed an integrated micro system silicon probe that allows measuring the mechanical properties (hardness, Young's module) of ultra thin layers in Nan scale. The whole probe is made using MEMS ( micro- electro- mechanical-systems) technology so that the sensor can be produced in a single technology process and the cost of the device is significantly reduced. Partners interested in implementing this technology are being sought.

**Detailed description:**

A Polish research Institute specializing in micro engineering developed an integrated micro system silicon probe that allows measuring the mechanical properties (hardness, Young's module) of ultra thin layers in Nan scale. The probe includes an elastic silicon lever with a silicon micro blade acting as an indicator. High- resolution measurement of depth of material penetration by the blade is effectuated with a fiber-optic Fabry- Perot interferometer.

**Innovative aspect and main advantages:**

The novelty of the probe consists of its distribution capacity to measure the indenter's displacement. Moreover, the whole probe is made using MEMS (micro- electro- mechanical systems) technology so that the sensor is produced in one single technology process and the cost of the device is significantly reduced

**Intellectual Property Right:**

Secret know-how

**Comments about market applications:**

industry, research

(Specific area of activity of the partner: renewable energy)

**Collaboration details:**

License Agreement;

Financial Resources;

Joint further development;

Testing of the new applications;

Adaptation to specific needs

**Nr PON/08/08**

**Title: Moisture-curable polyurethane insulation and coating compounds for sealing of joints and insulation coating of building materials**

**Abstract:**

A Polish research institute specializes in technologies for the industrial chemistry sector. The institute offers a modern elastic insulation material of very high ageing resistance. Joints and coatings using this technology are characterized by excellent mechanical properties, elasticity and high adhesion to different building materials. Partners interested in implementation or joint further development of the technology are being sought.

**Detailed description:**

The technology covers two grades of single-component polyurethane compounds, which crosslink with atmospheric moisture to form elastic materials and which are designated for application in building industry. The first one is a uniform, thick, thixotropic mass that can be used as sealant for various building materials. The second one is self-levelling coating material to be used as sealant for various building materials and as insulation coating on flat surfaces. Both grades are produced in a multi-step process comprising: mixing of polyol with fillers, dehydration of that mixture under diminished pressure at elevated temperature, and poly-addition reaction carried out at elevated temperature in the presence of inert gas leading to highly filled polyurethane pre-polymer capable of cross-linking with atmospheric moisture, with an additional operation enabling to achieve designated applications parameters.

**Innovative aspect and main advantages:**

Modern elastic insulation material of very high ageing resistance. Joints and coatings obtained using those technologies are characterized by excellent mechanical properties (also at low temperatures), elasticity and ageing resistance, as well as high adhesion to different building materials. Both products are solvent less. The manufacturing process does not lead to formation of hazardous wastes.

**Intellectual Property Right:**

Secret know-how, Development phase – Laboratory tested.

**Comments about market applications:**

Industry, research

**Collaboration details:**

Licence Agreement

**Nr PON/09/08**

**Title: UV – curable powder coatings**

**Abstract:**

A Polish research Institute has developed a process for production and application of UV-curable powder coatings, where curing proceeds at a room temperature. Combining the attributes of the powder coatings and radiation curing allows to coat heat-sensitive materials including thermoplastics and wood. Moreover, a short curing time can be applied and a smooth surface is obtained (no orange pills). The institute is looking for co-operation with companies producing paints and binders.

**Detailed description:**

Powder coatings have obtained a wide acceptance in the industrial market, meeting environmental regulation. However, the use of conventional thermal curing powder coatings is limited to the metal applications, because they need high temperature for film formation and curing. A Polish research institute has developed a process for production and application of UV-curable powder coatings. Combining the attributes of the powder coatings and radiation curing made possible the creation of environmentally friendly powder coatings for heat-sensitive materials, including thermoplastic and wood. A short curing time is applied, and separation of flowing and curing processes allows obtaining a smooth surface – no orange pills. The application of UV-curable materials gives new markets and demand for continued growth of the powder coatings industry. The institute is looking for companies producing paints and binders for technical co-operation

**Innovative aspect and main advantages:**

- Due to the moderate curing temperature it is possible to coat the temperature-sensitive substrates; - A short curing time can be applied; - A smooth surface is obtained

**Intellectual Property Right:**

Patent(s) applied for but not yet granted

**Comments about market applications:**

industry

**Collaboration details:**

Joint further development;  
Adaptation to specific needs

**Nr PON/10/08**

**Title: Solvent –free emulsion adhesive for construction building**

**Abstract:**

A Polish research institute offers a solvent –free emulsion adhesive for construction building. The water-emulsion two-component adhesive forms a waterproof polymeric bond with high mechanical strength and considerable adhesion on various materials used in the construction building. It can be used for wood, plastic, ceramic, rubber, flaxboard, corkboard, and also for wet materials (moist concrete). Partners for license agreement or technical co-operation are sought

**Detailed description:**

A big Polish institute offers a technology of water-emulsion two components adhesive. Components of the adhesive are joined together by a chemical reaction, thus forming a waterproof adhesive bond. Water evaporates from the adhesive bond and a waterproof polymeric bond is formed, which exhibits high mechanical strength and considerable adhesion on various materials being applied in the construction building. The adhesive may be used for bonding of wood elements, plastics, ceramic plates, rubber, flaxboard and corkboard. It can also be applied for bonding on wet materials, in particular of moist concrete.

**Innovative aspect and main advantages:**

Waterproof, solvent-free; - Suitable for a wide range of materials; - Can be used for bonding of wet materials, in particular of moist concrete

**Intellectual Property Right:**

Patent(s) granted

**Comments about market applications:**

Industry

**Collaboration details:**

Licence Agreement; Joint further development;  
Testing of new applications;  
Adaptation to specific needs

**Nr PON/11/08**

**Title: Method and system for preventive dissipation of inlet vortex ahead of an aircraft turbine engine**

**Abstract:**

A Polish research institute develops innovative solutions for aircraft industry. The institute has worked out a system that dissipates the inlet vortex ahead of an engine, hazardous to the ground running of aircraft turbine engines. The institute is looking for a co-operation with producers of airfield infrastructure equipment, particularly those who have testing and product introduction capacities.

**Detailed description:**

The invention provides capability to eliminate the inlet vortex hazardous to the ground running of aircraft turbine engines, with no need to modify aircraft structures. The preventive dissipation of inlet vortex ahead of an aircraft turbine engine is executed by means of air injection. The air is injected vertically to the direction of aircraft motion and parallel to the airfield pavement from pressure nozzles located in ground stations along taxiways and parts of runways. The speed of injected air is high enough to blow away the stagnation point from the surface of the airfield pavement.

**Innovative aspect and main advantages:**

The invention eliminates the inlet vortex hazardous to the ground running of aircraft turbine engines with no need to modify aircraft structures. – Effectively increases turbine engine safety; – Technical simplicity; – No need to equip an aircraft structure with relevant protection system

**Intellectual Property Right:**

Patent(s) applied but not yet granted. Development phase – Laboratory tested.

**Comments about market applications:**

industry (producers of airfield infrastructure equipment)

**Collaboration details:**

Join Venture Agreement;  
License Agreement;  
Financial Resources

**Nr PON/12/08**

**Title: The biopurification of the air from VOCs in the trickle bed reactors**

**Abstract:**

A Polish research institute has developed the technology of biopurification of the air from VOCs (Volatile Organic Compounds) in the trickle bed reactors operating at co-current flow of the liquid and gas phases. The process is realized in a three phase reactor with fixed bed with biological material immobilized on the bed. The biological methods are relatively cheap and easy to operate. The company is looking for joint further development and adaptation to specific needs.

**Detailed description:**

The process of biodegradation of VOCs (Volatile Organic Compounds) is carried out in the trickle bed bioreactor, operating at co-current flow of the liquid and gas phases. Gas phase is air polluted with a volatile organic compound, whereas the liquid phase is a solution of mineral salts supplying the reactor with an amount providing the covering of the packing with a film of liquid. The process is realized in a three phase reactor with fixed bed with biological material immobilized on the bed. Biological methods of gas purification are used in technologies in which large streams of waste gases containing toxic organic compounds of relatively small concentration are formed. The advantage of biological methods is absolute degradation of the pollutant; such processes do not shift the pollutant into other environmental ranges (from gas to liquid or solid) which is characteristic of classical methods of purification of gases (ozonization, absorption of pollutants in liquids, adsorption on active carbon, catalytic combustion). What is more, they are relatively cheap and easy to operate. It is estimated that approximately 10% of all gaseous emissions are suitable for purification by means of biological methods, including most gases containing volatile organic compounds. In the process a systematic monitoring of the biological material activity (qualitative analysis of the microflora and quantitative analysis of bacteria) is carried out. The results of experiments will enable the institute to elaborate and verify a mathematical model of the process. The worked out model will constitute the basis for proper designing and exploitation of three – phase bioreactors with fixed bed. It has to be stressed that the process is characterized by a high productivity of above 90%. The institute offers the possibility of selection and adaptation of bacteria to the volatile pollution of air, to carry out full process in the laboratory scale and to work out an assumption for pilot installation.

**Innovative aspect and Main advantages:**

Low capital investment and operating costs (functioning at normal temperature and pressure, absence of need of regeneration of elements responsible for purification).

Ecological purity, the absence of secondary contaminants, it does not shift the pollution to another environmental compartment.

**Intellectual Property Rights**

Others

**Comments about market applications:**

**Collaboration details:**

Technical consultancy;  
Joint Venture Agreement

**Nr PON/13/08**

**Title: A new technology of poultry's feathers utilisation.**

**Abstract:**

A Polish research institute developed a new technology of after-slaughter poultry's feathers utilisation which is devoid of pathogenic microorganisms. The end product of utilisation improves the quality of the soil in order to deacidification and fertilizing of the soil. The project is an example of unenergetic use of lignite. The institute is looking for partners for licence agreement, technical co-operation or commercial agreement with technical assistance.

**Detailed description:**

The invention concerns the utilization of after-slaughter waste feathers, which is devoid of pathogenic microorganisms. The matter of the invention is that feathers acquired from after-slaughter containing the 70 - 75 % of water are stored gradually to the determined capacity in the reactor. Then the reactor is closed and the feathers undergo the process of hydration of oxygenic lime in the amount of 8 -12 %, adding 8 - 10 % of lignite and peat which are improving fertilizer value from recycled feathers. The prepared mass is mixed with a speed 5 - 8 turns per minute, but not less than two hours and it is left to chill. After the process of hygienization the feathers are unloaded during mixing and the direction of reactors turns is changed regularly. After that the feathers undergo the process of mechanic disintegration. The end product improves the quality of the soil in order to deacidification and fertilize of the soil.

The project is an example of unenergetic use of lignite.

**Innovative aspect and main advantages:**

- improvement of soil quality in order to fertilize and deacidification
- the prepared product is devoid of pathogenic microorganisms

**Intellectual Property Rights:**

Patent(s) granted, Polish patent no P 38 1095, 20.11.2006.

**Comments about market applications:**

**Collaboration details:**

Technical consultancy;  
License Agreement

**Nr PON/14/08**

**Title: A New Device for Purifying Cutting Fluids Emulsion**

**Abstract:**

A Polish research institute has developed a new device which is designed to purify cutting fluids emulsions during the maintenance process of a machine. It enables disinfection and removal of solid impurities and leakage oil. The company is looking for partners for joint further development and adaptation of the technology to specific needs.

**Detailed description:**

A Polish research institute is conducting basic and applied research as well as implementation in the field of advanced technologies related to machines manufacturing and maintenance, materials engineering, environmental protection and systems engineering. The Device elaborated by the institute is designed to purify cutting fluid emulsions during the maintenance processes. It enables disinfection and removal of solid impurities and leakage oil. These processes can be realised individually or comprehensively in the technological line depending on the state of the emulsion cutting fluid.

**Innovative aspect and main advantages**

A Polish research institute is conducting basic and applied research as well as implementation in the field of advanced technologies related to machines manufacturing and maintenance, materials engineering, environmental protection and systems engineering. The Device elaborated by the institute is designed to purify cutting fluid emulsions during the maintenance processes. It enables disinfection and removal of solid impurities and leakage oil. These Processes can be realised individually or comprehensively in the technological line depending on the state of the emulsion cutting fluid.

**Current state of development of the technology**

Available for demonstration

**Intellectual Property Rights**

Patent(s) granted, Patent application No W116525

**Comments about market applications:**

**Collaboration details:**

Joint further;  
Adaptation to specific needs;  
Technical consultancy

**Nr PON/15/08**

**Title: Mobile Control Laboratory (MCL)**

**Abstract:**

A Polish institute has created an innovative Mobile Control Laboratory (MCL) consisting of a cargo van which has been specifically designed for the safe transportation of LPG samples and gasoline, diesel fuel and biofuel. In enlarged passenger compartment one carries out laboratory testing of LPG using a portable gas microchromatograph and a portable sulphur total analyzer. The institute is looking for partners for joint further development and adaptation to specific needs.

**Detailed description:**

A Polish institute active in oil, biofuels and bioenergy area has created a mobile control laboratory (MCL). The MCL consists of a cargo van (length 6m, height 2,6m) which has been specifically designed for the safe transportation of LPG samples and gasoline, diesel fuel and biofuel. In enlarged passenger compartment one carries out laboratory testing of LPG using a portable gas microchromatograph and a portable sulphur total analyzer. Mobile Control Laboratory is also used to define critical parameters of LPG that are most frequently not in compliance with norms (e.g. PN-EN 589 - Polish norm), based on the current LPG control on the market. Those parameters are: chemical composition with resulting parameters, water content tested on a portable gas microchromatograph and total sulphur content. Definition of those parameters allows for quality evaluation of LPG and necessity of performing further laboratory testing in the stationary laboratory according to needed norm, if those parameters are not met.

**Innovative aspect and main advantages**

1. Quick analysis at LPG auto-stations allows for reducing fuel consumption for good quality samples transport.
2. Increasing of trust to good quality fuel LPG causes increasing of consumption of ecological fuel LPG and finally causes reducing of emission dangerous compounds/pollutants.

**Current state of development of the technology**

**Intellectual Property Rights**

Secret know-how

**Comments about market applications:**

**Collaboration details:**

Adaptation to specific needs;  
Technical consultancy

**Nr PON/16/08**

**Title: High performance polymeric composites based on polycarbonate waste, including compact discs**

**Abstract:**

A Polish institute developed new high performance polymeric composites based on polycarbonate waste, including compact discs. The polymeric composites might be applied in engineering, automotive, electronic and electrical industry, and can be made equivalent to the materials made by leading producers. The institute is looking for partners for joint further development and technical consultancy.

**Detailed description:**

A Polish institute active in developing and designing chemical processes and materials, modernization and optimization of existing processes, has developed a new pro-ecological technology of new high-performance polymeric composites based on polycarbonate waste, including compact discs. The end product are polymeric composites which are equivalent to and can substitute raw materials. The project's innovativeness is due to the application of the method of reactive extrusion and simultaneous filling (e.g. glass fibre, montmorillonite, graphite, nano silica) in the presence of modifiers which can lend support to the formation of compatible heterogenous structure with improved adhesion at the interface. Stable covalent bonds are formed due to the chemical reactions that take place during reactive processing in corotating twin-screw extruder between functional groups of polycarbonate and reactive modifier.

**Innovative aspect and main advantages**

The innovation is related to the method of reactive extrusion and simultaneous filling (e.g. glass fibre, montmorillonite, graphite, nano silica). Depending on the type and concentration of the filler, new polymeric materials can be obtained, including nanocomposites with unique properties e.g. considerably higher stiffness, good mechanical strength and better thermal properties.

Therefore, the obtained composite is an engineering polymer, which can be applied for many years in numerous industries such as engineering, automotive, electronic and electrical.

**Advantages:**

- recycling and reprocessing of waste materials (mainly compact discs)
- restriction of natural resources from petroleum cracking in favour of recycling materials (production waste, compact discs)
- wasteless and sewageless technology

**Intellectual Property Rights**

Patent(s) granted, Patent No 378227

**Comments about market applications:**

**Collaboration details:**

License Agreement;  
Technical consultancy;  
Joint further development

**Nr PON/17/08**

**Title: Utilisation of waste keratin from poultry industry to production of novel polymer**

**Abstract:**

A Polish institute developed the new technology of utilization of waste keratin from poultry industry to production of novel polymer. This is a method of manufacturing differential keratin forms from feathers. The various forms of biocomposites with keratin from feathers in the shape of fibres and fibrils were obtained as the result of research. The company is looking for partners for commercial agreement with technical assistance.

**Detailed description:**

A method of manufacturing differential keratin forms from feathers was developed. The aim of investigation was to indicate new application directions connected with fibres and fibrous products. The institute used natural polymers and keratin obtained from chicken feathers. Keratin wastes are a potential renewable starting material. A method of manufacturing fibrous composite materials by wet spinning is presented.

Spinning solutions were prepared from these polymers, and after filtration and aeration they were used for fibres and fibrils formation.

The process of manufacturing fibrils and fibres both including keratin was investigated. The investigations included:

- preparing spinning solutions with different keratin contents,
- estimating the influence of the formation speed and the drawing on the fibre properties,
- estimating the sorption and biological properties and biodegradability of the composites obtained.

**Innovative aspect and main advantages:**

The various forms of biocomposites with keratin from feathers in the shape of fibres and fibrils were obtained as the result of research. It was demonstrated that adding keratin improves the hygroscopic properties. The chitosan-keratin sponges show lack of irritation and allergenic effects.

**Current state of development of the technology**

**Intellectual Property Rights**

Secret know-how

**Comments about market applications:**

**Collaboration details**

Testing of new applications;  
Adaptation to specific needs;  
Technical consultancy

**Nr PON/18/08**

**Title: Automatic data registration and transmission system for The Groundwater Observation and Research Network**

**Abstract:**

The system enables automatic obtaining: groundwater level fluctuation data in observation points and meteorological data. The system is based on GSM technology data transmission to central servers and afterwards their distribution through internet to management applications. The goal of systems operation is immediate reporting groundwater endangering by drought and innundating.

**Detailed description:**

The system contains equipment enabling measuring: wind direction and power, atmospheric pressure, humidity, air temperature, soil temperature, precipitation occurrence and intensity, groundwater level, conductivity and pH. The gauges are connected to transmission devices which transmit data to central database server. Stored data is rerouted through internet technology to internet application enabling managing, processing and presenting data coming from particular measuring points. The application runs on two admittance levels: employees managing data access and public access to part of data resources. The system includes 40 measurement stations and 20 second order points.

**Innovative aspect and main advantages:**

The system enables automatic access to measurement data and their processing. It will make public access to groundwater information possible in a modern way. The main advantages are: the current and public access to information about the state of groundwater level and possibility of immediate data processing during crisis situations.

**Intellectual Property Right:**

Others (registered design, plant variety right, etc).

**Comments about market applications:**

hydrogeology, cartography, Internet, data transmsion

**Collaboration details:**

License Agreement;  
Technical Co-operation;  
Joint Venture Agreement;  
Manufacturing Agreement (Subcontracting & Co-contracting);  
Commercial Agreement

**Nr PON/19/08**

**Title: Internet service to order geological maps**

**Abstract:**

Internet service enable everybody to order geological maps in scales 1:50 000: Detailed Geological Map of Poland, Hydrogeological Map of Poland, Geological-Economic Map of Poland in the way which is closed to e-commerce technology. The service deliver the index information and a state of this map production too.

**Detailed description:**

Internet service to order geological maps in scales 1:50 000: Detailed Geological Map of Poland, Hydrogeological Map of Poland, Geological-Economic Map of Poland was performed by Jason MacKenzie Poland company according to the specification prepared in Polish Geological Institute. Service functionality is closed to e-commerce technology: user use the "basket" and put maps in. Content of the basket can be modified. Cost of a maps in basket is calculated according to price list. Price list include the costs of maps making available only, because maps are the public property. User choice is available by use of graphic map index, for every map is used separate index. Indexes shows the state of every map production in different colors. User should fill out the form of order and send it to Polish Geological Institute.

**Innovative aspect and main advantages:**

Internet service enable everybody access to metadata and index data of geological maps and makes available to order this maps in modern way. The main advantage is the current and public access to information about the state of map production and possibility of immediately map ordering via Internet in many electronic formats and many projections.

**Intellectual Property Right:**

Others (registered design, plant variety right, etc).

**Comments about market applications:**

**Collaboration details:**

License Agreement;  
Technical Co-operation;  
Joint Venture Agreement;  
Manufacturing Agreement (Subcontracting & Co-contracting);  
Commercial Agreement

**Nr PON/20/08**

**Title: Application of bar codes in drilling cores archive**

**Abstract:**

In the archives of Polish Geological Institute about 500 thousand boxes with drill core are kept. Central Geological Database includes information about cores however core identification in archive departments takes place based on box description. In 2004 bar codes system was applied to "keep" information about cores. Palmtop with built-in bar code scanner reads information kept in the bar code.

**Detailed description:**

Applied bar code system workes in support of MSIST program, which uses MS Access source data base. Data base includes: ID of borehole in CGD, box number, draw-depth of drill core and chronostratigraphy. In palmtop memory information of all boreholes in given archive is stored. Bar code contains information of: borehole ID, borehole name and box number. Other data - depth and stratigraphy - are received from database loaded into palmtop memory. This information is displayed after bar code scanning.

**Innovative aspect and main advantages:**

Stocktaking of drill core archive with application of bar code was done in Poland for the first time. Similar system is working only in British Geological Survey. Up to now identification of drill core boxes was done based on hand description. Blurred descriptions should be often renewed. In case of exchanging destroyed box for new one the hand description should be done from the beginning. Labels with bar code are durable and easy to place on a new box.. Information in bar code is loaded to Central Geological Database. Labels with visible borehole name and box number are durable and firm markers. Person who works with drill cores has no problem with finding proper borehole and box. Ther is no need to renew blurred descriptions of boxes. Scanning of bar code enables to control the "movement" of a box (who and when used given part of a borehole). Connection with database in palmtop enables quick finding proper part of borehole depth.

**Intellectual Property Right:**

Others (registered design, plant variety right, etc).

**Comments about market applications:**

**Collaboration details:**

License Agreement Technical, Co-operation, Joint Venture Agreement, Manufacturing Agreement (Subcontracting & Co-contracting), Commercial Agreement.

**Nr PON/21/08**

**Title: Timber harvesting using the cut-to-length method in mixed stands in complex cutting**

**Abstract:**

Criteria for assessment of timber harvesting technologies: productivity, unit cost of timber harvesting, damage to trees, soil disturbances. Studies included four technological processes of timber harvesting in mixed stands in complex cutting (without group cutting system). Two processes represented traditional in Poland long-wood method and two others new one - the cut-to-length method.

**Detailed description:**

Proposed technological process of timber harvesting in cut-to-length method in mixed stands in complex cutting (without group cutting system):

- distance between strip roads approx. 30 m;
- felling, delimiting, and bucking (logs length up to 6,0 m, bolts 2,0 - 2,4 m) with chain saw or harvester in coniferous stands (with distance between strip roads approx. 20 m)
- timber extraction with forwarder.

**Innovative aspect and main advantages:**

Innovativeness of technological process of timber harvesting with cut-to-length method consists in timber processing into logs (up to 6,0 m) and extraction using forwarder, as opposed to processing into long logs (up to 14 m) and extraction using skidder. The proposed technological process of timber harvesting relates to Poland only. Higher productivity, lower unit cost of timber harvesting, less damage to trees and smaller soil disturbance in stands.

**Intellectual Property Right:**

Patent applied for but not yet granted

**Collaboration details:**

License Agreement;  
Technical Co-operation;  
Joint Venture Agreement;  
Manufacturing Agreement (Subcontracting & Co-contracting);  
Commercial Agreement.

**Nr PON/22/08**

**Title: Porous alumina grafts for bone filing application**

**Abstract:**

A Polish R&D Institute specialised in ceramic for use in medicine has developed a technology of production of porous alumina implants, that can be successfully applied for filling bone defects in orthopaedic, maxillofacial and spine surgery. Biological tests have shown good biocompatibility and ingrowths of well mineralised bone tissue into pores. Partners from medical sector interested in implementing this technology are sought.

**Detailed description:**

A Polish R&D Institute specialised in ceramic biomaterials for use in medicine offers a technology of production of porous alumina implants, that can be successfully applied for filling bone defects in orthopaedic, maxillofacial and spine surgery.

Porous alumina grafts are made of the material based on alumina powder (97%) with addition of calcium and magnesium compounds. The porous structure of the material is a result of chemical foaming during the heating process (gel-foaming method). Porous grafts are subjected to multistage sintering up to the maximum of 1730 C.

The ceramics obtained is characterised by the open porosity of 65-75% (with the 80% of pores ranging between 100 and 150 microns). Open porosity as well as the pores size make a structure analogous, although not identical as the mineral structure of the cancellous bone. The pores within the ceramic material are spherically shaped and the walls between them are built of well formed alumina crystals. The diameter of connective ducts between pores is usually close to 150 microns.

The mechanical strength, depending on the material porosity ranges between 10-16 MPa (bending strength) and 20-30 MPa (compressive strength), making easy to handle the material during the surgical procedures. After the overgrowing, the composite improves considerably its mechanical strength (up to 70%) and the modulus of elasticity (close to 30 GPa) is equal as the one characterising the compact bone, guaranteeing proper mechanical correlation between the bone and the graft. "In vivo" tests have proved that the organic matter (non-mineralised) appears in the external pores remaining in contact with the bone tissue, 3 days after the implantation. After 16 weeks overgrowing and the bone mineralisation are completed. It has been demonstrated as well that the pores overgrow by the kind of bone tissue that remains in contact with the graft. Electron microscope tests have shown that the in growing bone tissue is closely connected to the pores surface, and the aluminium from the ceramics does not penetrate the bone in contact. Histochemical and histopathologic analysis demonstrated the correct callus development and the normal wound healing process.

Clinical tests on the porous alumina ceramics have been shown that in the great majority of cases the patient treatment has been successful. It has been also observed that after the surgeries the necessary period of limbs fixation was by 1/3 shorter then in similar cases where bone grafts were applied. This feature reduces harms to the patient's organism and thanks to it the intense rehabilitation treatment can be incited earlier.

**Innovative aspect and main advantages:**

The innovating aspects of the technology consist of the elaboration of synthetic, porous, alumina material by gel-foaming method as well as in the application of the material as bone voids filler in orthopaedic and traumatic surgery. According to the results of diverse physical, chemical and biological analysis, porous alumina grafts:

- are totally biocompatible,
- are being successfully overgrown by well mineralised bone tissue,
- are characterised by mechanical strength sufficient for many kinds of operations as well are solid enough for free manipulation during surgical procedure,
- once overgrown they suitable modulus of elasticity, which guarantees their reliable co-operation with the bone,

- they can be machined during the operation in order to obtain the demanded shape of the implant,
- they can be sterilised by all methods accepted in medicine.

**Intellectual Property Right:**

Patent granted

**Current Stage of Development:**

Already on the market

**Collaboration details:**

Joint Venture Agreement

**Nr PON/23/08**

**Title: Bactericidal porous alumina implants containing vancomycin**

**Abstract:**

A Polish R&D Institute specialised in ceramic biomaterials for medical use, offers a technology of production of porous alumina implants, allowing an antimicrobial activity after implantation. Porous alumina material is formed by gel-foaming method, then sintered and impregnated by organic carrier containing vancomycin. Clinical tests demonstrated the suitability of bactericidal implants in the therapy of bone infections. Partners are sought for implementation or further common development.

**Detailed description:**

A Polish R&D Institute specialised in ceramic biomaterials for medical use, offers a technology of production of porous alumina implants, allowing an antimicrobial activity after implantation. The production method of bactericidal porous alumina implants is based on manufacturing of porous alumina implants and its impregnation by the antibiotic-containing carrier.

Porous alumina grafts are made of the material based on alumina powder (97%) with addition of calcium and magnesium compounds. The porous structure of the material is a result of chemical foaming during the casting process (gel-formed method). Porous grafts are subjected to multistage sintering, up to the maximum temperature of 1730°C.

The ceramic obtained is characterised by the open porosity of 65-75% (with the 80% of pores ranging between 100 and 150 microns). Open porosity as well as the pores sizes makes a structure analogous, although not identical as the mineral structure of the cancellous bone. The pores within the ceramic material are spherically shaped and the walls between them are built of well formed alumina crystals.

The diameter of connective dusts between pores is usually close to 150 microns.

Porous implants are impregnated by organic carrier (PVA) containing neomycin, applying a vacuum method. Finally the implants are drying by freeze-drying method.

Biological "in vivo" and "in vitro" tests proved that after implantation, the bacteria Porous alumina material is formed by gel-foaming method, then sintered and impregnated by organic carrier containing vancomycin. Clinical tests demonstrated the suitability of bactericidal implants in the therapy of bone infections.

**Innovative aspect and main advantages:**

The innovating aspects of the technology consist of the elaboration of synthetic, porous, alumina material by gel-foaming method, in the impregnation of containing antibiotic organic carrier as well as in the application in the clinical case of bone infection as bone filler and antibiotic delivery device. According to the results of diverse physical and biological tests, bactericidal alumina grafts:

- are totally biocompatible,
- after implantation, show antibacterial activity,
- are being successfully overgrown by well mineralised bone tissue,
- are characterised by mechanical strength sufficient for many kinds of operations as well as are solid enough for free manipulation during surgical procedure.

**Intellectual Property Right:**

Patent applied for but not yet granted

**Current Stage of Development:**

Available for demonstration

**Collaboration details:**

Joint Venture Agreement;  
Financial resources

**Nr PON/24/08**

**Title: Technology of utilisation melange - a rocket fuel oxidizer**

**Abstract:**

A Polish company related with waste management, recycling and utilization of dangerous military waste developed a new method of melange utilization. The developed technology is based on total destruction of rocket fuel oxidizer. The final product of destruction is 50% nitric acid. The partners for commercial agreement with technical assistance are expected.

**Detailed description:**

The company in collaboration with scientists working in Wroclaw University of Technology developed a method of melange utilization. The developed technology is based on total destruction of rocket fuel oxidizer. The final product of destruction is 50% nitric acid. The developed technology of melange disposal is a non-waste technology. The final product of utilization - 50% nitric acid - is totally used in nitrogen mineral fertilizers production. None of liquid and solid wastes as well as the other gases are emitted into the atmosphere during the whole process.

**Innovative aspect and main advantages:**

This method is totally safe and eco-friendly:

- the final product is totally used
- no pollution is emitted into atmosphere

**Intellectual Property Rights**

Patent(s) applied for but not yet granted

**Comments about market applications:**

**Collaboration details:**

Adaptation to specific needs;  
Technical consultancy;  
Engineering

**Nr PON/25/08**

**Title: Disperse system of vehicle monitoring using wireless transition and internet techniques**

**Abstract:**

System is based on communication mode GSM/GPRS, which sends vehicle's technical data to monitoring and visualization center. The data are presented in a form of website. The examples of transmitted data depending on the vehicle type are: speed, geographic position, power parameters, type of energy intake, temperature of used drive, active failure, conditions of vehicle's automatics and control

**Detailed description:**

Monitoring system might be used to monitor environmental changes, water level at depression channels, and positioning vehicle fleet as well as its control or control of public transportation fleet of vehicles

**Innovative aspect and main advantages:**

Usage of innovative communication's techniques and internet technology for vehicle's technical monitoring, especially traction vehicles.

**Intellectual Property Right:**

Others

**Collaboration details:**

Technical cooperation

**Nr PON/26/08**

**Title: Capillary semi-permeable membrane from polysulfon and polyrthersulfon**

**Abstract:**

This technology allows for the production of capillary membranes with different points of cut off, with outer diameter from 0,3 to 2,8mm and wall thickness ranging from 0,5 to 0,9mm. Membranes are bio- agreeable and might be used for filtration in the industry, science, and medicine. The Institute has also in its disposal a technology of using those membrane filtration modules.

**Detailed description:**

**Innovative aspect and main advantages:**

The Institute is the only place that produces capillary semi-permeable membrane from polysulfon and polyrthersulfon. There is only a handful companies abroad that are capable of production such a product.

**Intellectual Property Right:**

Others

**Collaboration details:**

Technical cooperation

**Nr PON/27/08**

**Title: Silica and Titanium silica Nanomaterials with strategically designed structure and properties suitable for high – tech usage**

**Abstract:**

Technology for innovative Nanomaterials was created on the basis of the soliquid-gelatin process using chosen silica and titanium precursors. Homogeneous structural qualities of synthesized nanomaterials were obtained by careful selection of the soliquid – gelatin process parameters, such as (pH, temperature, the dosage system). Silica nanoballs were obtained as functional and non-functional materials, created for build up into polymer matrix to modify its qualities (nonfillers). Silica – titanium nanoballs with developed surface and porous structure are characterized by specific catalytic qualities were obtained in a process of organic, molecular matrices build up. Draw up technology allows for the control of nanoballs size homogeneity by controlling the process in terms of nanoballs in take. The smallest obtained nanoball's dimension is 50 nm, the biggest is up to 600 nm. Above method allows obtaining nanomaterials characterized by surface size ranging from 200 to 1400m<sup>2</sup>/g, which is especially useful for catalytic type usage.

**Detailed description:**

Technology for innovative nanomaterials which has qualities such as:

- Homogeneous spread of nanoballs size
- Ball like shape, porous structure
- Cavity architecture in accordance with molecular structure

**Innovative aspect and main advantages:**

Innovativeness of this technology and its main feature is a fact that through the change of element's content it is possible to obtain nanomaterials with strategically designed architecture in accordance with high – tech requirements. There is no side effect products thanks to entire dissolvent recycle

**Intellectual Property Right:**

The intellectual property rights owner is the Industrial Chemistry Research Institute

**Collaboration details:**

License Agreement Technical;

Co-operation;

Joint Venture Agreement;

Manufacturing Agreement (Subcontracting & Co-contracting);

Commercial Agreement

**Nr PON/28/08**

**Title: New polymer composites made from polycarbonate waste, especially compact discs**

**Abstract:**

The main technology theme is a way of creating new polymer composites made from polycarbonate waste, especially compact discs. The process is lead by the method of reactive extrusion molding with simultaneous filling up (glass fiber, montmorillonite, graphite, silica nanopowder). Depending on the type and quantity of the filings this technology allows for obtaining new polymer composites including nanocomposites with unique properties such as: much better stiffness, substantial mechanic durability, and better heat qualities. Graphite composites are also characterized by good sliding qualities and durability against abrasion. The better stiffness results in larger stability of dimensions, and better mechanical vibration damping. Composites compared to the polycarbonates at the market have not only comparable properties but lower price.

**Detailed description:**

New polymer composites made from polycarbonate waste can be used as: railings for production line transporters, anti- abrasion strips, cochains, gear wheels, roles, tubes, gatherers, self seal rings, rotator and dosage pumps, valves, taps and filters frame, slide elements, tools for the loose materials transportation, cables holders, multi polar inserts for fuse base, elements for packaging and transportation machines, strips protecting quay against the abrasion, balling alleys surface.

**Innovative aspect and main advantages:**

The technology covers the newest achievements in chemical modification of polymer materials using waste, and or recycle materials, and quarantines that obtain polymer composites will have unique and high level of quality parameters, what results in a wide range of technological usage. Innovativeness and novel solutions present in the technology is confirmed by patent (P- 378227), as well as with numerous awards given to its authors at international fairs for innovations and inventions.

**Intellectual Property Right:**

The intellectual property rights owner is the Industrial Chemistry Research Institute

**Collaboration details:**

License Agreement Technical;  
Co-operation;  
Joint Venture Agreement;  
Manufacturing Agreement (Subcontracting & Co-contracting);  
Commercial Agreement

**Nr PON/29/08**

**Title: Production of zinc- oxide mono crystals**

**Abstract:**

**The method used for obtaining** zinc- oxide mono crystals is chemical transport of gas phase (CVT). Crystals (ZnO) are suitable for substrate to obtain thin layers based on ZnO (homoepitaxy). Crystals are the first products in a technology chain of production all kinds of semiconductors instruments.

**Detailed description:**

Zinc- oxide mono crystals are used in optoelectronics, are suitable for substrate to obtain thin layers based on ZnO (homoepitaxy), and also to epitaxy GaN

**Innovative aspect and main advantages:**

So far used method (Japan, Tokyo DENPA Company) is many times more expensive, hydrothermal method. New technology is characterized by reliability to obtain transport Conditions of source material for growing crystal, which was so far the biggest obstacle in production of oxide mono crystals at the gas phase.

**Intellectual Property Right:**

The intellectual property rights owner is the Institute of Physics PAS

**Collaboration details:**

License Agreement Technical;

Co-operation;

Joint Venture Agreement;

Manufacturing Agreement (Subcontracting & Co-contracting);

Commercial Agreement

**Nr PON/30/08**

**Title: The instrument indicating the lower attention state**

**Abstract:**

Optoelectronic instrument installed at the special spectacles frame, which include transmitter, receiver, microprocessor, chip, to analyze the location of spectacles frame and generator. The light beam of infrared frequency runs tangent to the eyeball. The lack of signal at the entry of receiver within given time created by blinking eye shows lower attention span (tiredness, sleepiness)

**Detailed description:**

The instrument indicating the lower attention state is dedicated for persons doing a long tiresome work in conditions endangering life such as drivers, machines operators, and rescue crews working at ozone deficient conditions. The instrument reacts to slower eye lid movement prior to sleep, which sets off an alarm. It can also send a signal about incoming danger to outer superior unit.

**Innovative aspect and main advantages:**

The usage of micro optoelectronic instrument located at the special spectacles frame, it non invasive instrument, there is no contact of eye ball with infrared radiation. By utilizing natural phenomena of slower eye lid movement prior to sleep. The instrument can be used by persons, who wear glasses to correct sight, or by persons who do not need correction- zero version.

**Intellectual Property Right:**

The intellectual property rights owner is Warsaw University of Technology

**Comments about market applications:**

**Collaboration details:**

License Agreement Technical;

Co-operation

Joint Venture Agreement;

Manufacturing Agreement (Subcontracting & Co-contracting);

Commercial Agreement

**Nr PON/31/08**

**Title: An instrument for detection of layer's structure delamination**

**Abstract:**

An instrument contains acoustic direction head, as well as mechanical linear and angular tracking, systems of data acquisition and analysis. Direction head allows for generating and receiving acoustic waves in given segment of researched element. The system of data analysis compares received signals from specified segment with standard signal. The differences discovered at certain levels results in sending information about structure failure and in order to eliminate that element.

**Detailed description:**

An effective and quick detection of layer's structure failures, especially to detection of delaminating of metal – semiconductor systems used in power diodes, and thyristors.

**Innovative aspect and main advantages:**

The technology allows for fast, non intrusive analysis of layer's structure by using surface acoustic waves. It results in elimination of failed elements before technology process is halted.

**Intellectual Property Right:**

The intellectual property rights owner is Warsaw University of Technology

**Collaboration details:**

License Agreement;  
Technical Co-operation;  
Joint Venture Agreement;  
Manufacturing Agreement (Subcontracting & Co-contracting);  
Commercial Agreement

**Title: Hybrid drive system**

**Abstract:**

Hybrid drive consists of many sources of energy (power). Thanks to appropriate connection structure between particular energy sources, as well as to usage of suitable selected drive components, with special emphasis put on the strategy of drive control it is possible to substantially limit energy consumption, including those of oil origin. It results in lower emission of toxic substances to natural environment being by product of burning mentioned above fuels.

**Detailed description:**

Hybrid drive mainly might be used in all kinds of vehicles exploited in cities. Mostly, it concerns usage, where such negative features as emission or noise are highly unwelcome, and were the lower possible fuel consumption is a target.

**Innovative aspect and main advantages:**

Currently, the theoretical possibilities of usage energies from number of many sources in hybrid drive, such as; combustion engine, fuel cell, or electrochemical batteries are well known. There are also known and formulated main kinds of drive structures in which particular element can be combining, for example – in series, or parallel drive. What is innovative in this technology is the way of design hybrid drive taking into account limits resulted from exploitation, and rigorous requirement concerned with drive function. It is especially important to suitably chose particular components, and draw out the best possible strategy for drive control. It is worth stressing that technology innovativeness is partly due to fact that currently it is impossible to talk about serial hybrid drive production. The goal is to produce such hybrid drive in which slightly higher price will be dwarfed by decrease in fuel consumption, as well as in toxic substances, including CO<sub>2</sub>. To build the drive the commonly accessible materials will be used, which will limit the expenses what will positively influence implementation of such a product into a production.

**Collaboration details:**

License Agreement;  
Technical Co-operation;  
Joint Venture Agreement;  
Manufacturing Agreement (Subcontracting & Co-contracting);  
Commercial Agreement

**Nr PON/33/08**

**Title: An instrument for micro hammering of the metal surface**

**Abstract:**

An instrument allows for local surface smoothing, as well as entering of cold work and shearing stress into surface layer. Work mechanism of the head consists of cyclical hitting of particular space with elements shaped as micro hammers with radius of working part curvature about 1mm.

The main elements of the head are:

- corpus shaped as double shield with pole keeping the head in grinding machine holder
- micro hammers with radius of the working part around 1 mm, rotary inserted in axles
- micro hammers axles produced from needle bearings
- elastic inserts to which micro hammers axles are hold
- shields that limit axis displacement of needle bearings, and protect the head from outside elements

An instrument is hold to, and generated from hand grinding machine with rotator speed of 3000- 8000 rpm

**Detailed description:**

An instrument for micro hammering of the metal surface is excellent tool for strengthening welded surfaces, as well as to the surfaces after previously electro- erosion treatment.

**Innovative aspect and main advantages:**

An instrument can be an excellent substitution to large, expensive instruments for hammering of the metal surfaces, especially in a case of local surface strengthening.

**Intellectual Property Right:**

The intellectual property rights owner is Warsaw University of Technology

**Collaboration details:**

License Agreement;  
Technical Co-operation;  
Joint Venture Agreement;  
Manufacturing Agreement (Subcontracting & Co-contracting);  
Commercial Agreement

**Nr PON/34/08**

**Title: Electrical atmospheric throwing power furnace - GOAT-700/54**

**Abstract:**

The furnace is dedicated for heat and chemo treatment in temperature up to 700°C, in the ammonia and nitrogen atmosphere. The furnace's retort is made from heat resistant materials, also resistant to ammonia.

**Detailed description:**

Electrical atmospheric throwing power furnace - GOAT-700/54 is used to chemo and heat treatment in the temperature range from 200°C to 700°C., and for elements ranging in mass from 600kg and max dimensions up to Ø400x700mm.

**Innovative aspect and main advantages:**

By using the furnace it is possible to create a process of nitrogenization in ammonia atmosphere and annealing recrystallization in the nitrogen atmosphere, also it is possible to insert large, up to 600kg. Appropriate ratio of retort's diameter to its height allows for even temperature spread through out the furnace, temperature range within ( $\pm 4^\circ\text{C}$ ), it results in quality improvement of treated items as well as low energy absorption, as well as a possibility to have a number of technological processes at the same time on the same inserted object.

**Collaboration details:**

License Agreement;  
Technical Co-operation;  
Joint Venture Agreement;  
Manufacturing Agreement (Subcontracting & Co-contracting);  
Commercial Agreement

**Nr PON/35/08**

**Title: Nitrogen Oxidation AG**

**Abstract:**

The result of nitrogen oxidation at the surface of quick drying steel made tools is diffusion layers, which consists of outer layer of oxygen and inner layer made from enriched nitrogen. It results in heighten durability of tools; they are less susceptible to usage, and corrosion. At the same time outer oxygen layer makes surface the darker more esthetic look.

**Innovative aspect and main advantages:**

One of the main features of the process of nitrogen oxidation AG compared to previously used Technologies is a division of nitrogen and oxidation phase in a water steam in such way as to eliminate creation of ammonia water in a smelter gas, which polluted the environment. In the process of nitrogen Oxidation smelter gases emitted in to the atmosphere consisted of neutral particles, such as nitrogen, water steam, carbon dioxide.

**Intellectual Property Right:**

The intellectual property rights owner is the IPM, and property rights to Technologies are available to the implementation unit.

**Comments about market applications:**

Improvement of quality and durability of produced tools.

**Collaboration details:**

License Agreement;  
Technical Co-operation;  
Joint Venture Agreement;  
Manufacturing Agreement (Subcontracting & Co-contracting);  
Commercial Agreement

**If you are interested in any of the above profiles, please contact:**

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