INNOVATION AND INTERNACIONALIZATION CATALOGUES

Environmental Companies

TECHNOLOGY PROFILES
2010

ACC1Ó
Competitiveness for Catalonia

Generalitat de Catalunya
Government of Catalonia

Ministry of Innovation, Universities and Enterprise
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2nd edition: May 2010

PHYSICAL AND EXACT SCIENCES,PROTECTING MAN AND ENVIRONMENT

Technology Offer

Non-clogging filter for a variety of applications for fluids filtration

(07 IL ILMA 0ILP)

Abstract

An Israeli SME has developed new non-clogging filters that can be used in multiple applications of solids separation, gas and liquids purification, including water treatment. The proposed filter is highly durable and very reliable even when treating aggressive and hot liquids and gases. Small, medium and large industrial filters have been produced and successfully operated. The company is looking for licensees and/or manufacturers that can adapt the technology to specific customers.

Description

The company's technology is the only industrial liquids and gas purification technology that eliminates clogging in filtration and solids separation processes.
This technology is an alternative to the use of Depth Filtration Cartridges, Grooved Discs, Screen and Thread filtration. It provides superior filtration characteristics compared to its competition.
The evaluation of the working performance and reliability of filtration equipment is largely dependent on reliability and performance of filter partitions. Such filter partitions – often called filtering elements – are made of various porous materials, for example: cloth, ceramics, ceramic-metal, grids, plates, fibrous materials, etc., in the form of spirals, cylinders or flat surfaces. Filtering elements produce filtering flow areas of fixed value. It means that neither pore size nor passage gaps can be regulated by conventional filtering elements, both during filtration and regeneration processes.

Unlike conventional filtering technologies, the company's filtering elements have the ability to precisely control the change of the properties of filtering elements – i.e. enlarge passage gaps during the flushing/regeneration step. The offered filtering mechanism traps solid particles of suspensions on the external surface of the filtration element while purified liquids or gases (filtrate) are released through carbine. When flow rate (production) falls below a pre-set value, the filtration procedure is automatically halted to start regeneration by applying flushing liquid or gas stream in counter-flow direction. During this process, passage gaps of the filtering element are enlarged while changing the element's mechanical properties. It is important that the energy of the counter flow of filtrate during the regeneration stage causes fluctuations and vibrations of the filtering element resulting in excellent partition cleaning and higher effective production rate.

Strong regeneration capabilities of the elements significantly improve service life, without requiring, in most cases, any special chemical treatment. The technology is designed for solids separation, water purification, aggressive liquids and gas separation and treatment.

The technology allows direct (regular) filtration and, in a combination with different granulated sorption materials, sorptive filtration. In the latter case, several processes of fluid treatment can be performed simultaneously, including micro-filtration, ion-exchange, separation, extraction, water disinfection, etc.

The elements can be produced to up to a length of 410 mm. Approximate flow rate for clear water based on these elements of 15 x 380 mm (active area dimensions) size with 7 micron average passage gap is 0.5 cu.m./h at 0.5 bar pressure drop. The largest module currently operated has a capacity of 150cu.m./h.

These elements provide ideal support for powdered and fine sorptive materials used for sorptive filtration – which makes it the most efficient way for simultaneous water purification from suspended and dissolved impurities– to any desired purity level:
• use of sorptive materials of down to 10 micron grain size drastically enlarges active area while providing much higher sorption capacity;
• small particles size result in much better sorption kinetics;
• exhausted /saturated sorptive material regeneration can be realized by using a co-current mechanism without material removal.

Sorptive filtration can be realized either by means of pre-coat mechanism or other solutions supporting high flow rates. This technology provides the largest surface/volume ratio (larger by up to 100%) and due to better sorption kinetics - largest product rate/volume ratio (larger by a factor of up to 10) compared to known pre-coat filtration technologies.

The technology in pre-coat operation was tested and used in following water treatments:
- iron removal from cold and hot water;
- heavy metals removal;
- organics removal in surface water filtration;
- oil removal;
- Giardia and Cryptosporidium removal and concentration for microbiological testing.

Innovations and advantages of the offer

• Changing filter geometry supporting multiple filtration grades and partition properties, while providing efficient self-cleaning;
• Exceptional resistance to most challenging operational conditions for filtration and self-cleaning processes;
• Several purification processes can be executed simultaneously.

Advantages:
-* No clogging during filtration;
-* Wide temperature operation range;
-* High abrasion resistance;
-* Resistance to oils, solvents, most oxidants, acids and alkalis;
-* Versatility and wide range of applications;
*- Low cost;
-* High reliability;
-* Long service life.

Current and Potential Domain of Application

•Oil – gas industry:
injected water filtration, Cooling- , Process- and

Recycled water, Alkali and Acid purification, separation and recycling;
•Water
-Drinking Water Purification : surface and underground potable water filtration, and purification from ferric compounds, heavy metals, radionuclide, arsenic, boron, nitrates, ammonia, dissolved organic compounds, pesticides, hormones, bacteria);
-Waste water purification : tertiary post- bio treatment of wastewater effluents: filtration and purification from heavy metals, mineral oils, ammonia, etc.
-Sea water desalination: Raw sea water filtration from solids and purification from organics, boron; Reverse osmosis and membranes protection;
Permeate (desalinated water) purification from boron.
•Industrial sewage treatment :
Sewage suspension separation; Heavy metals removal; Arsenic removal;
•Energy Industry:
Cooling tower water side stream filtration;
•Suspensions separation:
Industrial suspensions separation;
•Aquaculture:
Recycling of ponds water
•Irrigation:
Water filtration for drip- or sprinkler- irrigation.
•Swimming pools:
Water filtration, purification and disinfection
•Petrochemical:
Cooling , Process , Recycled water, Alkali and Acid purification, separation and recycling; Recovered and Injected water filtration; Oil-sand separation;
•Chemical:
Suspensions dewatering; Aggressive suspensions separation; Hot and aggressive liquids and gasses purification ; Cooling water filtration; Process water filtration and purification; Solutions clarification and purification; Galvanic solutions recycling.
•Oils purification:
Edible oils clarification; Used mineral oils filtration for reuse.
•Gas purification:
Power Stations exhaust gases that pass dust filters;
•Air purification:
Dust removal.

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OTHER INDUSTRIAL TECHNOLOGIES,PROTECTING MAN AND ENVIRONMENT Technology Offer

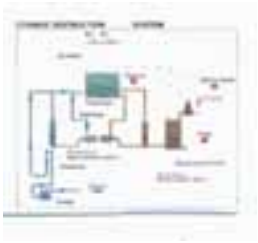
Revolutionary cyanide removal system for treating industrial wastewater - absolute decontamination from cyanide without use of chemicals

(07 IL ILMI 0JBN)

Abstract

An Israeli leading-edge SME has developed an innovative patented system designed to remove cyanide from manufacturing discharge waters without using chemicals, which enables a factory to reuse the water it employs in manufacturing. The company seeks partners for joint venture.

Description



An Israeli SME, a recognised expert in the application of breakthrough and innovative technologies and solutions for industrial wastewater treatment, purification and recycling, has developed an innovative patented system designed to remove cyanide from manufacturing discharge waters without chemicals, which enables a factory to reuse the water it employs in manufacturing.
The cyanide system oxidises the cyanides and thus liberates nascent ozone, nascent chloride and their respective hydroxyl radicals. The results are carbon dioxide and nitrogen. No other technology today is capable of doing that without using chemical reagents and without producing sludge.
The system works with many and varied applications in a full range of industries including: gold and silver mining, jewellery producers (gold & silver), electronics & manufacturing production, lead-sensitive industries, cyanide-producing and electroplating.

The systems can be supplied in either stationary or mobile configuration, tailored to the specific user's requirements. In the case of a mobile system, the deployment at the customer's site is only a matter of hours. The system operation is simple, safe and fully automated, allowing for 24-hour non-stop use. Operational costs are low - including modest energy consumption - and maintenance is reduced to a minimum. All of the human errors of under-dosing or over-dosing that occur today in the industry because of manual detox of cyanide are absolutely avoided when using this system, due to the stable and predictable process.

Innovations and advantages of the offer

• No chemicals.
• No sludge.
• Zero discharge.
• Allowing 24 hour non-stop use.
• Ability to be in compliance with the latest environmental codes, regulations and guidelines worldwide. • Fully automated system.
• Continuous-flow process.
• Very small surface/space requirements.
• Low electric power consumption requirements.
• Small footprint.

Current and Potential Domain of Application

solutions for metals processing, textile production, textile dyeing plants, cooling towers, heat exchanges and laundries.

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

A new technology for municipal and industrial wastewater treatment with low environmental impact

(07 IT SUTC 0JEZ)

Abstract

An Italian research institute has developed a new technology for wastewater treatment, characterised by high biomass concentration and negligible sludge production. When applied to industrial wastewater, it allows integrating biological degradation and chemical oxidation, which is useful to make biodegradable refractory contaminants. The institute is interested in technical cooperation with companies producing wastewater or developing solutions for textile and tannery wastewater treatment.

Description

Conventional suspended biomass reactors are widely used for municipal and/or industrial wastewater treatment, in spite of their specific drawbacks, such as low volumetric conversion capacity, which means large reaction volumes, low sludge settling rate, with consequent large-sized sedimentation tanks and high sludge production. High sludge production also bothers industrial wastewater treatments. It must be taken into account, in fact, that very often, together with biodegradable matter, industrial effluents contain pollutants refractory to biological degradation and/or toxic for the biomass. In order to remove such pollutants, a sharp increase of sludge production is expected since after conventional biological treatment at least a physicochemical polishing step is necessary to remove the recalcitrant compounds.
This explains the great effort being made worldwide to develop innovative technologies aimed at greater compactness, better operational flexibility and lower sludge production.

In such a context, an Italian research institute has developed a new technology for wastewater treatment, known with the acronym SBBGR (Sequencing Batch Biofilter Granular Reactor), based on a submerged biofilter that operates in a "fill and draw" mode, featured by maximum efficiency and minimum sludge production. SBBGR technology combines the advantages of biofilters (i.e., higher biomass concentrations and greater organic loads) with those of periodic systems (i.e., greater flexibility and stability). In addition, SBBGR technology boasts a unique feature: the presence of aerobic granular biomass. In fact, a large fraction of the biomass present in the system grows as granules characterised by very high density, as high as 30-40 kg/m3, to be achieved with interesting effects on sludge production.
Such a technology is effective also for the treatment of industrial wastewater recalcitrant to biological degradation (such as textile and tannery wastewater). In fact, SBBGR allows to integrate (“not combine”) biological degradation with chemical oxidation by dosing appropriate chemicals (i.e., ozone) in the reactor. In this integrated system, the chemicals consumption is minimised as it is used just to make biodegradable refractory contaminants successively removed in a biological reactor. The institute has developed and applied successfully the technology for municipal and industrial wastewater treatment, at laboratory scale. Recently, a SBBGR prototype has been implemented with a grant of the European Commission by LIFE financial instrument. The project is currently underway.

Innovations and advantages of the offer

SBBGR technology contributes to solve major problems in the field of wastewater treatments recognised worldwide, i.e.:
• The production of huge amounts of sludge usually associated with the treatment of concentrated wastewater.
• The difficulty to treat diluted wastewater (such as municipal effluents), giving rise to a very low biomass concentration when treated by conventional technologies, with negative effects on conversion capacities.

The high effectiveness of such a technology is due to

environmental impact

the peculiar characteristics of the biomass growing into the system. In fact, under specific operational conditions, such a biomass grows as very high-density granules, up to 4-5 times denser than the biomass growing in conventional suspended biomass systems. Such a high biomass concentration (up to 30-40 kg/m3) results in faster depurative kinetics, so that it is possible to treat wastewater in short time, in very small reactors and with low sludge production (i.e., almost one magnitude order lower than the one commonly reported for conventional systems).

Besides high conversion capacities (with consequent reduction of reaction volumes) and substantial (several times) reduction of sludge production, other advantages of SBBGR technology can be summarised in:

• Low footprint and high compactness since a single operative unit is needed to carry out all the steps of a biological treatment.
• The absence of secondary settling tank.
• Great operational flexibility, allowing wastewater treatment with variable volumetric flow rate and composition.
• Possibility to integrate biological degradation and chemical oxidation for the treatment of wastewater containing pollutants refractory to biological degradation and that need a chemical treatment to improve their biodegradability.

Current and Potential Domain of Application

Ensuring the decrease of environmental impact of effluents discharged into water bodies, the proposed technology will allow protecting he aquatic environment as well as all its related compartments and the health of human beings.

The above problems have international relevance and their solution, even if partial, will have a significant impact on the worldwide economy linked to the wastewater treatment market.

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OTHER INDUSTRIAL TECHNOLOGIES,ENERGY

Technology Offer

D-I-Y cleaning equipment using small turbine driven by a water pressure only

(08 CZ 0744 0IWD)

Abstract

A Czech company has developed an innovative principle for cleaning equipment. It is based on small turbine, which is driven by only the water pressure from the water tap. Advantages of this device are simple construction and ecologic propulsion without consumption of any energy. The company seeks partners interested in manufacturing cleaning equipment or in device-licence, joint venture & business cooperation.

Description

The technology uses movement of rotation caused by water source generated by the stream of water, which runs small cleaning brushes placed on rubber tubing.
The company seeks partners interested in manufacturing cleaning equipment or in device-licence, joint venture & business cooperation.

Innovations and advantages of the offer

The principle of the small turbine, which drives the cleaning equipment, has been patented and is ready for the market. It uses the moment of rotation caused by small water source. It is applicable for cleaning purposes, when the stream of water moves small cleaning brushes. The developer looks for a company ready to purchase a licence and start manufacturing the product.

Current and Potential Domain of Application

The technology is simple, new and cheap. It uses the moment of rotation caused by small water source. It is applicable for cleaning purposes.

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

Desalination of waters / Water Treatment

(08 DE 1592 0IKS)

Abstract

The enterprises` technology produces industrial water for much less than half of the costs of common technologies.
The technology can be used to optimise existing systems or to project new ones. The technology produces with much less energy costs, because of mainly using the gravity for agriculture, industries and households.

Description

Subject of the project is desalination of (surface) waters via the biotechnological process of bioaccumulation of sodium chloride. Embedded into a preliminary purification process (e.g. elimination of oil pollution via microorganisms) and possible after treatment process, depending on quality requirements. Results- fresh water extraction - from industrial water to drinking water. Also salt qualities special sodium chlorides (comparable to Sel de fleur) can be produced.
If substances are absorbed by organisms and resorbed, yet not biologically degraded, this leads to an accumulation of the substances in the biomass. This process is called bioaccumulation. Depending on the individual organism, this ability of accumulation is developed to different extents. Some species are capable of enriching even the lowest concentration of a substance from their surrounding medium for example in order to eliminate harmful and toxic or dangerous substances. These procedures play an especially important role particularly in the decontamination of non-degradable heavy metal salts too. The high salt concentration in fresh water surface waters such as rivers and lakes leads to a change of the biocenosis a significant influence on the human beings taking their industrial and drinking water from these waters. With his new technology it is possible to desalinate surface waters and to maintain their natural (measurable) fresh water status.

Innovations and advantages of the offer

The desalination process is based on modified, natural existing microorganisms. They are able to transport and solve it naturally with their semipermeable membrane (natural osmosis). In the course of this process crystalline structures appear on their surfaces, which were as overlap skimmed regularly and used to extract e.g. ski salt. The water phases sediment from each other through force of gravity after recovery and switching off the agitators.

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

Innovative Water Disinfection System

(08 DE 1699 27HP)

Abstract

A small German company specialised in water treatment systems has developed an innovative water disinfection system for germs reduction. The system is successfully used in Germany. The company wants to expand its activities and is seeking partner for commercial agreements with technical assistance and technical cooperation.

Description

The UV systems for drinking, industrial and waste water disinfection have been used for several years. The systems existing on the market, among others, show problems due to the contamination of the lamps located in the water.
By line-technical optimisation, a system was developed that is inured to contamination. The disinfection of the water by means of UV radiation is an inexpensive method since no chemicals have to be used.

The water is pumped through a quartz glass pipe installed within an aluminium pipe. Around the quartz glass pipe, low-pressure UVC radiators are arranged, emitting a wave length of 253.7 nm. This radiation destroys the DNA of the germs, cell division of that will be avoided by this. Special O3 radiators additionally generate a radiation of the wave length below 200 nm, that forms free ozone radicals from the air oxygen fed in. Ozone is one of the strongest oxidants and decomposes environmental toxins, avoids biological films and contains a short-term depot effect before it decomposes into oxygen again. Another advantage of ozone includes is that it also destroys germs and is much more effective than chlorine. The handling of dangerous chemicals is omitted. In case of air washers optionally, conductance measurement with automatic desalting can be implemented. Flow controllers and fault lock-on to GLT and other customer-specific functions can also be implemented.

The objective of the development of such systems for water disinfection included the optimised use of low water quantities. It is a system where the radiation source is not in the water as with most systems, but is arranged externally around a quartz glass pipe where the water is flowing through. So the expensive cleaning of the lamps is omitted. In addition the air cooling provides an optimum operation temperature.

Innovations and advantages of the offer

- Innovative reflection design enables low power consumption with simultaneously increased efficiency.
- Lowest decline in output of the radiators at increased water temperatures
- For the first time, disinfection is possible at temperature above 60 °C, conventional systems enable 30 °C at the maximum.
- No cleaning expenses, difficult rinsing with acid as well as storage of dangerous chemicals are omitted.
- Low power consumption (total electrical power of the system: Eco 1 x 16 W - radiator // Industry 1 - 2 x 16 W radiator)

Current and Potential Domain of Application

In various industries, especially in hot-water tanks, for drinking water treatment in food industry, in swimming pools, for well restoration, for fountain water treatment and for the disinfection of air washers and air conditioning systems.

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

Ionic exchanger on basis of natural material for waste water treatment

(08 DE 18A5 0IRP)

Abstract

A German company modifies natural material for different applications in household and industry. Its newly developed cationic exchanger, manufactured on basis of natural material, can be applied for different industrial requirements, for example waste water treatment. They are looking for a partner for technical cooperation but also for a licence agreement and financial support.

Description

A German SME produces a cationic exchanger on the basis of natural material. It has its applications in the traditionally ionic exchangers as well as in the solution of waste water treatment in which such technique had not been applicable so far. The ionic exchanger removes solved metals also in low residue concentration reliably and fast out of production sewage water, process water and ground water. At the same time the costs for water treatment can be reduced.

By interaction of the new basic structure and the combination of metal-binding groups new characteristics can be achieved. These are in particular :
- comparably high sorption capacity of light and significantly higher of heavy
  metal ions,
- high sorption speed,
- increased metal binding in presence of ammonium,
- filtration of suspended sediments and included unsolved metals.

Innovations and advantages of the offer

- Products composing the natural material are biologically degradable.
- Sustainable products with unique features.
- Can be built into existing ionic exchanger to substitute the former synthetic
  ionic exchanger without additional effort.

Current and Potential Domain of Application

Ionic exchange, biofuels, biodiesel-waterfree production.

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INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

Technology Offer

Scrap Tyre Compaction System

(08 GB 41n8 2S0N)

Abstract

A UK company offers a system for compacting motor vehicle tyres thereby reducing their bulk volume for onward transportation as one step in the re-cycling process. Partners are sought either from within or those with an understanding of the scrap tyre industry. Partners are sought either to licence the technology or for technical co-operation to further develop the technology and bring it to market.

Description

A UK company has developed a system that significantly reduces the bulk and volume of individual end-of-life vehicle tyres, by cutting and joining them into a continuous, compact form. The resulting compacted tyres take up significantly less space which has benefits for storage and transportation.

In essence, the system works by first cutting the wire bead. The tyre is then converted into a strip of rubber which is then joined to adjacent tyre strips. The joined strips are then whole rolled into a compact disc. The photograph below clearly demonstrates that by using this system ten tyres can be compacted into the volume taken by less than two tyres.

A manual version of the machine has confirmed the system's basic performance and a UK Patent application has been filed. Strong interest has already been shown by companies involved in the automotive aftermarket. The process will be applicable to all types of tyre, from unused tyres to used tyres that have been in storage for many years.

The technology and know-how to develop an automated version of the system is understood. It could be envisaged for example that an automated version of the machine could be mounted at the rear of a lorry for ease of transport, whereas a mobile version of the machine could provide an inexpensive way of clearing this dangerous and often unsightly waste.

Partners are sought either to license the technology as is or to work with the company to help complete the development of the automated system and bring it to market. In the latter case, the company would ideally be looking for partners that are able to co-finance the development work and who have appropriate access to market.

Innovations and advantages of the offer

The process reduces the volume of a stack of tyres to around 15%, allowing lorries to be loaded to their weight capacity, rather than volume capacity.

The rolling process results in a compact disc of tyres, making it easier to move using mechanical handling methods and to present them more conveniently to machines that will undertake further processing, whether tyre-derived fuel plants or crumbing systems using choppers or tread strippers.

This compaction system also destroys a tyre and thus ensures that scrap tyres cannot be re-sold, preventing potentially dangerous situations.

The reduction in storage space required by tyre re-processors is a further advantage.

Current and Potential Domain of Application

Automotive aftermarket; tyre transport companies; tyre reprocessing and re-cycling companies; waste management companies.

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

New concept of water treatment –accelerates natural phenomena to inhibit scale and corrosion, eliminate the use of inhibitors and any additives

(08 IL 80ER 2S2B)

Abstract

An Israeli SME manufacturer of water treatment systems and service company has developed a unique water treatment which is implementing special technology in treating water in cooling towers, hot water systems, commercial applications, drinking water, process water, reverse osmosis etc.
The new developed concept of water treatment – instead of using additives to inhibit scale and corrosion, accelerates those natural phenomena in the products. The company seeks partner for cooperation

Description

An Israeli company, a manufacturer and service company has developed a unique water treatment which is implementing special technology in treating water
By doing that the problems that were traditionally solved by inhibitors are being solved currently with the new products.
The technology can be used for treating without any additives, cooling towers, hot water systems, reverse osmosis systems, closed loops etc.

The natures of the products are reactors and settlers which the water is passing through them.
The new reactor and settler is designed to solve problems in cooling towers, Reverse Osmosis pre-treatment Hot water, Fe removal, closed cold and hot water systems and process water systems.

The technology is based on the concept that each water system is actually acting as a reactor and a settler, producing scale and corrosion compounds and accelerating bio-life growth. A new algorithm has developed by the company, which calculates the amount of scale and corrosion compounds and bio-life that each and every water system can produces, in terms of weight and time (the same as producing any chemical compound using a reactor and settler).

According to the calculation the reactors are being designed and integrated in the water system. Scale and corrosion compounds are being produced in the reactor instead of in the water system. While the bio-life is eliminated by natural biocide which is being produces in those reactors.
The driving force for the reactor is partial electrolysis of the water.

Traditional water treatment follows stability curves exceeding the stability curves show the potential of scale formation or potential for corrosion acceleration. The innovation is calculating a dynamic stability curve - this curve is typical to each and every water system. Therefore, the product can calculate the dynamic stability for each individual water system. The reactor is driven by partial electrolysis. Every electrolysis cell will deposit scale on the cathode. However the company developed a calculation method that can act as a package and the electrolysis cell will produce the right amount of scale that should be removed in order to meet the dynamic equilibrium curve.
It's developed, installed and implemented successfully worldwide. There is a full match between the market trend and the technology

Innovations and advantages of the offer

•The Technology does not require any acid.
•Eliminate the need of any additives- typical to each and every water system.
•calculating a dynamic stability curve
•Environmental friendly- Not discharge hazard waste to the environment and conserve water. 1.The treated water can be at a lower grade than drinking water.
2.The technical performances are equality or better to the chemical inhibitors treatment.
3.The operating price is lower than the chemical inhibitors.
4.Cost-effective:
In cooling towers application: to treat 300 TR normally with traditional treatment will cost USD 10,000 per year. The new offerd technology will cost USD 3,000 per year as service fee

Current and Potential Domain of Application

recycling of concentrate water for desalination, protection of reverse osmosis systems, filters embedded in the reverse osmosis system for desalinisation - improves the efficiency, processes where water without salts is required for production

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

Innovative system to reclaim the subsoil and depurate the ground waters

(08 IT 53U6 0IMO)

Abstract

An Italian University is developing an innovative system able to reclaim the subsoil of the polluted sites and to depurate the ground waters. The system uses natural and biodegradable materials without altering the ecological balance of the ecosystem and ground waters. The system is adaptable to different hydrogeological and stratigraphic contexts. The University is looking for partners for testing, technical co-operations and commercial agreements.

Description

An Italian University is developing an innovative system to reclaim the subsoil of the polluted sites and depurate the ground waters. It is able to anticipate the reclamation timing of the polluted sites and eliminate the pollutant proprieties of the ground waters accelerating the percolation process and the collection of the contaminative substances. The system is easily adaptable to different hydrogeological and stratigraphic contexts and guarantees excellent results in polluted sites contaminated by different types of substances (oil, fats, acids, etc.).

Innovations and advantages of the offer

The system is based on innovative technologies involving hydraulic, physics, chemical, and mechanics processes. It utilises natural and biodegradable materials without altering the ecological balance of the ecosystem and ground waters.

The main advanteges are:
• The sites and ground waters will be reclaimed in a very short time (by 6 months);
• The system is low cost;
• The system avoids the pollution of the deep ground waters usually used for irrigation.
• The system allows to reutilize the grounds reclaimed in a very short time (e.g. using the system will be possible to reclaim the unauthorized dumping grounds and reconvert them in authorized ones).

Currently there are on the market no technologies, processes and systems with the same functionalities and able to reach the same goals in a such short time.

Current and Potential Domain of Application

Public organization or private company involved in the waste management process;

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ENERGY,PROTECTING MAN AND ENVIRONMENT

Technology Offer

Biodiesel production by enzymatic catalysis

(08 IT 55Y2 0IEL)

Abstract

An Italian university research group has developed a new technology dedicated to the green production of a biofuel (biodiesel). This technology is a green alternative to current industrial methods, which uses a heterogeneous biocatalyst (immobilised lipase) that works in mild conditions without the formation of by-products. The university is looking for industrial companies working in the chemistry and biotechnology sector, and are interested in a technical co-operation agreement.

Description

Lipases used in biotechnology are normally of microbial origin and produced by fermentation processes. A number of commercial lipases are available for applied biocatalysis. Whilst some are employed as free powders the majority are used as immobilised preparations. Some of the latter are commercially available, and in a number of cases the enzymes have been immobilised on different supports. The present technology use a lipase (E.C. 3.1.1.3; triacyl glycerol acyl hydrolase) immobilised on mesoporous silica. Focus is on the structural features of the solid support upon chemical modification by a widely adopted procedure. The potential of the immobilised biocatalyst is towards the ethanolysis of sunflower oil in solvent-free conditions to produce biodiesel.

Innovations and advantages of the offer

The innovative aspect is the possibility to produce a renewable energy with a sustainable method that uses a biocatalyst coming from living organisms. The other innovative aspect is the immobilisation process, which produces a heterogeneous biocatalyst that can be reused several times thus decreasing its cost. The biodiesel production through immobilised enzymes presents the following advantages:

- Mild operative conditions. The reaction can be carried out at atmospheric pressure and low temperature (20-40°C). This requires less expensive plants and reduces safety hazards.
- No by-products are formed. At the end of the reaction only esters and glycerol are present. This drastically reduces expensive purification steps.
- Lipases catalyse both esterification and transesterification reactions. Thus even in the presence of a highly acid triglyceride feedstock no pre -treatments are needed.

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BIOLOGICAL SCIENCES,AGROFOOD INDUSTRY

Technology Offer

New mesoporous materials to create new supports for biosensorsis

(08 IT 55Y2 27FY)

Abstract

An Italian company, involved in the field of nanotechnologies in agro-food chain and in veterinarian field, has developed a new mesoporous materials for the immobilisation of biomolecules or micro-organisms on solid substrates to create new supports for biosensorsis. The technology provides new possibilities in the field of materials science, cosmetic formulations of sunscreen and in the packaging of food.The company is looking for technical cooperation agreement.

Description

The technology is based on the development of new mesoporous materials, for the immobilisation of biomolecules, or micro-organisms, on solid substrates for creating new supports for biosensors. The development of the so called sol-gel process provided new possibilities in the field of materials science, in fact the sol-gel route using organic-inorganic hybrids for the encapsulation of fragile biomolecules is a new discovery.

The well-defined pore structure is one attractive characteristic of these materials, able to be infiltrated into these pores to generate a responsive device for specified applications. The company has extended the method for the fabrication of well ordered mesoporous titania thin films for biosensors incorporating biological elements in these materials for the detection of dioxins, making a new type of biosensor with high sensitivity and simplicity of measurement. This device allows to track the presence of dioxin but the company's target is to expand this system for creating a multisensory for the detection of different contaminants, bacteria or toxins.

The technology developed for packaging of fruits is based on the synthesis of new materials composed of natural, biodegradable, antibacterial films with innovative properties. Polymeric films can extend the shelf-life of food controlling the permeation speed of compounds with low molecular weight towards the inside and towards the outside of packages.

Innovations and advantages of the offer

The innovative aspect of this materials, made on sol gel, for biosensors is that has never been used for the detection of food contaminants such as dioxin.

Moreover the bio-element used on the surface area of the pores identifies small quantities of the target molecule. Often, the packaging of food, the influence of the microbial growth, the presence and the concentration of gas and vapor, usually induce physical processes and chemical and enzymatic reactions able to cause in a short time the qualitative decline of food products. The technology overcomes all these problems because it allows control the porosity of the film and with some component it is possible to provide some antibacterial property to the film.

Using nanotechnology is possible to increase the mechanical properties of the film giving a bigger resistance. To improve the cosmetic formulations of sunscreen it is possible produce nanoparticles very small used in cosmetic formulations to avoid the white effect of sunscreen and with a higher shield against the sun. The technology offered ensures safer products for consumers with an anti-intusion properties and highly controlled.

The main advantage of mesoporous materials for biosensors and in particular for the detection of dioxin is that it is a simple method, low cost, easy to use, rapid, and very sensitive in comparison with the methods normally utilized, because it can immobilise small quantities of the target molecule in the nanopores. For the synthesis of these materials the company uses a new "green" method with a low environmental impact.

Current and Potential Domain of Application

These new products may be used in livestock and in production processes for the quality control, having a highly positive impact on food and consequently about their safety. The fields of application are:Quality control, Cosmetics, Packaging, Biodegradable processes.

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MEASUREMENTS AND STANDARDS,PROTECTING MAN AND ENVIRONMENT Technology Offer

Automatic Station for Detection of Petroleum-Originated Pollutions in Water (08 PL 61AJ 0J1Y)

Abstract

A Polish institute has developed a new system designed for water monitoring. The main part is a floating sensor platform. The system is monitoring water's quality, and in particular detecting oil spills. The technology allows to build environmental monitoring systems and early warning systems for pollutions (in particular oil spills). The institute is looking for industrial partners for joint further development and adaptation of the technology to specific needs.

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Description

A Polish institute 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 has developed a technology which is designed for water monitoring.
Its main part is a floating sensor platform. The system is monitoring water quality, and is in particular detecting oil spills.
The technology allows to build environmental monitoring systems and early warning systems for pollutions (in particular oil spills).

Innovations and advantages of the offer

The platform is equipped with a set of photovoltaic panels providing power to the instruments. Backup battery power is also provided, if sunlight is not available (e.g. at night). The platform is equipped with a set of sensors (contact and contactless) monitoring water quality; in particular, detecting oil spills.
A built-in computer analyses sensor data and transmits alerts and reports to a central location over a GSM network.
A central computer collects and logs data from multiple stations. It allows the operator to monitor and analyse both real-time and historical data, either locally or over the Internet or Intranet.

PROTECTING MAN AND ENVIRONMENT

Technology Offer

A New Device for Purifying Cutting Fluids Emulsion

(08 PL 61AJ 0J20)

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.

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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.

Innovations and advantages of the offer

This innovative solution is based on the coalescence phenomenon used in the removal of leakage oil. The use of a suitably shaped tank in the disinfection unit enables thin-layer distribution of the cutting fluid and increases the effectiveness of bactericide action of UV radiation.
This device can be easily connected to the tanks of different types, thanks to suitable hose-pipe terminals. The side-system enables treatment of the fluids without stopping machine operation.
Application of the new device enables the maintenance of cutting fluid in relations to purity and the inhibition of microorganism development. Moreover, it eliminates disagreable odor without necessity of biocide use.

ENERGY

Technology Offer

Biogas-fired heat and power plant – energy from waste dumps

(08 PL 64BJ 2RW0)

Abstract

A Polish technical enterprise offers a technology for waste dump biogas utilisation. The solution can be used on any waste dump sites and allows improving their cost-effectiveness, limiting the emission of irritant odours or preventing self-ignition, oozing and displacement of gas. The company looks for partners willing to buy the technology or partners interested in the development of the technology.

Description

A properly managed waste dump can also be a source of cheap renewable energy in the form of waste dump gas. With regard to environment protection the gas produced due to degradation must be properly stored and neutralised.

A biogas-fired heat and power plant, installed on a waste dump, consists of the following installations/units:
1. Gas installations.
a) Gas treatment plant.
b) Torch.
2. Co-generation unit - waste dump gas fire generating set.
a) Electric power output system.
b) Heat energy output system.

In principle, this gas is costless and its utilisation in this module with the gas engine significantly improves the profitability of the waste dump.
The produced electric power can be sold to the public network or used on spot (e.g. lighting of streets and public service buildings, etc).
The heat energy, which is produced during the electric power production process, can be used for the heating of such places as hospitals, schools, institutions, office buildings etc.

The Polish company is interested in a co-operation according to the following rules:

a) Sale of a complete heat and power plant (or power plant only, according to the need); sale of modules, complete systems, installation and consulting services in the field of service and operation of the installations, services or training for persons, appointed by the client.
b) Object building and operation in the scope of the contract. The contract with the company would mean that they would pay the client for the gas delivered from his waste dump and all the other matters would belong to the company. Within the contract they would start the whole investment for the client and overtake the entire responsibility for the operation of the power installations.
c) Establishing of a capital company with the client, which would be engaged in the production and utilisation of the waste dump power gas.

Innovations and advantages of the offer

The idea of biogas utilisation is well developed but many aspects of the technology have an impact on the effectiveness of the processes.

The company offers the know-how that allows to develop cost-effective and technologically up-to-date solutions connected mainly with co-generation units and heat and power output units.

A controlled operation of a waste dump as a natural gas deposit has many additional advantages: it limits the emission of irritant odours, prevents self-ignition, oozing and displacement of gas. The waste dump site can be promptly reclaimed.

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INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

Technology Offer

Drums and Intermediate Bulk Containers Reconditioning

(08 PL SPIM 0JX7)

Abstract

A Polish SME offers a technology for cleaning of drums and Intermediate Bulk Containers (IBC). It allows full reconditioning of the containers. The partners for commercial agreement with technical assistance, technical cooperation, joint venture or manufacturing agreement are sought.

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Description

A Polish SME active in waste utilisation offers a technology for cleaning drums and Intermediate Bulk Containers (IBC). It allows full reconditioning of the containers with efficiency of about 60 to 100 drums or 10 to14 IBC per hour. The process ensures:
• Container's interior drying.
• 4-stage or 2-stage cleaning of interior and exterior of the container.
• Correction of the barrel geometry and construction.
• Disinfection and sterilization of the container.
• Automatic leak-proofness testing.
• Outer surface finishing.
• Mechanical repair of the pallet and steel crate.

The technology is compatible with EU requirements.

Innovations and advantages of the offer

- High efficiency of the process. - Possibility to use steel drums and IBC containers many times.
- Money saving.
- Materials saving - eco-friendly technology.

ENERGY,PROTECTING MAN AND ENVIRONMENT

Technology Offer

Economical and efficient production of energy from municipal waste or sludge (08 PL SPIM 0K2H)

Abstract

A Polish SME active in the area of waste management and environment has developed a new technology for safe and clean waste utilisation with the option of energy production. The SME is looking for cooperation in shape of license agreement, commercial agreement with technical assistance or technical co-operation.

Description

A Polish SME active in the area of waste management and environment has developed a new technology for safe and clean waste utilisation with the option of energy production. The technology bases on two chemical processes that take place in closed reaction chambers. The first process is mineralisation (incineration) of waste with the help of properly selected catalysts at the temperature of 550ºC. The process takes place in a closed chamber. The by-products of the first process are: combustible gas and fully neutral ash. If any glass and metal elements were present in the waste they would remain unchanged after the whole process. The ash produced in the processing of organic elements is completely safe and meets all European standards for neutral waste. It can also be stored in open dumps. The main components of ash are: CaO, Al2O3, SiO2, Fe2O3. In the ash no Co, Pb, Tl were detected, and the remaining metals such as Ca, Cr, Mn were present in trace amounts. The second process is flameless gas combustion in a closed chamber. The flameless combustion with the help of properly selected catalysts converts the combustible gas into CO2 and H2O. The process of catalytic flameless combustion does not lead to production of dangerous compounds such as dioxins, furans and nitric oxide, which in turn eliminates the necessity of using expensive filters. The additional advantage of this method is the production of a substantial amount of heating energy as during a normal combustion process. This energy can be used for heating purposes in buildings, or can be converted into electrical energy using generators. Several trial installations proved the superiority of this technology, mainly because its cost-efficiency allows reducing exploitation costs up to 60%. In case of selling of the surplus of energy, the earned income can exceed the exploitation costs of the waste utilisation. There is a 15-fold reduction of the waste volume and a 50-fold reduction of the weight. Profits can be expected after 24 months after reaching the full production capacity, depending on waste composition.

Innovations and advantages of the offer

- The ash produced in the processing of organic elements is completely safe and meets all European standards for neutral waste.
- The process of catalytic flameless combustion does not lead to production of dangerous compounds such as dioxins, furans and nitric oxide, which in turn eliminates the necessity of using expensive filters.
- The advantage of this method is also the production of a substantial amount of heating energy as during a normal combustion process.
- There is a 15-fold reduction of the waste volume and a 50-fold reduction of the weight.
- The cost-efficiency of the technology allows reducing exploitation costs up to 60%.

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INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT — Technology Offer

Energy Collector for geothermal, ground and water heat pumps. (08 SE 67CJ 0JFO)

Abstract

An innovative Swedish company has developed an environmental friendly Energy Collector used for geothermal, ground and water loop heating applications. Using this collector, more customers have the possibility to utilize geothermal heating also those living in water protection areas or any other protected areas, since it provides a solution for all types of leakages.
Partners from the renewable energy sector are being sought for commercial agreement with technical assistance.

Description

The Green Energy Collector is composed of a number of different parts as the energy capsule, the casing pipe cap and protection and the polyethylene pipe.
Bio-ethanol is used as refrigerant. Together it provides an environmental friendly and safe collector used when installing geothermal, ground and water heat pumps.

After drilling the energy capsule is lowered into the borehole and filled with water. The energy capsule is pressed against the wall
-to protect the ground water from the collector content in case of leakage,
-to seal different water levels from each other and
-to strengthen the borehole to avoid collapse.
Neither Bentonite nor cement is required.

A Casing protection is used to protect the energy capsule and the pipe when lowering into the borehole.

The Energy Collector consists of winded energy pipes (diameter of 40 or 32 mm) with a welded U-turn. The collectors exist in dual, triple and quad winded versions and the pipes are manufactured in a high-grade PE80 material.

The company is an experienced and innovative plastic pipe manufacture since the 1970s. They provide pipes, connections, caps, manifold chambers and all sorts of products used in geo-thermal applications. Their products are made with highest quality and according to European Standard EN 12201.

Innovations and advantages of the offer

-The Green Collector saves money and trouble for the entrepreneur, when bentonite/cement no longer are required.

-The Green Collector is easier to lower into the borehole and is maintenance friendly.

-The consumers never have to consider leakage into their drinking water.

- More customers have the possibility to go geo-thermal, even if living in a water protection area or any other protected area.

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AGRICULTURE AND MARINE RESOURCES,PROTECTING MAN AND

Technology Offer

Biological decomposer for fast and controlled composting with significant reduction of odours, methane and ammonia

(09 CZ 0744 3F7B)

Abstract

A Czech Co. manufactures a powdered mixture of lyophilized bacteria strains and enzymes that commit fast and controlled decomposition of organic stuff within 3-6 months (obviously, time of decomposition depends on weather/season conditions and structure of the compost). It decomposes also cellulose, lignin, fats, horns. The invention ensures high stabilization of bio-waste and significant reduction of odours, methane and ammonia. Partners for collaboration on commercial applications are sought.

Description

A Czech company has developed and now manufactures powdered blend of certain lyophilized bacteria strains and enzymes that speed up and control composting process.

If we assume that typical composting process takes 12 months, and produces approximately 6kg of methane per 1 tonne of the dry matter, then with the application of the invention the time of decomposition may be reduced to 3 months, committing reduction of methane by 50%. This has been confirmed by the tests run in Germany – in the tests was used an instrument working on photo-acoustics spectroscopy principle (Brüel and Kjaer 1302).

How the invention works? In essence, growth of aerobic bacteria strains is intensified and unwanted anaerobic processes are suppressed. Nitrifying bacteria decompose unwanted gas compounds like NH3, CO2, CO, N2O, NOx, H2S.

Creation of methane and other unwanted odours (… and insects) are reduced remarkably. Therefore, it is possible to compost organic material not far from urban areas. The decomposer supports namely hydrolysis sub-step of the process of decomposition while it also ensures decomposition of substances which are partially or heavily resilient to decomposition such as are cellulose, lignin, fats/lipids, horns, etc.

Intensified biological process, commited by the invention, ensures also significantly higher stabilization of the biological waste and better dewatering. Controlled fermentation process allows also hygienization of already stabilized biologic material.

The decomposer is ready for application, samples are available upon serious request.

Innovations and advantages of the offer

- very fast and controllable decomposition of organic material (up to 3x faster than classical 12 month period of composting)
- significant reduction of odours, methane and ammonia
- better dewatering and stabilization of composted waste

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

High-performance and easy-maintenance primary shredder for the recycling industry (09 DE 0855 3DY8)

Abstract

A small German company has developed a frequency-driven rotor shredder for efficient primary shredding of different materials in the recycling process. The system is characterised by low wear as well as easy maintenance and re-conditioning, which guarantees high equipment availability. Companies from the recycling and waste recovery sector are sought for commercial agreements with technical assistance.

Description

Shredding is a basic process in the recycling industry. A large variety of technologies are available. Yet, most of them suffer from problems such as high and incalculable maintenance costs due to wear, shortcomings in equipment availability due to complicated reconditioning procedures or deficiencies when dealing with tough materials.

A German company has developed a frequency-driven primary shredder/rotor shears for efficient primary shredding of different materials in the recycling process. The system can be used for a wide range of wastes such as aluminium, tyres and electronic scrap, including materials that cannot be handled with conventional machines (such as giant tyres).

The machine works as follows: two parallel cutting shafts are driven in opposite directions by two industrial gears. The gripper hooks of the cutting shafts draw the input material centrically into the cutting shafts. In case of overcharge, a current-based reversing controller protects the machine from damage.

Wear of the shears is significantly reduced through the special construction. Even where wear is inevitable, maintenance is easy due to the rapid exchange system of rotor shears. These features allow for high equipment availability combined with low and calculable maintenance costs.

Primary shredders can be designed in stationary as well as mobile configurations, with and without conveyor technique. A pushing device helps to stabilise the desired capacity in case of bulky material. The primary shredder includes feed hopper, frame and central control unit.

Innovations and advantages of the offer

- High-performance, frequency driven primary shredder capable of reducing materials that cannot be handled by conventional shredders.
- Extremely sturdy and torsion-proof steel welded machine construction.
- Rapid change system of cutting shafts.
- Maximum tool life due to wear-resistant layer on knives.
- Calculable costs of wearing part.
- High operation reliability and equipment availability.

Current and Potential Domain of Application

Primary shredding of materials such as domestic household, commercial and industrial waste, electronic scrap, used oil-filters, plastic waste, wooden waste, textile waste, used car and truck tyres, huge tyres of mining vehicles, paper, files and paper board, refrigerators.

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PHYSICAL AND EXACT SCIENCES,PROTECTING MAN AND ENVIRONMENT Technology Offer

Low-wear granulators for secondary shredding in the recycling industry (09 DE 0855 3DYJ)

Abstract

A small German company has developed an innovative secondary shredder for the recycling industry. The machine granulates pre-shredded and pre-treated input material into the desired grain size of the final product. Its main innovative features are low wear and easy maintenance. The company seeks industry partners from the recycling and recovery sectors for commercial agreements with technical assistance.

Description

A small German company has developed an innovative secondary shredder for granulating pre-shredded and pre-treated input material into the desired grain size of the final product. The materials that can be treated range from household and industrial waste to electronic scrap and used car and truck tyres.

The granulator works as follows: The rotor, equipped with fly cutters, granulates the input materials with a speed of 420 min -1. Rotating inside the machine, the material is reduced until it is small enough to pass through a sieve located below the rotor. Any required output size can be attained by exchanging the sieve inserts.

The swivel-mounted stator swings out in case of incompatible material input. This way, a much higher operating safety can be reached compared to conventional secondary shredders with fixed stators. In case of disconnection, the stator can be readjusted quickly and easily into its initial position due to easy handling and hydraulic support.

The stator knives can be linearly readjusted up to 30 mm, which significantly reduces their replacement intervals. Furthermore, the stator knives and knife carriers can be rapidly exchanged. These features allow for a high equipment availability combined with low and calculable maintenance costs.

The secondary shredder is delivered with feed hopper, frame and central control unit. Depending on feeding and input material, the secondary shredders can be equipped with a pushing device.

Innovations and advantages of the offer

- Extremely sturdy and torsion-proof steel welded machine construction.
- Simple linear readjustment of stator knives up to 30 mm / 1.17 in.
- High operating safety due to swivel-mounted stator.
- Easy handling of wear parts.
- High equipment availability.
- Hydraulic swivel sieve for easy replacement and cleaning.
- Inspection door simplifies access and maintenance.

Current and Potential Domain of Application

Secondary shredding of materials such as domestic household, commercial and industrial waste, electronic scrap, used oil-filters, plastic waste, wooden waste, textile waste, used car and truck tyres, huge tyres of mining vehicles, paper, files and paper board, refrigerators.

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

Continuous filtration of sewage, process or ground water in an innovative sand filter without backwashing

(09 DE 0855 3FH3)

Abstract

A German company has developed a sand filter for sewage, process and ground water treatment. The filtration process is continuous and unlike conventional systems, backwashing of the sand/gravel (and the problems associated to it, such as shutdown times) is no longer an issue. Instead, the cleaning of sand/gravel particles is integrated into the filtration process. The company is looking for industry partners active in water treatment for commercial agreements with technical assistance.

Description

Sand filters are used in sewage, ground and process water treatment technology as a downstream cleaning stage filtering the smallest and finest particles,
thus allowing the operators to reach the requested target values for treated water.

In conventional sand filters, filtration takes place vertically and the pollutants accumulating in the filter bed need to be removed by backwashing. regularly. This interrupts the filtration process, makes additional devices such as catch basins indispensable and creates further problems when the sand needs to be sorted again according to grain size.

With the patent-protected sand filter developed by the German company, these problems are avoided. The device works as follows: It is a rectangular container equipped with a cone at the lower end. The sewage water passes through the filter horizontally, fully utilising the height and width of the container. The larger grain size sand/gravel particles are located towards the entrance side of the sewage water; smaller particles are located where the cleaned water exits the system

The filter space is filled with sand or gravel. The sand/gravel leaves the filter bed via an adjustable drainage device at the bottom of the container. It is continuously withdrawn from the lower end of the reaction space, lifted by an airlift system and cleaned from pollutants in a grit washer. The cleaned sand/gravel is transported back to the top of the filter bed. The pollutants are removed from the system by a pre-defined volume-stream. Due to the special construction of the filter, the cleaned sand/gravel sorts according to grain size, so that the entering liquid passes through the sand bed in the direction of decreasing grain size.

This construction allows for continuous filtration of liquids combined with a continuous cleaning of the sand/gravel. Problems associated to backwashing (necessary in conventional systems) are avoided, making the system more economical than conventional sand filters.

Innovations and advantages of the offer

• continuous filtration (no backwashing and related waiting period and devices)
• multilayer filtration (higher solids loads, lower danger of blocking, higher filtrate quality)
• modular construction (straightforward, approved filter units, usable for different amounts of water)

Current and Potential Domain of Application

The sand filter can be used in industrial or municipal treatment for the purification of sewage, ground and surface water, circulating water, cooling water etc.

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INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

Technology Offer

Exhaust and filter systems for the separation of oil and emulsion mists

(09 DE 0960 3ECC)

Abstract

A small German SME developed an exhaust and filter system for the separation of oil and emulsion mists.
Many material working processes in industry, trade and other sectors produce oil mists and emulsion vapours which pose a particular hazard for man and machines. The developed system removes hazardous substances from the breathing air and makes it possible to recirculate the air into the working environment which reduces energy costs. Commercial agreements with technical assistance are aimed.

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Description

A small German SME developed an exhaust and filter system for the separation of oil and emulsion mists.

Many material working processes in industry, trade and other sectors produce oil mists and emulsion vapours which pose a particular hazard for man and machines.

According to the legal regulations on clean air in working environments it is required that such hazardous substances are removed from the breathing air in order to prevent harmful effects on persons and machines. High-efficiency filter systems make it possible to recirculate the air into the working environment and thus help reduce energy costs.

The modular concept allows several filter units to be used in a combined assembly which is operated with a central fan.

The system may be run alternately in recirculating-air and exhaust-air mode.

The equipment may be fitted with an activated-carbon adsorption filter so that it can be used in gas and vapour environments.

Innovations and advantages of the offer

The exhaust and filter system:

- Makes it possible to recirculates the air into the working process,
- Reduces energy costs,
- Can be combined e.g. with a central fan.

INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT Technology Offer

Method for a biological production of combustible gas from reinforced plastics. (09 DE 76DW 3E3Z)

Abstract

A German company developed a method which allows the further utilisation, linked with energy production, out of glass-fiber reinforced plastics. Such a synthetic material is used in boat building, aviation and rotor blades. Sought is a licence agreement or a joint venture with an SME for a further development of this system.

Description

This technique of a German company for a biological production of combustible gas out of epoxy resin bound, glass-fiber reinforced plastics is a new possibility to eliminate and further utilise these plastics.

Concerning the elimination of glass-fiber reinforced plastics, which is primarily used in boat building, aviation, rotor blades and the production of plastics moulding, there is only the option to pulverize and burn the plastics so far. Thereby the energy input and pollution control of the combustion is a problem.

In general terms, the methodology is based on bacterial decomposition of the epoxy resin and the generation of methane and hydrogen gas plus leaving behind the inorganic filler and glass-fiber as result.

After the eduction of the combustible gas for energy production the inorganic residua with the bacterial biomass is used as nutrients for the breeding of algae to maximize the total amount of biomass which then is burned to slag in an economical way. The slag can be sold as an additive for the production of e.g. bricks, cement and ceramics.

This system is composed of four parts in principle:

1. The mechanical-thermal pre-treatment of the plastics parts.

2. The biological-bacterial production of gas out of the organic components of the plastics.

3. The biological after treatment of the inorganic residua to produce biomass and burning to slag.

4. The consequent storage of exhaust containing carbon dioxide resulting from every combustion process and the feeding into a separate system which produces biomass through the photosynthesis of algae.

This solution allows not only the elimination of those plastics but the further utilisation as well. The combustible biogas is used as fuel and/or for electricity generation. Besides there is the possibility to sell certificates of emission because of the treatment without carbon dioxide.

Sought is a licence agreement or a Joint Venture with an SME for further development of this system for adaptation to specific needs or implementation in existing plants.

Innovations and advantages of the offer

- Further utilization of epoxy resin bound, glass-fiber reinforced plastics.
- Combustible gas can be used for fuel or generation of electricity.
- Slag can be sold to the industry as an additional material.

Current and Potential Domain of Application

Industrial sector of glass-fibre reinforced plastics converting and recycling.

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

A patented process for adsorption of heavy metals on a granulate

(09 DK 20B7 3EFC)

Abstract

A Danish company has developed a patented process for adsorption of heavy metals on a granulate. The granulate is continuously generated by oxidation of Fe(II) and/or Mn(II) on the surfaces of a fluidised inert material. The company is looking for technical cooperation with product developing companies.

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Description

The idea of the patented process is adsorption of heavy metals on a granulate, which is continuously generated by oxidation of Fe(II) and/or Mn(II) on the surfaces of a fluidised inert material.

Mn(II) is added to the column together with Mn(VII). The Mn(VII) will oxidise Mn(II) forming MnO2 (black stone-like material) on the surface of the granulate. Since the process takes place on the surface of a sand-like granulate, a granulate with an active adsorptive surface is created.

A similar process, but with oxidation of Fe(II) into FeOOH (ochre - rust) on the surface of the granulate can also be used. The Mn process is best for removing heavy metals like Cd, Ni , Pb and Zn while the Fe process is preferred for removal of As, Mo, V, and U.

Innovations and advantages of the offer

The technology needs less man power for operation and produces 10% less sludge comparing to traditional chemical precipitation. The sludge is inert and can be used for other purpose.

Current and Potential Domain of Application

Heavy metal removal from waste water

OTHER INDUSTRIAL TECHNOLOGIES,BIOLOGICAL SCIENCES

Technology Offer

Automated oxygen utilization rate (OUR) measurements

(09 DK 20B7 3EZF)

Abstract

A small Danish company has developed unique systems for automated oxygen utility rate (OUR) measurements in activated sludge and waste water. Systems include sensors, instruments, chambers and software for automated measurements, control of devices, data acquisition, analysis and statistics. The company is looking for partners for technical cooperation and commercial agreements.

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Description

Founded in 2003, the company is a privately owned spin off company from the two Danish universities in Aalborg and Copenhagen. Based on a background in basic research and co-operation with leading universities around the world, the business develops unique and innovative products for water quality measurements and control as well as aquatic biology basic research.

The company offers unique computerized systems OUR and biological oxygen demand (BOD) measurements in a controlled environment. Single and multi channel systems include fibre optic sensorer, instruments for USB interface and software for Windows, as well as sample chambers, devices and fittings.

Innovations and advantages of the offer

OUR and BOD measurements are often done in a manual way requiring a significant amount of labor and time, and resulting in data of poor time resolution and accuracy. We know of no other suppliers of automated OUR/BOD measurement systems. These new systems are based on the use of fibre optic oxygen sensing technology and real time data acquisition and analysis. This results in a significant improvement over conventional methods in terms of accuracy and temporal resolution of data.
The company can provide a full service solution with all analysis and evaluation software, a wide range of sensor technologies, chambers and software, as well as a comprehensive customer support based on years of basic research.

OTHER INDUSTRIAL TECHNOLOGIES,BIOLOGICAL SCIENCES

Technology Offer

A novel procedure of inoculation for the removal hydrogen sulphide through biofiltration that respects the environment

(09 ES 27F4 3E0J)

Abstract

A Spanish research group in Andalusia has developed a novel procedure of inoculation for the removal hydrogen sulphide through biofiltration. Main advantages are the reduction of costs, time of latency and the increase of the removal yield. They are looking for licence agreement and technical cooperation.

Description

An Andalusian research group (Spain) has developed a novel invention which consists in an inoculation procedure by means of which is possible to accelerate the start-up, performance and optimal operation of packed bio-tricking filters for the removal hydrogen sulphide and/or reduced sulphur compounds (methyl mercaptan, dimethyl sulphide and dimethyl disulfide).

The control of organic volatile compound emissions and inorganic ones as well as their environmental effects have constituted, during the last years, a high-priority objective for the improvement of the environmental quality.
In this context, biofiltration is presented like a commendable alternative for the elimination of certain volatile compounds present in gas effluents due to its smallest operation costs, high degradation yield for a wide range of atmospheric pollutants and technological simplicity.

In this procedure an immobilization technique of two pure bacterial strains on polyurethane foam is applied.

This procedure permits both accelerating the start-up step and the optimization performance of a biotricking filter for the hydrogen sulphide and/or reduced sulphur compounds removal.
The reason of this improvement is that present biomass in active sludge from wastewater treatment plant is considered a limiting factor for the removal of these compound.

The procedure consists of three steps:

1.-Inoculum culture, which has different scaling up stages, depending on the culture of Acidithiobacillus thiooxidans o Thiobacillus thioparus.

2.- Inoculation and biotrickling filter start-up.

3.- Control and maintenance of the microbial population in the biofilter.
When a biotricking filter undergoes this type of inoculation procedure, the following advantages are obtained from the point of view both its design and the operation of the biofiltración process:

a) A co-immobilization of both microbial species is gotten, by means of the formulation of a mixed growth medium that allows the growth of both streams.

b) Through the controlled growth of the inoculum, it is possible to reduce the typical latent period of the microbial population from wastewater sludge, in several weeks (and even months treatments, to a period below 48 hours).

c) Equally, when a reduction of the latent period of the culture is produced, an increase of the removal yield takes place regarding the use of microorganisms coming from active sludge. In this way, superior yields are obtained up to 98%, passed the first 48 hours of operation of the biotricking filter.

d) Due to the combined inoculation of two bacterial depending on their different behaviour at different pH, another important advantage of the operative procedure is the high pH range in which the system is efficient for the removal. In this way, the system is effective from pH 0.5 until values in the region of neutrality.

Innovations and advantages of the offer

The reduction of the time of latency and the increase of the elimination yield present several advantages:

a) The industrial bio-filters operative at the moment could work with bigger load speeds for feeding the system. This aspect bears important economic benefits because the treatment capacity of the facilities is increased.

b) On the other hand, in facilities of new construction, costs derived from the size of the biofilters could be decreased considerably since for a certain treatment

capacity, the necessary dimensions for the biofilter are inferior.

c) In industrial biofilters operating at the moment, it would not be necessary great economic investments to implement this procedure, since from the technological point of view it is not required the incorporation of advanced specific equipment. On the contrary, it is only necessary to carry out the incorporation of the filler with the immobilised

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INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

Technology Offer

A new process for elimination of toxic metals from water

(09 FR 33j6 3D40)

Abstract

Dumping of industrial aqueous effluents containing toxic metals is no longer acceptable. This new process for water cleaning, set up by a French university laboratory, allows to decrease metal content below legal level and to reduce treatment costs compared to competing techniques. Industrial partners are sought for licensing and technical co-operation

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Description

The laboratory has discovered that a nickel surface covered with hydrogen is able to trap toxic metallic ions (cadmium, chromium, nickel…) present in water. Hydrogen adsorbed on the surface of the catalyser (nickel) is extremely reactive. It is able to reduce almost all metallic ions. Once reduced, the toxic metal is strongly adsorbed on the catalyser surface. It is extracted from the solution and replaced by hydronium (H3O+) cations, easily neutralised with hydroxides anions (OH-) to water molecules.

Innovations and advantages of the offer

The process offers the possibility of being selective: only the polluting metallic ions are eliminated. Moreover, it allows to reduce treatment costs (150 €/m3 versus 250 €/m3 for dumping of strongly nickel contaminated industrial effluents).

Current and Potential Domain of Application

Treatment of contaminated water (arsenic)
Treatment of water table accidentally polluted (chromium)
Treatment of industrial effluents such as wastewater strongly nickel contaminated from chemical nickel coating industries

PROTECTING MAN AND ENVIRONMENT

technology Request

Plastic (Polyethylene) mulching film recycling process

(09 FR 34k6 3FE4)

Abstract

A French SME landscaping enterprise, daily use poly ethylen woven mulching film to cover the soil around planted trees and plants. They would like to recycle all their waste in an environmentally friendly way. The company is interested in technical cooperation and/or subcontracting agreement to experiment a process in order to recycle that kind of stuff with environmentally friendly methods.

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Description

The French landscape PME is specialised in plantation and landscaping of the areas surrounding roads, and secondly, housing estates landscaping.
They plant annually some 300 000 trees, most of them young and small, some older and bigger, and create some 200 hectares of lawn (or flowered meadows).
The company use around 200 000 m2 plastic woven film, and have around 2 tons annual waste of it. These wastes are taken by an ISO 14001 certified waste specialised company, but till now, they finally are buried with ordinary wastes.
A process and an actor to recycle this kind of waste are sought.

Technical Specifications / Specific technical requirements of the request

The process must be environmental friendly,as an alternative of burying.

ENERGY,PROTECTING MAN AND ENVIRONMENT

Technology Offer

A torrefaction process to extract almost all the energy potential contained in the biomass

(09 FR 36I5 3D6S)

Abstract

A French engineering company, dedicated to the design and development of systems to convert biomass into carbon or energy. It offers innovative and environmental-friendly solutions, the concentration of energy from non food biomass to produce a renewable fuel.The torrefaction principle is based on the drying of raw material.The aim of the torrefaction is to break the biomass fibers in order to to eliminate all the water contained in the biomass. Thus, the biomass becomes hydrophobic and crumbly.

Description

A French engineering SME located near Bordeaux, in the South of France, dedicated to the design and development of systems to convert biomass into carbon or energy. The company offers innovative and environmental-friendly solutions, for the production of inorganic carbon out of wood waste. Moreover, it is a specialist in the concentration of energy from non food biomass.This company has first developed the CHARTHERMTM process, the only worldwide process able to recycle at an industrial scale, hazardous CCA-treated wood waste in an ecological way. Because of the increasing demand concerning renewable energies, the enterprise has also developed industrial equipments to produce fuels from non food biomass, like forestry and agriculture waste. For instance, it has been working on a “Fast Torrefaction System” which has been called TORSPYDTM, allowing to concentrate, in a dehydrated and easily pelletisable material, almost all the energy potential contained in any organic solid.The torrefaction principle, as the company sees it, is first based on the drying of the raw material, which is then heated up to 240°C in a soft way until the whole material is thermally treated. The aim of the torrefaction is to eliminate all the water contained in the biomass before continuing the thermal treatment until the biomass fibers start to break, making the biomass material become crumbly and easy to mill and pelletise. This low temperature treatment, by evaporating a minimum of light organic molecules, allows to keep most of the organic matter of the biomass. More precisely, during the TORSPYDTM process a flow of neutral hot gas crosses the biomass from the bottom to the top, heating it progressively until it reaches its torrefaction point (each kind of biomass has its proper torrefaction temperature point). At this point, it is important to emphasise the difference between grill and torrefaction. “Classical torrefaction” used to prepare coffee or cocoa beans is, in fact, a kind of toast, when TORSPYDTM torrefaction, is a regular and a equal heating of the particle from its core to its shell, at a temperature which never exceeds the torrefaction point of that type of biomass.

Innovations and advantages of the offer

The technology can be implemented at different scales, from 500 kg/h to 5.000 or more kg/h.It is a very good answer to the problem of the valuation of a very huge quantity of forest and agriculture co-products, that until now are not valuable because of the poor quantity of energy available in each cubic meter. The torrefaction of this Biomass, as close as possible from the place where it is, allows to give value to this Biomass : it becomes pertinent to transport this energy after having bee concentrated by torrefaction / pelletisation. On the other hand, torrefaction is the best process to prepare the biomass in order to mix it with fossil coals, or poor coals, and both to ameliorate the efficiency of the boilers and to save carbon credits through cofiring or 100% firing.

TORSPYDTM process allows to concentrate almost all the potential energy contained in the organic solid, because since all the water has been eliminated and the fibers have been broken there is not any possibility for torrefied material to absorb water again. Therefore all the hygroscopic phenomena disappear and, consequently, the “torrefied” biomass becomes hydrophobic. That preserves its quality during the storage whatever the duration of this storage. In

addition, water elimination makes the torrefied biomass be a better fuel than the “raw” biomass, because the potential energy contained and the effective energy restored during combustion are the same. Torrefied products can substitute charcoal in a number of applications such as fuel for domestic cooking stoves, residential heating, manufacture of improved solid fuel products such as fuel pellets, compacted fireplace logs and barbecue briquettes for commercial and domestic uses. Torrefied biomass can be also used as fuel for industrial applications. With a 30-35% fixed carbon content, torrefied wood has a promising potential as a reducer. Torrefied biomass can be blended with coal and co-fired in a Pulverized Coal Boiler (PBC). An important advantage of torrefied wood compared to untreated wood is its uniformity and its lack of water. Finally, in terms of transport costs, it is much more interesting to carry “torrefied” biomass instead of “raw” biomass, because water has been eliminated and the “torrefied” biomass is generally compacted into high density pellets. Thus at equal volume, much more effective energy is carried with “torrefied” biomass than with “raw” biomass.

Current and Potential Domain of Application

Energy – Recycling – Power industry – Cement industry

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ENERGY,AGRICULTURE AND MARINE RESOURCES

Technology Offer

A microbial fuel cell to treat effluents

(09 FR 36M1 3D3N)

Abstract

A French Laboratory has developed a new concept of microbial fuel cell using microbial films developed by bacteria. Varied renewable and low cost organic material can be used as fuel. Organic waste or liquid effluents can thus be exploited in an intensive way for power production. Partners from the agricultural industry and waste management domains are sought.

Description

A French Laboratory has developed a new concept of microbial fuel cell using microbial films developed by bacteria. Varied renewable and low cost organic material can be used as fuel. Organic waste or liquid effluents can thus be exploited in an intensive way for power production.

Microbial fuel cells (MFC) can replace very expensive metal catalysers often made of platinum (indispensable in classical fuel cells) by bacteria developing a biofilm on the surface of the electrodes. Thanks to these microbial films, MFC can use as fuel varied renewable and low cost organic material. Marine sediments; agricultural waste; liquid effluents can thus be exploited for power production. MFC are particularly adapted for supplying remote sites like offshore sites; marine surveillance systems, developing countries...

In parallel of power production, MFC speeds up the degradation of the biomass used as fuel and then allows intensification of waste management process. Nowadays, power production is still limited, but waste management process becomes really performing.

Innovations and advantages of the offer

Innovation:
- Microbial fuel cells turn directly into power part of the available energy contained within biodegradable compounds.
- The microorganisms sticking to the electrodes make a biofilm which catalyses electrons transfer reactions between available bio-compounds and electrodes.
- Microbial fuel cells can be fed by a wide range of biomass while keeping a great stability.

Advantages:
- Exploitation of waste for power production
- Varied low cost organic material to be used as fuel
- Cheaper than classical process
- Intensification of waste management process
- Stability of the process

Current and Potential Domain of Application

- Power production
- Waste & specific agro-food
- Effluents treatment (dairy farming; distilleries; liquid manures...)
- Marine applications supplying
- Non-governmental organisations (developing countries)

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PROTECTING MAN AND ENVIRONMENT

technology Request

Small scale Anaerobic Digester

(09 GB 39n3 3FFF)

Abstract

An SME in N.Ireland seeks a small scale Anaerobic Digestion System. The system should be under 100kw electrical output. They need expertise and designs, or actual hardware. They have the ability to assist with further development of the system.

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Description

The client is an SME, currently active in the environment sector (waste composting). They see a market opportunity for small (possibly farm-based) AD units. They can provide sector knowledge and engineering expertise to assist on the localisation of a system (and further development if required). They have experience of collaborative R&D with both universities and other SMEs.
They require a rapid move to a marketable solution, although they would consider collaboration on systems which are not market ready at this point in time.
They have already undertaken market research and identified users who have committed to install a system.

Technical Specifications / Specific technical requirements of the request

The system should be <100 kw output (electrical power generated)
The system should ideally be modular or easily scalable
The system should ideally be suited to self-build / installation by a farmer (perhaps in a silo or pit)

AGRICULTURE AND MARINE RESOURCES,PROTECTING MAN AND

Technology Offer

Technology and Knowhow for the Manufacture of High Quality Topsoil from Composted Sewage Sludge

(09 GB 42O1 3FE8)

Abstract

A Yorkshire SME has developed a unique process for the production of high quality synthetic topsoil, manufactured from composted sludge; a readily available waste product from sewage and water treatment works. The synthetic topsoil produced is of a consistently high quality, and can be tailored to suit specific applications. The use of such a topsoil as opposed to natural dug soils provides significant environmental benefits. The SME seeks licensing, joint venture or technical collaboration.

Description

Our client has developed a unique process for the production of high quality synthetic topsoil.

The company has developed a consistent and sustainable product for use in the landscaping market instead of a natural soil.
The starting point for the manufacture of the topsoil is composted sludge – a readily available waste product from sewage and water treatment works.

By blending and mixing with other environmental sound materials through a proprietary process, the company has been able to develop a rooting medium that fulfils the role of landscaping topsoil that was suitable for the sustainable growth and establishment of trees, shrubs and grass. The product promotes healthy root growth for anchorage, is suitably aerated and drainable and provides a sufficient source of available water and plant nutrition

A number of products can be made through this proprietary process:
• Subsoil - A clean, contaminate free sub-base available for most development projects.
• Topsoil - certified to BS3882:2007 standards. The product is of consistant quality and is available all year round.
• Roof Garden Substrate - High quality 'Roof Garden Substrate' can be produced from the topsoil, incorporating lecca to create a lighter weight growing media.
• Soil Conditioner - High quality soil conditioner that can be added to topsoil for increased fertility.
• Bespoke Mixes - Various mixes have been and can be developed to meet the requirements of a specific job

Innovations and advantages of the offer

• A consistent source of organic matter
• A consistent source of aggregate / mineral content
• A consistent mix all year round
• Each tonne topsoil saves 140kg of greenhouse gas emissions
• High organic matter content and fertility status - no need to add compost or fertiliser throughout the planting season.
• A sustainable soil compost blend.
• The topsoils are effective in substituting for the unsuitable use of extracted natural topsoil.
• The process allows an audit trail of all materials used.
• Year round availability.
• Consistent source of base materials.
• Large volumes available
• No stone or weed content.
• Easy to use and very workable.
• Offers good water holding capacity and drought resistance
• Bulk density of 1m3 per tonne, compared to the average of 1.5m3 per tonne of most as-dug soils. This can mean around 50% less wagons are required for haulage

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ELECTRONICS, IT AND TELECOMMS,INDUSTRIAL MANUFACTURING, Technology Offer

Low-level accounting technology for full ecological costing of products and processes (09 GB 44O7 3F76)

Abstract

A London-based company is developing low-level accounting technology to determine full ecological costing of products and processes. The system will allow secure interaction between companies within a supply line to include up-stream eco-costs into the final value. The company is looking for manufacturers with a strong interest in green practice to jointly develop the system, populate process definitions and adapt the system to the partners' manufacturing processes.

Description

A London-based company is developing low-level accounting technology that will allow full ecological costing of products and processes. The system will describe ecological costs of a product based on the energy and chemical input into the production process, as well as overhead costs (e.g. travel miles). Publishing of the eco-costs will allow customers to make decisions on the basis of this. In a second stage, individual customers will keep an account of their personal eco-footprint, allowing informed and directed behavioural change.

The eco-accounting system will be embedded in major financial accounting programs, allowing easy implementation across various business fields. Essential to the operation the system is communication with other entities within the supply chain, allowing upstream costs to be included in a product's eco-cost; this communication will be secure, through an online post-box system.

The company is looking for industrial manufacturers with a vested interest in green practice to jointly develop the system further and populate process definitions. The company is looking to apply for funding for this project, which could be in conjunction with the industrial partner.
The company will make a model of the partner's productions process, to be used in the eco-accounting system, but also allowing the partner to maximise the efficiency of their operations. In addition, the industrial partner will have pre-release access to the eco-accounting system, giving it a head-start before the competition.

Innovations and advantages of the offer

This eco-accounting system will allow companies to track and calculate the ecological footprint of their products or services. As the public is getting more aware of eco-costs, publishing the eco-costs of products will soon develop to be a selling point for products. In addition, the detailed eco-cost calculated by this system can be used to claim financial incentives for green business practice.

Collaboration with this company will give the industrial partner access to the eco-accounting system before the competition, allowing them to get a head-start on novel marketing methods. The model made of the industrial partner's operations will also allow the partner to streamline their operation, minimising the costs (both financially and ecologically) of their activities.

Current and Potential Domain of Application

The eco-accounting system will be embedded in financial accounting systems, allowing its use across wide ranges of industries.

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ENERGY,PROTECTING MAN AND ENVIRONMENT

technology Request

Partners required in anaerobic digestion

(09 GB 47P8 3EPZ)

Abstract

An SME based in North East England is seeking commercial partners active in the field of anaerobic digestion for waste management. Partners should be industrial small and large scale providers that are currently providing plants and equipment into any of the potential waste markets.

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Description

Anaerobic digestion is a series of processes in which microorganisms break down biodegradable material in the absence of oxygen.

A North East England based company working in the field of anaerobic energy conducting research is seeking partners in the anaerobic digestion, equipment and process markets, and especially food (meat) processing.

The company is looking to collaborate with food manufacturers and food processing companies particularly those in the meat and dairy sectors who would be interested in potential joint ventures, development work and finance raising for a facility that would be suitable to process their waste products into energy.

Potential investment is also being sought in which is an 'own and operate' business for the special purpose vehicle (SPVs)anaerobic digestion plants, that it is in the process of installing in the UK. The company is also interested in potential investment in any of the planned 'Special Purpose Vehicles (SPVs) anaerobic digestion plants, 3-4 are scheduled to be completed for 2010 in the UK but the the company is interested in expansion into new European markets.

Technical Specifications / Specific technical requirements of the request

The company is looking for development partners who have/or are developing new anaerobic digestion reactors for waste management.

ENERGY

Technology Offer

Components for high temperature polymer electrolyte membrane fuel cells

(09 GR 49R2 3CL8)

Abstract

A Greek SME active in the sector of energy, produces and commercialises polymer membranes and membrane Electrode Assemblies for high temperature polymer electrolyte membrane (PEM) Fuel Cells with increased catalyst tolerance, allowing the use of reformed hydrogen with high carbon oxide content, enhanced kinetics and easier thermal management. They can be used in both stationary and mobile power applications. Academic and industrial partners are sought for technical and commercial agreements.

Description

Fuel cells offer efficiency, negligible emissions and simplicity. These characteristics, together with large market potential in the power generation sector, place fuel cells among the most compelling of the distributed generation technologies.

High Temperature Polymer Electrolyte Fuel Cell (PEM FC) technology (160-200 degrees C) is a superior and enabling technology that will eventually replace low temperature PEM in most applications due to increased overall efficiency, fuel independence (reformed fuels i.e. natural gas, propane, biofuels, military fuels), decreased complexity and lower cost.

The technology can be used in applications as residential Combined Heat and Power (microCHP), truck Auxiliary Power Units (APUs), bus power, critical back-up, and larger scale CHP. The automotive market may yield millions of Euros to the supply side, even though it is still a long-term market.

The most popular PEM fuel cell technology is based on NAFION polymer proton conductor, sandwiched between two gas diffusion electrodes, which are mainly based on nanostructured platinum-supported electrocatalysts (Pt/C). However, the high cost of Nafion and the constrains set because of their low operating temperature (CO poisoning, ineffective exploitation of heat produced) urge towards the design and development of materials (Polymer electrolytes and electrocatalysts) which will allow the operation of PEM fuel cells at temperatures ranging from 130-200 degrees C. The polymers developed by the SME are expected to be used as alternatives to Nafion.

The operation of polymer electrolyte fuel cells at temperatures above 150degrees C offers very significant advantages. Among others, the tolerance of the catalyst is increased, allowing the use of reformed hydrogen with high CO content, the kinetics of both electrodes is enhanced and the thermal management is easier compared to the conventional PEM fuel cells.

The materials developed by this SME are based on aromatic polyethers bearing pyridine units, where the H3PO4 is preferentially bonded. These High-Temperature polymer electrolytes exhibit excellent mechanical and chemical properties, while their performance fulfils all requirements for application in energy production systems.

The Membrane Electrode Assemblies (MEA) of the SME are based on proprietary PBI (polybenzimidazole) free technology and exhibit the following characteristics:

-Long term stability with no degradation
-Non humidified gases
-Operation temperature 150-210degrees C
-Significantly faster break in period compared to the competition
-Low cost

The incorporation of the SMEs MEA into a PEM fuel cell will result in a system with innovative advantages such as:

-High power efficiency
-High CO tolerance
-Use of reformate stream
-High power-to-volume ratio
-Reduced complexity.

Innovations and advantages of the offer

- Good mechanical and chemical properties
- Can operate with H3PO4 doping level even below 200 %wt, thus offering higher life time of the catalyst
- Can operate at temperatures as high as 200 degrees C resulting in the reduction of the total cost, due to the ability of lower grade H2 feed, increased CO tolerance, design of simplified cooling system and effective heat recovery.
- Long term operation

Current and Potential Domain of Application

The produced combined system can be used in stationary applications such as critical back up or Combined Heat and Power (CHP). Critical back up applications are only used for a short period, when the grid power fails, so the fuel cell cost is not as critical as the reliability of the system. On the other hand, CHPs are meant for on going use and the fulfillment of needs, such as space heating and domestic hot water.

It can also be implemented in mobile applications such as Auxiliary Power Units (APUs), where the provision of power by conventional engines can be replaced, in compliance with anti-idling legislation.

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ENERGY

Technology Offer

Device for power generation with integrated use of wind and solar energy

(09 HR 89GJ 3CYG)

Abstract

A Croatian SME company is offering environmental innovation in the field of alternative energy sources with particular emphasis on the ecology. The main advantages of the proposed technology are its adaptability to different locations, low cost and increased efficiency compared to existing windmill technologies. The partners for commercialization of the innovation are sought.

Description

This invention relates to a device for producing electricity. Today wind power devices use only wind and solar devices use only the sun's energy.

Wind power devices on the market require high costs, not only because of the size of rotor, but also because of very demanding fixture. Such a demanding setting is needed in order to enable the wind power devices to endure very strong wind. As a consequence, they can be set up only at special locations which are damaging the image of the environment from far away.

The primary objective of this invention is to have wind and solar power device with unlimited use of both wind and solar energy for power generation.
Today's wind power devices must be excluded from working at very high wind speed, which is definitely their strong drawback. With this invention, owing to its technical performance, this is not necessary. Moreover, the device is most efficient in strong wind. An additional benefit is that the device can produce energy when there is no wind but there is sun, and that it is most effective when there is both wind and sun.

The above advantages are made possible by configuring the device in a way which enables the change of the horizontal wind direction to the vertical one. At the same time it is possible to collect and accelerate large amounts of wind, and to target it at the blades which are part of the turbine for producing the electricity.

Innovations and advantages of the offer

The invention enables virtually continuous and unlimited use of wind and solar energy.
Main advantages of the device are:
•it is adaptable to very inaccessible locations
•it can be economically produced
•it can be transported in smaller constituent parts
•it does not require expensive procedures for the static
•it is environmentally completely acceptable
•it can be incorporated into any environment and most importantly
•it can significantly compensate for the lack of ever more needed electricity.

With this approach it is much easier to bring the electricity to its destination than is the case with current windmills.

The invention has proven its functionality with an improvised model (small prototype).

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

New composting procedure for the treatment of sewage sludge (09 HU 50S5 3DV4)

Abstract

A Hungarian SME with several years experience in composting procedures has developed a new, more useful and environmentally friendly, technology for sewage sludge composting, which can be useful for sewage works or town management of regional governments. The end-product of the process has high fertilising value, organic matter and harmonious trace element content.
The company is looking for industrial partners interested in licence or commercial agreement supported by technical assistance.

Description

The composting technology offered by the Hungarian company is suitable for composting sewage sludge. It is based on the application of controlled composting for rapid degradation of organic pollutants and immobilization of inorganic micro-pollutants for safe land disposal by using industrial slurry-phase by-products (e.g. by-products from sunflower seed oil processing industry). The process of controlled composting contributes to preserve the fertilizer value.

Before the composting, the untreated sewage sludge is mixed with waste sludge (e.g. sludge produced by sunflower seed oil processing industry) and other specific additives to accelerate mineralization and to moderate ammonia and GHG (greenhouse Gas) emission.

In some cases composting simulation is used for optimalisation of raw material composition and gas emission controlling within 3 weeks in an adiabatic drum system.

Composting occurs under controlled condition which means that additives, digesters and labile carbon sources are added continuously to the compost pile. Specific additives are responsible for the suitable and rapid mineralization and thermophilic stage to preserve fertilizer value.

Depending on the properties of raw materials encapsulated windrow composting is applied for controlled composting which means a covering of compost pile by using specific polymers.

The end-product is a potential source for soil improvement and conditioning after 4-pre- and 6-week-term post maturation stages.

The whole composting process is not longer than 70-90 days.

Innovations and advantages of the offer

• During the pre-storage of raw sewage sludge the GHG (Greenhouse Effect) emission and f. coliform and streptococcus number is reduced significantly within 24-48 hours.
• Application of composting simulation occurs under controlled and closed condition which contributes to the preservation of fertilizer value.
• Utilization of specific non-hazardous additives and residuals from different industrial activities induces longer thermophilic phase.
• Acceleration of organic micro-pollutants' degradation and immobilization of inorganic toxic elements result in safe land disposal.
• Encapsulated windrow composting for moderation of runoff of macro and trace elements.
• During the pre-storage of raw sewage sludge the GHG (Greenhouse Effect) emission and f. coliform and streptococcus number is reduced significantly within 24-48 hours.
• Application and utilization of non-hazardous specific additives and digesters result in safe land disposal.
• Application of non-hazardous additives, digesters, water treatment residual by-products is suitable for reduction of total N (nitrogen) loss, P (phosphor) loss and suppressing pathogens before and during the composting.
• The offered technology is based on using of encapsulated semi-permeable membrane covering for moderation of GHG and odor emission.
• The offered technology is able to utilize solid phase biogas residuals, post maturation of pre-maturated municipal sewage sludge from closed composting reactor or root-zone treatment.

Current and Potential Domain of Application

The offered technology can be used by sewage works or the city management of regional governments.

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

New electrochemical process to treat waste water polluted with oil derivatives (09 HU 50S5 3FFH)

Abstract

A Hungarian SME active in the fields of industrial waste management, environmental protection, electrochemistry and chemistry is offering a new electrochemical process for the treatment of water or sludge polluted with oil derivatives which is much more efficient and cost-effective then other solutions now on the market. The technology can be useful for companies in the oil, fuel or machine industries.
The company is interested in license or commercial agreement with technical consultancy

Description

A Hungarian SME doing research and development in the fields of industrial waste management, environmental protection, electrochemistry and chemistry has invented electrochemical emulsion breaker equipment for waste water treatment.

Oil emulsions are produced in large quantities throughout in the industry. Car wash stations, cutting workshops, oil refineries and technologies using lubricants produce large amounts of waste waters that contain colloid oil. Breaking of oil emulsions and cleaning such polluted waters is a difficult task though it is enforced by environmental regulations.

Using the new automated electrochemical apparatus, waters polluted with oil can be cleaned very efficiently, at low energy costs. Oil content of waste waters can be easily decreased under 5 ppm (parts-per-million), which is the current environmental limit in the EU. Having a low chemical oxygen demand, the treated water can be recycled or let into the sewage system.

The apparatus can be manufactured in variable sizes; scaling-up of the technology is not problematic. Small mobile apparatuses and big reactors for the industry can be also available. The equipment can be produced in different sizes, and can be tailored to specific industrial needs.

Dual benefit is achieved through the operation of the new device: on the one hand the ecological burden posed by the pollution is decreased, on the other water consumption can be significantly reduced by means of recycling of the regenerated industrial water.

Using the new technology, the chemical oxygen demand (COD) and floating solid content of the water can be decreased to acceptable levels. Another advantage of the technology is that the hardness of technological waters drops to normal level (post-process average: 15 German hardness), which brings the well-known advantages to all equipment involved.

Sludge processing, processed water recycling:

Pollution separated from the wastewater is collected in a tray located at the bottom of the equipment, from where it is drained into a storage tank. Due to the cleaning technology, usually about 95% of the processed water is suitable for recycling (e.g. in case of washing, pre-cleaning). By means of cleaning and recycling the annual water and sewage fees can be reduced by about 85 – 90%, in case of many water intensive technologies. Cleaning the oil-contaminated wastewaters on-site eliminates waste transportation costs as well.

Innovations and advantages of the offer

Main advantages:
- The ecological effects of oily waste waters can be decreased by using the technology.
- Freshwater consumption of industrial technologies can be significantly reduced by using the technology, which enables re-using or recycling of the water.
- Due to the treatment, the hardness of technological waters drops to normal level.
- Considerable water and sewage fees and ecological fines can be saved.
- Approximately 85% of the processed water is suitable for recycling.

Current and Potential Domain of Application

Potential areas of use:
• Water cleaning at machine shops / manufacturing sites
• Water cleaning in the automobile industry
• Water cleaning at car wash stations

- Waste water treatment in the oil industry
- Remediation of polluted environs of oil storage tanks
- Cleaning of rubbish-heap leechate
- Breaking of oil and water emulsions in general
- Cleaning of seawater from oil spills

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ENERGY

Technology Offer

Dye Sensitised Solar Cells

(09 IT 521C 3DNK)

Abstract

An Italian university with a long experience in thin films and a-Si-based II generation solar cells is devoted to realising a solar cell structure of the photo-electrochemical type and particularly DSSC (Dye Sensitised Solar Cell). The group is looking for technical co-operation with an industry interested in project development and commercialisation.

Description

Efforts will be concentrated towards the design of photo-electrochemical solar cells of Graetzel type, capable of giving a threshold photovoltaic conversion efficiency higher possibly than 10 %, using new materials and new structures in order to escape patent restrictions.

The cell invented by Graetzel represents a really revolutionary concept in photovoltaics:

1) The difficulty of reaching higher efficiency by a gap material (like silicon), characterised by an optical threshold and as a consequence not using the whole wavelength interval of the solar spectrum, is brilliantly solved by particular dyes, which have quantum efficiency with a maximum of 90% and extending over the whole solar AM1 spectrum.

2) The difficulty of reaching larger photovoltages (which imply a higher threshold and a lower conversion efficiency) and thicker active regions, in order to absorb a large amount of light intensity, is also brilliantly solved by very thin film thicknesses, which do not supply large electrical fields and high voltages, but which are in series each other (the concept of a multi-junction solar cell is extended almost to infinite) and which do not need to be extremely pure or trap-free, since carrier path is extremely short.

3) This kind of approach can be (and in fact it is) extended to other structures, like solid-solid (by using ionic or p-type hole conductors), to organic or polymeric materials (with steps toward a simulation of photosynthesis) and can also use more organised nanostructures, like nanowires.

Innovations and advantages of the offer

Starting costs of silicon technology are very high and this is true also for amorphous silicon. Production costs for technologies that are using either very big vacuum deposition chambers or wide-area electronic devices approach can lean on well-established technologies, but they will never be cheap, as all the history starting from seventies or eighties has demonstrated. New cheaper approaches, like DSSC (Dye-Sensitised Solar Cells) or photo-electrochemical cells, capable of reaching conversion efficiencies of more than 10 %, are the main candidates for the lowest cost.

From the technical point of view, the goals could be related to the advantages of DSSC cells, like: potential to be flexible and transparent, potential to be manufactured in a continuous printing process, fabrication by means of large-area coatings; easy integration in a wide variety of devices; big cost reduction with comparison to traditional photovoltaic devices; substantial ecological and economic advantages.

Current and Potential Domain of Application

The main impact will concern small chemical industries, which may be stimulated to come into this kind of business and start to design their own production lines; the automotive and also the domotic world, which may be forced to consider these innovations also as a way to find new markets; and also some investor in this field, who can help in order to renew some industrial effort. At present, the Graetzel cell maintains the conversion efficiency records and starts to be applied in small power plants and also in cars, but the research field is really in a big progress.

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AGRICULTURE AND MARINE RESOURCES,PROTECTING MAN AND

Technology Offer

Floating buoy for sea waste collection

(09 IT 52T6 3FHE)

Abstract

An italian company has developed and patented an innovative system for sea waste collection. The system is based on a circular floating buoy made in polyethylene with a removable waste tank.The system is guaranteed against leaks caused by sea force, wind, rain and seabirds attacks. Optional electronic accessories such as radar reflecting tapes and a photovoltaic signalling light can be provided and easily integrated. The company is looking for a commercial agreement with technical assistance.

Description

An italian company designed and patented a system for sea waste collection made in polyethylene and based on a circular floating buoy with 1800 mm of diameter, furnished of an anchor bolt and a counterbalance system. The buoy include a removable tank (550 litres capacity) for storage of rubbish and waste. The floating trash box is equipped with a special closing cap that can be opened by an handle with a leverage system. The system is specifically designed to avoid leaks caused by the sea force, the wind force and the content is safely protected against the entrance of sea water, rain water and also from seabirds attacks. Being anchored on the seabed the product guarantees complete functionality for pleasure crafts and for the recovery of the removable tank to transfer the waste. A signalling light can be placed in the centre of the cap to locate the buoy at a long distance at night.
A large set of accessories is also available:
-Radar and retro-reflective tapes complying with Solas rules;
-Photovoltaic signaller light with automatic activation
-Dedicated bin bags made in heavy PVC in different colours for separate collection of rubbish and waste disposal.

Innovations and advantages of the offer

High Capacity (550 litres)
No leaks even in harsh sea condition
Protection against seabirds attacks
Visibility at night (photovoltaic powered light)
Radar detectable

Current and Potential Domain of Application

Ports, Marine Protected Areas, Marine Coast, Pleasure crafts marine areas.

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ENERGY

Technology Offer

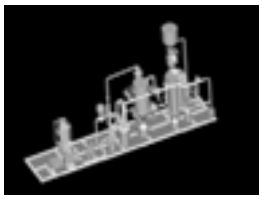
Biomass gasification plant for distribuited energy production.

(09 IT 53U1 3E6Z)

Abstract

An Italian spin-off company, highly specialized in realization of plant for the energetic trasformation of biomasses at distributed level, offers a developed and tested technology based on the gasification solution, able to satisfy both energy and heat requirement.
The company is looking for partners involved in the manufacturing and/or distribution of biomass renewable energy systems/plants for commercial agreements with technical assistance and for technical cooperation agreements.

Description



The company, highly specialized in the planning, realization and commercialization of advanced working unit for energetic transformation of biomasses
and waste to generate power at distributed level, gas filtration systems, engineering aspects of plants for energy and materials recovery from waste, has developed and tested a technology for energetic transformation of biomasses based on the gasification, able to satisfy both energy and heat requirement (up to 1.5 MWt) of small and medium industries, agricultural farm, tertiary companies.
The technology tested on pilot plant facility, is based on down-draft fixed bed technology and introduces two innovations in the gasification process. The first one related to the first step of internal pyrolysis and the other one regards the third step of thermal cracking. These options permit both an increasing of cold gas efficiency and improve the characteristics of product gas. In order to increase the energy conversion efficiency; gas filtration efficiency as well as simple and full automatic operation, plant is also optimized. The basic plant is primarily composed of a feeding unit, gasification unit and the gas filtration unit. The feeding unit comprises of a storage bin, an elevator, a secondary storage drier and an isolation bunker. Gasifier is a fixed bed down draft type realized with austenitic steel and refractory. The gas filtration unit can have different arrangement, the basic one (adopted for using gas in reciprocating internal engine) is composed of cyclone, pre-coated bag filter, water/oil scrubbing and de-humidifier/re-heater. The control system permit a full automatic control with limited man-power necessity. The family plant are available at three different power level 150, 600, and 1200 kWt.
A pilot plant having a size of 150 kWt has been realized and tested at different power level, the product gas characterization show an a Low Heating Value in the range of 4800-5200 kJ/Nm3, a gas composition in the range %H2=13.6-16.2, %CH4=1.6-1.9, CO=15.0-18.8, CO2=13.9-18.2, N2=47.8-50.0.

Innovations and advantages of the offer

The biomass gasification technologies developed for distributed application are based on “fixed bed gasifier” type, the society has been introduced some innovations in the gasifier arrangement in order to permit both an increasing of cold gas efficiency and improve the characteristics of product gas.
The others innovative aspects are:
- development of modular and standardized systems;
- development of products appropriate for both micro and distributed power -generation with thermal and electric cogeneration;
- development of competitive systems with the conventional distributed power generation systems;
- the positioning in market niches, predominantly focusing attention on “end user”.

Current and Potential Domain of Application

The main applications field are the market of products, suppliers of system, and technologies for both micro and the distributed power generation.
The principle potential customer are:

•Small and medium enterprises which have availability of residues (sawmill, oil-mills, automotive industry, etc.);
•Public administration and tertiary sector;
•Waste management Society;
•Energetic society (ESCO);

•Small districts or city interested in the distributed generation of power in the co-generation mode.;
•Agricultural farms;
Companies, societies and agencies operating in zones at higher environmental concern (parks, mountaineer community, etc).

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ENERGY,PROTECTING MAN AND ENVIRONMENT

Technology Offer

An innovative process for “environmental friendly” waste-to-energy flameless combustion and energy recovery

(09 IT 53U9 3CTV)

Abstract

An Italian start up company developed a unique, patented,flameless pressurised oxy-combustion technology for waste-to-energy market. It performs low emission and high efficiency energy recovery from brown fuels. It has been extensively tested with hazardous residues (from petrochemical,pharmaceutical industries), as well as conventional low ranking fuels(coals,oil shale), biomass. The company is interested in commercial agreements with industries or municipalities involved in waste management.

Description

The flameless process proposed outperforms competitors specifically for industrial waste treatment and for low ranking fuels (e.g. coal, biomass) difficult to handle with traditional technologies. The commercial unit available has a 15 MWth capacity, comprehensive package, including combustor, boiler and all auxiliary facilities.

The core of the unit is the reactor, where flameless combustion takes place. Flameless technology per se provides a quantum leap in overall emissions.
A combustion efficiency of 99%, as well as ultra low CO and TOC (total organic content) values directly at combustor outlet, provide air-born emissions of noxious organic species orders-of-magnitude less than the most demanding emission limits and the emissions ensured by the most competitive technologies. The uniform high temperature given in the combustor performs quantitative melting of ashes and segregation at combustor bottom.

Therefore, reduced fly ashes in the fumes allow particulate reduction, including sub-micron particulate, at stack.

Fly and heavy ashes are transformed into vitrified slag. Their zero carbon content and their fully amorphous nature impervious to heavy metal migration, secure zero-leaching (fully inert) solid residues. Ashes quantitative melting and coalescence is unique to the process.

High temperature ashes’ melting produces spherical liquid droplets prone to coalescence.
Large droplets then settle at reactor bottom and drain into a water bath. The cooling shock up the mass into glazed pearls easy to handle.

They can be disposed, or utilised for different applications (e.g. construction industry, sand blasting of alloyed materials).

Combustor fumes are essentially composed by CO2, a limited amount of excess Oxygen, plus condensable H2O. Quantitative combustion and ash melting produce clean fumes that ease high efficiency energy recovery, > 93%, so ensuring heat recovery under the form of superheated steam.

Innovations and advantages of the offer

The innovative solution proposed has been exploiting its potential, towards numerous applications, with its 5 MWth demonstration unit at the premises of the company.

Flameless technology, by its nature, has a remarkably reduced impact, in terms of emissions into the atmosphere, compared with other thermal treatment processes. The high and uniform temperature of the flameless process ensures the absence of dust (including fine) in emission. Complex and expensive (especially for the environment) fumes post-treatment systems can be avoided.

Moreover it has to be pointed out that:
• IR radiation is a powerful tool to introduce high internal heat flux, and to attain temperature uniformity;
• high partial pressure tri-atomic molecules (CO2, Water) secure the gas-to-gas heat transfer by

radiation;
• the preheating of reactants is performed inside the reactor;
• the process is completely computerised by input conditions (distributed control system);
• the combustion design is focused on the process, no longer on flame pattern;
• reactor is tailored to process, irrespective of burner requirements;
• combustion reaction takes place over the entire combustor;
• NOx and SOx are absent.

The commitment of the company is to work at the forefront of waste–to-energy technologies with energy recovery ensuring near zero emissions.

Competitive advantages of Flameless technology vs other technologies (e.g.: Rotary Kilns, Plasma, etc.) are:

1. highly efficient treatment performance:
–high treatment standard of toxic residues.
2. environment friendly process:
–fumes and flue gas well below EU limits;
4. return of investment:
–lower capex;
–better power recovery yields;
–lower operating costs;
–modular equipment to upgrade capacity.

Current and Potential Domain of Application

The Energy Recovery Technology here shown is suitable for different waste treatment needs:
– end of line hazardous residues from petrochemical, pharmaceutical industries
– waste disposal for operators of the waste industry.

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OTHER INDUSTRIAL TECHNOLOGIES,PROTECTING MAN AND ENVIRONMENT Technology Offer

Inertization of heavy metals into ceramic materials

(09 IT 54W2 3FH0)

Abstract

A spinoff company has developed a new technological process for the inertization of heavy metals in industrial wastes. The process is based on the insertion of metal elements into definite crystal site of minerals. The main advantage of this technology is the complete stabilization of the contaminants and the possibility to reuse the minerals as raw materials for further industrial processes. Partners are requested to apply this technology under license or joint venture agreement

Description

Extremely toxic sledges, containing heavy metals are produced in large quantity (thousands of tons/year) by a variety of industrial processes (metallurgic industry, tanneries, etc.). The traditional approach to the problem of the digestion of highly toxic and harmful wastes moves from the concept to reduce the pollution effect through a reduction of concentration (typical example is the retardation of the contaminant diffusion by encapsulation into concrete or glass). On the contrary, by a transformation technology the toxic element is absolutely and permanently immobilized inside ceramic materials. The company has developed an industrial inertization process that thermally stabilize heavy metals into ceramics, as oxides and silicates. These recycled ceramic materials can be reused as raw materials. The technology achieves this goal by introducing specific toxic elements in specific crystal structures. Applying proper procedures an element can be placed into a definite crystal site of a mineral (e.i. chrome inside spinel, nickel inside olivine) with the certainty that the element is chemically bound for definite intervals of pressure and temperature, wide enough to be enable the use of the material in industrial processes

Innovations and advantages of the offer

The innovative aspects of the technology relate to the definition of the chemical compositions and processing parameters that permit to achieve a complete and efficient inertization of the polluting elements.
The main advantages are the complete stability of the toxic elements stabilized into the minerals and secondly the revaluation of industrial wastes that, for example, can be reused as ceramic pigments. The economical advantages are both the elimination of the digestion costs both the exploitation of the raw matter produced

Current and Potential Domain of Application

The process finds application in the field of waste treatment

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ENERGY

technology Request

Research of know-how in the gasification of biomass

(09 IT 55W4 3FEO)

Abstract

An Italian engineering Company involved in EPC (Engineering, Procurement and Construction) activity in the power generation sector in the range of 0,5 – 5 MWe, is interested to find a technically proven biomass gasification process (know-how) for the cogeneration of heat and power from solid biomasses to offer to its clients in Italy.

Description

The request refers to the know-how of a power plant that may use as feed woodchips, straw, husk or any other type of solid biomass, to produce a clean syngas to be fed into an engine for both heat and power production.
The know-how should give special care to the environmental: exhaust gas should match the most stringent regulations and the remaining solid part should be disposed off in an economic way.
It is required the existence of at least one industrial plant satisfactorily working from which various information can be taken and where it is possible to bring potential clients for demonstration.
The owner of the know-how is required to have adequate technical staff in order to back up the Italian company with the necessary support during the various stages of engineering, procurement, construction, start-up and running of the plant.

Technical Specifications / Specific technical requirements of the request

The transfer of the know-how will require complete process documentation,i.e.:
- description of the process
– flow sheet with heat and material balance
- Suggested lay-out
- Process data sheet
- Motor list
- Start-up and maintenance handbook

If the know-how includes special equipment the company is ready to consider either the purchase of such equipment or the construction in Italy under license.

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

Disinfection of water and surfaces in contact with water

(09 IT 55W4 3FJ6)

Abstract

A private laboratory has developed and patented a technology based on the use of pressurised carbon dioxide when used alone or in synergy with typical biocides for the disinfection of water and surfaces in contact with water. The technology comprises also a method for metering and delivering carbon dioxide and their mixtures. The laboratory is looking for partners for a licensing agreement.

Description

The present technology is based on the use of pressurised carbon dioxide when used alone or in synergy with typical biocides for the disinfection of water and surfaces in contact with water. The technology comprises also a method for metering and delivering carbon dioxide and their mixtures. Carbon dioxide as gas, supercritical fluid or in form of carbonated salt doesn't acts only as solvent, propellant and mixing agent, but it is widely demonstrated to have biocide effect and to be synergistic enhancer of conventional biocides as chlorine compounds.

Comparison between disinfection with chlorine compounds and mixtures based on carbon dioxide and chlorine compounds:
Typical chlorine residual content for swimming pool disinfection: 0.5 mg/l. Normally chlorine is added in excess and for some days the swimming pool cannot be open until the residual level value is reached.
Mixture composition: Chlorine content 0.05 mg/l + Carbon dioxide 30 kg for the disinfection of 3000 mc volume swimming pool with a disinfection yield of 99.9%. The initial chlorine value is much lower than the residual. The swimming pool doesn't need to be closed for long times.

Innovations and advantages of the offer

This technology is able to solve the following problems:

- The use of carbon dioxide and of their mixtures with chlorine compounds already premixed and stored in a closed cylinders prevents the occurring of risks associated with the handling and storing of toxic and irritant biocides as chlorine gas, calcium hypochlorite.
- The synergistic effect of carbon dioxide on biocide activity is very effective so that the dosing of chlorine compounds can be drastically reduced. The low level of biocide reduces the risk of formation of carcinogenic compounds as AOX (halogenated organic compounds). For drinking water disinfection this advantage is also related with a lesser impact on water odour and taste.
- The reduction of chlorine dose allows to reduce the duration of maintenance operations.

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ENERGY,PROTECTING MAN AND ENVIRONMENT

Technology Offer

Comminution in controlled operative condition

(09 IT 55X8 3D1E)

Abstract

An Italian university research group has developed advanced technologies to recover materials and energy from different waste flows. The technologies can be applied to recover and recycle materials in close and/or open circuits, to improve the quality of primary or secondary raw materials derived from solid waste.

Description

Recycling of waste materials is a big issue in terms of environmental sustainability and of waste management. The development of proper technologies for waste materials recycling is recognised as a priority. To achieve this aim, the technologies applied in mineral processing can be adapted to recycling systems. In particular, the development of comminution technologies is one of the main actions for the improvement of the quality of recycled materials.

In this context, within research team, traditional and low temperature comminution (cryo-comminution) tests have been carried out both at a laboratory scale and at pilot scale. Low temperatures helps render also plastic material brittle and, therefore, reducing comminution energy. Different experimental conditions in terms of temperature and sample pre-conditioning have been adopted, utilising CO2 and liquid nitrogen as refrigerant agents.

Laboratory tests have been performed by a blade mill and by an ultra-centrifuge mill, suitably adjusted chamber by means of a flow of CO2, in order to reach low temperatures during material comminution. Materials have been fed to the mill together with the flow of CO2. The temperature is continuously monitored by thermocouples placed in the milling chamber.

Pilot scale tests have been performed by a cryogenic impact mill. Low temperatures have been reached through the injection of liquid nitrogen both into the feeding hopper, preconditioning the material, and into the comminution chamber.

The product, obtained by cryo-comminution, is characterised by a larger amount of fine particles in comparison to the product obtained at room temperature, starting from the same size distribution. This implies that the market value of a cryogenic product can become higher than the value of a traditional product, if the aim of the process is to reach a fine size distribution. Furthermore it has been observed that cryo-comminution allows to obtain a satisfactory liberation degree.

The following typologies of materials have been utilised for comminution tests:
single constituent materials: in particular different kinds of plastics, fed in granular form (drops):
-PET (polyethylene terephthalate) is a thermoplastic material found in a transparent amorphous status or in a semi-crystalline one;
-PS (polystyrene) is a thermoplastic amorphous and hard material;
-PVC (polyvinyl chloride) is an amorphous thermoplastic material with high chemical, light and environmental-agent resistance;
composite materials:
-end-use tyres, coming from recycling of heavy-vehicles, composed mainly of rubber with various inorganic fillers;
-plastic waste from spent lead batteries;
-pharmaceutical blister, composed of an aluminium foil sealed to a PVC;
-multi-layered packaging for food applications, made of paper and aluminium layers;
-WEEE (waste electric cables and printed circuit board).

The results of the performed tests show as cryo-comminution improves the effectiveness of size reduction of waste materials, promotes liberation of

constituents and increases specific surface size of comminuted particles in comparison to a comminution process carried out at room temperature.

Moreover, CO2 and liquid nitrogen flow create an inert atmosphere which prevent possible dust explosion during the comminution and handling processes.
The proposed technologies can be applied to recover and recycle materials in close and/or open circuits, to improve the quality of primary or secondary raw materials derived from solid waste, in particular composite materials with plastic behaviour, for all the applications in which a fine size distribution is required.

Innovations and advantages of the offer

Regarding the innovative aspects, the integrated systems for solid waste processing aimed to energy/material recovery lead to a beneficial impact on energetic/environmental issues as reduction of carbon dioxide emissions, reduction of energy consumption, reduction of waste production.

The advantages of cryogenic comminution are:
- energy reduction in comminution processes: a material is more fragile at low temperature than at room temperature, therefore, to achieve a defined size distribution, a lower energy amount is required;

- increase of economic value of obtained products: the product obtained by cryo-comminution is characterised by a larger amount of fine particles in comparison to the product obtained at room temperature, starting from the same size distribution. This implies that, if the aim of the process is to reach a fine size distribution, the market value of a cryogenic product is higher than the value of a traditional product;

- increase of liberation degree in the processing of composite materials;

- reduction of comminution time and equipment wearing: the material, ground under cryogenic conditions, is quickly reduced in size, thank to its embrittlement, so the equipment is submitted to a low wearing and the maintenance costs are significantly reduced.

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INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

Technology Offer

Generating electricity through sea and ocean waves motion

(09 IT 56Z4 3CVC)

Abstract

An Italian company operating in the production of electricity from renewable sources, has developed, from one of its several patents for the exploitation of wave motion of the sea and ocean, a system to convert recurring wave motion within the sea or oceans into electrical energy . The present invention offers significant advantages over traditional methods. The company is looking for a partnership interested in the industrial development of this system.

Description

The system is a modular concentrator of breaking water surface wave motion and it turns the kinetic energy of waves into potential energy by means of simple hydraulic or mechanical devices. The apparatus has been designed to constantly provide the potential energy required. The potential energy is then transformed, by traditional turbines coupled to alternators, into electrical energy ready to be used or distributed through existing power transmission grids without any further processing.

The environmental impact of this innovative device is very low, no need for foundations, easy maintenance and low operating costs.

Innovations and advantages of the offer

In a world where 70% of the planet is covered by water, waves are a constant source of power as they are effective yearlong. The present system utilising this kind of renewable source of energy has a performance of 95% and the plant, therefore, will be able to supply non-stop electrical energy. The electric power output is directly proportional to the following variables : the physical location of the modules (inshore / offshore) and number and size of the modules. Just to give an idea of the power output, a standard extendable design structure generates 1-MW of electrical energy.

Before entering the plant cycle the seawater is filtered and it is then returned to the sea, therefore preserving the aquatic ecosystem of the area.
The system has got a very low environmental impact as it does not need any underwater foundations. On the other hand, if opportunely positioned, the modules can preserve the integrity of the shoreline above all in those areas where the constant erosion of the waves is causing serious damages.

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OTHER INDUSTRIAL TECHNOLOGIES,PROTECTING MAN AND ENVIRONMENT Technology Offer

A novel organic fertilizer from humus

(09 LV 58AD 3F8Q)

Abstract

A Latvian company has developed a highly effective organic fertilizer. The product is produced from peat applying a special treatment technology. Properties of the fertilizer can be modified according to required needs by changing the treatment parameters. The company is looking for commercial agreement with technical assistance or joint venture agreement.

Description

The Latvian manufacturer has a lasting experience in peat processing industry. The newly developed product is produced from peat applying a special cavitation treatment technology for the extraction fractions of humus. The process does not involve toxic or harmful substances. The obtained product is highly effective fertilizer. The fertilizer contains microcells and a complex of biologically active substances like amino acids and humic acids. The fertilizer stimulates growth and maturing of the plants, as well as has a positive impact on soil properties promoting nutrient mobility and absorption. The fertilizer reduces the ripening time of berries, fruits and vegetables. In addition, the fertilizer restores the fertility of depleted soils and reduces the harmful influence of frosts and droughts. Application of the product jointly with mineral fertilizers can reduce the usage of the mineral fertilizers by 20-30 %.

The novel fertilizer increases soil fertility by:
- improving the soil structure;
- increasing the cation mobility and water holding capacity;
- preventing the increase of acidity of soil;
- increasing penetration and retention of calcium;
- promoting nutrient circulation in plants.

Innovations and advantages of the offer

• The technology is based on the use of non-linear effects of cavitation, similar to hydraulic effect with pressure up to 100 MPa and shock waves. These factors have a positive impact on a series of chemical reactions during the process.
• Possibility to adapt the product to local soil and climate conditions.
• Environmental friendliness of the product.
• Possibility to work into the ground by standard agricultural machinery.

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INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

Technology Offer

Environmentally friendly water disinfection.

(09 LV 58AD 3FED)

Abstract

A research group from Latvia has developed a technology and equipment for cheap and environmentally friendly disinfection of industrial waters. The technology is based on treatment of water with electric direct current and usage of specific Titanium oxide containing electrodes. The research group is looking for industrial partners for application of the technology.

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Description

The direct current in water system causes forming of anion and cation enriched water near the positive and negative electrodes respectively. Specific anions have strong anti-bacterial and anti-virus properties. The research group has developed a technology and device in which specific Titanium oxide containing electrodes with nanostructured microstructure are used for disinfection of industrial water.
The technology has wide application in various fields - for disinfection of biologically polluted industrial waters, for using in ventilation systems for preventing of bacterial contamination, for treatment of ballast waters on ships for avoiding of undesirable transference of living organisms from one geographical region to other, etc.

Innovations and advantages of the offer

The electrodes have high corrosion resistance.
The materials used are environmentally friendly and do not contain heavy or noble metals.
The water treatment method is simple, environmentally friendly and relatively cheap.

PROTECTING MAN AND ENVIRONMENT

Technology Offer

Integrated cost-effective concept to sanitise old landfills based on numerous proven technologies

(09 NL 60AF 3EBT)

Abstract

A Dutch SME offers a complete concept for waste recycling applied to landfill sanitation. The concept integrated relevant separation technologies and components into a waste treatment chain that ends in separate outgoing raw material streams. The concept sees waste material as value, and fully cleaning up old landfills also creates value to renew available areas for project developments. Partners are sought with strong interest in solving waste problems completely and thus effectively.

Description

A Dutch SME has developed an innovative and patented concept in the field of waste mining to sanitise e.g. old landfills. The concept focuses on sanitising landfills using an integrated approach and optimising reuse of landfill contents in the form of energy and reusable raw materials. The concept is unique in the world both in technical and economic terms. It is based on modern, proven, and often highly specialised separation and treatment technologies that are combined to form a controllable and flexible small-scale closed-chain structure.After digging up the landfill contents on the site, the production process meticulously sorts out and separates all recoverable raw materials (metal, glass, building materials, etc). Then, the flows will be processed in order to meet the purchasing specifications of the market. During these processes, a large amount of energy can be produced out of worthless but exploitable residual materials (such as biomass). Likewise, synthetic natural gas and diesel oil can also be produced and sold. Toxic or harmful non-usable substances are destroyed on site. Finally, the fully sanitised clean land can be used for new purposes, such as residential developments, business parks, recreation and agriculture. Background and potential in the Netherlands as an example for other regions:The Netherlands has about 4,000 (closed) landfills (8,000 ha), in which various types and of waste (chemical waste, bulky household refuse, white and brown goods, household residual waste, etc.) have been dumped over the past decades. Perpetual after-care for former landfills is mandatory in the Netherlands. This mandatory perpetual care can be of an environmental-hygienic, social and/or economic nature. Ten percent of the landfills are either located in areas that are needed for urban development or industrial use, or pose an environmental and hygienic risk, e.g. serious contamination of groundwater with leachate. Only costly partial solutions, such as transferring, removing and covering waste, have hitherto been provided to deal with the risks posed by these problem landfills. For landfill owners - often the municipalities - landfill sanitation carries a high price tag (E 140 up to more than E 200 per ton). A detailed business plan for a project in the Netherlands is available and will convince potential partners of the advantages.

Innovations and advantages of the offer

The integrated approach of the concept is based on the following implied features = advantages:
1.The waste materials and the land (ready for building) have value, and not the transport and the treatment in themselves.
2. The company creates a demountable relevant treatment chain that can be built on or right next to a landfill. This involves a considerable reduction in the logistical burden (transport) and operational costs.
3. Through the adoption and innovative combination of ultra-modern, small-scale and thus flexible technologies, the process chain guarantees a higher degree of efficiency than what can be achieved by current sanitation methods.
4. Efficiency can further be improved by means of selected input, i.e. the output of combinations of separation technologies used as a conditioned input for various treatment technologies.
5. The process can achieve a recycling quota of about 70% for usable materials. This is much higher than in current methods for dealing with landfills.
6. Non-usable substances (such as biomass), the remaining 25-30%, will be converted into energy.
7. Toxic and harmful substances (0-5%) are destroyed on site or permanently immobilised.
8. The company provides a close-to-zero emission production process, which may create opportunities for emissions trading.
9. The company carries out full and integrated landfill sanitation. The only material that will be brought back

is sanitised soil.
10. By fully sanitising a former landfill, the process creates enormous added value for space planning.

Current and Potential Domain of Application

Sanitation of landfills and dump yards, but also a process for waste mining for waste streams produced currently and in the future.

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ENERGY,AGRICULTURE AND MARINE RESOURCES

Technology Offer

Environmental friendly, low head hydro-power technology

(09 NL 60AF 3EE8)

Abstract

A Dutch SME has developed an innovative low-head hydro technology, which enables the user to generate clean and sustainable energy from the flow of water at relative low differences in water heights. The technology consists of a magnetic bearing that is a turbine as well as an a generator. The SME is looking for companies in the Enviromental/Energy sector for a geographical area or a specific application. Types of collaboration depend on the kind of partner.

Description

Besides being a source of renewable energy, the technology contributes to a sustainable environment through a range of design aspects and through its applications and uses.

The innovative low-head hydro technology has the following features: it consists of a low head small hydropower generator, with a water-flow sectional area of 1 m2. The basic unit is fully integrated, and includes the blades, bearings, generator and electronic boxes (see photo). From this basic unit, the electrical cable can be directly connected to the user network, with the voltage as required by the local conditions (f.i. 3phase, 400 V, 50 Hz).

The basic unit has a power rating of 33 kW when installed in a barrage with 2 meter head. Under these conditions, the water flow is 3.5 m3/s. Because this technology is serially sequentiable, provided enough water flow or water head the power output can be increased to meet the demand.

The ring has only one moving element. The entire construction consists of a rotor, the moving element, and a stator. The rotor has no central axle, but the bearings are positioned at the external surface of the rotor. The bearings can be of the ‘active magnetic type’, meaning that the position of the rotor is controlled by magnetic forces, so there is no mechanical contact. Generation of electrical energy occurs in the stator, which is positioned at the exterior , around the rotor. The generator is of the “Direct drive” type, there are no gear box or axles.

Innovations and advantages of the offer

-Maximised efficiency and power output
-Minimun wear and maintenance
-Little or no ecological impact
-Fish friendly
-Direct drive generator (no gear box, axles,…)
-Modular system

Current and Potential Domain of Application

The current pilot project is a generator in a weir whose generated energy is used for set-off by delivering energy to the grid.
Potential applications include island-applications, sustainable energy sourcing, generation of carbon credits by substitution of existing non-sustainably energy sources, negative cost generation in water management systems, etcetera.

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

Modular blocks technology for the agricultural sector

(09 NL 60AF 3EKT)

Abstract

A small Dutch company developed a manure treatment system consisting of a separator, a water treatment plant and a purifier to produce water of drinking quality. This is an integral solution for air, soil and groundwater, which is unique. The production costs are reduced by increasing product quantities. The company is looking for an industrial partner with expertise in larger water treatment plants. It will be possible also to financially participate.

Description

The basic principle of the system developed by a Dutch company consists of separating the sludge of a farmyard into contaminated water and solids. The water is treated in a compact reactor with nitrification and denitrification processes. Via membranes the concentration of biomass in the reactor can be kept on a high level, and consequently short treatment is guaranteed (2 days). This makes the unit very compact, and consequently such units can be fabricated in a factory. Due to the aggressive circumstances the units are completely made of plastic.

The process can be used for the agricultural sector for treating urine of cows/horses/pigs and other animals, but is also suitable to treat waste from slaughter companies, etc. For smaller communities up to 2.500 people the unit can also be used and with a multiple of modular blocks, and the capacity can be increased gradually.Manure collected underneath the grid in a stable consists of faeces and urine, which are mixed after some time. The manure mix causes ammonia problems. Via a pump the mix is transported to a miniature separator, which separates the sludge in water and solid.The contaminated water is pumped in a non-aerated compartment together with aerated water from the aeration zone of the reactor. Non-aerated water plus fresh urine water plus nitrate water are mixed, and nitrogen gas leaves the reactor. By gravity force this water enters into an aeration zone, and ammonium is converted into nitrate. A pump takes part of the aerated biomass and pumps it into membranes. Clean water is leaving the membranes. This water can be further purified to drinking water quality. What will be left is a concentrated potassium liquid flow that can be used as fertiliser.

The company has experience in the development of innovative systems, and has the expertise to build the units in series. Together with other partners they have developed the electronic system for communication. The application can be used in the agricultural industry as well as on farmyards for cows/ horses/pigs and other animals producing urine. The unit purifies the contaminated water on the same place where it is produced. The unit also has good application possibilities in villages where people are concentrated. With simple piping it will be possible to feed the water treatment. Also in bigger cities it will be possible to install multiple units around the city. This prevents extreme losses of energy by pumping contaminated water over long distances via big sewer pipes.

The company has started to find solutions for worldwide problems. They started in the agricultural sector where manure was a huge problem that caused air, soil and groundwater pollution. Via the inventions of manure separation belts underneath the grids in pig stables, they found that ammonium formation and bad smell are reduced by 80 %. Manure sludge was split into solids and contaminated water. The water was 80 % of the total manure volume, and consequently there was a need to build a compact water treatment plant.

Innovations and advantages of the offer

Many initiatives have come up in the past to solve the manure problem. All the solutions however covered a specific problem but there was nobody who had a solution that covered the problem as an integral solution.

The problem was air, soil and groundwater pollution. The company has been working on a total solution for this problem. Belt separation to reduce air pollution and at the same time separating the manure slurry. Water treatment to reduce the groundwater problem (nitrate problem) and later the compact bioreactor to reduce soil pollution.

Specifically the water treatment plant has no direct competitors as it has shown in patent searches in Europe and USA. No other system of similar technology is available.

The concept is based on the fact that production costs are reduced by increasing product quantities. This is contrary to many other philosophies where increase in system capacity will decrease cost per unit. Second philosophy is that pollution needs to be treated on the spot where it has been created i.e. the farmyard. This prevents transport of highly contaminated flows over long distances. Manure causes the spread of harmful bacteria over longer distances, and consequently causes diseases to animals and humans.

Benefits for the farmer will be:- Reduction of manure costs.- Reduction of ammonium formation when removing manure immediately out of stables.- Less ventilation.- Better health of animals.- Fewer odours. By improving the atmosphere in the stable advantages of 10 % more meat could be obtained with 8 % less food (valid for pigs). This also asks for an improvement of the complete stable set-up. The environmental aspects could be tremendous:- Reduction of odour.- Sharp fall in nitrate concentration in groundwater.- Reduction on earth warming (CO2 + heat) by trucks.- Reduction in spreading diseases.

Current and Potential Domain of Application

Agriculture industry, farmyards for cows/horses/pigs and other animals producing urine. Villages where people are concentrated.

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INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT — Technology Offer

Gas desulphurisation process for medium applications (09 NL 60AF 3ELP)

Abstract

A Dutch company active in the environmental sector has developed a selective(bio-) gas desulphurisation process. It is a multiple stage scrubbing process based on the selective absorption of H2S (Hydrogen Sulphide) in a solution of sodium hydroxide. The process is especially developed for companies with a medium gas throughput. The company is looking for a commercial agreement with technical assistance.

Description

Basic Process Description:

The biogas flow enters the bottom of the tower and leaves at the top. Water is sprayed from the top and will be in counter current with the gas flow.
In the tower an extensive contact between gas and water is created through an installed packed bed in the column.
H2S is absorbed from the gas phase into the water phase and will be binded by the caustic which is dosed in the recirculation water.

By continuous H2S measurement in the biogas outlet and adjusting the caustic dosing pump accordingly, minimum usage of caustic is ensured and maximum security of H2S concentration in the cleaned biogas is guaranteed.
Caustic savings upto 60% can be achieved in comparison with conventional caustic scrubber-technologies!

The course of this chemical process is further determined by chemical concentrations, pH values and the temperature and pressure of the system. The following conditions should be taken into consideration:
- the lower the final concentration of H2S in the purified gas, the higher the specific lye demand;
- the higher the temperature and pressure of the system, the higher the specific lye demand;
- the higher the CO2 content in the raw gas, the higher the lye demand;
- the longer the gas remains in the scrubber, the higher the specific lye demand.

The following design data is required in order to design a gas desulphurisation plant:
- gas flow in Nm3/hour; maximum, minimum, average, current and future;
- gas temperature in °C. ;
- gas pressure in mbar or Pa;
- composition of gas (CH4, CO2, H2S, other);
- required efficiency; ppm H2S in the purified gas.

For optimal performance of the process the following conditions need to be considered:
- fluctuations in gas flow preferably < 10 m3/hr per minute;
- system pressure preferably between - 250 and + 500 mmwg;
- process temperature preferably between 2 and 50 °C.

Innovations and advantages of the offer

- High removal efficiency on H2S
- Low caustic consumption
- Easy implementation of gas drying and conditioning
- Simple low cost operation and maintenance
- Caustic savings up to 60%
- Reliable and compact unit
- Small footprint

Current and Potential Domain of Application

1) To produce electricity from biogas. Biogas H2S removal before gas engine feeding in order to reach the quality demands by the biogas engine manufacturer.

2) H2S removal in order to protect gas turbines and boilers.

3) Meeting governmental SO2 emission standards.

4) Odour abatement (Air).

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INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

Technology Offer

Biological H2S removal without chemicals

(09 NL 60AF 3ELR)

Abstract

A Dutch company active in the environmental sector has developed a process for the removal of H2s out of biogas or landfill gas. The process is fully biological, requiring no (or in some cases minimal) chemicals or external utilities. The company is looking for a commercial agreement with technical assistance.

Description

Basic Process Description:

The biogas gets into a vertical column with packing media in a counter current pattern. The packing media provides sufficient contact surface area for the gas flow, nutrients and oxygen: It is also used as a carrier for the bacteria. When limited quantity of oxygen is added to the biogas, specific aerobic bacteria such a Thiotrix and Thiobacillus will oxidize H2S into elemental sulphur and/or depending on the environmental conditions into sulphuric acid. Oxygen is added to the gas in the form of compressed air. An automatic control system adjusts the amount of air flow according to the actual requirement which is turn is correlated with the biogas flow. Water and nutrients are sprayed on top of the medial and refreshed automatically as required.

In order to create the ideal temperature for the biological process, heat can be added by a heat-exchanger into water circulation loop.

Innovations and advantages of the offer

- No use of chemicals
- High efficiency
- > 95% reductions in of H2S for incoming biogas with up to 1 vol. % (10.000 ppm H2S).
- Almost no utilities necessary.
- No waste flow requiring treatment or transportation.
- Safe process. All equipment & instrumentation Ex-proof.
- Compressed air supply linked to the biogas flow and oxygen demand.
- Low capital and running costs

Current and Potential Domain of Application

- Biogas
- Landfill gas
- Anearobic cow manure treatment plants

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INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

Technology Offer

A process to recycle asbestos to non lethal mass for re-use as cement

(09 NL 60AH 3EGQ)

Abstract

A Dutch SME has a safe and patented technology to recycle asbestos containing waste materials into a non hazardous filler material. Normally, materials containing asbestos are made out of 90%cement, 8% asbestos and 2% other materials. After the process all material can be used as a filler for new cement and can easily be broken down in a fine powder to be used as cement. The company is interested in license agreements.

Description

In most cases, asbestos containing materials are used as a landfill material, still maintaining its dangerous specifications. The asbestos problem is not solved, only cat awaiting a proper process to eliminate the danger.
The developed patented technology is developed over years to a now proven technology. Using a thermal process the asbestos is backed and moisture is vaporized, breaking down the dangerous fiber and loosing it's specifications.
As the complete packed asbestos product is inserted in the oven it is not necessary to break down the product or remove it's bigbags. No dangerous manual handling is needed.
After the thermal process the product is fragile and can easily be broken down into a fine dust to be used as a slightly lower graded cement.

This process is innovative as previously developed thermal processes are unable to result in a high quality, re usable end product. Furthermore the process is safe for the operators and the environment during and after the thermal process.

We are looking for partners within Europe that are interested in a licensee to recycle asbestos containing waste in there neighbourhood.

Innovations and advantages of the offer

Innovations and advantages of the offer
•The asbestos problem is solved, not postponed in the future,
•No additional dangerous handling has to take place in the process,
•Re-use of valuable building materials,
•No additional chemicals are used in the process,
•High quality end product,
•Reduction of virgin material in the cement industry,
•Governance can control and monitor process and legislation,

To operate one (1) Moving Hood kiln an annual quantity of 40,000 ton of waste asbestos containing material is needed. If quantities are higher, a parallel kiln can be applied. Also is a tunnel oven possible. This kiln annual quantity of 100.000 ton of waste asbestos.

Current and Potential Domain of Application

This technology can be used in construction industry, recycling industry, building materials and cement industry

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INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

Technology Offer

Second generation biodegradable starch based bioplastic from by-products of the potato processing industry.

(09 NL 60AH 3F62)

Abstract

A Dutch SME has developed a new type of bioplastic which is based on starch from by-products of potatoes. The material is developed for injection moulding, extrusion and thermoforming applications. The firm is looking for commercial agreements with companies who want to develop new market applications which comply with the cradle tot cradle principle.

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Description

The Dutch company is producing biodegradable plastics, based on starch from the by-product of the potatoe industry, since 2001. Based on the experience and know-how from the first generation bioplastics the firm has developed a new type with improved properties. The development has resulted in an extremely versatile bioplastic, appropriate for extensive use in various applications. The firm is now looking for companies who want to develop new market applications which comply the cradle tot cradle principle.

Innovations and advantages of the offer

+ The eco-friendly bioplastic is based on renewable resources and can replace oil-based plastic;
+ The material isn't consuming food resources because it is made from biomass extracted from inedible by-products of potatoes.
+ This material doesn't claim large areas of land necessary to grow crops for human consumption.
+ Production of this bioplastic requires less energy than polyethylene production;
+ The material can be processed with conventional plastic converting machines for injection molding, extrusion and thermoforming;
+ Colouring can be done by biobased and conventional masterbatches;

Current and Potential Domain of Application

Controlled release technology; Agroculture; Horticulture; Packaging; Infrastructure; Building & Construction;
Promotion; Sport & Leisure; Automotive;

PROTECTING MAN AND ENVIRONMENT

technology Request

Technologies aiming in neutralization and/or utilization of organic waste

(09 PL 61AJ 3F7V)

Abstract

A Polish company spacializing in biomethods seeks technologies aiming at the neutralization and/or the utilization of organic waste (for example: application of incineration of animal wastes equipped with energy recovering systems, biogas plants for solid organic wastes or accelerated composting technologies in tunnels). The partners for information exchange or technical cooperation are sought.

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Description

A Polish company specializing in biomethods is interested in the technologies aiming at the neutralization and/or the utilization of organic waste(for example: application of incineration of animal wastes equipped with energy recovering systems, biogas plats for solid organic wastes or accelerated composting technologies in tunnels).

All new technologies and methods focused on the utilization of organic wastes with recovery of energy are in scope of their interest.

Technical Specifications / Specific technical requirements of the request

Safe application/usage (harmless for people, animals and plants, friendly to environment), cost-effective, technical support and social acceptance.

OTHER INDUSTRIAL TECHNOLOGIES,PHYSICAL AND EXACT SCIENCES

Technology Offer

Water Purification using a Novel Reactor with Photoactive Refill

(09 PL 63AW 3EY8)

Abstract

A technical university from north-west Poland has developed a technology of water purification using a reactor with a photoactive textile refill. The new technology offers simple solution for replacement of the catalyzing material. Instead of replacing a whole chemical reactor or its elements, only a photoactive textile refill has to be replaced. The university is interested in signing a license agreement, technical cooperation agreement or commercial agreement with technical assistance.

Description

The technology of water purification allows the removal of organic impurities from water. Unlike traditional methods, this technology is based on a reactor with a photoactive textile refill.

Currently, the need to separate the catalyst from the reaction mixture in a water slurry and the obligation to replace chemical reactor or its elements after loosing its catalyzing properties makes the application of photoactive process difficult. In the proposed technology of water purification titanium dioxide, the most often used photocatalyst, is immobilized on the textile base as a thin layer using sodium silicate as a binding material. In other words, water purification is achieved through the attachment of the soluble chemical compound to the unsoluble constant substance. Immobilizied catalyst is placed on the carrier in the form of a coat, and together it forms a replacable cartrifge filter.

The new technology offers a simple solution in case a reactor will loose its catalyzing properties. Instead of replacing a whole chemical reactor or its elements, only the photoactive cartridge filter has to be replaced. As a result, an expensive and time-consuming stage of separation the catalyst from the reaction mixture is eliminated.

Current stage of development requires a continuation of R&D activities from the potential partner. The university is interested in technical cooperation to adjust the technology to specific needs, as well as, in signing a license agreement with companies and/or organizations with the expertise and resources to take the technology from the laboratory prototype stage through to commercialization.

Innovations and advantages of the offer

Titanium dioxide, the most often used photocatalyst, is not applied in the suspension but is immobilized on the textile base. Application of silicate materials as a way of binding titanium dioxide particles provides great results.

The new technology offers simple solution in case the reactor will loose its catalyzing properties. Instead of replacing a whole chemical reactor or its elements, only the photoactive cartridge filter has to be replaced. As a result, an expensive and time-consuming stage of separating the catalyst from the reaction mixture is eliminated.

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INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

Technology Offer

Water-saving mixing system for domestic taps

(09 PT 65BN 3F52)

Abstract

A Portuguese University has developed a water-saving mixing system composed by a mixing valve associated to a reservoir that allows water savings in domestic systems installations. The university is looking for producers of taps, pipes, domestic water storage systems or other companies from the plumbing/sanitaryware sector interested in license or technical cooperation agreements.

Description

In each shower 5 litres of fresh water are wasted in average. This happens while the user is waiting for the hot water coming from the tap.

The developed technology allows savings up to 80% of this water based on a mechanical system that redirects the cold water from the pipeline to a small reservoir.

If the water at the tap is not hot, it will be conducted to the accumulation reservoir. If the water at inlet is hot or the accumulation reservoir is full, the water will be directed to the discharge valve zone.

With this new system, energy and water are saved, increasing the sustainability of domestic households.

This innovative system satisfies the needs of a growing market ecologically concerned.

Innovations and advantages of the offer

The developed technology has the following advantages over the existing systems:
- Simple and low-cost fabrication,
- Water saving functionality,
- Can be applied on existing systems without additional costs.

Current and Potential Domain of Application

The technology can be applied in any place where there is a necessity of a water mixing system.

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INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

Technology Offer

A technology for gypsum binder production from sludge of chemical water treatment for heat and power plants

(09 RU 86FG 3DGJ)

Abstract

A Russian R&D organization (Nizhni Novgorod) developed a technology for recycling sludge of chemical water treatment for heat and power plants. It enables gypsum binder production for construction needs and alleviates the problem of environmental amelioration of industrial areas. The organization is interested in commercial agreements with technical assistance (technology lines engineering, startup, staff training) and joint ventures.

Description

An R&D organization from Nizhni Novgorod has developed a technology for gypsum binder production for construction needs by recycling sludge (hazardous wastes of chemical water treatment at combined heat and power plants). Resulting gypsum binder may be used in the construction of various buildings and structures – in masonry and finishing mortars, in dry pack mortars, for manufacturing building components(wall blocks and panels, facing and decorative products, etc.).
The gypsum binder can have strength up to G-7 class (7 MPa).
The technology enables the production of high-quality environmentally safe and cheap construction material by recycling hazardous waste (sludge), which can be found in any city (tens and hundreds of thousands tons). Thus, the problem of environmental amelioration of large areas near the cities can be facilitated at the same time.

Innovations and advantages of the offer

* Use of chemical water treatment wastes as raw material for gypsum binder production;
* Environmental amelioration of large city areas
* Lower energy consumption to produce gypsum binder (no calcination is needed, unlike in the conventional technology).
* Production costs are 30 – 50% less than with the conventional technology
* Gypsum binder production with a predetemined strength grade (may vary from G-2 to G-7 depending on specific customer's requirements).

Current and Potential Domain of Application

The consumers of the technology are:
1. Combined heat and power plants interested in chemical water treatment sludge recycling.
2. Manufacturers of construction materials on the base of gypsum (plants producing wall panels, blocks, dry pack mortars, concretes, masonry mortars, etc.).
3. Real estate developers, using gypsum binder at construction sites (for masonry and finishing mortars, self-leveling floors, etc.).

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

Novel valorisation and treatment method for olive mill wastewater

(09 TR 97NA 3EWW)

Abstract

A Turkish Chemical Engineer working for 30 years mainly in water and waste water treatment area, offers a novel valorization and treatment method for olive mill waste water (OMWW) which has high polluting properties and presents a huge environmental challenge. This offer is combining a central collection facility, treating the OMWW and producing valuable products from OMWW and thus compensating the high costs of treatments. The inventor is looking for partners for licensing agreements.

Description

The annual world OMWW production is estimated to be around 30 million m3. Almost all of this production is in the Mediterranean countries and more than 75 % in EU countries. Proper treatment technologies, however, require high investment costs and a high level of technological know-how. Olive oil producers are usually small or medium scale enterprises working seasonally, unable to afford the costs of proper wastewater treatment plants. Therefore, olive mills' wastewater is generally discharged directly to soil, small rivers, lakes or sea.

The modern strategy for olive mill wastewater management is combining wastewater treatment and valorization. In other words, producing valuable products from wastewater and thus compensating the high costs of treatment. Designing centralized plants to collect wastewater from small olive mills within a regional radius offers a feasible economic solution.

OMWW is a mixture of olive vegetation water and soft olive fruit tissues and the water added in the various stages of the oil extraction process. It contains olive pulp, pectin, oil, etc., suspended in a relatively stable emulsion. Both the pit and the pulp of olives are rich in water-soluble compounds. The chemical composition of OMWW is variable depending on olive variety, cultivation conditions, degree of fruit maturity and the oil extraction process . In general, OMWW contains 83–96% water, 3.5–15% organics, and 0.5–2% mineral salts. The organic matter is composed of oil (1–14%), saccharides (13–53%), proteins (8–16%), organic acids (3–10%), polyalcohols (3–10%) and polyphenols (2–15%) . The phenolic constituents responsible for its dark color, are known to have antibacterial and phytotoxic effects .

For many decades antibiotic growth promoters have been used in the feed for farm animals. Because of the general problem of increased resistance of bacteria and the decreasing acceptance of the consumers for this type of additive, antibiotics have been banned already in some countries and will not have a future in the European Union. Due to the foreseen problems associated with the legislative ban of antibiotic growth promoters in the European Union by 2006 (e. g., performance losses in animal husbandry, food borne disease in humans, and increased use of therapeutic antibiotics), the demand for alternative feed ingredients in the EU has increased. Especially the poultry industry deals with the problem of transfer of pathogens (e. g., Salmonella, Campylobacter) from chickens to humans.

In this new wastewater treatment process, collected olive vegetation water from the contracted olive mills is firstly fed to special kind of oil skimmer. In this patented oil skimmer unit, olive oil is recovered from OMWW by using some special kinds of enzymes as mixture. After this step, OMWW is coagulated with modified zeolite powder and then filtered. The dried zeolite including polyphenols and enzymes is marketed as feed additive. After this coarse filtration, OMWW is fed to mineral powder precoated rotary vacuum filter and filtered up to 0.5 micron. The spent mineral can also be used as feed additive or pesticide/herbicide soil enhancer for ecological farming. Advanced treatment process is carried by membrane filtration steps. At the end of treatment, min. 80% of OMWW is saved as potable water and all the process is zero discharge.

Innovations and advantages of the offer

EU environmental regulations aim to preserve present fresh water sources due to the scarcity and therefore to reach zero discharge which means to reuse treated water at the plant or for irrigation. Serious infection problems and loss of meat production due to banned usage of antibiotics in animal nutrition, researchers

have been led alternative solutions such as new vaccines, and natural antimicrobial plant extracts using.

At the capacity of 25 m3/h (500m3/day) OMWW treatment about 5 t/day olive oil can be recovered. For the filtration 20 t/day zeolite is used and about 25 t/day feed additive is produced. This plant is operated about 100 days a year during olive oil season. Total sales of these products in a year on the basis of 100 days:

500 tons olive oil x 1500 €/t = 750.000 €
2500 tons feed add. x 2000 €/t = 5 000 000 €

The total investment cost for all mechanical/electrical equipments including installation is about 1.5 M €.

All the operating cost will be about 20 000 € (40 € per ton OMWW) per day.
Target markets/customers are animal feed producers. Total world animal feed production is about 650 M tons (150 M tons USA, 140 M tons EU25, 90 M tons China) and about 30% of these values belong to poultry feed. These kind of zeolite based natural feed additive can be used up to 2 kg per ton feed.

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ENERGY,PROTECTING MAN AND ENVIRONMENT

Technology Offer

A Novel Flue Gas Treatment System

(09 TR 98OF 3EOY)

Abstract

A Turkish entrepreneur has developed a new technology for the treatment of flue gases generated by fuel combustion.This novel technology enables the simultaneous treatment of NOx,SOx,CO,VOC and PM (particulate matter) in a single unit which can be used as an alternative to the conventional flue gas treatment systems. As a result of the treatment process an organic fertilizer is produced.The company is looking for partners for licence agreement,technical cooperation and commercial agreement.

Description

Combustion of hydrocarbon fuels such as coal and fuel-oil generates a flue gas containing a range of pollutants (NOx, SOx, CO, VOC etc.) besides CO2 which is well-known with its green house effect. There are sets of legislations in almost every country which regulate the emissions of power plant as well as manufacturing industries and central heating systems. In order to comply with the regulations and reduce air pollution risk, these facilities use air pollution control systems including scrubbing, bag filters and Electrostatic Precipitators (ESP). Although these conventional treatment systems are seen as established and proven technologies, operational costs are considerably high making them economic burdens to the associated company.

In the proposed technology air pollutants like NOx, SOx, CO, VOC and PM (particulate matter) is treated via a single unit. In this system as a result of physicochemical conversions (including adsorbtion), pollutant compounds are converted into end products which can be used as soil amendment and fertilizer.

In a pilot study following results were obtained:

• SO2 (Sulphur dioxide) is decreased from 431 mg/Nm³ to 89 mg/Nm³ (79.4% adsorption rate)

• NO2 (Nitrogen dioxide) is decreased from 61 mg/Nm³ to 18 mg/Nm³ (70.5% adsorption rate)

• Fly ash is decreased from 51 mg/Nm³ to 0 mg/Nm³ (100% adsorption rate)

• CO (Carbon monoxide) is decreased from 488 mg/Nm³ from 344 mg/Nm³ (29.5% adsorption rate).

As it was stated by the inventor of the system, the proposed technology is very suitable for large scale energy producer companies and central heating systems.

Innovations and advantages of the offer

Advantages of the technology over traditional air pollution control systems:

•It eliminates the need for different units for the removal of different pollutants. So, in the proposed system all above discussed pollutants (NOx, SOx, CO, VOC and PM) are treated in a single unit.

• At the end of the treatment process, pollutants are converted into value-added product in the form of agricultural fertilizer, which can be purchased.

• Since the end product of the system is used as fertilizer, disposal cost of residues (after conventional treatment) is eliminated,

Current and Potential Domain of Application

The proposed technology is a novel air pollution control system which offers several advantages over conventional treatment systems. It is suitable for power plants, manufacturing industries and central heating systems all of which require sophisticated flue gas treatment system.

The system was evolved as a result of research and development activities. It needs to be further developed/optimized in order to commercialize. So, currently there is no full-scale application.

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BIOLOGICAL SCIENCES,PROTECTING MAN AND ENVIRONMENT

Technology Offer

Intelligent Microorganisms For Recycling Plastics

(09 TR 98OB 3FG2)

Abstract

A Turkish R&D company that works on environmental biotechnology projects has invented innovative degradation system for waste plastics. With the help of this patented system, plastics are very efficiently disintegrated by using micro-organisms for large scales and industries. This company is ready to do licenses and commercial agreements.

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Description

Plastics accumulate in the environment at a rate of 25 million tons per year, and they damage not only the environment but also the animals. Traditional plastic degradation methods are expensive and do not recycle plastics efficiently. This Turkish company offers an innovative system that prevents using UV and heat treatment in recycling. Instead of current systems, the most effective biodegradation method is used by microorganisms. Also, it decreases the recycling cost and plastic degradation time.
This company is ready to license and do commercial agreements.

Innovations and advantages of the offer

In traditional plastic degradation methods, chemical and mechanical processes are used as recycling and some of the plastics can be reused in different forms. Recycling rates for plastic bags are extremely low. Only 1 to 3% of plastic bags are recycled. In addition, recycling plastic bags are not cost effective.

However, this patented system offers degradation of plastics around 90 percent to their monomers and these monomers can be reused in polymerization process to produce plastics. It decreases cost of recycling. Also the isolated monomers can be reused for further polymerizations.

ENERGY,PROTECTING MAN AND ENVIRONMENT

technology Request

Reducing NOx Emissions

(09 US 87GA 3FFB)

Abstract

A large US company is looking for technologies that can reduce nitrogen oxide (NOx) emissions for home heating furnaces. Proposals that adapt currently available NOx reduction technologies used in other industries are very desirable. A complete solution (technology, materials and design) is preferred but partial solutions will be considered. They are interested in licensing, product acquisition, joint development to adapt existing technology and supplier agreement.

Description

Government regulations will require gas home heating furnaces to reduce NOx emissions from 40ng/Joule to =14ng/Joule by 2014. NOx reductions can be achieved by modifying the combustion sub-system or by removing NOx from the exhaust. Cost-effective modifications to the combustion sub-system could involve changes to the burner and/or to supporting components such as blowers, igniters, flame/temperature sensors or fuel flow controls. Technology to remove NOx from the exhaust must be adaptable to the existing vertical and horizontal exhaust systems.

This is an applied engineering problem for a short-term need. Approaches for which compelling prior art exists will be given a strong preference. Solutions adapted from currently available technologies used in the heating, automotive, aerospace or energy production industries are strongly encouraged.

Possible approaches might include, but are not limited to:
- Novel combustion sub-system architectures.
- Lean pre-mix burners.
- Nozzle-mounted burners.
- In-shot burners.
- Oscillating combustion.
- Catalytic or other NOx reduction technology for exhaust systems.

R&D projects based solely on theoretical considerations will not be reviewed positively.

Technical Specifications / Specific technical requirements of the request

The successful technology must:
• Accommodate the use of natural gas and propane.
• Maintain efficient fuel combustion with:
- NOx emissions < 14 ng/Joule.
- Carbon Monoxide (CO) emissions <250 ppm (0.025%) on an air free basis and a maximum of 400 ppm at combustion levels.
• Demonstrate negative pressure in the primary heat exchanger.
• Withstand thermal cycling between 60 and 1100 ºF (15 and 600 °C) over the service life of the unit (> 20 years).
• Demonstrate a low-cost simple design that is easy to fabricate and assemble in a high-volume production setting.
• Be compatible with the current high-efficiency combustion systems.
• Be compatible with heating units between 45000 and 120000 BTU.
• Exhibit noise levels = current combustion systems.

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ENERGY,PROTECTING MAN AND ENVIRONMENT

technology Request

Efficient Vehicular Climate Control

(09 US 87GA 3FI4)

Abstract

A large US company is looking for novel climate control technologies that reduce power consumption from a car's heating and cooling systems. The company wants to link the cooling or heating strategy to the number of passengers in the car. They are interested in licensing, product acquisition, contract research, proof of concept to leading to scale up to high volume manufacturing, joint development and supplier agreement.

Description

Whether there is a single person or multiple people in a car, today's heating and cooling systems consume the same amount of energy. Even if the A/C vents are redirected, the compressor and fan still operate at a set speed. However if the system consumes only enough energy to make the driver feel comfortable, then less energy would be wasted controlling the temperature in the empty part of the passenger compartment. The result should be a reduction in fuel consumption and exhaust emissions during cabin cooling or heating (if an electric vehicle).

Possible approaches might include, but are not limited to:
- Novel, efficient air flow technologies.
- On-demand radiant heating.
- Cabin sensors to identify occupants.
- Energy efficient climate control systems.
- Solar load reduction devices.

Approaches not of interest:
Analytical studies without hardware.

Technical Specifications / Specific technical requirements of the request

The successful technology will:
- Enable the driver to feel comfortable without expending energy to heat or cool an unoccupied seating area.
- Consume less energy than controlling the temperature in the entire cabin
- Automatically adjust itself to additional passengers as they board or leave
- Reduce HVAC power consumption for a single driver by 30 ~ 50 % from current configurations

The company seeks novel technologies that create a microenvironment for the driver.

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ENERGY

technology Request

Ozone Detector

(09 US 87GA 3FIA)

Abstract

A large US company is looking to develop an ozone sensor or sensor-system that will monitor the effectiveness of catalytic ozone reduction across an automotive finned heat exchanger (e.g. a radiator or air conditioning condenser). The heat exchanger extended surfaces are coated with a direct ozone reduction (DOR) catalyst. They are interested in licensing, product acquisition, proof of concept leading to scale up to high volume manufacturing, joint development and supplier agreement.

Description

Advances in ground-level ozone reduction technology, exemplified by direct ozone reduction catalysts coated on automotive heat exchanger extended surfaces, require regular monitoring of the catalyst's activity to ensure any emission credits granted to the vehicle for utilizing this technology are consistent with regulations. Since activity of a catalyst can decrease with time, any emission credits originally granted on the initial catalyst performance may be called into question.

As allowable mobile source emission levels continue to decrease, the type of DOR monitoring systems change from those performing a simple functional check (system presence only), to something requiring a method of actually monitoring the performance of the DOR catalyst itself.

The problem is – how to design such a monitoring system to perform this task? The company seeks new direct ozone reduction performance monitoring technologies.

Possible approaches might include, but are not limited to:
- Electrical resistance.
- Differential adsorption.
- Differential reflectivity of catalyst surface.
- Direct ozone sensing devices.
- Differential ozone sensing devices.
- Sensing unique ozone odor.
- Other novel approaches.

Technical Specifications / Specific technical requirements of the request

The successful technology will:
- Cost less than $100/unit.
- Communicate with an on-board computer.
- Package in a compact housing (6"x6"x1").
- Operate over temperature range of -10oF to 250oF.
- Sense ozone levels between 10-300 ppb with an accuracy of 10 ppb.
- Measure the conversion of ozone over the DOR catalyst.

The technology should be tamper proof.

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PROTECTING MAN AND ENVIRONMENT

Technology Offer

Inorganic Composite Sorbent for the Removal and Immobilisation of Heavy Metals and/or Phosphates

(BICBA010)

Abstract

A West-Slovakian company has developed a method for producing a sorbent for the removal and immobilisation of the cations of heavy metals and/or phosphates in contaminated solids and/or liquids. The sorbent is according to this invention a composite granular material consisting of a carrier of schistose nature or related to the wastes from coal preparation. This company seeks partners from the chemical and agricultural sectors.

Description

The invention made by a West-Slovakian company is dealing with a method for producing a sorbent for the removal and immobilisation of the cations of the heavy metals and/or phosphates in contaminated solids and/or liquids. The sorbent is according to this invention a composite granular material consisting of a carrier of schistose nature or related to the wastes from coal preparation, an active component - semi-calcined dolomite with a high content of MgO.CaCO3, and a cement-type binder, preferably with Portland cement. Grading of used sorbent is determined by its assumed application for purification of contaminated solids or liquids. The sorbent is used as a filter body (matrix) material for purification of contaminated liquids in dynamic conditions, as an additive to contaminated liquids in settling tanks in static conditions, or - in a pulverised form - as an additive for the removal and immobilisation of heavy metals and/or phosphates in contaminated solids.
The term sorbent is used herein this invention for any representative of the class of materials characterised by their ability to immobilise the cations of heavy metals and/or phosphates by absorption, adsorption or chemisorption, or by any other mechanism. The sorbent is able to change pH in the system, to act as a buffer at the solid-contaminated liquid interface and to precipitate the cations of heavy metals in the bulk liquid. This is accompanied by formation of hydroxyls, hydrated oxides or hydroxides of individual heavy metals, resulting in a physico-chemical fixation of part of the precipitated metal cations on a rough surface of the porous sorbent. The most important raw materials for producing the body-forming component (carrier) of the sorbent include various natural schistose raw materials such as sericitic chlorite schists or black shales (e.g. those of upper Triassic age of Reingraaben type or from Mariathaal deposit), or tails from coal washing and/or dressing which are available at waste disposal sites, or combinations of these raw materials. Alternatively, also other natural materials such as tuffs, sandstone, clays, kaolins, diatomite or their combinations can be used for the latter purpose. When the sorbent is applied to remove and immobilise the cations of heavy metals and/or phosphates from a contaminated liquid phase, the sorbent is used as a filter body (matrix) with a contaminated liquid phase passing through it. Certain amounts of this sorbent with defined grain size can be also added to a contaminated liquid phase into the settling tanks before the filtration. When the composite sorbent is applied to immobilise the cations of heavy metals and/or phosphates in a contaminated solid phase (i.e. soils), certain amount of a pulverised sorbent is mixed with a contaminated solid before its disposal to limit possible washing-out of hazardous species specified above at a waste disposal site. Also the sorbent can be used for rehabilitation of soil in situ.

Innovations and advantages of the offer

Various sorbents functioning on the principle of cation exchange (ion exchangers) such as natural zeolites or alumino-silicates with a very low sorption capacity are known and commonly used in practice. These materials are mostly selective either to individual ions or to particular classes of ions, and their sorption capacity can be exhausted very quickly after reaching the equilibrium. Many natural materials functioning on principles of ion exchange, physical adsorption or chemisorption can be used only in a powder-like form. Finely milled, powdered organic materials, powdered coal, bentonite, various clays, natural zeolites, coal ashes or slugs are typical representatives of the latter class of sorbents. However, these materials cannot be directly used as the filter body (matrix), have a very low sorption capacity, and flocculation and separation of these fine materials from contaminated water by filtration after their active service life may cause serious problems in an actual technological process. Also a very efficient method for fixation of

the cations of heavy metals, directly using lime or Portland cement is known. However, the application of this direct method is limited by some technical problems (e.g. using lime or Portland cement as the filter body (matrix) material and, from a chemical point of view, very high pH values reached in the system can lead to repeated dissolution of precipitated salts). Disadvantages of all known methods discussed in previous paragraphs can be in a great extent eliminated using this new, innovative solution.

Advantages:
1) High efficiency (99%)
2) Long-term immobilisation of heavy metals
3) Universally applicable
4) Simple production
5) Usage of various natural raw materials
6) Possible usage of waste from coal preparation
7) Low price

Current and Potential Domain of Application

Remediation: wastewater treatment, mine drainage treatment, sludge disposal, sediments disposal, rehabilitation of contaminated soil.

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