Catalogue of Innovation Offers by Young Scientists of the National Academy of Sciences of Belarus

January 2026

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Contents

Composite materials based on iron as a highly efficient replacement for electrical steel

Technology offers
IDENTIFIER: TO

Summary

Center for Materials Research, represented by researchers Artem Larin and Grigory Rimsky (headed by Dr. Gennady Govor) offer consumers technology and equipment for obtaining soft magnetic composite materials containing metal powders with improved properties under commercial agreement with technical assistance and is looking for partners to enter into a joint venture agreement and a research cooperation agreement.

Description

The Centre for Materials Research developed a new method and equipment for the synthesis of metallic powder, which is then used to produce soft magnetic materials with new properties. Produced materials can be used as a replacement for electromagnetic steel.

In comparison to electromagnetic steel the soft magnetic materials have no eddy current losses at high frequencies due to electrical insulation of individual iron particles in the ferrite layer. The advantages for low frequency (50 Hz) applications are high linearity of magnetic characteristic and thermal stability. The manufacturing of parts using powder metallurgy means non-waste production and lower cost of finished products.

Typical applications of soft magnetic materials incl. electric motors, transformers, broadband electromagnetic screens, etc.

Specification of powder synthesis equipment:
* Particle size: 40-150 micrometers
* Average thickness of ferrite layer: 1-3 nanometers, compared to ca. 1 micrometer competitor
* Working temperature: 150-200 C, compared to ca. 1000 C competitor
* Productivity of single plant: 50 kg/h (scalable).

Parameters of offered soft magnetic materials based on iron powder:
* Magnetic saturation induction: up to 2.1 T, compared to 1.7 T competitor
* Working frequency: 100 Hz - 1 MHz, compared to 50-100Hz competitor
* Low electromagnetic losses.

Density of components manufactured by moulding powder under 0.5-0.6 GPa pressure is 7.3-7.5 g/cm3.

Examples of iron-based composite products can be found here (in Russian).

Contacts

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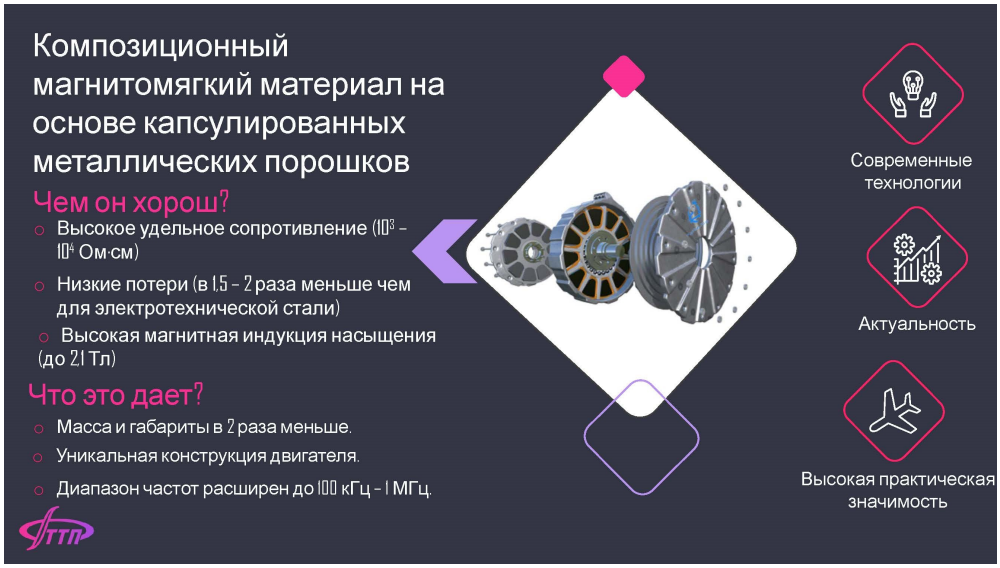
Attachments

Composite materials based on iron.jpg



Artem Larin&Grigory Rimsky.jpg

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"ThermoHedgehog" device for increasing the efficiency of using heat generated by autonomous heating devices of the "potbelly stove" type

Technology offers
IDENTIFIER: TO

Summary

A.V. Luikov Institute of Heat and Mass Transfer, represented by engineer Olga Ermakova, proposes a calculation method, design and production technology for the "TermoHedgehog" device to increase the efficiency of using heat generated by autonomous heating devices of the "potbelly stove" type based on commercial agreement with technical support, looking for partners for a joint venture agreement and on a research cooperation agreement .

Description

The device "ThermoHedgehog" allows you to increase the efficiency of the use of thermal energy in furnaces "potbelly stoves". The heat that used to fly into the chimney thanks to "ThermoHedgehog" will remain in the room and help increase the fire safety of the chimney and reduce the amount of products burned to achieve the required room temperature. Thanks to the original design solution, the product is easily mounted on the chimney.

The presentation of the device can be found here (in Russian).

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ThermoHedgehog.jpg

Olga Ermakova.jpg

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Technology for extracting lithium ions from aqueous media

Technology offers
IDENTIFIER: TO

Summary

The Institute of General and Inorganic Chemistry of the National Academy of Sciences of Belarus, represented by junior researcher Daria Pechenka (headed by Andrei Ivanets, Doctor of Chemistry, Corresponding Member of the NAS of Belarus), is developing a technology for extracting lithium ions from aqueous media and is looking for partners to conclude an agreement on research or technical cooperation.

Description

Now, lithium is widely used in various fields of industry. At the same time, lithium reserves on Earth are limited. These problems cause the relevance of the development of new materials and technologies for the extraction of lithium ions. The Institute of General and Inorganical Chemistry develops a technology for the production of sorbents based on lithium-manganese oxides for the extraction of lithium ions from aqueous solution, as well as the processing of lithium-ion batteries. These oxides are selective adsorbents of lithium ions. At present, adsorption is one of the most promising industrial methods.

The presentation of the technology can be found here (in Russian).

Contacts

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Technology for extracting lithium ions from aqueous media.jpg

Daria Pechenka.jpg

Diplom_D_Pechenka.jpg

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High Efficiency Cloning of European Spruce

Technology offers
IDENTIFIER: TO

Summary

The Institute of Forest, represented by researcher Marina Kusenkova (headed by Dr. Vladimir Padutov), is developing a highly efficient technology for the vegetative propagation of European spruce through the use of the somatic embryogenesis method and is looking for partners to conclude a research cooperation agreement.

Description

At the moment, laboratory methods have been developed for obtaining a specific type of callus tissue, inducing the development of embryoids in it, and regenerating full-fledged plants capable of growing in soil conditions. The practical significance of the results of the project lies in the possibility of their application in the production of planting material for decorative and selectively selected forms of conifers, as well as for genetic engineering manipulations as a regeneration system from a small number of cells.

The presentation of the technology can be found here (in Russian).

Contacts

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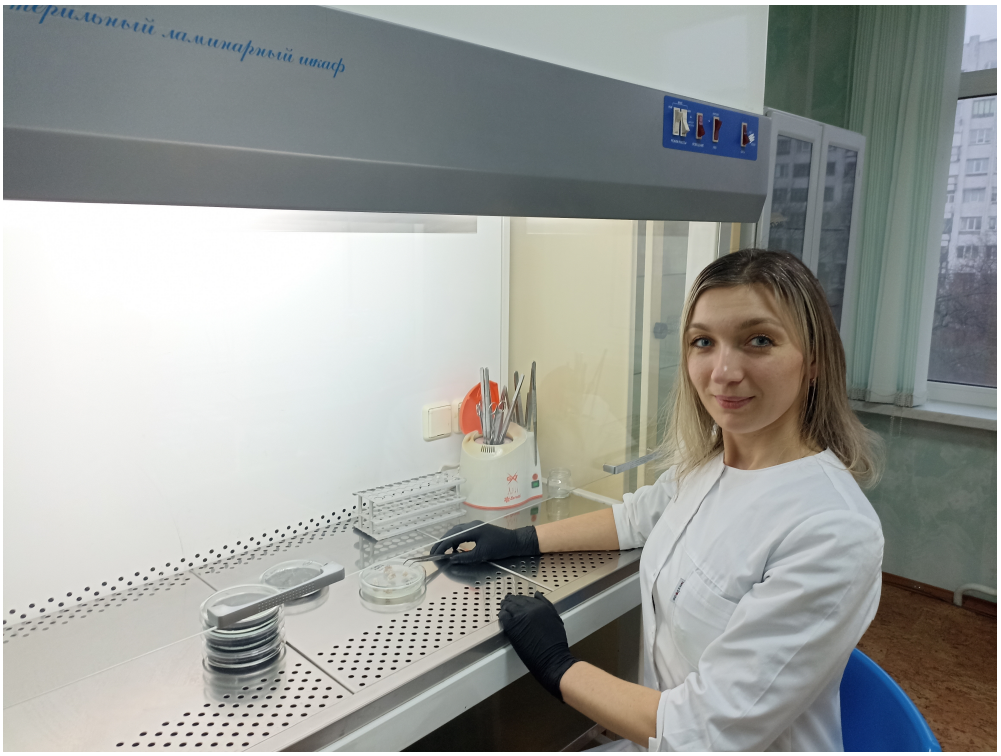
High Efficiency Cloning of European Spruce.jpg

Marina Kusenkova.jpg



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Growth regulator and immunomodulator of plants

Technology offers
IDENTIFIER: TO

Summary

The Institute of Experimental Botany and the Institute of Chemistry of New Materials represented by researcher Igor Ovchinikov, graduate student Ninel Elovskaya and junior researcher Victoria Nikolaichuk (headed by Academician Nikolai Laman) are developing a growth regulator and immunomodulator of plants are looking for partners to conclude a research cooperation agreement.

Description

The project is aimed at optimizing the process of obtaining new environmentally friendly compounds based on natural biologically active substances and scientific substantiation of their use in agriculture. As a result of the research, the synthesis technique has been improved and the quantitative patterns of the formation of chitosan conjugates with hydroxycinnamic acids have been established.

The presentation of the technology can be found here (in Russian).

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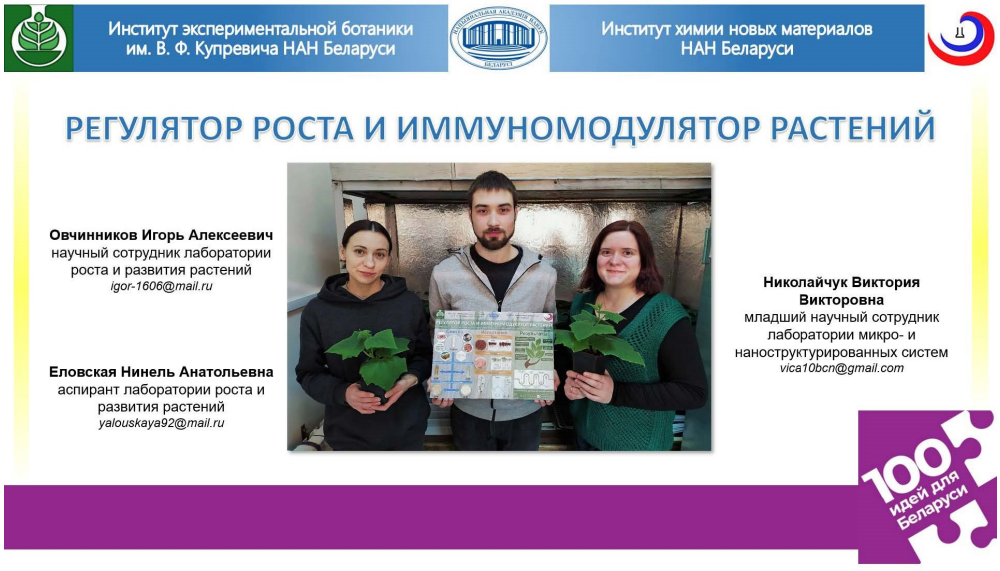
Attachments

Growth regulator_1.jpg



Growth regulator_2.jpg

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Technology for the production of dry mixtures and emulsions for the manufacture of natural 3D meat products (HoReCa 3D-food printing)

Technology offers
IDENTIFIER: TO

Summary

Institute of Meat and Dairy Industry represented by the Head of the Sector for Comprehensive Research of Meat Products Ph.D. Irina Kaltovich (headed by Ph.D. in Economics Oleksiy Meleshchenya) offers, under a commercial agreement with technical assistance, technology and mixtures for the production of 3D meat products that are distinguished by individualized nutritional and biological value, balanced and natural composition, original design, shape, taste.

Description

The 3D food printing market is dynamic and growing rapidly. The average annual growth rate of this market is about 16%.

RUE "Institute of Meat and Dairy Industry" provides scientific support for the development of the meat and dairy industries in the Republic of Belarus. Based on comprehensive multidisciplinary research on the use of additive technologies in the food industry, the institute developed technologies for the production of natural 3D meat products (semi-finished products and culinary products), as well as meat mixtures and meat emulsions based on high-quality raw materials of animal origin (beef, pork, chicken meat - broilers) for 3D printing.

Competitive advantages of 3D meat products:
* individualized nutritional and biological value, balanced ratios of amino acids, fatty acids, minerals, vitamins;
* natural composition, no food additives (preservatives, dyes, stabilizers, flavor and aroma enhancers, etc.);
* original technological parameters (design, shape, taste, etc.).

Competitive advantages of 3D meat mixes:
* the possibility of modeling the nutrient composition, taking into account the individual physiological needs of the body of a particular person;
* easily transportable and have a long shelf life (6 months at t=18±2 ºC, φ no more than 85%);
* convenient to use in expeditions, hikes, space flights, etc.

The technology for the production of 3D meat products, mixtures, emulsions and equipment for their production will increase the competitiveness of the food industry and will have a positive effect on strengthening the health of the nation.

The presentation of the technology can be found here (in Russian).

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Advantages of 3D meat products.jpg

Ph.D. Irina Kaltovich.jpg

Diplom_Ph.D. Irina Kaltovich.jpg

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